

ALASKA RETIREMENT MANAGEMENT BOARD

OCTOBER
5-6, 2017

BOARD OF TRUSTEES MEETING

DENA'INA CONVENTION CENTER
K'ENAKATNU ROOM
600 W. 7TH AVENUE
ANCHORAGE, AK
(907) 263-2850

TELECONFERENCE: 1-800-315-6338
ACCESS CODE: 12762#

THURSDAY, OCTOBER 5, 2017

- 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 – June 22-23, 2017**
- VII. 9:10 Staff Reports**
 - 1. Retirement & Benefits Division Report
Ajay Desai, Director, Division of Retirement & Benefits
Kevin Worley, CFO, Division of Retirement & Benefits
 - 2. Treasury Division Report
 - A. Delegation of Authority - Action
Resolution 2017-05
 - B. FY19 Budget - Action
Pamela Leary, Director, Treasury Division
 - 3. Calendar/Disclosure
Stephanie Alexander, Liaison Officer
 - 4. CIO Report
Bob Mitchell, Chief Investment Officer
 - 5. Fund Financial Presentation and Cash Flow Update
Scott Jones, Comptroller, Department of Revenue
Kevin Worley, CFO, Division of Retirement & Benefits
- VIII. 9:30 Reports**
 - 6. Chair Report, *Gail Schubert*
 - 7. Committee Reports

- A. Audit Committee, *Rob Johnson, Chair*
- B. Actuarial Committee, *Kris Erchinger, Chair*
- C. Defined Contrib. Plan Committee, *Bob Williams, Chair*
- D. Budget Committee, *Gail Schubert, Chair*

8. Legal Report, *Stuart Goering, Assistant Attorney General*

9:40–10:25 9. Performance Measurement – 2nd Quarter
Paul Erlendson, Callan Associates, Inc.

10:25AM – 10 MINUTE BREAK

10:35–10:50 10. Actuarial Resolutions -- FY19 Contribution Rate Setting
Kris Erchinger, Chair, Actuarial Committee

Information: History of PERS/TRS Employer Contribution Rates

Action: Relating to FY19 PERS Contribution Rate
Resolution 2017-06

Action: Relating to FY19 PERS RMMI Contribution Rate
Resolution 2017-07

Action: Relating to FY19 PERS ODD Contribution Rate
Resolution 2017-08

Action: Relating to FY19 TRS Contribution Rate
Resolution 2017-09

Action: Relating to FY19 TRS RMMI Contribution Rate
Resolution 2017-10

Action: Relating to FY19 TRS ODD Contribution Rate
Resolution 2017-11

Action: Relating to FY19 NGNMRS Contribution Amount
Resolution 2017-12

Information: JRS Contribution

10:55–11:35 11. A. Real Assets FY18 Annual Plan
Real Assets Guidelines Policies and Procedures
Nicholas Orr, Manager of Real Assets

11:40–12:20 B. Consultant Evaluation of Real Estate Plan:
Diversification, Compliance, & Performance
Measurement
*Chris Cunningham, Senior Vice President,
Townsend Group*

LUNCH – 12:20PM - 1:35PM

1:35–1:50	C.	Adoption: Real Assets FY18 Plan & Policies Board Discussion Action: Real Assets FY18 Annual Plan Resolution 2017-13 Action: Revised Investment Guidelines Resolution 2017-14 – Real Estate Resolution 2017-15 – Farmland Resolution 2017-16 – Timber Resolution 2017-17 – Infrastructure
1:55–2:25	12.	JP Morgan Asset Management <i>Mike Kelly, Director of U.S. Real Estate Comingled Funds</i>
2:30–3:00	13.	Sentinel Real Estate Corporation <i>George Tietjen, Co-Portfolio Manager, Managing Director</i> <i>David Stenger, Co-Portfolio Manager, Vice President</i>

3:00PM – 10 MINUTE BREAK

3:10–3:40	14.	Almanac Realty Investors <i>Matthew Kaplan, Managing Partner</i> <i>Josh Overbay, Managing Director</i>
3:45–4:15	15.	Panel Discussion – Real Estate Topics <i>Moderated by Nicholas Orr, Manager of Real Assets</i>

RECESS

FRIDAY, OCTOBER 6, 2017

- 9:00 Call to Order
- 9:00-9:30 16. CIO Update
Bob Mitchell, Chief Investment Officer
- 9:35-10:05 17. Governance Best Practices
Paul Erlendson, Callan Associates, Inc.
- 10:10-10:35 18. Investment Actions
A. Staff Recommendations regarding Callan Review of
DC Investment Structure
B. Equity Guidelines
Resolution 2017-18
Bob Mitchell, Chief Investment Officer

10:35AM – 10 MINUTE BREAK

- 10:45-11:20 19. Abbott Capital Management, LLC
Jonathan Roth, Managing Director, President
Matthew Smith, Managing Director
- 11:25-12:00 20. Arrowstreet Capital, L.P.
Alex Ogan, Portfolio Manager
Bryan Roda, Client Relationship Manager

LUNCH – 12:00PM - 1:15PM

- 1:15-1:45 21. Public Plan Returns and Liquidity
Bob Mitchell, Chief Investment Officer
Zachary Hanna, Deputy Chief Investment Officer
- 1:50 22. TIR Update – Executive Session

IX. Unfinished Business

X. New Business

- XI. Other Matters to Properly Come Before the Board**
- XII. Public/Member Comments**
- XIII. Investment Advisory Council Comments**
- XIV. Trustee Comments**
- XV. Future Agenda Items**
- XVI. Adjournment**

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

**State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
MEETING**

Location:
Dena'Ina Convention Center
600 West Seventh Avenue
Anchorage, Alaska

**MINUTES OF
June 22-23, 2017**

Thursday, June 22, 2017

CALL TO ORDER

VICE-CHAIR ROBERT JOHNSON called the meeting of the Alaska Retirement Management Board (ARMB) to order at 9:04 a.m.

ROLL CALL

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

Board Members Present

Robert Johnson, *Vice Chair*
Gayle Harbo, *Secretary*
Kristin Erchinger
Commissioner Sheldon Fisher
Commissioner Randall Hoffbeck - arrived late
Tom Brice
Norman West - arrived late

Board Members Absent

Gail Schubert, *Chair*
Bob Williams

Investment Advisory Council Members Present

Dr. William Jennings
Dr. Jerrold Mitchell
Robert Shaw

Investment Advisory Council Members Absent

None

Department of Revenue Staff Present

Bob Mitchell, Chief Investment Officer
Scott Jones, State Comptroller
Zachary Hanna, Deputy Chief Investment Officer
Pamela Leary, Director, Treasury Division
Stephanie Alexander, Board Liaison

Department of Administration Staff Present

Kevin Worley, Chief Financial Officer, Division of Retirement & Benefits (DRB)
Ajay Desai, Director, DRB

Consultants, Invited Participants, and Others Present

Paul Erlendson, Callan Associates, Inc.
Eugene Podkaminer, Callan Associates, Inc.
Doug Bratton, Crestline Investors
James Delaune, Crestline Investors
Keith Williams, Crestline Investors
Stuart Goering, Department of Law, Assistant Attorney General
Kelly Carbone, DePrince, Race & Zollo
Marc Miller, DePrince, Race & Zollo
Mike Comacho, JP Morgan
Todd Evans, JP Morgan
Garrett Norman, JP Morgan
Chris Gorgone, Man Group
Keith Haydon, Man Group
Shanta Puchtler, Man Group

PUBLIC MEETING NOTICE

STEPHANIE ALEXANDER, Board Liaison, confirmed public meeting notice requirements had been met.

APPROVAL OF AGENDA

MR. BRICE moved to approve the agenda. MS. ERCHINGER seconded the motion.

MR. BRICE requested Defined Contribution Committee be added under Item 7. Committee Reports. VICE-CHAIR JOHNSON noted the addition will be placed as 7B. Defined Contribution Committee and the Actuarial Committee will be moved to 7C.

There was no objection to the approval of the agenda, with the amendment addition of 7B. Defined Contribution Committee and 7C. Actuarial Committee.

PUBLIC/MEMBER PARTICIPATION, COMMUNICATIONS, AND APPEARANCES

None

APPROVAL OF MINUTES: April 20 - 21, 2017

MRS. HARBO moved to approve the minutes of the April 20 - 21, 2017 meeting. MR. BRICE seconded the motion.

The minutes were approved without objection.

STAFF REPORTS

1. RETIREMENT & BENEFITS DIVISION REPORT

VICE-CHAIR JOHNSON introduced Division of Retirement and Benefits (DRB) Director AJAY DESAI and Chief Financial Officer KEVIN WORLEY. VICE-CHAIR JOHNSON welcomed Chief Investment Officer BOB MITCHELL, Deputy Chief Investment Officer ZACHARY HANNA, and Board Liaison MS. ALEXANDER to their new positions.

A. Conduent Consulting Invoices (informational)

MR. WORLEY informed the new staff report format is being presented today. The Conduent invoices summarize the first nine months of FY17, ended March 31. Both the Judicial Retirement System (JRS) and National Guard Naval Militia Retirement System (NGNMRS) had a full valuation report completed, which is reflected in the additional costs.

B. Membership Statistics

MR. WORLEY provided the membership statistics for the quarters ending September 30, 2016, December 31, 2016, and March 31, 2017. He reported the continued decline in the number of Defined Benefit (DB) members and the continued increase in the number of Defined Contribution Retirement (DCR) members at each snapshot date. MR. WORLEY noted staff is preparing for the busiest time of the year for retirement processing in the summer.

C. DRB Update

MR. DESAI provided Board members with the fourth quarter audit report of FY17. There are no unusual findings. Staff has completed 32 audits, as shown, and two additional audits have been completed, leaving 22 audits remaining, as shown on the second page. MR. DESAI reviewed the projected audits for 2018, including field audits and desk audits. Overall, the audit process is routine and friendly, but there are times when delayed responses for information occur.

MR. DESAI gave a presentation on one of the SMART goals adopted under DRB for modernization. He provided high-level information regarding DRB, which outlined the benefit administration for both pension and health plans. The DB and DCR plans total approximately \$28 billion. DRB has the fiduciary responsibility for record-keeping and counseling services for about 80,000 employee members. Staff processes about 22,000

retirement applications annually, and answered nearly 90,000 phone calls in 2016. Approximately \$40 million annually is spent on operations.

MR. DESAI reviewed the work growth projections for the benefit processing area and customer service. The expected growth is one of the many challenges DRB faces that has precipitated the reevaluation of internal business processes, systems, and application. MR. DESAI explained DRB staff holds a very heavy manual workload, and utilizes multiple systems, platforms, software applications, and tools dating back 28 years to accomplish a single task. He provided a step-by-step walk-through example of processing a membership projection. MR. DESAI described the lack of a Single Source of Truth has created inefficiency, inconsistent backup, impediments to customer service, and an unattractive environment for staff.

MR. DESAI described the multi-year business case, which is based on three key drivers; 1) reduction of information technology (IT) costs, 2) optimization of business processes, and 3) improved business operations. MR. DESAI provided detailed examples of each key driver, and discussed the future-state approval concepts regarding a fully integrated single platform that interfaces with third-party administrators and other external entities. MR. DESAI reviewed the scope and strategy of the project, and showed the high-level timeline for the massive multi-year effort. Work on the Draft Business Case Document is underway. MR. DESAI commented ARMB is a strong stakeholder and partner. He requested feedback and guidance to assist in a smooth transition process.

MRS. HARBO requested additional information regarding cost analysis, including cost savings. MR. DESAI gave a detailed explanation and informed the approximate cost for the project is \$25 million to \$30 million. The current system, and remaining status quo, costs approximately \$40 million to \$45 million. MR. DESAI commented the new system will save approximately \$12 million to \$15 million, while gaining advanced technology, better customer service, and a solid, secure system.

MR. BRICE inquired as to payment for the project, potential consideration of cost-sharing with employers, and the timeline for completion. COMMISSIONER FISHER informed trust assets will be utilized. He commented the system is almost to a point where it cannot be maintained because the old technology is no longer supported. He believes DRB has done great work in creating a system that is intelligent and has a positive cash flow associated with the necessary improvement. No research has been conducted to-date whether other departments could leverage the technology. MR. BRICE indicated communicating with other employers may result in worthwhile feedback. MR. DESAI informed the project will take three to four years to implement.

MS. ERCHINGER welcomed the project and believes the current timing will significantly lower the costs and provide a better outcome with well-tested and well-proven technology.

VICE-CHAIR JOHNSON asked MR. DESAI how the ARM Board can be of assistance in this process. MR. DESAI requested Board support for the project. He will provide future updates and will ask the Board for additional guidance as the project progresses. VICE-

CHAIR JOHNSON expressed appreciation to MR. DESAI. He stated the Board, without objection, applauds the efforts of DRB and encourages the project to move forward.

COMMISSIONER FISHER advised the proposed order from the Governor's Office establishing the Retiree Advisory Committee should be announced the week of July 10th. ARMB members are invited to participate in the planning meeting to provide feedback on the proposed structure.

2. TREASURY DIVISION REPORT

VICE-CHAIR JOHNSON invited Treasury Division Director PAMELA LEARY to present the Treasury Division Report. She reiterated MR. BOB MITCHELL was announced as the new CIO and MR. HANNA was announced as the Deputy CIO. The Governor's Office approved the hiring of two experienced investment officers to the internal public equity team. Start dates will be determined once a budget is approved. There is one investment officer vacancy. Two summer interns, accomplished students from UAA and UAF, are working with the investment team. MS. LEARY believes it will be positive in terms of succession planning.

MS. LEARY informed the budget is still being developed and has not passed yet. Shut-down procedures include the Treasury maintaining a minimal level of function to preserve the state's financial assets and any cash management needs identified during the process.

3. CALENDAR/DISCLOSURE

MS. ALEXANDER stated the disclosure report is included in the packet and there are no transactions requiring additional review. The 2017 and 2018 calendars were also included.

4. CIO REPORT

MR. BOB MITCHELL provided an overview of the 42 items and one attachment of his report. The general trend of the transfers has been to divest equity securities and to periodically rebalance the allocation amongst the various plans. MR. BOB MITCHELL informed Eaton Vance had a recent charge of theft and fraud-related activity by a former employee for funds that do not affect the ARM Board. Eaton Vance has engaged a third-party to evaluate their systems. Staff and Callan continue to monitor the situation, and do not believe it warrants placing Eaton Vance on the watch list. Any significant developments will be brought before the Board.

MR. BOB MITCHELL reported one of Cap Guardian's international equity strategy managers announced his retirement, which is scheduled for November. An experienced portfolio manager has been identified to succeed. Staff and Callan have reviewed the multi-portfolio-manager strategy and believes diversification is built in structurally to the process. The announced change does not warrant placing Cap Guardian on the watch list.

MR. BOB MITCHELL expressed appreciation to leadership from the external equity team, SHANE CARSON and SEAN HOWARD, who have negotiated lower fees for over six strategies.

MR. BRICE requested an update on ARMB's relationship with Tishman Speyer, in light of concerns regarding inappropriate work and safety standards. MR. BOB MITCHELL commented on the existing investment relationship with Tishman Speyer and the recent activity directed toward monitoring due diligence. He noted further investigation will occur.

VICE-CHAIR JOHNSON asked if the due diligence is ongoing or scheduled, and requested a description of the process. MR. BOB MITCHELL explained the entire staff is conducting due diligence in the various asset classes on an ongoing basis, depending on the engagement and the investment mandate. On-site due diligence is scheduled on a three-year rotation and covers aspects such as investment strategy, investment team, risk processes, compliance, and infrastructure.

5. FUND FINANCIAL PRESENTATION

State Comptroller SCOTT JONES and MR. WORLEY presented the Fund Financial Report. MR. JONES noted the new format of the financial summary through April. No questions were asked. He informed, as of yesterday, total assets were up 12.72%.

TRUSTEE REPORTS

6. CHAIR REPORT

VICE-CHAIR JOHNSON stated CHAIR SCHUBERT will be in attendance tomorrow and will deliver her report at that time.

7. COMMITTEE REPORTS

A. Audit Committee

VICE-CHAIR JOHNSON informed the Audit Committee met yesterday and primarily focused on the KPMG audit results. No particular events were distinctly different from last year. Additional work has occurred as requested by FASB 74 and 75. KPMG is actively obtaining information directly from Aetna's offices, rather than exchanging PDFs. The process seems to be more efficient.

VICE-CHAIR JOHNSON advised discussion occurred and the decision was made to maintain the status quo of not having a policy in place expecting credit risk and investment risk. He reported the new organizational charts for Department of Administration and DRB were provided and reviewed.

VICE-CHAIR JOHNSON noted Conduent proposed the use of a computer modeling called GEMS for the analysis to project actuarial rates and assumptions. He believes it is worth

exploring whether the GEMS model results are similar to the building block model results. Representatives from Callan and GRS agree GEMS is the wave of the future.

B. Defined Contribution Committee

MR. BRICE reviewed yesterday's Defined Contribution Committee meeting highlights, including a presentation and vigorous discussion regarding the Division's efforts to ensure members and participants are retirement ready and how to enhance Defined Contribution programs. He added a new video is close to being released to inform recent hires of the system and benefits available.

C. Actuarial Committee

MS. ERCHINGER reported the Actuarial Committee met yesterday, as well, and heard a presentation by actuary Gabriel Roeder Smith (GRS) reviewing the 2016 Valuation Report for JRS and NGNMRS. There were no material recommendations. MS. ERCHINGER informed the three items remaining on the audit findings list are related to death, disability and COLA, disclosures of Employer Group Waiver Plan (EGWP) savings in the DCR plans, and monitoring the eligible service time for participants.

MS. ERCHINGER conveyed the bulk of the meeting was a presentation by Conduent regarding the economic assumption setting process in preparation for the upcoming experience analysis. Any potential recommended changes to assumptions will be reflected with the valuation beginning June 30, 2018. Future meetings will discuss economic assumptions, such as inflation, investment return, salary scale, payroll growth, and PRPA. The second area to be discussed at the October 4th meeting is healthcare assumptions.

The third area to be discussed is demographic assumptions at the March 28, 2018, meeting. The recommendation regarding economic assumptions is expected to be brought before the Board at the December 6th meeting. Final recommendations for assumption changes will come before the Board at the June 20, 2018 meeting. MS. ERCHINGER expressed appreciation to LARRY LANGER of Conduent for his diligent efforts in assisting the Actuarial Committee.

MS. ERCHINGER reviewed the presentation by EMILY RICCI of Department of Administration regarding the consideration and cost savings to shift the DB plans to the EGWP federal drug subsidy program established to encourage employers to provide prescription drug benefits. The DC plan currently uses the program.

MS. ERCHINGER informed the Committee will be requesting approval of two action items discussed yesterday; acceptance of the GRS certification of the 2016 plan valuations, and acceptance of Conduent's FY 2016 valuations.

8. LEGAL REPORT

Assistant Attorney General STUART GOERING will provide training later in the session.

9. CYBER-SECURITY REPORT

VICE-CHAIR JOHNSON requested MR. JONES and MR. DESAI to present the Cyber Security Report. MR. JONES explained information security is the combination of physical security, which is protection of personnel, hardware, software, networks and data from damaging physical events, and cyber security, which is the protection of networks, computers, programs and data from attacks or unauthorized access. MR. JONES gave an in-depth detailed description of the processes and protocols for maintaining physical and cyber security at the State Street facility and backup facilities.

MS. ERCHINGER commented she attended an onsite visit in the past and found the conditions as impressive as MR. JONES described.

VICE-CHAIR JOHNSON asked if the contractual relationship with State Street includes specific security demands they would otherwise not perform. MR. JONES advised State Street is currently required to follow very stringent and comprehensive Federal and State reviews.

MR. DESAI outlined the strict security layers DRB currently has in place to protect the Personal Identifiable Information (PII) and protected health information (HIPAA) held in the information technology systems. He reviewed the training staff undergoes regarding HIPAA confidentiality and cyber security awareness.

VICE-CHAIR JOHNSON asked if the DRB was subject to the recent worldwide malware virus. MR. DESAI explained thousands of attacks are routinely occurring because of connection to the internet, and because of the solid security protections adopted, penetration of the system's firewall is rare.

COMMISSIONER FISHER discussed the State's hiring of Chief Information Officer BILL VAJDA, who is focused on cyber security. The recent malware attack was seen attempting to penetrate the State's network, but was unsuccessful. COMMISSIONER FISHER stated the State's IT group could provide a security presentation to the Board, if requested.

VICE-CHAIR JOHNSON believes it is important to repeatedly advise the constituents and beneficiaries regarding the safety and security measures utilized by the administrators.

VICE-CHAIR JOHNSON recessed the meeting from 10:34 a.m. to 10:52 a.m.

10. ACTUARIAL REVIEW/ACCEPTANCE-CERTIFICATION OF FY2016 REVIEW REPORTS AND VALUATIONS

Action: Board Acceptance of GRS Certification for FY2016 PERS, TRS, NGNMRS, JRS, and DC Plan Valuations

MS. ERCHINGER, as Chair of the Actuarial Committee, moved to accept GRS Certification for FY2016 PERS, TRS, NGNMRS, JRS, and DC Plan Valuations. No second required.

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

**Action: Board Acceptance of FY2016 Conduent Valuations
for PERS, TRS, NGNMRS, JRS, and DC Plan Valuations**

MS. ERCHINGER, as Chair of the Actuarial Committee, moved to accept FY2016 Conduent Valuations for PERS, TRS, NGNMRS, JRS, and DC Plan Valuations. No second required.

VICE-CHAIR JOHNSON noted for the record considerable discussion occurred in Committee yesterday regarding the resolution. Committee meeting minutes are available for anyone interested.

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

11. ASSET ALLOCATION REVIEW AND APPROVAL

MR. BOB MITCHELL informed the Board asset allocation review and approval occurs annually. At the April Board meeting, a detailed presentation was given regarding the process, changes to the benchmarks, redefinition of asset classes, and an additional 30-year expected return horizon. Board members provided feedback, which included engagement with Callan and IAC members regarding recommended changes. MR. BOB MITCHELL noted additional interactive evaluation process between staff, Callan and the IAC occurred. He continued his presentation with a review and description of the proposed process changes.

COMMISSIONER FISHER commented he feels the discussion around asset allocation comes to the Board as a request for an approval, and Board members are not in a position to offer much during the process. He requested information at a future meeting pertaining to the ARMB's range of engagement in the asset allocation processes compared to peer group processes.

MR. BOB MITCHELL responded this is the third discussion this year at the Board level regarding asset allocation and he anticipates ongoing participation. He reiterated staff wants to engage the Board at whatever level the Board directs. A governance presentation will be given by PAUL ERLENDSON of Callan at an upcoming meeting and will specifically address COMMISSIONER FISHER's process questions and peer group analysis.

MS. ERCHINGER requested a discussion occur in the future focusing on the issue of liquidity in the closed system DB plan, particularly the fact that more money is exiting the plan than is entering the plan and the effects over time the ability to make benefit payments and still maintain the asset allocation. She requested additional discussion occur regarding the possibility of a split asset allocation for shorter-term assets and longer-term assets in order to maintain the return assumption and address liquidity concerns.

MR. BOB MITCHELL informed discussions with the Board regarding liquidity will occur over the next year or two. The three-billion-dollar injection into the system has increased assets, lowered the annual cash inflows, and provided a stabilizing period before assets

gradually decrease. He noted the current review includes 10-year assumptions and 30-year assumptions that are different. It is possible a formal asset liability study could be conducted by Callan to address the Board's specific concerns and questions.

MR. BOB MITCHELL continued his presentation describing the asset allocations structure and included a comparison to peers. He reviewed Callan's 2017 capital market expectations and decline of earnings assumptions over the next 10 years. The expected 10-year return for the plans, not including Military, is 6.6%, and minus inflation, it is 4.35%. This is 50 basis points lower than last year's expected return due to the lower overall market return expectations. The portfolio's risk profile remains the same. The Military plan expected 10-year return is 5.3%. MR. BOB MITCHELL showed five asset allocation mixes Callan created based on the Board's risk tolerance. The existing allocation is identical to Mix 4.

COMMISSIONER FISHER asked what the asset allocation would look like without the 50 basis-point reduction in real return. MR. BOB MITCHELL explained the market return expectations are lower and it would take changes to asset allocation and portfolio concentrations in private equity to return 7.13% over 10 years, none of which is prudent.

MR. SHAW commented issues with lower capital market assumptions for the future are being addressed by his plan in San Francisco and industry-wide.

MR. ERLENDSON reminded the Board the expected outcomes is a probability analysis model suggesting there is roughly a 40% probability the current target mix, indexed and net of fees, will achieve or exceed the return goal. Strategies that give a higher probability of exceeding the benchmark return net of fees can be added incrementally, otherwise, it does not make sense to take additional risk and introduce worse downside outcomes.

DR. JERROLD MITCHELL commented the differences between the standard deviation in Mix 1 through Mix 5 are small, but directional. The Board gets to determine if it is comfortable in its current positioning or if it is willing to take on more risk for more return.

MR. BOB MITCHELL stated the existing policy directs achievement of top quartile risk-adjusted performance while taking less risk than the median peer. He believes the recommendation of Mix 4 is within the guidelines. He reviewed Callan's long-term 80-year capital market projections and noted the 30-year return for plans, not including Military, is 8.1%. Projection for 30-year returns for Military is 6.7%. MS. ERCHINGER requested the record reflect the 30-year projected return is a combination of the first 10 years projected return, plus a proportionately higher return in years 11 through 30, producing the average annualized return of 8.1%.

Adopt Asset Allocation:

Resolution 2017-03:

DB PERS/TRS/JRS

PERS/TRS/JRS Retiree Health Trusts

Retiree Major Medical HRAP/ODD

Resolution 2017-04: DB NGNMRS

MS. ERCHINGER moved to adopt Resolution 2017-03 approving the asset allocation for DB PERS/TRS/JRS, PERS/TRS/JRS Retiree Health Trusts, Retiree Major Medical HRAP/ODD, and to adopt Resolution 2017-04 approving the asset allocation for DB NGNMRS. MR. BRICE seconded the motion.

There was no objection from members of the IAC to adopting both resolutions.

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

12. PERFORMANCE MEASUREMENT - 1ST QUARTER

MR. ERLENDSON provided the performance measurement review for the first quarter 2017. He expressed appreciation for the level of engagement from Board members. MR. ERLENDSON gave a broad overview of the strongly rising markets in the first quarter, noting emerging markets returned over 17% year-to-date, as the dollar has started to fall. The recent currency effect has been positive, but is expected to be moderate in the long-term. The ARMB's portfolio is purposefully more conservative than the benchmarks and tends to lag in strongly rising markets against the benchmarks. The reverse is true in declining markets when the portfolio suffers less volatility when the markets decrease.

MR. ERLENDSON discussed valuation and price-to-earnings (P/E) ratios for stocks are at the high end of historical averages, and the prices for bonds are high relative to their yields. Callan expects the capital markets going forward will be more muted. The economy continues to grow and wage growth has begun to move forward. Unemployment is low. Strong areas in the economy include financial services, information technology, and healthcare.

MR. BOB MITCHELL requested additional information regarding the persistent underperformance of international equities relative to domestic equities over the last 30 years. EUGENE PODKAMINER of Callan explained the drivers of rates and returns are influenced by different cycles of currency fluctuations, interest rates, inflation rates, and government policy. This provides diversification and is a key measure of an internally efficient portfolio.

MR. ERLENDSON noted the Federal Open Market Committee has raised interest rates twice this year, causing an uptick in the short end of the yield curve. He reviewed the trend in interest rates and informed higher interest rates may be painful initially for the bond portfolio, but will be good for institutional investors in the long-term. U.S. real estate indexes have returned over 10% in the last five years. Non-U.S. real estate indexes have experienced lower returns due to a less robust market environment and the currency effect.

MR. ERLENDSON continued the presentation focussing on the PERS plan as a proxy for all of the plans. Actual asset allocation is very close to strategic targets and exemplifies tight risk control. MR. ERLENDSON discussed the comparison between the PERS asset allocation and Callan's database of public funds. PERS has a lower allocation to domestic equities, a

lower allocation to fixed income, and a higher allocation to non-U.S. equities, real assets, and alternatives, such as private equity and absolute return.

MR. ERLENDSON reported on the plans relative to peers and noted the plans performed at or above median for most of the time periods. He recommended reviewing the allocation exhibit in reference to peer group comparisons to see the drivers in return distributions. The PERS performance Sharpe ratio to the public fund database over the last five years is above average. Over the last year, there have essentially been no draw-downs. For three and five years, draw-downs have remained about the same, and over 10 years, the plan is close to average. Standard deviation over the last five and 10 years is average to below average, which is good.

MR. ERLENDSON showed tracking of performance over 25 years versus the asset allocation policy return and the actuarial target return. Assets were well-ahead of the actuarial return for the cumulative period until 2008, when the market crisis eroded 30% of the funds. Total fund returns continue to closely track the strategic allocation target. MR. ERLENDSON focused on PERS' domestic equity allocations compared to Callan's public pension fund database. PERS trailed slightly by one percent last year, but had much less risk than other managers.

MR. ERLENDSON informed approximately 60% of the large cap assets is passively managed. There are 12 active managers whose account sizes vary from \$94 million to over one billion dollars. This creates a potential impact of given managers. MR. ERLENDSON recommended analyzing the variation and size allocation among the managers to see if readjustment is necessary. He noted the small cap portfolio has 14 mandates with a much smaller allocation to passive management. MR. ERLENDSON suggested the same analysis be conducted in regards to range of account size for small cap managers.

MR. ERLENDSON described the high grade fixed income program structure for PERS, and performance over all time periods outperform the benchmark. The bulk of the assets are managed internally and are conservative, containing less interest rate risk and less credit risk. MR. ERLENDSON gave a detailed performance report of the PERS Defined Contribution (DC) Plan. The names Tier I, Tier II, and Tier III are slated to be changed to eliminate confusion. The 14 options include three balanced funds and 11 target date funds. MR. ERLENDSON believes this platform provides participants with a greater engine for wealth creation over longer periods of time at lower fees compared to peers. Growth in the DC plan has increased \$200 million in the last year. The TRS DC plan has similar capital allocations and has increased in the last year. The Deferred Comp Plan is net shrinking, with last year's contributions at \$380 million and withdrawals at \$400 million.

VICE-CHAIR JOHNSON recessed the meeting from 12:23 p.m. to 1:32 p.m.

13. ALTERNATIVE BETA

VICE-CHAIR JOHNSON invited MR. PODKAMINER to present on alternative beta. MR. PODKAMINER explained the industry has multiple names for the alternative beta subset of the broad multi-asset class strategy, including risk premia, strategic beta, exotic beta, or hedge fund replication. He continued the presentation with a big-picture analysis of four strategic

asset allocation groups consisting of various asset classes and strategies brought together for simplicity. They are economic growth, risk mitigation, real assets, and absolute return. MR. PODKAMINER gave examples of specific investments driving performance in each bucket. The absolute return sleeve does not consist of asset classes, but of particular strategies. The multi-asset class strategies are included in the absolute return sleeve. Multi-asset class strategies are different from hedge funds in that they are transparent, liquid, and relatively cheap. Multi-asset class strategies are different from long-only mandates because they span asset classes, are allowed to go short, use leverage and derivatives, and are a little more expensive.

MR. PODKAMINER further explained multi-asset class strategies provide exposure to the two different categories of risk factors. The macro factors of GDP growth, inflation, and real rates drive performance risk and return across asset classes. Style factors help explain risk and return within an asset class, such as value, momentum, quality, and carry. Alternative beta/risk premia strategies provide exposure to those types of style factors with both classic rules-based finance and behavioral explanations. The implementation of a long/short approach is inherent in the design of risk premia strategies in order to capture the difference. An important consideration to note is risk premia has very low correlations to traditional equity and fixed income assets already held in the portfolio. They have large capacity and run at high levels of intended volatility. There is no industry standard benchmark used and most managers will report on a couple of different benchmarks, including 60/40, T-bill plus a rate, or active indices of alternative risk premia. The general risk level is 10%, with a 7% return goal.

DR. JERROLD MITCHELL requested additional information on the degree of acceptance of risk premia in the institutional investment community and the flow rate of money into this practice. MR. PODKAMINER reported there is a resounding flow of funds into the strategies. Acceptance differs by geography, with Nordic plans, Canadian plans, and Northern European plans investing like this for quite some time, and American plans now starting to catch up.

VICE-CHAIR JOHNSON inquired as to the specifics of the rules-based process used. MR. PODKAMINER informed there is a high quantitative component that is not calculated with paper and pencil. There is much data manipulation. The art comes in the way the models are specified and factors are exploited. They typically begin by looking at broad asset classes or markets and not on the granular level.

MR. ERLENDSON asked two questions: 1) if it is reasonable to invest in these strategies as a standalone separate account or is a comingled fund a better option, and 2) how important is the custodian to the efficacy of implementing the strategies. MR. PODKAMINER explained both a standalone separate account and a collective trust fund are institutional quality type wrappers for the vehicles. The custodians of these types of instruments are top tier. There are no concerns because they know how to mark, monitor, and house these types of assets.

14. ALTERNATIVE BETA MANAGER SEARCH

MR. BOB MITCHELL informed Callan was directed to perform an alternative beta manager search process, which resulted in six finalists and ultimately the two presenters here today. MR. ERLENDSON stated the screening process was quite iterative, utilizing at least four representatives from the research group, as well as peer review at the end of the process to select organizations that were credible, committed to the strategy, and produced lower correlations to the other asset classes. He will provide a copy of the actual document used.

A. JP Morgan Systematic Alpha

MR. BOB MITCHELL introduced TODD EVANS, of JP Morgan Asset Management, who introduced GARRET NORMAN, Client Portfolio Manager, and MIKE CAMACHO, Global Head of Beta Strategies. MR. EVANS expressed appreciation for ARMB's longstanding client relationship with JP Morgan of 34 years. He noted today's presentation focuses on their fastest growing part of the business, the beta platform and systemic alpha.

MR. CAMACHO stated he has been with JP Morgan 26 years and joined the asset management team last year to build out the quantitative beta platform. Alternative beta investments have been a focus since 2008. Growth in this area is quite strong and is currently between \$7 billion and \$8 billion. The four key principles the investments provide are liquidity, transparency, capacity, and modest costs.

MR. NORMAN continued the presentation describing the systematic alpha strategy as the flagship of the factor-based investment platform. It is centered around providing access to core hedge fund return sources from a bottom-up perspective. Diversification is provided at many levels, including the number of return sources being accessed. The systematic alpha strategy also seeks to provide investors with diversification against their existing traditional exposures. It is designed to have zero equity beta and zero duration over the long-term. The recommendation for the ARMB portfolio is the 10% implementation, with a target range of 8% to 10% volatility over the long-term and excess returns over cash of 6% to 8%. MR. NORMAN provided a detailed example of the systematic framework.

After the representatives completed their presentation and exited, DR. JENNINGS inquired as to the amount of the management fees. MR. BOB MITCHELL informed the fees start at approximately 1% and decline, based on assets under management. VICE-CHAIR JOHNSON asked if the systematic alpha investment vehicle is comingled investments or a separate account. MR. BOB MITCHELL noted both options are available, and he believes the comingled version would be utilized.

B. Man Alternative Risk Premia

MR. BOB MITCHELL introduced CHRIS GORGONE, Managing Director of U.S. Institutional Sales for Man Group, who introduced KEITH HAYDON, CIO for Man Solutions Limited, and SHANTA PUCHTLER, CEO for Man Numeric. MR. GORGONE advised Man Group is a global asset management firm based in London and runs a variety of

absolute return and long-only investment strategies. Man Group has 12,000 employees in every major market and a significant U.S. presence. Numeric hedge fund is a systematic Boston-based equities business that has been in operation for 30 years with approximately \$25 billion assets under management. AHL hedge fund is a London-based quant equity firm, also with a 30-year history and approximately \$25 billion assets under management. Numeric and AHL are the core business divisions of Man's alternative risk premia program.

MR. HAYDON described the effect of the alternative risk premia program is to produce a return of 6% to 7% annually, independent of the environment in which it operates, with a low beta to equities over a cycle. The management fee is less than 1% and there are no performance fees. The structure is completely transparent and invests in long and short bonds, equities, currencies, and commodities. The portfolio utilizes the maximum amount of capital to finance trading activities and a minimum amount in treasury bills. The structure is scaleable, with up to \$10 billion in capacity, a Sharpe ratio of .8, and daily liquidity.

The risk premia program was established in 2015, but the contents go back as far as 1987. MR. HAYDON gave a detailed outline of how the risk premia program was created utilizing AHL's macro, top-down, technical signals, and combining that with Numeric's bottom-up, security valuation, and fundamental data information. MR. HAYDON provided information on risk allocation strategies and targets.

MR. PUCHTLER noted he grew up outside of Fairbanks and expressed how good it is to be back. He continued the in-depth presentation on the risk premia research capabilities, product line, and underlying process components. MR. PUCHTLER explained trading is an important part of harvesting and capturing the risk premia and total return available in the processes. The portfolio is quantitatively rebalanced daily or weekly and a significant amount of focus is directed to utilizing the sophisticated cost saving trade algorithms.

MR. HAYDON discussed the critical importance of managing downside risk in the portfolio. He reviewed the different risk management strategies built into the original design, including resizing positions and volatility scaling. The independent risk management team is technically competent and provides oversight to ensure consistency with the objectives.

MR. BRICE expressed appreciation for the presentation. He asked if there is a regional bias to the investments. MR. PUCHTLER advised the portfolio is long/short and is market neutral and regionally neutral. MR. HAYDON added the momentum portfolio is constructed using volatility scaling and risks of each asset class instrument are balanced and equal to each other.

DR. MITCHELL requested views on the argument that every successful investment strategy occurred as imitators and the strategy is soon arbitrated away. MR. HAYDON expressed the same concern and addressed the issue in two ways. Within the investment program itself there are filters that will not allow the program to acquire an anti-value tilt. He understands the flow of capital into alternative risk premia is because it is a cheap form of alternative return. He believes the central flow of funds, having a much bigger effect in the market, is the move to passive investing.

VICE-CHAIR JOHNSON recessed the meeting from 3:21 p.m. to 3:31 p.m.

15. LEGAL FRAMEWORK FOR TRUSTEES

MR. GOERING informed MR. BOB MITCHELL requested this presentation. The Board has statutory obligation to provide Trustees with fiduciary training on an annual basis. MR. GOERING stated most of the presentations from staff and others are within the category of fiduciary education. He believes the education conferences play a valuable role. MR. GOERING noted the subjects he will review today could each be addressed in a semester-long course. His objective is to perhaps shed new insights to the categories and provide inquiry notice to Board members, meaning further questions will have to be asked if specific situations arise because not enough information will have been given today.

MR. GOERING reviewed the prudent investor rule in Alaska Statute (AS) 37.10.071 (c) and AS 37.10.210 (a). He discussed the ability to prudently delegate fiduciary duties to investment managers. The vetting process needs to be thorough and provide clear instruction in investment management agreements and investment guidelines. Continued oversight needs to occur to ensure the mandate is being followed and expectations are being met.

COMMISSIONER FISHER requested additional information regarding the fiduciary duty in reference to addressing a substantial unfunded liability. MR. GOERING does not believe the fiduciary duty requires the Board to do the impossible of making up underfunding through short-term investment strategy. MR. GOERING explained the unfunded liability issue is resolved in a different statute focused on contribution rates for past service liability.

MR. BOB MITCHELL asked for guidance on the seemingly additional difficulty of the Board setting a return expectation, and how that is determined. MR. GOERING believes the Board is and has historically been responsible for operating within a framework of reality. The long-term view is stable and consistent in trying to match return expectations with future liabilities, based on actuarial calculations. MR. BOB MITCHELL expressed interest in further discussion of this ambiguous and challenging topic offline.

MR. GOERING continued the presentation with extensive discussion on the additional individual topics of open meetings, public record, role of counsel, privilege, confidentiality, Executive Branch Ethics Act, and securities law. He commented the environment is legally saturated and advised Board members to discuss any legal doubts with him or staff.

RECESS FOR THE DAY

VICE-CHAIR JOHNSON recessed the meeting at 4:03 p.m.

Friday, June 23, 2017

CALL BACK TO ORDER

CHAIR GAIL SCHUBERT reconvened the meeting at 9:02 a.m.

Trustees Johnson, Harbo, Erchinger, Fisher, Hoffbeck, Brice, and West were also present.

16. EMERGING MARKET VALUE STRATEGY

MR. BOB MITCHELL informed representatives from DePrince, Race & Zollo (DRZ) will give the presentation on the Emerging Market Value Strategy. DRZ has managed a microcap strategy for the ARM Board since 2011, and employs the same value approach within the Emerging Market Value Strategy. Staff has vetted this strategy and believes it would be additive to the existing emerging market equity mandate with a compelling management fee of 30 basis points. MR. BOB MITCHELL introduced KELLY CARBONE, Managing Partner, and MARC MILLER, Co-Portfolio Manager.

MS. CARBONE reported DRZ became an independent firm in 1995, and included in their mission was commitment to the institutional marketplace and commitment to the 32-year investment philosophy, methodology, and discipline embedded across all firm strategies. Each strategy has a dedicated team, and the Emerging Market Value Strategy has four analysts exclusively focused on emerging markets. The strategy invests in all capitalization, large, mid, and small. The growth of the assets within the strategy is capped conservatively at \$4 billion to maintain the nimbleness for the smaller cap opportunities. MS. CARBONE provided a detailed review of the strategy's buy/sell decision process. On average, the portfolio holds 65 to 75 stocks and maintains a 1% minimum dividend yield requirement for all stocks.

MR. MILLER continued the presentation discussing emerging markets' history and growth catalysts, including the inflection of earnings estimates and the continuation of historical inexpensive valuations. MR. MILLER described an extensive analysis of the currently held Indian stock Tata Global Beverages as an illustration of the investment philosophy. MR. MILLER discussed travel to other countries is an important component in understanding companies, their business models, and the changes occurring in the market. MR. MILLER reviewed the eclectic top 10 holdings in the portfolio, and discussed the particular dynamics and perspectives regarding the Taiwanese-based company Delta Electronics.

MR. MILLER shared an overview of the sector and country allocation. The portfolio has sector overweights in consumer discretionary, financials, and materials, and underweights in technology. The country overweight is in Latin America and the underweight is in Asia.

MR. ERLENDSON requested information on the break-even range at which the international team is paying for itself, given the firm's decision to shut down marketing of existing international products. MS. CARBONE informed after discussions with Callan and other consulting firms, DRZ decided to close international and global strategies as a commitment to

adding the most alpha to the emerging market space. She noted the U.S. strategies have been subsidizing work outside the U.S. in a joyful way because the growth engine for the firm is the emerging market space. Most of the funds from the international and global strategies, approximately \$200 million in verbal commitments, are moving to the emerging market strategy. MS. CARBONE informed the fee of 30 basis points was offered in order to reach critical mass. She noted the strategy will be moving to its published fee of 100 basis points in the next couple of months, given the verbal commitments to the strategy.

MR. SHAW inquired as to selection of using the standard EM benchmark rather than the EM Value benchmark in light of DRZ's definitively value-tilted process. MS. CARBONE stated the preference would be to utilize the EM Value Index as the benchmark and believes it will change to this over time. She noted that more importantly, the strategy does not manage to either index. It is decisively value.

17. CRESTLINE INVESTORS

MR. BOB MITCHELL advised Crestline manages several mandates for the ARM Board in the absolute return asset class, oriented toward credit and opportunistic. He advised the presentation will be an overview of the current investments, including Specialty Lending Fund 1, which focuses on making first lien secured investments to low market cap high quality companies. Crestline will then introduce Specialty Lending Fund 2. MR. BOB MITCHELL informed later in the meeting, staff will recommend investment in Specialty Lending Fund 2.

DOUG BRATTON, Founder and CIO Crestline Investors, introduced KEITH WILLIAMS, Partner, and JAMES DELAUNE, Head of Coinvestment Operations. Crestline is an institutional credit-focused alternative asset manager with about \$8.8 billion of assets under management, with a diversified institutional client base. Offices are in the U.S., London, and Tokyo, and are comprised of 66 investment professionals and 140 employees. Crestline has provided innovative alternative investment offerings for 19 years, and has been an asset manager for the ARM Board since 2004.

MR. BRATTON noted two of the current mandates were split between the credit opportunistic strategies of Blue Glacier Fund (BGF) Class B and Blue Glacier Fund Class C. The strategies are liquidating mandates, which are evergreen by design to keep consistent allocation in the portfolio. BGF Class B had an inception date of May 2013, and focused on niche strategies, private credit strategies, and hedge fund secondaries. The account is currently liquidating and returning capital to ARMB. The return expectation is 10% to 12% net, and the mark-to-market return is in line at about 11.9%.

MR. WILLIAMS provided the update on the active opportunistic mandate BGF Class C, inception in April 2015, which focuses primarily on underserved and capital constrained asset classes, and takes advantage of market inefficiencies and dislocations. The investment was \$350 million and \$178 million has been committed across 17 deals, underwritten with a cash yield of 8.83% and a structured return of 14.91%. The pipeline looks very robust at this point.

VICE-CHAIR JOHNSON requested comment regarding the degree of exposure in this strategy and having to utilize lawyers in order to recover and preserve money in the fund. MR. WILLIAMS explained 43% of the deals are senior secured loans and 25% are mezzanine or structured equity. The lawyers for all of those are paid for by the counter-party. Structure is vital in every situation and often can dictate the outcome and recovery in the deal. It is important to be at the top of the capital structure risk, either a first lien lender or owning the entire asset. The IRR on the portfolio was 7.6% net as of February 28. He discussed deal examples of the portfolio showing diversification and the utilization of unique deal-sourcing through bilateral relationships and personal networks.

MR. ERLENDSON asked if the owned assets are encumbered. MR. WILLIAMS informed the assets were free and clear at underwriting. Since then, two of them have performed well enough to place a minimum amount of leverage on them.

MR. WILLIAMS continued the update noting the BGF Class C PE Credit strategy provides portfolio financing to private equity firms that are later in life, and would need capital to either provide liquidity for their LPs and/or for growth opportunities. The key to the strategy is to take senior positions on diversified portfolios at loan-to-values of less than 30%. MR. WILLIAMS walked Board members through a recent successful situation within the portfolio.

MR. WILLIAMS reviewed Specialty Lending I IRR to NRV is about 11.03% as of March 31. There were no payment defaults as of March 31, and no credits moving to non-accrual status. One transaction is in process and 31 have been completed. Out of the \$625 million, \$570 million has been invested. The portfolio level based on the average EBITDA was about \$35.5 million, 4.4 times levered, 54% loan-to-value, and a 9.7% yield at a three-year takeout on a non-levered basis. The vast majority of the deal support acquisitions and/or growth. Industry diversification is high. MR. WILLIAMS discussed the new strategy Specialty Lending II is an exact extension of Specialty Lending I.

MR. BOB MITCHELL requested additional information on the structure of Specialty Lending II with respect to leverage and risk to investors. MR. WILLIAMS advised the two forms of leverage in many of the direct lending strategies are subscription lines, used to facilitate quicker capital calls, and permanent leverage, the advanced rate ascribed by the permanent leverage provider, which is Goldman Sachs in Specialty Lending I. Pricing of leverage typically ranges from LIBOR 250 to LIBOR 350. The strategies can endure up to 1.5 to two times leverage, but on average the strategy seeks about a 50/50 equity to debt ratio. MR. WILLIAMS informed the risk is only at the investment level to the equity ARMB has committed.

MR. SHAW requested explanation of how the strategy aligns the life of each investment with the life of the placed leverage. MR. WILLIAMS explained Specialty Lending I was structured to ensure the life of the leverage mirrored the life of the fund. Since Specialty Lending II is a direct extension of Specialty Lending I, it will have the exact same strategy, same sourcing channeling, and exact same team. The only difference will be the max position

size will increase from \$30 million to \$50 million in order to take advantage of additional opportunities.

MR. WILLIAMS continued the presentation providing a detailed executive summary of the Specialty Lending II strategy, including team continuity, industry focus, attributes, risk mitigation, sourcing, and position size. MR. SHAW inquired as to the effect to this strategy of bank competition if Dodd Frank provisions were eliminated. MR. WILLIAMS commented the banks were not heavily participating in this area of the market before the Dodd Frank provisions and so he does not foresee an automatic increase if provisions were eliminated. MR. WILLIAMS believes the market the banks would most likely enter is the larger deal sizes, which are priced at LIBOR 400-plus and would generate large fees.

CHAIR SCHUBERT recessed the meeting from 10:14 a.m. to 10:28 a.m.

3. TIR UPDATE

EXECUTIVE SESSION: 10:30 a.m.

MR. GOERING advised it is appropriate to go into executive session to discuss the TIR update under the Open Meetings Act, AS 44.62.310 (c) 1.

MR. BRICE moved to go into executive session to discuss the TIR update. MS. HARBO seconded the motion.

The motion passed unanimously.

CHAIR SCHUBERT called the meeting back to order at 3:12 p.m.

19. INVESTMENT ACTION

A. Callan Contract Option

MR. WEST moved to direct staff to exercise the first one-year contract option, extending the consulting contract with Callan until June 30, 2018. VICE-CHAIR JOHNSON seconded the motion.

COMMISSIONER FISHER commented he is in favor of the motion and requests additional effort be put forth to build a more complete and independent relationship between Callan and the Board.

DR. JENNINGS noted legislation specifically tasks the IAC with advising the Board on selection of performance consultants. DR. JENNINGS supports Callan, who is a top tier firm and is incentive-aligned. DR. JENNINGS informed MR. SHAW emailed his advice regarding each of the upcoming discussion items to share with the Board, and supports the Callan and Townsend recommendations.

A roll call vote was taken of MS. ERCHINGER, COMMISSIONER FISHER, VICE-CHAIR JOHNSON, MR. WEST, and CHAIR SCHUBERT, and the motion passed unanimously.

CHAIR SCHUBERT indicated the other Trustees were excused.

B. Townsend Contract Option

MR. WEST moved to direct staff to exercise the first one-year contract option, extending the contract with Townsend until June 30, 2018. VICE-CHAIR JOHNSON seconded the motion.

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

C. Crestline Investors Mandate

MR. WEST moved to direct staff to negotiate with Crestline Investors a commitment of up to \$60 million to Crestline Specialty Lending Fund II, LP. MS. ERCHINGER seconded the motion.

MR. BOB MITCHELL explained this recommendation is to effectively maintain the asset size of the existing strategy to this mandate. Specialty Lending Fund I is at the end of its investment period and as redemptions are made, investments are returned. The main purpose is to have investment in the new fund as investments are returned. The investment amount of \$60 million was specifically chosen because of the asset levels held within the current Crestline mandates. Staff is cognizant and concerned with concentrating large amounts of investments in illiquid strategies with one firm.

VICE-CHAIR JOHNSON asked if the approval is subject to favorable negotiations on terms and conditions. MR. BOB MITCHELL agreed.

DR. JENNINGS commented he has concerns on the broad level about over-saturation and over-commitment to the private debt markets. He believes this space seems differentiated and durable. He noted good experience with Crestline and expressed support for the motion. DR. JENNINGS informed MR. SHAW emailed his support, noting the firm is high-quality, with a solid and consistent applied investment approach.

CHAIR SCHUBERT informed MRS. HARBO indicated her support.

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

D. DRZ Emerging Market Mandate

MR. WEST moved to direct staff to contract with DePrince, Race & Zollo, Inc. to manage an initial allocation of up to \$200 million in an emerging markets equity strategy subject to successful contract negotiations. MS. ERCHINGER seconded the motion.

COMMISSIONER FISHER requested comments from MR. ERLENDSON regarding Callan's conversations with DRZ about their success, and comments from MR. BOB MITCHELL regarding the \$200 million investment amount compared to the overall position. MR. ERLENDSON commented DRZ indicated recently they would no longer raise money for their other international strategies. The track records were somewhat midland and some of the clients had started redeeming because they do not see an ongoing commitment to the strategies. MR. ERLENDSON stated it is important to keep the talented staff motivated, partly by receiving earnings off of what they manage. That was the reason for the question about the break-even rate. He noted MS. CARBONE indicated the firm was committed to the strategy and Callan absolutely believes that is the case, but wanted to put it on the record since DRZ has shut down other products. MR. ERLENDSON believes asset values at \$500 million, as projected, will be profitable.

MS. ERCHINGER requested comment regarding unsettling remarks by MS. CARBONE, who noted as a result of Callan and other investment advisors expressing concern about DRZ international investments, DRZ made a decision to wind down their international. MS. ERCHINGER asked if Callan would be recommending this strategy if the fees were not at the significantly lower offering. MR. ERLENDSON answered yes, the research staff at Callan has reviewed this strategy and are advocates.

DR. JENNINGS reported MR. SHAW emailed his comments and supports the motion, suggesting this is a differentiated approach to emerging markets that will complement more traditional growth-oriented emerging market strategies. DR. JENNINGS stated his opinion that there is seemingly good value in emerging markets, especially within a value strategy. He believes saving 70 basis points off the typical fee is compelling. DR. JENNINGS noted the \$200 million investment is aggressive at 40% of the portfolio. He discussed the manager risk relative to ARMB's assets under management is small, and he is comfortable with the allocation level.

DR. JERROLD MITCHELL expressed support for the recommendation and believes emerging markets is a good place for long-term assets. He noted a slight disconnect between the stated strategy of value and smaller cap and the portfolio's largest holdings. He believes DRZ is committed to this strategy and that it is a growth platform for the company.

VICE-CHAIR JOHNSON indicated he would vote no on the motion, but stated he would accept a modification for a \$100 million allocation.

A roll call vote was taken, and the motion passed, with VICE-CHAIR JOHNSON voting against.

E. Alternative Beta Manager Selection

MR. WEST moved to direct staff to hire JP Morgan Asset Management and Man Group to collectively manage an initial allocation of up to \$400 million subject to completion of due diligence and successful contract negotiation. COMMISSIONER FISHER seconded the motion.

MR. WEST requested IAC members and MR. BOB MITCHELL to go on record as supporting the recommendation and indicating their due diligence. He does not believe the Board has enough empirical evidence to make the decision because the asset class does not have an industry-defined benchmark and has only a three-year track record. DR. JENNINGS reported MR. SHAW's comments supporting both alternative beta firms and noted this is a newer space, which will offer the ARM Board opportunity to earn differentiated returns not available in more traditional equity and fixed income spaces.

DR. JENNINGS informed there is economic evidence to support these strategies. He expressed issue with the 1% fee perhaps being expensive and believes successful fee negotiation is critical. DR. JENNINGS believes the IAC's due diligence is similar to the Board's due diligence in listening to the staff and the consultant's report. He is supportive of the motion.

DR. JERROLD MITCHELL expressed support for the recommendation and commitments to both firms.

MR. BOB MITCHELL commented he and MR. HANNA participated in a due diligence trip to visit all six finalists, including the two recommended today. Confidence in the firms is driven by multiple levels of risk management and the institutional quality of the organizations. He believes the fee advantage is significant because is it on the order of 1/3 of the all-in cost for traditional hedge fund strategies.

VICE-CHAIR JOHNSON found the presentation to be dense and requested an additional thumbnail review. MR. ERLENDSON informed much time has been focused on researching and evaluating these kinds of strategies. He noted it is challenging to understand the space because there is not a lot of history, but there is significant amount of academic research. Callan is 100% behind the research supporting the implementation. MR. ERLENDSON stated Callan will work with staff to ensure the standard ways of evaluating, in terms of peer group, benchmarks, and other protocols are readily accessible to the Board.

MR. BOB MITCHELL characterized the strategies as attempts to access return streams that traditional hedge funds access. This is done in a systematic way that is rules-based, transparent, and at a lower implementation cost. He noted that hedge fund strategies have effectively captured a significant portion of their total return from risk factors, and alternative beta attempts to access those risk factors at a lower cost.

MS. ERCHINGER expressed appreciation for the extra explanation.

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

CHAIR SCHUBERT noted for the record MRS. HARBO indicated her support for the motion.

UNFINISHED BUSINESS

None

NEW BUSINESS

None

OTHER MATTERS TO PROPERLY COME BEFORE THE BOARD

CHAIR SCHUBERT informed she has nothing to report under the Chair's report.

PUBLIC/MEMBER COMMENTS

None

INVESTMENT ADVISORY COUNCIL COMMENTS

DR. JENNINGS provided two social announcements; 1) MR. SHAW is newly appointed as the CIO of the San Francisco's Treasurer's Office, and 2) MR. ERLENDSON has reached a milestone birthday.

TRUSTEE COMMENTS

VICE-CHAIR JOHNSON expressed appreciation to MR. BOB MITCHELL for his efforts and for extending explanation when requested.

MS. ERCHINGER reminded all members the Actuarial Committee will meet on October 4th to discuss healthcare assumptions. Recommendations regarding economic assumptions will be brought before the Board on December 6th. Demographic assumptions will be discussed on March 28th.

FUTURE AGENDA ITEMS

None

ADJOURNMENT

There being no objection and no further business to come before the Board, the meeting was adjourned at 3:47 p.m. on June 23, 2017, on a motion made by MR. WEST and seconded by MS. ERCHINGER.

Chair of the Board of Trustees
Alaska Retirement Management Board

ATTEST:

Corporate Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Division of Retirement & Benefits Report October 5, 2017

Retirement System Membership Activity as of June 30, 2017 –

Attached for your information are the membership statistics for the quarters ending

- September 30, 2016
- December 31, 2016
- March 31, 2017
- June 30, 2017

For the June 30 timeframe, TRS typically will reflect a decrease in active members due to school recessing for the summer.

PERS DB population continues to decrease, but DC membership rose, though not enough to offset the decrease and reflects a net decrease in PERS active member counts. Some of the decrease can be attributed to school recessing.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Retirement System Membership Activity
as of June 30, 2017

ACTION: _____

DATE: October 5, 2017

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 June 30, 2017.

MEMBERSHIP STATISTICS AS OF SEPTEMBER 30, 2016

	PERS						TRS					JRS	NGNMRS	SBS	DCP
	DB				DC	SYSTEM TOTAL	DB			DC	SYSTEM TOTAL				
	Tier I	Tier II	Tier III	Total	Tier IV		Tier I	Tier II	Total	Tier III					
Active Members	1,728	4,308	9,981	16,017	18,838	34,855	544	4,696	5,240	5,072	10,312	75	n/a	21,385	6,296
Terminated Members															
Entitled to Future Benefits	531	2,396	2,997	5,924	684	6,608	56	700	756	383	1,139	3	n/a	22,096	4,741
Other Terminated Members	1,212	2,311	8,179	11,702	9,695	21,397	304	1,746	2,050	1,854	3,904	-	n/a	n/a	n/a
Total Terminated Members	1,743	4,707	11,176	17,626	10,379	28,005	360	2,446	2,806	2,237	5,043	3	n/a	22,096	4,741
Retirees & Beneficiaries	23,819	6,818	2,932	33,569	11	33,580	10,696	2,035	12,731	2	12,731	111	687	n/a	n/a
Managed Accounts	n/a	n/a	n/a	n/a	5,646	5,646	n/a	n/a	n/a	1,558	1,558	n/a	n/a	1,174	1,313
Retirements - 1st QTR FY17	168	155	119	442	-	442	126	205	331	2	331	1	17	n/a	n/a
Full Disbursements - 1st QTR FY17	16	27	106	149	523	672	12	37	49	103	152	-	n/a	588	151
Partial Disbursements - 1st QTR FY17	n/a	n/a	n/a	n/a	70	70	n/a	n/a	n/a	18	18	n/a	n/a	1,099	838

MEMBERSHIP STATISTICS AS OF DECEMBER 31, 2016

	PERS						TRS					JRS	NGNMRS	SBS	DCP
	DB				DC	SYSTEM	DB			DC	SYSTEM				
	Tier I	Tier II	Tier III	Total	Tier IV	TOTAL	Tier I	Tier II	Total	Tier III	TOTAL				
Active Members	1,686	4,240	9,900	15,826	19,377	35,203	545	4,704	5,249	5,304	10,553	76	n/a	20,188	6,096
Terminated Members															
Entitled to Future Benefits	495	2,355	2,985	5,835	691	6,526	53	681	734	360	1,094	3	n/a	24,365	4,965
Other Terminated Members	1,186	2,281	8,101	11,568	9,774	21,342	299	1,717	2,016	1,806	3,822	-	n/a	n/a	n/a
Total Terminated Members	1,681	4,636	11,086	17,403	10,465	27,868	352	2,398	2,750	2,166	4,916	3	n/a	24,365	4,965
Retirees & Beneficiaries	23,788	6,919	3,026	33,733	11	33,744	10,673	2,057	12,730	2	12,730	112	689	n/a	n/a
Managed Accounts	n/a	n/a	n/a	n/a	5,606	5,606	n/a	n/a	n/a	1,550	1,550	n/a	n/a	1,181	1,322
Retirements - 2nd QTR FY17	96	130	98	324	-	324	6	23	29	-	29	1	12	n/a	n/a
Full Disbursements - 2nd QTR FY17	36	37	118	191	422	613	18	26	44	69	113	-	n/a	542	151
Partial Disbursements - 2nd QTR FY17	n/a	n/a	n/a	n/a	64	64	n/a	n/a	n/a	11	11	n/a	n/a	954	562

MEMBERSHIP STATISTICS AS OF MARCH 31, 2017

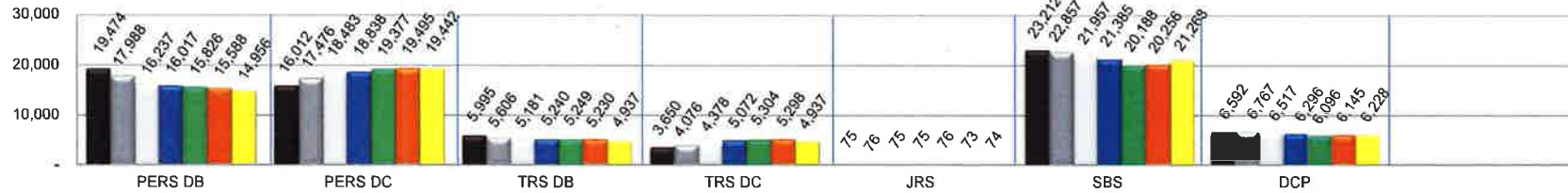
	PERS						TRS					JRS	NGNMRS	SBS	DCP
	DB				DC	SYSTEM	DB			DC	SYSTEM				
	Tier I	Tier II	Tier III	Total	Tier IV	TOTAL	Tier I	Tier II	Total	Tier III	TOTAL				
Active Members	1,635	4,161	9,792	15,588	19,495	35,083	538	4,692	5,230	5,298	10,528	73	n/a	20,256	6,145
Terminated Members															
Entitled to Future Benefits	470	2,302	2,984	5,756	730	6,486	52	681	733	354	1,087	3	n/a	23,781	4,897
Other Terminated Members	1,178	2,257	8,059	11,494	9,969	21,463	297	1,698	1,995	1,797	3,792	-	n/a	n/a	n/a
Total Terminated Members	1,648	4,559	11,043	17,250	10,699	27,949	349	2,379	2,728	2,151	4,879	3	n/a	23,781	4,897
Retirees & Beneficiaries	23,759	7,042	3,118	33,919	11	33,930	10,656	2,067	12,723	4	12,723	116	693	n/a	n/a
Managed Accounts	n/a	n/a	n/a	n/a	5,571	5,571	n/a	n/a	n/a	1,537	1,537	n/a	n/a	1,218	1,369
Retirements - 3rd QTR FY17	86	128	93	307	-	307	7	16	23	2	23	6	40	n/a	n/a
Full Disbursements - 3rd QTR FY17	14	49	96	159	440	599	21	43	64	84	148	-	n/a	588	181
Partial Disbursements - 3rd QTR FY17	n/a	n/a	n/a	n/a	61	61	n/a	n/a	n/a	18	18	n/a	n/a	898	542

MEMBERSHIP STATISTICS AS OF JUNE 30, 2017

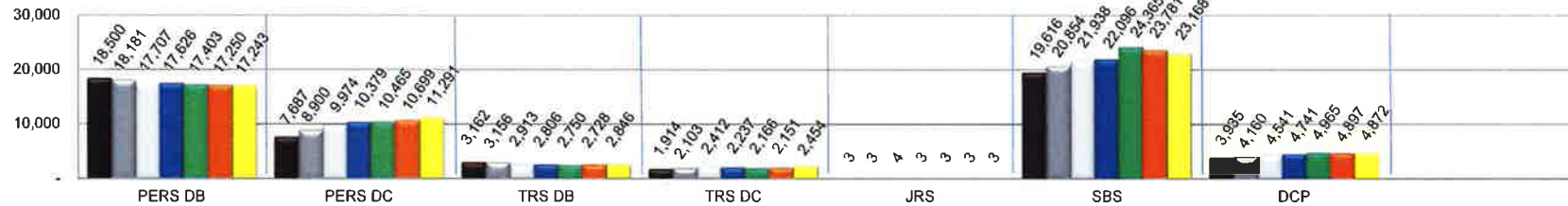
	PERS						TRS					JRS	NGNMRS	SBS	DCP	
	DB				DC	SYSTEM	DB			DC	SYSTEM					
	Tier I	Tier II	Tier III	Total	Tier IV		Tier I	Tier II	Total	Tier III						TOTAL
Active Members	1,471	3,963	9,522	14,956	19,442	34,398	460	4,477	4,937	4,937	9,874	74	n/a	21,268	6,228	
Terminated Members																
Entitled to Future Benefits	472	2,288	3,039	5,799	825	6,624	82	775	857	443	1,300	3	n/a	23,168	4,872	
Other Terminated Members	1,161	2,246	8,037	11,444	10,466	21,910	292	1,697	1,989	2,011	4,000	-	n/a	n/a	n/a	
Total Terminated Members	1,633	4,534	11,076	17,243	11,291	28,534	374	2,472	2,846	2,454	5,300	3	n/a	23,168	4,872	
Retirees & Beneficiaries	23,818	7,209	3,283	34,310	11	34,321	10,622	2,079	12,701	4	12,701	116	689	n/a	n/a	
Managed Accounts	n/a	n/a	n/a	n/a	5,541	5,541	n/a	n/a	n/a	1,533	1,533	n/a	n/a	1,270	1,407	
Retirements - 4th QTR FY17	145	173	158	476	-	476	5	13	18	-	18	-	22	n/a	n/a	
Full Disbursements - 4th QTR FY17	28	47	96	171	404	575	24	18	42	47	89	-	n/a	521	173	
Partial Disbursements - 4th QTR FY17	n/a	n/a	n/a	n/a	76	76	n/a	n/a	n/a	12	12	n/a	n/a	892	512	

Alaska Division of Retirement and Benefits
FY 2017 QUARTERLY REPORT OF MEMBERSHIP STATISTICS
 Annual & Quarterly Trends as of June 30, 2017

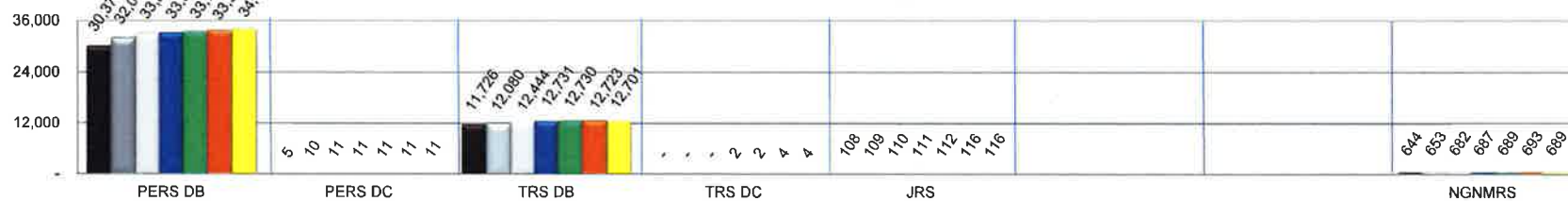
Active Members



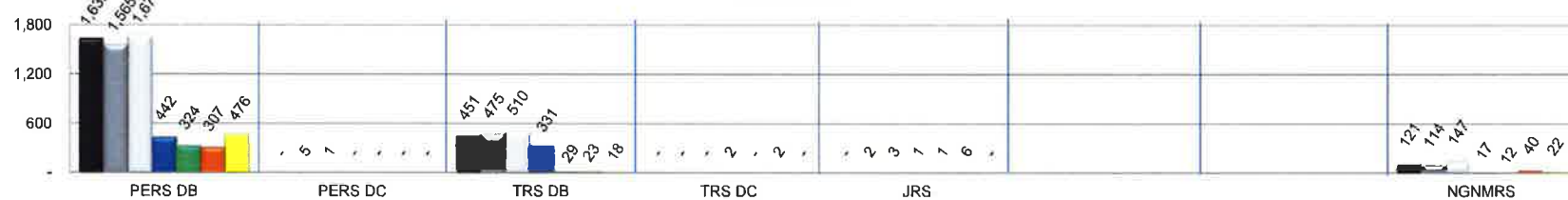
Terminated Members



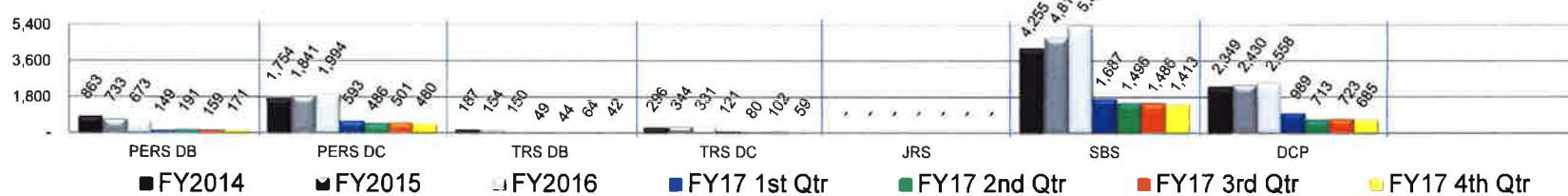
Retirees & Beneficiaries



Retirements



Disbursements



■ FY2014 ■ FY2015 ■ FY2016 ■ FY17 1st Qtr ■ FY17 2nd Qtr ■ FY17 3rd Qtr ■ FY17 4th Qtr

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 Great West.

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

October 5, 2017

Summary of Monthly Billings / Conduent HR Services -

Attached for your information are the quarterly payments related to actuarial services provided by our consulting actuary, Conduent Human Resource Services (Conduent), formerly Buck Consultants, a Xerox Company.

Items listed represent regular and non-regular costs incurred under our current contract with Conduent.

The listed costs are charged to the system or plan noted on the column headings.

Summary through the Twelve Months ended June 30, 2017 (last page of report)

Cost increases from prior year totals associated with JRS and NGNMRS represent the bi-annual actuarial valuation process as full actuarial valuation reports are prepared on even years, and roll-forward valuation letters (updates) are prepared on the odd years.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Summary of Monthly Billings -
Conduent Human Resource Services
DATE: October 5, 2017

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 & Benefits provide quarterly summary updates to review billings and services provided for actuarial valuations and other systems’ request.

STATUS:

Attached are the summary totals for the quarter and twelve months ended June 30, 2017.

Note: Beginning January 1, 2017, Buck Consultants’ name changed to Conduent Human Resource Services.

Conduent Human Resource Services
Billing Summary
For the Three Months Ended September 30, 2016

	<u>PERS</u>	<u>TRS</u>	<u>JRS</u>	<u>NGNMRS</u>	<u>EPORS</u>	<u>AHF</u>	<u>RHF</u>	<u>SBS</u>	<u>DCP</u>	<u>TOTAL</u>
Actuarial valuations	\$ 25,531	24,940	7,172	175	2,593	-	6,757	-	-	\$ 67,168
ARMB presentations and meeting attendance	7,607	3,026	32	166	-	-	-	-	-	10,831
GASB 68 work for PERS and TRS	3,408	1,509	-	-	-	-	-	-	-	4,917
GASB 67 valuation reports as of 6/30/16 (PERS, TRS, JRS, and NGNMRS)	3,774	1,687	35	194	-	-	-	-	-	5,690
Retiree medical data review	36,092	13,505	115	-	-	-	145	-	-	49,857
Misc emails and phone calls	532	242	1	-	-	-	2	-	-	777
TOTAL	\$ 76,944	44,909	7,355	535	2,593	-	6,904	-	-	\$ 139,240
For the Three Months Ended September 30, 2015	\$ 208,659	128,615	15,058	12,377	280	-	-	-	-	\$ 364,989

For the Three Months Ended December 31, 2016

	<u>PERS</u>	<u>TRS</u>	<u>JRS</u>	<u>NGNMRS</u>	<u>EPORS</u>	<u>AHF</u>	<u>RHF</u>	<u>SBS</u>	<u>DCP</u>	<u>TOTAL</u>
Actuarial Valuations	\$ 82,934	46,885	11,508	1,843	3,784	-	-	-	-	\$ 146,954
ARMB presentations and meeting attendance	1,948	716	14	3	-	-	-	-	-	2,681
GASB 68 work for PERS and TRS	20,189	8,937	-	-	-	-	-	-	-	29,126
GASB 67 valuation reports as of 6/30/16 (PERS, TRS, JRS, and NGNMRS)	10,378	4,595	-	-	-	-	-	-	-	14,973
Retiree medical data review	13,973	5,228	45	-	-	-	57	-	-	19,303
JRS alternative contribution pattern	-	-	2,220	-	-	-	-	-	-	2,220
NGNMRS conversion factors	-	-	-	1,869	-	-	-	-	-	1,869
KPMG audit out-of-scope investment return assumption review	4,781	2,117	-	-	-	-	-	-	-	6,898
GRS - regular discussions and past audit cleanup	5,409	2,177	31	162	-	-	2	-	-	7,781
Additional valuation data to account for rehires	1,470	603	-	-	-	-	-	-	-	2,073
Misc emails and phone calls	1,096	586	108	41	39	-	-	-	-	1,870
TOTAL	\$ 142,178	71,844	13,926	3,918	3,823	-	59	-	-	\$ 235,748
For the Three Months Ended December 31, 2015	\$ 132,211	63,932	9,418	8,554	-	-	-	-	-	\$ 214,115

For the Three Months Ended March 31, 2017

	<u>PERS</u>	<u>TRS</u>	<u>JRS</u>	<u>NGNMRS</u>	<u>EPORS</u>	<u>AHF</u>	<u>RHF</u>	<u>SBS</u>	<u>DCP</u>	<u>TOTAL</u>
Actuarial Valuations	\$ 93,887	53,680	22,739	15,465	4,251	-	-	-	-	\$ 190,022
ARMB presentations and meeting attendance	35,199	13,856	232	1,162	-	-	16	-	-	50,465
GASB 68 work for PERS and TRS	8,355	3,700	-	-	-	-	-	-	-	12,055
Retiree medical data review	2,356	881	8	-	-	-	-	-	-	3,245
Additional data preparation work for NGNMRS	-	-	-	26,599	-	-	-	-	-	26,599
Replacement rate support	2,740	912	-	-	-	-	-	-	-	3,652
Misc emails and phone calls	1,439	539	665	807	130	-	1	-	-	3,581
TOTAL	\$ 143,976	73,568	23,644	44,033	4,381	-	17	-	-	\$ 289,619
For the Three Months Ended March 31, 2016	\$ 96,919	57,673	7	31	-	-	1	-	-	\$ 154,631

For the Three Months Ended June 30, 2017

	PERS	TRS	JRS	NGNMRS	EPORS	AHF	RHF	SBS	DCP	TOTAL
Actuarial Valuations	\$ 8,236	6,714	4,582	2,649	1,108	-	-	-	-	\$ 23,289
ARMB presentations and meeting attendance	50,180	19,727	314	1,506	-	-	-	-	-	71,727
GASB 68 work for PERS and TRS	7,478	3,311	-	-	-	-	-	-	-	10,789
GASB 67 work for PERS, TRS, JRS, and NGNMRS	93	41	-	-	-	-	-	-	-	134
Additional data preparation work for NGNMRS	-	-	-	336	-	-	-	-	-	336
Projects under different amortization methods	9,497	3,894	-	-	-	-	-	-	-	13,391
Updated PERS and TRS projections to reflect YTD asset returns	6,195	2,540	-	-	-	-	-	-	-	8,735
RPEA vs Fisher	-	-	-	-	-	-	4,392	-	-	4,392
Misc emails and phone calls	6,914	3,009	1,614	1,402	518	-	-	-	-	13,457
TOTAL	\$ 88,593	39,236	6,510	5,893	1,626	-	4,392	-	-	\$ 146,250
For the Three Months Ended June 30, 2016	\$ 138,875	65,763	426	1,587	-	-	103	-	-	\$ 206,754

Summary through the Twelve Months Ended June 30, 2017

	PERS	TRS	JRS	NGNMRS	EPORS	AHF	RHF	SBS	DCP	TOTAL
Actuarial Valuations	\$ 210,588	132,219	46,001	20,132	11,736	-	6,757	-	-	\$ 427,433
ARMB presentations and meeting attendance	94,934	37,325	592	2,837	-	-	16	-	-	135,704
GASB 68 work for PERS and TRS	39,430	17,457	-	-	-	-	-	-	-	56,887
GASB 67 work for PERS, JRS, JRS, and NGNMRS	93	41	-	-	-	-	-	-	-	134
GASB 67 valuation reports as of 6/30/16 (PERS, TRS, JRS, and NGNMRS)	14,152	6,282	35	194	-	-	-	-	-	20,663
Retiree medical data review	52,421	19,614	168	-	-	-	202	-	-	72,405
JRS alternative contribution pattern	-	-	2,220	-	-	-	-	-	-	2,220
NGNMRS conversion factors	-	-	-	1,869	-	-	-	-	-	1,869
KPMG audit out-of-scope investment return assumption review	4,781	2,117	-	-	-	-	-	-	-	6,898
GRS - regular discussions and past audit cleanup	5,409	2,177	31	162	-	-	2	-	-	7,781
Additional valuation data to account for rehires	1,470	603	-	-	-	-	-	-	-	2,073
Additional data preparation work for NGNMRS	-	-	-	26,935	-	-	-	-	-	26,935
Replacement rate support	2,740	912	-	-	-	-	-	-	-	3,652
Projects under different amortization methods	9,497	3,894	-	-	-	-	-	-	-	13,391
Updated PERS and TRS projections to reflect YTD asset returns	6,195	2,540	-	-	-	-	-	-	-	8,735
RPEA vs Fisher	-	-	-	-	-	-	4,392	-	-	4,392
Misc emails and phone calls	9,981	4,376	2,388	2,250	687	-	3	-	-	19,685
TOTAL	\$ 451,691	229,557	51,435	54,379	12,423	-	11,372	-	-	\$ 810,857
Summary through the Twelve Months Ended June 30, 2016	\$ 576,664	315,983	24,909	22,549	280	-	104	-	-	\$ 940,489

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Division of Retirement & Benefits (DRB) Report - IT Modernization October 5, 2017

The report offers a status update on the DRB's IT modernization project and provides qualitative analysis of various options and industry trends.

Current Status: DRB completed initial high-level requirements for the enterprise solution by each business sections and working with the procurement office (Shared Services of Alaska – SSoA) to invite vendor community through the Request For Information (RFI) process for the following reasons:

- Identify companies that specialize in agile based enterprise-wide system development.
- Gain an understanding of various options, such as on-premises or cloud based solutions.
- Gain an understanding of the potential project cost for use in budgeting.
- Gain an understanding of the estimated duration required to complete the system development project.

Options: In the survey of benefit sectors and other state agencies, several deployment options are observed:

1. On-Premises: In-house developed, hosted and managed
2. Commercial-off-the-shelf (COTS) hosted onsite
3. Software-as-a-Service (SaaS)
4. Hybrid – Customized COTS

Each deployment model has benefits and drawbacks.

- In-house developed systems offer a high degree of customization, but usually have more complexity or higher cost of maintenance and operations.
- Both COTS and SaaS deployments reduce IT support costs by outsourcing software development and maintenance to the vendor. Both are written for a broad market, but offer fewer configuration options to allow the customer to customize the solution to better fit existing (or desired) business processes. The primary differences between COTS and SaaS are the licensing approach and the servers where systems are hosted.

The table below illustrates the key difference between different deployment options:

	<u>In-House (Custom)</u>	<u>COTS</u>	<u>SaaS</u>	<u>Hybrid - Customized COTS</u>
Foundation	Custom built to meet business requirements	Generic application systems that supports a general business types (such as dental practice or auto insurance)	Generic application systems that supports a general business types (such as dental practice or auto insurance)	Generic application systems that is customized specific to the business requirements
Ownership	Client owned: Developed based on the detailed functional and/or cross functional requirements	Solutions can be purchased, leased, or licensed	Licensed through a subscription model, granting a temporary right to use the solution until client subscribes	Solutions can be purchased, licensed
Management and support	Managed by client's internal staff or vendor hired by the client	Client or vendor depending upon the ownership	Vendors: applications, runtime, data, middleware, OSes, virtualization, servers, storage and networking	Client or vendor depending upon the ownership
Installation	On-premises	Can be installed on servers specified by customers, including in their own data centers	Centrally hosted on “the cloud” either by vendors or by an application service provider	Can be installed on servers specified by customers, including in their own data centers
Development	Developed based on the specific business function requirements	Developed based on the generic business functions	Developed based on the generic business functions	Developed based on the specific business function requirements
Time to Deployment	Longer development cycles result in longer deployment time	Faster deployment due to standard development	Faster deployment due to standard development	Faster than in-house solutions but longer due to customization and user acceptance testing
Overall Cost-Effectiveness	High upfront hardware and software cost, but lowest total cost of ownership over a period	Low upfront cost, but higher or equal total cost of ownership over a period	Low upfront cost but higher or equal total cost of ownership over a period	High upfront cost but lower total cost of ownership over a period
Customization	On-going cost for hardware and software upgrades (maintenance and licensing)	Less opportunity for any customization and upgrades	Introduces risk for future upgrades; raises the cost of maintenance and support	Can be continued to be supported by the vendor or with vendor's collaboration

Personalization	Highly flexible	Low and Limited flexibilities; any specific changes with respect to business will be hard to accommodate or will be very expensive	Low and Limited flexibilities; any specific changes with respect to business will be hard to accommodate or will be very expensive	Fairly Flexible
Integration	Highly flexible	Limited flexibility based on the platform	Inclusive of some standard integrations tools, such as bank interface; any unique protocols connecting to different platforms/systems will be hard to implement or will be very expensive	Fairly Flexible
Data security	Data secured within the premises (behind firewall). Organizations can customize and build systems to meet their specific security requirements.	Depending upon in-house data center or cloud solutions	Higher level of security than the customer's enterprise would provide. Redundant instances in very secure data centers in multiple geographies.	Depending upon in-house data center or cloud solutions
Effect on Application when doing Hardware Upgrades	Static system (manual upgrades); often stale and fewer versions behind due to budget constraints and other priorities	Fairly easy to accommodate as application layers are not impacted by the platform upgrades	Vendor provides all the hardware and upgrade services and performs much of the work to get the software working for client.	Fairly easy to accommodate as application layers are not impacted by the platform upgrades

DRB continues to weigh all options based on the specific needs of various business requirements, and how each option fits most efficiently based on the following key factors:

- Accommodating core business functions for DB/DC and health plans for Active and Retirees (most important)
- Compatibility and flexibility with the State's other systems and talents to support the solution for the long-term
- Total Cost of Ownership (TCO): Longevity of the solutions and cost-effectiveness over the life of system

Questions?

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Delegation of Authority

Resolution 2017-05

WHEREAS AS 37.10.210 established the Alaska Retirement Management Board (Board) to provide prudent and productive management and investment of trusts or other State funds; and

WHEREAS the Board shall establish investment policies for the funds for which it is responsible; and

WHEREAS the Board shall select and retain certain external and internal money managers; and

WHEREAS the Board may contract certain services to carry out its powers and duties; and

WHEREAS AS 37.10.260(a) establishes that the Department of Revenue shall provide staff for the Board; and

WHEREAS AS 37.10.260(b) authorizes the Board of Trustees to be responsible for designating a trustee or an officer or an employee of the Department of Revenue to sign on behalf of the Board any deed, contract, or other document that must be executed by or on behalf of the Board;

NOW THEREFORE BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, as follows: (1) To expedite business between meetings, either the Chairman or the Secretary of the Board is authorized to sign all deeds, contracts or other documents. All documents so signed shall be effective immediately but shall be presented to the Board at the succeeding meeting for Board information. (2) The Board will delegate to the Chief Investment Officer, or his designee, certain powers noted in the attachment entitled "Delegation Investment Authority." (3) This resolution repeals and replaces Resolution 2017-01.

DATED at Juneau, Alaska this _____ day of October, 2017.

Chair

ATTEST:

Secretary

Delegation of Investment Authority

Pursuant to Resolution 2017-05, the Chief Investment Officer (CIO) of the Department of Revenue is hereby authorized to commit, bind, and obligate the State of Alaska for transactions for all funds under the Alaska Retirement Management Board's management, consistent with actions and directions from the Board. The CIO is not authorized to significantly alter credit quality or duration parameters of any portfolios without prior approval from the Board or its designee.

The CIO is authorized to open an account or accounts with one or more firms or financial institutions for the purpose of engaging in transactions to purchase, sell, assign, or transfer the assets, or to otherwise enter into agreements, contracts, commitments or similar arrangements, including for cash or forward settlement or futures or options contracts relating to the investment of the above funds.

The CIO is authorized to execute those transactions, and in connection therewith to deliver securities and monies, to sign and deliver agreements, contracts, commitments and confirmations and other necessary, desirable or customary documents. Other parties to the transactions may rely and act upon any verbal or written orders and instructions from him in connection with such accounts and transactions.

The CIO is further authorized to delegate the above responsibilities to other individuals. The Board shall be notified at the next meeting as to which individuals have received such delegation.

With respect to security transactions for all funds, including funds other than fixed income portfolio, the CIO is authorized to adjust asset allocation within Board approved parameters. All asset allocation adjustments, with a complete explanation for the action, must be reported to the Board at the next meeting. The CIO will also be required to submit quarterly reports to the Board discussing market conditions, performance, and portfolio conditions.

The CIO is authorized to contract with current ARMB investment managers in good standing in amounts up to one percent of total ARMB defined benefit assets per single investment. This authority includes investment contracts, limited partnerships, commingled funds and joint venture investment relationships with current investment managers in all asset classes, in a manner consistent with the Board approved Investment Guidelines.

The CIO is authorized to approve investment manager requests to name ARMB in publications or written materials.

In the CIO's absence, responsibilities may be delegated to a senior investment officer, who will assume the CIO's delegated investment authority.

State of Alaska

ALASKA RETIREMENT MANAGEMENT BOARD

Addendum to Delegation of Authority Resolution 2017-05

Alaska Retirement Management Board Resolution 2017-05 delegates certain responsibilities to the Chief Investment Officer (CIO). The Chief Investment Officer is Bob G. Mitchell and his specimen signature follows.

Chief Investment Officer:

Bob G. Mitchell

Effective the ____ day of October, 2017

Gail Schubert, Chair, Alaska Retirement Management Board

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: FY2019 ARMB Budget Proposal

ACTION: X

DATE: October 5, 2017

INFORMATION:

BACKGROUND:

Pursuant to its charter, the Alaska Retirement Management Board (ARMB) Budget Committee meets annually to review the actual expenditures in the immediately preceding fiscal year budget; consider and review the current fiscal year budget as approved by the legislature; and develop a proposed budget for the next fiscal year and make appropriate recommendations for action to the Board.

The ARMB budget is reflected in the Alaska Budget System in two budget components: the Alaska Retirement Management Board component and the Alaska Retirement Management Board – Custody and Management component. For presentation purposes, the attached schedule combines these into one schedule for FY2013 through FY2017 actuals and FY2018 and FY2019 projected and proposed amounts.

STATUS:

Personal Services Costs

The ARMB purchases personal services from the Treasury Division each year. The FY2019 budget is estimated to include \$6.3 million for personal services. Increases for new positions and/or salary increases are included in the budget proposal during discussions with the OMB and Legislature.

Investment Management Fees

Budgeted external investment management fees are calculated as a percent of the market value of investments under management. The total projected cost of external management fees are summed with custody fees to be included in the FY19 budget proposal during discussions with the OMB and the Legislature. The investment management and custody fees are proposed to continue to be \$50 million for FY2019. Not all investment management fees are appropriated. Non-appropriated fees are netted from investment income and are not included in the budget.

Other Services Costs

The transition to more internally managed investments requires additional support costs. Increases to other service costs reflected in the attached working budget will be requested during discussions with the OMB and the Legislature.

Committee Recommendation

The Budget Committee met October 4, 2017 with Department of Revenue staff, reviewed the budget schedules and worksheets attached, and makes the following:

RECOMMENDATION

That the ARMB adopt the FY19 Proposed Budget as attached, with the understanding that components will be subject to appropriation by OMB and the Legislature.

Attachments: Budget and Management Fee Spreadsheets.

A B		C	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	FY19 ARMB Working Budget														
2															
3															
4															
5	Personal Services														
6	Travel	3,229,215	3,446,651	3,219,381	3,766,935	5,104,600	4,779,823	(324,777)	-6.4%	6,042,900	6,345,045	302,145	5.0%		
7	Staff	160,007	154,529	156,151	109,000	150,000	124,571	(25,429)	-17.0%	150,000	165,000				
8	Board	66,338	66,110	59,297	29,886	30,000	21,136	(8,864)	-29.5%	40,000	40,000				
9		229,345	220,639	215,448	138,887	180,000	145,707	(34,293)	-19.1%	190,000	205,000	15,000	7.9%		
10	Contractual														
11	Investment Management and Custody Fees														
12	Appropriated Investment Management Fees	31,760,963	37,815,145	43,464,356	42,850,970	60,706,700	46,694,004	(14,012,696)	-23.1%	48,553,000	48,553,000				
13	Custody	1,128,202	1,289,343	1,289,503	1,381,228	1,400,000	1,446,493	46,493	3.3%	1,447,000	1,447,000				
14		32,889,164	39,104,488	44,753,859	44,232,198	62,106,700	48,140,497	(13,966,203)	-22.5%	50,000,000	50,000,000	0	0.0%		
15	Investment Consulting														
16	General consultant and performance (Callan)	561,641	557,593	598,279	616,610	650,000	774,904	124,904	19.2%	776,000	820,000				
17	Other Consultants-Townsend, Crestline	100,000	105,000	100,000	100,000	110,000	287,400	177,400	161.3%	110,000	110,000				DC Plan review in fy17, Inv policy review in fy18, Asset /Liability study in fy19
18	Investment Advisory Council	113,973	106,580	102,171	103,816	150,000	103,134	(46,866)	-31.2%	150,000	150,000				Crestline
19		775,614	769,173	800,450	820,426	910,000	1,165,438	255,438	28.1%	1,036,000	1,080,000	44,000	4.2%		
20	Investment Information Services														
21	Bloomberg	327,302	320,253	359,999	378,006	450,000	450,513	513	0.1%	500,000	525,000				Annual cost increase for each user subscription and additional users
22	Factset	236,235	285,117	314,248	345,340	360,000	366,951	6,951	1.9%	375,000	400,000				Additional users/features added in 2013/2014/2015/2016/2017
23	Yieldbook	16,479	16,425	15,110	23,200	25,000	31,180	6,180	24.7%	32,000	32,000				
24	State Street Risk Management	96,243	54,996	0	0	150,000	75,000	(75,000)	-50.0%	100,000	100,000				Implemented in 2017
25	Standard & Poors	146,959	147,993	160,098	171,217	173,000	161,924	(11,076)	-6.4%	185,000	185,000				Standard and Poor, S&P Indices and CUSIP Data
26	Moodys	12,048	16,660	11,005	18,886	17,000	25,209	8,209	48.3%	25,000	25,000				
27	Credit Sights	2,701	2,390	2,059	3,829	5,000	3,829	(1,171)	-23.4%	4,000	4,000				
28	Trade Web	4,501	4,023	3,497	5,251	5,000	7,098	2,098	41.9%	10,000	10,000				
29	TREPP	30,600	0	0	0	0	0	0	0.0%	0	0				Terminated 12/12/2012
30	Institutional Investor Proxy Service for REIT Portfolio	8,346	9,063	9,063	14,040	10,000	48,080	38,080	380.8%	38,500	38,500				
31	Zach Investments Research	51,250	51,250	51,667	51,250	52,000	51,250	(750)	-1.4%	52,000	52,000				
32	FTSE International	15,510	16,230	16,990	17,805	17,900	1,860	(16,040)	-89.6%	17,900	17,900				

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Disclosure - Calendar Update

October 5, 2017

The Disclosure Memorandum is included in the packet; no transactions requiring additional review or discussion.

The remaining dates of the 2017 calendar are included. The 2018 calendar is attached and the ARMB website will be updated.

Nothing further to report.

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

To: ARMB Trustees
From: Stephanie Alexander
Date: September 19, 2017
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.

Name	Position Title	Disclosure Type	Disclosure Date
<i>None to report.</i>			

Alaska Retirement Management Board
2017 Meeting Calendar

October 4 – Wednesday	Committee Meetings: Actuarial Audit Budget Defined Contribution
October 5-6 Thursday-Friday Anchorage	*Audit Results/Assets – KPMG *Approve Budget *Performance Measurement – 2 nd Quarter *Real Estate Annual Plan *Real Estate Evaluation – Townsend Group *Manager Presentations
November 9-10 New York City	Investment Education Conference
November 10	Audit Committee
December 6 – Wednesday	Committee Meetings: Actuarial Audit
December 7-8 Thursday-Friday Anchorage	Audit Report - KPMG Performance Measurement – 3 rd Quarter Manager Review (Questionnaire) Private Equity Review *Manager Presentations

ALASKA RETIREMENT MANAGEMENT BOARD

2018 Meeting Calendar

DATE	LOCATION	DESCRIPTION
February 12 Monday	Telephonic	Actuarial Committee
March 28 Wednesday	Juneau, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee
March 29-30 Thursday-Friday	Juneau, AK	Board of Trustees Meeting: <i>*Performance Measurement – 4th Quarter</i> <i>*Conduent Draft Actuary Report/GRS Draft Actuary Certification</i> <i>*Review Private Equity Annual Plan</i> <i>*Capital Markets – Asset Allocation</i>
May 3 Thursday	Anchorage, AK or Telephonic	Actuarial Committee <i>*As necessary: follow-up/additional discussion/questions on valuations</i>
May 4 Friday	Anchorage, AK	Board of Trustees Meeting <i>*As necessary</i>
June 20 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee
June 21-22 Thursday - Friday	Anchorage, AK	Board of Trustees Meeting: <i>*Final Actuary Reports/Adopt Valuation</i> <i>*Performance Measurement - 1st Quarter</i> <i>*Manager Presentation</i>
September 19 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Budget Committee
September 20-21 Thursday - Friday	Anchorage, AK	Board of Trustees Meeting: <i>*Set Contribution Rates</i> <i>*Audit Results/Assets – KPMG</i> <i>*Approve Budget</i> <i>*Performance Measurement – 2nd Quarter</i> <i>*Real Estate Annual Plan</i> <i>*Real Estate Evaluation – Townsend Group</i> <i>*Manager Presentation</i>
October (TBD)	New York, NY	Board of Trustees Meeting: Education Conference
November (TBD)	Telephonic	Audit Committee
December 12 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee
December 13-14 Thursday-Friday	Anchorage, AK	Board of Trustees Meeting: <i>*Audit Report - KPMG</i> <i>*Performance Measurement – 3rd Quarter</i> <i>*Manager Review (Questionnaire)</i> <i>*Private Equity Review</i> <i>*Manager Presentations</i>

ALASKA RETIREMENT MANAGEMENT BOARD

CIO REPORT

Treasury Division

October 5, 2017

Item	Action	Date	Amount	Description/Summary
1	Rebalance Retirement Funds	6/14, 6/15, 6/22, 6/23, 6/28, 7/6, 7/11, 7/28, 8/3, 8/24, 8/25, 8/28		Available upon request.
	Transfers:			
2	S&P 600	7/5/2017	~\$200,000,000	Transferred small cap assets and residual cash balances from Russell 2000 Value and Growth accounts, and transition account.
3	Brandes Investment Partners	7/6/2017	(\$50,000,000)	Liquidated from international equity portfolio.
4	Capital Guardian	7/6/2017	(\$25,000,000)	Liquidated from international equity portfolio.
5	McKinley Capital	7/6/2017	(\$25,000,000)	Liquidated from international equity portfolio.
6	Lazard Asset Management	7/6/2017	(\$50,000,000)	Liquidated from global equity portfolio.
7	Short-term Investment Pool	7/6/2017	(\$175,000,000)	Liquidated from cash.
8	Intermediate US Treasury	7/6/2017	\$325,000,000	Invested in intermediate U.S. Treasury portfolio.
9	SSgA Russell Top 200	7/6/2017	~(\$200,000,000)	Transferred domestic equity assets to Large Cap Transition Fund
10	SSgA Russell Top 200	7/13/2017	(\$100,000,000)	Liquidated from domestic equity portfolio.
11	Short-term Investment Pool	7/13/2017	\$100,000,000	Invested in cash.
12	Lazard Asset Management	7/14/2017	(\$200,000,000)	Liquidated from global equity portfolio.
13	Capital Guardian	7/14/2017	(\$50,000,000)	Liquidated from international equity portfolio.
14	McKinley Capital	7/14/2017	(\$50,000,000)	Liquidated from international equity portfolio.
15	Intermediate US Treasury	7/14/2017	\$300,000,000	Invested in intermediate U.S. Treasury portfolio.
16	S&P 500 Equal Weight Portfolio	7/17/2017	~\$200,000,000	Transferred assets from Large Cap Transition Fund
17	Short-term Investment Pool	8/3/2017	(\$150,000,000)	Liquidated from cash.
18	Intermediate US Treasury	8/3/2017	\$150,000,000	Invested in intermediate U.S. Treasury portfolio.
19	Alliance Global Investors	8/14/2017	~(\$50,000,000)	Transferred domestic equity assets to Large Cap Transition Fund
20	McKinley Capital	8/14/2017	~(\$50,000,000)	Transferred domestic equity assets to Large Cap Transition Fund
21	Barrow, Hanley, Mewhinney & Strauss	8/14/2017	~(\$50,000,000)	Transferred domestic equity assets to Large Cap Transition Fund
22	Quantitative Management Associates	8/14/2017	~(\$50,000,000)	Transferred domestic equity assets to Large Cap Transition Fund
23	S&P 500 Equal Weight Portfolio	8/23/2017	~\$100,000,000	Transferred assets from Large Cap Transition Fund
24	Scientific Beta MBMS	8/23/2017	~\$100,000,000	Transferred assets from Large Cap Transition Fund
25	Allianz Global Investors	8/24/2017	(\$25,000,000)	Liquidated from domestic equity portfolio.
26	McKinley Capital	8/24/2017	(\$25,000,000)	Liquidated from domestic equity portfolio.
27	Short-term Investment Pool	8/24/2017	\$50,000,000	Invested in cash.

ALASKA RETIREMENT MANAGEMENT BOARD

CIO REPORT

Treasury Division

October 5, 2017

Item	Action	Date	Amount	Description/Summary
28	Intermediate US Treasury	8/25/2017	(\$100,000,000)	Liquidated from U.S. Treasury portfolio.
29	Short-term Investment Pool	8/25/2017	(\$100,000,000)	Liquidated from cash.
30	Man Alternative Risk Premia Strategy	8/25/2017	\$200,000,000	Invested in absolute return portfolio.
31	Mondrian Investment Partners	9/1/2017	(\$25,000,000)	Liquidated from international fixed income portfolio.
32	Western Asset Management Company	9/1/2017	\$25,000,000	Invested in taxable municipal fixed income portfolio.
33	SSgA Russell 1000 Growth	9/1/2017	(\$125,000,000)	Liquidated from domestic equity portfolio.
34	SSgA Russell 1000 Value	9/1/2017	(\$125,000,000)	Liquidated from domestic equity portfolio.
35	Intermediate US Treasury	9/1/2017	\$175,000,000	Invested in intermediate U.S. Treasury portfolio.
36	Short-term Investment Pool	9/1/2017	\$75,000,000	Invested in cash.
37	Barrow, Hanley, Mewhinney & Strauss	9/8/2017	(\$18,000,000)	Liquidated from domestic equity portfolio.
38	Fidelity Institutional Asset Management	9/8/2017	(\$92,000,000)	Liquidated from domestic equity portfolio.
39	Frontier Capital Management	9/8/2017	(\$21,000,000)	Liquidated from domestic equity portfolio.
40	Victory Capital Management	9/8/2017	(\$10,000,000)	Liquidated from domestic equity portfolio.
41	Lord Abbett & Co.	9/8/2017	(\$48,000,000)	Liquidated from domestic equity portfolio.
42	SSgA Managed Volatility	9/8/2017	(\$8,000,000)	Liquidated from domestic equity portfolio.
43	Intermediate US Treasury	9/8/2017	\$138,000,000	Invested in U.S. Treasury portfolio.
44	Short-term Investment Pool	9/8/2017	\$59,000,000	Invested in cash.
45	Portable Alpha Overlay Program	9/8/2017	(\$114,000,000)	Liquidated from domestic equity portfolio.
46	Short-term Investment Pool	9/18/2017	(\$1,998,000)	Liquidated from cash.
47	Crestline Blue Glacier Fund	9/18/2017	\$1,998,000	Investment in absolute return portfolio.
48	Portable Alpha Cash Transfers	Multiple Dates		Directed multiple transfers of cash into or out of PA futures accounts to maintain necessary margin positions; summary attached to this packet; copies of transactions available upon request.
	Watch List:			
49	Deprince, Race & Zollo Microcap Value Strategy			Recommend placing mandate on watch list.
	Other Actions:			
49	Conducted ongoing manager due diligence.			Staff conducted telephonic or on-site due diligence with managers. Details attached.
	Announcements:			
50	Paul O'Neil announced retirement on Nov. 1, 2017.	07/07/2017		Mr. O'Neil is chief compliance officer at Eaton Vance.
51	Townsend Group being acquired by Aon.	09/01/2017		Townsend serves as real estate consultant to the ARMB.

Manager Due Diligence

June 1, 2017 - August 31, 2017

Date	Manager	Asset Class	Location
6/1/2017	Hancock Ag	Real	Telephonic
6/6/2017	PE International	Private Equity	Telephonic
6/7/2017	Bridgewater	Absolute Return	Juneau
6/7/2017	PIMCO	Absolute Return	Telephonic
6/7/2017	Silverpeak	Real	Telephonic
6/8/2017	Scientific Beta	Absolute Return	Juneau
6/8/2017	Man Group	Absolute Return	Telephonic
6/8/2017	JP Morgan	Absolute Return	Telephonic
6/8/2017	George Ochs (City View)	Real	Telephonic
6/9/2017	Abraaj	Private Equity	Juneau
6/12/2017	Baillie Gifford	Public Equity	Anchorage
6/12/2017	Callan	Absolute Return	Telephonic
6/13/2017	Eaton Vance/Parametric	Public Equity	Seattle
6/14/2017	Adams Street	Private Equity	Juneau
6/14/2017	Fidelity Tactical Bond	Fixed Income	Telephonic
6/15/2017	Allianz - NFJ	Public Equity	Dallas
6/15/2017	Barrow, Hanley, Mewhinney & Strauss	Public Equity	Dallas
6/15/2017	Barrow, Hanley, Mewhinney & Strauss	Public Equity	Dallas
6/15/2017	Hancock Timber	Real	Telephonic
6/16/2017	Guggenheim Partners	Fixed Income	Telephonic
6/19/2017	UBS Realty	Real	Telephonic
6/20/2017	Pathway Capital	Private Equity	Juneau
6/20/2017	Warburg Pincus	Private Equity	Juneau
6/20/2017	TIR	Real	Telephonic
6/20/2017	Hancock Ag	Real	Telephonic
6/21/2017	McKinley Capital	Public Equity	Anchorage
6/21/2017	McKinley Capital	Public Equity	Anchorage
6/21/2017	LaSalle	Real	Telephonic
6/22/2017	UBS Ag	Real	Telephonic
6/23/2017	Sentinel	Real	Telephonic
6/27/2017	Pathway Capital	Private Equity	Irvine
6/27/2017	KKR	Real	Los Angeles
6/28/2017	PIMCO	Absolute Return	Irvine
6/28/2017	UBS Realty	Real	Los Angeles
6/28/2017	UBS Ag	Real	Los Angeles
6/28/2017	Riverside	Private Equity	Santa Monica
6/29/2017	JPM Real Estate	Real	Los Angeles
6/29/2017	LaSalle	Real	Los Angeles
6/29/2017	Glendon	Private Equity	Santa Monica
6/30/2017	JP Morgan	Absolute Return	Telephonic
6/30/2017	Man Group	Absolute Return	Telephonic
7/5/2017	BC Capital	Private Equity	Juneau
7/6/2017	LLR	Private Equity	Telephonic
7/6/2017	Starwood capital (real estate)	Real	Telephonic
7/11/2017	Man Group	Absolute Return	Telephonic
7/12/2017	Glendon	Private Equity	Telephonic
7/13/2017	George Ochs (City View)	Real	Juneau
7/13/2017	Allianz Global	Public Equity	Telephonic
7/13/2017	Allianz Global	Public Equity	Telephonic
7/14/2017	Societe Generate	Absolute Return	Juneau
7/14/2017	Hancock Timber	Real	Juneau
7/14/2017	Zebra Capital	Public Equity	Telephonic
7/17/2017	MacKay Shields	Fixed Income	New York
7/17/2017	Lazard Asset Management	Fixed Income	New York

Manager Due Diligence

June 1, 2017 - August 31, 2017

Date	Manager	Asset Class	Location
7/17/2017	Pathway Capital	Private Equity	Telephonic
7/18/2017	TCV	Private Equity	Juneau
7/18/2017	Crestview	Private Equity	Juneau
7/18/2017	Clarion	Real	Juneau
7/18/2017	T.Rowe	Public Equity	Telephonic
7/18/2017	T.Rowe	Public Equity	Telephonic
7/20/2017	Western Asset Mgt. Co.	Fixed Income	New York
7/21/2017	T.Rowe	Public Equity	Telephonic
7/21/2017	Penwood	Real	Telephonic
7/25/2017	BMO	Public Equity	Telephonic
7/25/2017	Brandes Investment Partners	Public Equity	Telephonic
7/25/2017	JPM Strategic Property Fund	Real	Telephonic
7/25/2017	IFM	Real	Telephonic
7/27/2017	CBRE Clarion	Real	Telephonic
7/27/2017	Starwood Energy (infra)	Real	Telephonic
7/28/2017	Man Group	Absolute Return	Telephonic
8/2/2017	JP Morgan	Absolute Return	Telephonic
8/2/2017	Jennison Associates, LLC	Public Equity	Telephonic
8/4/2017	Schroder Investment Management	Public Equity	Telephonic
8/7/2017	Elliot Capital	Absolute Return	Juneau
8/7/2017	Silverpeak	Real	Telephonic
8/8/2017	KKR REPA	Real	Telephonic
8/9/2017	Man Group	Absolute Return	Telephonic
8/9/2017	Lazard Asset Management	Public Equity	Telephonic
8/9/2017	Lazard Asset Management	Public Equity	Telephonic
8/9/2017	Brookfield	Real	Telephonic
8/10/2017	KKR Infrastructure	Real	Juneau
8/10/2017	Columbia Threadneedle	Fixed Income	Telephonic
8/11/2017	Pathway Capital	Private Equity	Telephonic
8/15/2017	Schroders	Fixed Income	Telephonic
8/15/2017	JPM Infrastructure fund	Real	Telephonic
8/16/2017	Millenium	Absolute Return	Juneau
8/16/2017	IFM Infrastructure Debt	Real	Juneau
8/16/2017	UBS Trumbull Property Fund	Real	Telephonic
8/17/2017	Neuberger Berman	Private Equity	Juneau
8/17/2017	Colony infrastructure	Real	Juneau
8/21/2017	UBS Ag	Real	Telephonic
8/22/2017	Crestline	Absolute Return	Telephonic
8/22/2017	Stonepeak	Real	Telephonic
8/23/2017	Two Sigma	Absolute Return	Juneau
8/23/2017	Hancock Timber	Real	Telephonic
8/24/2017	Sentinel	Real	Telephonic
8/24/2017	Hancock Ag	Real	Telephonic
8/28/2017	Sofinnova	Private Equity	Juneau
8/29/2017	UBS Realty	Real	Telephonic
8/29/2017	LaSalle	Real	Telephonic
8/31/2017	TIR	Real	Telephonic

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Fund Financials – Cash Flow Report

October 5, 2017

Scott Jones, State Comptroller, Department of Revenue

As of July month-end, total plan assets were as follows: PERS - \$17.8 billion, TRS - \$8.7 billion, JRS - \$195 million, NGNMRS - \$39 million, SBS - \$3.7 billion, and Deferred Comp - \$890 million. Total non-participant directed plans totaled \$25.4 billion and participant-directed plans \$5.9 billion. Total Assets were \$31.3 billion.

Year-to-date income was \$472 million and the plans experienced a net withdrawal of \$90.7 million. Total assets were up 1.23% year-to-date.

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

During the month of August total plan assets were up 0.80% (2.08% FYTD) to \$31.6 billion. Year-to-date income was \$643 million and net withdrawals were \$11.7 million.

Kevin Worley, Chief Financial Officer, Department of Administration

Presented is the Division of Retirement & Benefits' (DRB) Supplement to the Treasury Division's Financial Report as of July 31, 2017. DRB's supplemental report expands on Treasury's report of "Net Contributions (Withdrawals)" from page 1 and 2 of their report. DRB reports the summary totals of actual employer, member, State of Alaska, and other revenue contributions, as well as benefit payments, refunds / disbursements, and combined administrative / investment expenditures. DRB's report represents cash inflows / outflows for the 1-month ending July 31, 2017 (page 1 and 2). Also presented are participant directed disbursements by plan and by type for the 1-month period. At the end of our report, Notes to the DRB report are presented on page 4 and 5, which includes information for the healthcare plans regarding total receipts for Rx rebates from Aetna as well as Retiree Drug Subsidies (RDS) received from CMS.

