ALASKA RETIREMENT MANAGEMENT BOARD

MARCH
17-18, 2022

BOARD OF TRUSTEES MEETING

Alaska Retirement Management Board

Board of Trustees Meeting

Thursday, March 17, 2022

Call-In (Audio Only): 1-907-202-7104 **Code:** 504 463 704#

I. 9:00 AM Call to Order

II. Roll Call

III. Public Meeting Notice

IV. Approval of Agenda

V. Public/Member Participation, Communications, and Appearances
(Three Minute Limit)

VI. Approval of Minutes – December 2-3, 2021

VII. Election of Secretary

VIII. 9:15 AM Staff Reports

A. Retirement & Benefits Division Report
Ajay Desai, Director, Division of Retirement & Benefits
Kevin Worley, Chief Financial Officer, Division of Retirement & Benefits

B. Treasury Division Report
Pamela Leary, Director, Division of Treasury

C. Liaison Report
Alysia Jones, ARMB Liaison

D. CIO Report
Zachary Hanna, Chief Investment Officer

E. Fund Financial Presentation
Ryan Kauzlarich, Assistant Comptroller, Division of Treasury
Kevin Worley, Chief Financial Officer, Division of Retirement & Benefits

IX. 9:45 AM Trustee & Legal Reports

A. Chair Report, *Bob Williams*

B. Committee Reports

1. Audit Committee, *TBD*
2. DC Plan Committee, *Bob Williams, Chair*
3. Actuarial Committee, *Allen Hippler, Chair*
4. Operations Committee, *TBD*
5. Alaska Retiree Health Plan Advisory Board, *Lorne Bretz, ARMB Member*

C. Legal Report, *Ben Hofmeister, Assistant Attorney General, Dept of Law*

BREAK @ 10:20 am (10 MINUTES)

X. 10:30 AM Presentations

10:30 – 11:00 **A. Draft June 30, 2021 Actuarial Reports**
David Kershner & Scott Young, Buck

11:00 – 11:15 **B. Draft Actuary Certification**
Paul Wood & Bill Detweiler, Gabriel Roeder Smith

11:15 – 11:30 **C. Audit of State's Actuary**
Paul Wood & Bill Detweiler, Gabriel Roeder Smith

11:30 – 12:15 **D. Experience Study**
David Kershner & Scott Young, Buck

LUNCH @ 12:15 pm (75 MINUTES)

1:30– 2:30 **E. Performance Measurement - 4th Quarter**
Paul Erlendson & Steve Center, Callan LLC

2:30 – 3:00 **F. Risk Management**
Shane Carson, State Investment Officer

BREAK @ 3:00 pm (10 MINUTES)

3:10 – 4:10 **G. Fixed Income and Cash Management**
Victor Djajalie, State Investment Officer
Emily Howard, State Investment Officer

RECESS for the DAY @ 4:10 pm

Board of Trustees Meeting

Friday, March 18, 2022

Call-In (Audio Only): 1-907-202-7104 **Code:** 698 300 231#

9:00 – 10:30 **H. Current Geopolitics and the ARMB portfolio**
ARMB Investment Managers & Advisors

BREAK @ 10:30 am (10 MINUTES)

10:40 – 11:25 **I. Fidelity Signals**
Jordan Alexiev, Portfolio Manager
Kyan Nafissa, Investment Director
Kristin Shofner, Senior Vice President
Melissa Moesman, Account Executive

11:25 – 12:15 **J. PineBridge**
Michael Kelly, Managing Director, Head of Multi-Asset
Sunny Ng, Managing Director

LUNCH @ 12:15 pm (75 MINUTES)

1:30 – 2:15 **K. Peer Assumptions, Risk, and Time Horizon**
Zachary Hanna, Chief Investment Officer

2:15 – 3:45 **L. Capital Market Assumptions**
Jay Kloepfer, Executive Vice President and Director, Capital Market Research
Adam Lozinski, Assistant Vice President, Capital Market Research

BREAK @ 3:45 pm (10 MINUTES)

XI. 3:55 PM Investment Actions
A. General Consultant Contract: Callan LLC 1st Optional Renewal
B. Real Assets Consultant Contract: Callan LLC 1st Optional Renewal
Zachary Hanna, Chief Investment Officer

XII. 4:05 PM Unfinished Business
XIII. New Business
XIV. Other Matters to Properly Come Before the Board
XV. Public/Member Comments
XVI. Investment Advisory Council Comments
XVII. Trustee Comments
XVIII. Future Agenda Items
XIX. Adjournment

NOTE: Times are approximate, every attempt will be made to stay on schedule; however, adjustments may be made.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
MEETING

Videoconference

MINUTES OF
December 2-3, 2021

Thursday, December 2, 2021

CALL TO ORDER

CHAIR ROBERT JOHNSON called the videoconference of the Alaska Retirement Management Board (ARMB) to order at 9:01 a.m.

ROLL CALL

Seven ARMB trustees were present at roll call to form a quorum.

Board Members Present
Robert Johnson, *Chair*
Bob Williams, *Vice-Chair*
Gayle Harbo, *Secretary*
Lorne Bretz
Allen Hippler
Commissioner Lucinda Mahoney (late on 12/2/21)
Dennis Moen
Donald Krohn
Commissioner Paula Vrana

Board Members Absent
Commissioner Lucinda Mahoney (absent 12/3/2021)

Investment Advisory Council Members Present
Dr. William Jennings
Dr. Jerrold Mitchell
Ruth Ryerson

Department of Revenue Staff Present
Zachary Hanna, Chief Investment Officer
Pamela Leary, Director, Treasury Division
Scott Jones, Head of Investment Operations, Performance & Analytics

Michelle Prebula, State Investment Officer
Kevin Elliot, State Investment Officer
Casey Colton, State Investment Officer
Benjamin Garrett, State Investment Officer
Victor Djajalie, State Investment Officer
Shane Carson, State Investment Officer
Mark Moon, State Investment Officer
Sean Howard, State Investment Officer
Steve Sikes, State Investment Officer
Ryan Kauzlarich, Accountant V
Hunter Romberg, Investment Data Analyst
Grant Ficek, Business Analyst
Alysia Jones, Board Liaison

Department of Administration Staff Present
Ajay Desai, Director, Division of Retirement & Benefits
Jim Puckett, Deputy Director, Division of Retirement & Benefits
Kevin Worley, Chief Financial Officer, Division of Retirement & Benefits
Roberto Aceveda, Benefits and Counseling Manager,
Emily Ricci, Health Care Policy Administrator, Division of Retirement & Benefits
Amanda Pillifant, Department of Administration
Mark Rosier, Department of Administration

ARMB Legal Counsel Present
Benjamin Hofmeister, Assistant Attorney General, Department of Law

Consultants, Invited Participants
Steve Center, Callan
Paul Erlendson, Callan
Gary Robertson, Callan
Brady O'Connell, Callan
David Kershner, Buck
Scott Young, Buck
Tonya Manning, Buck
Melissa Beedle, KPMG
Elizabeth Stuart, KPMG
Paul Wood, Gabriel Roeder Smith
Bill Detweiler, Gabriel Roeder Smith
David Lebovitz, J.P. Morgan
Jeff Shields, J.P. Morgan
Deasee Phillips, J.P. Morgan
Dave Schiller, Summit
Peter Chung, Summit
Tony Salewski, Genstar
Carson Ewanich, Genstar

Others Present
Elaine Schroeder, Public
John Hudson, Public
Mike Vieira, Public
Doug Woodby, Public
Bob Schroeder, Public
Jim Simard, Public

PUBLIC MEETING NOTICE

Board Liaison ALYSIA JONES confirmed that public meeting notice requirements had been met.

APPROVAL OF AGENDA

MS. HARBO moved to approve the agenda. MR. WILLIAMS seconded the motion.

PUBLIC/MEMBER PARTICIPATION, COMMUNICATIONS AND APPEARANCES

CHAIR JOHNSON invited MS. SCHROEDER to speak.

MS. SCHROEDER said she was an Alaska State pension beneficiary that lived in Juneau. She reminded the Board that 350Juneau had previously testified before the Board and noted that they were part of a rapidly growing international movement of people who cared about the climate crisis and the financial solidity of the pension funds.

MS. SCHROEDER explained that the international fossil fuel divestment movement had grown to become a major global influence on energy policy, with 1,485 institutions publicly committed to some form of fossil fuel divestment, representing $39.2 trillion of assets under management.

MS. SCHROEDER noted that new divestment commitments from institutions such as Harvard University, PME and CDPQ, La Banque Postale, the City of Baltimore and the Ford and MacArthur Foundations. Other new commitments to divest included the cites of Rio de Janeiro, Glasgow, Paris, Seattle, Auckland, and Copenhagen, led by London and New York City pension funds.

MS. SCHROEDER said that they all want a healthy climate and healthy pension funds, that there were no contradictions between the two goals. She said they were asking the Board to conduct a transparent climate risk assessment and act on the findings.

MR. HUDSON spoke next stating that he was a state pension beneficiary and was a member of 350Juneau Climate Action for Alaska. He said the fossil fuel industry had argued that divestment from coal, oil and gas would cause financial harm to institutional investors, but recently, BlackRock had published a research report on the subject finding that investors had experienced neutral to positive results after divesting from fossil fuels. He said that fossil fuel divestment options had outperformed all other options in the benchmark portfolio and fossil fuel investments had consistently

underperformed the broader market over the past five years.

MR. HUDSON said the BlackRock report warned that fossil fuel reserves may become unusable in a low-carbon scenario where they would either face precipitous devaluation or become stranded. He said that evidence in the downward slide was seen in the market. He noted that in 1980, fossil fuel industries accounted for 28 percent of the stock market's value, where today, the share is less than 3 percent. He said that failure to recognize the industry's decline would be costly, that three major pension funds resisted the demands to divest and paid the price in billions of dollars over the last 10 years. He said the California State Teachers' Retirement Fund would have gained $5.5 billion if they had divested from fossil fuels and the California Public Employee's Retirement Fund would have gained $12 billion if they had divested.

MR. HUDSON said that investment managers had a legal responsibility to make the best financial decisions on behalf of the beneficiaries and with renewable energy growing faster than expected, and the demand for fossil fuels falling faster than expected, he said that it would be wise for the Board to consider divesting from fossil fuels and toward low-carbon energy industries.

MR. VIEIRA said that he was a teacher in the Sitka School District and currently serving as president of the Sitka Education Association and also as a member of the NEA-Alaska Saving Our Alaska Retirement Committee for several years.

MR. VIEIRA said that he was a member of the Tier 3 TRS system and was frustrated with the continued delay of the brokerage window option in the Tier 3 retirement system. He said they had been given only 32 options to invest in to take the risk and manage their entire success in retirement. He noted that the three-legged stool that most rely on is only two for them, with any option of Social Security being removed. He said the association in Sitka had been educating their members. He said they held an event in October where 40 percent of their membership registered to attend. They invited Empower to attend and presented information to help members begin to plan and be successful in retirement.

MR. VIEIRA said they had been promised that the brokerage window would be open by November 28th and promoted it and many people were eager to sign up for the state's 457 plan. He had checked with MR. PUCKETT on the date it was supposed to open, only to be told that it was not going to happen. He said that trust was broken between TRS members and the State Department of Retirement.

MR. VIEIRA said that he had friends around the country that also worked for public entities with Empower as their financial recordkeeper and they had access to brokerage windows. He urged the ARMB to have a sense of urgency to make it happen; MR. HIPPLER asked what percentage of teachers would use the brokerage window once it came online; MR. VIEIRA thought that five to 10 percent would immediately join and as the younger generation of teachers came in, he thought they would as well. He guessed that it would take three years and it would reach 50 percent.

MR. WOODBY said that he was a state pension beneficiary in Juneau and a member of 350Juneau Climate Action for Alaska. He thanked the state's staff members for their response to his public records request in September asking for listing of all holdings in the nondirected funds at the end of

the last fiscal year. He said they had gone above and beyond his request by also sending him a list of investments they classified as fossil fuel related.

MR. WOODBY explained that 350Juneau had, in September, conducted analyses of fossil fuel holdings in pension funds from 11 states with the assistance from Third Rail Economics, a financial analytics firm specializing in the energy sector. He said the data staff sent to him in September showed the proportion of fossil fuel holdings as 3.1 percent of the public equity and fixed income positions. He said that their analysis found over twice that amount at roughly 6.4 percent and the top 10 included producers in utilities such as Florida Power and Light, Berkshire Hathaway Energy, Shell International Finance, and Chevron USA. He said that 100 additional holdings that they identified were in companies on the global coal exit list. He then shared a quote from a Moody's research report released in October. He said "Across the G20, financial firms hold $22 trillion in loans and investments subject to carbon transition risk. Financial firms are under rising regulatory and commercial pressure to support the global sustainability drive. As the race to net zero emissions accelerates, banks, insurers, and asset managers will need to ramp up climate risk assessments and set clear goals for reaching net zero in their finance emissions."

MR. SCHROEDER said that he was a resident of Juneau and an early retiree, and that the state of Alaska fixed benefit and pension had provided him with financial stability for over 20 years. He said he had testified before urging the ARMB to examine its fossil fuel holdings and other investments that prop up the declining fossil fuel extraction industry. He said he had also urged the ARMB to evaluate the climate risk posed to its whole portfolio.

MR. SCHROEDER said his testimony focused on ARMB's use of private equity. He said that the ARMB has allocated 13 to 14 percent of the total funds to private equity. That his concern with private equity was that private equity investments were opaque since disclosure and reporting requirements were much weaker than market traded equities and bonds. He said that made it near to impossible for a pension holder to know exactly how the money was invested. He also noted that private equity holdings were of short duration. He said it often bolsters failing fossil fuel industries. He said according to the New York Times, private equity had invested at least $1.1 trillion in the energy sector with 88 percent of it going into fossil fuel companies

MR. SCHROEDER said that private equities may make money in the short term, but they were not likely to be sound in the long term as transition occurs from a carbon-based economy and society. He urged the ARMB to have staff look closer at private equity investments to see if they matched the transparency requirements, long-term investment strategy, and the emerging climate risk posture of the ARMB.

MR. SCHROEDER thanked the ARMB for providing data on investment holding and asked for similar cooperation in their examination of private equity holdings.

MR. SIMARD said that he too was a member of the 350Juneau Climate Action for Alaska, an Alaska state pension beneficiary, and a concerned grandfather. He said he had recently spoke with the Board about the risks to the retirement fund investments posed by the climate-related litigation against the fossil fuel industry. He noted that the number of climate related suits had steadily increased. He said

among the most promising were those filed by indigenous people with treaty rights to land and water resources that were impacted by climate disruptions.

MR. SIMARD said that in March, the Ontario Superior Court of Justice rejected a motion to dismiss filed by the province of Ontario in a suit filed on behalf of seven plaintiffs who alleged the provincial government violated the Canadian Charter of Rights and Freedom by failing to address climate change. He said one of the most interesting U.S. cases was brought by the State of Vermont against ExxonMobil and Shell and others, not asking for financial damages but to require producers of oil sold in Vermont to label their products as dangerous to the health of the global climate when used as they were intended. He said the suit contended that the oil producers had engaged in decades-long disinformation activities, depriving Vermont consumers of the information needed to make informed choices.

MR. SIMARD asked that the Board divest from risky and threatened oil stocks, and shift investments to renewable energy sources. He suggested that the Board be transparent about its moves, so that Alaskans could educate themselves about the economic risks.

CHAIR JOHNSON thanked the speakers.

APPROVAL OF MINUTES – 9/23-24/2021

MS. HARBO moved to approve the minutes of the September 23-24, 2021, meeting of the ARMB. MR. KROHN seconded the motion.

With no objections, the minutes were approved.

APPROVAL OF MINUTES – 10/11/2021

MS. HARBO moved to approve the minutes of the October 11, 2021, meeting of the ARMB. MR. KROHN seconded the motion.

With no objections, the minutes were approved.

ELECTION OF OFFICERS

CHAIR JOHNSON announced that he was stepping down from the office and would decline any nominations for any of the offices on the ARMB. CHAIR JOHNSON then asked for nominations.

MS. HARBO thanked CHAIR JOHNSON for his service noting that he had been a great chair. MS. HARBO nominated MR. WILLIAMS as Chair, MR. HIPPLER as Vice-Chair and herself as Secretary.

CHAIR JOHNSON said the slate had been proposed and asked if anyone else wished to step up and if there were any other proposals for alternatives to the slate proposed by MS. HARBO; MR. MOEN said that there were no objections.

MR. BRETZ seconded the nominations.

CHAIR JOHNSON accepted the second and asked if the proposed members were all agreeable to serving if elected; MR. WILLIAMS, MR. HIPPLER and MS. HARBO all agreed.

CHAIR JOHNSON asked if there were any objections to considering the nominations as a slate as opposed to position by position; no objection was noted.

A roll call vote was taken, and the proposed slate of MR. WILLIAMS as Chair, MR. HIPPLER as Vice Chair and MS. HARBO as Secretary passed unanimously.

CHAIR JOHNSON said that he would hand off the gavel to MR. WILLIAMS.

STAFF REPORTS

A. Retirement & Benefits Division Report

1. Buck Consulting Invoices

2. Member Statistics

MR. WORLEY turned attention to pages 68-70 of the PDF Board packet which was the Summary of Monthly Billings from Buck. He said the summary was at the request of the Board and the information provided was for the quarter ending September 30 and the next report would be in March for the two periods ending September 30 and December 30.

MR. WORLEY said that pages 71 through 75 of the PDF was the quarterly report as of September 30, 2021, for membership of PERS, TRS, JRS, the National Guard, SBS and Deferred Comp. He noted that prior statistics for June 30, 2021 were included for comparison.

MS. HARBO asked about the 151 partial disbursements for PERS DC members and if it meant they were taking some of the money that was contributed out, and not the full amount; MR. WORLEY said they have some provisions about partials and that they could be hardship requests. He said it would be discussed in detail in the cash flow portion of the presentation.

MR. DESAI noted that the Division of Retirement and Benefits continued to work on hybrid schedules while maintaining member services. He said they currently had 33 staff members working in office with 58 staff members teleworking full-time and 29 staff members on a hybrid teleworking schedule.

B. Treasury Division Report

MS. LEARY noted that the budget was moving through the appropriate channels, they had met with the Office of Management and Budget and believed there were no issues with the budget going into the Governor's budget. She said they were expecting that the Governor's budget would come through by mid-December and would confirm at the March meeting where they were once the budget goes through the Legislature.

MS. LEARY introduced MR. KAUZLARICH, assistant comptroller who would be providing the financial report to the Board.

C. Liaison Report

1. Disclosures Report

MS. JONES noted the first report was located on page 75 of the packet and was the third quarter financial disclosures report. She said for the third quarter there were no disclosures that required additional review or discussion.

2. Communication Report

MS. JONES noted that on the communications report, the only change from what had been provided was an email she had forwarded on 11/29 to the Board from CHAIR JOHNSON and that it would be included in the revised version. She said there were communications sent on behalf of the Board and a summary of public records requests received between September 1st and November 30th.

3. Meeting Calendar

MS. JONES said the 2022 meeting calendar was approved at the June meeting.

MR. BRETZ asked what was the course of action if a Trustee was interested in moving dates around; CHAIR WILLIAMS said he could make a request; MR. BRETZ then requested that the September date be moved out one week; MS. JONES noted that APFC's meeting was the 21st and 22nd and the Board may want to take that into consideration as they try not to overlap due to the commissioners' schedule. MR. BRETZ asked if there was an alternative date a week later or a week earlier; MR. HANNA suggested to take the discussion offline as there was much to discuss. MR. BRETZ agreed.

MS. JONES then displayed page 79 which showed a timeline of contract and review deadlines for FY2022-FY2027. She said that it was a work in progress at the request of former CHAIR JOHNSON. She said it was designed to show what needed to be completed in what fiscal year.

MS. HARBO commented that it was very helpful and thanked MS. JONES.

MR. JOHNSON said it was terrific and suggested it be placed as page 1 of future Board packets as a reminder to everyone.

CHAIR WILLIAMS noted that it lays it out so they know what was coming and why so they could be prepared for it.

D. CIO Report

MR. HANNA noted that the third quarter had been relatively mild followed by a strong performance for October and most of November. He said the market was extremely volatile with several different things driving the markets. He said the new COVID variant, increasing concerns about inflation, the upcoming debt ceiling decision, rising interest rates, and the tapering Federal Reserve were some of the culprits.

MR. HANNA said that Callan would be giving a presentation on inflation, and J.P. Morgan would

be presenting their guide to the markets. He said he was looking forward to both the presentations as they were particularly relevant with the fiscal year and actuarial experience study. He said he asked Callan to close the meeting with a presentation highlighting how institutional investors broadly think about reconciling capital market assumptions and actuarial assumptions, as food for thought for the March meeting where Callan will present on the next version of their capital market assumptions.

MR. HANNA said most of the rest of the agenda would be focused on private equity, that MR. HOWARD who manages the portfolio for the ARMB and MR. ROBERTSON from Callan would present that portion. He said that there would also be two private equity groups who would discuss how they approach growth equity and bio investing to provide more perspective on the asset class.

MR. HANNA said that item 2 of his report was the watch list. He said Man Group was the only manager currently on the watch list due to personnel changes. He said that it was expected to be resolved at some point during calendar year 2022. He noted a revision to the version of the watch list that was in the original ARMB packet. He said that Fidelity Real Estate High Income had just reached its six-year mark and had underperformed when compared to its benchmark. He said the net-of-fee performance had been 3.61 percent annualized, compared to the CMBS benchmark of 4.58 percent, a deficit of 123 basis points. He said they focus on commercial mortgage-backed securities which were debt instruments for commercial real estate. He said office properties in particular had been disproportionately impacted by COVID and most of the underperformance occurred during the March 2020 quarter. He said they were recommending the Board make a motion to put them on the watch list.

MS. HARBO so moved. MR. JOHNSON seconded the motion.

A roll call vote was taken, and the motion passed unanimously.

CHAIR WILLIAMS asked if there was any indication that the personnel changes at the Man Group were going well; MR. HANNA said that it was a thoughtful transfer within their organization. The CIO of the strategy retired and that they thought it was a significant enough of an event to put them on the watch list. He said they were not concerned about that aspect in the long run that they were being thoughtful about it.

MR. HANNA said that item 3 on the agenda included areas where he exercised CIO delegation for contracting. These included a $50 million private equity commitment to Summit XI, a private equity partnership that focuses on growth equity investments in technology, healthcare, life sciences, and growth products and services; a $50 million private equity commitment to Clearlake VII. He said they focus on middle market private equity and special situation investments in technology, industrials, and consumer sectors; and a contract amendment with Brandes that modestly reduced fees.

MR. HANNA said the last section of his report was a summary of the portfolio rebalancing that took place in September and October. He said it focused on risk management, bringing the portfolio back on a quarterly basis to the ARMB's established asset allocation risk profile. He said during that period they sold $148 million in domestic equities, purchased $61 million in international equity and $87

million in fixed income. He said they continued to increase the active weight in international equity with additions to Baillie Gifford and Brandes. He said they also added $100 million to the internally managed multifactor strategy which balanced out some of what they had with Scientific Beta. He said they also conducted four internal rebalance transactions over the period to equalize relative allocations across plans.

MR. HANNA said that McKinley's Healthcare Transformation strategy continued to perform well, that the annualized net performance through inception was 19.7 percent compared to the benchmark of 16.3 percent.

E. Fund Financial Presentation

MR. KAUZLARICH noted that the financial report began on page 82 of the packet, and it was for the period ending October 31st, 2021. He said that as of November 30th, PERS assets were $25 billion, TRS assets were $11.7 billion, JRS assets were $295.4 million, NGNMRS assets were $50 million, nonparticipant-directed assets totaled $34.2 billion and fiscal year-to-date investment income for nonparticipant-directed funds was approximately $1.5 billion. He said fiscal year-to-date net withdrawals were $362.2 million and invested assets under internal management were $17.6 billion.

MR. WORLEY noted that the Division of Retirement and Benefits' supplement report to Treasury's presentation began on page 110. He explained that within Treasury's report there was a column called "Net Contributions/ (Withdrawals)" and that is the net number for DRB's trusts that they administer. He said that they provide the breakdown of the revenues collected as well as the expenditures incurred by each of those trust plans.

TRUSTEE REPORTS & LEGAL REPORTS

A. Chair Report

CHAIR WILLIAMS turned the Chair report over the MR. JOHNSON.

MR. JOHNSON said the decision to not seek further reappointment or nomination was one he took seriously. He said he had thoroughly enjoyed, appreciated and was very proud of his tenure as chair for four years.

MR. JOHNSON said that since the last Board meeting, he had been involved in matters that suggest a tension between what was discussed at committees and what was discussed at the Board. He said that he wanted to remind CHAIR WILLIAMS and the Trustees to be aware of those tensions.

B. Committee Reports

1. Audit Committee

CHAIR HARBO said the Audit Committee heard a presentation from KPMG but would not go into any details as KPMG would be giving the full report themselves. She said MR. WORLEY had given a report on GASB 68/75 PERS and TRS allocation schedules, which were a work in progress and commented that they would most likely discuss them at a special meeting in mid-January.

CHAIR HARBO said that MR. WORLEY introduced MS. TRACI WALTHER, who was the new Accountant V and also the compliance officer for the Division of Retirement and Benefits.

CHAIR HARBO said that MS. HELMICK reported on audits to be completed by the Division, noting that they had audited 165 PERS employers and 58 TRS employers. She said they perform several audits each year but for FY2022 they have only one on-site audit of three employers in Fairbanks, and all other planned audits would be desk audits due to travel restrictions.

CHAIR HARBO said that MR. WORLEY spoke about the yearly financial report which was renamed the Annual Comprehensive Financial Report. She noted that there was a requirement under GASB Statement 98 that after December 15, 2021, all financial reports would have the new title.

CHAIR HARBO said they had a presentation from Maximus, a consulting firm that deals with federal funds allocated to the State of Alaska. She said the program required DRB and Treasury to indicate how federal funds were allocated to state programs.

2. DC Plan Committee

CHAIR WILLIAMS said MR. WORLEY discussed member services fees and the differences in the fees. He said the SBS, PERS DC and TRS DC all had a fee of 11 basis points where Deferred Comp had a fee of 17 basis points, which was 55.4 percent higher. He said a question was asked as to how the fees could be changed and what the impacts would be if they were changed.

CHAIR WILLIAMS said MR. PUCKETT presented a chronology of the brokerage window delays saying that there was a breakdown in the process and communication and issues with regulations. He said there was a desire to implement the portions as soon as they could be implemented, but it would be a recurring item on the agenda on the DC Committee until all employees have access.

CHAIR WILLIAMS said there was a report about educational outreach and Empower gave their update. He noted concerns about fee transparency on the website and making them more obvious so the price on what an option costs or what the fees were would be easy to see. He said that would be a recurring agenda item until that was updated.

CHAIR WILLIAMS said MS. RICCI presented on the DC Health Plan update. She had said that a lot of members were not aware that they had to retire directly into it and be employed the 12 months preceding going into it.

CHAIR WILLIAMS said MR. HANNA and MS. PREBULA had been negotiating with T. Rowe Price on ways to improve the target date funds fees and costs. He said most of the DC members were automatically put into a target date fund or were choosing a target date fund and that a large group of people were affected by it. He said T. Rowe Price gave a strong presentation about two options; one would be improving the quality with a slight reduction to fees and the other would be reducing the fees significantly. The staff was recommending Option 1.

CHAIR WILLIAMS made a motion on behalf of the Defined Contribution Committee who recommends the Alaska Retirement Management Board direct staff to amend the contract with T.

Rowe Price to implement Option No. 1, the TRP BBT plus Active structure.

MR. HANNA explained Option 2 as providing the same suite of options at the lowest cost possible and using a set of T. Rowe commingled funds rather than the separate accounts currently set up for participants. He said T. Rowe had added a lot of value historically through the use of selective active management for some of the asset classes and in terms of progression through the glide path for participants, there were some asset classes not currently offered in the existing target date offerings that have particular utility at various points in the glide path.

MR. HANNA said the recommendation of Option 1 would include a couple of additional asset classes that they thought would be useful and T. Rowe thought were useful for the target date funds, along with selective use of active management. He said the existing options had a small amount of active management and had been able to overcome the fee load and add 7 or 8 basis points of additional value beyond those fees. He said the expectation was that with some additional tools, they would be able to increase that amount of potential outperformance moving forward.

MS. HARBO said she had remembered that about 10 years ago, people in the DC program had been enrolling in more than one of the target date funds and wondered if, through education with Empower, if that had become less of a problem; CHAIR WILLIAMS said it was something they could find out and that he had remembered the same thing. He said that he looked at the target date funds as something that was immoveable. He commended MR. HANNA and MS. PREBULA on the negotiation.

A roll call vote was taken, and the motion passed unanimously.

MR. BRETZ asked what the new anticipated date would be for the brokerage window; CHAIR WILLIAMS said there was a legal statutory issue.

MR. HOFMEISTER said overarching all of this was the diminishment clause in the Alaska constitution. He noted that the Alaska Supreme Court takes the diminishment clause in a liberal manner. He said that every lawyer in the Department of Law had looked at it and had concerns because the defined contribution plan replaces retirement income like Social Security. He said if a person decided to use self-directed brokerage account and loses all their money, there were no regulations in place that shows that they waived their ability to make those decisions and there would be diminishment claims in the future and that was what the Department of Law was concerned about, the liability with this option.

MR. HOFMEISTER explained that he was asked by the trustees to look back at SB 141, which was the creation of the Defined Contribution Plan. He noted a conversation between Senator Bunde and Senator Stedman where Senator Bunde asked what would happen if they provided the options through the ARMB and they lose all their money; Senator Stedman said it would be fine because they were going to set up the system where they would have limited options.

MR. HOFMEISTER said with a self-directed brokerage account, the options would be infinite. He said the Empower documents he had seen had a requirement that the people who wanted to get into a

self-directed brokerage account had to check a box that essentially says they have expertise in investment. He found that alarming.

3. Actuarial Committee

MR. HIPPLER noted that the Actuarial Committee meeting focused on the 2021 valuation results. He said an overview of the results indicated gains on asset returns due to outperformance of the market and liability gains on the pension and healthcare side. He said the pension side was due to PRPA and COLA increase variances from the projection, and on the healthcare side, the per capita claims costs were lower than expected. He said that the asset gains and the liability gains contributed to the funding ratios of the plans improving.

MR. HIPPLER said the liability gain involved a discussion of prescription incurred claims cost per member per month and that they were going to look for a more thorough explanation of the prescription claims, costs, and information as to why they spike and decline during certain times.

MR. HIPPLER said the second topic discussed at the meeting was the economic assumptions for the experience study the committee would be engaging in next year. He said the economic assumptions comprise expected nominal returns for various asset classes and projected inflation rates which would result in a real return for assets. He noted that the inflation rate was also important as they calculate the liabilities because it impacted the expected costs on the plans.

4. Operations Committee

MR. JOHNSON said MR. JONES presented an update on preparations of a SWIFT report, which reviews compliance and vulnerabilities on cybersecurity issues. He said the Department of Revenue and Treasury were embarking on a transfer of date to the Azure cloud.

MR. JOHNSON said MS. LEARY spoke of the budget which was in process and that they were searching for a comptroller. He said she also presented the recommendation from the committee to the Board to adopt some amendments to the policy and procedures manual which started on page 118 of the packet. He said the amendments were initiated by a proposal from MR. BRETZ to have a requirement for an annual review of travel costs and such. He said the specific amendment was on page 142 of the packet. He said other amendments dealt with more editorial issues.

MR. JOHNSON advanced what was approved by the committee as a recommendation to the Board to adopt the amendments to the policy and procedures manual as presented in pages 118 through 230 of the Board packet.

MR. JOHNSON advanced the motion on behalf of the committee.

CHAIR WILLIAMS noted that as a motion from the committee, it did not need a second.

A roll call vote was taken, and <u>the motion passed unanimously.</u>

5. Alaska Retiree Health Plan Advisory Board

MR. BRETZ noted that the retirees were seeing the additional preventive care and preauthorization

of prescriptions with a target date of 2022. He said there were a lot of things that had to happen first, and had been happening, such as membership education and documents regarding the changes, training internally and externally for the members. He said telemedicine continued to be higher than prior to 2020. He said it was currently lower than 2020, but members were continuing to utilize that more than in the past.

MR. BRETZ encouraged the use of voluntary long-term care plan, that it was a good value. He said there were currently 12,000 annual claims with expenses totaling $20 million annually. He said the valuation on it showed that the plan was well funded. He said there had been no change in premiums since its inception in 1987.

MR. BRETZ talked about modernization of the healthcare plan and said the Division was looking at a list of items that included requests by advisors and membership. He said the Medicare Advantage plan continued to be a priority and the holdup had been the development of the network and that they hoped to have more progress on that in the new year.

MS. HARBO asked for clarification as to the long-term plan – that people had to sign up for that at retirement; MR. BRETZ said that was correct.

C. Legal Report

MR. HOFMEISTER noted that there had not been much development in terms of the law in the last few months. He said the RPEA case involving the 2014, 2016, and 2018 amendments and changes to the health plan booklet, was ongoing in the Superior Court in Anchorage, that deadlines had been moved forward in terms of dispositive motions and discovery. He said that the intention was for a trial in late January or early February.

MR. HOFMEISTER commented on the Miller v. Division of Retirement and Benefits case which dealt with the jurisdiction of the Office of Administrative Hearings which makes final decisions that are adverse to the person seeking the decision. He said per the regulations of the Division, only adverse decisions are referred to the OAH. He said Miller had received massage therapy that was paid for under the plan, but there was a realization by a third-party administrator that the billing codes were improper. A dispute ensued over billing codes which went through several layers of appeal with the third-party administrator and then the Division finally got it and decided to pay the claims but provide the appellant a letter telling her that in the future the appropriate billing codes needed to be used if future therapy sessions were going to be paid for under the plan. Miller wanted to appeal to the OAH per part of the statute, but since the Division's position was not an adverse decision, there was no need to send it to the OAH. He said due to procedural errors that occurred the case ended up in the Superior Court who agreed with the Division and affirmed the Division's decision. The case then went before the Supreme Court on November 9th and there should be a decision in 2022.

MR. HOFMEISTER then discussed Graham v. State which involved a PERS member. He said a firefighter won a jury verdict in the Superior Court for breach of contract with his employer. He claimed he should have been promoted sooner and the evidence included the increase in his PERS benefits if he would have been promoted. The jury awarded him $100,000 in past lost wages and $450,000 in future lost wages and benefits. The member asked the Division to have the entire

$550,000 be considered compensation as part of one of his three years and award that to his PERS account. DRB only used the past lost wages of $100,000.

MR. HOFMEISTER said the decision was upheld by the OAH then went to the Superior Court which affirmed the OAH decision. The member appealed to the Supreme court who affirmed the Superior Court's decision.

MR. HOFMEISTER then discussed Best v Fairbanks North Star Borough. He said the issue was related to subrogation. He said there was a question as to whether the plan at the Fairbanks North Star Borough, which is a self-funded plan, was actually an insurance policy under Alaska law. He said the analysis the Supreme Court went through was whether or not a self-funded plan like that of Fairbanks North Star Borough was similar to an insurance policy. The Supreme Court found that the Fairbanks North Star Borough plan was not an insurance policy for two reasons: one, because it was self-funded and two, because it was bargained for.

CHAIR WILLIAMS recessed the meeting from 10:47 a.m. until 10:54 a.m.

PRESENTATIONS

A. KPMG Audit Report

MS. BEEDLE said slide 3 and 4 showed the summary of the required communications. She said they had not yet been able to complete the audit of the National Guard System related to the census information. She noted that there was nothing pending related to PERS, TRS, JRS, DCP, SBS or the ARMB invested assets reports and had issued unmodified audit opinions for those reports. She said that National Guard would receive a qualified opinion similar to last year related to the deferred vested population, the census data, of not being able to be supported.

MS. BEEDLE noted that during their audits they did not identify any significant unusual transactions. She said for financial presentation and disclosure omissions, there were not matters to report. For non-GAAP policies, there were no matters that resulted in a material error in the financial statements. She said they did not find any actual or suspected illegal acts or acts of fraud resulting from the audit, there were no noncompliance or significant difficulties.

MS. BEEDLE noted one uncorrected audit misstatement related to the invested assets report which was the lag of the timing of the valuations that came in. She said that between the time Treasury had closed their books, there was approximately $79 million of private equity valuations as of June 30 that were reported that did not make it into the financial statements. She said that it was consistent with past years due to the new procedures put in place by Treasury to record as much as they could.

MS. BEEDLE said there was a corrected audit misstatement during the review of the total pension liability for the National Guard System. She said they worked with management and the actuaries and found that the discount rate initially used of 7 percent for the accounting valuation was not properly supported with the asset mix that the National Guard had and that resulted in lowering the discount rate to 5.75 percent which impacted the net contributed assets that National Guard had by $2.5 million.

MS. BEEDLE said that due to the error, they also looked to internal control deficiencies and the processes that management had in place to identify errors prior to the audit. She said they identified that there was not an adequate process in place to review the discount rate assumption for the National Guard System which resulted in a material weakness due to the size of the error. She noted that management was working with Buck and them to develop a process, so it does not happen in the future.

MS. BEEDLE said for significant accounting policies and practices, they were located in footnote 2 to the financial statements. She said there had been no changes to them over the last year and they are reviewed on an annual basis, and they found no indication that they were inappropriate during the audit.

MS. BEEDLE noted for the significant accounting estimates that they identify the total pension liability which resulted in the net pension liability or assets and the total OPEB liabilities as a significant accounting estimate due to the management judgment that was involved in determining the assumptions used to calculate the liabilities.

MS. BEEDLE noted they reviewed the assumptions, the underlying assumptions, the calculations, and the census data used to calculate them. She noted that they did find for PERS, TRS, and JRS that all of the assumptions were properly supported and reasonable.

MR. JOHNSON asked if they had run into any situations that fall outside the concept of material for the overall review that would be a concern going forward; MS. BEEDLE said they had not. She added that the data analysis they do pulls out outliers and sometimes they do a deeper dive and may expand their sampling.

B. Summary of Preliminary 2021 Valuation Results

MR. KERSHNER noted that their presentation started on page 251 of the Board packet and was the same presentation reviewed in detail at the Actuarial Committee meeting the day before. He said the June 30, 2021 valuation was used as a measurement of the plan's funded status, which compared the invested assets versus the actuarial liabilities. He said they also used the information for the most recent year to evaluate what happened during the year compared to what they expected to happen. Those results would be used to set the contribution rates for FY2024.

MR. KERSHNER said that slide 6 were the highlights of the valuation results for PERS and TRS. He noted that FY2021 was good to the plans from an asset and a liability perspective. He said the market returns were about 30 percent but did not anticipate such returns every year.

MR. KERSHNER said that because they try to minimize contribution volatility, they did not use market value of assets when they set contribution rates, instead they used a smoothed value (actuarial value) that recognized the market gains and losses over a five-year period.

MR. KERSHNER said that on the liability side they had gains for both pension and healthcare. He said pension had the largest source of gain from PRPA liabilities for those benefits. He said the change in the CPI used to generate PRPA benefits was negative, the PRPA benefits that went into

effect July 1, 2021, were zero, where they would have expected those to generate additional benefits based on the inflation assumption of 2.5 percent. That gave rise to the gains.

MR. KERSHNER noted losses on the salary side which was the first year in several that they had a larger than expected salary increases and those generated some partially offsetting losses. He said the pension gains were 1 percent of the liability and 0.6 percent to TRS.

MR. YOUNG said that for the healthcare side, there were gains primarily due to the per capita cost assumption. He explained that the starting point for what the expected cost was during the current year that was used to project future costs. To calculate that they look at the most recent two years of prior experience, weight those equally and project them to the valuation year to come up with the starting point for future costs. He said this year they found the medical portion of benefits were coming in more favorably than projected in the prior valuation. He said claims were lower than expected due to COVID-19 and people avoiding care. He noted that even after including a 4 percent additional load to the claims they use to calculate the average cost, they were still seeing a 4 to 5 percent gain.

MR. YOUNG said the prescription drug claims were close to what was expected and within 1 percent of the projections. He noted the EGWP subsidy estimate was higher than expected with an increase of almost 16 percent from 2021 to 2022.

MR. YOUNG said there was going to be some preventative care benefits added for pre-Medicare members, that will increase costs slightly, but more than offsetting that was the prescription drugs/specialty medication prior authorization program put in place. He said the expectation from Optum was that would reduce costs in 2022 and in future years and would produce a liability gain.

MR. KERSHNER said that with the assets higher than expected and the liabilities lower than expected, that contributed to funded ratios that were higher than anticipated and higher than in the previous year, had resulted in contribution rates that would be less this year compared to last year.

MR. JOHNSON asked if they were to combine the funded ratios of the healthcare and the pension plan, what were the funded ratios for the reporting period of June30, 2021 for PERS and TRS; MR. KERSHNER said the PERS funded ratio at a year ago was 79.3 percent and had increased to 85.5 percent. He said for TRS, a year ago the combined funded ratio was 86.9 percent, and at 6/30/21 it was 92.5 percent. He noted those funded ratios reflected the smoothed value of assets, not the market value of assets.

C. Audit of State's Actuary

MR. WOOD explained that every four or five years there is an opportunity to load up all the benefits for every single participant in the Alaska plans and conduct a replication valuation, rather than just taking a small sample. He said they had looked at all the plans at June 30, 2020 to get the full valuation. He said the first thing they looked at was the evaluation of the data that was available for the performance of the valuation, the broad data provided to Buck and the steps Buck goes through to get the final data used in the valuation. He said they also looked at the recommended economic and non-economic assumptions used in the valuation. He said when they look at assumptions, they put

themselves in the spot Buck was at when the assumptions were adopted. He said in 2019 when the 2017 experience study was done, they moved from an 8 percent return to a 7.38 percent return and lowered the inflation to 3.12 percent. He said the things they considered were if it was done during a regularly scheduled experience study and was due diligence put into determining the rates. He said another thing they considered was using the assumptions, methodologies, and funding method used by the Primary Actuary in their performance of the valuation of the plans.

MR. WOOD said they also evaluate the valuation results and reconcile any discrepancies between findings, assumptions, methodology, rates, and adjustments of the Primary Actuary. He said they then assess the conclusions of the valuation report for completeness and accuracy, they discuss the peer review audit valuation results with the primary actuary, review the format of the valuation report and offer recommendations and provide a report of the work performed along with any opinions and recommendations for improvement, and present findings to the ARMB.

MR. WOOD explained that it is different from the review they perform every year because the annual review is a test life review, and the replication audit is a more in-depth study. He said they coded up all the benefits and replicated the present value of future benefits, the actuarial accrued liability, and the actuarial determined employer contribution. He said they also looked at the actuarially determined employer contribution.

MR. DETWEILER said they first looked at the valuation. He said as actuaries they do not have to audit the data that is provided, but they are required to review it to make sure it was appropriate, sufficient, consistent, and reasonable for its intended purpose. He said when they performed the annual test lives, they matched up all individual data fields that Buck used compared to the data that was provided from DRB. He said they made sure the averages and the totals of all different data fields were reasonable and consistent and then reviewed the data questions again. He said that was something Buck provided to them and they were seeing some inconsistencies from year to year, some salaries that were drastically changing, changes in service amounts. They made sure Buck was asking the appropriate data questions and doing their due diligence for that process.

MR. DETWEILER said they were very comfortable with everything they saw in all of the accounts and the data questions that Buck had asked. He said they also had to make sure their report had disclosed it all properly and that they say they were scrubbing the data, checking for consistency, reasonableness, and disclosing everything.

MR. DETWEILER moved to slide 7 and noted that as MR. WOOD had stated earlier, all the assumptions they reviewed for the June 30, 2020, valuations were based on the prior experience studies. He said they ensured the experiences studies were performed on a reasonable schedule, every four years. He said the healthcare assumptions were reviewed on an annual basis regarding the net gains and losses on the healthcare side and it was because healthcare was more volatile.

MR. DETWEILER said the inflation rate was 2.5 percent which had been adopted a couple of years ago and was reasonable at that time. He said Buck was recommending 2 percent which could be considered at the bottom range. He noted that the investment return of 7.38 percent was reasonable at the time of the experience study a few years ago and was getting towards the higher end of what

they considered to be reasonable presently.

MR. DETWEILER said individual salary increases were typically tied to recent experience - what was expected to happen in the next few years. The total payroll growth of 2.75 percent was high compared to the experience they had seen, and Buck was recommending that it be lowered for the next experience study. He noted that the model Buck was using for healthcare cost trends was appropriate, that it was what a lot of large state plans used. He said one thing they had brought up previously was the EGWP assumption, that Buck was assuming that the subsidy would continue forever and stay flat. He said they believed that it could decline in the future and subsidies would not be as high as expected. He noted it as a risk associated with the assumption.

MR. WOOD said the risk happens if their payroll doesn't grow at 2.75 percent, and you end up with a percentage of pay that's increasing over time, putting pressure on the calculated rate that the state would have to make. He said Buck's recommendation of moving that down to 2.25 was going to change the pattern of future contributions, but that it helps offset some of that risk that is inherent in a level percent of pay funding situation.

MR. DETWEILER moved on to slide 9 to touch on the demographic assumptions, which showed what the chances are each year that participants would retire, terminate from employment, and death and disability. He said they were comfortable with the assumptions adopted a few years ago and they had not changed. He said the most important demographic assumptions was mortality which was based on the RP-2014 tables published by the Society of Actuaries. He said the Society of Actuaries had since finalized public-sector-specific mortality tables, which broke out several more categories -- teacher-specific tables, general-employee-specific tables, and public-safety-specific tables. He said they expected Buck to look at the tables compared to experience going forward to ensure they are appropriate for the ARMB.

MR. DETWEILER said slide 10 was the ARMB Replication Audit results for PERS DB and said the first numbers showed the present value of benefits, which was the complete liability, projected salaries, and service for active members – the total expected benefits to be paid broken out between pension and medical. He said below that was the actuarial accrued liability since the June 30, 2020 valuation date for each member. He said normal cost represented what was expected to be accrued in the next year. He said they subtracted AVA, which were the smoothed assets, to get the unfunded liability and funded ratio. He said the bottom showed the actuarially determined employer contribution which was the FY2023 rate recently adopted. He said Buck's numbers were on the left of the chart and GRS' numbers were on the right. He said the numbers represented how much money was needed in the plan to make sure it was properly funded. He said they were really happy to see the results as close as they were.

MR. DETWEILER explained that actuaries use different systems with slightly different programming which resulted in the numbers not matching up exactly. He said 5 percent or closer is considered a reasonable and comfortable match.

CHAIR WILLIAMS said the numbers were not matching up exactly and asked if it was because they were applying slightly different assumptions or what was causing the differences; MR. WOOD said

there could be minor differences in programming the benefits, or an ancillary benefit that they may have programmed differently, or there could be a different interpretation of the best way to value it. He noted that there could also be some slight differences in the timing of the assumptions.

MR. DETWEILER added differences in the timing of a small rounding in the calculation can change a number as much as a full percent.

MR. WOOD said the TRS DB had a very good match, that overall, the present value of benefits was less than 2 percent and the ultimate contribution rates was within 6 basis points.

MR. JOHNSON said that the previous slide showed PERS with a normal cost at 5.89 percent and TRS was only 1.99 percent. He then asked if that was one where there was more subjectivity in the assessment – were more factors involved that would suggest that kind of range; MR. WOOD said the normal cost could be very contentious. He said when they have decrement timing and they calculate the present value of future salaries, in the very last year, Buck assumes that everyone decrements or leaves the population at the very beginning of the year, but still allows for a full year of salary in that year, which creates a difference between the normal cost that GRS calculates, where they assume that the person did not leave until the middle of the year and only a portion of salary was included, as opposed to leaving immediately and a full year of salary being included.

MR. DETWEILER said the present value of benefits on the medical side, going from PERS to TRS DB had shrunk quite a bit. He said they could tell a very specific group that was causing the 2.83 percent – it was Tier 3 members with between five and 10 years of service and that was one of the test lives they were going to request from Buck to compare to make sure they were comfortable with how Buck was valuing them as compared to GRS.

MR. WOOD stated that for JRS their present value of benefits number was a bit lower than Buck's, but in the ballpark, and indicated that they were getting the right amount of contributions coming into the plan. He said NGNMRS was extremely well funded.

MR. DETWEILER said in summary, the results they would consider to be within a reasonable range. The match on the present value of benefits was within 1 percent, a very close match they considered as being highly successful. He said they believed Buck was taking the assumptions the Board had adopted and the benefits that were expected to be paid based on the statutes and creating liabilities that were appropriate to fund the plans appropriately.

MR. DETWEILER said they were in a unique situation where they were also the review actuary, and they get the present value of benefits per individual and were able to match up the individual present value of benefits person by person to what Buck got. He likened it to having all the participants in a giant football stadium and as they review each year, they select random people from different sections, but it's difficult with that many people to pinpoint where the differences might be. He said that's when they go to Buck and request individual test lives, so they can see why some of the numbers were not at the 100 percent threshold.

MR. DETWEILER said slide 18 showed the evaluation of results of individual present value of

benefits of every person Buck valued. He said the inactives and annuitants were easier to value because they knew exactly what they were being paid or expected to get pad going forward. He said with actives, they were further off.

MR. DETWEILER said they had performed both a test life audit in the past and a full replication audit. He said they believed their results were within a reasonable range of Buck and it was their opinion that the liabilities that Buck were calculating, based on the assumptions adopted and the statutes, that they were providing the Board with an accurate and reasonable contributions that need to go into the plan to ensure it was properly funded.

MR. DETWEILER said they had requested additional test lives form Buck and would be looking at those to try to pinpoint any issues to see if there was something in their report that they were not understanding about how they were valuing people or if it was just a slight difference in opinion about how they should be valued.

MR. JOHNSON asked about the range of reasonableness and if they were at a point where the ranges were so broad that they were not particularly useful; MR. WOOD said the ranges may be broad, but put in an exercise such as this, they know exactly what the assumptions were going to be. He said in terms of apples-to-apples comparison, there was no range, they did exactly what Buck did and were able to replicate it and align the replication. He said Buck's ranges came into play more in the assumption-setting process.

CHAIR WILLIAMS recessed the meeting from 11:50 a.m. until 1:22 p.m.

D. Performance Measurement, 3rd Quarter

MR. ERLENDSON started his presentation on slide 2. He said the upper left showed the real growth in GDP. He said two years ago the range would have been from plus 5 to minus 5 instead of from plus 40 to minus 40. He said they changed it because of the second quarter of 2020 when the real GDP collapsed by 30 percent within two months. He said the third quarter GDP increased 35 percent and is part of what was currently driving inflation.

MR. ERLENDSON noted the upper right panel showed the commodity-based portion of the PPI (producer price index). He said the PPI represented the cost of goods that go into the things people buy and the things people buy was reflected in the CPI (consumer price index) and wages. He said many sellers of goods and services had been restrained from raising their prices and passing through their costs. He said if people try to get in front of higher prices, they would drive prices up.

MR. ERLENDSON moved to slide 5. He noted that the stock market is not the economy but was a part of the economy that people could own. He said there were a lot of things in the private markets that normal people cannot buy, but institutions could. He said the economy seized up in March and April of 2020 when 22 million jobs were lost due to COVID. He said job growth needed to take place because absent the stimulus, people needed to go back to work and much of the recovery of the stock market was because more people had more money than they had before.

MR. ERLENDSON said slide 6 showed the employment landscape and noted that leisure and

hospitality lost the most jobs. He said that recently, people had been retiring and leaving the workforce entirely, that there were 10.4 million job openings at the end of September, 6.5 million people hired for new jobs, but 6.2 million people left, so only a net gain of 300,000 jobs. He said for the year ended September, there were 73 million people who were hired with 68 million who left.

MR. ERLENDSON said that during that time there was a lot of stimulus, both economic and medical support for people, that were no longer available. He said that as the supply of goods and services go up, that would moderate any potential future inflation.

MR. JOHNSON asked if the figures were reflective of different people moving in and moving out of the workforce or could it be five times more action going on than what was being reflected; MR. ERLENDSON said the separations of 6.2 million over the last year included people who had been laid off, decided to quit, take a new job somewhere else as well as people who decided they were done. He said 4.4 million of the 6.2 were people that permanently left the workforce. He said the participation rate of people from the age of 18 into the 60's as a workforce had been trending lower for years. He said some are either going to college or getting new training so they would be considered temporarily out of the workforce, but a number of people that were older had decided to leave permanently.

MR. ERLENDSON moved to slide 8 which showed what the Federal Reserve looked at when they decided to raise rates and when they thought inflation was a problem. He said the chart showed the personal consumption expenditures index that was the measure of inflation that was used by the Federal Reserve. He said there were different types of inflation, that medical inflation was different than housing, food or fuel and there were dozens of measures of inflation. He said part of the reason the Federal Reserve continued to say that they did not see a permanent increase in inflation was because their target, the dotted line on the chart, was at 2 percent. He said that over the last 13 or 14 years, it had rarely touched that level. He said the big spike on the right of the chart was due to supply chain disruptions, and fewer people in the workforce, which meant it was more expensive to buy goods and services. He noted the CPI-U was up 6.2 percent and a large part of that was driven by the composition of the index which was shown on slide 10.

MR. ERLENDSON said the categories shown on slide 10 were used within the measures of inflation calculated ty CPI-U. He noted that Food, Housing and Transportation were up. He said the driver for transportation was used and new cars. He said if a person was not buying a car their inflation rate was not 6.2 percent. He said they need to be mindful of what the metrics were actually measuring and why the Federal Reserve denies inflation is permanent. He said at some point, people will stop buying cars and prices would come down or the supply would increase, and the price will come down.

MR. ERLENDSON said the Federal Reserve thought it would take longer for prices to come down which was why they had been supporting the economy by buying $80 billion in Treasury securities every month for the last year or so, and then another $40 billion a month in mortgage-backed securities. He said that was almost 8 percent of the GDP. He said they were going to start pulling back by $10 billion a month fewer in treasuries, and $5 billion in mortgages. He said one way to beat inflation was to drive up interest rates, that higher interest rates could squeeze inflation down as it would reduce economic activity.

MR. ERLENDSON noted that on slide 11 the categories listed on the left were the ones that drove 70 percent of what was happening in the benchmark, and the standout in the middle was private transportation – cars and gasoline, so as that moderates, inflation should go down.

MR. ERLENDSON then skipped to slide 16 – Callan Periodic Table of Investment Returns, which showed what was going on in the capital markets over various time periods. He said as of December 1st, REITs were up over 15.5 percent and large cap equities in the S&P 500 were up 21.7 Small cap stocks up 12.4 at the end of September and were still positive at about 9.5 percent. He said there were two things that were getting problematic, emerging markets, down over 3 percent year-to-date, part of which was inflationary forces in the markets which were more pronounced because greater portions of their economies were based on expenditures for food, housing and energy and part of it was due to inflation.

MR. ERLENDSON said the index took into account what had happened to returns in that market when it was a U.S. investor out to sell in the local currency. He said the majority of the decline was because of the strengthening dollar. He said other economies were looking at it so there could be a lot of potential inflation-dampening effects of rising rates and as rates start to rise, it would make the U.S. Treasury market less appealing. He said that part of the reason there had been such a great market in the U.S. was because there was a lot of foreign capital that was looking for higher returns and they win in the currency trade because the dollar increases in value, which meant when they sold their dollar assets, they would get more of their own currency units.

CHAIR WILLIAMS said he loved the Callan periodic table and asked if they had one for institutional investors that goes from July 1 to June 30th; MR. CENTER said they could create one.

MR. HIPPLER asked where China was listed on the periodic table; MR. ERLENDSON said it would be in emerging markets.

MR. ERLENDSON noted that China was the third largest economy and that a lot of the emerging markets were dependent on manufacturing raw materials, that commodities had been driven by China as a buyer of commodities as well as finished goods. He said that China was outsourcing to Indonesia and Vietnam, and they had been buying materials back and putting them into their own products to ship elsewhere.

CHAIR WILLIAMS asked it if was accurate that a lot of U.S. domestic companies still had a lot of exposure to China; MR. CENTER said that was true. He said when strategies were marketed as ex-China, what it meant was they did not participate in the Chinese stock market. He noted that it was nearly impossible to fully guard from any exposure to the Chinese market but avoiding direct investment in China was what strategies were targeting. He said it was popular 30 years ago to avoid Japan because the Japanese market was going to crash.

MR. ERLENDSON said it was almost 50 percent of the non-U.S. index and people were saying that they needed to be in Japan but instead of a cap-weighted index, they did a GDP-weighted index.

MR. CENTER said that while they had seen non-U.S., ex-China products come to market, they were not proposing or suggesting them to their client base, they did not believe it made sense as an institutional investor to exclude China from the opportunity set in the non-U.S. equities.

MR. ERLENDSON moved on to slide 26 which showed a chart that showed rolling 10-year returns for a broad universe of public pension funds. He said the gray area was measuring the rolling historical 10-year returns for public pension funds from the 10th percentile to the 90th, capturing the variability. He said the 10-year average return for public pension funds was around 10 percent. He noted that a lot of changes had been made with the program in terms of getting rid of strategies that were not adding value after fees, simplifying the structure, and putting more in the hands of the entities and strategies that would add value and reduce fees.

MR. ERLENDSON said their concerns going forward as a firm were that they believed that inflation was not sustainable where it was, but there were pockets of activity driving the measures and that interest rates would likely go up. He said that the fund had done well, and they did not see anything that was a matter of concern.

MR. CENTER said slides 28, 29 and 30 were performance dashboards that they had inserted as snapshots of the performance for the pension plans. He said the top left chart on slide 28 for PERS, TRS and JRS showed the performance was above median and ahead of the targe over all time periods for the pension plans and the top right chart showed the standard deviation, which was below median. He said the maximum drawdown at the bottom left-hand corner compared favorably versus other pension plans, meaning the largest loss over these periods was a lower percentage than what the typical peer pension plan experienced. He said the Sharpe ratio, a measure of risk-adjusted performance, was quite strong and in the top quartile across all time periods.

MR. CENTER said slide 29 was similar for the healthcare plans and slide 30 was for the military plan that had a unique asset allocation with historically higher allocation to fixed income, a lower allocation to alternatives which resulted in less risk.

MR. CENTER said slide 31 showed the new asset allocation targets as approved the beginning of the quarter, stating that asset allocation was in line with targets, slightly overweight to fixed income and slightly underweight to real assets.

MR. CENTER said slide 32 showed the real assets portfolio which was 12 percent of the portfolio as of the end of the quarter and was high relative to other public pension plans. He said the allocation to fixed income was below median but still higher that it had been previously. He noted that the key driver was the allocation to real assets and "other alternatives" which was mostly private equity.

MR. CENTER said slide 35 showed the maximum drawdown period, noting they looked at three-, five- and 10-year periods and all had the same maximum drawdown of 11.9 percent. He moved on to slide 37 saying that it showed the drivers of relative performance over the last quarter and last trailing 12 months. He said the table at the top was for the last quarter and the key drivers of performance were the cumulative performance of the managers that added 82 basis points of performance relative to the target benchmark. He noted other drivers were the private equity portfolio and the fixed income

portfolio. He said they had received additional return figures for the real assets portfolio, and it was higher than what they had included in the preliminary figures and expected the numbers to improve. He said given the team kept asset allocation close to targets, it was not much of a driver of the performance.

MR. ERLENDSON said that they used passive strategies, so the active managers run the rest of the money that contributed to the outperformance. He said they had gone through a big consolidation a while ago and kept the ones they had the confidence in, and the strong performance suggested that was a good plan.

CHAIR WILLIAMS asked if he was suggesting they move the return expectation to 70 percent; MR. ERLENDSON said no; CHAIR WILLIAMS said that it seemed odd to hear that they were still waiting for some things to come in from September 30, that it was like a late reaction; MR. CENTER said they report the private equity numbers on a lag and they do not get revised. He said they also report real assets portfolio on a lag. He said alternative investments take a while to report their performance. He said that as allocation to alternatives grows, the timeliness of the data that was used to create the reports was difficult to gather on a timely basis, so they had elected to report them on a lag.

MR. CENTER said slide 38 showed the PERS long-term total fund performance from inception to September 30, 2021, noting that the plan outperformed the target benchmark for the quarter and overall looked very good since inception.

MR. ERLENDSON commented that the charts show performance compared to peers. He said that over the 30 years, they were down in the third quartile but ahead of the benchmark which suggested that during that time, they were positioned more conservatively than most other funds.

MR. CENTER said that overall, the domestic equity portfolio was a blend of passive strategies and factor driven strategies and that over the past 12 months it did add value. He said slide 42 showed that they were ahead of Russell 3000 benchmark by 25 basis points, that it did lag its indices over longer time periods. He said much was driven by recent performance from factor-driven strategies. He said the bright spot in the public equity portfolio had been small cap shown on slide 47 – up 57 percent, with a 9 percent excess return relative to the index. He said it was a passively invested strategy invested in the S&P 600 index which outperformed Russell 2000 index over the last 12 months and over the long term ahead of its benchmark.

MR. CENTER said global equities on slide 49 were both developed markets and emerging markets and ahead of its benchmark over all time period, about 1.3 percent ahead of the index over the last 12 months, 30 basis points ahead over the last quarter.

MR. CENTER said slide 50 was the cumulative performance of the developed market portfolio which was 40 percent active, 40 percent passive and 20 percent factor-based, adding 3 percent over the last 12 months and outperformed its index for all time periods.

MR. CENTER said emerging markets on slide 52 was a blend of passive and factor-based strategies

and outperformed its index and added 60 basis points relative to the MSCI Emerging Markets index.

MR. CENTER said slide 53 showed two emerging markets portfolios. The factor-based Scientific Beta portfolio that outperformed the MSCI Emerging Markets portfolio by 3 percent.

MR. CENTER said fixed income was on slide 54 noting that it was ahead of its benchmark over all time periods. He said the fixed income aggregate portfolio on slide 55 was down 90 basis points – right in line with the Bloomberg Aggregate index and 70 percent of the fixed income portfolio. He said the remaining 30 percent was divided between opportunistic, fixed income and alternative fixed income, which was private debt.

MR. CENTER said the opportunistic portfolio shown on slide 56 included alternative equity which was the McKinley Healthcare Transformation Fund, the tactical allocation strategies were about 60 percent of the portfolio which was made up of PineBridge and Fidelity which were up 20 percent over the last 12 months. He said the alternative beta program was 20 percent of the opportunistic portfolio and managed by Man Group which was designed to be a liquid substitute for hedge funds, and it was up 4 percent for the last 12 months.

MR. CENTER said slide 59 showed cash flow for the PERS DC Plan which was positive for the quarter. He said the TRS DC Plan on slide 60 showed 65 percent allocated to the asset allocation fund and ended the quarter with $80 million in assets and cash flow positive. He said the Deferred Comp Plan on page 63 was cash flow negative and had $1.2 billion in assets as of the end of the quarter with 23 percent of the plan invested in the asset allocation funds and the remainder split between the passive and active options.

MR. JOHNSON asked if the brokerage plan was in place, how would it affect the analysis; MR. CENTER said the charts would have another piece of the pie that would be allocated to self-directed brokerage. He said they don't track the performance of the self-directed brokerage window because the participants invest in eligible mutual funds or ETF and there would be no way for that to be tracked. He said they would track the percentage and dollar value allocated to them. He said that because there were so many options for the participants to invest in, there was no way for them to track the return.

CHAIR WILLIAMS said that there could be some sort of analysis; MR. CENTER said that may be something available from Empower because Callan does not track the individual purchases and sales, it would be something the individual participants would do.

MR. CENTER said that slide 66 and 67 looked at asset allocation options. He said the Target 2010 Trust was designed for participants that were retiring in 2021 and should be a fairly low-risk portfolio. He said it did have a negative return for the quarter and its benchmark was also down 0.2. He said asset allocation funds had all done well and that the more recent vintages as shown on slide 67, had done very well.

MR. CENTER said slide 68 showed passive strategies overall and said the passive funds were all matched with their benchmarks. He said active options on 69 also had no areas of concern. He said

the international equity fund, which was a blend of Brandes, and Baillie Gifford had a slight underperformance of the quarter, but very strong performance over the last three-year periods.

E. Private Equity Annual Plan

MR. HOWARD said slide 2 was a reminder of the primary role of the annual private equity review, which was to report on the status of the ARMB's private equity investments. He said slide 4 showed an overview of private equity investment and why fund sponsors invest in private equity. He said private equity as a whole has had a strong performance relative to public markets in recent years and over longer time periods.

MR. HOWARD said private equity had several unique characteristics. He said they were a larger and more diverse investment, but generally less efficient as companies but provided opportunities for value creation. He said most private equity groups aim to partner with their portfolio companies to create value by making operational and financial improvements and then sell the companies at increased valuations. He said that the main negative characteristics of private equity were illiquidity, fees were high relative to other asset classes, and market data was incomplete.

MR. HOWARD said slide 6 had information on the private equity structure. He said ARMB invested in private equity funds through two advisors, Abbott and Pathway. The investments were made through limited partnerships. He said the bottom diagram showed how private equity funds drawdown structure worked. He said at year zero, the ARMB makes a commitment of capital to a fund, the commitment is then drawn down when the general partner makes underlying portfolio company investments. He said the investment period was typically the first four to six years of the fund's life, the capital is returned as investments are sold. He said slide 7 gave a broad overview of the types of strategies included in private equity.

MR. HOWARD said slide 8 showed private equity, compared to other asset classes, had shown a wide performance dispersion response. He noted upper quartile funds had significantly outperformed lower quartile funds, that the dispersion made manager selection a critical component of implementation of the plan. He said diversification was also an important component. He said the goal was to build a well-diversified portfolio with high-quality partnerships.

MR. HOWARD said the next three market slides showed trends over time to get a sense of growth and health of the private markets. He said slide 9 reflected the amount of money committed to private equity funds by year. He said this year fundraising was on pace to return to the upper trajectory they had seen over the past decade, and they expected to see that trend continue as plans increased the allocations to private equity.

MR. HOWARD said slide 10 showed the number of investments and the amount of money invested in portfolio companies. He said the second half of the year had a strong recovery in deal activity. He moved to slide 11, noting the exit activity showing a staggering amount of capital had been returned to investors.

MR. HIPPLER asked if the past performance of mangers have a correlation to future performance;

MR. HOWARD said there was much more so in private equity; MR. HIPPLER then asked when they allocate a certain percentage of assets to private equity, how much additional off-balance-sheet commitments did they have; MR. HOWARD said the current unfunded commitment was about $1.6 billion. He said not all of that would be called, but what the model was trying to predict was when it was going to be called and predicting when they would receive the cash flows back.

CHAIR WILLIAMS asked was the estimated exit value like projecting out into the future – was it slow to capture; MR. HOWARD said those were the announced but not closed exits.

MR. HOWARD said slide 12 was the ARMB portfolio performance. He said overall the portfolio had performed well in the second quartile with a 13.6 percent IRR, compared to 12.2 for the Cambridge private equity median. He said the private equity policy had an expectation that the private equity portfolio would outperform the public equity blend by 2 percent net of fees. He said the ARMB's 10-year time-weighted return was 18 percent, compared to 11.1 percent for the benchmark blend, an outperformance of 6.9 percent. He noted that the chart showed within the last year, distributions surpassed contributions, which was reflective of the maturity of the program.

MR. HOWARD said slide 13 showed the public market equivalent returns (PMEs). He said a second way of measuring relative performance against public markets was by comparing against the public market equivalent returns. He said it was the best way to measure inception relative to performance. He said over the 10-year period, ARMB's portfolio had a 17.5 percent IRR compared to the PME IRR of 11.3 percent. He said since inception, the portfolio had outperformed the PME by over 5 percent, equivalent to $3.7 billion of additional fund value.

MR. HOWARD said slide 14 showed the ARMB's private equity cash flows. He said the strong exit activity has ARMB's portfolio on pace to return over $1 billion to the retirement systems. He said overall the portfolio had been a significant cash generator over the past five years providing net cash inflows of $429 million.

MR. HOWARD said slide 15 showed the portfolio was well diversified by strategy. He said the targets were 25 percent to venture capital, 45 percent to buyout and 30 percent to special situations. He said staff expected diversification to remain in line with long-term targets. He noted that the ARMB's private equity guidelines had a soft target of no more than 25 percent exposure to a given industry and software had exceeded the guideline for several years and was at 30 percent. He noted that software was viewed as being inherently diversified since it's exposed to the end market that it services rather than a narrow set of risk drivers. He said software had been a tailwind behind the portfolio over recent years, especially through the pandemic, but they did continue to monitor the exposure and, in the future, may recommend an increase to the industry guidelines for software.

MR. HOWARD said slide 17 showed the commitment target for 2020 was $600 million and during the year $571 million was committed to 59 investments, $176 million by Abbott, $195 million by Pathway, and $200 million directly. He said the co-investment program that was started in 2016 had made 13 investments totaling $31 million and delivered strong performance and significant cost savings to the portfolio.

MR. HOWARD said slide 18 showed the pacing model that's purpose was to project forward commitments needed to achieve ARMB's targeted allocation to private equity. He said slide 19 showed the output of the pacing model and the recommendation for forward commitments. He said for 2021, staff was recommending a commitment target for the next year of $700 million, split equally between Abbott, Pathway, and staff.

MR. HOWARD said private equity played an important role in achieving ARMB's return target, that despite the increase in flow of capital into private equity, they still expected the asset class to deliver a meaningful return premium over public markets. He said as the asset class grows, they would continue to work with Abbott and Pathway to look for opportunities to drive performance and cost improvements. He said staff's recommendation was that the ARMB approve Resolution 2021-12, which adopts the Private Equity Annual Tactical Plan as presented.

MS. HARBO moved to approve Resolution 2021-12. MR. BRETZ seconded the motion.

A roll call vote was taken, and the motion passed unanimously.

CHAIR WILLIAMS recessed the meeting from 2:55 P.m. until 3:07 p.m.

F. Private Equity Manager Review

MR. ROBERTSON said the portfolio had increased 64 percent in the fiscal year, noting the Cambridge private equity index was up 56 percent and the Russell 3000 was up 44 percent. He said slide 2 was a timeline of the portfolio showing the progression of the 23 years the portfolio had been active. He noted the difference in how the IRR benchmarks compared to the return multiple (TVPI), stating the reason for that was the IRRs were very sensitive to what happened earlier in the portfolio's life.

MR. ROBERTSON said that they had been through a series of increases and each time they made an increase, there was a ramp-up period that diminished returns a bit, but they were currently at a 14 percent target. He said looking at the table in the middle of slide 3 that plan increased 26 percent over the fiscal year, up $7 billion. He said there was a 2 percent increase in the private equity target so between the total plan growth and the target increase, the target increased by $1.5 billion, or 47 percent.

MR. ROBERTSON referred to slide 4 showing that in a 12-month period in the total private equity line of the chart, the portfolio grew $1.8 billion or 53 percent over the year.

MR. ROBERTSON said with their model, they've discovered when a plan grows like yours and is at target, the model like to have about 50 percent uncalled relative to the private equity target. The plan is currently at 35 percent, so if you take the next year's $700 million commitment, it would get back up to 50.

MR. ROBERTSON moved on to slide 5 stating that they were in a virtuous cycle of rising valuations and liquidity noting that any aspect of private equity, such as fundraising, investments, distributions,

credit availably had been strong.

MR. ROBERTSON said they had two external mangers, Abbot and Pathway. He said the left table showed the position of last year by all key measures, cumulative cash flows and valuation and then where they were at the end of the fiscal year, then they subtract the changes.

MR. ROBERTSON said the distributed to paid in or DPI was 106. He explained they paid in $6.4 billion, they distributed $6.8 billion, then divide those two and for every dollar paid in they get $1.06 back.

MR. ROBERTSON said the RVPI was the residual value or net asset value of the portfolio, noting that comparing what was paid in, they've got 79 cents on the dollar of value that's unrealized in the portfolio and if they add those two together, for every dollar that was put in, they've gotten the dollar back with 85 cents of profit, both realized and unrealized together.

MR. ROBERTSON said the target for the committed column was 6, and they were a little over target, he said paid in was very close to the committed target. He said the during the course of the year, 41 percent was invested of what was started with uncalled. He said if they did not make another dollar, and in the next couple of years they did not make any more commitments, the managers would deploy that in about two years, so they needed to commit the additional $700 million this year to keep that going.

MR. ROBERTSON said the metrics chart on the right showed the portfolio had distributed almost a billion in cash back to the plan last year, stating that the distributions came from the starting NAV which was $3.3 billion. He said they got 29.3 percent of the NAV back. He said $985 million had to be reinvested during the year so $602 million went back in but they got to keep $383 million of net distribution.

MR. ROBERTSON said the NAV started at $3.3 billion, and went up to $5.1 billion, a 53 percent change over time. He said Abbot and Pathway were very close to that, Abbott was at 68 percent increase and Pathway had a 62 percent increase, and that showed a very good quality of earnings.

MR. ROBERTSON said bullet point 9 showed the IRR was 13.6 percent which was above the median of 50. He said the TVPI in bullet point 10 was 1.85, putting them at a 36th percentile.

MR. ROBERTSON moved to slide 6 showing the gross distributions for FY2021 as 909,784, the previous highest year of gross distributions was in 2018 and it was not quite 600 for a 52 percent increase. He said the net distributions were at 405,376, and the previous high was 202, so it almost doubled any prior year. He said the previous high NAV increase was 408,795 in 2017, but the current year was up to $1.7 billion with a 300 percent increase over any other NAV increase. He added that the total appreciation number, which was the net cash distributions plus the NAV increase was effectively a 64 percent rate of return for the portfolio.

MR. ROBERTSON said the bottom table showed changes from previous highs. He said gross distributions were higher on a percentage basis in 2007, but the plan recycled almost all as paid-in

capital.

MR. ROBERTSON said slide 7 showed the diversification. He said there was a fair amount of venture capital mostly coming from Abbot, and overall, the combined tech and software was 41 percent. He said the tech sector was driving a lot of the large gains and the international and geographic diversification reflected the opportunity set.

MR. ROBERTSON said that Abbot was changing their president, Jonathan Roth who would be retiring at the end of 2022 and Len Pangburn had been nominated to be the new president by the managing directors. He said they had discussed this with Abbot and were very comfortable with the change.

MR. ROBERTSON said that the total portfolio and both Abbott and Pathway were spot on as far as the paid in relative to uncalled for the year. He said all three were exactly 41 percent. He said their gross distribution yields were 31 percent and their net distributions were a little better. He said the total portfolio was 11 percent. He said the NAV increases were 55 percent and the portfolio was 53 percent. He said Abbot was looking like 68 percent and the total portfolio was 64 percent.

MR. ROBERTSON said looking at bullet 10 on slide 9 showed Abbott's IRR was 12, placing them at the 50th percentile, and slightly below the median by about 10 basis points, 12.2 percent. He said bullet 11 showed their TVPI multiple was at the 36th percentile versus the median of 1.53 and an upper of 2.12.

MR. ROBERTSON said slide 12 reflected diversification, where most of the venture capital appreciation was. He said it was NAV-based with lots of unrealized appreciation.

MR. ROBERTSON said slide 14 for Pathway was similar to the Abbott discussion. He said the paid-in rate off of the uncalled was 41 percent. He said the key metrics showed the total portfolio at 29 for both, with a net cash yield close to 13, the total portfolio was 11, but a little less of a NAV increase. He said they were at 50 versus 53 for the total portfolio and they ended up at 62 versus 64 for the total portfolio.

MR. ROBERTSON said the benchmarking showed the IRR was at the 44th percentile, above the median. He said the vintage chart on slide 15 showed a steady performance with three first quartile years very strong, 15 years for the second quartile with nothing below median years.

MR. ROBERTSON said slide 16 showed the strategy benchmarking. He said slide 17 showed more of a buyout orientation. He said software and technology combined was the biggest total tech exposure, that Abbot was at 40.

MR. ROBERTSON moved on to slide 18 which showed the Treasury portfolio. He said it had been going for about 14 calendar years, invested in 12 vintage years. He said committed changes were less than 200 and paid-in was 28 percent. He said in the last five years, over 51 percent of the capital commitments had been made and had not been paid in yet. He said the amount paid in versus committed was 64 percent. He said in the total portfolio, the other two managers were over 80 percent.

MR. ROBERTSON said the portfolio had gross distributions of 27 percent, slightly less that the total portfolio's 29 percent. He said the NAV increase was 56 percent with an overall uplift of 61 percent versus 64 percent for the total portfolio. He said they had the largest NAV increase, noting that the largest from Pathway or Abbott was 56 percent. He said they also had the largest TVPI gain, up 32 percent.

MR. ROBERTSON moved to bullet point 11 stating that the goal was to gradually increase the number of partnership investments within a vintage year to five or more. He said from a benchmark standpoint, the portfolio was above median IRR, 48th percentile, and the TVPI was 44th percentile.

CHAIR WILLIAMS said the total portfolio appreciation was $349 million, 61 percent, up from 4 million, 1 percent last year and asked if it was because it was at different spots on the J-curve; MR. ROBERTSON said that as he had mentioned, it was a young portfolio and the shifts in cash flows were very dynamic from year to year and to keep in mind that the total portfolio was only up 10 percent last year.

MR. ROBERTSON moved to slide 19 showing the Cambridge Vintage Year Peer Group Benchmark. He said there were two years below median. He noted that they had a bit more volatility in the historical portfolio and he expected that to smooth out. He said in 2014 there were only two funds and one of them was a distressed-related fund in the middle of a bull market, the opportunity set did not really develop. He said in 2015 there was an energy fund in that time frame, but the majority of it was due to large senior debt credit fund that was place in there.

MR. ROBERTSON moved to slide 20 commenting that it was all second quartile and he had broken out the percentage that added up to 72 percent. He said there were a lot of different kinds of return drivers helping it along. He said they had very good diversification – software technology driving the good returns and write-ups, and the opportunity set was going to be a little more domestic for the portfolio.

MR. ROBERTSON then moved to slide 22, the summary. He said the portfolio was mature, it had a very good performance and a strong cash flow. He said overall they were at the 36th percentile, they had very high-quality general partners across the board. He said they were very well-positioned for the future with a lot of depth spread across different industries and geographies. He said it was a unique period of time where valuations were at the end of a business cycle, but given pent-up demand, cash in people's hands and all the large stimulus projects, it was like they were at the beginning of a business cycle in an economic regard.

G. Cybersecurity

MR. WOOD noted that they put the highest level of importance upon data security and started his presentation on the policies that they had in place – disaster incidents, training, monitoring and access controls.

MR. WOOD said that that when they talk about assets and data, they think of infrastructure assets,

and they divide assets into different classes. Class 1 assets – their policies are defined by assets that contain confidential participant data and class 2 assets do not have confidential client data. He said they also had standards and procedures they go through when assets reach their end of life. He said they also have types with their change management – type A changes would be something that would be a routine change, such as Microsoft releasing patches. Type B would be nonroutine service such as a switch that failed in their Chicago office that had to be fixed. He said they took an assessment of the hardware across the firm and took a proactive stance and changed the switch in the Denver office.

MR. WOOD said that they have a matrix that lays out the risks such as a data security breach to a piece of paper with a social security number on it left on a desk. He said they try to think of every instance that could lead to problems in the future.

MR. WOOD said that in terms of configuration standards, that applied to how they configure their workstations. He said they have PCs in their office and also have access to virtual machines, so if they cannot access a PC, they still have access to the virtual files.

MR. WOOD said the main goal of their disaster recovery was to support the continuation for services for their clients and to ensure they have an organized approach to address any issues that may come up. He said they maintain a business resumption plan that would support continuation of services to GRS clients and provide for an organized approach to addressing and managing a security incident, natural disaster, or infrastructure failure. He noted that when the pandemic hit and things shut down, they focused on how to continue to provide services to their clients, they followed their plan to a "T", and it worked. Their plan allowed for them to be successful during a trying period.

MR. WOOD said they had a disaster recovery plan for all infrastructure, so if something happened to the infrastructure necessary to a server, or a breach of data they had a set standard on how to deal with those issues. He said their headquarters in Michigan and their office in Florida both serve as a redundant backup for each other. He said they also have two colocation sites that are secured 24/7 with generator backups and employees working remotely run backups as well.

MR. WOOD said that every one of their employees, during the onboarding process were trained in several security policies which is a condition of employment. He said they also have to attend training each year on the GRS consulting policies and information security policies. He said they have online data security training, HIPAA training, employee acknowledgments, and ad hoc training as needed where they will discuss an issue and figure out the best way forward and how to keep it from happening again.

MR. WOOD said they have third-party monitoring by a security operations center (SOC) that provides vulnerability management. He said they monitor their systems on a 24/7 basis and if they discover any sort of issue, they are immediately notified of it and the issue would be dealt with immediately.

MR. WOOD said they also perform a third-party network penetration test and a social engineering assessment to see if outside people can get into their network. He said they had been testing them for years with phishing attempts. He said if someone does click on a phishing link, that person would

then get additional counselling and training. MR. WOOD said they have firewalls and antivirus software that is monitored by a third party and notifies them if there is any sort of event or equipment failure.

MR. WOOD said they have access controls such as strong passwords, auto locking of personal computers based on user activity. He said individual computers do not contain confidential data, and all their network equipment was physically secured as well through standard controls and permissions.

MR. WOOD said they hired a firm for a SOC 2 Type II report, entitled "Suitability of the Design and Operating Effectiveness of Controls Relevant to Security Availability, and Confidentiality. He said they had received their third annual SOC 2 Type II report and it reported zero deficiencies.

MR. WOOD said their client portal is set up with everything being encrypted using SSL certificates and very strong passwords with a minimum of 15 characters and access is limited to U.S. and Canada only. He said if anyone outside those two countries tried to access the site, GRS would immediately be notified and locked down so they would not have any breaches.

MR. WOOD said their client portal GRS Advantage contained GRS publications like news scans where a research group scans all the news articles that pertain to the public sector and aggregates them into a single publication. He said that their research articles could be found under Insights and Perspectives. He also noted they added a benchmarking software, GRS Trend Line, so if someone wanted to look up what the average inflation rate was across the public sector, the information would be there.

CHAIR WILLIAMS asked if that was something that was available to the Trustees; MR. WOOD said they could set that up.

MR. WOOD said that every GRS team member had the ability to work remotely which allowed for uninterrupted service to clients. He said the ability to work remotely had been in place for several years and transition to full remote work through the pandemic was seamless. He said they have security protocols set up such as two-factor authentication and VPN's through either a virtual machine or remote desktop directly to a PC at the office.

MR. KROHN asked if the server locations were also used by other people putting their servers in the buildings; MR. WOOD said he thought that was the case; MR. KROHN asked if the people who build the servers were employees or contractors; MR. WOOD said they were employees of GRS; MR. KROHN asked if there was a separate security system on the outside perimeter of the cage that the servers were in, outside the building that the servers were secured in; MR. WOOD said that he would find out.

MR. JOHNSON asked what the percentage of overhead costs was attributed to the IT side for security issues and what did he think the percentage component of a bid for services of IT cybersecurity protection was attributed to that; MR. WOOD said he was not sure, but the SOC audits were not cheap. He added that he has noticed an extreme focus on policies and insurance in a lot of the bids

they had been responding to.

H. Executive Session

CHAIR WILLIAMS said there was a request to go into Executive Session and asked for a motion to go into Executive Session to consider the matter related to a specific manager. He said the request for the Executive Session included all Trustees, IAC members, MR. ERLENDSON, MR. CENTER, MR. HANNA, MS. LEARY, MS. PREBULA, MR. MOON, MR. KAUZLARICH, MR. HOFFMEISTER, MR. JONES, and MS. JONES. CHAIR WILLIAMS then asked if there was anyone opposed. With no response, he said that after the break, they would go into Executive Session, and this would be the close of the public portion of the meeting. The public session would resume at 9:00am tomorrow morning.

CHAIR WILLIAMS recessed the public portion of the meeting at 4:32 p.m.

Friday, December 3, 2021

CALL BACK TO ORDER

CHAIR WILLIAMS reconvened the meeting at 9:00 a.m. He said that the Executive Session concluded at 5:02 p.m. and no action was taken.

I. J.P. Morgan Market Insights

MR. HANNA invited DAVID LEBOVITZ and JEFF SHILEDS with J.P. Morgan to present highlights from their Guide to the Markets.

MR. LEBOVITZ shared slide 3 which was their PMI heat map which takes into account both manufacturing and services and where green meant good and red meant not so good. He said with headlines around Omicron and concerns about another round of the virus, there have been concerns where to go from here. He said that no one knows how effective vaccines would be and how virulent the virus actually was. He said they would learn that in the coming weeks and that would help to broaden the direction of travel for the global economy. He said the underlying fundamentals of the global economy were solid and that any pause caused by the virus would be just that, a pause rather than a broader pullback. He said the reason for that was the consumers' financial position remained very solid. He said that manufacturing activity which was low would continue to grow as supply chain issues were sorted out. He said the third thing was business investment, he believed that business investment spending would continue to grow in 2022.

MR. LEBOVITZ commented on inflation. He said that the fed had finally admitted that inflation was not as transitory as they once thought. He said he thought they would go through a period that was stickier than expected, but not similar to the 1970's which was characterized by structurally higher inflation. He said that inflation was being driven by the parts of the economy that were hit the hardest during the pandemic, like hotel room prices, air fares, car prices. He said they don't believe that inflation was going to be a long-run problem because of forces they view that have weighted on inflation over the past 35 years remain in place, such as globalization, technological adoption, income inequality and demographics. He said as long as those forces remain in play, they believed it would

be difficult for inflation to accelerate over the course of the longer term.

MR. LEBOVITZ said the things to watch when it came to gauging inflation was home prices in the U.S. and how the prices were on fire, that homes were not on the market long and were sold at well above asking price. He said housing tends to show up in the official inflation statistics with a bit of a lag. He said the next issue was the supply chains, that delivery times continued to sit near an all-time high which has corresponded with a substantial increase in input prices, and raw material costs. He said that companies were passing along higher costs to the end consumer in the form of higher wages and higher transportation costs.

MR. LEBOVITZ moved to slide 6. He said payroll growth was disappointing, that unemployment rate fell to 4.25 percent and wage growth had accelerated to its fastest since the early 1980's. He said the thing that was impeding the labor market supply was that people were not being forced to go back to work, that they were still sitting on elevated cash balances, so until they run out of cash, they will stay on the sidelines. He said skill mismatch was a problem, 80 percent of the jobs in the U.S. labor market were in services and 20 percent were in manufacturing. He said you can't put a bartender in an assembly line job. He said childcare was also an issue.

MR. LEBOVITZ said the Fed interest rate forecast on slide 7 was a bit too friendly, that the idea that headline PCE was at 2.2 percent by the end of next year was a stretch. He thought it would be closer to 2.5 or 3 percent. He said they thought inflation would come back down closer to 2 percent by the end of 2022. He said chairman Powell announced that inflation was not transitory and would taper faster by the end of the year and conclude sometime around the middle of next year. MR. LEBOVITZ said they would find it difficult to raise rates if that happened. He said he believed that the feds would be able to hike the rate by late 2022 or early 2023 but the idea that they finish tapering and then immediately hike the rates – he did not think they would move that quickly.

MR. LEBOVITZ said they thought the short end would remain anchored but believed that as global growth improved it would allow the long end of the curve to drift higher. He said a key element to the curve was the continued rise in vaccination rates and broad immunity to the pandemic. He said as long as there was a large population globally who were not vaccinated, there would be more mutations of the virus. He said they believe that over time we would move past the virus, but the reality was that it would continue to evolve and continue to mutate as long as it had hosts to infect with no immunity or vaccination against the virus. He said they were looking at higher long rates next year -- 2.25 on the 10-year by the end of 2022 was a reasonable assumption.

MR. LEBOVITZ moved to slide 10. He explained the position of the diamonds relative to the X axis represented the correlation of each of the sectors to the S&P 500 and the position of the diamonds relative to the Y axis represented the average yield over the past 12 months.

MR. LEBOVITZ said when it came to navigating the traditional bond market, if it's about having a core allocation, they think moving away from U.S. Treasuries makes sense and they see opportunities to invest in things like investment grade corporates. He said they were comfortable going into high yield and EM debt, but they want to maintain a higher quality bias. He said he did not believe in silver bullets, but if there was a silver bullet from an income generation perspective, it would be core

real assets. He said the green diamonds in the center of the chart were real estate, infrastructure, and transportation on the top left. He said core real assets were for clients who want something like a high yield bond but don't want to take on that amount of equity risk.

MR. LEBOVITZ moved to slide 11 and said the chart on the left-hand side showed that cap rate spreads remained above their long-run average, that some of it had to do with the level of Treasury yields but core real estate looked cheap. He said the chart on the right showed that not all sectors had been created equal in the wake of COVID. He said in terms of sectors, the industrial sector had continued to plumb new lows from a vacancy rate perspective, multi-family housing had gone full circle, office space shot higher, and retail moved higher as well but appeared to be turning around.

MR. JOHNSON asked if there was a wave of long lease terminations coming for office spaces as leases expire; MR. LEBOVITZ said that there were lease terms coming up for expiration, but they did not see it as a repeat of what was seen during the financial crisis. He said the office was not going away, but the nature of office needs has changed. He thought that offices were going to transition into a place where people go to collaborate. He said there was a tremendous amount of new business formation during the pandemic and those new businesses would need homes.

MR. LEBOVITZ said that the nature of offices was changing as well as the nature of retail and those changes lent themselves to more opportunistic value-added approach to real estate investing.

MR. LEBOVITZ moved on to slide 12 saying that infrastructure had long been the darling of the European institutional investment community and was gaining traction in the U.S. He noted the chart on the right showed household utility spending, that households in the U.S had 2.5 percent of their total spending going to utility bills. He said those were usually the last bills that stop being paid when you fall on hard times and that the pandemic confirmed that.

MR. LEBOVITZ moved on to slide 13 and explained that transportation was a big focus for J.P. Morgan and their clients, especially shipping. He said he thought about the orderbook as a share of the total fleet, that it was back down below 10 percent after being north of 50 percent in 2008 and 2009. He said transportation was one of the few asset classes that had benefited from the pandemic and everything that had gone on from a supply chain and a shipping perspective. He said the ships were getting older and in need of replacing which was representative of a fairly significant investment opportunity going forward.

MR. LEBOVITZ moved on to the next slide regarding private credit. He said that there was a lot of cov-lite issuance, and EBITDA adjustments – very borrower-friendly behavior. He said he saw a chart the other day that looked at the share of cov-lite issuance for middle market direct lenders versus broadly syndicated leveraged loans and the spread between the two was 80 percent points – 7 percent of middle market direct lending was cov-lite and 90 percent of broadly syndicated leveraged loans are cov-lite. He said the quality of loans had improved since late 2019, early 2020 and that during periods of market stress, private credit, and direct lending, performed more like investment grade as opposed to high yield or leveraged loans.

MR. LEBOVITZ said the next slide showed the equity side. He said earnings growth had been

spectacular, that they had accounted for all the return seen as multiples, have actually declined year-to-date. He said they estimate, for calendar year 2021, S&P 500 earnings per share would grow by close to 70 percent for the year as a whole. He said that two-thirds of the earnings growth seen this year was driven by margin expansion.

MR. LEBOVITZ moved to slide 17. He said he believed capital spending would accelerate and be focused on things such as automation. At some point companies would get rid of some of their employees and put an iPad in their place. He said that there would be increased focus on productivity, efficiency, and automation and in conjunction with pass-through of higher input costs, that would allow companies to defend their margins.

MR. LEBOVITZ said that for the portfolios, they want to own the part of the market where earnings could do all the heavy lifting, those sectors and industries that have earning streams that were most sensitive to the underlying pace of economic growth. He said what the chart showed was the correlation of each sector's earnings to the pace of real GDP. He said the five most sensitive sectors were a blend of value and growth, such as industrials and financials, traditional value sectors, then there was tech, healthcare and communication services, traditional growth sectors. He said it was not about value or growth, but value and growth.

MR. LEBOVITZ said he believed that private equity should be a structural allocation in portfolios because it provided different underlying exposures when compared to the public markets. A greater orientation towards technology and healthcare. He said to help clients achieve their long-run return goals, they thought that allocating growthier parts of the capital markets has transitioned from being optional to being essential. He said he thought there would be an emerging opportunity in some of the more cyclical parts of the private markets going forward.

MR. LEBOVITZ said that the U.S. was a net borrower of dollars from the rest of the world and that had actually gotten worse during the pandemic. He said he believed that next year would be more about global growth, that they would see emerging markets come online and more synchronized global growth environment and that the dollar could trend lower over the course of 2022.

MR. LEBOVITZ said the next chart on slide 21 was international equities, he said he thought there was a structural opportunity in places like the emerging markets. He said one of the things he liked to tell clients was when it came to the United States, we like the idea of owning growth and renting value and when we think about international markets, we like the idea of owning the United States but renting markets like Europe and Japan, he said he believed that from a tactical perspective they could do well in 2022.

MR. LEBOVITZ moved to the chart on slide 23, he said the red dots represented the peak-to-trough decline for the S&P 500 each year back to 1980 and the gray bars were the full calendar year return. He said the peak-to-trough decline in 2021 had been 5 percent or a third of the average drawdown that had been seen over the course of the past four decades. He said the volatility had come back and that was normal, the environment seen for the better part of 2021 was not normal. He said they thought the volatility could persist but that the markets were resilient, that 75 percent of the time since 1980, despite falling by more than 14 percent during the course of the year, the S&P 500 had gone on

to finish the year in positive territory.

MR. LEBOVITZ moved to slide 24 and said the most intelligent thing he's heard anyone say about crypto was that if you're going to own it, you need to be prepared for the price to go to zero. He said it was not clear what the role of crypto plays in a portfolio and it was incredibly difficult to size given allocation. He said Bitcoin was only worth what somebody was willing to pay for it, so he had no idea what the expected return for that asset should be. He said the correlations were very unstable over time, that sometimes it acts like risk assets and sometimes it acts like more defensive assets and that made forecasting to correlation or covariance effectively next to impossible. He said the volatility of Bitcoin was multiple times that of the S&P 500, very unstable. He said that even if they were to use historical data to size the allocation, they would end up with wildly different recommended allocations, depending on the look-back window used.

MR. ERLENDSON asked if they could give a sense of J.P. Morgan's view about the use of artificial intelligence when it came to investment management of institutional money; MR. LEBOVITZ said that there were things that could be automated and things that cannot. He said he's skeptical of the robo advisor phenomenon. He said that most individuals want a one-on-one conversation. He said a human element is extremely important. He said when it came to underlying technicals of money management, they had success automating things such as trading treasuries. He said they found that it was possible to do it in a relatively frictionless way with a higher degree of accuracy than a human trader could do. He said he did not think that computers would be able to make portfolio management decisions or discuss the strategies and help people think about the way that they fit to portfolios, but he did see room for continued growth in terms of automation and technology in the investment management space.

MR. SHIELDS said that they were predicting they would get back to the historical million people visits per day and most likely would break through that number. He said they were now one of the largest Fintech businesses in the world and were balancing the act every day using new technologies but also remaining true to the person-to-person discussions that are still important to consumers.

MR. HIPPLER referred to slide 10 and asked how would they reduce volatility to offset the volatility in equities and other assets, given that the interest rate or the yield of those assets was so low. MR. LEBOVITZ said he thought of treasuries as a hedge rather than an investment at this point, that in order to maintain some defense in one's portfolio, we see opportunity in things like scrutinized paper. He said one could pick up a little bit of incremental yield without adding significantly to your overall duration or your portfolio's overall duration,

J. Private Equity/Growth Equity: Introduction to Summit Partners

MR. SCHILLER said that he was the Chief Investor Relations Officer at Summit. He introduced MR. CHUNG, the Chief Executive Officer of Summit and said he would be presenting.

MR. CHUNG gave a brief overview of the firm through slides and explained that it was started in 1984 with a foundational belief in profitable growth as the most reliable source of superior risk-adjusted returns through market and economic cycles. He said since inception they had a 32 percent

net IRR to investors over 38 years and a 2.4 times cumulative multiple money on their mature funds. He said that track record had allowed them to develop deep sector expertise in their three key industry sectors – technology, healthcare and growth products and services which included business services, financial technology, financial services, and high-growth consumer.

MR. CHUNG said another of their competitive advantages was their ability to create proprietary investment ideas. He said they were known as a pioneer and innovator in the direct sourcing of investments which meant they do not rely on investment bankers or other intermediaries to bring them investment ideas.

MR. CHUNG said they had the ability to improve the performance of their companies and enhance the value of those investments. They achieved that through their platform of four teams, which were built to serve the needs of growth companies. He said profitable growth was the driver of their returns and everything they do as an organization was focused on that belief on behalf of their investors.

MR. CHUNG explained that growth equity was an investment category that sits between early-stage venture capital and traditional private equity or leveraged buyouts. He said when they find companies, they look to protect their investors capital by investing in a senior equity security and exercising governance rights through a board seat. They take control and minority positions, but when they buy control, they are prudent in the use of leverage to finance those transactions. He said that process is made more intelligent and automated through their technology platform called Alpha5. He explained that it was a cloud-based, 21st century enterprise software platform that they built and maintained with their staff of software developers used only for their purposes.

MR. CHUNG said they look for profitable, category-leading companies with strong teams and when they find those companies, they are in a privileged position to create investment opportunities, which they structure carefully using senior equity securities and controlled leverage.

MR. CHUNG explained that they work actively to enhance the value of those companies through their value enhancement platform and as they see the opportunity to realized gains, they do so on a regular and disciplined basis. He said that almost 90 percent of the companies they invested in were profitable at the time of their initial investment. He said they were a lead investor in 93 percent of the investments and serve on the board of almost every company they invest in. He said that in terms of capital preservation, almost 80 percent of the investments that they've made from their funds were structured with a preferred equity instrument. He said that had allowed them to protect their investors' capital even in situations where the investments do not perform as planned.
MR. CHUNG said that 45 percent of the deals in their recent funds had no leverage at the time of their initial investment and noted the average senior leverage ration was just over three times trailing EBITDA.

MR. CHUNG said their teams were designed to support the needs of growth companies and they believed those resources were integral to their investment and value enhancement processes. He said they had an in-house operations team, an in-house talent and recruiting team, they recently built a technology and data science team and an in-house capital markets team which executes capital markets transactions on a turnkey basis for their portfolio companies.

MR. CHUNG noted that they had recently hired subject matter experts in fields like digital marketing, revenue optimization, and data science who were all involved in their due diligence process all the way through the life cycle of their investments.

MR. CHUNG explained that slide 9 showed the global investment team totaling 44 people, with 13 managing directors in the growth equity fund, averaging 17 years with Summit, a very stable and tenured partnership.

MR. ERLENSON asked what their view was of private equity – was it a fool's errand or stroke of genius for DC pension plans; MR. CHUNG said there had been such a heightened level of interest in private equity. He said that was something they did not control. He said if they do their jobs well and put together a highly curated portfolio of category-leading, profitable companies, they would deliver on their promise to their investors to do their best to create superior risk-adjusted returns.

MR. HOWARD asked if they could talk about how their process had changed with the growth of capital in private equity and how that affected their sourcing; MR. CHUNG said that the influx of capital into their asset class was not a new thing, that it happened in the late 90's and in the mid 2000's and was happening today as well. He said one of the ways they've had to adjust their process was to become more agile, so they operate a 24/7 investment committee operation. He said that allowed them to assemble deal-by-deal investment committees that were gathering the best minds in the firm around each investment opportunity. He said ten years ago they adjusted their sourcing model and moved to thematic idea generation and the Alpha5 technology platform. He said today, their sourcing idea generation was as or more productive than it had ever been. He stated 95 percent of investments made in 2021 were sourced directly by a Summit professional. He said they've found that the innovations and investments made in their sourcing and idea generation were serving them well in terms of creating truly differentiated idea generation.

MR. JOHNSON asked what controls they would have as a public pension board with respect to investments in private equity firms where at least the ideas being generated going forward would be similar to what their proxy policies might be on the public side – was there any measure of control that they could expect to have; MR. CHUNG said the typical avenue for those types of controls were through side letter agreements as part of the subscription documents in each fund. He said the other control would be to conduct due diligence on Summit and for them to be transparent about the categories that they were targeting.

CHAIR WILLIAMS asked how they decide when to apply leverage or not, what were the determining factors, and being the lead investor, having board representation, was that something that has wide open opportunities or did they have to hunt to find them; MR. CHUNG said that as far as board representation was concerned, it typically was not an issue, more often than not, they were being invited into the companies.

MR. CHUNG said the if the business was an attractive candidate but was not growing organically fast enough to produce the return, they may use leverage to enhance the return from the equity, or they may use the leverage to finance acquisitions to provide the extra layer of growth to get to the

target returns.

MR. HANNA asked MR. CHUNG to take them through the lifecycle of one of their investments – starting with idea generation, sourcing, and value creation, and ultimately exit. MR. CHUNG shared several examples with the group.

CHAIR WILLIAMS recessed the meeting from 10:43 a.m. until 10:55 a.m.

K. Private Equity/Buyout: Introduction to Genstar

MR. SALEWSKI explained that Genstar was founded in 1988 and was based in San Francisco, it started out as a holding company in the 1970's and 1980's that focused on the building material space. he said that company sold, and the co-CEO's kept the name and launched one of the early West Coast private equity funds and firms.

MR. SALEWSKI said they were a middle-market-focused private equity firm and defined that as companies with $50 million to $100 million of cash flow, of EBITDA, where they can write checks from $200 to over a billion dollars of equity. He said they look for strong businesses where they think they can upgrade the management teams and support them. He said they feel that if they have a great company with an outstanding management team, they could drive scale through new go-to-market sales strategies and through acquisitions. He said they double or even triple the size of the companies they invest in over a three-to-five-year period and those companies go on to bigger and better things after their ownership.

MR. SALEWSKI said they focus on four sectors - financial services, software, industrials, and healthcare. He said that the multisector approach was important because there were different times in a cycle where they want to be overweighted or under weighted in sectors and that gives them the flexibility to do that. He said they also partner with about 30 former C-level executives and CEO's who sit alongside of them to help identify companies – they sit on the board, and they introduce them to executives. He noted that they are a control investor which allowed them to be the majority shareholder so they could move quickly and drive the changes they identify. He said they've had a strong consistent profile of returns; six out of their seven funds were in the top quartile, and they had been rated one of the top three fund complexes in the world by HEC-Dow Jones measurements on an annual basis. He said they were a very focused firm, they do one private equity fund at a time, one buyout fund at a time. He said they were 100 percent owned by active partners in the firm.

MR. SALEWSKI moved to slide 3 which showed the five partners of the firm. He said slide 4 showed the entire investment team.

MR. SALEWSKI moved to slide 5 that showed the strategic advisory board and explained that they were the 30-former c-level executive and CEO's he mentioned previously. He said they had been with the firm anywhere from eight to 10 years and they were on two to four companies. He said they were a key part of their value creation model as they introduce them to executives and help develop themes, they sit on boards and were a great interface between the management teams on the board and the financial investors.

MR. SALEWSKI explained their investment model located on slide 7.. He said they start with a thesis within their four main sectors, they identify all the companies they think would be interesting and track them over a long period of time. Then they engage with those leadership teams and ask them if Genstar came in, what would they do differently, would they hire more salespeople, would they execute on more acquisitions, would they change their board and what types of activities would they have on their wish list to help accelerate growth; He said they find that there would be more value that they believe they could create with the infusion of Genstar and the expertise and talent that they bring. He then explained a few of the companies they bought, such as Mercer Advisors, a wealth management platform with $40 billion of assets that started out with only $4 billion of assets. He said Cetera was an independent broker/dealer which focused on serving wealth managers that doubled in size over the last three years since they owned it.

MR. SALEWSKI said that despite their growth in fund size and small growth in terms of firm size, they had been able to continue to deliver repeated strong performance with a very simple model that all came down to execution and the people who execute on it.

MR. HOWARD asked if he would take them through an example of the different verticals for a couple of the investments in sourcing all the way through to exit; MR. SALEWSKI reminded them that he had mentioned that Genstar had started in the building materials and industrial space. He said the first sector was the industrial vertical in 1988. Then in the mid 90's one of the team members mentioned that industrial space was interesting, and they could apply some of the same change management themes to healthcare. He said for them, healthcare was drug discovery and they looked at companies that provided drug trials or centralized data collection in drug trials.

MR. SALEWSKI said they joke about a parallel across their sectors. He said it was the classic picks-and-shovels approach to the gold rush where they were not betting on gold, but the people that would need blue jeans, picks, and axes to find the gold. He said the tools and services approach really exists across all of their sectors.

MR. SALEWSKI then walked through an example.

MR. HOWARD asked if he would talk about how the top-level decision was made as far as allocating to those sectors; MR. SALEWSKI said it was a bottoms-up process that they fund, since when they invest in their funds, they are 10-to-12-year closed-end vehicles. He said they were long-dated funds, so in spite of micro cycles within each of the sectors, they look to underwrite the companies for three to seven years, knowing that as they deploy the capital, it would be a 10-year journey.

MR. SALEWSKI said they look at each of the sectors, they have equivalent efforts in each and see what the best opportunities were. He said unless there were more liquid funds, they could not tweak that allocation forward and backward over the course of a fund, so they look at balanced funds within them. He said they do regression analysis and all of their sectors performed equally.

CHAIR WILLIAMS asked if the defined exit vision was on a timeline; MR. SALEWSKI said that they underwrite for a five-year plan which contains what the organic growth would look like, what the acquisition growth could look like, what the profile looked like in terms of how it was valued in

the marketplace. He said they look to accelerate growth which leads to higher exit multiples. He said they steer them into higher value parts of their marketplace to steer for a higher exit value and then they look to build an organized and an inorganic plan, and an acquisition plan for that. He said in that five year period, there was an 18-month window of true value creation out of the gate and they pushed the teams to hit the accelerator hard and drive the change levers, and hire the talent needed within the first 18 to 24 months; CHAIR WILLIAMS asked if they adjust their timeline a bit based on things that happen within that time frame if they see a way to get a lot more value; MR. SALEWSKI said that was correct, that every quarter, alongside of their mark-to-market valuation analysis, they do a different analysis for their internal purposes that they do not share externally.

MR. SALEWSKI said their management team sees external validation of their value creation, they will tell them that it may be early in the hold period, but it's a good time to exit, so they exit, but other times they may hold longer. He said when they hit the return goals, that is when they have the exit discussions.

MR. HOWARD asked how they were able to maintain the process as the fund sizes grew; MR. SALEWSKI said it was something they monitored closely. He said their team had gotten a little bigger with a few more advisors which works out to an equation that they back into the fund size that they think makes sense for the team that they have. He said they will only raise a fund that they believe the team they have could manage.

L. Understanding Returns for Public DB Plans

MR, HANNA explained that Callan recently released a white paper that was in the Board packet that bridged the gap between actuarial assumption and the capital market assumptions. He then invited MR. O'CONNELL of Callan to explain.

MR. O'CONNELL said that during his investment consulting career, at only one point in his career was the average funded status near or above 100 percent. He said the average funded status for public pension plans had been below 100 which made room for improvement in terms of having assets on hand to pay liabilities.

MR. O'CONNELL said that people often point towards disappointing investment returns as the reason for most public pension plans being underfunded which was the case in 2008. He said that slide 1 of the presentation was the range of returns that Callan's peer public pension plans had returned historically over the long run. He said it showed a distribution of returns for the 10th percentile down to the 90th percentile over three different time horizons - 10, 20 and 30 years. He said over the long periods of time, public pension plans had been able to exceed the actuarial discount rate and often exceeded the return forecast that Callan had projected at the beginning of those periods. He said that looking at the 10-year period, it looked really good, it did not include the Global Financial Crisis, but when looking back at the 20-year time horizon, it included the COVID market downturn as well as the Global Financial Crisis, so the returns look more modest.

MR. O'CONNELL said the 30-year time horizon that is commonly used as a minimum time period for a long-term investor included the three major market disruptions – the dot-com bubble, the Global Financial Crisis and the COVID disruption. He said the historical picture from the return standpoint

of what public plans had experienced, the range of returns was narrow, but all relatively good, and the median public plan had produced returns that had exceeded common actuarial discount rates.

MR. O'CONNELL noted they had a good asset return experience for public pension plans but faced challenges going forward, such as what did they expect from the future. He said they assumed that the public pension plan would invest 60 percent of assets in global equities, 25 percent in fixed income, 10 percent in real estate, and 5 percent in private equity. He said Callan's best forecast over the next 10 years was that creates a median expected return of about 6 percent. He said they showed that in good outcomes, they expected a return of twice that, 13.4 percent at the 10th percentile and in a very bad set of outcomes over a 10-year time horizon, an average return that could be negative. He noted that it was a modest return forecast because interest rates were low, equity valuations were high and there had been a lot of liquidity in the market that had driven up prices on a lot of assets and that made it harder to achieve the returns experience in the past going forward.

MR. O'CONNELL said the past presents a very different picture from what they expect in the future and that FY2021, which a lot of public plans use to measure their financials, was one of the best they had seen in a long time and had done a lot to improve public pension plan funded status. He said a lot of stakeholders and people involved in the public pension world were taken aback when they raised the issue of the kind of tough sledding that may be ahead for public plan fiduciaries. He said the graph on page 3 was a good illustration of the challenge faced over time by public plan trustees and stakeholders of how to justify the difference between the two lines. He said the dark blue line was data they got from NASRA which represented the public plan median discount rate over time. He said they started tracking that information in 2000 when 8 percent was the standard discount rate. He said the green line was Callan's estimate of the return forecast for the typical pension plan at each given time period and was down to 7 percent.

MR. O'CONNELL said the graph on page 4 was a histogram where they plotted the median public plan return for different fiscal years going back to the mid 70's. He said it showed that in 2021 the median public plan was up over 25 percent, that returns like that had not been seen since the mid 80's. He said those returns were driven by public pension plans being invested largely in bonds, more so than today and the bonds benefitting from interest rates coming down in a steep manner.

MR. O'CONNELL said there was great variability in the returns seen from year to year and the experience in any given year was going to be vastly different from the actuarial discount rate and the return forecast that Callan expected for a 10-year time horizon. He noted that it was important when digesting results in any fiscal year to put it in the broader context of what the long-term experience had been.

MR. O'CONNELL said that if they were to look at other consultants or use an average of return forecast for the coming 10 years, there would be a similar phenomenon, where the forecast for future returns was more modest than what the discount rate was. He said slide 5 showed different factors that they thought public plan fiduciaries and stakeholders should consider when trying to understand the how to reconcile the differences between the two. He said the issue of time horizon, when actuaries discuss the return on asset discount rate assumption, they viewed that as a long-term assumption, and their time horizon tends to be longer than what Callan uses. He said actuaries

typically operate for 20-year time periods and often 30-year periods. Callan's forecasts are the 10-year time horizon and is the best time period for fiduciaries to make decisions because it is more reflective of current market conditions.

MR. O'CONNELL said he looked at the long-term averages – how public plans had done over very long time periods and how they had done in exceeding their actuarial discount rate. He said because the median was much better on average than the actuarial discount rate, most public plans would be able to look at a higher historical return.

MR. O'CONNELL said they should look at inflation expectations used by consultants and actuaries. He noted that actuaries over the past several years had brought their inflation expectations down, that in the past they had used long-term averages of inflation. He said it would be interesting to see how actuary and consultant inflation forecasts change now that there has been an increase. He said that historically, actuaries had higher inflation expectations than consultants and that going forward, inflation would be what it is, and that the best way to reconcile the numbers would be to look at real or after-inflation returns and try to bridge the gap between the actuary's real discount rate less their inflation assumption against the consultant's return forecast above inflation so they eliminate the difference in the two numbers that comes from having inflation forecasts differ.

MR. O'CONNELL said that they did think it was important to make changes to the actuarial assumptions based on advice from the actuary, but infrequently and not making significant changes if possible. He said the assumptions the actuary used in valuing the liabilities could have a big impact on the overall financial picture. He said the investment consultant forecast takes into consideration market conditions that are more relevant and up to date, reflecting current market conditions. He said they want to avoid trying to move either the discount rate to match the consultant forecast or set the asset allocation so that they can reach the actuarial discount rate.

MR. O'CONNELL said the last factor was how they use active management in particular in the publicly traded asset classes. He said Callan's capital market forecast for public market asset classes did not include a premium for value added from active management. He said for alternatives they do private equity, real estate, and hedge funds and incorporate some value added from active management. He said for most public plans, over 50 percent of their assets were invested in non-U.S. equities and fixed income, so they do not factor into the 6 percent forecast how well or poorly they would do implementing with active management.

MR. O'CONNELL said one way to justify the difference between the 6 percent forecast and the 7 percent discount rate was to understand how they used active management in the past and how much active management the plan had in publicly traded asset classes and what the history had been of adding value with active management. He said the average investor should expect the index minus actively managed fees, so the best investors could expect to achieve a premium from active management, or alpha. He noted that they had incorporated alpha estimates into Callan's return forecasts. He said that it had never been an objective to make the actuarial discount rate and the consultant return forecast match. He said they were two different numbers with two different functions.

CHAIR WILLIAMS said that he thought MR. O'CONNELL was saying not to give any indication of what they should expect for returns for next year, but what kind of climate and what they should expect over the next 10 or 12 years; MR. O'CONNELL said that was correct; CHAIR WILLIAMS asked if he were to sum up in a few sentences why they should be less optimistic over the future than what they had in the past; MR. O'CONNELL said they need to find new ways to achieve the success that they had experienced in the past. He said they must work a bit harder to find investments that are less transparent, less liquid, and harder to understand that might play a bigger role in the portfolio going forward.

MR. JOHNSON asked if there were any takeaways from the high volatility this week to go into the longer-term forecasting – were there lessons to be learned; MR. O'CONNELL said that he thought the big lesson would be that it was impossible to forecast, with any degree of accuracy, how assets would perform over a short period of time. He said he also thought that public pension plans had the benefit of being long-term investors so the liability stream was long and there was a big pool of assets that could be invested in a way where they could ignore the short-term market disruptions.

MR. HIPPLER asked him to clarify if he thought of 6 percent return was a nominal return rather than a real return; MR. O'CONNELL confirmed that was the case; MR. HIPPLER asked if the average 10-year return for public fund assets over the last 40 years 9 percent and was expected to go down to 6 percent; MR. O'CONNELL said the average median return for their clients was 8.65 for 30 years and that they thought the average public plan, based on generic asset allocation would be close to 6 percent going forward.

UNFINISHED BUSINESS - None.

NEW BUSINESS – None

OTHER MATTERS TO PROPERLY COME BEFORE THE BOARD - None.

PUBLIC/MEMBER COMMENTS - None

INVESTMENT ADVISORY COUNCIL COMMENTS

DR. MITCHELL commented that the presentations over the past two days were enlightening, and he particularly liked the presentation from MR. O'CONNELL. He said that they were not going to radically change their market manager lineup just because of a one-year, two-year or even three-year forecast. He said that private equity had done very well for the fund and congratulated the Board for allowing it to evolve and the staff for doing such a great job in choosing managers, monitoring them, and staying on top of private equity.

CHAIR WILLIAMS said that MS. RYERSON could not be with them but did email some comments. He said she congratulated the new Board leadership and echoed many of the comments about CHAIR JOHNSON running the meetings so efficiently. She said she also very much appreciated his thoughts about spreading leadership responsibilities around to more Trustees. She said that in the long run, it made the Board a much stronger one overall to have more Trustees involved in leadership, both of the Board and of the Committees. She gave kudos to the format of the Summit presentation, she

thought that better information was exchanged thought the Q & A session and open discussion rather than simply reviewing a slide deck.

DR. JENNINGS said he thought it was a good meeting, that the educational sessions marked in blue on the agenda were useful things to make efforts to include. He said he found the manager perspectives useful. He said he thought there was a need for dialogue and discussion, interaction on the actuarial assumptions and encouraged working through staff to the leanings and insights to the various actuaries ahead of time might expedite the process.

CHAIR WILLIAMS said that the determinations would be made by June and asked if DR. JENNINGS felt that it had to be addressed earlier; DR JENNINGS said he felt like it needed more than one discussion, that there would be multiple iterations as opposed to waiting to see what would be presented in March. He said he thought some conversations prior to March might facilitate the process.
MR. HANNA said that he fully agreed. He said the experience study that was performed every four years was a significant amount of work for Trustees and the actuaries. He said they had a tentative meeting scheduled in April that was always on the schedule, and that staff was more than willing to firm up those dates.

TRUSTEE COMMENTS
MS. HARBO gave thanks to MR. JOHNSON for his service to the members and beneficiaries, first as legal counsel to the PERS and TRS Boards and the Alaska State Pension Investment Board, then the ARMB and finally as a Trustee and then chairman of the Board. She noted that she was happy he was going to remain as a Trustee on the Board. She also thanked the staff at Treasury and DRB for their service.

MR. MOEN also thanked MR. JOHNSON for his service and congratulated CHAIR WILLIAMS.

MR. JOHNSON said that he looked forward to the future of the ARMB under the leadership of CHAIR WILLIAMS, VICE-CHAIR HIPPLER, AND MS. HARBO as Secretary. He said he had enjoyed his time as chair and vice-chair two years prior and was very proud to have served with the Board. He said it was critical to maintain focus going forward.

CHAIR WILLIAMS said he had always found the Board to be one of the most competent, thoughtful, and professional boards with deep, important issues, important discussions, and was honored to get to work with great staff.

FUTURE AGENDA ITEMS - None.

ADJOURNMENT

There being no objection and no further business to come before the board, the meeting was adjourned at 12:27 p.m. on December 3, 2021, on a motion made by MS. HARBO and seconded by MR. JOHNSON.

Chair of the Board of Trustees
Alaska Retirement Management Board

ATTEST:

_____

Corporate Secretary

Note: An outside contractor recorded the meeting and prepared the summary minutes. For in-depth discussion and more presentation details, please refer to the recording of the meeting and presentation materials on file at the ARMB office.

ALASKA RETIREMENT MANAGEMENT BOARD
STAFF REPORT
Division of Retirement & Benefits Report
March 17, 2022

Summary of Monthly Billings / Buck Global LLC

Attached is the requested summary schedule of invoices by quarter related to actuarial services provided by the Division's consulting actuary, Buck Global LLC.

Included on this schedule is the quarter ended September 30, 2021, and the quarter ended December 31, 2021.

Items listed on the left side of the schedule represent regular and non-regular services provided under our current contract.

The associated costs of each service are charged to the System or Plan noted on the column headings.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Summary of Monthly Billings - Buck Global LLC

DATE: March 17, 2022

ACTION: _____

INFORMATION: X

BACKGROUND:

AS 37.10.220(a)(8) prescribes that the Alaska Retirement Management Board (Board) "coordinate with the retirement system administrator to have an annual actuarial valuation of each retirement system prepared to determine system assets, accrued liabilities, and funding ratios…."

As part of the oversight process, the Board has requested that the Division of Retirement and Benefits provide quarterly summary updates to review services provided and costs incurred for actuarial valuations and other systems' requests.

STATUS:

Attached are the summary totals for the six months ended December 31, 2021 with comparative totals from the prior fiscal year.

Buck
Billing Summary
For the Three Months Ended September 30, 2021

	PERS	TRS	JRS	NGNMRS	EPORS	TOTAL
Actuarial valuations	$ 53,466	42,561	5,457	5,457	2,184	$ 109,125
KPMG audit information request	3,142	1,278	23	90	-	4,533
ARMB presentations and meeting attendance	3,411	3,414	-	-	-	6,825
FY20 final PERS/TRS contribution rates	3,411	3,414	-	-	-	6,825
GASB 67/74	7,572	6,060	759	759	-	15,150
GASB 68/75	22,722	18,180	2,274	2,274	-	45,450
Projections	6,750	6,750	-	-	-	13,500
Estimated funded status of DB plan at 6/30/21	7,139	2,898	-	-	-	10,037
2020 valuation projections - no FY23 ASC and 3-year asset smoothing	25,235	9,816	26	-	-	35,077
AlaskaCare retiree plan cost study	6,185	2,296	22	-	-	8,503
Reset actuarial value of assets to market value of assets	11,445	4,646	-	-	-	16,091
TOTAL	$ 150,478	101,313	8,561	8,580	2,184	$ 271,116
For the Three Months Ended September 30, 2020	$ 101,046	81,969	8,500	8,523	-	$ 200,038

For the Three Months Ended December 31, 2021

	PERS	TRS	JRS	NGNMRS	EPORS	TOTAL
Actuarial valuations	$ 53,466	42,561	5,457	5,457	2,184	$ 109,125
KPMG audit information request	6,332	2,574	46	181	-	9,133
ARMB presentations and meeting attendance	39,467	18,075	266	1,030	-	58,838
FY20 final PERS/TRS contribution rates	3,411	3,414	-	-	-	6,825
GASB 67/74	7,572	6,060	759	759	-	15,150
GASB 68/75	22,722	18,180	2,274	2,274	-	45,450
Projections	6,750	6,750	-	-	-	13,500
Meeting materials	3,285	1,335	23	94	-	4,737
TOTAL	$ 143,005	98,949	8,825	9,795	2,184	$ 262,758
For the Three Months Ended December 31, 2020	$ 101,334	82,634	8,512	8,570	-	$ 201,050

Summary through the Six Months Ended December 31, 2021

	PERS	TRS	JRS	NGNMRS	EPORS	TOTAL
Actuarial valuations	$ 106,932	85,122	10,914	10,914	4,368	$ 218,250
KPMG audit information request	9,474	3,852	69	271	-	13,666
ARMB presentations and meeting attendance	42,878	21,489	266	1,030	-	65,663
FY20 final PERS/TRS contribution rates	6,822	6,828	-	-	-	13,650
GASB 67/74	15,144	12,120	1,518	1,518	-	30,300
GASB 68/75	45,444	36,360	4,548	4,548	-	90,900
Projections	13,500	13,500	-	-	-	27,000
Meeting materials	3,285	1,335	23	94	-	4,737
Estimated funded status of DB plan at 6/30/21	7,139	2,898	-	-	-	10,037
2020 valuation projections - no FY23 ASC and 3-year asset smoothing	25,235	9,816	26	-	-	35,077
AlaskaCare retiree plan cost study	6,185	2,296	22	-	-	8,503
Reset actuarial value of assets to market value of assets	11,445	4,646	-	-	-	16,091
TOTAL	$ 293,483	200,262	17,386	18,375	4,368	$ 533,874
Summary through the Six Months Ended December 31, 2020	$ 202,380	164,603	17,012	17,093	-	$ 401,088

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Division of Retirement & Benefits Report
March 17, 2022

Retirement System Membership Activity as of December 31, 2021

Attached are the membership statistics for the quarter ending

- December 31, 2021

There is a net increase in active members from last quarter, all in DCR members:

- PERS Tier 1-3 active members decreased from 9,798 to 9,586, or a decrease of 212.
- PERS DCR active members increased from 24,686 to 25,388, or an increase of 702.
- PERS active members had a net increase of 490.

- TRS Tier 1-2 active members decreased from 3,435 to 3,430, or a decrease of 5.
- TRS DCR active members increased from 6,194 to 6,622, or an increase of 428.
- TRS active members had a net increase of 423.

Retiree counts have changed in the following manner:

- PERS retirees increased from 37,028 to 37,123, or an increase of 95 (all tiers).
- TRS retirees decreased from 13,551 to 13,511, or a decrease of 40 (all tiers).

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Retirement System Membership Activity as of December 31, 2021

ACTION: _____

DATE: March 17, 2022

INFORMATION: **X**

BACKGROUND:

Information related to PERS, TRS, JRS, NGNMRS, SBS, and DCP membership activity as requested by the Board.

STATUS:

Membership information as of December 31, 2021.

MEMBERSHIP STATISTICS AS OF SEPTEMBER 30, 2021

	PERS						TRS					JRS	NGNMRS	SBS	DCP
	DB				DCR	SYSTEM	DB			DCR	SYSTEM				
	Tier I	Tier II	Tier III	Total	Tier IV	TOTAL	Tier I	Tier II	Total	Tier III	TOTAL				
Active Members	613	2,163	7,022	9,798	24,686	34,484	143	3,292	3,435	6,194	9,629	73	n/a	20,655	6,659
Terminated Members															
Entitled to Future Benefits	243	1,632	3,209	5,084	2,185	7,269	17	613	630	858	1,488	2	n/a	29,150	5,817
Other Terminated Members	985	1,995	7,330	10,310	16,706	27,016	220	1,437	1,657	2,880	4,537	1	n/a	n/a	n/a
Total Terminated Members	1,228	3,627	10,539	15,394	18,891	34,285	237	2,050	2,287	3,738	6,025	3	n/a	29,150	5,817
Retirees & Beneficiaries	22,236	9,297	5,350	36,883	145	37,028	9,966	3,543	13,509	42	13,551	144	692	n/a	n/a
Managed Accounts	n/a	n/a	n/a	n/a	5,973	5,973	n/a	n/a	n/a	1,496	1,496	n/a	n/a	3,354	3,171
Retirements - 1st QTR FY22	51	134	150	335	18	353	43	218	261	12	273	1	3	n/a	n/a
Full Disbursements - 1st QTR FY22	16	45	72	133	463	596	3	10	13	114	127	-	n/a	580	195
Partial Disbursements - 1st QTR FY22	n/a	n/a	n/a	n/a	151	151	n/a	n/a	n/a	42	42	n/a	n/a	1,378	608

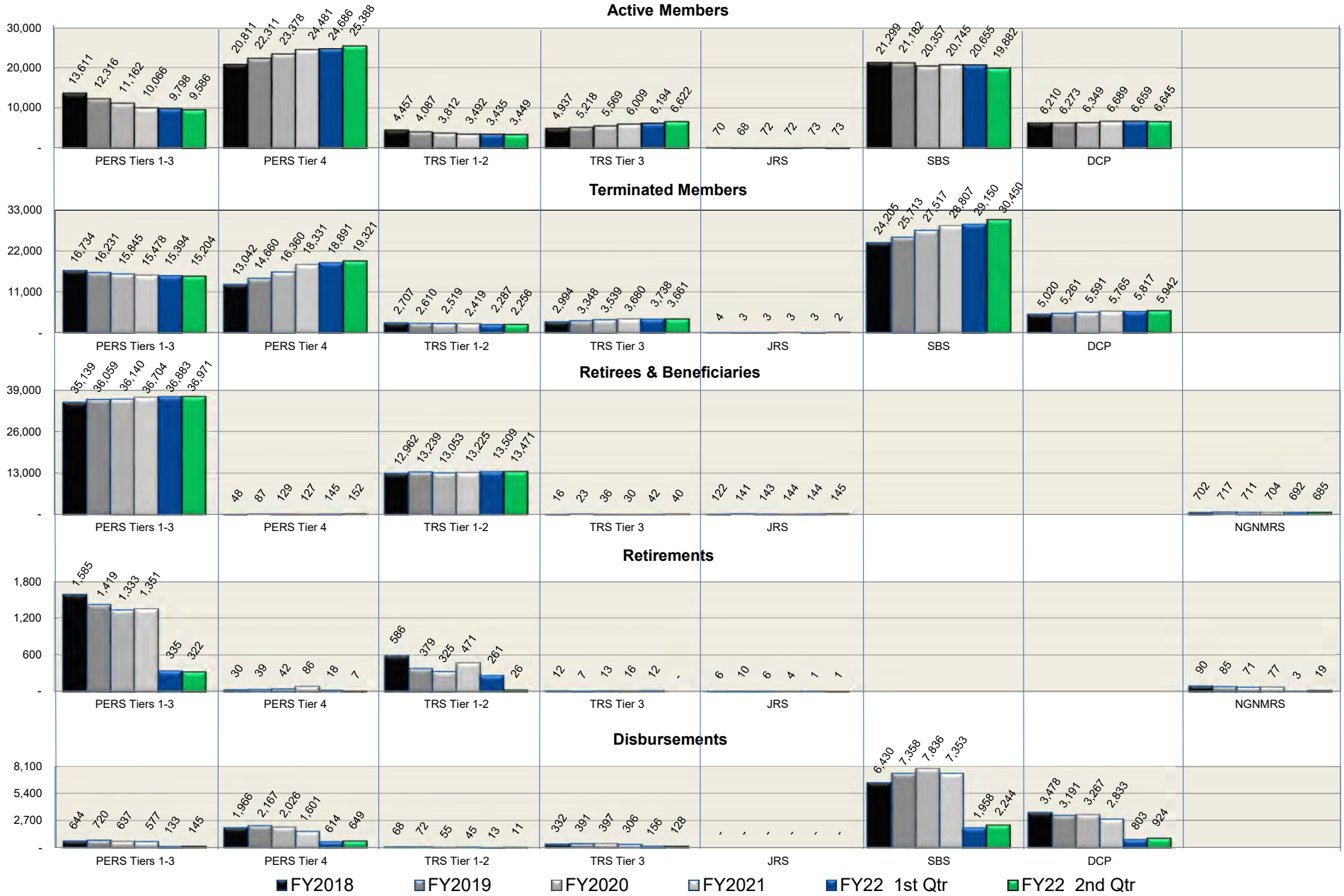
MEMBERSHIP STATISTICS AS OF DECEMBER 31, 2021

	PERS						TRS					JRS	NGNMRS	SBS	DCP
	DB				DCR	SYSTEM	DB			DCR	SYSTEM				
	Tier I	Tier II	Tier III	Total	Tier IV	TOTAL	Tier I	Tier II	Total	Tier III	TOTAL				
Active Members	586	2,100	6,900	9,586	25,388	34,974	155	3,294	3,449	6,622	10,071	73	n/a	19,882	6,645
Terminated Members															
Entitled to Future Benefits	239	1,568	3,166	4,973	2,215	7,188	16	600	616	829	1,445	1	n/a	30,450	5,942
Other Terminated Members	976	1,972	7,283	10,231	17,106	27,337	217	1,423	1,640	2,832	4,472	1	n/a	n/a	n/a
Total Terminated Members	1,215	3,540	10,449	15,204	19,321	34,525	233	2,023	2,256	3,661	5,917	2	n/a	30,450	5,942
Retirees & Beneficiaries	22,104	9,382	5,485	36,971	152	37,123	9,916	3,555	13,471	40	13,511	145	685	n/a	n/a
Managed Accounts	n/a	n/a	n/a	n/a	5,980	5,980	n/a	n/a	n/a	1,501	1,501	n/a	n/a	3,410	3,257
Retirements - 2nd QTR FY22	37	136	149	322	7	329	5	21	26	-	26	1	19	n/a	n/a
													11		
Full Disbursements - 2nd QTR FY22	11	43	91	145	483	628	2	9	11	80	91	-	n/a	547	167
Partial Disbursements - 2nd QTR FY22	n/a	n/a	n/a	n/a	166	166	n/a	n/a	n/a	48	48	n/a	n/a	1,697	757

Alaska Division of Retirement and Benefits

FY 2022 QUARTERLY REPORT OF MEMBERSHIP STATISTICS

Annual & Quarterly Trends as of December 31, 2021



LEGEND

Active Members - All active members at the time of the data pull,
except SBS & DCP, which are counts of contributors during the final quarter of each period.

Terminated Members - All members who have terminated without refunding their account,
except SBS & DCP, which are counts of members with balances at the end of the period less active members.

Retirees & Beneficiaries - All members who have retired from the plans, including beneficiaries eligible for benefits.

Managed Accounts - Individuals who have elected to participate in the managed accounts option with Empower.

Retirements - The number of retirement applications processed.

Full Disbursements - All types of disbursements that leave the member balance at zero.

Partial Disbursements - All types of disbursements that leave the member balance above zero. If more than one
partial disbursement is completed during the quarter for a member, they are counted only once for statistical purposes.

ALASKA RETIREMENT MANAGEMENT BOARD
STAFF REPORT
Division of Retirement & Benefits Report
March 17, 2022

Benefits And Retirement System (BEARS) Project Update

Project Background:

With a capital appropriation in FY19, the Division of Retirement and Benefits (DRB) began implementing a multi-year project to modernize IT and work processes to drive efficiency, accuracy, and security associated with its core business and services. This integrated, enterprise-wide system supports all our core business functions for pension and health plans of all tiers including demographic information as a single source of truth. The system will be an enterprise-level retirement information system solution providing many modern tools to enable the state to maintain and improve service to members. The system will integrate core business processes, facilitate consistency, and enable additional oversight and accountability.

To achieve these goals, DRB contracted with a Project Management consulting firm, Linea, to assist in enterprise-wide system selection plans and roadmaps, participate in a deeper dive in business process analysis and workflow design. Additionally, the firm assisted division staff with developing the requirements of the RFP for soliciting and securing a vendor solution for modernizing DRB's enterprise platform. as well as a firm to deliver an enterprise-wide solution.

In April 2020, DRB awarded Sagitec Solutions, a global technology solutions company, the contract to develop a new enterprise system. The total price of this agreement is $24,866,060.00 for implementation plus a one-year warranty period. The original bid was $36,855,381.00 with a total savings of $11,989,321.00, which is a 32.5% reduction in the original proposed cost. Since contract award, Sagitec has been working closely with DRB staff and Linea to analyze DRB's needs, review all requirements, and design and develop the modules that will comprise the enterprise-wide system.

Benefits And Retirement System (BEARS) Project Update (continued)

Status Update:

Since the September 2021 update on the BEARS modernization project, DRB has had several accomplishments and met several milestones. The project is currently on-time, on-budget, and is expected to be completed by December 4, 2023.

Accomplishments include:

- Completion of Pilot 1 testing
- Program Modules: In-depth analysis, design, and development of program modules including Retirement Benefits, Disability Benefits, Active and Retiree Death, Insurance, and Withdrawals. These modules are scheduled to be included in Pilot 2 testing later this year
- Data Conversion: Taking place in conjunction with module design and development, as it requires that the data source be mapped correctly for accessibility within the new module design
  - Person demographics, organization, and financial transactions are 100% complete
  - Membership, indebtedness, and enrollment and contribution data conversion is underway, with 5 of the remaining 7 modules at70% or higher completed
- Budget and Spending by Vendor (as of February 24, 2022):

SAGITEC – Program design, development, and implementation

TOTAL AUTHORIZATION	24,866,060
SPEND-TO-DATE	10,569,057
BALANCE REMAINING	14,297,003

LINEA – Program management

TOTAL AUTHORIZATION	3,270,858
SPEND-TO-DATE	2,001,060
BALANCE REMAINING	1,269,798

Division of Retirement & Benefits
Legislative Update – 2022

Bills	Sponsor	Referrals	Summary	Status
Pension Plans				
HB 55, CSHB 55	REPRESENTATIVE JOSEPHSON	(H) STA, FIN	This bill would open a new PERS Defined Benefits tier allowing current police/fire fighters to elect the new tier or remain in the PERS DCR. Make necessary changes relating to eligibility of peace officers and firefighters for DCR medical, changes to employee contribution as set by the ARMB, and changes to the PRPA program based on the funding of the PERS system.	(H) TRANSMITTED TO (S) 05/19/2021 (H) version: CSHB 55 (FIN)
HB 281	HOUSE RULES BY REQUEST OF THE GOVERNOR	(H) FIN	This legislation is the FY2023 budget bill making appropriations for the operating and loan program expenses of state government and for certain programs; capitalizing funds; amending appropriations; making capital appropriations, supplemental appropriations, and reappropriations; and providing for an effective date.	Referred to (H) FIN
HB 220	REPRESENTATIVE HOPKINS	(H) L&C, FIN	This legislation provides PERS and TRS employees a choice of choosing between the defined benefits and defined contributions plans.	Passed out of (H) L&C; Referred to (H) FIN
HB 248	REPRESENTATIVE SHAW	(H) STA, FIN	This legislation allows a retired Peace Office to return to work while maintaining access to their pension benefit. They would not be able to accrue additional service or an increase to their retirement benefit, but would have access to employee health insurance.	Referred to (H) STA
SB 6	SENATOR KAWASAKI	(S) EDC, L&C, FIN	This bill offers a temporary retirement incentive program to the defined benefits members of PERS and TRS. It allows qualified members to retire three years early.	(S) FIN
SB 37	SENATOR KIEHL	(S) L&C, FIN	This legislation provides restoration of tenure for certain disabled individuals and certain PERS/TRS employees an opportunity to choose between the defined benefit and	(S) L&C

Bill	Sponsor	Referrals	Summary	Status
			defined contribution plans of the Alaska Public Employees' Retirement and the Teachers' Retirement systems.	
SB 162	SENATE RULES BY REQUEST OF THE GOVERNOR	(S) FIN	This legislation is the FY2023 budget bill making appropriations for the operating and loan program expenses of state government and for certain programs; capitalizing funds; amending appropriations; making capital appropriations, supplemental appropriations, and reappropriations; and providing for an effective date.	(S) FIN
SRJ 12	SENATOR WIELECHOWSKI	(S) FIN	This resolution urges the United States Congress to repeal the Windfall Elimination Provision and Government Pension Offset of the Social Security Act.	(S) FIN
Bills	**Sponsor**	**Referrals**	**Summary**	**Status**
Health Plans				
HB 113	House Rules by Request of the Governor	(H) L&C, HSS, FIN	This legislation aims to reduce the cost of health care and improve care quality by addressing the lack of transparent data that is a hallmark of the health care industry today. This bill creates an All-Payer Claims Database (APCD) housed within the Division of Insurance. The APCD could be used to analyze health care cost, quality, and utilization data to aid in advising and making recommendations to policy makers and consumers on health care programs and policies. **Companion bill to SB 93	Has not been scheduled for a hearing.
SB 30	Senator Begich	(S) HSS, L&C, FIN	This legislation requires the AlaskaCare health plans to provide coverage for colorectal cancer screenings.	Withdrawn by Sponsor.
SB 41	Senator Hughes	(S) L&C, FIN	This legislation requires health care providers and insurers to publicly disclose network pricing agreements. It further requires commercial insurers to establish a cash incentive program to encourage commercially insured individuals to obtain care from lower cost network providers. The bill does not apply these requirements to the AlaskaCare health plans, but directs the Division of Retirement and Benefits to conduct an analysis to evaluate whether the	Referred to (S) L&C

Bill	Sponsor	Referrals	Summary	Status
			state or employees covered by AlaskaCare health plans would benefit if required to comply with the provisions outlined in the bill.	
SB 93	Senate Rules by Request of the Governor	(S) HSS, L&C, FIN	This legislation aims to reduce the cost of health care and improve care quality by addressing the lack of transparent data that is a hallmark of the health care industry today. This bill creates an All-Payer Claims Database (APCD) housed within the Division of Insurance. The APCD could be used to analyze health care cost, quality, and utilization data to aid in advising and making recommendations to policy makers and consumers on health care programs and policies. **Companion bill to HB 113	Heard and held in (S) FIN

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Disclosure – Communications - Calendar Update
March 17, 2022

The 4th Quarter Financial Disclosure Memorandum is included in the packet; no disclosure transactions require additional review or discussion.

The Communications Memorandum lists communications direct to and sent on behalf of the Board since the December 2-3, 2021 meeting, as well as a summary of public records request received between November 16, 2021 and February 28, 2022.

The remaining 2022 meeting calendar is attached, along with a DRAFT of the 2023 ARMB Calendar.

A copy of the timeline showing contract and review deadlines for FY2022 through FY2027 is also included in the packet for trustee reference.

ALASKA RETIREMENT MANAGEMENT BOARD
M E M O R A N D U M

To: ARMB Trustees
From: Alysia Jones
Date: March 2, 2022
Subject: Financial Disclosures

As required by AS 37.10.230 and Alaska Retirement Management Board policy relating to investment conduct and reporting, trustees and staff must disclose certain financial interests. We are hereby submitting to you a list of disclosures for individual transactions made by trustees and staff.

4th Quarter – October 1, 2021 to December 31, 2021

Name	Position Title	Disclosure Type	Disclosure Date
Hunter Romberg	Investment Data Analyst	Equities	1/03/2022
Jerrold Mitchell	Investment Advisory Council Member	Equities	1/04/2022
Donald Krohn	ARMB Trustee	Equities/Options	1/12/2022
Victor Djajalie	State Investment Officer	Equities	1/14/2022
Michelle Prebula	State Investment Officer	Equities	1/26/2022
Brian Fechter	Deputy Commissioner	Equities	2/08/2022

ALASKA RETIREMENT MANAGEMENT BOARD
M E M O R A N D U M

To: ARMB Trustees
From: Alysia Jones
Date: March 2, 2022
Subject: Communications & Information Requests

Communications to Trustees
There are no communications to report since the ARMB's December 2-3, 2021 meeting.

Communications Sent on behalf of the Board

Name	Type	Date	Topic
Notice to PERS & TRS Bargaining Units	Public Notice & Legal Ad*	12/23/21 – 2/1/2022	Announcement and instructions on submission of PERS and TRS list of nominees for upcoming vacancies.

**In accordance with 15 AAC 112.110 the notice was posted on the Alaska Online Public Notice System, the DOR and ARMB websites, and in one or more newspapers of general circulation in each judicial district of the state.*

Public Records Requests
From December 3, 2021 to February 28, 2022

Topics	# of Requests	Description
Quarterly Investment Info.	2	Investment pools, hedge funds/absolute return, real estate, private debt
Meeting Materials	4	Summary of Board Actions
Procurement / Contracts	1	Contract expirations

ALASKA RETIREMENT MANAGEMENT BOARD
2022 Meeting Calendar

DATE	LOCATION	DESCRIPTION
April 28* Thursday	Videoconference	Actuarial Committee *Follow-up/additional discussion/questions on valuations and/or experience study*
April 29* **Friday**	**Videoconference**	**Board of Trustees Meeting** Action required on Review Actuary RFP Follow-up/ additional discussion/ questions on actuarial (replication) audit
June 15 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
June 16-17 **Thursday - Friday**	**Anchorage, AK**	**Board of Trustees Meeting:** *Final Actuary Reports/Adopt Valuation* *Adopt Asset Allocation* *Performance Measurement - 1st Quarter* *Manager Review (FY23 Questionnaire)* *Manager Presentations*
September 14 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
September 15-16 **Thursday - Friday**	**Anchorage, AK**	**Board of Trustees Meeting:** *Set Contribution Rates* *Audit Results/Assets – Auditor* *Approve Budget* *Performance Measurement – 2nd Quarter* *Real Estate Annual Plan* *Real Assets Evaluation – Callan LLC* *Manager Presentations*
October 11 Tuesday (placeholder)	Videoconference	Audit Committee
November 30 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
December 1-2 **Thursday-Friday**	**Anchorage, AK**	**Board of Trustees Meeting:** *Audit Report - DRB Auditor* *Performance Measurement – 3rd Quarter* *Manager Review (FY23 Questionnaire)* *Private Equity Evaluation - Callan LLC* *Review Private Equity Annual Plan* *Cybersecurity* *Manager Presentations*

NOTE: Meeting locations and topics are subject to change.

**Dates are tentative. Meetings to be held as necessary*

Approved: 6/17/2021

ALASKA RETIREMENT MANAGEMENT BOARD
2023 DRAFT Meeting Calendar

DATE	LOCATION	DESCRIPTION
March 15 Wednesday	Juneau, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
March 16-17 Thursday-Friday	**Juneau, AK**	**Board of Trustees Meeting:** *Performance Measurement – 4th Quarter* *Buck Draft Actuarial Report/GRS Draft Actuary Certification* *Capital Markets – Asset Allocation* *Manager Presentations*
April 27* Thursday	Videoconference	Actuarial Committee *Follow-up/additional discussion/questions on valuations*
April 28* Friday	**Videoconference**	**Board of Trustees Meeting**
June 14 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
June 15-16 Thursday - Friday	**Anchorage, AK**	**Board of Trustees Meeting:** *Final Actuary Reports/Adopt Valuation* *Adopt Asset Allocation* *Performance Measurement - 1st Quarter* *Manager Presentations*
September 13 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
September 14-15 Thursday - Friday	**Anchorage, AK**	**Board of Trustees Meeting:** *Set Contribution Rates* *Audit Results/Assets – Auditor* *Approve Budget* *Performance Measurement – 2nd Quarter* *Real Estate Annual Plan* *Real Assets Evaluation – Callan LLC* *Manager Presentations*
October 10 Tuesday *(placeholder)*	Videoconference	Audit Committee
December 6 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
December 7-8 Thursday-Friday	**Anchorage, AK**	**Board of Trustees Meeting:** *Audit Report - DRB Auditor* *Performance Measurement – 3rd Quarter* *Manager Review (Questionnaire)* *Private Equity Evaluation - Callan LLC* *Review Private Equity Annual Plan* *Cybersecurity* *Manager Presentations*

NOTE: Meeting locations and topics are subject to change.

**Meetings to be held as necessary*

ARMB Timeline of Contract and Review Deadlines FY2022 - FY2027

FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
Trustee Appointments/ Nominations for Terms Ending 3/01/2022 *PERS - R. Johnson* *TRS - G. Harbo*	**Trustee Appointments/ Nominations for Terms Ending 3/01/2023** *Finance Officer - L. Bretz* *Public - A. Hippler*	**Trustee Appointments/ Nominations for Terms Ending 3/01/2024** *Public - D. Krohn* *PERS - D. Moen* *TRS - B. Williams*		**Trustee Appointments/ Nominations for Terms Ending 3/01/2026** *PERS - TBD* *TRS - TBD*	**Trustee Appointments/ Nominations for Terms Ending 3/01/2027** *Finance Officer - TBD* *Public - TBD*
	IAC Appointments *Seat 1 - R. Ryerson* Sept 2022 agenda Effective Date: 1/1/2023 *Seat 3 - W. Jennings* Mar 2023 agenda Effective Date: 7/01/2023 (FY24)	**IAC Appointments** *Seat 2 - J. Mitchell* March 2024 agenda Effective Date: 7/01/2024 (FY25)		**IAC Appointments** *Seat 1 - TBD* Sept 2025 agenda Effective Date: 1/01/2026 *Seat 2 - TBD* March 2025 agenda Effective Date: 7/01/2026 (FY27)	**IAC Appointments** *Seat 3 - TBD* March 2027 agenda Effective Date: 7/01/207 (FY28)
Performance Measurement - General Consultant Contract (TRSY) *1st Renewal Option -Callan LLC* March 2022 agenda Effective Date: 7/1/2022 (FY23)	**Performance Measurement (General) Consultant Contract (TRSY)** *2nd Renewal Option - Callan LLC* March 2023 agenda Effective Date: 7/01/2023 (FY24)	**Performance Measurement (General) Consultant Contract (TRSY)** *RFP - March 2024* Effective Date: 7/01/2024 (FY25)			**Performance Measurement - General Consultant Contract (TRSY)** *1st Renewal Option or RFP -* TBD March 2027 agenda Effective Date: 7/1/2027 (FY28)
		Performance Consultant Review (TRSY) AS 37.10.220(a)(11) *RFP - March 2024* Presentation Sept 2024 (FY25)			
Real Assets Consultant Contract (TRSY) *1st Renewal Option -Callan LLC* March 2022 agenda Effective Date: 7/1/2022 (FY23)	**Real Assets Consultant Contract (TRSY)** *2nd Renewal Option -Callan LLC* March 2023 agenda Effective Date: 7/01/2023 (FY24)	**Real Assets Consultant Contract (TRSY)** *RFP - March 2024* Effective Date: 7/01/2024 (FY25)			**Real Assets Consultant Contract** *1st Renewal Option or RFP -* TBD March 2027 agenda Effective Date: 7/1/2027 (FY28)
		Asset Liability Study (TRSY) *Recommendation: Every 5 years*			
	Actuary Contract (DRB) AS 37.10.220(a)(8 & 9) *3yr Renewal Option - Buck* March 2023 agenda Effective Date: 7/01/2023 (FY24)			**Actuary Contract (DRB)** AS 37.10.220(a)(8 & 9) *2yr Renewal Option - Buck* March 2026 agenda Effective Date: 7/01/2026 (FY27)	
Review Actuary Contract (TRSY) AS 37.10.220(a)(9) *RFP - March 2022* Effective Date: 7/01/2022 (FY23)			**Review Actuary Contract (TRSY)** AS 37.10.220(a)(9) *1st Renewal Option or RFP - TBD* March 2025 Effective Date: 7/01/2025 (FY26)	**Review Actuary Contract (TRSY)** AS 37.10.220(a)(9) *2nd Renewal Option or RFP - TBD* March 2026 Effective Date: 7/01/2026 (FY27)	**Review Actuary Contract (TRSY)** AS 37.10.220(a)(9) *RFP - March 2027* Effective Date: 7/01/2027 (FY28)
			Actuarial Audit RFP (TRSY) AS 37.10.220(a)(10) RFP March 2025 Effective Date: 7/01/2025 (FY26)		
Actuarial Valuations AS 37.10.220(a)(8)	**Actuarial Valuations** AS 37.10.220(a)(8)	**Actuarial Valuations** AS 37.10.220(a)(8)	**Actuarial Valuations** AS 37.10.220(a)(8)	**Actuarial Valuations** AS 37.10.220(a)(8)	**Actuarial Valuations** AS 37.10.220(a)(8)
Actuarial Experience Analysis AS 37.10.220(a)(9)			**Actuarial Experience Analysis** AS 37.10.220(a)(9)		
			Recordkeeper RFP (DRB) RFP October 2024 Effective Date: 7/01/2025		

Updated March 2022

THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Revenue

ALASKA RETIREMENT MANAGEMENT BOARD

PO Box 110405
Juneau, Alaska 99811-0405
Main: 907.465.3749
Fax: 907.465.4397

Chief Investment Officer Report

March 2022

1. CIO Update

2. Watch List:
   a. Existing – Man Group, personnel turnover, 3/21
   b. Existing – Fidelity Real Estate High Income, performance, 12/21
   c. Addition – Fidelity Signals due to personnel turnover
   d. Addition – Blackrock Real Estate due to personnel turnover
   e. Addition – Brandes International due to performance

3. Material contract and investment actions:
   a. 12/20/21 Mass Mutual Stable-Value Wrap Contract Update for T.Rowe/DC
   b. 02/22/22 Battery Ventures XIV $25 million private equity commitment

4. Portfolio Transaction Update from November 2021 through January 2022

Individual Manager Transactions

November 2021 - January 2021

Asset Class	Total
Fixed Income	412,072,808
Global Equity Ex-US	218,198,605
Opportunistic	40,569,486
Broad Domestic Equity	(670,840,898)
Real Assets	-
Private Equity	-
Net Buys	670,840,898
Net Sells	(670,840,898)

Manager	Total	Asset Class	Description of Large Transactions
ARMB Aggregate Bond Fund	279,200,000	Fixed Income	Quarter end rebalance
Baillie Gifford	164,000,000	Intl. Equity	Rebalancing International Equities
Brandes Investment Partners	155,500,000	Intl. Equity	Rebalancing International Equities
Short Term Fixed Income Pool	132,872,808	Fixed Income	Quarter end rebalance
ARMB Multi-factor	100,000,000	Dom. Equity	Rebalance Factor Allocation
SSGA Emerging Markets	54,800,000	Intl. Equity	Quarter end rebalance
Capital Group	39,000,000	Intl. Equity	Quarter end rebalance
PineBridge	32,300,000	Opportunistic	Quarter end rebalance
LGIMA Sci Beta Emerging Markets	25,700,000	Intl. Equity	Quarter end rebalance
LGIMA Sci Beta Developed Non-US	19,500,000	Intl. Equity	Quarter end rebalance
Fidelity Short Signaling	9,400,000	Opportunistic	Quarter end rebalance
International Equity Residual Asset	(1,395)	Intl. Equity	Closed Account Cleanup
ARMB Domestic Residual Assets	(40,898)	Dom. Equity	Closed Account Cleanup
Mackay Shields LLC	(130,514)	Opportunistic	Closed Account Cleanup
Schroders Advanced ILS Fund	(1,000,000)	Opportunistic	Closed Account Cleanup
ARMB S&P 600	(32,900,000)	Dom. Equity	Quarter end rebalance
Arrowstreet Capital	(43,200,000)	Intl. Equity	Quarter end rebalance
SSGA World ex-US IMI	(197,100,000)	Intl. Equity	Quarter end rebalance
ARMB Scientific Beta	(256,400,000)	Dom. Equity	Quarter end rebalance
ARMB S&P 900	(481,500,000)	Dom. Equity	Quarter end rebalance

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Fund Financials – Cash Flow Report
March 17, 2022

Ryan Kauzlarich, Assistant State Comptroller, Department of Revenue

As of January 2022 month-end, total plan assets were as follows: PERS - $24.8 billion, TRS - $11.6 billion, JRS - $292.6 million, NGNMRS - $49.2 million, SBS - $5.0 billion, DCP - $1.2 billion. Total non-participant directed plans totaled $33.9 billion, and participant-directed plans totaled $9.0 billion. Total assets were $42.9 billion.

Year-to-date income was $1.2 billion, and the plans experienced a net withdrawal of $587.9 million. Total assets were up 1.55% year-to-date.

Internally managed assets totaled $17.1 billion.

As of month-end, all plans were within their asset allocations bands.

Kevin Worley, Chief Financial Officer, Division of Retirement and Benefits

Presented is the Division of Retirement and Benefits (DRB) Supplement to the Treasury Division's Financial Report as of January 31, 2022.

DRB's supplement report expands on the ARMB Financial Report column "Net Contributions (Withdrawals)" located on pages 1 and 2. DRB reports the summary totals of actual employee and employer, State of Alaska, and other revenue items, as well as benefit payments, refunds & disbursements, and combined administrative & investment expenditures. DRB's supplement report presents cash inflows and outflows for the 7-months ended January 31, 2022 (page 1) and for the month of January 2022 (page 2).

Also presented are participant-directed distributions by plan and by type for the year-to-date period on page 3. This page includes Tier information on the defined benefit refunds, and vested percentage on defined contribution distributions.

"Notes for the DRB Supplement to the Treasury Report" includes information for the pension and healthcare plans. Additional information regarding other income is also presented on pages 4 and 5.

ALASKA RETIREMENT MANAGEMENT BOARD
FINANCIAL REPORT

As of January 31, 2022

ALASKA RETIREMENT MANAGEMENT BOARD
Schedule of Investment Income and Changes in Invested Assets by Fund
Fiscal Year-to-Date through January 31, 2022

	Beginning Invested Assets	Investment Income [1]	Net Contributions (Withdrawals)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income [2]
Public Employees' Retirement System (PERS)						
Defined Benefit Plans:						
Retirement Trust	$ 11,697,812,951	$ 437,139,406	$ (196,260,505)	$ 11,938,691,852	2.06%	3.77%
Retirement Health Care Trust	9,655,275,640	355,174,573	(198,754,895)	9,811,695,318	1.62%	3.72%
Total Defined Benefit Plans	21,353,088,591	792,313,979	(395,015,400)	21,750,387,170	1.86%	3.75%
Defined Contribution Plans:						
Participant Directed Retirement	1,964,383,666	(3,236,673)	54,861,653	2,016,008,646	2.63%	-0.16%
Health Reimbursement Arrangement	670,208,687	24,794,295	27,976,173	722,979,155	7.87%	3.62%
Retiree Medical Plan	200,227,739	7,417,265	9,216,511	216,861,515	8.31%	3.62%
Defined Benefit Occupational Death and Disability:						
Public Employees	41,171,441	1,524,833	2,242,340	44,938,614	9.15%	3.61%
Police and Firefighters	17,708,969	655,411	692,779	19,057,159	7.61%	3.63%
Total Defined Contribution Plans	2,893,700,502	31,155,131	94,989,456	3,019,845,089	4.36%	1.06%
Total PERS	**24,246,789,093**	**823,469,110**	**(300,025,944)**	**24,770,232,259**	2.16%	3.42%
Teachers' Retirement System (TRS)						
Defined Benefit Plans:						
Retirement Trust	6,614,621,768	249,681,912	(131,568,993)	6,732,734,687	1.79%	3.81%
Retirement Health Care Trust	3,671,369,667	135,015,526	(67,127,180)	3,739,258,013	1.85%	3.71%
Total Defined Benefit Plans	10,285,991,435	384,697,438	(198,696,173)	10,471,992,700	1.81%	3.78%
Defined Contribution Plans:						
Participant Directed Retirement	812,550,138	(1,794,266)	14,756,554	825,512,426	1.60%	-0.22%
Health Reimbursement Arrangement	196,700,402	7,253,140	6,354,210	210,307,752	6.92%	3.63%
Retiree Medical Plan	65,764,221	2,427,183	1,863,869	70,055,273	6.52%	3.64%
Defined Benefit Occupational Death and Disability	6,479,434	238,966	165,426	6,883,826	6.24%	3.64%
Total Defined Contribution Plans	1,081,494,195	8,125,023	23,140,059	1,112,759,277	2.89%	0.74%
Total TRS	**11,367,485,630**	**392,822,461**	**(175,556,114)**	**11,584,751,977**	1.91%	3.48%
Judicial Retirement System (JRS)						
Defined Benefit Plan Retirement Trust	238,747,285	9,045,764	1,000,024	248,793,073	4.21%	3.78%
Defined Benefit Retirement Health Care Trust	42,511,516	1,568,988	(304,645)	43,775,859	2.97%	3.70%
Total JRS	**281,258,801**	**10,614,752**	**695,379**	**292,568,932**	4.02%	3.77%
National Guard/Naval Militia Retirement System (MRS)						
Defined Benefit Plan Retirement Trust	49,296,334	906,358	(1,012,176)	49,190,516	-0.21%	1.86%
Other Participant Directed Plans						
Supplemental Annuity Plan	5,064,367,505	11,434,377	(86,409,580)	4,989,392,302	-1.48%	0.23%
Deferred Compensation Plan	1,217,085,734	4,328,294	(25,639,649)	1,195,774,379	-1.75%	0.36%
Total All Funds	**42,226,283,097**	**1,243,575,352**	**(587,948,084)**	**42,881,910,365**		
Total Non-Participant Directed	33,167,896,054	1,232,843,620	(545,517,062)	33,855,222,612	2.07%	3.75%
Total Participant Directed	9,058,387,043	10,731,732	(42,431,022)	9,026,687,753	-0.35%	0.12%
Total All Funds	**$ 42,226,283,097**	**$ 1,243,575,352**	**$ (587,948,084)**	**$ 42,881,910,365**	**1.55%**	**2.97%**

Notes:

(1) Includes interest, dividends, securities lending, expenses, realized and unrealized gains/losses

(2) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates and can be found at: http://treasury.dor.alaska.gov/armb/Reports-and-Policies/Investment-Performance.aspx

ALASKA RETIREMENT MANAGEMENT BOARD
Schedule of Investment Income and Changes in Invested Assets by Fund
For the Month Ended January 31, 2022

	Beginning Invested Assets	Investment Income (1)	Net Contributions (Withdrawals)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (2)
Public Employees' Retirement System (PERS)						
Defined Benefit Plans:						
Retirement Trust	$ 12,348,620,037	$ (363,585,377)	$ (46,342,808)	$ 11,938,691,852	-3.32%	-2.95%
Retirement Health Care Trust	10,131,682,050	(298,599,383)	(21,387,349)	9,811,695,318	-3.16%	-2.95%
Total Defined Benefit Plans	22,480,302,087	(662,184,760)	(67,730,157)	21,750,387,170	-3.25%	-2.95%
Defined Contribution Plans:						
Participant Directed Retirement	2,098,846,676	(89,237,216)	6,399,186	2,016,008,646	-3.95%	-4.25%
Health Reimbursement Arrangement	741,267,014	(21,824,341)	3,536,482	722,979,155	-2.47%	-2.94%
Retiree Medical Plan	222,240,702	(6,542,729)	1,163,542	216,861,515	-2.42%	-2.94%
Defined Benefit Occupational Death and Disability:						
Public Employees	46,016,602	(1,354,555)	276,567	44,938,614	-2.34%	-2.93%
Police and Firefighters	19,575,268	(576,440)	58,331	19,057,159	-2.65%	-2.94%
Total Defined Contribution Plans	3,127,946,262	(119,535,281)	11,434,108	3,019,845,089	-3.46%	-3.81%
Total PERS	**25,608,248,349**	**(781,720,041)**	**(56,296,049)**	**24,770,232,259**	-3.27%	-3.06%
Teachers' Retirement System (TRS)						
Defined Benefit Plans:						
Retirement Trust	6,977,293,700	(205,491,935)	(39,067,078)	6,732,734,687	-3.51%	-2.95%
Retirement Health Care Trust	3,858,997,568	(113,723,482)	(6,016,073)	3,739,258,013	-3.10%	-2.95%
Total Defined Benefit Plans	10,836,291,268	(319,215,417)	(45,083,151)	10,471,992,700	-3.36%	-2.95%
Defined Contribution Plans:						
Participant Directed Retirement	858,643,720	(36,834,944)	3,703,650	825,512,426	-3.86%	-4.28%
Health Reimbursement Arrangement	215,660,526	(6,349,621)	996,847	210,307,752	-2.48%	-2.94%
Retiree Medical Plan	71,888,246	(2,116,755)	283,782	70,055,273	-2.55%	-2.94%
Defined Benefit Occupational Death and Disability	7,068,361	(208,136)	23,601	6,883,826	-2.61%	-2.94%
Total Defined Contribution Plans	1,153,260,853	(45,509,456)	5,007,880	1,112,759,277	-3.51%	-3.94%
Total TRS	**11,989,552,121**	**(364,724,873)**	**(40,075,271)**	**11,584,751,977**	-3.38%	-3.05%
Judicial Retirement System (JRS)						
Defined Benefit Plan Retirement Trust	256,949,219	(7,563,626)	(592,520)	248,793,073	-3.17%	-2.95%
Defined Benefit Retirement Health Care Trust	45,099,701	(1,328,741)	4,899	43,775,859	-2.94%	-2.95%
Total JRS	**302,048,920**	**(8,892,367)**	**(587,621)**	**292,568,932**	-3.14%	-2.95%
National Guard/Naval Militia Retirement System (MRS)						
Defined Benefit Plan Retirement Trust	50,730,355	(1,381,268)	(158,571)	49,190,516	-3.04%	-2.73%
Other Participant Directed Plans						
Supplemental Annuity Plan	5,186,436,785	(183,632,159)	(13,412,324)	4,989,392,302	-3.80%	-3.55%
Deferred Compensation Plan	1,252,363,534	(52,695,630)	(3,893,525)	1,195,774,379	-4.52%	-4.21%
Total All Funds	**44,389,380,064**	**(1,393,046,338)**	**(114,423,361)**	**42,881,910,365**		
Total Non-Participant Directed	34,993,089,349	(1,030,646,389)	(107,220,348)	33,855,222,612	-3.25%	-2.95%
Total Participant Directed	9,396,290,715	(362,399,949)	(7,203,013)	9,026,687,753	-3.93%	-3.86%
Total All Funds	**$ 44,389,380,064**	**$ (1,393,046,338)**	**$ (114,423,361)**	**$ 42,881,910,365**	**-3.40%**	**-3.14%**

Notes:

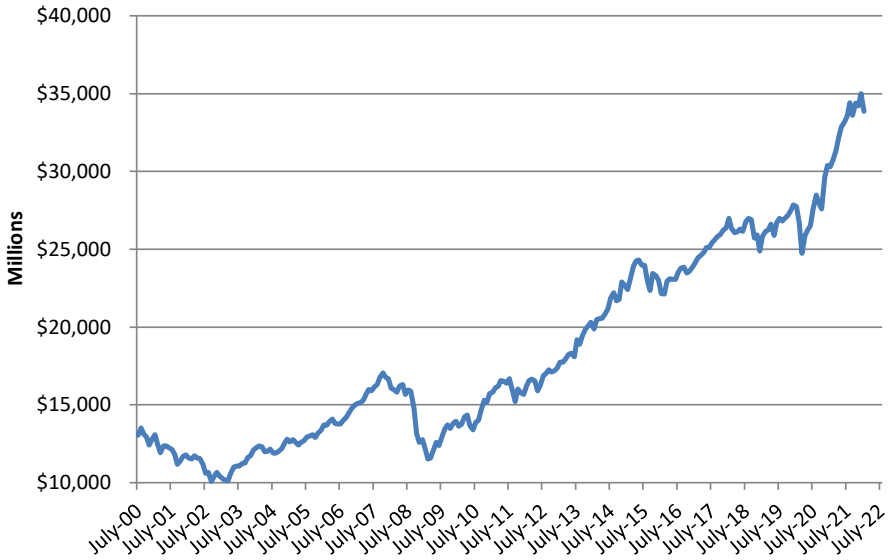
(1) Includes interest, dividends, securities lending, expenses, realized and unrealized gains/losses

(2) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates and can be found at: http://treasury.dor.alaska.gov/armb/Reports-and-Policies/Investment-Performance.aspx

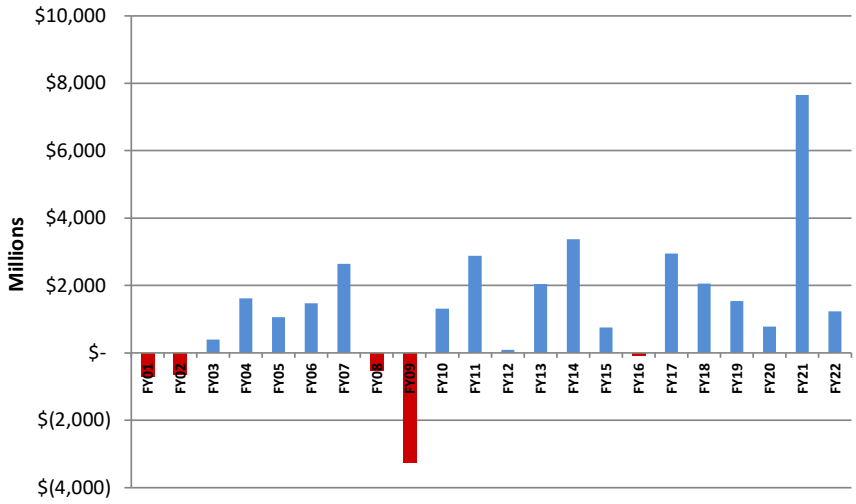
Total Non Participant Directed Assets

As of January 31, 2022

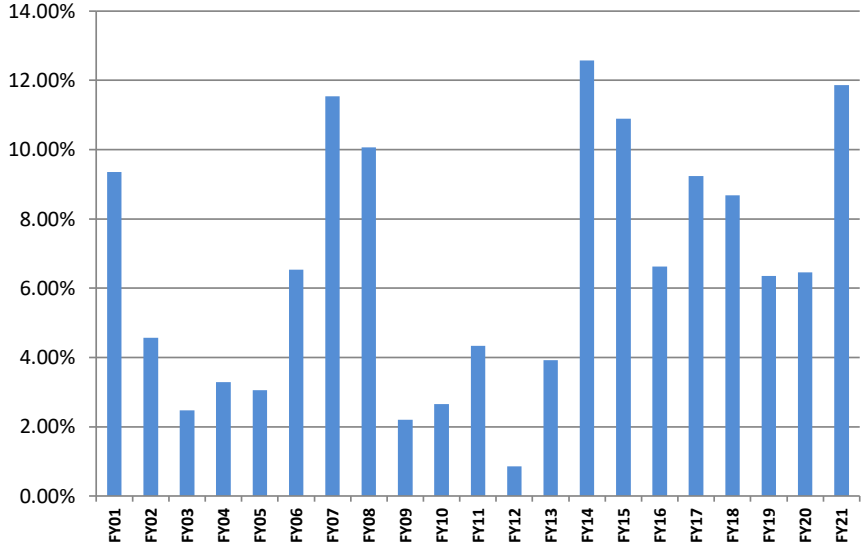
Total Assets History



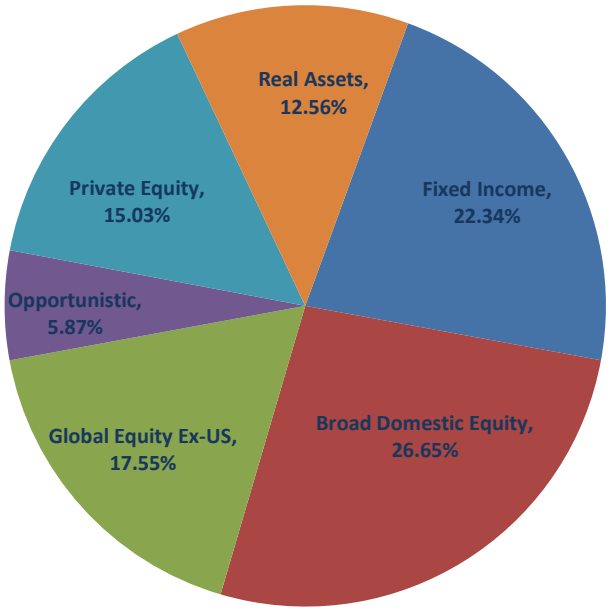
Income by Fiscal Year



5-year Annualized Returns as of Fiscal Year End

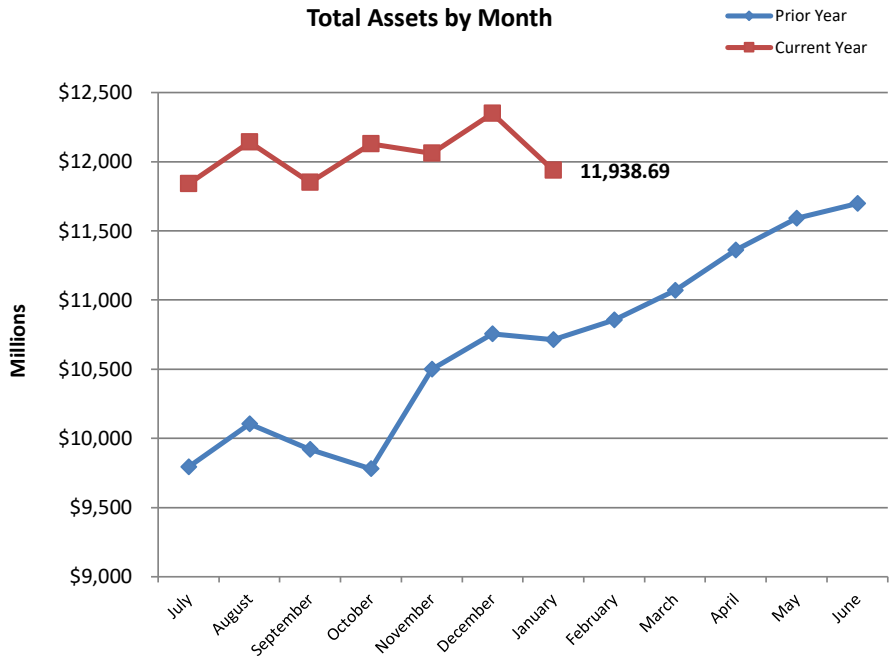


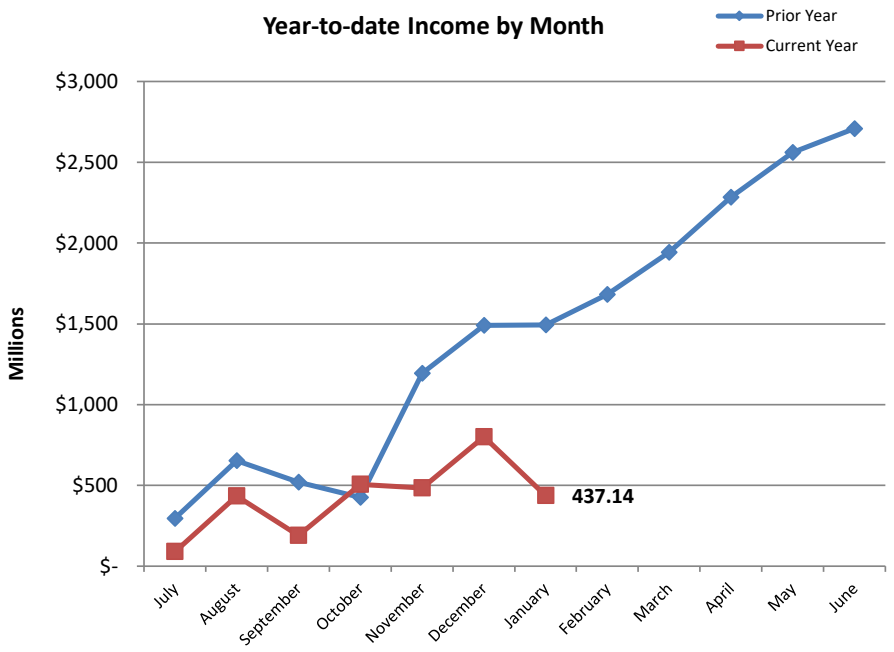
Actual Asset Allocation

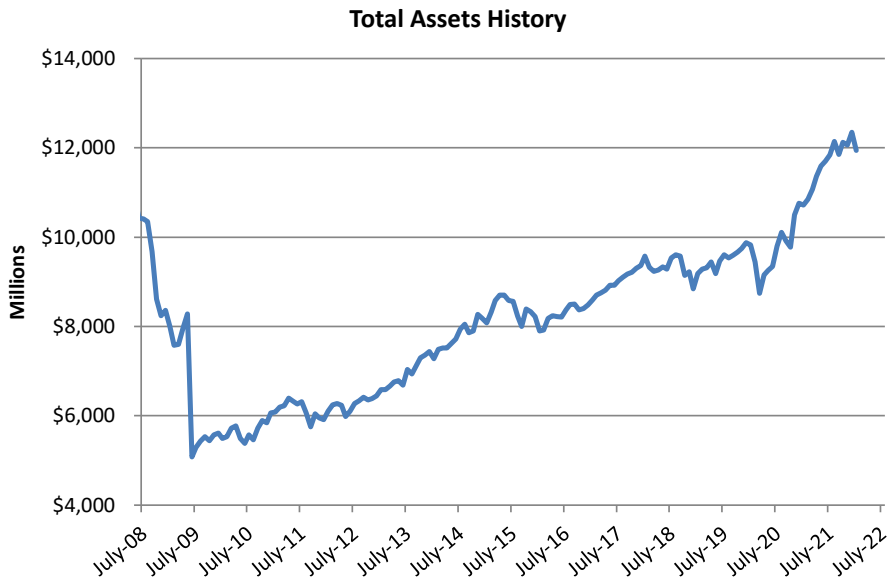


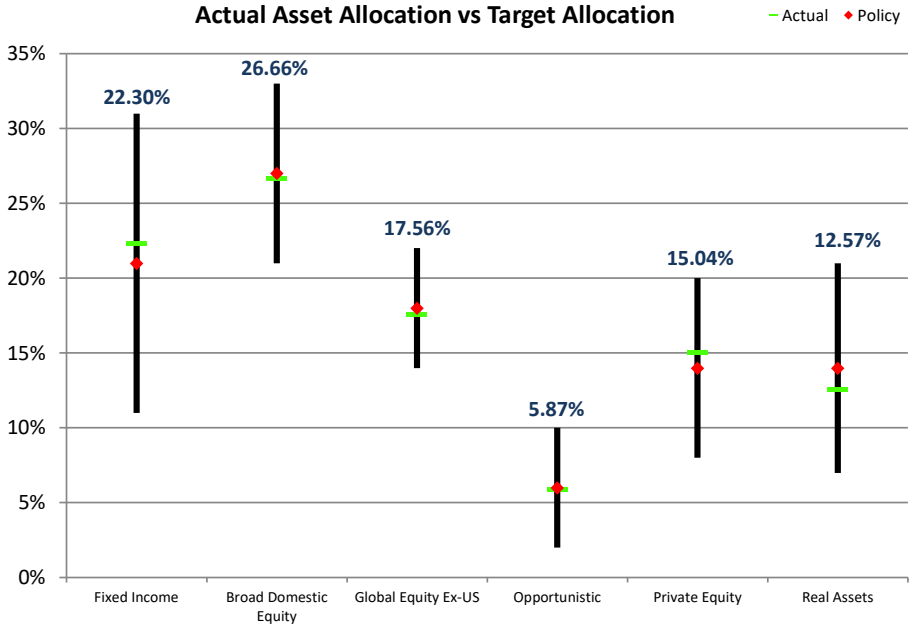
Public Employees' Retirement Pension Trust Fund

Fiscal Year-to-Date through January 31, 2022



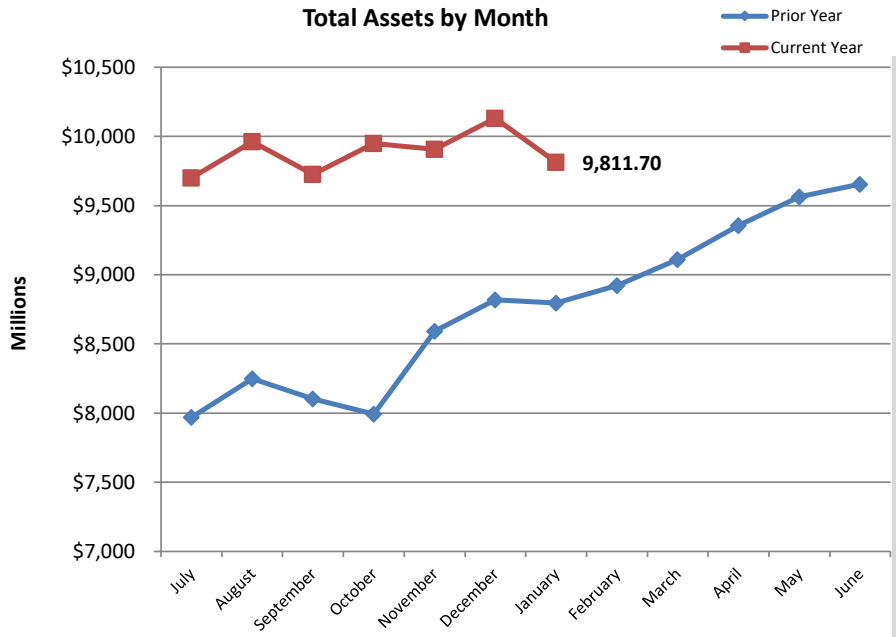


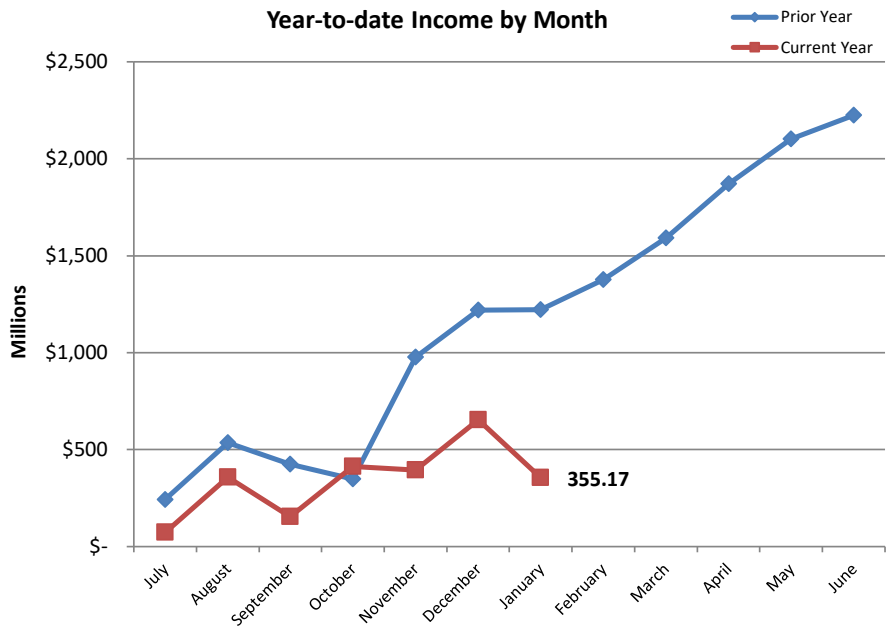


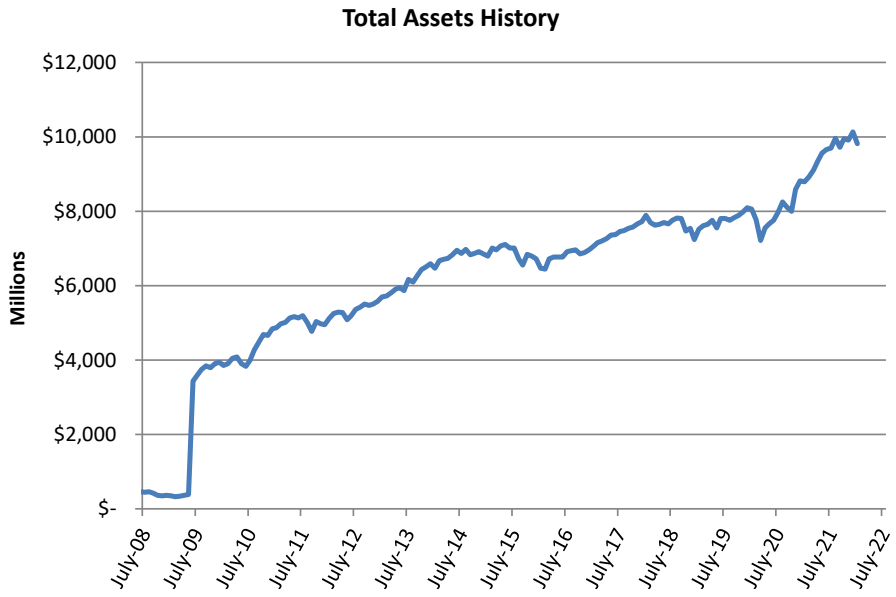


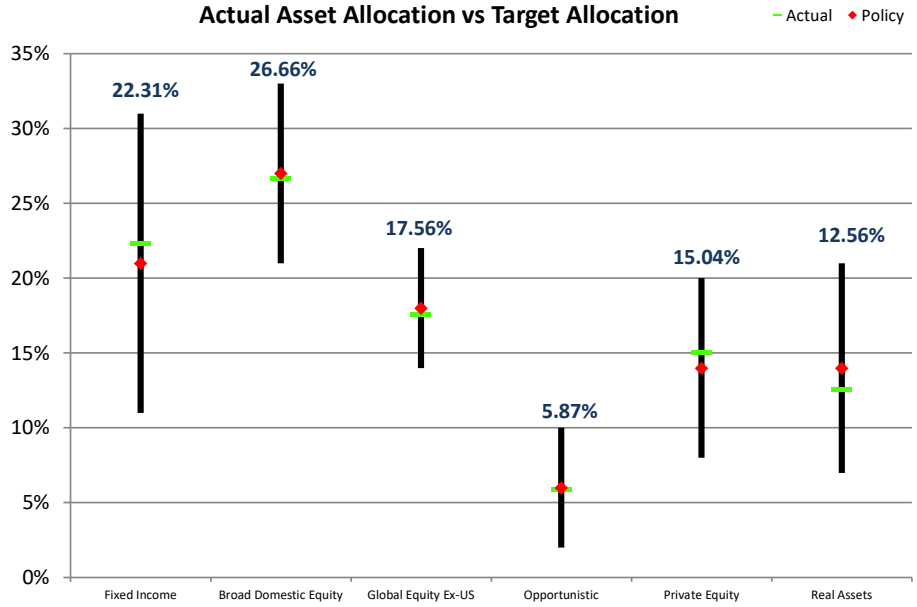
Public Employees' Retirement Health Care Trust Fund

Fiscal Year-to-Date through January 31, 2022



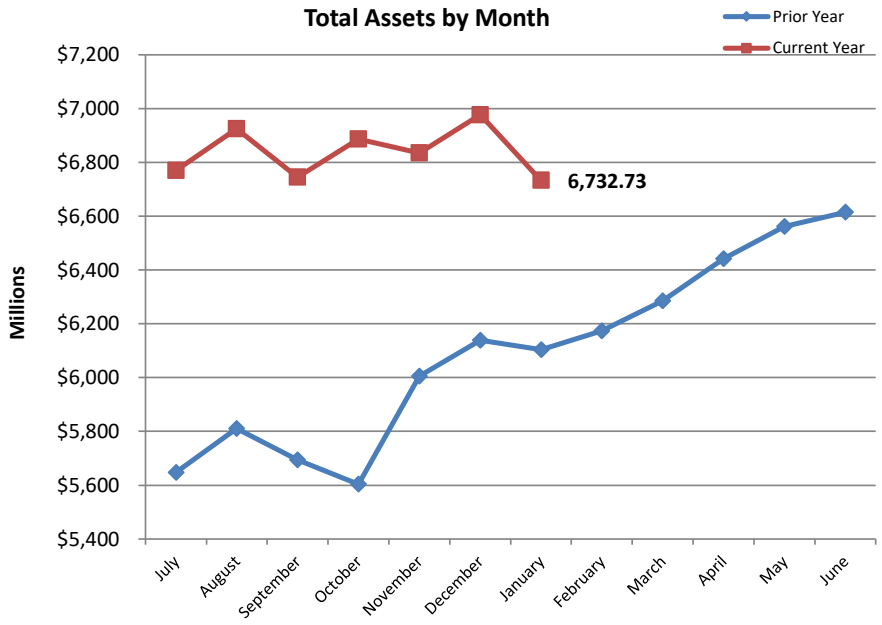


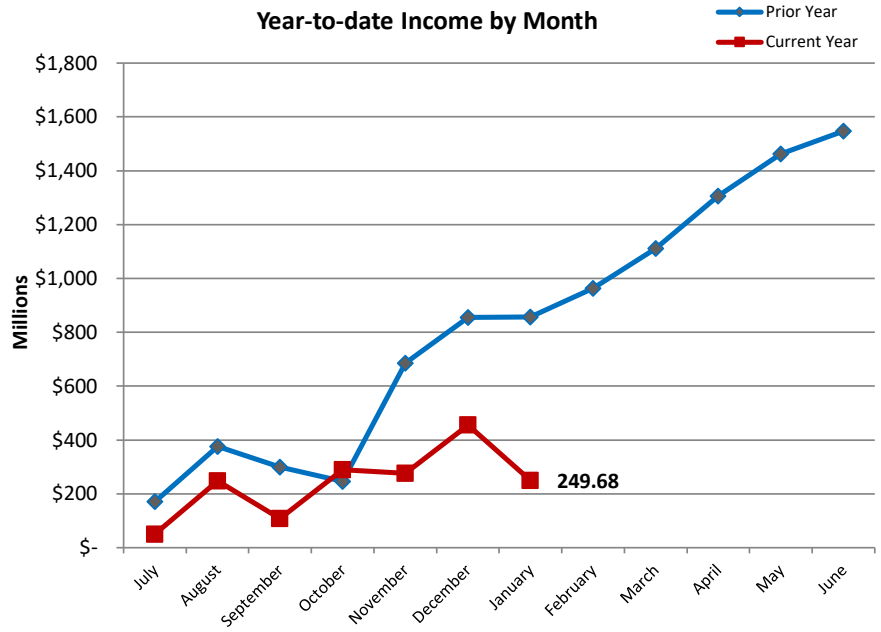


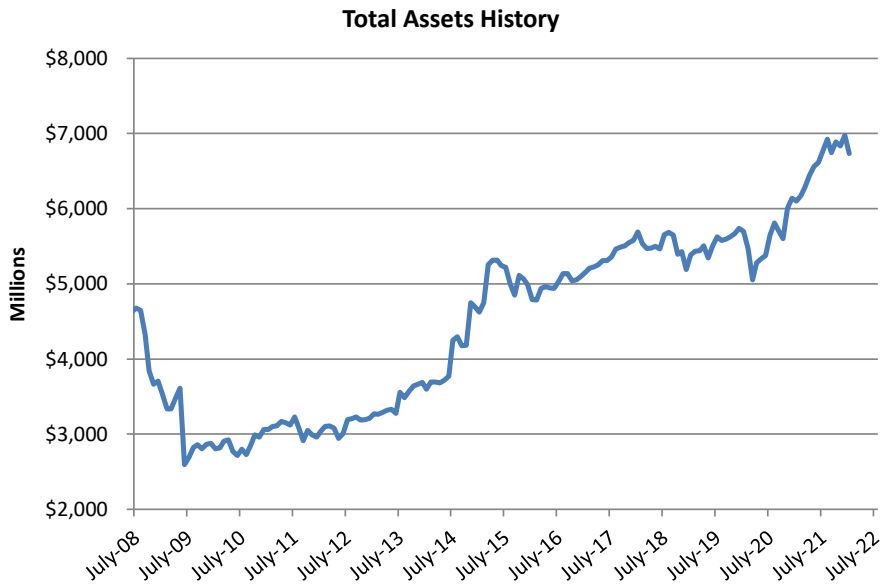


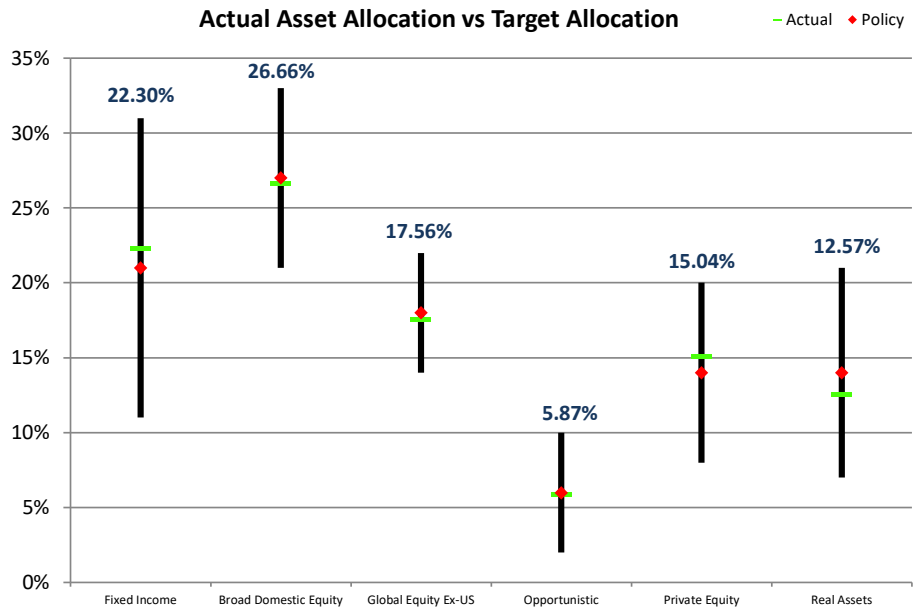
Teachers' Retirement Pension Trust Fund

Fiscal Year-to-Date through January 31, 2022



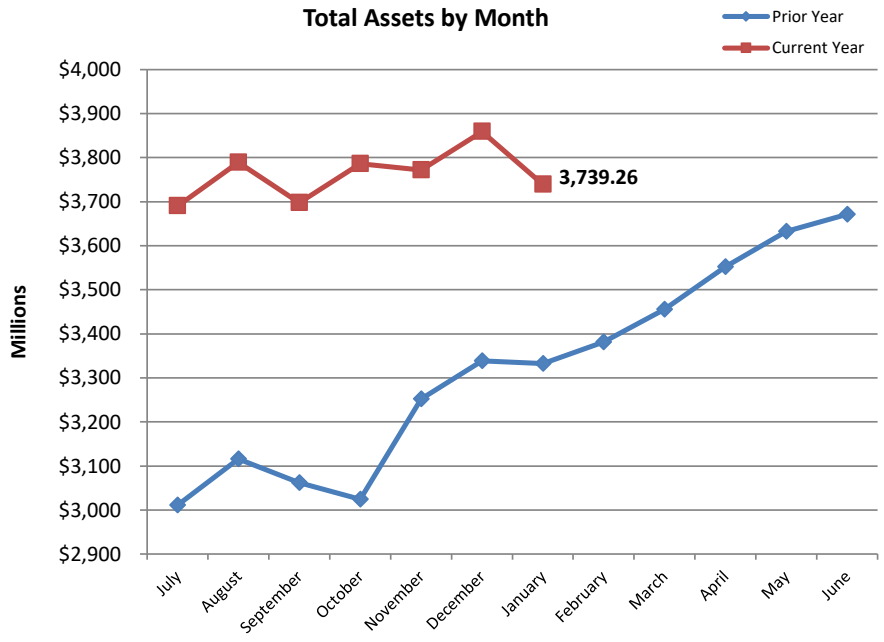


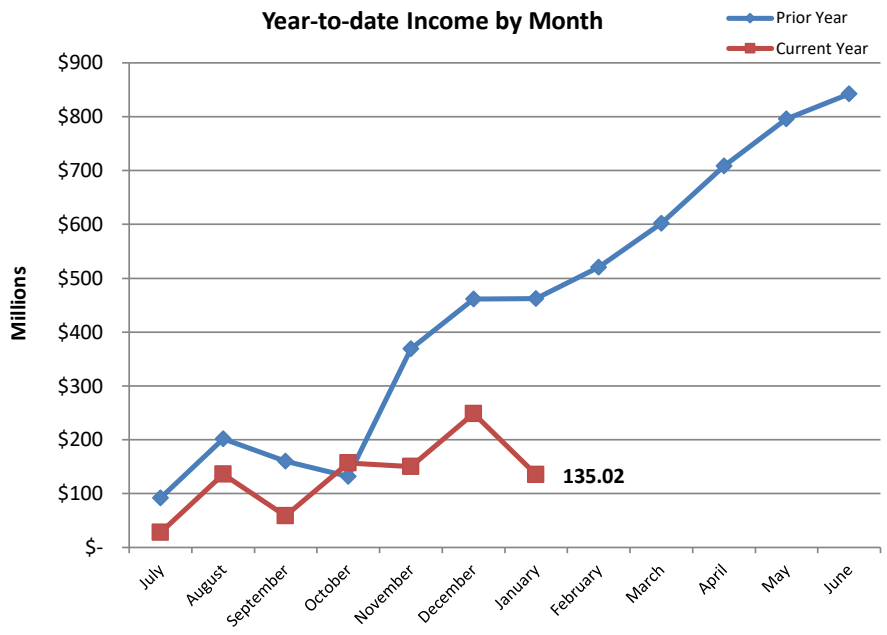


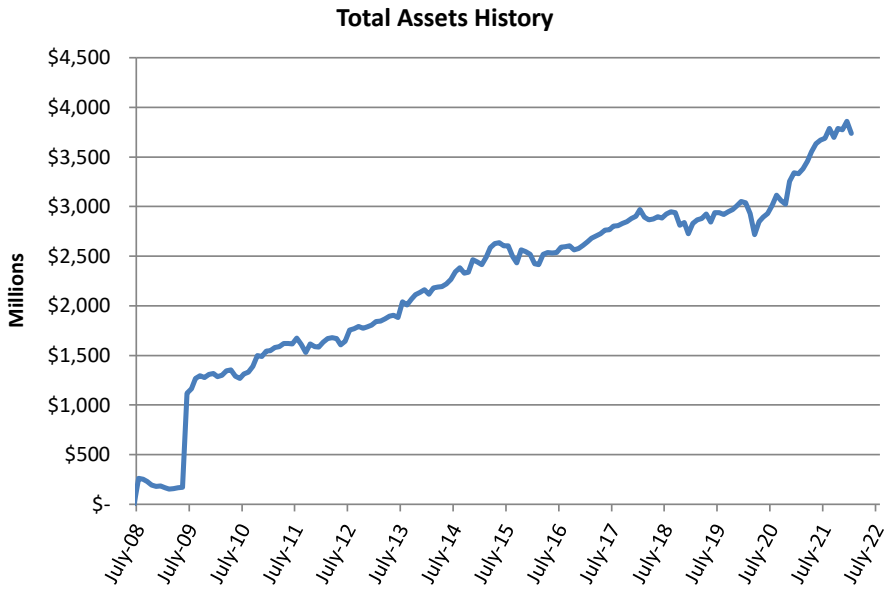


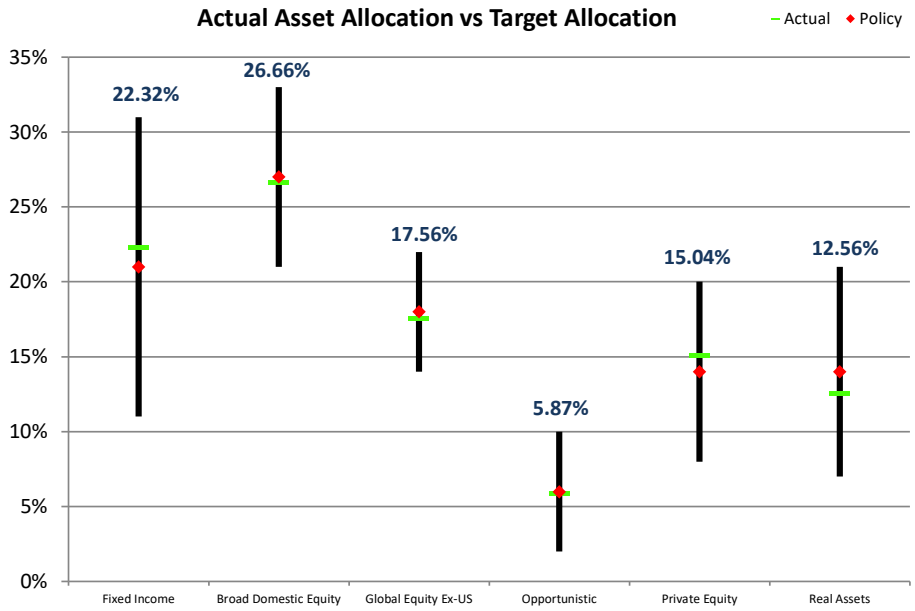
Teachers' Retirement Health Care Trust Fund

Fiscal Year-to-Date through January 31, 2022



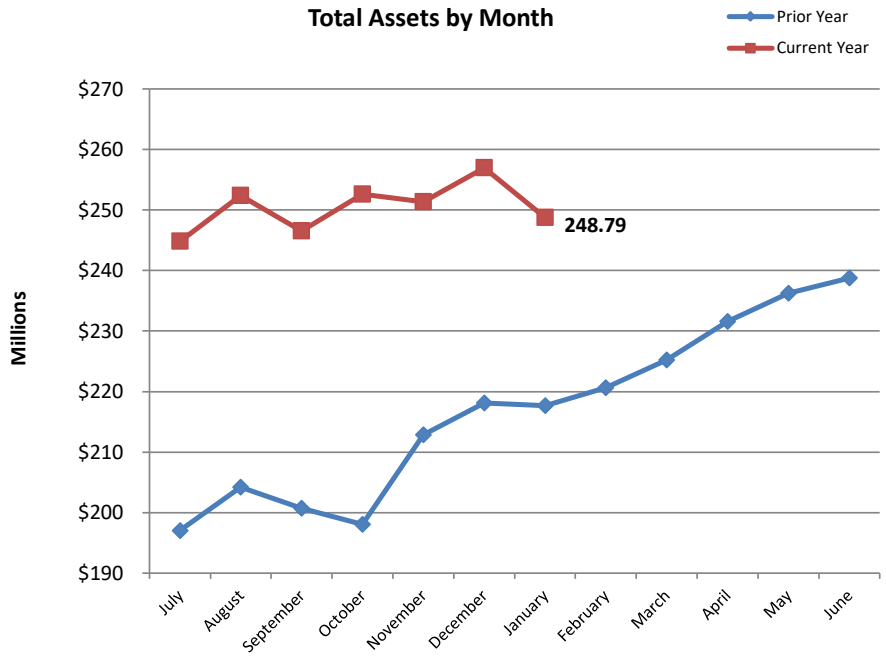


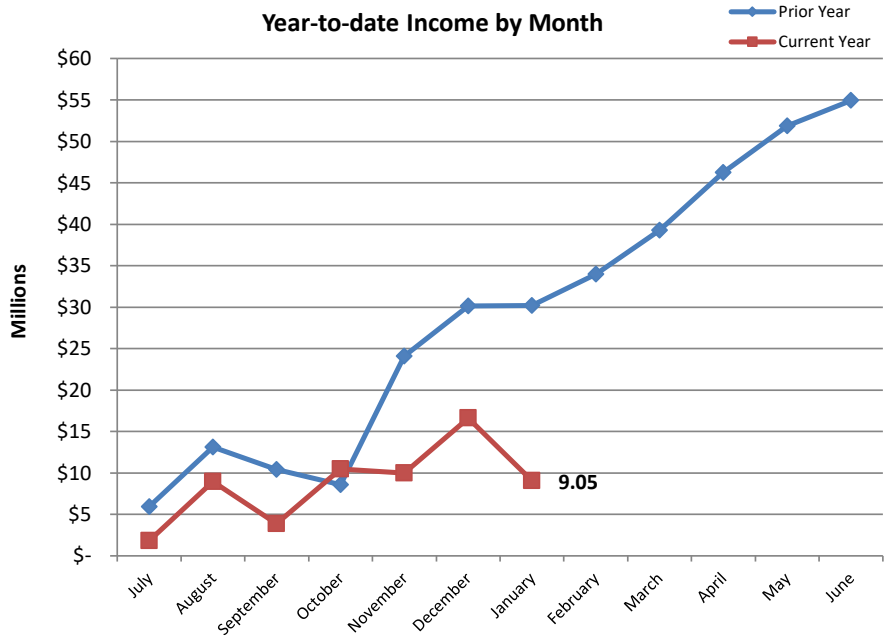


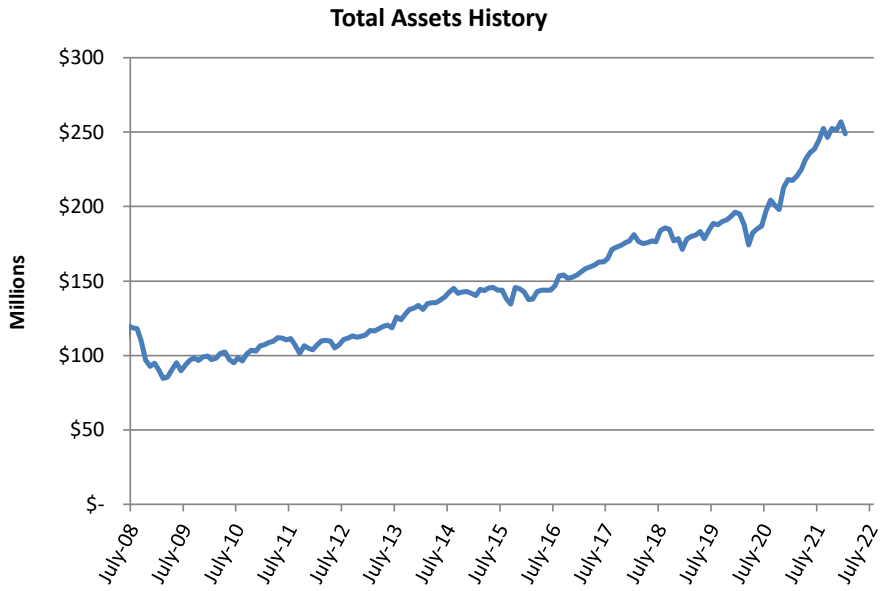


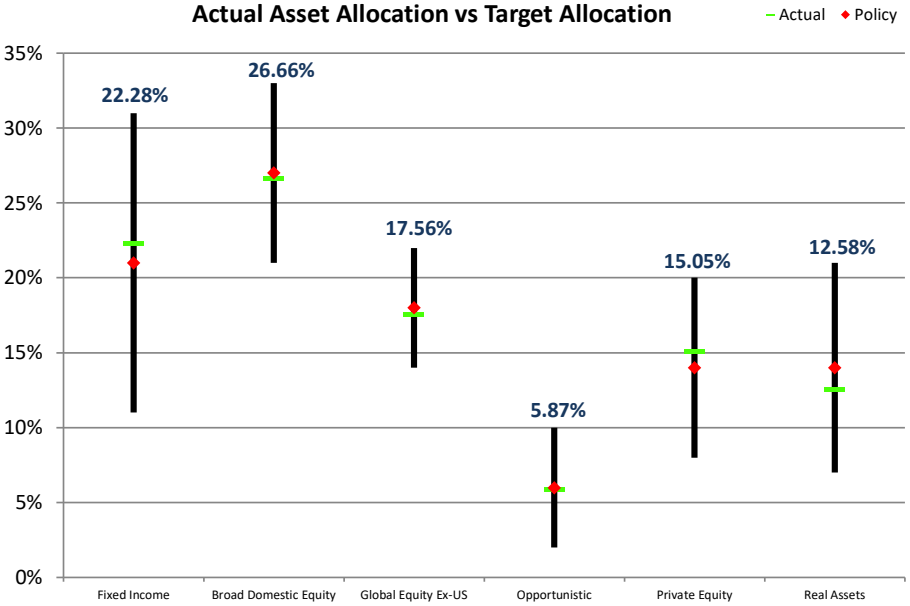
Judicial Retirement Pension Trust Fund

Fiscal Year-to-Date through January 31, 2022



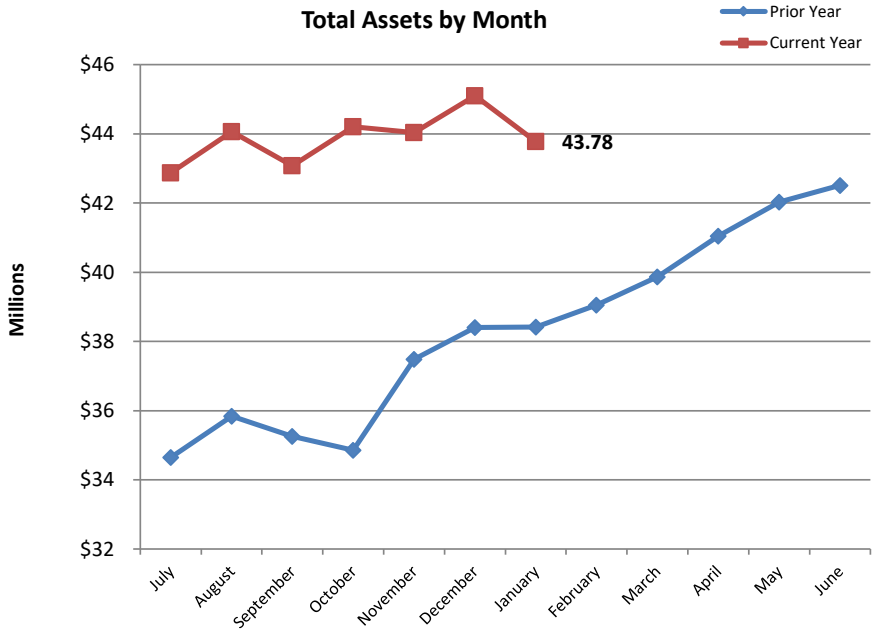


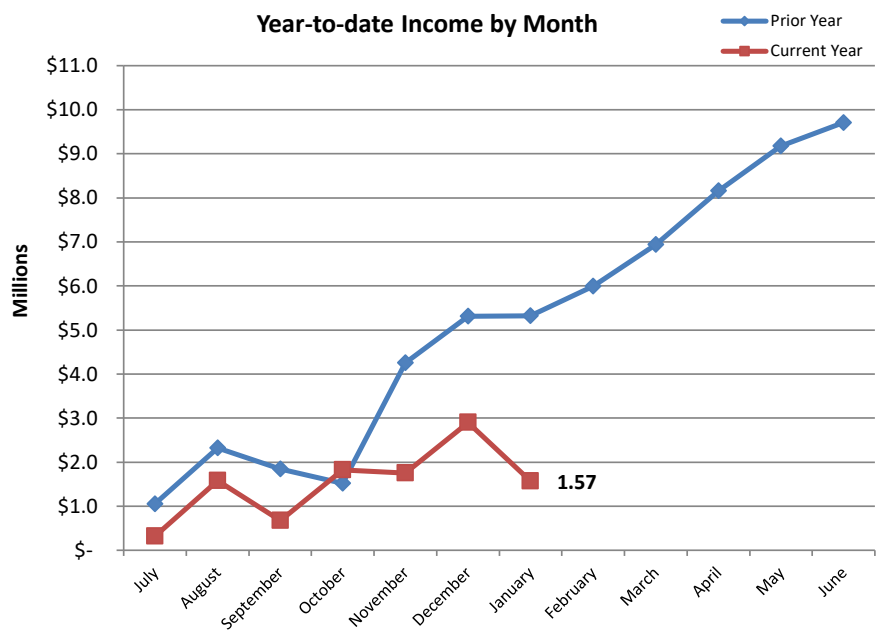


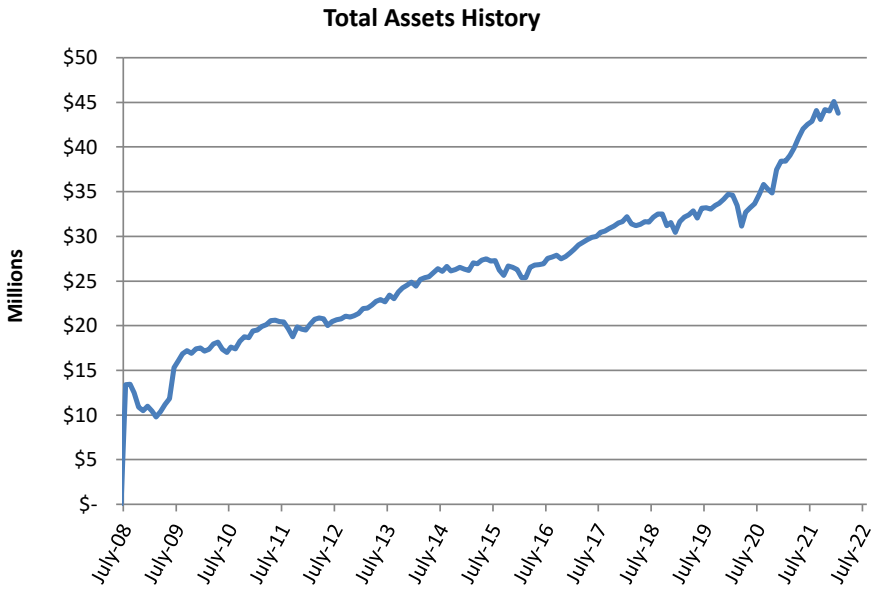


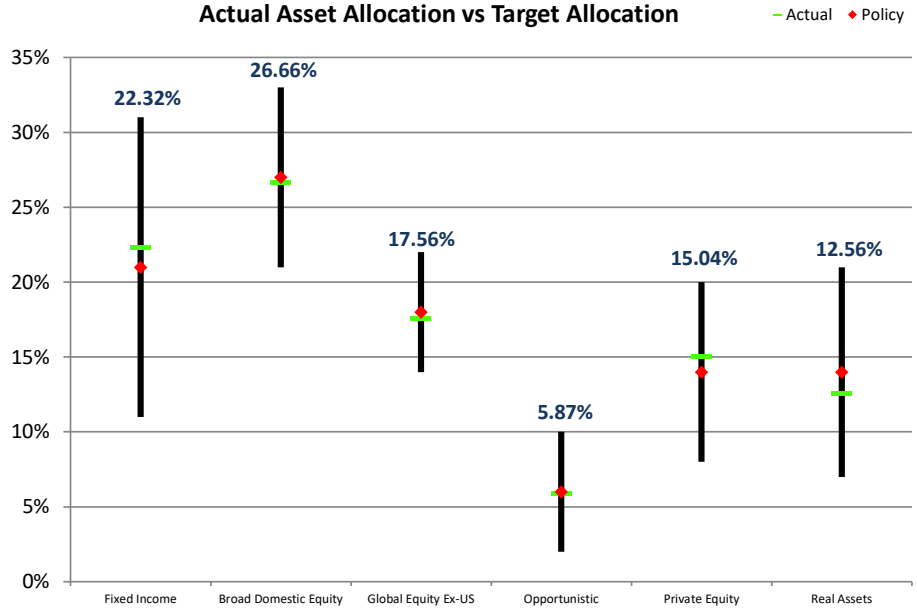
Judicial Retirement Health Care Trust Fund

Fiscal Year-to-Date through January 31, 2022



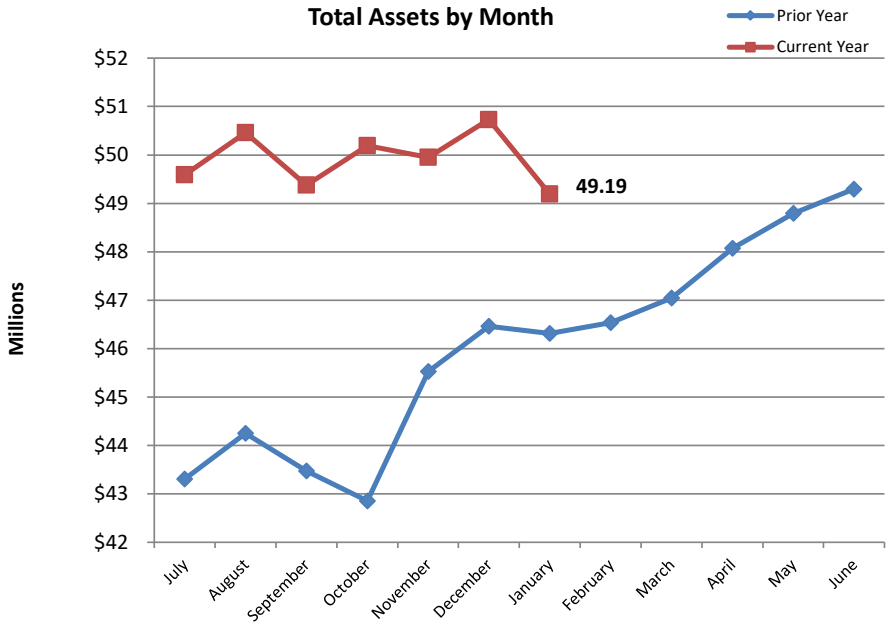


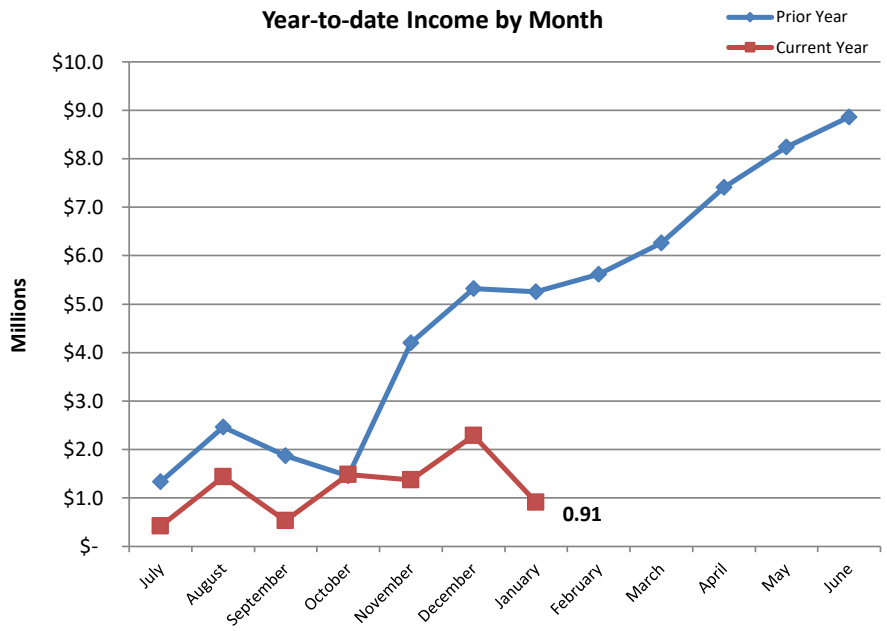


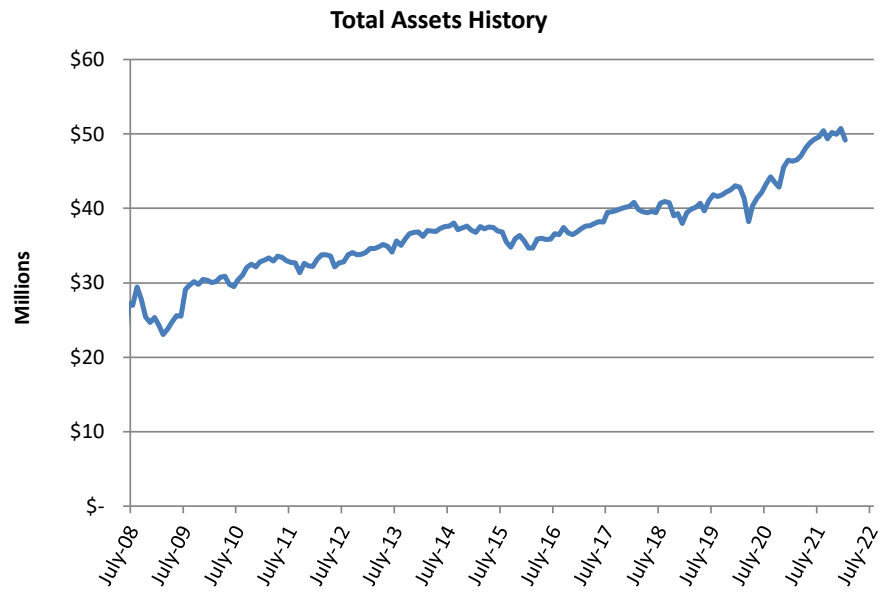


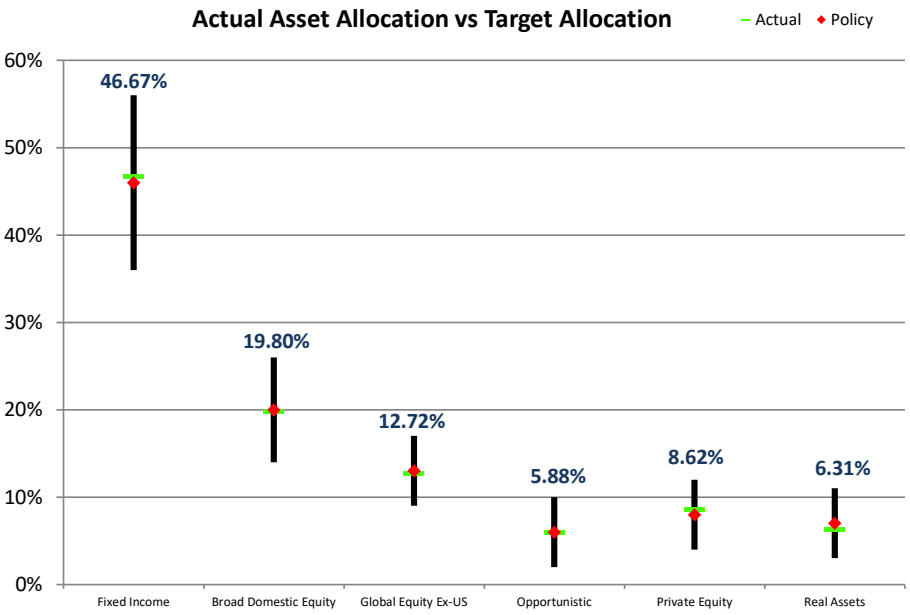
Military Retirement Trust Fund

Fiscal Year-to-Date through January 31, 2022









ALASKA RETIREMENT MANAGEMENT BOARD

Reporting of Funds by Manager

All Non-Participant Directed Plans

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended January 31, 2022

	Beginning Invested Assets	Investment Income	Net Contributions and (Withdrawals)	Ending Invested Assets	% increase (decrease)	% Change due to Investment Income
Cash						
Short-Term Fixed Income Pool	$ 291,683,335	$ (6,547)	$ 111,417,842	$ 403,094,630	38.20%	0.00%
Securities Lending Income Pool	40,415	42,512	(54,148)	28,779	-28.79%	318.66%
Total Cash	291,723,750	35,965	111,363,694	403,123,409	38.19%	0.01%
Fixed Income						
Alternative Fixed Income						
Crestline Investors, Inc.	646,057,161	1,578,244	(1,897,651)	645,737,754	-0.05%	0.24%
Prisma Capital Partners	69,158,048	(328,828)	-	68,829,220	-0.48%	-0.48%
Crestline Specialty Fund	6,621,255	-	-	6,621,255	-	-
Crestline Specialty Lending Fund II	48,566,132	-	(1,053,063)	47,513,069	-2.17%	-
Crestline Specialty Lending Fund III	21,951,723	-	-	21,951,723	-	-
Total Alternative Fixed Income	792,354,319	1,249,416	(2,950,714)	790,653,021	-0.21%	0.16%
Opportunistic Fixed Income						
Fidelity Inst. Asset Mgmt. High Yield CMBS	220,686,188	(948,302)	-	219,737,886	-0.43%	-0.43%
Fidelity Institutional Asset Management	999,279,699	(14,286,431)	-	984,993,268	-1.43%	-1.43%
MacKay Shields, LLC	2,016,185	-	-	2,016,185	-	-
Total Opportunistic Fixed Income	1,221,982,072	(15,234,733)	-	1,206,747,339	-1.25%	-1.25%
ARMB Barclays Agg Bond Fund	4,990,137,696	(105,947,691)	279,200,000	5,163,390,005	3.47%	-2.07%
Total Fixed Income	7,004,474,087	(119,933,008)	276,249,286	7,160,790,365	2.23%	-1.68%
Domestic Equities						
Small Cap						
Passively Managed						
ARMB S&P 600	797,204,128	(55,446,500)	(32,900,000)	708,857,628	-11.08%	-7.10%
Total Passive	797,204,128	(55,446,500)	(32,900,000)	708,857,628	-11.08%	-7.10%
Actively Managed						
Transition Account	-	7,553	-	7,553	100.00%	100.00%
Total Active	-	7,553	-	7,553	100.00%	100.00%
Total Small Cap	797,204,128	(55,438,947)	(32,900,000)	708,865,181	-11.08%	-7.10%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended January 31, 2022

Large Cap						
Passively Managed						
ARMB S&P 900	6,592,965,534	(328,083,794)	(389,500,000)	5,875,381,740	-10.88%	-5.13%
Total Passive	6,592,965,534	(328,083,794)	(389,500,000)	5,875,381,740	-10.88%	-5.13%
Actively Managed						
ARMB Domestic Residual Assets	43,622	282	-	43,904	0.65%	0.65%
ARMB Large Cap Multi-Factor	734,586,349	(42,774,545)	-	691,811,804	-5.82%	-5.82%
ARMB Scientific Beta	2,003,444,944	(102,045,104)	(156,221,559)	1,745,178,281	-12.89%	-5.30%
Transition Account	-	-	-	-	-	-
Total Active	2,738,074,915	(144,819,367)	(156,221,559)	2,437,033,989	-10.99%	-5.44%
Total Large Cap	9,331,040,449	(472,903,161)	(545,721,559)	8,312,415,729	-10.92%	-5.22%
Total Domestic Equity	10,128,244,577	(528,342,108)	(578,621,559)	9,021,280,910	-10.93%	-5.37%
Global Equities						
Large Cap						
Arrow Street Capital	658,941,031	(21,715,632)	(42,485,792)	594,739,607	-9.74%	-3.41%
Baillie Gifford Overseas Limited	622,339,406	(74,737,509)	-	547,601,897	-12.01%	-12.01%
Brandes Investment Partners	529,427,391	13,523,185	90,873,086	633,823,662	19.72%	2.35%
Cap Guardian Trust Co	582,356,553	(54,750,042)	39,000,000	566,606,511	-2.70%	-9.10%
Legal & General	933,621,112	(34,361,621)	79,453	899,338,944	-3.67%	-3.68%
McKinley Capital Management	2,706,159	(260,435)	-	2,445,724	-9.62%	-9.62%
SSgA MSCI World Ex-US IMI Index Fund	1,711,275,120	(81,136,955)	-	1,630,138,165	-4.74%	-4.74%
State Street Global Advisors	201,660	(1)	-	201,659	0.00%	0.00%
Total Large Cap	5,040,868,432	(253,439,010)	87,466,747	4,874,896,169	-3.29%	-4.98%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended January 31, 2022

Emerging Markets Equity						
MSCI Emerging Markets Index Fund	777,796,858	(14,382,967)	-	763,413,891	-1.85%	-1.85%
Legal & General Sci-Beta Emerging Markets	284,432,138	(5,640,448)	25,724,852	304,516,542	7.06%	-1.90%
Total Emerging Markets	1,062,228,996	(20,023,415)	25,724,852	1,067,930,433	0.54%	-1.86%
Total Global Equities	6,103,097,428	(273,462,425)	113,191,599	5,942,826,602	-2.63%	-4.44%
Opportunistic						
Alternative Equity Strategy						
Alternative Equity Strategies Transition Account	-	-	-	-	-	-
McKinley Global Health Care	414,275,104	(56,235,615)	490,587	358,530,076	-13.46%	-13.57%
Total Alternative Equity Strategy	414,275,104	(56,235,615)	490,587	358,530,076	-13.46%	-13.57%
Alternative Beta						
Man Group Alternative Risk Premia	318,549,095	13,260,854	-	331,809,949	4.16%	4.16%
Total Alternative Beta	318,549,095	13,260,854	-	331,809,949	4.16%	4.16%
Other Opportunities						
Project Pearl	8,299,224	-	-	8,299,224	-	-
Schroders Insurance Linked Securities	7,149,562	914	-	7,150,476	0.01%	0.01%
Total Other Opportunities	15,448,786	914	-	15,449,700	0.01%	0.01%
Tactical Allocation Strategies						
Fidelity Signals	661,007,666	(25,046,933)	9,400,000	645,360,733	-2.37%	-3.76%
PineBridge	637,991,656	(35,138,914)	32,300,000	635,152,742	-0.44%	-5.37%
Total Tactical Allocation Strategies	1,298,999,322	(60,185,847)	41,700,000	1,280,513,475	-1.42%	-4.56%
Total Opportunistic	2,047,272,307	(103,159,694)	42,190,587	1,986,303,200	-2.98%	-4.99%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended January 31, 2022

Private Equity						
Abbott Capital	2,037,386,987	(4,012,309)	(25,194,126)	2,008,180,552	-1.43%	-0.20%
Advent International GPE Fund VIII-B	35,184,117	-	-	35,184,117	-	-
Advent International GPE Fund IX	44,187,947	-	-	44,187,947	-	-
Angelo, Gordon & Co.	5,162	-	-	5,162	-	-
Clearlake Capital Partners VI	32,873,248	-	-	32,873,248	-	-
Dyal Capital Partners III	40,699,706	(1)	(3,452,025)	37,247,680	-8.48%	0.00%
Dyal Capital Partners IV	24,445,046	6,238,177	(635,942)	30,047,281	22.92%	25.86%
Genstar X	2,784,037	-	-	2,784,037	-	-
Glendon Opportunities	25,187,870	-	-	25,187,870	-	-
Glendon Opportunities II	74,511,380	-	-	74,511,380	-	-
Insight XII	13,771,376	-	-	13,771,376	-	-
KKR Lending Partners II	13,014,244	-	-	13,014,244	-	-
Lexington Capital Partners VIII	36,169,882	-	(874,475)	35,295,407	-2.42%	-
Lexington Partners VII	13,489,538	-	(616,077)	12,873,461	-4.57%	-
Merit Capital Partners	10,692,251	-	(200,625)	10,491,626	-1.88%	-
NB SOF III	15,318,669	-	-	15,318,669	-	-
NB SOF IV	39,050,571	(1)	(777,906)	38,272,664	-1.99%	0.00%
Neuberger Berman Secondary Opportunities Fund V	1,417,881	-	-	1,417,881	-	-
New Mountain Partners IV	11,957,844	-	-	11,957,844	-	-
New Mountain Partners V	66,170,543	-	189,577	66,360,120	0.29%	-
New Mountain Partners VI	12,050,419	-	2,681,631	14,732,050	22.25%	-
NGP XI	36,110,587	-	(723,037)	35,387,550	-2.00%	-
NGP XII	26,078,866	-	-	26,078,866	-	-
Onex Partnership III	4,046,837	-	-	4,046,837	-	-
Pathway Capital Management LLC	2,183,399,862	(11,485,848)	(9,428,555)	2,162,485,459	-0.96%	-0.53%
Resolute Fund III	7,345,745	-	-	7,345,745	-	-
Resolute Fund IV	60,296,403	-	-	60,296,403	-	-
Resolute Fund V	30,917,734	-	-	30,917,734	-	-
Summit Partners GE IX	63,779,168	-	(615,611)	63,163,557	-0.97%	-
Summit Partners GE X	28,218,447	-	(446,197)	27,772,250	-1.58%	-
Warburg Pincus Global Growth Fund	41,282,890	-	-	41,282,890	-	-
Warburg Pincus X	748,034	-	-	748,034	-	-
Warburg Pincus XI	16,303,341	-	-	16,303,341	-	-
Warburg Pincus XII	90,674,201	-	(806,000)	89,868,201	-0.89%	-
Total Private Equity	5,139,570,833	(9,259,982)	(40,899,368)	5,089,411,483	-0.98%	-0.18%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended January 31, 2022

Real Assets						
Farmland						
UBS Agrivest, LLC	895,540,847	-	-	895,540,847	-	-
Total Farmland	895,540,847	-	-	895,540,847	-	-
Timber						
Timberland Invt Resource LLC	360,175,959	-	(2,000,000)	358,175,959	-0.56%	-
Total Timber	360,175,959	-	(2,000,000)	358,175,959	-0.56%	-
Energy						
EIG Energy Fund XIV-A	4,578,422	(700,752)	-	3,877,670	-15.31%	-15.31%
EIG Energy Fund XV	7,831,900	308,548	-	8,140,448	3.94%	3.94%
EIG Energy Fund XVI	47,996,993	2,837,582	(343,519)	50,491,056	5.20%	5.93%
Total Energy	60,407,315	2,445,378	(343,519)	62,509,174	3.48%	4.06%
REIT						
REIT Transition Account	-	-	-	-	-	-
ARMB REIT	689,158,244	(54,544,951)	-	634,613,293	-7.91%	-7.91%
Total REIT	689,158,244	(54,544,951)	-	634,613,293	-7.91%	-7.91%
Infrastructure Private						
IFM Global Infrastructure Fund-Private	608,194,512	20,726,972	-	628,921,484	3.41%	3.41%
JP Morgan Infrastructure Fund-Private	140,105,678	-	-	140,105,678	-	-
Total Infrastructure Private	748,300,190	20,726,972	-	769,027,162	2.77%	2.77%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended January 31, 2022

Real Estate						
Core Commingled Accounts						
BlackRock US Core Property Fund	363,482,532	28,145,233	-	391,627,765	7.74%	7.74%
JP Morgan	176,249,515	4,639,439	(1,232,398)	179,656,556	1.93%	2.64%
UBS Trumbull Property Fund	42,691,749	2,062,792	(4,154,402)	40,600,139	-4.90%	5.08%
Total Core Commingled	582,423,796	34,847,464	(5,386,800)	611,884,460	5.06%	6.01%
Core Separate Accounts						
Sentinel Separate Account	265,386,746	-	(23,981,472)	241,405,274	-9.04%	-
UBS Realty	570,058,549	-	(1,915,929)	568,142,620	-0.34%	-
Total Core Separate	835,445,295	-	(25,897,401)	809,547,894	-3.10%	-
Non-Core Commingled Accounts						
Almanac Realty Securities V	51,911	-	-	51,911	-	-
Almanac Realty Securities VII	28,828,273	-	-	28,828,273	-	-
Almanac Realty Securities VIII	17,870,481	-	592,084	18,462,565	3.31%	-
Clarion Ventures 4	26,153,649	-	-	26,153,649	-	-
Colony Investors VIII, L.P.	85,460	-	-	85,460	-	-
ING Clarion Development Ventures III	1,381,800	-	-	1,381,800	-	-
KKR Real Estate Partners Americas L.P.	4,296,926	-	-	4,296,926	-	-
KKR Real Estate Partners Americas II	10,034,647	-	-	10,034,647	-	-
KKR Real Estate Partners Americas III	12,859,598	-	2,341,049	15,200,647	18.20%	-
Silverpeak Legacy Pension Partners II, L.P.	976,466	-	-	976,466	-	-
Silverpeak Legacy Pension Partners III, L.P.	2,541,214	-	-	2,541,214	-	-
Tishman Speyer Real Estate Venture VI	2,028,012	-	-	2,028,012	-	-
Tishman Speyer Real Estate Venture VII	146,284	-	-	146,284	-	-
Total Non-Core Commingled	107,254,721	-	2,933,133	110,187,854	2.73%	-
Total Real Estate	1,525,123,812	34,847,464	(28,351,068)	1,531,620,208	0.43%	2.31%
Total Real Assets	4,278,706,367	3,474,863	(30,694,587)	4,251,486,643	-0.64%	0.08%
Total Assets	$ 34,993,089,349	$ (1,030,646,389)	$ (107,220,348)	$ 33,855,222,612	-3.25%	-2.95%

ALASKA RETIREMENT MANAGEMENT BOARD

Reporting of Funds by Manager

Participant Directed Plans

Supplemental Annuity Plan
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
January 31, 2022

Participant Options	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
T. Rowe Price							
Stable Value Fund	$ 496,578,099	$ 723,083	$ (3,632,091)	$ 6,765,491	$ 500,434,582	0.78%	0.15%
Small Cap Stock Fund	263,397,083	(28,014,188)	(621,464)	(3,699,528)	231,061,903	-12.28%	-10.72%
Alaska Balanced Trust	1,211,954,611	(28,721,496)	(3,608,152)	(2,427,434)	1,177,197,529	-2.87%	-2.38%
Long Term Balanced Fund	798,631,673	(26,343,923)	(3,154,476)	2,905,312	772,038,586	-3.33%	-3.30%
AK Target Date 2010 Trust	10,598,366	(251,309)	(112,874)	(85,357)	10,148,826	-4.24%	-2.39%
AK Target Date 2015 Trust	79,705,448	(2,006,360)	(515,049)	(858,125)	76,325,914	-4.24%	-2.54%
AK Target Date 2020 Trust	92,513,329	(2,673,519)	(729,414)	72,394	89,182,790	-3.60%	-2.90%
AK Target Date 2025 Trust	124,436,380	(4,096,423)	(884,472)	(1,250,538)	118,204,947	-5.01%	-3.32%
AK Target Date 2030 Trust	103,674,570	(3,794,093)	354,668	814,941	101,050,086	-2.53%	-3.64%
AK Target Date 2035 Trust	105,582,525	(4,195,922)	331,810	(701,619)	101,016,794	-4.32%	-3.98%
AK Target Date 2040 Trust	99,813,093	(4,156,784)	227,060	(570,527)	95,312,842	-4.51%	-4.17%
AK Target Date 2045 Trust	121,264,216	(5,319,290)	551,516	(582,904)	115,913,538	-4.41%	-4.39%
AK Target Date 2050 Trust	132,376,427	(5,867,080)	716,157	(147,943)	127,077,561	-4.00%	-4.42%
AK Target Date 2055 Trust	138,862,095	(6,155,594)	713,388	(260,295)	133,159,594	-4.11%	-4.43%
AK Target Date 2060 Trust	9,337,872	(416,665)	319,676	(18,871)	9,222,012	-1.24%	-4.39%
AK Target Date 2065 Trust	3,957,668	(180,775)	148,320	90,837	4,016,050	1.48%	-4.43%
Total Investments with T. Rowe Price	3,792,683,455	(121,470,338)	(9,895,397)	45,834	3,661,363,554		
JP Morgan							
JPMorgan SmartSpending 2015 R6	8,635	3,451	1,153	1,246,367	1,259,606	14487.21%	0.55%
JPMorgan SmartSpending 2020 R6	38,319	(1,911)	941	4,420	41,769	9.00%	-4.66%
Total Investments with JP Morgan	46,954	1,540	2,094	1,250,787	1,301,375		
State Street Global Advisors							
Money Market	67,655,451	292	(321,960)	1,156,658	68,490,441	1.23%	0.00%
S&P 500 Stock Index Fund Series A	561,531,634	(29,146,551)	(794,548)	1,221,635	532,812,170	-5.11%	-5.19%
Russell 3000 Index	168,465,708	(9,975,252)	(174,451)	4,378,057	162,694,062	-3.43%	-5.85%
World Equity Ex-US Index	69,502,421	(2,021,263)	(266,779)	5,200,941	72,415,320	4.19%	-2.81%
Total Investments with SSgA	867,155,214	(41,142,774)	(1,557,738)	11,957,291	836,411,993		
BlackRock							
Passive U.S. Bond Index Fund	174,799,160	(3,630,391)	(935,900)	(4,472,518)	165,760,351	-5.17%	-2.11%
Strategic Completion Fund	39,259,212	(479,212)	(68,974)	(153,935)	38,557,091	-1.79%	-1.22%
Total Investments with BlackRock	214,058,372	(4,109,603)	(1,004,874)	(4,626,453)	204,317,442		
Brandes and Baillie Gifford							
AK International Equity Fund	140,468,312	(6,296,532)	(377,079)	(4,923,307)	128,871,394	-8.26%	-4.57%
Northern Trust							
Environmental, Social, and Governance Fund	172,024,478	(10,614,452)	(579,330)	(3,704,152)	157,126,544	-8.66%	-6.25%
Total All Funds	$ 5,186,436,785	$ (183,632,159)	$ (13,412,324)	$ -	$ 4,989,392,302	-3.80%	-3.55%

Notes: Source data provided by the record keeper, Empower Retirement.

(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.

Supplemental Annuity Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
January 31, 2022
$ (Thousands)

Invested Assets (at fair value)	**July**	**August**	**September**	**October**	**November**	**December**	**January**
Investments with T. Rowe Price							
Stable Value Fund	$ 488,478	$ 491,047	$ 496,851	$ 496,422	$ 493,197	$ 496,578	$ 500,435
Small Cap Stock Fund	277,757	277,500	267,769	276,182	263,304	263,397	231,062
Alaska Balanced Trust	1,223,740	1,228,707	1,200,662	1,218,503	1,205,383	1,211,955	1,177,198
Long Term Balanced Fund	774,789	783,806	763,138	788,770	777,998	798,632	772,039
AK Target Date 2010 Trust	10,085	10,174	10,009	10,317	10,219	10,598	10,149
AK Target Date 2015 Trust	83,324	83,550	80,248	81,032	79,381	79,705	76,326
AK Target Date 2020 Trust	92,999	93,604	91,518	94,397	91,264	92,513	89,183
AK Target Date 2025 Trust	116,770	119,535	116,297	122,038	121,258	124,436	118,205
AK Target Date 2030 Trust	97,336	98,709	96,270	101,931	101,714	103,675	101,050
AK Target Date 2035 Trust	99,225	101,763	98,230	102,219	101,264	105,583	101,017
AK Target Date 2040 Trust	94,988	96,923	93,922	98,068	96,915	99,813	95,313
AK Target Date 2045 Trust	113,224	116,158	111,828	117,863	115,792	121,264	115,914
AK Target Date 2050 Trust	126,689	129,643	124,797	132,034	128,963	132,376	127,078
AK Target Date 2055 Trust	128,109	131,897	127,877	135,479	133,321	138,862	133,160
AK Target Date 2060 Trust	7,336	7,669	7,712	8,548	8,687	9,338	9,222
AK Target Date 2065 Trust	3,129	3,452	3,007	3,210	3,532	3,958	4,016
Investments with JP Morgan							
JPMorgan SmartSpending 2015 R6	14	0	0	44	3	9	1,260
JPMorgan SmartSpending 2020 R6	9	317	3	50	344	38	42
Investments with State Street Global Advisors							
Money Market	66,716	67,010	67,679	68,691	67,742	67,655	68,490
S&P 500 Stock Index Fund Series A	534,147	547,482	516,062	547,889	542,403	561,532	532,812
Russell 3000 Index	139,778	145,498	142,405	155,260	157,498	168,466	162,694
World Equity Ex-US Index	53,790	54,806	55,740	60,526	61,635	69,502	72,415
Investments with BlackRock							
Passive U.S. Bond Index Fund	189,913	188,612	185,482	183,405	181,925	174,799	165,760
Strategic Completion Fund	37,611	37,762	37,018	38,044	37,285	39,259	38,557
Investments with Brandes and Baillie Gifford							
AK International Equity Fund	150,369	154,751	147,219	149,304	139,854	140,468	128,871
Investments with Northern Trust							
Environmental, Social, and Governance Fund	175,596	179,135	166,807	178,900	170,883	172,024	157,127
Total Invested Assets	**$ 5,085,920**	**$ 5,149,507**	**$ 5,008,551**	**$ 5,169,125**	**$ 5,091,762**	**$ 5,186,437**	**$ 4,989,392**
Change in Invested Assets							
Beginning Assets	$ 5,064,368	$ 5,085,920	$ 5,149,507	$ 5,008,551	$ 5,169,125	$ 5,091,762	$ 5,186,437
Investment Earnings	40,530	73,949	(130,128)	164,003	(65,272)	111,985	(183,632)
Net Contributions (Withdrawals)	(18,978)	(10,361)	(10,828)	(3,428)	(12,092)	(17,310)	(13,412)
Ending Invested Assets	**$ 5,085,920**	**$ 5,149,507**	**$ 5,008,551**	**$ 5,169,125**	**$ 5,091,762**	**$ 5,186,437**	**$ 4,989,392**

Note: Source data provided by the record keeper, Empower Retirement.

Deferred Compensation Plan
Schedule of Invested Assets and Changes in Invested Assets
for the Month Ended
January 31, 2022

Participant Options	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
T. Rowe Price							
Stable Value Fund	$ 203,249,768	$ 295,304	$ (1,911,500)	$ 3,290,230	$ 204,923,802	0.82%	0.14%
Small Cap Stock Fund	149,445,682	(15,858,880)	(774,291)	(2,090,550)	130,721,961	-12.53%	-10.71%
Alaska Balanced Trust	47,616,337	(1,126,537)	(186,203)	170,904	46,474,501	-2.40%	-2.37%
Long Term Balanced Fund	96,725,565	(3,228,204)	(227,163)	1,580,024	94,850,222	-1.94%	-3.31%
AK Target Date 2010 Trust	3,238,326	(74,581)	(20,784)	(9,919)	3,133,042	-3.25%	-2.31%
AK Target Date 2015 Trust	9,599,915	(243,427)	(13,554)	(9,261)	9,333,673	-2.77%	-2.54%
AK Target Date 2020 Trust	26,717,258	(758,910)	(295,624)	(315,600)	25,347,124	-5.13%	-2.87%
AK Target Date 2025 Trust	32,920,641	(1,098,996)	21,878	(416,240)	31,427,283	-4.54%	-3.36%
AK Target Date 2030 Trust	20,465,555	(734,244)	83,436	(401,671)	19,413,076	-5.14%	-3.62%
AK Target Date 2035 Trust	15,194,023	(600,618)	161,752	12,695	14,767,852	-2.80%	-3.93%
AK Target Date 2040 Trust	14,192,208	(592,109)	97,709	(75,936)	13,621,872	-4.02%	-4.17%
AK Target Date 2045 Trust	11,582,706	(518,041)	135,109	(649,373)	10,550,401	-8.91%	-4.57%
AK Target Date 2050 Trust	8,744,402	(395,791)	79,641	156,062	8,584,314	-1.83%	-4.47%
AK Target Date 2055 Trust	7,084,705	(315,250)	45,530	(3,602)	6,811,383	-3.86%	-4.44%
AK Target Date 2060 Trust	1,530,432	(68,498)	22,743	3,337	1,488,014	-2.77%	-4.44%
AK Target Date 2065 Trust	677,499	(30,191)	13,331	-	660,639	-2.49%	-4.41%
Total Investments with T. Rowe Price	648,985,022	(25,348,973)	(2,767,990)	1,241,100	622,109,159		
JP Morgan							
JPMorgan SmartSpending 2015 R6	433	(126)	324	5,526	6,157	1321.94%	-3.75%
JPMorgan SmartSpending 2020 R6	4,780	(141)	147	1,000	5,786	21.05%	-2.63%
Total Investments with JP Morgan	5,213	(267)	471	6,526	11,943		
State Street Global Advisors							
Money Market	20,467,628	89	(157,080)	68,942	20,379,579	-0.43%	0.00%
S&P 500 Stock Index	293,278,205	(15,199,613)	(673,921)	(286,882)	277,117,789	-5.51%	-5.19%
Russell 3000 Index	61,839,565	(3,642,909)	105,521	1,042,664	59,344,841	-4.03%	-5.84%
World Equity Ex-US Index	23,080,514	(665,738)	47,994	996,855	23,459,625	1.64%	-2.82%
Total Investments with SSgA	398,665,912	(19,508,171)	(677,486)	1,821,579	380,301,834		
BlackRock							
Passive U.S. Bond Index Fund	76,367,033	(1,590,141)	(340,411)	(924,344)	73,512,137	-3.74%	-2.10%
Strategic Completion Fund	16,843,786	(204,048)	(9,947)	579	16,630,370	-1.27%	-1.21%
Total Investments with BlackRock	93,210,819	(1,794,189)	(350,358)	(923,765)	90,142,507		
Brandes and Baillie Gifford							
AK International Equity Fund	53,536,193	(2,409,902)	41,760	(1,681,594)	49,486,457	-7.56%	-4.57%
Northern Trust							
Environmental, Social, and Governance Fund	57,960,375	(3,634,128)	(139,922)	(463,846)	53,722,479	-7.31%	-6.30%
Total All Funds	$ 1,252,363,534	$ (52,695,630)	$ (3,893,525)	$ -	$ 1,195,774,379	-4.52%	-4.21%

Notes: Source data provided by the record keeper, Empower Retirement.

(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.

Deferred Compensation Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
January 31, 2022
$ (Thousands)

Invested Assets (at fair value)	**July**	**August**	**September**	**October**	**November**	**December**	**January**
Investments with T. Rowe Price							
Stable Value Fund	$ 204,937	$ 205,613	$ 206,301	$ 206,279	$ 204,471	$ 203,250	$ 204,924
Small Cap Stock Fund	152,997	154,380	149,317	154,660	148,136	149,446	130,722
Alaska Balanced Trust	45,949	46,782	45,773	47,238	46,750	47,616	46,475
Long Term Balanced Fund	91,855	93,589	91,457	94,749	93,930	96,726	94,850
AK Target Date 2010 Trust	3,367	3,400	3,404	3,198	3,166	3,238	3,133
AK Target Date 2015 Trust	10,022	10,104	9,823	10,059	9,891	9,600	9,334
AK Target Date 2020 Trust	26,231	26,498	25,784	27,250	26,083	26,717	25,347
AK Target Date 2025 Trust	32,470	33,030	31,684	32,461	33,063	32,921	31,427
AK Target Date 2030 Trust	18,706	19,160	18,134	19,481	19,258	20,466	19,413
AK Target Date 2035 Trust	14,380	14,428	13,883	14,369	14,544	15,194	14,768
AK Target Date 2040 Trust	13,562	13,793	13,199	13,741	13,740	14,192	13,622
AK Target Date 2045 Trust	10,409	10,783	10,399	10,921	10,779	11,583	10,550
AK Target Date 2050 Trust	8,111	8,359	8,079	8,803	8,600	8,744	8,584
AK Target Date 2055 Trust	6,422	6,636	6,473	6,795	6,737	7,085	6,811
AK Target Date 2060 Trust	1,450	1,485	1,445	1,465	1,452	1,530	1,488
AK Target Date 2065 Trust	629	599	589	681	684	677	661
Investments with JP Morgan							
JPMorgan SmartSpending 2015 R6	3	3	0	0	0	0	6
JPMorgan SmartSpending 2020 R6	3	3	12	13	5	5	6
Investments with State Street Global Advisors							
Money Market	21,081	21,454	22,467	21,968	21,875	20,468	20,380
S&P 500 Stock Index	275,631	281,834	266,972	284,001	280,831	293,278	277,118
Russell 3000 Index	52,658	54,024	52,307	57,037	57,587	61,840	59,345
World Equity Ex-US Index	19,029	19,419	19,567	20,855	20,734	23,081	23,460
Investments with BlackRock							
Passive U.S. Bond Index Fund	80,804	80,060	78,818	78,015	77,793	76,367	73,512
Strategic Completion Fund	16,889	16,832	16,196	16,435	16,027	16,844	16,630
Investments with Brandes and Baillie Gifford							
AK International Equity Fund	58,826	59,613	56,665	57,370	53,990	53,536	49,486
Investments with Northern Trust							
Environmental, Social, and Governance Fund	57,412	58,923	55,352	59,420	57,261	57,960	53,722
Total Invested Assets	**$ 1,223,830**	**$ 1,240,801**	**$ 1,204,100**	**$ 1,247,263**	**$ 1,227,383**	**$ 1,252,364**	**$ 1,195,774**
Change in Invested Assets							
Beginning Assets	$ 1,217,086	$ 1,223,830	$ 1,240,801	$ 1,204,100	$ 1,247,263	$ 1,227,383	$ 1,252,364
Investment Earnings	10,325	20,564	(33,515)	45,849	(16,735)	30,535	(52,696)
Net Contributions (Withdrawals)	(3,581)	(3,594)	(3,186)	(2,687)	(3,144)	(5,555)	(3,894)
Ending Invested Assets	**$ 1,223,830**	**$ 1,240,801**	**$ 1,204,100**	**$ 1,247,263**	**$ 1,227,383**	**$ 1,252,364**	**$ 1,195,774**

Note: Source data provided by the record keeper, Empower Retirement.

Defined Contribution Retirement - Participant Directed PERS
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
January 31, 2022

Participant Options	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
T. Rowe Price							
Stable Value Fund	$ 124,020,195	$ 181,429	$ (289,257)	$ 936,619	$ 124,848,986	0.67%	0.15%
Small Cap Stock Fund	116,082,552	(12,399,382)	76,295	(511,504)	103,247,961	-11.06%	-10.70%
Alaska Balanced Trust	54,960,987	(1,309,475)	(86,602)	733,994	54,298,904	-1.20%	-2.37%
Long Term Balanced Fund	30,034,516	(1,032,862)	(29,426)	4,097,468	33,069,696	10.11%	-3.22%
AK Target Date 2010 Trust	3,424,508	(79,658)	(957)	(142,300)	3,201,593	-6.51%	-2.38%
AK Target Date 2015 Trust	13,294,436	(335,274)	(58,086)	(118,544)	12,782,532	-3.85%	-2.54%
AK Target Date 2020 Trust	47,420,515	(1,373,305)	(85,454)	(231,867)	45,729,889	-3.57%	-2.91%
AK Target Date 2025 Trust	89,764,480	(2,979,205)	323,690	(591,669)	86,517,296	-3.62%	-3.32%
AK Target Date 2030 Trust	102,586,693	(3,735,392)	245,885	(304,430)	98,792,756	-3.70%	-3.64%
AK Target Date 2035 Trust	130,543,180	(5,156,082)	587,301	(270,772)	125,703,627	-3.71%	-3.94%
AK Target Date 2040 Trust	154,558,550	(6,464,956)	929,068	53,765	149,076,427	-3.55%	-4.17%
AK Target Date 2045 Trust	202,265,549	(8,867,776)	981,357	(424,811)	193,954,319	-4.11%	-4.38%
AK Target Date 2050 Trust	240,590,038	(10,682,891)	1,290,547	(334,514)	230,863,180	-4.04%	-4.43%
AK Target Date 2055 Trust	260,177,006	(11,548,457)	1,763,602	(468,214)	249,923,937	-3.94%	-4.43%
AK Target Date 2060 Trust	10,534,024	(473,819)	563,475	(12,736)	10,610,944	0.73%	-4.38%
AK Target Date 2065 Trust	5,158,934	(233,587)	342,660	(8,635)	5,259,372	1.95%	-4.39%
Total Investments with T. Rowe Price	1,585,416,163	(66,490,692)	6,554,098	2,401,850	1,527,881,419		
JP Morgan							
JPMorgan SmartSpending 2015 R6	1,346	(48)	492	(62)	1,728	28.38%	-3.07%
JPMorgan SmartSpending 2020 R6	44,777	(1,167)	961	14,030	58,601	30.87%	-2.23%
Total Investments with JP Morgan	46,123	(1,215)	1,453	13,968	60,329		
State Street Global Advisors							
Money Market	15,135,549	70	37,574	1,408,668	16,581,861	9.56%	0.00%
S&P 500 Stock Index Fund Series A	87,270,380	(4,507,974)	(205,439)	318,703	82,875,670	-5.04%	-5.16%
Russell 3000 Index	92,466,684	(5,455,573)	84,548	4,004,118	91,099,777	-1.48%	-5.77%
World Equity Ex-US Index	50,202,584	(1,449,960)	34,156	3,172,705	51,959,485	3.50%	-2.80%
Total Investments with SSgA	245,075,197	(11,413,437)	(49,161)	8,904,194	242,516,793		
BlackRock							
Passive U.S. Bond Index Fund	74,574,121	(1,549,499)	(182,214)	(1,818,399)	71,024,009	-4.76%	-2.11%
Strategic Completion Fund	5,809,514	(70,119)	33,332	(84,299)	5,688,428	-2.08%	-1.21%
Total Investments with BlackRock	80,383,635	(1,619,618)	(148,882)	(1,902,698)	76,712,437		
Brandes and Baillie Gifford							
AK International Equity Fund	105,913,714	(4,733,520)	31,183	(4,401,379)	96,809,998	-8.60%	-4.56%
Northern Trust							
Environmental, Social, and Governance Fund	82,011,844	(4,978,734)	10,495	(5,015,935)	72,027,670	-12.17%	-6.26%
Total All Funds	$ 2,098,846,676	$ (89,237,216)	$ 6,399,186	$ -	$ 2,016,008,646	-3.95%	-4.25%

Notes: Source data provided by the record keeper, Empower Retirement.
(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.

Defined Contribution Retirement - Participant Directed PERS
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
January 31, 2022
$ (Thousands)

Invested Assets (at fair value)	**July**	**August**	**September**	**October**	**November**	**December**	**January**
Investments with T. Rowe Price							
Stable Value Fund	$ 118,076	$ 119,540	$ 120,658	$ 120,594	$ 122,847	$ 124,020	$ 124,849
Small Cap Stock Fund	124,848	125,147	119,941	122,899	114,946	116,083	103,248
Alaska Balanced Trust	47,383	49,356	49,779	52,528	53,836	54,961	54,299
Long Term Balanced Fund	13,857	15,467	17,912	21,908	25,200	30,035	33,070
AK Target Date 2010 Trust	3,467	3,515	3,416	3,357	3,359	3,425	3,202
AK Target Date 2015 Trust	13,574	13,592	13,269	13,587	13,249	13,294	12,783
AK Target Date 2020 Trust	46,846	47,035	45,731	46,976	46,510	47,421	45,730
AK Target Date 2025 Trust	86,710	88,196	85,890	88,831	87,797	89,764	86,517
AK Target Date 2030 Trust	97,134	98,887	96,310	100,381	99,510	102,587	98,793
AK Target Date 2035 Trust	123,227	125,787	121,833	127,547	126,108	130,543	125,704
AK Target Date 2040 Trust	145,065	148,749	144,451	151,539	149,129	154,559	149,076
AK Target Date 2045 Trust	189,980	194,566	187,799	197,310	194,365	202,266	193,954
AK Target Date 2050 Trust	226,477	231,766	224,317	236,286	232,602	240,590	230,863
AK Target Date 2055 Trust	239,429	246,604	239,298	252,737	249,379	260,177	249,924
AK Target Date 2060 Trust	7,460	7,796	8,023	9,033	9,534	10,534	10,611
AK Target Date 2065 Trust	3,250	3,699	3,785	4,254	4,510	5,159	5,259
Investments with JP Morgan							
JPMorgan SmartSpending 2015 R6	5	0	0	0	1	1	2
JPMorgan SmartSpending 2020 R6	5	0	1	3	36	45	59
State Street Global Advisors							
Money Market	14,810	15,438	15,656	15,571	15,561	15,136	16,582
S&P 500 Stock Index Fund Series A	78,578	80,615	76,541	82,360	82,633	87,270	82,876
Russell 3000 Index	72,802	76,379	74,804	82,172	83,918	92,467	91,100
World Equity Ex-US Index	42,667	42,874	42,316	44,580	44,077	50,203	51,959
Investments with BlackRock							
Passive U.S. Bond Index Fund	83,219	82,134	79,693	77,762	77,259	74,574	71,024
Strategic Completion Fund	5,956	5,781	5,689	5,853	5,609	5,810	5,688
Investments with Brandes and Baillie Gifford							
AK International Equity Fund	108,915	112,201	107,694	110,745	104,918	105,914	96,810
Investments with Northern Trust							
Environmental, Social, and Governance Fund	89,553	91,018	84,086	89,412	84,162	82,012	72,028
Total Invested Assets	**$ 1,983,291**	**$ 2,026,142**	**$ 1,968,893**	**$ 2,058,225**	**$ 2,031,055**	**$ 2,098,847**	**$ 2,016,009**
Change in Invested Assets							
Beginning Assets	$ 1,964,384	$ 1,983,291	$ 2,026,142	$ 1,968,893	$ 2,058,225	$ 2,031,055	$ 2,098,847
Investment Earnings	12,809	37,132	(64,693)	81,461	(39,028)	58,320	(89,237)
Net Contributions (Withdrawals)	6,098	5,720	7,443	7,872	11,858	9,472	6,399
Ending Invested Assets	**$ 1,983,291**	**$ 2,026,142**	**$ 1,968,893**	**$ 2,058,225**	**$ 2,031,055**	**$ 2,098,847**	**$ 2,016,009**

Note: Source data provided by the record keeper, Empower Retirement.

Defined Contribution Retirement - Participant Directed TRS
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
January 31, 2022

Participant Options	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
T. Rowe Price							
Stable Value Fund	$ 48,994,624	$ 71,505	$ 68,315	$ 150,724	$ 49,285,168	0.59%	0.15%
Small Cap Stock Fund	46,555,919	(4,980,320)	92,407	181,205	41,849,211	-10.11%	-10.67%
Alaska Balanced Trust	22,870,517	(546,536)	30,866	221,622	22,576,469	-1.29%	-2.38%
Long Term Balanced Fund	12,777,366	(440,489)	26,509	1,905,942	14,269,328	11.68%	-3.21%
AK Target Date 2010 Trust	1,085,054	(27,781)	12,621	201,304	1,271,198	17.16%	-2.33%
AK Target Date 2015 Trust	4,319,131	(109,440)	(3,837)	48,396	4,254,250	-1.50%	-2.52%
AK Target Date 2020 Trust	13,732,175	(399,444)	157,902	(1)	13,490,632	-1.76%	-2.89%
AK Target Date 2025 Trust	28,225,516	(933,334)	(161,527)	(227,022)	26,903,633	-4.68%	-3.33%
AK Target Date 2030 Trust	39,319,513	(1,434,165)	277,431	(335,861)	37,826,918	-3.80%	-3.65%
AK Target Date 2035 Trust	55,467,262	(2,185,162)	336,461	(294,665)	53,323,896	-3.86%	-3.94%
AK Target Date 2040 Trust	66,519,316	(2,785,801)	361,905	(238,708)	63,856,712	-4.00%	-4.18%
AK Target Date 2045 Trust	96,199,706	(4,216,913)	463,506	(219,341)	92,226,958	-4.13%	-4.38%
AK Target Date 2050 Trust	133,878,985	(5,949,945)	751,316	(258,089)	128,422,267	-4.08%	-4.44%
AK Target Date 2055 Trust	87,713,149	(3,892,344)	572,479	(225,474)	84,167,810	-4.04%	-4.43%
AK Target Date 2060 Trust	3,446,630	(155,489)	207,672	(2,591)	3,496,222	1.44%	-4.38%
AK Target Date 2065 Trust	590,314	(27,086)	50,724	-	613,952	4.00%	-4.40%
Total Investments with T. Rowe Price	661,695,177	(28,012,744)	3,244,750	907,441	637,834,624		
JP Morgan							
JPMorgan SmartSpending 2015 R6	-	-	-	-	-	0.00%	0.00%
JPMorgan SmartSpending 2020 R6	-	-	-	-	-	0.00%	0.00%
Total Investments with JP Morgan	-	-	-	-	-		
State Street Global Advisors							
Money Market	4,610,388	21	17,282	167,542	4,795,233	4.01%	0.00%
S&P 500 Stock Index Fund Series A	24,091,017	(1,245,728)	105,044	27,381	22,977,714	-4.62%	-5.16%
Russell 3000 Index	37,705,091	(2,252,931)	92,490	1,982,803	37,527,453	-0.47%	-5.82%
World Equity Ex-US Index	21,697,613	(627,903)	46,026	1,461,783	22,577,519	4.06%	-2.80%
Total Investments with SSgA	88,104,109	(4,126,541)	260,842	3,639,509	87,877,919		
BlackRock							
Passive U.S. Bond Index Fund	28,233,644	(586,937)	51,003	(985,148)	26,712,562	-5.39%	-2.11%
Strategic Completion Fund	1,573,715	(18,803)	8,680	20,466	1,584,058	0.66%	-1.18%
Total Investments with BlackRock	29,807,359	(605,740)	59,683	(964,682)	28,296,620		
Brandes and Baillie Gifford							
AK International Equity Fund	45,514,201	(2,050,344)	83,922.00	(1,414,552)	42,133,227	-7.43%	-4.57%
Northern Trust							
Environmental, Social, and Governance Fund	33,522,874	(2,039,575)	54,453.00	(2,167,716)	29,370,036	-12.39%	-6.28%
Total All Funds	$ 858,643,720	$ (36,834,944)	$ 3,703,650	$ -	$ 825,512,426	-3.86%	-4.28%

Notes: Source data provided by the record keeper, Empower Retirement.
(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.

Defined Contribution Retirement - Participant Directed TRS
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
January 31, 2022
$ (Thousands)

Invested Assets (at fair value)	**July**	**August**	**September**	**October**	**November**	**December**	**January**
Investments with T. Rowe Price							
Stable Value Fund	$ 46,955	$ 47,342	$ 47,754	$ 47,461	$ 48,163	$ 48,995	$ 49,285
Small Cap Stock Fund	50,379	50,599	48,156	49,222	46,068	46,556	41,849
Alaska Balanced Trust	20,063	20,970	20,990	21,734	22,292	22,871	22,576
Long Term Balanced Fund	5,573	6,530	7,354	8,928	10,530	12,777	14,269
AK Target Date 2010 Trust	1,196	1,256	1,239	1,275	1,266	1,085	1,271
AK Target Date 2015 Trust	4,024	4,173	4,113	4,239	4,223	4,319	4,254
AK Target Date 2020 Trust	14,018	13,876	13,534	13,891	13,694	13,732	13,491
AK Target Date 2025 Trust	27,427	27,347	26,508	27,495	27,317	28,226	26,904
AK Target Date 2030 Trust	37,836	38,163	36,847	38,675	38,380	39,320	37,827
AK Target Date 2035 Trust	52,959	53,903	51,606	54,161	53,408	55,467	53,324
AK Target Date 2040 Trust	62,818	64,059	62,219	65,476	64,379	66,519	63,857
AK Target Date 2045 Trust	90,922	92,299	88,891	93,559	92,280	96,200	92,227
AK Target Date 2050 Trust	126,623	129,199	124,467	131,132	128,736	133,879	128,422
AK Target Date 2055 Trust	82,393	84,076	81,075	85,230	84,190	87,713	84,168
AK Target Date 2060 Trust	2,521	2,634	2,609	2,932	3,079	3,447	3,496
AK Target Date 2065 Trust	365	388	395	473	516	590	614
Investments with JP Morgan							
JPMorgan SmartSpending 2015 R6	0	0	0	0	0	0	0
JPMorgan SmartSpending 2020 R6	0	0	0	0	0	0	0
Investments with State Street Global Advisors							
Money Market	4,501	4,754	4,583	4,627	4,549	4,610	4,795
S&P 500 Stock Index Fund Series A	22,155	22,404	21,052	22,759	22,808	24,091	22,978
Russell 3000 Index	29,502	30,900	30,379	33,635	34,438	37,705	37,527
World Equity Ex-US Index	18,199	18,208	17,995	18,873	18,865	21,698	22,578
Investments with BlackRock							
Passive U.S. Bond Index Fund	32,563	32,163	31,093	30,233	29,624	28,234	26,713
Strategic Completion Fund	1,591	1,549	1,521	1,571	1,551	1,574	1,584
Investments with Brandes and Baillie Gifford							
AK International Equity Fund	46,757	47,935	45,605	46,672	44,516	45,514	42,133
Investments with Northern Trust							
Environmental, Social, and Governance Fund	38,315	38,547	35,289	37,402	34,900	33,523	29,370
Total Invested Assets	**$ 819,656**	**$ 833,273**	**$ 805,272**	**$ 841,655**	**$ 829,772**	**$ 858,644**	**$ 825,512**
Change in Invested Assets							
Beginning Assets	$ 812,550	$ 819,656	$ 833,273	$ 805,272	$ 841,655	$ 829,772	$ 858,644
Investment Earnings	5,164	15,463	(26,802)	33,555	(16,485)	24,147	(36,835)
Net Contributions (Withdrawals)	1,942	(1,845)	(1,199)	2,827	4,602	4,725	3,704
Ending Invested Assets	**$ 819,656**	**$ 833,273**	**$ 805,272**	**$ 841,655**	**$ 829,772**	**$ 858,644**	**$ 825,512**

Note: Source data provided by the record keeper, Empower Retirement.

ALASKA RETIREMENT MANAGEMENT BOARD

FINANCIAL REPORT
(Supplement to the Treasury Division Report)

As of January 31, 2022

Prepared by the Division of Retirement & Benefits

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Seven Months Ending January 31, 2022

	Contributions				Expenditures				Net
	Contributions EE and/or ER	State of Alaska	Other	Total Contributions	Benefits	Refunds & Disbursements	Administrative & Investment	Total Expenditures	Contributions/ (Withdrawals)
Public Employees' Retirement System (PERS)									
Defined Benefit Plans:									
Retirement Pension Trust	$ 272,456,530	$ 97,699,500	$ 90,086	$ 370,246,116	$ (556,064,570)	$ (5,080,309)	$ (5,361,742)	$ (566,506,621)	$ (196,260,505)
Retirement Health Care Trust	38,899,115	-	50,358,512	89,257,627	(280,477,667)	-	(7,534,855)	(288,012,522)	(198,754,895)
Total Defined Benefit Plans	311,355,645	97,699,500	50,448,598	459,503,743	(836,542,237)	(5,080,309)	(12,896,597)	(854,519,143)	(395,015,400)
Defined Contribution Plans:									
Participant Directed Retirement	115,660,020	-	-	115,660,020	-	(56,435,325)	(4,363,042)	(60,798,367)	54,861,653
Health Reimbursement Arrangement [(a)]	28,293,930	-	16,394	28,310,324	(226,213)	-	(107,938)	(334,151)	27,976,173
Retiree Medical Plan [(a)]	9,968,572	-	91,335	10,059,907	(766,186)	-	(77,210)	(843,396)	9,216,511
Occupational Death and Disability: [(a)]									
All Others	2,330,705	-	-	2,330,705	(72,271)	-	(16,094)	(88,365)	2,242,340
Peace Officers and Firefighters	906,941	-	-	906,941	(200,752)	-	(13,410)	(214,162)	692,779
Total Defined Contribution Plans	157,160,168	-	107,729	157,267,897	(1,265,422)	(56,435,325)	(4,577,694)	(62,278,441)	94,989,456
Total PERS	**468,515,813**	**97,699,500**	**50,556,327**	**616,771,640**	**(837,807,659)**	**(61,515,634)**	**(17,474,291)**	**(916,797,584)**	**(300,025,944)**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Pension Trust	28,744,067	142,665,000	18,313	171,427,380	(299,554,025)	(913,780)	(2,528,568)	(302,996,373)	(131,568,993)
Retirement Health Care Trust	11,145,875	-	16,701,218	27,847,093	(90,171,230)	-	(4,803,043)	(94,974,273)	(67,127,180)
Total Defined Benefit Plans	39,889,942	142,665,000	16,719,531	199,274,473	(389,725,255)	(913,780)	(7,331,611)	(397,970,646)	(198,696,173)
Defined Contribution Plans:									
Participant Directed Retirement	35,204,955	-	-	35,204,955	-	(18,857,590)	(1,590,811)	(20,448,401)	14,756,554
Health Reimbursement Arrangement [(a)]	6,482,422	-	(15,316)	6,467,106	(81,143)	-	(31,753)	(112,896)	6,354,210
Retiree Medical Plan [(a)]	2,060,785	-	6,555	2,067,340	(166,541)	-	(36,930)	(203,471)	1,863,869
Occupational Death and Disability [(a)]	186,727	-	-	186,727	(14,173)	-	(7,128)	(21,301)	165,426
Total Defined Contribution Plans	43,934,889	-	(8,761)	43,926,128	(261,857)	(18,857,590)	(1,666,622)	(20,786,069)	23,140,059
Total TRS	**83,824,831**	**142,665,000**	**16,710,770**	**243,200,601**	**(389,987,112)**	**(19,771,370)**	**(8,998,233)**	**(418,756,715)**	**(175,556,114)**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Pension Trust	5,424,306	4,185,000	4	9,609,310	(8,525,482)	-	(83,804)	(8,609,286)	1,000,024
Defined Benefit Plan Retirement Health Care Trust	407,877	-	139,789	547,666	(804,280)	-	(48,031)	(852,311)	(304,645)
Total JRS	**5,832,183**	**4,185,000**	**139,793**	**10,156,976**	**(9,329,762)**	**-**	**(131,835)**	**(9,461,597)**	**695,379**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Pension Trust [(a)]	-	-	-	-	(836,757)	-	(175,419)	(1,012,176)	(1,012,176)
Other Participant Directed Plans									
Supplemental Annuity Plan (SBS)	100,994,601	-	-	100,994,601	-	(182,579,521)	(4,824,660)	(187,404,181)	(86,409,580)
Deferred Compensation Plan [(b)] (DCP)	29,006,217	-	-	29,006,217	-	(53,069,405)	(1,576,461)	(54,645,866)	(25,639,649)
Total All Funds	**688,173,645**	**244,549,500**	**67,406,890**	**1,000,130,035**	**(1,237,961,290)**	**(316,935,930)**	**(33,180,899)**	**(1,588,078,119)**	**(587,948,084)**
Total Non-Participant Directed	407,307,852	244,549,500	67,406,890	719,264,242	(1,237,961,290)	(5,994,089)	(20,825,925)	(1,264,781,304)	(545,517,062)
Total Participant Directed	280,865,793	-	-	280,865,793	-	(310,941,841)	(12,354,974)	(323,296,815)	(42,431,022)
Total All Funds	**$ 688,173,645**	**$ 244,549,500**	**$ 67,406,890**	**$ 1,000,130,035**	**$ (1,237,961,290)**	**$ (316,935,930)**	**$ (33,180,899)**	**$ (1,588,078,119)**	**$ (587,948,084)**

(a) Employer only contributions.
(b) Employee only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Month Ended January 31, 2022

	Contributions				Expenditures				Net
	Contributions EE and/or ER	State of Alaska	Other	Total Contributions	Benefits	Refunds & Disbursements	Administrative & Investment	Total Expenditures	**Contributions/ (Withdrawals)**
Public Employees' Retirement System (PERS)									
Defined Benefit Plans:									
Retirement Pension Trust	$ 34,722,936	$ -	$ 11,948	$ 34,734,884	$ (79,974,041)	$ (540,645)	$ (563,006)	$ (81,077,692)	$ (46,342,808)
Retirement Health Care Trust	5,120,527	-	14,666,076	19,786,603	(39,461,198)	-	(1,712,754)	(41,173,952)	(21,387,349)
Total Defined Benefit Plans	39,843,463	-	14,678,024	54,521,487	(119,435,239)	(540,645)	(2,275,760)	(122,251,644)	(67,730,157)
Defined Contribution Plans:									
Participant Directed Retirement	14,856,780	-	-	14,856,780	-	(7,691,257)	(766,337)	(8,457,594)	6,399,186
Health Reimbursement Arrangement [(a)]	3,579,479	-	-	3,579,479	(23,649)	-	(19,348)	(42,997)	3,536,482
Retiree Medical Plan [(a)]	1,218,797	-	35,576	1,254,373	(69,198)	-	(21,633)	(90,831)	1,163,542
Occupational Death and Disability: [(a)]								-	
All Others	293,958	-	-	293,958	(13,440)	-	(3,951)	(17,391)	276,567
Peace Officers and Firefighters	106,175	-	-	106,175	(41,013)	-	(6,831)	(47,844)	58,331
Total Defined Contribution Plans	20,055,189	-	35,576	20,090,765	(147,300)	(7,691,257)	(818,100)	(8,656,657)	11,434,108
Total PERS	**59,898,652**	**-**	**14,713,600**	**74,612,252**	**(119,582,539)**	**(8,231,902)**	**(3,093,860)**	**(130,908,301)**	**(56,296,049)**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Pension Trust	3,963,067	-	1,719	3,964,786	(42,692,791)	(38,969)	(300,104)	(43,031,864)	(39,067,078)
Retirement Health Care Trust	1,575,711	-	4,940,807	6,516,518	(11,894,596)	-	(637,995)	(12,532,591)	(6,016,073)
Total Defined Benefit Plans	5,538,778	-	4,942,526	10,481,304	(54,587,387)	(38,969)	(938,099)	(55,564,455)	(45,083,151)
Defined Contribution Plans:									
Participant Directed Retirement	5,437,320	-	-	5,437,320	-	(1,406,073)	(327,597)	(1,733,670)	3,703,650
Health Reimbursement Arrangement [(a)]	1,020,890	-	-	1,020,890	(18,419)	-	(5,624)	(24,043)	996,847
Retiree Medical Plan [(a)]	303,910	-	1,243	305,153	(9,254)	-	(12,117)	(21,371)	283,782
Occupational Death and Disability [(a)]	28,392	-	-	28,392	(2,024)	-	(2,767)	(4,791)	23,601
Total Defined Contribution Plans	6,790,512	-	1,243	6,791,755	(29,697)	(1,406,073)	(348,105)	(1,783,875)	5,007,880
Total TRS	**12,329,290**	**-**	**4,943,769**	**17,273,059**	**(54,617,084)**	**(1,445,042)**	**(1,286,204)**	**(57,348,330)**	**(40,075,271)**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Pension Trust	655,876	-	-	655,876	(1,235,676)	-	(12,720)	(1,248,396)	(592,520)
Defined Benefit Plan Retirement Health Care Trust	67,704	-	45,212	112,916	(101,506)	-	(6,511)	(108,017)	4,899
Total JRS	**723,580**	**-**	**45,212**	**768,792**	**(1,337,182)**	**-**	**(19,231)**	**(1,356,413)**	**(587,621)**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Pension Trust [(a)]	-	-	-	-	(147,580)	-	(10,991)	(158,571)	(158,571)
Other Participant Directed Plans									
Supplemental Annuity Plan (SBS)	13,334,370	-	-	13,334,370	-	(25,746,562)	(1,000,132)	(26,746,694)	(13,412,324)
Deferred Compensation Plan [(b)] (DCP)	4,328,531	-	-	4,328,531	-	(7,918,871)	(303,185)	(8,222,056)	(3,893,525)
Total All Funds	**90,614,423**	**-**	**19,702,581**	**110,317,004**	**(175,684,385)**	**(43,342,377)**	**-**	**(224,740,365)**	**(114,423,361)**
Total Non-Participant Directed	52,657,422	-	19,702,581	72,360,003	(175,684,385)	(579,614)	(3,316,352)	(179,580,351)	(107,220,348)
Total Participant Directed	37,957,001	-	-	37,957,001	-	(42,762,763)	(2,397,251)	(45,160,014)	(7,203,013)
Total All Funds	**$ 90,614,423**	**$ -**	**$ 19,702,581**	**$ 110,317,004**	**$ (175,684,385)**	**$ (43,342,377)**	**$ (5,713,603)**	**$ (224,740,365)**	**$ (114,423,361)**

(a) Employer only contributions.
(b) Employee only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Seven Months Ending January 31, 2022

PARTICIPANT DIRECTED DISBURSEMENTS BY PLAN AND TYPE

Type	PERS DCR Plan	TRS DCR Plan	Supplemental Annuity Plan	Deferred Compensation	TOTAL	% of Total
Payment to Beneficiary	$ 40,559	$ -	$ 593,326	$ 198,895	$ 832,780	0.3%
Death Benefit	975,131	897,253	9,493,081	3,519,092	14,884,557	4.8%
Disability / Hardship	37,519	-	44,974	38,465	120,958	0.0%
Minimum Required Distribution	146,705	36,629	9,683,526	3,847,037	13,713,897	4.4%
Deminimus Acct Balance Distribution	-	-	-	3,372	3,372	0.0%
Qualified Domestic Relations Order	572,969	155,858	3,227,911	322,341	4,279,079	1.4%
Separation from Service / Retirement	54,662,442	17,758,839	159,020,334	43,130,276	274,571,891	88.3%
Purchase of Service Credit	-	9,011	516,369	94,254	619,634	0.2%
Transfer to a Qualifying Plan	-	-	-	-	-	0.0%
59-½ In-service Distribution	-	-	-	1,909,311	1,909,311	0.6%
Qualified Birth / Adoption Expense	-	-	-	6,362	6,362	0.0%
CARES Act Distributions	-	-	-	-	-	0.0%
TOTAL	$ 56,435,325	$ 18,857,590	$ 182,579,521	$ 53,069,405	$ 310,941,841	100.0%

PERS & TRS PARTICIPANT DIRECTED DISBURSEMENTS BY PLAN AND VESTED PERCENTAGE

Vesting	PERS DCR Plan	TRS DCR Plan	TOTAL	% of Total
100% Vested	$ 50,440,840	$ 16,963,755	$ 67,404,595	89.5%
75% Vested	1,346,327	488,735	1,835,062	2.4%
50% Vested	1,246,488	468,262	1,714,750	2.3%
25% Vested	1,481,047	406,138	1,887,185	2.5%
0% Vested	1,920,623	530,700	2,451,323	3.3%
TOTAL	$ 56,435,325	$ 18,857,590	$ 75,292,915	100.0%

DEFINED BENEFIT REFUNDS BY PLAN, TIER, CONTRIBUTION TYPE AND VESTED STATUS

	PERS DB Pension Plan				TRS DB Pension Plan			JRS	TOTAL
Contribution Type	Tier 1	Tier 2	Tier 3	Total	Tier 1	Tier 2	Total	DB Pension Plan	DB Pension Plan
Mandatory Vested	$ 219,894	$ 920,164	$ 1,297,624	$ 2,437,682	$ -	$ 196,538	$ 196,538	$ -	$ 2,634,220.00
Mandatory Non-Vested	68,396	148,578	453,540	670,514	124,999	571,744	696,743	-	1,367,257
Geographic Differential	-	174,912	142,613	317,525	-	-	-	-	317,525
Voluntary Full	225,880	534,334	671,284	1,431,498	-	-	-	-	1,431,498
Indebtedness, Lagging & Partial	5,742	52,672	164,676	223,090	176	20,323	20,499	-	243,589
TOTAL	$ 519,912	$ 1,830,660	$ 2,729,737	$ 5,080,309	$ 125,175	$ 788,605	$ 913,780	$ -	$ 5,994,089

Notes for the DRB Supplement to the Treasury Report

January 2022

This report is the DRB supplement to the Treasury Division's Financial Report. It expands the "Net Contributions/(Withdrawals)" column into contributions and expenditures. It shows contributions received from both employees and employers, contributions from the State of Alaska, and other non-investment income. This report also expands expenditures into benefits, refunds & disbursements, and administrative & investment expenditures.

The net amount of total contributions and total expenditures, presented as "Net Contributions/(Withdrawals)", agrees with the same column in the Treasury Division's Report. Page one shows the year-to-date totals for the first seven months of Fiscal Year 2022, while page two shows only the month of January 2022.

Highlights – On page one, for the seven months ending January 31, 2022:

- PERS DB Pension – Average employer and employee contributions of $38.9 million per month; benefit payments of approximately $79.4 million per month; refunds average $726 thousand; and administrative and investment expenditures of $766 thousand per month (DOR and DRB).
- PERS DB Healthcare – Average employer contributions of $5.6 million per month; benefit payments of approximately $40.1 million per month; other income of $15.2 million from OptumRx EGWP Subsidies; $14 million from OptumRx pharmacy rebate (most recently received in November for 3rd Qtr 2021); $285 thousand from Aetna pharmacy rebate (most recently received in December for 2nd Qtr 2021); $20.7 million from EGWP coverage gap discount plan (CGDP) (most recently received in January for 3rd Qtr 2021); and average administrative and investment expenditures of $1.1 million per month (DOR and DRB).
- PERS DC Pension – Average employer and employee contributions of $16.5 million per month; participant disbursements average $8.1 million per month; and average administrative and investment expenditures of $623 thousand per month (DOR and DRB).
- PERS DCR Health – For HRA, RMP, and OD&D, only employer contributions average $5.9 million per month on behalf of participating employees; benefit payments of approximately $181 thousand per month. Currently, 15 benefits are being paid from the Occupational Death & Disability plans, 104 retirees are participating in RMP, and 136 retirees are participating in HRA. Other income of $36.7 thousand from OptumRx EGWP Subsidies; $22 thousand from OptumRx pharmacy rebate (most recently received in November for 3rd Qtr 2021); $32 thousand from EGWP coverage gap discount plan (CGDP) (most recently received in January for 3rd Qtr 2021); and administrative and investment expenditures were approximately $31 thousand per month (DOR and DRB).
- TRS DB Pension - Average employer and employee contributions of $4.1 million per month; benefit payments of approximately $42.8 million per month; refunds average $131 thousand; and average administrative and investment expenditures of $361 thousand per month (DOR and DRB).
- TRS DB Healthcare – Average employer contributions of $1.6 million per month; benefit payments of approximately $12.9 million per month; other income of $5.3 million from OptumRx EGWP Subsidies; $4.4 million from OptumRx pharmacy rebate (most recently received in November for 3rd Qtr 2021); $122 thousand from Aetna pharmacy rebate (most recently received in December for 2nd Qtr 2021); $6.8 million from EGWP coverage gap discount plan (CGDP) (most recently received in January for 3rd Qtr 2021); and average administrative and investment expenditures of $686 thousand per month (DOR and DRB).

- TRS DC Pension – Average employer and employee contributions of $5 million per month; participant disbursements average $2.7 million per month; and average administrative and investment expenditures of $227 thousand per month (DOR and DRB).
- TRS DCR Health – For HRA, RMP, and OD&D only, employer contributions average $1.2 million per month on behalf of participating employees; benefit payments of approximately $37 thousand per month. Currently, 1 benefit is being paid from the Occupational Death & Disability plans, 25 retirees are participating in RMP, and 38 retirees are participating in HRA. Other income of $3.8 thousand was received from monthly OptumRx EGWP Subsidies; $3 thousand from OptumRx pharmacy rebate (most recently received in November for 3rd Qtr 2021); and administrative and investment expenditures were approximately $11 thousand per month (DOR and DRB).
- JRS Pension – Average employer and employee contributions of $775 thousand per month; benefit payments of approximately $1.2 million per month; and average administrative and investment expenditures of $12 thousand per month (DOR and DRB).
- JRS Healthcare – Average employer contributions of $58 thousand per month; benefit payments of approximately $115 thousand per month. Other income of $44.9 thousand from OptumRx EGWP Subsidies; $32 thousand from OptumRx pharmacy rebate (most recently received in November for 3rd Qtr 2021); $61.6 thousand from EGWP coverage gap discount plan (CGDP) (most recently received in January for 3rd Qtr 2021); and average administrative and investment expenditures of $7 thousand per month (DOR and DRB).
- NGNMRS – A combination of lump-sum and monthly benefit payments of $120 thousand per month; and average administrative and investment expenditures of $25 thousand per month (DOR and DRB).
- SBS – Average employer and employee contributions and transfers in of $14.4 million per month. Participant disbursements average of $26.1 million per month; and average administrative and investment expenditures of $689 thousand per month (DOR and DRB).
- Deferred Compensation – Average member-only contributions and transfers in of $4.1 million per month; participant disbursements average of $7.6 million per month; and average administrative and investment expenditures of $225 thousand per month (DOR and DRB).

Highlights – On page two, activity for the one month of January 2022 only:

- PERS DB Healthcare – Other Income of $14.6 million from OptumRx EGWP Subsidy and EGWP Coverage GAP Discount Plan
- TRS DB Healthcare – Other Income of $4.9 million from OptumRx EGWP Subsidy and EGWP Coverage GAP Discount Plan
- JRS DB Healthcare – Other Income of $45.0 thousand from OptumRx EGWP Subsidy and EGWP Coverage GAP Discount Plan
- All other funds – Nothing significant to report.

If you have any questions or comments, please let me know.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Participant-Directed Plans
Empower Brokerage Option

ACTION: **X**

DATE: March 17-18, 2022

INFORMATION: _____

BACKGROUND

For several years, Defined Contribution members have expressed an interest in the ARMB offering a self-directed brokerage (SDB), and have occasionally contacted ARMB trustees and staff requesting the ARMB implement one. At the direction of the board, the Division of Retirement and Benefits and Treasury staff worked together to identify objective criteria for an SDB, a vendor was selected, and at the September 2020 ARMB meeting, an action item was approved to implement the Empower brokerage platform in the Alaska Supplemental Annuity Plan, the Defined Contribution Retirement Plans, and the Deferred Compensation Plan.

STATUS

As part of the preparations for implementation of the SDB, Department of Law and Ice Miller, Division of Retirement & Benefits outside counsel, were both consulted. In an internal memo distributed to the ARMB trustees, Department of Law attorneys cited several factors including legal decisions issued subsequent to the ARMB's decision to implement a SDB. Both *Metcalfe v. State* from April 2, 2021, and the *Hughes v Northwestern* from on January 24, 2022, raise concerns with the implementation of the SDB. The case of *Metcalfe v. State* reinforces the State's constitutional guarantee regarding employee retirement systems in terms of diminishment, and potentially increases the risk that any losses in the SDB may be subject to claims of diminishment or breach of fiduciary duty. Similarly, *Hughes v Northwestern* raises questions about State's ability to delegate fiduciary responsibilities in an SDB. As a result of their analysis of the SDB, and the impact of these two relatively new additions to case law, both Ice Miller, and the Department of Law attorneys do not recommend that the ARMB move forward with the SDB implementation.

RECOMMENDATION

The Alaska Retirement Management Board direct staff not to move forward with implementing a Brokerage platform for members of the Alaska Supplemental Annuity Plan, the Defined Contribution Retirement Plans, and the Deferred Compensation Plan.

BUCK

State of Alaska Retirement Systems

Presentation to ARMB Actuarial Committee

June 30, 2021 Valuation Results – PERS and TRS (DB and DCR)
June 30, 2021 Roll-Forward Valuation Results – JRS and NGNMRS
June 30, 2021 Valuation Projections – PERS and TRS
Healthcare Sensitivities – PERS and TRS

March 16, 2022

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Purpose of the Valuations

Purpose of the 2021 Valuations

- Measure each plan's funded status as of June 30, 2021
- Compare *actual* FY21 experience (assets and liabilities) to *expected* experience based on the assumptions used in the 2020 valuations
- Provide the basis for FY24 contribution rates

2021 Valuation Highlights (PERS and TRS)

Highlights of 2021 Valuation Results (PERS and TRS)

- Asset performance
  - FY21 asset returns **exceeded** the 7.38% expected return
    - ❑ Market returns were approximately 30%
    - ❑ Due to 5-year asset smoothing, actuarial returns were approximately 12%
- Liability experience
  - Liabilities are **less** than expected. Overall liability gains/(losses) and the more significant gain/(loss) amounts are:

Source	PERS		TRS	
	Pension	Healthcare	Pension	Healthcare
PRPA/COLA increases	$155M		$82M	
Salary increases	$(17)M		$(29)M	
Per capita claims cost		$272M		$97M
Plan changes		$62M		$22M
Overall gains/(losses)	$161M	$384M	$56M	$131M
- as % of 6/30/21 liability	1.0%	5.6%	0.7%	5.4%

The result:

- Funded ratios are up
- Contribution rates are down

Highlights of 2021 Valuation Results (cont'd)

- Key reasons for the $272M (PERS) and $97M (TRS) per capita claims cost gains:
  - Medical costs are lower than projected (4% lower for Pre-Medicare / 5% lower for Medicare)
  - EGWP subsidy provided by Optum increased by 16% from $1,003 for 2021 to $1,168 for 2022

	Medical			Prescription Drugs (Rx)		
	Pre-Medicare	Medicare Parts A & B	Medicare Part B Only	Pre-Medicare	Medicare	EGWP
Fiscal 2022 valuation age 65 per capita cost						
- Expected	16,358	1,705	5,628	3,647	3,591	(1,078)
- Actual	15,708	1,619	5,341	3,695	3,560	(1,168)
- Dollar (Gain) / Loss	(650)	(86)	(287)	48	(31)	(90)
- Percentage (Gain) / Loss	-4.0%	-5.0%	-5.1%	1.3%	-0.9%	8.3%

Note: The actual per capita costs in this table are before reflecting the impact of plan changes shown on the next slide.

Highlights of 2021 Valuation Results (cont'd)

- Two healthcare plan changes will be effective January 1, 2022:
  - Preventive benefits are being added for pre-Medicare members
  - Prior authorization of certain specialty medications is being implemented

- The estimated impact of these changes was provided by Segal

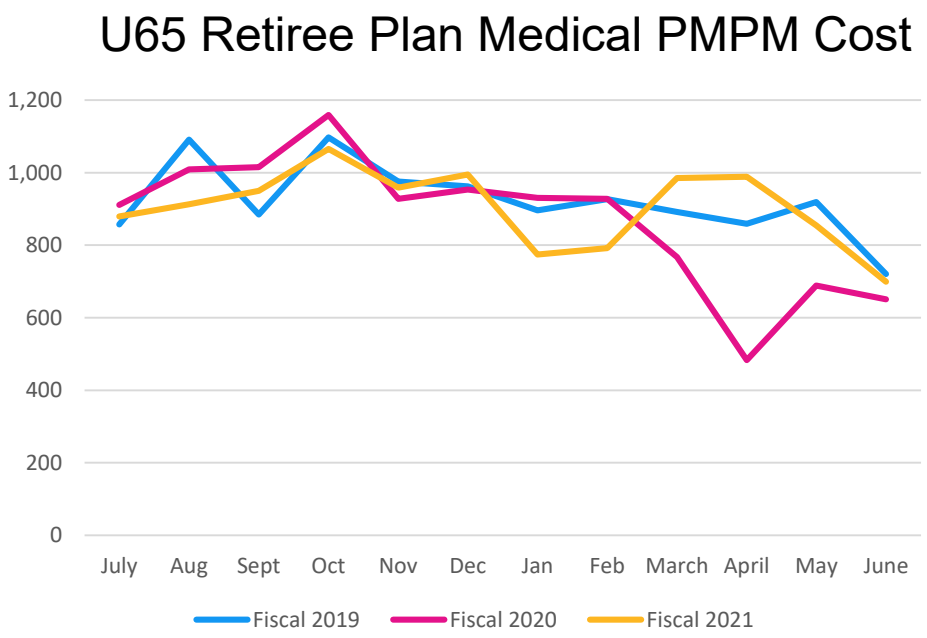
- Adjustments to the 6/30/21 valuation per capita costs to reflect these plan changes are as follows:

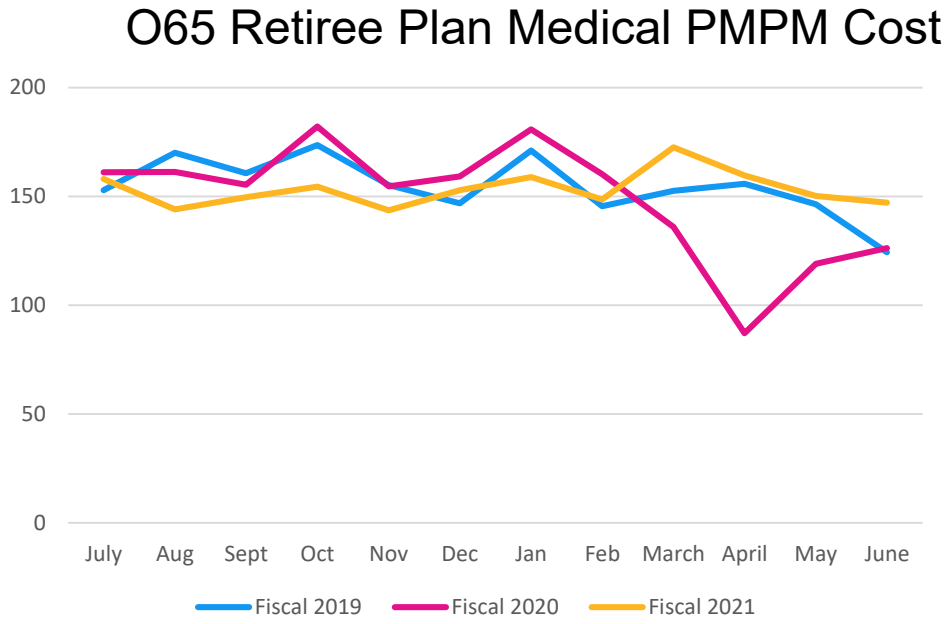
	Medical			Prescription Drugs (Rx)		
	Pre-Medicare	Medicare Parts A & B	Medicare Part B Only	Pre-Medicare	Medicare	EGWP
Fiscal 2022 valuation age 65 per capita cost						
- Prior to plan changes	15,708	1,619	5,341	3,695	3,560	(1,168)
- Impact of plan changes	1.4%	0.0%	0.0%	-8.7%	-2.4%	-3.2%
- After plan changes	15,926	1,619	5,341	3,375	3,474	(1,131)

Note: Figures in this table may differ due to rounding.

COVID-19 Impact – Medical Incurred Claims

Per Member Per Month (PMPM)

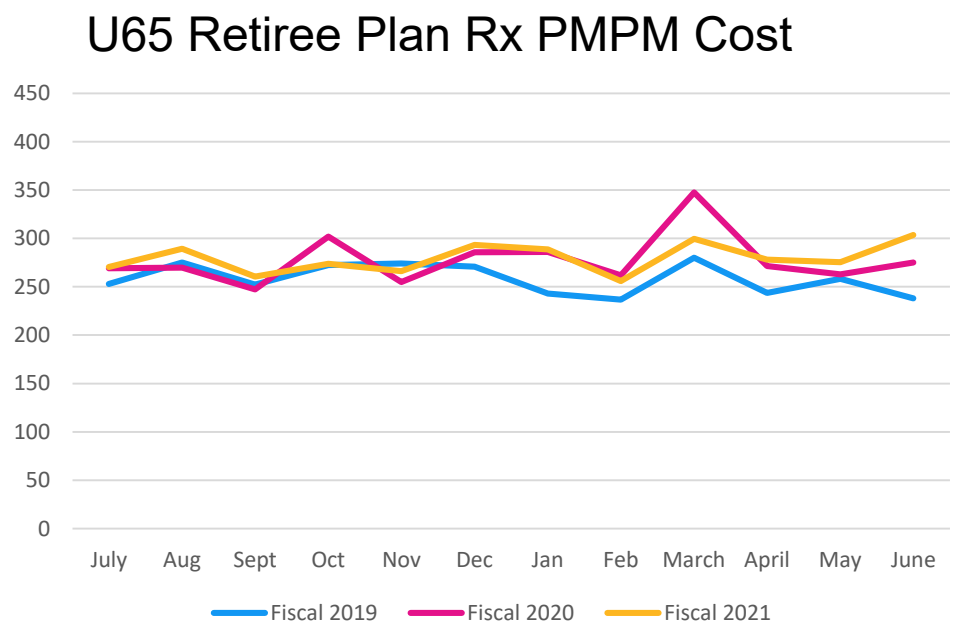


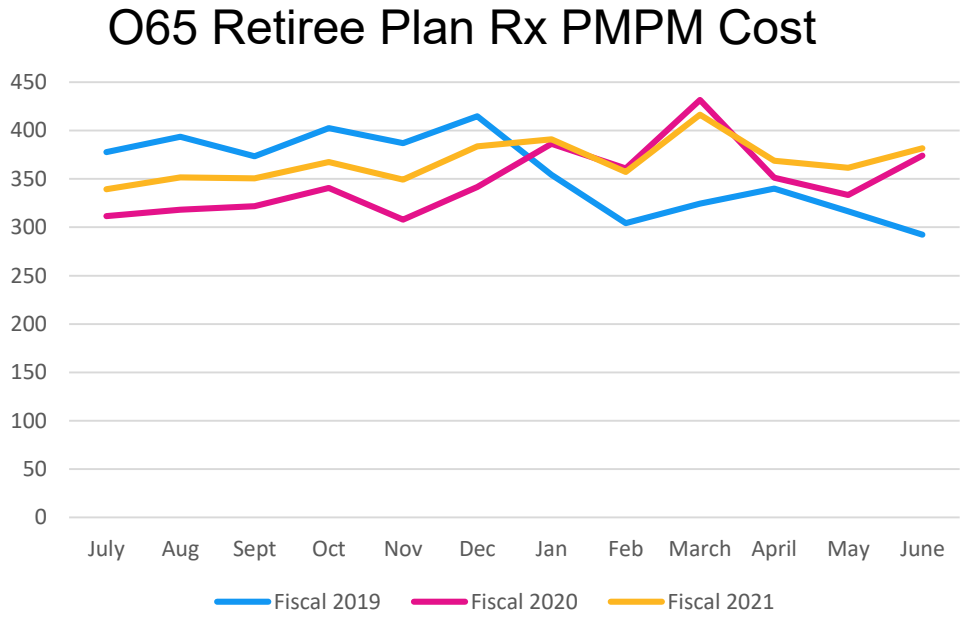


- Material decrease in PMPM cost during March – June of 2020 due to COVID-19
- Fiscal 2021 PMPM medical cost was lower than pre-COVID levels, so a 4% load was added to the Fiscal 2021 medical claims used in the per capita claims cost development to better reflect expected long-term costs

COVID-19 Impact – Rx Incurred Claims

Per Member Per Month (PMPM)





- Observed a spike in prescription drug claims in March 2020 (see next slide for details)
- Fiscal 2021 PMPM Rx cost not impacted by COVID like medical

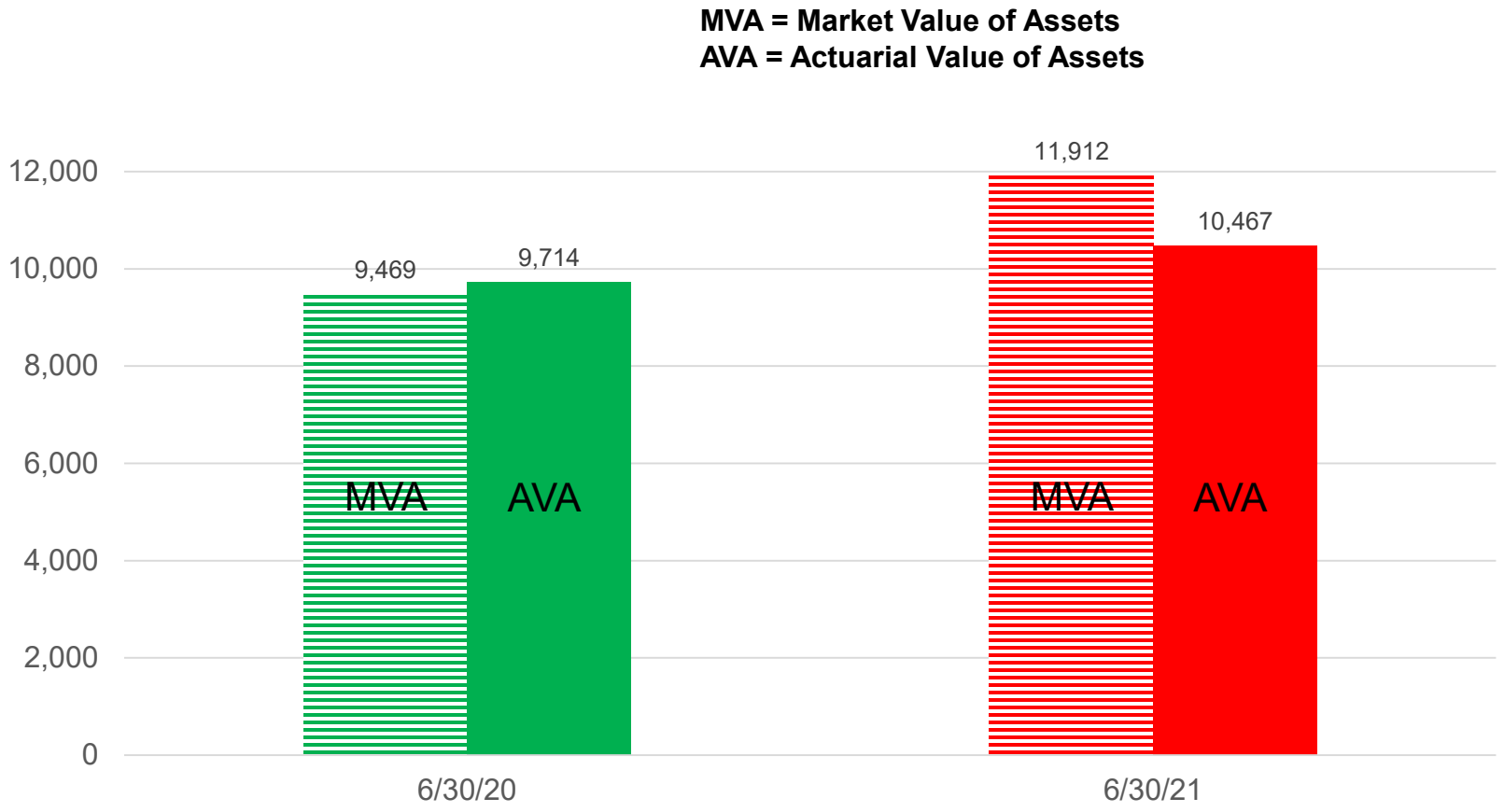
Details on March 2020 Spike in Rx Claims

- Because of COVID-19, Alaska permitted early refill of medications and members also increased utilization of home delivery and Retail 90 prescriptions

	Non-EGWP	EGWP
From Optum's Q1 2020 report (Q1 2020 vs Q1 2019):		
- Increase in overall plan paid PMPM trend	11.2%	21.9%
- Increase in Rx Count	20.1%	11.5%
- Increase in Rx Count due to COVID-19 (Refill Too Soon exception)	3.0%	3.5%
- Home delivery rate change (from 11.6% to 11.4% & 14.9% to 16.8%)	-0.2%	1.9%
From Optum's Q1 2021 report (Q1 2021 vs Q1 2020):		
- Home delivery rate change (from 11.4% to 11.5% & 16.8% to 18.3%)	0.1%	1.5%
- Retail 90 rate (from 34.7% to 34.8% & 35.2% to 35.6%)	0.1%	0.4%

2021 Valuation Results - PERS

PERS: Assets – Pension
($millions)

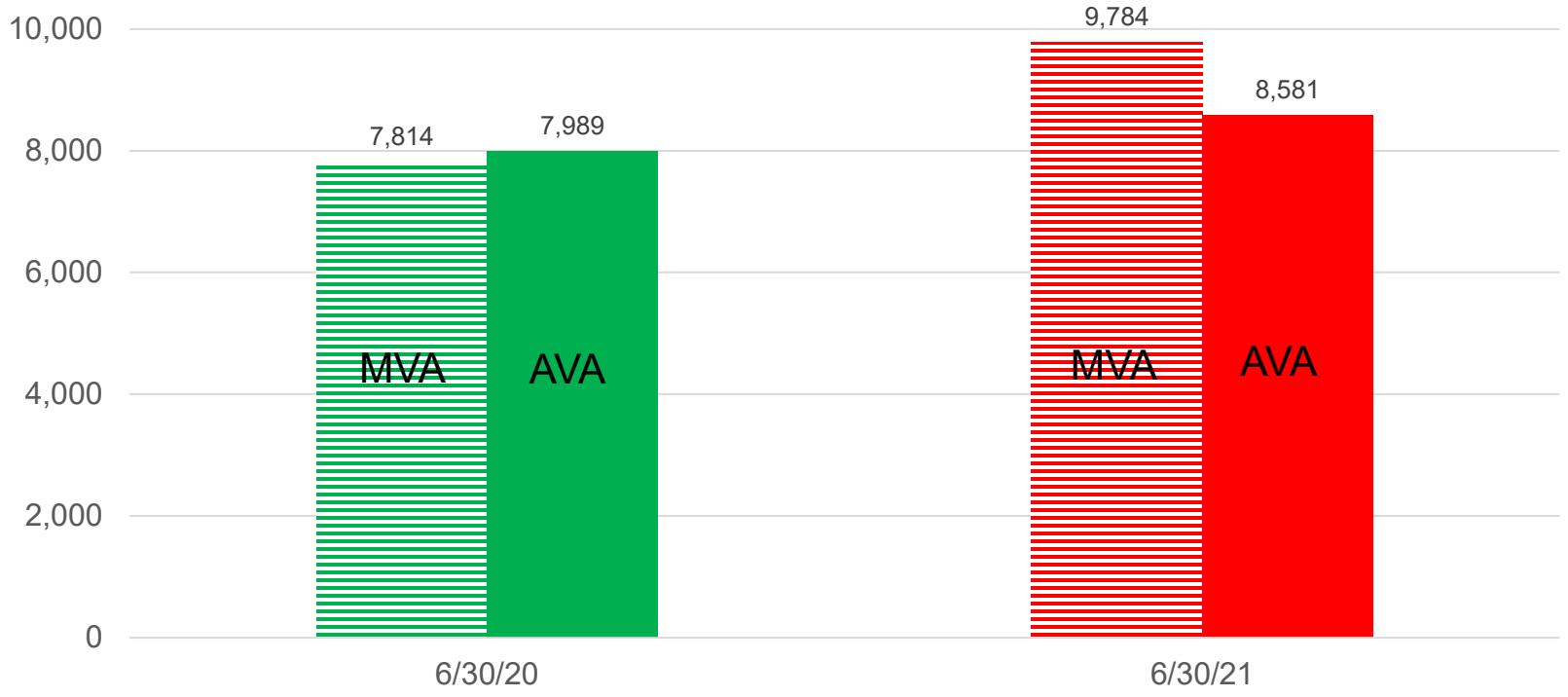


FY21 Asset Gains:

- MVA: $2,104M
- AVA: $396M

PERS: Assets – Healthcare
($millions)

MVA = Market Value of Assets
AVA = Actuarial Value of Assets

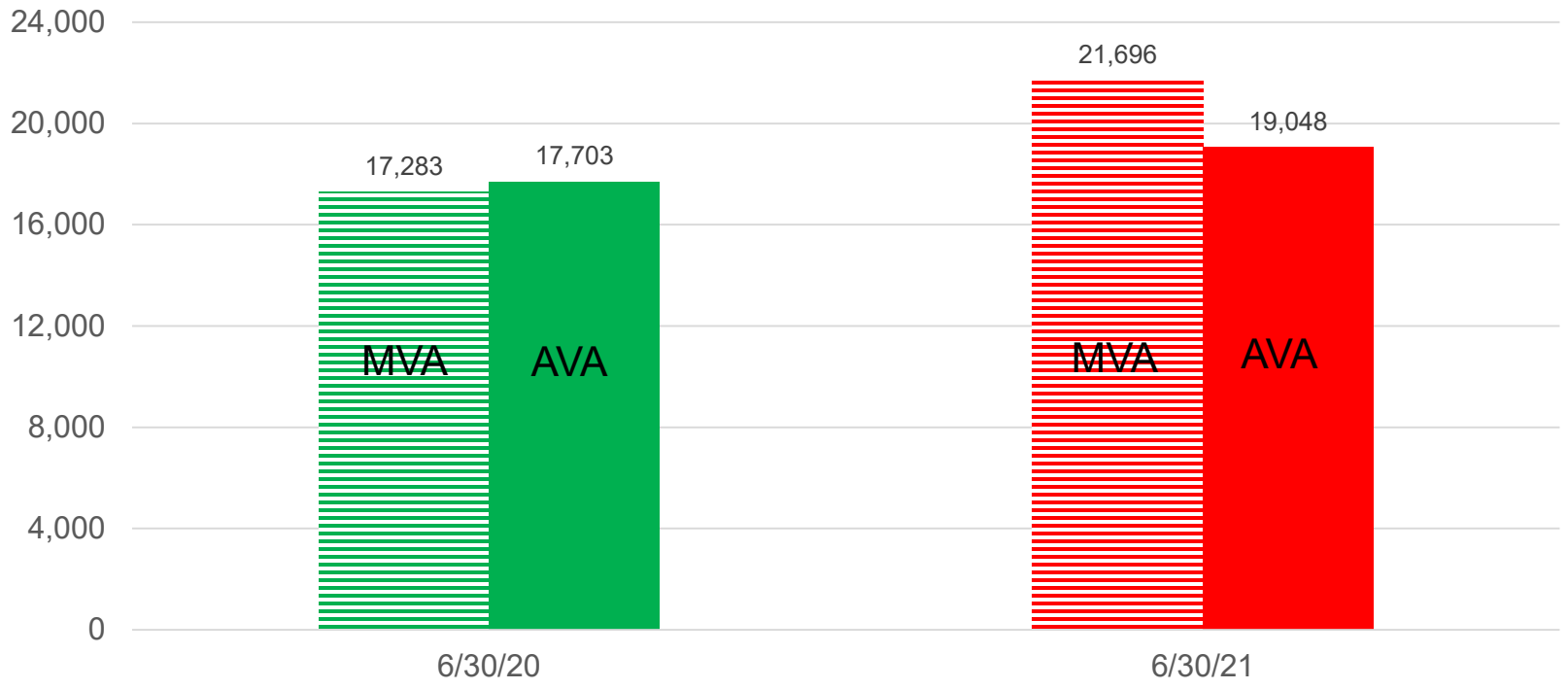


FY21 Asset Gains:

- MVA: $1,730M
- AVA: $338M

PERS: Assets – Total
($millions)

MVA = Market Value of Assets
AVA = Actuarial Value of Assets

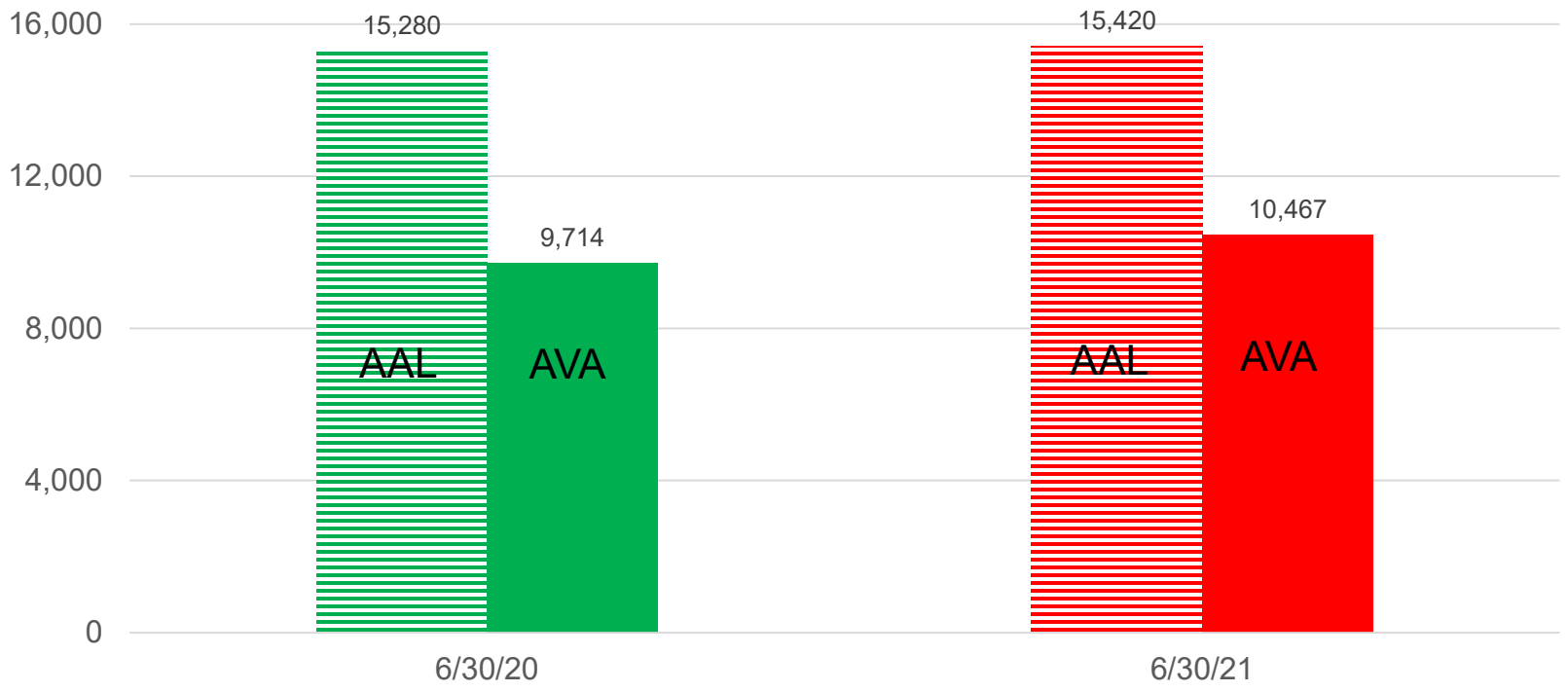


FY21 Asset Gains:

- MVA: $3,834M
- AVA: $734M

PERS: Assets vs Liabilities – Pension
($millions)

AAL = Actuarial Accrued Liability
AVA = Actuarial Value of Assets



Funded Ratio = 63.6%

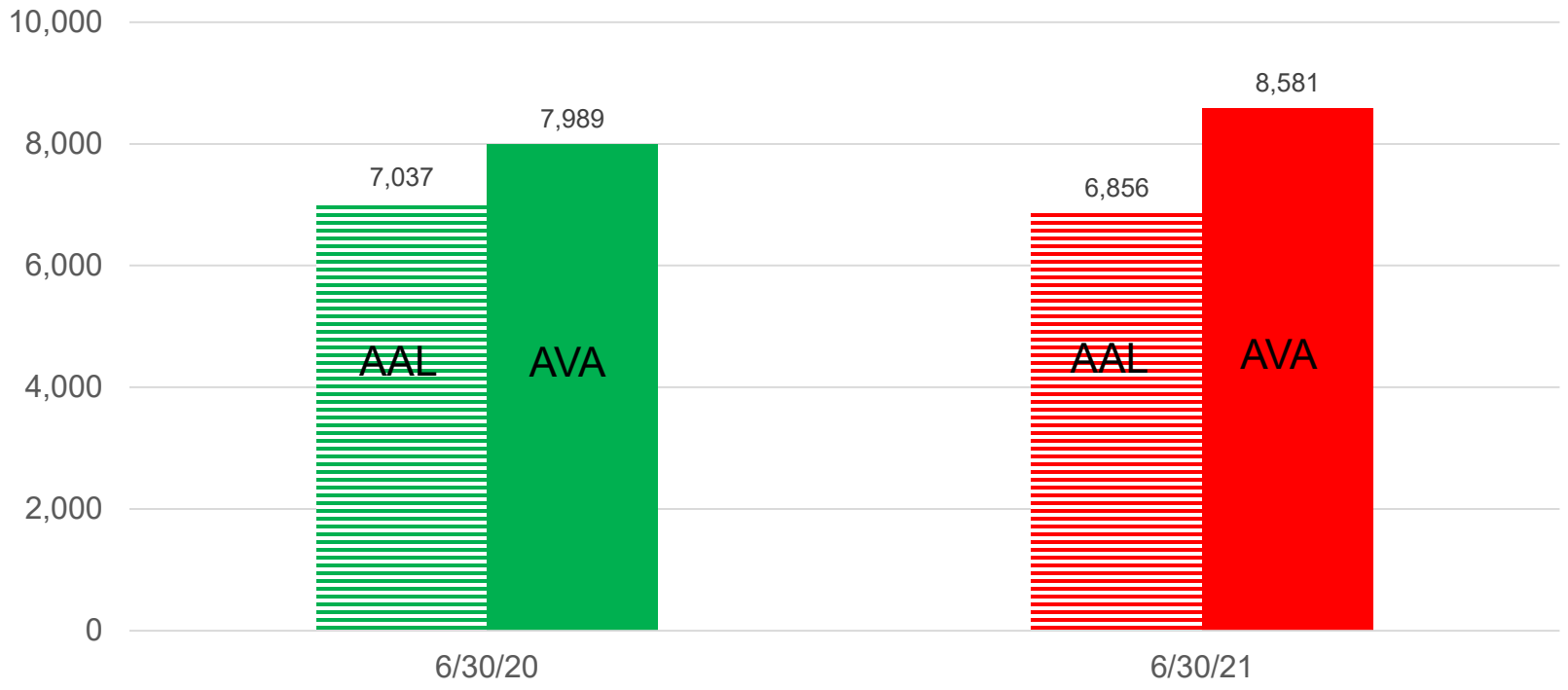
Funded Ratio = 67.9%

FY21 Gains:

- AAL: $161M
- AVA: $396M

PERS: Assets vs Liabilities – Healthcare
($millions)

AAL = Actuarial Accrued Liability
AVA = Actuarial Value of Assets



Funded Ratio = 113.5%

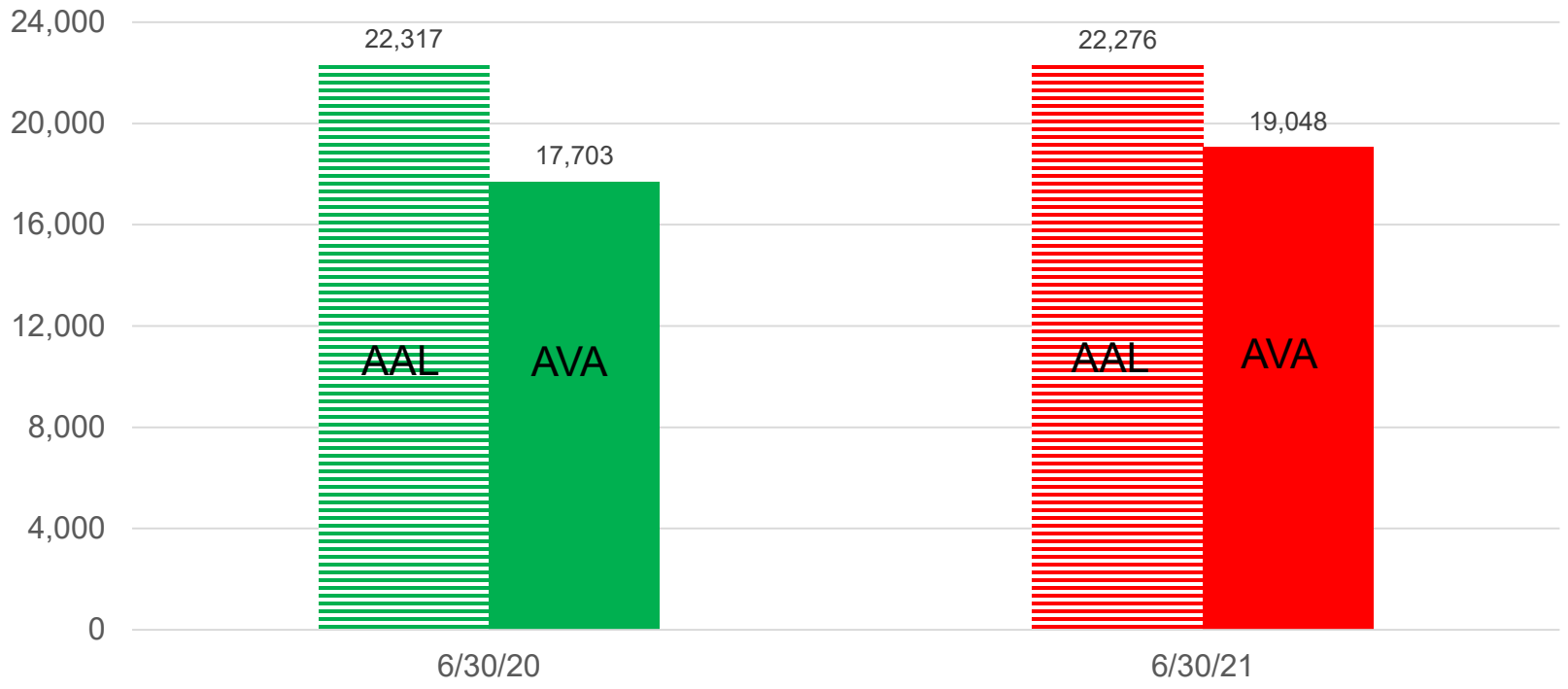
Funded Ratio = 125.2%

FY21 Gains:

- AAL: $384M
- AVA: $338M

PERS: Assets vs Liabilities – Total
($millions)

AAL = Actuarial Accrued Liability
AVA = Actuarial Value of Assets



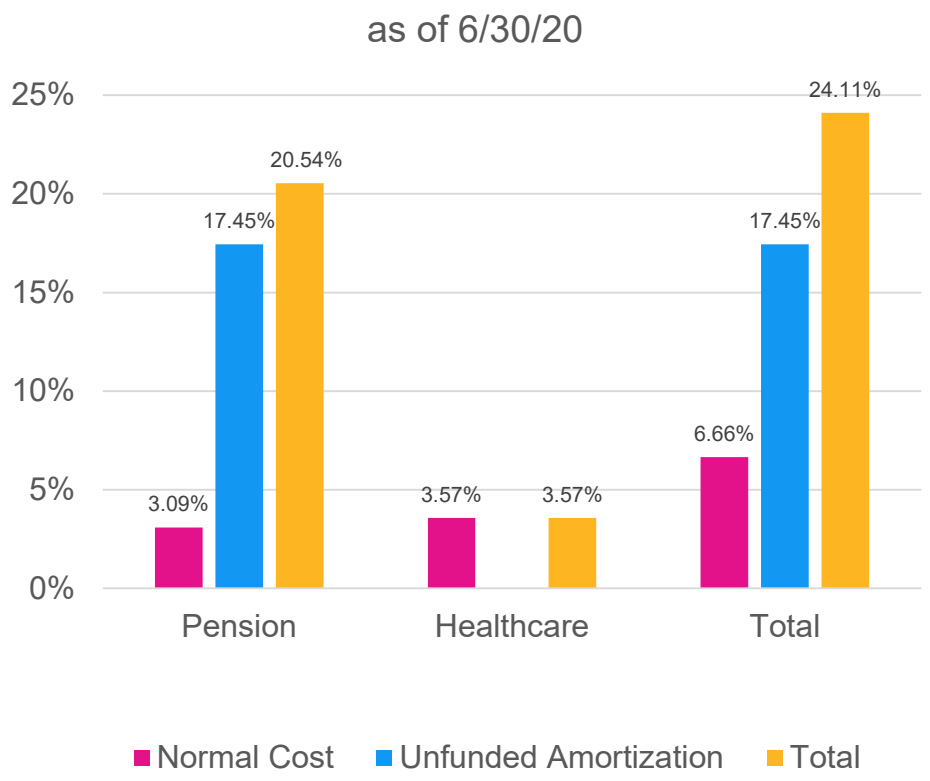
Funded Ratio = 79.3%

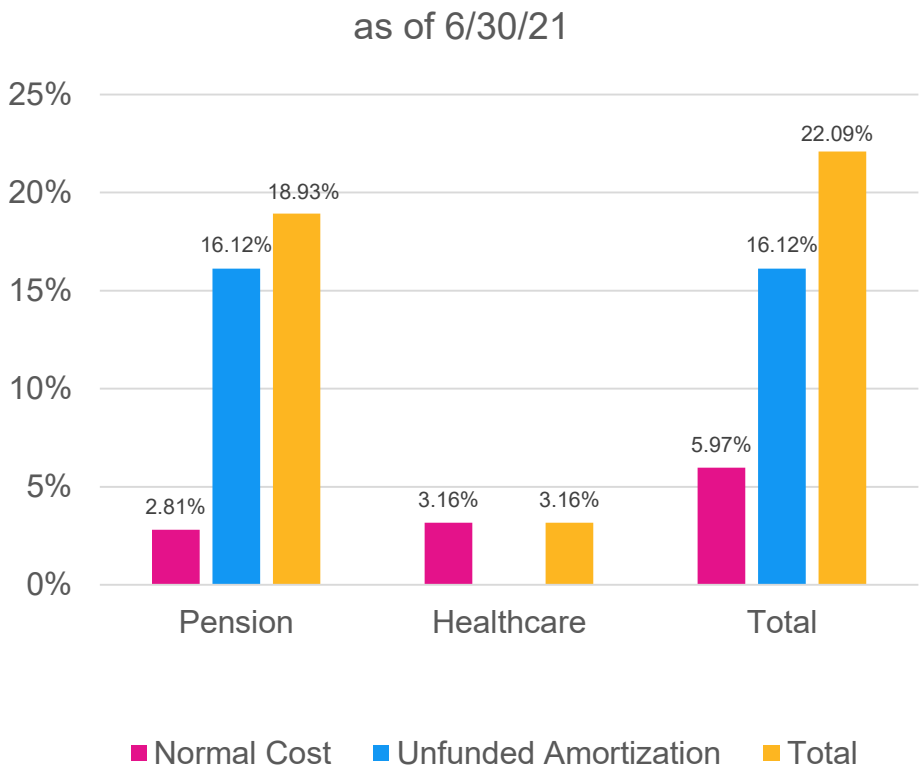
Funded Ratio = 85.5%

FY21 Gains:

- AAL: $545M
- AVA: $734M

PERS: Employer/State Contribution Rates
(% of DB/DCR payroll)

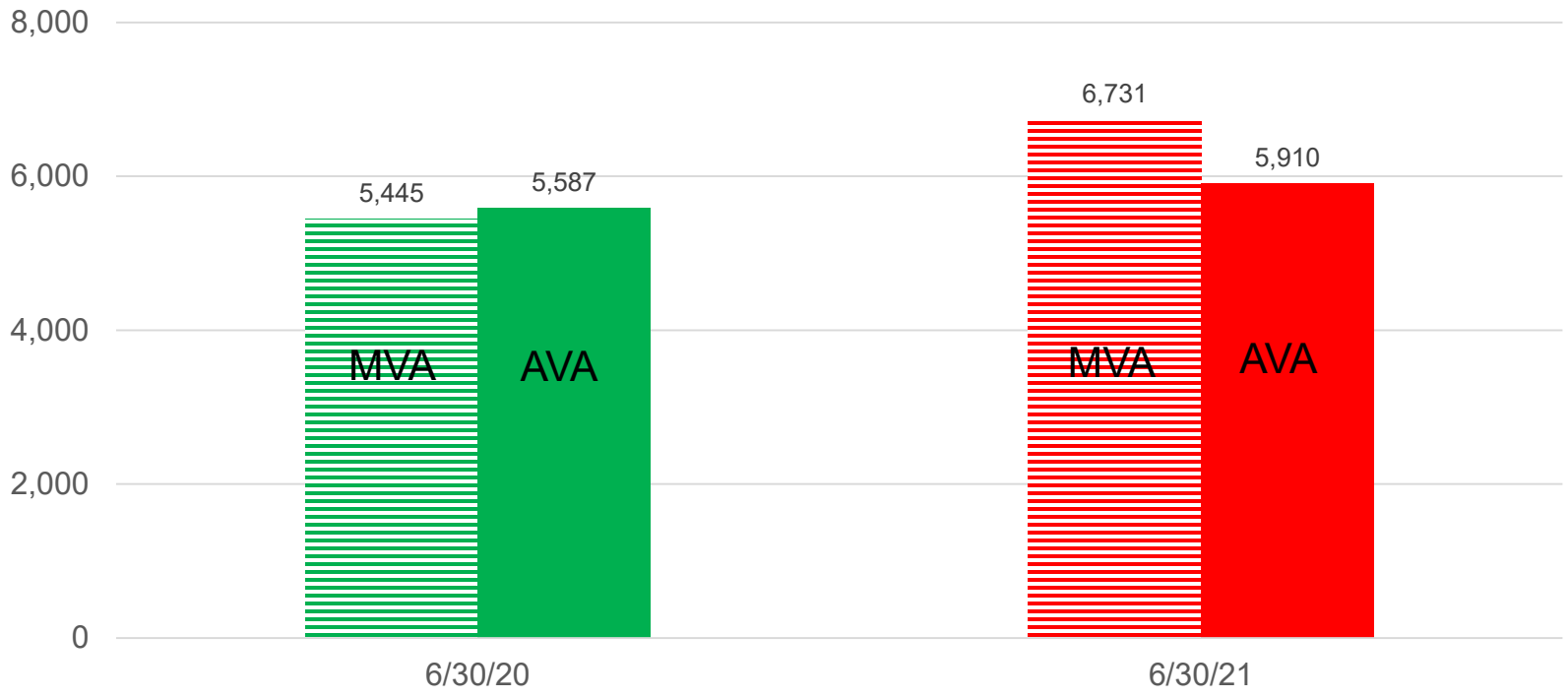




2021 Valuation Results - TRS

TRS: Assets – Pension
($millions)

MVA = Market Value of Assets
AVA = Actuarial Value of Assets

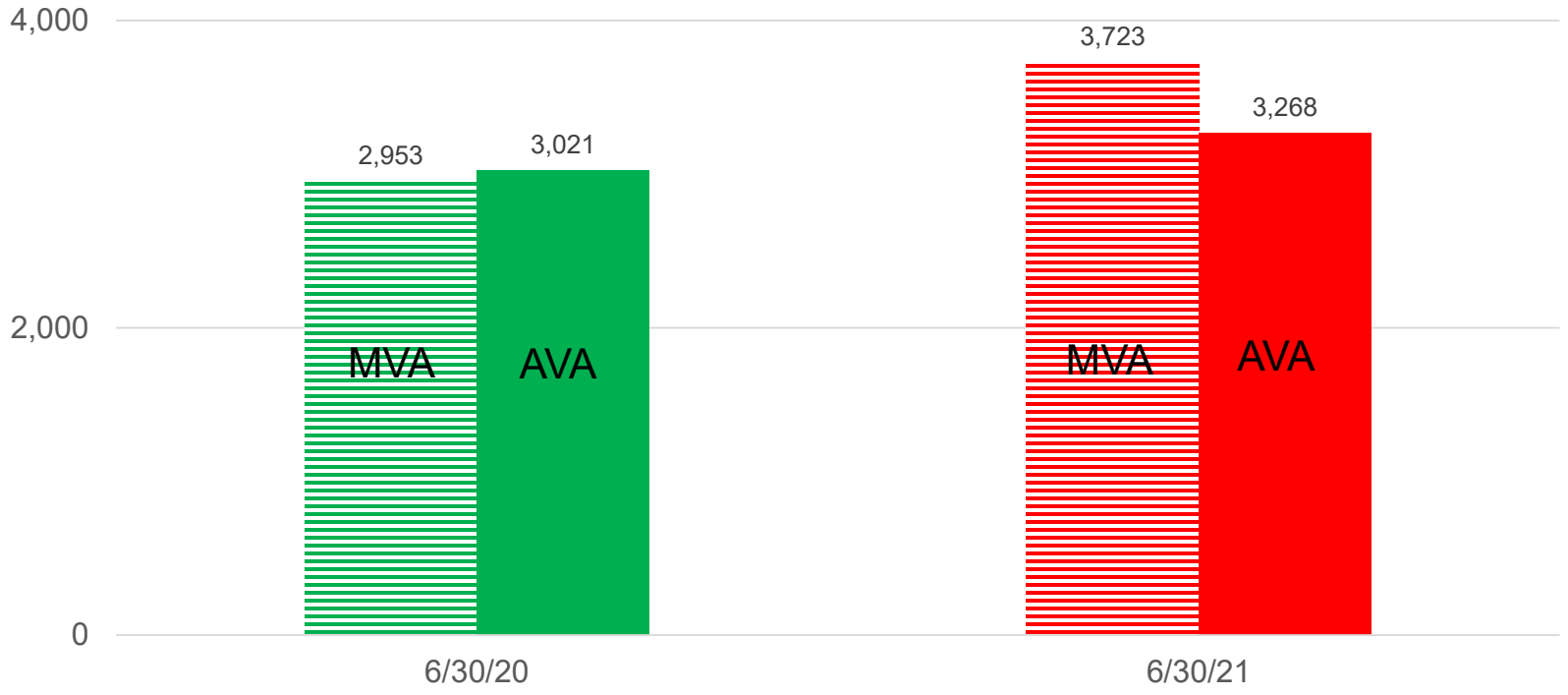


FY21 Asset Gains:

- MVA: $1,200M
- AVA: $227M

TRS: Assets – Healthcare
($millions)

MVA = Market Value of Assets
AVA = Actuarial Value of Assets

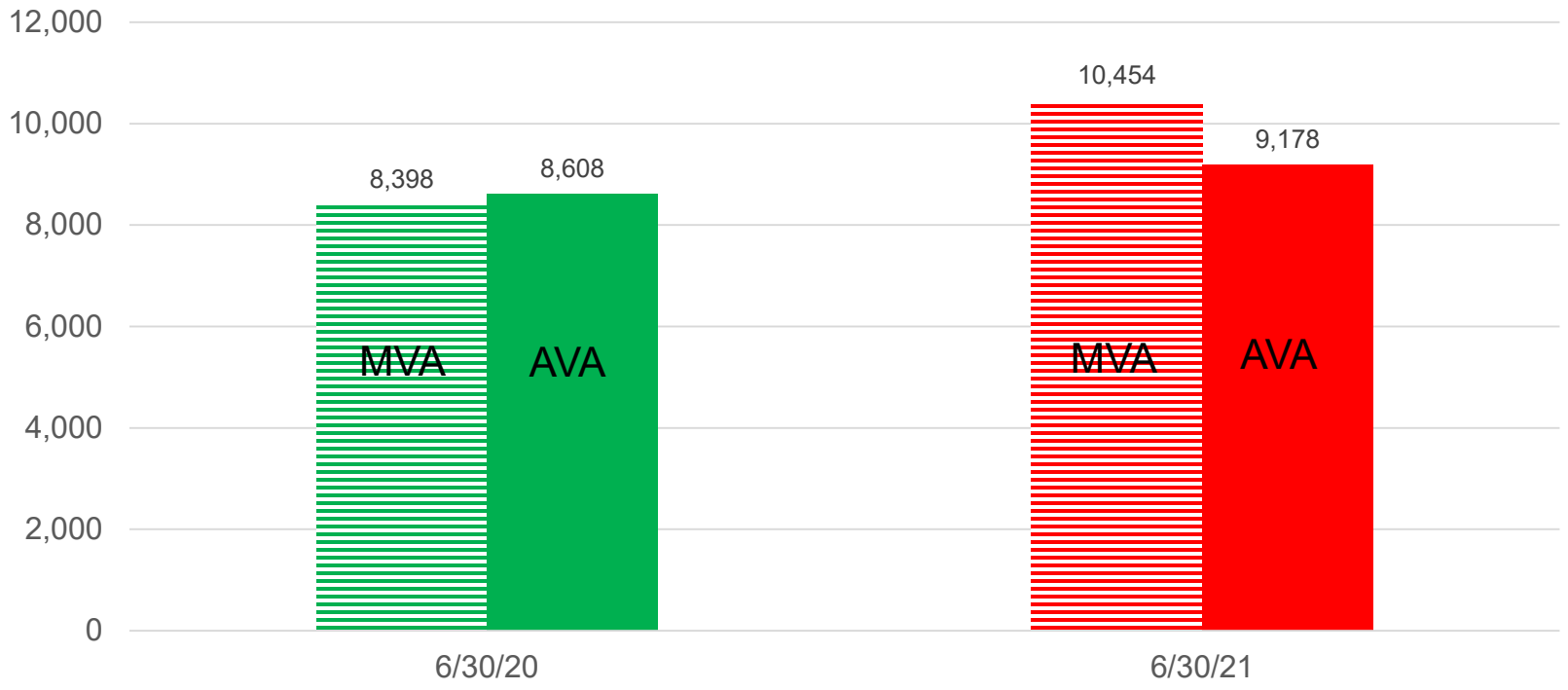


FY21 Asset Gains:

- MVA: $656M
- AVA: $127M

TRS: Assets – Total
($millions)

MVA = Market Value of Assets
AVA = Actuarial Value of Assets

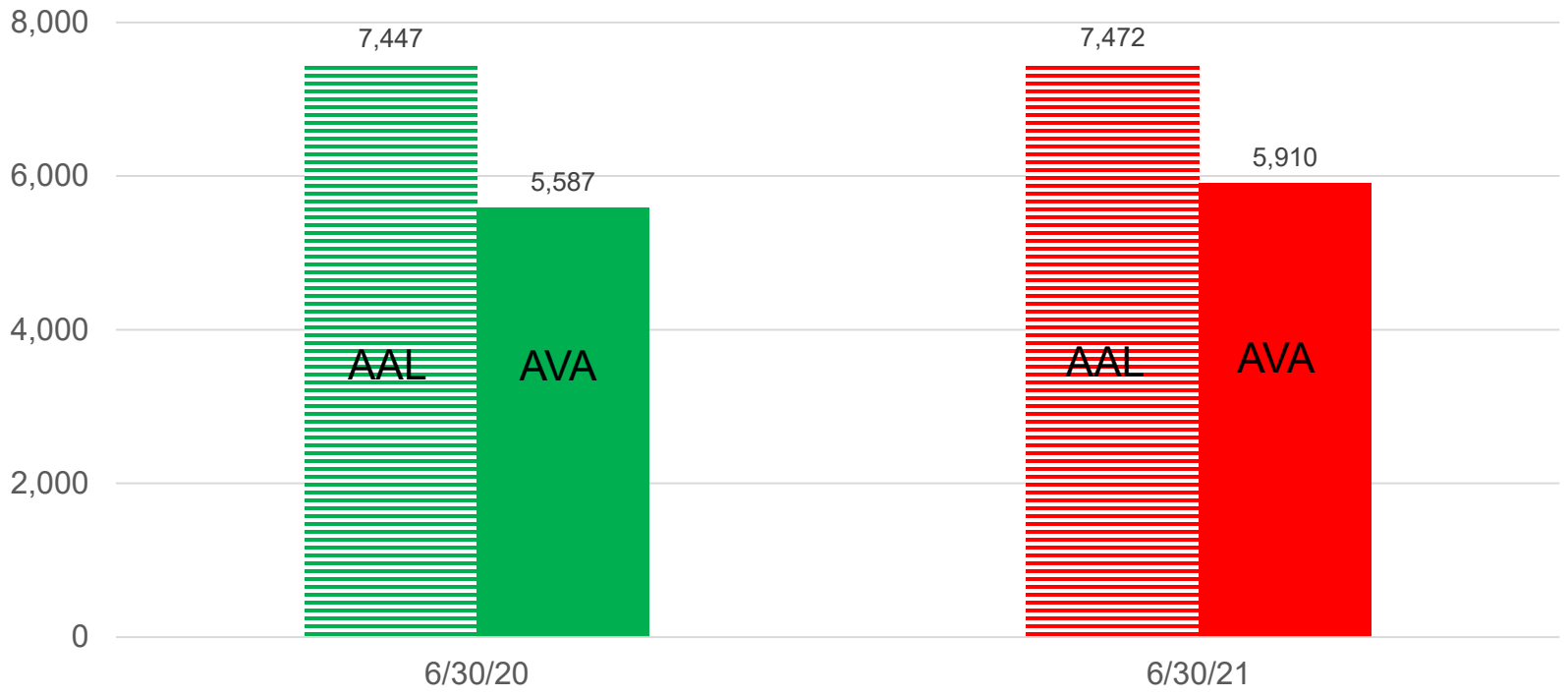


FY21 Asset Gains:

- MVA: $1,856M
- AVA: $354M

TRS: Assets vs Liabilities – Pension
($millions)

AAL = Actuarial Accrued Liability
AVA = Actuarial Value of Assets



Funded Ratio = 75.0%

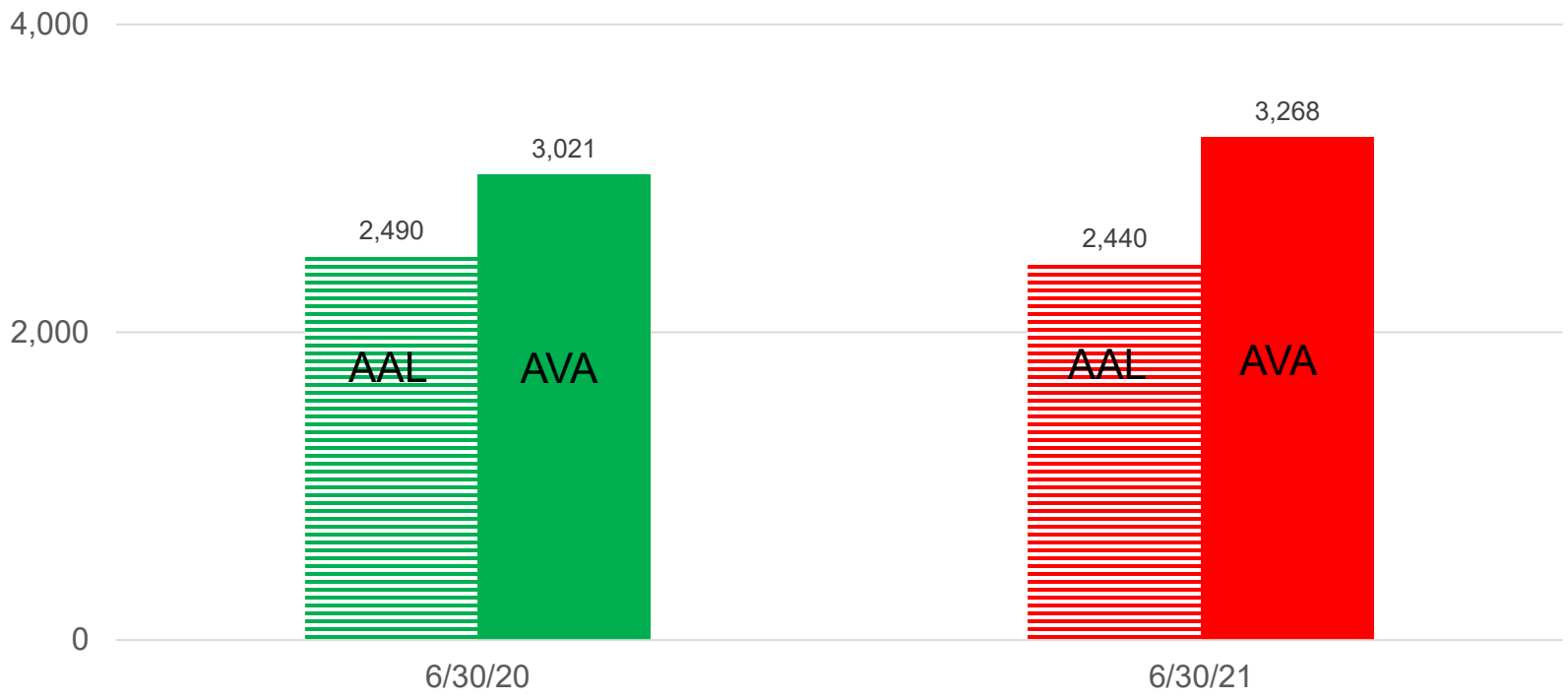
Funded Ratio = 79.1%

FY21 Gains:

- AAL: $56M
- AVA: $227M

TRS: Assets vs Liabilities – Healthcare
($millions)

AAL = Actuarial Accrued Liability
AVA = Actuarial Value of Assets



Funded Ratio = 121.4%

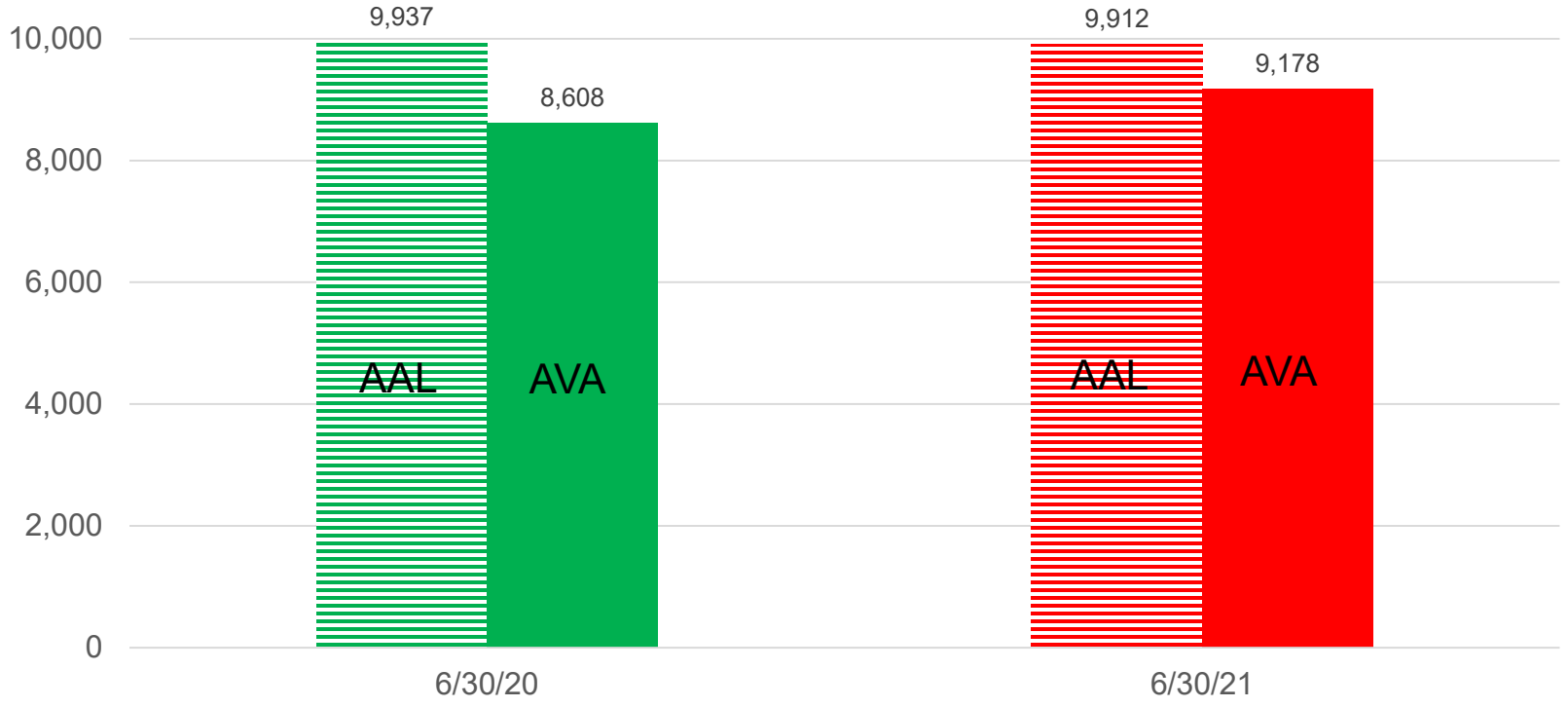
Funded Ratio = 133.9%

FY21 Gains:

- AAL: $131M
- AVA: $127M

TRS: Assets vs Liabilities – Total
($millions)

AAL = Actuarial Accrued Liability
AVA = Actuarial Value of Assets



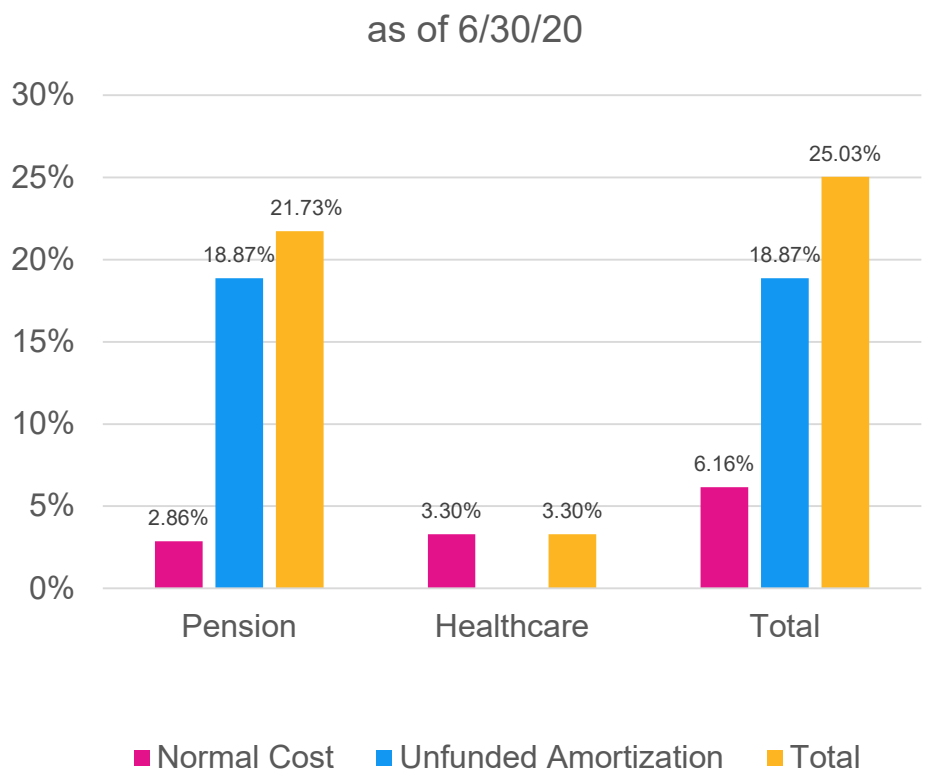
Funded Ratio = 86.6%

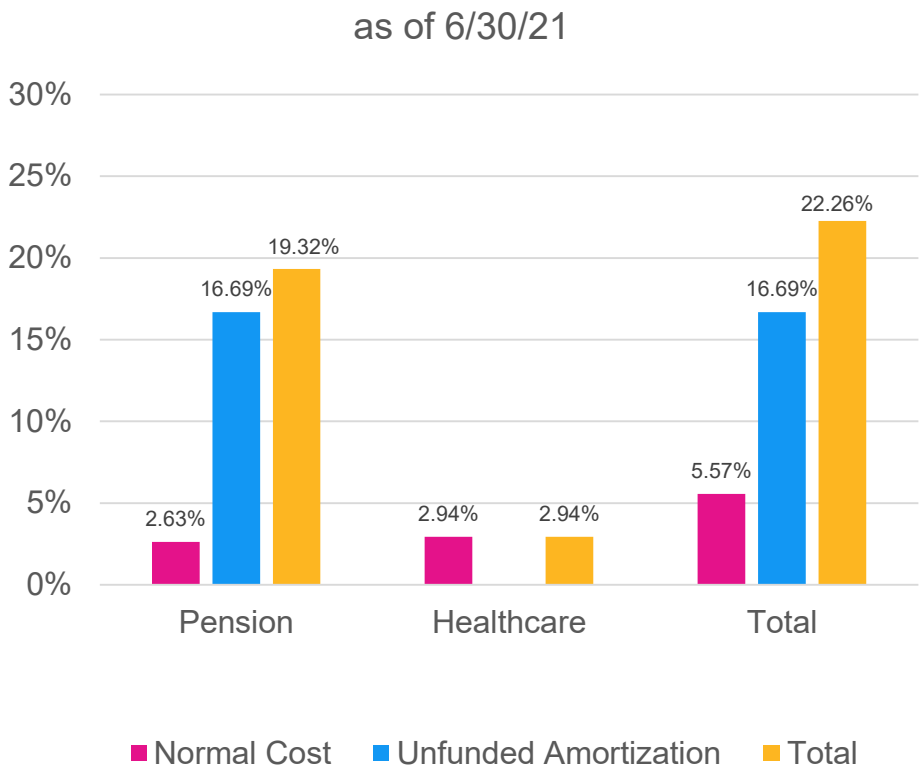
Funded Ratio = 92.6%

FY21 Gains:

- AAL: $187M
- AVA: $354M

TRS: Employer/State Contribution Rates
(% of DB/DCR payroll)

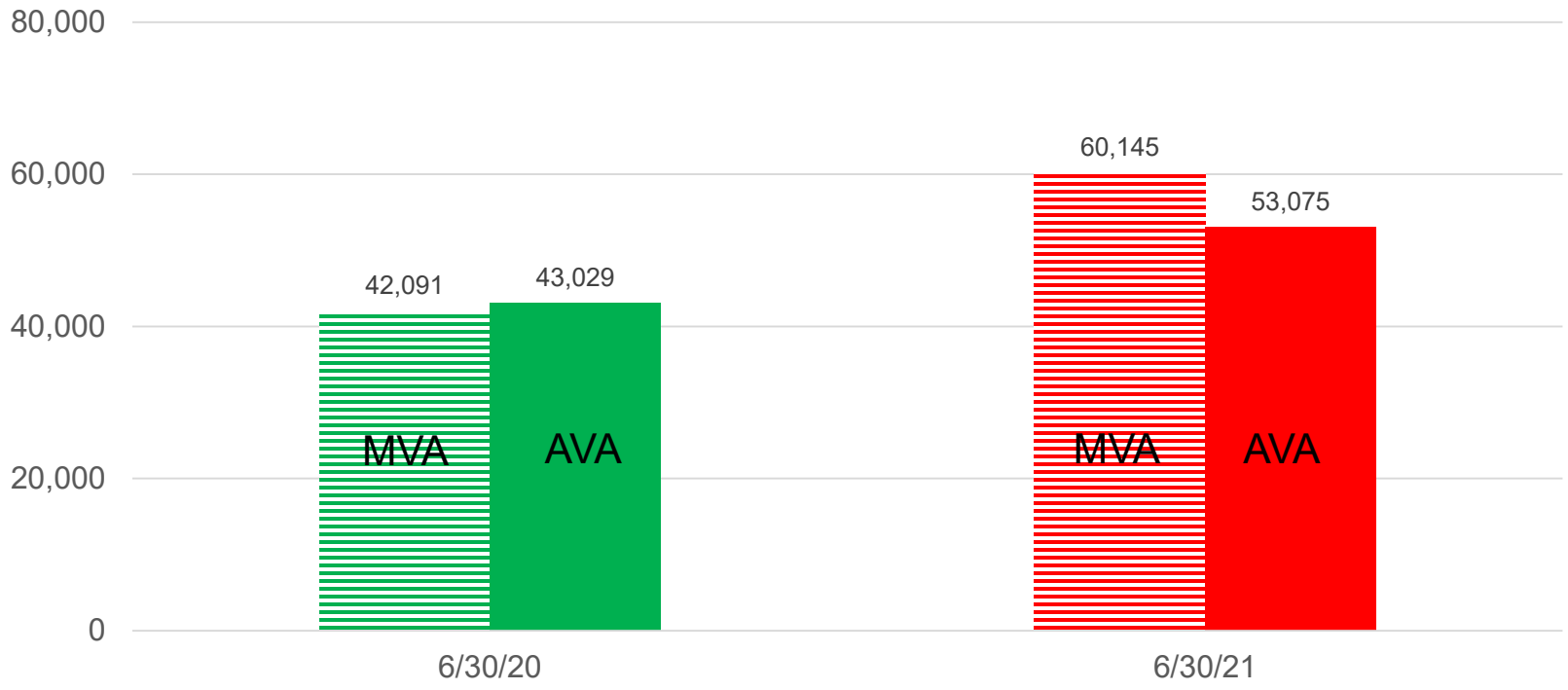




2021 Valuation Results – PERS DCR

PERS DCR: Assets – ODD
($000s)

MVA = Market Value of Assets
AVA = Actuarial Value of Assets

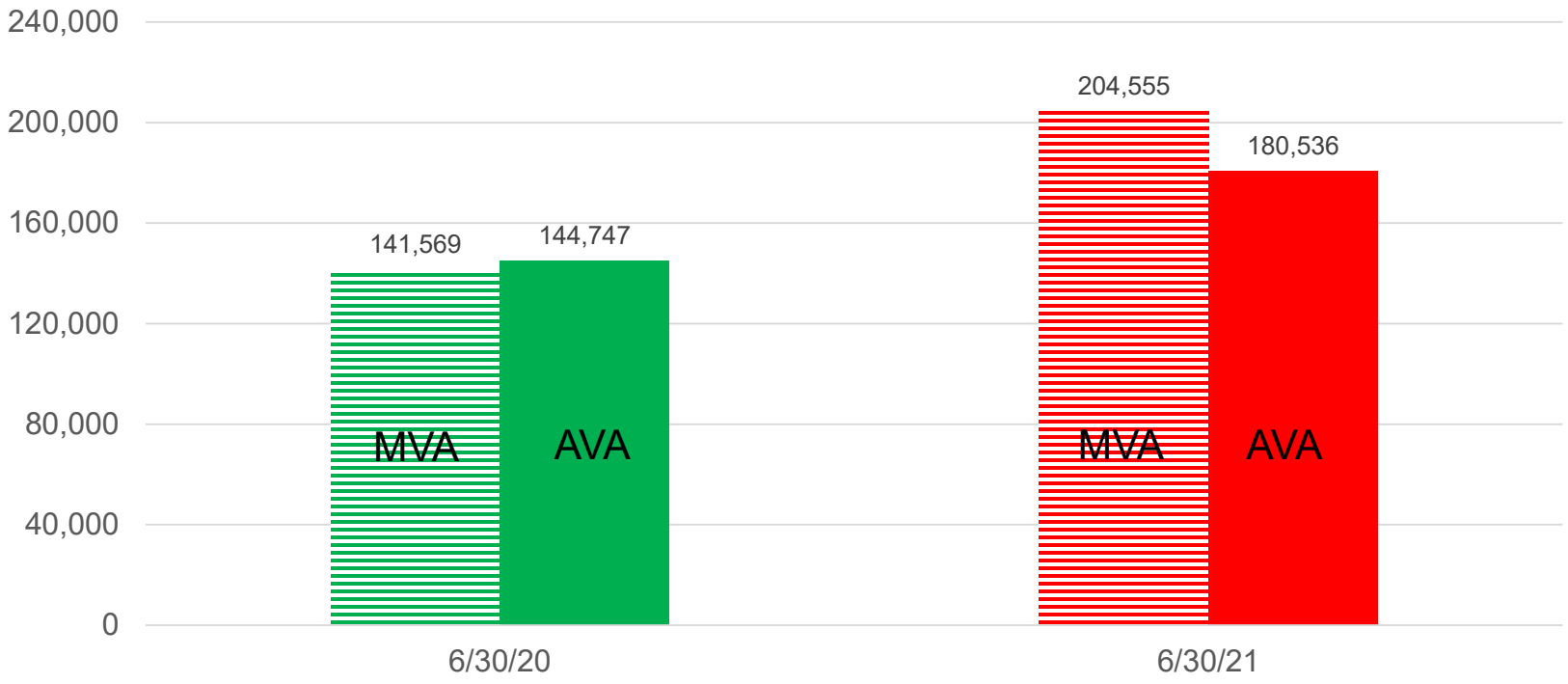


FY21 Asset Gains:

- MVA: $9.9M
- AVA: $1.8M

PERS DCR: Assets – Healthcare
($000s)

MVA = Market Value of Assets
AVA = Actuarial Value of Assets

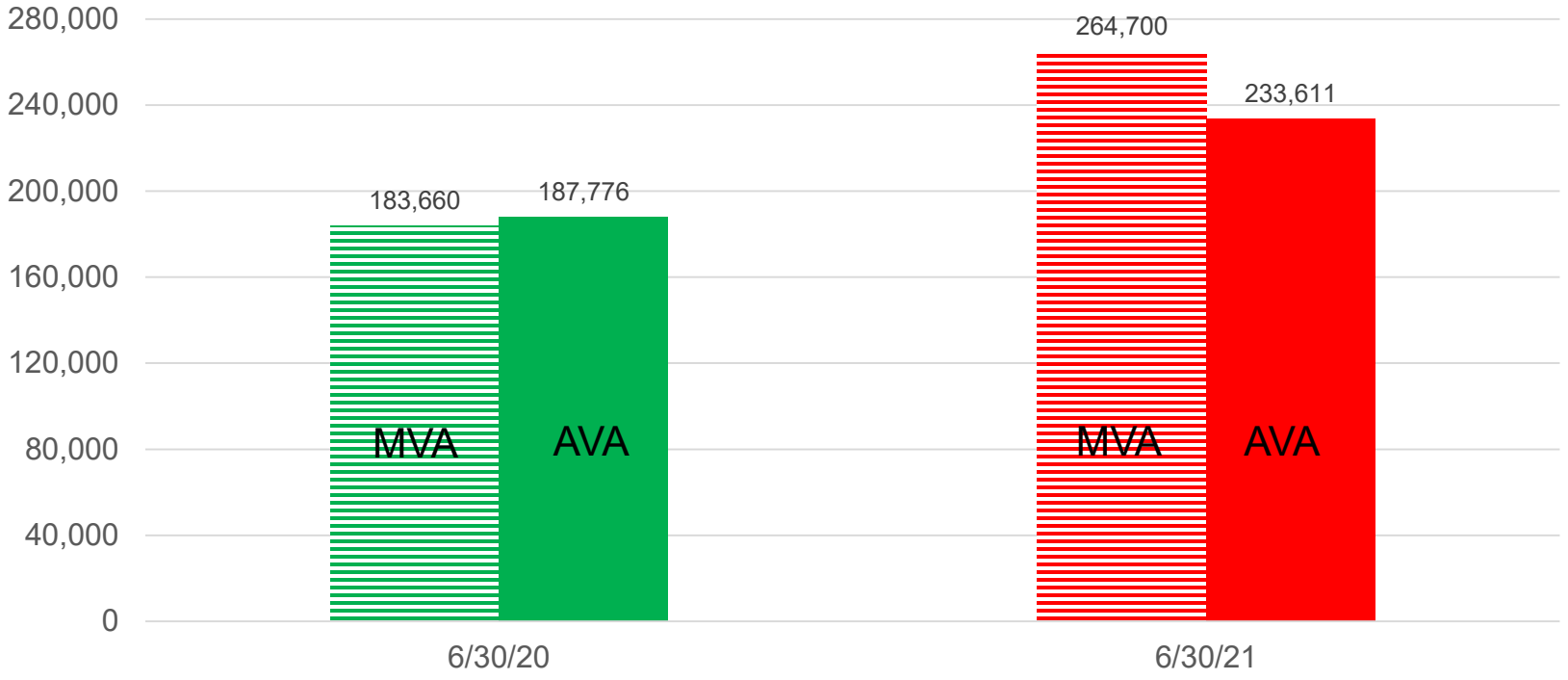


FY21 Asset Gains:

- MVA: $33.5M
- AVA: $6.1M

PERS DCR: Assets – Total
($000s)

MVA = Market Value of Assets
AVA = Actuarial Value of Assets

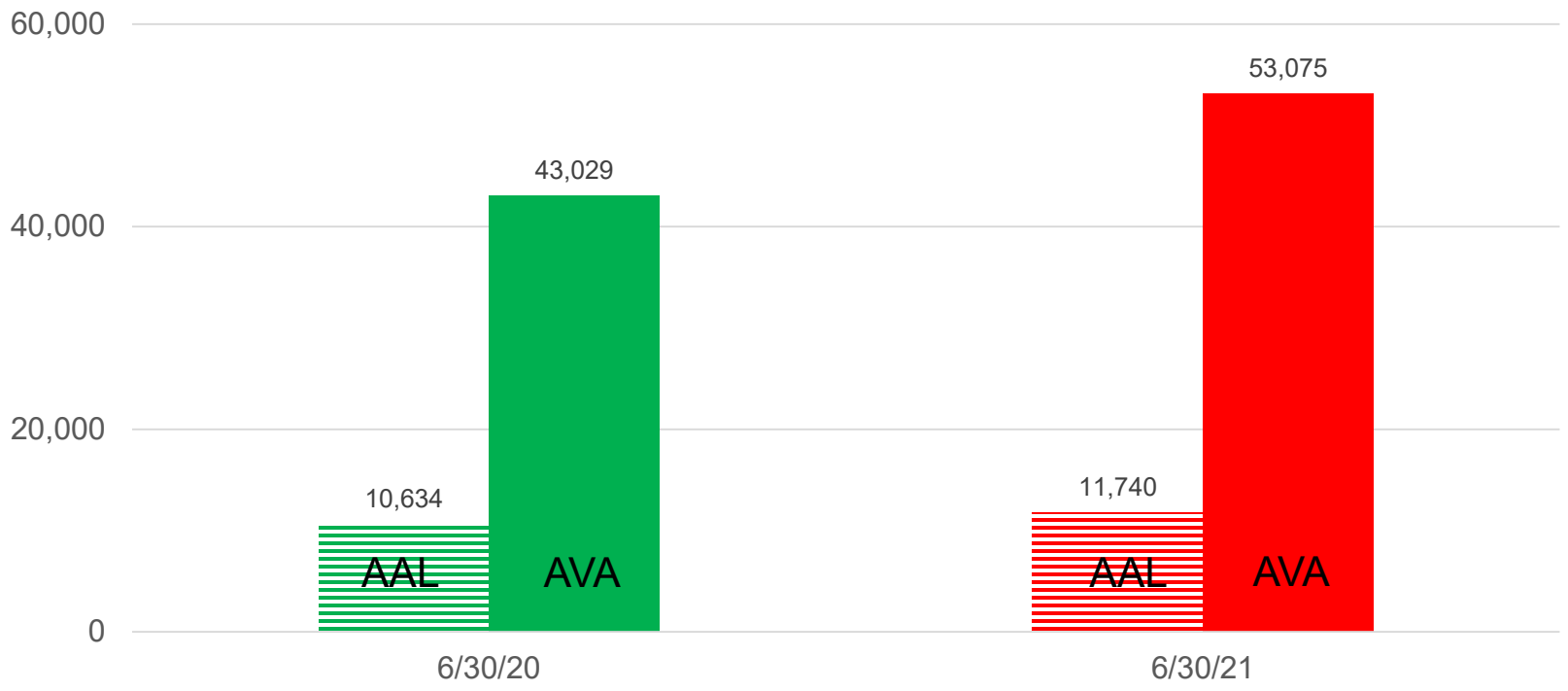


FY21 Asset Gains:

- MVA: $43.4M
- AVA: $7.9M

PERS DCR: Assets vs Liabilities – ODD
($000s)

AAL = Actuarial Accrued Liability
AVA = Actuarial Value of Assets



Funded Ratio = 404.6%

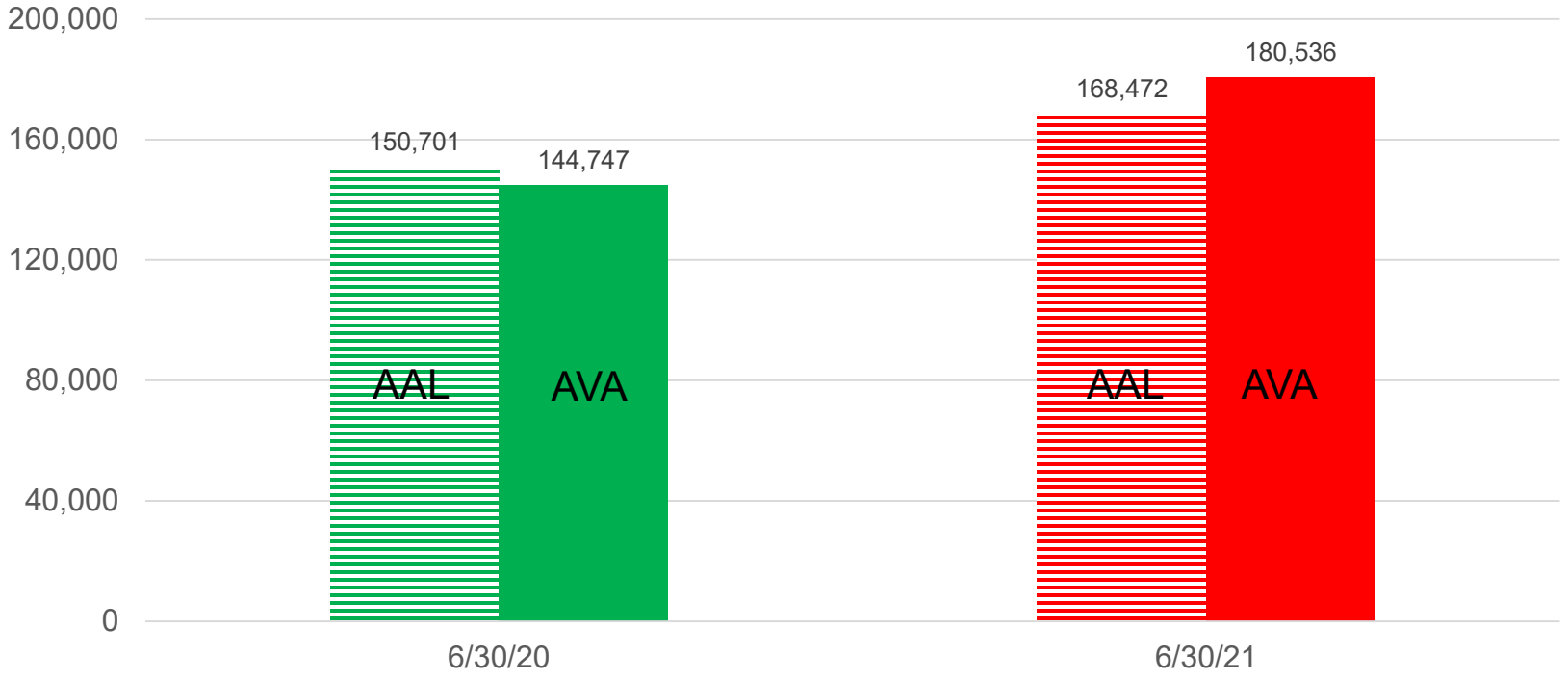
Funded Ratio = 452.1%

FY21 Gains:

- AAL: $4.7M
- AVA: $1.8M

PERS DCR: Assets vs Liabilities – Healthcare
($000s)

AAL = Actuarial Accrued Liability
AVA = Actuarial Value of Assets



Funded Ratio = 96.0%

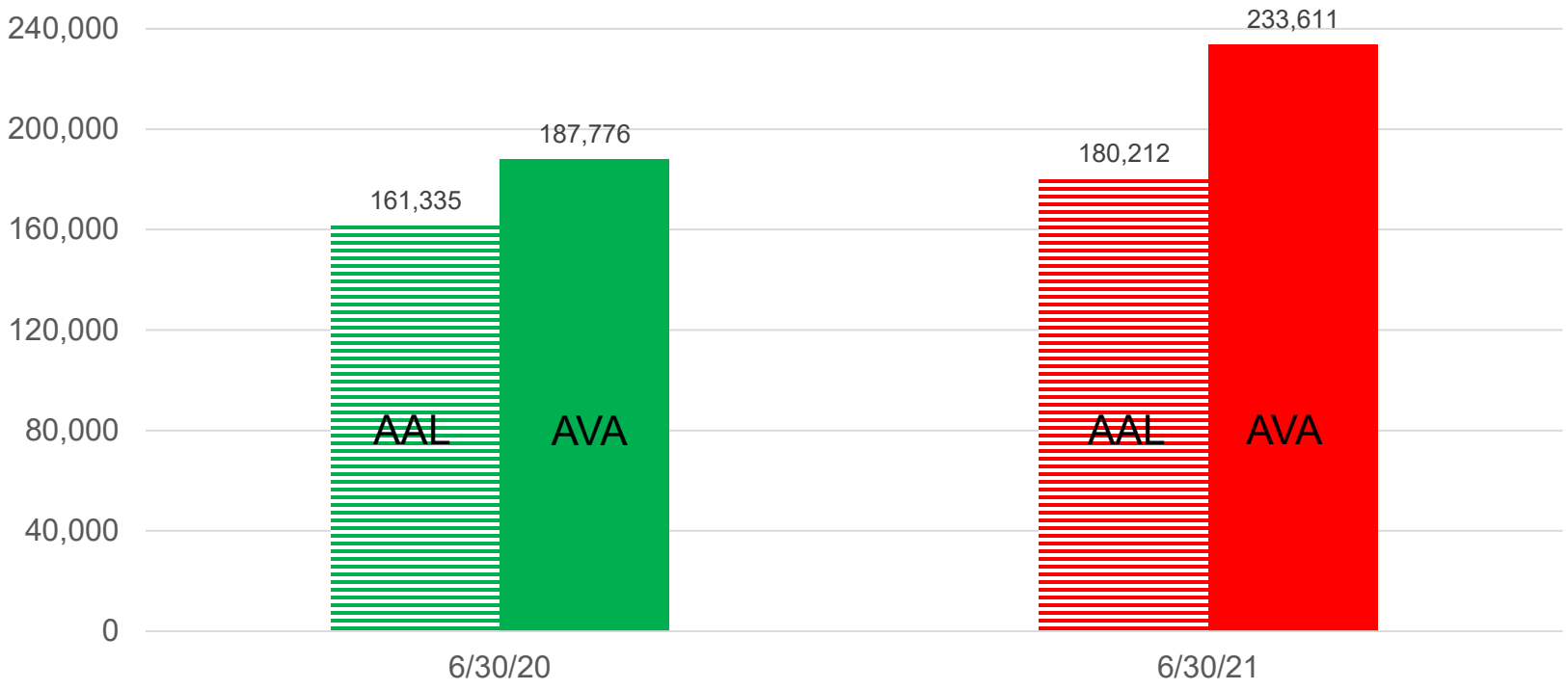
Funded Ratio = 107.2%

FY21 Gains:

- AAL: $9.5M
- AVA: $6.1M

PERS DCR: Assets vs Liabilities – Total
($000)

AAL = Actuarial Accrued Liability
AVA = Actuarial Value of Assets



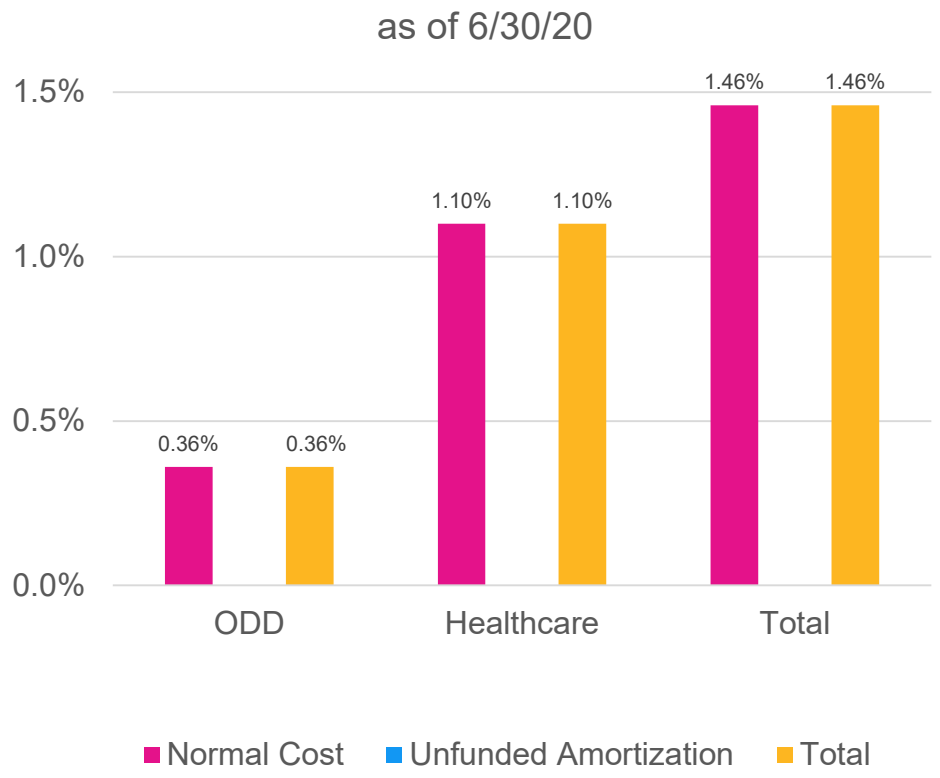
Funded Ratio = 116.4%

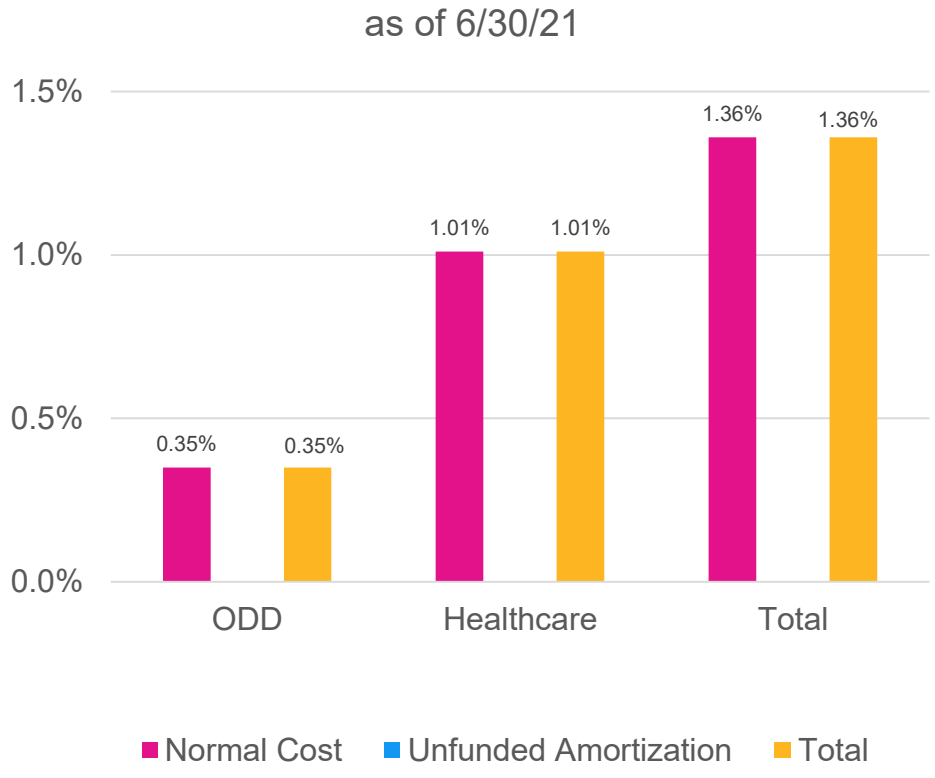
Funded Ratio = 129.6%

FY21 Gains:

- AAL: $14.2M
- AVA: $7.9M

PERS DCR: Employer Contribution Rates
(% of DCR payroll)

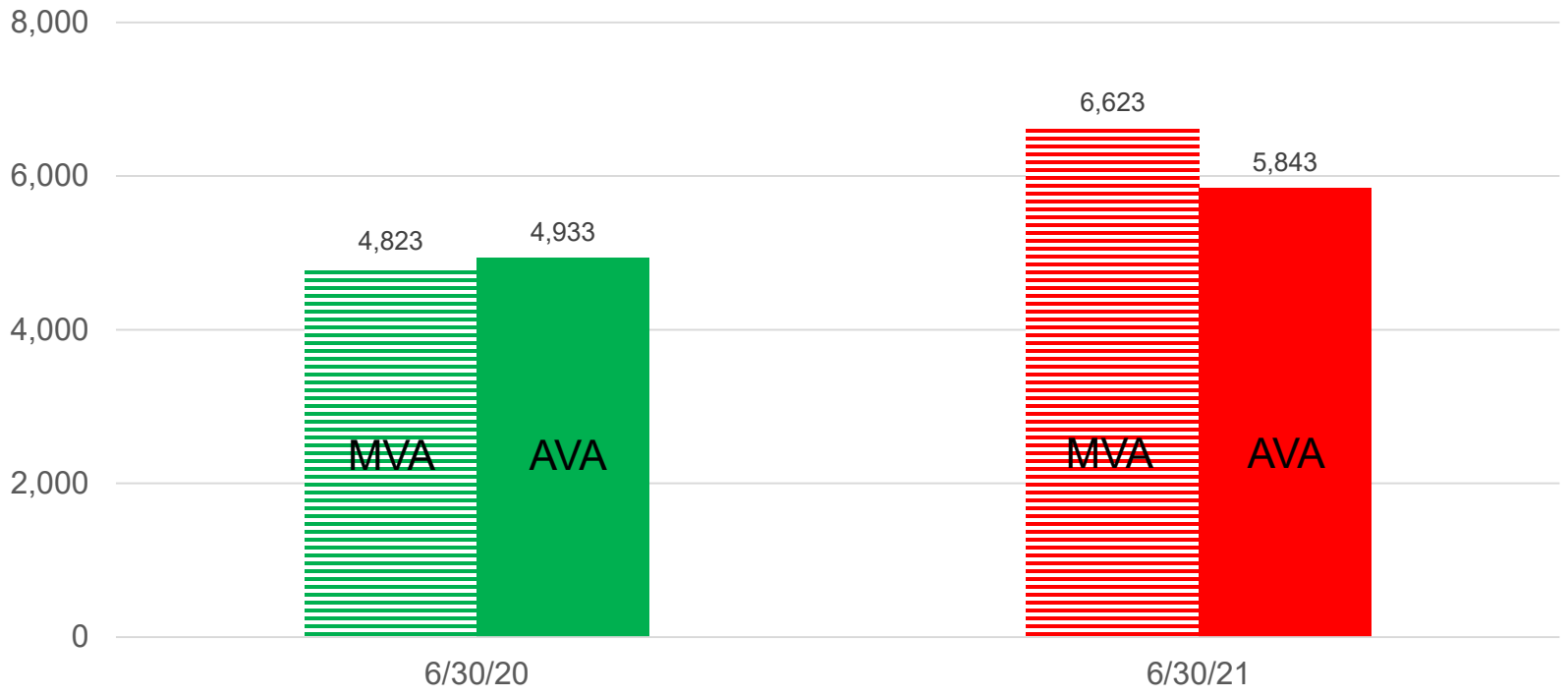




2021 Valuation Results – TRS DCR

TRS DCR: Assets – ODD
($000s)

MVA = Market Value of Assets
AVA = Actuarial Value of Assets

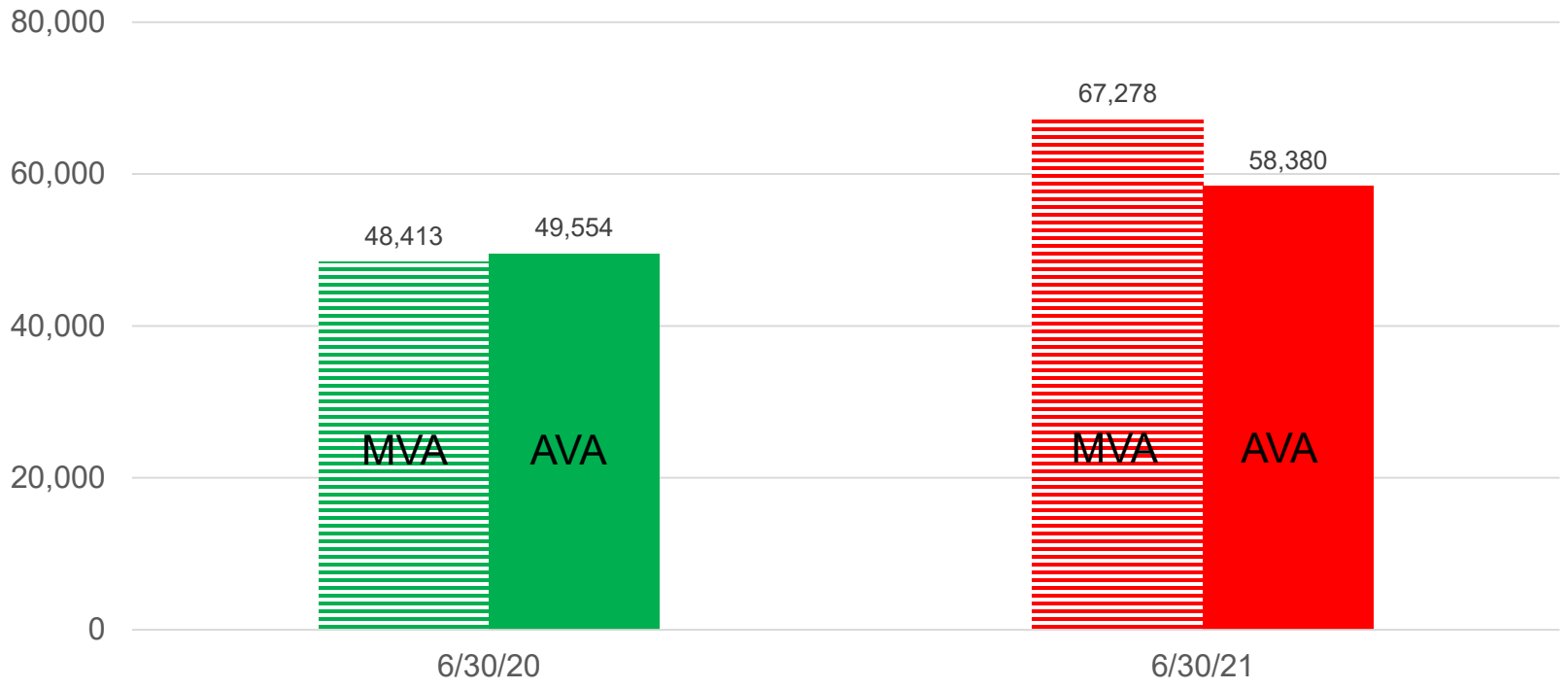


FY21 Asset Gains:

- MVA: $1.1M
- AVA: $0.2M

TRS DCR: Assets – Healthcare
($000s)

MVA = Market Value of Assets
AVA = Actuarial Value of Assets

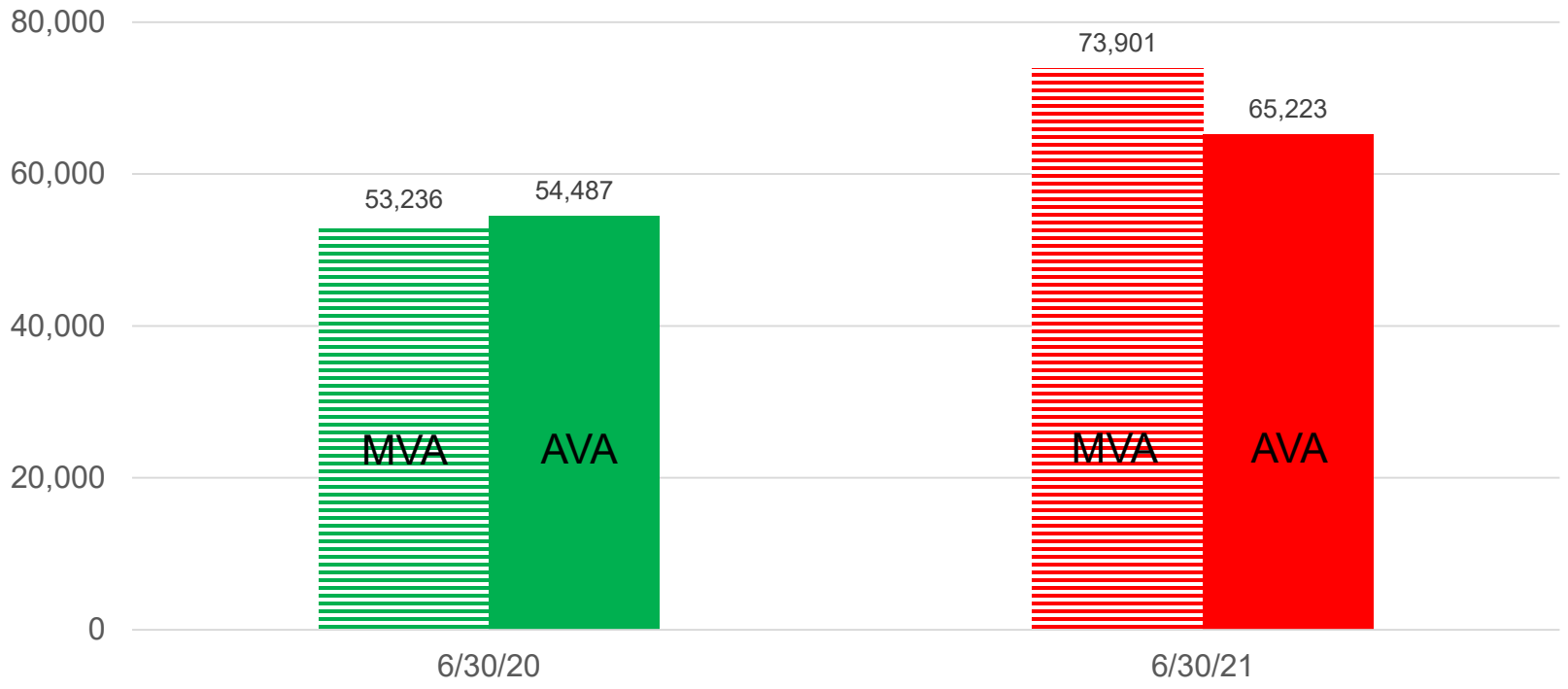


FY21 Asset Gains:

- MVA: $11.1M
- AVA: $2.0M

TRS DCR: Assets – Total
($000s)

MVA = Market Value of Assets
AVA = Actuarial Value of Assets

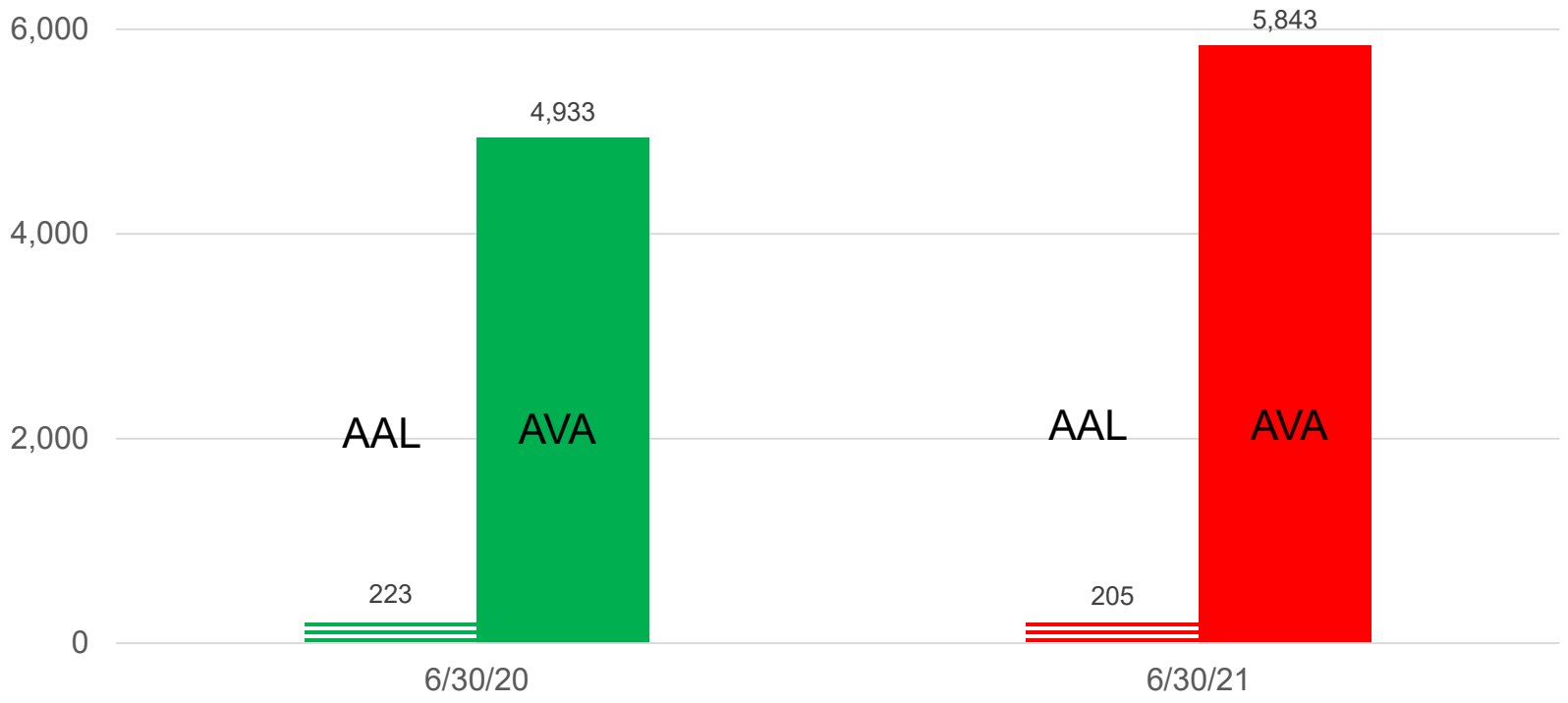


FY21 Asset Gains:

- MVA: $12.2M
- AVA: $2.2M

TRS DCR: Assets vs Liabilities – ODD
($000s)

AAL = Actuarial Accrued Liability
AVA = Actuarial Value of Assets



Funded Ratio = 2,212.1%

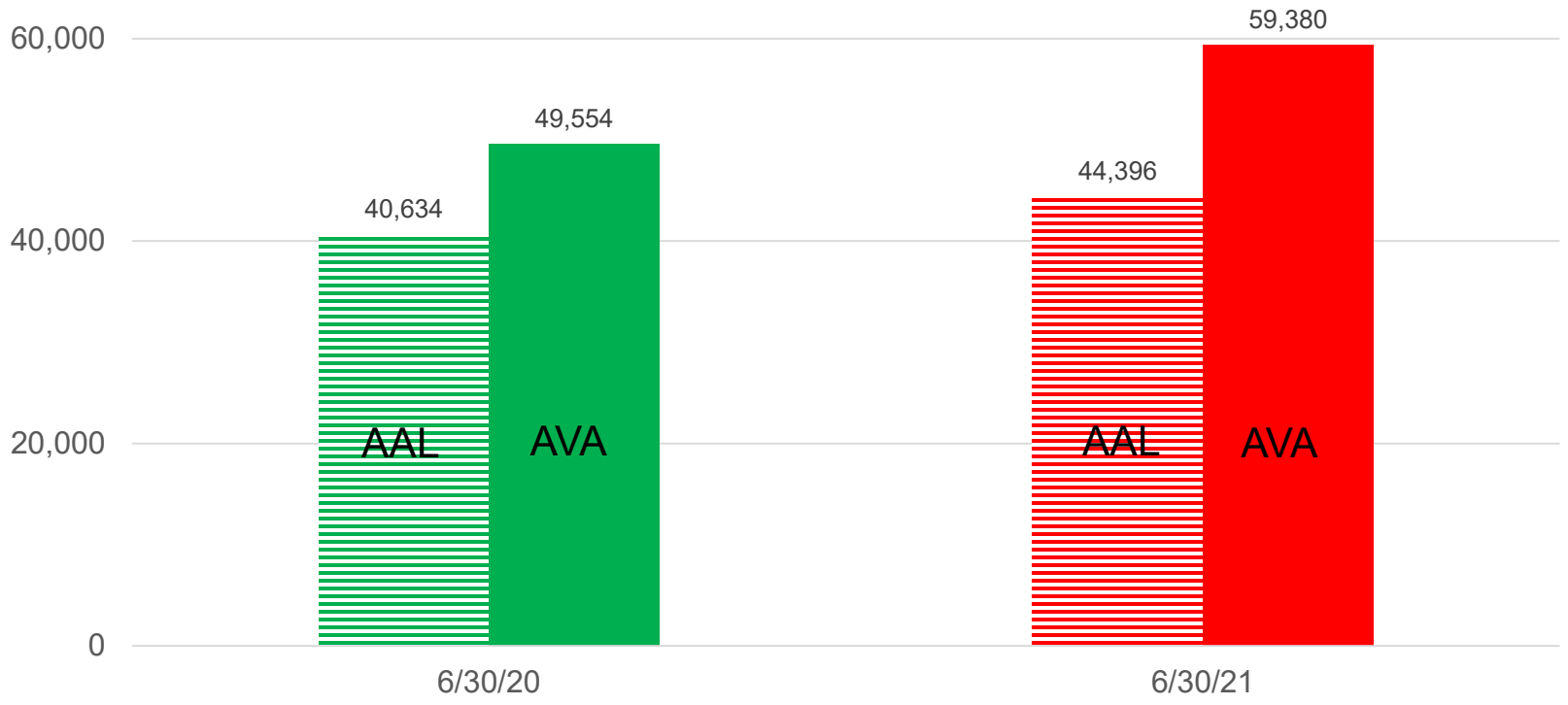
Funded Ratio = 2,850.2%

FY21 Gains:

- AAL: $0.3M
- AVA: $0.2M

TRS DCR: Assets vs Liabilities – Healthcare
($000s)

AAL = Actuarial Accrued Liability
AVA = Actuarial Value of Assets



Funded Ratio = 122.0%

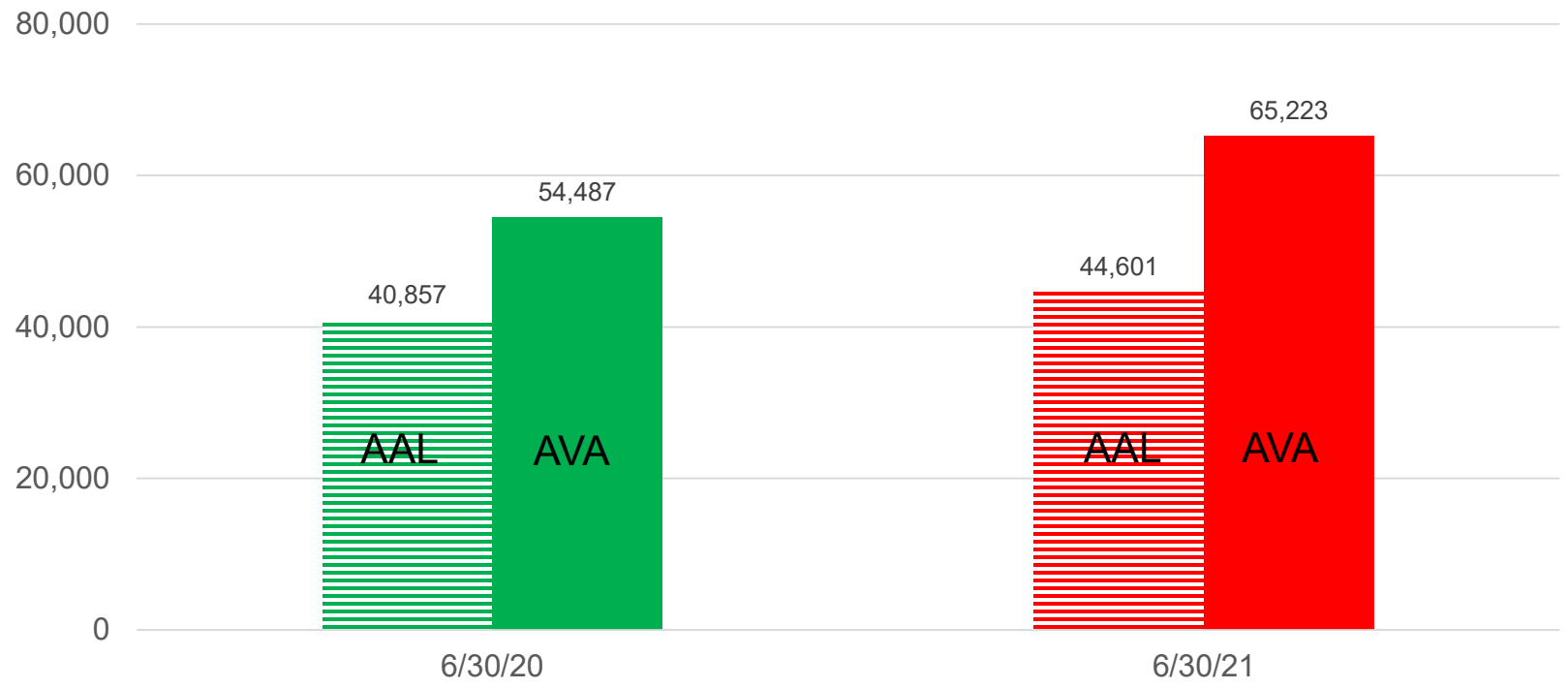
Funded Ratio = 133.8%

FY21 Gains:

- AAL: $2.7M
- AVA: $2.0M

TRS DCR: Assets vs Liabilities – Total
($000)

AAL = Actuarial Accrued Liability
AVA = Actuarial Value of Assets



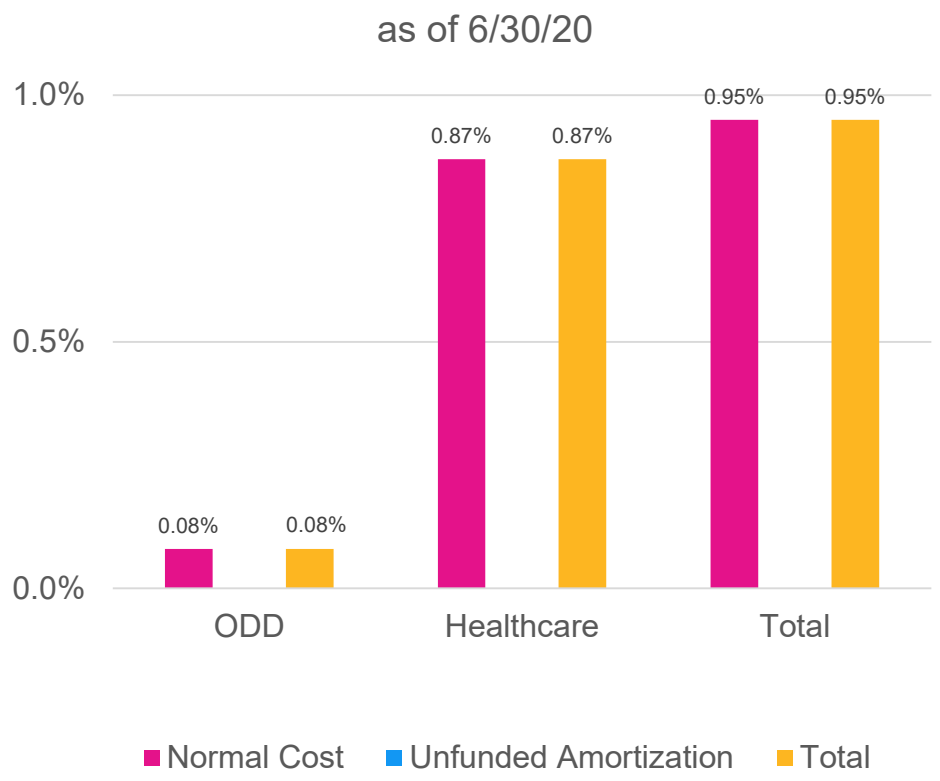
Funded Ratio = 133.4%

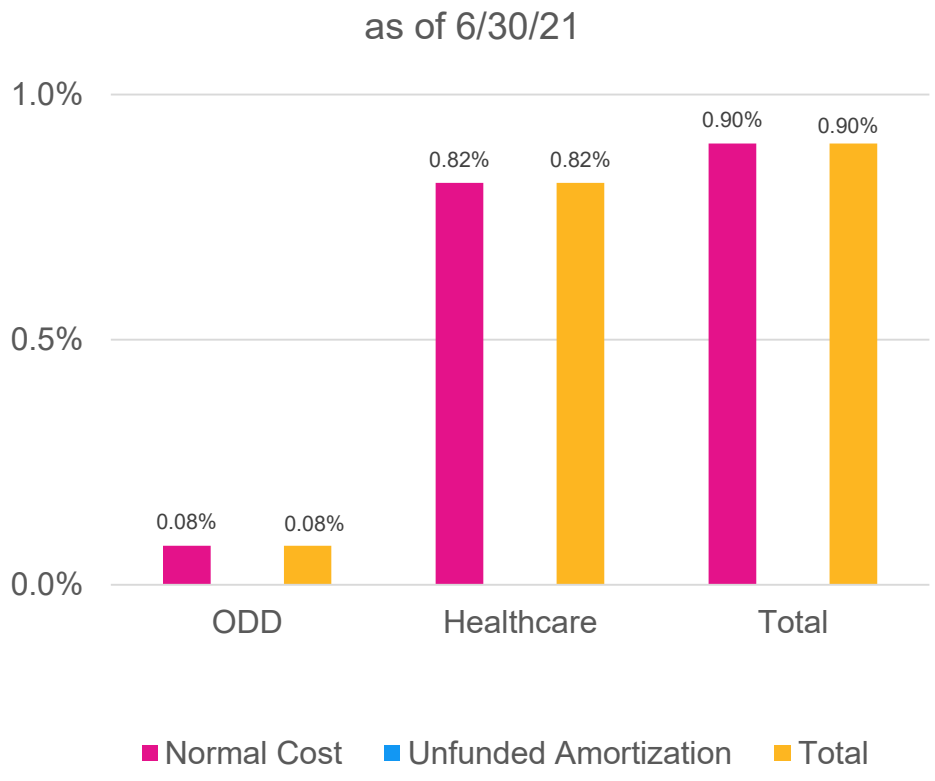
Funded Ratio = 146.2%

FY21 Gains:

- AAL: $3.0M
- AVA: $2.2M

TRS DCR: Employer Contribution Rates
(% of DCR payroll)





2021 Valuation Results – JRS

2021 Roll-Forward Valuation Results – JRS
($000s)

	Pension	Healthcare	Total
Actuarial Accrued Liability (AAL)	218,717	17,921	236,638
Actuarial Value of Assets (AVA)	215,641	37,884	253,525
Unfunded Actuarial Accrued Liability (AAL – AVA)	3,076	(19,963)	(16,887)
Funded Ratio (AVA / AAL)	98.6%	211.4%	107.1%
Market Value of Assets (MVA)	245,048	43,173	288,221
Contribution Rate (% of JRS payroll)			
- Normal Cost	38.99%	6.54%	45.53%
- Unfunded Amortization	19.71%	0.00%	19.71%
- Total	58.70%	6.54%	65.24%

2021 Valuation Results – NGNMRS

2021 Roll-Forward Valuation Results – NGNMRS
($000s)

	Pension
Actuarial Accrued Liability (AAL)	22,975
Actuarial Value of Assets (AVA)	45,248
Unfunded Actuarial Accrued Liability (AAL – AVA)	(22,273)
Funded Ratio (AVA / AAL)	196.9%
Market Value of Assets (MVA)	49,813
Contribution Amount	
- Normal Cost	503
- Administrative Expenses	268
- Unfunded Amortization	(3,486)
- Total	0

2021 Valuation Liability Gains/(Losses)

2021 Valuation Liability Gains/(Losses) – PERS

($000s)

	Pension	Healthcare	Total
Retirement	(7,211)	7,125	(86)
Termination	(7,963)	(10,409)	(18,372)
Disability	6,650	10,858	17,508
Mortality – Actives	14,401	(745)	13,656
Mortality – Inactives	(1,576)	2,684	1,108
Salary Increases	(17,126)	N/A	(17,126)
COLA/PRPA	155,142	N/A	155,142
Rehires	15,067	14,045	29,112
Transfers Between P/F and Others	(1,706)	(161)	(1,867)
Per Capita Claims Costs	N/A	272,205	272,205
Rx Plan Changes	N/A	61,807	61,807
Medicare Part B Only	N/A	5,743	5,743
Changes in Dependent Coverage Elections	N/A	15,017	15,017
Benefit Payments Different than Expected	19,147	21,107	40,254
Miscellaneous*	(13,992)	(15,552)	(29,544)
Total	160,833	383,724	544,557

*Pension amount includes 10,900 loss due to data changes related to beneficiaries and QDRO's. Healthcare amount includes 10,592 loss for data changes related to spouses' dates of birth.

2021 Valuation Liability Gains/(Losses) – TRS
($000s)

	Pension	Healthcare	Total
Retirement	4,502	(2,282)	2,220
Termination	(7,088)	(2,979)	(10,067)
Disability	(103)	220	117
Mortality – Actives	311	(2,709)	(2,398)
Mortality – Inactives	(5,089)	269	(4,820)
Salary Increases	(29,192)	N/A	(29,192)
COLA/PRPA	81,655	N/A	81,655
Rehires	3,085	3,476	6,561
Per Capita Claims Costs	N/A	96,861	96,861
Rx Plan Changes	N/A	21,763	21,763
Medicare Part B Only	N/A	1,278	1,278
Changes in Dependent Coverage Elections	N/A	9,126	9,126
Benefit Payments Different than Expected	14,033	10,592	24,625
Miscellaneous	(6.547)	(4,278)	(10,825)
Total	55,567	131,337	186,904

2021 Valuation Liability Gains/(Losses) – PERS DCR
($000s)

	ODD	Healthcare	Total
Retirement	0	(521)	(521)
Termination	(90)	2,669	2,579
Disability	3,346	341	3,687
Mortality – Actives	1,900	104	2,004
Mortality – Inactives	(21)	432	411
Salary Increases	(8)	N/A	(8)
New Entrants	(89)	(1,320)	(1,409)
Rehires	(47)	(3,068)	(3,115)
Transfers Between P/F and Others	(31)	(52)	(83)
Per Capita Claims Costs	N/A	7,066	7,066
Rx Plan Changes	N/A	2,029	2,029
Benefit Payments Different than Expected	145	209	354
Miscellaneous	(362)	1,560	1,198
Total	4,743	9,449	14,192

2021 Valuation Liability Gains/(Losses) – TRS DCR
($000s)

	ODD	Healthcare	Total
Retirement	0	550	550
Termination	(7)	2,361	2,354
Disability	219	(57)	162
Mortality – Actives	107	(9)	98
Mortality – Inactives	(1)	(30)	(31)
Salary Increases	(1)	N/A	(1)
New Entrants	0	(581)	(581)
Rehires	1	(2,038)	(2,037)
Per Capita Claims Costs	N/A	1,883	1,883
Rx Plan Changes	N/A	528	528
Benefit Payments Different than Expected	18	(101)	(83)
Miscellaneous	8	195	203
Total	344	2,701	3,045

2021 Valuation Projections

2021 Valuation Projections - Background

- Because of the unusually large FY21 market asset gains, the pension trusts are currently projected to be 100% funded by FY37 (PERS) and by FY32 (TRS) – much sooner than prior years' projections

- When the pension trusts are projected to be 100% funded, we still have non-zero unfunded liability layered amortization amounts
  - These positive amortization amounts generate Additional State Contributions in years *after* the pension trusts are projected to be 100% funded ➔ this leads to pension trust funded ratios *greater* than 100%

- Now or at some point in the future, the ARMB may want to consider modifying the 25-year layered amortization method such that all remaining layered amortization amounts are eliminated when a trust reaches a funded status of 100%, thereby avoiding funding the trust above 100%*.

* The healthcare trusts are currently more than 100% funded. If the ARMB were to implement this change, the healthcare unfunded liability amortization amounts (which are negative) would also be eliminated. However, this does not impact the current projections.

2021 Valuation Projections – Background (cont'd)

- To illustrate the impact of this potential change, we have included two alternative projections for the PERS and TRS pension trusts:
  - Alternative 1 – Current state (no changes to future unfunded liability amortization amounts)
  - Alternative 2 – Eliminate all remaining unfunded liability amortization amounts once the trust is projected to be 100% funded

- We considered each of these alternatives under two asset return scenarios*:
  - Scenario A – Market return of 7.38% in all years
  - Scenario B – Market return of 7.38% in all years except FY33 return of -10% (i.e., in the year after TRS is projected to be 100% funded)

* The impact of potential adverse asset returns (Scenario B) on future PERS contributions is not as significant as it is for TRS. Accordingly, projections for PERS are shown for Scenario A only.

2021 Valuation Projections – Background (cont'd)

- Why make the change?
  - Avoids funding the pension trust above 100%
    - *Without* the change, the FY39 funded ratio of the TRS pension trust is projected to be **115%** assuming expected asset returns in all years – see Alternative 1A on slide 68
    - *With* the change, the FY39 funded ratio of the TRS pension trust is projected to be **100%** assuming expected asset returns in all years – see Alternative 2A on slide 68

- Why not make the change?
  - If TRS experiences an adverse market return in FY33
    - The amortization amounts from the FY21 market gain are *negative*. If these negative amortization amounts are maintained (Alternative 1), they will mitigate against the *positive* amortization amounts from the FY33 adverse market return
    - Contributing the higher amounts in FY33-FY39 (Alternative 1) will lead to a higher projected FY39 funded ratio ➔ see Alternative 1B (**92%**) vs Alternative 2B (**77%**) on slide 68

2021 Valuation Projections – Background (cont'd)

Summary of FY24-FY62 TRS employer contributions and Additional State Contributions (ASC's) ($000's):

Asset Return Scenario	Alternative 1			Alternative 2		
	Employer	ASC's	Total	Employer	ASCs	Total
A - Expected Returns	$446,193	$1,182,244	$1,628,437	$338,616	$629,575	$968,191
B - FY33 Return of -10%	$794,741	$2,617,898	$3,412,639	$950,338	$3,064,566	$4,014,904

Projected TRS pension funded ratios in FY39:

Asset Return Scenario	Alternative 1	Alternative 2
A – Expected Returns	115%	100%
B – FY33 Return of -10%	92%	77%

With expected returns each year:

- Employer contributions and ASC's thru FY62 are ***lower* under Alternative 2** ($968M vs $1,628M) because the positive pension amortization amounts after FY32 have been eliminated.

With adverse return in FY33:

- Employer contributions and ASC's are ***lower* under Alternative 1** ($3,413M vs $4,015M) because the negative pension amortization amounts from the FY21 asset gain are maintained, which will offset the positive amortization amounts from the FY33 asset loss.

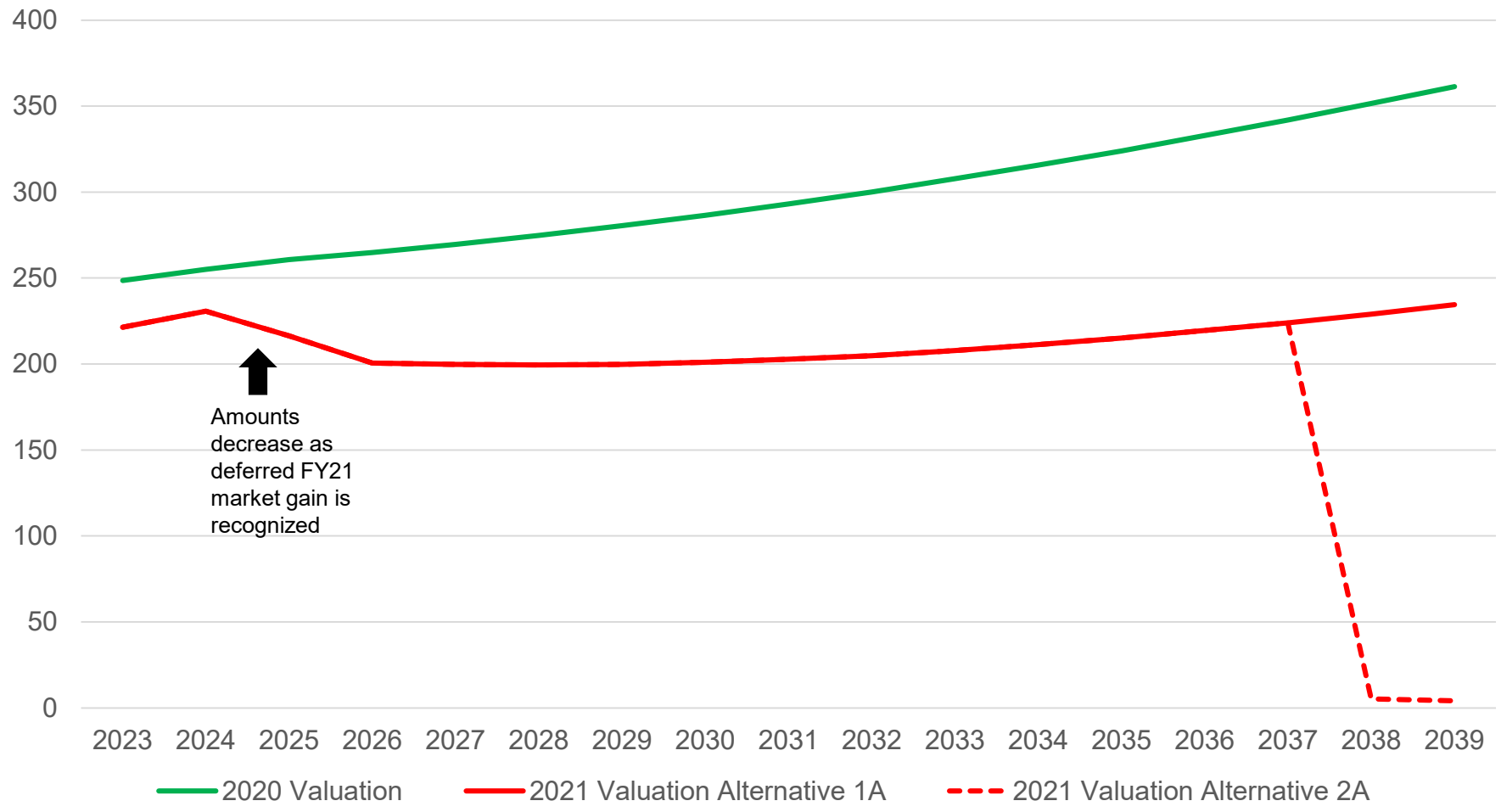
2021 Valuation Projections – Assumptions

- All experience after 6/30/21 matches valuation assumptions
- 0% active plan population growth overall, all new hires enter the DCR plans
- DCR contribution rates as of 6/30/21 assumed to remain constant
- Active rehire assumption grades to zero uniformly over 20 years
- Normal Cost percentage load for administrative expenses assumed to remain constant
- Additional State Contributions were allocated 100% to pension each year
- The FY23 contribution rates adopted by the ARMB in October 2021 are reflected
- The healthcare Normal Cost was assumed to be deposited to the healthcare trusts in FY24 and later
- The percentage of total PERS DB/DCR payroll attributable to the State's employees based on the June 30, 2021 data (approximately 50%) was assumed to remain constant in all years

Note: The 2020 valuation projections are shown for comparison purposes, and reflect SB 55 that was implemented effective July 1, 2021. See Section 3.1 of the June 30, 2020 valuation reports for the 2020 valuation projection assumptions.

PERS Projections

PERS – State-as-an-Employer Contributions
($millions)

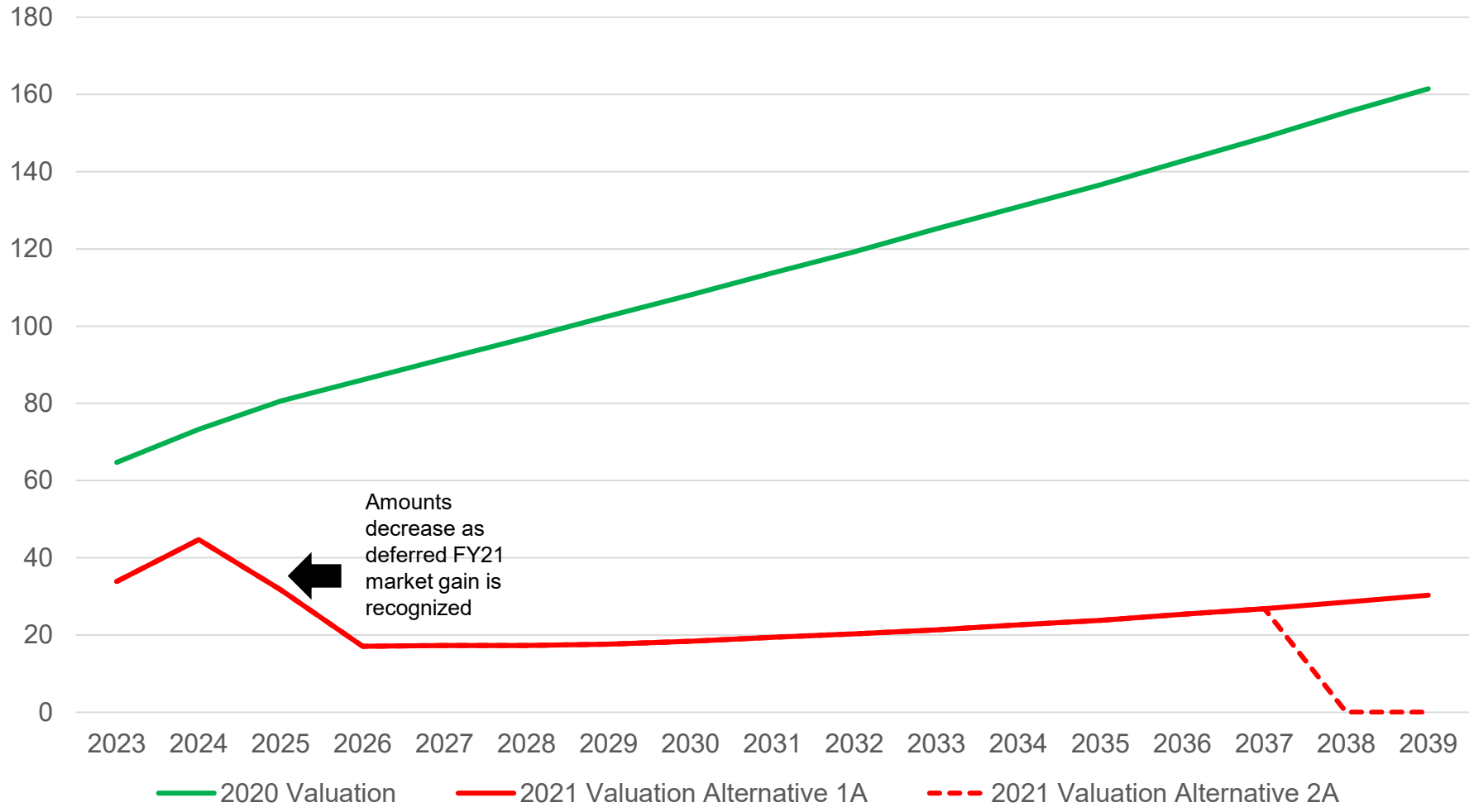


Under 2021 Valuation Alternative 1A, State-as-an-Employer Contributions continue to increase after the pension trust is projected to reach a funded status of 100%.

Under 2021 Valuation Alternative 2A, State-as-an-Employer Contributions are reduced to the Normal Cost after the pension trust is projected to reach a funded status of 100%.

PERS – Additional State Contributions

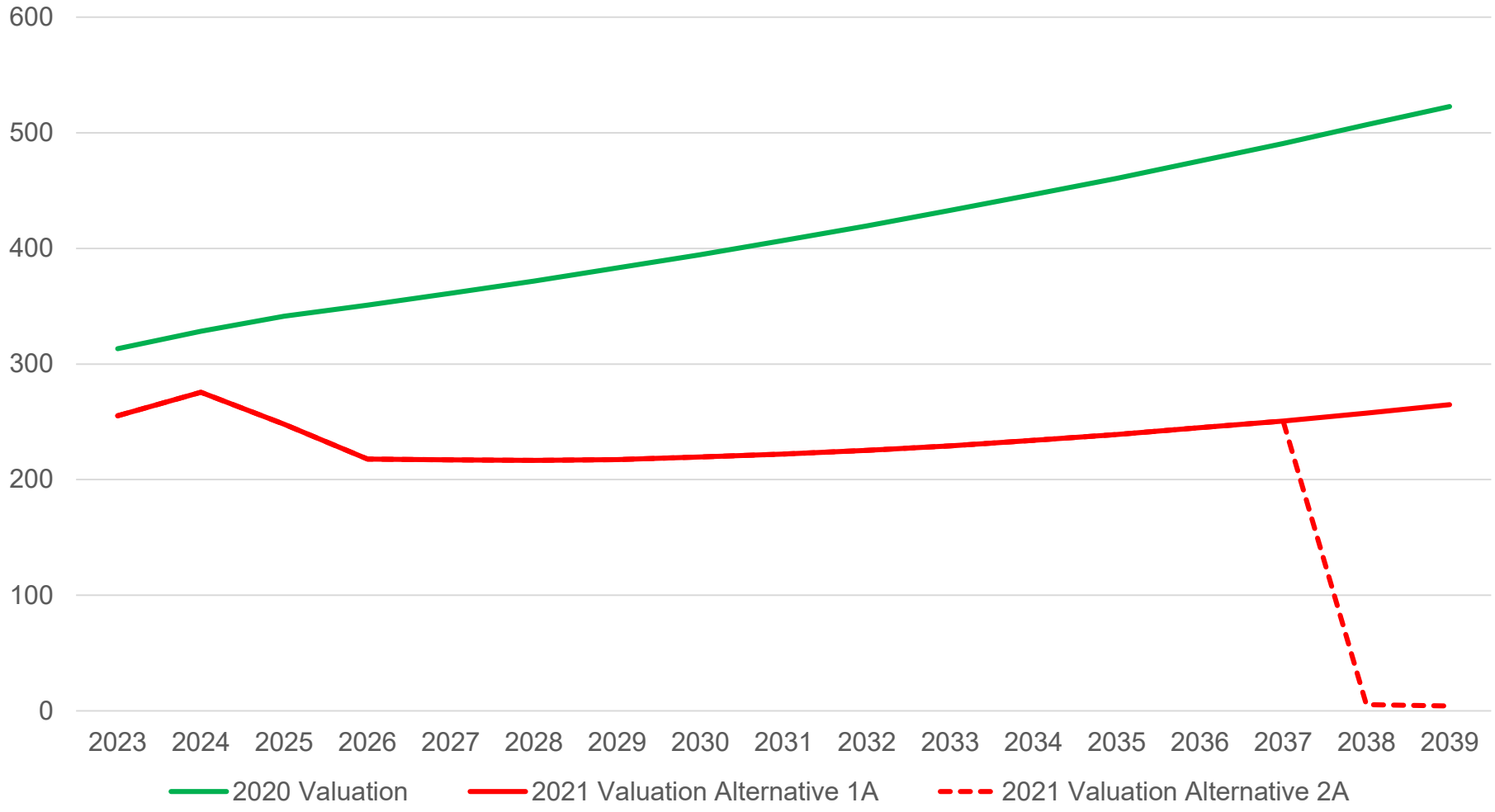
($millions)



Under 2021 Valuation Alternative 1A, Additional State Contributions continue after the pension trust is projected to reach a funded status of 100%.

Under 2021 Valuation Alternative 2A, Additional State Contributions are zero after the pension trust is projected to reach a funded status of 100%.

PERS – Total State Contributions
($millions)



PERS – State Contribution Projection Summary

($millions)

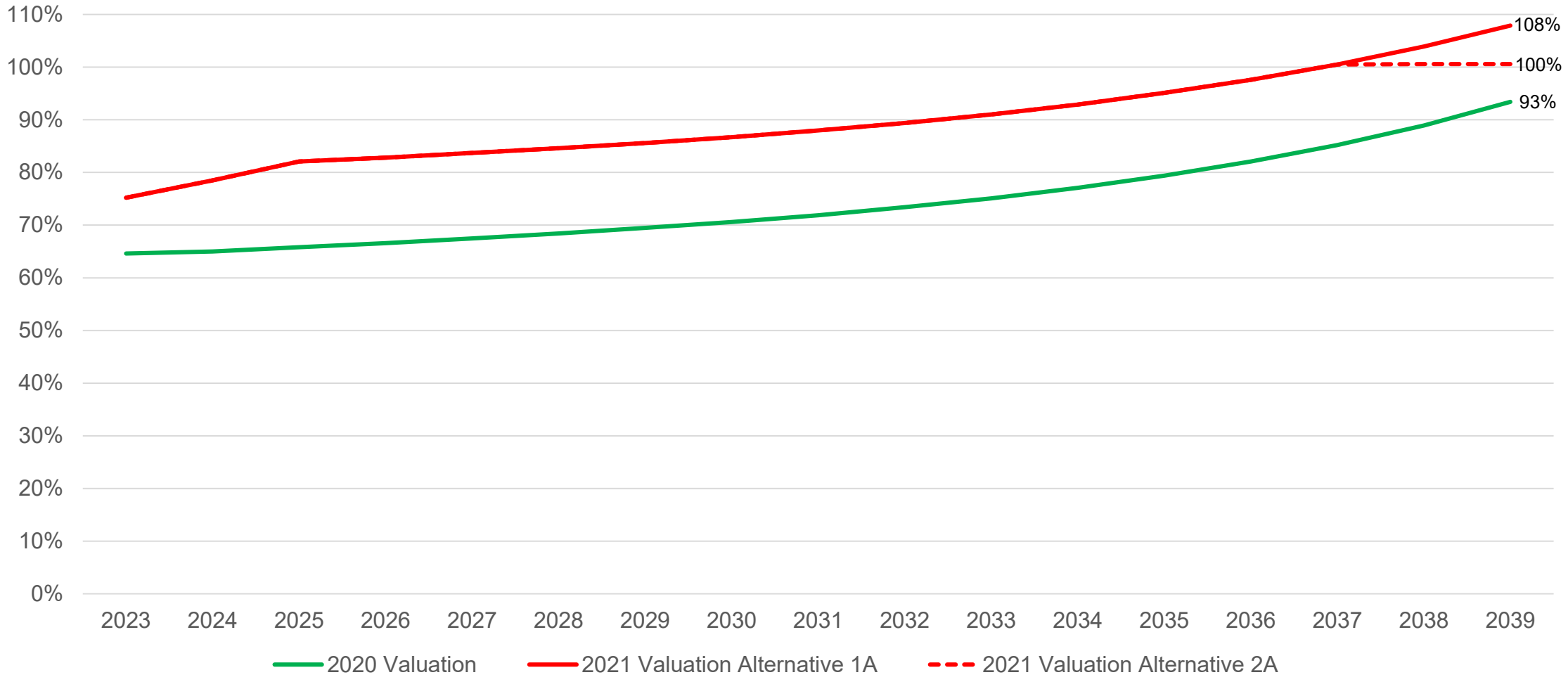
Fiscal Year	State-as-an-Employer Contributions			Additional State Contributions			Total State Contributions		
	2020 Valuation	2021 Valuation Alternative 1A	2021 Valuation Alternative 2A	2020 Valuation	2021 Valuation Alternative 1A	2021 Valuation Alternative 2A	2020 Valuation	2021 Valuation Alternative 1A	2021 Valuation Alternative 2A
2023	248.6	221.4	221.4	64.7	33.9	33.9	313.3	255.3	255.3
2024	255.0	230.8	230.8	73.3	44.7	44.7	328.3	275.5	275.5
2025	260.7	216.3	216.3	80.6	31.7	31.7	341.3	248.0	248.0
2026	264.9	200.6	200.6	86.1	17.1	17.1	351.0	217.7	217.7
2027	269.6	199.8	199.8	91.6	17.3	17.3	361.2	217.1	217.1
2028	274.8	199.4	199.4	97.0	17.3	17.3	371.8	216.7	216.7
2029	280.5	199.8	199.8	102.6	17.6	17.6	383.1	217.4	217.4
2030	286.5	201.1	201.1	108.1	18.4	18.4	394.6	219.5	219.5
2031	293.1	202.8	202.8	113.8	19.4	19.4	406.9	222.2	222.2
2032	300.1	204.9	204.9	119.3	20.3	20.3	419.4	225.2	225.2
2033	307.8	207.8	207.8	125.2	21.3	21.3	433.0	229.1	229.1
2034	315.7	211.3	211.3	130.9	22.6	22.6	446.6	233.9	233.9
2035	323.9	215.1	215.1	136.6	23.8	23.8	460.5	238.9	238.9
2036	332.9	219.5	219.5	142.8	25.4	25.4	475.7	244.9	244.9
2037	341.9	223.9	223.9	148.9	26.8	26.8	490.8	250.7	250.7
2038	351.5	**229.0**	**5.3**	155.4	**28.5**	**0.0**	506.9	257.5	5.3
2039	361.3	**234.5**	**4.1**	161.5	**30.3**	**0.0**	522.8	264.8	4.1
Sub-Total	5,068.8	3,618.0	3,163.9	1,938.4	416.4	357.6	7,007.2	4,034.4	3,521.5
2040-2062	0.0	13.1	13.1	0.0	0.0	0.0	0.0	13.1	13.1
Total	5,068.8	3,631.1	3,177.0	1,938.4	416.4	357.6	7,007.2	**4,047.5**	**3,534.6**

State-as-an-Employer contributions and Additional State Contributions thru FY39 are **lower under Alternative 2A vs Alternative 1A** because the positive amortization amounts after FY37 are eliminated under Alternative 2A.

Total State contributions thru FY62 **are also lower under Alternative 2A vs Alternative 1A.**

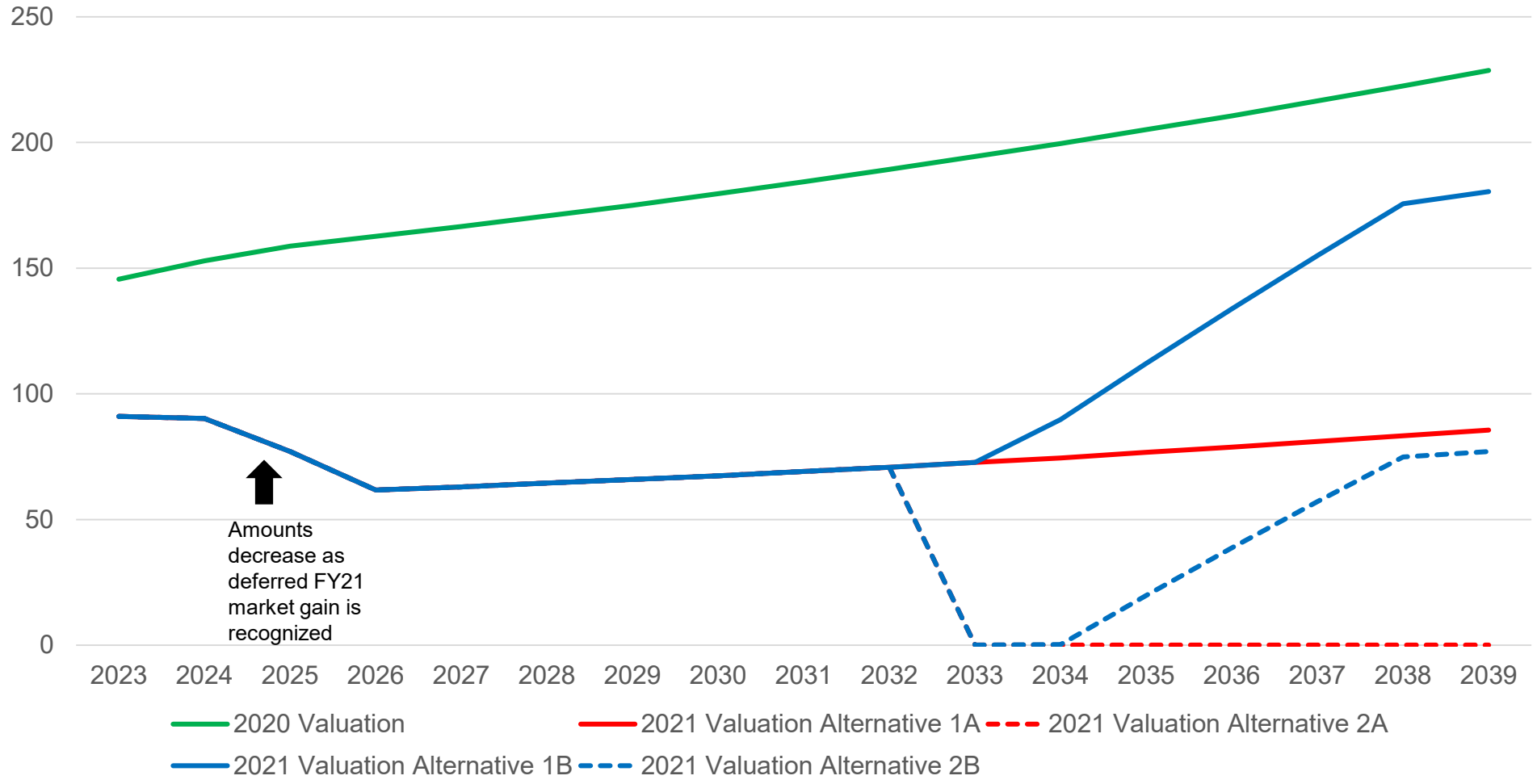
PERS – Projected Funded Ratios of Pension Trust

(based on Actuarial Value of Assets)



TRS Projections

TRS – Additional State Contributions
($millions)



All 2021 valuation alternative scenarios are the same through FY32.

The increases after FY33 under Alternatives1B and 2B are due to the adverse FY33 market return.

Additional State Contributions are projected to be **zero** after FY39 with expected returns each year (Alternatives 1A and 2A).

Additional State Contributions are projected to be **non-zero** after FY39 with adverse FY33 returns (Alternatives 1B and 2B).

TRS – Additional State Contribution Projection Summary

($millions)

Fiscal Year	Additional State Contributions				
	2020 Valuation	2021 Valuation Alternative 1A	2021 Valuation Alternative 2A	2021 Valuation Alternative 1B	2021 Valuation Alternative 2B
2023	145.6	91.0	91.0	91.0	91.0
2024	152.9	90.2	90.2	90.2	90.2
2025	158.8	77.0	77.0	77.0	77.0
2026	162.7	61.7	61.7	61.7	61.7
2027	166.6	63.0	63.0	63.0	63.0
2028	170.8	64.5	64.5	64.5	64.5
2029	175.0	65.9	65.9	65.9	65.9
2030	179.6	67.4	67.4	67.4	67.4
2031	184.4	69.1	69.1	69.1	69.1
2032	189.3	70.8	70.8	70.8	70.8
2033	194.4	**72.7**	**0.0**	**72.7**	**0.0**
2034	199.6	**74.5**	**0.0**	**89.8**	**0.2**
2035	205.1	**76.7**	**0.0**	**112.1**	**19.8**
2036	210.6	**78.8**	**0.0**	**133.8**	**38.7**
2037	216.5	**81.0**	**0.0**	**155.0**	**57.1**
2038	222.5	**83.3**	**0.0**	**175.6**	**74.9**
2039	228.7	**85.6**	**0.0**	**180.5**	**77.0**
Sub-Total	3,163.1	1,273.2	720.6	1,640.1	988.3
2040-2062	0.0	0.0	0.0	**1,068.9**	**2,167.3**
Total	3,163.1	1,273.2	720.6	2,709.0	3,155.6

Comparing Alternatives 1A and 2A (expected returns each year):

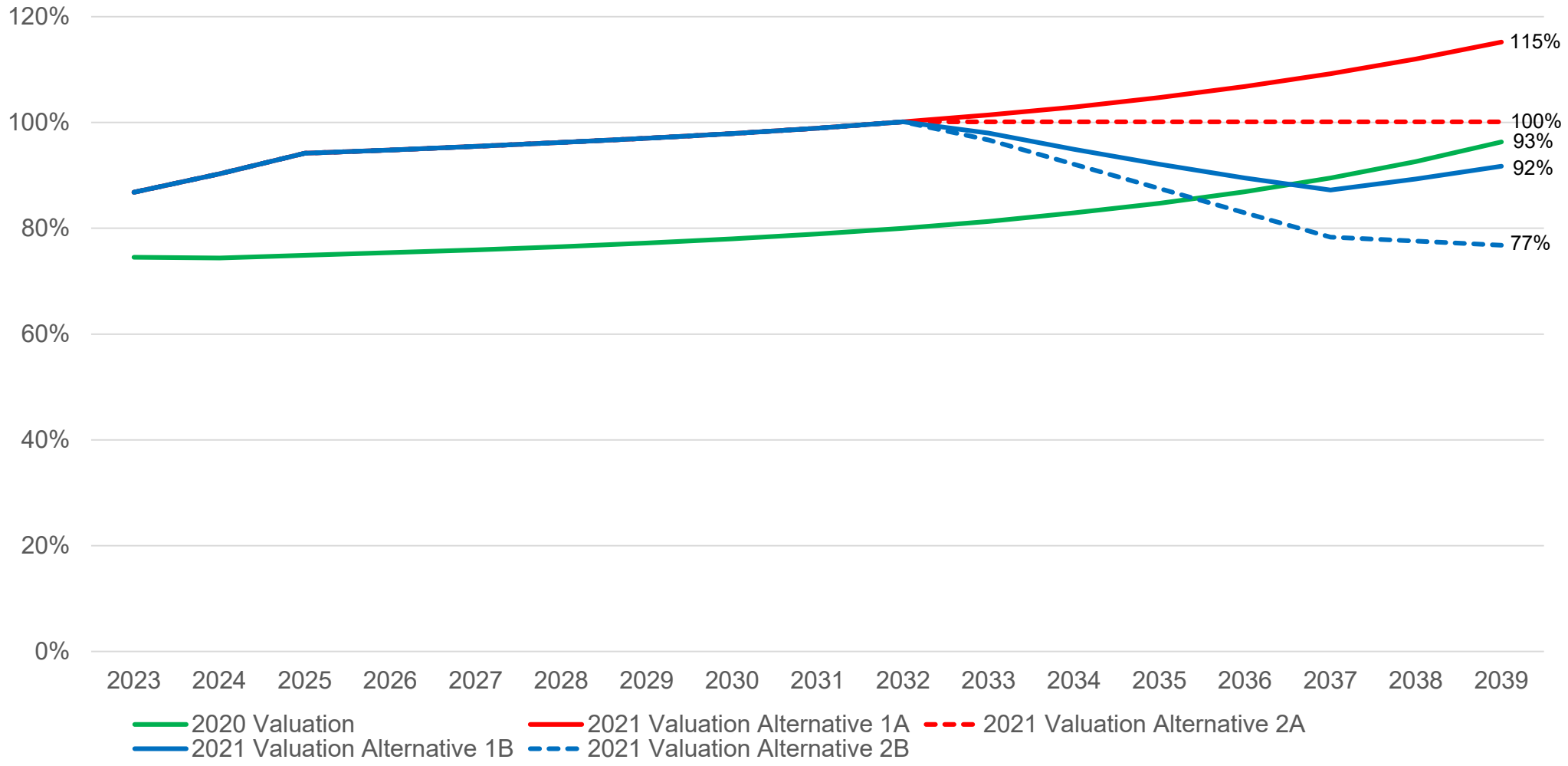
- Additional State Contributions thru FY39 are **lower under Alternative 2A vs Alternative 1A** because the positive amortization amounts after FY32 are eliminated.

Comparing Alternatives 1B and 2B (adverse return in FY33):

- Additional State Contributions thru FY39 are **lower under Alternative 2B vs Alternative 1B** because the positive amortization amounts after FY32 are eliminated.
- If we also consider FY40-FY62, Additional State Contributions in these years are **lower under Alternative 1B vs Alternative 2B** because the negative amortization amounts from the FY21 asset gain are maintained.

TRS – Projected Funded Ratios of Pension Trust

(based on Actuarial Value of Assets)



All 2021 valuation alternative scenarios are the same through FY32

Healthcare Sensitivities

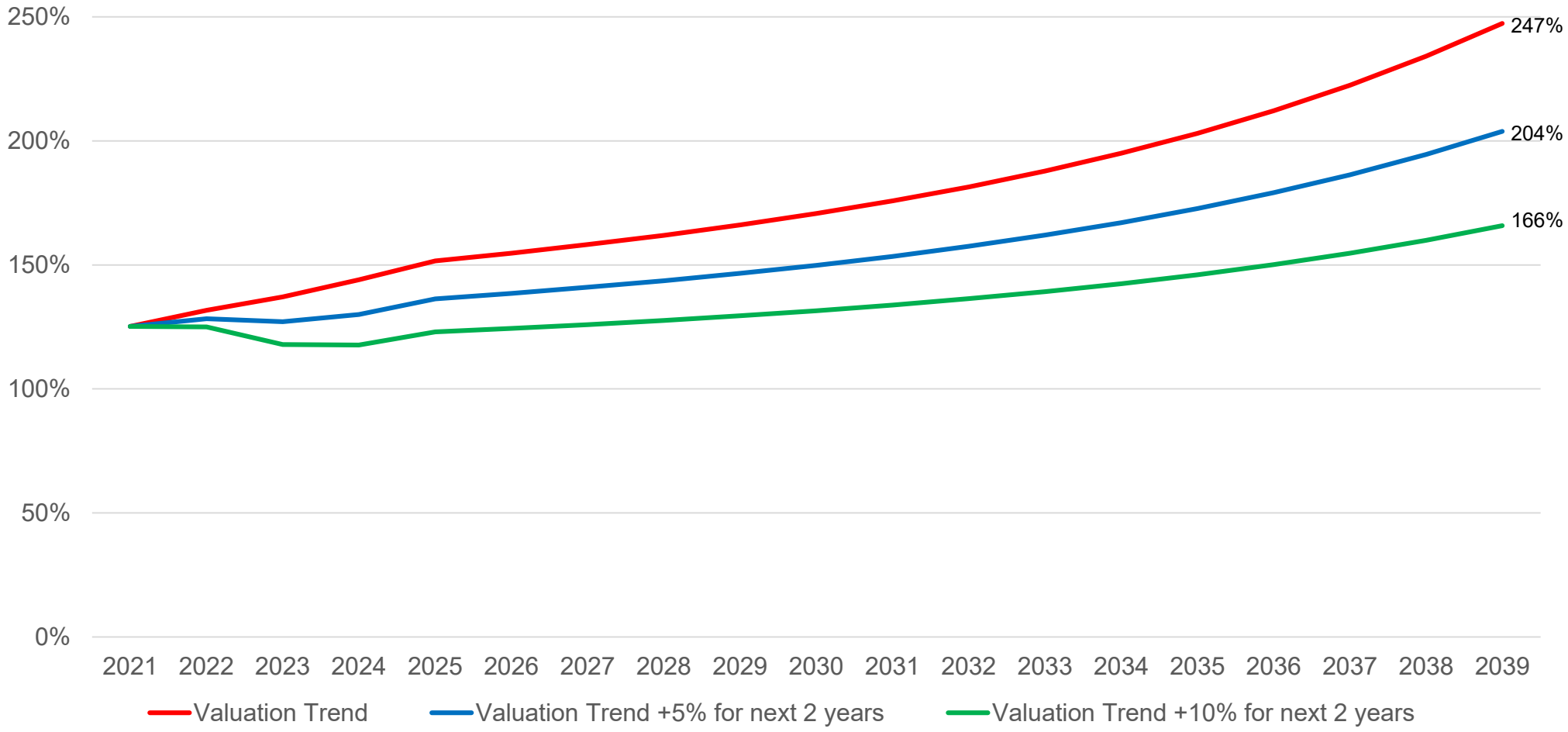
Healthcare Sensitivities - Background

- The PERS and TRS healthcare trusts are currently more than 100% funded, and have been so for the last few years due to several reasons
  - Favorable claims experience
  - Implementation of EGWP in 2019
  - New prescription drug contract with Optum in 2019
  - Plan changes made effective in 2022
  - Favorable asset returns
  - Contributing the healthcare Normal Cost per Alaska statutes
- If the healthcare Normal Cost continues to be deposited to the healthcare trust, the funded status of each healthcare trust is expected to continue to increase absent future adverse experience or changes in plan provisions and/or actuarial assumptions
- We have illustrated how the projected funded ratios of the healthcare trusts would change if the increases in healthcare costs during each of the next 2 years are*:
  - 5% higher than the valuation trend rate assumption
  - 10% higher than the valuation trend rate assumption

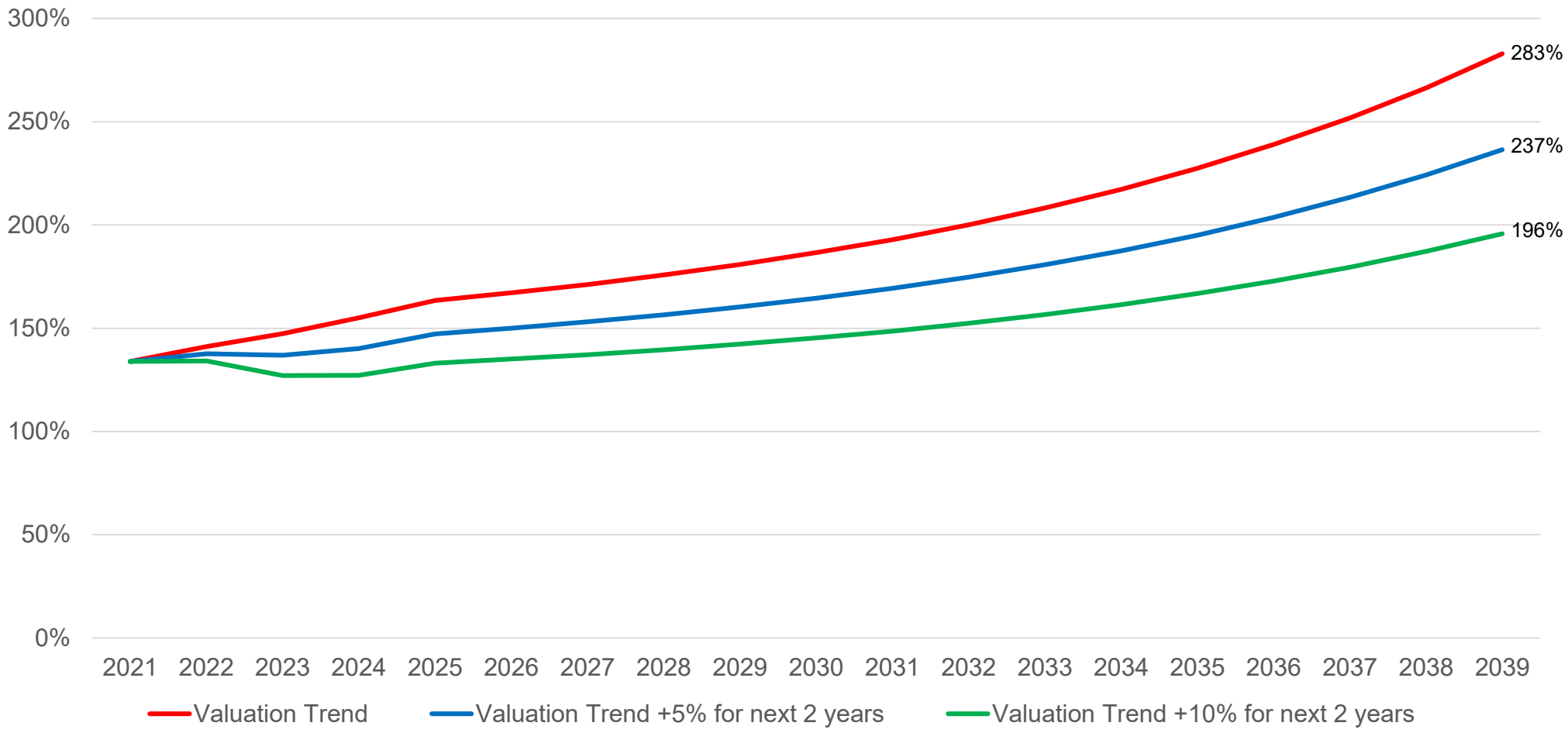
* Assuming no other gains/losses, and no changes in plan provisions and/or actuarial assumptions

PERS – Projected Funded Ratios of Healthcare Trust

(based on Actuarial Value of Assets)



TRS – Projected Funded Ratios of Healthcare Trust
(based on Actuarial Value of Assets)



Actuarial Certification

Actuarial Certification

The purpose of this presentation is to provide the ARMB Actuarial Committee with June 30, 2021 valuation results and projections for discussion at the March 16, 2022 meeting. This presentation should be considered part of the June 30, 2021 actuarial valuation report services.

The data, assumptions, methods, and plan provisions used to determine the results shown in this presentation are as shown in the draft June 30, 2021 actuarial valuation reports. The draft June 30, 2021 actuarial valuation reports include details related to potential risks associated with the plans (ASOP 51), and information regarding our use of models (ASOP 56).

Where presented, references to “funded ratio” and “unfunded actuarial accrued liability” typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded actuarial accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e., purchase annuities) all or a portion of its liabilities.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law.

The results were prepared under the direction of David Kershner and Scott Young, both of whom meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. These results have been prepared in accordance with all applicable Actuarial Standards of Practice.

David Kershner
FSA, EA, MAAA, FCA
Principal, Retirement

Scott Young
FSA, EA, MAAA
Director, Health

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State of Alaska

Timeline for June 30, 2021 Valuations (PERS/TRS DB and DCR, JRS, NGNMRS, EPORS)

Item #	Task	Original Deadline	Revised Deadline	Date Completed	Team Responsible	Comments / Notes
1	Enrollment Data Request to Aetna	7/16/21		7/6/21	Buck	Send to Daniel Dudley at Aetna. Enrollment counts received 7/21.
2	Valuation Data Request to DRB	7/16/21		7/16/21	Buck	
3	Monthly Audit Discussion with GRS / Buck	7/21/21		not needed	GRS / Buck	
4	Preliminary 6/30/2021 Assets to Buck	8/6/21		8/10/21	DRB	These will be used only for the adoption of FY23 contribution rates.
5	Monthly Audit Discussion with GRS / Buck	8/18/21		not needed	GRS / Buck	
6	Valuation Data to Buck	9/3/21		9/3/21	DRB	
7	Monthly Audit Discussion with GRS / Buck	9/15/21		9/15/21	GRS / Buck	
8	Audit Data and Sample Lives Request to Buck	9/17/21		9/22/21	GRS	
9	**Actuarial Committee Meeting - FY23 Contribution Rates**	9/22/21		9/22/21	All	**Teleconference**. Deadline for meeting materials is 9/3.
10	Claims Data Request to Segal/DRB	9/24/21		9/13/21	Buck	Incurred claims through 6/30/21 that are paid through 8/31/21.
11	Data Questions to DRB	9/24/21		9/29/21	Buck	PERS data questions sent on 9/24. TRS data questions sent on 9/29.
12	Data Answers to Buck	10/8/21		10/7/21	DRB	
13	Final 6/30/2021 Assets to Buck	10/15/21		n/a	DRB	Use same assets as provided for 6/30/21 GASB reporting.
14	Monthly Audit Discussion with GRS / Buck	10/20/21		10/20/21	GRS / Buck	
15	TRS (and selected school districts in PERS) updated active listing at 10/1/21 to capture term/rehires since 6/30/21	10/22/21			DRB	Won't be reflected in 6/30/21 valuations, but DRB still wants Buck to track how many terms/rehires by plan.
16	Claims Data to Buck	10/22/21		10/8/21	Segal / DRB	Incurred claims through 6/30/21 that are paid through 8/31/21.
17	6/30/2021 Valuation Data and DRB Data Questions to GRS	10/29/21	11/15/21	11/15/21	Buck	
18	Sample Life Information to GRS	11/5/21	11/19/21	11/19/21	Buck	
19	Preliminary Valuation Results and PVB's by individual to GRS	11/15/21	11/23/21	11/23/21	Buck	PERS DCR provided on 12/8. TRS DCR provided on 12/9.
20	Monthly Audit Discussion with GRS / Buck	11/17/21		11/17/21	GRS / Buck	
21	**Actuarial Committee Meeting - 6/30/21 valuation results (preliminary), economic assumptions for experience study**	12/1/21		12/1/21	All	**Juneau**. Deadline for meeting materials is 11/12.
22	Monthly Audit Discussion with GRS / Buck	12/15/21		12/15/21	GRS / Buck	
23	Draft DCR Valuation Reports to GRS	1/7/22		1/7/22	Buck	
24	Monthly Audit Discussion with GRS / Buck	1/19/22	1/21/22	1/21/22	GRS / Buck	
25	Draft DB Valuation Reports to GRS	1/21/22		1/26/22	Buck	
26	Monthly Audit Discussion with GRS / Buck	2/16/22		2/16/22	GRS / Buck	
27	Draft Actuarial Review Report to Buck	2/28/22			GRS	
28	Monthly Audit Discussion with GRS / Buck	3/9/22			GRS / Buck	
29	**Actuarial Committee Meeting - 6/30/21 valuation results (full), projections, draft valuation reports, demographic assumptions for experience study**	3/16/22			All	**Juneau**. Deadline for meeting materials is 2/25. Also include updated economic assumptions.
30	Monthly Audit Discussion with GRS / Buck	4/20/22			GRS / Buck	
31	**Actuarial Committee Meeting - follow-up to March meeting (if needed)**	4/28/22			All	Teleconference.
32	Monthly Audit Discussion with GRS / Buck	5/18/22			GRS / Buck	
33	**Actuarial Committee Meeting - final valuation reports, follow-up discussion on assumptions for experience study**	6/15/22			All	**Anchorage**. Deadline for meeting materials is 5/27.

Note: All deadline and completion dates are specific to PERS/TRS.

BUCK

State of Alaska

Public Employees' Retirement System

Actuarial Valuation Report
As of June 30, 2021

January 2022

DRAFT

January 26, 2022

State of Alaska
The Alaska Retirement Management Board
The Department of Revenue, Treasury Division
The Department of Administration, Division of Retirement and Benefits
P.O. Box 110203
Juneau, AK 99811-0203

Certification of Actuarial Valuation

Dear Members of The Alaska Retirement Management Board, The Department of Revenue and The Department of Administration:

This report summarizes the annual actuarial valuation results of the State of Alaska Public Employees' Retirement System (PERS) as of June 30, 2021 performed by Buck Global, LLC (Buck).

The actuarial valuation is based on financial information provided in the financial statements audited by KPMG LLP, member data provided by the Division of Retirement and Benefits, and medical enrollment data provided by the healthcare claims administrator (Aetna), as summarized in this report. The benefits considered are those delineated in Alaska statutes effective June 30, 2021. The actuary did not verify the data submitted, but did perform tests for consistency and reasonableness.

All costs, liabilities and other factors under PERS were determined in accordance with generally accepted actuarial principles and procedures. An actuarial cost method is used to measure the actuarial liabilities which we believe is reasonable. Buck is solely responsible for the actuarial data and actuarial results presented in this report. This report fully and fairly discloses the actuarial position of PERS as of June 30, 2021.

PERS is funded by Employer, State, and Member Contributions in accordance with the funding policy adopted by the Alaska Retirement Management Board (Board) and as required by Alaska state statutes. The funding objective for PERS is to pay required contributions that remain level as a percent of total PERS compensation. The Board has also established a funding policy objective that the required contributions be sufficient to pay the Normal Costs of active plan members, plan expenses, and amortize the Unfunded Actuarial Accrued Liability (UAAL) as a level percentage of total PERS compensation over a closed 25-year period as required by Alaska state statutes. The closed 25-year period was originally established effective June 30, 2014. Effective June 30, 2018, the Board adopted a 25-year layered UAAL amortization method as described in Section 5.2. The UAAL amortization continues to be on a level percent of pay basis. The compensation used to determine required contributions is the total compensation of all active members in PERS, including those hired after July 1, 2006 who are members of the Defined Contribution Retirement (DCR) Plan. This objective is currently being met and is projected to continue to be met. Absent future gains/losses, actuarially determined contributions are expected to remain level as a percent of pay and the overall funded status (on a combined pension/healthcare basis) is expected to increase to 100% in FY26 (the funded status of the pension trust is expected to increase to 100% in FY38).

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SB 55 was effective July 1, 2021. Under SB 55:

- The State-as-an-Employer contributes the full actuarial contribution rate based on the DB/DCR payroll of its employees (which is approximately 50% of the total PERS DB/DCR payroll).
- Non-State employers continue to contribute 22% of their DB/DCR payroll.
- The Additional State Contributions are based on the excess of the DB actuarial contribution rate and the DB contributions made by non-State employers.

The Board and staff of the State of Alaska may use this report for the review of the operations of PERS. Use of this report for any other purpose or by anyone other than the Board or staff of the State of Alaska may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without the review by Buck.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the actuarial assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. In particular, retiree group benefits models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of this valuation.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the plan. The actuary performs an analysis of plan experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience. The last full experience analysis was performed for the period July 1, 2013 to June 30, 2017. Based on that experience study, the Board adopted new assumptions effective beginning with the June 30, 2018 valuation to better reflect expected future experience. Based on our annual analysis of recent claims experience, changes were made to the per capita claim cost rates effective June 30, 2021 to better reflect expected future healthcare experience. A summary of the actuarial assumptions and methods used in this actuarial valuation is shown in Sections 5.2 and 5.3. We certify that the assumptions and methods described in Sections 5.2 and 5.3 of this report meet the requirements of all applicable Actuarial Standards of Practice.

Governmental Accounting Standards Board (GASB) Statement No. 67 (GASB 67) was effective for PERS beginning with fiscal year ending June 30, 2014, and Statement No. 74 (GASB 74) was effective for PERS beginning with fiscal year ending June 30, 2017. Separate GASB 67 and GASB 74 reports as of June 30, 2021 have been prepared. We have also prepared the member data tables shown in Section 4 of this report for the Statistical Section of the ACFR, as well as the summary of actuarial assumptions and analysis of financial experience for the Actuarial Section of the ACFR. Please see our separate GASB 67 and GASB 74 reports for other information needed for the ACFR.

Assessment of Risks

Actuarial Standard of Practice No. 51 (ASOP 51) applies to actuaries performing funding calculations related to a pension plan. ASOP 51 does not apply to actuaries performing services in connection with other post-employment benefits, such as medical benefits. Accordingly, ASOP 51 does not apply to the healthcare portion of PERS. See Section 6 of this report for further details regarding ASOP 51.

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Use of Models

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding methods specified in this report. The output from the third-party vendor software is used as input to internally developed models that apply applicable funding methods and policies to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal models are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts within Buck who are familiar with applicable funding methods, as well as the manner in which the model generates its output. If significant changes are made to the internal models, extra checking and review are completed. Significant changes to the internal models that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

Additional models used in valuing health benefits are described later in the report.

COVID-19

The potential impact of the ongoing COVID-19 pandemic on costs and liabilities was considered and an adjustment was made in setting the medical per capita claims cost assumption. FY20 medical claims were adjusted for a COVID-19 related decline in claims during the last four months (March – June) of FY20. FY21 medical claims were adjusted for a COVID-19 related decline in those claims during the fiscal year. A more detailed explanation on these adjustments is shown in Section 5.2.

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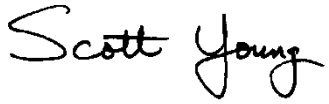
This report was prepared under my supervision and in accordance with all applicable Actuarial Standards of Practice. I am a Fellow of the Society of Actuaries, an Enrolled Actuary, a Fellow of the Conference of Consulting Actuaries, and a Member of the American Academy of Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

I am available to discuss this report with you at your convenience. I can be reached at 602-803-6174.

Respectfully submitted,

David J. Kershner, FSA, EA, MAAA, FCA
Principal

The undersigned actuary is responsible for all assumptions related to the average annual per capita health claims cost and the health care cost trend rates, and hereby affirms his qualification to render opinions in such matters in accordance with the Qualification Standards of the American Academy of Actuaries.



Scott Young, FSA, EA, MAAA, FCA
Director
Buck

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Executive Summary

Overview

The State of Alaska Public Employees' Retirement System (PERS) provides pension and postemployment healthcare benefits to eligible participants. The Commissioner of the Department of Administration is responsible for administering the plan. The Alaska Retirement Management Board has fiduciary responsibility over the assets of the plan. This report presents the results of the actuarial valuation of PERS as of the valuation date of June 30, 2021.

Purpose

An actuarial valuation is performed on the plan annually as of the end of the fiscal year. The main purposes of the actuarial valuation detailed in this report are:

1. To determine the Employer/State contribution necessary to meet the Board's funding policy for the plan;
2. To disclose the funding assets and liability measures as of the valuation date;
3. To review the current funded status of the plan and assess the funded status as an appropriate measure for determining future actuarially determined contributions;
4. To compare actual and expected experience under the plan during the last fiscal year; and
5. To report trends in contributions, assets, liabilities, and funded status over the last several years.

The actuarial valuation provides a "snapshot" of the funded position of PERS based on the plan provisions, membership data, assets, and actuarial methods and assumptions as of the valuation date.

Actuarial projections are also performed to provide a long-term view of the expected future funded status and contribution patterns (see Section 3). The future funded status and contribution patterns would be different than those shown in Section 3 if future experience does not match the actuarial assumptions used in the projections.

Retiree group benefits models necessarily rely on the use of approximations and estimates, and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements.

Funded Status

Where presented, references to "funded ratio" and "unfunded actuarial accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

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Funded Status as of June 30 ($'s in 000's)	2020	2021
Pension		
a. Actuarial Accrued Liability	$ 15,279,525	$ 15,419,975
b. Valuation Assets	9,713,710	10,466,709
c. Unfunded Actuarial Accrued Liability, (a) - (b)	$ 5,565,815	$ 4,953,266
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	63.6%	67.9%
e. Fair Value of Assets	$ 9,469,161	$ 11,912,309
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	62.0%	77.3%
Healthcare		
a. Actuarial Accrued Liability	$ 7,036,550	$ 6,856,170
b. Valuation Assets	7,989,358	8,581,155
c. Unfunded Actuarial Accrued Liability, (a) - (b)	$ (952,808)	$ (1,724,985)
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	113.5%	125.2%
e. Fair Value of Assets	$ 7,813,511	$ 9,784,141
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	111.0%	142.7%
Total		
a. Actuarial Accrued Liability	$ 22,316,075	$ 22,276,145
b. Valuation Assets	17,703,068	19,047,864
c. Unfunded Actuarial Accrued Liability, (a) - (b)	$ 4,613,007	$ 3,228,281
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	79.3%	85.5%
e. Fair Value of Assets	$ 17,282,672	$ 21,696,450
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	77.4%	97.4%

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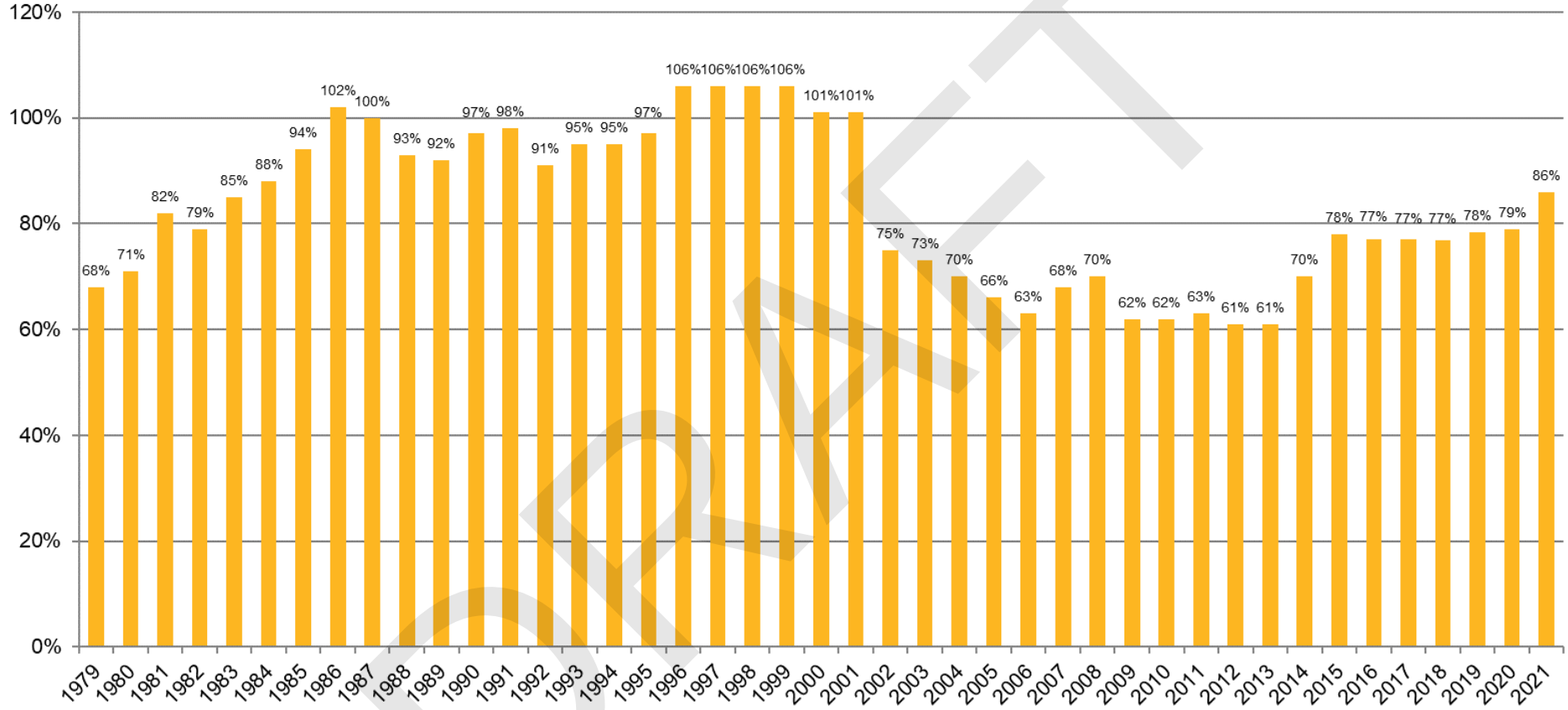
Funded Ratio History (Based on Valuation Assets)



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The key reasons for the change in the funded status are explained below. The funded status for healthcare benefits is not necessarily an appropriate measure to confirm that assets are sufficient to settle health plan obligations as there are no available financial instruments for purchase. Future experience is likely to vary from assumptions, so there is potential for actuarial gains or losses.

1. Investment Experience

The actuarial asset value was reinitialized to equal fair value of assets as of June 30, 2014. Beginning in FY15, the asset valuation method recognizes 20% of the investment gain or loss each year, for a period of five years. The FY21 investment return based on fair value of assets was approximately 30.0% compared to the expected investment return of 7.38% (net of investment expenses). This resulted in a market asset gain of approximately $3,834 million. Due to the recognition of investment gains and losses over a 5-year period, the FY21 investment return based on actuarial value of assets was approximately 11.6%, which resulted in an actuarial asset gain of approximately $734 million.

2. Salary Increases

Salary increases for continuing active members during FY21 were higher than expected based on the valuation assumptions, resulting in a liability loss of approximately $17 million.

3. Demographic Experience

Section 4 provides statistics on active and inactive participants. The number of active participants decreased 10.4% from 11,033 at June 30, 2020 to 9,888 at June 30, 2021 due to active members exiting the plan during the year (due to retirement, termination, death, and disability) and the closure of the plan to new entrants as of July 1, 2006. The average age of active participants increased from 53.21 to 53.51 and average credited service increased from 18.38 to 18.96 years.

The number of benefit recipients increased 1.6% from 37,106 to 37,717 and their average age increased from 70.77 to 71.17. The number of vested terminated participants decreased 3.6% from 5,327 to 5,135. Their average age increased from 53.52 to 53.92.

The overall effect of the demographic experience during FY21 was a liability gain of approximately $4.3 million (pension) and a liability gain of approximately $30.3[1] million (healthcare).

4. COLA / PRPA Experience

The cost-of-living increases (COLA) for benefit recipients during FY21 were less than expected based on the valuation assumptions, resulting in a liability gain of approximately $6 million. The postretirement pension adjustments (PRPA) were also less than expected, resulting in a liability gain of approximately $149 million.

5. Retiree Medical Claims Experience

As described in Section 5.2, recent medical claims experience and changes in healthcare enrollment data provided to us for the June 30, 2021 valuation generated a liability gain of approximately $272 million. Reduced claims during FY21, largely attributable to medical claims impacted by COVID-19, generated a liability gain of approximately $21 million.

[1] Includes the effects of changes in dependent coverage elections and Medicare Part B only experience.

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6. Changes in Methods Since the Prior Valuation

There were no changes in actuarial methods since the prior valuation.

7. Changes in Assumptions Since the Prior Valuation

Healthcare claim costs are updated annually as described in Section 5.2. The amounts included in the Normal Cost for administrative expenses were updated based on the last two years of actual administrative expenses paid from plan assets. There were no other changes in actuarial assumptions since the prior valuation.

8. Changes in Benefit Provisions Since the Prior Valuation

Starting in 2022, prior authorization will be required for certain specialty medications for all participants, and certain preventive benefits for pre-Medicare participants will now be covered by the plan. These changes created an actuarial gain of approximately $62 million.

Under SB 55 that was effective July 1, 2021: (i) The State-as-an-Employer contributes the full actuarial contribution rate based on the DB/DCR payroll of its employees (which is approximately 50% of the total PERS DB/DCR payroll); (ii) Non-State employers continue to contribute 22% of their DB/DCR payroll; (iii) the Additional State Contributions are based on the excess of the DB actuarial contribution rate and the DB contributions made by non-State employers.

There have been no other changes in benefit provisions valued since the prior valuation.

Projections

Absent future asset (and/or liability) losses, changes in plan provisions or actuarial assumptions, the $3,834 million FY21 market asset gain has a significant impact on the projections shown in Section 3. For example, the pension trust is currently projected to reach a funded status of 100% in FY38. Based on the 2020 valuation projections, the funded status of the pension trust was projected to be only 85% in FY38.

Once the pension trust is projected to reach of funded status of 100%, it may be reasonable to assume that all remaining pension unfunded liability layered amortization amounts should be reduced to zero. Since the healthcare trust is currently more than 100% funded, the healthcare unfunded liability amortization amounts would also be reduced to zero if the Board decides to implement this change (this does not impact the projections shown in Section 3.6 since the healthcare Normal Cost is assumed to be contributed as a minimum in all years after FY23 per Alaska state statutes).

We have shown the table of projected figures in Section 3.6 two ways:

a) Section 3.6A – No changes to the pension unfunded liability layered amortization amounts. In this case, Additional State Contributions totaling approximately $59 million are projected for FY38-FY39, even though the pension trust is projected to be 100% funded in FY38.
b) Section 3.6B – Eliminate the pension unfunded liability layered amortization amounts when the pension trust is projected to be 100% funded. In this case, the Additional State Contributions are projected to be zero after FY37.

The pros and cons of these two methods can be discussed further upon request.

In both cases, the pension Normal Cost is assumed to be contributed as a minimum based on Alaska state statutes. (The healthcare trust is currently over 100% funded, so the healthcare Normal Cost is also assumed to be contributed as a minimum based on Alaska state statutes.)

Sections 3.3 through 3.5 are based on the projections shown in Section 3.6A.

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Comparative Summary of Contribution Rates

Pension	Actual FY 2023	Estimated FY 2024
a. Normal Cost Rate Net of Member Contributions	2.37%	2.14%
b. Past Service Cost Rate	16.01%	14.38%
c. Total Employer/State Contribution Rate, (a) + (b), not less than (a)[1]	18.38%	16.52%

Healthcare	Actual FY 2023	Estimated FY 2024
a. Normal Cost Rate	2.84%	2.50%
b. Past Service Cost Rate	(4.94%)	(7.45%)
c. Total Employer/State Contribution Rate, (a) + (b), not less than (a)[1]	2.84%	2.50%

Total	Actual FY 2023	Estimated FY 2024
a. Normal Cost Rate Net of Member Contributions	5.21%	4.64%
b. Past Service Cost Rate	16.01%	14.38%
c. Total Employer/State Contribution Rate, (a) + (b)[1]	21.22%	19.02%
d. Board Adopted Total Employer/State Contribution Rate	18.38%[2]	TBD
e. Defined Contribution Retirement (DCR) Rate Paid by Employers	6.41%	6.63%
f. Board Adopted Total Rate, Including DCR Rate Paid by Employers, (d) + (e)	24.79%	TBD

Contribution rates are based on total (DB and DCR) payroll. The contribution rates shown above for FY24 are estimated assuming no actuarial gains/losses during FY22 and FY23. Actual FY24 contribution rates will be adopted by the Board in September 2022 reflecting FY22 asset experience.

Contribution rates include Employer contribution rates as limited by Alaska state statutes and the Additional State Contribution required under SB 125.

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[1] Beginning with the June 30, 2014 valuation, contribution rates for FY17 and beyond are determined using new methodology in accordance with 2014 legislation under HB 385 and SB 119, 2014 Alaska Laws, which changed the amortization methodology to a closed 25-year period as a level percentage of pay, and eliminated the time lag on the contribution rate calculation by using a 2-year "roll-forward" approach assuming 0% population growth. Investment gains and losses are recognized over a 5-year period beginning in FY15. Beginning with the June 30, 2018 valuation, the UAAL amortization was changed as described in Section 5.2.

[2] The FY23 contribution rates adopted by the Board in October 2021 were 18.38% for Pension and 0.00% for Healthcare.

Summary of Actuarial Accrued Liability Gain/(Loss) and Other Changes During the Year

The following table summarizes the sources of change in the total Employer/State contribution rate as of June 30, 2020 and June 30, 2021 based on DB and DCR payroll combined:

	Pension	Healthcare	Total
1. Total Employer/State Contribution Rate as of June 30, 2020	20.54%	3.57%	24.11%
2. Change due to:			
a. Health Claims Experience	N/A	(0.12)%	(0.12)%
b. Salary Increases	0.05%	N/A	0.05%
c. Investment Experience	(1.06)%	0.00%	(1.06)%
d. Demographic Experience and Miscellaneous [1]	(0.54)%	(0.26)%	(0.80)%
e. Actual vs Expected Contributions	(0.06)%	0.00%	(0.06)%
f. Assumption/Method Changes	0.00%	0.00%	0.00%
g. Plan Changes	0.00%	(0.03)%	(0.03)%
h. Total Change, (a) + (b) + (c) + (d) + (e) + (f) + (g)	(1.61)%	(0.41)%	(2.02)%
3. Total Employer/State Contribution Rate as of June 30, 2021, (1) + (2)(h)	18.93%	3.16%	22.09%

The following table shows the FY21 gain/(loss) on actuarial accrued liability as of June 30, 2021 ($'s in 000's):

	Pension	Healthcare	Total
Retirement Experience	$ (7,211)	$ 7,125	$ (86)
Termination Experience	(7,963)	(10,409)	(18,372)
Disability Experience	6,650	10,858	17,508
Active Mortality Experience	14,401	(745)	13,656
Inactive Mortality Experience	(1,576)	2,684	1,108
Salary Increases	(17,126)	N/A	(17,126)
Rehires (Net of Rehire Load)	15,067	14,045	29,112
Transfers between Peace/Fire and Others	(1,706)	(161)	(1,867)
COLA Increases	5,956	N/A	5,956
PRPA Increases	149,186	N/A	149,186
Benefit Payments Different than Expected	19,147	21,107	40,254
Per Capita Claims Cost	N/A	272,205	272,205
Medical and Prescription Drug Plan Changes	N/A	61,807	61,807
Medicare Part B Only Experience	N/A	5,743	5,743
Changes in Dependent Coverage Elections	N/A	15,017	15,017
Programming Changes[2]	(512)	N/A	(512)
Miscellaneous[3]	(13,480)	(15,552)	(29,032)
Total	$ 160,833	$ 383,724	$ 544,557

[1] Includes the effects of census data changes between the two valuations.

[2] Includes adjustments to (a) the 10% COLA to apply immediately for all disabled members, and (b) the PRPA increases for Peace Officer/Firefighters who retire from occupational disability.

[3] Includes the effects of various data changes that are typical when new census data is received for the annual valuation, as well as other items that do not fit neatly into any of the other categories. The pension amount includes a loss of $10,900 for unexpected beneficiaries and QDRO's based on last year's data, and the healthcare amount includes a loss of $10,592 for changes in spouses' dates of birth in the data.

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The rehire gain/(loss) amount shown on the previous page is the difference between (i) the increase in Actuarial Accrued Liability at June 30, 2021 due to rehires during the most recent plan year, and (ii) the load that was added to the June 30, 2020 Normal Cost based on the rehire load assumption used in the June 30, 2020 valuation. The development of the FY21 rehire gain/(loss) amount is shown in the table below ($'s in 000's):

	Pension	Healthcare	Total
1. Increase/(Decrease) in Actuarial Accrued Liability at June 30, 2021 due to Rehires	$ 7,095	$ (1,523)	$ 5,572
2. June 30, 2020 Normal Cost Rehire Load, with interest to June 30, 2021	$ 22,162	$ 12,522	$ 34,684
3. Rehire Gain/(Loss), (2) - (1)	$ 15,067	$ 14,045	$ 29,112

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Section 1: Actuarial Funding Results

Section 1.1: Actuarial Liabilities and Normal Cost ($'s in 000's)

Peace Officer / Firefighter

As of June 30, 2021	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Retirement Benefits	$ 877,332	$ 783,315
Termination Benefits	9,109	1,315
Disability Benefits	1,259	(1,287)
Death Benefits	9,057	5,989
Return of Contributions	1,243	(4,141)
Medical and Prescription Drug Benefits	356,026	305,813
Medicare Part D Subsidy	(30,079)	(25,883)
Indebtedness	(4,797)	(4,797)
Subtotal	$ 1,219,150	$ 1,060,324
Inactive Members		
Not Vested	$ 2,487	$ 2,487
Vested Terminations		
- Retirement Benefits	35,573	35,573
- Medical and Prescription Drug Benefits	95,523	95,523
- Medicare Part D Subsidy	(9,689)	(9,689)
- Indebtedness	(475)	(475)
Retirees & Beneficiaries		
- Retirement Benefits	1,730,944	1,730,944
- Medical and Prescription Drug Benefits	590,605	590,605
- Medicare Part D Subsidy	(79,219)	(79,219)
Subtotal	$ 2,365,749	$ 2,365,749
Total	**$ 3,584,899**	**$ 3,426,073**
Total Pension	**$ 2,661,732**	**$ 2,548,923**
Total Medical, Net of Part D Subsidy	**$ 923,167**	**$ 877,150**
Total Medical, Gross of Part D Subsidy	**$ 1,042,154**	**$ 991,941**

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Peace Officer / Firefighter

As of June 30, 2021	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
By Tier		
Tier 1		
- Pension	$ 989,348	$ 988,683
- Medical, Net of Part D Subsidy	272,846	272,432
Tier 2		
- Pension	694,313	683,185
- Medical, Net of Part D Subsidy	265,750	261,524
Tier 3		
- Pension	978,071	877,055
- Medical, Net of Part D Subsidy	384,571	343,194
Total	**$ 3,584,899**	**$ 3,426,073**

As of June 30, 2021	Normal Cost
Active Members	
Retirement Benefits	$ 17,624
Termination Benefits	1,528
Disability Benefits	495
Death Benefits	612
Return of Contributions	1,029
Medical and Prescription Drug Benefits	9,196
Medicare Part D Subsidy	(788)
Rehire Assumption (Pension)	3,996
Rehire Assumption (Medical)	1,437
Administrative Expenses (Pension)	1,615
Administrative Expenses (Medical)	773
Total	**$ 37,517**
Total Pension	**$ 26,899**
Total Medical, Net of Part D Subsidy	**$ 10,618**
Total Medical, Gross of Part D Subsidy	**$ 11,406**
By Tier	
Tier 1	
- Pension	$ 310
- Medical, Net of Part D Subsidy	204
Tier 2	
- Pension	3,601
- Medical, Net of Part D Subsidy	1,332
Tier 3	
- Pension	22,988
- Medical, Net of Part D Subsidy	9,082
Total	**$ 37,517**

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Section 1.1: Actuarial Liabilities and Normal Cost ($'s in 000's)

Others

As of June 30, 2021	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Retirement Benefits	$ 3,314,325	$ 3,021,247
Termination Benefits	213,325	120,766
Disability Benefits	16,937	5,047
Death Benefits	45,609	36,004
Return of Contributions	14,215	(28,530)
Medical and Prescription Drug Benefits	1,848,190	1,513,162
Medicare Part D Subsidy	(234,865)	(197,726)
Indebtedness	(39,283)	(39,283)
Subtotal	$ 5,178,453	$ 4,430,687
Inactive Members		
Not Vested	$ 73,923	$ 73,923
Vested Terminations		
- Retirement Benefits	651,624	651,624
- Medical and Prescription Drug Benefits	930,456	930,456
- Medicare Part D Subsidy	(102,384)	(102,384)
- Indebtedness	(12,942)	(12,942)
Retirees & Beneficiaries		
- Retirement Benefits	9,043,196	9,043,196
- Medical and Prescription Drug Benefits	4,572,277	4,572,277
- Medicare Part D Subsidy	(736,765)	(736,765)
Subtotal	$ 14,419,385	$ 14,419,385
Total	**$ 19,597,838**	**$ 18,850,072**
Total Pension	**$ 13,320,929**	**$ 12,871,052**
Total Medical, Net of Part D Subsidy	**$ 6,276,909**	**$ 5,979,020**
Total Medical, Gross of Part D Subsidy	**$ 7,350,923**	**$ 7,015,895**

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Others

As of June 30, 2021	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
By Tier		
Tier 1		
- Pension	$ 6,024,842	$ 6,001,018
- Medical, Net of Part D Subsidy	2,358,156	2,335,845
Tier 2		
- Pension	3,811,976	3,721,454
- Medical, Net of Part D Subsidy	1,873,154	1,810,864
Tier 3		
- Pension	3,484,111	3,148,580
- Medical, Net of Part D Subsidy	2,045,599	1,832,311
Total	**$ 19,597,838**	**$ 18,850,072**

As of June 30, 2021	Normal Cost
Active Members	
Retirement Benefits	$ 53,983
Termination Benefits	14,497
Disability Benefits	1,969
Death Benefits	1,742
Return of Contributions	7,031
Medical and Prescription Drug Benefits	58,336
Medicare Part D Subsidy	(6,562)
Rehire Assumption (Pension)	14,870
Rehire Assumption (Medical)	8,848
Administrative Expenses (Pension)	6,010
Administrative Expenses (Medical)	4,758
Total	**$ 165,482**
Total Pension	**$ 100,102**
Total Medical, Net of Part D Subsidy	**$ 65,380**
Total Medical, Gross of Part D Subsidy	**$ 71,942**
By Tier	
Tier 1	
- Pension	$ 8,729
- Medical, Net of Part D Subsidy	8,011
Tier 2	
- Pension	23,906
- Medical, Net of Part D Subsidy	15,939
Tier 3	
- Pension	67,467
- Medical, Net of Part D Subsidy	41,430
Total	**$ 165,482**

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Section 1.1: Actuarial Liabilities and Normal Cost ($'s in 000's)

All Members

As of June 30, 2021	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Retirement Benefits	$ 4,191,657	$ 3,804,562
Termination Benefits	222,434	122,081
Disability Benefits	18,196	3,760
Death Benefits	54,666	41,993
Return of Contributions	15,458	(32,671)
Medical and Prescription Drug Benefits	2,204,216	1,818,975
Medicare Part D Subsidy	(264,944)	(223,609)
Indebtedness	(44,080)	(44,080)
Subtotal	$ 6,397,603	$ 5,491,011
Inactive Members		
Not Vested	$ 76,410	$ 76,410
Vested Terminations		
- Retirement Benefits	687,197	687,197
- Medical and Prescription Drug Benefits	1,025,979	1,025,979
- Medicare Part D Subsidy	(112,073)	(112,073)
- Indebtedness	(13,417)	(13,417)
Retirees & Beneficiaries		
- Retirement Benefits	10,774,140	10,774,140
- Medical and Prescription Drug Benefits	5,162,882	5,162,882
- Medicare Part D Subsidy	(815,984)	(815,984)
Subtotal	$ 16,785,134	$ 16,785,134
Total	**$ 23,182,737**	**$ 22,276,145**
Total Pension	**$ 15,982,661**	**$ 15,419,975**
Total Medical, Net of Part D Subsidy	**$ 7,200,076**	**$ 6,856,170**
Total Medical, Gross of Part D Subsidy	**$ 8,393,077**	**$ 8,007,836**

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All Members

As of June 30, 2021	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
By Tier		
Tier 1		
- Pension	$ 7,014,190	$ 6,989,701
- Medical, Net of Part D Subsidy	2,631,002	2,608,277
Tier 2		
- Pension	4,506,289	4,404,639
- Medical, Net of Part D Subsidy	2,138,904	2,072,388
Tier 3		
- Pension	4,462,182	4,025,635
- Medical, Net of Part D Subsidy	2,430,170	2,175,505
Total	**$ 23,182,737**	**$ 22,276,145**

As of June 30, 2021	Normal Cost
Active Members	
Retirement Benefits	$ 71,607
Termination Benefits	16,025
Disability Benefits	2,464
Death Benefits	2,354
Return of Contributions	8,060
Medical and Prescription Drug Benefits	67,532
Medicare Part D Subsidy	(7,350)
Rehire Assumption (Pension)	18,866
Rehire Assumption (Medical)	10,285
Administrative Expenses (Pension)	7,625
Administrative Expenses (Medical)	5,531
Total	**$ 202,999**
Total Pension	**$ 127,001**
Total Medical, Net of Part D Subsidy	**$ 75,998**
Total Medical, Gross of Part D Subsidy	**$ 83,348**
By Tier	
Tier 1	
- Pension	$ 9,039
- Medical, Net of Part D Subsidy	8,215
Tier 2	
- Pension	27,507
- Medical, Net of Part D Subsidy	17,271
Tier 3	
- Pension	90,455
- Medical, Net of Part D Subsidy	50,512
Total	**$ 202,999**

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Section 1.2: Actuarial Contributions as of June 30, 2021 ($'s in 000's)

Peace Officer / Firefighter

Normal Cost Rate	Pension	Healthcare	Total
1. Total Normal Cost	$ 26,899	$ 10,618	$ 37,517
2. DB Rate Payroll Projected for FY22	147,739	147,739	147,739
3. DCR Rate Payroll Projected for FY22	220,974	220,974	220,974
4. Total Rate Payroll Projected for FY22	368,713	368,713	368,713
5. Normal Cost Rate			
a. Based on DB Rate Payroll, (1) ÷ (2)	18.21%	7.19%	25.39%
b. Based on Total Rate Payroll, (1) ÷ (4)	7.30%	2.88%	10.18%
6. Average Member Contribution Rate	3.01%	0.00%	3.01%
7. Employer Normal Cost, (5)(b) - (6)	4.29%	2.88%	7.17%

Past Service Rate	Pension	Healthcare	Total
1. Actuarial Accrued Liability	$ 2,548,923	$ 877,150	$ 3,426,073
2. Valuation Assets[1]	1,730,148	1,097,837	2,827,985
3. Unfunded Actuarial Accrued Liability, (1) - (2)	$ 818,775	$ (220,687)	$ 598,088
4. Funded Ratio, (2) ÷ (1)	67.9%	125.2%	82.5%
5. Past Service Cost Amortization Payment	63,731	(14,845)	48,886
6. Total Rate Payroll Projected for FY22	368,713	368,713	368,713
7. Past Service Rate, (5) ÷ (6)	17.28%	(4.03%)	17.28%
Total Employer / State Contribution Rate, not less than Normal Cost Rate	**21.57%**	**2.88%**	**24.45%**
Normal Cost Rate by Tier (Total Employer and Member)[2]			
Tier 1	20.67%	13.60%	34.27%
Tier 2	17.94%	6.64%	24.58%
Tier 3	18.22%	7.20%	25.42%

[1] Allocated between Peace Officer / Firefighter and Others in proportion to Actuarial Accrued Liability.

[2] Rates determined considering the payroll for members in each tier. DCR payroll is excluded from these calculations.

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Peace Officer / Firefighter

Schedule of Past Service Cost Amortizations - Pension ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Amount	6/30/2018	18	$ 731,232	$ 719,620	$ 56,655
Change in Assumptions	6/30/2018	22	88,162	88,911	6,175
FY19 Loss	6/30/2019	23	61,980	62,436	4,225
FY20 Loss	6/30/2020	24	31,158	31,297	2,067
FY21 Gain	6/30/2021	25	(83,489)	(83,489)	(5,391)
Total				**$ 818,775**	**$ 63,731**

Schedule of Past Service Cost Amortizations - Healthcare ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Amount	6/30/2018	18	$ (30,991)	$ (30,499)	$ (2,401)
Change in Assumptions/Methods/EGWP	6/30/2018	22	27,556	27,790	1,930
FY19 Gain	6/30/2019	23	(77,575)	(78,145)	(5,288)
FY20 Gain	6/30/2020	24	(38,036)	(38,206)	(2,524)
Medical and Prescription Drug Plan Chang	6/30/2021	25	(7,361)	(7,361)	(475)
FY21 Gain	6/30/2021	25	(94,266)	(94,266)	(6,087)
Total				**$ (220,687)**	**$ (14,845)**

Schedule of Past Service Cost Amortizations - Total ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Amount	6/30/2018	18	$ 700,241	$ 689,121	$ 54,254
Change in Assumptions/Methods/EGWP	6/30/2018	22	115,718	116,701	8,105
FY19 Gain	6/30/2019	23	(15,595)	(15,709)	(1,063)
FY20 Gain	6/30/2020	24	(6,878)	(6,909)	(457)
Medical and Prescription Drug Plan Chang	6/30/2021	25	(7,361)	(7,361)	(475)
FY21 Gain	6/30/2021	25	(177,755)	(177,755)	(11,478)
Total				**$ 598,088**	**$ 48,886**

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Section 1.2: Actuarial Contributions as of June 30, 2021 ($'s in 000's)

Others

Normal Cost Rate	Pension	Healthcare	Total
1. Total Normal Cost	$ 100,102	$ 65,380	$ 165,482
2. DB Rate Payroll Projected for FY22	710,902	710,902	710,902
3. DCR Rate Payroll Projected for FY22	1,327,142	1,327,142	1,327,142
4. Total Rate Payroll Projected for FY22	2,038,044	2,038,044	2,038,044
5. Normal Cost Rate			
a. Based on DB Rate Payroll, (1) ÷ (2)	14.08%	9.20%	23.28%
b. Based on Total Rate Payroll, (1) ÷ (4)	4.91%	3.21%	8.12%
6. Average Member Contribution Rate	2.38%	0.00%	2.38%
7. Employer Normal Cost, (5)(b) - (6)	2.53%	3.21%	5.74%

Past Service Rate	Pension	Healthcare	Total
1. Actuarial Accrued Liability	$ 12,871,052	$ 5,979,020	$ 18,850,072
2. Valuation Assets[1]	8,736,561	7,483,318	16,219,879
3. Unfunded Actuarial Accrued Liability, (1) - (2)	$ 4,134,491	$ (1,504,298)	$ 2,630,193
4. Funded Ratio, (2) ÷ (1)	67.9%	125.2%	86.0%
5. Past Service Cost Amortization Payment	324,336	(99,791)	224,545
6. Total Rate Payroll Projected for FY22	2,038,044	2,038,044	2,038,044
7. Past Service Rate, (5) ÷ (6)	15.91%	(4.90%)	15.91%
Total Employer / State Contribution Rate, not less than Normal Cost Rate	**18.44%**	**3.21%**	**21.65%**
Normal Cost Rate by Tier (Total Employer and Member)[2]			
Tier 1	18.20%	16.71%	34.91%
Tier 2	13.31%	8.87%	22.18%
Tier 3	13.96%	8.57%	22.53%

[1] Allocated between Peace Officer / Firefighter and Others in proportion to Actuarial Accrued Liability.

[2] Rates determined considering the payroll for members in each tier. DCR payroll is excluded from these calculations.

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Others

Schedule of Past Service Cost Amortizations - Pension ($'s in 000's)

Layer	Amortization Period		Balances		
	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Amount	6/30/2018	18	$ 3,889,167	$ 3,827,409	$ 301,329
Change in Assumptions	6/30/2018	22	467,280	471,245	32,732
FY19 Loss	6/30/2019	23	235,559	237,288	16,059
FY20 Loss	6/30/2020	24	93,343	93,760	6,193
FY21 Gain	6/30/2021	25	(495,211)	(495,211)	(31,977)
Total				**$ 4,134,491**	**$ 324,336**

Schedule of Past Service Cost Amortizations - Healthcare ($'s in 000's)

Layer	Amortization Period		Balances		
	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Amount	6/30/2018	18	$ (47,263)	$ (46,513)	$ (3,662)
Change in Assumptions/Methods/EGWP	6/30/2018	22	22,293	22,482	1,562
FY19 Gain	6/30/2019	23	(553,265)	(557,331)	(37,718)
FY20 Gain	6/30/2020	24	(253,711)	(254,843)	(16,833)
Medical and Prescription Drug Plan Chang	6/30/2021	25	(54,446)	(54,446)	(3,516)
FY21 Gain	6/30/2021	25	(613,647)	(613,647)	(39,624)
Total				**$ (1,504,298)**	**$ (99,791)**

Schedule of Past Service Cost Amortizations - Total ($'s in 000's)

Layer	Amortization Period		Balances		
	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Amount	6/30/2018	18	$ 3,841,904	$ 3,780,896	$ 297,667
Change in Assumptions/Methods/EGWP	6/30/2018	22	489,573	493,727	34,294
FY19 Gain	6/30/2019	23	(317,706)	(320,043)	(21,659)
FY20 Gain	6/30/2020	24	(160,368)	(161,083)	(10,640)
Medical and Prescription Drug Plan Chang	6/30/2021	25	(54,446)	(54,446)	(3,516)
FY21 Gain	6/30/2021	25	(1,108,858)	(1,108,858)	(71,601)
Total				**$ 2,630,193**	**$ 224,545**

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Section 1.2: Actuarial Contributions as of June 30, 2021 ($'s in 000's)

All Members

Normal Cost Rate	Pension	Healthcare	Total
1. Total Normal Cost	$ 127,001	$ 75,998	$ 202,999
2. DB Rate Payroll Projected for FY22	858,641	858,641	858,641
3. DCR Rate Payroll Projected for FY22	1,548,116	1,548,116	1,548,116
4. Total Rate Payroll Projected for FY22	2,406,757	2,406,757	2,406,757
5. Normal Cost Rate			
a. Based on DB Rate Payroll, (1) ÷ (2)	14.79%	8.85%	23.64%
b. Based on Total Rate Payroll, (1) ÷ (4)	5.28%	3.16%	8.44%
6. Average Member Contribution Rate[1]	2.47%	0.00%	2.47%
7. Employer Normal Cost, (5)(b) - (6)	2.81%	3.16%	5.97%

Past Service Rate	Pension	Healthcare	Total
1. Actuarial Accrued Liability	$ 15,419,975	$ 6,856,170	$ 22,276,145
2. Valuation Assets	10,466,709	8,581,155	19,047,864
3. Unfunded Actuarial Accrued Liability, (1) - (2)	$ 4,953,266	$ (1,724,985)	$ 3,228,281
4. Funded Ratio, (2) ÷ (1)	67.9%	125.2%	85.5%
5. Past Service Cost Amortization Payment	388,067	(114,636)	273,431
6. Total Rate Payroll Projected for FY22	2,406,757	2,406,757	2,406,757
7. Past Service Rate, (5) ÷ (6)	16.12%	(4.76%)	16.12%
Total Employer / State Contribution Rate, not less than Normal Cost Rate	**18.93%**	**3.16%**	**22.09%**
Normal Cost Rate by Tier (Total Employer and Member)[2]			
Tier 1	18.28%	16.61%	34.89%
Tier 2	13.78%	8.65%	22.43%
Tier 3	14.84%	8.29%	23.13%

[1] 7.5% for Peace Officer / Firefighter and 6.82% weighted average for Others

[2] Rates determined considering the payroll for members in each tier. DCR payroll is excluded from these calculations.

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All Members

Schedule of Past Service Cost Amortizations - Pension ($'s in 000's)

Layer	Amortization Period		Balances		
	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Amount	6/30/2018	18	$ 4,620,399	$ 4,547,029	$ 357,984
Change in Assumptions	6/30/2018	22	555,442	560,156	38,907
FY19 Loss	6/30/2019	23	297,539	299,724	20,284
FY20 Loss	6/30/2020	24	124,501	125,057	8,260
FY21 Gain	6/30/2021	25	(578,700)	(578,700)	(37,368)
Total				**$ 4,953,266**	**$ 388,067**

Schedule of Past Service Cost Amortizations - Healthcare ($'s in 000's)

Layer	Amortization Period		Balances		
	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Amount	6/30/2018	18	$ (78,254)	$ (77,012)	$ (6,063)
Change in Assumptions/Methods/EGWP	6/30/2018	22	49,849	50,272	3,492
FY19 Gain	6/30/2019	23	(630,840)	(635,476)	(43,006)
FY20 Gain	6/30/2020	24	(291,747)	(293,049)	(19,357)
Medical and Prescription Drug Plan Chang	6/30/2021	25	(61,807)	(61,807)	(3,991)
FY21 Gain	6/30/2021	25	(707,913)	(707,913)	(45,711)
Total				**$ (1,724,985)**	**$ (114,636)**

Schedule of Past Service Cost Amortizations - Total ($'s in 000's)

Layer	Amortization Period		Balances		
	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Amount	6/30/2018	18	$ 4,542,145	$ 4,470,017	$ 351,921
Change in Assumptions/Methods/EGWP	6/30/2018	22	605,291	610,428	42,399
FY19 Gain	6/30/2019	23	(333,301)	(335,752)	(22,722)
FY20 Gain	6/30/2020	24	(167,246)	(167,992)	(11,097)
Medical and Prescription Drug Plan Chang	6/30/2021	25	(61,807)	(61,807)	(3,991)
FY21 Gain	6/30/2021	25	(1,286,613)	(1,286,613)	(83,079)
Total				**$ 3,228,281**	**$ 273,431**

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Section 1.3: Roll-Forward Contribution Rate Calculation for FY24 ($'s in 000's)

	Pension	Healthcare	Total
1. Liability Roll Forward			
a. Actuarial Accrued Liability as of June 30, 2021	**$ 15,419,975**	**$ 6,856,170**	**$ 22,276,145**
b. Normal Cost	119,376	70,467	189,843
c. Interest on (a) and (b) at 7.38%	1,146,804	511,186	1,657,990
d. Estimated Benefit Payments	(974,479)	(410,194)	(1,384,673)
e. Interest on (d) at 7.38%, adjusted for timing	(38,319)	(14,867)	(53,186)
f. Expected Actuarial Accrued Liability as of June 30, 2022	**$ 15,673,357**	**$ 7,012,762**	**$ 22,686,119**
g. Projected Normal Cost	106,811	63,186	169,997
h. Interest on (f) and (g) at 7.38%	1,164,576	522,205	1,686,781
i. Estimated Benefit Payments	(1,023,259)	(429,353)	(1,452,612)
j. Interest on (i) at 7.38%, adjusted for timing	(40,237)	(15,561)	(55,798)
k. Expected Actuarial Accrued Liability as of June 30, 2023	**$ 15,881,248**	**$ 7,153,239**	**$ 23,034,487**
2. Asset Roll Forward			
a. Actuarial Value of Assets as of June 30, 2021	**$ 10,466,709**	**$ 8,581,155**	**$ 19,047,864**
b. Interest on (a) at 7.38%	772,443	633,289	1,405,732
c. Employee Contributions	65,405	0	65,405
d. Employer Contributions	404,768	75,091	479,859
e. State Assistance Contributions	97,700	0	97,700
f. Interest on (c) thru (e) at 7.38%, adjusted for timing*	24,251	2,722	26,973
g. Estimated Benefit Payments	(974,479)	(410,194)	(1,384,673)
h. Administrative Expenses	(7,625)	(5,531)	(13,156)
i. Interest on (g) and (h) at 7.38%, adjusted for timing	(38,595)	(15,067)	(53,662)
j. AVA Adjustments	441,594	371,829	813,423
k. Expected Actuarial Value of Assets as of June 30, 2022	**$ 11,252,171**	**$ 9,233,294**	**$ 20,485,465**
l. Interest on (k) at 7.38%	830,410	681,417	1,511,827
m. Employee Contributions	60,574	0	60,574
n. Employer Contributions	410,773	0	410,773
o. State Assistance Contributions**	33,933	0	33,933
p. Interest on (m) thru (o) at 7.38%, adjusted for timing*	19,587	0	19,587
q. Estimated Benefit Payments	(1,023,259)	(429,353)	(1,452,612)
r. Administrative Expenses	(6,877)	(4,996)	(11,873)
s. Interest on (q) and (r) at 7.38%, adjusted for timing	(40,486)	(15,742)	(56,228)
t. AVA Adjustments	413,313	344,736	758,049
u. Expected Actuarial Value of Assets as of June 30, 2023	**$ 11,950,139**	**$ 9,809,356**	**$ 21,759,495**
3. Expected Unfunded Actuarial Accrued Liability as of June 30, 2023, 1(k) - 2(u)	**$ 3,931,109**	**$ (2,656,117)**	**$ 1,274,992**

* Employee and Employer Contributions are paid throughout the year. State Assistance Contributions are assumed to be paid on July 1, 2021 for FY22, and July 1, 2022 for FY23.