**ALASKA RETIREMENT MANAGEMENT BOARD
FINANCIAL REPORT**

As of July 31, 2017

ALASKA RETIREMENT MANAGEMENT BOARD
Schedule of Investment Income and Changes in Invested Assets by Fund
Fiscal Year-to-Date through July 31, 2017

	Beginning Invested Assets	Investment Income ⁽¹⁾	Net Contributions (Withdrawals)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income ⁽²⁾
<u>Public Employees' Retirement System (PERS)</u>						
Defined Benefit Plans:						
Retirement Trust	\$ 8,922,461,847	\$ 138,879,947	\$ (40,812,952)	\$ 9,020,528,842	1.10%	1.56%
Retirement Health Care Trust	7,371,307,996	112,648,156	(22,865,616)	7,461,090,536	1.22%	1.53%
Total Defined Benefit Plans	16,293,769,843	251,528,103	(63,678,568)	16,481,619,378	1.15%	1.55%
Defined Contribution Plans:						
Participant Directed Retirement	860,873,883	16,290,128	6,377,929	883,541,940	2.63%	1.89%
Health Reimbursement Arrangement	292,327,555	4,490,212	2,665,254	299,483,021	2.45%	1.53%
Retiree Medical Plan	80,644,156	1,240,351	944,303	82,828,810	2.71%	1.53%
Defined Benefit Occupational Death and Disability:						
Public Employees	17,976,260	275,793	109,990	18,362,043	2.15%	1.53%
Police and Firefighters	8,626,606	132,331	34,205	8,793,142	1.93%	1.53%
Total Defined Contribution Plans	1,260,448,460	22,428,815	10,131,681	1,293,008,956	2.58%	1.77%
Total PERS	17,554,218,303	273,956,918	(53,546,887)	17,774,628,334	1.26%	1.56%
<u>Teachers' Retirement System (TRS)</u>						
Defined Benefit Plans:						
Retirement Trust	5,308,501,928	82,577,863	(33,505,259)	5,357,574,532	0.92%	1.56%
Retirement Health Care Trust	2,768,186,277	42,303,658	(8,488,980)	2,802,000,955	1.22%	1.53%
Total Defined Benefit Plans	8,076,688,205	124,881,521	(41,994,239)	8,159,575,487	1.03%	1.55%
Defined Contribution Plans:						
Participant Directed Retirement	367,437,623	7,055,815	1,143,520	375,636,958	2.23%	1.92%
Health Reimbursement Arrangement	87,760,833	1,349,342	611,808	89,721,983	2.23%	1.53%
Retiree Medical Plan	30,598,161	470,512	253,054	31,321,727	2.36%	1.53%
Defined Benefit Occupational Death and Disability	3,532,341	54,024	(22)	3,586,343	1.53%	1.53%
Total Defined Contribution Plans	489,328,958	8,929,693	2,008,360	500,267,011	2.24%	1.82%
Total TRS	8,566,017,163	133,811,214	(39,985,879)	8,659,842,498	1.10%	1.57%
<u>Judicial Retirement System (JRS)</u>						
Defined Benefit Plan Retirement Trust	162,899,812	2,536,696	(526,168)	164,910,340	1.23%	1.56%
Defined Benefit Retirement Health Care Trust	30,014,394	459,143	(45,303)	30,428,234	1.38%	1.53%
Total JRS	192,914,206	2,995,839	(571,471)	195,338,574	1.26%	1.56%
<u>National Guard/Naval Militia Retirement System (MRS)</u>						
Defined Benefit Plan Retirement Trust	38,151,192	491,346	820,801	39,463,339	3.44%	1.27%
<u>Other Participant Directed Plans</u>						
Supplemental Annuity Plan	3,691,373,402	49,638,272	2,504,047	3,743,515,721	1.41%	1.34%
Deferred Compensation Plan	877,970,832	11,572,702	88,205	889,631,739	1.33%	1.32%
Total All Funds	30,920,645,098	472,466,291	(90,691,184)	31,302,420,205		
Total Non-Participant Directed	25,122,989,358	387,909,374	(100,804,885)	25,410,093,847	1.14%	1.55%
Total Participant Directed	5,797,655,740	84,556,917	10,113,701	5,892,326,358	1.63%	1.46%
Total All Funds	\$ 30,920,645,098	\$ 472,466,291	\$ (90,691,184)	\$ 31,302,420,205	1.23%	1.53%

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://www.revenue.state.ak.us/treasury/programs/programs/other/armb/investmentresults.aspx>

ALASKA RETIREMENT MANAGEMENT BOARD
Schedule of Investment Income and Changes in Invested Assets by Fund
For the Month Ended July 31, 2017

	Beginning Invested Assets	Investment Income ⁽¹⁾	Net Contributions (Withdrawals)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income ⁽²⁾
<u>Public Employees' Retirement System (PERS)</u>						
Defined Benefit Plans:						
Retirement Trust	\$ 8,922,461,847	\$ 138,879,947	\$ (40,812,952)	\$ 9,020,528,842	1.10%	1.56%
Retirement Health Care Trust	7,371,307,996	112,648,156	(22,865,616)	7,461,090,536	1.22%	1.53%
Total Defined Benefit Plans	16,293,769,843	251,528,103	(63,678,568)	16,481,619,378	1.15%	1.55%
Defined Contribution Plans:						
Participant Directed Retirement	860,873,883	16,290,128	6,377,929	883,541,940	2.63%	1.89%
Health Reimbursement Arrangement	292,327,555	4,490,212	2,665,254	299,483,021	2.45%	1.53%
Retiree Medical Plan	80,644,156	1,240,351	944,303	82,828,810	2.71%	1.53%
Defined Benefit Occupational Death and Disability:						
Public Employees	17,976,260	275,793	109,990	18,362,043	2.15%	1.53%
Police and Firefighters	8,626,606	132,331	34,205	8,793,142	1.93%	1.53%
Total Defined Contribution Plans	1,260,448,460	22,428,815	10,131,681	1,293,008,956	2.58%	1.77%
Total PERS	17,554,218,303	273,956,918	(53,546,887)	17,774,628,334	1.26%	1.56%
<u>Teachers' Retirement System (TRS)</u>						
Defined Benefit Plans:						
Retirement Trust	5,308,501,928	82,577,863	(33,505,259)	5,357,574,532	0.92%	1.56%
Retirement Health Care Trust	2,768,186,277	42,303,658	(8,488,980)	2,802,000,955	1.22%	1.53%
Total Defined Benefit Plans	8,076,688,205	124,881,521	(41,994,239)	8,159,575,487	1.03%	1.55%
Defined Contribution Plans:						
Participant Directed Retirement	367,437,623	7,055,815	1,143,520	375,636,958	2.23%	1.92%
Health Reimbursement Arrangement	87,760,833	1,349,342	611,808	89,721,983	2.23%	1.53%
Retiree Medical Plan	30,598,161	470,512	253,054	31,321,727	2.36%	1.53%
Defined Benefit Occupational Death and Disability	3,532,341	54,024	(22)	3,586,343	1.53%	1.53%
Total Defined Contribution Plans	489,328,958	8,929,693	2,008,360	500,267,011	2.24%	1.82%
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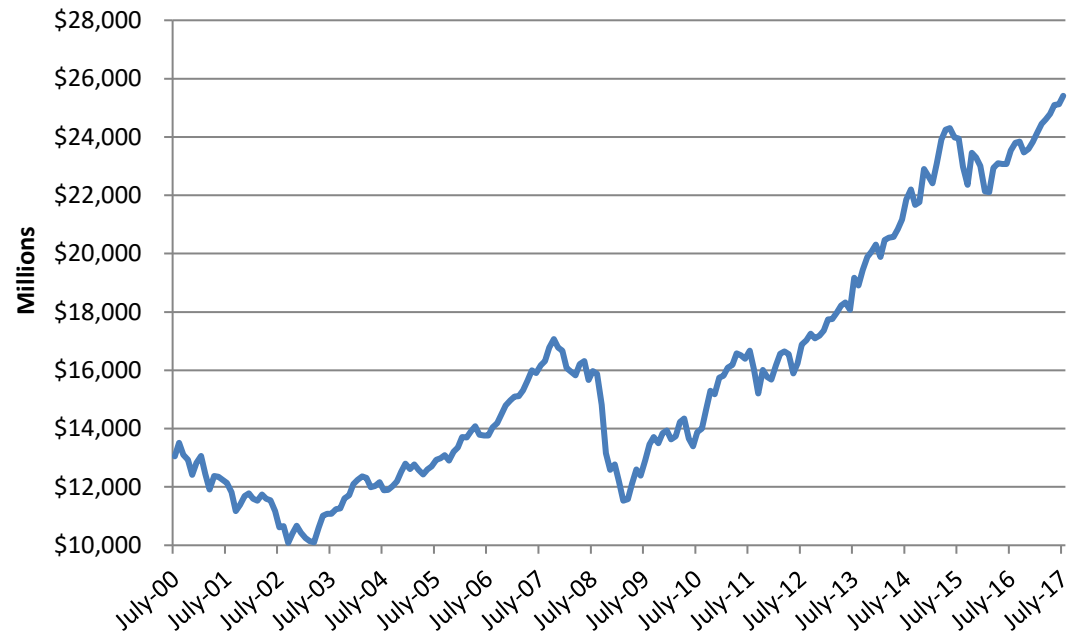
Notes:

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

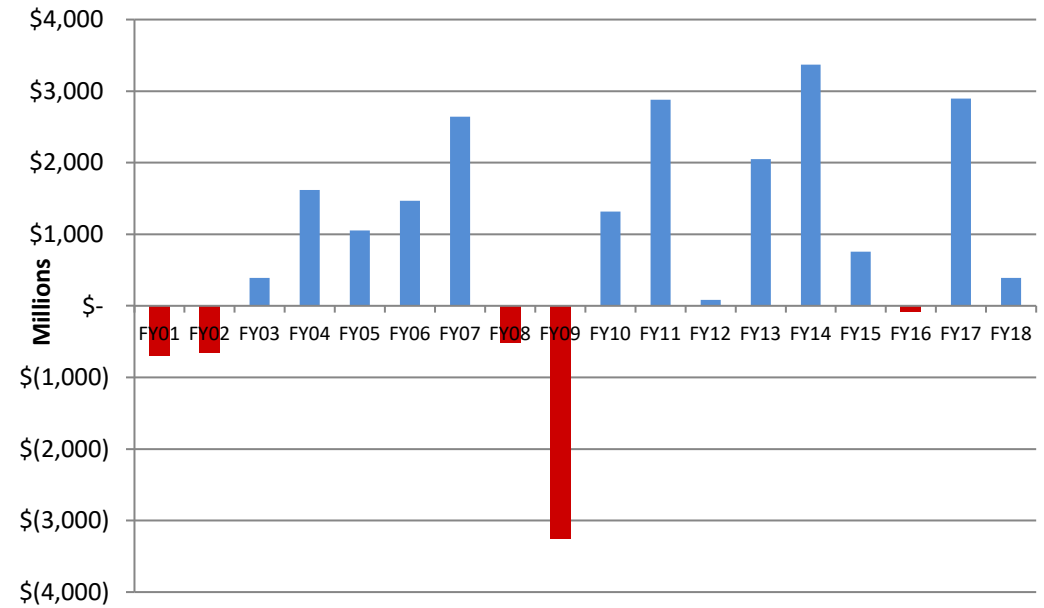
(2) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates and can be found at: <http://www.revenue.state.ak.us/treasury/programs/programs/other/armb/investmentresults.aspx>

Total Non Participant Directed Assets As of July 31, 2017

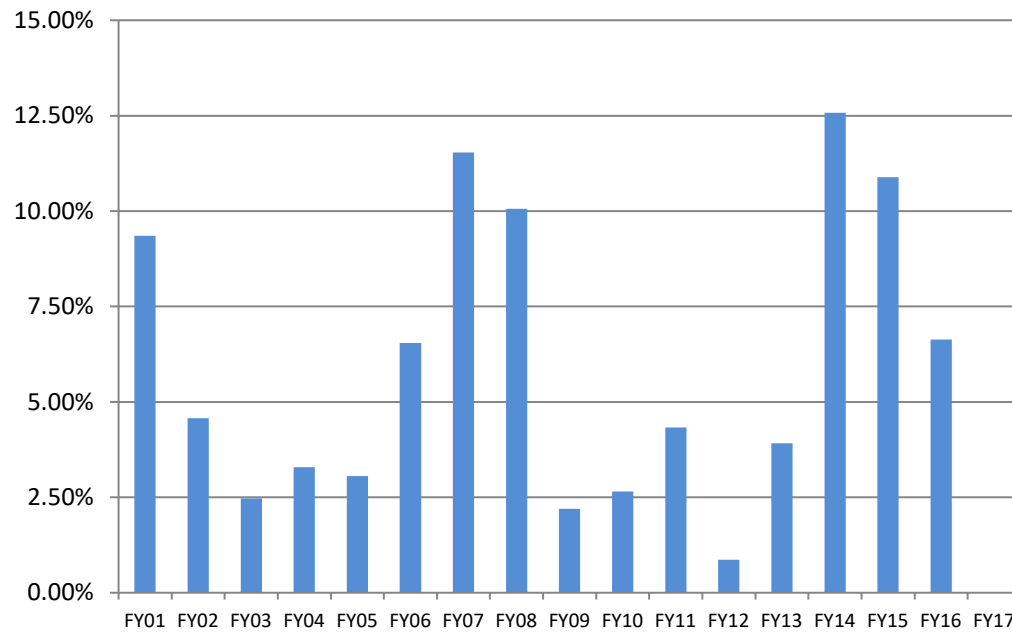
Total Assets History



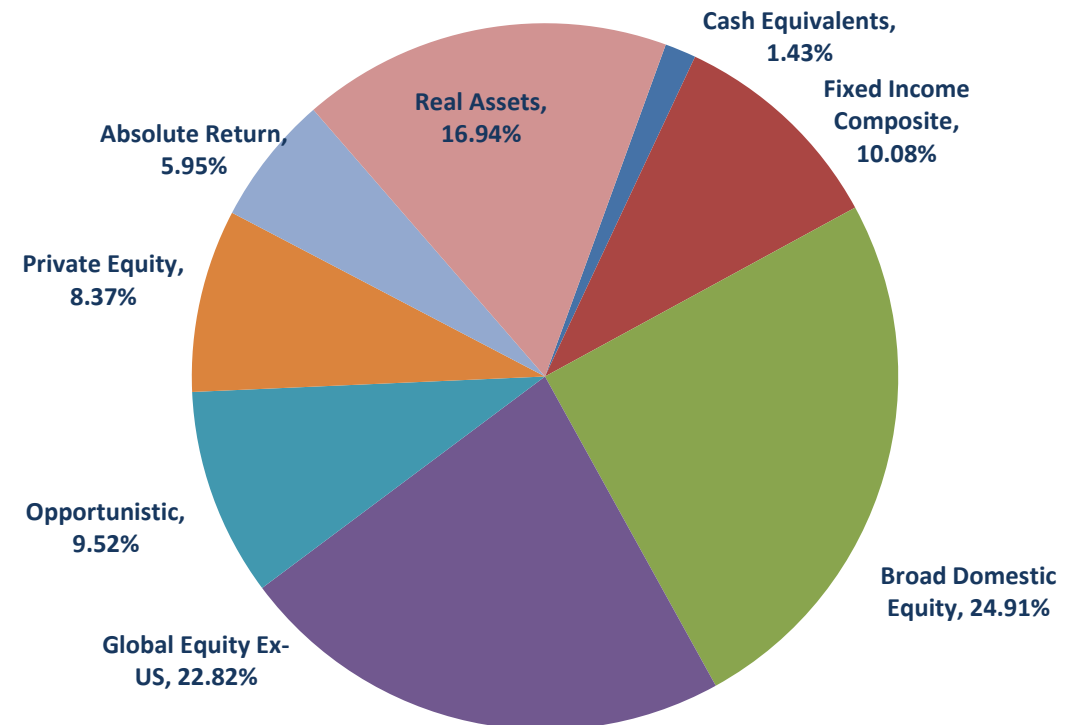
Income by Fiscal Year



5-year Annualized Returns as of Fiscal Year End



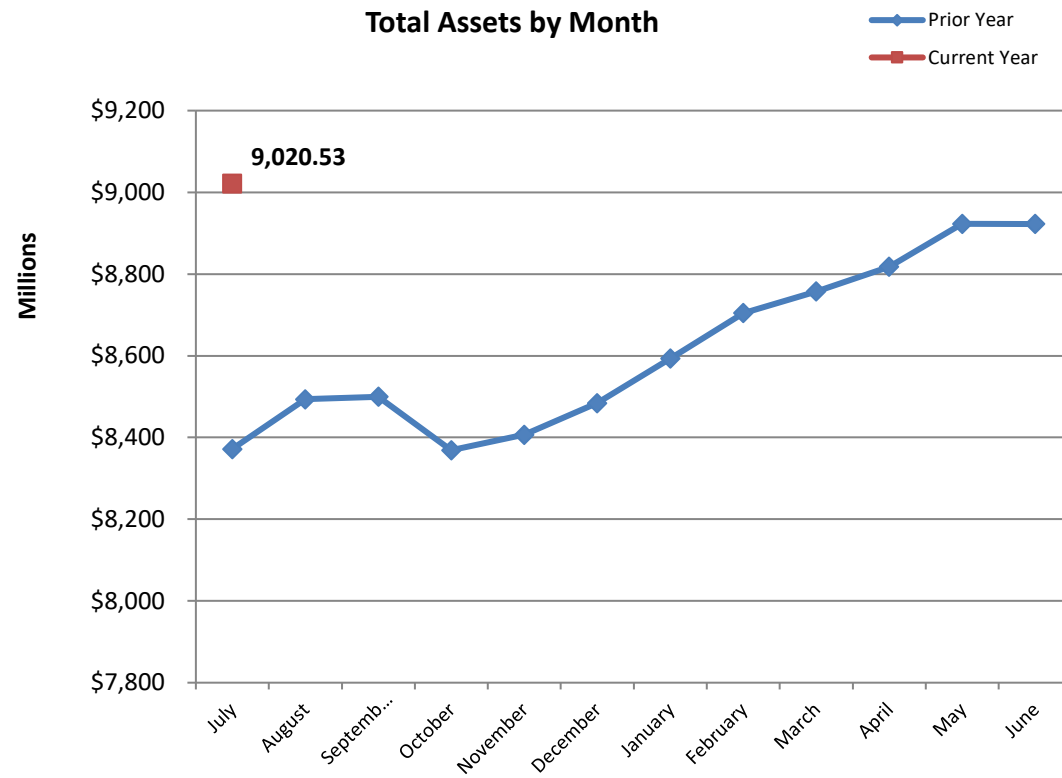
Actual Asset Allocation



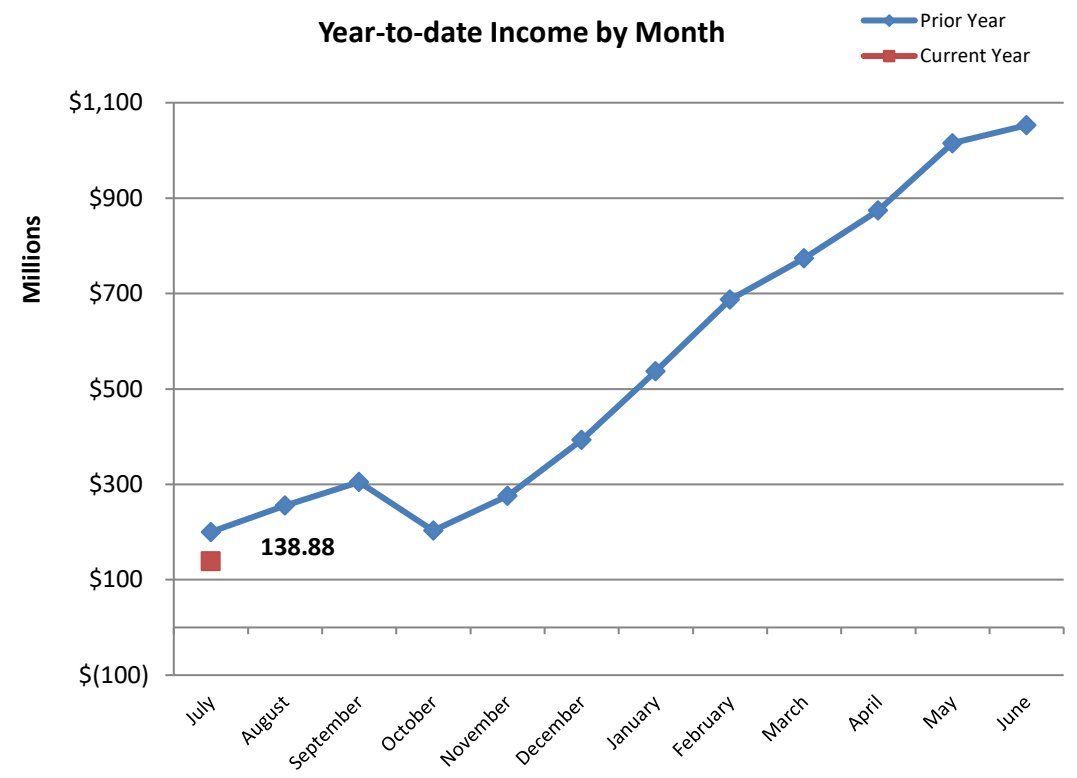
Public Employees' Retirement Pension Trust Fund

Fiscal Year-to-Date through July 31, 2017

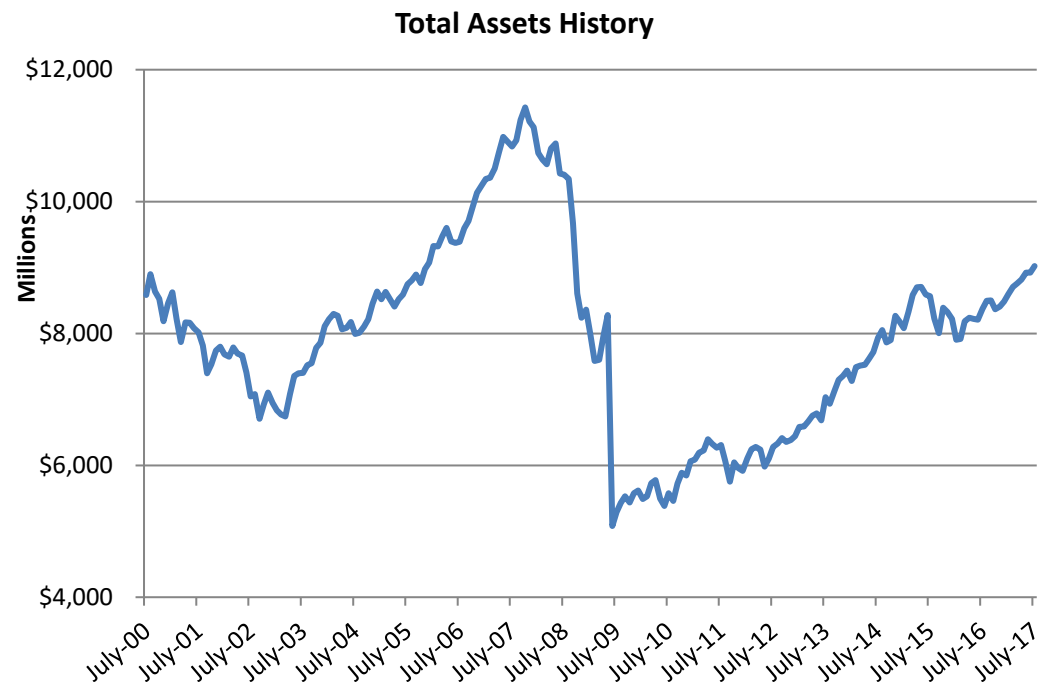
Total Assets by Month



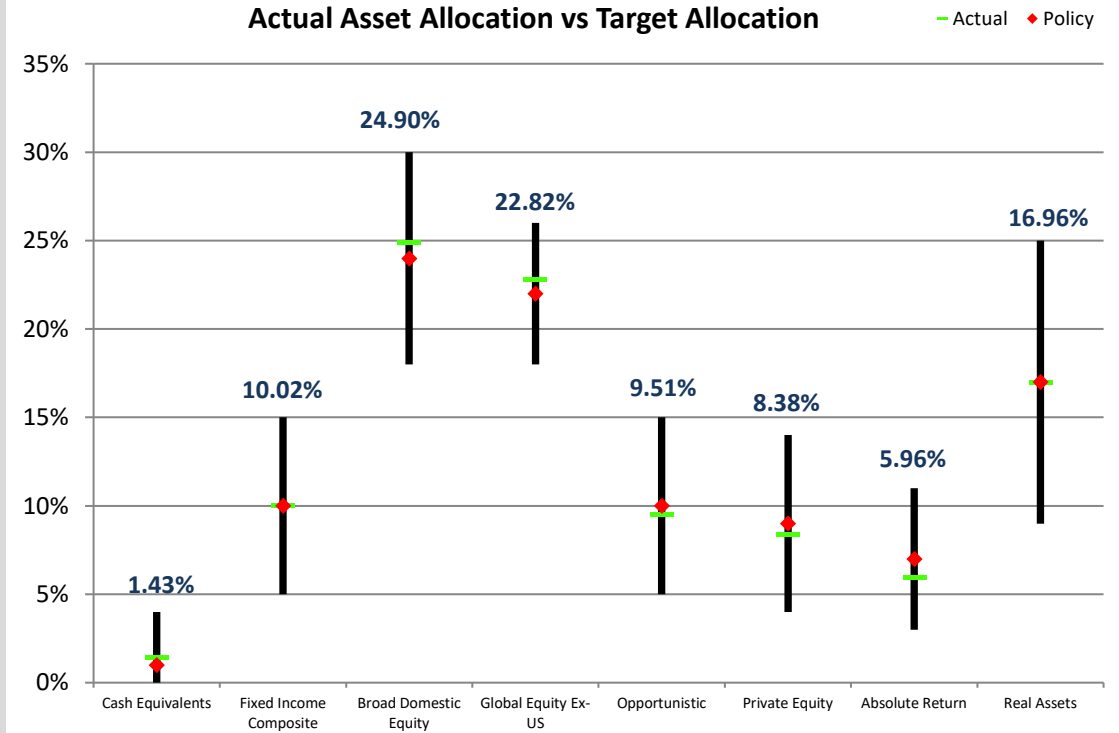
Year-to-date Income by Month



Total Assets History



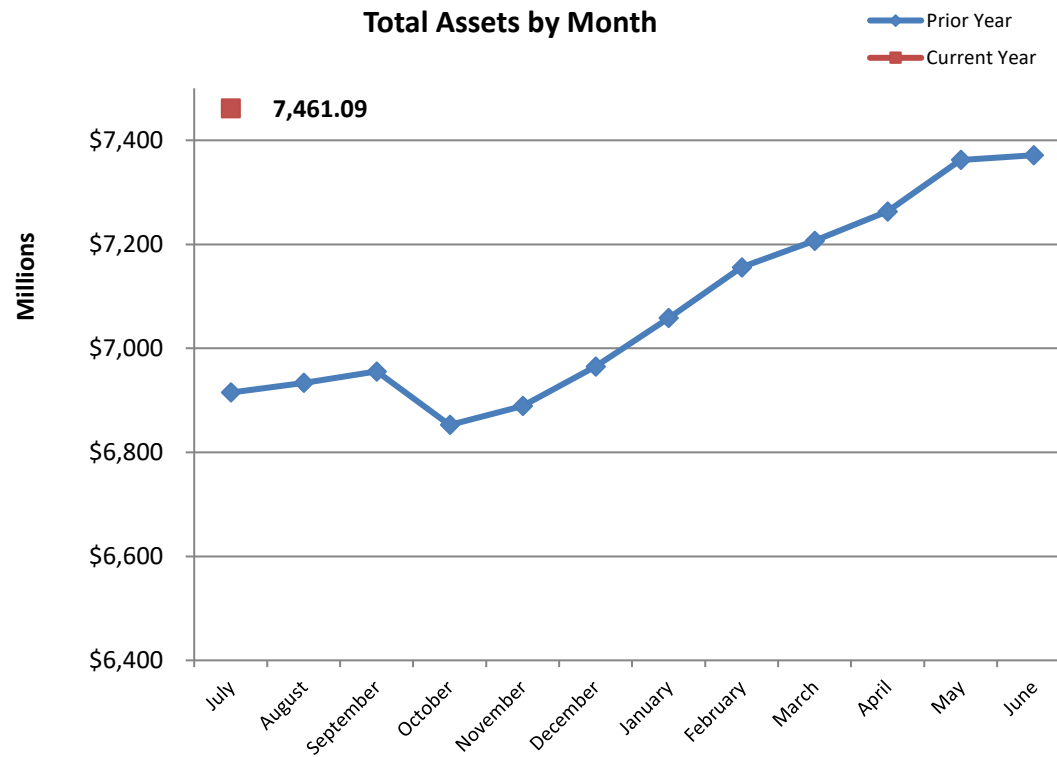
Actual Asset Allocation vs Target Allocation



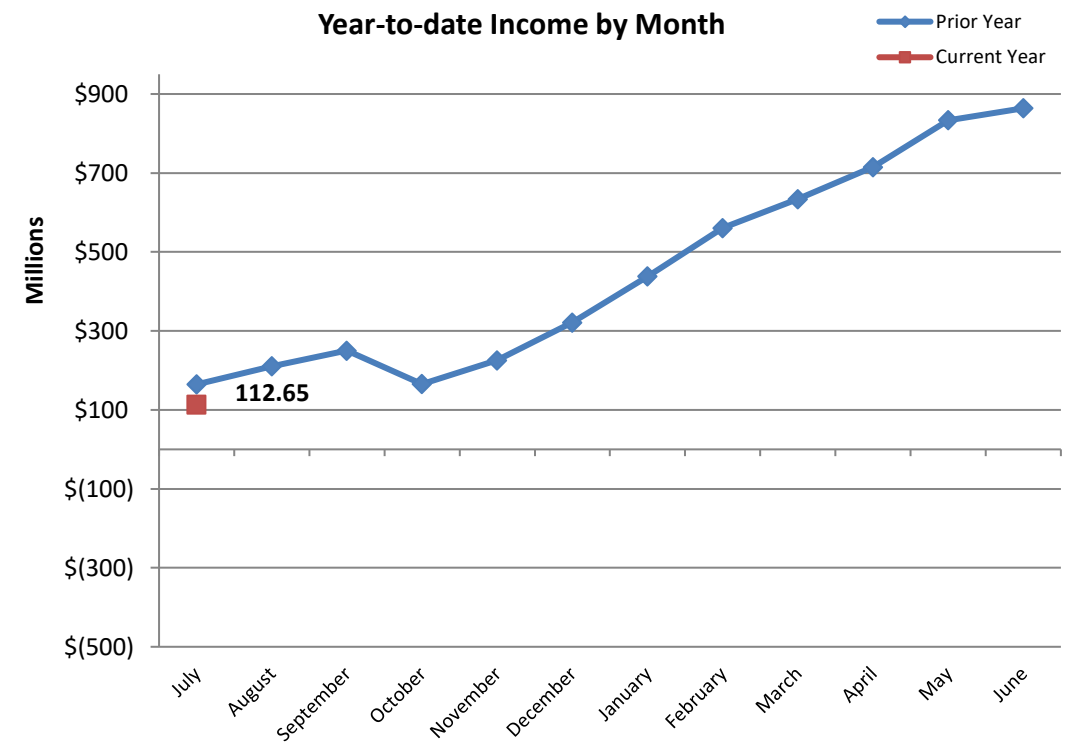
Public Employees' Retirement Health Care Trust Fund

Fiscal Year-to-Date through July 31, 2017

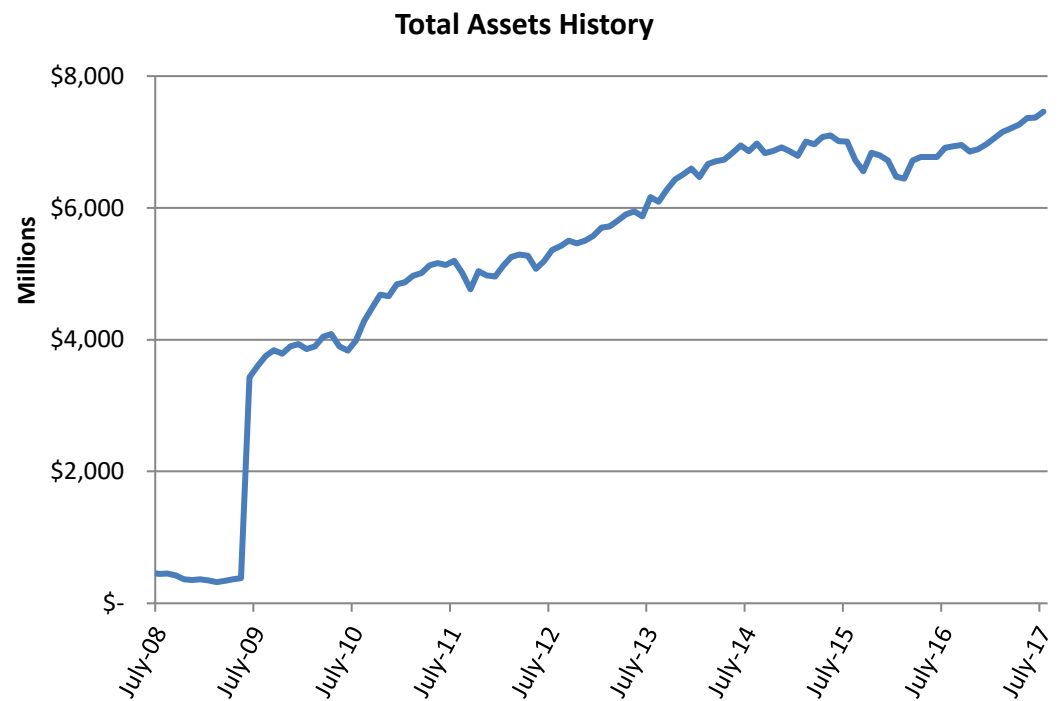
Total Assets by Month



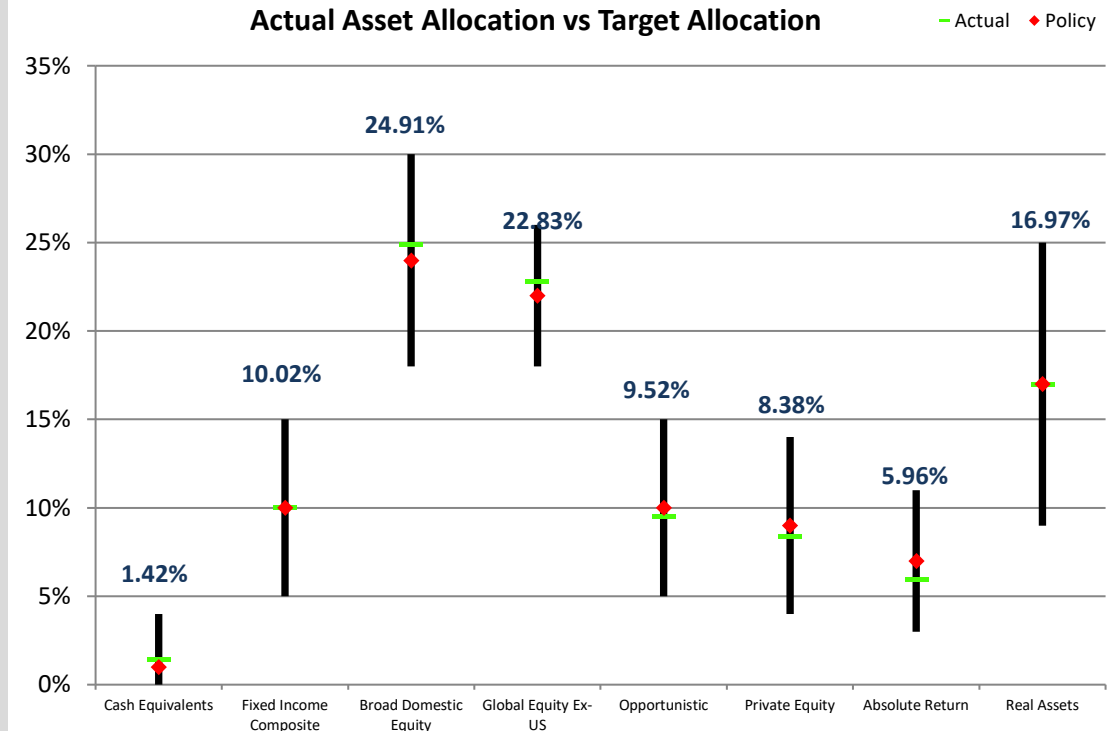
Year-to-date Income by Month



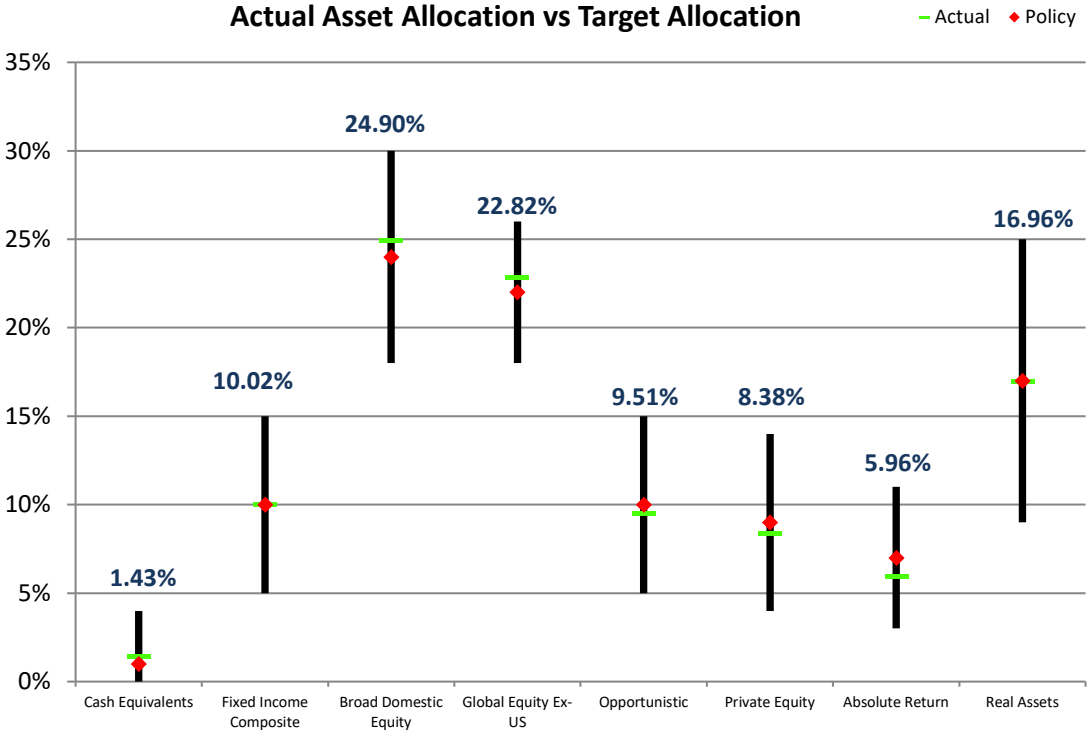
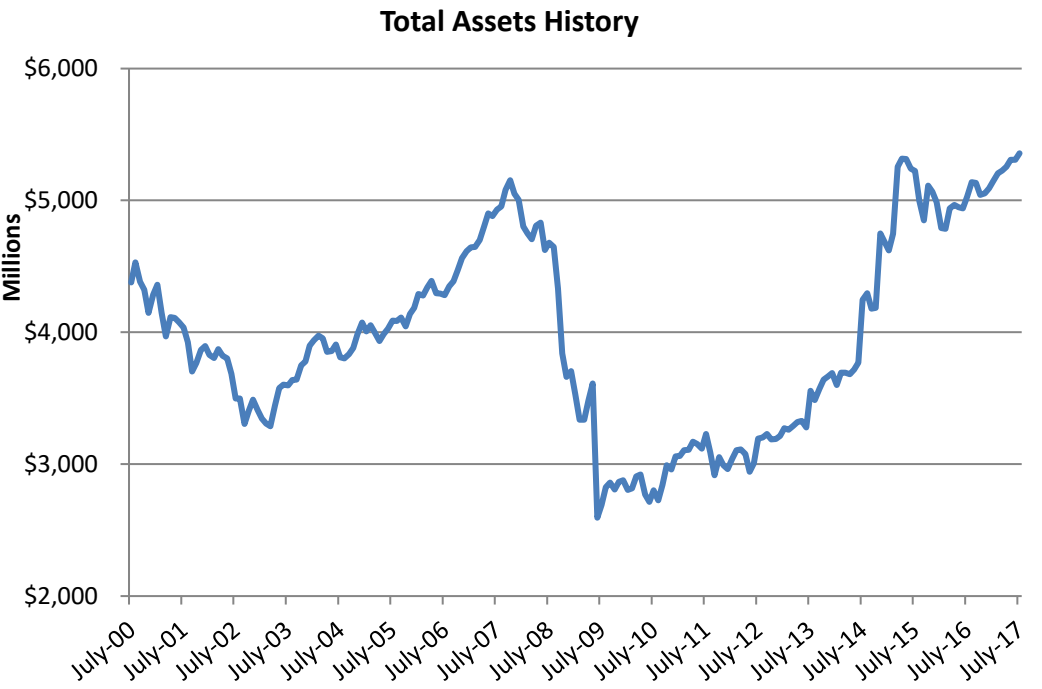
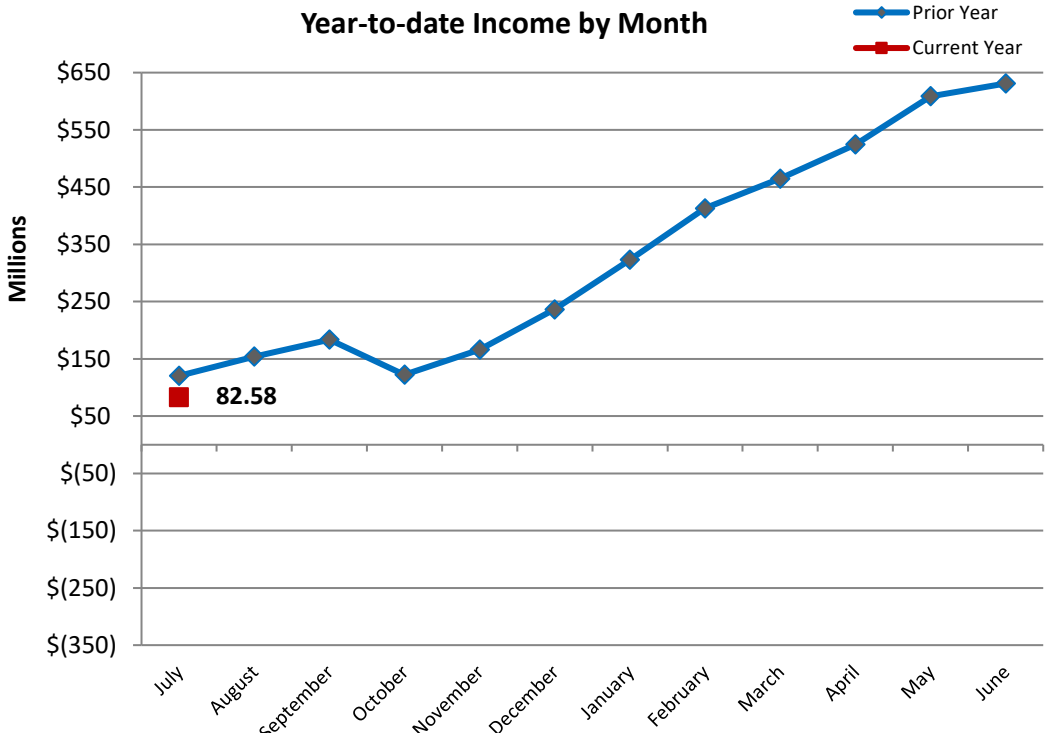
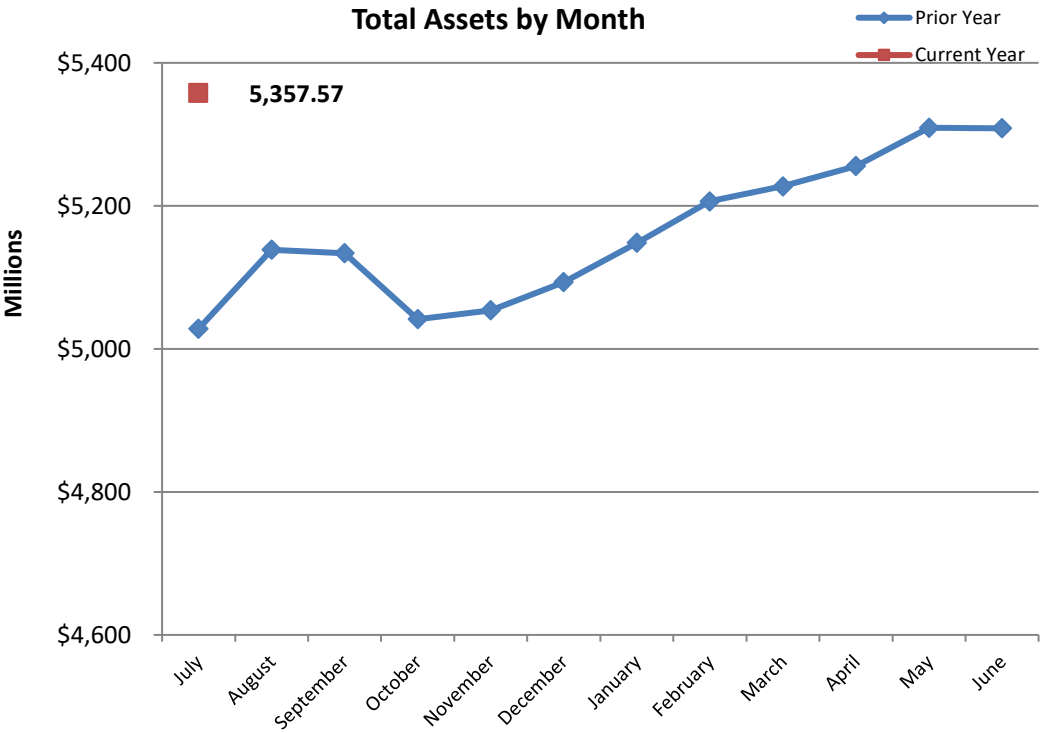
Total Assets History



Actual Asset Allocation vs Target Allocation



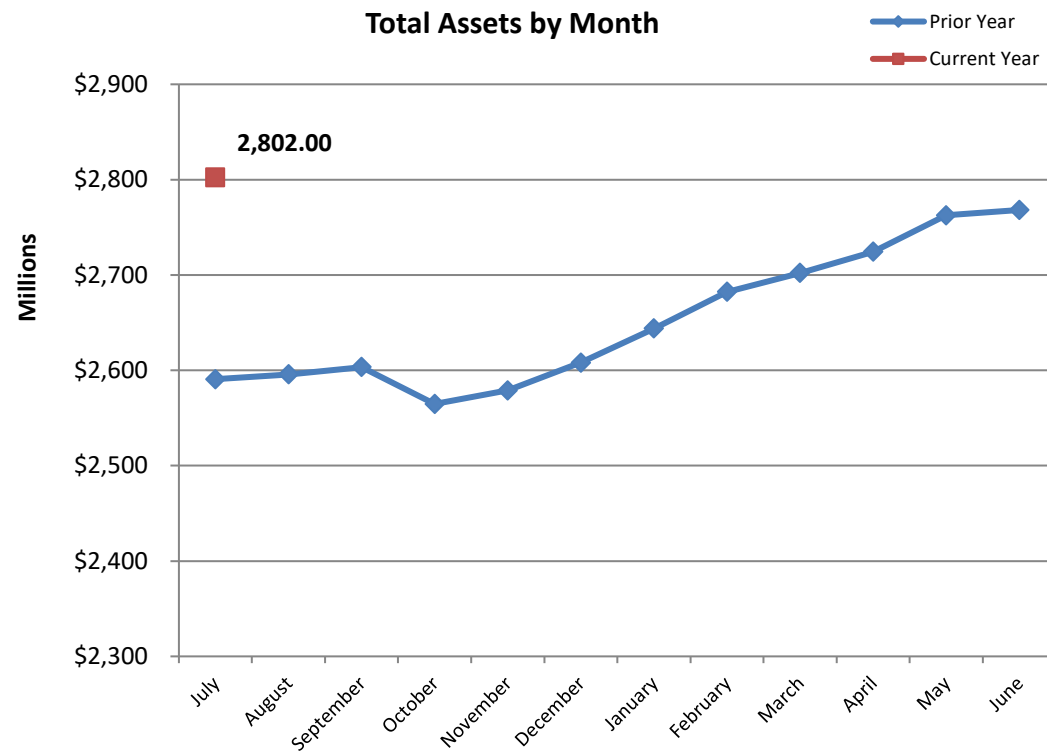
Teachers' Retirement Pension Trust Fund Fiscal Year-to-Date through July 31, 2017



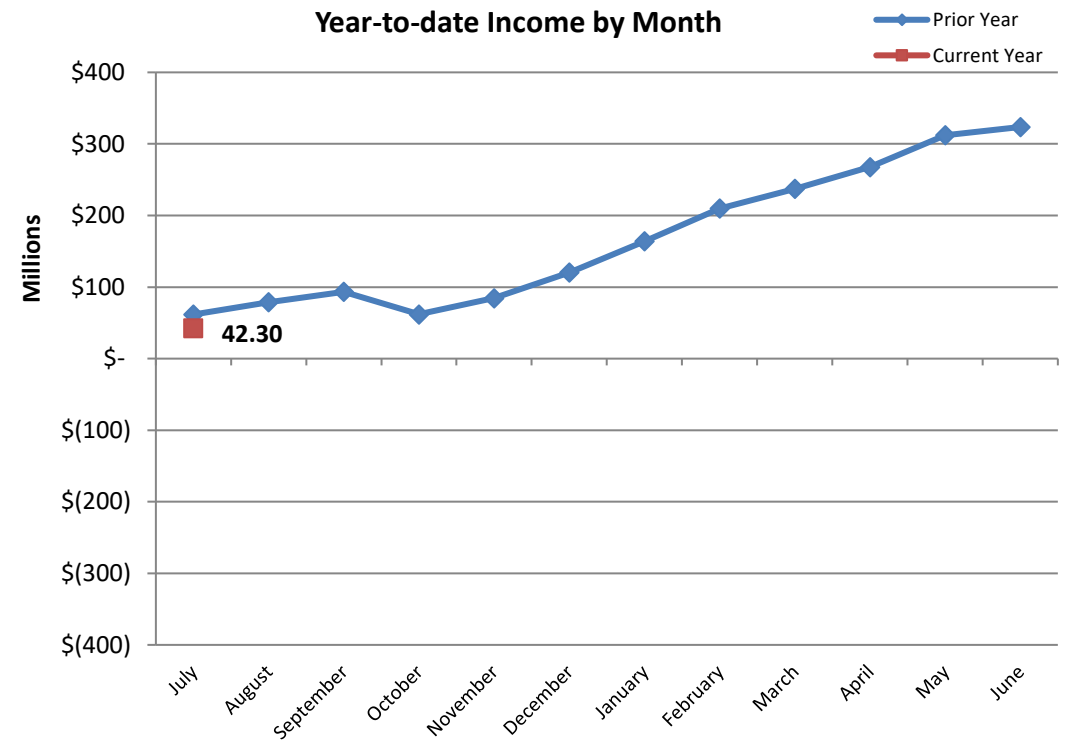
Teachers' Retirement Health Care Trust Fund

Fiscal Year-to-Date through July 31, 2017

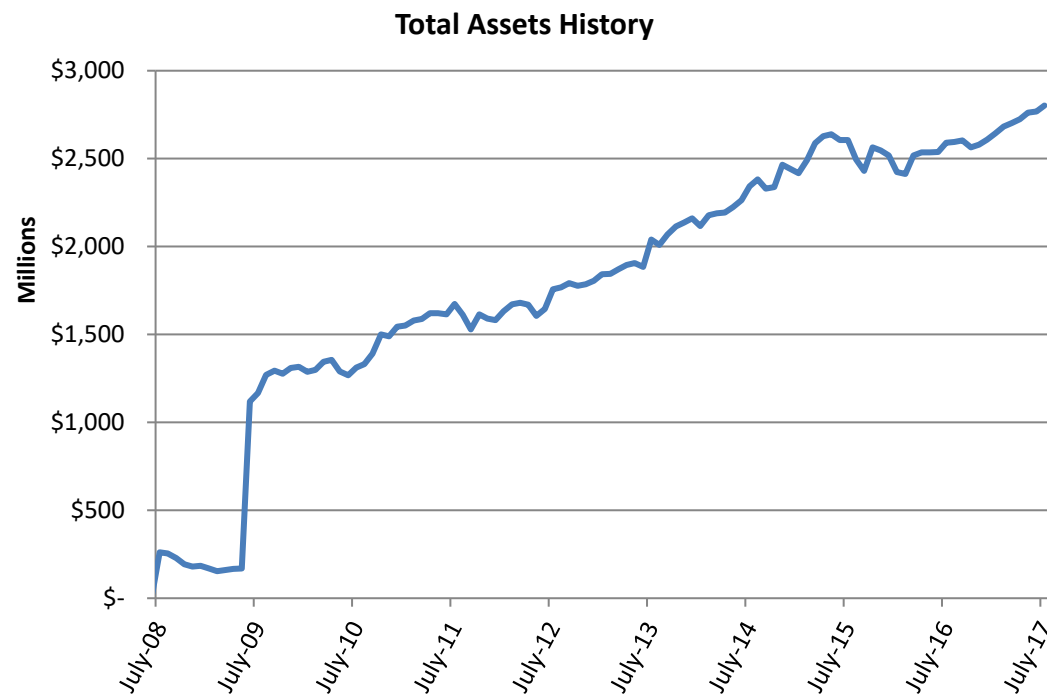
Total Assets by Month



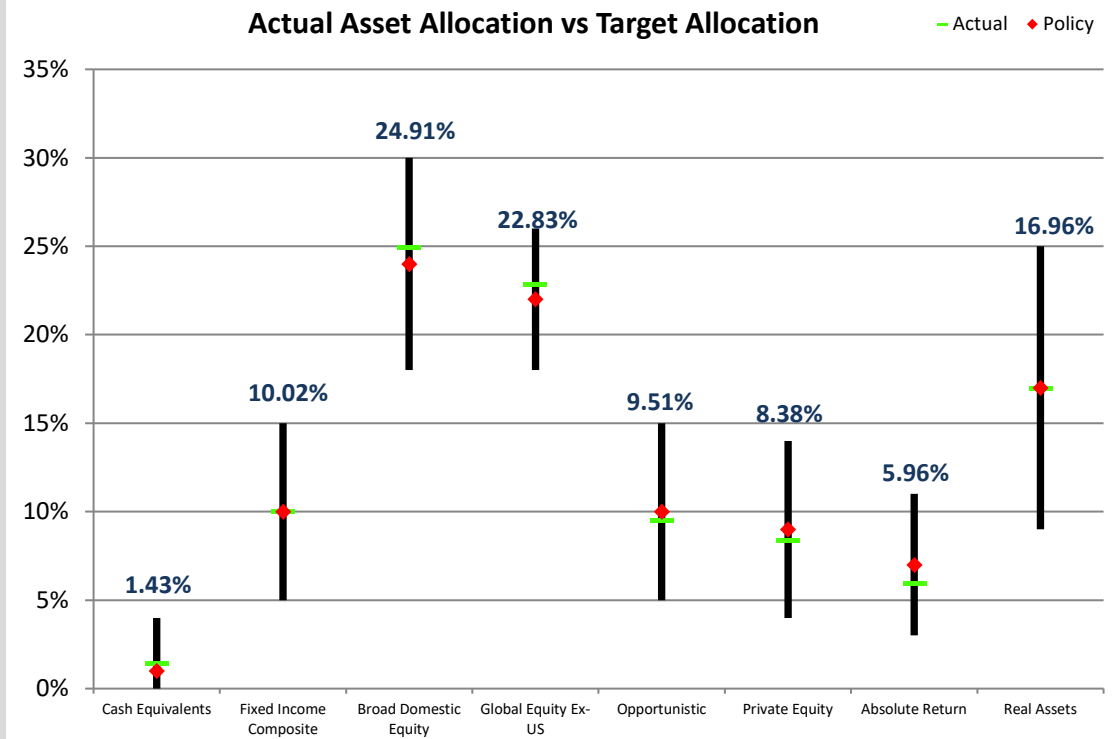
Year-to-date Income by Month



Total Assets History



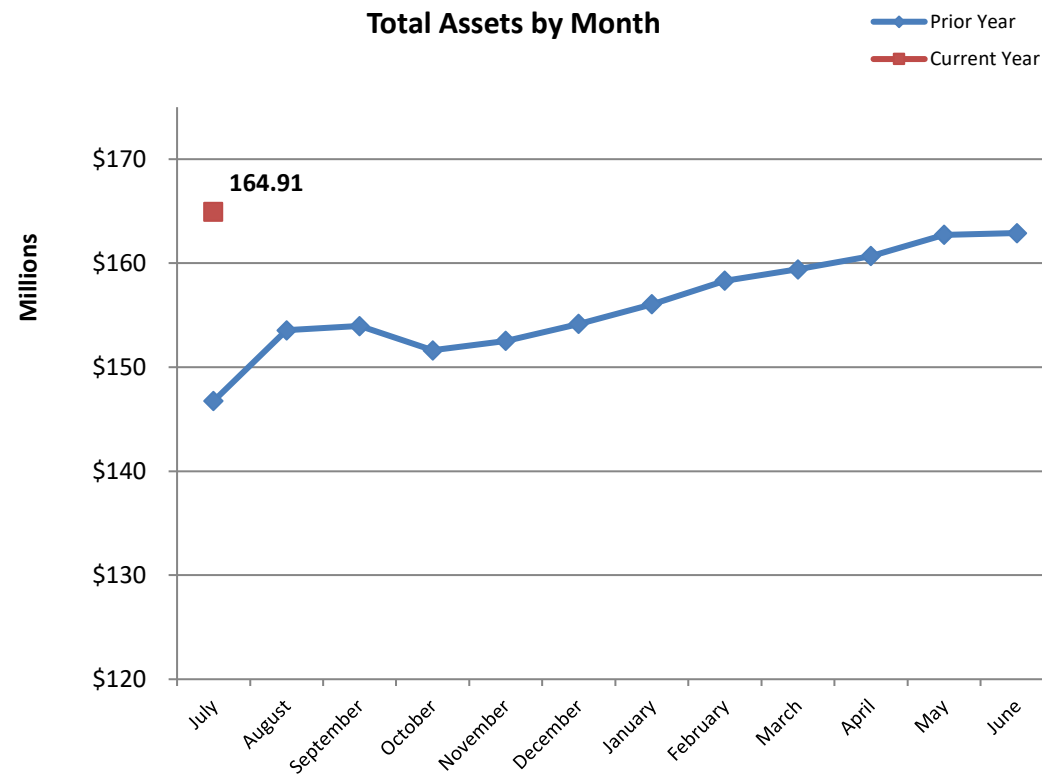
Actual Asset Allocation vs Target Allocation



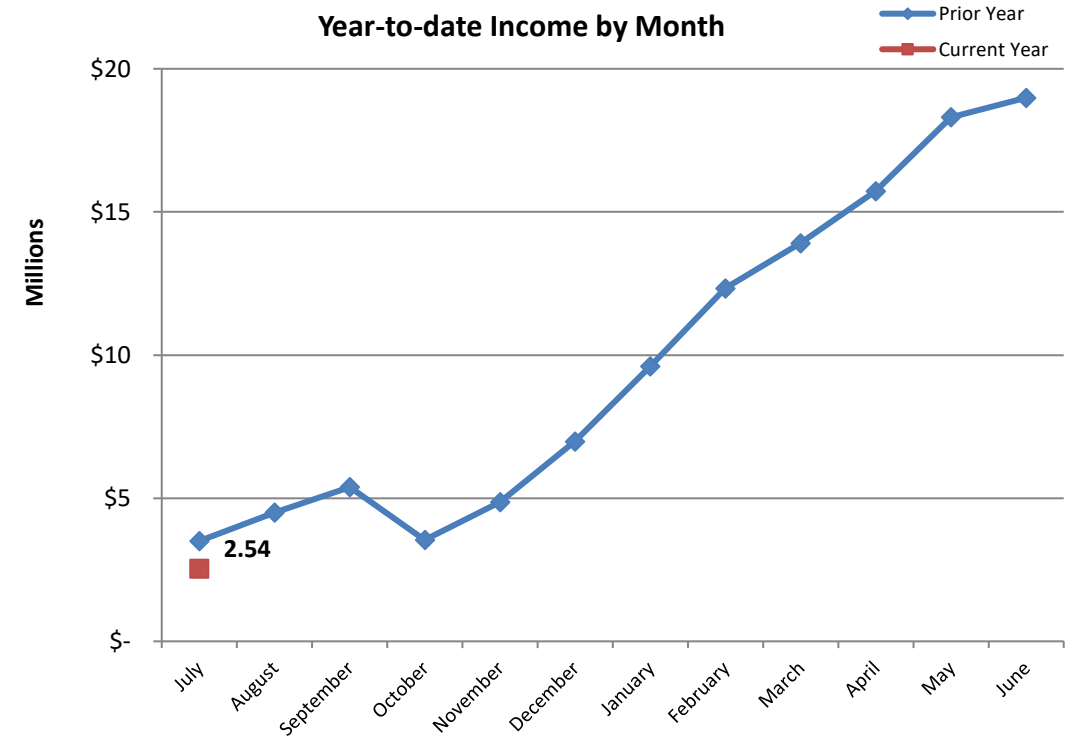
Judicial Retirement Pension Trust Fund

Fiscal Year-to-Date through July 31, 2017

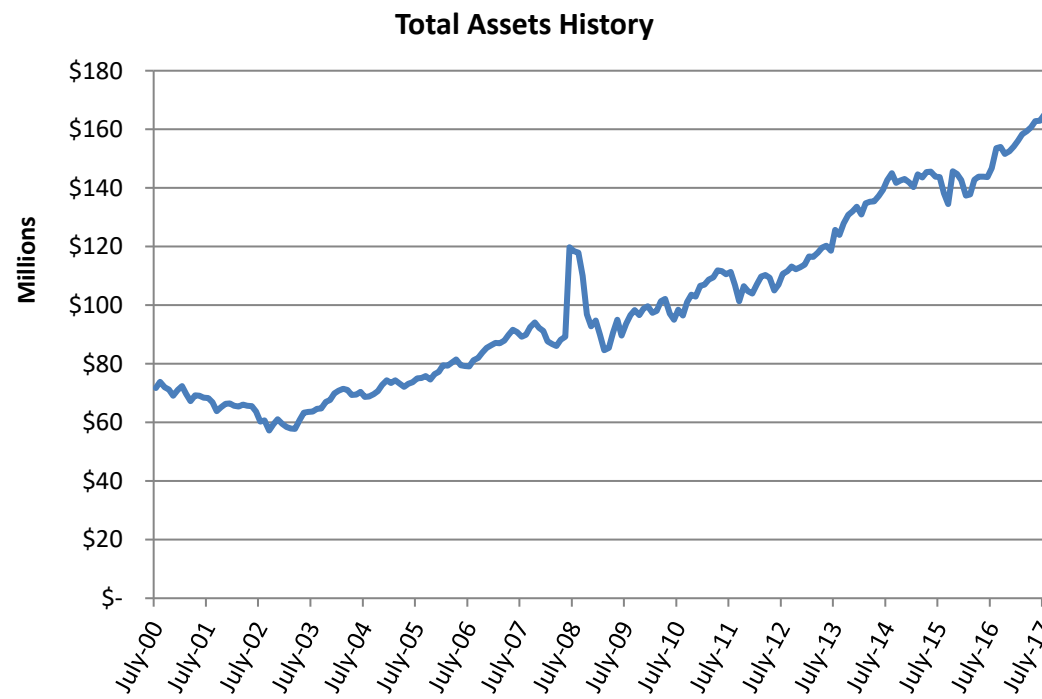
Total Assets by Month



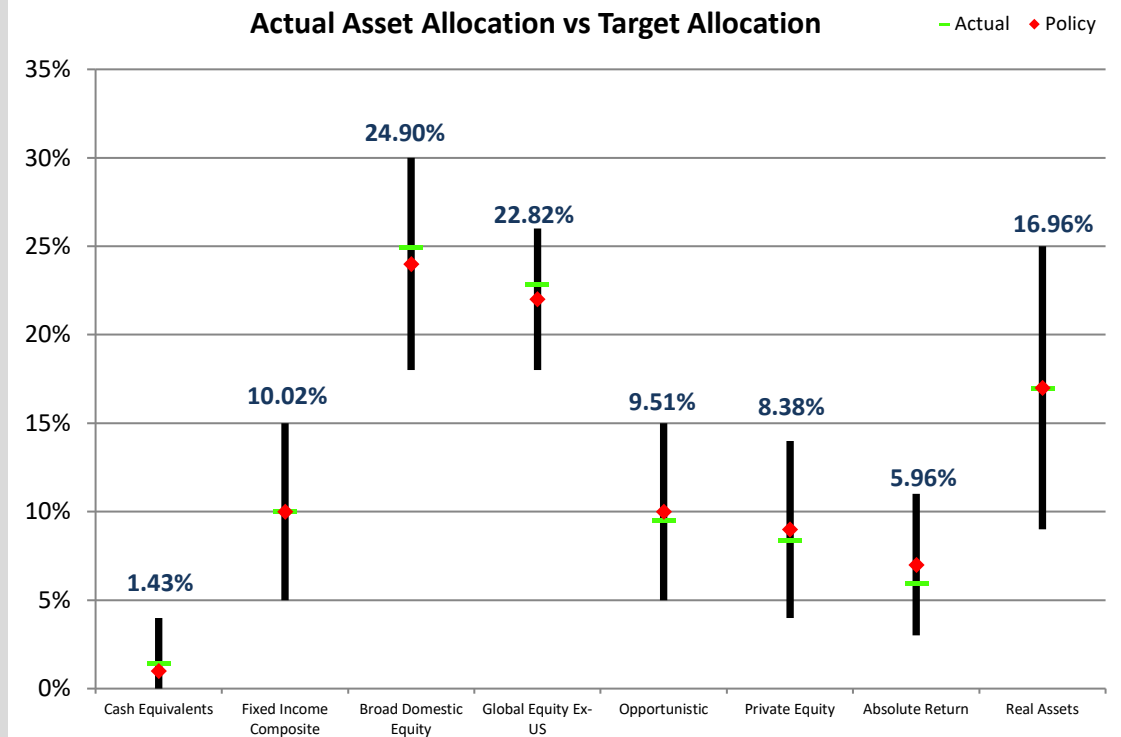
Year-to-date Income by Month



Total Assets History

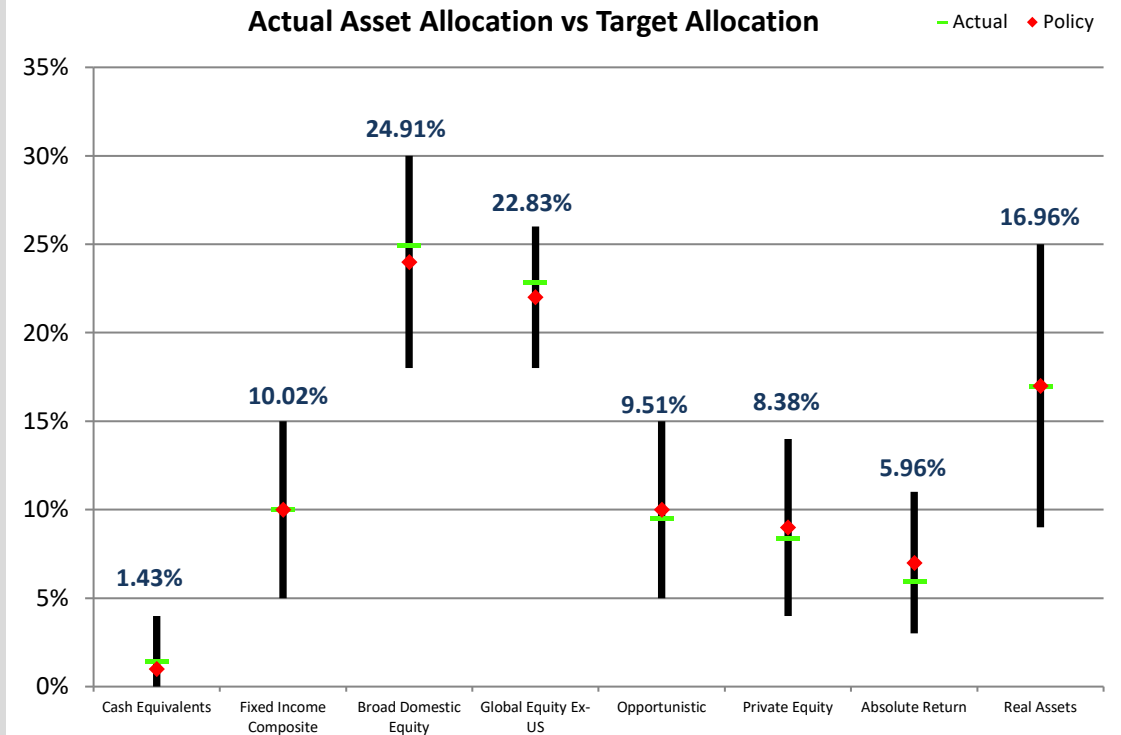
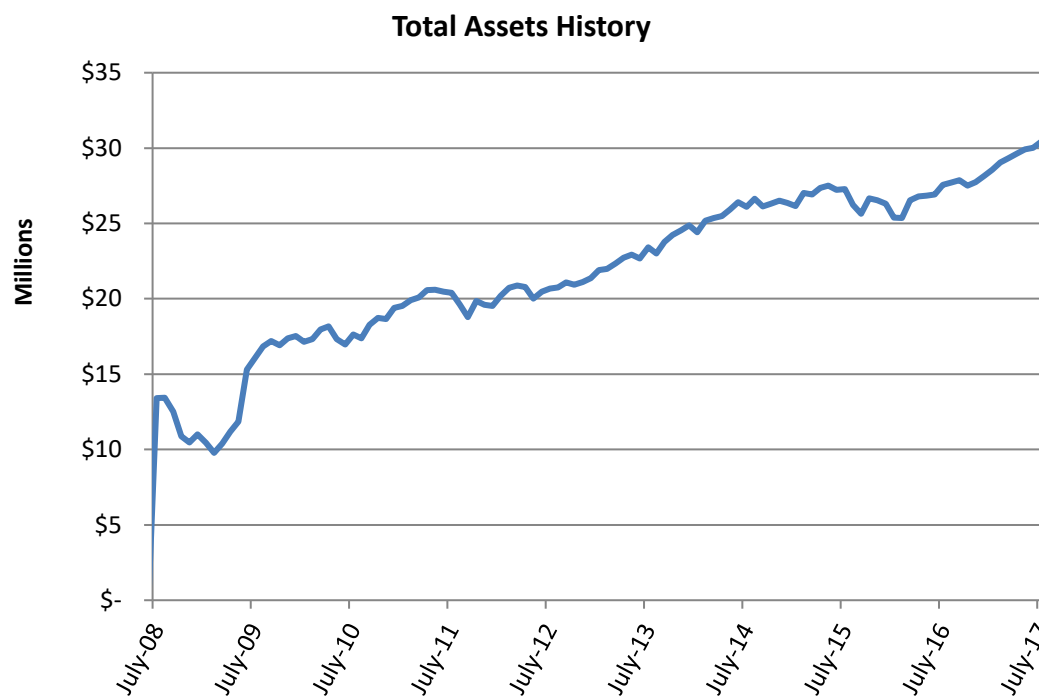
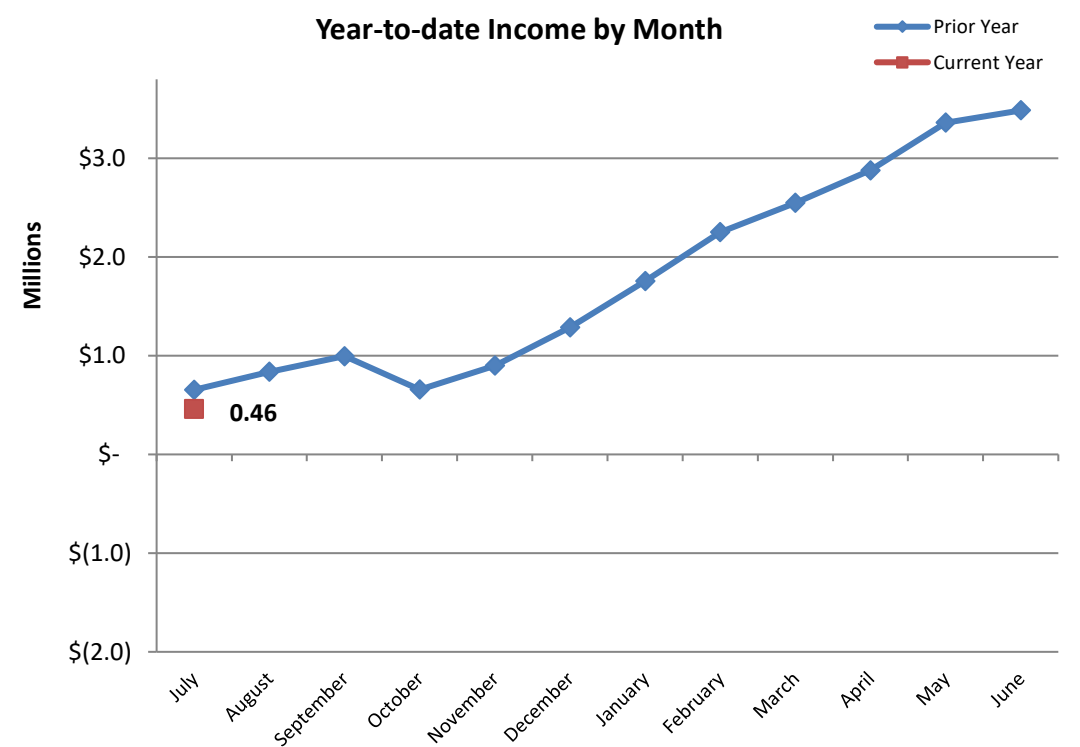
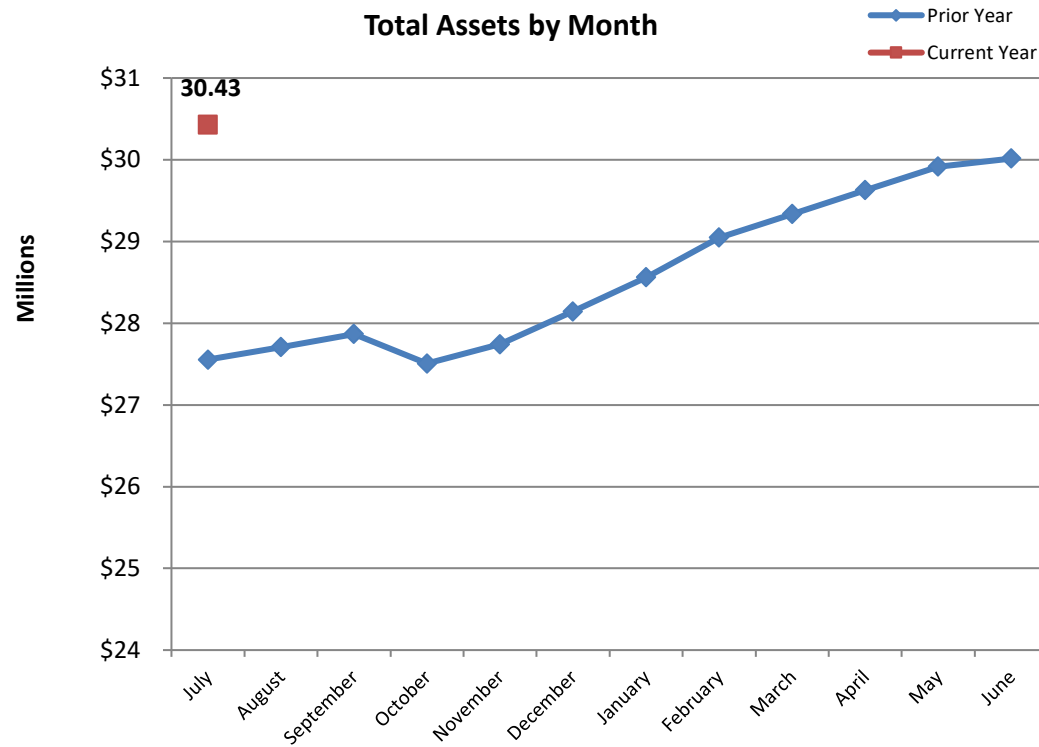


Actual Asset Allocation vs Target Allocation



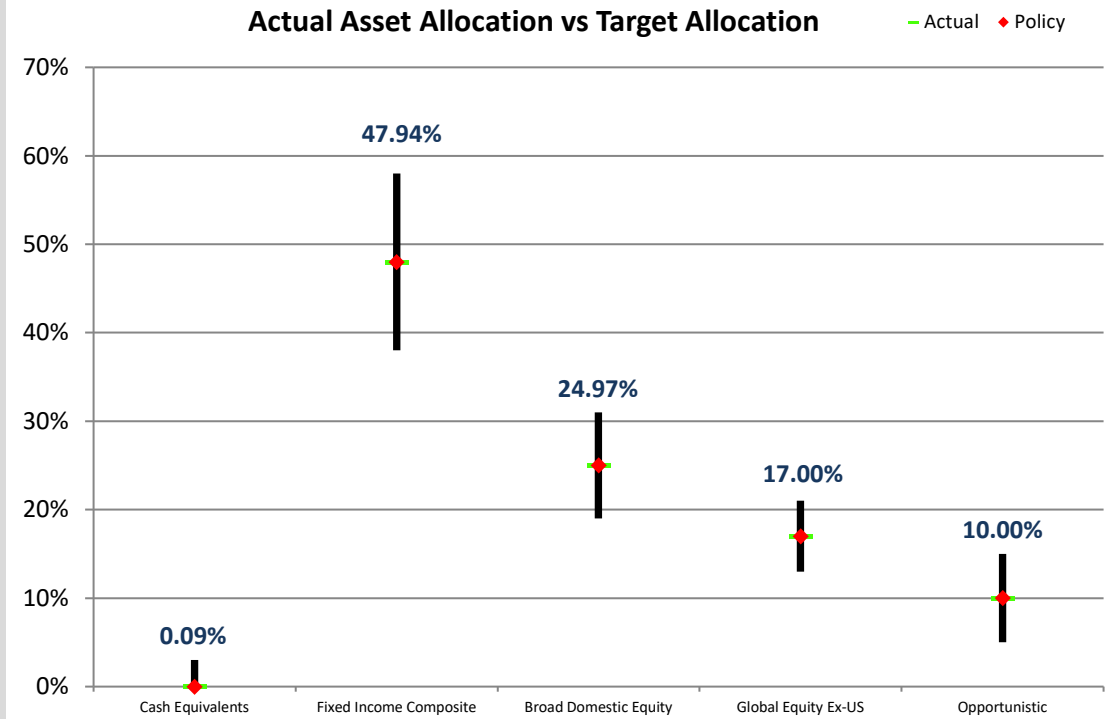
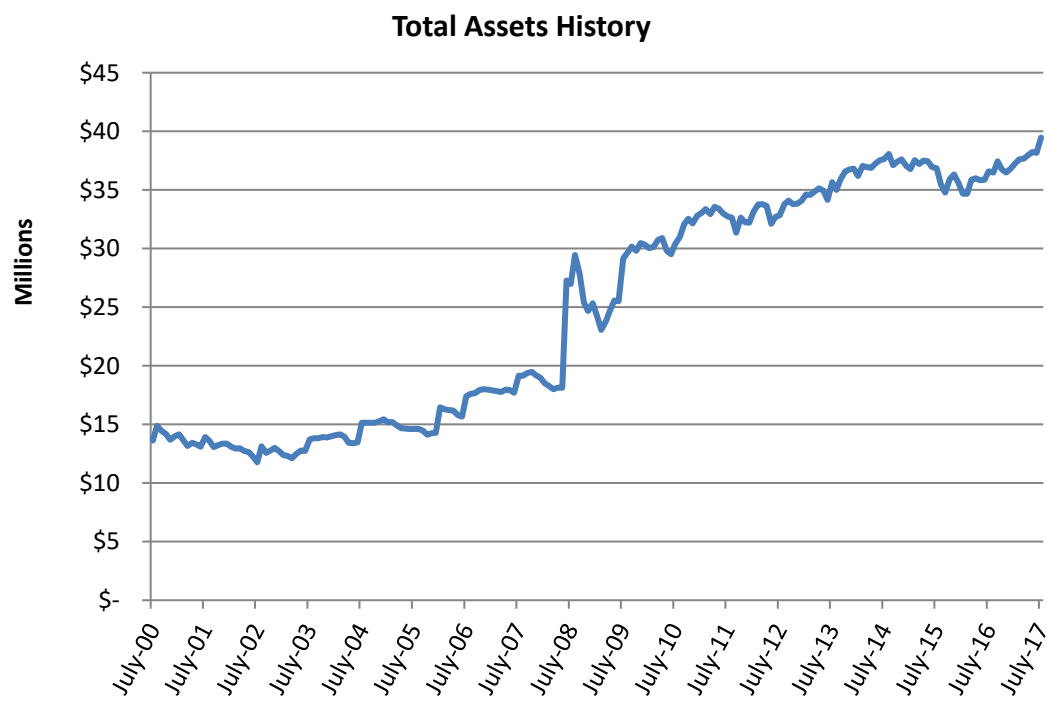
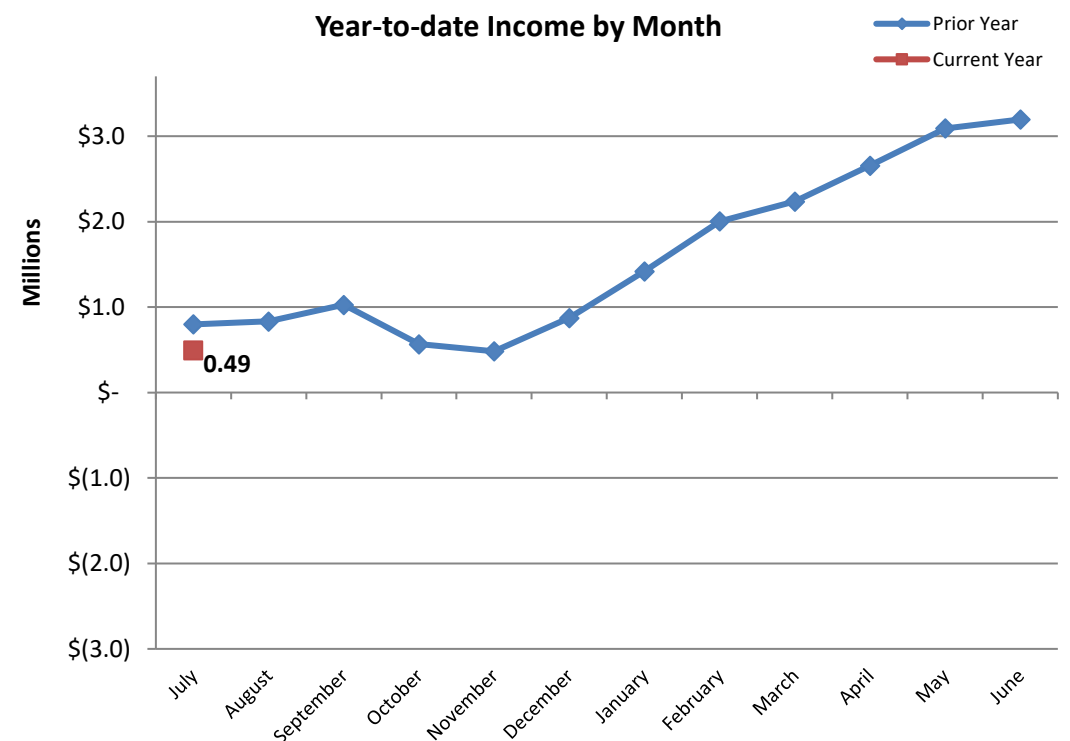
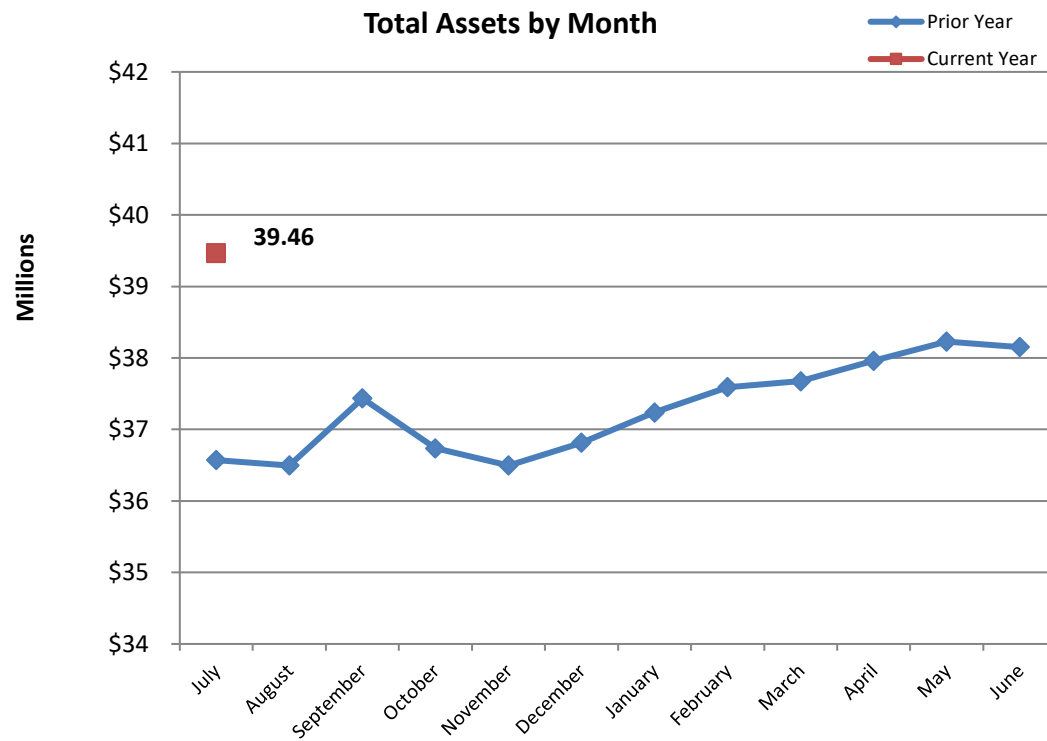
Judicial Retirement Health Care Trust Fund

Fiscal Year-to-Date through July 31, 2017



Military Retirement Trust Fund

Fiscal Year-to-Date through July 31, 2017



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 July 31, 2017

	Beginning Invested Assets	Investment Income	Net Contributions and (Withdrawals)	Ending Invested Assets	% increase (decrease)
Cash					
Short-Term Fixed Income Pool	\$ 486,097,293	\$ 448,172	\$ (123,994,599)	\$ 362,550,866	-25.42%
Securities Lending Income	315,429	251,702	(321,180)	245,951	-22.03%
Total Cash	<u>486,412,722</u>	<u>699,874</u>	<u>(124,315,779)</u>	<u>362,796,817</u>	-25.41%
Fixed Income					
US Treasury Fixed Income	<u>1,927,238,711</u>	<u>9,077,026</u>	<u>625,000,000</u>	<u>2,561,315,737</u>	32.90%
Domestic Equities					
Small Cap Pool					
Passively Managed					
S&P 600 Internally Managed	83,682,889	808,797	174,866	84,666,552	1.18%
SSgA Russell 2000 Growth	10,742	6,744	(10,407)	7,079	-34.10%
SSgA Russell 2000 Value	227,945	6,693	(131,533)	103,105	-54.77%
Total Passive	<u>83,921,576</u>	<u>822,234</u>	<u>32,926</u>	<u>84,776,736</u>	1.02%
Actively Managed					
Barrow, Haney, Mewhinney & Strauss	29,535,649	734,284	-	30,269,933	2.49%
BMO Global Asset Management	75,619,592	1,326,469	-	76,946,061	1.75%
DePrince, Race & Zollo Inc.- Micro Cap	100,917,456	1,929,985	-	102,847,441	1.91%
Fidelity (FIAM) Small Company	138,131,538	1,291,841	-	139,423,379	0.94%
Frontier Capital Mgmt. Co.	75,926,117	1,065,588	-	76,991,705	1.40%
Jennison Associates, LLC	101,267,320	739,200	-	102,006,520	0.73%
Lord Abbett & Co.- Micro Cap	100,805,209	4,176,764	-	104,981,973	4.14%
Lord Abbett Small Cap Growth Fund	54,105,679	979,012	-	55,084,691	1.81%
SSgA Futures Small Cap	2,443,057	151,523	-	2,594,580	6.20%
SSgA Volatility-Russell 2000	93,192,660	231,035	-	93,423,695	0.25%
Transition Account	38,196	36	(32,926)	5,306	-86.11%
Victory Capital Management	141,722,976	2,743,476	-	144,466,452	1.94%
Zebra Capital Management	94,664,492	(2,295,076)	-	92,369,416	-2.42%
Total Active	<u>1,008,369,941</u>	<u>13,074,137</u>	<u>(32,926)</u>	<u>1,021,411,152</u>	1.29%
Total Small Cap	<u>1,092,291,517</u>	<u>13,896,371</u>	<u>-</u>	<u>1,106,187,888</u>	1.27%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended July 31, 2017

Large Cap Pool

Passively Managed

SSgA Russell 1000 Growth	1,170,512,682	31,142,308	-	1,201,654,990	2.66%
SSgA Russell 1000 Value	1,052,180,136	14,022,415	-	1,066,202,551	1.33%
SSgA Russell 200	632,684,278	8,548,585	(300,542,706)	340,690,157	-46.15%
Total Passive	2,855,377,096	53,713,308	(300,542,706)	2,608,547,698	-8.64%

Actively Managed

Allianz Global Investors	229,091,542	5,756,933	-	234,848,475	2.51%
ARMB Equity Yield Strategy	316,297,714	5,234,225	-	321,531,939	1.65%
Barrow, Haney, Mewhinney & Strauss	219,220,809	2,086,093	-	221,306,902	0.95%
Lazard Freres	418,758,590	4,967,364	(104,252,400)	319,473,554	-23.71%
McKinley Capital Mgmt.	219,831,523	5,215,989	-	225,047,512	2.37%
Portable Alpha	480,342,214	12,600,297	(3,000,000)	489,942,511	2.00%
Quantitative Management Assoc.	246,628,965	3,772,212	-	250,401,177	1.53%
S&P 500 Equal Weight	-	793,037	202,683,636	203,476,673	100.00%
Scientific Beta, Internally Managed	206,310,015	3,049,865	-	209,359,880	1.48%
SSgA Futures large cap	2,245,304	333,128	3,000,000	5,578,432	148.45%
Transition Account	19	2,179,319	(2,140,930)	38,408	202047.37%
Total Active	2,338,726,695	45,988,462	96,290,306	2,481,005,463	6.08%
Total Large Cap	5,194,103,791	99,701,770	(204,252,400)	5,089,553,161	-2.01%
Total Domestic Equity	6,286,395,308	113,598,141	(204,252,400)	6,195,741,049	-1.44%

Global Equities Ex US

Small Cap Pool

Mondrian Investment Partners	170,445,398	5,434,977	-	175,880,375	3.19%
Schroder Investment Management	189,357,455	5,439,423	-	194,796,878	2.87%
Total Small Cap	359,802,853	10,874,400	-	370,677,253	3.02%

Large Cap Pool

Allianz Global Investors	285,052,822	10,903,469	-	295,956,291	3.83%
Arrow Street Capital	350,374,336	13,317,972	-	363,692,308	3.80%
Baillie Gifford Overseas Limited	439,197,100	12,923,195	-	452,120,295	2.94%
Blackrock ACWI Ex-US IMI	572,396,609	20,973,249	-	593,369,858	3.66%
Brandes Investment Partners	681,234,546	15,592,183	(50,000,000)	646,826,729	-5.05%
Cap Guardian Trust Co	576,863,911	18,659,023	(75,000,000)	520,522,934	-9.77%
Lazard Freres	385,317,169	11,695,194	(95,747,600)	301,264,763	-21.81%
McKinley Capital Management	584,679,333	16,643,390	(75,000,000)	526,322,723	-9.98%
SSgA Futures International	-	-	-	-	-
State Street Global Advisors	923,691,688	33,681,427	-	957,373,115	3.65%
Total Large Cap	4,798,807,514	154,389,102	(295,747,600)	4,657,449,016	-2.95%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended July 31, 2017

Emerging Markets Equity Pool					
Eaton Vance	273,209,556	12,706,913	-	285,916,469	4.65%
Lazard Asset Management	508,719,648	24,768,905	(50,000,000)	483,488,553	-4.96%
Total Emerging Markets Pool	781,929,204	37,475,818	(50,000,000)	769,405,022	-1.60%
Total Global Equities	5,940,539,571	202,739,320	(345,747,600)	5,797,531,291	-2.41%
Opportunistic					
Alternative Equity Strategy Pool					
Alternative Equity Strategies Transition Account	-	-	-	-	-
Analytic Buy Write Account	288,066,215	3,661,647	-	291,727,862	1.27%
Internally Managed Large Cap.	356,765,183	762,542	-	357,527,725	0.21%
Quantitative Management Associates MPS	166,684,144	1,883,385	-	168,567,529	1.13%
Relational Investors, LLC	1,080,903	-	-	1,080,903	-
SSgA Volatility-Russell 1000	95,680,101	1,022,981	-	96,703,082	1.07%
	908,276,546	7,330,555	-	915,607,101	0.81%
Taxable Municipal Bond Pool					
Guggenheim Partners	102,302,988	812,728	-	103,115,716	0.79%
Western Asset Management	107,463,958	1,363,407	-	108,827,365	1.27%
	209,766,946	2,176,135	-	211,943,081	1.04%
Alternative Fixed Income Pool					
Fidelity Institutional Asset Management.	135,439,061	1,193,064	-	136,632,125	0.88%
Schroders Innsurance Linked Securities	87,656,466	178,659	-	87,835,125	0.20%
	223,095,527	1,371,723	-	224,467,250	0.61%
International Fixed Income Pool					
Mondrian Investment Partners	184,957,183	4,508,713	-	189,465,896	2.44%
High Yield Pool					
Columbia Threadneedle	155,259,571	1,989,004	-	157,248,575	1.28%
Eaton Vance High Yield	127,162,969	1,435,774	-	128,598,743	1.13%
Fidelity Instit. Asset Mgmt. High Yield CMBS	211,540,464	1,466,283	-	213,006,747	0.69%
MacKay Shields, LLC	150,373,933	819,059	-	151,192,992	0.54%
	644,336,937	5,710,120	-	650,047,057	0.89%
Emerging Debt Pool					
Lazard Emerging Income	165,758,016	779,205	-	166,537,221	0.47%
	165,758,016	779,205	-	166,537,221	0.47%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended July 31, 2017

Convertible Bond Pool					
Advent Capital	190,210,495	2,191,534	-	192,402,029	1.15%
Total Opportunistic	2,526,401,650	24,067,985	-	2,550,469,635	0.95%
Private Equity Pool					
Abbott Capital	831,702,993	2,407,453	1,400,599	835,511,045	0.46%
Advent International GPE Fund VIII-B	5,743,617	-	-	5,743,617	-
Angelo, Gordon & Co.	878,368	-	-	878,368	-
Dyal Capital Partners III	19,818,683	119,172	-	19,937,855	0.60%
Glendon Opportunities	30,594,572	-	-	30,594,572	-
KKR Lending Partners II	84,920,768	-	-	84,920,768	-
Lexington Capital Partners VIII	12,212,395	-	2,745,560	14,957,955	22.48%
Lexington Partners VII	29,226,068	-	(781,508)	28,444,560	-2.67%
Merit Capital Partners	17,859,767	-	(2,449,487)	15,410,280	-13.72%
NB SOF III	29,110,756	-	828,755	29,939,511	2.85%
NB SOF IV	1,000,000	-	-	1,000,000	-
New Mountain Partners IV	21,260,621	-	-	21,260,621	-
NGP XI	29,676,943	-	-	29,676,943	-
Onex Partnership III	15,245,752	-	-	15,245,752	-
Pathway Capital Management LLC	908,101,057	2,851,818	(1,137,422)	909,815,453	0.19%
Resolute Fund III	8,226,805	-	-	8,226,805	-
Summit Partners GE IX	2,400,000	-	-	2,400,000	-
Warburg Pincus X	15,457,190	-	(828,257)	14,628,933	-5.36%
Warburg Pincus XI	30,634,009	-	-	30,634,009	-
Warburg Pincus XII	19,878,148	-	6,662,500	26,540,648	33.52%
Total Private Equity	2,113,948,512	5,378,443	6,440,740	2,125,767,695	0.56%
Absolute Return Pool					
Allianz Global Investors	361,323,703	-	-	361,323,703	-
Crestline Investors, Inc.	416,661,916	-	-	416,661,916	-
Crestline Specialty Fund	32,368,827	-	(1,179,534)	31,189,293	-3.64%
Global Asset Management (USA) Inc.	92,023,922	-	(76,000,000)	16,023,922	-82.59%
KKR Apex Equity Fund	94,471,861	(117,596)	-	94,354,265	-0.12%
Prisma Capital Partners	389,718,179	-	-	389,718,179	-
Zebra Global Equity Advantage Fund	70,966,393	(26,404)	-	70,939,989	-0.04%
Zebra Global Equity Fund	132,212,400	46,846	-	132,259,246	0.04%
Total Absolute Return Investments	1,589,747,201	(97,154)	(77,179,534)	1,512,470,513	-4.86%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended July 31, 2017

Real Assets

Farmland Pool

Hancock Agricultural Investment Group	265,623,648	-	-	265,623,648	-
UBS Agrivest, LLC	566,549,096	-	-	566,549,096	-
Total Farmland Pool	832,172,744	-	-	832,172,744	-

Timber Pool

Hancock Natural Resource Group	93,380,538	-	-	93,380,538	-
Timberland Invt Resource LLC	255,921,262	-	-	255,921,262	-
Total Timber Pool	349,301,800	-	-	349,301,800	-

Energy Pool

EIG Energy Fund XD	223,693	(32,610)	-	191,083	-14.58%
EIG Energy Fund XIV-A	13,978,305	(423,798)	-	13,554,507	-3.03%
EIG Energy Fund XV	30,632,298	(413,301)	-	30,218,997	-1.35%
EIG Energy Fund XVI	47,127,261	800,181	-	47,927,442	1.70%
Total Energy Pool	91,961,557	(69,528)	-	91,892,029	-0.08%

REIT Pool

REIT Trans Account	-	-	-	-	-
REIT Holdings	351,325,090	4,177,322	-	355,502,412	1.19%
Total REIT Pool	351,325,090	4,177,322	-	355,502,412	1.19%

TIPS Pool

TIPS Internally Managed Account	55,206,296	266,932	-	55,473,228	0.48%

Master Limited Partnerships

Advisory Research MLP	229,369,062	3,595,746	-	232,964,808	1.57%
Tortoise Capital Advisors	270,580,631	4,375,367	-	274,955,998	1.62%
Total Master Limited Partnerships	499,949,693	7,971,113	-	507,920,806	1.59%

Infrastructure Private Pool

IFM Global Infrastructuer Fund-Private	292,353,491	6,427,756	-	298,781,247	2.20%
JP Morgan Infrastructure Fund-Private	101,470,229	-	-	101,470,229	-
Total Infrastructure Private Pool	393,823,720	6,427,756	-	400,251,476	1.63%

Infrastructure Public Pool

Brookfield Investment Mgmt.-Public	104,164,724	2,998,500	-	107,163,224	2.88%
Lazard Asset Mgmt.-Public	141,123,851	5,301,633	-	146,425,484	3.76%
Total Infrastructure Public Pool	245,288,575	8,300,133	-	253,588,708	3.38%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended July 31, 2017

Real Estate

Core Commingled Accounts					
JP Morgan	246,591,274	3,934,093	(1,924,584)	248,600,783	0.81%
UBS Trumbull Property Fund	148,826,700	1,441,609	23,745,376	174,013,685	16.92%
Total Core Commingled	395,417,974	5,375,702	21,820,792	422,614,468	6.88%
Core Separate Accounts					
LaSalle Investment Management	188,145,998	-	(646,829)	187,499,169	-0.34%
Sentinel Separate Account	189,555,675	-	(1,210,767)	188,344,908	-0.64%
UBS Realty	512,319,449	-	(941,329)	511,378,120	-0.18%
Total Core Separate	890,021,122	-	(2,798,925)	887,222,197	-0.31%
Non-Core Commingled Accounts					
Almanac Realty Securities IV	-	-	-	-	-
Almanac Realty Securities V	4,259,056	-	-	4,259,056	-
Almanac Realty Securities VII	18,112,595	-	227,821	18,340,416	1.26%
BlackRock Diamond Property Fund	286,665	(3,691)	-	282,974	-1.29%
Clarion Ventures 4	18,861,966	-	-	18,861,966	-
Colony Investors VIII, L.P.	5,721,742	-	-	5,721,742	-
Cornerstone Apartment Venture III	41,600	-	-	41,600	-
Coventry	846,028	-	-	846,028	-
ING Clarion Development Ventures III	6,512,091	-	-	6,512,091	-
KKR Real Estate Partners Americas LP.	37,175,943	-	-	37,175,943	-
LaSalle Medical Office Fund II	476	-	-	476	-
Lowe Hospitality Partners	175,598	-	-	175,598	-
Silverpeak Legacy Pension Partners II, L.P.	11,099,992	-	-	11,099,992	-
Silverpeak Legacy Pension Partners III, L.P.	5,611,311	-	-	5,611,311	-
Tishman Speyer Real Estate Venture VI	33,602,927	-	-	33,602,927	-
Tishman Speyer Real Estate Venture VII	5,529,122	-	-	5,529,122	-
Total Non-Core Commingled	147,837,112	(3,691)	227,821	148,061,242	0.15%
Total Real Estate	1,433,276,208	5,372,011	19,249,688	1,457,897,907	1.72%
Total Real Assets	4,252,305,683	32,445,739	19,249,688	4,304,001,110	1.22%
Total Assets	\$ 25,122,989,358	\$ 387,909,374	\$ (100,804,885)	\$ 25,410,093,847	1.14%

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
July 31, 2017

	<u>Beginning Invested Assets</u>	<u>Investment Income</u>	<u>Net Contributions (Withdrawals)</u>	<u>Transfers In (Out)</u>	<u>Ending Invested Assets</u>	<u>% Change in Invested Assets</u>	<u>% Change due to Investment Income (1)</u>
Participant Options							
T. Rowe Price							
Stable Value Fund	\$ 364,821,723	\$ 687,152	\$ (1,147,473)	\$ (155,966)	\$ 364,205,436	-0.17%	0.19%
Small Cap Stock Fund	152,349,464	899,661	103,558	(1,693,326)	151,659,357	-0.45%	0.59%
Alaska Balanced Trust	1,157,931,052	12,301,550	(2,620,965)	(876,114)	1,166,735,523	0.76%	1.06%
Long Term Balanced Fund	591,594,749	9,477,086	1,218,802	1,065,143	603,355,780	1.99%	1.60%
AK Target Date 2010 Trust	10,074,342	123,085	194	47,211	10,244,832	1.69%	1.22%
AK Target Date 2015 Trust	89,018,719	1,234,092	(13,523)	(976,671)	89,262,617	0.27%	1.39%
AK Target Date 2020 Trust	86,815,499	1,433,688	254,165	1,463,587	89,966,939	3.63%	1.64%
AK Target Date 2025 Trust	63,773,860	1,155,005	416,187	319,114	65,664,166	2.96%	1.80%
AK Target Date 2030 Trust	48,435,669	958,383	413,251	181,871	49,989,174	3.21%	1.97%
AK Target Date 2035 Trust	45,556,784	958,502	357,294	18,949	46,891,529	2.93%	2.10%
AK Target Date 2040 Trust	45,011,096	995,341	460,611	(236,892)	46,230,156	2.71%	2.21%
AK Target Date 2045 Trust	49,143,143	1,107,171	547,763	(265,530)	50,532,547	2.83%	2.25%
AK Target Date 2050 Trust	55,553,600	1,252,711	708,677	394,873	57,909,861	4.24%	2.23%
AK Target Date 2055 Trust	43,730,440	987,978	1,085,277	(194,864)	45,608,831	4.30%	2.24%
AK Target Date 2060 Trust	1,081,128	25,614	4,616	233,493	1,344,851	24.39%	2.13%
Total Investments with T. Rowe Price	<u>2,804,891,268</u>	<u>33,597,019</u>	<u>1,788,434</u>	<u>(675,122)</u>	<u>2,839,601,599</u>		
State Street Global Advisors							
State Street Treasury Money Market Fund - Inst.	39,552,275	29,104	(215,296)	(130,844)	39,235,239	-0.80%	0.07%
S&P 500 Stock Index Fund Series A	407,253,815	8,351,554	364,945	(597,001)	415,373,313	1.99%	2.05%
Russell 3000 Index	70,708,068	1,329,510	157,860	(2,067,475)	70,127,963	-0.82%	1.91%
US Real Estate Investment Trust Index	36,754,071	332,501	104,403	(726,869)	36,464,106	-0.79%	0.91%
World Equity Ex-US Index	39,976,453	1,564,895	125,028	3,870,592	45,536,968	13.91%	3.73%
Long US Treasury Bond Index	15,862,545	(99,407)	(122,680)	241,800	15,882,258	0.12%	-0.62%
US Treasury Inflation Protected Securities Index	23,765,033	107,300	10,033	311,974	24,194,340	1.81%	0.45%
World Government Bond Ex-US Index	6,021,933	164,070	17,771	198,506	6,402,280	6.32%	2.68%
Global Balanced Fund	55,148,383	1,159,543	(3,425)	389,766	56,694,267	2.80%	2.10%
Total Investments with SSGA	<u>695,042,576</u>	<u>12,939,070</u>	<u>438,639</u>	<u>1,490,449</u>	<u>709,910,734</u>		
BlackRock							
Government/Credit Bond Fund	41,852,277	168,463	30,235	(1,094,513)	40,956,462	-2.14%	0.41%
Intermediate Bond Fund	41,542,980	132,676	8,959	169,387	41,854,002	0.75%	0.32%
Total Investments with Barclays Global Investors	<u>83,395,257</u>	<u>301,139</u>	<u>39,194</u>	<u>(925,126)</u>	<u>82,810,464</u>		
Brandes/Allianz (2)							
AK International Equity Fund	64,495,096	2,027,517	219,259	90,731	66,832,603	3.62%	3.14%
RCM							
Sustainable Core Opportunities Fund	43,549,205	773,527	18,521	19,068	44,360,321	1.86%	1.78%
Total All Funds	<u>\$ 3,691,373,402</u>	<u>\$ 49,638,272</u>	<u>\$ 2,504,047</u>	<u>\$ -</u>	<u>\$ 3,743,515,721</u>	1.41%	1.34%

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.

(2) This investment is comprised of two funds, Brandes International Equity Fund and Allianz NFJ International Fund effective March 30, 2015.

Supplemental Annuity Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
July 31, 2017
\$ (Thousands)

<u>Invested Assets</u> (at fair value)	<u>July</u>
Investments with T. Rowe Price	
Stable Value Fund	\$ 364,205
Small Cap Stock Fund	151,659
Alaska Balanced Trust	1,166,736
Long Term Balanced Fund	603,356
AK Target Date 2010 Trust	10,245
AK Target Date 2015 Trust	89,263
AK Target Date 2020 Trust	89,967
AK Target Date 2025 Trust	65,664
AK Target Date 2030 Trust	49,989
AK Target Date 2035 Trust	46,892
AK Target Date 2040 Trust	46,230
AK Target Date 2045 Trust	50,533
AK Target Date 2050 Trust	57,910
AK Target Date 2055 Trust	45,609
AK Target Date 2060 Trust	1,345
State Street Global Advisors	
State Street Treasury Money Market Fund - Inst.	39,235
S&P 500 Stock Index Fund Series A	415,373
Russell 3000 Index	70,128
US Real Estate Investment Trust Index	36,464
World Equity Ex-US Index	45,537
Long US Treasury Bond Index	15,882
US Treasury Inflation Protected Securities Index	24,194
World Government Bond Ex-US Index	6,402
Global Balanced Fund	56,694
Investments with BlackRock	
Government/Credit Bond Fund	40,956
Intermediate Bond Fund	41,854
Investments with Brandes/Allianz Institutional	
AK International Equity Fund	66,833
Investments with RCM	
Sustainable Core Opportunities Fund	44,360
Total Invested Assets	\$ <u>3,743,516</u>
<u>Change in Invested Assets</u>	
Beginning Assets	\$ 3,691,373
Investment Earnings	49,638
Net Contributions (Withdrawals)	2,504
Ending Invested Assets	\$ <u>3,743,516</u>

Deferred Compensation Plan
Schedule of Invested Assets and Changes in Invested Assets
for the Month Ended
July 31, 2017

	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
Participant Options							
T. Rowe Price							
Interest Income Fund	\$ 182,473,417	\$ 362,750	\$ (628,957)	\$ (360,663)	\$ 181,846,547	-0.34%	0.20%
Small Cap Stock Fund	100,184,437	594,045	71,099	(351,969)	100,497,612	0.31%	0.59%
Alaska Balanced Trust	24,498,151	262,959	(95,393)	150,865	24,816,582	1.30%	1.07%
Long Term Balanced Fund	50,386,707	818,697	2,692	917,030	52,125,126	3.45%	1.61%
AK Target Date 2010 Trust	4,061,817	49,797	(13,374)	(80,843)	4,017,397	-1.09%	1.24%
AK Target Date 2015 Trust	9,513,029	131,114	(155,779)	12,389	9,500,753	-0.13%	1.39%
AK Target Date 2020 Trust	23,168,633	379,487	92,440	122,612	23,763,172	2.57%	1.63%
AK Target Date 2025 Trust	13,723,908	251,743	138,819	560,548	14,675,018	6.93%	1.79%
AK Target Date 2030 Trust	9,314,218	184,163	101,368	(48,607)	9,551,142	2.54%	1.97%
AK Target Date 2035 Trust	5,816,850	122,849	59,480	(37,418)	5,961,761	2.49%	2.11%
AK Target Date 2040 Trust	5,947,236	134,178	72,296	632,345	6,786,055	14.10%	2.13%
AK Target Date 2045 Trust	4,171,660	93,950	64,304	18,538	4,348,452	4.24%	2.23%
AK Target Date 2050 Trust	3,034,527	68,766	51,102	17,453	3,171,848	4.53%	2.24%
AK Target Date 2055 Trust	3,410,363	76,778	57,520	14,816	3,559,477	4.37%	2.23%
AK Target Date 2060 Trust	108,537	2,462	1,782	207,496	320,277	195.09%	1.15%
Total Investments with T. Rowe Price	<u>439,813,490</u>	<u>3,533,738</u>	<u>(180,601)</u>	<u>1,774,592</u>	<u>444,941,219</u>		
State Street Global Advisors							
State Street Treasury Money Market Fund - Inst.	12,838,004	9,255	(160,265)	(173,623)	12,513,371	-2.53%	0.07%
Russell 3000 Index	36,731,959	689,022	106,422	(769,598)	36,757,805	0.07%	1.89%
US Real Estate Investment Trust Index	13,500,860	126,370	95,213	(666,117)	13,056,326	-3.29%	0.96%
World Equity Ex-US Index	15,008,944	578,288	(2,244)	643,747	16,228,735	8.13%	3.77%
Long US Treasury Bond Index	5,251,393	(33,801)	2,964	(4,154)	5,216,402	-0.67%	-0.64%
US Treasury Inflation Protected Securities Index	10,081,251	46,221	5,288	68,403	10,201,163	1.19%	0.46%
World Government Bond Ex-US Index	2,597,520	71,554	6,487	7,369	2,682,930	3.29%	2.75%
Global Balanced Fund	38,757,307	807,743	(8,964)	(59,364)	39,496,722	1.91%	2.09%
Total Investments with SSGA	<u>134,767,238</u>	<u>2,294,652</u>	<u>44,901</u>	<u>(953,337)</u>	<u>136,153,454</u>		
BlackRock							
S&P 500 Index Fund	200,698,947	4,115,106	69,224	(1,345,062)	203,538,215	1.41%	2.06%
Government/Credit Bond Fund	26,081,108	108,000	6,694	183,056	26,378,858	1.14%	0.41%
Intermediate Bond Fund	22,357,528	72,109	(2,091)	411,505	22,839,051	2.15%	0.32%
Total Investments with Barclays Global Investors	<u>249,137,583</u>	<u>4,295,215</u>	<u>73,827</u>	<u>(750,501)</u>	<u>252,756,124</u>		
Brandes/Allianz (2)							
AK International Equity Fund	35,765,056	1,120,149	120,601	(20,677)	36,985,129	3.41%	3.13%
RCM							
Sustainable Core Opportunities Fund	18,487,465	328,948	29,477	(50,077)	18,795,813	1.67%	1.78%
Total All Funds	<u>\$ 877,970,832</u>	<u>\$ 11,572,702</u>	<u>\$ 88,205</u>	<u>\$ -</u>	<u>\$ 889,631,739</u>	1.33%	1.32%

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.

(2) This investment is comprised of two funds, 50% Brandes International equity Fund and 50% Allianz NFJ International Fund effective March 30, 2015.

Deferred Compensation Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
July 31, 2017
\$ (Thousands)

<u>Invested Assets (at fair value)</u>	<u>July</u>
Investments with T. Rowe Price	
Interest Income Fund	
Cash and cash equivalents	\$ 8,401
Synthetic Investment Contracts	173,446
Small Cap Stock Fund	100,498
Alaska Balanced Trust	24,817
Long Term Balanced Fund	52,125
AK Target Date 2010 Trust	4,017
AK Target Date 2015 Trust	9,501
AK Target Date 2020 Trust	23,763
AK Target Date 2025 Trust	14,675
AK Target Date 2030 Trust	9,551
AK Target Date 2035 Trust	5,962
AK Target Date 2040 Trust	6,786
AK Target Date 2045 Trust	4,348
AK Target Date 2050 Trust	3,172
AK Target Date 2055 Trust	3,559
AK Target Date 2060 Trust	320
State Street Global Advisors	
State Street Treasury Money Market Fund - Inst.	12,513
Russell 3000 Index	36,758
US Real Estate Investment Trust Index	13,056
World Equity Ex-US Index	16,229
Long US Treasury Bond Index	5,216
US Treasury Inflation Protected Securities Index	10,201
World Government Bond Ex-US Index	2,683
Global Balanced Fund	39,497
Investments with BlackRock	
S&P 500 Index Fund	203,538
Government/Credit Bond Fund	26,379
Intermediate Bond Fund	22,839
Investments with Brandes/Allianz	
AK International Equity Fund	36,985
Investments with RCM	
Sustainable Core Opportunities Fund	18,796
Total Invested Assets	\$ 889,632
<u>Change in Invested Assets</u>	
Beginning Assets	\$ 877,971
Investment Earnings	11,573
Net Contributions (Withdrawals)	88
Ending Invested Assets	\$ 889,632

Defined Contribution Retirement - Participant Directed PERS
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
July 31, 2017

	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
Participant Options							
T. Rowe Price							
Alaska Money Market	\$ 5,956,743	\$ 4,809	\$ (146,774)	\$ (393,725)	\$ 5,421,053	-8.99%	0.08%
Small Cap Stock Fund	67,704,555	396,176	170,425	(723,358)	67,547,798	-0.23%	0.59%
Alaska Balanced Trust	15,044,016	172,759	54,611	1,945,299	17,216,685	14.44%	1.08%
Long Term Balanced Fund	11,267,770	186,613	49,502	659,586	12,163,471	7.95%	1.61%
AK Target Date 2010 Trust	2,130,114	26,064	22,234	8	2,178,420	2.27%	1.22%
AK Target Date 2015 Trust	10,401,385	146,611	82,359	5	10,630,360	2.20%	1.40%
AK Target Date 2020 Trust	26,820,275	438,464	273,571	16,024	27,548,334	2.71%	1.63%
AK Target Date 2025 Trust	41,344,636	749,464	467,934	16,677	42,578,711	2.98%	1.80%
AK Target Date 2030 Trust	43,474,556	860,150	445,141	(5,938)	44,773,909	2.99%	1.97%
AK Target Date 2035 Trust	51,055,326	1,074,356	453,918	(93,851)	52,489,749	2.81%	2.10%
AK Target Date 2040 Trust	60,223,086	1,330,361	548,828	46,528	62,148,803	3.20%	2.20%
AK Target Date 2045 Trust	76,159,765	1,714,291	728,651	(59,833)	78,542,874	3.13%	2.24%
AK Target Date 2050 Trust	90,333,549	2,037,038	1,158,455	(35,412)	93,493,630	3.50%	2.24%
AK Target Date 2055 Trust	66,174,286	1,494,214	1,109,767	(100,561)	68,677,706	3.78%	2.24%
AK Target Date 2060 Trust	228,660	5,730	(12,523)	122,445	344,312	50.58%	2.02%
Total Investments with T. Rowe Price	568,318,722	10,637,100	5,406,099	1,393,894	585,755,815		
State Street Global Advisors							
Money Market	4,011,545	3,053	33,073	89,660	4,137,331	3.14%	0.07%
S&P 500 Stock Index Fund Series A	81,118,625	1,662,285	295,539	241,118	83,317,567	2.71%	2.04%
Russell 3000 Index	14,222,395	256,218	101,422	(1,738,430)	12,841,605	-9.71%	1.91%
US Real Estate Investment Trust Index	15,087,736	139,740	41,522	(261,810)	15,007,188	-0.53%	0.93%
World Equity Ex-US Index	39,750,556	1,467,678	82,773	(693,397)	40,607,610	2.16%	3.72%
Long US Treasury Bond Index	1,146,014	(6,986)	12,873	49,038	1,200,939	4.79%	-0.59%
US Treasury Inflation Protected Securities Index	12,539,772	61,651	40,034	896,120	13,537,577	7.96%	0.47%
World Government Bond Ex-US Index	3,546,413	105,911	14,767	302,017	3,969,108	11.92%	2.86%
Global Balanced Fund	18,358,638	370,631	48,008	(1,752,304)	17,024,973	-7.26%	2.12%
Total Investments with SSGA	189,781,694	4,060,181	670,011	(2,867,988)	191,643,898		
BlackRock							
Government/Credit Bond Fund	34,285,617	148,768	98,241	1,435,711	35,968,337	4.91%	0.42%
Intermediate Bond Fund	22,319,487	74,480	62,786	1,118,731	23,575,484	5.63%	0.33%
Total Investments with Barclays Global Investors	56,605,104	223,248	161,027	2,554,442	59,543,821		
Brandes/Allianz (2)							
AK International Equity Fund	42,355,438	1,301,733	111,302	(1,057,076)	42,711,397	0.84%	3.11%
RCM							
Sustainable Core Opportunities Fund	3,812,925	67,866	29,490	(23,272)	3,887,009	1.94%	1.78%
Total All Funds	\$ 860,873,883	\$ 16,290,128	\$ 6,377,929	\$ -	\$ 883,541,940	2.63%	1.89%

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.

(2) This investment is comprised of two funds, 50% Brandes International equity Fund and 50% Allianz NEF International Fund effective March 30, 2015.

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
July 31, 2017
\$ (Thousands)

<u>Invested Assets (at fair value)</u>	<u>July</u>
Investments with T. Rowe Price	
Alaska Money Market	\$ 5,421
Small Cap Stock Fund	67,548
Alaska Balanced Trust	17,217
Long Term Balanced Fund	12,163
AK Target Date 2010 Trust	2,178
AK Target Date 2015 Trust	10,630
AK Target Date 2020 Trust	27,548
AK Target Date 2025 Trust	42,579
AK Target Date 2030 Trust	44,774
AK Target Date 2035 Trust	52,490
AK Target Date 2040 Trust	62,149
AK Target Date 2045 Trust	78,543
AK Target Date 2050 Trust	93,494
AK Target Date 2055 Trust	68,678
AK Target Date 2060 Trust	344
State Street Global Advisors	
Money Market	4,137
S&P 500 Stock Index Fund Series A	83,318
Russell 3000 Index	12,842
US Real Estate Investment Trust Index	15,007
World Equity Ex-US Index	40,608
Long US Treasury Bond Index	1,201
US Treasury Inflation Protected Securities Index	13,538
World Government Bond Ex-US Index	3,969
Global Balanced Fund	17,025
Investments with BlackRock	
Government/Credit Bond Fund	35,968
Intermediate Bond Fund	23,575
Investments with Brandes/Allianz	
International Equity Fund	42,711
Investments with RCM	
Sustainable Core Opportunities Fund	3,887
Total Invested Assets	\$ 883,542
<u>Change in Invested Assets</u>	
Beginning Assets	\$ 860,874
Investment Earnings	16,290
Net Contributions (Withdrawals)	6,378
Ending Invested Assets	\$ 883,542

Defined Contribution Retirement - Participant Directed TRS
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
July 31, 2017

	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
Participant Options							
T. Rowe Price							
Alaska Money Market	\$ 1,994,286	\$ 1,696	\$ (16,179)	\$ (42,700)	\$ 1,937,103	-2.87%	0.09%
Small Cap Stock Fund	28,996,876	171,971	(95,448)	(366,805)	28,706,594	-1.00%	0.60%
Alaska Balanced Trust	6,920,793	79,739	1,322	910,446	7,912,300	14.33%	1.08%
Long Term Balanced Fund	4,840,809	79,973	(4,510)	244,690	5,160,962	6.61%	1.61%
AK Target Date 2010 Trust	547,306	6,461	(24,621)	-	529,146	-3.32%	1.21%
AK Target Date 2015 Trust	3,105,465	43,757	8,497	-	3,157,719	1.68%	1.41%
AK Target Date 2020 Trust	8,019,174	131,642	128,806	-	8,279,622	3.25%	1.63%
AK Target Date 2025 Trust	13,377,971	243,111	39,218	(25,500)	13,634,800	1.92%	1.82%
AK Target Date 2030 Trust	15,466,447	306,335	126,120	-	15,898,902	2.80%	1.97%
AK Target Date 2035 Trust	23,053,613	485,869	70,578	(120,371)	23,489,689	1.89%	2.11%
AK Target Date 2040 Trust	24,265,494	538,329	38,156	(114)	24,841,865	2.38%	2.22%
AK Target Date 2045 Trust	38,429,091	867,365	223,595	-	39,520,051	2.84%	2.25%
AK Target Date 2050 Trust	53,674,663	1,211,300	528,807	(10,008)	55,404,762	3.22%	2.25%
AK Target Date 2055 Trust	21,105,287	481,178	487,906	(7,901)	22,066,470	4.55%	2.25%
AK Target Date 2060 Trust	65,389	1,292	(28)	71,331	137,984	111.02%	1.28%
Total Investments with T. Rowe Price	<u>243,862,664</u>	<u>4,650,018</u>	<u>1,512,219</u>	<u>653,068</u>	<u>250,677,969</u>		
State Street Global Advisors							
Money Market	485,835	343	4,418	(15,477)	475,119	-2.21%	0.07%
S&P 500 Stock Index Fund Series A	33,520,684	687,404	(103,965)	162,402	34,266,525	2.23%	2.05%
Russell 3000 Index	5,300,528	95,440	96	(706,258)	4,689,806	-11.52%	1.93%
US Real Estate Investment Trust Index	5,901,907	54,820	(16,047)	(102,825)	5,837,855	-1.09%	0.94%
World Equity Ex-US Index	17,568,494	648,095	(62,308)	(373,714)	17,780,567	1.21%	3.74%
Long US Treasury Bond Index	259,500	(1,625)	3,072	62	261,009	0.58%	-0.62%
US Treasury Inflation Protected Securities Index	5,131,852	25,478	(29,495)	401,272	5,529,107	7.74%	0.48%
World Government Bond Ex-US Index	1,535,533	45,220	(1,518)	110,124	1,689,359	10.02%	2.84%
Global Balanced Fund	9,187,197	185,197	(11,384)	(843,677)	8,517,333	-7.29%	2.11%
Total Investments with SSGA	<u>78,891,530</u>	<u>1,740,372</u>	<u>(217,131)</u>	<u>(1,368,091)</u>	<u>79,046,680</u>		
BlackRock							
Government/Credit Bond Fund	16,160,455	69,697	(98,729)	652,557	16,783,980	3.86%	0.42%
Intermediate Bond Fund	9,535,606	31,664	(5,374)	477,142	10,039,038	5.28%	0.32%
Total Investments with Barclays Global Investors	<u>25,696,061</u>	<u>101,361</u>	<u>(104,103)</u>	<u>1,129,699</u>	<u>26,823,018</u>		
Brandes/Allianz Institutional (2)							
AK International Equity Fund	17,437,423	536,468	(55,661)	(414,498)	17,503,732	0.38%	3.12%
RCM							
Sustainable Core Opportunities Fund	1,549,945	27,596	8,196	(178)	1,585,559	2.30%	1.78%
Total All Funds	<u>\$ 367,437,623</u>	<u>\$ 7,055,815</u>	<u>\$ 1,143,520</u>	<u>\$ -</u>	<u>\$ 375,636,958</u>	2.23%	1.92%

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.

(2) This investment is comprised of two funds, 50% Brandes International equity Fund and 50% Allianz NFJ International Fund effective March 30, 2015.

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
July 31, 2017
\$ (Thousands)

<u>Invested Assets (at fair value)</u>	<u>July</u>
Investments with T. Rowe Price	
Alaska Money Market	\$ 1,937
Small Cap Stock Fund	28,707
Alaska Balanced Trust	7,912
Long Term Balanced Fund	5,161
AK Target Date 2010 Trust	529
AK Target Date 2015 Trust	3,158
AK Target Date 2020 Trust	8,280
AK Target Date 2025 Trust	13,635
AK Target Date 2030 Trust	15,899
AK Target Date 2035 Trust	23,490
AK Target Date 2040 Trust	24,842
AK Target Date 2045 Trust	39,520
AK Target Date 2050 Trust	55,405
AK Target Date 2055 Trust	22,066
AK Target Date 2060 Trust	138
State Street Global Advisors	
Money Market	475
S&P 500 Stock Index Fund Series A	34,267
Russell 3000 Index	4,690
US Real Estate Investment Trust Index	5,838
World Equity Ex-US Index	17,781
Long US Treasury Bond Index	261
US Treasury Inflation Protected Securities Index	5,529
World Government Bond Ex-US Index	1,689
Global Balanced Fund	8,517
Investments with BlackRock	
Government/Credit Bond Fund	16,784
Intermediate Bond Fund	10,039
Investments with Brandes/Allianz	
AK International Equity Fund	17,504
Investments with RCM	
Sustainable Core Opportunities Fund	1,586
Total Invested Assets	\$ <u>375,637</u>
<u>Change in Invested Assets</u>	
Beginning Assets	\$ 367,438
Investment Earnings	7,056
Net Contributions (Withdrawals)	1,144
Ending Invested Assets	\$ <u>375,637</u>

ALASKA RETIREMENT MANAGEMENT BOARD

FINANCIAL REPORT

(Supplement to the Treasury Division Report)

As of July 31, 2017

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 One Months Ending July 31, 2017

	Contributions				Expenditures				Net
	Contributions EE and ER	State of Alaska	Other	Total Contributions	Benefits	Refunds & Disbursements	Administrative & Investment	Total Expenditures	Contributions/ (Withdrawals)
Public Employees' Retirement System (PERS)									
<u>Defined Benefit Plans:</u>									
Retirement Trust	\$ 26,853,006	\$ -	\$ 27	\$ 26,853,033	\$ (66,618,931)	\$ (761,314)	\$ (285,740)	\$ (67,665,985)	\$ (40,812,952)
Retirement Health Care Trust	9,065,599	-	184,804	9,250,403	(31,864,897)	-	(251,122)	(32,116,019)	(22,865,616)
Total Defined Benefit Plans	35,918,605	-	184,831	36,103,436	(98,483,828)	(761,314)	(536,862)	(99,782,004)	(63,678,568)
<u>Defined Contribution Plans:</u>									
Participant Directed Retirement	11,079,209	-	-	11,079,209	-	(3,386,373)	(1,314,907)	(4,701,280)	6,377,929
Health Reimbursement Arrangement ^(a)	2,670,560	-	-	2,670,560	(3,403)	-	(1,903)	(5,306)	2,665,254
Retiree Medical Plan ^(a)	947,444	-	-	947,444	(2,639)	-	(502)	(3,141)	944,303
Occupational Death and Disability: ^(a)									
Public Employees	119,701	-	-	119,701	(9,594)	-	(117)	(9,711)	109,990
Police and Firefighters	52,264	-	-	52,264	(17,987)	-	(72)	(18,059)	34,205
Total Defined Contribution Plans	14,869,178	-	-	14,869,178	(33,623)	(3,386,373)	(1,317,501)	(4,737,497)	10,131,681
Total PERS	50,787,783	-	184,831	50,972,614	(98,517,451)	(4,147,687)	(1,854,363)	(104,519,501)	(53,546,887)
Teachers' Retirement System (TRS)									
<u>Defined Benefit Plans:</u>									
Retirement Trust	4,728,542	-	708	4,729,250	(37,853,772)	(260,896)	(119,841)	(38,234,509)	(33,505,259)
Retirement Health Care Trust	1,539,859	-	70,323	1,610,182	(9,997,998)	-	(101,164)	(10,099,162)	(8,488,980)
Total Defined Benefit Plans	6,268,401	-	71,031	6,339,432	(47,851,770)	(260,896)	(221,005)	(48,333,671)	(41,994,239)
<u>Defined Contribution Plans:</u>									
Participant Directed Retirement	3,850,967	-	-	3,850,967	-	(2,310,519)	(396,928)	(2,707,447)	1,143,520
Health Reimbursement Arrangement ^(a)	610,783	-	-	610,783	1,600	-	(575)	1,025	611,808
Retiree Medical Plan ^(a)	255,622	-	-	255,622	(2,373)	-	(195)	(2,568)	253,054
Occupational Death and Disability ^(a)	-	-	-	-	-	-	(22)	(22)	(22)
Total Defined Contribution Plans	4,717,372	-	-	4,717,372	(773)	(2,310,519)	(397,720)	(2,709,012)	2,008,360
Total TRS	10,985,773	-	71,031	11,056,804	(47,852,543)	(2,571,415)	(618,725)	(51,042,683)	(39,985,879)
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	474,143	-	-	474,143	(997,892)	-	(2,419)	(1,000,311)	(526,168)
Defined Benefit Retirement Health Care Trust	48,784	-	457	49,241	(93,962)	-	(582)	(94,544)	(45,303)
Total JRS	522,927	-	457	523,384	(1,091,854)	-	(3,001)	(1,094,855)	(571,471)
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust ^(a)	907,231	-	-	907,231	(81,642)	-	(4,788)	(86,430)	820,801
Other Participant Directed Plans									
Supplemental Annuity Plan	14,213,945	-	-	14,213,945	-	(11,212,734)	(497,164)	(11,709,898)	2,504,047
Deferred Compensation Plan	3,552,507	-	-	3,552,507	-	(3,302,567)	(161,735)	(3,464,302)	88,205
Total All Funds	80,970,166	-	256,319	81,226,485	(147,543,490)	(21,234,403)	(3,139,776)	(171,917,669)	(90,691,184)
Total Non-Participant Directed	48,273,538	-	256,319	48,529,857	(147,543,490)	(1,022,210)	(769,042)	(149,334,742)	(100,804,885)
Total Participant Directed	32,696,628	-	-	32,696,628	-	(20,212,193)	(2,370,734)	(22,582,927)	10,113,701
Total All Funds	\$ 80,970,166	\$ -	\$ 256,319	\$ 81,226,485	\$ (147,543,490)	\$ (21,234,403)	\$ (3,139,776)	\$ (171,917,669)	\$ (90,691,184)

(a) Employer only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Month Ended July 31, 2017

	Contributions				Expenditures				Net
	Contributions EE and ER	State of Alaska	Other	Total Contributions	Benefits	Refunds & Disbursements	Administrative & Investment	Total Expenditures	Contributions/ (Withdrawals)
Public Employees' Retirement System (PERS)									
<u>Defined Benefit Plans:</u>									
Retirement Trust	\$ 26,853,006	\$ -	\$ 27	\$ 26,853,033	\$ (66,618,931)	\$ (761,314)	\$ (285,740)	\$ (67,665,985)	\$ (40,812,952)
Retirement Health Care Trust	9,065,599	-	184,804	9,250,403	(31,864,897)	-	(251,122)	(32,116,019)	(22,865,616)
Total Defined Benefit Plans	35,918,605	-	184,831	36,103,436	(98,483,828)	(761,314)	(536,862)	(99,782,004)	(63,678,568)
<u>Defined Contribution Plans:</u>									
Participant Directed Retirement	11,079,209	-	-	11,079,209	-	(3,386,373)	(1,314,907)	(4,701,280)	6,377,929
Health Reimbursement Arrangement ^(a)	2,670,560	-	-	2,670,560	(3,403)	-	(1,903)	(5,306)	2,665,254
Retiree Medical Plan ^(a)	947,444	-	-	947,444	(2,639)	-	(502)	(3,141)	944,303
Occupational Death and Disability: ^(a)									
Public Employees	119,701	-	-	119,701	(9,594)	-	(117)	(9,711)	109,990
Police and Firefighters	52,264	-	-	52,264	(17,987)	-	(72)	(18,059)	34,205
Total Defined Contribution Plans	14,869,178	-	-	14,869,178	(33,623)	(3,386,373)	(1,317,501)	(4,737,497)	10,131,681
Total PERS	50,787,783	-	184,831	50,972,614	(98,517,451)	(4,147,687)	(1,854,363)	(104,519,501)	(53,546,887)
Teachers' Retirement System (TRS)									
<u>Defined Benefit Plans:</u>									
Retirement Trust	4,728,542	-	708	4,729,250	(37,853,772)	(260,896)	(119,841)	(38,234,509)	(33,505,259)
Retirement Health Care Trust	1,539,859	-	70,323	1,610,182	(9,997,998)	-	(101,164)	(10,099,162)	(8,488,980)
Total Defined Benefit Plans	6,268,401	-	71,031	6,339,432	(47,851,770)	(260,896)	(221,005)	(48,333,671)	(41,994,239)
<u>Defined Contribution Plans:</u>									
Participant Directed Retirement	3,850,967	-	-	3,850,967	-	(2,310,519)	(396,928)	(2,707,447)	1,143,520
Health Reimbursement Arrangement ^(a)	610,783	-	-	610,783	1,600	-	(575)	1,025	611,808
Retiree Medical Plan ^(a)	255,622	-	-	255,622	(2,373)	-	(195)	(2,568)	253,054
Occupational Death and Disability ^(a)	-	-	-	-	-	-	(22)	(22)	(22)
Total Defined Contribution Plans	4,717,372	-	-	4,717,372	(773)	(2,310,519)	(397,720)	(2,709,012)	2,008,360
Total TRS	10,985,773	-	71,031	11,056,804	(47,852,543)	(2,571,415)	(618,725)	(51,042,683)	(39,985,879)
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	474,143	-	-	474,143	(997,892)	-	(2,419)	(1,000,311)	(526,168)
Defined Benefit Retirement Health Care Trust	48,784	-	457	49,241	(93,962)	-	(582)	(94,544)	(45,303)
Total JRS	522,927	-	457	523,384	(1,091,854)	-	(3,001)	(1,094,855)	(571,471)
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust ^(a)	907,231	-	-	907,231	(81,642)	-	(4,788)	(86,430)	820,801
Other Participant Directed Plans									
Supplemental Annuity Plan	14,213,945	-	-	14,213,945	-	(11,212,734)	(497,164)	(11,709,898)	2,504,047
Deferred Compensation Plan	3,552,507	-	-	3,552,507	-	(3,302,567)	(161,735)	(3,464,302)	88,205
Total All Funds	80,970,166	-	256,319	81,226,485	(147,543,490)	(21,234,403)	(3,139,776)	(171,917,669)	(90,691,184)
Total Non-Participant Directed	48,273,538	-	256,319	48,529,857	(147,543,490)	(1,022,210)	(769,042)	(149,334,742)	(100,804,885)
Total Participant Directed	32,696,628	-	-	32,696,628	-	(20,212,193)	(2,370,734)	(22,582,927)	10,113,701
Total All Funds	\$ 80,970,166	\$ -	\$ 256,319	\$ 81,226,485	\$ (147,543,490)	\$ (21,234,403)	\$ (3,139,776)	\$ (171,917,669)	\$ (90,691,184)

(a) Employer only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the One Months Ending July 31, 2017

PARTICIPANT DIRECTED DISBURSEMENTS BY PLAN AND BY TYPE

	PERS DCR Plan	TRS DCR Plan	Supplemental Annuity Plan	Deferred Compensation	TOTAL	% of Total
Payment to Beneficiary	\$ 4,451	\$ -	\$ 4,400	\$ 9,668	\$ 18,519	0.1%
Death Benefit	2,031	-	170,575	112,823	285,429	1.4%
Disability / Hardship	-	-	266	2,223	2,489	0.0%
Minimum Required Distribution	927	2,401	406,313	166,838	576,479	2.9%
Qualified Domestic Relations Order	39,904	-	408,010	33,169	481,083	2.4%
Separation from Service / Retirement	3,339,060	2,308,118	10,089,808	2,909,547	18,646,533	92.3%
Purchase of Service Credit	-	-	133,362	68,299	201,661	1.0%
Transfer to a Qualifying Plan	-	-	-	-	-	0.0%
TOTAL	<u>\$ 3,386,373</u>	<u>\$ 2,310,519</u>	<u>\$ 11,212,734</u>	<u>\$ 3,302,567</u>	<u>\$ 20,212,193</u>	<u>100.0%</u>

Notes for the DRB Supplement to the Treasury Report July 2017

This report is the DRB supplement to the Financial Report presented by the Treasury Division, and expands their “Net Contributions (Withdrawals)” column into contributions and expenditures. It shows contributions received from both employers and employees, contributions from the State of Alaska, and other non-investment income. It also breaks out 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 Report. Page one shows the year-to-date totals for the first month of Fiscal Year 2018, while page two shows the month of July 2017.