** The FY23 State Assistance Contribution is expected to be contributed 100% to pension.

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	Pension	Healthcare	Total
4. Expected Annual Rate Payroll for FY24			
a. Defined Benefit Members			$ 711,617
b. Defined Contribution Retirement Members			1,726,002
c. Total Rate Payroll			**$ 2,437,619**
5. Expected FY24 Contribution Rate Calculation			
a. Projected Normal Cost for FY24	$ 101,319	$ 60,964	$ 162,283
b. Projected Normal Cost Rate for FY24	4.16%	2.50%	6.66%
c. Expected Member Contribution Rate for FY24	(2.02%)	0.00%	(2.02%)
d. Expected Employer Normal Cost Rate for FY24	**2.14%**	**2.50%**	**4.64%**
e. Expected Unfunded Liability as of June 30, 2023	$ 3,931,109	$ (2,656,117)	$ 1,274,992
f. FY24 Layered Amortization of Expected Unfunded Liability	350,577	(181,538)	169,039
g. Expected Past Service Cost Contribution Rate for FY24	**14.38%**	**(7.45%)**	**14.38%**
h. Expected Total Contribution Rate for FY24, not less than Normal Cost Rate	**16.52%**	**2.50%**	**19.02%**

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The components of the expected FY24 amortization amounts are shown below (totals may not add due to rounding):

Expected FY24 Schedule of Past Service Cost Amortizations - Pension ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining at 6/30/23	Initial	Outstanding at 6/30/23	Beginning-of-Year Payment for FY24
Initial Amount	6/30/2018	16	$ 4,620,399	$ 4,435,190	$ 377,944
Change in Assumptions	6/30/2018	20	555,442	558,096	41,076
FY19 Loss	6/30/2019	21	297,539	299,829	21,415
FY20 Loss	6/30/2020	22	124,501	125,558	8,721
FY21 Gain	6/30/2021	23	(578,700)	(582,952)	(39,451)
Expected FY22 Gain	6/30/2022	24	(480,925)	(483,071)	(31,908)
Expected FY23 Gain	6/30/2023	25	(421,541)	(421,541)	(27,220)
Total				**$ 3,931,109**	**$ 350,577**

Expected FY24 Schedule of Past Service Cost Amortizations - Healthcare ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining at 6/30/23	Initial	Outstanding at 6/30/23	Beginning-of-Year Payment for FY24
Initial Amount	6/30/2018	16	$ (78,254)	$ (75,118)	$ (6,401)
Change in Assumptions/Methods/EGWP	6/30/2018	20	49,849	50,086	3,686
FY19 Gain	6/30/2019	21	(630,840)	(635,696)	(45,403)
FY20 Gain	6/30/2020	22	(291,747)	(294,222)	(20,436)
Medical and Prescription Drug Plan Chang	6/30/2021	23	(61,807)	(62,261)	(4,213)
FY21 Gain	6/30/2021	23	(707,913)	(713,116)	(48,260)
Expected FY22 Gain	6/30/2022	24	(491,339)	(493,531)	(32,599)
Expected FY23 Gain	6/30/2023	25	(432,259)	(432,259)	(27,912)
Total				**$ (2,656,117)**	**$ (181,538)**

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The components of the expected FY24 amortization amounts are shown below (totals may not add due to rounding):

Expected FY24 Schedule of Past Service Cost Amortizations - Total ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining at 6/30/23	Initial	Outstanding at 6/30/23	Beginning-of-Year Payment for FY24
Initial Amount	6/30/2018	16	$ 4,542,145	$ 4,360,072	$ 371,543
Change in Assumptions/Methods/EGWP	6/30/2018	20	605,291	608,182	44,762
FY19 Gain	6/30/2019	21	(333,301)	(335,867)	(23,988)
FY20 Gain	6/30/2020	22	(167,246)	(168,664)	(11,715)
Medical and Prescription Drug Plan Chang	6/30/2021	23	(61,807)	(62,261)	(4,213)
FY21 Gain	6/30/2021	23	(1,286,613)	(1,296,068)	(87,711)
Expected FY22 Gain	6/30/2022	24	(972,264)	(976,602)	(64,507)
Expected FY23 Gain	6/30/2023	25	(853,800)	(853,800)	(55,132)
Total				**$ 1,274,992**	**$ 169,039**

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Section 1.4: Actuarial Gain/(Loss) for FY21 ($'s in 000's)

	Pension	Healthcare	Total
1. Expected Actuarial Accrued Liability			
a. Actuarial Accrued Liability as of June 30, 2020	$ 15,279,525	$ 7,036,550	$ 22,316,075
b. Normal Cost	130,592	79,891	210,483
c. Interest on (a) and (b) at 7.38%	1,137,267	525,193	1,662,460
d. Employer Group Waiver Plan	0	52,545	52,545
e. Benefit Payments	(921,899)	(440,234)	(1,362,133)
f. Refund of Contributions	(8,107)	0	(8,107)
g. Interest on (d) thru (f) at 7.38%, adjusted for timing	(36,570)	(14,051)	(50,621)
h. Assumptions/Methods Changes	0	0	0
i. Expected Actuarial Accrued Liability as of June 30, 2021 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	$ 15,580,808	$ 7,239,894	$ 22,820,702
2. Actual Actuarial Accrued Liability as of June 30, 2021	15,419,975	6,856,170	22,276,145
3. Liability Gain/(Loss), (1)(i) - (2)	**$ 160,833**	**$ 383,724**	**$ 544,557**
4. Expected Actuarial Asset Value			
a. Actuarial Value of Assets as of June 30, 2020	$ 9,713,710	$ 7,989,358	$ 17,703,068
b. Interest on (a) at 7.38%	716,872	589,615	1,306,487
c. Employee Contributions	70,614	0	70,614
d. Employer Contributions	312,538	68,191	380,729
e. State Assistance Contributions	203,585	0	203,585
f. Employer Group Waiver Plan	0	52,545	52,545
g. Interest on (c) thru (f) at 7.38%, adjusted for timing	28,911	4,376	33,287
h. Benefit Payments	(921,899)	(440,234)	(1,362,133)
i. Refund of Contributions	(8,107)	0	(8,107)
j. Administrative Expenses	(8,232)	(4,859)	(13,091)
k. Interest on (h) thru (j) at 7.38%, adjusted for timing	(36,868)	(16,132)	(53,000)
l. Expected Actuarial Asset Value as of June 30, 2021 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h) + (i) + (j) + (k)	$ 10,071,124	$ 8,242,860	$ 18,313,984
5. Actual Actuarial Asset Value as of June 30, 2021	10,466,709	8,581,155	19,047,864
6. Actuarial Asset Value Gain/(Loss), (5) - (4)(l)	**$ 395,585**	**$ 338,295**	**$ 733,880**
7. Total Actuarial Gain/(Loss), (3) + (6)	**$ 556,418**	**$ 722,019**	**$ 1,278,437**
8. Contribution Gain/(Loss)	**$ 23,056**	**$ 47,438**	**$ 70,494**
9. Administrative Expense Gain/(Loss)	**$ (774)**	**$ 263**	**$ (511)**
10. FY21 Gain/(Loss), (7) + (8) + (9)	**$ 578,700**	**$ 769,720**	**$ 1,348,420**

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Section 1.5: Development of Change in Unfunded Liability During FY21 ($'s in 000's)

	Pension	Healthcare	Total
1. 2020 Unfunded Liability	$ 5,565,815	$ (952,808)	$ 4,613,007
a. Interest on Unfunded Liability at 7.38%	$ 410,757	$ (70,317)	$ 340,440
b. Normal Cost	130,592	79,891	210,483
c. Employee Contributions	(70,614)	0	(70,614)
d. Employer Contributions	(312,538)	(68,191)	(380,729)
e. State Assistance Contributions	(203,585)	0	(203,585)
f. Administrative Expenses	8,232	4,859	13,091
g. Interest on (b) thru (f) at 7.38%, adjusted for timing	(18,975)	3,600	(15,375)
h. Assumptions/Methods Changes	0	0	0
i. Expected Change in Unfunded Liability During FY21 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	$ (56,131)	$ (50,158)	$ (106,289)
2. Expected 2021 Unfunded Liability, (1) + (1)(i)	$ 5,509,684	$ (1,002,966)	$ 4,506,718
a. Liability (Gain)/Loss During FY21	$ (160,833)	$ (383,724)	$ (544,557)
b. Actuarial Assets (Gain)/Loss During FY21	(395,585)	(338,295)	(733,880)
c. Total Actuarial (Gain)/Loss During FY21	$ (556,418)	$ (722,019)	$ (1,278,437)
3. Actual 2021 Unfunded Liability, (2) + (2)(c)	$ 4,953,266	$ (1,724,985)	$ 3,228,281

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Section 1.6: Analysis of Financial Experience

Pension
Change in Employer / State Contribution Rate as of Valuation Date
Due to (Gains) and Losses in Actuarial Accrued Liabilities During the Last Five Fiscal Years
Resulting from Differences Between Assumed Experience and Actual Experience

	Change in Employer / State Contribution Rate During Fiscal Year				
	Pension				
Type of (Gain) or Loss	**2017**	**2018**	**2019**	**2020**	**2021**
1. Health Claims	N/A	N/A	N/A	N/A	N/A
2. Salary Experience	(0.36%)	(0.30%)	0.16%	(0.03%)	0.05%
3. Investment Experience	0.64%	0.52%	0.50%	0.44%	(1.06%)
4. Demographic Experience and Miscellaneous	(0.19%)	0.26%	(0.45%)	(0.19%)	(0.54%)
5. Actual vs Expected Contributions	0.15%	0.14%	0.11%	0.15%	(0.06%)
6. (Gain) or Loss During Year From Experience, (1) + (2) + (3) + (4) + (5)	0.24%	0.62%	0.32%	0.37%	(1.61%)
7. Assumptions / Method Changes	0.00%	1.65%	0.00%	0.00%	0.00%
8. Plan Changes	0.00%	0.00%	0.00%	0.00%	0.00%
9. Composite (Gain) or Loss During Year, (6) + (7) + (8)	0.24%	2.27%	0.32%	0.37%	(1.61%)
10. Beginning Total Employer / State Contribution Rate	17.34%	17.58%	19.85%	20.17%	20.54%
11. Ending Valuation Year Employer / State Contribution Rate, (9) + (10)	17.58%	19.85%	20.17%	20.54%	18.93%
12. Fiscal Year Rates Adopted by ARMB					
a. Fiscal Year Employer / State Contribution Rate	18.29%	20.66%	20.89%	18.38%	16.52% *
b. Fiscal Year for which Rate Applies	FY20	FY21	FY22	FY23	FY24

* Expected rate. Actual rate to be determined

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Healthcare
Change in Employer / State Contribution Rate as of Valuation Date
Due to (Gains) and Losses in Actuarial Accrued Liabilities During the Last Five Fiscal Years
Resulting from Differences Between Assumed Experience and Actual Experience

	Change in Employer / State Contribution Rate During Fiscal Year				
	Healthcare				
Type of (Gain) or Loss	**2017**	**2018**	**2019**	**2020**	**2021**
1. Health Claims	(2.46%)	(1.51%)	(2.39%)	(0.87%)	(0.12%)
2. Salary Experience	N/A	N/A	N/A	N/A	N/A
3. Investment Experience	0.51%	0.40%	0.38%	0.31%	0.00%
4. Demographic Experience and Miscellaneous	(0.48%)	(1.08%)	1.16%	0.38%	(0.26%)
5. Actual vs Expected Contributions	(0.12%)	0.06%	0.02%	(0.16%)	0.00%
6. (Gain) or Loss During Year From Experience, (1) + (2) + (3) + (4) + (5)	(2.55%)	(2.13%)	(0.83%)	(0.34%)	(0.38%)
7. Assumptions / Method Changes	2.89%	2.20%	0.00%	0.00%	0.00%
8. Plan Changes	0.00%	0.00%	0.00%	0.00%	(0.03%)
9. Composite (Gain) or Loss During Year, (6) + (7) + (8)	0.34%	0.07%	(0.83%)	(0.34%)	(0.41%)
10. Beginning Total Employer / State Contribution Rate	4.33%	4.67%	4.74%	3.91%	3.57%
11. Ending Valuation Year Employer / State Contribution Rate, (9) + (10)	4.67%	4.74%	3.91%	3.57%	3.16%
12. Fiscal Year Rates Adopted by ARMB					
a. Fiscal Year Employer / State Contribution Rate	4.89%	4.27%	3.12%	0.00%	2.50% *
b. Fiscal Year for which Rate Applies	FY20	FY21	FY22	FY23	FY24

* Expected rate. Actual rate to be determined

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Total
Change in Employer / State Contribution Rate as of Valuation Date
Due to (Gains) and Losses in Actuarial Accrued Liabilities During the Last Five Fiscal Years
Resulting from Differences Between Assumed Experience and Actual Experience

	Change in Employer / State Contribution Rate During Fiscal Year				
	Total				
Type of (Gain) or Loss	**2017**	**2018**	**2019**	**2020**	**2021**
1. Health Claims	(2.46%)	(1.51%)	(2.39%)	(0.87%)	(0.12%)
2. Salary Experience	(0.36%)	(0.30%)	0.16%	(0.03%)	0.05%
3. Investment Experience	1.15%	0.92%	0.88%	0.75%	(1.06%)
4. Demographic Experience and Miscellaneous	(0.67%)	(0.82%)	0.71%	0.19%	(0.80%)
5. Actual vs Expected Contributions	0.03%	0.20%	0.13%	(0.01%)	(0.06%)
6. (Gain) or Loss During Year From Experience, (1) + (2) + (3) + (4) + (5)	(2.31%)	(1.51%)	(0.51%)	0.03%	(1.99%)
7. Assumptions / Method Changes	2.89%	3.85%	0.00%	0.00%	0.00%
8. Plan Changes	0.00%	0.00%	0.00%	0.00%	(0.03%)
9. Composite (Gain) or Loss During Year, (6) + (7) + (8)	0.58%	2.34%	(0.51%)	0.03%	(2.02%)
10. Beginning Total Employer / State Contribution Rate	21.67%	22.25%	24.59%	24.08%	24.11%
11. Ending Valuation Year Employer / State Contribution Rate, (9) + (10)	22.25%	24.59%	24.08%	24.11%	22.09%
12. Fiscal Year Rates Adopted by ARMB					
a. Fiscal Year Employer / State Contribution Rate	23.18%	24.93%	24.01%	18.38%	19.02% *
b. Fiscal Year for which Rate Applies	FY20	FY21	FY22	FY23	FY24

* Expected rate. Actual rate to be determined

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Section 1.7: History of Unfunded Liability and Funded Ratio ($'s in 000's)

Valuation Date	Total Actuarial Accrued Liability	Valuation Assets	Assets as a Percent of Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability (UAAL)
June 30, 2003	$ 10,561,653	$ 7,687,281	72.8%	$ 2,874,372
June 30, 2004	11,443,916	8,030,414	70.2%	3,413,502
June 30, 2005	12,844,841	8,442,919	65.7%	4,401,922
June 30, 2006	14,388,413	9,040,908	62.8%	5,347,505
June 30, 2007	14,570,933	9,900,960	68.0%	4,669,973
June 30, 2008	15,888,141	11,040,106	69.5%	4,848,035
June 30, 2009	16,579,371	10,242,978	61.8%	6,336,393
June 30, 2010	18,132,492	11,157,464	61.5%	6,975,028
June 30, 2011	18,740,550	11,813,774	63.0%	6,926,776
June 30, 2012	19,292,361	11,832,030	61.3%	7,460,331
June 30, 2013	19,992,759	12,162,626	60.8%	7,830,133
June 30, 2014	20,897,372	14,644,598	70.1%	6,252,774
June 30, 2015	20,648,663	16,173,459	78.3%	4,475,204
June 30, 2016	21,369,490	16,467,992	77.1%	4,901,498
June 30, 2017	21,881,395	16,786,771	76.7%	5,094,624
June 30, 2018	22,264,137	17,116,701	76.9%	5,147,436
June 30, 2019	22,190,874	17,387,184	78.4%	4,803,690
June 30, 2020	22,316,075	17,703,068	79.3%	4,613,007
June 30, 2021	22,276,145	19,047,864	85.5%	3,228,281

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Section 2: Plan Assets

Section 2.1: Summary of Fair Value of Assets ($'s in 000's)

As of June 30, 2021	Pension	Healthcare	Total	Allocation Percent
Cash and Short-Term Investments				
- Cash and Cash Equivalents	$ 136,182	$ 99,250	$ 235,432	1.2%
- Subtotal	$ 136,182	$ 99,250	$ 235,432	1.2%
Fixed Income Investments				
- Domestic Fixed Income Pool	$ 2,413,353	$ 1,994,752	$ 4,408,105	20.2%
- International Fixed Income Pool	0	0	0	0.0%
- Tactical Fixed Income Pool	0	0	0	0.0%
- High Yield Pool	0	0	0	0.0%
- Treasury Inflation Protection Pool	0	0	0	0.0%
- Emerging Debt Pool	0	0	0	0.0%
- Subtotal	$ 2,413,353	$ 1,994,752	$ 4,408,105	20.2%
Equity Investments				
- Domestic Equity Pool	$ 3,265,330	$ 2,698,953	$ 5,964,283	27.4%
- International Equity Pool	1,799,583	1,487,442	3,287,025	15.1%
- Private Equity Pool	1,770,792	1,463,644	3,234,436	14.9%
- Emerging Markets Equity Pool	382,294	315,985	698,279	3.2%
- Alternative Equity Strategies	695,474	574,842	1,270,316	5.8%
- Subtotal	$ 7,913,473	$ 6,540,866	$ 14,454,339	66.4%
Other Investments				
- Real Estate Pool	$ 732,171	$ 606,137	$ 1,338,308	6.1%
- Other Investments Pool	731,828	604,892	1,336,720	6.1%
- Absolute Return Pool	0	0	0	0.0%
- Other Assets	17	967	984	0.0%
- Subtotal	$ 1,464,016	$ 1,211,996	$ 2,676,012	12.2%
Total Cash and Investments	$ 11,927,024	$ 9,846,864	$ 21,773,888	100.0%
Net Accrued Receivables	(14,715)	(62,723)	(77,438)	
Net Assets	$ 11,912,309	$ 9,784,141	$ 21,696,450	

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Section 2.2: Changes in Fair Value of Assets During FY21 ($'s in 000's)

Fiscal Year 2021	Pension	Healthcare	Total
1. Fair Value of Assets as of June 30, 2020	$ 9,469,161	$ 7,813,511	$ 17,282,672
2. Additions:			
a. Employee Contributions	$ 70,614	$ 0	$ 70,614
b. Employer Contributions	312,538	68,191	380,729
c. State Assistance Contributions	203,585	0	203,585
d. Interest and Dividend Income	132,757	109,764	242,521
e. Net Appreciation / Depreciation in Fair Value of Investments	2,688,309	2,206,395	4,894,704
f. Employer Group Waiver Plan	0	52,545	52,545
g. Other	537	596	1,133
h. Total Additions	$ 3,408,340	$ 2,437,491	$ 5,845,831
3. Deductions:			
a. Medical Benefits	$ 0	$ 440,234	$ 440,234
b. Retirement Benefits	921,899	0	921,899
c. Refund of Contributions	8,107	0	8,107
d. Investment Expenses	26,954	21,768	48,722
e. Administrative Expenses	8,232	4,859	13,091
f. Total Deductions	$ 965,192	$ 466,861	$ 1,432,053
4. Fair Value of Assets as of June 30, 2021	$ 11,912,309	$ 9,784,141	$ 21,696,450
5. Approximate Fair Value Investment Return Rate during FY21 Net of Investment Expenses	30.1%	30.0%	30.0%

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Section 2.3: Development of Actuarial Value of Assets ($'s in 000's)

The actuarial value of asset was set equal to the fair value as of June 30, 2014 and the 20% corridor was eliminated. Investment gains and losses after June 30, 2014 are recognized 20% per year over 5 years.

	Pension	Healthcare	Total
1. Deferral of Investment Gain / (Loss) for FY21			
a. Fair Value of Assets as of June 30, 2020	$ 9,469,161	$ 7,813,511	$ 17,282,672
b. Contributions	586,737	68,191	654,928
c. Employer Group Waiver Plan	0	52,545	52,545
d. Benefit Payments	930,006	440,234	1,370,240
e. Administrative Expenses	8,232	4,859	13,091
f. Actual Investment Return (net of investment expenses)	2,794,649	2,294,987	5,089,636
g. Expected Return Rate (net of investment expenses)	7.38%	7.38%	7.38%
h. Expected Return, Weighted for Timing	690,867	564,881	1,255,748
i. Investment Gain / (Loss) for the Year, (f) - (h)	2,103,782	1,730,106	3,833,888
2. Actuarial Value as of June 30, 2021			
a. Fair Value as of June 30, 2021	$ 11,912,309	$ 9,784,141	$ 21,696,450
b. Deferred Investment Gain / (Loss)	1,445,600	1,202,986	2,648,586
c. Actuarial Value as of June 30, 2021, (a) - (b)	10,466,709	8,581,155	19,047,864
3. Ratio of Actuarial Value of Assets to Fair Value of Assets	87.9%	87.7%	87.8%
4. Approximate Actuarial Value Investment Return Rate during FY21 Net of Investment Expenses	11.6%	11.7%	11.6%

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The tables below show the development of the gains/(losses) to be recognized in the current year ($'s in 000's):

Pension				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 393,607	$ 314,884	$ 78,723	$ 0
June 30, 2018	17,834	10,701	3,567	3,566
June 30, 2019	(136,242)	(54,496)	(27,248)	(54,498)
June 30, 2020	(310,824)	(62,165)	(62,165)	(186,494)
June 30, 2021	2,103,782	0	420,756	1,683,026
Total	**$ 2,068,157**	**$ 208,924**	**$ 413,633**	**$ 1,445,600**

Healthcare				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 341,151	$ 272,920	$ 68,231	$ 0
June 30, 2018	30,997	18,597	6,199	6,201
June 30, 2019	(101,128)	(40,452)	(20,226)	(40,450)
June 30, 2020	(244,753)	(48,952)	(48,951)	(146,850)
June 30, 2021	1,730,106	0	346,021	1,384,085
Total	**$ 1,756,373**	**$ 202,113**	**$ 351,274**	**$ 1,202,986**

Total				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 734,758	$ 587,804	$ 146,954	$ 0
June 30, 2018	48,831	29,298	9,766	9,767
June 30, 2019	(237,370)	(94,948)	(47,474)	(94,948)
June 30, 2020	(555,577)	(111,117)	(111,116)	(333,344)
June 30, 2021	3,833,888	0	766,777	3,067,111
Total	**$ 3,824,530**	**$ 411,037**	**$ 764,907**	**$ 2,648,586**

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Section 2.4: Historical Asset Rates of Return

	Actuarial Value		Fair Value	
Year Ending	Annual	Cumulative*	Annual	Cumulative*
June 30, 2005	8.7%	8.7%	8.5%	8.5%
June 30, 2006	9.3%	9.0%	11.4%	9.9%
June 30, 2007	11.6%	9.9%	18.5%	12.7%
June 30, 2008	10.0%	9.9%	(3.1%)	8.5%
June 30, 2009	(7.3%)	6.2%	(20.5%)	2.0%
June 30, 2010	7.2%	6.4%	10.2%	3.3%
June 30, 2011	7.2%	6.5%	20.4%	5.6%
June 30, 2012	1.2%	5.8%	0.2%	4.9%
June 30, 2013	4.0%	5.6%	12.1%	5.7%
June 30, 2014	21.9%	7.1%	18.1%	6.9%
June 30, 2015	7.0%	7.1%	2.9%	6.5%
June 30, 2016	5.0%	6.9%	(0.7%)	5.9%
June 30, 2017	5.4%	6.8%	12.8%	6.4%
June 30, 2018	6.1%	6.8%	8.2%	6.5%
June 30, 2019	5.5%	6.7%	6.0%	6.5%
June 30, 2020	5.8%	6.6%	4.1%	6.3%
June 30, 2021	11.6%	6.9%	30.0%	7.6%

* Cumulative since fiscal year ending June 30, 2005

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Section 3: Projections

Section 3.1: Projection Assumptions and Methods

Key Assumptions

- 7.38% investment return (net of investment expenses) on the Fair Value of Assets in all future years.
- The Actuarial Value of Assets was re-initialized to Fair Value as of June 30, 2014. The Actuarial Value of Assets after June 30, 2014 reflects the deferred gains and losses generated by the smoothing method. The current deferred amount is recognized in the first four years of the projections.
- Actuarial assumptions and methods as described in Section 5. No actuarial gains/losses are assumed after June 30, 2021.
- The actuarially calculated contribution rate using a two-year roll-forward approach is adopted each year.
- Projections assume a 0% increase in the total active member population. All new members are expected to enter the DCR plan.
- Contribution rates are determined as a percent of total DB and DCR payroll.
- The DCR contribution rate determined as of June 30, 2021 is assumed to remain constant in all future years.
- The active rehire assumption shown in Section 5 is assumed to grade to zero on a uniform basis over 20 years.
- The Normal Cost is increased by the administrative expenses shown in Section 5. For future years, the percent increase is assumed to remain constant.
- The % of total DB/DCR payroll represented by the State's employees based on the June 30, 2021 data was assumed to remain constant in all future years.
- In Section 3.6B, we assumed all remaining pension unfunded liability layered amortization amounts would be zero after the pension trust is projected to reach a funded status of 100%.

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Section 3.2: Membership Projection

Projected Active Member Count

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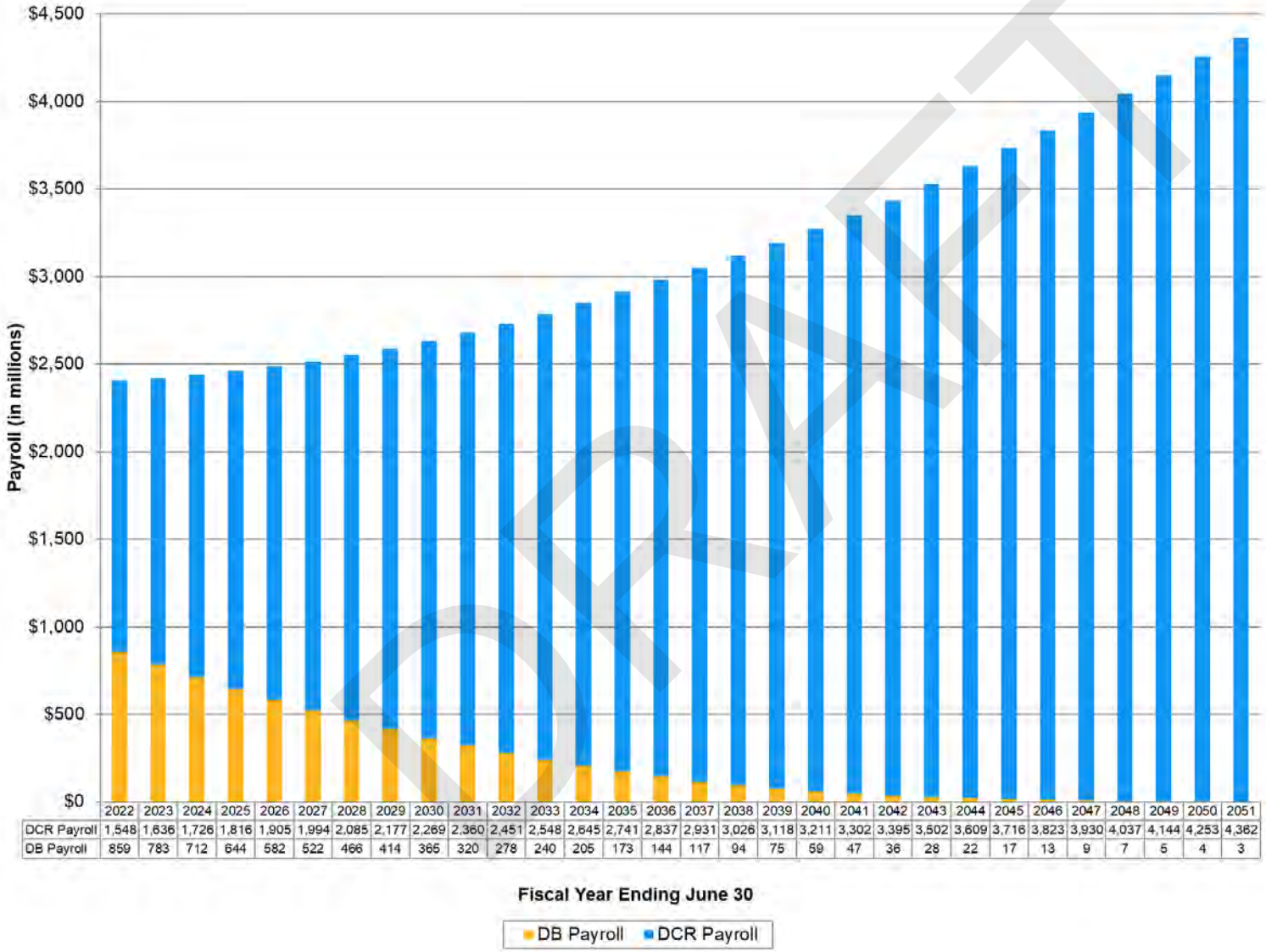
Projected DB and DCR Payroll



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
DCR Payroll	1,548	1,636	1,726	1,816	1,905	1,994	2,085	2,177	2,269	2,360	2,451	2,548	2,645	2,741	2,837	2,931	3,026	3,118	3,211	3,302	3,395	3,502	3,609	3,716	3,823	3,930	4,037	4,144	4,253	4,362
DB Payroll	859	783	712	644	582	522	466	414	365	320	278	240	205	173	144	117	94	75	59	47	36	28	22	17	13	9	7	5	4	3

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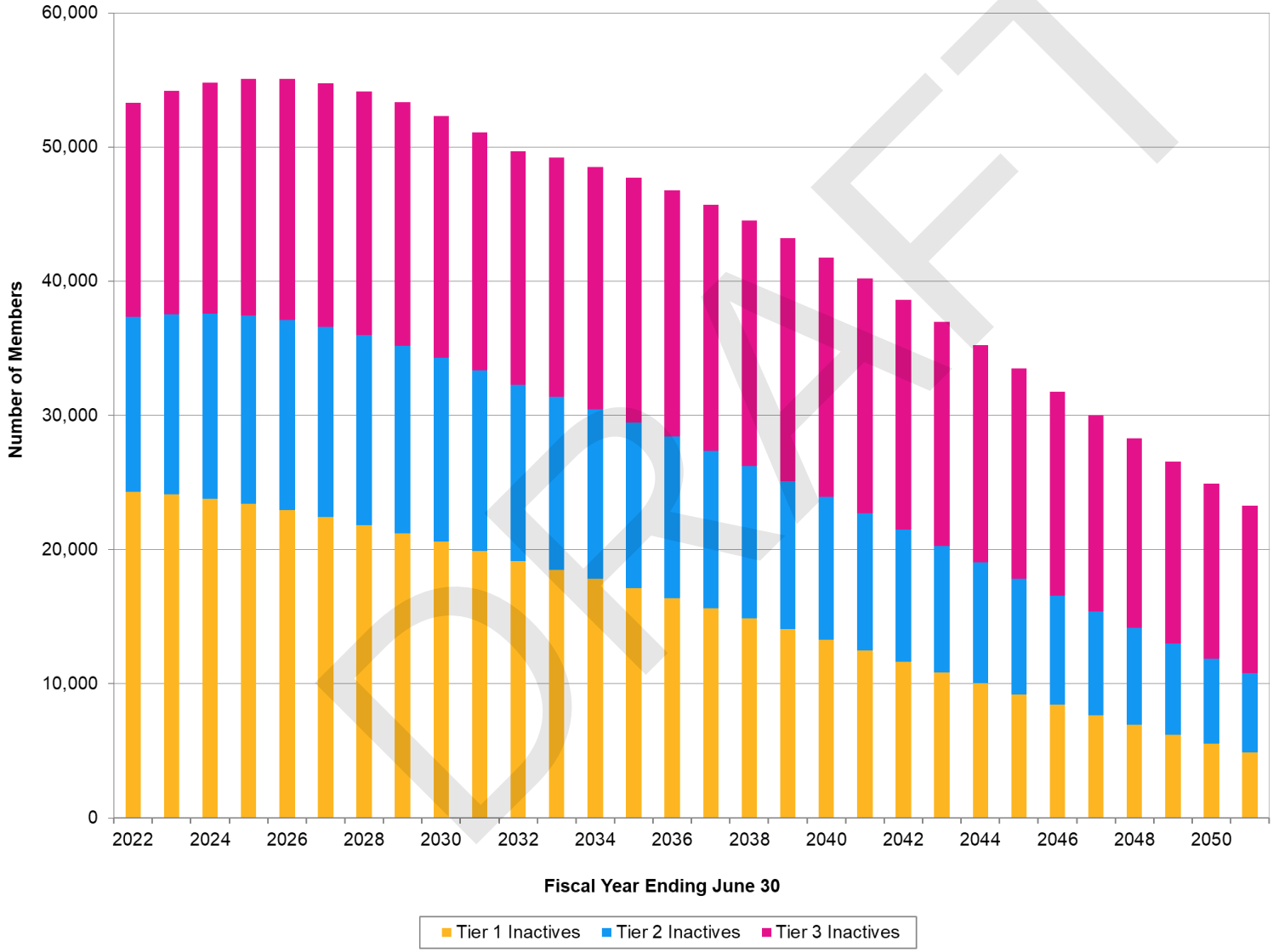
Projected Inactive Member Count



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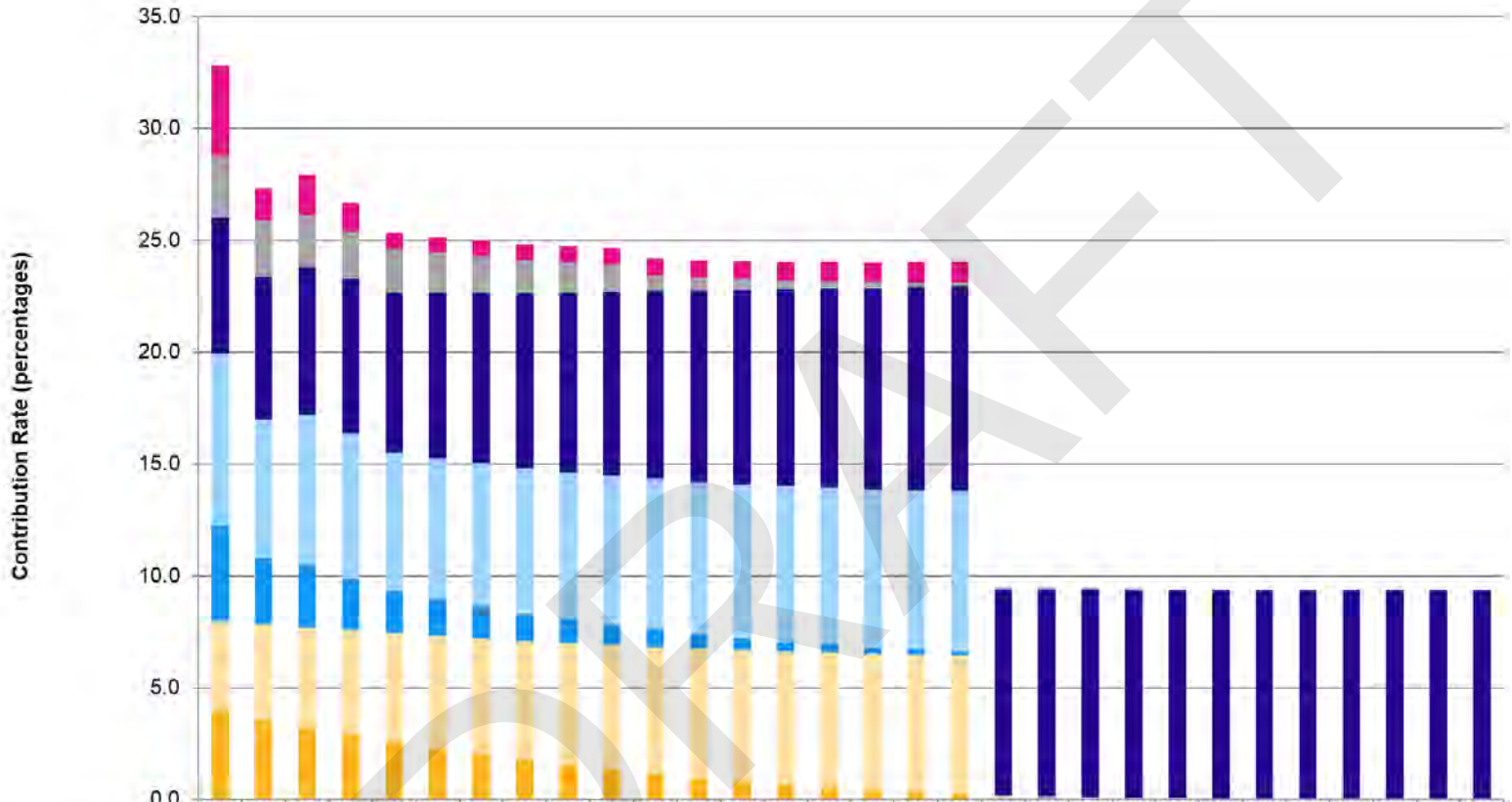
Section 3.3: Projected Employer/State Contribution Rates

Based on Total DB and DCR Payroll



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
State Assistance	4.07	1.40	1.83	1.29	0.69	0.69	0.68	0.68	0.70	0.72	0.74	0.76	0.79	0.82	0.85	0.88	0.91	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DB EE Contributions	2.72	2.50	2.30	2.11	1.94	1.77	1.62	1.48	1.35	1.24	0.71	0.60	0.50	0.41	0.33	0.27	0.21	0.16	0.13	0.10	0.07	0.06	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.00
DCR ER Contributions	6.10	6.41	6.63	6.91	7.17	7.42	7.65	7.86	8.06	8.24	8.40	8.55	8.69	8.80	8.91	9.00	9.08	9.14	9.19	9.23	9.26	9.28	9.30	9.32	9.33	9.34	9.34	9.35	9.35	9.35
State as ER on DCR Pay	7.69	6.19	6.71	6.49	6.18	6.29	6.39	6.48	6.57	6.66	6.74	6.81	6.88	6.95	7.01	7.06	7.12	7.17	0.09	0.07	0.06	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00
State as ER on DB Pay	4.26	2.96	2.76	2.30	1.89	1.65	1.43	1.23	1.06	0.90	0.77	0.64	0.53	0.44	0.36	0.28	0.22	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DB ER Contributions on DCR Pay	4.04	4.25	4.49	4.68	4.86	5.03	5.19	5.33	5.47	5.59	5.70	5.80	5.89	5.97	6.04	6.10	6.16	6.20	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DB ER Contributions on DB Pay	3.94	3.58	3.22	2.89	2.58	2.29	2.02	1.76	1.53	1.32	1.13	0.95	0.79	0.65	0.53	0.42	0.33	0.26	0.09	0.07	0.05	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.00	0.00

Fiscal Year Ending June 30

DB ER Contributions on DB Pay · DB ER Contributions on DCR Pay · State as ER on DB Pay · State as ER on DCR Pay · DCR ER Contributions · DB EE Contributions · State Assistance

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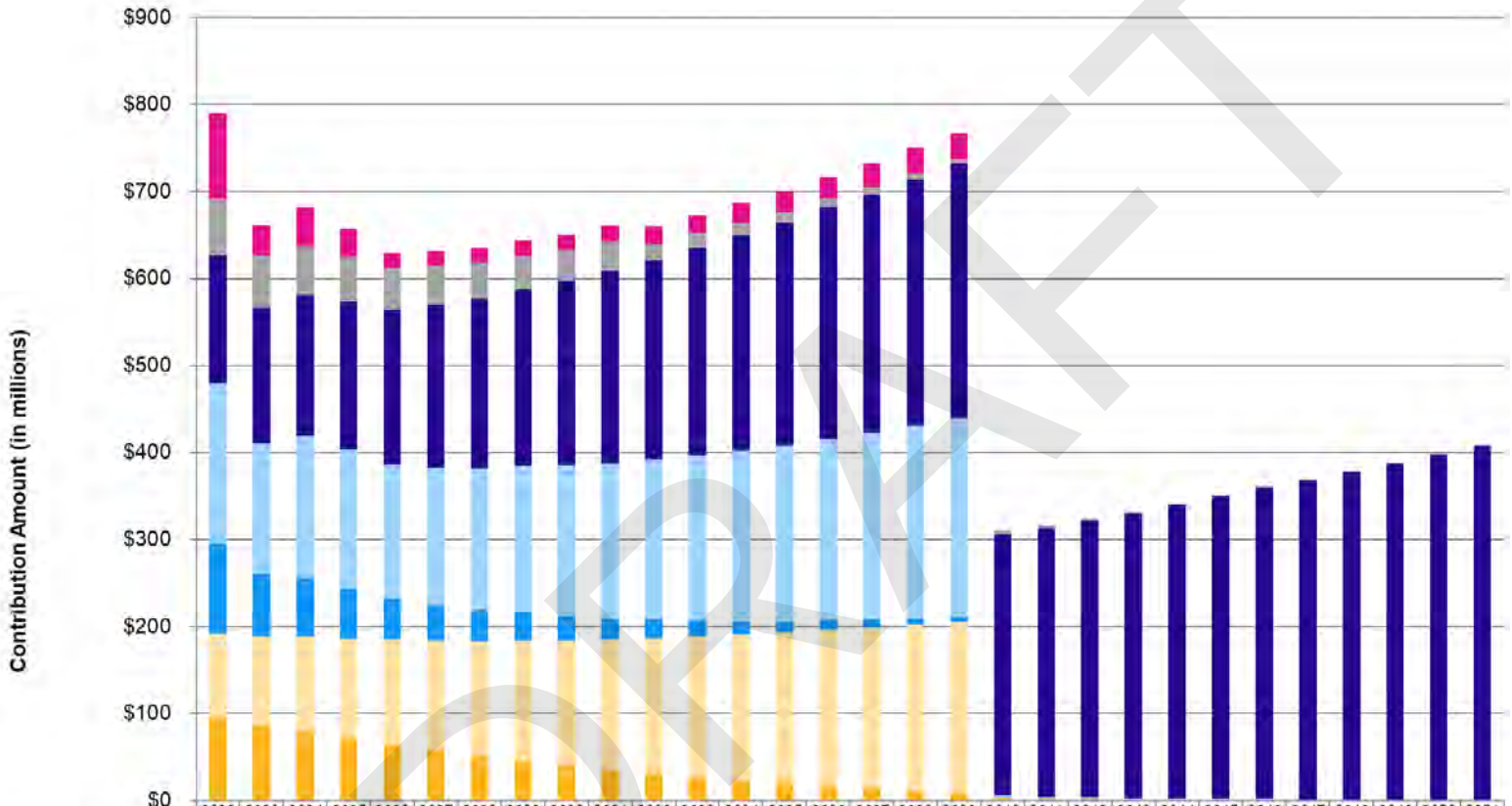
Section 3.4: Projected Employer/State Contribution Amounts



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
State Assistance	98	34	45	32	17	17	17	18	18	19	20	21	23	24	25	27	29	30	0	0	0	0	0	0	0	0	0	0	0	0
DB EE Contributions	65	61	56	52	48	45	41	38	36	33	19	17	14	12	10	8	7	5	4	3	2	2	1	1	1	1	0	0	0	0
DCR ER Contributions	147	155	162	170	178	187	195	204	212	221	229	238	248	256	266	274	283	292	300	309	318	328	338	348	358	368	378	388	398	408
State as ER on DCR Pay	185	150	163	160	154	158	163	168	173	179	184	190	196	202	209	215	222	229	3	2	2	1	1	1	1	0	0	0	0	0
State as ER on DB Pay	103	72	67	57	47	41	36	32	28	24	21	18	15	13	11	9	7	5	0	0	0	0	0	0	0	0	0	0	0	0
DB ER Contributions on DCR Pay	97	103	110	115	121	126	132	138	144	150	156	162	168	174	180	186	192	198	0	0	0	0	0	0	0	0	0	0	0	0
DB ER Contributions on DB Pay	95	86	79	71	64	58	51	46	40	35	31	27	23	19	16	13	10	8	3	2	2	1	1	1	1	0	0	0	0	0

Fiscal Year Ending June 30

DB ER Contributions on DB Pay · DB ER Contributions on DCR Pay · State as ER on DB Pay · State as ER on DCR Pay · DCR ER Contributions · DB EE Contributions · State Assistance

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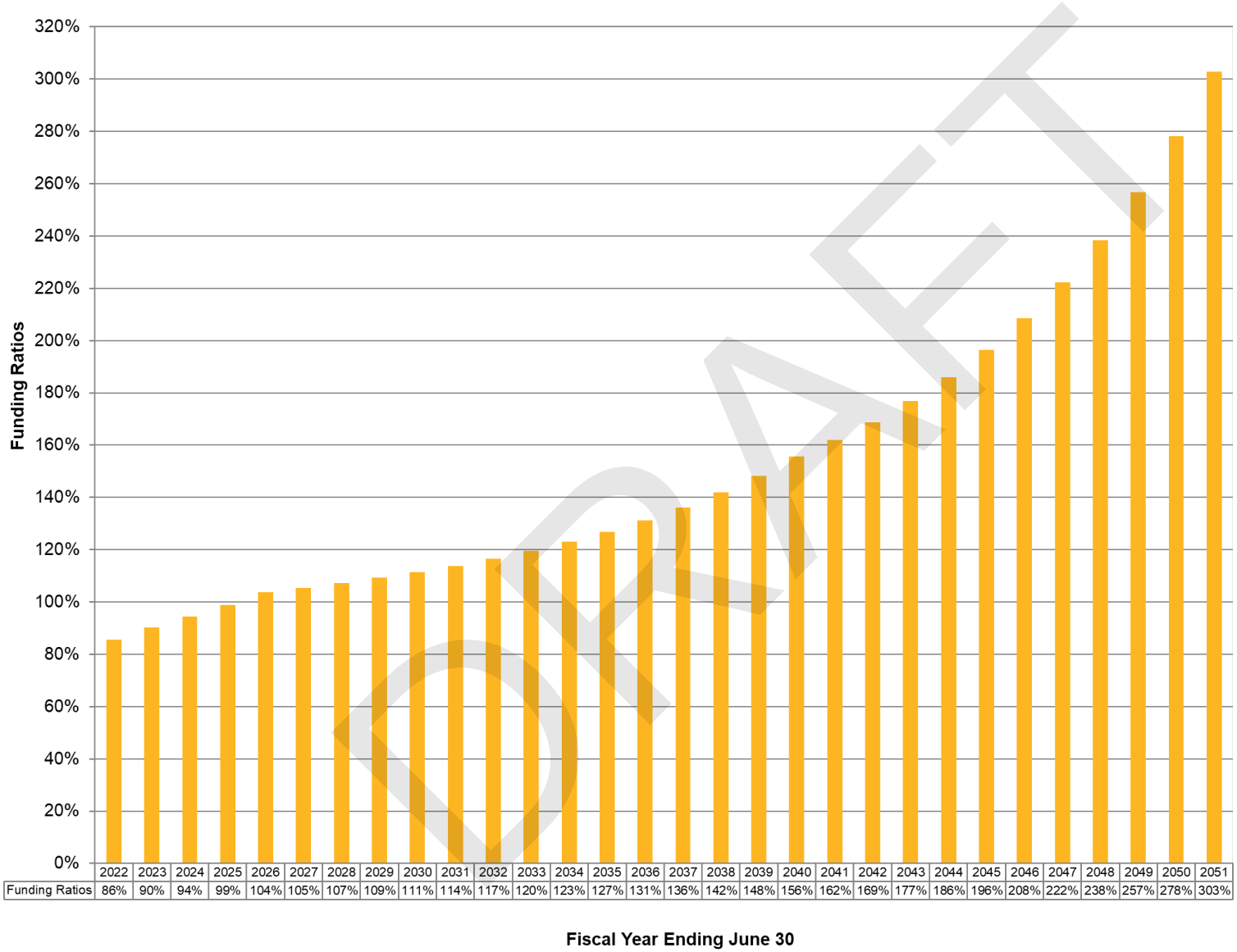
Section 3.5: Projection of Funded Ratios



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Funding Ratios	86%	90%	94%	99%	104%	105%	107%	109%	111%	114%	117%	120%	123%	127%	131%	136%	142%	148%	156%	162%	169%	177%	186%	196%	208%	222%	238%	257%	278%	303%

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Section 3.6A: Table of Projected Actuarial Results ($'s in 000's)

Fiscal Year End	Valuation Amounts on July 1 (Beginning of FY)				Cash Flow Amounts during Following 12 Months										Deferred Asset Gain / (Loss)
						Actuarial Contrib. Rates			DB Contributions						
	Actuarial Assets	Accrued Liability	Funding Ratio	Unfunded Liability / (Surplus)	Total Salaries	DB	DCR	Total	Non-State Employers	State as an Employer	State Assistance	Employee	Total	Benefit Payments	
2022	$ 19,047,864	$ 22,276,145	85.5%	$ 3,228,281	$ 2,406,757	24.01%	6.10%	30.11%	$ 192,141	$ 287,718	$ 97,700	$ 65,405	$ 642,964	$ 1,384,673	$ 2,030,628
2023	20,485,465	22,686,119	90.3%	2,200,654	2,419,276	18.38%	6.41%	24.79%	189,375	221,398	33,933	60,574	505,280	1,452,612	1,422,440
2024	21,759,495	23,034,487	94.5%	1,274,992	2,437,619	19.02%	6.63%	25.65%	188,118	230,844	44,673	56,077	519,712	1,519,487	766,777
2025	23,077,297	23,325,864	98.9%	248,567	2,459,924	17.66%	6.91%	24.57%	186,380	216,299	31,743	51,849	486,271	1,581,069	0
2026	24,457,146	23,553,712	103.8%	(903,434)	2,486,407	16.20%	7.17%	23.37%	185,141	200,553	17,103	48,126	450,923	1,639,102	0
2027	25,019,087	23,722,456	105.5%	(1,296,631)	2,515,962	15.95%	7.42%	23.37%	184,183	199,805	17,307	44,634	445,929	1,691,307	0
2028	25,564,111	23,834,711	107.3%	(1,729,400)	2,551,387	15.70%	7.65%	23.35%	183,830	199,443	17,294	41,406	441,973	1,743,410	0
2029	26,092,076	23,888,351	109.2%	(2,203,725)	2,591,246	15.49%	7.86%	23.35%	183,971	199,848	17,564	38,407	439,790	1,792,657	0
2030	26,606,454	23,882,931	111.4%	(2,723,523)	2,634,091	15.33%	8.06%	23.39%	184,367	201,056	18,384	35,618	439,425	1,841,559	0
2031	27,108,439	23,815,895	113.8%	(3,292,544)	2,680,313	15.20%	8.24%	23.44%	185,180	202,848	19,379	33,314	440,721	1,888,399	0
2032	27,600,920	23,686,165	116.5%	(3,914,755)	2,729,431	15.08%	8.40%	23.48%	186,380	204,935	20,283	19,379	430,977	1,921,262	0
2033	28,086,220	23,492,795	119.6%	(4,593,425)	2,788,219	14.97%	8.55%	23.52%	188,295	207,822	21,279	16,729	434,125	1,962,656	0
2034	28,568,243	23,233,706	123.0%	(5,334,537)	2,849,691	14.89%	8.69%	23.58%	190,443	211,269	22,607	14,248	438,567	1,997,145	0
2035	29,055,213	22,912,291	126.8%	(6,142,922)	2,913,742	14.83%	8.80%	23.63%	193,114	215,146	23,847	11,946	444,053	2,027,268	0
2036	29,553,053	22,529,016	131.2%	(7,024,037)	2,980,267	14.79%	8.91%	23.70%	195,878	219,465	25,439	9,835	450,617	2,052,266	0
2037	30,068,967	22,085,105	136.2%	(7,983,862)	3,048,570	14.75%	9.00%	23.75%	198,989	223,888	26,787	8,231	457,895	2,073,075	0
2038	30,609,336	21,582,882	141.8%	(9,026,454)	3,119,617	14.74%	9.08%	23.82%	202,374	228,950	28,508	6,551	466,383	2,084,652	0
2039	31,186,769	21,027,265	148.3%	(10,159,504)	3,192,990	14.75%	9.14%	23.89%	206,171	234,494	30,300	5,109	476,074	2,090,235	0
2040	31,811,419	20,421,271	155.8%	(11,390,148)	3,269,593	0.19%	9.19%	9.38%	3,119	3,093	0	4,250	10,462	2,085,624	0
2041	32,003,567	19,772,369	161.9%	(12,231,198)	3,349,104	0.15%	9.23%	9.38%	2,523	2,502	0	3,349	8,374	2,073,472	0
2042	32,220,543	19,085,708	168.8%	(13,134,835)	3,431,102	0.12%	9.26%	9.38%	2,067	2,050	0	2,402	6,519	2,052,889	0
2043	32,473,140	18,370,562	176.8%	(14,102,578)	3,530,182	0.08%	9.28%	9.36%	1,419	1,407	0	2,118	4,944	2,025,256	0
2044	32,771,570	17,627,087	185.9%	(15,144,483)	3,630,726	0.06%	9.30%	9.36%	1,094	1,085	0	1,452	3,631	1,985,697	0
2045	33,131,835	16,868,565	196.4%	(16,263,270)	3,732,491	0.05%	9.32%	9.37%	937	930	0	1,120	2,987	1,940,818	0
2046	33,564,699	16,099,675	208.5%	(17,465,024)	3,835,282	0.03%	9.33%	9.36%	578	573	0	767	1,918	1,889,001	0
2047	34,082,265	15,327,056	222.4%	(18,755,209)	3,939,244	0.02%	9.34%	9.36%	396	392	0	788	1,576	1,830,189	0
2048	34,698,782	14,557,874	238.4%	(20,140,908)	4,044,148	0.02%	9.34%	9.36%	406	402	0	404	1,212	1,769,122	0
2049	35,423,864	13,794,868	256.8%	(21,628,996)	4,149,573	0.01%	9.35%	9.36%	208	207	0	415	830	1,704,173	0
2050	36,269,528	13,042,643	278.1%	(23,226,885)	4,256,510	0.01%	9.35%	9.36%	214	212	0	426	852	1,639,176	0
2051	37,245,140	12,302,143	302.8%	(24,942,997)	4,365,118	0.01%	9.35%	9.36%	219	217	0	0	436	1,571,836	0
								Total	**$ 3,437,510**	**$ 3,918,851**	**$ 514,130**	**$ 584,929**			

Pension unfunded liability layered amortization amounts are maintained after the pension trust is projected to be 100% funded.

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Section 3.6A: Table of Projected Actuarial Results ($'s in 000's) (continued)

Fiscal Year End	Valuation Amounts on July 1 (Beginning of FY)					
	Funding Ratio			Unfunded Liability / (Surplus)		
	Pension	Healthcare	Total	Pension	Healthcare	Total
2022	67.9%	125.2%	85.5%	$ 4,953,266	$ (1,724,985)	$ 3,228,281
2023	71.8%	131.7%	90.3%	4,421,186	(2,220,532)	2,200,654
2024	75.2%	137.1%	94.5%	3,931,109	(2,656,117)	1,274,992
2025	78.5%	144.0%	98.9%	3,447,316	(3,198,749)	248,567
2026	82.1%	151.6%	103.8%	2,902,436	(3,805,870)	(903,434)
2027	82.8%	154.7%	105.5%	2,789,764	(4,086,395)	(1,296,631)
2028	83.7%	158.2%	107.3%	2,658,891	(4,388,291)	(1,729,400)
2029	84.6%	161.9%	109.2%	2,508,543	(4,712,268)	(2,203,725)
2030	85.6%	166.1%	111.4%	2,337,173	(5,060,696)	(2,723,523)
2031	86.7%	170.7%	113.8%	2,142,666	(5,435,210)	(3,292,544)
2032	88.0%	175.8%	116.5%	1,922,957	(5,837,712)	(3,914,755)
2033	89.4%	181.5%	119.6%	1,675,797	(6,269,222)	(4,593,425)
2034	91.0%	187.9%	123.0%	1,398,102	(6,732,639)	(5,334,537)
2035	92.9%	195.1%	126.8%	1,087,337	(7,230,259)	(6,142,922)
2036	95.1%	203.1%	131.2%	741,041	(7,765,078)	(7,024,037)
2037	97.6%	212.2%	136.2%	355,919	(8,339,781)	(7,983,862)
2038	100.5%	222.5%	141.8%	(70,737)	(8,955,717)	(9,026,454)
2039	103.9%	234.2%	148.3%	(542,888)	(9,616,616)	(10,159,504)
2040	107.9%	247.4%	155.8%	(1,064,015)	(10,326,133)	(11,390,148)
2041	108.8%	262.5%	161.9%	(1,143,242)	(11,087,956)	(12,231,198)
2042	109.9%	279.6%	168.8%	(1,228,723)	(11,906,112)	(13,134,835)
2043	111.0%	299.1%	176.8%	(1,320,548)	(12,782,030)	(14,102,578)
2044	112.4%	321.5%	185.9%	(1,419,202)	(13,725,281)	(15,144,483)
2045	114.0%	347.0%	196.4%	(1,525,307)	(14,737,963)	(16,263,270)
2046	115.8%	376.0%	208.5%	(1,639,585)	(15,825,439)	(17,465,024)
2047	117.9%	409.0%	222.4%	(1,762,076)	(16,993,133)	(18,755,209)
2048	120.4%	446.5%	238.4%	(1,893,634)	(18,247,274)	(20,140,908)
2049	123.2%	489.1%	256.8%	(2,035,226)	(19,593,770)	(21,628,996)
2050	126.6%	537.5%	278.1%	(2,187,088)	(21,039,797)	(23,226,885)
2051	130.5%	592.8%	302.8%	(2,350,329)	(22,592,668)	(24,942,997)

Pension unfunded liability layered amortization amounts are maintained after the pension trust is projected to be 100% funded.

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Section 3.6B: Table of Projected Actuarial Results ($'s in 000's)

Fiscal Year End	Valuation Amounts on July 1 (Beginning of FY)				Cash Flow Amounts during Following 12 Months										Deferred Asset Gain / (Loss)
						Actuarial Contrib. Rates			DB Contributions						
	Actuarial Assets	Accrued Liability	Funding Ratio	Unfunded Liability / (Surplus)	Total Salaries	DB	DCR	Total	Non-State Employers	State as an Employer	State Assistance	Employee	Total	Benefit Payments	
2022	$ 19,047,864	$ 22,276,145	85.5%	$ 3,228,281	$ 2,406,757	24.01%	6.10%	30.11%	$ 192,141	$ 287,718	$ 97,700	$ 65,405	$ 642,964	$ 1,384,673	$ 2,030,628
2023	20,485,465	22,686,119	90.3%	2,200,654	2,419,276	18.38%	6.41%	24.79%	189,375	221,398	33,933	60,574	505,280	1,452,612	1,422,440
2024	21,759,495	23,034,487	94.5%	1,274,992	2,437,619	19.02%	6.63%	25.65%	188,118	230,844	44,673	56,077	519,712	1,519,487	766,777
2025	23,077,297	23,325,864	98.9%	248,567	2,459,924	17.66%	6.91%	24.57%	186,380	216,299	31,743	51,849	486,271	1,581,069	0
2026	24,457,146	23,553,712	103.8%	(903,434)	2,486,407	16.20%	7.17%	23.37%	185,141	200,553	17,103	48,126	450,923	1,639,102	0
2027	25,019,087	23,722,456	105.5%	(1,296,631)	2,515,962	15.95%	7.42%	23.37%	184,183	199,805	17,307	44,634	445,929	1,691,307	0
2028	25,564,111	23,834,711	107.3%	(1,729,400)	2,551,387	15.70%	7.65%	23.35%	183,830	199,443	17,294	41,406	441,973	1,743,410	0
2029	26,092,076	23,888,351	109.2%	(2,203,725)	2,591,246	15.49%	7.86%	23.35%	183,971	199,848	17,564	38,407	439,790	1,792,657	0
2030	26,606,454	23,882,931	111.4%	(2,723,523)	2,634,091	15.33%	8.06%	23.39%	184,367	201,056	18,384	35,618	439,425	1,841,559	0
2031	27,108,439	23,815,895	113.8%	(3,292,544)	2,680,313	15.20%	8.24%	23.44%	185,180	202,848	19,379	33,314	440,721	1,888,399	0
2032	27,600,920	23,686,165	116.5%	(3,914,755)	2,729,431	15.08%	8.40%	23.48%	186,380	204,935	20,283	19,379	430,977	1,921,262	0
2033	28,086,220	23,492,795	119.6%	(4,593,425)	2,788,219	14.97%	8.55%	23.52%	188,295	207,822	21,279	16,729	434,125	1,962,656	0
2034	28,568,243	23,233,706	123.0%	(5,334,537)	2,849,691	14.89%	8.69%	23.58%	190,443	211,269	22,607	14,248	438,567	1,997,145	0
2035	29,055,213	22,912,291	126.8%	(6,142,922)	2,913,742	14.83%	8.80%	23.63%	193,114	215,146	23,847	11,946	444,053	2,027,268	0
2036	29,553,053	22,529,016	131.2%	(7,024,037)	2,980,267	14.79%	8.91%	23.70%	195,878	219,465	25,439	9,835	450,617	2,052,266	0
2037	30,068,967	22,085,105	136.2%	(7,983,862)	3,048,570	14.75%	9.00%	23.75%	198,989	223,888	26,787	8,231	457,895	2,073,075	0
2038	30,609,336	21,582,882	141.8%	(9,026,454)	3,119,617	0.34%	9.08%	9.42%	5,326	5,281	0	6,551	17,158	2,084,652	0
2039	30,720,192	21,027,265	146.1%	(9,692,927)	3,192,990	0.26%	9.14%	9.40%	4,168	4,134	0	5,109	13,411	2,090,235	0
2040	30,829,839	20,421,271	151.0%	(10,408,568)	3,269,593	0.19%	9.19%	9.38%	3,119	3,093	0	4,250	10,462	2,085,624	0
2041	30,949,547	19,772,369	156.5%	(11,177,178)	3,349,104	0.15%	9.23%	9.38%	2,523	2,502	0	3,349	8,374	2,073,472	0
2042	31,088,736	19,085,708	162.9%	(12,003,028)	3,431,102	0.12%	9.26%	9.38%	2,067	2,050	0	2,402	6,519	2,052,889	0
2043	31,257,806	18,370,562	170.2%	(12,887,244)	3,530,182	0.08%	9.28%	9.36%	1,419	1,407	0	2,118	4,944	2,025,256	0
2044	31,466,545	17,627,087	178.5%	(13,839,458)	3,630,726	0.06%	9.30%	9.36%	1,094	1,085	0	1,452	3,631	1,985,697	0
2045	31,730,499	16,868,565	188.1%	(14,861,934)	3,732,491	0.05%	9.32%	9.37%	937	930	0	1,120	2,987	1,940,818	0
2046	32,059,944	16,099,675	199.1%	(15,960,269)	3,835,282	0.03%	9.33%	9.36%	578	573	0	767	1,918	1,889,001	0
2047	32,466,459	15,327,056	211.8%	(17,139,403)	3,939,244	0.02%	9.34%	9.36%	396	392	0	788	1,576	1,830,189	0
2048	32,963,730	14,557,874	226.4%	(18,405,856)	4,044,148	0.02%	9.34%	9.36%	406	402	0	404	1,212	1,769,122	0
2049	33,560,765	13,794,868	243.3%	(19,765,897)	4,149,573	0.01%	9.35%	9.36%	208	207	0	415	830	1,704,173	0
2050	34,268,932	13,042,643	262.7%	(21,226,289)	4,256,510	0.01%	9.35%	9.36%	214	212	0	426	852	1,639,176	0
2051	35,096,900	12,302,143	285.3%	(22,794,757)	4,365,118	0.01%	9.35%	9.36%	219	217	0	0	436	1,571,836	0
								Total	$ 3,038,459	$ 3,464,822	$ 455,322	$ 584,929			

Pension unfunded liability layered amortization amounts are reduced to zero when the pension trust is projected to be 100% funded. The healthcare unfunded liability amortization amounts would also be reduced to zero since the healthcare trust is currently more than 100% funded.

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Section 3.6B: Table of Projected Actuarial Results ($'s in 000's) (continued)

Fiscal Year End	Valuation Amounts on July 1 (Beginning of FY)					
	Funding Ratio			Unfunded Liability / (Surplus)		
	Pension	Healthcare	Total	Pension	Healthcare	Total
2022	67.9%	125.2%	85.5%	$ 4,953,266	$ (1,724,985)	$ 3,228,281
2023	71.8%	131.7%	90.3%	4,421,186	(2,220,532)	2,200,654
2024	75.2%	137.1%	94.5%	3,931,109	(2,656,117)	1,274,992
2025	78.5%	144.0%	98.9%	3,447,316	(3,198,749)	248,567
2026	82.1%	151.6%	103.8%	2,902,436	(3,805,870)	(903,434)
2027	82.8%	154.7%	105.5%	2,789,764	(4,086,395)	(1,296,631)
2028	83.7%	158.2%	107.3%	2,658,891	(4,388,291)	(1,729,400)
2029	84.6%	161.9%	109.2%	2,508,543	(4,712,268)	(2,203,725)
2030	85.6%	166.1%	111.4%	2,337,173	(5,060,696)	(2,723,523)
2031	86.7%	170.7%	113.8%	2,142,666	(5,435,210)	(3,292,544)
2032	88.0%	175.8%	116.5%	1,922,957	(5,837,712)	(3,914,755)
2033	89.4%	181.5%	119.6%	1,675,797	(6,269,222)	(4,593,425)
2034	91.0%	187.9%	123.0%	1,398,102	(6,732,639)	(5,334,537)
2035	92.9%	195.1%	126.8%	1,087,337	(7,230,259)	(6,142,922)
2036	95.1%	203.1%	131.2%	741,041	(7,765,078)	(7,024,037)
2037	97.6%	212.2%	136.2%	355,919	(8,339,781)	(7,983,862)
2038	100.5%	222.5%	141.8%	(70,737)	(8,955,717)	(9,026,454)
2039	100.6%	234.2%	146.1%	(76,311)	(9,616,616)	(9,692,927)
2040	100.6%	247.4%	151.0%	(82,435)	(10,326,133)	(10,408,568)
2041	100.7%	262.5%	156.5%	(89,222)	(11,087,956)	(11,177,178)
2042	100.8%	279.6%	162.9%	(96,916)	(11,906,112)	(12,003,028)
2043	100.9%	299.1%	170.2%	(105,214)	(12,782,030)	(12,887,244)
2044	101.0%	321.5%	178.5%	(114,177)	(13,725,281)	(13,839,458)
2045	101.1%	347.0%	188.1%	(123,971)	(14,737,963)	(14,861,934)
2046	101.3%	376.0%	199.1%	(134,830)	(15,825,439)	(15,960,269)
2047	101.5%	409.0%	211.8%	(146,270)	(16,993,133)	(17,139,403)
2048	101.7%	446.5%	226.4%	(158,582)	(18,247,274)	(18,405,856)
2049	102.0%	489.1%	243.3%	(172,127)	(19,593,770)	(19,765,897)
2050	102.3%	537.5%	262.7%	(186,492)	(21,039,797)	(21,226,289)
2051	102.6%	592.8%	285.3%	(202,089)	(22,592,668)	(22,794,757)

Pension unfunded liability layered amortization amounts are reduced to zero when the pension trust is projected to be 100% funded. The healthcare unfunded liability amortization amounts would also be reduced to zero since the healthcare trust is currently more than 100% funded.

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Section 3.7: Projected Pension Benefit Recipients and Amounts ($'s in 000's)

Fiscal Year End	Pension		Fiscal Year End	Pension	
	Recipient Counts	Benefit Amounts		Recipient Counts	Benefit Amounts
2022	37,717	$ 974,479	2064	4,967	$ 433,043
2023	39,219	1,023,259	2065	4,396	395,909
2024	40,483	1,070,386	2066	3,878	360,533
2025	41,478	1,114,086	2067	3,411	326,935
2026	42,213	1,154,914	2068	2,989	295,126
2027	42,715	1,194,307	2069	2,609	265,117
2028	42,995	1,232,455	2070	2,268	236,912
2029	43,078	1,267,441	2071	1,962	210,515
2030	43,000	1,300,547	2072	1,690	185,925
2031	42,776	1,330,695	2073	1,447	163,136
2032	42,387	1,345,678	2074	1,232	142,139
2033	41,884	1,368,593	2075	1,042	122,918
2034	41,242	1,387,229	2076	876	105,446
2035	40,483	1,401,876	2077	731	89,683
2036	39,591	1,413,159	2078	604	75,579
2037	38,627	1,420,047	2079	496	63,070
2038	37,549	1,421,411	2080	403	52,079
2039	36,347	1,417,753	2081	325	42,522
2040	35,040	1,407,945	2082	259	34,303
2041	33,642	1,393,880	2083	204	27,322
2042	32,180	1,374,647	2084	159	21,469
2043	30,677	1,350,546	2085	122	16,633
2044	29,118	1,322,273	2086	93	12,693
2045	27,551	1,289,338	2087	70	9,539
2046	25,964	1,252,998	2088	52	7,052
2047	24,386	1,213,386	2089	38	5,130
2048	22,812	1,171,109	2090	28	3,669
2049	21,266	1,126,517	2091	20	2,583
2050	19,762	1,080,001	2092	14	1,789
2051	18,303	1,032,106	2093	11	1,222
2052	16,890	983,276	2094	7	826
2053	15,533	933,864	2095	5	553
2054	14,234	884,229	2096	4	370
2055	12,998	834,705	2097	3	249
2056	11,828	785,605	2098	2	170
2057	10,728	737,196	2099	2	118
2058	9,699	689,711	2100	1	85
2059	8,741	643,344	2101	1	62
2060	7,853	598,258	2102	1	48
2061	7,035	554,586	2103	1	38
2062	6,283	512,440	2104	0	0
2063	5,594	471,903	2105	0	0

Counts include retirees, disabilitants, and beneficiaries.

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Section 4: Member Data

Section 4.1: Summary of Members Included

As of June 30	2017	2018	2019	2020	2021
Active Members					
1. Number	14,719	13,434	12,152	11,033	9,888[1]
2. Average Age	52.10	52.52	52.84	53.21	53.51
3. Average Credited Service	16.57	17.21	17.80	18.38	18.96
4. Average Entry Age	35.53	35.30	35.04	34.83	34.55
5. Average Annual Earnings	$ 76,902	$ 77,813	$ 82,192	$ 83,757	$ 86,316
6. Number Vested	14,314	13,103	11,868	10,791	9,675
7. Percent Who Are Vested	97.2%	97.5%	97.7%	97.8%	97.8%
Retirees, Disabilitants, and Beneficiaries					
1. Number	34,347	35,454	36,310	37,106	37,717
2. Average Age	69.42	69.85	70.29	70.77	71.17
3. Average Years Since Retirement	11.71	11.87	12.14	12.45	12.66
4. Average Monthly Pension Benefit					
a. Base	$ 1,574	$ 1,616	$ 1,660	$ 1,704	$ 1,752
b. COLA[2]	93	94	92	93	94
c. PRPA[2]	230	222	241	244	230
d. Adjustment	1	1	1	0	0
e. Total	$ 1,898	$ 1,933	$ 1,994	$ 2,041	$ 2,076
Vested Terminations (vested at termination, not refunded contributions, or commenced benefit)					
1. Number	5,962	5,660	5,499	5,327	5,135
2. Average Age	52.45	52.56	53.06	53.52	53.92
3. Average Monthly Pension Benefit	$ 1,080	$ 1,087	$ 1,123	$ 1,158	$ 1,205
Non-Vested Terminations (not vested at termination, not refunded contributions)					
1. Number	11,506	11,192	10,921	10,642	10,432
2. Average Account Balance	$ 6,462	$ 6,558	$ 6,923	$ 7,060	$ 7,325
Total Number of Members	**66,534**	**65,740**	**64,882**	**64,108**	**63,172**

[1] Includes 4,643 male active members and 5,245 female active members.

[2] Calculated by taking the average of the data field, as provided by the State of Alaska, for all participants in the group.

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Summary of Members Included

As of June 30, 2021	DB Tier 1	DB Tier 2	DB Tier 3	DB Total	DCR Tier 4	Grand Total
Active Members						
1. Number	622	2,219	7,047	9,888	23,933	33,821
2. Average Age	63.38	56.77	51.61	53.51	41.26	44.84
3. Average Credited Service	23.72	23.30	17.17	18.96	4.93	9.03
4. Average Entry Age	39.66	33.47	34.44	34.55	36.33	35.81
5. Annual Earnings						
a. Total (000's)	$ 49,598	$ 198,403	$ 605,488	$ 853,489	$ 1,530,905	$ 2,384,394
b. Average	$ 79,740	$ 89,411	$ 85,921	$ 86,316	$ 63,966	$ 70,500

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

As of June 30, 2021	Tier 1	Tier 2	Tier 3	Total
Retirees, Disabilitants, and Beneficiaries				
1. Number	23,077	9,340	5,300	37,717
2. Average Age	72.84	69.13	67.42	71.17
3. Average Years Since Retirement	15.90	8.64	5.59	12.66
4. Average Monthly Pension Benefit				
a. Base	$ 1,766	$ 1,913	$ 1,405	$ 1,752
b. COLA	119	59	46	94
c. PRPA	325	100	43	230
d. Adjustment	0	1	1	0
e. Total	$ 2,210	$ 2,073	$ 1,495	$ 2,076

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Summary of Members Included

As of June 30, 2021	Active Members	Inactive Members				
		Retirees	Covered Spouses	Covered Children / Dependents	Deferred	Total Inactive Members
Retiree Medical Participants						
1. Retiree Coverage Only	9,817	19,421	0	0	2,153	21,574
2. Retiree + Spouse	0	12,647	12,647	0	3,281	28,575
3. Retiree + Children / Dependents	0	413	0	412	0	825
4. Family	0	773	773	1,112	0	2,658
5. Total	9,817	33,254	13,420	1,524	5,434	53,632

As of June 30, 2021	Retirees	Covered Spouses	Covered Children / Dependents	Deferred	Total Inactive Members
Retiree Medical Participants					
1. Pre-Medicare	7,134	4,641	1,524	5,260	18,559
2. Medicare Part A & B	25,889	8,730	0	174	34,793
3. Medicare Part B Only	231	49	0	0	280
4. Total	33,254	13,420	1,524	5,434	53,632

As of June 30, 2021	Retirees
Summary of Retiree Medical Data Received	
1. Retiree records on pension data	37,717
2. Remove duplicates on pension data	(1,163)
3. Valued in a different retiree healthcare plan[1]	(1,146)
4. Records without medical coverage	(2,305)
5. Medical only retirees	151
6. Total	33,254

[1] Each member's retiree medical benefits are valued in the plan indicated in the data from Aetna

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Summary of Members Included

Active Members – DB Only

As of June 30	2017	2018	2019	2020	2021
Peace Officer / Firefighter					
1. Number	1,606	1,507	1,382	1,266	1,137 [1]
2. Average Age	47.22	47.75	48.25	48.74	49.18
3. Average Credited Service	17.41	18.15	18.90	19.45	20.15
4. Average Entry Age	29.81	29.60	29.35	29.29	29.03
5. Average Annual Earnings	$ 106,987	$ 108,580	$ 120,089	$ 123,436	$ 127,327
6. Number Vested	1,599	1,500	1,374	1,260	1,134
7. Percent Who Are Vested	99.6%	99.5%	99.4%	99.5%	99.7%
Others					
1. Number	13,113	11,927	10,770	9,767	8,751 [2]
2. Average Age	52.70	53.12	53.43	53.79	54.07
3. Average Credited Service	16.47	17.09	17.66	18.24	18.80
4. Average Entry Age	36.23	36.03	35.77	35.55	35.27
5. Average Annual Earnings	$ 73,218	$ 73,926	$ 77,329	$ 78,613	$ 80,987
6. Number Vested	12,715	11,603	10,494	9,531	8,541
7. Percent Who Are Vested	97.0%	97.3%	97.4%	97.6%	97.6%
Total					
1. Number	14,719	13,434	12,152	11,033	9,888
2. Average Age	52.10	52.52	52.84	53.21	53.51
3. Average Credited Service	16.57	17.21	17.80	18.38	18.96
4. Average Entry Age	35.53	35.30	35.04	34.83	34.55
5. Average Annual Earnings	$ 76,902	$ 77,813	$ 82,192	$ 83,757	$ 86,316
6. Number Vested	14,314	13,103	11,868	10,791	9,675
7. Percent Who Are Vested	97.2%	97.5%	97.7%	97.8%	97.8%

Average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

[1] Includes 975 male active members and 162 female active members.

[2] Includes 3,668 male active members and 5,083 female active members.

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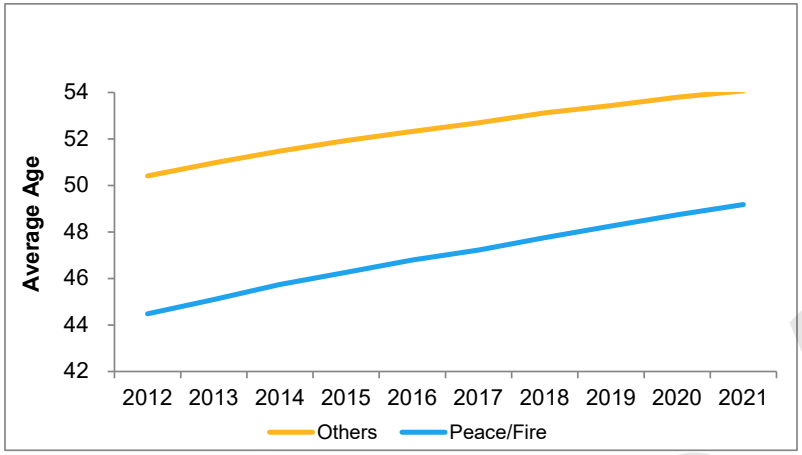
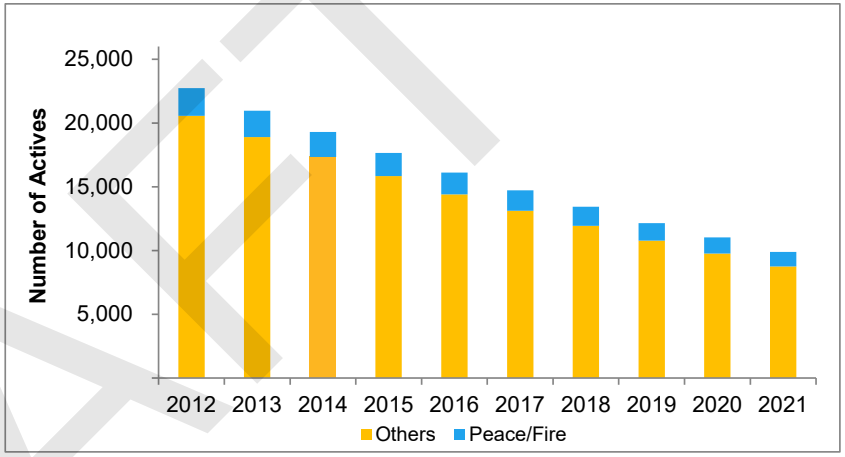
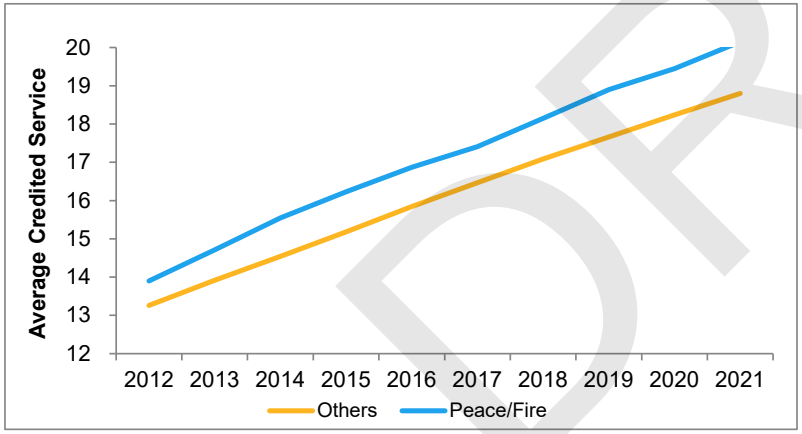
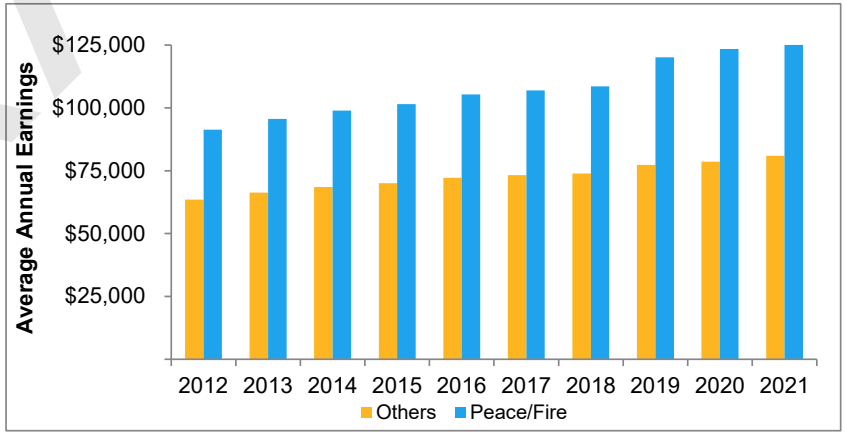
Summary of Members Included - Active Members at June 30









Average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

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Section 4.2: Age and Service Distribution of Active Members

Peace Officer / Firefighter

Annual Earnings by Age

Age	Number	Total Annual Earnings	Average Annual Earnings
0 - 19	0	$ 0	$ 0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	1	149,735	149,735
35 - 39	82	10,000,382	121,956
40 - 44	211	27,523,104	130,441
45 - 49	342	44,289,542	129,502
50 - 54	298	38,709,607	129,898
55 - 59	154	18,406,191	119,521
60 - 64	39	4,580,412	117,446
65 - 69	9	1,003,897	111,544
70 - 74	0	0	0
75+	1	108,235	108,235
Total	**1,137**	**$ 144,771,105**	**$ 127,327**

Annual Earnings by Credited Service

Years of Service	Number	Total Annual Earnings	Average Annual Earnings
0	0	$ 0	$ 0
1	0	0	0
2	2	112,128	56,064
3	0	0	0
4	1	72,120	72,120
0 - 4	**3**	**$ 184,248**	**$ 61,416**
5 - 9	14	1,250,847	89,346
10 - 14	64	6,186,036	96,657
15 - 19	520	64,179,398	123,422
20 - 24	372	50,328,887	135,293
25 - 29	137	19,319,401	141,018
30 - 34	24	2,885,555	120,231
35 - 39	1	201,624	201,624
40+	2	235,109	117,555
Total	**1,137**	**$ 144,771,105**	**$ 127,327**

Years of Credited Service by Age

	Years of Service									
Age	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35 - 39**	**40+**	**Total**
0 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0
30 - 34	0	0	0	1	0	0	0	0	0	1
35 - 39	0	6	10	65	1	0	0	0	0	82
40 - 44	1	3	11	143	52	1	0	0	0	211
45 - 49	1	1	12	145	143	40	0	0	0	342
50 - 54	0	2	15	87	124	64	6	0	0	298
55 - 59	1	2	11	64	44	23	9	0	0	154
60 - 64	0	0	4	12	7	8	7	0	1	39
65 - 69	0	0	1	3	1	1	2	1	0	9
70 - 74	0	0	0	0	0	0	0	0	0	0
75+	0	0	0	0	0	0	0	0	1	1
Total	**3**	**14**	**64**	**520**	**372**	**137**	**24**	**1**	**2**	**1,137**

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

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Age and Service Distribution of Active Members

Others

Annual Earnings by Age

Age	Number	Total Annual Earnings	Average Annual Earnings
0 - 19	0	$ 0	$ 0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	21	1,707,881	81,328
35 - 39	381	29,552,174	77,565
40 - 44	946	78,062,108	82,518
45 - 49	1,375	116,242,301	84,540
50 - 54	1,770	149,031,703	84,199
55 - 59	2,222	178,695,225	80,421
60 - 64	1,345	103,071,893	76,633
65 - 69	513	39,229,659	76,471
70 - 74	143	10,647,337	74,457
75+	35	2,477,974	70,799
Total	**8,751**	**$ 708,718,255**	**$ 80,987**

Annual Earnings by Credited Service

Years of Service	Number	Total Annual Earnings	Average Annual Earnings
0	14	$ 610,926	$ 43,638
1	21	950,377	45,256
2	51	2,731,908	53,567
3	51	2,643,493	51,833
4	55	3,225,895	58,653
0 - 4	**192**	**$ 10,162,599**	**$ 52,930**
5 - 9	478	29,009,387	60,689
10 - 14	1,287	86,078,633	66,883
15 - 19	3,388	273,611,478	80,759
20 - 24	2,024	179,443,910	88,658
25 - 29	982	92,070,037	93,758
30 - 34	310	29,705,129	95,823
35 - 39	69	6,757,881	97,940
40+	21	1,879,201	89,486
Total	**8,751**	**$ 708,718,255**	**$ 80,987**

Years of Credited Service by Age

	Years of Service									
Age	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+	Total
0 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0
30 - 34	1	6	11	3	0	0	0	0	0	21
35 - 39	26	45	114	193	3	0	0	0	0	381
40 - 44	34	74	191	532	114	1	0	0	0	946
45 - 49	33	86	201	611	377	66	1	0	0	1,375
50 - 54	36	96	227	642	500	225	44	0	0	1,770
55 - 59	28	83	293	722	565	401	118	12	0	2,222
60 - 64	21	55	175	467	323	186	89	27	2	1,345
65 - 69	11	21	55	167	111	83	44	15	6	513
70 - 74	2	11	16	38	23	18	13	11	11	143
75+	0	1	4	13	8	2	1	4	2	35
Total	**192**	**478**	**1,287**	**3,388**	**2,024**	**982**	**310**	**69**	**21**	**8,751**

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

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Section 4.3: Member Data Reconciliation

Pension

		Inactive Members					
	Active Members	Due a Refund	Deferred Benefits	Retired Members	Disabled Members	Bene-ficiaries	Total
As of June 30, 2020	**11,033**	**10,642**	**5,327**	**32,536 ***	**149**	**4,436**	**64,123**
Vested Terminations	(366)	(8)	376	0	(2)	0	0
Non-Vested Terminations	(37)	37	0	0	0	0	0
Refund of Contributions	(10)	(152)	(31)	0	0	(6)	(199)
Disability Retirements	(12)	0	(6)	0	18	0	0
Age Retirements	(873)	(17)	(406)	1,316	(20)	0	0
Deaths With Beneficiary	(15)	1	(10)	(357)	(3)	384	0
Deaths Without Beneficiary	(13)	(26)	(7)	(469)	(3)	(266)	(784)
Expired Benefits	(2)	0	0	0	0	(3)	(5)
Data Corrections	0	(7)	(5)	1	0	(18)	(29)
Converted To DCR Plan	0	0	0	0	0	0	0
Transfers In/Out	2	0	(2)	(3)	0	(1)	(4)
Rehires	177	(62)	(102)	(12)	0	0	1
Pick Ups***	4	24	1	3	0	52	84
Net Change	**(1,145)**	**(210)**	**(192)**	**479**	**(10)**	**142**	**(936)**
As of June 30, 2021	**9,888**	**10,432**	**5,135**	**33,015 ** **	**139**	**4,578**	**63,187**

* Includes 15 medical only retirees
** Includes 15 medical only retirees
*** Pickup beneficiaries are primarily new DROs.

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Member Data Reconciliation

Healthcare

		Inactive Members				
	Active Members	Retirees	Covered Spouses	Covered Children / Dependents	Deferred	Total Inactive Members
As of June 30, 2020	**10,908**	**32,857**	**13,323**	**1,493**	**5,591**	**53,264**
Vested Terminations	(340)	0	0	0	340	340
Non-Vested Terminations	(36)	0	0	0	0	0
Refund of Contributions	(10)	0	0	0	(27)	(27)
Disability Retirements	(12)	12	8	1	0	21
Age Retirements	(757)	757	386	118	0	1,261
Deferred Retirements	0	286	143	32	(286)	175
Retired without Medical Coverage	(86)	0	0	0	86	86
Deceased	(25)	(913)	(91)	(13)	(27)	(1,044)
New Beneficiaries	0	153	(153)	0	0	0
Added Retiree Medical Coverage	0	113	46	5	(113)	51
Added Dependent Coverage	0	0	110	83	0	193
Dropped Retiree Medical Coverage	0	(12)	(4)	(4)	12	(8)
Dropped Dependent Coverage	0	0	(345)	(190)	0	(535)
Rehires	177	(12)	(3)	(2)	(142)	(159)
Transfers In/Out	(2)	13	0	1	0	14
Net Change	**(1,091)**	**397**	**97**	**31**	**(157)**	**368**
As of June 30, 2021	**9,817**	**33,254**	**13,420**	**1,524**	**5,434**	**53,632**

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Section 4.4: Schedule of Active Member Data

Peace Officer / Firefighter

Valuation Date	Number	Annual Earnings (000's)	Annual Average Earnings	Percent Increase in Average Earnings	Number of Participating Employers
June 30, 2021	1,137	$ 144,771	$ 127,327	3.2%	151
June 30, 2020	1,266	156,271	123,436	2.8%	153
June 30, 2019	1,382	165,963	120,089	10.6%	155
June 30, 2018	1,507	163,630	108,580	1.5%	155
June 30, 2017	1,606	171,821	106,987	1.6%	155
June 30, 2016	1,704	179,461	105,317	3.8%	155
June 30, 2015	1,827	185,350	101,450	2.5%	159
June 30, 2014	1,958	193,737	98,946	3.4%	159
June 30, 2013	2,065	197,534	95,658	4.8%	159
June 30, 2012	2,164	197,544	91,287	4.1%	160

Others

Valuation Date	Number	Annual Earnings (000's)	Annual Average Earnings	Percent Increase in Average Earnings	Number of Participating Employers
June 30, 2021	8,751	$ 708,718	$ 80,987	3.0%	151
June 30, 2020	9,767	767,817	78,613	1.7%	153
June 30, 2019	10,770	832,832	77,329	4.6%	155
June 30, 2018	11,927	881,716	73,926	1.0%	155
June 30, 2017	13,113	960,106	73,218	1.4%	155
June 30, 2016	14,401	1,039,960	72,214	3.2%	155
June 30, 2015	15,833	1,108,218	69,994	2.1%	159
June 30, 2014	17,339	1,188,918	68,569	3.4%	159
June 30, 2013	18,890	1,252,786	66,320	4.5%	159
June 30, 2012	20,566	1,305,337	63,471	4.6%	160

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

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Section 4.5: Active Member Payroll Reconciliation

Payroll Field	Payroll Data (000's)
a) DRB actual reported salaries FY21 in employer list	$ 2,242,794
b) DRB actual reported salaries FY21 in valuation data	2,186,265
c) Annualized valuation data	2,384,394
d) Valuation payroll as of June 30, 2021	2,480,990
e) Rate payroll for FY22	2,406,757
f) Rate payroll for FY24	2,437,619

a) Actual reported salaries from DRB employer listing showing all payroll paid during FY21, including those who were not active as of June 30, 2021
b) Payroll from valuation data for people who are in active status as of June 30, 2021
c) Payroll from (b) annualized for both new entrants and part-timers
d) Payroll from (c) with one year of salary scale applied to estimate salaries payable for the upcoming year
e) Payroll from (d) with the part-timer annualization removed
f) Payroll from (e) with two years of assumed decrements and salary scale, and 0% population growth

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Section 4.6: Summary of New Pension Benefit Recipients

Peace Officer / Firefighter

During the Year Ending June 30	2017	2018	2019	2020	2021
Service					
1. Number	119	105	109	118	129
2. Average Age at Commencement	56.65	55.70	55.61	55.52	55.30
3. Average Monthly Pension Benefit	$ 4,166	$ 4,519	$ 4,412	$ 5,199	$ 5,248
Survivor (including surviving spouse and DROs)					
1. Number	42	44	36	43	58
2. Average Age at Commencement	62.88	63.76	68.19	67.92	64.58
3. Average Monthly Pension Benefit	$ 1,797	$ 2,187	$ 1,842	$ 1,785	$ 1,971
Disability					
1. Number	4	4	4	3	4
2. Average Age at Commencement	49.33	46.56	50.44	51.72	52.10
3. Average Monthly Pension Benefit	$ 2,427	$ 3,230	$ 3,071	$ 5,276	$ 2,890
Total					
1. Number	165	153	149	164	191
2. Average Age at Commencement	58.06	57.78	58.51	58.70	58.05
3. Average Monthly Pension Benefit	$ 3,521	$ 3,814	$ 3,755	$ 4,305	$ 4,204

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Summary of New Pension Benefit Recipients

Peace Officer / Firefighter

	Years of Credited Service						
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+
Period 7/1/2020 – 6/30/2021:							
Average Monthly Pension	$ 2,612	$ 767	$ 1,619	$ 3,711	$ 5,196	$ 6,960	$ 7,970
Number of Recipients	2	5	9	26	42	40	9
Period 7/1/2019 – 6/30/2020:							
Average Monthly Pension	$ 0	$ 694	$ 2,212	$ 3,626	$ 5,531	$ 6,829	$ 8,636
Number of Recipients	0	6	11	23	40	32	9
Period 7/1/2018 – 6/30/2019:							
Average Monthly Pension	$ 0	$ 651	$ 1,933	$ 3,362	$ 4,786	$ 6,196	$ 5,688
Number of Recipients	0	5	11	25	38	26	6
Period 7/1/2017 – 6/30/2018:							
Average Monthly Pension	$ 0	$ 1,063	$ 2,133	$ 3,747	$ 4,847	$ 6,024	$ 7,717
Number of Recipients	0	4	18	19	35	30	3
Period 7/1/2016 – 6/30/2017:							
Average Monthly Pension	$ 0	$ 686	$ 2,075	$ 3,234	$ 4,462	$ 5,151	$ 6,376
Number of Recipients	0	8	9	28	41	23	14
Period 7/1/2015 – 6/30/2016:							
Average Monthly Pension	$ 0	$ 958	$ 1,742	$ 3,347	$ 4,622	$ 5,778	$ 7,221
Number of Recipients	0	6	11	19	30	28	16
Period 7/1/2014 – 6/30/2015:							
Average Monthly Pension	$ 0	$ 1,173	$ 1,621	$ 3,632	$ 4,436	$ 5,457	$ 6,863
Number of Recipients	0	8	9	26	24	25	7
Period 7/1/2013 – 6/30/2014:							
Average Monthly Pension	$ 290	$ 1,423	$ 2,002	$ 2,902	$ 4,014	$ 5,464	$ 6,299
Number of Recipients	1	9	10	14	22	16	7
Period 7/1/2012 – 6/30/2013:							
Average Monthly Pension	$ 0	$ 865	$ 1,779	$ 2,762	$ 3,793	$ 4,983	$ 4,911
Number of Recipients	0	9	8	19	31	18	4
Period 7/1/2011 – 6/30/2012:							
Average Monthly Pension	$ 0	$ 1,159	$ 1,161	$ 3,142	$ 3,504	$ 4,673	$ 5,079
Number of Recipients	0	13	13	12	20	17	7

"Average Monthly Pension" includes postretirement pension adjustments and cost-of-living increases.

Beneficiaries are not included in the table above.

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Summary of New Pension Benefit Recipients

Others

During the Year Ending June 30	2017	2018	2019	2020	2021
Service					
1. Number	1,393	1,419	1,288	1,166	1,171
2. Average Age at Commencement	61.40	62.19	61.38	61.70	62.03
3. Average Monthly Pension Benefit	$ 2,404	$ 2,477	$ 2,540	$ 2,701	$ 2,693
Survivor (including surviving spouse and DROs)					
1. Number	292	261	238	297	391
2. Average Age at Commencement	67.12	70.38	69.25	72.09	72.34
3. Average Monthly Pension Benefit	$ 1,150	$ 1,120	$ 1,249	$ 1,204	$ 1,265
Disability					
1. Number	14	28	17	9	14
2. Average Age at Commencement	52.43	53.80	52.95	54.21	53.39
3. Average Monthly Pension Benefit	$ 2,405	$ 1,896	$ 2,313	$ 2,422	$ 2,587
Total					
1. Number	1,699	1,708	1,543	1,472	1,576
2. Average Age at Commencement	62.31	63.31	62.50	63.75	64.51
3. Average Monthly Pension Benefit	$ 2,189	$ 2,260	$ 2,339	$ 2,397	$ 2,338

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Summary of New Pension Benefit Recipients

Others

	Years of Credited Service						
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+
Period 7/1/2020 – 6/30/2021:							
Average Monthly Pension	$ 553	$ 628	$ 1,317	$ 2,213	$ 3,091	$ 4,607	$ 6,054
Number of Recipients	17	163	228	281	194	188	114
Period 7/1/2019 – 6/30/2020:							
Average Monthly Pension	$ 492	$ 601	$ 1,311	$ 2,065	$ 3,040	$ 4,686	$ 6,213
Number of Recipients	32	165	218	258	183	197	122
Period 7/1/2018 – 6/30/2019:							
Average Monthly Pension	$ 652	$ 646	$ 1,301	$ 2,071	$ 3,058	$ 4,596	$ 5,685
Number of Recipients	21	190	266	289	222	205	105
Period 7/1/2017 – 6/30/2018:							
Average Monthly Pension	$ 414	$ 607	$ 1,299	$ 1,982	$ 3,034	$ 4,475	$ 6,085
Number of Recipients	26	221	351	280	223	214	127
Period 7/1/2016 – 6/30/2017:							
Average Monthly Pension	$ 381	$ 640	$ 1,271	$ 2,067	$ 3,119	$ 4,579	$ 6,224
Number of Recipients	27	254	375	233	212	191	115
Period 7/1/2015 – 6/30/2016:							
Average Monthly Pension	$ 434	$ 660	$ 1,240	$ 2,017	$ 3,059	$ 4,158	$ 6,583
Number of Recipients	30	323	387	266	192	161	135
Period 7/1/2014 – 6/30/2015:							
Average Monthly Pension	$ 430	$ 685	$ 1,260	$ 2,008	$ 3,086	$ 4,544	$ 6,195
Number of Recipients	42	284	304	213	198	169	98
Period 7/1/2013 – 6/30/2014:							
Average Monthly Pension	$ 503	$ 700	$ 1,189	$ 2,065	$ 3,021	$ 4,439	$ 5,490
Number of Recipients	48	347	319	241	214	224	121
Period 7/1/2012 – 6/30/2013:							
Average Monthly Pension	$ 414	$ 650	$ 1,179	$ 1,925	$ 2,879	$ 4,356	$ 5,208
Number of Recipients	59	349	365	257	206	209	132
Period 7/1/2011 – 6/30/2012:							
Average Monthly Pension	$ 407	$ 610	$ 1,147	$ 1,931	$ 2,805	$ 4,214	$ 5,076
Number of Recipients	67	351	314	204	208	188	106

"Average Monthly Pension" includes postretirement pension adjustments and cost-of-living increases.

Beneficiaries are not included in the table above.

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Section 4.7: Summary of All Pension Benefit Recipients

	Peace Officer / Firefighter	Others
Service		
1. Number as of June 30, 2020	2,931	29,590
2. Net Change During FY21	60	419
3. Number as of June 30, 2021	2,991	30,009
4. Average Age at Commencement	53.21	58.45
5. Average Current Age	68.46	71.24
6. Average Monthly Pension Benefit	$ 3,574	$ 2,057
Survivors (including surviving spouses and DROs)		
1. Number as of June 30, 2020	611	3,825
2. Net Change During FY21	45	97
3. Number as of June 30, 2021	656	3,922
4. Average Age at Commencement	57.93	63.52
5. Average Current Age	69.52	73.48
6. Average Monthly Pension Benefit	$ 1,758	$ 1,120
Disability		
1. Number as of June 30, 2020	26	123
2. Net Change During FY21	0	(10)
3. Number as of June 30, 2021	26	113
4. Average Age at Commencement	46.32	46.10
5. Average Current Age	51.35	55.06
6. Average Monthly Pension Benefit	$ 3,189	$ 1,970
Total		
1. Number as of June 30, 2020	3,568	33,538
2. Net Change During FY21	105	506
3. Number as of June 30, 2021	3,673	34,044
4. Average Age at Commencement	54.00	58.99
5. Average Current Age	68.53	71.44
6. Average Monthly Pension Benefit	$ 3,247	$ 1,949

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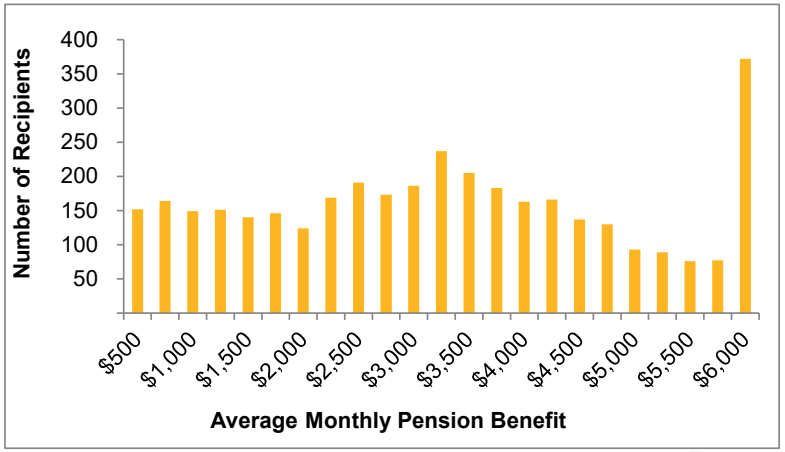
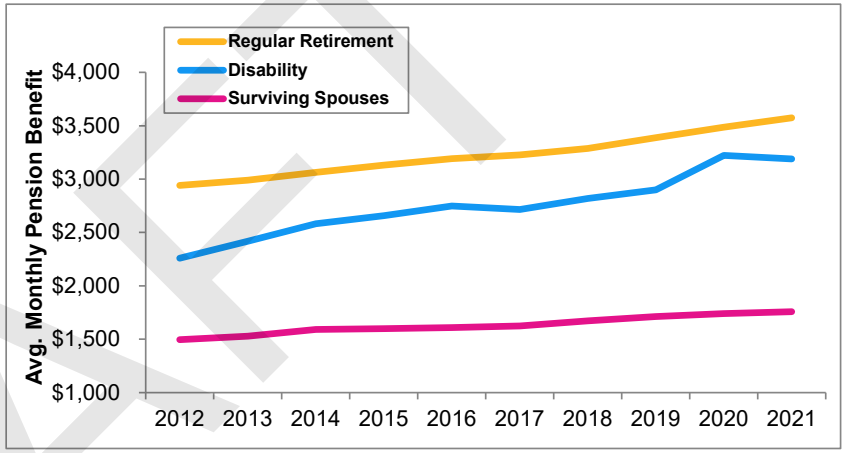
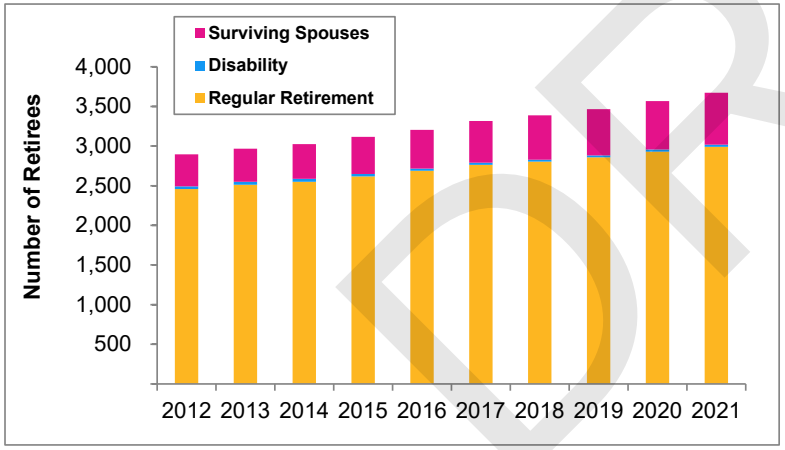
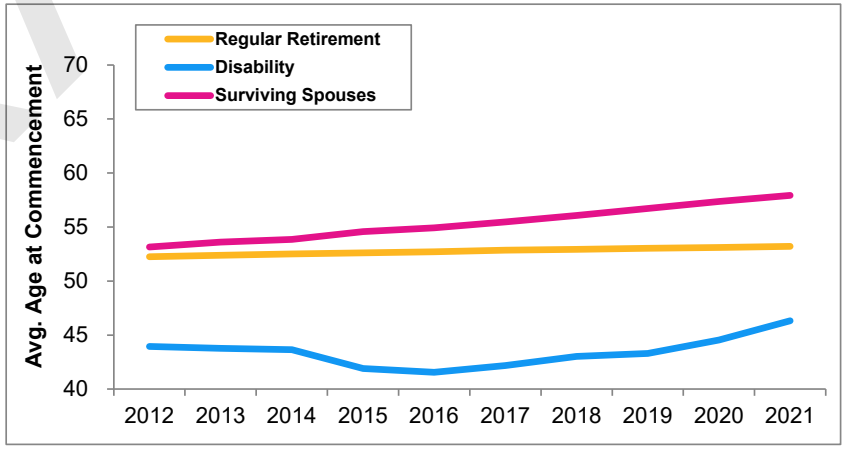
Summary of All Pension Benefit Recipients

Peace Officer / Firefighter









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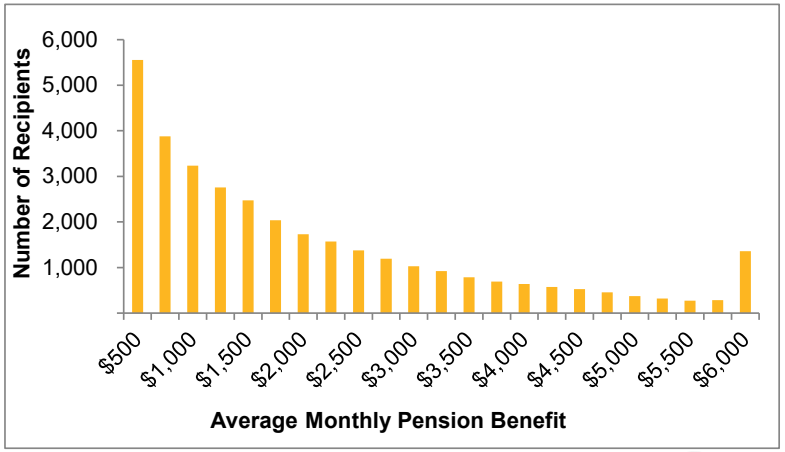
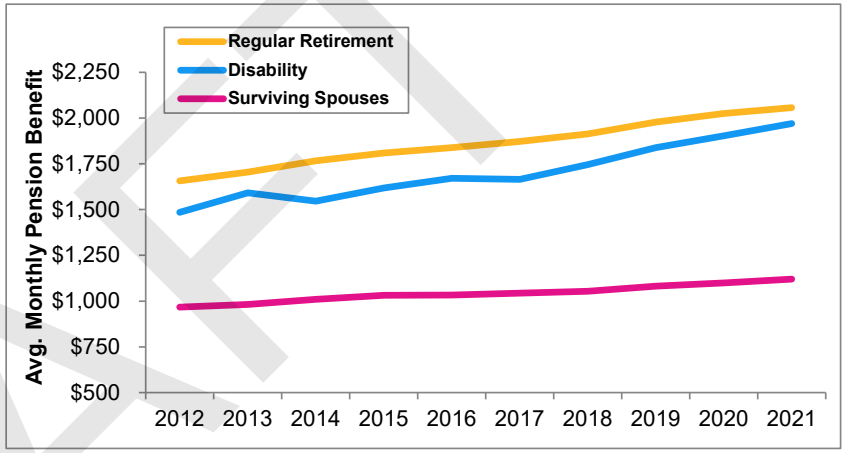
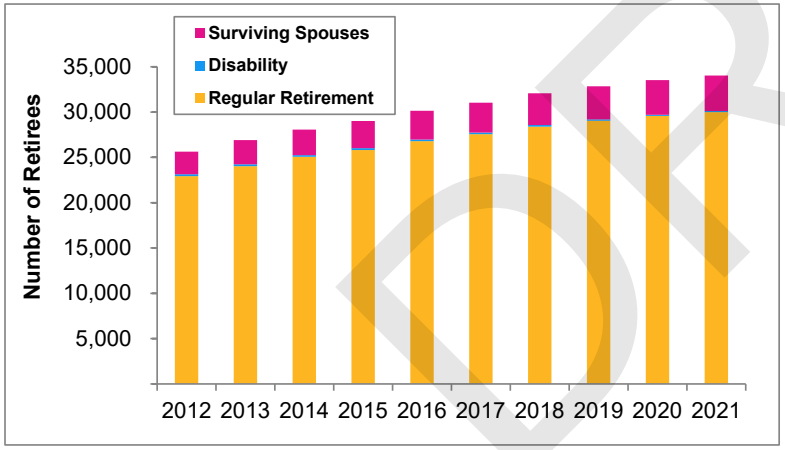
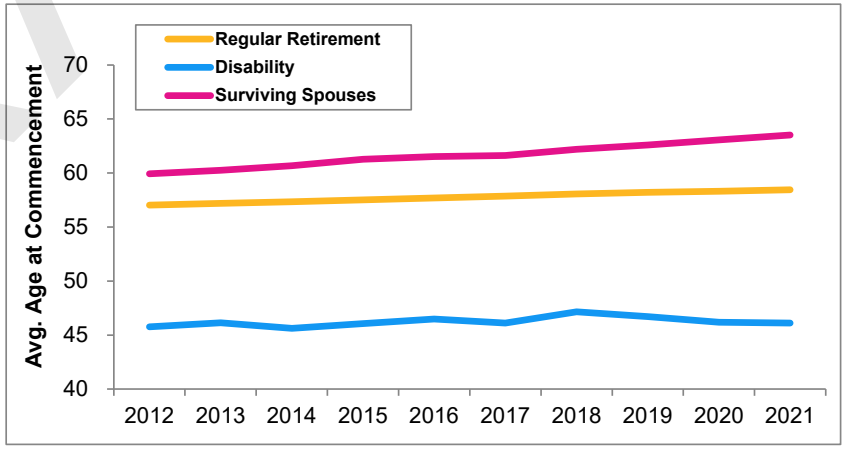
Summary of All Pension Benefit Recipients

Others









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Summary of All Pension Benefit Recipients

Peace Officer / Firefighter

Annual Pension Benefit by Age

Age	Number	Total Annual Pension Benefit	Average Annual Pension Benefit
0 - 19	0	$ 0	$ 0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	1	57,465	57,465
40 - 44	13	583,451	44,881
45 - 49	78	4,380,328	56,158
50 - 54	215	12,336,820	57,381
55 - 59	324	16,323,478	50,381
60 - 64	607	23,982,868	39,510
65 - 69	777	27,706,706	35,659
70 - 74	803	28,357,790	35,315
75+	855	29,388,739	34,373
Total	**3,673**	**$ 143,117,645**	**$ 38,965**

Annual Pension Benefit by Years Since Commenced

Years Since Comm.	Number	Total Annual Pension Benefit	Average Annual Pension Benefit
0	200	$ 10,277,339	$ 51,387
1	155	8,093,071	52,213
2	152	6,797,168	44,718
3	133	6,097,594	45,847
4	169	7,165,651	42,400
0 - 4	**809**	**$ 38,430,823**	**$ 47,504**
5 - 9	581	23,847,931	41,046
10 - 14	545	16,936,288	31,076
15 - 19	630	20,887,127	33,154
20 - 24	621	22,321,128	35,944
25 - 29	203	7,853,908	38,689
30 - 34	212	9,808,110	46,265
35 - 39	45	2,108,485	46,855
40+	27	923,845	34,216
Total	**3,673**	**$ 143,117,645**	**$ 38,965**

Years Since Commencement by Age

	Years Since Commencement									
Age	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+	Total
0 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0
30 - 34	0	0	0	0	0	0	0	0	0	0
35 - 39	1	0	0	0	0	0	0	0	0	1
40 - 44	10	1	2	0	0	0	0	0	0	13
45 - 49	63	14	1	0	0	0	0	0	0	78
50 - 54	153	49	11	0	2	0	0	0	0	215
55 - 59	180	87	39	14	2	2	0	0	0	324
60 - 64	195	148	112	122	30	0	0	0	0	607
65 - 69	92	168	162	200	135	15	2	2	1	777
70 - 74	52	66	162	193	215	74	31	5	5	803
75+	63	48	56	101	237	112	179	38	21	855
Total	**809**	**581**	**545**	**630**	**621**	**203**	**212**	**45**	**27**	**3,673**

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Summary of All Pension Benefit Recipients

Others

Annual Pension Benefit by Age

Age	Number	Total Annual Pension Benefit	Average Annual Pension Benefit
0 - 19	0	$ 0	$ 0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	2	70,193	35,097
35 - 39	5	75,774	15,155
40 - 44	9	130,847	14,539
45 - 49	34	450,340	13,245
50 - 54	158	4,979,060	31,513
55 - 59	1,196	38,955,221	32,571
60 - 64	5,770	162,252,318	28,120
65 - 69	8,778	215,609,089	24,562
70 - 74	8,228	183,341,302	22,283
75+	9,864	190,225,443	19,285
Total	**34,044**	**$ 796,089,587**	**$ 23,384**

Annual Pension Benefit by Years Since Commenced

Years Since Comm.	Number	Total Annual Pension Benefit	Average Annual Pension Benefit
0	1,681	$ 47,044,071	$ 27,986
1	1,416	41,473,469	29,289
2	1,516	42,241,297	27,864
3	1,469	40,628,509	27,657
4	1,617	43,823,763	27,102
0 - 4	**7,699**	**$ 215,211,109**	**$ 27,953**
5 - 9	7,894	200,110,996	25,350
10 - 14	6,483	144,288,042	22,256
15 - 19	5,276	109,883,248	20,827
20 - 24	3,850	76,656,753	19,911
25 - 29	1,381	24,178,292	17,508
30 - 34	1,155	21,111,290	18,278
35 - 39	249	3,779,040	15,177
40+	57	870,817	15,277
Total	**34,044**	**$ 796,089,587**	**$ 23,384**

Years Since Commencement by Age

	Years Since Commencement									
Age	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+	Total
0 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0
30 - 34	1	1	0	0	0	0	0	0	0	2
35 - 39	1	4	0	0	0	0	0	0	0	5
40 - 44	4	3	2	0	0	0	0	0	0	9
45 - 49	17	10	5	2	0	0	0	0	0	34
50 - 54	108	25	15	7	2	1	1	0	0	159
55 - 59	869	248	47	13	14	3	1	0	0	1,195
60 - 64	3,342	1,780	569	51	11	12	4	0	1	5,770
65 - 69	1,924	3,385	2,545	849	55	12	6	2	0	8,778
70 - 74	759	1,671	2,176	2,580	1,005	17	13	5	2	8,228
75+	674	767	1,124	1,774	2,763	1,336	1,130	242	54	9,864
Total	**7,699**	**7,894**	**6,483**	**5,276**	**3,850**	**1,381**	**1,155**	**249**	**57**	**34,044**

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Section 4.8: Pension Benefit Recipients by Type of Benefit and Option Elected

Peace Officer / Firefighter

Amount of Monthly Pension Benefit	Number of Recipients	Type of Pension Benefit			Option Selected				
		1	2	3	1	2	3	4	5
$ 1 – 300	55	16	39	0	42	4	0	2	7
301 – 600	175	110	65	0	97	37	22	7	12
601 – 900	182	100	81	1	109	43	11	12	7
901 – 1,200	167	89	78	0	108	30	16	6	7
1,201 – 1,500	178	111	66	1	105	39	19	6	9
1,501 – 1,800	172	124	48	0	93	45	22	8	4
1,801 – 2,100	156	106	49	1	70	41	33	7	5
2,101 – 2,400	240	177	60	3	113	70	32	12	13
2,401 – 2,700	193	163	26	4	74	63	38	13	5
2,701 – 3,000	228	199	27	2	78	97	34	11	8
3,001 – 3,300	283	249	31	3	98	107	57	12	9
3,301 – 3,600	231	199	29	3	84	92	32	13	10
3,601 – 3,900	206	184	19	3	75	87	30	10	4
3,901 – 4,200	202	191	9	2	64	87	35	12	4
4,200+	1,005	972	30	3	271	479	179	67	9
Total	3,673	2,990	657	26	1,481	1,321	560	198	113

Type of Pension Benefit
1. Regular Retirement
2. Survivor Payment
3. Disability

Option Selected
1. Whole Life Annuity
2. 75% Joint and Contingent Annuity
3. 50% Joint and Contingent Annuity
4. 66 2/3% Joint and Survivor Annuity
5. Level Income Option

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Pension Benefit Recipients by Type of Benefit and Option Elected

Others

Amount of Monthly Pension Benefit	Number of Recipients	Type of Pension Benefit			Option Selected				
		1	2	3	1	2	3	4	5
$ 1 – 300	2,112	1,553	558	1	1,038	386	282	62	344
301 – 600	5,102	4,260	836	6	2,709	1,170	814	256	153
601 – 900	4,240	3,530	700	10	2,238	1,030	675	181	116
901 – 1,200	3,491	3,004	480	7	1,738	843	669	160	81
1,201 – 1,500	2,972	2,587	368	17	1,480	750	563	109	70
1,501 – 1,800	2,378	2,113	254	11	1,103	672	462	84	57
1,801 – 2,100	2,049	1,836	197	16	951	550	396	93	59
2,101 – 2,400	1,759	1,599	149	11	781	504	348	81	45
2,401 – 2,700	1,475	1,357	101	17	648	415	307	57	48
2,701 – 3,000	1,270	1,181	86	3	552	392	254	41	31
3,001 – 3,300	1,084	1,026	56	2	429	352	233	42	28
3,301 – 3,600	918	877	38	3	365	288	202	45	18
3,601 – 3,900	791	762	27	2	313	273	156	34	15
3,901 – 4,200	717	690	27	0	284	229	158	30	16
4,200+	3,686	3,634	45	7	1,269	1,296	865	207	49
Total	34,044	30,009	3,922	113	15,898	9,150	6,384	1,482	1,130

Type of Pension Benefit
1. Regular Retirement
2. Survivor Payment
3. Disability

Option Selected
1. Whole Life Annuity
2. 75% Joint and Contingent Annuity
3. 50% Joint and Contingent Annuity
4. 66 2/3% Joint and Survivor Annuity
5. Level Income Option

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Section 4.9: Pension Benefit Recipients Added to and Removed from Rolls

Peace Officer / Firefighter

Year Ended	Added to Rolls		Removed from Rolls		Rolls at End of Year		Percent Increase in Annual Pension Benefits	Average Annual Pension Benefit
	No.[1]	Annual Pension Benefits[1]	No.[1]	Annual Pension Benefits[1]	No.	Annual Pension Benefits		
June 30, 2021	191	$ 9,635,568	86	$ 2,931,719	3,673	$ 143,117,645	4.9%	$ 38,965
June 30, 2020	164	8,472,240	61	1,078,932	3,568	136,413,796	5.7%	38,233
June 30, 2019	149	6,713,940	71	233,335	3,465	129,020,488	5.3%	37,235
June 30, 2018	153	7,002,504	81	2,573,694	3,387	122,539,883	3.7%	36,179
June 30, 2017	165	6,971,580	54	2,132,027	3,315	118,111,073	4.3%	35,629
June 30, 2016	137	6,618,744	49	1,594,394	3,204	113,271,520	4.6%	35,353
June 30, 2015	136	5,617,344	46	633,046	3,116	108,247,168	4.8%	34,739
June 30, 2014	109	4,270,620	50	(145,771)	3,026	103,262,870	4.5%	34,125
June 30, 2013	113	4,162,920	42	240,775	2,967	98,846,479	4.1%	33,315
June 30, 2012	179	5,246,271	41	(177,568)	2,896	94,924,334	6.1%	32,778

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[1] Numbers are estimated, and include other internal transfers.

Pension Benefit Recipients Added to and Removed from Rolls

Others

Year Ended	Added to Rolls		Removed from Rolls		Rolls at End of Year		Percent Increase in Annual Pension Benefits	Average Annual Pension Benefit
	No.[1]	Annual Pension Benefits[1]	No.[1]	Annual Pension Benefits[1]	No.	Annual Pension Benefits		
June 30, 2021	1,576	$ 44,216,256	1,070	$ 20,522,550	34,044	$ 796,089,587	3.1%	$ 23,384
June 30, 2020	1,472	42,340,608	779	9,911,423	33,538	772,395,881	4.4%	23,030
June 30, 2019	1,543	43,301,707	765	3,096,594	32,845	739,966,696	5.7%	22,529
June 30, 2018	1,708	46,316,673	673	10,533,376	32,067	699,761,583	5.4%	21,823
June 30, 2017	1,699	44,619,382	816	14,610,212	31,032	663,978,286	4.7%	21,397
June 30, 2016	1,780	44,409,702	660	12,099,362	30,149	633,969,116	5.4%	21,028
June 30, 2015	1,583	39,939,292	627	7,232,812	29,029	601,658,776	5.7%	20,726
June 30, 2014	1,778	44,823,611	603	3,011,383	28,073	568,952,296	7.9%	20,267
June 30, 2013	1,808	43,247,667	554	4,861,626	26,898	527,140,068	7.9%	19,598
June 30, 2012	1,679	37,855,250	636	5,344,239	25,644	488,754,027	7.1%	19,059

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[1] Numbers are estimated, and include other internal transfers.

Section 5: Basis of the Actuarial Valuation

Section 5.1: Summary of Plan Provisions

Effective Date

January 1, 1961, with amendments through June 30, 2021. Chapter 82, 1986 Session Laws of Alaska, created a two-tier retirement system. Members who were first hired under PERS before July 1, 1986 (Tier 1) are eligible for different benefits than members hired after June 30, 1986 (Tier 2). Chapter 4, 1996 Session Laws of Alaska created a third tier for members who were first hired after June 30, 1996 (Tier 3). Chapter 9, 2005 Session Laws of Alaska, closed the plan to new members hired after June 30, 2006.

Administration of Plan

The Commissioner of Administration or the Commissioner's designee is the administrator of the system. The Attorney General of the state is the legal counsel for the system and shall advise the administrator and represent the system in legal proceedings.

Prior to June 30, 2005, the Public Employees' Retirement Board prescribed policies and adopted regulations and performed other activities necessary to carry out the provisions of the system. The Alaska State Pension Investment Board, Department of Revenue, Treasury Division was responsible for investing PERS funds.

On July 27, 2005, Senate Bill 141, enacted as Chapter 9, 2005 Session laws of Alaska, replaced the Public Employees' Retirement Board and the Alaska State Pension Investment Board with the Alaska Retirement Management Board.

Employers Included

Currently there are 151 employers participating in PERS, including the State of Alaska and 150 political subdivisions and public organizations. Two additional political subdivisions participate in PERS for healthcare benefits only.

Membership

PERS membership is mandatory for all permanent full-time and part-time employees of the State of Alaska and participating political subdivisions and public organizations, unless they are specifically excluded by Alaska Statute or employer participation agreements. Employees participating in the University of Alaska's Optional Retirement Plan or other retirement plans funded by the State are not covered by PERS. Elected officials may waive PERS membership.

Certain members of the Alaska Teachers' Retirement System (TRS) are eligible for PERS retirement benefits for their concurrent elected public official service with municipalities. In addition, employees who work half-time in PERS and TRS simultaneously are eligible for half-time PERS and TRS credit.

Senate Bill 141, signed into law on July 27, 2005, closes the plan effective July 1, 2006, to new members first hired on or after July 1, 2006.

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Credited Service

Permanent employees who work at least 30 hours a week earn full-time credit; part-time employees working between 15 and 30 hours a week earn partial credit based upon the number of hours worked. Members receiving PERS occupational disability benefits continue to earn PERS credit while disabled. Survivors who are receiving occupational death benefits continue to earn PERS service credit while occupational survivor benefits are being paid.

Members may claim other types of service, including:

- part-time State of Alaska service rendered after December 31, 1960, and before January 1, 1976;
- service with the State, former Territory of Alaska, or U.S. Government in Alaska before January 1, 1961;
- past Peace Officer, correctional officer, fire fighter, and special officer service after January 1, 1961;
- military service (not more than five years may be claimed);
- temporary service after December 31, 1960;
- elected official service before January 1, 1981;
- Alaska Bureau of Indian Affairs service;
- past service rendered by employees who worked half-time in PERS and TRS simultaneously;
- leave without pay service after June 13, 1987, while receiving Workers' Compensation;
- Village Public Safety Officer service; and
- service as a temporary employee of the legislature before July 1, 1979, but this service must have been claimed no later than July 1, 2003, or by the date of retirement, if sooner (not more than ten years may be claimed).

Except for service before January 1, 1961, with the State, former Territory of Alaska, or U.S. Government in Alaska, contributions are required for all past service.

Past employment with participating political subdivisions that occurred before the employers joined PERS is creditable if the employers agree to pay the required contributions.

At the election of certain PERS members, certain service may be credited in the same fashion as members in TRS.

Members employed as dispatchers or within a state correctional facility may, at retirement, elect to convert their dispatcher or correctional facility service from “all other” service to Peace Officer/Firefighter service and retire under the 20-year retirement option. Members pay the full actuarial cost of conversion.

Employer Contributions

PERS employers contribute the amounts required, in addition to employees’ contributions, to fund the benefits of the system.

The normal cost rate is a uniform rate for all participating employers (less the value of members’ contributions).

The past service rate is a uniform rate for all participating employers to amortize the unfunded past service liability with payments that are a level percentage of payroll amount over a closed 25-year period starting June 30, 2014. Effective June 30, 2018, each future year’s unfunded service liability is separately amortized on a level percent of pay basis over 25 years.

Employer rates cannot be less than the normal cost rate.

Pursuant to AS 39.35.255 effective July 1, 2008 and subsequently amended on July 1, 2021, each non-state PERS employer will pay a simple uniform contribution rate of 22% of non-state member payroll and

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the State as an employer will pay the total contribution rate, adopted by the Board, of State member payroll.

Additional State Contributions

Pursuant to AS 39.35.280 effective July 1, 2008, the State shall contribute an amount (in addition to the State contribution as an employer) that, when combined with the total employer contributions, will be sufficient to pay the total contribution rate adopted by the Board.

Member Contributions

Mandatory Contributions: Peace Officer/Firefighter members are required to contribute 7.5% of their compensation; all Others contribute 6.75%. Those all Others who have elected to have their service calculated under TRS rules contribute 9.76% of their compensation. Members' contributions are deducted from gross wages before federal income taxes are withheld.

Contributions for Claimed Service: Member contributions are also required for most of the claimed service described above.

Voluntary Contributions: Members may voluntarily contribute up to 5% of their salary on an after-tax basis. Voluntary contributions are recorded in a separate account and are payable to the:

a. member in lump sum payment upon termination of employment;
b. member's beneficiary if the member dies; or
c. member in a lump sum, life annuity, or payments over a designated period of time when the member retires.

Interest: Members' contributions earn 4.5% interest, compounded semiannually on June 30 and December 31.

Refund of Contributions: Terminated members may receive refunds of their member contribution accounts which includes their mandatory and voluntary contributions, indebtedness payments, and interest earned. Terminated members' accounts may be attached to satisfy claims under Alaska Statute 09.38.065, federal income tax levies, and valid Qualified Domestic Relations Orders.

Reinstatement of Contributions: Refunded accounts and the corresponding PERS service may be reinstated upon reemployment in PERS prior to July 1, 2010. Interest accrues on refunds until paid in full or members retire.

Retirement Benefits

Eligibility

a. Members, including deferred vested members, are eligible for normal retirement at age 55 or early retirement at age 50 if they were hired before July 1, 1986 (Tier 1), and age 60 or early retirement at age 55 if they were hired on or after July 1, 1986 (Tiers 2 & 3). Additionally, they must have at least:
   (i) five years of paid-up PERS service;
   (ii) 60 days of paid-up PERS service as employees of the legislature during each of five legislative sessions and they were first hired by the legislature before May 30, 1987;
   (iii) 80 days of paid-up PERS service as employees of the legislature during each of five legislative sessions and they were first hired by the legislature after May 29, 1987;
   (iv) two years of paid-up PERS service and they are vested in TRS; or
   (v) two years of paid-up PERS service and a minimum three years of TRS service to qualify for a public service benefit.

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b. Members may retire at any age when they have:
   (i) 20 paid-up years of PERS Peace Officer/Firefighter service; or
   (ii) 30 paid-up years of PERS "all other" or "elected official" service.

Benefit Type

Lifetime benefits are paid to members. Eligible members may receive normal, unreduced benefits when they (1) reach normal retirement age and complete the service required; or (2) satisfy the minimum service requirements under the "20 and out" or "30 and out" provisions. Members may receive early, actuarially reduced benefits when they reach early retirement age and complete the service required.

Members may select a joint and survivor option. Members who entered PERS prior to July 1, 1996 may also select a 66-2/3 last survivor option or a level income option. Under these options and early retirement, benefits are actuarially adjusted so that members receive the actuarial equivalents of their normal benefit amounts.

Benefit Calculations

Retirement benefits are calculated by multiplying the average monthly compensation (AMC) times credited PERS service times the percentage multiplier. The AMC is determined by averaging the salaries earned during the five highest (three highest for Peace Officer/Firefighter members or members hired prior to July 1, 1996) consecutive payroll years. Members must earn at least 115 days of credit in the last year worked to include it in the AMC calculation. PERS pays a minimum benefit of $25.00 per month for each year of service when the calculated benefit is less.

The percentage multipliers for Peace Officer/Firefighter members are 2% for the first ten years of service and 2.5% for all service over ten years.

The percentage multipliers for all Others are 2% for the first ten years, 2.25% for the next ten years, and 2.5% for all remaining service earned on or after July 1, 1986. All service before that date is calculated at 2%.

Indebtedness

Members who terminate and refund their PERS contributions are not eligible to retire unless they return to PERS employment and pay back their refunds plus interest or accrue additional service which qualifies them for retirement. PERS refunds must be paid in full if the corresponding service is to count toward the minimum service requirements for retirement. Refunded PERS service is included in total service for the purpose of calculating retirement benefits. However, when refunds are not completely paid before retirement, benefits are actuarially reduced for life. Indebtedness balances may also be created when a member purchases qualified claimed service.

Reemployment of Retired Members

Retirement and retiree healthcare benefits are suspended while retired members are reemployed under PERS. During reemployment, members earn additional PERS service and contributions are withheld from their wages. A member who retired with a normal retirement benefit can elect to waive payment of PERS contributions. The waiver allows the member to continue receiving the retirement benefit during the period of reemployment. Members who elect the waiver option do not earn additional PERS service. The Waiver Option first became effective July 1, 2005 and applies to reemployment periods after that date. The Waiver Option is not available to members who retired early or under the Retirement Incentive Programs (RIPs). The Waiver Option is no longer available after June 30, 2009.

Members retired under the Retirement Incentive Programs (RIPs) who return to employment will:

a. forfeit the three years of incentive credits that they received;

b. owe PERS 150% of the benefits that they received for state and political subdivision members, and 110% for school district employees, under the 1996-2000 RIP, which may include costs for

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health insurance, excluding amounts that they paid to participate for the 1986 and 1989 RIPs. Under prior RIPs, the penalty is 110% of the benefits received; and

c. be charged 7% interest from the date that they are reemployed until their indebtedness is paid in full or they retire again. If the indebtedness is not completely paid, future benefits will be actuarially reduced for life.

Employers make contributions to the unfunded liability of the plan on behalf of rehired retired members at the rate the employer is making contributions to the unfunded liability of the plan for other members.

Postemployment Healthcare Benefits

Major medical benefits are provided to retirees and their surviving spouses by PERS for all employees hired before July 1, 1986 (Tier 1) and disabled retirees. Employees hired after June 30, 1986 (Tier 2) and their surviving spouses with five years of credited service (or ten years of credited service for those first hired after June 30, 1996 (Tier 3)) must pay the full monthly premium if they are under age sixty and will receive benefits paid by PERS if they are over age sixty. Tier 3 Members with between five and ten years of credited service must pay the full monthly premium regardless of their age. Tier 2 and Tier 3 Members with less than five years of credited service are not eligible for postemployment healthcare benefits. Tier 2 Members who are receiving a conditional benefit and are age eligible are eligible for postemployment healthcare benefits. In addition, Peace Officers and their surviving spouses with twenty-five years of Peace Officer membership service, Other employees and their surviving spouses with thirty years of membership service, and any disabled member receive benefits paid by PERS, regardless of their age or date of hire.

Medical, prescription drug, dental, vision and audio coverage is provided through the AlaskaCare Retiree Health Plan. Health plan provisions do not vary by retirement tier or age, except for Medicare coordination. Participants in dental, vision, and audio coverage pay a full self-supporting rate and those benefits are not included in this valuation.

Starting in 2022, prior authorization will be required for certain specialty medications for all participants. There is no change to the medications that are covered by the plan.

Starting in 2022, certain preventive benefits for pre-Medicare participants will now be covered by the plan.

Surviving spouses continue coverage only if a pension payment form that provided survivor benefits was elected. Alternate payees (i.e. individuals who are the subject of a domestic relations order or DRO) are allowed to participate in the plan, but must pay the full cost.

Where premiums are required prior to age 60, the valuation bases this payment upon the age of the retiree.

Participants in the defined benefit plan are covered under the following benefit design:

Plan Feature	Amounts
Deductible (single/family)	$150 / $450
Coinsurance (most services)	20%
Outpatient surgery/testing	0%
Maximum Out-of-Pocket (single/family, excluding deductible)	$800 / $2,400
Rx Copays (generic/brand/mail-order), does not apply to OOP max	$4 / $8 / $0
Lifetime Maximum	$2,000,000

The plan coordinates with Medicare on a traditional Coordination of Benefits Method. Starting in 2019, the prescription drug coverage is through a Medicare Part D EGWP arrangement.

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Disability Benefits

Monthly disability benefits are paid to permanently disabled members until they die, recover, or become eligible for normal retirement. Members are appointed to normal retirement on the first of the month after they become eligible.

Occupational Disability

Members are not required to satisfy age or service requirements to be eligible for occupational disability. Monthly benefits are equal to 40% of their gross monthly compensation on the date of their disability. Members on occupational disability continue to earn PERS service until they become eligible for normal retirement. Peace Officer/Firefighter members may elect to retain the disability benefit formula for the calculation of their normal retirement benefits.

Non-occupational Disability

Members must be vested (five paid up years of PERS service) to be eligible for non-occupational disability benefits. Monthly benefits are calculated based on the member's average monthly compensation and PERS service on the date of termination from employment because of disability. Members do not earn PERS service while on non-occupational disability.

Death Benefits

Monthly death benefits may be paid to a spouse or dependent children upon the death of a member. If monthly benefits are not payable under the occupational and non-occupational death provisions, the designated beneficiary receives the lump sum benefit described below.

Occupational Death

When an active member (vested or non-vested) dies from occupational causes, a monthly survivor's pension may be paid to the spouse. The pension equals 40% of the member's gross monthly compensation on the date of death or disability, if earlier. If there is no spouse, the pension may be paid to the member's dependent children. On the member's normal retirement date, the benefit converts to a normal retirement benefit. The normal benefit is based on the member's salary on the date of death and service, including service accumulated from the date of the member's death to the normal retirement date. Survivors of Peace Officer/Firefighter members receive the greater of 50% of the member's gross monthly compensation on the date of death or disability, or 75% of the member's monthly normal retirement benefit (including service projected to Normal Retirement). If the member is unmarried with no children, a refund of contributions is payable to the estate.

Death after Occupational Disability

When a member dies while occupationally disabled, benefits are paid as described above in Occupational Death.

Non-Occupational Death

When a vested member dies from non-occupational causes, the surviving spouse may elect to receive a monthly 50% joint and survivor benefit or a lump sum benefit. The monthly benefit is calculated on the member's average monthly compensation and PERS service at the time of termination or death.

Lump Sum Non-Occupational Death Benefit

Upon the death of a member who has less than one year of service, the designated beneficiary receives the member's contribution account, which includes mandatory and voluntary contributions, indebtedness payments, and interest earned. If the member has more than one year of PERS service or is vested, the beneficiary also receives $1,000 and $100 for each year of PERS service.

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Death After Retirement

When a retired member dies, the designated beneficiary receives the member's contribution account, less any benefits already paid and the member's last benefit check. If the member selected a survivor option at retirement, the eligible spouse receives continuing, lifetime monthly benefits.

Postretirement Pension Adjustments

Postretirement pension adjustments (PRPAs) are granted annually to eligible benefit recipients when the consumer price index (CPI) for urban wage earners and clerical workers for Anchorage increases during the preceding calendar year. PRPAs are calculated by multiplying the recipient's base benefit including past PRPAs, but excluding the Alaska COLA, times:

a. The lesser of 75% of the CPI increase in the preceding calendar year or 9%, if the recipient is at least age 65 or on PERS disability; or
b. The lesser of 50% of the CPI increase in the preceding calendar year or 6%, if the recipient is at least age 60, or under age 60 if the recipient has been receiving benefits for at least five years.

Ad hoc PRPAs, up to a maximum of 4%, may be granted to eligible recipients who were first hired before July 1, 1986 (Tier 1) if the CPI increases and the funded ratio is at least 105%.

In a year where an ad hoc PRPA is granted, eligible recipients will receive the higher of the two calculations.

Alaska Cost-of-Living Allowance (COLA)

Eligible benefit recipients who reside in Alaska receive an Alaska COLA equal to 10% of their base benefits or $50, whichever is more. The following benefit recipients are eligible:

a. members who first entered PERS before July 1, 1986 (Tier 1) and their survivors;
b. members who first entered PERS after June 30, 1986 (Tiers 2 & 3) and their survivors if they are at least age 65; and
c. all disabled members.

Changes in Benefit Provisions Valued Since the Prior Valuation

Starting in 2022, prior authorization will be required for certain specialty medications for all participants, and certain preventive benefits for pre-Medicare participants will now be covered by the plan.

Under SB 55 that was effective July 1, 2021: (i) The State-as-an-Employer contributes the full actuarial contribution rate based on the DB/DCR payroll of its employees (which is approximately 50% of the total PERS DB/DCR payroll); (ii) Non-State employers continue to contribute 22% of their DB/DCR payroll; (iii) the Additional State Contributions are based on the excess of the DB actuarial contribution rate and the DB contributions made by non-State employers.

There were no other changes in benefit provisions since the prior valuation.

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Section 5.2: Description of Actuarial Methods and Valuation Procedures

The funding method used in this valuation was adopted by the Board in October 2006. Changes in methods were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017. The asset smoothing method used to determine valuation assets was changed effective June 30, 2014.

Benefits valued are those delineated in Alaska State statutes as of the valuation date. Changes in State statutes effective after the valuation date are not taken into consideration in setting the assumptions and methods.

Actuarial Cost Method

Liabilities and contributions shown in the report are computed using the Entry Age Normal Actuarial Cost Method, level percent of pay.

Effective June 30, 2018, the Board adopted a layered UAAL amortization method: Layer #1 equals the sum of (i) the UAAL at June 30, 2018 based on the 2017 valuation, plus (ii) the FY18 experience gain/loss. Layer #1 is amortized over the remainder of the 25-year closed period that was originally established in 2014[1]. Layer #2 equals the change in UAAL at June 30, 2018 due to the experience study and EGWP implementation. Layer #2 is amortized over a separate closed 25-year period starting in 2018. Future layers will be created each year based on the difference between actual and expected UAAL occurring that year, and will be amortized over separate closed 25-year periods. The UAAL amortization continues to be on a level percent of pay basis. State statutes allow the contribution rate to be determined on payroll for all members, defined benefit and defined contribution member payroll combined.

Projected pension and postemployment healthcare benefits were determined for all active members. Cost factors designed to produce annual costs as a constant percentage of each member's expected compensation in each year from the assumed entry age to the assumed retirement age were applied to the projected benefits to determine the normal cost (the portion of the total cost of the plan allocated to the current year under the method). The normal cost is determined by summing intermediate results for active members and determining an average normal cost rate which is then related to the total payroll of active members. The actuarial accrued liability for active members (the portion of the total cost of the plan allocated to prior years under the method) was determined as the excess of the actuarial present value of projected benefits over the actuarial present value of future normal costs.

The actuarial accrued liability for retired members and their beneficiaries currently receiving benefits, terminated vested members and disabled members not yet receiving benefits was determined as the actuarial present value of the benefits expected to be paid. No future normal costs are payable for these members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of plan assets measured on the valuation date.

Under this method, experience gains or losses, i.e., decreases or increases in accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

[1] Layer #1 is referred to as “initial amount” in Sections 1.2 and 1.3.

Valuation of Assets

The actuarial asset value was reinitialized to equal Fair Value of Assets as of June 30, 2014. Beginning in FY15, the asset valuation method recognizes 20% of the gain or loss each year, for a period of five years. All assets are valued at fair value. Assets are accounted for on an accrued basis and are taken directly from financial statements audited by KPMG LLP.

Changes in Methods Since the Prior Valuation

There were no changes in the asset or valuation methods since the prior valuation.

Valuation of Retiree Medical and Prescription Drug Benefits

This section outlines the detailed methodology used in the internal model developed by Buck to calculate the initial per capita claims cost rates for the PERS postemployment healthcare plan. Note that the methodology reflects the results of our annual experience rate update for the period from July 1, 2020 to June 30, 2021.

Base claims cost rates are incurred healthcare costs expressed as a rate per member per year. Ideally, claims cost rates should be derived for each significant component of cost that can be expected to require differing projection assumptions or methods (i.e., medical claims, prescription drug claims, administrative costs, etc). Separate analysis is limited by the availability and historical credibility of cost and enrollment data for each component of cost. This valuation reflects non-prescription claims separated by Medicare status, including eligibility for free Part A coverage. Prescription costs are analyzed separately as in prior valuations. Administrative costs are assumed in the final per capita claims cost rates used for valuation purposes, as described below. Analysis to date on Medicare Part A coverage is limited since Part A claim data is not available by individual, nor is this status incorporated into historical claim data.

<u>Benefits</u>

Medical, prescription drug, dental, vision and audio coverage is provided through the AlaskaCare Retiree Health Plan and is available to employees of the State and subdivisions who meet retirement criteria based on the retirement plan tier in effect at their date of hire. Health plan provisions do not vary by retirement tier or age, except for Medicare coordination for those Medicare-eligible. Dental, vision and audio claims (DVA) are excluded from data analyzed for this valuation because those are retiree-pay all benefits where rates are assumed to be self-supporting. Buck relies upon rates set by a third-party for the DVA benefits. Buck reviewed historical rate-setting information and views contribution rate adjustments made are not unreasonable.

<u>Administration and Data Sources</u>

The plan was administered by Wells Fargo Insurance Services (acquired by HealthSmart, in January 2012) from July 1, 2009 through December 31, 2013 and by Aetna effective January 1, 2014.

Claims incurred for the period from July 2019 through June 2021 (FY20 through FY21) were provided by the State of Alaska from reports extracted from their data warehouse, which separated claims by Medicare status. Monthly enrollment data for the same period was provided by Aetna.

Aetna also provided census information identifying Medicare Part B only participants. These participants are identified when hospital claims are denied by Medicare; Aetna then flags that participant as a Part B only participant. Buck added newly identified participants to our list of Medicare Part B only participants. Buck assumes that once identified as Part B only, that participant remains in that status until we are notified otherwise.

Aetna provided a snapshot file as of July 1, 2021 of retirees and dependents that included a coverage level indicator. The monthly enrollment data includes double coverage participants. These are participants whereby both the retiree and spouse are retirees from the State and both are reflected with Couple coverage in the enrollment. In this case, such a couple would show up as four members in the

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monthly enrollment (each would be both a retiree and a spouse). As a result, the snapshot census file was used to adjust the total member counts in the monthly enrollment reports to estimate the number of unique participants enrolled in coverage. Based on the snapshot files from the last two valuations, the total member count in the monthly enrollment reports needs to be reduced by approximately 13% to account for the number of participants with double coverage.

Aetna does not provide separate experience by Medicare status in standard reporting so the special reports mentioned above from the data warehouse were used this year to obtain that information and incorporate it into the per capita rate development for each year of experience (with corresponding weights applied in the final per capita cost).

Methodology

Buck projected historical claim data to FY22 for retirees using the following summarized steps:

1. Develop historical annual incurred claim cost rates – an analysis of medical costs was completed based on claims information and enrollment data provided by the State of Alaska and Aetna for each year in the experience period of FY20 through FY21.
    - Costs for medical services and prescriptions were analyzed separately, and separate trend rates were developed to project expected future medical and prescription costs for the valuation year (e.g. from the experience period up through FY22).
    - Because the reports provided reflected incurred claims, no additional adjustment was needed to determine incurred claims to be used in the valuation.
    - An offset for costs expected to be reimbursed by Medicare was incorporated beginning at age 65. Alaska retirees who do not have 40 quarters of Medicare-covered compensation do not qualify for Medicare Part A coverage free of charge. This is a relatively small and closed group. Medicare was applied to State employment for all employees hired after March 31, 1986. For the “no-Part A” individuals who are required to enroll in Medicare Part B, the State is the primary payer for hospital bills and other Part A services. Claim experience is not available separately for participants with both Medicare Parts A and B and those with Part B only. For Medicare Part B only participants, a lower average claims cost was applied to retirees covered by both Medicare Part A and B vs. retirees covered only by Medicare Part B based upon manual rate models that estimate the Medicare covered proportion of medical costs. To the extent that no-Part A claims can be isolated and applied strictly to the appropriate closed group, actuarial accrued liability will be more accurate.
    - Based on census data received from Aetna, less than 1% of the current retiree population was identified as having coverage only under Medicare Part B. We assume that 5% of actives hired before April 1, 1986 and current retirees who are not yet Medicare eligible will not be eligible for Medicare Part A.
    - Based upon a reconciliation of valuation census data to the snapshot eligibility files provided by Aetna as of July 1, 2020, and July 1, 2021, Buck adjusted member counts used for duplicate records where participants have double coverage; i.e. primary coverage as a retiree and secondary coverage as the covered spouse of another retiree. This is to reflect the total cost per distinct individual/member which is then applied to distinct members in the valuation census.
    - Buck understands that pharmacy claims reported do not reflect rebates. Based on actual pharmacy rebate information provided by Optum, rebates were assumed to be 19.5% of prescription drug claims for FY20, 16.2% of pre-Medicare, and 14.3% of Medicare prescription drug claims for FY21.
2. Develop estimated EGWP reimbursements – Segal provided estimated 2022 EGWP subsidies, developed with the assistance of OptumRx. These amounts are applicable only to Medicare-eligible participants.

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3. Adjust for claim fluctuation, anomalous experience, etc. – explicit adjustments are often made for anticipated large claims or other anomalous experience. FY19 and FY20 experience were compared to assess the impact of COVID-19 and whether an adjustment to FY20 claims was indicated for use in the June 30, 2020 valuation. A material decrease in medical claims during March 2020 to June 2020 was experienced due to COVID-19. Therefore, an adjustment was made for those months to adjust for the decrease that is not expected to continue in future years. There was an observed spike in prescription drug claims in March 2020; however, the FY20 prescription drug experience appears reasonable to use without adjustment for COVID-19. To adjust for the decrease in medical claims due to COVID-19 during the last 4 months of FY20, the per capita cost during the first 8 months was used as the basis for estimating claims that would have occurred in the absence of COVID-19. FY21 experience was also thoroughly reviewed to assess the impact of COVID-19 and whether an adjustment to FY21 claims was appropriate for use in the June 30, 2021 valuation. FY21 medical per capita claims were noticeably lower than expected, so a 4% load was added to the FY21 medical claims used in the per capita claims cost development to better reflect future expected long-term costs of the plan. Total prescription drug claims experience for FY21 was reasonable and consistent with FY19 and FY20 experience. Therefore no adjustment was made to FY21 prescription drug claims. Due to group size and demographics, we did not make any additional large claim adjustments. We do blend both Alaska plan-specific and national trend factors as described below. Buck compared data utilized to lag reports and quarterly plan experience presentations provided by the State and Aetna to assess accuracy and reasonableness of data.

4. Trend all data points to the projection period – project prior years' experience forward to FY22 for retiree benefits on an incurred claim basis. Trend factors derived from historical Alaska-specific experience and national trend factors are shown in the table in item 5 below.

5. Apply credibility to prior experience – adjust prior year's data by assigning weight to recent periods, as shown at the right of the table below. The Board approved a change in the weighting of experience periods beginning with the June 30, 2017 valuation as outlined below. Note also that for FY20 to FY21 medical and both years of prescription drugs we averaged projected plan costs using Alaska-specific trend factors and national trend factors, assigning 75% weight to Alaska-specific trends and 25% to national trends. For FY21 to FY22 medical we applied 100% weight to national trends because the Alaska-specific trends were impacted by COVID-19:

Alaska-Specific and National Average Weighted Trend from Experience Period to Valuation Year

Experience Period	Medical	Prescription	Weighting Factors
FY20 to FY21	6.3% Pre-Medicare / 5.2% Medicare	7.6%	50%
FY21 to FY22	8.1% Pre-Medicare / 4.8% Medicare	8.0%	50%

Trend assumptions used for rate development are assessed annually and as additional/improved reporting becomes available, we will incorporate into rate development as appropriate.

6. Starting in 2022, prior authorization will be required for certain specialty medications. There is no change to the medications that are covered by the plan. Segal provided an estimate of the impact of this change to the DB retiree health plan cost for calendar year 2022. The DB base claims costs for pre-Medicare prescription drug, Medicare prescription drug, and EGWP were adjusted to reflect this change. Additionally, starting in 2022, certain preventive benefits for pre-Medicare participants will now be covered by the plan. Segal provided an estimate of the impact of this change to the DB retiree health plan cost for calendar year 2022. The DB base claims cost for pre-Medicare medical was adjusted to reflect this change.

7. Develop separate administration costs – no adjustments were made for internal administrative costs. Third party retiree plan administration fees for FY22 are based upon total fees projected to 2022 by Segal based on actual FY21 fees. The annual per participant per year administrative cost rate for medical and prescription benefits is $493.

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Healthcare Reform

Healthcare Reform legislation passed on March 23, 2010 included several provisions with potential implications for the State of Alaska Retiree Health Plan liability. Buck evaluated the impact due to these provisions.

Because the State plan is retiree-only, and was in effect at the time the legislation was enacted, not all provisions of the health reform legislation apply to the State plan. Unlimited lifetime benefits and dependent coverage to age 26 are two of these provisions. We reviewed the impact of including these provisions, but there was no decision made to adopt them, and no requirement to do so.

Because Transitional Reinsurance fees are only in effect until 2016, we excluded these for valuation purposes.

The Further Consolidated Appropriations Act, 2020 passed in December 2019 repealed several healthcare-related taxes, including the Cadillac Tax.

The Tax Cuts and Jobs Act passed in December 2017 included the elimination of the individual mandate penalty and changed the inflation measure for purposes of determining the limits for the High Cost Excise Tax to use chained CPI. It is our understanding the law does not directly impact other provisions of the ACA. While the nullification of the ACA's individual mandate penalty does not directly impact employer group health plans, it could contribute to the destabilization of the individual market and increase the number of uninsured. Such destabilization could translate to increased costs for employers. We have considered this when setting our healthcare cost trend assumptions and will continue to monitor this issue.

We have not identified any other specific provisions of healthcare reform or its potential repeal that would be expected to have a significant impact on the measured obligation. We will continue to monitor legislative activity.

Data

In accordance with actuarial standards, we note the following specific data sources and steps taken to value retiree medical benefits:

The Division of Retirement and Benefits provided pension valuation census data, which for people currently in receipt of healthcare benefits was supplemented by coverage data from the healthcare claims administrator (Aetna).

Certain adjustments and assumptions were made to prepare the data for valuation:

- All records provided with retiree medical coverage on the Aetna data were included in this valuation and we relied on the Aetna data as the source of medical coverage for current retirees and their dependents.
- Some records in the Aetna data were duplicates due to the double coverage (i.e. coverage as a retiree and as a spouse of another retiree) allowed under the plan. Records were adjusted for these members so that each member was only valued once. Any additional value of the double coverage (due to coordination of benefits) is small and reflected in the per capita costs.
- Covered children included in the Aetna data were valued until age 23, unless disabled. We assumed that those dependents over 23 were only eligible and valued due to being disabled.
- For individuals included in the pension data expecting a future pension, we valued health benefits starting at the same point that the pension benefit is assumed to start.

We are not aware of any other data issues that would be expected to have a material impact on the results and there are no unresolved matters related to the data.

The chart below shows the basis of setting the per capita claims cost assumption, which includes both PERS and TRS.

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	Medical		Prescription Drugs (Rx)	
	Pre-Medicare	Medicare	Pre-Medicare	Medicare
A. Fiscal 2020				
1. Incurred Claims	$ 229,531,664	$ 89,497,345	$ 64,442,660	$ 188,022,328
2. Adjustments for Rx Rebates	0	0	(12,566,319)	(36,664,354)
3. Net incurred claims	$ 229,531,664	$ 89,497,345	$ 51,876,341	$ 151,357,974
4. Average Enrollment	19,354	44,965	19,354	44,965
5. Claim Cost Rate (3) / (4)	11,860	1,990	2,680	3,366
6. Trend to Fiscal 2022	1.149	1.103	1.162	1.162
7. Fiscal 2022 Incurred Cost Rate (5) x (6)	$ 13,630	$ 2,195	$ 3,116	$ 3,912
B. Fiscal 2021				
1. Incurred Claims	$ 196,566,470	$ 86,512,435	$ 60,691,609	$ 207,822,858
2. Adjustments for Rx Rebates and COVID (Medical only)	7,862,659	3,460,497	(9,832,041)	(29,718,669)
3. Net incurred claims	$ 204,429,129	$ 89,972,933	$ 50,859,568	$ 178,104,189
4. Average Enrollment	18,106	47,025	18,106	47,025
5. Claim Cost Rate (3) / (4)	11,291	1,913	2,809	3,787
6. Trend to Fiscal 2022	1.081	1.048	1.080	1.080
7. Fiscal 2022 Incurred Cost Rate (5) x (6)	$ 12,205	$ 2,005	$ 3,034	$ 4,090

	Medical		Prescription Drugs (Rx)	
	Pre-Medicare	Medicare	Pre-Medicare	Medicare
C. Incurred Cost Rate by Fiscal Year				
1. Fiscal 2020 A.(7)	13,630	2,195	3,116	3,912
2. Fiscal 2021 B.(7)	12,205	2,005	3,034	4,090
D. Weighting by Fiscal Year				
1. Fiscal 2020	50%	50%	50%	50%
2. Fiscal 2021	50%	50%	50%	50%
E. Fiscal 2022 Incurred Cost Rate				
1. Rate at Average Age C x D	$ 12,918	$ 2,100	$ 3,075	$ 4,001
2. Average Aging Factor	0.822	1.271	0.832	1.124
3. Rate at Age 65 (1) / (2)	$ 15,708	$ 1,652	$ 3,695	$ 3,560
F. Development of Part A&B and Part B Only Cost from Pooled Rate Above				
1. Part A&B Average Enrollment		46,602		
2. Part B Only Average Enrollment		423		
3. Total Medicare Average Enrollment B(4)		47,025		
4. Cost ratio for those with Part B only to those with Parts A&B		3.300		
5. Factor to determine cost for those with Parts A&B (2) / (3) x (4) + (1) / (3) x 1.00		1.021		
6. Medicare per capita cost for all participants: E(3)		$ 1,652		
7. Cost for those eligible for Parts A&B: (6) / (5)		$ 1,619		
8. Cost for those eligible for Part B only: (7) x (4)		$ 5,341		

	Medical		Prescription Drugs (Rx)	
	Pre-Medicare	Medicare	Pre-Medicare	Medicare
1. Rate at Age 65	$ 15,708	$ 1,619	$ 3,695	$ 3,560
2. Adjustment factor for plan changes	1.39%	0.00%	-8.67%	-2.41%
3. Adjusted Rate at Age 65 (1) x [1 + (2)]	$ 15,926	$ 1,619	$ 3,375	$ 3,474

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Following the development of total projected costs, a distribution of per capita claims cost was developed. This was accomplished by allocating total projected costs to the population census used in the valuation. The allocation was done separately for each of prescription drugs and medical costs for the Medicare eligible and pre-Medicare populations. The allocation weights were developed using participant counts by age and assumed morbidity and aging factors. Results were tested for reasonableness based on historical trend and external benchmarks for costs paid by Medicare.

Below are the results of this analysis:

Distribution of Per Capita Claims Cost by Age for the Period July 1, 2021 through June 30, 2022

Age	Medical and Medicare Parts A & B	Medical and Medicare Part B Only	Prescription Drug	Medicare EGWP Subsidy
45	$ 9,719	$ 9,719	$ 2,062	$ 0
50	10,996	10,996	2,449	0
55	12,441	12,441	2,908	0
60	14,076	14,076	3,133	0
65	1,619	5,341	3,474	1,131
70	1,877	6,192	3,836	1,249
75	2,176	7,178	4,235	1,379
80	2,402	7,925	4,130	1,345

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Section 5.3: Summary of Actuarial Assumptions

The demographic and economic assumptions used in the June 30, 2021 valuation are described below. Unless noted otherwise, these assumptions were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017.

Investment Return

7.38% per year, net of investment expenses.

Salary Scale

Salary scale rates based upon the 2013-2017 actual experience (see Table 1).

Inflation – 2.50% per year.

Productivity – 0.25% per year.

Payroll Growth

2.75% per year (inflation + productivity).

Total Inflation

Total inflation as measured by the Consumer Price Index for urban and clerical workers for Anchorage is assumed to increase 2.50% annually.

Mortality (Pre-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

RP-2014 employee table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Deaths are assumed to result from occupational causes 75% of the time for Peace Officer/Firefighters, and 40% of the time for Others.

Mortality (Post-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

91% of male and 96% of female rates of RP-2014 healthy annuitant table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Turnover

Select and ultimate rates based upon the 2013-2017 actual experience (see Tables 2a and 2b).

Disability

Incidence rates based upon the 2013-2017 actual experience (see Table 3).

Post-disability mortality in accordance with the RP-2014 disabled table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement. Disabilities are assumed to be occupational 75% of the time for Peace Officer/Firefighters, and 40% of the time for Others.

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Retirement

Retirement rates based upon the 2013-2017 actual experience (see Tables 4a and 4b).

Deferred vested members are assumed to retire at their earliest unreduced retirement date.

The modified cash refund annuity is valued as a three-year certain and life annuity.

Spouse Age Difference

Males are assumed to be three years older than their wives. Females are assumed to be two years younger than husbands.

Percent Married for Pension

For Others, 75% of male members and 70% of female members are assumed to be married. For Peace Officer/Firefighters, 85% of male members and 60% of female members are assumed to be married.

Dependent Spouse Medical Coverage Election

Applies to members who do not have double medical coverage. For Others, 65% of male members and 60% of female members are assumed to be married and cover a dependent spouse. For Peace Officer/Firefighters, 75% of male members and 50% of female members are assumed to be married and cover a dependent spouse.

Dependent Children

- Pension: None
- Healthcare: Benefits for dependent children have been valued only for members currently covering their dependent children. These benefits are only valued through the dependent children's age 23 (unless the child is disabled).

Contribution Refunds

For Others, 5% of terminating members with vested benefits are assumed to have their contributions refunded.

For Peace Officers/Firefighters, 10% of terminating members with vested benefits are assumed to have their contributions refunded.

100% of those with non-vested benefits are assumed to have their contributions refunded.

Imputed Data

Data changes from the prior year which are deemed to have an immaterial impact on liabilities and contribution rates are assumed to be correct in the current year's client data. Non-vested terminations with appropriate refund dates are assumed to have received a full refund of contributions. Active members with missing salary and service are assumed to be terminated with status based on their vesting percentage.

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Active Rehire Assumption

The Normal Cost used for determining contribution rates and in the projections includes a rehire assumption to account for anticipated rehires. The Normal Cost shown in the report includes the following assumptions (which were developed based on the five years of rehire loss experience through June 30, 2017). For projections, these assumptions were assumed to grade to zero uniformly over a 20-year period.

- Pension: 18.77%
- Healthcare: 17.09%

Re-Employment Option

All re-employed retirees are assumed to return to work under the Standard Option.

Active Data Adjustment

No adjustment was made to reflect participants who terminate employment before the valuation date and are subsequently rehired after the valuation date.

Alaska Cost-of-Living Adjustments (COLA)

Of those benefit recipients who are eligible for the Alaska COLA, 70% of Others and 65% of Peace Officers/Firefighters are assumed to remain in Alaska and receive the COLA.

Postretirement Pension Adjustment (PRPA)

50% and 75% of assumed inflation, or 1.25% and 1.875% respectively, is valued for the annual automatic PRPA as specified in the statute.

Expenses

The investment return assumption is net of investment expenses.

The Normal Cost as of June 30, 2021 was increased by the following amounts for administrative expenses (for projections, the percent increase was assumed to remain constant in future years):

- Pension: $7,625,000
- Healthcare: $5,531,000

Part-Time Status

Part-time employees are assumed to earn 1.00 years of credited service per year for Peace Officer/Firefighter and 0.75 years of credited service per year for Other members.

Service

Total credited service is provided by the State. This service is assumed to be the only service that should be used to calculate benefits. Additionally, the State provides claimed service (including Bureau of Indian Affairs Service). Claimed service is used for vesting and eligibility purposes as described in Section 5.1.

Final Average Earnings

Final Average Earnings is provided on the data for active members. This amount is used as a minimum in the calculation of the average earnings in the future.

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Per Capita Claims Cost

Sample claims cost rates adjusted to age 65 for FY22 medical and prescription drugs are shown below. The prescription drug costs reflect the plan change to require prior authorization for certain specialty medications. The pre-Medicare medical cost reflects the coverage of additional preventive benefits.

	Medical	Prescription Drugs
Pre-Medicare	$ 15,926	$ 3,375
Medicare Parts A & B	$ 1,619	$ 3,474
Medicare Part B Only	$ 5,341	$ 3,474
Medicare Part D – EGWP	N/A	$ 1,131

Members are assumed to attain Medicare eligibility at age 65. All costs are for the 2022 fiscal year (July 1, 2021 – June 30, 2022).

The EGWP subsidy is assumed to increase in future years by the trend rates shown on the following pages. No future legislative changes or other events are anticipated to impact the EGWP subsidy. If any legislative or other changes occur in the future that impact the EGWP subsidy (which could either increase or decrease the plan's Actuarial Accrued Liability), those changes will be evaluated and quantified when they occur.

Third Party Administrator Fees

$493 per person per year; assumed to increase at 4.5% per year.

Medicare Part B Only

We assume that 5% of actives hired before April 1, 1986 and current retirees who are not yet Medicare eligible will not be eligible for Medicare Part A.

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Healthcare Cost Trend

The table below shows the rate used to project the cost from the shown fiscal year to the next fiscal year. For example, 6.3% is applied to the FY22 pre-Medicare medical claims costs to get the FY23 medical claims costs.

	Medical Pre-65	Medical Post-65	Prescription Drugs / EGWP
FY22	6.3%	5.4%	7.1%
FY23	6.1%	5.4%	6.8%
FY24	5.9%	5.4%	6.4%
FY25	5.8%	5.4%	6.1%
FY26	5.6%	5.4%	5.7%
FY27-FY40	5.4%	5.4%	5.4%
FY41	5.3%	5.3%	5.3%
FY42	5.2%	5.2%	5.2%
FY43	5.1%	5.1%	5.1%
FY44	5.1%	5.1%	5.1%
FY45	5.0%	5.0%	5.0%
FY46	4.9%	4.9%	4.9%
FY47	4.8%	4.8%	4.8%
FY48	4.7%	4.7%	4.7%
FY49	4.6%	4.6%	4.6%
FY50+	4.5%	4.5%	4.5%

For the June 30, 2014 valuation and later, the updated Society of Actuaries' Healthcare Cost Trend Model is used to project medical and prescription drug costs. This model estimates trend amounts that are projected out for 80 years. The model has been populated with assumptions that are specific to the State of Alaska.

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Aging Factors

Age	Medical	Prescription Drugs
0 – 44	2.0%	4.5%
45 – 54	2.5%	3.5%
55 – 64	2.5%	1.5%
65 – 74	3.0%	2.0%
75 – 84	2.0%	-0.5%
85 – 94	0.3%	-2.5%
95+	0.0%	0.0%

Retired Member Contributions for Medical Benefits

Currently contributions are required for PERS members who are under age 60 and have less than 30 years of service (25 for Peace Officer/Firefighter). Eligible Tier 1 members are exempt from contribution requirements. Annual FY22 contributions based on monthly rates shown below for calendar 2022 are assumed based on the coverage category for current retirees. The composite rate shown is used for current active and inactive members in Tier 2 or 3 who are assumed to retire prior to age 60 with less than 30 years of service and who are not disabled. For dependent children, we value 1/3 of the annual retiree contribution to estimate the per child rate based upon the assumed number of children in rates where children are covered.

Coverage Category	Calendar 2022 Annual Contribution	Calendar 2022 Monthly Contribution	Calendar 2021 Monthly Contribution
Retiree Only	$ 8,448	$ 704	$ 704
Retiree and Spouse	$ 16,896	$ 1,408	$ 1,408
Retiree and Child(ren)	$ 11,940	$ 995	$ 995
Retiree and Family	$ 20,388	$ 1,699	$ 1,699
Composite	$ 12,552	$ 1,046	$ 1,046

Trend Rate for Retired Member Medical Contributions

The table below shows the rate used to project the retired member medical contributions from the shown fiscal year to the next fiscal year. For example, 0.0% is applied to the FY22 retired member medical contributions to get the FY23 retired member medical contributions.

Trend Assumptions	
FY22	0.0%
FY23+	4.0%

Graded trend rates for retired member medical contributions are consistent with the rates used for the June 30, 2020 valuation. Actual FY22 retired member medical contributions are reflected in the valuation.

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Healthcare Participation

100% of system paid members and their spouses are assumed to elect healthcare benefits as soon as they are eligible. 20% of non-system paid members and their spouses are assumed to elect healthcare benefits as soon as they are eligible.

Changes in Assumptions Since the Prior Valuation

Healthcare claim costs are updated annually as described in Section 5.2. The amounts included in the Normal Cost for administrative expenses were changed from $7,223,000 to $7,625,000 for pension, and from $4,934,000 to $5,531,000 for healthcare (based on the most recent two years of actual administrative expenses paid from plan assets).

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Table 1: Salary Scales

Peace Officer / Firefighter		Others	
Years of Service	Percent Increase	Years of Service	Percent Increase
0	7.75%	0	6.75%
1	7.25%	1	6.25%
2	6.75%	2	5.75%
3	6.25%	3	5.25%
4	5.75%	4	4.75%
5	5.25%	5	4.25%
6	4.75%	6	3.75%
7	4.25%	7	3.65%
8	3.75%	8	3.55%
9	3.65%	9	3.45%
10	3.55%	10	3.35%
11	3.45%	11	3.25%
12	3.35%	12	3.15%
13	3.25%	13	3.05%
14	3.15%	14	2.95%
15	3.05%	15	2.85%
16	2.95%	16	2.75%
17	2.85%	17	2.75%
18+	2.75%	18+	2.75%

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Table 2a: Turnover Rates for Peace Officer / Firefighter

Select Rates during the First 5 Years of Employment

Years of Service	Male	Female
0	15.00%	15.00%
1	12.00%	8.00%
2	7.20%	6.40%
3	5.67%	5.60%
4	6.48%	7.20%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	4.70%	6.80%	39	2.04%	2.98%
23	4.46%	6.80%	40	1.68%	3.39%
24	4.22%	6.80%	41	1.67%	3.37%
25	3.98%	6.80%	42	1.67%	3.36%
26	3.74%	6.80%	43	1.71%	3.33%
27	3.50%	6.80%	44	1.76%	3.31%
28	3.32%	6.63%	45	1.81%	3.28%
29	3.14%	6.46%	46	1.85%	3.25%
30	2.96%	6.29%	47	1.90%	3.23%
31	2.79%	6.12%	48	2.22%	3.19%
32	2.61%	5.95%	49	2.53%	3.15%
33	2.50%	5.36%	50	3.18%	6.42%
34	2.39%	4.77%	51	4.24%	6.32%
35	2.28%	4.18%	52	4.24%	6.19%
36	2.17%	3.60%	53	4.24%	6.04%
37	2.06%	3.01%	54	4.24%	3.00%
38	2.05%	2.99%	55+	3.00%	2.00%

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Table 2b: Turnover Rates for Others

Select Rates during the First 5 Years of Employment

Hire Age Under 35			Hire Age Over 35		
Years of Service	Male	Female	Years of Service	Male	Female
0	29.00%	29.00%	0	20.00%	20.00%
1	16.25%	20.00%	1	12.00%	15.00%
2	13.00%	16.00%	2	10.00%	12.50%
3	10.40%	12.80%	3	8.50%	10.00%
4	8.45%	10.40%	4	8.50%	9.00%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	11.40%	12.99%	39	5.47%	5.23%
23	10.83%	12.21%	40	4.86%	5.65%
24	10.26%	11.43%	41	4.71%	5.51%
25	9.69%	10.65%	42	4.56%	5.38%
26	9.12%	9.87%	43	4.50%	5.19%
27	8.55%	9.09%	44	4.44%	4.99%
28	8.30%	8.72%	45	4.39%	4.80%
29	8.05%	8.34%	46	4.33%	4.60%
30	7.80%	7.97%	47	4.27%	4.41%
31	7.54%	7.60%	48	4.26%	4.40%
32	7.29%	7.23%	49	4.24%	4.39%
33	6.99%	6.88%	50	3.63%	4.45%
34	6.69%	6.53%	51	3.60%	4.43%
35	6.39%	6.17%	52	3.56%	4.40%
36	6.10%	5.82%	53	3.52%	4.37%
37	5.80%	5.47%	54	4.17%	6.20%
38	5.63%	5.35%	55+	3.00%	5.00%

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Table 3: Disability Rates

	Peace Officer / Firefighter		Others	
Age	Male	Female	Male	Female
< 23	0.0179%	0.0112%	0.0327%	0.0376%
23	0.0244%	0.0153%	0.0360%	0.0400%
24	0.0310%	0.0194%	0.0392%	0.0424%
25	0.0374%	0.0234%	0.0425%	0.0448%
26	0.0440%	0.0275%	0.0456%	0.0472%
27	0.0505%	0.0316%	0.0489%	0.0496%
28	0.0526%	0.0329%	0.0501%	0.0510%
29	0.0548%	0.0343%	0.0513%	0.0524%
30	0.0570%	0.0356%	0.0524%	0.0538%
31	0.0591%	0.0370%	0.0536%	0.0554%
32	0.0612%	0.0383%	0.0548%	0.0568%
33	0.0634%	0.0397%	0.0566%	0.0586%
34	0.0657%	0.0411%	0.0584%	0.0606%
35	0.0679%	0.0425%	0.0602%	0.0624%
36	0.0702%	0.0439%	0.0620%	0.0644%
37	0.0724%	0.0453%	0.0638%	0.0662%
38	0.0757%	0.0473%	0.0669%	0.0696%
39	0.0789%	0.0493%	0.0701%	0.0728%
40	0.0822%	0.0514%	0.0734%	0.0762%
41	0.0854%	0.0534%	0.0765%	0.0794%
42	0.0886%	0.0554%	0.0797%	0.0826%
43	0.0977%	0.0611%	0.0879%	0.0908%
44	0.1066%	0.0667%	0.0962%	0.0990%
45	0.1157%	0.0723%	0.1043%	0.1072%
46	0.1247%	0.0780%	0.1125%	0.1154%
47	0.1337%	0.0836%	0.1208%	0.1236%
48	0.1462%	0.0914%	0.1329%	0.1360%
49	0.1588%	0.0993%	0.1451%	0.1484%
50	0.1714%	0.1071%	0.1572%	0.1608%
51	0.1839%	0.1150%	0.1694%	0.1734%
52	0.1965%	0.1228%	0.1815%	0.1858%
53	0.2294%	0.1434%	0.2132%	0.2168%
54	0.2624%	0.1640%	0.2450%	0.2478%

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Table 4a: Retirement Rates for Peace Officer / Firefighter

	Reduced		Unreduced	
Age	Male	Female	Male	Female
< 47	N/A	N/A	8.80%	6.00%
47	N/A	N/A	8.80%	15.00%
48	N/A	N/A	14.30%	15.00%
49	N/A	N/A	14.30%	15.00%
50	5.00%	5.00%	16.50%	15.00%
51	5.00%	7.00%	16.50%	15.00%
52	7.00%	7.00%	20.35%	15.00%
53	7.00%	7.00%	20.35%	15.00%
54	7.00%	35.00%	20.35%	25.00%
55	7.00%	8.00%	27.50%	20.00%
56	7.00%	8.00%	27.50%	15.00%
57	7.00%	8.00%	27.50%	15.00%
58	7.00%	8.00%	27.50%	15.00%
59	20.00%	20.00%	27.50%	15.00%
60	N/A	N/A	33.00%	25.00%
61	N/A	N/A	27.50%	20.00%
62	N/A	N/A	27.50%	30.00%
63	N/A	N/A	27.50%	50.00%
64	N/A	N/A	22.00%	50.00%
65	N/A	N/A	22.00%	50.00%
66	N/A	N/A	27.50%	50.00%
67	N/A	N/A	55.00%	50.00%
68	N/A	N/A	55.00%	50.00%
69	N/A	N/A	55.00%	50.00%
70+	N/A	N/A	100.00%	100.00%

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Table 4b: Retirement Rates for Others

	Reduced		Unreduced	
Age	Male	Female	Male	Female
< 50	N/A	N/A	11.00%	11.00%
50	6.00%	8.00%	33.00%	38.50%
51	6.00%	8.00%	35.75%	38.50%
52	9.00%	8.00%	35.75%	38.50%
53	6.00%	8.00%	35.75%	38.50%
54	20.00%	15.00%	38.50%	38.50%
55	6.00%	6.00%	33.00%	33.00%
56	6.00%	6.00%	22.00%	22.00%
57	6.00%	6.00%	22.00%	19.80%
58	6.00%	6.00%	22.00%	19.80%
59	15.00%	20.00%	22.00%	19.80%
60	N/A	N/A	22.00%	23.10%
61	N/A	N/A	22.00%	22.00%
62	N/A	N/A	22.00%	22.00%
63	N/A	N/A	22.00%	22.00%
64	N/A	N/A	22.00%	22.00%
65	N/A	N/A	24.75%	28.60%
66	N/A	N/A	27.50%	28.60%
67	N/A	N/A	22.00%	24.20%
68	N/A	N/A	24.75%	24.20%
69	N/A	N/A	27.50%	24.20%
70	N/A	N/A	27.50%	24.20%
71	N/A	N/A	27.50%	24.20%
72	N/A	N/A	27.50%	27.50%
73	N/A	N/A	27.50%	27.50%
74	N/A	N/A	27.50%	38.50%
75	N/A	N/A	55.00%	55.00%
76	N/A	N/A	55.00%	55.00%
77	N/A	N/A	55.00%	55.00%
78	N/A	N/A	55.00%	55.00%
79	N/A	N/A	55.00%	55.00%
80+	N/A	N/A	100.00%	100.00%

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Section 6: Actuarial Standard of Practice No. 51

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities, current contribution requirements, and the funded status of the plan. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the plan. Understanding the risks to the funding of the plan is important.

Actuarial Standard of Practice No. 51 (ASOP 51)[1] requires certain disclosures of potential risks to the plan and provides useful information for intended users of actuarial reports that determine plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is negative, but all risk should be understood and accepted based on knowledge, judgement, and educated decisions. Future measurements may deviate in ways that produce positive or negative financial impacts to the plan.

In the actuary's professional judgment, the following risks may reasonably be anticipated to significantly affect the pension plan's future financial condition and contribution requirements.

- Investment Risk – potential that the investment return will be different than the 7.38% expected in the actuarial valuation
- Contribution Risk – potential that the contribution actually made will be different than the actuarially determined contribution
- Long-Term Return on Investment Risk – potential that changes in long-term capital market assumptions or the plan's asset allocation will create the need to update the long-term return on investment assumption
- Longevity Risk – potential that participants live longer than expected compared to the valuation mortality assumptions
- Salary Increase Risk – potential that future salaries will be different than expected in the actuarial valuation
- Inflation Risk – potential that the consumer price index (CPI) for urban wage earners and clerical workers for Anchorage is different than the 2.5% assumed in the valuation
- Other Demographic Risk – potential that other demographic experience will be different than expected

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the plan. **This list is not all-inclusive**; it is an attempt to identify the more significant risks and how those risks might affect the results shown in this report.

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the plan sponsor to make contributions to the plan when due, or to assess the likelihood or consequences of potential future changes in law. In addition, this valuation report is not intended to provide investment advice or to provide guidance on the management or reduction of risk.

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[1] ASOP 51 does not apply to the healthcare portion of the plan. Accordingly, all figures in this section relate to the pension portion.

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Assessment of Risks

Investment Risk

Plan costs are very sensitive to the market return.

- Any return on assets lower than assumed will increase costs.
- The plan uses an actuarial value of assets that smooths gains and losses on market returns over a five-year period to help control some of the volatility in costs due to investment risk.
- Historical experience of actual returns is shown in Section 2.4 of this report. This historical experience illustrates how returns can vary over time.

Contribution Risk

There is a risk to the plan when the employer's and/or State's actual contribution amount and the actuarially determined contribution differ.

- If the actual contribution is lower than the actuarially determined contribution, the plan may not be sustainable in the long term.
- Any underpayment of the contribution will increase future contribution amounts to help pay off the additional Unfunded Actuarial Accrued Liability associated with the underpayment(s).
- As long as the Board consistently adopts the actuarially determined contributions, this risk is mitigated due to Alaska statutes requiring the State to contribute additional funds necessary to pay the total contributions adopted by the Board.

Long-Term Return on Investment Risk

Inherent in the long-term return on investment assumption is the expectation that the current rate will be used until the last benefit payment of the plan is made. There is a risk that sustained changes in economic conditions, changes in long-term future capital market assumptions, or changes to the plan's asset allocation will necessitate an update to the long-term return on investment assumption used.

- Under a lower long-term return on investment assumption, less investment return is available to pay plan benefits. This may lead to a need for increased employer contributions.
- The liabilities will be higher at a lower assumed rate of return because future benefits will have a lower discount rate applied when calculating the present value.
- A 1% decrease in the long-term return on investment assumption will increase actuarial accrued liability by approximately 11%.
- This risk may be increased due to the plan being closed to new entrants. As the plan continues to mature, the magnitude of negative cash flow discussed in the Plan Maturity Measures later in this section will grow, thereby creating a need for more liquid assets that may not garner the same long-term return as currently assumed.

Longevity Risk

Plan costs will be increased as participants are expected to live longer.

- Benefits are paid over a longer lifetime when life expectancy is expected to increase. The longer duration of payments leads to higher liabilities.
- Health care has been improving, which affects the life expectancy of participants. As health care improves, leading to longer life expectancies, costs to the plan could increase.

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- The mortality assumption for the plan mitigates this risk by assuming future improvement in mortality. However, any improvement in future mortality greater than that expected by the current mortality assumption would lead to increased costs for the plan.
- The Postretirement Pension Adjustments and Alaska Cost-of-Living Allowance increase longevity risk because members who live longer than expected will incur more benefit payment increases than expected and therefore increase costs.

Salary Increase Risk

Plan costs will be increased if actual salary increases are larger than expected.

- Higher-than-expected salary increases will produce higher benefits.
- The higher benefits may be partially offset by increased employee contributions due to higher salaries.
- If future payroll grows at a rate different than assumed, contributions as a percentage of payroll will be affected.

Inflation Risk

Plan costs will be increased if the actual CPI for Anchorage is greater than the 2.5% assumed in the valuation.

- Retirement benefits will be greater than expected if the CPI is greater than the assumed rate, which will increase costs.
- This risk is mitigated by the 75% and 50% of CPI provisions and the 9% and 6% maximums.
- This risk is also mitigated by the age and time in payment requirements to receive an increase.
- Inflation risk may be associated with the interaction of inflation with other assumptions, but this is not significant as a standalone assumption, and therefore is considered as part of the associated assumption risk instead of being discussed here.

Other Demographic Risk

The plan is subject to risks associated with other demographic assumptions (e.g., retirement, termination, and retired members remaining in Alaska assumptions). Differences between actual and expected experience for these assumptions tend to have less impact on the overall costs of the plan. The demographic assumptions used in the valuation are re-evaluated regularly as part of the four-year experience studies to ensure the assumptions are consistent with long-term expectations.

Historical Information

Monitoring certain information over time may help understand risks faced by the plan. Historical information is included throughout this report. Some examples are:

- Funded Ratio History shown in the Executive Summary illustrates how the plan's funded status (comparison of actuarial accrued liabilities to actuarial value of assets) has changed over time.
- Section 1.6 shows historical analysis of financial experience including how contribution rates have changed over time.
- Section 2.4 shows the volatility of asset returns over time.
- Section 4 includes various historical information showing how member census data has changed over time.

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Plan Maturity Measures

There are certain measures that may aid in understanding the significant risks to the plan.

Ratio of Retired Liability to Total Liability ($'s in $000's)	June 30, 2020	June 30, 2021
1. Retiree and Beneficiary Accrued Liability	$ 10,472,466	$ 10,774,140
2. Total Accrued Liability	$ 15,279,525	$ 15,419,975
3. Ratio, (1) ÷ (2)	68.5%	69.9%

A high percentage of liability concentrated on participants in pay status indicates a mature plan (often a ratio above 60% - 65%). Because the plan was closed to new entrants in 2006, we expect the percentage in item #3 to continue to increase over time. An increasing percentage may indicate a need for a less risky asset allocation, which may lead to a lower long-term return on asset assumption and increased costs. Higher percentages may also indicate greater investment risk as benefit payments may be greater than contributions creating an increased reliance on investment returns. This ratio should be monitored each year in the future.

Ratio of Cash Flow to Assets ($'s in $000's)	FYE June 30, 2020	FYE June 30, 2021
1. Contributions	$ 504,029	$ 586,737
2. Benefit Payments	895,523	930,006
3. Cash Flow, (1) - (2)	$ (391,494)	$ (343,269)
4. Fair Value of Assets	$ 9,469,161	$ 11,912,309
5. Ratio, (3) ÷ (4)	(4.1%)	(2.9%)

When this cash flow ratio is negative, more cash is being paid out than deposited in the trust. Negative cash flow indicates the trust needs to rely on investment returns to cover benefit payments and / or may need to invest in more liquid assets to cover the benefit payments. More liquid assets may not generate the same returns as less liquid assets, which can increase the investment risk. Currently, the low magnitude of the ratio implies there may already be enough liquid assets to cover the benefit payments, less investment return is needed to cover the shortfall, or only a small portion of assets will need to be converted to cash. Therefore, the investment risk is likely not amplified at this time. However, due to the plan being closed, we expect this measure to become increasingly negative over time. This maturity measure should be monitored in the future.

Contribution Volatility ($'s in $000's)	June 30, 2020	June 30, 2021
1. Fair Value of Assets	$ 9,469,161	$ 11,912,309
2. DB/DCR Payroll	$ 2,373,078	$ 2,406,757
3. Asset to Payroll Ratio, (1) ÷ (2)	399.0%	495.0%
4. Accrued Liability	$ 15,279,525	$ 15,419,975
5. Liability to Payroll Ratio, (4) ÷ (2)	643.9%	640.7%

Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 10% may experience twice the contribution volatility due to investment return volatility than a plan with an asset-to-payroll ratio of 5%. Plans that have higher liability-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, if an assumption change increases the liability of two plans by the same percent, the plan with a liability-to-payroll ratio of 10% may experience twice the contribution volatility than a plan with a liability-to-payroll ratio of 5%.

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Glossary of Terms

Actuarial Accrued Liability

Total accumulated cost to fund pension or postemployment benefits arising from service in all prior years.

Actuarial Cost Method

Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension or postemployment plan for a group of plan members to the years of service that give rise to that cost.

Actuarial Present Value of Projected Benefits

Amount which, together with future interest, is expected to be sufficient to pay all future benefits.

Actuarial Valuation

Study of probable amounts of future pension or postemployment benefits and the necessary amount of contributions to fund those benefits.

Actuary

Person who performs mathematical calculations pertaining to pension and insurance benefits based on specific procedures and assumptions.

GASB 67 and 68

Governmental Accounting Standards Board Statement Number 67 amends Number 25 effective for the fiscal year beginning after June 15, 2013 and defines new financial reporting requirements for public pension plans.

Governmental Accounting Standards Board Statement Number 68 amends Number 27 effective for fiscal years beginning after June 15, 2014 and defines new accounting and financial reporting requirements for employers sponsoring public pension plans.

GASB 74 and 75

Governmental Accounting Standards Board Statement Number 74 amends Number 43 effective for the fiscal year beginning after June 15, 2016 and defines new financial reporting requirements for public postemployment benefit plans.

Governmental Accounting Standards Board Statement Number 75 amends Number 45 effective for fiscal years beginning after June 15, 2017 and defines new accounting and financial reporting requirements for employers sponsoring public postemployment benefit plans.

Normal Cost

That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual participant or the plan as a whole.

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Rate Payroll

Members' earnings used to determine contribution rates.

Unfunded Actuarial Accrued Liability (UAAL)

The portion of the actuarial accrued liability not offset by plan assets.

Valuation Payroll

Members' earnings used to determine Normal Cost and Actuarial Accrued Liability.

Vested Benefits

Benefits which are unconditionally guaranteed regardless of employment.

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BUCK

State of Alaska

Public Employees' Retirement System Defined Contribution Retirement Plan

For Occupational Death & Disability and Retiree Medical Benefits

Actuarial Valuation Report

As of June 30, 2021

January 2022

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January 7, 2022

State of Alaska
The Alaska Retirement Management Board
The Department of Revenue, Treasury Division
The Department of Administration, Division of Retirement and Benefits
P.O. Box 110203
Juneau, AK 99811-0203

Certification of Actuarial Valuation

Dear Members of The Alaska Retirement Management Board, The Department of Revenue and The Department of Administration:

This report summarizes the annual actuarial valuation results of the State of Alaska Public Employees' Retirement System Defined Contribution Retirement (PERS DCR) Plan as of June 30, 2021 performed by Buck Global, LLC (Buck).

The actuarial valuation is based on financial information provided in the financial statements audited by KPMG LLP, member data provided by the Division of Retirement and Benefits, and medical enrollment data provided by the healthcare claims administrator (Aetna), as summarized in this report. The benefits considered are those delineated in Alaska statutes effective June 30, 2021. The actuary did not verify the data submitted, but did perform tests for consistency and reasonableness.

All costs, liabilities and other factors under PERS DCR were determined in accordance with generally accepted actuarial principles and procedures. An actuarial cost method is used to measure the actuarial liabilities which we believe is reasonable. Buck is solely responsible for the actuarial data and actuarial results presented in this report. This report fully and fairly discloses the actuarial position of PERS DCR as of June 30, 2021.

PERS DCR is funded by Employer Contributions in accordance with the funding policy adopted by the Alaska Retirement Management Board (Board). The funding objective for PERS DCR is to pay required contributions that remain level as a percent of PERS DCR compensation. The Board has also established a funding policy objective that the required contributions be sufficient to pay the Normal Costs of active plan members, plan expenses, and amortize the Unfunded Actuarial Accrued Liability as a level percent of PERS DCR compensation over closed layered 25-year periods. This objective is currently being met and is projected to continue to be met as required by the Alaska State statutes. Absent future gains/losses, actuarially determined contributions are expected to remain level as a percent of pay and the overall funded status is expected to remain at or above 100%.

The Board and staff of the State of Alaska may use this report for the review of the operations of PERS DCR. Use of this report for any other purpose or by anyone other than the Board or staff of the State of Alaska may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without the review by Buck.

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Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the actuarial assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. In particular, retiree group benefits models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of this valuation.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the plan. The actuary performs an analysis of plan experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience. The last full experience analysis was performed for the period July 1, 2013 to June 30, 2017. Based on that experience study, the Board adopted new assumptions effective beginning with the June 30, 2018 valuation to better reflect expected future experience. Based on our annual analysis of recent claims experience, changes were made to the per capita claims cost rates effective June 30, 2021 to better reflect expected future healthcare experience. A summary of the actuarial assumptions and methods used in this actuarial valuation is shown in Sections 4.2 and 4.3. We certify that the assumptions and methods described in Sections 4.2 and 4.3 of this report meet the requirements of all applicable Actuarial Standards of Practice.

Governmental Accounting Standards Board (GASB) Statement No. 74 (GASB 74) was effective for PERS DCR beginning with fiscal year ending June 30, 2017, and GASB 75 was effective beginning with fiscal year ending June 30, 2018. Separate GASB 74 and GASB 75 reports have been prepared.

Assessment of Risks

Actuarial Standard of Practice No. 51 (ASOP 51) applies to actuaries performing funding calculations related to a pension plan. ASOP 51 does not apply to actuaries performing services in connection with other post-employment benefits, such as medical benefits. Accordingly, ASOP 51 does not apply to the retiree medical portion of PERS DCR. We also believe ASOP 51 does not apply to the occupational death & disability portion of PERS DCR. Therefore, information related to ASOP 51 is not included in this report. However, it may be beneficial to review the ASOP 51 information provided in the PERS valuation report for information on risks that may also relate to the occupational death & disability benefits provided by this plan.

Use of Models

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding methods specified in this report. The output from the third-party vendor software is used as input to an internally developed model that applies applicable funding methods and policies to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal model are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts

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within Buck who are familiar with applicable funding methods, as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking and review are completed. Significant changes to the internal model that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

Buck used manual rate models to determine relative plan values for the defined benefit (DB) retiree medical plan and the DCR retiree medical plan, and to reflect the different Medicare coordination methods between the two plans. The manual rate models are intended to provide benchmark data and pricing capabilities, calculate per capita costs, and calculate actuarial values of different commercial health plans. Buck relied on the models, which were developed using industry data by actuaries and consultants at OptumInsight.

COVID-19

The potential impact of the ongoing COVID-19 pandemic on costs and liabilities was considered and an adjustment was made in setting the medical per capita claims cost assumption. FY20 medical claims were adjusted for a COVID-19 related decline in claims during the last four months (March – June) of FY20. FY21 medical claims were adjusted for a COVID-19 related decline in those claims during the fiscal year. A more detailed explanation on these adjustments is shown in Sections 4.2 and 4.3 and in the valuation report for the DB plan.

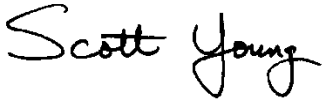
This report was prepared under my supervision and in accordance with all applicable Actuarial Standards of Practice. I am a Fellow of the Society of Actuaries, an Enrolled Actuary, a Fellow of the Conference of Consulting Actuaries, and a Member of the American Academy of Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

I am available to discuss this report with you at your convenience. I can be reached at 602-803-6174.

Respectfully submitted,

Principal
Buck

The undersigned actuary is responsible for all assumptions related to the average annual per capita health claims cost and the health care cost trend rates, and hereby affirms his qualification to render opinions in such matters in accordance with the Qualification Standards of the American Academy of Actuaries.



Scott Young, FSA, EA, MAAA, FCA
Director
Buck

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Executive Summary

Overview

The State of Alaska Public Employees' Retirement System Defined Contribution Retirement (PERS DCR) Plan provides occupational death & disability and retiree medical benefits to eligible members hired after June 30, 2006 or who have elected participation in this plan. The Commissioner of the Department of Administration is responsible for administering the plan. The Alaska Retirement Management Board has fiduciary responsibility over the assets of the plan. This report presents the results of the actuarial valuation of PERS DCR as of the valuation date of June 30, 2021.

Purpose

An actuarial valuation is performed on the plan annually as of the end of the fiscal year. The main purposes of the actuarial valuation detailed in this report are:

1. To determine the Employer contribution necessary to meet the Board's funding policy for the plan;
2. To disclose the funding assets and liability measures as of the valuation date;
3. To review the current funded status of the plan and assess the funded status as an appropriate measure for determining actuarially determined contributions;
4. To compare actual and expected experience under the plan during the last fiscal year; and
5. To report trends in contributions, assets, liabilities, and funded status over the last several years.

The actuarial valuation provides a "snapshot" of the funded position of PERS DCR based on the plan provisions, membership data, assets, and actuarial methods and assumptions as of the valuation date.

Funded Status

Where presented, references to "funded ratio" and "unfunded actuarial accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Funded Status as of June 30 ($'s in 000's)		2020	2021
Occupational Death & Disability			
a.	Actuarial Accrued Liability	$ 10,634	$ 11,740
b.	Valuation Assets	43,029	53,075
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ (32,395)	$ (41,335)
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	404.6%	452.1%
e.	Fair Value of Assets	$ 42,091	$ 60,145
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	395.8%	512.3%

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Funded Status as of June 30 ($'s in 000's)		2020	2021
Retiree Medical			
a.	Actuarial Accrued Liability	$ 150,701	$ 168,472
b.	Valuation Assets	144,747	180,536
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ 5,954	$ (12,064)
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	96.0%	107.2%
e.	Fair Value of Assets	$ 141,569	$ 204,555
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	93.9%	121.4%
Total			
a.	Actuarial Accrued Liability	$ 161,335	$ 180,212
b.	Valuation Assets	187,776	233,611
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ (26,441)	$ (53,399)
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	116.4%	129.6%
e.	Fair Value of Assets	$ 183,660	$ 264,700
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	113.8%	146.9%

The key reasons for the change in the funded status are explained below. The funded status for healthcare benefits is not necessarily an appropriate measure to confirm that assets are sufficient to settle health plan obligations as there are no available financial instruments for purchase. Future experience is likely to vary from assumptions so there is potential for actuarial gains or losses.

1. **Investment Experience**

   The approximate FY21 investment return based on fair value of assets was 29.6% compared to the expected investment return of 7.38% (net of investment expenses of approximately 0.29%). This resulted in a gain of approximately $43,414,000 to the plan from investment experience. The asset valuation method recognizes 20% of this gain ($8,683,000) this year and an additional 20% in each of the next 4 years. In addition, 20% of the FY17 investment gain, 20% of the FY18 investment loss, 20% of the FY19 investment loss, and 20% of the FY20 investment loss were recognized this year. The approximate FY21 asset return based on actuarial value of assets was 11.3% compared to the expected asset return of 7.38% (net of investment expenses).

2. **Salary Increases**

   Salary increases for continuing active members during FY21 were higher than anticipated based on the valuation assumptions, resulting in a liability loss of approximately $8,000.

3. **Demographic Experience**

   The number of active members increased 4.4% from 22,923 at June 30, 2020 to 23,933 at June 30, 2021. The average age of active members increased from 41.21 to 41.26 and average credited service increased from 4.66 to 4.93 years.

   The demographic experience gains/losses are shown on page 4.

4. **Retiree Medical Claims Experience**

   Please refer to the State of Alaska Public Employees' Retirement System (PERS) Defined Benefit Plan Actuarial Valuation Report as of June 30, 2021 for a full description of the assumptions and costs of the retiree medical plan. Adjustments to these costs and assumptions are described in this report.

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The recent claims experience described in Section 4.2 of this report (Section 5.2 of the PERS report) created an actuarial gain of approximately $7,066,000.

5. **Changes in Methods Since the Prior Valuation**

   There were no changes in actuarial methods since the prior valuation.

6. **Changes in Assumptions Since the Prior Valuation**

   Healthcare claim costs are updated annually as described in Section 4.2. The amounts included in Normal Cost for administrative expenses were updated based on the last two years of actual administrative expenses paid from plan assets. There were no other changes in actuarial assumptions since the prior valuation.

7. **Changes in Benefit Provisions Since the Prior Valuation**

   Starting in 2022, prior authorization will be required for certain specialty medications. This change created an actuarial gain of approximately $2,029,000. There have been no other changes in benefit provisions valued since the prior valuation.

Comparative Summary of Contribution Rates

Occupational Death & Disability	FY 2023	FY 2024
Peace Officer/Firefighter		
a. Employer Normal Cost Rate	0.68%	0.68%
b. Past Service Cost Rate	(0.19)%	(0.24)%
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	0.68%	0.68%
Others		
a. Employer Normal Cost Rate	0.30%	0.30%
b. Past Service Cost Rate	(0.16)%	(0.19)%
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	0.30%	0.30%

Retiree Medical	FY 2023	FY 2024
a. Employer Normal Cost Rate	1.05%	1.01%
b. Past Service Cost Rate	0.05%	(0.02)%
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	1.10%	1.01%

Total	FY 2023	FY 2024
Peace Officer/Firefighter		
a. Employer Normal Cost Rate	1.73%	1.69%
b. Past Service Cost Rate	0.05%	(0.02)%
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	1.78%	1.69%
Others		
a. Employer Normal Cost Rate	1.35%	1.31%
b. Past Service Cost Rate	0.05%	(0.02)%
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	1.40%	1.31%

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The exhibit below shows the historical Board-adopted employer contribution rates for PERS DCR.

		Total Employer Contribution Rate		
Valuation Date	Fiscal Year	Occupational Death & Disability (PF / Others)	Retiree Medical	Total (PF / Others)
June 30, 2008	FY11	1.18% / 0.31%	0.55%	1.73% / 0.86%
June 30, 2009	FY12	0.97% / 0.11%	0.51%	1.48% / 0.62%
June 30, 2010	FY13	0.99% / 0.14%	0.48%	1.47% / 0.62%
June 30, 2011	FY14	1.14% / 0.20%	0.48%	1.62% / 0.68%
June 30, 2012	FY15	1.06% / 0.22%	1.66%	2.72% / 1.88%
June 30, 2013	FY16	1.05% / 0.22%	1.68%	2.73% / 1.90%
June 30, 2014	FY17	0.49% / 0.17%	1.18%	1.67% / 1.35%
June 30, 2015	FY18	0.43% / 0.16%	1.03%	1.46% / 1.19%
June 30, 2016	FY19	0.76% / 0.26%	0.94%	1.70% / 1.20%
June 30, 2017	FY20	0.72% / 0.26%	1.32%	2.04% / 1.58%
June 30, 2018	FY21	0.70% / 0.31%	1.27%	1.97% / 1.58%
June 30, 2019	FY22	0.68% / 0.31%	1.07%	1.75% / 1.38%
June 30, 2020	FY23	0.68% / 0.30%	1.10%	1.78% / 1.40%
June 30, 2021	FY24	TBD	TBD	TBD

Summary of Actuarial Accrued Liability Gain/(Loss)

The following table shows the FY21 gain/(loss) on actuarial accrued liability as of June 30, 2021 ($'s in 000's):

	Occupational Death & Disability	Retiree Medical	Total
Retirement Experience	$ 0	$ (521)	$ (521)
Termination Experience	(90)	2,669	2,579
Disability Experience	3,346	341	3,687
Active Mortality Experience	1,900	104	2,004
Inactive Mortality Experience	(21)	432	411
Salary Increases	(8)	N/A	(8)
New Entrants	(89)	(1,320)	(1,409)
Rehires	(47)	(3,068)	(3,115)
Transfers Between P/F and Others	(31)	(52)	(83)
Benefit Payments Different than Expected	145	209	354
Per Capita Claims Costs	N/A	7,066	7,066
Prescription Drug Plan Changes	N/A	2,029	2,029
Miscellaneous[1]	(362)	1,560	1,198
Total	$ 4,743	$ 9,449	$ 14,192

[1] Includes the effects of various data changes that are typical when new census data is received for the annual valuation, as well as other items that do not fit neatly into any of the other categories.

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Section 1: Actuarial Funding Results

Section 1.1: Actuarial Liabilities and Normal Cost ($'s in 000's)

Peace Officer / Firefighter

As of June 30, 2021	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Occupational Death Benefits	$ 3,705	$ (12)
Occupational Disability Benefits	12,254	3,750
Medical and Prescription Drug Benefits	43,037	22,460
Medicare Part D Subsidy	(8,159)	(4,294)
Subtotal	$ 50,837	$ 21,904
Benefit Recipients		
Survivor Benefits	$ 323	$ 323
Disability Benefits	4,865	4,865
Medical and Prescription Drug Benefits	788	788
Medicare Part D Subsidy	(138)	(138)
Subtotal	$ 5,838	$ 5,838
Total	**$ 56,675**	**$ 27,742**
Total Occupational Death & Disability	**$ 21,147**	**$ 8,926**
Total Retiree Medical, Net of Part D Subsidy	**$ 35,528**	**$ 18,816**
Total Retiree Medical, Gross of Part D Subsidy	**$ 43,825**	**$ 23,248**

As of June 30, 2021	Normal Cost
Active Members	
Occupational Death Benefits	$ 485
Occupational Disability Benefits	1,019
Medical and Prescription Drug Benefits	2,300
Medicare Part D Subsidy	(434)
Subtotal	$ 3,370
Administrative Expense Load	
Occupational Death & Disability	$ 4
Retiree Medical	7
Subtotal	$ 11
Total	**$ 3,381**
Total Occupational Death & Disability	**$ 1,508**
Total Retiree Medical, Net of Part D Subsidy	**$ 1,873**
Total Retiree Medical, Gross of Part D Subsidy	**$ 2,307**

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Section 1.1: Actuarial Liabilities and Normal Cost ($'s in 000's)

Others

As of June 30, 2021	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Occupational Death Benefits	$ 9,151	$ 641
Occupational Disability Benefits	16,372	1,618
Medical and Prescription Drug Benefits	286,967	182,893
Medicare Part D Subsidy	(59,007)	(37,778)
Subtotal	$ 253,483	$ 147,374
Benefit Recipients		
Survivor Benefits	$ 0	$ 0
Disability Benefits	555	555
Medical and Prescription Drug Benefits	5,746	5,746
Medicare Part D Subsidy	(1,205)	(1,205)
Subtotal	$ 5,096	$ 5,096
Total	**$ 258,579**	**$ 152,470**
Total Occupational Death & Disability	**$ 26,078**	**$ 2,814**
Total Retiree Medical, Net of Part D Subsidy	**$ 232,501**	**$ 149,656**
Total Retiree Medical, Gross of Part D Subsidy	**$ 292,713**	**$ 188,639**

As of June 30, 2021	Normal Cost
Active Members	
Occupational Death Benefits	$ 1,449
Occupational Disability Benefits	2,503
Medical and Prescription Drug Benefits	17,248
Medicare Part D Subsidy	(3,527)
Subtotal	$ 17,673
Administrative Expense Load	
Occupational Death & Disability	$ 12
Retiree Medical	17
Subtotal	$ 29
Total	**$ 17,702**
Total Occupational Death & Disability	**$ 3,964**
Total Retiree Medical, Net of Part D Subsidy	**$ 13,738**
Total Retiree Medical, Gross of Part D Subsidy	**$ 17,265**

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Section 1.1: Actuarial Liabilities and Normal Cost ($'s in 000's)

All Members

As of June 30, 2021	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Occupational Death Benefits	$ 12,856	$ 629
Occupational Disability Benefits	28,626	5,368
Medical and Prescription Drug Benefits	330,004	205,353
Medicare Part D Subsidy	(67,166)	(42,072)
Subtotal	$ 304,320	$ 169,278
Benefit Recipients		
Survivor Benefits	$ 323	$ 323
Disability Benefits	5,420	5,420
Medical and Prescription Drug Benefits	6,534	6,534
Medicare Part D Subsidy	(1,343)	(1,343)
Subtotal	$ 10,934	$ 10,934
Total	**$ 315,254**	**$ 180,212**
Total Occupational Death & Disability	**$ 47,225**	**$ 11,740**
Total Retiree Medical, Net of Part D Subsidy	**$ 268,029**	**$ 168,472**
Total Retiree Medical, Gross of Part D Subsidy	**$ 336,538**	**$ 211,887**

As of June 30, 2021	Normal Cost
Active Members	
Occupational Death Benefits	$ 1,934
Occupational Disability Benefits	3,522
Medical and Prescription Drug Benefits	19,548
Medicare Part D Subsidy	(3,961)
Subtotal	$ 21,043
Administrative Expense Load	
Occupational Death & Disability	$ 16
Retiree Medical	24
Subtotal	$ 40
Total	**$ 21,083**
Total Occupational Death & Disability	**$ 5,472**
Total Retiree Medical, Net of Part D Subsidy	**$ 15,611**
Total Retiree Medical, Gross of Part D Subsidy	**$ 19,572**

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Section 1.2: Actuarial Contributions as of June 30, 2021 for FY24 ($'s in 000's)

Peace Officer / Firefighter

Normal Cost Rate	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	$ 1,508	$ 1,873	$ 3,381
2. DCR Plan Rate Payroll Projected for FY22	220,974	220,974	220,974
3. Employer Normal Cost Rate, (1) ÷ (2)	0.68%	0.85%	1.53%
Past Service Rate			
1. Actuarial Accrued Liability	$ 8,926	$ 18,816	$ 27,742
2. Valuation Assets	15,959	20,163	36,122
3. Unfunded Actuarial Accrued Liability, (1) - (2)	$ (7,033)	$ (1,347)	$ (8,380)
4. Funded Ratio based on Valuation Assets	178.8%	107.2%	130.2%
5. Past Service Cost Amortization Payment	(522)	(47)	(569)
6. DCR Plan Rate Payroll Projected for FY22	220,974	220,974	220,974
7. Past Service Cost Rate, (5) ÷ (6)	(0.24%)	(0.02%)	(0.26%)
Total Employer Contribution Rate, not less than Normal Cost Rate	**0.68%**	**0.85%**	**1.53%**

The table below shows the total employer contribution rate based on total DB and DCR Plan payroll for informational purposes.

Total Employer Contribution Rate as Percent of Total Payroll	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	$ 1,508	$ 1,873	$ 3,381
2. Total DB and DCR Plan Rate Payroll Projected for FY22	368,713	368,713	368,713
3. Employer Normal Cost Rate, (1) ÷ (2)	0.41%	0.51%	0.92%
4. Past Service Cost Amortization Payment	(522)	(47)	(569)
5. Past Service Cost Rate, (4) ÷ (2)	(0.14%)	(0.01%)	(0.15%)
Total Employer Contribution Rate, not less than Normal Cost Rate	**0.41%**	**0.51%**	**0.92%**

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Peace Officer / Firefighter

Schedule of Past Service Cost Amortizations - Occupational Death & Disability ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2007	11	$ (100)	$ (93)	$ (10)
FY08 Gain	06/30/2008	12	(586)	(555)	(58)
Change in Assumptions	06/30/2009	13	(104)	(101)	(10)
FY09 Loss	06/30/2009	13	446	433	43
Change in Assumptions	06/30/2010	14	79	77	7
FY10 Gain	06/30/2010	14	(282)	(280)	(26)
FY11 Loss	06/30/2011	15	73	70	6
FY12 Gain	06/30/2012	16	(349)	(354)	(30)
FY13 Gain	06/30/2013	17	(204)	(207)	(17)
Change in Assumptions	06/30/2014	18	(1,274)	(1,303)	(103)
PRPA Modification	06/30/2014	18	(91)	(92)	(7)
FY14 Gain	06/30/2014	18	(95)	(98)	(8)
FY15 Gain	06/30/2015	19	(664)	(679)	(52)
FY16 Loss	06/30/2016	20	4	4	0
FY17 Gain	06/30/2017	21	(525)	(534)	(38)
FY18 Gain	06/30/2018	22	(262)	(264)	(18)
Change in Assumptions	06/30/2018	22	(633)	(639)	(44)
FY19 Loss	06/30/2019	23	219	220	15
FY20 Gain	06/30/2020	24	(792)	(796)	(53)
FY21 Gain	06/30/2021	25	(1,842)	(1,842)	(119)
Total				**$ (7,033)**	**$ (522)**

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Peace Officer / Firefighter

Schedule of Past Service Cost Amortizations - Retiree Medical ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2007	11	$ (21)	$ (23)	$ (3)
Change in Assumptions	06/30/2008	12	17	15	2
FY08 Gain	06/30/2008	12	(62)	(59)	(6)
Change in Assumptions	06/30/2009	13	(8)	(8)	(1)
FY09 Gain	06/30/2009	13	(38)	(38)	(4)
Change in Assumptions	06/30/2010	14	41	40	4
FY10 Gain	06/30/2010	14	(46)	(42)	(4)
FY11 Loss	06/30/2011	15	70	68	6
Change in Assumptions	06/30/2012	16	3,085	3,122	266
FY12 Gain	06/30/2012	16	(273)	(275)	(23)
FY13 Loss	06/30/2013	17	880	897	73
Change in Assumptions	06/30/2014	18	(3,034)	(3,100)	(244)
FY14 Loss	06/30/2014	18	1,213	1,240	98
FY15 Gain	06/30/2015	19	(712)	(727)	(55)
EGWP Gain	06/30/2016	20	(1,675)	(1,711)	(126)
FY16 Loss	06/30/2016	20	1,116	1,140	84
Change in Assumptions	06/30/2017	21	2,244	2,280	163
FY17 Gain	06/30/2017	21	(50)	(52)	(4)
FY18 Gain	06/30/2018	22	(231)	(233)	(16)
Change in Assumptions/Methods	06/30/2018	22	(649)	(654)	(45)
FY19 Gain	06/30/2019	23	(1,291)	(1,300)	(88)
Change in Assumptions	06/30/2020	24	1,116	1,121	74
FY20 Gain	06/30/2020	24	(1,082)	(1,087)	(72)
Prescription Drug Plan Changes	06/30/2021	25	(235)	(235)	(15)
FY21 Gain	06/30/2021	25	(1,726)	(1,726)	(111)
Total				**$ (1,347)**	**$ (47)**

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Peace Officer / Firefighter

Schedule of Past Service Cost Amortizations - Total ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2007	11	$ (121)	$ (116)	$ (13)
Change in Assumptions	06/30/2008	12	17	15	2
FY08 Gain	06/30/2008	12	(648)	(614)	(64)
Change in Assumptions	06/30/2009	13	(112)	(109)	(11)
FY09 Loss	06/30/2009	13	408	395	39
Change in Assumptions	06/30/2010	14	120	117	11
FY10 Gain	06/30/2010	14	(328)	(322)	(30)
FY11 Loss	06/30/2011	15	143	138	12
Change in Assumptions	06/30/2012	16	3,085	3,122	266
FY12 Gain	06/30/2012	16	(622)	(629)	(53)
FY13 Loss	06/30/2013	17	676	690	56
Change in Assumptions	06/30/2014	18	(4,308)	(4,403)	(347)
PRPA Modification	06/30/2014	18	(91)	(92)	(7)
FY14 Loss	06/30/2014	18	1,118	1,142	90
FY15 Gain	06/30/2015	19	(1,376)	(1,406)	(107)
EGWP Gain	06/30/2016	20	(1,675)	(1,711)	(126)
FY16 Loss	06/30/2016	20	1,120	1,144	84
Change in Assumptions	06/30/2017	21	2,244	2,280	163
FY17 Gain	06/30/2017	21	(575)	(586)	(42)
FY18 Gain	06/30/2018	22	(493)	(497)	(34)
Change in Assumptions/Methods	06/30/2018	22	(1,282)	(1,293)	(89)
FY19 Gain	06/30/2019	23	(1,072)	(1,080)	(73)
Change in Assumptions	06/30/2020	24	1,116	1,121	74
FY20 Gain	06/30/2020	24	(1,874)	(1,883)	(125)
Prescription Drug Plan Changes	06/30/2021	25	(235)	(235)	(15)
FY21 Gain	06/30/2021	25	(3,568)	(3,568)	(230)
Total				**$ (8,380)**	**$ (569)**

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Section 1.2: Actuarial Contributions as of June 30, 2021 for FY24 ($'s in 000's)

Others

Normal Cost Rate	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	$ 3,964	$ 13,738	$ 17,702
2. DCR Plan Rate Payroll Projected for FY22	1,327,142	1,327,142	1,327,142
3. Employer Normal Cost Rate, (1) ÷ (2)	0.30%	1.03%	1.33%
Past Service Rate			
1. Actuarial Accrued Liability	$ 2,814	$ 149,656	$ 152,470
2. Valuation Assets	37,116	160,373	197,489
3. Unfunded Actuarial Accrued Liability, (1) - (2)	$ (34,302)	$ (10,717)	$ (45,019)
4. Funded Ratio based on Valuation Assets	1,319.0%	107.2%	129.5%
5. Past Service Cost Amortization Payment	(2,515)	(323)	(2,838)
6. DCR Plan Rate Payroll Projected for FY22	1,327,142	1,327,142	1,327,142
7. Past Service Cost Rate, (5) ÷ (6)	(0.19%)	(0.02%)	(0.21%)
Total Employer Contribution Rate, not less than Normal Cost Rate	**0.30%**	**1.03%**	**1.33%**

The table below shows the total employer contribution rate based on total DB and DCR Plan payroll for informational purposes.

Total Employer Contribution Rate as Percent of Total Payroll	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	$ 3,964	$ 13,738	$ 17,702
2. Total DB and DCR Plan Rate Payroll Projected for FY22	2,038,044	2,038,044	2,038,044
3. Employer Normal Cost Rate, (1) ÷ (2)	0.19%	0.68%	0.87%
4. Past Service Cost Amortization Payment	(2,515)	(323)	(2,838)
5. Past Service Cost Rate, (4) ÷ (2)	(0.12%)	(0.02%)	(0.14%)
Total Employer Contribution Rate, not less than Normal Cost Rate	**0.19%**	**0.68%**	**0.87%**

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Others

Schedule of Past Service Cost Amortizations - Occupational Death & Disability ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2007	11	$ (40)	$ (38)	$ (5)
FY08 Gain	06/30/2008	12	(318)	(303)	(32)
Change in Assumptions	06/30/2009	13	(92)	(89)	(9)
FY09 Gain	06/30/2009	13	(1,924)	(1,865)	(185)
Change in Assumptions	06/30/2010	14	24	25	3
FY10 Gain	06/30/2010	14	(994)	(982)	(92)
FY11 Gain	06/30/2011	15	(1,184)	(1,182)	(105)
FY12 Gain	06/30/2012	16	(1,233)	(1,246)	(106)
FY13 Gain	06/30/2013	17	(779)	(794)	(65)
Change in Assumptions	06/30/2014	18	(51)	(51)	(4)
PRPA Modification	06/30/2014	18	(27)	(28)	(2)
FY14 Gain	06/30/2014	18	(2,003)	(2,044)	(161)
FY15 Gain	06/30/2015	19	(1,850)	(1,890)	(143)
FY16 Gain	06/30/2016	20	(2,361)	(2,409)	(177)
FY17 Gain	06/30/2017	21	(2,377)	(2,413)	(172)
FY18 Gain	06/30/2018	22	(2,590)	(2,613)	(182)
Change in Assumptions	06/30/2018	22	(272)	(275)	(19)
FY19 Gain	06/30/2019	23	(3,984)	(4,013)	(272)
FY20 Gain	06/30/2020	24	(4,803)	(4,824)	(318)
FY21 Gain	06/30/2021	25	(7,268)	(7,268)	(469)
Total				**$ (34,302)**	**$ (2,515)**

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Others

Schedule of Past Service Cost Amortizations - Retiree Medical ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2007	11	$ (335)	$ (308)	$ (34)
Change in Assumptions	06/30/2008	12	165	157	16
FY08 Gain	06/30/2008	12	(702)	(664)	(70)
Change in Assumptions	06/30/2009	13	(122)	(118)	(11)
FY09 Gain	06/30/2009	13	(438)	(425)	(42)
Change in Assumptions	06/30/2010	14	(572)	(564)	(53)
FY10 Loss	06/30/2010	14	579	567	53
FY11 Loss	06/30/2011	15	820	823	73
Change in Assumptions	06/30/2012	16	25,180	25,475	2,171
FY12 Loss	06/30/2012	16	1,451	1,466	124
FY13 Loss	06/30/2013	17	9,974	10,159	831
Change in Assumptions	06/30/2014	18	(21,822)	(22,303)	(1,756)
FY14 Loss	06/30/2014	18	7,002	7,157	563
FY15 Gain	06/30/2015	19	(8,726)	(8,923)	(679)
EGWP Gain	06/30/2016	20	(17,884)	(18,239)	(1,342)
FY16 Loss	06/30/2016	20	10,367	10,573	778
Change in Assumptions	06/30/2017	21	21,288	21,613	1,544
FY17 Gain	06/30/2017	21	(1,658)	(1,682)	(120)
FY18 Loss	06/30/2018	22	118	119	8
Change in Assumptions/Methods	06/30/2018	22	(8,993)	(9,070)	(630)
FY19 Gain	06/30/2019	23	(10,841)	(10,922)	(739)
Change in Assumptions	06/30/2020	24	6,369	6,398	423
FY20 Gain	06/30/2020	24	(6,288)	(6,316)	(417)
Prescription Drug Plan Changes	06/30/2021	25	(1,794)	(1,794)	(116)
FY21 Gain	06/30/2021	25	(13,896)	(13,896)	(898)
Total				**$ (10,717)**	**$ (323)**

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Others

Schedule of Past Service Cost Amortizations - Total ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2007	11	$ (375)	$ (346)	$ (39)
Change in Assumptions	06/30/2008	12	165	157	16
FY08 Gain	06/30/2008	12	(1,020)	(967)	(102)
Change in Assumptions	06/30/2009	13	(214)	(207)	(20)
FY09 Gain	06/30/2009	13	(2,362)	(2,290)	(227)
Change in Assumptions	06/30/2010	14	(548)	(539)	(50)
FY10 Gain	06/30/2010	14	(415)	(415)	(39)
FY11 Gain	06/30/2011	15	(364)	(359)	(32)
Change in Assumptions	06/30/2012	16	25,180	25,475	2,171
FY12 Loss	06/30/2012	16	218	220	18
FY13 Loss	06/30/2013	17	9,195	9,365	766
Change in Assumptions	06/30/2014	18	(21,873)	(22,354)	(1,760)
PRPA Modification	06/30/2014	18	(27)	(28)	(2)
FY14 Loss	06/30/2014	18	4,999	5,113	402
FY15 Gain	06/30/2015	19	(10,576)	(10,813)	(822)
EGWP Gain	06/30/2016	20	(17,884)	(18,239)	(1,342)
FY16 Loss	06/30/2016	20	8,006	8,164	601
Change in Assumptions	06/30/2017	21	21,288	21,613	1,544
FY17 Gain	06/30/2017	21	(4,035)	(4,095)	(292)
FY18 Gain	06/30/2018	22	(2,472)	(2,494)	(174)
Change in Assumptions/Methods	06/30/2018	22	(9,265)	(9,345)	(649)
FY19 Gain	06/30/2019	23	(14,825)	(14,935)	(1,011)
Change in Assumptions	06/30/2020	24	6,369	6,398	423
FY20 Gain	06/30/2020	24	(11,091)	(11,140)	(735)
Prescription Drug Plan Changes	06/30/2021	25	(1,794)	(1,794)	(116)
FY21 Gain	06/30/2021	25	(21,164)	(21,164)	(1,367)
Total				**$ (45,019)**	**$ (2,838)**

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Section 1.2: Actuarial Contributions as of June 30, 2021 for FY24 ($'s in 000's)

All Members

Normal Cost Rate	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	$ 5,472	$ 15,611	$ 21,083
2. DCR Plan Rate Payroll Projected for FY22	1,548,116	1,548,116	1,548,116
3. Employer Normal Cost Rate, (1) ÷ (2)	0.35%	1.01%	1.36%

Past Service Rate			
1. Actuarial Accrued Liability	$ 11,740	$ 168,472	$ 180,212
2. Valuation Assets	53,075	180,536	233,611
3. Unfunded Actuarial Accrued Liability, (1) - (2)	$ (41,335)	$ (12,064)	$ (53,399)
4. Funded Ratio based on Valuation Assets	452.1%	107.2%	129.6%
5. Past Service Cost Amortization Payment	(3,037)	(370)	(3,407)
6. DCR Plan Rate Payroll Projected for FY22	1,548,116	1,548,116	1,548,116
7. Past Service Cost Rate, (5) ÷ (6)	(0.20%)	(0.02%)	(0.22%)
Total Employer Contribution Rate, not less than Normal Cost Rate	**0.35%**	**1.01%**	**1.36%**

The table below shows the total employer contribution rate based on total DB and DCR Plan payroll for informational purposes.

Total Employer Contribution Rate as Percent of Total Payroll	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	$ 5,472	$ 15,611	$ 21,083
2. Total DB and DCR Plan Rate Payroll Projected for FY22	2,406,757	2,406,757	2,406,757
3. Employer Normal Cost Rate, (1) ÷ (2)	0.23%	0.65%	0.88%
4. Past Service Cost Amortization Payment	(3,037)	(370)	(3,407)
5. Past Service Cost Rate, (4) ÷ (2)	(0.13%)	(0.01%)	(0.14%)
Total Employer Contribution Rate, not less than Normal Cost Rate	**0.23%**	**0.65%**	**0.88%**

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All Members

Schedule of Past Service Cost Amortizations - Occupational Death & Disability ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2007	11	$ (140)	$ (131)	$ (15)
FY08 Gain	06/30/2008	12	(904)	(858)	(90)
Change in Assumptions	06/30/2009	13	(196)	(190)	(19)
FY09 Gain	06/30/2009	13	(1,478)	(1,432)	(142)
Change in Assumptions	06/30/2010	14	103	102	10
FY10 Gain	06/30/2010	14	(1,276)	(1,262)	(118)
FY11 Gain	06/30/2011	15	(1,111)	(1,112)	(99)
FY12 Gain	06/30/2012	16	(1,582)	(1,600)	(136)
FY13 Gain	06/30/2013	17	(983)	(1,001)	(82)
Change in Assumptions	06/30/2014	18	(1,325)	(1,354)	(107)
PRPA Modification	06/30/2014	18	(118)	(120)	(9)
FY14 Gain	06/30/2014	18	(2,098)	(2,142)	(169)
FY15 Gain	06/30/2015	19	(2,514)	(2,569)	(195)
FY16 Gain	06/30/2016	20	(2,357)	(2,405)	(177)
FY17 Gain	06/30/2017	21	(2,902)	(2,947)	(210)
FY18 Gain	06/30/2018	22	(2,852)	(2,877)	(200)
Change in Assumptions	06/30/2018	22	(905)	(914)	(63)
FY19 Gain	06/30/2019	23	(3,765)	(3,793)	(257)
FY20 Gain	06/30/2020	24	(5,595)	(5,620)	(371)
FY21 Gain	06/30/2021	25	(9,110)	(9,110)	(588)
Total				**$ (41,335)**	**$ (3,037)**

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All Members

Schedule of Past Service Cost Amortizations - Retiree Medical ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2007	11	$ (356)	$ (331)	$ (37)
Change in Assumptions	06/30/2008	12	182	172	18
FY08 Gain	06/30/2008	12	(764)	(723)	(76)
Change in Assumptions	06/30/2009	13	(130)	(126)	(12)
FY09 Gain	06/30/2009	13	(476)	(463)	(46)
Change in Assumptions	06/30/2010	14	(531)	(524)	(49)
FY10 Loss	06/30/2010	14	533	525	49
FY11 Loss	06/30/2011	15	890	891	79
Change in Assumptions	06/30/2012	16	28,265	28,597	2,437
FY12 Loss	06/30/2012	16	1,178	1,191	101
FY13 Loss	06/30/2013	17	10,854	11,056	904
Change in Assumptions	06/30/2014	18	(24,856)	(25,403)	(2,000)
FY14 Loss	06/30/2014	18	8,215	8,397	661
FY15 Gain	06/30/2015	19	(9,438)	(9,650)	(734)
EGWP Gain	06/30/2016	20	(19,559)	(19,950)	(1,468)
FY16 Loss	06/30/2016	20	11,483	11,713	862
Change in Assumptions	06/30/2017	21	23,532	23,893	1,707
FY17 Gain	06/30/2017	21	(1,708)	(1,734)	(124)
FY18 Gain	06/30/2018	22	(113)	(114)	(8)
Change in Assumptions/Methods	06/30/2018	22	(9,642)	(9,724)	(675)
FY19 Gain	06/30/2019	23	(12,132)	(12,222)	(827)
Change in Assumptions	06/30/2020	24	7,485	7,519	497
FY20 Gain	06/30/2020	24	(7,370)	(7,403)	(489)
Prescription Drug Plan Changes	06/30/2021	25	(2,029)	(2,029)	(131)
FY21 Gain	06/30/2021	25	(15,622)	(15,622)	(1,009)
Total				**$ (12,064)**	**$ (370)**

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All Members

Schedule of Past Service Cost Amortizations - Total ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2007	11	$ (496)	$ (462)	$ (52)
Change in Assumptions	06/30/2008	12	182	172	18
FY08 Gain	06/30/2008	12	(1,668)	(1,581)	(166)
Change in Assumptions	06/30/2009	13	(326)	(316)	(31)
FY09 Gain	06/30/2009	13	(1,954)	(1,895)	(188)
Change in Assumptions	06/30/2010	14	(428)	(422)	(39)
FY10 Gain	06/30/2010	14	(743)	(737)	(69)
FY11 Gain	06/30/2011	15	(221)	(221)	(20)
Change in Assumptions	06/30/2012	16	28,265	28,597	2,437
FY12 Gain	06/30/2012	16	(404)	(409)	(35)
FY13 Loss	06/30/2013	17	9,871	10,055	822
Change in Assumptions	06/30/2014	18	(26,181)	(26,757)	(2,107)
PRPA Modification	06/30/2014	18	(118)	(120)	(9)
FY14 Loss	06/30/2014	18	6,117	6,255	492
FY15 Gain	06/30/2015	19	(11,952)	(12,219)	(929)
EGWP Gain	06/30/2016	20	(19,559)	(19,950)	(1,468)
FY16 Loss	06/30/2016	20	9,126	9,308	685
Change in Assumptions	06/30/2017	21	23,532	23,893	1,707
FY17 Gain	06/30/2017	21	(4,610)	(4,681)	(334)
FY18 Gain	06/30/2018	22	(2,965)	(2,991)	(208)
Change in Assumptions/Methods	06/30/2018	22	(10,547)	(10,638)	(738)
FY19 Gain	06/30/2019	23	(15,897)	(16,015)	(1,084)
Change in Assumptions	06/30/2020	24	7,485	7,519	497
FY20 Gain	06/30/2020	24	(12,965)	(13,023)	(860)
Prescription Drug Plan Changes	06/30/2021	25	(2,029)	(2,029)	(131)
FY21 Gain	06/30/2021	25	(24,732)	(24,732)	(1,597)
Total				**$ (53,399)**	**$ (3,407)**

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Section 1.3: Actuarial Gain/(Loss) for FY21 ($'s in 000's)

	Occupational Death & Disability	Retiree Medical	Total
1. Expected Actuarial Accrued Liability			
a. Actuarial Accrued Liability as of June 30, 2020	$ 10,634	$ 150,701	$ 161,335
b. Normal Cost	5,133	15,162	20,295
c. Interest on (a) and (b) at 7.38%	1,164	12,241	13,405
d. Employer Group Waiver Plan	0	60	60
e. Benefit Payments	(431)	(237)	(668)
f. Interest on (d) and (e) at 7.38%, adjusted for timing	(17)	(6)	(23)
g. Assumption/Method Changes	0	0	0
h. Expected Actuarial Accrued Liability as of June 30, 2021 (a) + (b) + (c) + (d) + (e) + (f) + (g)	$ 16,483	$ 177,921	$ 194,404
2. Actual Actuarial Accrued Liability as of June 30, 2021	11,740	168,472	180,212
3. Liability Gain/(Loss), (1)(h) - (2)	**$ 4,743**	**$ 9,449**	**$ 14,192**
4. Expected Actuarial Asset Value			
a. Actuarial Asset Value as of June 30, 2020	$ 43,029	$ 144,747	$ 187,776
b. Interest on (a) at 7.38%	3,176	10,682	13,858
c. Employer Contributions	5,334	18,559	23,893
d. Employer Group Waiver Plan	0	60	60
e. Interest on (c) and (d) at 7.38%, adjusted for timing	193	675	868
f. Benefit Payments	(431)	(237)	(668)
g. Administrative Expenses	(32)	(22)	(54)
h. Interest on (f) and (g) at 7.38%, adjusted for timing	(18)	(9)	(27)
i. Expected Actuarial Asset Value as of June 30, 2021 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	$ 51,251	$ 174,455	$ 225,706
5. Actuarial Asset Value as of June 30, 2021	53,075	180,536	233,611
6. Actuarial Asset Gain/(Loss), (5) - (4)(i)	**$ 1,824**	**$ 6,081**	**$ 7,905**
7. Total Actuarial Gain/(Loss), (3) + (6)	**$ 6,567**	**$ 15,530**	**$ 22,097**
8. Contribution Gain/(Loss)	**$ 2,575**	**$ 2,122**	**$ 4,697**
9. Administrative Expense Gain/(Loss)	**$ (32)**	**$ (1)**	**$ (33)**
10. FY21 Gain/(Loss), (7) + (8) + (9)	**$ 9,110**	**$ 17,651**	**$ 26,761**

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Section 1.4: History of Unfunded Liability and Funded Ratio ($'s in 000's)

Valuation Date	Total Actuarial Accrued Liability	Valuation Assets	Assets as a Percent of Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability (UAAL)
June 30, 2007	$ 759	$ 1,255	165.3%	$ (496)
June 30, 2008	2,018	4,007	198.6%	(1,989)
June 30, 2009	4,316	8,613	199.6%	(4,297)
June 30, 2010	8,038	13,568	168.8%	(5,530)
June 30, 2011	13,251	19,058	143.8%	(5,807)
June 30, 2012	46,921	24,915	53.1%	22,006
June 30, 2013	63,885	31,709	49.6%	32,176
June 30, 2014	53,844	41,461	77.0%	12,383
June 30, 2015	63,732	63,202	99.2%	530
June 30, 2016	77,052	87,027	112.9%	(9,975)
June 30, 2017	117,243	108,503	92.5%	8,740
June 30, 2018	126,311	131,058	103.8%	(4,747)
June 30, 2019	134,720	155,484	115.4%	(20,764)
June 30, 2020	161,335	187,776	116.4%	(26,441)
June 30, 2021	180,212	233,611	129.6%	(53,399)

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Section 2: Plan Assets

Section 2.1: Summary of Fair Value of Assets ($'s in 000's)

As of June 30, 2021	Occupational Death & Disability	Retiree Medical	Total	Allocation Percent
Cash and Short-Term Investments				
- Cash and Cash Equivalents	$ 772	$ 2,614	$ 3,386	1.3%
- Subtotal	$ 772	$ 2,614	$ 3,386	1.3%
Fixed Income Investments				
- Domestic Fixed Income Pool	$ 12,129	$ 41,250	$ 53,379	20.2%
- International Fixed Income Pool	0	0	0	0.0%
- Tactical Fixed Income Pool	0	0	0	0.0%
- High Yield Pool	0	0	0	0.0%
- Treasury Inflation Protection Pool	0	0	0	0.0%
- Emerging Debt Pool	0	0	0	0.0%
- Subtotal	$ 12,129	$ 41,250	$ 53,379	20.2%
Equity Investments				
- Domestic Equity Pool	$ 16,411	$ 55,812	$ 72,223	27.3%
- International Equity Pool	9,045	30,759	39,804	15.1%
- Private Equity Pool	8,900	30,267	39,167	14.8%
- Emerging Markets Equity Pool	1,921	6,534	8,455	3.3%
- Alternative Equity Strategies	3,495	11,886	15,381	5.8%
- Subtotal	$ 39,772	$ 135,258	$ 175,030	66.3%
Other Investments				
- Real Estate Pool	$ 3,686	$ 12,534	$ 16,220	6.1%
- Other Investments Pool	3,679	12,508	16,187	6.1%
- Absolute Return Pool	0	0	0	0.0%
- Other Assets	0	0	0	0.0%
- Subtotal	$ 7,365	$ 25,042	$ 32,407	12.2%
Total Cash and Investments	$ 60,038	$ 204,164	$ 264,202	100.0%
Net Accrued Receivables	107	391	498	
Net Assets	$ 60,145	$ 204,555	$ 264,700	
Peace Officer / Firefighter	$ 18,085	N/A	N/A	
Others	42,060	N/A	N/A	
All Members	$ 60,145	$ 204,555	$ 264,700	

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Section 2.2: Changes in Fair Value of Assets During FY21 ($'s in 000's)

Fiscal Year 2021	Occupational Death & Disability	Retiree Medical	Total
1. Fair Value of Assets as of June 30, 2020	$ 42,091	$ 141,569	$ 183,660
2. Additions:			
a. Member Contributions	$ 0	$ 0	$ 0
b. Employer Contributions	5,334	18,559	23,893
c. Interest and Dividend Income	626	2,120	2,746
d. Net Appreciation/(Depreciation) in Fair Value of Investments	12,678	42,913	55,591
e. Employer Group Waiver Plan	0	60	60
f. Other	2	7	9
g. Total Additions	$ 18,640	$ 63,659	$ 82,299
3. Deductions:			
a. Medical Benefits	$ 0	$ 237	$ 237
b. Death & Disability Benefits	431	0	431
c. Investment Expenses	123	414	537
d. Administrative Expenses	32	22	54
e. Total Deductions	$ 586	$ 673	$ 1,259
4. Fair Value of Assets as of June 30, 2021	$ 60,145	$ 204,555	$ 264,700
5. Approximate Fair Value Investment Return Rate during FY21 Net of Investment Expenses	29.6%	29.6%	29.6%

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Section 2.3: Development of Actuarial Value of Assets ($'s in 000's)

The actuarial value of assets and the fair value were $0 at June 30, 2006. Investment gains and losses are recognized 20% per year over 5 years. In no event may valuation assets be less than 80% or more than 120% of fair value as of the current valuation date.

	Occupational Death & Disability	Retiree Medical	Total
1. Investment Gain/(Loss) for FY21			
a. Fair Value as of June 30, 2020	$ 42,091	$ 141,569	$ 183,660
b. Contributions	5,334	18,559	23,893
c. Employer Group Waiver Plan	0	60	60
d. Benefit Payments	431	237	668
e. Administrative Expenses	32	22	54
f. Actual Investment Return (net of investment expenses)	13,183	44,626	57,809
g. Expected Return Rate (net of investment expenses)	7.38%	7.38%	7.38%
h. Expected Return	3,282	11,113	14,395
i. Investment Gain/(Loss) for the Year (f) - (h)	9,901	33,513	43,414
2. Actuarial Value as of June 30, 2021			
a. Fair Value as of June 30, 2021	$ 60,145	$ 204,555	$ 264,700
b. Deferred Investment Gain/(Loss)	7,070	24,019	31,089
c. Preliminary Actuarial Value as of June 30, 2021, (a) - (b)	53,075	180,536	233,611
d. Upper Limit: 120% of Fair Value as of June 30, 2021	72,174	245,466	317,640
e. Lower Limit: 80% of Fair Value as of June 30, 2021	48,116	163,644	211,760
f. Actuarial Value at June 30, 2021, (c) limited by (d) and (e)	53,075	180,536	233,611
3. Ratio of Actuarial Value of Assets to Fair Value of Assets	88.2%	88.3%	88.3%
4. Approximate Actuarial Value Investment Return Rate during FY21 Net of Investment Expenses	11.4%	11.3%	11.3%
5. Actuarial Value Allocation[1]			
a. Peace Officer / Firefighter	$ 15,959	$ 20,163	$ 36,122
b. Others	37,116	160,373	197,489
c. All Members	$ 53,075	$ 180,536	$ 233,611

[1] Occupational death & disability allocated using fair value of assets. Retiree medical allocated based on retiree medical actuarial accrued liability.

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The tables below show the development of the gains/(losses) to be recognized in the current year ($'s in 000's):

Occupational Death & Disability				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 1,090	$ 872	$ 218	$ 0
June 30, 2018	23	15	5	3
June 30, 2019	(370)	(148)	(74)	(148)
June 30, 2020	(1,178)	(236)	(236)	(706)
June 30, 2021	9,901	0	1,980	7,921
Total	**$ 9,466**	**$ 503**	**$ 1,893**	**$ 7,070**

Retiree Medical				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 3,156	$ 2,524	$ 632	$ 0
June 30, 2018	(58)	(36)	(12)	(10)
June 30, 2019	(1,212)	(484)	(242)	(486)
June 30, 2020	(3,825)	(765)	(765)	(2,295)
June 30, 2021	33,513	0	6,703	26,810
Total	**$ 31,574**	**$ 1,239**	**$ 6,316**	**$ 24,019**

Total				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 4,246	$ 3,396	$ 850	$ 0
June 30, 2018	(35)	(21)	(7)	(7)
June 30, 2019	(1,582)	(632)	(316)	(634)
June 30, 2020	(5,003)	(1,001)	(1,001)	(3,001)
June 30, 2021	43,414	0	8,683	34,731
Total	**$ 41,040**	**$ 1,742**	**$ 8,209**	**$ 31,089**

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Section 2.4: Historical Asset Rates of Return

	Actuarial Value		Fair Value	
Year Ending	Annual	Cumulative*	Annual	Cumulative*
June 30, 2008	5.0%	5.0%	(7.1%)	(7.1%)
June 30, 2009	2.4%	3.7%	(13.0%)	(10.1%)
June 30, 2010	3.9%	3.8%	6.6%	(4.8%)
June 30, 2011	7.3%	4.6%	19.2%	0.7%
June 30, 2012	6.9%	5.1%	2.0%	0.9%
June 30, 2013	7.9%	5.5%	11.8%	2.7%
June 30, 2014	10.9%	6.3%	18.0%	4.7%
June 30, 2015	9.5%	6.7%	3.3%	4.6%
June 30, 2016	6.7%	6.7%	0.2%	4.1%
June 30, 2017	7.8%	6.8%	12.6%	4.9%
June 30, 2018	7.9%	6.9%	7.9%	5.2%
June 30, 2019	6.6%	6.9%	6.2%	5.2%
June 30, 2020	6.4%	6.8%	4.3%	5.2%
June 30, 2021	11.3%	7.2%	29.6%	6.7%

* Cumulative since fiscal year ending June 30, 2008

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Section 3: Member Data

Section 3.1: Summary of Members Included

As of June 30	2017	2018	2019	2020	2021
Active Members - Peace Officer / Firefighter					
1. Number	1,701	1,905	2,038	2,228	2,350[1]
2. Average Age	35.59	35.63	35.76	35.92	36.40
3. Average Credited Service	4.65	4.83	5.09	5.36	5.71
4. Average Entry Age	30.94	30.80	30.67	30.56	30.69
5. Average Annual Earnings	$ 77,800	$ 78,603	$ 84,593	$ 87,365	$ 90,022
Active Members - Others					
1. Number	17,470	18,473	19,864	20,695	21,583[2]
2. Average Age	41.22	41.34	41.49	41.78	41.79
3. Average Credited Service	3.83	4.08	4.25	4.59	4.84
4. Average Entry Age	37.39	37.26	37.24	37.19	36.95
5. Average Annual Earnings	$ 56,100	$ 57,349	$ 58,223	$ 59,603	$ 61,129
Active Members - Total					
1. Number	19,171	20,378	21,902	22,923	23,933[3]
2. Average Age	40.72	40.80	40.96	41.21	41.26
3. Average Credited Service	3.90	4.15	4.33	4.66	4.93
4. Average Entry Age	36.82	36.65	36.63	36.55	36.33
5. Average Annual Earnings	$ 58,025	$ 59,336	$ 60,676	$ 62,302	$ 63,966
Disabilitants and Beneficiaries (Occupational Death & Disability)					
1. Number	14	15	16	15	14
2. Average Age	42.37	43.66	42.28	44.66	47.27
3. Average Monthly Death & Disability Benefit	$ 2,199	$ 2,285	$ 2,404	$ 2,698	$ 2,601
Retirees, Surviving Spouses, and Dependent Spouses (Retiree Medical)					
1. Number	9	23	43	66	93
2. Average Age	70.76	69.97	69.72	68.85	69.75
Total Number of Members	**19,194**	**20,416**	**21,961**	**23,004**	**24,040**

Average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

[1] Includes 1,966 male active members and 384 female active members.

[2] Includes 9,309 male active members and 12,274 female active members.

[3] Includes 11,275 male active members and 12,658 female active members.

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Section 3.2: Age and Service Distribution of Active Members

Annual Earnings by Age

Age	Number	Total Annual Earnings	Average Annual Earnings
0 - 19	118	$ 4,365,252	$ 36,994
20 - 24	1,300	59,848,610	46,037
25 - 29	3,113	178,588,359	57,369
30 - 34	3,947	253,180,514	64,145
35 - 39	3,912	268,741,119	68,697
40 - 44	3,031	206,711,466	68,199
45 - 49	2,518	165,069,623	65,556
50 - 54	2,178	143,486,833	65,880
55 - 59	1,845	121,517,531	65,863
60 - 64	1,361	89,532,606	65,784
65 - 69	457	30,885,212	67,583
70 - 74	118	7,109,810	60,253
75+	35	1,868,090	53,374
Total	**23,933**	**$1,530,905,025**	**$ 63,966**

Annual Earnings by Credited Service

Years of Service	Number	Total Annual Earnings	Average Annual Earnings
0	4,026	$ 200,461,317	$ 49,792
1	3,075	165,422,602	53,796
2	2,898	169,417,994	58,460
3	2,274	138,590,119	60,946
4	1,768	113,814,667	64,375
0 - 4	**14,041**	**$ 787,706,699**	**$ 56,100**
5 - 9	6,695	478,308,411	71,443
10 - 14	3,192	264,443,776	82,846
15 - 19	5	446,141	89,228
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	0	0	0
40+	0	0	0
Total	**23,933**	**$1,530,905,027**	**$ 63,966**

Years of Credited Service by Age

	Years of Service									
Age	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35 - 39**	**40+**	**Total**
0 - 19	118	0	0	0	0	0	0	0	0	118
20 - 24	1,293	7	0	0	0	0	0	0	0	1,300
25 - 29	2,673	435	5	0	0	0	0	0	0	3,113
30 - 34	2,528	1,190	229	0	0	0	0	0	0	3,947
35 - 39	2,029	1,244	639	0	0	0	0	0	0	3,912
40 - 44	1,511	924	594	2	0	0	0	0	0	3,031
45 - 49	1,248	793	476	1	0	0	0	0	0	2,518
50 - 54	1,038	738	402	0	0	0	0	0	0	2,178
55 - 59	777	652	416	0	0	0	0	0	0	1,845
60 - 64	596	483	282	0	0	0	0	0	0	1,361
65 - 69	168	171	116	2	0	0	0	0	0	457
70 - 74	49	41	28	0	0	0	0	0	0	118
75+	13	17	5	0	0	0	0	0	0	35
Total	**14,041**	**6,695**	**3,192**	**5**	**0**	**0**	**0**	**0**	**0**	**23,933**

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

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Section 3.3: Member Data Reconciliation

	Actives	Retirees and Surviving Spouses	Dependent Spouses	OD&D Disabilitants	OD&D Beneficiaries	Total
As of June 30, 2020 [1]	**22,923**	**50**	**16**	**13**	**2**	**23,004**
New Entrants	3,809	0	0	0	0	3,809
Rehires	635	0	0	0	0	635
Vested Terminations	(633)	0	0	0	0	(633)
Non-Vested Terminations	(2,174)	0	0	0	0	(2,174)
Refund of Contributions	(590)	0	0	0	0	(590)
Disability Retirements	0	0	0	0	0	0
Age Retirements	(24)	24	10	0	0	10
Deaths With Beneficiary	(29)	(1)	0	0	0	(30)
Deaths Without Beneficiary	0	(1)	0	0	0	(1)
Converted To/From DB Plan	0	0	0	0	0	0
Added Dependent Coverage	0	0	1	0	0	1
Dropped Dependent Coverage	0	0	0	0	0	0
Transfers In/Out	16	(5)	0	0	0	11
Data Corrections	0	0	(1)	0	(1)	(2)
Net Change	**1,010**	**17**	**10**	**0**	**(1)**	**1,036**
As of June 30, 2021 [2]	**23,933**	**67**	**26**	**13**	**1**	**24,040**

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[1] 114 participants are expected to receive retiree medical benefits in a different plan and are included for OD&D benefits only.

[2] 89 participants are expected to receive retiree medical benefits in a different plan and are included for OD&D benefits only.

Section 3.4: Schedule of Active Member Data

Valuation Date	Number	Annual Earnings (000's)	Annual Average Earnings	Percent Increase in Average Earnings	Number of Participating Employers
June 30, 2021	23,933	$ 1,530,905	$ 63,966	2.7%	151
June 30, 2020	22,923	1,428,140	62,302	2.7%	153
June 30, 2019	21,902	1,328,934	60,676	2.3%	155
June 30, 2018	20,378	1,209,152	59,336	2.3%	155
June 30, 2017	19,171	1,112,398	58,025	1.5%	157
June 30, 2016	18,215	1,041,437	57,175	3.4%	157
June 30, 2015	17,098	945,496	55,299	1.9%	159
June 30, 2014	15,800	857,150	54,250	3.7%	159
June 30, 2013	14,316	748,658	52,295	4.7%	159
June 30, 2012	12,597	629,128	49,943	4.5%	160

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

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Section 3.5: Active Member Payroll Reconciliation

Payroll Field	Payroll Data (000's)
a) DRB actual reported salaries FY21 in employer list	$ 1,427,348
b) DRB actual reported salaries FY21 in valuation data	1,357,501
c) Annualized valuation data	1,530,905
d) Valuation payroll as of June 30, 2021	1,603,885
e) Rate payroll for FY22	1,548,116

a) Actual reported salaries from DRB employer listing showing all payroll paid during FY21, including those who were not active as of June 30, 2021
b) Payroll from valuation data for people who are in active status as of June 30, 2021
c) Payroll from (b) annualized for both new entrants and part-timers
d) Payroll from (c) with one year of salary scale applied to estimate salaries payable for the upcoming year
e) Payroll from (d) with the part-timer annualization removed

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Section 4: Basis of the Actuarial Valuation

Section 4.1: Summary of Plan Provisions

Effective Date

July 1, 2006, with amendments through June 30, 2021.

Administration of Plan

The Commissioner of Administration or the Commissioner's designee is the administrator of the Plan. The Attorney General of the state is the legal counsel for the Plan and shall advise the administrator and represent the Plan in legal proceedings.

The Alaska Retirement Management Board prescribes policies, adopts regulations, invests the funds, and performs other activities necessary to carry out the provisions of the Plan.

Employers Included

Currently there are 151 employers participating in PERS DCR, including the State of Alaska, and 150 political subdivisions and public organizations.

Membership

An employee of a participating employer who first enters service on or after July 1, 2006, or a member of the defined benefit plan who works for an employer who began participation on or after July 1, 2006, and meets the following criteria is a member in the Plan:

- Permanent full-time or part-time employees of the State of Alaska, participating political subdivisions or public organizations. An employee must be regularly scheduled to work 30 or more hours per week to be considered full-time by the PERS. An employee must be regularly scheduled to work 15 or more hours per week but less than 30 hours to be considered a part-time employee for PERS purposes.
- Elected state officials.
- Elected municipal officials who are compensated and receive at least $2,001.00 per month.

Members can convert to PERS DCR if they are an eligible non-vested member of the PERS defined benefit plan whose employer consents to transfers to the defined contribution plan and they elect to transfer his or her account balance to PERS DCR.

Member Contributions

Other than the member-paid premiums discussed later in this section, there are no member contributions for the occupational death & disability and retiree medical benefits.

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Retiree Medical Benefits

- Member must retire directly from the plan to be eligible for retiree medical coverage. Normal retirement eligibility is the earlier of a) 25 years of service as a peace officer or firefighter and 30 years of service for any other employee or b) Medicare eligible and 10 years of service.
- No subsidized retiree medical benefits are provided until normal retirement eligibility. The member's and any covered dependent's premium is 100% until the member is Medicare eligible. Upon the member's Medicare-eligibility, the required contribution will follow the service-based schedule shown below.
- Coverage cannot be denied except for failure to pay premium.
- Members who are receiving disability benefits or survivors who are receiving monthly survivor benefits are not eligible until the member meets, or would have met if he/she had lived, the normal retirement eligibility requirements.
- The following is a summary of the medical benefit design adopted in July 2016. The plan description below is used for valuation purposes and indicates participant cost-sharing. Please refer to the benefit handbook for more details.

Plan Design Feature	In-Network[1]	Out-of-Network[1] [2]
Deductible (single / family)	$300 / $600	
Medical services (participant share)	20%	40%
Emergency Room Copay (non-emergent use)	$100	$100
Medical Out-of-Pocket Maximum (single / family, including deductible)	$1,500 / $3,000	$3,000 / $6,000
Medicare Coordination	Exclusion	Exclusion
Pharmacy	No Deductible	No Deductible
Retail Generic (per 30-day fill)	20% $10 min / $50 max	
Retail Non-Formulary Brand (per 30-day fill)	25% $25 min / $75 max	40%
Retail Formulary Brand (per 30-day fill)	35% $80 min / $150 max	
Mail-Order Generic	$20 copay	
Mail-Order Non-Formulary Brand	$50 copay	40%
Mail-Order Formulary Brand	$100 copay	
Pharmacy Out-of-Pocket Max (single / family)	$1,000 / $2,000	
Medicare Pharmacy Arrangement	Retiree Drug Subsidy / Employer Group Waiver Plan effective 1/1/2019	
Wellness / Preventative	100% covered, not subject to deductible	20%, after deductible

[1] Section 1.1 of the AlaskaCare Defined Contribution Retiree Benefit Plan states that this health plan shall be updated from time to time to reflect changes in benefits, including annual adjustments to the premium, deductible, coinsurance, medical out-of-pocket limit, and prescription drug out-of-pocket limit.

[2] OON applies only to non-Medicare eligible participants.

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- Buck used manual rate models to determine relative plan values for the defined benefit (DB) retiree medical plan and the DCR retiree medical plan outlined above. We applied the ratio of the DCR retiree medical plan value to the DB retiree medical plan value to the per capita costs determined for each of pre/post-Medicare medical and pharmacy benefits to estimate corresponding values for the DCR retiree medical plan design. These factors are noted in Section 4.3. We further adjusted the Medicare medical manual rate to reflect the Medicare coordination method adopted. The estimated 2022 reimbursements under EGWP were provided by Segal Consulting (who worked with the EGWP administrator, Optum, to develop those estimates). We reflect estimated discounts and pharmacy rebates in the defined benefit medical cost so no further adjustment was needed for the DCR retiree medical plan. The medical network differential is reflected in the relative plan value adjustments.
- Starting in 2022, prior authorization will be required for certain specialty medications. There is no change to the medications that are covered by the plan.
- The retiree medical plan's coverage is supplemental to Medicare. Medicare coordination is described in the DCR Plan Handbook, referred to in the industry as exclusion coordination: Medicare payment is deducted from the Medicare allowable expense and plan parameters are applied to the remaining amount. Starting in 2019, the prescription drug coverage is through a Medicare Part D EGWP arrangement.
- The premium for Medicare-eligible retirees will be based on the member's years of service. The percentage of premium paid by the member is as follows:

Years of Service	Percent of Premium Paid by Member
< 15	30%
15 – 19	25%
20 – 24	20%
25 – 29	15%
30+	10%

- The premium for dependents who are not eligible for Medicare aligns with the member's subsidy. While a member is not Medicare-eligible, premiums are 100% of the estimated cost.
- Members have a separate defined contribution Health Reimbursement Arrangement account, which is not reflected in this valuation, that can be used to pay for premiums or other medical expenses.
- For valuation purposes, retiree premiums were assumed to equal the percentages outlined in the table above times the age-related plan costs. Future premiums calculated and charged to DCR participants will need to be determined reflecting any appropriate adjustments to the defined benefit (DB) plan data because current DB premiums were determined using information based upon enrollment with members who have double coverage.
- Coverage will continue for surviving spouses of covered retired members.

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Occupational Disability Benefits

- Benefit is 40% of salary at date of disability.
- For Peace Officer and Firefighters there is a Disability Benefit Adjustment such that:
  - The disability benefit is increased by 75% of the cost of living increase in the preceding calendar year or 9%, whichever is less.
  - At the time the disabled member retires, the retirement benefit will be increased by a percentage equal to the total cumulative percentage that has been applied to the disability benefit. Monthly annuity payments are made from the member's contribution balance until the fund is exhausted, at which the plan pays all remaining payments.
- For Others, there is no increase in the occupational disability benefit after commencement.
- Member earns service while on occupational disability.
- Benefits cease when the member becomes eligible for normal retirement at Medicare-eligible age and 10 years of service, or at any age with 30 years of service for Others members or 25 years of service for Peace Officer/Firefighter members.
- Peace Officer/Firefighter members may select the defined contribution account or the monthly benefit payable as if they were retiring under Tier 3 (service continues during disability, final average salary is as of date of disability), but with payments first made from the member's DC account until it's exhausted.
- No subsidized retiree medical benefits are provided until normal retirement eligibility. The member's premium is 100% of the estimated cost until they are Medicare eligible. Medicare-eligible premiums follow the service-based schedule above.

Occupational Death Benefits

- Benefit is 40% of salary for Others members and 50% of salary for Peace Officer/Firefighter members.
- Survivor's Pension Adjustment: A survivor's pension is increased by 50% of the cost of living increase in the preceding calendar year or 6%, whichever is less, if the recipient is at least age 60 on July 1, or under age 60 if the recipient has been receiving PERS benefits for at least 5 years as of July 1.
- Benefits cease when the member would have become eligible for normal retirement.
- The period during which the survivor is receiving benefits is counted as service credit toward retiree medical benefits.
- No subsidized retiree medical benefits are provided until the member would have been eligible for normal retirement. The surviving spouse's premium is 100% of the estimated cost until the member would have been Medicare eligible. Medicare-eligible premiums follow the service-based schedule above.

Changes Since the Prior Valuation

Starting in 2022, prior authorization will be required for certain specialty medications. There have been no other changes in PERS DCR benefit provisions valued since the prior valuation.

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Section 4.2: Description of Actuarial Methods and Valuation Procedures

The funding method used in this valuation was adopted by the Board in October 2006, and was modified as part of the experience study for the period July 1, 2013 to June 30, 2017. The asset smoothing method used to determine valuation assets was implemented effective June 30, 2006.

Benefits valued are those delineated in Alaska State statutes as of the valuation date. Changes in State statutes effective after the valuation date are not taken into consideration in setting the assumptions and methods.

Actuarial Cost Method

Liabilities and contributions shown in the report are computed using the Entry Age Normal Actuarial Cost Method, level percent of pay. Each year's difference between actual and expected unfunded actuarial accrued liability is amortized over 25 years as a level percentage of expected payroll.

Cost factors designed to produce annual costs as a constant percentage of each member's expected compensation in each year for death & disability benefits and retiree medical benefits, from the assumed entry age to the last age with a future benefit were applied to the projected benefits to determine the normal cost (the portion of the total cost of the plan allocated to the current year under the method). The normal cost is determined by summing intermediate results for active members and determining an average normal cost rate which is then related to the total DCR Plan payroll of active members. The actuarial accrued liability for active members (the portion of the total cost of the plan allocated to prior years under the method) was determined as the excess of the actuarial present value of projected benefits over the actuarial present value of future normal costs.

The actuarial accrued liability for beneficiaries and disabled members currently receiving benefits (if any) was determined as the actuarial present value of the benefits expected to be paid. No future normal costs are payable for these members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of plan assets measured on the valuation date.

Under this method, experience gains or losses, i.e., decreases or increases in accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

Valuation of Assets

Effective June 30, 2006, the asset valuation method recognizes 20% of the investment gain or loss in each of the current and preceding four years. This method was phased in over five years. Fair Value of Assets was $0 as of June 30, 2006. All assets are valued at fair value. Assets are accounted for on an accrued basis and are taken directly from financial statements audited by KPMG LLP. Valuation assets are constrained to a range of 80% to 120% of the fair value of assets.

Changes in Methods Since the Prior Valuation

There were no changes in the asset or valuation methods since the prior valuation.

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Valuation of Retiree Medical and Prescription Drug Benefits

The methodology used for the valuation of the retiree medical benefits is described in Section 5.2 of the State of Alaska Public Employees' Retirement System Defined Benefit Plan Actuarial Valuation Report as of June 30, 2021.

Starting in 2022, prior authorization will be required for certain specialty medications. There is no change to the medications that are covered by the plan. Segal provided an estimate of the impact of this change to the DB retiree health plan cost for calendar year 2022. The DB base claims costs for pre-Medicare prescription drug, Medicare prescription drug, and EGWP were adjusted to reflect this change. Those base claims costs were used for the DCR valuation with further adjustments as noted below. Additionally, starting in 2022, certain common preventive benefits will be covered for the DB plan. However, preventive benefits are already covered under the DCR plan so no adjustment is needed for that change. Therefore, the base claims cost for the DB plan prior to reflecting the addition of preventive benefits was used for the DCR valuation with further adjustments as noted below.