Highlights – On page one, for the one month ending July 31, 2017:

- PERS DB Pension – Employer and employee contributions of \$26.9 million; benefit payments of approximately \$66.6 million; refunds of \$761 thousand and Administrative and Investment expenditures of \$286 thousand (DOR and DRB).
- PERS DB Healthcare – Employer contributions of \$9.1 million; other income of \$183 thousand from Rx rebates and \$2 thousand other; benefit payments of approximately \$31.9 million; and Administrative and Investment expenditures of \$251 thousand (DOR and DRB).
- PERS DC Pension – Employer and employee contributions of \$11.1 million; participant disbursements of \$3.4 million; and Administrative and Investment expenditures of \$1.3 million (DOR and DRB).
- PERS DC Health – For HRA, RMP, and OD&D, only employer contributions on behalf of participating employees; currently eleven (11) benefits are being paid from the Occupational Death & Disability plans; 5 are for Public Employees and 6 are for Police and Firefighters, 9 due to disability and 2 due to death. Currently 6 retirees are participating in RMP and 8 are participating in HRA. Administrative and Investment expenditures were approximately \$3 thousand.
- TRS DB Pension - Employer and employee contributions of \$4.7 million; benefit payments of approximately \$37.9 million; refunds of \$261 thousand; and Administrative and Investment expenditures of \$120 thousand (DOR and DRB).
- TRS DB Healthcare – Employer contributions of \$1.5 million; other income of \$69 thousand from Rx rebates and \$1 thousand other; benefit payments of approximately \$10 million; and Administrative and Investment expenditures of \$101 thousand (DOR and DRB).
- TRS DC Pension – Employer and employee contributions of \$3.9 million; participant disbursements of \$2.3 million; and Administrative and investment expenditures of \$397 thousand (DOR and DRB).

- TRS DC Health – For HRA, RMP, and OD&D, only employer contributions on behalf of participating employees; currently no benefits paid from any category; and minor Administrative and Investment expenditures for each category (DOR and DRB).
- JRS Pension – Employer and employee contributions of \$474 thousand; benefit payments of approximately \$998 thousand; and Administrative and Investment expenditures of \$2 thousand (DOR and DRB).
- JRS Healthcare – Employer contributions of \$49 thousand; other income from Rx rebates of \$457; benefit payments of \$94 thousand; and Administrative and Investment expenditures of \$582 per. (DOR and DRB).
- NGNMRS – Annual contribution from DMVA in the amount of \$907 thousand was received; combination of lump-sum and monthly benefit payments of \$82 thousand; and Administrative and Investment expenditures of approximately \$5 thousand (DOR and DRB).
- SBS – Employer and employee contributions and transfers in of \$14.2 million. Participant disbursements of \$11.2 million; and Administrative and Investment expenditures of \$497 thousand (DOR and DRB).
- Deferred Compensation – Member-only contributions and transfers in of \$3.6 million; participant disbursements of \$3.3; and Administrative and Investment expenditures of \$162 thousand (DOR and DRB).

Highlights – On page two, activity for the one month ending July 31, 2017 only:

- PERS DB Pension – Benefit payments of approximately \$66.6 million exceeded the monthly high of \$65.7 million in Fy17. The monthly average in Fy17 was \$64.2 million.
- PERS DB Healthcare – nothing significant to report
- PERS DC Pension – Administrative and Investment expenditures of \$1.3 million exceeded the monthly high of \$933 thousand in Fy17. The monthly average in Fy17 was \$231 thousand.
- PERS DC Health – nothing significant to report
- TRS DB Pension – Administrative and Investment expenditures of \$120 thousand are lower than the monthly low of \$127 thousand in Fy17. The monthly average in Fy17 was \$525 thousand.
- TRS DB Healthcare – nothing significant to report

- TRS DC Pension – Administrative and investment expenditures of \$397 thousand exceeded the monthly high of \$230 thousand in Fy17. The monthly average in Fy17 was \$84 thousand.
- TRS DC Health – nothing significant to report
- JRS Pension – nothing significant to report
- JRS Healthcare – nothing significant to report.
- NGNMRS – Administrative and investment expenditures of \$5 thousand are lower than the monthly low of \$9 thousand in Fy17. The monthly average in Fy17 was \$19 thousand.
- SBS – Participant disbursements of \$11.2 million were lower than the monthly low of \$13.5 million in Fy17. The monthly average in Fy17 was 17.4 million.
- Deferred Compensation – Administrative and Investment expenditures of \$162 thousand exceeded the monthly high of \$157 thousand in Fy17. The monthly average in Fy17 was \$128 thousand.

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

October 6, 2017



ARMB Board Meeting

Investment Performance
Periods Ended June 30, 2017

Steve Center, CFA
Senior Vice President

Paul Erlendson
Senior Vice President

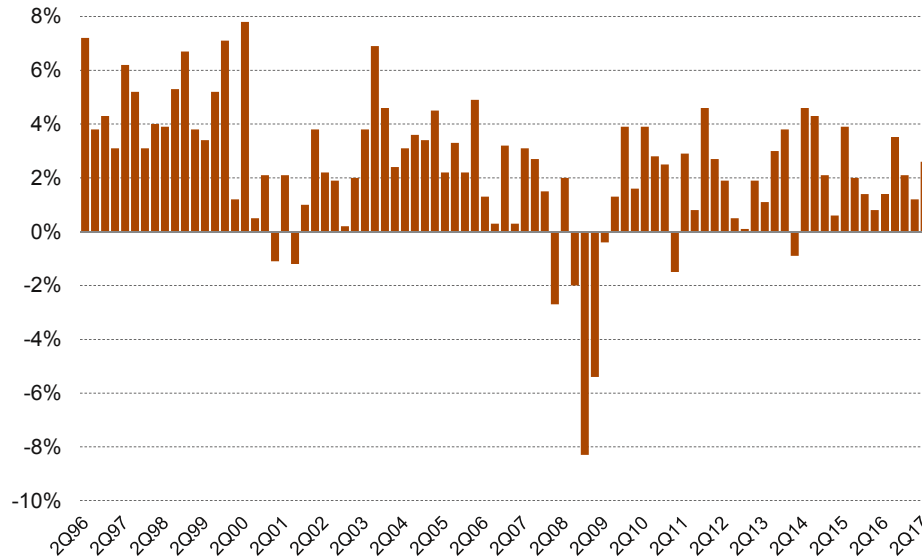
Agenda

- Market and Economic Environment
- Total Fund Performance
 - Major Asset Classes

U.S. Economy

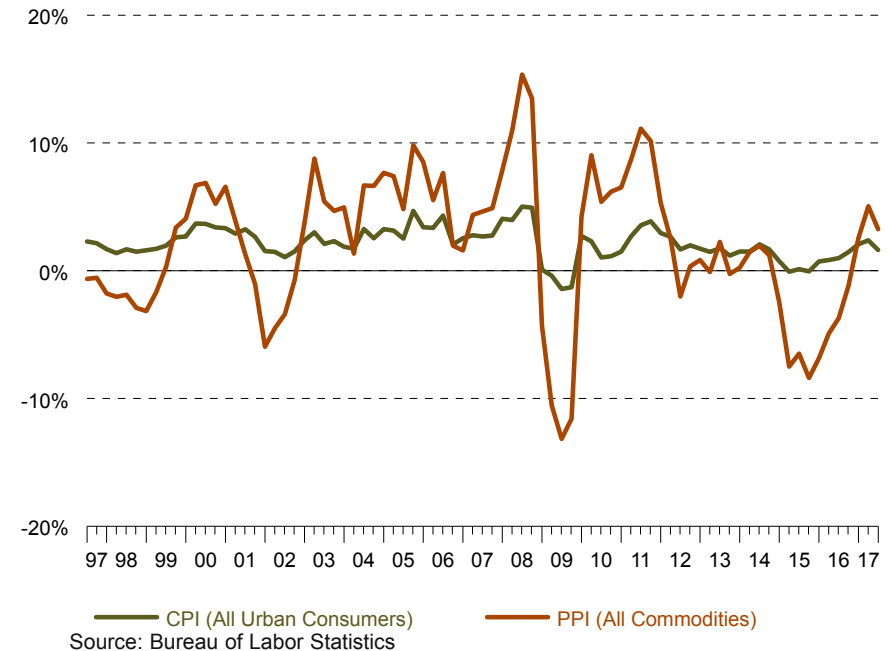
Periods Ending June 30, 2017

Quarterly Real GDP Growth (20 Years)



Source: Bureau of Economic Analysis

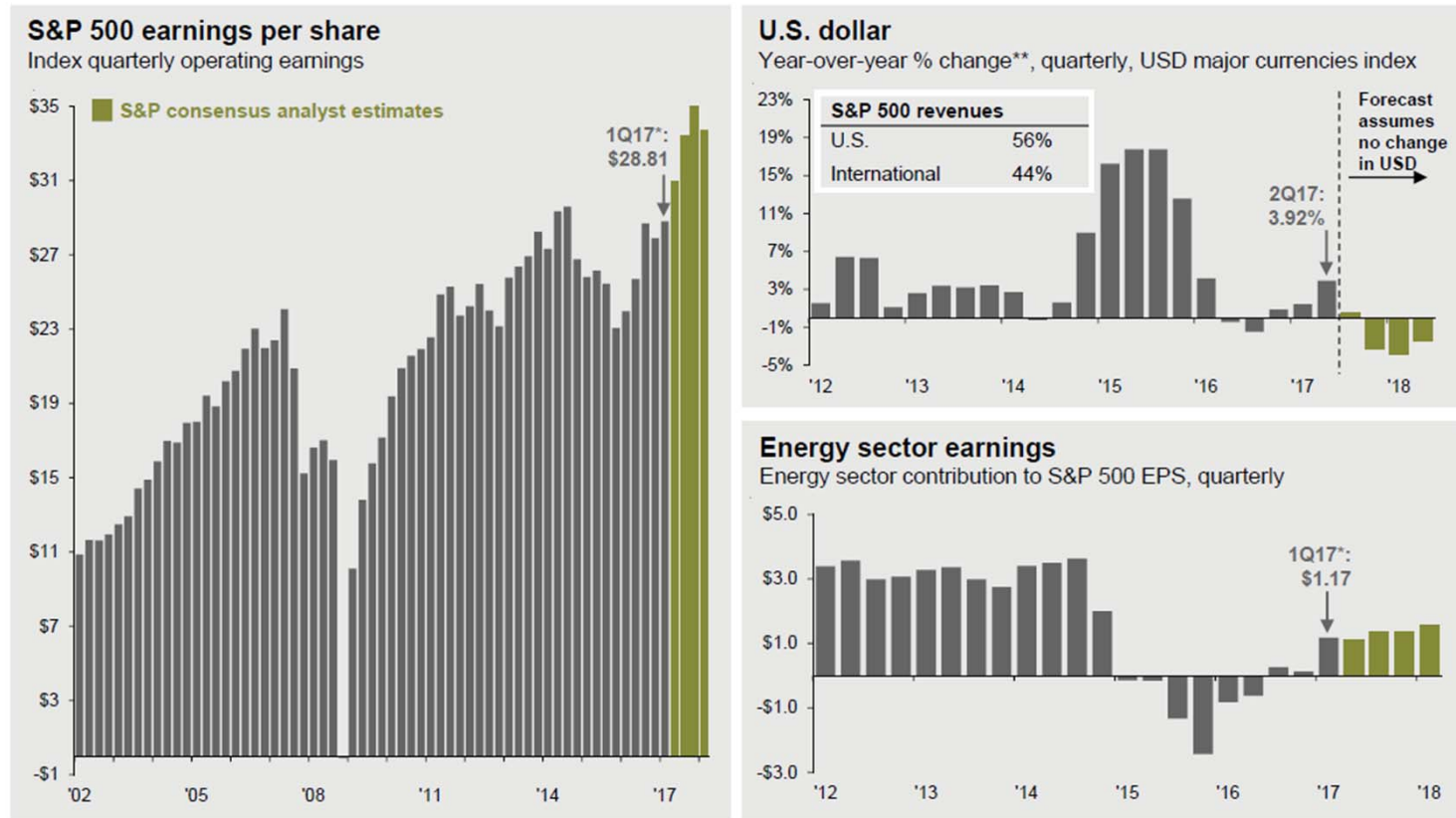
Inflation Year-Over-Year



— CPI (All Urban Consumers) — PPI (All Commodities)
Source: Bureau of Labor Statistics

- The initial estimate of 2nd quarter GDP was 2.6%, in-line with expectations and stronger than Q1's 1.4%.
- June headline inflation rose 1.6% over the trailing twelve months. Core CPI increased 1.7%.
- June unemployment was 4.4% (down 0.1% from March) while the labor force participation rate fell to 62.8% (down 0.2%).
- The Fed increased the target overnight rate to 1.00% - 1.25% on June 15.

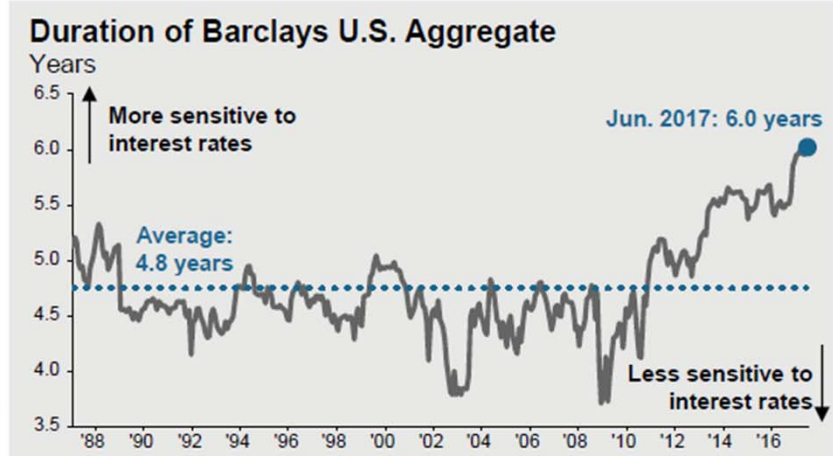
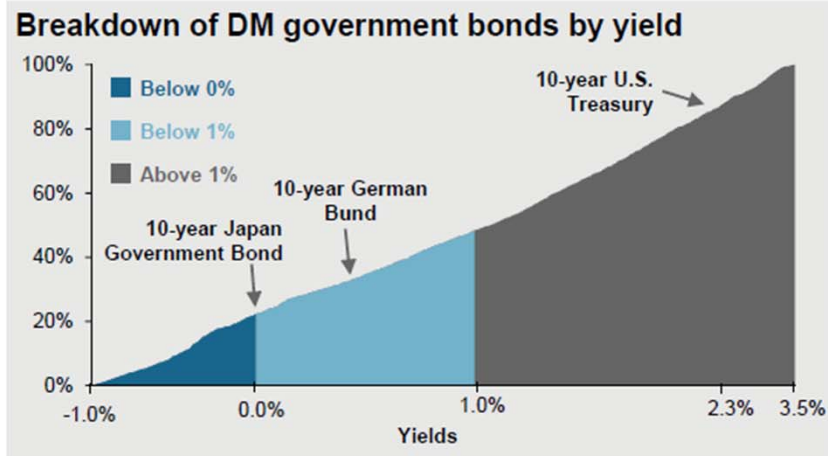
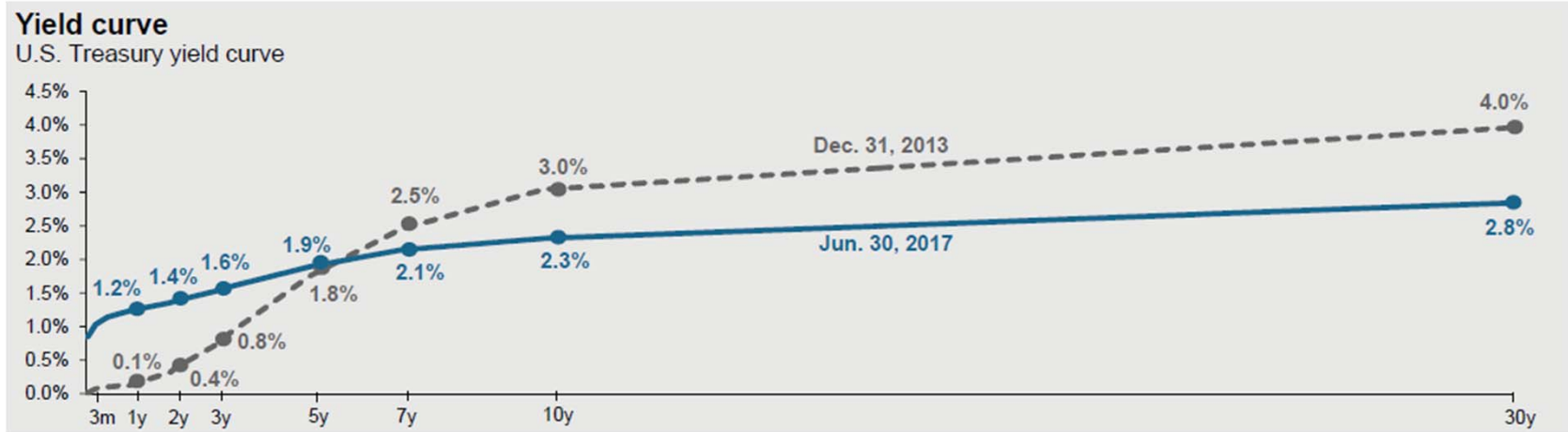
Corporate Earnings



- Earnings lifted U.S. equities higher in the quarter, driven by a few key factors:
 - A boost to exports from a weaker dollar
 - Wages have increased enough to support consumer spending yet labor costs have not weighed on profits
 - The energy sector's earnings drag at the broad index level has abated
 - Companies are benefitting from years of extensive cost-cutting

Source: Compustat, FactSet, Standard & Poor's, J.P. Morgan Asset Management; (Top right) Federal Reserve, S&P 500 individual company 10k filings, S&P Index Alert. EPS levels are based on operating earnings per share. Earnings estimates are Standard & Poor's consensus analyst expectations. Past performance is not indicative of future returns. Currencies in the Trade Weighted U.S. Dollar Major Currencies Index are: British pound, euro, Swedish krona, Australian dollar, Canadian dollar, Japanese yen and Swiss franc. *1Q17 earnings are calculated using actual earnings for 98.6% of S&P 500 market cap and earnings estimates for the remaining companies. **Year-over-year change is calculated using the quarterly average for each period. USD forecast assumes no change in the U.S. dollar from its June 30, 2017 level. Guide to the Markets – U.S. Data are as of June 30, 2017.

Bond Market Dynamics



- Historically high duration means the U.S. Aggregate is more sensitive to interest rate changes; however, higher yields in the U.S. relative to other developed markets increases global demand which could slow the pace at which long rates rise.

Source: FactSet, J.P. Morgan Asset Management; (Bottom left) Bloomberg, BofA/Merrill Lynch. (Bottom right) Barclays, Bloomberg. The Developed Market Government Bond Index is the Bank of America/Merrill Lynch Global Government Index. Duration measures the sensitivity of the price of a bond to a change in interest rates. The higher the duration the greater the sensitivity bond is to movements in the interest rate. Guide to the Markets – U.S. Data are as of June 30, 2017.

Asset Class Performance

Periodic Table of Investment Returns
for Periods Ended June 30, 2017

Best



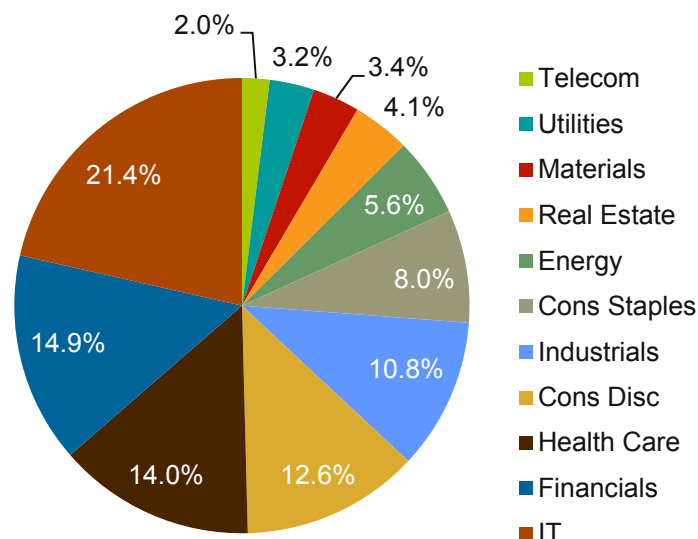
Worst

Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 20 Years
MSCI:EM Gross 6.4%	Russell:2000 Index 24.6%	S&P:500 9.6%	S&P:500 14.6%	S&P:500 7.2%	Russell:2000 Index 8.0%
MSCI:EAFE 6.1%	MSCI:EM Gross 24.2%	Russell:2000 Index 7.4%	Russell:2000 Index 13.7%	Russell:2000 Index 6.9%	S&P:500 7.2%
S&P:500 3.1%	MSCI:EAFE 20.3%	Blmbg:Aggregate 2.5%	MSCI:EAFE 8.7%	Blmbg:Aggregate 4.5%	MSCI:EM Gross 5.8%
Russell:2000 Index 2.5%	S&P:500 17.9%	MSCI:EM Gross 1.4%	MSCI:EM Gross 4.3%	MSCI:EM Gross 2.2%	Blmbg:Aggregate 5.2%
Blmbg:Aggregate 1.4%	3 Month T-Bill 0.5%	MSCI:EAFE 1.1%	Blmbg:Aggregate 2.2%	MSCI:EAFE 1.0%	MSCI:EAFE 4.3%
3 Month T-Bill 0.2%	Blmbg:Aggregate (0.3%)	3 Month T-Bill 0.2%	3 Month T-Bill 0.2%	3 Month T-Bill 0.6%	3 Month T-Bill 2.2%
Blmbg:Commodity Price Idx (3.2%)	Blmbg:Commodity Price Idx (7.0%)	Blmbg:Commodity Price Idx (15.0%)	Blmbg:Commodity Price Idx (9.4%)	Blmbg:Commodity Price Idx (6.9%)	Blmbg:Commodity Price Idx (1.8%)

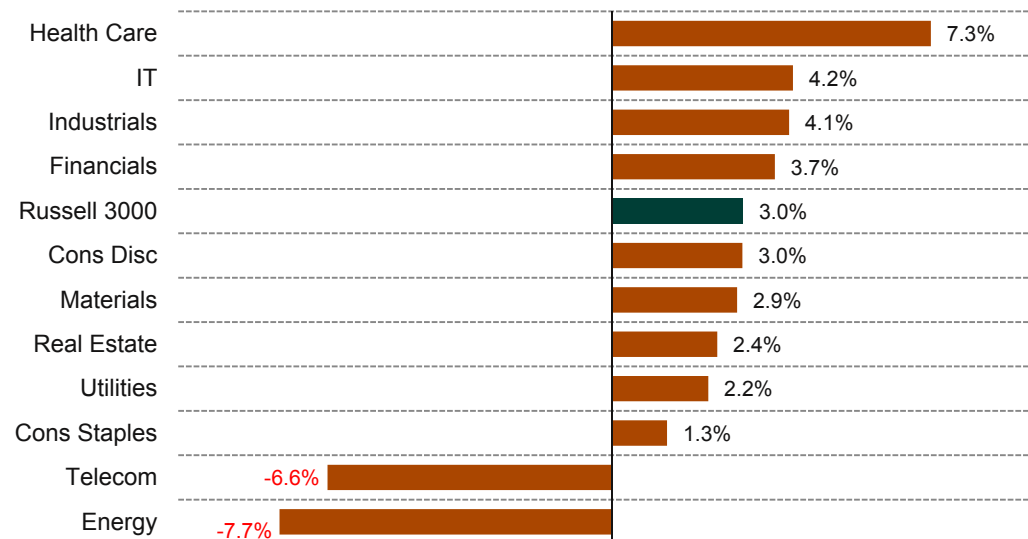
U.S. Equity Returns

Periods Ending June 30, 2017

Economic Sector Exposure (Russell 3000)



Quarterly Returns (Russell 3000)



Source: Barrow Hanley Quarterly Benchmark Review

- The RU 1000 was up 3.1% - Health Care (+7.2%) and Industrials (+4.3%) were the best performing sectors.
- The RU 2000 was up 2.5% - Telecom (+15.5%) and Health Care (+8.8%) were the best performing sectors.
- S&P 500 companies reported the strongest quarterly earnings growth rate in six years and 70% of companies reported earnings above expectations.

U.S. Equity Style Returns

Periods Ending June 30, 2017

2Q 2017				Annualized 1 Year Returns				
	Value	Core	Growth		Value	Core	Growth	
Large	1.3%	3.1%	4.7%	Large	15.5%	18.0%	20.4%	 Represents 3 best performing asset classes in time period
Mid	1.4%	2.7%	4.2%	Mid	15.9%	16.5%	17.1%	 Represents 3 middle performing asset classes in time period
Small	0.7%	2.5%	4.4%	Small	24.9%	24.6%	24.4%	 Represents 3 worst performing asset classes in time period

- Last Quarter: Large outperformed except in value, which was led by mid; growth outperformed.
 - Strong earnings and continued flows into passive strategies, particularly ETFs, buoyed large cap.
 - Growth stocks Facebook, Amazon, Apple, Microsoft, and Google accounted for 22% of the S&P 500's quarterly return.
- Last Year: Small outperformed; growth outperformed except in small cap where value edged growth.

Large Cap Core is represented by the Russell 1000 Index, Large Cap Value is represented by the Russell 1000 Value Index and Large Cap Growth is represented by the Russell 1000 Growth Index. Mid Cap Core is represented by the Russell Midcap Index, Mid Cap Value is represented by the Russell Midcap Value Index and Mid Cap Growth is represented by the Russell Midcap Growth Index. Small Cap Core is represented by the Russell 2000 Index, Small Cap Value is represented by the Russell 2000 Value Index and Small Cap Growth is represented by the Russell 2000 Growth Index.

A comparison of US Stock Market Conditions

Characteristics of U.S. Stock Market	1976	1996	2016	
Number of listed companies	4,796	7,322	3,671	➔ Fewer than ever
Market capitalization (billions 2016 USD)	\$2,975	\$12,322	\$25,303	
Gross domestic product (billions 2016 USD)	\$6,325	\$11,769	\$18,565	
Market capitalization as a % of GDP	47.0%	104.7%	136.3%	
Individual direct ownership	50.0%	27.2%	21.5%	➔ More institutional
Number of ETFs (U.S. domestic equity)	0	2	658	
NYSE annual share volume (in millions)	5,360	104,636	316,495	
Equity options traded (contracts in millions)	32	199	3,626	
Characteristics of U.S. Companies	1976	1996	2016	
Average market capitalization (millions 2016 USD)	\$620	\$1,683	\$6,893	
Corporate profit as a % of GDP	6.9%	6.2%	8.9%	
Average age in years of a listed company	10.9	12.2	18.4	
Herfindahl-Hirschman Index (HHI)	1,392	812	1,180	➔ Relatively diverse
New establishments	697,749	711,716	669,917	
Assets Under Management (in Billions USD)	1976	1996	2016	
Mututal funds	\$40	\$1,725	\$8,725	
Index funds	<\$1	\$85	\$1,990	
Hedge funds (long/short equity)	<\$1	\$130	\$850	
Venture capital	\$4	\$48	\$333	
Buyout funds	<\$1	\$80	\$827	

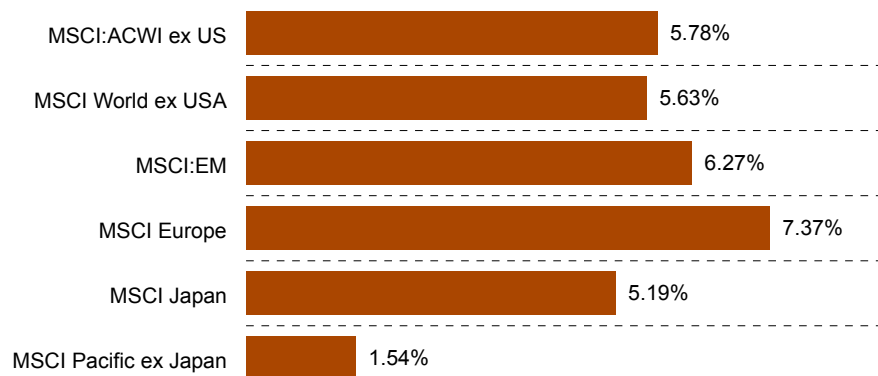
Source: Credit Suisse, "The Incredible Shrinking Universe of Stocks"

- The Herfindahl–Hirschman Index provides a measure of market concentration.
- According to the US Department of Justice website, the agency generally consider markets in which the HHI is between 1,500 and 2,500 points to be moderately concentrated, and consider markets in which the HHI is in excess of 2,500 points to be highly concentrated.

International Equity Returns

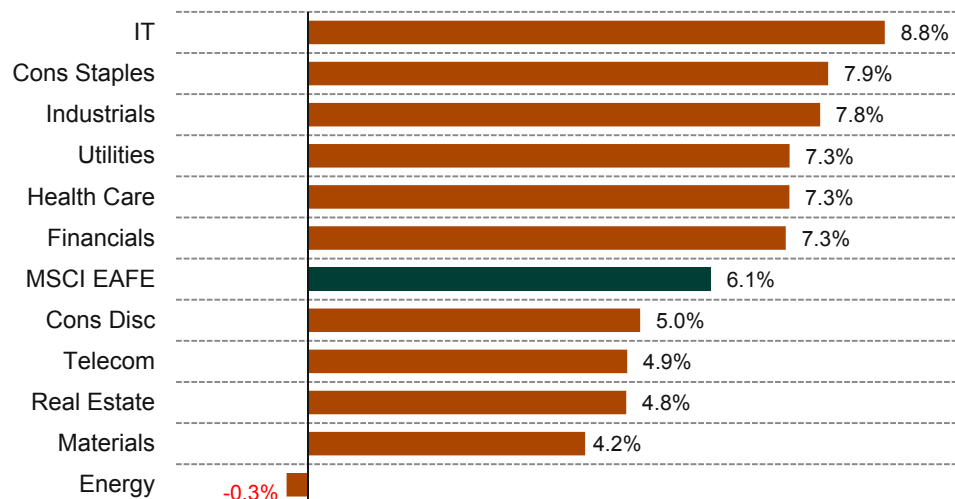
Periods Ending June 30, 2017

Regional Quarterly Performance (U.S. Dollar)



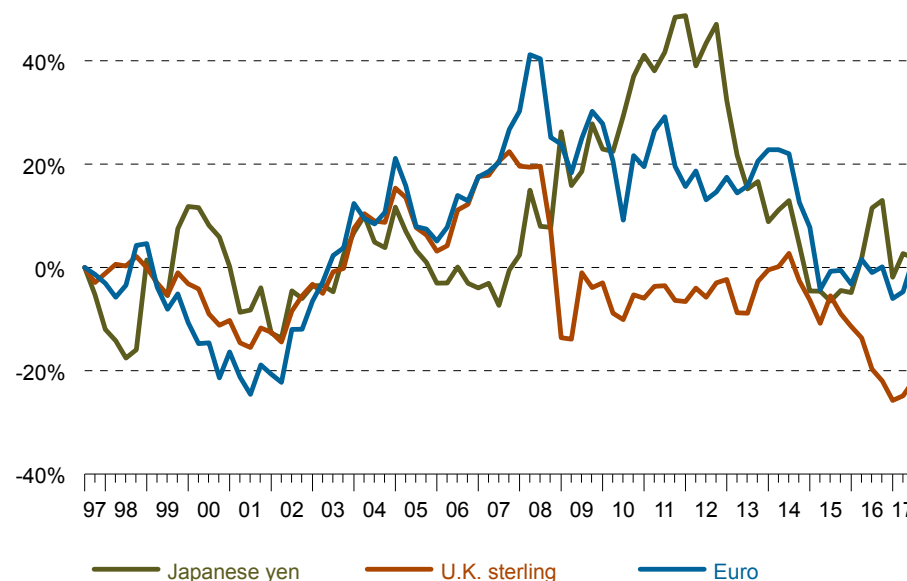
Source: MSCI

MSCI EAFE Sector Returns



Source: Barrow Hanley Quarterly Benchmark Review

Major Currencies' Cumulative Returns (vs. U.S. Dollar)



*Euro returns from 1Q99. German mark prior to 1Q99.

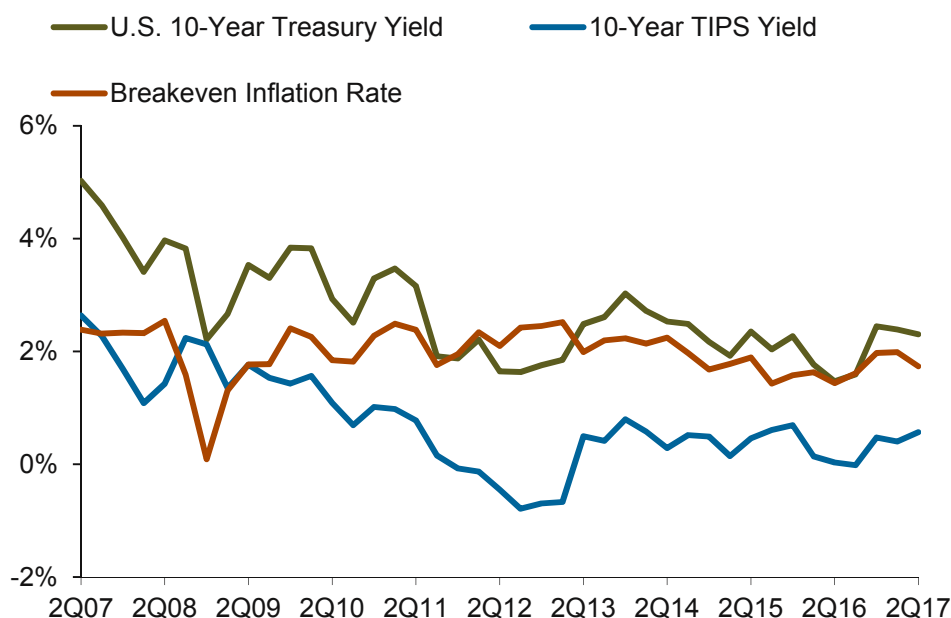
Source: MSCI

- The best performing region was Europe (+7.4%).
- The euro (+6.6%) and pound (3.9%) strengthened versus the dollar while the yen weakened (-0.8%).
- Economic recovery and market-friendly election outcomes spurred non-U.S. equities past U.S. equities for the second consecutive quarter.

Yield Curve Changes

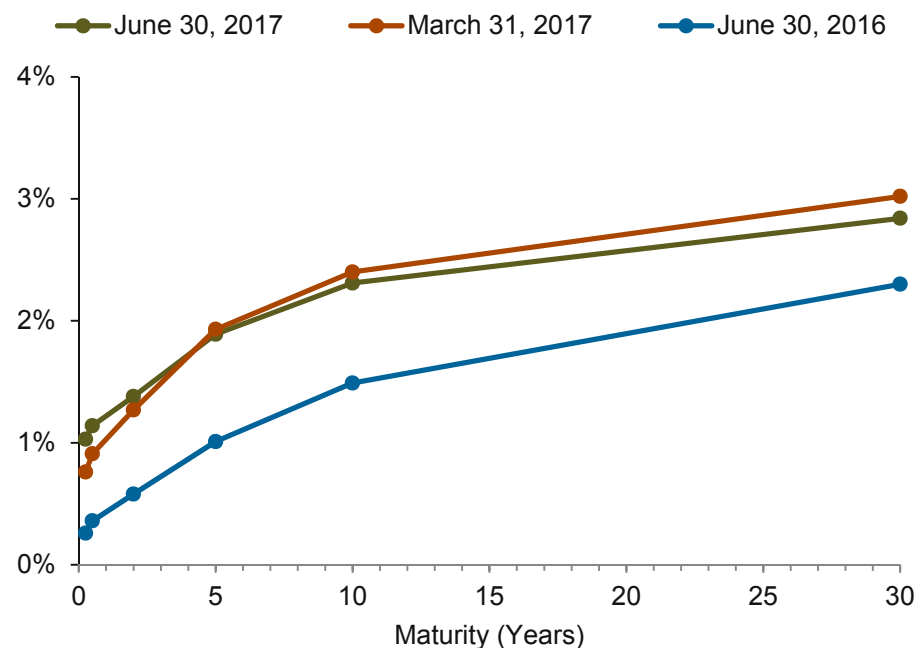
Periods Ending June 30, 2017

Historical 10-Year Yields



Source: Bloomberg

U.S. Treasury Yield Curves



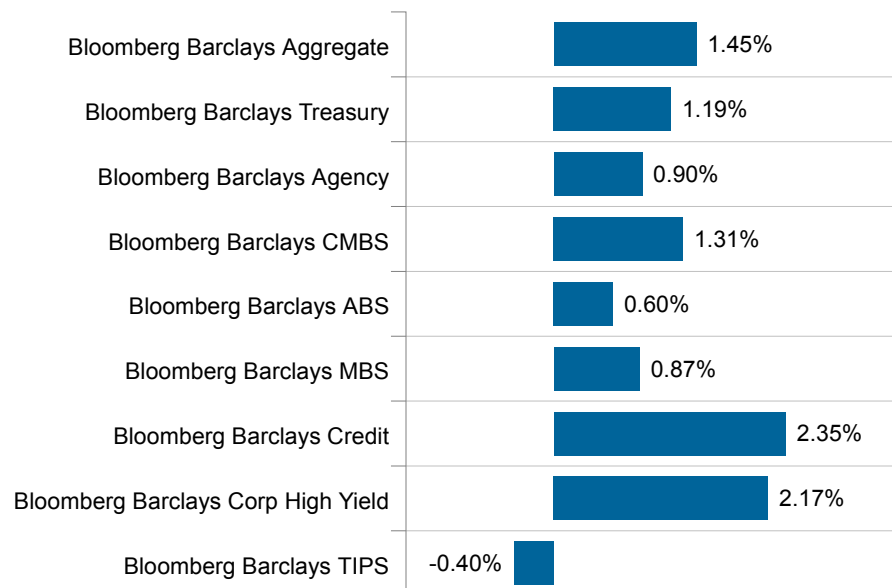
Source: U.S. Department of the Treasury

- The Treasury yield curve flattened with short term rates rising along with Fed action and the long term falling on expectations of a slower growth trajectory. The yield on the 10-year and 30-year dropped 9 bps and 18 bps, respectively. The 3-month rose 27 bps.
- Breakeven inflation fell as expectations for policy-driven growth have softened.
- Worldwide, rates remain low.

Total Rates of Return by Bond Sector

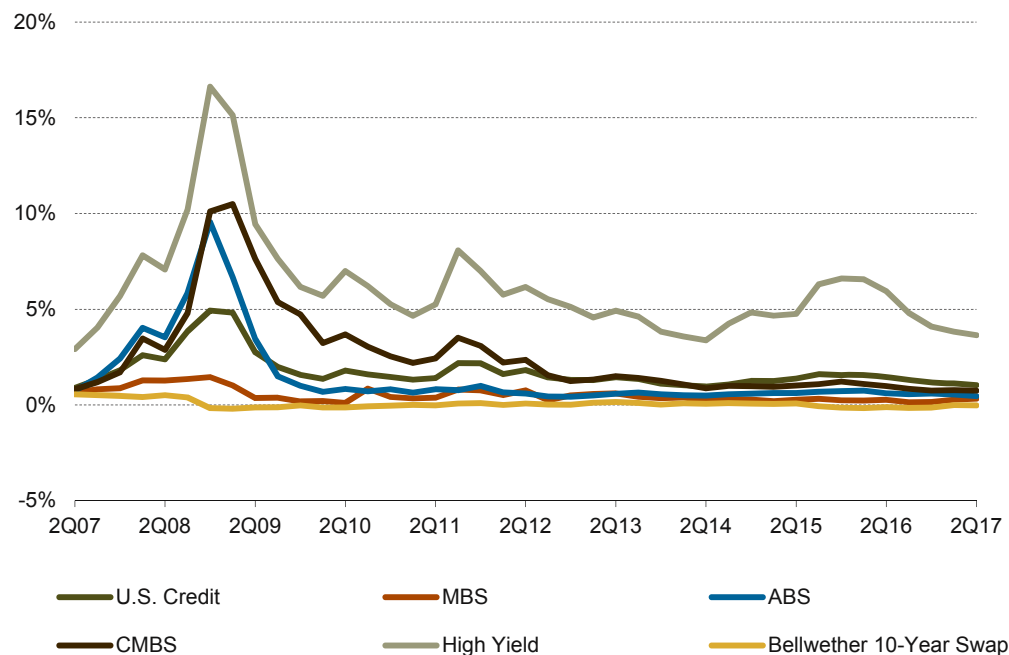
Periods Ending June 30, 2017

Total Returns



Source: Bloomberg Barclays

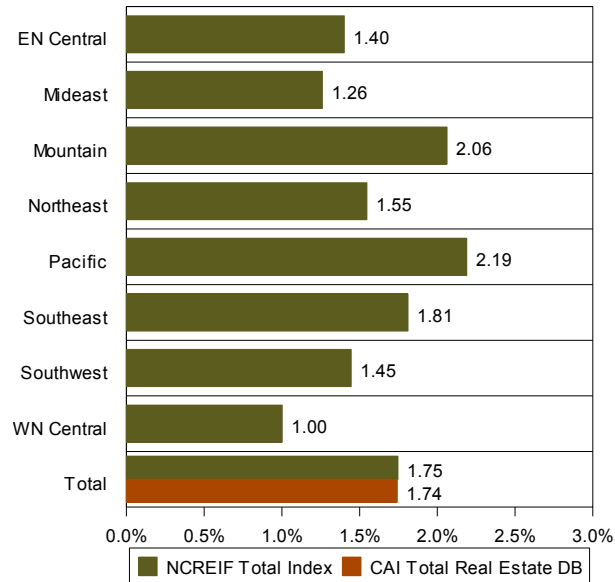
Effective Yield Over Treasuries



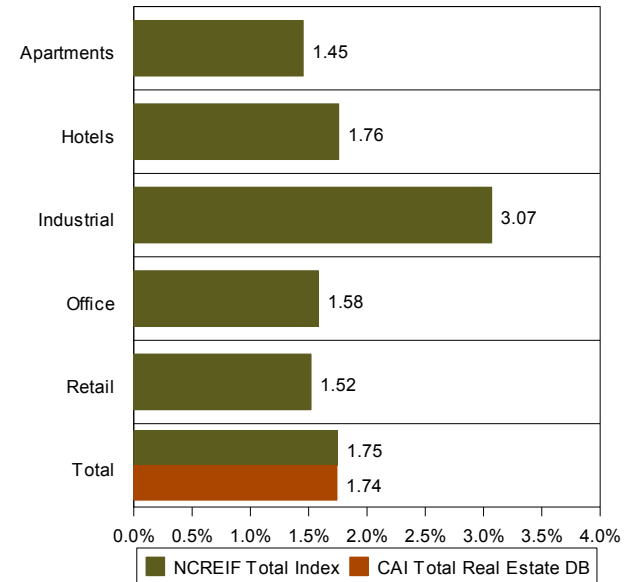
- Credit (+2.4%) and high yield (+2.2%) were the best performing sectors on solid earnings and as global demand for yield provided support for spread sectors.
- Treasury Inflation Protected Securities (TIPS) (-0.4%) underperformed on lower inflation expectations following weak CPI and retail sales data.
- Demand for yield saw spreads contract in most sectors; MBS widened moderately.

Real Estate Overview

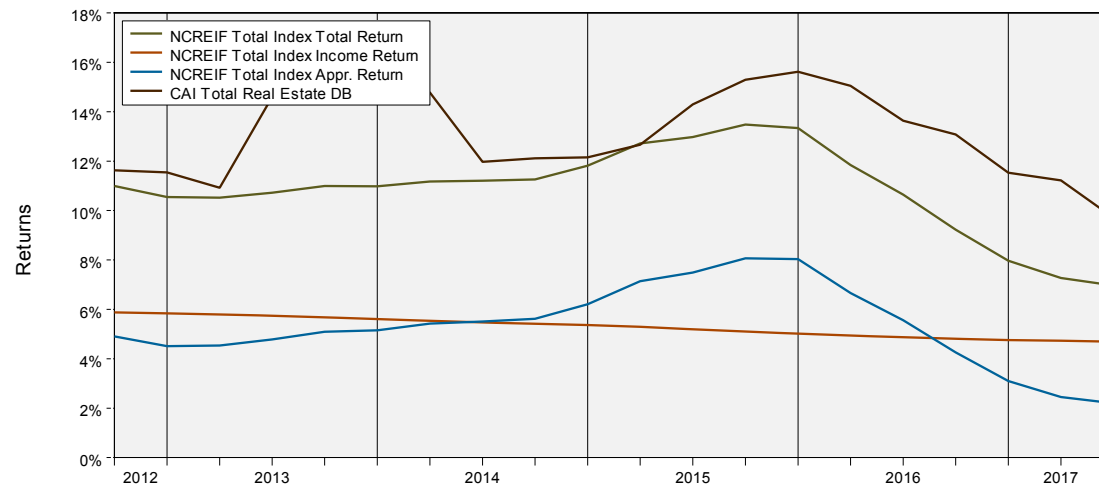
NCREIF Total Index Returns by Geographic Area
Quarter Ended June 30, 2017



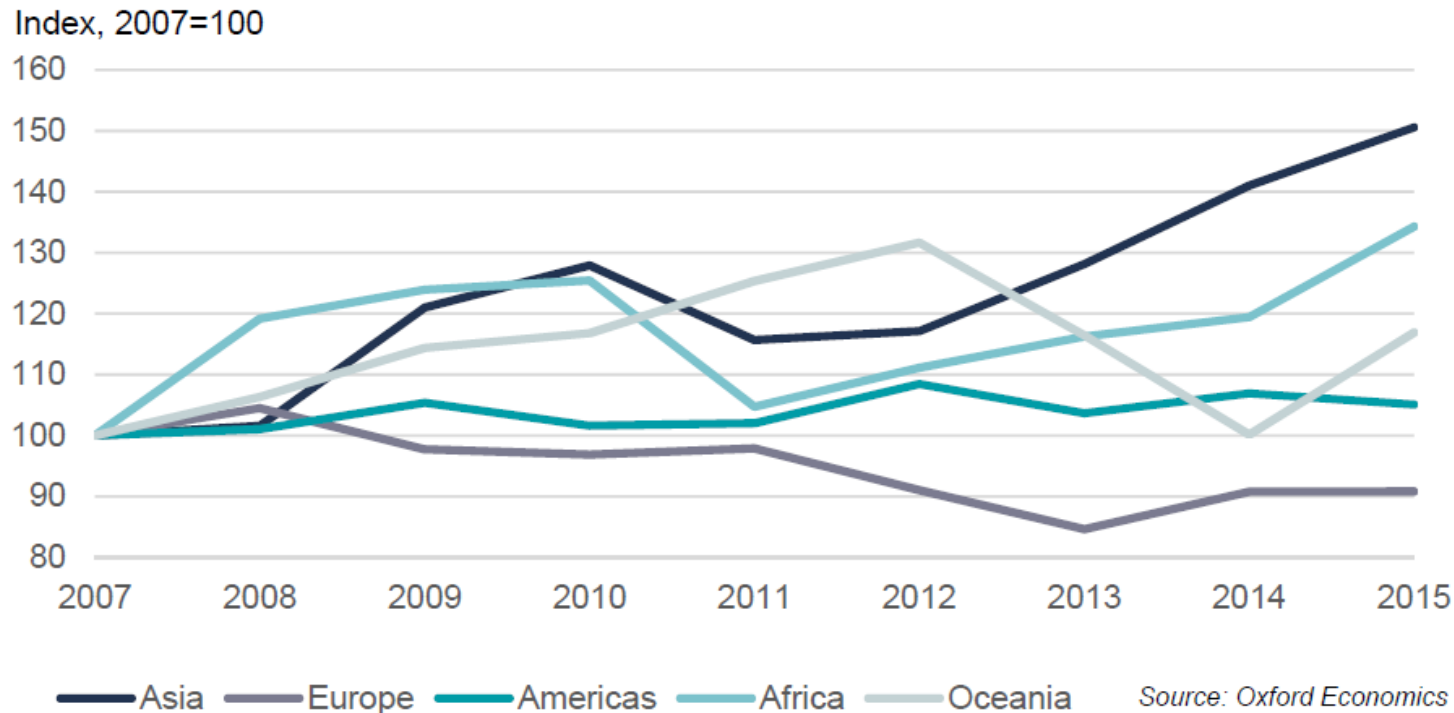
NCREIF Total Index Returns by Property Type
Quarter Ended June 30, 2017



Rolling 1 Year Returns



Infrastructure



- Global Infrastructure Hub (“GIH”) is a G20-backed enterprise. The GIH commissioned Oxford Economics to prepare a July 2017 report titled “Global Infrastructure Outlook: Infrastructure Investment Needs 50 Countries, 7 Sectors to 2040.”
- Two-thirds of global infrastructure spending between 2007 - 2015 was in roads and electricity.
- The report estimates an \$18trn shortfall between current investment projections and required spending. The largest amount of spending, \$28 trillion, is expected in China with the largest shortfall, \$3.8 trillion, expected to occur in the United States.

Sources: The Economist magazine; Oxford Economics

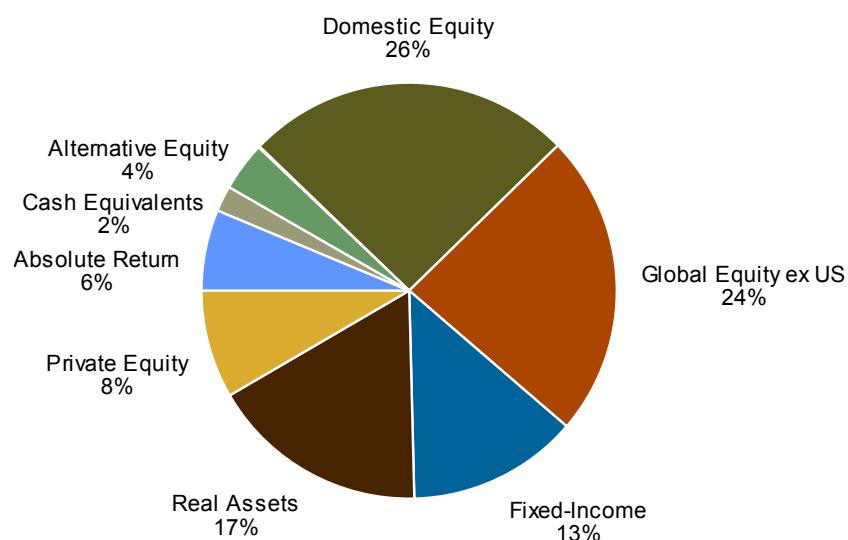


Pension Plan

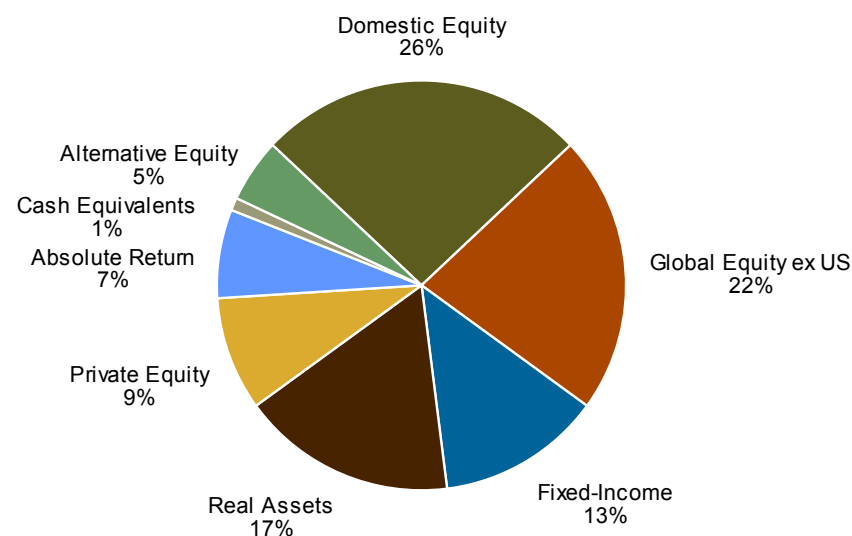
Asset Allocation – Public Employees’ Retirement System

Quarter Ending June 30, 2017

Actual Asset Allocation



Target Asset Allocation



Asset Class	\$000s Actual	Weight Actual	Target	Percent Difference	\$000s Difference
Domestic Equity	2,280,001	25.5%	26.0%	(0.5%)	(41,486)
Global Equity ex US	2,110,046	23.6%	22.0%	1.6%	145,710
Fixed-Income	1,186,150	13.3%	13.0%	0.3%	25,406
Real Assets	1,519,054	17.0%	17.0%	0.0%	1,159
Private Equity	751,778	8.4%	9.0%	(0.6%)	(51,814)
Absolute Return	565,357	6.3%	7.0%	(0.7%)	(59,658)
Cash Equivalents	174,177	2.0%	1.0%	1.0%	84,889
Alternative Equity	342,234	3.8%	5.0%	(1.2%)	(104,206)
Total	8,928,797	100.0%	100.0%		

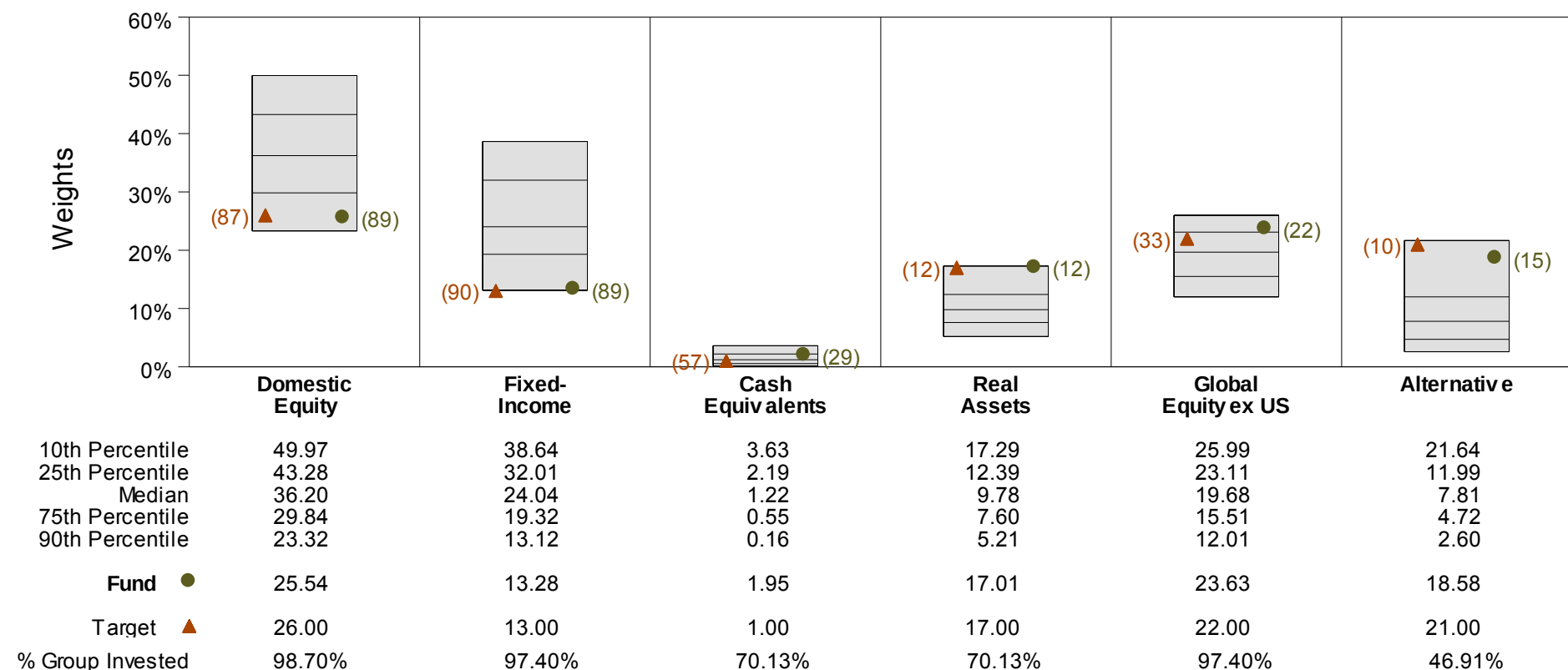
PERS is used as illustrative throughout the presentation.

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



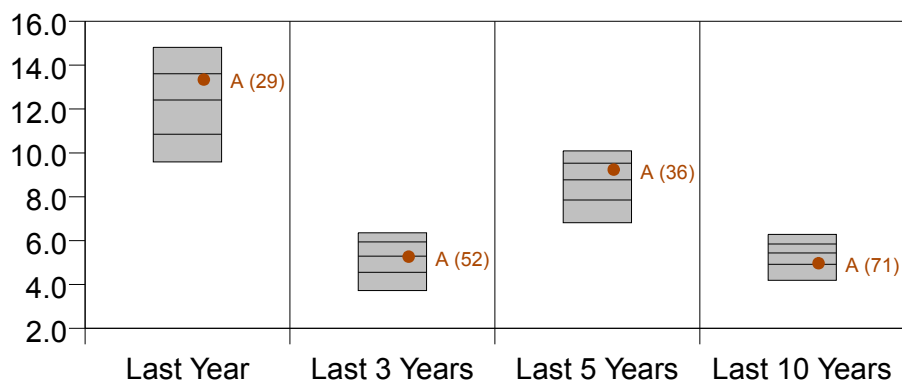
- All positions are reasonably close to their targets. Fixed income is a low allocation when compared to other public funds. Real assets are high when compared to other public funds. Policy is “growth” oriented as opposed to “income” oriented.

*Note that “Alternative” includes private equity and absolute return

Total Fund Return vs Public Funds (PERS)

Callan Public Fund Database

Returns
for Periods Ended June 30, 2017
Group: CAI Public Fund Sponsor Database

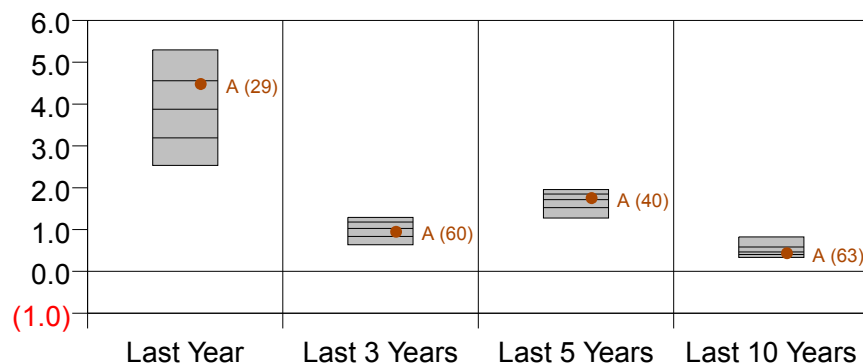


- Return rankings do not take risk into account.
- As displayed on the previous slide, the “growth” orientation of the portfolio lends itself to aggressive positioning; however the lower weight to Domestic Equity relative to peers affects longer-term results.

Total Fund Sharpe Ratio Rankings vs Public Funds (PERS)

Callan Public Fund Database

Sharpe Ratio
for Periods Ended June 30, 2017
Group: CAI Public Fund Sponsor Database

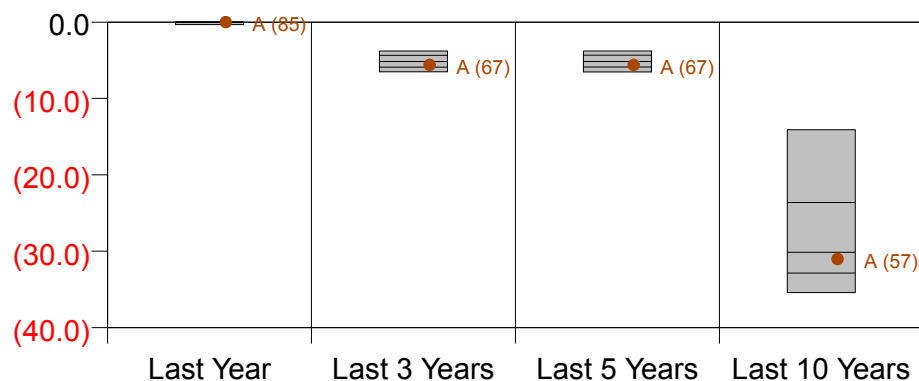


- Sharpe ratio is a risk adjusted return measure.
- Excess return above the risk free rate (T-Bills) is divided by the standard deviation of excess return.
- The portfolio was above median for the one and five-year periods, and below for the three and ten-year periods.

Total Maximum Drawdown Rankings vs Public Funds (PERS)

Callan Public Fund Database

Maximum Drawdown
for Periods Ended June 30, 2017
Group: CAI Public Fund Sponsor Database



10th Percentile	0.00	(3.78)	(3.78)	(14.06)
25th Percentile	0.00	(4.33)	(4.31)	(23.62)
Median	0.00	(5.15)	(5.14)	(30.11)
75th Percentile	0.00	(5.88)	(5.87)	(32.83)
90th Percentile	(0.32)	(6.49)	(6.52)	(35.40)

Member Count	197	193	182	150

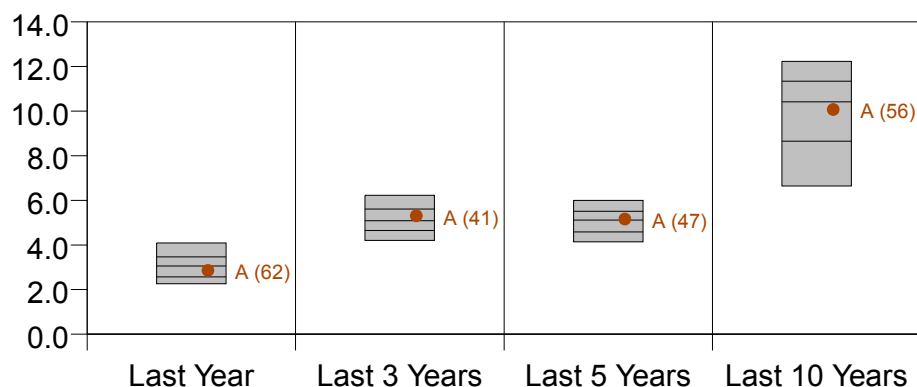
ARMB - PERS - Total Fund	0.00	(5.60)	(5.60)	(30.99)

- Maximum drawdown is a measure of the largest loss from peak to trough in a given period.
- Bigger losses result in lower rankings.
- The compressed distribution over the last year, three-year, and five-year time frames is due in part to the consistent bull market.

Standard Deviation Ranking vs Public Funds (PERS)

Callan Public Fund Database

Standard Deviation
for Periods Ended June 30, 2017
Group: CAI Public Fund Sponsor Database



- Standard deviation is a measure of risk or volatility.
- Lower ranking in this dimension means less risk over the time period.
- The portfolio's thorough diversification has a dampening effect on volatility.

PERS Performance – 2nd Quarter 2017 & Trailing Year

Relative Attribution Effects for Quarter ended June 30, 2017

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	26%	26%	2.76%	3.02%	(0.07%)	0.00%	(0.07%)
Fixed-Income	13%	13%	1.64%	1.12%	0.07%	(0.01%)	0.06%
Real Assets	17%	17%	0.84%	1.75%	(0.16%)	(0.01%)	(0.17%)
Global Equity ex US	23%	22%	6.09%	5.99%	0.02%	0.03%	0.05%
Private Equity	8%	9%	5.88%	3.89%	0.16%	(0.01%)	0.16%
Absolute Return	7%	7%	3.04%	1.42%	0.11%	0.01%	0.11%
Alternative Equity	4%	5%	2.04%	2.96%	(0.04%)	0.00%	(0.04%)
Cash Equivalents	1%	1%	0.21%	0.20%	0.00%	(0.00%)	(0.00%)
Total			3.25%	= 3.15%	+ 0.10%	+ 0.00%	0.10%

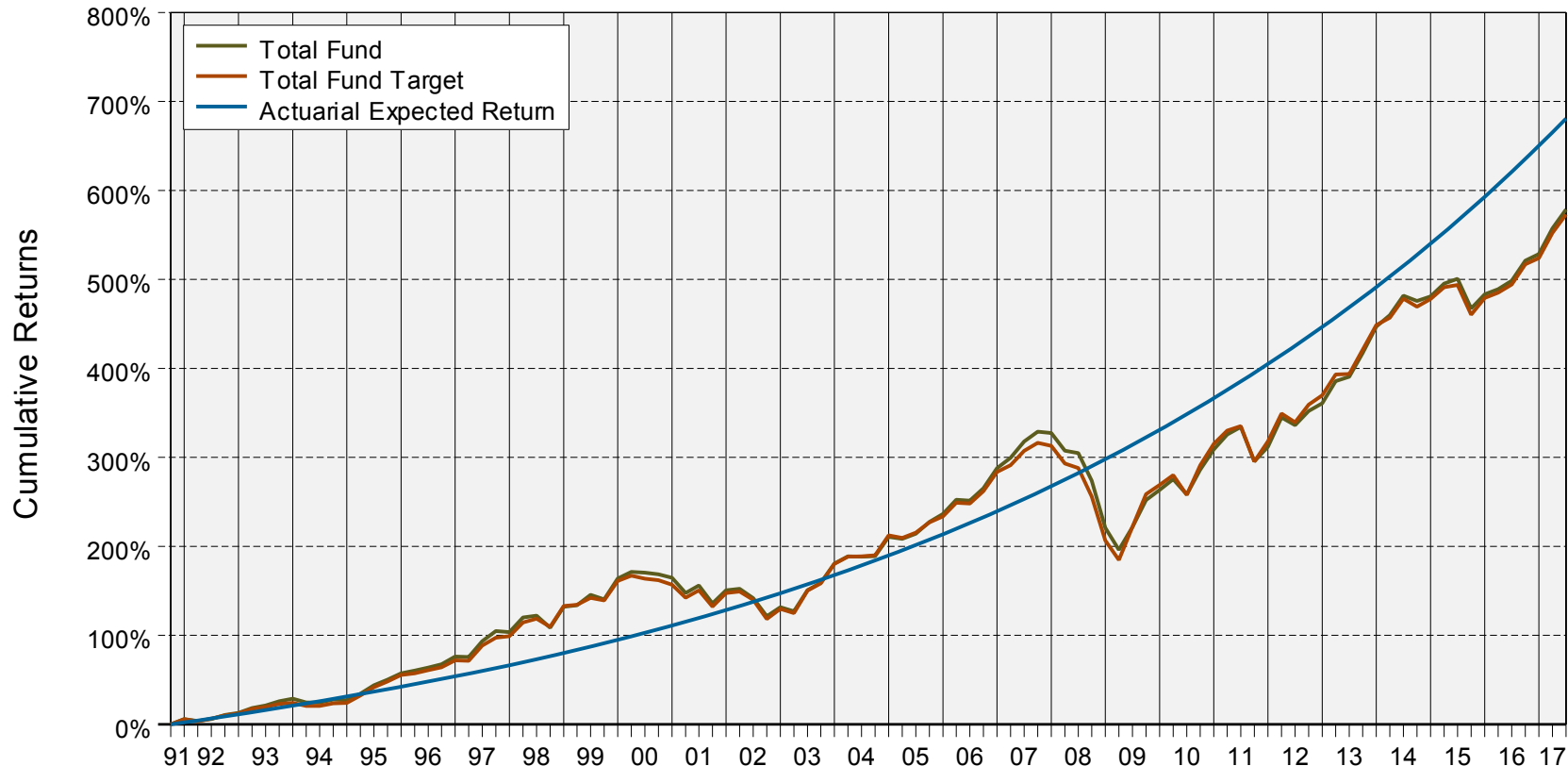
One Year Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	26%	26%	18.55%	18.51%	0.01%	(0.01%)	0.00%
Fixed-Income	12%	13%	2.91%	0.02%	0.39%	0.09%	0.48%
Real Assets	18%	17%	5.98%	5.66%	0.06%	(0.05%)	0.01%
Global Equity ex US	24%	22%	20.41%	21.00%	(0.14%)	0.05%	(0.08%)
Private Equity	8%	9%	17.04%	21.04%	(0.30%)	(0.08%)	(0.38%)
Absolute Return	7%	7%	8.47%	5.49%	0.21%	0.02%	0.23%
Alternative Equity	4%	5%	11.38%	15.07%	(0.16%)	(0.02%)	(0.17%)
Cash Equivalents	1%	1%	0.79%	0.49%	0.00%	0.01%	0.01%
Total			13.35%	= 13.26%	+ 0.08%	+ 0.01%	0.09%

- The long-term benchmark for private equity is the Russell 3000 Index plus 350 basis points

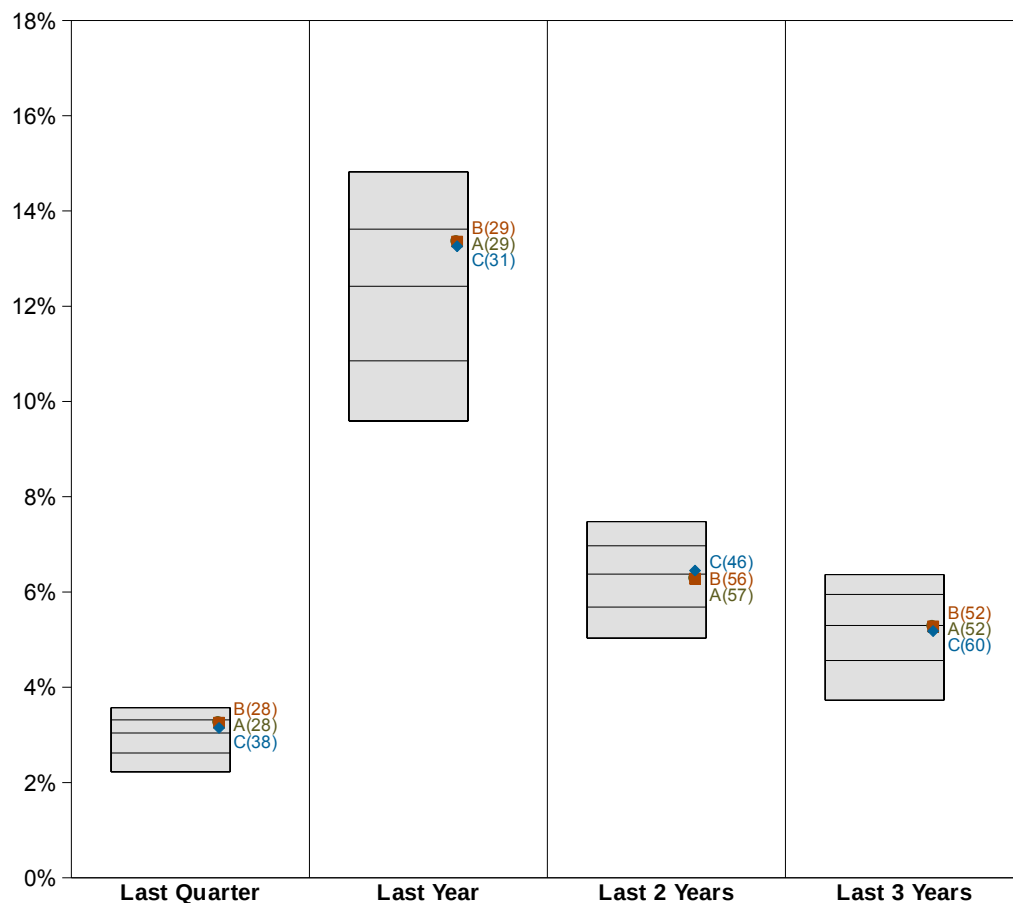
PERS Long-Term Total Fund Performance as of 6/30/17

Cumulative Returns Actual vs Target



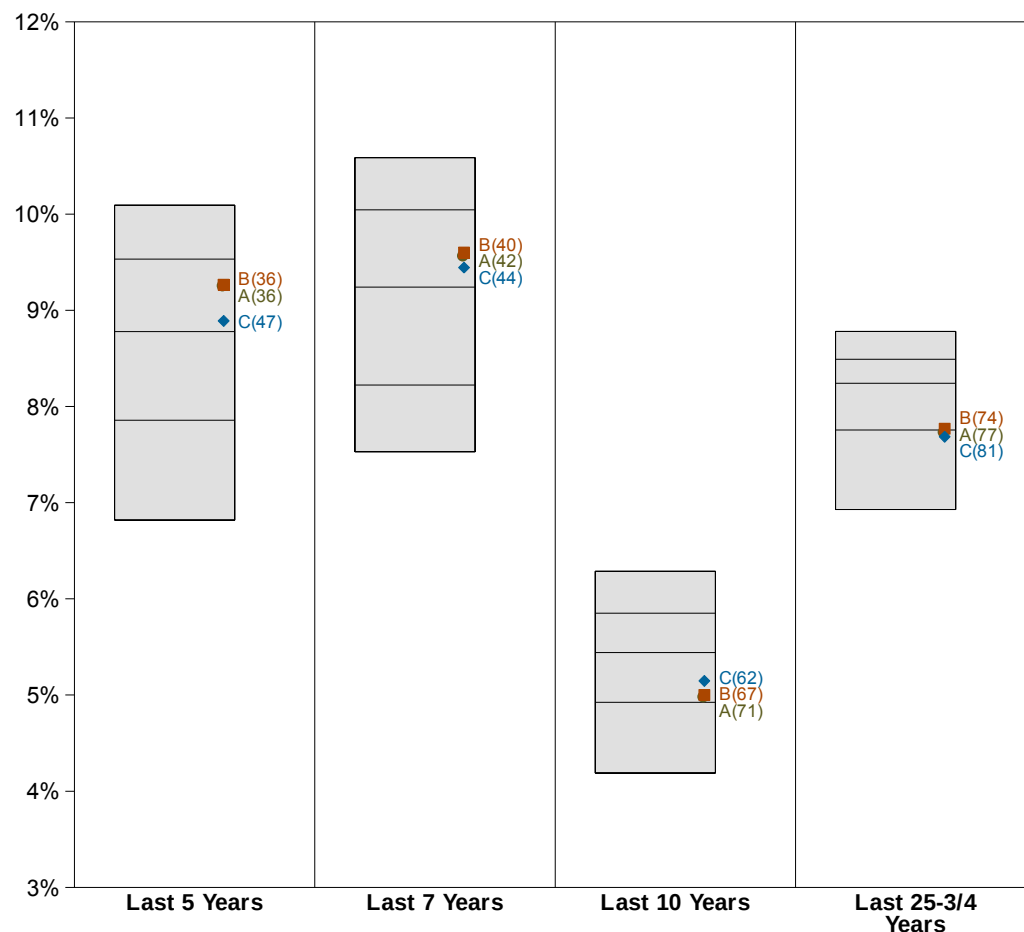
- Each Fund has two targets: the asset allocation policy return and the actuarial return.
- Total Fund returns continue to closely track the strategic allocation target.
- Since the volatile 2008/2009 period, though it suffered a setback in 3Q15, Total Fund performance had been closing the gap versus the actuarial return.

Annualized Total Fund Returns as of 6/30/17



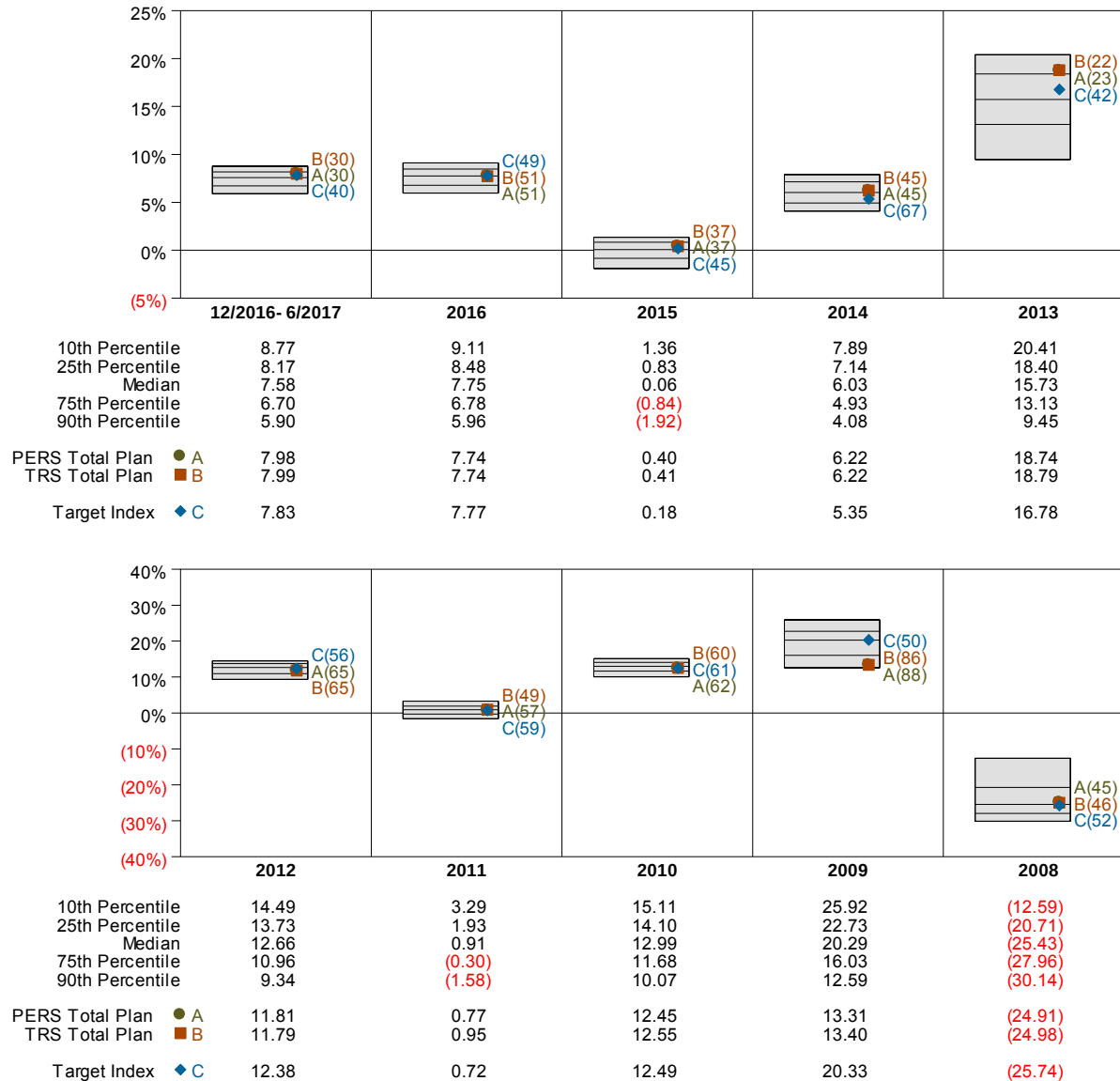
- PERS and TRS have outperformed their target for the last quarter, year, and three-year time frames.
- PERS 2nd quarter performance beat the target by 10 basis points.

Longer-Term Total Fund Returns as of 6/30/17



- Five-year performance is above target and median.
- Seven-year performance is also above target and median.
- 10-year return is below target and median. PERS trails the target return by 18 basis points.
- 25 and 1/4-year return beats the target.

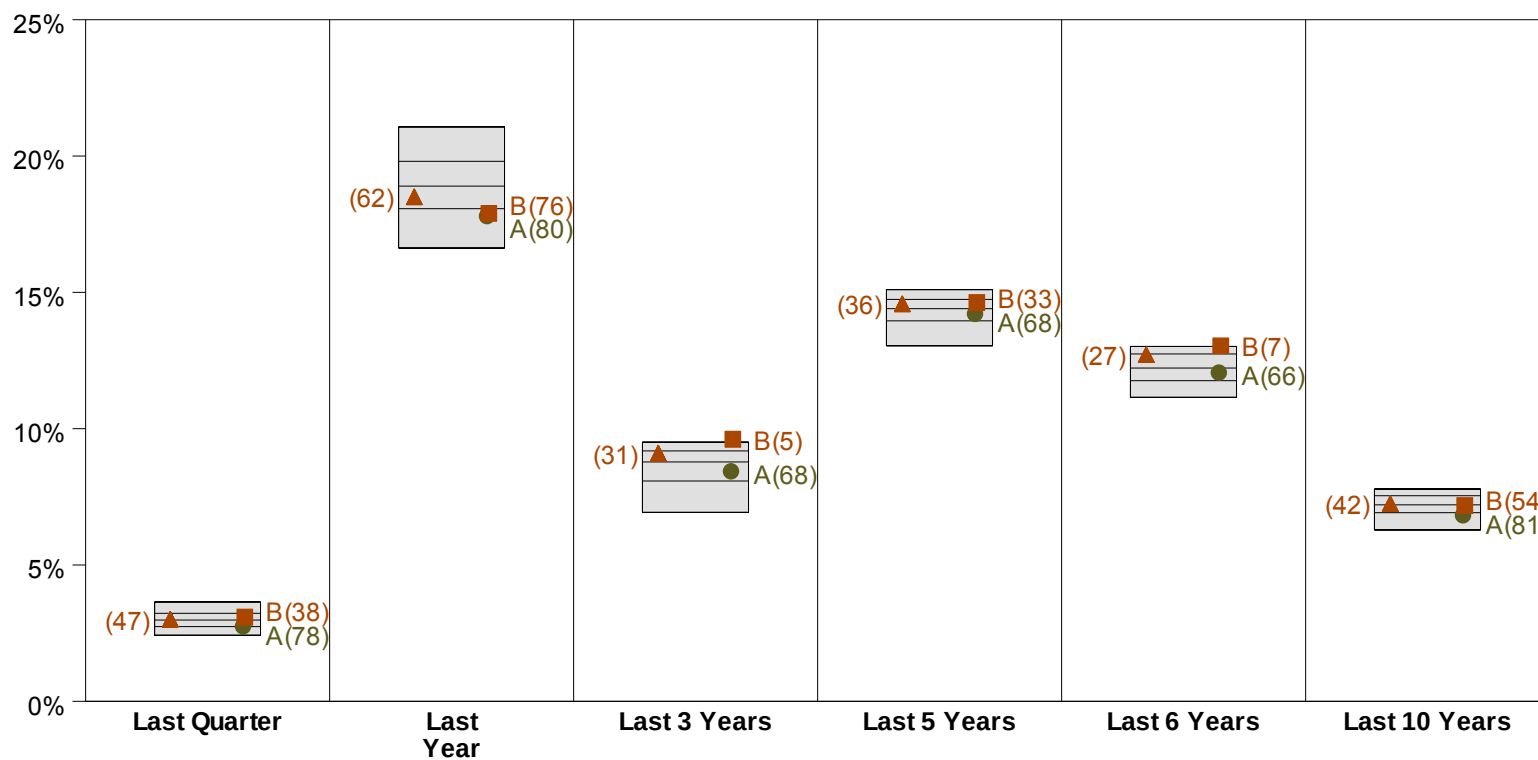
Calendar Period Total Fund Performance



- PERS and TRS had the same return during 2016 and 2014.
- 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.
- PERS ranks above median in five and TRS ranks above median in six of the ten periods shown.

Total Domestic Equity through 6/30/17

Performance vs Pub Pln- Domestic Equity (Gross)



10th Percentile	3.65	21.07	9.51	15.10	13.02	7.79
25th Percentile	3.23	19.81	9.18	14.74	12.74	7.54
Median	2.98	18.90	8.78	14.40	12.23	7.21
75th Percentile	2.74	18.07	8.09	13.96	11.76	6.92
90th Percentile	2.43	16.63	6.93	13.05	11.15	6.29
Domestic Equity Pool Standard & Poor's 500	2.70	17.74	8.38	14.15	11.99	6.77
Russell 3000 Index	3.02	18.51	9.10	14.58	12.72	7.26

Domestic Equity Component Returns

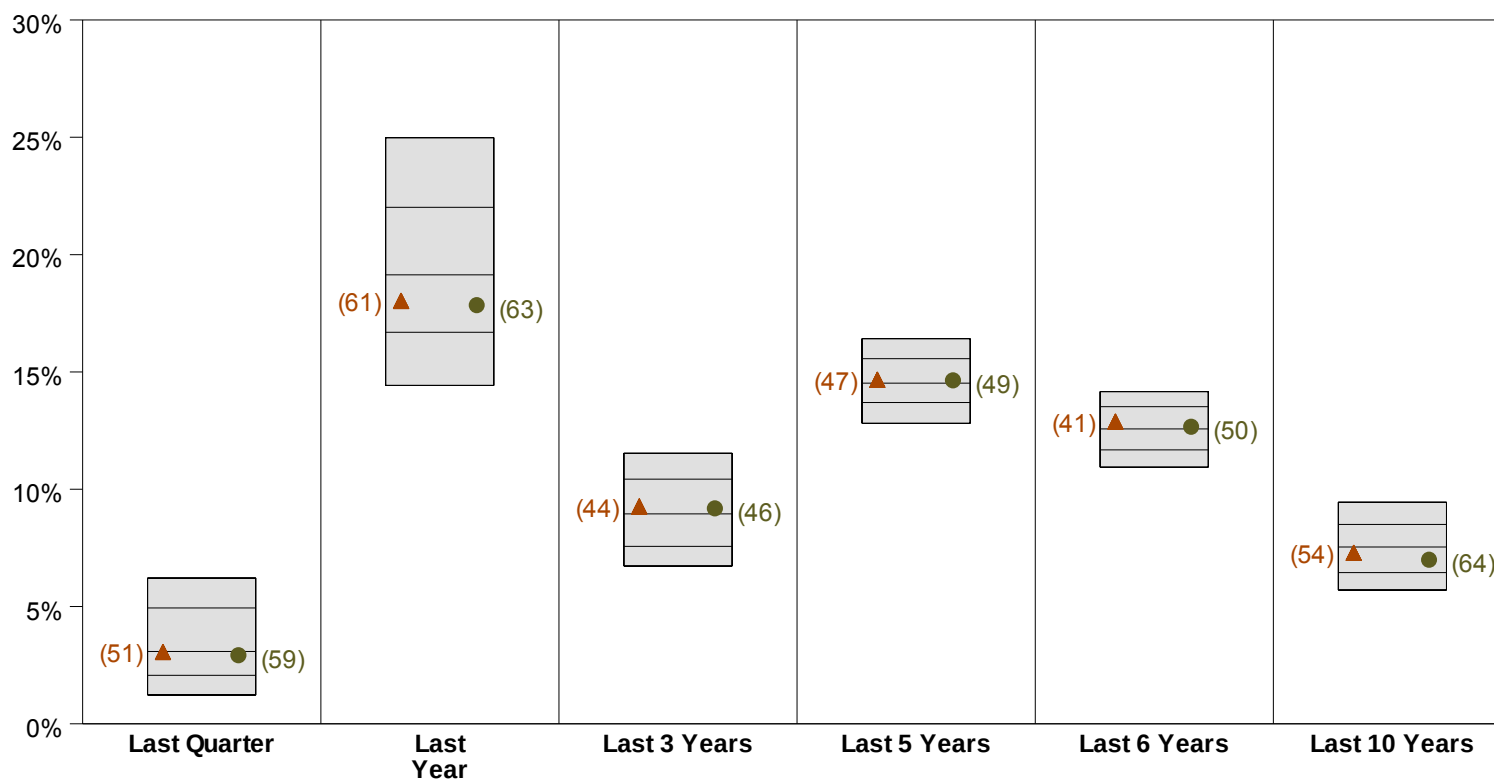
Returns for Periods Ended June 30, 2017

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years
Total Dom Equity Pool	2.70%	17.74%	8.38%	14.15%	11.99%
Russell 3000 Index	3.02%	18.51%	9.10%	14.58%	12.72%
Large Cap Managers	2.85%	17.76%	9.10%	14.57%	12.59%
Large Cap Active	2.98%	20.78%	9.33%	14.85%	12.43%
Large Cap Passive	3.07%	17.94%	9.39%	14.69%	12.97%
Russell 1000 Index	3.06%	18.03%	9.26%	14.67%	12.88%
Small Cap Managers	2.27%	23.23%	7.18%	14.28%	11.06%
Small Cap Active	2.21%	23.93%	7.18%	14.32%	11.10%
Small Cap Passive	2.48%	18.17%	7.08%	13.33%	10.68%
Russell 2000 Index	2.46%	24.60%	7.36%	13.70%	10.91%
Alternative Equity	1.99%	11.27%	4.55%	8.99%	7.81%

- Newly adopted policy (effective 7-1-13) alters cosmetics of “true” traditional active & passive returns.
 - *Alternative Equity* category includes defensive equity oriented portfolios, including the Analytic Buy/Write, Advent Convertible Bond, QMA Market Participation, and in-house equity yield strategies.
- Alternative equity continues to mute overall volatility within the equity portfolio.
- Alternative equity performance contributed positively to the Total Domestic Equity portfolio during the quarter despite trailing other sub-composites.

Large Cap Domestic Equity Pool through 6/30/17

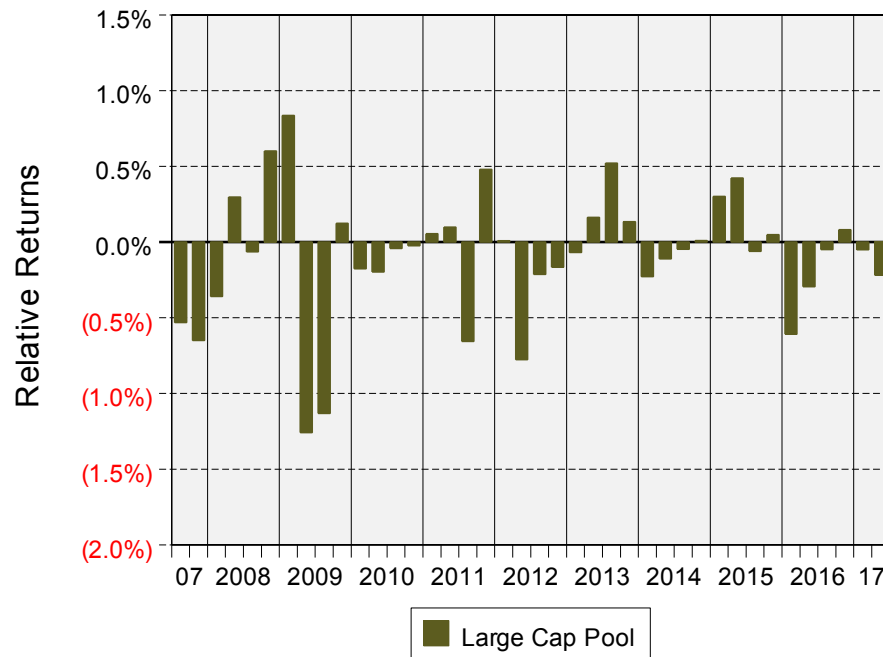
Performance vs Callan Large Capitalization (Gross)



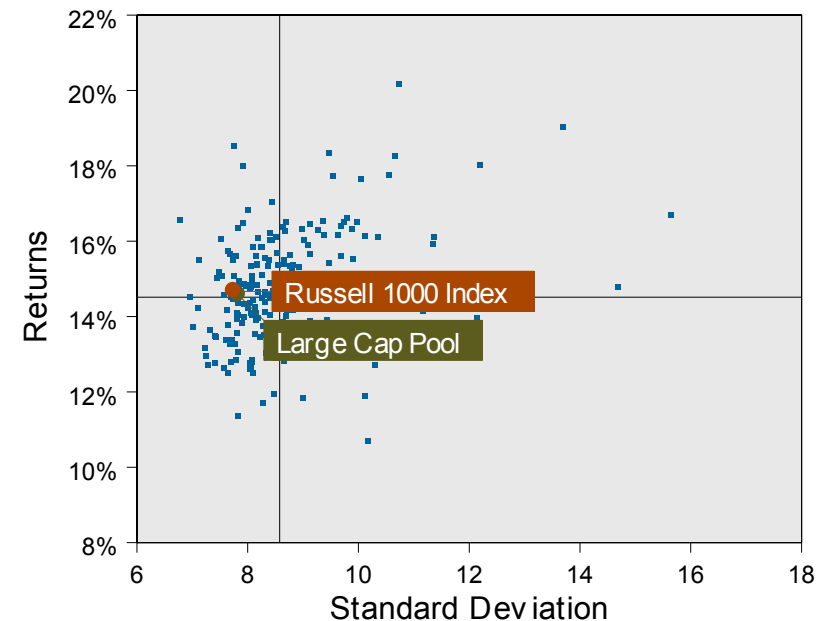
10th Percentile	6.22	24.98	11.53	16.42	14.16	9.44
25th Percentile	4.94	22.01	10.43	15.56	13.51	8.50
Median	3.09	19.14	8.95	14.52	12.57	7.54
75th Percentile	2.07	16.69	7.57	13.69	11.68	6.44
90th Percentile	1.23	14.43	6.72	12.81	10.94	5.70
Large Cap Pool ●	2.85	17.76	9.10	14.57	12.59	6.92
Russell 1000 Index ▲	3.06	18.03	9.26	14.67	12.88	7.29

Large Cap Domestic Equity Pool as of 6/30/17

Relative Return vs Russell 1000 Index



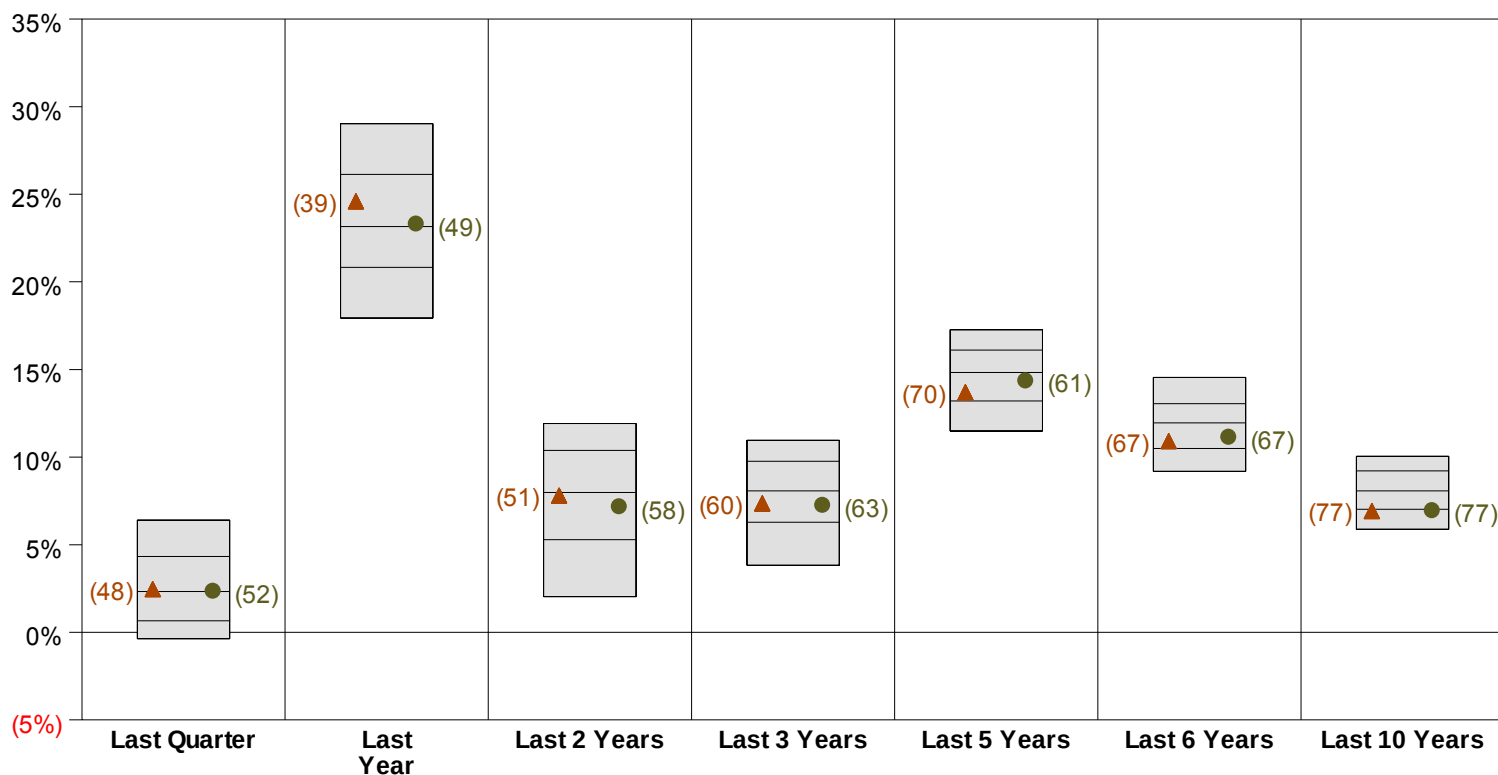
Callan Large Capitalization (Gross)
Annualized Five Year Risk vs Return



- Over 3/5 of large cap allocation is passively managed.
- Long-term performance exhibits market-like returns with similar risk.

Small Cap Domestic Equity Pool through 6/30/17

Performance vs Callan Small Capitalization (Gross)

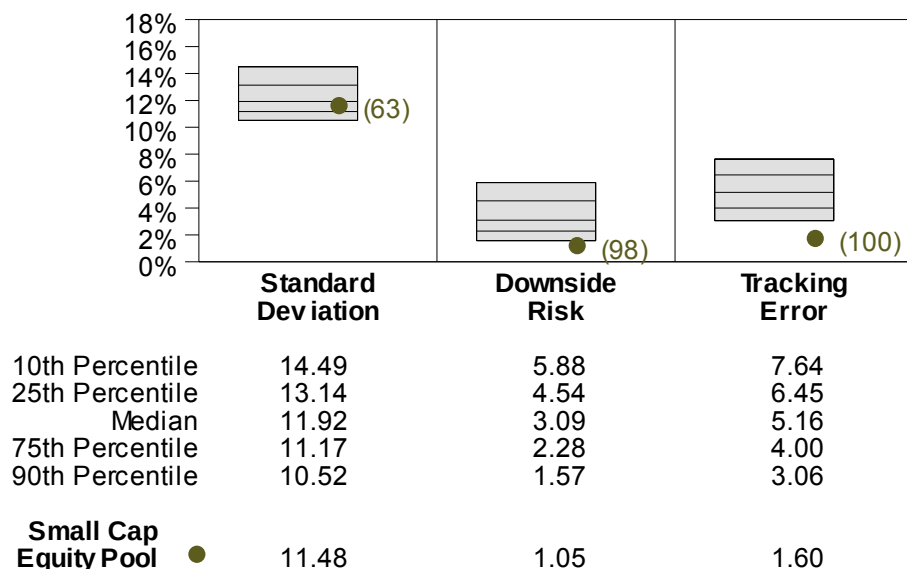


10th Percentile	6.40	29.03	11.92	10.96	17.27	14.55	10.04
25th Percentile	4.32	26.14	10.38	9.75	16.11	13.05	9.20
Median	2.33	23.16	7.97	8.07	14.83	11.96	8.07
75th Percentile	0.66	20.83	5.28	6.27	13.21	10.49	7.02
90th Percentile	(0.37)	17.94	2.03	3.82	11.49	9.18	5.88

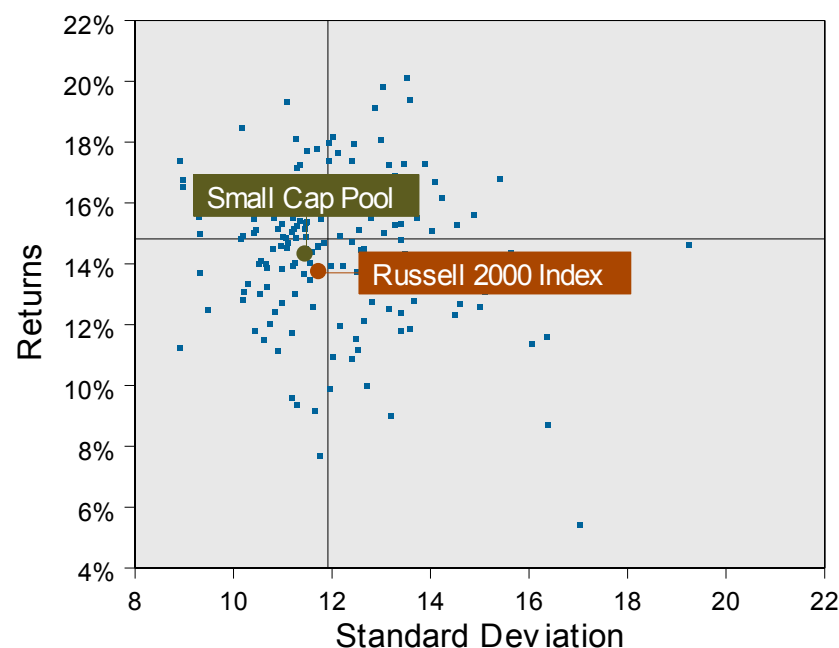
Small Cap Pool	●	2.27	23.23	7.08	7.18	14.28	11.06	6.87
Russell 2000 Index	▲	2.46	24.60	7.80	7.36	13.70	10.91	6.92

- Returns have lagged the index in recent periods but compare favorably across the five, six, and 10 year time frames.

Small Cap Pool through 6/30/17



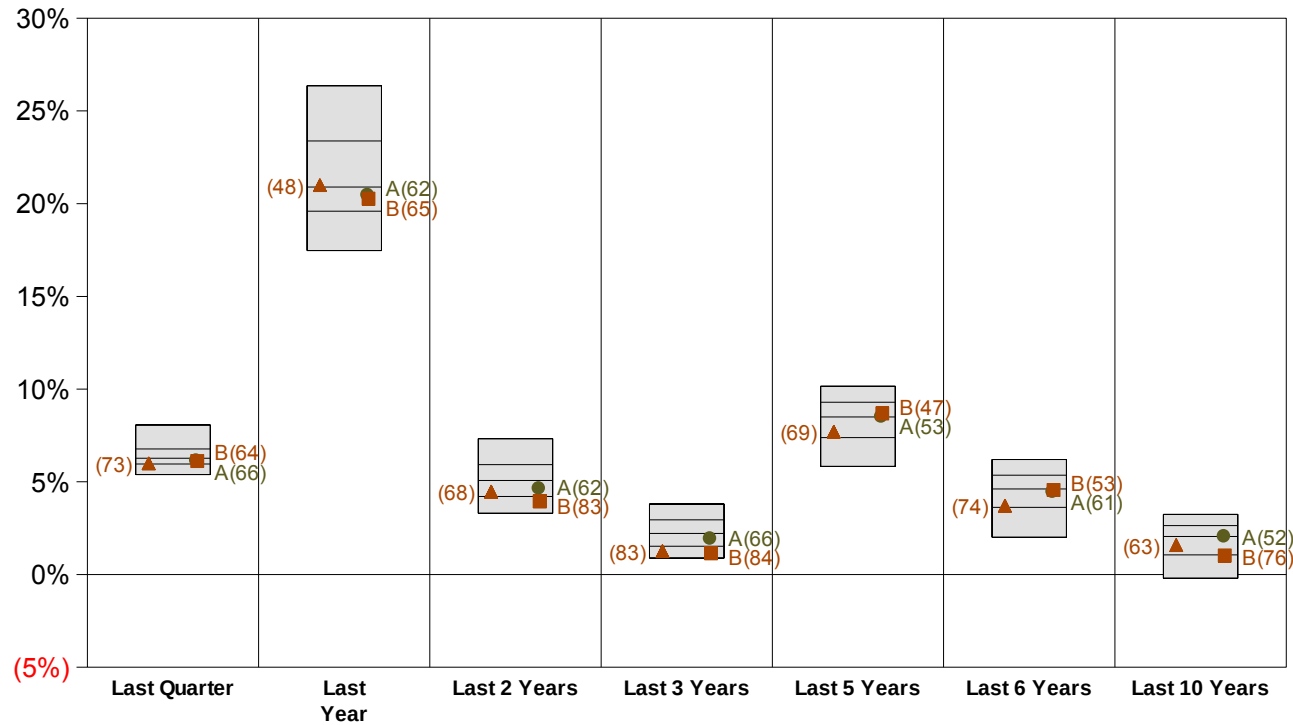
Callan Small Capitalization (Gross)
Annualized Five Year Risk vs Return



- The five-year risk statistics of standard deviation, downside risk, and tracking error compare favorably versus the peer group of small cap managers.

International Equity through 6/30/17

Performance vs Pub Pln- International Equity (Gross)

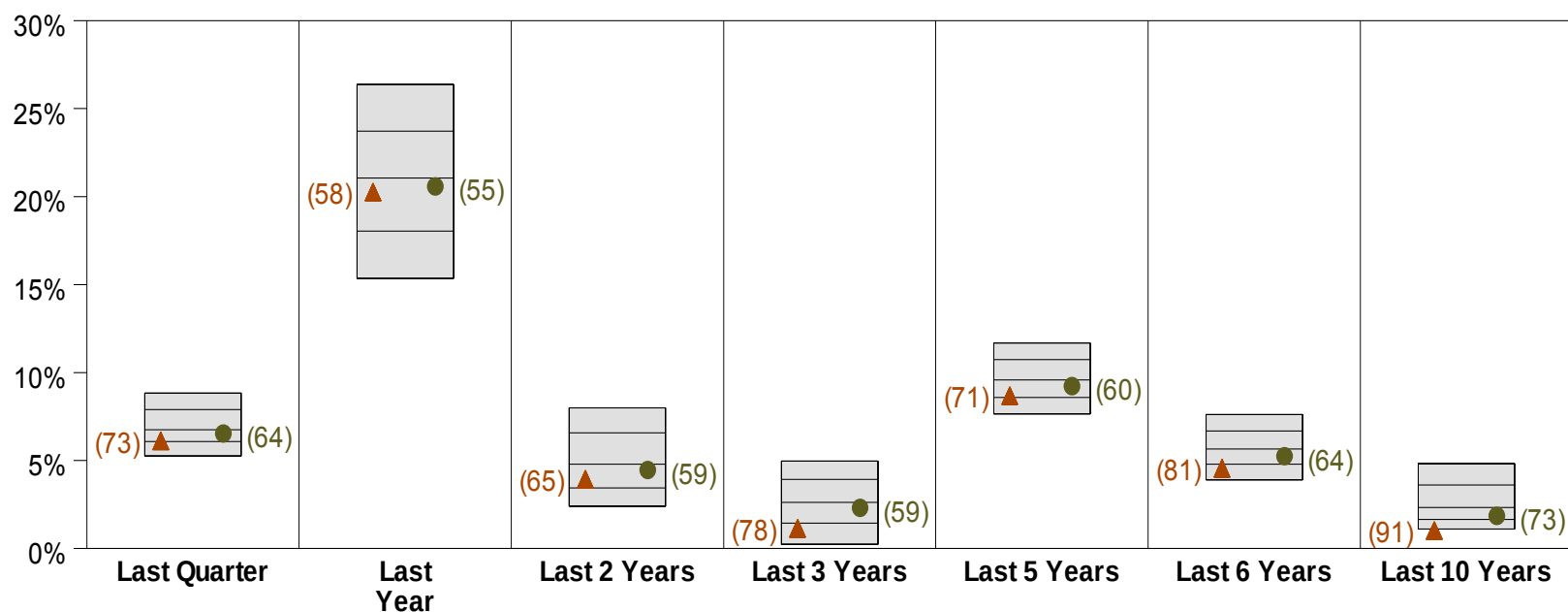


- Underperformance by the emerging markets managers weighed on performance relative to peers for the trailing year.

	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	8.07	26.36	7.32	3.81	10.15	6.20	3.24
25th Percentile	6.78	23.38	5.93	2.95	9.29	5.35	2.65
Median	6.27	20.90	5.07	2.22	8.50	4.62	2.05
75th Percentile	5.96	19.59	4.22	1.52	7.38	3.62	1.06
90th Percentile	5.39	17.47	3.31	0.90	5.83	2.01	(0.20)
Employees' Total Int'l Equity MSCI	● A 6.09	20.41	4.59	1.89	8.47	4.42	2.01
EAFE Index	■ B 6.12	20.27	3.94	1.15	8.69	4.56	1.03
MSCI ACWIxUS Gross	▲ 5.99	21.00	4.47	1.27	7.70	3.71	1.59

International Equity ex Emerging Markets through 6/30/17

Performance vs Callan Non-US Equity (Gross)



10th Percentile	8.83	26.38	8.00	4.97	11.69	7.61	4.82
25th Percentile	7.90	23.72	6.57	3.92	10.74	6.67	3.61
Median	6.75	21.05	4.79	2.63	9.57	5.66	2.33
75th Percentile	6.07	18.04	3.45	1.44	8.58	4.79	1.65
90th Percentile	5.26	15.35	2.40	0.24	7.64	3.90	1.10

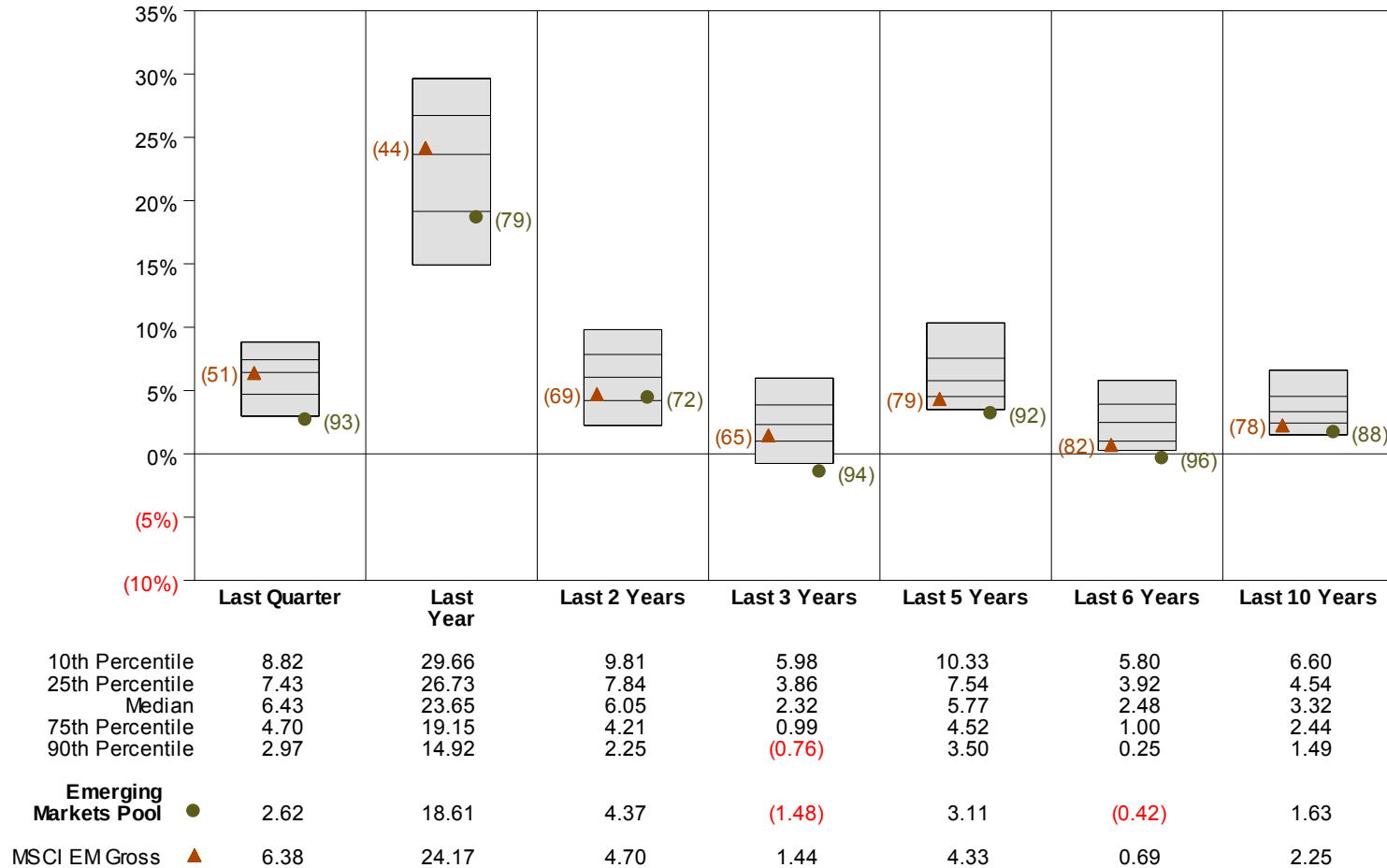
Int'l Equity Pool (ex Emerging. Mkt)	●	6.43	20.48	4.35	2.19	9.13	5.13	1.74
MSCI EAFE	▲	6.12	20.27	3.94	1.15	8.69	4.56	1.03

International Equity ex Emerging Markets through 6/30/17

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Int'l Equity Pool (ex Emerging Market)	6.43%	20.48%	2.19%	9.13%	1.74%
Allianz Global Investors	5.55%	16.51%	-	-	-
Arrowstreet ACWI ex -US	5.80%	20.25%	-	-	-
Baillie Gifford ACWI ex US	8.86%	20.75%	-	-	-
Blackrock ACWI ex US IMI	6.00%	20.74%	1.37%	-	-
Brandes Investment	4.32%	19.31%	1.74%	9.92%	2.05%
Capital Guardian	7.42%	25.01%	2.97%	9.80%	2.42%
Lazard Asset Intl	5.59%	13.40%	1.02%	8.23%	2.88%
McKinley Capital	8.47%	20.83%	5.59%	10.89%	1.08%
SSgA Int'l	6.05%	20.71%	1.41%	7.89%	-
Schroder Inv Mgmt	10.76%	28.01%	6.82%	14.15%	-
Mondrian Intl Sm Cap	7.94%	19.16%	4.53%	10.40%	-
MSCI EAFE Index	6.12%	20.27%	1.15%	8.69%	1.03%
MSCI ACWI ex-US IMI Index	5.85%	20.43%	1.14%	7.58%	1.38%

Emerging Markets Pool through 6/30/17

Performance vs Emerging Markets Equity DB (Gross)



- After underperforming dramatically in the 2nd quarter, the Emerging Markets Pool lags the benchmark in all trailing periods shown.

Emerging Markets Pool through 6/30/17

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Emerging Markets Pool	2.62%	18.61%	(1.48%)	3.11%	1.63%
Lazard Emerging	2.16%	19.32%	(1.60%)	3.12%	-
Eaton Vance Emerging(net)	3.50%	17.30%	(1.34%)	3.13%	-
MSCI Emerging Mkts Idx	6.38%	24.17%	1.44%	4.33%	2.25%

Total Bond as of 6/30/17

Performance vs Pub Pln- Domestic Fixed (Gross)



- The Total Bond portfolio has a custom target, intermediate in nature, that reflects a cautious view on the risk of rising rates.
- The strategy's returns outperform the benchmark over all time periods.

Includes In-House and External Portfolios

Real Assets through 6/30/17

	Last Quarter	Fiscal Year	Last 3 Years	Last 5 Years
Real Assets	0.84%	5.98%	4.83%	7.51%
Real Assets Target (1)	1.75%	5.66%	7.50%	8.36%
Real Estate Pool	1.80%	5.95%	10.26%	10.35%
Real Estate Target (2)	1.80%	6.29%	10.10%	10.48%
Private Real Estate	1.75%	7.37%	10.58%	10.41%
NCREIF Total Index	1.75%	6.97%	10.17%	10.49%
REIT Internal Portfolio	2.01%	(0.04%)	8.84%	9.79%
NAREIT Equity Index	2.27%	0.22%	8.86%	9.95%
 Total Farmland	0.69%	3.88%	5.07%	7.73%
UBS Farmland	0.68%	4.53%	5.59%	8.92%
Hancock Agricultural	0.71%	2.53%	3.98%	5.70%
ARMB Farmland Target (3)	1.97%	5.34%	5.81%	9.33%
 Total Timber	0.06%	(0.94%)	2.47%	4.97%
Timberland Investment Resources	(0.09%)	(0.78%)	3.07%	4.67%
Hancock Timber	0.48%	(1.42%)	0.81%	5.27%
NCREIF Timberland Index	0.70%	3.35%	5.54%	7.16%
 TIPS Internal Portfolio	(0.38%)	(0.60%)	0.69%	0.29%
BC US TIPS Index	(0.40%)	(0.63%)	0.63%	0.27%
 Total Energy Funds *	8.24%	30.30%	(10.95%)	(6.80%)
CPI + 5%	1.70%	6.50%	5.58%	6.11%
 MLP Composite	(6.94%)	3.28%	(9.26%)	-
Advisory Research (FKA FAMCO) MLP	(8.66%)	1.36%	(10.92%)	-
Tortoise Capital Adv MLP	(5.43%)	4.97%	(7.76%)	-
Alerian MLP Index	(6.35%)	0.40%	(11.23%)	1.77%
 Total Infrastructure	4.99%	11.50%	4.17%	-
Brookfield	3.07%	7.48%	0.64%	-
Lazard	10.01%	29.05%	9.95%	-
JPM Infrastructure	2.54%	1.42%	0.49%	-
IFM Infrastructure (funded May 2015)	4.28%	9.57%	-	-
Global Infrastructure Idx	5.95%	12.71%	3.50%	9.67%

Real estate returns are provided to Callan by ARMB's real estate consultant.

Absolute Return Composite through 6/30/17

Performance vs Callan Absolute Return Hedge Fund of Fun (Net)



- The absolute return allocation has exceeded the HFRI FoF Index over each trailing period shown.

Absolute Return Composite through 6/30/17

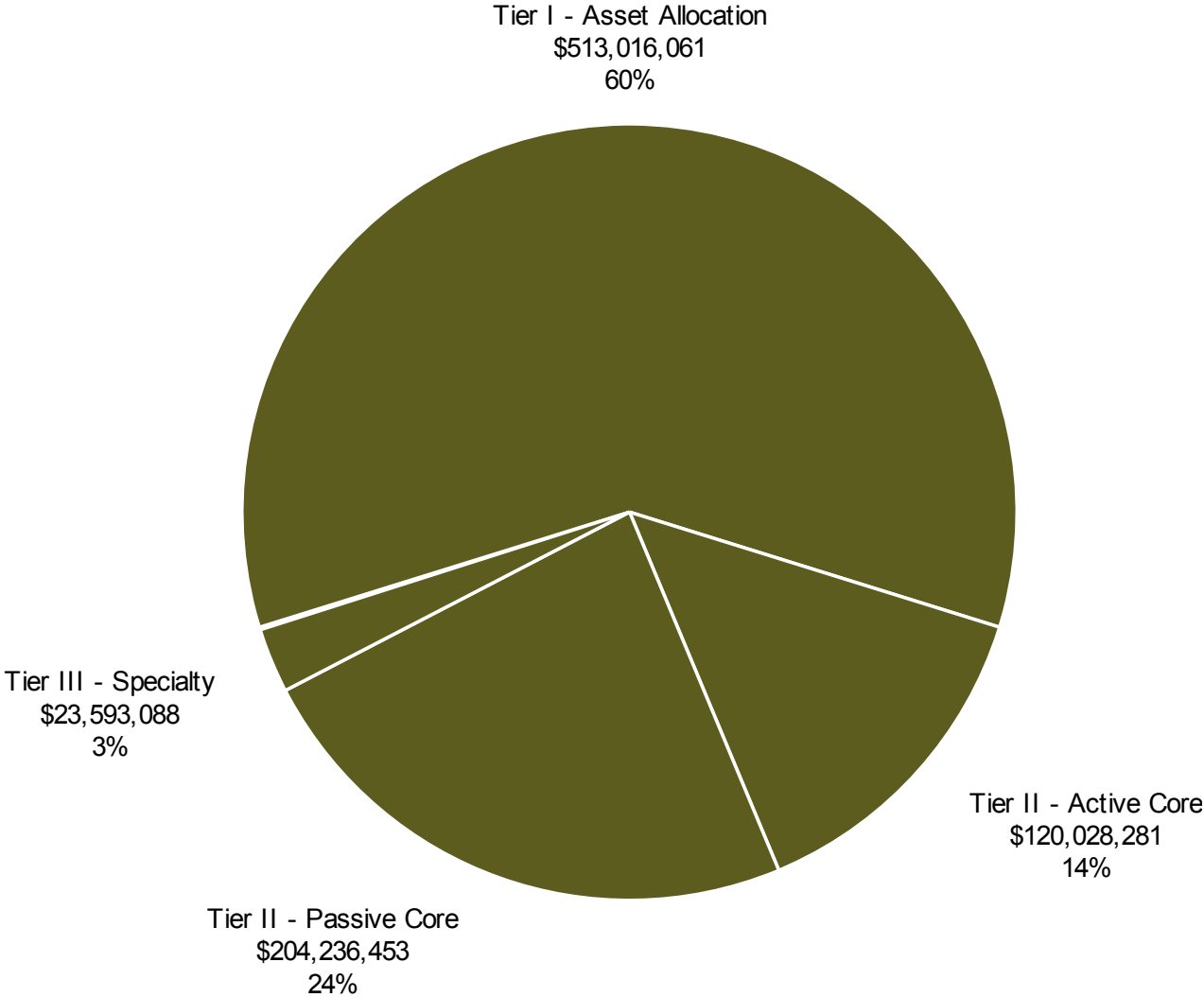
	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Absolute Return	3.04%	8.47%	4.72%	5.80%	2.68%
Crestline ABS	2.96%	15.76%	9.91%	8.75%	3.94%
Glob Asset Mgt	0.61%	3.10%	1.05%	4.17%	-
Prisma ABS	1.60%	7.73%	1.22%	4.92%	-
Allianz Stuctured Alpha 1000+	2.71%	10.56%	-	-	-
KKR Apex Equity Fund	0.31%	(3.30%)	-	-	-
Crestline Specialty Lending Fund	3.94%	11.89%	-	-	-
Zebra Global Equity	1.27%	1.22%	-	-	-
Zebra Global Adv antage	1.56%	0.78%	-	-	-
HFRI Fund of Funds Index	0.80%	6.48%	1.55%	3.87%	0.87%



Defined Contribution Plan

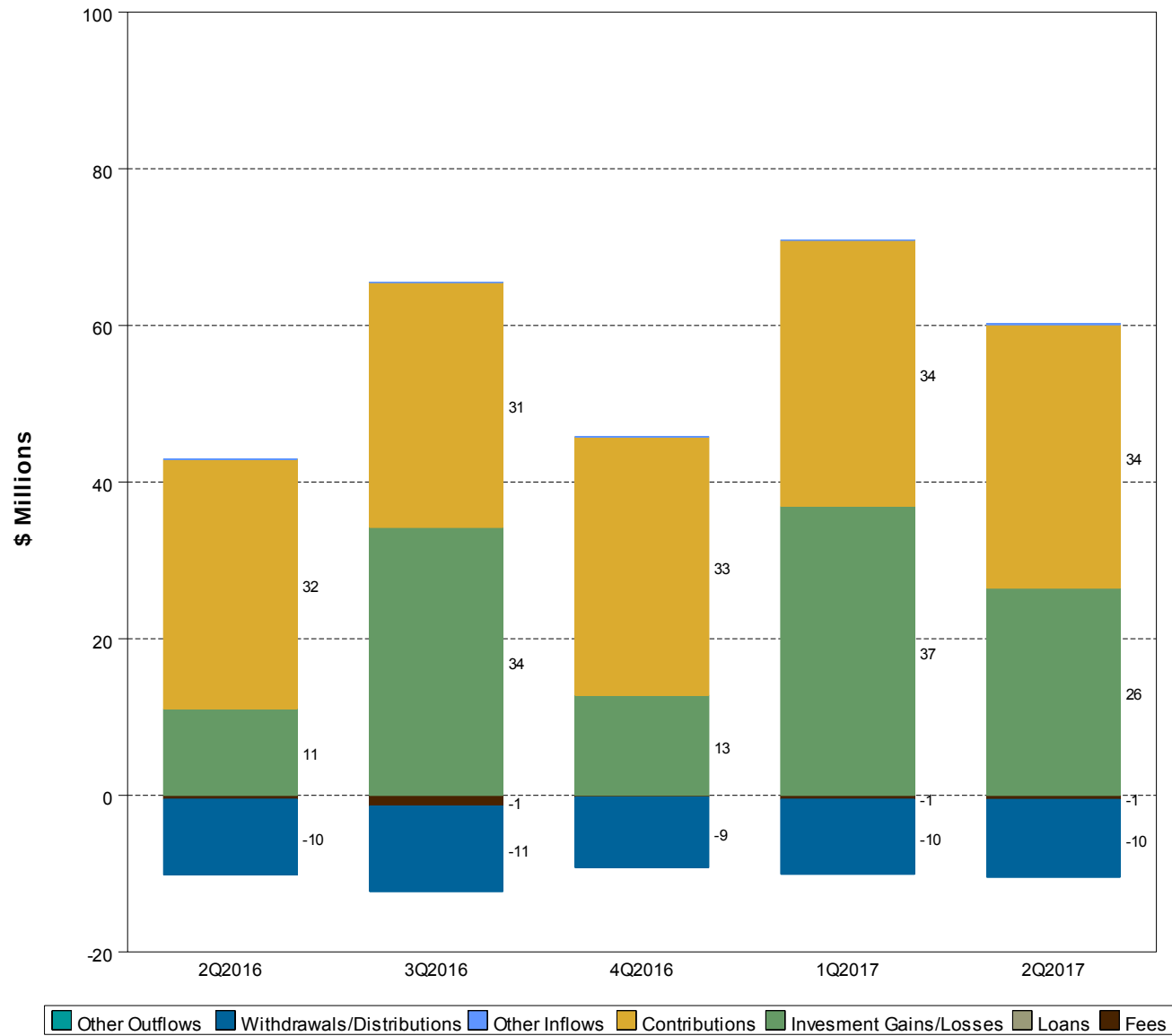
PERS DC Plan

June 30, 2017



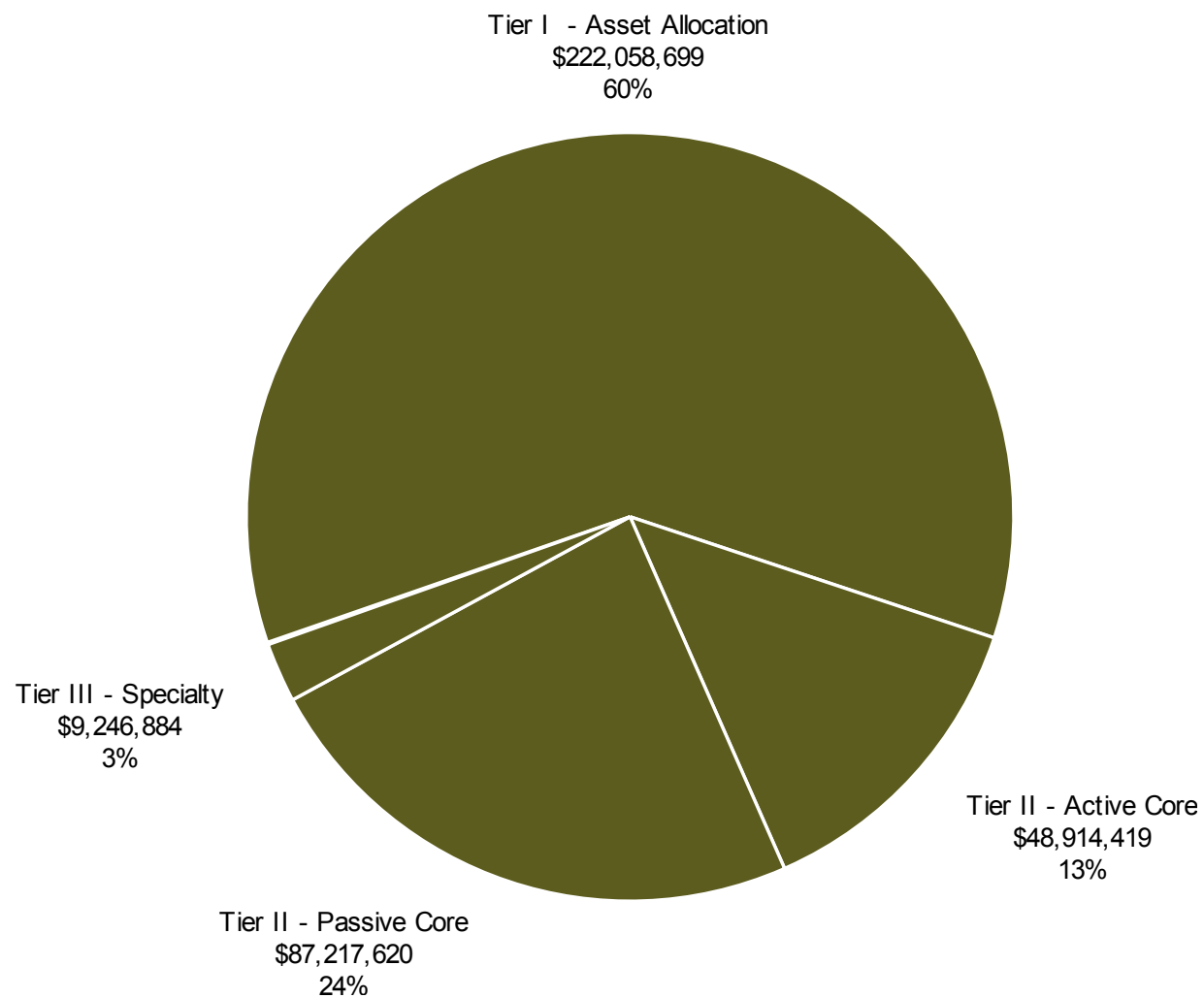
PERS DC Plan: Asset Changes

June 30, 2017



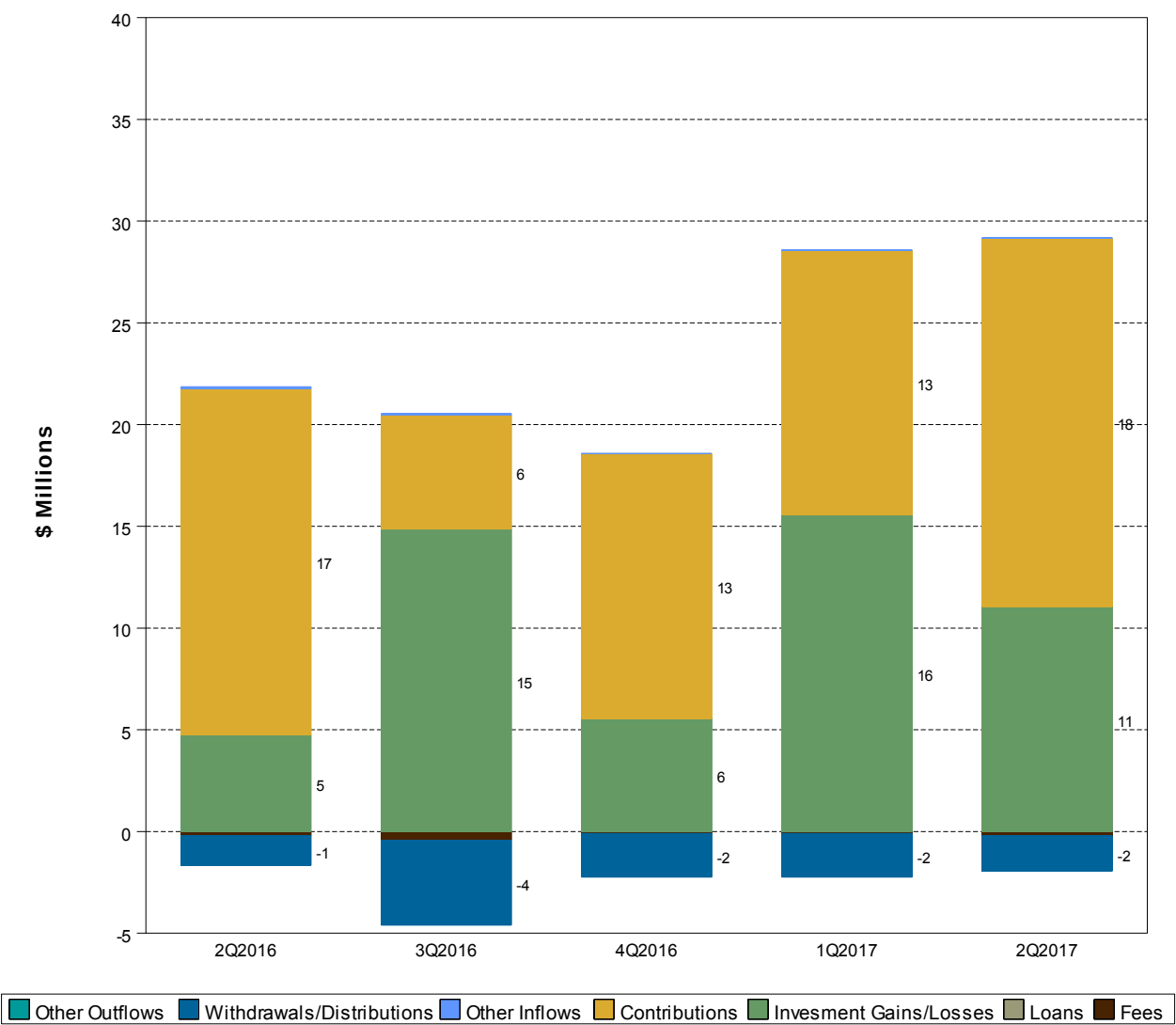
TRS DC Plan

June 30, 2017



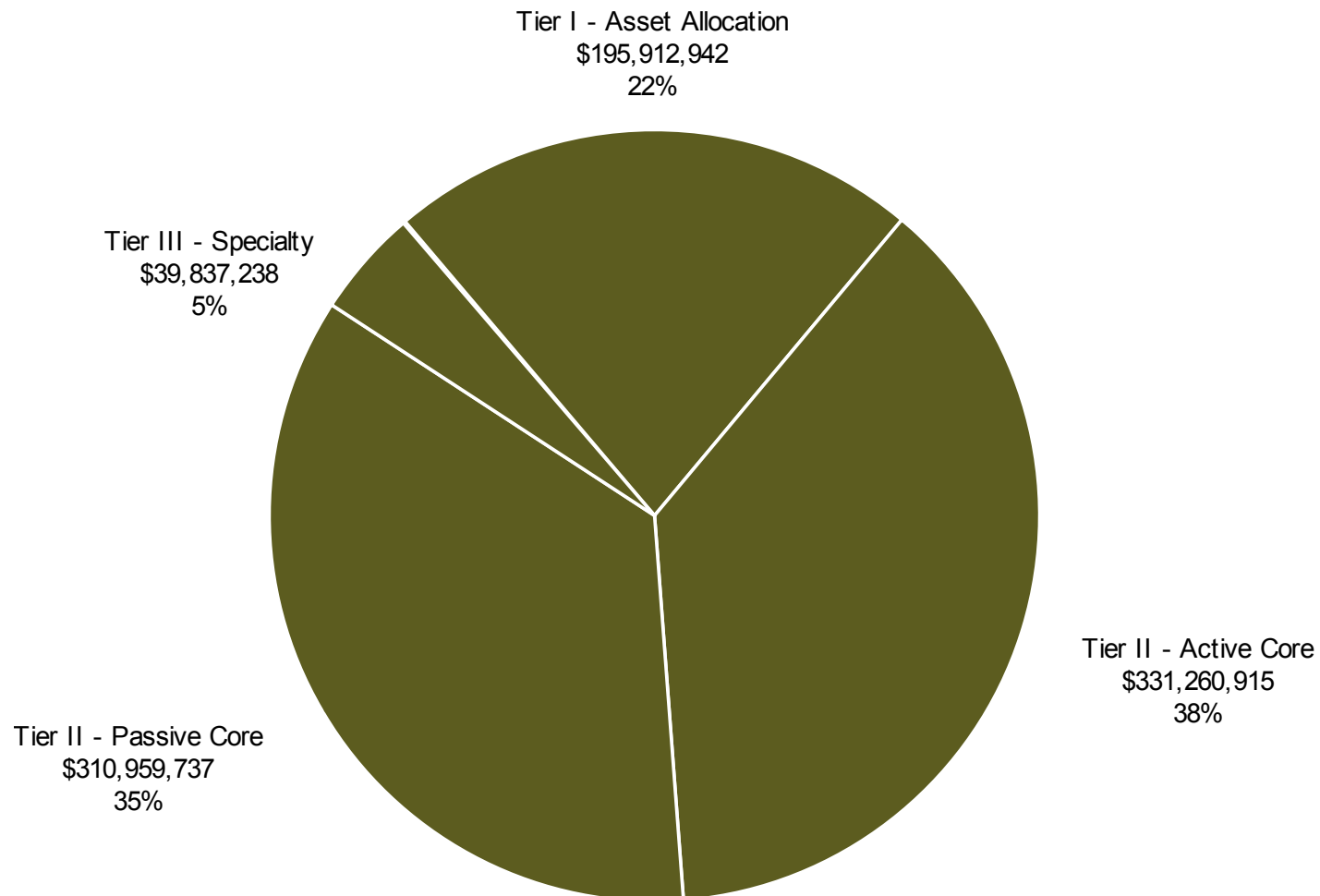
TRS DC Plan: Asset Growth Changes

June 30, 2017



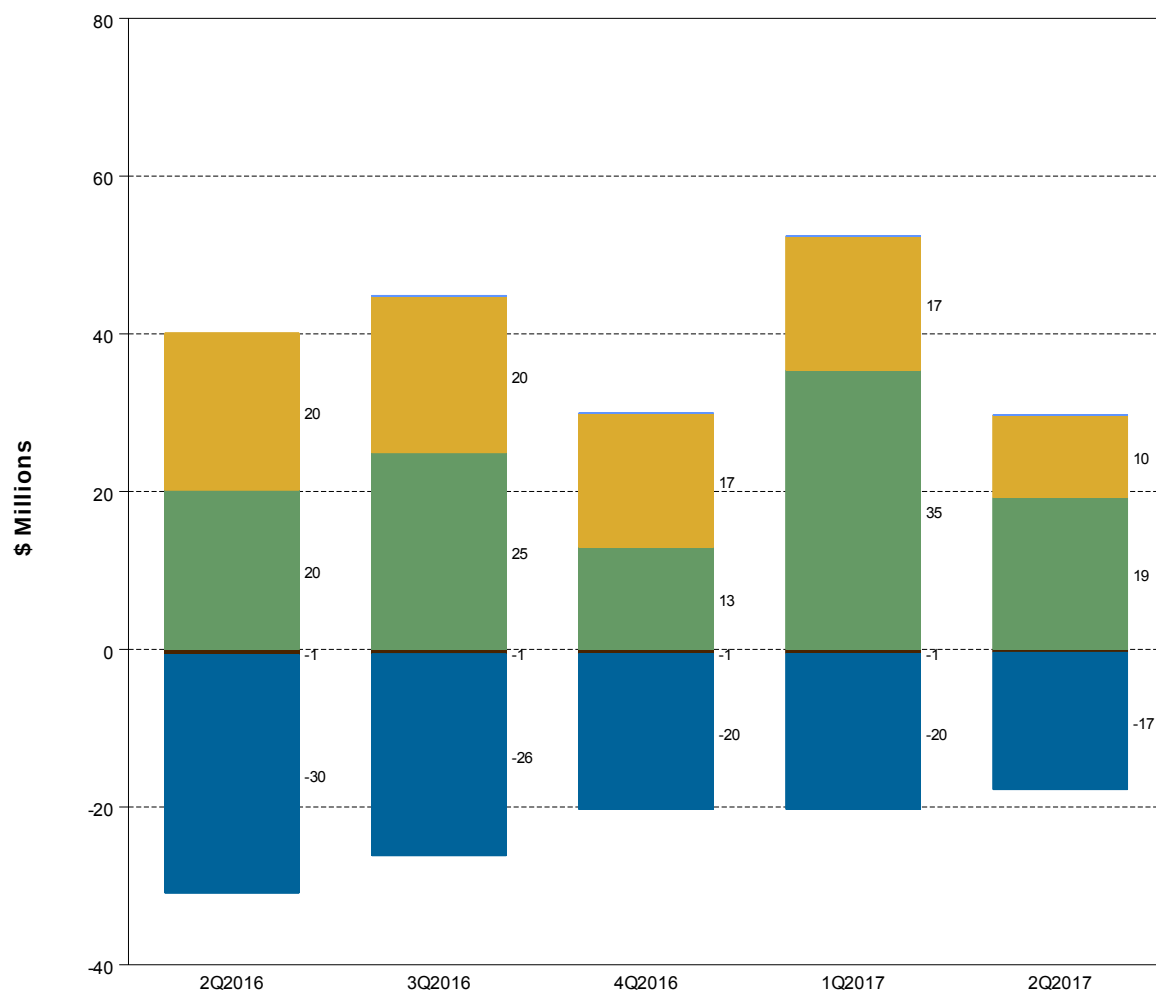
Deferred Comp Plan

June 30, 2017



Deferred Comp Plan: Quarterly Asset Changes

June 30, 2017



Other Outflows Withdrawals/Distributions Other Inflows Contributions Investment Gains/Losses Loans Fees

Individual Account Option Performance: 6/30/17

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
Tier I - Asset Allocation										
Alaska Balanced Trust	2.0 62	6.3 66	3.7 59	5.9 64	6.8 58	3.2 77		0.8 31	0.1 100	1.8 29
CAI MA Tgt Alloc Cons MFs										
Passive Target	1.9 63	6.4 65	3.7 60	5.7 65	6.7 64	3.2 78				1.7 36
Alaska Long-Term Balanced	2.7 47	11.1 49	4.9 55	8.6 46	9.5 46	4.9 62		0.4 33	0.2 100	1.7 38
CAI MA Tgt Alloc Mod MFs										
Passive Target	2.7 49	11.2 47	4.9 51	8.5 48	9.4 47	5.0 60				1.7 44
SSgA Global Balanced (i)	3.5 19	10.4 7	3.8 11	7.2 1	7.8 1	5.3 58		0.9 1	0.3 100	1.3 2
CAI Global FI MFs										
Global Balanced Custom Benchmark	3.4 23	10.4 7	3.5 12	7.0 1	7.6 1	5.4 57				1.3 4
Target 2010 Trust	2.1 55	8.2 34	3.9 47	7.0 34	8.0 28	3.9 71		0.1 18	0.2 100	1.7 5
CAI Tgt Date 2010										
Custom Index	2.1 64	8.3 34	3.9 50	7.0 35	8.0 28	4.0 62				1.7 10
Target 2015 Trust	2.4 45	9.8 29	4.5 33	8.2 17	9.1 14	4.6 54		0.2 11	0.2 100	1.7 14
CAI Tgt Date 2015										
Custom Index	2.4 46	9.9 29	4.4 38	8.1 17	9.1 14	4.7 45				1.7 16
Target 2020 Trust	2.8 36	11.7 20	5.1 16	9.2 11	10.1 9	5.3 39		0.2 5	0.2 100	1.7 7
CAI Tgt Date 2020										
Custom Index	2.7 41	11.7 20	4.9 19	9.2 11	10.1 9	5.4 25				1.7 13
Target 2025 Trust	3.0 49	13.3 23	5.5 14	10.1 14	11.0 13	5.9 38		0.1 11	0.2 100	1.7 8
CAI Tgt Date 2025										
Custom Index	3.0 50	13.3 23	5.3 19	10.1 14	11.0 12	6.1 26				1.6 19
Target 2030 Trust	3.2 50	14.7 23	5.8 14	10.9 13	11.7 11	6.4 44		0.1 10	0.2 100	1.7 6
CAI Tgt Date 2030										
Custom Index	3.2 52	14.8 22	5.7 18	10.9 13	11.7 10	6.6 31				1.6 13
Target 2035 Trust	3.4 60	15.9 31	6.1 13	11.5 14	12.3 4	6.8 43		0.1 8	0.3 100	1.7 4
CAI Tgt Date 2035										
Custom Index	3.4 65	16.0 30	6.0 18	11.5 14	12.3 3	7.0 33				1.6 13

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

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 2040 Trust	3.6 55	17.0 28	6.4 12	11.9 10	12.5 3	7.1 51		0.1 7	0.3 100	1.6 4
CAI Tgt Date 2040										
Custom Index	3.6 56	17.0 27	6.2 14	11.8 11	12.5 2	7.4 33				1.6 10
Target 2045 Trust	3.7 62	17.2 40	6.5 12	11.9 12	12.6 3	7.2 61		0.1 8	0.3 100	1.6 4
CAI Tgt Date 2045										
Custom Index	3.6 65	17.3 40	6.3 18	11.9 12	12.6 2	7.4 45				1.6 10
Target 2050 Trust	3.6 67	17.2 42	6.5 17	11.9 11	12.6 3	7.2 74		0.1 6	0.3 100	1.6 4
CAI Tgt Date 2050										
Custom Index	3.6 71	17.3 42	6.3 23	11.9 12	12.6 3	7.4 55				1.6 10
Target 2055 Trust	3.6 78	17.2 48	6.5 21	11.9 15	12.6 8	7.2 75		0.1 11	0.3 100	1.6 4
CAI Tgt Date 2055										
Custom Index	3.6 77	17.3 48	6.3 25	11.9 16	12.6 7	7.4 51				1.6 9
Target 2060 Trust	3.6 77	17.0 57								
CAI Tgt Date 2060										
Custom Index	3.6 75	17.3 52								

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: 6/30/17

Active Equity, Stable Value, and Interest Income

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										
International Equity Fund CAI Mut Fd: Non-U.S. Equity Style MSCI ACWI ex US Index	4.4 87	16.9 81								
	6.0 73	21.0 43	1.3 73	7.7 92	7.1 97	10.7 53				0.7 91
Allianz/RCM Socially Responsible CAI Mut Fd: Core Equity Style Custom Benchmark	4.3 19	16.3 79	7.6 79	13.2 77	13.4 86	7.6 80		-0.1 79	2.2 78	1.7 49
	3.1 51	16.3 79	7.9 73	13.4 76	14.5 69	7.5 85				1.8 40
T. Rowe Price Small Cap CAI Mut Fd: Sm Cap Broad Style Russell 2000 Index	2.5 56	21.3 70	8.0 41	14.5 43	16.4 23	10.8 80		0.4 22	2.7 100	1.3 24
	2.5 56	24.6 31	7.4 52	13.7 71	14.4 68	11.8 59				1.2 55
T. Rowe Price Stable Value CAI Stable Value Database 5 Yr U.S. Treas Rolling	0.6 1	2.3 1	2.4 1	2.5 1	2.7 2	0.1 42		17.4 13	0.0 96	24.9 17
	0.3 98	1.3 99	1.3 99	1.4 99	1.8 71	0.1 26				11.8 87
Def Comp Interest Income Fund CAI Stable Value Database 5 Yr U.S. Treas Rolling	0.6 1	2.6 1	2.8 1	2.9 1	3.2 1	0.1 17		29.5 3	0.1 55	22.7 29
	0.3 98	1.3 99	1.3 99	1.4 99	1.8 71	0.1 26				11.8 87

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

Passive Options: 6/30/17

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										
SSgAS&P 500 Index Fund (i)	3.1 51	17.9 58	9.6 37	14.6 45	15.4 46	7.7 77		-0.6 87	0.0 100	1.9 19
Callan Large Cap Core MFs										
S&P 500 Index	3.1 51	17.9 58	9.6 37	14.6 45	15.4 45	7.7 77				1.9 19
BlackRock S&P 500 Index Fund (i)	3.1 51	17.9 58	9.6 37	14.6 45	15.4 45	7.7 77		-0.4 69	0.0 100	1.9 19
Callan Large Cap Core MFs										
S&P 500 Index	3.1 51	17.9 58	9.6 37	14.6 45	15.4 45	7.7 77				1.9 19
SSgARussell 3000 Index Fund (i)	3.0 65	18.5 63	9.1 48	14.6 52	15.3 56	7.9 85		0.2 36	0.1 100	1.8 18
CAI Mut Fd: Large Cap Broad Style (Net)										
Russell 3000 Index	3.0 65	18.5 63	9.1 48	14.6 52	15.3 56	7.9 85				1.8 18
SSgAWorld Equity ex-US Index Fund (i)	5.9 77	19.8 57	0.9 82	7.2 97	6.7 97	10.7 57		-0.0 98	0.9 100	0.7 94
CAI MF: Non-U.S. Equity Style										
MSCI ACWI x U.S. Index (Net)	5.8 78	20.5 44	0.8 84	7.2 97	6.7 98	10.7 53				0.7 94
SSgALong US Treasury Bond (i)	4.0 89	-7.3 79	5.6 67	2.8 80	5.9 85	11.0 32		-0.0 81	0.1 100	0.2 64
CAI Mut Fd: Extended Mat Fixed Income										
Bimbg Long Treasury Index	4.0 89	-7.2 79	5.6 68	2.8 80	5.9 84	10.9 36				0.2 64
SSgAUS TIPS (i)	-0.4 62	-0.7 93	0.5 64	0.2 90	2.7 73	5.0 40		-4.4 100	0.0 100	-0.0 90
CAI TIPS MFs										
Bimbg U.S. TIPS Index	-0.4 61	-0.6 88	0.6 55	0.3 83	2.9 60	5.0 40				0.0 80
SSgAWorld Gov't Bond ex-US (i)	3.8 17	-5.0 99	-2.2 97	-0.8 97	1.3 97	9.0 1		-0.3 98	0.1 100	-0.1 96
CAI Mut Fd: Global Fixed Income Style										
Citi WGBI Non-U.S. Index	3.8 17	-5.0 99	-2.2 97	-0.8 97	1.4 97	9.0 1				-0.1 96
SSgAUS REIT Index Fund (i)	1.6 61	-2.6 73	7.8 45	8.7 58	12.7 41	11.3 24		-3.6 100	0.1 100	0.8 74
CAI Mut Fd: Real Estate Database										
DJ US Select REIT Index	1.6 58	-2.4 66	8.0 36	9.0 40	13.0 29	11.3 22				0.8 56
BlackRock Govt/Credit (i)	1.7 46	-0.4 97	2.5 87	2.2 95	3.3 94	3.5 1		-1.5 99	0.1 100	0.6 97
CAI Mut Fd: Core Bond Style										
Bimbg Govt/Credit Bd	1.7 45	-0.4 97	2.6 82	2.3 94	3.4 93	3.5 1				0.6 97
BlackRock Intermediate Gov't Bond (i)	0.7 79	-1.3 99	1.4 90	0.9 92	1.7 92	2.0 59		-2.8 100	0.0 97	0.4 96
CAI MF: Intermediate Fixed Income Style										
Bimbg Gov Inter	0.7 79	-1.2 99	1.5 89	1.1 92	1.8 91	2.0 59				0.4 94

Returns:
■ above median
■ third quartile
■ fourth quartile

Risk:
■ below median
■ second quartile
■ first quartile

Risk Quadrant:

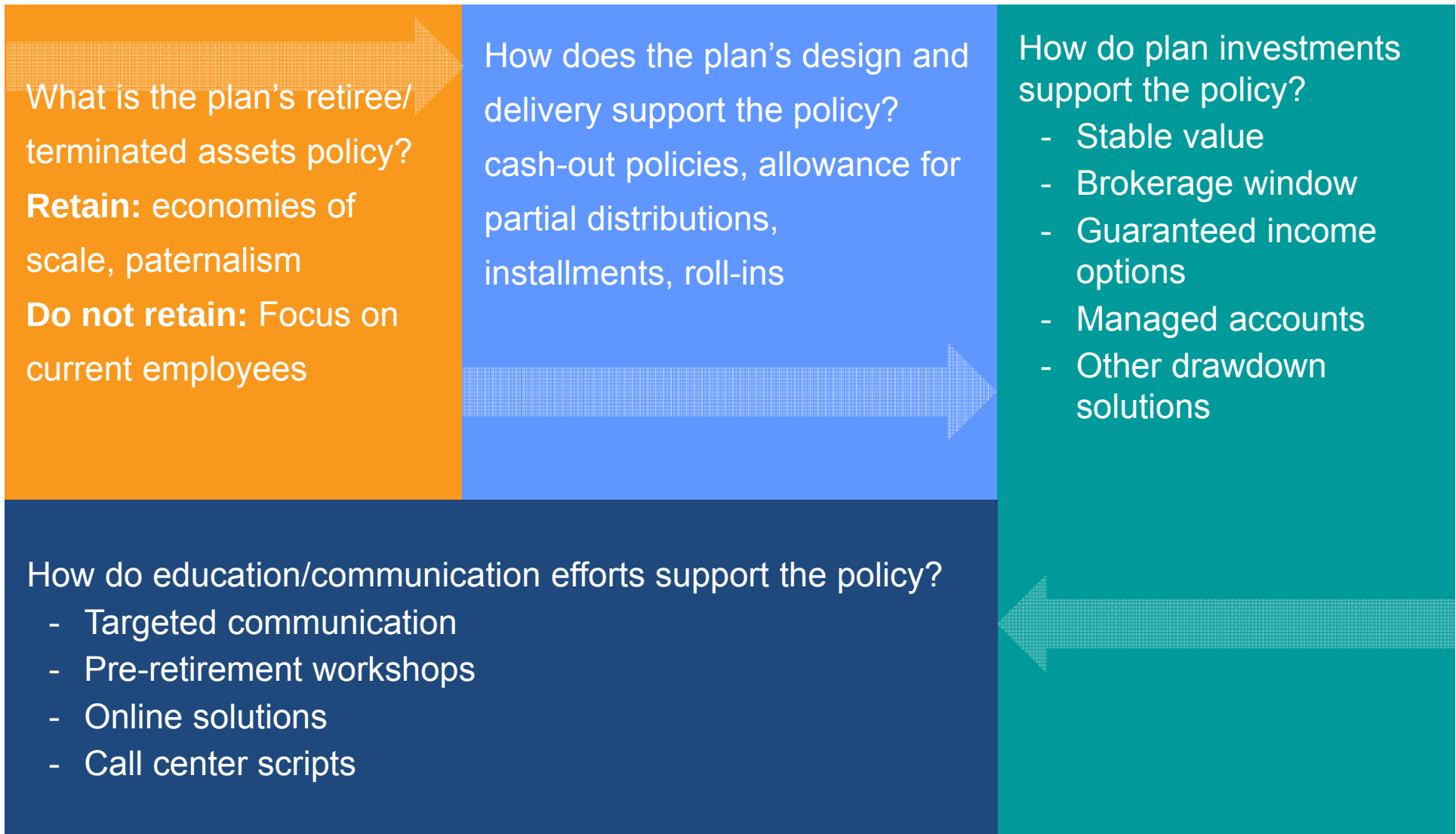

Excess Return Ratio:
■ above median
■ third quartile
■ fourth quartile

Tracking Error:
■ below median
■ second quartile
■ first quartile

Sharpe Ratio:
■ above median
■ third quartile
■ fourth quartile

(i) – Indexed scoring method used. Green: manager & index differ by less than +/- 10 percentiles; Yellow: manager and index differ by +/- 20 percentiles; Red: manager & index differ by more than 20 percentiles.

DC Plans generally: Food for thought regarding outcomes



What may be next for Defined Contribution plan lineups?

- Those near-retirement do engage with the plan¹—opportunity to move beyond THE DEFAULT
- The upside: opportunities to get a piece of the “in” and “near” retirement pie

Possible Rack Space in the “Retirement Tier” of DC Plan Lineup

	In-Plan	Guaranteed	Flexible
Payout funds	✓		✓
Managed account	✓		✓
Stable value	✓	✓	✓
Annuity as a form of distribution payment		✓	
In-plan guaranteed income for life product	✓	✓	
Annuity placement solutions		✓	
Longevity insurance/QLAC	?	✓	

1. Employees Approaching Retirement Defy Conventional Wisdom on Plan Engagement, Franklin Templeton, Topic Paper October 2015

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: History of PERS / TRS Employer
Contribution Rates
 DATE: October 5, 2017

ACTION: _____
 INFORMATION: X

Below is a history of employer contribution rates adopted by the Alaska Retirement Management Board for Fiscal Years 2010 through 2018, as well as the proposed FY 2019 contribution rates.

ARM BOARD ADOPTED RATES												
		FY10	FY11	FY12 (a)	FY13	FY14 (b)	FY15 (b)	FY15 (c)	FY16	FY17	FY18	PROPOSED FY19 (d)
Public Employees' Retirement System (PERS)												
	DB Employer Contribution Rate	27.65%	27.96%	33.49%	35.84%	35.68%	44.03%	31.90%	27.19%	26.14%	25.01%	27.58%
	DCR - Retiree Medical Plan	0.83%	0.55%	0.51%	0.48%	0.48%	1.66%	1.66%	1.68%	1.18%	1.03%	0.94%
	DCR - OD&D - All Others	0.30%	0.31%	0.20%	0.14%	0.20%	0.22%	0.22%	0.22%	0.17%	0.16%	0.26%
	DCR - OD&D - P/F	1.33%	1.18%	0.97%	0.99%	1.14%	1.06%	1.06%	1.05%	0.49%	0.43%	0.76%
Teachers' Retirement System (TRS)												
	DB Employer Contribution Rate	39.53%	38.56%	45.55%	52.67%	53.62%	70.75%	48.69%	29.27%	28.02%	26.78%	28.90%
	DCR - Retiree Medical Plan	1.03%	0.68%	0.58%	0.49%	0.47%	2.04%	2.04%	2.04%	1.05%	0.91%	0.79%
	DCR - OD&D	0.32%	0.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%

- (a) Beginning in Fiscal Year 2012, the defined benefit employer contribution rates for both PERS and TRS incorporated the normal cost of the Defined Contribution Retirement Plan.
- (b) As noted in the June 30, 2012 actuarial valuation reports, "The Board changed the amortization method used for funding from the level percentage of payroll method to the level dollar method in June 2012, effective June 30, 2012."
- (c) During the FY 2014 legislative session, HB 385 enacted certain changes into law. In AS 37.10.220(a), item (a)(8)(B) was amended to define that "an appropriate contribution rate for liquidating the past service liability of the defined benefit retirement plan under AS 14.25.009 - 14.25.220 or the past service liability of the defined benefit retirement plan under AS 39.35.095 - 39.35.680 must be determined by a level percent of pay method based on amortization of the past service liability for a closed term of 25 years;" The PERS DB and TRS DB Employer Contribution Rates for FY 2015 were updated to the level percentage of pay methodology from the previously determined rates that were prepared using the level dollar methodology, and have been done so going forward.
- (d) Beginning in Fiscal Year 2019, employer contribution rates for plans which have no past service liability as determined by the actuarial valuation process will not reflect a contribution rate for liquidating past service liability under AS 37.10.220(a)(8)(B). In this case, the contribution rate equals the Normal Cost rate.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: FY 19 PERS Employer Contribution Rate
Tier I - III
DATE: October 4, 2017

ACTION: X
INFORMATION:

BACKGROUND:

AS 37.10.220(a)(8) sets forth the responsibility of the Alaska Retirement Management Board (Board) to annually certify to each employer in the system contribution rates for normal costs and for liquidating any past service liability:

(8) 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 and to certify to the appropriate budgetary authority of each employer in the system

(A) an appropriate contribution rate for normal costs; and

(B) an appropriate contribution rate for liquidating any past service liability; in this subparagraph, the appropriate contribution rate for liquidating the past service liability of the defined benefit retirement plan under AS 14.25.009 - 14.25.220 or the past service liability of the defined benefit retirement plan under AS 39.35.095 - 39.35.680 must be determined by a level percent of pay method based on amortization of the past service liability for a closed term of 25 years;

AS 39.35.270 requires that the amount of each Public Employees' Retirement System (PERS) employer's contribution to the system shall be determined by applying the employer's contribution rate, as certified by the Alaska Retirement Management Board (Board), to the total compensation paid to the active employee. Statutory employer contribution and additional state contribution are established under the following two sections of Alaska Statute:

Sec. 39.35.255. Contributions by employers. (a) Each employer shall contribute to the system every payroll period an amount calculated by applying a rate of 22 percent of the greater of the total of all base salaries

(1) paid by the employer to employees who are active members of the system, including any adjustments to contributions required by AS 39.35.520; or

(2) paid by the employer to employees who were active members of the system during the corresponding payroll period for the fiscal year ending June 30, 2007."

and:

Sec. 39.35.280. Additional state contributions. In addition to the contributions that the state is required to make under AS 39.35.255 as an employer, the state shall contribute to the plan each July 1 or, if funds are not available on July 1, as soon after July 1 as funds become available, an amount for the ensuing fiscal year that, when combined with the total employer contributions that the administrator estimates will be allocated under AS 39.35.255(c), is sufficient to pay the plan's past service liability at the contribution rate adopted by the board under AS 37.10.220 for that fiscal year.

STATUS:

The Division of Retirement & Benefits' actuary, Conduent Human Resource Services, has completed the FY 19 Allocation of the Additional State Contributions based on June 30, 2016 roll-forward valuation report dated September 15, 2017. This roll-forward valuation methodology has been reviewed by the Board's actuary, Gabriel, Roeder, Smith & Co.

RECOMMENDATION:

That the Alaska Retirement Management Board set the Fiscal Year 2019 PERS actuarially determined contribution rate attributable to employers consistent with its fiduciary duty, as set out in the attached form of Resolution 2017-06.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2019 Employer Contribution Rate
For the Public Employees' Retirement System

Resolution 2017-06

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220(a)(8) requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios, and to certify to the appropriate budgetary authority of each employer in the system an appropriate contribution rate for normal costs and an appropriate contribution rate for liquidating any past service liability determined by a level percent of pay method based on amortization of the past service liability for a closed term of 25 years; and

WHEREAS, AS 39.35.255 establishes a statutory employer contribution rate of 22.00 percent and AS 39.35.280 requires additional state contribution to make up the difference between 22.00 percent and the actuarially determined contribution rate; and

WHEREAS, the "PERS, TRS, and JRS - Allocation of the Additional State Contributions for FY 19" letter dated September 15, 2017 determines that the actuarially determined contribution rate for pension benefits is 18.27 percent composed of the normal cost rate of 3.55 percent and past service rate of 14.72 percent; and

WHEREAS, the "PERS, TRS, and JRS - Allocation of the Additional State Contributions for FY 19" letter dated September 15, 2017 determines that the actuarially determined contribution rate for postemployment healthcare benefits is 4.37 percent composed of the normal cost rate of 2.56 percent and past service rate of 1.81 percent; and

WHEREAS, the “PERS, TRS, and JRS - Allocation of the Additional State Contributions for FY 19” letter dated September 15, 2017 presents the employer rate incorporating the normal cost of the Defined Contribution Retirement Plan of 4.94 percent;

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, that the Fiscal Year 2019 actuarially determined contribution rate attributable to employers participating in the Public Employees’ Retirement System is set at 27.58 percent, composed of the contribution rate for defined benefit pension of 18.27 percent, the contribution rate for postemployment healthcare of 4.37 percent, and the contribution rate for defined contribution pension of 4.94 percent.

DATED at Anchorage, Alaska this 5th day of October, 2017.

Chair

ATTEST:

Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: FY 2019 PERS Retiree Major Medical
and Occupational Death & Disability

ACTION: X

DATE: October 5, 2017

INFORMATION: _____

BACKGROUND:

The Alaska Retirement Management Board (Board) establishes rates for the Public Employees' Retirement System (PERS) Tier IV Defined Contribution Retirement Plan (DCR) for the following plans: 1) Retiree Major Medical Insurance (RMMI) and 2) Occupational Death & Disability (OD&D) under the following two sections in Alaska Statute:

Retiree Major Medical Insurance

AS 39.35.750 (b) requires that "An employer shall also contribute an amount equal to a percentage, as adopted by the board, of each member's compensation from July 1 to the following June 30 to pay for retiree major medical insurance."

Occupational Death & Disability

AS 39.35.750 (e) requires that "An employer shall make annual contributions to the plan in an amount determined by the board to be actuarially required to fully fund the cost of providing occupational disability and occupational death benefits under AS 39.35.890 and 39.35.892. The contribution required under this subsection for peace officers and fire fighters and the contribution required under this subsection for other employees shall be separately calculated based on the actuarially calculated costs for each group of employees."

STATUS:

The Division of Retirement & Benefits' actuary, Conduent Human Resource Services, has completed the actuarial valuation of the PERS DCR Plan as of June 30, 2016. The valuation has been reviewed by the Board's actuary, Gabriel, Roeder, Smith & Co. (GRS).

According to the PERS DCR Plan actuarial valuation report, and confirmed by GRS, the Fiscal Year 2019 actuarially determined contribution rates attributable to employers for the Retiree Major Medical Insurance (RMMI) should be 0.94 percent; for the peace officer/firefighter Occupational Death & Disability (OD&D) benefit should be 0.76 percent; and for "all other" OD&D benefit should be 0.26 percent.

RECOMMENDATION:

That the Alaska Retirement Management Board set Fiscal Year 2019 PERS DCR Retiree Major Medical Insurance and Occupational Death & Disability Benefit rates as set out in the following resolutions:

1. Resolution 2017-07: Public Employees' DCR Plan Retiree Major Medical Insurance Rate
2. Resolution 2017-08: Public Employees' DCR Plan Occupational Death & Disability Benefit Rate

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2019 Employer Contribution Rate
For Public Employees' Defined Contribution Retirement Plan
Retiree Major Medical Insurance Rate

Resolution 2017-07

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220 requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios; and

WHEREAS, AS 39.35.750(b) requires the Board to approve an amount equal to a percentage of each member's compensation from July 1 to the following June 30 to pay for retiree major medical insurance; and

WHEREAS, the June 30, 2016 PERS Defined Contribution actuarial valuation report determines that the actuarially determined contribution rate for retiree major medical insurance is 0.94 percent, composed of the normal cost rate of 0.88 percent and past service rate of 0.06 percent;

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, the Fiscal Year 2019 employer contribution rate for the retiree major medical insurance for the Public Employees' Defined Contribution Retirement Plan is set at 0.94 percent.

DATED at Anchorage, Alaska this 5th day of October, 2017.

Chair

ATTEST:

Secretary

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2019 Employer Contribution Rate
For Public Employees' Defined Contribution Retirement Plan
Occupational Death & Disability Benefit Rates

Resolution 2017-08

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220 requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios; and

WHEREAS, AS 39.35.750(e) requires the Board to determine an actuarially sound amount required to fully fund the cost of providing occupational disability and occupational death benefits under AS 39.35.890 and 39.35.892, and that such contribution for peace officers and fire fighters, and the contribution for other employees shall be calculated separately; and

WHEREAS, the June 30, 2016 PERS Defined Contribution actuarial valuation report determines that the actuarially determined contribution rate for peace officer / firefighter occupational death & disability is 0.76 percent, which is the normal cost rate, and the actuarially determined contribution rate for "all other" is 0.26 percent, which is the normal cost rate; and

WHEREAS, there is no past service liability as determined by the annual actuarial valuation of the PERS Defined Contribution occupational death & disability, so no contribution rate for liquidating past service liability is appropriate under AS 37.10.220(a)(8)(B);

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, the Fiscal Year 2019 employer contribution rate for public employees' occupational death and disability benefit rate is set at 0.76 percent for peace officers / fire fighters, and at 0.26 percent for all other Public Employees' Defined Contribution Retirement Plan employees.

DATED at Anchorage, Alaska this 5th day of October, 2017.

Chair

ATTEST:

Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: FY 19 TRS Employer Contribution Rate
Tier I - II
DATE: October 4, 2017

ACTION: X
INFORMATION:

BACKGROUND:

AS 37.10.220(a)(8) sets forth the responsibility of the Alaska Retirement Management Board (Board) to annually certify to each employer in the system contribution rates for normal costs and for liquidating any past service liability:

(8) 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 and to certify to the appropriate budgetary authority of each employer in the system

(A) an appropriate contribution rate for normal costs; and

(B) an appropriate contribution rate for liquidating any past service liability; in this subparagraph, the appropriate contribution rate for liquidating the past service liability of the defined benefit retirement plan under AS 14.25.009 - 14.25.220 or the past service liability of the defined benefit retirement plan under AS 39.35.095 - 39.35.680 must be determined by a level percent of pay method based on amortization of the past service liability for a closed term of 25 years;

AS 14.25.070 requires that the amount of each Teachers' Retirement System (TRS) employer's contribution to the system shall be determined by applying the employer's contribution rate, as certified by the Alaska Retirement Management Board (ARMB), to the total compensation paid to the active employee. Statutory employer contribution and additional state contribution are established under the following two sections of Alaska Statute:

Sec. 14.25.070. Contributions by employers. (a) Each employer shall contribute to the system every payroll period an amount calculated by applying a rate of 12.56 percent to the total of all base salaries paid by the employer to active members of the system, including any adjustments to contributions required by AS 14.25.173(a).

and:

Sec. 14.25.085. Additional state contributions. In addition to the contributions that the state is required to make under AS 14.25.070 as an employer, the state shall contribute to the plan each July 1 or, if funds are not available on July 1, as soon after July 1 as funds become available, an amount for the ensuing fiscal year that, when combined with the total employer contributions that the administrator estimates will be allocated under AS 14.25.070(c), is sufficient to pay the plan's past service liability at the contribution rate adopted by the board under AS 37.10.220 for that fiscal year.

STATUS:

The Division of Retirement & Benefits' actuary, Conduent Human Resource Services, has completed the FY 19 Allocation of the Additional State Contributions based on June 30, 2016 roll-forward valuation report dated September 15, 2017. This roll-forward valuation methodology has been reviewed by the Board's actuary, Gabriel, Roeder, Smith & Co. (GRS).

RECOMMENDATION:

That the Alaska Retirement Management Board set the Fiscal Year 2019 TRS actuarially determined contribution rate attributable to employers consistent with its fiduciary duty, as set out in the attached form of Resolution 2017-09.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2019 Employer Contribution Rate
For the Teachers' Retirement System

Resolution 2017-09

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220(a)(8) requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios, and to certify to the appropriate budgetary authority of each employer in the system an appropriate contribution rate for normal costs and an appropriate contribution rate for liquidating any past service liability determined by a level percent of pay method based on amortization of the past service liability for a closed term of 25 years; and

WHEREAS, AS 14.25.070 establishes a statutory employer contribution rate of 12.56 percent and AS 14.25.085 requires additional state contribution to make up the difference between 12.56 percent and the actuarially determined contribution rate; and

WHEREAS, the "PERS, TRS, and JRS - Allocation of the Additional State Contributions for FY 19" letter dated September 15, 2017 determines that the actuarially determined contribution rate for pension benefits is 20.86 percent composed of the normal cost rate of 3.26 percent and past service rate of 17.60 percent; and

WHEREAS, the "PERS, TRS, and JRS - Allocation of the Additional State Contributions for FY 19" letter dated September 15, 2017 determines that the actuarially determined contribution rate for postemployment healthcare benefits is 2.70 percent composed of the normal cost rate of 2.03 percent and past service rate of 0.67 percent; and

WHEREAS, the “PERS, TRS, and JRS - Allocation of the Additional State Contributions for FY 19” letter dated September 15, 2017 presents the employer rate incorporating the normal cost of the Defined Contribution Retirement Plan of 5.34 percent;

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, that the Fiscal Year 2019 actuarially determined contribution rate attributable to employers participating in the Teachers’ Retirement System is set at 28.90 percent, composed of the contribution rate for defined benefit pension of 20.86 percent, the contribution rate for postemployment healthcare of 2.70 percent, and the contribution rate for defined contribution pension of 5.34 percent.

DATED at Anchorage, Alaska this 5th day of October, 2017.

Chair

ATTEST:

Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: FY 2019 TRS Retiree Major Medical ACTION: X
and Occupational Death & Disability

DATE: October 5, 2017 INFORMATION: _____

BACKGROUND:

The Alaska Retirement Management Board (Board) establishes rates for the Teachers' Retirement System (TRS) Tier III Defined Contribution Retirement Plans for the following plans: 1) Retiree Major Medical Insurance (RMMI) and 2) Occupational Death & Disability (OD&D) under the following two sections in Alaska Statute:

Retiree Major Medical Insurance

AS 14.25.350 (b) requires that "An employer shall also contribute an amount equal to a percentage, as approved by the board, of each member's compensation from July 1 to the following June 30 to pay for retiree major medical insurance."

Occupational Death & Disability

AS 14.25.350 (e) requires that "An employer shall make annual contributions to a trust account in the plan, applied as a percentage of each member's compensation from July 1 to the following June 30, in an amount determined by the board to be actuarially required to fully fund the cost of providing occupational disability and occupational death benefits under AS 14.25.310 - 14.25.590. The contribution required under this subsection for peace officers and fire fighters and the contribution required under this subsection for other employees shall be separately calculated based on the actuarially calculated costs for each group of employees."

STATUS:

The Division of Retirement & Benefits' actuary, Conduent Human Resource Services, has completed the actuarial valuation of the TRS DCR Plan as of June 30, 2016. The valuation has been reviewed by the Board's actuary, Gabriel, Roeder, Smith & Co. (GRS).

According to the TRS DCR Plan actuarial valuation report, and confirmed by GRS, the Fiscal Year 2019 actuarially determined contribution rate attributable to employers for the Retiree Major Medical Insurance (RMMI) should be 0.79 percent and for the Occupational Death & Disability (OD&D) Benefit should be 0.08 percent.

RECOMMENDATION:

That the Alaska Retirement Management Board set Fiscal Year 2019 TRS DCR Retiree Major Medical Insurance and Occupational Death & Disability Benefit rates as set out in the following resolutions:

1. Resolution 2017-10: Teachers' DCR Plan Retiree Major Medical Insurance Rate
2. Resolution 2017-11: Teachers' DCR Plan Occupational Death & Disability Benefit Rate

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2019 Employer Contribution Rate
For Teachers' Defined Contribution Retirement Plan
Retiree Major Medical Insurance Rate

Resolution 2017-10

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220 requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios; and

WHEREAS, AS 14.25.350(b) requires the Board to approve an amount equal to a percentage of each member's compensation from July 1 to the following June 30 to pay for retiree major medical insurance; and

WHEREAS, the June 30, 2016 TRS Defined Contribution actuarial valuation report determines that the actuarially determined contribution rate for retiree major medical insurance is 0.79 percent, which is the normal cost rate;

WHEREAS, there is no past service liability as determined by the annual actuarial valuation of the TRS Defined Contribution retiree major medical insurance, so no contribution rate for liquidating past service liability is appropriate under AS 37.10.220(a)(8)(B);

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, the Fiscal Year 2019 employer contribution rate for the retiree major medical insurance for the Teachers' Defined Contribution Retirement Plan is set at 0.79 percent.

DATED at Anchorage, Alaska this 5th day of October, 2017.

Chair

ATTEST:

Secretary

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2019 Employer Contribution Rate
For Teachers' Defined Contribution Retirement Plan
Occupational Death & Disability Benefit Rate

Resolution 2017-11

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220 requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios; and

WHEREAS, AS 14.25.350 (e) requires the Board to determine an actuarially sound amount required to fully fund the cost of providing occupational disability and occupational death benefits under AS 14.25.310 – 14.25.590; and

WHEREAS, the June 30, 2016 TRS Defined Contribution actuarial valuation report determines that the actuarially determined contribution rate for occupational death & disability is 0.08 percent, which is the normal cost rate; and

WHEREAS, there is no past service liability as determined by the annual actuarial valuation of the TRS Defined Contribution occupational death & disability, so no contribution rate for liquidating past service liability is appropriate under AS 37.10.220(a)(8)(B);

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, the Fiscal Year 2019 employer contribution rate for teachers' occupational death and disability benefit rate is set at 0.08 percent for all Teachers' Defined Contribution Retirement Plan employees.

DATED at Anchorage, Alaska this 5th day of October, 2017.

Chair

ATTEST:

Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: FY 2019 Alaska National Guard and
Naval Militia Contribution Amount

ACTION: X

DATE: October 5, 2017

INFORMATION:

BACKGROUND:

AS 26.05.226 requires that “(a) The Department of Military and Veterans’ Affairs (DMVA) shall contribute to the Alaska National Guard and Alaska Naval Militia retirement system the amounts determined by the Alaska Retirement Management Board as necessary to (1) fund the system based on the actuarial requirements of the system as established by the Alaska Retirement Management Board; and (2) administer the system. (b) The amount required for contributions from the Department of Military and Veterans' Affairs under (a) of this section shall be included in the annual appropriations made to the Department of Military and Veterans' Affairs.”

STATUS:

The Division of Retirement & Benefits' (Division's) actuary, Conduent Human Resource Services, has completed the actuarial valuation of the Alaska National Guard and Naval Militia Retirement System (NGNMRS) as of June 30, 2016. The actuarial valuation has been reviewed by the Alaska Retirement Management Board's (Board's) actuary, Gabriel, Roeder, Smith & Co. (GRS) and then certified and accepted by the Board.

According to the NGNMRS June 30, 2016 actuarial valuation report, and confirmed by GRS, the Fiscal Year 2018 actuarially determined contribution amount should be \$851,686.

The Actuarial Committee met October 4, 2017, and passed a motion recommending that the Board adopt Resolution 2017-12 setting the FY 2019 NGNMRS contribution amount at \$851,686.

RECOMMENDATION:

That the Alaska Retirement Management Board set the Fiscal Year 2019 NGNMRS annual contribution amount consistent with its fiduciary duty, as set out in the attached form of Resolution 2017-12.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2019 Contribution Amount
For the Alaska National Guard and Naval Militia Retirement System

Resolution 2017-12

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220(a)(8) requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios, and to certify to the appropriate budgetary authority of each employer in the system an appropriate contribution rate for normal costs and an appropriate contribution rate for liquidating any past service liability; and

WHEREAS, the June 30, 2016 Alaska National Guard and Naval Militia Retirement System actuarial valuation report determines that the actuarially determined contribution amount is \$851,686, composed of the normal cost of \$610,686, and expense load cost of \$241,000; and

WHEREAS, there is no past service liability as determined by the actuarial valuation of the Alaska National Guard and Naval Militia Retirement System, so no contribution amount for liquidating past service liability is appropriate under AS 37.10.220(a)(8)(B);

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, that the Fiscal Year 2019 contribution amount for the State of Alaska, Department of Military and Veterans' Affairs to the Alaska National Guard and Naval Militia Retirement System is set at \$851,686.

DATED at Anchorage, Alaska this 5th day of October, 2017.

Chair

ATTEST:

Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: FY 2019 JRS Employer Contribution
Rate

ACTION: _____

DATE: October 5, 2017

INFORMATION: X

BACKGROUND:

AS 22.25.046 states in part that:

(a) The state court system shall contribute to the judicial retirement system at the rate established by the commissioner of administration. The contribution rate shall be based on the results of an actuarial valuation of the judicial retirement system. The results of the actuarial valuation shall be based on actuarial methods and assumptions adopted by the commissioner of administration.

(b) The contribution rate shall be a percentage which, when applied to the covered compensation of all active members of the judicial retirement system, will generate sufficient money to support, along with contributions from members, the benefits of the judicial retirement system.

(c) Employer contributions shall be separately computed for benefits provided by AS 22.25.090 and shall be deposited in the Alaska retiree health care trust established under AS 39.30.097(a)."

STATUS:

The Division of Retirement & Benefits' (Division's) actuary, Conduent Human Resource Services, has completed the actuarial valuation of the Alaska Judicial Retirement System (JRS) as of June 30, 2016. The actuarial valuation has been reviewed by the Alaska Retirement Management Board's (Board's) actuary, Gabriel, Roeder, Smith & Co. (GRS) and then certified and accepted by the Board.

According to the JRS actuarial valuation as of June 30, 2016, the recommended Fiscal Year 2019 employer contribution rate is 70.24 percent based on the following table:

	Pension	Post-employment Health Care	Total
Normal Cost Rate	38.14%	4.47%	42.61%
Past Service Cost Rate	32.45%	-4.82%	27.63%
Total Employer Contribution Rate	70.59%	-0.35%	70.24%

The Alaska Legislature has established operating budget language that explicitly addresses JRS past service costs separate from the normal costs. Normal costs as a percentage are charged to the Alaska Court System's operating budget and past service cost in dollars is funded separately in retirement section language like PERS and TRS. The computed JRS Past Service Contribution amount is \$4,909,000 as shown on page 2 of the Conduent Human Resource Services letter dated September 15, 2017. The contribution amount should be reflected in the operating budget language section and should be deposited in the JRS pension benefit trust during FY 2019.

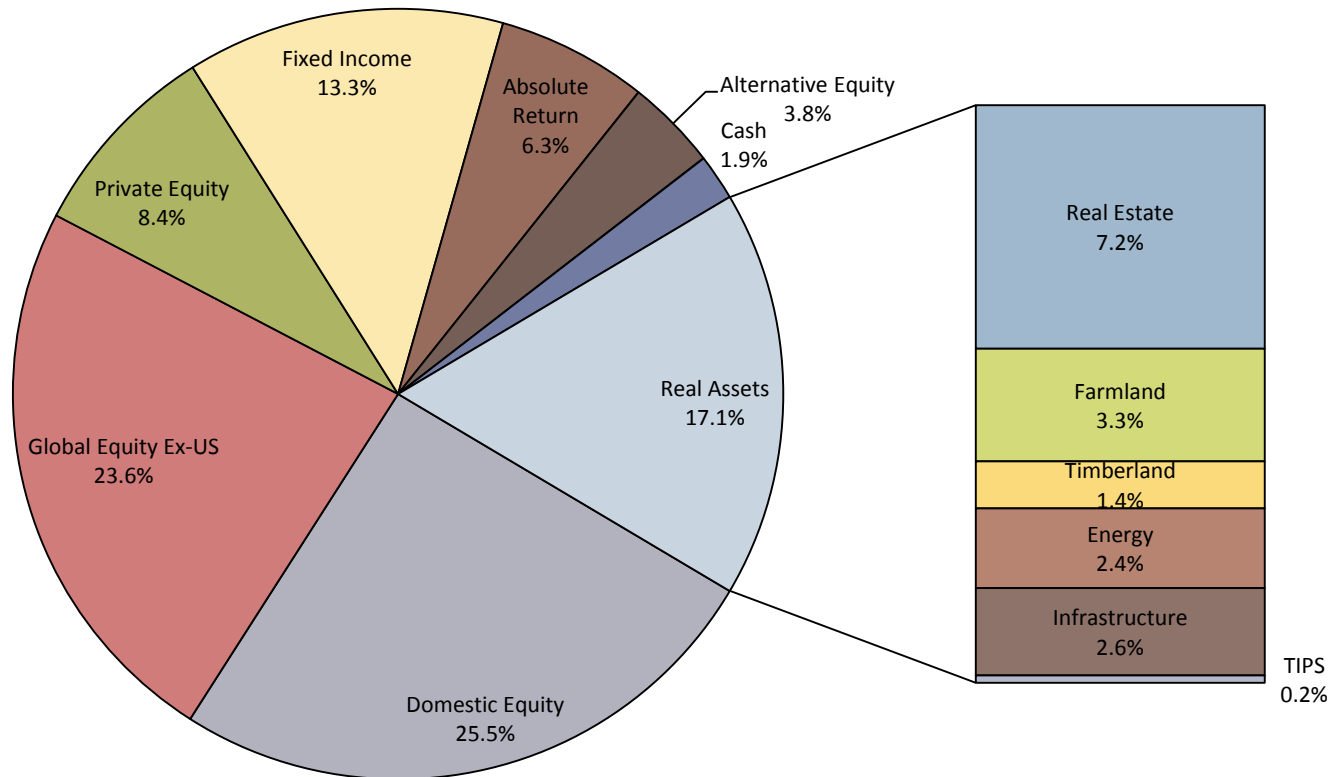
Alaska Retirement Management Board

Real Assets Fiscal Year 2018 Investment Plan

October 2017

Real Assets Plan Level Allocation

ARMB Actual Asset Allocation June 30, 2017



Source: State Street Bank and Trust Company and manager reported NAVs for Real Estate, Farmland, Timberland, and Infrastructure. Percentages reflect combined defined benefit pension and health care portfolios as of June 30, 2017. Percentages may not add to 100% due to rounding.

Real Assets Portfolio Approach

- Portfolio Role: The primary role of the Real Assets portfolio is to generate attractive returns in assets which provide portfolio diversification and inflation hedging to ARMB's total portfolio. Many of the asset sectors in Real Assets have historically exhibited low volatility and a high income component of total return.
- Strategy: Lower risk, lower return approach. Conservative strategy employing low leverage and focusing on higher quality assets producing stable returns.
- Return Expectations: Long-term performance expectations for Real Estate, Farmland, Timberland, and Infrastructure are to exceed a 5% net real return over rolling 5-year periods. Custom benchmarks are also used to evaluate performance compared to market.
- Benchmark: At the asset class level, a custom benchmark of 31% NCREIF Property Index, 4% FTSE NAREIT Equity Index, 25% NCREIF Farmland Index, 10% NCREIF Timberland Index, 12.5% Alerian MLP Index, and 17.5% S&P Global Infrastructure Index is employed.
- Structure: The Real Assets portfolio is primarily a collection of private, illiquid assets requiring long-term holding periods. However, the portfolio includes both publicly traded and private investment structures. Liquid investments include REITs, TIPS, MLP investments, and infrastructure stock portfolios.
- Implementation: Management of the portfolio is delegated among staff. Private Real Estate, Farmland, Timberland, and Infrastructure are managed by the real assets group. TIPS are managed by fixed income staff, REITs are managed by the internal equity team, and Energy is managed by private equity staff. Discretionary authority is given to external managers to select and manage the investments.

Role of Real Assets

- Diversification: Low correlations with stocks and bonds, particularly with private market components.
- Inflation Hedge: Relatively high correlation with CPI driven by inflation-linked payments (infrastructure), economic inputs (agriculture and timber), and/or economic sensitivity.
- Stable Income Return: Many of the assets have a leased or contractually based cash flow structure (real estate, farmland, infrastructure).

Selected Asset Returns 2010-2016 (calendar years)

2010	2011	2012	2013	2014	2015	2016
NAREIT All Equity Idx 27.9%	ARMB Farmland Idx 14.9%	NAREIT All Equity Idx 19.7%	S&P 500 32.4%	NAREIT All Equity Idx 28.0%	NCREIF:Total Index 13.3%	S&P:GI Infr Idx 12.4%
S&P 500 15.1%	NCREIF:Total Index 14.3%	ARMB Farmland Idx 17.3%	MSCI EAFE 22.8%	S&P 500 13.7%	ARMB Farmland Idx 6.2%	S&P 500 12.0%
NCREIF:Total Index 13.1%	NAREIT All Equity Idx 8.3%	MSCI EAFE 17.3%	ARMB Farmland Idx 15.8%	S&P:GI Infr Idx 13.0%	NCREIF:Timberland Index 5.0%	NAREIT All Equity Idx 8.6%
MSCI EAFE 7.8%	Barclays Aggregate 7.8%	S&P 500 16.0%	S&P:GI Infr Idx 15.0%	NCREIF:Total Index 11.8%	NAREIT All Equity Idx 2.8%	NCREIF:Total Index 8.0%
ARMB Farmland Idx 7.7%	S&P 500 2.1%	S&P:GI Infr Idx 11.9%	NCREIF:Total Index 11.0%	NCREIF:Timberland Index 10.5%	S&P 500 1.4%	ARMB Farmland Idx 5.3%
Barclays Aggregate 6.5%	NCREIF:Timberland Index 1.6%	NCREIF:Total Index 10.5%	NCREIF:Timberland Index 9.7%	ARMB Farmland Idx 7.9%	Barclays Aggregate 0.5%	Barclays Aggregate 2.6%
S&P:GI Infr Idx 5.8%	S&P:GI Infr Idx (0.4%)	NCREIF:Timberland Index 7.8%	NAREIT All Equity Idx 2.9%	Barclays Aggregate 6.0%	MSCI EAFE (0.8%)	NCREIF:Timberland Index 2.6%
NCREIF:Timberland Index (0.2%)	MSCI EAFE (12.1%)	Barclays Aggregate 4.2%	Barclays Aggregate (2.0%)	MSCI EAFE (4.9%)	S&P:GI Infr Idx (11.5%)	MSCI EAFE 1.0%

Source: Callan

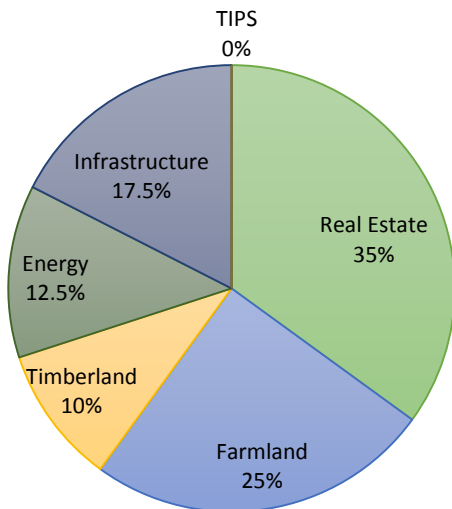
Real Assets Portfolio Sector Allocation

- The Fiscal Year 2017 asset allocation target for Real Assets was 17% +/- 8%.
- The actual Real Assets allocation was 17.1% at June 30, 2017.
- No new strategies were added to the asset class in Fiscal Year 2017. \$25MM was committed to KKR's REPA II fund in our non-core real estate strategy. Existing commitments across the other strategies continued to be funded.

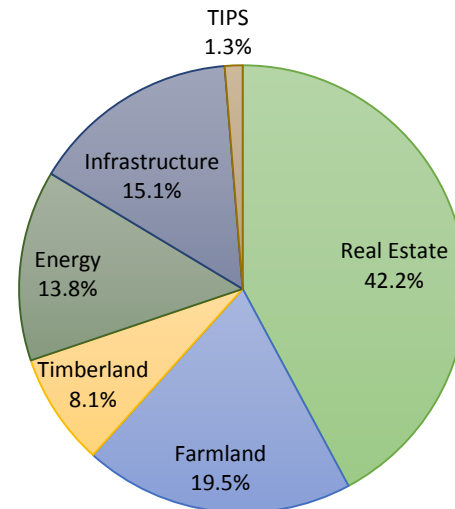
ARMB Actual Sector Allocation Compared to Target Allocation as of June 30, 2017				
Sector Allocation	Actual %	Target %	Target Band	Actual % (-) Target %
Real Assets				
Real Estate	42.2%	35%	+40%/-35%	7.2%
Farmland	19.5%	25%	+30%/-25%	-5.5%
Timberland	8.1%	10%	+30%/-10%	-1.9%
Infrastructure	15.1%	17.5%	+10%/-17.5%	-2.4%
Energy	13.8%	12.5%	+10%/-5%	1.3%
TIPS	1.3%	0%	+20%	1.3%

Source: State Street Bank and Trust Company and manager reported NAVs. Percentages reflect combined defined benefit pension and health care portfolios as of June 30, 2017. Percentages may not add due to rounding.

ARMB Real Assets Portfolio
Target Asset Allocations as of June 30, 2017



ARMB Real Assets Portfolio
Total Market Value \$4.3 billion as of June 30, 2017

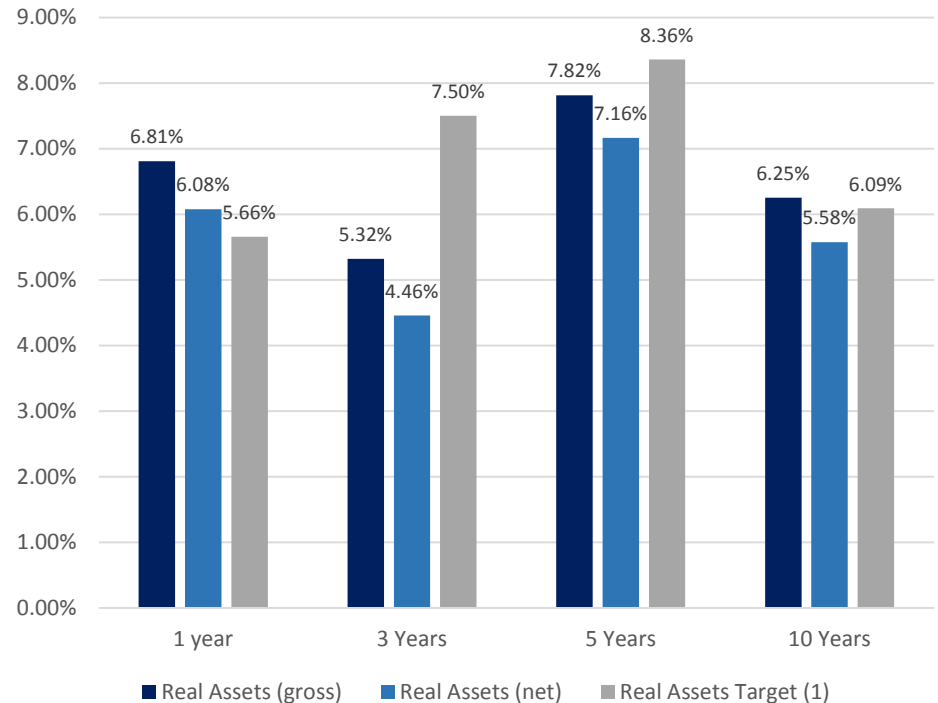


Real Assets Performance

ARMB Returns for Periods Ending June 30, 2017

	1 year	3 Years	5 Years	10 Years
Real Assets (gross)	6.81%	5.32%	7.82%	6.25%
Real Assets (net)	6.08%	4.46%	7.16%	5.58%
Real Assets Target ⁽¹⁾	5.66%	7.50%	8.36%	6.09%
Total Real Estate (gross)	6.50%	10.91%	11.05%	4.32%
Total Real Estate (net)	5.90%	10.23%	10.30%	3.58%
Real Estate Total Target ⁽²⁾	6.29%	10.10%	10.48%	6.69%
Total Private Real Estate (gross)	8.07%	11.42%	11.30%	4.31%
Total Private Real Estate (net)	7.33%	10.57%	10.40%	3.47%
NCREIF Total Index	6.97%	10.17%	10.49%	6.42%
REIT Internal Portfolio	-0.04%	8.84%	9.79%	5.27%
NAREIT Equity Index	0.22%	8.86%	9.95%	6.21%
Total Farmland (gross)	4.69%	5.92%	8.69%	10.00%
Total Farmland (net)	3.88%	5.07%	7.78%	8.98%
ARMB Farmland Target ⁽³⁾	5.34%	5.81%	9.33%	10.89%
Total Timber (gross)	-0.20%	3.28%	5.74%	
Total Timber (net)	-0.95%	2.48%	4.90%	
NCREIF Timberland Index	3.35%	5.57%	7.18%	
Total Public Infrastructure (gross)	20.28%	5.82%		
Total Public Infrastructure (net)	19.53%	5.16%		
Total Private Infrastructure (gross)	12.50%	6.30%		
Total Private Infrastructure (net)	10.55%	4.74%		
Global Infrastructure Index	12.71%	3.50%	9.67%	
Total ARMB MLP Composite (gross)	3.31%	-9.19%		
Total ARMB MLP Composite (net)	2.70%	-9.59%		
Alerian MLP Index	0.40%	-11.23%	1.77%	
Total Energy Funds (gross)*	30.30%	-10.95%	-6.80%	
CPI + 5%	6.50%	5.58%	6.11%	6.64%
TIPS Internal Portfolio	-0.60%	0.69%	0.29%	
Barclays US TIPS Index	-0.63%	0.63%	0.27%	4.27%

Real Assets Performance vs Target



(1) As of 04/21/2017, the Real Assets Target consists of 31% NCREIF Property Index, 4% FTSE NAREIT Equity Index, 25% NCREIF Farmland Index, 10% NCREIF Timberland Index, 12.5% Alerian MLP Index, and 17.5% S&P Global Infrastructure Index.

(2) ARMB Custom Real Estate Target is 90% NCREIF Property Index and 10% FTSE NAREIT All Equity Index.

(3) ARMB Custom Farmland Target is leased-only properties in the NCREIF Farmland Index reweight to reflect 90% row crops and 10% permanent crops until 1/1/08 and 80% row crops and 20% permanent crops thereafter.

* Return data supplied by State Street

Source: Callan Associates, State Street, Manager Reports as of June 30, 2017

Total Real Estate Portfolio

- The core portfolio returned 7.53% gross / 6.88% net for the fiscal year, consistent with the NCREIF Property Index benchmark of 6.97% (gross).
- Non-Core portfolio returned 12.16% gross / 10.69% net during the fiscal year with strong performance from Almanac, Clarion, KKR, and Tishman Speyer funds.
- \$25MM was committed to KKR's REPA II fund; this was the only Non-Core fund commitment made during the fiscal year.
- U.S. REIT portfolio returned -0.04% compared to FTSE NAREIT All Equity REITs Index of 0.22%.

Strategy	Market Value	% of ARMB Real Estate Portfolio
Core Real Estate	\$ 1,304,942,898	72%
Non-Core Real Estate	\$ 152,384,502	8%
REIT Portfolio	\$ 351,325,090	19%
Totals	\$ 1,808,652,490	100%

Real Estate Portfolio Profile

- Net Asset Value: \$1.8 billion
- Number of Properties: 19 + commingled fund interests
- Core Structure: 3 separate accounts, 2 open-end funds
- Non-Core Structure: 15 commingled funds
- Remaining separate account allocation: \$163 million

Annual ARMB Real Estate Returns

Fiscal Year ending June 30, 2017

	1 Year	3 Year	5 Year	10 Year	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
ARMB Core Income	4.63%	4.79%	4.92%	5.59%	4.63%	4.71%	5.03%	4.82%	5.43%	5.72%	6.78%	7.33%	5.88%	5.64%
ARMB Core Appreciation	2.81%	5.37%	5.46%	0.48%	2.81%	6.47%	6.87%	6.48%	4.75%	5.84%	11.33%	-8.00%	-27.72%	2.58%
ARMB Core Total (Gross)	7.53%	10.34%	10.59%	6.10%	7.53%	11.40%	12.16%	11.53%	10.37%	11.81%	18.68%	-1.11%	-23.10%	8.33%
ARMB Core Total (Net)	6.88%	9.66%	9.88%	5.38%	6.88%	10.72%	11.44%	10.80%	9.63%	11.03%	17.80%	-1.90%	-23.65%	7.64%
ARMB Non-Core Total (Gross)	12.16%	16.42%	14.56%	-0.52%	12.16%	16.08%	21.19%	16.51%	7.34%	4.49%	27.71%	-15.73%	-59.31%	5.10%
ARMB Non-Core Total (Net)	10.69%	14.67%	12.88%	-1.81%	10.69%	14.11%	19.39%	14.73%	5.92%	3.09%	26.46%	-17.85%	-58.84%	3.11%
ARMB REIT (Net)	-0.04%	8.84%	9.79%	5.27%	-0.04%	23.70%	4.26%	12.95%	9.53%	12.56%	35.51%	52.24%	-46.49%	-15.65%
ARMB Total Real Estate (Gross)	6.50%	10.91%	11.05%	4.32%	6.50%	14.48%	11.90%	13.06%	9.51%	10.09%	21.79%	-2.73%	-34.66%	6.10%
ARMB Total Real Estate (Net)	5.90%	10.23%	10.30%	3.58%	5.90%	13.76%	11.17%	12.26%	8.57%	9.22%	20.90%	-3.80%	-34.81%	5.12%
ARMB Custom Benchmark	6.29%	10.10%	10.48%	6.69%	6.29%	11.91%	12.19%	11.42%	10.70%	12.36%	18.36%	3.66%	-21.13%	6.82%

Source: Townsend

Private Core Real Estate Portfolio

- Two sales occurred during the year. Parallel 41, an apartment building in Stamford, CT, was sold by Sentinel for \$33.35MM. Amberglen, an office building in Portland, OR, was sold by LaSalle for \$33MM.
- Real Estate fundamentals are generally strong across markets and continue to improve in warehouse, office, retail, and apartments. Generally low vacancy rates have given landlords pricing power and the ability to increase rents. Space absorption across sectors is expected to continue to be positive going forward, though new supply is expected to increase vacancy rates.

Manager	Market Value	% of ARMB Private Real Estate Portfolio	Number of Properties
LaSalle	\$ 189,546,857	13%	4
Sentinel	\$ 194,991,680	13%	3
UBS	\$ 521,224,900	36%	12
JPMorgan Strategic Property Fund	\$ 248,600,783	17%	-
UBS Trumbull Property Fund	\$ 150,578,675	10%	-
Non-Core Real Estate	\$ 152,384,502	10%	-
Totals	\$ 1,457,327,397	100%	19



Private Core Real Estate Portfolio

- UBS IMA outperformed on the strength of the retail and industrial properties it manages.
- Sentinel IMA, our multi-family sector manager, outperformed its benchmark (NCREIF Apartment Index) 8.69% vs 8.14%.
- LaSalle IMA experienced weaker performance due to vacancy in a large office asset.
- JPM SPF outperformed due to the strength of its industrial properties as well as its overweight to the office sector.
- UBS TPF's underperformance was primarily due to weak property-level returns, especially related to some of its office assets.

Annual ARMB Private Real Estate Total Returns
Fiscal Year ending June 30, 2017

	1 Year	3 Year	5 Year	10 Year	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
ARMB Core Real Estate (Gross)	7.53%	10.34%	10.59%	6.10%	7.53%	11.40%	12.16%	11.53%	10.37%	11.81%	18.68%	-1.11%	-23.10%	8.33%
ARMB Core Real Estate (Net)	6.88%	9.66%	9.88%	5.38%	6.88%	10.72%	11.44%	10.80%	9.63%	11.03%	17.80%	-1.90%	-23.65%	7.64%
NCREIF Property Index (Gross)	6.97%	10.17%	10.49%	6.42%	6.97%	10.64%	12.98%	11.21%	10.73%	12.04%	16.73%	-1.48%	-19.56%	9.21%
LaSalle IMA (Gross)	3.95%	5.06%	6.77%	5.17%	3.95%	8.08%	3.21%	8.96%	9.81%	12.24%	24.88%	2.96%	-24.04%	8.85%
LaSalle IMA (Net)	3.35%	4.47%	6.13%	4.49%	3.35%	7.50%	2.63%	8.34%	9.02%	11.47%	23.97%	2.12%	-24.57%	8.19%
Sentinel IMA (Gross)	8.69%	11.94%	10.69%	6.83%	8.69%	14.89%	12.32%	9.19%	8.48%	16.68%	18.11%	5.39%	-25.07%	7.06%
Sentinel IMA (Net)	8.15%	11.36%	10.11%	6.25%	8.15%	14.31%	11.72%	8.60%	7.89%	16.05%	17.40%	4.68%	-25.49%	6.60%
UBS IMA (Gross)	9.60%	14.97%	14.23%	7.96%	9.60%	16.50%	19.03%	15.51%	10.79%	11.42%	17.05%	-0.35%	-20.76%	7.40%
UBS IMA (Net)	9.10%	14.43%	13.63%	7.33%	9.10%	15.98%	18.41%	14.85%	10.11%	10.75%	16.21%	-1.07%	-21.26%	6.83%
JPMorgan SPF (Gross)	7.91%	10.75%	12.11%	6.00%	7.91%	11.07%	13.34%	14.04%	14.32%	11.93%	18.86%	-5.65%	-26.40%	9.41%
JPMorgan SPF (Net)	6.98%	9.81%	11.16%	5.09%	6.98%	10.13%	12.38%	13.07%	13.35%	10.99%	17.91%	-6.51%	-27.08%	8.52%
UBS TPF (Gross)	5.59%	9.59%	9.78%	5.25%	5.59%	10.66%	12.64%	10.37%	9.78%	11.13%	17.00%	-0.93%	-22.88%	5.26%
UBS TPF (Net)	4.62%	8.50%	8.68%	4.21%	4.62%	9.52%	11.49%	9.23%	8.64%	10.01%	15.97%	-1.77%	-23.63%	4.11%

Source: Townsend, NCREIF

Farmland Portfolio

- Farmland portfolio returned 4.69% gross / 3.88% net for the fiscal year, below the ARMB Farmland Target benchmark return of 5.34%.
- The Farmland portfolio is within the row/permanent crop-type mix targets of 80%/20% +/- 10% at 85% row and 15% permanent. The portfolio is well diversified based on location and crop type. The portfolio grows a wide variety of row crops including corn, cotton, and soybeans. Permanent crops include pistachios, almonds, apples, oranges, and wine grapes.
- Farmland returns have moderated in recent years due to continued commodity price weakness and strength in the US dollar. In general, ARMB's managers have been able to hold rents at existing levels but some rent concessions have been made in certain markets where farm profitability has been more severely impacted.
- Weaker commodity prices, a stronger US dollar, and expectations for higher interest rates create the potential for more attractive investment opportunities in the future.

Farmland Portfolio Profile

- Net Asset Value: \$838 million
- Total Acres: 155,589
- Remaining separate account allocation: \$173 million

Manager	Market Value	% of ARMB Ag Portfolio	Number of Properties
Hancock Ag	\$ 267,209,928	32%	25
UBS Farmland	\$ 570,396,289	68%	67
Totals	\$ 837,606,217	100%	92

Investment Location - Top 5 States		
	ARMB Portfolio	Properties
California	22.6%	14
Idaho	16.8%	15
Texas	10.7%	9
Illinois	9.2%	7
Colorado	8.8%	9

Annual ARMB Farmland Returns Fiscal Year ending June 30, 2017

	1 Year	3 Year	5 Year	10 Year	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
ARMB Farmland Total Return (Gross)	4.69%	5.92%	8.69%	10.00%	4.69%	6.87%	6.20%	9.45%	16.62%	16.18%	10.81%	6.43%	6.77%	16.87%
ARMB Farmland Total Return (Net)	3.88%	5.07%	7.73%	8.98%	3.88%	5.99%	5.36%	8.24%	15.56%	15.23%	9.91%	5.52%	5.88%	15.05%
ARMB Farmland Custom Benchmark	5.34%	5.81%	9.33%	10.89%	5.34%	6.39%	5.69%	12.05%	17.72%	17.92%	10.21%	5.47%	11.23%	18.03%
Hancock Ag Total Return (Gross)	3.25%	4.82%	6.54%	8.90%	3.25%	6.00%	5.24%	7.24%	11.14%	14.76%	9.09%	9.41%	8.90%	14.57%
Hancock Ag Total Return (Net)	2.41%	3.97%	5.69%	8.02%	2.41%	5.13%	4.39%	6.40%	10.27%	13.82%	8.21%	8.50%	7.99%	13.61%
UBS Farmland Total Return (Gross)	5.37%	6.43%	9.78%	10.56%	5.37%	7.29%	6.64%	10.44%	19.77%	17.04%	11.88%	4.86%	5.75%	17.87%
UBS Farmland Total Return (Net)	4.53%	5.59%	8.92%	9.69%	4.53%	6.44%	5.80%	9.57%	18.84%	16.12%	10.99%	4.01%	4.90%	16.97%

Source: Callan, HAIG, UBS

Timberland Portfolio

- Timberland portfolio returned -0.19% gross / -0.95% net for the fiscal year. The Timberland portfolio underperformed the NCREIF Timberland Index benchmark return of 3.35%. No acquisitions and no large property sales occurred during the fiscal year.
- Low returns in the Timberland portfolio in Fiscal Year 2017 are again attributed to sluggish growth in new housing starts as well as excess timber supply resulting from lower harvest levels following the 2008 housing crisis. Housing starts are a main driver of timber demand and continue to rise from historically low levels.
- Timberland fundamentals are expected to strengthen with continued growth in housing starts and tariffs on Canadian production. Demand for timber is expected to increase as mill capacity is currently being added in the U.S. Southeast.

Timberland Portfolio Profile

- Net Asset Value: \$350 million
- Total Acres: 166,151
- Remaining separate account allocation: \$54 million

Manager	Market Value	% of ARMB Timber Portfolio	Number of Properties
Hancock Timber	\$ 93,834,597	27%	3
TIR	\$ 255,689,723	73%	13
Totals	\$ 349,524,320	100.00%	16

Diversification by Geographic Region			
	ARMB Portfolio	NTI	Difference
South	59.9%	69.3%	-9.4%
Pacific Northwest	14.9%	23.3%	-8.4%
Northeast	13.0%	4.3%	8.7%
Lake States	12.2%	3.1%	9.1%

Annual ARMB Timberland Returns Fiscal Year Ending June 30, 2017

	1 Year	3 Year	5 Year	2017	2016	2015	2014	2013	2012	2011	2010
ARMB Timberland Total Return (Gross)	-0.20%	3.28%	5.74%	-0.20%	1.07%	9.23%	10.93%	8.14%	5.76%	5.58%	-2.10%
ARMB Timberland Total Return (Net)	-0.95%	2.48%	4.90%	-0.95%	0.27%	8.37%	10.06%	7.26%	4.88%	4.68%	-2.92%
NCREIF Timberland Index	3.35%	5.57%	7.18%	3.35%	3.49%	10.02%	9.92%	9.37%	1.13%	0.51%	-3.60%
Hancock Timber Total Return (Gross)	-0.72%	1.51%	6.04%	-0.72%	-1.57%	7.03%	15.45%	11.01%	9.80%	7.87%	-1.82%
Hancock Timber Total Return (Net)	-1.42%	0.81%	5.27%	-1.42%	-2.24%	6.30%	14.60%	10.12%	8.87%	6.91%	-2.72%
TIR Total Return (Gross)	-0.01%	3.90%	5.53%	-0.01%	1.97%	10.02%	9.29%	6.74%	3.57%	4.11%	-2.21%
TIR Total Return (Net)	-0.78%	3.07%	4.67%	-0.78%	1.13%	9.12%	8.40%	5.86%	2.72%	3.26%	-3.01%

Source: Callan, HTRG, TIR

Infrastructure

- The Fiscal Year 2017 infrastructure portfolio return was 15.45% gross / 13.95% net compared to its global benchmark return of 12.71%. Returns were negatively impacted by strong U.S. dollar but continue to be supported by globally low interest rates and the search for yield by investors.
- ARMB's infrastructure portfolio is focused on core investments characterized by long-lived assets with high barriers to entry. These assets often have monopolistic characteristics with contracted or regulated cash flows. Investments include airports, toll roads, sea ports, water utilities, and electric transmission assets. Both the IFM and JPM investments are large private open-end funds that invest in OECD countries globally. Brookfield and Lazard invest in public stocks in OECD countries, with Brookfield also including some emerging market exposure.

Infrastructure Portfolio

- Net Asset Value: \$648 million
- Private Infrastructure: 2 open-end funds
- Public Infrastructure: 2 separate accounts

Manager	Market Value	% of ARMB Infrastructure Portfolio
IFM	\$ 298,781,248	46%
JPMorgan Infrastructure	\$ 103,397,658	16%
Brookfield	\$ 104,241,968	16%
Lazard	\$ 141,330,595	22%
Totals	\$ 647,751,468	100%

ARMB Annual Returns

Fiscal Year ending June 30, 2017

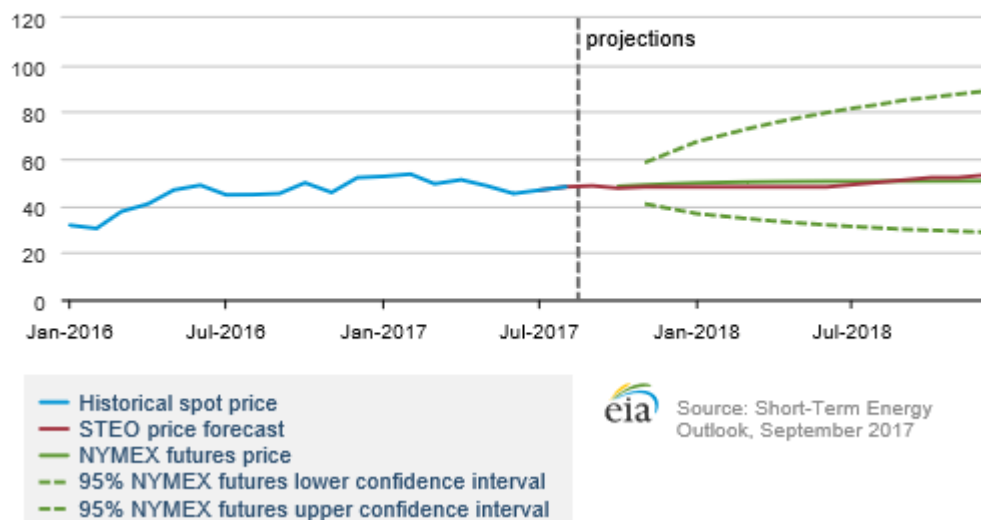
Infrastructure	1 year	3 year	5 year	2017	2016	2015	2014	2013	2012
ARMB Infrastructure Total Return (Gross)	15.45%	5.49%		15.45%	6.93%	-4.93%			
ARMB Infrastructure Total Return (Net)	13.95%	4.36%		13.95%	5.68%	-5.61%			
S&P Global Infrastructure Index	12.71%	3.50%	9.67%	12.71%	3.71%	-5.15%	30.42%	9.70%	-4.18%
IFM Infrastructure (Gross)	14.36%	8.59%		14.36%	10.42%	1.39%			
IFM Infrastructure (Net)	12.05%	7.18%		12.05%	8.64%	1.15%			
JPM Infrastructure (Gross)	7.14%	2.84%		7.14%	2.78%	-1.22%			
JPM Infrastructure (Net)	6.20%	1.74%		6.20%	1.58%	-2.39%			
Lazard Infrastructure (Gross)	29.33%	9.93%		29.33%	8.57%	-5.38%			
Lazard Infrastructure (Net)	28.56%	9.30%		28.56%	7.84%	-5.81%			
Brookfield Infrastructure (Gross)	8.02%	0.49%		8.02%	1.34%	-7.31%			
Brookfield Infrastructure (Net)	7.29%	-0.18%		7.29%	0.63%	-7.89%			

Source: Callan, IFM, JPM, Brookfield, Lazard

MLP / Energy / TIPS

- ARMB's MLP and private energy investments recovered as energy markets were relatively stable over Fiscal Year 2017.
- MLP valuations increased modestly in 2017 and are expected to continue to rebound as energy volumes increase along with more stable pricing.
- EIG's portfolio recovered strongly in 2017 after markdowns the prior three years.

West Texas intermediate (WTI) crude oil price
dollars per barrel



Strategy	Market Value	% of Other Real Assets
Energy Funds	\$ 91,961,557	14%
MLPs	\$ 499,949,693	77%
TIPS	\$ 55,206,296	9%
Totals	\$ 647,117,546	100%

Annual ARMB Returns
Fiscal Year Ending June 30, 2017

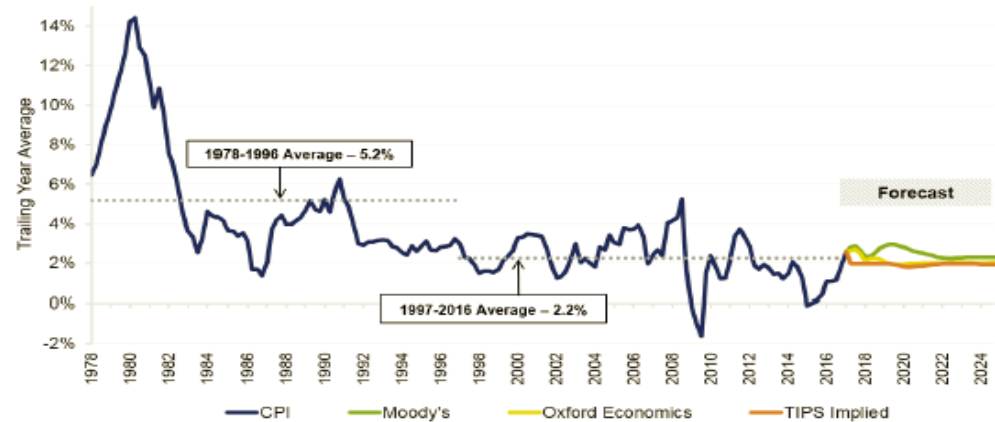
Master Limited Partnerships	1 Year	3 Year	5 Year	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
ARMB MLP Total Return (Gross)	3.28%	-9.26		3.28%	-17.97%	-11.89%	34.52%						
ARMB MLP Total Return (Net)	2.70%	-9.59%		2.70%	-18.32%	-11.89%	34.52%						
Alerian MLP Index	0.40%	-11.23%	1.77%	0.40%	-13.11%	-19.81%	21.57%	28.38%	7.86%	27.86%			
Advisory Research MLP (Gross)	1.36%	-10.92%		1.36%	-21.74%	-10.89%	29.96%						
Advisory Research MLP (Net)	0.85%	-11.14%		0.85%	-21.93%	-10.89%	29.96%						
Tortoise MLP (Gross)	4.97%	-7.76%		4.97%	-14.24%	-12.83%	38.96%						
Tortoise MLP (Net)	4.33%	-8.19%		4.33%	-14.91%	-13.49%	38.30%						
EIG Energy Funds													
EIG Energy Funds Composite	30.30%	-10.95%	-6.80%	30.30%	-35.72%	-15.69%	-5.73%	5.61%	5.15%	8.04%			
US TIPS													
ARMB TIPS Portfolio	-0.60%	0.69%	0.29%	-0.60%	4.36%	-1.59%	4.19%	-4.61%	12.31%	8.06%	7.18%	1.22%	
Barclays US TIPS Index	-0.63%	0.63%	0.27%	-0.63%	4.35%	-1.73%	4.44%	-4.78%	11.66%	7.74%	9.52%	-1.11%	15.09%

Source: Callan, State Street

Inflation

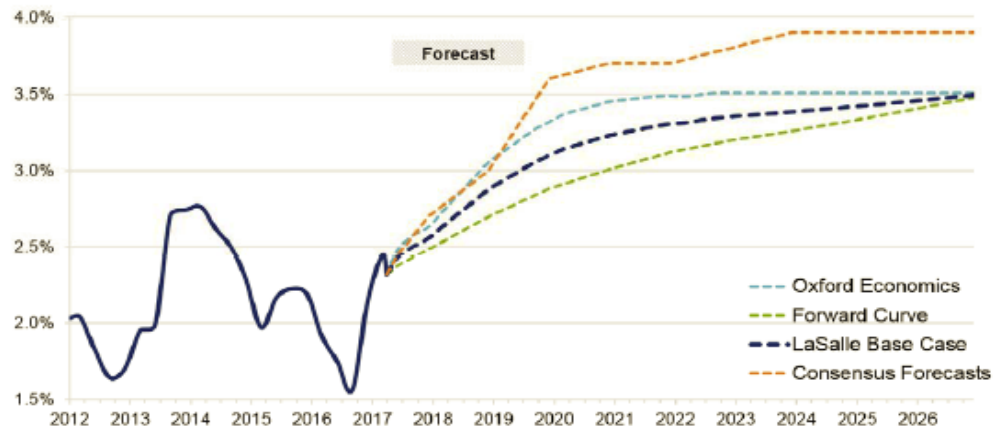
- One of the strategic objectives for real assets is to provide a hedge against inflation. Current market expectations are that inflation will not be a concern. In the short-term, commodity weakness, USD appreciation, and the potential for slower global growth are consistent with low inflation expectations. While not an apparent threat right now, the Real Assets portfolio should help hedge against unexpected higher inflation should that occur.
- Although the market is not concerned about inflation, nominal U.S. Treasury rates are expected to increase over time as a result of continued economic growth and tightening of stimulative monetary policy.
- Given the capital intensive levered nature of the asset class, rising U.S. Treasury rates will likely be a headwind to future asset performance. Offsetting that threat is the expectation for continued economic growth.

Inflation History and Forecast



Source: LaSalle Investment Management

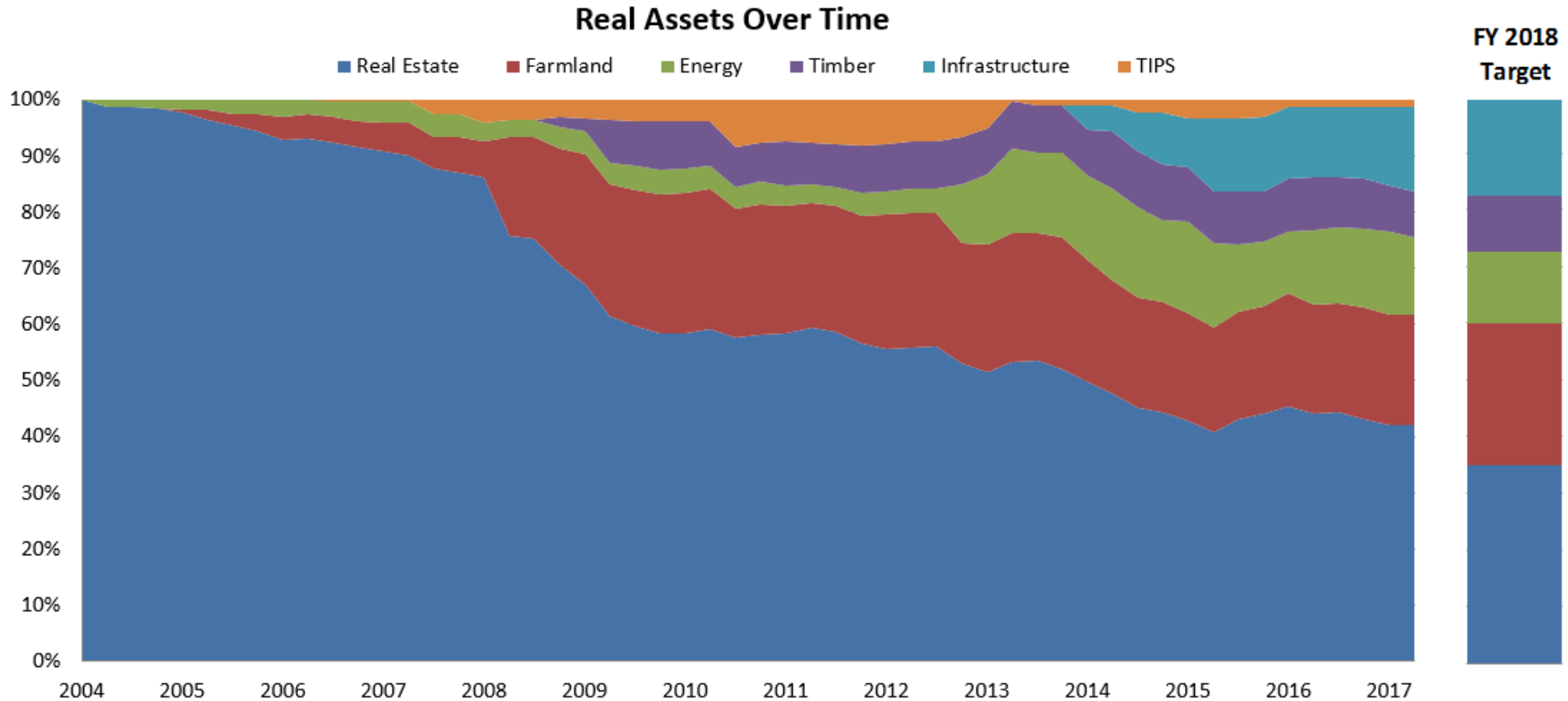
10-Year Treasury Note – Recent History and Forecast



Source: LaSalle Investment Management

History of Real Assets Allocation

The Real Assets asset class continues to evolve and mature with each sector now approaching its target allocation.



Aggregate Real Assets Market Values (\$ billions, as of June 30, 2017)

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
0.96	1.30	1.53	1.98	2.49	2.04	2.03	2.55	2.69	3.13	3.60	4.18	4.17	4.29

Fiscal Year 2018 Investment Recommendations

Category	Recommendation	Rationale
Real Assets	The overall Fiscal Year 2018 investment strategy is to stay the course with the existing investment sectors, strategies, and investment managers.	The portfolio is a diversified mix of real assets strategies which is at its target allocation. ARMB's actual allocation to the overall Real Assets portfolio can be managed by the CIO over time using the liquid investments in MLPs, REITs, TIPS, public infrastructure, and private open-end funds.
Real Estate	- Continue strategy of managing existing core separate account portfolios and allocations with a focus on assets located in markets with high barriers to entry. - Staff will continue to explore new value-add and opportunistic real estate investments.	- A focus on quality, high barrier to entry assets is the foundation of ARMB's core real estate strategy. - Higher risk/return strategies are not a strategic focus for the portfolio but attractive investment opportunities may arise.

Fiscal Year 2018 Investment Recommendations

Category	Recommendation	Rationale
Timberland	Continue deploying existing capital commitments.	Timber is near its target allocation. Several properties are likely to be added by year end which should bring our timber exposure closer to target allocation.
Infrastructure	- Reduce minimum public equity manager requirement - Change the 10% limit on infrastructure development to 20%	- Currently the guidelines call for at least two public equity managers. Attractive investment opportunities may arise and the public equity space would be the source of funding. - IFM has a massive development project underway. If they or JPM were to undertake another sizeable development, ARMB could run afoul of this guideline.
TIPS and Energy	No recommendations	

Fiscal Year 2018 Investment Recommendations

Category	Recommendation	Rationale
Farmland	Continue deploying existing capital commitments.	Farmland is under its target allocation. UBS is likely to begin investing in 2018 the \$100MM ARMB allocated to it in 2016, which should address this issue.

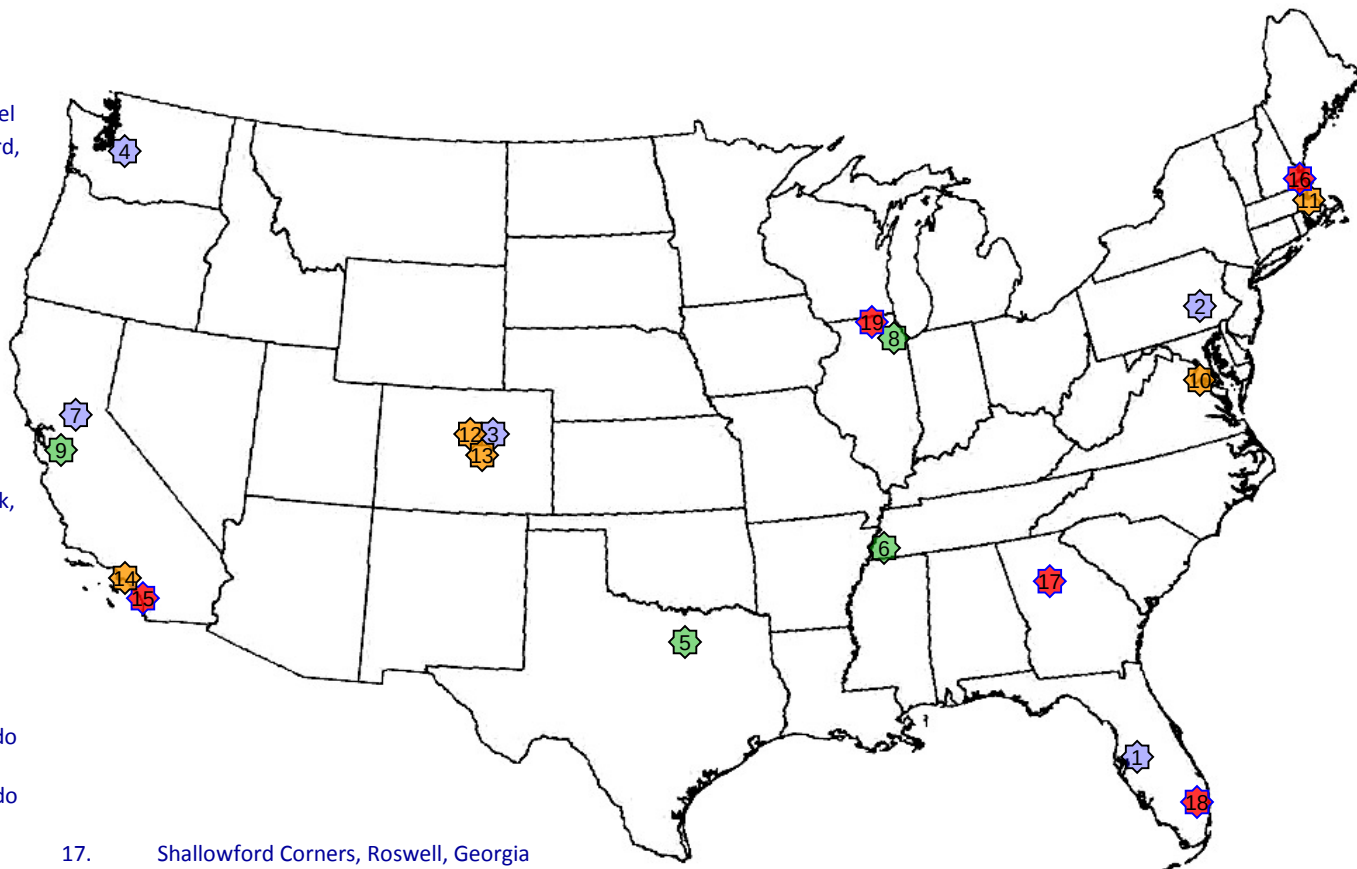
Appendix

Appendix A: Separate Account Real Estate Properties

Property List

1. Versant Place, Brandon, Florida - Sentinel
2. Valleybrook at Chadds Ford, Chadds Ford, Pennsylvania – Sentinel
3. Remington at Lone Tree, Denver, Colorado – UBS
4. Springbrook Apartments, Renton, Washington – UBS
5. Gateway Distribution Center, Roanoke, Texas – UBS
6. Memphis Industrial Park, Memphis, Tennessee – UBS
7. Preserve at Blue Ravine, Folsom, CA – Sentinel
8. West 55th Street Industrial Park, McCook, Illinois – UBS
9. Winton Industrial Center, Hayward, California – UBS
10. Virginia Square, Arlington, Virginia – LaSalle
11. 400 Crown Colony, Quincy, Massachusetts – UBS
12. One Maroon Circle, Englewood, Colorado – UBS
13. Two Maroon Circle, Englewood, Colorado – UBS
14. 330 North Brand Boulevard, Glendale, California – UBS
15. Aliso Creek, Laguna Beach, California – LaSalle
16. Westford Valley Marketplace, Westford, Massachusetts – UBS

17. Shallowford Corners, Roswell, Georgia – LaSalle
18. Winston Park Shopping Center, Coconut Creek Florida – UBS
19. Glen Gate Shopping Center, Glenview Illinois – LaSalle



Legend

Apartments	Blue	
Industrial	Green	
Office	Orange	
Retail	Red	

Appendix B: Glossary of Terms

Allocation	The total amount of investments a Separate Account Manager is authorized to make on behalf of the ARMB.
Barrier to Entry	Broad term used to describe a market environment that is supply constrained due to one or more factors such as zoning, lack of developable real estate, geography, etc.
Cap Rate	Capitalization Rate. One measure of expected return determined by dividing the first year expected annual net operating income from the property by the purchase price.
Closed-End Fund	A commingled fund that has a finite life. Investors ability to invest is limited to a certain time period at the inception of the fund. An investor's ability to sell the fund is often limited. Structures include limited partnerships, limited liability companies, and REITs.
Core Real Estate	Substantially leased, multi-tenant properties, greater than \$5 million in size, in major metropolitan areas, with little or no mortgage debt. Makes up the largest share of most pension fund portfolios.
Commitment	The total amount of investment a commingled fund is authorized to make on behalf of the ARMB.
NCREIF Property Index - NPI	National Council of Real Estate Investment Fiduciaries - NCREIF Property Index. The NCREIF Property Index is a quarterly time series composite total rate of return measure of investment performance of a very large pool of individual commercial real estate properties acquired in the private market for investment purposes only. All properties in the NPI have been acquired, at least in part, on behalf of tax-exempt institutional investors - the great majority being pension funds. As such, all properties are held in a fiduciary environment. As of June 30, 2017: 7,161 properties valued at over \$539 billion.
NCREIF Farmland Index – NFI	The NCREIF Farmland Index is a quarterly time series composite return measure of investment performance of a large pool of individual agricultural properties acquired in the private market for investment purposes only. All properties in the Farmland Index have been acquired, at least in part, on behalf of tax-exempt institutional investors - the great majority being pension funds. As such, all properties are held in a fiduciary environment. As of June 30, 2017: 705 properties valued at over \$8.0 billion.
NCREIF Timberland Index – NTI	The NCREIF Timberland Index is a quarterly time series composite return measure of investment performance of a large pool of individual timber properties acquired in the private market for investment purposes only. All properties in the Timberland Index have been acquired, at least in part, on behalf of tax-exempt institutional investors - the great majority being pension funds. As such, all properties are held in a fiduciary environment. As of June 30, 2017: 457 properties valued at over \$25.4 billion.
Net Asset Value	Total asset value – total liabilities = net asset value. In the context of REITs, net asset value is the value of real estate owned by the company less all debt owed by the company.
Non-Core Real Estate	Value-add or opportunistic real estate strategies involving higher risk than core investing. Investment strategies include relatively substantial redevelopment or releasing, buying distressed assets, new property development, and high leverage.
Open-End Fund	A commingled fund that has an infinite life. An investor may buy and sell shares of the fund. Similar to a mutual fund.
REIT	Real Estate Investment Trust – A company that owns and operates income producing real estate such as apartments, shopping centers, offices, hotels, and warehouses. A REIT must distribute at least 90% of taxable income to its shareholders annually. A REIT is a creation of the Internal Revenue Code which allows companies, who elect and meet stringent requirements, to avoid paying taxes on income passed through to shareholders.
Separate Account	An account with an investment manager that is invested exclusively for the ARMB and is not commingled with other client funds. Investments are made at the discretion of the Separate Account manager within the policy parameters approved by ARMB.



Alaska Retirement Management Board

Portfolio and Manager Performance Report

June 30, 2017



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- A. Alaska Retirement Management Board Portfolio Overview as of Second Quarter 2017
- B. Portfolio Detail
- C. Real Assets Fiscal Year Plans and Policies – Real Estate
- D. Real Estate Market Overview
- E. 2Q 2017 Flash Report
- F. Glossary of Terms

ARMB Portfolio Overview



Funding Status

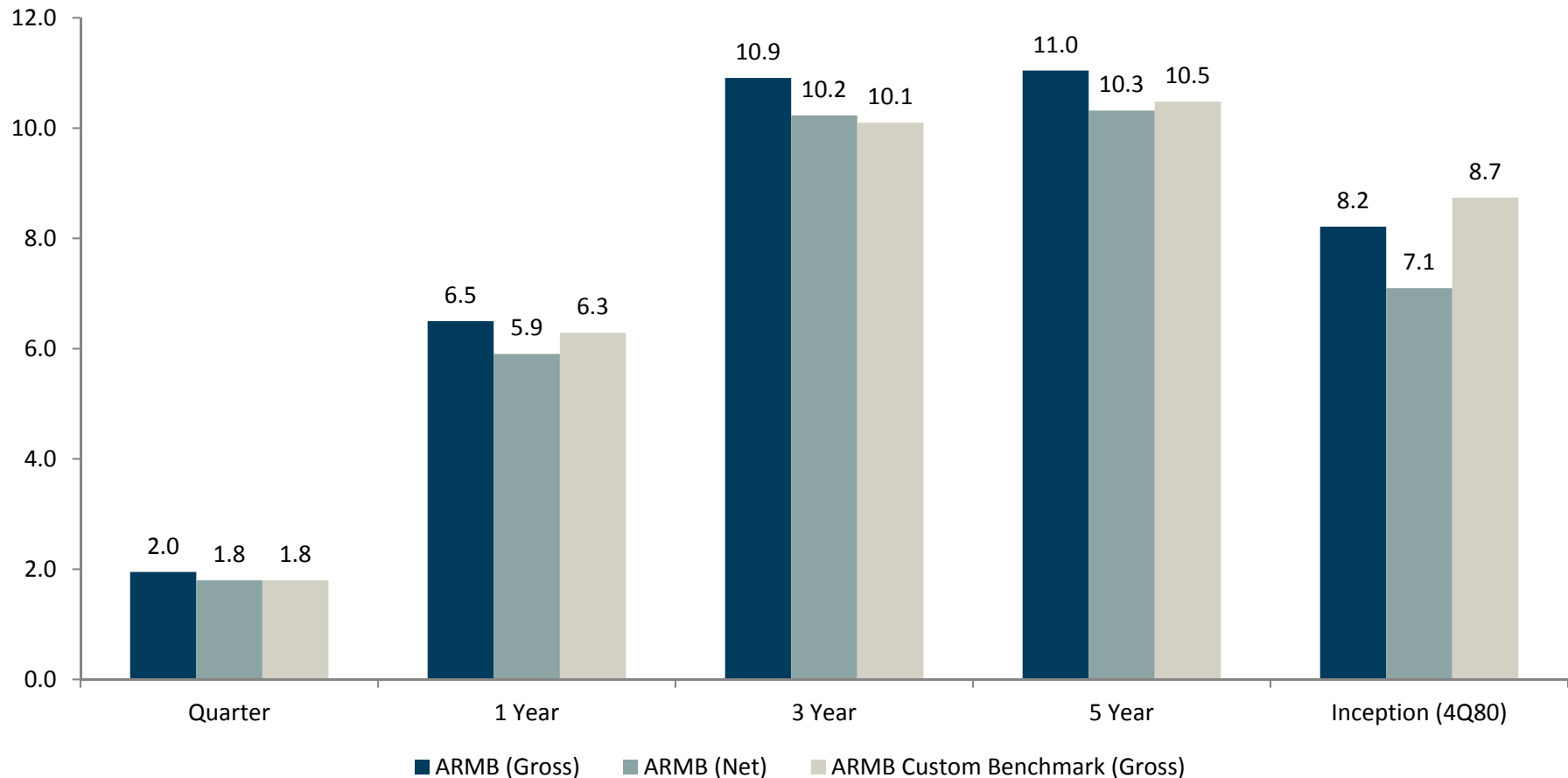
AS OF JUNE 30, 2017



- As of June 30, 2017, real estate comprised 42% of the real assets portfolio, in comparison to the 35% targeted allocation.
- Overfunding will continue to be addressed through additional allocations to other real assets and through self liquidating funds within the real estate portfolio.
- Additional commitments will need to be made (as appropriate) in order to maintain the 35% target over longer term periods.



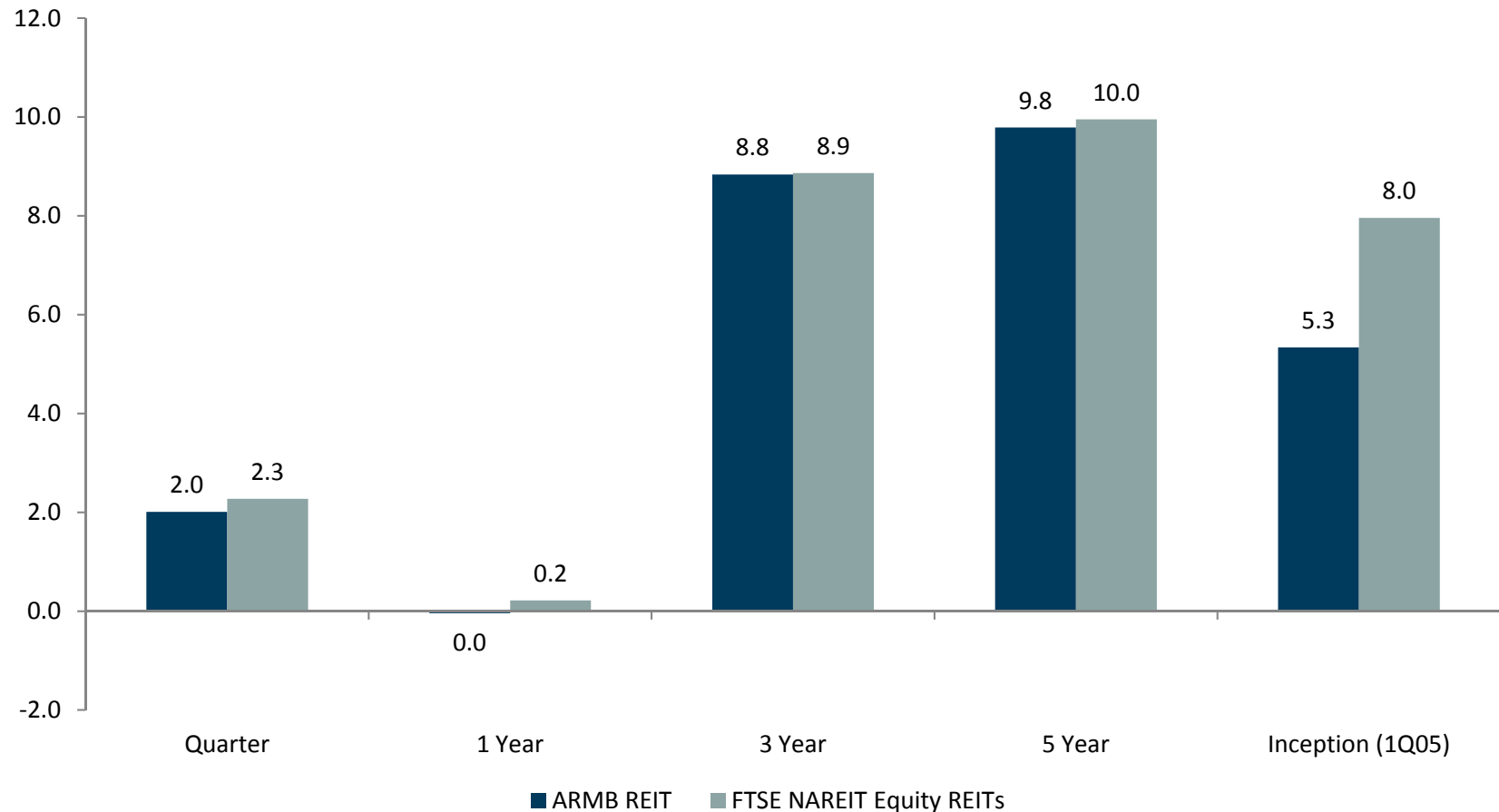
Total Portfolio Time-Weighted Returns – June 30, 2017



- ARMB performance remains strong, with returns exceeding those of the gross Custom Benchmark over all time periods except the since inception period.
- The relatively low fee drag is due to the significant presence of Core investments and separate accounts, which charge lower fees than higher risk commingled fund offerings.
- Since inception underperformance is attributable to the impact of poor vintage year performers selected preceding the GFC in 2005-2008.



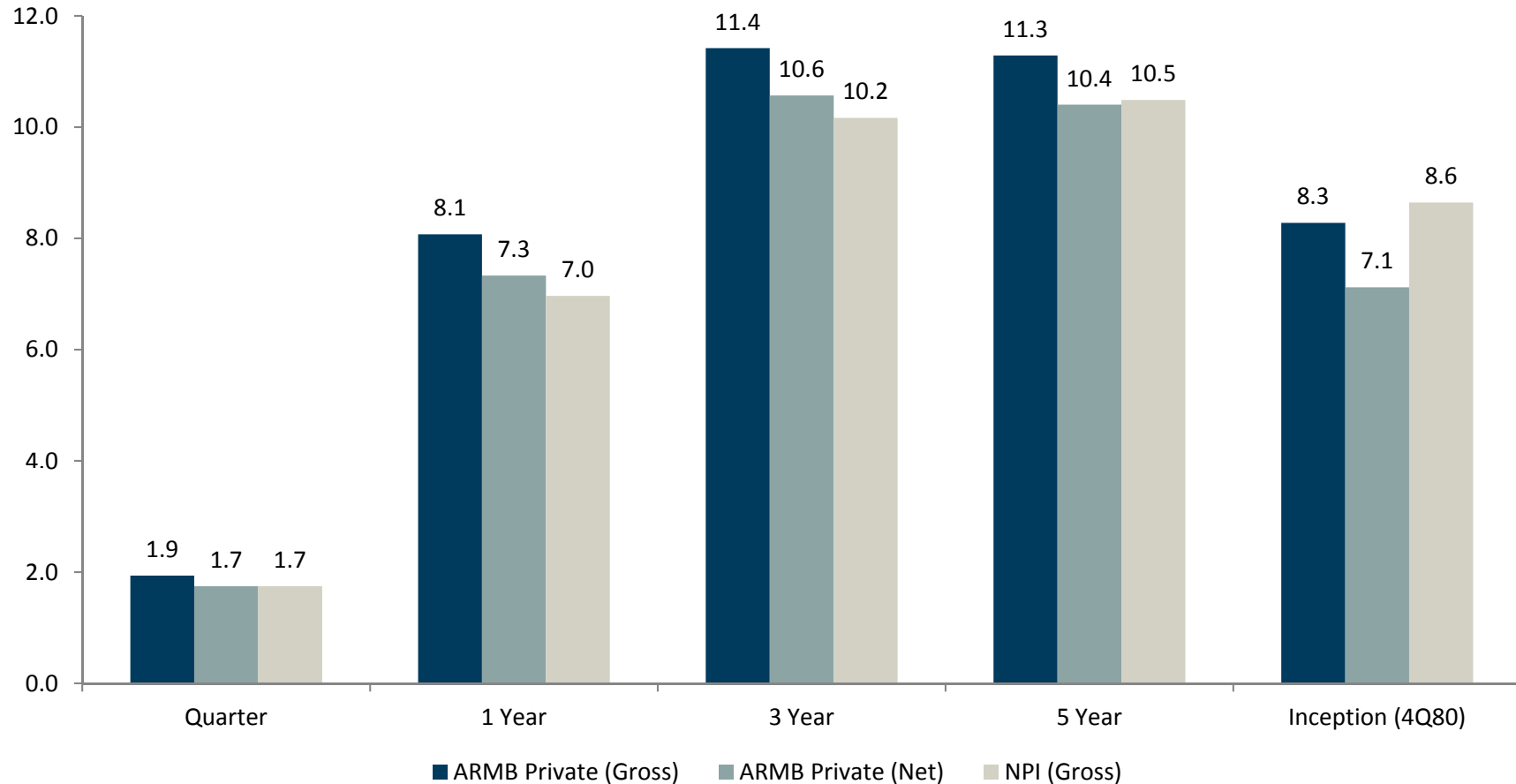
Public Portfolio Time-Weighted Returns – June 30, 2017



- The ARMB public portfolio continues to perform in line with the benchmark, exhibiting strong absolute returns over the medium term (three and five year periods).
- Since Inception performance reflects prior investment strategies while the five year demonstrates the successful changes made by Staff.



Private Portfolio Time-Weighted Returns – June 30, 2017

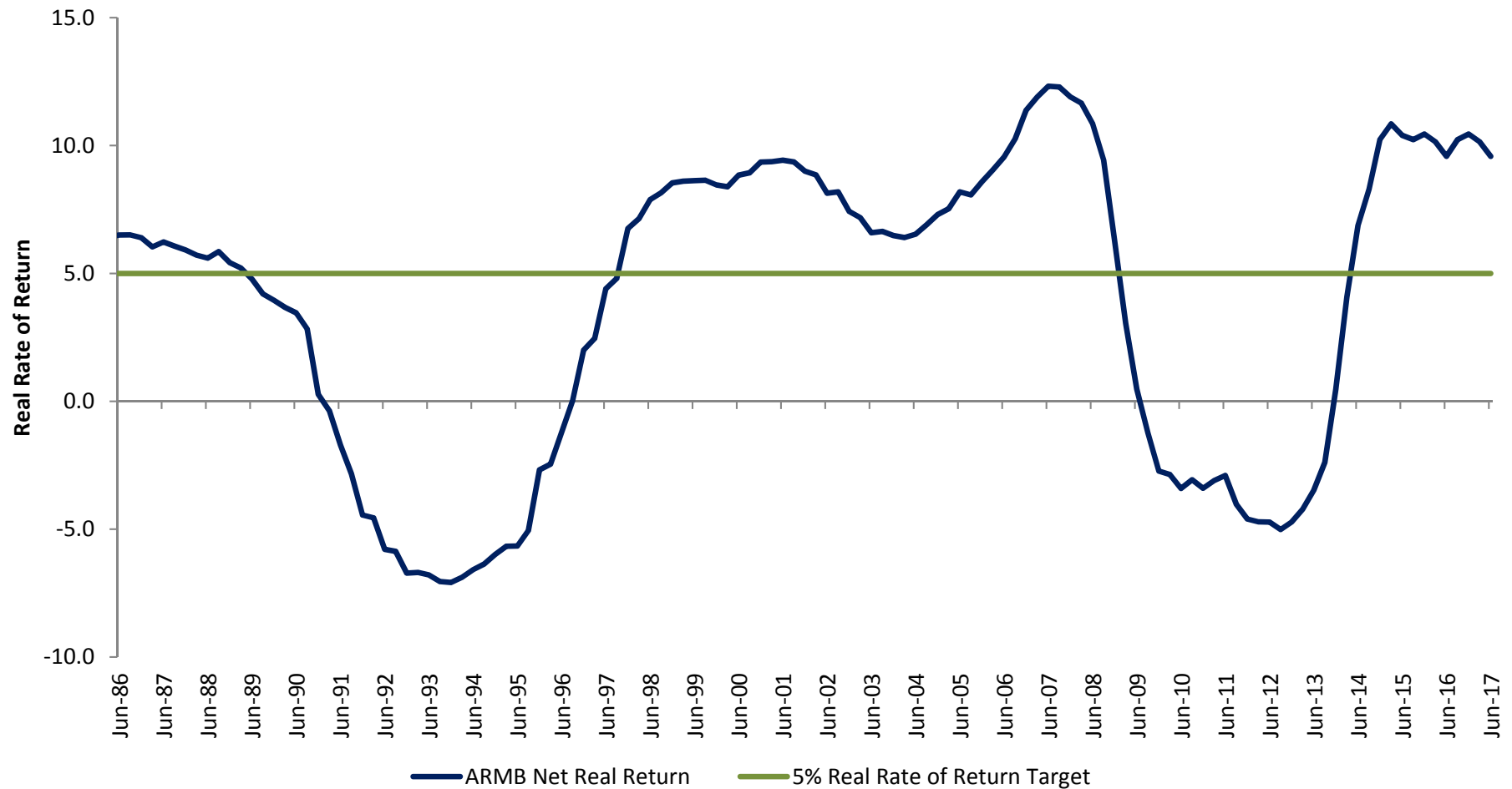


- The private portfolio outperforms the benchmark (gross to gross) over most time periods except since inception period.
- Since inception returns are diluted by the lower performance in the non-core and public portfolios.
- It is important to note that income generation has been consistently strong at an annualized 4.5% over the trailing 5 years.