Due to the lack of experience for the DCR retiree medical plan, base claims costs are based on those described in the actuarial valuation as of June 30, 2021 for the Defined Benefit (DB) retiree medical plan covering TRS and PERS. The DB rates were used with some adjustments. The claims costs were adjusted to reflect the differences between the DCR medical plan and the DB medical plan. These differences include network steerage, different coverage levels, different Medicare coordination for medical benefits, and an indexing of the retiree out-of-pocket dollar amounts. To account for higher initial copays, deductibles and out-of-pocket limits, projected FY22 claims costs were reduced 3.1% for medical claims, and 8.9% for prescription drugs. In addition, to account for the difference in Medicare coordination, projected FY22 medical claims costs for Medicare eligible retirees were further reduced 29.5%.

To adjust for the decrease in medical claims due to COVID-19 during the last 4 months of FY20, the per capita cost during the first 8 months was used as the basis for estimating claims that would have occurred in the absence of COVID-19. FY21 experience was also thoroughly reviewed to assess the impact of COVID-19 and whether an adjustment to FY21 claims was appropriate for use in the June 30, 2021 valuation. FY21 medical per capita claims were noticeably lower than expected, so a 4% load was added to the FY21 medical claims used in the per capita claims cost development to better reflect future expected long-term costs of the plan.

No implicit subsidies are assumed. Employees projected to retire with 30 years of service (25 years of service for Peace/Fire) prior to Medicare are valued with commencement deferred to Medicare eligibility because those members will be required to pay the full plan premium prior to Medicare. Explicit subsidies for disabled and normal retirement are determined using the plan-defined percentages of age-related total projected plan costs, again with no implicit subsidy assumed.

The State transitioned to an Employer Group Waiver Program (EGWP) for DCR participants effective January 1, 2019. The estimated 2022 reimbursements under EGWP were provided by Segal Consulting (who worked with the EGWP administrator, Optum, to develop those estimates).

Healthcare Reform

Healthcare Reform legislation passed on March 23, 2010 included several provisions with potential implications for the State of Alaska Retiree Health Plan liability. Buck evaluated the impact due to these provisions.

Because the State plan is retiree-only, not all provisions are required. Unlimited lifetime benefits and dependent coverage to age 26 are two of these provisions. The adopted DCR plan does not place lifetime limits on benefits, but does restrict dependent child coverage.

The Further Consolidated Appropriations Act, 2020 passed in December 2019 repealed several healthcare-related taxes, including the Cadillac Tax.

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The Tax Cuts and Jobs Act passed in December 2017 included the elimination of the individual mandate penalty and changed the inflation measure for purposes of determining the limits for the High Cost Excise Tax to use chained CPI. It is our understanding the law does not directly impact other provisions of the ACA. While the nullification of the ACA's individual mandate penalty does not directly impact employer group health plans, it could contribute to the destabilization of the individual market and increase the number of uninsured. Such destabilization could translate to increased costs for employers. We have considered this when setting our healthcare cost trend assumptions and will continue to monitor this issue.

We have not identified any other specific provisions of healthcare reform or its potential repeal that would be expected to have a significant impact on the measured obligation. We will continue to monitor legislative activity.

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Section 4.3: Summary of Actuarial Assumptions

The demographic and economic assumptions used in the June 30, 2021 valuation are described below. Unless noted otherwise, these assumptions were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017.

Investment Return

7.38% per year, net of investment expenses.

Salary Scale

Salary scale rates based upon the 2013-2017 actual experience (see Table 1).

Inflation – 2.50% per year.

Productivity – 0.25% per year.

Payroll Growth

2.75% per year (inflation + productivity).

Total Inflation

Total inflation as measured by the Consumer Price Index for urban and clerical workers for Anchorage is assumed to increase 2.50% annually.

Mortality (Pre-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

100% (male and female) of RP-2014 employee table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Deaths are assumed to result from occupational causes 75% of the time for Peace Officer/Firefighters, and 40% of the time for Others.

Mortality (Post-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

91% of male and 96% of female rates of RP-2014 healthy annuitant table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Turnover

Select and ultimate rates based upon the 2013-2017 actual experience (see Tables 2a and 2b).

Disability

Incidence rates based upon the 2013-2017 actual experience (see Table 3).

Disabilities are assumed to be occupational 75% of the time for Peace Officer/Firefighters, and 40% of the time for Others. For Peace Officer/Firefighters, members are assumed to take the monthly annuity 100% of the time.

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Post-disability mortality in accordance with the RP-2014 disabled table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Retirement

Retirement rates based upon the 2013-2017 actual experience (see Table 4).

Spouse Age Difference

Males are assumed to be three years older than their wives. Females are assumed to be two years younger than husbands.

Percent Married for Occupational Death & Disability

For Others, 75% of male members and 70% of female members are assumed to be married. For Peace Officer/Firefighters, 85% of male members and 60% of female members are assumed to be married.

Dependent Spouse Medical Coverage Election

Applies to members who do not have double medical coverage. For Others, 65% of male members and 60% of female members are assumed to be married and cover a dependent spouse. For Peace Officer/Firefighters, 75% of male members and 50% of female members are assumed to be married and cover a dependent spouse.

Part-Time Status

Part-time employees are assumed to earn 1.00 years of credited service per year for Peace Officer/Firefighter and 0.75 years of credited service per year for Other members.

Peace Officer / Firefighter Occupational Disability Retirement Benefit Commencement

The occupational disability retirement benefit is assumed to be first payable from the member's DC account and the retirement benefit payable from the occupational death & disability trust will commence five years later.

Per Capita Claims Cost

Sample claims cost rates (before base claims cost adjustments described below) adjusted to age 65 for FY22 medical and prescription drugs are shown below. The prescription drug costs reflect the plan change to require prior authorization for certain specialty medications.

	Medical	Prescription Drugs
Pre-Medicare	$ 15,708	$ 3,375
Medicare Parts A & B	$ 1,619	$ 3,474
Medicare Part D – EGWP	N/A	$ 1,131

Members are assumed to attain Medicare eligibility at age 65. All costs are for the 2022 fiscal year (July 1, 2021 – June 30, 2022).

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The EGWP subsidy is assumed to increase in future years by the trend rates shown on the following pages. No future legislative changes or other events are anticipated to impact the EGWP subsidy. If any legislative or other changes occur in the future that impact the EGWP subsidy (which could either increase or decrease the plan's Actuarial Accrued Liability), those changes will be evaluated and quantified when they occur.

Third Party Administrator Fees

$493 per person per year; assumed to increase at 4.5% per year.

Base Claims Cost Adjustments

Due to higher initial copays, deductibles, out-of-pocket limits and member cost sharing compared to the DB medical plan, the following cost adjustments are applied to the per capita claims cost rates above:

- 0.969 for the pre-Medicare plan.
- 0.674 for both the Medicare medical plan and Medicare coordination method (3.1% reduction for the medical plan and 29.5% reduction for the coordination method).
- 0.911 for the prescription drug plan.

Administrative Expenses

Beginning with the June 30, 2018 valuation, the Normal Cost is increased for administrative expenses expected to be paid from plan assets during the year. The amounts included in the June 30, 2021 Normal Cost, which are based on the average of actual administrative expenses during the last two fiscal years, are $16,000 for occupational death & disability and $24,000 for retiree medical.

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Healthcare Cost Trend

The table below shows the rate used to project the cost from the shown fiscal year to the next fiscal year. For example, 6.3% is applied to the FY22 pre-Medicare medical claims costs to get the FY23 medical claims costs.

	Medical Pre-65	Medical Post-65	Prescription Drugs / EGWP
FY22	6.3%	5.4%	7.1%
FY23	6.1%	5.4%	6.8%
FY24	5.9%	5.4%	6.4%
FY25	5.8%	5.4%	6.1%
FY26	5.6%	5.4%	5.7%
FY27-FY40	5.4%	5.4%	5.4%
FY41	5.3%	5.3%	5.3%
FY42	5.2%	5.2%	5.2%
FY43	5.1%	5.1%	5.1%
FY44	5.1%	5.1%	5.1%
FY45	5.0%	5.0%	5.0%
FY46	4.9%	4.9%	4.9%
FY47	4.8%	4.8%	4.8%
FY48	4.7%	4.7%	4.7%
FY49	4.6%	4.6%	4.6%
FY50+	4.5%	4.5%	4.5%

For the June 30, 2014 valuation and later, the updated Society of Actuaries' Healthcare Cost Trend Model is used to project medical and prescription drug costs. This model estimates trend amounts that are projected out for 80 years. The model has been populated with assumptions that are specific to the State of Alaska.

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Aging Factors

Age	Medical	Prescription Drugs
0 – 44	2.0%	4.5%
45 – 54	2.5%	3.5%
55 – 64	2.5%	1.5%
65 – 74	3.0%	2.0%
75 – 84	2.0%	-0.5%
85 – 94	0.3%	-2.5%
95+	0.0%	0.0%

Retiree Medical Participation

Decrement Due to Disability		Decrement Due to Retirement	
Age	Percent Participation	Age	Percent Participation*
< 56	75.0%	55	50.0%
56	77.5%	56	55.0%
57	80.0%	57	60.0%
58	82.5%	58	65.0%
59	85.0%	59	70.0%
60	87.5%	60	75.0%
61	90.0%	61	80.0%
62	92.5%	62	85.0%
63	95.0%	63	90.0%
64	97.5%	64	95.0%
65+	100.0%	65+	**Years of Service**
			< 15 75.0%
			15 – 19 80.0%
			20 – 24 85.0%
			25 – 29 90.0%
			30+ 95.0%

* Participation assumption is a combination of (i) the service-based rates for retirement from employment at age 65+ and (ii) the age-based rates for retirement from employment before age 65. These rates reflect the expected plan election rate that varies by reason for decrement, duration that a member may pay full cost prior to Medicare eligibility, and availability of alternative and/or lower cost options, particularly in the Medicare market. This assumption is based on observed trends in participation from a range of other plans.

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Imputed Data

Data changes from the prior year which are deemed to have immaterial impact on liabilities and contribution rates are assumed to be correct in the current year's client data. Non-vested terminations with appropriate refund dates are assumed to have received a full refund of contributions. Active members with missing salary and service are assumed to be terminated with status based on their vesting percentage.

Changes in Assumptions Since the Prior Valuation

The amounts included in the Normal Cost for administrative expenses were changed from $1,000 to $16,000 for occupational death & disability, and from $20,000 to $24,000 for retiree medical (based on the most recent two years of actual administrative expenses paid from plan assets). The per capita claims cost assumption is updated annually.

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Table 1: Salary Scales

Peace Officer / Firefighter		Others	
Years of Service	Percent Increase	Years of Service	Percent Increase
0	7.75%	0	6.75%
1	7.25%	1	6.25%
2	6.75%	2	5.75%
3	6.25%	3	5.25%
4	5.75%	4	4.75%
5	5.25%	5	4.25%
6	4.75%	6	3.75%
7	4.25%	7	3.65%
8	3.75%	8	3.55%
9	3.65%	9	3.45%
10	3.55%	10	3.35%
11	3.45%	11	3.25%
12	3.35%	12	3.15%
13	3.25%	13	3.05%
14	3.15%	14	2.95%
15	3.05%	15	2.85%
16	2.95%	16	2.75%
17	2.85%	17	2.75%
18+	2.75%	18+	2.75%

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Table 2a: Turnover Rates for Peace Officer / Firefighter

Select Rates during the First 5 Years of Employment

Years of Service	Male	Female
0	18.90%	20.63%
1	14.18%	16.50%
2	10.50%	13.75%
3	9.45%	12.38%
4	8.40%	11.00%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	5.52%	11.97%	44	5.78%	11.09%
23	5.65%	11.97%	45	5.71%	11.03%
24	5.78%	11.97%	46	5.64%	10.98%
25	5.91%	11.97%	47	5.57%	10.92%
26	6.04%	11.97%	48	6.01%	10.84%
27	6.16%	11.97%	49	6.45%	10.75%
28	6.16%	11.94%	50	6.89%	10.67%
29	6.15%	11.91%	51	7.32%	10.58%
30	6.14%	11.88%	52	7.76%	10.50%
31	6.14%	11.84%	53	7.97%	10.66%
32	6.12%	11.81%	54	8.18%	10.82%
33	6.11%	11.79%	55	8.38%	10.98%
34	6.09%	11.77%	56	8.59%	11.15%
35	6.08%	11.75%	57	8.80%	11.31%
36	6.07%	11.72%	58	9.03%	11.47%
37	6.05%	11.70%	59	9.25%	11.63%
38	6.03%	11.60%	60	9.48%	11.79%
39	6.00%	11.50%	61	9.71%	11.95%
40	5.98%	11.40%	62	9.94%	12.12%
41	5.95%	11.30%	63	12.37%	12.28%
42	5.93%	11.20%	64	14.81%	12.44%
43	5.85%	11.14%	65+	17.25%	12.60%

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Table 2b: Turnover Rates for Others

Select Rates during the First 5 Years of Employment

Years of Service	Male	Female
0	24.36%	27.98%
1	21.00%	22.31%
2	16.80%	17.85%
3	13.44%	14.28%
4	9.45%	12.34%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	13.71%	16.50%	44	7.83%	8.22%
23	13.71%	16.51%	45	7.72%	7.90%
24	13.71%	16.51%	46	7.60%	7.58%
25	13.71%	16.52%	47	7.48%	7.26%
26	13.71%	16.53%	48	7.68%	7.23%
27	13.71%	16.54%	49	7.87%	7.20%
28	13.41%	15.94%	50	8.07%	7.17%
29	13.21%	15.34%	51	8.26%	7.14%
30	12.82%	17.75%	52	8.46%	7.11%
31	12.52%	14.15%	53	8.46%	7.26%
32	12.22%	13.55%	54	8.47%	7.42%
33	11.65%	12.90%	55	8.48%	7.57%
34	11.09%	12.24%	56	8.48%	7.72%
35	10.52%	11.58%	57	8.49%	7.88%
36	9.95%	10.92%	58	8.77%	8.15%
37	9.39%	10.26%	59	9.08%	8.42%
38	9.12%	9.98%	60	9.32%	8.69%
39	8.86%	9.70%	61	9.60%	8.96%
40	8.60%	9.42%	62	9.88%	9.24%
41	8.32%	9.14%	63	10.28%	10.51%
42	8.07%	8.86%	64	10.68%	11.78%
43	7.95%	8.54%	65+	11.08%	13.05%

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Table 3: Disability Rates

	Peace Officer / Firefighter		Others	
Age	Male	Female	Male	Female
< 23	0.0179%	0.0112%	0.0327%	0.0376%
23	0.0244%	0.0153%	0.0360%	0.0400%
24	0.0310%	0.0194%	0.0392%	0.0424%
25	0.0374%	0.0234%	0.0425%	0.0448%
26	0.0440%	0.0275%	0.0456%	0.0472%
27	0.0505%	0.0316%	0.0489%	0.0496%
28	0.0526%	0.0329%	0.0501%	0.0510%
29	0.0548%	0.0343%	0.0513%	0.0524%
30	0.0570%	0.0356%	0.0524%	0.0538%
31	0.0591%	0.0370%	0.0536%	0.0554%
32	0.0612%	0.0383%	0.0548%	0.0568%
33	0.0634%	0.0397%	0.0566%	0.0586%
34	0.0657%	0.0411%	0.0584%	0.0606%
35	0.0679%	0.0425%	0.0602%	0.0624%
36	0.0702%	0.0439%	0.0620%	0.0644%
37	0.0724%	0.0453%	0.0638%	0.0662%
38	0.0757%	0.0473%	0.0669%	0.0696%
39	0.0789%	0.0493%	0.0701%	0.0728%
40	0.0822%	0.0514%	0.0734%	0.0762%
41	0.0854%	0.0534%	0.0765%	0.0794%
42	0.0886%	0.0554%	0.0797%	0.0826%
43	0.0977%	0.0611%	0.0879%	0.0908%
44	0.1066%	0.0667%	0.0962%	0.0990%
45	0.1157%	0.0723%	0.1043%	0.1072%
46	0.1247%	0.0780%	0.1125%	0.1154%
47	0.1337%	0.0836%	0.1208%	0.1236%
48	0.1462%	0.0914%	0.1329%	0.1360%
49	0.1588%	0.0993%	0.1451%	0.1484%
50	0.1714%	0.1071%	0.1572%	0.1608%
51	0.1839%	0.1150%	0.1694%	0.1734%
52	0.1965%	0.1228%	0.1815%	0.1858%
53	0.2294%	0.1434%	0.2132%	0.2168%
54	0.2624%	0.1640%	0.2450%	0.2478%

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Table 4: Retirement Rates

Age	Rate
< 55	2.0%
55	3.0%
56	3.0%
57	3.0%
58	3.0%
59	3.0%
60	5.0%
61	5.0%
62	10.0%
63	5.0%
64	5.0%
65	25.0%
66	25.0%
67	25.0%
68	20.0%
69	20.0%
70+	100.0%

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Glossary of Terms

Actuarial Accrued Liability

Total accumulated cost to fund pension or postemployment benefits arising from service in all prior years.

Actuarial Cost Method

Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension or postemployment plan for a group of plan members to the years of service that give rise to that cost.

Actuarial Present Value of Projected Benefits

Amount which, together with future interest, is expected to be sufficient to pay all future benefits.

Actuarial Valuation

Study of probable amounts of future pension or postemployment benefits and the necessary amount of contributions to fund those benefits.

Actuary

Person who performs mathematical calculations pertaining to pension and insurance benefits based on specific procedures and assumptions.

GASB 74 and 75

Governmental Accounting Standards Board Statement Number 74 amends Number 43 effective for the fiscal year beginning after June 15, 2016 and defines new financial reporting requirements for public postemployment benefit plans. Governmental Accounting Standards Board Statement Number 75 amends Number 45 effective for fiscal years beginning after June 15, 2017 and defines new accounting and financial reporting requirements for employers sponsoring public postemployment benefit plans.

Normal Cost

That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual participant or the plan as a whole.

Rate Payroll

Members' earnings used to determine contribution rates.

Unfunded Actuarial Accrued Liability (UAAL)

The portion of the actuarial accrued liability not offset by plan assets.

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Valuation Payroll

Members' earnings used to determine Normal Cost and Actuarial Accrued Liability.

Vested Benefits

Benefits which are unconditionally guaranteed regardless of employment.

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BUCK

State of Alaska

Teachers' Retirement System

Actuarial Valuation Report
As of June 30, 2021

January 2022

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January 26, 2022

State of Alaska
The Alaska Retirement Management Board
The Department of Revenue, Treasury Division
The Department of Administration, Division of Retirement and Benefits
P.O. Box 110203
Juneau, AK 99811-0203

Certification of Actuarial Valuation

Dear Members of The Alaska Retirement Management Board, The Department of Revenue and The Department of Administration:

This report summarizes the annual actuarial valuation results of the State of Alaska Teachers' Retirement System (TRS) as of June 30, 2021 performed by Buck Global, LLC (Buck).

The actuarial valuation is based on financial information provided in the financial statements audited by KPMG LLP, member data provided by the Division of Retirement and Benefits, and medical enrollment data provided by the healthcare claims administrator (Aetna), as summarized in this report. The benefits considered are those delineated in Alaska statutes effective June 30, 2021. The actuary did not verify the data submitted, but did perform tests for consistency and reasonableness.

All costs, liabilities, and other factors under TRS were determined in accordance with generally accepted actuarial principles and procedures. An actuarial cost method is used to measure the actuarial liabilities which we believe is reasonable. Buck is solely responsible for the actuarial data and actuarial results presented in this report. This report fully and fairly discloses the actuarial position of TRS as of June 30, 2021.

TRS is funded by Employer, State, and Member Contributions in accordance with the funding policy adopted by the Alaska Retirement Management Board (Board) and as required by Alaska state statutes. The funding objective for TRS is to pay required contributions that remain level as a percent of total TRS compensation. The Board has also established a funding policy objective that the required contributions be sufficient to pay the Normal Costs of active plan members, plan expenses, and amortize the Unfunded Actuarial Accrued Liability (UAAL) as a level percentage of total TRS compensation over a closed 25-year period as required by Alaska state statutes. The closed 25-year period was originally established effective June 30, 2014. Effective June 30, 2018, the Board adopted a 25-year layered UAAL amortization method as described in Section 5.2. The UAAL amortization continues to be on a level percent of pay basis. The compensation used to determine required contributions is the total compensation of all active members in TRS, including those hired after July 1, 2006 who are members of the Defined Contribution Retirement (DCR) Plan. This objective is currently being met and is projected to continue to be met. Absent future gains/losses, actuarially determined contributions are expected to remain level as a percent of pay and the overall funded status (on a combined pension/healthcare basis) is expected to increase to 100% in FY24 (the funded status of the pension trust is expected to increase to 100% in FY33).

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The Board and staff of the State of Alaska may use this report for the review of the operations of TRS. Use of this report for any other purpose or by anyone other than the Board or staff of the State of Alaska may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without the review by Buck.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the actuarial assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. In particular, retiree group benefits models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of this valuation.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the plan. The actuary performs an analysis of plan experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience. The last full experience analysis was performed for the period July 1, 2013 to June 30, 2017. Based on that experience study, the Board adopted new assumptions effective beginning with the June 30, 2018 valuation to better reflect expected future experience. Based on our annual analysis of recent claims experience, changes were made to the per capita claim cost rates effective June 30, 2021 to better reflect expected future healthcare experience. A summary of the actuarial assumptions and methods used in this actuarial valuation is shown in Sections 5.2 and 5.3. We certify that the assumptions and methods described in Sections 5.2 and 5.3 of this report meet the requirements of all applicable Actuarial Standards of Practice.

Governmental Accounting Standards Board (GASB) Statement No. 67 (GASB 67) was effective for TRS beginning with fiscal year ending June 30, 2014, and Statement No. 74 (GASB 74) was effective for TRS beginning with fiscal year ending June 30, 2017. Separate GASB 67 and GASB 74 reports as of June 30, 2021 have been prepared. We have also prepared the member data tables shown in Section 4 of this report for the Statistical Section of the ACFR, as well as the summary of actuarial assumptions and analysis of financial experience for the Actuarial Section of the ACFR. Please see our separate GASB 67 and GASB 74 reports for other information needed for the ACFR.

Assessment of Risks

Actuarial Standard of Practice No. 51 (ASOP 51) applies to actuaries performing funding calculations related to a pension plan. ASOP 51 does not apply to actuaries performing services in connection with other post-employment benefits, such as medical benefits. Accordingly, ASOP 51 does not apply to the healthcare portion of TRS. See Section 6 of this report for further details regarding ASOP 51.

Use of Models

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under

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the funding methods specified in this report. The output from the third-party vendor software is used as input to internally developed models that apply applicable funding methods and policies to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal models are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts within Buck who are familiar with applicable funding methods, as well as the manner in which the model generates its output. If significant changes are made to the internal models, extra checking and review are completed. Significant changes to the internal models that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

Additional models used in valuing health benefits are described later in the report.

COVID-19

The potential impact of the ongoing COVID-19 pandemic on costs and liabilities was considered and an adjustment was made in setting the medical per capita claims cost assumption. FY20 medical claims were adjusted for a COVID-19 related decline in claims during the last four months (March – June) of FY20. FY21 medical claims were adjusted for a COVID-19 related decline in those claims during the fiscal year. A more detailed explanation on these adjustments is shown in Section 5.2.

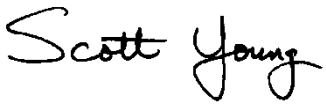
This report was prepared under my supervision and in accordance with all applicable Actuarial Standards of Practice. I am a Fellow of the Society of Actuaries, an Enrolled Actuary, a Fellow of the Conference of Consulting Actuaries, and a Member of the American Academy of Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

I am available to discuss this report with you at your convenience. I can be reached at 602-803-6174.

Respectfully submitted,

David J. Kershner, FSA, EA, MAAA, FCA
Principal
Buck

The undersigned actuary is responsible for all assumptions related to the average annual per capita health claims cost and the health care cost trend rates, and hereby affirms his qualification to render opinions in such matters in accordance with the Qualification Standards of the American Academy of Actuaries.



Scott Young, FSA, EA, MAAA, FCA
Director
Buck

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Executive Summary

Overview

The State of Alaska Teachers' Retirement System (TRS) provides pension and postemployment healthcare benefits to teachers and other eligible participants. The Commissioner of the Department of Administration is responsible for administering the plan. The Alaska Retirement Management Board has fiduciary responsibility over the assets of the plan. This report presents the results of the actuarial valuation of TRS as of the valuation date of June 30, 2021.

Purpose

An actuarial valuation is performed on the plan annually as of the end of the fiscal year. The main purposes of the actuarial valuation detailed in this report are:

1. To determine the Employer/State contribution necessary to meet the Board's funding policy for the plan;
2. To disclose the funding assets and liability measures as of the valuation date;
3. To review the current funded status of the plan and assess the funded status as an appropriate measure for determining future actuarially determined contributions;
4. To compare actual and expected experience under the plan during the last fiscal year; and
5. To report trends in contributions, assets, liabilities, and funded status over the last several years.

The actuarial valuation provides a "snapshot" of the funded position of TRS based on the plan provisions, membership data, assets, and actuarial methods and assumptions as of the valuation date.

Actuarial projections are also performed to provide a long-term view of the expected future funded status and contribution patterns (see Section 3). The future funded status and contribution patterns would be different than those shown in Section 3 if future experience does not match the actuarial assumptions used in the projections.

Retiree group benefits models necessarily rely on the use of approximations and estimates, and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements.

Funded Status

Where presented, references to "funded ratio" and "unfunded actuarial accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

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Funded Status as of June 30 ($'s in 000's)		2020	2021
Pension			
a.	Actuarial Accrued Liability	$ 7,447,036	$ 7,471,887
b.	Valuation Assets	5,587,064	5,910,369
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ 1,859,972	$ 1,561,518
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	75.0%	79.1%
e.	Fair Value of Assets	$ 5,444,799	$ 6,731,481
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	73.1%	90.1%
Healthcare			
a.	Actuarial Accrued Liability	$ 2,489,675	$ 2,439,603
b.	Valuation Assets	3,021,283	3,267,737
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ (531,608)	$ (828,134)
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	121.4%	133.9%
e.	Fair Value of Assets	$ 2,953,461	$ 3,723,031
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	118.6%	152.6%
Total			
a.	Actuarial Accrued Liability	$ 9,936,711	$ 9,911,490
b.	Valuation Assets	8,608,347	9,178,106
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ 1,328,364	$ 733,384
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	86.6%	92.6%
e.	Fair Value of Assets	$ 8,398,260	$ 10,454,512
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	84.5%	105.5%

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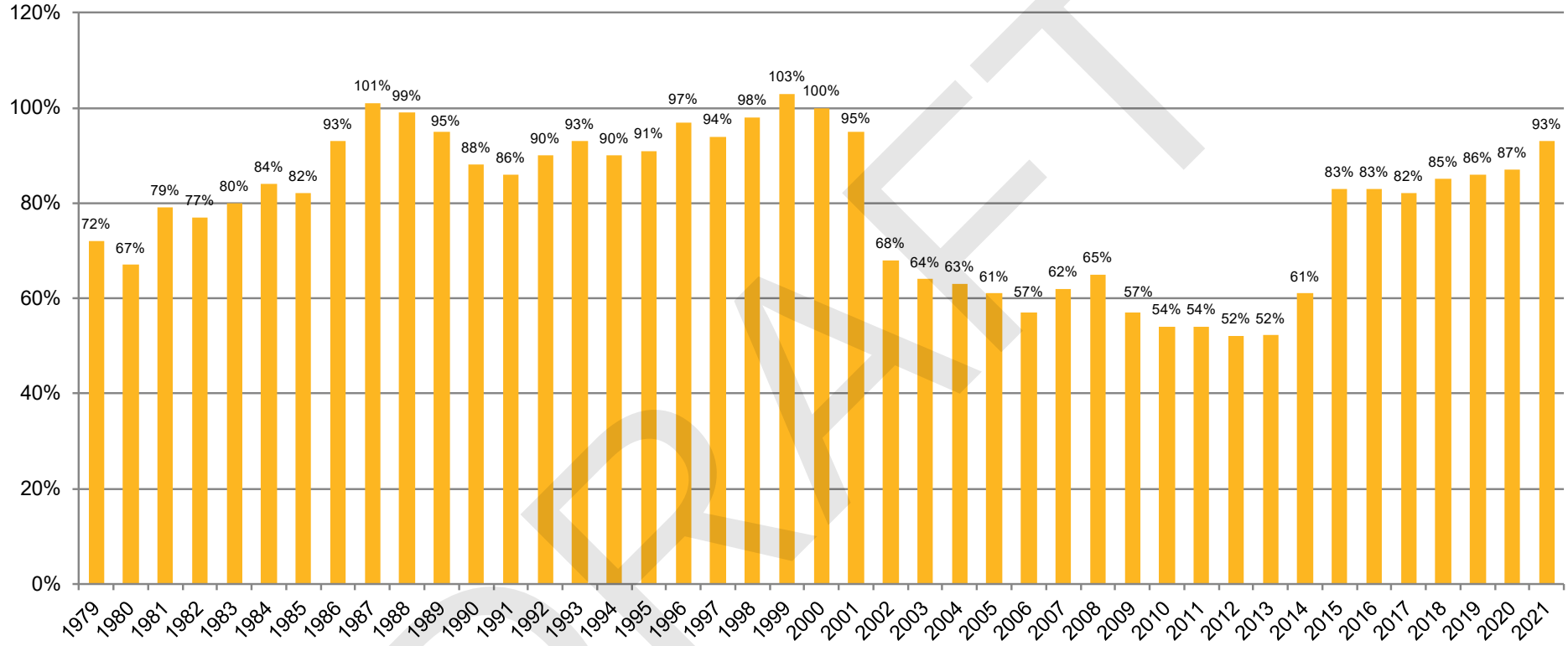
Funded Ratio History (Based on Valuation Assets)



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The key reasons for the change in the funded status are explained below. The funded status for healthcare benefits is not necessarily an appropriate measure to confirm that assets are sufficient to settle health plan obligations as there are no available financial instruments for purchase. Future experience is likely to vary from assumptions so there is potential for actuarial gains or losses.

1. Investment Experience

The actuarial asset value was reinitialized to equal fair value of assets as of June 30, 2014. Beginning in FY15, the asset valuation method recognizes 20% of the investment gain or loss each year, for a period of five years. The FY21 investment return based on fair value of assets was approximately 30.1% compared to the expected investment return of 7.38% (net of investment expenses). This resulted in a market asset gain of approximately $1,856 million. Due to the recognition of investment gains and losses over a 5-year period, the FY21 investment return based on actuarial value of assets was approximately 11.6%, which resulted in an actuarial asset gain of approximately $354 million.

2. Salary Increases

Salary increases for continuing active members during FY21 were higher than expected based on the valuation assumptions, resulting in a liability loss of approximately $29 million.

3. Demographic Experience

Section 4 provides statistics on active and inactive participants. The number of active participants decreased 10.4% from 3,789 at June 30, 2020 to 3,396 at June 30, 2021 due to active members exiting the plan during the year (due to retirement, termination, death, and disability) and the closure of the plan to new entrants as of July 1, 2006. The average age of active participants increased from 51.92 to 52.14 and average credited service increased from 19.76 to 20.31 years.

The number of benefit recipients increased 2.1% from 13,689 to 13,972, and their average age increased from 71.85 to 72.26. The number of vested terminated participants decreased 4.8% from 764 to 727. Their average age increased from 52.37 to 52.68.

The overall effect of the demographic experience during FY21 was a liability loss of approximately $7 million (pension) and a liability gain of approximately $3[1] million (healthcare).

4. COLA / PRPA Experience

The cost-of-living increases (COLA) for benefit recipients during FY21 were less than expected based on the valuation assumptions, resulting in a liability gain of approximately $0.3 million. The postretirement pension adjustments (PRPA) were also less than expected, resulting in a liability gain of approximately $81 million.

5. Retiree Medical Claims Experience

As described in Section 5.2, recent medical claims experience and changes in healthcare enrollment data provided to us for the June 30, 2021 valuation generated a liability gain of approximately $97 million. Reduced claims during FY21, largely attributable to medical claims impacted by COVID-19, generated a liability gain of approximately $11 million.

[1] Includes the effects of changes in dependent coverage elections and Medicare Part B only experience.

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6. Changes in Methods Since the Prior Valuation

There were no changes in actuarial methods since the prior valuation.

7. Changes in Assumptions Since the Prior Valuation

Healthcare claim costs are updated annually as described in Section 5.2. The amounts included in the Normal Cost for administrative expenses were updated based on the last two years of actual administrative expenses paid from plan assets. There were no other changes in actuarial assumptions since the prior valuation.

8. Changes in Benefit Provisions Since the Prior Valuation

Starting in 2022, prior authorization will be required for certain specialty medications for all participants, and certain preventive benefits for pre-Medicare participants will now be covered by the plan. These changes created an actuarial gain of approximately $22 million. There have been no other changes in benefit provisions valued since the prior valuation.

Projections

Absent future asset (and/or liability) losses, changes in plan provisions or actuarial assumptions, the $1,856 million FY21 market asset gain has a significant impact on the projections shown in Section 3. For example, the pension trust is currently projected to reach a funded status of 100% in FY33. Based on the 2020 valuation projections, the funded status of the pension trust was projected to be only 80% in FY33.

Once the pension trust is projected to reach a funded status of 100%, it may be reasonable to assume that all remaining pension unfunded liability layered amortization amounts should be reduced to zero. Since the healthcare trust is currently more than 100% funded, the healthcare unfunded liability amortization amounts would also be reduced to zero if the Board decides to implement this change (this does not impact the projections shown in Section 3.6 since the healthcare Normal Cost is assumed to be contributed as a minimum in all years after FY23 per Alaska state statutes).

We have shown the table of projected figures in Section 3.6 two ways:

a) Section 3.6A – No changes to the pension unfunded liability layered amortization amounts. In this case, Additional State Contributions totaling approximately $553 million are projected for FY33 through FY39, even though the pension trust is projected to be 100% funded by FY33.

b) Section 3.6B – Eliminate the pension unfunded liability layered amortization amounts when the pension trust is projected to be 100% funded. In this case, the Additional State Contributions are projected to be zero after FY32.

The pros and cons of these two methods can be discussed further upon request.

In both cases, the pension Normal Cost is assumed to be contributed as a minimum based on Alaska state statutes. (The healthcare trust is currently over 100% funded, so the healthcare Normal Cost is also assumed to be contributed as a minimum based on Alaska state statutes.)

Sections 3.3 through 3.5 are based on the projections shown in Section 3.6A.

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Comparative Summary of Contribution Rates

Pension	Actual FY 2023	Estimated FY 2024
a. Normal Cost Rate Net of Member Contributions	2.24%	2.05%
b. Past Service Cost Rate	15.66%	12.90%
c. Total Employer/State Contribution Rate, (a) + (b), not less than (a)[1]	17.90%	14.95%

Healthcare	Actual FY 2023	Estimated FY 2024
a. Normal Cost Rate	2.72%	2.41%
b. Past Service Cost Rate	(7.93)%	(11.03)%
c. Total Employer/State Contribution Rate, (a) + (b), not less than (a)[1]	2.72%	2.41%

Total	Actual FY 2023	Estimated FY 2024
a. Normal Cost Rate Net of Member Contributions	4.96%	4.46%
b. Past Service Cost Rate	15.66%	12.90%
c. Total Employer/State Contribution Rate, (a) + (b)[1]	20.62%	17.36%
d. Board Adopted Total Employer/State Contribution Rate	17.90%[2]	TBD
e. Defined Contribution Retirement (DCR) Rate Paid by Employers	6.72%	7.03%
f. Board Adopted Total Rate, Including DCR Rate Paid by Employers, (d) + (e)	24.62%	TBD

Contribution rates are based on total (DB and DCR) payroll. The contribution rates shown above for FY24 are estimated assuming no actuarial gains/losses during FY22 and FY23. Actual FY24 contribution rates will be adopted by the Board in September 2022 reflecting FY22 asset experience.

Contribution rates include Employer contribution rates as limited by Alaska state statutes and the Additional State Contribution required under SB 125.

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[1] Beginning with the June 30, 2014 valuation, contribution rates for FY17 and beyond are determined using new methodology in accordance with 2014 legislation under HB 385 and SB 119, 2014 Alaska Laws, which changed the amortization methodology to a closed 25-year period as a level percentage of pay, and eliminated the time lag on the contribution rate calculation by using a 2-year "roll-forward" approach assuming 0% population growth. Investment gains and losses are recognized over a 5-year period beginning in FY15. Beginning with the June 30, 2018 valuation, the UAAL amortization was changed as described in Section 5.2.

[2] The FY23 contribution rates adopted by the Board in October 2021 were 17.90% for Pension and 0.00% for Healthcare.

Summary of Actuarial Accrued Liability Gain/(Loss) and Other Changes During the Year

The following table summarizes the sources of change in the total Employer/State contribution rate as of June 30, 2020 and June 30, 2021 based on DB and DCR payroll combined:

	Pension	Healthcare	Total
1. Total Employer/State Contribution Rate as of June 30, 2020	21.73%	3.30%	25.03%
2. Change due to:			
a. Health Claims Experience	N/A	(0.11)%	(0.11)%
b. Salary Increases	0.25%	N/A	0.25%
c. Investment Experience	(1.95)%	0.00%	(1.95)%
d. Demographic Experience and Miscellaneous[1]	(0.68)%	(0.23)%	(0.91)%
e. Actual vs Expected Contributions	(0.03)%	0.00%	(0.03)%
f. Assumption/Method Changes	0.00%	0.00%	0.00%
g. Plan Changes	0.00%	(0.02)%	(0.02)%
h. Total Change, (a) + (b) + (c) + (d) + (e) + (f) + (g)	(2.41)%	(0.36)%	(2.77)%
3. Total Employer/State Contribution Rate as of June 30, 2021, (1) + (2)(h)	19.32%	2.94%	22.26%

The following table shows the FY21 gain/(loss) on actuarial accrued liability as of June 30, 2021 ($'s in 000's):

	Pension	Healthcare	Total
Retirement Experience	$ 4,502	$ (2,282)	$ 2,220
Termination Experience	(7,088)	(2,979)	(10,067)
Disability Experience	(103)	220	117
Active Mortality Experience	311	(2,709)	(2,398)
Inactive Mortality Experience	(5,089)	269	(4,820)
Salary Increases	(29,192)	N/A	(29,192)
Rehires (Net of Rehire Load)	3,085	3,476	6,561
COLA Increases	293	N/A	293
PRPA Increases	81,362	N/A	81,362
Benefit Payments Different than Expected	14,033	10,592	24,625
Per Capita Claims Cost	N/A	96,861	96,861
Medical and Prescription Drug Plan Changes	N/A	21,763	21,763
Medicare Part B Only Experience	N/A	1,278	1,278
Changes in Dependent Coverage Elections	N/A	9,126	9,126
Programming Changes[2]	(227)	N/A	(227)
Miscellaneous[3]	(6,320)	(4,278)	(10,598)
Total	$ 55,567	$ 131,337	$ 186,904

[1] Includes the effects of census data changes between the two valuations.
[2] Includes the adjustment to the COLA for Tier 2 disabilities to commence immediately.
[3] Includes the effects of various data changes that are typical when new census data is received for the annual valuation, as well as other items that do not fit neatly into any of the other categories.

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The rehire gain/(loss) amount shown on the previous page is the difference between (i) the increase in Actuarial Accrued Liability at June 30, 2021 due to rehires during the most recent plan year, and (ii) the load that was added to the June 30, 2020 Normal Cost based on the rehire load assumption used in the June 30, 2020 valuation. The development of the FY21 rehire gain/(loss) amount is shown in the table below ($'s in 000's):

	Pension	Healthcare	Total
1. Increase/(Decrease) in Actuarial Accrued Liability at June 30, 2021 due to Rehires	$ 3,917	$ (817)	$ 3,100
2. June 30, 2020 Normal Cost Rehire Load, with interest to June 30, 2021	$ 7,002	$ 2,659	$ 9,661
3. Rehire Gain/(Loss), (2) - (1)	$ 3,085	$ 3,476	$ 6,561

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Section 1: Actuarial Funding Results

Section 1.1: Actuarial Liabilities and Normal Cost ($'s in 000's)

As of June 30, 2021	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Retirement Benefits	$ 1,842,511	$ 1,682,831
Termination Benefits	24,805	5,215
Disability Benefits	1,745	(1,845)
Death Benefits	12,117	10,274
Return of Contributions	2,130	(31,947)
Medical and Prescription Drug Benefits	863,878	743,380
Medicare Part D Subsidy	(95,180)	(82,422)
Indebtedness	(26,453)	(26,453)
Subtotal	$ 2,625,553	$ 2,299,033
Inactive Members		
Not Vested	$ 39,268	$ 39,268
Vested Terminations		
- Retirement Benefits	141,625	141,625
- Medical and Prescription Drug Benefits	261,528	261,528
- Medicare Part D Subsidy	(29,859)	(29,859)
- Indebtedness	(4,137)	(4,137)
Retirees & Beneficiaries		
- Retirement Benefits	5,657,056	5,657,056
- Medical and Prescription Drug Benefits	1,836,116	1,836,116
- Medicare Part D Subsidy	(289,140)	(289,140)
Subtotal	$ 7,612,457	$ 7,612,457
Total	**$ 10,238,010**	**$ 9,911,490**
Total Pension	**$ 7,690,667**	**$ 7,471,887**
Total Medical, Net of Part D Subsidy	**$ 2,547,343**	**$ 2,439,603**
Total Medical, Gross of Part D Subsidy	**$ 2,961,522**	**$ 2,841,024**

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As of June 30, 2021	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
By Tier		
Tier 1		
- Pension	$ 4,372,747	$ 4,366,405
- Medical, Net of Part D Subsidy	1,077,186	1,074,462
Tier 2		
- Pension	3,317,920	3,105,482
- Medical, Net of Part D Subsidy	1,470,157	1,365,141
Total	**$ 10,238,010**	**$ 9,911,490**

As of June 30, 2021	Normal Cost
Active Members	
Retirement Benefits	$ 28,231
Termination Benefits	3,445
Disability Benefits	628
Death Benefits	344
Return of Contributions	6,053
Medical and Prescription Drug Benefits	20,441
Medicare Part D Subsidy	(2,209)
Rehire Assumption (Pension)	6,026
Rehire Assumption (Medical)	2,193
Administrative Expenses (Pension)	3,217
Administrative Expenses (Medical)	1,604
Total	**$ 69,973**
Total Pension	**$ 47,944**
Total Medical, Net of Part D Subsidy	**$ 22,029**
Total Medical, Gross of Part D Subsidy	**$ 24,238**
By Tier	
Tier 1	
- Pension	$ 2,260
- Medical, Net of Part D Subsidy	903
Tier 2	
- Pension	45,684
- Medical, Net of Part D Subsidy	21,126
Total	**$ 69,973**

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Section 1.2: Actuarial Contributions as of June 30, 2021 ($'s in 000's)

Normal Cost Rate	Pension	Healthcare	Total
1. Total Normal Cost	$ 47,944	$ 22,029	$ 69,973
2. DB Rate Payroll Projected for FY22	326,551	326,551	326,551
3. DCR Rate Payroll Projected for FY22	423,783	423,783	423,783
4. Total Rate Payroll Projected for FY22	750,334	750,334	750,334
5. Normal Cost Rate			
a. Based on DB Rate Payroll, (1) ÷ (2)	14.68%	6.75%	21.43%
b. Based on Total Rate Payroll, (1) ÷ (4)	6.39%	2.94%	9.33%
6. Average Member Contribution Rate[1]	3.76%	0.00%	3.76%
7. Employer Normal Cost, (5)(b) - (6)	2.63%	2.94%	5.57%

Past Service Rate	Pension	Healthcare	Total
1. Actuarial Accrued Liability	$ 7,471,887	$ 2,439,603	$ 9,911,490
2. Valuation Assets	5,910,369	3,267,737	9,178,106
3. Unfunded Actuarial Accrued Liability, (1) - (2)	$ 1,561,518	$ (828,134)	$ 733,384
4. Funded Ratio, (2) ÷ (1)	79.1%	133.9%	92.6%
5. Past Service Cost Amortization Payment	125,231	(55,785)	69,446
6. Total Rate Payroll Projected for FY22	750,334	750,334	750,334
7. Past Service Rate, (5) ÷ (6)	16.69%	(7.43%)	9.26%
Total Employer / State Contribution Rate, not less than Normal Cost Rate	**19.32%**	**2.94%**	**22.26%**
Normal Cost Rate by Tier (Total Employer and Member)[2]			
Tier 1	15.35%	6.13%	21.49%
Tier 2	14.65%	6.77%	21.42%

[1] Assumes no member contributions from members in the DCR plan, 9.65% contributions for Tier 1 members who elected supplemental coverage, and 8.65% for the remaining members.

[2] Rates determined considering the payroll for members in each tier. DCR payroll is excluded from these calculations.

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Schedule of Past Service Cost Amortizations - Pension ($'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	18	$ 1,720,344	$ 1,693,026	$ 133,291
Change in Assumptions	6/30/2018	22	14,346	14,467	1,005
FY19 Loss	6/30/2019	23	94,314	95,008	6,430
FY20 Loss	6/30/2020	24	44,395	44,593	2,945
FY21 Gain	6/30/2021	25	(285,576)	(285,576)	(18,440)
Total				**$ 1,561,518**	**$ 125,231**

Schedule of Past Service Cost Amortizations - Healthcare ($'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	18	$ (48,285)	$ (47,519)	$ (3,741)
Change in Assumptions/Methods/EGWP	6/30/2018	22	(166,274)	(167,686)	(11,647)
FY19 Gain	6/30/2019	23	(213,757)	(215,328)	(14,572)
FY20 Gain	6/30/2020	24	(101,507)	(101,961)	(6,735)
Medical/Prescription Drug Plan Changes	6/30/2021	25	(21,763)	(21,763)	(1,405)
FY21 Gain	6/30/2021	25	(273,877)	(273,877)	(17,685)
Total				**$ (828,134)**	**$ (55,785)**

Schedule of Past Service Cost Amortizations - Total ($'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	18	$ 1,672,059	$ 1,645,507	$ 129,550
Change in Assumptions/Methods/EGWP	6/30/2018	22	(151,928)	(153,219)	(10,642)
FY19 Gain	6/30/2019	23	(119,443)	(120,320)	(8,142)
FY20 Gain	6/30/2020	24	(57,112)	(57,368)	(3,790)
Medical/Prescription Drug Plan Changes	6/30/2021	25	(21,763)	(21,763)	(1,405)
FY21 Gain	6/30/2021	25	(559,453)	(559,453)	(36,125)
Total				**$ 733,384**	**$ 69,446**

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Section 1.3: Roll-Forward Contribution Rate Calculation for FY24 ($'s in 000's)

	Pension	Healthcare	Total
1. Liability Roll Forward			
a. Actuarial Accrued Liability as of June 30, 2021	**$ 7,471,887**	**$ 2,439,603**	**$ 9,911,490**
b. Normal Cost	44,727	20,425	65,152
c. Interest on (a) and (b) at 7.38%	554,726	181,550	736,276
d. Estimated Benefit Payments	(523,901)	(134,643)	(658,544)
e. Interest on (d) at 7.38%, adjusted for timing	(20,601)	(4,880)	(25,481)
f. Expected Actuarial Accrued Liability as of June 30, 2022	**$ 7,526,838**	**$ 2,502,055**	**$ 10,028,893**
g. Projected Normal Cost	40,486	18,726	59,212
h. Interest on (f) and (g) at 7.38%	558,469	186,034	744,503
i. Estimated Benefit Payments	(541,571)	(140,701)	(682,272)
j. Interest on (i) at 7.38%, adjusted for timing	(21,296)	(5,099)	(26,395)
k. Expected Actuarial Accrued Liability as of June 30, 2023	**$ 7,562,926**	**$ 2,561,015**	**$ 10,123,941**
2. Asset Roll Forward			
a. Actuarial Value of Assets as of June 30, 2021	**$ 5,910,369**	**$ 3,267,737**	**$ 9,178,106**
b. Interest on (a) at 7.38%	436,185	241,159	677,344
c. Employee Contributions	31,383	0	31,383
d. Employer Contributions	24,161	22,360	46,521
e. State Assistance Contributions	142,665	0	142,665
f. Interest on (c) thru (e) at 7.38%, adjusted for timing*	12,542	810	13,352
g. Estimated Benefit Payments	(523,901)	(134,643)	(658,544)
h. Administrative Expenses	(3,217)	(1,604)	(4,821)
i. Interest on (g) and (h) at 7.38%, adjusted for timing	(20,717)	(4,938)	(25,655)
j. AVA Adjustments	250,511	140,417	390,928
k. Expected Actuarial Value of Assets as of June 30, 2022	**$ 6,259,981**	**$ 3,531,298**	**$ 9,791,279**
l. Interest on (k) at 7.38%	461,987	260,610	722,597
m. Employee Contributions	29,220	0	29,220
n. Employer Contributions	44,104	0	44,104
o. State Assistance Contributions**	91,029	0	91,029
p. Interest on (m) thru (o) at 7.38%, adjusted for timing*	9,375	0	9,375
q. Estimated Benefit Payments	(541,571)	(140,701)	(682,272)
r. Administrative Expenses	(2,932)	(1,478)	(4,410)
s. Interest on (q) and (r) at 7.38%, adjusted for timing	(21,402)	(5,153)	(26,555)
t. AVA Adjustments	233,895	130,611	364,506
u. Expected Actuarial Value of Assets as of June 30, 2023	**$ 6,563,686**	**$ 3,775,187**	**$ 10,338,873**
3. Expected Unfunded Actuarial Accrued Liability as of June 30, 2023, 1(k) - 2(u)	**$ 999,240**	**$ (1,214,172)**	**$ (214,932)**

* Employee and Employer Contributions are paid throughout the year. State Assistance Contributions are assumed to be paid on July 1, 2021 for FY22, and July 1, 2022 for FY23.

** The FY23 State Assistance Contribution is expected to be contributed 100% to pension.

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	Pension	Healthcare	Total
4. Expected Annual Rate Payroll for FY24			
a. Defined Benefit Members			$ 270,617
b. Defined Contribution Retirement Members			491,467
c. Total Rate Payroll			**$ 762,084**
5. Expected FY24 Contribution Rate Calculation			
a. Projected Normal Cost for FY24	$ 39,024	$ 18,394	$ 57,418
b. Projected Normal Cost Rate for FY24	5.12%	2.41%	7.53%
c. Expected Member Contribution Rate for FY24	(3.07%)	0.00%	(3.07%)
d. Expected Employer Normal Cost Rate for FY24	**2.05%**	**2.41%**	**4.46%**
e. Expected Unfunded Liability as of June 30, 2023	$ 999,240	$ (1,214,172)	$ (214,932)
f. FY24 Layered Amortization of Expected Unfunded Liability	98,310	(84,064)	14,246
g. Expected Past Service Cost Contribution Rate for FY24	**12.90%**	**(11.03%)**	**12.90%**
h. Expected Total Contribution Rate for FY24, not less than Normal Cost Rate	**14.95%**	**2.41%**	**17.36%**

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The components of the expected FY24 amortization amounts are shown below (totals may not add due to rounding):

Expected FY24 Schedule of Past Service Cost Amortizations - Pension ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining at 6/30/23	Initial	Outstanding at 6/30/23	Beginning-of-Year Payment for FY24
Initial Amount	6/30/2018	16	$ 1,720,344	$ 1,651,383	$ 140,722
Change in Assumptions	6/30/2018	20	14,346	14,414	1,061
FY19 Loss	6/30/2019	21	94,314	95,041	6,788
FY20 Loss	6/30/2020	22	44,395	44,772	3,110
FY21 Gain	6/30/2021	23	(285,576)	(287,675)	(19,468)
Expected FY22 Gain	6/30/2022	24	(275,429)	(276,658)	(18,274)
Expected FY23 Gain	6/30/2023	25	(242,037)	(242,037)	(15,629)
Total				**$ 999,240**	**$ 98,310**

Expected FY24 Schedule of Past Service Cost Amortizations - Healthcare ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining at 6/30/23	Initial	Outstanding at 6/30/23	Beginning-of-Year Payment for FY24
Initial Amount	6/30/2018	16	$ (48,285)	$ (46,351)	$ (3,950)
Change in Assumptions/Methods/EGWP	6/30/2018	20	(166,274)	(167,070)	(12,296)
FY19 Gain	6/30/2019	21	(213,757)	(215,403)	(15,385)
FY20 Gain	6/30/2020	22	(101,507)	(102,370)	(7,110)
Medical/Prescription Drug Plan Changes	6/30/2021	23	(21,763)	(21,923)	(1,484)
FY21 Gain	6/30/2021	23	(273,877)	(275,889)	(18,671)
Expected FY22 Gain	6/30/2022	24	(199,895)	(200,787)	(13,262)
Expected FY23 Gain	6/30/2023	25	(184,379)	(184,379)	(11,906)
Total				**$ (1,214,172)**	**$ (84,064)**

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The components of the expected FY24 amortization amounts are shown below (totals may not add due to rounding):

Expected FY24 Schedule of Past Service Cost Amortizations - Total ($'s in 000's)

	Amortization Period		Balances		
Layer	Date Created	Years Remaining at 6/30/23	Initial	Outstanding at 6/30/23	Beginning-of-Year Payment for FY24
Initial Amount	6/30/2018	16	$ 1,672,059	$ 1,605,032	$ 136,772
Change in Assumptions/Methods/EGWP	6/30/2018	20	(151,928)	(152,656)	(11,235)
FY19 Gain	6/30/2019	21	(119,443)	(120,362)	(8,597)
FY20 Gain	6/30/2020	22	(57,112)	(57,598)	(4,000)
Medical/Prescription Drug Plan Changes	6/30/2021	23	(21,763)	(21,923)	(1,484)
FY21 Gain	6/30/2021	23	(559,453)	(563,564)	(38,139)
Expected FY22 Gain	6/30/2022	24	(475,324)	(477,445)	(31,536)
Expected FY23 Gain	6/30/2023	25	(426,416)	(426,416)	(27,535)
Total				**$ (214,932)**	**$ 14,246**

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Section 1.4: Actuarial Gain/(Loss) for FY21 ($'s in 000's)

	Pension	Healthcare	Total
1. Expected Actuarial Accrued Liability			
a. Actuarial Accrued Liability as of June 30, 2020	$ 7,447,036	$ 2,489,675	$ 9,936,711
b. Normal Cost	48,401	23,057	71,458
c. Interest on (a) and (b) at 7.38%	553,163	185,440	738,603
d. Employer Group Waiver Plan	0	18,355	18,355
e. Benefit Payments	(499,942)	(141,137)	(641,079)
f. Refund of Contributions	(1,487)	0	(1,487)
g. Interest on (d) thru (f) at 7.38%, adjusted for timing	(19,717)	(4,450)	(24,167)
h. Assumptions/Methods Changes	0	0	0
i. Expected Actuarial Accrued Liability as of June 30, 2021 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	$ 7,527,454	$ 2,570,940	$ 10,098,394
2. Actual Actuarial Accrued Liability as of June 30, 2021	7,471,887	2,439,603	9,911,490
3. Liability Gain/(Loss), (1)(i) - (2)	**$ 55,567**	**$ 131,337**	**$ 186,904**
4. Expected Actuarial Asset Value			
a. Actuarial Value of Assets as of June 30, 2020	$ 5,587,064	$ 3,021,283	$ 8,608,347
b. Interest on (a) at 7.38%	412,325	222,971	635,296
c. Employee Contributions	33,342	0	33,342
d. Employer Contributions	28,430	24,700	53,130
e. State Assistance Contributions	134,976	0	134,976
f. Employer Group Waiver Plan	0	18,355	18,355
g. Interest on (c) thru (f) at 7.38%, adjusted for timing	12,200	1,560	13,760
h. Benefit Payments	(499,942)	(141,137)	(641,079)
i. Refund of Contributions	(1,487)	0	(1,487)
j. Administrative Expenses	(3,446)	(1,836)	(5,282)
k. Interest on (h) thru (j) at 7.38%, adjusted for timing	(19,842)	(5,182)	(25,024)
l. Expected Actuarial Asset Value as of June 30, 2021 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h) + (i) + (j) + (k)	$ 5,683,620	$ 3,140,714	$ 8,824,334
5. Actual Actuarial Asset Value as of June 30, 2021	5,910,369	3,267,737	9,178,106
6. Actuarial Asset Value Gain/(Loss), (5) - (4)(l)	**$ 226,749**	**$ 127,023**	**$ 353,772**
7. Total Actuarial Gain/(Loss), (3) + (6)	**$ 282,316**	**$ 258,360**	**$ 540,676**
8. Contribution Gain/(Loss)	**$ 3,606**	**$ 37,720**	**$ 41,326**
9. Administrative Expense Gain/(Loss)	**$ (346)**	**$ (440)**	**$ (786)**
10. FY21 Gain/(Loss), (7) + (8) + (9)	**$ 285,576**	**$ 295,640**	**$ 581,216**

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Section 1.5: Development of Change in Unfunded Liability During FY21 ($'s in 000's)

	Pension	Healthcare	Total
1. 2020 Unfunded Liability	$ 1,859,972	$ (531,608)	$ 1,328,364
a. Interest on Unfunded Liability at 7.38%	$ 137,266	$ (39,233)	$ 98,033
b. Normal Cost	48,401	23,057	71,458
c. Employee Contributions	(33,342)	0	(33,342)
d. Employer Contributions	(28,430)	(24,700)	(53,130)
e. State Assistance Contributions	(134,976)	0	(134,976)
f. Administrative Expenses	3,446	1,836	5,282
g. Interest on (b) thru (f) at 7.38%, adjusted for timing	(8,503)	874	(7,629)
h. Assumptions/Methods Changes	0	0	0
i. Expected Change in Unfunded Liability During FY21 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	$ (16,138)	$ (38,166)	$ (54,304)
2. Expected 2021 Unfunded Liability, (1) + (1)(i)	$ 1,843,834	$ (569,774)	$ 1,274,060
a. Liability (Gain)/Loss During FY21	$ (55,567)	$ (131,337)	$ (186,904)
b. Actuarial Assets (Gain)/Loss During FY21	(226,749)	(127,023)	(353,772)
c. Total Actuarial (Gain)/Loss During FY21	$ (282,316)	$ (258,360)	$ (540,676)
3. Actual 2021 Unfunded Liability, (2) + (2)(c)	$ 1,561,518	$ (828,134)	$ 733,384

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Section 1.6: Analysis of Financial Experience

Pension
Change in Employer / State Contribution Rate as of Valuation Date
Due to (Gains) and Losses in Actuarial Accrued Liabilities During the Last Five Fiscal Years
Resulting from Differences Between Assumed Experience and Actual Experience

	Change in Employer / State Contribution Rate During Fiscal Year				
	Pension				
Type of (Gain) or Loss	**2017**	**2018**	**2019**	**2020**	**2021**
1. Health Claims	N/A	N/A	N/A	N/A	N/A
2. Salary Experience	(0.34%)	(0.39%)	(0.06%)	(0.06%)	0.25%
3. Investment Experience	1.12%	0.91%	0.93%	0.83%	(1.95%)
4. Demographic Experience and Miscellaneous	(0.47%)	0.37%	0.75%	(0.28%)	(0.68%)
5. Actual vs Expected Contributions	(0.07%)	(0.03%)	(0.15%)	(0.17%)	(0.03%)
6. (Gain) or Loss During Year From Experience, (1) + (2) + (3) + (4) + (5)	0.24%	0.86%	1.47%	0.32%	(2.41%)
7. Assumptions / Method Changes	0.00%	(0.32%)	0.00%	0.00%	0.00%
8. Plan Changes	0.00%	0.00%	0.00%	0.00%	0.00%
9. Composite (Gain) or Loss During Year, (6) + (7) + (8)	0.24%	0.54%	1.47%	0.32%	(2.41%)
10. Beginning Total Employer / State Contribution Rate	19.16%	19.40%	19.94%	21.41%	21.73%
11. Ending Valuation Year Employer / State Contribution Rate, (9) + (10)	19.40%	19.94%	21.41%	21.73%	19.32%
12. Fiscal Year Rates Adopted by ARMB					
a. Fiscal Year Employer / State Contribution Rate	20.71%	20.94%	22.51%	17.90%	14.95% *
b. Fiscal Year for which Rate Applies	FY20	FY21	FY22	FY23	FY24

* Expected rate. Actual rate to be determined

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Healthcare
Change in Employer / State Contribution Rate as of Valuation Date
Due to (Gains) and Losses in Actuarial Accrued Liabilities During the Last Five Fiscal Years
Resulting from Differences Between Assumed Experience and Actual Experience

	Change in Employer / State Contribution Rate During Fiscal Year				
	Healthcare				
Type of (Gain) or Loss	**2017**	**2018**	**2019**	**2020**	**2021**
1. Health Claims	(2.32%)	(1.58%)	(2.51%)	(0.95%)	(0.11%)
2. Salary Experience	N/A	N/A	N/A	N/A	N/A
3. Investment Experience	0.56%	0.45%	0.45%	0.38%	0.00%
4. Demographic Experience and Miscellaneous	(0.71%)	1.49%	1.60%	0.49%	(0.23%)
5. Actual vs Expected Contributions	(0.11%)	0.05%	(0.02%)	(0.19%)	0.00%
6. (Gain) or Loss During Year From Experience, (1) + (2) + (3) + (4) + (5)	(2.58%)	0.41%	(0.48%)	(0.27%)	(0.34%)
7. Assumptions / Method Changes	3.41%	0.24%	0.00%	0.00%	0.00%
8. Plan Changes	0.00%	0.00%	0.00%	0.00%	(0.02%)
9. Composite (Gain) or Loss During Year, (6) + (7) + (8)	0.83%	0.65%	(0.48%)	(0.27%)	(0.36%)
10. Beginning Total Employer / State Contribution Rate	2.57%	3.40%	4.05%	3.57%	3.30%
11. Ending Valuation Year Employer / State Contribution Rate, (9) + (10)	3.40%	4.05%	3.57%	3.30%	2.94%
12. Fiscal Year Rates Adopted by ARMB					
a. Fiscal Year Employer / State Contribution Rate	3.91%	3.40%	2.98%	0.00%	2.41% *
b. Fiscal Year for which Rate Applies	FY20	FY21	FY22	FY23	FY24

* Expected rate. Actual rate to be determined

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Total
Change in Employer / State Contribution Rate as of Valuation Date
Due to (Gains) and Losses in Actuarial Accrued Liabilities During the Last Five Fiscal Years
Resulting from Differences Between Assumed Experience and Actual Experience

	Change in Employer / State Contribution Rate During Fiscal Year				
	Total				
Type of (Gain) or Loss	**2017**	**2018**	**2019**	**2020**	**2021**
1. Health Claims	(2.32%)	(1.58%)	(2.51%)	(0.95%)	(0.11%)
2. Salary Experience	(0.34%)	(0.39%)	(0.06%)	(0.06%)	0.25%
3. Investment Experience	1.68%	1.36%	1.38%	1.21%	(1.95%)
4. Demographic Experience and Miscellaneous	(1.18%)	1.86%	2.35%	0.21%	(0.91%)
5. Actual vs Expected Contributions	(0.18%)	0.02%	(0.17%)	(0.36%)	(0.03%)
6. (Gain) or Loss During Year From Experience, (1) + (2) + (3) + (4) + (5)	(2.34%)	1.27%	0.99%	0.05%	(2.75%)
7. Assumptions / Method Changes	3.41%	(0.08%)	0.00%	0.00%	0.00%
8. Plan Changes	0.00%	0.00%	0.00%	0.00%	(0.02%)
9. Composite (Gain) or Loss During Year, (6) + (7) + (8)	1.07%	1.19%	0.99%	0.05%	(2.77%)
10. Beginning Total Employer / State Contribution Rate	21.73%	22.80%	23.99%	24.98%	25.03%
11. Ending Valuation Year Employer / State Contribution Rate, (9) + (10)	22.80%	23.99%	24.98%	25.03%	22.26%
12. Fiscal Year Rates Adopted by ARMB					
a. Fiscal Year Employer / State Contribution Rate	24.62%	24.34%	25.49%	17.90%	17.36% *
b. Fiscal Year for which Rate Applies	FY20	FY21	FY22	FY23	FY24

* Expected rate. Actual rate to be determined

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Section 1.7: History of Unfunded Liability and Funded Ratio ($'s in 000's)

Valuation Date	Total Actuarial Accrued Liability	Valuation Assets	Assets as a Percent of Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability (UAAL)
June 30, 2003	$ 5,835,609	$ 3,752,285	64.3%	$ 2,083,324
June 30, 2004	6,123,600	3,845,370	62.8%	2,278,230
June 30, 2005	6,498,556	3,958,939	60.9%	2,539,617
June 30, 2006	7,229,851	4,141,700	57.3%	3,088,151
June 30, 2007	7,189,403	4,424,399	61.5%	2,765,004
June 30, 2008	7,619,178	4,936,976	64.8%	2,682,202
June 30, 2009	7,847,514	4,472,958	57.0%	3,374,556
June 30, 2010	8,847,788	4,739,128	53.6%	4,108,660
June 30, 2011	9,128,795	4,937,937	54.1%	4,190,858
June 30, 2012	9,346,444	4,869,154	52.1%	4,477,290
June 30, 2013	9,592,107	4,974,076	51.9%	4,618,031
June 30, 2014	9,841,032	6,019,274	61.2%	3,821,758
June 30, 2015	9,729,117	8,108,923	83.3%	1,620,194
June 30, 2016	9,907,624	8,200,391	82.8%	1,707,233
June 30, 2017	10,144,618	8,313,637	82.0%	1,830,981
June 30, 2018	9,960,440	8,440,309	84.7%	1,520,131
June 30, 2019	9,906,664	8,511,493	85.9%	1,395,171
June 30, 2020	9,936,711	8,608,347	86.6%	1,328,364
June 30, 2021	9,911,490	9,178,106	92.6%	733,384

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Section 2: Plan Assets

Section 2.1: Summary of Fair Value of Assets ($'s in 000's)

As of June 30, 2021	Pension	Healthcare	Total	Allocation Percent
Cash and Short-Term Investments				
- Cash and Cash Equivalents	$ 72,735	$ 38,232	$ 110,967	1.1%
- Subtotal	$ 72,735	$ 38,232	$ 110,967	1.1%
Fixed Income Investments				
- Domestic Fixed Income Pool	$ 1,365,542	$ 758,389	$ 2,123,931	20.3%
- International Fixed Income Pool	0	0	0	0.0%
- Tactical Fixed Income Pool	0	0	0	0.0%
- High Yield Pool	0	0	0	0.0%
- Treasury Inflation Protection Pool	0	0	0	0.0%
- Emerging Debt Pool	0	0	0	0.0%
- Subtotal	$ 1,365,542	$ 758,389	$ 2,123,931	20.3%
Equity Investments				
- Domestic Equity Pool	$ 1,847,616	$ 1,026,121	$ 2,873,737	27.4%
- International Equity Pool	1,018,255	565,514	1,583,769	15.1%
- Private Equity Pool	1,001,964	556,466	1,558,430	14.9%
- Emerging Markets Equity Pool	216,313	120,135	336,448	3.2%
- Alternative Equity Strategies	393,518	218,551	612,069	5.8%
- Subtotal	$ 4,477,666	$ 2,486,787	$ 6,964,453	66.4%
Other Investments				
- Real Estate Pool	$ 414,283	$ 230,449	$ 644,732	6.1%
- Other Investments Pool	414,089	229,975	644,064	6.1%
- Absolute Return Pool	0	0	0	0.0%
- Other Assets	0	318	318	0.0%
- Subtotal	$ 828,372	$ 460,742	$ 1,289,114	12.2%
Total Cash and Investments	$ 6,744,315	$ 3,744,150	$ 10,488,465	100.0%
Net Accrued Receivables	(12,834)	(21,119)	(33,953)	
Net Assets	$ 6,731,481	$ 3,723,031	$ 10,454,512	

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Section 2.2: Changes in Fair Value of Assets During FY21 ($'s in 000's)

Fiscal Year 2021	Pension	Healthcare	Total
1. Fair Value of Assets as of June 30, 2020	$ 5,444,799	$ 2,953,461	$ 8,398,260
2. Additions:			
a. Employee Contributions	$ 33,342	$ 0	$ 33,342
b. Employer Contributions	28,430	24,700	53,130
c. State Assistance Contributions	134,976	0	134,976
d. Interest and Dividend Income	75,824	41,567	117,391
e. Net Appreciation / Depreciation in Fair Value of Investments	1,534,132	835,912	2,370,044
f. Employer Group Waiver Plan	0	18,355	18,355
g. Other	273	247	520
h. Total Additions	$ 1,806,977	$ 920,781	$ 2,727,758
3. Deductions:			
a. Medical Benefits	$ 0	$ 141,137	$ 141,137
b. Retirement Benefits	499,942	0	499,942
c. Refund of Contributions	1,487	0	1,487
d. Investment Expenses	15,420	8,238	23,658
e. Administrative Expenses	3,446	1,836	5,282
f. Total Deductions	$ 520,295	$ 151,211	$ 671,506
4. Fair Value of Assets as of June 30, 2021	$ 6,731,481	$ 3,723,031	$ 10,454,512
5. Approximate Fair Value Investment Return Rate during FY21 Net of Investment Expenses	30.1%	29.9%	30.1%

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Section 2.3: Development of Actuarial Value of Assets ($'s in 000's)

The actuarial value of asset was set equal to the fair value as of June 30, 2014 and the 20% corridor was eliminated. Investment gains and losses after June 30, 2014 are recognized 20% per year over 5 years.

	Pension	Healthcare	Total
1. Deferral of Investment Gain / (Loss) for FY21			
a. Fair Value of Assets as of June 30, 2020	$ 5,444,799	$ 2,953,461	$ 8,398,260
b. Contributions	196,748	24,700	221,448
c. Employer Group Waiver Plan	0	18,355	18,355
d. Benefit Payments	501,429	141,137	642,566
e. Administrative Expenses	3,446	1,836	5,282
f. Actual Investment Return (net of investment expenses)	1,594,809	869,488	2,464,297
g. Expected Return Rate (net of investment expenses)	7.38%	7.38%	7.38%
h. Expected Return, Weighted for Timing	394,184	214,344	608,528
i. Investment Gain / (Loss) for the Year, (f) - (h)	1,200,625	655,144	1,855,769
2. Actuarial Value as of June 30, 2021			
a. Fair Value as of June 30, 2021	$ 6,731,481	$ 3,723,031	$ 10,454,512
b. Deferred Investment Gain / (Loss)	821,112	455,294	1,276,406
c. Actuarial Value as of June 30, 2021, (a) - (b)	5,910,369	3,267,737	9,178,106
3. Ratio of Actuarial Value of Assets to Fair Value of Assets	87.8%	87.8%	87.8%
4. Approximate Actuarial Value Investment Return Rate during FY21 Net of Investment Expenses	11.6%	11.7%	11.6%

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The tables below show the development of the gains/(losses) to be recognized in the current year ($'s in 000's):

Pension				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 236,679	$ 189,344	$ 47,335	$ 0
June 30, 2018	13,001	7,800	2,600	2,601
June 30, 2019	(82,246)	(32,898)	(16,449)	(32,899)
June 30, 2020	(181,816)	(36,363)	(36,363)	(109,090)
June 30, 2021	1,200,625	0	240,125	960,500
Total	**$ 1,186,243**	**$ 127,883**	**$ 237,248**	**$ 821,112**

Healthcare				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 126,053	$ 100,843	$ 25,210	$ 0
June 30, 2018	9,619	5,772	1,924	1,923
June 30, 2019	(38,309)	(15,324)	(7,662)	(15,323)
June 30, 2020	(92,367)	(18,473)	(18,473)	(55,421)
June 30, 2021	655,144	0	131,029	524,115
Total	**$ 660,140**	**$ 72,818**	**$ 132,028**	**$ 455,294**

Total				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 362,732	$ 290,187	$ 72,545	$ 0
June 30, 2018	22,620	13,572	4,524	4,524
June 30, 2019	(120,555)	(48,222)	(24,111)	(48,222)
June 30, 2020	(274,183)	(54,836)	(54,836)	(164,511)
June 30, 2021	1,855,769	0	371,154	1,484,615
Total	**$ 1,846,383**	**$ 200,701**	**$ 369,276**	**$ 1,276,406**

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Section 2.4: Historical Asset Rates of Return

	Actuarial Value		Fair Value	
Year Ending	Annual	Cumulative*	Annual	Cumulative*
June 30, 2005	9.1%	9.1%	8.5%	8.5%
June 30, 2006	9.6%	9.3%	11.4%	9.9%
June 30, 2007	11.9%	10.2%	18.5%	12.7%
June 30, 2008	10.2%	10.2%	(3.0%)	8.6%
June 30, 2009	(7.9%)	6.3%	(21.0%)	1.9%
June 30, 2010	8.1%	6.6%	10.6%	3.3%
June 30, 2011	6.9%	6.6%	20.5%	5.6%
June 30, 2012	0.7%	5.9%	0.2%	4.9%
June 30, 2013	3.7%	5.6%	12.2%	5.7%
June 30, 2014	22.7%	7.2%	18.2%	6.9%
June 30, 2015	7.2%	7.2%	3.2%	6.5%
June 30, 2016	5.1%	7.1%	(0.7%)	5.9%
June 30, 2017	5.6%	6.9%	12.9%	6.4%
June 30, 2018	6.2%	6.9%	8.2%	6.6%
June 30, 2019	5.5%	6.8%	5.9%	6.5%
June 30, 2020	5.8%	6.7%	4.1%	6.4%
June 30, 2021	11.6%	7.0%	30.1%	7.6%

* Cumulative since fiscal year ending June 30, 2005

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Section 3: Projections

Section 3.1: Projection Assumptions and Methods

Key Assumptions

- 7.38% investment return (net of investment expenses) on the Fair Value of Assets in all future years.
- The Actuarial Value of Assets was re-initialized to Fair Value as of June 30, 2014. The Actuarial Value of Assets after June 30, 2014 reflects the deferred gains and losses generated by the smoothing method. The current deferred amount is recognized in the first four years of the projections.
- Actuarial assumptions and methods as described in Section 5. No actuarial gains/losses are assumed after June 30, 2021.
- The actuarially calculated contribution rate using a two-year roll-forward approach is adopted each year.
- Projections assume a 0% increase in the total active member population. All new members are expected to enter the DCR plan.
- Contribution rates are determined as a percent of total DB and DCR payroll.
- The DCR contribution rate determined as of June 30, 2021 is assumed to remain constant in all future years.
- The active rehire assumption shown in Section 5 is assumed to grade to zero on a uniform basis over 20 years.
- The Normal Cost is increased by the administrative expenses shown in Section 5. For future years, the percent increase is assumed to remain constant.
- In Section 3.6B, we assumed all remaining pension unfunded liability layered amortization amounts would be zero after the pension trust is projected to reach a funded status of 100%.

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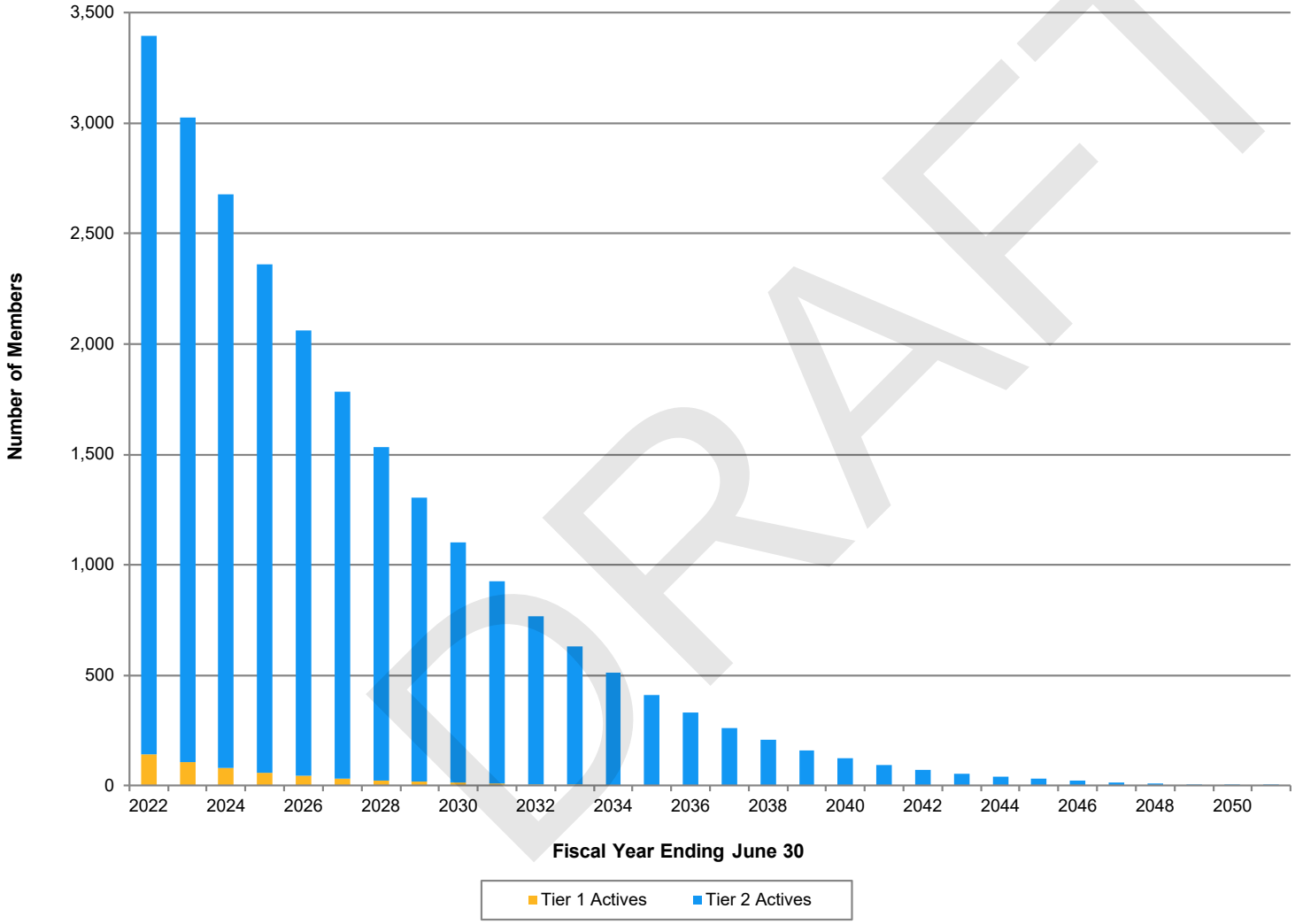
Section 3.2: Membership Projection

Projected Active Member Count



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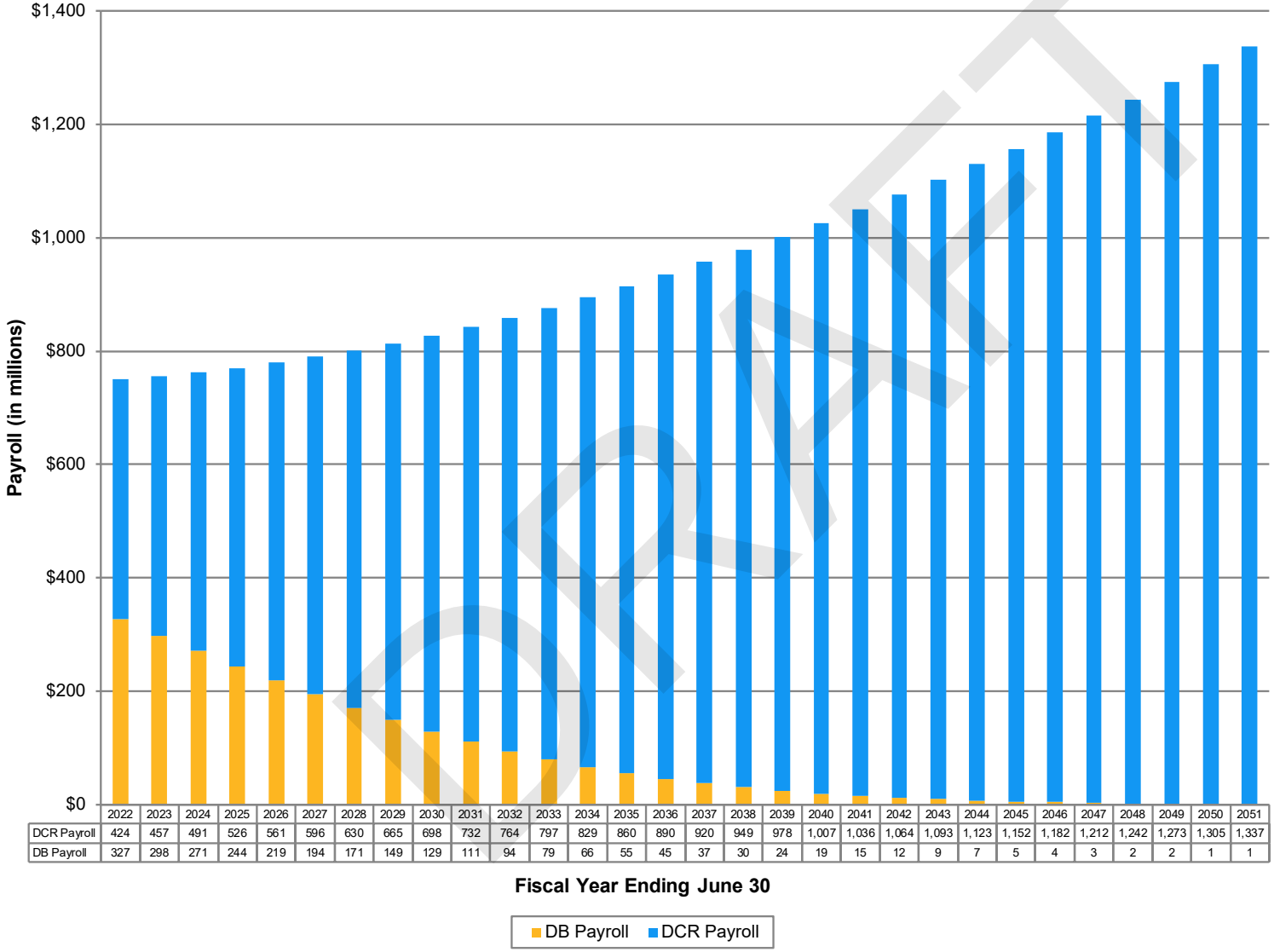
Projected DB and DCR Payroll



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
DCR Payroll	424	457	491	526	561	596	630	665	698	732	764	797	829	860	890	920	949	978	1,007	1,036	1,064	1,093	1,123	1,152	1,182	1,212	1,242	1,273	1,305	1,337
DB Payroll	327	298	271	244	219	194	171	149	129	111	94	79	66	55	45	37	30	24	19	15	12	9	7	5	4	3	2	2	1	1

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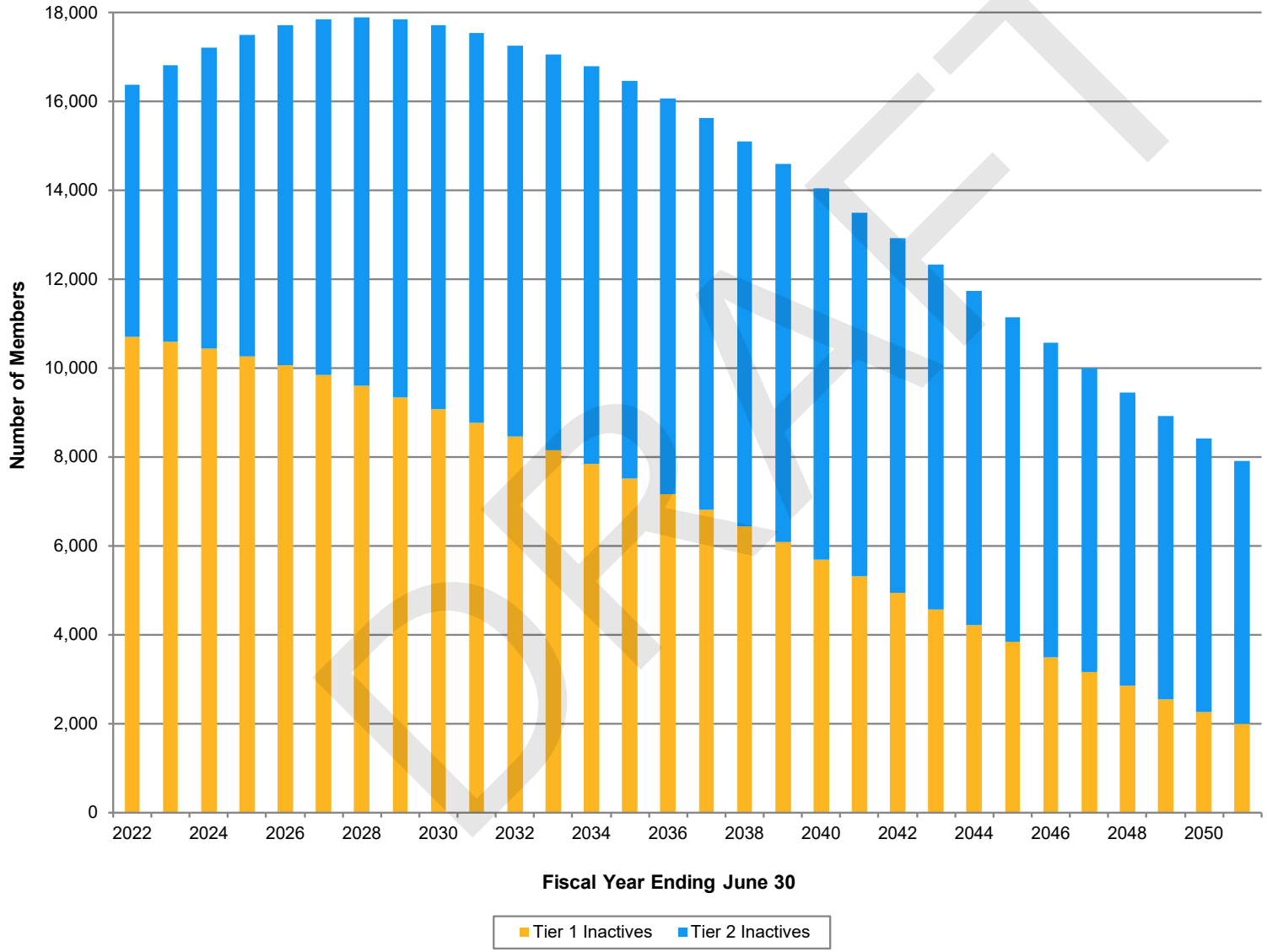
Projected Inactive Member Count



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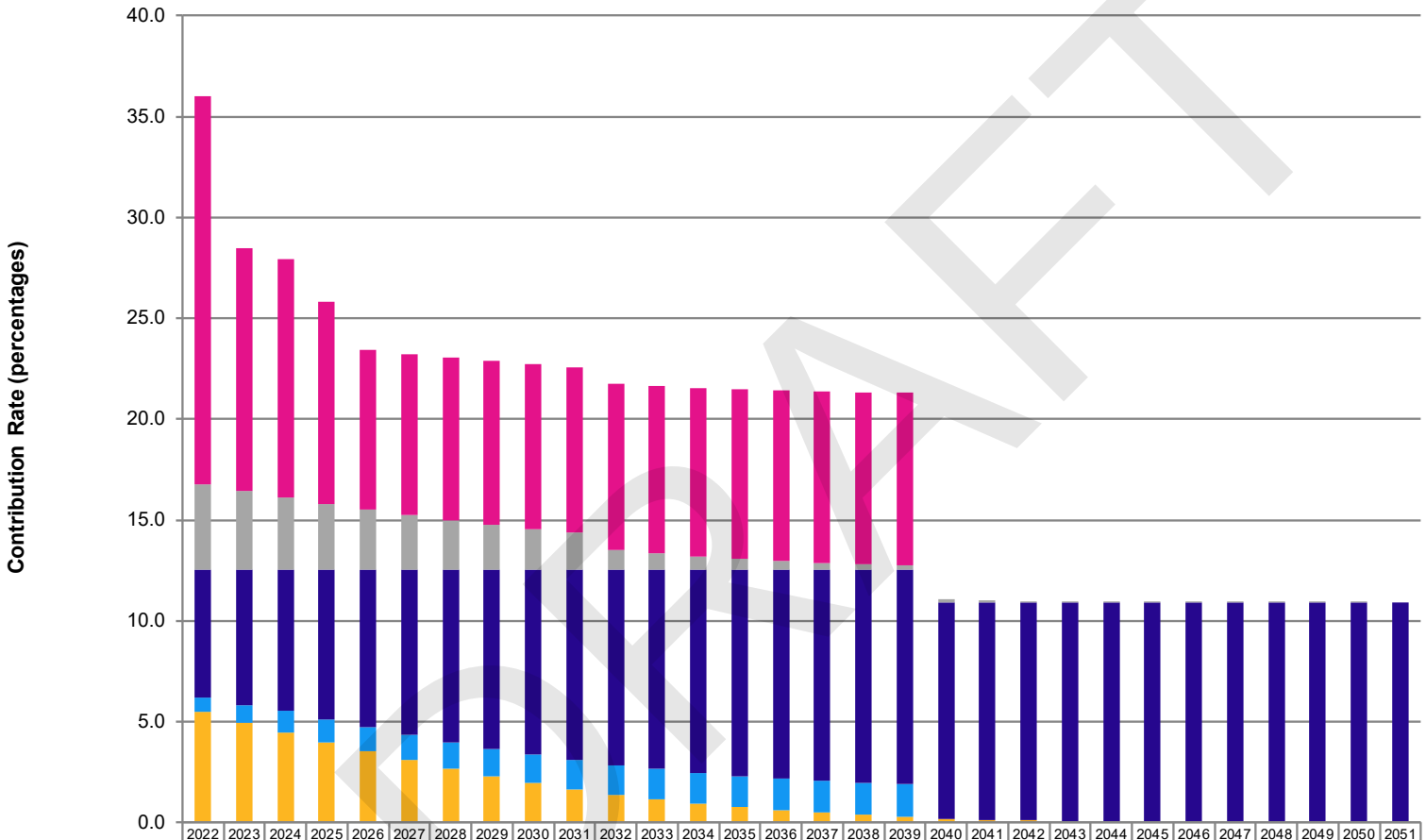
Section 3.3: Projected Employer/State Contribution Rates

Based on Total DB and DCR Payroll



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
State Assistance	19.29	12.06	11.83	9.99	7.92	7.98	8.05	8.10	8.15	8.20	8.25	8.30	8.33	8.39	8.43	8.47	8.51	8.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DB EE Contributions	4.18	3.87	3.55	3.24	2.96	2.68	2.43	2.21	2.01	1.83	0.95	0.78	0.64	0.52	0.42	0.33	0.26	0.20	0.16	0.12	0.09	0.07	0.05	0.04	0.03	0.02	0.01	0.01	0.01	0.00
DCR ER Contributions	6.36	6.72	7.03	7.45	7.84	8.23	8.58	8.91	9.20	9.47	9.71	9.91	10.09	10.25	10.38	10.48	10.57	10.64	10.70	10.75	10.78	10.81	10.83	10.85	10.86	10.87	10.88	10.89	10.89	10.89
DB ER Contributions on DCR Pay	0.73	0.88	1.07	1.13	1.20	1.25	1.31	1.35	1.40	1.44	1.47	1.51	1.54	1.56	1.58	1.60	1.61	1.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DB ER Contributions on DB Pay	5.47	4.96	4.46	3.98	3.52	3.08	2.67	2.30	1.96	1.65	1.38	1.14	0.93	0.75	0.60	0.48	0.38	0.30	0.20	0.15	0.11	0.09	0.06	0.05	0.03	0.03	0.02	0.01	0.01	0.01

Fiscal Year Ending June 30

DB ER Contributions on DB Pay | DB ER Contributions on DCR Pay | DCR ER Contributions | DB EE Contributions | State Assistance

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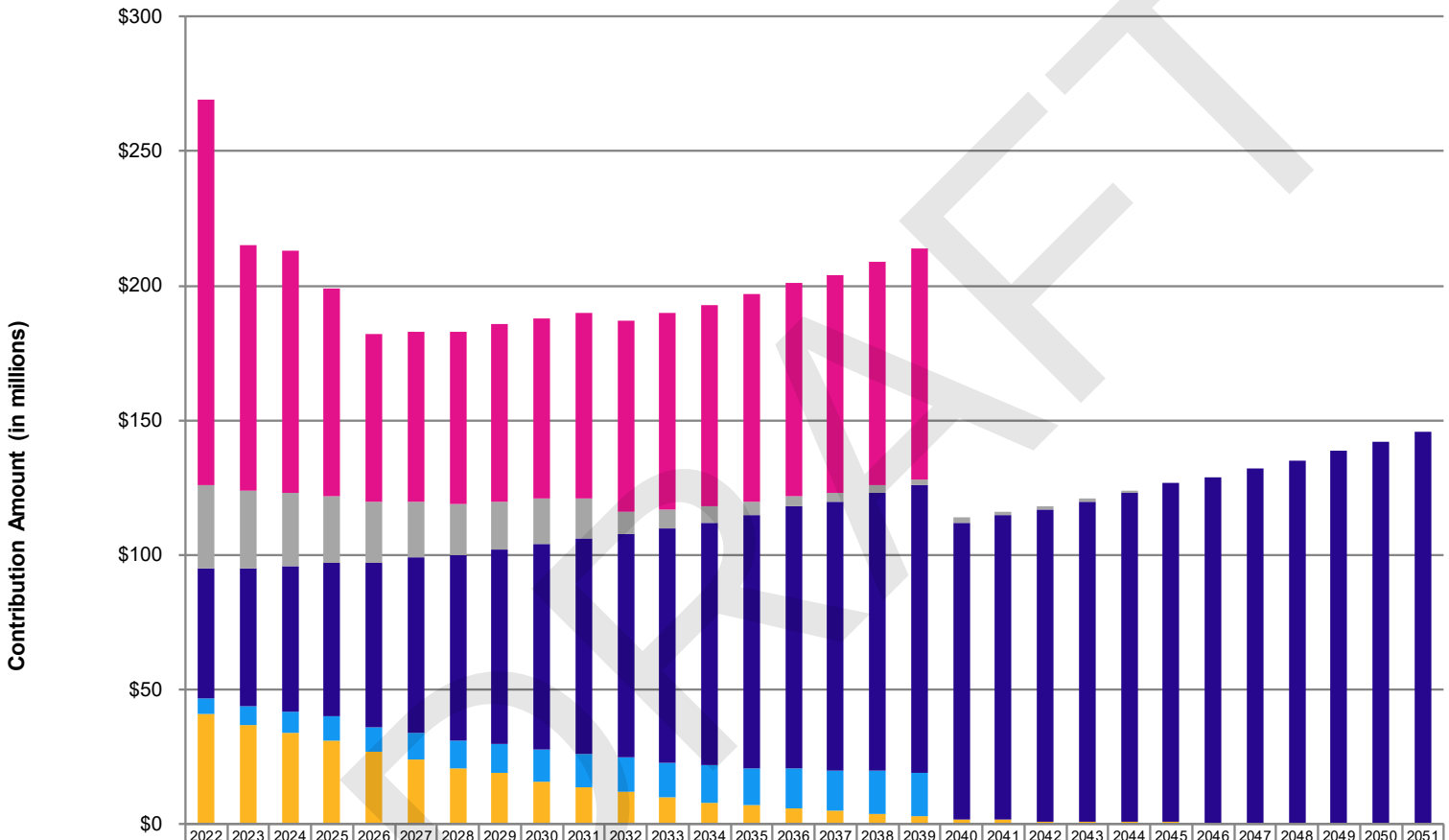
Section 3.4: Projected Employer/State Contribution Amounts



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
State Assistance	143	91	90	77	62	63	64	66	67	69	71	73	75	77	79	81	83	86	0	0	0	0	0	0	0	0	0	0	0	0
DB EE Contributions	31	29	27	25	23	21	19	18	17	15	8	7	6	5	4	3	3	2	2	1	1	1	1	0	0	0	0	0	0	0
DCR ER Contributions	48	51	54	57	61	65	69	72	76	80	83	87	90	94	97	100	103	107	110	113	116	119	122	126	129	132	135	139	142	146
DB ER Contributions on DCR Pay	6	7	8	9	9	10	10	11	12	12	13	13	14	14	15	15	16	16	0	0	0	0	0	0	0	0	0	0	0	0
DB ER Contributions on DB Pay	41	37	34	31	27	24	21	19	16	14	12	10	8	7	6	5	4	3	2	2	1	1	1	1	0	0	0	0	0	0

Fiscal Year Ending June 30

DB ER Contributions on DB Pay | DB ER Contributions on DCR Pay | DCR ER Contributions | DB EE Contributions | State Assistance

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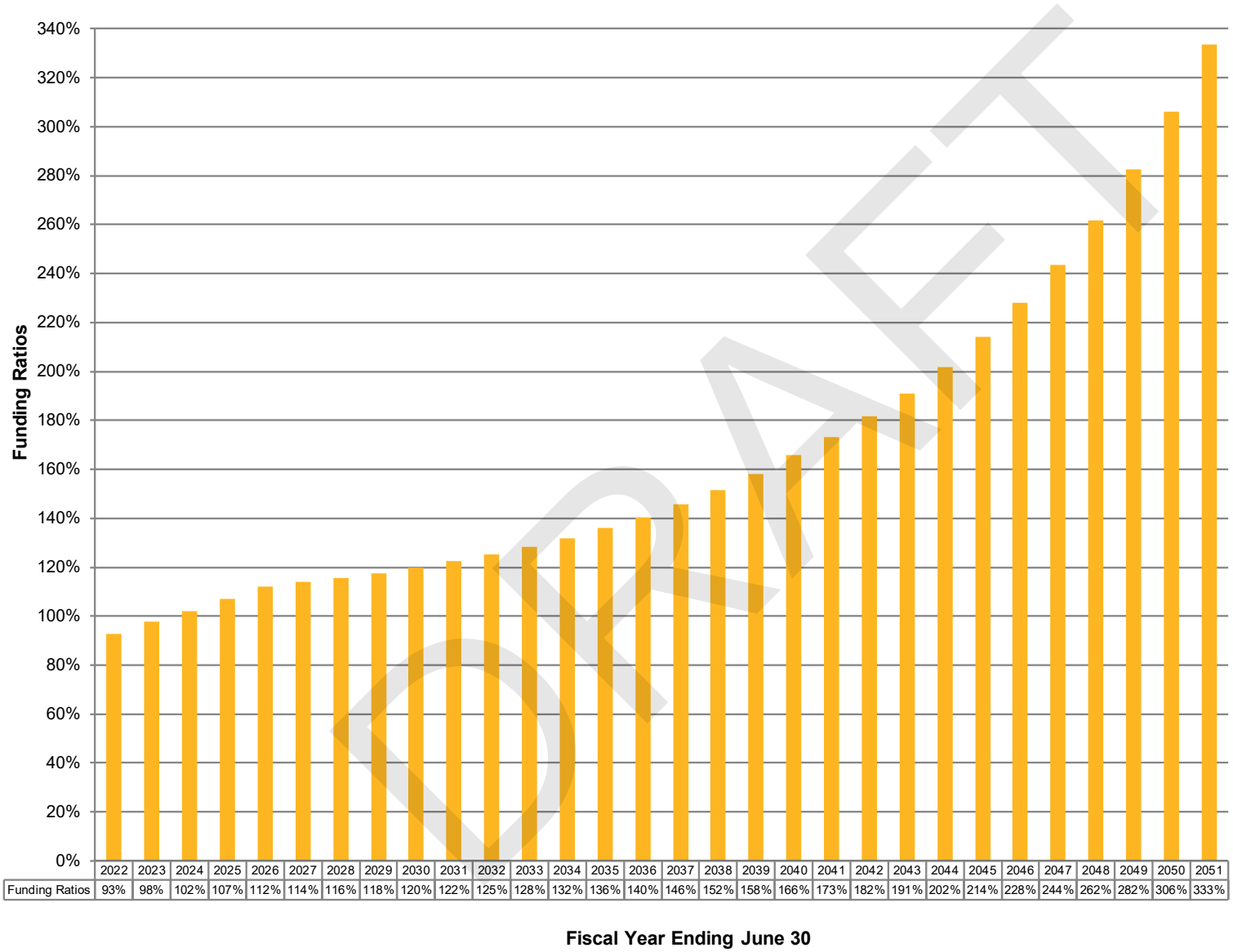
Section 3.5: Projection of Funded Ratios



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Funding Ratios	93%	98%	102%	107%	112%	114%	116%	118%	120%	122%	125%	128%	132%	136%	140%	146%	152%	158%	166%	173%	182%	191%	202%	214%	228%	244%	262%	282%	306%	333%

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Section 3.6A: Table of Projected Actuarial Results ($'s in 000's)

Fiscal Year End	Valuation Amounts on July 1 (Beginning of FY)				Cash Flow Amounts during Following 12 Months									Deferred Asset Gain / (Loss)
						Actuarial Contrib. Rates			DB Contributions					
	Actuarial Assets	Accrued Liability	Funding Ratio	Unfunded Liability / (Surplus)	Total Salaries	DB	DCR	Total	Employer	State Assistance	Employee	Total	Benefit Payments	
2022	$ 9,178,106	$ 9,911,490	92.6%	$ 733,384	$ 750,334	25.49%	6.36%	31.85%	$ 46,521	$ 142,665	$ 31,383	$ 220,569	$ 658,544	$ 979,677
2023	9,791,279	10,028,893	97.6%	237,614	755,203	17.90%	6.72%	24.62%	44,104	91,029	29,220	164,353	682,272	687,471
2024	10,338,873	10,123,941	102.1%	(214,932)	762,084	17.36%	7.03%	24.39%	42,143	90,155	27,025	159,323	706,663	371,154
2025	10,899,272	10,193,784	106.9%	(705,488)	770,330	15.10%	7.45%	22.55%	39,364	76,956	24,990	141,310	730,156	0
2026	11,489,368	10,240,200	112.2%	(1,249,168)	779,629	12.64%	7.84%	20.48%	36,799	61,747	23,100	121,646	753,067	0
2027	11,680,120	10,261,023	113.8%	(1,419,097)	789,757	12.31%	8.23%	20.54%	34,197	63,023	21,189	118,409	774,027	0
2028	11,860,260	10,256,329	115.6%	(1,603,931)	801,009	12.03%	8.58%	20.61%	31,880	64,481	19,496	115,857	795,147	0
2029	12,029,532	10,225,194	117.6%	(1,804,338)	813,553	11.75%	8.91%	20.66%	29,695	65,898	17,944	113,537	815,453	0
2030	12,188,201	10,166,564	119.9%	(2,021,637)	827,298	11.51%	9.20%	20.71%	27,797	67,425	16,615	111,837	833,857	0
2031	12,338,080	10,080,920	122.4%	(2,257,160)	842,250	11.29%	9.47%	20.76%	26,025	69,065	15,430	110,520	850,139	0
2032	12,481,100	9,969,584	125.2%	(2,511,516)	858,486	11.10%	9.71%	20.81%	24,466	70,825	8,156	103,447	858,425	0
2033	12,619,080	9,832,428	128.3%	(2,786,652)	876,187	10.95%	9.91%	20.86%	23,219	72,724	6,834	102,777	870,267	0
2034	12,754,565	9,669,875	131.9%	(3,084,690)	894,739	10.80%	10.09%	20.89%	22,100	74,532	5,726	102,358	878,203	0
2035	12,891,657	9,484,401	135.9%	(3,407,256)	914,255	10.70%	10.25%	20.95%	21,119	76,706	4,754	102,579	882,220	0
2036	13,035,192	9,278,669	140.5%	(3,756,523)	934,724	10.61%	10.38%	20.99%	20,377	78,797	3,926	103,100	883,293	0
2037	13,188,986	9,054,611	145.7%	(4,134,375)	956,215	10.55%	10.48%	21.03%	19,889	80,991	3,156	104,036	881,551	0
2038	13,357,129	8,814,138	151.5%	(4,542,991)	978,629	10.50%	10.57%	21.07%	19,475	83,281	2,544	105,300	876,734	0
2039	13,544,196	8,559,463	158.2%	(4,984,733)	1,001,616	10.47%	10.64%	21.11%	19,231	85,638	2,003	106,872	870,111	0
2040	13,753,765	8,291,660	165.9%	(5,462,105)	1,025,544	0.20%	10.70%	10.90%	2,051	0	1,641	3,692	861,473	0
2041	13,877,722	8,012,059	173.2%	(5,865,663)	1,050,331	0.15%	10.75%	10.90%	1,575	0	1,260	2,835	848,623	0
2042	14,023,350	7,724,346	181.5%	(6,299,004)	1,075,968	0.11%	10.78%	10.89%	1,183	0	968	2,151	832,948	0
2043	14,195,351	7,431,010	191.0%	(6,764,341)	1,102,329	0.09%	10.81%	10.90%	992	0	772	1,764	813,044	0
2044	14,400,354	7,136,152	201.8%	(7,264,202)	1,129,431	0.06%	10.83%	10.89%	678	0	565	1,243	791,506	0
2045	14,642,346	6,841,474	214.0%	(7,800,872)	1,157,134	0.05%	10.85%	10.90%	578	0	463	1,041	767,682	0
2046	14,926,751	6,549,448	227.9%	(8,377,303)	1,185,529	0.03%	10.86%	10.89%	356	0	356	712	744,305	0
2047	15,256,103	6,259,887	243.7%	(8,996,216)	1,214,554	0.03%	10.87%	10.90%	364	0	243	607	720,850	0
2048	15,634,029	5,973,113	261.7%	(9,660,916)	1,244,336	0.02%	10.88%	10.90%	248	0	124	372	698,677	0
2049	16,062,648	5,688,055	282.4%	(10,374,593)	1,274,685	0.01%	10.89%	10.90%	127	0	127	254	676,267	0
2050	16,546,068	5,405,124	306.1%	(11,140,944)	1,305,812	0.01%	10.89%	10.90%	131	0	131	262	654,115	0
2051	17,088,195	5,124,249	333.5%	(11,963,946)	1,337,788	0.01%	10.89%	10.90%	134	0	0	134	631,192	0
								Total	**$ 536,818**	**$ 1,415,938**	**$ 270,141**	**$ 2,222,897**		

Pension unfunded liability layered amortization amounts are maintained after the pension trust is projected to be 100% funded.

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Section 3.6A: Table of Projected Actuarial Results ($'s in 000's) (continued)

Fiscal Year End	Valuation Amounts on July 1 (Beginning of FY)					
	Funding Ratio			Unfunded Liability / (Surplus)		
	Pension	Healthcare	Total	Pension	Healthcare	Total
2022	79.1%	133.9%	92.6%	$ 1,561,518	$ (828,134)	$ 733,384
2023	83.2%	141.1%	97.6%	1,266,857	(1,029,243)	237,614
2024	86.8%	147.4%	102.1%	999,240	(1,214,172)	(214,932)
2025	90.3%	155.1%	106.9%	733,329	(1,438,817)	(705,488)
2026	94.2%	163.5%	112.2%	437,124	(1,686,292)	(1,249,168)
2027	94.8%	167.2%	113.8%	392,379	(1,811,476)	(1,419,097)
2028	95.5%	171.2%	115.6%	342,345	(1,946,276)	(1,603,931)
2029	96.2%	175.8%	117.6%	286,499	(2,090,837)	(1,804,338)
2030	97.0%	180.9%	119.9%	224,495	(2,246,132)	(2,021,637)
2031	97.9%	186.6%	122.4%	155,794	(2,412,954)	(2,257,160)
2032	98.9%	192.9%	125.2%	79,928	(2,591,444)	(2,511,516)
2033	100.1%	200.1%	128.3%	(3,860)	(2,782,792)	(2,786,652)
2034	101.4%	208.2%	131.9%	(96,549)	(2,988,141)	(3,084,690)
2035	102.9%	217.3%	135.9%	(198,734)	(3,208,522)	(3,407,256)
2036	104.7%	227.5%	140.5%	(311,256)	(3,445,267)	(3,756,523)
2037	106.8%	239.0%	145.7%	(434,961)	(3,699,414)	(4,134,375)
2038	109.2%	251.9%	151.5%	(570,605)	(3,972,386)	(4,542,991)
2039	112.0%	266.4%	158.2%	(719,254)	(4,265,479)	(4,984,733)
2040	115.2%	282.9%	165.9%	(881,936)	(4,580,169)	(5,462,105)
2041	117.0%	301.5%	173.2%	(947,493)	(4,918,170)	(5,865,663)
2042	119.0%	322.4%	181.5%	(1,017,888)	(5,281,116)	(6,299,004)
2043	121.3%	346.1%	191.0%	(1,093,557)	(5,670,784)	(6,764,341)
2044	124.0%	372.4%	201.8%	(1,174,895)	(6,089,307)	(7,264,202)
2045	127.0%	401.6%	214.0%	(1,262,219)	(6,538,653)	(7,800,872)
2046	130.5%	434.0%	227.9%	(1,356,129)	(7,021,174)	(8,377,303)
2047	134.5%	470.0%	243.7%	(1,456,929)	(7,539,287)	(8,996,216)
2048	139.1%	510.1%	261.7%	(1,565,199)	(8,095,717)	(9,660,916)
2049	144.5%	555.4%	282.4%	(1,681,447)	(8,693,146)	(10,374,593)
2050	150.7%	606.6%	306.1%	(1,806,230)	(9,334,714)	(11,140,944)
2051	157.9%	665.0%	333.5%	(1,940,279)	(10,023,667)	(11,963,946)

Pension unfunded liability layered amortization amounts are maintained after the pension trust is projected to be 100% funded.

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Section 3.6B: Table of Projected Actuarial Results ($'s in 000's)

Fiscal Year End	Valuation Amounts on July 1 (Beginning of FY)				Cash Flow Amounts during Following 12 Months									Deferred Asset Gain / (Loss)
						Actuarial Contrib. Rates			DB Contributions					
	Actuarial Assets	Accrued Liability	Funding Ratio	Unfunded Liability / (Surplus)	Total Salaries	DB	DCR	Total	Employer	State Assistance	Employee	Total	Benefit Payments	
2022	$ 9,178,106	$ 9,911,490	92.6%	$ 733,384	$ 750,334	25.49%	6.36%	31.85%	$ 46,521	$ 142,665	$ 31,383	$ 220,569	$ 658,544	$ 979,677
2023	9,791,279	10,028,893	97.6%	237,614	755,203	17.90%	6.72%	24.62%	44,104	91,029	29,220	164,353	682,272	687,471
2024	10,338,873	10,123,941	102.1%	(214,932)	762,084	17.36%	7.03%	24.39%	42,143	90,155	27,025	159,323	706,663	371,154
2025	10,899,272	10,193,784	106.9%	(705,488)	770,330	15.10%	7.45%	22.55%	39,364	76,956	24,990	141,310	730,156	0
2026	11,489,368	10,240,200	112.2%	(1,249,168)	779,629	12.64%	7.84%	20.48%	36,799	61,747	23,100	121,646	753,067	0
2027	11,680,120	10,261,023	113.8%	(1,419,097)	789,757	12.31%	8.23%	20.54%	34,197	63,023	21,189	118,409	774,027	0
2028	11,860,260	10,256,329	115.6%	(1,603,931)	801,009	12.03%	8.58%	20.61%	31,880	64,481	19,496	115,857	795,147	0
2029	12,029,532	10,225,194	117.6%	(1,804,338)	813,553	11.75%	8.91%	20.66%	29,695	65,898	17,944	113,537	815,453	0
2030	12,188,201	10,166,564	119.9%	(2,021,637)	827,298	11.51%	9.20%	20.71%	27,797	67,425	16,615	111,837	833,857	0
2031	12,338,080	10,080,920	122.4%	(2,257,160)	842,250	11.29%	9.47%	20.76%	26,025	69,065	15,430	110,520	850,139	0
2032	12,481,100	9,969,584	125.2%	(2,511,516)	858,486	11.10%	9.71%	20.81%	24,466	70,825	8,156	103,447	858,425	0
2033	12,619,080	9,832,428	128.3%	(2,786,652)	876,187	1.05%	9.91%	10.96%	9,200	0	6,834	16,034	870,267	0
2034	12,661,947	9,669,875	130.9%	(2,992,072)	894,739	0.84%	10.09%	10.93%	7,516	0	5,726	13,242	878,203	0
2035	12,697,059	9,484,401	133.9%	(3,212,658)	914,255	0.68%	10.25%	10.93%	6,217	0	4,754	10,971	882,220	0
2036	12,728,424	9,278,669	137.2%	(3,449,755)	934,724	0.53%	10.38%	10.91%	4,954	0	3,926	8,880	883,293	0
2037	12,758,984	9,054,611	140.9%	(3,704,373)	956,215	0.43%	10.48%	10.91%	4,112	0	3,156	7,268	881,551	0
2038	12,792,076	8,814,138	145.1%	(3,977,938)	978,629	0.33%	10.57%	10.90%	3,229	0	2,544	5,773	876,734	0
2039	12,831,180	8,559,463	149.9%	(4,271,717)	1,001,616	0.26%	10.64%	10.90%	2,605	0	2,003	4,608	870,111	0
2040	12,878,942	8,291,660	155.3%	(4,587,282)	1,025,544	0.20%	10.70%	10.90%	2,051	0	1,641	3,692	861,473	0
2041	12,938,337	8,012,059	161.5%	(4,926,278)	1,050,331	0.15%	10.75%	10.90%	1,575	0	1,260	2,835	848,623	0
2042	13,014,639	7,724,346	168.5%	(5,290,293)	1,075,968	0.11%	10.78%	10.89%	1,183	0	968	2,151	832,948	0
2043	13,112,197	7,431,010	176.5%	(5,681,187)	1,102,329	0.09%	10.81%	10.90%	992	0	772	1,764	813,044	0
2044	13,237,264	7,136,152	185.5%	(6,101,112)	1,129,431	0.06%	10.83%	10.89%	678	0	565	1,243	791,506	0
2045	13,393,420	6,841,474	195.8%	(6,551,946)	1,157,134	0.05%	10.85%	10.90%	578	0	463	1,041	767,682	0
2046	13,585,654	6,549,448	207.4%	(7,036,206)	1,185,529	0.03%	10.86%	10.89%	356	0	356	712	744,305	0
2047	13,816,033	6,259,887	220.7%	(7,556,146)	1,214,554	0.03%	10.87%	10.90%	364	0	243	607	720,850	0
2048	14,087,681	5,973,113	235.9%	(8,114,568)	1,244,336	0.02%	10.88%	10.90%	248	0	124	372	698,677	0
2049	14,402,180	5,688,055	253.2%	(8,714,125)	1,274,685	0.01%	10.89%	10.90%	127	0	127	254	676,267	0
2050	14,763,057	5,405,124	273.1%	(9,357,933)	1,305,812	0.01%	10.89%	10.90%	131	0	131	262	654,115	0
2051	15,173,598	5,124,249	296.1%	(10,049,349)	1,337,788	0.01%	10.89%	10.90%	134	0	0	134	631,192	0
								Total	**$ 429,241**	**$ 863,269**	**$ 270,141**	**$ 1,562,651**		

Pension unfunded liability layered amortization amounts are reduced to zero when the pension trust is projected to be 100% funded. The healthcare unfunded liability amortization amounts would also be reduced to zero since the healthcare trust is currently more than 100% funded.

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Section 3.6B: Table of Projected Actuarial Results ($'s in 000's) (continued)

Fiscal Year End	Valuation Amounts on July 1 (Beginning of FY)					
	Funding Ratio			Unfunded Liability / (Surplus)		
	Pension	Healthcare	Total	Pension	Healthcare	Total
2022	79.1%	133.9%	92.6%	$ 1,561,518	$ (828,134)	$ 733,384
2023	83.2%	141.1%	97.6%	1,266,857	(1,029,243)	237,614
2024	86.8%	147.4%	102.1%	999,240	(1,214,172)	(214,932)
2025	90.3%	155.1%	106.9%	733,329	(1,438,817)	(705,488)
2026	94.2%	163.5%	112.2%	437,124	(1,686,292)	(1,249,168)
2027	94.8%	167.2%	113.8%	392,379	(1,811,476)	(1,419,097)
2028	95.5%	171.2%	115.6%	342,345	(1,946,276)	(1,603,931)
2029	96.2%	175.8%	117.6%	286,499	(2,090,837)	(1,804,338)
2030	97.0%	180.9%	119.9%	224,495	(2,246,132)	(2,021,637)
2031	97.9%	186.6%	122.4%	155,794	(2,412,954)	(2,257,160)
2032	98.9%	192.9%	125.2%	79,928	(2,591,444)	(2,511,516)
2033	100.1%	200.1%	128.3%	(3,860)	(2,782,792)	(2,786,652)
2034	100.1%	208.2%	130.9%	(3,931)	(2,988,141)	(2,992,072)
2035	100.1%	217.3%	133.9%	(4,136)	(3,208,522)	(3,212,658)
2036	100.1%	227.5%	137.2%	(4,488)	(3,445,267)	(3,449,755)
2037	100.1%	239.0%	140.9%	(4,959)	(3,699,414)	(3,704,373)
2038	100.1%	251.9%	145.1%	(5,552)	(3,972,386)	(3,977,938)
2039	100.1%	266.4%	149.9%	(6,238)	(4,265,479)	(4,271,717)
2040	100.1%	282.9%	155.3%	(7,113)	(4,580,169)	(4,587,282)
2041	100.1%	301.5%	161.5%	(8,108)	(4,918,170)	(4,926,278)
2042	100.2%	322.4%	168.5%	(9,177)	(5,281,116)	(5,290,293)
2043	100.2%	346.1%	176.5%	(10,403)	(5,670,784)	(5,681,187)
2044	100.2%	372.4%	185.5%	(11,805)	(6,089,307)	(6,101,112)
2045	100.3%	401.6%	195.8%	(13,293)	(6,538,653)	(6,551,946)
2046	100.3%	434.0%	207.4%	(15,032)	(7,021,174)	(7,036,206)
2047	100.4%	470.0%	220.7%	(16,859)	(7,539,287)	(7,556,146)
2048	100.5%	510.1%	235.9%	(18,851)	(8,095,717)	(8,114,568)
2049	100.6%	555.4%	253.2%	(20,979)	(8,693,146)	(8,714,125)
2050	100.7%	606.6%	273.1%	(23,219)	(9,334,714)	(9,357,933)
2051	100.8%	665.0%	296.1%	(25,682)	(10,023,667)	(10,049,349)

Pension unfunded liability layered amortization amounts are reduced to zero when the pension trust is projected to be 100% funded. The healthcare unfunded liability amortization amounts would also be reduced to zero since the healthcare trust is currently more than 100% funded.

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Section 3.7: Projected Pension Benefit Recipients and Amounts ($'s in 000's)

Fiscal Year End	Pension		Fiscal Year End	Pension	
	Recipient Counts	Benefit Amounts		Recipient Counts	Benefit Amounts
2022	13,972	$ 523,901	2061	3,322	$ 247,589
2023	14,475	541,571	2062	3,032	230,176
2024	14,931	558,743	2063	2,757	213,153
2025	15,322	574,804	2064	2,498	196,552
2026	15,654	589,941	2065	2,253	180,409
2027	15,927	603,906	2066	2,023	164,764
2028	16,120	616,957	2067	1,808	149,662
2029	16,245	628,371	2068	1,607	135,141
2030	16,289	638,195	2069	1,419	121,258
2031	16,267	646,049	2070	1,246	108,058
2032	16,156	646,045	2071	1,085	95,589
2033	15,986	649,844	2072	938	83,897
2034	15,736	651,554	2073	805	73,022
2035	15,417	651,076	2074	684	62,995
2036	15,036	648,676	2075	577	53,829
2037	14,618	644,278	2076	481	45,531
2038	14,136	638,247	2077	397	38,093
2039	13,640	630,181	2078	324	31,501
2040	13,127	620,418	2079	261	25,726
2041	12,587	609,059	2080	208	20,732
2042	12,032	596,090	2081	164	16,473
2043	11,460	581,732	2082	128	12,898
2044	10,885	566,218	2083	97	9,943
2045	10,317	549,623	2084	74	7,541
2046	9,759	532,176	2085	54	5,622
2047	9,212	514,031	2086	39	4,118
2048	8,685	495,291	2087	28	2,963
2049	8,174	476,108	2088	20	2,092
2050	7,678	456,645	2089	14	1,450
2051	7,195	437,031	2090	10	987
2052	6,728	417,362	2091	7	659
2053	6,277	397,718	2092	4	434
2054	5,844	378,168	2093	3	281
2055	5,429	358,769	2094	2	180
2056	5,032	339,565	2095	2	114
2057	4,655	320,596	2096	1	73
2058	4,295	301,889	2097	1	45
2059	3,953	283,470	2098	0	0
2060	3,629	265,363	2099	0	0

Counts include retirees, disabilitants, and beneficiaries.

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Section 4: Member Data

Section 4.1: Summary of Members Included

As of June 30	2017	2018	2019	2020	2021
Active Members					
1. Number	4,772	4,418	4,044	3,789	3,396[1]
2. Average Age	50.86	51.13	51.48	51.92	52.14
3. Average Credited Service	18.12	18.62	19.21	19.76	20.31
4. Average Entry Age	32.74	32.51	32.27	32.16	31.83
5. Average Annual Earnings	$ 86,327	$ 87,374	$ 88,879	$ 90,564	$ 94,143
6. Number Vested	4,772	4,418	4,044	3,789	3,396
7. Percent Who Are Vested	100.0%	100.0%	100.0%	100.0%	100.0%
Retirees, Disabilitants, and Beneficiaries					
1. Number	12,983	13,277	13,491	13,689	13,972
2. Average Age	70.36	70.78	71.30	71.85	72.26
3. Average Years Since Retirement	14.13	14.40	14.74	15.06	15.24
4. Average Monthly Pension Benefit					
a. Base	$ 2,228	$ 2,273	$ 2,303	$ 2,330	$ 2,363
b. COLA[2]	128	128	126	126	125
c. PRPA[2]	506	488	518	519	491
d. Adjustment	0	0	0	0	(1)
e. Sick	62	65	67	68	70
f. Total	$ 2,924	$ 2,954	$ 3,014	$ 3,043	$ 3,048
Vested Terminations (vested at termination, not refunded contributions, or commenced benefit)					
1. Number	876	797	812	764	727
2. Average Age	50.82	51.01	51.71	52.37	52.68
3. Average Monthly Pension Benefit	$ 1,441	$ 1,350	$ 1,534	$ 1,579	$ 1,635
Non-Vested Terminations (not vested at termination, not refunded contributions)					
1. Number	1,994	1,900	1,810	1,744	1,679
2. Average Account Balance	$ 20,290	$ 20,872	$ 21,612	$ 22,591	$ 23,388
Total Number of Members	**20,625**	**20,392**	**20,157**	**19,986**	**19,774**

[1] Includes 1,060 male active members and 2,336 female active members.

[2] Calculated by taking the average of the data field, as provided by the State of Alaska, for all participants in the group.

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Summary of Members Included

As of June 30, 2021	DB Tier 1	DB Tier 2	DB Total	DCR Tier 3	Grand Total
Active Members					
1. Number	142	3,254	3,396	5,521	8,917
2. Average Age	63.37	51.65	52.14	41.90	45.80
3. Average Credited Service	30.23	19.88	20.31	6.34	11.66
4. Average Entry Age	33.14	31.77	31.83	35.56	34.14
5. Annual Earnings					
a. Total	$ 14,388,684	$ 305,322,636	$ 319,711,320	$ 408,804,718	$ 728,516,038
b. Average	$ 101,329	$ 93,830	$ 94,143	$ 74,045	$ 81,700

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

As of June 30, 2021	Tier 1	Tier 2	Total
Retirees, Disabilitants, and Beneficiaries			
1. Number	10,454	3,518	13,972
2. Average Age	74.32	66.14	72.26
3. Average Years Since Retirement	18.30	6.14	15.24
4. Average Monthly Pension Benefit			
a. Base	$ 2,375	$ 2,329	$ 2,363
b. COLA	148	57	125
c. PRPA	630	77	491
d. Adjustment	(1)	(1)	(1)
e. Sick	69	71	70
f. Total	$ 3,221	$ 2,533	$ 3,048

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Summary of Members Included

As of June 30, 2021	Active Members	Inactive Members				
		Retirees	Covered Spouses	Covered Children / Dependents	Deferred	Total Inactive Members
Retiree Medical Participants						
1. Retiree Coverage Only	3,366	7,679	0	0	369	8,048
2. Retiree + Spouse	0	3,935	3,935	0	602	8,472
3. Retiree + Children / Dependents	0	193	0	179	0	372
4. Family	0	331	331	482	0	1,144
5. Total	3,366	12,138	4,266	661	971	18,036

As of June 30, 2021	Retirees	Covered Spouses	Covered Children / Dependents	Deferred	Total Inactive Members
Retiree Medical Participants					
1. Pre-Medicare	2,243	1,274	661	954	5,132
2. Medicare Part A & B	9,685	2,960	0	17	12,662
3. Medicare Part B Only	210	32	0	0	242
4. Total	12,138	4,266	661	971	18,036

As of June 30, 2021	Retirees
Summary of Retiree Medical Data Received	
1. Retiree records on pension data	13,972
2. Remove duplicates on pension data	(528)
3. Valued in a different retiree healthcare plan[1]	(837)
4. Records without medical coverage	(506)
5. Medical only retirees	37
6. Total	12,138

[1] Each member's retiree medical benefits are valued in the plan indicated in the data from Aetna

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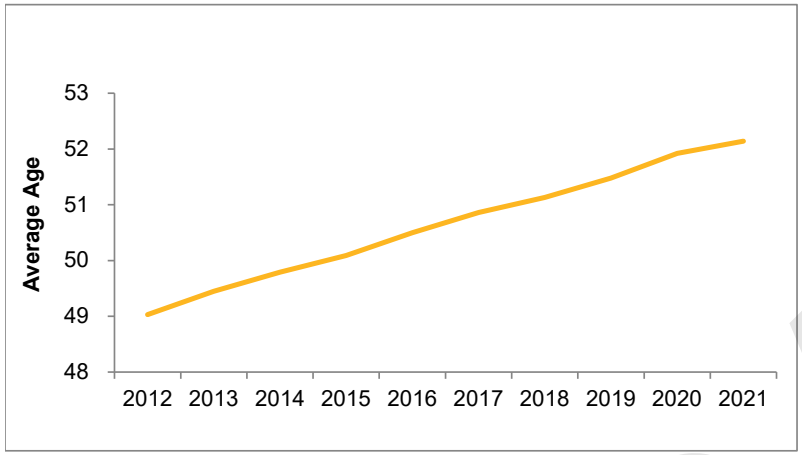
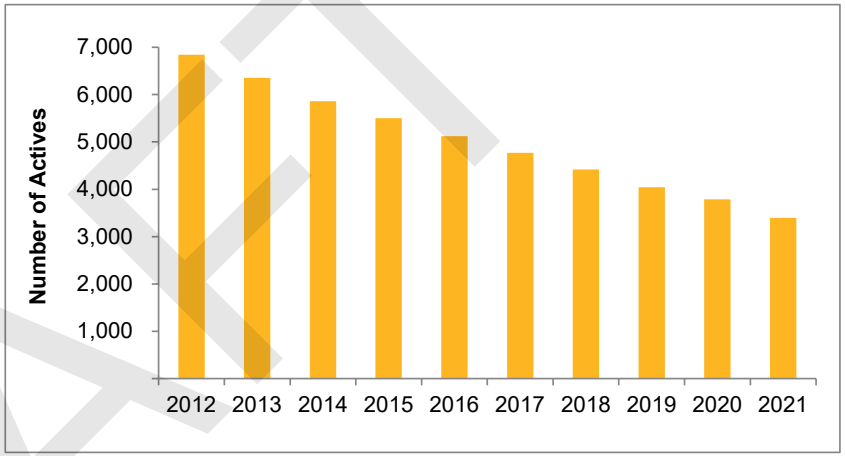
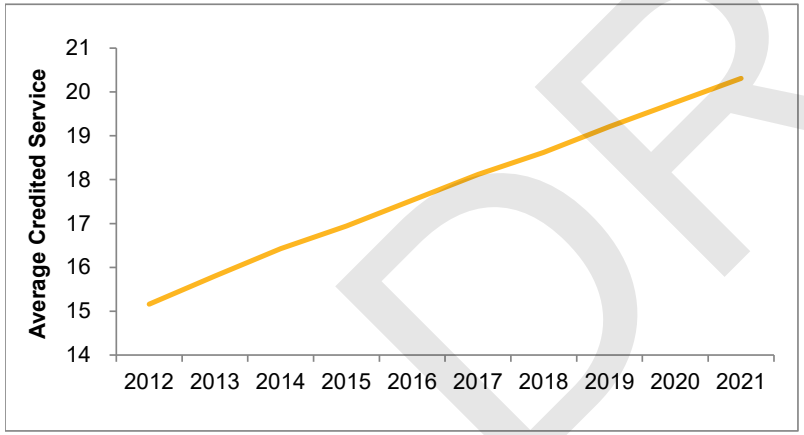
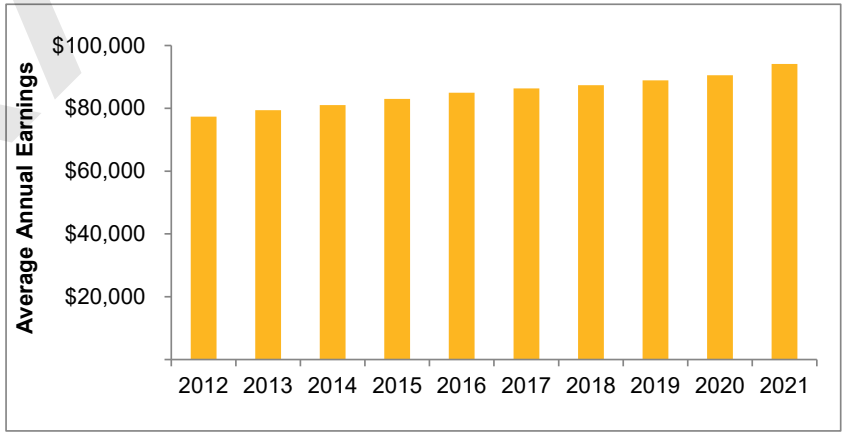
Summary of Members Included - Active Members at June 30









Average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

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Section 4.2: Age and Service Distribution of Active Members

Annual Earnings by Age

Age	Number	Total Annual Earnings	Average Annual Earnings
0 - 19	0	$ 0	$ 0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	53	4,432,577	83,634
40 - 44	530	47,463,436	89,554
45 - 49	858	80,163,262	93,430
50 - 54	902	86,221,152	95,589
55 - 59	582	55,038,876	94,569
60 - 64	295	28,816,905	97,684
65 - 69	111	11,205,958	100,955
70 - 74	48	4,616,849	96,184
75+	17	1,752,305	103,077
Total	**3,396**	**$319,711,320**	**$ 94,143**

Annual Earnings by Credited Service

Years of Service	Number	Total Annual Earnings	Average Annual Earnings
0	0	$ 0	$ 0
1	3	158,220	52,740
2	1	44,803	44,803
3	7	484,633	69,233
4	12	801,689	66,807
0 - 4	**23**	**$ 1,489,345**	**$ 64,754**
5 - 9	89	6,523,824	73,301
10 - 14	252	21,173,526	84,022
15 - 19	1,262	116,203,267	92,079
20 - 24	1,208	116,732,875	96,633
25 - 29	397	40,101,280	101,011
30 - 34	129	13,459,854	104,340
35 - 39	24	2,701,868	112,578
40+	12	1,325,481	110,457
Total	**3,396**	**$319,711,320**	**$ 94,143**

Years of Credited Service by Age

	Years of Service									
Age	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35 - 39**	**40+**	**Total**
0 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0
30 - 34	0	0	0	0	0	0	0	0	0	0
35 - 39	0	3	13	36	1	0	0	0	0	53
40 - 44	5	30	83	349	63	0	0	0	0	530
45 - 49	1	25	69	346	381	36	0	0	0	858
50 - 54	11	18	46	265	405	141	16	0	0	902
55 - 59	2	9	20	149	204	136	58	4	0	582
60 - 64	3	2	15	72	105	61	29	6	2	295
65 - 69	0	2	4	29	33	13	20	9	1	111
70 - 74	1	0	1	10	13	8	5	4	6	48
75+	0	0	1	6	3	2	1	1	3	17
Total	**23**	**89**	**252**	**1,262**	**1,208**	**397**	**129**	**24**	**12**	**3,396**

Total and average annual earnings (“valuation pay”) are the annualized earnings for the fiscal year ending on the valuation date.

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Section 4.3: Member Data Reconciliation

Pension

		Inactive Members					
	Active Members	Due a Refund	Deferred Benefits	Retired Members	Disabled Members	Bene-ficiaries	Total
As of June 30, 2020	**3,789**	**1,744**	**764**	**12,267**	**20**	**1,402**	**19,986**
Vested Terminations	(116)	(3)	119	0	0	0	0
Non-Vested Terminations	(3)	3	0	0	0	0	0
Refund of Contributions	(1)	(41)	(3)	0	0	0	(45)
Disability Retirements	(1)	0	0	0	1	0	0
Age Retirements	(326)	(7)	(113)	447	(1)	0	0
Deaths With Beneficiary	(1)	0	(2)	(127)	0	130	0
Deaths Without Beneficiary	(2)	(4)	(2)	(124)	0	(46)	(178)
Data Corrections	0	(1)	1	0	0	(8)	(8)
Transfers In/Out	0	0	0	0	0	0	0
Rehires	57	(16)	(37)	(4)	0	0	0
Pick Ups*	0	4	0	0	0	15	19
Net Change	**(393)**	**(65)**	**(37)**	**192**	**0**	**91**	**(212)**
As of June 30, 2021	**3,396**	**1,679**	**727**	**12,459**	**20**	**1,493**	**19,774**

* Pickup beneficiaries are primarily new DROs.

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Healthcare

		Inactive Members				
	Active Members	Retirees	Covered Spouses	Covered Children / Dependents	Deferred	Total Inactive Members
As of June 30, 2020	**3,746**	**12,019**	**4,220**	**669**	**952**	**17,860**
Vested Terminations	(87)	0	0	0	87	87
Non-Vested Terminations	(2)	0	0	0	0	0
Refund of Contributions	(1)	0	0	0	(3)	(3)
Disability Retirements	(1)	1	0	0	0	1
Age Retirements	(257)	257	131	53	0	441
Deferred Retirements	0	51	28	10	(51)	38
Retired without Medical Coverage	(82)	0	0	0	82	82
Deceased	(3)	(259)	(28)	(3)	(8)	(298)
New Beneficiaries	0	40	(40)	0	0	0
Added Retiree Medical Coverage	0	40	13	1	(40)	14
Added Dependent Coverage	0	0	41	27	0	68
Dropped Retiree Medical Coverage	0	(6)	(1)	(1)	6	(2)
Dropped Dependent Coverage	0	0	(97)	(94)	0	(191)
Rehires	55	(3)	(1)	(1)	(52)	(57)
Transfers In/Out	(2)	(2)	0	0	(2)	(4)
Net Change	**(380)**	**119**	**46**	**(8)**	**19**	**176**
As of June 30, 2021	**3,366**	**12,138**	**4,266**	**661**	**971**	**18,036**

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Section 4.4: Schedule of Active Member Data

Valuation Date	Number	Annual Earnings (000's)	Annual Average Earnings	Percent Increase in Average Earnings	Number of Participating Employers
June 30, 2021	3,396	$ 319,711	$ 94,143	4.0%	56
June 30, 2020	3,789	343,146	90,564	1.9%	56
June 30, 2019	4,044	359,426	88,879	1.7%	56
June 30, 2018	4,418	386,016	87,373	1.2%	56
June 30, 2017	4,772	411,951	86,327	1.6%	57
June 30, 2016	5,123	435,222	84,955	2.4%	57
June 30, 2015	5,502	456,636	82,995	2.4%	58
June 30, 2014	5,861	474,873	81,023	2.1%	58
June 30, 2013	6,352	504,260	79,386	2.6%	58
June 30, 2012	6,845	529,468	77,351	3.6%	58

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

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Section 4.5: Active Member Payroll Reconciliation

Payroll Field	Payroll Data (000's)
a) DRB actual reported salaries FY21 in employer list	$ 806,609
b) DRB actual reported salaries FY21 in valuation data	719,382
c) Annualized valuation data	728,516
d) Valuation payroll as of June 30, 2021	756,805
e) Rate payroll for FY22	750,334
f) Rate payroll for FY24	762,084

a) Actual reported salaries from DRB employer listing showing all payroll paid during FY21, including those who were not active as of June 30, 2021
b) Payroll from valuation data for people who are in active status as of June 30, 2021
c) Payroll from (b) annualized for both new entrants and part-timers
d) Payroll from (c) with one year of salary scale applied to estimate salaries payable for the upcoming year
e) Payroll from (d) with the part-timer annualization removed
f) Payroll from (e) with two years of assumed decrements and salary scale, and 0% population growth

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Section 4.6: Summary of New Pension Benefit Recipients

During the Year Ending June 30	2017	2018	2019	2020	2021
Service					
1. Number	376	465	367	331	447
2. Average Age at Commencement	59.77	59.98	59.87	59.71	59.79
3. Average Monthly Pension Benefit	$ 3,300	$ 3,527	$ 3,562	$ 3,693	$ 3,593
Survivor (including surviving spouse and DROs)					
1. Number	108	87	96	127	145
2. Average Age at Commencement	70.57	71.61	74.36	74.16	76.80
3. Average Monthly Pension Benefit	$ 1,643	$ 2,022	$ 1,795	$ 1,903	$ 1,951
Disability					
1. Number	3	3	5	2	1
2. Average Age at Commencement	43.30	49.92	51.51	53.65	54.35
3. Average Monthly Pension Benefit	$ 3,678	$ 3,625	$ 4,182	$ 3,019	$ 4,886
Total					
1. Number	487	555	468	460	593
2. Average Age at Commencement	62.06	61.75	62.75	63.67	63.94
3. Average Monthly Pension Benefit	$ 2,935	$ 3,292	$ 3,206	$ 3,196	$ 3,194

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Summary of New Pension Benefit Recipients

Average Pension Benefit Payments

	Years of Credited Service						
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+
Period 7/1/2020 – 6/30/2021:							
Average Monthly Pension	$ 451	$ 764	$ 1,509	$ 2,684	$ 3,625	$ 4,659	$ 6,090
Number of Recipients	8	24	33	83	142	112	46
Period 7/1/2019 – 6/30/2020:							
Average Monthly Pension	$ 243	$ 1,054	$ 1,647	$ 2,600	$ 3,616	$ 4,874	$ 6,772
Number of Recipients	8	19	26	72	90	78	40
Period 7/1/2018 – 6/30/2019:							
Average Monthly Pension	$ 334	$ 891	$ 1,540	$ 2,760	$ 3,567	$ 4,666	$ 6,777
Number of Recipients	4	23	39	87	93	85	41
Period 7/1/2017 – 6/30/2018:							
Average Monthly Pension	$ 204	$ 899	$ 1,583	$ 2,583	$ 3,422	$ 4,580	$ 6,083
Number of Recipients	5	21	61	85	109	130	57
Period 7/1/2016 – 6/30/2017:							
Average Monthly Pension	$ 426	$ 795	$ 1,626	$ 2,433	$ 3,549	$ 4,536	$ 6,351
Number of Recipients	10	22	60	75	100	64	48
Period 7/1/2015 – 6/30/2016:							
Average Monthly Pension	$ 245	$ 1,002	$ 1,535	$ 2,540	$ 3,445	$ 4,472	$ 6,168
Number of Recipients	11	31	82	69	105	74	54
Period 7/1/2014 – 6/30/2015:							
Average Monthly Pension	$ 349	$ 1,041	$ 1,342	$ 2,205	$ 3,267	$ 4,220	$ 5,900
Number of Recipients	11	33	70	67	137	125	94
Period 7/1/2013 – 6/30/2014:							
Average Monthly Pension	$ 235	$ 904	$ 1,435	$ 2,398	$ 3,016	$ 4,073	$ 7,485
Number of Recipients	8	31	31	28	22	18	12
Period 7/1/2012 – 6/30/2013:							
Average Monthly Pension	$ 253	$ 1,030	$ 1,496	$ 2,450	$ 3,281	$ 4,384	$ 6,052
Number of Recipients	10	57	67	90	101	79	64
Period 7/1/2011 – 6/30/2012:							
Average Monthly Pension	$ 353	$ 1,064	$ 1,512	$ 2,241	$ 3,276	$ 4,320	$ 5,739
Number of Recipients	11	43	62	61	118	81	58

"Average Monthly Pension" includes postretirement pension adjustments and cost-of-living increases.

Beneficiaries are not included in the table above.

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Section 4.7: Summary of All Pension Benefit Recipients

As of June 30	2017	2018	2019	2020	2021
Service					
1. Number, Fiscal Year Start	11,527	11,716	11,988	12,147	12,267
2. Net Change	189	272	159	120	192
3. Number, Fiscal Year End	11,716	11,988	12,147	12,267	12,459
4. Average Age at Commencement	55.55	55.70	55.82	55.93	56.05
5. Average Current Age	70.09	70.50	70.99	71.50	71.85
6. Average Monthly Pension Benefit	$ 3,064	$ 3,093	$ 3,161	$ 3,199	$ 3,210
Surviving Spouse (including DROs)					
1. Number, Fiscal Year Start	1,168	1,237	1,261	1,315	1,400
2. Net Change	69	24	54	85	93
3. Number, Fiscal Year End	1,237	1,261	1,315	1,400	1,493
4. Average Age at Commencement	62.98	63.16	63.73	64.49	65.32
5. Average Current Age	73.42	73.90	74.65	75.26	75.97
6. Average Monthly Pension Benefit	$ 1,584	$ 1,618	$ 1,629	$ 1,665	$ 1,688
Survivor (other than spouse)					
1. Number, Fiscal Year Start	3	3	3	3	2
2. Net Change	0	0	0	(1)	(2)
3. Number, Fiscal Year End	3	3	3	2	0
4. Average Age at Commencement	52.81	53.85	53.85	53.94	0.00
5. Average Current Age	58.22	60.65	61.65	61.56	0.00
6. Average Monthly Pension Benefit	$ 746	$ 749	$ 765	$ 705	$ 0
Disability					
1. Number, Fiscal Year Start	28	27	25	26	20
2. Net Change	(1)	(2)	1	(6)	0
3. Number, Fiscal Year End	27	25	26	20	20
4. Average Age at Commencement	45.25	44.40	45.75	46.74	47.37
5. Average Current Age	50.34	50.02	51.08	51.73	52.85
6. Average Monthly Pension Benefit	$ 3,500	$ 3,494	$ 3,666	$ 3,658	$ 3,643
Total					
1. Number, Fiscal Year Start	12,726	12,983	13,277	13,491	13,689
2. Net Change	257	294	214	198	283
3. Number, Fiscal Year End	12,983	13,277	13,491	13,689	13,972
4. Average Age at Commencement	56.24	56.38	56.56	56.79	57.02
5. Average Current Age	70.36	70.78	71.30	71.85	72.26
6. Average Monthly Pension Benefit	$ 2,924	$ 2,954	$ 3,014	$ 3,043	$ 3,048

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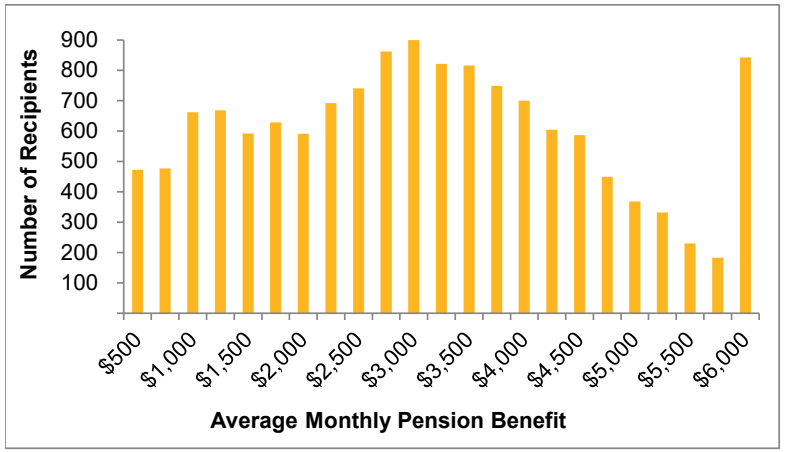
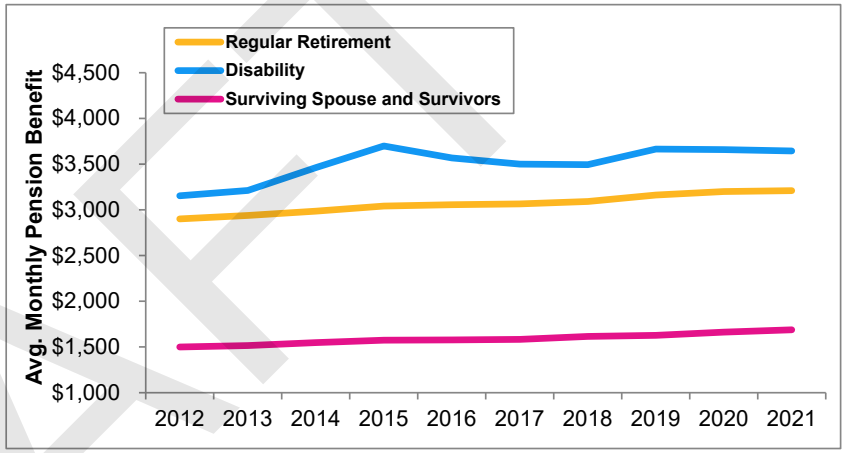
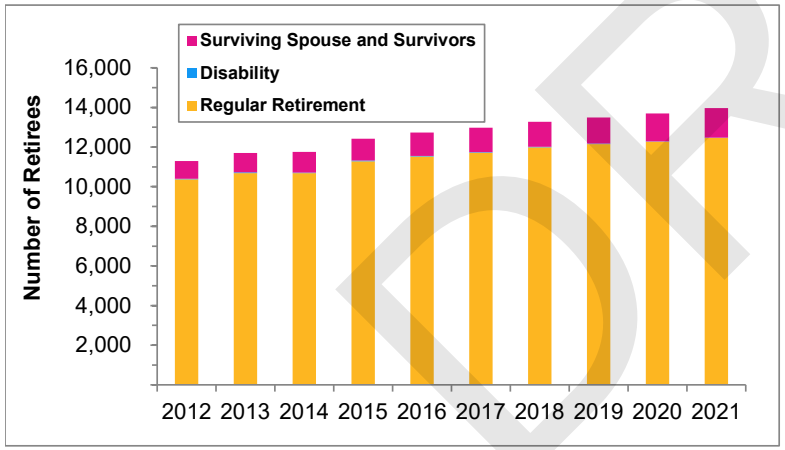
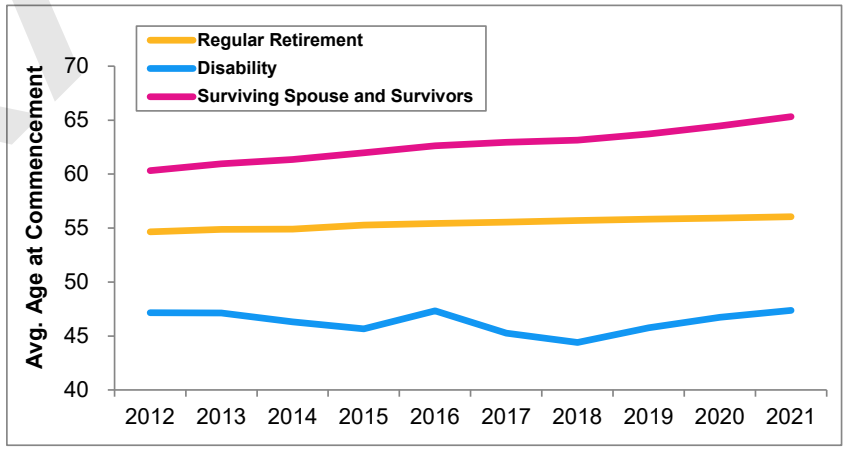
Summary of All Pension Benefit Recipients









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Summary of All Pension Benefit Recipients

Distribution of Annual Pension Benefits for Benefit Recipients

Annual Pension Benefit by Age

Age	Number	Total Annual Pension Benefit	Average Annual Pension Benefit
0 - 19	0	$ 0	$ 0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	0	0	0
40 - 44	6	194,721	32,454
45 - 49	55	1,913,518	34,791
50 - 54	258	11,082,589	42,956
55 - 59	703	30,350,083	43,172
60 - 64	1,729	63,061,790	36,473
65 - 69	2,797	98,633,289	35,264
70 - 74	3,393	118,070,449	34,798
75+	5,031	187,776,040	37,324
Total	**13,972**	**$511,082,479**	**$ 36,579**

Annual Pension Benefit by Years Since Commenced

Years Since Comm.	Number	Total Annual Pension Benefit	Average Annual Pension Benefit
0	514	$ 19,547,143	$ 38,029
1	471	18,221,267	38,686
2	474	18,533,172	39,100
3	488	19,918,428	40,816
4	487	18,219,745	37,412
0 - 4	**2,434**	**$ 94,439,755**	**$ 38,800**
5 - 9	2,517	94,156,710	37,408
10 - 14	2,129	72,087,821	33,860
15 - 19	2,184	70,007,604	32,055
20 - 24	2,175	76,417,673	35,135
25 - 29	1,222	48,723,567	39,872
30 - 34	916	39,327,726	42,934
35 - 39	299	12,721,955	42,548
40+	96	3,199,668	33,330
Total	**13,972**	**$511,082,479**	**$ 36,579**

Years Since Commencement by Age

	Years Since Commencement									
Age	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+	Total
0 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0
30 - 34	0	0	0	0	0	0	0	0	0	0
35 - 39	0	0	0	0	0	0	0	0	0	0
40 - 44	3	2	1	0	0	0	0	0	0	6
45 - 49	52	3	0	0	0	0	0	0	0	55
50 - 54	202	49	5	0	2	0	0	0	0	258
55 - 59	416	192	73	20	2	0	0	0	0	703
60 - 64	777	501	274	140	33	3	1	0	0	1,729
65 - 69	430	953	693	462	231	26	1	0	1	2,797
70 - 74	237	514	699	932	720	227	60	2	2	3,393
75+	317	303	384	630	1,187	966	854	297	93	5,031
Total	**2,434**	**2,517**	**2,129**	**2,184**	**2,175**	**1,222**	**916**	**299**	**96**	**13,972**

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Section 4.8: Pension Benefit Recipients by Type of Benefit and Option Elected

Amount of Monthly Pension Benefit	Number of Recipients	Type of Pension Benefit			Option Selected			
		1	2	3	1	2	3	4
$ 1 – 300	240	165	75	0	148	46	39	7
301 – 600	405	276	129	0	228	71	84	22
601 – 900	666	510	156	0	366	135	126	39
901 – 1,200	831	651	180	0	496	158	143	34
1,201 – 1,500	730	560	170	0	406	155	148	21
1,501 – 1,800	735	561	174	0	415	159	138	23
1,801 – 2,100	757	598	159	0	406	155	169	27
2,101 – 2,400	846	714	132	0	383	203	227	33
2,401 – 2,700	999	900	99	0	451	237	281	30
2,701 – 3,000	1,079	1,002	72	5	466	256	324	33
3,001 – 3,300	990	944	42	4	395	244	326	25
3,301 – 3,600	955	919	35	1	392	208	328	27
3,601 – 3,900	874	854	18	2	342	186	320	26
3,901 – 4,200	757	735	17	5	312	163	261	21
4,200+	3,108	3,070	35	3	1,173	555	1,277	103
Total	13,972	12,459	1,493	20	6,379	2,931	4,191	471

Type of Pension Benefit
1. Regular Retirement
2. Survivor Payment
3. Disability

Option Selected
1. Whole Life Annuity
2. 75% Joint and Contingent Annuity
3. 50% Joint and Contingent Annuity
4. 66 2/3% Joint and Survivor Annuity

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Section 4.9: Pension Benefit Recipients Added to and Removed from Rolls

Year Ended	Added to Rolls		Removed from Rolls		Rolls at End of Year		Percent Increase in Annual Pension Benefits	Average Annual Pension Benefit
	No.[1]	Annual Pension Benefits[1]	No.[1]	Annual Pension Benefits[1]	No.	Annual Pension Benefits		
June 30, 2021	593	$ 22,728,504	310	$ 11,391,465	13,972	$ 511,082,479	2.3%	$ 36,579
June 30, 2020	460	17,641,920	262	5,527,983	13,689	499,745,440	2.5%	36,507
June 30, 2019	468	18,004,896	254	871,684	13,491	487,631,503	3.6%	36,145
June 30, 2018	555	21,924,986	261	6,926,129	13,277	470,498,291	3.3%	35,437
June 30, 2017	487	17,151,684	230	7,736,025	12,983	455,499,434	2.1%	35,084
June 30, 2016	530	18,364,581	222	6,144,109	12,726	446,083,775	2.8%	35,053
June 30, 2015	888	34,120,658	220	3,531,501	12,418	433,863,303	7.6%	34,938
June 30, 2014	226	5,964,256	181	(1,150,187)	11,750	403,274,146	1.8%	34,321
June 30, 2013	576	19,387,542	172	1,652,575	11,705	396,159,703	4.7%	33,845
June 30, 2012	473	17,104,564	188	(617,561)	11,301	378,424,736	4.9%	33,486

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[1] Numbers are estimated, and include other internal transfers.

Section 5: Basis of the Actuarial Valuation

Section 5.1: Summary of Plan Provisions

Effective Date

July 1, 1955, with amendments through June 30, 2021. Chapter 97, 1990 Session Laws of Alaska, created a two-tier retirement system. Members who were first hired under TRS before July 1, 1990 (Tier 1) are eligible for different benefits than members hired after June 30, 1990 (Tier 2). Chapter 9, 2005 Session Laws of Alaska, closed the plan to new members hired after June 30, 2006.

Administration of Plan

The Commissioner of Administration or the Commissioner's designee is the administrator of the system. The Attorney General of the state is the legal counsel for the system and shall advise the administrator and represent the system in legal proceedings.

Prior to June 30, 2005, the Teachers' Retirement Board prescribed policies and adopted regulations and performed other activities necessary to carry out the provisions of the system. The Alaska State Pension Investment Board, Department of Revenue, Treasury Division was responsible for investing TRS funds.

On July 27, 2005, Senate Bill 141, enacted as Chapter 9, 2005 Session laws of Alaska, replaced the Teachers' Retirement Board and the Alaska State Pension Investment Board with the Alaska Retirement Management Board.

Employers Included

Currently, there are 56 employers participating in TRS, including the State of Alaska, 52 school districts, and three other eligible organizations.

Membership

Membership in TRS is mandatory for the following employees hired before July 1, 2006:

- certificated full-time and part-time elementary and secondary teachers, certificated school nurses, and certificated employees in positions requiring teaching certificates;
- positions requiring a teaching certificate as a condition of employment in the Department of Education and Early Development and the Department of Labor and Workforce Development;
- University of Alaska full-time and part-time teachers, and full-time administrative employees in positions requiring academic standing if approved by the TRS administrator;
- certain full-time or part-time teachers of Alaska Native language or culture who have elected to be covered under TRS;
- members on approved sabbatical leave under AS 14.20.310;
- certain State legislators who have elected to be covered under TRS; and
- a teacher who has filed for worker's compensation benefits due to an on-the-job assault and who, as a result of the physical injury, is placed on leave without pay.

Employees participating in the University of Alaska's Optional Retirement Plan or other retirement plans funded by the State are not covered by TRS.

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Employees who work half-time in TRS and Public Employees' Retirement System (PERS) simultaneously are eligible for half-time TRS and PERS credit.

Senate Bill 141, signed into law on July 27, 2005, closes the plan effective July 1, 2006 to new members first hired on or after July 1, 2006.

Credited Service

TRS members receive a year of membership credit if they work a minimum of 172 days during the school year (July 1 through June 30 of the following year). Fractional credit is determined based on the number of days worked. Part-time members who work at least 50% of full-time receive membership credit for each day in proportion to full-time service. Credit is granted for all Alaskan public school service.

Members may claim other types of service, including:

- Outside teaching service in out-of-state schools or Alaska private schools (not more than ten years may be claimed);
- Military service (not more than five years of military service or ten years of combined outside and military service may be claimed);
- Alaska Bureau of Indian Affairs (BIA) service;
- Retroactive Alaskan service that was not creditable at the time it occurred, but later became creditable because of legislative change;
- Unused sick leave credit after members retire; and
- Leave of absence without pay.

Except for retroactive Alaska service that occurred before July 1, 1955, and unused sick leave, contributions are required for all claimed service.

Members receiving TRS disability benefits continue to earn TRS credit while disabled.

Survivors who are receiving occupational death benefits continue to earn TRS service credit while occupational survivor benefits are being paid.

Employer Contributions

TRS employers contribute the amounts required, in addition to employees' contributions, to fund the benefits of the system.

The normal cost rate is a uniform rate for all participating employers (less the value of members' contributions).

The past service rate is a uniform rate for all participating employers to amortize the unfunded past service liability with payments that are a level percentage of payroll amount over a closed 25-year period starting June 30, 2014. Effective June 30, 2018, each future year's unfunded service liability is separately amortized on a level percent of pay basis over 25 years.

Employer rates cannot be less than the normal cost rate.

Pursuant to AS14.25.070 effective July 1, 2008, each TRS employer will pay a simple uniform contribution rate of 12.56% of member payroll.

Additional State Contributions

Pursuant to AS14.25.085 effective July 1, 2008, the State shall contribute an amount (in addition to the State contribution as an employer) that, when combined with the employer contribution of 12.56%, will be sufficient to pay the total contribution rate adopted by the Board.

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Member Contributions

Mandatory Contributions: Members are required to contribute 8.65% of their base salaries. Members' contributions are deducted from gross salaries before federal income taxes are withheld.

Contributions for Claimed Service: Member contributions are also required for most of the claimed service described above.

1% Supplemental Contributions: Members who joined the system before July 1, 1982 and elected to participate in the supplemental contributions provision are required to contribute an additional 1% of their salaries. Supplemental contributions are deducted from gross salaries after federal income taxes are withheld. Under the supplemental provision, an eligible spouse or dependent child will receive a survivor's allowance or spouse's pension if the member dies (see below). Supplemental contributions are only refundable upon death (see below).

Interest: Members' contributions earn 4.5% interest, compounded annually on June 30.

Refund of Contributions: Terminated members may receive refunds of their member contribution accounts which includes their mandatory contributions, indebtedness payments, and interest earned. Terminated members' accounts may be attached to satisfy claims under Alaska Statute 09.38.065, federal income tax levies, and valid Qualified Domestic Relations Orders.

Reinstatement of Contributions: Refunded accounts and the corresponding TRS service may be reinstated upon reemployment in TRS prior to July 1, 2010. Interest accrues on refunds until paid in full or members retire.

Retirement Benefits

Eligibility

a. Members, including deferred vested members, are eligible for normal retirement at age 55 or early retirement at age 50 if they were hired before July 1, 1990 (Tier 1), and age 60 or early retirement at age 55 if they were hired on or after July 1, 1990 (Tier 2). Additionally, they must have at least:
   (i) eight years of paid-up membership service;
   (ii) 15 years of paid-up creditable service, the last five years of which are membership service, and they were first hired under TRS before July 1, 1975;
   (iii) five years of paid-up membership service and three years of paid-up Alaska Bureau of Indian Affairs service;
   (iv) 12 years of combined part-time and full-time paid-up membership service;
   (v) two years of paid-up membership service if they are vested in PERS; or
   (vi) one year of paid-up membership service if they are retired from PERS.

b. Members may retire at any age when they have:
   (i) 25 years of paid-up creditable service, the last five years of which are membership service;
   (ii) 20 years of paid-up membership service;
   (iii) 20 years of combined paid-up membership and Alaska Bureau of Indian Affairs service, the last five years of which are membership service; or
   (iv) 20 years of combined paid-up part-time and full-time membership service.

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Benefit Type

Lifetime benefits are paid to members. Eligible members may receive normal, unreduced benefits when they (1) reach normal retirement age and complete the service required; or (2) satisfy the minimum service requirements to retire at any age under (b) above. Members may receive early, actuarially reduced benefits when they reach early retirement age and complete the service required.

Members may select joint and survivor options and a last survivor option. Under these options and early retirement, benefits are actuarially adjusted so that members receive the actuarial equivalents of their normal benefit amounts.

Benefit Calculations

Retirement benefits are calculated by multiplying the average base salary (ABS) times the total TRS service times the percentage multiplier. The ABS is determined by averaging the salaries earned during the three highest school years. Members must earn at least 115 days of credit in a school year to include it in the ABS calculation. TRS pays a minimum benefit of $25.00 per month for each year of service when the calculated benefit is less.

The percentage multipliers are 2% for the first 20 years and 2.5% for all remaining service. Service before July 1, 1990 is calculated at 2%.

Indebtedness

Members who terminate and refund their TRS contributions are not eligible to retire unless they return to TRS employment and pay back their refunds plus interest or accrue additional service which qualifies them for retirement. TRS refunds must be paid in full if the corresponding service is to count toward the minimum service requirements for retirement. Refunded TRS service is included in total service for the purpose of calculating retirement benefits. However, when refunds are not completely paid before retirement, benefits are actuarially reduced for life. Indebtedness balances may also be created when a member purchases qualified claimed service.

Reemployment of Retired Members

Retirees who return to work in a permanent full-time or part-time TRS position after a Normal Retirement are eligible to return under the Standard Option.

Under the Standard Option, retirement and retiree healthcare benefits are suspended while retired members are reemployed under TRS. During reemployment, members earn additional TRS service and contributions are withheld from their wages.

Members retired under the Retirement Incentive Programs (RIPs) who return to employment will:

a. forfeit the three years of incentive credits that they received;

b. owe TRS 110% of the benefits that they received under the RIP, which may include costs for health insurance, excluding amounts that they paid to participate; and

c. be charged 7% interest from the date that they are reemployed until their indebtedness is paid in full or they retire again. If the indebtedness is not completely paid, future benefits will be actuarially reduced for life.

Employers make contributions to the unfunded liability of the plan on behalf of rehired retired members at the rate the employer is making contributions to the unfunded liability of the plan for other members.

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Postemployment Healthcare Benefits

When pension benefits begin, major medical benefits are provided by TRS to (1) all employees first hired before July 1, 1990 (Tier 1) and their surviving spouses and (2) members and their surviving spouses who have 25 years of membership service, are disabled or age 60 or older, regardless of their initial hire dates. Employees first hired after June 30, 1990 (Tier 2) and their surviving spouses may receive major medical benefits prior to age 60 by paying premiums.

Medical, prescription drug, dental, vision, and audio coverage is provided through the AlaskaCare Retiree Health Plan. Health plan provisions do not vary by retirement tier or age, except for Medicare coordination. Participants in dental, vision, and audio coverage pay a full self-supporting rate and those benefits are not included in this valuation.

Starting in 2022, prior authorization will be required for certain specialty medications for all participants. There is no change to the medications that are covered by the plan.

Starting in 2022, certain preventive benefits for pre-Medicare participants will now be covered by the plan.

Surviving spouses continue coverage only if a pension payment form that provided survivor benefits was elected. Alternate payees (i.e. individuals who are the subject of a domestic relations order or DRO) are allowed to participate in the plan, but must pay the full cost.

Where premiums are required prior to age 60 (Tier 2), the valuation bases this payment upon the age of the retiree.

Participants in the defined benefit plan are covered under the following benefit design:

Plan Feature	Amounts
Deductible (single/family)	$150 / $450
Coinsurance (most services)	20%
Outpatient surgery/testing	0%
Maximum Out-of-Pocket (single/family, excluding deductible)	$800 / $2,400
Rx Copays (generic/brand/mail-order), does not apply to OOP max	$4 / $8 / $0
Lifetime Maximum	$2,000,000

The plan coordinates with Medicare on a traditional Coordination of Benefits Method. Starting in 2019, the prescription drug coverage is through a Medicare Part D EGWP arrangement.

Disability Benefits

Monthly disability benefits are paid to permanently disabled members until they die, recover, or become eligible for normal retirement. To be eligible, members must have at least five years of paid-up membership service.

Disability benefits are equal to 50% of the member's base salary at the time of disability. The benefit is increased by 10% of the base salary for each minor child, up to a maximum of 40%. Members continue to earn TRS service until eligible for normal retirement.

Members are appointed to normal retirement on the first of the month after they become eligible.

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Death Benefits

Monthly death benefits may be paid to a spouse or dependent children upon the death of a member. If monthly benefits are not payable under the supplemental contributions provision or occupational and non-occupational death provisions, the designated beneficiary receives the lump sum benefit described below.

Occupational Death

When an active member dies from occupational causes, a monthly survivor's pension may be paid to the spouse, unless benefits are payable under the supplemental contributions provision (see below). The pension equals 40% of the member's base salary on the date of death or disability, if earlier. If there is no spouse, the pension may be paid to the member's dependent children. On the member's normal retirement date, the benefit converts to a normal retirement benefit. The normal benefit is based on the member's average base salary on the date of death and service, including service accumulated from the date of the member's death to the normal retirement date.

Non-Occupational Death

When a vested member dies from non-occupational causes, the surviving spouse may elect to receive a monthly 50% joint and survivor benefit or a lump sum benefit, unless benefits are payable under the supplemental contributions provision (see below). The monthly benefit is calculated on the member's average base salary and TRS service accrued at the time of death.

Lump Sum Benefit

Upon the death of an active member who has less than one year of service or an inactive member who is not vested, the designated beneficiary receives the member's contribution account, which includes mandatory contributions, indebtedness payments, and interest earned. Any supplemental contributions will also be refunded. If the member has more than one year of TRS service or is vested, the beneficiary also receives $1,000 and $100 for each year of TRS service, up to a maximum of $3,000. An additional $500 may be payable if the member is survived by dependent children.

Supplemental Contributions Provision

Members are eligible for supplemental coverage if they joined TRS before July 1, 1982, elected to participate in the supplemental provision, and made the required contributions. A survivor's allowance or spouse's pension (see below) may be payable if the member made supplemental contributions for at least one year and dies while in membership service or while disabled under TRS. In addition, the allowance and pension may be payable if the member dies while retired or in deferred vested status if supplemental contributions were made for at least five years.

a. **Survivor's Allowance:** If the member is survived by dependent children, the surviving spouse and dependent children are entitled to a survivor's allowance. The allowance for the spouse is equal to 35% of the member's base salary at the time of death or disability, plus 10% for each dependent child up to a maximum of 40%. The allowance terminates and a spouse's pension becomes payable when there is no longer an eligible dependent child.

b. **Spouse's Pension:** The spouse's pension is equal to 50% of the retirement benefit that the deceased member was receiving or the unreduced retirement benefit that the deceased member would have received if retired at the time of death. The spouse's pension begins on the first of the month after the member's death or termination of the survivor's allowance.

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Death After Retirement

If a joint and survivor option was selected at retirement, the eligible spouse receives continuing, lifetime monthly benefits after the member dies. A survivor's allowance or spouse's pension may be payable if the member participated in the supplemental contributions provision. If a joint and survivor option was not selected and benefits are not payable under the supplemental contributions provision, the designated beneficiary receives the member's contribution account, less any benefits already paid and the member's last benefit check.

Postretirement Pension Adjustments

Postretirement pension adjustments (PRPAs) are granted annually to eligible benefit recipients when the consumer price index (CPI) for urban wage earners and clerical workers for Anchorage increases during the preceding calendar year. PRPAs are calculated by multiplying the recipient's base benefit including past PRPAs, but excluding the Alaska COLA, times:

a. The lesser of 75% of the CPI increase in the preceding calendar year or 9% if the recipient is at least age 65 or on TRS disability; or
b. The lesser of 50% of the CPI increase in the preceding calendar year or 6% if the recipient is at least age 60, or under age 60 if the recipient has been receiving benefits for at least eight years.

Ad hoc PRPAs, up to a maximum of 4%, may be granted to eligible recipients who were first hired before July 1, 1990 (Tier 1) if the CPI increases and the funded ratio is at least 105%.

In a year where an ad hoc PRPA is granted, eligible recipients will receive the higher of the two calculations.

Alaska Cost-of-Living Allowance (COLA)

Eligible benefit recipients who reside in Alaska receive an Alaska COLA equal to 10% of their base benefits. The following benefit recipients are eligible:

a. members who were first hired under TRS before July 1, 1990 (Tier 1) and their survivors;
b. members who were first hired under TRS after June 30, 1990 (Tier 2) and their survivors if they are at least age 65; and
c. all disabled members.

Changes in Benefit Provisions Valued Since the Prior Valuation

Starting in 2022, prior authorization will be required for certain specialty medications for all participants, and certain preventive benefits for pre-Medicare participants will now be covered by the plan. There were no other changes in benefit provisions since the prior valuation.

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Section 5.2: Description of Actuarial Methods and Valuation Procedures

The funding method used in this valuation was adopted by the Board in October 2006. Changes in methods were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017. The asset smoothing method used to determine valuation assets was changed effective June 30, 2014.

Benefits valued are those delineated in Alaska State statutes as of the valuation date. Changes in State statutes effective after the valuation date are not taken into consideration in setting the assumptions and methods.

Actuarial Cost Method

Liabilities and contributions shown in the report are computed using the Entry Age Normal Actuarial Cost Method, level percent of pay.

Effective June 30, 2018, the Board adopted a layered UAAL amortization method: Layer #1 equals the sum of (i) the UAAL at June 30, 2018 based on the 2017 valuation, plus (ii) the FY18 experience gain/loss. Layer #1 is amortized over the remainder of the 25-year closed period that was originally established in 2014[1]. Layer #2 equals the change in UAAL at June 30, 2018 due to the experience study and EGWP implementation. Layer #2 is amortized over a separate closed 25-year period starting in 2018. Future layers will be created each year based on the difference between actual and expected UAAL occurring that year, and will be amortized over separate closed 25-year periods. The UAAL amortization continues to be on a level percent of pay basis. State statutes allow the contribution rate to be determined on payroll for all members, defined benefit and defined contribution member payroll combined.

Projected pension and postemployment healthcare benefits were determined for all active members. Cost factors designed to produce annual costs as a constant percentage of each member's expected compensation in each year from the assumed entry age to the assumed retirement age were applied to the projected benefits to determine the normal cost (the portion of the total cost of the plan allocated to the current year under the method). The normal cost is determined by summing intermediate results for active members and determining an average normal cost rate which is then related to the total payroll of active members. The actuarial accrued liability for active members (the portion of the total cost of the plan allocated to prior years under the method) was determined as the excess of the actuarial present value of projected benefits over the actuarial present value of future normal costs.

The actuarial accrued liability for retired members and their beneficiaries currently receiving benefits, terminated vested members and disabled members not yet receiving benefits was determined as the actuarial present value of the benefits expected to be paid. No future normal costs are payable for these members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of plan assets measured on the valuation date.

Under this method, experience gains or losses, i.e., decreases or increases in accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

[1] Layer #1 is referred to as "initial amount" in Sections 1.2 and 1.3.

Valuation of Assets

The actuarial asset value was reinitialized to equal Fair Value of Assets as of June 30, 2014. Beginning in FY15, the asset valuation method recognizes 20% of the gain or loss each year, for a period of five years. All assets are valued at fair value. Assets are accounted for on an accrued basis and are taken directly from financial statements audited by KPMG LLP.

Changes in Methods Since the Prior Valuation

There were no changes in the asset or valuation methods since the prior valuation.

Valuation of Retiree Medical and Prescription Drug Benefits

This section outlines the detailed methodology used in the internal model developed by Buck to calculate the initial per capita claims cost rates for the TRS postemployment healthcare plan. Note that the methodology reflects the results of our annual experience rate update for the period from July 1, 2020 to June 30, 2021.

Base claims cost rates are incurred healthcare costs expressed as a rate per member per year. Ideally, claims cost rates should be derived for each significant component of cost that can be expected to require differing projection assumptions or methods (i.e., medical claims, prescription drug claims, administrative costs, etc.). Separate analysis is limited by the availability and historical credibility of cost and enrollment data for each component of cost. This valuation reflects non-prescription claims separated by Medicare status, including eligibility for free Part A coverage. Prescription costs are analyzed separately as in prior valuations. Administrative costs are assumed in the final per capita claims cost rates used for valuation purposes, as described below. Analysis to date on Medicare Part A coverage is limited since Part A claim data is not available by individual, nor is this status incorporated into historical claim data.

<u>Benefits</u>

Medical, prescription drug, dental, vision and audio coverage is provided through the AlaskaCare Retiree Health Plan and is available to employees of the State and subdivisions who meet retirement criteria based on the retirement plan tier in effect at their date of hire. Health plan provisions do not vary by retirement tier or age, except for Medicare coordination for those Medicare-eligible. Dental, vision and audio claims (DVA) are excluded from data analyzed for this valuation because those are retiree-pay all benefits where rates are assumed to be self-supporting. Buck relies upon rates set by a third-party for the DVA benefits. Buck reviewed historical rate-setting information and views contribution rate adjustments made are not unreasonable.

<u>Administration and Data Sources</u>

The plan was administered by Wells Fargo Insurance Services (acquired by HealthSmart, in January 2012) from July 1, 2009 through December 31, 2013 and by Aetna effective January 1, 2014.

Claims incurred for the period from July 2019 through June 2021 (FY20 through FY21) were provided by the State of Alaska from reports extracted from their data warehouse, which separated claims by Medicare status. Monthly enrollment data for the same period was provided by Aetna.

Aetna also provided census information identifying Medicare Part B only participants. These participants are identified when hospital claims are denied by Medicare; Aetna then flags that participant as a Part B only participant. Buck added newly identified participants to our list of Medicare Part B only participants. Buck assumes that once identified as Part B only, that participant remains in that status until we are notified otherwise.

Aetna provided a snapshot file as of July 1, 2021 of retirees and dependents that included a coverage level indicator. The monthly enrollment data includes double coverage participants. These are participants whereby both the retiree and spouse are retirees from the State and both are reflected with Couple coverage in the enrollment. In this case, such a couple would show up as four members in the

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monthly enrollment (each would be both a retiree and a spouse). As a result, the snapshot census file was used to adjust the total member counts in the monthly enrollment reports to estimate the number of unique participants enrolled in coverage. Based on the snapshot files from the last two valuations, the total member count in the monthly enrollment reports needs to be reduced by approximately 13% to account for the number of participants with double coverage.

Aetna does not provide separate experience by Medicare status in standard reporting so the special reports mentioned above from the data warehouse were used this year to obtain that information and incorporate it into the per capita rate development for each year of experience (with corresponding weights applied in the final per capita cost).

Methodology

Buck projected historical claim data to FY22 for retirees using the following summarized steps:

1. Develop historical annual incurred claim cost rates – an analysis of medical costs was completed based on claims information and enrollment data provided by the State of Alaska and Aetna for each year in the experience period of FY20 through FY21.
    - Costs for medical services and prescriptions were analyzed separately, and separate trend rates were developed to project expected future medical and prescription costs for the valuation year (e.g. from the experience period up through FY22).
    - Because the reports provided reflected incurred claims, no additional adjustment was needed to determine incurred claims to be used in the valuation.
    - An offset for costs expected to be reimbursed by Medicare was incorporated beginning at age 65. Alaska retirees who do not have 40 quarters of Medicare-covered compensation do not qualify for Medicare Part A coverage free of charge. This is a relatively small and closed group. Medicare was applied to State employment for all employees hired after March 31, 1986. For the “no-Part A” individuals who are required to enroll in Medicare Part B, the State is the primary payer for hospital bills and other Part A services. Claim experience is not available separately for participants with both Medicare Parts A and B and those with Part B only. For Medicare Part B only participants, a lower average claims cost was applied to retirees covered by both Medicare Part A and B vs. retirees covered only by Medicare Part B based upon manual rate models that estimate the Medicare covered proportion of medical costs. To the extent that no-Part A claims can be isolated and applied strictly to the appropriate closed group, actuarial accrued liability will be more accurate.
    - Based on census data received from Aetna, less than 1% of the current retiree population was identified as having coverage only under Medicare Part B. We assume that 5% of actives hired before April 1, 1986 and current retirees who are not yet Medicare eligible will not be eligible for Medicare Part A.
    - Based upon a reconciliation of valuation census data to the snapshot eligibility files provided by Aetna as of July 1, 2020, and July 1, 2021, Buck adjusted member counts used for duplicate records where participants have double coverage; i.e. primary coverage as a retiree and secondary coverage as the covered spouse of another retiree. This is to reflect the total cost per distinct individual/member which is then applied to distinct members in the valuation census.
    - Buck understands that pharmacy claims reported do not reflect rebates. Based on actual pharmacy rebate information provided by Optum, rebates were assumed to be 19.5% of prescription drug claims for FY20, 16.2% of pre-Medicare, and 14.3% of Medicare prescription drug claims for FY21.
2. Develop estimated EGWP reimbursements – Segal provided estimated 2022 EGWP subsidies, developed with the assistance of OptumRx. These amounts are applicable only to Medicare-eligible participants.

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3. Adjust for claim fluctuation, anomalous experience, etc. – explicit adjustments are often made for anticipated large claims or other anomalous experience. FY19 and FY20 experience were compared to assess the impact of COVID-19 and whether an adjustment to FY20 claims was indicated for use in the June 30, 2020 valuation. A material decrease in medical claims during March 2020 to June 2020 was experienced due to COVID-19. Therefore, an adjustment was made for those months to adjust for the decrease that is not expected to continue in future years. There was an observed spike in prescription drug claims in March 2020; however, the FY20 prescription drug experience appears reasonable to use without adjustment for COVID-19. To adjust for the decrease in medical claims due to COVID-19 during the last 4 months of FY20, the per capita cost during the first 8 months was used as the basis for estimating claims that would have occurred in the absence of COVID-19. FY21 experience was also thoroughly reviewed to assess the impact of COVID-19 and whether an adjustment to FY21 claims was appropriate for use in the June 30, 2021 valuation. FY21 medical per capita claims were noticeably lower than expected, so a 4% load was added to the FY21 medical claims used in the per capita claims cost development to better reflect future expected long-term costs of the plan. Total prescription drug claims experience for FY21 was reasonable and consistent with FY19 and FY20 experience. Therefore, no adjustment was made to FY21 prescription drug claims. Due to group size and demographics, we did not make any additional large claim adjustments. We do blend both Alaska plan-specific and national trend factors as described below. Buck compared data utilized to lag reports and quarterly plan experience presentations provided by the State and Aetna to assess accuracy and reasonableness of data.

4. Trend all data points to the projection period – project prior years' experience forward to FY22 for retiree benefits on an incurred claim basis. Trend factors derived from historical Alaska-specific experience and national trend factors are shown in the table in item 5 below.

5. Apply credibility to prior experience – adjust prior year's data by assigning weight to recent periods, as shown at the right of the table below. The Board approved a change in the weighting of experience periods beginning with the June 30, 2017 valuation as outlined below. Note also that for FY20 to FY21 medical and both years of prescription drugs we averaged projected plan costs using Alaska-specific trend factors and national trend factors, assigning 75% weight to Alaska-specific trends and 25% to national trends. For FY21 to FY22 medical we applied 100% weight to national trends because the Alaska-specific trends were impacted by COVID-19:

Alaska-Specific and National Average Weighted Trend from Experience Period to Valuation Year

Experience Period	Medical	Prescription	Weighting Factors
FY20 to FY21	6.3% Pre-Medicare / 5.2% Medicare	7.6%	50%
FY21 to FY22	8.1% Pre-Medicare / 4.8% Medicare	8.0%	50%

Trend assumptions used for rate development are assessed annually and as additional/improved reporting becomes available, we will incorporate into rate development as appropriate.

6. Starting in 2022, prior authorization will be required for certain specialty medications. There is no change to the medications that are covered by the plan. Segal provided an estimate of the impact of this change to the DB retiree health plan cost for calendar year 2022. The DB base claims costs for pre-Medicare prescription drug, Medicare prescription drug, and EGWP were adjusted to reflect this change. Additionally, starting in 2022, certain preventive benefits for pre-Medicare participants will now be covered by the plan. Segal provided an estimate of the impact of this change to the DB retiree health plan cost for calendar year 2022. The DB base claims cost for pre-Medicare medical was adjusted to reflect this change.

7. Develop separate administration costs – no adjustments were made for internal administrative costs. Third party retiree plan administration fees for FY22 are based upon total fees projected to 2022 by Segal based on actual FY21 fees. The annual per participant per year administrative cost rate for medical and prescription benefits is $493.

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Healthcare Reform

Healthcare Reform legislation passed on March 23, 2010 included several provisions with potential implications for the State of Alaska Retiree Health Plan liability. Buck evaluated the impact due to these provisions.

Because the State plan is retiree-only, and was in effect at the time the legislation was enacted, not all provisions of the health reform legislation apply to the State plan. Unlimited lifetime benefits and dependent coverage to age 26 are two of these provisions. We reviewed the impact of including these provisions, but there was no decision made to adopt them, and no requirement to do so.

Because Transitional Reinsurance fees are only in effect until 2016, we excluded these for valuation purposes.

The Further Consolidated Appropriations Act, 2020 passed in December 2019 repealed several healthcare-related taxes, including the Cadillac Tax.

The Tax Cuts and Jobs Act passed in December 2017 included the elimination of the individual mandate penalty and changed the inflation measure for purposes of determining the limits for the High Cost Excise Tax to use chained CPI. It is our understanding the law does not directly impact other provisions of the ACA. While the nullification of the ACA's individual mandate penalty does not directly impact employer group health plans, it could contribute to the destabilization of the individual market and increase the number of uninsured. Such destabilization could translate to increased costs for employers. We have considered this when setting our healthcare cost trend assumptions and will continue to monitor this issue.

We have not identified any other specific provisions of healthcare reform or its potential repeal that would be expected to have a significant impact on the measured obligation. We will continue to monitor legislative activity.

Data

In accordance with actuarial standards, we note the following specific data sources and steps taken to value retiree medical benefits:

The Division of Retirement and Benefits provided pension valuation census data, which for people currently in receipt of healthcare benefits was supplemented by coverage data from the healthcare claims administrator (Aetna).

Certain adjustments and assumptions were made to prepare the data for valuation:

- All records provided with retiree medical coverage on the Aetna data were included in this valuation and we relied on the Aetna data as the source of medical coverage for current retirees and their dependents.
- Some records in the Aetna data were duplicates due to the double coverage (i.e. coverage as a retiree and as a spouse of another retiree) allowed under the plan. Records were adjusted for these members so that each member was only valued once. Any additional value of the double coverage (due to coordination of benefits) is small and reflected in the per capita costs.
- Covered children included in the Aetna data were valued until age 23, unless disabled. We assumed that those dependents over 23 were only eligible and valued due to being disabled.
- For individuals included in the pension data expecting a future pension, we valued health benefits starting at the same point that the pension benefit is assumed to start.

We are not aware of any other data issues that would be expected to have a material impact on the results and there are no unresolved matters related to the data.

The chart below shows the basis of setting the per capita claims cost assumption, which includes both PERS and TRS.

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	Medical		Prescription Drugs (Rx)	
	Pre-Medicare	Medicare	Pre-Medicare	Medicare
A. Fiscal 2020				
1. Incurred Claims	$ 229,531,664	$ 89,497,345	$ 64,442,660	$ 188,022,328
2. Adjustments for Rx Rebates	0	0	(12,566,319)	(36,664,354)
3. Net incurred claims	$ 229,531,664	$ 89,497,345	$ 51,876,341	$ 151,357,974
4. Average Enrollment	19,354	44,965	19,354	44,965
5. Claim Cost Rate (3) / (4)	11,860	1,990	2,680	3,366
6. Trend to Fiscal 2022	1.149	1.103	1.162	1.162
7. Fiscal 2022 Incurred Cost Rate (5) x (6)	$ 13,630	$ 2,195	$ 3,116	$ 3,912
B. Fiscal 2021				
1. Incurred Claims	$ 196,566,470	$ 86,512,435	$ 60,691,609	$ 207,822,858
2. Adjustments for Rx Rebates and COVID (Medical only)	7,862,659	3,460,497	(9,832,041)	(29,718,669)
3. Net incurred claims	$ 204,429,129	$ 89,972,933	$ 50,859,568	$ 178,104,189
4. Average Enrollment	18,106	47,025	18,106	47,025
5. Claim Cost Rate (3) / (4)	11,291	1,913	2,809	3,787
6. Trend to Fiscal 2022	1.081	1.048	1.080	1.080
7. Fiscal 2022 Incurred Cost Rate (5) x (6)	$ 12,205	$ 2,005	$ 3,034	$ 4,090

	Medical		Prescription Drugs (Rx)	
	Pre-Medicare	Medicare	Pre-Medicare	Medicare
C. Incurred Cost Rate by Fiscal Year				
1. Fiscal 2020 A.(7)	13,630	2,195	3,116	3,912
2. Fiscal 2021 B.(7)	12,205	2,005	3,034	4,090
D. Weighting by Fiscal Year				
1. Fiscal 2020	50%	50%	50%	50%
2. Fiscal 2021	50%	50%	50%	50%
E. Fiscal 2022 Incurred Cost Rate				
1. Rate at Average Age C x D	$ 12,918	$ 2,100	$ 3,075	$ 4,001
2. Average Aging Factor	0.822	1.271	0.832	1.124
3. Rate at Age 65 (1) / (2)	$ 15,708	$ 1,652	$ 3,695	$ 3,560
F. Development of Part A&B and Part B Only Cost from Pooled Rate Above				
1. Part A&B Average Enrollment		46,602		
2. Part B Only Average Enrollment		423		
3. Total Medicare Average Enrollment B(4)		47,025		
4. Cost ratio for those with Part B only to those with Parts A&B		3.300		
5. Factor to determine cost for those with Parts A&B (2) / (3) x (4) + (1) / (3) x 1.00		1.021		
6. Medicare per capita cost for all participants: E(3)		$ 1,652		
7. Cost for those eligible for Parts A&B: (6) / (5)		$ 1,619		
8. Cost for those eligible for Part B only: (7) x (4)		$ 5,341		

	Medical		Prescription Drugs (Rx)	
	Pre-Medicare	Medicare	Pre-Medicare	Medicare
1. Rate at Age 65	$ 15,708	$ 1,619	$ 3,695	$ 3,560
2. Adjustment factor for plan changes	1.39%	0.00%	-8.67%	-2.41%
3. Adjusted Rate at Age 65 (1) x [1 + (2)]	$ 15,926	$ 1,619	$ 3,375	$ 3,474

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Following the development of total projected costs, a distribution of per capita claims cost was developed. This was accomplished by allocating total projected costs to the population census used in the valuation. The allocation was done separately for each of prescription drugs and medical costs for the Medicare eligible and pre-Medicare populations. The allocation weights were developed using participant counts by age and assumed morbidity and aging factors. Results were tested for reasonableness based on historical trend and external benchmarks for costs paid by Medicare.

Below are the results of this analysis:

Distribution of Per Capita Claims Cost by Age for the Period July 1, 2021 through June 30, 2022

Age	Medical and Medicare Parts A & B	Medical and Medicare Part B Only	Prescription Drug	Medicare EGWP Subsidy
45	$ 9,719	$ 9,719	$ 2,062	$ 0
50	10,996	10,996	2,449	0
55	12,441	12,441	2,908	0
60	14,076	14,076	3,133	0
65	1,619	5,341	3,474	1,131
70	1,877	6,192	3,836	1,249
75	2,176	7,178	4,235	1,379
80	2,402	7,925	4,130	1,345

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Section 5.3: Summary of Actuarial Assumptions

The demographic and economic assumptions used in the June 30, 2021 valuation are described below. Unless noted otherwise, these assumptions were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017.

Investment Return

7.38% per year, net of investment expenses.

Salary Scale

Salary scale rates based upon the 2013-2017 actual experience (see Table 1).

Inflation – 2.50% per year.

Productivity – 0.25% per year.

Payroll Growth

2.75% per year (inflation + productivity).

Total Inflation

Total inflation as measured by the Consumer Price Index for urban and clerical workers for Anchorage is assumed to increase 2.50% annually.

Mortality (Pre-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

RP-2014 white-collar employee table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Deaths are assumed to result from occupational causes 15% of the time.

Mortality (Post-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

93% of male and 90% of female rates of RP-2014 white-collar healthy annuitant table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Turnover

Select and ultimate rates based upon the 2013-2017 actual experience (see Table 2).

Disability

Incidence rates based upon the 2013-2017 actual experience (see Table 3).

Post-disability mortality in accordance with the RP-2014 disabled table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

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Retirement

Retirement rates based upon the 2013-2017 actual experience (see Table 4).

Deferred vested members are assumed to retire at their earliest unreduced retirement date.

The modified cash refund annuity is valued as a three-year certain and life annuity.

Spouse Age Difference

Males are assumed to be three years older than their wives. Females are assumed to be two years younger than husbands.

Percent Married for Pension

85% of male members and 75% of female members are assumed to be married at termination from active service.

Dependent Spouse Medical Coverage Election

Applies to members who do not have double medical coverage. 65% of male members and 60% of female members are assumed to be married and cover a dependent spouse.

Dependent Children

- Pension: For the participants who are assumed to be married, those between ages 25 and 45 are assumed to have two dependent children.
- Healthcare: Benefits for dependent children have been valued only for members currently covering their dependent children. These benefits are only valued through the dependent children's age 23 (unless the child is disabled).

Contribution Refunds

0% of terminating members with vested benefits are assumed to have their contributions refunded. 100% of those with non-vested benefits are assumed to have their contributions refunded.

Imputed Data

Data changes from the prior year which are deemed to have an immaterial impact on liabilities and contribution rates are assumed to be correct in the current year's client data. Non-vested terminations with appropriate refund dates are assumed to have received a full refund of contributions. Active members with missing salary and service are assumed to be terminated with status based on their vesting percentage.

Active Rehire Assumption

The Normal Cost used for determining contribution rates and in the projections includes a rehire assumption to account for anticipated rehires. The Normal Cost shown in the report includes the following assumptions (which were developed based on the five years of rehire loss experience through June 30, 2017). For projections, these assumptions were assumed to grade to zero uniformly over a 20-year period.

- Pension: 15.57%
- Healthcare: 12.03%

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Re-Employment Option

All re-employed retirees are assumed to return to work under the Standard Option.

Active Data Adjustment

No adjustment was made to reflect participants who terminate employment before the valuation date and are subsequently rehired after the valuation date.

Alaska Cost-of-Living Adjustments (COLA)

Of those benefit recipients who are eligible for the Alaska COLA, 60% are assumed to remain in Alaska and receive the COLA.

Postretirement Pension Adjustment (PRPA)

50% and 75% of assumed inflation, or 1.25% and 1.875% respectively, is valued for the annual automatic PRPA as specified in the statute.

Expenses

The investment return assumption is net of investment expenses.

The Normal Cost as of June 30, 2021 was increased by the following amounts for administrative expenses (for projections, the percent increase was assumed to remain constant in future years):

- Pension: $3,217,000
- Healthcare: $1,604,000

Part-Time Status

Part-time employees are assumed to earn 0.75 years of credited service per year.

Sick Leave

4.5 days of unused sick leave for each year of service are assumed to be available to be credited once the member is retired, terminates or dies.

Service

Total credited service is provided by the State. This service is assumed to be the only service that should be used to calculate benefits. Additionally, the State provides claimed service (including Bureau of Indian Affairs Service). Claimed service is used for vesting and eligibility purposes as described in Section 5.1.

Final Average Earnings

Final Average Earnings is provided on the data for active members. This amount is used as a minimum in the calculation of the average earnings in the future.

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Per Capita Claims Cost

Sample claims cost rates adjusted to age 65 for FY22 medical and prescription drugs are shown below. The prescription drug costs reflect the plan change to require prior authorization for certain specialty medications. The pre-Medicare medical cost reflects the coverage of additional preventive benefits.

	Medical	Prescription Drugs
Pre-Medicare	$ 15,926	$ 3,375
Medicare Parts A & B	$ 1,619	$ 3,474
Medicare Part B Only	$ 5,341	$ 3,474
Medicare Part D – EGWP	N/A	$ 1,131

Members are assumed to attain Medicare eligibility at age 65. All costs are for the 2022 fiscal year (July 1, 2021 – June 30, 2022).

The EGWP subsidy is assumed to increase in future years by the trend rates shown on the following pages. No future legislative changes or other events are anticipated to impact the EGWP subsidy. If any legislative or other changes occur in the future that impact the EGWP subsidy (which could either increase or decrease the plan's Actuarial Accrued Liability), those changes will be evaluated and quantified when they occur.

Third Party Administrator Fees

$493 per person per year; assumed to increase at 4.5% per year.

Medicare Part B Only

We assume that 5% of actives hired before April 1, 1986 and current retirees who are not yet Medicare eligible will not be eligible for Medicare Part A.

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Healthcare Cost Trend

The table below shows the rate used to project the cost from the shown fiscal year to the next fiscal year. For example, 6.3% is applied to the FY22 pre-Medicare medical claims costs to get the FY23 medical claims costs.

	Medical Pre-65	Medical Post-65	Prescription Drugs / EGWP
FY22	6.3%	5.4%	7.1%
FY23	6.1%	5.4%	6.8%
FY24	5.9%	5.4%	6.4%
FY25	5.8%	5.4%	6.1%
FY26	5.6%	5.4%	5.7%
FY27-FY40	5.4%	5.4%	5.4%
FY41	5.3%	5.3%	5.3%
FY42	5.2%	5.2%	5.2%
FY43	5.1%	5.1%	5.1%
FY44	5.1%	5.1%	5.1%
FY45	5.0%	5.0%	5.0%
FY46	4.9%	4.9%	4.9%
FY47	4.8%	4.8%	4.8%
FY48	4.7%	4.7%	4.7%
FY49	4.6%	4.6%	4.6%
FY50+	4.5%	4.5%	4.5%

For the June 30, 2014 valuation and later, the updated Society of Actuaries' Healthcare Cost Trend Model is used to project medical and prescription drug costs. This model estimates trend amounts that are projected out for 80 years. The model has been populated with assumptions that are specific to the State of Alaska.

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Aging Factors

Age	Medical	Prescription Drugs
0 – 44	2.0%	4.5%
45 – 54	2.5%	3.5%
55 – 64	2.5%	1.5%
65 – 74	3.0%	2.0%
75 – 84	2.0%	-0.5%
85 – 94	0.3%	-2.5%
95+	0.0%	0.0%

Retired Member Contributions for Medical Benefits

Currently contributions are required for TRS members who are under age 60 and have less than 25 years of service. Eligible Tier 1 members are exempt from contribution requirements. Annual FY22 contributions based on monthly rates shown below for calendar 2022 are assumed based on the coverage category for current retirees. The composite rate shown is used for current active and inactive members in Tier 2 who are assumed to retire prior to age 60 with less than 25 years of service and who are not disabled. For dependent children, we value 1/3 of the annual retiree contribution to estimate the per child rate based upon the assumed number of children in rates where children are covered.

Coverage Category	Calendar 2022 Annual Contribution	Calendar 2022 Monthly Contribution	Calendar 2021 Monthly Contribution
Retiree Only	$ 8,448	$ 704	$ 704
Retiree and Spouse	$ 16,896	$ 1,408	$ 1,408
Retiree and Child(ren)	$ 11,940	$ 995	$ 995
Retiree and Family	$ 20,388	$ 1,699	$ 1,699
Composite	$ 12,552	$ 1,046	$ 1,046

Trend Rate for Retired Member Medical Contributions

The table below shows the rate used to project the retired member medical contributions from the shown fiscal year to the next fiscal year. For example, 0.0% is applied to the FY22 retired member medical contributions to get the FY23 retired member medical contributions.

Trend Assumptions	
FY22	0.0%
FY23+	4.0%

Graded trend rates for retired member medical contributions are consistent with the rates used for the June 30, 2020 valuation. Actual FY22 retired member medical contributions are reflected in the valuation.

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Healthcare Participation

100% of system paid members and their spouses are assumed to elect healthcare benefits as soon as they are eligible. 20% of non-system paid members and their spouses are assumed to elect healthcare benefits as soon as they are eligible.

Changes in Assumptions Since the Prior Valuation

Healthcare claim costs are updated annually as described in Section 5.2. The amounts included in the Normal Cost for administrative expenses were changed from $3,003,000 to $3,217,000 for pension, and from $1,362,000 to $1,604,000 for healthcare (based on the most recent two years of actual administrative expenses paid from plan assets).

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Table 1: Salary Scale

Years of Service	Percent Increase
0	6.75%
1	6.25%
2	5.75%
3	5.25%
4	4.75%
5	4.25%
6	3.75%
7	3.65%
8	3.55%
9	3.45%
10	3.35%
11	3.25%
12	3.15%
13	3.05%
14	2.95%
15	2.85%
16+	2.75%

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Table 2: Turnover Rates

Select Rates during the First 8 Years of Employment

Years of Service	Male	Female
0	20.40%	17.00%
1	20.40%	17.00%
2	16.80%	14.00%
3	14.40%	12.00%
4	12.00%	10.00%
5	10.80%	9.00%
6	9.00%	7.50%
7	7.20%	6.00%

Ultimate Rates after the First 8 Years of Employment

Age	Male	Female	Age	Male	Female
22	2.62%	3.79%	39	2.57%	3.74%
23	2.62%	3.79%	40	2.26%	2.75%
24	2.61%	3.79%	41	2.26%	2.75%
25	2.61%	3.79%	42	2.25%	2.74%
26	2.61%	3.79%	43	2.24%	2.73%
27	2.60%	3.79%	44	2.23%	2.73%
28	2.60%	4.27%	45	2.22%	2.72%
29	2.60%	4.76%	46	2.21%	2.71%
30	2.60%	5.24%	47	2.20%	2.70%
31	2.60%	5.73%	48	2.18%	2.69%
32	2.59%	6.22%	49	2.16%	2.68%
33	2.59%	5.72%	50	3.43%	4.42%
34	2.59%	5.23%	51	3.39%	4.39%
35	2.59%	4.74%	52	3.35%	4.36%
36	2.58%	4.25%	53	3.30%	4.32%
37	2.58%	3.75%	54	3.00%	7.56%
38	2.58%	3.75%	55+	2.00%	5.00%

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Table 3: Disability Rates

Age	Male	Female
< 31	0.0337%	0.0612%
31	0.0337%	0.0613%
32	0.0337%	0.0613%
33	0.0342%	0.0622%
34	0.0347%	0.0631%
35	0.0353%	0.0641%
36	0.0357%	0.0650%
37	0.0362%	0.0659%
38	0.0371%	0.0674%
39	0.0379%	0.0689%
40	0.0387%	0.0703%
41	0.0395%	0.0718%
42	0.0403%	0.0733%
43	0.0423%	0.0770%
44	0.0443%	0.0806%
45	0.0464%	0.0843%
46	0.0483%	0.0879%
47	0.0504%	0.0916%
48	0.0536%	0.0975%
49	0.0569%	0.1034%
50	0.0601%	0.1093%
51	0.0634%	0.1152%
52	0.0666%	0.1211%
53	0.0746%	0.1356%
54	0.0826%	0.1501%

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Table 4: Retirement Rates

	Reduced		Unreduced	
Age	Male	Female	Male	Female
< 45	N/A	N/A	3.0%	3.0%
45	N/A	N/A	5.0%	5.0%
46	N/A	N/A	5.0%	8.0%
47	N/A	N/A	5.0%	8.0%
48	N/A	N/A	5.0%	8.0%
49	N/A	N/A	5.0%	8.0%
50	10.0%	10.0%	5.0%	14.0%
51	10.0%	10.0%	8.0%	13.0%
52	10.0%	10.0%	15.0%	13.0%
53	10.0%	12.0%	15.0%	14.0%
54	10.0%	12.0%	15.0%	15.0%
55	15.0%	8.0%	20.0%	17.0%
56	10.0%	8.0%	17.0%	17.0%
57	10.0%	8.0%	15.0%	17.0%
58	10.0%	8.0%	20.0%	17.0%
59	10.0%	8.0%	20.0%	23.0%
60	N/A	N/A	25.0%	23.0%
61	N/A	N/A	18.0%	23.0%
62	N/A	N/A	18.0%	21.0%
63	N/A	N/A	18.0%	21.0%
64	N/A	N/A	18.0%	26.0%
65	N/A	N/A	30.0%	21.0%
66	N/A	N/A	25.0%	21.0%
67	N/A	N/A	25.0%	21.0%
68	N/A	N/A	25.0%	26.0%
69	N/A	N/A	35.0%	26.0%
70	N/A	N/A	30.0%	26.0%
71	N/A	N/A	30.0%	37.0%
72	N/A	N/A	30.0%	37.0%
73	N/A	N/A	30.0%	37.0%
74	N/A	N/A	30.0%	37.0%
75 - 79	N/A	N/A	50.0%	50.0%
80+	N/A	N/A	100.0%	100.0%

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Section 6: Actuarial Standard of Practice No. 51

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities, current contribution requirements, and the funded status of the plan. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the plan. Understanding the risks to the funding of the plan is important.

Actuarial Standard of Practice No. 51 (ASOP 51)[1] requires certain disclosures of potential risks to the plan and provides useful information for intended users of actuarial reports that determine plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is negative, but all risk should be understood and accepted based on knowledge, judgement, and educated decisions. Future measurements may deviate in ways that produce positive or negative financial impacts to the plan.

In the actuary's professional judgment, the following risks may reasonably be anticipated to significantly affect the pension plan's future financial condition and contribution requirements.

- Investment Risk – potential that the investment return will be different than the 7.38% expected in the actuarial valuation
- Contribution Risk – potential that the contribution actually made will be different than the actuarially determined contribution
- Long-Term Return on Investment Risk – potential that changes in long-term capital market assumptions or the plan's asset allocation will create the need to update the long-term return on investment assumption
- Longevity Risk – potential that participants live longer than expected compared to the valuation mortality assumptions
- Salary Increase Risk – potential that future salaries will be different than expected in the actuarial valuation
- Inflation Risk – potential that the consumer price index (CPI) for urban wage earners and clerical workers for Anchorage is different than the 2.5% assumed in the valuation
- Other Demographic Risk – potential that other demographic experience will be different than expected

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the plan. **This list is not all-inclusive**; it is an attempt to identify the more significant risks and how those risks might affect the results shown in this report.

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the plan sponsor to make contributions to the plan when due, or to assess the likelihood or consequences of potential future changes in law. In addition, this valuation report is not intended to provide investment advice or to provide guidance on the management or reduction of risk.

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[1] ASOP 51 does not apply to the healthcare portion of the plan. Accordingly, all figures in this section relate to the pension portion.

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Assessment of Risks

Investment Risk

Plan costs are very sensitive to the market return.

- Any return on assets lower than assumed will increase costs.
- The plan uses an actuarial value of assets that smooths gains and losses on market returns over a five-year period to help control some of the volatility in costs due to investment risk.
- Historical experience of actual returns is shown in Section 2.4 of this report. This historical experience illustrates how returns can vary over time.

Contribution Risk

There is a risk to the plan when the employer's and/or State's actual contribution amount and the actuarially determined contribution differ.

- If the actual contribution is lower than the actuarially determined contribution, the plan may not be sustainable in the long term.
- Any underpayment of the contribution will increase future contribution amounts to help pay off the additional Unfunded Actuarial Accrued Liability associated with the underpayment(s).
- As long as the Board consistently adopts the actuarially determined contributions, this risk is mitigated due to Alaska statutes requiring the State to contribute additional funds necessary to pay the total contributions adopted by the Board.

Long-Term Return on Investment Risk

Inherent in the long-term return on investment assumption is the expectation that the current rate will be used until the last benefit payment of the plan is made. There is a risk that sustained changes in economic conditions, changes in long-term future capital market assumptions, or changes to the plan's asset allocation will necessitate an update to the long-term return on investment assumption used.

- Under a lower long-term return on investment assumption, less investment return is available to pay plan benefits. This may lead to a need for increased employer contributions.
- The liabilities will be higher at a lower assumed rate of return because future benefits will have a lower discount rate applied when calculating the present value.
- A 1% decrease in the long-term return on investment assumption will increase actuarial accrued liability by approximately 11%.
- This risk may be increased due to the plan being closed to new entrants. As the plan continues to mature, the magnitude of negative cash flow discussed in the Plan Maturity Measures later in this section will grow, thereby creating a need for more liquid assets that may not garner the same long-term return as currently assumed.

Longevity Risk

Plan costs will be increased as participants are expected to live longer.

- Benefits are paid over a longer lifetime when life expectancy is expected to increase. The longer duration of payments leads to higher liabilities.
- Health care has been improving, which affects the life expectancy of participants. As health care improves, leading to longer life expectancies, costs to the plan could increase.

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- The mortality assumption for the plan mitigates this risk by assuming future improvement in mortality. However, any improvement in future mortality greater than that expected by the current mortality assumption would lead to increased costs for the plan.
- The Postretirement Pension Adjustments and Alaska Cost-of-Living Allowance increase longevity risk because members who live longer than expected will incur more benefit payment increases than expected and therefore increase costs.

Salary Increase Risk

Plan costs will be increased if actual salary increases are larger than expected.

- Higher-than-expected salary increases will produce higher benefits.
- The higher benefits may be partially offset by increased employee contributions due to higher salaries.
- If future payroll grows at a rate different than assumed, contributions as a percentage of payroll will be affected.

Inflation Risk

Plan costs will be increased if the actual CPI for Anchorage is greater than the 2.5% assumed in the valuation.

- Retirement benefits will be greater than expected if the CPI is greater than the assumed rate, which will increase costs.
- This risk is mitigated by the 75% and 50% of CPI provisions and the 9% and 6% maximums.
- This risk is also mitigated by the age and time in payment requirements to receive an increase.
- Inflation risk may be associated with the interaction of inflation with other assumptions, but this is not significant as a standalone assumption, and therefore is considered as part of the associated assumption risk instead of being discussed here.

Other Demographic Risk

The plan is subject to risks associated with other demographic assumptions (e.g., retirement, termination, and retired members remaining in Alaska assumptions). Differences between actual and expected experience for these assumptions tend to have less impact on the overall costs of the plan. The demographic assumptions used in the valuation are re-evaluated regularly as part of the four-year experience studies to ensure the assumptions are consistent with long-term expectations.

Historical Information

Monitoring certain information over time may help understand risks faced by the plan. Historical information is included throughout this report. Some examples are:

- Funded Ratio History shown in the Executive Summary illustrates how the plan's funded status (comparison of actuarial accrued liabilities to actuarial value of assets) has changed over time.
- Section 1.6 shows historical analysis of financial experience including how contribution rates have changed over time.
- Section 2.4 shows the volatility of asset returns over time.
- Section 4 includes various historical information showing how member census data has changed over time.

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Plan Maturity Measures

There are certain measures that may aid in understanding the significant risks to the plan.

Ratio of Retired Liability to Total Liability ($'s in $000's)	June 30, 2020	June 30, 2021
1. Retiree and Beneficiary Accrued Liability	$ 5,570,625	$ 5,657,056
2. Total Accrued Liability	$ 7,447,036	$ 7,471,887
3. Ratio, (1) ÷ (2)	74.8%	75.7%

A high percentage of liability concentrated on participants in pay status indicates a mature plan (often a ratio above 60% - 65%). Because the plan was closed to new entrants in 2006, we expect the percentage in item #3 to continue to increase over time. An increasing percentage may indicate a need for a less risky asset allocation, which may lead to a lower long-term return on asset assumption and increased costs. Higher percentages may also indicate greater investment risk as benefit payments may be greater than contributions creating an increased reliance on investment returns. This ratio should be monitored each year in the future.

Ratio of Cash Flow to Assets ($'s in $000's)	FYE June 30, 2020	FYE June 30, 2021
1. Contributions	$ 207,899	$ 196,748
2. Benefit Payments	490,447	501,429
3. Cash Flow, (1) - (2)	$ (282,548)	$ (304,681)
4. Fair Value of Assets	$ 5,444,799	$ 6,731,481
5. Ratio, (3) ÷ (4)	(5.2%)	(4.5%)

When this cash flow ratio is negative, more cash is being paid out than deposited in the trust. Negative cash flow indicates the trust needs to rely on investment returns to cover benefit payments and / or may need to invest in more liquid assets to cover the benefit payments. More liquid assets may not generate the same returns as less liquid assets, which can increase the investment risk. Currently, the low magnitude of the ratio implies there may already be enough liquid assets to cover the benefit payments, less investment return is needed to cover the shortfall, or only a small portion of assets will need to be converted to cash. Therefore, the investment risk is likely not amplified at this time. However, due to the plan being closed, we expect this measure to become increasingly negative over time. This maturity measure should be monitored in the future.

Contribution Volatility ($'s in $000's)	June 30, 2020	June 30, 2021
1. Fair Value of Assets	$ 5,444,799	$ 6,731,481
2. DB/DCR Payroll	$ 741,090	$ 750,334
3. Asset to Payroll Ratio, (1) ÷ (2)	734.7%	897.1%
4. Accrued Liability	$ 7,447,036	$ 7,471,887
5. Liability to Payroll Ratio, (4) ÷ (2)	1,004.9%	995.8%

Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 10% may experience twice the contribution volatility due to investment return volatility than a plan with an asset-to-payroll ratio of 5%. Plans that have higher liability-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, if an assumption change increases the liability of two plans by the same percent, the plan with a liability-to-payroll ratio of 10% may experience twice the contribution volatility than a plan with a liability-to-payroll ratio of 5%.

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Glossary of Terms

Actuarial Accrued Liability

Total accumulated cost to fund pension or postemployment benefits arising from service in all prior years.

Actuarial Cost Method

Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension or postemployment plan for a group of plan members to the years of service that give rise to that cost.

Actuarial Present Value of Projected Benefits

Amount which, together with future interest, is expected to be sufficient to pay all future benefits.

Actuarial Valuation

Study of probable amounts of future pension or postemployment benefits and the necessary amount of contributions to fund those benefits.

Actuary

Person who performs mathematical calculations pertaining to pension and insurance benefits based on specific procedures and assumptions.

GASB 67 and 68

Governmental Accounting Standards Board Statement Number 67 amends Number 25 effective for the fiscal year beginning after June 15, 2013 and defines new financial reporting requirements for public pension plans.

Governmental Accounting Standards Board Statement Number 68 amends Number 27 effective for fiscal years beginning after June 15, 2014 and defines new accounting and financial reporting requirements for employers sponsoring public pension plans.

GASB 74 and 75

Governmental Accounting Standards Board Statement Number 74 amends Number 43 effective for the fiscal year beginning after June 15, 2016 and defines new financial reporting requirements for public postemployment benefit plans.

Governmental Accounting Standards Board Statement Number 75 amends Number 45 effective for fiscal years beginning after June 15, 2017 and defines new accounting and financial reporting requirements for employers sponsoring public postemployment benefit plans.

Normal Cost

That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual participant or the plan as a whole.

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Rate Payroll

Members' earnings used to determine contribution rates.

Unfunded Actuarial Accrued Liability (UAAL)

The portion of the actuarial accrued liability not offset by plan assets.

Valuation Payroll

Members' earnings used to determine Normal Cost and Actuarial Accrued Liability.

Vested Benefits

Benefits which are unconditionally guaranteed regardless of employment.

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BUCK

State of Alaska

Teachers' Retirement System Defined Contribution Retirement Plan

For Occupational Death & Disability and Retiree Medical Benefits

Actuarial Valuation Report

As of June 30, 2021

January 2022

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January 7, 2022

State of Alaska
The Alaska Retirement Management Board
The Department of Revenue, Treasury Division
The Department of Administration, Division of Retirement and Benefits
P.O. Box 110203
Juneau, AK 99811-0203

Certification of Actuarial Valuation

Dear Members of The Alaska Retirement Management Board, The Department of Revenue and The Department of Administration:

This report summarizes the annual actuarial valuation results of the State of Alaska Teachers' Retirement System Defined Contribution Retirement (TRS DCR) Plan as of June 30, 2021 performed by Buck Global, LLC (Buck).

The actuarial valuation is based on financial information provided in the financial statements audited by KPMG LLP, member data provided by the Division of Retirement and Benefits, and medical enrollment data provided by the healthcare claims administrator (Aetna), as summarized in this report. The benefits considered are those delineated in Alaska statutes effective June 30, 2021. The actuary did not verify the data submitted, but did perform tests for consistency and reasonableness.

All costs, liabilities and other factors under TRS DCR were determined in accordance with generally accepted actuarial principles and procedures. An actuarial cost method is used to measure the actuarial liabilities which we believe is reasonable. Buck is solely responsible for the actuarial data and actuarial results presented in this report. This report fully and fairly discloses the actuarial position of TRS DCR as of June 30, 2021.

TRS DCR is funded by Employer Contributions in accordance with the funding policy adopted by the Alaska Retirement Management Board (Board). The funding objective for TRS DCR is to pay required contributions that remain level as a percent of TRS DCR compensation. The Board has also established a funding policy objective that the required contributions be sufficient to pay the Normal Costs of active plan members, plan expenses, and amortize the Unfunded Actuarial Accrued Liability as a level percent of TRS DCR compensation over closed layered 25-year periods. This objective is currently being met and is projected to continue to be met as required by the Alaska State statutes. Absent future gains/losses, actuarially determined contributions are expected to remain level as a percent of pay and the overall funded status is expected to remain at or above 100%.

The Board and staff of the State of Alaska may use this report for the review of the operations of TRS DCR. Use of this report for any other purpose or by anyone other than the Board or staff of the State of Alaska may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without the review by Buck.

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Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the actuarial assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. In particular, retiree group benefits models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of this valuation.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the plan. The actuary performs an analysis of plan experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience. The last full experience analysis was performed for the period July 1, 2013 to June 30, 2017. Based on that experience study, the Board adopted new assumptions effective beginning with the June 30, 2018 valuation to better reflect expected future experience. Based on our annual analysis of recent claims experience, changes were made to the per capita claims cost rates effective June 30, 2021 to better reflect expected future healthcare experience. A summary of the actuarial assumptions and methods used in this actuarial valuation is shown in Sections 4.2 and 4.3. We certify that the assumptions and methods described in Sections 4.2 and 4.3 of this report meet the requirements of all applicable Actuarial Standards of Practice.

Governmental Accounting Standards Board (GASB) Statement No. 74 (GASB 74) was effective for TRS DCR beginning with fiscal year ending June 30, 2017, and GASB 75 was effective beginning with fiscal year ending June 30, 2018. Separate GASB 74 and GASB 75 reports have been prepared.

Assessment of Risks

Actuarial Standard of Practice No. 51 (ASOP 51) applies to actuaries performing funding calculations related to a pension plan. ASOP 51 does not apply to actuaries performing services in connection with other post-employment benefits, such as medical benefits. Accordingly, ASOP 51 does not apply to the retiree medical portion of TRS DCR. We also believe ASOP 51 does not apply to the occupational death & disability portion of TRS DCR. Therefore, information related to ASOP 51 is not included in this report. However, it may be beneficial to review the ASOP 51 information provided in the TRS valuation report for information on risks that may also relate to the occupational death & disability benefits provided by this plan.

Use of Models

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding methods specified in this report. The output from the third-party vendor software is used as input to an internally developed model that applies applicable funding methods and policies to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal model are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts

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within Buck who are familiar with applicable funding methods, as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking and review are completed. Significant changes to the internal model that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

Buck used manual rate models to determine relative plan values for the defined benefit (DB) retiree medical plan and the DCR retiree medical plan, and to reflect the different Medicare coordination methods between the two plans. The manual rate models are intended to provide benchmark data and pricing capabilities, calculate per capita costs, and calculate actuarial values of different commercial health plans. Buck relied on the models, which were developed using industry data by actuaries and consultants at OptumInsight.

COVID-19

The potential impact of the ongoing COVID-19 pandemic on costs and liabilities was considered and an adjustment was made in setting the medical per capita claims cost assumption. FY20 medical claims were adjusted for a COVID-19 related decline in claims during the last four months (March – June) of FY20. FY21 medical claims were adjusted for a COVID-19 related decline in those claims during the fiscal year. A more detailed explanation on these adjustments is shown in Sections 4.2 and 4.3 and in the valuation report for the DB plan.

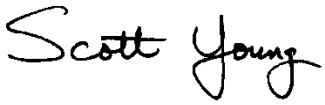
This report was prepared under my supervision and in accordance with all applicable Actuarial Standards of Practice. I am a Fellow of the Society of Actuaries, an Enrolled Actuary, a Fellow of the Conference of Consulting Actuaries, and a Member of the American Academy of Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

I am available to discuss this report with you at your convenience. I can be reached at 602-803-6174.

Respectfully submitted,

David J. Kershner, FSA, EA, MAAA, FCA
Principal
Buck

The undersigned actuary is responsible for all assumptions related to the average annual per capita health claims cost and the health care cost trend rates, and hereby affirms his qualification to render opinions in such matters in accordance with the Qualification Standards of the American Academy of Actuaries.



Scott Young, FSA, EA, MAAA, FCA
Director
Buck

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Executive Summary

Overview

The State of Alaska Teachers' Retirement System Defined Contribution Retirement (TRS DCR) Plan provides occupational death & disability and retiree medical benefits to teachers and other eligible members hired after June 30, 2006 or who have elected participation in this plan. The Commissioner of the Department of Administration is responsible for administering the plan. The Alaska Retirement Management Board has fiduciary responsibility over the assets of the plan. This report presents the results of the actuarial valuation of TRS DCR as of the valuation date of June 30, 2021.

Purpose

An actuarial valuation is performed on the plan annually as of the end of the fiscal year. The main purposes of the actuarial valuation detailed in this report are:

1. To determine the Employer contribution necessary to meet the Board's funding policy for the plan;
2. To disclose the funding assets and liability measures as of the valuation date;
3. To review the current funded status of the plan and assess the funded status as an appropriate measure for determining actuarially determined contributions;
4. To compare actual and expected experience under the plan during the last fiscal year; and
5. To report trends in contributions, assets, liabilities, and funded status over the last several years.

The actuarial valuation provides a "snapshot" of the funded position of TRS DCR based on the plan provisions, membership data, assets, and actuarial methods and assumptions as of the valuation date.

Funded Status

Where presented, references to "funded ratio" and "unfunded actuarial accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Funded Status as of June 30 ($'s in 000's)		2020	2021
Occupational Death & Disability			
a.	Actuarial Accrued Liability	$ 223	$ 205
b.	Valuation Assets	4,933	5,843
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ (4,710)	$ (5,638)
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	2,212.1%	2,850.2%
e.	Fair Value of Assets	$ 4,823	$ 6,623
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	2,162.8%	3,230.7%

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Funded Status as of June 30 ($'s in 000's)		2020	2021
Retiree Medical			
a.	Actuarial Accrued Liability	$ 40,634	$ 44,396
b.	Valuation Assets	49,554	59,380
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ (8,920)	$ (14,984)
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	122.0%	133.8%
e.	Fair Value of Assets	$ 48,413	$ 67,278
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	119.1%	151.5%
Total			
a.	Actuarial Accrued Liability	$ 40,857	$ 44,601
b.	Valuation Assets	54,487	65,223
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ (13,630)	$ (20,622)
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	133.4%	146.2%
e.	Fair Value of Assets	$ 53,236	$ 73,901
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	130.3%	165.7%

The key reasons for the change in the funded status are explained below. The funded status for healthcare benefits is not necessarily an appropriate measure to confirm that assets are sufficient to settle health plan obligations as there are no available financial instruments for purchase. Future experience is likely to vary from assumptions so there is potential for actuarial gains or losses.

1. **Investment Experience**

   The approximate FY21 investment return based on fair value of assets was 29.5% compared to the expected investment return of 7.38% (net of investment expenses of approximately 0.29%). This resulted in a gain of approximately $12,235,000 to the plan from investment experience. The asset valuation method recognizes 20% of this gain ($2,447,000) this year and an additional 20% in each of the next 4 years. In addition, 20% of the FY17 investment gain, 20% of the FY18 investment loss, 20% of the FY19 investment loss, and 20% of the FY20 investment loss were recognized this year. The approximate FY21 asset return based on actuarial value of assets was 11.3% compared to the expected asset return of 7.38% (net of investment expenses).

2. **Salary Increases**

   Salary increases for continuing active members during FY21 were higher than anticipated based on the valuation assumptions, resulting in a liability loss of approximately $1,000.

3. **Demographic Experience**

   The number of active members increased 3.5% from 5,332 at June 30, 2020 to 5,521 at June 30, 2021. The average age of active members increased from 41.63 to 41.90 and average credited service increased from 6.03 to 6.34 years.

   The demographic experience gains/losses are shown on page 4.

4. **Retiree Medical Claims Experience**

   Please refer to the State of Alaska Teachers' Retirement System (TRS) Defined Benefit Plan Actuarial Valuation Report as of June 30, 2021 for a full description of the assumptions and costs of the retiree medical plan. Adjustments to these costs and assumptions are described in this report.

   The recent claims experience described in Section 4.2 of this report (Section 5.2 of the TRS report) created an actuarial gain of approximately $1,883,000.

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5. **Changes in Methods Since the Prior Valuation**

   There were no changes in actuarial methods since the prior valuation.

6. **Changes in Assumptions Since the Prior Valuation**

   Healthcare claim costs are updated annually as described in Section 4.2. The amounts included in Normal Cost for administrative expenses were updated based on the last two years of actual administrative expenses paid from plan assets. There were no other changes in actuarial assumptions since the prior valuation.

7. **Changes in Benefit Provisions Since the Prior Valuation**

   Starting in 2022, prior authorization will be required for certain specialty medications. This change created an actuarial gain of approximately $528,000. There have been no other changes in benefit provisions valued since the prior valuation.

Comparative Summary of Contribution Rates

Occupational Death & Disability	FY 2023	FY 2024
a. Employer Normal Cost Rate	0.08%	0.08%
b. Past Service Cost Rate	(0.10)%	(0.11)%
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	0.08%	0.08%

Retiree Medical	FY 2023	FY 2024
a. Employer Normal Cost Rate	0.87%	0.82%
b. Past Service Cost Rate	(0.14)%	(0.22)%
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	0.87%	0.82%

Total	FY 2023	FY 2024
a. Employer Normal Cost Rate	0.95%	0.90%
b. Past Service Cost Rate	(0.24)%	(0.33)%
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	0.95%	0.90%

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The exhibit below shows the historical Board-adopted employer contribution rates for TRS DCR.

		Total Employer Contribution Rate		
Valuation Date	Fiscal Year	Occupational Death & Disability	Retiree Medical	Total
June 30, 2010	FY13	0.00%	0.49%	0.49%
June 30, 2011	FY14	0.00%	0.47%	0.47%
June 30, 2012	FY15	0.00%	2.04%	2.04%
June 30, 2013	FY16	0.00%	2.04%	2.04%
June 30, 2014	FY17	0.00%	1.05%	1.05%
June 30, 2015	FY18	0.00%	0.91%	0.91%
June 30, 2016	FY19	0.08%	0.79%	0.87%
June 30, 2017	FY20	0.08%	1.09%	1.17%
June 30, 2018	FY21	0.08%	0.93%	1.01%
June 30, 2019	FY22	0.08%	0.83%	0.91%
June 30, 2020	FY23	0.08%	0.87%	0.95%
June 30, 2021	FY24	TBD	TBD	TBD

Summary of Actuarial Accrued Liability Gain/(Loss)

The following table shows the FY21 gain/(loss) on actuarial accrued liability as of June 30, 2021 ($'s in 000's):

	Occupational Death & Disability	Retiree Medical	Total
Retirement Experience	$ 0	$ 550	$ 550
Termination Experience	(7)	2,361	2,354
Disability Experience	219	(57)	162
Active Mortality Experience	107	(9)	98
Inactive Mortality Experience	(1)	(30)	(31)
Salary Increases	(1)	N/A	(1)
New Entrants	0	(581)	(581)
Rehires	1	(2,038)	(2,037)
Benefit Payments Different than Expected	18	(101)	(83)
Per Capita Claims Costs	N/A	1,883	1,883
Prescription Drug Plan Changes	N/A	528	528
Miscellaneous[1]	8	195	203
Total	$ 344	$ 2,701	$ 3,045

[1] Includes the effects of various data changes that are typical when new census data is received for the annual valuation, as well as other items that do not fit neatly into any of the other categories.

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Section 1: Actuarial Funding Results

Section 1.1: Actuarial Liabilities and Normal Cost ($'s in 000's)

As of June 30, 2021	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Occupational Death Benefits	$ 844	$ 94
Occupational Disability Benefits	1,407	(66)
Medical and Prescription Drug Benefits	83,777	54,549
Medicare Part D Subsidy	(17,536)	(11,418)
Subtotal	$ 68,492	$ 43,159
Benefit Recipients		
Survivor Benefits	$ 0	$ 0
Disability Benefits	177	177
Medical and Prescription Drug Benefits	1,600	1,600
Medicare Part D Subsidy	(335)	(335)
Subtotal	$ 1,442	$ 1,442
Total	**$ 69,934**	**$ 44,601**
Total Occupational Death & Disability	**$ 2,428**	**$ 205**
Total Retiree Medical, Net of Part D Subsidy	**$ 67,506**	**$ 44,396**
Total Retiree Medical, Gross of Part D Subsidy	**$ 85,377**	**$ 56,149**

As of June 30, 2021	Normal Cost
Active Members	
Occupational Death Benefits	$ 118
Occupational Disability Benefits	217
Medical and Prescription Drug Benefits	4,361
Medicare Part D Subsidy	(913)
Subtotal	$ 3,783
Administrative Expense Load	
Occupational Death & Disability	$ 5
Retiree Medical	22
Subtotal	$ 27
Total	**$ 3,810**
Total Occupational Death & Disability	**$ 340**
Total Retiree Medical, Net of Part D Subsidy	**$ 3,470**
Total Retiree Medical, Gross of Part D Subsidy	**$ 4,383**

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Section 1.2: Actuarial Contributions as of June 30, 2021 for FY24 ($'s in 000's)

Normal Cost Rate	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	$ 340	$ 3,470	$ 3,810
2. DCR Plan Rate Payroll Projected for FY22	423,783	423,783	423,783
3. Employer Normal Cost Rate, (1) ÷ (2)	0.08%	0.82%	0.90%

Past Service Cost Rate			
1. Actuarial Accrued Liability	$ 205	$ 44,396	$ 44,601
2. Valuation Assets	5,843	59,380	65,223
3. Unfunded Actuarial Accrued Liability, (1) - (2)	$ (5,638)	$ (14,984)	$ (20,622)
4. Funded Ratio based on Valuation Assets	2,850.2%	133.8%	146.2%
5. Past Service Cost Amortization Payment	(448)	(934)	(1,382)
6. DCR Plan Rate Payroll Projected for FY22	423,783	423,783	423,783
7. Past Service Cost Rate, (5) ÷ (6)	(0.11%)	(0.22%)	(0.33%)
Total Employer Contribution Rate, not less than Normal Cost Rate	**0.08%**	**0.82%**	**0.90%**

The table below shows the total employer contribution rate based on total DB and DCR Plan payroll for informational purposes.

Total Employer Contribution Rate as Percent of Total Payroll	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	$ 340	$ 3,470	$ 3,810
2. Total DB and DCR Plan Rate Payroll Projected for FY22	750,334	750,334	750,334
3. Employer Normal Cost Rate, (1) ÷ (2)	0.05%	0.46%	0.51%
4. Past Service Cost Amortization Payment	(448)	(934)	(1,382)
5. Past Service Cost Rate, (4) ÷ (2)	(0.06%)	(0.12%)	(0.18%)
Total Employer Contribution Rate, not less than Normal Cost Rate	**0.05%**	**0.46%**	**0.51%**

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Schedule of Past Service Cost Amortizations - Occupational Death & Disability ($'s in 000's)

Layer	Amortization Period		Balances		
	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2007	11	$ 16	$ 14	$ 2
FY08 Gain	06/30/2008	12	(392)	(367)	(39)
Change in Assumptions	06/30/2009	13	(82)	(78)	(8)
FY09 Gain	06/30/2009	13	(594)	(577)	(57)
Change in Assumptions	06/30/2010	14	(7)	(8)	(1)
FY10 Gain	06/30/2010	14	(479)	(472)	(44)
FY11 Gain	06/30/2011	15	(560)	(559)	(50)
FY12 Gain	06/30/2012	16	(129)	(131)	(11)
FY13 Gain	06/30/2013	17	(149)	(150)	(12)
Change in Assumptions	06/30/2014	18	(50)	(53)	(4)
PRPA Modification	06/30/2014	18	(25)	(25)	(2)
FY14 Gain	06/30/2014	18	(255)	(260)	(20)
FY15 Gain	06/30/2015	19	(275)	(280)	(21)
FY16 Gain	06/30/2016	20	(209)	(215)	(16)
FY17 Gain	06/30/2017	21	(251)	(253)	(18)
Change in Assumptions[1]	06/30/2018	22	0	0	0
FY18 Gain	06/30/2018	22	(257)	(259)	(18)
FY19 Gain	06/30/2019	23	(338)	(340)	(23)
FY20 Gain	06/30/2020	24	(637)	(640)	(42)
FY21 Gain	06/30/2021	25	(985)	(985)	(64)
Total				**$ (5,638)**	**$ (448)**

[1] The net effect of changing assumptions was less than $1,000.

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Schedule of Past Service Cost Amortizations - Retiree Medical ($'s in 000's)

Layer	Amortization Period		Balances		
	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2007	11	$ (239)	$ (221)	$ (25)
Change in Assumptions	06/30/2008	12	84	83	9
FY08 Gain	06/30/2008	12	(393)	(367)	(39)
Change in Assumptions	06/30/2009	13	(69)	(66)	(7)
FY09 Gain	06/30/2009	13	(281)	(274)	(27)
Change in Assumptions[1]	06/30/2010	14	0	0	0
FY10 Gain	06/30/2010	14	(545)	(537)	(50)
FY11 Gain	06/30/2011	15	(94)	(92)	(8)
Change in Assumptions	06/30/2012	16	11,518	11,654	993
FY12 Gain	06/30/2012	16	(60)	(57)	(5)
FY13 Loss	06/30/2013	17	3,439	3,506	287
Change in Assumptions	06/30/2014	18	(9,736)	(9,951)	(783)
FY14 Loss	06/30/2014	18	1,616	1,650	130
FY15 Gain	06/30/2015	19	(3,485)	(3,562)	(271)
EGWP Impact	06/30/2016	20	(6,400)	(6,528)	(480)
FY16 Loss	06/30/2016	20	958	980	72
Change in Assumptions	06/30/2017	21	7,645	7,761	554
FY17 Gain	06/30/2017	21	(1,451)	(1,473)	(105)
Change in Assumptions/Methods	06/30/2018	22	(9,505)	(9,585)	(666)
FY18 Loss	06/30/2018	22	2,491	2,512	174
FY19 Gain	06/30/2019	23	(4,904)	(4,941)	(334)
Change in Assumptions	06/30/2020	24	2,153	2,163	143
FY20 Gain	06/30/2020	24	(1,655)	(1,662)	(110)
Prescription Drug Plan Changes	06/30/2021	25	(528)	(528)	(34)
FY21 Gain	06/30/2021	25	(5,449)	(5,449)	(352)
Total				**$ (14,984)**	**$ (934)**

[1] The net effect of changing assumptions was less than $1,000. The demographic assumption changes decreased liability by $133,000 and the economic assumptions changes increased the liability by $133,000. Therefore, the net effect of all assumptions changes is $0 for amortization purposes.

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Schedule of Past Service Cost Amortizations - Total ($'s in 000's)

Layer	Amortization Period		Balances		
	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2007	11	$ (223)	$ (207)	$ (23)
Change in Assumptions	06/30/2008	12	84	83	9
FY08 Gain	06/30/2008	12	(785)	(734)	(78)
Change in Assumptions	06/30/2009	13	(151)	(144)	(15)
FY09 Gain	06/30/2009	13	(875)	(851)	(84)
Change in Assumptions	06/30/2010	14	(7)	(8)	(1)
FY10 Gain	06/30/2010	14	(1,024)	(1,009)	(94)
FY11 Gain	06/30/2011	15	(654)	(651)	(58)
Change in Assumptions	06/30/2012	16	11,518	11,654	993
FY12 Gain	06/30/2012	16	(189)	(188)	(16)
FY13 Loss	06/30/2013	17	3,290	3,356	275
Change in Assumptions	06/30/2014	18	(9,786)	(10,004)	(787)
PRPA Modification	06/30/2014	18	(25)	(25)	(2)
FY14 Loss	06/30/2014	18	1,361	1,390	110
FY15 Gain	06/30/2015	19	(3,760)	(3,842)	(292)
EGWP Impact	06/30/2016	20	(6,400)	(6,528)	(480)
FY16 Loss	06/30/2016	20	749	765	56
Change in Assumptions	06/30/2017	21	7,645	7,761	554
FY17 Gain	06/30/2017	21	(1,702)	(1,726)	(123)
Change in Assumptions/Methods	06/30/2018	22	(9,505)	(9,585)	(666)
FY18 Loss	06/30/2018	22	2,234	2,253	156
FY19 Gain	06/30/2019	23	(5,242)	(5,281)	(357)
Change in Assumptions	06/30/2020	24	2,153	2,163	143
FY20 Gain	06/30/2020	24	(2,292)	(2,302)	(152)
Prescription Drug Plan Changes	06/30/2021	25	(528)	(528)	(34)
FY21 Gain	06/30/2021	25	(6,434)	(6,434)	(416)
Total				**$ (20,622)**	**$ (1,382)**

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Section 1.3: Actuarial Gain/(Loss) for FY21 ($'s in 000's)

	Occupational Death & Disability	Retiree Medical	Total
1. Expected Actuarial Accrued Liability			
a. Actuarial Accrued Liability as of June 30, 2020	$ 223	$ 40,634	$ 40,857
b. Normal Cost	312	3,388	3,700
c. Interest on (a) and (b) at 7.38%	39	3,249	3,288
d. Employer Group Waiver Plan	0	3	3
e. Benefit Payments	(24)	(171)	(195)
f. Interest on (d) and (e) at 7.38%, adjusted for timing	(1)	(6)	(7)
g. Assumption/Method Changes	0	0	0
h. Expected Actuarial Accrued Liability as of June 30, 2021 (a) + (b) + (c) + (d) + (e) + (f) + (g)	$ 549	$ 47,097	$ 47,646
2. Actual Actuarial Accrued Liability as of June 30, 2021	205	44,396	44,601
3. Liability Gain/(Loss), (1)(h) - (2)	**$ 344**	**$ 2,701**	**$ 3,045**
4. Expected Actuarial Asset Value			
a. Actuarial Asset Value as of June 30, 2020	$ 4,933	$ 49,554	$ 54,487
b. Interest on (a) at 7.38%	364	3,657	4,021
c. Employer Contributions	362	4,217	4,579
d. Employer Group Waiver Plan	0	3	3
e. Interest on (c) and (d) at 7.38%, adjusted for timing	13	153	166
f. Benefit Payments	(24)	(171)	(195)
g. Administrative Expenses	(9)	(34)	(43)
h. Interest on (f) and (g) at 7.38%, adjusted for timing	(1)	(7)	(8)
i. Expected Actuarial Asset Value as of June 30, 2021 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	$ 5,638	$ 57,372	$ 63,010
5. Actuarial Asset Value as of June 30, 2021	5,843	59,380	65,223
6. Actuarial Asset Gain/(Loss), (5) - (4)(i)	**$ 205**	**$ 2,008**	**$ 2,213**
7. Total Actuarial Gain/(Loss), (3) + (6)	**$ 549**	**$ 4,709**	**$ 5,258**
8. Contribution Gain/(Loss)	**$ 445**	**$ 1,295**	**$ 1,740**
9. Administrative Expense Gain/(Loss)	**$ (9)**	**$ (27)**	**$ (36)**
10. FY21 Gain/(Loss), (7) + (8) + (9)	**$ 985**	**$ 5,977**	**$ 6,962**

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Section 1.4: History of Unfunded Liability and Funded Ratio ($'s in 000's)

Valuation Date	Total Actuarial Accrued Liability	Valuation Assets	Assets as a Percent of Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability (UAAL)
June 30, 2007	$ 374	$ 597	159.7%	$ (223)
June 30, 2008	801	1,728	215.7%	(927)
June 30, 2009	1,460	3,424	234.5%	(1,964)
June 30, 2010	2,448	5,472	223.5%	(3,024)
June 30, 2011	3,858	7,566	196.1%	(3,708)
June 30, 2012	16,874	9,285	55.0%	7,589
June 30, 2013	22,138	11,146	50.3%	10,992
June 30, 2014	16,296	13,611	83.5%	2,685
June 30, 2015	19,797	20,847	105.3%	(1,050)
June 30, 2016	22,007	28,733	130.6%	(6,726)
June 30, 2017	33,707	34,586	102.6%	(879)
June 30, 2018	32,459	40,621	125.1%	(8,162)
June 30, 2019	33,221	46,666	140.5%	(13,445)
June 30, 2020	40,857	54,487	133.4%	(13,630)
June 30, 2021	44,601	65,223	146.2%	(20,622)

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Section 2: Plan Assets

Section 2.1: Summary of Fair Value of Assets ($'s in 000's)

As of June 30, 2021	Occupational Death & Disability	Retiree Medical	Total	Allocation Percent
Cash and Short-Term Investments				
- Cash and Cash Equivalents	$ 75	$ 757	$ 832	1.1%
- Subtotal	$ 75	$ 757	$ 832	1.1%
Fixed Income Investments				
- Domestic Fixed Income Pool	$ 1,336	$ 13,569	$ 14,905	20.2%
- International Fixed Income Pool	0	0	0	0.0%
- Tactical Fixed Income Pool	0	0	0	0.0%
- High Yield Pool	0	0	0	0.0%
- Treasury Inflation Protection Pool	0	0	0	0.0%
- Emerging Debt Pool	0	0	0	0.0%
- Subtotal	$ 1,336	$ 13,569	$ 14,905	20.2%
Equity Investments				
- Domestic Equity Pool	$ 1,809	$ 18,359	$ 20,168	27.4%
- International Equity Pool	997	10,118	11,115	15.1%
- Private Equity Pool	981	9,956	10,937	14.9%
- Emerging Markets Equity Pool	212	2,150	2,362	3.2%
- Alternative Equity Strategies	385	3,910	4,295	5.8%
- Subtotal	$ 4,384	$ 44,493	$ 48,877	66.4%
Other Investments				
- Real Estate Pool	$ 406	$ 4,124	$ 4,530	6.2%
- Other Investments Pool	406	4,115	4,521	6.1%
- Absolute Return Pool	0	0	0	0.0%
- Other Assets	0	0	0	0.0%
- Subtotal	$ 812	$ 8,239	$ 9,051	12.3%
Total Cash and Investments	$ 6,607	$ 67,058	$ 73,665	100.0%
Net Accrued Receivables	16	220	236	
Net Assets	$ 6,623	$ 67,278	$ 73,901	

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Section 2.2: Changes in Fair Value of Assets During FY21 ($'s in 000's)

Fiscal Year 2021	Occupational Death & Disability	Retiree Medical	Total
1. Fair Value of Assets as of June 30, 2020	$ 4,823	$ 48,413	$ 53,236
2. Additions:			
a. Member Contributions	$ 0	$ 0	$ 0
b. Employer Contributions	362	4,217	4,579
c. Interest and Dividend Income	70	707	777
d. Net Appreciation/(Depreciation) in Fair Value of Investments	1,415	14,279	15,694
e. Employer Group Waiver Plan	0	3	3
f. Other	0	2	2
g. Total Additions	$ 1,847	$ 19,208	$ 21,055
3. Deductions:			
a. Medical Benefits	$ 0	$ 171	$ 171
b. Death & Disability Benefits	24	0	24
c. Investment Expenses	14	138	152
d. Administrative Expenses	9	34	43
e. Total Deductions	$ 47	$ 343	$ 390
4. Fair Value of Assets as of June 30, 2021	$ 6,623	$ 67,278	$ 73,901
5. Approximate Fair Value Investment Return Rate during FY21 Net of Investment Expenses	29.5%	29.5%	29.5%

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Section 2.3: Development of Actuarial Value of Assets ($'s in 000's)

The actuarial value of assets and the fair value were $0 at June 30, 2006. Investment gains and losses are recognized 20% per year over 5 years. In no event may valuation assets be less than 80% or more than 120% of fair value as of the current valuation date.

	Occupational Death & Disability	Retiree Medical	Total
1. Investment Gain/(Loss) for FY21			
a. Fair Value as of June 30, 2020	$ 4,823	$ 48,413	$ 53,236
b. Contributions	362	4,217	4,579
c. Employer Group Waiver Plan	0	3	3
d. Benefit Payments	24	171	195
e. Administrative Expenses	9	34	43
f. Actual Investment Return (net of investment expenses)	1,471	14,850	16,321
g. Expected Return Rate (net of investment expenses)	7.38%	7.38%	7.38%
h. Expected Return	368	3,718	4,086
i. Investment Gain/(Loss) for the Year (f) - (h)	1,103	11,132	12,235
2. Actuarial Value as of June 30, 2021			
a. Fair Value as of June 30, 2021	$ 6,623	$ 67,278	$ 73,901
b. Deferred Investment Gain/(Loss)	780	7,898	8,678
c. Preliminary Actuarial Value as of June 30, 2021, (a) - (b)	5,843	59,380	65,223
d. Upper Limit: 120% of Fair Value as of June 30, 2021	7,947	80,733	88,680
e. Lower Limit: 80% of Fair Value as of June 30, 2021	5,299	53,823	59,122
f. Actuarial Value at June 30, 2021, (c) limited by (d) and (e)	5,843	59,380	65,223
3. Ratio of Actuarial Value of Assets to Fair Value of Assets	88.2%	88.3%	88.3%
4. Approximate Actuarial Value Investment Return Rate during FY21 Net of Investment Expenses	11.4%	11.3%	11.3%

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The tables below show the development of the gains/(losses) to be recognized in the current year ($'s in 000's):

Occupational Death & Disability				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 143	$ 115	$ 28	$ 0
June 30, 2018	8	6	2	0
June 30, 2019	(48)	(20)	(10)	(18)
June 30, 2020	(140)	(28)	(28)	(84)
June 30, 2021	1,103	0	221	882
Total	**$ 1,066**	**$ 73**	**$ 213**	**$ 780**

Retiree Medical				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 1,184	$ 948	$ 236	$ 0
June 30, 2018	(19)	(12)	(4)	(3)
June 30, 2019	(460)	(184)	(92)	(184)
June 30, 2020	(1,367)	(273)	(273)	(821)
June 30, 2021	11,132	0	2,226	8,906
Total	**$ 10,470**	**$ 479**	**$ 2,093**	**$ 7,898**

Total				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 1,327	$ 1,063	$ 264	$ 0
June 30, 2018	(11)	(6)	(2)	(3)
June 30, 2019	(508)	(204)	(102)	(202)
June 30, 2020	(1,507)	(301)	(301)	(905)
June 30, 2021	12,235	0	2,447	9,788
Total	**$ 11,536**	**$ 552**	**$ 2,306**	**$ 8,678**

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Section 2.4: Historical Asset Rates of Return

	Actuarial Value		Fair Value	
Year Ending	Annual	Cumulative*	Annual	Cumulative*
June 30, 2008	6.4%	6.4%	(0.3%)	(0.3%)
June 30, 2009	3.2%	4.8%	(12.0%)	(6.3%)
June 30, 2010	4.2%	4.6%	6.4%	(2.3%)
June 30, 2011	7.4%	5.3%	18.9%	2.6%
June 30, 2012	6.9%	5.6%	1.6%	2.4%
June 30, 2013	7.7%	6.0%	11.9%	3.9%
June 30, 2014	10.9%	6.6%	18.0%	5.8%
June 30, 2015	9.5%	7.0%	3.1%	5.5%
June 30, 2016	6.5%	6.9%	(0.1%)	4.9%
June 30, 2017	7.6%	7.0%	12.6%	5.6%
June 30, 2018	7.8%	7.1%	8.0%	5.8%
June 30, 2019	6.4%	7.0%	6.2%	5.9%
June 30, 2020	6.3%	7.0%	4.3%	5.7%
June 30, 2021	11.3%	7.3%	29.5%	7.3%

* Cumulative since fiscal year ending June 30, 2008

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Section 3: Member Data

Section 3.1: Summary of Members Included

As of June 30	2017	2018	2019	2020	2021
Active Members					
1. Number	4,694	4,915	4,998	5,332	5,521[1]
2. Average Age	40.21	40.64	41.06	41.63	41.90
3. Average Credited Service	4.88	5.30	5.67	6.03	6.34
4. Average Entry Age	35.33	35.34	35.39	35.60	35.56
5. Average Annual Earnings	$ 66,542	$ 68,119	$ 69,619	$ 71,118	$ 74,045
Disabilitants and Beneficiaries (Occupational Death & Disability)					
1. Number	0	0	1	1	1
2. Average Age	N/A	N/A	53.45	54.45	55.45
3. Average Monthly Death & Disability Benefit	N/A	N/A	$ 2,024	$ 2,024	$ 2,024
Retirees, Surviving Spouses, and Dependent Spouses (Retiree Medical)					
1. Number	4	9	12	17	24
2. Average Age	69.72	68.59	68.54	68.79	67.71
Total Number of Members	**4,698**	**4,924**	**5,011**	**5,350**	**5,546**

Average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

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[1] Includes 1,431 male active members and 4,090 female active members.

Section 3.2: Age and Service Distribution of Active Members

Annual Earnings by Age

Age	Number	Total Annual Earnings	Average Annual Earnings
0 - 19	0	$ 0	$ 0
20 - 24	93	4,820,122	51,829
25 - 29	582	35,233,778	60,539
30 - 34	913	62,245,631	68,177
35 - 39	1,122	84,044,406	74,906
40 - 44	897	68,120,327	75,942
45 - 49	632	50,198,959	79,429
50 - 54	521	41,787,962	80,207
55 - 59	404	32,949,416	81,558
60 - 64	245	20,049,134	81,833
65 - 69	87	7,203,861	82,803
70 - 74	21	1,709,445	81,402
75+	4	441,677	110,419
Total	**5,521**	**$ 408,804,718**	**$ 74,045**

Annual Earnings by Credited Service

Years of Service	Number	Total Annual Earnings	Average Annual Earnings
0	134	$ 7,688,581	$ 57,377
1	677	42,392,282	62,618
2	549	36,410,038	66,321
3	516	35,912,821	69,598
4	442	30,921,457	69,958
0 - 4	**2,318**	**$ 153,325,179**	**$ 66,145**
5 - 9	1,864	141,448,230	75,884
10 - 14	1,221	103,476,219	84,747
15 - 19	116	10,364,704	89,351
20 - 24	2	190,386	95,193
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	0	0	0
40+	0	0	0
Total	**5,521**	**$ 408,804,718**	**$ 74,045**

Years of Credited Service by Age

	Years of Service									
Age	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+	Total
0 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	93	0	0	0	0	0	0	0	0	93
25 - 29	485	97	0	0	0	0	0	0	0	582
30 - 34	426	428	59	0	0	0	0	0	0	913
35 - 39	336	405	367	14	0	0	0	0	0	1,122
40 - 44	317	295	255	29	1	0	0	0	0	897
45 - 49	216	207	188	21	0	0	0	0	0	632
50 - 54	173	181	151	15	1	0	0	0	0	521
55 - 59	140	132	116	16	0	0	0	0	0	404
60 - 64	90	77	60	18	0	0	0	0	0	245
65 - 69	30	34	20	3	0	0	0	0	0	87
70 - 74	11	7	3	0	0	0	0	0	0	21
75+	1	1	2	0	0	0	0	0	0	4
Total	**2,318**	**1,864**	**1,221**	**116**	**2**	**0**	**0**	**0**	**0**	**5,521**

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

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Section 3.3: Member Data Reconciliation

	Actives	Retirees and Surviving Spouses	Dependent Spouses	OD&D Disabilitants	OD&D Beneficiaries	Total
As of June 30, 2020 [1]	**5,332**	**14**	**3**	**1**	**0**	**5,350**
New Entrants	702	0	0	0	0	702
Rehires	230	0	0	0	0	230
Vested Terminations	(308)	0	0	0	0	(308)
Non-Vested Terminations	(384)	0	0	0	0	(384)
Refund of Contributions	(41)	0	0	0	0	(41)
Disability Retirements	0	0	0	0	0	0
Age Retirements	(6)	6	2	0	0	2
Deaths With Beneficiary	0	0	0	0	0	0
Deaths Without Beneficiary	(8)	0	0	0	0	(8)
Data Corrections	4	0	(1)	0	0	3
Net Change	**189**	**6**	**1**	**0**	**0**	**196**
As of June 30, 2021 [2]	**5,521**	**20**	**4**	**1**	**0**	**5,546**

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[1] 125 participants are expected to receive retiree medical benefits in a different plan and are included for OD&D benefits only.

[2] 128 participants are expected to receive retiree medical benefits in a different plan and are included for OD&D benefits only.

Section 3.4: Schedule of Active Member Data

Valuation Date	Number	Annual Earnings (000's)	Annual Average Earnings	Percent Increase in Average Earnings	Number of Participating Employers
June 30, 2021	5,521	$ 408,805	$ 74,045	4.1%	57
June 30, 2020	5,332	379,201	71,118	2.2%	57
June 30, 2019	4,998	347,957	69,619	2.2%	57
June 30, 2018	4,915	334,803	68,119	2.4%	57
June 30, 2017	4,694	312,347	66,542	2.0%	57
June 30, 2016	4,383	285,854	65,219	2.5%	58
June 30, 2015	4,095	260,584	63,635	2.7%	58
June 30, 2014	3,547	219,701	61,940	2.4%	58
June 30, 2013	3,272	197,944	60,496	3.5%	58
June 30, 2012	3,057	178,761	58,476	4.7%	58

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

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Section 3.5: Active Member Payroll Reconciliation

Payroll Field	Payroll Data (000's)
a) DRB actual reported salaries FY21 in employer list	$ 451,880
b) DRB actual reported salaries FY21 in valuation data	401,736
c) Annualized valuation data	408,805
d) Valuation payroll as of June 30, 2021	427,762
e) Rate payroll for FY22	423,783

a) Actual reported salaries from DRB employer listing showing all payroll paid during FY21, including those who were not active as of June 30, 2021
b) Payroll from valuation data for people who are in active status as of June 30, 2021
c) Payroll from (b) annualized for both new entrants and part-timers
d) Payroll from (c) with one year of salary scale applied to estimate salaries payable for the upcoming year
e) Payroll from (d) with the part-timer annualization removed

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Section 4: Basis of the Actuarial Valuation

Section 4.1: Summary of Plan Provisions

Effective Date

July 1, 2006, with amendments through June 30, 2021.

Administration of Plan

The Commissioner of Administration or the Commissioner's designee is the administrator of the Plan. The Attorney General of the state is the legal counsel for the Plan and shall advise the administrator and represent the Plan in legal proceedings.

The Alaska Retirement Management Board prescribes policies, adopts regulations, invests the funds, and performs other activities necessary to carry out the provisions of the Plan.

Employers Included

Currently there are 57 employers participating in TRS DCR, including the State of Alaska, 53 school districts, and three other eligible organizations.

Membership

An employee of a participating employer who first enters service on or after July 1, 2006, or a member of the defined benefit plan who works for an employer who began participation on or after July 1, 2006, and meets the following criteria is a member in the Plan:

- Permanent full-time or part-time elementary or secondary teachers, school nurses, or a person in a position requiring a teaching certificate as a condition of hire in a public school of the State of Alaska, the Department of Education and Early Development, or in the Department of Labor and Workforce Development.
- Full-time or part-time teachers at the University of Alaska or persons occupying full-time administrative positions requiring academic standing who are not in the University's Optional Retirement Plan.

Members can convert to TRS DCR if they are an eligible non-vested member of the TRS defined benefit plan whose employer consents to transfers to the defined contribution plan and they elect to transfer his or her account balance to TRS DCR.

Member Contributions

Other than the member-paid premiums discussed later in this section, there are no member contributions for the occupational death & disability and retiree medical benefits.

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Retiree Medical Benefits

- Member must retire directly from the plan to be eligible for retiree medical coverage. Normal retirement eligibility is the earlier of a) 30 years of service or b) Medicare eligible and 10 years of service.
- No subsidized retiree medical benefits are provided until normal retirement eligibility. The member's and any covered dependent's premium is 100% until the member is Medicare eligible. Upon the member's Medicare-eligibility, the required contribution will follow the service-based schedule shown below.
- Coverage cannot be denied except for failure to pay premium.
- Members who are receiving disability benefits or survivors who are receiving monthly survivor benefits are not eligible until the member meets, or would have met if he/she had lived, the normal retirement eligibility requirements.
- The following is a summary of the medical benefit design adopted in July 2016. The plan description below is used for valuation purposes and indicates participant cost-sharing. Please refer to the benefit handbook for more details.