Real Rate of Return Objective

Rolling 5 Years - Inception through June 30, 2017



- The portfolio continues to exceed the 5% real rate of return target bolstered by a strong market recovery as well as low inflation.



Portfolio Compliance – Funded

Portfolio Component	Strategic Limits	Portfolio June 30, 2017
Investment Risk Style/Category		
Core	50% - 100%	72.2%
Non-Core	0% - 50%	8.4%
Public Equity	0% - 50%	19.4%
Public and Private Debt	0%	0%
Control Mechanisms		
Non-Controlled Investments (180 days)	50%	8.4%
Single Manager Limits	45%	Largest Manager 37.1% (UBS)
Diversification		
Geographic, MSA, Economic	Per Consultant	Compliant
Ex- United States	20%	1.5%
Single Property	10%	Compliant
Property Type	40%	Compliant
Leverage		
Core Allocations	35%	7.8%
Non-Core Allocations	65%	34.6%



Portfolio Detail



Core Portfolio Time-Weighted Returns – June 30, 2017

	3 Year Gross	+/- NPI		5 Year Gross	+/- NPI		SI Gross	+/- NPI
Core Funds								
JP Morgan Strategic Property Fund	10.7%	0.5%		12.1%	1.6%		9.7%	0.2%
UBS Trumbull Property Fund	9.6%	0.6%		9.8%	0.7%		8.7%	0.1%
Core IMA's								
LaSalle	5.1%	5.1%		6.8%	3.7%		7.7%	1.4%
Sentinel	11.9%	1.7%		10.7%	0.2%		10.2%	1.3%
UBS Realty	15.0%	4.8%		14.2%	3.7%		10.1%	0.7%
Core Total Portfolio	10.3%	0.1%		10.6%	0.1%		8.6%	0.0%
NPI Benchmark	10.2%			10.5%			Various	

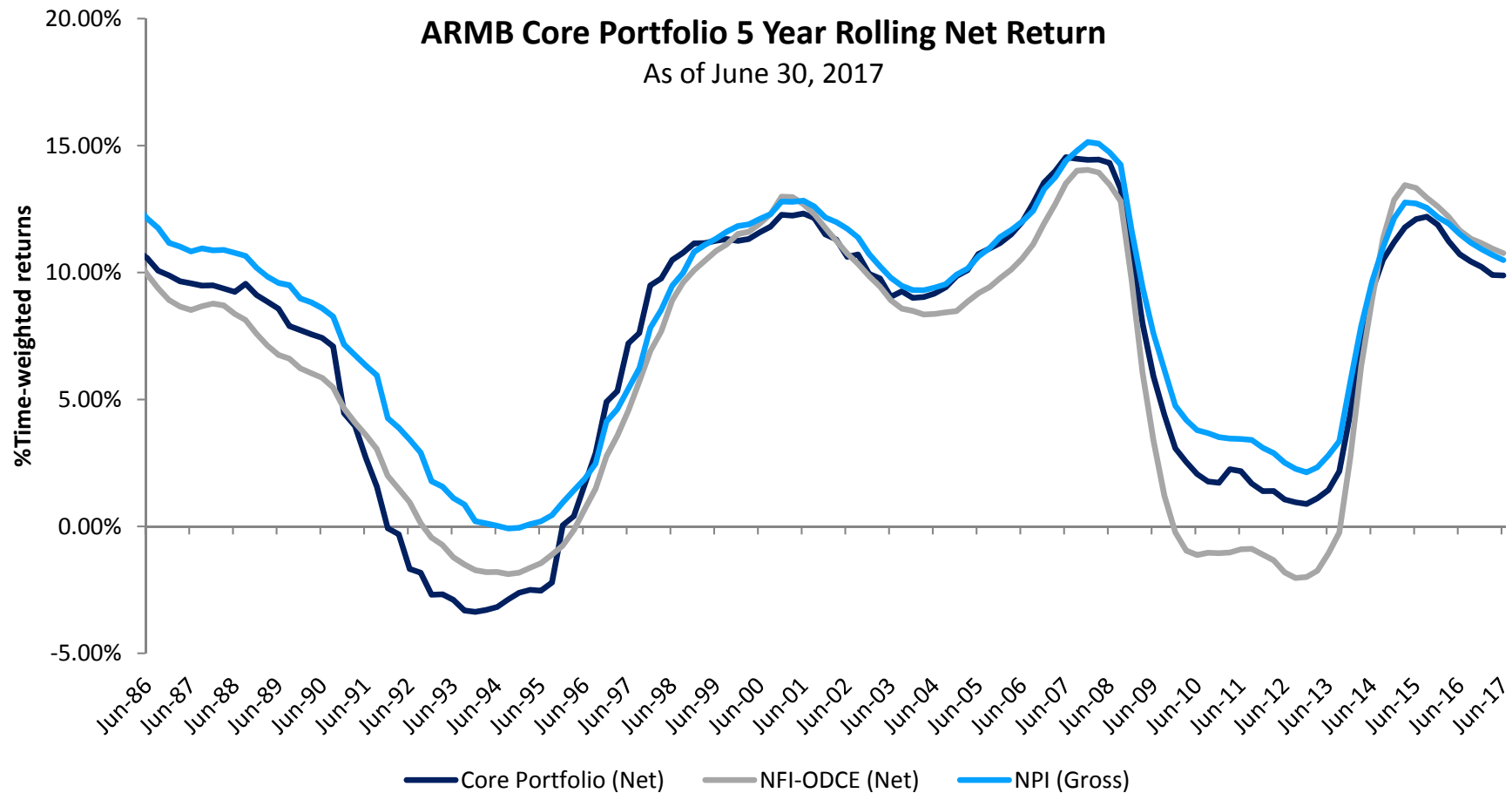
- Takeover portfolios generally begin with a revaluation of assets and may lag the market for a year or two.
- Assets held by takeover managers after three years will be transferred to the managers active portfolio.

	1 Qtr Gross	+/- NPI		1 Year Gross	+/- NPI		SI Gross	+/- NPI
Takeover IMA's – Inception 4Q14								
Sentinel	-0.8%	2.5%		-16.7%	23.7%		-13.5%	23.6%
NPI Benchmark	1.7%			7.0%			10.1%	



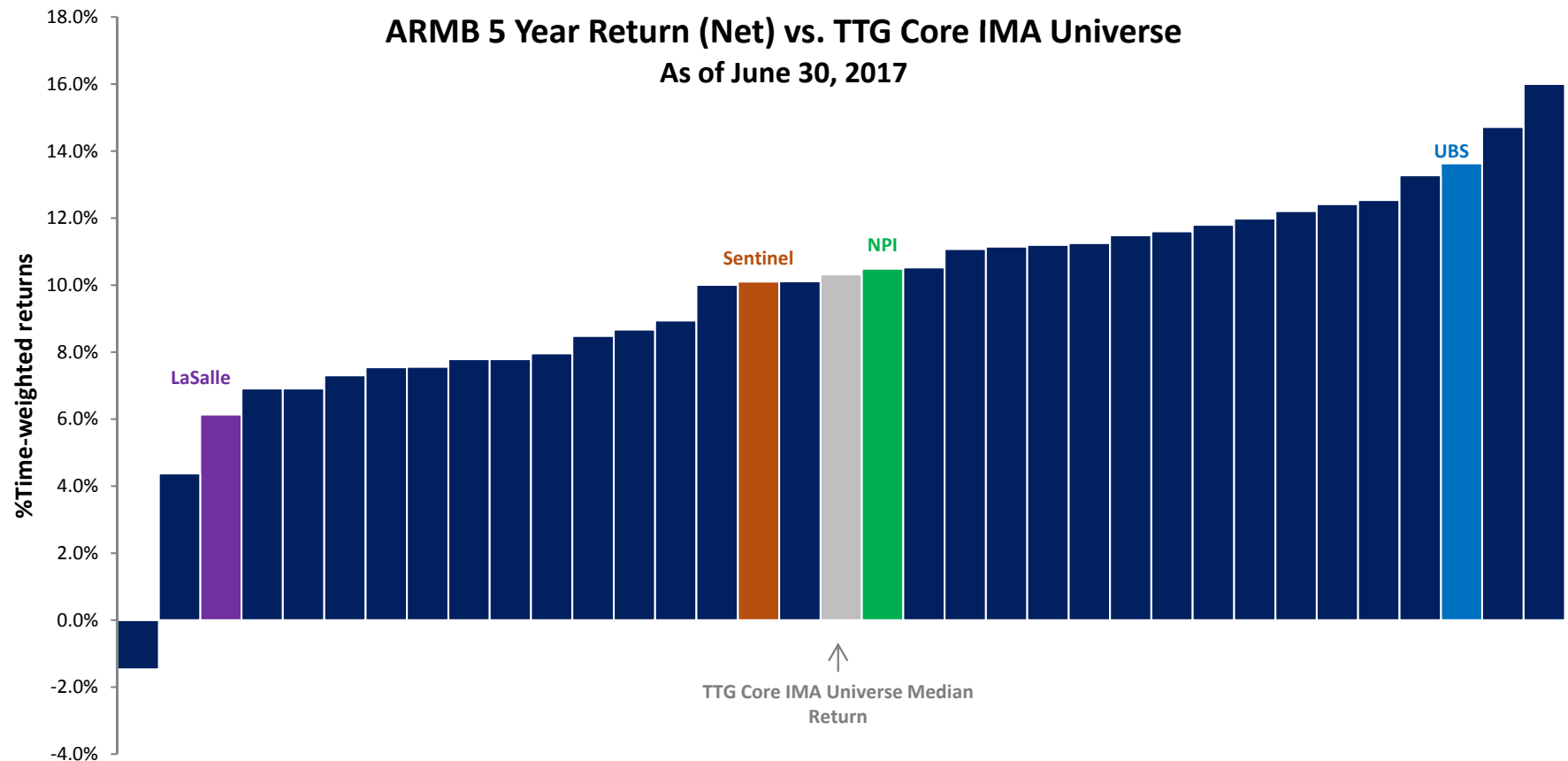
Rolling Five Year Analysis – Nominal Returns

- The ARMB Core portfolio has underperformed the NPI over most rolling five year periods.
- Please note that the NPI is an unleveraged index, whereas the ARMB Core portfolio has an LTV of 7.8%, as of June 30, 2017.
- The ODCE benchmark is provided to demonstrate the pattern of a leveraged portfolio (21.5% LTV, as of June 30, 2017).



IMA Manager 5 Year Net Returns Vs. Townsend Core IMA Universe

- For the five year period ending June 30, 2017, only UBS exceeded the NPI index with Sentinel underperforming by only 39 basis points.



*NOTE, The IMA Universe is for comparison purposes only, as differing goals/objectives, leverage, and inception dates are present within the universe. The IMA Universe is not Risk Adjusted. All ARMB IMAs remain unlevered, consistent with the NPI.

Open End Fund Selection

- For the five year period ending June 30, 2017, ARMB's investment in JP Morgan Strategic Property Fund performed in line with many comparable funds, while the investment in UBS Trumbull Property Fund provided relatively lower returns.
- Over longer periods, JP Morgan SPF performed better than most peers and UBS TPF performed in line with its peers.

Core OECF Universe 5 Year Performance Ranking

2Q17 Annualized Returns	5 Year	
	TGRS	TNET
Core Diversified		
Prime Property Fund	14.2%	12.8%
Jamestown Premier Property Fund	15.2%	12.1%
Smart Markets Fund, LP	12.6%	11.8%
RREEF America REIT II	12.6%	11.7%
Heitman HART	12.4%	11.6%
Principal U.S. Property Account	12.7%	11.4%
INVESCO Core Real Estate	12.0%	11.1%
Lion Properties Fund	12.1%	11.1%
JP Morgan Strategic Property Fund	12.1%	11.0%
LaSalle Property Fund	11.6%	11.0%
PRISA SA	11.8%	11.0%
BlackRock US Core Property Fund, L.P.	11.6%	10.8%
L&B Core Income Partners, L.P.	11.6%	10.8%
Madison Core Property Fund LLC	11.6%	10.6%
ASB Allegiance Real Estate Fund	11.6%	10.6%
AEW Core Property Trust	11.0%	10.2%
American Core Realty Fund	11.2%	10.1%
Barings Core Property Fund LP	10.6%	9.7%
AFL-CIO Building Investment Trust	10.5%	9.5%
TIAA-CREF Core Property Fund	10.3%	9.3%
Multi-Employer Property Trust	10.1%	9.2%
UBS Trumbull Property Fund	9.8%	8.7%
NFI-ODCE	11.8%	10.8%

Core OECF Universe 10 Year Performance Ranking

2Q17 Annualized Returns	10 Year	
	TGRS	TNET
Core Diversified		
Heitman HART	6.8%	6.1%
ASB Allegiance Real Estate Fund	6.6%	5.6%
Prime Property Fund	6.7%	5.5%
JP Morgan Strategic Property Fund	6.0%	4.9%
RREEF America REIT II	5.4%	4.6%
INVESCO Core Real Estate	5.4%	4.6%
Principal U.S. Property Account	5.6%	4.4%
UBS Trumbull Property Fund	5.3%	4.3%
AFL-CIO Building Investment Trust	5.2%	4.2%
Barings Core Property Fund LP	5.0%	4.1%
American Core Realty Fund	5.1%	4.1%
PRISA SA	4.7%	3.9%
Multi-Employer Property Trust	4.2%	3.3%
Lion Properties Fund	4.3%	3.3%
TIAA-CREF Core Property Fund	3.3%	2.4%
BlackRock US Core Property Fund, L.P.	2.3%	1.6%
NFI-ODCE	6.2%	5.2%

Non-Core Portfolio

- ARMB's Non-Core Portfolio is faced with challenging vintage year exposure that impacted long term performance compared to the unlevered core benchmark (NPI)
- Performance has improved significantly over recent years, with the Non-Core Portfolio outperforming the NPI over the quarter as well as the one, three, and five-year time periods.

Returns (%) As of June 30, 2017	Quarter			1 Year			3 Year			5 Year			Since Inception		
	TGRS	TNET	Variance to NPI	TGRS	TNET	Variance to NPI	TGRS	TNET	Variance to NPI	TGRS	TNET	Variance to NPI	TGRS	TNET	Multiple
Non-Core Portfolio															
Almanac Realty Securities V, LP	6.6	6.1	4.8	14.2	12.6	7.3	14.7	-3.8	4.6	12.3	0.7	1.8	12.5	9.2	1.4
Almanac Realty Securities VII	4.2	3.4	2.5	15.9	11.6	9.0							16.3	10.4	1.2
BlackRock Diamond Property Fund	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.3
Clarion Development Ventures III	15.0	15.0	13.3	60.2	60.2	53.2	72.7	72.2	62.5	42.1	41.1	31.7			1.8
Clarion Development Ventures IV	0.3	0.1	-1.5	10.9	11.0	4.0							9.2	8.6	1.1
Colony Investors VIII	-0.9	-1.2	-2.7	-0.8	-1.8	-7.7	-8.3	-10.1	-18.5	3.7	1.4	-6.8	-15.4	-18.6	0.4
Cornerstone Apartment Venture III	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.2
Coventry Real Estate Fund II	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.4
KKR Real Estate Partners Americas	4.8	3.7	3.1	13.1	11.0	6.1	13.8	10.3	3.6				14.4	9.9	1.3
LaSalle Medical Office Fund II	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.3
Lowe Hospitality Investment Partners	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.6
Silverpeak Legacy Partners II (Lehman)	-3.5	-4.2	-5.2	-4.1	-6.4	-11.1	19.0	17.3	8.9	17.2	15.8	6.7	9.7	7.8	1.3
Silverpeak Legacy Partners III (Lehman)	-0.8	-1.3	-2.6	-0.2	-2.5	-7.2	-3.0	-5.2	-13.2	-1.2	-3.2	-11.7	-13.4	-16.0	0.4
Tishman Speyer Real Estate Venture VI	5.9	5.8	4.2	12.0	11.3	5.0	17.1	16.4	7.0	12.1	11.2	1.6	2.2	1.6	1.2
Tishman Speyer Real Estate Venture VII	0.5	0.2	-1.2	3.5	2.1	-3.5	25.2	23.6	15.0	21.2	19.5	10.7	-15.9	-21.7	1.1
Total Non-Core Portfolio	3.7	3.1	1.9	12.2	10.7	5.2	16.4	14.7	6.3	14.5	12.9	4.0	7.2	5.5	
NPI	1.7			7.0			10.2			10.5			9.5		

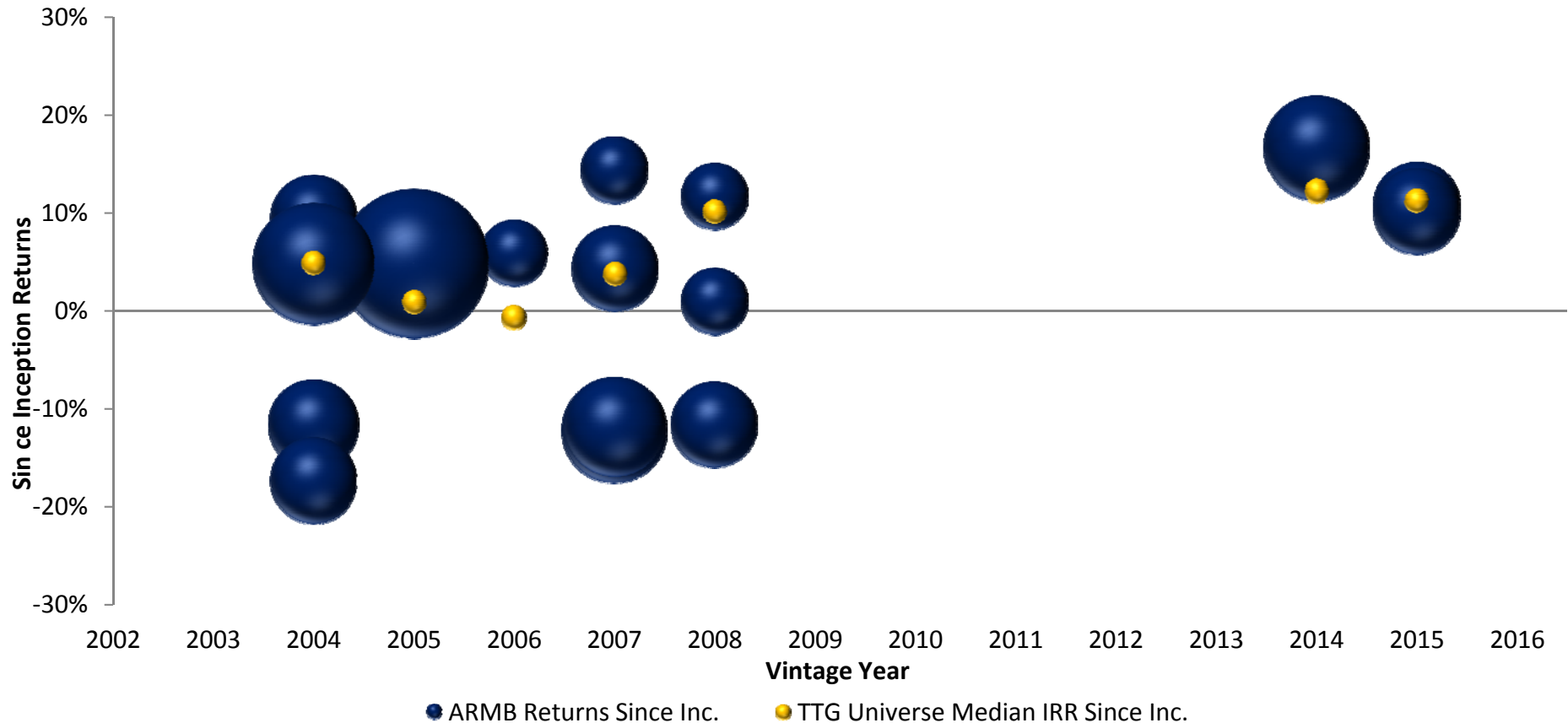


Impact of Vintage Year Allocations on Non-Core Performance

- The vintage year of an investment, along with the relative weighting of any single investment allocation within each vintage year and across the portfolio, will have a significant role in its return profile and portfolio impact.
- ARMB's non-core fund commitments are concentrated in peak vintage years and recovery within the ARMB portfolio has been muted due to limited investments in key recovery vintage years (2009-2013). Townsend would recommend more consistent vintage year commitments.

ARMB Vintage Year Analysis

As of June 30, 2017



Real Assets Fiscal Year Plans and Policies – Real Estate

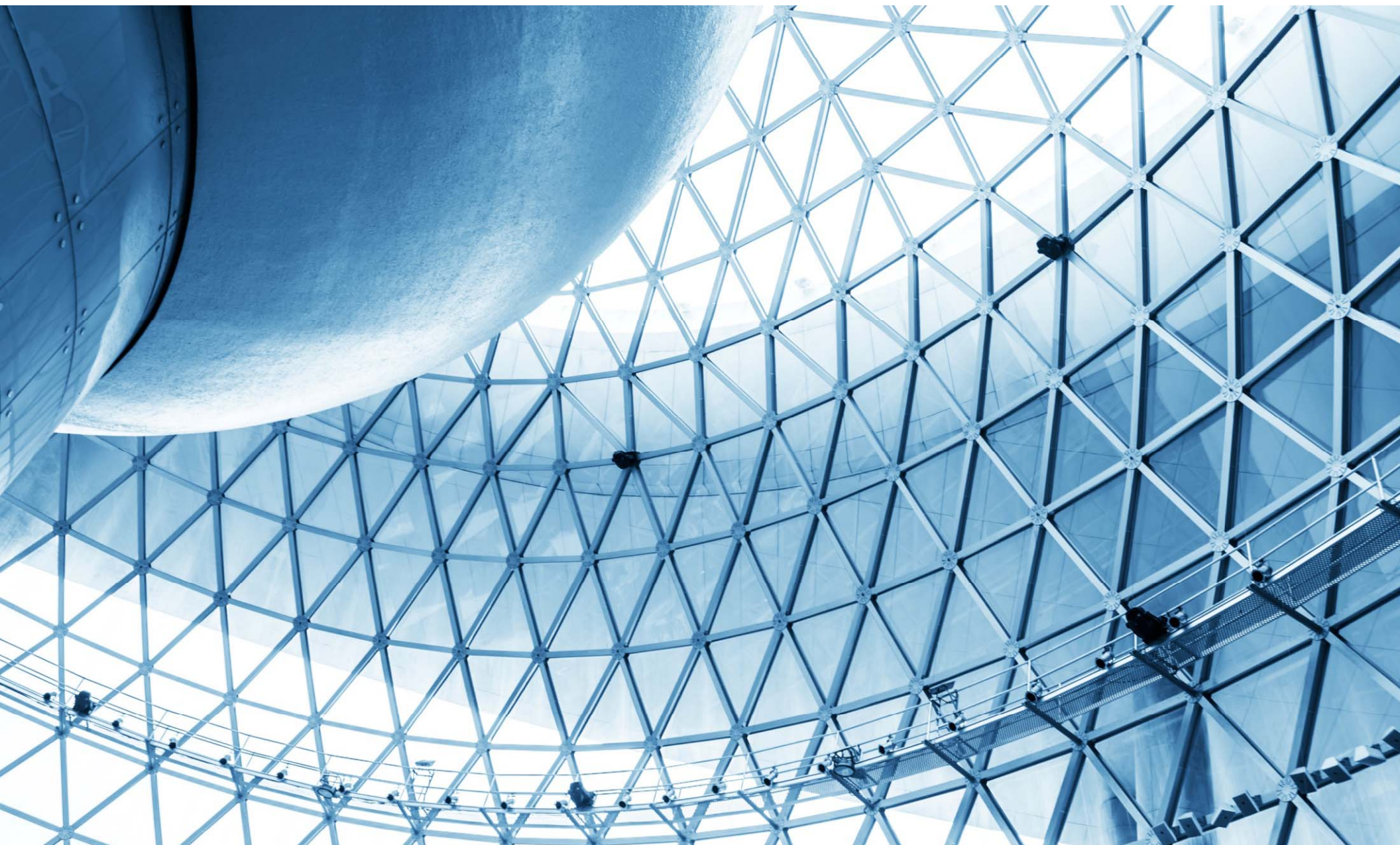


Fiscal 2017 Real Estate Plans and Policies

Staff Recommendations As proposed to ARMB	Consultant Comments
Consider means to enhance risk adjusted returns of the total private real estate portfolio	In the coming year, staff and Townsend will independently assess ways to improve the positioning of the total real estate portfolio. We will present our recommendations at the following annual board meeting, highlighting any significant discrepancies. This may include recommendations around the use of leverage, investment structures, new investments, and other topics.
New Real Estate Investments	One new non-core commitment was made in Fiscal 2017. KKR Real Estate Partners America II – Fund II represents ARMB’s second allocation to the successful, theme-driven KKR Real Estate series. The still recently launched Fund I (2014 vintage) has produced a 16.6% net IRR and 1.3x net multiple for ARMB. Fund I has also already returned more than 50% of ARMB’s capital commitment. Supporting documentation from Townsend’s Fund II review was provided to staff.
Continue to explore new Value Add and Opportunistic real estate investments	Selective new investments will help continue to maintain target exposures to Non-Core real estate. Offerings that are somewhat defensive in nature or structure (e.g., strong income/cash flow and pre-seeded portfolios) will be preferred.



Real Estate Market Overview



United States Real Estate Market Update (2Q17)

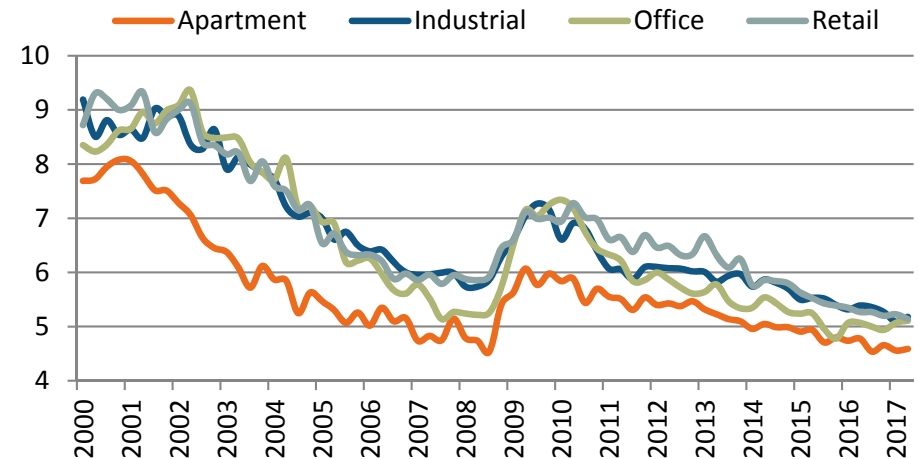
General

- The S&P 500 produced a gross total return of 3.1% during the Quarter, as market have continued to rally to new heights. Likewise, the MSCI US REIT index produced a more moderate return of 1.7%. Consumer Sentiment cooled off during the Quarter, with a final value of 95.1 in June, but remains elevated. US 10 year treasury bond yields compressed an additional 8 bps, from March 31 to June 30, to 2.3%.
- Macro indicators for U.S. real estate surpassed expectation, GDP growth for the 2nd quarter was revised up to an annualized rate of 3.0%, beating the 2.7% expected. With the conclusion of June, the economy has now experienced 81 consecutive months of job growth. Furthermore, headline inflation remained healthy at 1.9%, just shy of the fed's 2% target. The Federal reserve did not raises rates as initially expected, and now the futures market implied probabilities indicate that another rate hike is not likely until 2018.

Commercial Real Estate

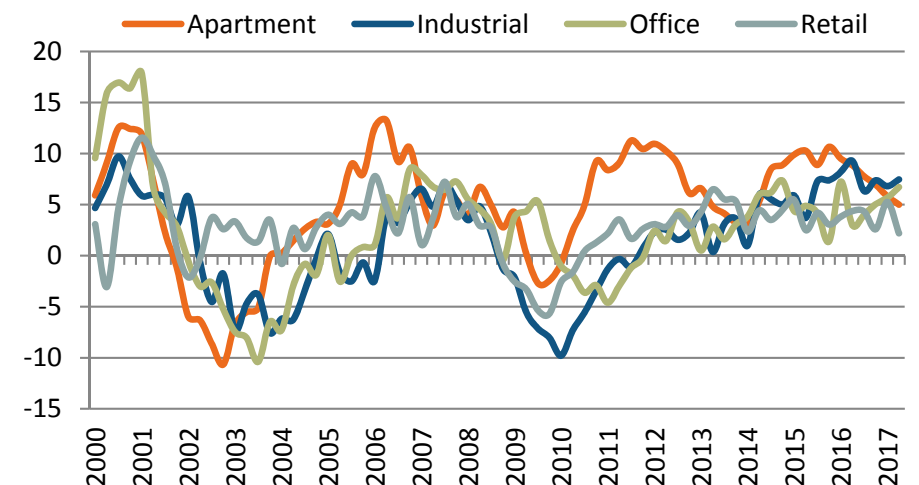
- In 2016, \$124.1bn of aggregate capital was raised by US real estate funds. During the 1st half of 2017, an additional \$56.3bn of capital which represents a decline of 10% compared to the 1st half of 2017. Continuing on trend since 2012, 2017 (YTD) has witnessed the largest average fund size at \$449m thus far.
- According to RCA, deal volume dropped 8% during the 1st half of 2017 in the US compared to 2016, although capital markets remains healthy at this point. NOI Growth remains positive for all major property types tracked in the NPI, even retail despite recent negative headlines.
- Transaction cap rates (6.06%) on average remained flat during the 2nd Quarter of 2017. Multifamily, industrial and office witnessed less than 10 bps of expansion, while retail experienced 9 bps of compression.
- 10 year treasury bond yields compressed an additional 10bps to 2.3% during the quarter and, subsequent to quarter end, have continued to decline. It appears now the pro-growth political agenda the market expected will be more difficult to achieve than initially implied by the markets reaction.

Current Value Cap Rates by Property Type



Source: NCREIF

4-Qtr Rolling NOI Growth By Property Type



Source: NCREIF



United States Property Matrix (2Q17)



INDUSTRIAL

- As of 2Q17, Industrial properties returned 3.1% and outperformed the NPI by 132 bps.
- During the quarter, net absorption was exceeded by new deliveries for the first time in seven years. However, net deliveries still lags net absorption for the first half of the year.
- A lack of investment opportunities persists, driving a continued increase in investor demand for secondary and tertiary markets. Tertiary market activity has increased 36.2% since 2014.
- First half volumes totaled \$23.8 billion, amounting to 245.0 million sqft of activity, representing year-over-year growth of 20.7%.
- The 50 bps vacancy rate decrease over the past 12 months has led to an historical low of 5.2%. A lack of supply continues to increase rental rates, reaching an all-time high of \$5.35 psf equating to 12-month rental rate growth of 9.2%.

MULTIFAMILY

- Sales volume totaled \$30.5 billion in the second quarter, compared to the \$24.8 billion the prior quarter. First half sales are down 22.3% from 2016's record setting pace of activity.
- Investors continue to shift their focus to untapped submarkets with limited exposure to construction. This shift has caused garden-style transactions to represent 70.6% of year-to-date activity, the highest level since 2009.
- Declines in primary markets transactions continues to elevate the liquidity in secondary and tertiary markets. Secondary markets comprised a two-decade record 44.6% of first half transactions.
- Annual rent growth in the second quarter was 2.5%. The pace of rent growth has now declined 190 bps year-over-year, with concessions increasing alongside recent deliveries.
- The apartment sector delivered a 1.5% return during the Quarter, underperforming the NPI by 30 bps.

OFFICE

- The Office sector returned 1.6% in 2Q17, 16 bps below the NPI.
- Year-to-date absorption in the office sector has totaled 9.9 million sqft, marking 29 consecutive quarters of positive absorption.
- Construction volumes held steady at 108.8 million sqft, remaining near the cycle high. Development and financing markets have begun to pull back, with construction starts now below the long-term quarterly average of 11.1 million sqft.
- With the market realizing increased new deliveries, year-over-year Class A vacancy has increased approximately 50 bps. The increase in deliveries has not impacted rent growth, which is up 3.2% over the past 12 months.
- Volumes recovered modestly this quarter, falling just 3.6% year-over-year, reaching \$31.5 billion. The first half of 2017 has still seen an 11.9% year-over-year decline. Investor selectivity in the market led to a forecasted volume decline of 10.0% from 2016 levels.

RETAIL

- First half retail sales volumes declined 18.7% at midyear to \$27.0 billion in transactions. Investors are returning to strong gateway markets to place capital with less risk, given retail uncertainty.
- Transactions over \$1.0 billion accounted for 31.7% of retail volume in the first half of 2017, the highest level since 2014.
- Outside of power center vacancy softening by 62 bps year-over-year, all other retail product are experiencing vacancy declines with a 20 bps reduction over the past 12 months.
- Institutional retail investment declined 67.1% year-over-year. Private sources of capital increasingly represent a potential opportunity to divest, if sellers are willing to meet these buyers' pricing expectations.
- As of 2Q17, the retail sector delivered a quarterly return of 1.5%, performing 23 bps below the NPI.



Global Real Estate Market Update (2Q17)

Global

- Global investment activity remained stable during 2Q 2017 totaling \$153 billion, unchanged from 2Q 2016 levels. Existing political tension and uncertainties continued into the second quarter, but global markets were largely unaffected and commercial real estate investments continue to be accretive. London maintained its top global investment position, followed by New York and Los Angeles in second and third place, respectively.

Direct Commercial Real Estate Investment - Regional Volumes, 2016 - 2017

\$ US Billions	Q1 2017	Q2 2017	% Change		% Change		% Change	
			Q1 17 - Q2 17	Q2 2016	Q2 16 - Q2 17	H1 2016	H1 2017	H1 16 - H1 17
Americas	58	64	10%	69	-7%	130	122	-6%
EMEA	56	58	4%	56	4%	106	114	8%
Asia Pacific	29	31	7%	28	11%	54	61	13%
Total	143	153	7%	153	0%	290	297	2%

Source: Jones Lang LaSalle, July 2017

Europe

- European investment increased 4% y/y in 2Q 2017 to \$58 billion. While France saw a 45% decline y/y, this was compensated for by a strong 8% annual increase by Germany. The U.K. performed well, with \$18 billion in Q2, or an increase of 18% y/y. Southern Europe posted a 58% y/y jump, with Spain and Italy being the significant contributors. Further, Greece had a large increase in investment volumes with \$400M in 2Q 2017 as compared to \$38 million in 2Q 2016. Central and Eastern Europe was down 5% y/y, mostly due to a 28% decrease by Poland. However, Russia saw a major \$1 billion hike in investment volumes resulting in a 285% y/y increase. The Nordics saw a 6% y/y increase in activity.

Asia

- Asia Pacific investment for 1H 2017 increased 13% from 1H 2016, coming in at \$60.7 billion. China was the strongest contributor with \$12.4 billion of investment volumes, or a 36% y/y increase, but activity also increased in South Korea and Japan and remained stable in Australia, Singapore, and Hong Kong. Domestic buyers dominated the Japanese market by making up 30% of total transactions, and a significant portion of demand in Australia came from offshore capital sources. Cross border investments accounted for 30% of total transaction volumes.

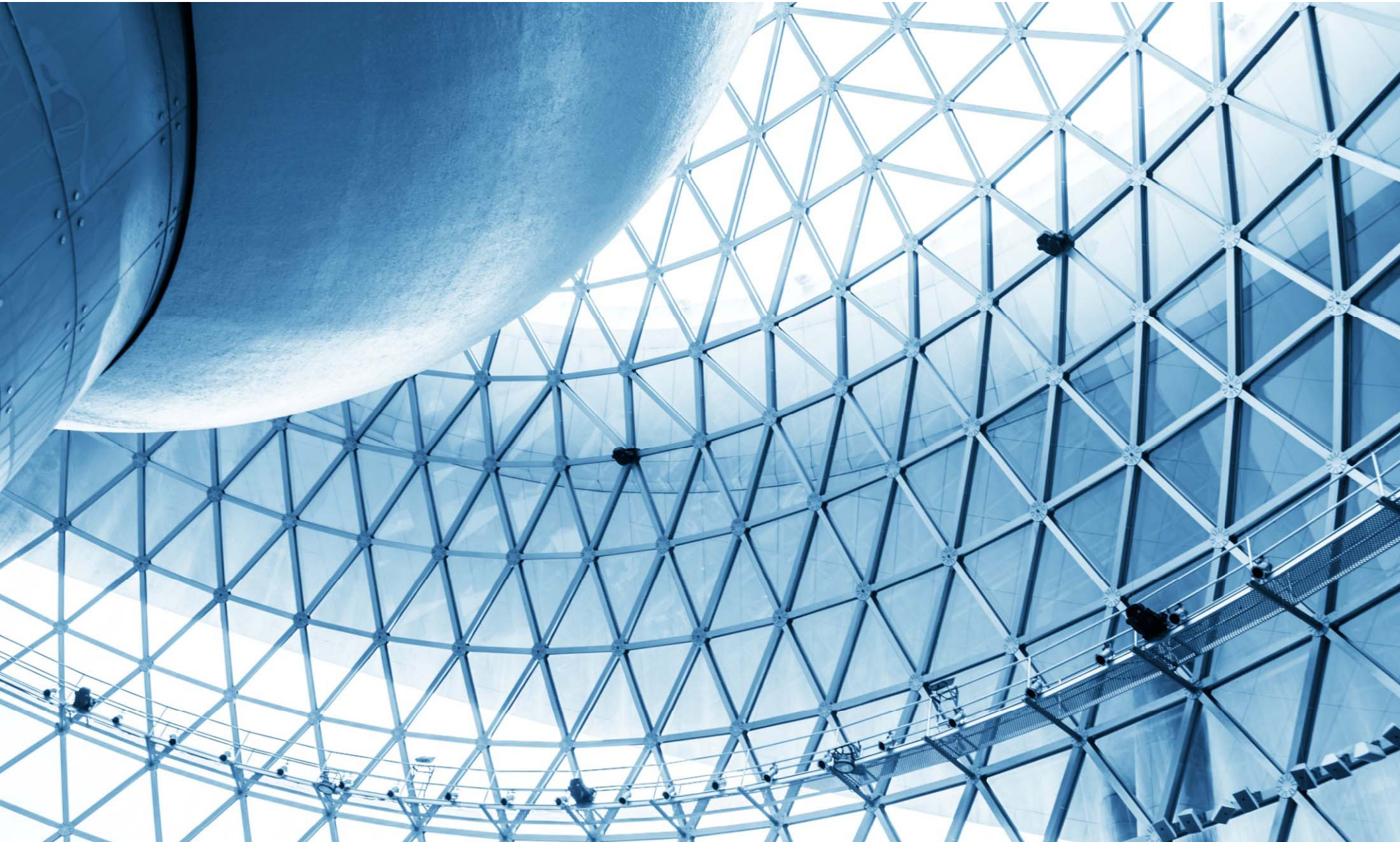
Global Outlook - GDP (Real) Growth % pa, 2016-2018

	2016	2017	2018
Global	3.1	3.5	3.7
Asia Pacific	5.5	5.4	5.3
Australia	2.5	2.5	2.4
China	6.7	6.6	6.1
India	7.9	6.9	7.5
Japan	1.0	1.4	1.3
North America	0.8	1.9	2.5
US	1.6	2.2	2.7
MENA*	3.2	2.5	3.7
European Union	2.0	2.2	1.9
France	1.1	1.6	1.7
Germany	1.8	2.0	1.6
UK	1.8	1.7	1.5

*Middle East North Africa

Source: Jones Lang LaSalle (Oxford Economics), July 2017

2Q 2017 Flash Report



Portfolio Composition (\$)							
Total Plan Assets		Allocation		Market Value		Unfunded Commitments	
25,105,446,758		1,493,774,082	6.0%	1,808,652,490	7.2%	254,010,718	1.0%
						-568,889,126	-2.3%

Performance Summary		Quarter (%)		1 Year (%)		3 Year (%)		5 Year (%)	
		TGRS	TNET	TGRS	TNET	TGRS	TNET	TGRS	TNET
ARMB Real Estate Portfolio		2.0	1.8	6.5	5.9	10.9	10.2	11.0	10.3
NCREIF Property Index "NPI"		1.7		7.0		10.2		10.5	

Funding Status (\$)	Investment Vintage Year	Commitment Amount	Funded Amount	Unfunded Commitments	Capital Returned	Market Value	Market Value (%)	Market Value + Unfunded Commitments (%)
Core Portfolio								
JP Morgan Strategic Property Fund*	1999	85,000,000	110,376,102	0	102,072,642	248,600,783	13.7	12.1
LaSalle I.M.A.	2003	0	343,543,323	0	330,561,134	189,546,858	10.5	9.2
Sentinel I.M.A.	2000	105,000,000	213,716,877	54,285,915	187,550,382	194,310,785	10.7	12.1
Sentinel I.M.A. (Takeover 2014)	2014	0	46,119,758	0	34,670,504	680,895	0.0	0.0
UBS Realty I.M.A. - ARMB 1997*	1998	305,000,000	400,597,220	0	344,167,810	521,224,902	28.8	25.3
UBS Trumbull Property Fund*	1980	45,000,885	95,004,072	50,000,000	97,204,641	150,578,675	8.3	9.7
Core Portfolio	1980	540,000,885	1,209,357,352	104,285,915	1,096,227,113	1,304,942,898	72.2	68.3
Non-Core Portfolio								
Almanac Realty Securities V, LP	2008	30,000,000	35,250,734	0	46,022,506	4,534,345	0.3	0.2
Almanac Realty Securities VII	2015	50,000,000	18,269,381	32,719,265	2,313,187	18,736,265	1.0	2.5
BlackRock Diamond Property Fund	2007	75,000,000	75,023,221	0	25,762,282	282,974	0.0	0.0
Clarion Development Ventures III	2007	30,000,000	31,075,733	960,000	47,148,132	7,532,411	0.4	0.4
Clarion Ventures 4	2015	50,000,000	44,615,719	14,191,695	31,110,292	18,879,537	1.0	1.6
Colony Investors VIII	2007	68,000,000	72,248,907	2,551,100	26,467,270	5,644,074	0.3	0.4
Cornerstone Apartment Venture III	2007	50,000,000	32,560,555	17,439,445	39,063,892	39,902	0.0	0.8
Coventry Real Estate Fund II	2004	55,000,000	61,984,715	0	23,341,485	854,475	0.0	0.0
KKR Real Estate Partners Americas	2014	75,000,000	59,634,992	39,154,003	38,114,360	38,553,105	2.1	3.8
LaSalle Medical Office Fund II	2006	30,000,000	26,356,805	49,501	33,824,654	196	0.0	0.0
Lowe Hospitality Investment Partners	2004	50,000,000	71,797,637	0	40,784,455	148,693	0.0	0.0
Silverpeak Legacy Partners II	2005	150,000,000	154,005,289	15,712,249	187,596,162	10,486,129	0.6	1.3
Silverpeak Legacy Partners III	2008	50,000,000	22,634,384	26,532,914	3,188,427	5,479,404	0.3	1.6
Tishman Speyer Real Estate Venture VI	2004	100,000,000	180,453,152	0	176,715,239	35,673,979	2.0	1.7
Tishman Speyer Real Estate Venture VII	2008	30,000,000	30,037,851	414,631	26,028,121	5,539,013	0.3	0.3
Non-Core Portfolio	1998	893,000,000	915,949,075	149,724,803	747,480,464	152,384,502	8.4	14.6
ARMB Private Real Estate Portfolio	1980	1,433,000,885	2,125,306,427	254,010,718	1,843,707,577	1,457,327,400	80.6	83.0
ARMB Private Real Estate Portfolio w/o JPM SPF	1980	1,348,000,885	2,014,930,325	254,010,718	1,741,634,935	1,208,726,617	66.8	70.9
Public Investments								
ARMB REIT*	2004	0	554,329,580	0	359,597,852	351,325,090	19.4	17.0
Public Investments	2005	0	554,329,580	0	359,597,852	351,325,090	19.4	17.0
Total Current Portfolio								
ARMB Real Estate Portfolio	1980	1,433,000,885	2,679,636,007	254,010,718	2,203,305,429	1,808,652,490	100.0	100.0

Returns (%) ^{1,2}	Market Value (\$)	Quarter				1 Year				3 Year				5 Year				Inception		TWR Calculation Inception	Net IRR ⁶	Equity Multiple
		INC	APP	TGRS	TNET	INC	APP	TGRS	TNET	INC	APP	TGRS	TNET	INC	APP	TGRS	TNET	TGRS	TNET			
Core Portfolio																						
JP Morgan Strategic Property Fund*	248,600,783	1.0	0.5	1.6	1.4	4.3	3.5	7.9	7.0	4.9	5.6	10.7	9.8	5.1	6.7	12.1	11.2	9.7	8.8	1Q98	9.4	3.2
LaSalle I.M.A.	189,546,858	1.2	-0.3	0.9	0.7	4.9	-0.9	4.0	3.4	4.3	0.7	5.1	4.5	4.6	2.1	6.8	6.1	7.7	7.0	4Q03	7.3	1.5
Sentinel I.M.A.	194,310,785	1.3	1.7	3.0	2.9	5.3	3.2	8.7	8.1	5.5	6.2	11.9	11.4	5.3	5.1	10.7	10.1	10.2	9.6	4Q00	9.4	1.8
Sentinel I.M.A. (Takeover 2014)	680,895	-0.8	0.0	-0.8	-0.8	0.7	-17.2	-16.7	-17.2									-13.5	-14.0	4Q14	-11.4	0.8
UBS Realty I.M.A. - ARMB 1997*	521,224,902	1.1	0.8	1.8	1.7	4.5	5.0	9.6	9.1	4.9	9.8	15.0	14.4	5.0	8.9	14.2	13.6	10.1	9.4	2Q98	9.3	2.2
UBS Trumbull Property Fund* ⁷	150,578,675	1.1	0.0	1.2	1.0	4.5	1.0	5.6	4.6	4.8	4.6	9.6	8.5	5.0	4.7	9.8	8.7	8.7	7.6	4Q80	8.0	2.6
Core Portfolio ⁸	1,304,942,898	1.1	0.6	1.7	1.6	4.6	2.8	7.5	6.9	4.8	5.4	10.3	9.7	4.9	5.5	10.6	9.9	8.6	7.5	4Q80		
Non-Core Portfolio																						
Almanac Realty Securities V, LP	4,534,345	-0.1	6.6	6.6	6.1	6.2	7.3	14.2	12.6	14.7	-3.8	11.0	9.7	12.3	0.7	13.4	12.1	12.5	9.2	2Q08	11.6	1.4
Almanac Realty Securities VII	18,736,265	2.8	1.4	4.2	3.4	10.3	5.2	15.9	11.6									16.3	10.4	3Q15	10.7	1.2
BlackRock Diamond Property Fund	282,974	-1.1	-0.2	-1.3	-1.3	-2.6	19.0	16.0	16.0	0.8	-1.5	-0.6	-1.2	1.1	2.3	3.5	2.6	-6.7	-7.8	1Q07	-12.3	0.3
Clarion Development Ventures III ³	7,532,411	3.3	11.7	15.0	15.0	-6.6	69.6	60.2	60.2	6.9	60.8	72.7	72.2	1.0	40.2	42.1	41.1			3Q09	14.3	1.8
Clarion Ventures 4	18,879,537	0.2	0.1	0.3	0.1	2.8	7.8	10.9	11.0									9.2	8.6	2Q15	10.1	1.1
Colony Investors VIII	5,644,074	0.6	-1.6	-0.9	-1.2	1.7	-2.4	-0.8	-1.8	1.8	-10.1	-8.3	-10.1	1.7	1.9	3.7	1.4	-15.4	-18.6	4Q07	-11.9	0.4
Cornerstone Apartment Venture III	39,902	-4.1	0.0	-4.1	-4.1	-13.8	0.0	-13.8	-13.8	-51.5	2.4	-50.4	-50.4	-33.7	0.7	-33.2	-33.5	-19.2	-20.0	3Q07	4.3	1.2
Coventry Real Estate Fund II ⁴	854,475	-0.8	1.4	0.6	0.6	-1.5	33.9	31.7	33.1	-0.9	11.5	10.4	8.3	-0.1	0.6	0.4	-1.7			2Q04	-11.7	0.4
KKR Real Estate Partners Americas	38,553,105	1.8	3.0	4.8	3.7	6.7	6.1	13.1	11.0	6.7	6.8	13.8	10.3					14.4	9.9	2Q14	16.6	1.3
LaSalle Medical Office Fund II	196	-58.7	0.0	-58.7	-58.7	-4.2	0.2	-4.0	-4.0	-3.7	-0.2	-3.9	-4.5	1.0	5.7	6.7	5.7	4.8	1.2	1Q07	5.8	1.3
Lowe Hospitality Investment Partners	148,693	-15.3	0.0	-15.3	-15.3	-14.9	-28.1	-37.5	-37.5	-22.4	-7.4	-27.7	-28.0	-11.1	5.3	-6.2	-6.9	-14.0	-16.2	3Q04	-17.4	0.6
Silverpeak Legacy Partners II	10,486,129	0.9	-4.4	-3.5	-4.2	-0.6	-3.5	-4.1	-6.4	1.6	17.3	19.0	17.3	1.7	15.4	17.2	15.8	9.7	7.8	4Q05	4.7	1.3
Silverpeak Legacy Partners III	5,479,404	-0.3	-0.5	-0.8	-1.3	0.4	-0.6	-0.2	-2.5	1.0	-4.0	-3.0	-5.2	0.8	-2.0	-1.2	-3.2	-13.4	-16.0	2Q08	-11.7	0.4
Tishman Speyer Real Estate Venture VI	35,673,979	-0.1	6.0	5.9	5.8	-0.3	12.3	12.0	11.3	-0.4	17.6	17.1	16.4	-0.3	12.4	12.1	11.2	2.2	1.6	1Q05	4.7	1.2
Tishman Speyer Real Estate Venture VII	5,539,013	-0.1	0.7	0.5	0.2	0.9	2.6	3.5	2.1	0.2	25.0	25.2	23.6	0.2	21.0	21.2	19.5	-15.9	-21.7	2Q08	0.9	1.1
Non-Core Portfolio ⁸	152,384,502	1.0	2.7	3.7	3.1	2.9	9.1	12.2	10.7	3.8	12.3	16.4	14.7	3.1	11.2	14.5	12.9	7.2	5.5	1Q98		
ARMB Private Real Estate Portfolio ⁸	1,457,327,400	1.1	0.8	1.9	1.7	4.4	3.6	8.1	7.3	4.7	6.5	11.4	10.6	4.5	6.5	11.3	10.4	8.3	7.1	4Q80		
ARMB Private Real Estate Portfolio w/o JPM SPF ⁸	1,208,726,617	1.1	0.9	2.0	1.8	4.4	3.6	8.1	7.4	4.6	6.7	11.6	10.7	4.4	6.5	11.2	10.3	8.2	7.1	4Q80		
Public Investments																						
ARMB REIT*	351,325,090			2.0	2.0			0.0	0.0			8.8	8.8			9.8	9.8	5.3	5.3	1Q05	7.3	1.3
Public Investments	351,325,090			2.0	2.0			0.0	0.0			8.8	8.8			9.8	9.8	5.3	5.3	1Q05	7.3	1.3
Total Portfolio																						
ARMB Real Estate Portfolio ⁸	1,808,652,490			2.0	1.8			6.5	5.9			10.9	10.2			11.0	10.3	8.2	7.1	4Q80		
Indices																						
NCREIF Property Index "NPI"		1.2	0.6	1.7		4.7	2.2	7.0		4.9	5.1	10.2		5.2	5.1	10.5		8.6		4Q80		
ARMB Custom Benchmark ⁵				1.8				6.3				10.1				10.5		8.7		4Q80		
Idx: FTSE NAREIT Equity REITs				2.3				0.2				8.9				10.0		11.9		4Q80		

Quarterly Cash Flow Activity (\$)	Beginning Market Value	Contributions	Distributions	Withdrawals	Gross Income	Manager Fees	Appreciation	Ending Market Value	LTV (%)
Core Portfolio									
JP Morgan Strategic Property Fund*	247,194,992	0	1,910,705	0	2,546,150	537,160	1,307,506	248,600,783	25.1
LaSalle I.M.A.	222,780,382	68,000	2,158,084	32,544,300	2,265,590	294,560	-570,170	189,546,858	0.0
Sentinel I.M.A.	190,647,963	0	1,778,448	0	2,420,251	234,414	3,255,433	194,310,785	0.0
Sentinel I.M.A. (Takeover 2014)	686,160	0	0	0	-5,265	0	0	680,895	0.0
UBS Realty I.M.A. - ARMB 1997*	515,407,283	0	3,087,835	0	5,529,834	590,783	3,966,403	521,224,902	0.0
UBS Trumbull Property Fund*	125,128,801	25,000,000	1,011,237	0	1,705,624	290,865	46,351	150,578,675	15.1
Core Portfolio	1,301,845,581	25,068,000	9,946,309	32,544,300	14,462,184	1,947,782	8,005,523	1,304,942,898	7.8
Non-Core Portfolio									
Almanac Realty Securities V, LP	5,899,895	0	874,072	766,767	-2,734	19,351	297,374	4,534,345	0.0
Almanac Realty Securities VII	18,987,796	802,717	689,272	988,646	514,312	155,822	265,180	18,736,265	0.0
BlackRock Diamond Property Fund	286,665	0	0	0	-3,035	0	-655	282,974	0.0
Clarion Development Ventures III	7,059,160	0	0	547,071	224,690	0	795,632	7,532,411	0.0
Clarion Ventures 4	18,861,919	0	0	0	35,908	36,219	17,929	18,879,537	0.0
Colony Investors VIII	6,778,274	0	0	1,056,600	42,700	16,300	-104,000	5,644,074	0.0
Cornerstone Apartment Venture III	41,601	0	0	0	-1,699	0	0	39,902	0.0
Coventry Real Estate Fund II	849,057	0	0	0	-6,888	0	12,306	854,475	0.0
KKR Real Estate Partners Americas	36,206,375	3,233,851	857,781	1,406,493	673,598	394,614	1,098,169	38,553,105	57.0
LaSalle Medical Office Fund II	476	0	0	0	-279	0	0	196	0.0
Lowe Hospitality Investment Partners	175,602	0	0	0	-26,909	0	0	148,693	0.0
Silverpeak Legacy Partners II	11,099,992	0	0	153,467	94,136	76,734	-477,798	10,486,129	29.0
Silverpeak Legacy Partners III	5,611,311	0	0	58,150	-15,081	29,036	-29,640	5,479,404	14.0
Tishman Speyer Real Estate Venture VI	35,976,159	0	2,373,232	0	-23,136	59,294	2,153,482	35,673,979	36.0
Tishman Speyer Real Estate Venture VII	6,146,154	0	617,032	0	-8,112	23,019	41,022	5,539,013	43.0
Non-Core Portfolio	153,980,436	4,036,568	5,411,389	4,977,194	1,497,471	810,389	4,069,001	152,384,502	34.6
ARMB Private Real Estate Portfolio	1,455,826,017	29,104,568	15,357,698	37,521,494	15,959,655	2,758,171	12,074,524	1,457,327,400	11.6
ARMB Private Real Estate Portfolio w/o JPM SPF	1,208,631,025	29,104,568	13,446,993	37,521,494	13,413,505	2,221,011	10,767,018	1,208,726,617	8.2
Public Investments									
ARMB REIT*	344,401,721	3,296,076	3,296,076	0	0	0	6,923,369	351,325,090	0.0
Public Investments	344,401,721	3,296,076	3,296,076	0	0	0	6,923,369	351,325,090	0.0
Total Portfolio									
ARMB Real Estate Portfolio	1,800,227,738	32,400,644	18,653,774	37,521,494	15,959,655	2,758,171	18,997,893	1,808,652,490	9.5

Property Type Diversification (%)	Apartment	Office	Industrial	Retail	Hotel	Other
Core Portfolio						
JP Morgan Strategic Property Fund	20.1	42.5	10.6	26.1	-	0.7
LaSalle I.M.A.	-	34.4	-	65.6	-	-
Sentinel I.M.A.	100.0	-	-	-	-	-
Sentinel I.M.A. (Takeover 2014)	-	-	-	-	-	-
UBS Realty I.M.A. - ARMB 1997	19.0	25.1	43.5	12.4	-	-
UBS Trumbull Property Fund	30.1	30.4	13.6	22.6	3.4	-
Core Portfolio	29.9	26.4	21.1	22.0	0.4	0.1
Non-Core Portfolio						
Almanac Realty Securities V, LP	-	47.9	50.1	-	-	2.1
Almanac Realty Securities VII	46.4	10.8	13.4	1.5	1.8	26.1
BlackRock Diamond Property Fund	-	-	-	-	-	-
Clarion Development Ventures III	-	-	-	-0.1	6.1	94.1
Clarion Ventures 4	34.0	44.2	-	21.9	-	-
Colony Investors VIII	-	-	-	0.6	0.0	99.4
Cornerstone Apartment Venture III	-	-	-	-	-	-
Coventry Real Estate Fund II	-	-	-	100.0	-	-
KKR Real Estate Partners Americas	17.8	13.6	-	28.8	15.6	24.3
LaSalle Medical Office Fund II	-	-	-	-	-	-
Lowe Hospitality Investment Partners	-	-	-	-	-	-
Silverpeak Legacy Partners II	-	31.6	-	1.4	23.1	43.8
Silverpeak Legacy Partners III	0.3	67.0	-	27.9	4.3	0.5
Tishman Speyer Real Estate Venture VI	-	81.3	-	-	-	18.7
Tishman Speyer Real Estate Venture VII	-	46.7	-	-	-	53.3
Non-Core Portfolio	16.0	37.5	3.3	13.2	6.2	23.8
ARMB Private Real Estate Portfolio	28.5	27.5	19.3	21.1	1.0	2.5
NPI	24.3	36.8	14.2	23.8	0.9	0.0

Geographic Diversification (%)	North East	Mid East	East North Central	West North Central	South East	South West	Mountain	Pacific	Ex-US
Core Portfolio									
JP Morgan Strategic Property Fund	23.1	7.8	4.6	0.1	6.1	16.8	2.9	38.7	-
LaSalle I.M.A.	-	34.4	26.9	-	14.9	-	-	23.8	-
Sentinel I.M.A.	39.4	-	-	-	28.7	-	-	31.9	-
Sentinel I.M.A. (Takeover 2014)	-	-	-	-	-	-	-	-	-
UBS Realty I.M.A. - ARMB 1997	12.9	-	6.7	-	10.4	5.6	15.6	48.8	-
UBS Trumbull Property Fund	24.5	9.1	10.9	0.8	8.7	6.4	9.7	29.8	-
Core Portfolio	18.2	7.5	8.8	0.1	12.8	6.0	8.0	38.5	-
Non-Core Portfolio									
Almanac Realty Securities V, LP	-	-	-	-	-	-	-	-	-
Almanac Realty Securities VII	-	-	-	-	-	-	-	-	-
BlackRock Diamond Property Fund	-	-	-	-	-	-	-	-	-
Clarion Development Ventures III	53.2	-	-	-	47.0	-	-	-0.1	-
Clarion Ventures 4	55.8	-	-	-	-	-	44.2	-	-
Colony Investors VIII	0.0	-	-	-	-	-	-	15.7	84.3
Cornerstone Apartment Venture III	-	-	-	-	-	-	-	-	-
Coventry Real Estate Fund II	-	-	22.9	-	-	-	42.9	34.3	-
KKR Real Estate Partners Americas	12.3	1.8	10.2	2.8	16.1	18.9	-	13.2	24.7
LaSalle Medical Office Fund II	-	-	-	-	-	-	-	-	-
Lowe Hospitality Investment Partners	-	-	-	-	-	-	-	-	-
Silverpeak Legacy Partners II	8.5	13.7	22.2	-	-	-	-	17.1	38.4
Silverpeak Legacy Partners III	20.0	-	-	-	0.3	7.1	-	-	72.6
Tishman Speyer Real Estate Venture VI	-	18.7	-	-	17.0	-	-	64.3	-
Tishman Speyer Real Estate Venture VII	-	46.7	0.0	-	-	-	-	53.3	-
Non-Core Portfolio	14.5	8.8	5.0	1.1	11.4	7.4	6.8	27.6	17.5
ARMB Private Real Estate Portfolio	17.9	7.6	8.5	0.2	12.7	6.2	7.9	37.6	1.5
NPI	21.6	11.6	7.3	1.3	9.3	10.6	6.4	32.0	-

Metropolitan Statistical Area Diversification

As of June 30, 2017

ARMB Total Portfolio: Largest Metro Concentrations		
MSA Title%	% of Current NAV	NCREIF Weight
CA - Los Angeles	13.0%	7.8%
CA - San Francisco	11.3%	4.7%
IL - Chicago	8.2%	5.9%
CO - Denver	7.2%	2.7%
MA - Boston	7.0%	4.0%
DC - Washington	6.5%	7.6%
PA - Philadelphia	5.4%	0.4%
NY - New York	4.3%	12.3%
CA - Sacramento	4.3%	0.3%
TX - Dallas	4.2%	4.0%

ARMB I.M.A. Portfolio: Largest Metro Concentrations		
MSA Title%	% of Current NAV	NCREIF Weight
CA - Los Angeles	14.5%	7.8%
CA - San Francisco	13.7%	4.7%
IL - Chicago	9.5%	5.9%
CO - Denver	9.0%	2.7%
PA - Philadelphia	8.4%	0.4%
MA - Boston	7.5%	4.0%
DC - Washington	7.2%	7.6%
CA - Sacramento	6.8%	0.3%
FL - Tampa	6.1%	0.5%
WA - Seattle	4.9%	4.1%

NOTES:

- 1) Does not include partial periods.
- 2) Private real estate performance calculated quarterly. Public performance provided from State Street and calculated monthly.
- 3) Clarion Development Ventures III ("CDV III") reported performance in Q3 2009 that resulted in a negative market value. Based on industry reporting standards, a Fund level negative market value ends a time weighted series. The first quarter with a positive market value begins a new inception period, but returns may not be immediately meaningful therefore since inception returns are not displayed. The analysis of this fund should be done on an IRR basis.
- 4) Coventry Real Estate Fund II began investing in 2Q04 and suffered significant value losses beginning in 4Q08. At the request of ARMB, Fund II was written down to \$0 in 2Q09. ARMB has requested that the Fund II values be adjusted and added back into the portfolio as of 2Q11 due to Fund II recovery. As a result, Coventry Real Estate Fund II has a series of returns from 2Q04-4Q08, a stub quarter to add the Fund value back into the portfolio and a series of returns beginning in 2Q11 which will reflect actual quarterly returns. All quarterly returns are included in the total Portfolio but they are not meaningful due to the gaps in quarterly returns.
- 5) 90% NPI/10% NAREIT since 1/1/2005, 100% NPI back to inception.
- 6) IRR after advisory fees, incentive and promote. This includes actual cash flows and a reversion representing the LP Net Assets at market value as of the period and reporting date.
- 7) Townsend calculates performance data and investment values based on actual cash flows, rather than accruals. UBS TPF reflects management fees payable to the manager within capital account statements as accrued fees in the quarter in which they are earned. Quarterly fees are typically paid in arrears within the following quarter. Thus, the NAV shown in Townsend's report may differ from the capital account statements provided by the manager. One additional quarter of management fees would also need to be recognized within the Townsend data if the position were fully liquidated.
- 8) IRR and equity multiple figures are unavailable for these composites due to missing historic cash flow data within several legacy funds.

* Hardcoded data

Advisory Disclosures and Definitions

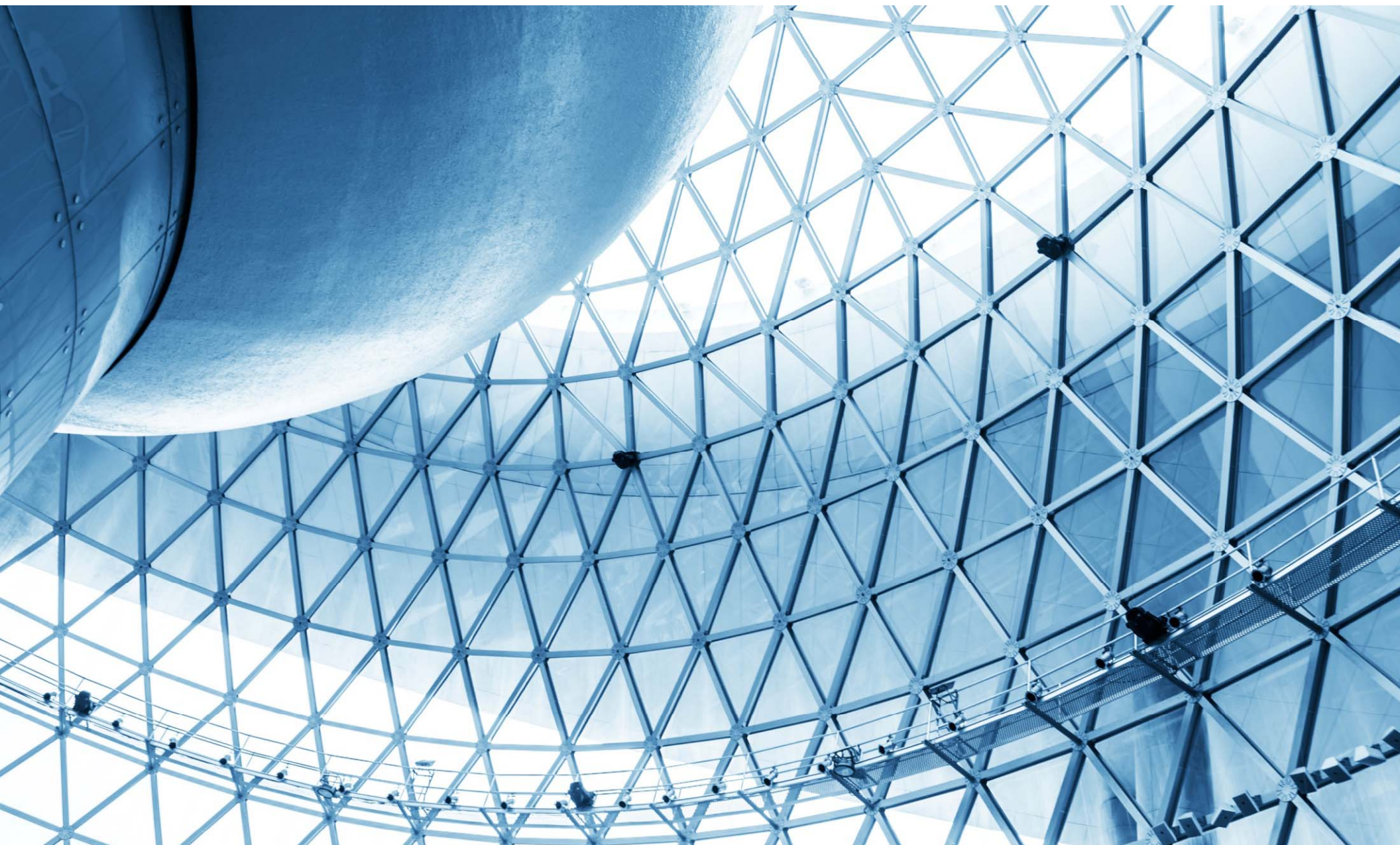
Disclosure

- Trade Secret and Confidential.
- Past performance is not indicative of future results.
- Investing involves risk, including the possible loss of principal.
- Returns are presented on a time weighted basis and shown both gross and net of underlying third party fees and expenses and may include income, appreciation and/or other earnings. In addition, investment level Net IRR's and equity multiples are reported.
- The Townsend Group, on behalf of its client base, collects quarterly limited partner/client level performance data based upon inputs from the underlying investment managers. Data collection is for purposes of calculating investment level performance as well as aggregating and reporting client level total portfolio performance. Quarterly limited partner/client level performance data is collected directly¹ from the investment managers via a secure data collection site.
- In select instances where underlying investment managers have ceased reporting limited partner/client level performance data directly to The Townsend Group via a secure data collection site, The Townsend Group may choose to input performance data on behalf of its client based upon the investment managers quarterly capital account statements which are supplied to The Townsend Group and the client alike.

Benchmarks

- The potential universe of available real asset benchmarks are infinite. Any one benchmark, or combination thereof, may be utilized on a gross or net of fees basis with or without basis point premiums attached. These benchmarks may also utilize a blended composition with varying weighting methodologies, including market weighted and static weighted approaches

Glossary of Terms



Cash Flow Statement

Beginning Market Value:	Value of real estate, cash and other holdings from prior period end.
Contributions:	Cash funded to the investment for acquisition and capital items (i.e., initial investment cost or significant capital improvements).
Distributions:	Actual cash returned from the investment, representing distributions of income from operations.
Withdrawals:	Cash returned from the investment, representing returns of capital or net sales proceeds.
Ending Market Value:	The value of an investment as determined by actual sales dollars invested and withdrawn plus the effects of appreciation and reinvestment; market value is equal to the ending cumulative balance of the cash flow statement (NAV).
Unfunded Commitments:	Capital allocated to managers which remains to be called for investment. Amounts are as reported by managers.
Remaining Allocation	The difference between the ending market value + the unfunded commitments and the target allocation. This figure represents dollars available for allocation.



Style Groups

The Style Groups consist of returns from commingled funds with similar risk/return investment strategies. Investor portfolios/investments are compared to comparable style groupings.	
Core:	Direct investments in operating, fully leased, office, retail, industrial, or multifamily properties using little or no leverage (normally less than 30%).
Value-Added:	Core returning investments that take on moderate additional risk from one or more of the following sources: leasing, re-development, exposure to non-traditional property types, the use of leverage.
Opportunistic:	Investments that take on additional risk in order to achieve a higher return. Typical sources of risks are: development, land investing, operating company investing, international exposure, high leverage, distressed properties.



Indices

Stylized Index:	Weights the various style group participants so as to be comparable to the investor portfolio holdings for each period.
Open-End Diversified Core Equity Index (“ODCE”):	A core index that includes only open-end diversified core strategy funds with at least 95% of their investments in U.S. markets. The ODCE is the first of the NCREIF Fund Database products, created in May 2005, and is an index of investment returns reporting on both a historical and current basis (16 active vehicles). The ODCE Index is capitalization-weighted and is reported gross and net of fees. Measurement is time-weighted and includes leverage.
Open-End Diversified Value Equity Index (“ODVE”):	A value-added index that includes only open-end diversified value-added strategy funds with at least 95% of their investments in U.S. markets. The Open-End Diversified Value Equity index is not a published index, but rather maintained internally by The Townsend Group and is an index of investment returns reporting on both a historical and current basis (12 active vehicles). The Open-End Diversified Value Equity Index is capitalization-weighted and is reported gross and net of fees. Measurement is time-weighted and includes leverage.
NCREIF Property Index (“NPI”):	National Property Index comprised of core equity real estate assets owned by institutions.
NAREIT Equity Index:	This is an index of Equity Real Estate Investment Trust returns reflecting the stock value changes of REIT issues as determined through public market transactions.



Performance

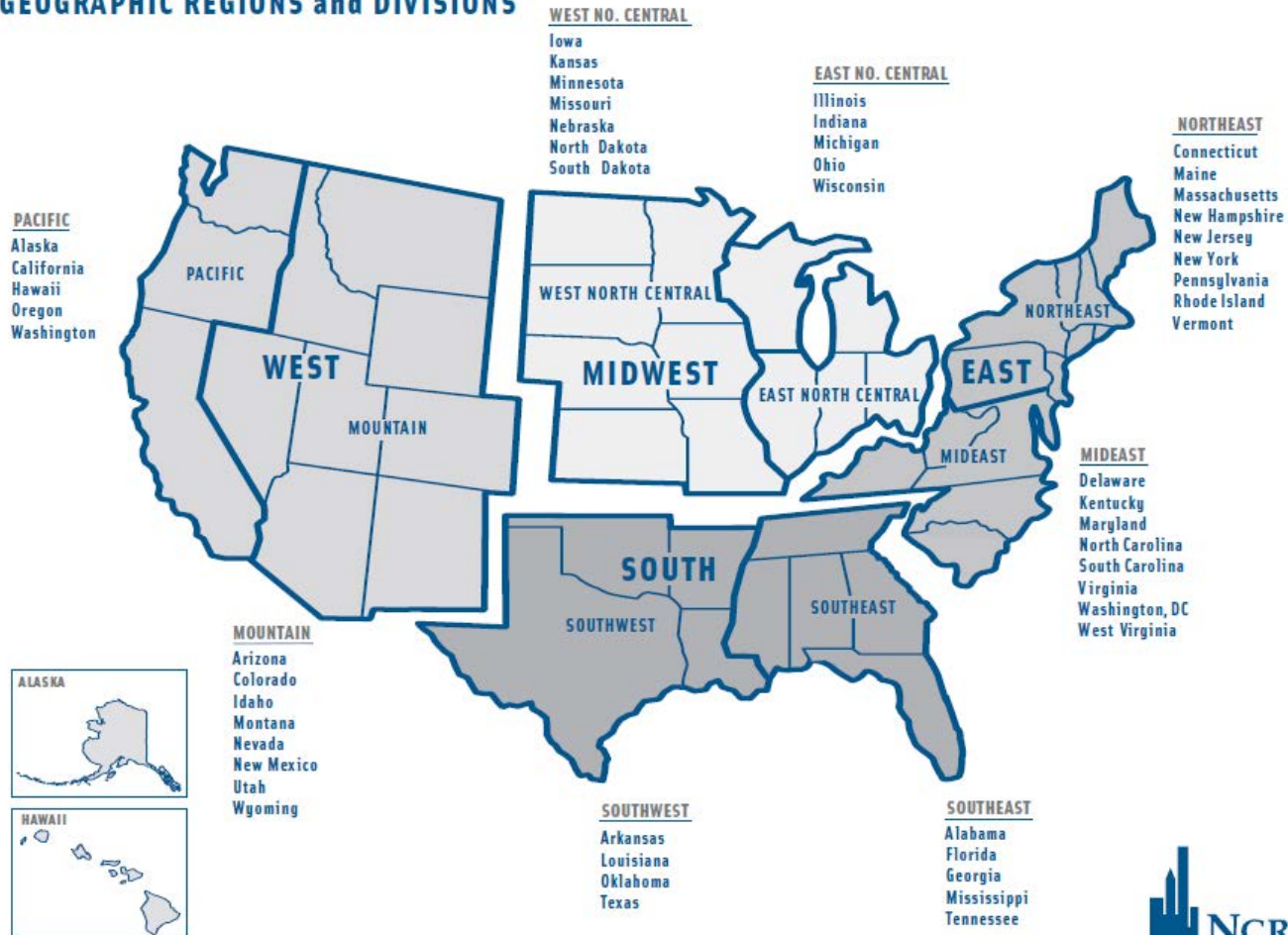
Income Return (“INC”):	Net operating income net of debt service before deduction of capital items (e.g., roof replacement, renovations, etc.)
Appreciation Return (“APP”):	Increase or decrease in investment's value based on internal or third party appraisal, recognition of capital expenditures which did not add value or uncollectible accrued income, or realized gain or loss from sales.
Total Gross Return (“TGRS”):	The sum of the income return and appreciation return before adjusting for fees paid to and/or accrued by the manager.
Total Net Return (“TNET”):	Total gross return less Advisor fees reported. All fees are requested (asset management, accrued incentives, paid incentives). No fee data is verified. May not include any fees paid directly by the investor as opposed to those paid from cash flows.
Inception Returns¹:	The total net return for an investment or portfolio over the period of time the client has funds invested. Total portfolio Inception Returns may include returns from investments no longer held in the current portfolio.
Net IRR:	IRR after advisory fees, incentive and promote. This includes actual cash flows and a reversion representing the LP Net Assets at market value as of the period end reporting date.
Equity Multiple:	The ratio of Total Value to Paid-in-Capital (TVPIC). It represents the Total Return of the investment to the original investment not taking into consideration the time invested. Total Value is computed by adding the Residual Value and Distributions. It is calculated net of all investment advisory and incentive fees and promote.

¹ Portfolio level returns include historical returns of managers no longer with assets under management. All returns are calculated on a time-weighted basis.



Glossary of Terms

GEOGRAPHIC REGIONS and DIVISIONS



ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Fiscal Year 2018 Real Assets Annual
Investment Plan

ACTION: X

DATE: October 5, 2017

INFORMATION:

BACKGROUND

Staff prepares an Annual Real Assets Investment Plan to review performance, structure, objectives, and strategy of the portfolio. The plan establishes the Board-approved plan for the portfolio for the upcoming fiscal year.

STATUS

Staff, with the assistance of The Townsend Group, Callan, and ARMB's real assets advisors, has developed the Real Assets Annual Investment Plan for Fiscal Year 2018. The Real Assets Annual Investment Plan includes a presentation of historical performance, investment background, current market conditions and Fiscal Year 2018 investment strategy. Specific recommendations for the Real Assets Fiscal Year 2018 Investment Plan are as follows:

Real Estate

- Continue strategy of managing existing core separate account portfolios and allocations toward core assets located in markets with high barriers to entry.
- Staff will continue to explore new value-add and opportunistic real estate investments.

Timberland

- Staff will continue deploying existing capital allocations.

Farmland

- Staff will continue deploying existing capital allocations.

Infrastructure

- Reduce minimum public equity manager requirement.
- Change the limit on infrastructure development from 10% to 20%.

TIPS/Energy

- No recommendations.

RECOMMENDATION

The ARMB approve Resolution 2017-13 which adopts the Real Assets Annual Investment Plan for Fiscal Year 2018.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Real Assets Annual Investment Plan

Resolution 2017-13

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, the Board contracts an independent consultant to provide experience and expertise in asset allocation and other investment matters to come before the Board; and

WHEREAS, the Board has established an asset allocation for the funds that considers earnings and liabilities on a current as well as a future basis; and

WHEREAS, the Board has authorized investments in Real Assets for the Public Employees' Retirement System, Teachers' Retirement System, and Judicial Retirement System, including investments for those systems in the State of Alaska Retirement and Benefits Plans Trust; and

WHEREAS, the Board will establish and on an annual basis review an investment plan for Real Assets asset class.

NOW THEREFORE BE IT RESOLVED THAT THE ALASKA RETIREMENT MANAGEMENT BOARD adopt the Real Assets Annual Investment Plan for Fiscal Year 2018, attached hereto and made a part hereof.

DATED at Anchorage, Alaska this ____ day of October, 2017.

Chair

ATTEST:

Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Real Assets Investment Guidelines
Policies, Procedures and Guidelines

ACTION: X

DATE: October 5, 2017

INFORMATION:

BACKGROUND

As part of the annual planning process for Real Assets, proposed changes to the Real Estate, Farmland, Timberland, and Infrastructure Policies, Procedures and Guidelines (Guidelines) are recommended by staff.

STATUS

The Infrastructure Guidelines have been revised to change the limit on infrastructure development from 10% to 20%. The requirement to have two public infrastructure managers has also been removed.

The Farmland Guidelines have been revised to remove the requirement for a 5% going-in yield on new farmland properties and to remove the requirement that individual farmland properties meet the portfolio income hurdle.

No other substantive changes are being proposed to the Guidelines.

RECOMMENDATION

The ARMB approve:

Resolution 2017-14 which adopts the revised Real Estate Investment Guidelines;

Resolution 2017-15 which adopts the revised Farmland Investment Guidelines;

Resolution 2017-16 which adopts the revised Timberland Investment Guidelines; and,

Resolution 2017-17 which adopts the revised Infrastructure Investment Guidelines.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Real Estate Investment Guidelines

Resolution 2017-14

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, the Board contracts an independent consultant to provide experience and expertise in asset allocation and other investment matters to come before the Board; and

WHEREAS, the Board has established an asset allocation for the funds that considers earnings and liabilities on a current as well as a future basis; and

WHEREAS, the Board has authorized investment in real estate assets for the Public Employees' Retirement System, Teachers' Retirement System, and Judicial Retirement System, including investments for those systems in the State of Alaska Retirement and Benefit Plans Trust; and

WHEREAS, the Board establishes and from time to time as necessary, modifies investment policies, procedures, and guidelines for real estate;

NOW THEREFORE, BE IT RESOLVED THAT THE ALASKA RETIREMENT MANAGEMENT BOARD adopts the revised Real Estate Investment Guidelines, attached hereto and made a part hereof. This resolution repeals and replaces Resolution 2016-19.

DATED at Anchorage, Alaska this ____ day of October, 2017.

Chair

ATTEST:

Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

REAL ESTATE INVESTMENT

POLICIES, PROCEDURES AND GUIDELINES

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ATTACHMENTS

Attachment 1 – Delegation of Responsibilities

ALASKA RETIREMENT MANAGEMENT BOARD

REAL ESTATE INVESTMENT

POLICIES, PROCEDURES AND GUIDELINES

I. INVESTMENT OBJECTIVES

A. Investments in Real Estate and Other Real Estate Related Assets

The Alaska Retirement Management Board (ARMB) will invest in real estate with the goals of portfolio diversification and attaining the optimum return on the portfolio, consistent with the assumption of prudent risk and safety of principal. ARMB recognizes the need to use active investment management in order to obtain the highest attainable total investment return (measured as income plus appreciation) within ARMB's framework of prudence and managed risk.

ARMB will select Real Estate Investment Managers who have the discretion to invest in publicly traded equity and/or privately placed equity sectors, subject to ARMB's approval of an Annual Strategic/Tactical Plan and an Annual Investment Plan. In order for real estate investments to be considered, the Investment Manager must demonstrate that it is able to: add value through its real estate knowledge, experience and strategy; underwrite the risks of the investment which is contemplated; and at the time of investment, comply with the intent of the Real Estate Investment Policies, Procedures and Guidelines (**Guidelines**).

Single property and multi property strategies will be considered as well as "pooled/commingled" fund investment vehicles.

B. Asset Allocation

The ARMB allocation to real estate investments shall be determined by the Board of Trustees and reviewed annually. Allocated capital to Investment Managers will be defined as invested capital based on ARMB's cost.

C. Portfolio Return Objective

1. Total Return

Over rolling 5 year periods, the equity real estate investment portfolio is expected to generate a minimum total real rate of return (net of investment management fees) of 5% using a time-weighted rate of return calculation. The inflation index used to calculate the actual real rate of return is the CPI All Urban.

2. Income Return

Income, which is defined as cash distributed to ARMB, is expected to produce 50-60% of the total return over rolling five-year periods.

3. Index

The overall portfolio is expected to exceed the target index. The target index is composed of 90% NCREIF Property Index and 10% NAREIT Equity Index.

II. PROGRAM RISK MANAGEMENT AND IMPLEMENTATION

The selection and management of assets in the real estate portfolio of the ARMB will be guided by the principles of preserving investment capital, attaining the optimum return on the portfolio consistent with the assumption of prudent risk, generating current income, being sensitive to inflation, maintaining diversification of assets and diversification of management responsibility.

In real estate investment, there is an inherent risk that the actual income and return of capital will vary from the amounts expected. The ARMB will manage the investment risk associated with real estate in several ways:

A. Institutional Quality

All assets must be of institutional investment quality as evidenced by a precedent of institutional investment in similar properties; expert analysis which supports the economic viability of the market; high quality construction and design features; and a potential competitive position within the property's immediate market area.

B. Diversification

The real estate portfolio will be diversified as to style group, property type, industry sector, life cycle, economic driver, investment manager and geographical location. Diversification reduces the impact on the portfolio of any one investment or any single manager's investment style to the extent that an adversity affecting any one particular area will not impact a disproportionate share of the total portfolio. Portfolios for core investment managers and non-core or value added investment managers will carry the diversification characteristics set forth in the allocations and definitions set out below. Diversification compliance will be monitored on a quarterly basis for compliance with ARMB's Guidelines by staff and the real estate consultant.

For purposes of calculating diversification compliance, the overall real estate portfolio size will be considered the product of the greater of projected or target real estate allocation times the projected fiscal year-end overall plan assets as established in the Annual Investment Plan. The projected fiscal year-end overall plan assets will take into account the target allocations and projected returns of all asset classes in which plan assets are invested, and estimated net pay-outs to plan beneficiaries. Unless exceptional circumstances justify a deviation, the maximum percentage of the real estate portfolio investment for each of the identified categories is as follows:

Non-Controlled Investments:	
(ARMB cannot liquidate within 180 days)	50%
Non-Core Investments (See definition below):	50%
Single Manager Limit: (value of both Separate Account and Commingled Fund combined, if applicable)	45 %
Public Equity:	50 %
Public Debt:	0 %
Private Equity:	100 %
Private Debt:	0 %

Geographic:

ARMB will avoid over-concentration in areas of similar real estate performance. The consultant will monitor ARMB's concentrations in this area, considering indicators such as NCREIF sub-region, metropolitan areas and economic drivers. The consultant will report its conclusions regarding the acceptability of ARMB's concentration limits quarterly.

Outside United States:	20 %
Single Property Investment: (acquisition cost plus projected capital additions and improvements)	5 %
Single-Tenant (any one firm):	10 %
Property Type:	40 %

Manager Allocation – It is understood that Separate Account Investment Managers may exceed their Board-approved allocations by up to 5% for the purposes of capital improvements on existing assets and/or for the completion of an acquisition. A core Separate Account Investment Manager's portfolio may be invested up to 15% in core-plus style properties to assemble a core portfolio. A value-added Separate Account Investment Manager's portfolio shall include 70%-100% in value-added style properties, and may include up to 30% in opportunistic style properties.

Subject to CIO approval, upon the sale of a property held by a Separate Account Investment Manager in which the net sales proceeds are in excess of the property's cumulative basis, the advisor's allocation will increase in an amount equal to the lesser of the excess of the net sales proceeds over the property's cumulative basis or the aggregate

portfolio net asset value over the aggregate portfolio cumulative basis adjusted to reflect actual sale proceeds. The CIO will also consider whether an allocation increase should be adjusted for any past realized losses incurred by the Separate Account Investment Manager. The intent of this provision is to allow a Separate Account Investment Manager to reinvest realized gains but only to the extent gains are greater than losses which have been experienced in other property investments in the Separate Account Investment Manager's portfolio.

Exceptional circumstances justifying a deviation – When circumstances arise of a temporary nature, such as an unexpected re-valuation of assets, a transfer of assets among managers, or an event in which it would be in the fiduciary interest of the ARMB to do so, the limits set forth in paragraph II.B of ARMB Policies may be exceeded provided that ARMB concurs.

CIO Discretionary Investment Authority – The CIO shall have the following discretionary investment authority:

- a) To increase or decrease existing separate account allocations and investments in open-end funds;
- b) To commit to new investment funds up to \$100 million for each fund; and,
- c) To engage consultants and take other action as may be necessary to ensure sufficient due diligence is performed on all investments under consideration.

The CIO shall exercise this discretion within Board approved asset allocations, investment plans, and guidelines as they may apply.

The CIO will provide prior notification to the Chair of ARMB before committing to any investments under this authority. All discretionary CIO investment actions shall be reported to the Board.

Definitions

Core Investments

Primary
Characteristics:

- Fully or substantially leased (85% occupancy or greater)
- Inconsequential turnover near term
- Inconsequential physical issues or renovation required
- Credit tenants
- Primary markets
- Quality property
- Income produces 50% or more of expected return
- Typically longer term holds
- Properties in markets with stable or improving economic conditions

Core-plus Investments

Primary Characteristics:	• Limited renovation, primarily deferred maintenance, limited physical issues or repositioning needed • Modest near term lease roll over; modest vacant lease up • Expected growth through increasing rents • Poor prior management • A- to B- quality • Income produces 50% or more of expected return

Non-Core Investments

Value-Added Investments

Primary Characteristics:	• Asset renovation – lobbies, corridors, deferred maintenance • Intermediate term (6-9 months) physical issues • Current vacancies or rent loss • Near term roll over exposure • Repositioning, re-tenanting • Distressed prior management • Purchase of adjacent land to develop • Alternative, turnaround markets and property types • Income produces 50% or less of total return

Opportunistic Investments – These investments involve significant redevelopment risk, high leasing risk, and high development risk.

Primary Characteristics:	• Empty Buildings • High near term turnover • New development – spec or limited pre-leasing • Significant rehabilitation and leasing, redevelopment into alternative uses • Capital displacement in maligned markets: lack of investment capital due to level of risk • Non-traditional asset type (mezzanine debt, land, etc.) • Wide ranging investment structures

- Investing in non-performing notes
- Cross-border investing
- Holding periods typically 1 to 5 years
- Income produces less than 50% of total return

Note: *Properties within a multi-property investment will be categorized as either core or non-core.*

C. Implementation Approach

The ARMB will implement an investment process for real estate which will, over time, include a minimum of three (3) qualified Separate Account Investment Managers who have been selected on a competitive basis. The ARMB will endeavor to allocate specific funds to qualified managers on a separate account basis. Selected managers will seek real estate investment opportunities in publicly-traded equity and/or privately-placed equity sectors. Investments will be made on a discretionary basis subject to Staff approval of the Annual Strategic/Tactical Plans prepared by Separate Account Investment Managers and ARMB's approval of the Annual Investment Plan prepared by Staff. In addition to separate accounts, ARMB will selectively consider investments in "pooled/commingled" investment vehicles.

All allocation of funds to a manager (including additional investment with existing accounts) and investment strategy must be recommended to ARMB by Staff and the Real Estate Consultant and be accompanied by an investment report which, at a minimum, includes the following: market information; investment alternatives; fee structure and comparison to other alternatives; demonstration of compliance with Guidelines and the then current Annual Investment Plan; historical performance of Separate Account Investment Manager (cash-based internal rates of return and industry standard); projected returns (income and appreciation); and positive and negative attributes of the investment strategy.

On a selective basis, a member of ARMB may visit the site of a real estate investment for the purpose of rendering a report to ARMB supplementing reports provided by Staff, the Real Estate Consultant, or others.

D. Prudent Leverage

The total amount of leverage placed on the aggregate separate account assets will not exceed thirty five percent (35%) of the total market value of the real estate separate account portfolio. Directly-owned properties will not be leveraged by the Separate Account Investment Manager. Property encumbered by debt at the time of purchase, if justified on a risk-return basis by the Separate Account Investment Manager, may be acquired subject to Chief Investment Officer approval. With authorization by the ARMB, the Chief Investment Officer may place leverage on a pool of existing core real estate assets held in ARMB's separate account portfolio in a manner consistent with the ARMB's Guidelines.

The total amount of fund level leverage, at the time of investment, will not exceed 35% for core commingled funds investing in a core equity diversified asset strategy. The total amount of fund level leverage, at the time of investment, will not exceed 65% for non-

core commingled funds investing in a value add or opportunistic equity diversified asset strategy.

E. Lease Structure

Multi-tenant and single tenant properties will be considered. When acquiring single tenant properties, consideration will be given to avoid multiple single-tenant exposure to any firm if those single tenant properties constitute more than 10% of the portfolio. A staggered lease structure for commercial properties will be emphasized.

F. Separate Account Investment Manager Business Plan; Annual Strategic/Tactical Plan; Disposition/Exit Strategy

A Business Plan (including property operating budgets) will be completed by each manager for each asset under its management. The Business Plan will identify the current and anticipated competitive position for each property in order to set tactical and strategic objectives and will prescribe in appropriate detail a disposition and exit strategy respecting the particular investments. Part of this process is to evaluate the potential timing of dispositions. A property is considered for sale when it is believed that the equity in the existing investment can achieve a higher return in another real estate investment of similar risk. The Annual Strategic/Tactical Plan will describe the expectation of the manager with respect to acquisitions and dispositions.

G. Fee Structure

Involvement in any venture will be done on a fee basis that is competitive. The preferred method of calculating manager fees will be based upon a formula, which considers both 1) the cost basis of assets under management and 2) investment performance. All fee structures will be approved by ARMB. For core managers, the return-based portion of a fee will emphasize actual cash available for distribution to ARMB.

H. Single Asset Ownership Structure (Applies to Separate Accounts Only)

Provided that the goals of these guidelines are followed, ARMB may invest in separate, specific real estate assets. However, such investments will be undertaken in a fashion structured to limit ARMB's liability to the amount of its investment.

I. Reporting System

Staff and the Real Estate Consultant will develop and implement a comprehensive and responsive reporting and monitoring system for the entire portfolio, individual investments and individual managers. The reporting and monitoring system will endeavor to identify under-performing investments, controlled portfolio diversification deficiencies and inherent conflicts of interest, thereby facilitating active portfolio management. A cash-based internal rate of return (IRR) will be used when evaluating the long-term performance of an investment. Time-weighted returns will be used to measure comparative performance.

J. Distribution of Current Income

All separate account income will be distributed immediately to ARMB or its designee and not automatically reinvested in the account.

K. Lines of Responsibility

Well defined lines of responsibility and accountability will be required of all participants in ARMB's real estate investment program. Participants are identified as:

ARMB – The fiduciaries appointed by the Governor to represent the beneficiaries' interest which shall retain final authority over all real estate investment decisions.

Staff – Investment professionals on the staff of the Department of Revenue and assigned ARMB responsibilities who will assist in the Real Estate equity investment program's design, policy implementation and administration.

Real Estate Consultant – Professionals retained to support Staff and ARMB through the provision of expert real estate strategic planning, implementation and performance monitoring support.

Separate Account Investment Managers – Qualified entities who provide institutional real estate investment management services and maintain a discretionary relationship with ARMB subject to Staff's approval of Annual Business Plans and Annual Strategic/Tactical plans, prepared by Separate Account Investment Managers, and ARMB's approval of the Annual Investment Plan.

Commingled Fund Managers – Qualified entities who provide institutional real estate investment management services through open-end and closed-end real estate pools and other pooled/commingled vehicles.

III. CONFLICTS OF INTEREST

In real estate investment, separate and distinct from other asset classes, the Manager of a Separate Account or Commingled Fund may have direct or significant control over the operations of the assets. This inherent or potential conflict of interest if openly described and regulated may contribute to the lower volatility associated with the asset class, but it also creates a need for a higher oversight standard by the plan sponsor. Staff and ARMB will maintain this oversight in at least the following ways:

A. Property Valuation

The Separate Account Investment Manager will provide ARMB with annual appraisal valuations for all properties for which it has asset management responsibility as of the quarter ending March 31. Unless otherwise directed by ARMB, the appraisal will be prepared by a qualified independent third party entity in accordance with industry standards. Staff may waive the appraisal requirement for recent acquisitions or pending dispositions following a recommendation by the Separate Account Investment Manager that such appraisal would not be a cost effective exercise. For development assets, appraisals are to be conducted in the manner described above after substantial completion payment by ARMB is made. In addition, the Separate Account Investment Manager will mark each asset to market each quarter based on asset conditions and leasing, operations and capital market conditions for comparable properties in that market.

B. Property Management

The selection of on-site property management will generally be left to the discretion of the Separate Account Investment Manager. It is expected that the Separate Account Investment Manager will retain the highest caliber, market rate property management service either through a third party fee manager or the Separate Account Investment Manager's affiliated property management division. This business relationship will be periodically reviewed by Staff, the Real Estate Consultant and ARMB.

IV. INSURANCE COVERAGE

The Separate Account Investment Manager will obtain insurance for the physical properties and assets under its control. The coverage will be in such amounts and against such risks as, in the Separate Account Investment Manager's professional judgment, shall be in accordance with sound institutional practices applicable to such properties or assets in the specific geographic area. It is expected that such insurance will include, but not be limited to, casualty loss, including where deemed appropriate by the Separate Account Investment Manager, earthquake, flood and any other disaster-type insurance coverage; comprehensive general liability; and title insurance. Separate Account Investment Managers will provide proof of insurance to Staff annually.

V. UNRELATED BUSINESS INCOME TAX

Prior to entering into any transaction, the Manager will assess whether income generated from the property under consideration could qualify as unrelated business taxable income. If this risk exists, the Manager will provide ARMB with an opinion of counsel satisfactory to ARMB that the transaction will not generate unrelated business taxable income under the

federal income tax law or any other tax provisions that could affect ARMB's tax-exempt status existing at the time. The Manager shall investigate as to whether ARMB shall be entitled to any property tax exemptions. Managers will provide letters of opinion on UBIT and property tax exemptions to Staff.

VI. ENVIRONMENTAL EVALUATIONS

As a standard procedure during the pre-acquisition analysis, the Separate Account Investment Manager will initiate a formal evaluation for each property through the selection of an environmental consultant. In carrying out the review, appropriate procedures based on standards of the locale and conditions known to exist in the locale shall be undertaken and such procedures should at a minimum include:

- Appointment of an environmental consultant with specific experience in testing and removal of asbestos and other environmental hazards.
- A site survey will be conducted to determine from the available evidence whether hazardous chemicals or environmentally dangerous materials exist or have existed on the subject property, including, at a minimum, a Phase I report.

ARMB may invest in properties, which contain asbestos and other toxic substances, only if the following conditions are met:

- The substance and potential risks are thoroughly disclosed.
- The property is not in violation of any federal, state or local law, ordinance, or regulation relating to the property's environmental condition.
- The estimated cost of the removal or containment programs will be reflected in the purchase assumptions.
- The substance can be properly contained or removed in accordance with the then current Environmental Protection Agency Standards.
- The leasing rollover pattern in the property will accommodate a removal program in the future.

Separate Account Investment Managers will provide the environmental evaluation reports to staff

VII. PROCEDURES FOR INVESTMENT

A. Delegation of Responsibilities

The real estate investment program will be implemented and monitored through the coordinated efforts of the ARMB, Staff, the Real Estate Consultant, and the qualified Manager(s). Delegation of responsibilities for each participant is described in the following sections: A summary of the delegation is attached:

1. ARMB

ARMB will retain final authority over all real estate investment strategy decisions except for Business Plan variances as set forth in the Guidelines Section VIII; approve the Guidelines, the Annual Investment Plan and any periodic revisions to these documents which ARMB deems to be appropriate and prudent for the

investment of ARMB assets; retain qualified investment managers and real estate consultants; and set investment limits.

2. Staff

Staff will coordinate program compliance among all participants and communicate the investment policies, objectives and performance criteria to the Separate Account Investment Managers and monitor diversification compliance on a quarterly basis. Staff will also coordinate the receipt and distribution of capital. Staff, in cooperation with the Real Estate Consultant, will periodically review the Separate Account Investment Managers' and portfolio's performance in relation to target returns; review and approve the Separate Account Investment Manager's Annual Business Plan and Annual Strategic/Tactical Plan; review and recommend investments in commingled vehicles; prepare and recommend an Annual Investment Plan; and recommend revisions to the Real Estate Investment Policy Procedures and Guidelines. Staff will also review and approve the detailed property operating budgets prior to the start of each fiscal year and revisions to the property operating budgets in accordance with Section VIII of these Guidelines.

3. Real Estate Consultant

In cooperation with Staff and as deemed appropriate by ARMB, the Real Estate Consultant will ensure program compliance; assist in the implementation of a multiple manager program; review all program documentation and management relationships; conduct manager searches when requested; provide performance measurement analysis of the portfolio; review the Annual Investment Plan as set forth in the Investment Procedures outlined below; and provide special project research pertaining to technical real estate issues.

The Real Estate Consultant will, as requested by ARMB, provide periodic reports for the real estate program including a performance evaluation of the total portfolio to include both ARMB's commingled fund investments and ARMB's separate account investments. The analysis will include both income and capital accounting; comparison to industry performance benchmarks (such as NCREIF); Manager reviews, and effects of "Pooled Leverage" on the real estate portfolio. The Real Estate Consultant will prepare a quarterly performance analysis report which will provide after-fee realized and unrealized gains/losses; monitor and report quarterly diversification compliance and the geographic concentration limits; time weighted returns including both current quarter returns and annualized returns since portfolio inception; and internal rates of return since inception based on actual cash flow from and to ARMB.

Additional responsibilities may include developing selection criteria in manager search efforts, coordinating/conducting manager searches, conducting manager reviews, and other special projects.

4. Managers

Separate Account Investment Managers will acquire and manage real estate investments on behalf of ARMB and in accordance with the then current and approved Annual Business, Annual Strategic/Tactical Plans, and the objectives set forth in the Annual Investment Plan and the Guidelines. Managers will prepare Annual Business (including property operating budgets) and Annual Strategic/Tactical Plans for Staff review and approval.

Commingled fund investment managers will acquire and manage real estate investments on behalf of ARMB and in accordance with the terms of any and all agreements between each respective Manager and ARMB.

B. Investment Procedure

Real estate investments, in compliance with ARMB's Policies, shall be acquired through the following process:

1. Separate Accounts:

Annually, Staff will prepare an Investment Plan after reviewing the Annual Business and Strategic/Tactical Plans of the Separate Account Investment Managers. This document will recommend, as appropriate, revisions to the ARMB Guidelines, additional allocations to existing managers, and revisions to the Annual Business and Strategic/Tactical Plans of each respective Separate Account Investment Manager. Any searches that may be recommended will be outlined. The Investment Plan will then be reviewed by the consultant and submitted to ARMB for final approval. Staff and the Real Estate Consultant shall review the Separate Account Investment Manager's Annual Business Plans and Annual Strategic/Tactical Plans for consistency with the Annual Investment Plan. Staff will approve all Plans prepared by Separate Account Investment Managers.

Investments will be made on a discretionary basis by Separate Account Investment Managers in accordance with their approved Annual Business and Strategic/Tactical Plans. Separate Account Investment Managers must provide staff with copies of their internal "Investment Committee" reports for each asset purchased on ARMB's behalf.

2. Commingled Funds:

Investments in commingled funds will be recommended by Staff and the Real Estate Consultant on an individual fund basis in accordance with the Annual Investment Plan and the ARMB Guidelines.

VIII. DELEGATION OF AUTHORITY

ARMB shall delegate authority to Staff to approve the following:

- Each Separate Account Investment Manager's detailed property operating budgets for each fiscal year;
- Annual Business Plans and Annual Tactical/Strategic Plans prepared by ARMB's Separate Account Investment Managers;
- Revised property operating budgets and variances in approved Annual Business Plans for unanticipated, significant leasing activity; and

- Line item variances in approved capital expenditure budgets in amounts up to \$300,000 with a cumulative fiscal year maximum of \$3,000,000 per Separate Account Investment Manager for other capital expenditures not related to leasing activity (such as repairs for building damage or defects).

IX. CONFIDENTIALITY

Pursuant to 15 AAC 112.770, ARMB shall withhold from other persons all information furnished to it by Manager(s) or Consultant(s) which is reasonably designated by Manager(s) or Consultant(s) as being confidential or proprietary, within the meaning of Alaska Statutes regarding rights to public information, except to the extent that the information is needed by ARMB in order to adequately report on the status and performance of the portfolio, or to comply with a court subpoena or with an official criminal investigation.

Those portions of reports provided pursuant to Part II section I (Reporting System) of these Guidelines shall be considered confidential pursuant to 15 AAC 112.770 to the extent that information is reasonably designated by Manager(s) as being confidential or proprietary, or to the extent the disclosure of which would unfairly prejudice the ability of Manager(s) or ARMB to manage, lease, market or sell such property or Assets.

X. REVISIONS

This document replaces and consolidates the policies, procedures, and guidelines as of ~~September 24, 2015~~September 29, 2016. This document is to be reviewed no less than annually and revised as appropriate.

XI. REAL ESTATE SEPARATE ACCOUNT INVESTMENT MANAGERS

The following investment managers acquire institutional-grade properties on a discretionary basis for the Alaska Retirement Management Board:

UBS Realty Investors LLC

Property type – Core/apartments, industrial, retail and office

Contact - Jeffrey G. Maguire
Managing Director

10 State House Square
Hartford, CT 06103-3604

Telephone: 860-616-9086

Fax: 860-616-9104

E-mail: jeffrey.maguire@ubs.com

Web site: www.ubs.com

Sentinel Realty Advisors Corp.

Property type – Core/apartments only

Contact – ~~David Weiner~~ George Tietjen

Managing Director

1251 Avenue of the Americas

New York, NY 10020

Telephone: 212-408-29~~2913~~

Fax: 212-603-5961

E-mail: weiner@sentinelcorp.com

Web site: www.sentinelcorp.com

LaSalle Investment Management

Property type – Core/apartments, industrial, retail and office (includes Takeover Assets)

Attn: George Duke

Managing Director

100 East Pratt Street, 20th Floor

Baltimore, MD 21202

Telephone: (410) 878-4810

Facsimile: (410) 878-4910

E-mail: George.Duke@lasalle.com

Web site: www.lasalle.com

XII. REAL ESTATE COMMINGLED ACCOUNT INVESTMENT MANAGERS

UBS Realty Investors LLC

Contact: Thomas J. Anathan,
Managing Director

10 State House Square
Hartford, CT 06103-3604

Telephone: 860-616-9128;

Facsimile: 860-616-9104

E-mail: thomas.anathan@ubs.com

J.P. Morgan Asset Management

Contact: Ann Cole, Managing Director Portfolio Manager; Kimberly Adams, Managing Director Portfolio Manager, Strategic Property Fund

270 Park Avenue, 7th Floor

New York, NY 10017

Telephone: (AC) 212-648-2152

Telephone: (KA) 312-732-6366

Facsimile: 917-464-7449

ann.e.cole@jpmorgan.com

kimberly.a.adams@jpmorgan.com

Clarion Partners

Contact: ~~Doug Bowen~~ Richard Schaupp
Managing Director
230 Park Avenue
New York, NY 10169
Telephone: 212-883-~~27162506~~
Facsimile: 212-883-2806
E-mail:
richard.schaupp@clarionpartners.com

Tishman Speyer Properties

Contact: Julie Lurie
45 Rockefeller Plaza, 7th Floor
New York, NY 10020
Telephone: 212-715-0329
Facsimile: 212-895-0129
E-mail: JRLurie@tishmanspeyer.com

Almanac Realty Investors, LLC

Contact: Matt Kaplan, Managing Partner
1140 Avenue of the Americas, 17th Floor
New York, NY 10036
Telephone: 212-403-3522
Facsimile: 212-403-3520
E-mail:
matthew.kaplan@almanacrealty.com

ColonyCapital, LLC

Contact: Andrea Nicholas
515 S. Flower Street, 44th Floor
Los Angeles, CA 90071
Telephone: 310-552-7191
Facsimile: 310-407-7391
E-mail: ANicholas@colonyinc.com

LaSalle Investment Management

Contact: Steve Bolen, President
100 East Pratt Street, 20th Floor
Baltimore, MD 21202
Telephone: 410-347-0660
Facsimile: 410-347-0612 fax
E-mail: steve.bolen@lasalle.com

KKR & Co. L.P.

Contact: Dan McLaughlin, Director
555 California Street
San Francisco, CA 94101
Telephone: 415-315-6573
E-mail: dan.mclaughlin@kk.com

Silverpeak Legacy Partners

Contact: Colleen Fennerty
Managing Director
40 West 57th Street, 29th Floor
New York, NY 10019
Telephone: 212-716-2064
Facsimile: (646) 285-9271
E-mail: investorrelations@silverpeakre.com

~~Cornerstone~~ Barings Real Estate Advisers LLC

Contact: Patrick T. Kendall, Vice President
One Financial Plaza, Suite 1700
Hartford, CT 06103
Telephone: 310-234-2525
Facsimile: 949-852-9804
E-mail: pkendall@Cornerstoneadvisorsbarings.com

Coventry Real Estate Fund II, LLC

Contact: Peter Henkel
1 East 52nd Street, 4th Floor
New York, NY 10022
Telephone: 212-699-4109
Facsimile: 212-699-4124
E-mail: phenkel@coventryadvisors.com

BlackRock, Inc.

Contact: Ted Koros, Managing Director
50 California Street, Suite 300
San Francisco, CA 94111
Telephone: 415-670-6210
Facsimile: 646-521-4982
E-mail: theodore.koros@blackrock.com

Lowe Hospitality Investment Partners, LLC

Contact: Bleecker P. Seaman, Executive VP
11777 San Vicente Boulevard, Suite 900
P.O. Box 49021
Los Angeles, CA 90049-6615
Telephone: 310-571-4263
Facsimile: 310-207-1132
bseaman@loweenterprises.com

Attachment 1

REAL ESTATE INVESTMENT POLICY and PROCEDURES - Delegation of Responsibilities Attachment						
	Frequency	Separate Account Investment Managers	Consultant	Staff		Board
Real Estate Investment Policy, Procedures, and Guidelines			R	P&R		A
Review and Revise	Annually		R	R		A
Separate Account Investment Manager Selection	Periodically		G&R	G&R		A
Request For Proposal (RFP)			P&R	P&R		A
Real Estate Consultant Selection	Tri-Annually			G&R		A
Request For Proposal (RFP)				P&R		A
Commingled Fund Selection**	Periodically		R	R		A
Real Estate Investment Plan**	Annually		R	P&R		A
Separate Account Business Plan**	Annually	P	R	R&A		
Detailed Property Operating Budget	Annually	P	R	R&A		
Separate Account Strategic/Tactical Plan**	Annually	P	R	R&A		RT
Quarterly Performance	Quarterly		P	RT		RT
Portfolio/Property Diversification Compliance	Quarterly		M	M		
Geographic Concentration Limit	Quarterly		M	RT		

A = Approves
G = Grade
P = Prepares
R = Recommends

RT = Reported To
M = Monitor

* Grade Semi-finalists only
** Investment Decision (Shaded)

ALASKA RETIREMENT MANAGEMENT BOARD REAL ESTATE INVESTMENT POLICIES, PROCEDURES AND GUIDELINES

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ATTACHMENTS

Attachment 1 – Delegation of Responsibilities

ALASKA RETIREMENT MANAGEMENT BOARD

REAL ESTATE INVESTMENT

POLICIES, PROCEDURES AND GUIDELINES

I. INVESTMENT OBJECTIVES

A. Investments in Real Estate and Other Real Estate Related Assets

The Alaska Retirement Management Board (ARMB) will invest in real estate with the goals of portfolio diversification and attaining the optimum return on the portfolio, consistent with the assumption of prudent risk and safety of principal. ARMB recognizes the need to use active investment management in order to obtain the highest attainable total investment return (measured as income plus appreciation) within ARMB's framework of prudence and managed risk.

ARMB will select Real Estate Investment Managers who have the discretion to invest in publicly traded equity and/or privately placed equity sectors, subject to ARMB's approval of an Annual Strategic/Tactical Plan and an Annual Investment Plan. In order for real estate investments to be considered, the Investment Manager must demonstrate that it is able to: add value through its real estate knowledge, experience and strategy; underwrite the risks of the investment which is contemplated; and at the time of investment, comply with the intent of the Real Estate Investment Policies, Procedures and Guidelines (**Guidelines**).

Single property and multi property strategies will be considered as well as "pooled/commingled" fund investment vehicles.

B. Asset Allocation

The ARMB allocation to real estate investments shall be determined by the Board of Trustees and reviewed annually. Allocated capital to Investment Managers will be defined as invested capital based on ARMB's cost.

C. Portfolio Return Objective

1. Total Return

Over rolling 5 year periods, the equity real estate investment portfolio is expected to generate a minimum total real rate of return (net of investment management fees) of 5% using a time-weighted rate of return calculation. The inflation index used to calculate the actual real rate of return is the CPI All Urban.

2. Income Return

Income, which is defined as cash distributed to ARMB, is expected to produce 50-60% of the total return over rolling five-year periods.

3. Index

The overall portfolio is expected to exceed the target index. The target index is composed of 90% NCREIF Property Index and 10% NAREIT Equity Index.

II. PROGRAM RISK MANAGEMENT AND IMPLEMENTATION

The selection and management of assets in the real estate portfolio of the ARMB will be guided by the principles of preserving investment capital, attaining the optimum return on the portfolio consistent with the assumption of prudent risk, generating current income, being sensitive to inflation, maintaining diversification of assets and diversification of management responsibility.

In real estate investment, there is an inherent risk that the actual income and return of capital will vary from the amounts expected. The ARMB will manage the investment risk associated with real estate in several ways:

A. Institutional Quality

All assets must be of institutional investment quality as evidenced by a precedent of institutional investment in similar properties; expert analysis which supports the economic viability of the market; high quality construction and design features; and a potential competitive position within the property's immediate market area.

B. Diversification

The real estate portfolio will be diversified as to style group, property type, industry sector, life cycle, economic driver, investment manager and geographical location. Diversification reduces the impact on the portfolio of any one investment or any single manager's investment style to the extent that an adversity affecting any one particular area will not impact a disproportionate share of the total portfolio. Portfolios for core investment managers and non-core or value added investment managers will carry the diversification characteristics set forth in the allocations and definitions set out below. Diversification compliance will be monitored on a quarterly basis for compliance with ARMB's Guidelines by staff and the real estate consultant.

For purposes of calculating diversification compliance, the overall real estate portfolio size will be considered the product of the greater of projected or target real estate allocation times the projected fiscal year-end overall plan assets as established in the Annual Investment Plan. The projected fiscal year-end overall plan assets will take into account the target allocations and projected returns of all asset classes in which plan assets are invested, and estimated net pay-outs to plan beneficiaries. Unless exceptional circumstances justify a deviation, the maximum percentage of the real estate portfolio investment for each of the identified categories is as follows:

Non-Controlled Investments:	
(ARMB cannot liquidate within 180 days)	50%
Non-Core Investments (See definition below):	50%
Single Manager Limit: (value of both Separate Account and Commingled Fund combined, if applicable)	45 %
Public Equity:	50 %
Public Debt:	0 %
Private Equity:	100 %
Private Debt:	0 %

Geographic:

ARMB will avoid over-concentration in areas of similar real estate performance. The consultant will monitor ARMB's concentrations in this area, considering indicators such as NCREIF sub-region, metropolitan areas and economic drivers. The consultant will report its conclusions regarding the acceptability of ARMB's concentration limits quarterly.

Outside United States:	20 %
Single Property Investment: (acquisition cost plus projected capital additions and improvements)	5 %
Single-Tenant (any one firm):	10 %
Property Type:	40 %

Manager Allocation – It is understood that Separate Account Investment Managers may exceed their Board-approved allocations by up to 5% for the purposes of capital improvements on existing assets and/or for the completion of an acquisition. A core Separate Account Investment Manager's portfolio may be invested up to 15% in core-plus style properties to assemble a core portfolio. A value-added Separate Account Investment Manager's portfolio shall include 70%-100% in value-added style properties, and may include up to 30% in opportunistic style properties.

Subject to CIO approval, upon the sale of a property held by a Separate Account Investment Manager in which the net sales proceeds are in excess of the property's cumulative basis, the advisor's allocation will increase in an amount equal to the lesser of the excess of the net sales proceeds over the property's cumulative basis or the aggregate

portfolio net asset value over the aggregate portfolio cumulative basis adjusted to reflect actual sale proceeds. The CIO will also consider whether an allocation increase should be adjusted for any past realized losses incurred by the Separate Account Investment Manager. The intent of this provision is to allow a Separate Account Investment Manager to reinvest realized gains but only to the extent gains are greater than losses which have been experienced in other property investments in the Separate Account Investment Manager's portfolio.

Exceptional circumstances justifying a deviation – When circumstances arise of a temporary nature, such as an unexpected re-valuation of assets, a transfer of assets among managers, or an event in which it would be in the fiduciary interest of the ARMB to do so, the limits set forth in paragraph II.B of ARMB Policies may be exceeded provided that ARMB concurs.

CIO Discretionary Investment Authority – The CIO shall have the following discretionary investment authority:

- a) To increase or decrease existing separate account allocations and investments in open-end funds;
- b) To commit to new investment funds up to \$100 million for each fund; and,
- c) To engage consultants and take other action as may be necessary to ensure sufficient due diligence is performed on all investments under consideration.

The CIO shall exercise this discretion within Board approved asset allocations, investment plans, and guidelines as they may apply.

The CIO will provide prior notification to the Chair of ARMB before committing to any investments under this authority. All discretionary CIO investment actions shall be reported to the Board.

Definitions

Core Investments

Primary
Characteristics:

- Fully or substantially leased (85% occupancy or greater)
- Inconsequential turnover near term
- Inconsequential physical issues or renovation required
- Credit tenants
- Primary markets
- Quality property
- Income produces 50% or more of expected return
- Typically longer term holds
- Properties in markets with stable or improving economic conditions

Core-plus Investments

Primary
Characteristics:

- Limited renovation, primarily deferred maintenance, limited physical issues or repositioning needed
- Modest near term lease roll over; modest vacant lease up
- Expected growth through increasing rents
- Poor prior management
- A- to B- quality
- Income produces 50% or more of expected return

Non-Core Investments

Value-Added Investments

Primary
Characteristics:

- Asset renovation – lobbies, corridors, deferred maintenance
- Intermediate term (6-9 months) physical issues
- Current vacancies or rent loss
- Near term roll over exposure
- Repositioning, re-tenanting
- Distressed prior management
- Purchase of adjacent land to develop
- Alternative, turnaround markets and property types
- Income produces 50% or less of total return

Opportunistic Investments – These investments involve significant redevelopment risk, high leasing risk, and high development risk.

Primary
Characteristics:

- Empty Buildings
- High near term turnover
- New development – spec or limited pre-leasing
- Significant rehabilitation and leasing, redevelopment into alternative uses
- Capital displacement in maligned markets: lack of investment capital due to level of risk
- Non-traditional asset type (mezzanine debt, land, etc.)
- Wide ranging investment structures

- Investing in non-performing notes
- Cross-border investing
- Holding periods typically 1 to 5 years
- Income produces less than 50% of total return

Note: *Properties within a multi-property investment will be categorized as either core or non-core.*

C. Implementation Approach

The ARMB will implement an investment process for real estate which will, over time, include a minimum of three (3) qualified Separate Account Investment Managers who have been selected on a competitive basis. The ARMB will endeavor to allocate specific funds to qualified managers on a separate account basis. Selected managers will seek real estate investment opportunities in publicly-traded equity and/or privately-placed equity sectors. Investments will be made on a discretionary basis subject to Staff approval of the Annual Strategic/Tactical Plans prepared by Separate Account Investment Managers and ARMB's approval of the Annual Investment Plan prepared by Staff. In addition to separate accounts, ARMB will selectively consider investments in "pooled/commingled" investment vehicles.

All allocation of funds to a manager (including additional investment with existing accounts) and investment strategy must be recommended to ARMB by Staff and the Real Estate Consultant and be accompanied by an investment report which, at a minimum, includes the following: market information; investment alternatives; fee structure and comparison to other alternatives; demonstration of compliance with Guidelines and the then current Annual Investment Plan; historical performance of Separate Account Investment Manager (cash-based internal rates of return and industry standard); projected returns (income and appreciation); and positive and negative attributes of the investment strategy.

On a selective basis, a member of ARMB may visit the site of a real estate investment for the purpose of rendering a report to ARMB supplementing reports provided by Staff, the Real Estate Consultant, or others.

D. Prudent Leverage

The total amount of leverage placed on the aggregate separate account assets will not exceed thirty five percent (35%) of the total market value of the real estate separate account portfolio. Directly-owned properties will not be leveraged by the Separate Account Investment Manager. Property encumbered by debt at the time of purchase, if justified on a risk-return basis by the Separate Account Investment Manager, may be acquired subject to Chief Investment Officer approval. With authorization by the ARMB, the Chief Investment Officer may place leverage on a pool of existing core real estate assets held in ARMB's separate account portfolio in a manner consistent with the ARMB's Guidelines.

The total amount of fund level leverage, at the time of investment, will not exceed 35% for core commingled funds investing in a core equity diversified asset strategy. The total amount of fund level leverage, at the time of investment, will not exceed 65% for non-

core commingled funds investing in a value add or opportunistic equity diversified asset strategy.

E. Lease Structure

Multi-tenant and single tenant properties will be considered. When acquiring single tenant properties, consideration will be given to avoid multiple single-tenant exposure to any firm if those single tenant properties constitute more than 10% of the portfolio. A staggered lease structure for commercial properties will be emphasized.

F. Separate Account Investment Manager Business Plan; Annual Strategic/Tactical Plan; Disposition/Exit Strategy

A Business Plan (including property operating budgets) will be completed by each manager for each asset under its management. The Business Plan will identify the current and anticipated competitive position for each property in order to set tactical and strategic objectives and will prescribe in appropriate detail a disposition and exit strategy respecting the particular investments. Part of this process is to evaluate the potential timing of dispositions. A property is considered for sale when it is believed that the equity in the existing investment can achieve a higher return in another real estate investment of similar risk. The Annual Strategic/Tactical Plan will describe the expectation of the manager with respect to acquisitions and dispositions.

G. Fee Structure

Involvement in any venture will be done on a fee basis that is competitive. The preferred method of calculating manager fees will be based upon a formula, which considers both 1) the cost basis of assets under management and 2) investment performance. All fee structures will be approved by ARMB. For core managers, the return-based portion of a fee will emphasize actual cash available for distribution to ARMB.

H. Single Asset Ownership Structure (Applies to Separate Accounts Only)

Provided that the goals of these guidelines are followed, ARMB may invest in separate, specific real estate assets. However, such investments will be undertaken in a fashion structured to limit ARMB's liability to the amount of its investment.

I. Reporting System

Staff and the Real Estate Consultant will develop and implement a comprehensive and responsive reporting and monitoring system for the entire portfolio, individual investments and individual managers. The reporting and monitoring system will endeavor to identify under-performing investments, controlled portfolio diversification deficiencies and inherent conflicts of interest, thereby facilitating active portfolio management. A cash-based internal rate of return (IRR) will be used when evaluating the long-term performance of an investment. Time-weighted returns will be used to measure comparative performance.

J. Distribution of Current Income

All separate account income will be distributed immediately to ARMB or its designee and not automatically reinvested in the account.

K. Lines of Responsibility

Well defined lines of responsibility and accountability will be required of all participants in ARMB's real estate investment program. Participants are identified as:

ARMB – The fiduciaries appointed by the Governor to represent the beneficiaries' interest which shall retain final authority over all real estate investment decisions.

Staff – Investment professionals on the staff of the Department of Revenue and assigned ARMB responsibilities who will assist in the Real Estate equity investment program's design, policy implementation and administration.

Real Estate Consultant – Professionals retained to support Staff and ARMB through the provision of expert real estate strategic planning, implementation and performance monitoring support.

Separate Account Investment Managers – Qualified entities who provide institutional real estate investment management services and maintain a discretionary relationship with ARMB subject to Staff's approval of Annual Business Plans and Annual Strategic/Tactical plans, prepared by Separate Account Investment Managers, and ARMB's approval of the Annual Investment Plan.

Commingled Fund Managers – Qualified entities who provide institutional real estate investment management services through open-end and closed-end real estate pools and other pooled/commingled vehicles.

III. CONFLICTS OF INTEREST

In real estate investment, separate and distinct from other asset classes, the Manager of a Separate Account or Commingled Fund may have direct or significant control over the operations of the assets. This inherent or potential conflict of interest if openly described and regulated may contribute to the lower volatility associated with the asset class, but it also creates a need for a higher oversight standard by the plan sponsor. Staff and ARMB will maintain this oversight in at least the following ways:

A. Property Valuation

The Separate Account Investment Manager will provide ARMB with annual appraisal valuations for all properties for which it has asset management responsibility as of the quarter ending March 31. Unless otherwise directed by ARMB, the appraisal will be prepared by a qualified independent third party entity in accordance with industry standards. Staff may waive the appraisal requirement for recent acquisitions or pending dispositions following a recommendation by the Separate Account Investment Manager that such appraisal would not be a cost effective exercise. For development assets, appraisals are to be conducted in the manner described above after substantial completion

payment by ARMB is made. In addition, the Separate Account Investment Manager will mark each asset to market each quarter based on asset conditions and leasing, operations and capital market conditions for comparable properties in that market.

B. Property Management

The selection of on-site property management will generally be left to the discretion of the Separate Account Investment Manager. It is expected that the Separate Account Investment Manager will retain the highest caliber, market rate property management service either through a third party fee manager or the Separate Account Investment Manager's affiliated property management division. This business relationship will be periodically reviewed by Staff, the Real Estate Consultant and ARMB.

IV. INSURANCE COVERAGE

The Separate Account Investment Manager will obtain insurance for the physical properties and assets under its control. The coverage will be in such amounts and against such risks as, in the Separate Account Investment Manager's professional judgment, shall be in accordance with sound institutional practices applicable to such properties or assets in the specific geographic area. It is expected that such insurance will include, but not be limited to, casualty loss, including where deemed appropriate by the Separate Account Investment Manager, earthquake, flood and any other disaster-type insurance coverage; comprehensive general liability; and title insurance. Separate Account Investment Managers will provide proof of insurance to Staff annually.

V. UNRELATED BUSINESS INCOME TAX

Prior to entering into any transaction, the Manager will assess whether income generated from the property under consideration could qualify as unrelated business taxable income. If this risk exists, the Manager will provide ARMB with an opinion of counsel satisfactory to ARMB that the transaction will not generate unrelated business taxable income under the federal income tax law or any other tax provisions that could affect ARMB's tax-exempt status existing at the time. The Manager shall investigate as to whether ARMB shall be entitled to any property tax exemptions. Managers will provide letters of opinion on UBIT and property tax exemptions to Staff.

VI. ENVIRONMENTAL EVALUATIONS

As a standard procedure during the pre-acquisition analysis, the Separate Account Investment Manager will initiate a formal evaluation for each property through the selection of an environmental consultant. In carrying out the review, appropriate procedures based on standards of the locale and conditions known to exist in the locale shall be undertaken and such procedures should at a minimum include:

- Appointment of an environmental consultant with specific experience in testing and removal of asbestos and other environmental hazards.
- A site survey will be conducted to determine from the available evidence whether hazardous chemicals or environmentally dangerous materials exist or have existed on the subject property, including, at a minimum, a Phase I report.

ARMB may invest in properties, which contain asbestos and other toxic substances, only if the following conditions are met:

- The substance and potential risks are thoroughly disclosed.
- The property is not in violation of any federal, state or local law, ordinance, or regulation relating to the property's environmental condition.
- The estimated cost of the removal or containment programs will be reflected in the purchase assumptions.
- The substance can be properly contained or removed in accordance with the then current Environmental Protection Agency Standards.
- The leasing rollover pattern in the property will accommodate a removal program in the future.

Separate Account Investment Managers will provide the environmental evaluation reports to staff

VII. PROCEDURES FOR INVESTMENT

A. Delegation of Responsibilities

The real estate investment program will be implemented and monitored through the coordinated efforts of the ARMB, Staff, the Real Estate Consultant, and the qualified Manager(s). Delegation of responsibilities for each participant is described in the following sections: A summary of the delegation is attached:

1. ARMB

ARMB will retain final authority over all real estate investment strategy decisions except for Business Plan variances as set forth in the Guidelines Section VIII; approve the Guidelines, the Annual Investment Plan and any periodic revisions to these documents which ARMB deems to be appropriate and prudent for the investment of ARMB assets; retain qualified investment managers and real estate consultants; and set investment limits.

2. Staff

Staff will coordinate program compliance among all participants and communicate the investment policies, objectives and performance criteria to the Separate Account Investment Managers and monitor diversification compliance on a quarterly basis. Staff will also coordinate the receipt and distribution of capital. Staff, in cooperation with the Real Estate Consultant, will periodically review the Separate Account Investment Managers' and portfolio's performance in relation to target returns; review and approve the Separate Account Investment Manager's Annual Business Plan and Annual Strategic/Tactical Plan; review and recommend investments in commingled vehicles; prepare and recommend an Annual Investment Plan; and recommend revisions to the Real Estate Investment Policy Procedures and Guidelines. Staff will also review and approve the detailed property operating budgets prior to the start of each fiscal year and revisions to the property operating budgets in accordance with Section VIII of these Guidelines.

3. Real Estate Consultant

In cooperation with Staff and as deemed appropriate by ARMB, the Real Estate Consultant will ensure program compliance; assist in the implementation of a multiple manager program; review all program documentation and management relationships; conduct manager searches when requested; provide performance measurement analysis of the portfolio; review the Annual Investment Plan as set forth in the Investment Procedures outlined below; and provide special project research pertaining to technical real estate issues.

The Real Estate Consultant will, as requested by ARMB, provide periodic reports for the real estate program including a performance evaluation of the total portfolio to include both ARMB's commingled fund investments and ARMB's separate account investments. The analysis will include both income and capital accounting; comparison to industry performance benchmarks (such as NCREIF); Manager reviews, and effects of "Pooled Leverage" on the real estate portfolio. The Real Estate Consultant will prepare a quarterly performance analysis report which will provide after-fee realized and unrealized gains/losses; monitor and report quarterly diversification compliance and the geographic concentration limits; time weighted returns including both current quarter returns and annualized returns since portfolio inception; and internal rates of return since inception based on actual cash flow from and to ARMB.

Additional responsibilities may include developing selection criteria in manager search efforts, coordinating/conducting manager searches, conducting manager reviews, and other special projects.

4. Managers

Separate Account Investment Managers will acquire and manage real estate investments on behalf of ARMB and in accordance with the then current and approved Annual Business, Annual Strategic/Tactical Plans, and the objectives set forth in the Annual Investment Plan and the Guidelines. Managers will prepare Annual Business (including property operating budgets) and Annual Strategic/Tactical Plans for Staff review and approval.

Commingled fund investment managers will acquire and manage real estate investments on behalf of ARMB and in accordance with the terms of any and all agreements between each respective Manager and ARMB.

B. Investment Procedure

Real estate investments, in compliance with ARMB's Policies, shall be acquired through the following process:

1. Separate Accounts:

Annually, Staff will prepare an Investment Plan after reviewing the Annual Business and Strategic/Tactical Plans of the Separate Account Investment Managers. This document will recommend, as appropriate, revisions to the ARMB Guidelines, additional allocations to existing managers, and revisions to the Annual Business and Strategic/Tactical Plans of each respective Separate Account Investment Manager. Any searches that may be recommended will be outlined. The Investment Plan will then be reviewed by the consultant and submitted to ARMB for final approval. Staff

and the Real Estate Consultant shall review the Separate Account Investment Manager's Annual Business Plans and Annual Strategic/Tactical Plans for consistency with the Annual Investment Plan. Staff will approve all Plans prepared by Separate Account Investment Managers.

Investments will be made on a discretionary basis by Separate Account Investment Managers in accordance with their approved Annual Business and Strategic/Tactical Plans. Separate Account Investment Managers must provide staff with copies of their internal "Investment Committee" reports for each asset purchased on ARMB's behalf.

2. Commingled Funds:

Investments in commingled funds will be recommended by Staff and the Real Estate Consultant on an individual fund basis in accordance with the Annual Investment Plan and the ARMB Guidelines.

VIII. DELEGATION OF AUTHORITY

ARMB shall delegate authority to Staff to approve the following:

- Each Separate Account Investment Manager's detailed property operating budgets for each fiscal year;
- Annual Business Plans and Annual Tactical/Strategic Plans prepared by ARMB's Separate Account Investment Managers;
- Revised property operating budgets and variances in approved Annual Business Plans for unanticipated, significant leasing activity; and
- Line item variances in approved capital expenditure budgets in amounts up to \$300,000 with a cumulative fiscal year maximum of \$3,000,000 per Separate Account Investment Manager for other capital expenditures not related to leasing activity (such as repairs for building damage or defects).

IX. CONFIDENTIALITY

Pursuant to 15 AAC 112.770, ARMB shall withhold from other persons all information furnished to it by Manager(s) or Consultant(s) which is reasonably designated by Manager(s) or Consultant(s) as being confidential or proprietary, within the meaning of Alaska Statutes regarding rights to public information, except to the extent that the information is needed by ARMB in order to adequately report on the status and performance of the portfolio, or to comply with a court subpoena or with an official criminal investigation.

Those portions of reports provided pursuant to Part II section I (Reporting System) of these Guidelines shall be considered confidential pursuant to 15 AAC 112.770 to the extent that information is reasonably designated by Manager(s) as being confidential or proprietary, or to the extent the disclosure of which would unfairly prejudice the ability of Manager(s) or ARMB to manage, lease, market or sell such property or Assets.

X. REVISIONS

This document replaces and consolidates the policies, procedures, and guidelines as of September 29, 2016. This document is to be reviewed no less than annually and revised as appropriate.

XI. REAL ESTATE SEPARATE ACCOUNT INVESTMENT MANAGERS

The following investment managers acquire institutional-grade properties on a discretionary basis for the Alaska Retirement Management Board:

UBS Realty Investors LLC

Property type – Core/apartments, industrial, retail and office
Contact - Jeffrey G. Maguire
Managing Director
10 State House Square
Hartford, CT 06103-3604
Telephone: 860-616-9086
Fax: 860-616-9104
E-mail: jeffrey.maguire@ubs.com
Web site: www.ubs.com

Sentinel Realty Advisors Corp.

Property type – Core/apartments only
Contact – George Tietjen
Managing Director
1251 Avenue of the Americas
New York, NY 10020
Telephone: 212-408-2929
Fax: 212-603-5961
E-mail: weiner@sentinelcorp.com
Web site: www.sentinelcorp.com

LaSalle Investment Management

Property type – Core/apartments, industrial, retail and office (includes Takeover Assets)
Attn: George Duke
Managing Director
100 East Pratt Street, 20th Floor
Baltimore, MD 21202
Telephone: (410) 878-4810
Facsimile: (410) 878-4910
E-mail: George.Duke@lasalle.com
Web site: www.lasalle.com

XII. REAL ESTATE COMMINGLED ACCOUNT INVESTMENT MANAGERS

UBS Realty Investors LLC

Contact: Thomas J. Anathan,
Managing Director
10 State House Square
Hartford, CT 06103-3604
Telephone: 860-616-9128;
Facsimile: 860-616-9104
E-mail: thomas.anathan@ubs.com

J.P. Morgan Asset Management

Contact: Ann Cole, Managing Director Portfolio Manager; Kimberly Adams, Managing Director Portfolio Manager, Strategic Property Fund
270 Park Avenue, 7th Floor
New York, NY 10017
Telephone: (AC) 212-648-2152
Telephone: (KA) 312-732-6366
Facsimile: 917-464-7449
ann.e.cole@jpmorgan.com
kimberly.a.adams@jpmorgan.com

Clarion Partners

Contact: Richard Schaupp
Director
230 Park Avenue
New York, NY 10169
Telephone: 212-883-2716
Facsimile: 212-883-2806
E-mail: richard.schaupp@clarionpartners.com

Tishman Speyer Properties

Contact: Julie Lurie
45 Rockefeller Plaza, 7th Floor
New York, NY 10020
Telephone: 212-715-0329
Facsimile: 212-895-0129
E-mail: JRLurie@tishmanspeyer.com

Almanac Realty Investors, LLC

Contact: Matt Kaplan, Managing Partner
1140 Avenue of the Americas, 17th Floor New
York, NY 10036
Telephone: 212-403-3522
Facsimile: 212-403-3520
E-mail: matthew.kaplan@almanacrealty.com

ColonyCapital, LLC

Contact: Andrea Nicholas
515 S. Flower Street, 44th Floor
Los Angeles, CA 90071
Telephone: 310-552-7191
Facsimile: 310-407-7391
E-mail: ANicholas@colonyinc.com

LaSalle Investment Management *Contact:*

Steve Bolen, President
100 East Pratt Street, 20th Floor
Baltimore, MD 21202
Telephone: 410-347-0660
Facsimile: 410-347-0612 fax
E-mail: steve.bolen@lasalle.com

KKR & Co. L.P.

Contact: Dan McLaughlin, Director
555 California Street
San Francisco, CA 94101
Telephone: 415-315-6573
E-mail: dan.mclaughlin@kk.com

Silverpeak Legacy Partners

Contact: Colleen Fennerty
Managing Director
40 West 57th Street, 29th Floor
New York, NY 10019
Telephone: 212-716-2064
Facsimile: (646) 285-9271
E-mail: investorrelations@silverpeakre.com

Barings Real Estate Advisers LLC

Contact: Patrick T. Kendall, Vice President
One Financial Plaza, Suite 1700
Hartford, CT 06103
Telephone: 310-234-2525
Facsimile: 949-852-9804
E-mail: pkendall@barings.com

Coventry Real Estate Fund II, LLC

Contact: Peter Henkel
1 East 52nd Street, 4th Floor
New York, NY 10022
Telephone: 212-699-4109
Facsimile: 212-699-4124
E-mail: phenkel@coventryadvisors.com

BlackRock, Inc.

Contact: Ted Koros, Managing Director
50 California Street, Suite 300
San Francisco, CA 94111
Telephone: 415-670-6210
Facsimile: 646-521-4982
E-mail: theodore.koros@blackrock.com

Lowe Hospitality Investment Partners, LLC

Contact: Bleecker P. Seaman, Executive VP
11777 San Vicente Boulevard, Suite 900
P.O. Box 49021
Los Angeles, CA 90049-6615
Telephone: 310-571-4263
Facsimile: 310-207-1132
E-mail: bseaman@loweenterprises.com

Attachment 1

REAL ESTATE INVESTMENT POLICY and PROCEDURES - Delegation of Responsibilities Attachment					
	Frequency	Separate Account Investment Managers	Consultant	Staff	Board
Real Estate Investment Policy, Procedures, and Guidelines			R	P&R	A
Review and Revise	Annually		R	R	A
Separate Account Investment Manager Selection	Periodically		G&R	G&R	A
Request For Proposal (RFP)			P&R	P&R	A
Real Estate Consultant Selection	Tri-Annually			G&R	A
Request For Proposal (RFP)				P&R	A
Commingled Fund Selection**	Periodically		R	R	A
Real Estate Investment Plan**	Annually		R	P&R	A
Separate Account Business Plan**	Annually	P	R	R&A	
Detailed Property Operating Budget	Annually	P	R	R&A	
Separate Account Strategic/Tactical Plan**	Annually	P	R	R&A	RT
Quarterly Performance	Quarterly		P	RT	RT
Portfolio/Property Diversification Compliance	Quarterly		M	M	
Geographic Concentration Limit	Quarterly		M	RT	
A = Approves RT = Reported To G = Grade M = Monitor P = Prepares R = Recommends					
* Grade Semi-finalists only ** Investment Decision (Shaded)					

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Farmland Investment Guidelines

Resolution 2017-15

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, the Board contracts an independent consultant to provide experience and expertise in asset allocation and other investment matters to come before the Board; and

WHEREAS, the Board has established an asset allocation for the funds that considers earnings and liabilities on a current as well as a future basis; and

WHEREAS, the Board has authorized investment in farmland assets for the Public Employees' Retirement System, Teachers' Retirement System, and Judicial Retirement System, including investments for those systems in the State of Alaska Retirement and Benefit Plans Trust; and

WHEREAS, the Board establishes and from time to time as necessary, modifies investment policies, procedures and guidelines for farmland;

NOW THEREFORE BE IT RESOLVED THAT THE ALASKA RETIREMENT MANAGEMENT BOARD adopt the Farmland Investment Policies, Procedures, and Guidelines, attached hereto and made a part hereof.

This resolution repeals and replaces Resolution 2016-20.

DATED at Anchorage, Alaska this ____ day of October, 2017.

Chair

ATTEST:

Secretary

APPENDIX E

ALASKA RETIREMENT MANAGEMENT BOARD FARMLAND INVESTMENT POLICIES, PROCEDURES AND GUIDELINES

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ALASKA RETIREMENT MANAGEMENT BOARD FARMLAND INVESTMENT POLICIES, PROCEDURES AND GUIDELINES

I. INVESTMENT OBJECTIVES

A. Investments in Farmland and Other Farmland Related Assets

The Alaska Retirement Management Board (ARMB) will invest in Farmland with the goals of portfolio diversification and attaining the optimum return on the portfolio, consistent with the assumption of prudent risk and safety of principal. ARMB recognizes the need to use active investment management in order to obtain the highest attainable total investment return (measured as income plus appreciation) within ARMB's framework of prudence and managed risk.

ARMB will select Separate Account Investment Managers (**Managers**) who have the discretion to invest in Farmland, subject to ARMB's approval of an Annual Strategic/Tactical Plan and an Annual Investment Plan. In order for Farmland investments to be considered, the Manager must demonstrate that it is able to: add value through its Farmland knowledge, experience and strategy; underwrite the risks of the investment which is contemplated; and comply with the intent of the Farmland Investment Policies, Procedures and Guidelines (**Guidelines**).

Single property and multi property strategies will be considered.

B. Asset Allocation

The ARMB allocation to Farmland investments shall be determined by the Board of Trustees and reviewed annually.

Farmland Investments will be allocated 80% to row crops and 20% to permanent crops, +/- ten (10%) percent.

Allocated capital to Managers will be defined as invested capital based on ARMB's cost.

C. Portfolio Return Objective

1. Total Return

Over rolling 5 year periods, the equity Farmland investment portfolio is expected to generate a minimum total real rate of return (net of investment management fees) of 5% using a time-weighted rate of return calculation. The inflation index used to calculate the actual real rate of return is the CPI All Urban.

2. Income Return

Income, which is defined as cash distributed to ARMB, is expected to produce 4.0% returns over rolling five-year periods with a minimum of 3.0% distributed income ~~for individual properties~~ after fees and projected capital expenditures.

~~3. Minimum Going-In Yields~~

~~The investment manager's initial three-year period projection will equal or exceed 5.0% income before fees for the entire portfolio, but individual properties may have a projected current income as low as 4.0%.~~

II. PROGRAM RISK MANAGEMENT AND IMPLEMENTATION

The selection and management of assets in the Farmland portfolio of the ARMB will be guided by the principles of preserving investment capital, attaining the optimum return on the portfolio consistent with the assumption of prudent risk, generating current income, being sensitive to inflation, maintaining diversification of assets and diversification of management responsibility.

In Farmland investment, there is an inherent risk that the actual income and return of capital will vary from the amounts expected. The ARMB will manage the investment risk associated with Farmland in several ways:

A. *Institutional Quality*

All assets must be of institutional investment quality as evidenced by a precedent of institutional investment in similar properties; i.e., properties that have high percentage of Class I & II soils or other soil types appropriate for the production of the targeted commodity, adequate sources of water for irrigation (if applicable) at reasonable costs, located in well established agricultural regions.

“Eligible Properties” mean real property in which ownership in fee vests in ARMB or an ARMB Title Holding Entity. Subsurface, water or other property rights will be acquired and/or retained consistent with use of the property for Farmland, and the terms of acquisition shall include the most favorable rights and terms accorded to any other participant in any controlling or overriding master lease or utilization type agreement which might be applicable to the use of the property (for example, if the ARMB property is a portion of a larger agricultural unit). For purposes of this definition, real property includes any property treated as real property either by local law or state law or for federal income tax purposes.

Investments will be located in the United States of America. International investments are not permitted.

B. *Diversification*

The Farmland portfolio will be diversified as to crop type, property type and geographical location. Diversification reduces the impact on the portfolio of any one investment.

Diversification compliance will be monitored on a quarterly basis for compliance with ARMB's Guidelines by staff.

For purposes of calculating diversification compliance, the overall Farmland portfolio size will be considered the allocation to Farmland. Unless exceptional circumstances justify a deviation, the maximum percentage of the Farmland portfolio investment for each of the identified categories is as follows:

Controlled Investments:	100 %
<i>(ARMB can liquidate within 180 days –targeted, not guaranteed))</i>	
Non-Controlled Investments:	50%
<i>(ARMB cannot liquidate within 180 days)</i>	
Public Equity:	0 %
Public Debt:	0 %
Private Equity:	100 %
Private Debt:	0 %

Geographic:

ARMB will avoid over-concentration in areas of similar Farmland performance. The consultant will monitor ARMB's concentrations in this area. The consultant will report its conclusions regarding the acceptability of ARMB's concentration limits quarterly.

Properties Within the Same NCREIF Farmland Region	40%
Single Property Investment:*	15%
<i>(acquisition cost plus projected capital additions and improvements)</i>	
Single-Tenant/Sub-Tenant (any one firm):	15%
Crop Type (with a band of +/- 10%)	
Row Crop	80%
Permanent Crop	20%
Properties Producing the Same Commodity	30%

Exceptional circumstances justifying a deviation – When circumstances arise of a temporary nature, such as an unexpected re-valuation of assets, a transfer of assets among managers, or an event in which it would be in the fiduciary interest of the ARMB to do so, the limits set forth in paragraph II.B of ARMB Policies may be exceeded provided that ARMB concurs.

* Exception for high cost markets shall be approved annually by the ARMB through its Annual Investment Plan.

Reinvestment of allocation by the investment manager shall require approval by the Chief Investment Officer (CIO). The CIO has discretion in determining the reinvestment amount to authorize. Amounts may reflect the original allocation or may recognize some portion of any realized gains or losses.

CIO Discretionary Investment Authority – The CIO shall have the following discretionary investment authority:

- a) To increase or decrease existing separate account allocations and investments in open-end funds;
- b) To commit to new investment funds up to \$100 million for each fund; and,
- c) To engage consultants and take other action as may be necessary to ensure sufficient due diligence is performed on all investments under consideration.

The CIO shall exercise this discretion within Board approved asset allocations, investment plans, and guidelines as they may apply.

The CIO will provide prior notification to the Chair of ARMB before committing to any investments under this authority. All discretionary CIO investment actions shall be reported to the Board.

C. Implementation Approach

The ARMB will implement an investment process for Farmland which will, over time, include a minimum of two (2) qualified investment managers who have been selected on a competitive basis. The ARMB will endeavor to allocate specific funds to qualified managers on a separate account basis. Selected managers will seek Farmland investment opportunities in privately-placed equity sectors. Investments will be made on a discretionary basis subject to ARMB Staff approval of the Annual Strategic/Tactical Plans prepared by Managers and Staff's approval of the Annual Investment Plan.

All allocation of funds to a manager (including additional investment with existing accounts) and investment strategy must be recommended to Staff and be accompanied by an investment report which, at a minimum, includes the following: market information; investment alternatives; fee structure and comparison to other alternatives; demonstration of compliance with the Guidelines and the then current Annual Investment Plan; historical performance of Manager (cash-based internal rates of return and industry standard); projected returns (income and appreciation); and positive and negative attributes of the investment strategy.

On a selective basis, a member of ARMB may visit the site of a Farmland investment for the purpose of rendering a report to ARMB supplementing reports provided by Staff or others.

D. Prudent Leverage

The total amount of leverage placed on the aggregate Separate Account assets will not exceed ten percent (10%) of the total market value of the Farmland separate account portfolio. Directly-owned properties will not be leveraged by the separate account investment manager unless, with approval from the Chief Investment Officer, the property was encumbered by debt at the time of purchase and leaving the debt in place can be justified on a risk-return basis. With authorization by the ARMB, the Chief Investment Officer may place leverage on a pool of existing core Farmland assets held in ARMB's separate account portfolio in a manner consistent with the ARMB's Guidelines.

E. Lease Structure

All leases must be of institutional investment quality with a precedent of institutional investment in similar properties; Leases will be structured with fixed cash rents, or participating rents calculated as a percentage of gross income. A lease structure incorporating both fixed cash rent and participating rent is also acceptable.

F. Manager Business Plan; Annual Strategic/Tactical Plan; Disposition/Exit Strategy

A Business Plan (including property operating budgets) will be completed by each manager for each asset under its management. The Business Plan will identify the current and anticipated competitive position for each property in order to set tactical and strategic objectives and will prescribe in appropriate detail a disposition and exit strategy respecting the particular investments. Part of this process is to evaluate the potential timing of dispositions. The Annual Strategic/Tactical Plan will describe the expectation of the manager with respect to acquisitions and dispositions.

G. Fee Structure

Involvement in any venture will be done on a fee basis that is competitive. The preferred method of calculating manager fees will be based upon a formula, which considers 1) the cost basis of assets under management and 2) market value of the assets under management. All fee structures will be approved by ARMB.

H. Single Asset Ownership Structure (Applies to Separate Accounts Only)

Provided that the goals of these guidelines are followed, ARMB may invest in separate, specific Farmland assets. However, such investments will be undertaken in a fashion structured to limit ARMB's liability to the amount of its investment.

I. Reporting System

Staff will develop and implement a comprehensive and responsive reporting and monitoring system for the entire portfolio, individual investments and individual managers. The reporting and monitoring system will endeavor to identify under-performing

investments, control portfolio diversification deficiencies and inherent conflicts of interest, thereby facilitating active portfolio management. A cash-based internal rate of return (IRR) will be used when evaluating the long-term performance of an investment. Time-weighted returns will be used to measure comparative performance.

J. Distribution of Current Income

All separate account income less expenses and prudent operating reserves will be distributed to ARMB or its designee on a quarterly basis and not automatically reinvested in the Account.

K. Lines of Responsibility

Well defined lines of responsibility and accountability will be required of all participants in ARMB's Farmland investment program. Participants are identified as:

ARMB – The fiduciaries appointed by the Governor to represent the beneficiaries' interest which shall retain final authority over all Farmland investment decisions.

Staff – Investment professionals on the staff of the Department of Revenue and assigned ARMB responsibilities who will assist in the Farmland equity investment program's design, policy implementation and administration.

Separate Account Managers – Qualified entities that provide institutional Farmland investment management services and maintain a discretionary relationship with ARMB subject to Staff's approval of Annual Business Plans and Annual Strategic/Tactical plans, prepared by Managers.

III. CONFLICTS OF INTEREST

In Farmland investment, separate and distinct from other asset classes, the Manager of a Separate Account or Commingled Fund may have direct or significant control over the operations of the assets. Additionally, Managers may now or in the future maintain or manage properties and provide discretionary or non-discretionary advisory services for a number of other accounts and clients, including accounts affiliated with the Manager. These inherent or potential conflicts of interest if openly described and regulated may contribute to the lower volatility associated with the asset class, but it also creates a need for a higher oversight standard by the plan sponsor. Staff and ARMB will maintain this oversight in at least the following ways:

A. Property Valuation

The following valuation procedures shall be applied to all farmland assets managed in separate accounts for the Alaska Retirement Management Board:

- 1) All assets shall be appraised at the time of acquisition.

- 2) All assets shall be appraised annually during the quarter ending March 31 unless the property was acquired during the preceding twelve months in which case, based on a recommendation from the advisor, staff may allow an appraisal update or waive the appraisal requirement if such appraisal would not be a cost effective exercise.
- 3) All property valuations shall be reviewed internally by advisors for the quarters ending in June, September, and December. If changes in market conditions, expected cash flows, or other factors suggest a property valuation has likely changed by more than 3% to 5% the advisor shall prepare a documented internal valuation and record the resulting value in the financial statements.
- 4) Appraisals will be prepared by a qualified independent third party entity in accordance with industry standards. Appraisers shall be selected by the advisor in a manner that achieves a high quality appraisal at a reasonable cost.
- 5) Advisor shall attempt to rotate appraisers on each property every three years.

B. Property Management

The selection of on-site property management will generally be left to the discretion of the Manager. It is expected that the Manager will retain the highest caliber, market rate property management service either through a third party fee manager or the Manager's affiliated property management division. This business relationship will be periodically reviewed by Staff and ARMB.

IV. INSURANCE COVERAGE

The Manager will obtain insurance for the physical properties and assets under its control. The coverage will be in such amounts and against such risks as, in the Manager's professional judgment, shall be in accordance with sound institutional practices applicable to such properties or assets in the specific geographic area. It is expected that such insurance will include, but not be limited to, casualty loss, including where deemed appropriate by the Manager, disaster-type insurance coverage; comprehensive general liability; and title insurance.

V. UNRELATED BUSINESS INCOME TAX

The Manager will provide ARMB with an opinion of counsel satisfactory to ARMB that the standard lease or subsequent revisions to the standard lease used to lease Account Property will not generate unrelated business taxable income under the federal income tax law or any other tax provisions that could affect ARMB's tax-exempt status existing at the time. The Manager shall investigate as to whether ARMB shall be entitled to any property tax exemptions.

VI. ENVIRONMENTAL EVALUATIONS

As a standard procedure during the pre-acquisition analysis, the Manager will initiate a formal evaluation for each property through the selection of an environmental consultant. In carrying out the review, appropriate procedures based on standards of the locale and conditions known to exist in the locale shall be undertaken and such procedures should at a minimum include:

- Appointment of an environmental consultant with specific experience in testing and removal of asbestos and other environmental hazards.
- A site survey will be conducted to determine from the available evidence whether hazardous chemicals or environmentally dangerous materials exist or have existed on the subject property, including, at a minimum, a Phase I report.

ARMB may invest in properties, which contain asbestos and other toxic substances, only if the following conditions are met:

- The substance and potential risks are thoroughly disclosed.
- The property is not in violation of any federal, state or local law, ordinance, or regulation relating to the property's environmental condition.
- The estimated cost of the removal or containment programs will be reflected in the purchase assumptions.
- The substance can be properly contained or removed in accordance with the then current Environmental Protection Agency Standards.
- The leasing rollover pattern in the property will accommodate a removal program in the future.

VII. PROCEDURES FOR INVESTMENT

A. Delegation of Responsibilities

The Farmland investment program will be implemented and monitored through the coordinated efforts of the ARMB; Staff and; the qualified Manager(s). Delegation of responsibilities for each participant is described in the following sections: A summary of the delegation is attached:

1. ARMB

ARMB will retain final authority over all Farmland investment strategy decisions except for Business Plan variances as set forth in the Guidelines Section VIII; approve the Guidelines, the Annual Investment Plan and any periodic revisions to these documents which ARMB deems to be appropriate and prudent for the investment of ARMB assets; retain qualified investment managers and Farmland consultants; and set investment limits.

2. Staff

Staff will coordinate program compliance among all participants and communicate the investment policies, objectives and performance criteria to the Managers and monitor diversification compliance on a quarterly basis. Staff will also coordinate the receipt and distribution of capital. Staff will periodically review the Managers' and portfolio's performance in relation to target returns; review and approve the Manager's Annual Business Plan and Annual Strategic/Tactical Plan; review and recommend an Annual Investment Plan; and recommend revisions to the Farmland Investment Policy Procedures and Guidelines. Staff will also review and approve the detailed property operating budgets prior to the start of each fiscal year and revisions to the property operating budgets in accordance with Section VIII of these Guidelines.

3. Managers

Separate account investment managers will acquire and manage Farmland investments on behalf of ARMB and in accordance with the then current and approved Annual Business, Annual Strategic/Tactical Plans, and the objectives set forth in the Annual Investment Plan and the Guidelines. Managers will prepare Annual Business (including property operating budgets) and Annual Strategic/Tactical Plans for Staff review and approval.

B. Investment Procedure

Farmland investments, in compliance with ARMB's Policies, shall be acquired through the following process:

Separate Accounts:

Annually, Staff will prepare an Investment Plan after reviewing the Annual Business and Strategic/Tactical Plans of the separate account investment managers. This document will recommend, as appropriate, revisions to the ARMB Guidelines, additional allocations to existing managers, and revisions to the Annual Business and Strategic/Tactical Plans of each respective separate account investment manager. Staff shall review the Manager's Annual Business Plans and Annual Strategic/Tactical Plans for consistency with the Annual Investment Plan. Staff will approve all Plans prepared by the Managers.

Investments will be made on a discretionary basis by separate account investment managers in accordance with their approved Annual Business and Strategic/Tactical Plans. Investments will be approved in accordance with Managers' standard internal investment approval process, which may involve levels of authority delegated to senior officers and/or one or more investment committees. Upon the request of ARMB, separate account investment managers will provide copies of their internal Investment Committee reports for each asset purchased.

VIII. DELEGATION OF AUTHORITY

ARMB shall delegate authority to Staff to approve the following:

- Each separate account Manager's detailed property operating budgets for each fiscal year;
- Annual Business Plans and Annual Tactical/Strategic Plans prepared by ARMB's separate account Managers;
- Revised property operating budgets and variances in approved Annual Business Plans for unanticipated, significant leasing activity; and
- Line item variances in approved capital expenditure budgets in amounts up to \$500,000 with a cumulative fiscal year maximum of \$3,000,000 per Investment Manager for other capital expenditures not related to leasing activity (such as repairs for building damage or defects).

IX. CONFIDENTIALITY

Pursuant to 15 AAC 112.770, ARMB shall withhold from other persons all information furnished to it by Manager(s) or Consultant(s) which is reasonably designated by Manager(s) or Consultant(s) as being confidential or proprietary, within the meaning of Alaska Statutes regarding rights to public information, except to the extent that the information is needed by ARMB in order to adequately report on the status and performance of the portfolio, or to comply with a court subpoena or with an official criminal investigation.

Those portions of reports provided pursuant to Part II section I (Reporting System) of these Guidelines shall be considered confidential pursuant to 15 AAC 112.770 to the extent that information is reasonably designated by Manager(s) as being confidential or proprietary, or to the extent the disclosure of which would unfairly prejudice the ability of Manager(s) or ARMB to manage, lease, market or sell such property or Assets.

X. REVISIONS

This document is to be reviewed no less than annually and revised as appropriate.

XI. FARMLAND SEPARATE ACCOUNT INVESTMENT MANAGERS

The following investment managers will acquire institutional-grade farmland properties on a discretionary basis for the Alaska Retirement Management Board:

Hancock Agricultural Investment Group Oliver Williams 197 Clarendon Street C-08-99 Boston, MA 02116-5010 <i>Telephone:</i> 617-747-1645 <i>Fax:</i> 617-747-8645 <i>E-mail:</i> owilliams@hnrq.com <i>Web site:</i> www.haig.jhancock.com	UBS ~~AgriVest~~ <u>Farmland Investors</u> LLC James B. McCandless 10 State House Square, 15th Floor Hartford, CT 06103-3604 <i>Telephone:</i> 860-616-9200 <i>Fax:</i> 860-616-9204 <i>E-mail:</i> james.mccandless@ubs.com <i>Web site:</i> www.ubs.com

Attachment 1

FARMLAND INVESTMENT POLICIES, PROCEDURES AND GUIDELINES - Delegation of Responsibilities "Attachment 1"					
	Frequency	Separate Account Investment Managers	Consultant	Staff	Board
Farmland Investment Policies Procedures and Guidelines Review and Revise	Annually			P, R	A
Separate Account Investment Manager Selection Request for Proposals (RFP)	Periodically		P, G, R	P, G, R	A
Farmland Investment Plan	Annually			P, R	A
Separate Account Business Plan and Strategic/Tactical Plan	Annually	P, R		A	
Quarterly Performance	Quarterly		P		
Portfolio/Property Diversification Compliance	Quarterly	P		M	
Geographic Concentration Limit	Quarterly	P		M	
A = Approve G = Grade P = Prepare	R = Recommend M = Monitor				

APPENDIX E

ALASKA RETIREMENT MANAGEMENT BOARD FARMLAND INVESTMENT POLICIES, PROCEDURES AND GUIDELINES

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ALASKA RETIREMENT MANAGEMENT BOARD FARMLAND INVESTMENT POLICIES, PROCEDURES AND GUIDELINES

I. INVESTMENT OBJECTIVES

A. Investments in Farmland and Other Farmland Related Assets

The Alaska Retirement Management Board (ARMB) will invest in Farmland with the goals of portfolio diversification and attaining the optimum return on the portfolio, consistent with the assumption of prudent risk and safety of principal. ARMB recognizes the need to use active investment management in order to obtain the highest attainable total investment return (measured as income plus appreciation) within ARMB's framework of prudence and managed risk.

ARMB will select Separate Account Investment Managers (**Managers**) who have the discretion to invest in Farmland, subject to ARMB's approval of an Annual Strategic/Tactical Plan and an Annual Investment Plan. In order for Farmland investments to be considered, the Manager must demonstrate that it is able to: add value through its Farmland knowledge, experience and strategy; underwrite the risks of the investment which is contemplated; and comply with the intent of the Farmland Investment Policies, Procedures and Guidelines (**Guidelines**).

Single property and multi property strategies will be considered.

B. Asset Allocation

The ARMB allocation to Farmland investments shall be determined by the Board of Trustees and reviewed annually.

Farmland Investments will be allocated 80% to row crops and 20% to permanent crops, +/- ten (10%) percent.

Allocated capital to Managers will be defined as invested capital based on ARMB's cost.

C. Portfolio Return Objective

1. Total Return

Over rolling 5 year periods, the equity Farmland investment portfolio is expected to generate a minimum total real rate of return (net of investment management fees) of 5% using a time-weighted rate of return calculation. The inflation index used to calculate the actual real rate of return is the CPI All Urban.

2. Income Return

Income, which is defined as cash distributed to ARMB, is expected to produce 4.0% returns over rolling five-year periods with a minimum of 3.0% distributed income after fees and projected capital expenditures.

II. PROGRAM RISK MANAGEMENT AND IMPLEMENTATION

The selection and management of assets in the Farmland portfolio of the ARMB will be guided by the principles of preserving investment capital, attaining the optimum return on the portfolio consistent with the assumption of prudent risk, generating current income, being sensitive to inflation, maintaining diversification of assets and diversification of management responsibility.

In Farmland investment, there is an inherent risk that the actual income and return of capital will vary from the amounts expected. The ARMB will manage the investment risk associated with Farmland in several ways:

A. Institutional Quality

All assets must be of institutional investment quality as evidenced by a precedent of institutional investment in similar properties; i.e., properties that have high percentage of Class I & II soils or other soil types appropriate for the production of the targeted commodity, adequate sources of water for irrigation (if applicable) at reasonable costs, located in well established agricultural regions.

“Eligible Properties” mean real property in which ownership in fee vests in ARMB or an ARMB Title Holding Entity. Subsurface, water or other property rights will be acquired and/or retained consistent with use of the property for Farmland, and the terms of acquisition shall include the most favorable rights and terms accorded to any other participant in any controlling or overriding master lease or utilization type agreement which might be applicable to the use of the property (for example, if the ARMB property is a portion of a larger agricultural unit). For purposes of this definition, real property includes any property treated as real property either by local law or state law or for federal income tax purposes.

Investments will be located in the United States of America. International investments are not permitted.

B. Diversification

The Farmland portfolio will be diversified as to crop type, property type and geographical location. Diversification reduces the impact on the portfolio of any one investment. Diversification compliance will be monitored on a quarterly basis for compliance with ARMB’s Guidelines by staff.

For purposes of calculating diversification compliance, the overall Farmland portfolio size will be considered the allocation to Farmland. Unless exceptional circumstances justify a deviation, the maximum percentage of the Farmland portfolio investment for each of the identified categories is as follows:

Controlled Investments:	100 %
<i>(ARMB can liquidate within 180 days –targeted, not guaranteed))</i>	
Non-Controlled Investments:	50%
<i>(ARMB cannot liquidate within 180 days)</i>	
Public Equity:	0 %
Public Debt:	0 %
Private Equity:	100 %
Private Debt:	0 %

Geographic:

ARMB will avoid over-concentration in areas of similar Farmland performance. The consultant will monitor ARMB's concentrations in this area. The consultant will report its conclusions regarding the acceptability of ARMB's concentration limits quarterly.

Properties Within the Same NCREIF Farmland Region	40%
Single Property Investment:*	15%
<i>(acquisition cost plus projected capital additions and improvements)</i>	
Single-Tenant/Sub-Tenant (any one firm):	15%
Crop Type (with a band of +/- 10%)	
Row Crop	80%
Permanent Crop	20%
Properties Producing the Same Commodity	30%

Exceptional circumstances justifying a deviation – When circumstances arise of a temporary nature, such as an unexpected re-valuation of assets, a transfer of assets among managers, or an event in which it would be in the fiduciary interest of the ARMB to do so, the limits set forth in paragraph II.B of ARMB Policies may be exceeded provided that ARMB concurs.

* Exception for high cost markets shall be approved annually by the ARMB through its Annual Investment Plan.

Reinvestment of allocation by the investment manager shall require approval by the Chief Investment Officer (CIO). The CIO has discretion in determining the reinvestment amount to authorize. Amounts may reflect the original allocation or may recognize some portion of any realized gains or losses.

CIO Discretionary Investment Authority – The CIO shall have the following discretionary investment authority:

- a) To increase or decrease existing separate account allocations and investments in open-end funds;
- b) To commit to new investment funds up to \$100 million for each fund; and,
- c) To engage consultants and take other action as may be necessary to ensure sufficient due diligence is performed on all investments under consideration.

The CIO shall exercise this discretion within Board approved asset allocations, investment plans, and guidelines as they may apply.

The CIO will provide prior notification to the Chair of ARMB before committing to any investments under this authority. All discretionary CIO investment actions shall be reported to the Board.

C. Implementation Approach

The ARMB will implement an investment process for Farmland which will, over time, include a minimum of two (2) qualified investment managers who have been selected on a competitive basis. The ARMB will endeavor to allocate specific funds to qualified managers on a separate account basis. Selected managers will seek Farmland investment opportunities in privately-placed equity sectors. Investments will be made on a discretionary basis subject to ARMB Staff approval of the Annual Strategic/Tactical Plans prepared by Managers and Staff's approval of the Annual Investment Plan.

All allocation of funds to a manager (including additional investment with existing accounts) and investment strategy must be recommended to Staff and be accompanied by an investment report which, at a minimum, includes the following: market information; investment alternatives; fee structure and comparison to other alternatives; demonstration of compliance with the Guidelines and the then current Annual Investment Plan; historical performance of Manager (cash-based internal rates of return and industry standard); projected returns (income and appreciation); and positive and negative attributes of the investment strategy.

On a selective basis, a member of ARMB may visit the site of a Farmland investment for the purpose of rendering a report to ARMB supplementing reports provided by Staff or others.

D. Prudent Leverage

The total amount of leverage placed on the aggregate Separate Account assets will not exceed ten percent (10%) of the total market value of the Farmland separate account portfolio. Directly-owned properties will not be leveraged by the separate account investment manager unless, with approval from the Chief Investment Officer, the property was encumbered by debt at the time of purchase and leaving the debt in place can be

justified on a risk-return basis. With authorization by the ARMB, the Chief Investment Officer may place leverage on a pool of existing core Farmland assets held in ARMB's separate account portfolio in a manner consistent with the ARMB's Guidelines.

E. Lease Structure

All leases must be of institutional investment quality with a precedent of institutional investment in similar properties; Leases will be structured with fixed cash rents, or participating rents calculated as a percentage of gross income. A lease structure incorporating both fixed cash rent and participating rent is also acceptable.

F. Manager Business Plan; Annual Strategic/Tactical Plan; Disposition/Exit Strategy

A Business Plan (including property operating budgets) will be completed by each manager for each asset under its management. The Business Plan will identify the current and anticipated competitive position for each property in order to set tactical and strategic objectives and will prescribe in appropriate detail a disposition and exit strategy respecting the particular investments. Part of this process is to evaluate the potential timing of dispositions. The Annual Strategic/Tactical Plan will describe the expectation of the manager with respect to acquisitions and dispositions.

G. Fee Structure

Involvement in any venture will be done on a fee basis that is competitive. The preferred method of calculating manager fees will be based upon a formula, which considers 1) the cost basis of assets under management and 2) market value of the assets under management. All fee structures will be approved by ARMB.

H. Single Asset Ownership Structure (Applies to Separate Accounts Only)

Provided that the goals of these guidelines are followed, ARMB may invest in separate, specific Farmland assets. However, such investments will be undertaken in a fashion structured to limit ARMB's liability to the amount of its investment.

I. Reporting System

Staff will develop and implement a comprehensive and responsive reporting and monitoring system for the entire portfolio, individual investments and individual managers. The reporting and monitoring system will endeavor to identify under-performing investments, control portfolio diversification deficiencies and inherent conflicts of interest, thereby facilitating active portfolio management. A cash-based internal rate of return (IRR) will be used when evaluating the long-term performance of an investment. Time-weighted returns will be used to measure comparative performance.

J. Distribution of Current Income

All separate account income less expenses and prudent operating reserves will be distributed to ARMB or its designee on a quarterly basis and not automatically reinvested in the Account.

K. Lines of Responsibility

Well defined lines of responsibility and accountability will be required of all participants in ARMB's Farmland investment program. Participants are identified as:

ARMB – The fiduciaries appointed by the Governor to represent the beneficiaries' interest which shall retain final authority over all Farmland investment decisions.

Staff – Investment professionals on the staff of the Department of Revenue and assigned ARMB responsibilities who will assist in the Farmland equity investment program's design, policy implementation and administration.

Separate Account Managers – Qualified entities that provide institutional Farmland investment management services and maintain a discretionary relationship with ARMB subject to Staff's approval of Annual Business Plans and Annual Strategic/Tactical plans, prepared by Managers.

III. CONFLICTS OF INTEREST

In Farmland investment, separate and distinct from other asset classes, the Manager of a Separate Account or Commingled Fund may have direct or significant control over the operations of the assets. Additionally, Managers may now or in the future maintain or manage properties and provide discretionary or non-discretionary advisory services for a number of other accounts and clients, including accounts affiliated with the Manager. These inherent or potential conflicts of interest if openly described and regulated may contribute to the lower volatility associated with the asset class, but it also creates a need for a higher oversight standard by the plan sponsor. Staff and ARMB will maintain this oversight in at least the following ways:

A. Property Valuation

The following valuation procedures shall be applied to all farmland assets managed in separate accounts for the Alaska Retirement Management Board:

- 1) All assets shall be appraised at the time of acquisition.
- 2) All assets shall be appraised annually during the quarter ending March 31 unless the property was acquired during the preceding twelve months in which case, based on a recommendation from the advisor, staff may allow an appraisal update or waive the appraisal requirement if such appraisal would not be a cost effective exercise.

- 3) All property valuations shall be reviewed internally by advisors for the quarters ending in June, September, and December. If changes in market conditions, expected cash flows, or other factors suggest a property valuation has likely changed by more than 3% to 5% the advisor shall prepare a documented internal valuation and record the resulting value in the financial statements.
- 4) Appraisals will be prepared by a qualified independent third party entity in accordance with industry standards. Appraisers shall be selected by the advisor in a manner that achieves a high quality appraisal at a reasonable cost.
- 5) Advisor shall attempt to rotate appraisers on each property every three years.

B. Property Management

The selection of on-site property management will generally be left to the discretion of the Manager. It is expected that the Manager will retain the highest caliber, market rate property management service either through a third party fee manager or the Manager's affiliated property management division. This business relationship will be periodically reviewed by Staff and ARMB.

IV. INSURANCE COVERAGE

The Manager will obtain insurance for the physical properties and assets under its control. The coverage will be in such amounts and against such risks as, in the Manager's professional judgment, shall be in accordance with sound institutional practices applicable to such properties or assets in the specific geographic area. It is expected that such insurance will include, but not be limited to, casualty loss, including where deemed appropriate by the Manager, disaster-type insurance coverage; comprehensive general liability; and title insurance.

V. UNRELATED BUSINESS INCOME TAX

The Manager will provide ARMB with an opinion of counsel satisfactory to ARMB that the standard lease or subsequent revisions to the standard lease used to lease Account Property will not generate unrelated business taxable income under the federal income tax law or any other tax provisions that could affect ARMB's tax-exempt status existing at the time. The Manager shall investigate as to whether ARMB shall be entitled to any property tax exemptions.

VI. ENVIRONMENTAL EVALUATIONS

As a standard procedure during the pre-acquisition analysis, the Manager will initiate a formal evaluation for each property through the selection of an environmental consultant. In carrying out the review, appropriate procedures based on standards of the locale and conditions known to exist in the locale shall be undertaken and such procedures should at a minimum include:

- Appointment of an environmental consultant with specific experience in testing and removal of asbestos and other environmental hazards.
- A site survey will be conducted to determine from the available evidence whether hazardous chemicals or environmentally dangerous materials exist or have existed on the subject property, including, at a minimum, a Phase I report.

ARMB may invest in properties, which contain asbestos and other toxic substances, only if the following conditions are met:

- The substance and potential risks are thoroughly disclosed.
- The property is not in violation of any federal, state or local law, ordinance, or regulation relating to the property's environmental condition.
- The estimated cost of the removal or containment programs will be reflected in the purchase assumptions.
- The substance can be properly contained or removed in accordance with the then current Environmental Protection Agency Standards.
- The leasing rollover pattern in the property will accommodate a removal program in the future.

VII. PROCEDURES FOR INVESTMENT

A. Delegation of Responsibilities

The Farmland investment program will be implemented and monitored through the coordinated efforts of the ARMB; Staff and; the qualified Manager(s). Delegation of responsibilities for each participant is described in the following sections: A summary of the delegation is attached:

1. ARMB

ARMB will retain final authority over all Farmland investment strategy decisions except for Business Plan variances as set forth in the Guidelines Section VIII; approve the Guidelines, the Annual Investment Plan and any periodic revisions to these documents which ARMB deems to be appropriate and prudent for the investment of ARMB assets; retain qualified investment managers and Farmland consultants; and set investment limits.

2. Staff

Staff will coordinate program compliance among all participants and communicate the investment policies, objectives and performance criteria to the Managers and monitor diversification compliance on a quarterly basis. Staff will also coordinate the receipt and distribution of capital. Staff will periodically review the Managers' and portfolio's performance in relation to target returns; review and approve the Manager's Annual

Business Plan and Annual Strategic/Tactical Plan; review and recommend an Annual Investment Plan; and recommend revisions to the Farmland Investment Policy Procedures and Guidelines. Staff will also review and approve the detailed property operating budgets prior to the start of each fiscal year and revisions to the property operating budgets in accordance with Section VIII of these Guidelines.

3. Managers

Separate account investment managers will acquire and manage Farmland investments on behalf of ARMB and in accordance with the then current and approved Annual Business, Annual Strategic/Tactical Plans, and the objectives set forth in the Annual Investment Plan and the Guidelines. Managers will prepare Annual Business (including property operating budgets) and Annual Strategic/Tactical Plans for Staff review and approval.

B. Investment Procedure

Farmland investments, in compliance with ARMB's Policies, shall be acquired through the following process:

Separate Accounts:

Annually, Staff will prepare an Investment Plan after reviewing the Annual Business and Strategic/Tactical Plans of the separate account investment managers. This document will recommend, as appropriate, revisions to the ARMB Guidelines, additional allocations to existing managers, and revisions to the Annual Business and Strategic/Tactical Plans of each respective separate account investment manager. Staff shall review the Manager's Annual Business Plans and Annual Strategic/Tactical Plans for consistency with the Annual Investment Plan. Staff will approve all Plans prepared by the Managers.

Investments will be made on a discretionary basis by separate account investment managers in accordance with their approved Annual Business and Strategic/Tactical Plans. Investments will be approved in accordance with Managers' standard internal investment approval process, which may involve levels of authority delegated to senior officers and/or one or more investment committees. Upon the request of ARMB, separate account investment managers will provide copies of their internal Investment Committee reports for each asset purchased.

VIII. DELEGATION OF AUTHORITY

ARMB shall delegate authority to Staff to approve the following:

- Each separate account Manager's detailed property operating budgets for each fiscal year;
- Annual Business Plans and Annual Tactical/Strategic Plans prepared by ARMB's separate account Managers;
- Revised property operating budgets and variances in approved Annual Business Plans for unanticipated, significant leasing activity; and

- Line item variances in approved capital expenditure budgets in amounts up to \$500,000 with a cumulative fiscal year maximum of \$3,000,000 per Investment Manager for other capital expenditures not related to leasing activity (such as repairs for building damage or defects).

IX. CONFIDENTIALITY

Pursuant to 15 AAC 112.770, ARMB shall withhold from other persons all information furnished to it by Manager(s) or Consultant(s) which is reasonably designated by Manager(s) or Consultant(s) as being confidential or proprietary, within the meaning of Alaska Statutes regarding rights to public information, except to the extent that the information is needed by ARMB in order to adequately report on the status and performance of the portfolio, or to comply with a court subpoena or with an official criminal investigation.

Those portions of reports provided pursuant to Part II section I (Reporting System) of these Guidelines shall be considered confidential pursuant to 15 AAC 112.770 to the extent that information is reasonably designated by Manager(s) as being confidential or proprietary, or to the extent the disclosure of which would unfairly prejudice the ability of Manager(s) or ARMB to manage, lease, market or sell such property or Assets.

X. REVISIONS

This document is to be reviewed no less than annually and revised as appropriate.

XI. FARMLAND SEPARATE ACCOUNT INVESTMENT MANAGERS

The following investment managers will acquire institutional-grade farmland properties on a discretionary basis for the Alaska Retirement Management Board:

Hancock Agricultural Investment Group Oliver Williams 197 Clarendon Street C-08-99 Boston, MA 02116-5010 <i>Telephone:</i> 617-747-1645 <i>Fax:</i> 617-747-8645 <i>E-mail:</i> owilliams@hnrg.com <i>Web site:</i> www.haig.jhancock.com	UBS Farmland Investors LLC James B. McCandless 10 State House Square, 15th Floor Hartford, CT 06103-3604 <i>Telephone:</i> 860-616-9200 <i>Fax:</i> 860-616-9204 <i>E-mail:</i> james.mccandless@ubs.com <i>Web site:</i> www.ubs.com

Attachment 1

FARMLAND INVESTMENT POLICIES, PROCEDURES AND GUIDELINES - Delegation of Responsibilities "Attachment 1"					
	Frequency	Separate Account Investment Managers	Consultant	Staff	Board
Farmland Investment Policies Procedures and Guidelines Review and Revise	Annually			P, R	A
Separate Account Investment Manager Selection Request for Proposals (RFP)	Periodically		P, G, R	P, G, R	A
Farmland Investment Plan	Annually			P, R	A
Separate Account Business Plan and Strategic/Tactical Plan	Annually	P, R		A	
Quarterly Performance	Quarterly		P		
Portfolio/Property Diversification Compliance	Quarterly	P		M	
Geographic Concentration Limit	Quarterly	P		M	
A = Approve G = Grade P = Prepare	R = Recommend M = Monitor				

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Timberland Investment Guidelines

Resolution 2017-16

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, the Board contracts an independent consultant to provide experience and expertise in asset allocation and other investment matters to come before the Board; and

WHEREAS, the Board has established an asset allocation for the funds that considers earnings and liabilities on a current as well as a future basis; and

WHEREAS, the Board has authorized investment in timberland assets for the Public Employees' Retirement System, Teachers' Retirement System, and Judicial Retirement System, including investments for those systems in the State of Alaska Retirement and Benefit Plans Trust; and

WHEREAS, the Board establishes and from time to time as necessary, modifies investment policies, procedures and guidelines for timberland;

NOW THEREFORE BE IT RESOLVED THAT THE ALASKA RETIREMENT MANAGEMENT BOARD adopt the Timberland Investment Guidelines, attached hereto and made a part hereof.

This resolution repeals and replaces Resolution 2016-21.

DATED at Anchorage, Alaska this ____ day of October, 2017.

Chair

ATTEST:

Secretary

Timberland

ARMB Investment Guidelines

Section 1. Investment Objective

To develop a diversified portfolio of Timberland Investments with a focus on total return which will seek to produce a minimum 5% net real total rate ~~or~~of return over rolling five-year periods. Portfolio risk shall reflect, in each ARMB Timberland Advisor's (as defined in Section 2 below) judgment, the lowest expected risk profile required to achieve the return objectives. Each ARMB Timberland Advisor will place an emphasis on the preservation of capital and diversify the Timberland Investments to minimize risk. To the extent return objectives can be met, current income shall be given preference over appreciation.

Section 2. ARMB Timberland Advisor Selection

ARMB will select qualified investment managers who have the discretion to invest in Timberland ("ARMB Timberland Advisors). In order for entities to be considered, the entity must demonstrate that it is able to add value through its Timberland knowledge, experience and strategy; evaluate the risks of each Timberland Investment which is contemplated; and, comply with these ARMB Timberland Investment Guidelines (the "ARMB Investment Guidelines").

ARMB will implement an investment process for Timberland which will, over time, include a minimum of two (2) qualified ARMB Timberland Advisors who have been selected on a competitive basis. Each ARMB Timberland Advisor will provide services according to an agreed upon investment management agreement (contract) and the ARMB Investment Guidelines. ARMB will endeavor to allocate specific funds to each ARMB Timberland Advisor on a separate account basis (each a "Separate Account"). ARMB Timberland Advisors will invest funds on a discretionary basis in Timberland Investment opportunities to the extent of its specific allocation and Separate Account.

Compensation for investment management services will be done on a fee basis that is competitive. The preferred method of calculating ARMB Timberland Advisor fees will be based upon a formula, which considers 1) the cost basis of assets under management and 2) market value of the assets under management.

Section 3. Allocation

ARMB's allocation to Timberland Investments shall be determined by the Board of Trustees and reviewed annually.

Reinvestment of allocation by the investment manager shall require approval by the Chief Investment Officer (CIO). The CIO has discretion in determining the reinvestment amount to authorize. Amounts may reflect the original allocation or may recognize some portion of any realized gains or losses.

CIO Discretionary Investment Authority – The CIO shall have the following discretionary investment authority:

- a) To increase or decrease existing separate account allocations and investments in open-end funds;
- b) To commit to new investment funds up to \$100 million for each fund; and,
- c) To engage consultants and take other action as may be necessary to ensure sufficient due diligence is performed on all investments under consideration.

The CIO shall exercise this discretion within Board approved asset allocations, investment plans, and guidelines as they may apply.

The CIO will provide prior notification to the Chair of ARMB before committing to any investments under this authority. All discretionary CIO investment actions shall be reported to the Board.

Section 4. Advisor Performance Benchmark

NCREIF Timberland Index

Section 5. Investment Constraints

(a) Each property underlying a Timberland Investment will be commercial timberland in accordance with the standards and customs of the region in which the property is located. Although commercial attributes vary significantly across regions and among forest types, generally, properties will be characterized by adequate timber stocking, sufficient productivity, established timber markets, and ready access.

(b) Location: Timberland Investments will be located inside the United States of America.

(c) Diversification and Concentration: Each ARMB Timberland Advisor will undertake to ensure that the Timberland Investments under its control are adequately diversified. While each ARMB Timberland Advisor will seek to invest across the primary timberland regions of the United States as defined by the National Council of Real Estate Investment Fiduciaries (NCREIF) Timberland Index, geographic diversification will ultimately depend on the availability of attractive investment opportunities, as well as potential diversification by species, age classes of trees and suitability for a variety of end products.

(d) Leverage: The total amount of leverage placed on the aggregate Separate Accounts allocated to all ARMB Timberland Advisors for investment will not exceed ten percent (10%) of the total market value of all such Timberland Investments at the time such leverage is incurred. The purchase or refinance of Timberland Investments with debt and borrowing against Timberland Investments shall be permitted only with the prior consent of ARMB's Chief Investment Officer. The Advisor will not cause the Account to incur indebtedness without ARMB's prior consent.

(e) Allocation: Each ARMB Timberland Advisor may exceed its Separate Account Allocation by up to 5% for the purposes of capital expenditures on existing assets and/or the completion of an acquisition.

(f) Non-Routine Activity: Each ARMB Timberland Advisor will seek the prior approval of ARMB's Chief Investment Officer before entering into any arrangements which provide ancillary income activity from the Timberland which are not routinely associated with Timberland Investments. Examples include mining, wind farms, and utility infrastructure.

Section 6. ARMB Timberland Advisor Annual Portfolio Review

Annually, each ARMB Timberland Advisor will submit an annual portfolio review to ARMB staff ("Staff") which shall include an annual business plan addressing each Timberland Investment in the portfolio in its Separate Account and an annual portfolio level strategic plan. The objective of this effort is to facilitate Staff's monitoring of the Timberland Investments to ensure existing investments and future strategy are consistent with ARMB's objectives and to recognize any program changes, which may require ARMB approval, to facilitate the efficient operation of the investment program. Each ARMB Timberland Advisor will collaborate with Staff to identify the specific content of the business plan and strategic plan for the Timberland Investments in its Separate Account, but should consider the following:

Annual business plans will focus on past performance and future performance expectations for existing assets in the portfolio. Information should include performance analysis, hold/sell analysis, and investment budgets including explanations for future capital budget items.

Annual portfolio level strategic plans will focus on overall portfolio and market performance, portfolio diversification, market conditions, and strategy for acquisitions and disposition for the upcoming year. The strategic plan should also include any recommendations to improve the ARMB Investment Guidelines and/or ARMB's Timberland investment strategy.

Section 7. Ownership Structure

Timberland Investments will be owned in a structure designed to limit ARMB's liability to the amount of its capital commitment to such Timberland Investment and, where feasible, to recognize and preserve tax-exempt status.

Section 8. Reporting System

Staff will develop and implement a comprehensive and responsive reporting and monitoring system for all Timberland Investments and each ARMB Timberland Advisor. In order to facilitate active portfolio management, Staff will develop a reporting and monitoring system which will endeavor to identify under-performing investments, control portfolio diversification deficiencies and manage inherent conflicts of interest. A cash-based internal rate of return (IRR) will be used when evaluating the long-term performance of a Timberland Investment. Time-weighted returns will be used to measure comparative performance.

Section 9. Lines of Responsibility

The Timberland investment program will be implemented and monitored through the coordinated efforts of the ARMB, Staff, and the ARMB Timberland Advisors. A description of the program participants and their general responsibilities are as follows:

ARMB – The statutorily created board which is the fiduciary for the retirement trust funds, comprised of trustees appointed by the Governor to represent the beneficiaries' interest. ARMB hires qualified ARMB Timberland Advisors and consultants; approves the ARMB Investment Guidelines and revisions to them; and approves the Annual Investment Plan prepared by Staff.

Staff - Investment professionals on staff at the Department of Revenue assigned to ARMB Timberland Investments, who will assist in the Timberland investment program's design, policy implementation, and administration. Staff coordinates program and guidelines compliance among all participants and communicates the investment policies, objectives, and performance criteria to the ARMB Timberland Advisors; monitors diversification compliance on a quarterly basis; and coordinates the receipt and distribution of capital. Staff will review and approve each ARMB Timberland Advisor's annual business plan, including revisions to the investment budgets in accordance with Section 13 hereof, and annual portfolio level strategic plan. Staff will recommend, to ARMB, revisions to the Timberland Investment Guidelines as may be necessary from time to time.

Annually, Staff will prepare an Annual Investment Plan after reviewing the annual business and annual portfolio level strategic plan prepared by the ARMB Timberland Advisors. This document will recommend, as appropriate, revisions to the overall Timberland Investment strategy, revisions to the Timberland Investment Guidelines, and make recommendations for additional allocations to the ARMB Timberland Advisors as may be desirable.

ARMB Timberland Advisors – Qualified entities selected by ARMB that provide institutional Timberland investment management services to ARMB. ARMB Timberland Advisors will invest and manage the Timberland Investment portfolios in accordance with their contracts.

Section 10. Property Management

The selection of on-site property management will generally be left to the discretion of the applicable ARMB Timberland Advisor. It is expected the ARMB Timberland Advisor will retain the highly qualified, market rate property management service either through a third party fee manager or the ARMB Timberland Advisor's affiliated property management division. This business relationship will be periodically reviewed by Staff and ARMB.

Section 11. Insurance Coverage

Each ARMB Timberland Advisor shall obtain insurance coverage with respect to the Timberland and the Timberland Investments in such amounts and against such risks as, in such ARMB

Timberland Advisor's professional judgment, are in accordance with sound institutional practices applicable to Timberland Investments.

Section 12. Environmental Evaluations

As part of the pre-acquisition analysis for all prospective new Timberland Investments, each ARMB Timberland Advisor shall conduct a Phase 1 Environmental Site Assessment to identify the presence or likely presence of hazardous substances or petroleum products under conditions that indicate an imminent, existing or past release, or a material threat of a release into structures, or into the ground, groundwater or surface water.

Section 13. Delegation of Authority

ARMB shall delegate authority to Staff to approve the following:

- Annual business plans and annual portfolio strategic plans prepared by the ARMB Timberland Advisors;
- Revised investment budgets and variances in approved annual business plans for unanticipated activity; and
- Line item variances in approved capital expenditure budgets in amounts up to \$500,000 with a cumulative fiscal year maximum of \$3,000,000 per Advisor.

Section 14. Confidentiality

Pursuant to 15 AAC 112.770, ARMB shall withhold from other persons all information furnished to it by ARMB Timberland Advisor(s) or consultant(s) which is reasonably designated by ARMB Timberland Advisor(s) or consultant(s) as being confidential or proprietary, within the meaning of Alaska Statutes regarding rights to public information, except to the extent that the information is needed by ARMB in order to adequately report on the status and performance of the portfolio, or to comply with a court subpoena or with an official criminal investigation.

Those portions of reports provided pursuant to the Agreement with ARMB Timberland Advisor(s) shall be considered confidential pursuant to 15 AAC 112.770 to the extent that information is reasonably designated by ARMB Timberland Advisor(s) as being confidential or proprietary, or to the extent the disclosure of which would unfairly prejudice the ability of ARMB Timberland Advisor(s) or ARMB to manage, lease, market or sell such property or Assets.

Section 15. Unrelated Business Income Tax

Each ARMB Timberland Advisor will manage its respective Separate Account with a view toward minimizing the recognition of unrelated business taxable income (“UBTI”) to the extent consistent with the Investment Objective set forth in Section 1 above. Each ARMB Timberland Advisor will consult with ARMB prior to entering into any transaction that could reasonably be expected to result in the recognition of significant amounts of UBTI.

Section 16. Revisions

The ARMB Investment Guidelines are to be reviewed no less than annually and revised as appropriate.

Section 17. ARMB Timberland Advisors

The following entities have been selected and appointed as ARMB Timberland Advisors to acquire Timberland properties on a discretionary basis for the Alaska Retirement Management Board:

Hancock Timber Resource Group 197 Clarendon Street C-08-99 Boston, MA 02116-5010 Telephone: 617-747-1600 Fax: 617-747-1516 www.hancocktimber.com	Timberland Investment Resources, LLC 115 Perimeter Center Place, Suite 940 Atlanta, GA 30346 Telephone: 404-848-2000 Fax: 404-848-2006 www.tirlc.com

Section 18. Definitions

(a) “Timber” means trees growing on Timberland, or trees which have been cut but not removed from Timberland.

(b) “Timberland” means real property which is to be planted with Timber or real property on which Timber is growing.

(c) “Timberland Investment” means, in general, all interests (including fee ownership, leasehold interests or management rights) in Timberland; timber deeds, timber cutting contracts and other rights, contracts or agreements relating to the ownership, cutting and/or use of Timber; options to acquire or sell Timber or Timberland or interests therein; mineral rights (including oil and gas rights), biomass or carbon credits attendant to the ownership of Timberland; and personal property, both tangible and intangible, directly associated or connected with the use of Timberland.

Timberland

ARMB Investment Guidelines

Section 1. Investment Objective

To develop a diversified portfolio of Timberland Investments with a focus on total return which will seek to produce a minimum 5% net real total rate of return over rolling five-year periods. Portfolio risk shall reflect, in each ARMB Timberland Advisor's (as defined in Section 2 below) judgment, the lowest expected risk profile required to achieve the return objectives. Each ARMB Timberland Advisor will place an emphasis on the preservation of capital and diversify the Timberland Investments to minimize risk. To the extent return objectives can be met, current income shall be given preference over appreciation.

Section 2. ARMB Timberland Advisor Selection

ARMB will select qualified investment managers who have the discretion to invest in Timberland ("ARMB Timberland Advisors). In order for entities to be considered, the entity must demonstrate that it is able to add value through its Timberland knowledge, experience and strategy; evaluate the risks of each Timberland Investment which is contemplated; and, comply with these ARMB Timberland Investment Guidelines (the "ARMB Investment Guidelines").

ARMB will implement an investment process for Timberland which will, over time, include a minimum of two (2) qualified ARMB Timberland Advisors who have been selected on a competitive basis. Each ARMB Timberland Advisor will provide services according to an agreed upon investment management agreement (contract) and the ARMB Investment Guidelines. ARMB will endeavor to allocate specific funds to each ARMB Timberland Advisor on a separate account basis (each a "Separate Account"). ARMB Timberland Advisors will invest funds on a discretionary basis in Timberland Investment opportunities to the extent of its specific allocation and Separate Account.

Compensation for investment management services will be done on a fee basis that is competitive. The preferred method of calculating ARMB Timberland Advisor fees will be based upon a formula, which considers 1) the cost basis of assets under management and 2) market value of the assets under management.

Section 3. Allocation

ARMB's allocation to Timberland Investments shall be determined by the Board of Trustees and reviewed annually.

Reinvestment of allocation by the investment manager shall require approval by the Chief Investment Officer (CIO). The CIO has discretion in determining the reinvestment amount to authorize. Amounts may reflect the original allocation or may recognize some portion of any realized gains or losses.

CIO Discretionary Investment Authority – The CIO shall have the following discretionary investment authority:

- a) To increase or decrease existing separate account allocations and investments in open-end funds;

- b) To commit to new investment funds up to \$100 million for each fund; and,
- c) To engage consultants and take other action as may be necessary to ensure sufficient due diligence is performed on all investments under consideration.

The CIO shall exercise this discretion within Board approved asset allocations, investment plans, and guidelines as they may apply.

The CIO will provide prior notification to the Chair of ARMB before committing to any investments under this authority. All discretionary CIO investment actions shall be reported to the Board.

Section 4. Advisor Performance Benchmark

NCREIF Timberland Index

Section 5. Investment Constraints

(a) Each property underlying a Timberland Investment will be commercial timberland in accordance with the standards and customs of the region in which the property is located. Although commercial attributes vary significantly across regions and among forest types, generally, properties will be characterized by adequate timber stocking, sufficient productivity, established timber markets, and ready access.

(b) Location: Timberland Investments will be located inside the United States of America.

(c) Diversification and Concentration: Each ARMB Timberland Advisor will undertake to ensure that the Timberland Investments under its control are adequately diversified. While each ARMB Timberland Advisor will seek to invest across the primary timberland regions of the United States as defined by the National Council of Real Estate Investment Fiduciaries (NCREIF) Timberland Index, geographic diversification will ultimately depend on the availability of attractive investment opportunities, as well as potential diversification by species, age classes of trees and suitability for a variety of end products.

(d) Leverage: The total amount of leverage placed on the aggregate Separate Accounts allocated to all ARMB Timberland Advisors for investment will not exceed ten percent (10%) of the total market value of all such Timberland Investments at the time such leverage is incurred. The purchase or refinance of Timberland Investments with debt and borrowing against Timberland Investments shall be permitted only with the prior consent of ARMB's Chief Investment Officer. The Advisor will not cause the Account to incur indebtedness without ARMB's prior consent.

(e) Allocation: Each ARMB Timberland Advisor may exceed its Separate Account Allocation by up to 5% for the purposes of capital expenditures on existing assets and/or the completion of an acquisition.

(f) Non-Routine Activity: Each ARMB Timberland Advisor will seek the prior approval of ARMB's Chief Investment Officer before entering into any arrangements which provide ancillary income activity from the Timberland which are not routinely associated with Timberland Investments. Examples include mining, wind farms, and utility infrastructure.

Section 6. ARMB Timberland Advisor Annual Portfolio Review

Annually, each ARMB Timberland Advisor will submit an annual portfolio review to ARMB staff (“Staff”) which shall include an annual business plan addressing each Timberland Investment in the portfolio in its Separate Account and an annual portfolio level strategic plan. The objective of this effort is to facilitate Staff’s monitoring of the Timberland Investments to ensure existing investments and future strategy are consistent with ARMB’s objectives and to recognize any program changes, which may require ARMB approval, to facilitate the efficient operation of the investment program. Each ARMB Timberland Advisor will collaborate with Staff to identify the specific content of the business plan and strategic plan for the Timberland Investments in its Separate Account, but should consider the following:

Annual business plans will focus on past performance and future performance expectations for existing assets in the portfolio. Information should include performance analysis, hold/sell analysis, and investment budgets including explanations for future capital budget items.

Annual portfolio level strategic plans will focus on overall portfolio and market performance, portfolio diversification, market conditions, and strategy for acquisitions and disposition for the upcoming year. The strategic plan should also include any recommendations to improve the ARMB Investment Guidelines and/or ARMB’s Timberland investment strategy.

Section 7. Ownership Structure

Timberland Investments will be owned in a structure designed to limit ARMB’s liability to the amount of its capital commitment to such Timberland Investment and, where feasible, to recognize and preserve tax-exempt status.

Section 8. Reporting System

Staff will develop and implement a comprehensive and responsive reporting and monitoring system for all Timberland Investments and each ARMB Timberland Advisor. In order to facilitate active portfolio management, Staff will develop a reporting and monitoring system which will endeavor to identify underperforming investments, control portfolio diversification deficiencies and manage inherent conflicts of interest. A cash-based internal rate of return (IRR) will be used when evaluating the long-term performance of a Timberland Investment. Time-weighted returns will be used to measure comparative performance.

Section 9. Lines of Responsibility

The Timberland investment program will be implemented and monitored through the coordinated efforts of the ARMB, Staff, and the ARMB Timberland Advisors. A description of the program participants and their general responsibilities are as follows:

ARMB – The statutorily created board which is the fiduciary for the retirement trust funds, comprised of trustees appointed by the Governor to represent the beneficiaries’ interest. ARMB hires qualified ARMB Timberland Advisors and consultants; approves the ARMB Investment Guidelines and revisions to them; and approves the Annual Investment Plan prepared by Staff.

Staff - Investment professionals on staff at the Department of Revenue assigned to ARMB Timberland Investments, who will assist in the Timberland investment program's design, policy implementation, and administration. Staff coordinates program and guidelines compliance among all participants and communicates the investment policies, objectives, and performance criteria to the ARMB Timberland Advisors; monitors diversification compliance on a quarterly basis; and coordinates the receipt and distribution of capital. Staff will review and approve each ARMB Timberland Advisor's annual business plan, including revisions to the investment budgets in accordance with Section 13 hereof, and annual portfolio level strategic plan. Staff will recommend, to ARMB, revisions to the Timberland Investment Guidelines as may be necessary from time to time.

Annually, Staff will prepare an Annual Investment Plan after reviewing the annual business and annual portfolio level strategic plan prepared by the ARMB Timberland Advisors. This document will recommend, as appropriate, revisions to the overall Timberland Investment strategy, revisions to the Timberland Investment Guidelines, and make recommendations for additional allocations to the ARMB Timberland Advisors as may be desirable.

ARMB Timberland Advisors – Qualified entities selected by ARMB that provide institutional Timberland investment management services to ARMB. ARMB Timberland Advisors will invest and manage the Timberland Investment portfolios in accordance with their contracts.

Section 10. Property Management

The selection of on-site property management will generally be left to the discretion of the applicable ARMB Timberland Advisor. It is expected the ARMB Timberland Advisor will retain the highly qualified, market rate property management service either through a third party fee manager or the ARMB Timberland Advisor's affiliated property management division. This business relationship will be periodically reviewed by Staff and ARMB.

Section 11. Insurance Coverage

Each ARMB Timberland Advisor shall obtain insurance coverage with respect to the Timberland and the Timberland Investments in such amounts and against such risks as, in such ARMB Timberland Advisor's professional judgment, are in accordance with sound institutional practices applicable to Timberland Investments.

Section 12. Environmental Evaluations

As part of the pre-acquisition analysis for all prospective new Timberland Investments, each ARMB Timberland Advisor shall conduct a Phase 1 Environmental Site Assessment to identify the presence or likely presence of hazardous substances or petroleum products under conditions that indicate an imminent, existing or past release, or a material threat of a release into structures, or into the ground, groundwater or surface water.

Section 13. Delegation of Authority

ARMB shall delegate authority to Staff to approve the following:

- Annual business plans and annual portfolio strategic plans prepared by the ARMB Timberland Advisors;
- Revised investment budgets and variances in approved annual business plans for unanticipated activity; and
- Line item variances in approved capital expenditure budgets in amounts up to \$500,000 with a cumulative fiscal year maximum of \$3,000,000 per Advisor.

Section 14. Confidentiality

Pursuant to 15 AAC 112.770, ARMB shall withhold from other persons all information furnished to it by ARMB Timberland Advisor(s) or consultant(s) which is reasonably designated by ARMB Timberland Advisor(s) or consultant(s) as being confidential or proprietary, within the meaning of Alaska Statutes regarding rights to public information, except to the extent that the information is needed by ARMB in order to adequately report on the status and performance of the portfolio, or to comply with a court subpoena or with an official criminal investigation.

Those portions of reports provided pursuant to the Agreement with ARMB Timberland Advisor(s) shall be considered confidential pursuant to 15 AAC 112.770 to the extent that information is reasonably designated by ARMB Timberland Advisor(s) as being confidential or proprietary, or to the extent the disclosure of which would unfairly prejudice the ability of ARMB Timberland Advisor(s) or ARMB to manage, lease, market or sell such property or Assets.

Section 15. Unrelated Business Income Tax

Each ARMB Timberland Advisor will manage its respective Separate Account with a view toward minimizing the recognition of unrelated business taxable income (“UBTI”) to the extent consistent with the Investment Objective set forth in Section 1 above. Each ARMB Timberland Advisor will consult with ARMB prior to entering into any transaction that could reasonably be expected to result in the recognition of significant amounts of UBTI.

Section 16. Revisions

The ARMB Investment Guidelines are to be reviewed no less than annually and revised as appropriate.

Section 17. ARMB Timberland Advisors

The following entities have been selected and appointed as ARMB Timberland Advisors to acquire Timberland properties on a discretionary basis for the Alaska Retirement Management Board:

Hancock Timber Resource Group 197 Clarendon Street C-08-99 Boston, MA 02116-5010 Telephone: 617-747-1600 Fax: 617-747-1516 www.hancocktimber.com	Timberland Investment Resources, LLC 115 Perimeter Center Place, Suite 940 Atlanta, GA 30346 Telephone: 404-848-2000 Fax: 404-848-2006 www.tirlc.com

Section 18. Definitions

(a) “Timber” means trees growing on Timberland, or trees which have been cut but not removed from Timberland.

(b) “Timberland” means real property which is to be planted with Timber or real property on which Timber is growing.

(c) “Timberland Investment” means, in general, all interests (including fee ownership, leasehold interests or management rights) in Timberland; timber deeds, timber cutting contracts and other rights, contracts or agreements relating to the ownership, cutting and/or use of Timber; options to acquire or sell Timber or Timberland or interests therein; mineral rights (including oil and gas rights), biomass or carbon credits attendant to the ownership of Timberland; and personal property, both tangible and intangible, directly associated or connected with the use of Timberland.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Infrastructure Investment Guidelines

Resolution 2017-17

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, the Board contracts an independent consultant to provide experience and expertise in asset allocation and other investment matters to come before the Board; and

WHEREAS, the Board has established an asset allocation for the funds that considers earnings and liabilities on a current as well as a future basis; and

WHEREAS, the Board has authorized investment in real estate assets for the Public Employees' Retirement System, Teachers' Retirement System, and Judicial Retirement System, including investments for those systems in the State of Alaska Retirement and Benefit Plans Trust; and

WHEREAS, the Board establishes and from time to time as necessary, modifies investment policies, procedures, and guidelines for real estate;

NOW THEREFORE, BE IT RESOLVED THAT THE ALASKA RETIREMENT MANAGEMENT BOARD adopts the Infrastructure Investment Guidelines, attached hereto and made a part hereof.

This resolution repeals and replaces Resolution 2016-22.

DATED at Anchorage, Alaska this ____ day of October, 2017.

Chair

ATTEST:

Secretary

Infrastructure

ARMB Investment Guidelines

In addition to the Infrastructure Guidelines, public infrastructure investments shall comply with ARMB's Investment Guidelines for Domestic, International and Alternative Equities.

Section 1. Investment Objective

To develop a diversified portfolio of infrastructure investments with a focus on total return which will seek to produce a minimum 5% net real total rate of return over rolling five-year periods. Portfolio risk shall reflect the lowest expected risk profile required to achieve the return objectives. Each ARMB infrastructure advisor will place an emphasis on the preservation of capital and diversify the infrastructure investments to minimize risk. To the extent return objectives can be met, current income shall be given preference over appreciation.

Section 2. ARMB Infrastructure Advisor Selection

ARMB will select qualified investment managers who have the discretion to invest in infrastructure. In order for entities to be considered, the entity must demonstrate that it is able to add value through its infrastructure knowledge, experience and strategy; evaluate the risks of each infrastructure investment which is contemplated; and comply with these ARMB Infrastructure Investment Guidelines.

ARMB will implement an investment process for infrastructure which will, over time, include a minimum of two private investment ~~and two public investment qualified investment~~ advisors who have been selected on a competitive basis. Each ARMB infrastructure investment advisor will provide services according to an agreed upon investment management agreement (contract) and the ARMB Investment Guidelines. ARMB will endeavor to allocate specific funds to each ARMB infrastructure investment advisor. ARMB infrastructure advisors will invest funds on a discretionary basis in infrastructure investment opportunities to the extent of its specific allocation.

Compensation for investment management services will be done on a fee basis that is competitive. The preferred method of calculating ARMB infrastructure investment advisor fees will be based upon a formula, which considers 1) the cost basis of assets under management and 2) market value of the assets under management.

Section 3. Allocation

ARMB's allocation to infrastructure investments shall be determined by the Board of Trustees and reviewed annually.

CIO Discretionary Investment Authority – The CIO shall have the following discretionary investment authority:

- a) To increase or decrease existing separate account allocations and investments in open-end funds;
- b) To commit to new investment funds up to \$100 million for each fund; and,
- c) To engage consultants and take other action as may be necessary to ensure sufficient due diligence is performed on all investments under consideration.

The CIO shall exercise this discretion within Board approved asset allocations, investment plans, and guidelines as they may apply.

The CIO will provide prior notification to the Chair of ARMB before committing to any investments under this authority. All discretionary CIO investment actions shall be reported to the Board.

Section 4. Performance Benchmark

The benchmark for the total infrastructure portfolio will be the S&P Global Infrastructure Index. Investment managers for public stock portfolios will be allowed to use their preferred infrastructure benchmark. Private investment advisors will be evaluated based on the income and total return objectives of their strategies.

Section 5. Investment Constraints

- (a) Private infrastructure investment strategies shall be constrained by the partnership agreements and other agreements establishing the contractual arrangement with ARMB's infrastructure investment advisors.
- (b) Location: No more than 10% of ARMB's infrastructure investments shall be located in emerging markets.
- (c) Strategy: No more than ~~10~~20% of ARMB's infrastructure investments shall be focused on development of infrastructure assets.
- (d) Diversification and Concentration: Each ARMB infrastructure advisor shall ensure that the infrastructure investments under its control are adequately diversified in the context of its investment strategy.
- (e) Leverage: The total amount of leverage utilized by private infrastructure managers shall not exceed 75% of the value of the asset as measured at the time the leverage is placed on the asset. Public infrastructure investment managers shall not use leverage.

Section 6. Ownership Structure

Private infrastructure investments will be owned in a structure designed to limit ARMB's liability to the amount of its investment and, where feasible, to recognize and preserve tax-exempt status.

Section 7. Reporting System

Staff will develop and implement a comprehensive and responsive reporting and monitoring system for each ARMB infrastructure advisor.

Section 8. Lines of Responsibility

The infrastructure investment program will be implemented and monitored through the coordinated efforts of the ARMB, staff, and the ARMB infrastructure advisors. A description of the program participants and their general responsibilities are as follows:

ARMB – The statutorily created board which is the fiduciary for the retirement trust funds, comprised of trustees appointed by the Governor to represent the beneficiaries' interest. ARMB hires qualified infrastructure investment advisors and consultants, approves the ARMB Investment Guidelines and revisions to them, and approves the Annual Investment Plan prepared by staff.

Staff - Investment professionals on staff at the Department of Revenue assigned to ARMB infrastructure investments, which will assist in the program's design, policy implementation, and administration. Staff will recommend revisions to the Infrastructure Investment Guidelines as may be necessary from time to time to ARMB.

Annually, staff will prepare an Annual Investment Plan. This document will recommend, as appropriate, revisions to the overall infrastructure investment strategy, revisions to the Infrastructure Investment Guidelines, and make recommendations for additional allocations as may be desirable.

ARMB Infrastructure Advisors – Qualified entities selected by ARMB that provide institutional infrastructure investment management services to ARMB. ARMB Infrastructure Advisors will invest and manage the portfolios in accordance with their contracts.

Section 9. Confidentiality

Pursuant to 15 AAC 112.770, ARMB shall withhold from other persons all information furnished to it by ARMB Infrastructure Advisor(s) or consultant(s) which is reasonably designated by ARMB Infrastructure Advisor(s) or consultant(s) as being confidential or proprietary, within the meaning of Alaska Statutes regarding rights to public information, except to the extent that the information is needed by ARMB in order to adequately report on the status and performance of the portfolio, or to comply with a court subpoena or with an official criminal investigation.

Those portions of reports provided pursuant to the Agreement with ARMB Infrastructure Advisor(s) shall be considered confidential pursuant to 15 AAC 112.770 to the extent that information is reasonably designated by ARMB Infrastructure Advisor(s) as being confidential or proprietary, or to the extent the disclosure of which would unfairly prejudice the ability of ARMB Infrastructure Advisor(s) or ARMB to manage, lease, market or sell such property or assets.

Section 10. Revisions

The ARMB Investment Guidelines are to be reviewed no less than annually and revised as appropriate.

Section 11. ARMB Infrastructure Advisors

The following entities have been selected and appointed as ARMB Infrastructure Advisors to acquire infrastructure investments on a discretionary basis for the Alaska Retirement Management Board:

IFM Investors 114 West 47 th Street New York, NY 10036 Phone: 212-784-2260 www.ifminvestors.com	Lazard Asset Management LLC 30 Rockefeller Plaza, 57 th Floor New York, NY 10112 Phone: 212-632-6519 www.lazardnet.com
JPMorgan Asset Management 270 Park Avenue, 7 th Floor, NY1-K141 New York, NY 10017 Phone: 212-648-2219 www.jpmorgan.com	Brookfield Investment Management Inc. 250 Vesey Street New York, NY 10281-1023 Phone: 212-978-1794 www.brookfieldim.com

Infrastructure

ARMB Investment Guidelines

In addition to the Infrastructure Guidelines, public infrastructure investments shall comply with ARMB's Investment Guidelines for Domestic, International and Alternative Equities.

Section 1. Investment Objective

To develop a diversified portfolio of infrastructure investments with a focus on total return which will seek to produce a minimum 5% net real total rate of return over rolling five-year periods. Portfolio risk shall reflect the lowest expected risk profile required to achieve the return objectives. Each ARMB infrastructure advisor will place an emphasis on the preservation of capital and diversify the infrastructure investments to minimize risk. To the extent return objectives can be met, current income shall be given preference over appreciation.

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Section 4. Performance Benchmark

The benchmark for the total infrastructure portfolio will be the S&P Global Infrastructure Index. Investment managers for public stock portfolios will be allowed to use their preferred infrastructure benchmark. Private investment advisors will be evaluated based on the income and total return objectives of their strategies.

Section 5. Investment Constraints

- (a) Private infrastructure investment strategies shall be constrained by the partnership agreements and other agreements establishing the contractual arrangement with ARMB's infrastructure investment advisors.
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- (c) Strategy: No more than 20% of ARMB's infrastructure investments shall be focused on development of infrastructure assets.
- (d) Diversification and Concentration: Each ARMB infrastructure advisor shall ensure that the infrastructure investments under its control are adequately diversified in the context of its investment strategy.
- (e) Leverage: The total amount of leverage utilized by private infrastructure managers shall not exceed 75% of the value of the asset as measured at the time the leverage is placed on the asset. Public infrastructure investment managers shall not use leverage.

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Section 7. Reporting System

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Annually, staff will prepare an Annual Investment Plan. This document will recommend, as appropriate, revisions to the overall infrastructure investment strategy, revisions to the Infrastructure Investment Guidelines, and make recommendations for additional allocations as may be desirable.

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J.P. Morgan Asset Management Global Real Assets

Mandate: JPMCB Strategic Property Fund – Open-End Commingled Real Estate Fund

Hired: 1998

Firm Information	Investment Approach	Total ARMB Mandate
J.P. Morgan Investment Management Inc. (JPMIM) is the primary U.S. investment advisory branch of J.P. Morgan Asset Management (JPMAM), which is the marketing name for the asset management businesses of JPMorgan Chase & Co. (JPMC), a publicly traded company, and its affiliates worldwide. JPMIM is wholly-owned by JPMorgan Asset Management Holdings Inc. which is a subsidiary of JPMC. JPMIM was incorporated in Delaware on February 7, 1984. J.P. Morgan Global Real Assets employs 240 professionals, serves 1,000 institutional clients from eight offices and is headquartered in New York, New York. As of 6/30/2017, J.P. Morgan Global Real Assets total assets under management were \$90.0 billion. Key Executives: Ann Cole, Portfolio Manager Kimberly Adams, Portfolio Manager Alexia Gottschalch, Client Relationship Manager Todd Evans, Client Relationship Manager	J.P. Morgan Asset Management - Global Real Assets follows a disciplined investment process that focuses on adding value throughout the acquisition, ownership and disposition of an asset. Investment decisions are based upon a variety of factors, including, without limitation, a fulsome macro and micro research analysis and a quantitative financial analysis. Such factors ensure the performance viability of the proposed investment and its compatibility with a client's investment strategy and objectives. Prior to making an investment, J.P. Morgan requires the approval of an Investment Committee, whose review includes consideration of the following factors: cash flow and debt assumptions; return models; property history; location analysis; investment proposal; transaction structure (equity/debt); investment strengths and weaknesses; tenant analysis; replacement cost analysis; research assessment; comparable sales and lease analysis; and investment recommendation. Benchmark: NCREIF Fund Index - ODCE	Assets Under Management: 6/30/2017: \$248,600,783

Concerns: None

6/30/2017 Performance

	Last Quarter	1-Year	3-Years Annualized	5-Years Annualized
Manager (Gross)	1.57%	7.91%	10.75%	12.11%
Fee	0.22%	0.93%	0.94%	0.95%
Manager (Net)	1.35%	6.98%	9.81%	11.16%
Benchmark (Net)	1.47%	6.90%	10.33%	10.76%

J.P. Morgan Asset Management

JPMCB Strategic Property Fund¹ | October 5, 2017

Mike Kelly, Managing Director
(212) 648-2104, mike.p.kelly@jpmorgan.com

Alexia Gottschalch, Managing Director
(212) 648-0739, alexia.k.gottschalch@jpmchase.com

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Today's Presenters



Mike P. Kelly, *Managing Director*, is Director of U.S. Real Estate Commingled Funds and head of Debt Capital Markets, Real Estate Americas, at J.P. Morgan Asset Management. An employee since 2009, Mike is responsible for oversight of the portfolio managers for U.S. open-end funds, leadership of the client strategy team and management of a team that procures debt for J.P. Morgan Asset Management's properties and originates and manages mezzanine loans. Before joining the firm, he was a director and head of Real Estate Conduit and Workouts for Citigroup Global Markets. Previously, Michael was a vice president and originator in the Large Loan CMBS Group and assisted with management of Goldman Sachs Commercial Mortgage Capital. Prior to that, he was a managing director and co-head of Commercial Mortgage Origination at New York Life Investment Management. He started in the industry in 1989. Mike earned a B.S. in business management from Springfield College and an M.S. in real estate from New York University and holds Series 3, 7 and 63 licenses.



Alexia Gottschalch, *Managing Director*, manages Key Client Relationships and Consultant Strategy for Real Estate Americas at J.P. Morgan Asset Management. She is responsible for advising clients of the firm on global real estate strategy, across geographies and risk levels. Alexia also serves on the Real Estate Americas Management Team as well as the Global Alternatives Client Operating Committee. Prior to joining J.P. Morgan, Alexia was Global Head of Capital Markets of Grosvenor Fund Management, leading a central capital raising team. Earlier in her career, she was a member of senior management at Independence Capital Partners, Cheswold Real Estate Investment Management, Prudential Real Estate Investors, Tishman Speyer, ING and Deutsche Bank. She earned her A.B. from the University of Pennsylvania and holds Series 3, 7, 24 and 63 licenses.

¹Commingled Pension Trust Fund Strategic Property of JPMorgan Chase Bank, N.A. ("Strategic Property Fund" or "SPF")

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Investment review

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J.P. Morgan Asset Management – Overview

J.P. Morgan Asset Management – Real Estate Americas platform

We are one of the industry's premier real assets investment managers

Scale, stability and strength

- \$63 billion in AUM across the U.S.
- 45 years of real estate investment management experience
- 200+ professionals in 8 offices across the country

Capabilities and experience

- Part of a global platform of real estate, infrastructure and maritime/transport strategies
- A disciplined investment process consistently implemented across investment types and regions
- Local expertise across strategies, sectors and regions, and complex transactions

Information advantage

- Large organization provides access to outstanding proprietary and external data sources
- Dedicated research team provides market research and portfolio construction analysis
- Over \$10 billion of annual transaction activity provides extensive market knowledge

Client focus

- Trusted advisor and fiduciary to over 1,000 clients worldwide
- A legacy of trusted partnership built on a promise to put client interests ahead of our own
- Focus on open communication, transparency and shared information

AUM as of March 31, 2017

Source : J.P. Morgan Asset Management

J.P. Morgan Asset Management – Real Estate Americas platform

Head of Real Estate Americas Kevin Faxon, MD – 30 years experience

Chief Investment Officer Doug Schwartz, MD – 23 years experience		Director of Research Dave Esrig, MD 25 years experience	Chairman of Investment Committee and Head of Separate Accounts Benjamin Gifford, MD 44 years experience	Director of REA Commingled Funds / Head of Debt Capital Markets Mike Kelly, MD – 28 years experience		
Acquisitions	Asset Management Mark Bonapace, MD 26 years experience			Fund Portfolio Mgmt	Client Strategy	Head of Debt Financing Cassandra Clark, ED 15 years experience
Northeast Peter Sibilia, MD Southwest Robert Curran, MD Midwest/FL & East Industrial Scott Strauss, ED Mid-Atlantic/Southeast Preston Meyer, ED West Morgan Lingle, MD Mezzanine Debt Candace Chao, MD National Retail Andrea Pierce, MD <i>19 years average experience</i>	East/South Whit Wilcox, MD Central Scott MacDonald, MD West Steve Zaun, ED Retail Joseph Dobronyi, MD Residential Allina Boohoff, MD Development & Engineering James Kennedy, MD <i>28 years average experience</i>	Luigi Cerreta, ED Aric Chang, ED Brian Nottage, MD <i>18 years average experience</i>	Alice Cao, ED Wayne Comer, MD Eric Johnson, MD Daniel Volpano, MD <i>31 years average experience</i>	JPMCB Strategic Property Fund Kim Adams, MD Ann Cole, MD JPMCB Special Situation Property Fund Craig Theirl, MD U.S. Real Estate Income & Growth Fund Nancy Brown, MD JPMCB Core Diversified Commercial Property Fund/ JPMCB Diversified Commercial Property Fund Dave Esrig, MD Susan Kolasa, MD <i>24 years average experience</i>	Melissa Anezinis, ED Josh Braunstein, VP Rebekah Brown, ED Alexia Gottschalch, MD Larry Ostow, MD Jackie Weinman, VP <i>18 years average experience</i>	

Functional Partners

Head of Finance and Business Management, Global Alternatives Lawrence Fuchs, MD 25 years experience	Finance Al Dort, MD 25 years experience	Appraisal Ruchi Pathela, ED 18 years experience	Chief Operating Officer REA William Schultz, MD 26 years experience	Global Product Development Steven Greenspan, MD 32 years experience	Omni Solutions Bernie McNamara, MD 21 years experience	Client Relations Ravi Sharma, MD 20 years experience

July 2017. There can be no assurance that professionals currently employed by JPMAM will continue to be employed by JPMAM or that past performance or success of any professional serves as an indicator of professional's future performance or success.

Investment Committee

Institutionalized process employed across the platform: collaborative, streamlined, efficient, and thorough

Voting members: unanimous vote required to approve all acquisitions and dispositions

Chief Investment Officer

- Provides investment experience and ensures consistency of process and policy
- Underwriting responsibility

Portfolio Manager

- Represents the interests of the Fund
- Responsible for adherence to Fund investment strategy and maintaining portfolio diversification

Asset Management Regional or Property Sector Head

- Provides market and sector expertise
- Responsible for executing on business plan of the asset

Real Estate Research Senior Member

- Provides macro perspective
- Advises on economic and demographic trends, risks/opportunities and portfolio strategies

Participating members: provide expertise in respective areas to aid in decision making

Investment
Committee
Chairman

Head of Real
Estate
Americas

Engineering
Services

Financial

Director, U.S.
Real Estate
Commingled
Funds

Product
Development

Head of
Asset
Management

Director of
Valuations

Debt
Financing

For illustrative purposes only

Investment Summary and Performance

Alaska Retirement Management Board

Investment Summary as of June 30, 2017

Invested capital	Market value
Strategic Property Fund	\$248,600,783

Account Performance (%)	Income	Appreciation	Total	ODCE Value
Three months ¹	1.0	0.5	1.6	1.7
Year to date	2.1	1.4	3.5	3.5
One year	4.3	3.5	7.9	7.9
Three years	4.7	5.9	10.8	11.3
Five years	4.9	7.0	12.1	11.8
Ten years	5.3	0.7	6.0	5.3
Fifteen years	5.8	3.2	9.1	8.3
Twenty years	6.5	3.2	9.8	9.2
Since inception (7/1/84)	6.9	1.7	8.7	7.4

¹non-annualized returns

Past performance is not a guarantee of comparable future results. Total return assumes the reinvestment of income. Performance results are gross of investment management fees. The deduction of an advisory fee reduces an investor's return. Actual account performance will vary depending on individual portfolio security selection and the applicable fee schedule.

JPMCB Strategic Property Fund is core real estate

Residential



Van Ness Residential, Boston, MA

Retail



Valley Fair Mall, San Jose, CA

Industrial



Alliance Texas – Industrial, Fort Worth, Texas

Office



Water Garden, Santa Monica, CA

These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future

JPMCB SPF: Core real estate investment strategy

High quality stabilized assets

- Focus on attractive, stabilized investments with high quality physical improvements
- Invest only in the four main property types: office, retail, residential and industrial
- Excellent location factors, with dominant competitive market positions
- Assets located in primary markets with stronger growth demographics

Large, well-diversified portfolio

- Focus on larger assets, which have consistently outperformed
- Meaningful sector, geographic and in-market diversification
- Fund size provides unique deal access
- Research-based portfolio construction

Low beta strategy

- Focus on long-term outperformance with lower risk profile
- Conservative approach to leverage
- High producing regional malls provide stability
- Minimal development

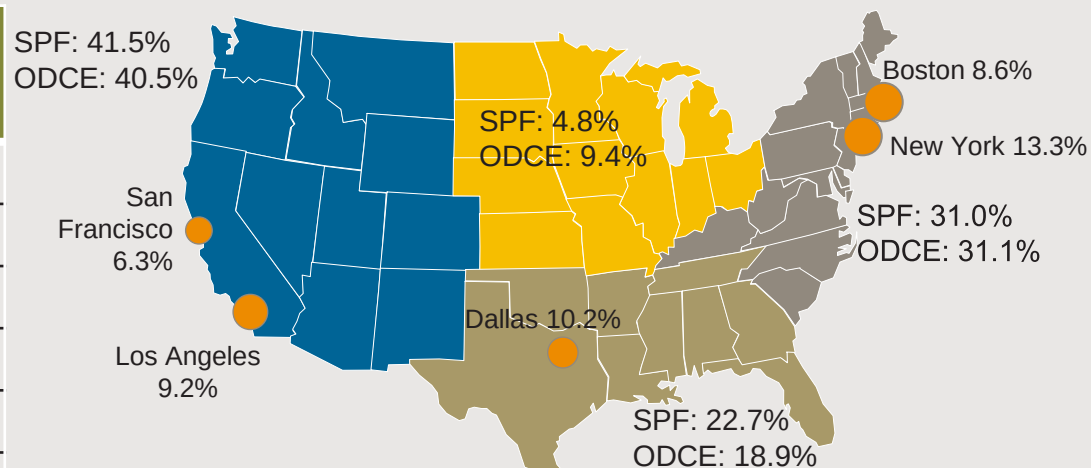
It should not be assumed that Fund positioning in the future will be profitable or will equal past performance.

JPMCB SPF: 2Q 2017 Fund Highlights

Balance Sheet	Broad Diversification	Low Risk Profile									
\$42.1bn gross asset value \$31.4bn net asset value 6.7% cash position 25.1% LTV - Over \$919mm of annual net cash flow \$704.4mm contribution queue (as of September 1, 2017)	- Largest tenant: 1.7% of total Fund revenue - Largest asset: 3.6% of Fund NAV - Largest MSA concentration: 13.3% of Fund NAV	- No fund level or unsecured debt - Beta: 0.91x the peer set <table> <tr> <th></th><th>SPF</th><th>Peers¹</th></tr> <tr> <td>Non-core property types</td><td>0%</td><td>3.5%</td></tr> <tr> <td>Development (% GAV)</td><td>1.5%</td><td>4.9%</td></tr> </table>		SPF	Peers ¹	Non-core property types	0%	3.5%	Development (% GAV)	1.5%	4.9%
	SPF	Peers ¹									
Non-core property types	0%	3.5%									
Development (% GAV)	1.5%	4.9%									

Fund Diversification²

	SPF (%) ² 12/31/2015	SPF (%) ² 6/30/2017	ODCE (%) 6/30/2017
Office	48.2	42.7	36.8
Industrial	7.7	10.7	15.0
Residential	20.0	20.2	24.1
Retail	23.9	26.2	20.2
Other	0.1	0.3	4.0
Total	100.0	100.0	100.0



¹ IPD as of June 30, 2017; non-core property types are self-storage and hotel (gross of debt as reported by IPD), based on the MSCI-ACOE index excluding SPF

² Net of debt; values may not total 100% due to rounding ³ Direct real estate with land

Past performance is not a guarantee of comparable future returns. Returns assume the reinvestment of income. Diversification does not guarantee investment returns and does not eliminate the risk of loss

JPMCB SPF: Performance overview

Supplemental to annual performance report

Annualized returns as of June 30, 2017 (%)	Three months ¹	Year to date	One year	Three years	Five years	Ten years	Since incep. 1/1/98
Income	1.0	2.1	4.3	4.7	4.9	5.3	6.5
Appreciation	0.5	1.4	3.5	5.9	7.0	0.7	3.0
SPF Total Gross	1.6	3.5	7.9	10.8	12.1	6.0	9.7
NFI-ODCE Total – Value ²	1.7	3.5	7.9	11.3	11.8	5.3	9.0
SPF Total Net	1.3	3.0	6.9	9.7	11.0	5.0	8.6

Yearly returns since inception 1998 (%)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Income	9.4	9.2	8.7	8.6	8.1	7.4	7.1	6.6	5.7	5.4	5.0	6.1	6.6	5.5	5.3	5.2	5.2	4.9	4.4
Appreciation	6.3	5.0	5.1	-0.9	-2.8	3.0	4.9	17.4	10.3	10.7	-12.5	-30.9	7.1	10.0	6.5	10.2	5.7	9.9	3.9
Total	16.4	14.7	14.1	7.6	5.1	10.6	12.3	25.1	16.6	16.7	-8.1	-26.6	14.2	16.0	12.1	15.9	11.1	15.2	8.4
NFI-ODCE	16.4	13.2	14.3	5.6	5.5	9.3	13.1	21.4	16.3	16.0	-10.0	-29.8	16.4	16.0	10.9	13.9	12.5	15.0	8.8

¹ non-annualized returns

² Preliminary as June 30, 2017 (98% reported)

Past performance is not a guarantee of comparable future results. Total return assumes the reinvestment of income. Performance results are gross of investment management fees. The deduction of an advisory fee reduces an investor's return. Actual account performance will vary depending on individual portfolio security selection and the applicable fee schedule.

JPMCB SPF: Retail portfolio

Retail Exposure

	NAV (millions)	Allocation	ODCE
Current (6/30/2017)	\$7,613	26.2%	20.2%
Year-end projection (12/31/2017)	--	25.8%	N/A

Market Highlights

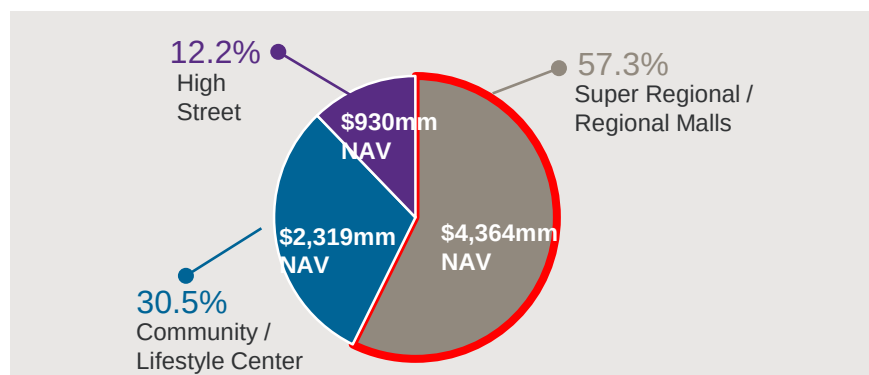
- Weakest malls comprise a tiny share of market's value
- NOI growth is outpacing sales growth
- Power of experiential retail continues

2017 Portfolio Objective

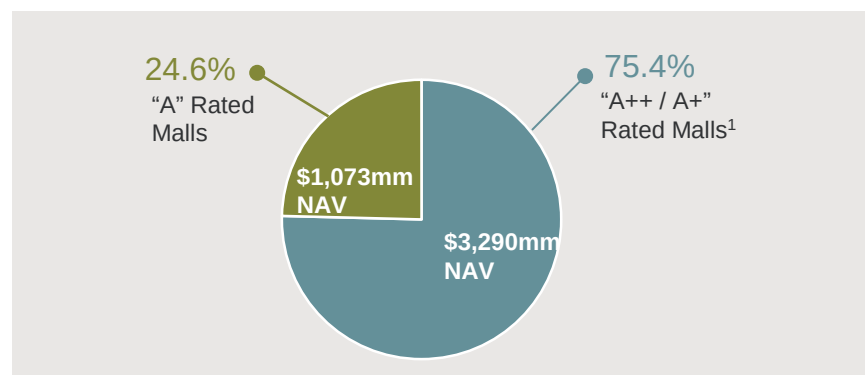
- Remain overweight – continue to re-invest in existing portfolio to maintain dominant position

SPF retail portfolio as of 6/30/17:

Breakdown by Subsector



Composition of Mall Portfolio

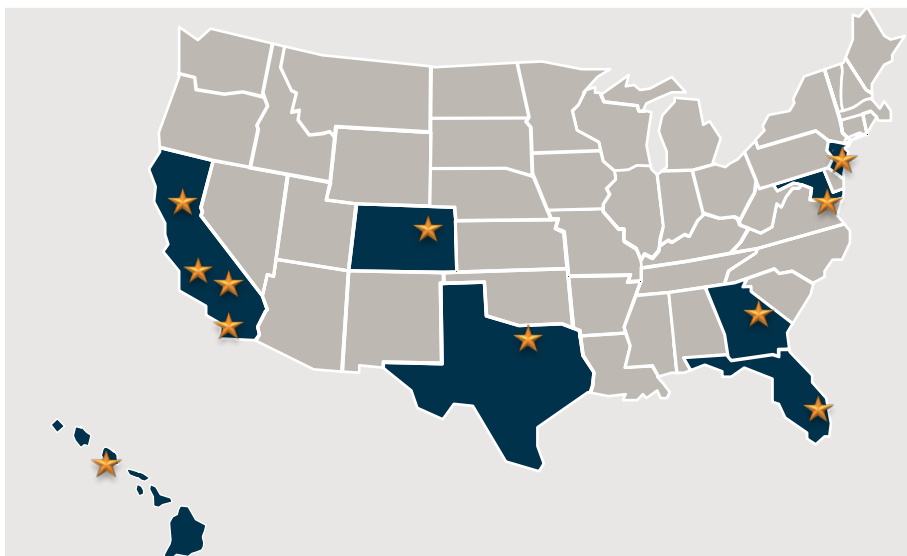


¹ As of May 31, 2017

Retail: Diversified portfolio of 11 fortress malls

SPF owns a diversified portfolio of regional and super-regional malls that drive performance and portfolio stability

SPF's 11 fortress malls



Mall Sales PSF¹

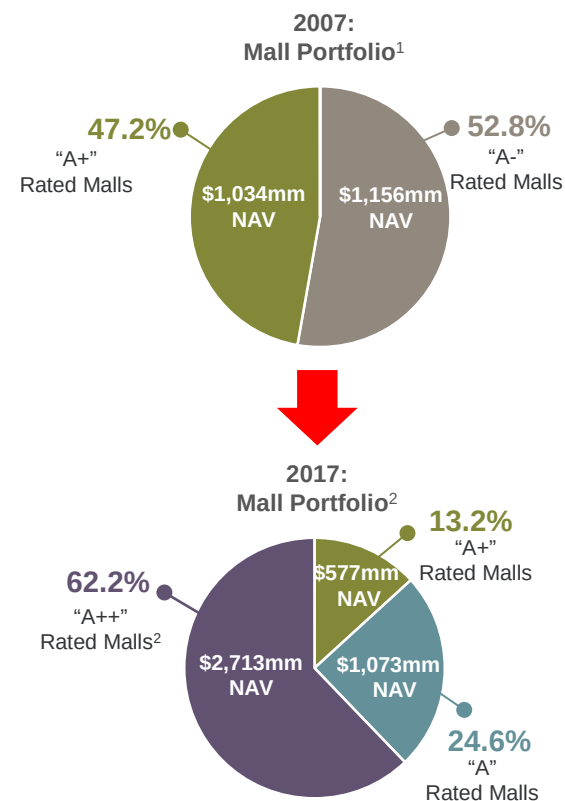
SPF	\$896³
Industry Average	\$498 ²
General Growth Properties	\$591
Simon Property Group	\$615
Macerich	\$639
Taubman	\$776

These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future

Source (left): Green Street Advisors, J.P. Morgan and as reported by respective companies, as of 2016Q4; Source (right): NCREIF As of 2017Q1

¹as of 1Q17 unless otherwise noted; ²as of 6/14/2017; ³as of 5/31/2017; ⁴SPF sector betas (versus ODCE overall) from 2000 to 1Q17;

Proactively upgrading the portfolio



JPMCB SPF: Office portfolio

Office Exposure

	NAV (millions)	Allocation	ODCE
Current (6/30/2017)	\$12,378	42.7%	36.8%
Year-end projection (12/31/2017)	--	41.3%	N/A

Market Highlights

- Mitigated inventory growth in major markets
- Improved corporate earnings expected to help CBDs
- Potential late cycle “pop” albeit muted relative to historical

2017 Portfolio Objective

- Continue to like CBD overweight, but comfortable with 2016 reduction



One Memorial Drive, Cambridge, MA

Office Case Study

- Acquired in September 2014 for \$405.0mm
- Renewal of two large tenants at record-high rents for the Cambridge submarket
 - Microsoft renewed 156,000 sf (43% of GLA) for 10 years
 - InterSystems renewed existing space plus additional space for total of 180,000 sf (51% of GLA)
- Conversion of under-utilized parking garage into 42,760 sf of office space
- Property is currently valued at \$535.6mm, representing a 32.2% appreciation over the purchase price
- The East Cambridge submarket continues to show strength with occupancy currently at 99% for Class-A buildings

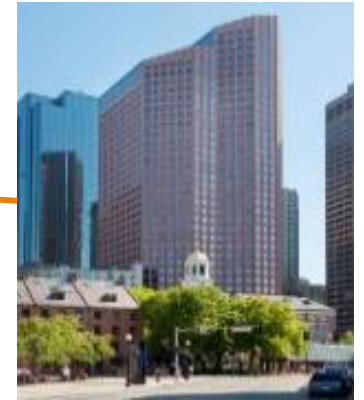
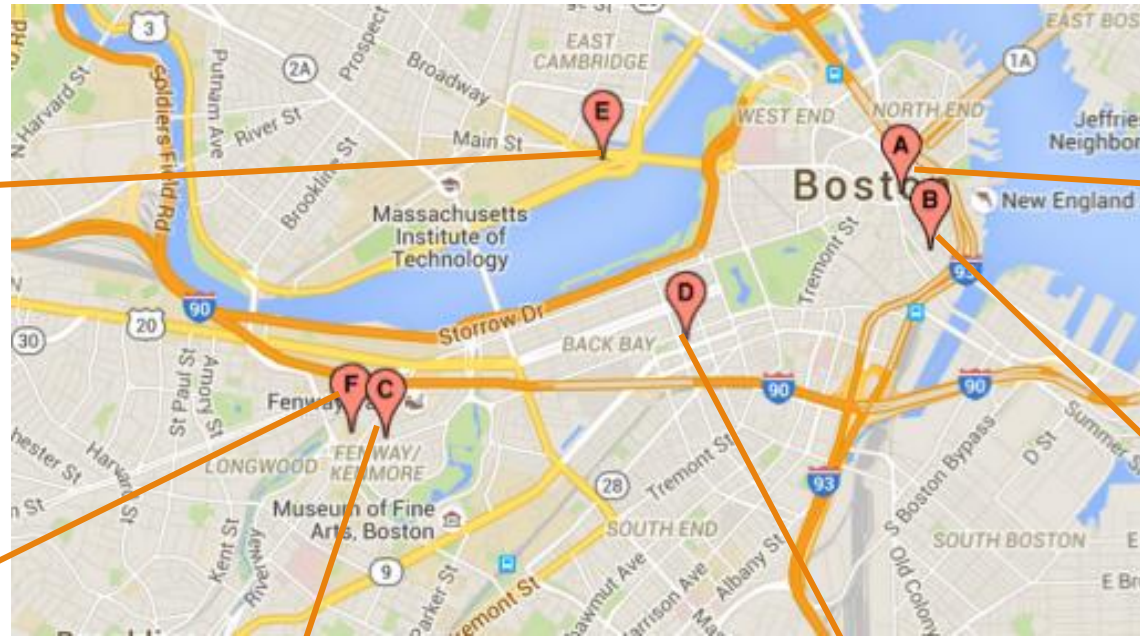
This example is a representative investment. However, you should not assume that this type of investment will be available to or, if available, will be selected for investment in the future. There can be no guarantee of future success.

Intramarket diversification in Boston office portfolio

Six Boston CBD assets across multiple submarkets accounting for 4.4mm square feet and 4% of NAV



One Memorial Drive
358,387 SF, \$186.8mm



60 State Street
902,521 SF, \$161.0mm



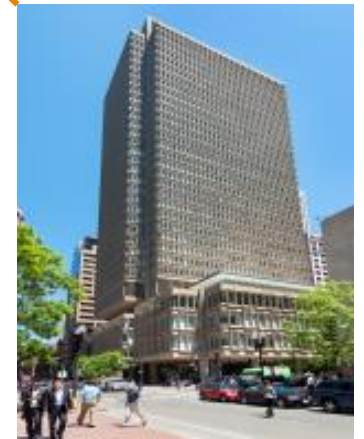
Landmark Center
1,037,636 SF, \$354.1mm



Van Ness
267,057 SF, \$206.6mm



500 Boylston and 222 Berkeley
1,297,302 SF, \$454.4mm



225 Franklin Street
935,350 SF, \$170.0mm

As of June 30, 2017

These examples are representative investments. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment in the future. There can be no guarantee of future success.

JPMCB SPF: Multifamily portfolio

Multifamily Exposure

	NAV (millions)	Allocation	ODCE
Current (6/30/2017)	\$5,861	20.2%	24.1%
Year-end projection (12/31/2017)	--	21.5%	N/A

Market Highlights

- Year-over-year rent growth is slowing
- Construction has been concentrated in CBDs
- High rents and affordability ceilings will limit NOI and pricing

2017 Portfolio Objective

- Maintain sector underweight – still room for incremental strategic acquisitions

2Q 2017 Multifamily Dispositions



Triangle Residential Portfolio, Austin, TX

Size	529 units
Acquisition Date	Dec 2006 – Aug 2008
Disposition Date	Jun 2017
Net proceeds	\$131.2 million
Realized IRR	4.0%
Equity Multiple	1.2x



Palazzo Park La Brea, Los Angeles, CA

Size	1,382 units
Acquisition Date	Dec 2007
Disposition Date	Jun 2017
Net proceeds	\$310.9 million
Realized IRR	6.5%
Equity Multiple	1.8x

¹ As of March 31, 2017 / ² As of May 31, 2017

The IRR shown above is calculated based upon internal JPMIM data and is gross of fees. There can be no guarantee the IRR will be achieved. This example is a representative investment. However, you should not assume that this type of investment will be available to or, if available, will be selected for investment in the future. There can be no guarantee of future success.

JPMCB SPF: Industrial portfolio

Industrial Exposure

	NAV (millions)	Allocation	ODCE
Current (6/30/2017)	\$3,091	10.7%	15.0%
Year-end projection (12/31/2017)	--	11.4%	N/A

Market Highlights

- E-commerce driving demand
- Rent premium for infill almost 40% to big box
- Occupancy and rent growth most favorable since late 90s

2017 Portfolio Objective

- Buy and build distribution and infill



Vineyard I and II Portfolios, Ontario, CA

Industrial Case Study

- Acquired land in July 2015 for \$149.4 million of net equity in off-market transactions
- Opportunity to develop 7 state-of-the-art warehouse-distribution buildings on one of the best infill locations in the Inland Empire West submarket
- Vineyard I now fully committed to tenants including Arvato (28%), GPR Logistics (20%) and a consumer electronics corporation (30%)
- Vineyard II 100% leased to QVC
- Projected ROC: Actual ROC:
 - Vineyard I – 5.2% – Vineyard I – 5.6%
 - Vineyard II – 5.0% – Vineyard II – 5.0%
 - Overall – 5.1% – Overall – 5.4%
- All spec buildings have leased at rates above pro forma

There can be no guarantee the IRR will be achieved. This example is a representative investment. However, you should not assume that this type of investment will be available to or, if available, will be selected for investment in the future. There can be no guarantee of future success.

Looking ahead

- Low beta strategy key to late cycle success
- Reinvest in existing assets
- Continue with mall redevelopment strategies
- New acquisition focus in multifamily and industrial
- Projected 2017 total return of 6-8%*



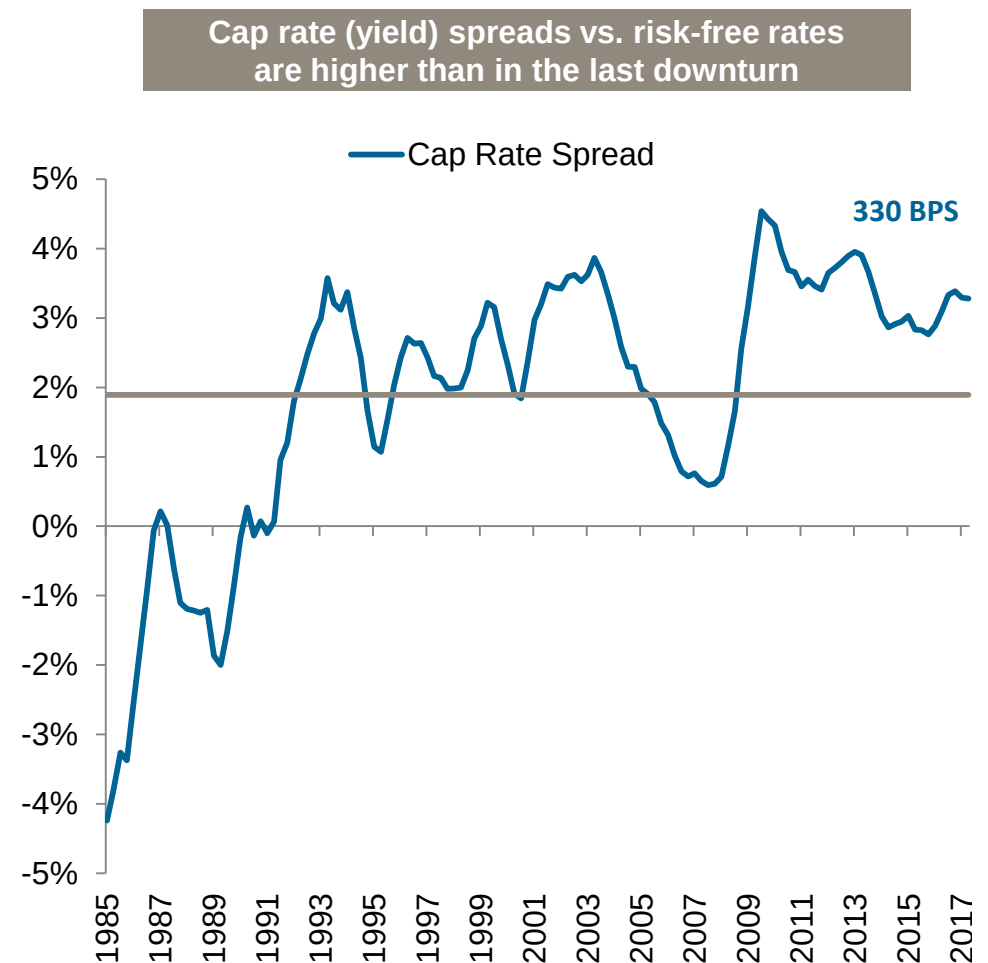
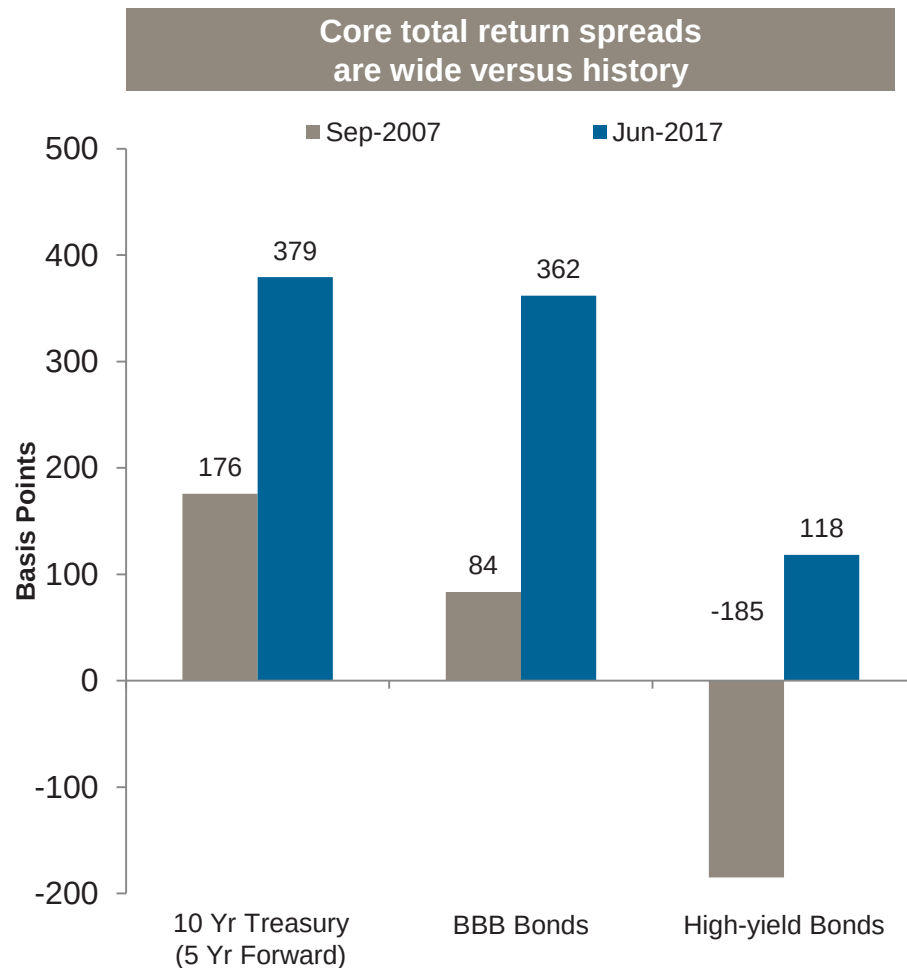
McKinney & Olive, Dallas, TX

This example is a representative investment. However, you should not assume that this type of investment will be available to or, if available, will be selected for investment in the future. There can be no guarantee of future success.

* The target returns are for illustrative purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns similar to the target returns shown above. Because of the inherent limitations of the target returns, potential investors should not rely on them when making a decision on whether or not to invest in the strategy. Please see the complete Target Return disclosure at the conclusion of the presentation for more information on the risks and limitation of target returns.