Plan Design Feature	In-Network[1]	Out-of-Network[1] [2]
Deductible (single / family)	$300 / $600	
Medical services (participant share)	20%	40%
Emergency Room Copay (non-emergent use)	$100	$100
Medical Out-of-Pocket Maximum (single / family, including deductible)	$1,500 / $3,000	$3,000 / $6,000
Medicare Coordination	Exclusion	Exclusion
Pharmacy	No Deductible	No Deductible
Retail Generic (per 30-day fill)	20% $10 min / $50 max	
Retail Non-Formulary Brand (per 30-day fill)	25% $25 min / $75 max	40%
Retail Formulary Brand (per 30-day fill)	35% $80 min / $150 max	
Mail-Order Generic	$20 copay	
Mail-Order Non-Formulary Brand	$50 copay	40%
Mail-Order Formulary Brand	$100 copay	
Pharmacy Out-of-Pocket Max (single / family)	$1,000 / $2,000	
Medicare Pharmacy Arrangement	Retiree Drug Subsidy / Employer Group Waiver Plan effective 1/1/2019	
Wellness / Preventative	100% covered, not subject to deductible	20%, after deductible

[1] Section 1.1 of the AlaskaCare Defined Contribution Retiree Benefit Plan states that this health plan shall be updated from time to time to reflect changes in benefits, including annual adjustments to the premium, deductible, coinsurance, medical out-of-pocket limit, and prescription drug out-of-pocket limit.

[2] OON applies only to non-Medicare eligible participants.

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- Buck used manual rate models to determine relative plan values for the defined benefit (DB) retiree medical plan and the DCR retiree medical plan outlined above. We applied the ratio of the DCR retiree medical plan value to the DB retiree medical plan value to the per capita costs determined for each of pre/post-Medicare medical and pharmacy benefits to estimate corresponding values for the DCR retiree medical plan design. These factors are noted in Section 4.3. We further adjusted the Medicare medical manual rate to reflect the Medicare coordination method adopted. The estimated 2022 reimbursements under EGWP were provided by Segal Consulting (who worked with the EGWP administrator, Optum, to develop those estimates). We reflect estimated discounts and pharmacy rebates in the defined benefit medical cost so no further adjustment was needed for the DCR retiree medical plan. The medical network differential is reflected in the relative plan value adjustments.
- Starting in 2022, prior authorization will be required for certain specialty medications. There is no change to the medications that are covered by the plan.
- The retiree medical plan's coverage is supplemental to Medicare. Medicare coordination is described in the DCR Plan Handbook, referred to in the industry as exclusion coordination: Medicare payment is deducted from the Medicare allowable expense and plan parameters are applied to the remaining amount. Starting in 2019, the prescription drug coverage is through a Medicare Part D EGWP arrangement.
- The premium for Medicare-eligible retirees will be based on the member's years of service. The percentage of premium paid by the member is as follows:

Years of Service	Percent of Premium Paid by Member
< 15	30%
15 – 19	25%
20 – 24	20%
25 – 29	15%
30+	10%

- The premium for dependents who are not eligible for Medicare aligns with the member's subsidy. While a member is not Medicare-eligible, premiums are 100% of the estimated cost.
- Members have a separate defined contribution Health Reimbursement Arrangement account, which is not reflected in this valuation, that can be used to pay for premiums or other medical expenses.
- For valuation purposes, retiree premiums were assumed to equal the percentages outlined in the table above times the age-related plan costs. Future premiums calculated and charged to DCR participants will need to be determined reflecting any appropriate adjustments to the defined benefit (DB) plan data because current DB premiums were determined using information based upon enrollment with members who have double coverage.
- Coverage will continue for surviving spouses of covered retired members.

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Occupational Disability Benefits

- Benefit is 40% of salary at date of disability.
- Disability Benefit Adjustment: The disability benefit is increased by 75% of the cost of living increase in the preceding calendar year or 9%, whichever is less.
- Member earns service while on occupational disability.
- Benefits cease when the member becomes eligible for normal retirement at Medicare-eligible age and 10 years of service, or at any age with 30 years of service.
- No subsidized retiree medical benefits are provided until normal retirement eligibility. The member's premium is 100% of the estimated cost until they are Medicare eligible. Medicare-eligible premiums follow the service-based schedule above.

Occupational Death Benefits

- Benefit is 40% of salary.
- Survivor's Pension Adjustment: A survivor's pension is increased by 50% of the cost of living increase in the preceding calendar year or 6%, whichever is less, if the recipient is at least age 60 on July 1, or under age 60 if the recipient has been receiving TRS benefits for at least 8 years as of July 1.
- Benefits cease when the member would have become eligible for normal retirement.
- The period during which the survivor is receiving benefits is counted as service credit toward retiree medical benefits.
- No subsidized retiree medical benefits are provided until the member would have been eligible for normal retirement. The surviving spouse's premium is 100% of the estimated cost until the member would have been Medicare eligible. Medicare-eligible premiums follow the service-based schedule above.

Changes Since the Prior Valuation

Starting in 2022, prior authorization will be required for certain specialty medications. There have been no other changes in TRS DCR benefit provisions valued since the prior valuation.

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Section 4.2: Description of Actuarial Methods and Valuation Procedures

The funding method used in this valuation was adopted by the Board in October 2006, and was modified as part of the experience study for the period July 1, 2013 to June 30, 2017. The asset smoothing method used to determine valuation assets was implemented effective June 30, 2006.

Benefits valued are those delineated in Alaska State statutes as of the valuation date. Changes in State statutes effective after the valuation date are not taken into consideration in setting the assumptions and methods.

Actuarial Cost Method

Liabilities and contributions shown in the report are computed using the Entry Age Normal Actuarial Cost Method, level percent of pay. Each year's difference between actual and expected unfunded actuarial accrued liability is amortized over 25 years as a level percentage of expected payroll.

Cost factors designed to produce annual costs as a constant percentage of each member's expected compensation in each year for death & disability benefits and retiree medical benefits, from the assumed entry age to the last age with a future benefit were applied to the projected benefits to determine the normal cost (the portion of the total cost of the plan allocated to the current year under the method). The normal cost is determined by summing intermediate results for active members and determining an average normal cost rate which is then related to the total DCR Plan payroll of active members. The actuarial accrued liability for active members (the portion of the total cost of the plan allocated to prior years under the method) was determined as the excess of the actuarial present value of projected benefits over the actuarial present value of future normal costs.

The actuarial accrued liability for beneficiaries and disabled members currently receiving benefits (if any) was determined as the actuarial present value of the benefits expected to be paid. No future normal costs are payable for these members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of plan assets measured on the valuation date.

Under this method, experience gains or losses, i.e., decreases or increases in accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

Valuation of Assets

Effective June 30, 2006, the asset valuation method recognizes 20% of the investment gain or loss in each of the current and preceding four years. This method was phased in over five years. Fair Value of Assets was $0 as of June 30, 2006. All assets are valued at fair value. Assets are accounted for on an accrued basis and are taken directly from financial statements audited by KPMG LLP. Valuation assets are constrained to a range of 80% to 120% of the fair value of assets.

Changes in Methods Since the Prior Valuation

There were no changes in the asset or valuation methods since the prior valuation.

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Valuation of Retiree Medical and Prescription Drug Benefits

The methodology used for the valuation of the retiree medical benefits is described in Section 5.2 of the State of Alaska Teachers' Retirement System Defined Benefit Plan Actuarial Valuation Report as of June 30, 2021.

Starting in 2022, prior authorization will be required for certain specialty medications. There is no change to the medications that are covered by the plan. Segal provided an estimate of the impact of this change to the DB retiree health plan cost for calendar year 2022. The DB base claims costs for pre-Medicare prescription drug, Medicare prescription drug, and EGWP were adjusted to reflect this change. Those base claims costs were used for the DCR valuation with further adjustments as noted below. Additionally, starting in 2022, certain common preventive benefits will be covered for the DB plan. However, preventive benefits are already covered under the DCR plan so no adjustment is needed for that change. Therefore, the base claims cost for the DB plan prior to reflecting the addition of preventive benefits was used for the DCR valuation with further adjustments as noted below.

Due to the lack of experience for the DCR retiree medical plan, base claims costs are based on those described in the actuarial valuation as of June 30, 2021 for the Defined Benefit (DB) retiree medical plan covering TRS and PERS. The DB rates were used with some adjustments. The claims costs were adjusted to reflect the differences between the DCR medical plan and the DB medical plan. These differences include network steerage, different coverage levels, different Medicare coordination for medical benefits, and an indexing of the retiree out-of-pocket dollar amounts. To account for higher initial copays, deductibles and out-of-pocket limits, projected FY22 claims costs were reduced 3.1% for medical claims, and 8.9% for prescription drugs. In addition, to account for the difference in Medicare coordination, projected FY22 medical claims costs for Medicare eligible retirees were further reduced 29.5%.

To adjust for the decrease in medical claims due to COVID-19 during the last 4 months of FY20, the per capita cost during the first 8 months was used as the basis for estimating claims that would have occurred in the absence of COVID-19. FY21 experience was also thoroughly reviewed to assess the impact of COVID-19 and whether an adjustment to FY21 claims was appropriate for use in the June 30, 2021 valuation. FY21 medical per capita claims were noticeably lower than expected, so a 4% load was added to the FY21 medical claims used in the per capita claims cost development to better reflect future expected long-term costs of the plan.

No implicit subsidies are assumed. Employees projected to retire with 30 years of service prior to Medicare are valued with commencement deferred to Medicare eligibility, because those members will be required to pay the full plan premium prior to Medicare. Explicit subsidies for disabled and normal retirement are determined using the plan-defined percentages of age-related total projected plan costs, again with no implicit subsidy assumed.

The State transitioned to an Employer Group Waiver Program (EGWP) for DCR participants effective January 1, 2019. The estimated 2022 reimbursements under EGWP were provided by Segal Consulting (who worked with the EGWP administrator, Optum, to develop those estimates).

Healthcare Reform

Healthcare Reform legislation passed on March 23, 2010 included several provisions with potential implications for the State of Alaska Retiree Health Plan liability. Buck evaluated the impact due to these provisions.

Because the State plan is retiree-only, not all provisions are required. Unlimited lifetime benefits and dependent coverage to age 26 are two of these provisions. The adopted DCR plan does not place lifetime limits on benefits, but does restrict dependent child coverage.

The Further Consolidated Appropriations Act, 2020 passed in December 2019 repealed several healthcare-related taxes, including the Cadillac Tax.

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The Tax Cuts and Jobs Act passed in December 2017 included the elimination of the individual mandate penalty and changed the inflation measure for purposes of determining the limits for the High Cost Excise Tax to use chained CPI. It is our understanding the law does not directly impact other provisions of the ACA. While the nullification of the ACA's individual mandate penalty does not directly impact employer group health plans, it could contribute to the destabilization of the individual market and increase the number of uninsured. Such destabilization could translate to increased costs for employers. We have considered this when setting our healthcare cost trend assumptions and will continue to monitor this issue.

We have not identified any other specific provisions of healthcare reform or its potential repeal that would be expected to have a significant impact on the measured obligation. We will continue to monitor legislative activity.

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Section 4.3: Summary of Actuarial Assumptions

The demographic and economic assumptions used in the June 30, 2021 valuation are described below. Unless noted otherwise, these assumptions were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017.

Investment Return

7.38% per year, net of investment expenses.

Salary Scale

Salary scale rates based upon the 2013-2017 actual experience (see Table 1).

Inflation – 2.50% per year.

Productivity – 0.25% per year.

Payroll Growth

2.75% per year (inflation + productivity).

Total Inflation

Total inflation as measured by the Consumer Price Index for urban and clerical workers for Anchorage is assumed to increase 2.50% annually.

Mortality (Pre-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

RP-2014 white-collar employee table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Deaths are assumed to result from occupational causes 15% of the time.

Mortality (Post-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

93% of male and 90% of female rates of RP-2014 white-collar healthy annuitant table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Turnover

Select and ultimate rates based upon the 2013-2017 actual experience (see Table 2).

Disability

Incidence rates based upon the 2013-2017 actual experience (see Table 3).

Disabilities are assumed to be occupational 15% of the time.

Post-disability mortality in accordance with the RP-2014 disabled table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

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Retirement

Retirement rates based upon the 2013-2017 actual experience (see Table 4).

Spouse Age Difference

Males are assumed to be three years older than their wives. Females are assumed to be two years younger than husbands.

Percent Married for Occupational Death & Disability

85% of male members and 75% of female members are assumed to be married at termination from active service.

Dependent Spouse Medical Coverage Election

Applies to members who do not have double medical coverage. 65% of male members and 60% of female members are assumed to be married and cover a dependent spouse.

Part-Time Status

Part-time employees are assumed to earn 0.75 years of service per year.

Per Capita Claims Cost

Sample claims cost rates (before base claims cost adjustments described below) adjusted to age 65 for FY22 medical and prescription drugs are shown below. The prescription drug costs reflect the plan change to require prior authorization for certain specialty medications.

	Medical	Prescription Drugs
Pre-Medicare	$ 15,708	$ 3,375
Medicare Parts A & B	$ 1,619	$ 3,474
Medicare Part D – EGWP	N/A	$ 1,131

Members are assumed to attain Medicare eligibility at age 65. All costs are for the 2022 fiscal year (July 1, 2021 – June 30, 2022).

The EGWP subsidy is assumed to increase in future years by the trend rates shown on the following pages. No future legislative changes or other events are anticipated to impact the EGWP subsidy. If any legislative or other changes occur in the future that impact the EGWP subsidy (which could either increase or decrease the plan's Actuarial Accrued Liability), those changes will be evaluated and quantified when they occur.

Third Party Administrator Fees

$493 per person per year; assumed to increase at 4.5% per year.

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Base Claims Cost Adjustments

Due to higher initial copays, deductibles, out-of-pocket limits and member cost sharing compared to the DB medical plan, the following cost adjustments are applied to the per capita claims cost rates above:

- 0.969 for the pre-Medicare plan.
- 0.674 for both the Medicare medical plan and Medicare coordination method (3.1% reduction for the medical plan and 29.5% reduction for the coordination method).
- 0.911 for the prescription drug plan.

Administrative Expenses

Beginning with the June 30, 2018 valuation, the Normal Cost is increased for administrative expenses expected to be paid from plan assets during the year. The amounts included in the June 30, 2021 Normal Cost, which are based on the average of actual administrative expenses during the last two fiscal years, are $5,000 for occupational death & disability and $22,000 for retiree medical.

Healthcare Cost Trend

The table below shows the rate used to project the cost from the shown fiscal year to the next fiscal year. For example, 6.3% is applied to the FY22 pre-Medicare medical claims costs to get the FY23 medical claims costs.

	Medical Pre-65	Medical Post-65	Prescription Drugs / EGWP
FY22	6.3%	5.4%	7.1%
FY23	6.1%	5.4%	6.8%
FY24	5.9%	5.4%	6.4%
FY25	5.8%	5.4%	6.1%
FY26	5.6%	5.4%	5.7%
FY27-FY40	5.4%	5.4%	5.4%
FY41	5.3%	5.3%	5.3%
FY42	5.2%	5.2%	5.2%
FY43	5.1%	5.1%	5.1%
FY44	5.1%	5.1%	5.1%
FY45	5.0%	5.0%	5.0%
FY46	4.9%	4.9%	4.9%
FY47	4.8%	4.8%	4.8%
FY48	4.7%	4.7%	4.7%
FY49	4.6%	4.6%	4.6%
FY50+	4.5%	4.5%	4.5%

For the June 30, 2014 valuation and later, the updated Society of Actuaries' Healthcare Cost Trend Model is used to project medical and prescription drug costs. This model estimates trend amounts that are projected out for 80 years. The model has been populated with assumptions that are specific to the State of Alaska.

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Aging Factors

Age	Medical	Prescription Drugs
0 – 44	2.0%	4.5%
45 – 54	2.5%	3.5%
55 – 64	2.5%	1.5%
65 – 74	3.0%	2.0%
75 – 84	2.0%	-0.5%
85 – 94	0.3%	-2.5%
95+	0.0%	0.0%

Retiree Medical Participation

Decrement Due to Disability		Decrement Due to Retirement	
Age	Percent Participation	Age	Percent Participation*
< 56	75.0%	55	50.0%
56	77.5%	56	55.0%
57	80.0%	57	60.0%
58	82.5%	58	65.0%
59	85.0%	59	70.0%
60	87.5%	60	75.0%
61	90.0%	61	80.0%
62	92.5%	62	85.0%
63	95.0%	63	90.0%
64	97.5%	64	95.0%
65+	100.0%	65+	**Years of Service**
			< 15 75.0%
			15 – 19 80.0%
			20 – 24 85.0%
			25 – 29 90.0%
			30+ 95.0%

* Participation assumption is a combination of (i) the service-based rates for retirement from employment at age 65+ and (ii) the age-based rates for retirement from employment before age 65. These rates reflect the expected plan election rate that varies by reason for decrement, duration that a member may pay full cost prior to Medicare eligibility, and availability of alternative and/or lower cost options, particularly in the Medicare market. This assumption is based on observed trends in participation from a range of other plans.

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Imputed Data

Data changes from the prior year which are deemed to have immaterial impact on liabilities and contribution rates are assumed to be correct in the current year's client data. Non-vested terminations with appropriate refund dates are assumed to have received a full refund of contributions. Active members with missing salary and service are assumed to be terminated with status based on their vesting percentage.

Changes in Assumptions Since the Prior Valuation

The amounts included in the Normal Cost for administrative expenses were changed from $0 to $5,000 for occupational death & disability, and from $8,000 to $22,000 for retiree medical (based on the most recent two years of actual administrative expenses paid from plan assets). The per capita claims cost assumption is updated annually.

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Table 1: Salary Scale

Years of Service	Percent Increase
0	6.75%
1	6.25%
2	5.75%
3	5.25%
4	4.75%
5	4.25%
6	3.75%
7	3.65%
8	3.55%
9	3.45%
10	3.35%
11	3.25%
12	3.15%
13	3.05%
14	2.95%
15	2.85%
16+	2.75%

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Table 2: Turnover Rates

Select Rates during the First 6 Years of Employment

Years of Service	Male	Female
0	20.70%	21.80%
1	19.55%	18.70%
2	16.10%	15.40%
3	13.80%	13.20%
4	11.50%	11.00%
5	7.32%	8.05%

Ultimate Rates after the First 6 Years of Employment

Age	Male	Female	Age	Male	Female
< 26	9.41%	8.31%	45	9.05%	8.09%
26	9.41%	8.32%	46	8.99%	8.07%
27	9.40%	8.33%	47	8.94%	8.04%
28	9.39%	8.32%	48	8.86%	8.00%
29	9.39%	8.32%	49	8.78%	7.95%
30	9.38%	8.31%	50	8.70%	7.91%
31	9.37%	8.31%	51	8.62%	7.86%
32	9.36%	8.30%	52	8.54%	7.82%
33	9.35%	8.29%	53	8.37%	7.73%
34	9.35%	8.28%	54	8.20%	7.64%
35	9.34%	8.27%	55	8.03%	7.55%
36	9.34%	8.26%	56	7.86%	7.46%
37	9.33%	8.25%	57	7.69%	7.36%
38	9.31%	8.24%	58	7.76%	7.50%
39	9.29%	8.22%	59	7.82%	7.64%
40	9.26%	8.21%	60	7.89%	7.78%
41	9.24%	8.19%	61	7.95%	7.92%
42	9.22%	8.17%	62	8.02%	8.05%
43	9.16%	8.15%	63	8.59%	8.29%
44	9.11%	8.12%	64	9.17%	8.52%
			65+	9.75%	8.75%

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Table 3: Disability Rates

Age	Male	Female
< 31	0.0337%	0.0612%
31	0.0337%	0.0613%
32	0.0337%	0.0613%
33	0.0342%	0.0622%
34	0.0347%	0.0631%
35	0.0353%	0.0641%
36	0.0357%	0.0650%
37	0.0362%	0.0659%
38	0.0371%	0.0674%
39	0.0379%	0.0689%
40	0.0387%	0.0703%
41	0.0395%	0.0718%
42	0.0403%	0.0733%
43	0.0423%	0.0770%
44	0.0443%	0.0806%
45	0.0464%	0.0843%
46	0.0483%	0.0879%
47	0.0504%	0.0916%
48	0.0536%	0.0975%
49	0.0569%	0.1034%
50	0.0601%	0.1093%
51	0.0634%	0.1152%
52	0.0666%	0.1211%
53	0.0746%	0.1356%
54	0.0826%	0.1501%

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Table 4: Retirement Rates

Age	Rate
< 55	2.0%
55	3.0%
56	3.0%
57	3.0%
58	3.0%
59	3.0%
60	5.0%
61	5.0%
62	10.0%
63	5.0%
64	5.0%
65	25.0%
66	25.0%
67	25.0%
68	20.0%
69	20.0%
70+	100.0%

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Glossary of Terms

Actuarial Accrued Liability

Total accumulated cost to fund pension or postemployment benefits arising from service in all prior years.

Actuarial Cost Method

Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension or postemployment plan for a group of plan members to the years of service that give rise to that cost.

Actuarial Present Value of Projected Benefits

Amount which, together with future interest, is expected to be sufficient to pay all future benefits.

Actuarial Valuation

Study of probable amounts of future pension or postemployment benefits and the necessary amount of contributions to fund those benefits.

Actuary

Person who performs mathematical calculations pertaining to pension and insurance benefits based on specific procedures and assumptions.

GASB 74 and 75

Governmental Accounting Standards Board Statement Number 74 amends Number 43 effective for the fiscal year beginning after June 15, 2016 and defines new financial reporting requirements for public postemployment benefit plans. Governmental Accounting Standards Board Statement Number 75 amends Number 45 effective for fiscal years beginning after June 15, 2017 and defines new accounting and financial reporting requirements for employers sponsoring public postemployment benefit plans.

Normal Cost

That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual participant or the plan as a whole.

Rate Payroll

Members' earnings used to determine contribution rates.

Unfunded Actuarial Accrued Liability (UAAL)

The portion of the actuarial accrued liability not offset by plan assets.

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Valuation Payroll

Members' earnings used to determine Normal Cost and Actuarial Accrued Liability.

Vested Benefits

Benefits which are unconditionally guaranteed regardless of employment.

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January 6, 2022

State of Alaska
The Alaska Retirement Management Board
The Department of Revenue, Treasury Division
The Department of Administration, Division of Retirement and Benefits
P.O. Box 110203
Juneau, AK 99811-0203

Re: Judicial Retirement System and National Guard and Naval Militia Retirement System Roll-Forward Actuarial Valuations as of June 30, 2021

Dear Members of The Alaska Retirement Management Board, The Department of Revenue and The Department of Administration:

We have completed the roll-forward actuarial valuations for the State of Alaska Judicial Retirement System (JRS) and the National Guard and Naval Militia Retirement System (NGNMRS) as of June 30, 2021. The valuations have been performed by a projection or "roll forward" of results from the last valuation date of June 30, 2020 to June 30, 2021. Actual asset values as of June 30, 2021 were reflected. A summary of results and description of assumptions and methods are included in this report.

The purposes of these roll-forward valuations are to (i) determine the employer contributions necessary to meet the Board's funding policy for each System, (ii) disclose the funding assets and liability measures as of the valuation date, and (iii) review the current funded status of each System and assess the funded status as an appropriate measure for determining future actuarially determined contributions.

The Board and staff of the State of Alaska may use this report for the review of the operations of JRS and NGNMRS. Use of this report for any other purpose or by anyone other than the Board or staff of the State of Alaska may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without the review by Buck.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the actuarial assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. In particular, retiree group benefits models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of these valuations.

Actuarial Assumptions and Methods

In lieu of collecting new participant data as of June 30, 2021 and performing a full actuarial valuation, the actuarial liabilities are projected or “rolled forward” from the June 30, 2020 valuation date to June 30, 2021 by assuming the actuarial assumptions during the year are exactly realized.

The actuarial value of assets was calculated as of June 30, 2021 using actual assets and cash flows during FY21. The asset valuation method recognizes 20% of the investment gain or loss each year, for a period of five years. Valuation assets are constrained to a range of 80% to 120% of the fair value of assets.

All data, actuarial assumptions, methods, and plan provisions are the same as those shown in the June 30, 2020 valuation reports dated May 20, 2021, with the following exceptions:

- For JRS, the amounts included in the Normal Cost for administrative expenses were changed from $83,000 to $102,000 for pension and from $24,000 to $31,000 for healthcare, based on the most recent two years of actual administrative expenses paid from plan assets.
- For NGNMRS, the amount included in the Normal Cost for administrative expenses was changed from $256,000 to $268,000, based on the most recent two years of actual administrative expenses paid from plan assets.
- For NGNMRS, the June 30, 2020 actuarial accrued liability used for the roll-forward valuation reflects a valuation system coding update that was recommended by the reviewing actuary. This update decreased the June 30, 2020 actuarial accrued liability by $38,250.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of each System and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under each System.

Funded Status

Where presented, references to “funded ratio”, “funded status”, and “unfunded actuarial accrued liability” typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded actuarial accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but make no assessment regarding the funded status of the plans if the plans were to settle (i.e. purchase annuities) for a portion or all of their liabilities.

Summary of Results

The results of the June 30, 2021 roll-forward valuations are shown below (results from the June 30, 2020 valuations are shown for comparison purposes):

	June 30, 2020	June 30, 2021
Judicial Retirement System		
• Funded Status[1]		
o Pension	92.0%	98.6%
o Healthcare	207.6%	211.4%
o Total	100.5%	107.1%
• Employer/State Contribution Rates[2]		
o Pension	63.6%	58.7%
o Healthcare	6.5%	6.5%
o Total	70.1%	65.2%
National Guard and Naval Militia Retirement System		
• Funded Status[1]	191.9%	196.9%
• Actuarially Determined Contribution, not less than zero[3]	$ 0	$ 0

The following table summarizes the FY21 actuarial gains/(losses). Net actuarial gains/losses decrease/increase the unfunded actuarial accrued liability versus what was expected based on the previous valuation.

	JRS	NGNMRS
Asset Gain/(Loss)	$ 9,349,000	$ 1,040,000
Liability Gain/(Loss)	N/A	41,000[4]
Healthcare Benefit Payment Gain/(Loss)	(608,000)	N/A
Contribution Gain/(Loss)	4,665,000	0
Administrative Expense Gain/(Loss)	(19,000)	(41,000)
Total Gain/(Loss)	$ 13,387,000	$ 1,040,000

[1] The funded status shown is based on the actuarial value of assets. The funded status is different based on the fair value of assets.

[2] The June 30, 2020 valuation determined the contribution rates for FY23. The June 30, 2021 valuation determines the contribution rates for FY24. Total contribution rates are not less than the Normal Cost rate.

[3] The June 30, 2020 valuation determined the contribution for FY23. The June 30, 2021 valuation determines the contribution for FY24.

[4] The June 30, 2020 actuarial accrued liability used for the roll-forward valuation reflects a valuation system coding update that was recommended by the reviewing actuary. The amount shown includes interest to June 30, 2021.

Assessment of Risks

Actuarial Standard of Practice No. 51 (ASOP 51) applies to actuaries performing funding calculations related to a pension plan. ASOP 51 does not apply to actuaries performing services in connection with other post-employment benefits, such as medical benefits. Accordingly, ASOP 51 does not apply to the healthcare portion of JRS. See pages 16-18 of this report for further details regarding ASOP 51.

Use of Models

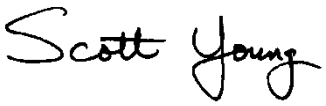
Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of each plan using data and assumptions as of the measurement date under the funding methods specified in this report. The output from the third-party vendor software is used as input to internally developed models that apply applicable funding methods and policies to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal models are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts within Buck who are familiar with applicable funding methods, as well as the manner in which the model generates its output. If significant changes are made to the internal models, extra checking and review are completed. Significant changes to the internal models that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

Additional models used in valuing health benefits for JRS are described in Section 4.2 of the June 30, 2020 report dated May 20, 2021.

This report was prepared under our supervision and in accordance with all applicable Actuarial Standards of Practice. We are Fellows of the Society of Actuaries, Enrolled Actuaries, Fellows of the Conference of Consulting Actuaries, and Members of the American Academy of Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Please let us know if you have any questions or if you would like to discuss these results in more detail. David can be reached at 602-803-6174 and Scott can be reached at 216-315-1929.

Sincerely,



David J. Kershner, FSA, EA, MAAA, FCA
Principal
Buck

Scott Young, FSA, EA, MAAA, FCA
Director
Buck

Attachments

cc: Mr. Kevin Worley, State of Alaska

Judicial Retirement System

Funded Status as of June 30		2020	2021
Pension			
a.	Actuarial Accrued Liability	$ 211,742,043	$ 218,717,460
b.	Valuation Assets	194,788,043	215,641,198
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ 16,954,000	$ 3,076,262
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	92.0%	98.6%
e.	Fair Value of Assets	$ 189,844,025	$ 245,047,997
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	89.7%	112.0%
Healthcare			
a.	Actuarial Accrued Liability	$ 16,763,770	$ 17,920,646
b.	Valuation Assets	34,805,639	37,884,167
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ (18,041,869)	$ (19,963,521)
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	207.6%	211.4%
e.	Fair Value of Assets	$ 34,036,503	$ 43,173,349
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	203.0%	240.9%
Total			
a.	Actuarial Accrued Liability	$ 228,505,813	$ 236,638,106
b.	Valuation Assets	229,593,683	253,525,365
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ (1,087,869)	$ (16,887,259)
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	100.5%	107.1%
e.	Fair Value of Assets	$ 223,880,528	$ 288,221,346
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	98.0%	121.8%

Comparative Summary of Contribution Rates		FY 2023	FY 2024
Pension			
a.	Normal Cost Rate Net of Member Contributions	38.85%	38.99%
b.	Past Service Cost Rate	24.74%	19.71%
c.	Total Employer/State Contribution Rate, (a) + (b), not less than (a)	63.59%	58.70%
Healthcare			
a.	Normal Cost Rate	6.49%	6.54%
b.	Past Service Cost Rate	(8.24)%	(9.33)%
c.	Total Employer/State Contribution Rate, (a) + (b), not less than (a)	6.49%	6.54%
Total			
a.	Normal Cost Rate Net of Member Contributions	45.34%	45.53%
b.	Past Service Cost Rate	24.74%	19.71%
c.	Total Employer/State Contribution Rate, (a) + (b), not less than (a)	70.08%	65.24%

Judicial Retirement System (continued)

Actuarial Contributions as of June 30, 2021 for FY24	Pension	Healthcare	Total
Normal Cost Rate			
1. Total Normal Cost	$ 5,952,927	$ 860,927	$ 6,813,854
2. Base Salaries for Upcoming Fiscal Year	13,157,172	13,157,172	13,157,172
3. Normal Cost Rate, (1) ÷ (2)	45.24%	6.54%	51.78%
4. Average Member Contribution Rate	6.25%	0.00%	6.25%
5. Employer Normal Cost Rate, (3) - (4)	38.99%	6.54%	45.53%
Past Service Rate			
1. Actuarial Accrued Liability	$ 218,717,460	$ 17,920,646	$ 236,638,106
2. Valuation Assets	215,641,198	37,884,167	253,525,365
3. Unfunded Actuarial Accrued Liability, (1) - (2)	$ 3,076,262	$ (19,963,521)	$ (16,887,259)
4. Funded Ratio, (2) ÷ (1)	98.6%	211.4%	107.1%
5. Past Service Cost Amortization Payment	2,593,806	(1,227,111)	1,366,695
6. Base Salaries for Upcoming Fiscal Year	13,157,172	13,157,172	13,157,172
7. Past Service Rate, (5) ÷ (6)	19.71%	(9.33)%	10.38%
Total Employer Contribution Rate, not less than Normal Cost Rate	58.70%	6.54%	65.24%

Judicial Retirement System (continued)

Schedule of Past Service Cost Amortizations - Pension

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability[1]	6/30/2002	6	$ 5,864,449	$ 3,943,106	$ 731,664
FY03/04 Loss[1]	6/30/2004	8	855,068	681,204	98,849
Revaluation of Liabilities[1]	6/30/2005	9	9,115,451	7,702,909	1,014,308
FY05/06 Loss[1]	6/30/2006	10	18,186,558	16,102,295	1,947,827
FY07 Loss	6/30/2007	11	1,364,721	1,254,213	140,759
FY08 Gain	6/30/2008	12	(29,014,739)	(27,481,906)	(2,884,889)
FY09 Loss	6/30/2009	13	21,273,454	20,625,359	2,039,004
Change in Assumptions	6/30/2010	14	13,976,981	13,791,031	1,291,385
FY10 Loss	6/30/2010	14	6,474,780	6,388,639	598,229
FY11 Loss	6/30/2011	15	7,397,917	7,407,859	660,308
FY12 Loss	6/30/2012	16	11,916,371	12,057,403	1,027,469
FY13 Loss	6/30/2013	17	7,033,497	6,922,837	566,097
Change in Assumptions	6/30/2014	18	4,219,851	4,312,578	339,526
FY14 Gain	6/30/2014	18	(14,458,986)	(14,776,719)	(1,163,359)
FY15 Gain	6/30/2015	19	(3,325,706)	(3,400,048)	(258,478)
FY16 Gain	6/30/2016	20	(9,932,623)	(10,131,681)	(745,694)
FY17 Gain	6/30/2017	21	(1,137,538)	(1,154,977)	(82,492)
Change in Assumptions	6/30/2018	22	10,343,783	10,431,580	724,547
FY18 Gain	6/30/2018	22	(12,096,419)	(12,199,094)	(847,313)
Change in Assumptions	6/30/2019	23	(14,775,890)	(14,884,472)	(1,007,300)
FY19 Loss	6/30/2019	23	3,344,559	3,369,137	228,005
Change in Assumptions	6/30/2020	24	(21,604,253)	(21,700,673)	(1,433,384)
FY20 Loss	6/30/2020	24	5,424,705	5,448,915	359,915
FY21 Gain	6/30/2021	25	(11,633,233)	(11,633,233)	(751,177)
Total				**$ 3,076,262**	**$ 2,593,806**

[1] The pension and healthcare split was done based on the ratio of unfunded actuarial accrued liability as of June 30, 2006.

Judicial Retirement System (continued)

Schedule of Past Service Cost Amortizations - Healthcare

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability[1]	6/30/2002	6	$ 2,295,257	$ 1,543,274	$ 286,362
FY03/04 Loss[1]	6/30/2004	8	334,660	266,612	38,688
Revaluation of Liabilities[1]	6/30/2005	9	3,567,649	3,014,800	396,985
FY05/06 Loss[1]	6/30/2006	10	7,117,943	6,302,194	762,350
FY07 Gain	6/30/2007	11	(810,073)	(744,478)	(83,552)
Change in Assumptions	6/30/2008	12	789,072	747,387	78,456
FY08 Gain	6/30/2008	12	(14,011,596)	(13,271,372)	(1,393,151)
FY09 Loss	6/30/2009	13	901,355	873,897	86,393
Change in Assumptions	6/30/2010	14	2,006,196	1,979,505	185,360
FY10 Gain	6/30/2010	14	(1,930,656)	(1,904,968)	(178,380)
FY11 Loss	6/30/2011	15	550,376	551,115	49,124
Change in Assumptions	6/30/2012	16	353,605	357,788	30,489
FY12 Gain	6/30/2012	16	(5,516,210)	(5,581,498)	(475,626)
FY13 Loss	6/30/2013	17	226,259	230,466	18,846
Change in Assumptions	6/30/2014	18	772,305	789,275	62,139
FY14 Gain	6/30/2014	18	(3,342,464)	(3,415,915)	(268,932)
FY15 Gain	6/30/2015	19	(1,416,996)	(1,448,671)	(110,131)
Change in Method	6/30/2016	20	(3,567,789)	(3,639,291)	(267,852)
FY16 Gain	6/30/2016	20	(425,711)	(434,243)	(31,960)
FY17 Gain	6/30/2017	21	(586,113)	(595,099)	(42,504)
Change in Assumptions/ Methods/EGWP	6/30/2018	22	1,009,960	1,018,532	70,744
FY18 Gain	6/30/2018	22	(2,148,478)	(2,166,713)	(150,494)
Change in Assumptions	6/30/2019	23	126,754	127,684	8,641
FY19 Gain	6/30/2019	23	(155,028)	(156,166)	(10,568)
Change in Assumptions	6/30/2020	24	200,955	201,852	13,333
FY20 Gain	6/30/2020	24	(2,842,610)	(2,855,296)	(188,600)
FY21 Gain	6/30/2021	25	(1,754,192)	(1,754,192)	(113,271)
Total				**$ (19,963,521)**	**$ (1,227,111)**

[1] The pension and healthcare split was done based on the ratio of unfunded actuarial accrued liability as of June 30, 2006.

Judicial Retirement System (continued)

Schedule of Past Service Cost Amortizations - Total

	Amortization Period		Balances		
Layer	Date Created	Years Remaining	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	6/30/2002	6	$ 8,159,706	$ 5,486,380	$ 1,018,026
FY03/04 Loss	6/30/2004	8	1,189,728	947,816	137,537
Revaluation of Liabilities	6/30/2005	9	12,683,100	10,717,709	1,411,293
FY05/06 Loss	6/30/2006	10	25,304,501	22,404,489	2,710,177
FY07 Loss	6/30/2007	11	554,648	509,735	57,207
Change in Assumptions	6/30/2008	12	789,072	747,387	78,456
FY08 Gain	6/30/2008	12	(43,026,335)	(40,753,278)	(4,278,040)
FY09 Loss	6/30/2009	13	22,174,809	21,499,256	2,125,397
Change in Assumptions	6/30/2010	14	15,983,177	15,770,536	1,476,745
FY10 Loss	6/30/2010	14	4,544,124	4,483,671	419,849
FY11 Loss	6/30/2011	15	7,948,293	7,958,974	709,432
Change in Assumptions	6/30/2012	16	353,605	357,788	30,489
FY12 Loss	6/30/2012	16	6,400,161	6,475,905	551,843
FY13 Loss	6/30/2013	17	7,259,756	7,153,303	584,943
Change in Assumptions	6/30/2014	18	4,992,156	5,101,853	401,665
FY14 Gain	6/30/2014	18	(17,801,450)	(18,192,634)	(1,432,291)
FY15 Gain	6/30/2015	19	(4,742,702)	(4,848,719)	(368,609)
Change in Method	6/30/2016	20	(3,567,789)	(3,639,291)	(267,852)
FY16 Gain	6/30/2016	20	(10,358,334)	(10,565,924)	(777,654)
FY17 Gain	6/30/2017	21	(1,723,651)	(1,750,076)	(124,996)
Change in Assumptions/ Methods/EGWP	6/30/2018	22	11,353,743	11,450,112	795,291
FY18 Gain	6/30/2018	22	(14,244,897)	(14,365,807)	(997,807)
Change in Assumptions	6/30/2019	23	(14,649,136)	(14,756,788)	(998,659)
FY19 Loss	6/30/2019	23	3,189,531	3,212,971	217,437
Change in Assumptions	6/30/2020	24	(21,403,298)	(21,498,821)	(1,420,051)
FY20 Loss	6/30/2020	24	2,582,095	2,593,619	171,315
FY21 Gain	6/30/2021	25	(13,387,425)	(13,387,425)	(864,448)
Total				**$ (16,887,259)**	**$ 1,366,695**

Judicial Retirement System (continued)

Changes in Fair Value of Assets During FY21	Pension	Healthcare	Total
1. Fair Value of Assets as of June 30, 2020	$ 189,844,025	$ 34,036,503	$ 223,880,528
2. Additions:			
a. Employee Contributions	$ 837,686	$ 0	$ 837,686
b. Employer Contributions	6,962,607	654,383	7,616,990
c. State Contributions	5,145,000	0	5,145,000
d. Interest and Dividend Income	2,685,812	478,159	3,163,971
e. Net Appreciation / Depreciation in Fair Value of Investments	54,575,739	9,641,569	64,217,308
f. Employer Group Waiver Plan	0	168,159	168,159
g. Other	7,891	14,345	22,236
h. Total Additions	$ 70,214,735	$ 10,956,615	$ 81,171,350
3. Deductions:			
a. Medical Benefits	$ 0	$ 1,692,383	$ 1,692,383
b. Retirement Benefits	14,368,857	0	14,368,857
c. Refund of Contributions	0	0	0
d. Investment Expenses	544,884	95,170	640,054
e. Administrative Expenses	97,022	32,216	129,238
f. Total Deductions	$ 15,010,763	$ 1,819,769	$ 16,830,532
4. Fair Value of Assets as of June 30, 2021	$ 245,047,997	$ 43,173,349	$ 288,221,346
5. Approximate Fair Value Investment Return Rate during FY21 Net of Investment Expenses	30.0%	29.9%	30.0%

Judicial Retirement System (continued)

Development of Actuarial Value of Assets	Pension	Healthcare	Total
1. Investment Gain / (Loss) for FY21			
a. Fair Value of Assets as of June 30, 2020	$ 189,844,025	$ 34,036,503	$ 223,880,528
b. Contributions	12,945,293	654,383	13,599,676
c. Employer Group Waiver Plan	0	168,159	168,159
d. Benefit Payments	14,368,857	1,692,383	16,061,240
e. Administrative Expenses	97,022	32,216	129,238
f. Actual Investment Return (net of investment expenses)	56,724,558	10,038,903	66,763,461
g. Expected Return Rate (net of investment expenses)	7.38%	7.38%	7.38%
h. Expected Return, Weighted for Timing	14,104,367	2,479,200	16,583,567
i. Investment Gain / (Loss) for the Year, (f) - (h)	42,620,191	7,559,703	50,179,894
2. Actuarial Value as of June 30, 2021			
a. Fair Value as of June 30, 2021	$ 245,047,997	$ 43,173,349	$ 288,221,346
b. Deferred Investment Gain / (Loss)	29,406,799	5,289,182	34,695,981
c. Preliminary Actuarial Value at June 30, 2021, (a) - (b)	215,641,198	37,884,167	253,525,365
d. Lower Limit: 80% of Fair Value as of June 30, 2021	196,038,398	34,538,679	230,577,077
e. Upper Limit: 120% of Fair Value as of June 30, 2021	294,057,596	51,808,019	345,865,615
f. Actuarial Value as of June 30, 2021, (c) limited by (d) and (e)	$ 215,641,198	$ 37,884,167	$ 253,525,365
3. Ratio of Actuarial Value of Assets to Fair Value of Assets	88.0%	87.7%	88.0%
4. Approximate Actuarial Value Investment Return Rate during FY21 Net of Investment Expenses	11.5%	11.6%	11.5%

Judicial Retirement System (continued)

Pension				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 7,229,597	$ 5,783,677	$ 1,445,920	$ 0
June 30, 2018	292,590	175,554	58,518	58,518
June 30, 2019	(2,647,188)	(1,058,876)	(529,437)	(1,058,875)
June 30, 2020	(6,148,327)	(1,229,665)	(1,229,665)	(3,688,997)
June 30, 2021	42,620,191	0	8,524,038	30,096,153
Total	**$ 41,346,863**	**$ 3,670,690**	**$ 8,269,374**	**$ 29,406,799**

Healthcare				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 1,282,441	$ 1,025,952	$ 256,489	$ 0
June 30, 2018	98,500	59,100	19,700	19,700
June 30, 2019	(409,783)	(163,914)	(81,956)	(163,913)
June 30, 2020	(1,023,945)	(204,789)	(204,789)	(614,367)
June 30, 2021	7,559,703	0	1,511,941	6,047,762
Total	**$ 7,506,916**	**$ 716,349**	**$ 1,501,385**	**$ 5,289,182**

Total				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 8,512,038	$ 6,809,629	$ 1,702,409	$ 0
June 30, 2018	391,090	234,654	78,218	78,218
June 30, 2019	(3,056,971)	(1,222,790)	(611,393)	(1,222,788)
June 30, 2020	(7,172,272)	(1,434,454)	(1,434,454)	(4,303,364)
June 30, 2021	50,179,894	0	10,035,979	40,143,915
Total	**$ 48,853,779**	**$ 4,387,039**	**$ 9,770,759**	**$ 34,695,981**

National Guard and Naval Militia Retirement System

Funded Status as of June 30		2020		2021
a.	Actuarial Accrued Liability	$ 22,417,247	$	22,975,269
b.	Valuation Assets	43,020,393		45,248,391
c.	Unfunded Actuarial Accrued Liability, (a) - (b)	$ (20,603,146)	$	(22,273,122)
d.	Funded Ratio based on Valuation Assets, (b) ÷ (a)	191.9%		196.9%
e.	Fair Value of Assets	$ 42,095,708	$	49,813,036
f.	Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	187.8%		216.8%

Actuarial Determined Contribution Amounts		FY 2023		FY 2024
a.	Normal Cost	$ 503,140	$	503,140
b.	Administrative Expense Load	256,000		268,000
c.	Past Service Cost	(3,224,638)		(3,486,009)
d.	Total Annual Contribution, (a) + (b) + (c), not less than 0	$ 0	$	0

National Guard and Naval Militia Retirement System (continued)

Changes in Fair Value of Assets During FY21

1.	Fair Value of Assets as of June 30, 2020	$	42,095,708
2.	Additions:		
	a. Employer Contributions	$	0
	b. Investment Income		9,571,576
	c. Other		1,690
	d. Total Additions	$	9,573,266
3.	Deductions:		
	a. Retirement Benefits	$	1,454,330
	b. Investment Expenses		97,169
	c. Administrative Expenses		304,439
	d. Total Deductions	$	1,855,938
4.	Fair Value of Assets as of June 30, 2021	$	49,813,036
5.	Approximate Fair Value Investment Return Rate during FY21 Net of Investment Expenses		23.0%

National Guard and Naval Militia Retirement System (continued)

Development of Actuarial Value of Assets

1.	Investment Gain / (Loss) for FY21		
	a. Fair Value of Assets as of June 30, 2020	$	42,095,708
	b. Contributions		0
	c. Benefit Payments		1,454,330
	d. Administrative Expenses		304,439
	e. Actual Investment Return (net of investment expenses)		9,476,097
	f. Expected Return Rate (net of investment expenses)		7.00%
	g. Expected Return, Weighted for Timing		2,881,937
	h. Investment Gain / (Loss) for the Year, (e) - (g)		6,594,160
2.	Actuarial Value as of June 30, 2021		
	a. Fair Value as of June 30, 2021	$	49,813,036
	b. Deferred Investment Gain / (Loss)		4,564,645
	c. Preliminary Actuarial Value at June 30, 2021, (a) - (b)		45,248,391
	d. Lower Limit: 80% of Fair Value as of June 30, 2021		39,850,429
	e. Upper Limit: 120% of Fair Value as of June 30, 2021		59,775,643
	f. Actuarial Value as of June 30, 2021, (c) limited by (d) and (e)	$	45,248,391
3.	Ratio of Actuarial Value of Assets to Fair Value of Assets		90.8%
4.	Approximate Actuarial Value Investment Return Rate during FY21 Net of Investment Expenses		9.5%

Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2017	$ 704,309	$ 563,448	$ 140,861	$ 0
June 30, 2018	(681,054)	(408,633)	(136,211)	(136,210)
June 30, 2019	(407,413)	(162,966)	(81,483)	(162,964)
June 30, 2020	(685,847)	(137,169)	(137,169)	(411,509)
June 30, 2021	6,594,160	0	1,318,832	5,275,328
Total	**$ 5,524,155**	**$ (145,320)**	**$ 1,104,830**	**$ 4,564,645**

Actuarial Standard of Practice No. 51

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities, current contribution requirements, and the funded status of the plans. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the plans. Understanding the risks to the funding of the plans is important.

Actuarial Standard of Practice No. 51 (ASOP 51)[1] requires certain disclosures of potential risks to the plans and provides useful information for intended users of actuarial reports that determine plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is negative, but all risk should be understood and accepted based on knowledge, judgement, and educated decisions. Future measurements may deviate in ways that produce positive or negative financial impacts to the plan.

In the actuary's professional judgment, the following risks may reasonably be anticipated to significantly affect the pension plans' future financial condition and contribution requirements.

- Investment Risk – potential that the investment return will be different than the return expected in the actuarial valuation (7.38% for JRS and 7.00% for NGNMRS)
- Contribution Risk – potential that the contribution actually made will be different than the actuarially determined contribution
- Long-Term Return on Investment Risk – potential that changes in long-term capital market assumptions or the plan's asset allocation will create the need to update the long-term return on investment assumption
- Longevity Risk – potential that participants live longer than expected compared to the valuation mortality assumptions
- Salary Increase Risk[2] – potential that future salaries will be different than expected in the actuarial valuation
- Inflation Risk[2] – potential that the consumer price index (CPI) for urban wage earners and clerical workers for Anchorage is different than the 2.5% inflation rate assumed in the valuation
- Other Demographic Risk – potential that other demographic experience will be different than expected

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the plan. **This list is not all-inclusive**; it is an attempt to identify the more significant risks and how those risks might affect the results shown in this report.

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[1] ASOP 51 does not apply to the healthcare portion of JRS. Accordingly, all comments in this section relate to the pension portion of JRS.

[2] Salary increase risk and inflation risk apply to JRS only.

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the plan sponsor to make contributions to the plans when due, or to assess the likelihood or consequences of potential future changes in law. In addition, this valuation report is not intended to provide investment advice or to provide guidance on the management or reduction of risk.

Assessment of Risks

Investment Risk

Plan costs are very sensitive to the market return.

- Any return on assets lower than assumed will increase costs.
- The plans use an actuarial value of assets that smooths gains and losses on market returns over a five-year period to help control some of the volatility in costs due to investment risk.
- Historical experience of actual returns is shown in Section 2.5 (JRS) and Section 2.4 (NGNMRS) of the June 30, 2020 reports dated May 20, 2021. This historical experience illustrates how returns can vary over time.

Contribution Risk

There is a risk to the plans when the employer's and/or State's actual contribution amount and the actuarially determined contribution differ.

- If the actual contributions are lower than the actuarially determined contributions, the plans may not be sustainable in the long term.
- Any underpayment of the contribution will increase future contribution amounts to help pay off the additional Unfunded Actuarial Accrued Liability associated with the underpayment(s).
- As long as the Board consistently adopts the actuarially determined contributions, this risk is mitigated due to Alaska statutes requiring the State to contribute additional funds necessary to pay the total contributions adopted by the Board.

Long-Term Return on Investment Risk

Inherent in the long-term return on investment assumption is the expectation that the current rate will be used until the last benefit payment of the plan is made. There is a risk that sustained changes in economic conditions, changes in long-term future capital market assumptions, or changes to the plans' asset allocations will necessitate an update to the long-term return on investment assumption used.

- Under a lower long-term return on investment assumption, less investment return is available to pay plan benefits. This may lead to a need for increased employer contributions.
- The liabilities will be higher at a lower assumed rate of return because future benefits will have a lower discount rate applied when calculating the present value.
- A 1% decrease in the long-term return on investment assumption will increase the actuarial accrued liability by approximately 11% for JRS and 9% for NGNMRS.

Longevity Risk

Plan costs will be increased as participants are expected to live longer.

- Benefits are paid over a longer lifetime when life expectancy is expected to increase. The longer duration of payments leads to higher liabilities.
- Health care has been improving, which affects the life expectancy of participants. As health care improves, leading to longer life expectancies, costs to the plans could increase.
- The mortality assumptions for the plans mitigates this risk by assuming future improvements in mortality. However, any improvement in future mortality greater than that expected by the current mortality assumptions would lead to increased costs for the plans.

JRS provides cost-of-living adjustments on retirement benefits (based on salary changes of sitting judges) that increase longevity risk, because members who live longer than expected will incur more benefit payment increases than expected and therefore increase costs.

Salary Increase Risk[1]

Plan costs will be increased if actual salary increases are larger than expected.

- Higher-than-expected salary increases will produce higher benefits.
- The higher benefits may be partially offset by increased employee contributions due to higher salaries.
- If future payroll grows at a rate different than assumed, contributions as a percentage of payroll will be affected.

Inflation Risk[1]

Inflation risk may be associated with the interaction of inflation with other assumptions, but this is not significant as a standalone assumption, and therefore is considered as part of the associated assumption risk instead of being discussed here.

Other Demographic Risk

The plans are subject to risks associated with other demographic assumptions (e.g., retirement and termination rates). Differences between actual and expected experience for these assumptions tend to have less impact on the overall costs of the plans. The demographic assumptions used in the valuations are re-evaluated regularly as part of the four-year experience studies to ensure the assumptions are consistent with long-term expectations.

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[1] Salary increase risk and inflation risk apply to JRS only.

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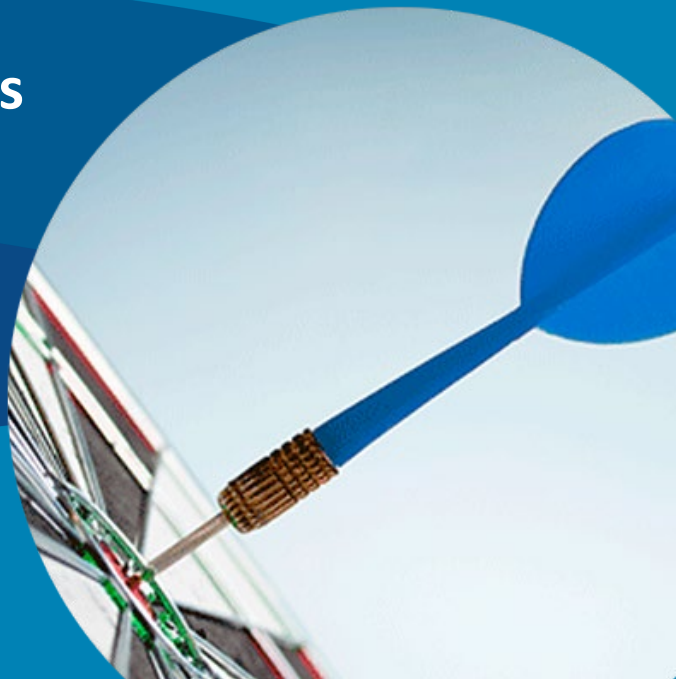
Alaska Retirement Management Board
Actuarial Committee

Actuarial Review of June 30, 2021 Valuations

Paul Wood, ASA, FCA, MAAA
Bill Detweiler, ASA, EA, FCA, MAAA
March 16, 2022



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Review of the June 30, 2021 Actuarial Valuation

- Claims and Enrollment Review
- Assumptions Review
- Test Life Review

GRS

Claims and Enrollment Review

- Buck provided a PowerPoint that showed the development of the Per Capita Claims Costs (PCCC)
- Overall, based on the data in the PowerPoint, there was favorable claims experience meaning the PCCC did not increase as much as was expected

GRS

Claims and Enrollment Review

PCCC Claims Development

- Overall, we found the development of the PCCC to be reasonable
- The table below shows the final PCCC used in the valuation, as confirmed through test life checking
- It also compares the PCCC used this year to those used last year

Per Capita Claims Cost (Age 65)						
	Medical			Prescription Drugs		
	June 30, 2020 Valaution	June 30, 2021 Valaution	Change	June 30, 2020 Valaution	June 30, 2021 Valaution	Change
Pre-Medicare	$ 15,360	$ 15,926	3.7%	$ 3,393	$ 3,375	-0.5%
Medicare Parts A & B	$ 1,618	$ 1,619	0.1%	$ 3,340	$ 3,474	4.0%
Medicare Part B Only	$ 5,340	$ 5,341	0.0%	$ 3,340	$ 3,474	4.0%
Medicare Part D – EGWP	N/A	N/A	N/A	$ 1,003	$ 1,131	12.8%

GRS

Claims and Enrollment Review

PCCC Gains and COVID-19 Experience

- Large gains five years in a row
  - This is mostly due to positive experience on the medical claims
  - The gains this year would have been even larger, but Buck added a 4% load to the medical claims to account for COVID-19 experience
- Pre-Medicare costs were increased and Prescription Drugs costs were decreased this year due to plan changes
- Both of these items need to be carefully monitored going forward to see if claims swing back in the other direction

GRS

Assumptions Review

Gains and Losses

- Now have three years of experience under most recently adopted assumptions
- Can start to monitor any developing trends
  - New Medicare Part B Assumption causing consistent gains
  - Investment return expectations still continuing a downward trend around the country

GRS

Test Life Review

- For a sample group we examine the following:
  - Data inputs
  - Benefit amounts
  - Liability calculations
- The sample lives tell us if the assumptions are correctly employed
- They tell us if the plan provisions are valued correctly

GRS

Test Life Review - Findings

- Materiality Standards
  - Actuaries look to the Actuarial Standards of Practice
    - "An item or a combination of related items is material if its omission or misstatement could influence a decision of an intended user"
  - Relies heavily on the professional judgement of the actuary

GRS

Test Life Review - Findings

- We choose test lives each year that are different and contain unique characteristics
- In years with no assumption or plan changes, we first replicate the significant benefits (retirement/withdrawal), then dive deeper into small differences on the ancillary benefits (death/disability)
- As a result, we were able to identify some minor findings this year related to the valuation of certain ancillary benefits, or related to unique characteristics of the test lives chosen

GRS

Test Life Review - Findings

- **Finding #1 - Administration of Claimed Service**
  - An active PERS DB Peace Officer/Firefighter member who has 5 years of claimed service has this amount being included in credited service and excluded from eligibility service
  - Additionally, the early retirement reduction factors (ERFs) being used for this member are based on the credited service with the claimed service included
  - We recommend Buck confirm this treatment is consistent with how the Alaska DRB is administrating the benefits for members that have claimed service.
- **Finding #2 - Retirement Benefit for PERS DB Peace Officer/Firefighter Occupational Disability**
  - Based on one of our agreed upon recommendations from last year, for DB PERS Peace Officer/Firefighter members, we expected to see an increase to the deferred retirement benefit for the occupational disability piece by the same accumulative PRPA percentage that was applied to the disability benefit
  - However, a DB PERS Peace Officer/Firefighter member is only having the benefit increased until age 55, rather than their assumed retirement age of 57
  - We recommend Buck increase this benefit until the assumed retirement age for each member.

GRS

Test Life Review - Findings

- **Finding #3 - Occupational Death COLA Benefit for PERS DB Peace Officer/Firefighter**
  - PERS DB Peace Officer/Firefighter members have a 10% Alaska COLA benefit amount (before applying any decrements, assumptions, or payment forms) for the deferred occupational married death benefit piece not equal to 10% of the regular benefit amount for this piece
  - We recommend Buck update this 10% Alaska COLA benefit component to be 10% of the regular benefit amount or provide an explanation as to why it is not.
- **Finding #4 - Service Eligibility for TRS DB**
  - A TRS DB member has different service amounts being used for death benefits eligibility.
  - We recommend Buck confirm which of these service amounts the Alaska DRB uses for eligibility and use that service amount consistently across all benefits.

GRS

Test Life Review - Findings

- **Finding #5 - Occupational Disability Benefit for PERS PF DCR OD&D**
  - A TRS DCR occupational disability member has their benefit being calculated assuming the service amount provided by the Alaska DRB is as of the date of disability.
  - We recommend Buck confirm with the Alaska DRB that this service amount is as of the date of disability, and not as of the valuation date.

GRS

Test Life Review – Findings

Communications with Buck

- We provided these findings to Buck
  - For the first four findings, Buck agreed they need to make some updates to their valuations
  - The fifth finding is still being reviewed
  - Both Buck and GRS agree these findings are immaterial and recommend they be included in the next valuation

GRS

Test Life Review – Summary

PERS DB Pension

PERS DB - Active Test Case 1 - P/F Tier 1			
Basic Data:	Current Age	Credited Service	Gender
	57.6	15.5	Male
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**
Total Retirement PVB	482,147	482,146	0.0%
Total Withdrawal PVB	-	-	0.0%
Total Death PVB	9,724	9,407	3.4%
Total Disability PVB	-	-	0.0%
GRAND TOTAL PVB	**491,870**	**491,554**	**0.1%**

PERS DB - Active Test Case 2 - Others Tier 2			
Basic Data:	Current Age	Credited Service	Gender
	67.3	6.7	Female
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**
Total Retirement PVB	84,972	84,972	0.0%
Total Withdrawal PVB	-	-	0.0%
Total Death PVB	1,257	1,265	-0.6%
Total Disability PVB	-	-	0.0%
GRAND TOTAL PVB	**86,229**	**86,237**	**0.0%**

PERS DB - Active Test Case 3 - P/F Tier 3			
Basic Data:	Current Age	Credited Service	Gender
	42.2	5.2	Male
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**
Total Retirement PVB	177,490	177,490	0.0%
Total Withdrawal PVB	30,583	30,584	0.0%
Total Death PVB	6,955	6,994	-0.6%
Total Disability PVB	5,236	5,223	0.2%
GRAND TOTAL PVB	**220,264**	**220,290**	**0.0%**

PERS DB - Inactive Test Cases			
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**
PERS Peace Officer/Firefighter - Retiree	558,060	558,060	0.0%
PERS Peace Officer/Firefighter - Beneficiary	463,295	463,061	0.1%
PERS Peace Officer/Firefighter - DV	78,936	78,522	0.5%
PERS Others - Retiree	692,135	692,135	0.0%
PERS Others - Beneficiary	82,712	82,712	0.0%
PERS Others - DV	57,846	57,499	0.6%

GRS

Test Life Review – Summary

TRS DB Pension

TRS DB - Active Test Case 1 - Tier 1			
Basic Data:	Current Age	Credited Service	Gender
	69.0	12.6	Female
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**
Total Retirement PVB	260,387	260,387	0.0%
Total Withdrawal PVB	-	-	0.0%
Total Death PVB	2,212	1,908	15.9%
Total Disability PVB	-	-	0.0%
GRAND TOTAL PVB	**262,599**	**262,296**	**0.1%**

TRS DB - Active Test Case 2 - Tier 2			
Basic Data:	Current Age	Credited Service	Gender
	42.4	3.5	Female
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**
Total Retirement PVB	52,201	52,201	0.0%
Total Withdrawal PVB	21,778	21,778	0.0%
Total Death PVB	835	814	2.6%
Total Disability PVB	1,853	1,762	5.2%
GRAND TOTAL PVB	**76,667**	**76,554**	**0.1%**

TRS DB - Active Test Case 3 - Tier 2			
Basic Data:	Current Age	Credited Service	Gender
	47.8	7.0	Female
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**
Total Retirement PVB	150,782	150,782	0.0%
Total Withdrawal PVB	28,919	28,919	0.0%
Total Death PVB	1,836	1,825	0.6%
Total Disability PVB	2,644	2,591	2.0%
GRAND TOTAL PVB	**184,181**	**184,118**	**0.0%**

TRS DB - Inactive Test Cases			
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**
TRS - Retiree - Female, Tier 1	443,684	443,684	0.0%
TRS - DV - Female, Tier 2	70,976	70,658	0.5%
TRS - Beneficiary - Female, Tier 2	199,134	199,067	0.0%

GRS

Test Life Review – Summary

PERS Retiree Health

Actives	Test Case 1 - PF Tier 1			Test Case 2 - Other Tier 2			Test Case 3 - P/F Tier 3		
Basic Data:									
Sex	Male			Female			Male		
Current Age	57.57			67.30			42.24		
Current Credited Service	20.47			6.74			5.19		
Present Value of Benefits (PVB)	**GRS***	**Buck**	**% Diff**	**GRS**	**Buck**	**% Diff**	**GRS**	**Buck**	**% Diff**
Retirement:									
Tier x <Member>	147,044	147,026	0.0%	35,847	35,845	0.0%	81,402	81,387	0.0%
Tier x <Spouse>	139,495	135,988	2.6%	18,673	18,651	0.1%	75,128	71,763	4.7%
Contrib Tier x <Member>	-	-	0.0%	-	-	0.0%	900	899	0.0%
Contrib Tier x <Spouse>	-	-	0.0%	-	-	0.0%	677	677	0.0%
Post 65 Part D Tier x <Member>	18,460	18,459	0.0%	6,915	6,914	0.0%	8,897	8,896	0.0%
Post 65 Part D Tier x <Spouse>	13,847	13,846	0.0%	3,576	3,576	0.0%	6,514	6,513	0.0%
Total Retirement PVB	**254,232**	**250,708**	**1.4%**	**44,029**	**44,007**	**0.1%**	**139,542**	**136,164**	**2.5%**

Inactives - PVB	GRS	Buck	% Diff
Retiree - P/F Tier 2 - Female	305,408	305,377	0.0%
Beneficiary - P/F Tier 2 - Female	156,465	156,432	0.0%
Vested Termination - P/F Tier 3 - Male	170,838	171,857	-0.6%
Retiree - Other Tier 2 - Female	87,500	87,486	0.0%
Beneficiary - Other Tier 1 - Male	92,909	92,894	0.0%
Vested Termination - Other Tier 1 - Male	225,975	230,674	-2.0%

GRS

Test Life Review – Summary

TRS Retiree Health

Actives	Test Case 1 - Tier 1			Test Case 2 - Tier 2			Test Case 3 - Tier 2		
Basic Data:									
Sex	Female			Female			Female		
Current Age	69.00			47.75			42.43		
Current Credited Service	12.60			7.00			3.50		
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**	**GRS**	**Buck**	**% Diff**	**GRS**	**Buck**	**% Diff**
Retirement:									
Tier x <Member>	98,578	98,570	0.0%	90,701	90,683	0.0%	49,227	49,217	0.0%
Tier x <Spouse>	50,812	50,811	0.0%	45,053	43,094	4.5%	24,528	23,409	4.8%
Post 65 Part D Tier x <Member>	(19,010)	(19,009)	0.0%	(11,634)	(11,632)	0.0%	(6,257)	(6,256)	0.0%
Post 65 Part D Tier x <Spouse>	(9,764)	(9,764)	0.0%	(6,804)	(6,803)	0.0%	(3,680)	(3,680)	0.0%
Contrib <Member>	-	-	0.0%	(718)	(717)	0.0%	(366)	(366)	0.0%
Contrib <Spouse>	-	-	0.0%	(429)	(429)	0.0%	(219)	(219)	0.0%
Total Retirement PVB	**120,615**	**120,609**	**0.0%**	**116,169**	**114,196**	**1.7%**	**63,232**	**62,105**	**1.8%**

Inactives - PVB	GRS	Buck	% Diff
Retiree - Male	180,702	180,677	0.0%
Vested Termination -Male	191,153	193,435	-1.2%
Retiree - Male	174,434	172,511	1.1%

GRS

Test Life Review – Summary

PERS and TRS DCR Occupational Death & Disability

DCR Active Test Case 1 PERS Other			
Basic Data:	Current Age	Credited Service	Sex
	56.14	6.66	Female
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**
Total Disability PVB	1,047.51	1,048.04	-0.1%
Total Death PVB	390.62	390.60	0.0%
GRAND TOTAL PVB	**1,438.12**	**1,438.64**	**0.0%**

DCR Active Test Case 2 PERS P/F			
Basic Data:	Current Age	Credited Service	Sex
	37.73	8.26	Male
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**
Total Disability PVB	7,911.43	7,911.15	0.0%
Total Death PVB	1,884.77	1,884.83	0.0%
GRAND TOTAL PVB	**9,796.21**	**9,795.98**	**0.0%**

DCR Active Test Case 3 TRS			
Basic Data:	Current Age	Credited Service	Sex
	49.33	10.00	Female
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**
Total Disability PVB	404.26	404.26	0.0%
Total Death PVB	232.50	232.52	0.0%
GRAND TOTAL PVB	**636.75**	**636.78**	**0.0%**

DCR Inactive Test Cases			
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**
PERS Other - Disability	104,971.07	105,056.00	-0.1%
PERS P/F - Disability	640,778.98	640,657.00	0.0%
TRS - Disability	184,262.54	176,511.00	4.4%

GRS

Test Life Review – Summary

PERS and TRS DCR Retiree Health

Actives	Test Case 1 - PERS Other			Test Case 2 - PERS PF			Test Case 3 - TRS		
Basic Data:									
Sex	Female			Male			Female		
Current Age	56.14			37.73			49.3333		
Current Credited Service	6.16			8.26			10.00		
Present Value of Benefits (PVB)	**GRS**	**Buck**	**% Diff**	**GRS**	**Buck**	**% Diff**	**GRS**	**Buck**	**% Diff**
Retirement:									
Post 65 DCR <Member>	23,695.24	23,736.33	-0.2%	12,727.27	12,587.32	1.1%	15,736.80	15,769.20	-0.2%
Post 65 DCR <Spouse>	12,758.30	12,780.36	-0.2%	12,974.40	12,812.96	1.3%	8,459.26	8,476.71	-0.2%
Contrib DCR <Member>	(5,591.08)	(5,599.14)	-0.1%	(1,500.67)	(1,314.04)	14.2%	(2,139.58)	(2,086.07)	2.6%
Contrib DCR <Spouse>	(3,012.20)	(3,016.54)	-0.1%	(1,560.48)	(1,345.46)	16.0%	(1,151.68)	(1,123.14)	2.5%
Post 65 Part D DCR <Member>	3,763.09	3,886.02	-3.2%	2,468.88	2,429.60	1.6%	2,910.99	2,929.25	-0.6%
Post 65 Part D DCR <Spouse>	2,006.00	2,087.21	-3.9%	1,900.11	1,871.54	1.5%	1,562.90	1,572.65	-0.6%
Total Retirement PVB	**33,619.33**	**33,874.24**	**-0.8%**	**27,009.50**	**27,041.92**	**-0.1%**	**25,378.70**	**25,538.60**	**-0.6%**

Inactives - PVB	GRS	Buck	% Diff
PERS Other - Disability	72,971.21	75,240.00	-3.0%
PERS P/F - Disability	67,965.46	69,620.00	-2.4%
TRS - Disability	75,216.82	77,396.00	-2.8%

GRS

Summary of Recommendations

- We recommend Buck examine experience under the current assumptions in the upcoming experience study to determine if they are working as intended or need to be modified.
- We recommend Buck continues to track the medical claims experience closely, particularly any further impact from the plan changes or COVID-19 experience.
- We recommend Buck review with the Board whether to implement a new entrant/rehire assumption in the DCR plan.
- We recommend Buck continue to disclose the nature and impact of all programming changes included in the valuation.
- We recommend Buck generate a new gain/loss item that tracks the experience of the EGWP savings assumption.
- We recommend that Buck implement the changes to their valuation methods as detailed in findings of the test life review.
- We recommend Buck make some small modifications to their valuation reports to improve communication and disclosures.

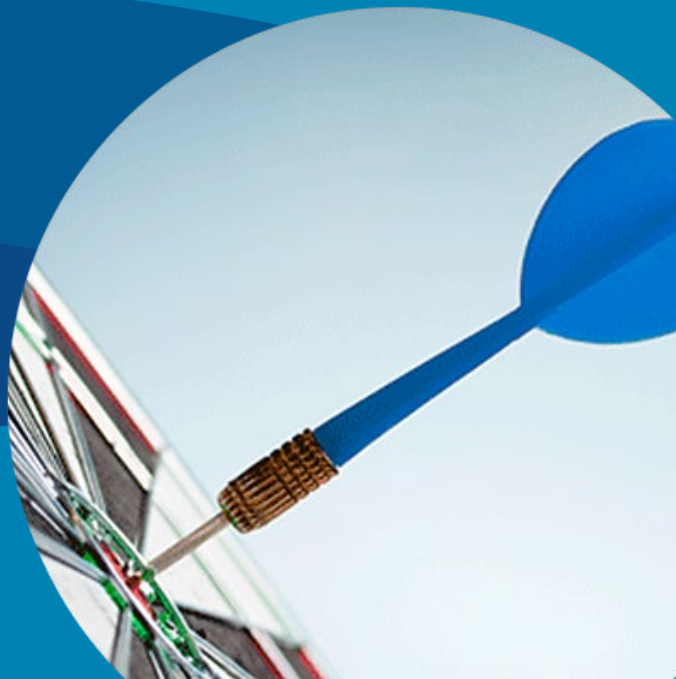
GRS

Questions?

Alaska Retirement Management Board

June 30, 2020 Valuations Replication Audit Follow Up

Paul Wood, ASA, FCA, MAAA
Bill Detweiler, ASA, EA, FCA, MAAA
March 17, 2022



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Replication of the June 30, 2020 Actuarial Valuations

- Status update
- Additional test life findings
- Report content recommendations

Replication of the June 30, 2020 Actuarial Valuations

- We presented our initial findings at the December meeting
- We concluded:
  - Our results are within a reasonable range of the Buck valuations
  - It is our opinion that the Buck valuation conclusions accurately portray the actuarial status of the systems and are reflected in the required contribution rates
- We identified additional test lives to check to pinpoint any particular issues that can be incorporated into future valuations
- We issued a draft report detailing all of our findings and any recommendations

GRS

Replication of the June 30, 2020 Actuarial Valuations – Findings Related to Test Lives

- **Finding #1 - 415(b) Limit**
  - Benefits are currently being limited by the 415(b) limit
  - We recommend Buck confirm with Alaska staff if benefits in excess of the 415(b) limit are being paid (potentially through an excess benefit account), and if so, how
- **Finding #2 - Rate Used in Valuation Not Matching Rate Disclosed in Report**
  - The ultimate termination rate being used for a male in the PERS DCR retiree medical valuation appears to be using the age 64 rate instead of the age 65 rate shown in the report
  - We recommend Buck verify all decrement rates shown in the reports are consistent with those being used in the calculations

GRS

Replication of the June 30, 2020 Actuarial Valuations – Findings Related to Test Lives

- **Finding #3 - Retirement Rates Not Being Applied at All Eligible Ages**
  - A PERS DCR Peace Officer/Firefighter member is eligible to retire at age 44, but retirement rates do not appear to start until age 45, so no retirement rate or termination rate is being used for this member at age 44
  - We recommend Buck apply retirement rates at all eligible ages
- **Finding #4 - Spouse Age Assumption**
  - Benefits for a TRS DCR Occupational Death & Disability member appear to be assuming that male spouses are 3 years older
  - We recommend Buck update this assumption to be consistent with the most recently adopted assumption that male spouse are 2 years older

GRS

Replication of the June 30, 2020 Actuarial Valuations – Findings Related to Test Lives

- **Finding #5 - Contribution Refunds Assumption**
  - Death benefits for a TRS retiree medical non-occupational member appear to include a 95% assumption
  - We recommend Buck update this assumption to be consistent with the most recently adopted assumption that 0% of terminating members with vested benefits are assumed to have their contributions refunded
- **Finding #6 - Retiree Medical Children Premiums**
  - Retiree medical benefits for children in the PERS and TRS DB plans appear to be assuming that premiums will be paid after the retired member turns 60 years old
  - We recommend Buck update all DB spouse and children retiree medical benefit so that premiums are no longer paid when the retired member turns 60 years old

GRS

Replication of the June 30, 2020 Actuarial Valuations – Findings Related to Test Lives

- We provided these findings to Buck
  - The first and fifth findings are still being reviewed
  - For the other four findings, Buck agreed they need to make some updates to their valuations
    - The third finding does not impact the current valuations, but may impact future valuations
  - Both Buck and GRS agree these findings are immaterial and recommend they be included in the next valuation

GRS

Replication of the June 30, 2020 Actuarial Valuations – Report Content

- We made some small recommendations on the contents of the report
- In general, the actuarial valuation reports complied with the applicable Actuarial Standards of Practice and thoroughly communicated the assumptions, methods and plan provisions incorporated into the June 30, 2020 actuarial valuations

GRS

Questions?

BUCK

State of Alaska Retirement Systems

Presentation to ARMB Actuarial Committee

2021 Experience Study – Demographic Assumptions, Updated Economic Assumptions

March 16, 2022

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Background

Background

- Under AS 37.10.220(a)(9), the ARMB requests the plan actuary to conduct an experience analysis of the retirement systems at least once every four years (except healthcare costs and trend rates are analyzed annually)

- The last experience study covered the experience for the 4-year period July 1, 2013 to June 30, 2017
  - New assumptions adopted by the ARMB were effective beginning with the June 30, 2018 valuations

- The current experience study covers the experience for the 4-year period July 1, 2017 to June 30, 2021
  - New assumptions adopted by the ARMB will be effective beginning with the June 30, 2022 valuations

- The experience study covers *economic* and *demographic* assumptions
  - Proposed economic assumptions were initially discussed at the December 2021 meeting
  - Today's presentation includes an analysis of the demographic assumptions, along with updated economic assumptions

Background (cont'd)

- Each assumption used in the valuation should represent the actuary's **best estimate of reasonable long-term expectations**
  - An assumption is considered reasonable if it is not anticipated to result in significant cumulative gains or losses over time
  - Each assumption should be evaluated considering its materiality on the valuation results
  - The assumptions should be consistent with each other
  - Typically, a range of reasonableness applies for each assumption
  - Past experience should be considered, but not given undue influence if future expectations differ

- Although the analysis of experience during the last 4-year period involves a lot of numbers and data, the overall process of setting assumptions is a blend of art and science

Background (cont'd)

- Actuarial Standard of Practice No. 51 (ASOP 51) requires the actuary to identify risks that, in his/her professional judgment, may reasonably be anticipated to significantly affect the plan's future financial condition

- The more significant risk factors affecting future funded ratios and contribution rates of the plans are:
  - Investment Risk – future investment returns will be different than the assumed rate
  - Contribution Risk – the actuarially determined contribution is not deposited to the trust each year
  - Long-Term Return on Investment Risk – changes in capital market assumptions or the asset allocation will create the need to update the long-term investment return assumption
  - Longevity Risk – mortality rates of participants and beneficiaries will be different than assumed
  - Salary Increase Risk – future salary increases will be different than assumed
  - Inflation Risk – changes in the CPI will be different than assumed
  - Other Demographic Risk – retirement and withdrawal patterns will be different than assumed

- An experience study is performed every 4 years to assess whether the assumptions being used in the annual actuarial valuations should be changed to better match future experience, thereby managing these risk factors

Demographic Assumptions

Demographic Assumptions - Background

- Demographic assumptions are used to predict expected patterns of behavior of plan participants
  - Mortality
  - Retirement
  - Withdrawal (termination of employment)
  - Disability
  - Occupational-related death and disability
  - Withdrawal of contributions upon termination
  - Rehires
  - Unused sick days (TRS)
  - Population growth rate
  - Alaska residency for COLA
  - Part-time service
  - Percent electing lump sums (NGNMRS)
  - Healthcare dependent assumptions
  - Medicare Part B only
  - Healthcare participation
  - Healthcare morbidity

Demographic Assumptions – Background (cont'd)

- We analyzed plan experience for the 4-year period July 1, 2017 to June 30, 2021
- Data used is the same as the data from the annual valuations
- Actual experience (A) was compared to expected experience (E) based on the current demographic assumptions
  - A/E ratios were developed for each assumption that had credible experience
  - See Appendix for further details
- For some decrements (e.g., disability) or small groups (e.g., JRS), there was insufficient experience; in these cases, we are proposing no changes to the current assumptions

Demographic Assumptions – Background (cont'd)

- Experience was analyzed on a *liability*-weighted basis for mortality (pension), retirement and ultimate withdrawal; and on a *headcount* basis for other assumptions

- Differences between headcount-weighted and liability-weighted analysis:
  - On a headcount-weighted basis, each person who decrements (changes status) counts equally
  - On a liability-weighted basis, those who decrement are treated differently depending on their respective liabilities

- Example
  - Two people from the same tier retire with unreduced benefits – one at age 50 and the other at age 62
  - They both have the same average salary and the same benefit service (i.e., the *amount* of their retirement benefit is the same)
  - On a *headcount*-weighted basis, each person counts as one in terms of changing from active to retired status
  - The 50-year old has significantly higher liabilities than the 62-year old because benefits are expected to be paid over a longer period of time
  - The *liability*-weighted impact of the 50-year old is much different than the *liability*-weighted impact of the 62-year old

Mortality Assumption

Mortality Assumption

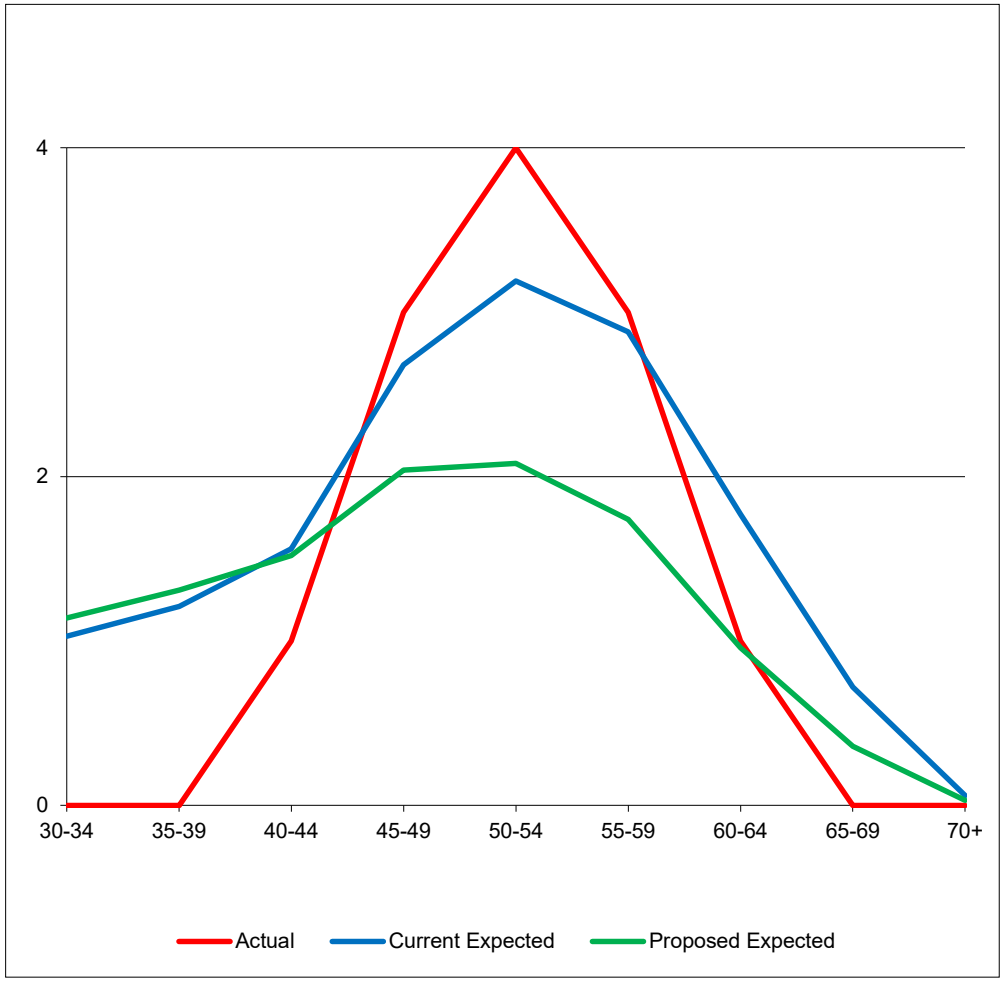
- A mortality assumption typically includes
  - A *base table* with mortality rates that typically differ by gender, age, and occupation
  - A *mortality improvement scale* projects future changes in mortality rates; most recently developed improvement scales project future changes in mortality by age and year of birth (those born more recently are expected to live longer); these are called *generational* mortality improvement scales
  - The Society of Actuaries publishes annual updates to standard mortality improvement scales
- The current mortality assumption was set based on the 2017 experience study
  - Base Table: RP-2014
  - Generational Mortality Improvement Scale: MP-2017
  - Percentages of base table rates are used for certain groups to match plan experience
- Credibility factors were applied if mortality experience was partially statistically credible
- Since the 2017 experience study was completed, the Society of Actuaries has published mortality tables that are specific to the public sector, including separate tables for Safety employees, Teachers, and General employees (these public sector-specific mortality tables are referred to as Pub-2010)

Mortality Assumption (cont'd)

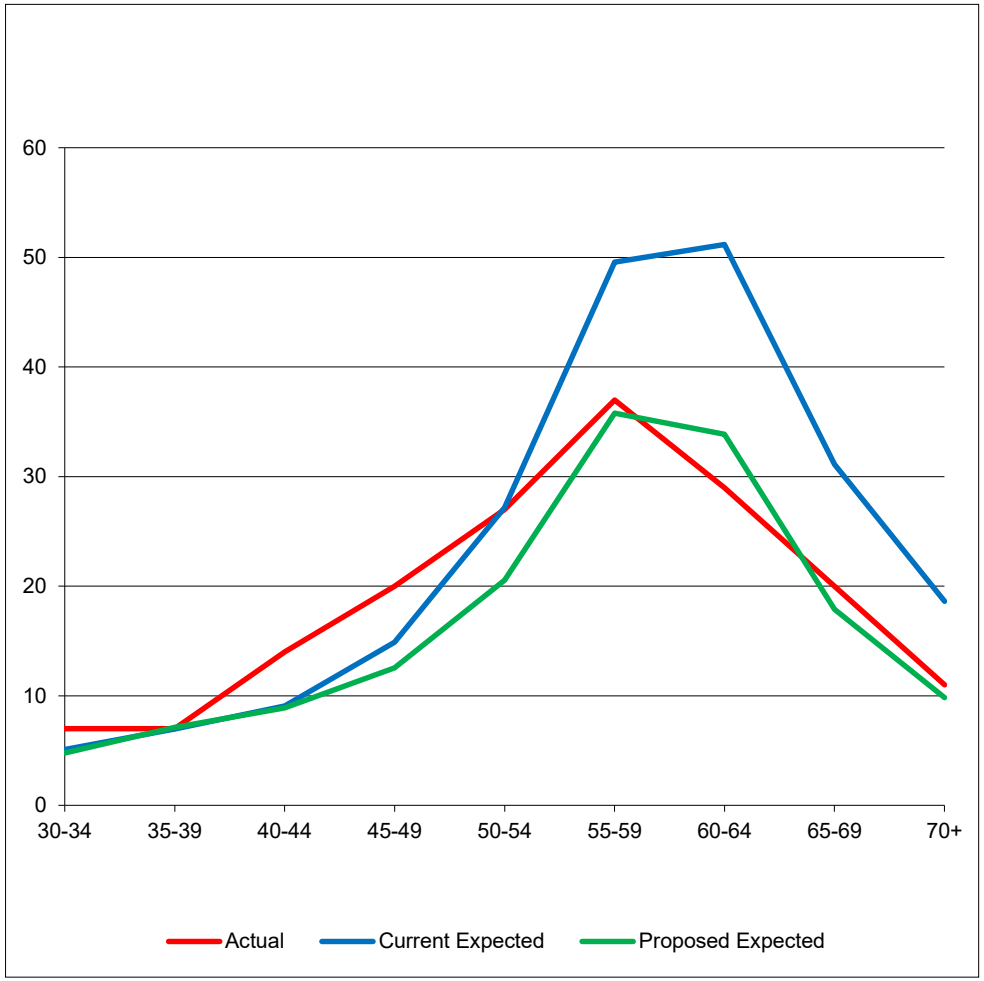
- We propose Pub-2010 mortality tables that differ by plan/group:
  - PERS and PERS DCR
    - Peace/Fire – Pub-2010 *Safety*
    - Others – Pub-2010 *General*
  - TRS and TRS DCR
    - Pub-2010 *Teachers*
  - JRS
    - Pub-2010 *General Above-Median*
  - NGNMRS
    - Pub-2010 *Safety*
- For the mortality improvement scale, we propose updating to the most recently-published generational mortality improvement scale as of the date of each annual valuation

Pre-Commencement Mortality Experience – PERS/PERS DCR

Headcounts – Peace/Fire



Headcounts – Others



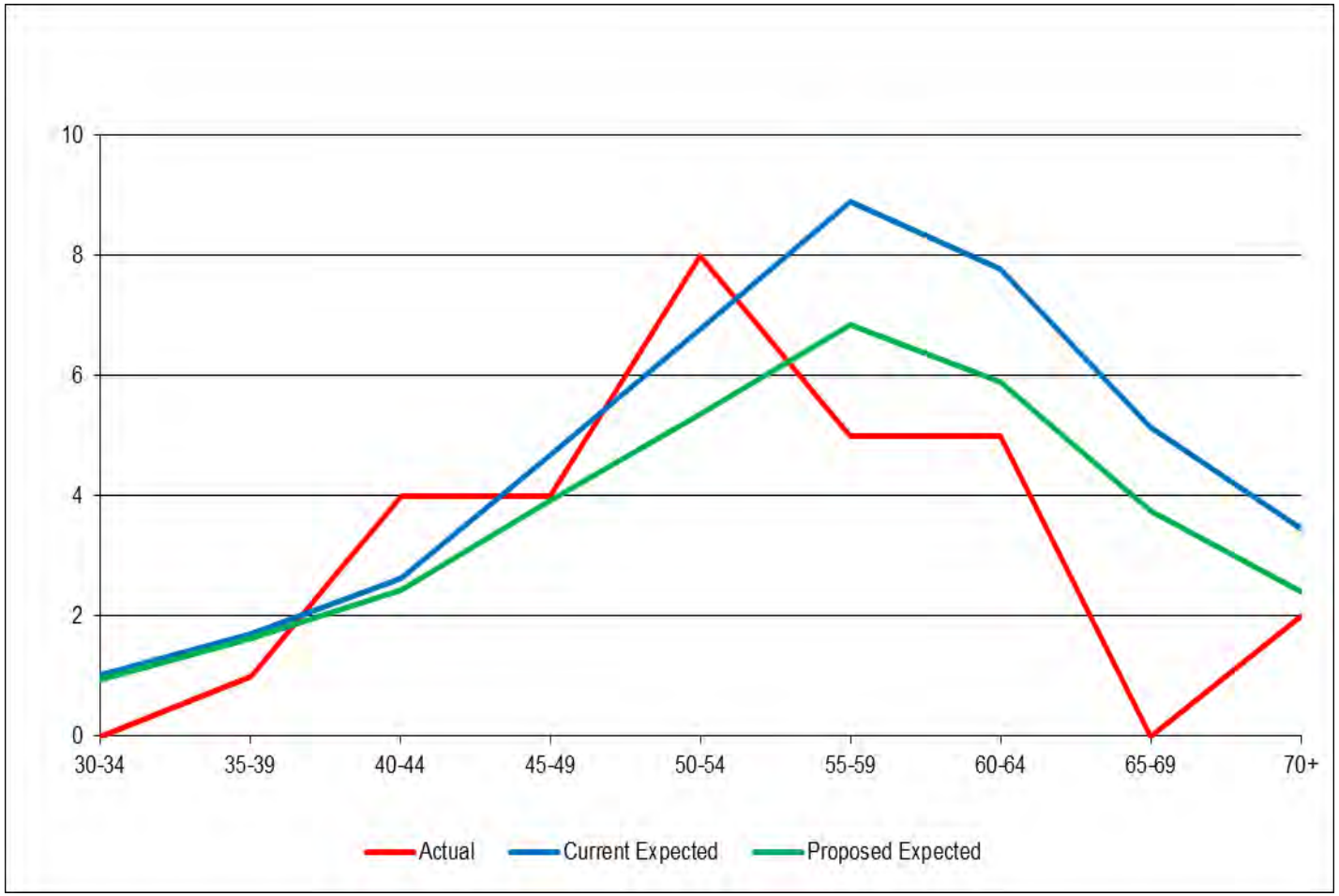
Not enough experience to be statistically credible

Proposed rates for pension: Pub-2010 employee benefit-weighted table (Safety for Peace/Fire; General for Others)

Proposed rates for healthcare: Pub-2010 employee headcount-weighted table (Safety for Peace/Fire; General for Others)

Pre-Commencement Mortality Experience – TRS/TRS DCR

Headcounts



Not enough experience to be statistically credible

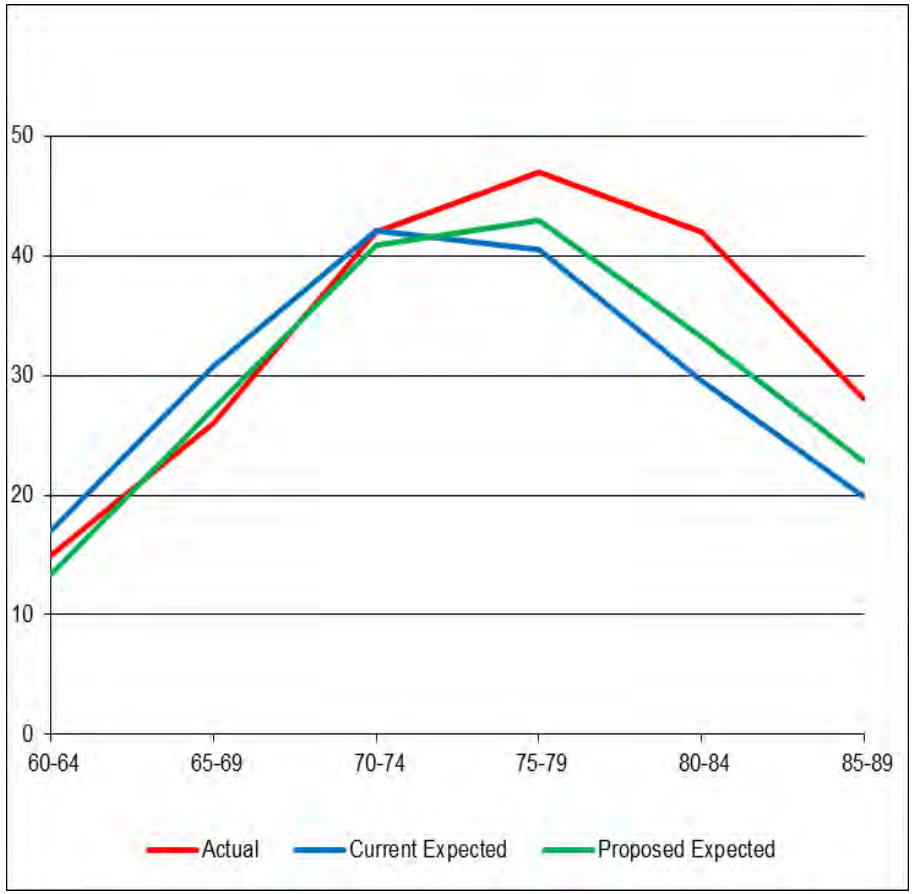
Proposed rates for pension: Pub-2010 employee benefit-weighted Teachers table

Proposed rates for healthcare: Pub-2010 employee headcount-weighted Teachers table

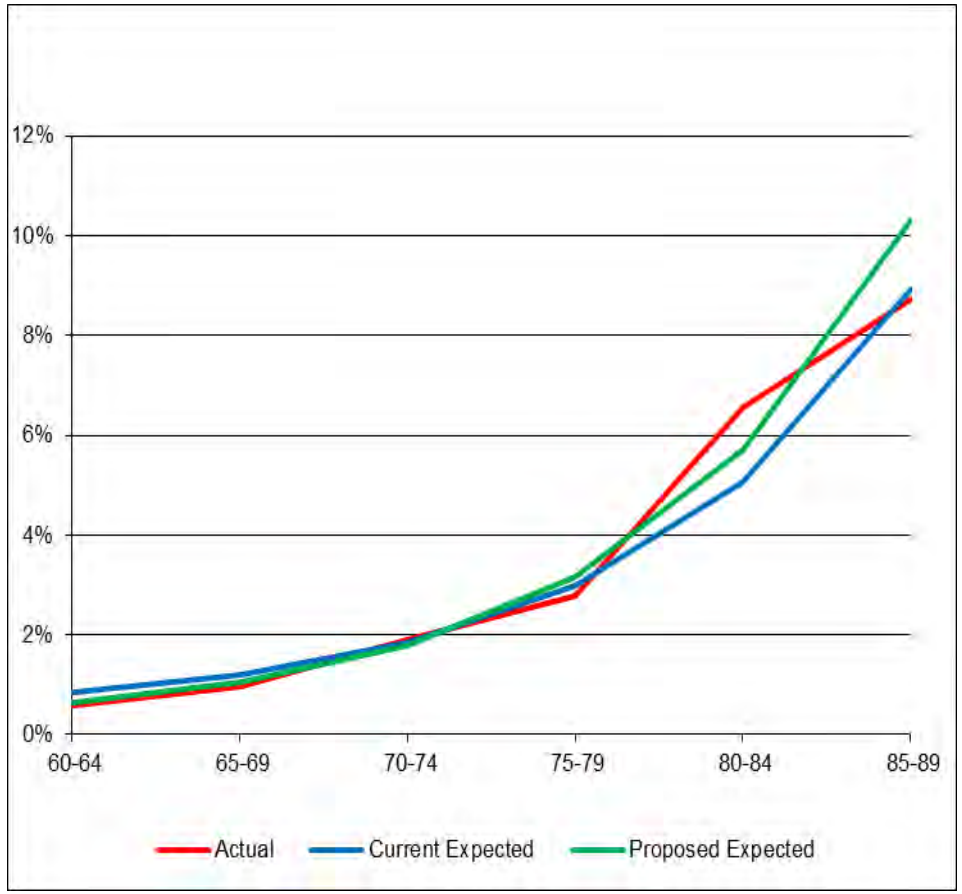
Post-Commencement Mortality Experience – PERS/PERS DCR

Peace/Fire - Retirees

Headcounts



Liability-Weighted Rates



Experience was partially credible

Proposed rates for pension: Pub-2010 Retiree Benefit-Weighted Safety Table

Proposed rates for healthcare: Pub-2010 Retiree Headcount-Weighted Safety Table

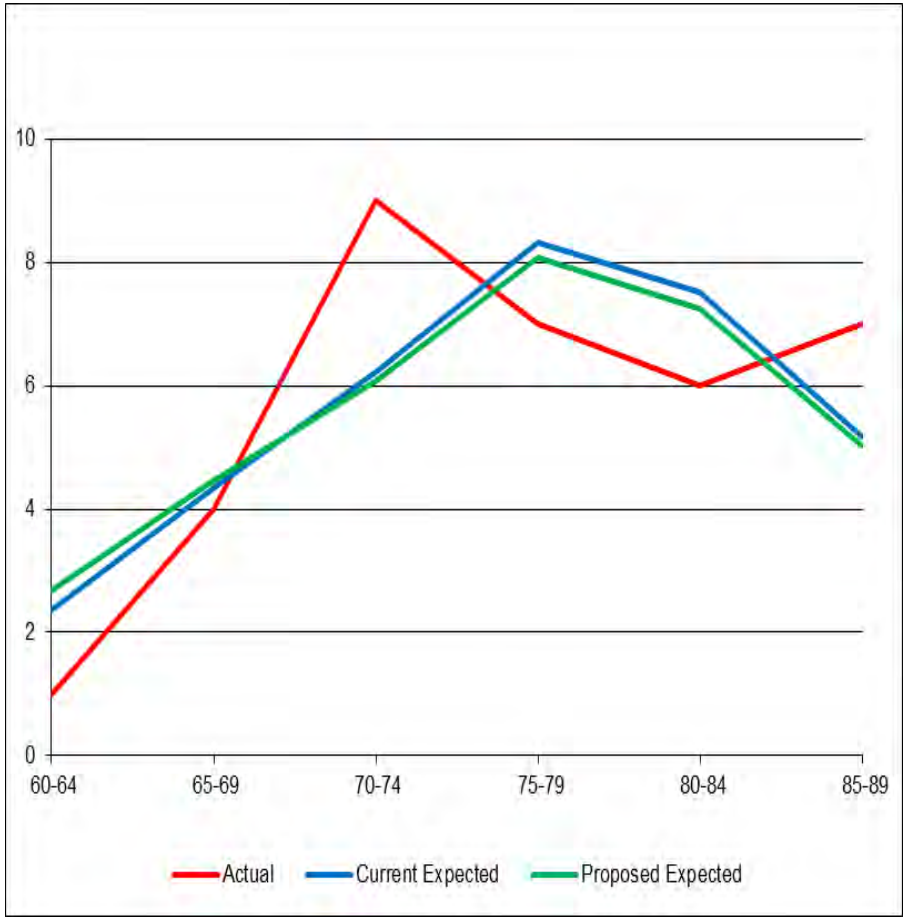
A/E Ratios:

- Current = 92%
- Proposed = 96%

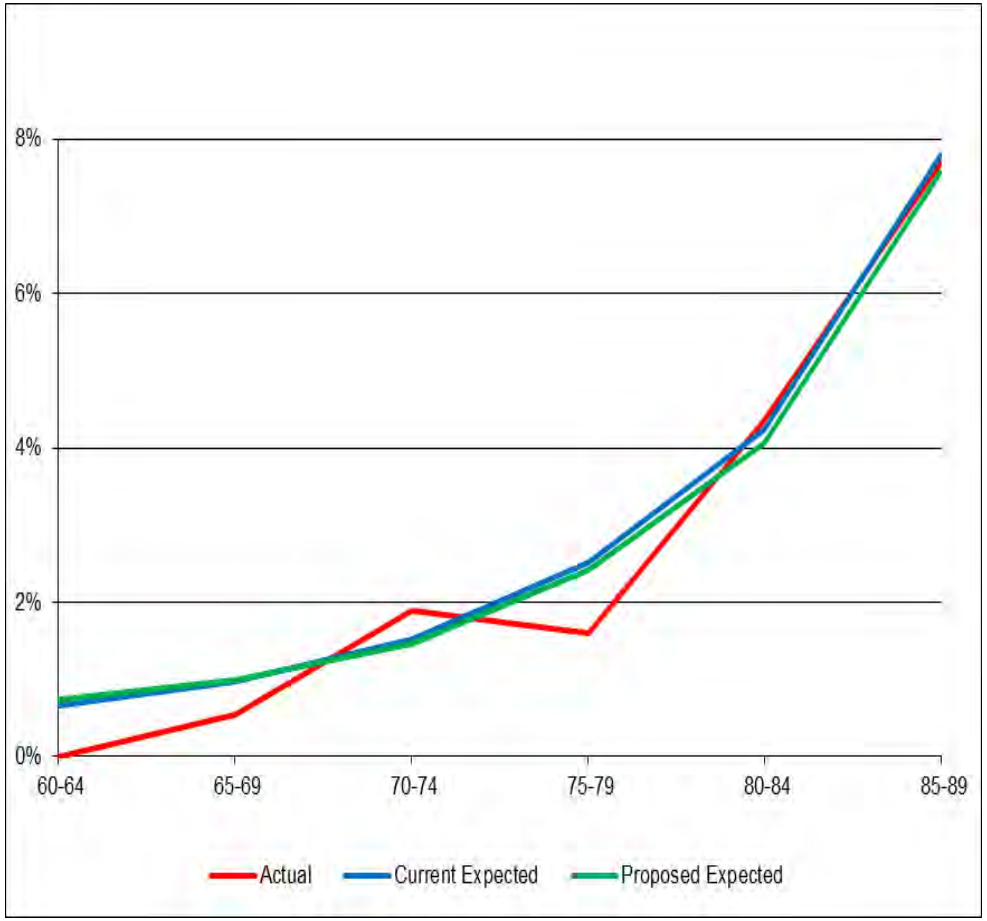
Post-Commencement Mortality Experience – PERS/PERS DCR

Peace/Fire - Beneficiaries

Headcounts



Liability-Weighted Rates



Not enough experience to be statistically credible

Proposed rates for pension: Pub-2010 Contingent Survivor Benefit-Weighted Table

Proposed rates for healthcare: Pub-2010 Contingent Survivor Headcount-Weighted Table

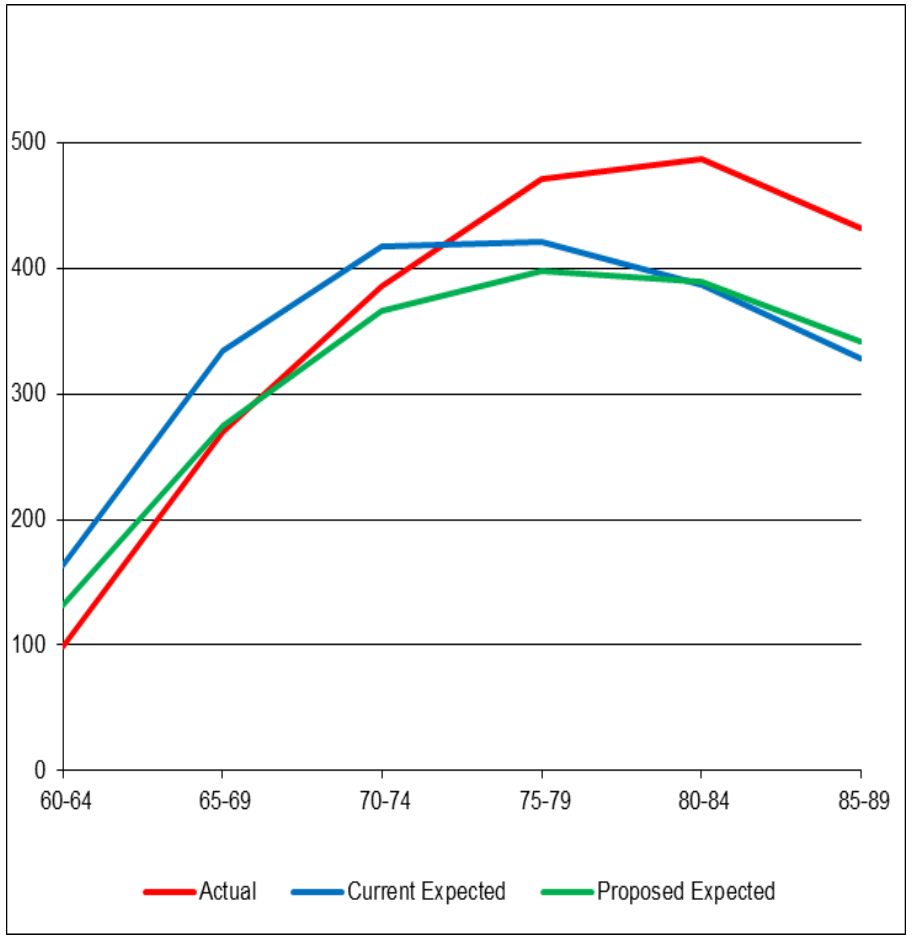
A/E Ratios:

- Current = 91%
- Proposed = 90%

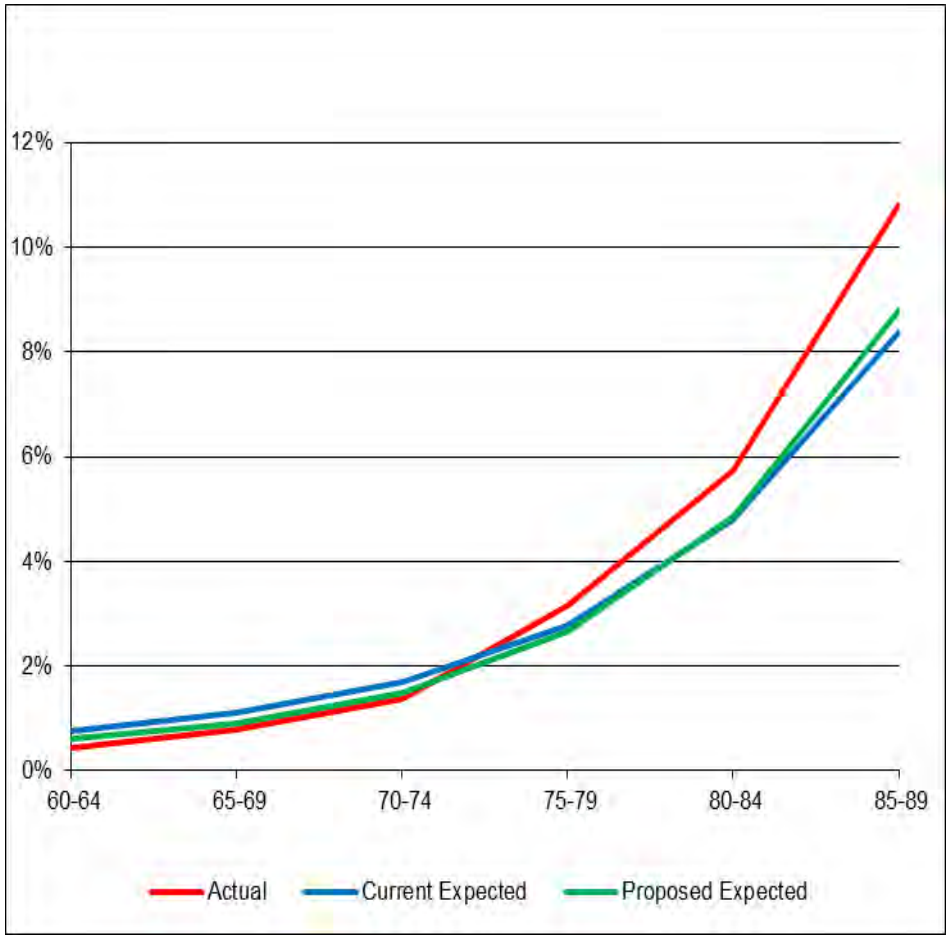
Post-Commencement Mortality Experience – PERS/PERS DCR

Others - Retirees

Headcounts



Liability-Weighted Rates



Experience was partially credible

Proposed rates for pension: Pub-2010 Retiree Benefit-Weighted General Table (98% of male rates; 106% of female rates)

Proposed rates for healthcare: Pub-2010 Retiree Headcount-Weighted General Table (101% of male rates; 110% of female rates)

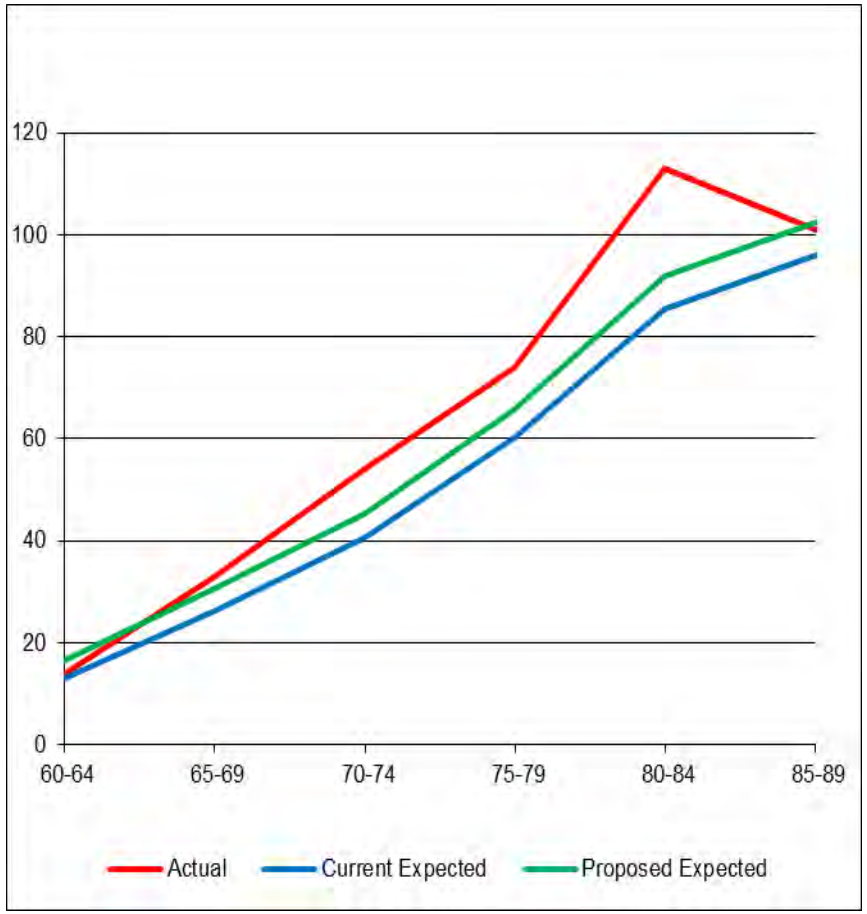
A/E Ratios:

- Current = 91%
- Proposed = 100%

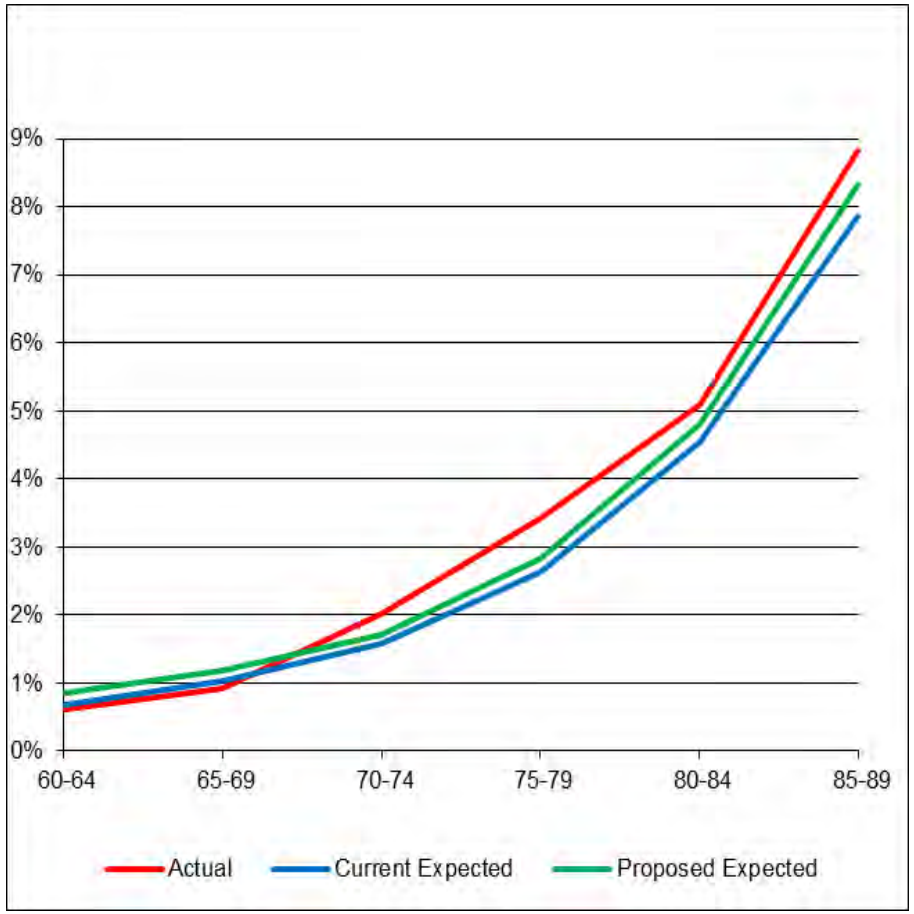
Post-Commencement Mortality Experience – PERS/PERS DCR

Others - Beneficiaries

Headcounts



Liability-Weighted Rates



Experience was partially credible

Proposed rates for pension: Pub-2010 Contingent Survivor Benefit-Weighted Table (102% of male rates; 108% of female rates)

Proposed rates for healthcare: Pub-2010 Contingent Survivor Headcount-Weighted Table (101% of male rates; 108% of female rates)

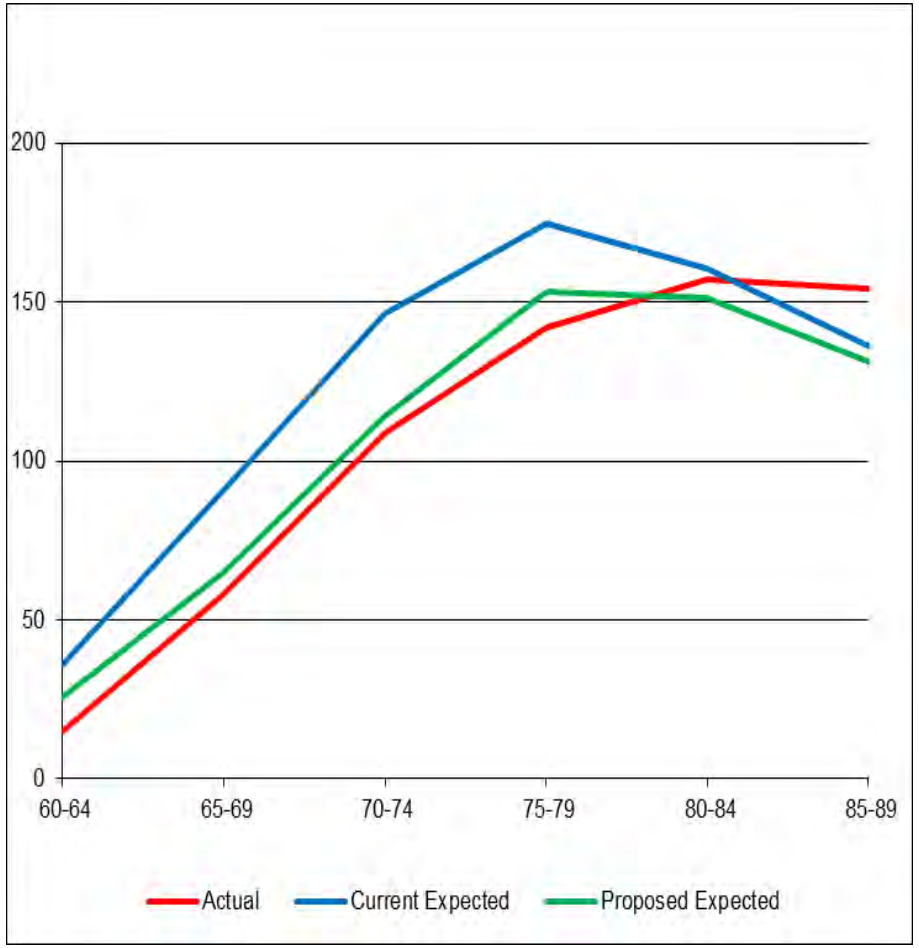
A/E Ratios:

- Current = 119%
- Proposed = 109%

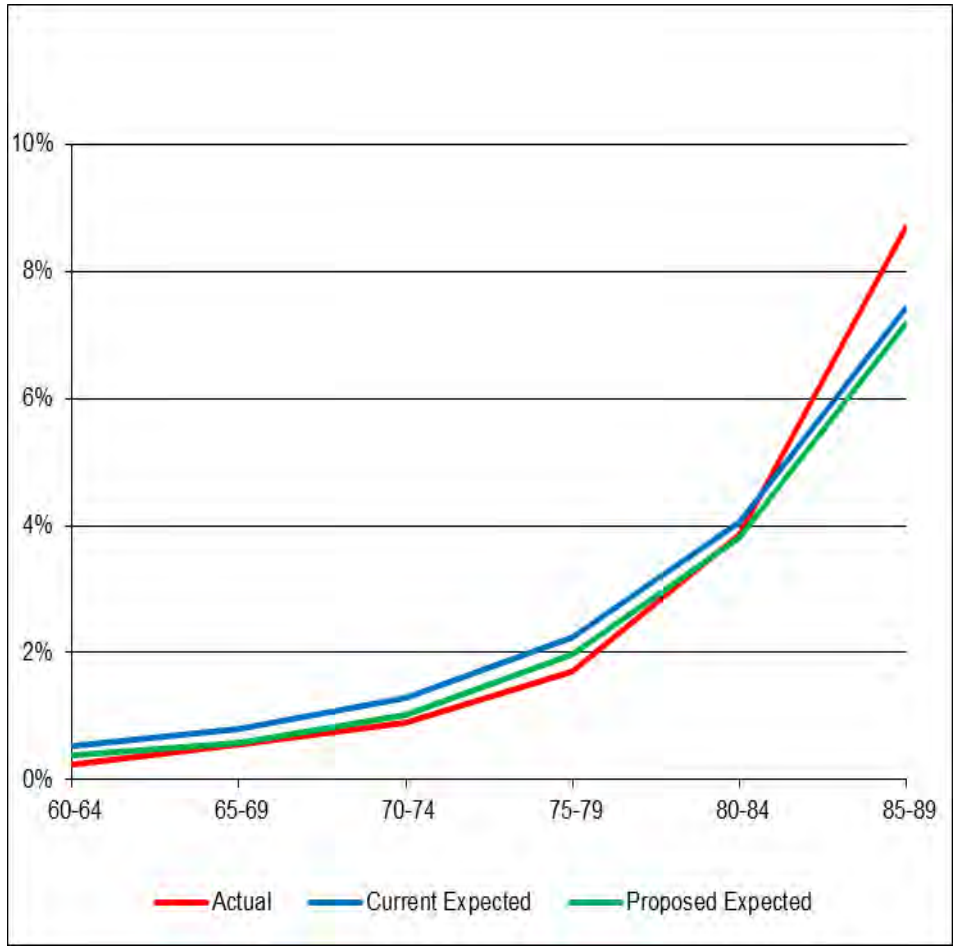
Post-Commencement Mortality Experience – TRS/TRS DCR

Retirees

Headcounts



Liability-Weighted Rates



Experience was partially credible

Proposed rates for pension: Pub-2010 Retiree Benefit-Weighted Teachers Table (97% of male rates; 97% of female rates)

Proposed rates for healthcare: Pub-2010 Retiree Headcount-Weighted Teachers Table (98% of male rates; 100% of female rates)

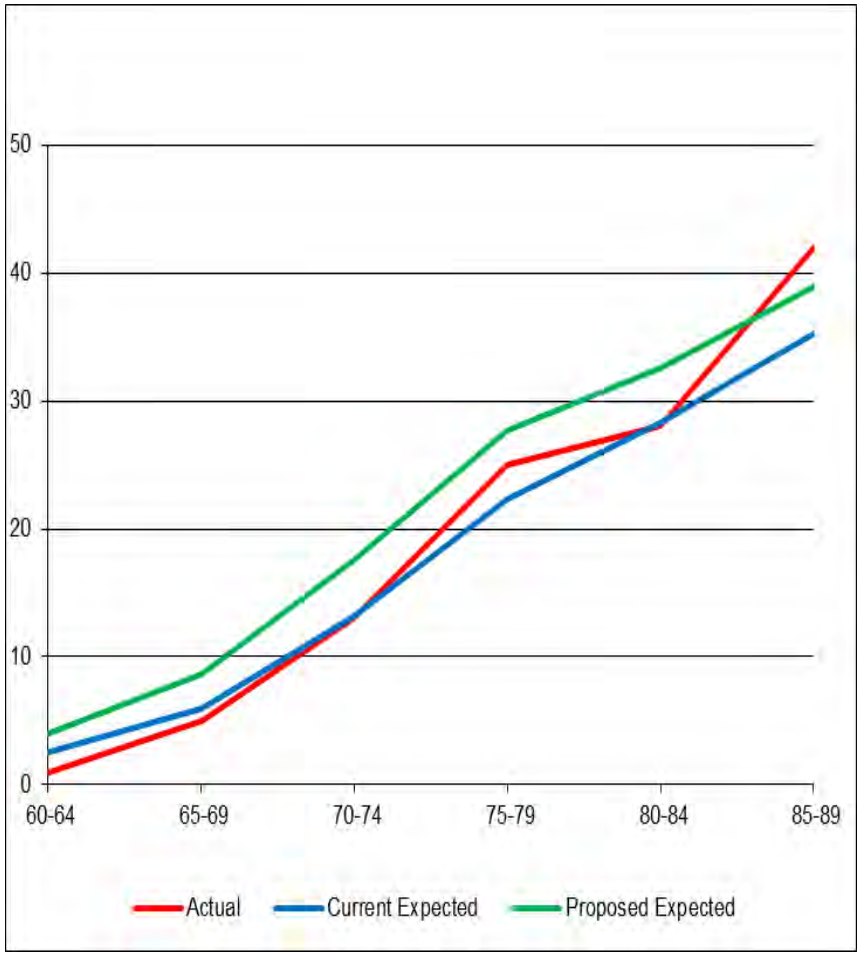
A/E Ratios:

- Current = 84%
- Proposed = 98%

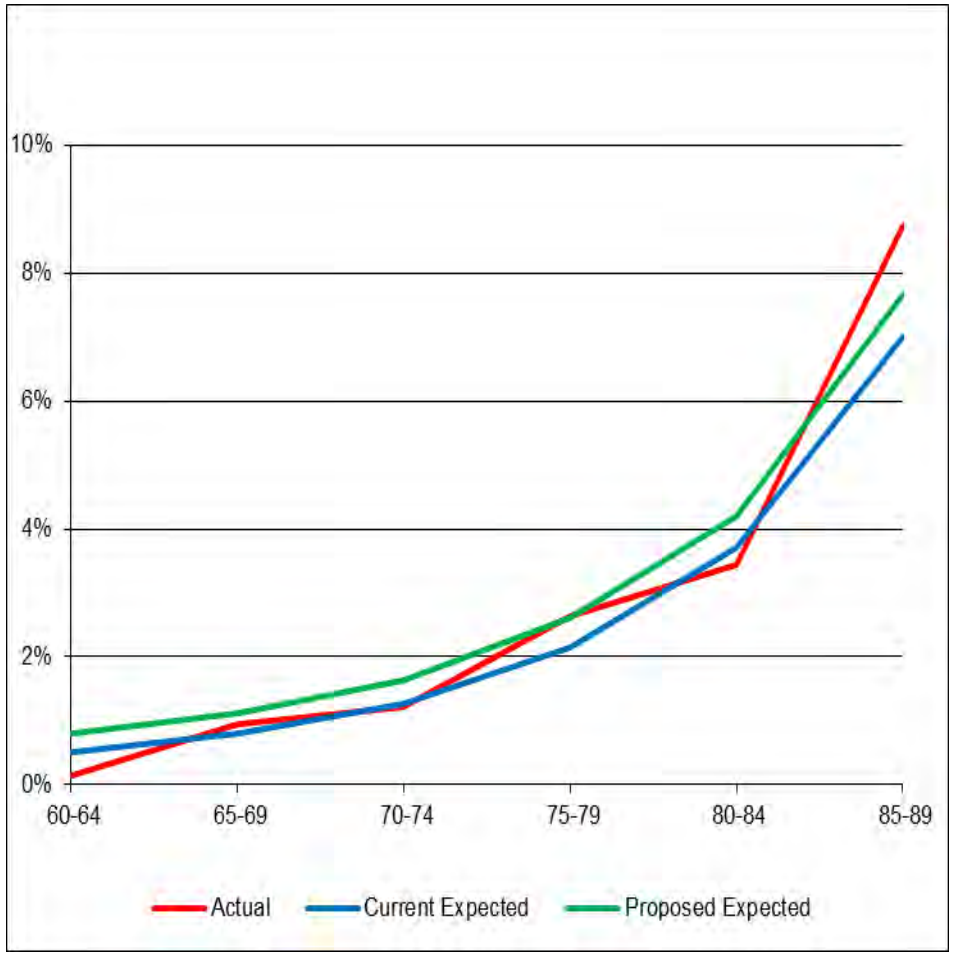
Post-Commencement Mortality Experience – TRS/TRS DCR

Beneficiaries

Headcounts



Liability-Weighted Rates



Experience was partially credible

Proposed rates for pension: Pub-2010 Contingent Survivor Benefit-Weighted Table (100% of male rates; 95% of female rates)

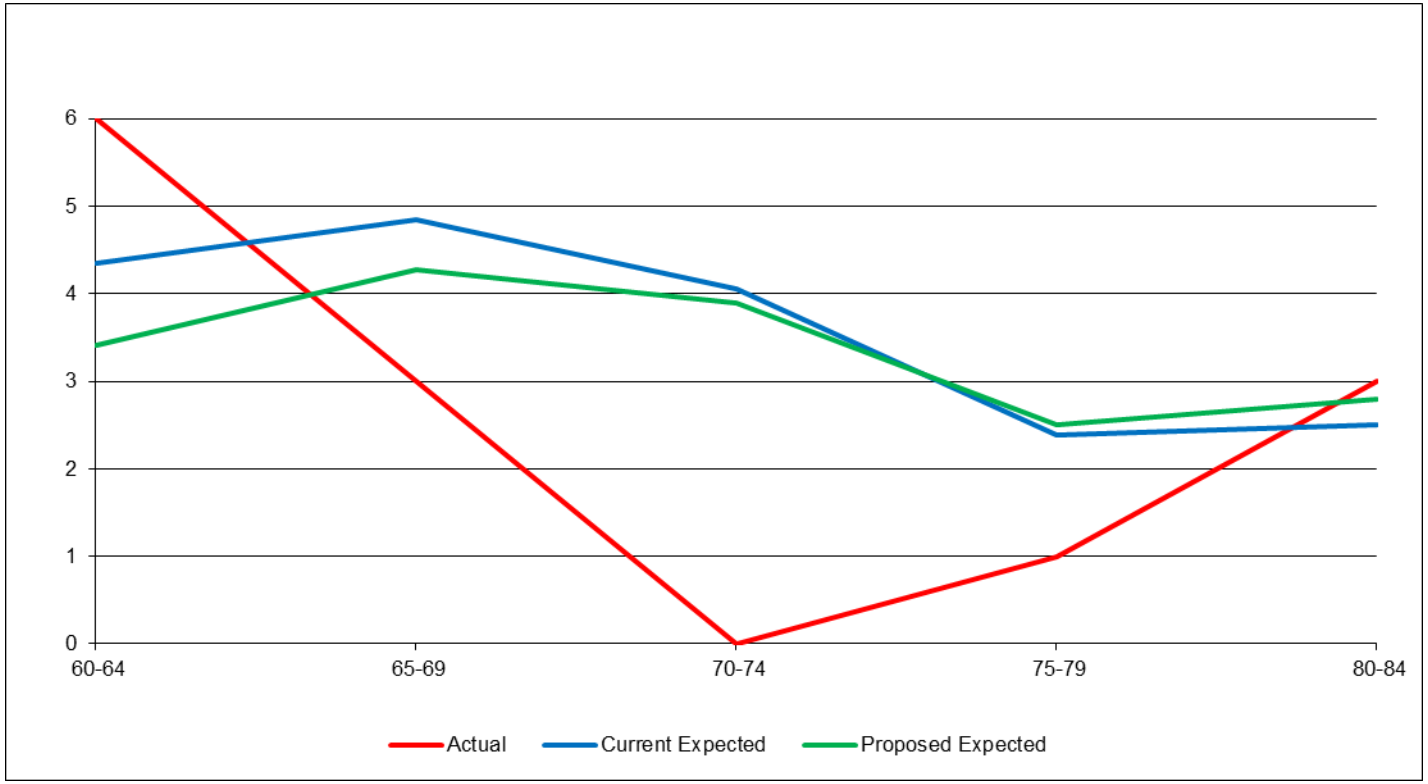
Proposed rates for healthcare: Pub-2010 Contingent Survivor Headcount-Weighted Table (100% of male rates; 94% of female rates)

A/E Ratios:

- Current = 108%
- Proposed = 92%

Post-Commencement Mortality Experience – NGNMRS
Retirees

Headcounts



Not enough experience to be statistically credible

Proposed rates: Pub-2010 employee benefit-weighted Safety table

Current and Proposed Mortality Assumption

Pre-Commencement

Plan	Current Assumption		Proposed Assumption	
	Base Table	Mortality Improvement	Base Table[1]	Mortality Improvement
PERS and PERS DCR				
- Peace/Fire	RP-2014	MP-2017	Pub-2010 Safety	MP-2021[2]
- Others	RP-2014	MP-2017	Pub-2010 General	MP-2021[2]
TRS and TRS DCR	RP-2014 White Collar	MP-2017	Pub-2010 Teachers	MP-2021[2]
JRS	RP-2014 White Collar	MP-2017	Pub-2010 General Above-Median[3]	MP-2021[2]
NGNMRS	RP-2014	MP-2017	Pub-2010 Safety	MP-2021[2]

1. Amount-weighted version for pension, headcount-weighted version for healthcare.
2. We propose annually updating the mortality improvement scale to the most recently-published scale as of the valuation date. The MP-2021 scale was published in October 2021.
3. Above-Median Income table based on salary of the active participant.

Current and Proposed Mortality Assumption (cont'd)

Post-Commencement

Plan	Current Assumption		Proposed Assumption - Pension	
	Base Table	Mortality Improvement	Base Table[1]	Mortality Improvement
PERS and PERS DCR				
- Peace/Fire	RP-2014 (91% male, 96% female)	MP-2017	Pub-2010 Safety (100% male, 100% female)	MP-2021[2]
- Others	RP-2014 (91% male, 96% female)	MP-2017	Pub-2010 General (98% male, 106% female)	MP-2021[2]
TRS and TRS DCR	RP-2014 White Collar (93% male, 90% female)	MP-2017	Pub-2010 Teachers (97% male, 97% female)	MP-2021[2]
JRS	RP-2014 White Collar (93% male, 90% female)	MP-2017	Pub-2010 General Above-Median[3]	MP-2021[2]
NGNMRS	RP-2014 (91% male, 96% female)	MP-2017	Pub-2010 Safety (100% male, 100% female)	MP-2021[2]

1. Amount-weighted version. For beneficiaries, Contingent Annuitant table will be used with adjusted rates (not shown here) based on experience and partial credibility.
2. We propose annually updating the mortality improvement scale to the most recently-published scale as of the valuation date. The MP-2021 scale was published in October 2021.
3. Above-Median Income table based on benefit of the retired participant.

Current and Proposed Mortality Assumption (cont'd)

Post-Commencement

Plan	Current Assumption		Proposed Assumption - Healthcare	
	Base Table	Mortality Improvement	Base Table[1]	Mortality Improvement
PERS and PERS DCR				
- Peace/Fire	RP-2014 (91% male, 96% female)	MP-2017	Pub-2010 Safety (100% male, 100% female)	MP-2021[2]
- Others	RP-2014 (91% male, 96% female)	MP-2017	Pub-2010 General (101% male, 110% female)	MP-2021[2]
TRS and TRS DCR	RP-2014 White Collar (93% male, 90% female)	MP-2017	Pub-2010 Teachers (98% male, 100% female)	MP-2021[2]
JRS	RP-2014 White Collar (93% male, 90% female)	MP-2017	Pub-2010 General Above-Median[3]	MP-2021[2]

1. Headcount-weighted version. For beneficiaries, Contingent Annuitant table will be used with adjusted rates (not shown here) based on experience and partial credibility.
2. We propose annually updating the mortality improvement scale to the most recently-published scale as of the valuation date. The MP-2021 scale was published in October 2021.
3. Above-Median Income table based on benefit of the retired participant.

Retirement Assumption

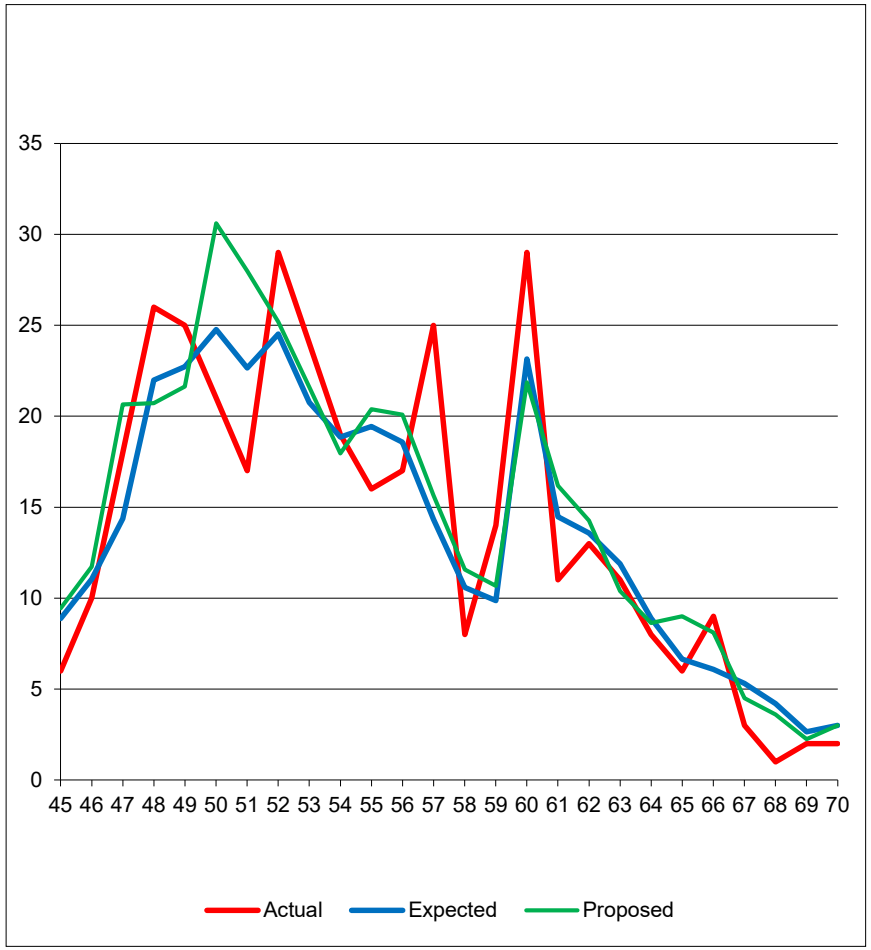
Retirement Assumption

- The retirement assumption is used to project the ages at which active participants are expected to retire

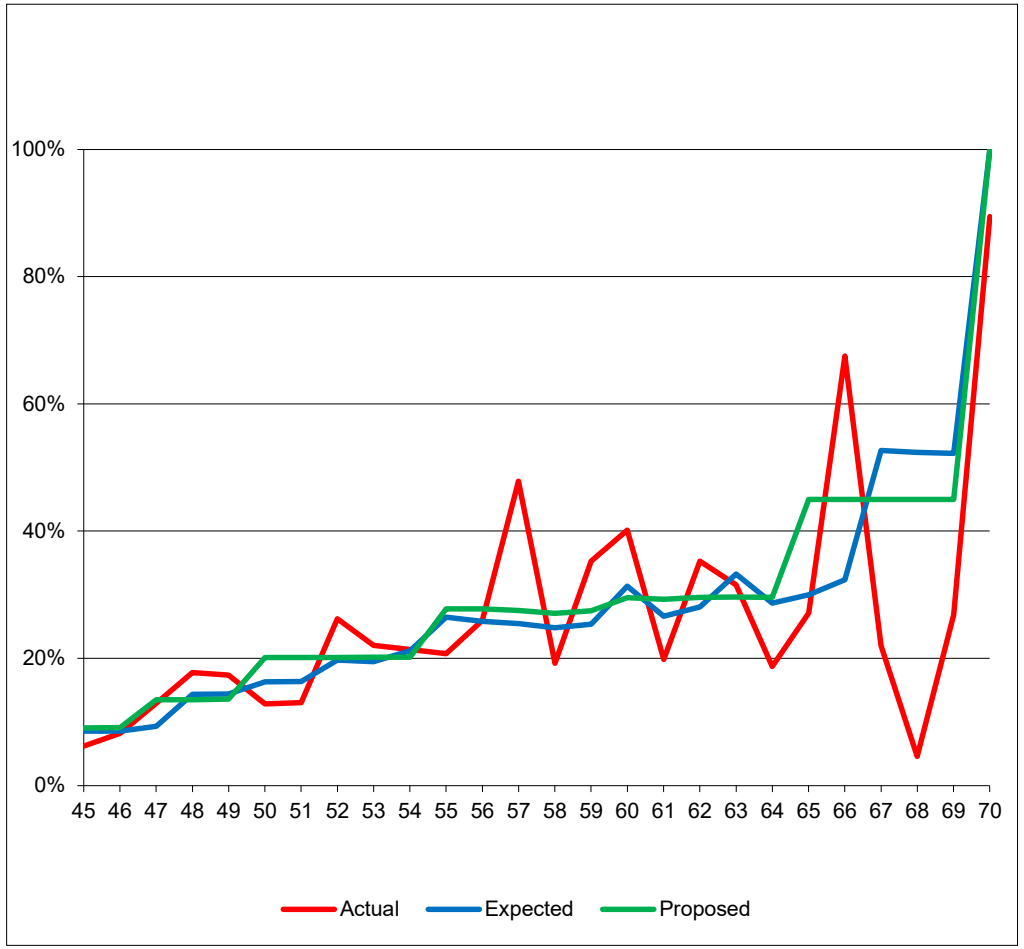
- Different groups are eligible for *unreduced* retirement benefits if they meet certain age and/or service requirements; otherwise, they are eligible for *reduced* retirement benefits

Unreduced Retirement Experience - PERS P/F

Headcounts



Liability-Weighted Rates



Counts:

- Actual = 385
- Expected = 386
- Proposed = 412

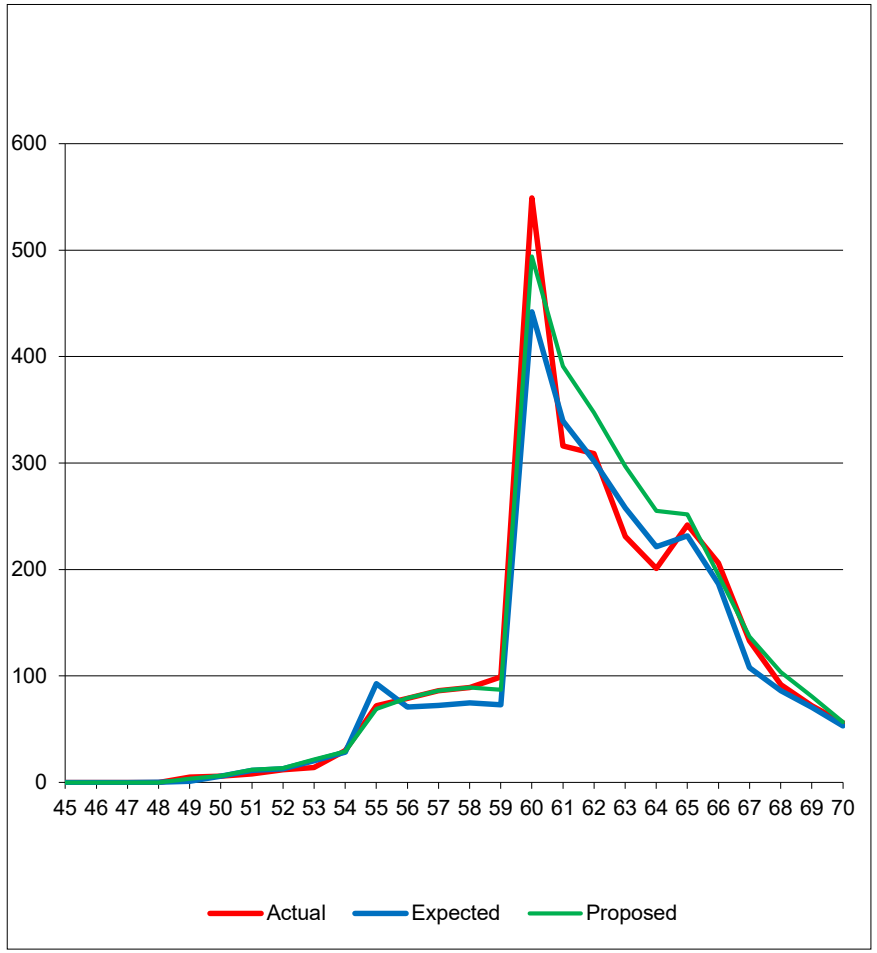
Proposed rates are adjustments to rates at all ages to better match recent experience based on *liability-weighted* A/E ratios.

A/E Ratios:

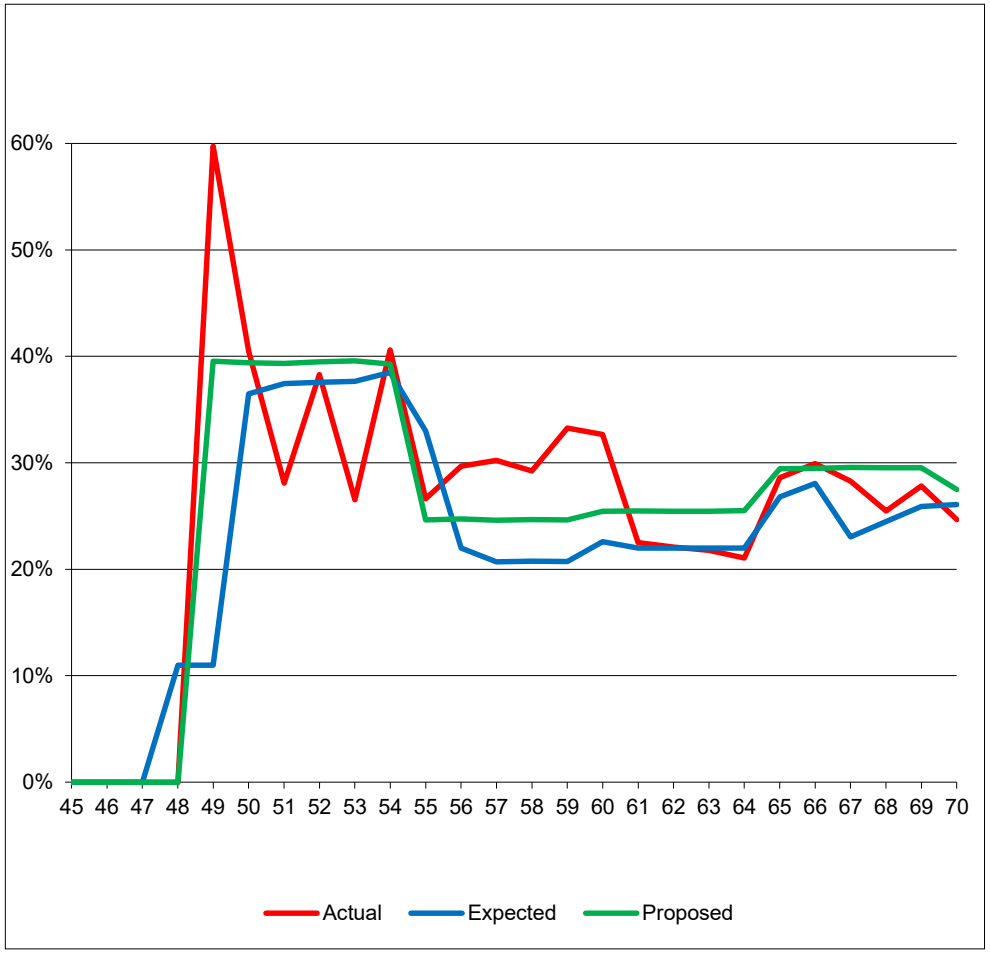
- Current = 105%
- Proposed = 98%

Unreduced Retirement Experience - PERS Others

Headcounts



Liability-Weighted Rates



Counts:

- Actual = 3,060
- Expected = 2,987
- Proposed = 3,321

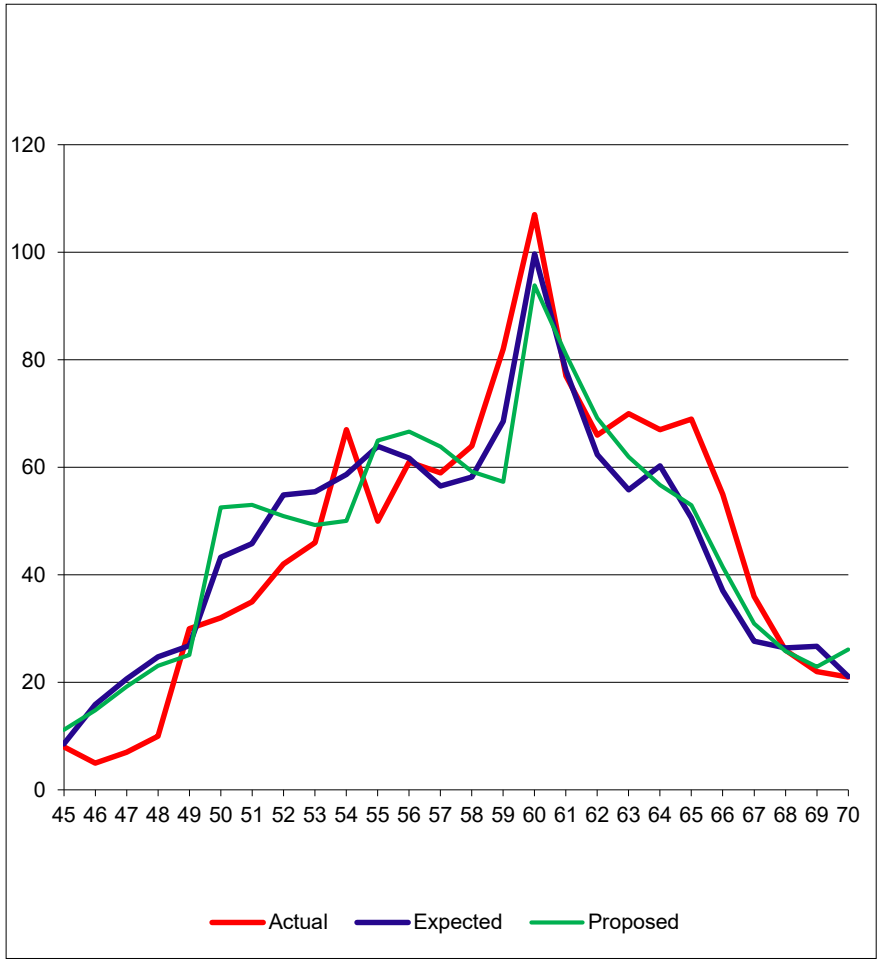
Proposed rates are adjustments to rates at all ages to better match recent experience based on *liability-weighted* A/E ratios.

A/E Ratios:

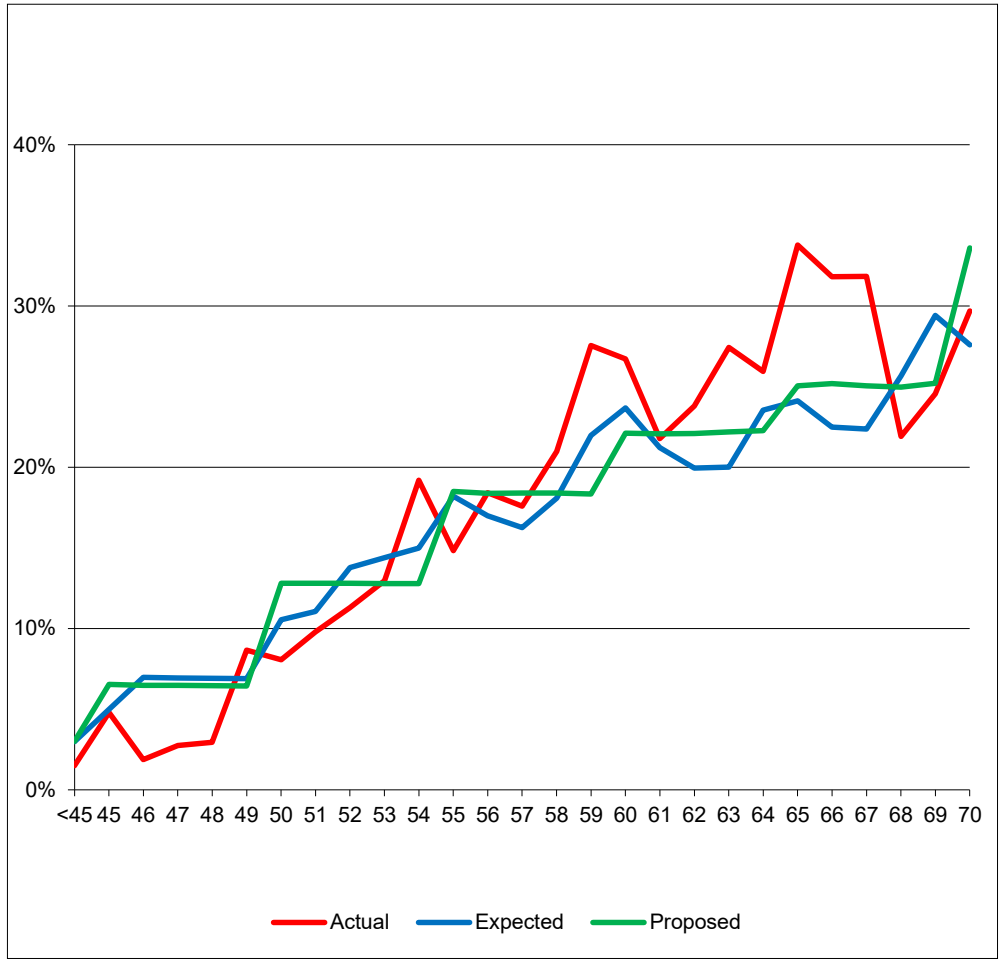
- Current = 111%
- Proposed = 100%

Unreduced Retirement Experience - TRS

Headcounts



Liability-Weighted Rates



Counts:

- Actual = 1,262
- Expected = 1,303
- Proposed = 1,317

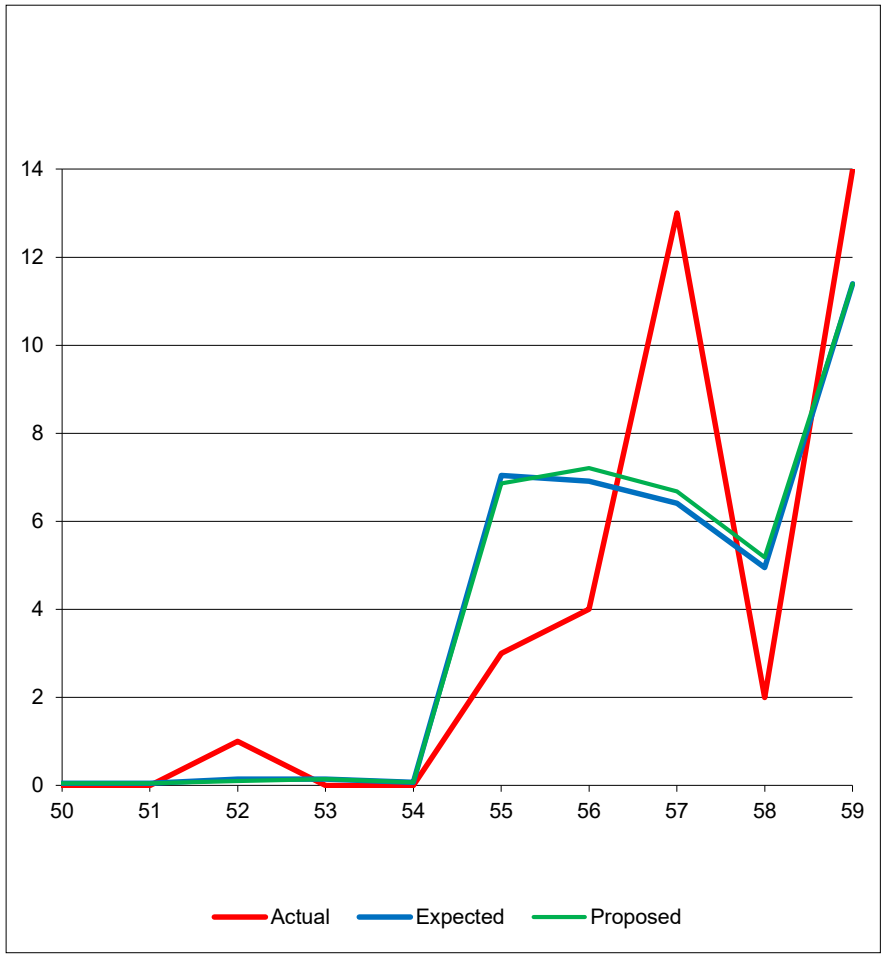
Proposed rates are adjustments to rates at all ages to better match recent experience based on *liability-weighted* A/E ratios.

A/E Ratios:

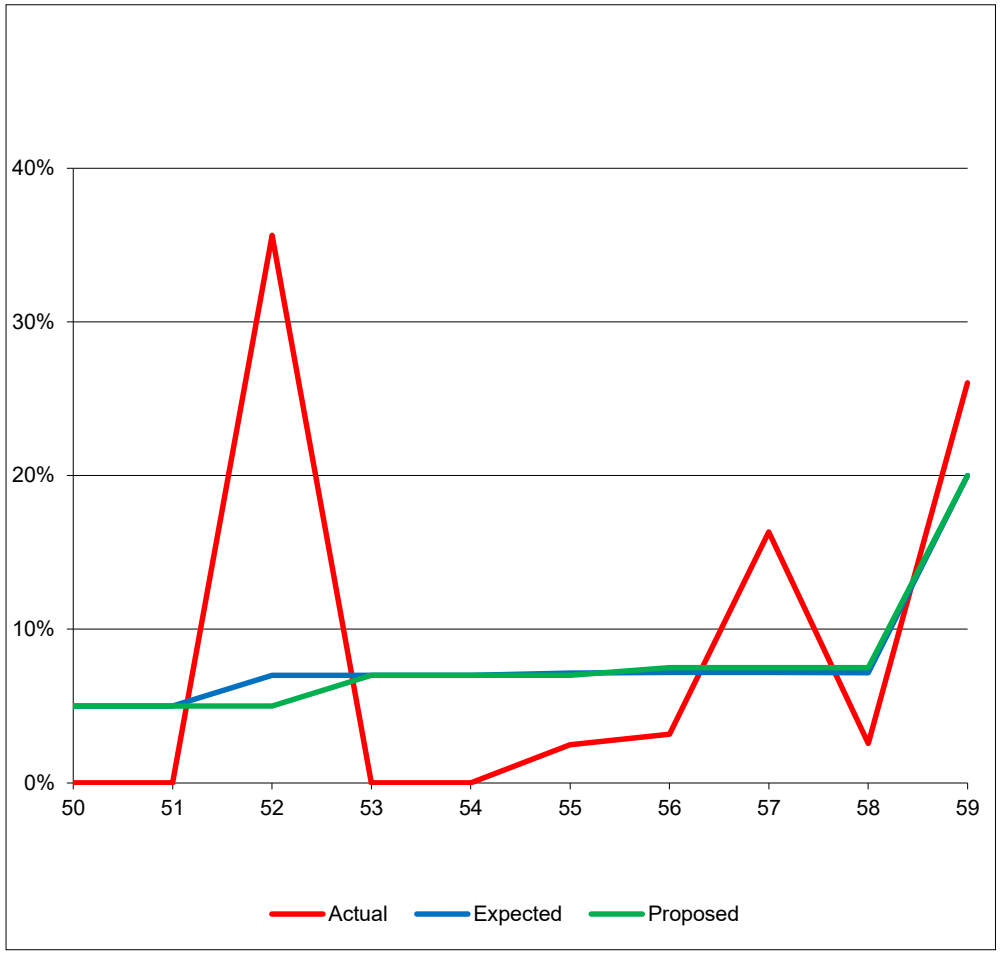
- Current = 102%
- Proposed = 101%

Reduced Retirement Experience - PERS P/F

Headcounts



Liability-Weighted Rates



Counts:

- Actual = 37
- Expected = 37
- Proposed = 38

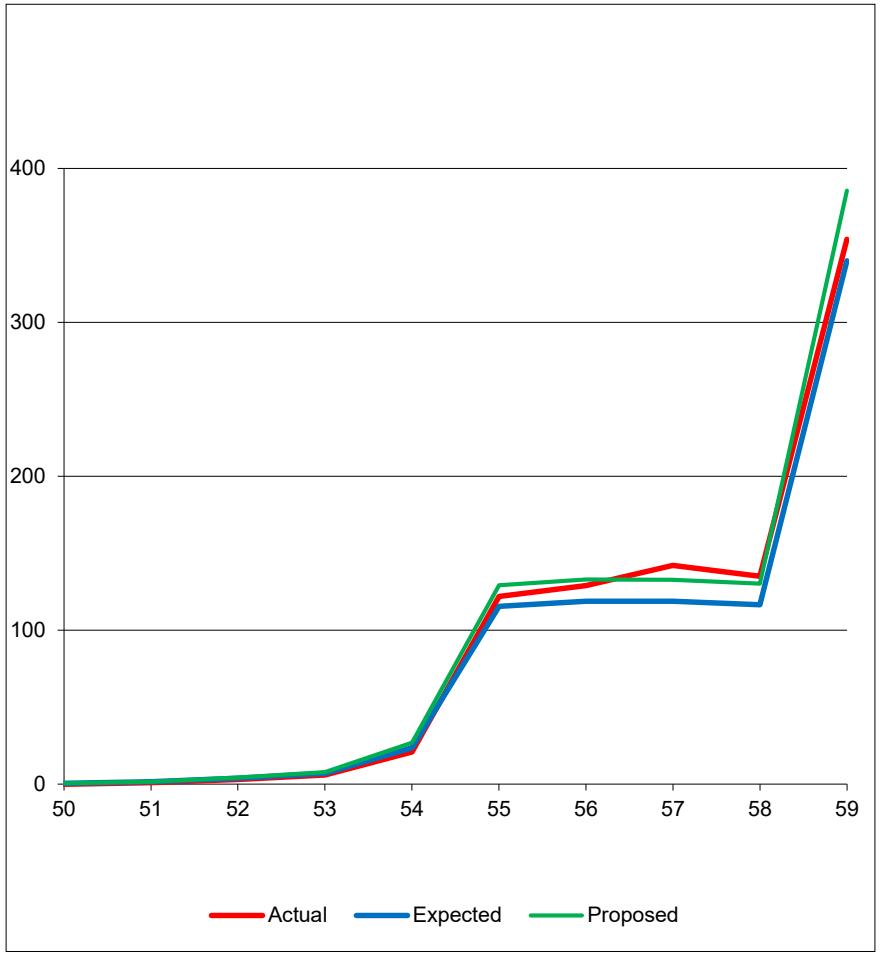
Proposed rates are minor adjustments to rates at all ages to better match recent experience based on *liability-weighted* A/E ratios.

A/E Ratios:

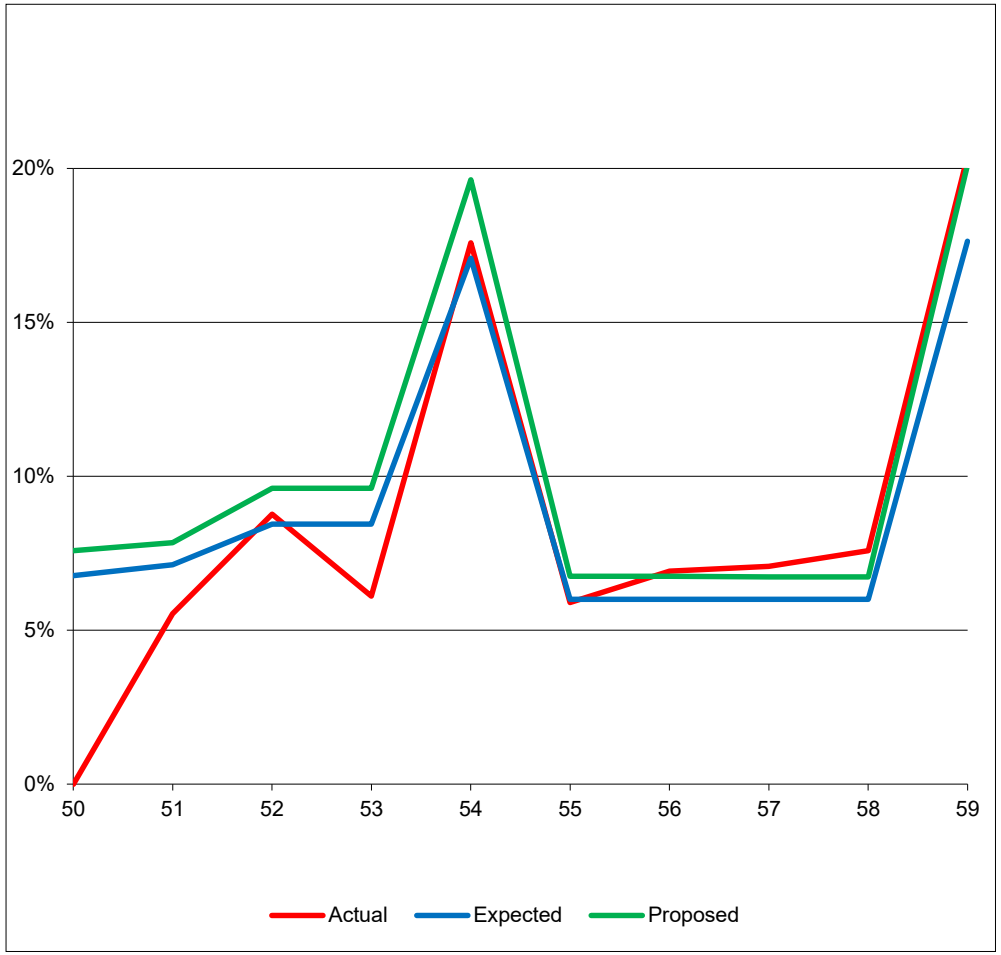
- Current = 101%
- Proposed = 100%

Reduced Retirement Experience - PERS Others

Headcounts



Liability-Weighted Rates



Counts:

- Actual = 913
- Expected = 846
- Proposed = 952

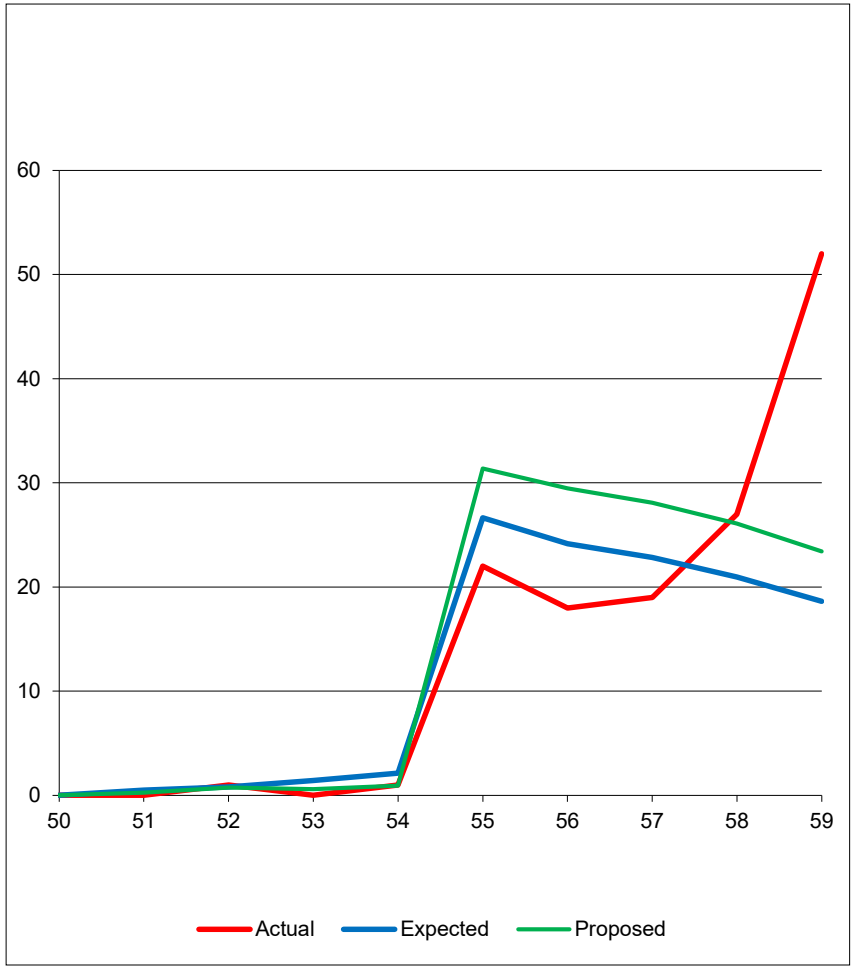
Proposed rates are adjustments to rates at all ages to better match recent experience based on *liability-weighted* A/E ratios.

A/E Ratios:

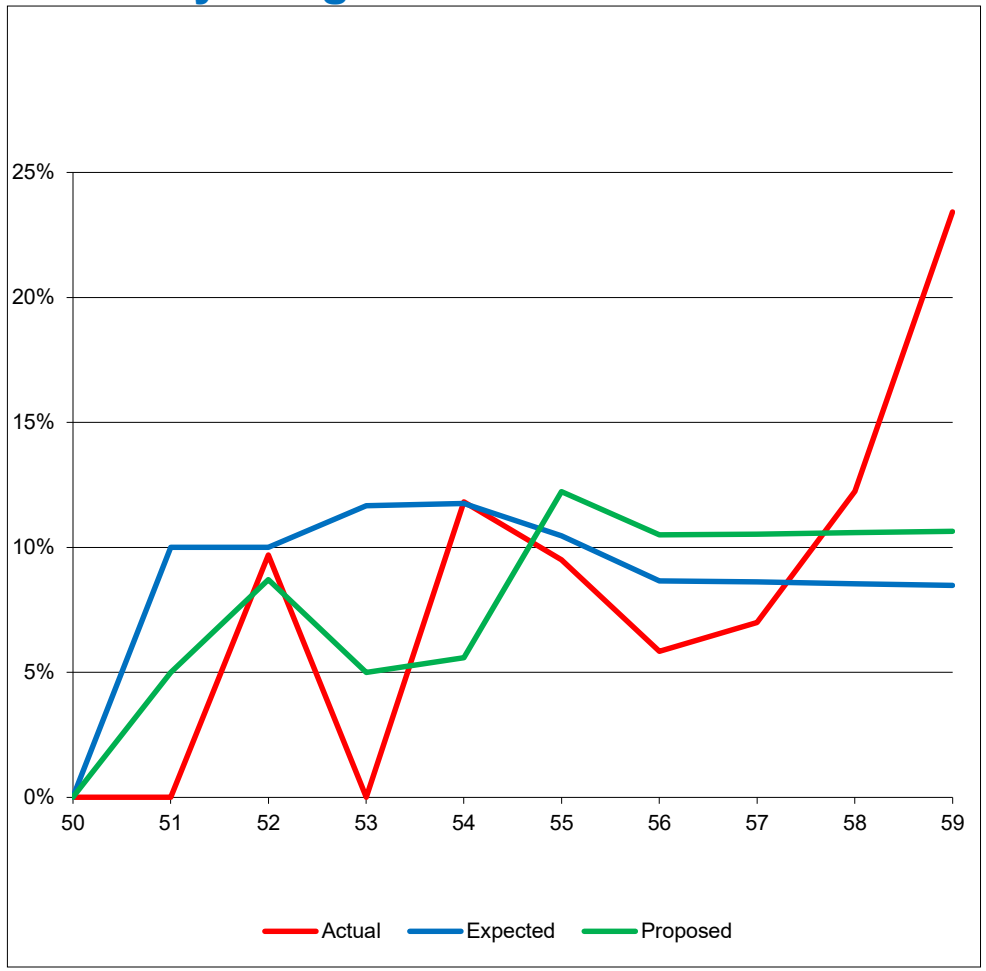
- Current = 114%
- Proposed = 100%

Reduced Retirement Experience - TRS

Headcounts



Liability-Weighted Rates



Counts:

- Actual = 140
- Expected = 118
- Proposed = 141

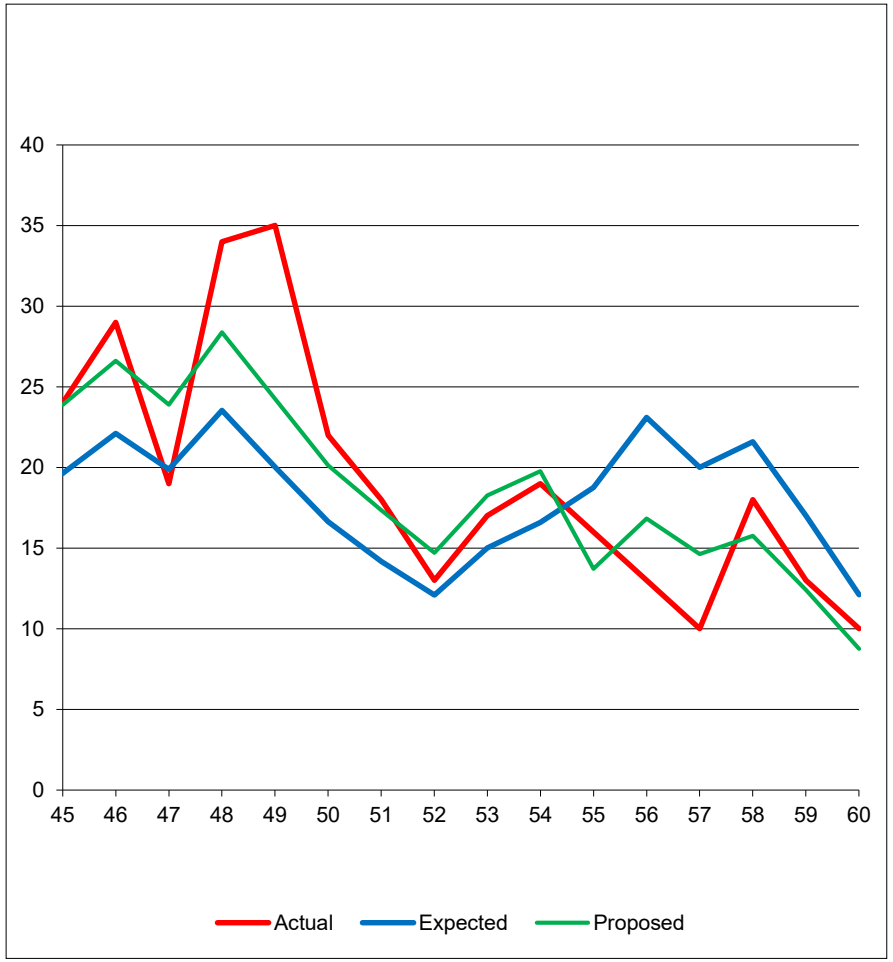
Proposed rates are adjustments to rates at all ages to better match recent experience based on *liability-weighted* A/E ratios.

A/E Ratios:

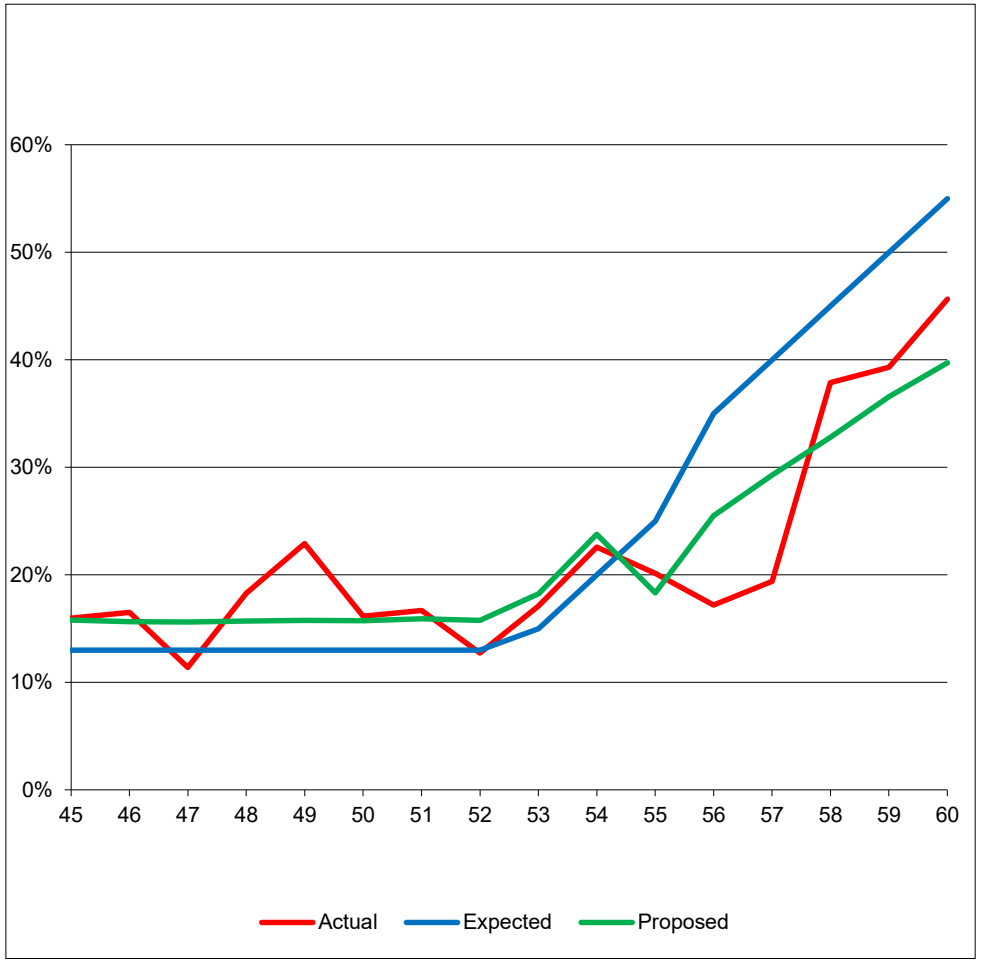
- Current = 122%
- Proposed = 103%

Retirement Experience - NGNMRS

Headcounts



Liability-Weighted Rates



Counts:

- Actual = 482
- Expected = 431
- Proposed = 465

Proposed rates are adjustments to rates at all ages to better match recent experience based on *liability-weighted* A/E ratios.

A/E Ratios:

- Current = 104%
- Proposed = 100%

Withdrawal Assumption

Withdrawal Assumption

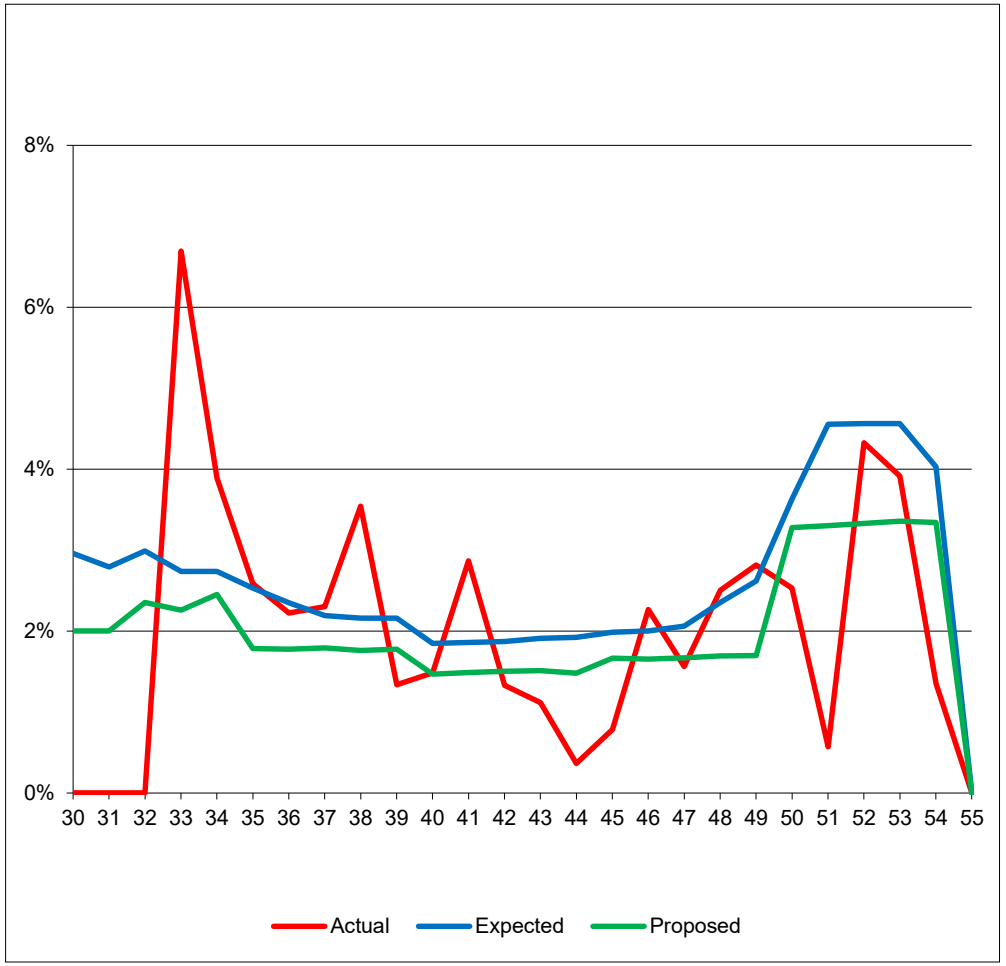
- The withdrawal assumption is used to project the ages at which active participants are expected to terminate employment

- The withdrawal assumption typically reflects *select* and *ultimate* rates
  - Withdrawal rates are assumed to be higher during the first few years of employment (the “select period”)
  - Beyond the select period, withdrawal rates decrease by age

Withdrawal Experience - PERS P/F

Headcounts

Liability-Weighted Rates



Counts:

- Actual = 71
- Expected = 83
- Proposed = 65

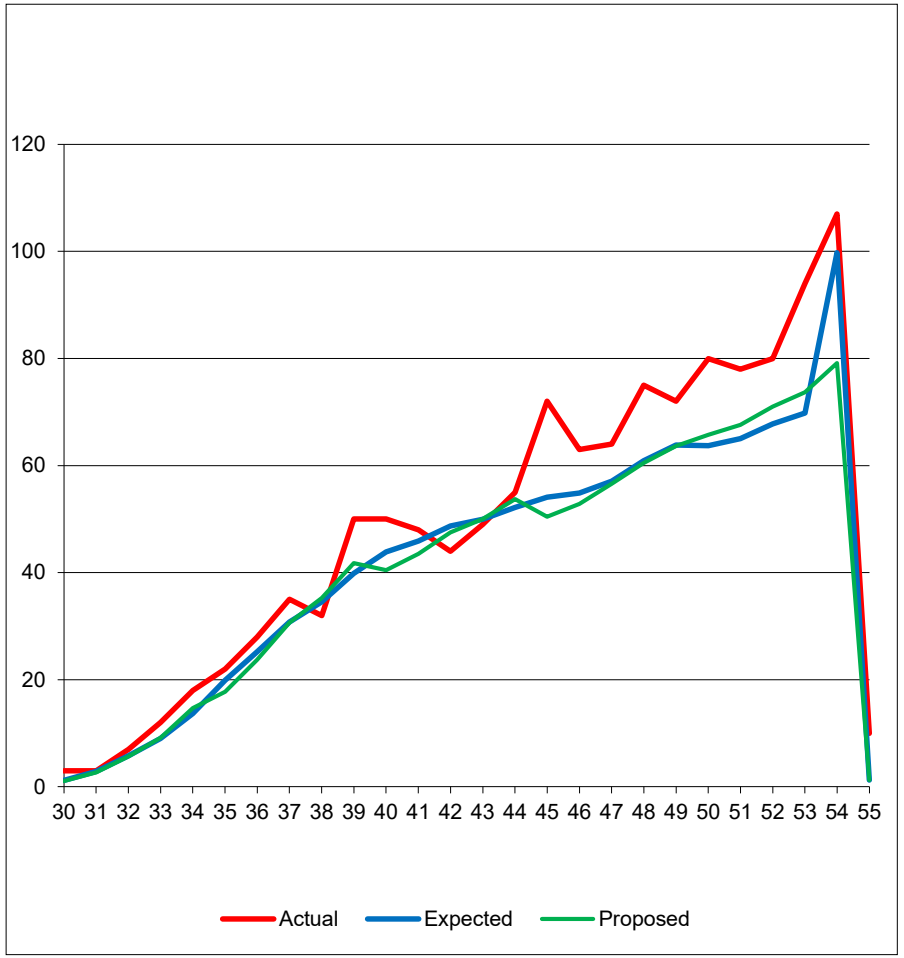
Proposed rates are adjustments to rates at all ages to better match recent experience based on *liability-weighted* A/E ratios.

A/E Ratios:

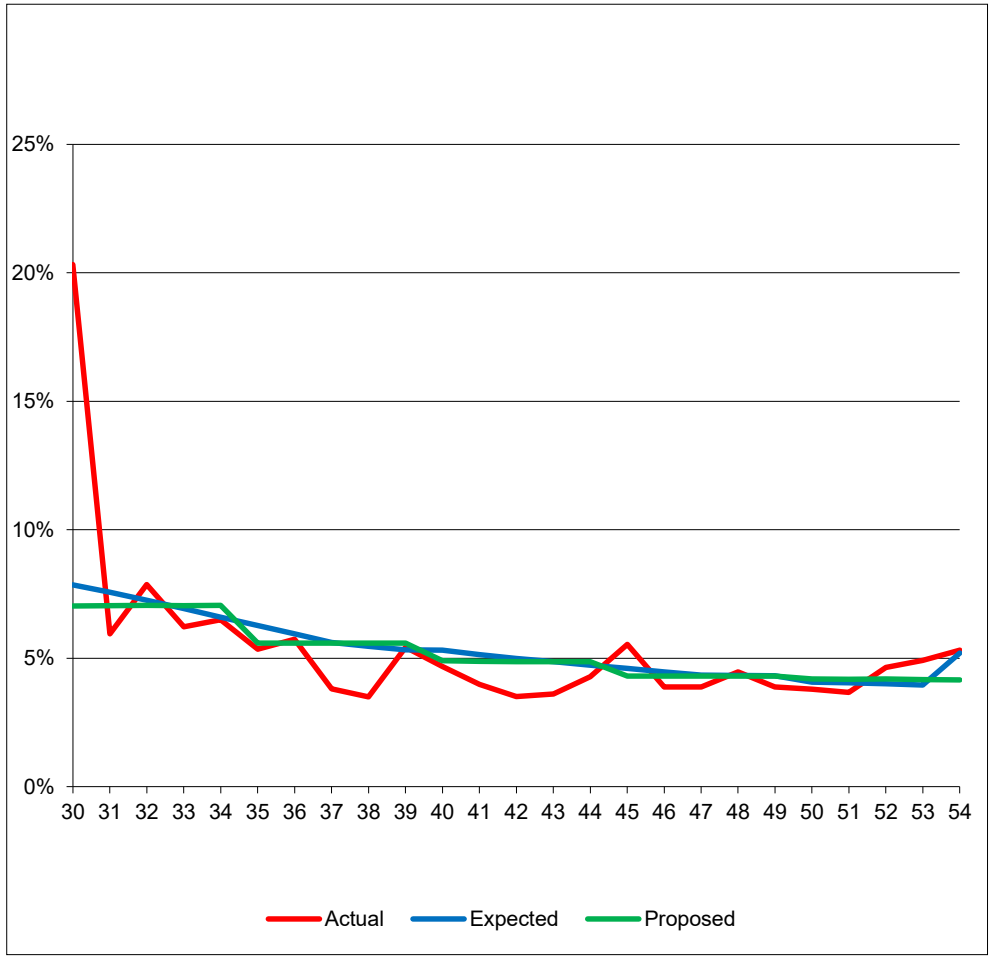
- Current = 78%
- Proposed = 100%

Withdrawal Experience - PERS Others

Headcounts



Liability-Weighted Rates



Counts:

- Actual = 1,306
- Expected = 1,092
- Proposed = 1,070

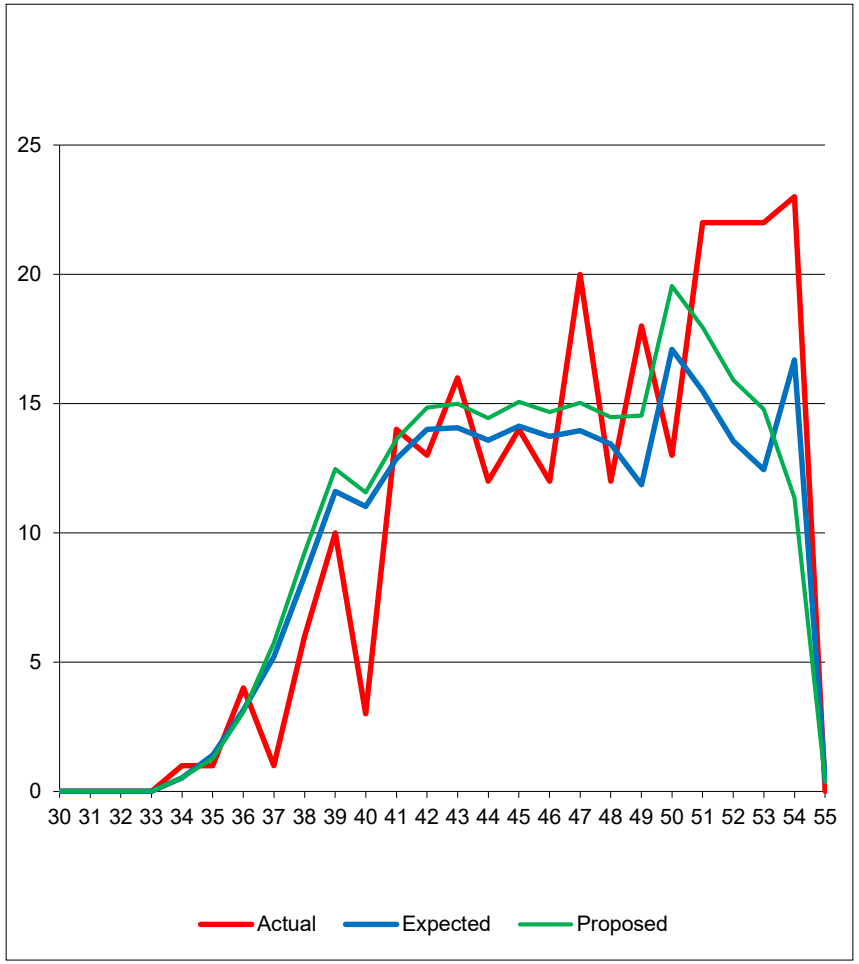
Proposed rates are adjustments to rates at all ages to better match recent experience based on *liability-weighted* A/E ratios.

A/E Ratios:

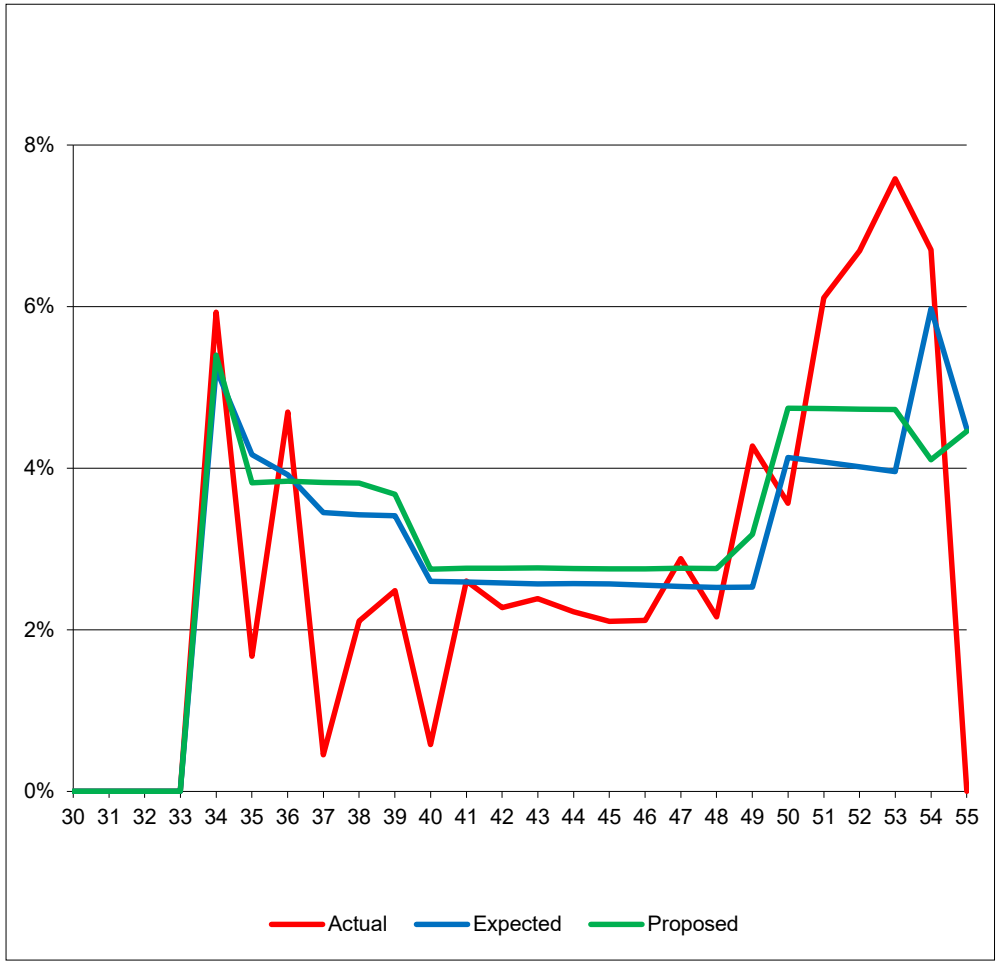
- Current = 97%
- Proposed = 99%

Withdrawal Experience - TRS

Headcounts



Liability-Weighted Rates



Counts:

- Actual = 270
- Expected = 241
- Proposed = 258

Proposed rates are adjustments to rates at all ages to better match recent experience based on *liability-weighted* A/E ratios.

A/E Ratios:

- Current = 108%
- Proposed = 100%

Withdrawal Experience – PERS DCR

Select (less than 5 years of service)

Headcounts – Peace/Fire

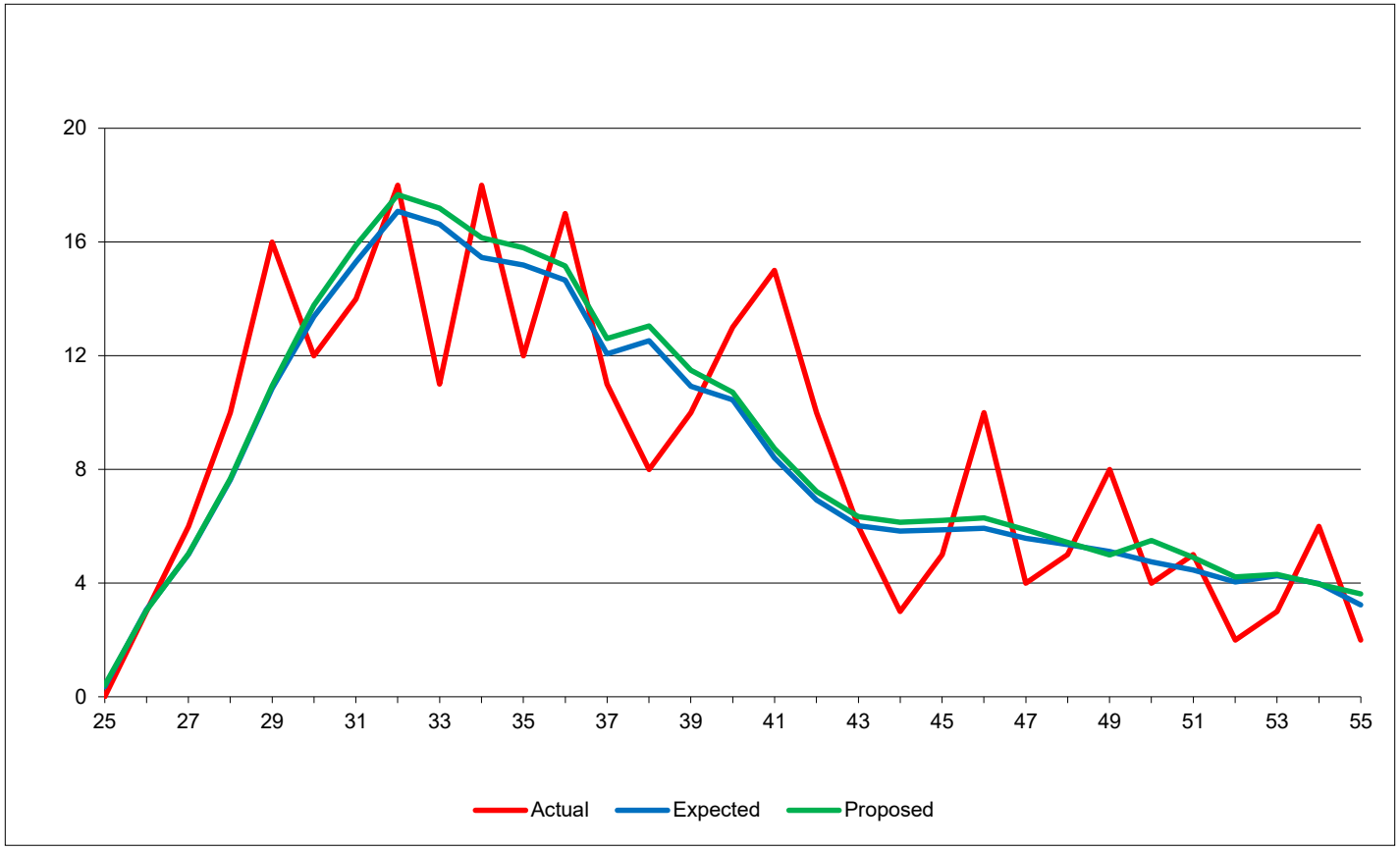
	Male			Female		
	Actual	Current Expected	Proposed Expected	Actual	Current Expected	Proposed Expected
< 1 year	83	94	84	29	22	29
1 year	86	113	95	33	26	33
2 years	78	74	78	22	20	22
3 years	78	61	72	17	16	17
4 years	68	55	66	12	15	12

Proposed rates are adjustments to rates at all service levels to better match recent experience based on *headcount-weighted* A/E ratios.

Withdrawal Experience - PERS DCR

Ultimate (5+ years of service)

Headcounts – P/F



Counts:

- Actual = 293
- Expected = 280
- Proposed = 291

Proposed rates are adjustments to rates at all ages to better match recent experience based on *headcount-weighted* A/E ratios.

Withdrawal Experience – PERS DCR

Select (less than 5 years of service)

Headcounts – Others

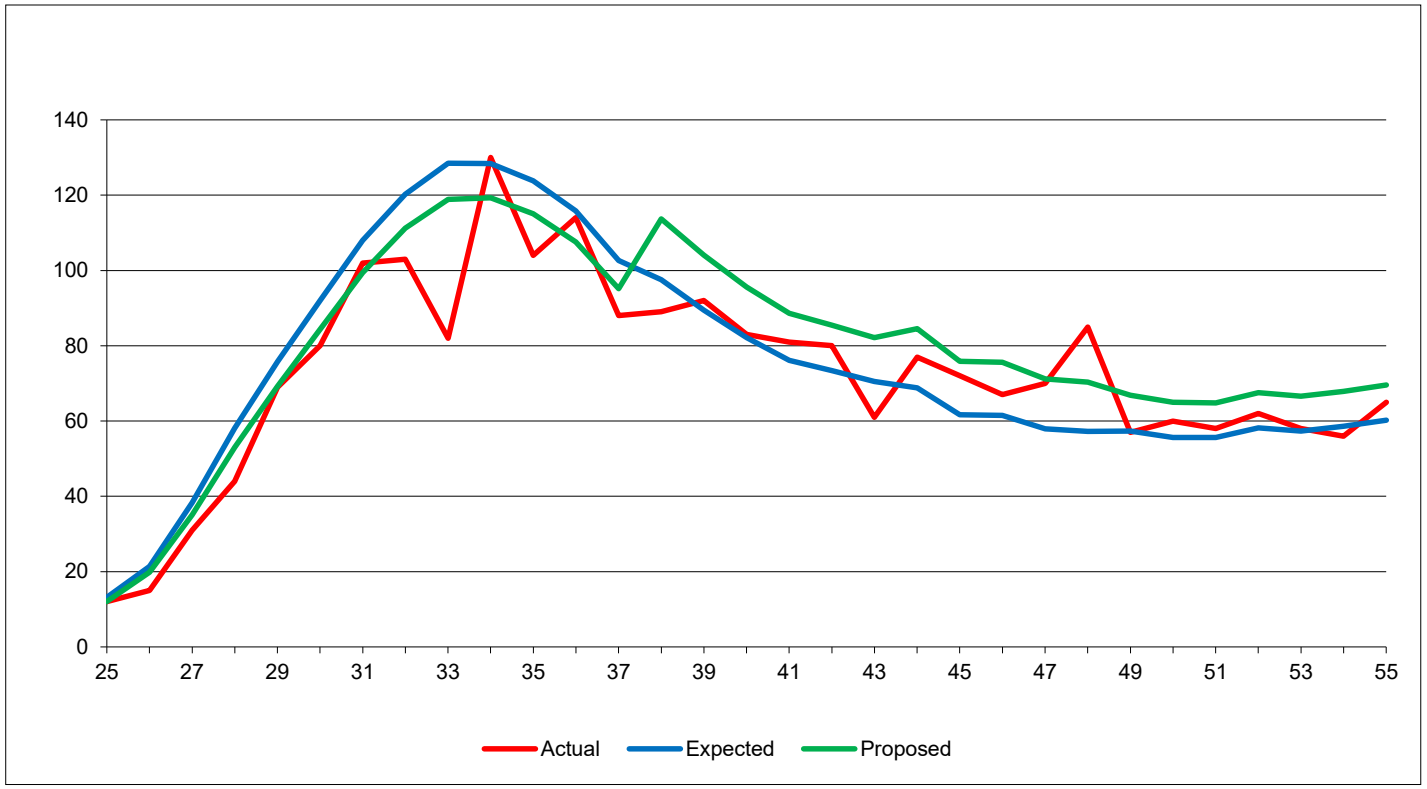
	Male			Female		
	Actual	Current Expected	Proposed Expected	Actual	Current Expected	Proposed Expected
< 1 year	877	761	875	1,220	1,159	1,201
1 year	1,111	1,122	1,068	1,931	1,812	1,949
2 years	682	699	666	1,168	1,082	1,152
3 years	463	457	477	736	659	739
4 years	357	280	356	557	483	548

Proposed rates are adjustments to rates at all service levels to better match recent experience based on *headcount-weighted* A/E ratios.

Withdrawal Experience - PERS DCR

Ultimate (5+ years of service)

Headcounts - Others



Counts:

- Actual = 3,037
- Expected = 2,928
- Proposed = 3,086

Proposed rates are adjustments to rates at all ages to better match recent experience based on *headcount-weighted* A/E ratios.

Withdrawal Experience – TRS DCR

Select (less than 6 years of service)

Headcounts

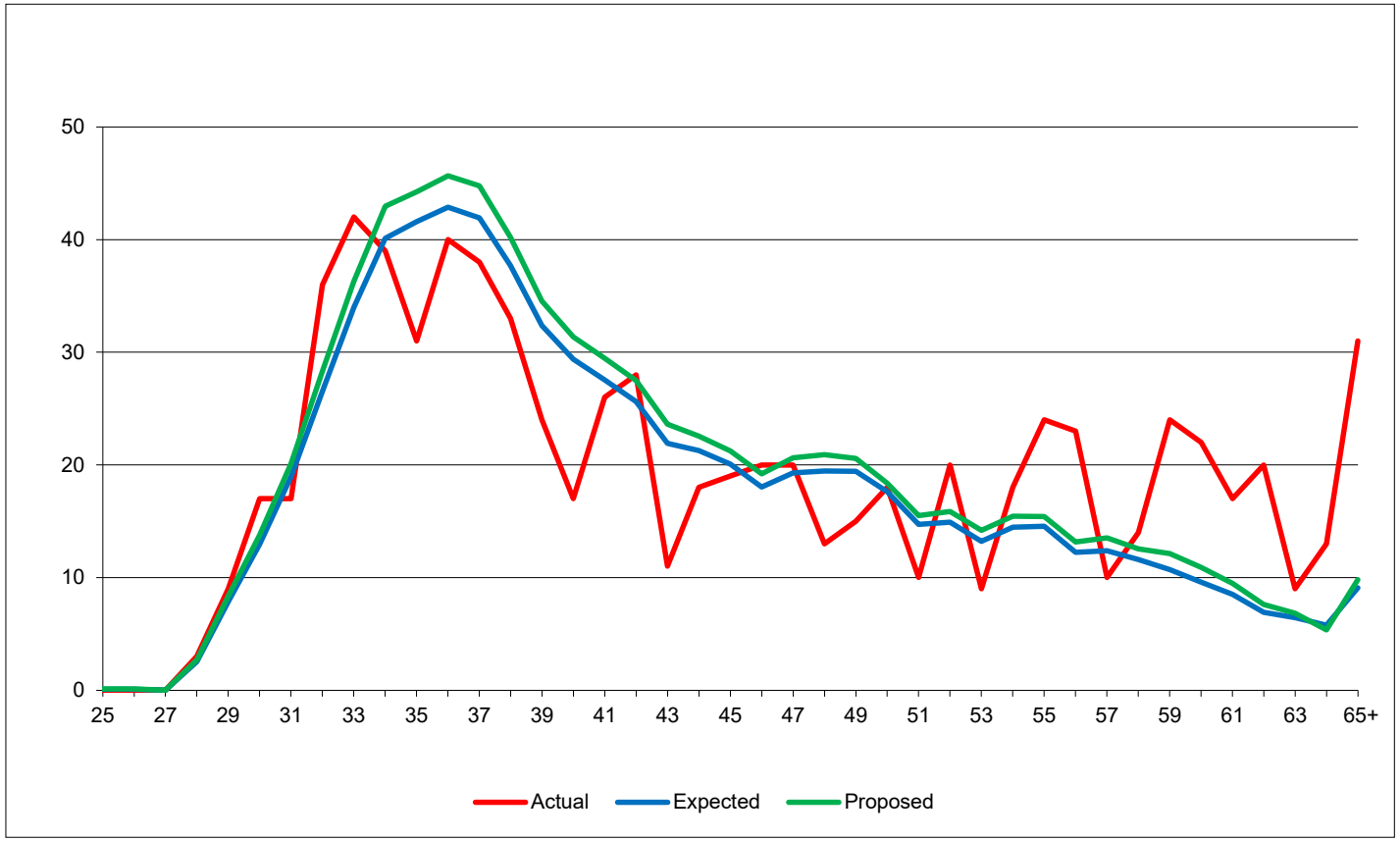
	Male			Female		
	Actual	Current Expected	Proposed Expected	Actual	Current Expected	Proposed Expected
< 1 year	7	6	8	21	15	21
1 year	203	140	201	415	373	419
2 years	106	90	106	323	273	319
3 years	86	70	86	204	206	202
4 years	58	53	59	204	163	193
5 years	77	35	62	138	106	132

Proposed rates are adjustments to rates at all service levels to better match recent experience based on *headcount-weighted* A/E ratios.

Withdrawal Experience - TRS DCR

Ultimate (6+ years of service)

Headcounts



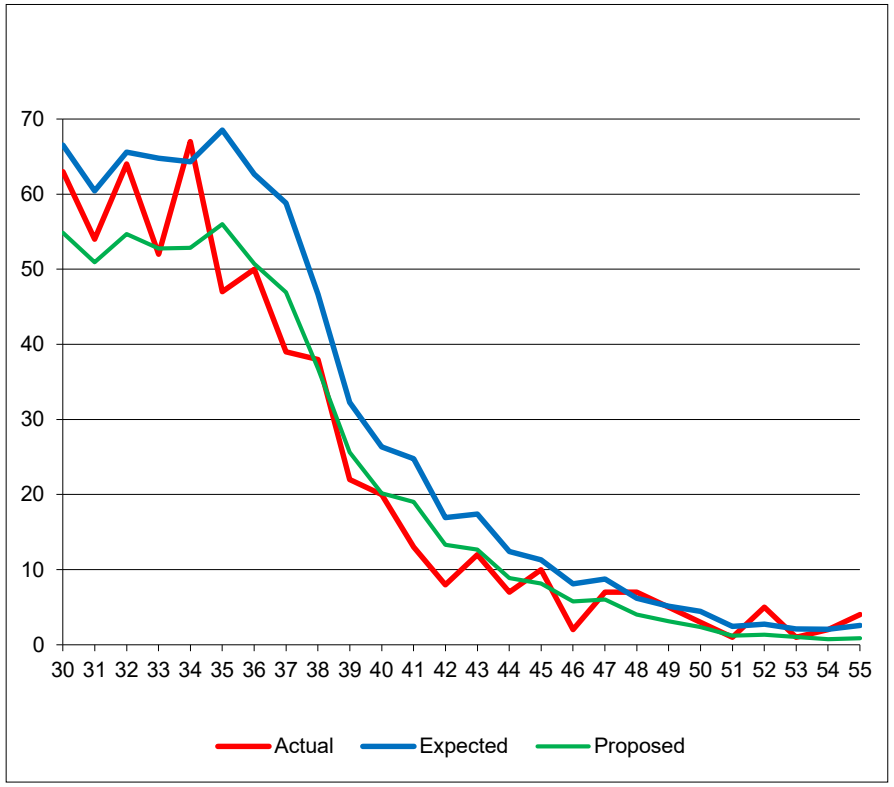
Counts:

- Actual = 798
- Expected = 744
- Proposed = 795

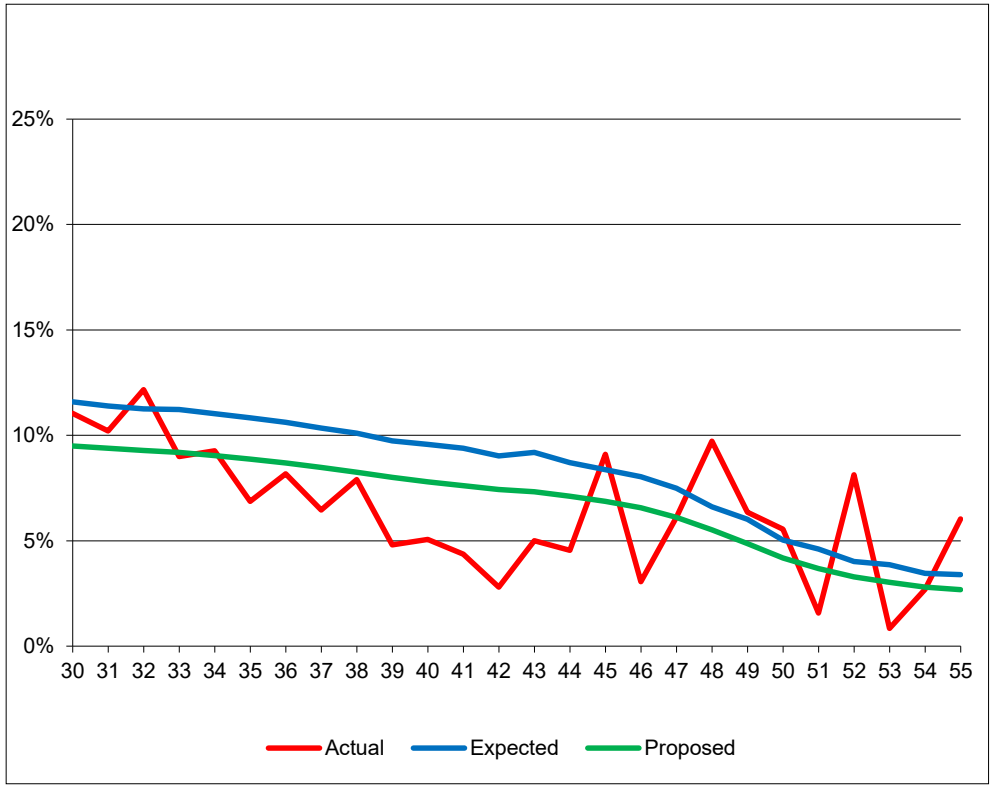
Proposed rates are adjustments to rates at all ages to better match recent experience based on *headcount-weighted* A/E ratios.

Withdrawal Experience – NGNMRS

Headcounts



Liability-Weighted Rates



Counts:

- Actual = 1,385
- Expected = 1,443
- Proposed = 1,162

Proposed rates are adjustments to rates at all ages to better match recent experience based on *liability-weighted* A/E ratios.

A/E Ratios:

- Current = 81%
- Proposed = 99%

Other Demographic Assumptions

Other Demographic Assumptions

- Disability
  - Insufficient disability experience, so we propose no changes to the current disability rates
- Occupational-related death and disability

	Current	Actual	Proposed
PERS – P/F	75%	72%	70%
PERS – Others	40%	36%	35%
TRS	15%	n/a	15%

- Withdrawal of contributions upon termination

	Current	Actual	Proposed
PERS – P/F	10%	5%	5%
PERS - Others	5%	4%	5%
TRS	0%	1%	0%

- Rehires (percentage load to Normal Cost)

	Current	Actual	Proposed
PERS – pension	18.77%	15.33%	15.30%
PERS – healthcare	17.09%	2.36%	2.40%
TRS – pension	15.57%	11.98%	12.00%
TRS - healthcare	12.03%	0.20%	0.20%

Comments regarding the rehire assumption:

- The current rehire loads for the DB plans, which were developed based on the 5 years of experience ending in 2017, were too high based on the most recent 4 years of rehire experience. The actual liabilities from rehires during the last 4 years were compared to the current rehire loads, and adjustments were made to the current rehire loads to better match recent experience.
- With lower proposed rehire loads for healthcare, a greater portion of the fixed employer contributions (22% for PERS and 12.56% for TRS) will be deposited to the DB pension trusts rather than the DB healthcare trusts. Based on the comparative funded ratios of the DB pension and DB healthcare trusts, we believe it is more prudent to deposit more contributions to the DB pension trusts.
- There have been recent suggestions to implement rehire loads for the DCR plans. Doing so would increase the portion of the fixed employer contributions being deposited to the DCR trusts. Because the DCR trusts are so well funded, they are able to absorb any reasonable losses due to rehires. Therefore, we believe it is more prudent to deposit more contributions to the DB trusts. Accordingly, we are proposing no rehire loads for the DCR plans at this time.

Other Demographic Assumptions (cont'd)

- Unused sick days (TRS)
  - Current: 4.5 days
  - Actual: 5.30 days
  - Proposed: 5.25 days
- Population growth rate
  - Current: 0%
  - Actual: -0.05% (PERS); -1.48% (TRS)
  - Proposed: 0%
- Alaska residency for COLA

	Current	Actual	Proposed
PERS – P/F	65%	60%	60%
PERS – Others	70%	65%	65%
TRS	60%	59%	60%

- Part-time service (years)

	Current	Actual	Proposed
PERS – P/F	1.00	n/a	1.00
PERS – Others	0.75	0.68	0.75
TRS	0.75	0.76	0.75

Other Demographic Assumptions (cont'd)

- Percent electing lump sums (NGNMRS)

	Current	Actual	Proposed
Active	70%	49%	50%
Terminated Vested	70%	52%	50%

- Healthcare dependent assumptions
  -

	Current		Actual		Proposed	
	Male	Female	Male	Female	Male	Female
PERS - P/F	75%	50%	72%	45%	75%	50%
PERS - Others	65%	60%	57%	46%	60%	50%
TRS	65%	60%	56%	47%	60%	50%
JRS	90%	70%	69%	17%	80%	60%

  - Spouse age difference

	Current		Actual		Proposed	
	Male	Female	Male	Female	Male	Female
PERS – P/F	3	-2	2.7	-2.6	3	-2
PERS – Others	3	-2	3.5	-1.8	3	-2
TRS	3	-2	3.4	-1.7	3	-2
JRS	4	-4	2.5	4.4	4	-4

Other Demographic Assumptions (cont'd)

- Healthcare participation

	Current		Actual		Proposed	
	System paid	Non-System paid	System paid	Non-System paid	System paid	Non-System paid
PERS – P/F	100%	20%	96%	21%	100%	20%
PERS – Others	100%	20%	98%	28%	100%	25%
TRS	100%	20%	94%	22%	100%	20%

- Medicare Part B only
  - Current: 5%
  - Actual: 2%
  - Proposed: 2%
- Healthcare morbidity

Age	Current		Proposed	
	Medical	Rx	Medical	Rx
0-44	2.0%	4.5%	2.0%	4.5%
45-54	2.5%	3.5%	2.5%	3.5%
55-64	2.5%	1.5%	2.5%	1.0%
65-74	3.0%	2.0%	2.0%	2.1%
75-84	2.0%	-0.5%	2.2%	-0.3%
85-94	0.3%	-2.5%	0.5%	-2.5%
95+	0.0%	0.0%	0.0%	0.0%

Updated Economic Assumptions

Updated Economic Assumptions

- At the December meeting, we discussed proposed changes to the economic assumptions
- The proposed inflation rate was originally 2.0%, but it was felt that this is too low. So, we have modified the proposed inflation rate to 2.25% (it is currently 2.5%).
- The new proposed inflation rate also affects the salary increase rates, healthcare trend rates, and payroll growth rate
- Updated proposed economic assumptions are shown on the next four slides

Economic Assumptions – Current and Proposed

PERS/TRS/JRS

	Current	Proposed
Nominal Return, net of investment expenses	7.38%	7.00%
Inflation Rate	2.50%	2.25%
Real Rate of Return	4.88%	4.75%
Payroll Growth Rate	2.75%	2.50%

NGNMRS

	Current	Proposed
Nominal Return, net of investment expenses	7.00%	5.75%
Inflation Rate	2.50%	2.25%
Real Rate of Return	4.50%	3.50%

Economic Assumptions – Current and Proposed (cont'd)

Salary Increase Rates

PERS/PERS DCR – Peace/Fire

Service	Current	Proposed
0	7.75%	8.25%
1	7.25%	7.50%
2	6.75%	7.00%
3	6.25%	6.75%
4	5.75%	6.50%
5	5.25%	6.00%
6	4.75%	5.50%
7	4.25%	5.25%
8	3.75%	5.00%
9	3.65%	4.80%

Service	Current	Proposed
10	3.55%	4.70%
11	3.45%	4.60%
12	3.35%	4.50%
13	3.25%	4.40%
14	3.15%	4.30%
15	3.05%	4.20%
16	2.95%	4.10%
17	2.85%	4.00%
18	2.75%	3.80%
19	2.75%	3.80%
20+	2.75%	3.60%

PERS/PERS DCR - Others

Service	Current	Proposed
0	6.75%	6.50%
1	6.25%	5.75%
2	5.75%	5.25%
3	5.25%	4.75%
4	4.75%	4.50%
5	4.25%	4.00%
6	3.75%	3.80%
7	3.65%	3.70%
8	3.55%	3.50%
9	3.45%	3.30%

Service	Current	Proposed
10	3.35%	3.20%
11	3.25%	3.00%
12	3.15%	2.85%
13	3.05%	2.80%
14	2.95%	2.75%
15	2.85%	2.70%
16	2.75%	2.65%
17+	2.75%	2.60%

Economic Assumptions – Current and Proposed (cont'd)

Salary Increase Rates (cont'd)

TRS

Service	Current	Proposed
0	6.75%	6.75%
1	6.25%	6.25%
2	5.75%	5.75%
3	5.25%	5.50%
4	4.75%	5.25%
5	4.25%	5.00%
6	3.75%	4.75%
7	3.65%	4.50%
8	3.55%	4.25%
9	3.45%	4.00%
10	3.35%	3.75%

Service	Current	Proposed
11	3.25%	3.50%
12	3.15%	3.25%
13	3.05%	3.20%
14	2.95%	3.10%
15	2.85%	3.00%
16	2.75%	2.90%
17	2.75%	2.80%
18	2.75%	2.75%
19	2.75%	2.70%
20+	2.75%	2.60%

TRS DCR

Service	Current	Proposed
0	6.75%	7.00%
1	6.25%	6.50%
2	5.75%	6.00%
3	5.25%	5.50%
4	4.75%	5.00%
5	4.25%	4.75%
6	3.75%	4.50%
7	3.65%	4.25%
8	3.55%	4.00%
9	3.45%	3.75%
10	3.35%	3.50%

Service	Current	Proposed
11	3.25%	3.25%
12	3.15%	3.00%
13	3.05%	2.80%
14	2.95%	2.75%
15	2.85%	2.70%
16	2.75%	2.65%
17	2.75%	2.60%
18+	2.75%	2.60%

JRS

Current: 0% per year through FY24, 3.62% per year thereafter

Proposed: 0% per year through FY24, 2.75% per year thereafter

Economic Assumptions – Current and Proposed (cont'd)

Healthcare Trend Rates

Current

Fiscal Year	Medical Pre-65	Medical Post-65	Prescription Drugs/EGWP
FY22	6.3%	5.4%	7.1%
FY23	6.1%	5.4%	6.8%
FY24	5.9%	5.4%	6.4%
FY25	5.8%	5.4%	6.1%
FY26	5.6%	5.4%	5.7%
FY27-FY40	5.4%	5.4%	5.4%
FY41	5.3%	5.3%	5.3%
FY42	5.2%	5.2%	5.2%
FY43	5.1%	5.1%	5.1%
FY44	5.1%	5.1%	5.1%
FY45	5.0%	5.0%	5.0%
FY46	4.9%	4.9%	4.9%
FY47	4.8%	4.8%	4.8%
FY48	4.7%	4.7%	4.7%
FY49	4.6%	4.6%	4.6%
FY50+	4.5%	4.5%	4.5%

Proposed

Fiscal Year	Medical Pre-65	Medical Post-65	Prescription Drugs/EGWP
FY22	6.30%	5.40%	7.10%
FY23	7.00%	5.50%	7.50%
FY24	6.70%	5.50%	7.20%
FY25	6.40%	5.40%	6.90%
FY26	6.15%	5.35%	6.60%
FY27	5.95%	5.30%	6.30%
FY28	5.70%	5.20%	5.95%
FY29	5.50%	5.15%	5.65%
FY30	5.25%	5.10%	5.35%
FY31-FY38	5.05%	5.05%	5.05%
FY39	5.00%	5.00%	5.00%
FY40	4.95%	4.95%	4.95%
FY41	4.85%	4.85%	4.85%
FY42	4.80%	4.80%	4.80%
FY43	4.70%	4.70%	4.70%
FY44	4.65%	4.65%	4.65%
FY45	4.55%	4.55%	4.55%
FY46	4.50%	4.50%	4.50%
FY47	4.45%	4.45%	4.45%
FY48	4.35%	4.35%	4.35%
FY49	4.30%	4.30%	4.30%
FY50+	4.25%	4.25%	4.25%

The trend rates for the 6/30/21 valuations are not being changed.

The proposed assumption illustrates lowering the ultimate trend rate from 4.50% to 4.25%. Short-term trend rates were also modified to achieve a gradual decline to the 4.25% ultimate rate.

Cost Effects of Proposed Assumptions

Cost Effects of Proposed Assumptions

- The cost effects shown in this presentation are based on the most recent valuations that have been reviewed and adopted by the ARMB (i.e., the June 30, 2020 valuations)

- The cost effects are shown in two steps
  - 1st step: Changing just the demographic assumptions
  - 2nd step: Changing all of the assumptions

Cost Effects of Proposed Assumptions (cont'd)

PERS

as of June 30, 2020 ($000's)	Current			Proposed – Demographic Only			Proposed – All Assumptions		
	Pension	Healthcare	Total	Pension	Healthcare	Total	Pension	Healthcare	Total
1. Actuarial Accrued Liability (AAL)	15,279,525	7,036,550	22,316,075	15,278,343	6,741,265	22,019,608	15,667,382	7,034,680	22,702,062
2. Actuarial Value of Assets (AVA)	9,713,710	7,989,358	17,703,068	9,713,710	7,989,358	17,703,068	9,713,710	7,989,358	17,703,068
3. Unfunded Actuarial Accrued Liability (AAL - AVA)	5,565,815	(952,808)	4,613,007	5,564,633	(1,248,093)	4,316,540	5,953,672	(954,678)	4,998,994
4. Funded Ratio (AVA / AAL)	**63.6%**	**113.5%**	**79.3%**	**63.6%**	**118.5%**	**80.4%**	**62.0%**	**113.6%**	**78.0%**
5. Normal Cost (Total)	137,815	84,825	222,640	135,952	72,334	208,286	147,723	78,469	226,192
6. Projected DB/DCR Payroll for Upcoming Year			2,373,078			2,373.078			2,371,708
7. Contribution Rate as of 6/30/20*									
7a. Normal Cost Rate (Employer)	3.09%	3.57%	6.66%	3.01%	3.05%	6.06%	3.51%	3.31%	6.82%
7b.Unfunded Liability Amortization Rate	17.45%	(2.66%)	17.45%	17.44%	(3.47%)	17.44%	18.35%	(2.64%)	18.35%
7c.Total Rate (not less than Employer Normal Cost)	**20.54%**	**3.57%**	**24.11%**	**20.45%**	**3.05%**	**23.50%**	**21.86%**	**3.31%**	**25.17%**

* % of projected DB/DCR payroll for the upcoming year

Cost Effects of Proposed Assumptions (cont'd)

TRS

as of June 30, 2020 ($000's)	Current			Proposed – Demographic Only			Proposed – All Assumptions		
	Pension	Healthcare	Total	Pension	Healthcare	Total	Pension	Healthcare	Total
1. Actuarial Accrued Liability (AAL)	7,447,036	2,489,675	9,936,711	7,504,444	2,433,004	9,937,448	7,670,804	2,538,043	10,208,847
2. Actuarial Value of Assets (AVA)	5,587,064	3,021,283	8,608,347	5,587,064	3,021,283	8,608,347	5,587,064	3,021,283	8,608,347
3. Unfunded Actuarial Accrued Liability (AAL - AVA)	1,859,972	(531,608)	1,328,364	1,917,380	(588,279)	1,329,101	2,083,740	(483,240)	1,600,500
4. Funded Ratio (AVA / AAL)	**75.0%**	**121.4%**	**86.6%**	**74.5%**	**124.2%**	**86.6%**	**72.8%**	**119.0%**	**84.3%**
5. Normal Cost (Total)	51,404	24,419	75,823	50,288	21,257	71,545	55,252	24,021	79,273
6. Projected DB/DCR Payroll for Upcoming Year			741,090			741,090			742,178
7. Contribution Rate as of 6/30/20*									
7a. Normal Cost Rate (Employer)	2.86%	3.30%	6.16%	2.71%	2.87%	5.58%	3.37%	3.24%	6.61%
7b. Unfunded Liability Amortization Rate	18.87%	(4.82%)	18.87%	19.37%	(5.31%)	19.37%	20.60%	(4.35%)	20.60%
7c. Total Rate (not less than Employer Normal Cost)	**21.73%**	**3.30%**	**25.03%**	**22.08%**	**2.87%**	**24.95%**	**23.97%**	**3.24%**	**27.21%**

* % of projected DB/DCR payroll for the upcoming year

Cost Effects of Proposed Assumptions (cont'd)

PERS DCR

as of June 30, 2020 ($000's)	Current			Proposed – Demographic Only			Proposed – All Assumptions		
	ODD	Healthcare	Total	ODD	Healthcare	Total	ODD	Healthcare	Total
1. Actuarial Accrued Liability (AAL)	10,634	150,701	161,335	10,916	127,999	138,915	11,709	135,014	146,723
2. Actuarial Value of Assets (AVA)	43,029	144,747	187,776	43,029	144,747	187,776	43,029	144,747	187,776
3. Unfunded Actuarial Accrued Liability (AAL - AVA)	(32,395)	5,954	(26,441)	(32,113)	(16,748)	(48,861)	(31,320)	(9,733)	(41,053)
4. Funded Ratio (AVA / AAL)	**404.6%**	**96.0%**	**116.4%**	**394.2%**	**113.1%**	**135.2%**	**367.5%**	**107.2%**	**128.0%**
5. Normal Cost	5,134	15,182	20,316	4,316	12,137	16,453	4,486	12,905	17,391
6. Projected DCR Payroll for Upcoming Year			1,443,017			1,443,017			1,441,293
7. Contribution Rate as of 6/30/20*									
7a. Normal Cost Rate	0.36%	1.05%	1.41%	0.30%	0.84%	1.14%	0.31%	0.90%	1.21%
7b. Unfunded Liability Amortization Rate	(0.17%)	0.05%	0.05%	(0.16%)	(0.05%)	(0.21%)	(0.16%)	(0.02%)	(0.18%)
7c. Total Rate (not less than Employer Normal Cost)	**0.36%**	**1.10%**	**1.46%**	**0.30%**	**0.84%**	**1.14%**	**0.31%**	**0.90%**	**1.21%**

* % of projected DCR payroll for the upcoming year

Cost Effects of Proposed Assumptions (cont'd)

TRS DCR

as of June 30, 2020 ($000's)	Current			Proposed – Demographic Only			Proposed – All Assumptions		
	ODD	Healthcare	Total	ODD	Healthcare	Total	ODD	Healthcare	Total
1. Actuarial Accrued Liability (AAL)	223	40,634	40,857	228	36,770	36,998	221	38,624	38,845
2. Actuarial Value of Assets (AVA)	4,933	49,554	54,487	4,933	49,554	54,487	4,933	49,554	54,487
3. Unfunded Actuarial Accrued Liability (AAL - AVA)	(4,710)	(8,920)	(13,630)	(4,705)	(12,784)	(17,489)	(4,712)	(10,930)	(15,642)
4. Funded Ratio (AVA / AAL)	**2,212.1%**	**122.0%**	**133.4%**	**2,163.6%**	**134.8%**	**147.3%**	**2,232.1%**	**128.3%**	**140.3%**
5. Normal Cost	312	3,396	3,708	290	2,728	3,018	296	2,929	3,225
6. Projected DCR Payroll for Upcoming Year			391,854			391,854			392,915
7. Contribution Rate as of 6/30/20*									
7a. Normal Cost Rate	0.08%	0.87%	0.95%	0.07%	0.70%	0.77%	0.08%	0.75%	0.83%
7b. Unfunded Liability Amortization Rate	(0.10%)	(0.14%)	(0.24%)	(0.10%)	(0.20%)	(0.30%)	(0.09%)	(0.17%)	(0.26%)
7c. Total Rate (not less than Employer Normal Cost)	**0.08%**	**0.87%**	**0.95%**	**0.07%**	**0.70%**	**0.77%**	**0.08%**	**0.75%**	**0.83%**

* % of projected DCR payroll for the upcoming year

Cost Effects of Proposed Assumptions (cont'd)

JRS

as of June 30, 2020 ($000's)	Current			Proposed – Demographic Only			Proposed – All Assumptions		
	Pension	Healthcare	Total	Pension	Healthcare	Total	Pension	Healthcare	Total
1. Actuarial Accrued Liability (AAL)	211,742	16,764	228,506	205,330	15,717	221,047	199,869	16,398	216,267
2. Actuarial Value of Assets (AVA)	194,788	34,806	229,594	194,788	34,806	229,594	194,788	34,806	229,594
3. Unfunded Actuarial Accrued Liability (AAL - AVA)	16,954	(18,042)	(1,088)	10,542	(19,089)	(8,547)	5,081	(18,408)	(13,327)
4. Funded Ratio (AVA / AAL)	**92.0%**	**207.6%**	**100.5%**	**94.9%**	**221.5%**	**103.9%**	**97.5%**	**212.3%**	**106.2%**
5. Normal Cost (Total)	5,934	854	6,788	5,801	782	6,583	5,404	834	6,238
6. Projected Payroll for Upcoming Year			13,157			13,157			13,157
7. Contribution Rate as of 6/30/20*									
7a. Normal Cost Rate (Employer)	38.85%	6.49%	45.34%	37.84%	5.94%	43.78%	34.82%	6.34%	41.16%
7b. Unfunded Liability Amortization Rate	24.74%	(8.24%)	24.74%	21.60%	(8.76%)	21.60%	18.93%	(8.32%)	18.93%
7c. Total Rate (not less than Employer Normal Cost)	**63.59%**	**6.49%**	**70.08%**	**59.44%**	**5.94%**	**65.38%**	**53.75%**	**6.34%**	**60.09%**

* % of projected payroll for the upcoming year

Cost Effects of Proposed Assumptions (cont'd)

NGNMRS

as of June 30, 2020 ($000's)	Current	Proposed – Demographic Only	Proposed – All Assumptions
1. Actuarial Accrued Liability (AAL)	22,417	23,081	25,842
2. Actuarial Value of Assets (AVA)	43,020	43,020	43,020
3. Unfunded Actuarial Accrued Liability (AAL - AVA)	(20,603)	(19,939)	(17,178)
4. Funded Ratio (AVA / AAL)	**191.9%**	**186.4%**	**166.5%**
5. Normal Cost	503	581	722
6. Contribution as of 6/30/20			
6a. Normal Cost and Administrative Expenses	759	837	978
6b. Unfunded Liability Amortization	(3,325)	(3,121)	(2,590)
6c. Total (not less than zero)	**0**	**0**	**0**

Appendix

A/E Ratios

Mortality - Post-Commencement

PERS/PERS DCR Peace/Fire - Retirees & Beneficiaries

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	72,182,000	68,589,000	95%	69,014,000	99%	179	179	200
Female	12,704,000	9,122,000	72%	12,346,000	74%	53	56	54

PERS/PERS DCR Others - Retirees & Beneficiaries

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	287,298,000	269,971,000	94%	271,510,000	99%	1,243	1,228	1,433
Female	225,904,000	208,501,000	92%	201,832,000	103%	1,548	1,461	1,639

TRS/TRS DCR - Retirees & Beneficiaries

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	163,403,000	146,051,000	89%	148,611,000	98%	449	427	445
Female	169,039,000	137,860,000	82%	142,779,000	97%	594	532	550

NGNMRS - Retirees & Beneficiaries

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	162,000	96,000	59%	135,000	71%	23	20	14
Female	18,000	13,000	72%	16,000	81%	3	2	1

Mortality - Pre-Commencement

PERS/PERS DCR Peace/Fire

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	14	11	10
Female	2	2	2

PERS/PERS DCR Others

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	128	89	105
Female	90	66	70

TRS/TRS DCR

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	17	14	18
Female	25	20	11

A/E Ratios (cont'd)

Retirement - Unreduced

PERS Peace/Fire

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	249,393,000	257,818,000	103%	265,408,000	97%	320	339	316
Female	40,812,000	46,089,000	113%	45,833,000	101%	66	73	69

PERS Others

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	543,358,000	621,089,000	114%	628,289,000	99%	1,230	1,429	1,301
Female	613,317,000	667,762,000	109%	660,318,000	101%	1,757	1,892	1,759

TRS

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	256,879,000	265,168,000	103%	267,058,000	99%	429	447	422
Female	471,731,000	477,277,000	101%	467,672,000	102%	874	870	840

NGNMRS

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	3,530,000	3,599,000	102%	3,607,000	100%	370	391	406
Female	547,000	633,000	116%	636,000	100%	61	74	76

A/E Ratios (cont'd)

Retirement - Reduced

PERS Peace/Fire

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	13,724,000	14,039,000	102%	14,164,000	99%	30	31	30
Female	2,886,000	2,820,000	98%	2,721,000	104%	7	7	7

PERS Others

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	133,336,000	160,992,000	121%	157,441,000	102%	327	386	360
Female	164,236,000	178,409,000	109%	179,148,000	100%	519	566	553

TRS

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	15,625,000	14,950,000	96%	14,822,000	101%	41	39	38
Female	26,743,000	36,807,000	138%	35,417,000	104%	77	102	102

A/E Ratios (cont'd)

Withdrawal - Ultimate

PERS Peace/Fire

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	27,698,000	20,852,000	75%	20,834,000	100%	64	48	50
Female	6,808,000	6,169,000	91%	6,124,000	101%	19	17	21

PERS Others

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	110,944,000	107,455,000	97%	108,330,000	99%	424	415	487
Female	146,874,000	143,583,000	98%	144,046,000	100%	667	655	819

TRS

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	17,620,000	24,865,000	141%	24,578,000	101%	56	79	82
Female	51,008,000	49,144,000	96%	49,616,000	99%	183	179	188

A/E Ratios (cont'd)

Withdrawal - Ultimate

PERS DCR Peace/Fire

Group	Headcounts			A / CE	A / NE
	Current Expected	New Expected	Actual		
Male/Female	280	291	293	105%	101%

PERS DCR Others

Group	Headcounts			A / CE	A / NE
	Current Expected	New Expected	Actual		
Male/Female	2,928	3,086	3,037	104%	98%

TRS DCR

Group	Headcounts			A / CE	A / NE
	Current Expected	New Expected	Actual		
Male/Female	744	795	798	107%	100%

NGNMRS

Group	Actuarial Accrued Liability					Headcounts		
	Current Expected	Actual	A / CE	New Expected	A / NE	Current Expected	New Expected	Actual
Male	1,337,000	1,124,000	84%	1,136,000	99%	1,115	912	1,058
Female	372,000	260,000	70%	261,000	100%	328	250	327

Withdrawal (Select) Headcounts – DCR Plans

Withdrawal - Select < 1 year

PERS DCR Peace/Fire

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	94	84	83
Female	22	29	29

PERS DCR Others

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	761	875	877
Female	1,159	1,201	1,220

TRS DCR

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	6	8	7
Female	15	21	21

Withdrawal - Select 1 year

PERS DCR Peace/Fire

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	113	95	86
Female	26	33	33

PERS DCR Others

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	1,122	1,068	1,111
Female	1,812	1,949	1,931

TRS DCR

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	140	201	203
Female	373	419	415

Withdrawal - Select 2 years

PERS DCR Peace/Fire

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	74	78	78
Female	20	22	22

PERS DCR Others

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	699	666	682
Female	1,082	1,152	1,168

TRS DCR

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	90	106	106
Female	273	319	323

Withdrawal (Select) Headcounts – DCR Plans (cont'd)

Withdrawal - Select 3 years

PERS DCR Peace/Fire

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	61	72	78
Female	16	17	17

PERS DCR Others

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	457	477	463
Female	659	739	736

TRS DCR

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	70	86	86
Female	206	202	204

Withdrawal - Select 4 years

PERS DCR Peace/Fire

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	55	66	68
Female	15	12	12

PERS DCR Others

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	280	356	357
Female	483	548	557

TRS DCR

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	53	59	58
Female	163	193	204

Withdrawal - Select 5 years

TRS DCR

Group	Headcounts		
	Current Expected	New Expected	Actual
Male	35	62	77
Female	106	132	138

Current and Proposed Decrements

Retirement – PERS Peace/Fire

Current

	Reduced		Unreduced	
Age	Male	Female	Male	Female
< 47	N/A	N/A	8.80%	6.00%
47	N/A	N/A	8.80%	15.00%
48	N/A	N/A	14.30%	15.00%
49	N/A	N/A	14.30%	15.00%
50	5.00%	5.00%	16.50%	15.00%
51	5.00%	7.00%	16.50%	15.00%
52	7.00%	7.00%	20.35%	15.00%
53	7.00%	7.00%	20.35%	15.00%
54	7.00%	35.00%	20.35%	25.00%
55	7.00%	8.00%	27.50%	20.00%
56	7.00%	8.00%	27.50%	15.00%
57	7.00%	8.00%	27.50%	15.00%
58	7.00%	8.00%	27.50%	15.00%
59	20.00%	20.00%	27.50%	15.00%
60	N/A	N/A	33.00%	25.00%
61	N/A	N/A	27.50%	20.00%
62	N/A	N/A	27.50%	30.00%
63	N/A	N/A	27.50%	50.00%
64	N/A	N/A	22.00%	50.00%
65	N/A	N/A	22.00%	50.00%
66	N/A	N/A	27.50%	50.00%
67	N/A	N/A	55.00%	50.00%
68	N/A	N/A	55.00%	50.00%
69	N/A	N/A	55.00%	50.00%
70+	N/A	N/A	100.00%	100.00%

Proposed

	Reduced		Unreduced	
Age	Male	Female	Male	Female
< 47	N/A	N/A	9.00%	7.50%
47	N/A	N/A	13.00%	18.50%
48	N/A	N/A	13.00%	18.50%
49	N/A	N/A	13.00%	18.50%
50	5.00%	5.00%	20.00%	21.00%
51	5.00%	5.00%	20.00%	21.00%
52	7.00%	7.00%	20.00%	21.00%
53	7.00%	7.00%	20.00%	21.00%
54	7.00%	7.00%	20.00%	21.00%
55	7.50%	7.50%	29.00%	20.00%
56	7.50%	7.50%	29.00%	20.00%
57	7.50%	7.50%	29.00%	20.00%
58	7.50%	7.50%	29.00%	20.00%
59	20.00%	20.00%	29.00%	20.00%
60	N/A	N/A	29.00%	31.50%
61	N/A	N/A	29.00%	31.50%
62	N/A	N/A	29.00%	31.50%
63	N/A	N/A	29.00%	31.50%
64	N/A	N/A	29.00%	31.50%
65	N/A	N/A	45.00%	45.00%
66	N/A	N/A	45.00%	45.00%
67	N/A	N/A	45.00%	45.00%
68	N/A	N/A	45.00%	45.00%
69	N/A	N/A	45.00%	45.00%
70+	N/A	N/A	100.00%	100.00%

Current and Proposed Decrements

Retirement – PERS Others

Current

	Reduced		Unreduced	
Age	Male	Female	Male	Female
< 50	N/A	N/A	11.00%	11.00%
50	6.00%	8.00%	33.00%	38.50%
51	6.00%	8.00%	35.75%	38.50%
52	9.00%	8.00%	35.75%	38.50%
53	6.00%	8.00%	35.75%	38.50%
54	20.00%	15.00%	38.50%	38.50%
55	6.00%	6.00%	33.00%	33.00%
56	6.00%	6.00%	22.00%	22.00%
57	6.00%	6.00%	22.00%	19.80%
58	6.00%	6.00%	22.00%	19.80%
59	15.00%	20.00%	22.00%	19.80%
60	N/A	N/A	22.00%	23.10%
61	N/A	N/A	22.00%	22.00%
62	N/A	N/A	22.00%	22.00%
63	N/A	N/A	22.00%	22.00%
64	N/A	N/A	22.00%	22.00%
65	N/A	N/A	24.75%	28.60%
66	N/A	N/A	27.50%	28.60%
67	N/A	N/A	22.00%	24.20%
68	N/A	N/A	24.75%	24.20%
69	N/A	N/A	27.50%	24.20%
70	N/A	N/A	27.50%	24.20%
71	N/A	N/A	27.50%	24.20%
72	N/A	N/A	27.50%	27.50%
73	N/A	N/A	27.50%	27.50%
74	N/A	N/A	27.50%	38.50%
75	N/A	N/A	55.00%	55.00%
76	N/A	N/A	55.00%	55.00%
77	N/A	N/A	55.00%	55.00%
78	N/A	N/A	55.00%	55.00%
79	N/A	N/A	55.00%	55.00%
80+	N/A	N/A	100.00%	100.00%

Proposed

	Reduced		Unreduced	
Age	Male	Female	Male	Female
< 50	N/A	N/A	11.50%	11.50%
50	7.00%	8.50%	37.50%	40.50%
51	7.00%	8.50%	37.50%	40.50%
52	11.00%	8.50%	37.50%	40.50%
53	11.00%	8.50%	37.50%	40.50%
54	24.00%	16.50%	37.50%	40.50%
55	7.00%	6.50%	25.50%	24.00%
56	7.00%	6.50%	25.50%	24.00%
57	7.00%	6.50%	25.50%	24.00%
58	7.00%	6.50%	25.50%	24.00%
59	18.00%	22.00%	25.50%	24.00%
60	N/A	N/A	26.50%	24.50%
61	N/A	N/A	26.50%	24.50%
62	N/A	N/A	26.50%	24.50%
63	N/A	N/A	26.50%	24.50%
64	N/A	N/A	26.50%	24.50%
65	N/A	N/A	30.50%	28.50%
66	N/A	N/A	30.50%	28.50%
67	N/A	N/A	30.50%	28.50%
68	N/A	N/A	30.50%	28.50%
69	N/A	N/A	30.50%	28.50%
70	N/A	N/A	27.50%	27.50%
71	N/A	N/A	27.50%	27.50%
72	N/A	N/A	27.50%	27.50%
73	N/A	N/A	27.50%	27.50%
74	N/A	N/A	27.50%	27.50%
75	N/A	N/A	50.00%	50.00%
76	N/A	N/A	50.00%	50.00%
77	N/A	N/A	50.00%	50.00%
78	N/A	N/A	50.00%	50.00%
79	N/A	N/A	50.00%	50.00%
80+	N/A	N/A	100.00%	100.00%

Current and Proposed Decrements

Retirement – TRS

Current

	Reduced		Unreduced	
Age	Male	Female	Male	Female
< 45	N/A	N/A	3.0%	3.0%
45	N/A	N/A	5.0%	5.0%
46	N/A	N/A	5.0%	8.0%
47	N/A	N/A	5.0%	8.0%
48	N/A	N/A	5.0%	8.0%
49	N/A	N/A	5.0%	8.0%
50	10.0%	10.0%	5.0%	14.0%
51	10.0%	10.0%	8.0%	13.0%
52	10.0%	10.0%	15.0%	13.0%
53	10.0%	12.0%	15.0%	14.0%
54	10.0%	12.0%	15.0%	15.0%
55	15.0%	8.0%	20.0%	17.0%
56	10.0%	8.0%	17.0%	17.0%
57	10.0%	8.0%	15.0%	17.0%
58	10.0%	8.0%	20.0%	17.0%
59	10.0%	8.0%	20.0%	23.0%
60	N/A	N/A	25.0%	23.0%
61	N/A	N/A	18.0%	23.0%
62	N/A	N/A	18.0%	21.0%
63	N/A	N/A	18.0%	21.0%
64	N/A	N/A	18.0%	26.0%
65	N/A	N/A	30.0%	21.0%
66	N/A	N/A	25.0%	21.0%
67	N/A	N/A	25.0%	21.0%
68	N/A	N/A	25.0%	26.0%
69	N/A	N/A	35.0%	26.0%
70	N/A	N/A	30.0%	26.0%
71	N/A	N/A	30.0%	37.0%
72	N/A	N/A	30.0%	37.0%
73	N/A	N/A	30.0%	37.0%
74	N/A	N/A	30.0%	37.0%
75 - 79	N/A	N/A	50.0%	50.0%
80+	N/A	N/A	100.0%	100.0%

Proposed

	Reduced		Unreduced	
Age	Male	Female	Male	Female
< 45	N/A	N/A	3.00%	3.00%
45	N/A	N/A	5.50%	7.00%
46	N/A	N/A	5.50%	7.00%
47	N/A	N/A	5.50%	7.00%
48	N/A	N/A	5.50%	7.00%
49	N/A	N/A	5.50%	7.00%
50	5.00%	5.00%	12.50%	13.00%
51	5.00%	5.00%	12.50%	13.00%
52	5.00%	10.00%	12.50%	13.00%
53	5.00%	5.00%	12.50%	13.00%
54	10.00%	5.00%	12.50%	13.00%
55	14.50%	11.00%	20.00%	17.50%
56	9.50%	11.00%	20.00%	17.50%
57	9.50%	11.00%	20.00%	17.50%
58	9.50%	11.00%	20.00%	17.50%
59	9.50%	11.00%	20.00%	17.50%
60	N/A	N/A	19.50%	23.50%
61	N/A	N/A	19.50%	23.50%
62	N/A	N/A	19.50%	23.50%
63	N/A	N/A	19.50%	23.50%
64	N/A	N/A	19.50%	23.50%
65	N/A	N/A	28.00%	23.50%
66	N/A	N/A	28.00%	23.50%
67	N/A	N/A	28.00%	23.50%
68	N/A	N/A	28.00%	23.50%
69	N/A	N/A	28.00%	23.50%
70	N/A	N/A	30.00%	36.00%
71	N/A	N/A	30.00%	36.00%
72	N/A	N/A	30.00%	36.00%
73	N/A	N/A	30.00%	36.00%
74	N/A	N/A	30.00%	36.00%
75 - 79	N/A	N/A	50.00%	50.00%
80+	N/A	N/A	100.00%	100.00%

Current and Proposed Decrements

Retirement – PERS DCR

Current

Age	Rate
< 55	2.0%
55	3.0%
56	3.0%
57	3.0%
58	3.0%
59	3.0%
60	5.0%
61	5.0%
62	10.0%
63	5.0%
64	5.0%
65	25.0%
66	25.0%
67	25.0%
68	20.0%
69	20.0%
70+	100.0%

Proposed

Age	Rate
< 55	2.0%
55	3.0%
56	3.0%
57	3.0%
58	3.0%
59	3.0%
60	5.0%
61	5.0%
62	10.0%
63	5.0%
64	5.0%
65	25.0%
66	25.0%
67	25.0%
68	20.0%
69	20.0%
70+	100.0%

Retirement – TRS DCR

Current

Age	Rate
< 55	2.0%
55	3.0%
56	3.0%
57	3.0%
58	3.0%
59	3.0%
60	5.0%
61	5.0%
62	10.0%
63	5.0%
64	5.0%
65	25.0%
66	25.0%
67	25.0%
68	20.0%
69	20.0%
70+	100.0%

Proposed

Age	Rate
< 55	2.0%
55	3.0%
56	3.0%
57	3.0%
58	3.0%
59	3.0%
60	5.0%
61	5.0%
62	10.0%
63	5.0%
64	5.0%
65	25.0%
66	25.0%
67	25.0%
68	20.0%
69	20.0%
70+	100.0%

Current and Proposed Decrements

Retirement – NGNMRS

Current

Age	Male	Female
< 51	13.00%	13.00%
51	13.00%	13.00%
52	13.00%	13.00%
53	15.00%	15.00%
54	20.00%	20.00%
55	25.00%	25.00%
56	35.00%	35.00%
57	40.00%	40.00%
58	45.00%	45.00%
59	50.00%	50.00%
60	55.00%	55.00%
61	60.00%	60.00%
62	60.00%	60.00%
63	60.00%	60.00%
64	60.00%	60.00%
65+	100.00%	100.00%

Proposed

Age	Male	Female
< 51	15.34%	18.20%
51	15.34%	18.20%
52	15.34%	18.20%
53	17.70%	21.00%
54	23.60%	28.00%
55	18.50%	16.25%
56	25.90%	22.75%
57	29.60%	26.00%
58	33.30%	29.25%
59	37.00%	32.50%
60	40.70%	35.75%
61	44.40%	35.75%
62	44.40%	35.75%
63	44.40%	35.75%
64	44.40%	35.75%
65+	100.00%	100.00%

Retirement – JRS

Current

Age	Rate
< 59	3%
59	10%
60	20%
61	20%
62	10%
63	10%
64	10%
65	20%
66	20%
67	10%
68	10%
69	10%
70+	100%

Proposed

Age	Rate
< 59	3%
59	10%
60	20%
61	20%
62	10%
63	10%
64	10%
65	20%
66	20%
67	10%
68	10%
69	10%
70+	100%

Current and Proposed Decrements

Withdrawal – PERS Peace/Fire

Current

Select Rates during the First 5 Years of Employment

Years of Service	Male	Female
0	15.00%	15.00%
1	12.00%	8.00%
2	7.20%	6.40%
3	5.67%	5.60%
4	6.48%	7.20%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	4.70%	6.80%	39	2.04%	2.98%
23	4.46%	6.80%	40	1.68%	3.39%
24	4.22%	6.80%	41	1.67%	3.37%
25	3.98%	6.80%	42	1.67%	3.36%
26	3.74%	6.80%	43	1.71%	3.33%
27	3.50%	6.80%	44	1.76%	3.31%
28	3.32%	6.63%	45	1.81%	3.28%
29	3.14%	6.46%	46	1.85%	3.25%
30	2.96%	6.29%	47	1.90%	3.23%
31	2.79%	6.12%	48	2.22%	3.19%
32	2.61%	5.95%	49	2.53%	3.15%
33	2.50%	5.36%	50	3.18%	6.42%
34	2.39%	4.77%	51	4.24%	6.32%
35	2.28%	4.18%	52	4.24%	6.19%
36	2.17%	3.60%	53	4.24%	6.04%
37	2.06%	3.01%	54	4.24%	3.00%
38	2.05%	2.99%	55+	3.00%	2.00%

Proposed

Select Rates during the First 5 Years of Employment

Years of Service	Male	Female
0	15.00%	15.00%
1	12.00%	8.00%
2	7.20%	6.40%
3	5.67%	5.60%
4	6.48%	7.20%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	2.40%	5.80%	39	1.60%	3.00%
23	2.40%	5.80%	40	1.30%	3.00%
24	2.40%	5.80%	41	1.30%	3.00%
25	2.40%	5.80%	42	1.30%	3.00%
26	2.40%	5.80%	43	1.30%	3.00%
27	2.40%	5.80%	44	1.30%	3.00%
28	2.40%	5.80%	45	1.50%	2.90%
29	2.40%	5.80%	46	1.50%	2.90%
30	2.00%	5.10%	47	1.50%	2.90%
31	2.00%	5.10%	48	1.50%	2.90%
32	2.00%	5.10%	49	1.50%	2.90%
33	2.00%	5.10%	50	3.00%	5.00%
34	2.00%	5.10%	51	3.00%	5.00%
35	1.60%	3.00%	52	3.00%	5.00%
36	1.60%	3.00%	53	3.00%	5.00%
37	1.60%	3.00%	54	3.00%	5.00%
38	1.60%	3.00%	55+	2.25%	1.80%

Current and Proposed Decrements

Withdrawal – PERS Others

Current

Select Rates during the First 5 Years of Employment

Hire Age Under 35		
Years of Service	Male	Female
0	29.00%	29.00%
1	16.25%	20.00%
2	13.00%	16.00%
3	10.40%	12.80%
4	8.45%	10.40%

Hire Age Over 35		
Years of Service	Male	Female
0	20.00%	20.00%
1	12.00%	15.00%
2	10.00%	12.50%
3	8.50%	10.00%
4	8.50%	9.00%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female
< 23	11.40%	12.99%
23	10.83%	12.21%
24	10.26%	11.43%
25	9.69%	10.65%
26	9.12%	9.87%
27	8.55%	9.09%
28	8.30%	8.72%
29	8.05%	8.34%
30	7.80%	7.97%
31	7.54%	7.60%
32	7.29%	7.23%
33	6.99%	6.88%
34	6.69%	6.53%
35	6.39%	6.17%
36	6.10%	5.82%
37	5.80%	5.47%
38	5.63%	5.35%

Age	Male	Female
39	5.47%	5.23%
40	4.86%	5.65%
41	4.71%	5.51%
42	4.56%	5.38%
43	4.50%	5.19%
44	4.44%	4.99%
45	4.39%	4.80%
46	4.33%	4.60%
47	4.27%	4.41%
48	4.26%	4.40%
49	4.24%	4.39%
50	3.63%	4.45%
51	3.60%	4.43%
52	3.56%	4.40%
53	3.52%	4.37%
54	4.17%	6.20%
55+	3.00%	5.00%

Proposed

Select Rates during the First 5 Years of Employment

Hire Age Under 35		
Years of Service	Male	Female
0	29.00%	29.00%
1	16.25%	20.00%
2	13.00%	16.00%
3	10.40%	12.80%
4	8.45%	10.40%

Hire Age Over 35		
Years of Service	Male	Female
0	20.00%	20.00%
1	12.00%	15.00%
2	10.00%	12.50%
3	8.50%	10.00%
4	8.50%	9.00%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female
< 23	7.80%	8.20%
23	7.80%	8.20%
24	7.80%	8.20%
25	7.80%	8.20%
26	7.80%	8.20%
27	7.80%	8.20%
28	7.80%	8.20%
29	7.80%	8.20%
30	7.00%	7.10%
31	7.00%	7.10%
32	7.00%	7.10%
33	7.00%	7.10%
34	7.00%	7.10%
35	5.70%	5.50%
36	5.70%	5.50%
37	5.70%	5.50%
38	5.70%	5.50%

Age	Male	Female
39	5.70%	5.50%
40	4.50%	5.20%
41	4.50%	5.20%
42	4.50%	5.20%
43	4.50%	5.20%
44	4.50%	5.20%
45	4.20%	4.40%
46	4.20%	4.40%
47	4.20%	4.40%
48	4.20%	4.40%
49	4.20%	4.40%
50	3.60%	4.70%
51	3.60%	4.70%
52	3.60%	4.70%
53	3.60%	4.70%
54	3.60%	4.70%
55+	2.90%	4.90%

Current and Proposed Decrements

Withdrawal – TRS

Current

Select Rates during the First 8 Years of Employment

Years of Service	Male	Female
0	20.40%	17.00%
1	20.40%	17.00%
2	16.80%	14.00%
3	14.40%	12.00%
4	12.00%	10.00%
5	10.80%	9.00%
6	9.00%	7.50%
7	7.20%	6.00%

Ultimate Rates after the First 8 Years of Employment

Age	Male	Female	Age	Male	Female
22	2.62%	3.79%	39	2.57%	3.74%
23	2.62%	3.79%	40	2.26%	2.75%
24	2.61%	3.79%	41	2.26%	2.75%
25	2.61%	3.79%	42	2.25%	2.74%
26	2.61%	3.79%	43	2.24%	2.73%
27	2.60%	3.79%	44	2.23%	2.73%
28	2.60%	4.27%	45	2.22%	2.72%
29	2.60%	4.76%	46	2.21%	2.71%
30	2.60%	5.24%	47	2.20%	2.70%
31	2.60%	5.73%	48	2.18%	2.69%
32	2.59%	6.22%	49	2.16%	2.68%
33	2.59%	5.72%	50	3.43%	4.42%
34	2.59%	5.23%	51	3.39%	4.39%
35	2.59%	4.74%	52	3.35%	4.36%
36	2.58%	4.25%	53	3.30%	4.32%
37	2.58%	3.75%	54	3.00%	7.56%
38	2.58%	3.75%	55+	2.00%	5.00%

Proposed

Select Rates during the First 8 Years of Employment

Years of Service	Male	Female
0	20.40%	17.00%
1	20.40%	17.00%
2	16.80%	14.00%
3	14.40%	12.00%
4	12.00%	10.00%
5	10.80%	9.00%
6	9.00%	7.50%
7	7.20%	6.00%

Ultimate Rates after the First 8 Years of Employment

Age	Male	Female	Age	Male	Female
22	3.60%	4.60%	39	3.60%	3.90%
23	3.60%	4.60%	40	3.10%	2.60%
24	3.60%	4.60%	41	3.10%	2.60%
25	3.60%	4.60%	42	3.10%	2.60%
26	3.60%	4.60%	43	3.10%	2.60%
27	3.60%	4.60%	44	3.10%	2.60%
28	3.60%	4.60%	45	3.10%	2.60%
29	3.60%	4.60%	46	3.10%	2.60%
30	3.60%	5.40%	47	3.10%	2.60%
31	3.60%	5.40%	48	3.10%	2.60%
32	3.60%	5.40%	49	3.10%	2.60%
33	3.60%	5.40%	50	4.60%	4.80%
34	3.60%	5.40%	51	4.60%	4.80%
35	3.60%	3.90%	52	4.60%	4.80%
36	3.60%	3.90%	53	4.60%	4.80%
37	3.60%	3.90%	54	4.60%	4.80%
38	3.60%	3.90%	55+	2.80%	4.80%

Current and Proposed Decrements

Withdrawal – PERS DCR Peace/Fire

Current

Select Rates during the First 5 Years of Employment

Years of Service	Male	Female
0	18.90%	20.63%
1	14.18%	16.50%
2	10.50%	13.75%
3	9.45%	12.38%
4	8.40%	11.00%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	5.52%	11.97%	44	5.78%	11.09%
23	5.65%	11.97%	45	5.71%	11.03%
24	5.78%	11.97%	46	5.64%	10.98%
25	5.91%	11.97%	47	5.57%	10.92%
26	6.04%	11.97%	48	6.01%	10.84%
27	6.16%	11.97%	49	6.45%	10.75%
28	6.16%	11.94%	50	6.89%	10.67%
29	6.15%	11.91%	51	7.32%	10.58%
30	6.14%	11.88%	52	7.76%	10.50%
31	6.14%	11.84%	53	7.97%	10.66%
32	6.12%	11.81%	54	8.18%	10.82%
33	6.11%	11.79%	55	8.38%	10.98%
34	6.09%	11.77%	56	8.59%	11.15%
35	6.08%	11.75%	57	8.80%	11.31%
36	6.07%	11.72%	58	9.03%	11.47%
37	6.05%	11.70%	59	9.25%	11.63%
38	6.03%	11.60%	60	9.48%	11.79%
39	6.00%	11.50%	61	9.71%	11.95%
40	5.98%	11.40%	62	9.94%	12.12%
41	5.95%	11.30%	63	12.37%	12.28%
42	5.93%	11.20%	64	14.81%	12.44%
43	5.85%	11.14%	65+	17.25%	12.60%

Proposed

Select Rates during the First 5 Years of Employment

Years of Service	Male	Female
0	17.00%	27.00%
1	12.00%	21.00%
2	11.00%	15.00%
3	11.00%	13.00%
4	10.00%	9.00%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	6.60%	10.20%	44	6.50%	9.50%
23	6.60%	10.20%	45	6.50%	9.30%
24	6.60%	10.20%	46	6.50%	9.30%
25	6.60%	10.20%	47	6.50%	9.30%
26	6.60%	10.20%	48	6.50%	9.30%
27	6.60%	10.20%	49	6.50%	9.30%
28	6.60%	10.20%	50	8.50%	9.10%
29	6.60%	10.20%	51	8.50%	9.10%
30	6.80%	10.00%	52	8.50%	9.10%
31	6.80%	10.00%	53	8.50%	9.10%
32	6.80%	10.00%	54	8.50%	9.10%
33	6.80%	10.00%	55	9.80%	9.60%
34	6.80%	10.00%	56	9.80%	9.60%
35	6.70%	9.90%	57	9.80%	9.60%
36	6.70%	9.90%	58	9.80%	9.60%
37	6.70%	9.90%	59	9.80%	9.60%
38	6.70%	9.90%	60	12.50%	10.30%
39	6.70%	9.90%	61	12.50%	10.30%
40	6.50%	9.50%	62	12.50%	10.30%
41	6.50%	9.50%	63	12.50%	10.30%
42	6.50%	9.50%	64	12.50%	10.30%
43	6.50%	9.50%	65+	19.20%	10.70%

Current and Proposed Decrements

Withdrawal – PERS DCR Others

Current

Select Rates during the First 5 Years of Employment

Years of Service	Male	Female
0	24.36%	27.98%
1	21.00%	22.31%
2	16.80%	17.85%
3	13.44%	14.28%
4	9.45%	12.34%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	13.71%	16.50%	44	7.83%	8.22%
23	13.71%	16.51%	45	7.72%	7.90%
24	13.71%	16.51%	46	7.60%	7.58%
25	13.71%	16.52%	47	7.48%	7.26%
26	13.71%	16.53%	48	7.68%	7.23%
27	13.71%	16.54%	49	7.87%	7.20%
28	13.41%	15.94%	50	8.07%	7.17%
29	13.21%	15.34%	51	8.26%	7.14%
30	12.82%	17.75%	52	8.46%	7.11%
31	12.52%	14.15%	53	8.46%	7.26%
32	12.22%	13.55%	54	8.47%	7.42%
33	11.65%	12.90%	55	8.48%	7.57%
34	11.09%	12.24%	56	8.48%	7.72%
35	10.52%	11.58%	57	8.49%	7.88%
36	9.95%	10.92%	58	8.77%	8.15%
37	9.39%	10.26%	59	9.08%	8.42%
38	9.12%	9.98%	60	9.32%	8.69%
39	8.86%	9.70%	61	9.60%	8.96%
40	8.60%	9.42%	62	9.88%	9.24%
41	8.32%	9.14%	63	10.28%	10.51%
42	8.07%	8.86%	64	10.68%	11.78%
43	7.95%	8.54%	65+	11.08%	13.05%

Proposed

Select Rates during the First 5 Years of Employment

Years of Service	Male	Female
0	28.00%	29.00%
1	20.00%	24.00%
2	16.00%	19.00%
3	14.00%	16.00%
4	12.00%	14.00%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	13.70%	15.80%	44	8.50%	10.60%
23	13.70%	15.80%	45	8.90%	8.90%
24	13.70%	15.80%	46	8.90%	8.90%
25	13.70%	15.80%	47	8.90%	8.90%
26	13.70%	15.80%	48	8.90%	8.90%
27	13.70%	15.80%	49	8.90%	8.90%
28	13.70%	15.80%	50	8.40%	8.70%
29	13.70%	15.80%	51	8.40%	8.70%
30	12.20%	11.20%	52	8.40%	8.70%
31	12.20%	11.20%	53	8.40%	8.70%
32	12.20%	11.20%	54	8.40%	8.70%
33	12.20%	11.20%	55	8.70%	9.50%
34	12.20%	11.20%	56	8.70%	9.50%
35	9.70%	10.20%	57	8.70%	9.50%
36	9.70%	10.20%	58	8.70%	9.50%
37	9.70%	10.20%	59	8.70%	9.50%
38	9.70%	10.20%	60	10.10%	11.80%
39	9.70%	10.20%	61	10.10%	11.80%
40	8.50%	10.60%	62	10.10%	11.80%
41	8.50%	10.60%	63	10.10%	11.80%
42	8.50%	10.60%	64	10.10%	11.80%
43	8.50%	10.60%	65+	11.20%	15.70%

Current and Proposed Decrements

Withdrawal – TRS DCR

Current

Select Rates during the First 6 Years of Employment

Years of Service	Male	Female
0	20.70%	21.80%
1	19.55%	18.70%
2	16.10%	15.40%
3	13.80%	13.20%
4	11.50%	11.00%
5	7.32%	8.05%

Ultimate Rates after the First 6 Years of Employment

Age	Male	Female	Age	Male	Female
< 26	9.41%	8.31%	45	9.05%	8.09%
26	9.41%	8.32%	46	8.99%	8.07%
27	9.40%	8.33%	47	8.94%	8.04%
28	9.39%	8.32%	48	8.86%	8.00%
29	9.39%	8.32%	49	8.78%	7.95%
30	9.38%	8.31%	50	8.70%	7.91%
31	9.37%	8.31%	51	8.62%	7.86%
32	9.36%	8.30%	52	8.54%	7.82%
33	9.35%	8.29%	53	8.37%	7.73%
34	9.35%	8.28%	54	8.20%	7.64%
35	9.34%	8.27%	55	8.03%	7.55%
36	9.34%	8.26%	56	7.86%	7.46%
37	9.33%	8.25%	57	7.69%	7.36%
38	9.31%	8.24%	58	7.76%	7.50%
39	9.29%	8.22%	59	7.82%	7.64%
40	9.26%	8.21%	60	7.89%	7.78%
41	9.24%	8.19%	61	7.95%	7.92%
42	9.22%	8.17%	62	8.02%	8.05%
43	9.16%	8.15%	63	8.59%	8.29%
44	9.11%	8.12%	64	9.17%	8.52%
			65+	9.75%	8.75%

Proposed

Select Rates during the First 6 Years of Employment

Years of Service	Male	Female
0	28.00%	31.00%
1	28.00%	21.00%
2	19.00%	18.00%
3	17.00%	13.00%
4	13.00%	13.00%
5	13.00%	10.00%

Ultimate Rates after the First 6 Years of Employment

Age	Male	Female	Age	Male	Female
< 26	10.50%	8.70%	45	10.00%	8.40%
26	10.50%	8.70%	46	10.00%	8.40%
27	10.50%	8.70%	47	10.00%	8.40%
28	10.50%	8.70%	48	10.00%	8.40%
29	10.50%	8.70%	49	10.00%	8.40%
30	10.50%	8.70%	50	9.50%	8.10%
31	10.50%	8.70%	51	9.50%	8.10%
32	10.50%	8.70%	52	9.50%	8.10%
33	10.50%	8.70%	53	9.50%	8.10%
34	10.50%	8.70%	54	9.50%	8.10%
35	10.40%	8.60%	55	8.80%	7.90%
36	10.40%	8.60%	56	8.80%	7.90%
37	10.40%	8.60%	57	8.80%	7.90%
38	10.40%	8.60%	58	8.80%	7.90%
39	10.40%	8.60%	59	8.80%	7.90%
40	10.30%	8.60%	60	9.30%	8.70%
41	10.30%	8.60%	61	9.30%	8.70%
42	10.30%	8.60%	62	9.30%	8.70%
43	10.30%	8.60%	63	9.30%	8.70%
44	10.30%	8.60%	64	9.30%	8.70%
			65+	10.90%	7.40%

Current and Proposed Decrements

Withdrawal – JRS

Current

Years of Service	Rate
0	3%
1	3%
2	3%
3	3%
4	3%
5	3%
6	3%
7	3%
8	3%
9	3%
10+	1%

Proposed

Years of Service	Rate
0	3%
1	3%
2	3%
3	3%
4	3%
5	3%
6	3%
7	3%
8	3%
9	3%
10+	1%

Current and Proposed Decrements

Withdrawal – NGNMRS

Current

Select Rates during the First 5 Years of Employment

Years of Service	Unisex
0	20.00%
1	10.00%
2	10.00%
3	10.00%
4	10.00%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
20	14.94%	18.92%	40	9.09%	11.52%
21	14.13%	17.90%	41	8.87%	11.24%
22	13.44%	17.03%	42	8.68%	11.00%
23	12.86%	16.29%	43	8.51%	10.78%
24	12.40%	15.70%	44	8.31%	10.53%
25	12.03%	15.24%	45	8.04%	10.18%
26	11.74%	14.87%	46	7.66%	9.70%
27	11.52%	14.59%	47	7.13%	9.03%
28	11.35%	14.37%	48	6.46%	8.19%
29	11.21%	14.20%	49	5.67%	7.18%
30	11.09%	14.05%	50	4.89%	6.19%
31	10.98%	13.91%	51	4.27%	5.42%
32	10.86%	13.76%	52	3.83%	4.85%
33	10.73%	13.59%	53	3.51%	4.45%
34	10.57%	13.39%	54	3.27%	4.15%
35	10.37%	13.14%	55	3.10%	3.93%
36	10.15%	12.85%	56	3.02%	3.82%
37	9.89%	12.53%	57	3.03%	3.84%
38	9.62%	12.18%	58	3.11%	3.94%
39	9.35%	11.84%	59	3.27%	4.14%
			60	3.38%	4.29%

Proposed

Select Rates during the First 5 Years of Employment

Years of Service	Unisex
0	20.00%
1	10.00%
2	10.00%
3	10.00%
4	10.00%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
20	9.53%	9.94%	40	7.73%	8.06%
21	9.53%	9.94%	41	7.54%	7.87%
22	9.53%	9.94%	42	7.38%	7.70%
23	9.53%	9.94%	43	7.23%	7.55%
24	9.53%	9.94%	44	7.06%	7.37%
25	9.53%	9.94%	45	6.83%	7.13%
26	9.53%	9.94%	46	6.51%	6.79%
27	9.53%	9.94%	47	6.06%	6.32%
28	9.53%	9.94%	48	5.49%	5.73%
29	9.53%	9.94%	49	4.82%	5.03%
30	9.43%	9.84%	50	4.16%	4.33%
31	9.33%	9.74%	51	3.63%	3.79%
32	9.23%	9.63%	52	3.26%	3.40%
33	9.12%	9.51%	53	2.98%	3.12%
34	8.98%	9.37%	54	2.78%	2.91%
35	8.81%	9.20%	55	2.64%	2.75%
36	8.63%	9.00%	56	2.57%	2.67%
37	8.41%	8.77%	57	2.58%	2.69%
38	8.18%	8.53%	58	2.64%	2.76%
39	7.95%	8.29%	59	2.78%	2.90%
			60	2.88%	3.00%

Actuarial Certification

Use of Models

Actuarial Standard of Practice No. 56 ("ASOP 56") provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. For this presentation, Buck used the following:

- internally developed and third-party model to compare actual versus assumed experience and determine proposed assumptions to use for valuing the liabilities in the third-party software
- models to analyze investment returns as previously described in the December 2021 presentation
- third-party software to calculate the liabilities associated with the plans based on current and proposed assumptions
- an internally developed model that applies applicable funding methods and policies to the liabilities derived from the output of the third-party software and other inputs, such as plan assets and contributions, to determine the contribution rates

Buck has an extensive review process for annual valuations whereby the results of the liability calculations are checked using detailed sample output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other outputs and the internal model are similarly reviewed in detail and at a high level for accuracy, reasonability and consistency with prior results. The models used for annual valuations are used for this presentation and any adaptations for this presentation are checked and reviewed by experts within the company who are familiar with applicable funding methods as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking and review are completed.