Is now the right time to invest in U.S. core real estate?

U.S. core real estate is fairly valued

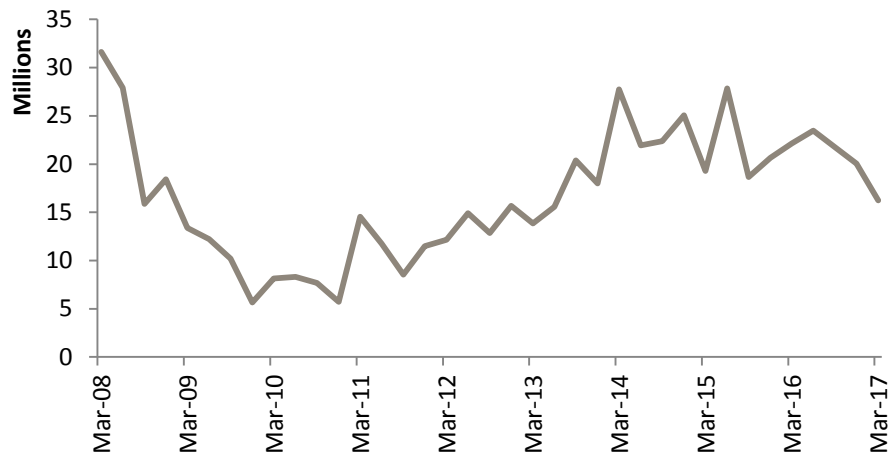


Source: JPMAM, Moody's; Barclay's, Bloomberg, as of June 2017. The IRR (internal rate of return) used above is calculated based upon internal JPMAM data. There can be no guarantee the IRR will be achieved. The charts and/or graphs shown above and throughout the presentation are for illustration and discussion purposes only

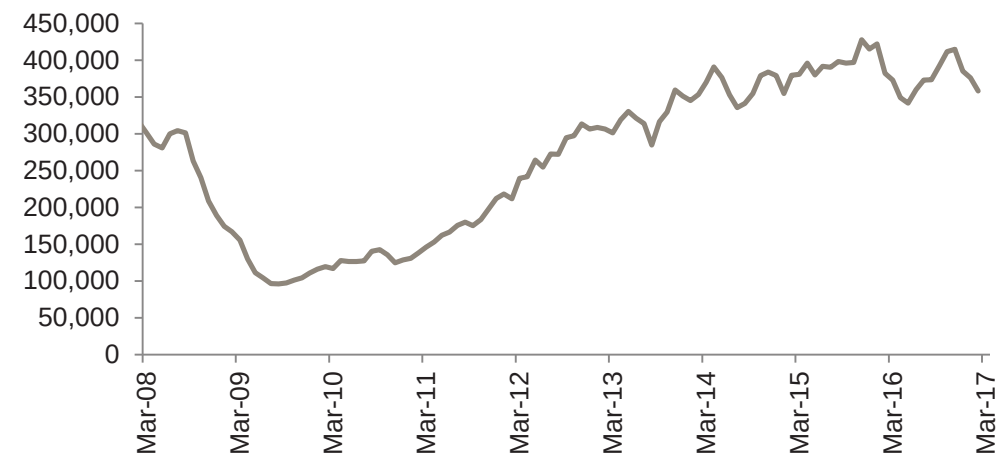
Is now the right time to invest in U.S. core real estate? (cont'd)

Construction starts are falling during continued expansion and stable to declining vacancy

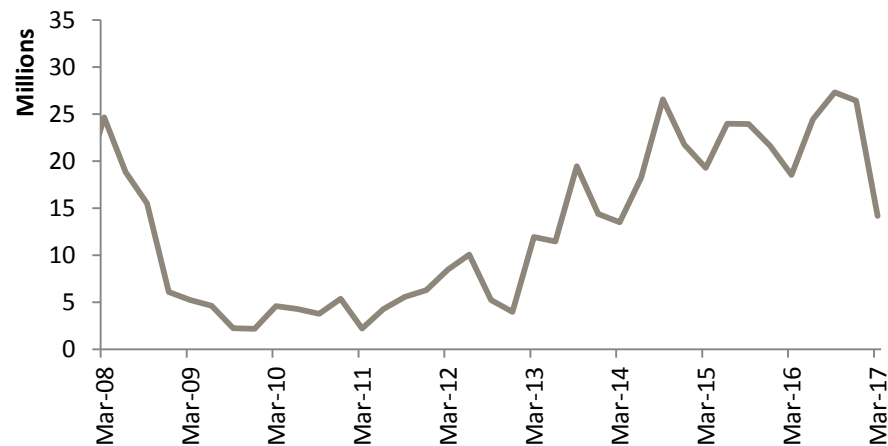
U.S. office construction starts (SF)



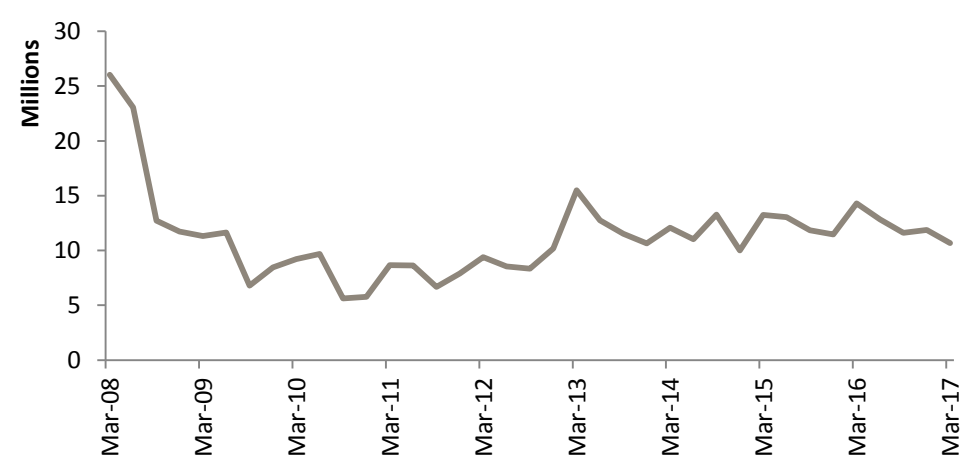
Annual apartment permits



U.S. warehouse construction starts (SF)



U.S. retail construction starts (SF)

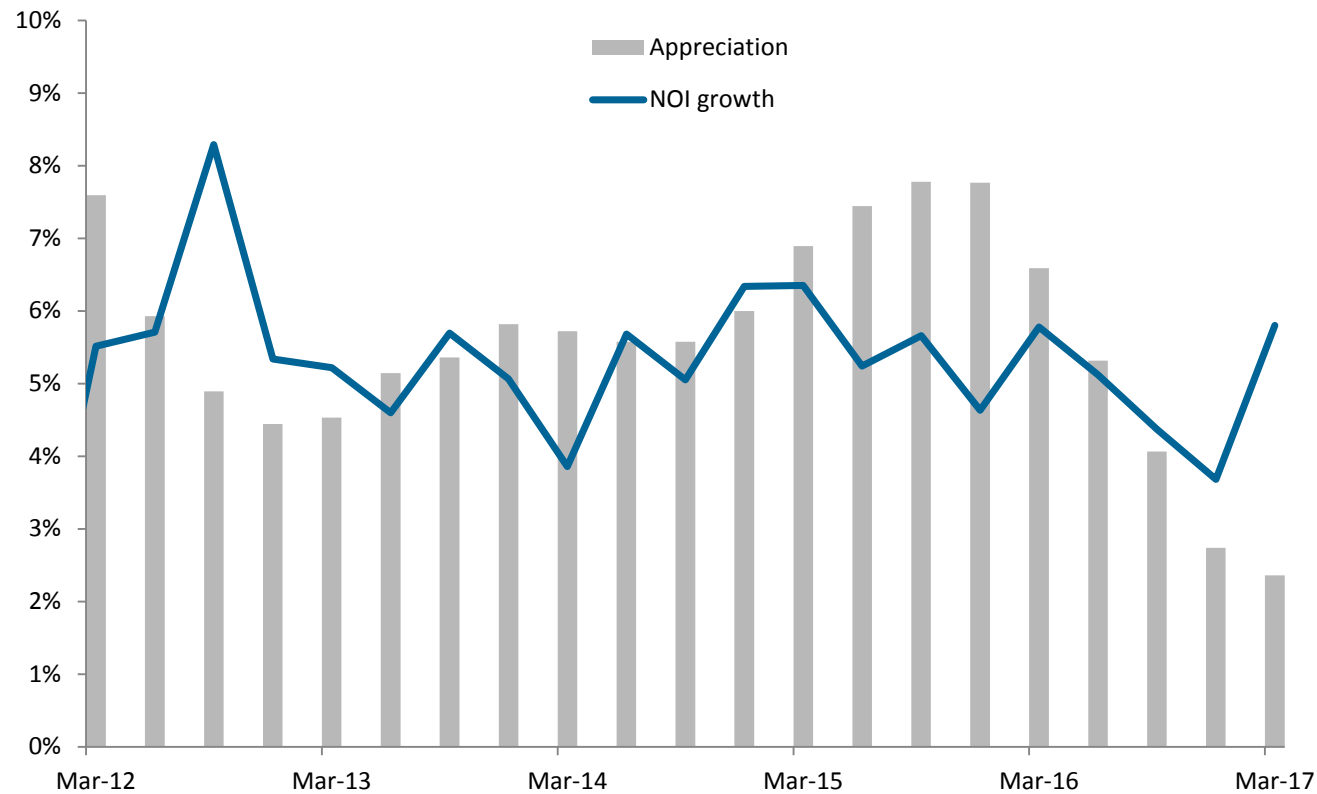


Source: CoStar (top left, bottom right), as of 3/31/2017; Bureau of Census (top right), as of 2/28/2017; Dodge Construction (lower left), as of 03/31/2017

NOI growth is outpacing appreciation again

This should boost cap rates and share of core returns coming from income – exactly what we want to see as cycle matures

Four quarter ODCE unlevered property appreciation versus NOI growth

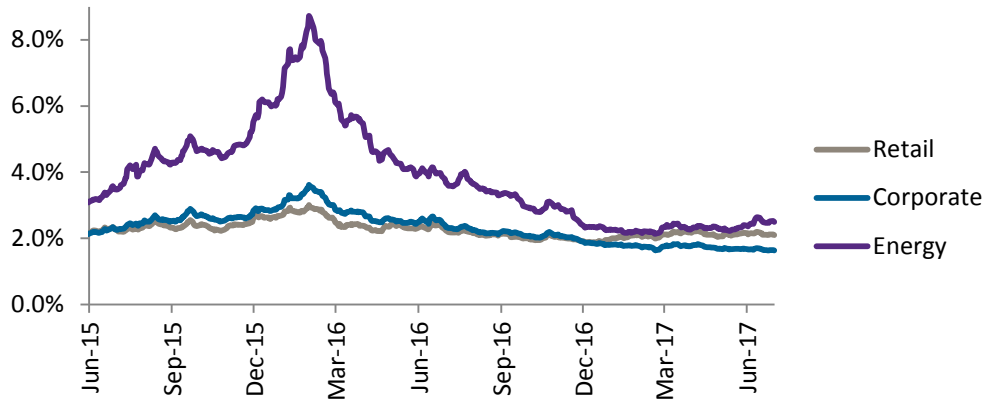


Source: NCREIF, as of March 2017

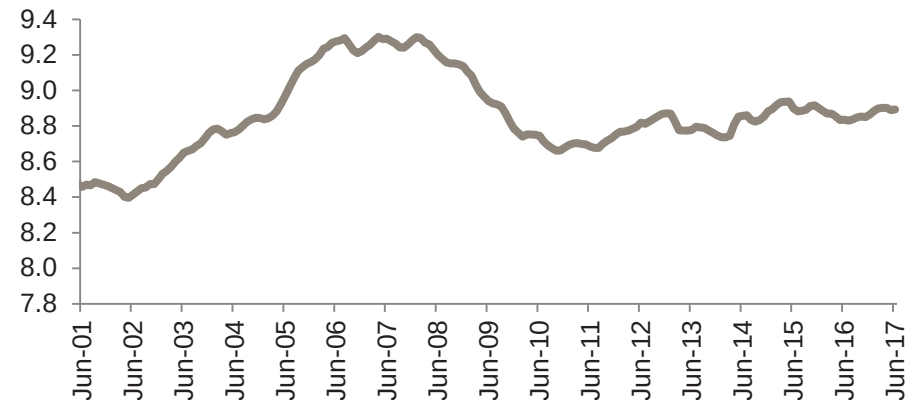
Retail's apocalyptic narrative not yet backed by macroeconomic data...

Even the bond market is shrugging

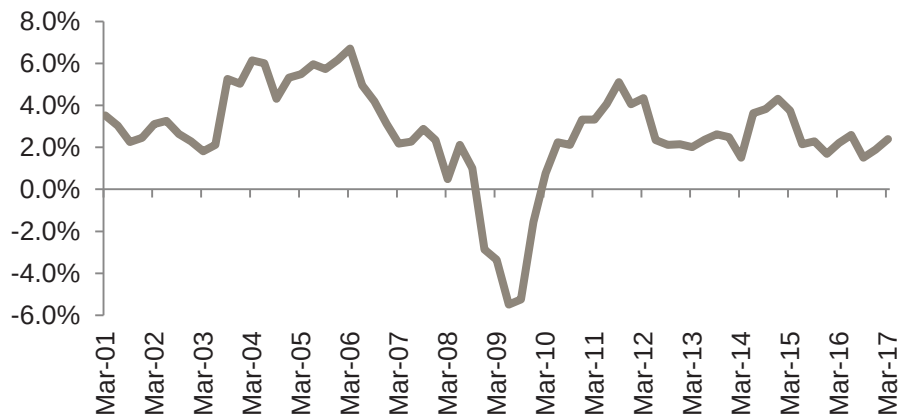
Option adjusted spreads on IG & High Yield debt



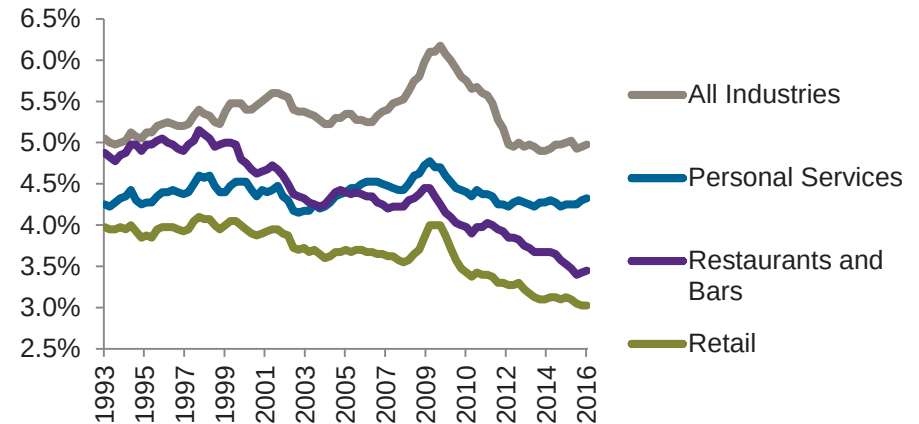
Salespeople in retail sector, millions



Retail sales, x internet, x autos, x gas, versus a year earlier



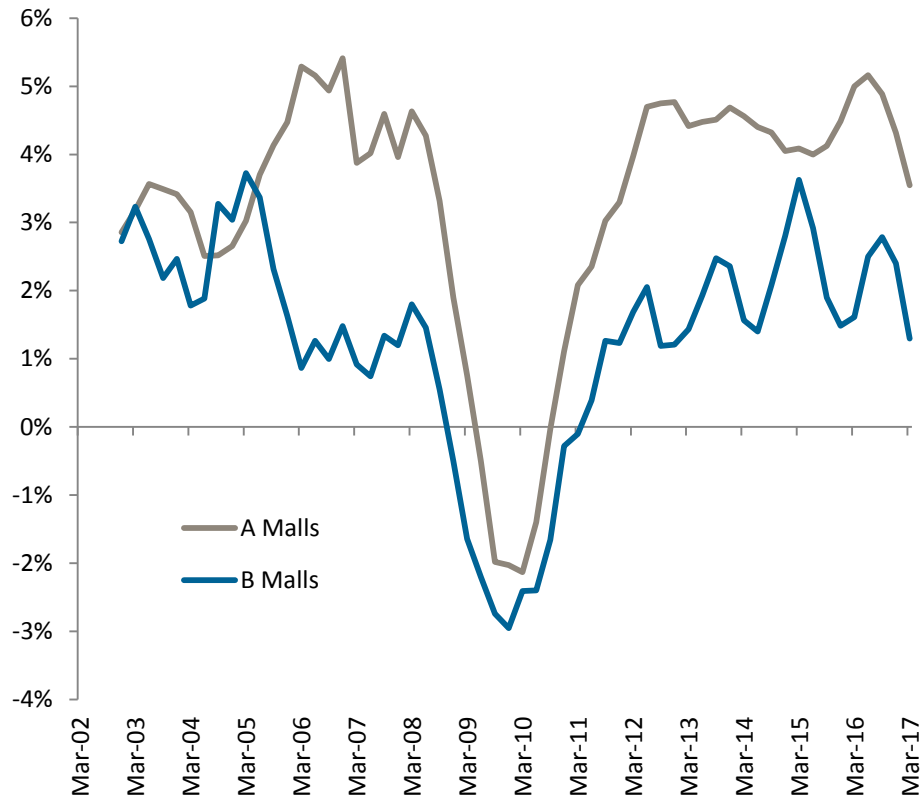
Share of establishments closing, quarterly rate



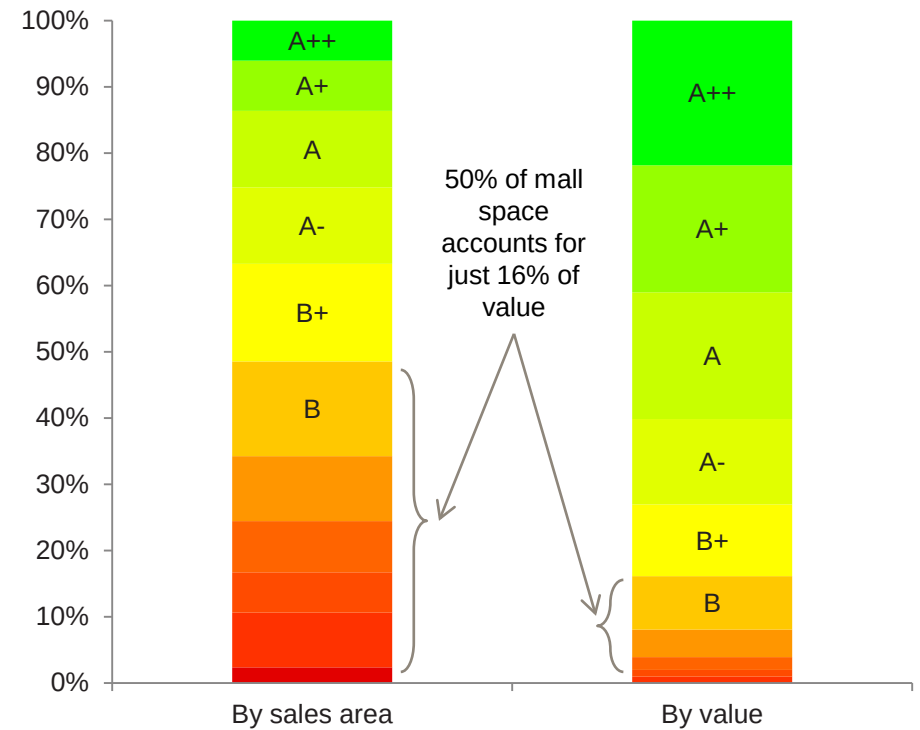
Sources: Upper Left: Barclays as of July 2017; Upper Right: BLS as of June 2017; Lower Left: Bureau of Census as of March 2017; Lower Right: BLS as of 3Q 2016

Class A malls still performing

Mall REIT y/y same-store NOI growth by class



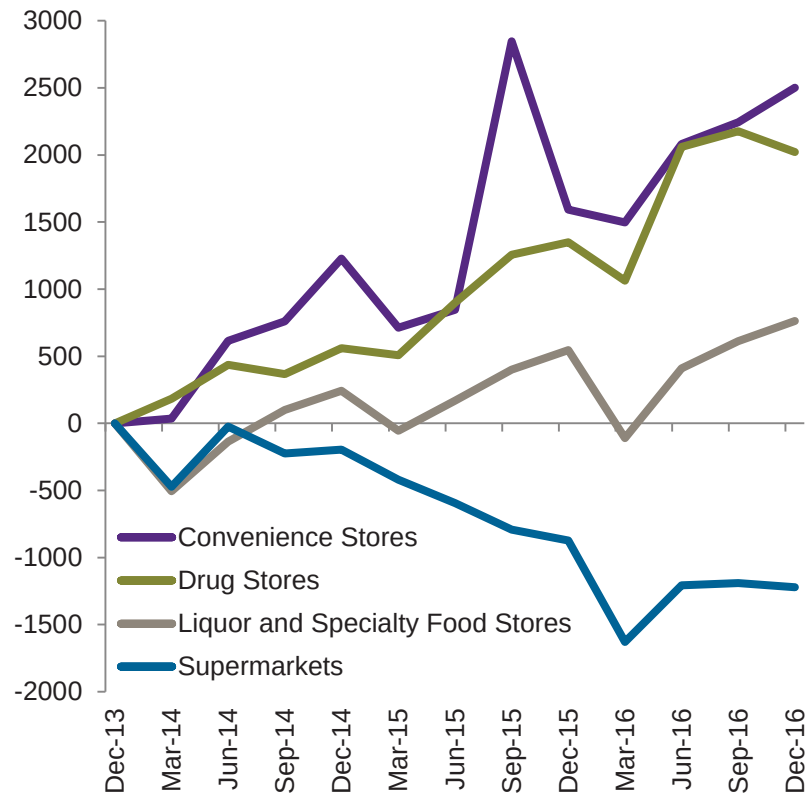
The weakest malls comprise only a tiny share of total market's value



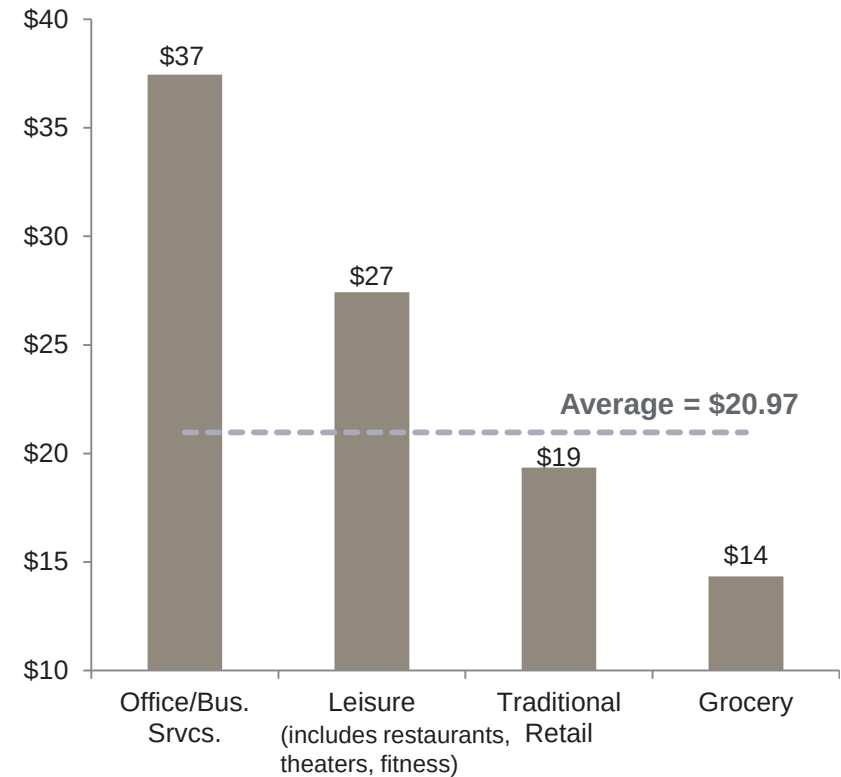
Source: Left : JPMAM, as of 1Q 2017; Right: Green Street Advisors

Retail strips: transition from traditional goods-selling retail to restaurants, services and experiential retailers does not need to reduce shopping center NOI

Three year cumulative change in store count



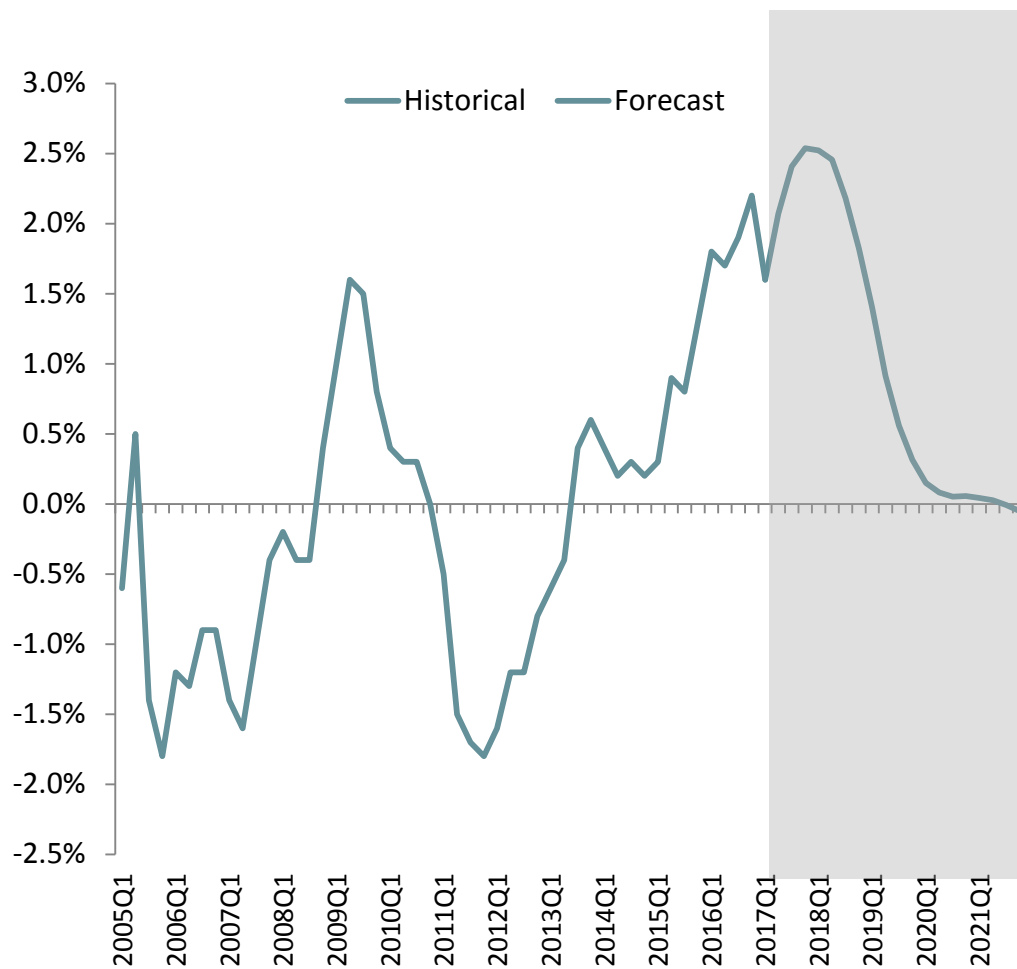
Net effective rent by tenant category



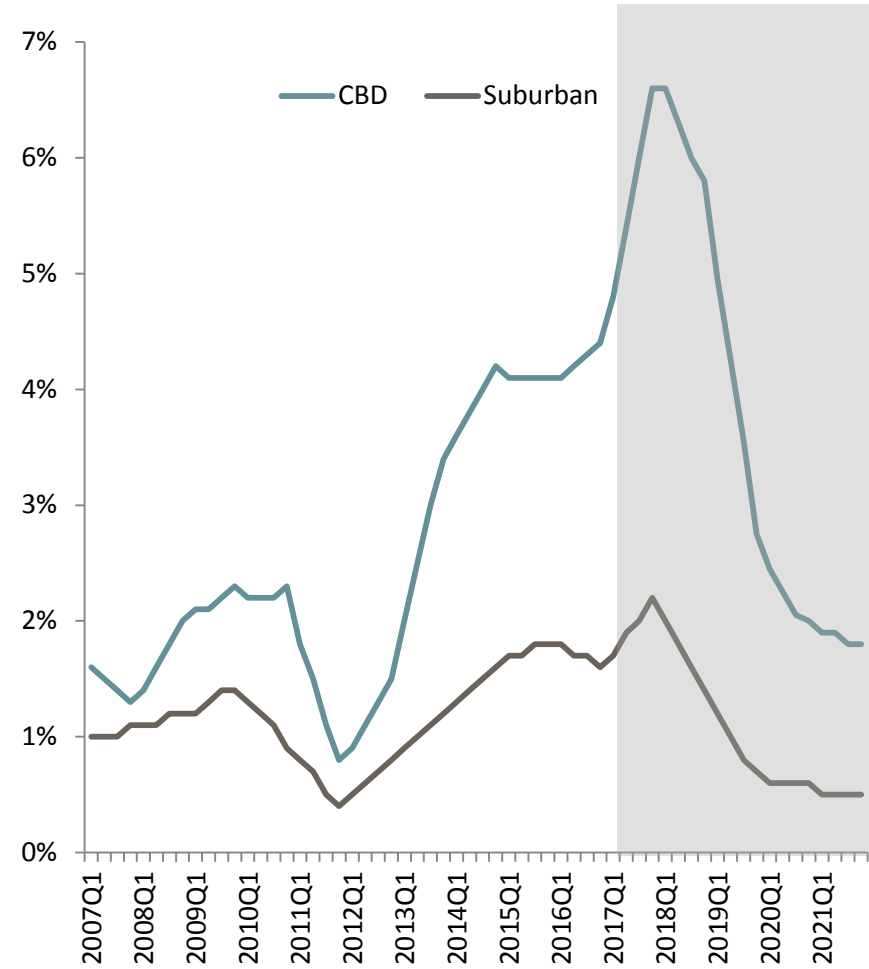
Source: Left: U.S. Bureau of Labor Statistics, as of 4Q 2016; Right: JPMAM

Apartment: closing urban underperformance gap requires collapse in supply

Rent growth gap: suburban minus urban



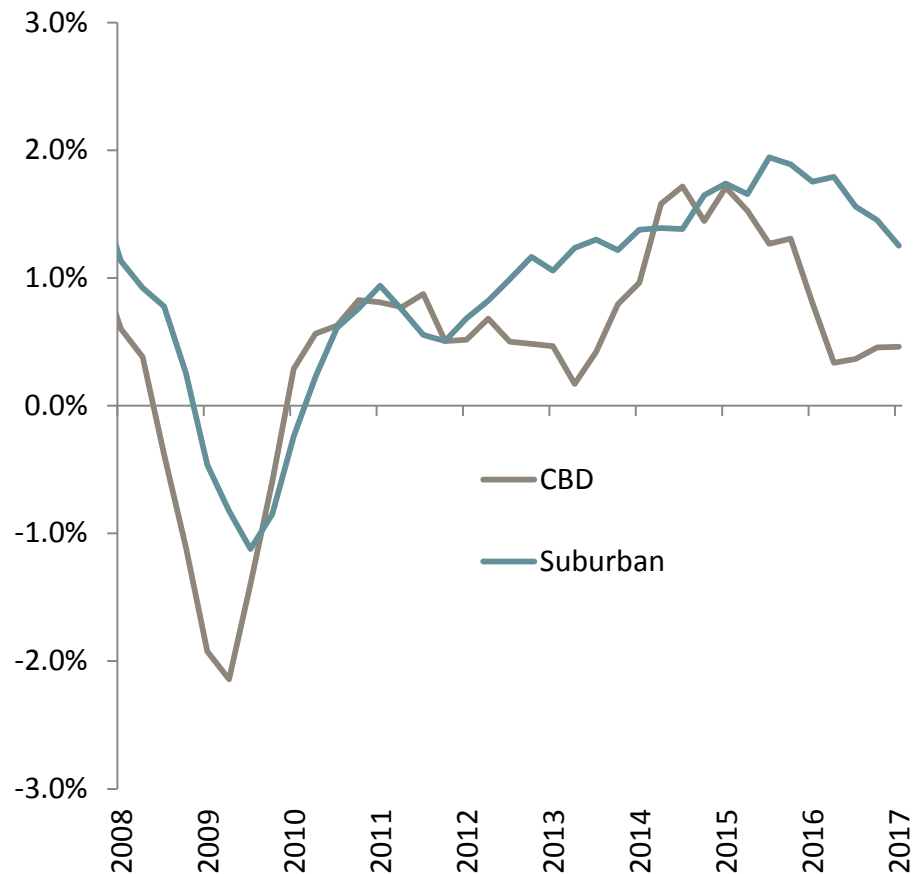
Completions as % of stock



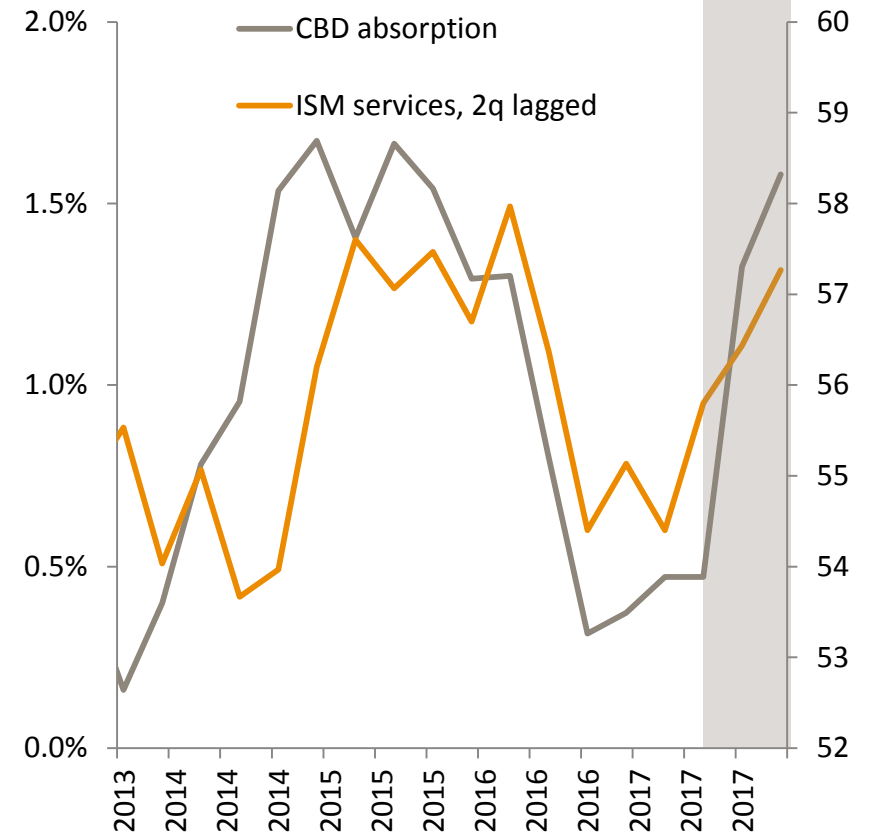
Sources: JPMAM, Reis and Axiometrics, as of 1Q 2017

Office: outside of tech, CBD leasing still soft, but forward indicators positive

Office net absorption



Regression forecast of CBD absorption on ISM



Source: CBRE-EA, as of March 2017

Industrial: large box segment of some markets at risk of over-supply

Rolling four quarter stats as a share of stock, buildings larger than 400K SF

Market	Stock (Buildings)	Vacancy	Net absorption	Deliveries	Under construction
Atlanta	253	10.6%	7.6%	8.7%	9.0%
Chicago	425	7.7%	3.0%	4.3%	4.2%
Dallas / Fort Worth	283	9.4%	7.2%	8.0%	6.8%
Inland Empire	329	5.8%	8.5%	7.8%	7.3%
Houston	101	3.6%	14.8%	12.5%	4.1%
Los Angeles	105	1.9%	-0.4%	1.4%	1.9%
New York	201	4.8%	2.9%	1.2%	2.8%
San Francisco Bay Area	42	3.5%	5.6%	4.4%	2.5%
Seattle / Puget Sound	59	1.0%	-0.2%	0.0%	4.4%
South Florida	23	2.3%	0.7%	0.0%	6.7%
Washington DC	40	5.7%	2.2%	1.5%	13.8%

Source: CoStar, as of 2Q 2017

Looking forward

Capital Market Expectations

- High quality transactions will continue to have strong bidder pools.
- Value-added real estate remains liquid despite risk averse lending environment.
- ODCE total return for next four quarters should be in the 6.5% to 7.5% range.

Sector Views

- Apartment: Significant outperformance in less supplied suburbs.
- Industrial: Big box supply will slow rent growth in a few locations, but tenant demand will remain strong. Improving efficiencies in distribution could weigh on demand despite retail and online sales growth.
- Office: Absorption may reaccelerate in 2H17 on improved sentiment and financial services profits, but we've been waiting for three quarters now.
- Retail: Negative news flow is focused on lower quality malls. Grocery-anchored strips not fully bulletproof, but necessity and service-oriented tenants still expanding.

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JPMCB Strategic Property Fund: Fee schedule

Tiered Fee Structure Based on NAV of Investor's Shares		Percentage (per annum)
Clients < \$100 million		1.00%
Clients > \$100 million	First \$100 million	0.92%
	Next \$150 million	0.85%
	Next \$250 million	0.80%
	Amounts thereafter	0.75%
Fee on Cash		
	Cash > 5%	0.15%

- The fee will only be 0.15% with respect to the market value of cash and cash equivalents in SPF in excess of a 5.0% reserve position for cash and cash equivalents
- No acquisition, disposition or incentive fees
- Fees shall be computed and billed on a calendar quarter basis, in arrears

Valuation Process

Independent third-party valuation review and approval – Every asset – Every quarter

■ Quarterly: Valuation of every asset

- Office, Industrial and Retail Assets
 - Each quarter that a property is not valued by a third-party appraiser, the Altus Group completes an interim quarterly valuation
 - The Altus valuations are reviewed by a member of the valuations group for reasonableness and by the responsible Asset Manager for accuracy of property information and reasonableness of assumptions
- Multifamily Assets
 - Each quarter, the Altus Group monitors the multifamily assets for changes in rent, occupancy and appropriateness of previous capital market assumptions
 - The Altus Group will recommend which assets should be reviewed further for a potential interim quarterly valuation. If JPM and the Altus Group agree that a change in value from the current carrying value is supported, JPM will produce an interim quarterly valuation which will be reviewed and approved by the Altus Group
- Internal Valuations
 - In certain circumstances, for example development assets and land, JPM completes an internal valuation. The Altus Group will also review all JPM internal valuations in a manner similar to that of the external review process
- Director of Valuations reviews and signs off on each value

■ Quarterly: Independent third-party valuation review and approval for every asset

- All valuations reviewed and approved by the Altus Group every quarter

■ Quarterly: Audit review by PricewaterhouseCoopers

■ Annual: Third-party valuation

- External valuation once per year for all assets occurring throughout the year
- Asset managers review external appraisals
 - Accuracy of factual information
 - Accuracy of leasing conditions and market data
 - Summarizes appraisal assumptions and valuation conclusion
- Director of Valuations reviews reasonableness of assumptions and final value, as well as consistency of pricing parameters within geographic region and property type

Third-party appraisal firms:

- Cushman & Wakefield
- CB Richard Ellis
- Integra Realty Resources
- National Valuation Consultants
- National Property Valuation Advisors
- Welsh Chester Galiney Matone
- New Market Real Estate Group
- KTR Real Estate Advisors
- Real Estate Research Corporation

Product Design: Risk Management Elements

Fund guidelines	Strategic Property Fund
Leverage Limit:	
Portfolio	35%
Asset Specific	65%
Cash Min - Max	1% - 5%
Asset Type Sector Concentration + / - vs. NFI-ODCE ¹	15%
Geographic Sector Concentration + / - vs. NFI-ODCE ¹	15%
Development Property - Non Income Producing Max ²	15%
JV Single-Partner Largest Concentration ³	10%
Single Largest Asset Concentration ³	5%
Annual Gross Turnover (rolling four quarters) ⁴	5% - 20%
Annual Net Turnover (rolling four quarters) ⁵	5% - 20%

¹ Based on Fund's gross asset value (GAV) - direct real estate only, excluding Land

² Based on Fund's gross asset value (GAV) - direct real estate only, including Land. 5% for new development and up to a total 15% including re-development opportunities.

³ Based on the Fund's net asset value (NAV)

⁴ Represents, as a percentage of the Fund's quarterly average gross asset value, the total gross acquisitions, gross sales proceeds and capital expenditures over a rolling 12 month period

⁵ Represents, as a percentage of the Fund's quarterly average net asset value, total net sales proceeds over a rolling 12 month period

Appendix – Biographies of key professionals

J.P. Morgan Asset Management – Real Estate Americas



Kevin Faxon, Managing Director, is head of Real Estate Americas at J.P. Morgan Asset Management. The 250 person group manages more than \$60 billion of assets across a range of Core, Value-added and Opportunistic strategies on behalf of institutional, sovereign and high net worth investors. Kevin is a member of JPMAM Americas Executive Committee and sits on the J.P. Morgan Commercial Real Estate Council which coordinates the Real Estate activities of the broader Firm. An employee since 1988, Kevin was previously portfolio manager of the Special Situation Property and Income & Growth Funds. Prior to assuming these roles, Kevin was head of acquisitions for the western United States. Before joining the firm, he was employed by Landauer Associates, a national real estate consulting firm. Kevin holds a B.S. in real estate and finance from the University of Connecticut and an M.B.A. in finance from New York University. He is Chairman of the Board of Directors of PREA and Urban Land Institute Foundation Trustee and Governor.



Douglas A. Schwartz, Managing Director, is Chief Investment Officer, Real Estate Americas, J.P. Morgan Asset Management. Previously, Doug was portfolio manager of JPMCB Special Situation Property Fund, an open-end, value added real estate fund. Prior to this role, he was head of real estate acquisitions for the West Coast with responsibility for sourcing, underwriting and closing transactions across property types for all of J.P. Morgan's U.S. real estate funds. His 22 years in the industry have included roles in acquisitions, asset management, development management and research. Prior to joining the firm in 2004, he held real estate investment roles with Lowe Enterprises, Bristol Group and Sedway & Associates. Doug earned his B.A. in mathematics from the University of Pennsylvania and an M.B.A. from the University of California, Los Angeles. Doug is a volunteer mentor for American Corporate Partners, and a ULI IOPC assistant chairman.



Mike P. Kelly, Managing Director, is Director of U.S. Real Estate Commingled Funds and head of Debt Capital Markets, Real Estate Americas, at J.P. Morgan Asset Management. An employee since 2009, Mike is responsible for oversight of the portfolio managers for U.S. open-end funds, leadership of the client strategy team and management of a team that procures debt for J.P. Morgan Asset Management's properties and originates and manages mezzanine loans. Before joining the firm, he was a director and head of Real Estate Conduit and Workouts for Citigroup Global Markets. Previously, Michael was a vice president and originator in the Large Loan CMBS Group and assisted with management of Goldman Sachs Commercial Mortgage Capital. Prior to that, he was a managing director and co-head of Commercial Mortgage Origination at New York Life Investment Management. He started in the industry in 1989. Mike earned a B.S. in business management from Springfield College and an M.S. in real estate from New York University and holds Series 3, 7 and 63 licenses.



Ann E. Cole, Managing Director, is co-portfolio manager for J.P. Morgan's flagship U.S. core real estate strategy, Strategic Property Fund. Ann joined the Strategic Property Fund portfolio management team in July 2012. Since joining J.P. Morgan Asset Management in 1989, Ann has held various positions in our Real Estate Asset Management team including Sector Head of our office/industrial East (more than \$4 billion in assets) and West (more than \$3 billion in assets) Regions. Ann has extensive real estate experience with the acquisition, asset management, development and disposition of institutional quality real estate and was responsible for overseeing the development of Strategic Property Fund's 2000 Avenue of the Stars in Los Angeles. Ann also served as a Client Portfolio Manager on the Marketing and Client Strategy team, where she advised clients on real estate investment strategies. Ann has a B.B.A. in accounting from Pace University and passed the March 1987 CPA examination. Ann holds the Series 7 and 63 licenses, is an active participant in NAREIM and a member of PREA.



Kimberly A. Adams, Managing Director, is co-portfolio manager for J.P. Morgan's flagship U.S. core real estate strategy, Strategic Property Fund. Kim joined the Strategic Property Fund portfolio management team in July 2012. Since joining J.P. Morgan Asset Management in 2003, Kim has served in various investment roles including Sector Head for office/industrial asset management in the Central region. In this role, Kim was responsible for leading the asset management efforts for the region's office and industrial holdings, a \$5.0 billion portfolio in gross value totaling approximately 66 million square feet. Previously, Kim served as a senior asset manager in the retail group as well as in the East/South region and as an acquisitions officer in the Midwest Region. Earlier in her career, Kim worked for Prudential Real Estate Investors and LaSalle Investment Management. Kim received a B.A. in economics from Northwestern University and an M.B.A. from the Kellogg Graduate School of Management. She serves as a council member for the Urban Land Institute and a member of PREA.

J.P. Morgan Asset Management – Real Estate Americas



Alexia Gottschalch, *Managing Director*, manages Key Client Relationships and Consultant Strategy for Real Estate Americas at J.P. Morgan Asset Management. She is responsible for advising clients of the firm on global real estate strategy, across geographies and risk levels. Alexia also serves on the Real Estate Americas Management Team as well as the Global Alternatives Client Operating Committee. Prior to joining J.P. Morgan, Alexia was Global Head of Capital Markets of Grosvenor Fund Management, leading a central capital raising team. Earlier in her career, she was a member of senior management at Independence Capital Partners, Cheswold Real Estate Investment Management, Prudential Real Estate Investors, Tishman Speyer, ING and Deutsche Bank. She earned her A.B. from the University of Pennsylvania and holds Series 3, 7, 24 and 63 licenses.



Benjamin G. Gifford, *Managing Director*, is Chairman of Real Estate Americas Investment Committee at J.P. Morgan Asset Management. Ben is responsible for governing the Investment Committee proceedings as well as managing Real Estate Americas' Separate Account business. An employee since 1998, Ben is the former CIO, Real Estate Americas, and, in that role, was responsible for the direct real estate investment activity of the commingled funds and all separate accounts. Prior to joining the firm, he was president of O'Connor Realty Advisors, where he was responsible for the separate account direct investment real estate advisory business. He was also employed at the Morgan Guaranty Trust Company, where he was responsible for real estate equity investments on behalf of its commingled trust fund and separate accounts. Prior to that, he was employed by the Teachers Insurance and Annuity Association (TIAA) as a mortgage officer. Ben holds a B.A. from the University of Pennsylvania and his professional affiliations include the Urban Land Institute, the International Council of Shopping Centers and the Pension Real Estate Association.



Dave Esrig, *Managing Director*, is JPMAM's Director of Research for Real Estate Americas and OECD Infrastructure and is the senior portfolio manager of the firm's suite of proprietary real estate funds of funds. An employee since 1997, Dave and his team forecast local economic and property performance used in acquisitions and dispositions underwriting. Additionally, he and his team develop new investment strategies for existing as well as new funds. Dave holds a B.A. from the University of Virginia, an M.A. in economics from the University of Pennsylvania, and is a CFA charter holder.



Mark Bonapace, *Managing Director*, is the head of Asset Management for the JPMorgan Real Estate Group, responsible for the management, leasing and ongoing development of the real estate assets. An employee since 1990, Mark has held several positions within the group. Prior to his role as head of Asset Management, Mark was the sector head for Office/Industrial East/South within the Real Estate Group. Mark has also been the Office/Industrial sector head for the Central region and was a Senior Asset Manager for our Retail portfolio. Mark previously worked at Deloitte & Touche for four years. He holds a B.S. in accounting from the University of Delaware and an M.B.A. in finance from New York University's Stern School of Business. Mark is also a Certified Public Accountant and an active member of the Urban Land Institute.



James F. Kennedy, *Managing Director*, is the head of the Development & Engineering Group, Global Real Estate, at J.P. Morgan Asset Management. An employee since 2004, he is responsible for engineering and environmental due diligence, development oversight and general engineering support. Jim is involved with the various real estate and infrastructure funds internationally, and provides leadership in the group's sustainability initiatives. Prior to joining J.P. Morgan Jim served in various roles across the development, construction and business consulting fields. His experience ranges across asset types, including office, industrial, retail, multi-family, hospitality and large-scale civil infrastructure. Jim received a B.B.A. in finance from the University of Massachusetts at Amherst and an M.S. in civil and environmental engineering from the Massachusetts Institute of Technology. He is a member of the American Society of Civil Engineers, National Association of Real Estate Investment Managers, Urban Land Institute and International Council of Shopping Centers. Jim is a USGBC-LEED Accredited Professional.

J.P. Morgan Asset Management – Real Estate Americas



Lawrence Fuchs, *Managing Director*, is the Head of Finance and Business Management, Global Alternatives, at J.P. Morgan Asset Management. An employee since 2000, he is responsible for driving strategy and operations around new business initiatives, governance, risk management, financial planning, and people initiatives. Lawrence is a member of the Global Alternatives Management Committee and serves on the investment committees and boards of directors of various real estate, infrastructure and maritime funds. Prior to joining the group, he was the director of operations for the Emerging Markets U.S. division of J.P. Morgan Securities, Inc. From 1998 to 2000, he was a member of the Emerging Markets Trading Association, providing insight for emerging markets operational risk and business practices. Lawrence registered as a General Securities Principal of J.P. Morgan Institutional Investments, Inc. He holds a B.B.A. in finance from Hofstra University.



Steven M. Greenspan, *Managing Director*, is the Global Director of Product Development for J.P. Morgan Asset Management. Steven plays an integral role in the design, marketing, launch, implementation and oversight of Real Estate Americas' global products and strategies. A J.P. Morgan employee since 1996, Steven has broad experience in structuring open- and closed-end funds and separate accounts designed to meet the complex commercial, legal, regulatory, and tax needs of JPMAM's global client base. He is a member of JPMAM's Global and Americas Management Committees and serves on the investment committees and boards of directors of various real estate, infrastructure and maritime funds. Steven has been recognized as a New York Super Lawyer. He previously served as a vice president/assistant general counsel in JPMAM's Legal Department, and as a practicing attorney in the real estate and corporate departments at Stroock & Stroock & Lavan LLP. Steven holds a B.P.S. from the University at Buffalo and a J.D. from Brooklyn Law School.



William C. Schultz, *Managing Director*, is Chief Operating Officer of Real Estate Americas for J.P. Morgan Asset Management. An employee since 2002, he is responsible for development and execution of the business plan, strategic initiatives and operational management of the Americas real estate business. Bill is a member of the Real Estate Americas Management Committee. He is also a board member of the JPMorgan Alternative Property Fund and a past board member of the JPMorgan US Real Estate Income and Growth Fund. His prior responsibilities within Real Estate Americas include managing the platform's expansion into Europe and Asia and roles as the Global Head of Technology, India Services and Product Delivery. Prior to joining the firm, Bill was a business process engineering and technology consultant, providing automation solutions to Fortune 500 companies globally. He holds a B.A. in economics from Glassboro State College.



Alfred W. Dort, *Managing Director*, is head of the Global Real Estate Financial Group at J.P. Morgan Asset Management. An employee since 1997, he manages a team of professionals that provide dedicated support to the real estate and transportation teams in New York, Los Angeles, London, Luxembourg, Mumbai, Hong Kong and Singapore. His responsibilities include all aspects of financial management, tax, reporting and analysis for all of the platforms open- and closed-end funds and separate accounts. He serves on the boards of directors of several real estate funds and is a non-voting member of the Real Estate Americas Investment Committee. Prior to joining the firm, Alfred spent several years with PricewaterhouseCoopers LLP, providing consulting and accounting services to real estate industry clients. He earned a B.S. in accountancy from Villanova University and is a Certified Public Accountant. He is currently a member of the American Institute of Certified Public Accountants and the New York State Society of Certified Public Accountants.

Real Estate Investment Management Services

JPMCB Strategic Property Fund Annual Performance Report

Annual returns, U.S. \$

Composite											As of December 31				
			Total Gross Return	Total Net Return	NCREIF Property Index Return	NCREIF ODCE Index Return	Composite 3yr St Dev	NCREIF Property Index 3yr St Dev	NCREIF ODCE Index 3yr St Dev	Internal Dispersion	Number of Accounts	Composite Assets (\$millions)	% of Real Estate Assets (%)	Total Firm Assets (\$billions)	
Year	Income (%)	Appreciation (%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)					
2015	4.87	9.93	15.24	14.10	13.33	15.01	1.36	0.33	0.46	n/a	≤ 5	39,655	44.20	849	
2014	5.18	7.70	11.14	10.04	11.81	12.49	1.35	0.21	0.49	n/a	≤ 5	34,441	41.83	845	
2013	5.25	10.16	15.90	14.76	10.99	13.94	1.44	0.51	0.74	n/a	≤ 5	27,665	38.28	775	
2012	5.26	6.54	12.12	11.02	10.54	10.94	2.05	1.08	1.45	n/a	≤ 5	24,450	37.79	701	
2011	5.47	9.98	15.96	14.82	14.26	15.99	9.18	4.63	7.47	n/a	≤ 5	21,322	35.60	657	
2010	6.61	7.11	14.15	13.03	13.11	16.36	9.35	4.89	7.49	n/a	≤ 5	17,868	36.24	621	
2009	6.13	(30.92)	(26.55)	(27.30)	(16.86)	(29.76)	9.46	5.05	7.39	n/a	≤ 5	14,821	33.54	617	
2008	4.97	(12.49)	(8.09)	(9.01)	(6.46)	(10.01)	5.24	4.07	4.98	n/a	≤ 5	18,741	37.12	575	
2007	5.42	10.73	16.68	15.54	15.84	15.97	3.33	0.81	0.96	n/a	≤ 5	20,357	36.00	442	
2006	5.72	10.34	16.60	15.45	16.59	16.32	3.36	0.96	0.95	n/a	≤ 5	16,322	38.00	374	

Fees (as of 12/31/15)

1.00% per annum on the market value of the assets, except for cash holdings in excess of 7.5% of the fund's total assets, which are charged a standard cash management fee of 15 basis points.

Minimum investment: \$10 million

J.P. Morgan Investment Management Inc. claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. J.P. Morgan Investment Management, Inc has been independently verified for the period from 2001-2013. The verification report is available upon request.

Verification assesses whether (1) the firm has complied with all the composite construction requirements of the GIPS standards on a firm-wide basis and (2) the firm's policies and procedures are designed to calculate and present performance in compliance with the GIPS standards. Verification does not ensure the accuracy of any specific composite presentation.

J.P. Morgan Investment Management Inc. (JPMIM or the Firm) consists of the assets of institutional clients invested in US managed products including 1) the fixed income and cash assets formerly part of Chase Asset Management and MDS&Chase Partners, 2) the New York institutional investment division of JPMorgan Chase Bank, N.A., formerly Morgan Guaranty Trust Company of New York, and 3) the institutional investment assets of JPMorgan Investment Advisors, Inc. (JPMIA), formerly known as Banc One Investment Advisors Corporation (BOIA), the advisor to institutional assets directly managed by JPMIA or sub-advised by an affiliate institution, and 4) the institutional assets of Bear Stearns Asset Management Inc. The Firm also includes Separately Managed Accounts over which JPMIM has full and sole discretion. JPMIM is marketed under JPMorgan Asset Management.

The composite contains a single account which is the commingled fund that is directly invested according to JPMIM's Strategic Property Fund strategy. The strategy is an actively managed diversified, core, open-end commingled pension trust fund. It seeks to generate an income-driven rate of return and outperform the NCREIF Fund Index – Open End Diversified Core Equity (NFI-ODCE) over a full market cycle (three-to-five-year horizon) through asset, geographic and sector selection and active asset management. The Fund invests in high-quality stabilized assets with dominant competitive characteristics in markets with attractive demographics throughout the United States. The composite was created in December 2000.

Equity futures are occasionally used in accordance with client-authorized account objectives and guidelines in order to equitize large cash contributions and to minimize market impact while purchasing individual equity securities.

Both gross and net returns reflect the reinvestment of income, deduction of transaction costs, and are net of withholding taxes where applicable and include the effect of leverage, which averaged 26.30% of asset value in the year 2015. All returns are expressed in U.S. dollars. Gross returns do not reflect the deduction of investment advisory fees or any other expenses that may be incurred in the management of the account. The sum of the income and appreciation returns will not equal the total gross return due to the effect of compounding. Net returns have been calculated monthly using the actual fees charged to shareholders of the fund. As of December 31, 2015, the standard annual fee schedule is as follows: For investors with Fund NAV below \$100 million: 1.00% of the participant's pro-rata share of the net asset value of JPMCB Strategic Property Fund, except that the fee will only be 0.15% with respect to the market value of cash and cash equivalents in SPF in excess of a 7.5% reserve position for cash and cash equivalents. For investors that maintain Fund NAV of \$100 million or more: 1.00% of the participant's pro-rata share of the net asset value of JPMCB Strategic Property Fund on the first \$40 million of NAV, 0.90% per annum on the next \$25 million of NAV, and 0.85% per annum on the balance of the NAV; except that the fee will only be 0.15% with respect to the market value of cash and cash equivalents in SPF in excess of a 7.5% reserve position for cash and cash equivalents.

The firm's list of composite descriptions and the policies for valuing portfolios, calculating performance and preparing compliant presentations are available upon request.

Effective July 1, 2013, the Fund will change its benchmark from the NCREIF Property Index (NPI) to the NCREIF Fund Index – Open End Diversified Core Equity (NFI-ODCE). As a capitalization-weighted index of U.S. open-end core direct real estate funds with returns based on changes in the published market value of net assets of its constituents, the NFI-ODCE provides a more meaningful peer-to-peer comparison than the NPI, a market-value weighted index of unleveraged property returns for the investment-grade U.S. real estate market. Released in 2005, the NFI-ODCE was not available for use as a benchmark at the Fund's inception January 1, 1998. We have made the decision to switch the Fund's benchmark to the NFI-ODCE as the index is now more widely used in the industry as a gauge of performance of the overall institutional-quality U.S. real estate marketplace.

The three-year annualized standard deviation measures the variability of the composite and the benchmark returns over the preceding 36-month period.

The internal dispersion of annual returns is measured by the asset-weighted standard deviation of gross account returns included in the composite for the full year. For periods with 5 or fewer accounts included for the entire year, internal dispersion is not presented (n/a) as it is not considered meaningful.

Past performance is no guarantee of future results. As with any investment vehicle, there is always the potential for gains as well as the possibility of losses.

J.P. Morgan Asset Management – Real Estate Americas

The Commingled Pension Trust Fund (Strategic Property) of JPMorgan Chase Bank N.A. is a collective trust fund established and maintained by JPMorgan Chase Bank, N.A. under a declaration of trust. The fund is not required to file a prospectus or registration statement with the SEC, and accordingly, neither is available. The fund is available only to certain qualified retirement plans and governmental plans and are not offered to the general public. Units of the fund are not bank deposits and are not insured or guaranteed by any bank, government entity, the FDIC or any other type of deposit insurance. You should carefully consider the investment objectives, risk, charges, and expenses of the funds before investing.

Opinions, estimates, forecasts, and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. We believe the information provided here is reliable. These views and strategies described may not be suitable for all investors. References to specific securities, asset classes and financial markets are for illustrative purposes only and are not intended to be, and should not be interpreted as, recommendations. Past performance is no guarantee of future results.

Real estate investing may be subject to a higher degree of market risk because of concentration in a specific industry, sector or geographical sector. Real estate investing may be subject to risks including, but not limited to, declines in the value of real estate, risks related to general and economic conditions, changes in the value of the underlying property owned by the trust and defaults by borrower.

Leverage. Certain of the Fund's investments may be leveraged, which may adversely affect income earned by the Fund or may result in a loss of principal. The use of leverage creates an opportunity for increased net income, but at the same time involves a high degree of financial risk and may increase the exposure of the Fund or its investments to factors such as rising interest rates, downturns in the economy or deterioration in the condition of the investment collateral. The Fund may be unable to secure attractive financing as market fluctuations may significantly decrease the availability and increase the cost of leverage. Principal and interest payments on any leverage will be payable regardless of whether the Fund has sufficient cash available. Senior lenders would be entitled to a preferred cash flow prior to the Fund's entitlement to payment on its Investment.

The Target Return has been established by J.P. Morgan Investment Management Inc. "J.P. Morgan" based on its assumptions and calculations using data available to it and in light of current market conditions and available investment opportunities and is subject to the risks set forth herein and to be set forth more fully in the Memorandum. The target returns are for illustrative purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns similar to the target returns shown above. Because of the inherent limitations of the target returns, potential investors should not rely on them when making a decision on whether or not to invest in the strategy. The target returns cannot account for the impact that economic, market, and other factors may have on the implementation of an actual investment program. Unlike actual performance, the target returns do not reflect actual trading, liquidity constraints, fees, expenses, and other factors that could impact the future returns of the strategy. The manager's ability to achieve the target returns is subject to risk factors over which the manager may have no or limited control. There can be no assurance that the Fund will achieve its investment objective, the Target Return or any other objectives. The return achieved may be more or less than the Target Return. The data supporting the Target Return is on file with J.P. Morgan and is available for inspection upon request.

The value of investments and the income from them may fluctuate and your investment is not guaranteed. Past performance is no guarantee of future results. Please note current performance may be higher or lower than the performance data shown. Please note that investments in foreign markets are subject to special currency, political, and economic risks. Exchange rates may cause the value of underlying overseas investments to go down or up. Investments in emerging markets may be more volatile than other markets and the risk to your capital is therefore greater. Also, the economic and political situations may be more volatile than in established economies and these may adversely influence the value of investments made.

The deduction of an advisory fee reduces an investor's return. Actual account performance will vary depending on individual portfolio security selection and the applicable fee schedule. Fees are available upon request.

The following is an example of the effect of compounded advisory fees over a period of time on the value of a client's portfolio: A portfolio with a beginning value of \$100mm, gaining an annual return of 10% per annum would grow to \$259mm after 10 years, assuming no fees have been paid out. Conversely, a portfolio with a beginning value of \$100mm, gaining an annual return of 10% per annum, but paying a fee of 1% per annum, would only grow to \$235mm after 10 years. The annualized returns over the 10 year time period are 10.00% (gross of fees) and 8.91% (net of fees). If the fee in the above example was 0.25% per annum, the portfolio would grow to \$253mm after 10 years and return 9.73% net of fees. The fees were calculated on a monthly basis, which shows the maximum effect of compounding.

All case studies are shown for illustrative purposes only and should not be relied upon as advice or interpreted as a recommendation. They are based on current market conditions that constitute our judgment and are subject to change. Results shown are not meant to be representative of actual investment results. Past performance is not necessarily indicative of the likely future performance of an investment.

Any securities mentioned throughout the presentation are shown for illustrative purposes only and should not be interpreted as recommendations to buy or sell. A full list of firm recommendations for the past year is available upon request.

The Fund is established and maintained by JPMorgan Chase Bank, N.A. under a Declaration of Trust. The Fund is a bank-sponsored collective investment fund established as a group trust within the meaning of Internal Revenue Service Revenue Ruling 81-100, as amended. The Fund is available exclusively to certain tax-qualified retirement and governmental plans that have appointed JPMorgan Chase Bank, N.A. as fiduciary for the plan.

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Sentinel Real Estate Advisors Corporation

Mandate: Real Estate Separate Account

Hired: 2000

Firm Information	Investment Approach	Total ARMB Mandate
Sentinel is an independent, privately held real estate investment manager headquartered in New York, NY. Sentinel and its affiliates comprise a fully integrated organization that provides real estate investment management services to institutional and qualified private investors in the United States and abroad. Sentinel manages pooled and separate accounts holding diversified portfolios of real estate properties valued at \$7.0 billion consisting of nearly 29,000 apartment units and 8 million square feet of commercial real estate. Key Executives: George Tietjen, Managing Director/Co-Portfolio Manager David Stenger, Vice President/Co-Portfolio Manager	Sentinel's mandate is unique among ARMB's real estate separate accounts focusing specifically on multifamily investments. Sentinel's organization structure is vertically integrated so virtually all professionals working on an investment property are Sentinel employees. The strategy for ARMB is to construct a portfolio of core multifamily properties in markets with high barriers to entry with a focus on income and long term appreciation. Once a property is acquired, Sentinel seeks to add value to that investment. Sentinel's asset and property management teams take an active role in maximizing the property's potential through aggressive leasing strategies, continuous maintenance and capital improvement programs and cost controls. Benchmark: NCREIF Apartment Subindex	Assets Under Management: 6/30/2017: \$194,340,785

Concerns: None.

6/30/2017 Performance

	<u>Last Quarter</u>	<u>1-Year</u>	<u>3-Years Annualized</u>	<u>5-Years Annualized</u>
Manager (gross)	2.99%	8.69%	11.94%	10.68%
Fee	0.12%	0.54%	0.58%	0.58%
Manager (net)	2.87%	8.15%	11.36%	10.10%
Benchmark	1.45%	6.28%	9.18%	9.64%

Presentation for: Alaska Retirement Management Board (ARMB)



**By:
SENTINEL REALTY ADVISORS CORPORATION**

October 5, 2017

**George Tietjen, Managing Director/Co-Portfolio Manager
David Stenger, Vice President/Co-Portfolio Manager**

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Folsom, California
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Chadds Ford, Pennsylvania
- Versant Place Apartments
Brandon, Florida

SENTINEL PROFILE

- Company established in 1969.
- AUM as of June 30, 2017: \$7 billion.
- Stable and experienced senior management team that averages over 20 years with firm. David Weiner, Sentinel's Vice Chairman and a Co-Portfolio Manager retired in December 2016. His responsibilities were assigned to other senior officers of the firm. George Tietjen became the new Co-Portfolio Manager and has been with Sentinel since 1990. David Stenger continues to be Co-Portfolio Manager and has managed the ARMB account for 11 years.
- Approximately 900 employees including on-site property management.
- Assets geographically diversified across the US.
 - Nearly 29,000 apartment units
 - Nearly 8 million square feet of commercial real estate

SENTINEL PROFILE *(cont'd)*

- Wide range of multifamily and commercial investment strategies.
 - Sentinel Real Estate Fund (open end, core fund)
 - Sentinel National Urban Residential Partners (closed end, value add fund)
 - Separate accounts (core, core-plus and value added strategies)
 - Sentinel began our relationship with ARMB in 1984 and now manages a separate account with three apartment communities.

MULTIFAMILY MARKET UPDATE

Widespread Investor Appeal of US Multifamily Ownership

- US multifamily investments are the second largest institutional real estate investment sector as reported by the National Council of Real Estate Investment Fiduciaries (“NCREIF”), with an asset value of over \$131 billion.
- Over the past 20 years, the multifamily sector, as measured by the NCREIF Apartment Subindex, generated an average annual unleveraged total return of 9.5%. The income return averaged 6.1%.
- Cash flows from multifamily investments benefit from income sources spread over a large number of tenants, with no large single-tenant exposure and no major retensing or renewal expenditures compared to the office, retail and industrial sectors.

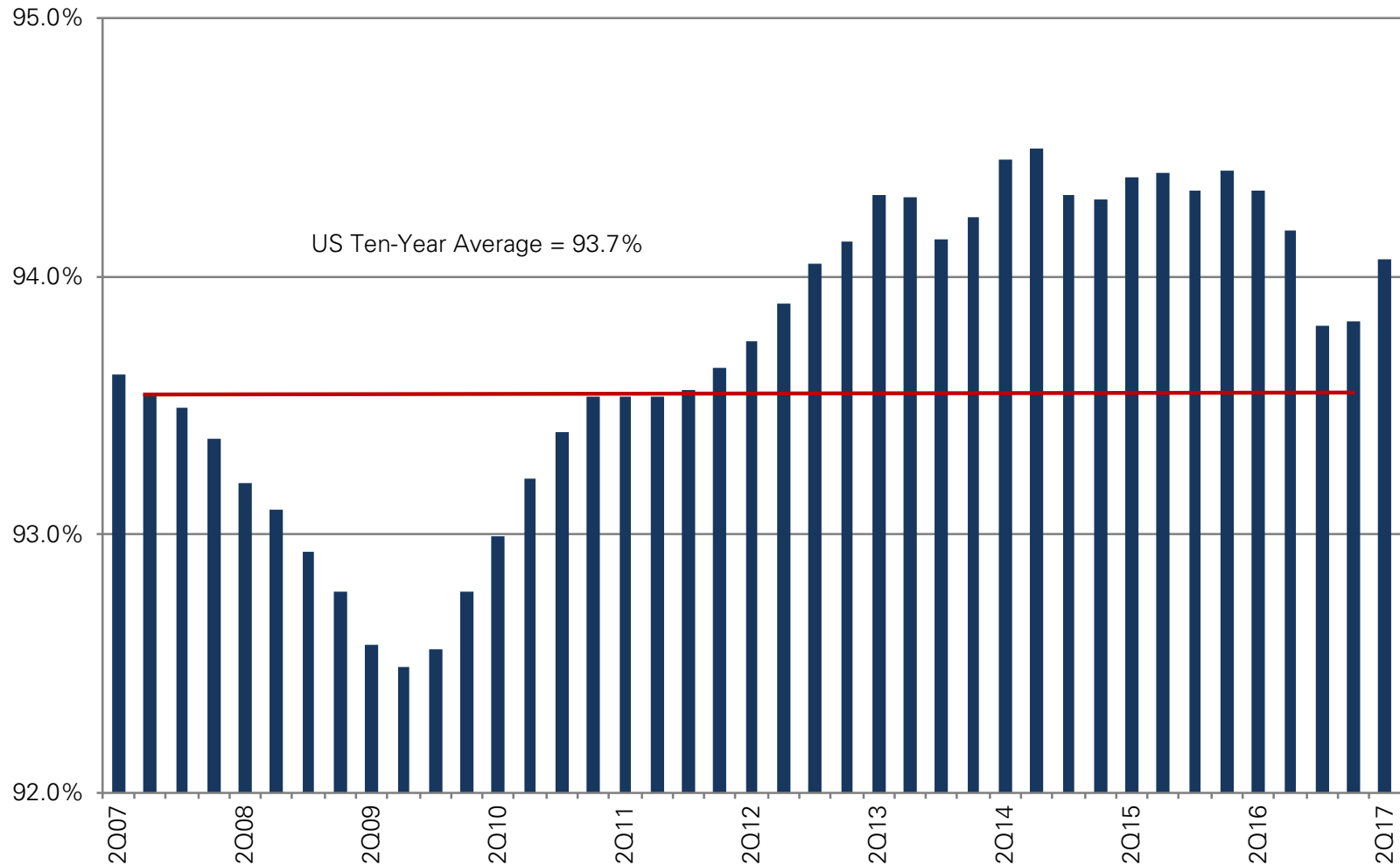
MULTIFAMILY MARKET UPDATE *(cont'd)*

Compelling Attributes of the Multifamily Sector

- **High occupancy rates:** While the average occupancy in the US declined year-over-year, it remained at 94.1% as of second quarter of 2017, still 40 basis points above the ten-year historical average.
- **Rent growth:** Same-store effective rents grew by 2.6% during the 12 months ended June 30, 2017, down compared to the cyclical peak year-over-year growth rate of 5.3% in the third quarter of 2015, but well above the ten-year average of 1.7%.
- **Financing:** Multifamily investments enjoy access to accretive debt financing provided to the sector through Fannie Mae, Freddie Mac, insurance companies and banks.

MULTIFAMILY MARKET UPDATE *(cont'd)*

Quarterly Occupancy Rates for US Apartments

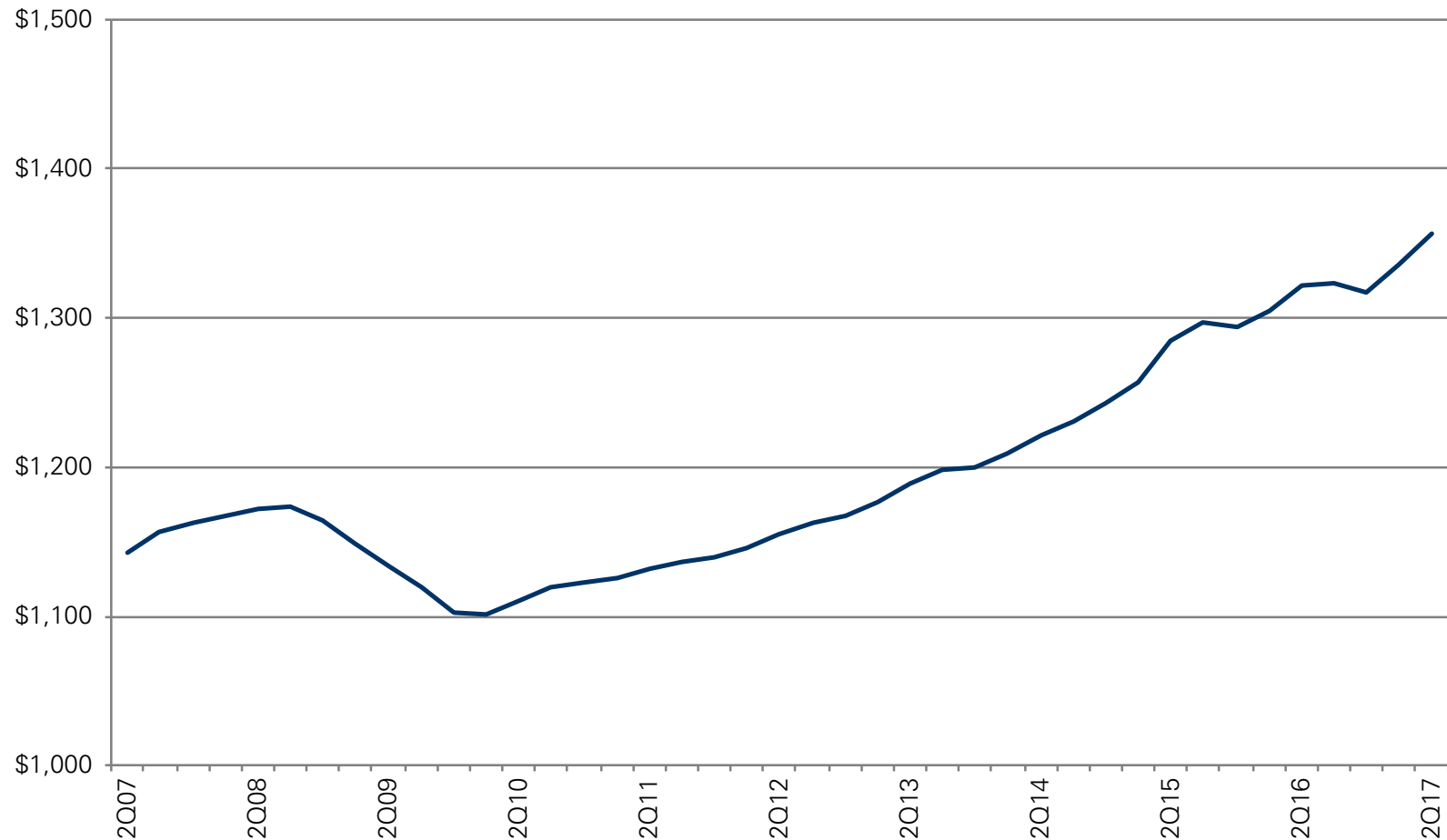


Source: CoStar

■ National Occupancy Rate

MULTIFAMILY MARKET UPDATE *(cont'd)*

Quarterly Effective Rents for US Apartments



Source: CoStar

— National Same-Store Effective Rent

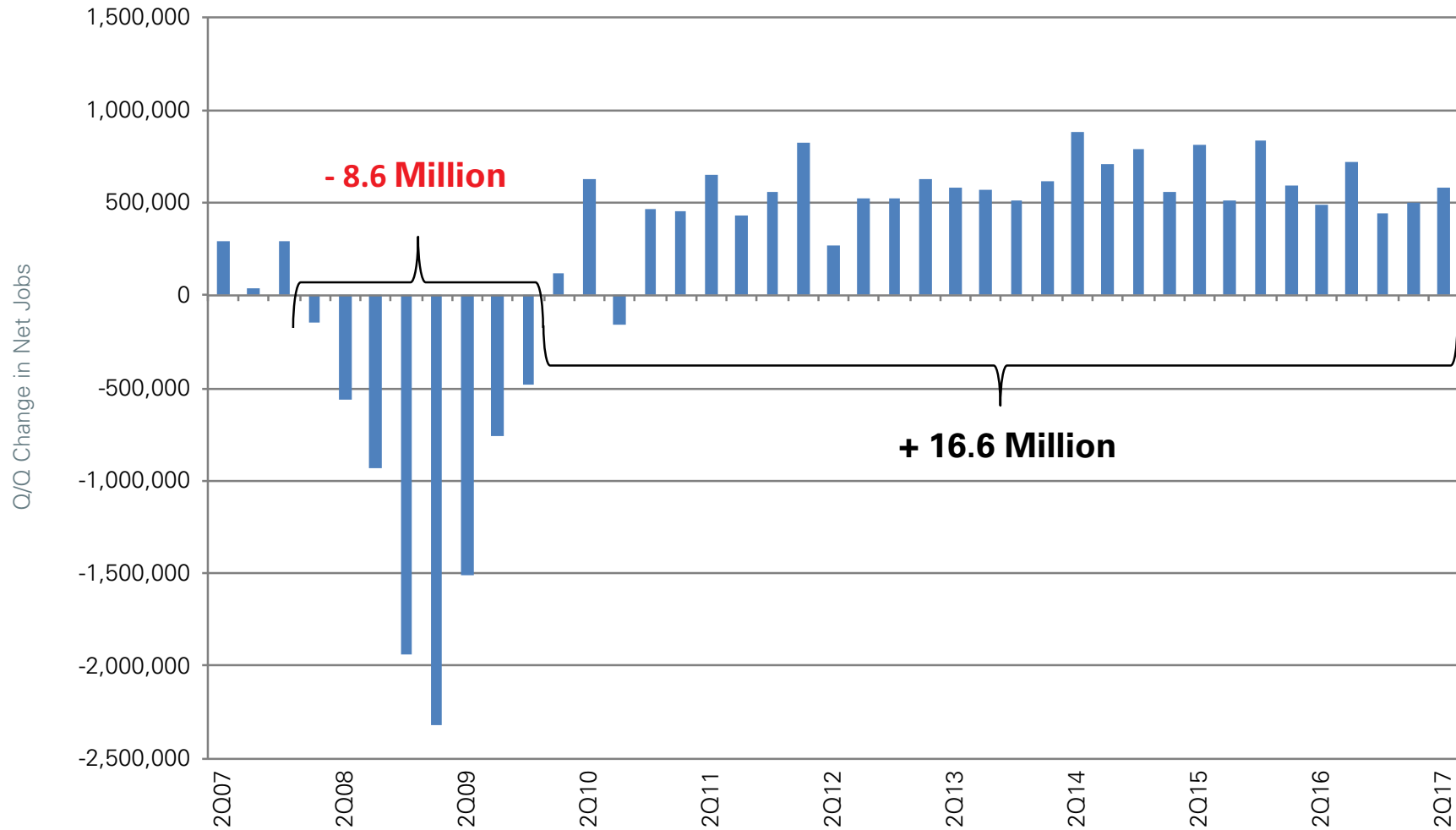
MULTIFAMILY MARKET UPDATE *(cont'd)*

US Multifamily Demand Trends

- Steady job growth is encouraging new household formations and supporting healthy rental demand.
 - During the 12-month period ended June 30, 2017, the nation's non-farm employment increased by 1.6%, adding 2.2 million net new jobs. Since 2010, total non-farm employment has grown by 16.6 million net new jobs and is now 5.8% above its prerecession peak.
 - Healthy employment growth has contributed to a decline in the US unemployment rate, which fell 60 basis points over the past year to 4.5% as of June 30, 2017 -- a rate many economists consider "full employment."

MULTIFAMILY MARKET UPDATE *(cont'd)*

Steady US Employment Gains



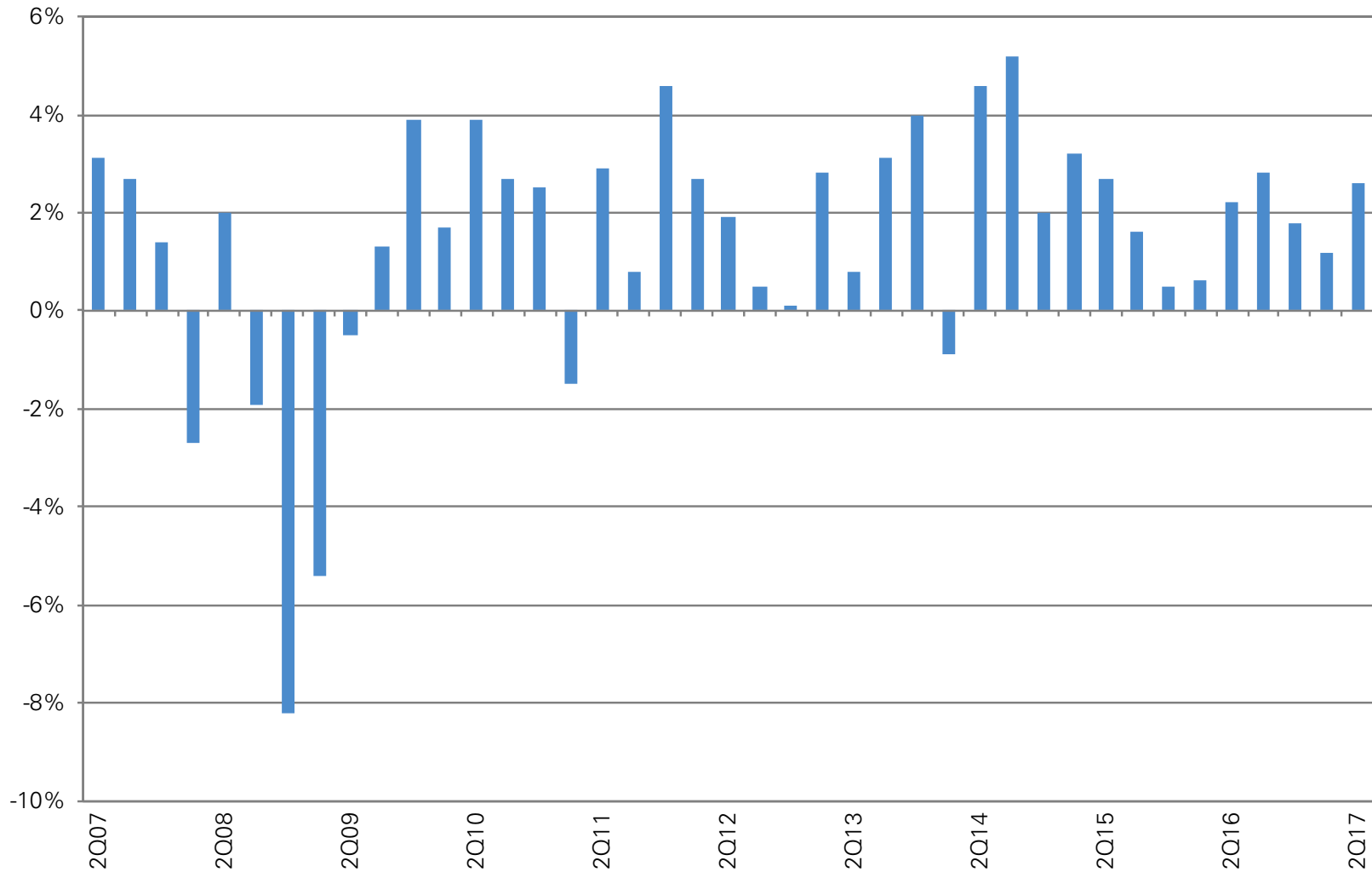
Source: US Bureau of Labor Statistics
Seasonally Adjusted

MULTIFAMILY MARKET UPDATE (*cont'd*)

- According to an advance estimate by the US Bureau of Economic Analysis (BEA), real GDP increased by a seasonally adjusted annual rate of 2.6% in the second quarter of 2017. US GDP has now experienced growth in 30 out of the past 32 quarters since the end of the Global Financial Crisis.
- Overall, the US economic outlook remains positive.
 - The US Congressional Budget Office expects moderate economic growth to continue as real GDP is projected to grow by 2.1% in 2017, followed by 2.2% in 2018, 1.7% in 2019 and 1.4% in 2020, and then average 1.9% between 2021 and 2027.
 - *Moody's Economy.com* projects US non-farm employment to grow by an average of 0.9% annually through 2021, while the nation's unemployment rate remains below 5.0% through the forecast period.

MULTIFAMILY MARKET UPDATE *(cont'd)*

Quarterly US GDP Growth



Source: US Department of Commerce
Seasonally Adjusted at Annual Rates

MULTIFAMILY MARKET UPDATE *(cont'd)*

- According to the *US Census Bureau*, more than nine million additional households have entered the renter pool since 2007, bringing the total number of US renter households to 43.3 million. This was the highest decade of growth on record.
- All age cohorts tracked by the *US Census Bureau* showed increases in renter households. Most notably, the prime home buying cohort of 35- to 44-year-olds added 1.4 million renter households during the period.
- US population growth over the next ten years is projected to be approximately 24 million people, setting a pace similar to the last ten years. This growth should support strong multifamily demand.

MULTIFAMILY MARKET UPDATE *(cont'd)*

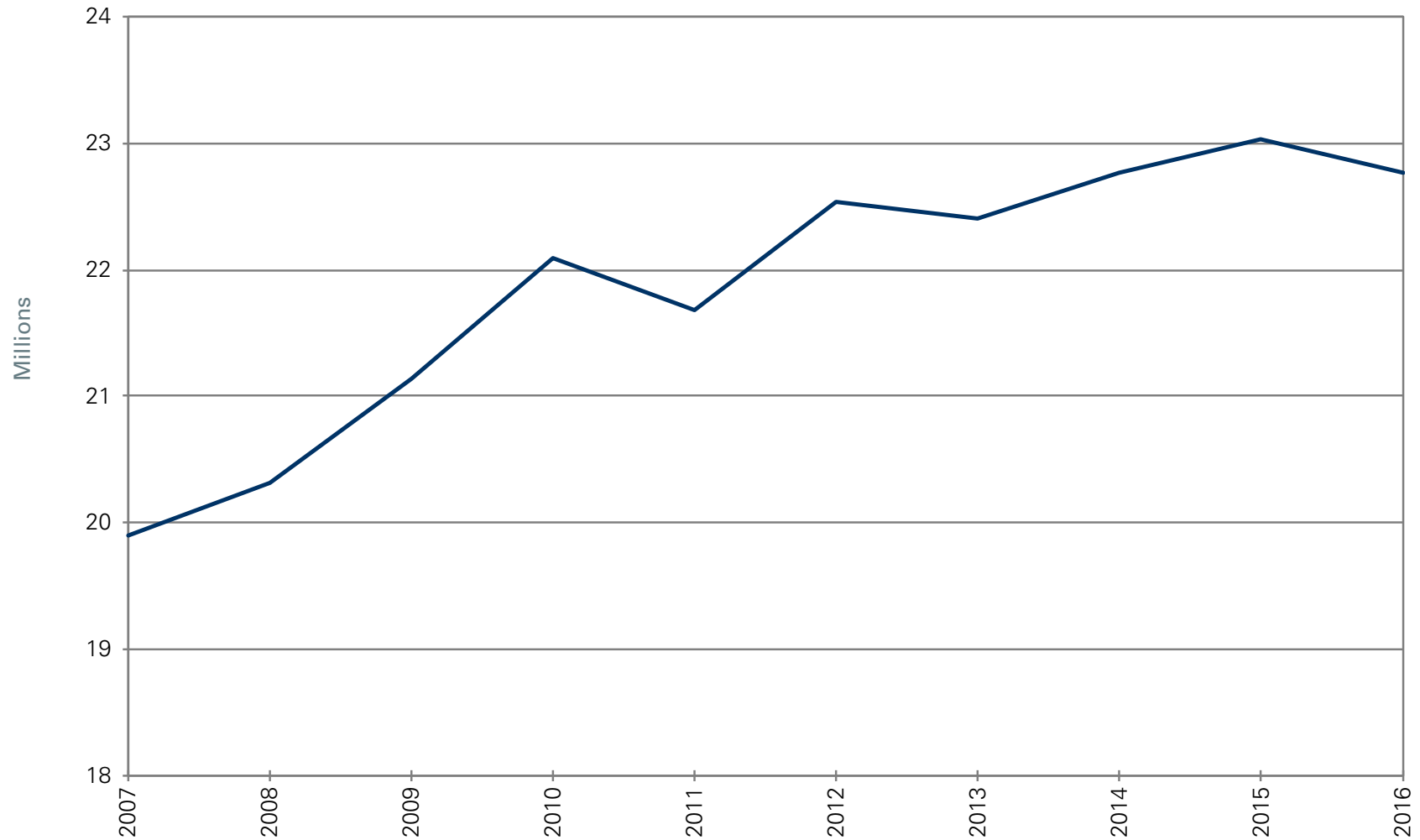
US Population and Household Growth by Age Cohort

Age of Householder	Population Growth 2007-2016	Renter Household Growth 2007-2016	Projected Population Growth 2017-2026
20 to 34 year olds	+6,851,000	+2,285,000	+2,293,000
35 to 44 year olds	-2,307,000	+1,415,000	+5,499,000
45 to 54 year olds	-625,000	+1,235,000	-1,558,000
55 to 64 year olds	+9,389,000	+2,221,000	-164,000
65 years and over	+12,276,000	+1,906,000	+18,042,000
Total	+25,584,000	+9,062,000	+24,112,000

Source: US Census Bureau

MULTIFAMILY MARKET UPDATE *(cont'd)*

Young Adults Living at Home



Source: US Census Bureau

— 18-34 Year Olds Living With Parents

MULTIFAMILY MARKET UPDATE (*cont'd*)

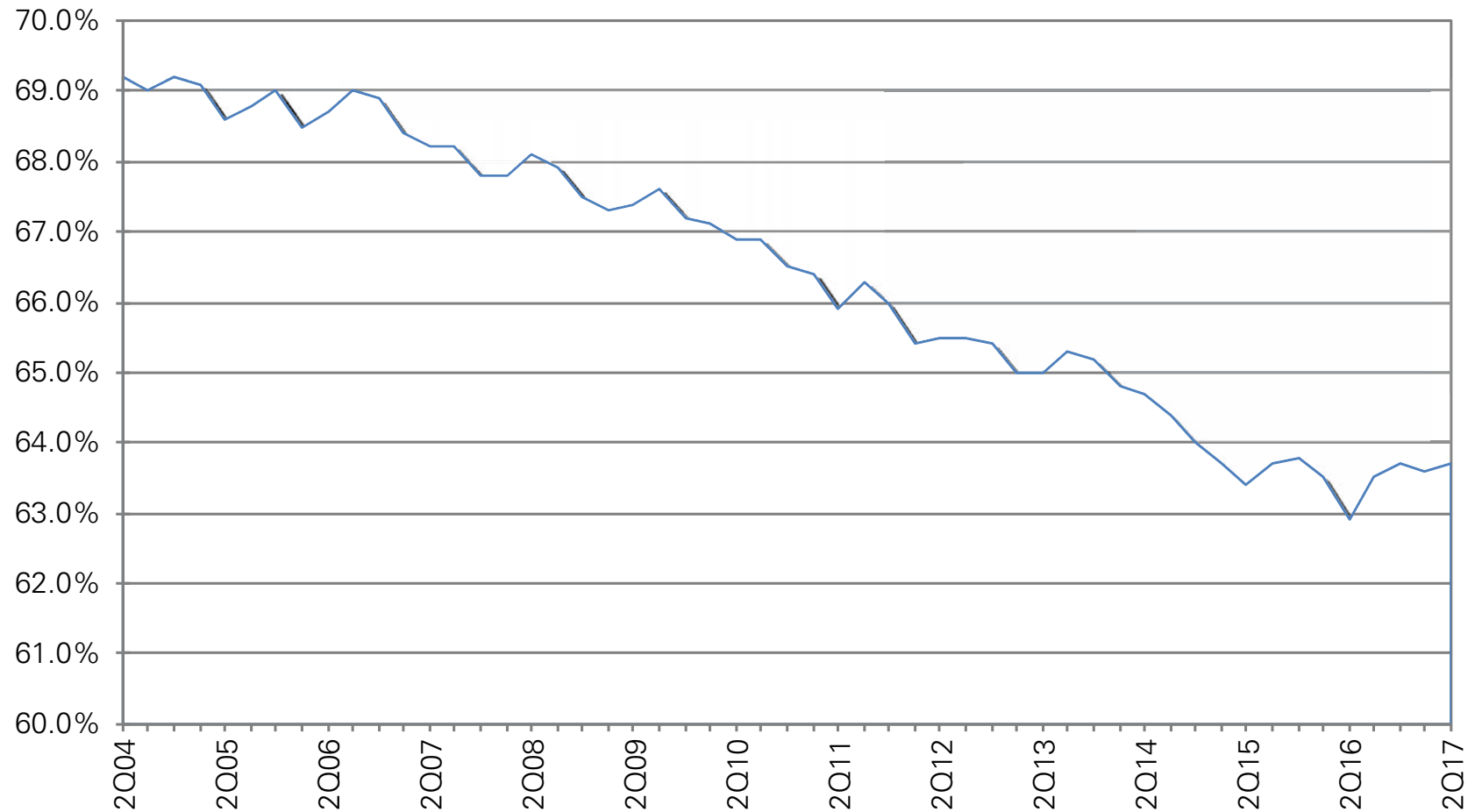
- The *US Census Bureau* has identified an estimated 22.8 million 18- to 34-year-olds living at home or residing in college dorms. Continued job creation should allow the members of this group to form independent households and enter the renter pool in line with historical housing preferences.

MULTIFAMILY MARKET UPDATE (*cont'd*)

- The US homeownership rate as of the second quarter of 2017 was 63.7%, 550 basis points below the peak of 69.2% set in 2004.
 - Rising single-family home prices have outpaced slow income growth over the past several years. As of 2Q17, the median price of a single-family home rose to \$232,100, up 6.9% year-over-year, while the nation's median household income increased by 2.6% over the same period.
 - In addition, the inventory of for-sale single-family homes is decreasing. According to the *Federal Reserve Bank of St. Louis*, as of June 30, 2017 there was a 5.4-month supply of unsold single-family homes in the US, compared to the ten-year historical average of 6.8 months.

MULTIFAMILY MARKET UPDATE *(cont'd)*

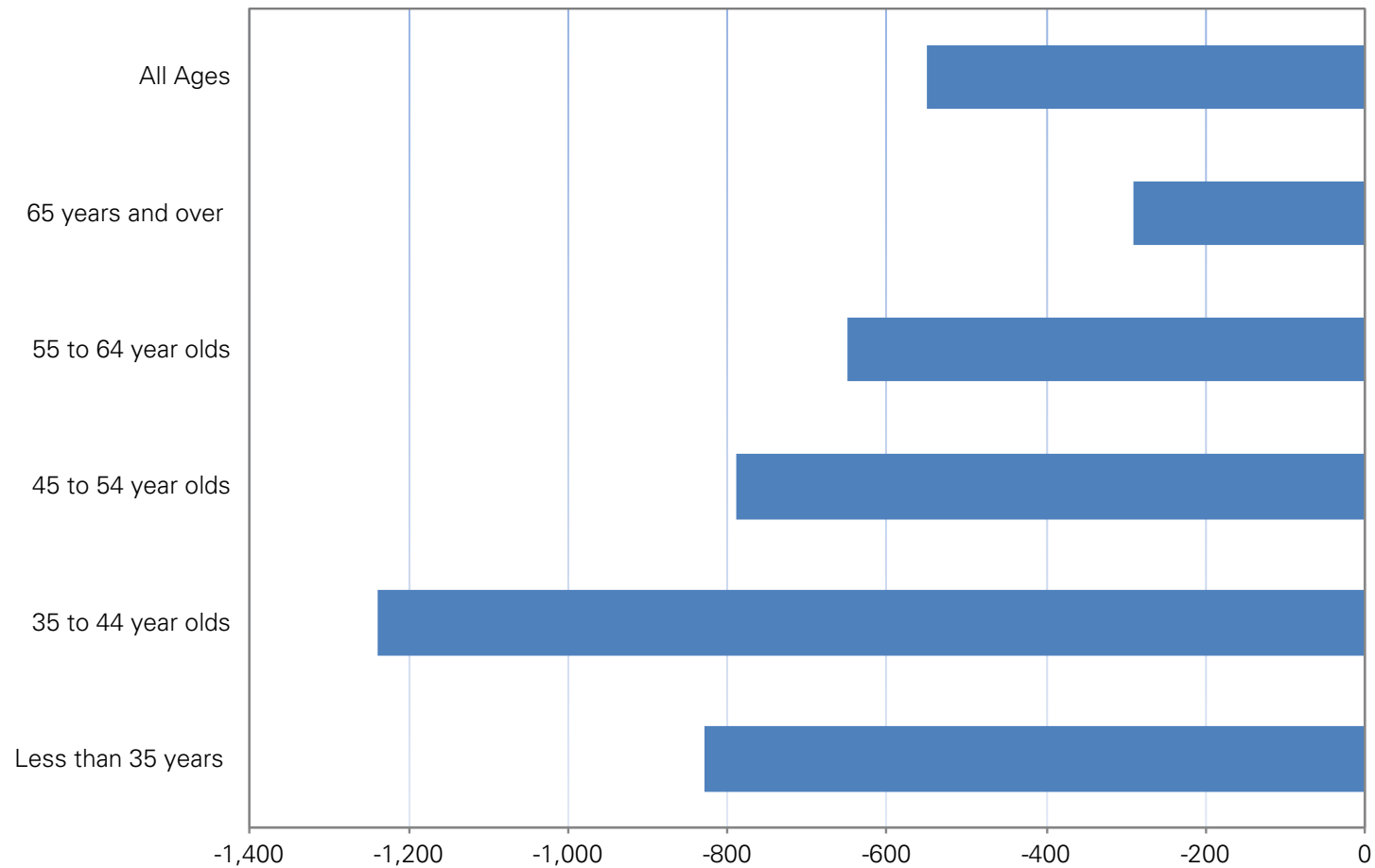
Homeownership Rate



Source: US Census Bureau

MULTIFAMILY MARKET UPDATE *(cont'd)*

Decrease in US Homeownership Rates by Age Cohort
2004-2017



Source: US Census Bureau

■ Basis Point Change

MULTIFAMILY MARKET UPDATE (*cont'd*)

- On average, renters are staying in the renter pool for longer periods of time.
 - Americans are renting for six years before buying, compared to an average of 2.6 years in the 1970s, according to a study conducted by *Zillow.com*.
 - Home purchases are being postponed as the median age of marriage has increased by 2.0 years for men and 1.8 years for women over the past decade.
 - Debt from student loans has impacted the ability to undertake large financial commitments such as homeownership. The average student loan debt has increased by 78% over the past ten years to a record high of \$37,173 in 2016.

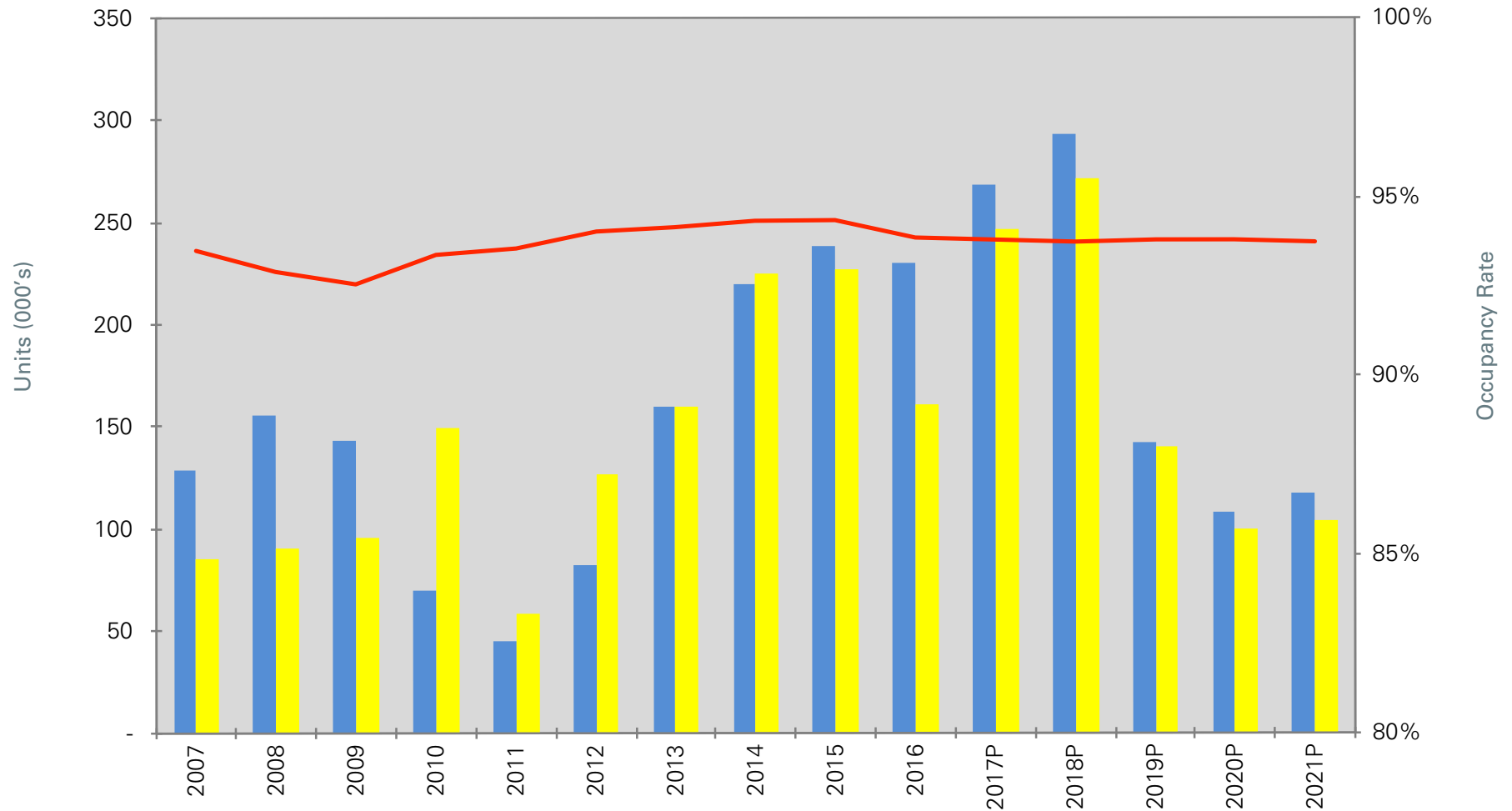
MULTIFAMILY MARKET UPDATE (*cont'd*)

New Supply in the US Apartment Sector

- New apartment supply continued to come online at an elevated rate during the second quarter of 2017 with the delivery of approximately 46,000 apartment units across the nation. This was 23.8% above the ten-year quarterly average, but marks the lowest number of deliveries in the past four quarters. Net absorption measured nearly 74,000 units during 2Q17, the second highest quarterly total on record.
 - From 2010-2016, developers delivered 1,044,000 units across the US compared with net absorption of 1,106,000 units.
 - From 2017-2021, 928,000 units are projected to be delivered compared with the expected net absorption of 780,000 units. Multifamily deliveries are projected to peak in 2018 before gradually tapering off through the forecast period.
 - According to *CoStar*, the average months delayed for multifamily buildings completed in the US has increased from slightly less than one month in the beginning of 2016 to more than five months at the end of June 2017.

MULTIFAMILY MARKET UPDATE *(cont'd)*

US Apartment Market Trends



Source: CoStar

■ Net Completions

■ Net Absorption

— Occupancy Rate

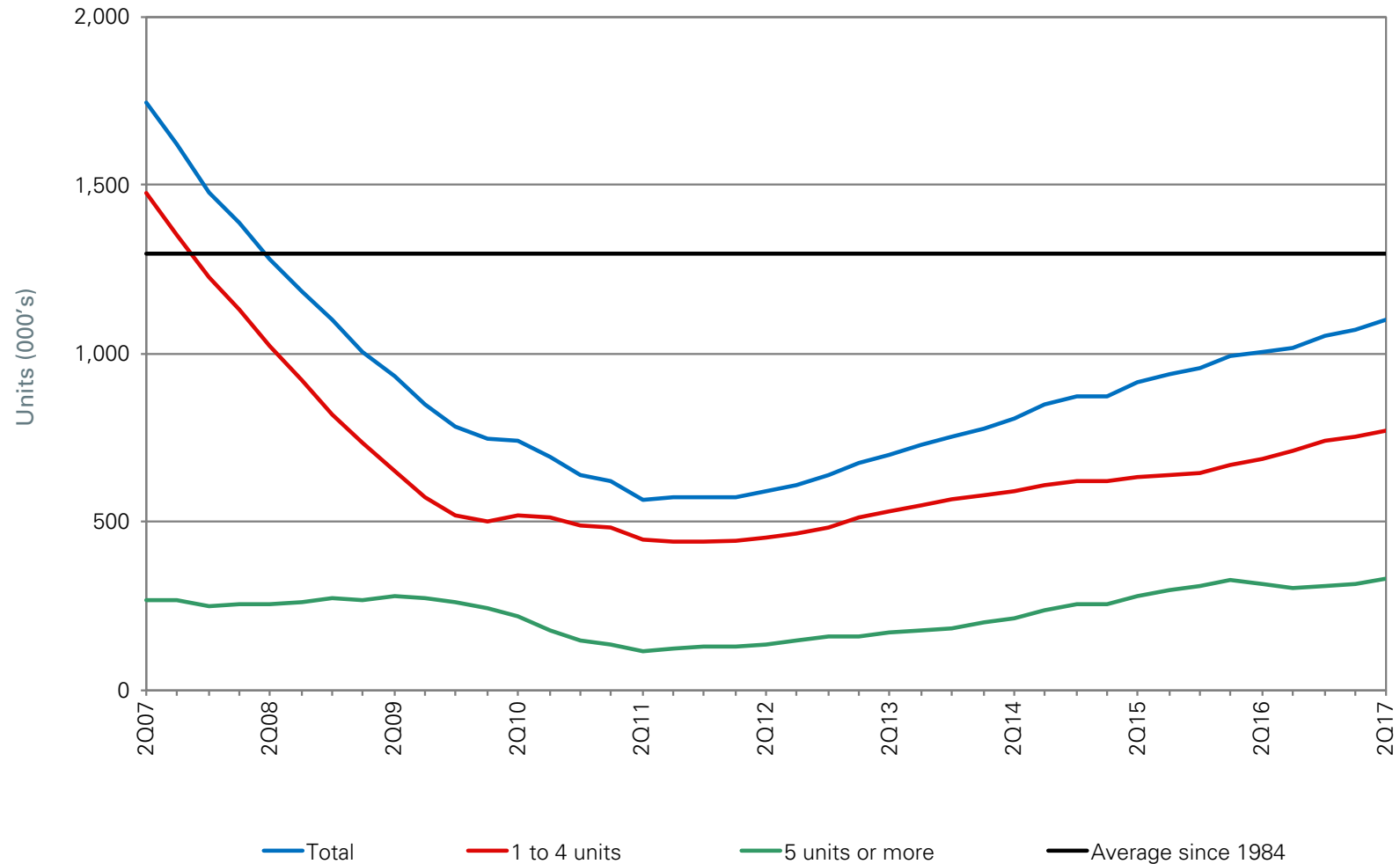
(P) Projected

MULTIFAMILY MARKET UPDATE (*cont'd*)

- The focus of the current development wave has been high density, upmarket product.
 - Since 2007, approximately 93% of new apartment development has been considered luxury, Class A. From 2001-2006, 76% of all new construction fit within this category.
- Total US housing construction, including both multifamily and single-family units, continues to trend well below the long-run average. There were 1,100,000 units constructed during the rolling 12-month period ended June 30, 2017, up 7.7% year-over-year, but 15.1% below the annual average since the *US Census Bureau* began record keeping in 1984.

MULTIFAMILY MARKET UPDATE *(cont'd)*

New Privately Owned Housing Completed in US Permit Areas



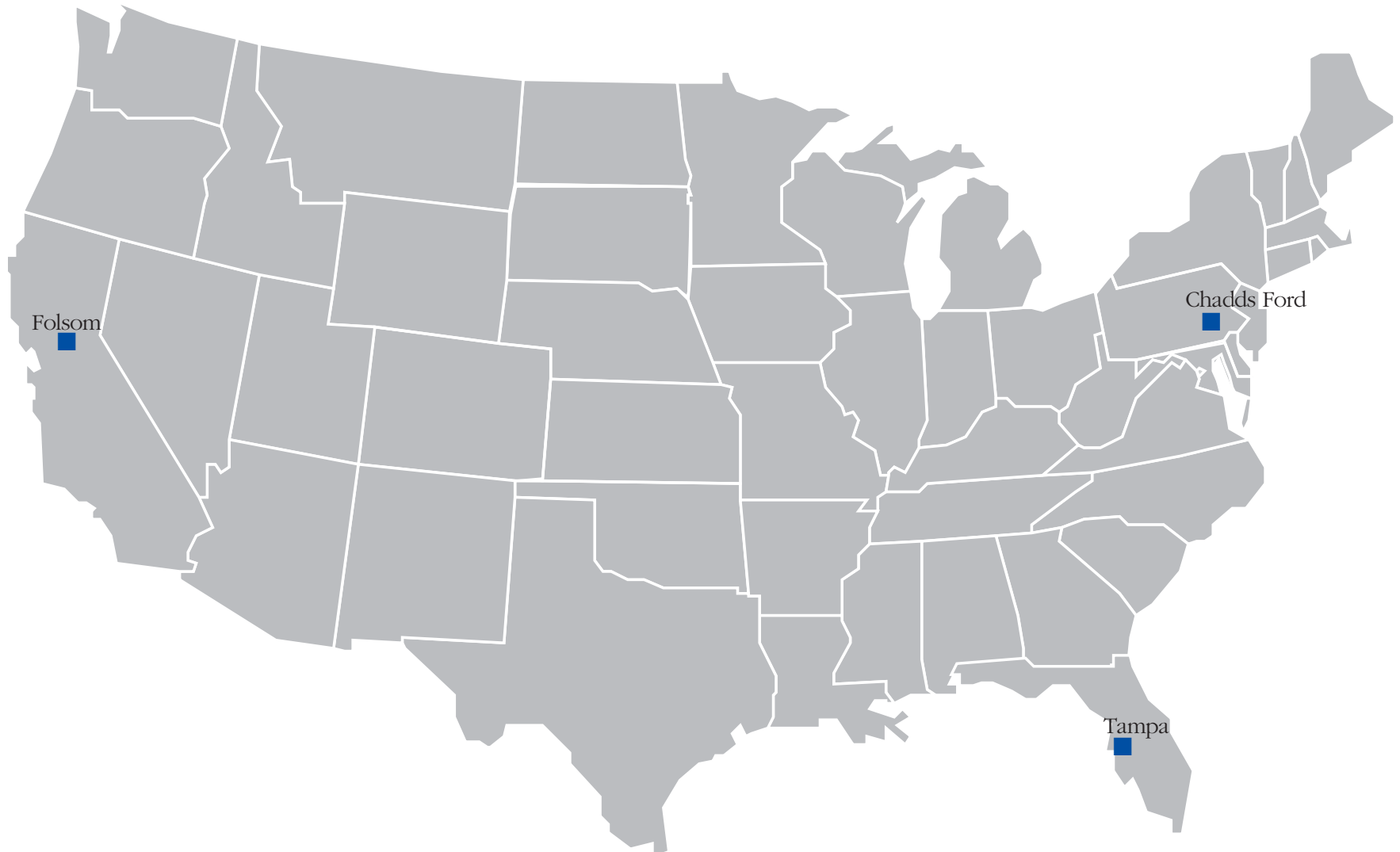
Source: US Census Bureau
Not Seasonally Adjusted, Rolling 12 Month Data

ARMB SEPARATE ACCOUNT REVIEW

- Three stabilized multifamily properties totaling 996 units.
 - Preserve at Blue Ravine Apartments, Folsom, CA (260 units)
 - Valleybrook at Chadds Ford Apartments, Chadds Ford, PA (352 units)
 - Versant Place Apartments, Brandon, FL (384 units)
- Total fair market value of \$194.0 million as of June 30, 2017.

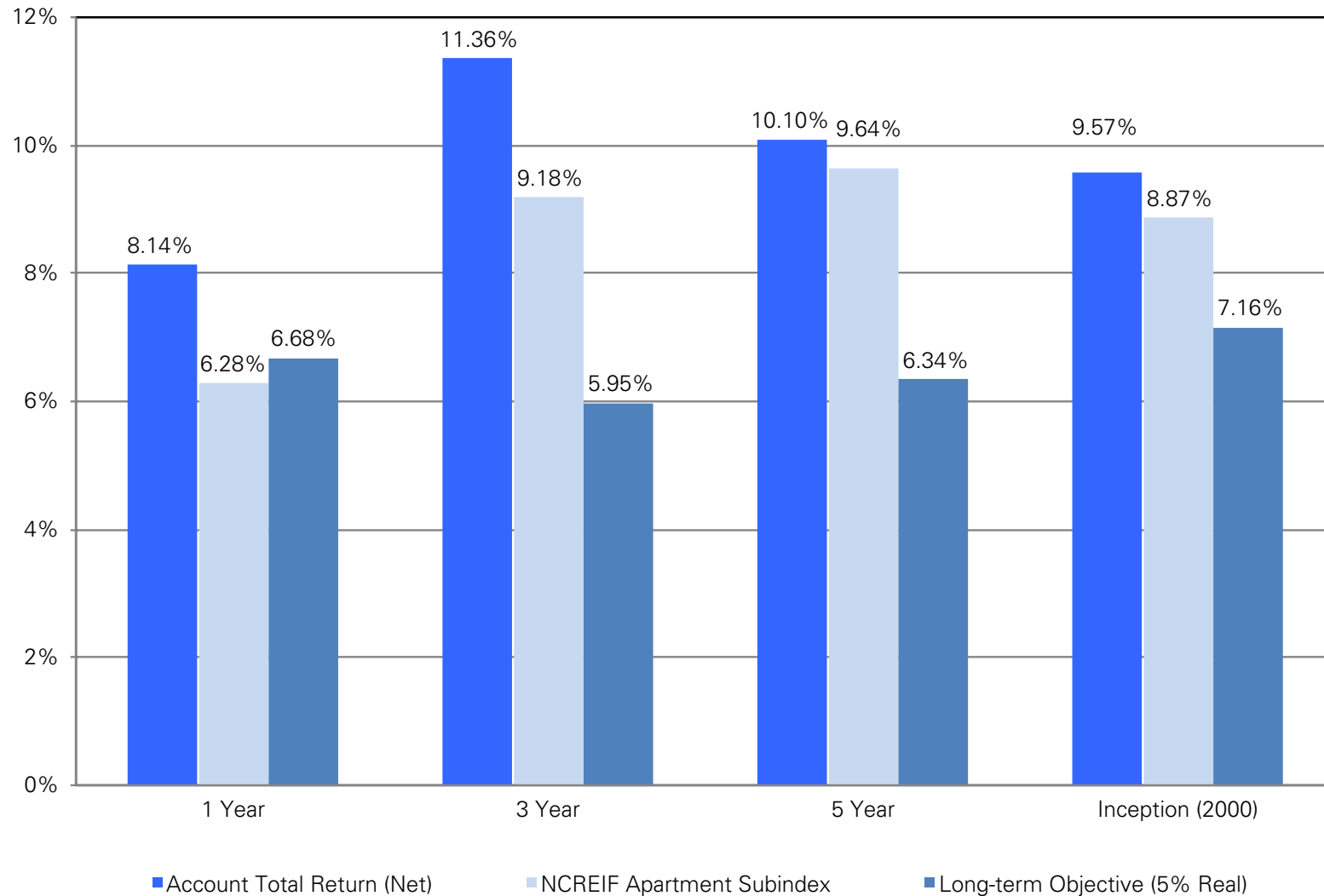
ARMB SEPARATE ACCOUNT REVIEW *(cont'd)*

Portfolio Diversification



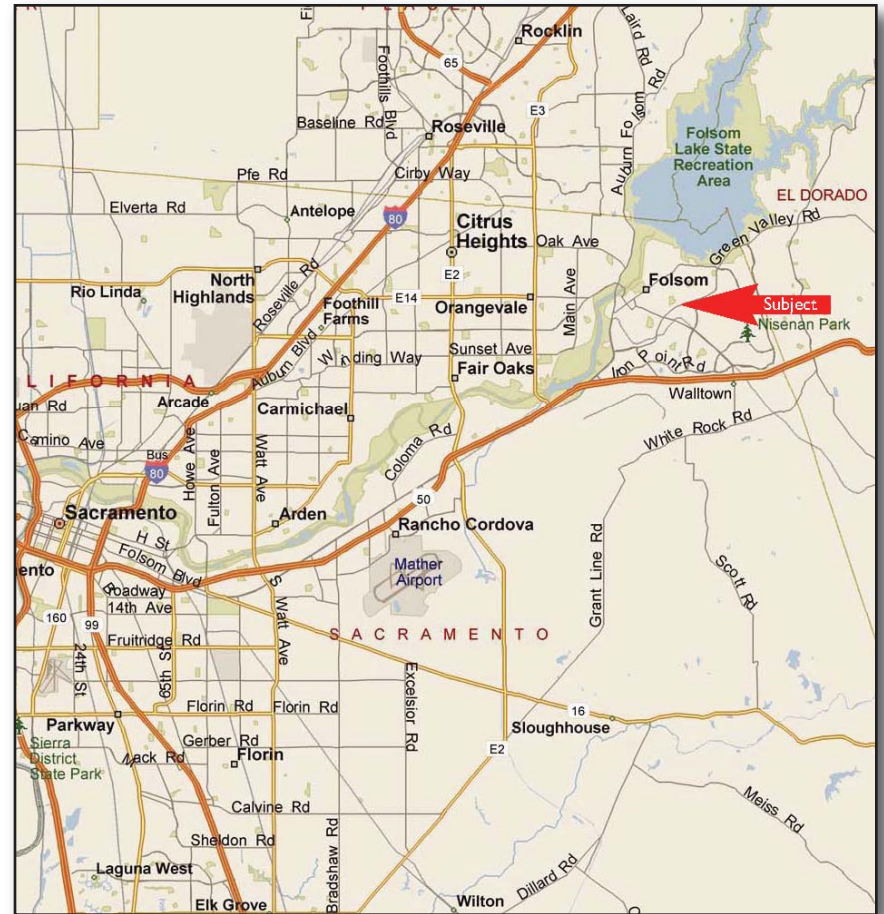
ARMB SEPARATE ACCOUNT REVIEW *(cont'd)*

Portfolio Returns (as of June 30, 2017)



PRESERVE AT BLUE RAVINE APARTMENTS

Folsom, California



PRESERVE AT BLUE RAVINE APARTMENTS

Folsom, California

Property Description

- Completed in 2000
- 260 units
- One-, two- and three-bedroom apartments
- Percentage leased (8/31/17): 99.6%

Financial Information

- Date Acquired: 7/17/08
- Purchase Price: \$40,570,000 (\$156,038 per unit)
- Historical Cost (6/30/17): \$45,145,530 (\$173,637 per unit)
- Valuation (6/30/17): \$61,900,000 (\$238,077 per unit)
- Unleveraged IRR (6/30/17): 8.4%

PRESERVE AT BLUE RAVINE APARTMENTS

Folsom, California

Market Information

- Non-farm employment in the Sacramento area grew by 2.1% year-over-year.
- The area's population is expected to grow by 1.0% annually through 2021, exceeding the national average.
- Average same-store effective rents grew by 8.1% year-over-year, as average occupancy rates remained high.

Key Market Factors

- Constrained supply: No new submarket supply since 2013, with minimal new submarket development projected.
- Home prices are rising faster than the national statistic. Nonetheless, home purchases weigh on rental demand.

PRESERVE AT BLUE RAVINE APARTMENTS

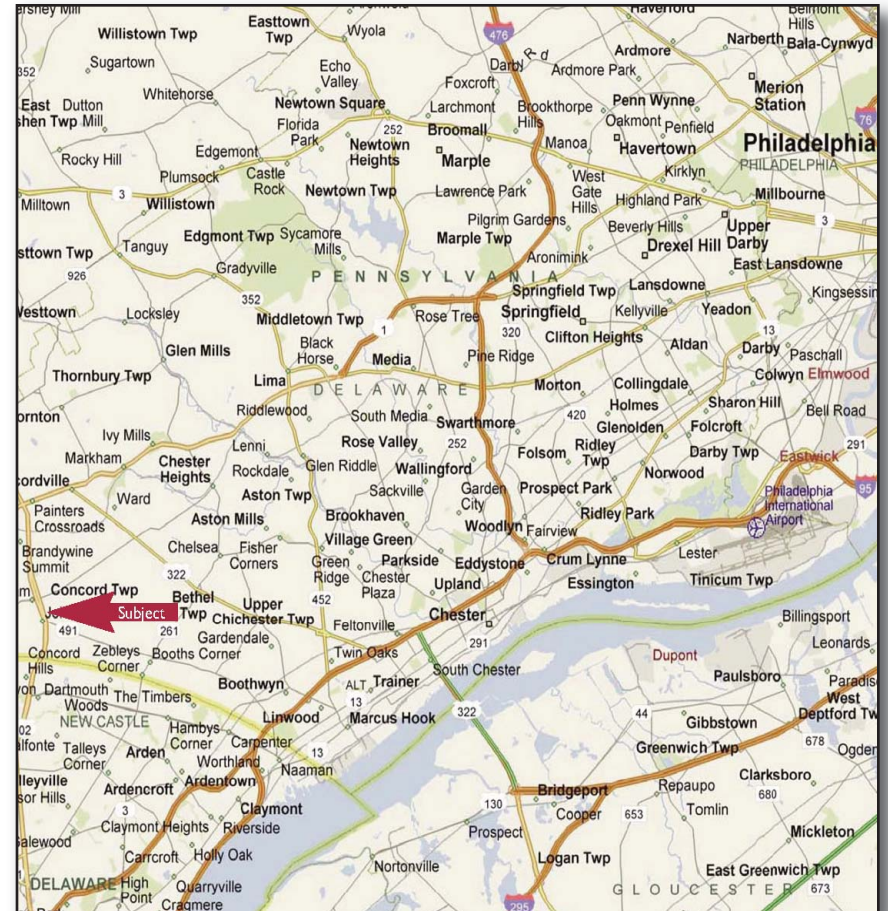
Folsom, California

Investment Thesis

- Preserve at Blue Ravine is a Class A property in a growing, upscale and supply-constrained market.
 - Projections for above-average job and population growth.
 - Constrained supply due to limited developable sites in the area.
 - The property has a visible location adjacent to a highly-rated school, with proximity to outdoor/community recreational facilities.
- Preserve was acquired based on the community's value-add potential. The original acquisition strategy was concluded in fiscal 2014. Based on the recognized potential for additional accretive upgrades, Sentinel initiated a program to upgrade appliances and unit finishes, which is now over 70% complete.
- Ongoing enhancements to the property's competitive amenities and unit finishes should support continued rent growth.

VALLEYBROOK AT CHADDS FORD APARTMENTS

Chadds Ford, Pennsylvania



VALLEYBROOK AT CHADDS FORD APARTMENTS

Chadds Ford, Pennsylvania

Property Description

- Completed in 2002
- 352 units
- One-, two- and three-bedroom apartments
- Percentage leased (8/31/17): 94.9%

Financial Information

- Date Acquired: 11/30/12
- Purchase Price: \$65,175,000 (\$185,156 per unit)
- Historical Cost (6/30/17): \$68,265,729 (\$193,937 per unit)
- Valuation (6/30/17): \$76,500,000 (\$217,330 per unit)
- Unleveraged IRR (6/30/17): 6.9%

VALLEYBROOK AT CHADDS FORD APARTMENTS

Chadds Ford, Pennsylvania

Market Information

- Non-farm employment in the Philadelphia area grew by 1.9% year-over-year, exceeding the national average.
- The area's population is expected to grow by 0.1% annually through 2021.
- Average same-store effective rents grew by 2.1% year-over-year, as the average occupancy fell slightly.