Actuarial Certification

The purpose of this presentation is to provide the ARMB Actuarial Committee with an analysis of proposed changes to the demographic and economic assumptions that are used in the actuarial valuations of the State of Alaska's retirement systems for discussion with the actuary at the March 2022 ARMB meeting. Use of this presentation, for any other purpose or by anyone other than the ARMB or staff of the State of Alaska may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the presentation for that purpose. Because of the risk of misinterpretation of results, you should ask Buck to review any statement you wish to make on the results contained in this presentation. Buck will not accept any liability for any such statement made without the review by Buck.

The cost effects of the proposed assumptions are based on the June 30, 2020 valuations, and are meant to show the estimated impact of the assumptions changes. They are not to be used for determining actual funding contributions.

Please see the draft June 30, 2021 actuarial valuation reports for a more detailed description of risk factors related to future funding of the plans (ASOP 51).

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law.

The results were prepared under the direction of David Kershner and Scott Young, both of whom meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. These results have been prepared in accordance with all applicable Actuarial Standards of Practice.

David Kershner
FSA, EA, MAAA, FCA
Principal, Retirement

Scott Young
FSA, EA, MAAA, FCA
Director, Health

BUCK

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Callan

March17, 2022

ARMB Board Meeting

Preliminary Investment Performance
Periods Ended December 31, 2021

Steve Center, CFA
Senior Vice President

Paul Erlendson
Senior Vice President

Agenda

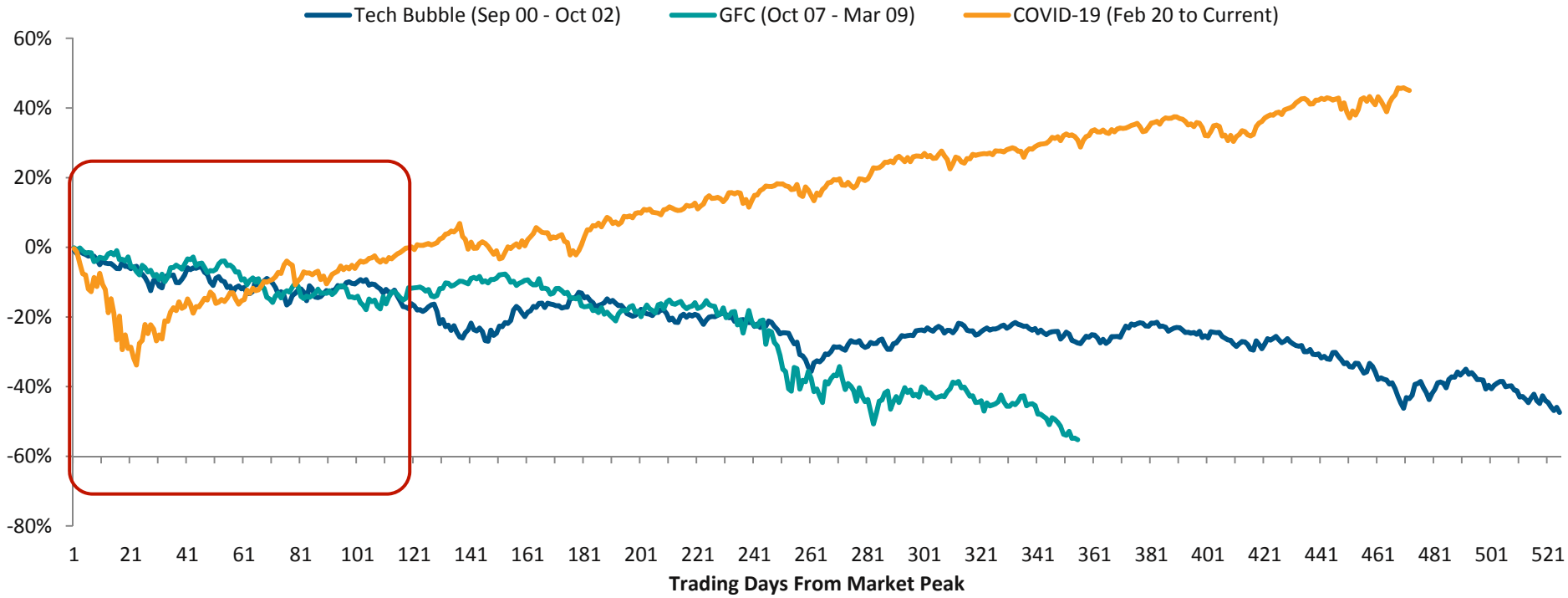
- Market and Economic Environment
- Total Fund Performance
  - Defined Benefit Plans' Major Asset Classes
  - Participant-Directed Plans

Unprecedented Shock to Global Capital Markets—But It Was Over in a Flash!

V-shaped recovery in equity—back in black by mid-August 2020, up 119% from market bottom!

S&P 500 Cumulative Returns

Market Peak-to-Trough for Recent Corrections vs. Current Path of COVID-19 Correction Through 12/31/21

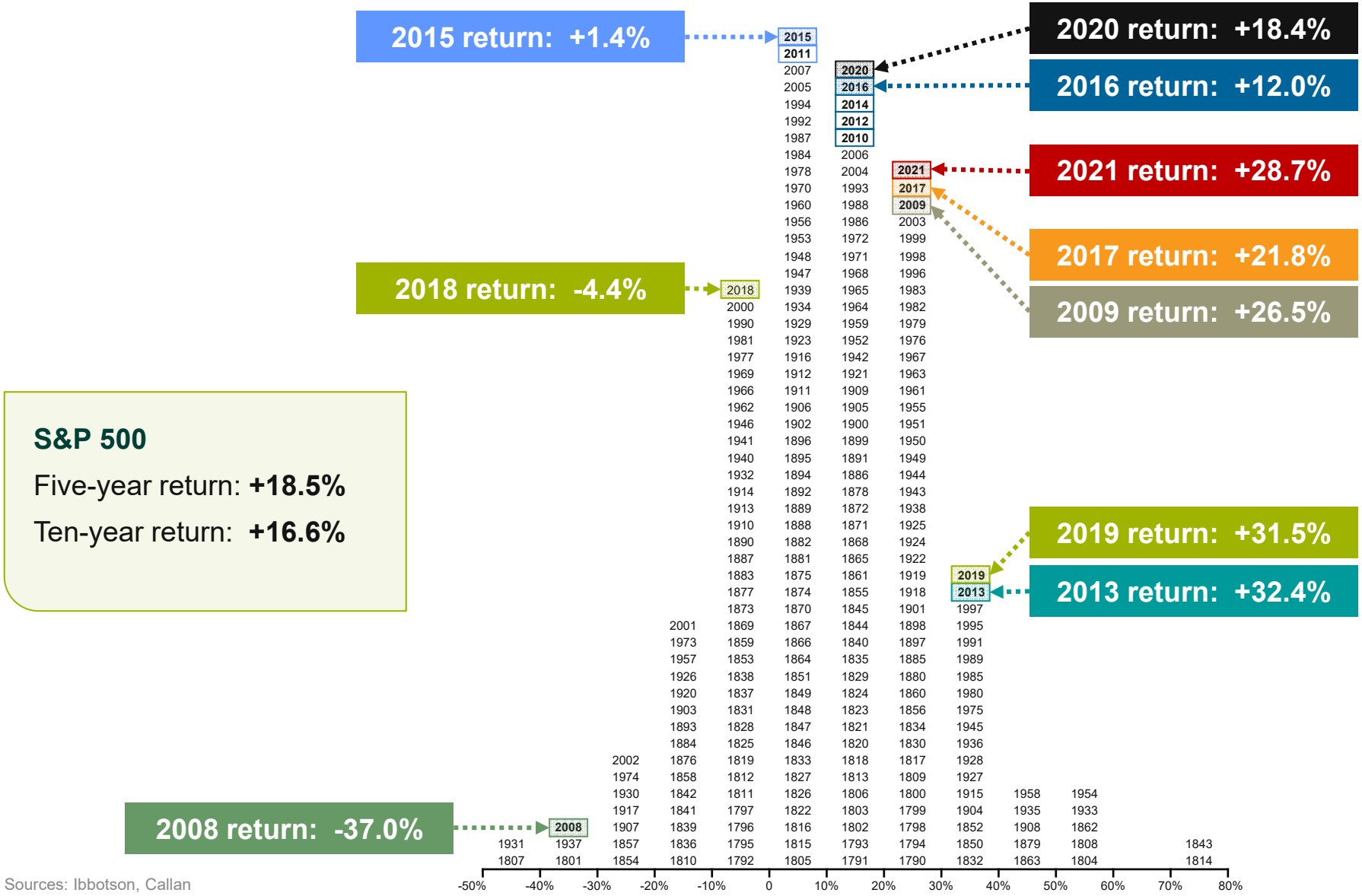


- Sharpest and fastest equity market decline ever: 16 trading days to reach bear market; -34% after just 23 days
  - S&P 500 recovered all its pandemic-related losses by Aug. 10, 2020, only 97 days from the bottom.
  - S&P 500 up 28.7% in 2021.
- **Fun fact:** As of Dec. 31, 2021, or 472 trading days, the S&P is up over 45% from the previous market peak on 2/19/20. In contrast, during the GFC the market was still down 31% from the previous market peak after 472 trading days (Aug. 24, 2009).

Sources: Callan, S&P Dow Jones Indices

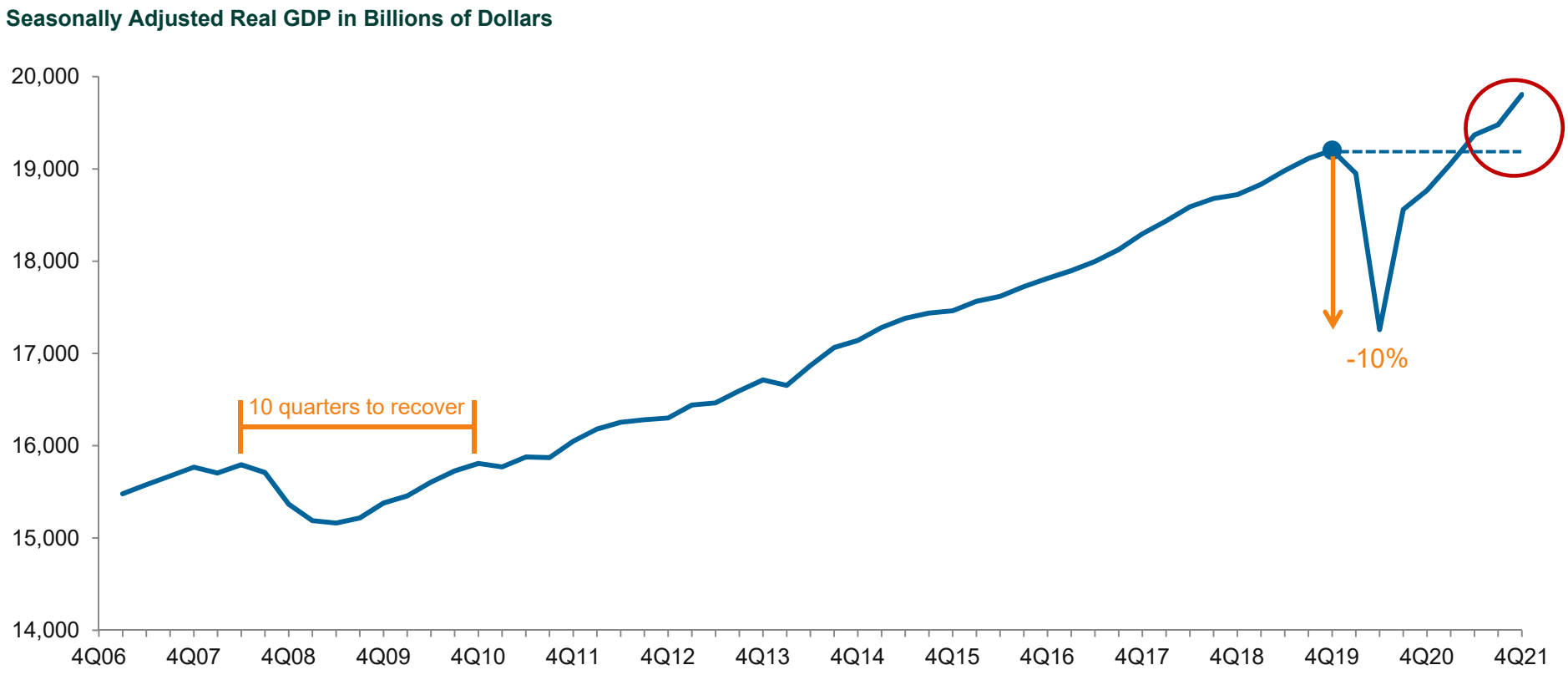
Stock Market Returns by Calendar Year

2021 performance in perspective: History of the U.S. stock market (232 years of returns)



Sources: Ibbotson, Callan

GDP Recovered Pre-Pandemic Level in 2Q21 After Deepest Drop in 75 Years



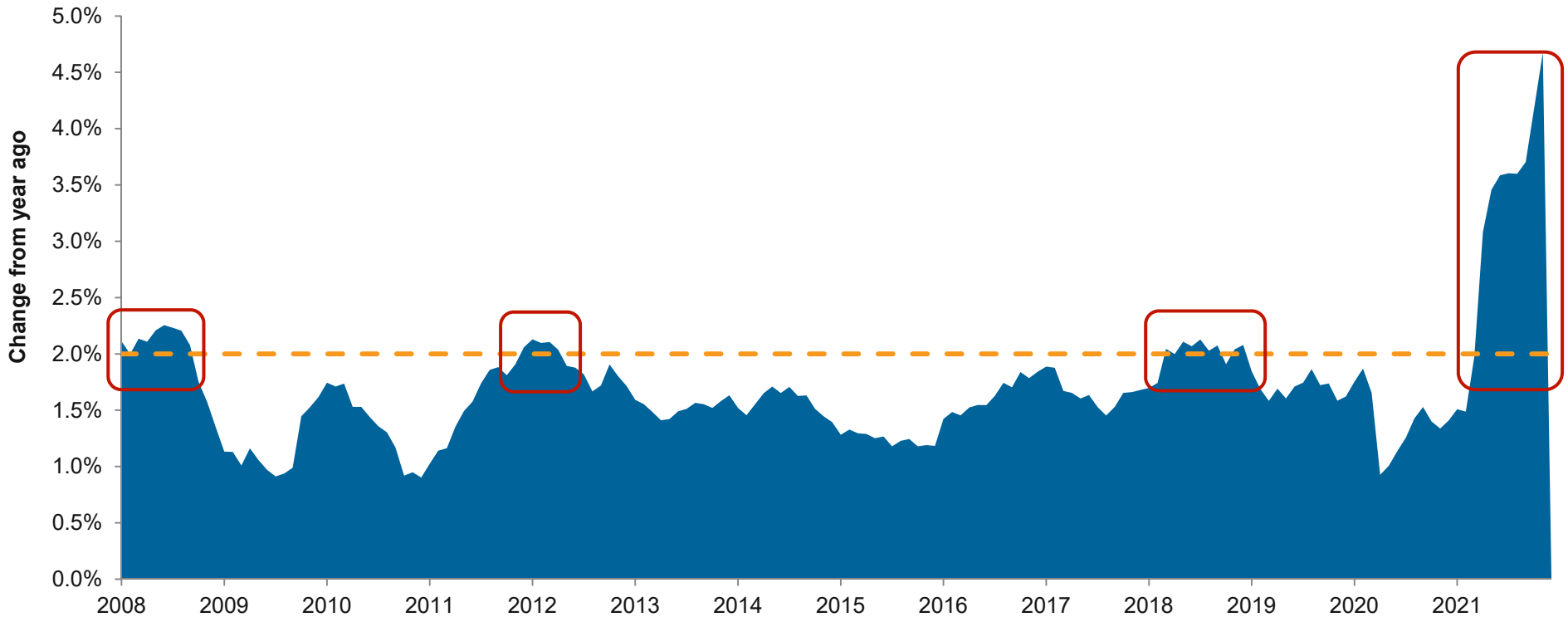
- After the Global Financial Crisis, it took 2½ years before real GDP reclaimed its pre-recession highs.
  - GFC peak to trough down 4%
- 2Q20 real GDP level was down over 10% from 4Q19.
  - Pre-pandemic peak level of GDP reached in 2Q21: $19.368T vs. $19.202T for 4Q19
- 2021 GDP showed annual growth of 5.7%, with consensus estimates just north of 4.0% for 2022, followed by return to trend.

Source: Federal Reserve Bank of St. Louis

The Fed's New Inflation Framework

Targeting core Personal Consumption Expenditures Index

PCE Excluding Food and Energy (Chain-Type Price Index)



- Inflation worries are in the headlines, and the data are clearly signaling a sharp rise in the short term.
- Inflation had consistently undershot the Fed's 2% target, prompting the Fed to change its inflation framework.
- Fed's aim is to achieve an average of 2% inflation over the medium term, which is not specifically defined.
- Personal Consumption Expenditures (PCE) Index is the Fed's target, different from and typically lower than CPI-U, which had a year-over-year gain of 7.0% in December 2021.

Sources: Federal Reserve Bank of St. Louis, U.S. Bureau of Economic Analysis

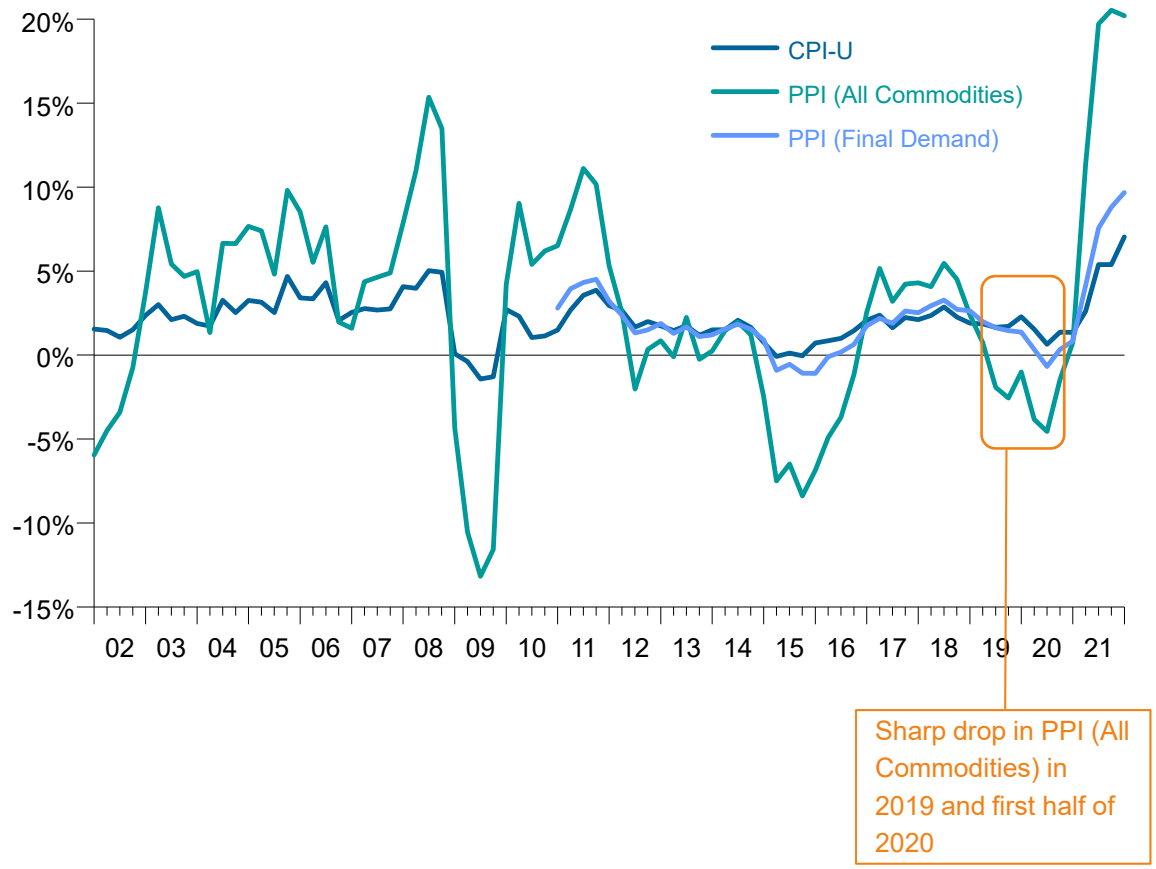
Inflation Rebounds and Spurs Headline Concerns

CPI and PPI up sharply again in 4Q21

Inflation fell dramatically at the onset of the pandemic, starting in February 2020.

- The recovery to pre-pandemic levels in the Consumer Price Index required a 2.6% year-over-year change.
- 7% jump in 4Q CPI-U represents kinks in supply chains and labor markets after a year of global economic disruption and shutdown.
- Producer prices had been tumbling for more than a year prior to the pandemic; recovery to 2018 price ***levels*** generated eye-popping year-over-year percentage changes through 2Q, and the sharp rise continued through the second half of 2021.
- Prices for transportation goods, energy, and food drove the Producer Price Index's rise.

Consumer and Producer Price Indices – Inflation Year-Over-Year



Source: Federal Reserve Bank of St. Louis

Contributors to Recent Inflation: Primary Categories

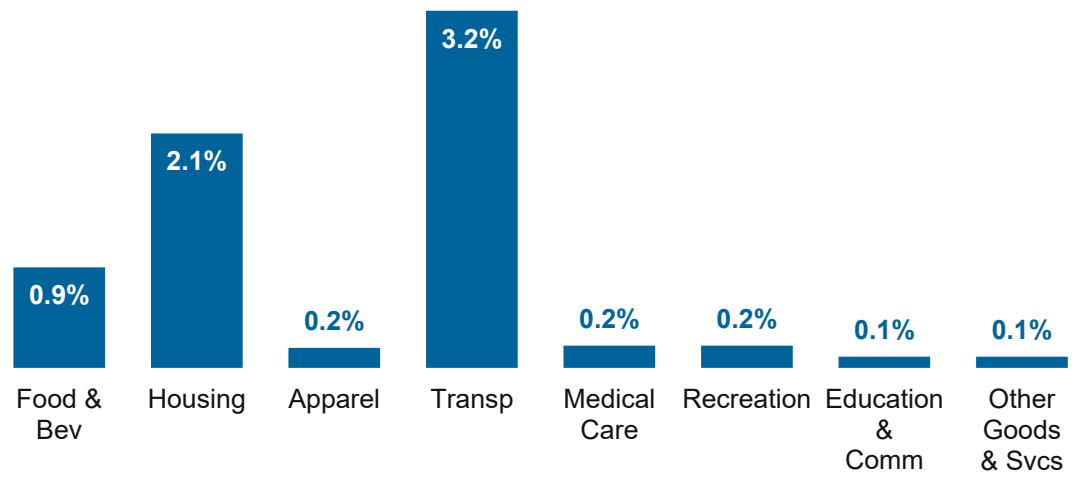
Transportation, including new and used cars, parts, and gasoline, saw a spike in inflation.

- Year-over-year prints are more than three times higher than any other category.
- With a meaningful 15% weight in the index, transportation also has the highest weighted contribution to headline CPI.

Housing and food and beverage have also been significant contributors to headline CPI.

- Inflation within these categories has been far lower than transportation, but their large index weights make them meaningful contributors to overall inflation.

Contribution to December 2021 YOY Inflation



Primary Category	Primary Category Weight	Year-over-Year Change											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
All Items	100.0%	1.4%	1.7%	2.6%	4.2%	5.0%	5.4%	5.4%	5.3%	5.4%	6.2%	6.8%	7.0%
Food & Bev	15.2%	3.7%	3.5%	3.4%	2.3%	2.1%	2.4%	3.4%	3.7%	4.5%	5.1%	5.8%	6.0%
Housing	42.4%	1.8%	1.8%	2.1%	2.6%	2.9%	3.1%	3.4%	3.5%	3.9%	4.5%	4.8%	5.1%
Apparel	2.7%	-2.5%	-3.6%	-2.5%	1.9%	5.6%	4.9%	4.2%	4.2%	3.4%	4.3%	5.0%	5.8%
Transportation	15.2%	-1.3%	0.6%	5.8%	14.9%	20.0%	21.5%	19.4%	17.8%	16.6%	18.7%	21.1%	21.1%
Medical Care	8.9%	1.9%	2.0%	1.8%	1.5%	0.9%	0.4%	0.3%	0.4%	0.4%	1.3%	1.7%	2.2%
Recreation	5.8%	0.1%	0.8%	1.1%	2.1%	1.6%	2.4%	3.5%	3.4%	3.5%	3.9%	3.2%	3.3%
Education & Communication	6.8%	1.7%	1.7%	1.5%	1.7%	1.9%	2.1%	1.1%	1.2%	1.7%	1.8%	1.7%	1.6%
Other Goods & Svcs	3.2%	2.1%	2.1%	2.4%	2.7%	2.7%	2.5%	2.9%	3.5%	3.4%	4.2%	4.4%	4.5%

Source: U.S. Bureau of Labor Statistics

Contributors to Recent Inflation: Primary and Subcategories

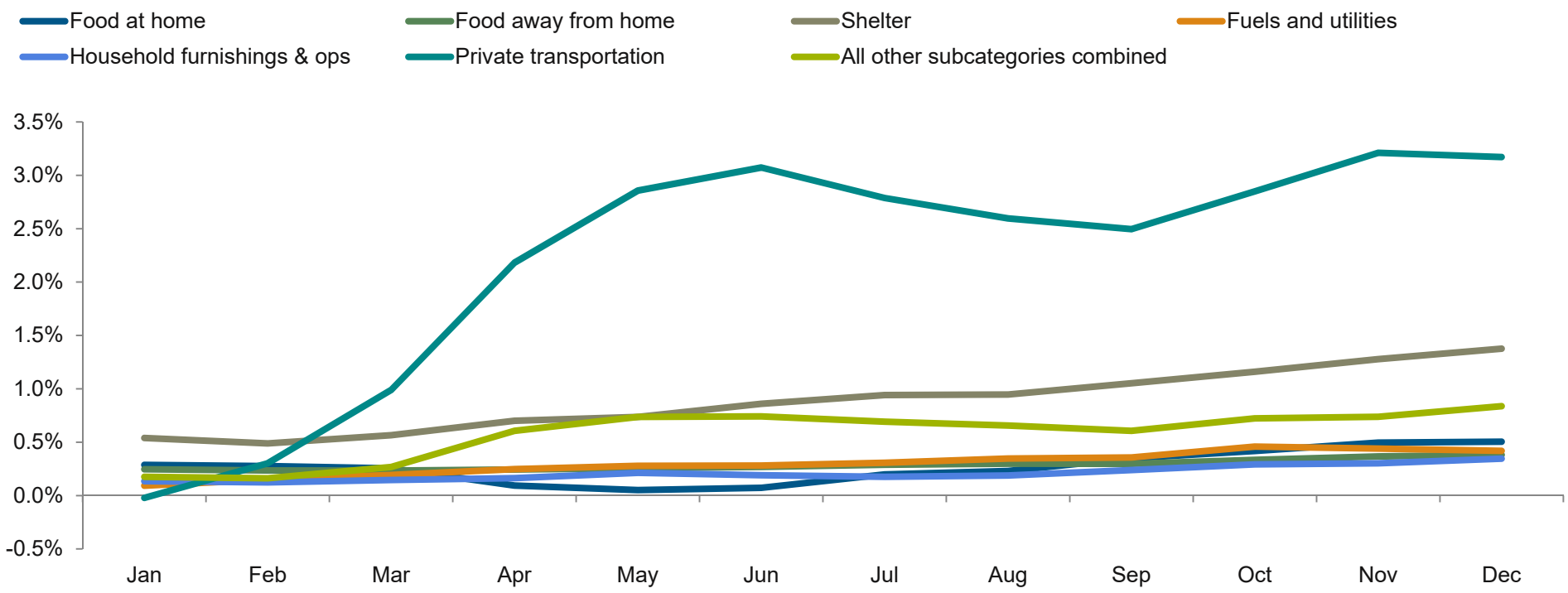
Primary Category	Primary Category Weight	Subcategory	Sub-Category Weight	Year-over-Year Change											
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Food & Bev	15.2%	Food at home	7.8%	3.7%	3.5%	3.3%	1.2%	0.7%	0.9%	2.6%	3.0%	4.5%	5.4%	6.4%	6.5%
		Food away from home	6.3%	3.9%	3.7%	3.7%	3.8%	4.0%	4.2%	4.6%	4.7%	4.7%	5.3%	5.8%	6.0%
		Alcoholic beverages	1.0%	2.4%	2.0%	2.0%	1.9%	1.6%	1.9%	2.4%	2.6%	2.8%	2.2%	1.9%	2.3%
Housing	42.4%	Shelter	33.3%	1.6%	1.5%	1.7%	2.1%	2.2%	2.6%	2.8%	2.8%	3.2%	3.5%	3.8%	4.1%
		Fuels and utilities	4.4%	2.1%	3.4%	4.4%	5.7%	6.4%	6.4%	7.0%	7.9%	8.2%	10.4%	10.0%	9.5%
		Furnishings & operations	4.7%	2.9%	2.6%	3.1%	3.5%	4.6%	4.1%	3.8%	4.0%	5.1%	6.2%	6.5%	7.4%
Apparel	2.7%	Men's and boys' apparel	0.7%	-2.6%	-4.1%	-2.7%	2.1%	4.2%	2.3%	3.0%	3.9%	4.4%	6.3%	7.8%	7.8%
		Women's and girls' apparel	1.1%	-3.3%	-4.2%	-4.6%	-0.3%	4.8%	5.3%	4.6%	3.6%	0.6%	2.1%	3.4%	4.4%
		Footwear	0.6%	-2.1%	-2.3%	-0.2%	3.9%	7.1%	6.5%	4.6%	5.1%	6.5%	5.2%	4.7%	6.0%
		Infants' and toddlers' apparel	0.1%	-5.7%	-6.8%	-4.2%	1.7%	3.1%	-0.5%	-1.2%	-1.4%	3.0%	7.6%	4.5%	4.6%
		Jewelry and watches	0.2%	3.9%	1.2%	6.7%	9.5%	12.4%	11.2%	9.5%	10.7%	6.8%	6.1%	5.2%	7.2%
Transportation	15.2%	Private transportation	14.1%	-0.2%	2.2%	7.0%	15.5%	20.3%	21.9%	19.8%	18.5%	17.8%	20.3%	22.8%	22.6%
		Public transportation	1.1%	-13.9%	-16.2%	-8.2%	7.0%	15.9%	17.3%	14.0%	8.4%	1.6%	-1.1%	-0.6%	2.4%
Medical Care	8.9%	Medical care commodities	1.6%	-2.3%	-2.5%	-2.4%	-1.7%	-1.9%	-2.2%	-2.1%	-2.5%	-1.6%	-0.4%	0.2%	0.4%
		Medical care services	7.3%	2.9%	3.0%	2.7%	2.2%	1.5%	1.0%	0.8%	1.0%	0.9%	1.7%	2.1%	2.5%
Recreation	5.8%	Video and audio	1.5%	2.1%	2.7%	2.8%	2.9%	3.0%	4.0%	3.7%	3.6%	3.5%	3.3%	3.2%	2.1%
		Pets, pet products and services	1.2%	1.1%	1.1%	1.5%	2.4%	2.5%	2.9%	3.2%	2.4%	3.3%	3.8%	3.5%	4.1%
		Sporting goods	0.6%	2.8%	4.6%	4.8%	7.0%	9.0%	7.5%	5.7%	7.6%	7.5%	8.7%	8.4%	6.3%
		Photography	0.1%	3.2%	1.5%	0.6%	1.5%	3.1%	1.5%	2.2%	2.6%	2.3%	2.0%	3.2%	3.6%
		Other recreational goods	0.4%	-3.8%	-2.8%	-1.0%	1.8%	2.1%	1.5%	1.3%	1.1%	-0.6%	-0.3%	1.1%	2.5%
		Other recreational services	1.9%	-2.5%	-1.6%	-1.3%	-0.2%	-2.4%	-0.5%	3.5%	3.2%	3.1%	3.9%	1.9%	3.0%
		Recreational reading materials	0.1%	4.3%	3.4%	3.0%	5.5%	3.8%	0.7%	1.5%	1.3%	2.8%	1.7%	2.2%	0.3%
Education & Communication	6.8%	Education	3.0%	1.3%	1.2%	0.8%	0.8%	1.0%	1.2%	1.2%	1.4%	2.0%	2.0%	2.1%	2.0%
		Communication	3.8%	2.1%	2.2%	2.1%	2.4%	2.6%	2.8%	1.1%	1.0%	1.5%	1.5%	1.3%	1.3%
Other Goods & Svcs	3.2%	Tobacco and smoking products	0.6%	6.7%	7.0%	6.3%	6.8%	7.3%	7.0%	6.4%	6.3%	6.7%	8.5%	8.9%	9.0%
		Personal care	2.6%	1.1%	1.0%	1.5%	1.7%	1.6%	1.5%	2.1%	2.8%	2.6%	3.2%	3.3%	3.4%

- **Subcategories highlighted in blue were the biggest contributors to December YOY headline CPI due to a combination of high index weights and high inflation within the subcategory.**
- These components combined make up over 70% of the index weight.
- **Other subcategories, such as men's and boy's apparel, jewelry, and watches, as well as tobacco and smoking products, have also seen high inflation but do not contribute as much to headline inflation due to lower index weights.**

Source: U.S. Bureau of Labor Statistics

Contributors to Recent Inflation: Weighted Contribution Over Time

Contribution to YOY Inflation (YTD through December 2021)



Looking at the six subcategories highlighted before, and combining the remaining 20, shows how impactful those few areas have been in driving inflation.

- Combining those 20 subcategories would only make them the third-largest contributor to inflation over the last few months even if they were a single category.

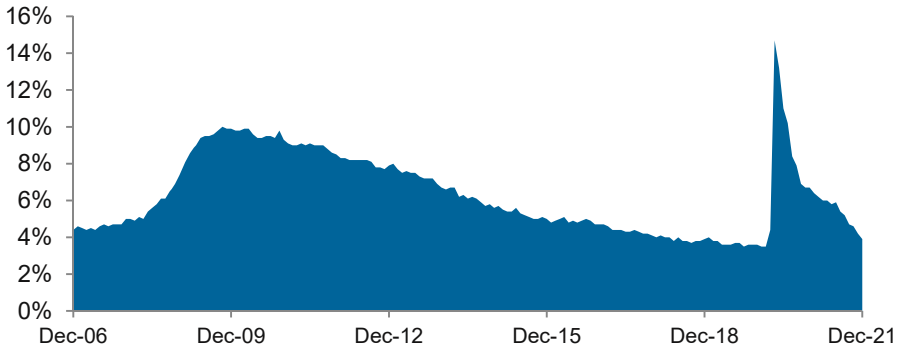
Private transportation stands out because the category has not seen inflation readings this high since 1980.

- If private transportation were at its long-term average of 2.2%, December's headline inflation would have dropped from 7.0% to 4.2%.

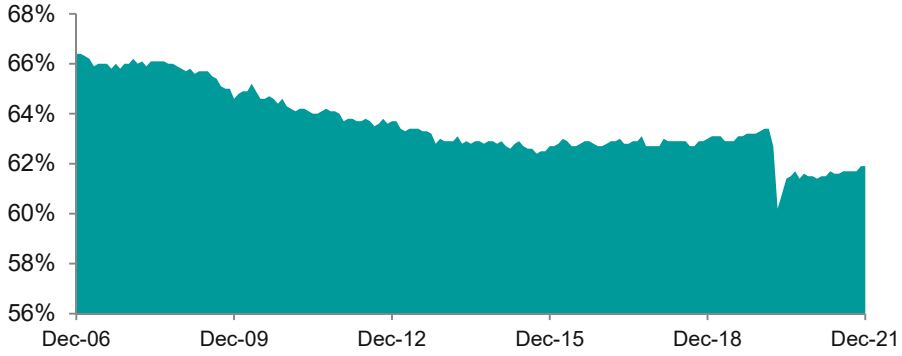
Source: U.S. Bureau of Labor Statistics

Wages and Employment

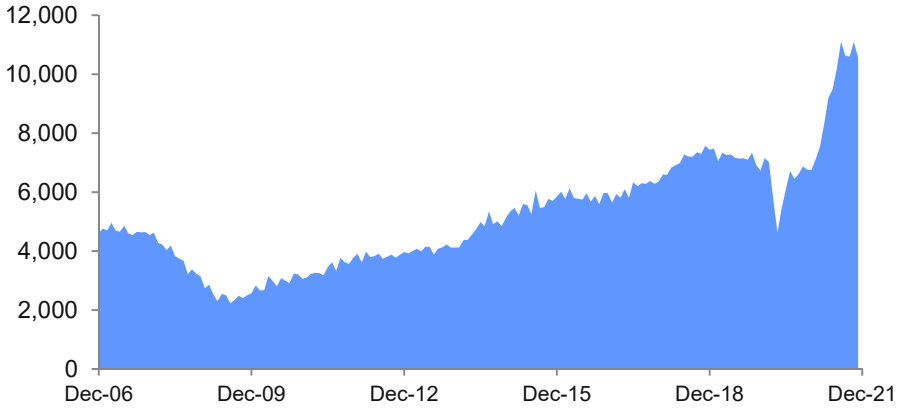
Unemployment Rate



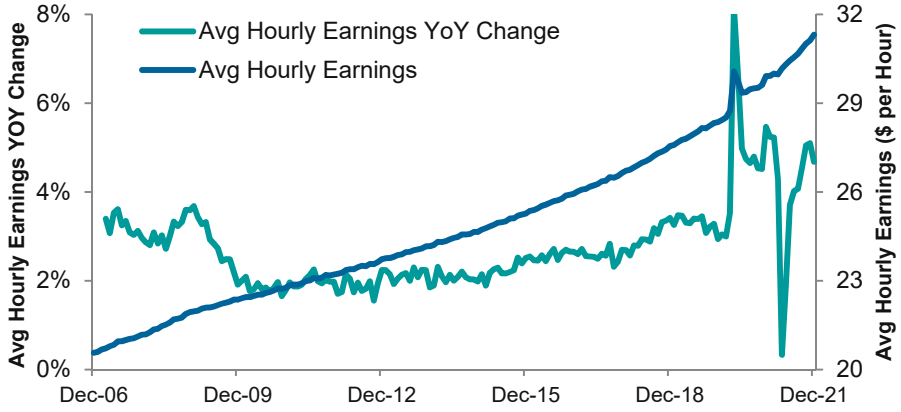
Labor Force Participation Rate



Job Openings (in thousands)



Average Hourly Earnings



- Unemployment continues to fall even as the labor force participation rate has trended slightly upward.
- Job openings are significantly elevated but appear to have paused their rapid ascension, at least temporarily.
- Average hourly earnings rose about 4.7% for the YOY period ending in December.
- Wage-related inflation could persist if the labor force does not expand to fill open jobs.

Source: U.S. Bureau of Labor Statistics

Callan Periodic Table of Investment Returns – Calendar Year

Monthly Returns												Annual Returns
Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	2021
Small Cap Equity 5.03%	Small Cap Equity 6.23%	Large Cap Equity 4.38%	Real Estate 6.42%	Dev ex-U.S. Equity 3.48%	Large Cap Equity 2.33%	Real Estate 3.83%	Large Cap Equity 3.04%	High Yield -0.01%	Large Cap Equity 7.01%	U.S. Fixed Income 0.30%	Real Estate 6.33%	Large Cap Equity 28.71%
Emerging Market Equity 3.07%	Real Estate 3.70%	Real Estate 2.85%	Large Cap Equity 5.34%	Emerging Market Equity 2.32%	Small Cap Equity 1.94%	Large Cap Equity 2.38%	Emerging Market Equity 2.62%	U.S. Fixed Income -0.87%	Real Estate 5.98%	Large Cap Equity -0.69%	Dev ex-U.S. Equity 5.08%	Real Estate 26.09%
High Yield 0.33%	Large Cap Equity 2.76%	Dev ex-U.S. Equity 2.55%	Dev ex-U.S. Equity 3.15%	Real Estate 1.79%	High Yield 1.34%	Global ex-U.S. Fixed Income 1.51%	Small Cap Equity 2.24%	Global ex-U.S. Fixed Income -2.45%	Small Cap Equity 4.25%	Global ex-U.S. Fixed Income -0.72%	Large Cap Equity 4.48%	Small Cap Equity 14.82%
U.S. Fixed Income -0.72%	Dev ex-U.S. Equity 2.55%	Small Cap Equity 1.00%	Emerging Market Equity 2.49%	Global ex-U.S. Fixed Income 1.36%	Real Estate 0.78%	U.S. Fixed Income 1.12%	Dev ex-U.S. Equity 1.60%	Dev ex-U.S. Equity -2.87%	Dev ex-U.S. Equity 2.98%	High Yield -0.97%	Small Cap Equity 2.23%	Dev ex-U.S. Equity 12.62%
Real Estate -0.81%	Emerging Market Equity 0.76%	High Yield 0.15%	Small Cap Equity 2.10%	Large Cap Equity 0.70%	U.S. Fixed Income 0.70%	Dev ex-U.S. Equity 0.66%	Real Estate 1.31%	Small Cap Equity -2.95%	Emerging Market Equity 0.99%	Real Estate -2.24%	Emerging Market Equity 1.88%	High Yield 5.28%
Large Cap Equity -1.01%	High Yield 0.37%	U.S. Fixed Income -1.25%	Global ex-U.S. Fixed Income 1.62%	U.S. Fixed Income 0.33%	Emerging Market Equity 0.17%	High Yield 0.38%	High Yield 0.51%	Emerging Market Equity -3.97%	U.S. Fixed Income -0.03%	Emerging Market Equity -4.08%	High Yield 1.87%	U.S. Fixed Income -1.54%
Global ex-U.S. Fixed Income -1.03%	U.S. Fixed Income -1.44%	Emerging Market Equity -1.51%	High Yield 1.09%	High Yield 0.30%	Dev ex-U.S. Equity -1.02%	Small Cap Equity -3.61%	U.S. Fixed Income -0.19%	Large Cap Equity -4.65%	High Yield -0.17%	Small Cap Equity -4.17%	Global ex-U.S. Fixed Income -0.07%	Emerging Market Equity -2.54%
Dev ex-U.S. Equity -1.07%	Global ex-U.S. Fixed Income -1.94%	Global ex-U.S. Fixed Income -2.42%	U.S. Fixed Income 0.79%	Small Cap Equity 0.21%	Global ex-U.S. Fixed Income -2.02%	Emerging Market Equity -6.73%	Global ex-U.S. Fixed Income -0.61%	Real Estate -5.80%	Global ex-U.S. Fixed Income -0.39%	Dev ex-U.S. Equity -4.68%	U.S. Fixed Income -0.26%	Global ex-U.S. Fixed Income -7.05%

Sources: ● Bloomberg Aggregate ● Bloomberg Corp High Yield ● Bloomberg Global Aggregate ex US ● FTSE EPRA Nareit Developed ● MSCI World ex USA ● MSCI Emerging Markets ● Russell 2000 ● S&P 500

Callan Periodic Table of Investment Returns – Trailing Calendar Years

Annual Returns									
2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Real Estate 27.73%	Small Cap Equity 38.82%	Real Estate 15.02%	Large Cap Equity 1.38%	Small Cap Equity 21.31%	Emerging Market Equity 37.28%	U.S. Fixed Income 0.01%	Large Cap Equity 31.49%	Small Cap Equity 19.96%	Large Cap Equity 28.71%
Emerging Market Equity 18.23%	Large Cap Equity 32.39%	Large Cap Equity 13.69%	U.S. Fixed Income 0.55%	High Yield 17.13%	Dev ex-U.S. Equity 24.21%	High Yield -2.08%	Small Cap Equity 25.52%	Large Cap Equity 18.40%	Real Estate 26.09%
Dev ex-U.S. Equity 16.41%	Dev ex-U.S. Equity 21.02%	U.S. Fixed Income 5.97%	Real Estate -0.79%	Large Cap Equity 11.96%	Large Cap Equity 21.83%	Global ex-U.S. Fixed Income -2.15%	Dev ex-U.S. Equity 22.49%	Emerging Market Equity 18.31%	Small Cap Equity 14.82%
Small Cap Equity 16.35%	High Yield 7.44%	Small Cap Equity 4.89%	Dev ex-U.S. Equity -3.04%	Emerging Market Equity 11.19%	Small Cap Equity 14.65%	Large Cap Equity -4.38%	Real Estate 21.91%	Global ex-U.S. Fixed Income 10.11%	Dev ex-U.S. Equity 12.62%
Large Cap Equity 16.00%	Real Estate 3.67%	High Yield 2.45%	Small Cap Equity -4.41%	Real Estate 4.06%	Global ex-U.S. Fixed Income 10.51%	Real Estate -5.63%	Emerging Market Equity 18.44%	Dev ex-U.S. Equity 7.59%	High Yield 5.28%
High Yield 15.81%	U.S. Fixed Income -2.02%	Emerging Market Equity -2.19%	High Yield -4.47%	Dev ex-U.S. Equity 2.75%	Real Estate 10.36%	Small Cap Equity -11.01%	High Yield 14.32%	U.S. Fixed Income 7.51%	U.S. Fixed Income -1.54%
U.S. Fixed Income 4.21%	Emerging Market Equity -2.60%	Global ex-U.S. Fixed Income -3.08%	Global ex-U.S. Fixed Income -6.02%	U.S. Fixed Income 2.65%	High Yield 7.50%	Dev ex-U.S. Equity -14.09%	U.S. Fixed Income 8.72%	High Yield 7.11%	Emerging Market Equity -2.54%
Global ex-U.S. Fixed Income 4.09%	Global ex-U.S. Fixed Income -3.08%	Dev ex-U.S. Equity -4.32%	Emerging Market Equity -14.92%	Global ex-U.S. Fixed Income 1.49%	U.S. Fixed Income 3.54%	Emerging Market Equity -14.57%	Global ex-U.S. Fixed Income 5.09%	Real Estate -9.04%	Global ex-U.S. Fixed Income -7.05%

Sources: ● Bloomberg Aggregate ● Bloomberg Corp High Yield ● Bloomberg Global Aggregate ex US ● FTSE EPRA Nareit Developed ● MSCI World ex USA ● MSCI Emerging Markets ● Russell 2000 ● S&P 500

Callan Periodic Table of Investment Returns – Fiscal Year

Monthly Returns												Fiscal Year
Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	FY 2021
Emerging Market Equity 8.94%	Large Cap Equity 7.19%	U.S. Fixed Income -0.05%	Small Cap Equity 2.09%	Small Cap Equity 18.43%	Small Cap Equity 8.65%	Small Cap Equity 5.03%	Small Cap Equity 6.23%	Large Cap Equity 4.38%	Real Estate 6.42%	Dev ex-U.S. Equity 3.48%	Large Cap Equity 2.33%	Small Cap Equity 62.03%
Large Cap Equity 5.64%	Small Cap Equity 5.63%	Global ex-U.S. Fixed Income -0.58%	Emerging Market Equity 2.06%	Dev ex-U.S. Equity 15.34%	Emerging Market Equity 7.35%	Emerging Market Equity 3.07%	Real Estate 3.70%	Real Estate 2.85%	Large Cap Equity 5.34%	Emerging Market Equity 2.32%	Small Cap Equity 1.94%	Emerging Market Equity 40.90%
High Yield 4.69%	Dev ex-U.S. Equity 5.16%	High Yield -1.03%	High Yield 0.51%	Real Estate 13.19%	Dev ex-U.S. Equity 4.55%	High Yield 0.33%	Large Cap Equity 2.76%	Dev ex-U.S. Equity 2.55%	Dev ex-U.S. Equity 3.15%	Real Estate 1.79%	High Yield 1.34%	Large Cap Equity 40.79%
Global ex-U.S. Fixed Income 4.44%	Real Estate 2.52%	Emerging Market Equity -1.60%	Global ex-U.S. Fixed Income 0.46%	Large Cap Equity 10.95%	Large Cap Equity 3.84%	U.S. Fixed Income -0.72%	Dev ex-U.S. Equity 2.55%	Small Cap Equity 1.00%	Emerging Market Equity 2.49%	Global ex-U.S. Fixed Income 1.36%	Real Estate 0.78%	Dev ex-U.S. Equity 33.60%
Real Estate 2.78%	Emerging Market Equity 2.21%	Dev ex-U.S. Equity -2.82%	U.S. Fixed Income -0.45%	Emerging Market Equity 9.25%	Real Estate 3.51%	Real Estate -0.81%	Emerging Market Equity 0.76%	High Yield 0.15%	Small Cap Equity 2.10%	Large Cap Equity 0.70%	U.S. Fixed Income 0.70%	Real Estate 33.55%
Small Cap Equity 2.77%	High Yield 0.95%	Real Estate -3.11%	Large Cap Equity -2.66%	High Yield 3.96%	Global ex-U.S. Fixed Income 2.17%	Large Cap Equity -1.01%	High Yield 0.37%	U.S. Fixed Income -1.25%	Global ex-U.S. Fixed Income 1.62%	U.S. Fixed Income 0.33%	Emerging Market Equity 0.17%	High Yield 15.37%
Dev ex-U.S. Equity 2.66%	Global ex-U.S. Fixed Income 0.29%	Small Cap Equity -3.34%	Real Estate -3.33%	Global ex-U.S. Fixed Income 2.38%	High Yield 1.88%	Global ex-U.S. Fixed Income -1.03%	U.S. Fixed Income -1.44%	Emerging Market Equity -1.51%	High Yield 1.09%	High Yield 0.30%	Dev ex-U.S. Equity -1.02%	Global ex-U.S. Fixed Income 4.60%
U.S. Fixed Income 1.49%	U.S. Fixed Income -0.81%	Large Cap Equity -3.80%	Dev ex-U.S. Equity -3.93%	U.S. Fixed Income 0.98%	U.S. Fixed Income 0.14%	Dev ex-U.S. Equity -1.07%	Global ex-U.S. Fixed Income -1.94%	Global ex-U.S. Fixed Income -2.42%	U.S. Fixed Income 0.79%	Small Cap Equity 0.21%	Global ex-U.S. Fixed Income -2.02%	U.S. Fixed Income -0.33%

Sources: ● Bloomberg Aggregate ● Bloomberg Corp High Yield ● Bloomberg Global Aggregate ex US ● FTSE EPRA Nareit Developed ● MSCI World ex USA ● MSCI Emerging Markets ● Russell 2000 ● S&P 500

Callan Periodic Table of Investment Returns – Trailing Fiscal Years

Fiscal Year Returns – Ending June 30									
06/2012	06/2013	06/2014	06/2015	06/2016	06/2017	06/2018	06/2019	06/2020	06/2021
U.S. Fixed Income 7.47%	Small Cap Equity 24.21%	Large Cap Equity 24.61%	Large Cap Equity 7.42%	Real Estate 11.58%	Small Cap Equity 24.60%	Small Cap Equity 17.57%	Large Cap Equity 10.42%	U.S. Fixed Income 8.74%	Small Cap Equity 62.03%
High Yield 7.27%	Large Cap Equity 20.60%	Dev ex-U.S. Equity 23.83%	Small Cap Equity 6.49%	Global ex-U.S. Fixed Income 11.24%	Emerging Market Equity 23.75%	Large Cap Equity 14.37%	U.S. Fixed Income 7.87%	Large Cap Equity 7.51%	Emerging Market Equity 40.90%
Large Cap Equity 5.45%	Dev ex-U.S. Equity 17.07%	Small Cap Equity 23.64%	U.S. Fixed Income 1.86%	U.S. Fixed Income 6.00%	Dev ex-U.S. Equity 19.49%	Emerging Market Equity 8.20%	Real Estate 7.68%	Global ex-U.S. Fixed Income 0.71%	Large Cap Equity 40.79%
Real Estate 1.62%	Real Estate 13.50%	Emerging Market Equity 14.31%	Real Estate -0.36%	Large Cap Equity 3.99%	Large Cap Equity 17.90%	Dev ex-U.S. Equity 7.04%	High Yield 7.48%	High Yield 0.03%	Dev ex-U.S. Equity 33.60%
Global ex-U.S. Fixed Income -0.33%	High Yield 9.49%	Real Estate 13.55%	High Yield -0.40%	High Yield 1.62%	High Yield 12.70%	Real Estate 5.64%	Global ex-U.S. Fixed Income 4.10%	Emerging Market Equity -3.39%	Real Estate 33.55%
Small Cap Equity -2.08%	Emerging Market Equity 2.87%	High Yield 11.73%	Emerging Market Equity -5.12%	Small Cap Equity -6.73%	Real Estate 0.21%	Global ex-U.S. Fixed Income 2.78%	Dev ex-U.S. Equity 1.29%	Dev ex-U.S. Equity -5.42%	High Yield 15.37%
Dev ex-U.S. Equity -14.13%	U.S. Fixed Income -0.69%	Global ex-U.S. Fixed Income 9.42%	Dev ex-U.S. Equity -5.28%	Dev ex-U.S. Equity -9.84%	U.S. Fixed Income -0.31%	High Yield 2.62%	Emerging Market Equity 1.22%	Small Cap Equity -6.63%	Global ex-U.S. Fixed Income 4.60%
Emerging Market Equity -15.94%	Global ex-U.S. Fixed Income -3.40%	U.S. Fixed Income 4.37%	Global ex-U.S. Fixed Income -13.19%	Emerging Market Equity -12.05%	Global ex-U.S. Fixed Income -3.80%	U.S. Fixed Income -0.40%	Small Cap Equity -3.31%	Real Estate -16.25%	U.S. Fixed Income -0.33%

Sources: ● Bloomberg Aggregate ● Bloomberg Corp High Yield ● Bloomberg Global Aggregate ex US ● FTSE EPRA Nareit Developed ● MSCI World ex USA ● MSCI Emerging Markets ● Russell 2000 ● S&P 500

Resurgent U.S. Equity Market in 4Q21

Strong performance across both growth and value strategies during 2021

U.S. equity 2021 returns are eye-popping:

- *S&P 500: +28.7%*
- *U.S. Small Cap: +14.8%*

Global ex-U.S. markets lagged:

- *MSCI World ex USA: +12.6%*
- *Emerging Markets: -2.5%*

- Economic data recovered in 4Q after softening in 3Q. Tight labor market and mismatch between jobs and job seekers is vexing employers.
- Inflation spiked and recorded 7% for the first time in decades.
- 4Q GDP hit a robust 6.9%, after dropping in 3Q. Growth for the year was 5.7%. The recovery is still solid. Supply chain issues and sentiment surrounding the end of fiscal stimulus, the Omicron variant, and the Fed taper vex investors as we head into 2022.

Returns for Periods ended 12/31/21

	1 Quarter	1 Year	5 Years	10 Years	25 Years
U.S. Equity					
Russell 3000	9.28	25.66	17.97	16.30	9.81
S&P 500	11.03	28.71	18.47	16.55	9.76
Russell 2000	2.14	14.82	12.02	13.23	8.99
Global ex-U.S. Equity					
MSCI World ex USA	3.14	12.62	9.63	7.84	5.39
MSCI Emerging Markets	-1.31	-2.54	9.88	5.49	--
MSCI ACWI ex USA Small Cap	0.62	12.93	11.21	9.46	6.93
Fixed Income					
Bloomberg Aggregate	0.01	-1.54	3.57	2.90	4.94
90-day T-Bill	0.01	0.05	1.14	0.63	2.06
Bloomberg Long Gov/Credit	2.15	-2.52	7.39	5.72	7.31
Bloomberg Global Agg ex-US	-1.18	-7.05	3.07	0.82	3.40
Real Estate					
NCREIF Property	6.15	17.70	7.75	9.32	9.38
FTSE Nareit Equity	16.31	43.24	10.75	11.38	9.89
Alternatives					
CS Hedge Fund	0.94	8.23	5.47	4.90	6.74
Cambridge Private Equity*	5.01	48.82	21.29	17.11	15.64
Bloomberg Commodity	-1.56	27.11	3.66	-2.85	1.13
Gold Spot Price	4.08	-3.51	9.69	1.56	6.61
Inflation - CPI-U	1.64	7.04	2.92	2.14	2.28

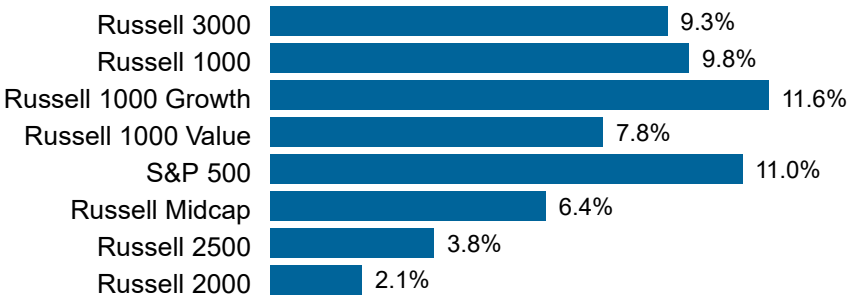
*Cambridge PE data through 09/30/21.
Sources: Bloomberg, Callan, Cambridge, Credit Suisse, FTSE Russell, MSCI, NCREIF, S&P Dow Jones Indices

U.S. Equity Performance: 4Q21

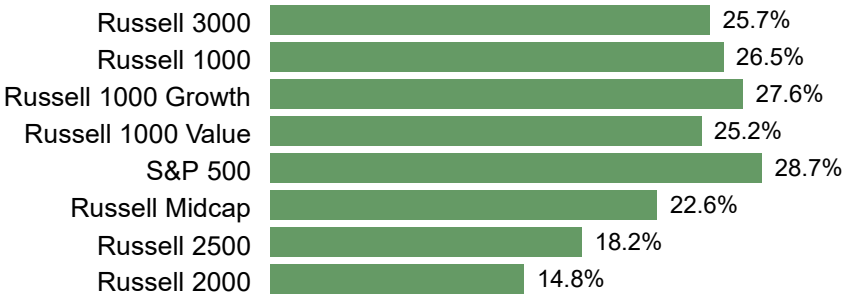
Returns grind higher despite mounting concerns

- S&P 500 posted a strong 11.0% gain in 4Q21; large cap growth (Russell 1000 Growth) was the top performer, which contrasted with the worst-performing asset class, small cap growth (Russell 2000 Growth).
- The new Omicron variant, continued supply chain disruptions, and renewed fears of persistent inflation pushed investors into the perceived safety of the largest stocks during the quarter.
- S&P 500 sector results were mixed, with Real Estate (+17.5%) posting the top returns alongside Technology (+16.7%) and Materials (+15.2%); Communication Services (0.0%) and Financials (+4.6%) lagged broad returns.
- In 2021, small value outperformed small growth by over 2,500 bps (RUS2V 28.3% vs. RUS2G 2.8%), a stark reversal from 2020 and a pattern consistent with periods of robust GDP growth.

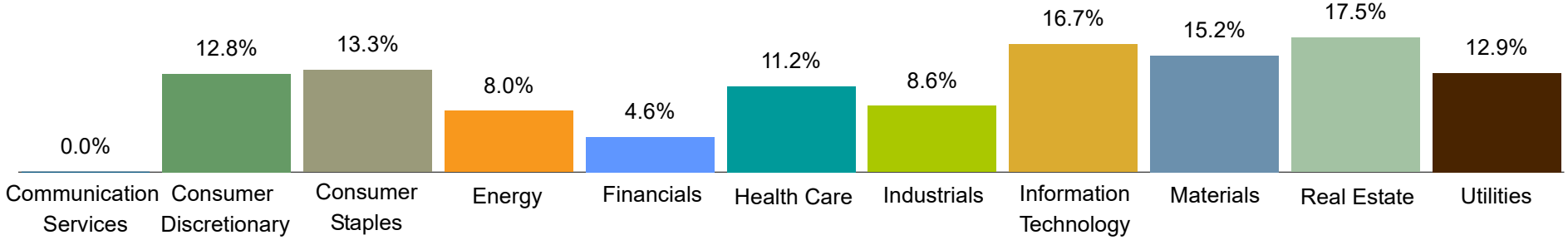
U.S. Equity: Quarterly Returns



U.S. Equity: One-Year Returns



Industry Sector Quarterly Performance (S&P 500)



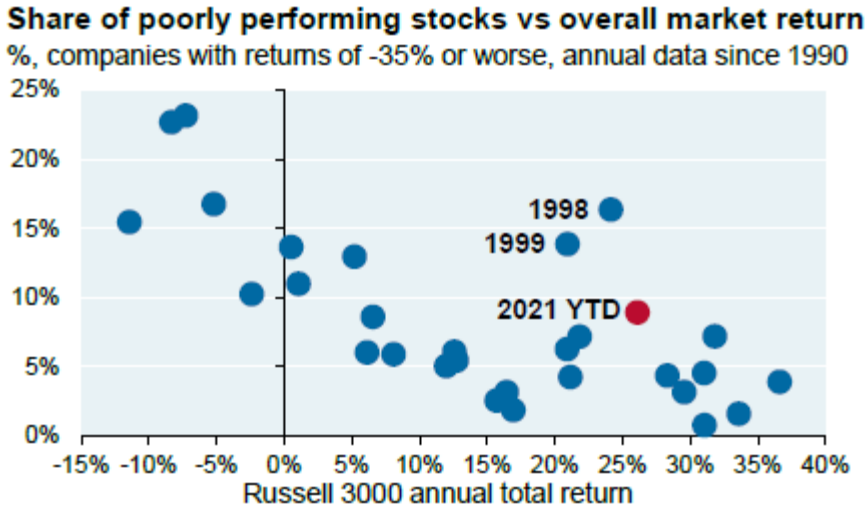
Sources: FTSE Russell, S&P Dow Jones Indices

U.S. Equity Market Overview

Index concentration driving positive returns…

- Ten largest stocks in the S&P 500 comprised 30.5% of index but accounted for 65% of 2021 return.*
- During 4Q21, top 10 weights accounted for ~40% of return.

- **…but outsized contribution of largest stocks may be hiding underlying weakness**
  - Nearly 10% of Russell 3000 stocks fell by 35% or more in 2021, which is unusual for a year when market returns were in excess of 25%.



Source: JPMorgan Asset Management
*Top 10 stocks: Apple, Microsoft, Amazon, Facebook, Google, Tesla, Berkshire Hathaway, JPMorgan, Johnson and Johnson, and Visa.

U.S. Equity Market Overview

Market capitalization and style driving divergence in returns

- Mega-cap growth (Russell Top 200 Growth) was the strongest performer in both 4Q21 and 2021.
- Growth style returns highly correlated with market capitalization in both 4Q21 and 2021 (higher market capitalization = high return)
  - *Within micro-, small-, and smid-cap growth, Health Care (especially biotech/pharma) was the biggest detractor to returns and is a larger weight in benchmark compared to mid- and large-cap growth.*
- Value returns correlated with market capitalization in 4Q21; full year 2021, value returns did not experience much divergence
  - *Biggest contributor to value style returns were Energy holdings across market capitalizations.*

4Q21

Size	TR (%)	Style: Growth	Style: Core	Style: Value
	Mega	13.7	11.0	7.4
	Large	11.6	9.8	7.8
	Mid	2.8	6.4	8.5
	SMid	0.2	3.8	6.4
	Small	0.0	2.1	4.4
	Micro	-8.0	-2.7	1.2

2021

Size	TR (%)	Style: Growth	Style: Core	Style: Value
	Mega	31.2	27.9	23.5
	Large	27.6	26.5	25.2
	Mid	12.7	22.6	28.3
	SMid	5.0	18.2	27.8
	Small	2.8	14.8	28.3
	Micro	0.9	19.3	34.8

Sources: Furey Research, FactSet

Global ex-U.S. Equity Performance: 4Q21

Omicron takes center stage

- A recovery-driven market shifted back to COVID favorites, boosting Information Technology stocks.
- Small cap underperformed large amid global growth concerns.
- Emerging markets struggled relative to developed markets as China experienced significant pressure from an economic slowdown and its regulatory crackdown.

Stalled recovery

- As the new variant took hold, Energy and Communication Services lagged on fear of restrained growth.
- Japan suffered from both supply chain issues and economic constraints from COVID-19.
- Growth and momentum factors outperformed in developed markets but not in emerging markets.

U.S. dollar vs. other currencies

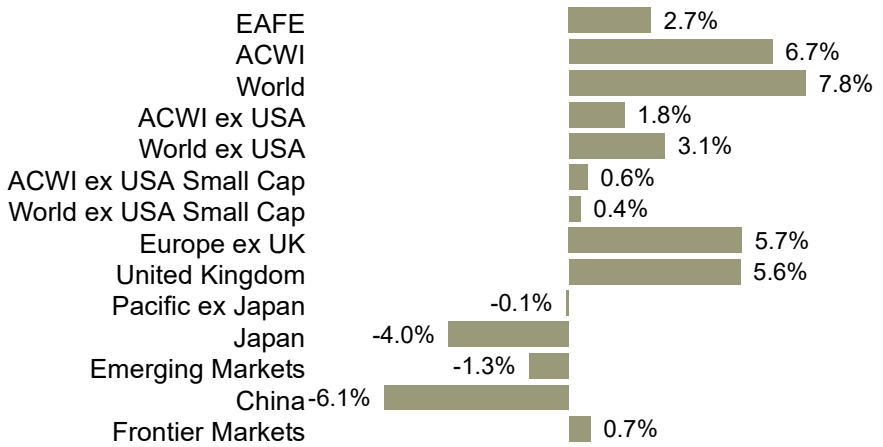
- The U.S. dollar rose against other major currencies as tapering accelerated alongside the expectation for 2022 rate hikes, which notably detracted from global ex-U.S. results.

Growth vs. value

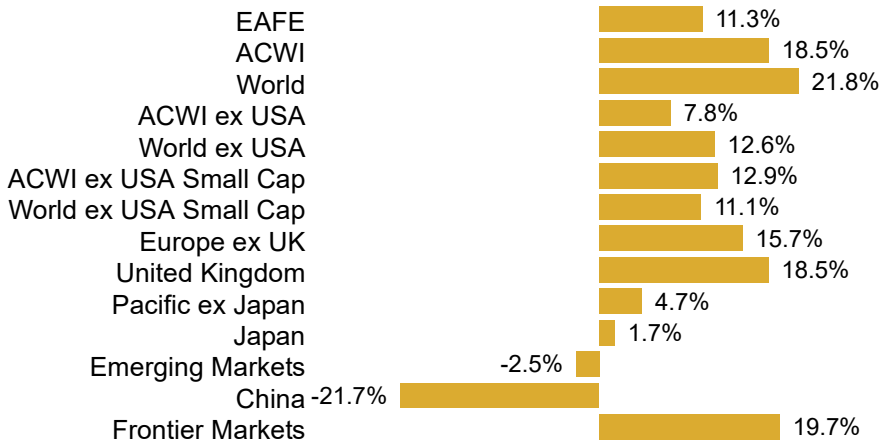
- Inflationary pressures and the ultimate rebound from COVID-19 supported value's leadership for the full year, despite the shift to growth in 4Q21.

Source: MSCI

Global Equity: Quarterly Returns



Global Equity: One-Year Returns



U.S. Fixed Income Performance: 4Q21

Treasury yields again unchanged

- 10-year at 1.52% at 9/30 and 12/31, up from 1.45% on 6/30
- TIPS outperformed nominal Treasuries and 10-year breakeven spreads widened to 2.56%.
- Real yields remain solidly in negative territory.

Bloomberg Aggregate was literally flat in 4Q

- Spread sectors (Agencies, ABS, CMBS, MBS, and Credit) all underperformed UST by a modest amount (but positive YTD).
- One of four years with negative returns for the Agg dating back to 1976
- Yield curve flattened; curve positioning had a meaningful impact on returns in 4Q.

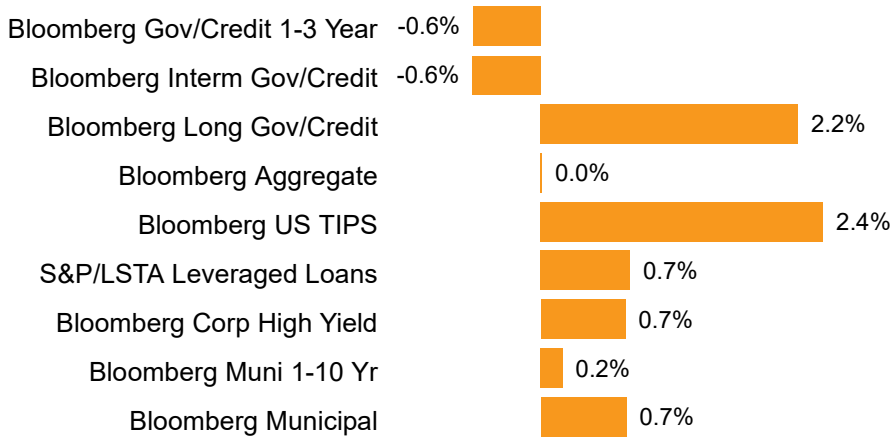
High yield and leveraged performed relatively well

- Spreads remain near historic tights.
- High yield issuers' default rate declined to a record low in December (J.P. Morgan).
- New issuance hit a record for the second year in a row as issuers looked to finance at relatively low rates.

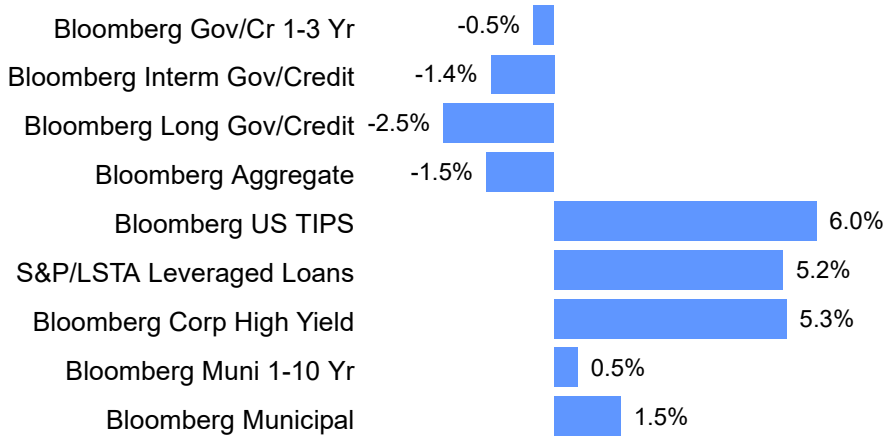
Munis outperformed Treasuries

- Lower-quality bonds continued their trend of outperformance as investors sought yield.

U.S. Fixed Income: Fourth Quarter Returns



U.S. Fixed Income: 2021 Returns



Source: Bloomberg

U.S. Private Real Estate Market Trends

Continued strong performance across the asset class

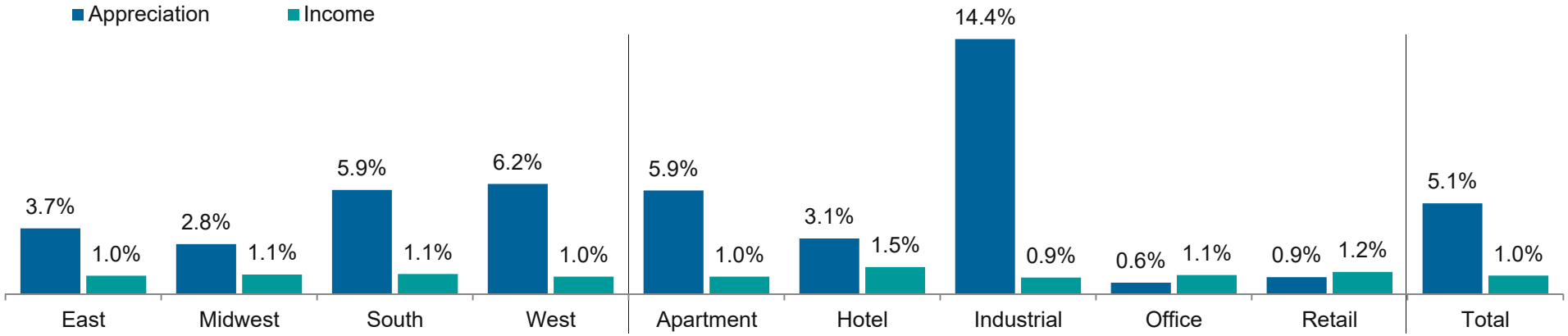
Strongest gains for ODCE in history

- ODCE posted its best return ever in 4Q21; Industrial was the best performer.
- Income returns were positive across sectors.
- Appraisers are pricing in a recovery due to strong fundamentals in Industrial and Multifamily.
- Return dispersion by manager within the ODCE Index was due to the composition of underlying portfolios.
- Niche sectors such as self-storage and life sciences continued to be accretive.

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
NCREIF ODCE	7.7%	21.0%	8.2%	7.7%	9.4%
Income	0.8%	3.1%	3.1%	3.2%	3.6%
Appreciation	6.9%	17.6%	5.0%	4.4%	5.7%
NCREIF Property Index	6.2%	17.7%	8.4%	7.8%	9.3%
Income	1.0%	4.2%	4.3%	4.5%	4.9%
Appreciation	5.1%	13.1%	3.9%	3.2%	4.3%

Returns are geometrically linked

NCREIF Property Index Quarterly Returns by Region and Property Type

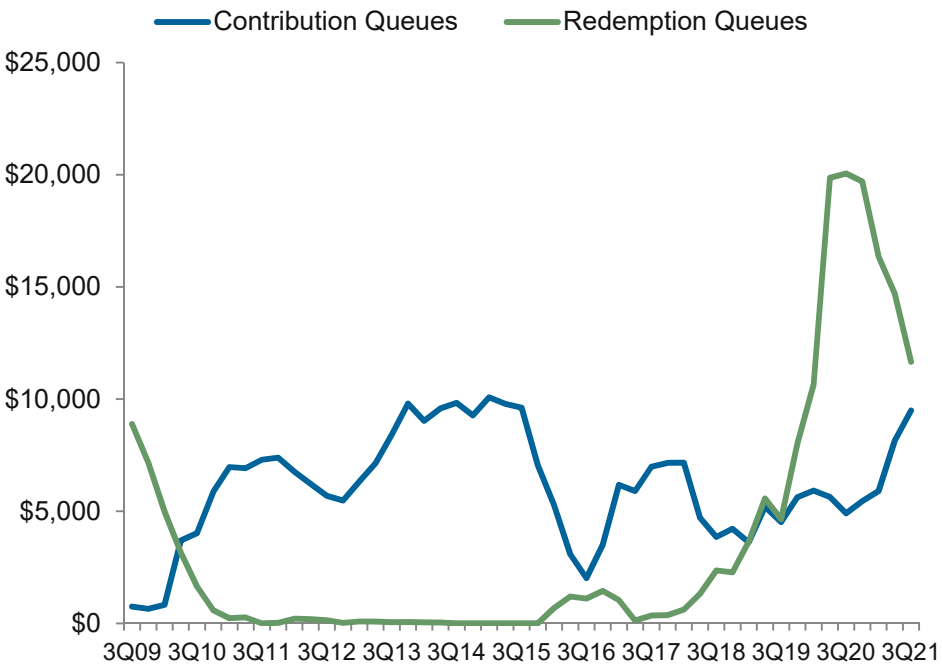


Source: NCREIF, ODCE return is net

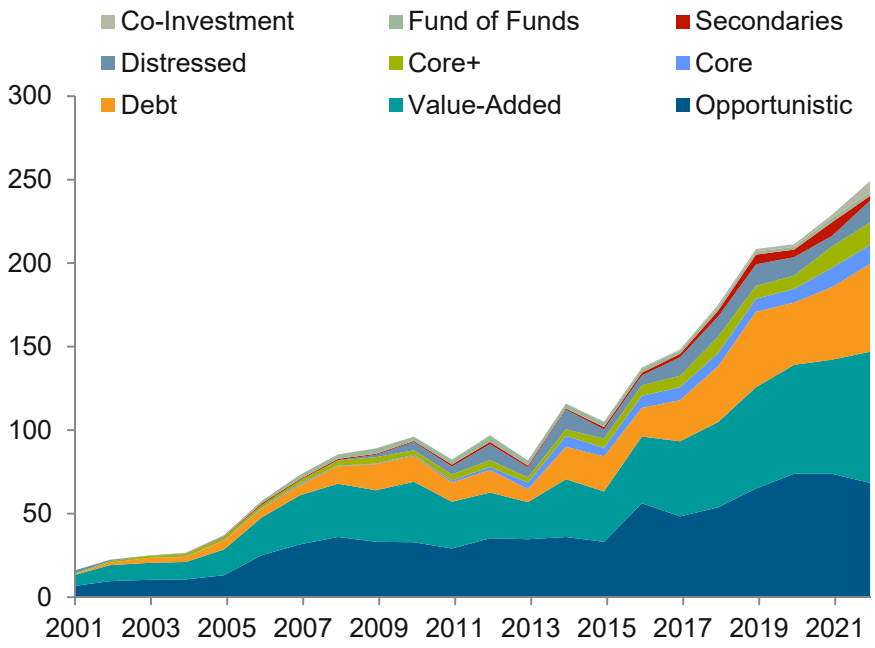
U.S. Private Real Estate Market Trends

Dry powder increasing and exceeds $200 billion

Core Fund Contribution/Redemption Queues ($bn)



Dry Powder for CRE Investment in North America ($bn)



- Net core activity has rebounded considerably during the past three quarters.
- >$200 billion of capital waiting to be deployed in North America
- Majority of dry powder capital in opportunistic, value-add, and debt funds

Sources: NCREIF, AEW, Preqin

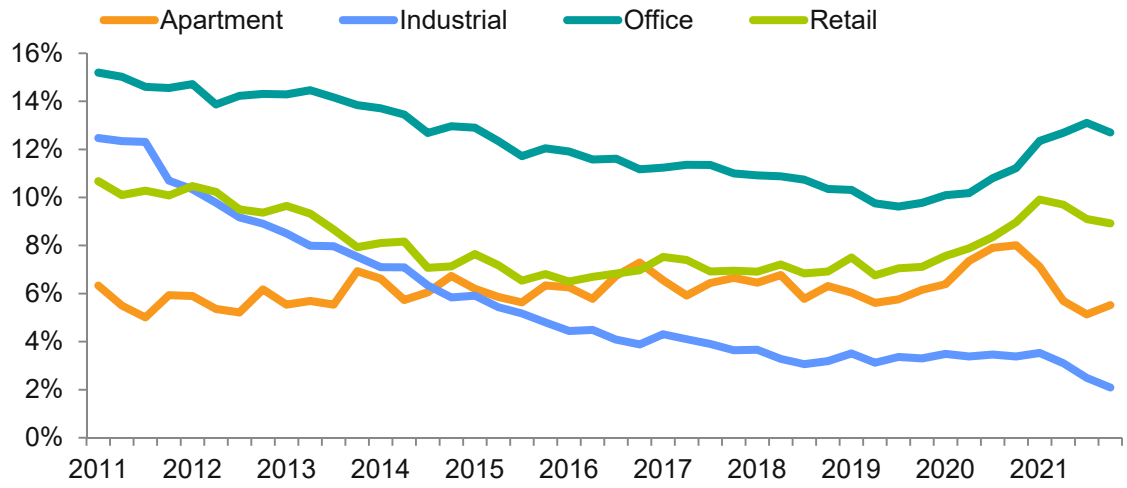
U.S. Private Real Estate Market Trends

Signs of recovery in retail in 4Q21

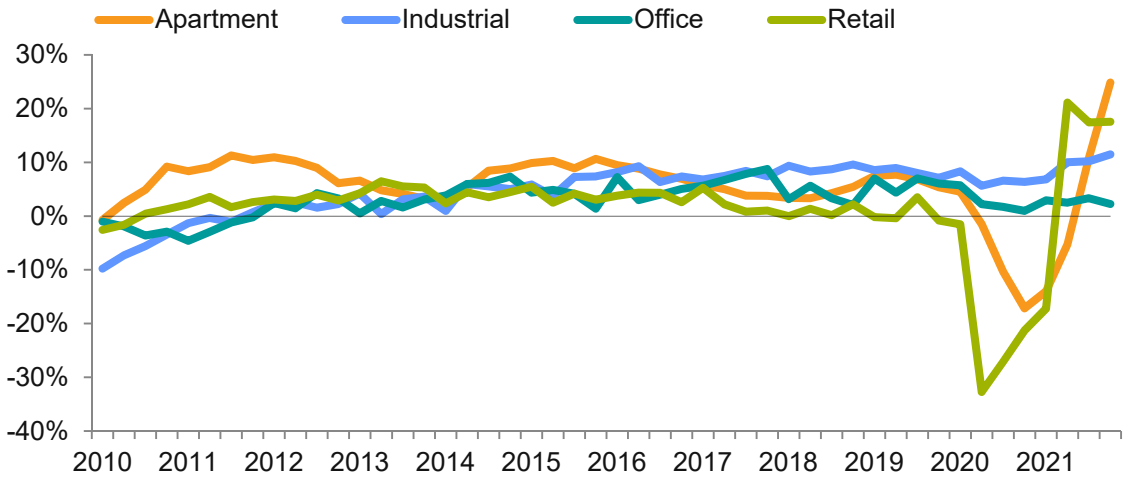
Compression in vacancy rates

- Vacancy rates kept compressing in Industrial and Multifamily as demand continued.
- Net operating income turned negative for Office as the Omicron variant delayed many return-to-work plans.
- 4Q21 rent collections are stable across all sectors.
- Demand outpaced supply as new construction of preleased Industrial and Multifamily occurred.

Vacancy by Property Type



Rolling 4-Quarter NOI Growth by Property Type



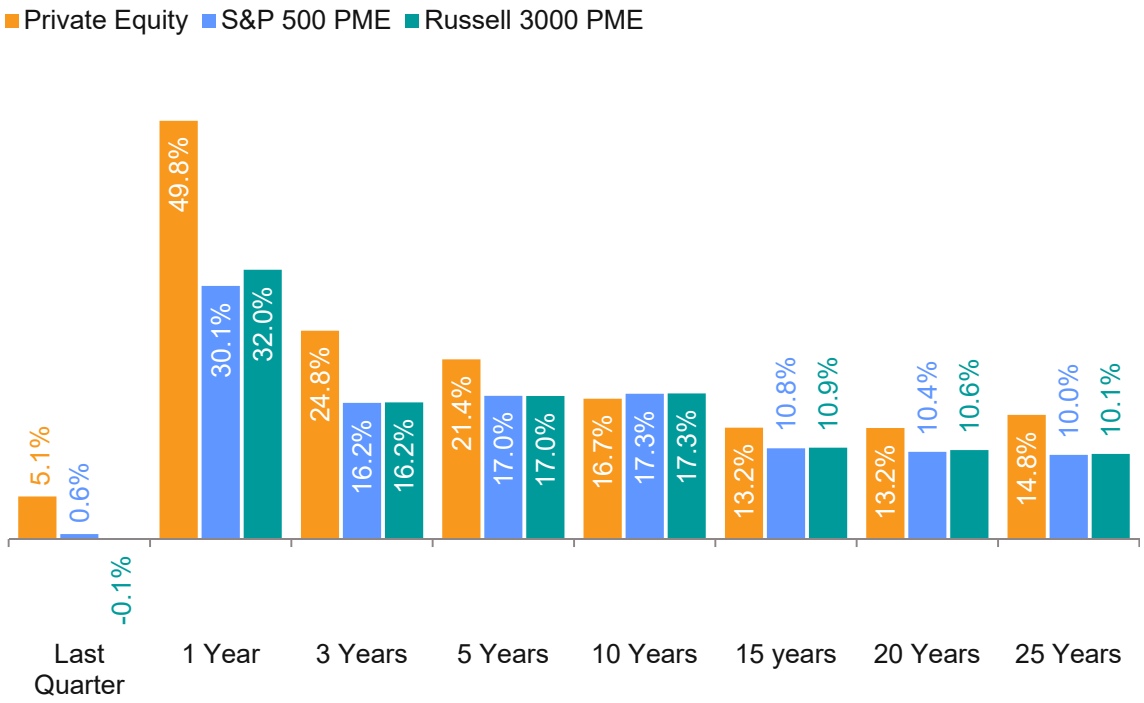
Source: NCREIF

Private Equity Performance

Huge gains over the last year, outpacing public equity

- Significant outperformance over one-year period with private equity exceeding the public markets by 18 to 20 percentage points
- Private equity 3Q21 gains ahead of those of public equity by 5 percentage points
- Private equity consistently ahead of public equity by ~2 to 4 percentage points across all longer-term time horizons, except over the last 10 years
- Volatility in recent public markets performance yet to translate to private markets performance

Net IRRs as of 09/30/21



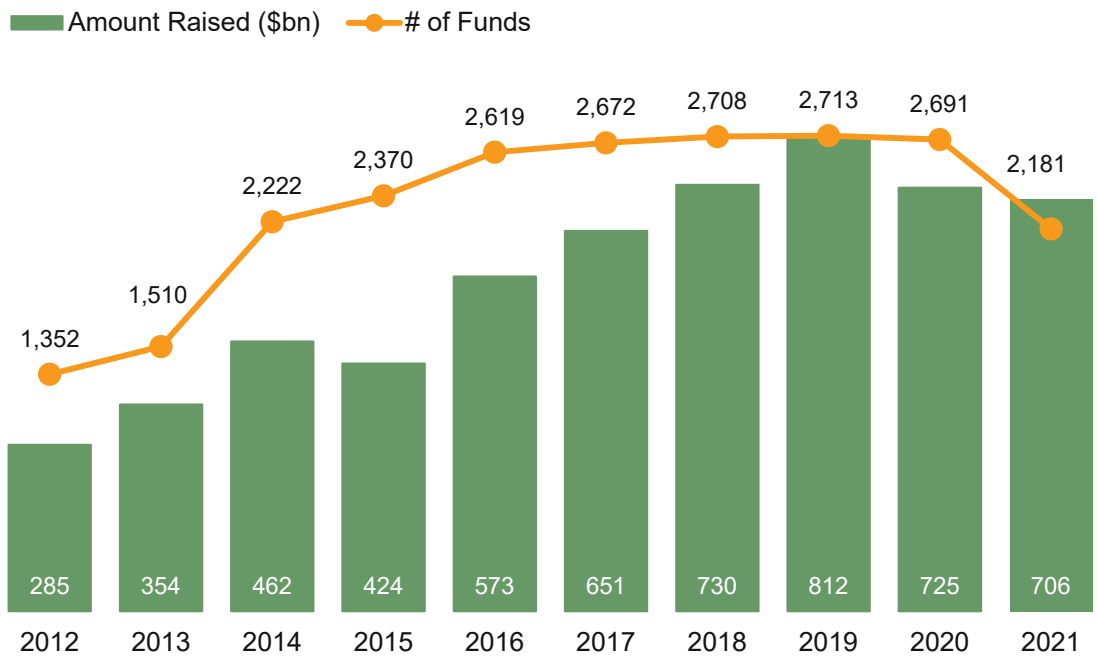
Source: Refinitiv/Cambridge

Private Equity Global Fundraising

2021 fundraising holds steady

- 2021 fundraising lagging 2019's peak by 13%, but remains consistent with 2020 fundraising
- While a large number of funds were raising in 2021, many did not hold final closes until 2022 due to LP capital budgeting constraints. Fundraising timelines have consequently become extended.
- As a result, a surge in fundraising stats is expected in 1Q22.

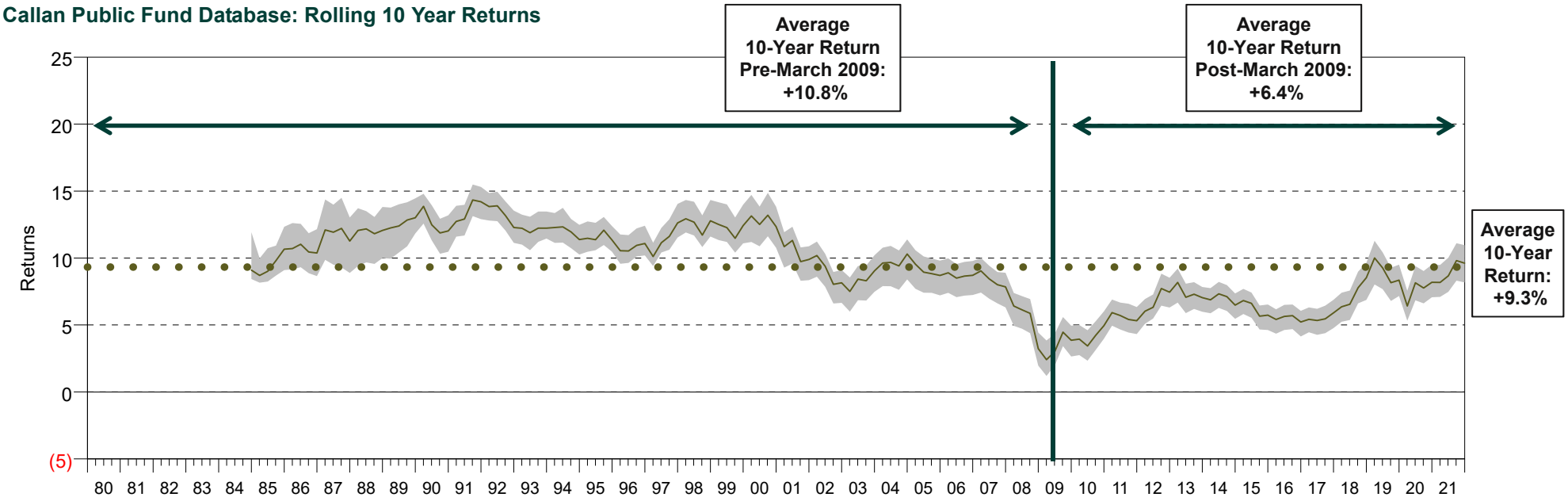
Annual Fundraising



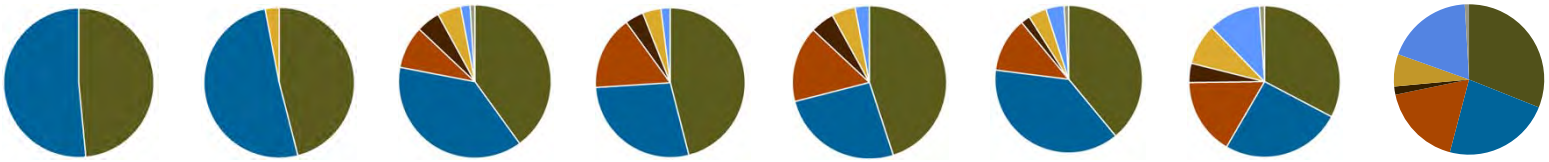
Source: PitchBook, data through 12/31/21

Historical Public Fund Asset Allocation and Returns

Callan Public Fund Database: Rolling 10 Year Returns



10 Year Return	10.7%	12.0%	11.4%	12.4%	8.7%	5.0%	5.7%	9.7%



Asset Class	1985	1990	1995	2000	2005	2010	2015	2021
Domestic Equity	49%	46%	40%	46%	45%	39%	33%	31%
Domestic Fixed Income	52%	51%	38%	28%	26%	30%	26%	23%
Non-U.S. Equity			9%	16%	16%	15%	16%	18%
Non-U.S. Fixed Income			5%	4%	5%	4%	4%	2%
Real Estate		3%	5%	4%	5%	4%	9%	7%
Other Alternatives			2%	2%	3%	7%	11%	19%
Cash Equivalents			1%			1%	1%	1%

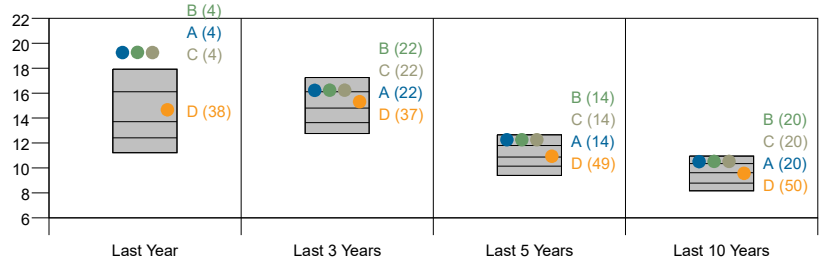
Allocations are as of December 31 of the applicable year except the current year which is September 30.

Callan

Pension Plan

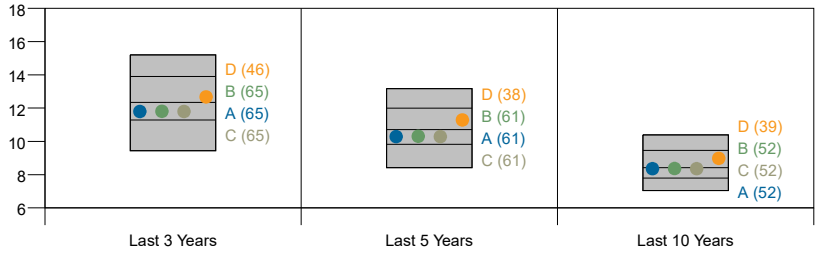
PERS, TRS, and JRS Performance Dashboard – December 31, 2021

Returns vs Callan Public Fund Sponsor Database



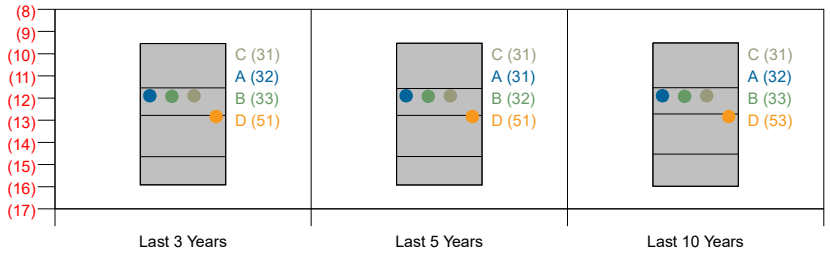
		Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile		17.92	17.26	12.67	10.96
25th Percentile		16.13	16.12	11.82	10.37
Median		13.72	14.82	10.89	9.63
75th Percentile		12.43	13.64	10.15	8.79
90th Percentile		11.23	12.77	9.41	8.18
Member Count		198	198	196	185
Employees' Total Plan	A	19.27	16.24	12.27	10.53
Teachers' Total Plan	B	19.28	16.25	12.27	10.53
Judicial Total Plan	C	19.27	16.24	12.27	10.53
Policy Target	D	14.67	15.33	10.95	9.58

Standard Deviation vs Callan Public Fund Sponsor Database



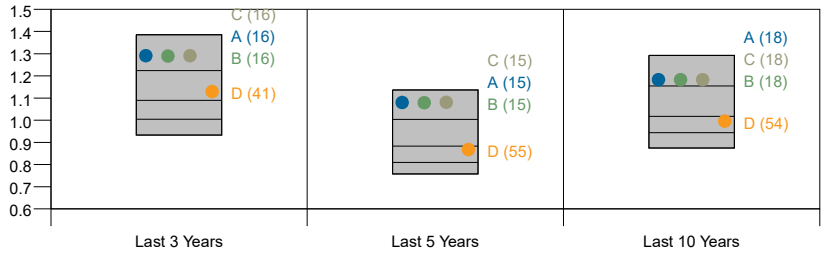
		Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile		15.21	13.18	10.40
25th Percentile		13.90	12.00	9.46
Median		12.35	10.71	8.42
75th Percentile		11.30	9.83	7.80
90th Percentile		9.45	8.42	7.04
Member Count		198	196	185
Employees' Total Plan	A	11.81	10.30	8.36
Teachers' Total Plan	B	11.82	10.31	8.37
Judicial Total Plan	C	11.80	10.29	8.37
Policy Target	D	12.68	11.30	8.98

Maximum Drawdown vs Callan Public Fund Sponsor Database



		Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile		(9.54)	(9.52)	(9.51)
25th Percentile		(11.54)	(11.57)	(11.53)
Median		(12.78)	(12.78)	(12.72)
75th Percentile		(14.64)	(14.63)	(14.53)
90th Percentile		(15.91)	(15.92)	(15.97)
Member Count		198	196	185
Employees' Total Plan	A	(11.90)	(11.90)	(11.90)
Teachers' Total Plan	B	(11.92)	(11.92)	(11.92)
Judicial Total Plan	C	(11.89)	(11.89)	(11.89)
Policy Target	D	(12.83)	(12.83)	(12.83)

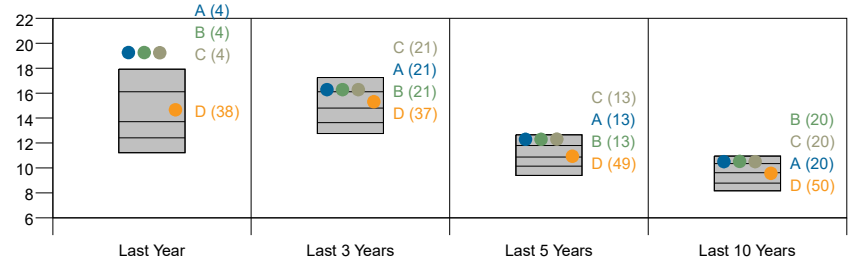
Sharpe Ratio vs Callan Public Fund Sponsor Database



		Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile		1.39	1.14	1.29
25th Percentile		1.22	1.00	1.15
Median		1.09	0.88	1.02
75th Percentile		1.01	0.81	0.94
90th Percentile		0.93	0.76	0.88
Member Count		198	196	185
Employees' Total Plan	A	1.29	1.08	1.18
Teachers' Total Plan	B	1.29	1.08	1.18
Judicial Total Plan	C	1.29	1.08	1.18
Policy Target	D	1.13	0.87	1.00

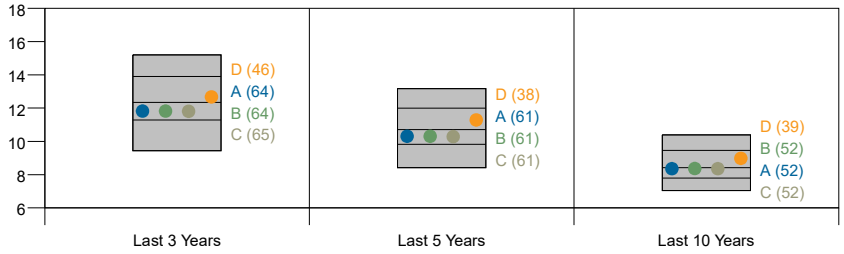
Health Care Plans Performance Dashboard – December 31, 2021

Returns vs Callan Public Fund Sponsor Database



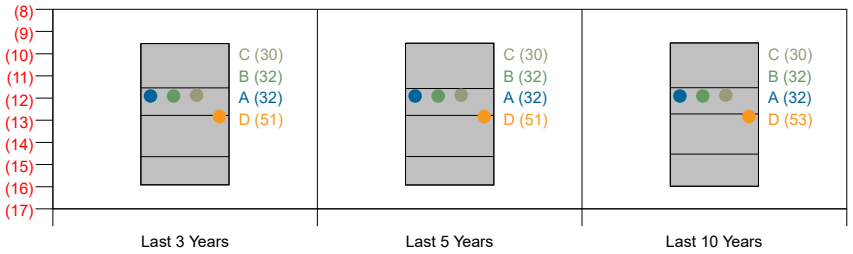
		Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile		17.92	17.26	12.67	10.96
25th Percentile		16.13	16.12	11.82	10.37
Median		13.72	14.82	10.89	9.63
75th Percentile		12.43	13.64	10.15	8.79
90th Percentile		11.23	12.77	9.41	8.18
Member Count		198	198	196	185
PERS Health Plan	A	19.27	16.29	12.31	10.52
TRS Health Plan	B	19.27	16.29	12.31	10.53
JRS Health Plan	C	19.26	16.29	12.31	10.53
Policy Target	D	14.67	15.33	10.95	9.58

Standard Deviation vs Callan Public Fund Sponsor Database



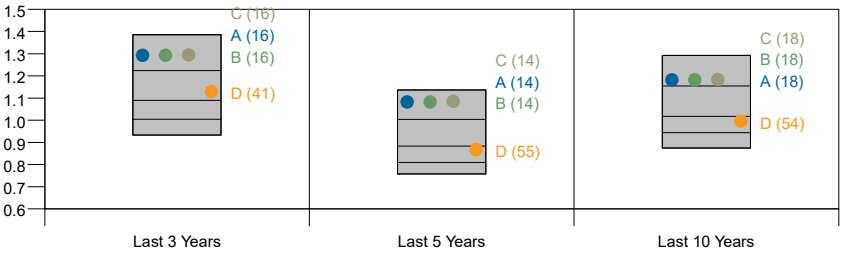
		Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile		15.21	13.18	10.40
25th Percentile		13.90	12.00	9.46
Median		12.35	10.71	8.42
75th Percentile		11.30	9.83	7.80
90th Percentile		9.45	8.42	7.04
Member Count		198	196	185
PERS Health Plan	A	11.83	10.31	8.37
TRS Health Plan	B	11.83	10.31	8.37
JRS Health Plan	C	11.81	10.29	8.36
Policy Target	D	12.68	11.30	8.98

Maximum Drawdown vs Callan Public Fund Sponsor Database



		Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile		(9.54)	(9.52)	(9.51)
25th Percentile		(11.54)	(11.57)	(11.53)
Median		(12.78)	(12.78)	(12.72)
75th Percentile		(14.64)	(14.63)	(14.53)
90th Percentile		(15.91)	(15.92)	(15.97)
Member Count		198	196	185
PERS Health Plan	A	(11.90)	(11.90)	(11.90)
TRS Health Plan	B	(11.90)	(11.90)	(11.90)
JRS Health Plan	C	(11.87)	(11.87)	(11.87)
Policy Target	D	(12.83)	(12.83)	(12.83)

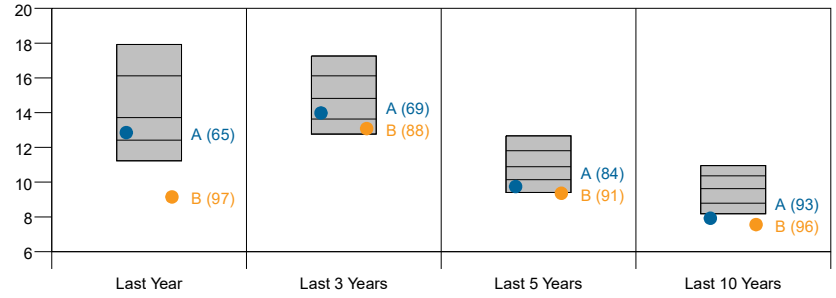
Sharpe Ratio vs Callan Public Fund Sponsor Database



		Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile		1.39	1.14	1.29
25th Percentile		1.22	1.00	1.15
Median		1.09	0.88	1.02
75th Percentile		1.01	0.81	0.94
90th Percentile		0.93	0.76	0.88
Member Count		198	196	185
PERS Health Plan	A	1.29	1.08	1.18
TRS Health Plan	B	1.29	1.08	1.18
JRS Health Plan	C	1.30	1.09	1.18
Policy Target	D	1.13	0.87	1.00

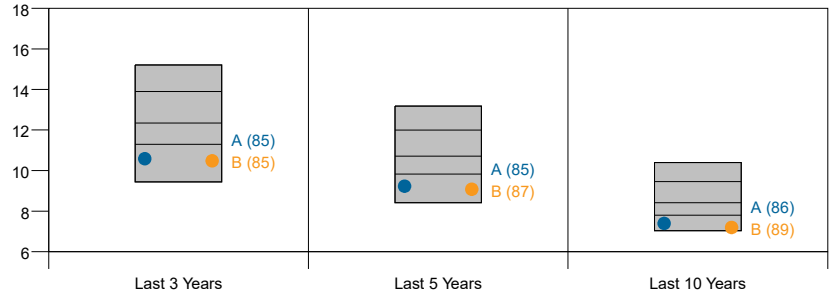
Military Plan Performance Dashboard – December 31, 2021

Returns vs Callan Public Fund Sponsor Database



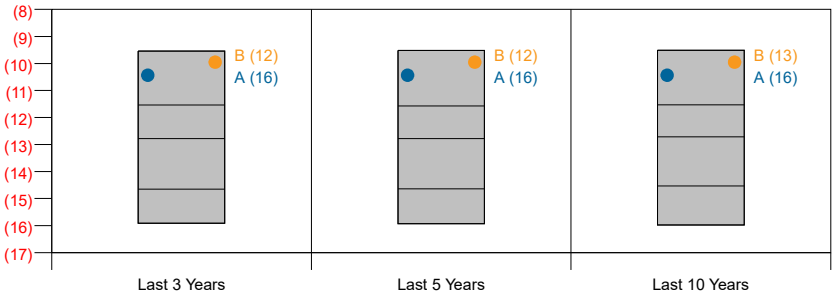
		Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile		17.92	17.26	12.67	10.96
25th Percentile		16.13	16.12	11.82	10.37
Median		13.72	14.82	10.89	9.63
75th Percentile		12.43	13.64	10.15	8.79
90th Percentile		11.23	12.77	9.41	8.18
Member Count		198	198	196	185
Military Total Plan	A	12.85	13.98	9.75	7.92
Military Policy Target	B	9.15	13.09	9.36	7.56

Standard Deviation vs Callan Public Fund Sponsor Database



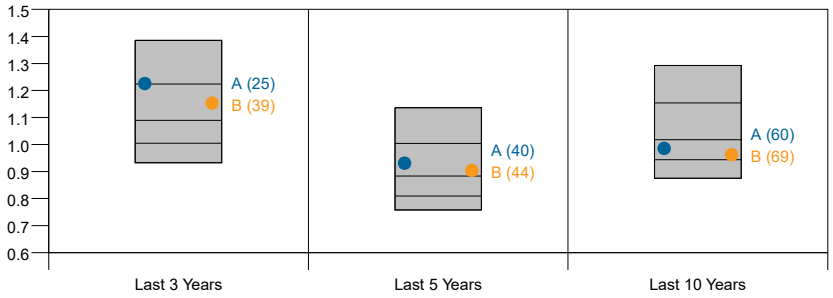
		Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile		15.21	13.18	10.40
25th Percentile		13.90	12.00	9.46
Median		12.35	10.71	8.42
75th Percentile		11.30	9.83	7.80
90th Percentile		9.45	8.42	7.04
Member Count		198	196	185
Military Total Plan	A	10.59	9.24	7.40
Military Policy Target	B	10.48	9.09	7.20

Maximum Drawdown vs Callan Public Fund Sponsor Database



		Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile		(9.54)	(9.52)	(9.51)
25th Percentile		(11.54)	(11.57)	(11.53)
Median		(12.78)	(12.78)	(12.72)
75th Percentile		(14.64)	(14.63)	(14.53)
90th Percentile		(15.91)	(15.92)	(15.97)
Member Count		198	196	185
Military Total Plan	A	(10.44)	(10.44)	(10.44)
Military Policy Target	B	(9.95)	(9.95)	(9.95)

Sharpe Ratio vs Callan Public Fund Sponsor Database

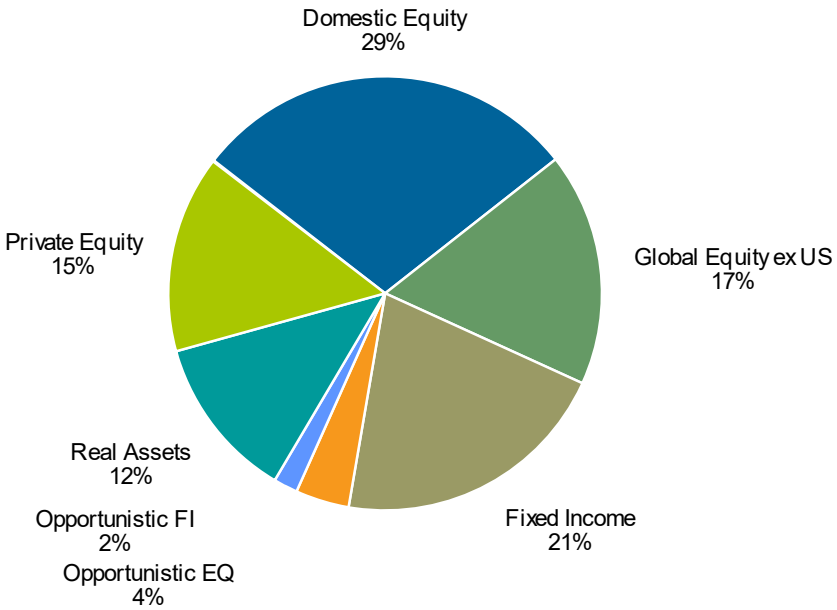


		Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile		1.39	1.14	1.29
25th Percentile		1.22	1.00	1.15
Median		1.09	0.88	1.02
75th Percentile		1.01	0.81	0.94
90th Percentile		0.93	0.76	0.88
Member Count		198	196	185
Military Total Plan	A	1.23	0.93	0.99
Military Policy Target	B	1.15	0.90	0.96

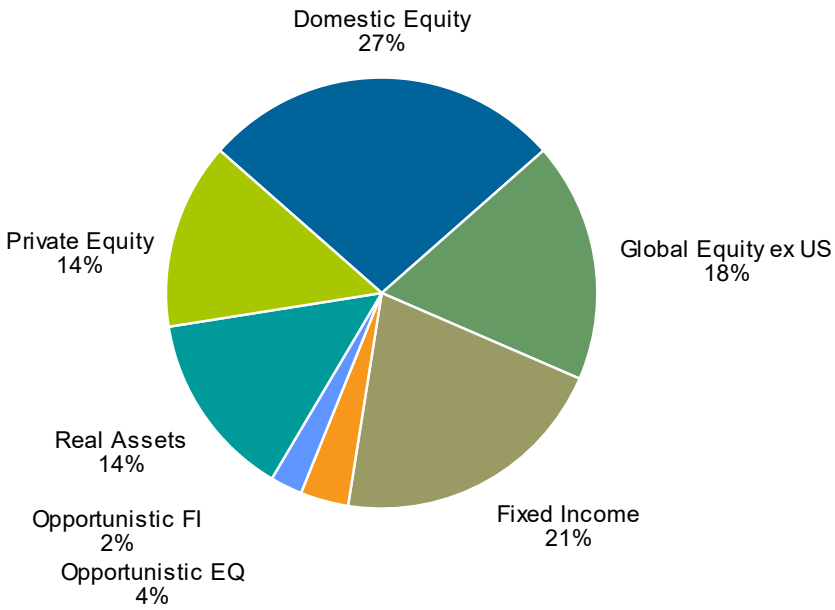
Asset Allocation – Public Employees' Retirement System

Quarter Ending December 31, 2021

Actual Asset Allocation



Target Asset Allocation



Asset Class	$000s Actual	Weight Actual	Target	Percent Difference	$000s Difference
Domestic Equity	3,571,714	28.9%	27.0%	1.9%	237,590
Global Equity ex US	2,152,308	17.4%	18.0%	(0.6%)	(70,441)
Fixed Income	2,581,090	20.9%	21.0%	(0.1%)	(12,117)
Opportunistic EQ	493,611	4.0%	3.6%	0.4%	49,061
Opportunistic FI	228,084	1.8%	2.4%	(0.6%)	(68,282)
Real Assets	1,508,888	12.2%	14.0%	(1.8%)	(219,917)
Private Equity	1,812,911	14.7%	14.0%	0.7%	84,107
Total	12,348,606	100.0%	100.0%		

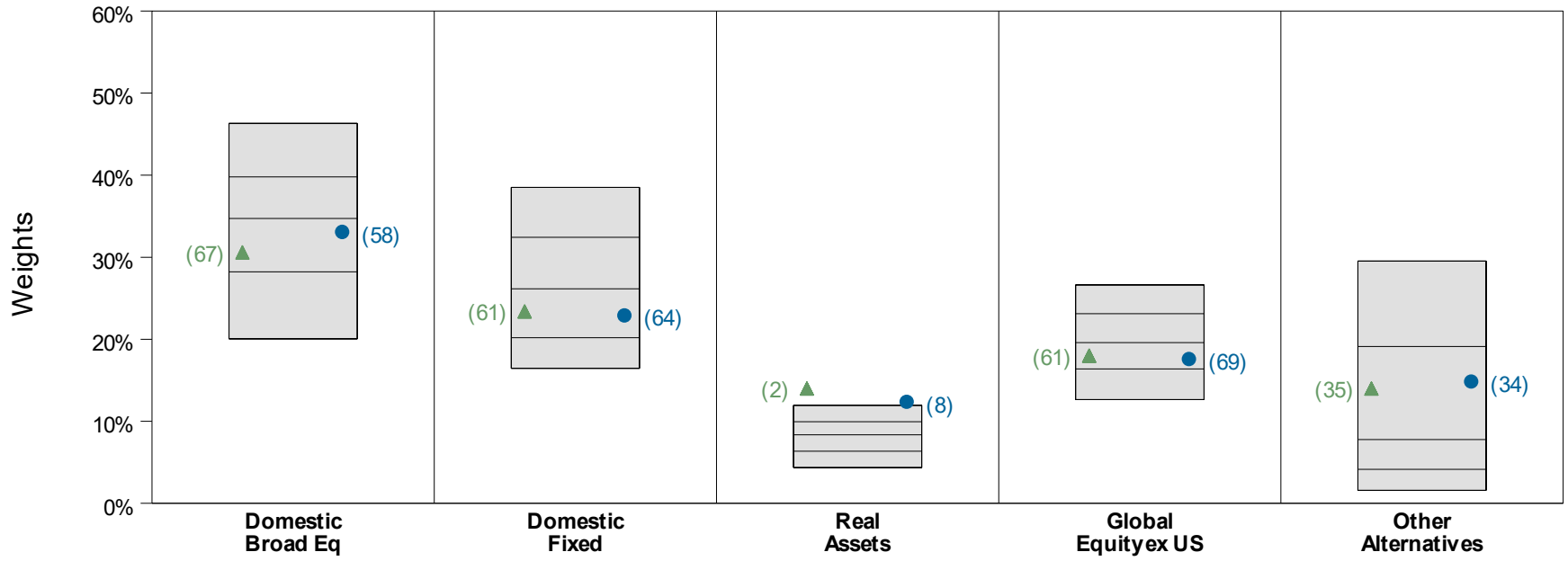
PERS is used as illustrative throughout the presentation.

The other plans exhibit similar modest and understandable variations from strategic target allocations.

Asset Allocation vs. Public Funds (PERS)

Callan Public Fund Database

Asset Class Weights vs Callan Public Fund Sponsor Database



	Domestic Broad Eq	Domestic Fixed	Real Assets	Global Equity ex US	Other Alternatives
10th Percentile	46.30	38.51	11.96	26.64	29.53
25th Percentile	39.77	32.43	9.94	23.12	19.12
Median	34.71	26.15	8.37	19.60	7.79
75th Percentile	28.22	20.19	6.36	16.39	4.16
90th Percentile	20.06	16.46	4.36	12.65	1.59
Fund ●	32.92	22.75	12.22	17.43	14.68
Target ▲	30.60	23.40	14.00	18.00	14.00

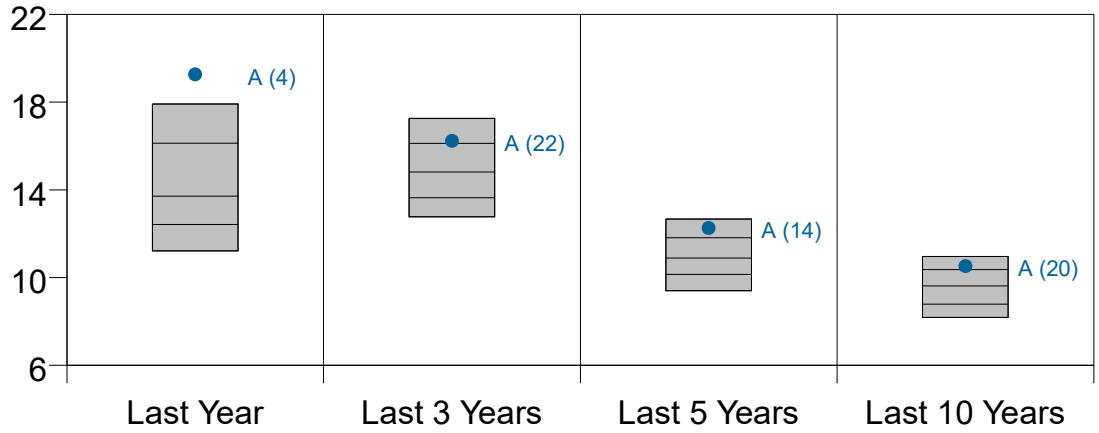
- Asset class allocations are in line with targets after the asset allocation update and associated rebalancing.
- Weightings to real assets and alternatives are relatively high in comparison to other public funds.

Notes: Real Assets includes Private Real Estate, REITs, Farmland, Timber, Energy, and Infrastructure. Other Alternatives represents private equity.

Total Fund Return vs Public Funds (PERS)

Callan Public Fund Database

Gross of Fee Returns
for Periods Ended December 31, 2021
Group: Callan Public Fund Sponsor Database



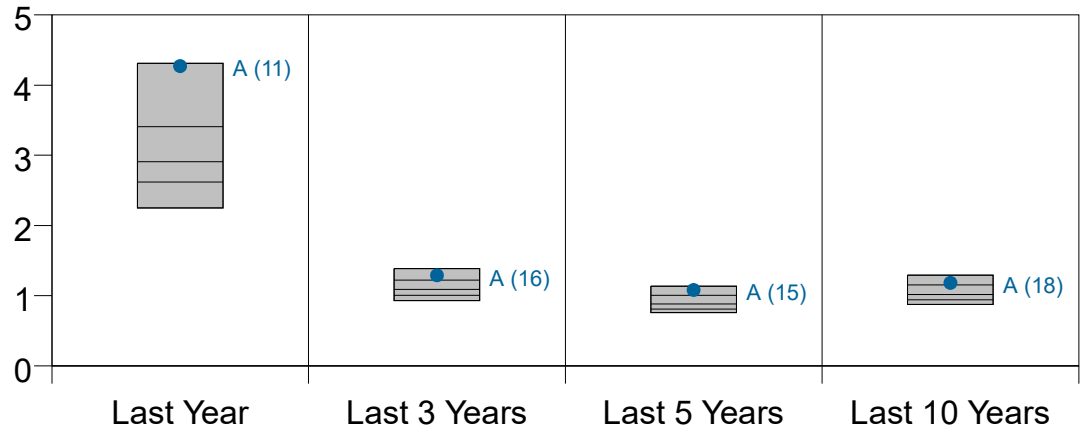
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	17.92	17.26	12.67	10.96
25th Percentile	16.13	16.12	11.82	10.37
Median	13.72	14.82	10.89	9.63
75th Percentile	12.43	13.64	10.15	8.79
90th Percentile	11.23	12.77	9.41	8.18
Member Count	198	198	196	185
PERS - Total Fund ● A	19.27	16.24	12.27	10.53

- Despite the recent change to the asset allocation, longer-term performance reflects ARMB's prior orientation toward capital growth as opposed to income generation.
- Performance was above the Public Funds median for the one-, three-, five-, and ten-year periods.

Total Fund Sharpe Ratio Rankings vs Public Funds (PERS)

Callan Public Fund Database

Gross of Fee Sharpe Ratio
for Periods Ended December 31, 2021
Group: Callan Public Fund Sponsor Database



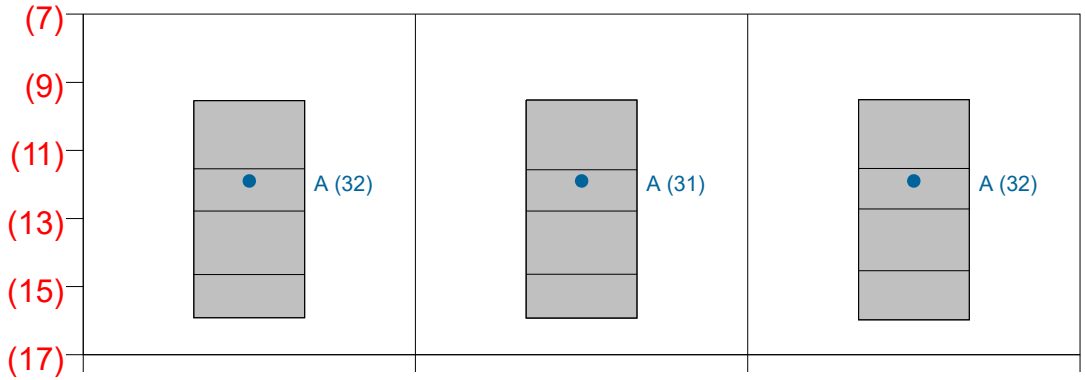
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	4.31	1.39	1.14	1.29
25th Percentile	3.41	1.22	1.00	1.15
Median	2.91	1.09	0.88	1.02
75th Percentile	2.62	1.01	0.81	0.94
90th Percentile	2.25	0.93	0.76	0.88
Member Count	198	198	196	185
PERS - Total Fund ● A	4.27	1.29	1.08	1.18

- “Sharpe ratio” is a risk-adjusted measure of excess return above the risk-free rate.
- ARMB’s risk-adjusted return (Sharpe ratio) was above the Public Funds median for the one-, three-, five-, and ten-year periods.

Total Maximum Drawdown Rankings vs Public Funds (PERS)

Callan Public Fund Database

Gross of Fee Maximum Drawdown
for Periods Ended December 31, 2021
Group: Callan Public Fund Sponsor Database



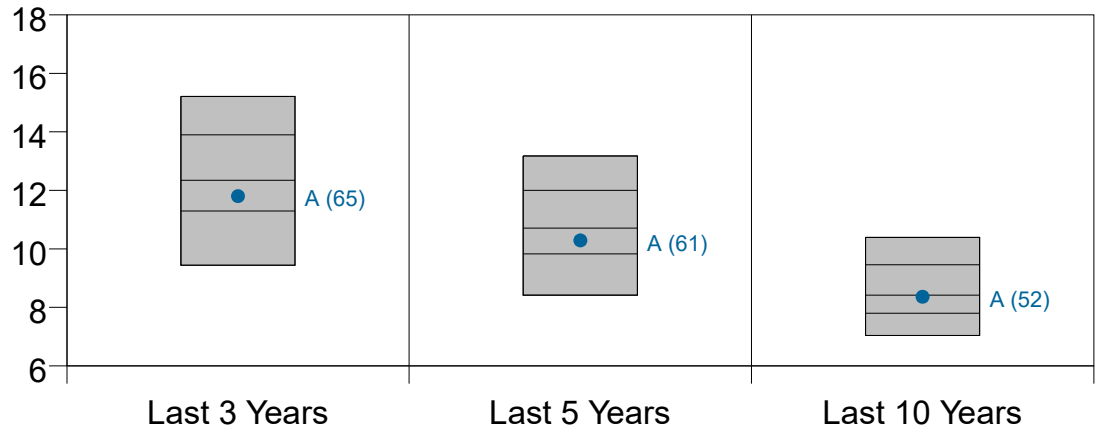
	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	(9.54)	(9.52)	(9.51)
25th Percentile	(11.54)	(11.57)	(11.53)
Median	(12.78)	(12.78)	(12.72)
75th Percentile	(14.64)	(14.63)	(14.53)
90th Percentile	(15.91)	(15.92)	(15.97)
Member Count	198	196	185
PERS - Total Fund ● A	(11.90)	(11.90)	(11.90)

- "Maximum drawdown" is a measure of the largest loss from peak to trough in a given period.
- Lower rankings reflect larger drawdowns (i.e. bigger losses). ARMB's drawdown rankings for all periods have reflected better than average drawdowns (i.e. lower losses) and have improved over time.
- The drawdown experienced in the first quarter of 2020 is the largest of the last 10 years.

Standard Deviation Ranking vs Public Funds (PERS)

Callan Public Fund Database

Gross of Fee Standard Deviation
for Periods Ended December 31, 2021
Group: Callan Public Fund Sponsor Database



	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	15.21	13.18	10.40
25th Percentile	13.90	12.00	9.46
Median	12.35	10.71	8.42
75th Percentile	11.30	9.83	7.80
90th Percentile	9.45	8.42	7.04
Member Count	198	196	185
PERS - Total Fund ● A	11.81	10.30	8.36

- “Standard deviation” measures variability of returns. It is one measurement of investment risk.
- Less standard deviation results in lower rankings. A lower ranking of standard deviation suggests lower variability.
- ARMB’s portfolio diversification has resulted in volatility that is lower than median compared to peers.

PERS Performance Attribution – 4th Quarter 2021 & Trailing Year

Relative Attribution Effects for Quarter ended December 31, 2021

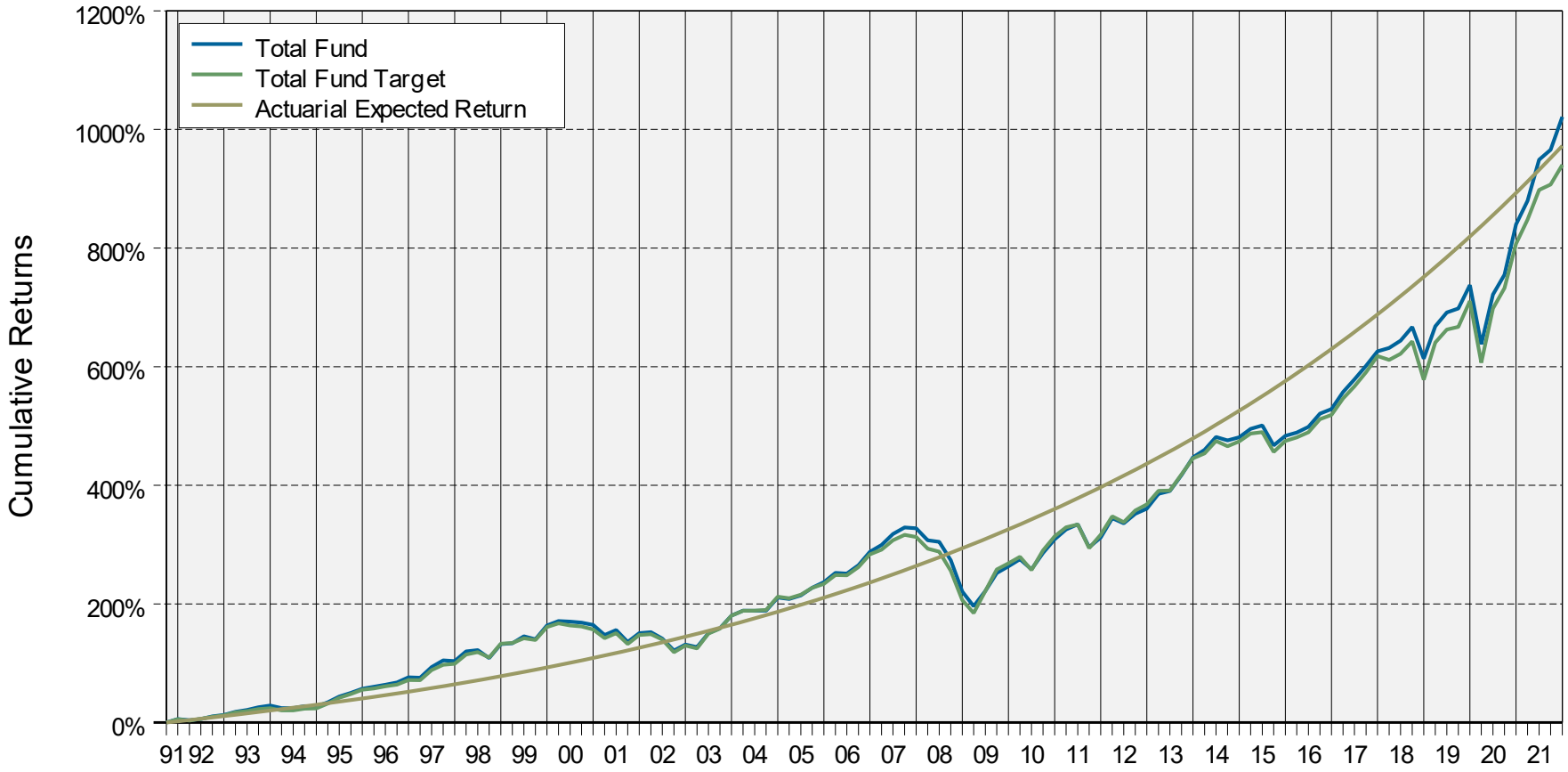
Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	28%	27%	10.02%	9.28%	0.21%	0.04%	0.25%
Fixed-Income	22%	21%	0.28%	0.01%	0.06%	(0.04%)	0.02%
Opportunistic	6%	6%	3.53%	3.67%	(0.01%)	(0.00%)	(0.01%)
Real Assets	12%	14%	5.84%	3.30%	0.30%	(0.00%)	0.30%
Global Equity ex US	18%	18%	1.25%	1.64%	(0.07%)	0.00%	(0.07%)
Private Equity	14%	14%	8.46%	(1.41%)	1.43%	(0.03%)	1.40%
Total			**5.19% =**	**3.29% +**	**1.92% +**	**(0.02%)**	**1.90%**

One Year Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	28%	27%	27.32%	25.66%	0.44%	0.02%	0.46%
Fixed-Income	22%	21%	0.77%	(1.46%)	0.55%	(0.08%)	0.47%
Opportunistic	6%	6%	12.30%	10.06%	0.14%	(0.00%)	0.13%
Real Assets	12%	13%	15.49%	12.25%	0.39%	(0.05%)	0.34%
Global Equity ex US	18%	19%	9.29%	8.53%	0.15%	(0.01%)	0.15%
Private Equity	13%	13%	62.25%	34.60%	3.11%	(0.10%)	3.00%
Total			**19.27% =**	**14.67% +**	**4.82% +**	**(0.22%)**	**4.60%**

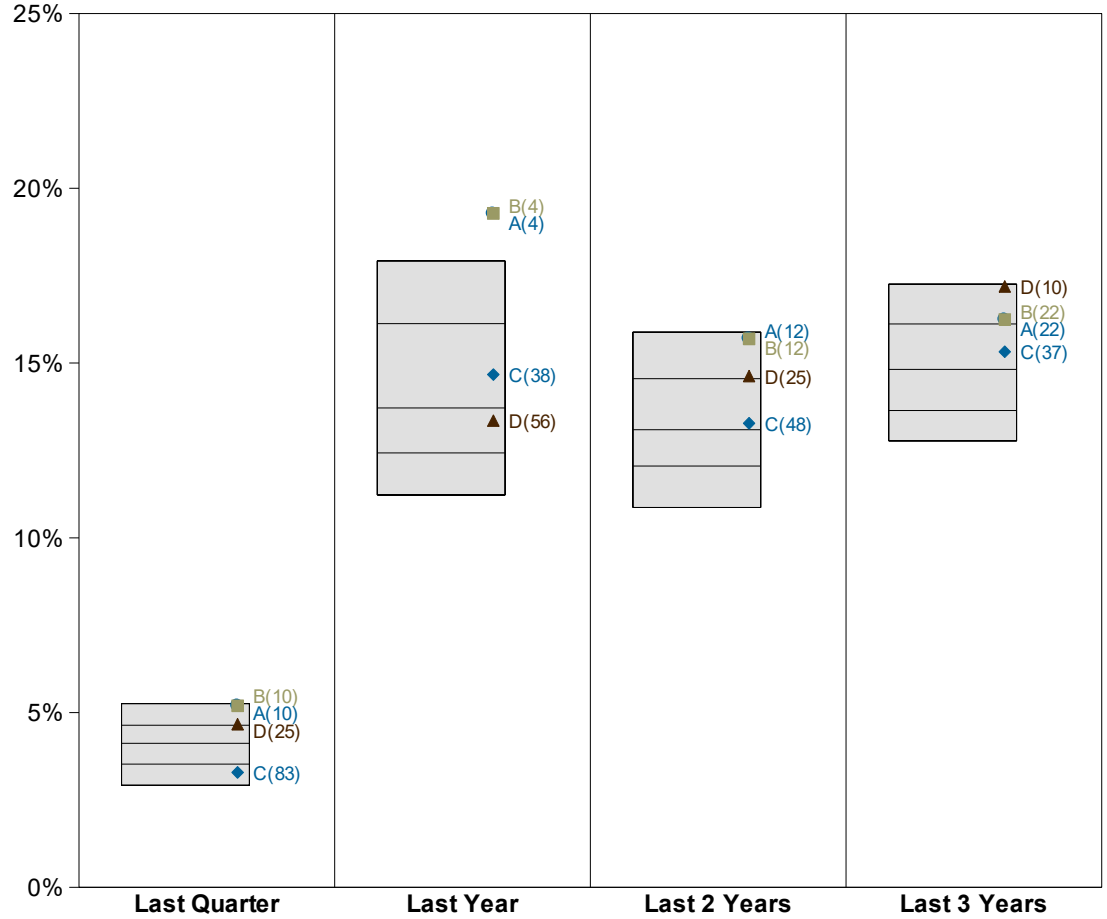
PERS Long-Term Total Fund Performance as of 12/31/2021

Cumulative Returns Actual vs Target



- Each Fund has two targets: the asset allocation policy return and the actuarial return.
- Total Fund returns continue to closely track the strategic allocation target.
- Market correction setbacks in 3Q15, 4Q18, and 1Q20 have hindered the Total Fund's progress toward closing the gap versus the actuarial return following the Global Financial Crisis of 2008/2009.

Annualized Total Fund Returns as of 12/31/21

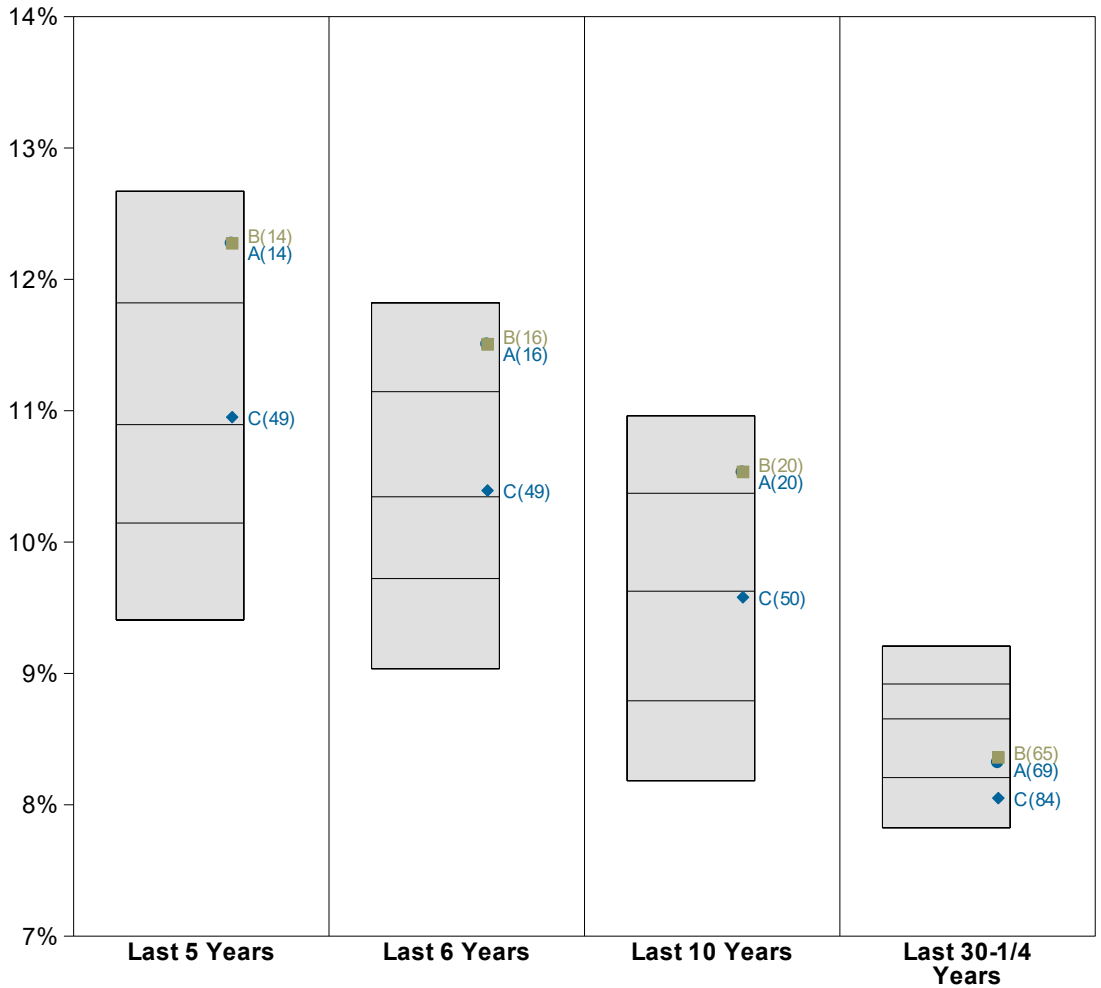


	Last Quarter	Last Year	Last 2 Years	Last 3 Years
10th Percentile	5.25	17.92	15.89	17.26
25th Percentile	4.64	16.13	14.55	16.12
Median	4.12	13.72	13.09	14.82
75th Percentile	3.53	12.43	12.05	13.64
90th Percentile	2.92	11.23	10.87	12.77
PERS Total Plan ● A	5.19	19.27	15.69	16.24
TRS Total Plan ■ B	5.19	19.28	15.69	16.25
Target Index ◆ C	3.29	14.67	13.28	15.33
Public Market Proxy ▲ D	4.67	13.36	14.63	17.19

- PERS and TRS have outperformed their target for the last quarter, one-year, two-year and three-year periods.

The Public Market Proxy consists of 45% Russell 3000 Index, 30% MSCI ACWI ex US IMI (Net), and 25% Bloomberg Aggregate Index.

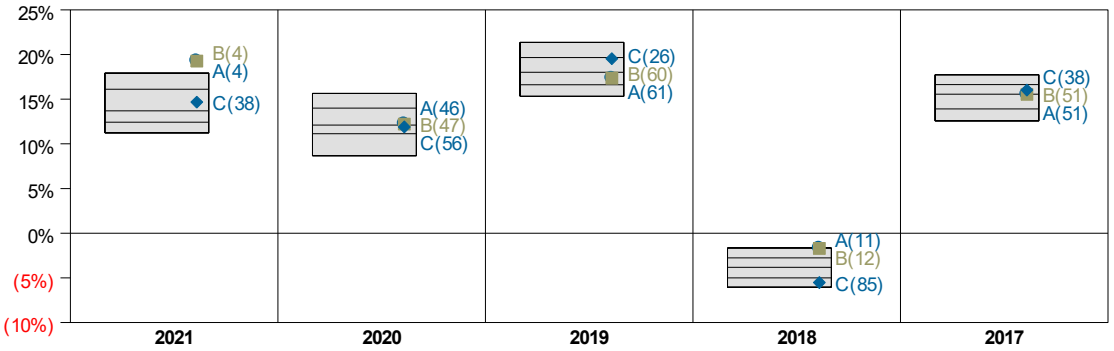
Longer-Term Total Fund Returns as of 12/31/21



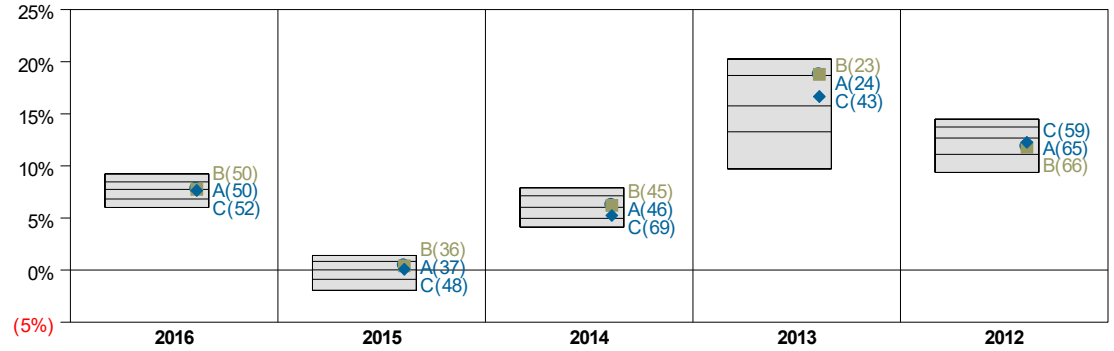
	Last 5 Years	Last 6 Years	Last 10 Years	Last 30-1/4 Years
10th Percentile	12.67	11.82	10.96	9.21
25th Percentile	11.82	11.14	10.37	8.92
Median	10.89	10.34	9.63	8.65
75th Percentile	10.15	9.72	8.79	8.21
90th Percentile	9.41	9.04	8.18	7.82
PERS Total Plan ● A	12.27	11.50	10.53	8.32
TRS Total Plan ■ B	12.27	11.51	10.53	8.36
Target Index ◆ C	10.95	10.39	9.58	8.05

- Five-, six-, and ten-year performance is above target and median.
- 30 year and one quarter return for PERS beat the target by 27 basis points.

Calendar Period Total Fund Performance



	2021	2020	2019	2018	2017
10th Percentile	17.92	15.65	21.36	(1.65)	17.74
25th Percentile	16.13	14.00	19.66	(2.77)	16.64
Median	13.72	12.10	18.01	(3.82)	15.57
75th Percentile	12.43	11.14	16.61	(4.99)	13.92
90th Percentile	11.23	8.66	15.32	(6.04)	12.57
PERS Total Plan ● A	19.27	12.23	17.34	(1.70)	15.52
TRS Total Plan ■ B	19.28	12.21	17.36	(1.70)	15.54
Target Index ◆ C	14.67	11.90	19.54	(5.53)	16.03

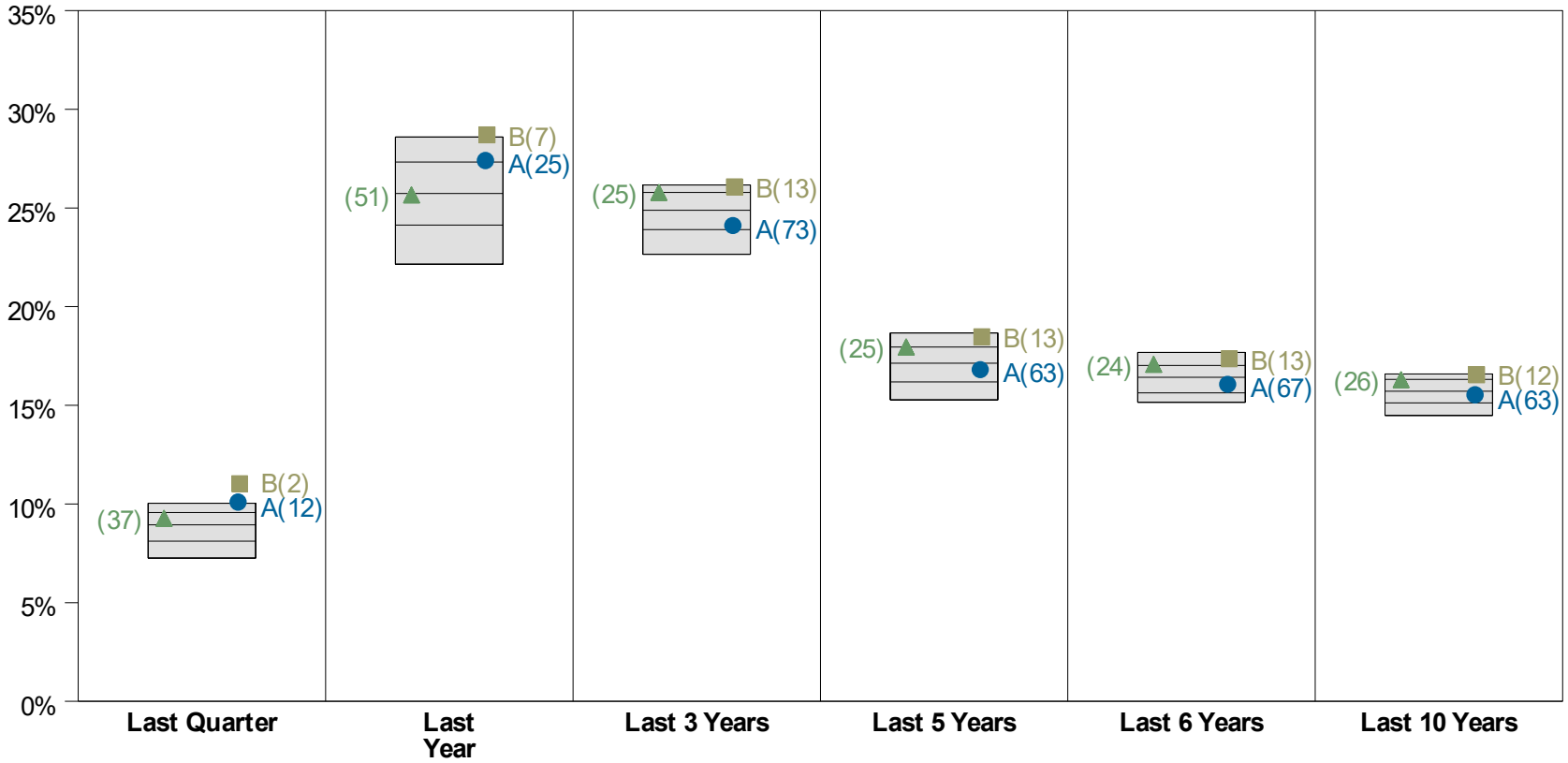


	2016	2015	2014	2013	2012
10th Percentile	9.23	1.40	7.90	20.27	14.49
25th Percentile	8.46	0.84	7.14	18.69	13.73
Median	7.74	0.02	6.03	15.76	12.67
75th Percentile	6.82	(0.88)	4.96	13.28	11.11
90th Percentile	6.01	(1.95)	4.13	9.71	9.38
PERS Total Plan ● A	7.74	0.40	6.22	18.74	11.81
TRS Total Plan ■ B	7.74	0.41	6.22	18.79	11.79
Target Index ◆ C	7.64	0.08	5.24	16.66	12.26

- PERS and TRS rank at or above median in eight of the 10 periods shown.
- Peer group range of returns during 2016, 2015, and 2014 were very tight.
- Wide range of peer group returns during calendar 2013 due to varying fixed-income allocations within the Public Fund universe.

Total Domestic Equity through 12/31/21

Performance vs Public Fund - Domestic Equity (Gross)



		Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile		10.04	28.60	26.16	18.66	17.68	16.58
25th Percentile		9.57	27.32	25.79	17.95	17.02	16.31
Median		8.95	25.73	24.88	17.13	16.42	15.71
75th Percentile		8.11	24.13	23.91	16.19	15.63	15.12
90th Percentile		7.25	22.15	22.65	15.28	15.15	14.48
Domestic Equity Pool	● A	10.02	27.32	24.02	16.73	15.98	15.44
Standard & Poor's 500	■ B	11.03	28.71	26.07	18.47	17.36	16.55
Russell 3000 Index	▲	9.28	25.66	25.79	17.97	17.08	16.30

Domestic Equity Component Returns

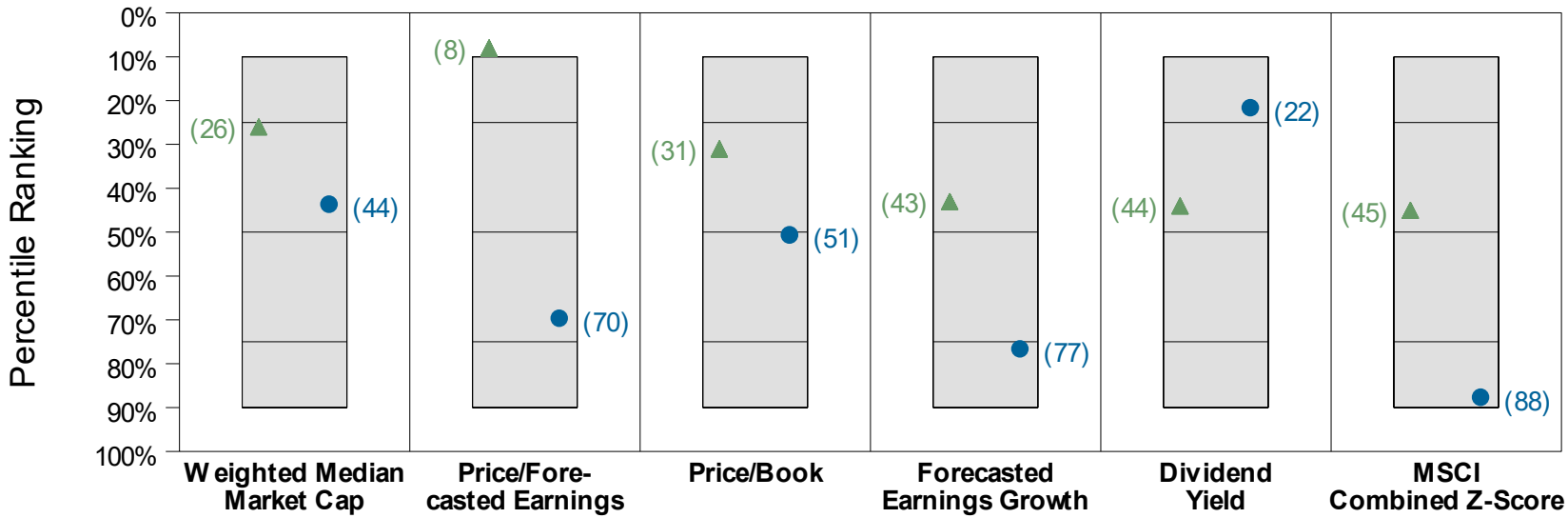
Returns for Periods Ended December 31, 2021

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Total Dom Equity Pool	10.02%	27.32%	24.02%	16.73%	15.44%
Russell 3000 Index	9.28%	25.66%	25.79%	17.97%	16.30%
Large Cap Managers	10.41%	27.26%	24.23%	17.25%	15.85%
Russell 1000 Index	9.78%	26.45%	26.21%	18.43%	16.54%
Small Cap Managers	5.60%	26.53%	21.26%	13.53%	14.16%
Russell 2000 Index	2.14%	14.82%	20.02%	12.02%	13.23%

- The large cap composite trailed its benchmark (the Russell 1000 Index) for the trailing 3-, 5-, and 10-year periods and outperformed over the last quarter and year.
- The small cap composite has outperformed its benchmark (the Russell 2000 Index) over all periods shown in the table.

Domestic Equity Portfolio Characteristics

Portfolio Characteristics Percentile Rankings
Rankings Against Public Fund - Domestic Equity
as of December 31, 2021

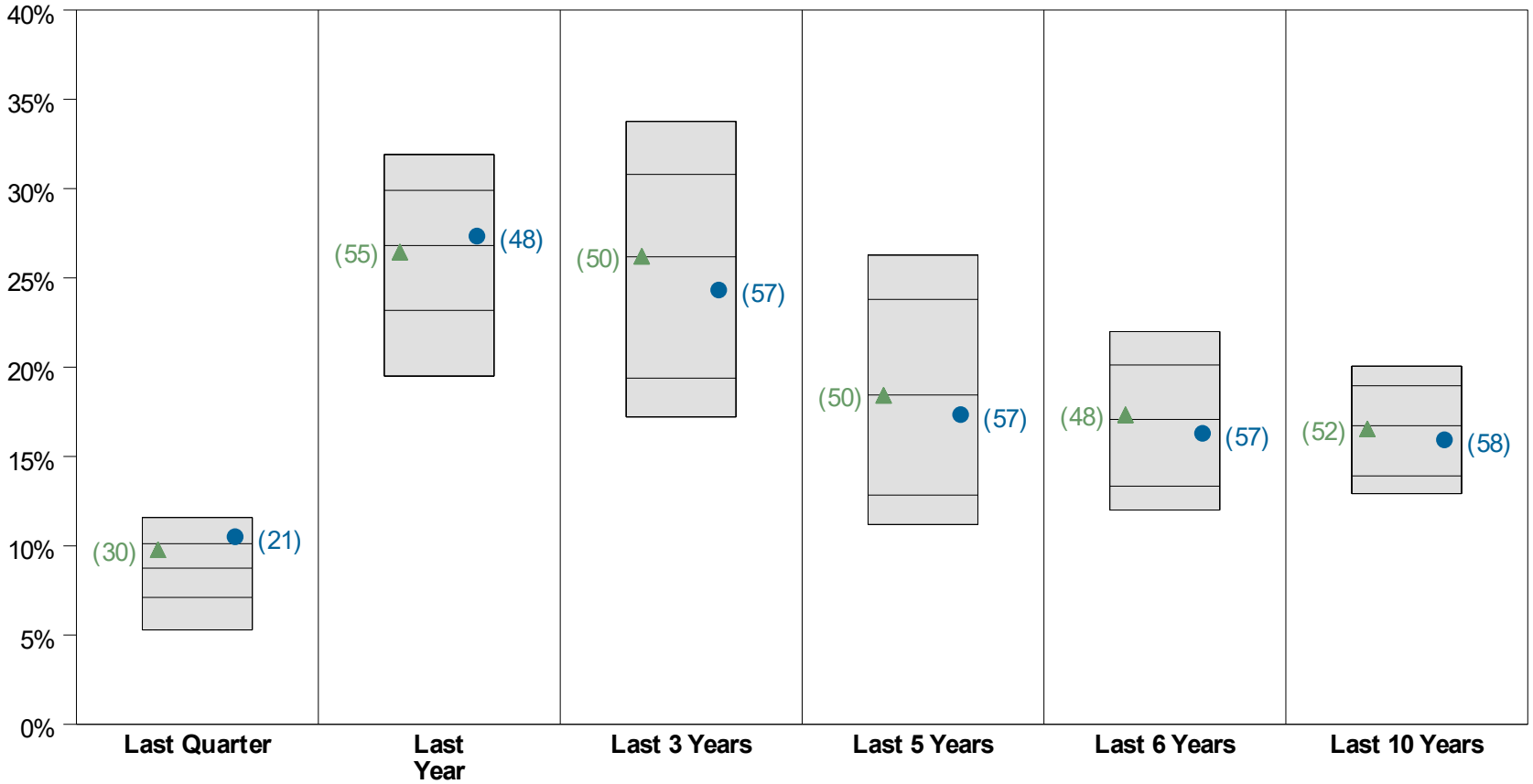


	Weighted Median Market Cap	Price/Fore-casted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	218.73	21.87	4.55	20.89	1.30	0.11
25th Percentile	149.54	21.58	4.44	20.44	1.29	0.02
Median	94.91	20.83	3.84	20.01	1.20	(0.02)
75th Percentile	63.40	19.72	3.54	19.14	1.11	(0.05)
90th Percentile	47.98	18.49	3.04	18.28	1.05	(0.22)
Domestic Equity Pool ●	101.70	20.03	3.83	19.11	1.29	(0.11)
Russell 3000 Index ▲	138.25	22.06	4.20	20.25	1.24	(0.00)

- ARMB's overall domestic equity portfolio's market capitalization is smaller than 44% of public funds (first column).
- Overall, ARMB's domestic equity portfolio tilts decidedly "value" versus peers (last column on right).
  - "MSCI Combined Z-Score" measures Growth and Value characteristics of individual stocks within managers' portfolios.
  - A low Z-Score rank (i.e.– the dot appears towards the top of the floating bar) indicates a Growth bias.
  - A high Z-Score rank (i.e. – the dot appears towards the bottom of the floating bar) indicates a Value bias.

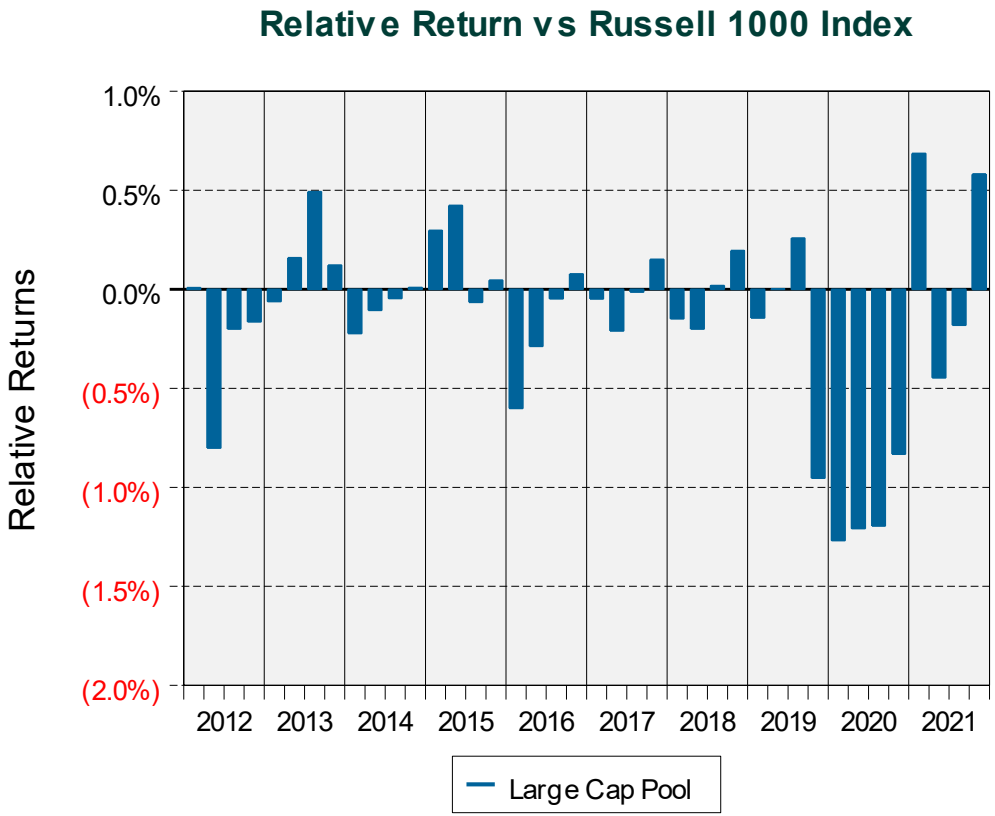
Large Cap Domestic Equity through 12/31/21

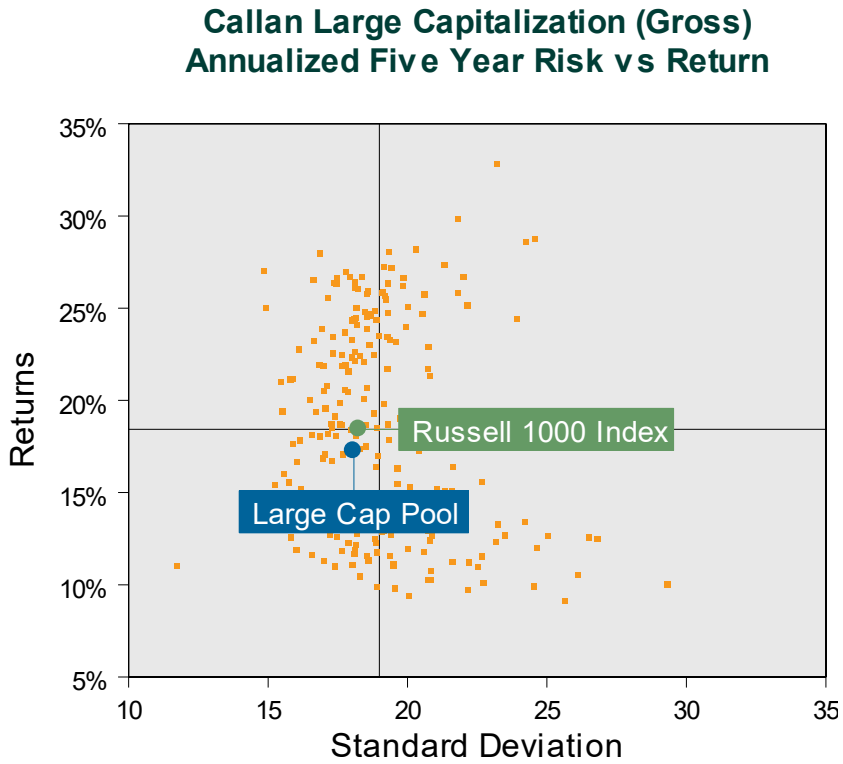
Performance vs Callan Large Capitalization (Gross)



	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	11.58	31.91	33.77	26.27	21.99	20.06
25th Percentile	10.12	29.90	30.80	23.80	20.12	18.96
Median	8.74	26.82	26.18	18.44	17.08	16.72
75th Percentile	7.11	23.19	19.38	12.84	13.33	13.92
90th Percentile	5.28	19.50	17.21	11.18	12.00	12.92
Large Cap Pool ●	10.41	27.26	24.23	17.25	16.20	15.85
Russell 1000 Index ▲	9.78	26.45	26.21	18.43	17.34	16.54

Large Cap Domestic Equity as of 12/31/21

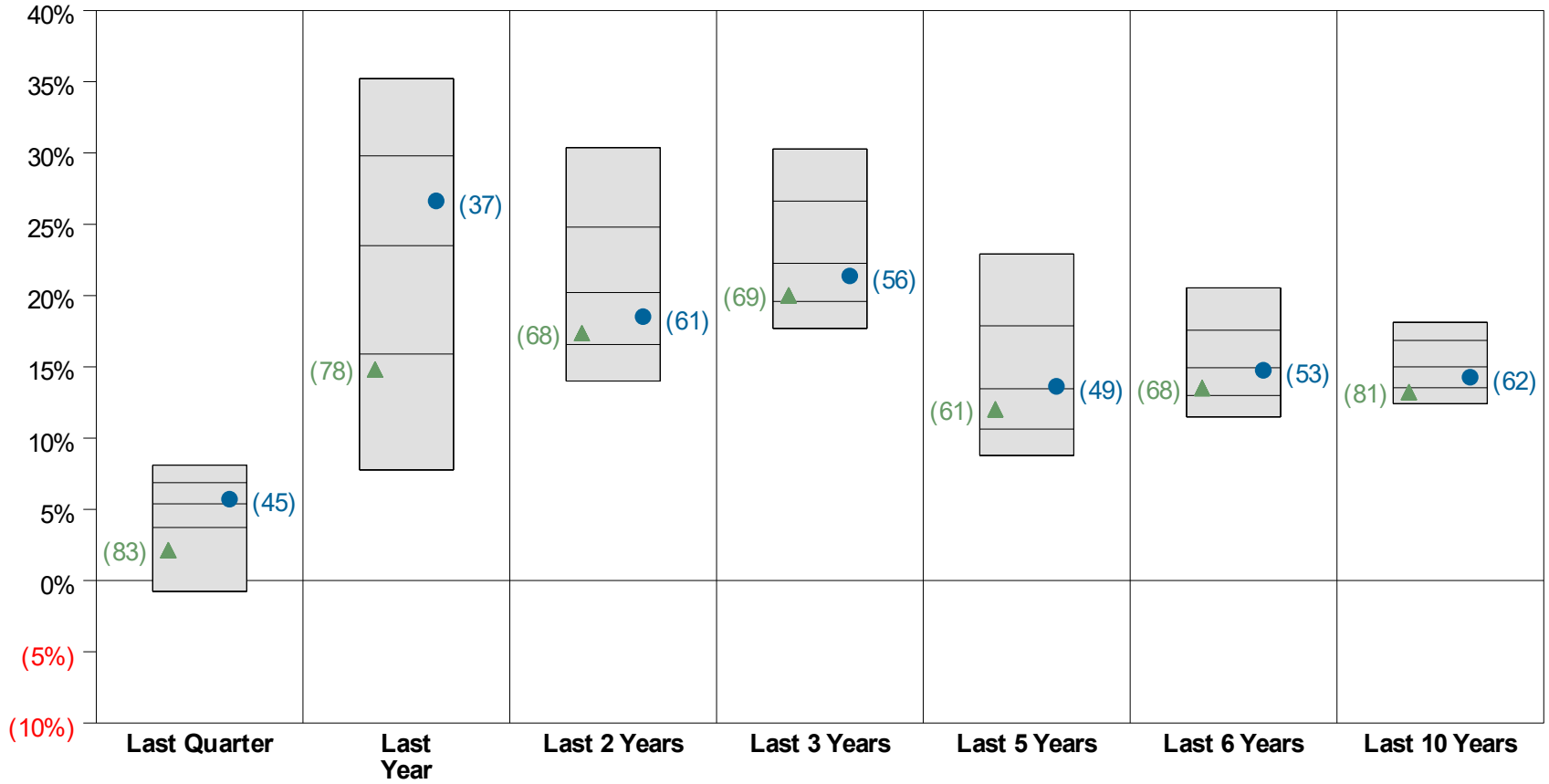




- Large Cap Domestic Equity returns outperformed the Russell 1000 index by 63bps in the fourth quarter of 2021.
- Long-term performance exhibits market-like returns with similar risk.
- Underperformance vs. the Russell 1000 Index in 4Q19 through 4Q20 was driven by Scientific Beta, which trailed the broad benchmark by between 2% and 4% in each of those quarters.
- Passive implementation also detracted as the S&P 900 Index trailed the Russell 1000 Index by 1.1% in 2Q20, 0.8% in 3Q20, and 0.9% in 4Q20.

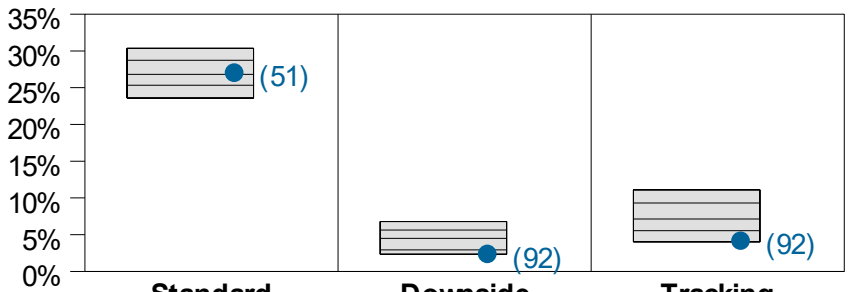
Small Cap Domestic Equity through 12/31/21

Performance vs Callan Small Capitalization (Gross)



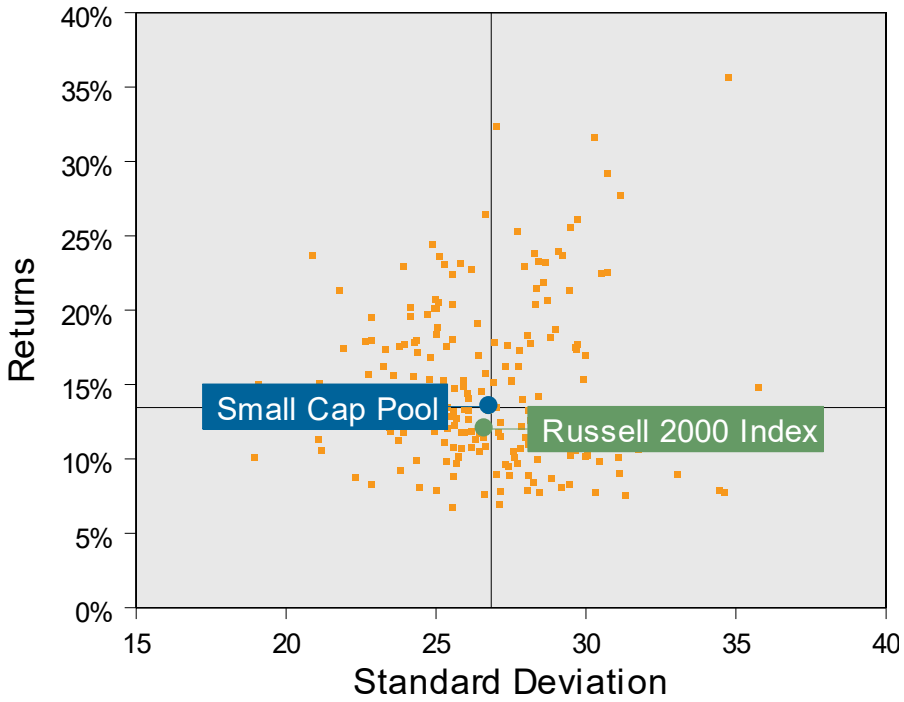
	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	8.10	35.22	30.37	30.28	22.92	20.55	18.13
25th Percentile	6.87	29.81	24.80	26.62	17.87	17.57	16.85
Median	5.38	23.50	20.21	22.26	13.46	14.93	14.99
75th Percentile	3.73	15.90	16.56	19.59	10.63	12.99	13.53
90th Percentile	(0.77)	7.75	14.01	17.70	8.78	11.49	12.41
Small Cap Pool ●	5.60	26.53	18.40	21.26	13.53	14.64	14.16
Russell 2000 Index ▲	2.14	14.82	17.36	20.02	12.02	13.52	13.23

Small Cap Domestic Equity through 12/31/21



	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	30.37	6.79	11.11
25th Percentile	28.74	5.64	9.32
Median	26.84	4.50	7.13
75th Percentile	25.35	2.94	5.58
90th Percentile	23.61	2.36	4.05
Small Cap Equity Pool ●	26.80	2.15	3.96

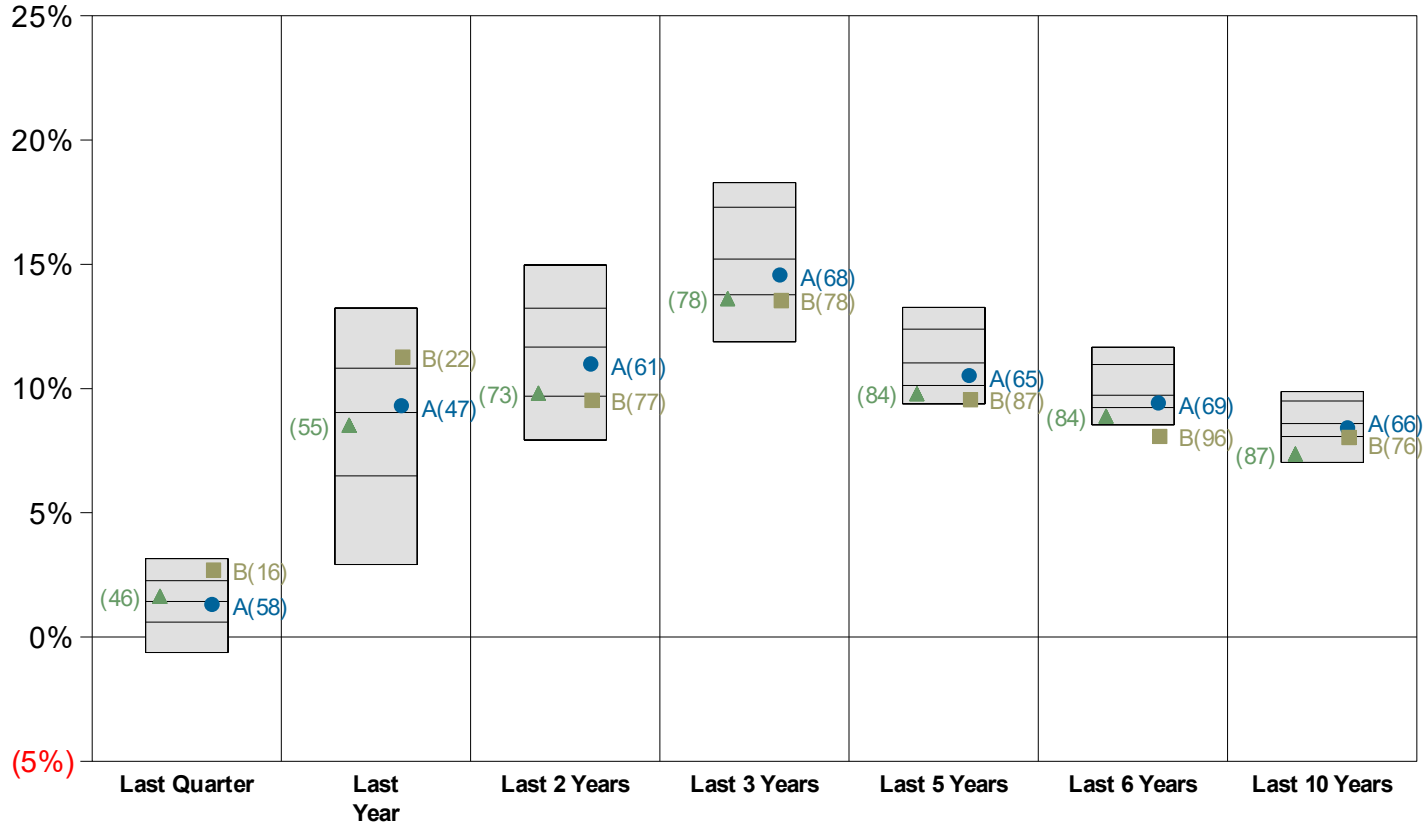
Callan Small Capitalization (Gross)
Annualized Five Year Risk vs Return



- The five-year risk statistics of standard deviation, downside risk, and tracking error compare favorably versus the peer group of small cap managers.

Global Equity ex-US through 12/31/21

Performance vs Public Fund - International Equity (Gross)

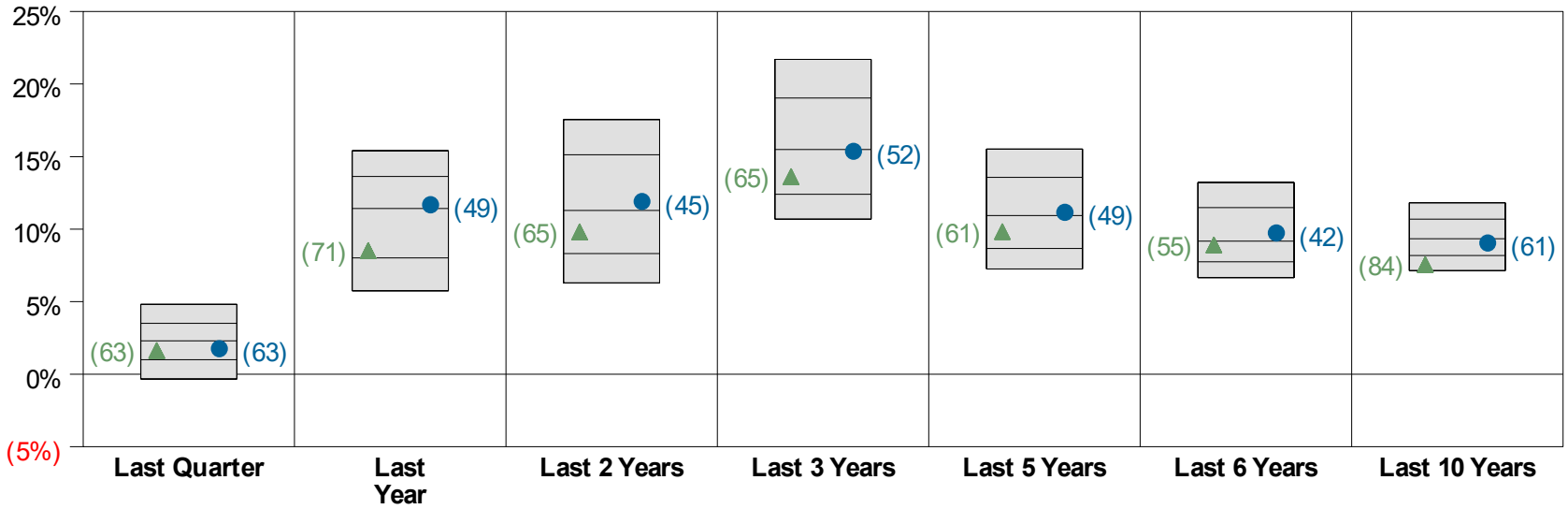


		Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile		3.15	13.24	14.97	18.29	13.27	11.66	9.88
25th Percentile		2.27	10.82	13.24	17.30	12.39	10.97	9.50
Median		1.43	9.04	11.67	15.21	11.03	9.73	8.59
75th Percentile		0.60	6.49	9.69	13.77	10.12	9.24	8.07
90th Percentile		(0.63)	2.92	7.93	11.88	9.38	8.54	7.03
Global Equity ex-US	● A	1.26	9.26	10.93	14.52	10.47	9.36	8.36
MSCI EAFE Index	■ B	2.69	11.26	9.53	13.54	9.55	8.08	8.03
Int'l Equity Target	▲	1.64	8.53	9.81	13.62	9.79	8.89	7.37

The Int'l Equity Target currently consists of MSCI ACWI ex U.S. IMI.

International Equity ex Emerging Markets through 12/31/21

Performance vs Callan Non-US Equity (Gross)



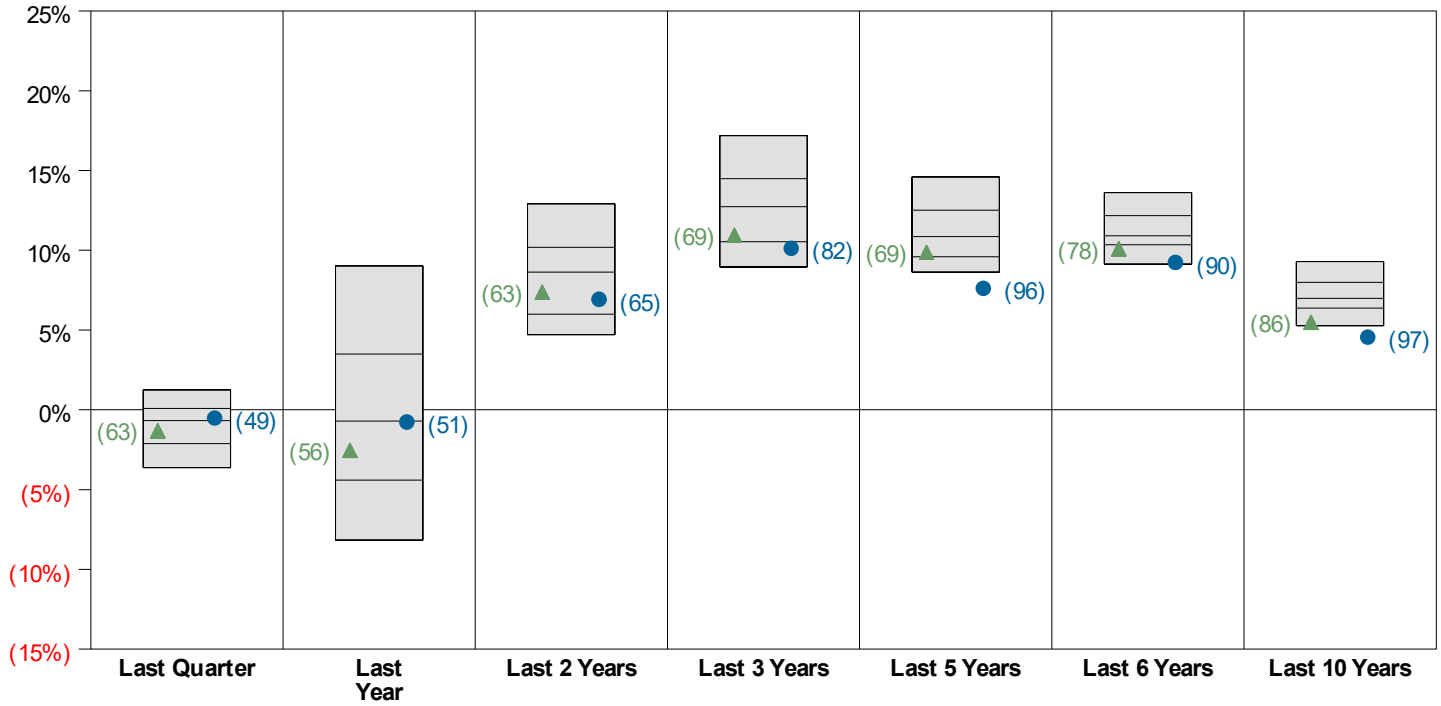
	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	4.82	15.41	17.56	21.69	15.53	13.21	11.82
25th Percentile	3.51	13.62	15.13	19.04	13.56	11.48	10.69
Median	2.30	11.41	11.29	15.48	10.93	9.17	9.33
75th Percentile	0.99	8.02	8.31	12.40	8.66	7.74	8.18
90th Percentile	(0.33)	5.74	6.29	10.68	7.25	6.65	7.13
Int'l Equity Pool (ex Emerging. Mkt) ●	1.63	11.56	11.79	15.25	11.03	9.61	8.93
MSCI ACWI ex US IMI ▲	1.64	8.53	9.81	13.62	9.83	8.91	7.57

International Equity ex Emerging Markets through 12/31/21

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Int'l Equity Pool (ex Emerging Market)	**1.63%**	**11.56%**	**15.25%**	**11.03%**	**8.93%**
Arrowstreet ACWI ex -US	0.98%	16.01%	20.99%	14.67%	-
Baillie Gifford ACWI ex US	1.12%	3.93%	23.16%	15.68%	-
Brandes Investment	(0.05%)	13.91%	9.46%	6.91%	7.53%
Capital Guardian	(0.65%)	6.45%	20.23%	15.20%	11.15%
L&G Sci Beta Dev ex US	2.73%	12.70%	-	-	-
SSgA World ex US IMI	2.75%	12.43%	-	-	-
MSCI EAFE Index	2.69%	11.26%	13.54%	9.55%	8.03%
MSCI ACWI ex-US IMI Index	1.64%	8.53%	13.62%	9.83%	7.57%

Emerging Markets through 12/31/21

Performance vs Callan Emerging Broad (Gross)



	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	1.25	9.02	12.92	17.19	14.60	13.61	9.30
25th Percentile	0.09	3.49	10.18	14.49	12.51	12.17	7.98
Median	(0.67)	(0.71)	8.63	12.73	10.86	10.91	6.98
75th Percentile	(2.12)	(4.40)	5.99	10.53	9.59	10.34	6.38
90th Percentile	(3.62)	(8.17)	4.71	8.94	8.63	9.14	5.27
Emerging Markets Pool ●	(0.61)	(0.85)	6.82	10.03	7.52	9.15	4.46
MSCI EM ▲	(1.31)	(2.54)	7.38	10.94	9.88	10.09	5.49

- After underperforming by 3.76% in 2Q17, 1.38% in 3Q17, 1.68% in 4Q17, 4.03% in 2Q18, 1.87% in 1Q19, 1.41% in 4Q19, 0.94% in 1Q21, 0.47% in 2Q21, the Emerging Markets Pool outperformed the benchmark by 1.69% over the last year, 0.70% in 4Q21 and ranks above median over the last quarter.
- DRZ and Lazard were liquidated and L&G Scientific Beta was funded in 4Q19, leaving only passive and smart beta approaches within the emerging markets equity space.

Emerging Markets Pool through 12/31/21

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Emerging Markets Pool	**(0.61%)**	**(0.85%)**	**10.03%**	**7.52%**	**4.46%**
SSgA Emerging Markets	(1.24%)	(2.63%)	-	-	-
L&G SciBeta EM	0.98%	3.53%	-	-	-
MSCI EM	(1.31%)	(2.54%)	10.94%	9.88%	5.49%

Total Fixed Income as of 12/31/21

Performance vs Public Fund - Domestic Fixed (Gross)

	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	0.63	1.93	5.67	7.01	5.33	5.46	5.00
25th Percentile	0.31	0.57	4.78	6.47	4.82	5.02	4.33
Median	0.03	(0.59)	3.82	5.60	4.26	4.18	3.64
75th Percentile	(0.24)	(1.21)	3.00	4.84	3.58	3.22	2.86
90th Percentile	(0.53)	(1.53)	2.46	3.96	2.97	2.83	2.46
Total Fixed Income Pool ●	0.28	0.76	4.22	4.91	3.91	4.24	3.13
Fixed Income Target ▲	0.01	(1.46)	2.76	3.75	2.93	2.92	2.17

- The Total Fixed Income Pool portfolio outperformed the Fixed Income Target in all time periods shown.
- The transition from intermediate Treasury to Aggregate mandates was completed during the fourth quarter of 2019.

Total Fixed Income through 12/31/21

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Fixed Income	**0.28%**	**0.76%**	**4.91%**	**3.91%**	**3.13%**
Fixed Income Target	0.01%	(1.46%)	3.75%	2.93%	2.17%
Blmbg Treasury Intmdt	(0.57%)	(1.72%)	3.04%	2.33%	1.68%
ARMB US Aggregate	(0.17%)	(1.86%)	-	-	-
Opportunistic Fixed Income	**0.66%**	**2.68%**	**5.98%**	**5.33%**	**6.18%**
FIAM Tactical Bond	0.71%	1.48%	7.90%	5.81%	-
Blmbg Aggregate	0.01%	(1.54%)	4.79%	3.57%	2.90%
FIAM REHI	0.45%	9.19%	4.69%	4.82%	-
Blmbg:Universal CMBS xAaa	(0.65%)	2.86%	5.74%	5.05%	5.01%
Alternative Fixed Income	**2.54%**	**15.30%**	**-**	**-**	**-**
Crestline (Blue Glacier)	1.19%	14.48%	6.52%	6.95%	7.50%
Prisma Capital (Polar Bear)	17.40%	24.24%	8.34%	6.74%	5.43%
Crestline Specialty Lending Fund	2.45%	20.27%	17.04%	15.71%	-
Crestline Specialty Lndg Fd II	2.03%	16.54%	12.75%	-	-
HFRI Fund of Funds Index	0.31%	6.05%	8.42%	5.68%	4.55%
T-Bills + 5%	1.24%	5.05%	5.99%	6.14%	5.63%

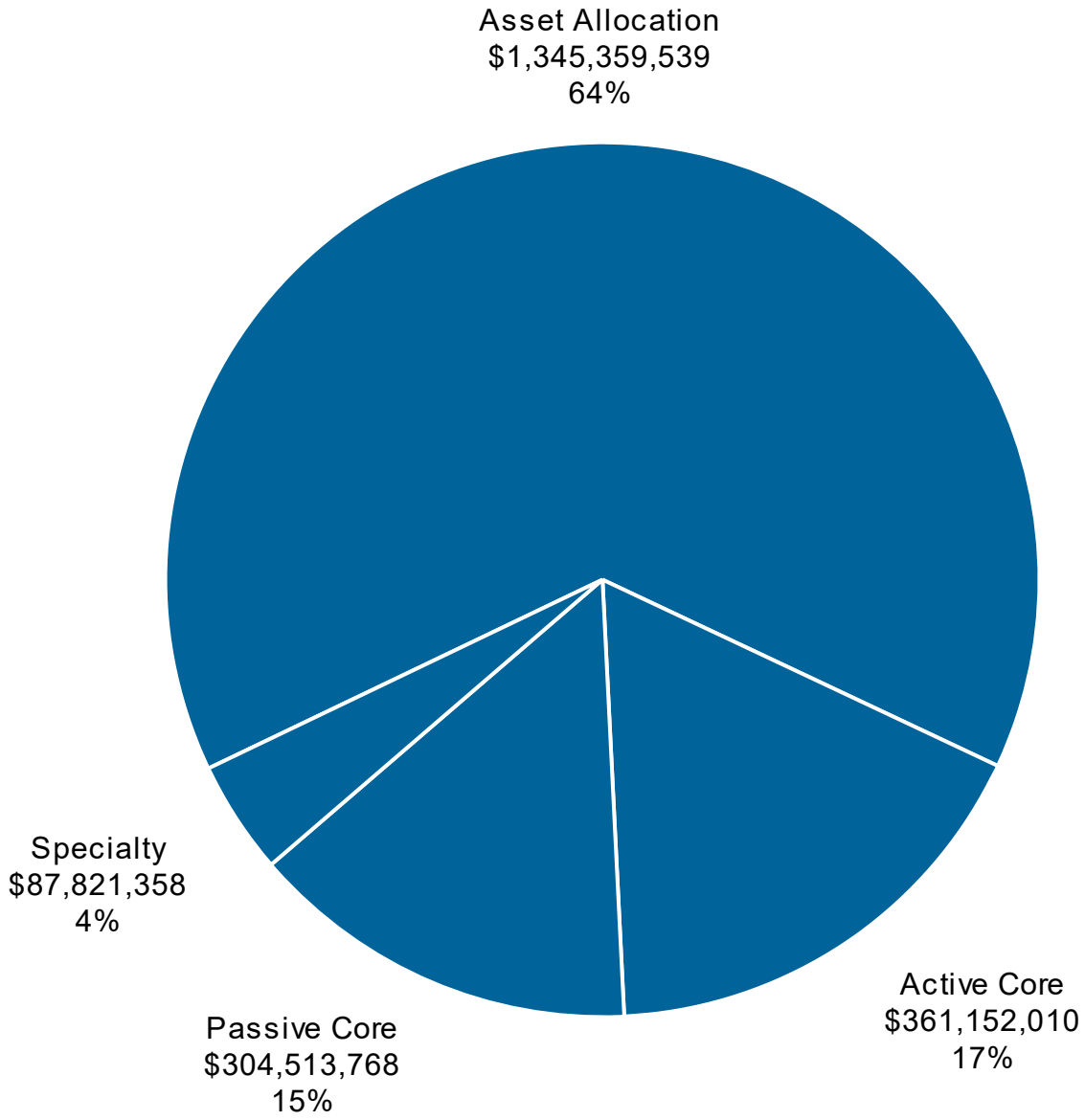
Opportunistic through 12/31/21

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Opportunistic (T)	**3.59%**	**12.37%**	**12.49%**	**-**	**-**
Alternative Equity Strategies	**4.63%**	**16.42%**	**22.09%**	**15.02%**	**11.91%**
McKinley Healthcare Transformation	4.63%	16.42%	-	-	-
MSCI ACWI	6.68%	18.54%	20.38%	14.40%	11.85%
Other Opportunities	**(0.08%)**	**(6.87%)**	**(0.85%)**	**0.00%**	**-**
Project Pearl	(0.49%)	(14.36%)	-	-	-
Schroders Insurance Linked	0.43%	(0.06%)	0.50%	(0.48%)	-
T-Bills + 6%	1.48%	6.05%	6.99%	7.14%	6.63%
Tactical Allocation Strategies	**4.10%**	**11.71%**	**14.39%**	**-**	**-**
PineBridge	2.75%	9.86%	12.87%	-	-
Pine Bridge Benchmark	0.74%	1.93%	9.19%	7.16%	4.94%
Fidelity Signals	5.44%	13.55%	15.89%	-	-
Fidelity Signals Benchmark	3.68%	10.03%	14.22%	10.10%	8.43%
Alternative Beta	**0.49%**	**11.60%**	**(3.09%)**	**(2.92%)**	**-**
Man Group Alternative Risk Premia	0.49%	11.60%	0.19%	-	-
T-Bills + 5%	1.24%	5.05%	5.99%	6.14%	5.63%

Participant-Directed Plans

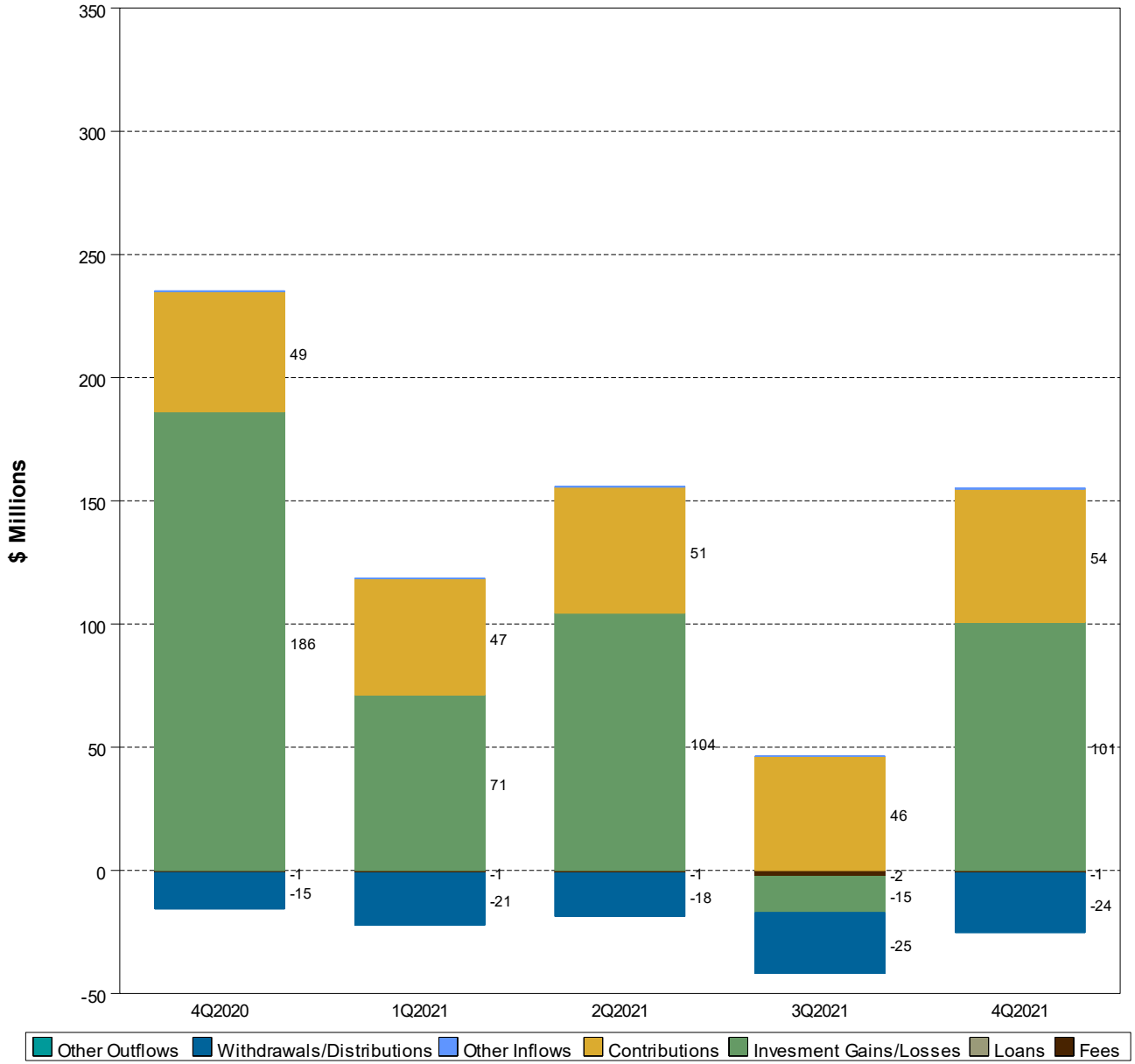
PERS DC Plan

December 31, 2021



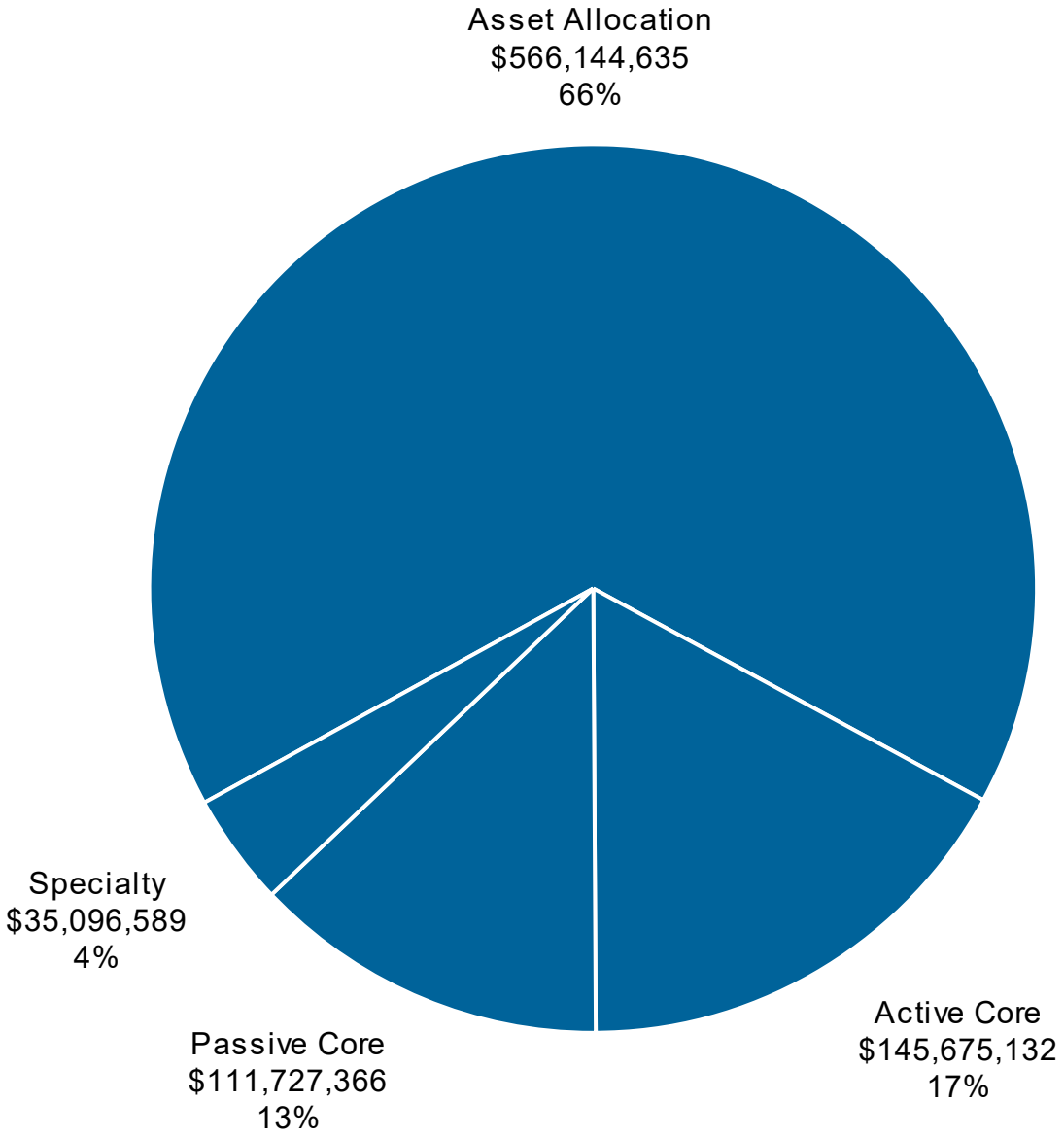
PERS DC Plan: Asset Changes

December 31, 2021



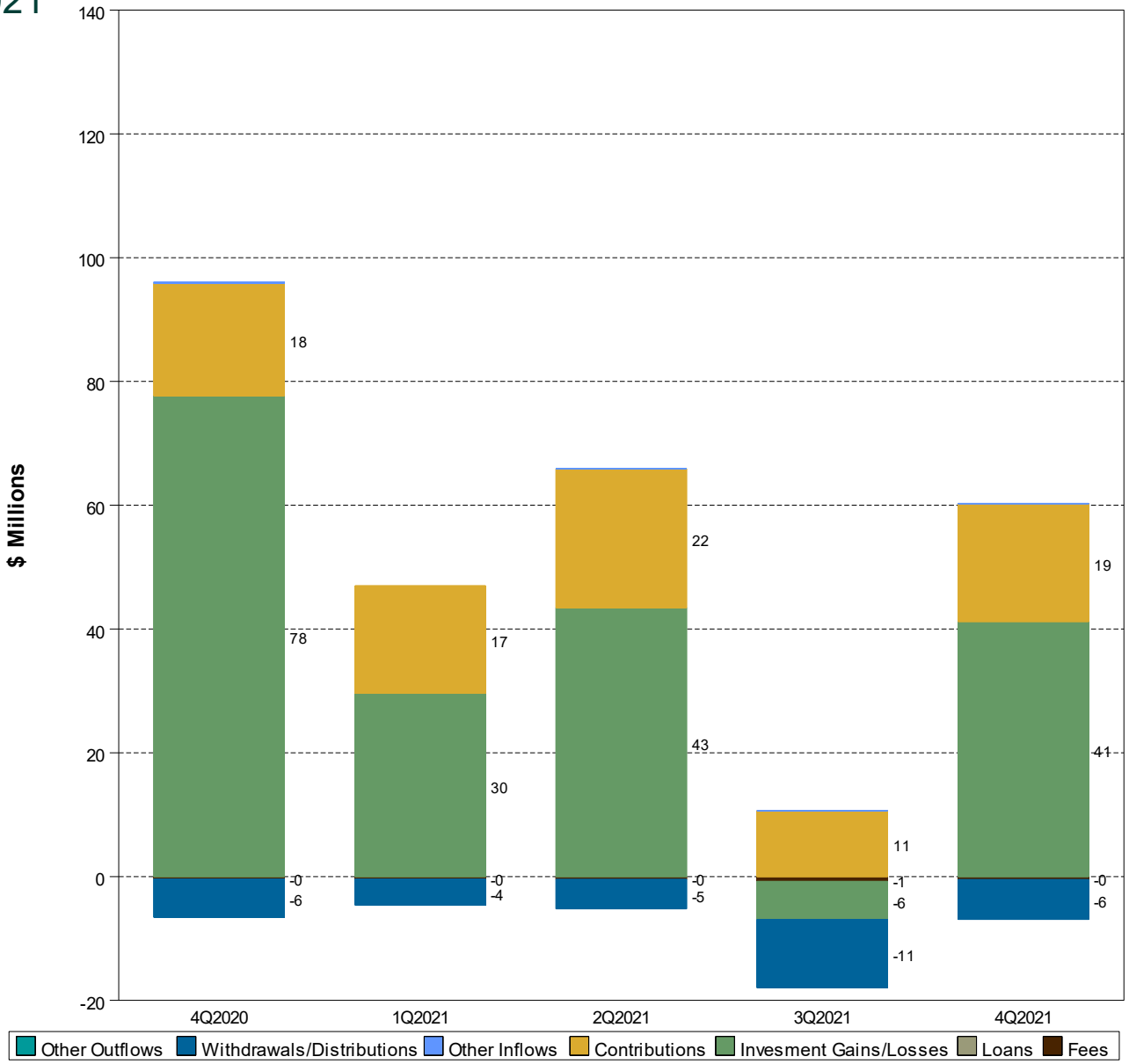
TRS DC Plan

December 31, 2021



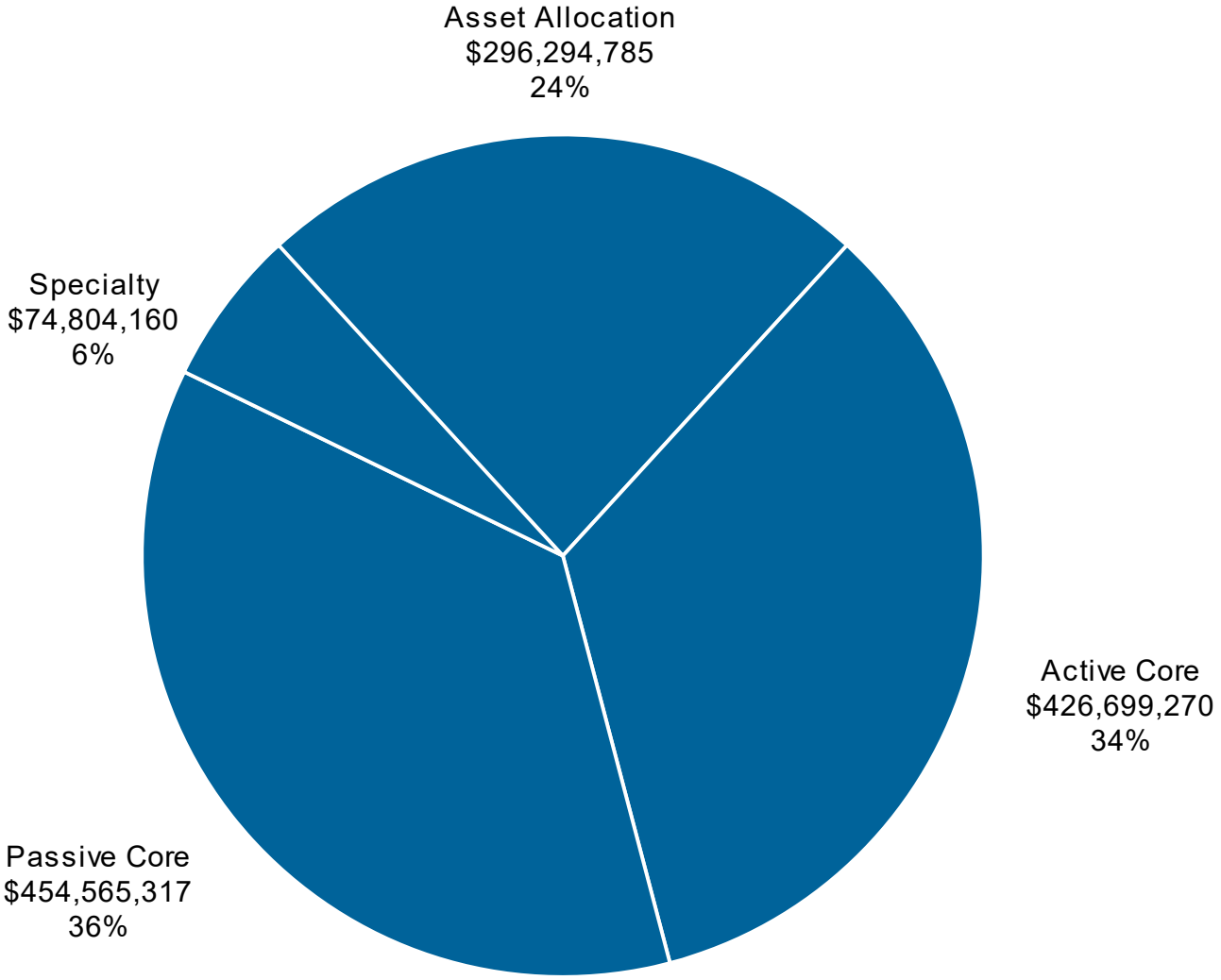
TRS DC Plan: Asset Changes

December 31, 2021



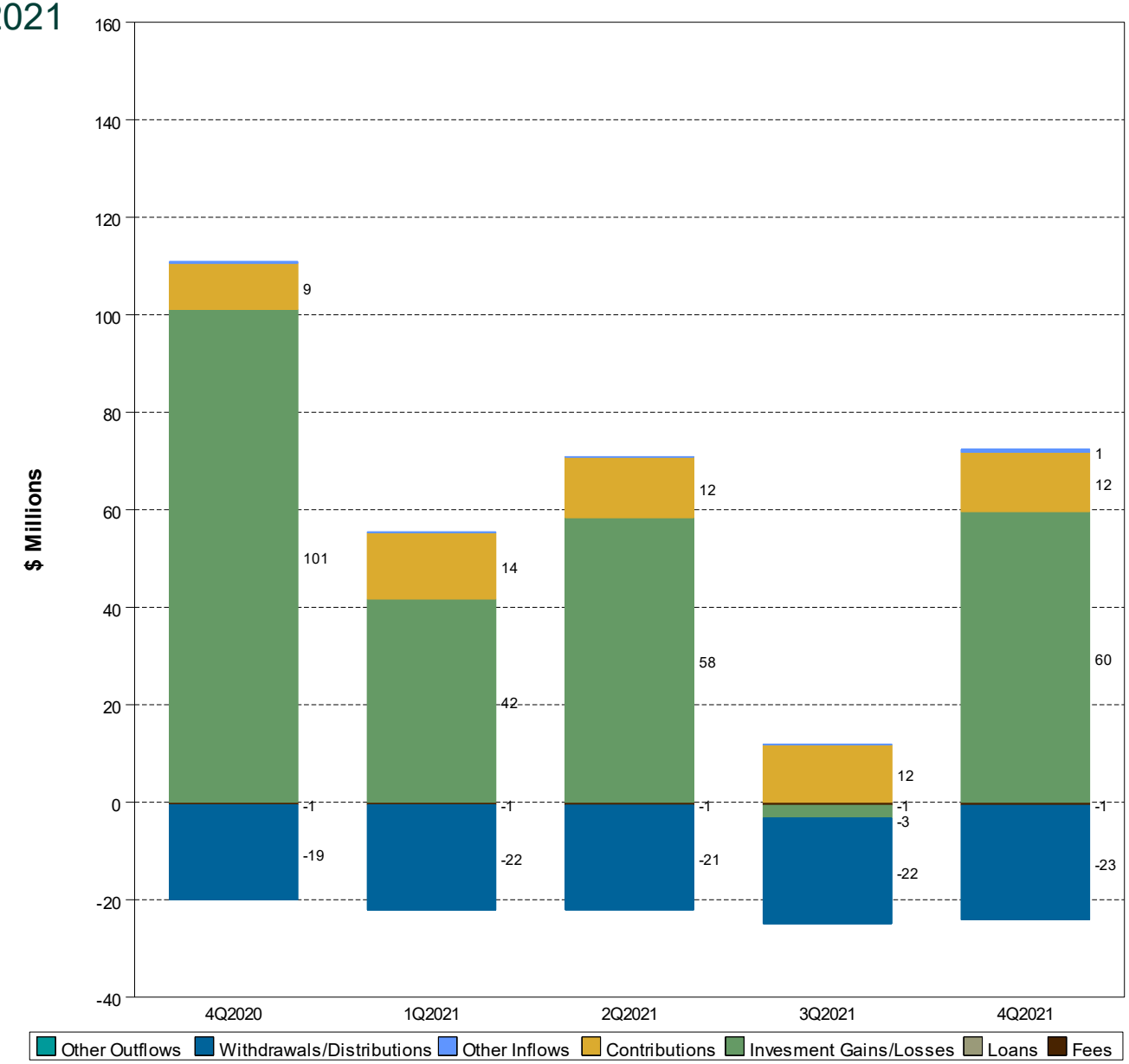
Deferred Comp Plan

December 31, 2021



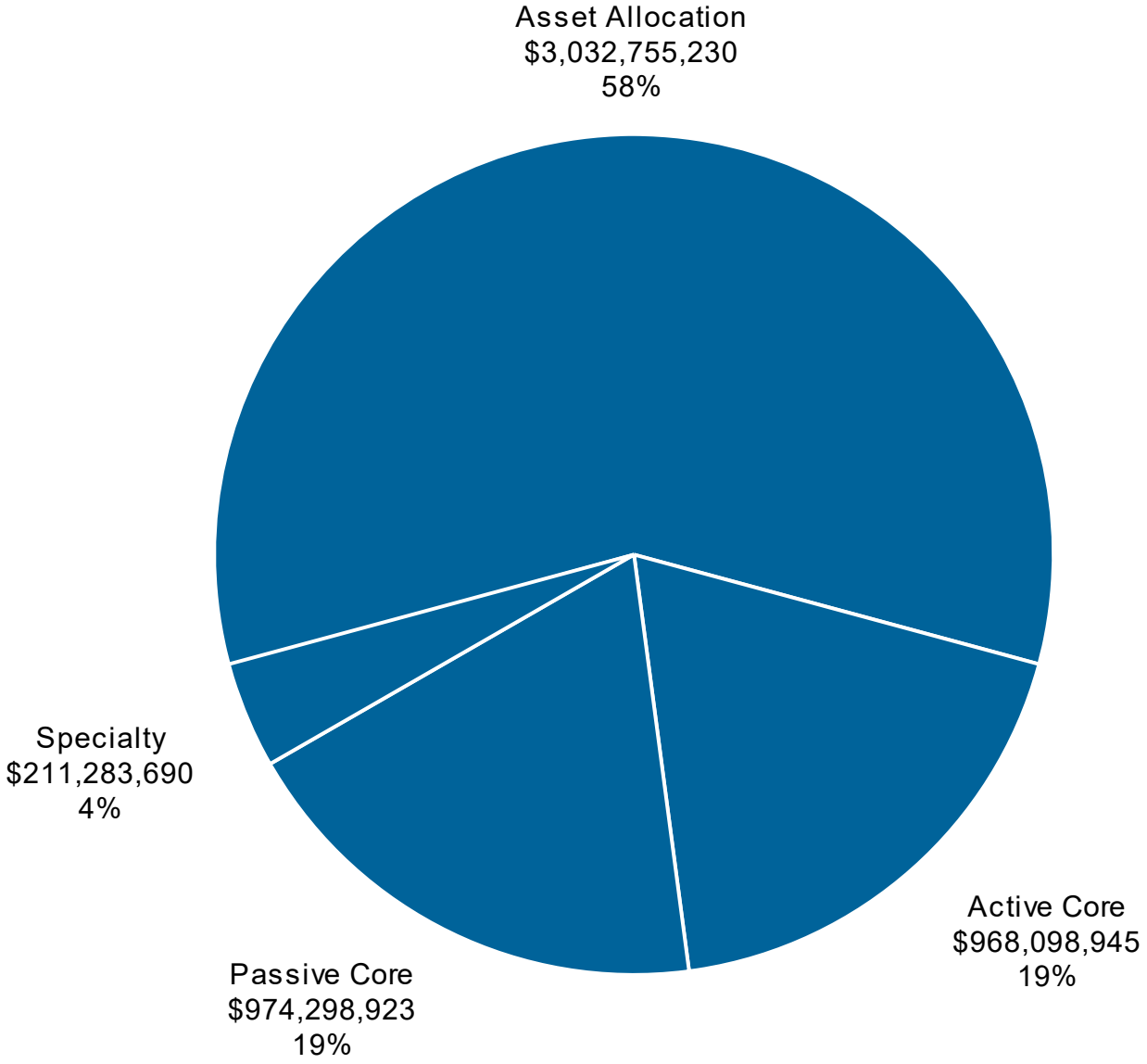
Deferred Comp Plan: Asset Changes

December 31, 2021



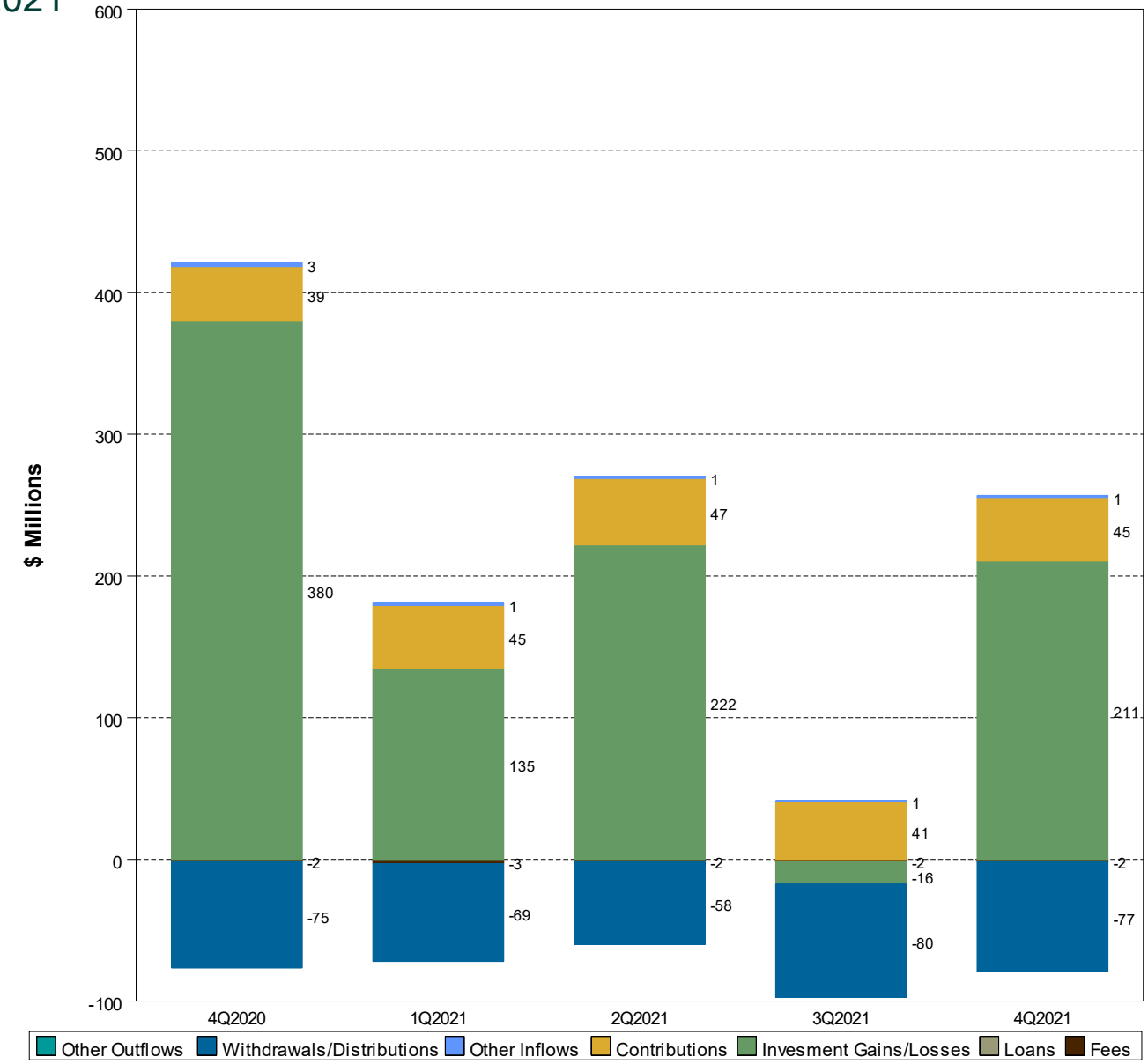
SBS Fund

December 31, 2021



SBS Fund: Asset Changes

December 31, 2021



Individual Account Option Performance: 12/31/21

Balanced & Target Date Funds

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Asset Allocation										
Alaska Balanced Trust	**2.2** 38	**6.1** 48	**10.1** 30	**7.4** 25	**6.0** 22	**6.3** 70		**-0.3** 44	**0.3** 100	**1.0** 7
CAI MA Tgt Alloc Cons MFs										
Passive Target	2.4 27	6.4 43	10.2 29	7.5 21	6.1 21	6.5 67				1.0 7
Alaska Long-Term Balanced	**4.0** 49	**11.1** 54	**14.5** 39	**10.4** 34	**8.4** 32	**10.8** 59		**-0.8** 63	**0.3** 100	**0.9** 27
CAI MA Tgt Alloc Mod MFs										
Passive Target	4.2 44	11.6 51	14.8 36	10.7 31	8.5 30	11.0 57				0.9 27
Target 2010 Trust	**2.5** 40	**7.0** 42	**10.5** 61	**7.8** 43	**6.3** 52	**7.3** 51		**-0.6** 82	**0.3** 99	**0.9** 40
CAI Tgt Date 2010										
Custom Index	2.7 24	7.4 37	10.7 50	7.9 37	6.4 41	7.5 48				0.9 40
Target 2015 Trust	**2.9** 41	**8.3** 38	**11.8** 44	**8.8** 29	**7.2** 32	**8.5** 40		**-0.3** 40	**0.4** 100	**0.9** 33
CAI Tgt Date 2015										
Custom Index	3.1 29	8.6 36	11.9 41	8.9 23	7.2 31	8.7 39				0.9 37
Target 2020 Trust	**3.5** 27	**10.0** 24	**13.6** 20	**10.0** 15	**8.1** 14	**10.2** 24		**-0.4** 25	**0.3** 100	**0.9** 29
CAI Tgt Date 2020										
Custom Index	3.7 25	10.3 17	13.7 16	10.1 14	8.1 13	10.4 23				0.9 30
Target 2025 Trust	**4.2** 15	**11.9** 14	**15.3** 11	**11.2** 8	**9.0** 7	**11.8** 18		**-0.4** 20	**0.3** 100	**0.8** 25
CAI Tgt Date 2025										
Custom Index	4.4 13	12.3 9	15.5 11	11.3 8	9.0 7	12.0 14				0.8 28
Target 2030 Trust	**4.8** 19	**13.6** 15	**16.8** 14	**12.2** 9	**9.8** 8	**13.3** 25		**-0.6** 28	**0.3** 100	**0.8** 17
CAI Tgt Date 2030										
Custom Index	4.9 16	14.0 9	17.0 12	12.3 7	9.8 7	13.4 23				0.8 17
Target 2035 Trust	**5.3** 22	**15.0** 24	**18.2** 21	**13.0** 18	**10.4** 16	**14.5** 41		**-0.5** 31	**0.3** 100	**0.8** 10
CAI Tgt Date 2035										
Custom Index	5.5 15	15.5 15	18.3 18	13.2 15	10.5 14	14.7 39				0.8 10
Target 2040 Trust	**5.8** 27	**16.3** 34	**19.2** 22	**13.7** 16	**11.0** 14	**15.5** 52		**-0.5** 34	**0.3** 100	**0.8** 5
CAI Tgt Date 2040										
Custom Index	5.9 21	16.8 19	19.4 20	13.9 14	11.0 11	15.7 48				0.8 5
Target 2045 Trust	**6.1** 25	**17.4** 37	**20.0** 19	**14.2** 12	**11.3** 10	**16.3** 62		**-0.6** 34	**0.3** 99	**0.8** 7
CAI Tgt Date 2045										
Custom Index	6.2 19	17.8 21	20.2 15	14.4 9	11.4 8	16.4 57				0.8 6

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:

Excess Return Ratio:
- above median
- third quartile
- fourth quartile

Tracking Error:
- below median
- second quartile
- first quartile

Sharpe Ratio:
- above median
- third quartile
- fourth quartile

Individual Account Option Performance: 12/31/21

Balanced & Target Date Funds

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Target 2050 Trust	**6.2** 31	**17.5** 43	**20.1** 21	**14.2** 13	**11.3** 11	**16.3** 75		**-0.6** 40	**0.3** 99	**0.8** 7
CAI Tgt Date 2050 Custom Index	6.3 26	17.9 32	20.2 17	14.4 8	11.4 9	16.4 68				0.8 6
Target 2055 Trust	**6.2** 32	**17.5** 48	**20.1** 31	**14.2** 17	**11.3** 16	**16.3** 79		**-0.6** 48	**0.3** 100	**0.8** 8
CAI Tgt Date 2055 Custom Index	6.3 27	17.9 37	20.2 20	14.4 11	11.4 15	16.4 73				0.8 5
Target 2060 Trust	**6.2** 31	**17.4** 55	**20.0** 40	**14.1** 24		**16.3** 80		**-0.9** 76	**0.3** 100	**0.8** 8
CAI Tgt Date 2060 Custom Index	6.3 30	17.9 37	20.2 26	14.4 12		16.4 73				0.8 6
Target 2065 Trust	**6.2** 30	**17.5** 47								
CAI Tgt Date 2065 Custom Index	6.3 25	17.9 40								
JPMorgan SmartSpending 2015 R6	**2.6** 68									
Callan Target Date 2015 JPMorgan:SR Income MF Idx	2.4 72	6.4 91	10.2 87	7.3 92	6.0 89	7.4 72				0.8 59
JPMorgan SmartSpending 2020 R6	**2.4** 86									
Callan Target Date 2020 JPMorgan:SR 2020 MF Index	2.4 86	6.4 88	10.7 78	8.0 79	6.6 68	8.2 80				0.8 51

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:

Excess Return Ratio:
- above median
- third quartile
- fourth quartile

Tracking Error:
- below median
- second quartile
- first quartile

Sharpe Ratio:
- above median
- third quartile
- fourth quartile

Other Options: 12/31/21

Passive Strategies

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Index Funds										
SSgA S&P 500 Index Fund (i)	**11.0** 8	**28.7** 12	**26.0** 13	**18.5** 12	**14.9** 11	**17.6** 43		**-1.1** 16	**0.0** 81	**1.0** 15
Callan S&P 500 Index MFs										
S&P 500 Index	11.0 8	28.7 6	26.1 6	18.5 6	14.9 6	17.6 30				1.0 8
SSgA Russell 3000 Index Fund (i)	**9.4** 34	**25.7** 45	**25.8** 49	**18.0** 49	**14.5** 47	**18.7** 52		**-0.2** 53	**0.1** 100	**0.9** 53
CAI Mut Fd: Large Cap Broad Style (Net)										
Russell 3000 Index	9.3 37	25.7 47	25.8 49	18.0 49	14.5 47	18.7 51				0.9 53
SSgA World Equity ex-US Index Fund (i)	**2.3** 53	**8.0** 67	**13.4** 61	**9.8** 55	**6.8** 52	**18.4** 63		**0.2** 45	**1.0** 99	**0.5** 53
CAI MF: Non-U.S. Equity Style										
MSCI ACWI x U.S. Index (Net)	1.8 57	7.8 69	13.2 63	9.6 56	6.6 54	18.0 73				0.5 53
BlackRock Passive US Bd Index Fund (i)	**-0.1** 36	**-1.6** 81	**4.7** 95						**0.1** 100	
Callan Core Bond MFs										
Blmbg Aggregate	0.0 14	-1.5 78	4.8 95	3.6 91	3.0 84	3.2 77				0.8 73

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:

Excess Return Ratio:
- above median
- third quartile
- fourth quartile

Tracking Error:
- below median
- second quartile
- first quartile

Sharpe Ratio:
- above median
- third quartile
- fourth quartile

(i) – Indexed scoring method used. Green: manager & index ranking differ by less than +/- 10 percentiles; Yellow: manager and index ranking differ by +/- 20 percentiles; Red: manager & index ranking differ by more than 20 percentiles.

Other Options: 12/31/21

Active Equity, Stable Value, and Money Market

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Active and Other Funds										
BlackRrock Strategic Completion Fd	**4.6** 32	**18.7** 41								
Callan Real Assets MFs										
Strategic Completion Custom Index	4.7 22	19.1 40								
Northern Trust ESG Fund	**12.1** 5	**31.6** 6	**27.0** 42						**0.1** 100	
Callan Lg Cap Broad MF										
MSCI USA ESG	12.1 5	31.7 5	27.3 41	19.2 44	15.0 45	16.8 91				1.1 37
International Equity Fund	**0.7** 73	**8.1** 66	**16.2** 38	**9.7** 56	**5.0** 81	**19.5** 39		**0.0** 56	**2.8** 92	**0.4** 56
CAI Mut Fd: Non-U.S. Equity Style										
MSCI ACWI ex US Index	1.8 57	7.8 69	13.2 63	9.6 56	6.6 54	18.0 73				0.5 53
T. Rowe Price Small Cap	**3.4** 62	**17.1** 50	**25.3** 32	**17.1** 37	**14.3** 34	**22.9** 92		**0.9** 12	**6.7** 85	**0.7** 30
CAI Mut Fd: Sm Cap Broad Style										
Russell 2000 Index	2.1 71	14.8 58	20.0 63	12.0 63	10.8 60	26.6 49				0.4 61
T. Rowe Price Stable Value	**0.5** 5	**1.9** 4	**2.3** 1	**2.4** 1	**2.4** 1	**0.1** 82		**3.4** 5	**0.4** 40	**9.5** 2
Callan Stable Value CT										
FTSE 3 Mo T-Bill	0.0 98	0.0 99	1.0 98	1.1 97	0.8 99	0.5 1				-0.1 97
SSgA Inst Treasury Money Market	**0.0** 98	**0.0** 99	**0.8** 14	**1.0** 9	**0.7** 12	**0.4** 10		**-3.1** 35	**0.0** 95	**-0.3** 9
Callan Money Market Funds										
FTSE 3 Mo T-Bill	0.0 11	0.0 10	1.0 2	1.1 2	0.8 2	0.5 4				-0.1 2

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:

Excess Return Ratio:
- above median
- third quartile
- fourth quartile

Tracking Error:
- below median
- second quartile
- first quartile

Sharpe Ratio:
- above median
- third quartile
- fourth quartile

Callan

Callan Update

Published Research Highlights from 4Q21

A Guide to Reinsurance for Institutional Investors

2021 ESG Survey

2021 Cost of Doing Business Survey

2021 Investment Management Fee Study

Recent Blog Posts

Understanding Return Forecasts for Public DB Plans

Brady O'Connell and John Pirone

Rising Rates! Why the Heck Do We Own Bonds?

Alex Browning and Adam Lozinski

How Investors Should Respond to China's Regulatory Crackdown

Fanglue Zhou

Additional Reading

Private Equity Trends quarterly newsletter
Active vs. Passive quarterly charts
Capital Markets Review quarterly newsletter
Monthly Updates to the Periodic Table
Market Pulse Flipbook quarterly markets update

Callan Institute Events

Upcoming conferences, workshops, and webinars

Callan College

Intro to Investments - Learn the Fundamentals

This course is for institutional investors, including trustees and staff members of public plans, corporate plans, and nonprofits. This session familiarizes trustees and staff with basic investment theory, terminology, and practices.

Join our next VIRTUAL session via Zoom (3 sessions, 2-3 hours each):
March 1-3, 2022

Join our next LIVE session in San Francisco (1½-day session):
July 26-27, 2022

Introductory Workshop for DC Plan Fiduciaries

This one-day workshop centers on the fundamentals of administering a defined contribution (DC) plan. Designed primarily for ERISA fiduciaries and supporting staff members, attendees will gain a better understanding of the key responsibilities of an ERISA fiduciary and best practices for executing those responsibilities.

Join our LIVE session in San Francisco:
March 23, 2022

Mark Your Calendar

2022 National Conference

April 25-27, 2022 – San Francisco

Palace Hotel
2 New Montgomery St., San Francisco, CA 94105

2022 June Regional Workshops

June 7, 2022 – Atlanta

June 9, 2022 – Portland

Watch your email for further details and an invitation.

Webinars & Research Café Sessions

Webinar: DC Survey Results

February 23, 2022 – 9:30am (PT)

Research Café: ESG Interview Series

April 6, 2022 – 9:30am (PT)

Market Intelligence

April 14, 2022 – 9:30am (PT)

Content Calendar – Callan Institute

4Q22 Webinar Topics:

- Market Intelligence
- Regional Workshop Recap
- ESG Survey
- Research Café (TBD)

1Q22 Webinar Topics:

- Capital Markets Assumptions
- Market Intelligence
- DC Trends Survey
- Research Café (TBD)

3Q22 Webinar Topics:

- Market Intelligence
- Research Café (TBD)

2Q22 Webinar Topics:

- Market Intelligence
- Regional Workshop Recap
- Research Café: ESG Interview Series

Callan College | Conference/Workshop | Publication | Webinar | Research Café

Callan Updates

Firm updates by the numbers, as of December 31, 2021

Total Associates: ~200

Ownership

- 100% employees
- 22 new shareholders in 2021—a firm record
- 67% of employees are equity owners
- 55% of shareholders identify as women or minority

Total General and Investment Consultants: more than 55

Total Specialty and Research Consultants: more than 60

Total CFA/CAIA/FRMs: ~55

Total Institutional Investor Clients: more than 400

AUA: more than $3 trillion

Leadership Changes

- Annoesjka West has been promoted to lead the New Jersey investment consulting team
- Jen Gallo has been promoted to chief compliance officer in addition to her role as general counsel
- Tom Shingler has been named ESG team practice leader

"I'm excited about this new opportunity to lead the New Jersey team and continue the success of our office. The last 20 years at Callan have been a tremendous experience for me, and I have no doubt that will continue in my new role."

— Annoesjka West, senior vice president, on being named manager of Callan's New Jersey investment consulting team

Disclaimers

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This report may consist of statements of opinion, which are made as of the date they are expressed and are not statements of fact.

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Past performance is no guarantee of future results.

The statements made herein may include forward-looking statements regarding future results. The forward-looking statements herein: (i) are best estimations consistent with the information available as of the date hereof and (ii) involve known and unknown risks and uncertainties such that actual results may differ materially from these statements. There is no obligation to update or alter any forward-looking statement, whether as a result of new information, future events or otherwise. Undue reliance should not be placed on forward-looking statements.

ALASKA RETIREMENT MANAGEMENT BOARD

Risk Reporting

March 2022

Shane Carson, CAIA, CFA
State Investment Officer

Key Board Decisions

Determine Investment Objective

- Fund's Purpose
- Governance – who makes which decisions?

Determine Asset Allocation

- Strategic
- Tactical

Oversee Implementation

- Manager Structure – number and types of manager allocations.
- Manager Selection

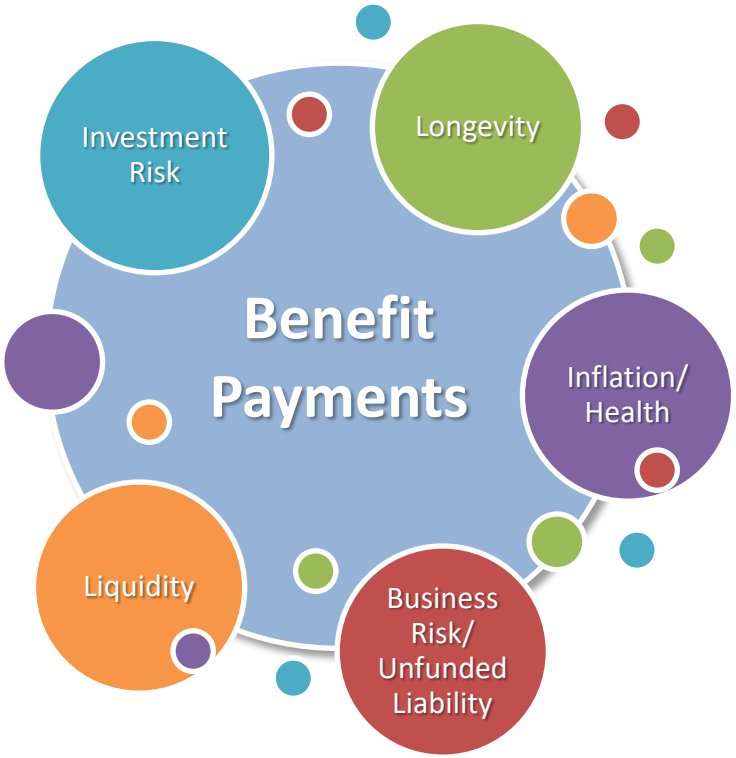
Monitor Results

- Are the fund, asset classes and mandates performing as expected?
- Are they achieving objectives?

Risk and the Retirement System

What does risk mean to the ARMB?

- At the most comprehensive level, risk is anything that could impact the objectives of the retirement systems.
- The defined benefit systems' primary objective is to pay all benefits when they are due.
- Risk encompasses both assets and liabilities.
- Defined benefit systems are designed to be able to take risks – pooling market, longevity, and other risks across time and a broad pool of participants.
- Setting and monitoring investment risks is one of the primary roles of the ARMB.



Risk Monitoring Tool: truView

- The ARMB is using truView for portfolio risk analytics. truView is State Street Global Exchange's risk measurement platform.
- truView analytics are run semi-annual, at month-end in June and December.
- We use truView to help answer the following questions:
  - Is the portfolio risk positioned according to the ARMB's asset allocation?
  - What is the probability and magnitude of potential losses?
  - Is the ARMB taking more or less risk than the strategic benchmark by asset class?
  - Are specific investment mandates or managers adding to or reducing risk?
  - Does the ARMB have unexpected risk exposures or concentration?
  - How would the ARMB's current portfolio perform in historic market events or scenarios?

Volatility Decomposition

- Total portfolio volatility is dominated by public equities at 60%.
- Public and private equities contribute 78% of total volatility.
- Portfolio volatility has increased from 13.1% in June to 13.4% in December but is still within Callan's long-term forecast of 13.9% for ARMB's target asset allocation.

Volatility Decomposition 12/31/2021

	Market Value (Millions)	Allocation (%)	Volatility[1] (% per annum)	Volatility Contribution (% of Total Vol)
Broad Domestic Equity	9,543	27.8%	18.3%	37.6%
Global Equity Ex-US	6,216	18.1%	16.6%	22.1%
Real Assets	4,270	12.4%	14.2%	11.4%
Broad Fixed Income	7,134	20.8%	3.4%	3.4%
Private Equity	5,139	15.0%	16.9%	18.7%
Opportunistic	2,049	6.0%	15.4%	6.8%
TOTAL	**34,350**	**100.0%**	**13.4%**	**100.0%**

Volatility Decomposition 6/30/2021

	Market Value (Millions)	Allocation (%)	Volatility[1] (% per annum)	Volatility Contribution (% of Total Vol)
Broad Domestic Equity	9,298	27.9%	17.9%	37.4%
Global Equity Ex-US	6,132	18.4%	16.6%	22.9%
Real Assets	4,128	12.4%	14.7%	11.6%
Broad Fixed Income	7,192	21.6%	3.3%	3.7%
Private Equity	4,562	13.7%	16.6%	17.2%
Opportunistic	1,977	5.9%	16.0%	7.2%
TOTAL	**33,290**	**100.0%**	**13.1%**	**100.0%**

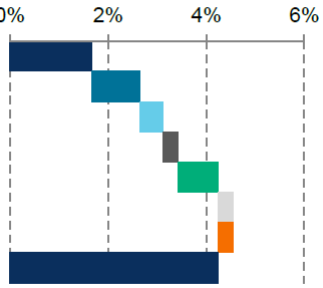
Volatility at the asset class level is calculated using parametric Value-at-Risk at 84th percentile, expressed as a percentage of the market value of each asset class.

Asset Class Risk & Diversification

- The monthly value-at-risk is 4.3%.
- Broad Domestic Equity and Global Equity ex-US contributed 52% of VaR.
- VaR increased from June's report by approximately 0.7%
- The value-at-risk increase from June's report was mainly driven by a decrease in the Diversification Benefit.

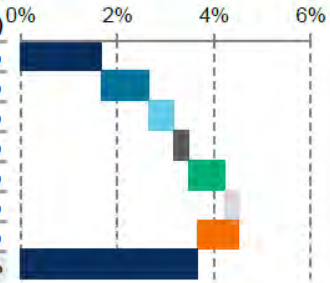
Asset Class Risk & Diversification 12/31/2021

	Allocation (%)	Value-at-Risk[1] Contribution (% of Total VaR)	Value-at-Risk[1] (% of Total MV)
Broad Domestic Equity	27.8%	28.9%	1.7%
Global Equity Ex-US	18.1%	23.3%	1.0%
Real Assets	12.4%	14.7%	0.5%
Broad Fixed Income	20.8%	7.8%	0.3%
Private Equity	15.0%	18.2%	0.8%
Opportunistic	6.0%	7.1%	0.3%
Diversification Benefit	-	-	-0.3%
TOTAL	**100.0%**	**100.0%**	**4.3%**



Asset Class Risk & Diversification 6/30/2021

	Allocation (%)	Value-at-Risk[1] Contribution (% of Total VaR)	Value-at-Risk[1] (% of Total MV)
Broad Domestic Equity	27.9%	32.8%	1.7%
Global Equity Ex-US	18.4%	22.1%	1.0%
Real Assets	12.4%	12.0%	0.5%
Broad Fixed Income	21.6%	7.8%	0.3%
Private Equity	13.7%	19.1%	0.7%
Opportunistic	5.9%	6.2%	0.3%
Diversification Benefit	-	-	-0.8%
TOTAL	**100.0%**	**100.0%**	**3.6%**



Equity Beta

- Equity betas are within expectations for 12/31/2021.
- ARMB's Domestic and Global ex-US portfolios should closely parallel their respective benchmarks.
- Slight increase in total equity beta in the 12/31/2021 report.

Total Equity
State of Alaska

Sub Asset Class Beta Analysis

Asset Class / [Benchmark]	Market Value (Millions)	Allocation (%)	Beta[1] 1Y to the Benchmark	Beta[1] 5Y to the Benchmark
Broad Domestic Equity / [Russell 3000]	**9,543**	**60.6%**	**0.98**	**1.02**
Large Cap Pool (AYQK)	8,780	55.7%	0.99	1.00
Small Cap Pool (AYQC)	763	4.8%	0.81	1.27
Global Equity Ex-Us / [MSCI ACWI Ex US IMI]	**6,216**	**39.4%**	**0.84**	**0.98**
Emerging Markets Pool (AYSC)	1,079	6.8%	0.74	0.93
IE Large Cap Pool (AYRC)	5,136	32.6%	0.86	0.99
TOTAL Equity / [MSCI ACWI]	**15,759**	**100.0%**	**1.00**	**1.05**

1. Beta is the regression coefficient generated by a linear regression of the percent return time series of position on an explanatory time series. This explanatory time series is often composed of the returns from a broader market index, the Benchmarks of each of the Equity Asset Classes.

International Equity Country Exposure

- For Fiscal Year 2022, the target allocation to International Equities is 18% of the total ARMB portfolio
- The International Equity asset class invests in a diversified market basket across more than 60 countries
- In aggregate, asset class level active country weights exist due to active management and factor exposures but are generally not concentrated and track reasonably close to the benchmark

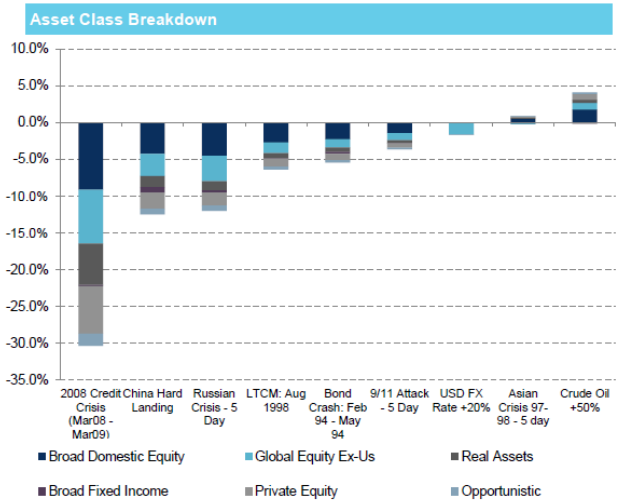
Country	International Portfolio	Benchmark	Difference
Japan	16.1%	14.8%	1.4%
United Kingdom	10.3%	9.4%	1.0%
China	7.6%	7.8%	-0.2%
France	7.4%	6.4%	1.0%
Germany	5.6%	5.3%	0.3%
Canada	5.2%	7.5%	-2.3%
Switzerland	4.7%	6.3%	-1.5%
Taiwan	4.3%	4.8%	-0.4%
Netherlands	3.7%	2.9%	0.8%
India	3.5%	4.0%	-0.5%
South Korea	3.4%	3.5%	-0.1%
Australia	3.1%	4.6%	-1.4%
Hong Kong	2.7%	2.3%	0.4%
Sweden	2.6%	2.5%	0.1%
Brazil	2.2%	1.4%	0.9%

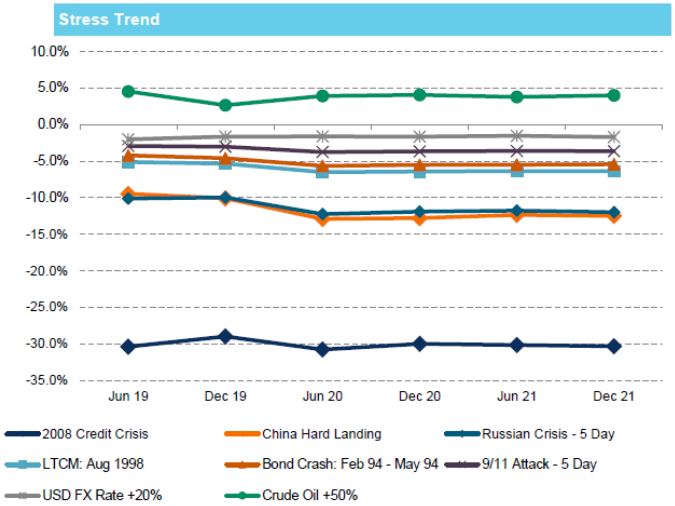
Country	International Portfolio	Benchmark	Difference
Italy	1.9%	1.4%	0.4%
Spain	1.6%	1.5%	0.2%
Denmark	1.6%	1.5%	0.1%
Russia	1.5%	0.8%	0.7%
Mexico	0.9%	0.0%	0.9%
Finland	0.9%	0.6%	0.3%
South Africa	0.8%	0.8%	0.0%
Singapore	0.8%	1.0%	-0.2%
Saudi Arabia	0.8%	0.9%	-0.1%
Belgium	0.6%	1.0%	-0.4%
Norway	0.6%	0.6%	0.0%
Ireland	0.6%	0.6%	0.0%
Israel	0.5%	0.7%	-0.2%
Thailand	0.4%	0.7%	-0.3%
Less than 0.4% weight	3.8%	3.9%	-0.1%

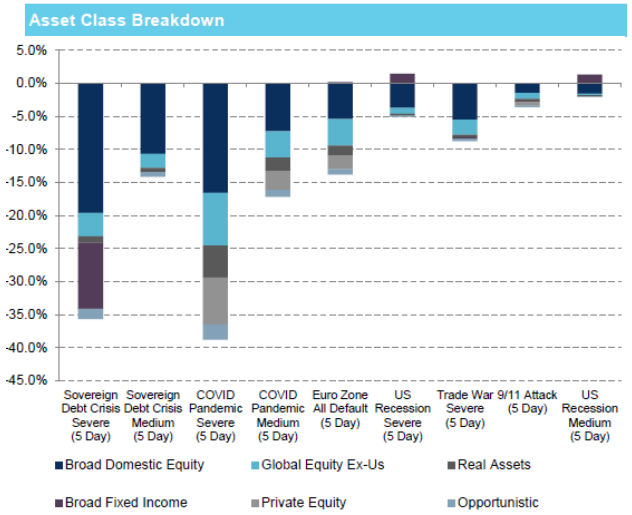
ARMB Global ex-US benchmark is MSCI ACWI ex-US IMI
Data as of 1/31/2022
Source: Custody and Bloomberg holdings and benchmark weights

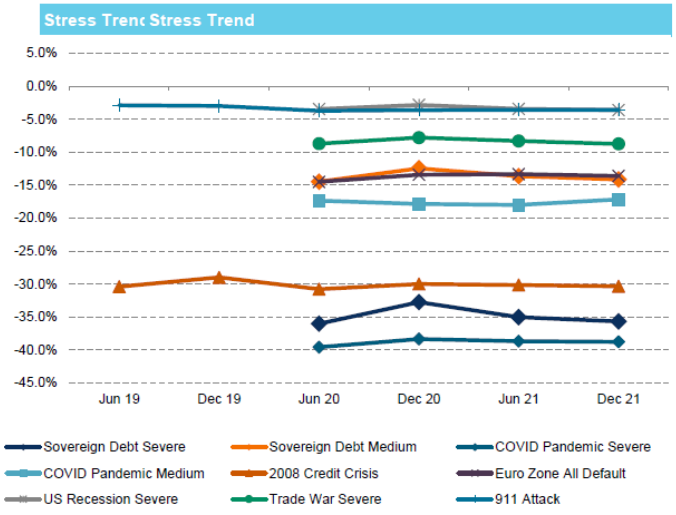
Stress Tests

- Stress tests reveal no significant change in expected outcomes.







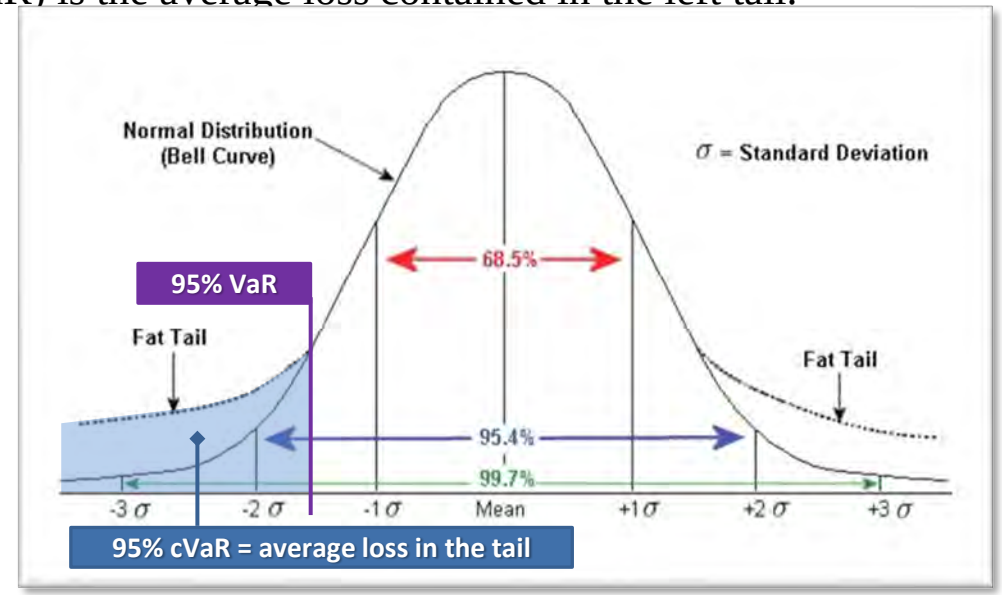


Summary

- Risk metrics are within expectations.
- Public equity allocation is the largest driver of portfolio volatility and value-at-risk as expected.
  - Overall portfolio volatility increased from the June report and is approaching long-term risk expectations.
- truView models several historical and predictive scenarios.
  - ARMB's portfolio sensitivity to the stress tests has been little changed over time indicating there are no sudden or unexpected exposures to assets that are sensitive to the scenarios provided.

What is Value-at-Risk?

- Value-at-risk (VaR)
  - A commonly used measure of potential loss.
  - VaR represents a return threshold over a given time horizon whereby worse outcomes are only expected with some small and specific probability.
  - VaR can be estimated parametrically using the mean and standard deviation, but this ignores fat tails (kurtosis, skewness).
  - VaR also can be estimated using historic market information, which includes past fat tails – this is the approach truView takes.
- Expected shortfall (conditional VaR or cVaR) is the average loss contained in the left tail.
- Why are VaR and cVaR important?
  - They quantify the risk of loss for the portfolio.
  - Differences between historical and parametric-based VaR calculations suggest impact of fat tails.



ALASKA RETIREMENT MANAGEMENT BOARD

Internally Managed Fixed Income

March 2022

Victor Djajalie, CFA
Director of Internal Fixed Income

Key Board Decisions

Determine Investment Objective

- Fund's Purpose
- Governance – who makes which decisions?

Determine Asset Allocation

- Strategic
- Tactical

Oversee Implementation

- Manager Structure – number and types of manager allocations.
- Manager Selection

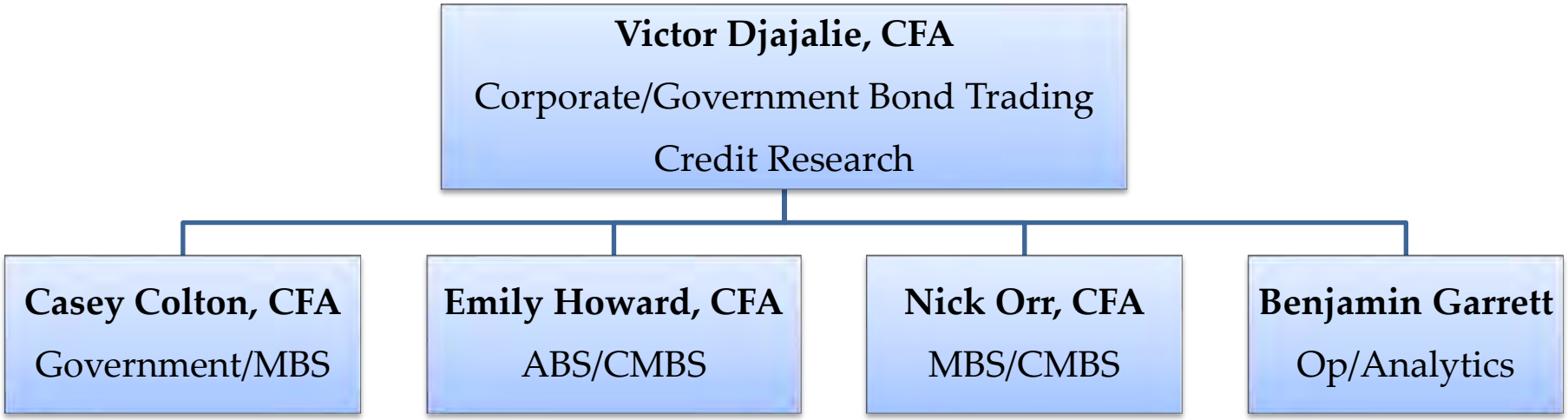
Monitor Results

- Are the fund, asset classes and mandates performing as expected?
- Are they achieving objectives?

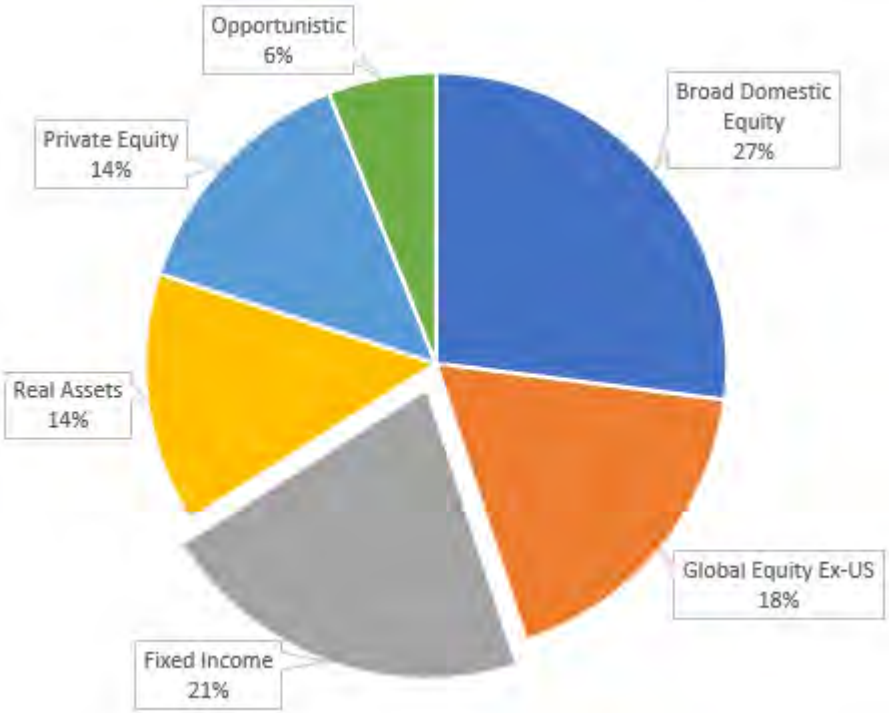
Presentation Agenda

- Fixed Income Market Outlook
- Internal Fixed Income Process
  - Portfolio Positioning
  - Portfolio Performance

Fixed Income Investment Team



ARMB Target Asset Allocation
Fiscal Year 2022



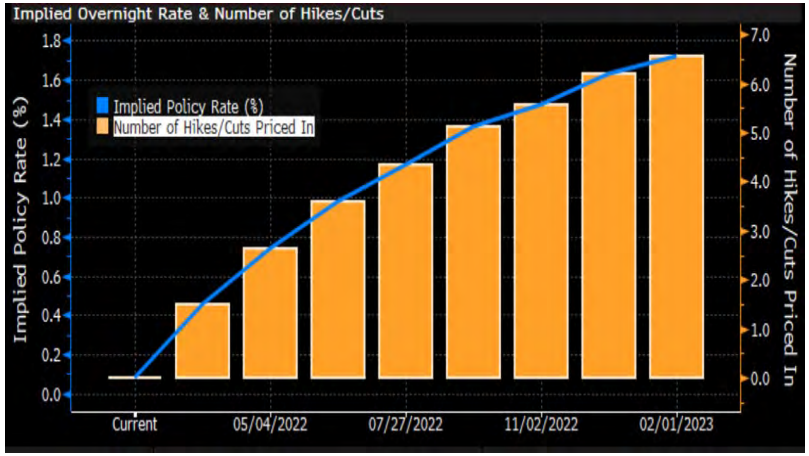
Fixed Income Market Outlook

10 Year US Treasury Yields

Source: Bloomberg

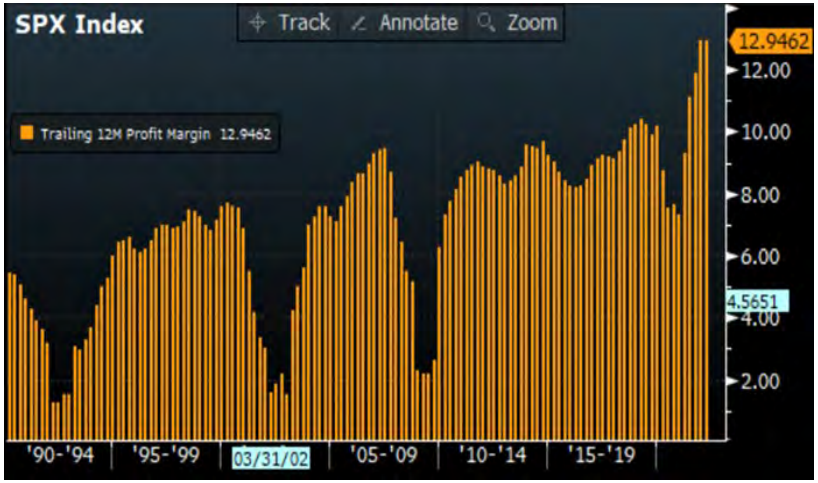
- US treasury rates remained low by historical standard despite recent selloffs spurred by Fed tapering announcement and expectation of Fed hikes.
- Rates have been volatile and tend to be influenced by pandemic headlines, Fed announcement, and concern over Russian invasion on Ukraine.

Inflation and Fed



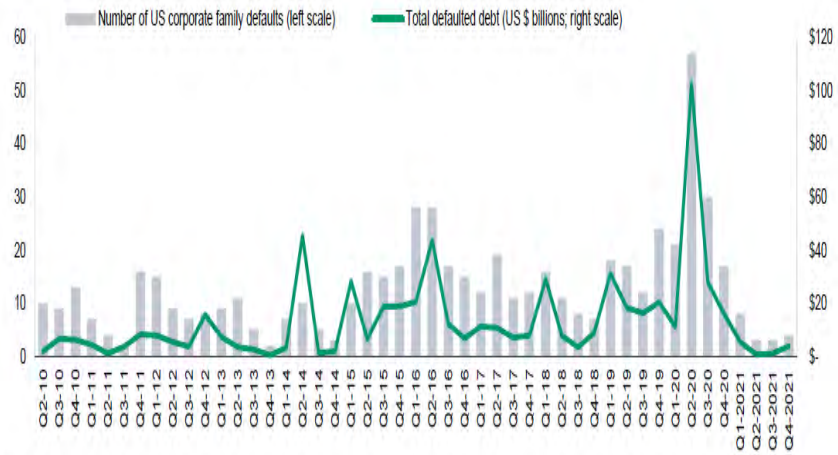
- Inflation has been spurred by material shortages, tight labor conditions, global shipping and supply-chain issues. Core PCE reached as high as 4.9% as of December 2021, exceeding Fed's 2% target.
- Fed has turned hawkish with their announcement of tapering and markets pricing in multiple hikes in the near future.

Profitability And Leverage

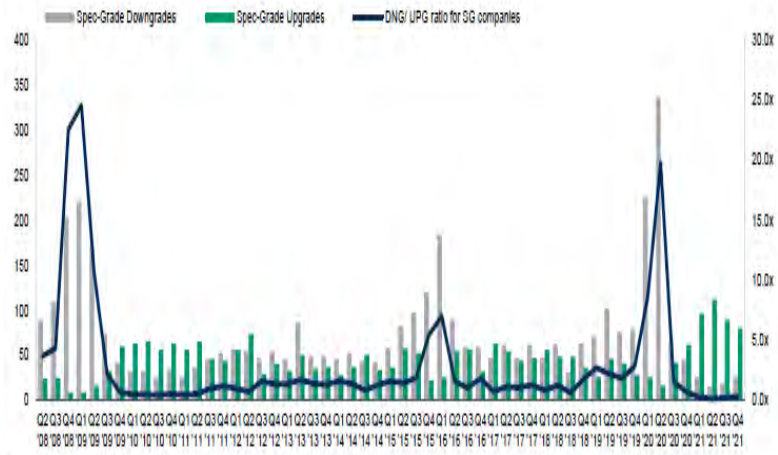


- Company fundamentals remained robust, supported by strong profit margin and healthy balance sheets.
- Gross leverage as measured by Total Debt to EBITDA has improved significantly as companies bolstered their cash reserves during the pandemic period.

Corporate Fundamentals



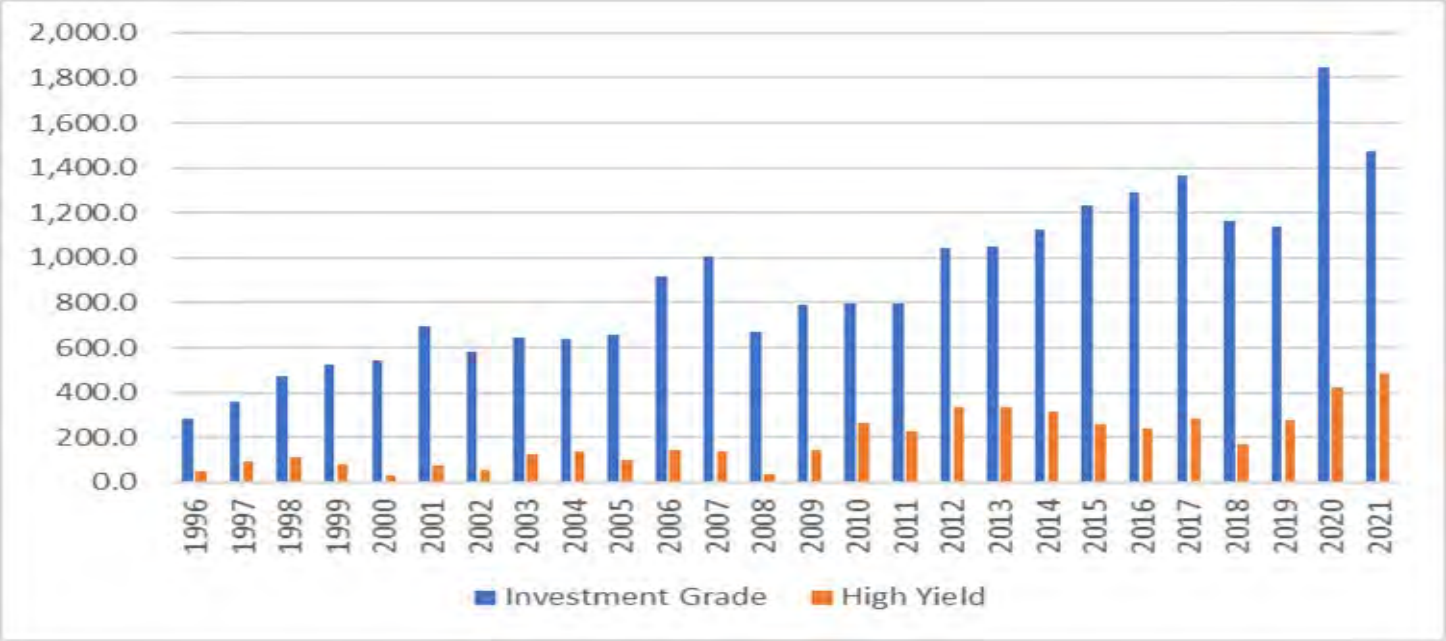
Source: Moody's Investors Service



Source: Moody's Investors Service

- Defaults inched higher in the most recent quarter but remained at seven year low with a total of four defaults in Q4.
- Default rate, however, is expected to modestly rise as strong growth and earnings gradually normalize.
- Upgrades continue to outpace downgrades.

Corporate Bond Net Issuance



Source: Sifma

- Corporate Investment Grade and High Yield bond issuance remained strong and well supported as investors continue to search for yield in the low interest rate environment.

Investment Grade Corporate Spreads

Source: Bloomberg

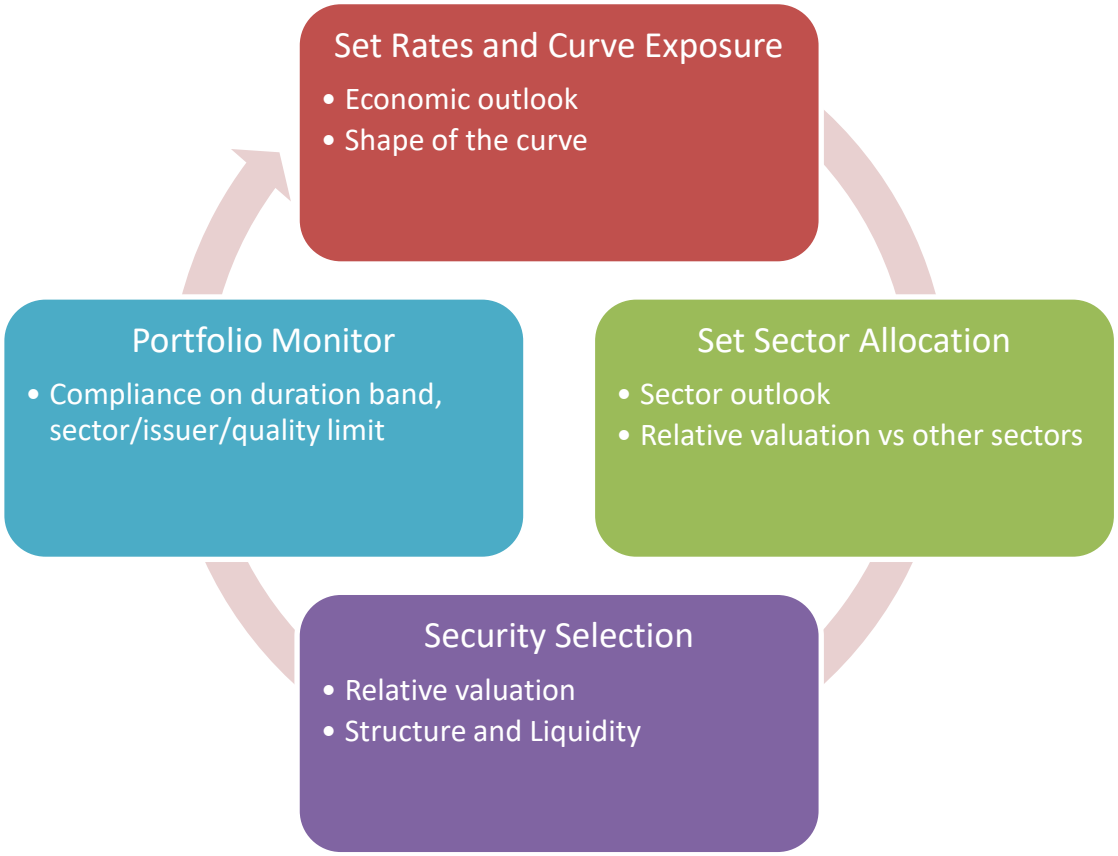
- Strong investor demand, coupled with improving fundamentals continue to support Investment Grade spreads despite recent hawkish Fed and waning secondary liquidity.

Internal Fixed Income Process

Investment Objectives

- Generate excess return relative to the index over time.
- Provide liquidity as required.
- Serve as a diversifier to reduce risk as part of asset allocation.

Fixed Income Investment Process



Investment Approach

- Identify a broad range of potential movements in the yield curve from one to three months into the future.
- Position portfolios to attempt to outperform modestly over a broad range of scenarios.
- Manage trading costs and give liquidity sparingly.
- Seek yield in non-Treasury holdings:
  - Position portfolio in higher conviction securities.
  - Diversify positions.

Risks to Investment Approach

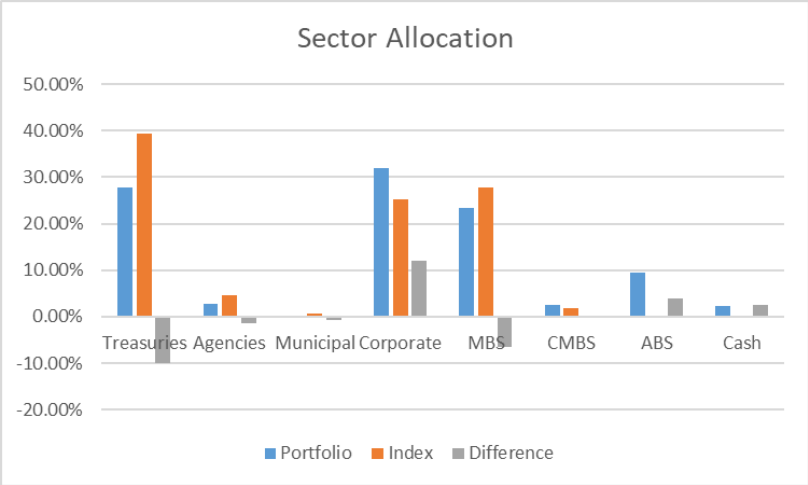
- Future yield curve changes and the implied volatility of interest rates may be different than what we forecast.
- Changes in risk tolerance in the market are not explicitly incorporated, so this could detract from performance.
- Idiosyncratic, bond-specific, credit and structural risk are also present.

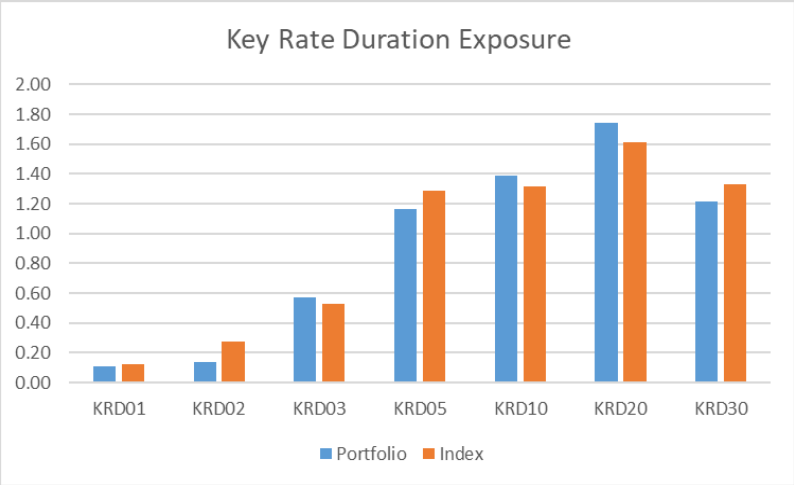
Dependence on Technology and Generalizations

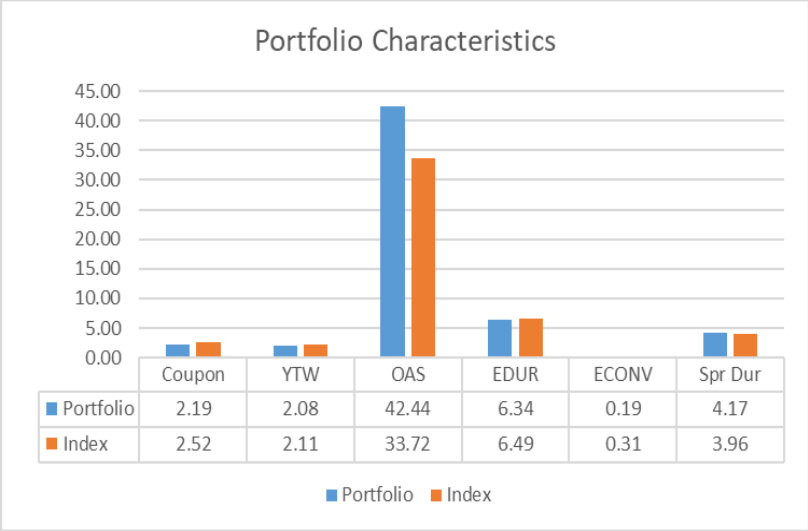
Bloomberg Aggregate Index	ARMB Fixed Income
• Market value: $25.8tn • 12,300+ securities • Treasuries, agencies, MBS, Corporates, CMBS, ABS • Maturity: 1 to 100 years • 900+ issuers	• Market value: $5.1bn • 850+ securities • Treasuries, agencies, MBS, Corporates, CMBS, ABS • Maturity: 0 (cash) to 38 years • 200+ issuers

- Managing and constructing fixed income portfolios is a complex task as it involves working with a large number of securities with different characteristics.
- Sophisticated analytic tools such as YieldBook and Bloomberg are utilized to map general characteristics of the index and portfolio.
- Active exposures are then created in an attempt to generate excess return relative to the index.

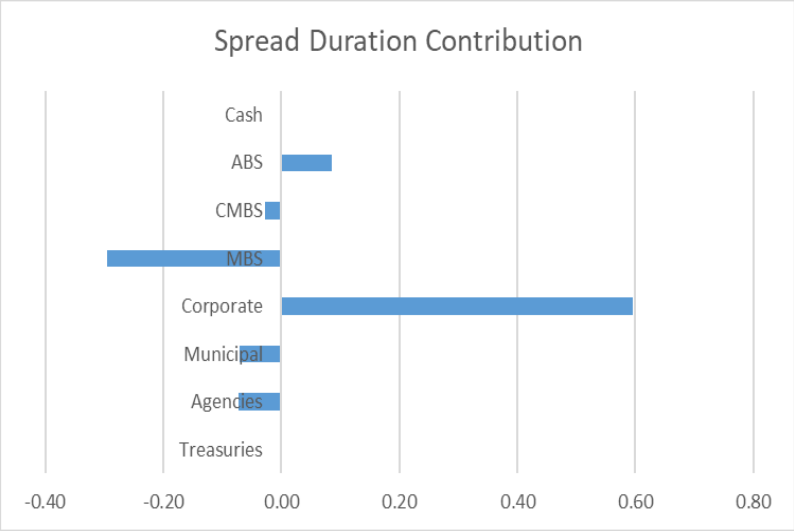
ARMB Fixed Income Dashboard
Jan 31, 2022



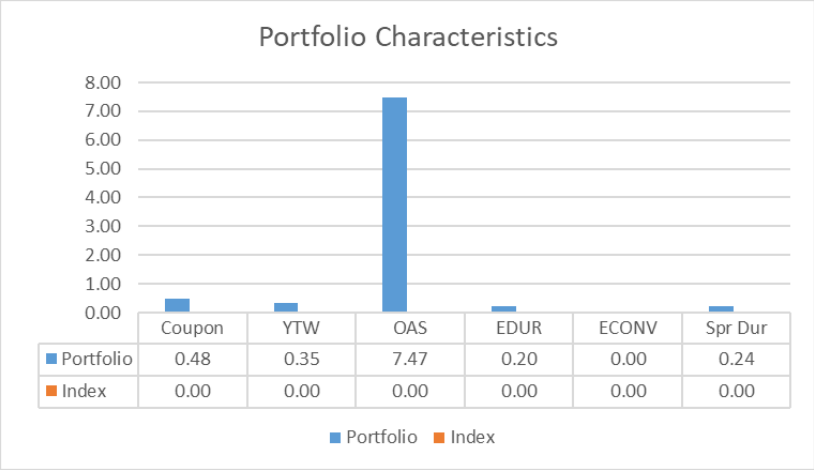




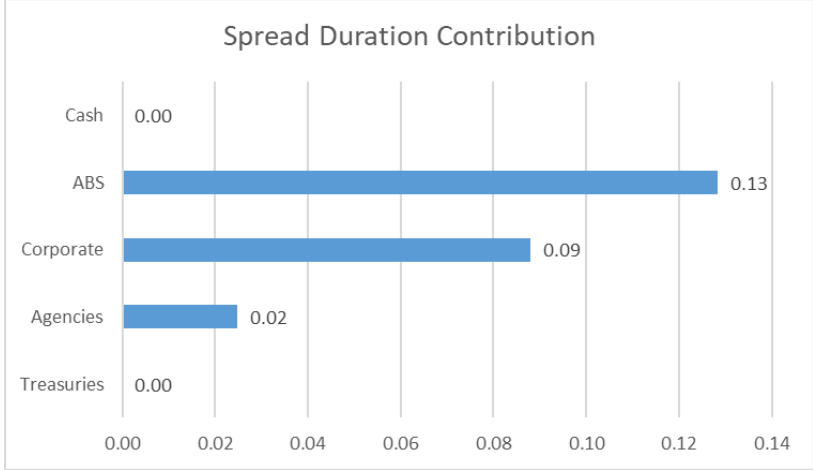
	Coupon	YTW	OAS	EDUR	ECONV	Spr Dur
Portfolio	2.19	2.08	42.44	6.34	0.19	4.17
Index	2.52	2.11	33.72	6.49	0.31	3.96

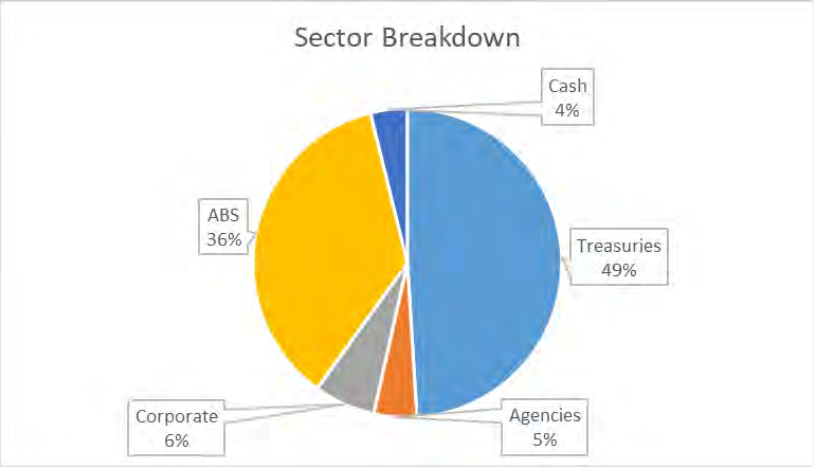


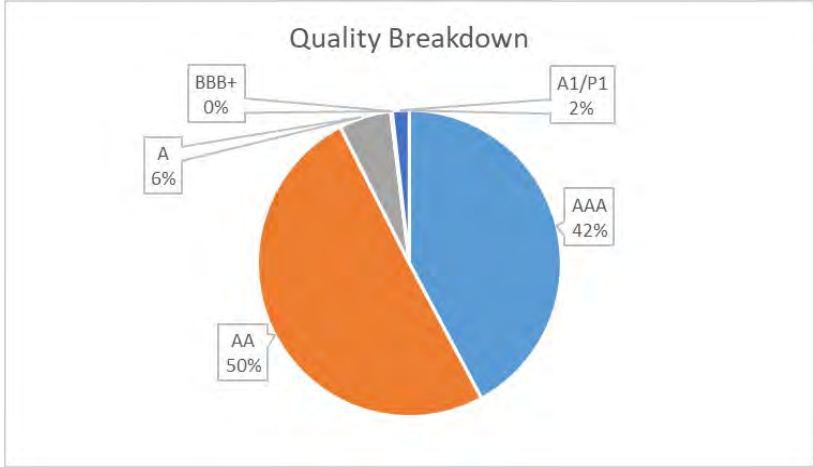
Short-term Pool Dashboard
Jan 31, 2022



	Coupon	YTW	OAS	EDUR	ECONV	Spr Dur
Portfolio	0.48	0.35	7.47	0.20	0.00	0.24
Index	0.00	0.00	0.00	0.00	0.00	0.00







Performance

As of Jan 31, 2022	3month	1 Year	3 Year	5 Year	10 Year
Short-term Fixed Income (AY70)	0.00%	0.07%	1.03%	1.29%	0.84%
3M T-Bill	0.01%	0.04%	0.93%	1.13%	0.63%
	-0.01%	*0.03%*	*0.10%*	*0.16%*	*0.21%*

As of Jan 31, 2022	3month	1 Year	Since Inception (Sep 2019)
ARMB Fixed Income (AY77)	-2.12%	-3.03%	1.78%
Bloomberg Aggregate Index	-2.12%	-2.97%	1.31%
	0.00%	*-0.06%*	*0.47%*

Summary

- Fixed Income Market Outlook
  - US Treasury yields are likely to remain low for the foreseeable future
  - Investment grade spreads are likely to remain tight

- Internal Fixed Income Process
  - Portfolio Positioning
  - Portfolio Performance

Alaska Retirement Management Board

Short-Term Fixed Income
AY70

March 2022

Emily Howard, CFA
State Investment Officer

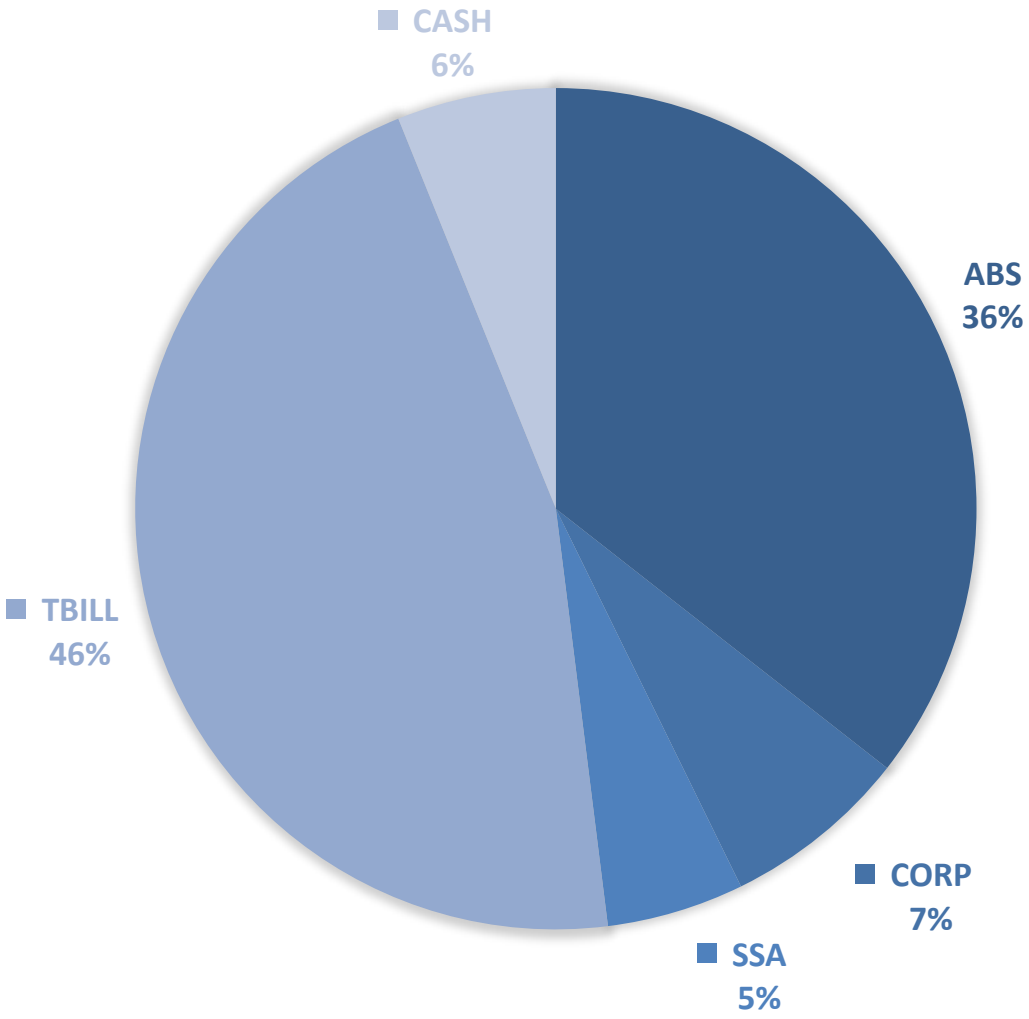
Investment Objectives

- AY70 is the Short-Term Fixed Income investment pool
- $4.006bn assets under management as of 12/31/21
- AY70 is the only pool that invests funds on behalf of both Treasury and ARMB accounts
- Investment Objectives:
  1) Earn the highest possible return
  2) Meet significant liquidity requirements
  3) Take very low principal risk
- Benchmark: 3-Month U.S. Treasury Bill
- All Short-Term investment requirements are met through AY70. For example:
  - Funds just received from or awaiting disbursement to eligible ARMB beneficiaries
  - Investment cash held by participating manager accounts
  - State government obligations including payroll, school funding, vendor payables

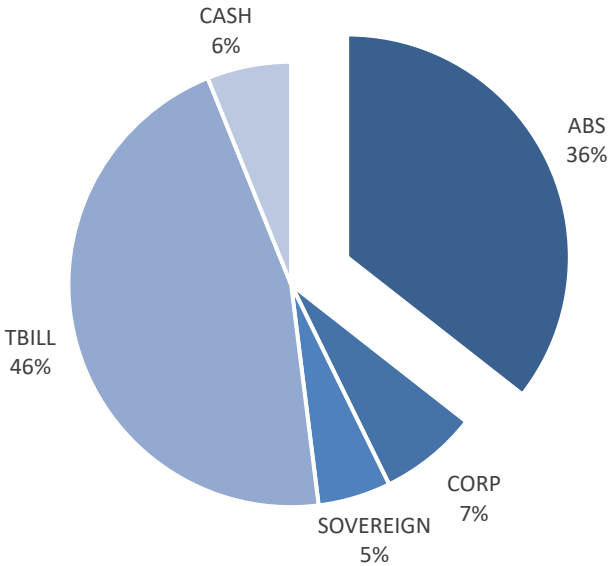
Sector Exposure as of 12/31/21; AUM $4.006bn

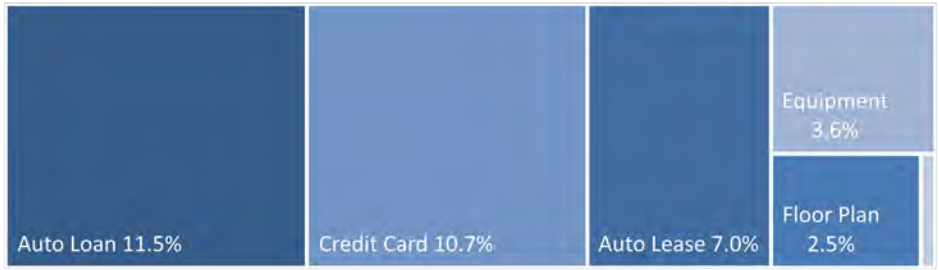
•To ensure adequate liquidity, AY70 owns Treasury Bills and Overnight Repurchase Agreements (Cash)

•To achieve the highest possible return, AY70 owns spread product including ABS, Corporate and Suprasovereign bonds, in place of Tbills

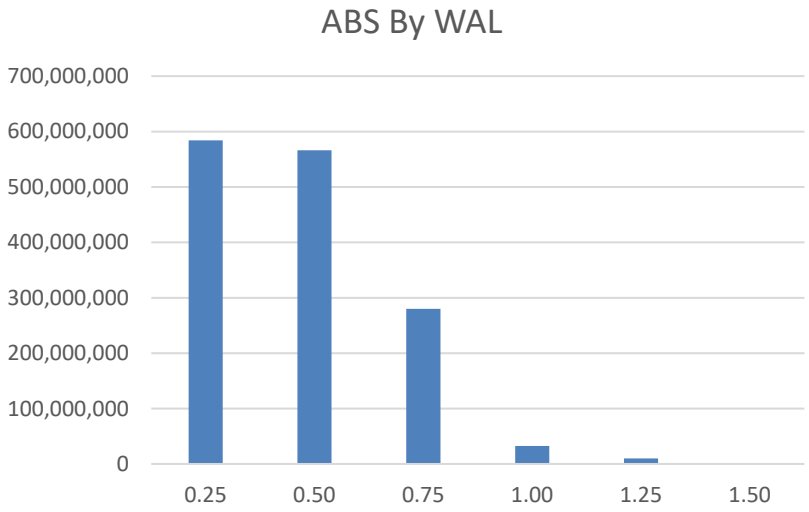


ABS Exposure in AY70 as of 12/31/21





- <1.17/3yr Weighted Average Life (fixed/floating)
- AAA by two ratings agencies
- Public or Private Issuance

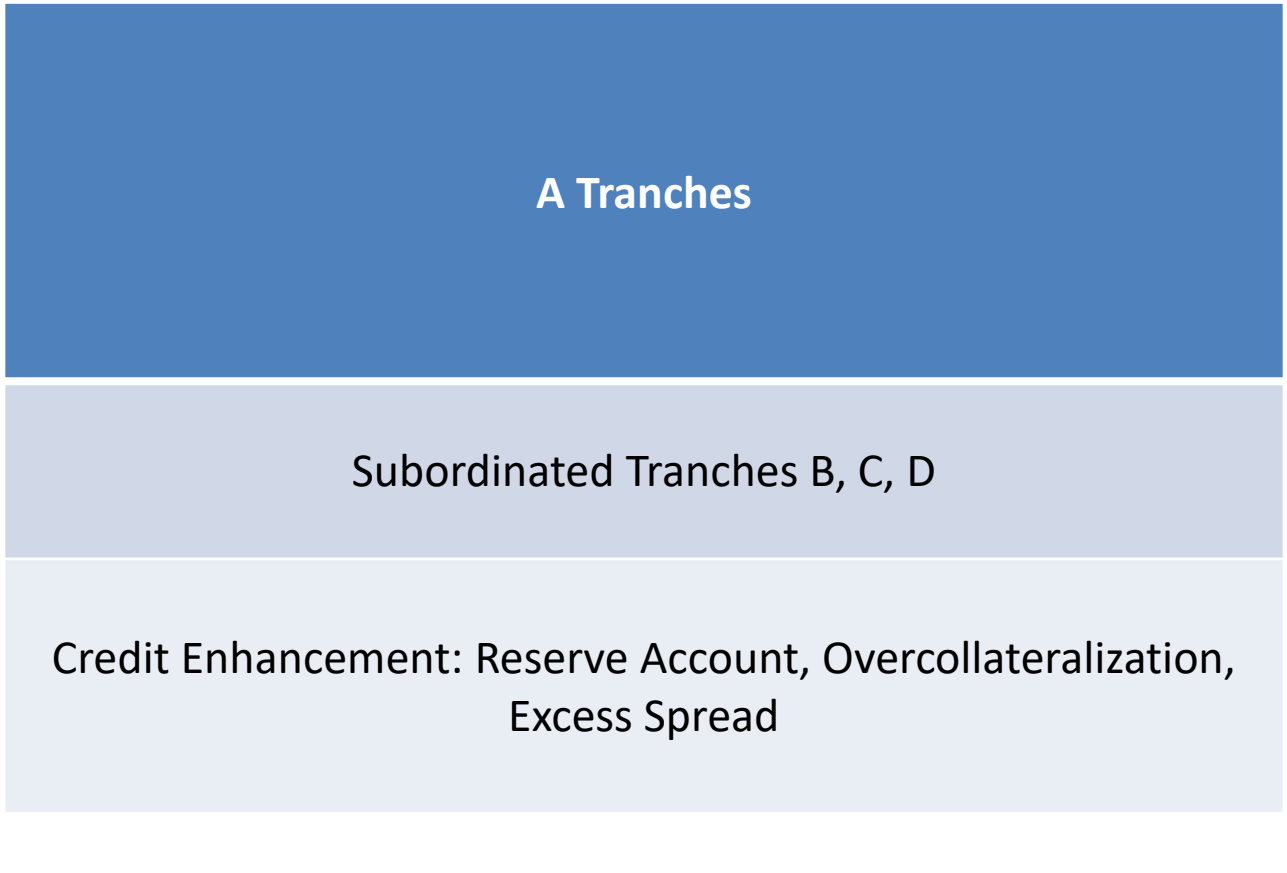


Asset Backed Securities

- Opportunity for Increased Yield → Higher Returns
  - As of 12/31,Yield to Call of AY70's ABS holdings ~.232% vs 3mo tbill ~.039%
- Robust Principal Protection → AAA ratings due to Credit Enhancement
- Good liquidity in normal market conditions, less liquidity in market stress
- Risks:
  - Collateral may decrease in value
  - Timing of Cashflows is uncertain, can be either faster or slower than expected
  - Credit quality of sponsor
  - Liquidity

ABS Structure – Low Principal Risk

Principal Payments



Principal Losses

Auto Loan: General Structure

Principal Payments

Source: Prospectus

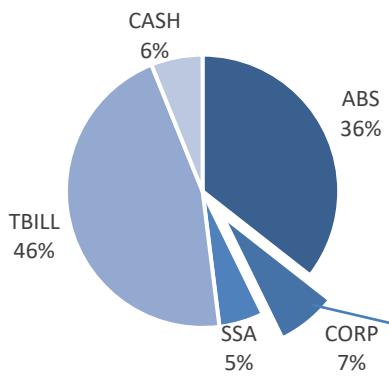
CARMX 2020-2	Size	Rating (S&P/Fitch)	% of Initial Principal Balance
A-1	223,000	A-1+/F1+	19.27%
A2-A	258,385	AAA/AAA	22.33%
A2-B Floating	65,000	AAA/AAA	5.62%
A-3	388,134	AAA/AAA	33.55%
A-4	106,731	AAA/AAA	9.23%
B	37,600	AA/AA	3.25%
C	31,820	A/A	2.75%
D	39,330	BBB/BBB	3.40%
Overcollateralization	6,942		0.60%
Aggregate Principal Balance	**1,156,942**		100%
Reserve Account	11,569		1.00%
Excess Spread			~ 3.86% per annum

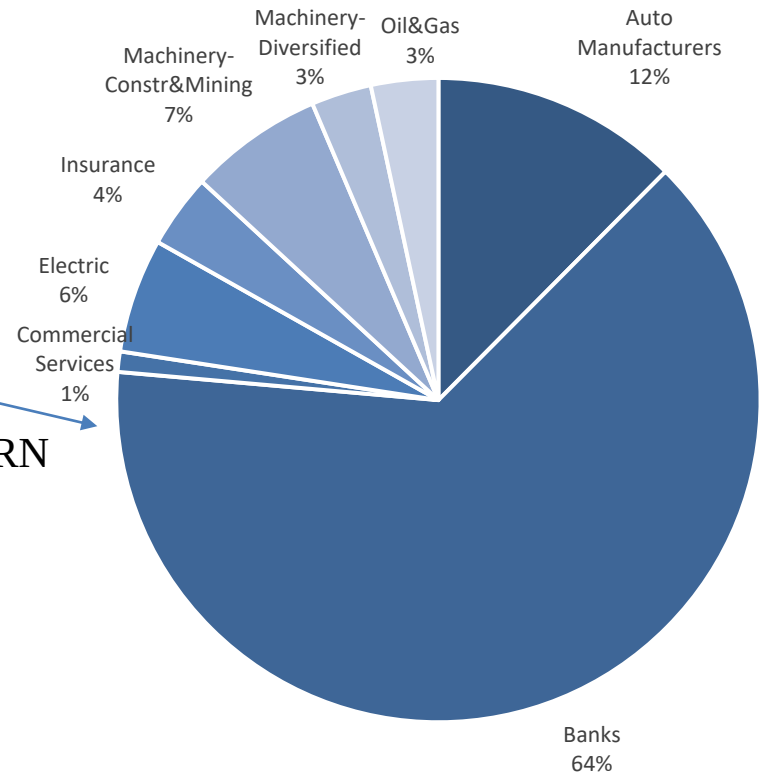
CE = 11.0%

Losses

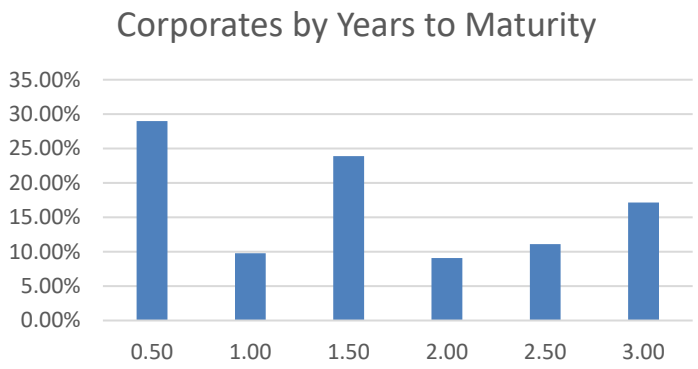
- Bonds are backed by the principal balance on a pool of auto loans
- Subordinated Tranches → Lower Credit Enhancement→ Lower Ratings
- Hard Credit Enhancement for A tranches is 11.0%
- Rating Agency Loss Expectations: S&P = 2.90% ; Fitch = 2.80%

Corporate Exposure in AY70 as of 12/31/21





- Limit: <14 months/3yr to maturity for Fixed/FRN
  - ~92% floating as of 12/31/21
- Credit Rating: Long Term at least "A3", Short Term at least "P1" or equivalent
- Concentration limits: if the corporate bond is rated AAA, it may be no more than 1% of the portfolio. Lower ratings have lower concentration limits.
- Risks:
  - Credit Downgrade
  - Spread widening
  - Liquidity

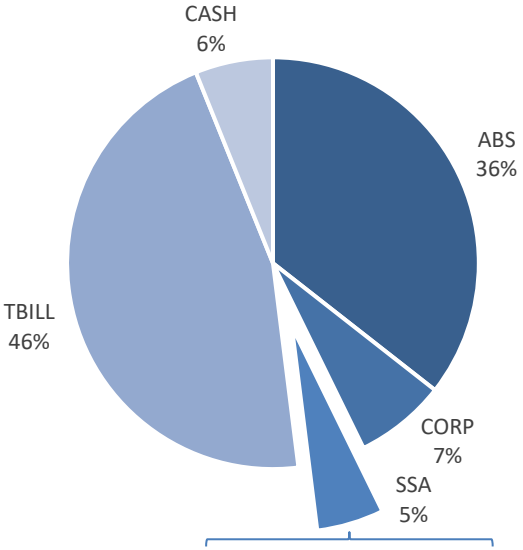


Suprasovereigns (SSA)

- International Development Banks
  - AAA Rated
  - Capital is provided by regional and non-regional member countries
    - Regional members are those in the geographic target area
    - Non-regional members generally include the United States, United Kingdom, Canada, Japan, France and Germany, among others

- Regional Development Banks, Canadian Provinces

- Risks
  - Liquidity
  - Limited credit risk due to high quality sovereign ownership and conservative risk profiles



Examples:
African Development Bank (AFDB)
Asia Development Bank (ASIA)
Inter-American Development Bank (IADB)
European Investment Bank (EIB)
International Bank for Reconstruction and Development (IBRD)

Developments of Note
LIBOR Transition

- AY70 Floating Rate Exposure as of 12/31/21:
  - 92% of Corporates
  - 15% of ABS

- LIBOR was discontinued for most tenors as of 12/31/21. US Dollar 1-month and 3-month tenors will still be published through June 2023.

- SOFR (Secured Overnight Financing Rate) is the heir apparent to LIBOR
  - SOFR is based on overnight transactions in the USD Treasury repo market
  - The Treasury Repo market is based on “risk free” transactions, so SOFR has been a less than natural fit for pricing products that contain inherent credit risk

- Corporate Bonds have in large part adopted SOFR as the reference rate for Floaters

- ABS has been slow to shift to SOFR referenced floaters
  - Floating rate tranches of ABS have declined to only 5% of total issuance in 2021

Investment Performance
January 31, 2022

As of Jan 31, 2022	3month	1 Year	3 Year	5 Year	10 Year
Short-term Fixed Income (AY70)	0.00%	0.07%	1.03%	1.29%	0.84%
3M T-Bill	0.01%	0.04%	0.93%	1.13%	0.63%
	-0.01%	*0.03%*	*0.10%*	*0.16%*	*0.21%*

Fidelity Institutional Asset Management

Mandate: **Tactical Allocation** **Hired:** **2018**

Firm Information	Investment Approach	Total ARMB Mandate
Fidelity Investments was founded in 1946 by Edward C. Johnson II. Fidelity is one of the largest independently owned investment management organizations in the world. The Johnson family owns 49% of the firm; Fidelity employees own the remainder. As of 12/31/2021, the firm's total institutional assets under management were $324.2 billion. **Key Executives:** ***Jordan Alexiev***, Portfolio Manager ***Kyan Nafissi,*** Investment Director ***Kristin Shofner,*** Senior Vice President ***Melissa Moesman,*** VP, Account Executive	The Fidelity Signaling strategy is a multi-asset, tactical allocation strategy based on Fidelity's proprietary business cycle models, taking the premise that the stage of the business cycle is an important driver of asset class performance and risk. Consequently, overall portfolio risk and allocation decisions are made depending on the specific assessment of the business cycle. **Benchmark:** Blended Benchmark 60% MSCI ACWI IMI and 40% Bloomberg US Aggregate Bond Index until 3/31/2021 then, 70% MSCI ACWI, and 30% Bloomberg US Aggregate Bond Index	**Assets Under Management ($millions):** 12/31/2021: $661

Concerns: Departure of Portfolio Manager – ARMB Watchlist Recommendation

12/31/2021 Performance (net of fees)

	Last Quarter	1-Year	3-Years Annualized	5-Years Annualized
Signaling	5.36%	13.21%	15.53%	-
Benchmark	4.29%	11.10%	14.60%	-

Presentation to:

State of Alaska

March 18, 2022

Fidelity Signaling Portfolio

Jordan Alexiev, CFA
Portfolio Manager

Kristin Shofner
Senior Vice President, Business Development

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Fidelity INVESTMENTS

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1. Fidelity Team Overview
2. Performance
3. Process and Positioning
4. Capital Markets Update
5. Appendix
   A. Performance Attribution
   B. Holdings Performance
   C. Biographies
   D. Important Information

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See "Important Information" for a discussion of performance data, some of the principal risks related to any of the investment strategies referred to in this presentation, professional designations and how they are obtained, and other information related to this presentation.

Fidelity Team Overview

Global Institutional Solutions

Bringing the research, investment acumen, and client-centric focus of Fidelity

Global Institutional Solutions Portfolio Management Team

Jordan Alexiev
Portfolio Manager

Ed Heilbron
Portfolio Manager

Tom McFarren
Portfolio Manager

Portfolio and Institutional Portfolio Managers

Over 17 years average Fidelity tenure

Over 23 years average industry tenure

Portfolio Implementation

Abhi Dani
Portfolio Analyst

Ryan Bringewatt
Portfolio Analyst

Client Engagement

Ian Johnson
Institutional Portfolio Manager

Kyan Nafissi
Investment Director

Manager Research

Ryan Mishina
Analyst

Deepak Bansal
Analyst

Strategic Advisers Manager Research
29 Analysts

Asset Allocation Research Team

Lisa Emsbo-Mattingly
Managing Director of Research

Cait Dourney
Business Cycle Analyst

Emil Iantchev
Portfolio Construction Analyst

+ 9 Analysts Covering
- *Secular Backdrop*
- *Inflation & Commodities*
- *China*
- *Industries/Styles*
- *Fixed Income*
- *Geopolitics*

Quant Research

Dushyant Jhamb
Quant Analyst

Suren Karapteyan
Quant/Risk Analyst

GAA Central Quant Team
10 Quant Analysts

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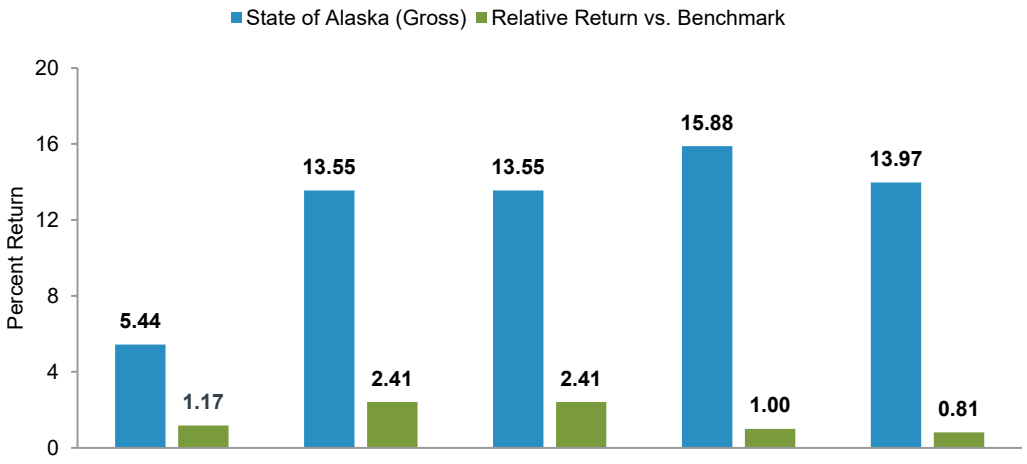
Performance

Portfolio Performance (Gross)

As of December 31, 2021



	CUMULATIVE		ANNUALIZED		
	3-Month	YTD	1-Year	3-Year	Since Inception
State of Alaska (Gross)	**5.44**	**13.55**	**13.55**	**15.88**	**13.97**
Custom Blended Benchmark*	4.27	11.14	11.14	14.88	13.16
Relative Return vs. Benchmark (Gross)	*1.17*	*2.41*	*2.41*	*1.00*	*0.81*

*Custom blended benchmark consists of 70% MSCI All Country World IMI and 30% Bloomberg Aggregate Bond Index.

Client data shown. Portfolio Inception Date: 10/31/18.

Performance data is shown gross of any fees and expenses, including advisory fees, which when deducted will reduce returns.

Past performance is no guarantee of future results.

Source: FIAM Performance Reporting Group.

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Process/Positioning

Components of Alaska RMB Investment Process

Uncorrelated sources of return

BUSINESS CYCLE

- Asset prices are influenced by the constant flow from economic expansion to contraction and back
- Early | Mid | Late | Recession

VALUE

- Assets tend to mean-revert over time towards their Fair Value levels
- Leverage long-term capital market assumptions to harvest secular themes

MOMENTUM

- Assets that are outperforming tend to continue to outperform, and vice versa
- Generates active weights using 12-1 momentum signal

DISCRETION

- Cycles rhyme but carry important nuances
- Portfolio Managers incorporate additional macroeconomic and fundamental information

Correlation of Signal Returns

Jan '01 - Sep '21

	Business Cycle	Value	Momentum
Business Cycle	1.0		
Value	0.1	1.0	
Momentum	0.1	-0.3	1.0

For illustrative purposes only. Past performance is no guarantee of future results. Diversification does not ensure a profit or guarantee against a loss.
Fidelity proprietary analysis based on data from Bloomberg Finance L.P, FactSet., as of 9/30/21.

Active Portfolio Weights Through Time

	Asset Class	Pool/Portfolio Statistic	Index Bands	1/31/2021	2/28/2021	3/31/2021	4/30/2021	5/31/2021	6/30/2021	7/31/2021	8/31/2021	9/30/2021	10/31/2021	11/30/2021	12/31/2021	1/31/2022
Capital Appreciation			70 +/-15%	11.0%	10.2%	10.0%	9.4%	9.1%	8.9%	9.2%	9.1%	8.9%	4.3%	4.2%	3.7%	4.0%
	US Equity	Spartan S&P 500 Index Pool		2.1%	1.6%	1.3%	1.2%	1.7%	2.8%	3.5%	3.5%	3.5%	0.9%	1.3%	2.6%	2.7%
		FIAM Small/Mid Cap Pool		1.1%	0.7%	0.8%	0.3%	0.2%	0.1%	0.4%	0.1%	0.1%	-0.4%	-0.8%	-1.7%	-1.6%
		FIAM Small Cap Core Pool		0.0%	0.0%	0.3%	0.9%	0.6%	0.3%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
	Non-US Developed Equity	Spartan Dev Intl Index		1.5%	2.0%	2.8%	2.4%	2.9%	2.7%	2.7%	2.6%	2.1%	0.8%	0.6%	0.5%	1.3%
		FIAM Select International Small Cap Pool		0.8%	0.8%	0.8%	0.8%	0.3%	0.3%	0.3%	0.1%	0.1%	-0.1%	-0.3%	-1.1%	-1.1%
	Emerging Market Equity	FIAM Select EM Pool		2.9%	2.9%	2.3%	1.8%	1.8%	1.6%	1.1%	0.9%	0.7%	0.0%	0.3%	-0.7%	-1.0%
	Commodities	Spartan Commodity Index Pool		0.3%	0.6%	0.9%	1.0%	1.7%	1.2%	1.2%	1.5%	1.9%	2.6%	2.6%	2.7%	2.6%
		FIAM U.S. Real Estate Pool		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.5%	0.5%	0.7%	1.3%	1.2%
	High Yield	FIAM High Yield Bond Pool		2.5%	1.7%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Capital Preservation			30 +/-15%	-11.0%	-10.2%	-10.0%	-9.4%	-9.1%	-8.9%	-9.2%	-9.1%	-8.9%	-4.3%	-4.2%	-3.7%	-4.0%
	Core Bonds	FIAM BMD Pool		-14.3%	-13.5%	-14.5%	-13.0%	-14.2%	-14.5%	-14.8%	-15.0%	-14.8%	-14.8%	-13.5%	-14.8%	-14.8%
	TIPS	FIAM Interm Inflation Protected Index Pool		0.8%	1.1%	2.4%	4.1%	2.9%	2.9%	2.9%	3.1%	3.1%	5.9%	4.6%	6.5%	5.8%
	Treasury Strips	FIAM Long Strips Pool		2.5%	2.2%	2.2%	0.7%	2.2%	2.7%	2.7%	2.8%	2.8%	4.6%	4.7%	4.6%	5.0%
	Cash	FIAM Institutional Cash		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Portfolio Statistics																
		Expected Active Equity Beta		0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.07	0.07	0.01	0.01	0.00	0.00
		Expected Active Duration		-0.08	-0.14	-0.17	-0.44	-0.17	-0.06	-0.10	-0.07	-0.05	0.55	0.60	0.58	0.62
		Expected Tracking Error		1.5%	1.5%	1.5%	1.4%	1.3%	1.3%	1.3%	1.2%	1.2%	0.8%	0.8%	0.8%	0.9%

- Rationale for Key Changes/Explanation for Large Active Positions
  - Business cycle transitioned from early to mid-cycle in the beginning of 2021. While both early and mid-cycle promote an OW to equities and an UW to Core Bonds, we tend to hold more High Yield bonds earlier in the cycle and transition to international equities as the cycle progresses.
  - Reduction in EM equities OW throughout 2021 was due to momentum and discretion of GIS PM team regarding concerns about Chinese slowdown.
  - Inflation protection (Commodities and TIPS OW) increased during 2021 largely due to momentum and PM discretion that the market was underestimating the longevity of higher inflation. Also, a rising late cycle signal contributed to increased inflation protection in October 2021.
  - Tracking error and beta was reduced starting in September 2021 while duration was increased due to a rising late-cycle signal and our discretionary view that chances of a mid-cycle correction were increasing due to weakness in China and concerns around inflation.

Illustrative purposes only. Table above shows active risk targets and resulting portfolio risk statistics. Actual portfolio weights and risk stats may differ due to implementation

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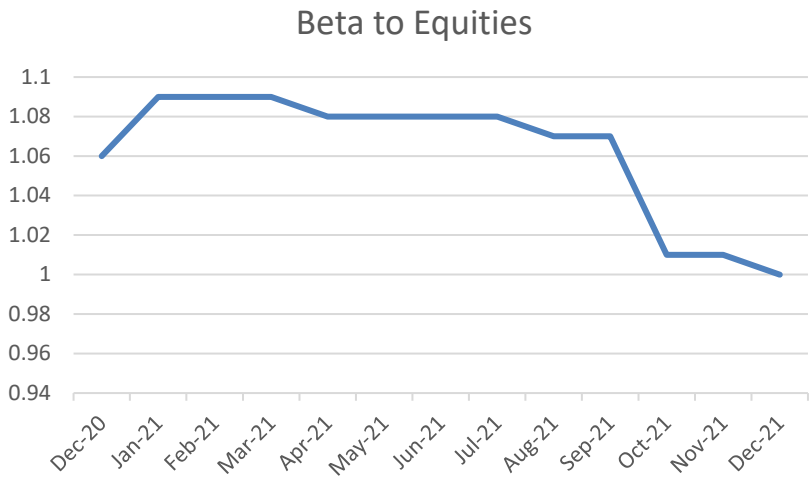
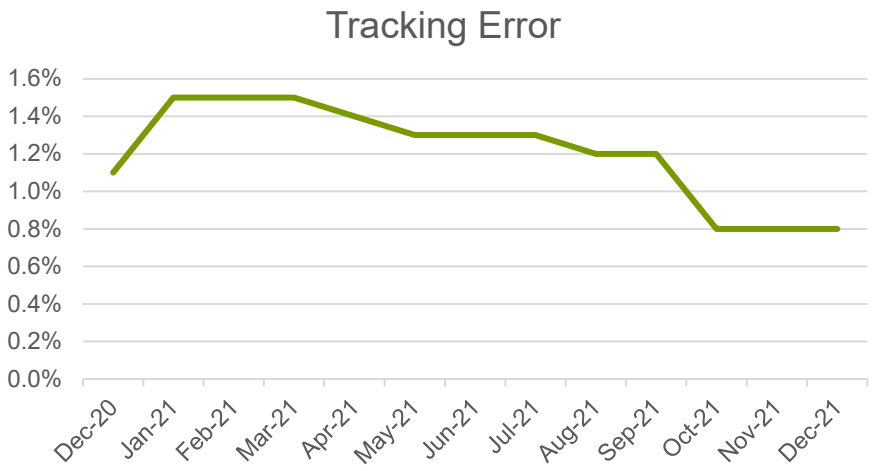
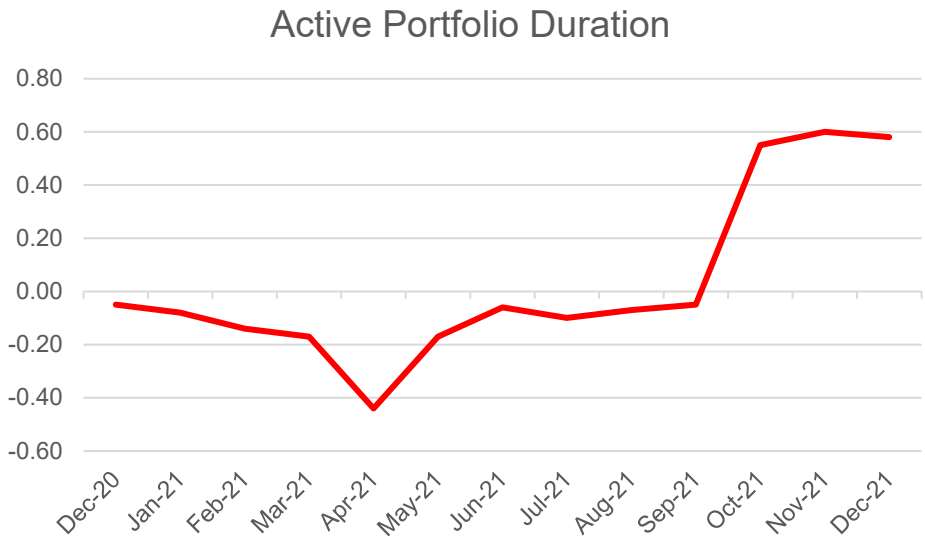
Portfolio Statistics Through Time







Illustrative purposes only. Table above shows active risk targets and resulting portfolio risk statistics. Actual portfolio weights and risk stats may differ due to implementation

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Active Portfolio Weights as of 1/31/22

		Active Weights
Asset Class	**Pool**	**Underweight/Overweight Relative to Benchmark***
Capital Appreciation		4.0%
US Equity	Spartan S&P 500 Index Pool	2.7%
	FIAM Small/Mid Cap Pool	-1.6%
	FIAM Small Cap Core Pool	0.0%
Non-US Developed Equity	Spartan Dev Intl Index	1.3%
	FIAM Select International Small Cap Pool	-1.1%
Emerging Market Equity	FIAM Select EM Pool	-1.0%
Commodities	Spartan Commodity Index Pool	2.6%
US REITS	FIAM U.S. Real Estate Pool	1.2%
High Yield	FIAM High Yield Bond Pool	0.0%
Capital Preservation		-4.0%
Core Bonds	FIAM BMD Pool	-14.8%
TIPS	FIAM Interm Inflation Protected Index Pool	5.8%
Treasury Strips	FIAM Long Strips Pool	5.0%
Cash	FIAM Institutional Cash	0.0%

*Custom blended benchmark consists of 70% MSCI All Country World IMI and 30% Bloomberg Barclays Aggregate Bond Index.

Source: FIAM Performance Reporting Group.

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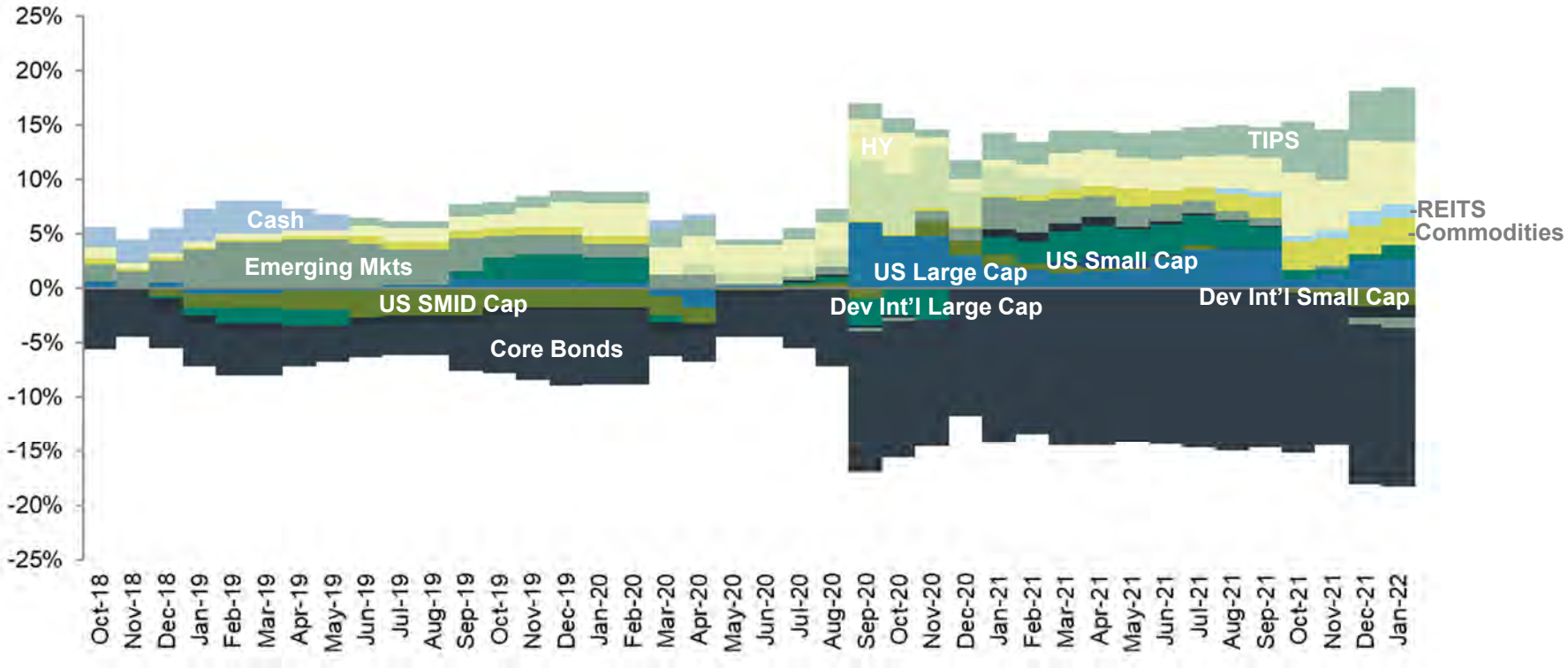
ARMB Monthly Active Targets



- Current Expected Stats: Tracking Error=0.9, Active Beta=0.0, Active Duration= 0.6

Client data shown.

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Capital Markets Update

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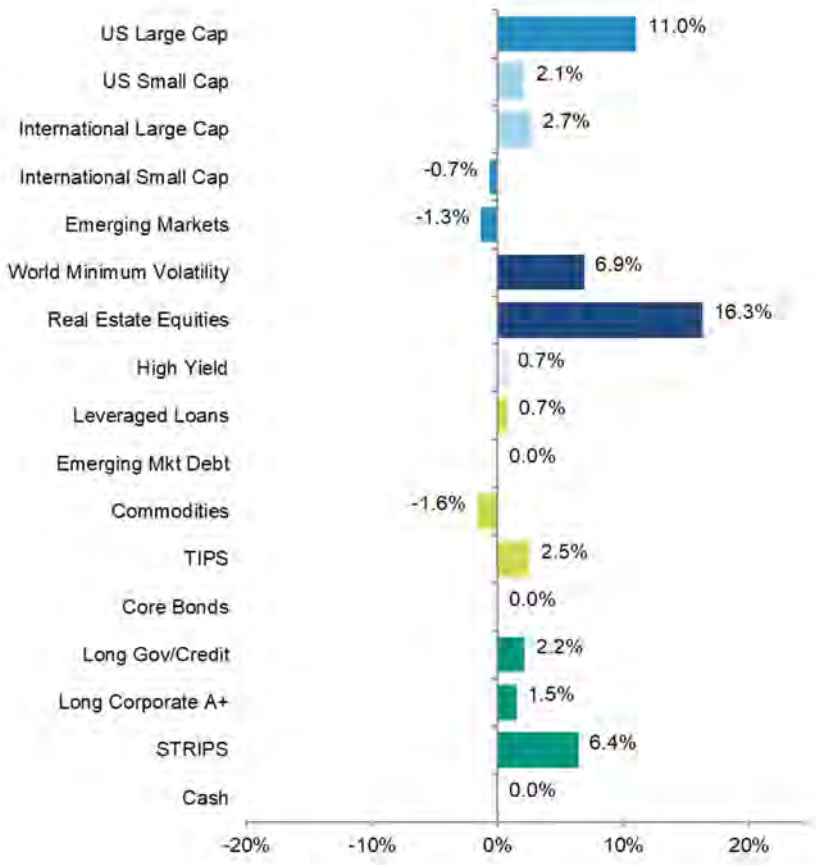
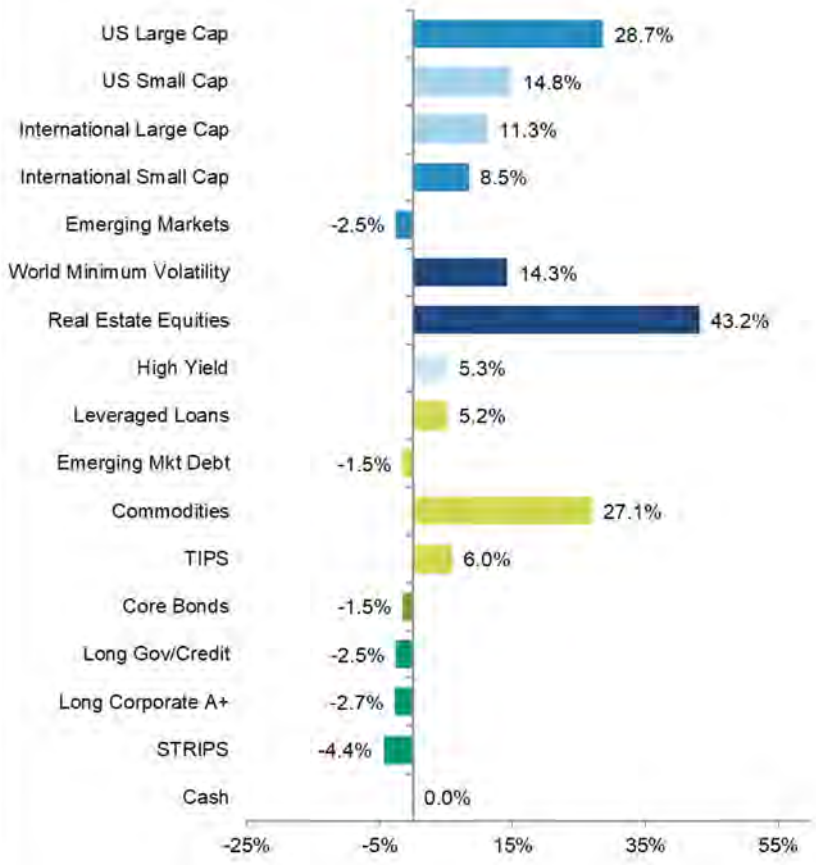
Asset Class Returns

FOURTH QUARTER 2021



1-YEAR



Indexes being used are as follows: S&P 500, Russell 2500, MSCI EAFE, S&P EPAC Small Cap, MSCI Emerging Markets, MSCI World Minimum Volatility, Real Estate Income Benchmark, Bloomberg U.S. High Yield, S&P/LSTA Leverage Loan, JPM EMBI Global, MSCI ACWI Commodity Producers Sector, Bloomberg U.S. Govt inflation linked, Bloomberg U.S. Agg, Bloomberg Long Term U.S. Treasuries, Bloomberg 3 Month T-Bill. Index performance does not reflect the deduction of advisory fees, transaction charges and other expenses, which would reduce performance. Investing directly in an index is not possible. Past performance is no guarantee of future results.

Source: Bloomberg. As of 12/31/21.

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Capital Markets Update

Mid-Cycle recovery continues while signs of late-cycle emerge

Services and Manufacturing PMIs

Mid-Cycle with hints of Late

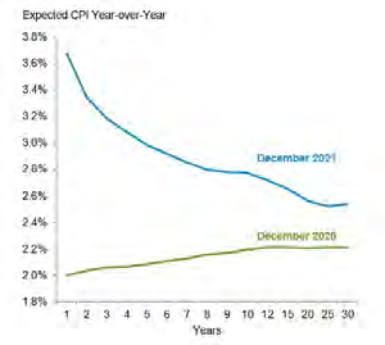
- Despite Omicron cases rising at the end of the year, the economy remained in a mid-cycle recovery mode as we flipped to a new calendar year. Economic activity levels, the job market, consumer balance sheets, and corporate earnings all improved or remained on stable footing throughout the year, typical of a mid-cycle environment.
- As we look forward to 2022, we think most of the key pieces to extend the cycle remain in place, but we are watching some emerging signs of moving into more a late cycle environment. Peaking economic and corporate earnings growth and signs of inflation being more than transitory are early signs of late cycle.

S&P 500 Return Decomposition

Earnings Drive Prices in 2021

- S&P 500 returns were driven higher primarily by multiple expansion in 2020. 2020 multiple expansion was likely due to the market's prediction that earnings would improve in the following year, which panned out in 2021 and prices were driven by earnings.
- With earning estimates coming down and the potential for higher rates to put pressure on multiples, it may be hard for 2022 to produce as strong of a year for stocks as 2021. Given our view that a large portion of historical mid-cycle returns have already been realized by equities, we are entering the year by taking a balanced approach to risk.

Inflation Expectations: CPI Swaps



Don't Say the T Word

- The fed has retired "transitory" from its vernacular when talking about inflation and for good reason, while inflation coming out of the worst of the pandemic was driven by elevated prices in durable goods like used cars, inflation is now being driven by housing, wages, and food prices all of which are viewed as more long-lasting inflationary forces.
- Breakeven forecasts have moved higher as a result of this shift in the composition of the drivers of inflation, but we think estimates may still be too low. As a result, we have continued to prefer TIPs over nominal bonds.

China Industrial Production

China Growth Recession

- China's industrial production has seemed to have bottomed but there are still reasons to be concerned with the Chinese economy as the property sector has not yet shown signs of improvement. Credit growth has also remained muted as the focus on deleveraging has continued.
- There is normally some lag in how China's economic activity impacts industrial activity in the rest of the world, adding to the reasons to believe why global economic activity may have peaked during this recovery cycle.

Source: Bloomberg, AART

As of 12/31/21

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Current Opportunities and Risks

Opportunities

Strong consumer + infrastructure spend

- **Wealth effects**: The dramatic rise in consumer net worth, coupled with higher savings post-pandemic, could continue to propel higher spending and GDP growth.

- **Relatively easy financial conditions**: Despite the recent hawkishness of the Fed, financial conditions remain very accommodative and bank lending is starting to pick up.

- **Re-opening**: The potential of COVID to evolve into a less severe situation can improve global reopening and extend the duration of the current cycle.

Risks

Deceleration in growth and declining liquidity

- **Peak Growth/Stimulus**: The reopening effect on earnings is starting to fade. There is also risk is that the baton pass from stimulus to income as people get back to work won't be smooth and there might have been some pull forward of demand.

- **Policy Error**: Potential for policy mistakes on both sides - premature withdrawal of monetary stimulus could hinder recovery on one side, while non-transitory inflation could destabilize inflation expectations on the other side and challenge Fed's credibility.

- **China Policy Tightening**: relatively subdued Chinese monetary and fiscal response may not be enough to offset ongoing weakness in real estate sector and prospects for falling exports.

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Past Peak Growth, but Global Expansion Should Persist

The global economy likely passed its peak rate of growth, but a sustained expansion appears likely. The trajectory of the pandemic will be crucial to the global outlook, with emerging-market economies generally more susceptible to health setbacks. China may be at the trough of its growth recession. Despite some signs of late-cycle pressures in the labor markets, we expect the U.S. mid-cycle backdrop to prevail in 2022.

BUSINESS CYCLE FRAMEWORK

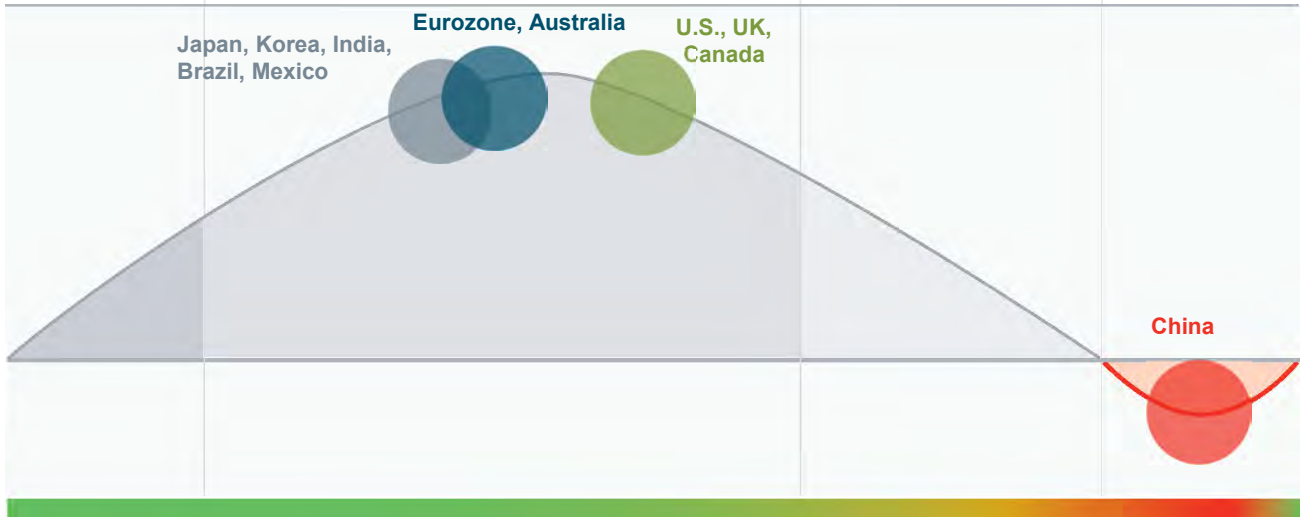
Cycle Phases

EARLY
- Activity rebounds (GDP, IP, employment)
- Credit begins to grow
- Profits grow rapidly
- Policy still stimulative
- Inventories low; sales improve

MID
- Growth peaking
- Credit growth strong
- Profit growth peaks
- Policy neutral
- Inventories, sales grow; equilibrium reached

LATE
- Growth moderating
- Credit tightens
- Earnings under pressure
- Policy contractionary
- Inventories grow, sales growth falls

RECESSION
- Falling activity
- Credit dries up
- Profits decline
- Policy eases
- Inventories, sales fall



A growth recession is a significant decline in activity relative to a country's long-term economic potential. Note: The diagram above is a hypothetical illustration of the business cycle, the pattern of cyclical fluctuations in an economy over a few years that can influence asset returns over an intermediate-term horizon. There is not always a chronological, linear progression among the phases of the business cycle, and there have been cycles when the economy has skipped a phase or retraced an earlier one. Source: Fidelity Investments (AART), as of 12/31/21.

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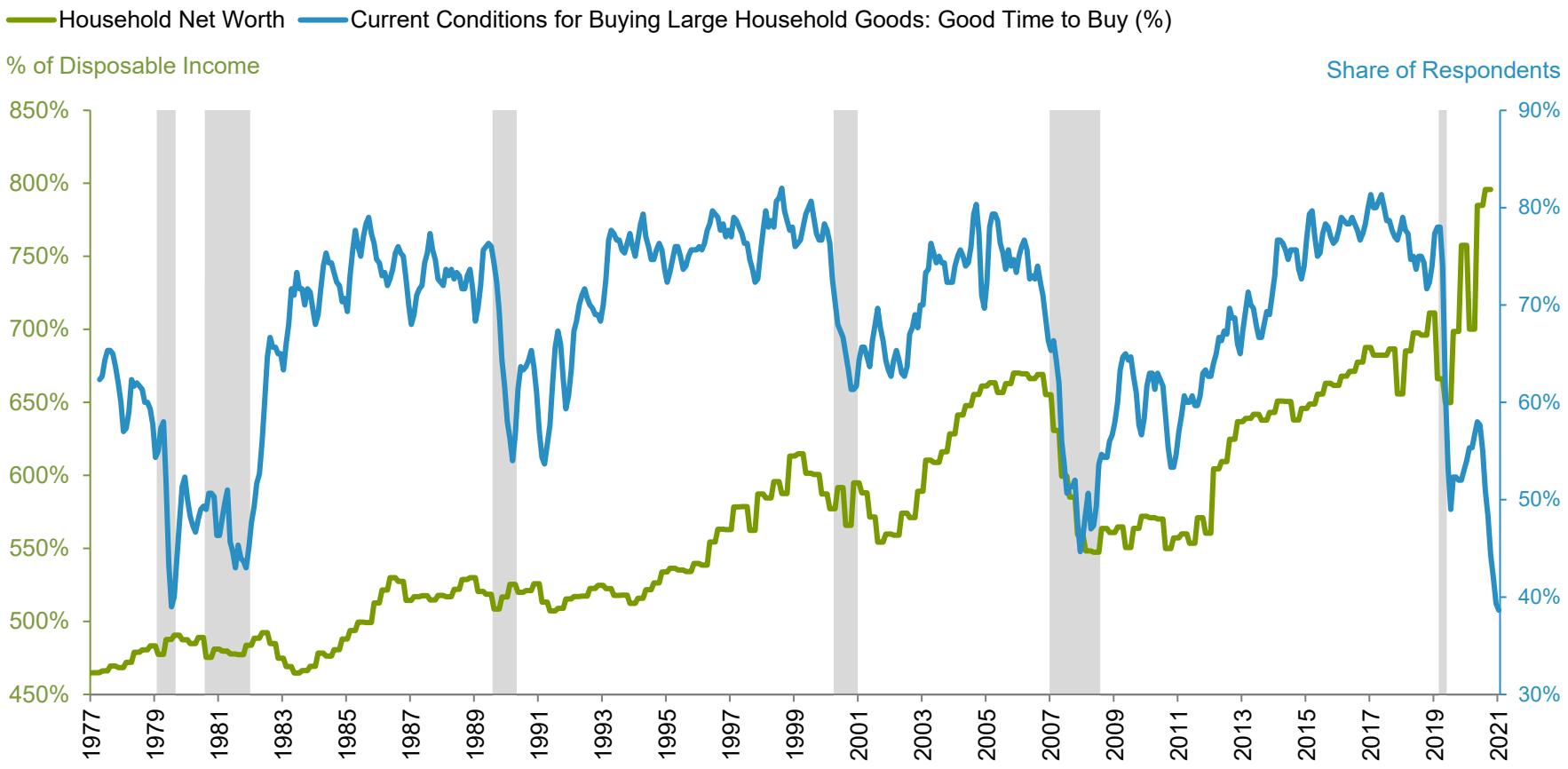
U.S. Consumers Well-Positioned But Inflation Is Painful

The U.S. consumer is bolstered by record-high net worth, pent-up savings, and strong employment markets. However, high inflation has weighed on sentiment as the percentage of consumers viewing the current backdrop as a good time to purchase large household goods hit its lowest point in four decades. Consumer strength supports the mid-cycle backdrop, but more persistent inflation may inhibit real economic growth.

U.S. HOUSEHOLD WEALTH AND CONSUMER SENTIMENT



Gray bars indicate U.S. recessions. Sources: Federal Reserve Board, University of Michigan, Haver Analytics, Fidelity Investments (AART), as of 11/30/21.

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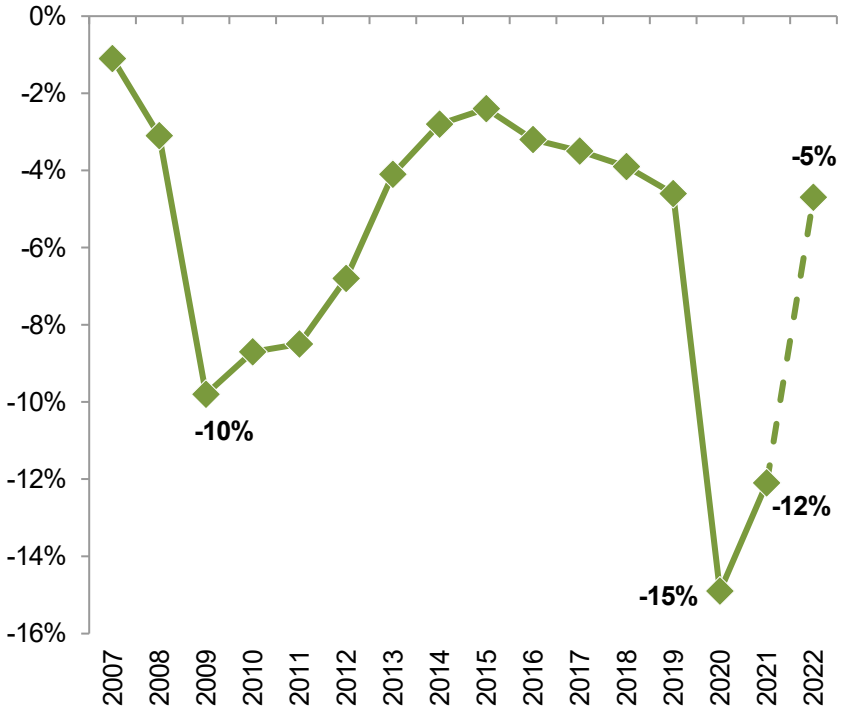
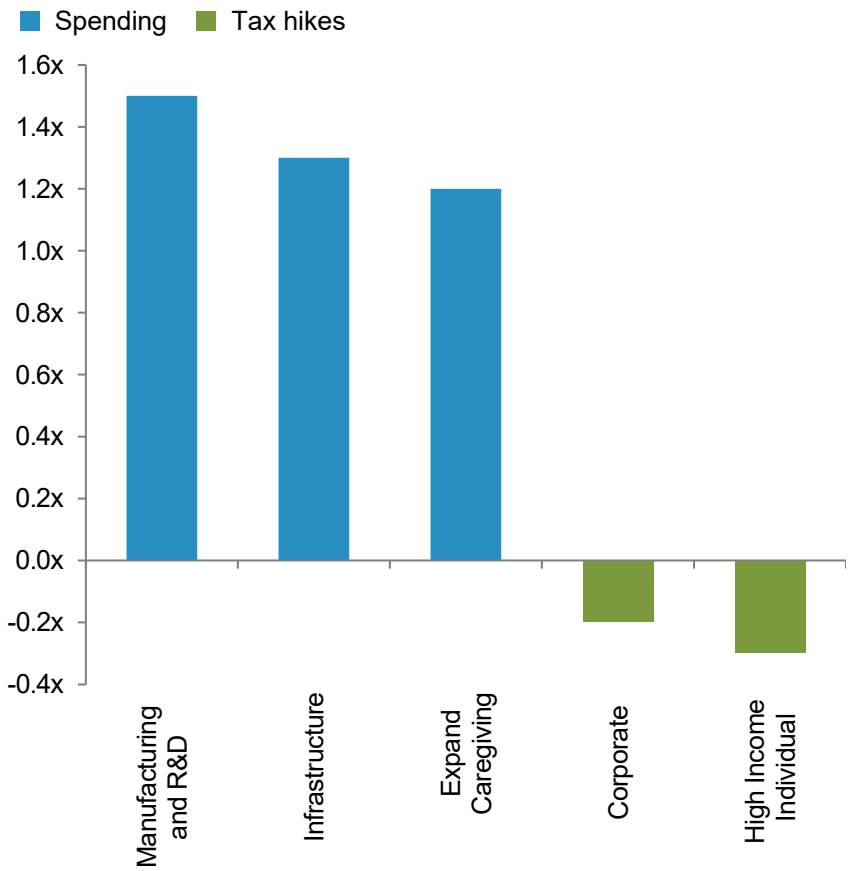
Fiscal Drag in 2022, But Higher Multi-Year Multiplier Mix

After nearly $3 trillion of emergency stimulus in FY 2021, the budget deficit is set to shrink considerably and offer less fiscal support in 2022. Legislation approved in Q4 provides more than half a trillion dollars of extra multi-year spending on infrastructure, which traditionally has a high multiplier effect on near-term growth. Any additional multi-year spending or tax increases will depend on negotiations among Congressional Democrats.

FISCAL DEFICIT AS A PERCENTAGE OF GDP



FISCAL MULTIPLIERS



LEFT Dashed line projection represents updated deficit baseline from the Committee for a Responsible Federal Budget CRFB) using CBO July GDP forecasts. Sources: CRFB, Congressional Budget Office, Haver Analytics, Fidelity Investments (AART), as of 11/15/21.
RIGHT: R&D: Research and development. Multipliers are rough estimates of how much a dollar of spending or tax changes would impact GDP based on historical averages. Sources: Congressional Budget Office, Richmond Federal Reserve, Fidelity Investments (AART), as of 9/30/21.

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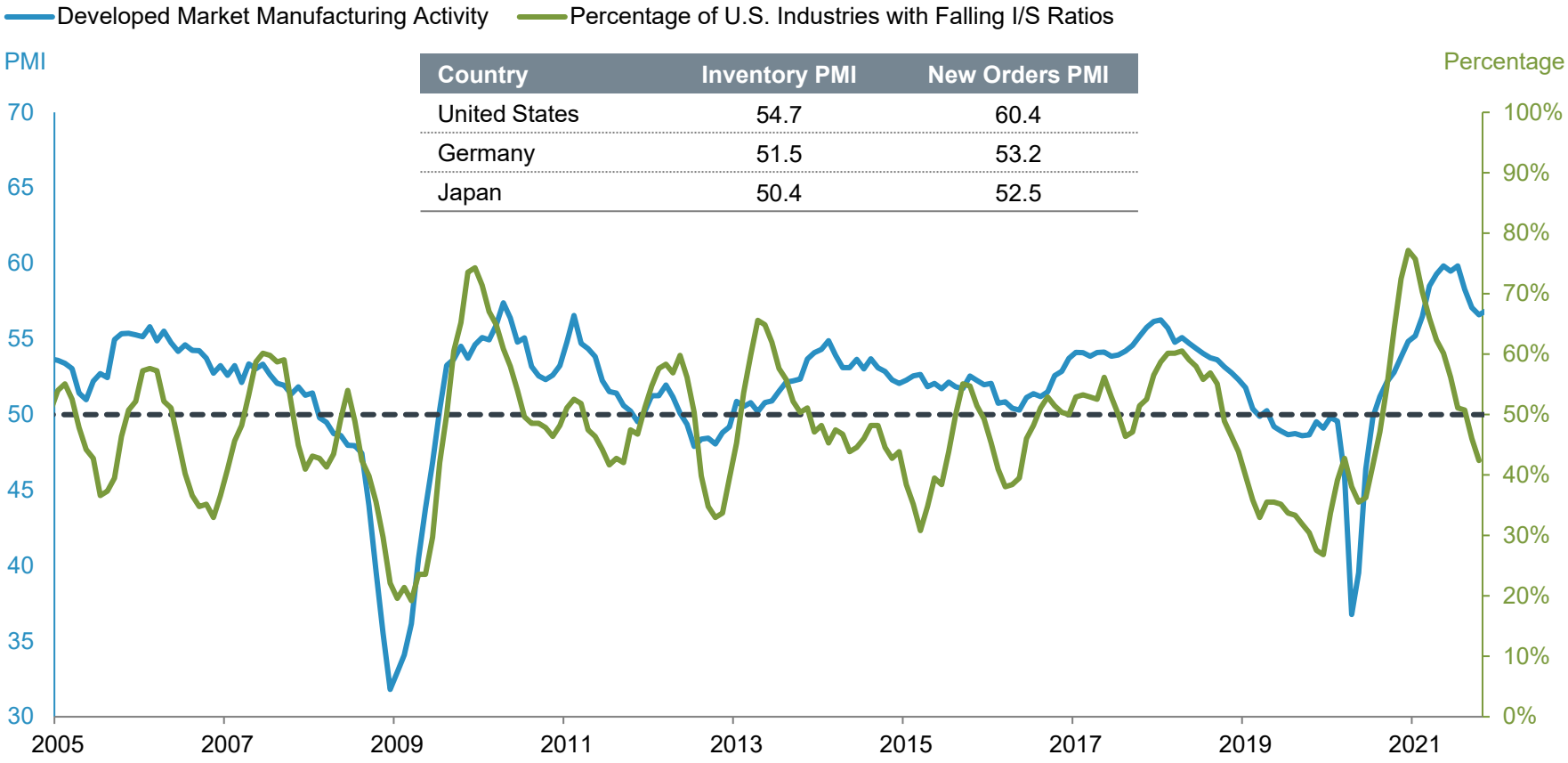
Inventory Buildup Suggests Cooling Manufacturing Activity

The lagged impact of China's slowdown implies the peak in global industrial activity is behind us. Inventories relative to sales are rising, suggesting developed-market (DM) manufacturing may decelerate from decade-high activity levels. Bullwhips—leading indicators measuring the gap between new-order demand and the supply of inventories—remain positive but have shrunk and likely represent a mid-cycle headwind for DM.

GLOBAL MANUFACTURING VS. INVENTORY CYCLE



Country	Inventory PMI	New Orders PMI
United States	54.7	60.4
Germany	51.5	53.2
Japan	50.4	52.5

PMI: Purchasing managers' index. **Graph**: I/S: Inventory relative to sales. Six-month moving average of U.S. industries with contracting inventory to sales ratios. Sources: Census Bureau, IHS Markit, Haver Analytics, Fidelity Investments (AART), as of 10/31/21. **Table**: Sources: IHS Markit, Haver Analytics, Fidelity Investments (AART), as of 12/31/21.

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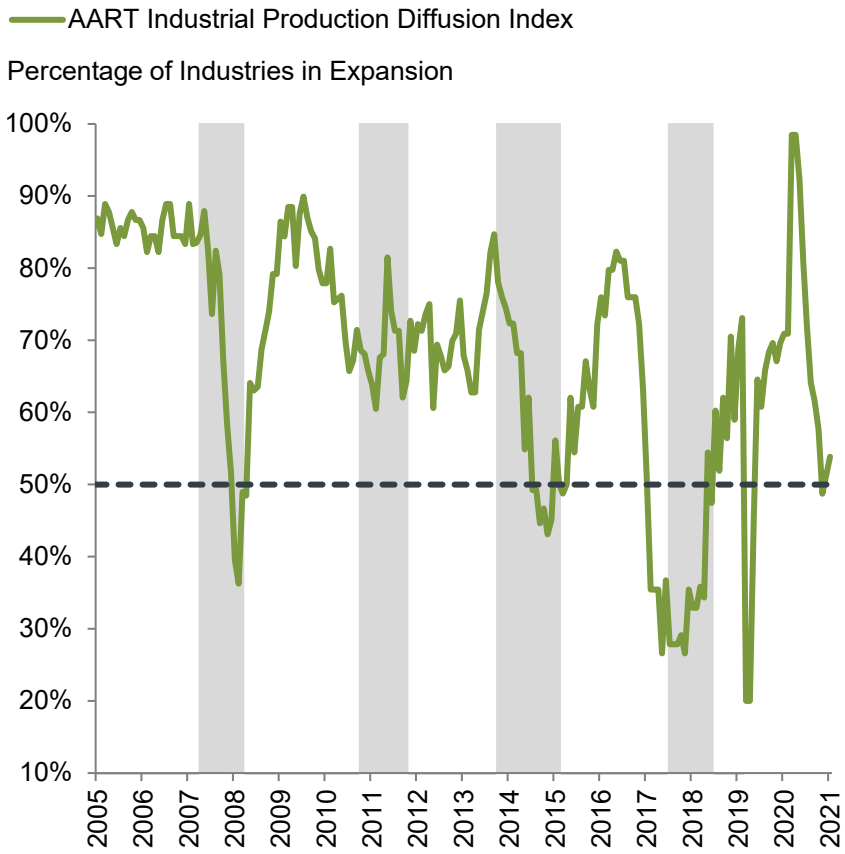
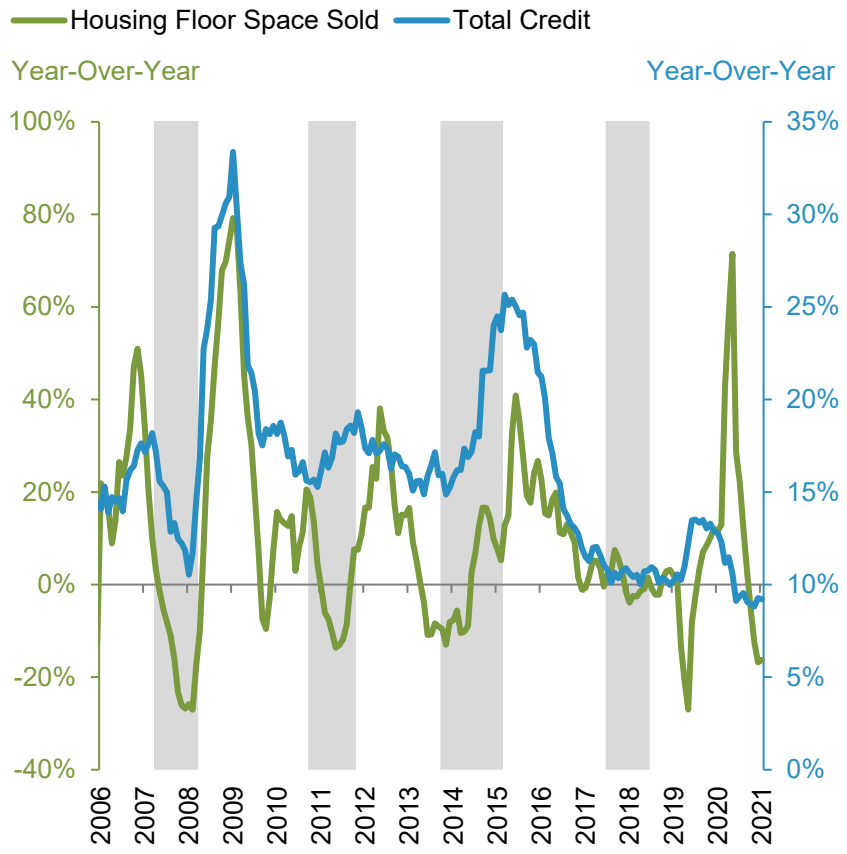
Industrial Trough in China, but Property Remains a Risk

China's industrial cycle appears to be bottoming, and monetary and fiscal policies are gradually shifting to a more accommodative stance. Activity continues to decelerate in the all-important real estate sector, where slowing construction activity and weak sales remain a key source of risk. As officials attempt to limit leverage and address financial imbalances, the strength of any economic recovery may remain muted.

CHINA: INDUSTRIAL PRODUCTION



CHINA: PROPERTY SALES AND CREDIT GROWTH



Gray bars represent growth recessions as defined by AART. **LEFT**: Sources: National Bureau of Statistics, People's Bank of China, Fidelity Investments (AART), as of 11/30/21. **RIGHT**: Three-month moving average of floor space sold. Sources: People's Bank of China, National Bureau of Statistics, Fidelity Investments (AART), as of 11/30/21.

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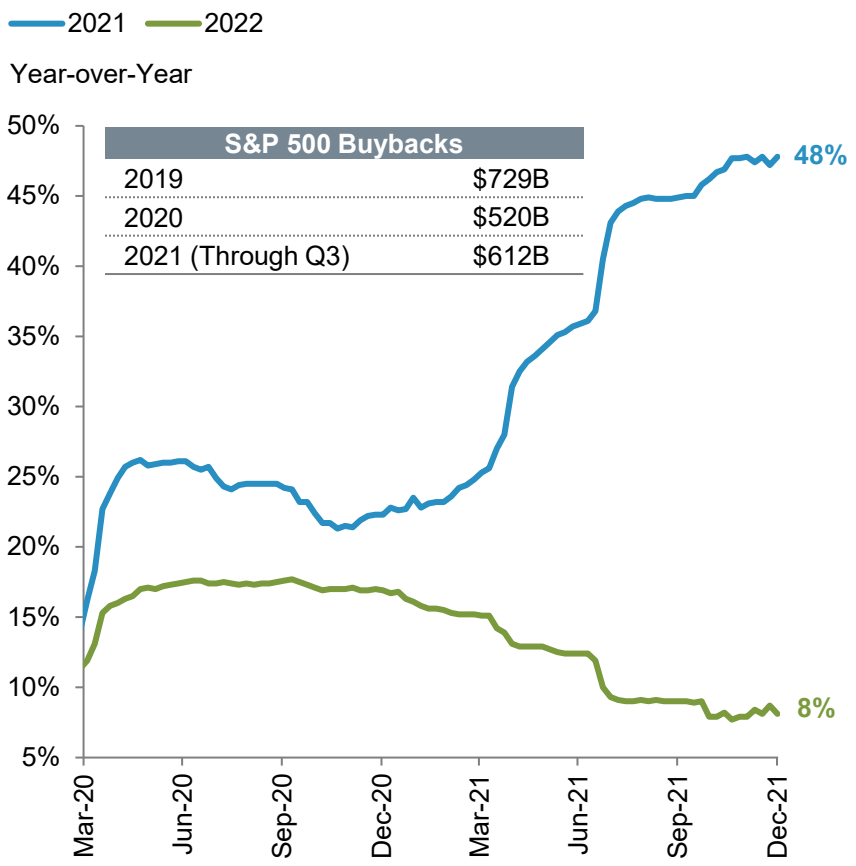
Corporate Profits Beat Expectations, Upside Now Harder

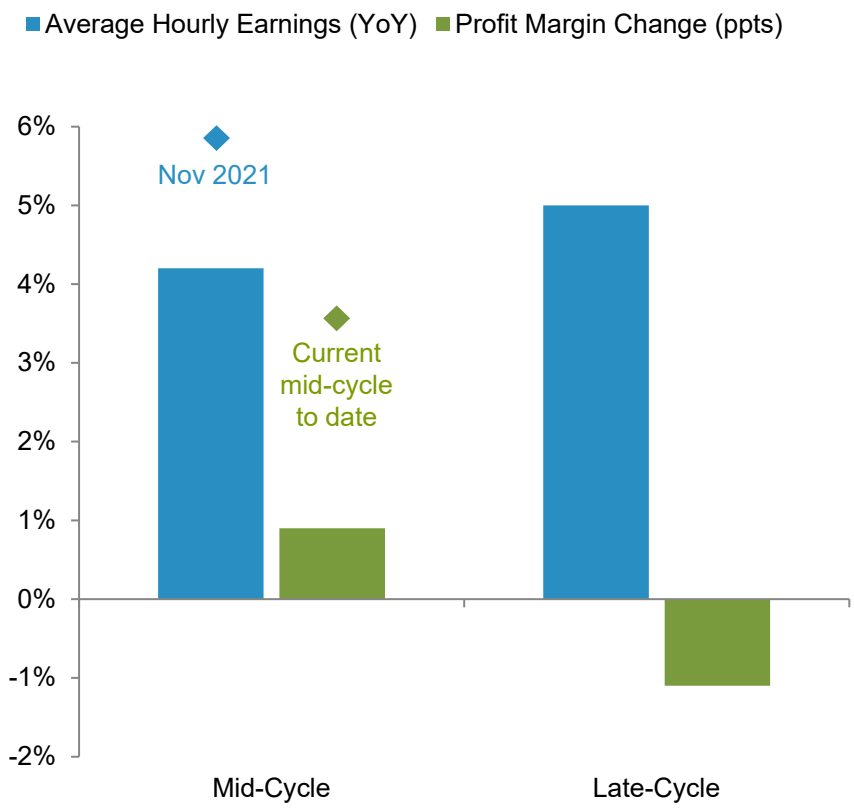
The nearly 50% rebound in corporate earnings during 2021 far exceeded expectations amid accelerating sales growth and greater corporate pricing power. With profit margins back to all-time highs and having already outpaced typical mid-cycle gains—and facing unusually high wage pressures—it may prove more challenging to expand them going forward. Investors expect slower, but still solid, high single-digit profit growth in 2022.

S&P 500 EARNINGS EXPECTATIONS



S&P 500 Buybacks	
2019	$729B
2020	$520B
2021 (Through Q3)	$612B

WAGE GROWTH AND PROFIT MARGINS (1950–2021)



LEFT: Street estimates. Sources: Bloomberg Financial LP, Fidelity Investments (AART), as of 12/31/21.
RIGHT: Sources: Bureau of Economic Analysis, Fidelity Investments (AART), as of 11/30/21.

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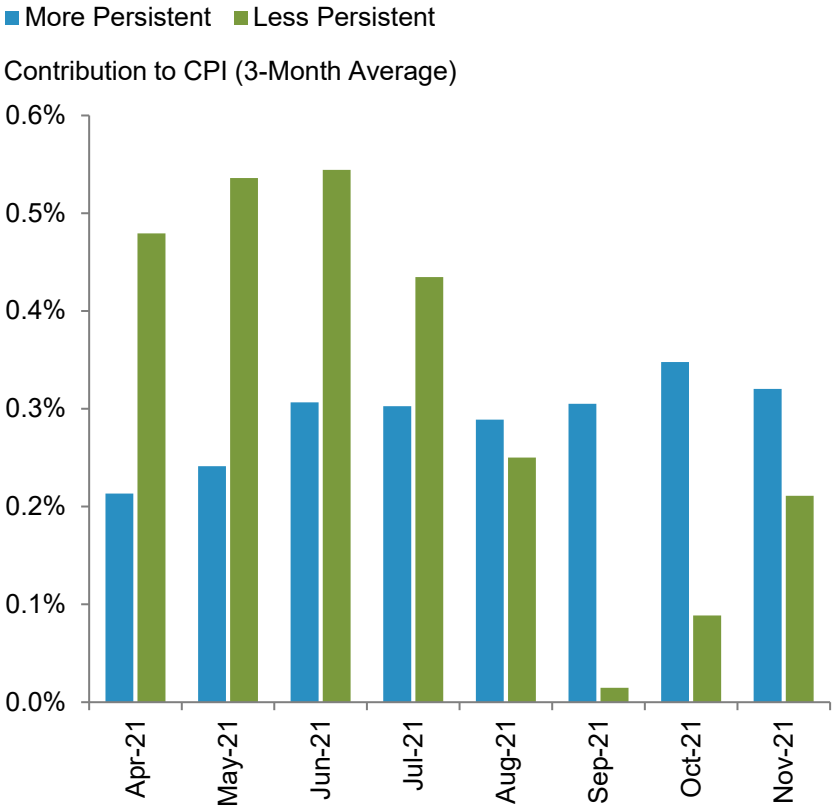
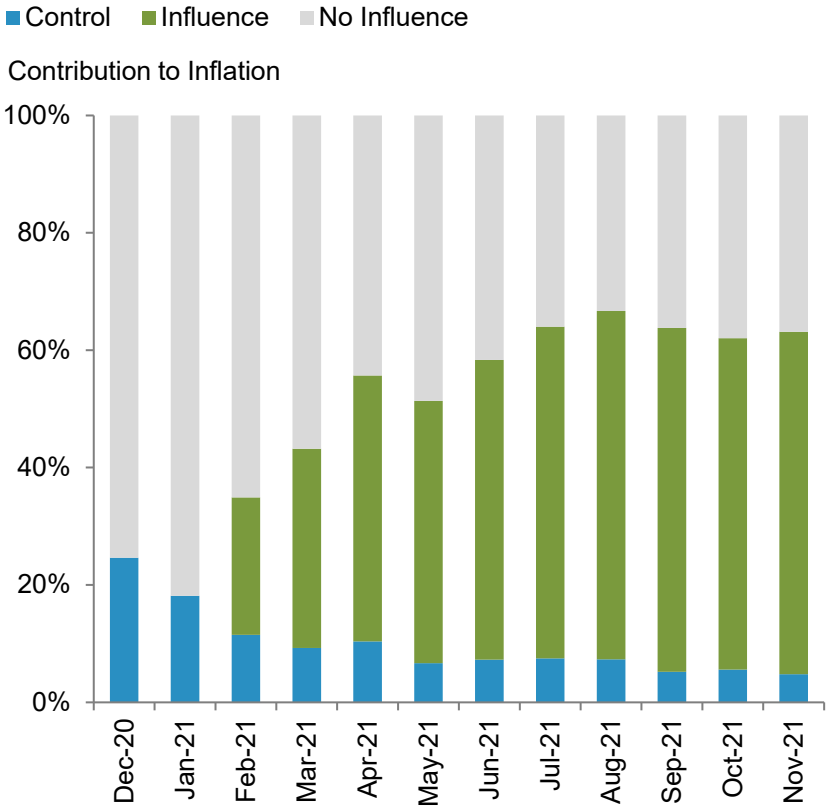
Inflation Rates to Moderate, But Pressures More Persistent

Base-year effects will help mechanically reduce inflation rates from current 30-year highs, and we see initial signs that some of the most extreme supply-related pressures are easing. However, categories where price changes tend to be more persistent, such as housing and food, now account for a larger portion of inflationary pressure. Demand-side factors—where the Federal Reserve can exert its influence—are major contributors to price pressure.

PERSISTENT VS. TRANSITORY INFLATION CONTRIBUTION



INFLATION PRESSURES BY DEGREE OF FED SWAY



LEFT: CPI: Consumer Price Index. More Persistent Categories include areas where, historically, inflation has taken longer to dissipate, including Housing and Food & Beverages. Sources: Bureau of Labor Statistics, Haver Analytics, Fidelity Investments (AART), as of 11/30/21. **RIGHT:** Based on the categorization of key inflation drivers in our proprietary inflation models, evaluated by whether monetary policy has direct control of inflation drivers, some influence over them, or neither. Fidelity Investments (AART), as of 11/30/21.

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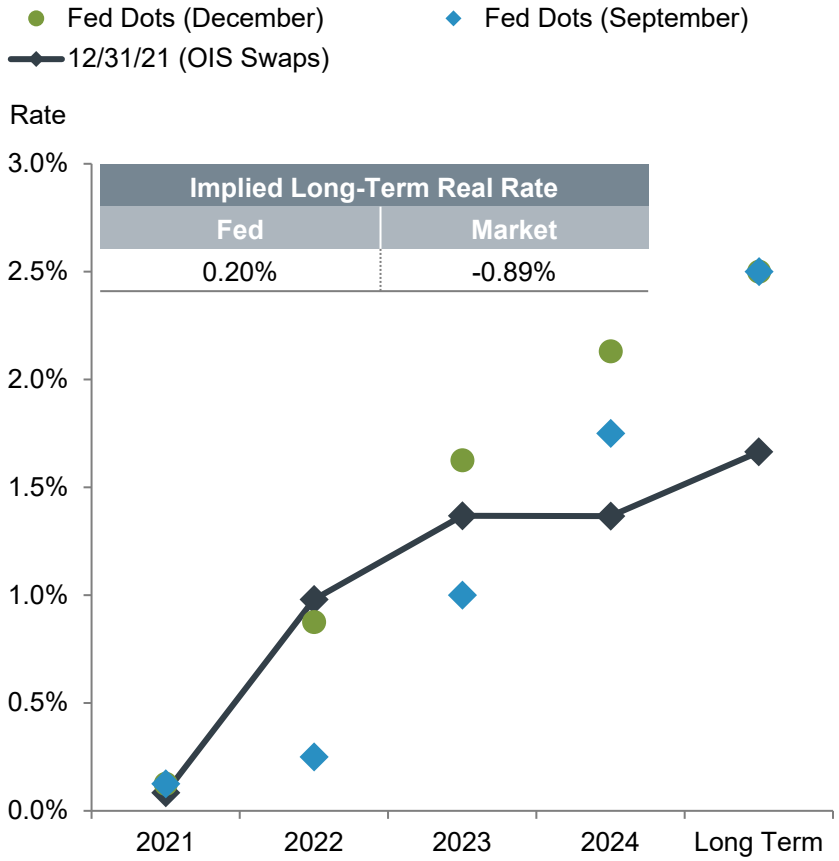
The Federal Reserve Signals Tightening Ahead

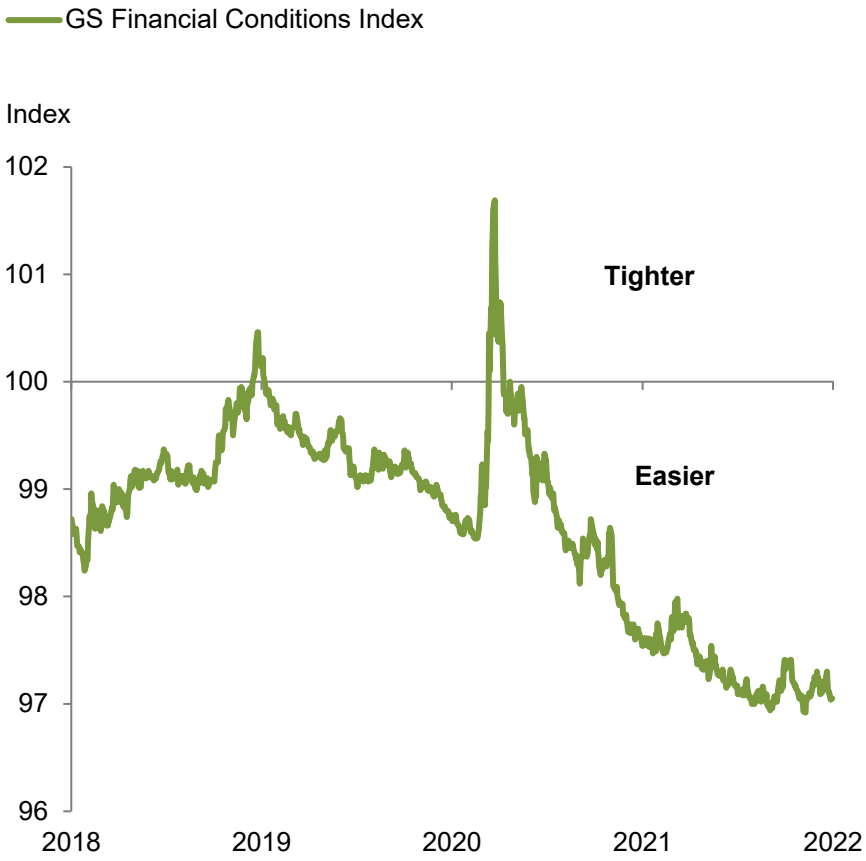
During Q4, the Fed signaled its intent to begin reducing the extraordinary monetary accommodation that has facilitated extremely easy financial conditions. Fed members raised their rate-hike guidance during Q4 on inflation concerns. Market expectations are in line with Fed projections for roughly three hikes in 2022, but investors foresee fewer hikes thereafter and a long-term future that never reaches positive real rates.

FED AND MARKET RATE GUIDANCE



Implied Long-Term Real Rate	
Fed	Market
0.20%	-0.89%

FINANCIAL CONDITIONS



LEFT: OIS: Overnight Indexed Swaps. Dots: Federal Open Market Committee members' median rate projection. Sources: Federal Reserve Board, Bloomberg Financial L.P., Fidelity Investments (AART), as of 12/31/21. **Table:** Federal Reserve long-term real rate calculated using long-term projection minus St. Louis Fed 5Y5Y inflation forecast. Market calculated using 10Y1M OIS minus 5Y5Y inflation swap.
RIGHT: GS: Goldman Sachs. Sources Bloomberg Financial L.P., Goldman Sachs, Fidelity Investments (AART), as of 12/31/21.

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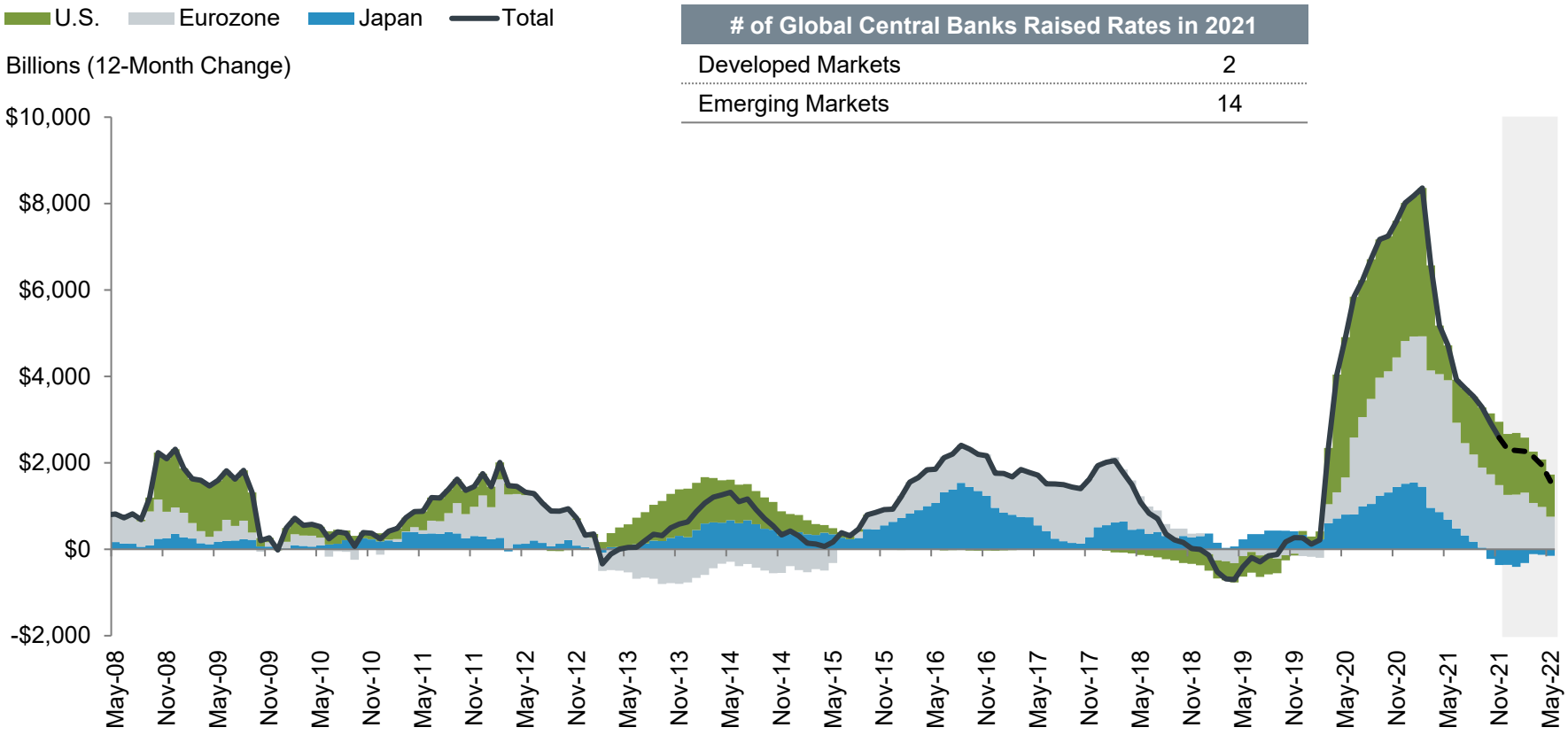
Central Bank Normalization May Strain Liquidity, Markets

Trillions of dollars of asset purchases by global central banks resulted in abundant financial market liquidity, supporting asset prices and subduing volatility in 2021. However, global monetary policy is shifting toward normalization, as 16 central banks raised interest rates and the Fed accelerated the end of its QE program to early 2022. Liquidity growth may switch to a headwind during 2022, raising the odds of higher market volatility.

CENTRAL BANK BALANCE SHEETS



# of Global Central Banks Raised Rates in 2021	
Developed Markets	2
Emerging Markets	14

Gray bar represents projected balances. QE: Quantitative easing. Dashed line and shaded area represent estimates based on the U.S. Federal Reserve tapering its QE and ending asset purchases in March 2022, the European Central Bank purchasing EUR50B of Pandemic Emergency Purchase Program in Q1 2022 and €20B in ordinary QE in Q1 and €40B of ordinary QE in Q2 2022, and the Bank of Japan purchasing assets at an average of prior 12 months. Sources: Federal Reserve, Bank of Japan, European Central Bank, Haver Analytics, Fidelity Investments (AART), as of 11/30/21. TABLE: Emerging-market countries include Brazil, Peru, Poland, Russia, South Africa, and others as of 12/31/21.

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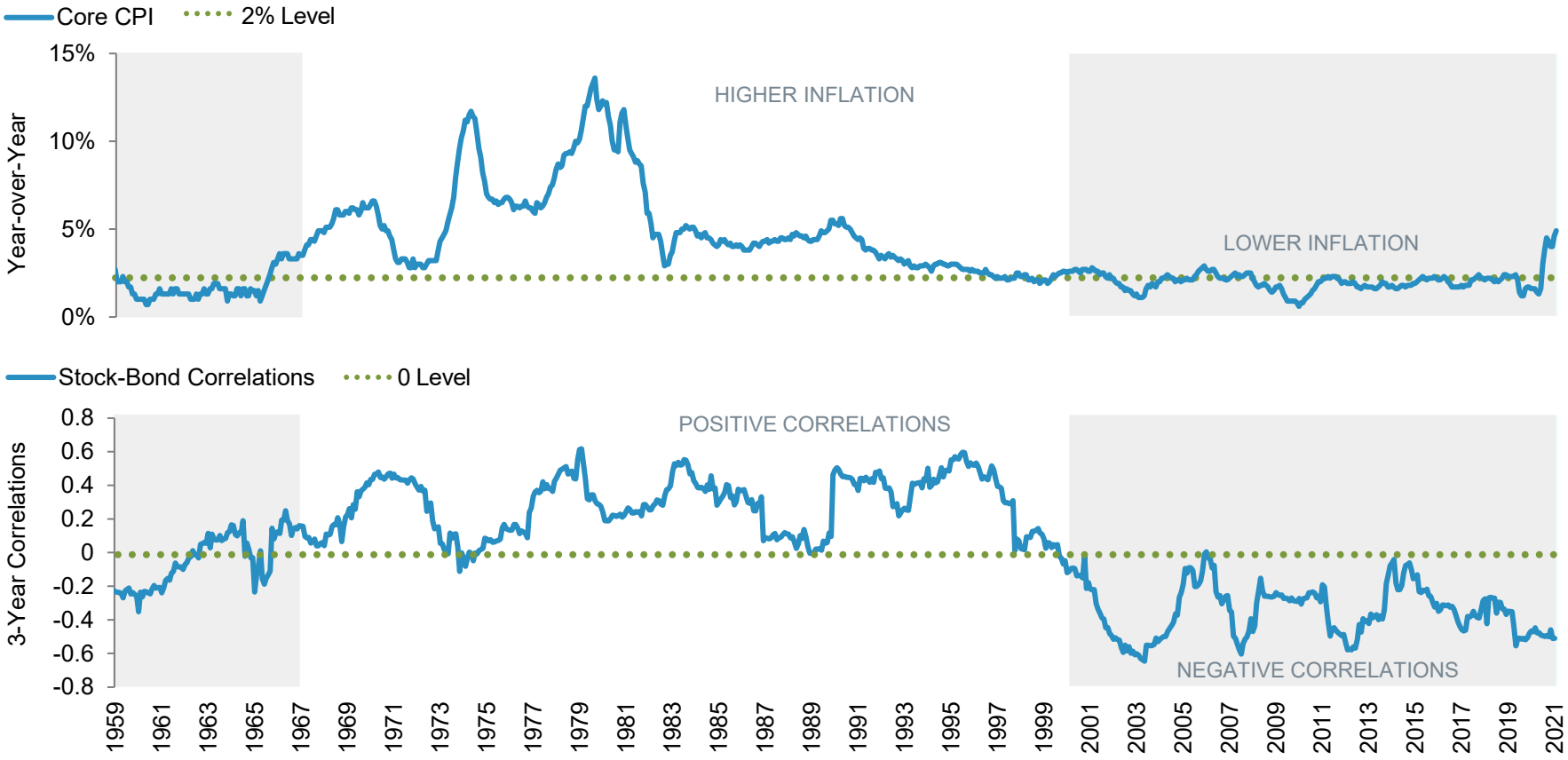
Stock-Bond Diversification Highest When Inflation Is Tame

Over the past 20 years, U.S. core inflation rarely stayed above 2%. In this environment, correlations between U.S. stocks and Treasury bonds were negative, providing strong portfolio diversification. Historically, higher inflation—such as during the period lasting roughly from 1966 to 2000—generated headwinds for both stocks and bonds and led to higher return correlations and diminished diversification benefits.

STOCK AND TREASURY BOND CORRELATIONS VS. INFLATION



Past performance is no guarantee of future results. Fidelity Investments proprietary analysis of historical asset class performance is not indicative of future performance. Sources: Bureau of Labor Statistics, Haver Analytics, Bloomberg Finance L.P., Fidelity Investments (AART), as of 11/30/21.

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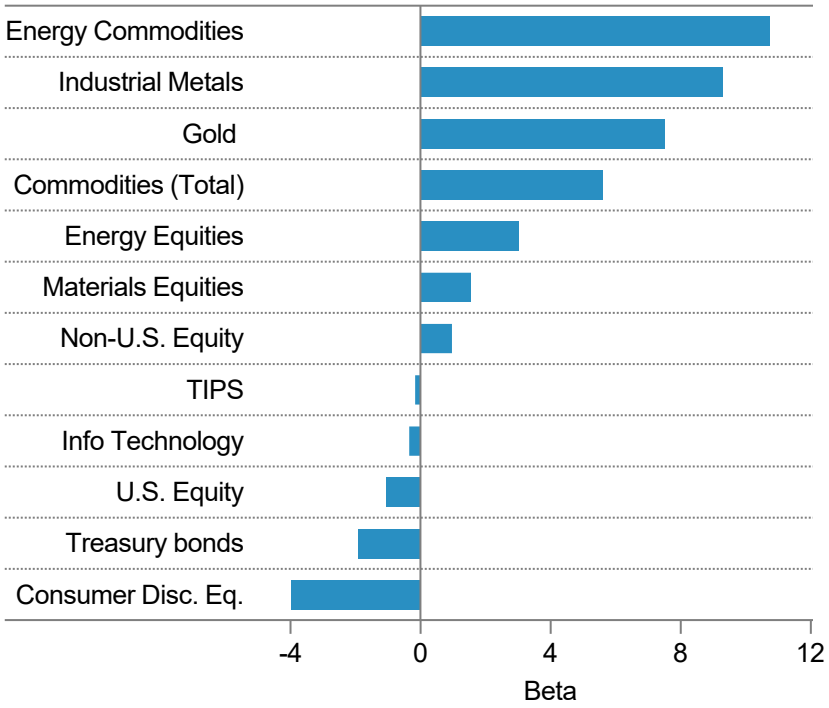
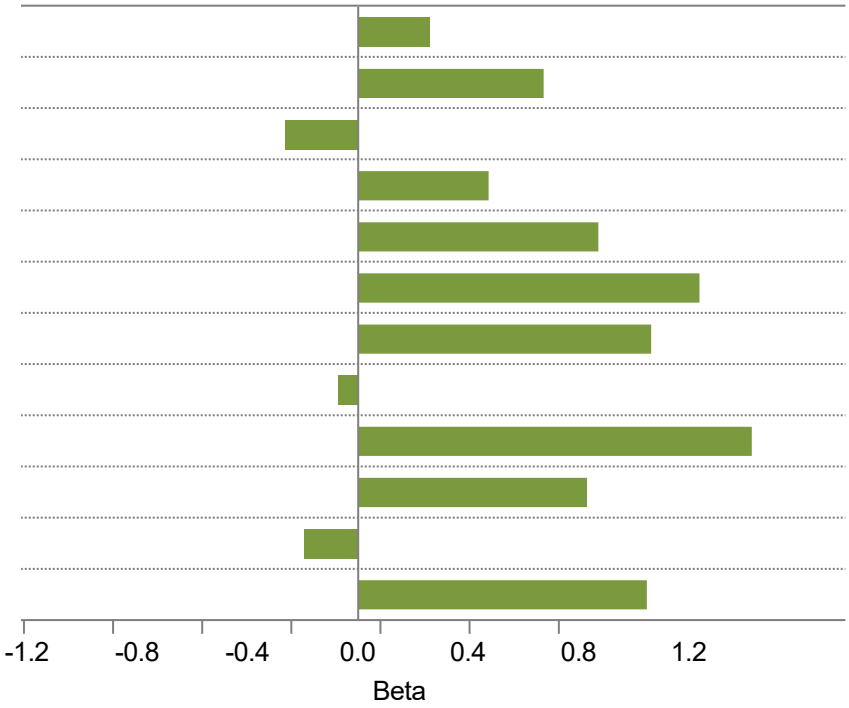
Inflation-Sensitive Assets Can Help Provide Diversification

The potential for higher inflation represents a risk factor for a multi-asset portfolio. Inflation-resistant assets, including commodities and commodity-producer equities, can help hedge against surprise increases in inflation while providing potential for capital appreciation in a higher nominal-growth environment. In fixed income, inflation-hedging assets, such as TIPS, have provided better diversification than Treasury bonds.

RETURN SENSITIVITY TO INFLATION SURPRISES (1972–2020)



RETURN SENSITIVITY TO GROWTH SURPRISES (1972–2020)



Past performance is no guarantee of future results. Inflation sensitivity measured relative to CPI, an index that tracks the percentage change in the price of a specified "basket" of consumer goods and services. Growth sensitivity measured relative to the Purchasing Manager's Index (PMI) that shows the prevailing trends in the manufacturing and service sectors. Beta is a measure of a variable's sensitivity (response) relative to changes (volatility) in a reference (benchmark), which has a beta of 1. Indexes: U.S. Equity—Dow Jones U.S. Total Stock Market Index℠; Non-U.S. Equity (EM+DM)—MSCI ACWI ex USA Index; Commodities—Bloomberg Commodity Index Total Return℠. Commodity sectors represent categories within the Bloomberg Commodity Index Total Return℠. Equity sectors represent categories within MSCI All Country World Index (ACWI) as defined by the Global Industry Classification Standard (GICS®). Sources: Bureau of Labor Statistics, Fidelity Investments; data 1/1/72 through 10/31/20.

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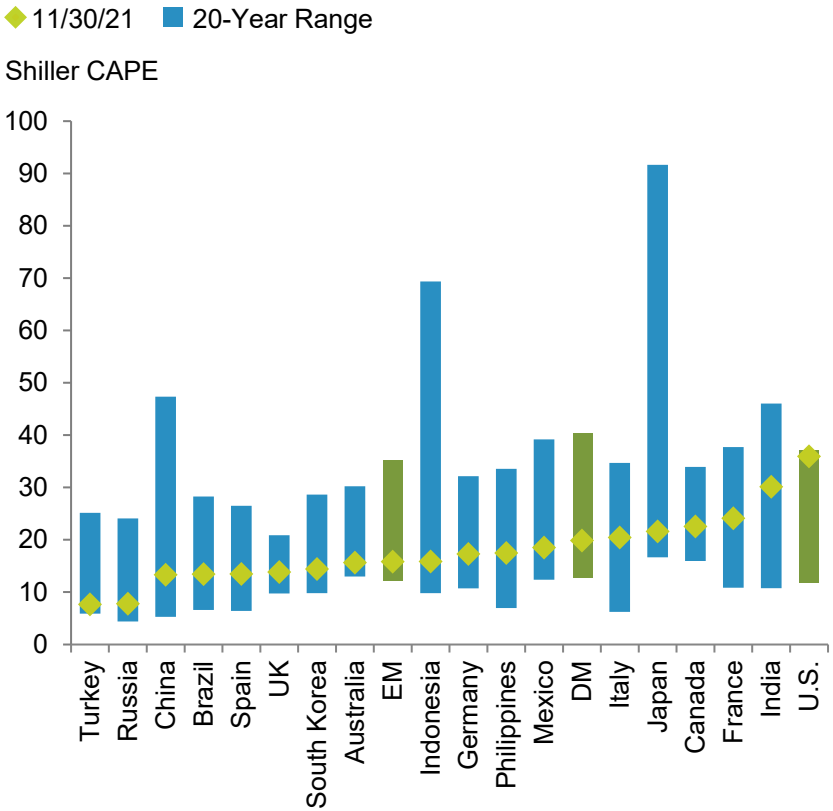
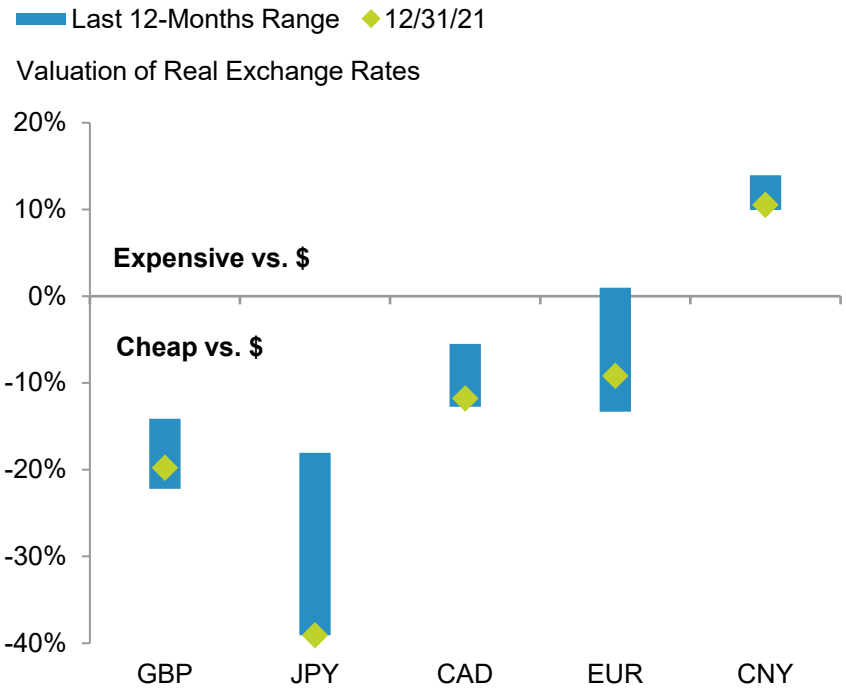
Dollar Strengthened, Non-U.S. Assets Relatively Attractive

Cyclically adjusted P/E (CAPE) ratios for non-U.S. equities remained below U.S. valuations. During 2022, the U.S. dollar rose against most major developed-market currencies, and the valuation of the dollar's real exchange rate remains expensive. These valuation metrics indicate a relatively favorable long-term backdrop for non-U.S. stocks and currencies.

CYCLICALLY ADJUSTED P/Es



VALUATION OF MAJOR CURRENCIES VS. USD



DM: Developed markets. EM: Emerging markets. Past performance is no guarantee of future results. It is not possible to invest directly in an index. All indexes are unmanaged. **LEFT:** Price-to-earnings (P/E) ratio (or multiple): stock price divided by earnings per share, which indicates how much investors are paying for a company's earnings power. Cyclically adjusted earnings are 10-year averages adjusted for inflation. Sources: FactSet, countries' statistical organizations, Haver Analytics, Fidelity Investments (AART), as of 11/30/21. **RIGHT:** GBP—British pound; JPY—Japanese yen; CAD—Canadian dollar; EUR—euro; CNY—Chinese yuan.
Sources: Federal Reserve Board, Haver Analytics, Fidelity Investments (AART), as of 12/31/21.

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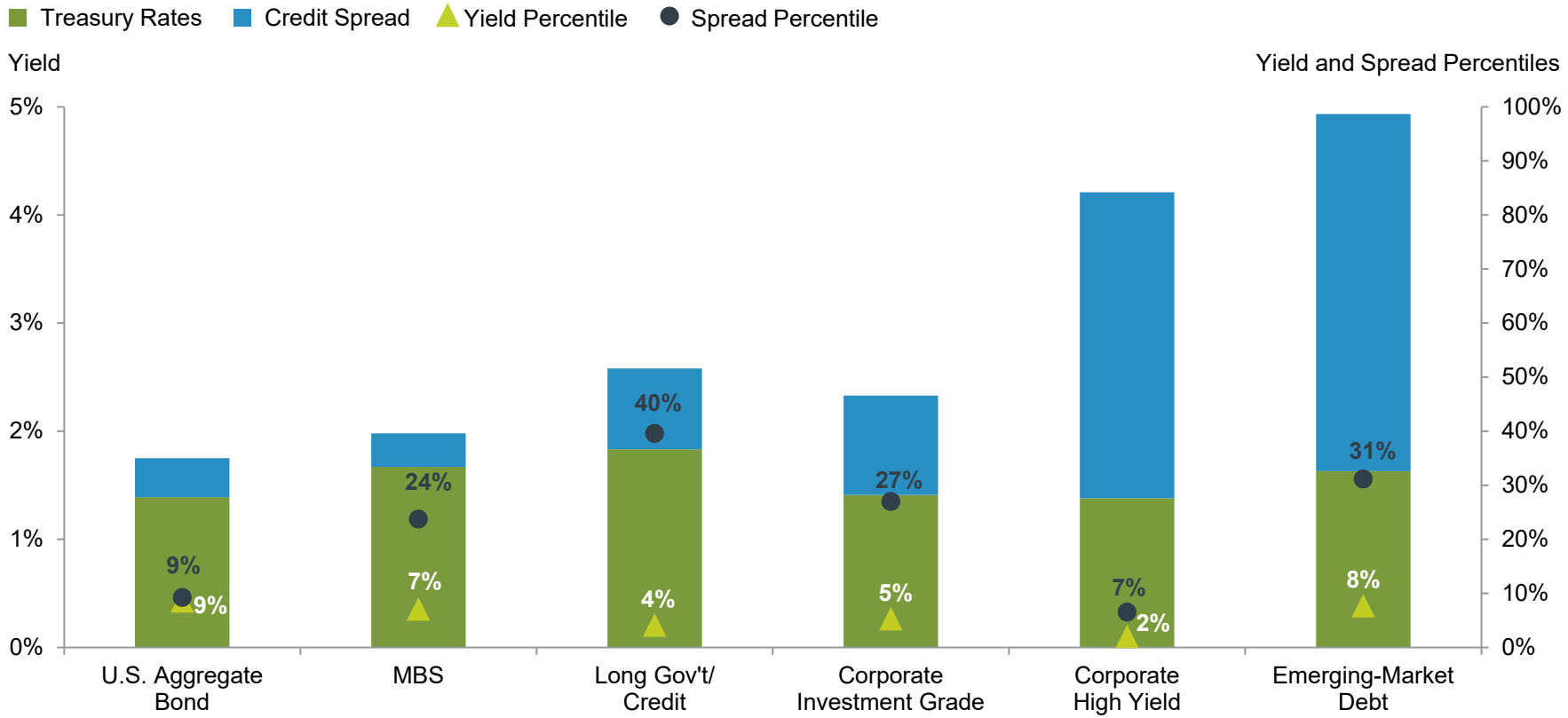
Rates and Spreads Ticked Higher But Remained Very Low

Both interest rates and credit spreads for most bond categories ended Q4 little changed but slightly higher. Bond yields remained in the bottom decile relative to history across all major fixed income categories, and spreads remained tight relative to history. During 2021, falling credit spreads helped offset the negative dynamic of rising bond yields for most categories.

FIXED INCOME YIELDS AND SPREADS (1993–2021)



Past performance is no guarantee of future results. It is not possible to invest directly in an index. All indexes are unmanaged. Percentile ranks of yields and spreads based on historical period from 1993 to 2021. MBS: Mortgage-backed securities. Treasury rates different across asset classes due to different duration for each index. Sources: Bloomberg Finance L.P., Bank of America Merrill Lynch, JP Morgan, Fidelity Investments (AART), as of 12/31/21.

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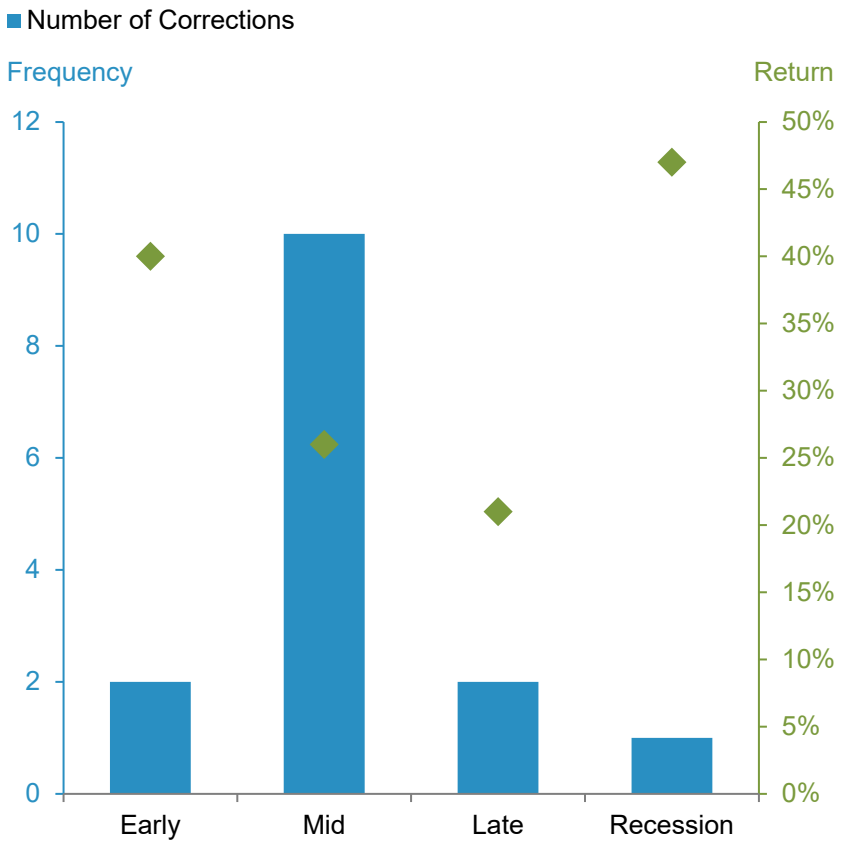
Stock Market Corrections Common in Mid Cycle

The mid-cycle phase of the U.S. business cycle historically has provided a positive backdrop for the performance of riskier asset classes. However, stock market corrections (drawdowns of between 10% and 20%) have occurred more frequently in mid cycle. This volatility often has been relatively short-lived, with the market typically recovering and going on to surpass its prior peak.

S&P 500 MARKET CORRECTIONS SINCE 1950



MID-CYCLE CORRECTIONS

Short, Frequent, and Opportunistic
Average duration 4 months peak to trough
Average 13% drawdown
67% of corrections during mid cycle
8 market corrections over last two mid cycles
26% median 1-year return from trough

Correction defined as a 10% to 20% market decline from peak to trough. Bear market defined as drawdown greater than 20%. Sources: Bloomberg Financial L.P., Fidelity Investments (AART), as of 12/31/21.

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Business Cycle Approach to Equity Sectors

A disciplined business cycle approach to sector allocation seeks to generate active returns by favoring industries that may benefit from cyclical trends. Economically sensitive sectors historically have performed better in the early- and mid-cycle phases of an economic expansion. Meanwhile, companies in defensive sectors with relatively more stable earnings growth have tended to outperform in weaker environments.

BUSINESS CYCLE APPROACH TO SECTORS

Sector	EARLY CYCLE Rebounds	MID CYCLE Peaks	LATE CYCLE Moderates	RECESSION Contracts
Financials	+			
Real Estate	++			--
Consumer Discretionary	++	-	--	
Information Technology	+	+	--	--
Industrials	++			--
Materials	+	--	+	
Consumer Staples			++	++
Health Care	--		++	++
Energy	--		++	
Communication Services		+		-
Utilities	--	-	+	++
	Economically sensitive sectors have tended to outperform, while more defensive sectors have tended to underperform.	Making marginal portfolio allocation changes to manage drawdown risk with sectors may enhance risk-adjusted returns during this cycle.	Defensive and inflation-resistant sectors have tended to perform better, while more cyclical sectors underperform.	Since performance generally has been negative during recessions, investors should focus on the most defensive, historically stable sectors.

Past performance is no guarantee of future results. Sectors as defined by GICS. White line is a theoretical representation of the business cycle as it moves through early, mid, late, and recession phases. Green- and red-shaded portions above respectively represent over- or underperformance relative to the broader market; unshaded (white) portions suggest no clear pattern of over- or underperformance. Double +/– signs indicate that the sector is showing a consistent signal across all three metrics: full-phase average performance, median monthly difference, and cycle hit rate.
A single +/– indicates a mixed or less consistent signal. Return data from 1962 to 2020. Source: Fidelity Investments (AART), as of 12/31/21.

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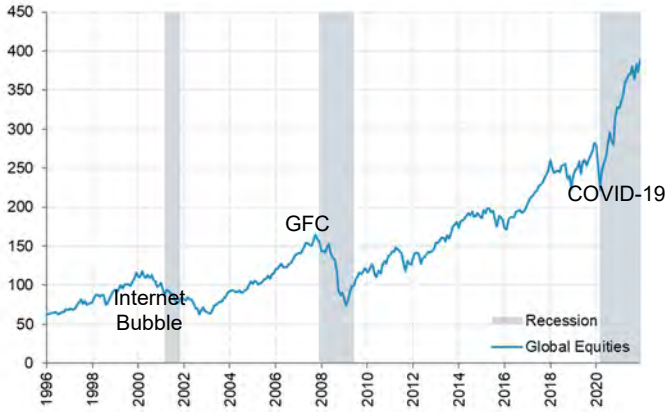
Long-Term Capital Markets Review

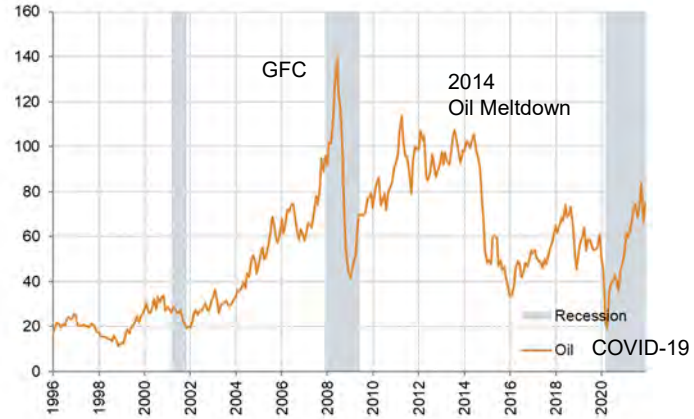
GLOBAL EQUITY PRICES
JANUARY 1996–DECEMBER 2021



U.S. TREASURY YIELDS
JANUARY 1996–DECEMBER 2021

U.S. DOLLAR
JANUARY 1996–DECEMBER 2021

OIL PRICES
JANUARY 1996–DECEMBER 2021



Source: Bloomberg. Indices represented include MSCI All Country World, U.S. 10-Year Treasury Yields, DXY Dollar, and WTI 1st Generic Contract.

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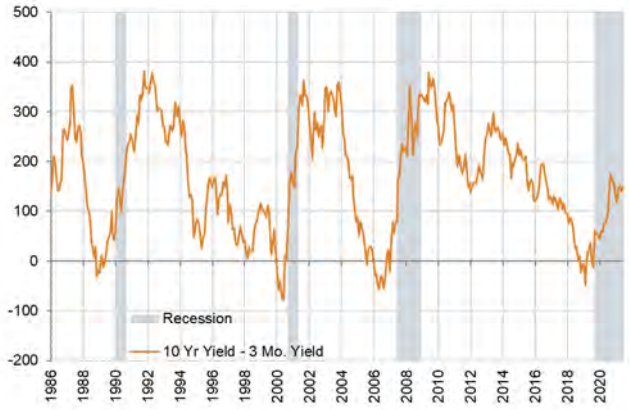
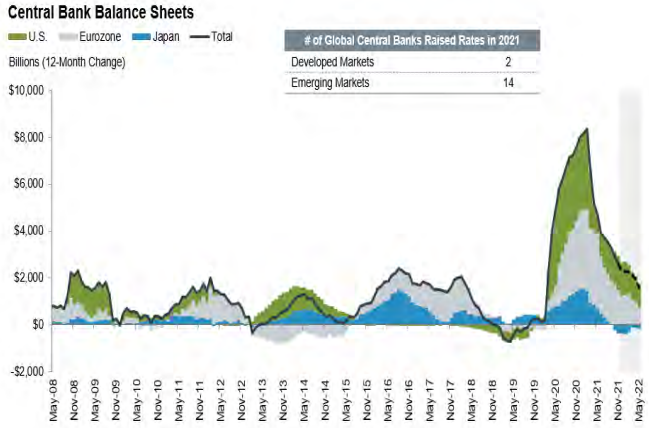
Key Economic Charts

YIELD CURVE STEEPENS AS EXPECTATIONS IMPROVE
JULY 1986–DECEMBER 2021

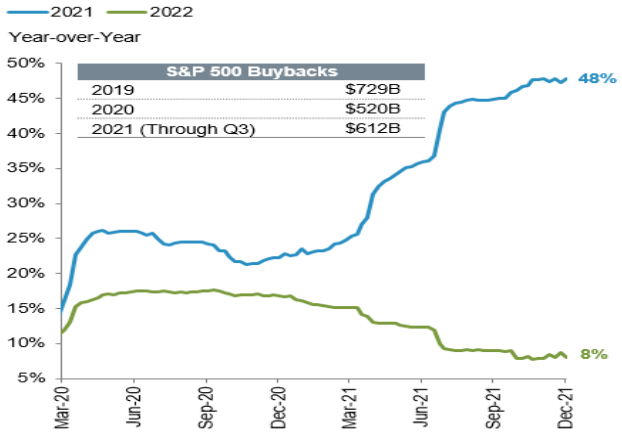


CENTRAL BANK BALANCE SHEETS
APRIL 2007-MAY 2022 (ESTIMATED)



U.S. EQUITIES REMAIN AT ABOVE HISTORICAL VALUATION
DECEMBER 1979–DECEMBER 2021

S&P EARNINGS EXPECTATIONS
MARCH 2020-DECEMBER 2021



Sources: NBER, MSCI, Bloomberg, Haver, AART

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Appendix

Performance Attribution (Gross)

1 Year Period Ending December 31, 2021

Attribution Themes

- Total alpha was positive for the one-year period, both active allocation and underlying managers contributed positively.
- Active allocation (measured by the sum of "Extended Alpha" and "Positioning Alpha") was positive for the one-year period. An underweight to Investment Grade bonds and an overweight to U.S. equities made the largest impact.
- Underlying manager alpha was positive for the period as well. FIAM Broad Market Duration contributed the most to underlying manager alpha, but positive performance was broad based, with U.S. equity and non-U.S. equity managers contributing positively as well.

Asset Class/Security Name	Benchmark Name	Policy Avg Wt	Policy Return	Extended Avg Wt	Extended Alpha	Positioning Return	Positioning Alpha	Alloc Alpha	Fund Return	Fund Ctrb	Select Alpha	Total Alpha
US EQUITIES	**Blended Component BM (1)**	**39.31**	**25.60**	**42.24**	**0.39**	**27.54**	**0.71**	**1.10**	**27.96**	**11.02**	**0.17**	**1.27**
FIAM Smid Cap Core	Russell 2500			4.71		18.18	-0.28		22.05	1.00	0.15	
FIAM Sm Cap Core	Russell 2000			0.34		1.88	-0.07		8.14	0.04	0.02	
Spartan 500 Index	S&P 500			37.19		28.71	1.06		28.71	9.98	0.00	
US REAL ESTATE	**FTSE NAREIT Eq REIT Link**		**10.03**	**0.11**	**0.04**	**10.03**	**0.00**	**0.04**	**8.24**	**0.04**	**-0.01**	**0.03**
FIAM Reit	FTSE NAREIT Eq REIT Link			0.11		10.03	0.00		8.24	0.04	-0.01	
COMMODITIES	**BBG Commodity Ind**		**27.11**	**1.16**	**0.05**	**27.11**	**0.00**	**0.05**	**26.98**	**0.18**	**0.00**	**0.05**
Spartan Commdity Idx	BBG Commodity Ind			1.16		27.11	0.00		26.98	0.18	0.00	
NON-US EQUITIES	**Blended Component BM (2)**	**28.60**	**8.53**	**32.20**	**-0.02**	**7.43**	**-0.37**	**-0.39**	**7.40**	**2.46**	**-0.10**	**-0.49**
NON-US DEVELOPED EQUITIES	**Blended Component BM (3)**	**20.17**	**12.39**	**22.39**	**0.08**	**11.92**	**-0.10**	**-0.02**	**12.78**	**2.91**	**0.15**	**0.13**
FIAM Sisc	S&P EPAC SmallCap (N)			3.40		8.06	-0.15		12.43	0.46	0.15	
Spartan Dev Intl Idx	MSCI Wld ex US (N)			18.99		12.62	0.05		12.86	2.45	0.00	
EMERGING MARKET EQUITIES	**MSCI EM IMI (N)**	**8.43**	**-0.28**	**9.81**	**-0.11**	**-2.54**	**-0.26**	**-0.37**	**-4.34**	**-0.45**	**-0.25**	**-0.62**
FIAM Select Eme	MSCI Emerging Markets (N)			9.81		-2.54	-0.26		-4.34	-0.45	-0.25	
US INVESTMENT GRADE BONDS	**BBg US Agg Bond**	**32.10**	**-1.54**	**18.20**	**1.82**	**-1.54**	**0.00**	**1.82**	**-0.29**	**-0.34**	**0.29**	**2.11**
FIAM Broad Market Duration	BBg US Agg Bond			18.20		-1.54	0.00		-0.29	-0.34	0.29	
US LONG-TERM TREASURIES	**BBg US LT Treasury Bond**		**-4.65**	**2.49**	**-0.37**	**-4.37**	**0.04**	**-0.33**	**-4.62**	**-0.04**	**-0.02**	**-0.35**
FIAM Long U.S. Treasury Strips	BBg US STRIP 25-30 Cus			2.49		-4.37	0.04		-4.62	-0.04	-0.02	
US INFLATION PROTECTED BONDS	**BBg 1-10 TIPS**		**5.69**	**2.88**	**-0.10**	**5.69**	**0.00**	**-0.10**	**5.61**	**0.19**	**0.00**	**-0.10**
FIAM Int Infl Pr Idx	BBg 1-10 TIPS			2.88		5.69	0.00		5.61	0.19	0.00	
US HIGH YIELD	**ICE BofA US HY Const**		**1.81**	**0.71**	**-0.04**	**1.81**	**0.00**	**-0.04**	**1.36**	**0.02**	**-0.02**	**-0.06**
FIAM High Yield Bond	ICE BofA HYII Cons/HYII			0.71		1.81	0.00		1.36	0.02	-0.02	
SHORT-TERM/CASH	**BBG 3M t-bill Bellwether**		**0.04**	**0.03**	**0.00**	**0.04**	**0.00**	**0.00**	**0.17**	**0.00**	**0.00**	**0.00**
FIAM Instl Cash	BBG 3M t-bill Bellwether			0.03		0.04	0.00		0.17	0.00	0.00	
TOTAL PRIMARY	**Alaska R MGMT Board**	**100.00**	**11.08**	**100.00**	**1.76**	**13.23**	**0.39**	**2.15**		**13.54**	**0.31**	**2.46**
TOTAL NON-PRIMARY										0.01		0.01
TOTAL FUND	**Alaska R MGMT Board**	**100.00**	**11.08**	**100.00**	**1.76**	**13.23**	**0.39**	**2.15**	**13.55**	**13.55**	**0.31**	**2.47**

Blended Component BM (1): 11.2% MSCI USA Small Cap (N) + 88.8% MSCI US (N) Blended Component BM (2): 60.1% MSCI Wld ex US (N) + 11.0% MSCI Wld Sm Cap x US (N) + 28.9% MSCI EM IMI (N) Blended Component BM (3): 84.5% MSCI Wld ex US (N) + 15.5% MSCI Wld Sm Cap x US (N)
For illustrative purposes only. Client data shown. Performance shown is gross of any fees and expenses, including advisory fees, which when deducted will reduce returns. Past performance is no guarantee of future results. Performance shown is gross of any fees and expenses, including advisory fees, which when deducted will reduce returns.

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Fidelity INVESTMENTS

Alaska Portfolio Performance

Holdings Performance summary

Performance Returns of Underlying Portfolios	Cumulative Returns		Annualized Returns				
	3-month	1-year	3-year	5-year	10-year	Life of Fund	Inception Date
CAPITAL APPRECIATION							
Spartan 500 Equity Index (Gross)	**11.03**	**28.71**	**26.07**	**---**	**---**	**18.36**	**21.65**
S&P 500	11.03	28.71	26.07	---	---	18.35	21.65
Relative Return (Gross)	0.00	0.00	0.00	---	---	0.01	0.00
Small/Mid Cap Core (Gross)	**3.82**	**22.05**	**21.10**	**12.65**	**14.38**	**11.51**	**16.71**
Russell 2500	3.82	18.18	21.91	13.75	14.15	9.87	16.99
Relative Return (Gross)	0.00	3.87	(0.81)	(1.10)	0.23	1.64	(0.28)
							3/31/21
FIAM Sm Cap Core Pool - A	**3.87**	**21.01**	**24.39**	**15.08**	**16.20**	**12.10**	**8.17**
Russell 2000	2.14	14.82	20.02	12.02	13.23	9.86	1.88
Relative Return (Gross)	1.73	6.19	4.37	3.06	2.97	2.24	6.29
Select International Small Cap Gross)	**1.79**	**12.43**	**19.17**	**13.14**	**12.72**	**11.65**	**15.03**
S&P EPAC Small Cap (N)	(0.71)	8.06	15.00	10.57	10.42	9.61	11.54
Relative Return (Gross)	2.50	4.37	4.17	2.57	2.30	2.04	3.49
Spartan Dev Intl Idx (Gross)	**3.59**	**12.86**	**14.43**	**---**	**---**	**7.94**	**11.78**
MSCI World ex US (N)	3.14	12.62	14.07	---	---	7.55	11.37
Relative Return (Gross)	0.45	0.24	0.36	---	---	0.39	0.41
Spartan Commodity Index (Gross)	**(1.41)**	**26.98**	**9.74**	**---**	**---**	**5.23**	**6.63**
BBG Commodity Ind TR	(1.56)	27.11	9.86	---	---	5.33	6.70
Relative Return (Gross)	0.15	(0.13)	(0.12)	---	---	(0.10)	(0.07)
Select Emerging Market Equity (Gross)	**(1.01)**	**(4.34)**	**14.34**	**12.30**	**7.73**	**11.05**	**14.03**
MSCI Emerging Markets (N)	(1.31)	(2.54)	10.94	9.87	5.49	9.87	10.81
Relative Return (Gross)	0.30	(1.80)	3.40	2.43	2.24	1.18	3.22

As of 12/31/21.

Client data shown.

Performance shown is gross of any fees and expenses, including advisory fees, which when deducted will reduce returns.

Past performance is no guarantee of future results.

Source: Fidelity Investments.

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Fidelity INVESTMENTS

Alaska Portfolio Performance

Holdings Performance summary

	Cumulative Returns		Annualized Returns				
	3-month	1-year	3-year	5-year	10-year	Life of Fund	Inception Date
CAPITAL APPRECIATION, cont.							8/31/21
FIAM REIT Pool – A (Gross)	**14.43**	**39.98**	**20.84**	**12.03**	**12.38**	**10.95**	**8.27**
FTSE NAREIT Eq REIT Link	16.31	43.24	18.41	10.75	11.38	10.03	10.03
Relative Return (Gross)	(1.88)	(3.26)	2.43	1.28	1.00	0.92	(1.76)
CAPITAL PRESERVATION							
Broad Market Duration (Gross)	**0.16**	**(0.29)**	**6.57**	**4.75**	**4.02**	**5.89**	**6.87**
BBg U.S. Agg Bond	0.01	(1.54)	4.79	3.57	2.90	5.33	5.33
Relative Return (Gross)	0.15	1.25	1.78	1.18	1.12	0.56	1.54
Intermediate Inflation Protected Index (Gross)	**1.46**	**5.61**	**6.91**	**4.43**	**2.53**	**3.35**	**6.77**
BBg 1-10 TIPS	1.54	5.69	6.97	4.46	2.57	3.38	6.84
Relative Return (Gross)	(0.08)	(0.08)	(0.06)	(0.03)	(0.04)	(0.03)	(0.07)
US Long STRIPS (Gross)	**5.98**	**(4.62)**	**12.91**	**9.51**	**---**	**7.07**	**3.29**
BBg US STRIPS 25-30	6.44	(4.37)	13.31	9.71	---	7.36	3.59
Relative Return (Gross)	(0.46)	(0.25)	(0.40)	(0.20)	---	(0.29)	(0.30)
Institutional Cash (Gross)	**0.04**	**0.17**	**1.10**	**1.37**	**0.89**	**1.40**	**1.18**
BBg 3M T-Bill	0.01	0.04	1.00	1.15	0.64	1.08	1.07
Relative Return (Gross)	0.03	0.13	0.10	0.22	0.25	0.32	0.11

As of 12/31/21.

Client data shown.

Performance shown is gross of any fees and expenses, including advisory fees, which when deducted will reduce returns.

Past performance is no guarantee of future results.

Source: Fidelity Investments.

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Fidelity INVESTMENTS

Biographies

Jordan Alexiev, CFA

Portfolio Manager

Jordan Alexiev is a portfolio manager in the Global Institutional Solutions (GIS) group at Fidelity Investments. Fidelity Investments is a leading provider of investment management, retirement planning, portfolio guidance, brokerage, benefits outsourcing, and other financial products and services to institutions, financial intermediaries, and individuals. GIS is an investment team within Fidelity's Asset Management Solutions division, an integrated investment, distribution, and client service organization dedicated to meeting the unique needs of the institutional marketplace.

In this role, Mr. Alexiev manages custom multi-asset class mandates for institutional investors and financial intermediaries. The team is dedicated to serving the needs of institutional asset owners that seek strategic support, guidance, customization, and active allocation.

Prior to assuming his current role in January 2021, Mr. Alexiev was a team leader in the Asset Allocation Research Team (AART) and was responsible for analyzing and synthesizing investment perspectives across Fidelity's asset management unit to generate insights on macroeconomic and financial market trends and their implications for asset allocation.

Prior to joining Fidelity in 2011, Mr. Alexiev was vice president and head of currency research at State Street. In this role, Mr. Alexiev was responsible for quantitative asset allocation research and was involved with managing active currency programs. He has been in the financial industry since 2003.

Mr. Alexiev earned his bachelor of science degree in economics and marketing from West Virginia Wesleyan College and his master of business administration and master of science in finance degrees from Boston College. He is also a CFA® charterholder.

Biographies

Kristin Shofner

Senior Vice President, Business Development

Kristin Shofner is senior vice president of business development within the Asset Management Solutions division at Fidelity Investments. Fidelity Investments is a leading provider of investment management, retirement planning, portfolio guidance, brokerage, benefits outsourcing, and other financial products and services to institutions, financial intermediaries, and individuals. The Fidelity Asset Management Solutions division is an integrated investment, distribution, and client service organization dedicated to meeting the unique needs of the institutional marketplace.

In this role, Ms. Shofner leads the development of relationships with public pension plans.

Prior to joining Fidelity in 2013, Ms. Shofner served as director of institutional sales and marketing at Lord, Abbett & Co. LLC. Previously, she served as manager of institutional sales and client services and as a manager research associate at Asset Strategy Consulting, later acquired by InvestorForce. She has been in the financial industry since 1998.

Ms. Shofner earned her bachelor of arts degree in history and sociology from the University of California at Santa Barbara where she ran Division I Cross Country and Track & Field. She was also a member of our United States Ekiden Relay Team in China and ran in the US Olympic Trials Women's Steeplechase in Atlanta.

Important Information

Please read this information carefully. Speak with your relationship manager if you have any questions.

This document does not make an offer or solicitation to buy or sell any securities or services, and is not investment advice. FIAM does not provide legal or tax advice and we encourage you to consult your own lawyer, accountant, or other advisor before making an investment.

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Risks

Past performance is no guarantee of future results. Investors should be aware that an investment's value may be volatile and involves the risk that you may lose money. Performance for individual accounts will differ from performance for composites and representative accounts due to factors, including but not limited to, portfolio size, trading restrictions, account objectives and restrictions, and factors specific to a particular investment structure. Representative account information is based on an account in that strategy's composite that generally reflects that strategy's management and is not based on performance of that account.

The value of a strategy's investments will vary in response to many factors, including adverse issuer, political, regulatory, market, or economic developments. The value of an individual security or a particular type of security can be more volatile than and perform differently from the market as a whole. Nearly all accounts are subject to volatility in non-U.S. markets, either through direct exposure or indirect effects on U.S. markets from events abroad, including fluctuations in foreign currency exchange rates and, in the case of less developed markets, currency illiquidity. Events such as natural disasters, pandemics, epidemics, and social unrest in one country, region, or financial market may adversely impact issuers in a different country, region, or financial market. Performance could be negatively impacted if the value of a portfolio holding were harmed by such political or economic conditions or events. Moreover, such negative political and economic conditions and events could disrupt the processes necessary for investment operations.

The performance of fixed income strategies will change daily based on changes in interest rates and market conditions and in response to other economic, political, or financial developments. Debt securities are sensitive to changes in interest rates depending on their maturity, and may involve the risk that their prices may decline if interest rates rise or, conversely, if interest rates decline, their prices may increase. Debt securities carry the risk of default, prepayment risk, and inflation risk. Changes specific to an issuer, such as its financial condition or its economic environment, can affect the credit quality or value of an issuer's securities. Lower-quality debt securities (those rated or considered below investment-grade quality, also referred to as high-yield debt securities) and certain types of other securities are more volatile, speculative and involve greater risk due to increased sensitivity to adverse issuer, political, regulatory, and market developments, especially in periods of general economic difficulty. The value of mortgage securities may change due to shifts in the market's perception of issuers and changes in interest rates, regulatory, or tax changes.

Derivatives may be volatile and involve significant risk, such as credit risk, currency risk, leverage risk, counterparty risk, and liquidity risk. Using derivatives can disproportionately increase losses and reduce opportunities for gains in certain circumstances.

These materials contain statements that are "forward-looking statements," which are based on certain assumptions of future events. FIAM does not assume any duty to update any forward-looking statement. Actual events may differ from those assumed. There can be no assurance that forward-looking statements, including any projected returns, will materialize or that actual market conditions and/or performance results will not be materially different or worse than those presented.

Important Information, continued

Performance Data
Unless otherwise indicated performance data shown is client data. Performance data is generally presented gross of any fees and expenses, including advisory fees, which when deducted will reduce returns. All results reflect realized and unrealized appreciation and the reinvestment of dividends and investment income, if applicable. Taxes have not been deducted.

FIAM claims compliance with the Global Investment Performance Standards (GIPS®). In conducting its investment advisory activities, FIAM utilizes certain assets, resources and investment personnel of Fidelity Management & Research Company LLC and its affiliates, which do not claim compliance with GIPS®. Performance for individual accounts will differ from performance for composites and representative accounts due to factors, including but not limited to, portfolio size, trading restrictions, account objectives and restrictions, and factors specific to a particular investment structure. If representative account information is shown, it is based on an account in the subject strategy's composite that generally reflects that strategy's management and is not based on performance.

* * * *

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"Fidelity Investments" and/or "Fidelity" refers collectively to FMR LLC, a U.S. company, and its subsidiaries, including but not limited to Fidelity Management & Research Company LLC (FMR), FIAM LLC and FIAM TC.

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PineBridge Investments

Mandate: **Tactical Allocation** **Hired:** **2018**

Firm Information

PineBridge Investments is a private global asset manager focused on active high-conviction investing. The firm is majority-owned by a subsidiary of Pacific Century Group, an Asia-based private investment group. PineBridge was formerly the asset management division of AIG and has been independent since 2010.

As of 12/31/2021, the firm's total assets under management were $148.7 billion.

Key Executives:
Michael Kelly, *Managing Director, Head of Multi Asset*
Sunny Ng, *Managing Director*
Deanne Nezas, *Managing Director*
Joy Booker, *Managing Director*
Joe Fague, *Senior Vice President*

Investment Approach

The PineBridge Global Dynamic Asset Allocation strategy is a multi-asset class portfolio whose objective is to deliver CPI +5% returns, and 200 bps of excess return over the benchmark, over a full market cycle.

The portfolio is constructed based on PineBridge's 5-year capital market line (CML). A portfolio risk level relative to the benchmark is set based on the assessment of the capital market line and investment convictions around an intermediate-term time horizon. An optimal portfolio is created based on this view with a preference for those asset classes with the highest expected Sharpe Ratios. The CML is updated on a quarterly basis.

The ARMB strategy allows for selective active management of underlying strategies resulting in more passive management than PineBridge's traditional portfolio. The purpose is to lower overall fees.

Benchmark: Blended Benchmark
60% MSCI ACWI and 40% Bloomberg Barclays Global Treasury until 3/31/2021 then, 70% MSCI ACWI, 30% Bloomberg Barclays US Aggregate Bond Index

Total ARMB Mandate

Assets Under Management ($millions):
12/31/2021: $638

Concerns: None

12/31/2021 Performance (net of fees)

	Last Quarter	1-Year	3-Years Annualized	5-Years Annualized
PineBridge	2.70%	9.65%	12.63%	-
Benchmark	4.29%	9.79%	13.98%	-

PineBridge® INVESTMENTS

A Presentation to:

Alaska Retirement Management Board

March 2022

PineBridge Global Dynamic Asset Allocation

Investment Outlook

Presented By:

Michael Kelly, CFA
Managing Director
Global Head of Multi-Asset
PineBridge Investments

Sunny Ng, CFA
Managing Director
Portfolio Manager
PineBridge Investments

Capital at Risk: All investments involve risk. The value of your investment and the income from it will fluctuate and a loss of capital June occur.
This material must be read in conjunction with the Disclosure Statement.

Team Biographies

Michael J. Kelly, CFA
Managing Director,
Global Head of Multi-Asset
PineBridge Investments,
New York

Mr. Kelly joined the firm in 1999 and is responsible for overseeing the firm's global multi-asset business. Mr. Kelly founded the firm's Multi-Asset investment process and integrated several formerly independent regional balanced teams into one global team focused on total return oriented asset allocation, as well as manager selection. Today, the team's flagship total return strategy has one of the longest track records focused on CPI + 5% oriented investing (over rolling 5 year periods) versus a relative return investment strategy. Mr. Kelly also serves as a member of the firm's Governance Committee and Management Committee and chairs the firm's Stewardship Committee. Prior to joining the firm, he spent 15 years in various equity research and portfolio management roles at JPMorgan Investment Management. During his last five years at JPMorgan, he also chaired their US Asset Allocation Committee. Prior to that, he spent several years in economic research at the economic consulting firm Townsend-Greenspan & Co. He holds an MBA from the Wharton Graduate School of Business. He also is a CFA charterholder.

Sunny Ng, CFA
Managing Director,
Portfolio Manager, Global Multi-Asset
PineBridge Investments,
New York

Mr. Ng joined the firm in 2016 and is a portfolio manager for several of the teams' accounts and funds and is responsible for the Global Multi-Asset Team's client-facing activities globally. Prior to joining the firm, Mr. Ng was a Managing Director and Head of Asia ex Japan Portfolio Strategists at State Street Global Advisors (SSGA), where he was responsible for leading the regional team representing SSGA investment views and strategies to clients across Asia. Prior to that, Mr. Ng was Research Director for Morningstar Asia, where he was responsible for overseeing and building out the firm's funds research platform in Hong Kong, Singapore, and Taiwan. Prior to that, Mr. Ng held positions at AllianceBernstein and Pavilion Advisory Group, where he founded the quantitative strategies group. Mr. Ng has been active in industry research and has multiple articles published in the Journal of Portfolio Management, including "A Constant Volatility Framework for Managing Tail Risk," which received the AIMA Hillsdale Research award for best paper in 2010. He holds Bachelor of Commerce and MBA degrees from Concordia University in Montreal. He also is a CFA charterholder.

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Section I

Introduction to PineBridge Investments

A Heritage of Active High Conviction Investing

PineBridge Investments

We are a **private, global asset manager** with a **focus on active, high conviction investing**

Independent since 2010, the firm draws on **decades of investment experience and a history** of managing money for sophisticated investors

Our clients include **corporate** and **public pensions, insurance companies, sovereign wealth funds, endowments and foundations, intermediaries** and **high net worth individuals**

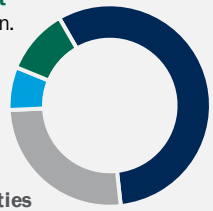
The firm has more than 700 employees, including approximately 230 investment professionals[1] in **25 office locations** around the world.

Total Firm AUM: US $148.7 bn.

Client AUM By Region[2]

AUM by Channel[2]

Investment Capabilities[2]



Data as of 31 December 2021. [1] Investment professionals include portfolio managers, research analysts, traders, portfolio strategists and product specialists, and are subject to change. [2] US$39.7 billion (US$22.3 billion equities, US$17.4 billion fixed income) of assets managed by joint ventures or other entities not wholly owned by PineBridge Investments. Includes PineBridge Benson Elliot Real Estate AUM of US$3.0 billion. [3] Multi-Asset includes US$8.3 billion allocated opportunistically by the Multi-Asset team to PineBridge equity, fixed income and alternative strategies. Due to rounding totals are approximate.

PineBridge® INVESTMENTS

Employees Are Core to Our Responsibility Efforts

Employee-led committees drive environmental, social, and governance principles across corporate, investment and client activities

Pensions & Investments' **Best Places to Work** for two consecutive years (US)[1]

Diversity & Inclusion

An **inclusive, private equity networking organization** for women in the real estate (WIRE) industry.

PineBridge | Women's Network
PineBridge | GenBridge Network
PineBridge | LGBTQ+ & Allies Network
PineBridge | Black Employee Network

Employee-led resource groups champion inclusion and empowerment across the lenses of diversity.

Winner, *Citywire's* inaugural **Gender Diversity Awards**[2]

Founding Signatory, **Diversity in Action Initiative**[3]

Internships

- New York -
- London -
- Hong Kong -

ESG Investing & Stewardship

'A+' rating: overall approach to Strategy and Governance placing us in the top quartile of asset managers rated by the PRI[4]

Investor and partner with the IFC in landmark Global Social Bond Program to fight Covid-19[5]

Published thought leader and active industry participant

NET ZERO ASSET MANAGERS INITIATVE

Fundraising & Community Engagement

Partnerships

The Opportunity Network (US)

Educational and professional opportunities for young people from historically underrepresented backgrounds.

Young Minds (UK)

The UK's leading charity fighting for youth mental health.

As of 31 December 2021. For illustrative purposes only. We are not soliciting or recommending any action based on this material. [1]For the Best Places to Work in Money Management, Pensions & Investments partnered with Best Companies Group, a research firm, to conduct a two-part survey for employers and their employees. For details on eligibility criteria and the survey's methodology, please visit https://www.bestplacestoworkmm.com/eligibility-criteria. [2]*Citywire* Gender Diversity Awards recognize progress by fund management groups on the representation of women and gender diversity practices, December 2020. For further details, please visit https://www.citywire.co.uk/wealth-manager/news/gender-diversity-awards-fund-group-winners-revealed/a1437029?ref=author/mkirakosian. [3]Institutional Limited Partners Association includes 550+ member institutions representing over US$2 trillion of private equity AUM launched their DIA initiative in December 2020. [4]To access the Full Assessment Report visit https://www.pinebridge.com/PRI-assessment. To access the Transparency Report visit: https://www.pinebridge.com/PRI-transparency. Principles for Responsible Investment (PRI) ratings are based upon information reported by PRI signatories. For further details on PRI methodology, please visit www.unpri.org/signatories/about-pri-assessment. PineBridge Investments has been a PRI signatory since 22 June 2015. Third-party rankings and recognition are no guarantee of future investment success. Working with a highly rated advisor does not ensure that a client or prospective client will experience a higher level of performance or results. Ratings should not be construed as an endorsement of the advisor by any client nor are they representative of any one client's evaluation. [5]IFC issued US$1bn three-year Global Social Bond on 11 March 2020 to support resilience-building programs against Covid-19. The issuance was widely recognized as a historic transaction given challenging market conditions at the time.

PineBridge® INVESTMENTS

Section II

Executive Summary

A Global Team Approach

Experienced and Stable Team Leverages PineBridge's Ecosystem

Michael Kelly
Global Head of Multi-Asset
New York
36 Years of Experience

Strategy & Research

Hani Redha
Managing Director
London
22 Years of Experience

Steven Lin*
Managing Director
New York
24 Years of Experience

Jonathan DePeri
Vice President
New York
14 Years of Experience

Mikhail Johaadien
Vice President
London
13 Years of Experience

Pranit Chordiya
Research Analyst
Mumbai
4 Years Experience

Saurabh Gokhale
Research Analyst
Mumbai
4 Years of Experience

Ian Huynh
Research Analyst
London
1 Year of Experience

Manager Selection

Chair PB ESG Committee
Paul Mazzacano
Managing Director
New York
28 Years of Experience

Eric Hsing
Senior Manager
Taipei
16 Years of Experience

Allison Fang
Senior Manager
Taipei
12 Years of Experience

Priya Shah
Associate
Mumbai
3 Years of Experience

Economics

Markus Schomer
Managing Director
New York
27 Years of Experience

Portfolio Implementation

Peter Hu
Managing Director
New York
18 Years of Experience

Chair ESG MA Process
Deanne Nezas*
Managing Director
New York
37 Years of Experience

Jose Aragon
Managing Director
New York
19 Years of Experience

Austin Strube
Vice President
New York
11 Years of Experience

Sean Jo
Vice President
New York
10 Years of Experience

Kaustubh Tiwari
Associate
Mumbai
1 Year of Experience

Portfolio Strategy

Sunny Ng
Managing Director
New York
19 Years of Experience

Mary Nicola
Senior Vice President
Singapore
14 Years of Experience

Jonathan DiMola
Vice President
New York
10 Years of Experience

Kimberly Tong
Senior Analyst
Hong Kong
6 Years of Experience

Kaveri Bachchhav
Associate
Mumbai
4 Years of Experience

Team members in

New York | Hong Kong | Mumbai
London | Singapore | Taipei

PineBridge's global network of investment professionals[1]

Fixed Income	Equity	Rates and Macro	Global FX	Economics	Alternatives
Steven Oh Managing Director, Global Head of Credit & Fixed Income Los Angeles	**Anik Sen** Managing Director, Global Head of Equities New York	**Roberto Coronado** Senior Vice President, Portfolio Manager London	**Anders Faergemann** Managing Director, Senior Sovereign PM London	**Markus Schomer** Managing Director, Chief Economist New York	**Steve Costabile** Managing Director, Global Head of Private Funds Group New York

As of 31 January 2022. [1]Investment professionals include portfolio managers, research analysts, traders, portfolio strategists, and product specialists; subject to change.
* Steven Lin and Deanne Nezas have dotted reporting lines to Michael Kelly in their roles as Head of Risk and Chair of the ESG MA process respectively

PineBridge® INVESTMENTS

Multi-Asset Solutions Meet Different Portfolio Needs

GDAA: An Alternative to Growth Assets

PineBridge GDAA

	Alternatives to Growth Assets	Strategic Mixes	Alternatives to Capital Preservation Assets
Nature of Return ►	Total Return	Relative Return	Absolute Return
Description ►	Target equity-like returns but with lower volatility	60/40 replacement with various risk management approaches, e.g. Diversified Growth Funds, Levered Risk Parity, Levered Risk Premia	Target volatility of fixed income but with potential for higher returns and low interest rate sensitivity
Objective Return (p.a.) ►	CPI[1] plus 5-6%	Relative Return Benchmark	CPI[1] plus 2-3%
Objective Risk (Volatility p.a.) ►	8-10% p.a.	5-7% p.a.	3-4% p.a.
Role in Portfolio Context ►	Dynamically manage risk between equities and fixed income	Diversify by introducing additional asset classes	Structurally balance risks to mitigate short-term downdrafts and reduce interest rate sensitivity

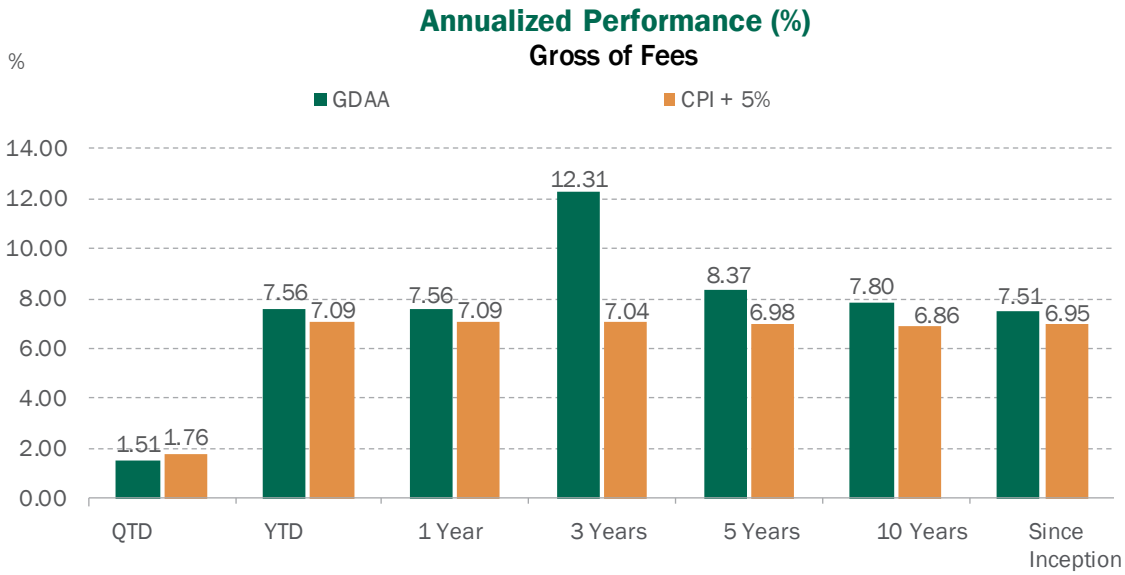
- **'Liquid alternatives' strategy**
- **Outcomes-based**
- **Diversifier for traditional equity/fixed income portfolios**

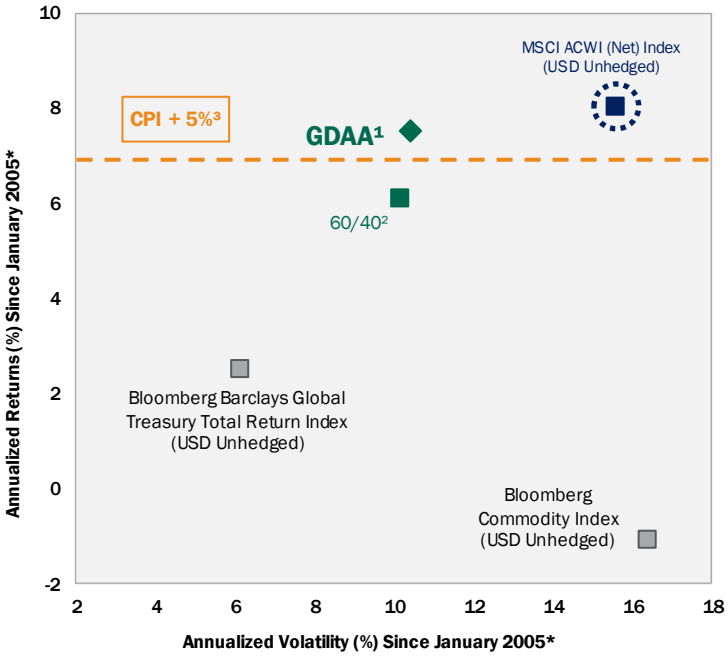
Common Characteristics

As of 31 January 2022. **There is no assurance that any investment objective or target will be achieved.** Please refer to the Sound Basis Disclosure. The targeted returns provided are used as an estimated guideline or comparative measure regarding annual performance returns averaged over a time horizon. They reflect a guideline which the investment manager considers reasonable having considered the current industry and interest rate environment as well as quantitative and qualitative analyses. If one or more of the assumptions used in the formulation of the targeted returns turns out to be incorrect, the target may not be achieved. Targeted returns do not take into account unanticipated material changes in the market and/or other economic conditions affecting the investments, transaction costs that may arise, the imposition of taxes and the actual sale or trade of investments. Targeted returns should not be relied upon. Strategic Mixes and Alternatives to Capital Preservation Assets do not represent PineBridge products and are offered for purposes of comparison only. [1]CPI is defined as US CPI ex-food & energy.

PineBridge® INVESTMENTS

PineBridge Multi-Asset
Composite Performance





Annualized Performance (%)
Net of Fees

	QTR	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception
PineBridge GDAA (Net of fees)	1.40	7.08	7.08	11.83	7.92	7.39	7.23
CPI+5%	1.76	7.09	7.09	7.04	6.98	6.86	6.95

As of December 31, 2021. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Reflects the performance of the PineBridge Multi-Asset Composite (the "Composite"). The performance returns in this presentation do not reflect the deduction of management and incentive fees and expenses and would be reduced by such fees and other expenses. The performance results presented are gross of fees and do not reflect the deduction of investment advisory fees and expenses. **There is no assurance that any investment objective or target will be achieved.** Please refer to the Sound Basis Disclosure in the Appendix. For further performance information, as well as the Composite's complete benchmark information, please see the Schedule of Rates of Return and Notes to the Schedule of Rates of Return. **Past performance is not indicative of future results.** *Annualized Returns and Annualized Volatility are shown since inception of the PineBridge Multi-Asset Composite The inception date of the Composite is 1 January 2005. [1]PineBridge Multi-Asset Composite. [2]The 60/40 Risk Budget represents 60% MSCI ACWI (Net) Index/40% FTSE World Government Bond Index (USD Unhedged) from 1 January 2005 to 31 July 2018 and 60% MSCI ACWI (Net) Index/40% Bloomberg Barclays Global Treasury Total Return Index (USD Unhedged) from 1 August 2018 to date. Risk budget is the overall portfolio's risk which seeks to average to the risk of 60/40 global equity/global bond mix over full cycles. Effective 1 October 2019, the primary benchmark was retroactively switched to CPI+5% and renamed the primary objective, and the secondary benchmark was retroactively changed to 60/40 and renamed the risk budget. [3]CPI measured as the 5 year rolling average US Consumer Price Index ("CPI") Urban Consumers, less Food and Energy, plus 5% annualized ("CPI+5%"); rebalanced monthly.

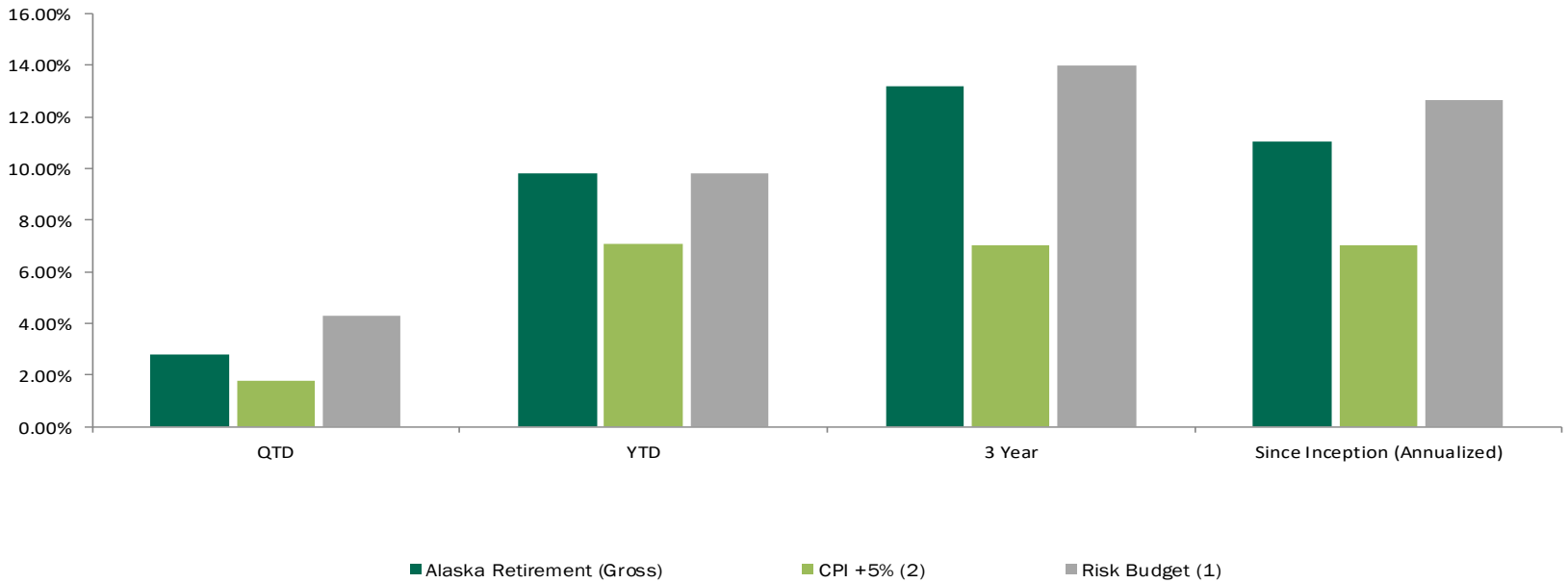
PineBridge® INVESTMENTS

Alaska Retirement Management Board

As of 31 December 2021

Performance Returns

	Market Value	Inception Date	QTD	YTD	3 Year	Since Inception (Annualized)
Alaska Retirement (Gross)	$ 629,881,991	10/31/2018	2.80%	9.79%	13.16%	11.02%
Risk Budget (1)			4.29%	9.78%	13.97%	12.65%
CPI +5% (2)			1.76%	7.09%	7.04%	7.04%
Over/Under Performance vs CPI +5% (2)			1.04%	2.70%	6.12%	3.98%



(1) The risk budget is 70% MSCI All Country World IMI Index (Net) + 30% Bloomberg US Aggregate Index from 3/31/2021 to present. The risk budget for the portfolio from inception through 3/31/2021 was 60% MSCI All Country World Index (Net) + 40% Bloomberg Global Treasury Total Return Index Value Unhedged. Performance for periods less than one year is not annualized. Past performance is not indicative of future results.

(2) CPI measured as the 5 year rolling average US Consumer Price Index ("CPI") Urban Consumers, less Food and Energy, plus 5% annualized ("CPI+5%"); rebalanced monthly. The CPI is a measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services.

*Performance includes the period October 31, 2018 – Current report date.

PineBridge® INVESTMENTS

Section III

Our Solution & Approach

Investment Philosophy

We Believe

Fundamentals ultimately drive markets

An **intermediate time horizon** allows market prices to converge towards fundamentals

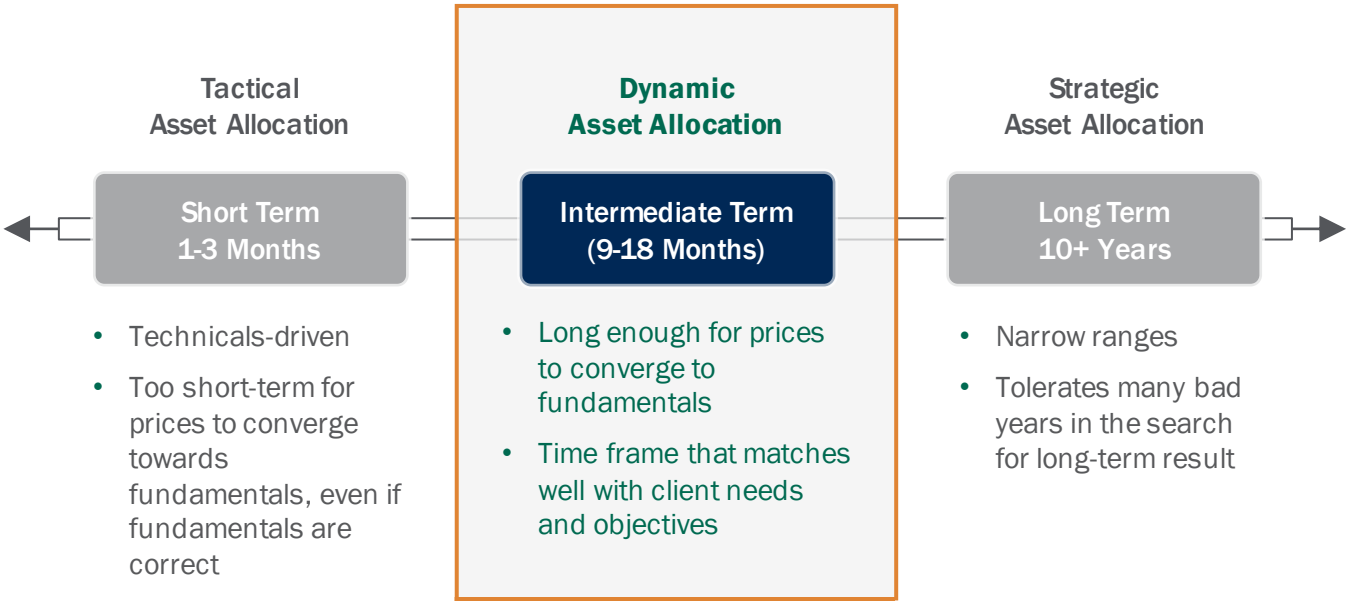
Each cycle is unique

A culture that **supports and encourages differences in opinion** drives better investment outcomes

Risk and return are equally important

Diversification alone fails to protect during periods of stress

PineBridge's Approach to Dynamic Asset Allocation is based on an intermediate-term perspective, allowing opportunistic positioning with wide asset class ranges



Any views represent the opinion of the investment manager and are subject to change. **There is no assurance that any investment objective will be achieved.**

PineBridge® INVESTMENTS

Investment Process

Time-Tested, Methodical, and Repeatable Process

	Capital Market Line (5-Year Fundamental View)	Multi-Asset Strategy (Intermediate View)	Rigorous Portfolio Implementation
	Identifies attractively valued asset classes based on fundamentals over the next 5 years, including ESG Outlook and impact on cash flows	• Decides level of risk to take • Determines asset classes with highest potential of improving fundamentals over 9-18 months, with review of ESG Outlook and consideration of ESG Engagement Level	• Uses outputs from Steps 1 and 2 to build efficient portfolio • Select/monitor underlying strategies • Implement with consideration of ESG Engagement Level
FREQUENCY	Quarterly	Monthly	Daily
OUTPUT	• Expected asset class return, risk, and correlation on 5-year, forward-looking basis	• Risk positioning, the Risk Dial Score (RDS)[1] • Asset class convictions	• Efficient frontier using mandate guidelines and Smart Benchmark[2] based on Risk Dial Score • Final portfolio position based on convictions
RESPONSIBILITY	Global Multi-Asset Team	Global Multi-Asset Team	Portfolio Implementation teams

[1]Numeric score determined by Investment Team indicative of its relative preference towards risk; 1 – most risk-seeking; 3 – neutral; 5 – most risk-averse. [2]Smart Benchmark is the selected point on the efficient frontier that reflects the Risk Dial Score; it is the most efficient portfolio that the portfolio implementation step uses as a basis prior to over or underweighting this portfolio based on intermediate term asset class convictions.

PineBridge® INVESTMENTS

Section IV

Investment Outlook

Regimes Are Not Permanent

Yet Protracted Adjustment Periods Within and Across Business Cycles

LOWER INFLATION ⟷ HIGHER INFLATION

LOWER RATES ↑ ↓ HIGHER RATES

Stall Speed

- **Excess Supply** in **Money Market**
- **Excess Supply** in **Real Economy**
- Central banks rely on unconventional policies to boost demand

EXCESS SUPPLY IN MARKET OF MONEY

Reflation

- **Recovery in Demand** in **Real Economy**
- **Excess Supply** in **Money Market**
- Inflation is stable around target and credit spreads/bond yields are stable

EXCESS SUPPLY IN REAL ECONOMY

Balanced Growth

- **Transition between Reflation vs. Running Hot**

EXCESS DEMAND IN REAL ECONOMY

Running Hot

- **Recovery in Supply** in **Real Economy**
- **Excess Demand** in **Money Market**
- Demand harnessed by central bank's tightening monetary policies

EXCESS DEMAND IN MARKET OF MONEY

Overheating

- **Excess Demand** in **Real Economy**
- **Excess Demand** in **Money Market**
- Liquidity tightens in either forms of widening credit spreads or bond yield increases

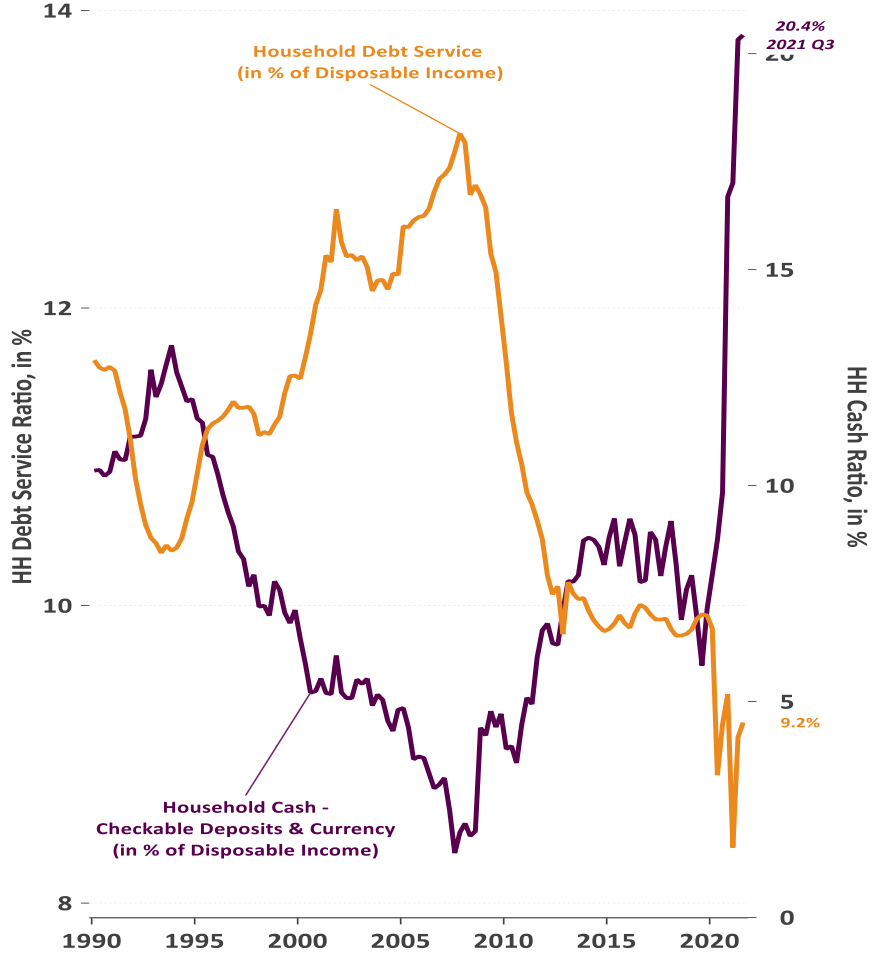
Source: PineBridge Investments, Feb. 1, 2022. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any opinions, projections, forecasts, or forward-looking statements represent the views of the manager, are valid only as of the date of this presentation and are subject to change.

PineBridge® INVESTMENTS

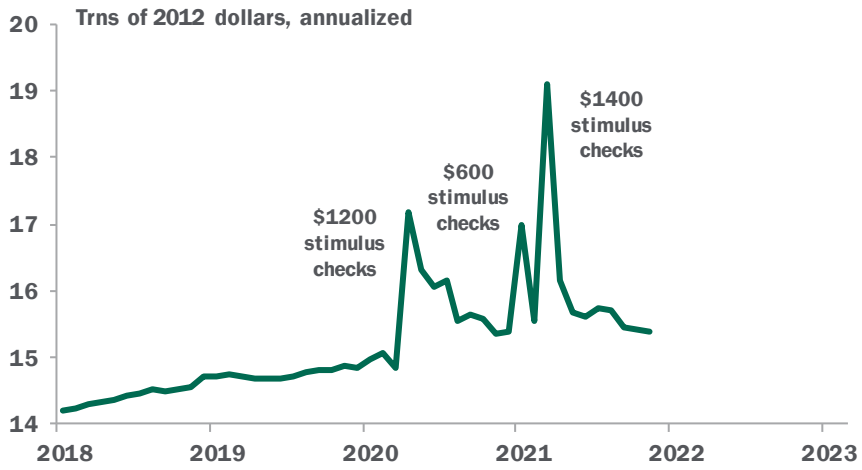
US dealing with both Supply Bottlenecks and Demand Shocks

US Consumer is in good shape

Low household debt service and cash as a % of income signals there is plenty of fire power to spend[1]

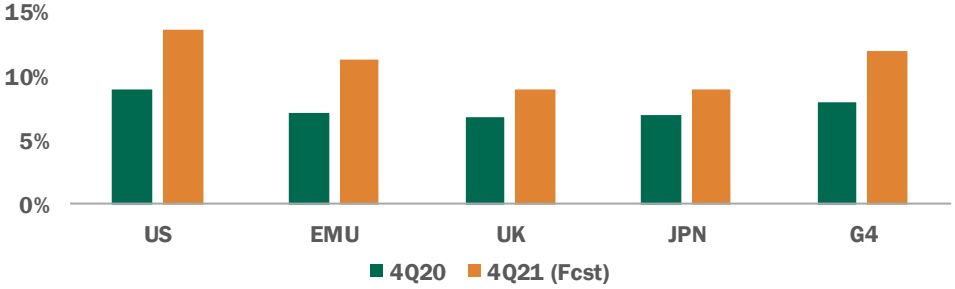


Real Disposable Income[1]



Excess Household Savings, G4[2]

% of household income, actual cumulative saving since 4Q19 less 2019 pace

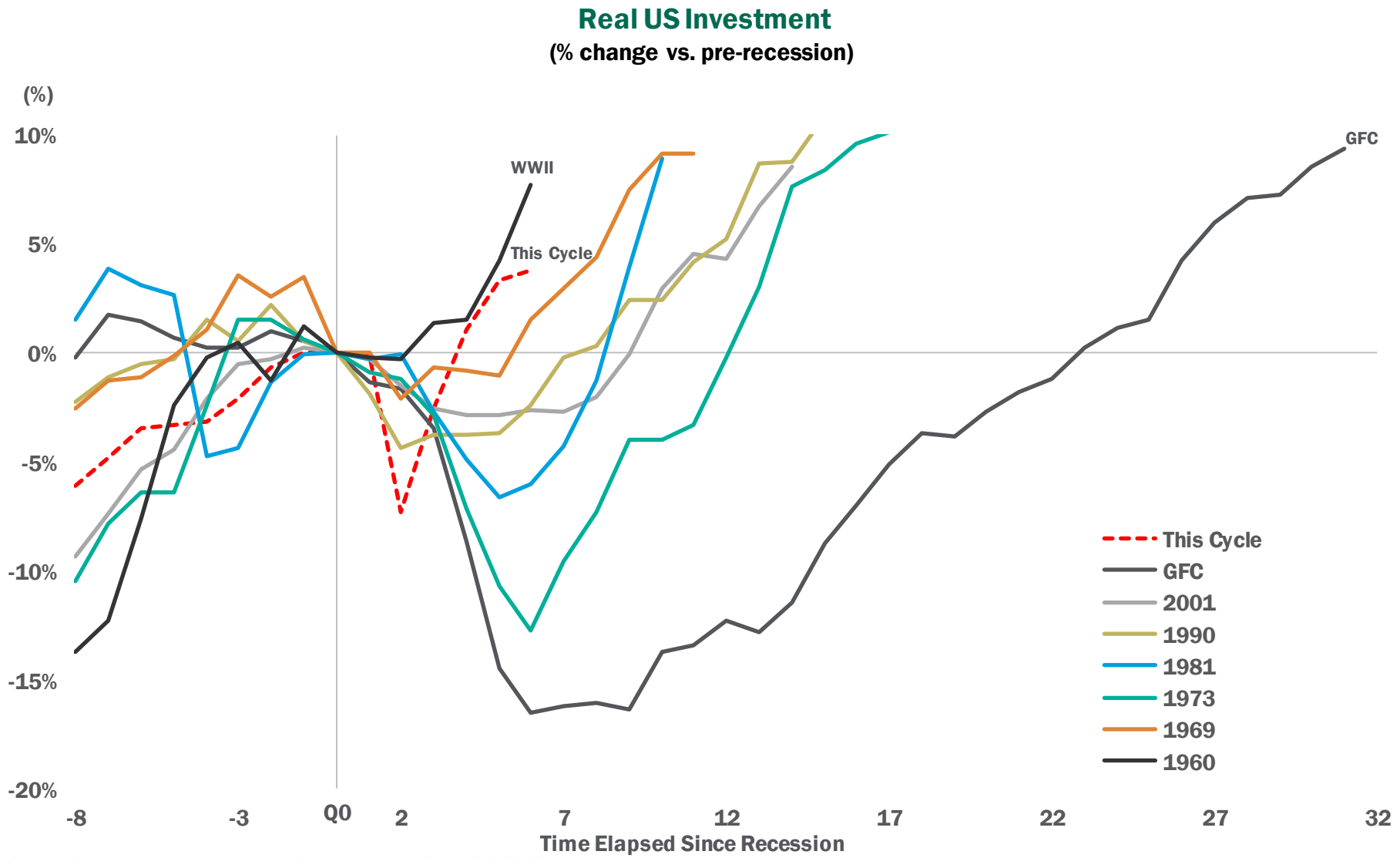


Source: [1]Macrobond, PineBridge Investments Calculations as of Feb. 1, 2022. [2]J.P. Morgan Global Economics. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any opinions, projections, forecasts, or forward-looking statements represent the views of the manager, are valid only as of the date of this presentation and are subject to change.

PineBridge® INVESTMENTS

Global Growth is supported by capex

US seeing the strongest capex cycle since 1940s

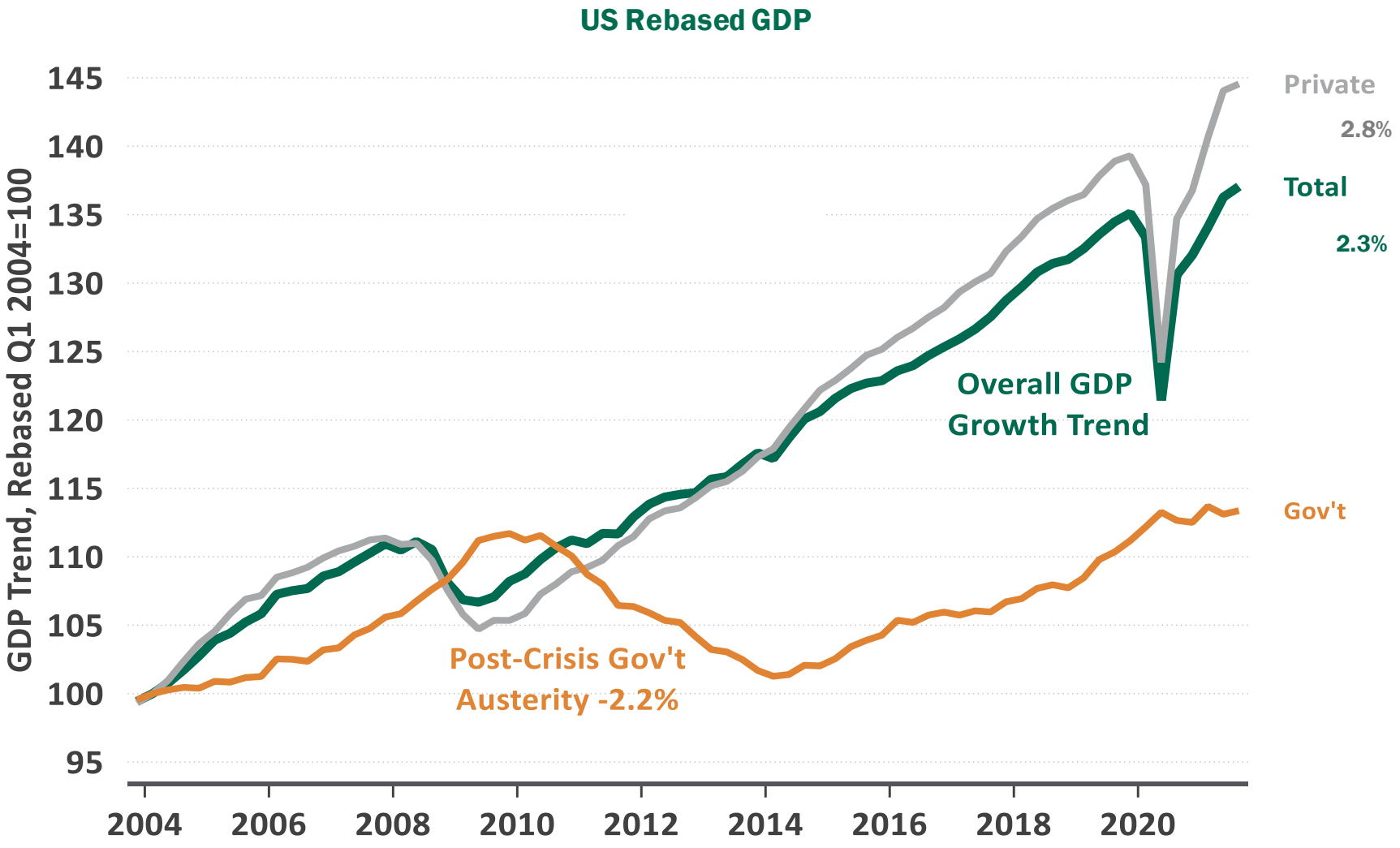


Source: Census Bureau, PineBridge Calculations as of Dec. 31, 2021. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any opinions, projections, forecasts, or forward-looking statements represent the views of the manager, are valid only as of the date of this presentation and are subject to change.

PineBridge® INVESTMENTS

We do not expect fiscal austerity this time around

Unlike the last cycle, Government spending will be supportive



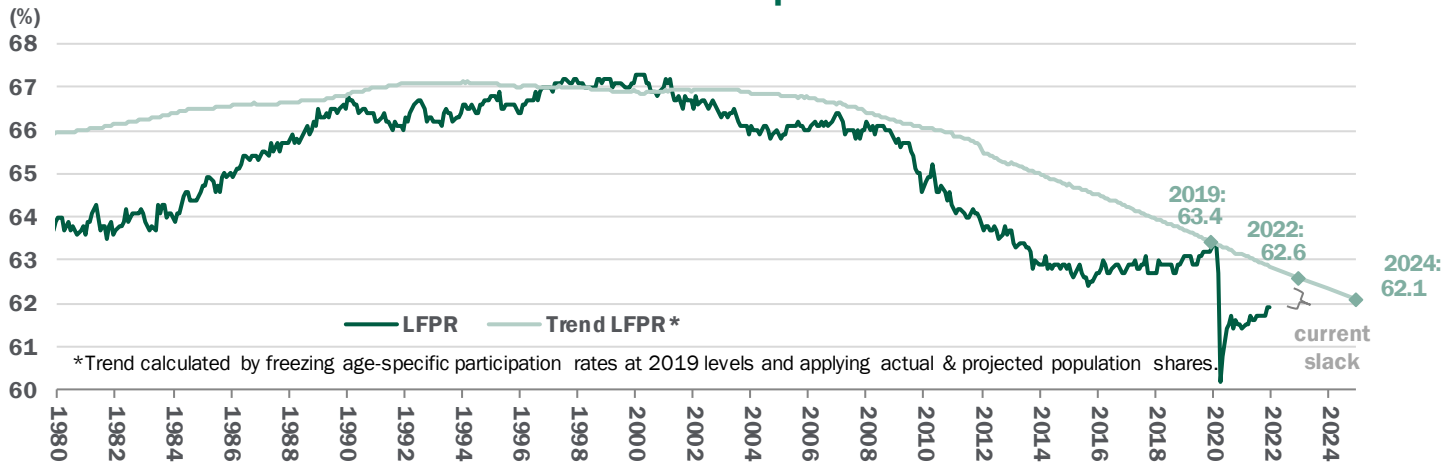
Source: Macrobond, PineBridge Investments Calculations as of Q4 2021. For illustrative purposes only. Any views are the opinion of the investment manager and are subject to change. There can be no assurance that the target will be achieved. For illustrative purposes only. We are not soliciting or recommending any action based on this material.

PineBridge® INVESTMENTS

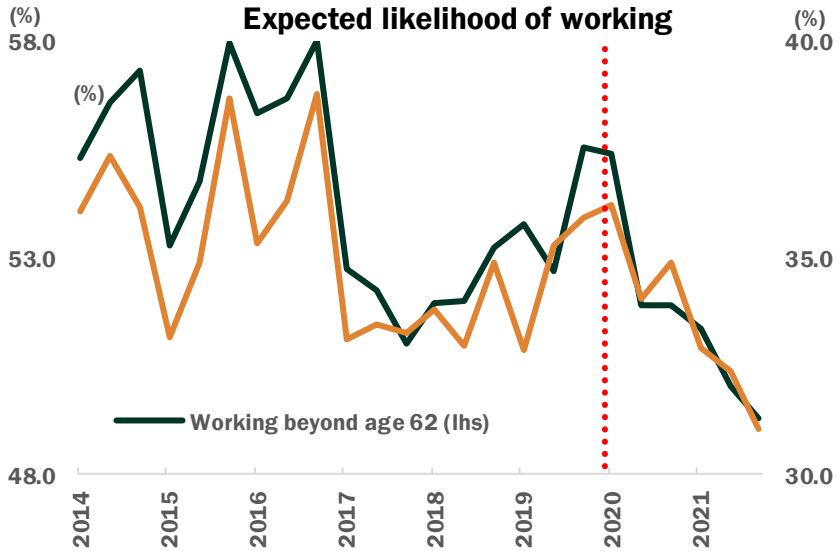
Labor markets likely to remain tight

Thanks to early retirement and low immigration

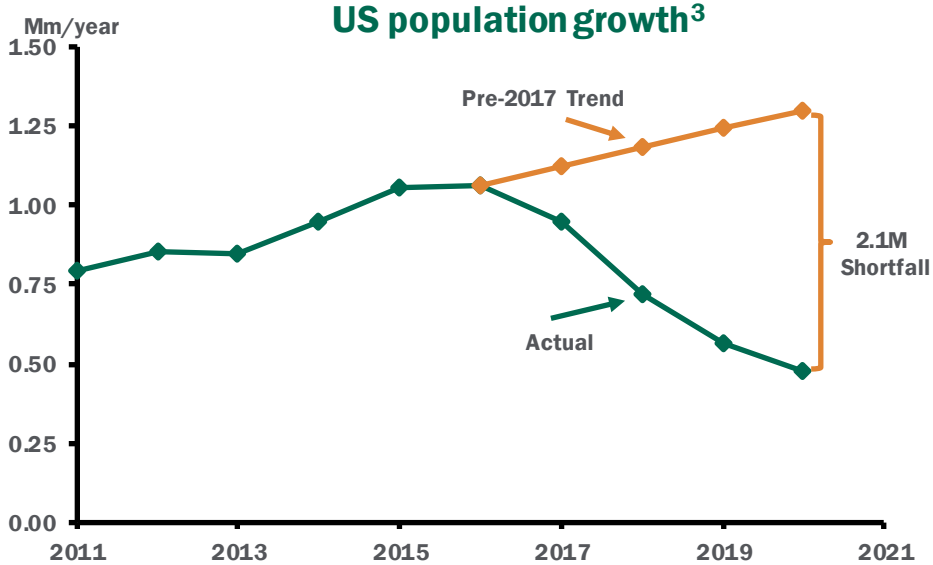
Labour Force Participation Rate[1]



Americans are dreaming of retiring early[2]



Contribution of net immigration to US population growth[3]



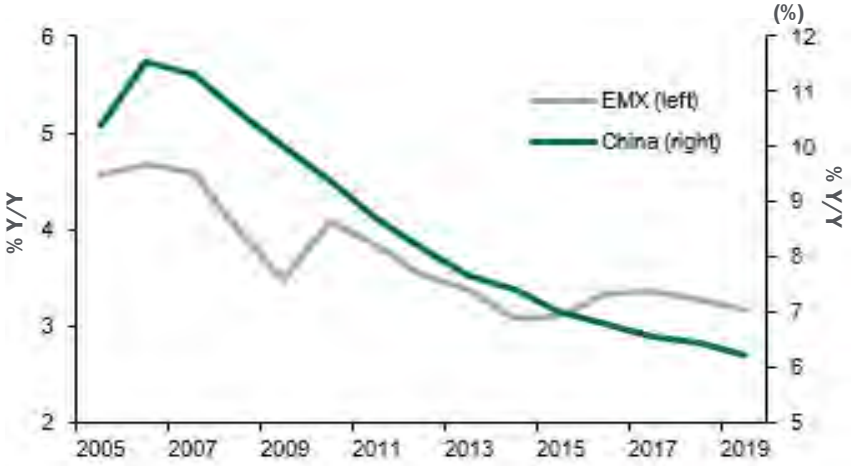
Source: [1]Haver, JEF Economics. [2]Survey of Consumer Expectations, 2013-2021 Federal Reserve Bank of New York (FRBNY). [3]Census Bureau, J.P. Morgan. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any opinions, projections, forecasts, or forward-looking statements represent the views of the manager, are valid only as of the date of this presentation, and are subject to change.

PineBridge® INVESTMENTS

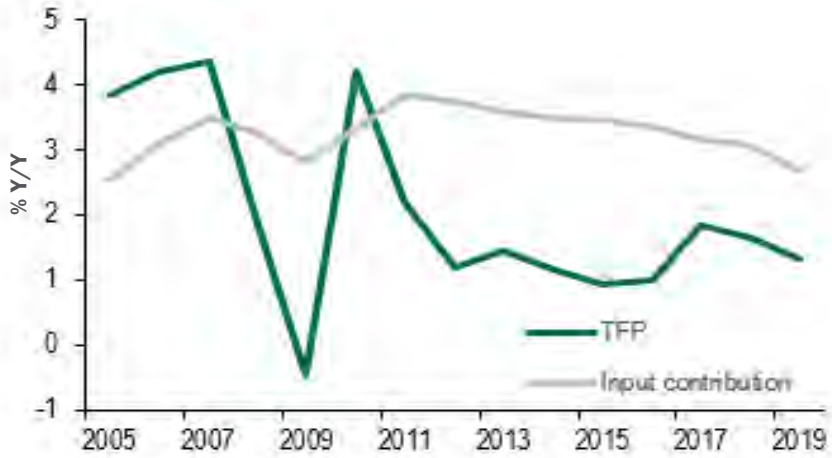
Emerging Markets – Ongoing Structural Headwinds

Declining potential growth, productivity and global trade

EM Potential GDP growth (Bottom-up)

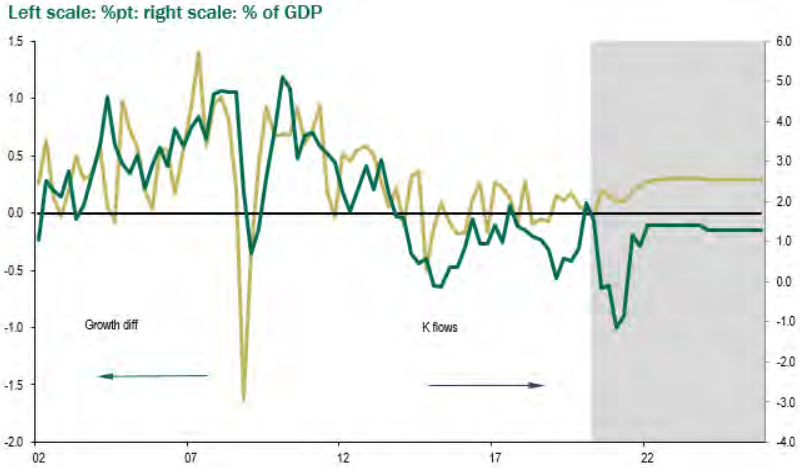


Contribution to EM GDP Growth



EMX Growth positively correlated with world trade

EMX-DM Growth differential and EMX capital flows

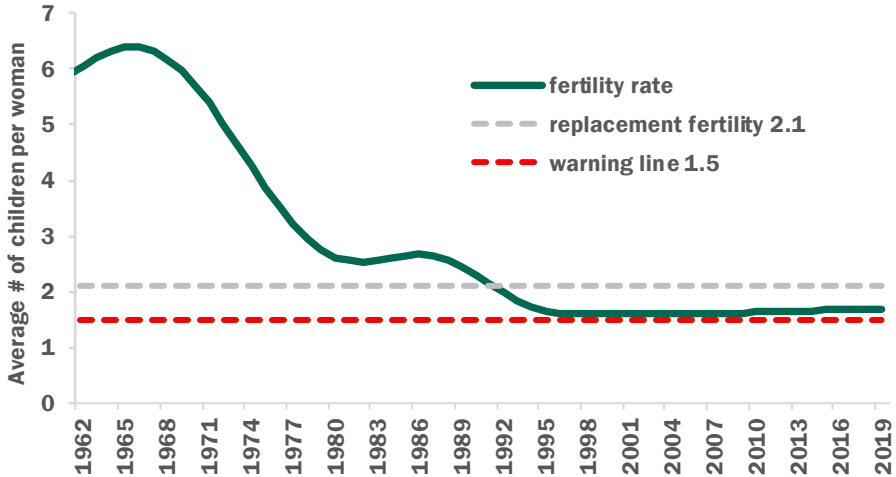


Source: J.P. Morgan, CPB as of November 2021. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any opinions, projections, forecasts, or forward-looking statements represent the views of the manager, are valid only as of the date of this presentation and are subject to change.

PineBridge® INVESTMENTS

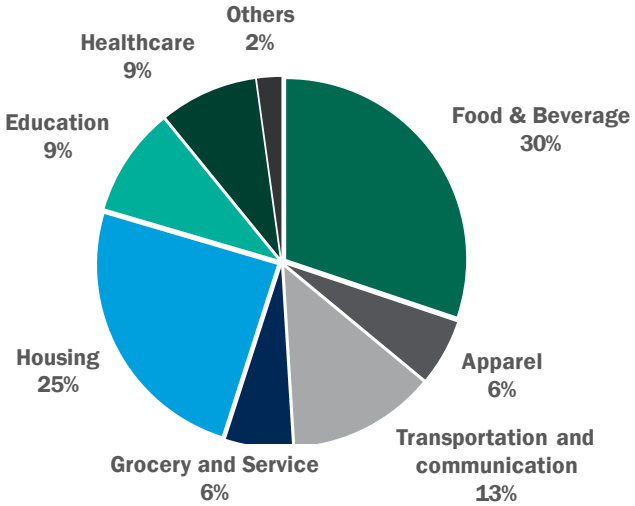
China's Policy shifts to tackle the "three big mountains"

Fertility Rate Well Below Replacement Level



Declining Pre-school Population

Three Mountains Represent Nearly Half of Income



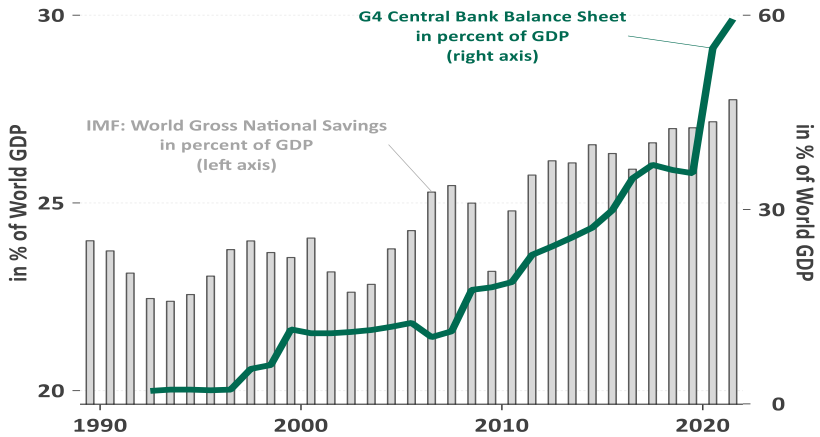
Source: National Bureau of Statistics, World Bank, CNNIC, Morgan Stanley Research, Haitong Research, as of Q3 2021. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any views represent the opinion of the investment manager, are valid as of the date indicated, and are subject to change

PineBridge® INVESTMENTS

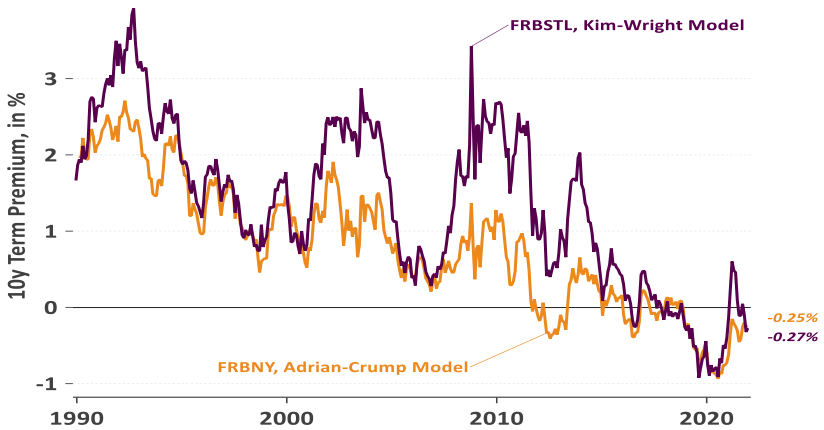
Post-crisis liquidity will only get worse

Global Savings Glut and QE have flowed into Fixed Income and Private equity

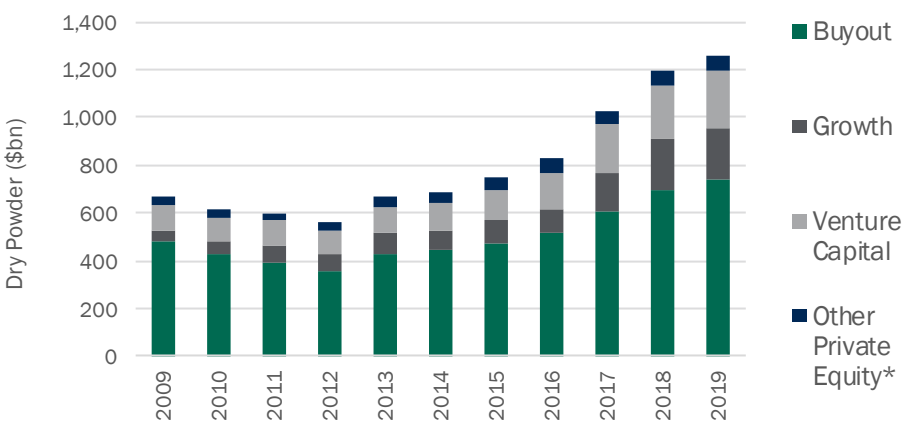
Global Savings Glut[1]



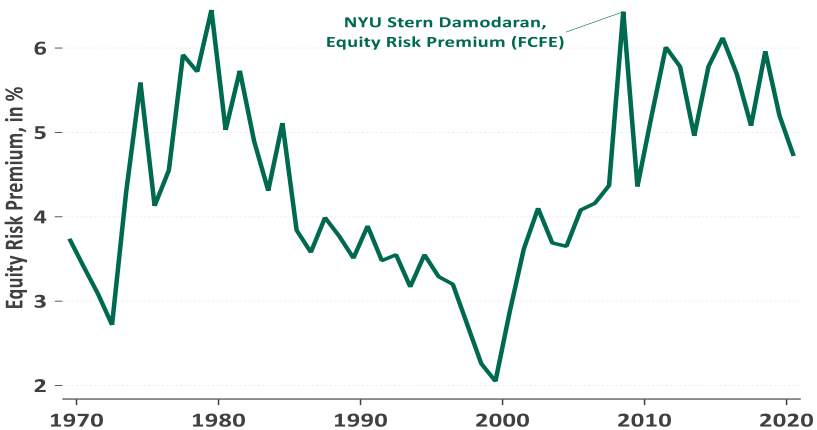
Continuing Flows Into Fixed Income Have Weighed Down Term Premium[1]



Record level of Dry Powder in Private Equity Suggests Crowding[2]



US Equity Risk Premium is on the high end[1]



Source: [1]Macrobond, PineBridge Calculation as of Feb. 1, 2022. [2]Source: Preqin as of Sep. 30, 2020. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any opinions, projections, forecasts, or forward-looking statements represent the views of the manager, are valid only as of the date of this presentation and are subject to change.

PineBridge® INVESTMENTS

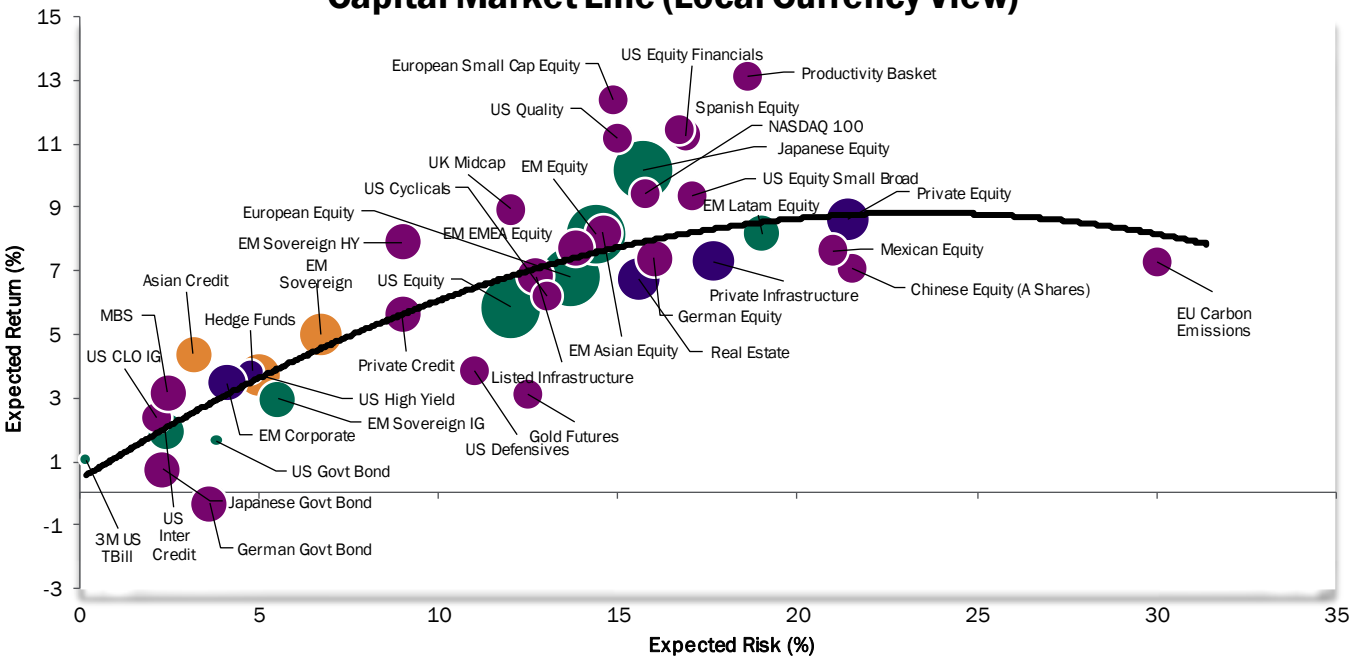
Section V

Current Portfolio Positioning & Convictions

Current Positioning

As of 31 January 2022

Capital Market Line (Local Currency View)



Dot Color = Liquidity
- Most Liquid
- Less Liquid
- Least Liquid

Dots = Select Asset Class

Dot Size = Degree of Correlation

Large: More Correlated
Small: Less Correlated

Position = Valuation

Above Line: Attractively valued
On Line: Fairly valued
Below Line: Unattractively valued

Multi-Asset Strategy

Risk Dial Score[1]: 3.15

	Positive Convictions	Negative Convictions
Equity	• US Quality • Japanese Equity • US Financials	• EM EMEA • Taiwan Equity
Fixed Income	• Investment Grade CLO • China Property Bond	• US Treasury
Alternatives	• Productivity Basket	• Gold

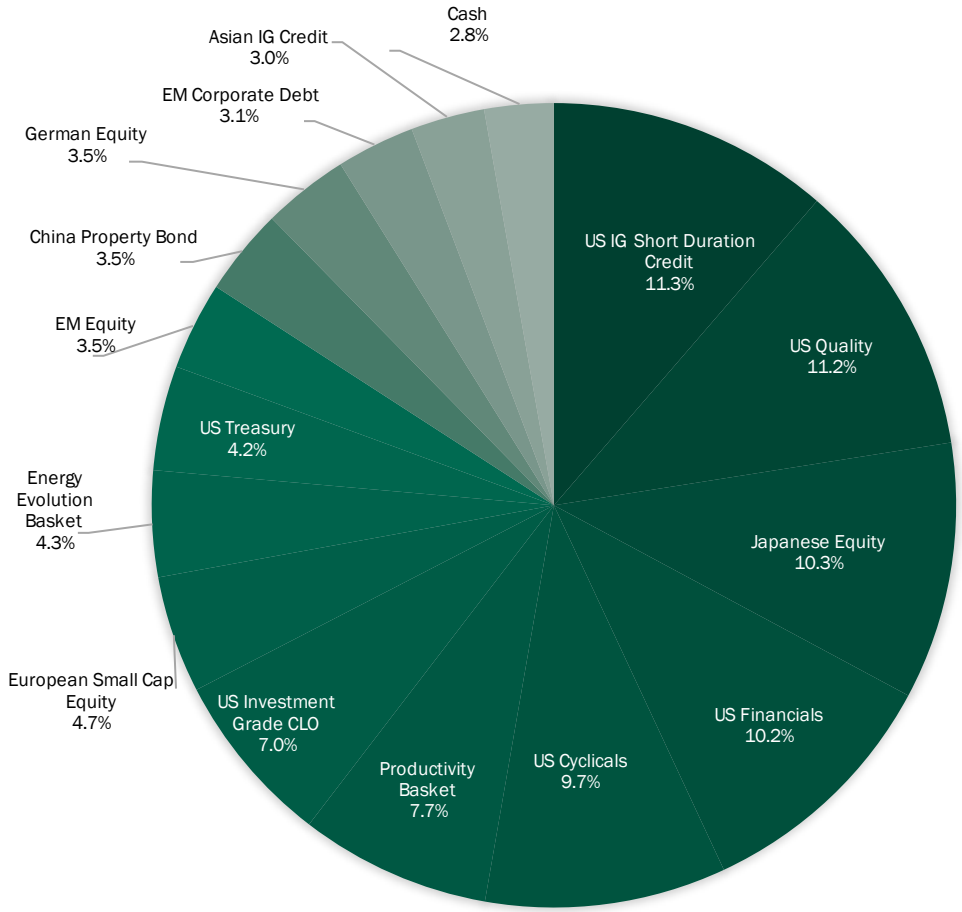
As of 31 January 2022. For illustrative purposes only. We are not soliciting or recommending any action based on this material. **Past performance is not indicative of future results. There is no assurance that any investment objective will be achieved.** Represents the local currency view of the PineBridge Capital Market Line (CML). Based on PineBridge's estimates of forward-looking 5-year returns and standard deviation. The CML is not intended to represent the return prospects of any PineBridge products, only the attractiveness of asset class indexes, compared across the capital markets. There can be no assurance that the expected returns will be achieved over any particular time horizon. This information June constitute "projections," "forecasts" or other "forward-looking statements" which do not reflect actual results and are based primarily upon applying a set of assumptions to certain financial information. See Multi-Asset Endnotes for further information. Note that the CML's shape and positioning were determined based on the larger categories and do not reflect the subset categories of select asset classes, which are shown to relative to other asset classes only. *Productivity Basket is constituted from a blended allocation to stocks of companies that provide productivity-enhancing technologies towards growing capital expenditure intentions globally.

[1] Numeric score determined by Investment Team indicative of its relative preference towards risk; 1 – most risk-seeking; 3 – neutral; 5 – most risk-averse.

PineBridge® INVESTMENTS

Current Portfolio

Current Portfolio (31 January 2022)



	Asset Class	1/31/2022
Equities	US Quality	11.2%
	Japanese Equity	10.3%
	US Financial Equity	10.2%
	US Cyclicals	9.7%
	European Small Cap Equity	4.7%
	German Equity	3.5%
	EM Equity	3.5%
	Total	**53.1%**
Fixed Income	US IG Short Duration Credit	11.3%
	US Investment Grade CLO	7.0%
	Asian IG Credit	3.0%
	China Property Bond	3.5%
	US Treasury	4.2%
	EM Corporate Debt	3.1%
	Total	**32.2%**
Alternatives	Productivity Basket	7.7%
	Energy Evolution Basket	4.3%
	Total	**11.9%**
	Cash and Cash Equivalents	2.8%
		100.00%
	Total Global Equity Hedge	-5.3%
	Cash to Support Equity Hedge	5.3%

Total may not add up to 100% due to rounding. There can be no assurance that any of the above allocations will remain in the portfolio at the time this allocation is presented. Diversification does not ensure against market loss. [1]Directly Held refers to specific market/style exposures that reflect the Global Multi-Asset Team's convictions, wherein the Team directs the respective underlying PineBridge investment teams to execute.

PineBridge® INVESTMENTS

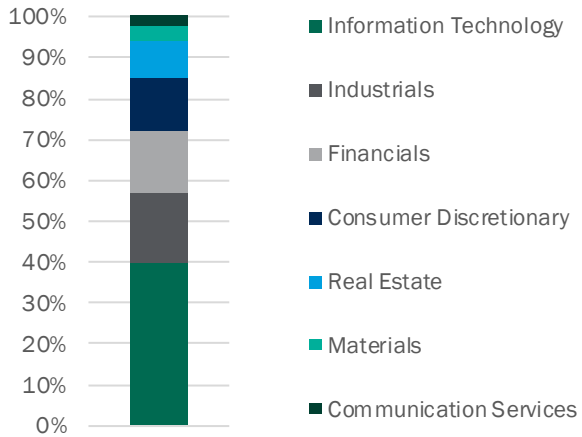
US Quality

As we move to the next stage of the cycle, quality stocks will lead

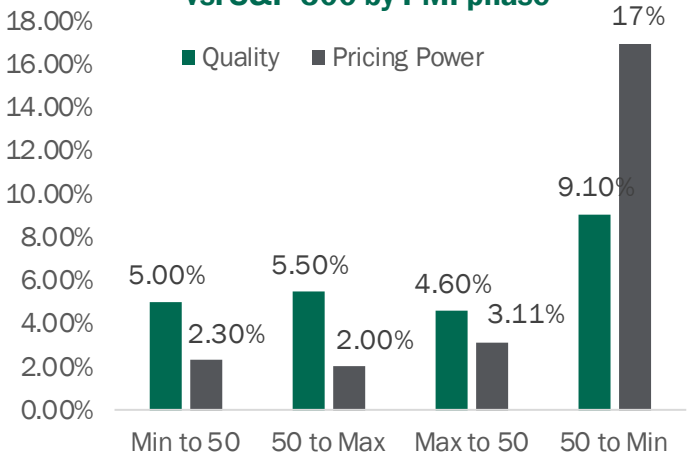
Key Drivers:

- Quality companies are defined as companies with strong balance sheets, high RoE levels and stable earnings
- Our basket targets companies that exhibit strong/stable margins and those with low wage costs
- Companies with these attractive characteristics can be found across sectors
- Pricing power will be an important driver of earnings as the cycle matures
- These companies derated during the pandemic leaving valuations attractive

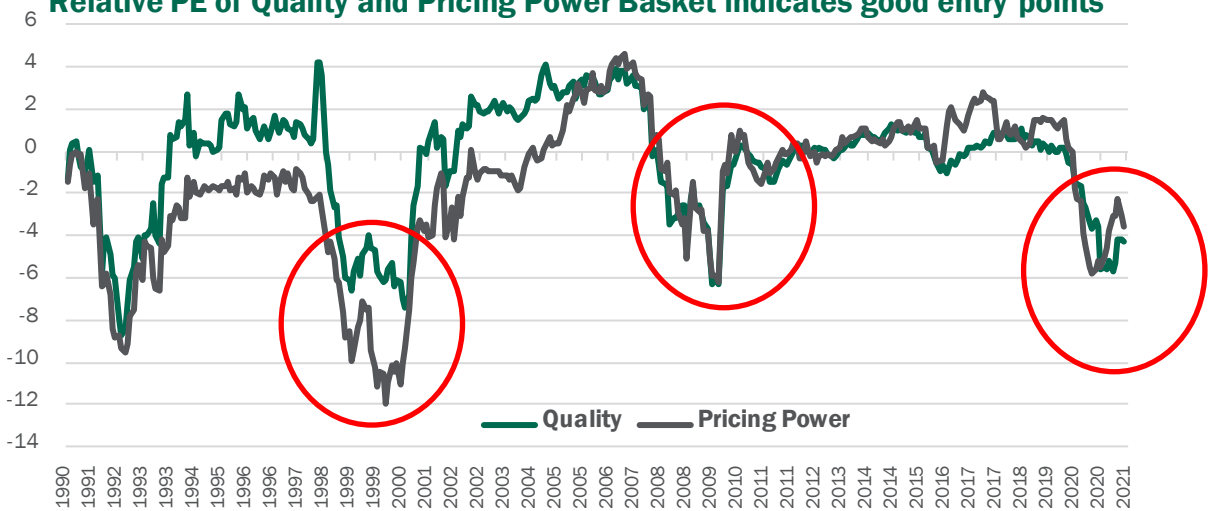
PB US Quality % Breakdown by Sector



PB US Quality Relative Performance Returns vs. S&P 500 by PMI phase



Relative PE of Quality and Pricing Power Basket indicates good entry points



Source: Pinebridge Investments, as of Feb. 1, 2022. Any views are the opinion of the investment manager and are subject to change. There can be no assurance that the target will be opinion of the investment manager, are valid only as of the date indicated, and are subject to change. .

PineBridge® INVESTMENTS

Productivity Basket

Reflects Rising Business Investment in Corporate-Focused Technology Sectors

Key Drivers:

- Rising global business investment activity intentions are reflected in corporate-focused technology sectors such as cloud computing, software as a service, and cyber security.
- While these concepts have existed for many years, we believe this has reached critical mass and are now prioritized in IT spending budgets to protect margins and counter disruption in several industries.
- Confirmation of this is reflected in the clear upward inflection in sales growth for these sub-sectors.
- While the longer-term impacts of Covid-19 are not certain, these companies are well placed to benefit from any increase in working from home. Cloud computing in particular should remain resilient.
- ESG has been trending positive over the last year. Software companies are setting carbon emission targets. Increased focus on using renewable energy when selecting data providers.

PineBridge Productivity Basket[1]

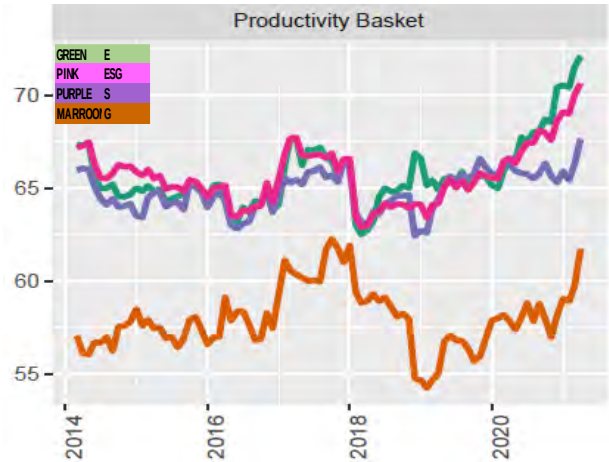
Component	Weights
Cyber Security	30%
Automation	25%
Cloud Computing	20%
AI & IOT	15%
SaaS	10%

CIO Survey: External IT Spending Expectations

Revenue Breakdown in 2019[1]

	Weights (%)
North America	39.4%
Europe	31.3%
Japan	19.4%
APAC ex-Japan	8.4%
Central & South America	1.0%
Middle East	0.5%

Baseline ESG Rank Trend[2]



Source: [1]IMF, Bloomberg, Macrobond, PineBridge Investments Calculations as of 1 December 2021. [2]Sustainalytics. As of 23 April 2021. Any views are the opinion of the investment manager and are subject to change. There can be no assurance that the target will be opinion of the investment manager, are valid only as of the date indicated, and are subject to change.

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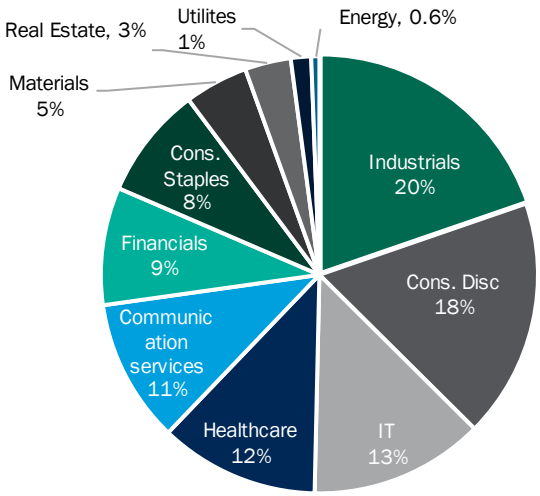
Japan Equities

Attractively valued with high beta to global growth

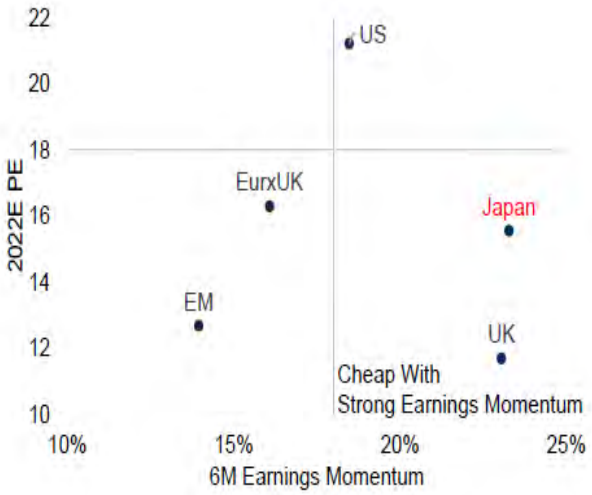
Key Drivers:

- Semiconductor availability will help all auto makers going forward, but Japan Index is more heavily weighted in auto manufacturing than others
- Recent viral outbreak caused a pullback and an interesting entry point as valuations look attractive
- Japan's vaccination rate has climbed more rapidly than almost any other. This drag should end.
- When change does come in Japan it does early on in a Prime Minister's tenure. This new PM has big fiscal stimulus plans.
- Japan maintains the highest operational leverage to global growth
- On the ESG front, Japan equities has lagged behind but carbon neutral targets are very ambitious

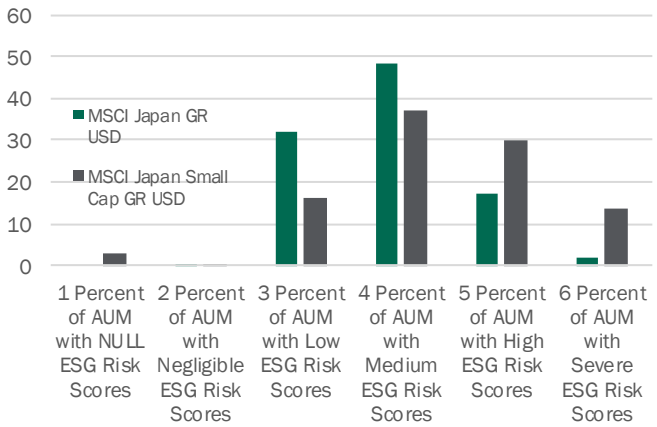
Sector breakdown highlights cyclical nature[1]



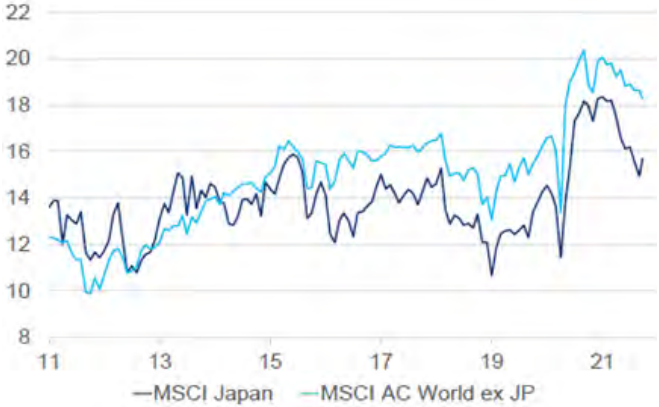
Earnings Momentum & Valuation[2]



Japan equities ESG Risk falls in medium risk[3]



Japan's DPS Growth and payout ratio higher than MSCI AC World ex-Japan's[2]



Source: [1]Bloomberg. Macrobond, January 2022. [2]Citi Research, DataStream, FactSet, as of September 30 2021. [3]Morningstar, as of March 31 2021. Any views are the opinion of the investment manager and are subject to change. There can be no assurance that the target will be opinion of the investment manager, are valid only as of the date indicated, and are subject to change.

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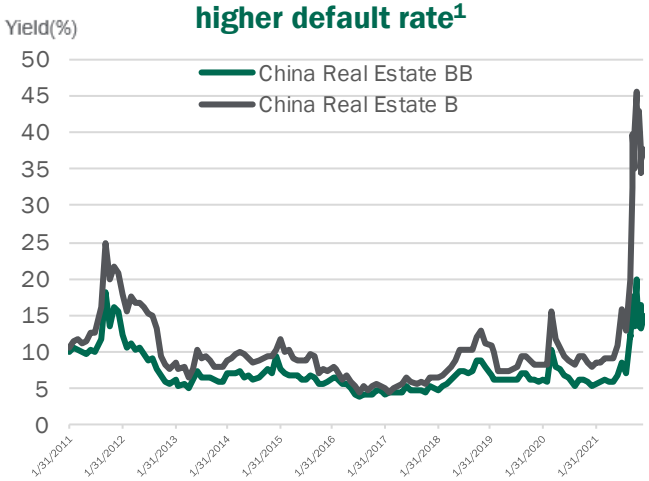
China Property Bond

No over-tightening but no significant easing either

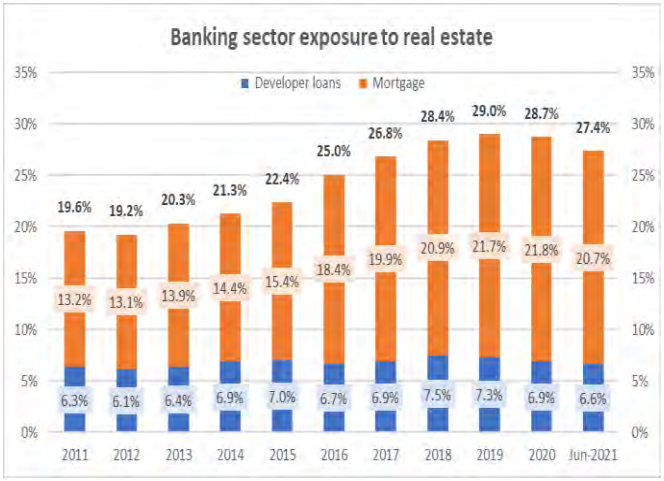
Key Drivers:

- China's high yield credit market is still marked by high levels of distress among many property companies, but the market is clearly starting to differentiate between names
- Property sales volumes are expected to stabilize from Q2 next year
- Policy risk seems to have peaked, and policies are being slightly eased, which will help mainly the highest quality names
- Valuation are currently pricing in significant default risks providing a good entry point into potentially attractive risk/ return opportunities.
- The allocation will be actively and dynamically managed by our bottom-up specialist to protect against unexpected outcomes as well as take advantage of quick repricing moves across the market
- Net Increase of Property Loans guided to stay 30% of new loans for the sector

Current valuation is pricing in much higher default rate[1]



Property sector loan growth decelerated[2]



Incremental easing to support higher quality names[1]

JACI HY China Property bonds*	1 yr	2 yr
Market implied breakeven default probability (based on market value)	39%	44%
Market implied breakeven default probability (based on notional value)	48%	52%
Avg bond px	76	76
Avg coupon	7.5	7.4
Avg maturity	1.1	2.0
Avg yield	47.5	29.7
Avg spread	4725	2816

Selective cities lowered mortgage rate in Oct[2]

City	City (CN)	First-home mortgage rate	MoM change
Luoyang	洛阳	6.13%	-25bps
Huzhou	湖州	6.00%	-20bps
Guangzhou	广州	5.85%	-15bps
Zhongshan	中山	6.10%	-15bps
Xiangyang	襄阳	5.68%	-10bps
Dazhou	达州	5.65%	-10bps
Wuxi	无锡	6.00%	-10bps
Tai'an	泰安	5.50%	-10bps
Jilin	吉林	5.10%	-5bps
Shenzhen	深圳	5.10%	-5bps
Beihai	北海	6.25%	-5bps
Tangshan	唐山	5.20%	-5bps
Zhangzhou	漳州	5.40%	-5bps
Mianyang	绵阳	5.88%	-2bps

Source: [1]BofA, JP Morgan, PineBridge estimates as of December 31 2021. *Excluded SINHLD, FANHAI, SUNCHN, CHFOTN, LGUANG, THHTGP, FTHDGR, EVERRE and TIANHL
[2]JP. Morgan, PineBridge Investments. As of 17 November 2021. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any views represent the opinion of the manager and are subject to change. Any opinions, projections, forecast, or forward looking statements presented are valid only as of the indicated and are subject to change.

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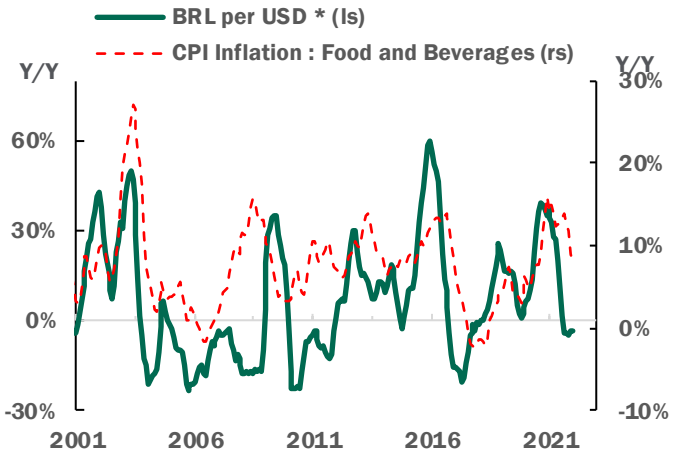
EM LATAM Local Currency Bonds

Signs of peaking inflation

Key Drivers:

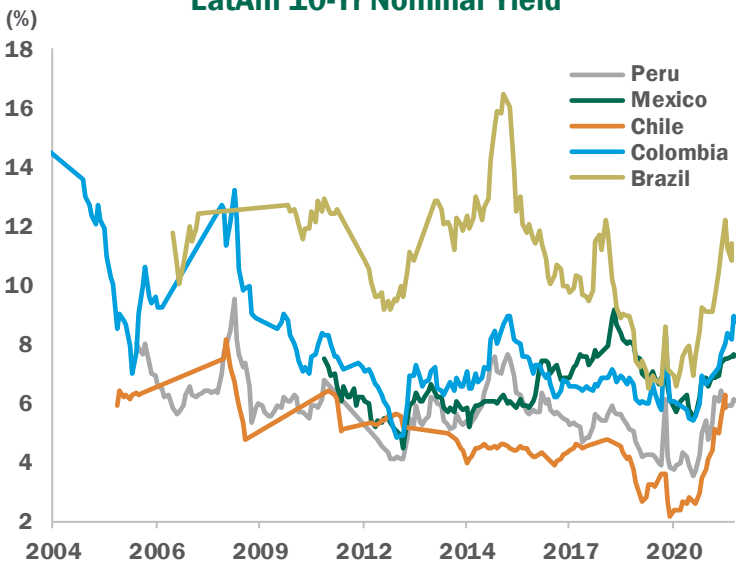
- In 2021, emerging markets faced an early spike in inflation and central banks responded swiftly and forcefully. This was particularly the case in Latin America, which is more vulnerable to food and energy prices
- Looking ahead, we see good prospects for inflation to peak and decline rapidly as supply issues fade and substantial rate hikes take effect.
- Meanwhile, the Fed wishes to move only modestly until later this year, hoping for the best, yielding an intermediate-term period during which the US dollar's strength should stabilize
- Subdued economic growth and improving inflationary outlook will pressure central banks to cut policy rates

Brazil : Signs of Peaking Inflation

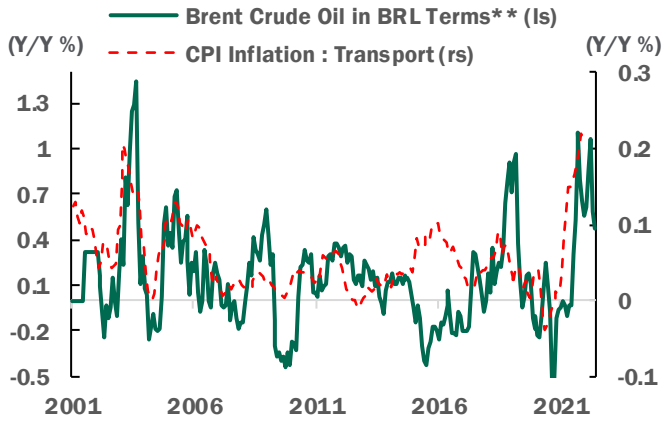


*shown as 3-month moving average, advanced by 3 months

LatAm 10-Yr Nominal Yield

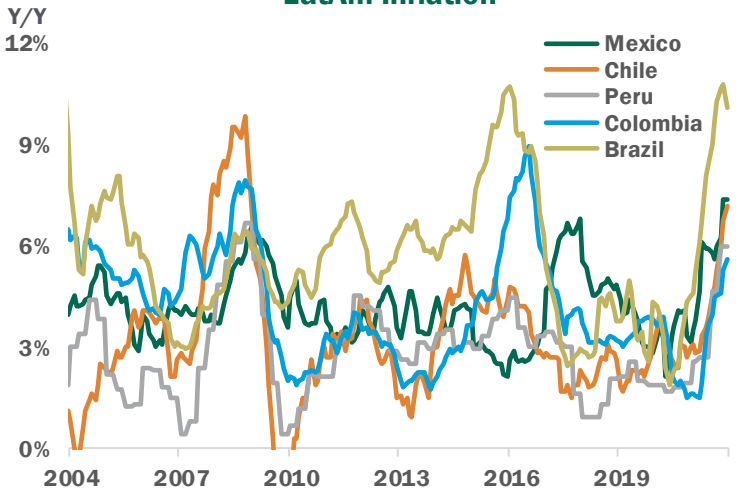


Brazil : Signs of Peaking Inflation



**shown as 3-month moving average, advanced by 6 months

LatAm Inflation



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Section VI

Appendix

Investment Process
Building the Capital Market Line (CML)

The CML is an independent synthesis of top-down and bottom-up insights that identifies attractively valued asset classes based on fundamentals over the next 5 years.

Top-Down Generalists Debate with Bottom-Up Specialists

19 quarterly dialogues with asset class specialists with over 100 fundamental metrics assessed

Carefully constructed mix of participants to actively debate on wide range of macro & micro topics, including:

- Economic Cycles
- Regime Shifts
- Structural Reforms
- Profitability/Margins

Finalize Fundamental Inputs

Global Multi-Asset Team actively debates to finalize fundamental metrics such as:

- **Equity (ROE, PE Ratio)**
- **Fixed Income (Real Rate, Net Default Rate)**
- **Alternatives (Illiquidity Premium for Private Equity)**

Calculate Outputs

Utilize Capital Market Line models, which have evolved over a decade of testing and calibration with following components:

- Current Price
- Income Growth
- 5-Year Repricing
- Fundamental Views

Capital Market Line

- Expected Return
- Expected Risk
- Correlations

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Investment Process

Using PineBridge's Ecosystem to Develop Multi-Asset Strategy

Asset Class Team Meetings (Monthly)
Participate in monthly asset class team meetings to garner near-term insights

Fixed Income	Equity	Rates and Macro	Global FX	Economic	Alternatives

Investment Strategy Meeting (Monthly)
Michael J. Kelly, CFA, Chair

Debate differences of opinion on topical investment themes among asset class investment teams

Multi-Asset Strategy Meeting (Monthly)
Hani Redha, CAIA, Chair

Debate risk positioning and path of fundamentals over a 9-18 month horizon

Risk Dial Score[1]

Asset Class Convictions (Sample)

Equities	Least Attractive	Unattractive	Neutral	Attractive	Most Attractive
US Financials					■
US Cyclicals			■		
US Quality					■
Japan Equity					■
Fixed Income					
EM Sovereign			■		
EM Corporate				■	
Asia IG Credit				■	
Bank Loans			■		
Alternatives					
Listed Real Estate				■	
Private Equity		■			

Capital Market Line (Quarterly)

- Slope
- Dispersion of asset classes around CML

Capital Market Line (Quarterly)

- Identify attractively valued asset classes over next five years

ESG Outlook (Semi-Annually)

- Review ESG Outlook and Engagement Level for asset class convictions

As of 31 January 2022. For illustrative purposes only. We are not soliciting or recommending any action based on this material. [1]Numeric score determined by Investment Team indicative of its relative preference towards risk; 1 – most risk-seeking; 3 – neutral; 5 – most risk-averse.

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Investment Process

Applying Multi-Asset Strategy to Portfolio Implementation

Portfolio Implementation
Peter Hu, CFA, Chair

Efficient Frontier & Smart Benchmark → **Overweight / Underweight** → **Global Dynamic Asset Allocation Portfolio**

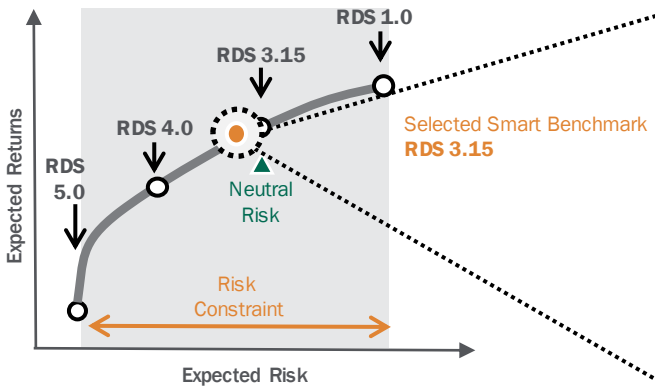
Creating the Efficient Frontier:
Portfolio's risk/return objective and constraints (shaded area) are used to create an efficient frontier based on risk/return metrics on the CML

Determining the Smart Benchmark:
Specific Smart Benchmark is selected to reflect the Risk Dial Score formed as part of the Multi-Asset Strategy

Overweighting/Underweighting Asset Classes:
Intermediate term asset class convictions are used to increase or decrease exposures on a portfolio level

Selecting and Monitoring Underlying Strategies:
Deep experience within the team used to decide the optimal implementation plan based on a risk, time, cost, and ESG Engagement Level (e.g. passive/active, derivatives, manager selection)

Arriving at the Smart Benchmark



Sample Portfolio Implementation

Asset Class	Smart Benchmark (RDS 3.15)	Portfolio Position	Sample Implementation Strategy
US Cyclicals	13%	12%	PB Directly Held[1]
US Financials	3%	2%	PB Directly Held[1]
Europe Equity	7%	8%	PB Directly Held[1]
Chinese Equity	1%	1%	PB China A
Japan Equity	9%	8%	PB Japan Active
US IG CLO	2%	3%	PB Directly Held[1]
EM Corporate	3%	3%	PB Directly Held[1]
Asian IG Credit	5%	4%	PB Directly Held[1]
US IG Short Duration Credit	6%	7%	PB Directly Held[1]
Productivity Basket	7%	8%	PB Directly Held[1]
Energy Evolution Basket	4%	5%	PB Directly Held[1]
Cash	7%	8%	Cash

As of 31 January 2022. [1]PB Directly Held refers to specific market/style exposures that reflect the Global Multi-Asset Team's convictions, wherein the Team directs the respective underlying PineBridge investment teams to execute. For illustrative purposes only. We are not soliciting or recommending any action based on this material. There can be no assurance that the expected returns will be achieved under any particular time horizon. Benchmarks are used for purposes of comparison, and the comparison should not be understood to mean there would necessarily be a correlation between any fund's or strategy's returns and any benchmark cited in this presentation. An investor cannot invest in an index. Portfolio holdings and weights may change based on criteria decided by the investment manager, an executed investment management agreement, and/or market conditions.

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Alaska Retirement Management Board

As of 31 December 2021

	QTD	YTD	3 Year	Since Inception
Alaska Retirement (Gross)	2.80	9.79	13.16	11.02
From Asset Allocation Alpha	2.75	10.43	13.98	12.41
Residual (1)	0.05	-0.64	-0.81	-1.40
CPI +5% (USD) (2)	1.76	7.09	7.04	7.04

In Q4 2021, the Portfolio returned 2.8% (Gross)

Largest total return contributors were*:

- US Cyclicals contributed 163 bps
- Productivity Basket contributed 106 bps
- European Small Cap Equity contributed 42 bps

Largest total return detractors were*:

- Global Equity Hedge contributed -31 bps
- EUR contributed -12 bps
- Japanese Equity contributed -10 bps

(1) Residual captures interaction between Asset Allocation Alpha and tracking error managed implementation, inter month asset all ocation decisions, and portfolio ramp-up.
(2) CPI measured as the 5 year rolling average US Consumer Price Index ("CPI") Urban Consumers, less Food and Energy, plus 5% annualized ("CPI+5%"); rebalan ced monthly. The CPI is a measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services.
The inception of the Portfolio is 31 October 2018. Returns for periods greater than one year are annualized.
*Contributors to return from asset allocation alpha. Past performance is not indicative of future returns.

PineBridge® INVESTMENTS

Alaska Retirement Management Board

As of 31 December 2021

	QTD	YTD	3 Year	Since Inception
Alaska Retirement (Gross)	2.80	9.79	13.16	11.02
Risk Budget (2)	4.29	9.78	13.97	12.65
Excess Return	-1.49	0.00	-0.81	-1.63
From Asset Allocation Alpha	-1.30	0.65	-0.75	-0.93
Residual (1)	-0.19	-0.65	-0.05	-0.70

In Q4 2021, the Portfolio returned 2.8% outperforming 70/30 Risk Budget by -149 bps.

Relative to the Risk Budget, the largest contributors were*:

- Global Government Bond contributed 133 bps
- US Cyclicals contributed 93 bps
- Productivity Basket contributed 47 bps

Relative to the Risk Budget, the largest detractors were*:

- Global Equity Hedge contributed -208 bps
- Cash contributed -49 bps
- US IG Short Duration Credit contributed -36 bps

(1) Residual captures interaction between Asset Allocation Alpha and tracking error managed implementation, inter month asset allocation decisions, and portfolio ramp-up.

(2) The risk budget is 70% MSCI All Country World IMI Index (Net) + 30% Bloomberg US Aggregate Index from 3/31/2021 to present. The risk budget for the portfolio from inception through 3/31/2021 was 60% MSCI All Country World Index (Net) + 40% Bloomberg Global Treasury Total Return Index Value Unhedged. Performance for periods less than one year is not annualized. Past performance is not indicative of future results.

*Contributors to excess return from asset allocation alpha. Past performance is not indicative of future returns.

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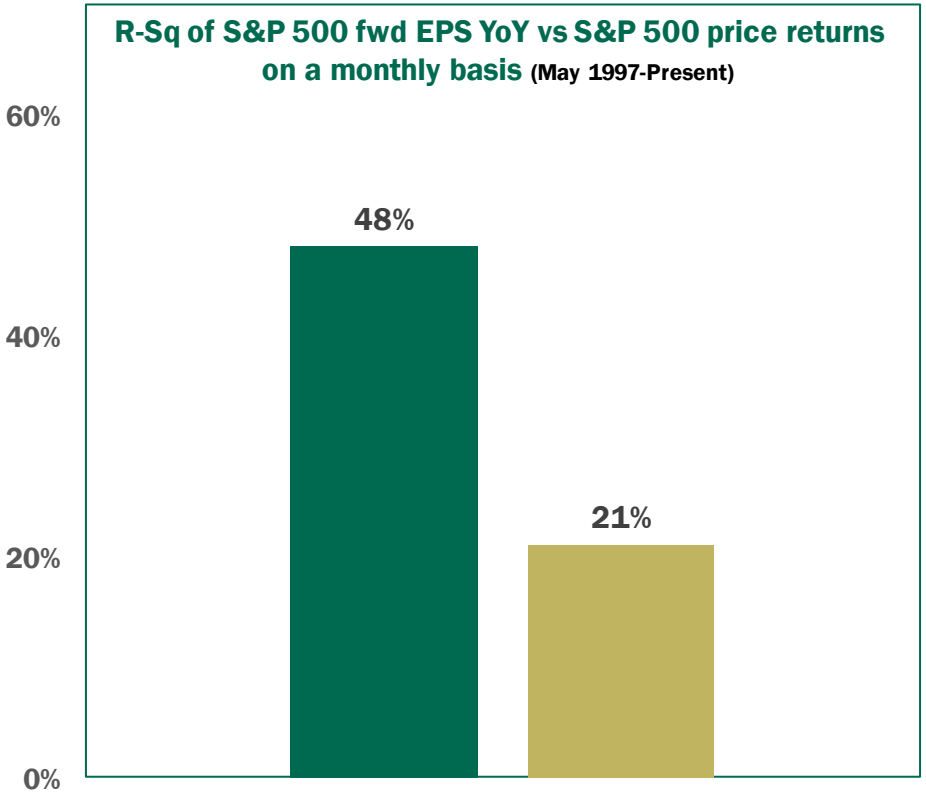
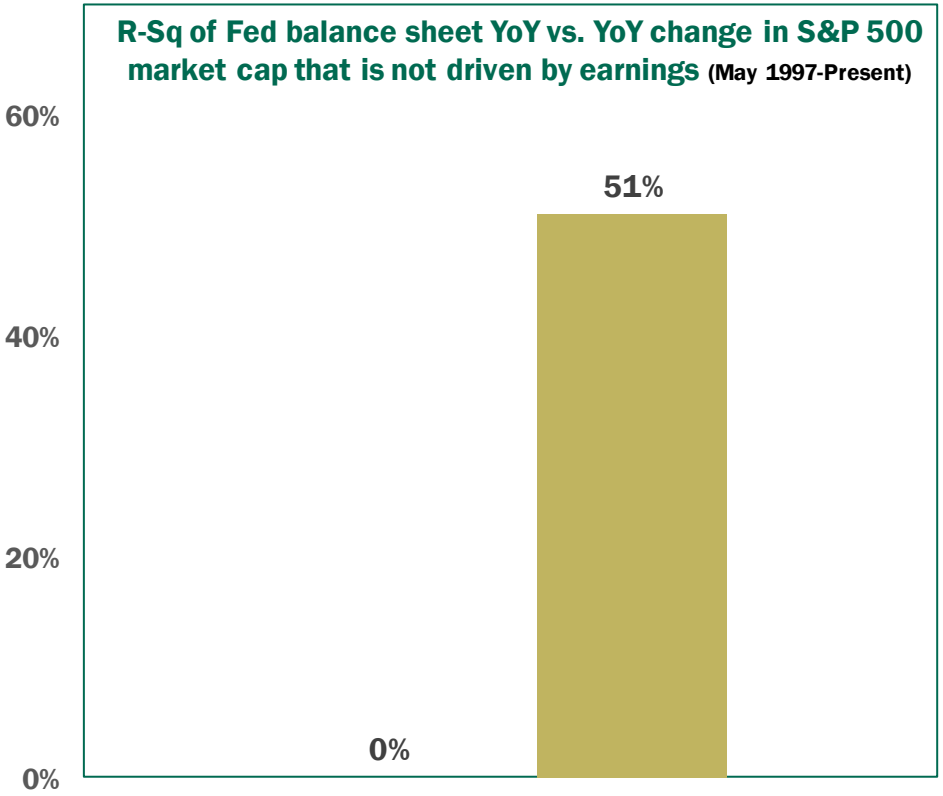
Fed liquidity a key driver of S&P 500 returns post GFC

Earnings explained nearly 50% of market returns pre-GFC, but only 21% of post-GFC returns



More than half of non-earnings driven market cap changes were explained by Fed balance sheet expansion post-GFC



Source: FactSet, BofA US Equity & Quant Strategy, PineBridge Investment Calculations as of Feb. 1, 2022. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any opinions, projections, forecasts, or forward-looking statements represent the views of the manager, are valid only as of the date of this presentation and are subject to change.

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Section VII

Disclosures

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Last updated 28 October 2021

Alaska Retirement Management Board

Peers | Time Horizon | Risk

Zachary Hanna, CFA
Chief Investment Officer

Key Board Decisions

Determine Investment Objective

- Fund's Purpose
- Governance – who makes which decisions?

Determine Asset Allocation

- Strategic
- Tactical

Oversee Implementation

- Manager Structure – number and types of manager allocations.
- Manager Selection

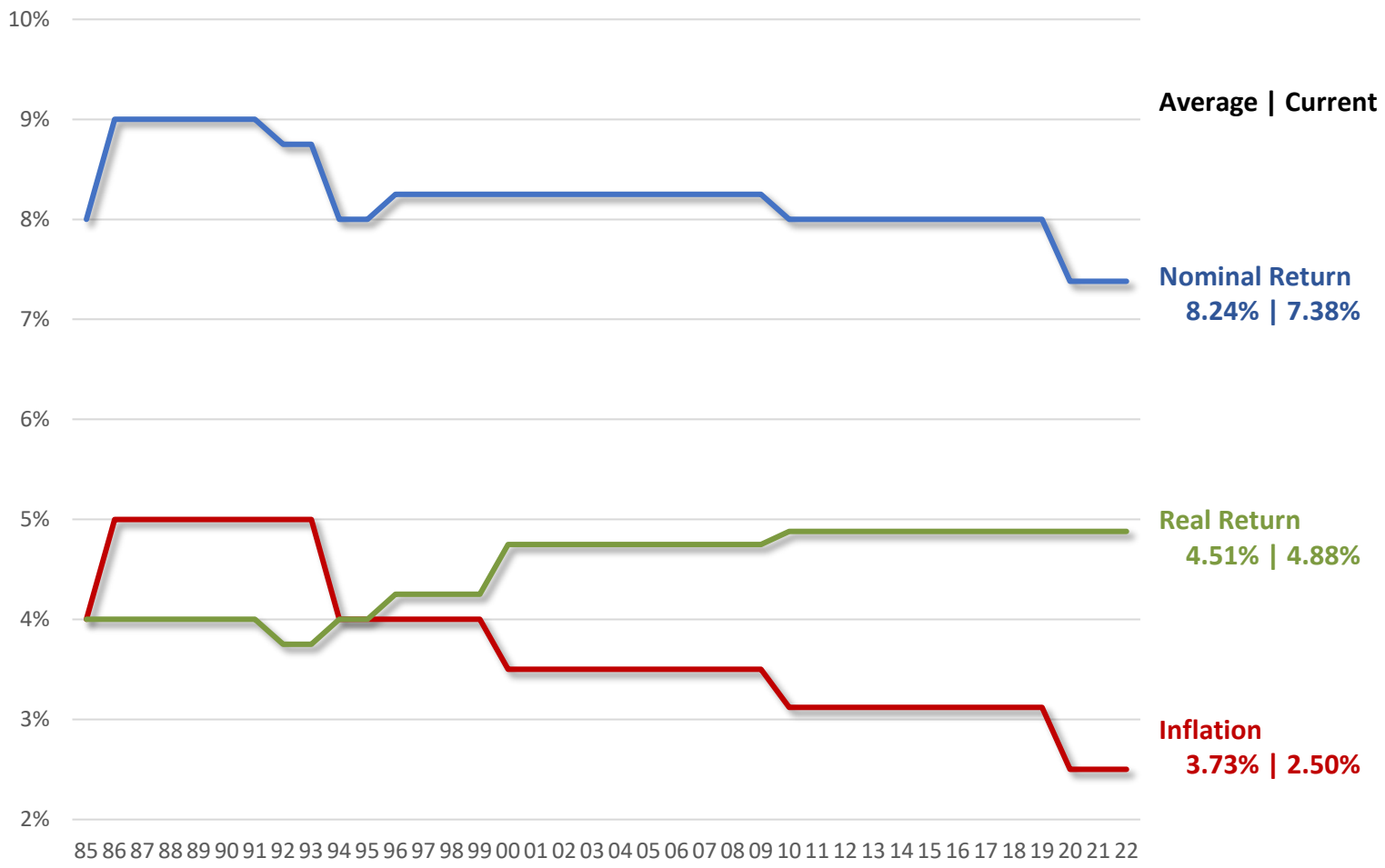
Monitor Results

- Are the fund, asset classes and mandates performing as expected?
- Are they achieving objectives?

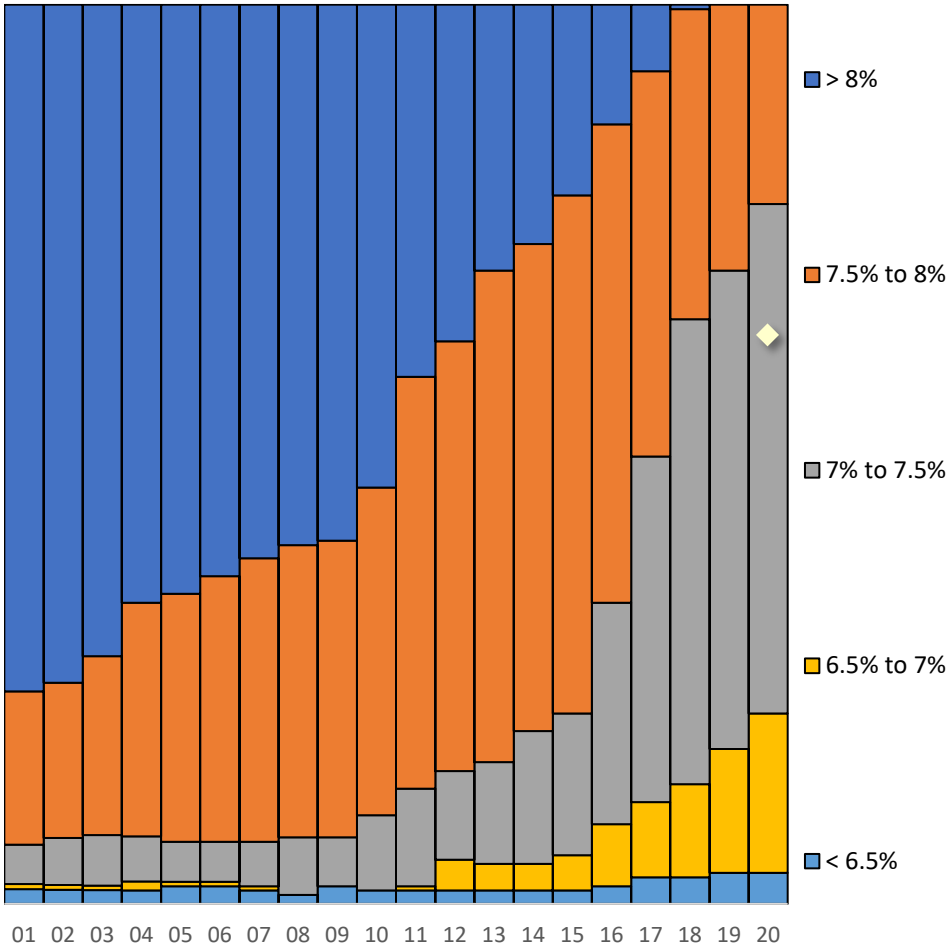
Peers | Time Horizon | Risk

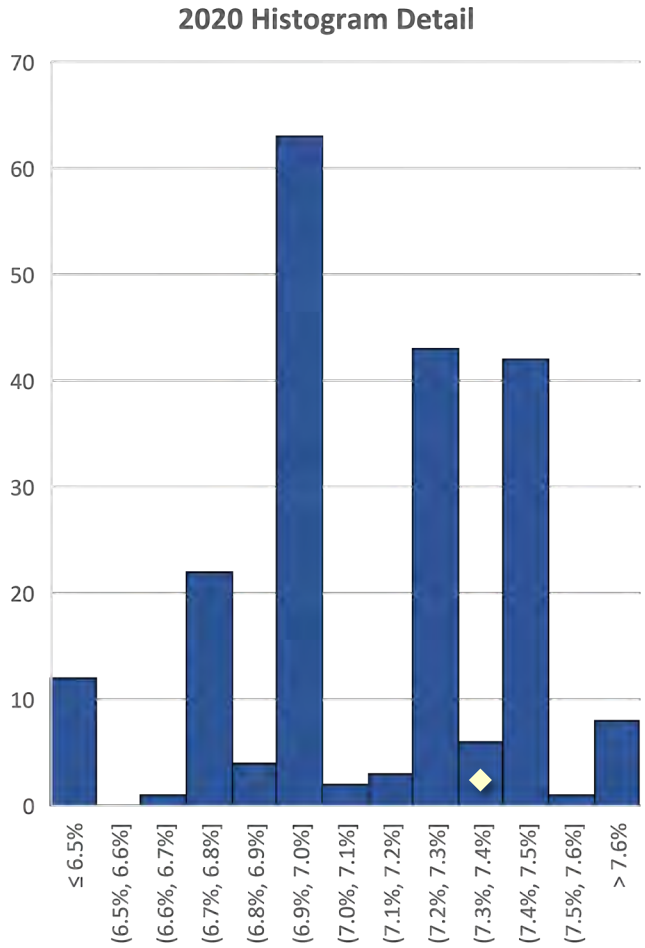
- The ARMB is in the process of undertaking annual asset allocation work and adopting economic assumptions for a periodic actuarial experience study.
- Reviewing peer defined benefit assumptions and relative investment risk is part of this process.
- Evaluating the plan's time horizon is also increasingly important since the systems are closed and maturing.

ARMB Actuarial Assumption History



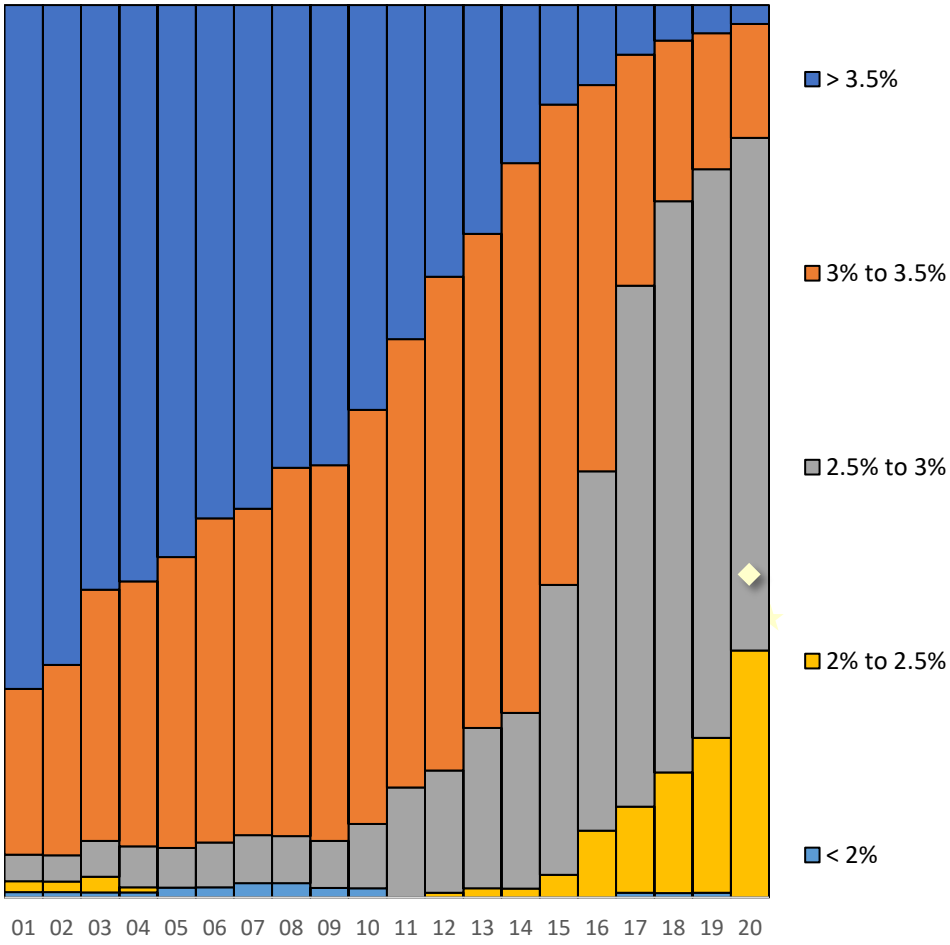
Peer Assumptions – Nominal Returns

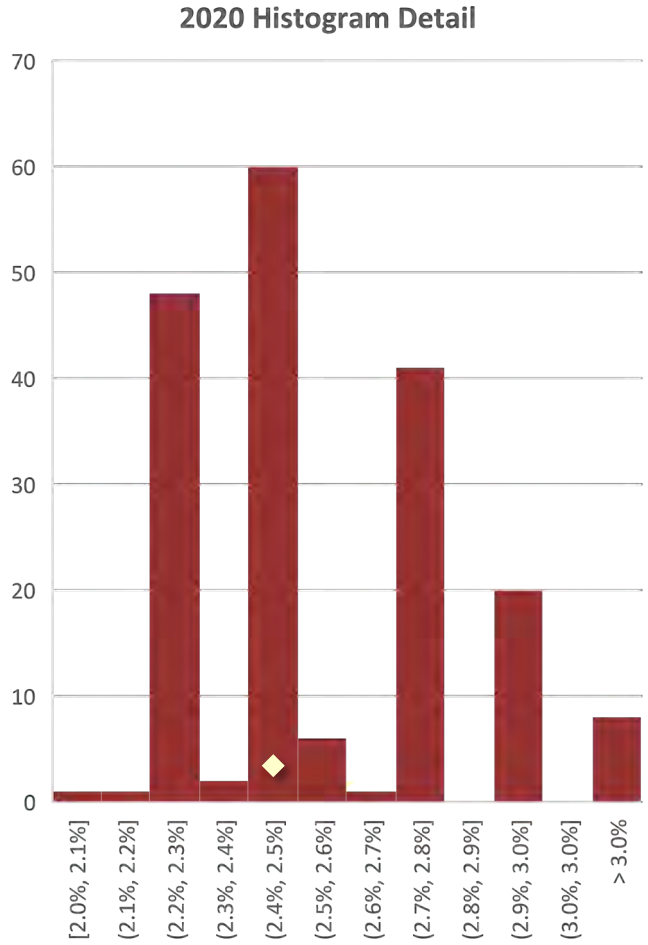




Source: ARMB staff analysis of *Public Plans Data*. 2001-2020.
National Association of State Retirement Administrators (NASRA).

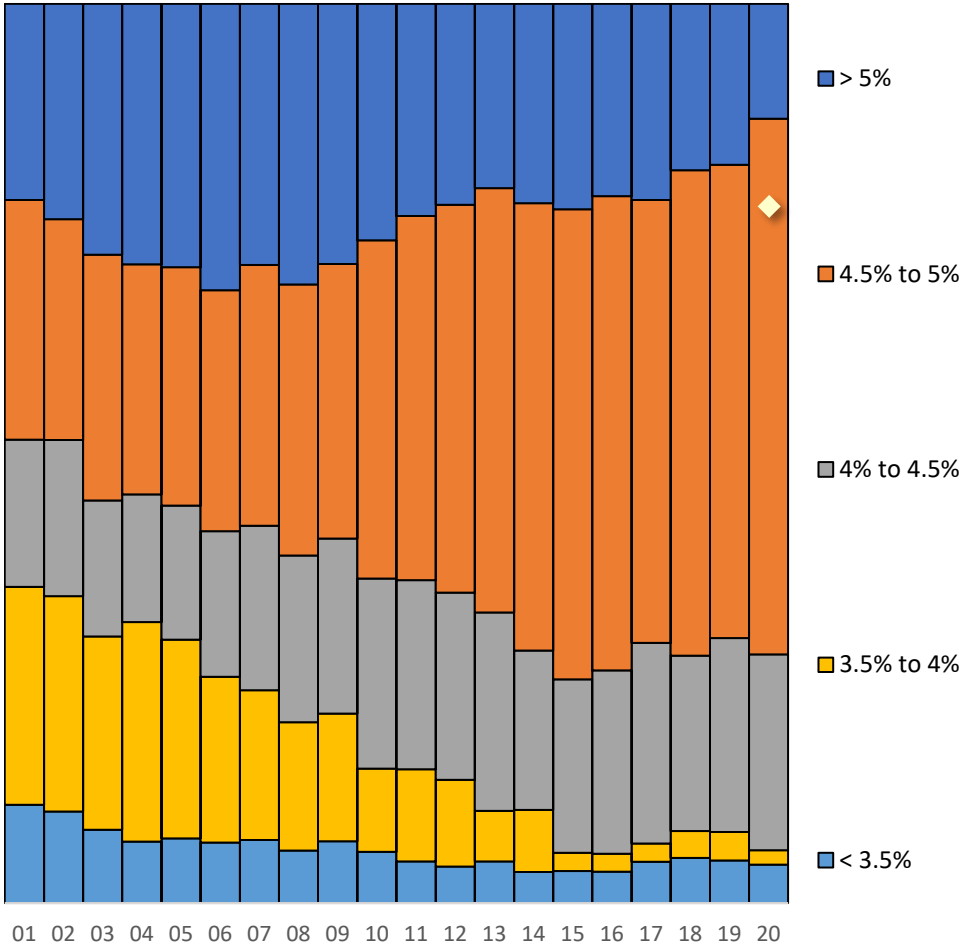
Peer Assumptions – Inflation

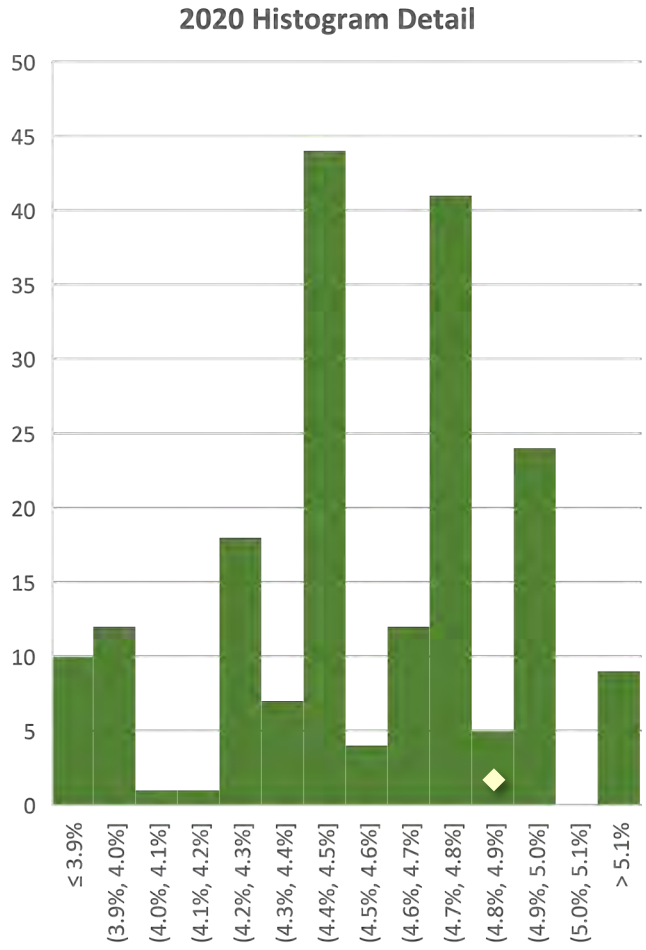




Source: ARMB staff analysis of *Public Plans Data*. 2001-2020.
National Association of State Retirement Administrators (NASRA).

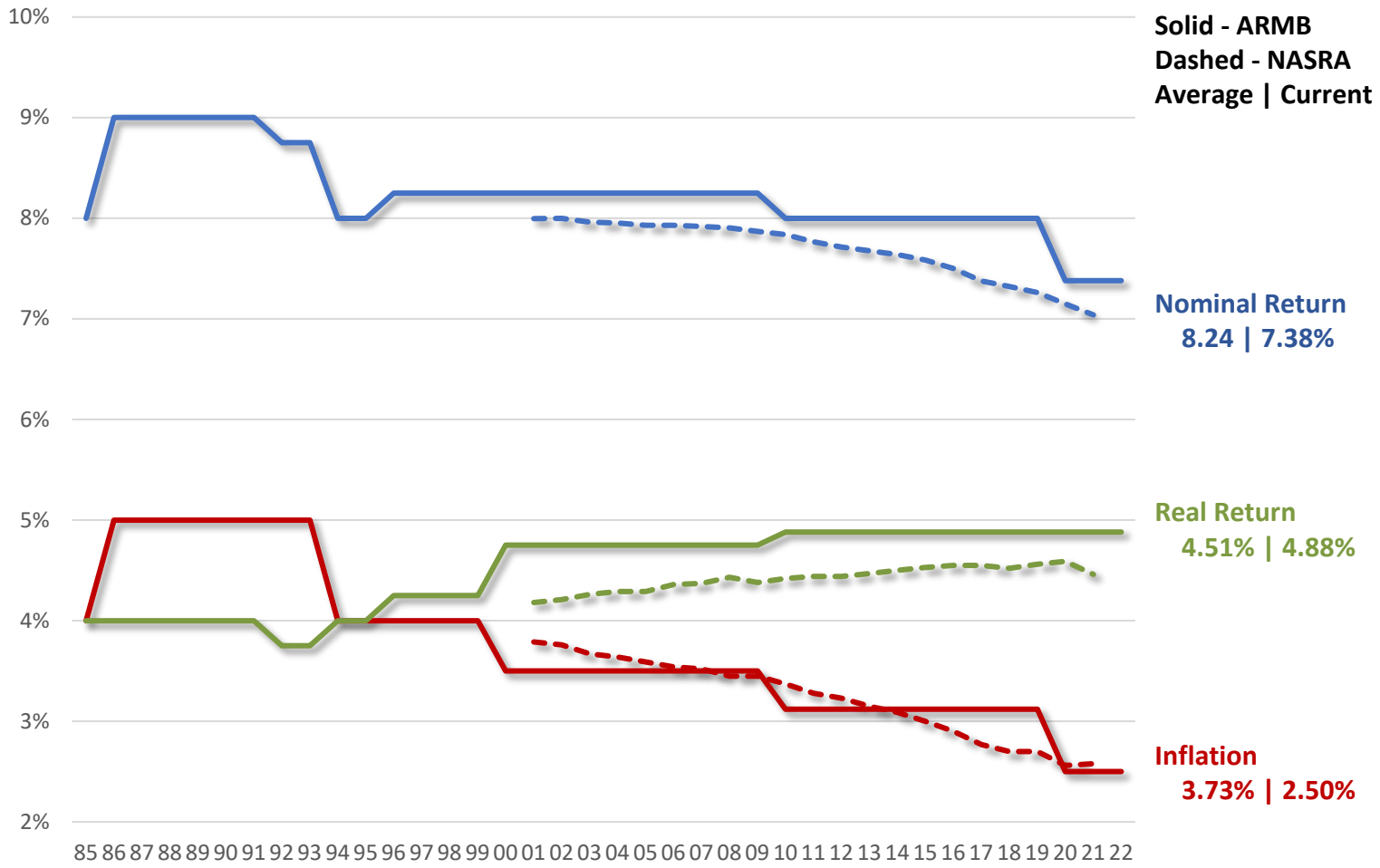
Peer Assumptions – Real Returns





Source: ARMB staff analysis of *Public Plans Data*. 2001-2020.
National Association of State Retirement Administrators (NASRA).

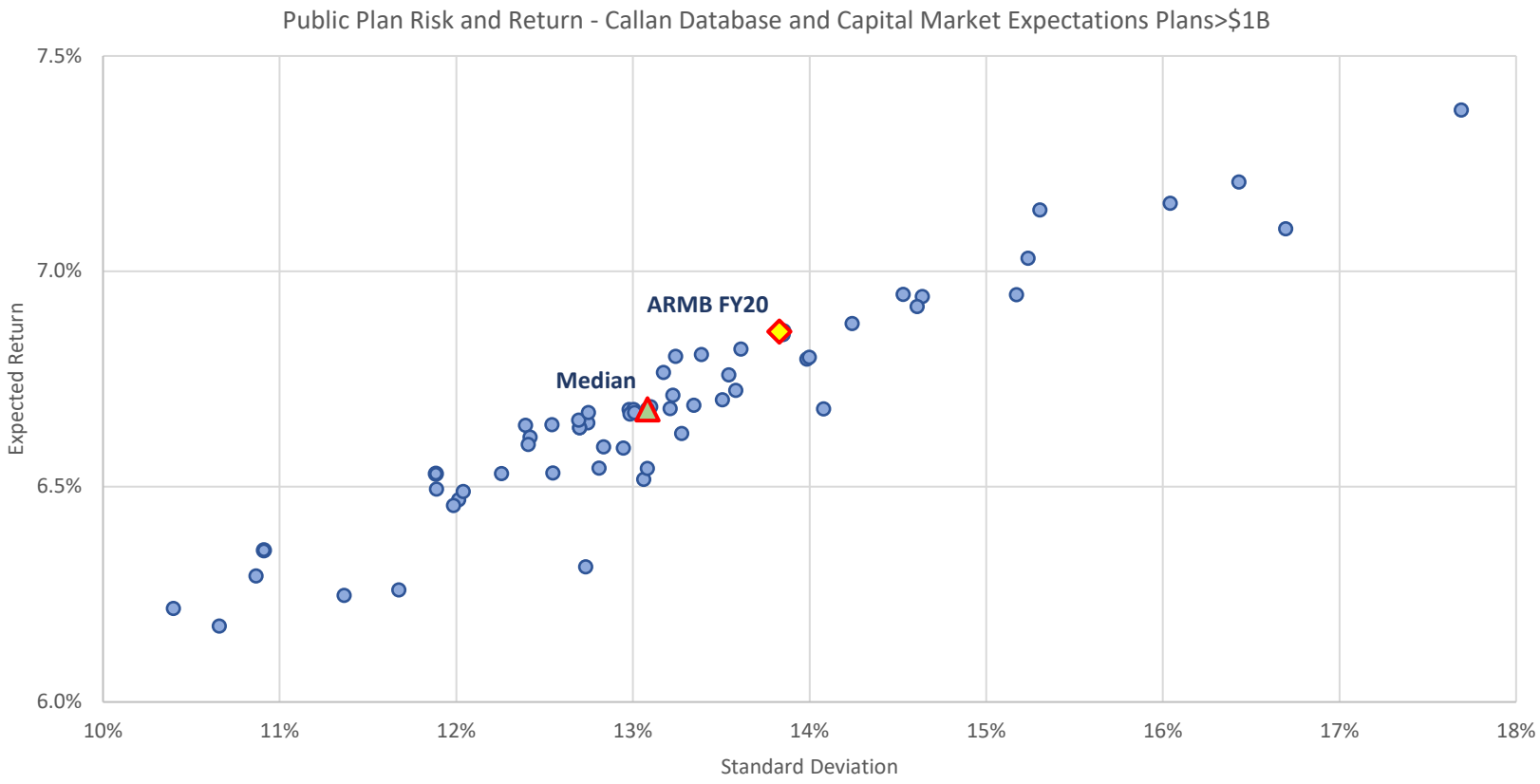
ARMB and Peer Assumption History



Source: ARMB staff analysis of *Public Plans Data*. 2001-2020.
National Association of State Retirement Administrators (NASRA).

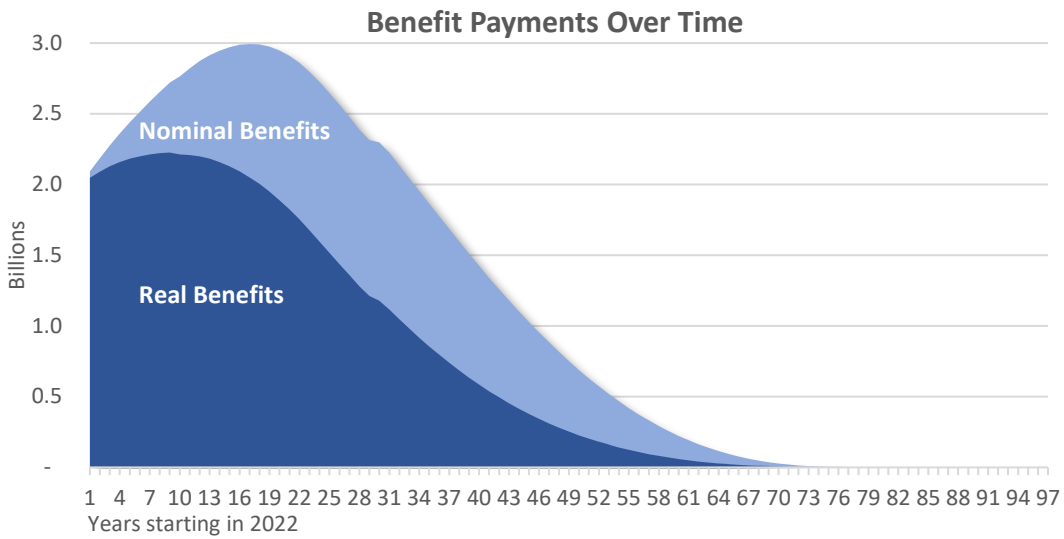
Investment Risk Posture

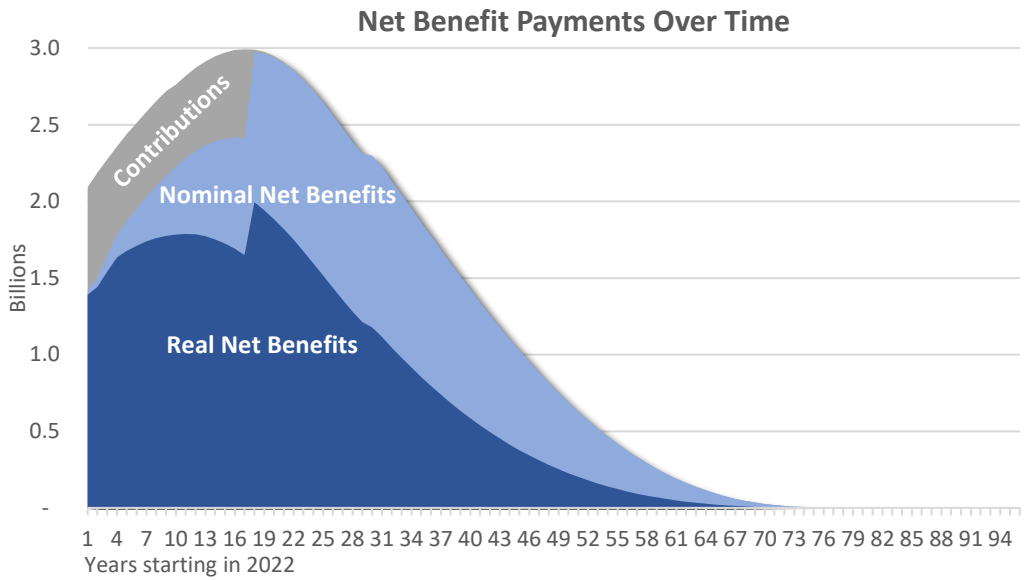
- The ARMB's risk posture is higher than the median plan.
- Plan sponsor risk postures vary due to differing time horizons, asset/liability relationships, and other unique circumstances.
- The ability to bear risk is influenced by loss aversion, prudent investor considerations, liquidity, and other factors.



Time Horizon – Benefit Payments

- The PERS and TRS defined benefit systems are closed and mature but expected payments don't peak for over 10 years and extend 96 years into the future.
- The plans are expected to pay out $113 billion in nominal payments or $71 billion in inflation-adjusted payments using Callan's inflation assumption of 2.25%. Forward contributions of $8 billion offset some of these payments, leaving $63 billion.
- The systems are heavily reliant on investment earnings to bridge the ~$30 billion gap between these payments and current assets.
- Establishing an appropriate time horizon for the investment earnings assumption is important.





Time Horizon Matters

- Time horizon is important with respect to both return and inflation expectations.
- Currently, return expectations are increasing with time horizon – the longer the appropriate time horizon, the more you would generally expect to earn over time.
- Inflation expectations are generally trending downward over time currently due to higher expected shorter-term inflation.
- Most open defined benefit plans have a very long time horizon, generally well in excess of 30 years.

Buck – December 2021 GEMS Modeling:

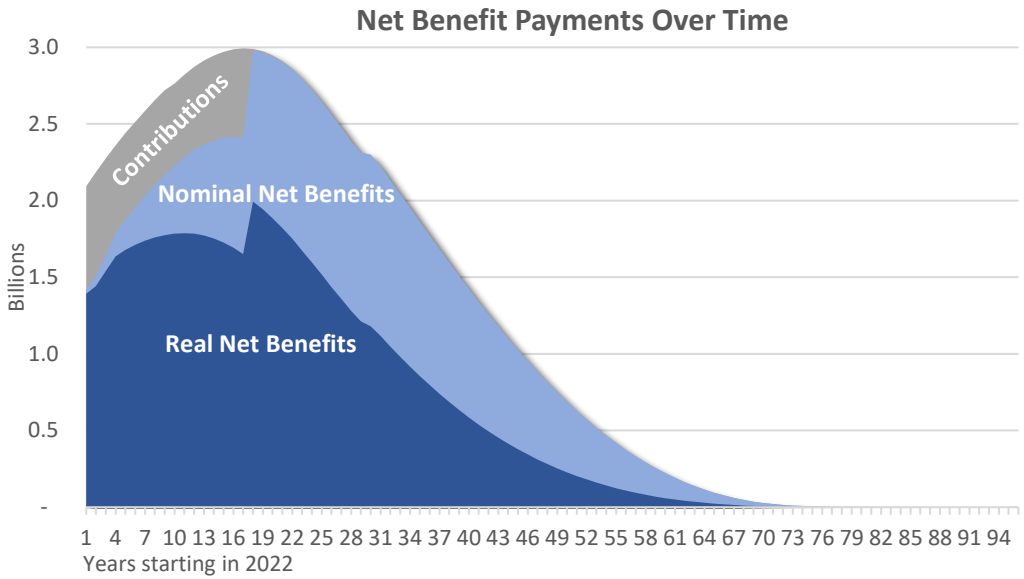
	10-year	20-year	30-year
Approach #1			
- expected value	**6.02%**	**6.60%**	**6.86%**
- 65th percentile	7.54%	7.81%	7.88%
- 35th percentile	4.81%	5.50%	5.96%

Callan – 2022 Capital Market Assumptions:

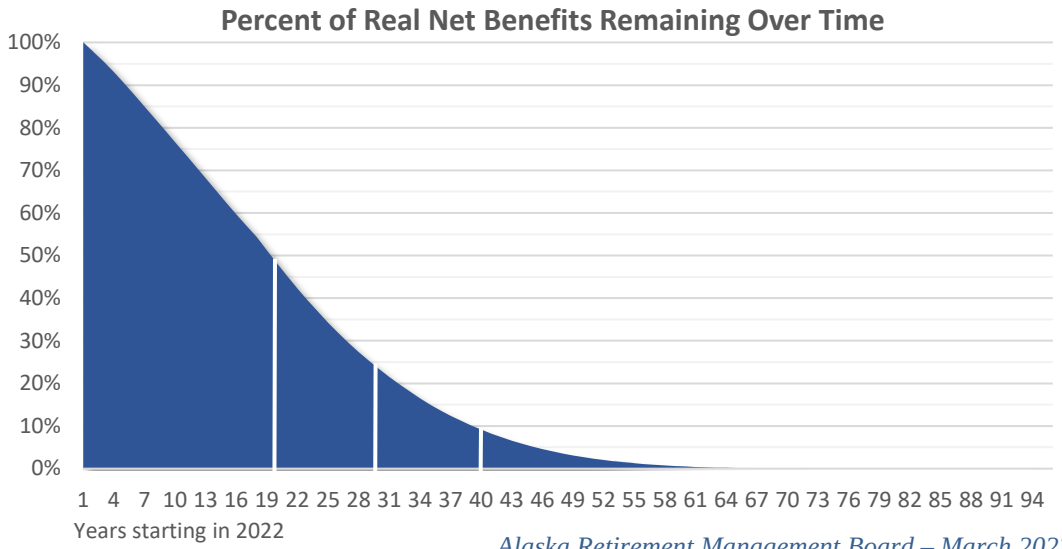
AssetClass	2022-2031 10-Year Annualized Return	2022-2041 20-Year Annualized Return	2022-2051 30-Year Annualized Return
Broad US Equity	6.60%	7.10%	7.55%
Large Cap US Equity	6.50%	7.00%	7.45%
Small/Mid Cap US Equity	6.70%	7.35%	7.95%
Global ex-US Equity	6.80%	7.40%	7.90%
Developed ex-US Equity	6.50%	7.00%	7.45%
Emerging Market Equity	6.90%	7.60%	8.25%
Core US Fixed	1.75%	2.65%	3.50%
ARMB Fixed Income	1.70%	2.60%	3.40%
Opportunistic	5.00%	5.65%	6.25%
Private Credit	5.50%	6.20%	6.80%
Core Real Estate	5.75%	6.15%	6.55%
Timber	5.40%	5.85%	6.20%
Farmland	5.50%	5.95%	6.30%
Private Infrastructure	6.10%	6.55%	6.95%
US REITs	6.20%	6.70%	7.10%
Real Assets	6.15%	6.59%	6.95%
Hedge Funds	4.10%	4.55%	5.00%
Private Equity	8.00%	8.45%	8.90%
Cash Equivalents	1.20%	1.70%	2.15%

ARMB Time Horizon – Benefit Payments Over Time

- The full expected time horizon of the retirement systems is 96 years, but payments decrease to a low level well before that point.

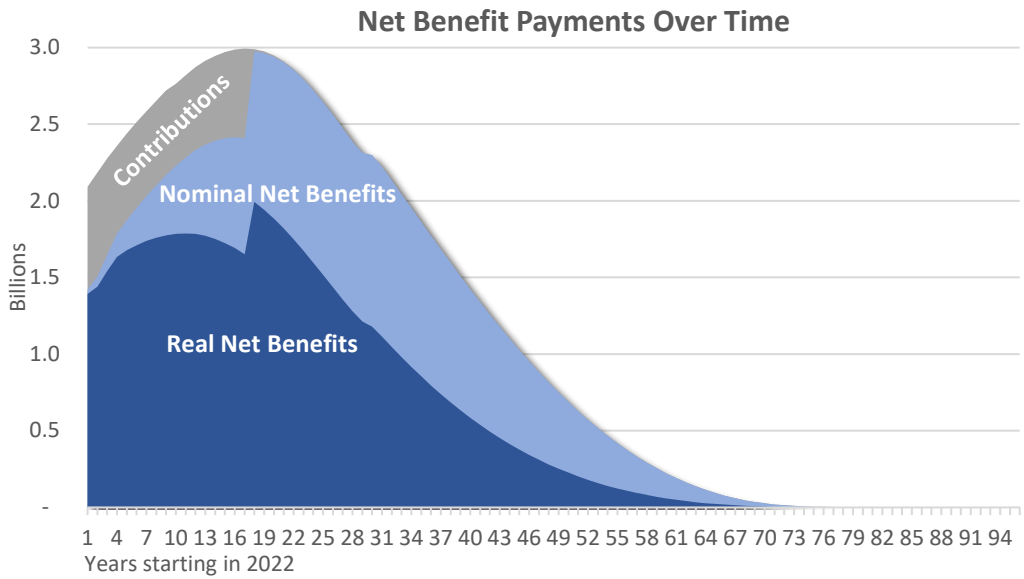


- The percentage of total benefit payments remaining decrease fairly quickly over time:
  - In 20 years ~50% the payments have been paid out and remain.
  - In 30 years ~25% of the payments remain.
  - In 40 years ~10% of the payments remain.

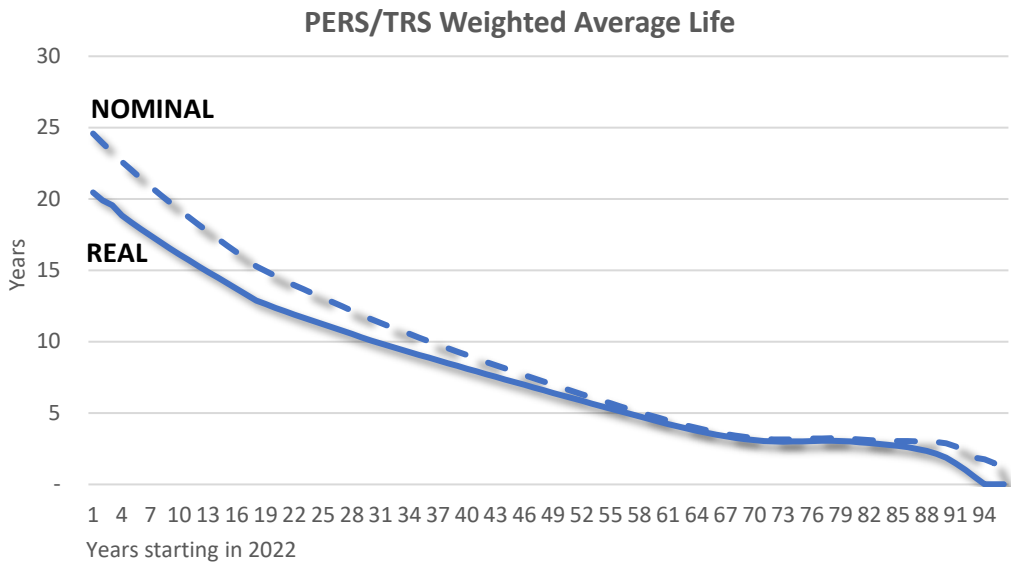


ARMB Time Horizon – Weighted Average Life

- The approach staff uses to estimate time horizon for the systems is to calculate the weighted average life of the net benefit payments over time.
- This average life decreases over time as you approach the last benefit payments.



- In inflation-adjusted real terms, the weighted average life of the systems is currently 20 years.
- This is a reasonable estimate of the average investment time horizon of the funds.

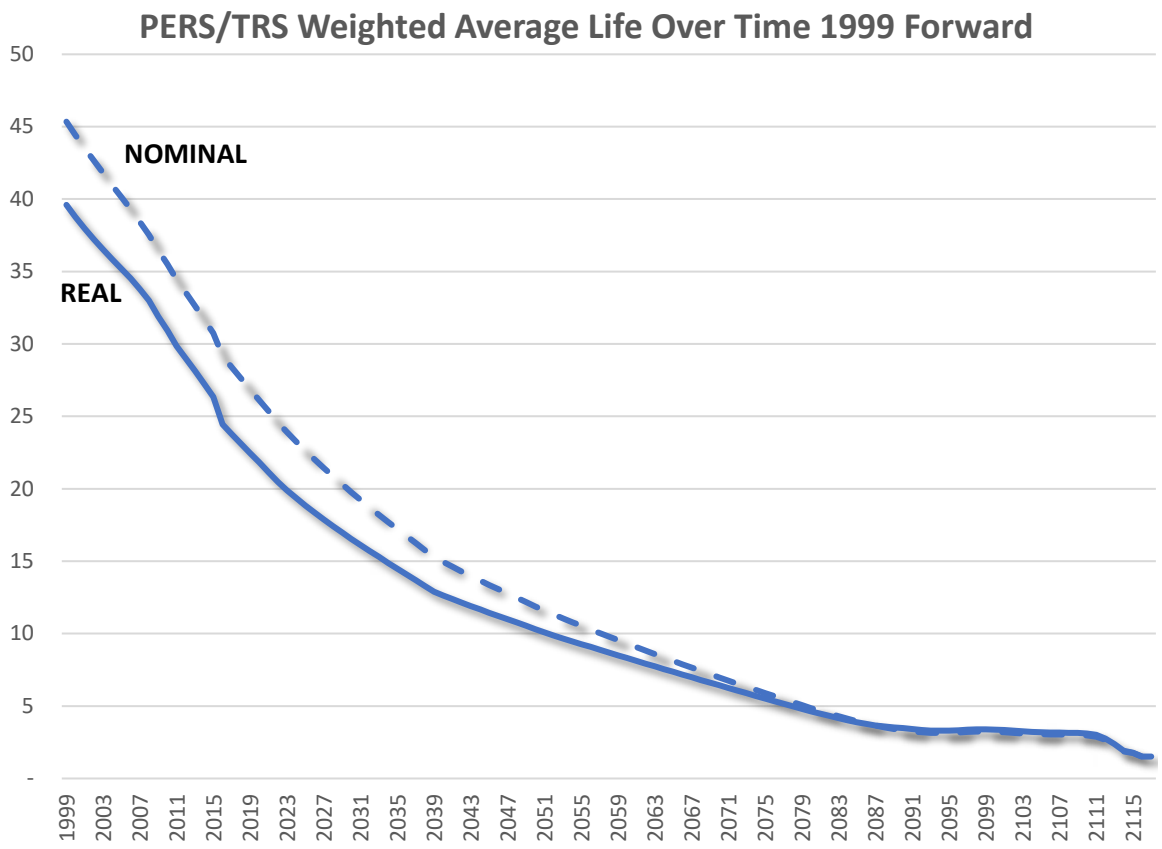


Weighted-Average back to 1999

- For some historical context, staff calculated the weighted average life back to 1999 using actual prior benefit payments and forward payments as currently projected.

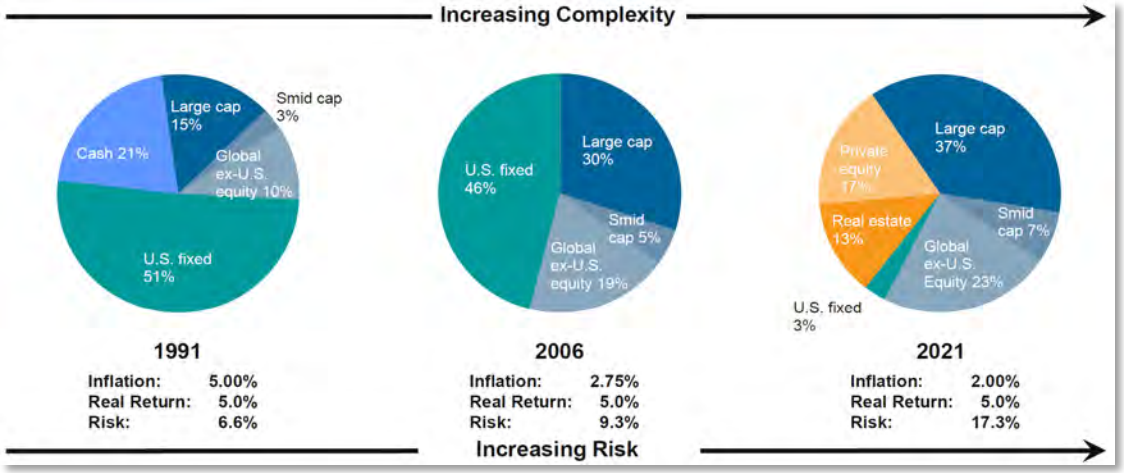
- At the start, the average life was ~40 years and has been decreasing steadily as the number of retirees increases and the plans become more mature.

- It is worth noting that this would not have been the perspective of the plans back in 1999 since at that time they were presumed to remain open with a somewhat perpetual life.



Economic Assumptions and Asset Allocation

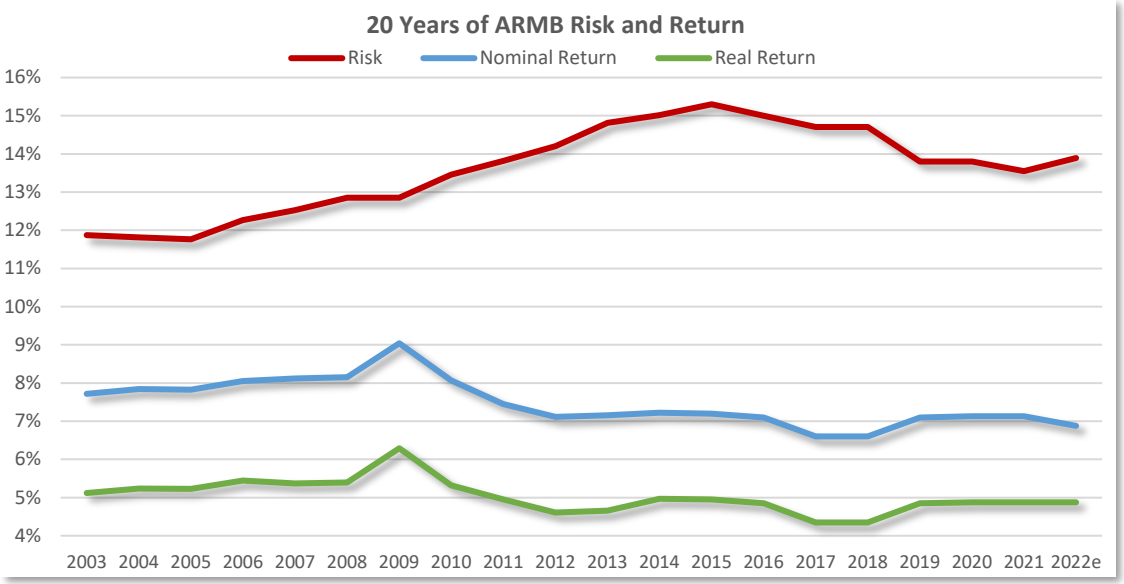
- Positioning a portfolio to achieve ~5% real return has required increasing levels of risk and complexity.



Source: Callan LLC

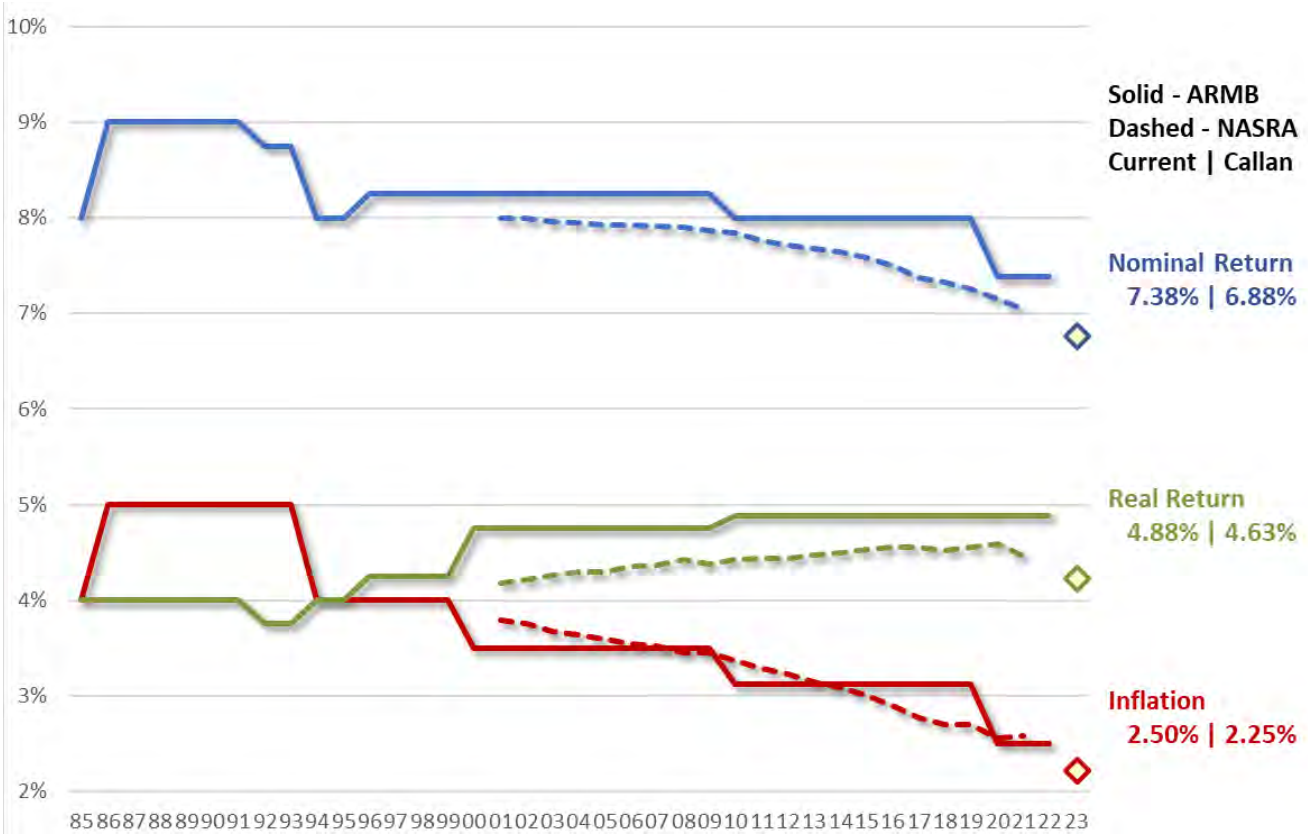
- Like most institutional investors, the ARMB's risk has generally risen over time, while real returns have remained relatively static.

- In 2019, the ARMB moved to a 20-year asset allocation time horizon to better align assets and liabilities and moderate annual asset allocation changes.



Summary and Callan Initial Asset Allocation

- The ARMB moved to a 20-year asset allocation time horizon in 2019 after the prior experience study.
- 20 years remains a reasonable planning time horizon for both the liabilities and the assets.
- At the upcoming June ARMB meeting, the board will discuss asset allocation.
- The ARMB could consider aligning the experience study economic assumptions with the adopted asset allocation.



Questions?

Callan

2022 Capital Markets Assumptions

March 17, 2022

Alaska Retirement Management Board

Paul Erlendson
Fund Sponsor Consulting

Jay Kloepfer
Capital Markets Research

Steven Center, CFA
Fund Sponsor Consulting

Adam Lozinski, CFA
Fund Sponsor Consulting

Agenda

Process overview

Why does Callan create capital markets projections?

Current market conditions

- Special topic: inflation

2022 expectations

- Economic outlook
- Asset class outlook
  - Equity
  - Fixed income
  - Alternative investments
- Forecast parameters
  - Returns
  - Risk
  - Correlation

Detailed 2022 projections and resulting portfolio returns

Callan

Process Overview

Why Make Capital Markets Projections?

Guiding objectives and process

A long-term strategic investment plan is the cornerstone of a prudent process.

- Capital markets projections are key elements to set reasonable return and risk expectations for the appropriate time horizon.
- Projections represent our best thinking regarding the long-term (10-year) outlook, recognizing our median projections represent the midpoint of a range, rather than a specific number.
- Develop results that are readily defensible both for individual asset classes and for total portfolios
- Be conscious of the level of change suggested in strategic allocations for long-term investors: DB plan sponsors, foundations, endowments, trusts, DC participants, families, and individuals
- Reflect common sense and recent market developments, within reason

Callan's forecasts are informed by current market conditions, but are not built directly from them.

- Balance recent, immediate performance and valuation against long-term equilibrium expectations

How are Capital Market Projections Constructed?

Guiding objectives and process

Underlying beliefs guide the development of the projections:

- An initial bias toward long-run averages
- A conservative bias
- An awareness of risk premiums
- A presumption that markets are ultimately clear and rational

Reflect our beliefs that long-term equilibrium relationships between the capital markets and lasting trends in global economic growth are key drivers to setting capital market expectations

Long-term compensated risk premiums represent “beta”—exposure to each broad market, whether traditional or “exotic,” with limited dependence on successful realization of alpha

The projection process is built around several key building blocks:

- Advanced modeling at the individual asset class level (e.g., a detailed bond model, an equity model)
- A path for interest rates and inflation
- A cohesive economic outlook
- A framework that encompasses Callan beliefs about the long-term operation and efficiencies of the capital markets

2022 Risk and Returns

Summary of Callan's Long-Term Capital Market Assumptions (2022 – 2031)

Asset Class	Index	Projected Return			Projected Risk
		1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation
Equities					
Broad U.S. Equity	Russell 3000	8.00%	6.60%	4.35%	17.95%
Large Cap U.S. Equity	S&P 500	7.85%	6.50%	4.25%	17.70%
Small/Mid Cap U.S. Equity	Russell 2500	8.75%	6.70%	4.45%	21.30%
Global ex-U.S. Equity	MSCI ACWI ex USA	8.70%	6.80%	4.55%	20.70%
Developed ex-U.S. Equity	MSCI World ex USA	8.25%	6.50%	4.25%	19.90%
Emerging Market Equity	MSCI Emerging Markets	9.80%	6.90%	4.65%	25.15%
Fixed Income					
Short Duration Gov't/Credit	Bloomberg 1-3 Yr G/C	1.50%	1.50%	-0.75%	2.00%
Core U.S. Fixed	Bloomberg Aggregate	1.80%	1.75%	-0.50%	3.75%
Long Government	Bloomberg Long Gov	1.85%	1.10%	-1.15%	12.50%
Long Credit	Bloomberg Long Cred	2.60%	2.10%	-0.15%	10.50%
Long Government/Credit	Bloomberg Long G/C	2.30%	1.80%	-0.45%	10.40%
TIPS	Bloomberg TIPS	1.35%	1.25%	-1.00%	5.05%
High Yield	Bloomberg High Yield	4.40%	3.90%	1.65%	10.75%
Global ex-U.S. Fixed	Bloomberg Gl Agg xUSD	1.20%	0.80%	-1.45%	9.20%
Emerging Market Sovereign Debt	EMBI Global Diversified	4.00%	3.60%	1.35%	9.50%
Alternatives					
Core Real Estate	NCREIF ODCE	6.60%	5.75%	3.50%	14.20%
Private Infrastructure	MSCI Glb Infra/FTSE Dev Core 50/50	7.10%	6.10%	3.85%	15.45%
Private Equity	Cambridge Private Equity	11.45%	8.00%	5.75%	27.60%
Private Credit	N/A	6.40%	5.50%	3.25%	14.60%
Hedge Funds	Callan Hedge FOF Database	4.35%	4.10%	1.85%	8.20%
Commodities	Bloomberg Commodity	4.05%	2.50%	0.25%	18.00%
Cash Equivalents	90-Day T-Bill	1.20%	1.20%	-1.05%	0.90%
Inflation	CPI-U		2.25%		1.60%

* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

Callan

Current Market Conditions

Resurgent U.S. Equity Market in 4Q21

Strong performance across both growth and value strategies during 2021

- 2021 returns for U.S. equity markets are eye-popping:
  - S&P 500: +28.7%
  - U.S. Small Cap: +14.8%
  - Non-U.S. equity markets lagged:
  - MSCI World ex USA: +12.6%
  - Emerging Markets: -2.5%
- Economic data recovered in 4Q after softening in 3Q. Tight labor market and mismatch between jobs and job seekers is vexing employers.
- Inflation spiked and recorded 7% for the first time in decades.
- 4Q GDP hit a robust 6.8% (estimate), after dropping in 3Q. Growth for the year is 5.7% (estimate). The economic recovery is still solid. Supply chain issues and sentiment surrounding the end of fiscal stimulus, the Omicron variant, and the Fed taper vex investors as we head into 2022.

Returns for Periods ended 12/31/21

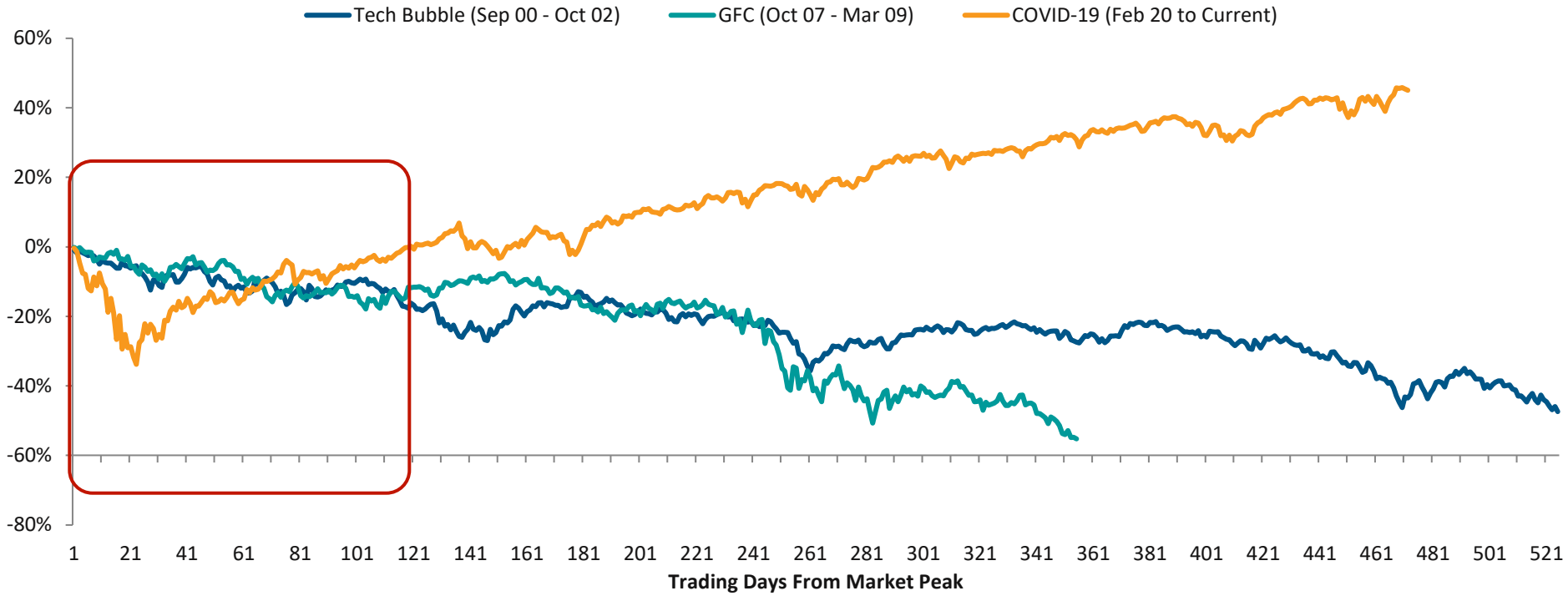
	1 Quarter	1 Year	5 Years	10 Years	25 Years
U.S. Equity					
Russell 3000	9.28	25.66	17.97	16.30	9.81
S&P 500	11.03	28.71	18.47	16.55	9.76
Russell 2000	2.14	14.82	12.02	13.23	8.99
Global ex-U.S. Equity					
MSCI World ex USA	3.14	12.62	9.63	7.84	5.39
MSCI Emerging Markets	-1.31	-2.54	9.88	5.49	--
MSCI ACWI ex USA Small Cap	0.62	12.93	11.21	9.46	6.93
Fixed Income					
Bloomberg Aggregate	0.01	-1.54	3.57	2.90	4.94
90-day T-Bill	0.01	0.05	1.14	0.63	2.06
Bloomberg Long Gov/Credit	2.15	-2.52	7.39	5.72	7.31
Bloomberg Global Agg ex-US	-1.18	-7.05	3.07	0.82	3.40
Real Estate					
NCREIF Property	5.23	16.67	7.57	9.23	9.34
FTSE Nareit Equity	16.31	43.24	10.75	11.38	9.89
Alternatives					
CS Hedge Fund	0.94	8.23	5.47	4.90	6.74
Cambridge Private Equity*	4.81	49.51	21.16	17.17	15.72
Bloomberg Commodity	-1.56	27.11	3.66	-2.85	1.13
Gold Spot Price	4.08	-3.51	9.69	1.56	6.61
Inflation - CPI-U	1.64	7.04	2.92	2.14	2.28

*Cambridge PE preliminary data through 09/30/21.
Sources: Bloomberg, Callan, Cambridge, Credit Suisse, FTSE Russell, MSCI, NCREIF, S&P Dow Jones Indices

Unprecedented Shock to Global Capital Markets—But It Was Over in a Flash!

V-shaped recovery in equity—back in black by mid-August 2020, up 119% from market bottom!

S&P 500 Cumulative Returns
Market Peak-to-Trough for Recent Corrections vs. Current Path of COVID-19 Correction Through 12/31/21



Sharpest and fastest equity market decline ever: 16 trading days to reach bear market; -34% after just 23 days

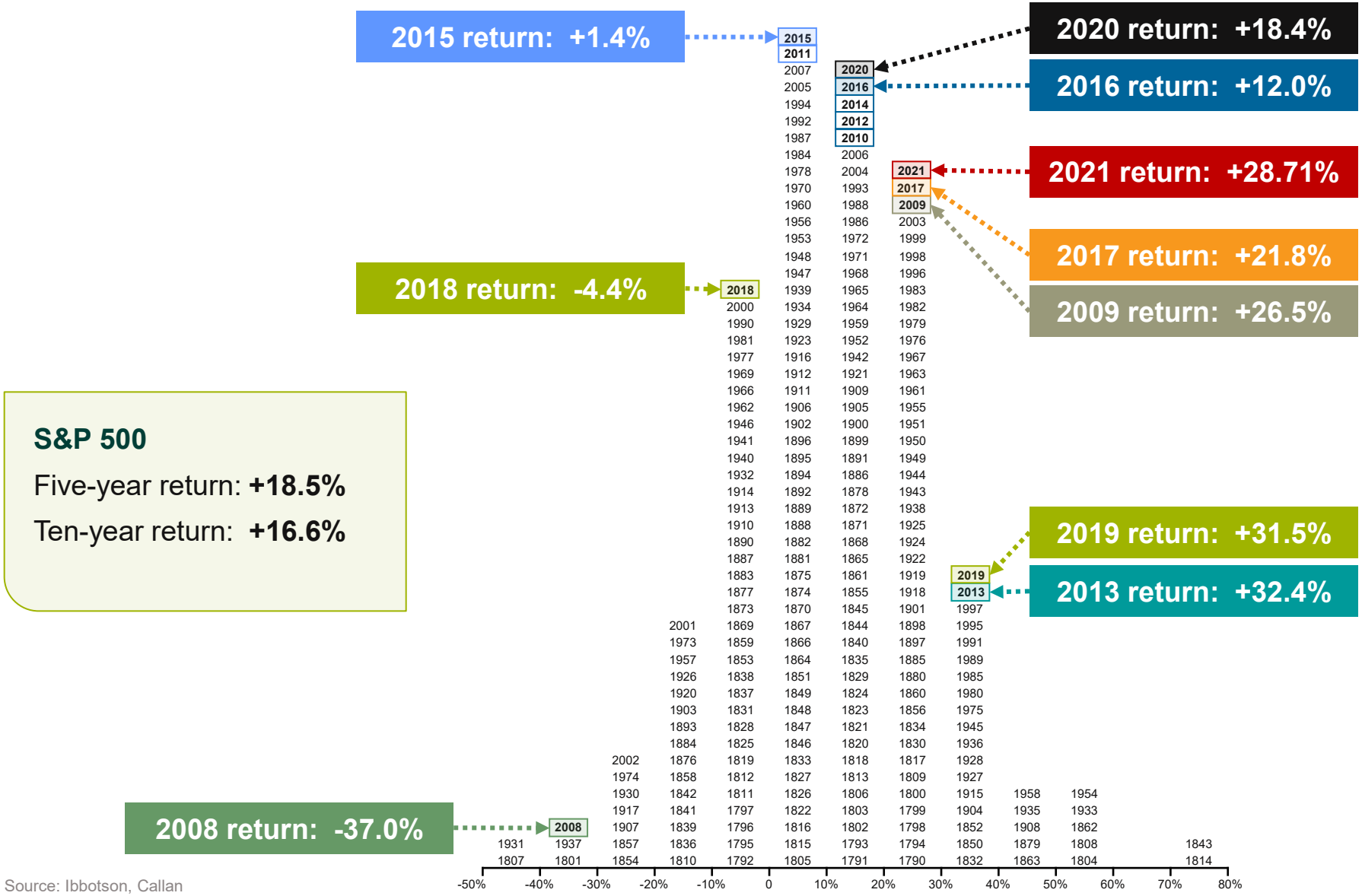
- S&P 500 recovered all its pandemic-related losses by Aug. 10, 2020, only 97 days from the bottom.
- S&P 500 up 28.7% in 2021.

Fun fact: As of Dec. 31, 2021, or 472 trading days, the S&P is up over 45% from the previous market peak on 2/19/20. In contrast, during the GFC the market was still down 31% from the previous market peak after 472 trading days (Aug. 24, 2009).

Sources: Callan, S&P Dow Jones Indices

Stock Market Returns by Calendar Year

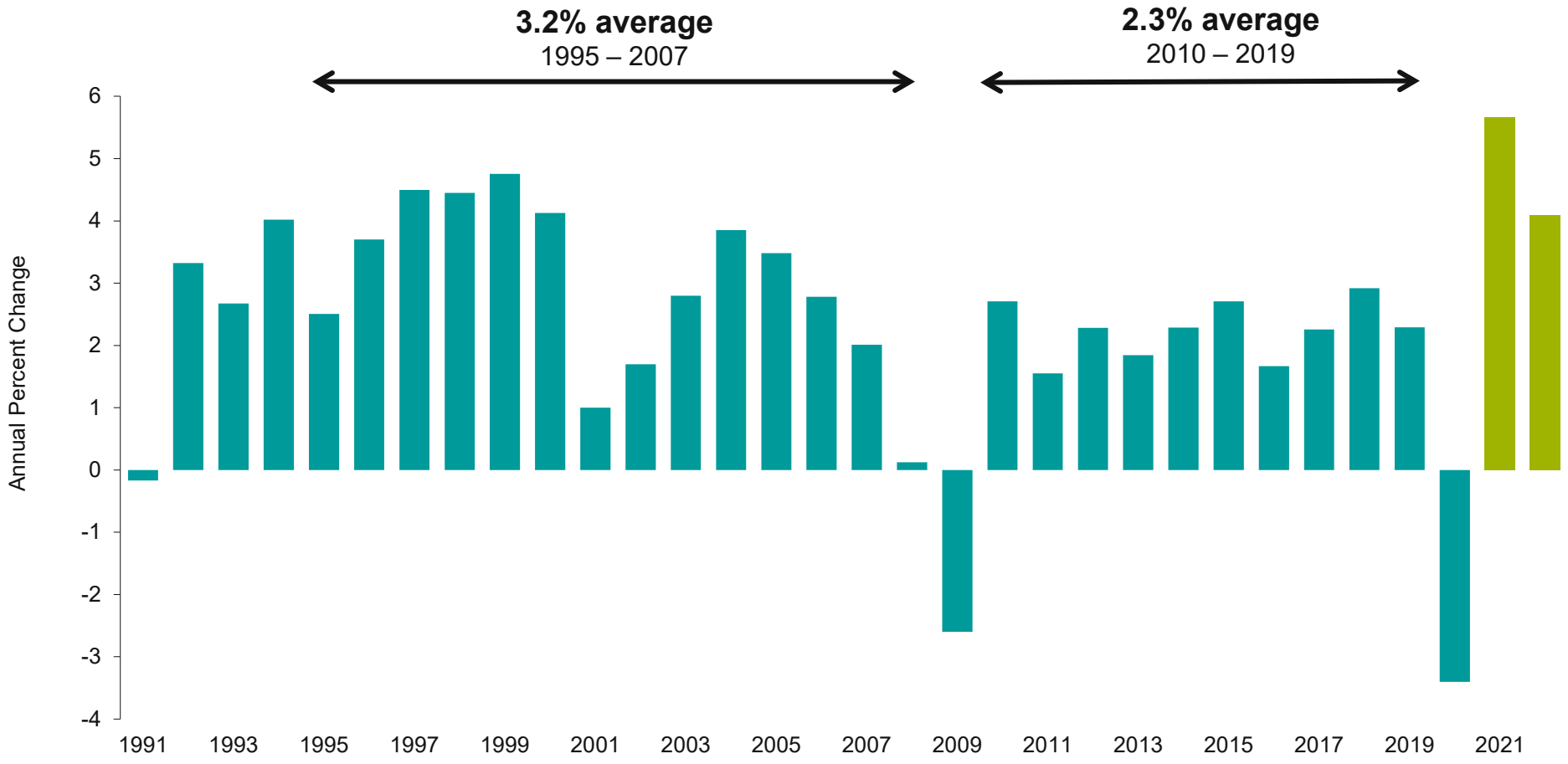
2021 performance in perspective: History of the U.S. stock market (232 years of returns)



Source: Ibbotson, Callan

U.S. GDP Growth to Return to a Slower Trajectory After Recovery From 2020

Real GDP growth

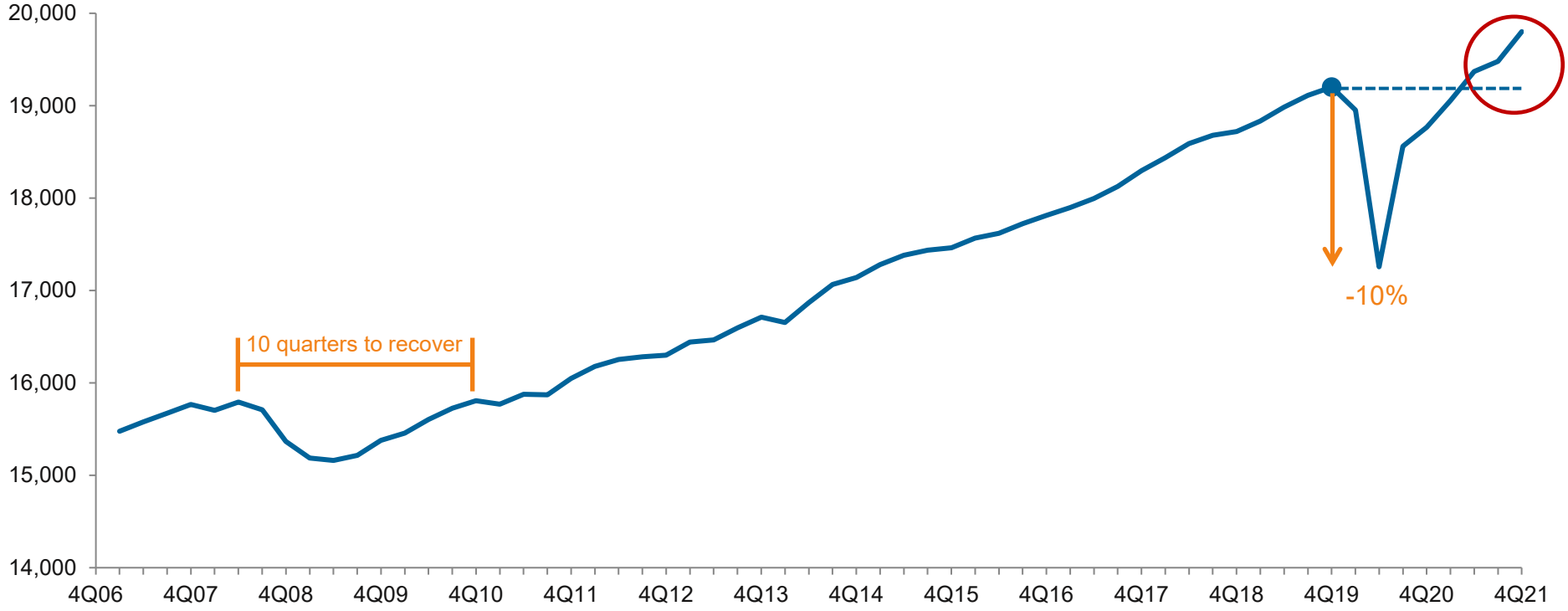


Note: 2021 and 2022 Forecast: IHS Markit

Source: IHS Markit

GDP Recovered Pre-Pandemic Level in 2Q21 After Deepest Drop in 75 Years

Seasonally Adjusted Real GDP in Billions of Dollars



After the Global Financial Crisis, it took 2.5 years before real GDP reclaimed its pre-recession highs.

- GFC peak to trough down 4%

2Q20 real GDP level was down over 10% from 4Q19.

- Pre-pandemic peak level of GDP reached in 2Q21: $19.368T vs. $19.202T for 4Q19

2021 GDP on track for annual growth of 5.7%, with consensus estimates just north of 4.0% for 2022, followed by return to trend.

Source: Federal Reserve Bank of St. Louis

Economic Outlook

Role of economic variables

GDP and inflation

- GDP forecasts provide a very rough estimate of future earnings growth
- Inflation forecasts provide an approximate path for short-term yields
- Inflation is added to the real return forecasts for equity and fixed income

GDP forecasts

- 2% to 2.5% for the U.S.
- 1.5% to 2.0% for developed ex-U.S. markets
- 4% to 5% for emerging markets
- All forecasts are below long-term averages
- Path to longer-term growth will include cycles with recessions

Inflation forecasts

- 2.0% to 2.5% for the U.S.
- 1.75% to 2.25% for developed ex-U.S. markets
- 2.40% to 2.90% for emerging markets

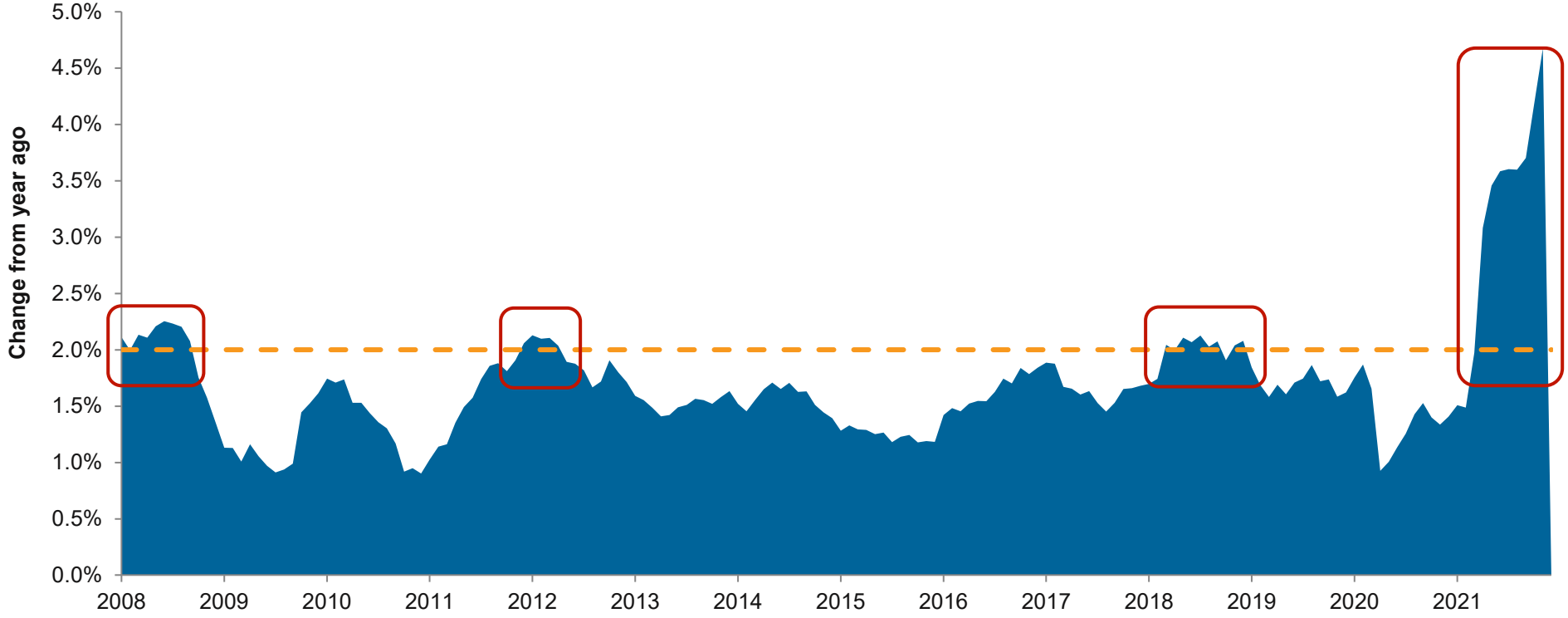
Callan

Detour: Special Focus on Inflation

The Fed's New Inflation Framework

Targeting core Personal Consumption Expenditures Index

Personal Consumption Expenditures Excluding Food and Energy (Chain-Type Price Index)



- Inflation worries are in the headlines, and the data are clearly signaling a sharp rise in the short term.
- Inflation had consistently undershot the Fed's 2% target, prompting the Fed to change its inflation framework.
- Fed's aim is to achieve an average of 2% inflation over the medium term, which is not specifically defined.
- PCE is the Fed's target, different from and typically lower than CPI-U, which had a year-over-year gain of 7.0% in December 2021.

Sources: Federal Reserve Bank of St. Louis, U.S. Bureau of Economic Analysis

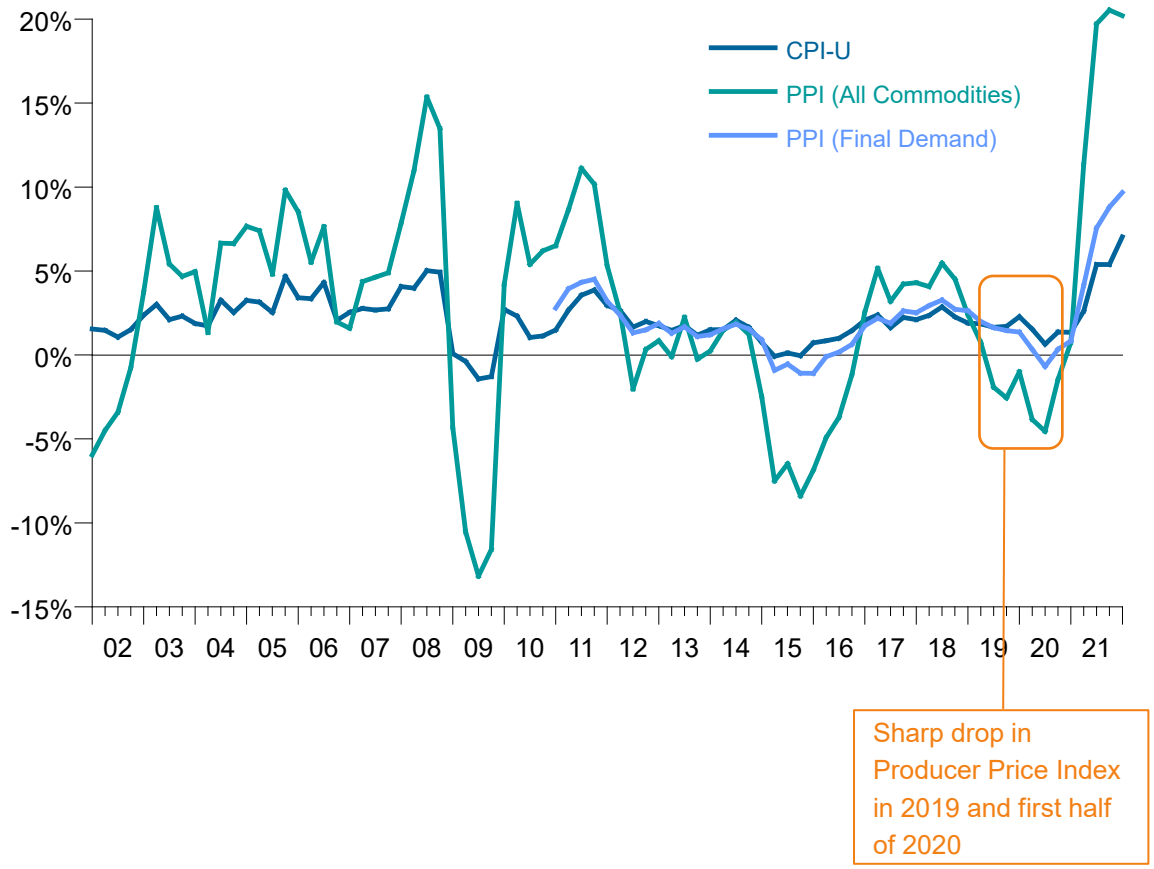
Inflation Rebounds and Spurs Headline Concerns

CPI and PPI up sharply again in 4Q21

Inflation fell sharply at the onset of the pandemic, starting in February 2020.

- The recovery to pre-pandemic levels in the Consumer Price Index required a 2.6% year-over-year change.
- 7% jump in 4Q CPI-U represents kinks in supply chains and labor markets after a year of global economic disruption and shutdown.
- Producer prices had been tumbling for more than a year prior to the pandemic; recovery to 2018 price ***levels*** generated eye-popping year-over-year percent change through 2Q, and the sharp rise continued through the second half of 2021.
- Driving the PPI's rise were prices for transportation goods, energy and food.

Consumer and Producer Price Indexes – Inflation Year-Over-Year

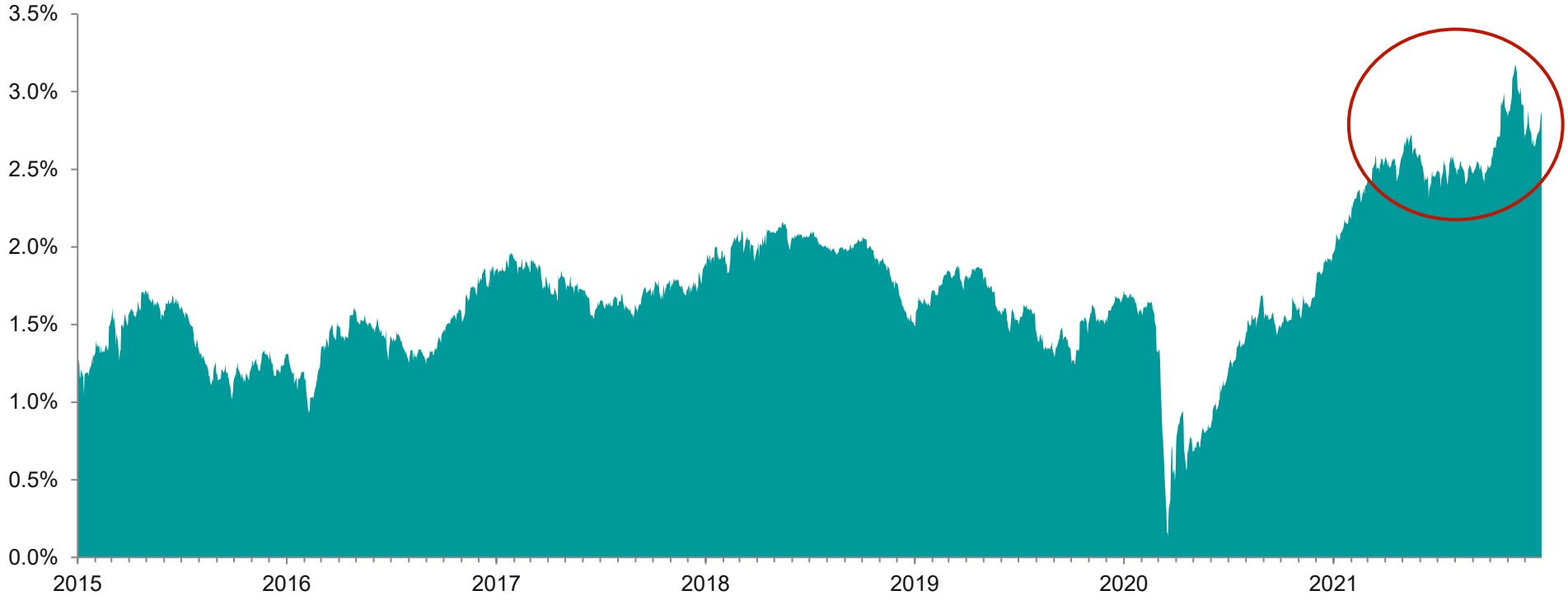


Source: Federal Reserve Bank of St. Louis

Inflation Rebounds and Spurs Headline Concerns

Fixed income market: rising short- to medium-term inflation expectations

5-Year Breakeven Inflation Rate



Fixed income market expecting inflation to rise in the near term.

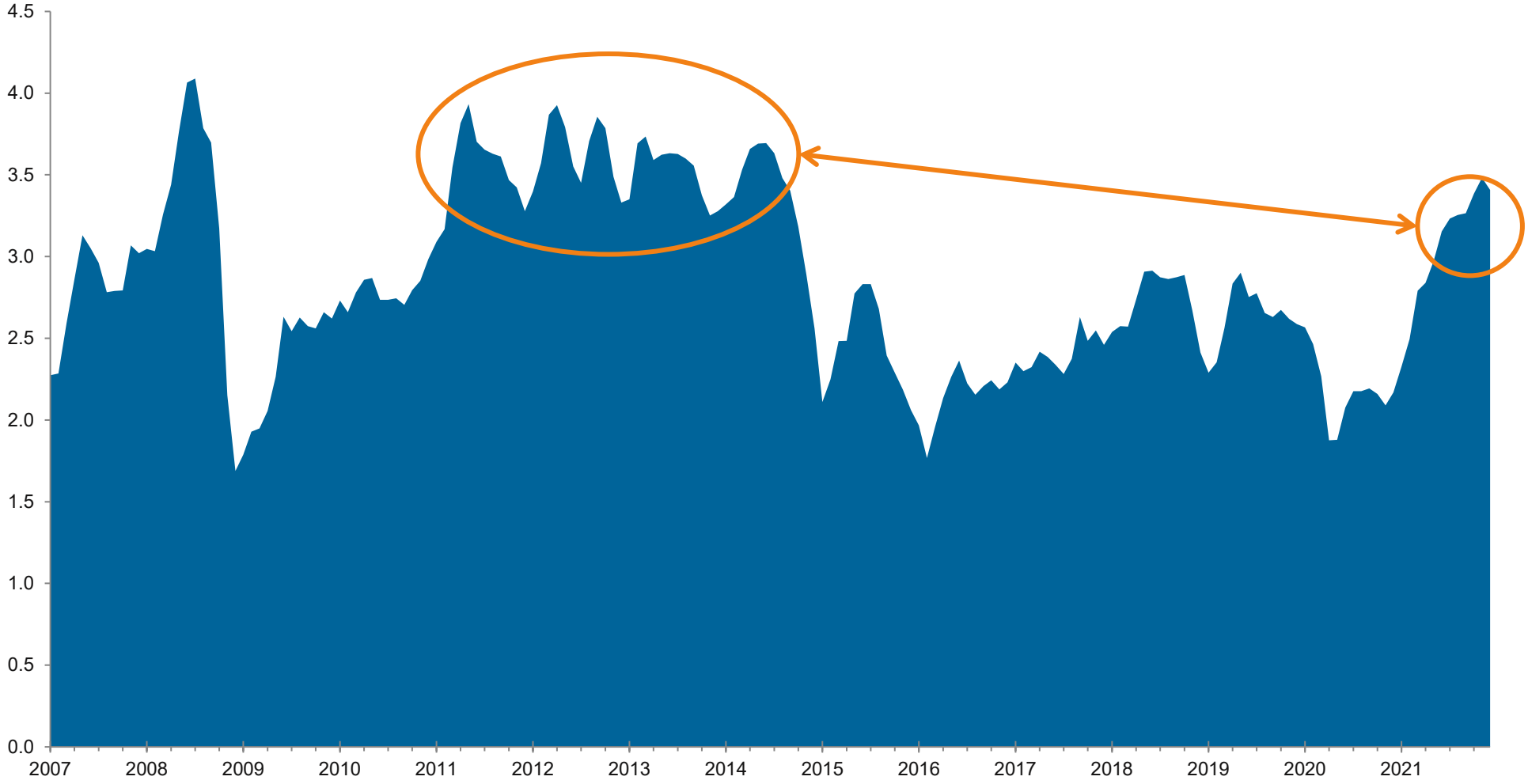
- The five-year breakeven inflation rate has recovered from near zero, and is now above 2.5%—substantially lower than current level.
- Five-year breakeven inflation rate is the difference between five-year nominal and five-year Treasury Inflation-Protected Securities (TIPS) yields.
- Actual breakeven rate not as important as markets forecasting neither deflation nor high inflation

Source: Federal Reserve Bank of St. Louis

Gasoline Prices Are Top of Mind for Consumers, but Still Below Early 2010s Peaks

A highly visible inflation measure; feeds expectations

Average Price: Gasoline, Unleaded Regular (Cost per Gallon / 3.785 Liters) in U.S. City Average



Source: Federal Reserve Bank of St. Louis

So When Does Inflation Become a Problem?

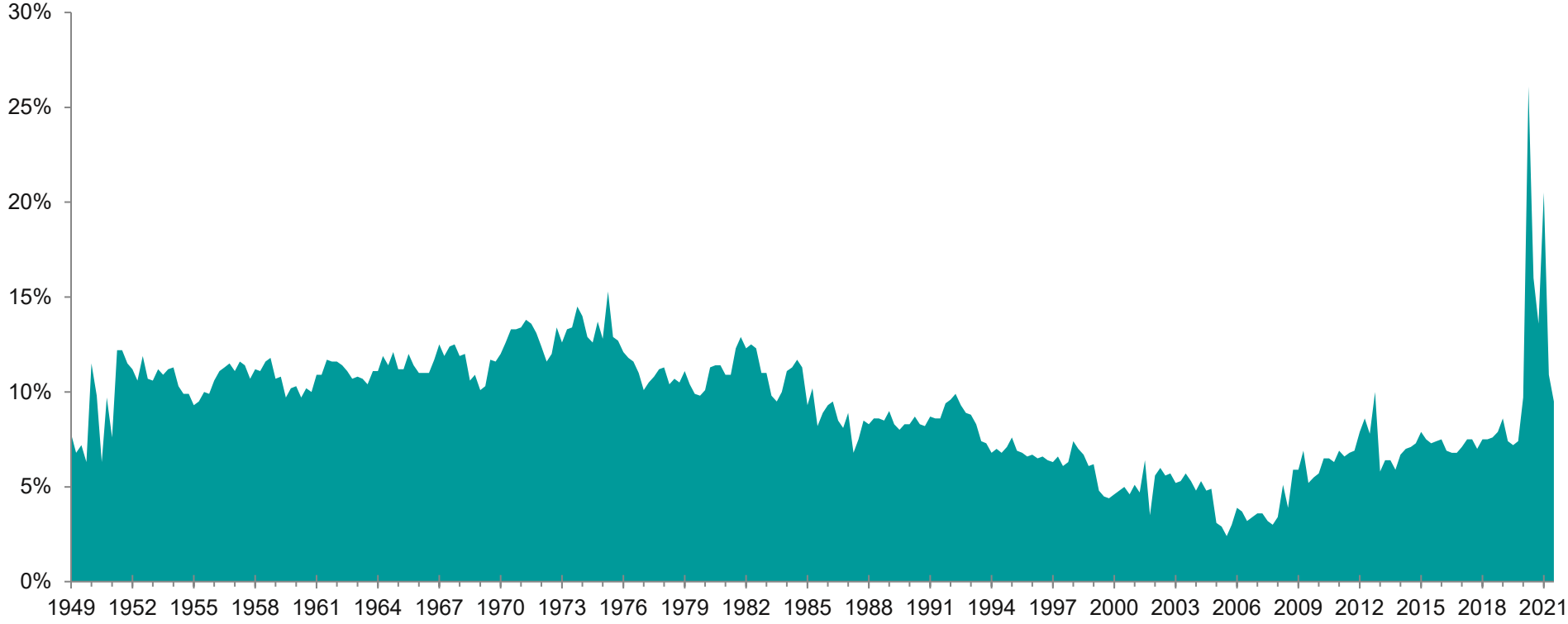
The majority of the working-age and younger population has no experience with sustained inflation.

- Last spurt above 5% happened in 2007, when oil prices spiked to above $100 per barrel; this spike evaporated with the GFC.
- Last ***sustained*** bout of inflation was wrung out of the U.S. economy by serial recessions in 1980 and 1981. Inflation had reached double-digits in the late 1970s, and short interest rates were hiked to just below 20%, twice!
- Decades of policy error, both monetary and fiscal, led to the build-up of inflation during the late 1960s and into the 1970s—the wage-price spiral of the 1970s did not materialize out of thin air.
- Current global monetary and fiscal policies were enacted to combat an unprecedented pandemic, the shutdown of production, transportation, and distribution, and severe interruption in consumer and business activities that led to the steepest recession in 75 years.
- The policies were key to the incredible economic recovery seen in the U.S. and around the world.
- The interruption of supply chains, labor markets, manufacturing processes, and the delivery of goods and services was substantial; the working-out of these kinks was both expected and actually better/faster than projected just a year ago.
- This recession was also the first to feature substantial job loss but no decline in aggregate income, which suggests substantial pent-up demand.
- The current spike in inflation was completely expected; there are no surprises. Inflation is working itself out at different rates and at different levels of pervasiveness across commodities, materials, goods, manufacturing, and services. The labor market suffered some of the greatest disruption and will take the longest to iron out the kinks.
- While the current spike is alarming, the return toward normal markets means that underlying demand will return to normal, and pressures on prices will abate, likely toward the second half of 2022 and in the following years.

History

U.S. savings rate

Personal Savings as a Percentage of Disposable Personal Income



Does saving drive the stock and bond markets?

Savings rate declined from mid-1970s to GFC then increased

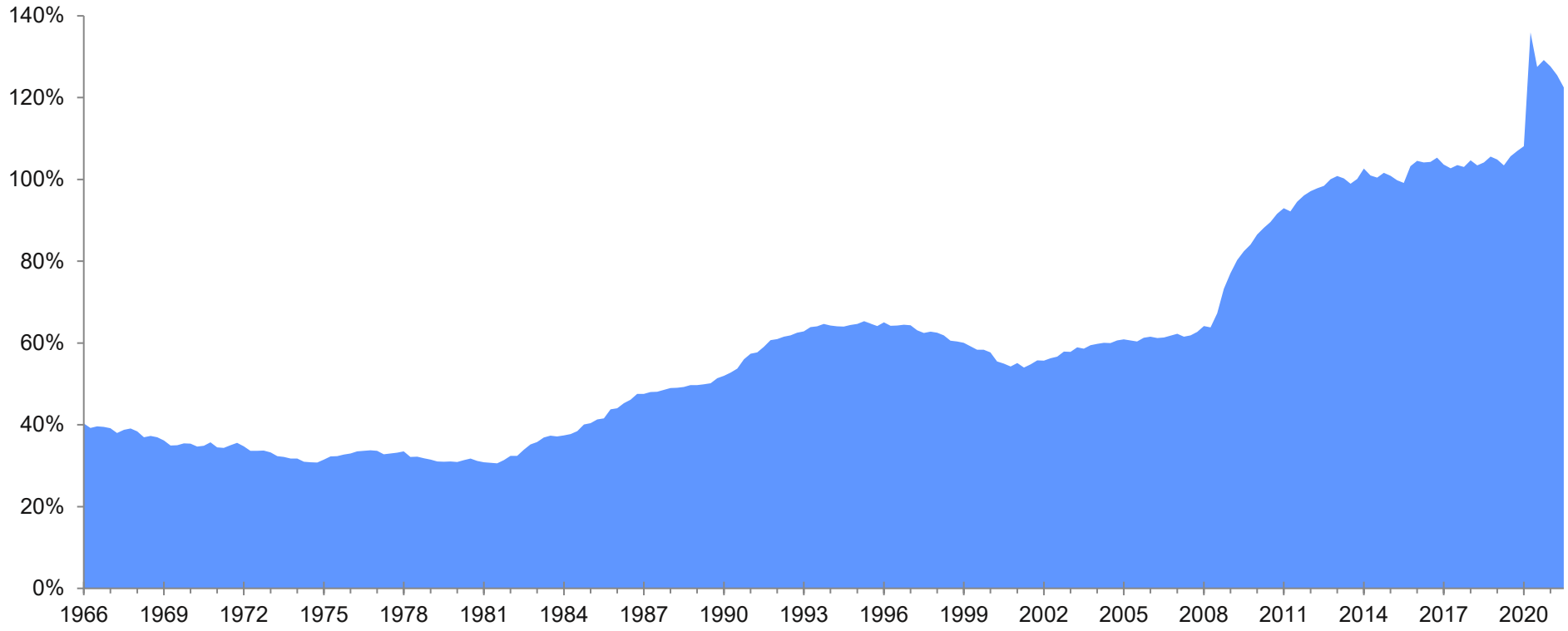
- Americans less fiscally prudent before GFC? Aging population spending accumulated savings?
- Americans more fiscally prudent after GFC? Long-term trend?

Source: Federal Reserve Bank of St. Louis

History

U.S. government debt

Federal Debt: Total Public Debt as a Percentage of Gross Domestic Product



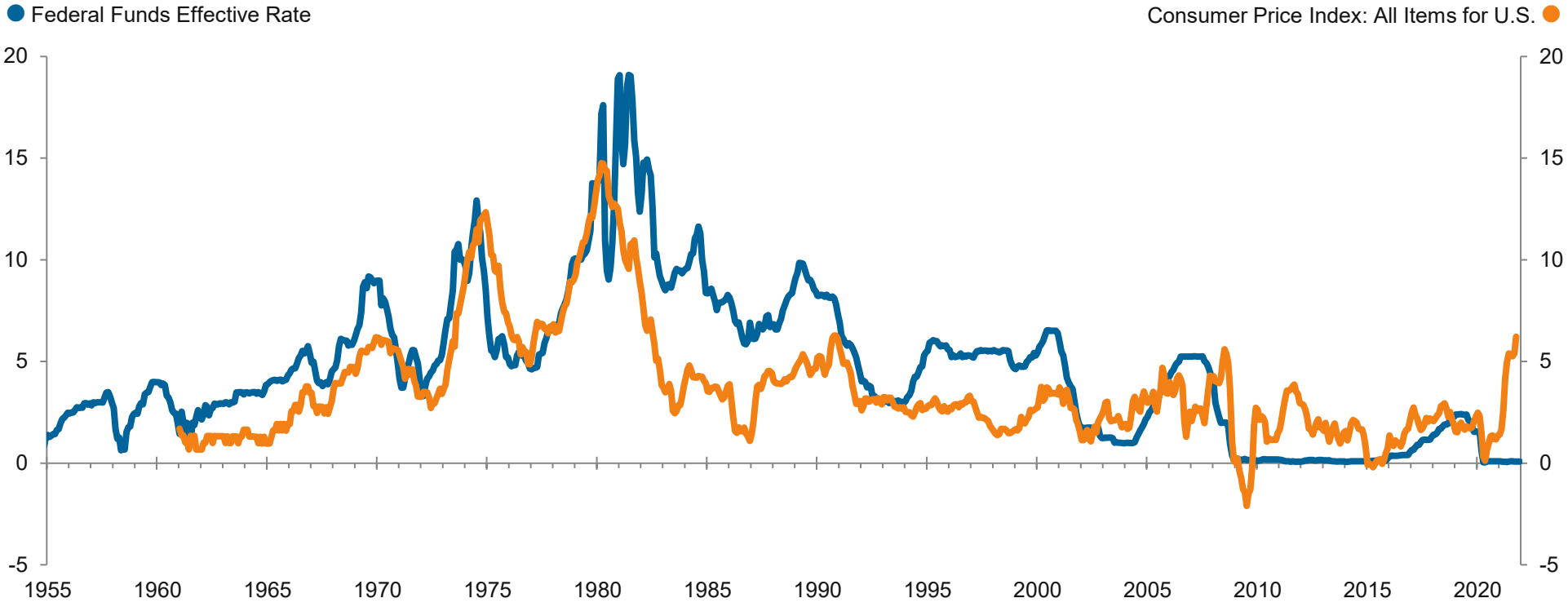
So far government debt has not crowded out private debt

- Foreign demand for U.S. debt
- Equity hedging?
- Financial repression would seem to argue against holding Treasuries

Source: Federal Reserve Bank of St. Louis

Inflation versus Interest Rates Over the Long Term

Federal Funds vs. Consumer Price Index



We are a long way from the inflation and interest rate spike of 1980–1981, and even the last rise in inflation from 2005–2008.

Source: Federal Reserve Bank of St. Louis

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Fixed Income

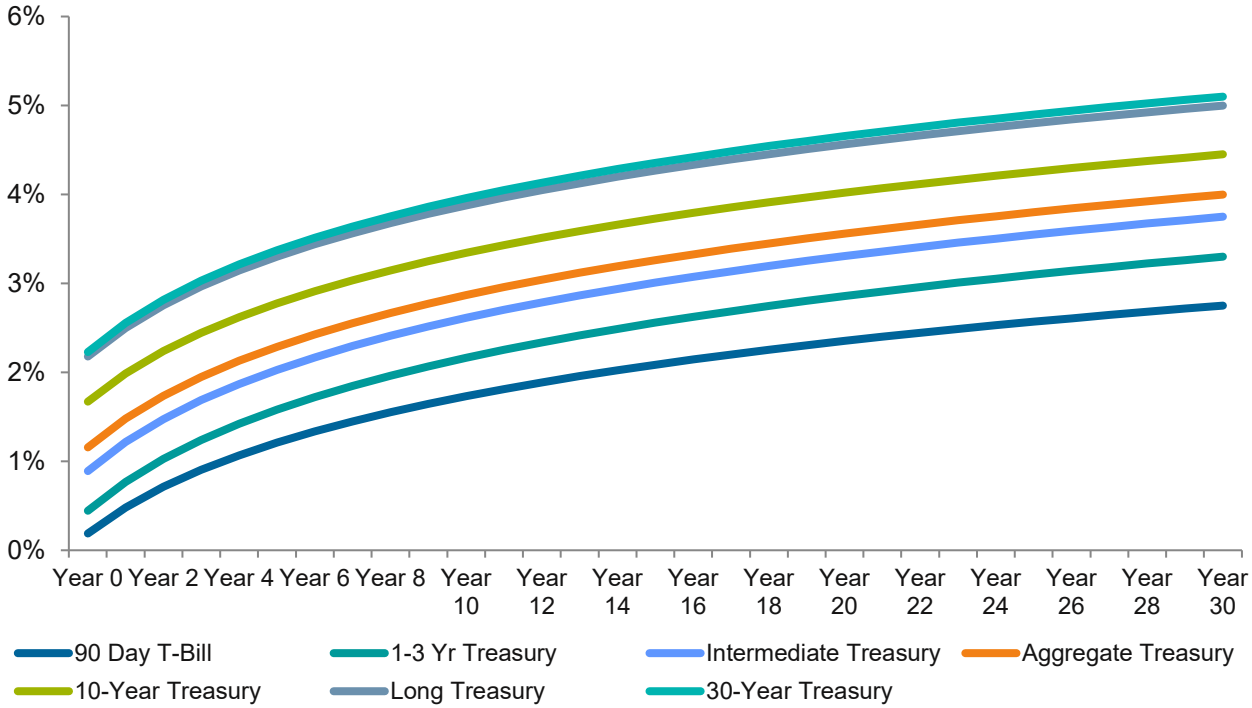
10-Year Expected Returns

10-Year Projections

	Income Return	+	Capital Gain/Loss	+	Credit Default	+	Roll Return	=	2022 Expected Return	2021 Expected Return	Change
Cash	**1.20%**		**0.00%**		**0.00%**		**0.00%**		**1.20%**	**1.00%**	**0.20%**
Short Duration 1-3 Year G/C	**1.65%**		**-0.40%**		**0.00%**		**0.25%**		**1.50%**	**1.50%**	**0.00%**
1-3 Year Government	1.55%		-0.40%		0.00%		0.25%		1.40%		
1-3 Year Credit	2.15%		-0.50%		-0.10%		0.25%		1.80%		
Intermediate G/C	**2.35%**		**-0.80%**		**-0.10%**		**0.25%**		**1.70%**	**1.50%**	**0.20%**
Intermediate Government	2.05%		-0.80%		0.00%		0.25%		1.50%		
Intermediate Credit	2.95%		-1.00%		-0.20%		0.25%		2.00%		
Aggregate	**2.90%**		**-1.30%**		**-0.10%**		**0.25%**		**1.75%**	**1.75%**	**0.00%**
Government	2.25%		-1.20%		0.00%		0.25%		1.30%		
Securitized	2.55%		-0.90%		0.00%		0.25%		1.90%		
Credit	3.85%		-1.80%		-0.30%		0.25%		2.00%		
Long Duration G/C	**4.25%**		**-2.85%**		**-0.20%**		**0.60%**		**1.80%**	**1.80%**	**0.00%**
Long Government	3.30%		-2.80%		0.00%		0.60%		1.10%		
Long Credit	4.70%		-2.90%		-0.30%		0.60%		2.10%		
TIPS	**2.50%**		**-1.50%**		**0.00%**		**0.25%**		**1.25%**	**1.70%**	**-0.45%**
Non-U.S. Fixed (unhedged)	**2.15%**		**-1.50%**		**-0.10%**		**0.25%**		**0.80%**	**0.75%**	**0.05%**
High Yield	**6.95%**		**-1.30%**		**-2.00%**		**0.25%**		**3.90%**	**4.35%**	**-0.45%**
Emerging Market Debt	**6.05%**		**-1.40%**		**-1.30%**		**0.25%**		**3.60%**	**3.50%**	**0.10%**
Bank Loans	**6.50%**		**-0.30%**		**-1.60%**		**0.00%**		**4.60%**	**4.30%**	**0.30%**

Yield Curve Path

Smoothed Yield Curve Paths



	Long Term Premium	Final Yield	Premium Over
Inflation	0.00%	2.25%	N/A
90 Day T-Bill	0.50%	2.75%	Inflation
TIPS	1.50%	4.25%	Cash
1-3 Year Treasury	0.55%	3.30%	
Intermediate Treasury	1.00%	3.75%	
Aggregate Treasury	1.25%	4.00%	
10-Year Treasury	1.70%	4.45%	
Long Treasury	2.25%	5.00%	
30-Year Treasury	2.35%	5.10%	

We updated the bond model this year to extend our yield forecast horizon over 30 years.

- Allows for a longer-term view on reversion to equilibrium rates, durations, convexity, and spreads.
- We used a smoothing approach where yields rise faster early in the horizon and reach equilibrium at year 30.

Cash at the end of the 30-year horizon is 2.75%.

- Reflects a 50 basis point premium over projected inflation, which is consistent with long-term U.S. interest rate history.

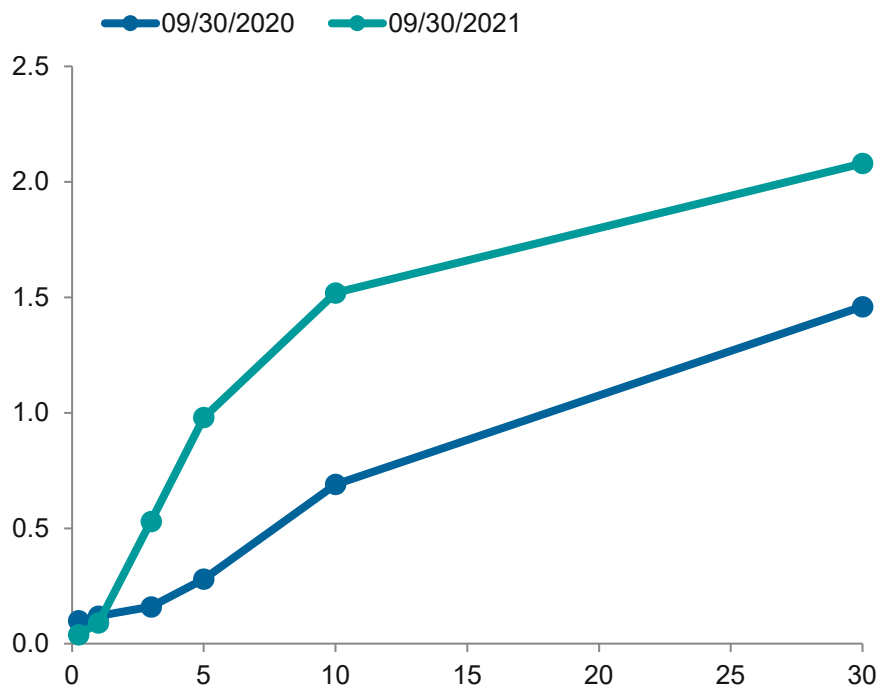
Term premiums are consistent with long-term historical medians.

- For example, in Year 30 the 10-Year Treasury yield is 4.45%, or 1.70% above cash.

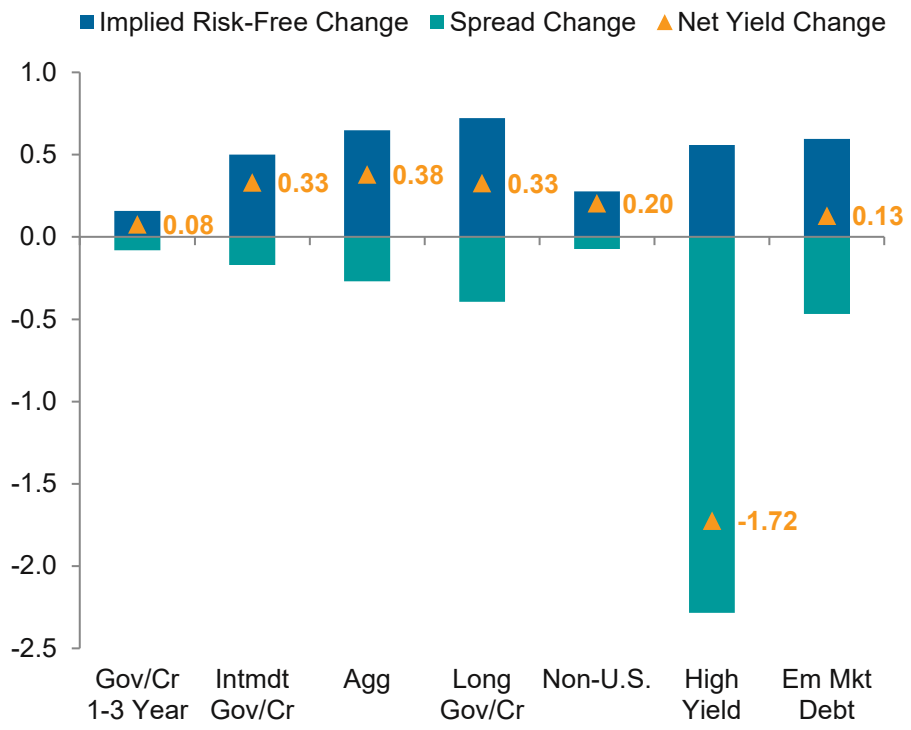
Rate Movement in the Last Year

(9/30/20 to 9/30/21)

Treasury Yield Curve Change



Net Yield Changes After Spread Tightening



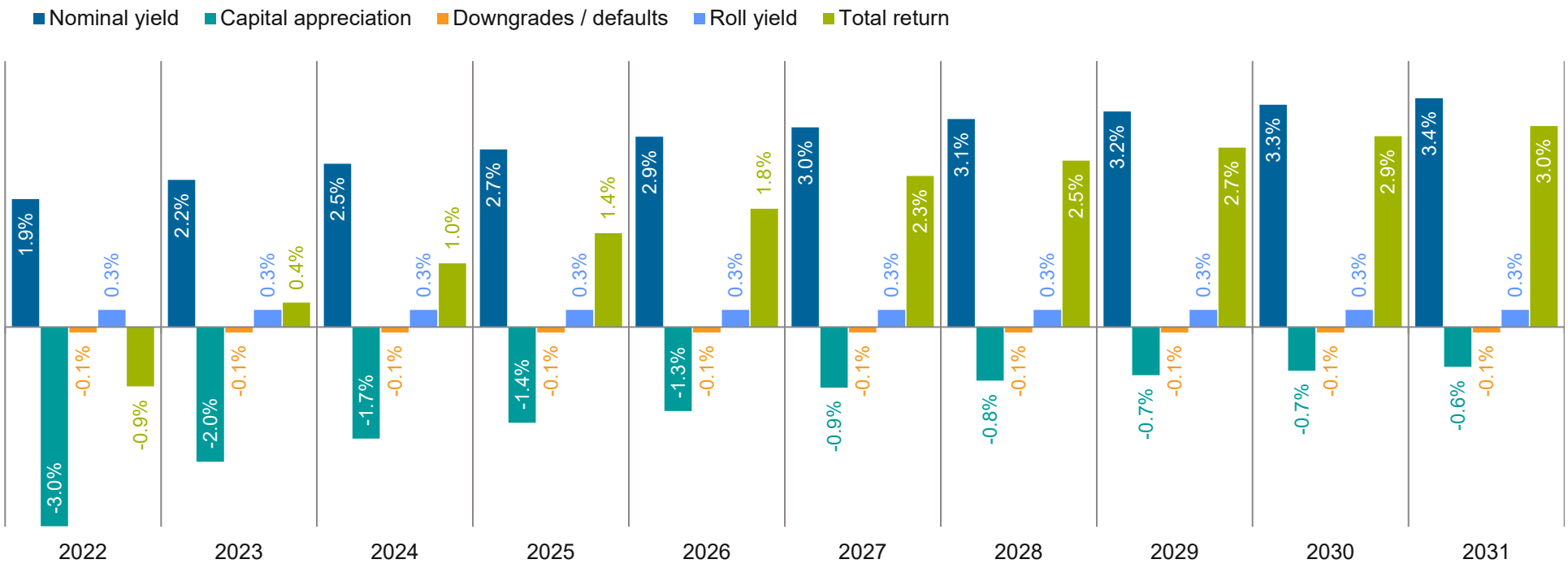
The Treasury yield curve rose meaningfully in the last year.

- However, spreads also tightened and absorbed some of the rise in rates.
- In the case of high yield, spreads tightened so much the overall yield on the sector dropped by over 1.7%.

Sources: Bloomberg, Federal Reserve

Core Fixed Income Return Components

Total Return Attribution

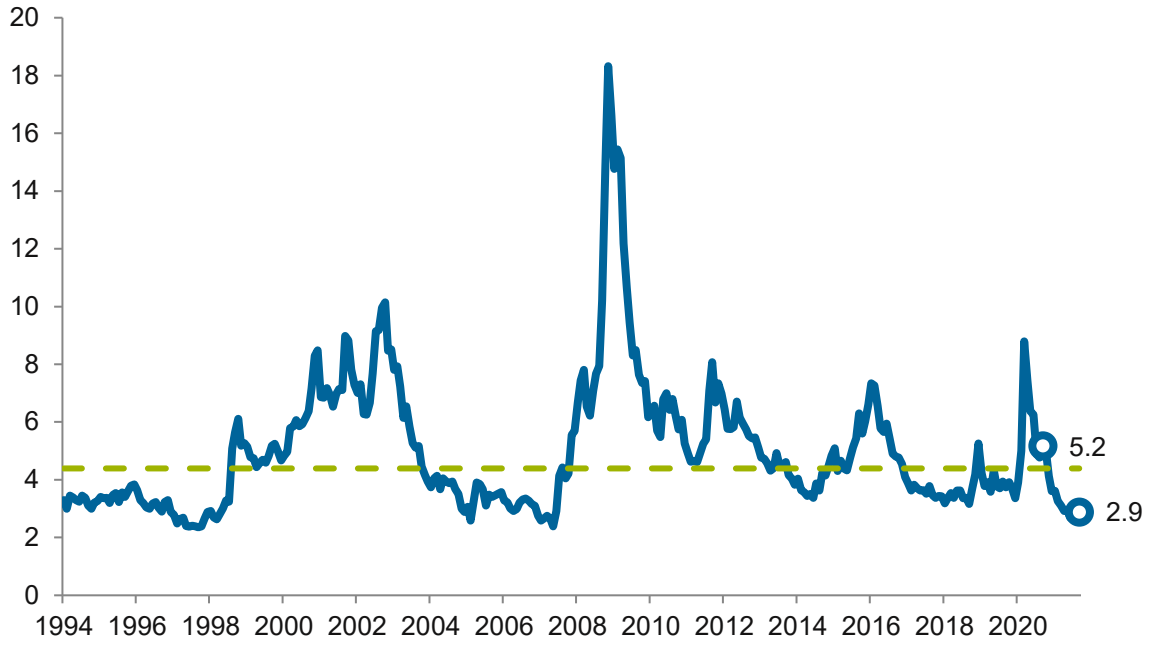


Higher yields relative to last year are offset by capital losses from our rising rate projection.

- We project rates to rise faster early in the forecast, leading to larger capital losses and lower total returns.
- As rates stabilize, the carry from yield outweighs capital losses, leading to positive total returns.

Key Assumption Changes for 2022: High Yield

Historical High Yield OAS



Data represents Jan 1994 to Sept 2021

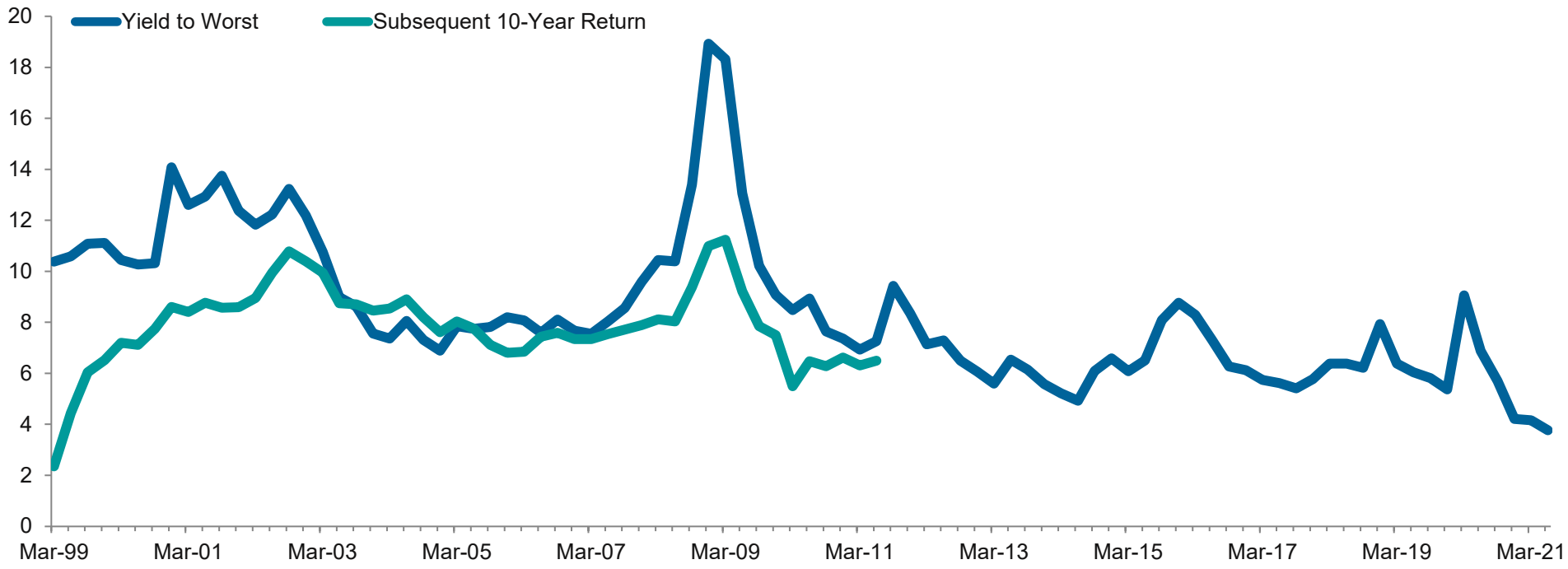
	High Yield OAS
Minimum	2.35
25th	3.38
50th	4.39
75th	6.08
Maximum	18.33
Average	4.99
Spread as of 9/30/20	5.17
Percentile as of 9/30/20	64%
Spread as of 9/30/21	2.89
Percentile as of 9/30/21	8%

- Last year spreads were above median at the time we prepared assumptions.
- This year spreads were in the bottom decile.
- Assuming spreads rise back to long-term medians, in addition to rising risk-free rates, will create a stronger headwind to performance.

Source: Bloomberg

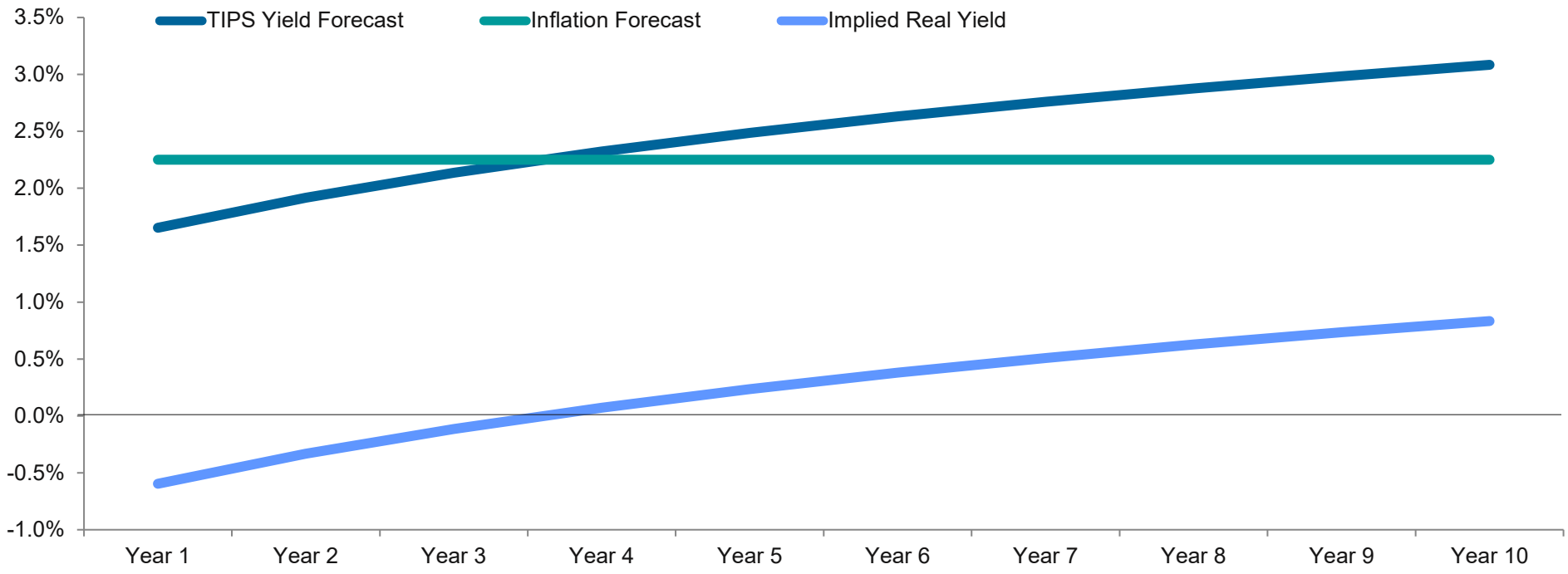
Key Assumption Changes for 2022: High Yield

High yield starting yield vs. forward 10-year return



- There have only been a few periods where the subsequent 10-year return beat the starting yield.
- The performance gap represents downgrade and default drag.
- Our high yield projection reflects this relationship, with the starting yield acting as a constraint on our return expectation.

Key Assumption Changes for 2022: TIPS



- This year we updated the model to use real duration for TIPS instead of nominal duration.
- Since our inflation assumption is flat, that implies our rising yield forecast equates to rising real yields.
- Median TIPS real duration is 7.8 historically vs. a median of 5.5 for nominal duration.
- The higher duration translates to higher capital losses compared to the 2021 forecast, more than offsetting the higher starting yield.

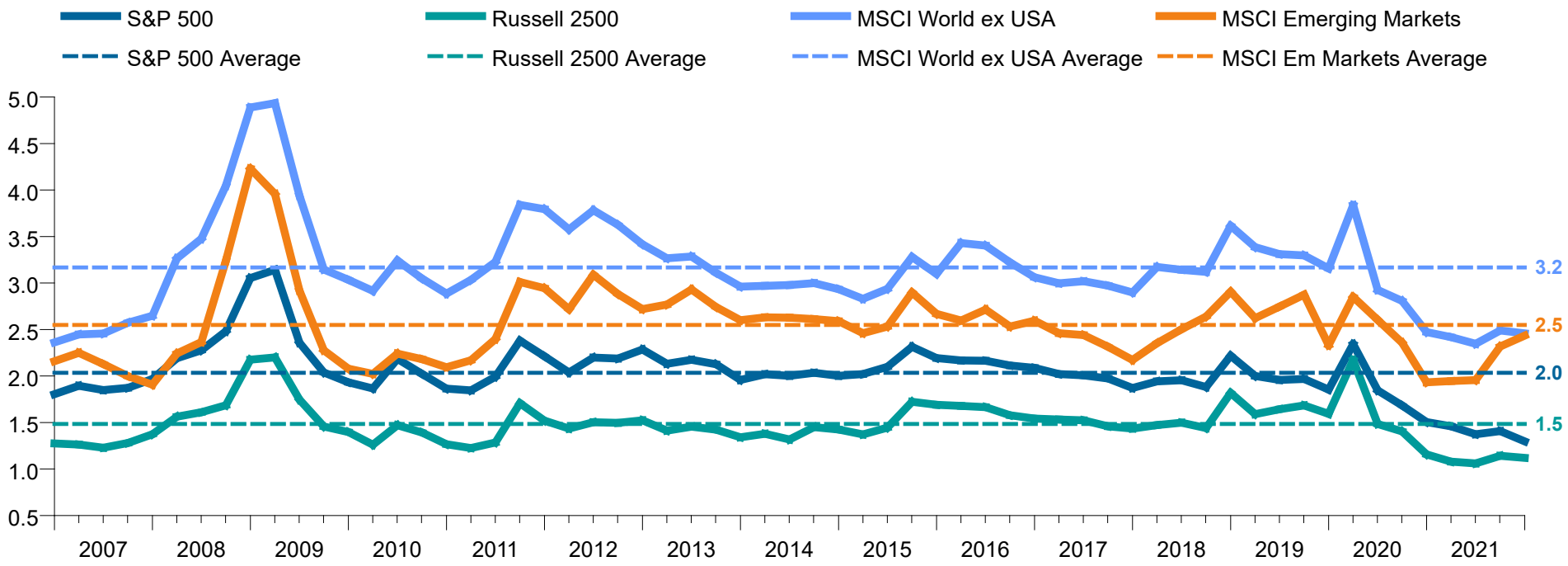
Callan

Equity

U.S. Equity Assumptions

Dividend yields

Dividend Yield for 15 Years Ended December 31, 2021

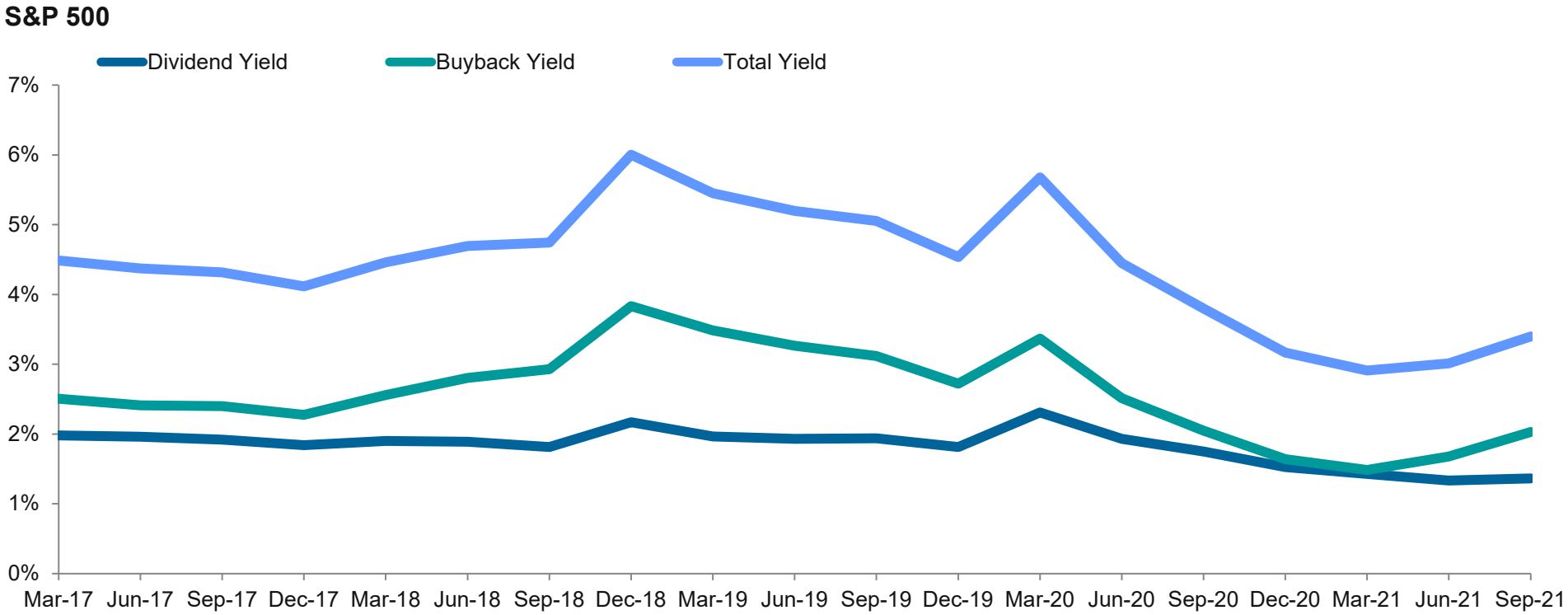


- COVID-19 caused a decline in yields around the world.
- Yields have turned up but have still not reached their pre-pandemic levels.
- Forecast yields are expected to return to approximately their longer-term averages.

Sources: MSCI, Russell, Standard & Poor's

U.S. Equity Assumptions

Return of cash



S&P 500 dividend and buyback yields declined in 2020.

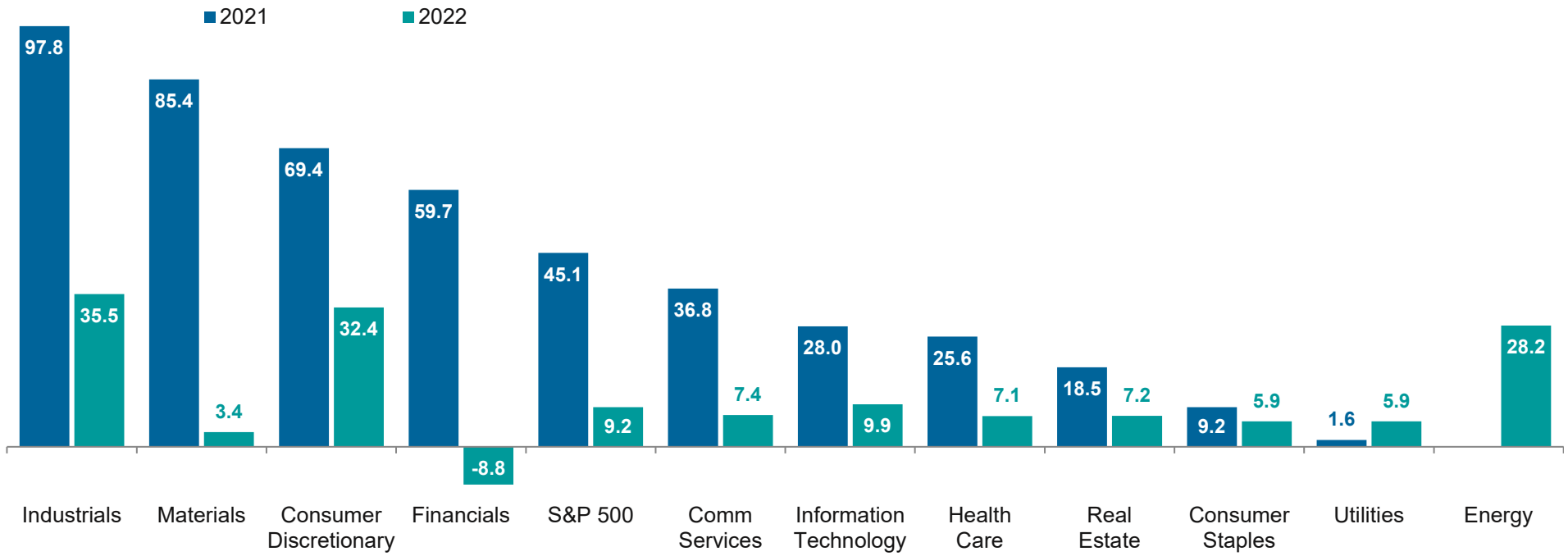
- Dollar value of dividends stalled.
- Dollar value of buybacks dropped significantly at the onset of the pandemic but recovered to near pre-pandemic levels.
- Price appreciation was the major cause of declines in yields.

Source: Standard & Poor's

U.S. Equity Assumptions

Current earnings growth

Percent S&P 500 Earnings Growth



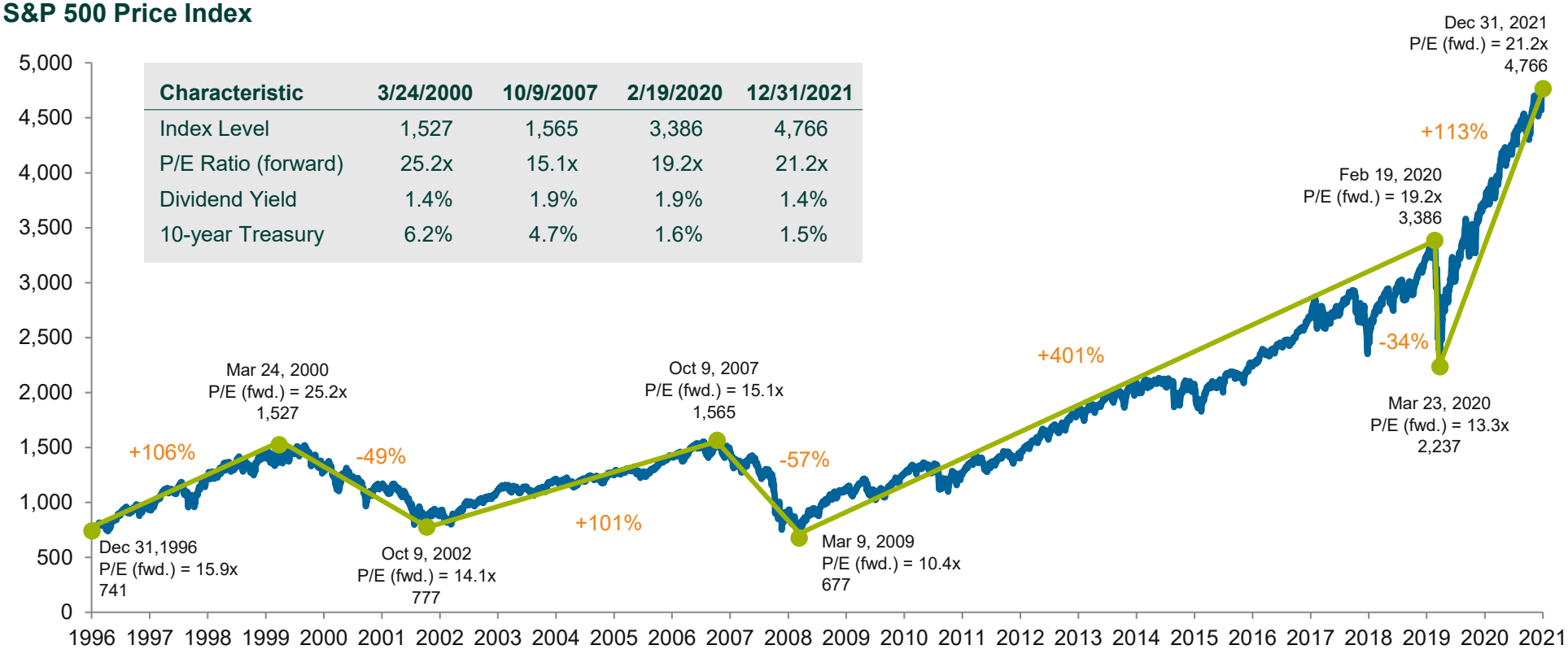
- Projections are as of December 2021.
- Earnings growth for 2021 continues to surprise on the upside.
- The magnitude of that growth was due to poor earnings in 2020 as well as demand from the economy's reopening.
- Projected earnings growth for 2021 is likely to outpace return, which was 29% for 2021.
  - Keeps backward-looking P/E in line

Source: Factset, Standard & Poors

U.S. Equity Assumptions

Price appreciation

S&P 500 Price Index



Characteristic	3/24/2000	10/9/2007	2/19/2020	12/31/2021
Index Level	1,527	1,565	3,386	4,766
P/E Ratio (forward)	25.2x	15.1x	19.2x	21.2x
Dividend Yield	1.4%	1.9%	1.9%	1.4%
10-year Treasury	6.2%	4.7%	1.6%	1.5%

- The S&P has more than doubled since the pandemic low.
- Appreciation has outpaced forward earnings estimates and valuations have increased above pre-pandemic levels.

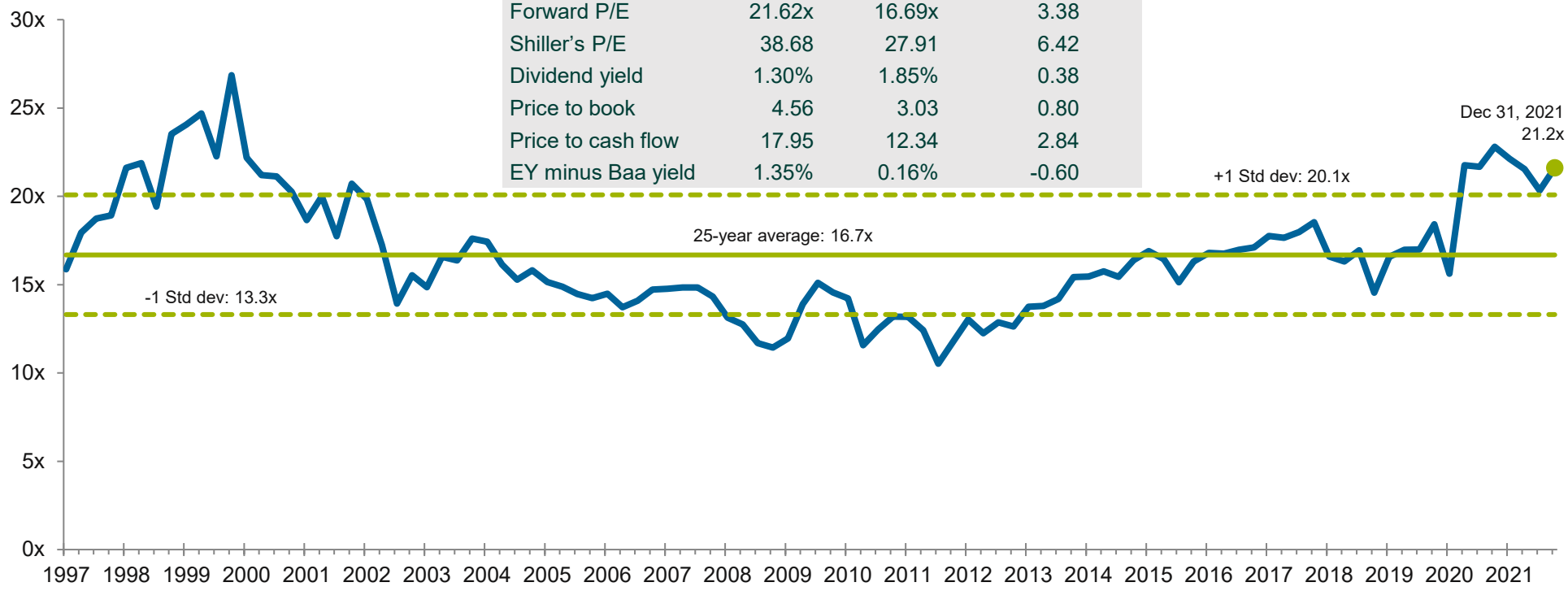
Source: Federal Reserve, Standard & Poor's

U.S. Equity Assumptions

Large cap valuations

S&P 500 Index: Forward P/E Ratio

Valuation Measure	Latest	25-year Average	Std Dev Over- / Under-valued
Forward P/E	21.62x	16.69x	3.38
Shiller's P/E	38.68	27.91	6.42
Dividend yield	1.30%	1.85%	0.38
Price to book	4.56	3.03	0.80
Price to cash flow	17.95	12.34	2.84
EY minus Baa yield	1.35%	0.16%	-0.60



- All valuation measures in excess of one standard deviation above 25-year averages.
- Forward P/E has stalled even with exceptional forecast returns for 2022.
- Return to more normal earnings growth in future years limits price appreciation without further valuation expansion.

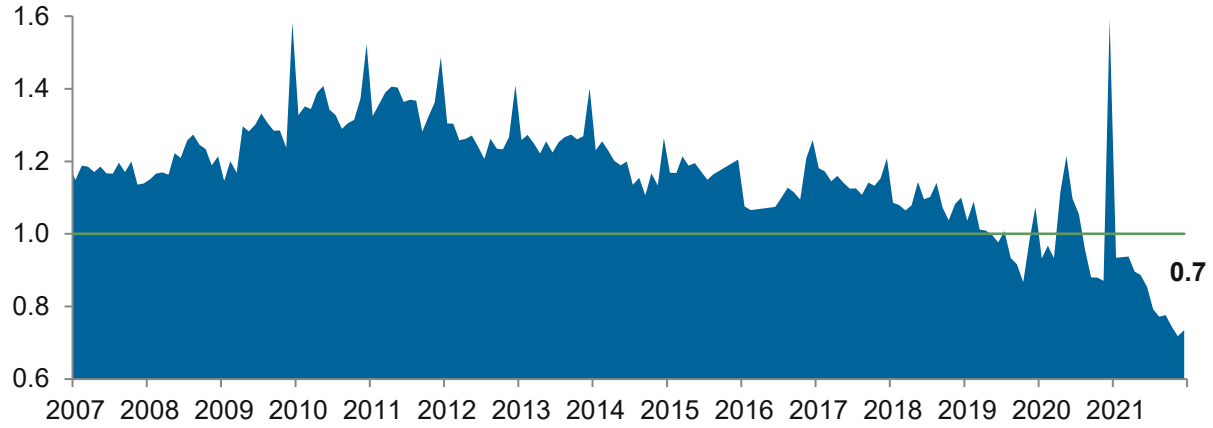
Source: FactSet, FRB, Robert Shiller, Standard & Poor's, Thomson Reuters, J.P. Morgan Asset Management

U.S. Equity Assumptions

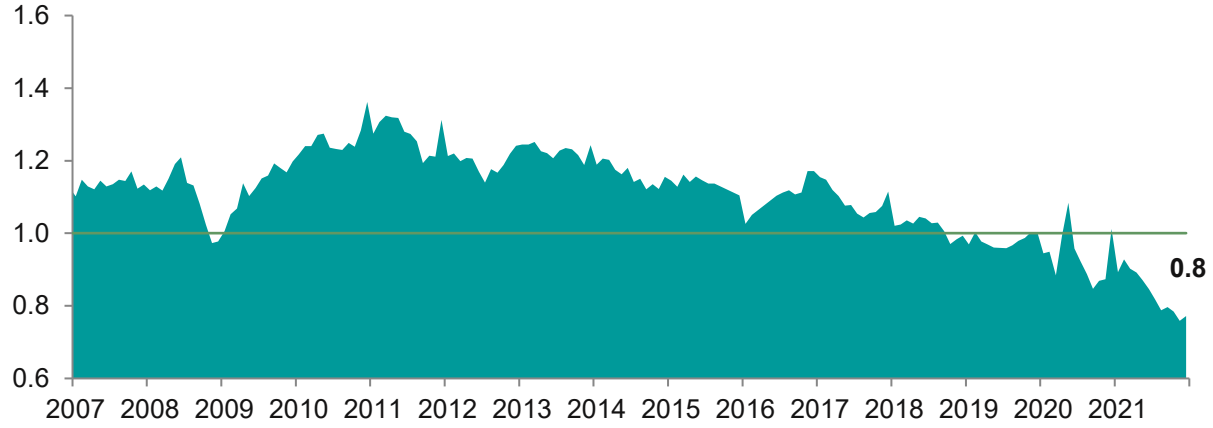
Mid and small cap relative valuations

- Large capitalization stocks have relatively high valuations.
- Historically, smaller cap stocks have had higher valuations than large caps.
  - Investors buying future rather than historical earnings
- The small cap S&P 600 P/E is only 69% of the S&P 500 P/E.
- The mid cap S&P 400 P/E is only 76% of the S&P 500 P/E.
- Lower valuations improve the potential for higher returns relative to large cap going forward.

S&P 600/S&P 500 Relative Forward P/E Ratios



S&P 400/S&P 500 Relative Forward P/E Ratios



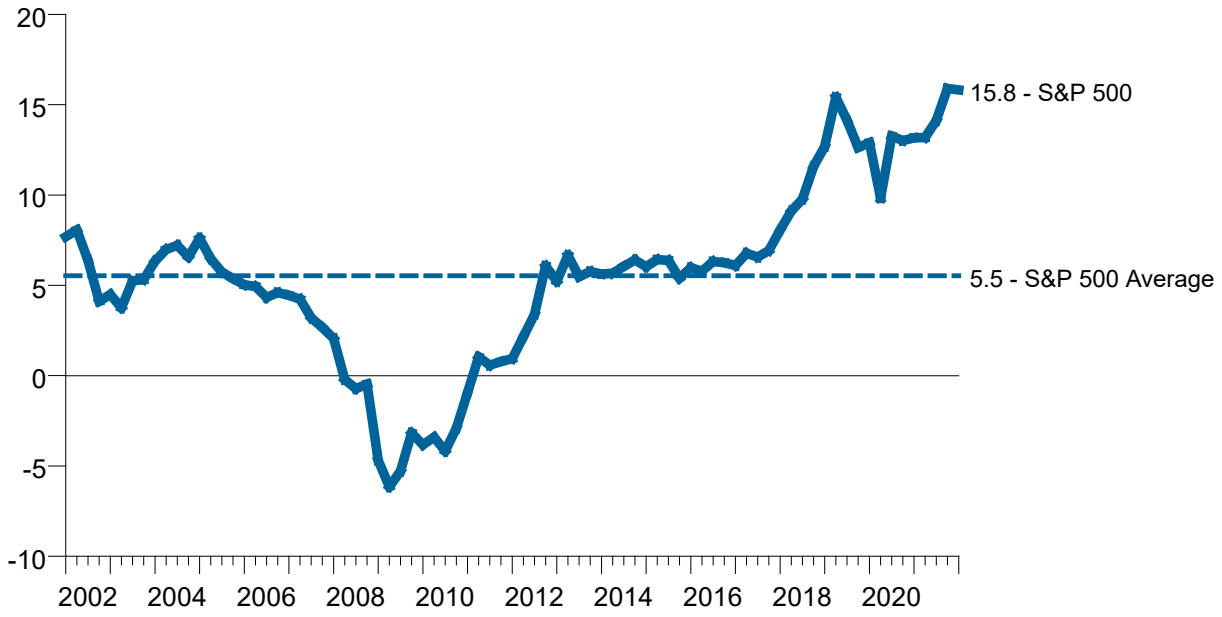
Source: Standard & Poor's

U.S. Equity Assumptions

Risk premium

- Over the very long term, the equity risk premium (ERP) vs. cash is around 6%.
- Callan equity projection is at T-bills + 5.3%, consistent with long-term history.
  - Over the past 20 years ERP vs. cash has been 5.5%.
- Cash at 1.2%, ERP at 5.3% = Equity Return of 6.50%

Rolling 40 Quarter Relative Returns Relative To 3 Month T-Bill for 20 Years Ended December 31, 2021

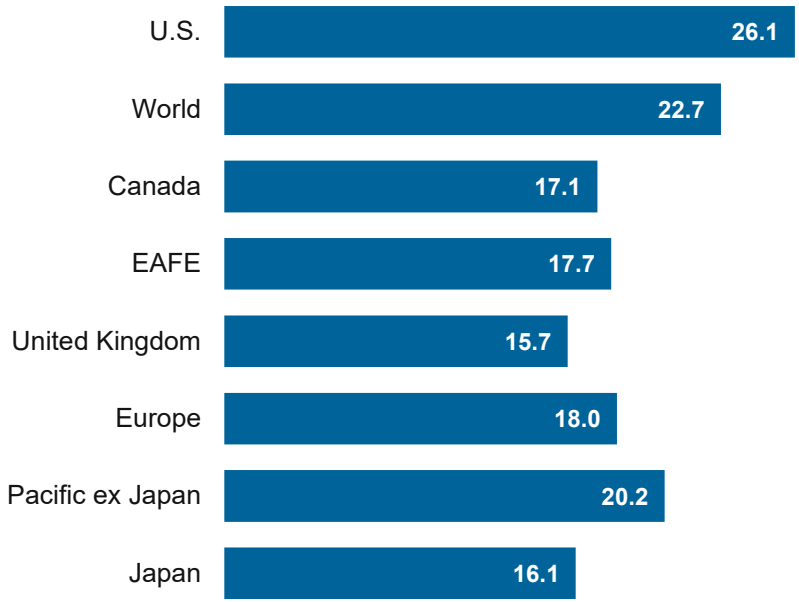


Source: Standard & Poor's

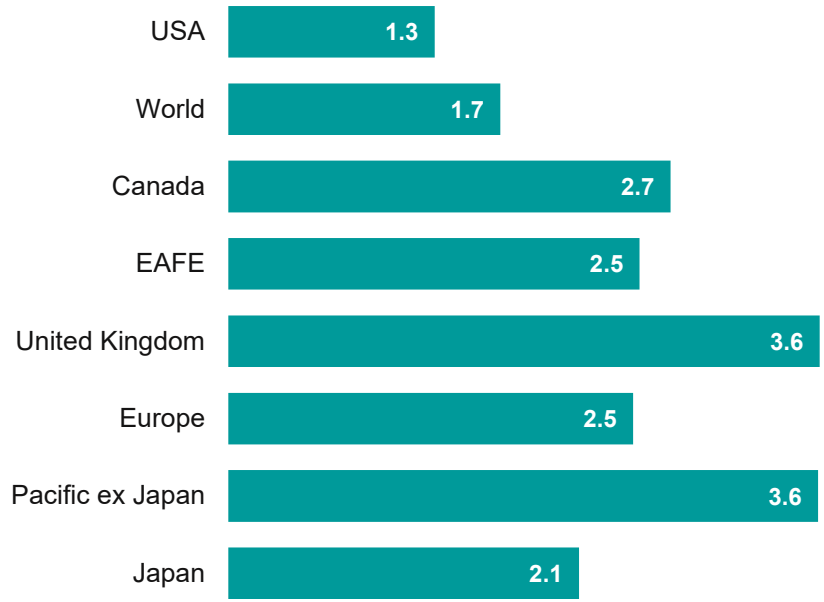
Global ex-U.S. Equity Assumptions

Developed markets valuations and dividend yield

Price Earnings Ratio



Dividend Yield



Valuations are generally high in developed markets.

- Valuations have changed only modestly over the past year.
- U.S. continues to have the highest valuations.

Low dividend yields have a direct impact on returns.

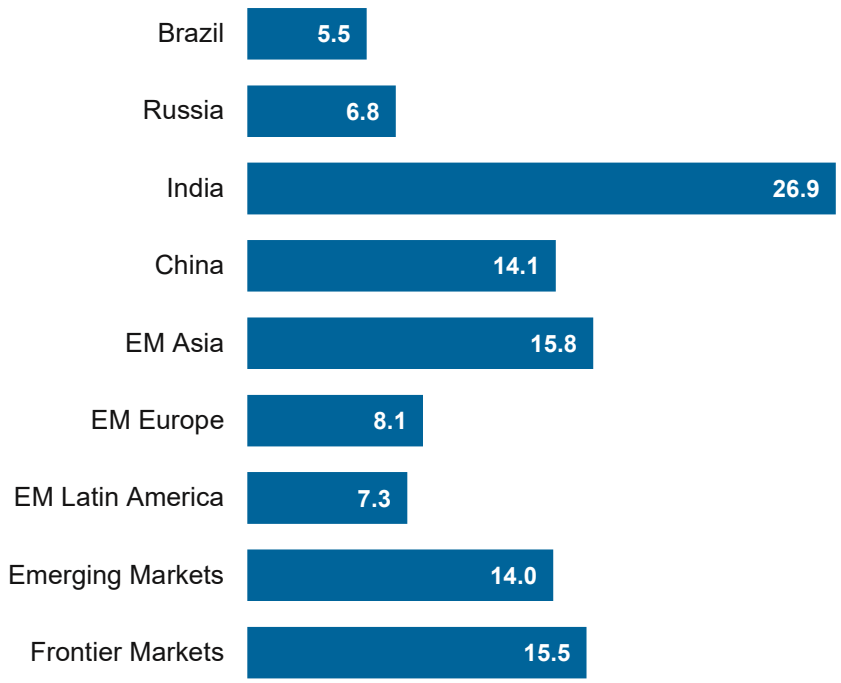
- Dividend yields have generally stayed the same or fallen since last year.

Source: MSCI (Dec. 31, 2021)

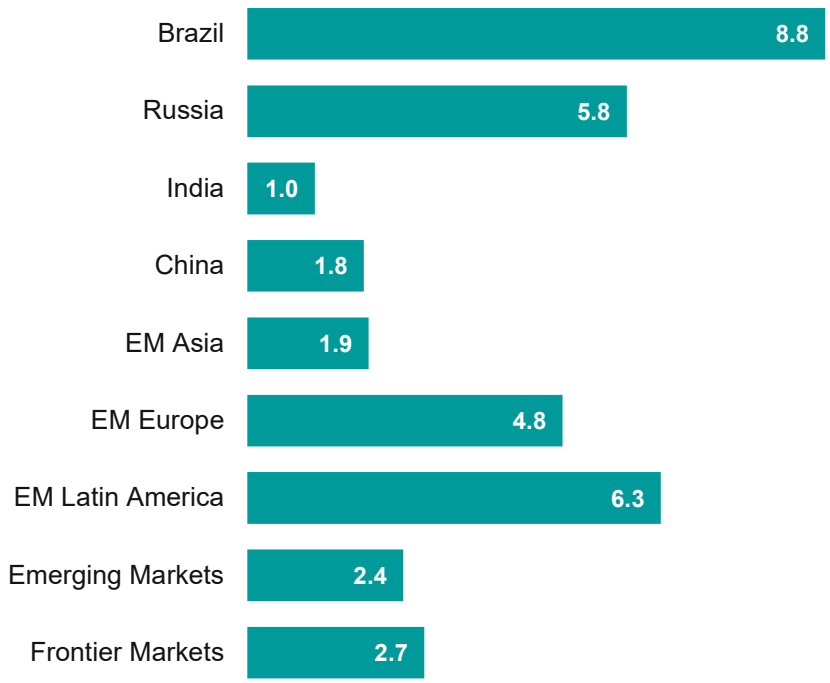
Global ex-U.S. Equity Assumptions

Emerging markets valuations and dividend yield

Price Earnings Ratio



Dividend Yield



Emerging markets also have elevated valuations.

- Among the BRICs, India has the highest valuation metrics while Brazil has fallen dramatically.
- Asia has the highest regional valuations, Latin America the lowest.

Significant dilution is realized as growing companies issue more shares.

Source: MSCI (Dec. 31, 2021)

Public Equity Assumptions

Index	Current Dividend Yield*	Forecasts Dividend Yield	Net Buyback Yield	Inflation	Real Earnings Growth**	Valuation Adjustment	Total Geometric Return	2021 Return	Change
S&P 500	1.35%	1.75%	0.50%	2.25%	2.25%	-0.25%	6.50%	6.50%	0.00%
Russell 2500	1.17%	1.50%	0.00%	2.25%	2.95%	0.00%	6.70%	6.70%	0.00%
Russell 3000	1.24%	1.70%	0.45%	2.25%	2.35%	-0.20%	6.55%	6.60%	-0.05%
MSCI World ex USA	2.53%	2.75%	0.00%	2.00%	1.75%	0.00%	6.50%	6.50%	0.00%
MSCI Emerging Markets	2.38%	2.10%	-2.10%	2.65%	4.25%	0.00%	6.90%	6.90%	0.00%
Aggregate							1.75%	1.75%	0.00%
Cash							1.20%	1.00%	0.20%

Index	Forecast ERP Cash^	Historical ERP Cash	Delta ERP Cash	Forecast ERP Aggregate	Historical ERP Aggregate^^	Delta ERP Aggregate
S&P 500	5.30%	7.62%	-2.32%	4.75%	4.80%	-0.05%
Russell 2500	5.50%	8.04%	-2.54%	4.95%	5.21%	-0.26%

No changes in public equity projections

- Change in Russell 3000 projection due to a difference in rounding
- 25 bps increase in inflation is offset by a 25 bps decrease in dividend yields

* Index yields as of December 31, 2021
** S&P 500 real earnings growth is forecast real GDP growth. R 2500 real earnings growth is an 70 bps spread over S&P 500. Developed and emerging markets earnings growth in line with their respective GDP assumptions.
^ Assumes cash return of 1.2%.
^^ Assumes Aggregate forecast is 1.75%.

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Alternatives

Private Equity

Background

The private equity market in aggregate is driven by many of the same economic factors as public equity markets. Buyout valuations appear reasonable while venture/growth equity valuations are high.

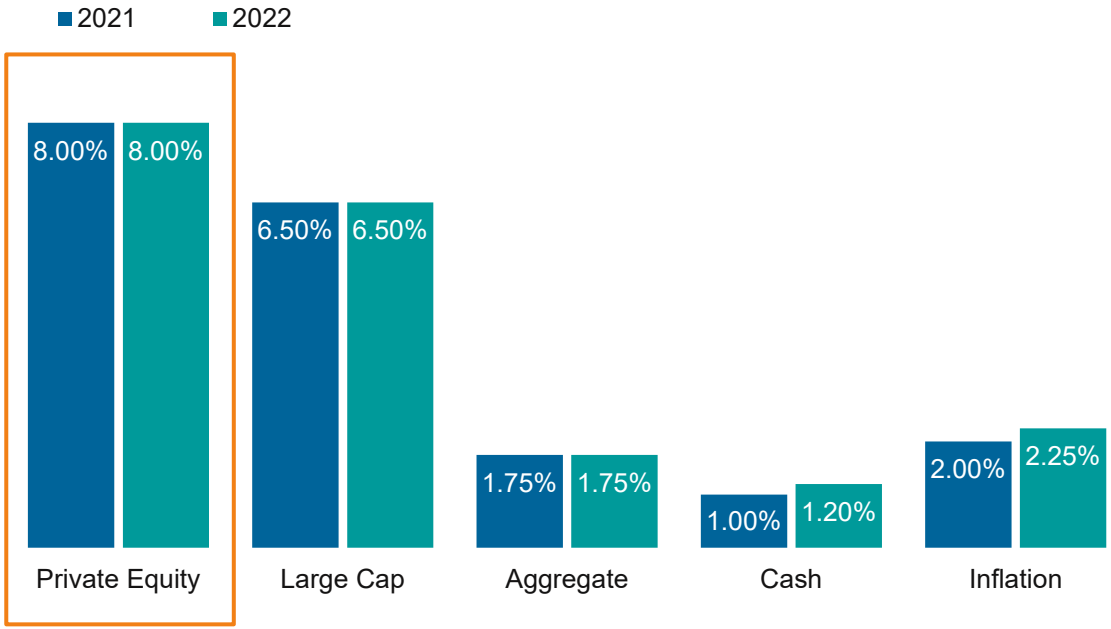
Consequently, the private equity performance expectations did not change relative to where they were last year.

We see tremendous disparity between the best- and worst-performing private equity managers.

The ability to select skillful managers could result in realized returns significantly greater than projected here.

2022 private equity return projection: 8.00% (unchanged)

Return Projections



Real Estate

Background

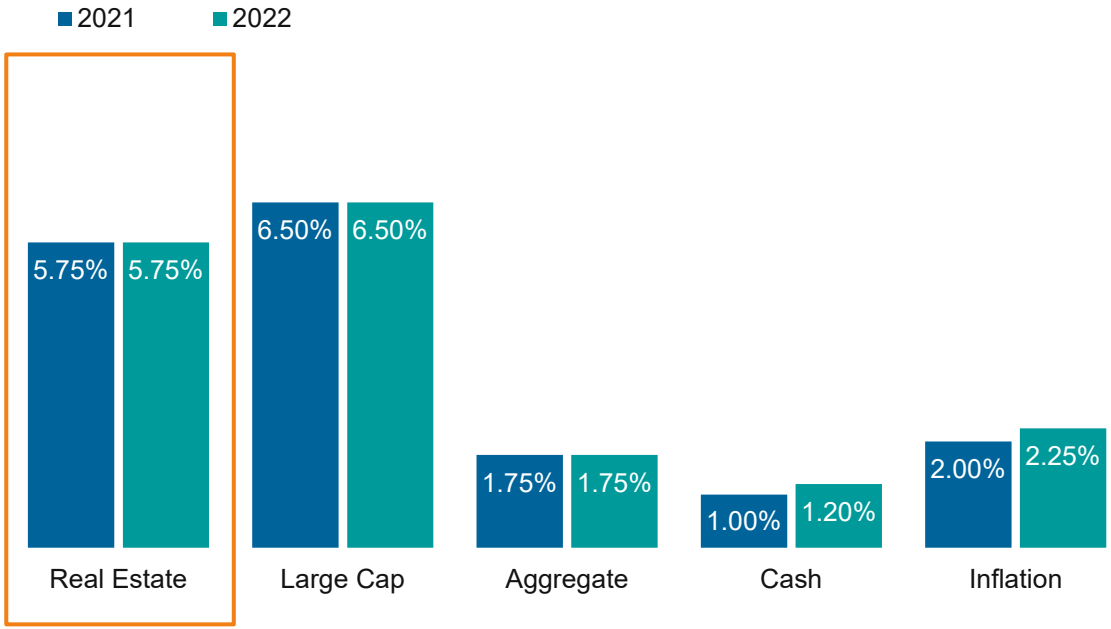
The foreseeable low interest rate environment should help to ensure that real estate continues to garner interest from investors seeking income, supporting returns.

Weakening expectations for some real estate sectors, such as office and retail may continue to be offset by other sectors such as industrial and residential. Non-traditional sectors like medical office and data centers continue to grow in institutional portfolios.

No change to the outlook for real estate returns compared to last year.

2022 real estate return projection: 5.75% (unchanged)

Return Projections



Hedge Funds

Background

Hedge funds can be evaluated in a multi-factor context using the following relationship:

Expected Return = Cash + Equity Beta x (Equity-Cash) + Exotic Beta + Net Alpha

Callan's 10-year cash forecast is 1.2%.

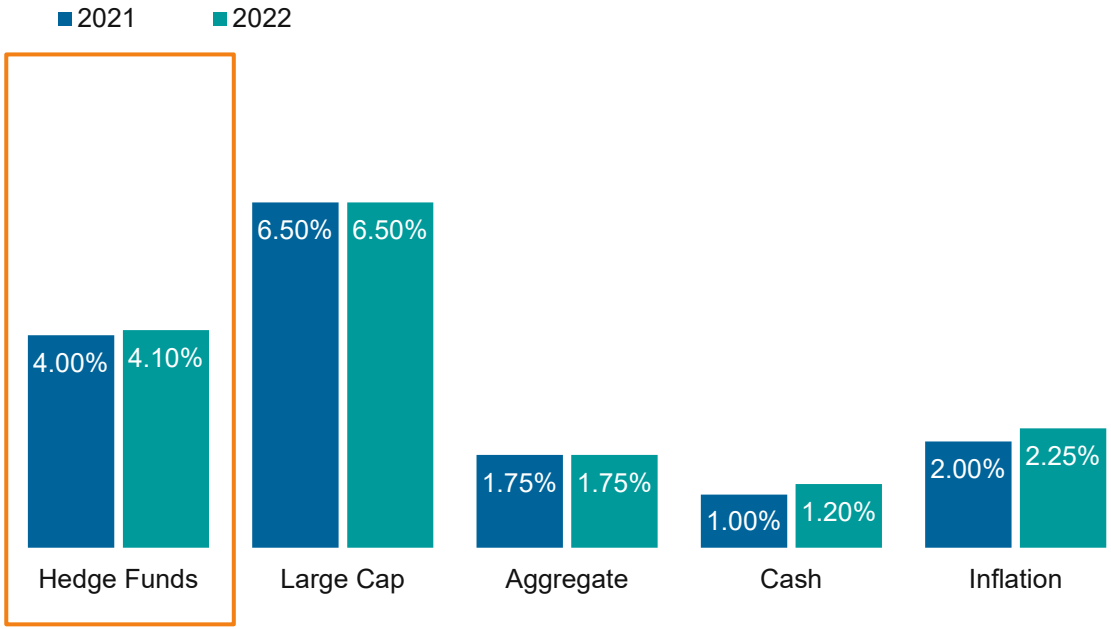
Diversified hedge fund portfolios have historically exhibited equity beta relative to the S&P 500 of about 0.4.

Combined with our equity risk premium forecast, this results in an excess return from equity beta of just over 2%.

Return from hedge fund exotic beta and illiquidity premia is forecast to be 0.5% to 1.0%, to arrive at an overall expected return of 4.1%.

2022 hedge fund return projection: 4.1% (up 10 bps)

Return Projections



Private Credit

Background

Return projection is anchored on middle market direct lending where yields have returned to pre-COVID lows.

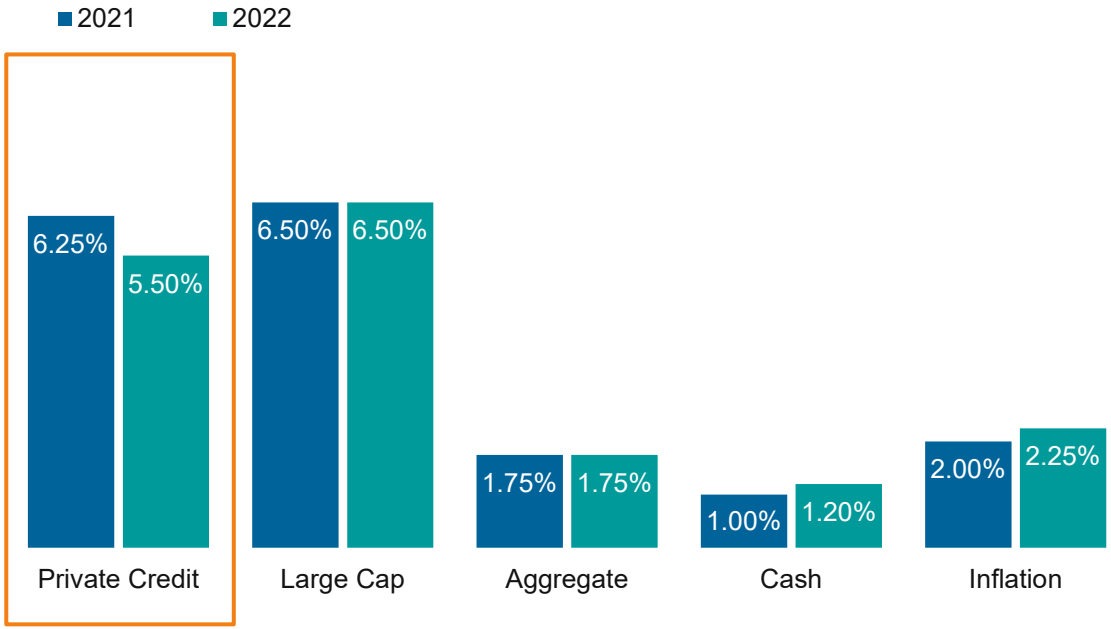
While banks are no longer major investors in this market, there is strong appetite from institutional and retail investors.

~160 bps is a reasonable return premium relative to high yield (3.9%) and leveraged loans.

A portfolio with more distressed and specialty finance exposure would have a higher return though with a lower current yield and higher volatility and higher correlation to public and private equity.

2022 private credit return projection: 5.5% (down 75 bps)

Return Projections

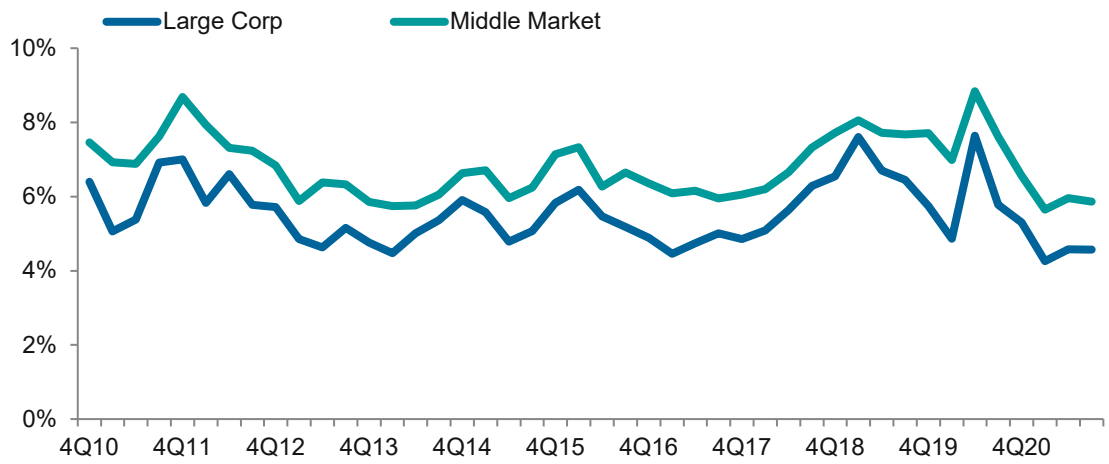


Private Credit

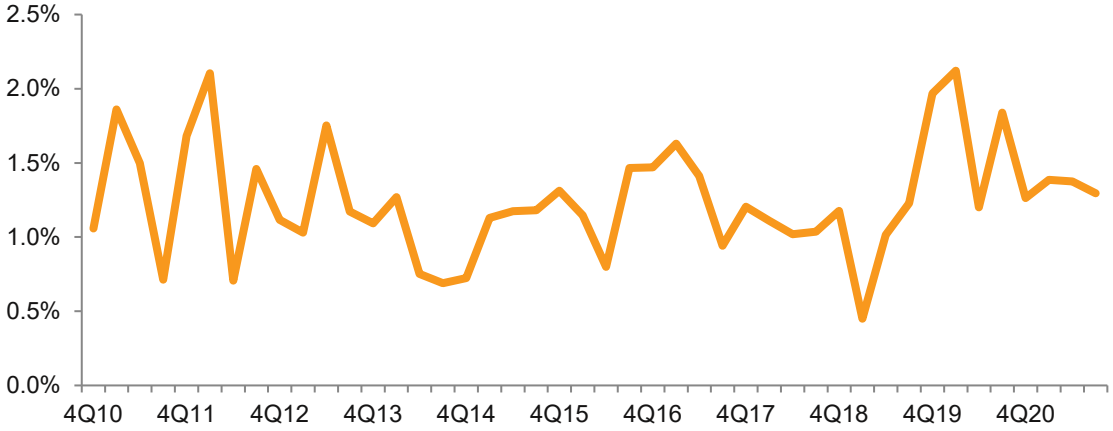
- Return calculations assume 3.7% cost of leverage and 0.75% unlevered loss ratio
- Corresponds to 5.50% geometric

Unlevered Yield	7.2%
Leverage	0.85x
Levered Yield	10.2%
Management Fee and Operating Expense	1.7%
Incentive Rate	15%
Hurdle	4%
Incentive Fee	0.7%
Total Fees and Exp.	2.4%
Loss Ratio	1.4%
Net Arithmetic	6.4%

Loan Yields



Middle Market Premium



Source: Refinitiv LPC. All-in yield (LIBOR + Spread + OID) assuming 3-year takeout
Note: 2Q20 was deemed less reliable due to lack of data points to calculate a MM institutional all-in yield statistic

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Detailed 2022 Expectations and Resulting Portfolio Returns and Risks

2022 Risk and Returns

Summary of Callan's Long-Term Capital Market Assumptions (2022 – 2031)

Asset Class	Index	Projected Return			Projected Risk
		1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation
Equities					
Broad U.S. Equity	Russell 3000	8.00%	6.60%	4.35%	17.95%
Large Cap U.S. Equity	S&P 500	7.85%	6.50%	4.25%	17.70%
Smid Cap U.S. Equity	Russell 2500	8.75%	6.70%	4.45%	21.30%
Global ex-U.S. Equity	MSCI ACWI ex USA	8.70%	6.80%	4.55%	20.70%
Developed ex-U.S. Equity	MSCI World ex USA	8.25%	6.50%	4.25%	19.90%
Emerging Market Equity	MSCI Emerging Markets	9.80%	6.90%	4.65%	25.15%
Fixed Income					
Short Duration Gov/Credit	Bloomberg 1-3 Yr G/C	1.50%	1.50%	-0.75%	2.00%
Core U.S. Fixed	Bloomberg Aggregate	1.80%	1.75%	-0.50%	3.75%
Long Government	Bloomberg Long Gov	1.85%	1.10%	-1.15%	12.50%
Long Credit	Bloomberg Long Cred	2.60%	2.10%	-0.15%	10.50%
Long Government/Credit	Bloomberg Long G/C	2.30%	1.80%	-0.45%	10.40%
TIPS	Bloomberg TIPS	1.35%	1.25%	-1.00%	5.05%
High Yield	Bloomberg High Yield	4.40%	3.90%	1.65%	10.75%
Global ex-U.S. Fixed	Bloomberg Gl Agg xUSD	1.20%	0.80%	-1.45%	9.20%
Emerging Market Sovereign Debt	EMBI Global Diversified	4.00%	3.60%	1.35%	9.50%
Alternatives					
Core Real Estate	NCREIF ODCE	6.60%	5.75%	3.50%	14.20%
Private Infrastructure	MSCI Glb Infra/FTSE Dev Core 50/50	7.10%	6.10%	3.85%	15.45%
Private Equity	Cambridge Private Equity	11.45%	8.00%	5.75%	27.60%
Private Credit	N/A	6.40%	5.50%	3.25%	14.60%
Hedge Funds	Callan Hedge FOF Database	4.35%	4.10%	1.85%	8.20%
Commodities	Bloomberg Commodity	4.05%	2.50%	0.25%	18.00%
Cash Equivalents	90-Day T-Bill	1.20%	1.20%	-1.05%	0.90%
Inflation	CPI-U		2.25%		1.60%

* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

2022 Correlations

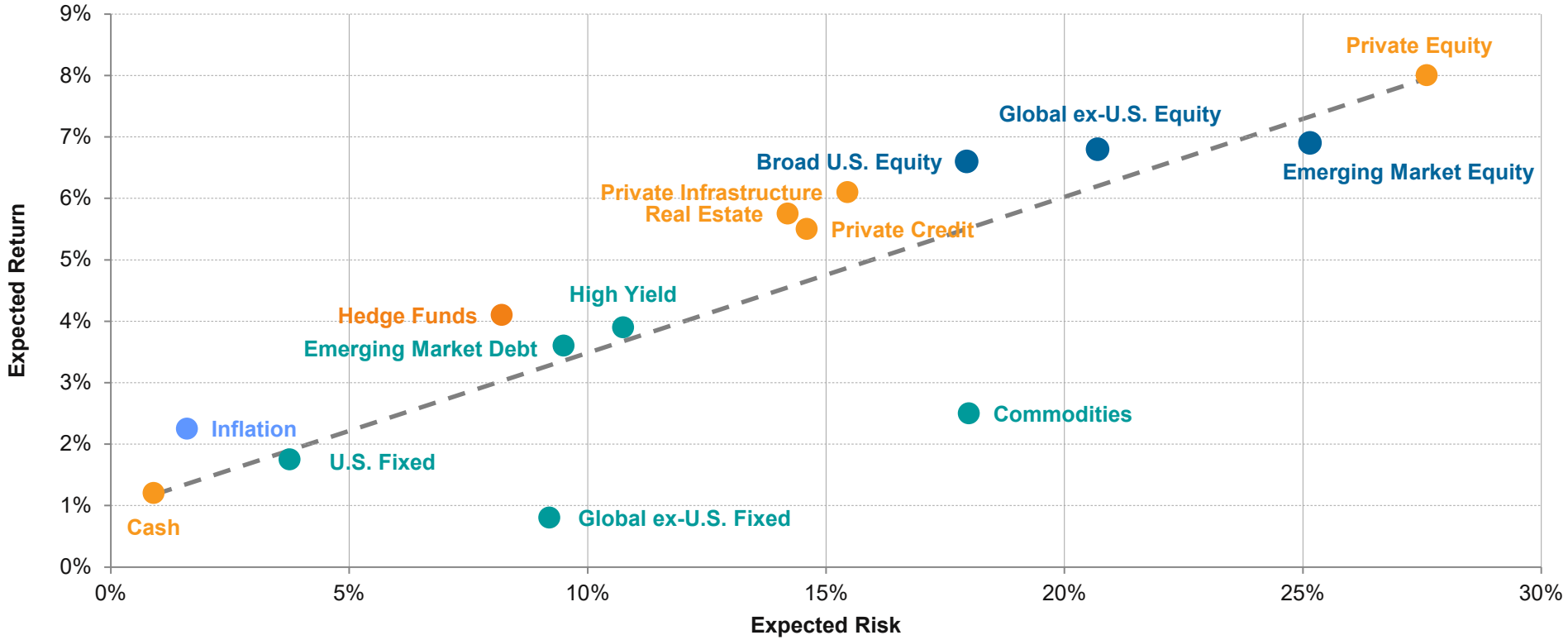
	Large Cap	Smid Cap	Dev ex-U.S. Equity	Em Markets	Short Duration	Core Fixed	Long Gov	Long Credit	TIPS	High Yield	GI ex-U.S. Fixed	EM	Core Real Estate	Private Infra	Private Equity	Private Credit	Hedge Funds	Comm	Cash Equiv	Inflation
U.S. Large Cap	1.00																			
U.S. Smid Cap	0.90	1.00																		
Dev ex-U.S. Equity	0.77	0.77	1.00																	
Em Market Equity	0.79	0.76	0.84	1.00																
Short Dur Gov/Credit	-0.06	-0.08	-0.06	-0.10	1.00															
Core U.S. Fixed	-0.10	-0.12	-0.11	-0.14	0.78	1.00														
Long Government	-0.15	-0.16	-0.13	-0.16	0.67	0.84	1.00													
Long Credit	0.28	0.25	0.26	0.24	0.64	0.80	0.69	1.00												
TIPS	-0.08	-0.08	-0.09	-0.10	0.56	0.70	0.53	0.52	1.00											
High Yield	0.71	0.68	0.69	0.69	-0.01	0.00	-0.08	0.40	0.06	1.00										
Global ex-U.S. Fixed	0.01	0.00	0.05	0.08	0.48	0.50	0.42	0.49	0.45	0.12	1.00									
EM Sovereign Debt	0.56	0.54	0.55	0.61	0.08	0.14	0.05	0.35	0.18	0.60	0.15	1.00								
Core Real Estate	0.64	0.60	0.60	0.56	-0.01	-0.04	-0.09	0.24	-0.02	0.53	-0.02	0.33	1.00							
Private Infrastructure	0.65	0.60	0.61	0.58	0.00	0.01	-0.03	0.27	-0.02	0.50	0.03	0.35	0.76	1.00						
Private Equity	0.77	0.73	0.73	0.72	-0.10	-0.19	-0.21	0.15	-0.14	0.59	0.06	0.40	0.50	0.62	1.00					
Private Credit	0.68	0.65	0.65	0.64	0.00	-0.06	-0.10	0.28	-0.09	0.63	0.06	0.48	0.47	0.52	0.65	1.00				
Hedge Funds	0.79	0.74	0.75	0.74	0.10	0.13	0.07	0.39	0.09	0.64	0.05	0.53	0.45	0.47	0.57	0.61	1.00			
Commodities	0.28	0.27	0.27	0.27	-0.10	-0.10	-0.10	0.01	0.10	0.15	0.15	0.19	0.21	0.18	0.23	0.17	0.23	1.00		
Cash Equivalents	-0.06	-0.08	-0.10	-0.10	0.30	0.15	0.08	-0.05	0.12	-0.11	0.00	-0.07	0.00	-0.07	0.00	-0.06	-0.04	-0.02	1.00	
Inflation	-0.02	0.02	0.00	0.03	-0.21	-0.25	-0.23	-0.25	0.08	0.05	-0.10	0.00	0.10	0.06	0.06	0.06	0.15	0.29	0.05	1.00

Summary of Important Changes for 2022 Capital Market Assumptions

- Cash return increased 0.2%
- Inflation assumption increased 0.25% (from 2.00% to 2.25%)
- No change in return or risk assumptions for public equity
- No change in return or risk assumption for core fixed income or short duration
- TIPS and High Yield return projections lowered by 45 basis points
- Private credit return assumption lowered by 75 basis points
- No change in return assumption for private equity or core real estate

Relationship Between Expected Return and Risk – Capital Market Line

Visualizing Callan's 2022–2031 capital markets assumptions



Our forecasts link expected return to risk

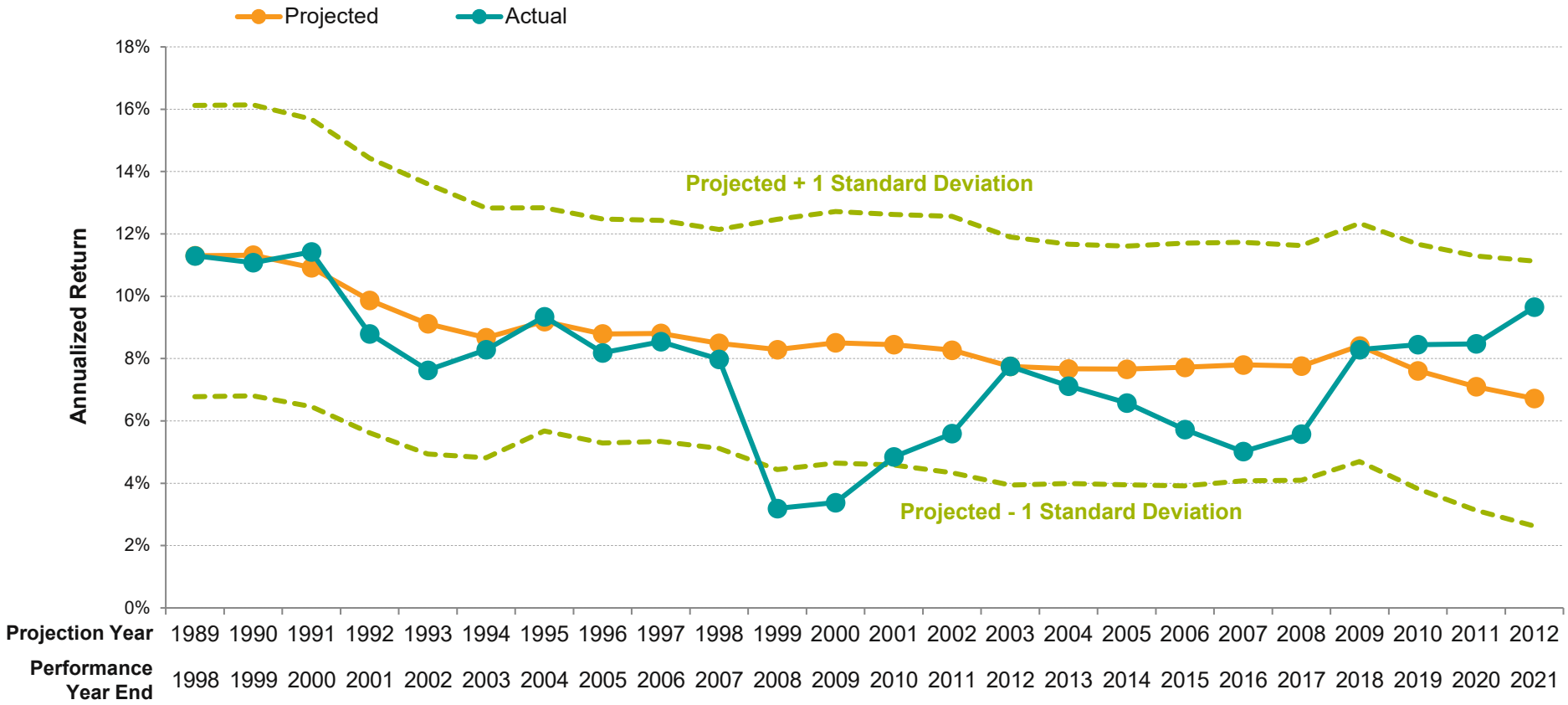
For example, investors demand a greater return from private equity than public equity as compensation for higher risk

Source: Callan

Actual Returns versus Callan Projections

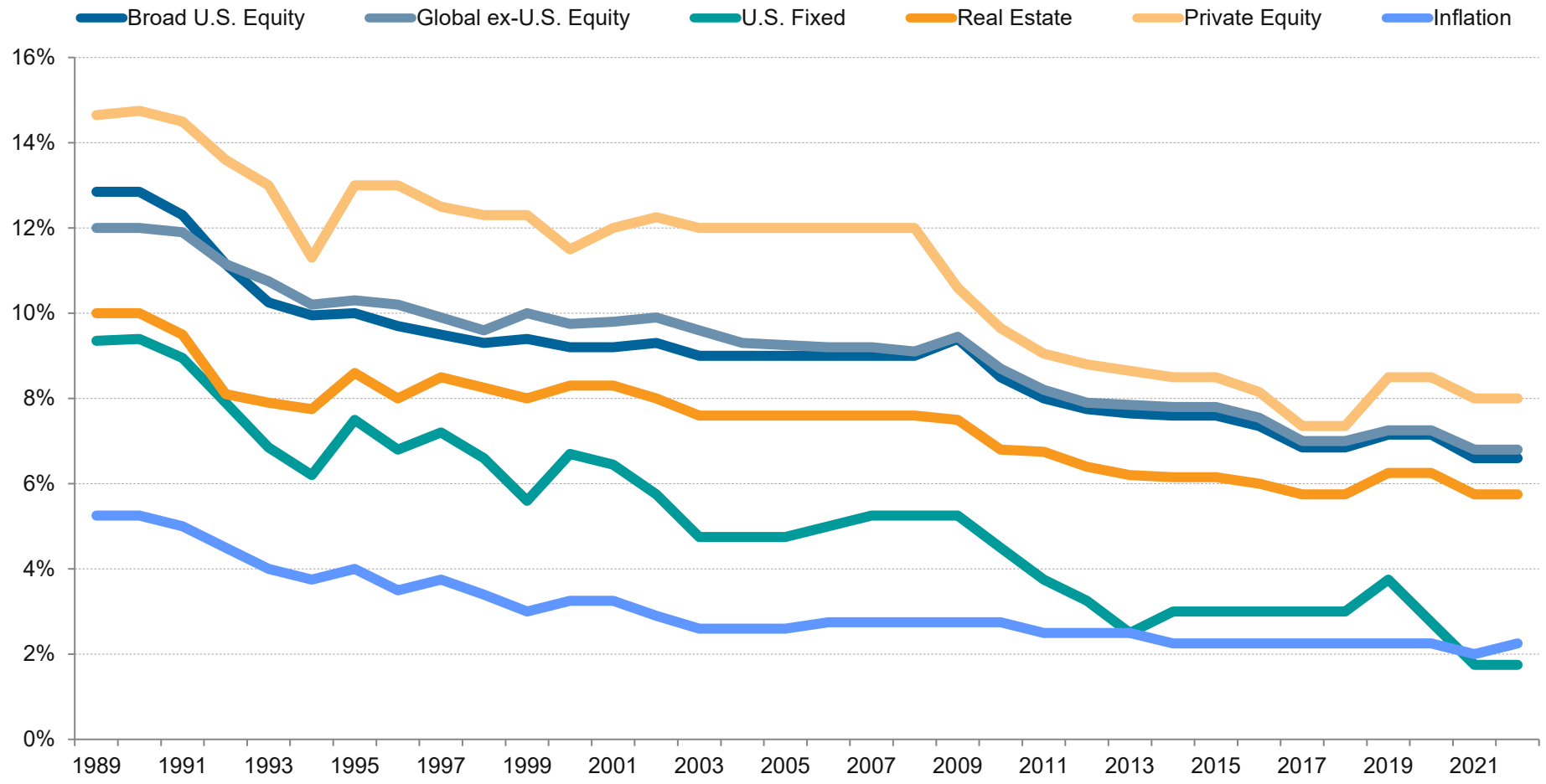
Projection Years 1989-2012

Historical Comparison: Actual Returns vs. Callan Capital Markets Projections
Portfolio (60% Equity, 30% Fixed, 10% Real Estate)



Return Projections: Major Asset Classes

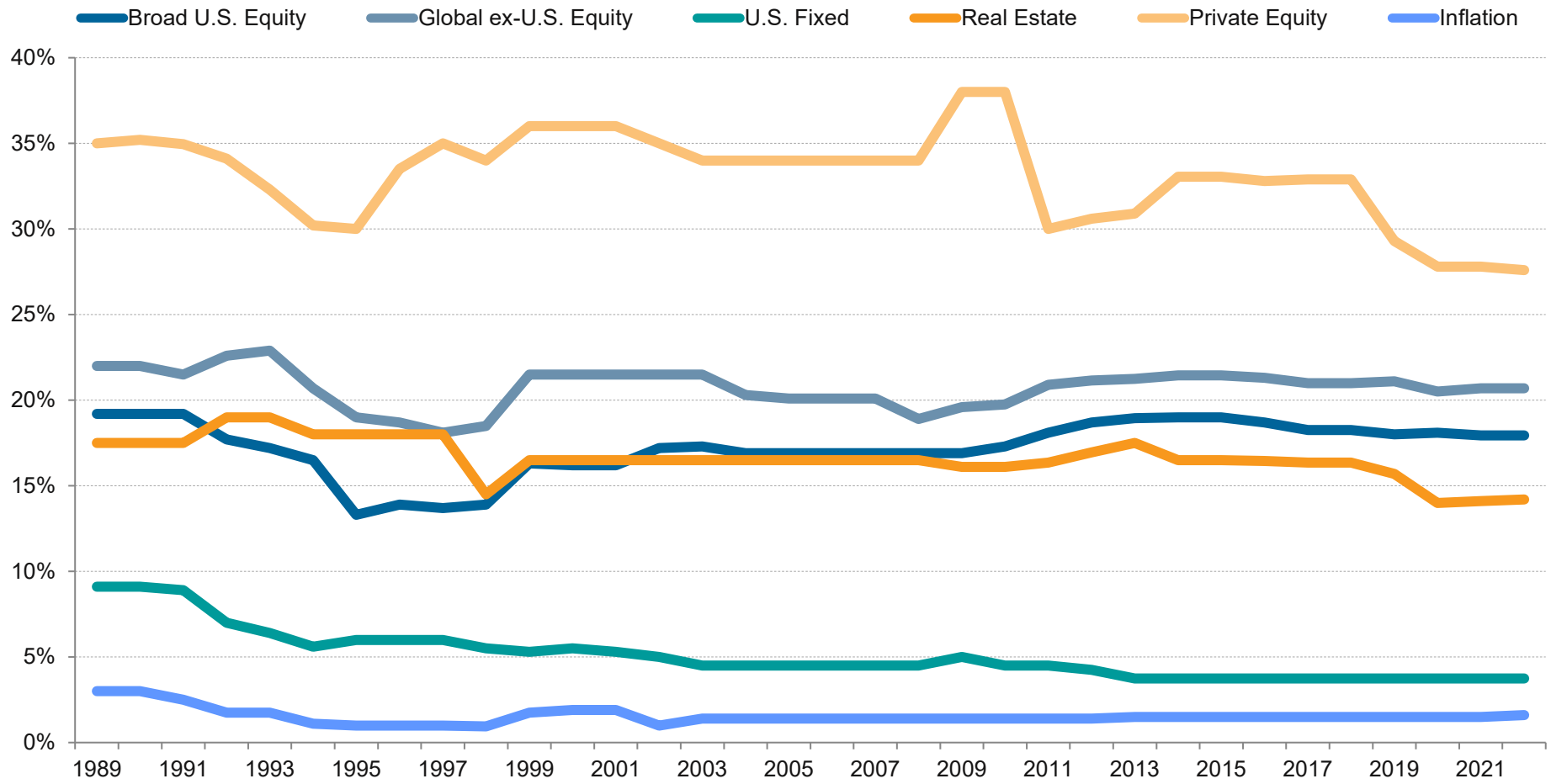
1989–2022



Source: Callan

Risk Projections: Major Asset Classes

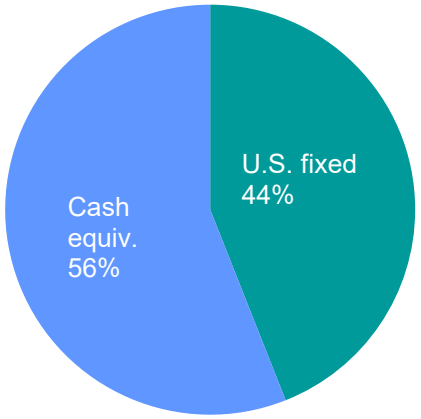
1989–2022



Source: Callan

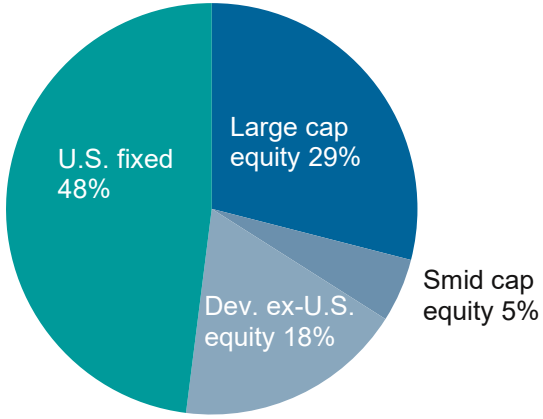
7% Expected Returns Over Past 30 Years

Increasing Complexity



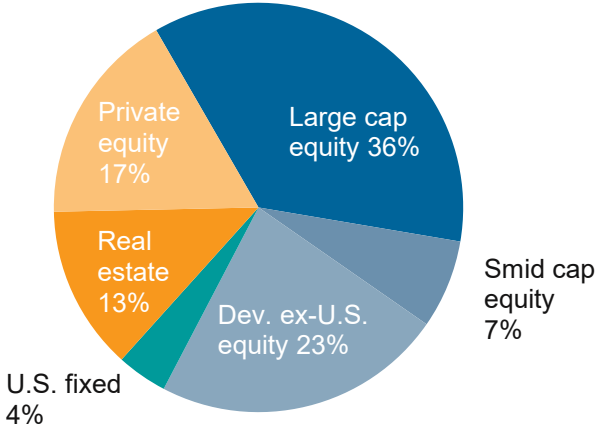
1992

Return: **7.0%**
Risk: **3.2%**



2007

Return: **7.0%**
Risk: **9.4%**



2022

Return: **7.0%**
Risk: **16.8%**

Increasing Risk

In 1992, our expectations for cash and broad U.S. fixed income were 6.2% and 7.9%, respectively

Return-seeking assets were not required to earn a 7% projected return

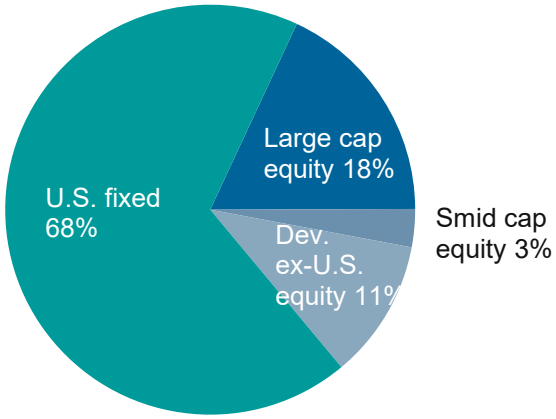
15 years later, an investor would have needed over half of the portfolio in public equities to achieve a 7% projected return, with approximately 3x the portfolio volatility of 1992

Today an investor is required to include 96% in return-seeking assets (including 30% in private market investments) to earn a 7% projected return at over 5x the volatility compared to 1992

Source: Callan

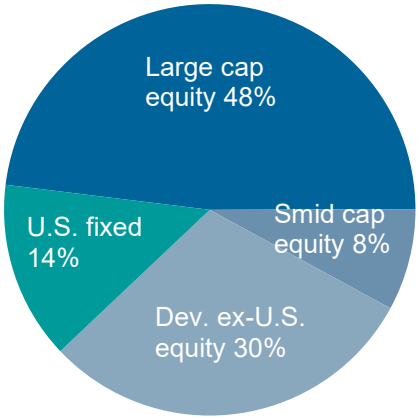
5% Expected Real Returns Over Past 30 Years

Increasing Complexity



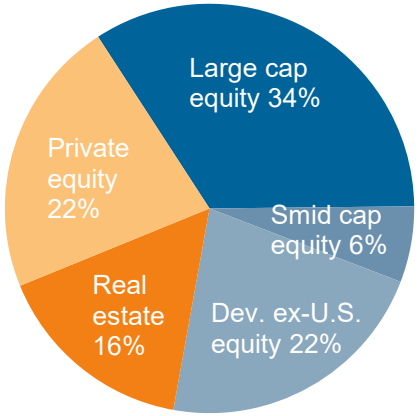
1992

Inflation:	**4.50%**
Real Return:	**5.0%**
Risk:	**7.2%**



2007

Inflation:	**2.75%**
Real Return:	**5.0%**
Risk:	**14.6%**



2022

Inflation:	**2.25%**
Real Return:	**5.0%**
Risk:	**17.8%**

Increasing Risk

Despite a 4.5% inflation projection, an investor could have over two-thirds of the portfolio in low-risk assets (fixed income) and still earn a 5% projected real return in 1992

15 years later, an investor would have needed 86% in public equities to achieve a 5% projected real return with over 2x the portfolio volatility of 1992

Today an investor must have 100% of the portfolio in return-seeking assets to earn a 5% projected real return at approximately 2.5x the volatility compared to 1992

Source: Callan

Customized 10-Year ARMB Capital Market Projections – PERS & TRS Target

ARMB Asset Allocation Model 2022-2031

Asset Class	Target Weight	PROJECTED RETURN 1-Year Arithmetic	PROJECTED RETURN 10-Year Geometric Return	PROJECTED RISK Annualized Standard Deviation	Projected Yield
Public Equities	**45.0%**				
Broad US Equity	27.0%	8.00%	6.60%	17.95%	1.70%
Global Ex-US Equity	18.0%	8.70%	6.80%	20.70%	2.55%
Fixed Income	**21.0%**				
ARMB Core Fixed Income	21.0%	1.75%	1.70%	3.55%	2.82%
Opportunistic	**6.0%**				
Opportunistic	6.0%	5.45%	5.00%	10.60%	2.20%
Private Equity	**14.0%**				
Private Equity	14.0%	11.45%	8.00%	27.60%	0.00%
Real Assets	**14.0%**	**6.90%**	**6.15%**	**13.60%**	**4.35%**
Real Estate	4.90%	6.60%	5.75%	14.20%	4.40%
Timber	1.40%	6.45%	5.40%	15.60%	3.70%
Farmland	3.50%	6.60%	5.50%	15.45%	4.25%
Private Infrastructure	2.10%	7.10%	6.10%	15.45%	4.60%
REITs	2.10%	8.15%	6.20%	20.70%	4.65%
Cash Equivalents	**0.0%**				
Cash Equivalents	0.0%	1.20%	1.20%	0.90%	1.20%
Inflation			2.25%	1.50%	
Total Fund	**100.0%**	**7.05%**	**6.25%**	**13.83%**	**2.27%**

Projection set customized to reflect specific ARMB strategies:

- Real assets, opportunistic and fixed income

Current target projected to generate a return of 6.25% compounded over 10 years, at a risk (standard deviation) of 13.83%. This return is comparable to that projected last year for the same target (6.25%).

Source: Callan LLC

2022 Correlation Assumptions for Customized ARMB Asset Class Set

Correlation Matrix	Broad US	Large	SMID	Glb ex US	Int'l	Emerge	Dom Fix	ARMB Fix	Opp	Priv Cred	Core RE	Timber	Farm	Priv Infra	US REITs	Real A	HF	PE	Cash	CPI
Broad US Equity	**1.000**																			
Large Cap US Equity	0.997	**1.000**																		
Small/Mid Cap US Equity	0.931	0.900	**1.000**																	
Global ex-US Equity	0.817	0.807	0.796	**1.000**																
Developed ex-US Equity	0.781	0.770	0.770	0.980	**1.000**															
Emerging Market Equity	0.796	0.790	0.760	0.931	0.840	**1.000**														
Core US Fixed	-0.104	-0.099	-0.120	-0.123	-0.106	-0.140	**1.000**													
ARMB Fixed Income	-0.105	-0.100	-0.121	-0.124	-0.107	-0.141	1.000	**1.000**												
Opportunistic	0.986	0.990	0.887	0.793	0.758	0.773	0.042	0.042	**1.000**											
Private Credit	0.735	0.730	0.700	0.720	0.695	0.690	-0.060	-0.061	0.724	**1.000**										
Core Real Estate	0.708	0.705	0.663	0.674	0.660	0.629	-0.035	-0.035	0.703	0.560	**1.000**									
Timber	0.699	0.695	0.660	0.663	0.640	0.635	-0.020	-0.020	0.695	0.540	0.640	**1.000**								
Farmland	0.705	0.700	0.670	0.654	0.640	0.610	-0.100	-0.101	0.689	0.520	0.590	0.600	**1.000**							
Private Infrastructure	0.722	0.720	0.670	0.694	0.680	0.645	0.010	0.009	0.724	0.520	0.760	0.630	0.600	**1.000**						
US REITs	0.803	0.790	0.795	0.787	0.765	0.745	-0.110	-0.110	0.778	0.620	0.695	0.620	0.630	0.630	**1.000**					
Real Assets	0.845	0.839	0.800	0.804	0.785	0.753	-0.061	-0.061	0.834	0.643	0.914	0.774	0.818	0.858	0.821	**1.000**				
Hedge Funds	0.783	0.780	0.734	0.762	0.735	0.730	0.142	0.141	0.803	0.610	0.520	0.530	0.540	0.474	0.620	0.622	**1.000**			
Private Equity	0.803	0.798	0.760	0.783	0.760	0.743	-0.190	-0.190	0.774	0.680	0.600	0.600	0.600	0.620	0.750	0.730	0.602	**1.000**		
Cash Equivalents	-0.064	-0.060	-0.080	-0.104	-0.100	-0.100	0.150	0.162	-0.039	-0.060	0.000	-0.010	-0.100	-0.070	-0.050	-0.052	-0.040	0.000	**1.000**	
Inflation	-0.013	-0.020	0.020	0.011	0.000	0.030	-0.250	-0.249	-0.056	0.060	0.100	0.020	0.010	0.055	0.120	0.076	0.150	0.060	0.050	**1.000**

Source: Callan LLC

Expanding the Length of the Forecast Horizon

10-Year vs. Equilibrium Capital Market Expectations

- As the time horizon grows beyond 10 years, our capital market expectations increasingly incorporate “equilibrium returns”. Equilibrium returns reference ***long-term historical mean results***, with an overlay of informed judgment. Key elements to consider:
  - Nominal returns
  - Inflation
  - Real returns
  - Risk premium – bonds over cash, stocks over bonds, long duration over short
  - Long-term underlying economic growth (real GDP)
- 10-Year expectations:
  - Large Cap Stocks: 6.5% nominal, 4.25% real, 4.75% premium over bonds
  - Bonds: 1.75% nominal, -0.50% real, 0.50 % premium over cash
  - Cash: 1.2% nominal, -1.05% real
  - Inflation: 2.25%
  - Underlying economic growth (real GDP) – 2 to 2.5% per year
- Equilibrium expectations:
  - Large Cap Stocks: 8.40% nominal, 6.15% real, 3.45% premium over bonds
  - Bonds: 5.1% nominal, 2.85% real, 2.05% premium over cash
  - Cash: 3.05% nominal, 0.80% real
  - Inflation: 2.25%
  - Underlying economic growth (real GDP) – 3% per year

As Time Horizon Increases, Expected Returns Increase

Transition from 10-Year to 20-Year Horizon – Heading Toward LT Equilibrium

AssetClass	2022-2031 10-Year Annualized Return	2022-2041 20-Year Annualized Return	2022-2051 30-Year Annualized Return	Long-Term Annualized Equilibrium Return	Projected Standard Deviation
Broad US Equity	6.60%	7.10%	7.55%	8.55%	17.97%
Large Cap US Equity	6.50%	7.00%	7.45%	8.40%	17.70%
Small/Mid Cap US Equity	6.70%	7.35%	7.95%	9.10%	21.30%
Global ex-US Equity	6.80%	7.40%	7.90%	8.90%	20.68%
Developed ex-US Equity	6.50%	7.00%	7.45%	8.35%	19.90%
Emerging Market Equity	6.90%	7.60%	8.25%	9.50%	25.15%
Core US Fixed	1.75%	2.65%	3.50%	5.10%	3.75%
ARMB Fixed Income	1.70%	2.60%	3.40%	5.00%	3.57%
Opportunistic	5.00%	5.65%	6.25%	7.45%	10.58%
Private Credit	5.50%	6.20%	6.80%	8.15%	14.60%
Core Real Estate	5.75%	6.15%	6.55%	7.40%	14.20%
Timber	5.40%	5.85%	6.20%	7.05%	15.60%
Farmland	5.50%	5.95%	6.30%	7.10%	15.95%
Private Infrastructure	6.10%	6.55%	6.95%	7.95%	15.45%
US REITs	6.20%	6.70%	7.10%	8.05%	20.70%
Real Assets	6.15%	6.59%	6.95%	7.85%	13.62%
Hedge Funds	4.10%	4.55%	5.00%	5.85%	8.20%
Private Equity	8.00%	8.45%	8.90%	9.65%	27.60%
Cash Equivalents	1.20%	1.70%	2.15%	3.05%	0.90%

Source: Callan LLC

Focus on 20-Year Horizon – PERS ($22.8 b) & TRS ($10.8 b at 1/31/22)

Achieve 4.88% Real Return over 20-Year Horizon

ARMB adopted new target portfolio following the 2019 asset-liability study, and refined the target in the 2021 asset allocation review

- Duration, cash flows and demographic forecasts suggest the investment time horizon for PERS and TRS remains long
- Current 10-year capital market forecasts can lead investors to take on substantial risk to meet a fixed return goal
- Extending the forecast horizon enabled the plans to moderate exposure to risk assets while still meeting the return target over this longer horizon
- The target represents the risk posture of the plans and acknowledges future liquidity needs

Portfolios optimized using broad US and non-US equity, broad US fixed income, real assets and private equity

- Opportunistic is modeled as 60/40 exposure to public market stocks and bonds
- Real assets modeled using current target weights to each component within the total real asset composite
  - *35% Real estate*
  - *10% Timber*
  - *25% Farmland*
  - *15% Private Infrastructure*
  - *15% REITs*

Fixed income modeled as 95% broad market (BB Aggregate) and 5% cash

Customized 20-Year ARMB Capital Market Projections – PERS & TRS Target

ARMB Asset Allocation Model 2022-2041

Asset Class	Target Weight	PROJECTED RETURN 1-Year Arithmetic	PROJECTED RETURN 20-Year Geometric Return	PROJECTED RISK Annualized Standard Deviation	Projected Yield
Public Equities	**45.0%**				
Broad US Equity	27.0%	8.50%	7.10%	17.95%	1.70%
Global Ex-US Equity	18.0%	9.25%	7.35%	20.70%	2.55%
Fixed Income	**21.0%**				
ARMB Core Fixed Income	21.0%	2.65%	2.60%	3.55%	2.82%
Opportunistic	**6.0%**				
Opportunistic	6.0%	6.10%	5.70%	10.60%	2.20%
Private Equity	**14.0%**				
Private Equity	14.0%	11.90%	8.45%	27.60%	0.00%
Real Assets	**14.0%**	**7.35%**	**6.60%**	**13.62%**	**4.35%**
Real Estate	4.90%	7.00%	6.15%	14.20%	4.40%
Timber	1.40%	6.90%	5.85%	15.60%	3.70%
Farmland	3.50%	7.05%	5.85%	15.45%	4.25%
Private Infrastructure	2.10%	7.55%	6.55%	15.45%	4.60%
REITs	2.10%	8.60%	6.70%	20.70%	4.65%
Cash Equivalents	**0.0%**				
Cash Equivalents	0.0%	1.70%	1.70%	0.90%	1.70%
Inflation			2.25%	1.50%	
Total Fund	**100.0%**	**7.63%**	**6.88%**	**13.83%**	**2.27%**

Projection set customized to reflect specific ARMB strategies:

- Real assets, opportunistic and fixed income

Current target projected to generate a return of 6.88% compounded over 10 years, at a risk (standard deviation) of 13.83%. This return is comparable to that projected last year for the same target (6.88%).

Source: Callan LLC

Focus on 20-Year Time Horizon

Compare Return and Risk for 2022 vs. 2021 Capital Market Assumptions

- Target adopted in 2021 represents a portfolio designed to meet the goal of 7.13% nominal/4.88% real return over 20 years
- Inflation assumption is 2.25%, up from 2.0% projected in 2021
  - As a result, the real return goes down for the same asset allocation and the same nominal return projection
- 2022 assumptions suggest a nominal return gap of 25 basis points versus 7.13%, with a comparable real return gap
- Actuary's effective long term real return target is 4.88%
- Target shown at right is expected to generate a long-term (20-year) return that is close to (but just below) the plan's real return target (6.88% - 2.25% = 4.63%)
- Target expected to generate a greater return for the same level of risk as a portfolio restricted to the public markets

	2022 Projection	2021 Projection
Broad US Equity	27	27
Global ex-US Equity	18	18
ARMB Fixed Income	21	21
Opportunistic	6	6
Real Assets	14	14
Private Equity	14	14
Totals	100	100
Projected Arithmetic Return	7.04%	7.04%
10-year Compound Return	6.27%	6.25%
Projected Standard Deviation	13.83%	13.89%
Projected Arithmetic Return	7.63%	7.63%
20-year Compound Return	6.88%	6.88%
Projected Standard Deviation	13.83%	13.89%
Real Return (2.25% inflation for 2022, 2.0% for 2021)	4.63%	4.88%
Equity	59%	59%
Inv Grade Fixed	21%	21%
Alts	28%	28%

Source: Callan LLC

Appendix

2022 10-Year Assumptions vs. 2021

Summary of Callan's Long-Term Capital Market Assumptions (2022 - 2031)

		PROJECTED RETURN			PROJECTED RISK	2021 - 2030			vs 2021	
Asset Class	**Index**	**1-Year Arithmetic**	**10-Year Geometric***	**Real**	**Standard Deviation**	**1-Year Arithmetic**	**10-Year Geometric***	**Standard Deviation**	**Geometric* Delta**	**Std Dev Delta**
Equities										
Broad U.S. Equity	Russell 3000	8.00%	6.60%	4.35%	17.95%	8.00%	6.60%	17.95%	0.00%	0.00%
Large Cap U.S. Equity	S&P 500	7.85%	6.50%	4.25%	17.70%	7.85%	6.50%	17.70%	0.00%	0.00%
Small/Mid Cap U.S. Equity	Russell 2500	8.75%	6.70%	4.45%	21.30%	8.75%	6.70%	21.30%	0.00%	0.00%
Global ex-U.S. Equity	MSCI ACWI ex USA	8.70%	6.80%	4.55%	20.70%	8.70%	6.80%	20.70%	0.00%	0.00%
Developed ex-U.S. Equity	MSCI World ex USA	8.25%	6.50%	4.25%	19.90%	8.25%	6.50%	19.90%	0.00%	0.00%
Emerging Market Equity	MSCI Emerging Markets	9.80%	6.90%	4.65%	25.15%	9.80%	6.90%	25.15%	0.00%	0.00%
Fixed Income										
Short Duration Gov't/Credit	Bloomberg Barclays 1-3 Yr G/C	1.50%	1.50%	-0.75%	2.00%	1.50%	1.50%	2.00%	0.00%	0.00%
Core U.S. Fixed	Bloomberg Barclays Aggregate	1.80%	1.75%	-0.50%	3.75%	1.80%	1.75%	3.75%	0.00%	0.00%
Long Government	Bloomberg Barclays Long Gov	1.85%	1.10%	-1.15%	12.50%	1.35%	0.60%	12.50%	0.50%	0.00%
Long Credit	Bloomberg Barclays Long Cred	2.60%	2.10%	-0.15%	10.50%	2.95%	2.45%	10.50%	-0.35%	0.00%
Long Government/Credit	Bloomberg Barclays Long G/C	2.30%	1.80%	-0.45%	10.40%	2.30%	1.80%	10.40%	0.00%	0.00%
TIPS	Bloomberg Barclays TIPS	1.35%	1.25%	-1.00%	5.05%	1.80%	1.70%	5.05%	-0.45%	0.00%
High Yield	Bloomberg Barclays High Yield	4.40%	3.90%	1.65%	10.75%	4.85%	4.35%	10.75%	-0.45%	0.00%
Global ex-U.S. Fixed	Bloomberg Barclays Gl Agg xUSD	1.20%	0.80%	-1.45%	9.20%	1.15%	0.75%	9.20%	0.05%	0.00%
Emerging Market Sovereign Debt	EMBI Global Diversified	4.00%	3.60%	1.35%	9.50%	3.90%	3.50%	9.50%	0.10%	0.00%
Alternatives										
Core Real Estate	NCREIF ODCE	6.60%	5.75%	3.50%	14.20%	6.60%	5.75%	14.10%	0.00%	0.10%
Private Infrastructure	MSCI Glb Infra/FTSE Dev Core 50/50	7.10%	6.10%	3.85%	15.45%	7.00%	6.00%	15.45%	0.10%	0.00%
Private Equity	Cambridge Private Equity	11.45%	8.00%	5.75%	27.60%	11.50%	8.00%	27.80%	0.00%	-0.20%
Private Credit	N/A	6.40%	5.50%	3.25%	14.60%	7.15%	6.25%	14.60%	-0.75%	0.00%
Hedge Funds	Callan Hedge FoF Database	4.35%	4.10%	1.85%	8.20%	4.25%	4.00%	8.00%	0.10%	0.20%
Commodities	Bloomberg Commodity	4.05%	2.50%	0.25%	18.00%	3.80%	2.25%	18.00%	0.25%	0.00%
Cash Equivalents	90-Day T-Bill	1.20%	1.20%	-1.05%	0.90%	1.00%	1.00%	0.90%	0.20%	0.00%
Inflation	CPI-U		2.25%		1.60%		2.00%	1.50%	0.25%	0.10%

** Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).*

Disclaimers

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ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Callan General Consulting Contract	ACTION:	X
DATE:	March 17-18, 2022	INFORMATION:	

BACKGROUND:

Callan LLC (Callan) currently serves as the Performance Measurement and Investment Advisory Consultant for the Alaska Retirement Management Board (ARMB).

Contractual services include the following:
1) Asset Liability Study,
2) Asset Allocation,
3) Manager Selection,
4) Performance Measurement,
5) Investment Management; and
6) General Consulting

The period of performance for this contract began July 1, 2019, and ends June 30, 2022, with two optional one-year extensions.

The contract was awarded to Callan in 2019 after going through a public RFP process.

STATUS:

Callan has served as the general investment consultant for 30 years and continues to do a good job.

Staff does not believe the cost/benefit of going through a new RFP process at this time is warranted.

The compensation terms of the arrangement will continue as agreed upon in the current contract.

RECOMMENDATION:

The Alaska Retirement Management Board direct staff to exercise the first of two, one-year contract extensions to extend Callan's general consulting contract until June 30, 2023.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Callan Real Assets Consulting Contract	ACTION:	X
DATE:	March 17-18, 2022	INFORMATION:	

BACKGROUND:

Callan LLC (Callan) serves as the Real Assets Consultant for the Alaska Retirement Management Board (ARMB).

Contractual services include the following:
1) Strategic Consulting,
2) Sourcing and Due Diligence,
3) Monitoring and Performance Measurement; and,
4) Other special projects as needed.

The period of performance for this contract began July 1, 2019, and ends June 30, 2022, with two optional one-year extensions.

The contract was awarded to Callan in 2019 after going through a public RFP process.

STATUS:

Callan replaced the former real estate consultant in 2019 and has done a good job providing consulting services across the broader real assets landscape. Having the same firm provide both general consulting and real assets consulting also helps streamline portfolio analysis and reporting to staff and ARMB.

Staff does not believe the cost/benefit of going through a new RFP process at this time is warranted.

The compensation terms of the arrangement will continue as agreed upon in the current contract.

RECOMMENDATION:

The Alaska Retirement Management Board direct staff to exercise the first of two, one-year contract extensions to extend Callan's real assets consulting contract until June 30, 2023.