Key Market Factors

- High barriers to entry serve to limit new multifamily supply.
- Excellent schools and prime location drive rental demand.
- Home prices in the Philadelphia MSA appreciated below the national average.

VALLEYBROOK AT CHADDS FORD APARTMENTS

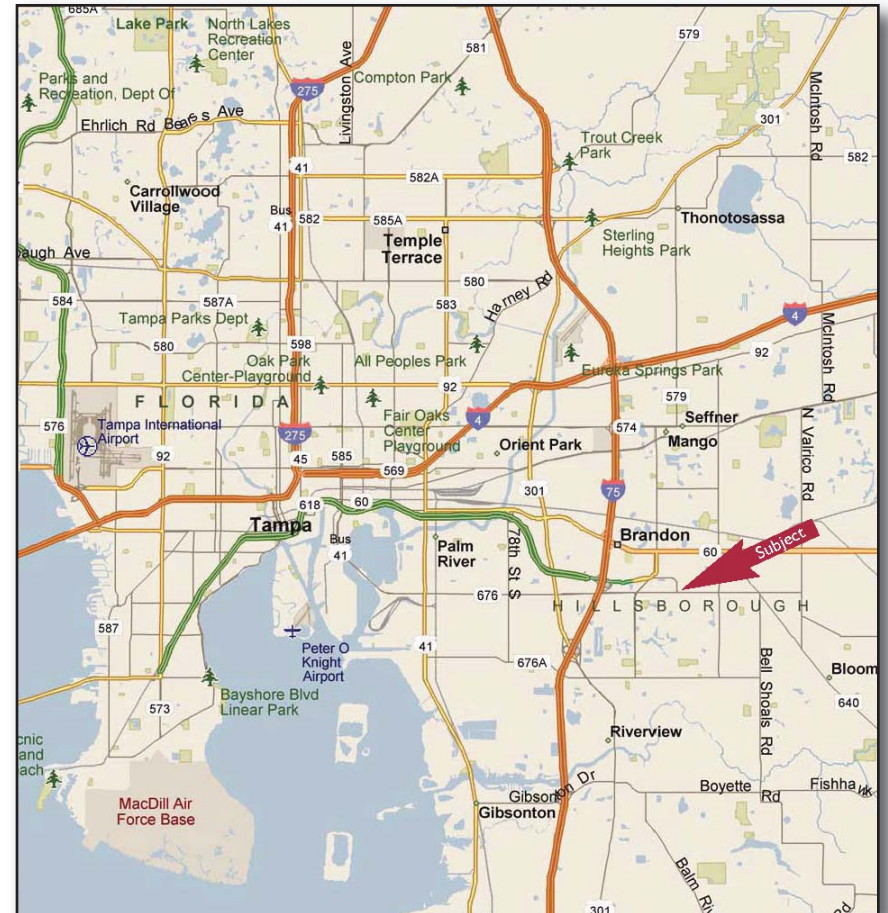
Chadds Ford, Pennsylvania

Investment Thesis

- Valleybrook is a Class A property in a supply-constrained area. The property has a highly-visible location along a major thoroughfare with a signalized ingress and egress.
- Minimal new supply is anticipated within the submarket for the foreseeable future.
- The property's potential for enhanced unit finishes and amenities was considered as part of the investment thesis.
- Numerous improvements have been made to the community to enhance its appeal to prospective residents.
- A unit interior upgrade program was tested in 2014, and has been rolled out over time, based on market acceptance.

VERSANT PLACE APARTMENTS

Brandon, Florida



VERSANT PLACE APARTMENTS

Brandon, Florida

Property Description

- Completed in 2000
- 384 units
- One-, two- and three-bedroom apartments
- Percentage leased (8/31/17): 97.9%

Financial Information

- Date Acquired: 9/14/00
- Purchase Price: \$27,264,690 (\$71,000 per unit)
- Historical Cost (6/30/17): \$32,218,048 (\$83,901 per unit)
- Valuation (6/30/17): \$55,600,000 (\$144,792 per unit)
- Unleveraged IRR (6/30/17): 9.4%

VERSANT PLACE APARTMENTS

Brandon, Florida

Market Information

- Non-farm employment in the Tampa MSA grew strongly for the year, rising by 3.2% and exceeding the national average.
- The area's population is expected to grow by 1.1% annually through 2021.
- Average same-store effective rents in the market grew by 3.4% year-over-year.

Key Market Factors

- Brandon is an established suburb of Tampa, with an easy commute to the downtown area and employers to the north and south via I-75.
- The Brandon area has experienced ongoing development of high-end multifamily communities owing to the area's sustained growth and desirability.
- Single-family home prices rose at more than double the national rate, but home purchases remain a headwind to leasing.

VERSANT PLACE APARTMENTS

Brandon, Florida

Investment Thesis

- Strategy at acquisition was focused on enhancing the community's competitiveness relative to its peers to close the rent gap.
 - All unit interiors were upgraded (384 units).
 - Clubhouse and fitness centers were upgraded.
 - Addition of gated 24-hour access, screened-in patios.
 - Addition of washers and dryers in units freed up additional amenity space.
- Additional unit upgrades are now being implemented based on market demand.
- The asset is nearing the end of its investment period, and will be considered for a sale within three to four years.

Presentation for: Alaska Retirement Management Board (ARMB)



**By:
SENTINEL REALTY ADVISORS CORPORATION**

October 5, 2017

**George Tietjen, Managing Director/Co-Portfolio Manager
David Stenger, Vice President/Co-Portfolio Manager**

Almanac Realty Investors

Mandate: Almanac Realty Securities V and Almanac Realty Securities VII

Hired: 2008

Firm Information	Investment Approach	Total ARMB Mandate				
Almanac Realty Securities (ARS) is the closed-end real estate fund series of Almanac Realty Investors (ARI), a real estate investment manager founded in 1981 as Rothschild Realty. ARI is specifically focused on making investments in real estate companies (“entity-level”, “platform”, or “corporate” investments). The ARS fund series has been in existence for over 21 years through seven funds. As of 6/30/2017, Almanac Realty Investors’ total assets under management were \$2.6 billion. Key Executives: Matthew Kaplan, Managing Partner Josh Overbay, Client Relationship	Almanac Realty Securities follows a focused investment mandate of making private placements of debt and equity capital into private and public real estate companies. The ARS series funds provide growth capital to real estate operating companies that meet the following criteria: 1) proven management teams, 2) business plans focused on superior opportunities, 3) have a competitive advantage within their “niche”, and 4) pricing dislocations. Almanac seeks to protect invested capital by mitigating risk through the structuring of its investments. Target Return: Net annual return of 12%+	Assets Under Management: 6/30/2017: <table><tr><td>ARS V:</td><td>\$4,534,345</td></tr><tr><td>ARS VII:</td><td>\$18,736,265</td></tr></table>	ARS V:	\$4,534,345	ARS VII:	\$18,736,265
ARS V:	\$4,534,345					
ARS VII:	\$18,736,265					

Concerns: None

6/30/2017 Performance

ARS V

	<u>Last Quarter</u>	<u>1-Year</u>	<u>3-Years Annualized</u>	<u>5-Years Annualized</u>
Manager Gross	6.56%	14.24%	11.04%	13.44%
Fee	0.43%	1.61%	1.31%	1.33%
Manager Net	6.13%	12.63%	9.73%	12.11%

ARS VII

	<u>Last Quarter</u>	<u>1-Year</u>	<u>3-Years Annualized</u>	<u>5-Years Annualized</u>
Manager Gross	4.21%	15.93%	-	-
Fee	0.84%	4.32%	-	-
Manager Net	3.37%	11.61%	-	-



ALMANAC
REALTY INVESTORS

Alaska Retirement Management Board
Overview of Almanac Realty Investors, LLC

October 5, 2017

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Each of the Funds is a closed-end private investment fund that has held its final closing. As a result, new subscriptions for interests in the referenced Funds are not being accepted. Investments in a Fund are speculative and involve a high degree of risk. Investments in a Fund and in vehicles similar to the Funds are suitable investments only for sophisticated investors (i) who do not require immediate liquidity for their investments and are able to bear the financial risks of their investment for an indefinite period of time, (ii) for whom such an investment does not constitute a complete investment program and (iii) who fully understand, are willing to assume and who have the financial resources necessary to withstand, the risks involved in a specialized investment program and to bear the potential loss of their entire investment. Further, such investments involve significant risks associated with the nature of the underlying investments. There will be no public market for the Fund interests, and an investment in the Fund is subject to significant restrictions on transferability and resale, including, without limitation, under the Securities Act of 1933, as amended, and the applicable laws of any country, state or other jurisdiction, pursuant to registration or exemption therefrom.

Almanac believes the information contained in this document to be reliable but does not warrant its accuracy or completeness. The estimates, investment strategies, and views expressed in this document are based upon current market conditions and/or data and information provided by unaffiliated third parties and are subject to change without notice. Certain economic and market information contained herein has been obtained from published sources prepared by other parties. While such sources are believed to be reliable, neither the Fund, Almanac, nor their respective affiliates assume any responsibility for the accuracy or completeness of such information. Neither delivery of this document nor any statement herein should be taken to imply that any information contained herein is correct as of any time subsequent to the date hereof.

No guarantee or representation is made that the Fund's investment program, including, without limitation, the Fund's investment objectives, diversification strategies, or risk monitoring goals, will be successful, and investment results may vary substantially over time. Investment losses may occur from time to time. Nothing herein is intended to imply that Almanac's investment methodology may be considered "conservative", "safe", "risk free" or "risk averse". PAST PERFORMANCE IS NOT INDICATIVE NOR A GUARANTEE OF FUTURE RESULTS. NO ASSURANCE CAN BE MADE THAT PROFITS WILL BE ACHIEVED OR THAT SUBSTANTIAL LOSSES WILL NOT BE INCURRED.



Almanac Executive Summary

Almanac Realty Investors (“ARI”)

- Real estate investment manager founded in 1981 as Rothschild Realty
- Partner owned since 2007
- Changed name from Rothschild Realty to Almanac Realty Investors, LLC in 2011
- RAUM of \$2.6 billion as of June 30, 2017
- A focus on making investments in real estate companies (“entity-level,” “platform,” or “corporate” investments) in both private and public markets

Almanac Realty Securities (“ARS”)

- Established Almanac Realty Securities (“ARS”) Fund Series in 1996 (formerly known as Five Arrows Realty Securities)
- Focused investment mandate: private placements of debt and equity capital into private and public real estate companies
- 21 years; seven funds; \$4.2 billion committed for investments across more than 38 companies¹
- Attractive absolute, relative and risk-adjusted returns
- 12.9% net IRR¹ since inception (1996): approximately half from current income, half from appreciation as of June 30, 2017

Almanac Realty Public Securities (“ARPS”)

- Launching a new strategy focused on investing in publicly traded real estate securities
- The new strategy will leverage Almanac’s knowledge, experience, and infrastructure to capture opportunities that persist in public markets

Note: Please refer to the “Performance Notes” on pages 28-31 for important information regarding defined terms and performance calculations. *Past performance is not indicative of future results, and there can be no assurance that ARS VIII will achieve rates of return or portfolio diversification comparable to the ARS Fund series.*

1. Includes ARS I-VII and not CARS I.



Almanac Funds Performance

As of June 30, 2017 - Estimated Fair Value

Fund (Investment Period)	Net IRRs ²	Net Multiples ²	DPI Ratio ³	Index Comparison ¹			
				RMS ⁴	NCREIF ⁵	S&P 500 ⁶	Citi BB Bond ⁷
ARS I (1996-1998)	15.7%	2.3x	1.9	9.4%	9.9%	7.1%	7.3%
ARS II (1998-1999)	14.3%	1.5x	1.5	14.9%	10.5%	0.0%	6.4%
ARS III (1999-2001)	9.3%	1.4x	1.4	15.1%	10.2%	4.4%	7.3%
ARS IV (2004-2007)	9.4%	1.5x	1.5	7.0%	7.0%	7.0%	7.8%
ARS V (2007-2011)	11.6%	1.5x	1.4	11.2%	10.2%	12.8%	7.4%
ARS VI (2011-2016)	16.2%	1.4x	0.7	11.8%	10.3%	14.9%	5.4%
ARS VII (2015-2019)	10.8%	1.2x	0.1	7.4%	7.7%	13.5%	6.4%
Total	12.9%	1.5x	1.2	11.2%	9.6%	7.5%	7.2%
CARS I (2014-2016)	13.4%	1.4x	0.2	6.4%	9.2%	9.5%	4.7%

Realizations of \$2.3 billion out of \$3.4 billion invested by ARS I-VII⁸

Sources: NCREIF, Bloomberg.

Note: Please refer to the "Performance Notes" on pages 28-31 for important information regarding defined terms and performance calculations. *Past performance is not indicative of future results, and there can be no assurance that ARS VIII will achieve rates of return or portfolio diversification comparable to the ARS Fund series.* Performance information includes both realized and unrealized investments and the actual realized return of unrealized investments may differ materially from the returns indicated herein.

- Returns are calculated for each index starting from the date each Almanac investment is made and ending with the earlier of the investment exit or 6/30/2017 and are weighted by the size of each Almanac investment. Indices are shown for comparison purposes only and are not investment products available for purchase. Indices are unmanaged and generally do not take into account fees or expenses.
- The returns reflect investment management fees and carried interest paid/accrued.
- The Distributions to Paid-In ("DPI") Ratio is calculated by dividing the cumulative distributions as of 6/30/2017 by the amount of paid-in capital.
- MSCI US REIT Index, calculated by Morgan Stanley Capital International, Inc. The index is calculated with dividends reinvested on a daily basis and is designed to measure the performance of equity REIT securities. All index members are real estate equity securities from the MSCI US Investable Market 2500 Index.
- NCREIF Property Index, published and distributed by the National Council of Real Estate Investment Fiduciaries. The NCREIF Property Index consists of both equity and leveraged properties, but the leveraged properties are reported on an unleveraged basis, so the index is completely unleveraged.
- Standard and Poor's 500 Index. The S&P 500 is an index consisting of 500 stocks chosen for market size, liquidity and industry grouping, among other factors, which is meant to reflect the risk/return characteristics of the large-cap universe.
- Citigroup Investment-Grade Bond Index for BB-rated bonds. This is a total return index.
- Includes sidetar participation amounts. Realizations represent the amount of partner capital invested into portfolio companies that has either been returned or that was not recovered at the time of disposition as of 6/30/2017. Does not include CARS I.



Almanac / Alaska Retirement Partnership

Alaska Retirement Management Board has entrusted Almanac with \$130 million of capital commitments to date in over a decade of partnership.

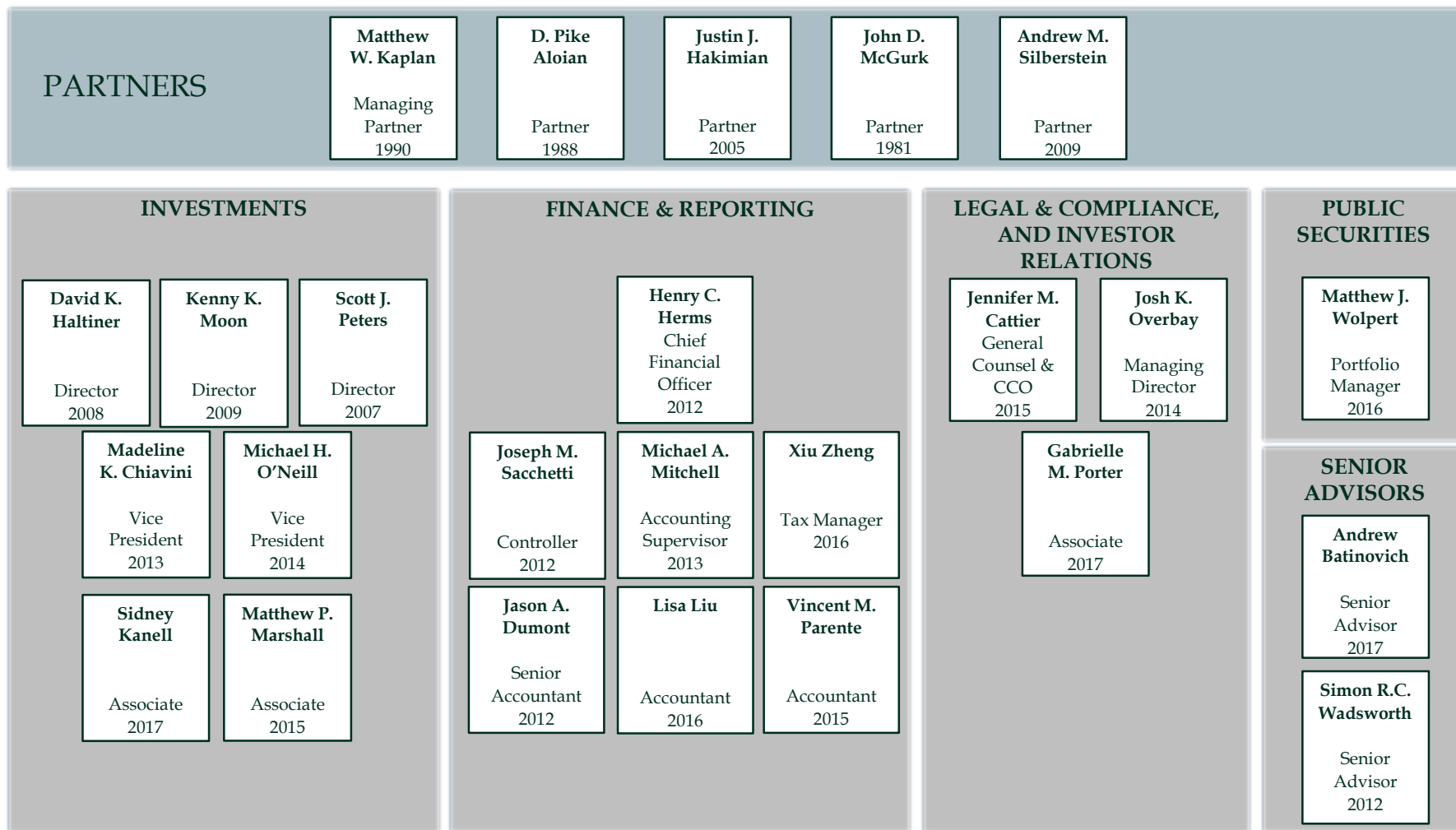
Fund	ARS IV	ARS V	ARS VII
Vintage	2004	2007	2014
Fund Size	\$445 million	\$840 million	\$1.26 billion
Alaska Retirement Commitment	\$50 million	\$30 million	\$50 million
Inception to date Net IRR ¹	9.3%	11.6%	10.7%
Inception to date Net Multiple ¹	1.5x	1.5x	1.2x
Current Status	Realized	Realizing	Investing

Note: Please refer to the "Performance Notes" on pages 28-31, which provide important information regarding defined terms and the calculation of prior performance. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.* Performance information includes both realized and unrealized investments and the actual realized return of unrealized investments may differ materially from the returns indicated herein.

1. The returns reflect investment management fees and carried interest paid/accrued.



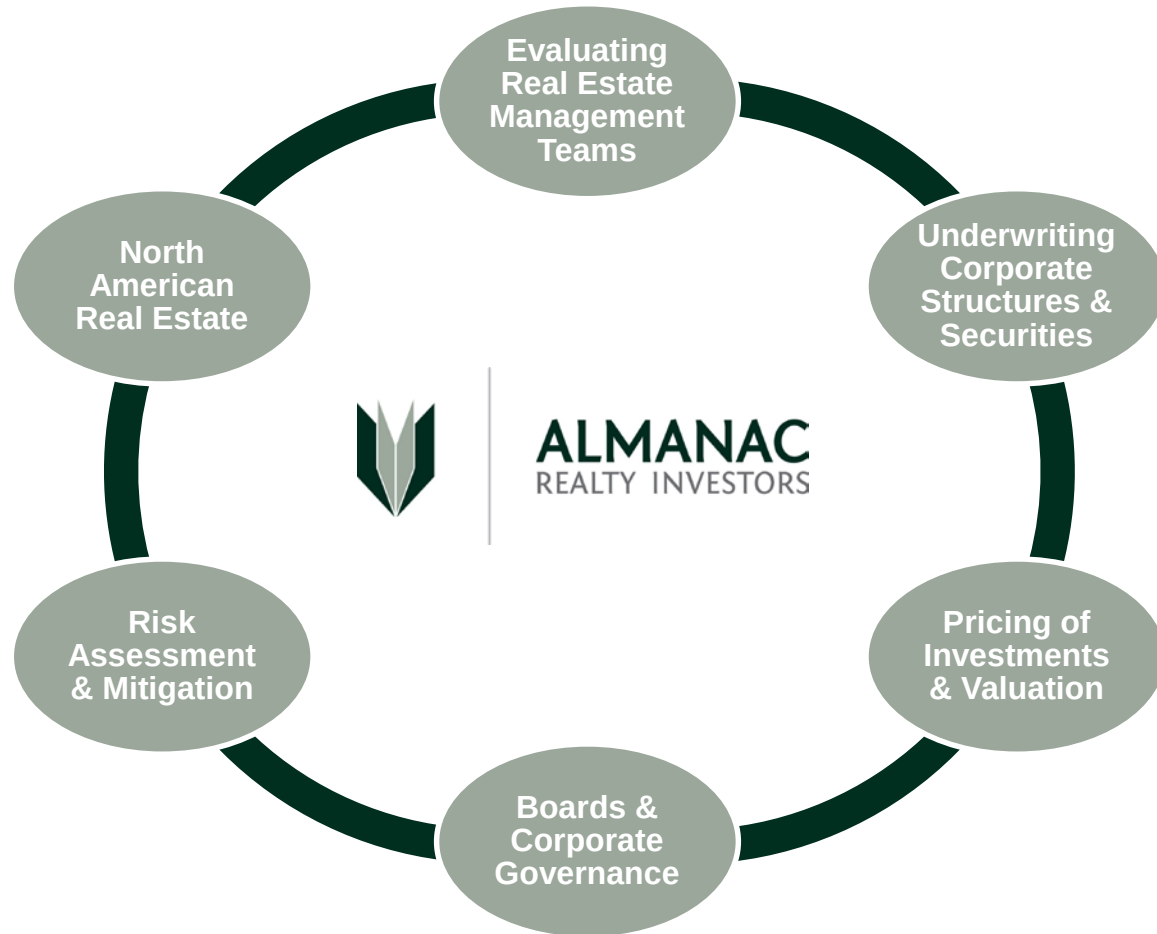
Almanac Organizational Structure



Note: Years correspond to date of initial hiring by ARI, its predecessors and/or its affiliates. Senior advisors are consultants, not full-time employees, of Almanac Realty Investors, LLC.



Almanac Core Investment Competencies



Almanac Investment Strategies

FLAGSHIP / VALUE ADD

Almanac Realty Securities

Formed 1996 – ARS I-VII, CARS I

- 21 years; eight funds; \$4.4 billion committed for investment across more than 39 companies
- 12.9% compounded annual Net IRR¹ generated since inception in 1996
- Established, high quality companies
- Experienced management teams
- Growth oriented use of proceeds
- Structured / senior securities where possible
- Shared control
- Existing portfolio of assets typically contributed
- \$100 - \$250+ million investment size
- Additional investment opportunities:
 - Start up & early stage
 - Control/take private, operating businesses, financial/management distress

LONG-TERM INVESTMENTS

Almanac Horizon Fund

Targeted 2017 Formation

- Large portfolio of stabilized industrial and office assets
- Strong cash flow profile
- Opportunity for modest growth
- 20 year history with the Company
- 9-10% net annualized return target²

PUBLIC SECURITIES

Almanac Realty Public Securities

2017 Formation

- Value oriented long / short real estate securities strategy investing primarily in +/- 250 real estate companies publicly listed North America
- Concentrated portfolio with 20 – 40 total long and short positions
- Potential for long-only sleeves/SMA's

Note: All information as of date hereof unless otherwise noted. This is not intended to be an offer to sell, or a solicitation of any offer to buy, interests in any Almanac fund or product. Any such offer will only be made by means of a confidential private offering memorandum or other similar document, which will contain material information (including certain risks of investing in the vehicle) not contained in this presentation and which would qualify in its entirety the information set forth in this presentation. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.*

1. As of 6/30/2017. Includes ARS I-VII and not CARS I. Please refer to the "Performance Notes" on pages 28-31 for important information regarding defined terms and performance calculations.
2. Target returns are not a reliable indicator of future performance and no guarantee or assurance is given that such returns will be achieved or that an investment in the strategy will not result in a loss. Such target returns are based on assumptions made by Almanac, which may differ materially from actual events or conditions, take into account anticipated use of leverage and assume the reinvestment of proceeds from asset liquidations, income, and other earnings.



Almanac Realty Securities VII, L.P. (“ARS VII”)

ARS VII Summary

- ARS VII held its final closing with over \$1.4 billion of commitments (including sidecar participations) in May 2015
- Since inception in April 2015, ARS VII has generated a Fund Gross IRR of 18.9% and a Fund Net IRR of 10.8% and a Fund Net Multiple of 1.2x
- No J-curve loss – Positive earnings for each of the first two years
- Through 2017 YTD, ARS VII committed \$995.2 million¹ to 5 companies
 - Commitment of \$225.0 million¹ to Mt. Auburn, inclusive of \$150.0 million¹ in March 2015 and \$75.0 million¹ in April 2017; additional \$75.0 million¹ potential accordion commitment subject to approval by the Almanac investment committee
 - Increased commitment of \$125.0 million¹ to CA Student Living in April 2016 (up from \$100.0 million¹ in April 2015)
 - Commitment of \$175.2 million¹ to Claros REIT in August 2015
 - Commitment of \$270.0 million¹ to Westcore Properties II in September 2016, with \$67.5 million¹ potential accordion commitment subject to approval by the Almanac investment committee
 - Commitment of \$200.0 million¹ to PREP Property Group in June 2017, with \$100.0 million¹ potential accordion commitment subject to approval by the Almanac investment committee

Note: Please refer to the “Performance Notes” on pages 28-31 for important information regarding defined terms and performance calculations. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.*

1. Includes sidecar participations.



ARS VII Portfolio Company Investments

ARS VII is approximately 86% committed (through Total Commitments and potential Accordions)

(\$ in millions)	Mount Auburn	CA Student Living	Claros REIT	Westcore Properties II	Mount Auburn (Upsize)	PREP Property Group
Origination Date	4/2015	4/2015	8/2015	9/2016	4/2017	6/2017
Property Type	Multifamily	Student Housing	Mortgage REIT	Industrial / Office	Multifamily	Retail
Original Structure	Non-Convertible Debentures, Warrants, Convertible Preferred	Non-Convertible Debentures, Profit Participation Units	Non-Convertible Debentures, Common Equity	Non-Convertible Debentures, Common Equity	Convertible Preferred Equity	Non-Convertible Debentures, Common Equity
Interest / Dividend Rate	7.5% / 8.25%	8.0% ¹	10.0% ² / Varies	8.0% / Varies ³	6.60%	10.0% ⁴ / Varies ³
Total Commitment	\$150.0	\$125.0	\$175.2	\$270.0	\$75.0	\$200.0
Accordion ⁵	--	--	--	\$67.5	\$75.0	\$100.0
ARS VII Commitment	\$134.2	\$100.0	\$149.6	\$222.1	\$60.0	\$95.6
Gross IRR	25.6%	24.3%	11.3%	7.1%	N/A	N/A
Gross Multiple	1.3x	1.4x	1.2x	1.0x	N/A	1.4x
Initial Projected IRR	15.0-17.0%	17.0-19.0%	15.0-16.0%	15.0-16.5%	16.5-18.5%	16.0-17.5%
Expected Exit	04/21	04/22	08/22	09/24	2021	2025
% of Capital Returned	0%	27%	0%	0%	0%	0%

As of 6/30/2017, pro forma for subsequent commitments.

Please refer to the "Performance Notes" on pages 28-31 for important information regarding defined terms and performance calculations. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.*

- Investment terms provide for a minimum return; greater of 15.5% IRR or multiple of 1.65x.
- Investment terms provide for 10.0% interest rate, 6.0% of which must be paid current.
- 100% of REIT taxable income is distributed annually.
- Investment terms provide for 10.0% interest rate, 8.0% of which must be paid current in Years 1-3 and 9.0% thereafter.
- Additional capital which may be requested by the respective portfolio companies that is subject to approval by the ARS VII investment committee.



ARS VII Investment – CA Student Living

Company Description

CA Student Living (CA) is a Chicago based vertically integrated student housing real estate company with investment, development, property management, leasing, and accounting / reporting capabilities. CA will continue to primarily develop Class A student housing properties located in close proximity (less than 0.5 miles) at Tier 1 public universities with high barriers-to-entry and, to a lesser extent, acquire existing assets with similar qualities.

Investment Opportunity

- CA has acquired or developed more than 14,000 beds and \$1.5 billion of student housing in 20 markets, of which over \$1.0 billion has been profitably realized
- Focused investment strategy consistent with CA's successful track record of student housing developments
- Opportunity to accumulate a Class A, newly developed portfolio of properties at Tier 1 universities and continue to build a best-in-class student housing platform
- Proven success in accessing institutional capital and meeting the fiduciary reporting and compliance requirements of large institutional investors

Results

- Unrealized Gross IRR: 24.3%
- Unrealized Gross Multiple: 1.4x

As of 6/30/2017.

Note: Please refer to the "Performance Notes" on pages 28-31 for important information regarding defined terms and performance calculations. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.* The investment described above was included for the purpose of illustrating one or more investment strategies employed by Almanac. Please refer to pages 22-23 for a list of all investments that comprise Almanac's track record.



Uncommon – University of Oregon



ICON Gardens – University of California Santa Barbara



ARS VII Investment – Mount Auburn

Company Description

MA Multifamily Master Holdings, LLC (Mount Auburn), headquartered in Los Angeles, is a newly formed vertically integrated real estate company that focuses on the acquisition, financing, and management of multifamily assets in targeted secondary markets across the United States. Mount Auburn seeks to acquire assets at or below replacement cost in markets that possess low unemployment rates, positive population and job growth, and diversified employment bases with established employers. Frequently, such markets are the seat of the state or county government and/or home to major universities or healthcare systems. Once acquired, the properties will be operated for steady growth in cash flow and with the objective of minimizing interest rate risk through the use of long term fixed rate, self-amortizing debt (i.e. HUD, Fannie Mae, Freddie Mac, etc).

Mount Auburn currently owns 29 properties totaling approximately 8,600 units

Investment Opportunity

- High quality management team with an average of more than 15 years in the multifamily industry
- Vertically integrated and institutional quality investment management and property management platforms
- Contributed portfolio consists of stabilized properties with strong and steady cash flow profile
- Capitalizes on favorable demographic and economic trends in secondary markets

Results (2015 Commitment)

- Unrealized Gross IRR: 25.6%
- Unrealized Gross Multiple: 1.3x

Results (2017 Additional Commitment)

- Unrealized Gross IRR: n/a
- Unrealized Gross Multiple: n/a

As of 6/30/2017.

Note: Please refer to the "Performance Notes" on pages 28-31 for important information regarding defined terms and performance calculations. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.* The investment described above was included for the purpose of illustrating one or more investment strategies employed by Almanac. Please refer to pages 22-23 for a list of all investments that comprise Almanac's track record.



Woodland Lakes – Lansing, MI



Lake Castleton – Indianapolis, IN



ARS VII Investment – Claros

Company Description

Claros REIT Holdings LP (Claros) is an entity formed in 2015, which holds shares in a mortgage real estate investment trust (REIT) launched in the same year to focus on first mortgage originations on transitional commercial properties. Headquartered in New York City, Claros was formed in partnership with the Mack Real Estate Credit Strategies, L.P., an affiliate of the Mack Real Estate Group. The REIT will seek to create a diversified portfolio of income-producing mortgage loans primarily through origination. The REIT will primarily focus on loans of \$50-200 million secured by institutional quality commercial real estate in major US markets.

Investment Opportunity

- High-quality management team with strong investment, credit underwriting, asset management, and real estate operating backgrounds
- Focused investment strategy to capitalize on attractive market opportunity – the REIT will seek to provide a one stop source of capital to borrowers, while investing in an attractive risk-adjusted position in the property capital stack
- The REIT will benefit from the depth and breadth of additional resources at Mack Real Estate Group and its affiliates, including property/asset management capabilities and development expertise
- Companies sponsored by the Mack family have an established record investing in commercial real estate-related investments with large institutional investors over the past several decades

Results

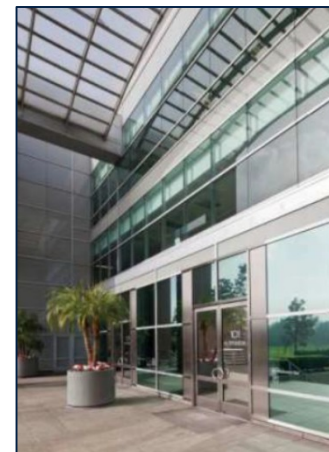
- Unrealized Gross IRR: 11.3%
- Unrealized Gross Multiple: 1.2x

As of 6/30/2017.

Note: Please refer to the "Performance Notes" on pages 28-31 for important information regarding defined terms and performance calculations. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.* The investment described above was included for the purpose of illustrating one or more investment strategies employed by Almanac. Please refer to pages 22-23 for a list of all investments that comprise Almanac's track record.



48 Lex – New York, NY



101 N. Sepulveda – El Segundo, CA



1300 Flushing – Brooklyn, NY



ARS VII Investment – Westcore 2.0

Company Description

Westcore Properties II (“Westcore 2.0”) is a San Diego, California based vertically-integrated real estate company that focuses on the acquisition, management, leasing, repositioning and disposition of industrial and, to a lesser extent, office properties primarily in the Western U.S.

Westcore 2.0 currently owns 16 properties, totaling 2.4 million square feet.

Investment Opportunity

- A proven Almanac partner
 - Second vehicle established by the Westcore Principals and Almanac
 - ARS V is expected to earn a Projected Gross IRR of 17.0 – 18.0% and a Projected Gross Multiple of 1.9 – 2.0x on its investments in Westcore 1.0, despite operating at a weighted average LTV of only 50%
- High-quality management team averaging over 30 years of commercial real estate experience
- Focused investment strategy consistent with the Westcore Principals’ successful track record of acquiring, value-enhancing and disposing of industrial and office properties

Results

- Unrealized Gross IRR of 7.1%
- Unrealized Gross Multiple of 1.0x

As of 6/30/2017.

Note: Please refer to the “Performance Notes” on pages 28-31 for important information regarding defined terms and performance calculations. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.* The investment described above was included for the purpose of illustrating one or more investment strategies employed by Almanac. Please refer to pages 22-23 for a list of all investments that comprise Almanac’s track record.



Escondido Business Center – San Diego, CA



7037 West Van Buren Street – Phoenix, AZ



ARS VII Investment – PREP Property Group

Company Description

PREP Property Group, LLC (“PREP”) is a Park City, Utah based vertically-integrated real estate company that focuses on the acquisition, management, leasing, repositioning, and redevelopment of retail assets in infill secondary markets across the U.S.

PREP currently has interests in 5 retail properties, totaling 2.2 million square feet. PREP is also the sponsor of an externally-advised private REIT focused on acquiring and owning triple-net leased retail properties.

Investment Opportunity

- Management led by President & CEO Mike Phillips, who has 40 years of experience in retail real estate and over 25 years of experience in owning, running, and growing Phillips Edison & Co., a retail-focused real estate platform that Mike co-founded
- Mike Phillips and the PREP senior management team have a highly successful track record in value-add retail real estate
- Two-pronged investment strategy: (i) value-add / opportunistic retail remerchandising and redevelopment, and (ii) retail net-lease acquisitions
- Upside opportunity to scale-up investment management platform through PREP’s existing RIA network and broker/dealer retail investor channels

Projected Results for PREP

- Initial Projected Gross IRR of 16.0 – 17.5%
- Initial Projected Gross Multiple of 2.0 – 2.2x
- Projections over an eight-year term

As of 6/30/2017.

Note: Please refer to the “Performance notes” on pages 28-31, which provide important information regarding defined terms and the calculation of prior performance. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.* The investment described above was included for the purpose of illustrating one or more investment strategies employed by Almanac. Please refer to pages 22-23 for a list of all investments that comprise Almanac’s track record.



The Kenwood Collection – Cincinnati, OH



Hanover Crossing – Boston, MA



ARS VII Pipeline

- Term sheets signed or in negotiation
 - \$100-150 million growth capital for limited service hotel company

- In depth discussions ongoing
 - \$150-200 million growth capital for grocery-anchored retail platform

- Selected deals we did not do
 - Growth capital for Eastern U.S. industrial company
 - Growth capital for non-traded public hotel REIT
 - Growth capital for multifamily subsidiary of a public office REIT
 - Formation and growth capital for manufactured housing company focused on the U.K., U.S. and Canada
 - Roll up and growth capital for family-oriented national manufactured housing company
 - Roll up and growth capital for sunbelt small tenant industrial company
 - Roll up and growth capital for West Coast-based office and industrial company



Almanac Realty Securities V, L.P. (“ARS V”)

ARS V Summary

- ARS V held its final closing in July 2008 with \$839.2 million of commitments plus \$81.7 million of commitments to sidecar co-investment vehicles. Investment period, including follow-ons, ended July 2013
- Since inception, ARS V has generated a Fund Gross IRR of 16.8%, Fund Net IRR of 11.6% and Fund Net Multiple of 1.5x
- Fund Net IRR expectation of 11.5%-12.0%
- For 2016, the Total Annual Net Return was 7.7% comprised of income of 9.1% and appreciation of (1.6%), reflecting final write downs of Vanta and treatment of dividends as reversal of unrealized appreciation
- ARS V has funded \$910.7 million¹ to 7 companies (and open market securities), 5 of which have been fully realized
- Fully realized investment in Welsh in June 2016, prior to the stated maturity in January 2017, resulting in a Gross IRR of 14.7% and Gross Multiple of 1.6x
- Realized \$83.6 million of investment in Vanta during 2016 and YTD 2017, representing greater than 90% of total proceeds that were expected to be realized
- Received \$80.0 million, fully repaying the Westcore 1.0 debenture in 2016; remaining common equity continues to perform well (\$25.1 million of unrealized appreciation above \$117.7 million cost basis)
 - The Westcore 1.0 monetization is underway and proceeding according to plan

As of 6/30/2017.

Note: Please refer to the "Performance Notes" on pages 28-31 for important information regarding defined terms and performance calculations. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.*

1. Includes sidecar co-investment vehicles.



ARS V Portfolio Company Investments

(\$ in millions)	Open Market ³	Shaner Mortgage ³	RXR ³	JH ³	BSRT ³	Welsh ³	Vanta	Westcore
Origination Date	10/08	8/09	5/10	8/11	3/10	11/10	8/07	6/11
Property Type	Various	Hotels	Office	Multifamily	Multifamily	Industrial	Office	Industrial / Office
Original Structure	Mixed	Common	Convertible Debt	Convertible Debt	Convertible Debt	Convertible Debt	Unsecured Debt / Conv. Debt / Pref. Stock	Unsecured Debt / Common
Interest/ Dividend Rate	9.8% ⁴	10.4%	8.0%	9.0% ⁶	9.0%	9.0% ⁶	8.5% ⁷	10.0% ⁹ / Varies ¹⁰
Total Commitment ¹	\$17.8	\$50.0 ⁵	\$175.0	\$100.0	\$100.0	\$190.0	\$110.0 ⁸	\$197.7
ARS V Commitment ²	\$17.8	\$50.0 ⁵	\$140.0	\$100.0	\$85.0	\$158.3	\$110.0 ⁸	\$197.7
Inception to Date Gross IRR	73.4%	32.4%	31.2%	21.3%	15.9%	14.7%	3.8%	17.7%
Gross Multiple	1.4x	1.6x	2.1x	1.6x	1.6x	1.6x	1.3x	2.0x
Initial Projected IRR	15.0-20.0%	16.0-18.0%	18.0-20.0%	15.0-16.0%	15.0-20.0%	15.0-17.0%	16.0-18.0%	18.0-20.0%
Current Projected IRR	N/A	N/A	N/A	N/A	N/A	N/A	3.5-4.0%	17.0-18.0%
Expected Exit	--	--	--	--	--	--	12/17	01/19
% of Capital Returned	100%	100%	100%	100%	100%	100%	23%	40%

As of 6/30/2017.

Please refer to the "Performance Notes" on pages 28-31 for important information regarding defined terms and performance calculations. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.* 1. Total Commitment reflects the original commitment amount including sidecar participations. 2. Reflects original commitment amount. 3. Fully realized. 4. Average yield on cost of purchases. 5. Shaner Mortgage commitment downsized to \$29.6 million. 6. Indicates final contractual rate step up. 7. \$20.7 million 2011 Debenture yielding a 15.0% coupon (8.5% current pay) was repaid in 2016. 8. Vanta commitment downsized to \$100.6 million. 9. \$80.0 million Debenture repaid in 2016. 10. 100% of REIT taxable income is distributed annually.



ARS V Investment – Vanta (formerly known as T. Wall Properties)

Property Type	Office
Origination Date	August 2007
Structure	Non-convertible Debentures, Convertible Debentures, Preferred Stock
Maturity Date	September 2016
ARS V Commitment	\$110.0 million ¹
Total Invested	\$100.6 million
Proceeds to Date	\$125.0 million
Fair Value	\$3.0 million
Interest Rate ²	Preferred Stock: 8.5% dividend Convertible Debenture: 8.5% accrual rate
Inception to Date Gross IRR	3.8%
Projected Gross IRR	Initial: 16.0%-18.0%; Current Estimate: 3.5%-4.0%
Governance	2 of 3 board seats (John McGurk, Justin Hakimian)
Owned Portfolio	39 acres of unimproved land
Occupancy	

2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
93%	88%	80%	76%	80%	86%	90%	86%	89%	100%

As of 6/30/2017.

Note: Please refer to the “Performance Notes” on pages 28-31 for important information regarding Almanac’s investments and certain of the prior performance information included herein. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.*

1. In February 2011, Vanta commitment downsized to \$104.9 million. ARS V funded \$100.6 million.

2. ARS V ceased accruing interest and dividends in 2016.

Status Update

- Vanta is implementing its liquidation plan
 - During 2016, the Company sold all but one operating asset, totaling 2.2 million square feet and \$300.8 million of gross proceeds
 - Subsequent to year-end, Vanta sold its remaining operating asset for net proceeds of \$47.2 million
 - All but four land parcels have been monetized. The remaining are being marketed for sale
- ARS V received total distributions of :
 - \$34.4 million in 2016
 - \$49.3 million subsequent to year-end
 - Remaining proceeds to be distributed are estimated at \$3-5 million as of 12/31/16
- Vanta was in default of its obligations to pay the outstanding amounts due under the 2007 debenture and 2011 debenture as of September 30, 2016 (the Maturity Date)
- We anticipate liquidating Vanta in 2017



ARS V Investment – Westcore 1.0

Property Type	Industrial and Office					
Origination Dates	June 2011, December 2012					
Structure	Common Stock, Non-convertible Debentures					
Maturity Date	Debentures fully repaid as of December 2016					
ARS V Commitment	\$197.7 million (\$80.0 million non-convertible debenture, \$117.7 million common stock)					
Total Invested	\$197.7 million (\$80.0 million non-convertible debenture, \$117.7 million common stock)					
Proceeds to Date	\$244.4 million					
Fair Value	\$142.8 million					
Inception to Date Gross IRR	17.7%					
Projected Gross IRR	Initial: 18.0%-20.0%; Current Estimate: 17.0%-18.0%					
Governance	2 of 4 board seats (Andrew Silberstein, Matthew Kaplan)					
Owned Portfolio	Wholly Owned: 12 Properties (1.9 million square feet) Joint Ventures: 63 Properties (11.6 million square feet)					
Portfolio Occupancy	2011	2012	2013	2014	2015	2016
	71%	78%	85%	86%	91%	86%

As of 6/30/2017.

Note: Please refer to the “Performance Notes” on pages 28-31 for important information regarding Almanac’s investments and certain of the prior performance information included herein. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.*

Status Update

- During 2016, Westcore 1.0 began the process of monetizing its portfolio
- Upon receiving conflict waivers from the Advisory Boards of ARS V and ARS VII, Westcore 1.0 distributed the Service Company and one property to the Principals in lieu of cash distributions. The Principals contributed such assets into Westcore 2.0, an ARS VII portfolio company
- To date, the pace of and proceeds from property distributions are consistent with plan and continue ongoing
- Disposition proceeds to date used to repay the Debentures in full (\$80.0 million) and distribute \$2.20 per share (\$25.9 million) in 2016 and an additional \$6.36 per share (\$74.8 million) year-to-date 2017
- Westcore 1.0 expects to realize the remaining properties over the next 12 months, resulting in additional distributions to ARS V of approximately \$90 million



Deal By Deal Track Record

Almanac Portfolio Companies - Realized

Company (Ticker)	Fund	Origination Date	Realization Date	Product Type	Geography	Original Commitment ¹	Fund Share of		
							Original Commitment	Realized Capital	Gross IRR
Ambassador Apartments (NYSE: AAH)	ARS I	Jul-96	May-98	Multi-family	Sun Belt	\$ 25.0	\$ 25.0	\$ 25.0	17.9%
Lexington Corp (NYSE: LXP)	ARS I	Dec-96	Oct-02	NNN Lease	National	25.0	25.0	25.0	14.3%
Pacific Gulf Properties (NYSE: PAG)	ARS I	Dec-96	Dec-03	Multi-family / Industrial	West Coast	55.0	55.0	55.0	19.4%
CNL Financial	ARS I	Sep-97	Oct-04	NNN Lease / Finance	National	40.0	40.0	40.0	14.8%
Acadia Realty Trust (NYSE: AKR)	ARS I	Apr-98	Jun-03	Retail	East Coast	22.6	22.6	22.6	7.6%
EastGroup Properties (NYSE: EGP)	ARS II	Sep-98	Dec-03	Industrial	South, West, Sun Belt	70.0	70.0	70.0	14.7%
Morningstar Storage	ARS II	Dec-98	Jul-03	Self-Storage	Carolinas	60.0	60.0	60.0	9.7%
HealthCare REIT (NYSE: HCN)	ARS II	Jan-99	Dec-03	Healthcare NNN	National	75.0	75.0	75.0	13.5%
CNL Hospitality	ARS II	Jan-99	May-07	Hospitality NNN	National	64.1	64.1	64.1	21.7%
WNY Group	ARS II	Apr-99	Sep-00	Multi-Family	Mid-Atlantic	20.0	20.0	20.0	25.4%
Open Market	ARS II	Apr-99	Jul-02	Various	Various	32.0	32.0	32.0	17.5%
Brandywine Realty Trust (NYSE: BDN)	ARS III	Apr-99	Feb-05	Office / Industrial	Mid-Atlantic	105.0	105.0	105.0	15.2%
Parkway Properties (NYSE: PKY)	ARS III	Oct-00	Apr-07	Office	Southeast	75.0	75.0	75.0	16.8%
Victory Real Estate	ARS IV	Sep-04	Dec-11	Retail	Southeast	100.0	75.0	75.0	10.2%
Encore Hospitality ²	ARS IV	Apr-05	Sep-07	Limited-service Hospitality	South	85.0	70.0	37.2	64.3%
National RV Communities	ARS IV	Nov-05	Jun-13	RV/MH Parks	National	115.0	115.0	115.0	14.4%
Allegro Senior Living (Hallmark)	ARS IV	Mar-07	Oct-14	Senior Housing	Southeast	75.0	75.0	75.0	15.2%
Denholtz Holdings ³	ARS IV	Dec-05	Dec-14	Office / Industrial	East	125.0	100.6	25.0	(17.8%)
Shaner Holdings ⁴	ARS IV	Nov-07	Apr-15	Hospitality	East	65.0	65.0	59.6	12.5%
Open Market	ARS V	Nov-08	Sep-09	Various	Various	17.8	17.8	17.8	73.4%
Shaner Mortgage ⁵	ARS V	Aug-09	Sep-11	Hospitality Mortgage REIT	National	50.0	50.0	29.6	32.4%
RXR Realty	ARS V	Apr-10	Dec-13	Office	NYC Metropolitan	175.0	140.0	140.0	31.2%
JH Real Estate	ARS V	Aug-11	Jan-15	Multi-family	California	100.0	100.0	100.0	21.3%
BSR Trust (Summit)	ARS V	Mar-10	May-15	Multi-family	Southeast	100.0	85.0	85.0	15.9%
Welsh Property Trust	ARS V	Nov-10	Jun-16	Industrial	Midwest	190.0	158.3	158.3	14.7%
Drawbridge Realty Trust	ARS VI	Dec-11	Dec-14	NNN Industrial/R&D/Office	West Coast	150.0	132.0	132.0	20.4%
Nolan Real Estate ⁶	ARS VI	Jul-12	Dec-14	Multi-family	Midwest	125.0	110.0	61.4	28.4%
Winter Properties ⁷	ARS VI	Mar-14	Nov-16	Mixed Use	NYC Metropolitan	200.0	175.0	48.1	19.9%

As of 6/30/2017. Note: Please refer to the "Performance Notes" on pages 28-31 for important information regarding defined terms and performance calculations. \$ 1,827.7 15.7%
Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series. It should not be assumed that recommendations made in the future will be profitable or will equal the performance of the securities in this list.

1. "Original Commitment" refers to the fund's initial commitment to the portfolio company, or, if greater, the outstanding commitment to the company (e.g., an upside or additional commitment), and does not take into account adjustments for potential increases (e.g., unapproved accretions) or decreases (e.g., an elective decrease or a negotiated release of a portion of an original commitment).
2. Encore Hospitality commitment downsized to \$45.2 million (\$37.2 million at fund share).
3. Denholtz commitment downsized to \$103.8 million (\$83.5 million at fund share).
4. Shaner Holdings commitment downsized to \$59.6 million (\$59.6 million at fund share).
5. Shaner Mortgage commitment downsized to \$29.6 million (\$29.6 million at fund share).
6. Nolan Real Estate commitment downsized to \$69.8 million (\$61.4 million at fund share).
7. Winter Properties commitment downsized to \$55.0 million (\$48.1 million at fund share).



Almanac Portfolio Companies - Unrealized

Company (Ticker)	Origination			Geography	Fund Share of		Fund Share of		Gross
	Fund	Date	Product Type		Original Commitment ¹	Original Commitment	Invested Capital	Unrealized	
Merritt Properties	ARS I	Oct-97	Industrial / Office	Mid-Atlantic	\$ 150.0	\$ 150.0	\$ 92.5	\$ 57.5	18.5%-19.0%
Advance Realty	ARS III	Aug-01	Office / Industrial	Mid-Atlantic	66.1	66.1	64.4	1.7	(13.0%)-(12.0%)
Vanta Properties (T. Wall) ²	ARS V	Nov-07	Office / Land	Madison, WI	134.1	134.1	45.3	55.3	3.5%-4.0%
Westcore Properties	ARS V	Jul-11	Office / Industrial	West Coast	197.7	197.7	80.0	117.7	17.0%-18.0%
RAIT Financial Trust (NYSE: RAS)	ARS VI	Oct-12	Mortgage REIT	National	100.0	100.0	18.7	81.3	N/A ³
Shaner Hospitality Finance ⁴	ARS VI	Jun-13	Hospitality	National	50.0	50.0	-	3.0	22.5%-27.5%
HRI Properties (convertible)	ARS VI	Apr-14	Hosp./Multi-family/Com.	South	150.0	121.9	-	121.9	15.0%-19.0%
HRI Properties (non-convertible)	ARS VI	Jan-16	Hosp./Multi-family/Com.	South	50.0	40.6	-	40.6	16.0%-16.0%
CA Student Living	ARS VII	Apr-15	Student Housing	National	125.0	100.0	25.0	75.0	17.0%-19.0%
Mount Auburn	ARS VII	May-15	Multi-family	National	150.0	134.2	-	134.2	15.0%-17.0%
Claros REIT	ARS VII	Aug-15	Mortgage REIT	National	175.2	149.6	-	149.6	15.0%-16.0%
Westcore Properties II	ARS VII	Sep-16	Office / Industrial	West Coast	270.0	222.1	-	62.5	15.0%-16.5%
Mount Auburn (addtl commitment)	ARS VII	Apr-17	Multi-family	National	75.0	60.0	-	-	16.5%-18.5%
PREP Property Group	ARS VII	Jun-17	Retail	National	200.0	191.1	-	10.0	16.0%-17.5%
Total ARS Unrealized Investments							\$ 325.9	\$ 910.3	14.0%-15.5%
Slate Asset Management	CARS I	Nov-14	Office / Industrial / Retail	North America	C\$ 140.0	C\$ 140.0	C\$ -	C\$ 130.0	N/A ⁵

As of 6/30/2017, pro forma for subsequent commitments.

Note: Please refer to the "Performance Notes" on pages 28-31 for important information regarding defined terms and performance calculations. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.*

1. "Original Commitment" refers to the fund's initial commitment to the portfolio company, or, if greater, the outstanding commitment to the company (e.g., an upside or additional commitment), and does not take into account adjustments for potential increases (e.g., unapproved accordions) or decreases (e.g., an elective decrease or a negotiated release of a portion of an original commitment).
2. Vanta Properties commitment downsized to \$100.6 million (\$100.6 million at fund share).
3. Almanac does not disclose projected return information for individual portfolio investments in publicly traded companies.
4. Shaner Hospitality Finance commitment downsized to \$3.0 million (\$3.0 million at fund share).
5. Gross Projected IRR for the Slate Asset Management investment has not been updated since February 2015, when the Gross Projected IRR was estimated at 15.0% - 17.0%.



Almanac Realty Investors Conclusion

Conclusion

Almanac Realty Investors

- 36 year-history of real estate investing
- Proven, stable, and experienced investment team
- Philosophy of putting investors first

Almanac Funds

- 8 funds; \$4.4 billion committed for investment across more than 39 companies¹
- 12.9% Net IRR to investors over 20 years in the ARS Fund Series³

ARS V

- Funded \$910.7 million² to 7 companies (and open market securities), 5 of which have been fully realized
- Fund Net IRR expectation of 11.5%-12.0%
- Since inception, generated a Fund Gross IRR of 16.8%, Fund Net IRR of 11.6% and Fund Net Multiple of 1.5x

ARS VII

- Final closing in May 2015 with \$1.26 billion of commitments, plus \$156.2 million of commitments to sidecar co-investment vehicles
- Since inception in April 2015, ARS VII has generated a Fund Gross IRR of 18.9% and a Fund Net IRR of 10.8% and a Fund Net Multiple of 1.2x
- Pipeline remains active; ARS VII is 86% committed through primary commitments and potential accordions. With the 20% reserve for follow-on investments, ARS has additional capacity for 1 potential deal.

ARS VIII

- Launched September 2017

Note: Please refer to the “Performance Notes” on pages 28-31 for important information regarding defined terms and performance calculations. *Past performance is not indicative of future results, and there can be no assurance that any Almanac fund will achieve rates of return or portfolio diversification comparable to the ARS Fund series.*

1. Includes ARS I-VII and CARS I.

2. Including sidecar participations.

3. As of June 30, 2017. Includes ARS I-VII and not CARS I.



Appendix

Almanac Professional Biography

Matthew W. Kaplan

Managing Partner

Matthew W. Kaplan, 54, Managing Partner. Mr. Kaplan joined Almanac in 1992 and is currently responsible for overseeing the activities of Almanac and is the Portfolio Manager of the ARS Fund Series. From 1990 to 1992, he served in the Corporate Finance Department of Rothschild Inc. Mr. Kaplan is a director of Westcore Properties and Westcore Properties II. Mr. Kaplan has been a director of Allegro Holdings, Ambassador Apartments Inc., CNL Financial Services, CNL Hospitality Properties, Encore Hospitality, Hallmark Holdings, National RV Communities, Parkway Properties, RXR Realty, Vanta Commercial Properties (formerly known as T. Wall Holdings), Winter Properties, and WNY Group. Mr. Kaplan is a member of NAREIT's Real Estate Investment Advisory Council and has been a member of the Urban Land Institute. From 1988 to 1990, he was a management consultant at Touche Ross & Co. Mr. Kaplan graduated cum laude from Washington University in 1984 and received an MBA from The Wharton School in 1988.

Josh K. Overbay

Managing Director

Josh K. Overbay, 37, Managing Director. Mr. Overbay joined Almanac in 2014 and is responsible for leading the firm's capital raising and investor relations activities. From 2010 to 2014, he was a Director at Lazard Frères in the Private Fund Advisory Group, with specific responsibility for advising and raising capital for real estate private equity fund managers. From 2007 to 2010, he was a Vice President of Perseus Realty Partners, a Washington, DC, based real estate private equity firm, where he led the firm's global capital raising and investor relations activities. Previously, he worked in financial services public policy roles at the U.S. Chamber of Commerce. Mr. Overbay graduated from Roanoke College in 2002, received a Masters in Legislative Affairs and Public Policy from The George Washington University in 2007, and a Masters in Real Estate from Georgetown University in 2010.



Performance Notes

Performance information included in this presentation is intended solely to provide recipients with information about the existing Funds and their respective investments. In considering the performance information contained herein, prospective limited partners should understand that an investment in any fund does not represent an interest in any investment or investment portfolio of any prior, related or other investment fund sponsored, managed or advised by Almanac. Information respecting prior performance is not indicative of actual results to be obtained by any Fund, and there can be no assurance that any Fund will be able to implement its investment strategy or investment approach, achieve comparable results, that any target results will be met or that it will be able to avoid losses.

The performance returns attributable to any particular limited partner may vary from the returns presented due to difference in timing of net cash flows between investors and the amount of net cash flows attributable to each investors interest. The performance returns may include returns for investments that are not fully realized. In the case of investments that are not fully realized, the actual realized returns on such investments will depend on, among other factors, future operating results, the value of the assets, market conditions at the time of realization, the level of transaction costs incurred, and the timing and manner of sale, all of which may differ from the assumptions used to estimate the future value of the investments. Accordingly, the actual realized return of investments that are not fully realized may differ materially from the returns indicated herein. Fund level returns represent a measurement of the performance of the Fund related to the capital interests held by the unaffiliated limited partner group taken as a whole (hereinafter referred to as the “limited partners”), and excluding the capital interests in the Fund that are held by the general partner and any limited partner that is a current or former affiliate of the general partner.



Performance Notes

“Fund Gross IRR” is calculated in the same manner as the Gross IRR, and combines the cash flows from investments in all portfolio companies of the referenced fund.

“Net IRR”: The inception to date net fund IRR, as it applies to the capital interests of the Limited Partners as a whole, and the net partner IRR, as it applies to the capital interest of an individual partner (collectively, the “Net IRR”) (the Limited Partners and an individual partner referred to as an “Investor” with reference to the net fund IRR and net partner IRR, respectively) is the compounded per annum rate of return on an Investor’s investment in the Fund, after deduction of management fees, partnership expenses, carried interest and fund reserves, measured from inception through the last day of the reporting period. The Net IRR is calculated using the actual dates that the Investor made its capital contributions to the Fund and the actual dates that the Investor received a distribution of the available net cash flow from the Fund. The Net IRR uses the estimated fair value of the Investor’s interest in the Fund as of the last day of the reporting period, net of the estimated carried interest that would be due as of such date based on such estimated fair value, as the residual value.

“Net Multiple” is the ratio of (x) the net value of the limited partners’ interest in the referenced Fund, over (y) the amount of capital invested by such limited partners in the referenced Fund. The Net Multiple is measured from the inception (the date of first investment in a portfolio company) through the last day of the reporting period, and is not impacted by the time that capital has been invested. In determining the Net Multiple, the net value of the limited partners’ interest in the referenced Fund represents (a) the inception to date operating net cash flow distributed to such limited partners (after deduction of management fees, partnership expenses, carried interest and fund reserves), plus (b) the inception to date realized gains distributed to such limited partners, and (c) the estimated fair value of the limited partners’ interest in the referenced Fund as of the last day of the reporting period, net of the estimated carried interest that would be due as of such date based on such estimated value. As it relates to performance measurement, the Net Multiple for the referenced Fund may differ from the net multiple generated for any single limited partner.

“Distributions to Paid-In (DPI) Ratio” is the ratio of (x) the cumulative distributions to limited partners, over (y) the amount of capital invested by such limited partners in the referenced Fund.



Performance Notes

“% of Partner Capital Returned” represents the percentage of partner capital invested into portfolio companies of the referenced Fund that has been returned as of June 30, 2017.

Investment level returns represent a measurement of the performance of the Fund’s investments related to the capital invested in each investment. Gross investment level returns are reported for each investment and for all of the Fund’s investments on a combined basis.

“Gross IRR”: The inception to date Gross Investment Level Internal Rate of Return (the “Gross IRR”) is the compounded per annum rate of return on an investment in a portfolio company, before the allocation and deduction of management fees, partnership expenses and carried interest, and fund reserves. The Gross IRR presented for each investment represents the return through the earlier of the current reporting date or the date of full realization. The Gross IRR is calculated using the actual dates that an investment is made into, or returned from, a portfolio company. The Gross IRR calculation generally recognizes income from an investment when contractually due (i.e. interest on loans, fees and preferred dividends), or in the case of common equity investments, when received. The estimated fair value of an investment, before deduction for carried interest, is utilized as the residual value in the calculation of the Gross IRR for any investments that have not been fully realized as of the current reporting date. Under the terms of the applicable Partnership Agreement, capital contributions made to the partnership which are used to fund temporary investments, and which are returned before a specified date (Bridge Investments), if any, are excluded from the Gross IRR presentation.

“Gross Multiple” is the ratio of (x) the total value of the Fund’s interest in a portfolio company, over (y) the amount of capital that the Fund invested in such portfolio company. The Gross Multiple is measured from the inception of an investment through the last day of the reporting period (or through the date of full realization, if earlier), and is not impacted by the time that capital has been invested. In determining the Gross Multiple for an investment that has been fully realized, the total value of the Fund’s interest in a portfolio company equals (a) the inception to date gross cash received from an investment, plus (b) the gain (loss) realized upon disposition of such investment. In determining the Gross Multiple for an investment that has not been fully realized, the total value of the Fund’s interest in a portfolio company represents (a) the inception to date gross cash received from an investment, plus (b) the gain (loss) realized from any partial disposition of such investment, and (c) the estimated fair value of the Fund’s interest in such investment as of the last day of the reporting period.



Performance Notes

“Gross Projected IRR” is calculated in a manner similar to the calculation of Gross IRR for inception to date returns, except that these calculations contain estimates and assumptions about the timing and amount of future investment and partnership level cash flows and expenses, including the timing, form, and estimated proceeds resulting from assumed future exit transactions. Gross Projected IRRs are presented as a range. The extent of the range is a function of the level of the current yield Almanac expects to achieve through the projected realization date, the timing of the assumed future exit transaction, as well as the ultimate net exit price (which typically Almanac projects across various scenarios). These estimates and assumptions are inherently uncertain, and subject to numerous factors, many of which are not in Almanac’s control. These estimates and assumptions were not prepared with a view towards public disclosure or compliance with any published guidelines. The internal projected return information set forth above is presented only for illustrative purposes as a guideline to assist prospective investors in understanding the types of portfolio investments made by Almanac on behalf of the ARS Funds. As such, neither Almanac Realty Investors, LLC, nor the referenced Fund, represent or warrant, and there can be no assurances, that these estimates and assumptions will be accurate; actual results may differ materially from these estimates.

“Initial Projected IRRs” are based on the original underwriting of a transaction. When projected IRRs are presented as a range, the extent of the range is a function of the level of the current yield Almanac expects to achieve through the projected realization date, the timing of the assumed future exit transaction, as well as the ultimate net exit price (which typically Almanac projects across various scenarios).

“Initial Contractual Yield” is the stated interest rate set forth in the transaction agreement of each applicable investment in effect during the initial period that the investment was outstanding. Where investments were made that included common equity, the weighted average yield is shown assuming no dividends on the common equity investment. This figure may differ from the realized yield on cost over the life of the investment, due to changes in interest rates, payment terms, and other loan modifications. The Initial Contractual Yield is included solely for the purpose of providing prospective limited partners with historical context with respect to Almanac’s emphasis on achieving current yield. There can be no assurance that any Fund will achieve similar Initial Contractual Yields with respect to its investment program.



Alaska Retirement Management Board

CIO Update

Bob Mitchell, CFA
October 5-6, 2017

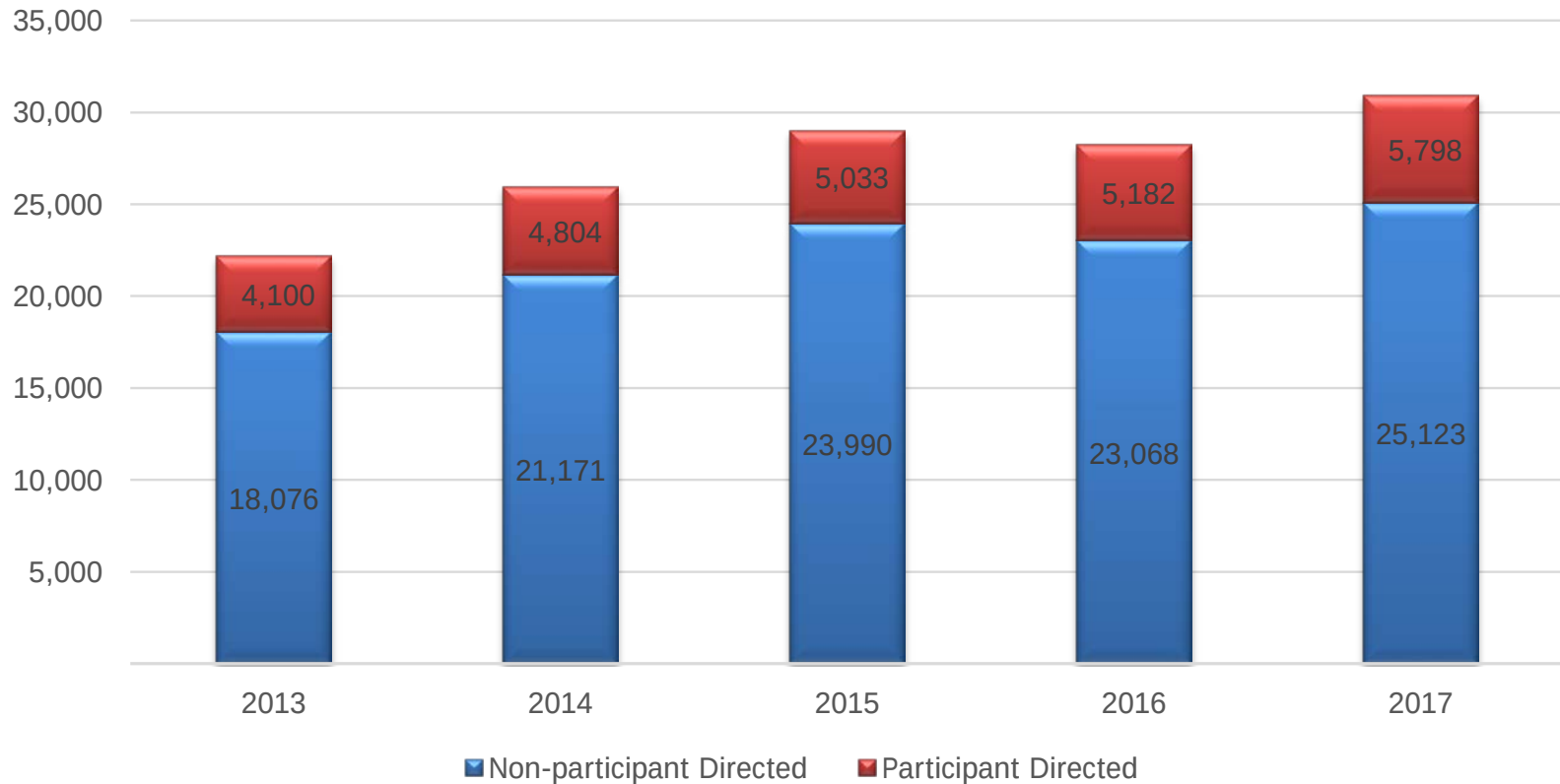
FY 18 Asset Allocation Review and Approval

Overview

- Progression of DC and DB Assets Under Management
- Challenges of Current Environment
- Strategic Focus
- Upcoming projects

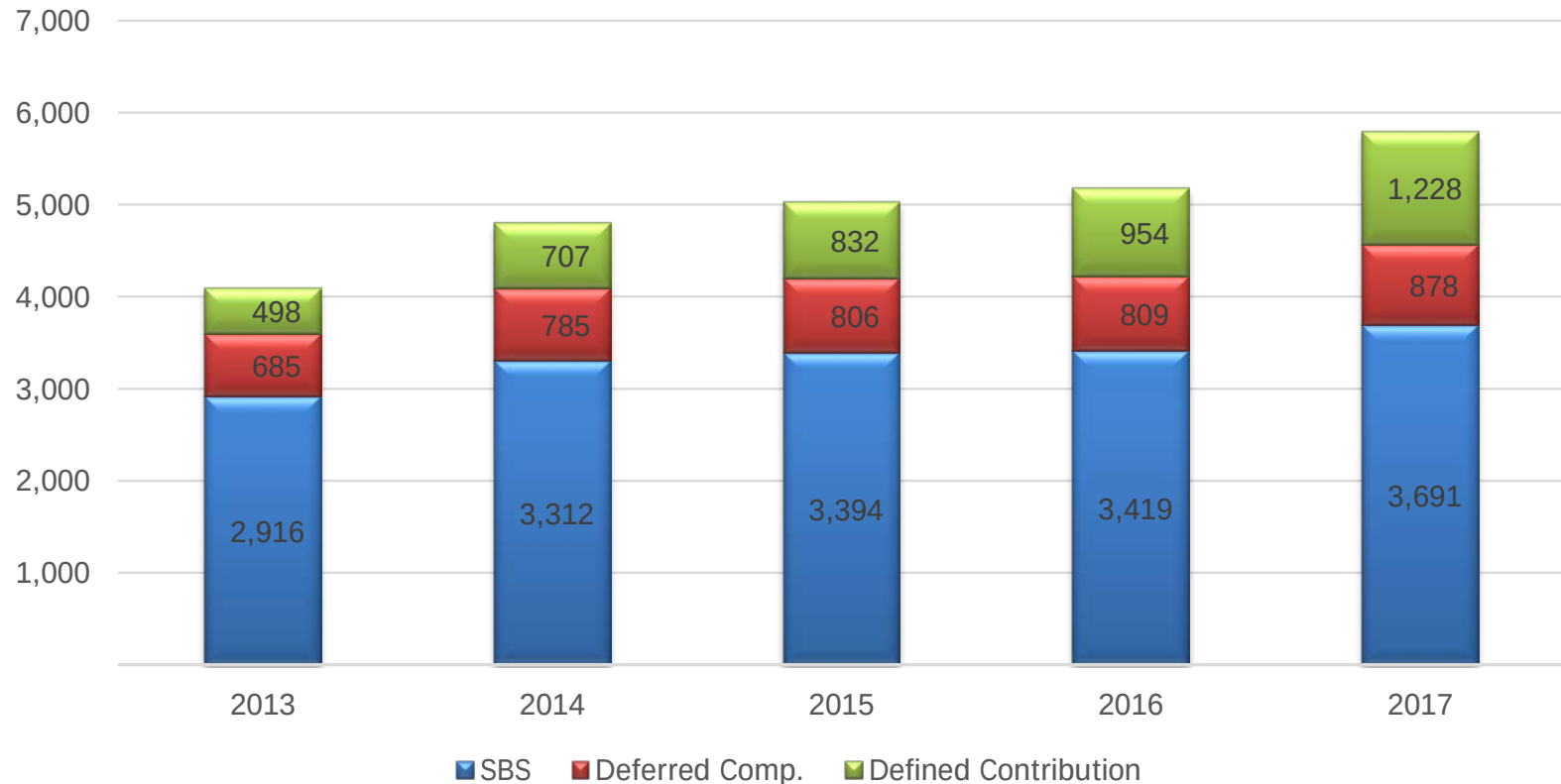
Progression of DC and DB Assets Under Management

Total Assets Under Management
(\$ million)



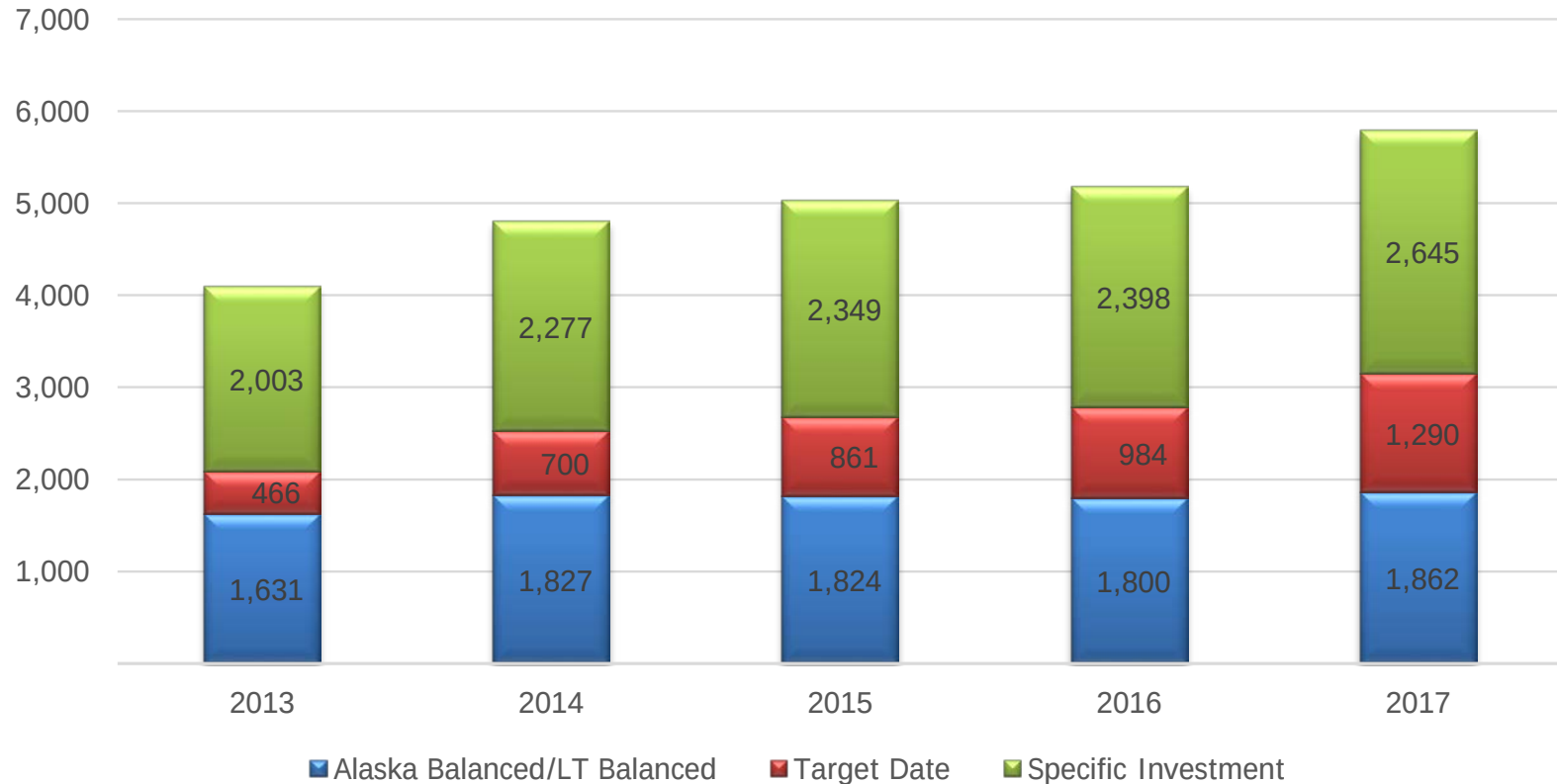
Progression of DC and DB Assets Under Management

Participant Directed AUM by Investment Plan
(\$ million)



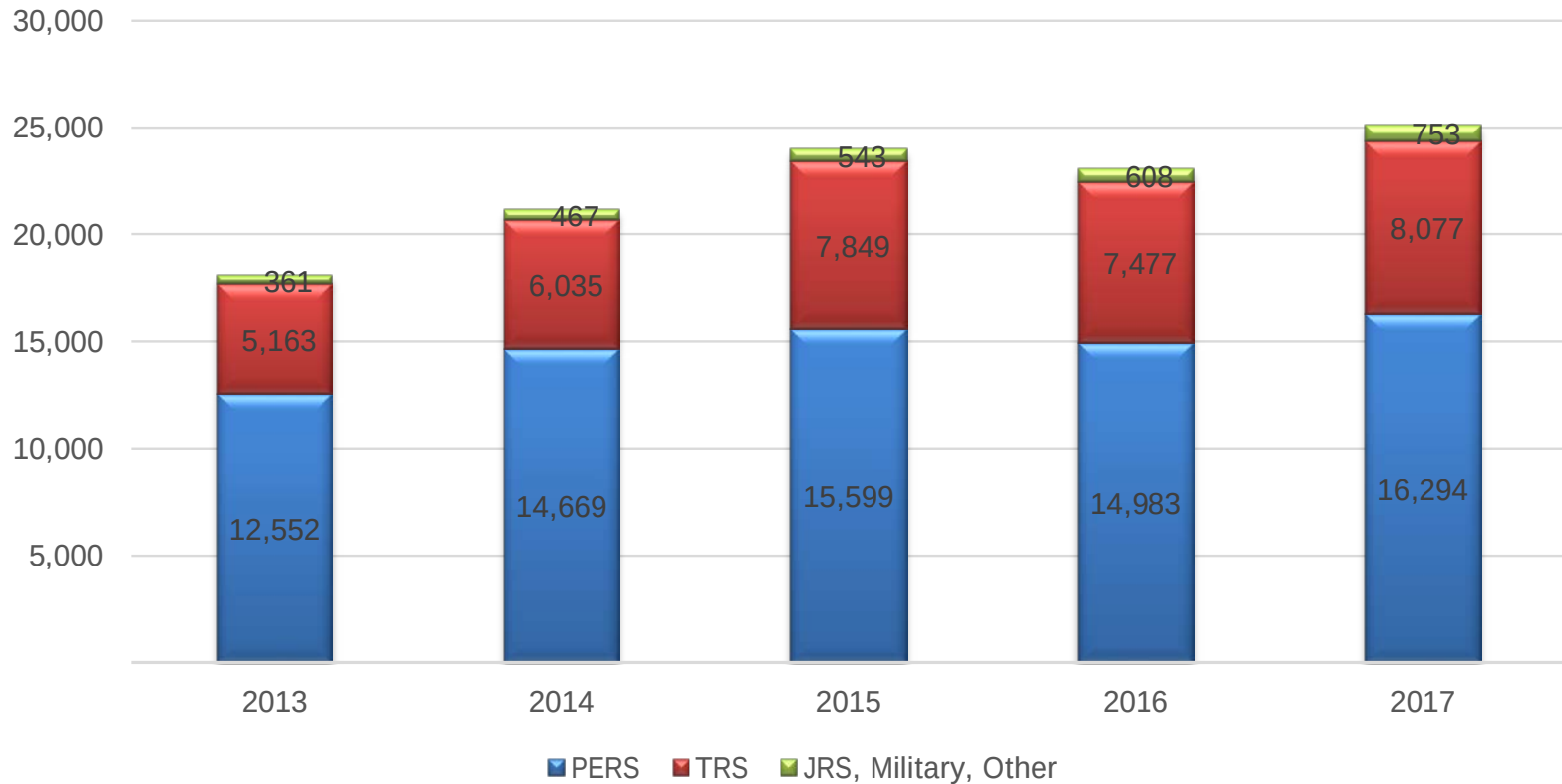
Progression of DC and DB Assets Under Management

Participant Directed AUM by Investment Type
(\$ million)



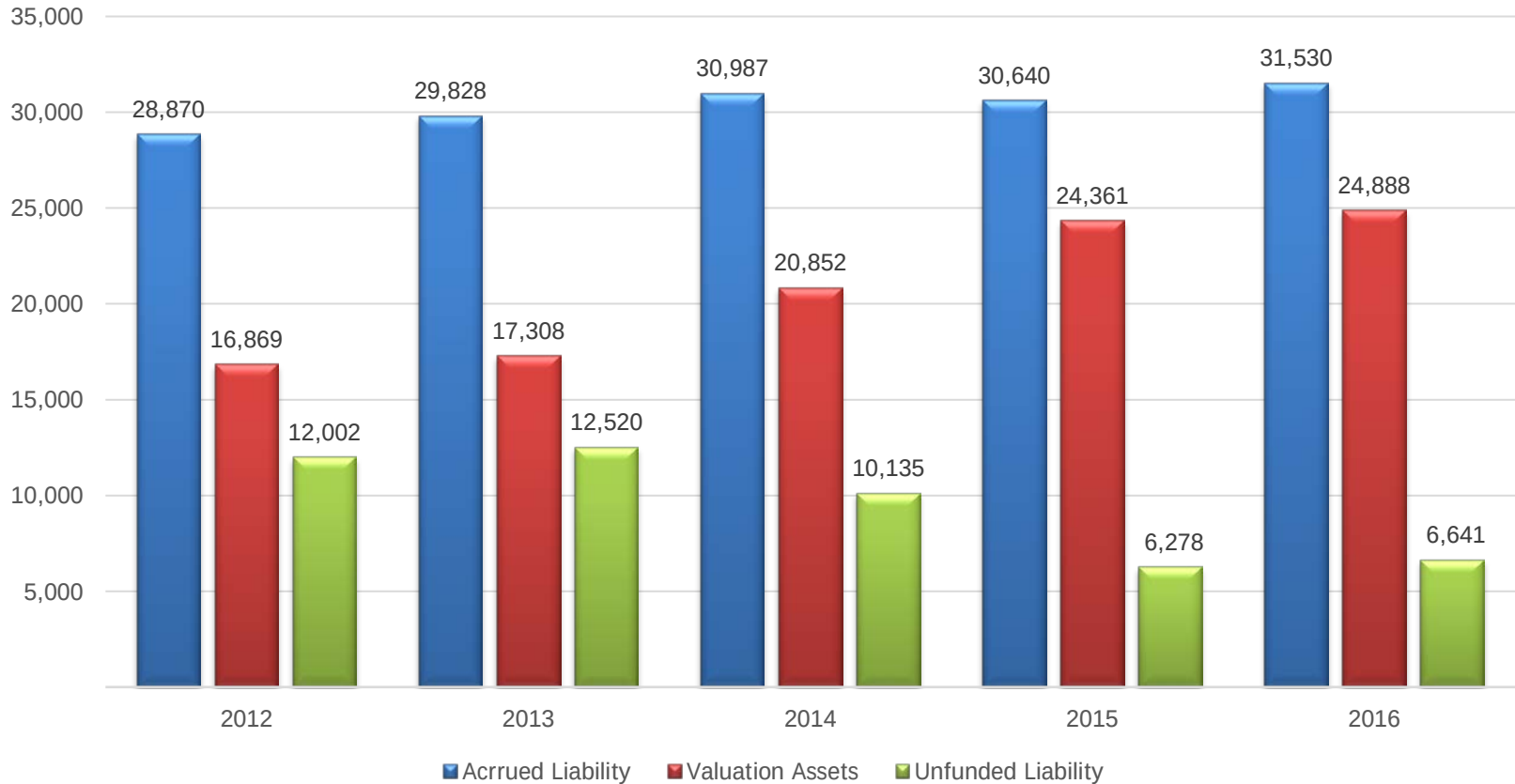
Progression of DC and DB Assets Under Management

Non-Part. Directed AUM by Investment Plan
(\$ million)

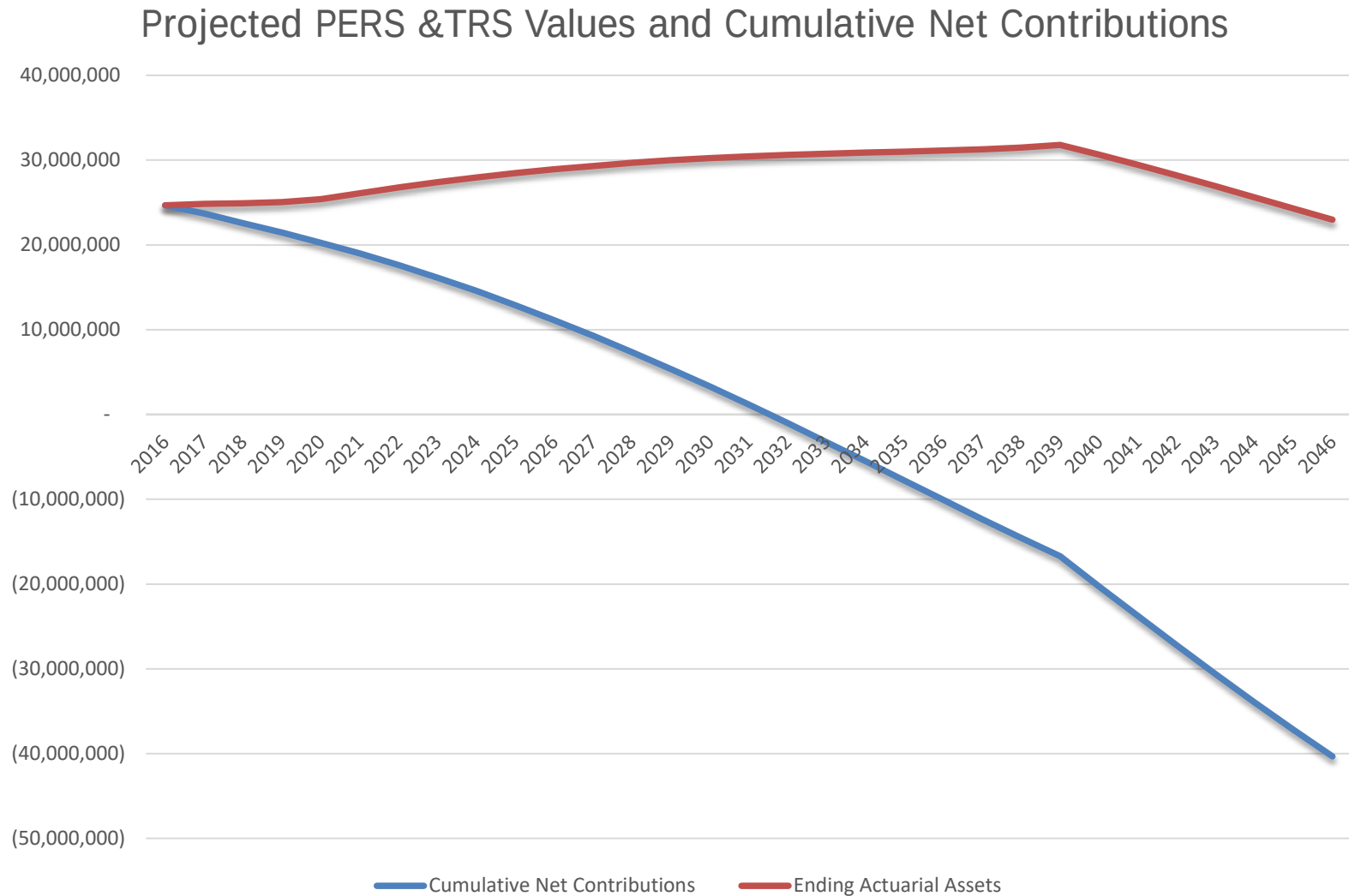


Progression of DC and DB Assets Under Management

PERS & TRS Pension and Post-Empl. Health
(\$ million)



Progression of DC and DB Assets Under Management



Progression of DC and DB Assets Under Management

Twenty-Five and Three-Quarter Year Annualized Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	36%	35%	9.03%	9.64%	(0.24%)	0.04%	(0.20%)
Fixed-Income	28%	27%	5.95%	5.56%	0.11%	(0.09%)	0.01%
High Yield	0%	0%	-	-	0.00%	0.00%	0.00%
Real Assets	10%	10%	7.52%	7.34%	(0.08%)	0.01%	(0.07%)
Global Equity ex US	17%	16%	7.19%	5.59%	0.24%	(0.02%)	0.22%
Int'l Fixed-Income	2%	2%	-	-	0.01%	0.03%	0.05%
Private Equity	4%	5%	-	-	0.12%	0.02%	0.14%
Absolute Return	2%	2%	-	-	(0.05%)	(0.01%)	(0.06%)
Alternative Equity	1%	1%	-	-	(0.01%)	0.00%	(0.00%)
Other	0%	0%	-	-	0.00%	(0.02%)	(0.01%)
Cash	0%	1%	-	-	0.00%	0.02%	0.02%
Total			7.72%	= 7.63%	+ 0.11%	+ (0.02%)	0.09%

The table above provides the longest attribution we have of our performance.

How are we doing net of fees? 7.72% ➔ 7.44%

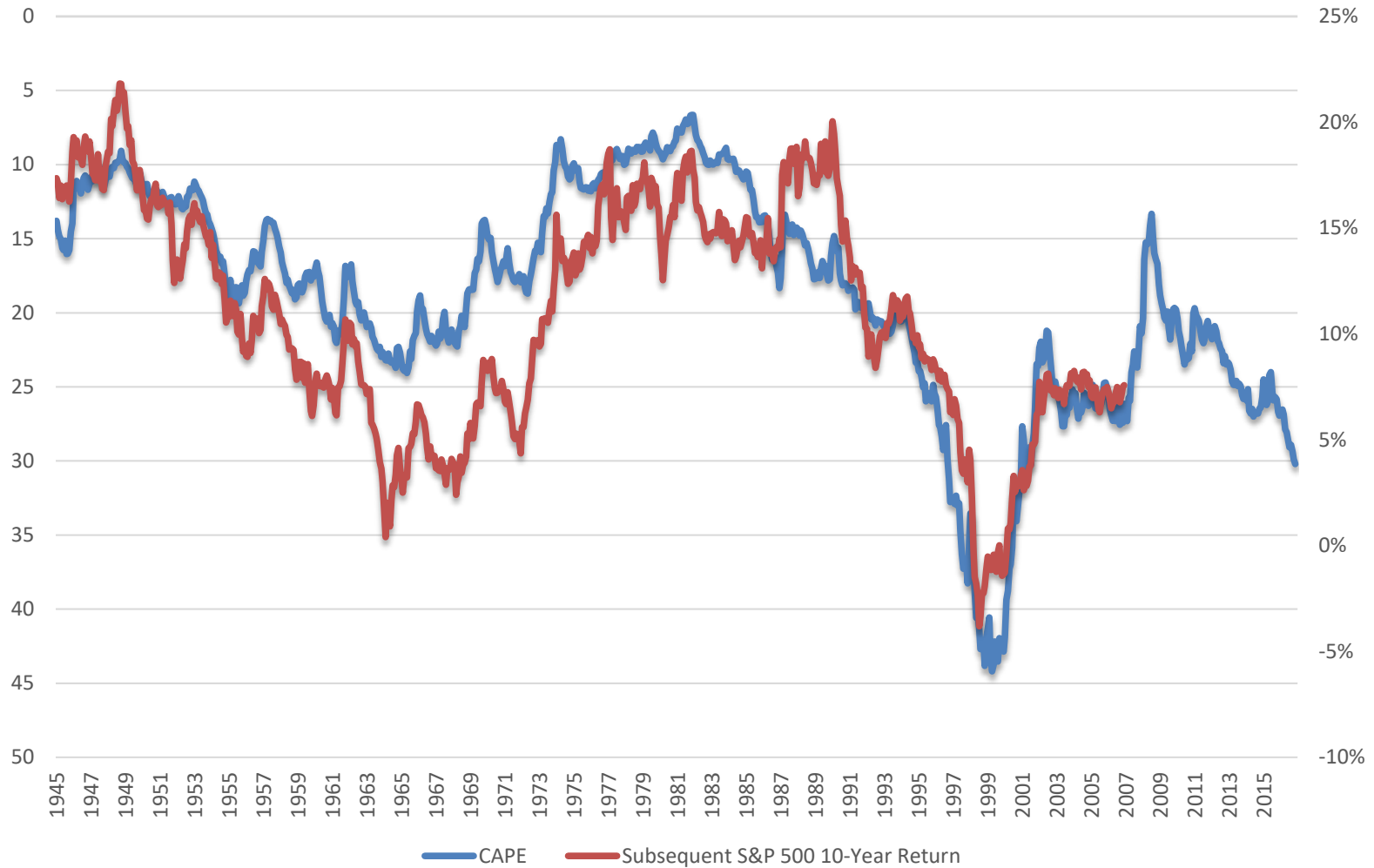
For additional perspective, we have access to 33 years of returns for PERS and TRS. Over this time period, PERS and TRS have generated 8.95% and 9.29%, respectively.

General Observations:

- Performance is similar to the strategic asset allocation. Most of the performance is coming from Beta (market returns) and relatively little is coming from alpha (manager outperformance and asset allocation).
- We have outperformed our benchmark gross of fees, but not net of fees.

Challenge of Current Environment

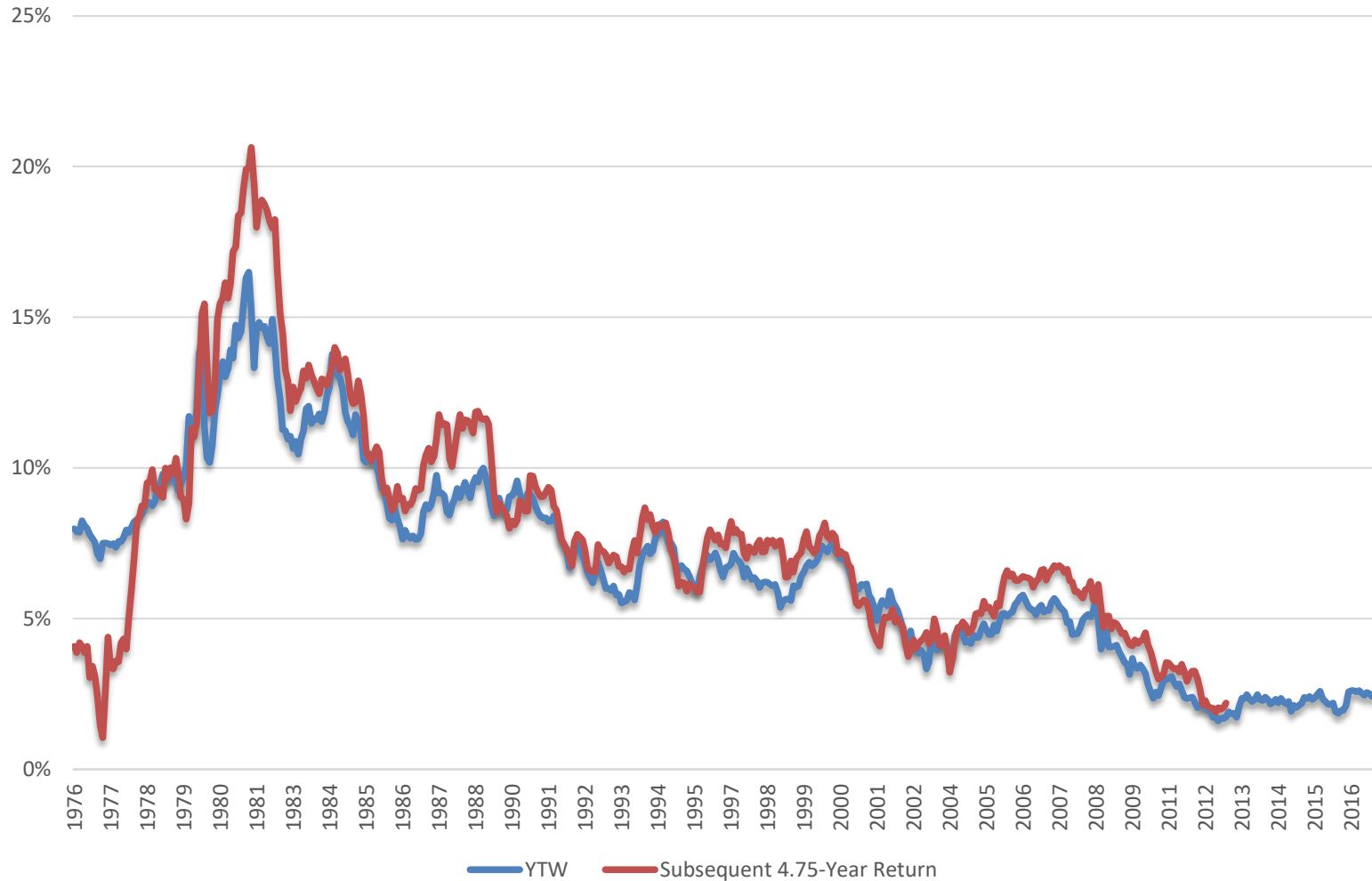
Prospective Equity Returns



Source: www.econ.yale.edu/~shiller/data.htm, Bloomberg

Challenge of Current Environment

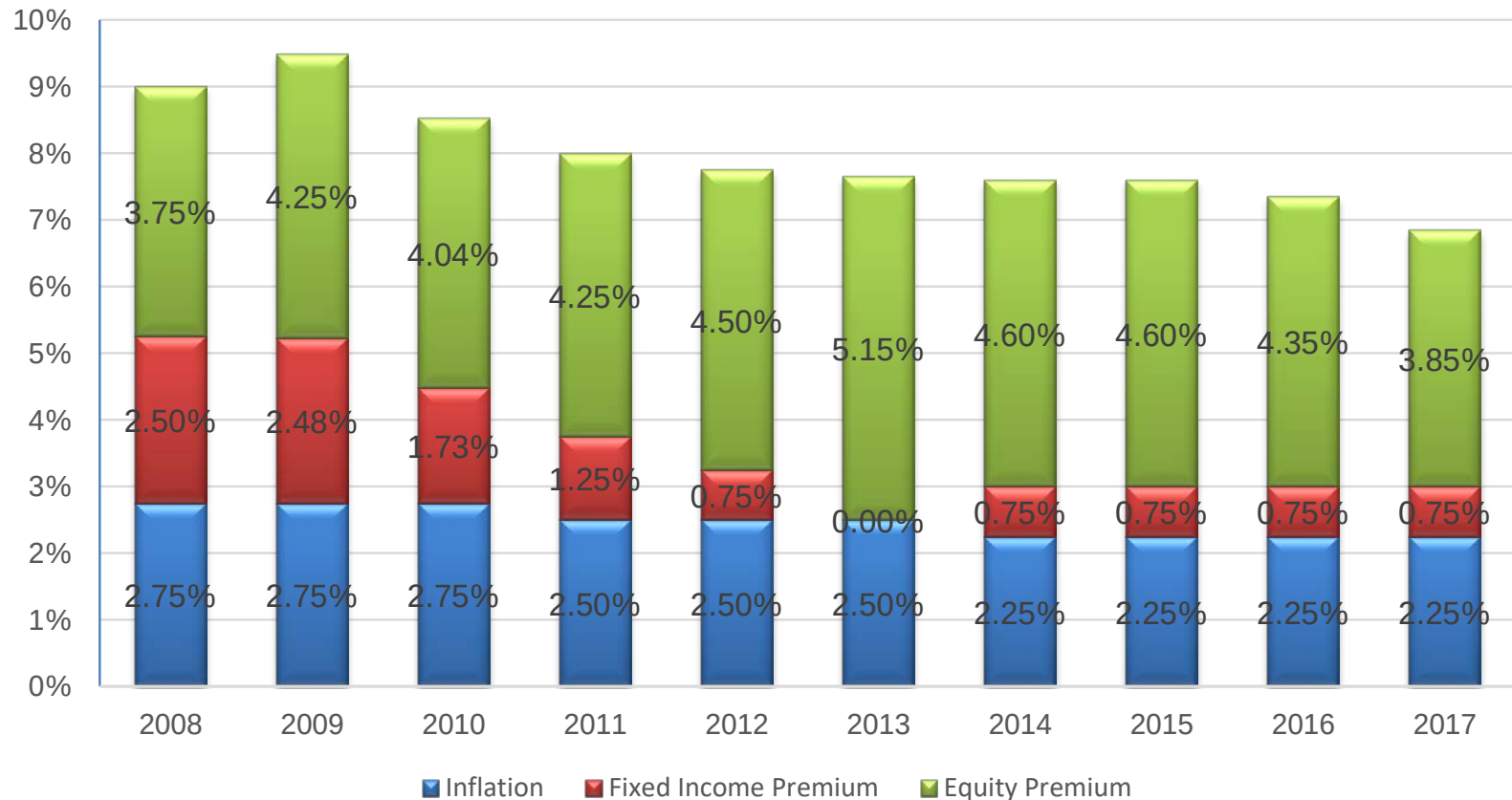
Prospective Bond Returns



Source: Barcaplive.com , Bloomberg

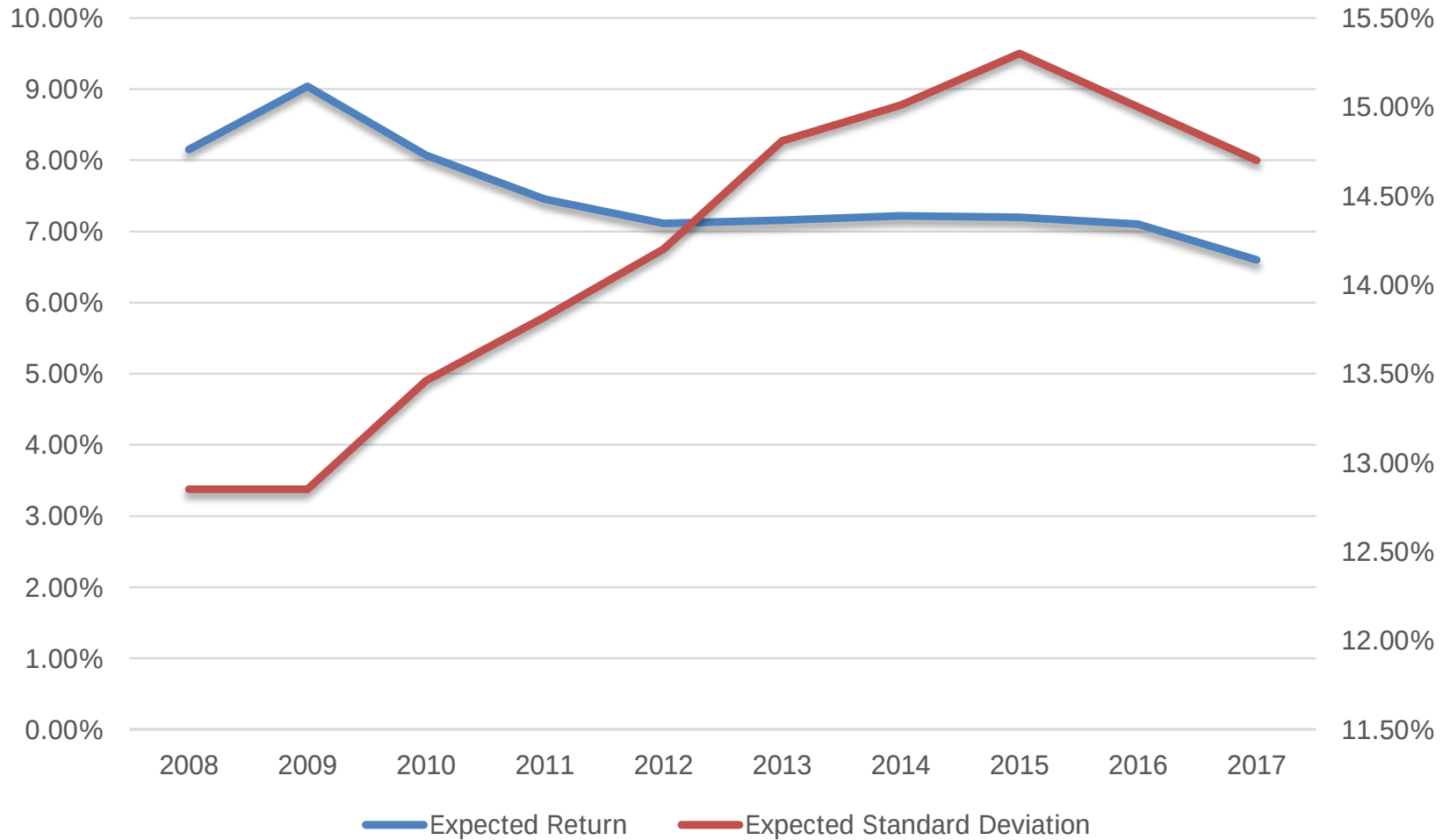
Challenge of Current Environment

Callan Capital Market Long-Term Return Assumptions



Challenge of Current Environment

ARMB Return and Risk

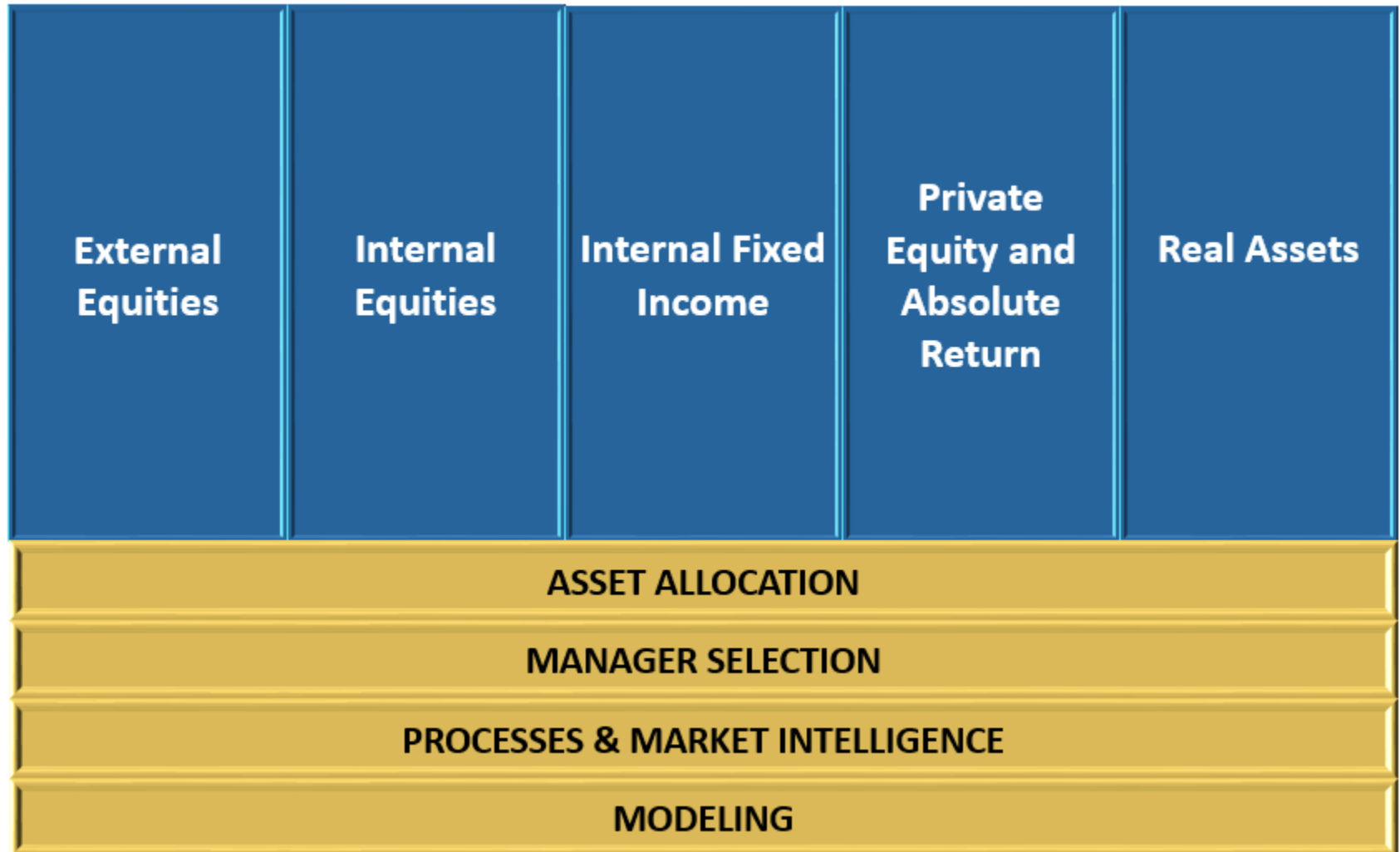


Strategic Focus

- Evaluate Contours of the Risk Frontier
- Focus on Net Return Outcomes
- Increase Emphasis on Alpha Strategies
 - Mandate-level security selection and timing
 - Asset Class and Sub-Asset Class Selection and Timing
- Dedicate Organizational Resources in These Areas

Strategic Focus

Portfolio Management



Upcoming Projects

- Risk
 - Review of Peer Return Assumptions (October 2017)
 - Liquidity (October 2017)
 - Risk Reporting (December 2017)
 - Asset-Liability Study (request in Fall 2018)
- Governance
 - Best Practices (October 2017)
 - Investment Policy Audit (request in December 2017)
- Net returns
 - Active vs. Passive (December 2017)
 - Domestic Public Equity and Fixed Income Review (December 2017)
 - Fee Review (March 2018)
- Alpha Strategies
 - Strategic Partnerships (November 2017)
 - Dynamic Strategies (March 2018)
 - Rebalancing
 - Rules-based strategies
 - External strategies

October 5, 2017



ARMB Board Meeting

Governance Best Practices

Paul Erlendson

Senior Vice President

Steve Center, CFA

Senior Vice President

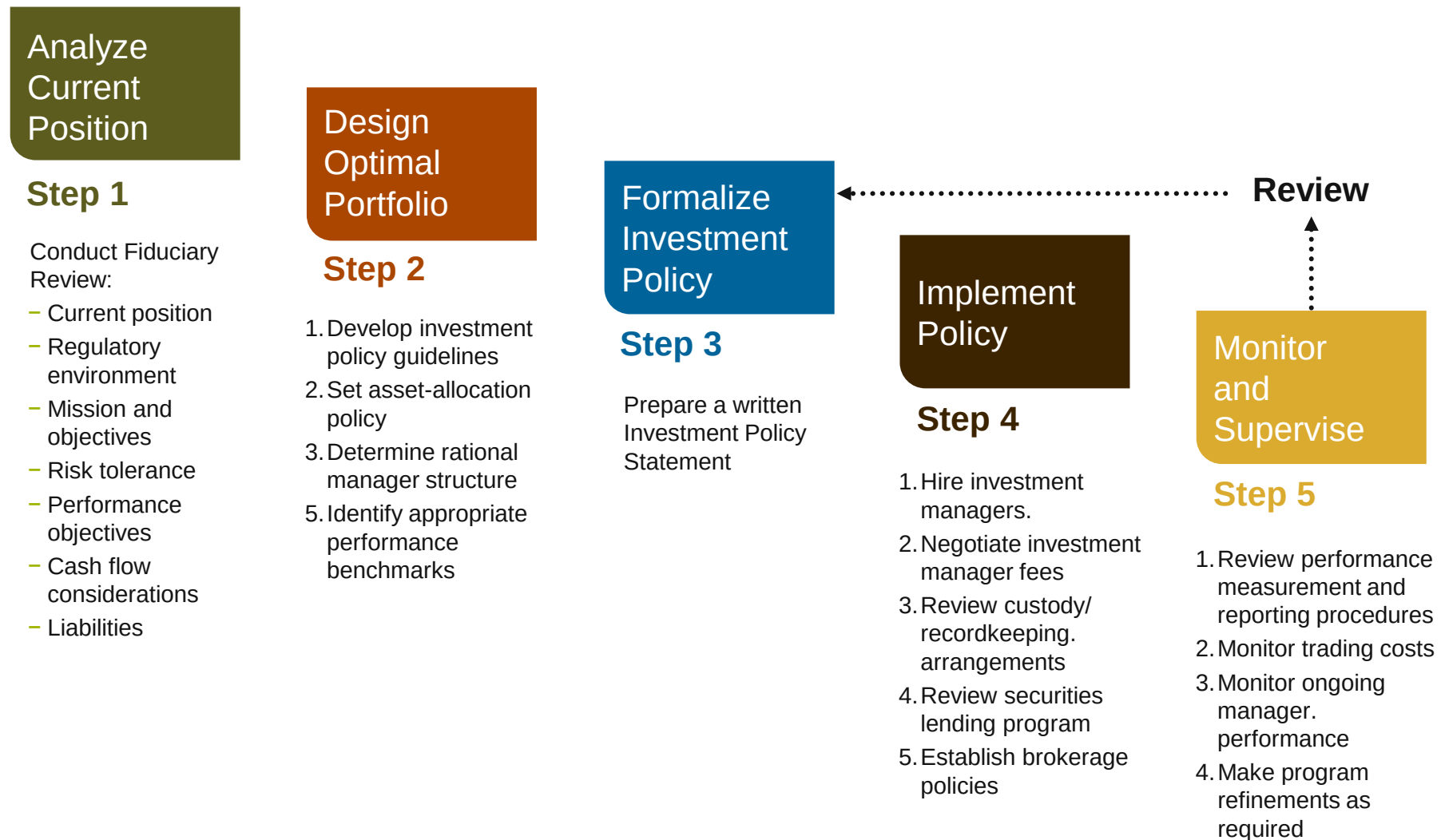
Framing the Discussion

Topics of Discussion

1. An overview of the fiduciary process as relates to operating an investment program
2. A practical understanding of who is a “fiduciary” and a description of fiduciary duties
3. An overview of “governance”: what is it in practice and why does governance matter
4. Best practices: a noble if aspirational goal for fiduciaries and investors
5. Survey results regarding defined contribution plans
6. A listing of suggested readings

Framing the Discussion: Steps in the Investment Process

A recommended fiduciary process for all types of funds



Who is a fiduciary?

Comments below are of a practical nature and should not be construed as legal advice

- A fiduciary is anyone who has discretionary authority or control over plan assets and/or the administration of the employee benefit plan. This status is not derived from one's title, fiduciary status results from the functions one performs.
- The United States Department of Labor describes fiduciaries as those who:
 - “exercise discretionary control or authority over plan management or plan assets, have discretionary authority or responsibility for the administration of a plan, or provide investment advice to a plan for compensation or have any authority or responsibility to do so.”¹
- Depending on the individual's or firm's responsibilities, fiduciary status may apply to administrators, staff, trustees, investment committee members, investment managers, and consultants.
- The legal definition of “fiduciary” is defined in law. Laws vary so one should consult with qualified legal counsel to determine one's legal status within a fiduciary construct.

¹ The quotation is taken from the US Department of Labor website: <https://www.dol.gov/general/topic/health-plans/fiduciaryresp>.

The duties of a fiduciary

Paraphrased from “The Clapman Report 2.0²”

- **Duty of Loyalty**: A Trustee must discharge his or her duties with respect to the system solely in the interests of and for the exclusive purpose of providing benefits to participants and their beneficiaries. There are related duties such as minimizing employer contributions and defraying reasonable expenses but the Trustee’s duty to participants and their beneficiaries takes precedence over all other duties.
- **Duty of Impartiality**: The duty of impartiality requires a Trustee to act in a way that serves the overall best interests of all members of the system when the Board is required to make a decision that may impact groups of participants differently.
- **Duty of Care (prudence)**: Fiduciaries must discharge their duties with respect to the system with the same care, skill, prudence and diligence under the circumstances then prevailing that a prudent person acting in a like capacity and familiar with these matters would use in the conduct of an enterprise of a like character with like aims.
- Fiduciaries are also expected to run the plan solely in the interest of participants and beneficiaries (“exclusive benefit rule); diversify plan assets to minimize likelihood of large losses; control expenses; avoid conflicts of interest; and follow Plan documents.

² These duties are addressed in detail in Clapman Report 2.0: Model Governance Provisions to Support Pension Fund Best Practice Principles,” (2013). Published by The Stanford Institutional Investors’ Forum Committee on Fund Governance.

Prohibited Transactions

“ERISA”³ applies to private sector employee benefit plans. One element of ERISA speaks to certain types of transactions that are prohibited conduct by Plan Fiduciaries..

- **Self-dealing by a fiduciary:** A fiduciary can’t engage in transactions with the Plan if that fiduciary
 1. has a personal interest (self-dealing) in the transaction,
 2. has or represents adverse interests, or
 3. receives compensation from a third party. .
- **Party in interest transactions:** The duty of impartiality requires a Trustee to act in the overall best interests of all members of the system whenever the Board makes a decision that may affect groups of participants differently (e.g.– retired members, active members, future members).

Prohibited transaction rules are complex. There may be significant monetary and potential criminal penalties.

³ The Employee Retirement Income Security Act (“ERISA”) of 1974 was created to address problems that had arisen within the private sector trust fund world. It addresses a number of procedural issues including fiduciary behavior.

A short to-do list for fiduciaries

1. Prepare, follow and periodically review written investment policies.
2. Diversify portfolio assets with regard to the specific risk/return objectives of participants/beneficiaries.
3. Use qualified professionals (“prudent experts”) to provide advice and make discretionary investment decisions.
4. Control and account for all investment and administrative expenses.
5. Monitor the activities of all money managers and service providers.
6. Document the process used to make investment policy decisions

What is “governance”?

An essential element of any successful enterprise

- Governance models define principles, procedures and responsibilities.
- There is much variety yet no single ‘best’ model.
- In their 2014 white paper⁴, Randy Miller and Rick Funston identified four basic governance models utilized by public pension funds (from most to least common):
 1. An integrated investment and pension administration organization with a single board;
 2. A separate investment management organization with its own board;
 3. Separate investment and pension administration organizations reporting to one board; and
 4. Sole fiduciary.

⁴ “Public Pension Governance That Works” (2014). By Randy Miller and Rick Funston, Funston Advisory Services LLC.

A Governance Checklist

- NCPERS⁵ has proposed a series of topics to be addressed in a governance model:
 - Governance Manual
 - Board Practices
 - Board Policies
 - Risk Oversight
 - Strategic Planning
 - Reporting: Key Performance and Risk Measures
 - Stakeholder Communications

- Two key elements of successful governance models:
 - Continuing education for Trustees and staff, including formal training for new Trustees
 - Active and regular participation by each Trustee in the fiduciary process

⁵ National Conference on Public Employee Retirement Systems, “Best Governance Practices for Public Retirement Systems”

One firm's view of “best practices”

Vanguard conducted a survey and identified the following best practices⁶

- An explicit understanding of a portfolio's purpose and objective and a clear definition of success in determining whether the portfolio fulfills that purpose and meets that objective.
- A charter outlining the roles and responsibilities of committee members, support staff, and — if applicable — consultants.
- A clear investment strategy that includes a reasonable set of assumptions about a sponsoring organization's risk tolerance and expected returns.
- A straightforward process for hiring managers to implement that investment strategy and for identifying the circumstances under which such relationships can be terminated.
- Common sense and discipline.
- A recognition that investment theory is often at odds with behavioral tendencies, necessitating that committee members adopt a disciplined investment system and maintain their focus on the investment goals.
- A willingness by committee members to challenge and debate the issues at hand using facts and data instead of relying on strong opinions to prevail.
- A desire by Trustees to establish constructive relationships and discussions among themselves and with those with whom they work in order to be the best committee or Board possible.

⁶ “Investment Committees: Vanguard's Views of Best Practices” (2004). The Vanguard Group.

Observations from a recent DC Plan governance survey⁷

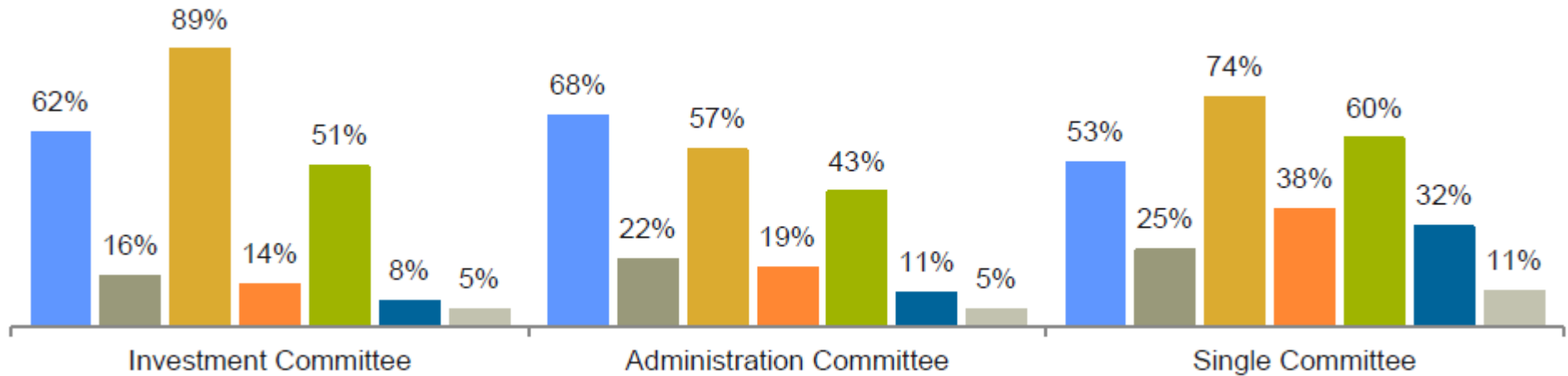
Survey conducted mid-2017

- Callan conducted a survey of 106 defined contribution plan sponsors in mid-2017.
- The results apply only to defined contribution plans; characteristics of DB plans may be different but the general observations are instructive.
- Respondents: 25 public funds, 58 corporate plans, and 23 tax exempt entities.
- The major areas of oversight by committees: **Investments** and **Administration**.
- More than half of respondents (57%) employed a single committee to oversee investments and plan administration.
- Plans with larger participant populations (e.g. > 10,000) tended to use multiple committees.
- 65% of public plans used a single committee to oversee investments and administration.

⁷ “It Takes A Committee: The Best Ways to Govern DC Plans,” Callan Institute draft white paper

Committee Composition

Membership by professional background



- Percentages will not add to 100% since individual members may have reported more than one category of affiliation.
- In cases where there are multiple committees, it is less common for investment and finance types to be on Admin Committees.
- Employee representatives may be included on the committee to provide insight into the participant population, or union groups may be required as part of contracts.



Two Views of Committee Size

Where combined investments / admin committees exist, their size tends to be larger

Investment Committee



= **6.2** members, with minimum of 3 and maximum of 12

Administration Committee

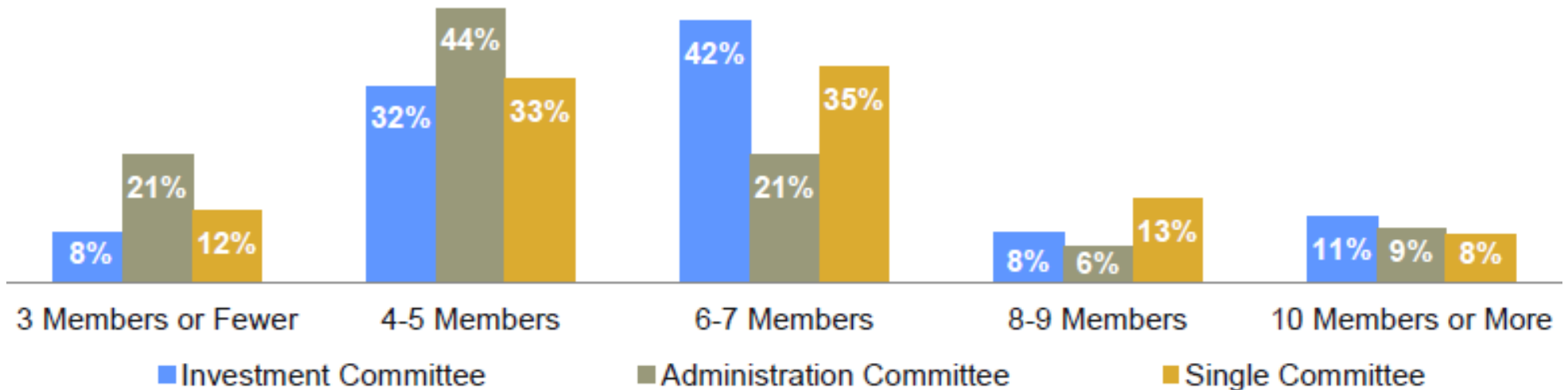


= **5.4** members, with minimum of 3 and maximum of 14

Single Committee

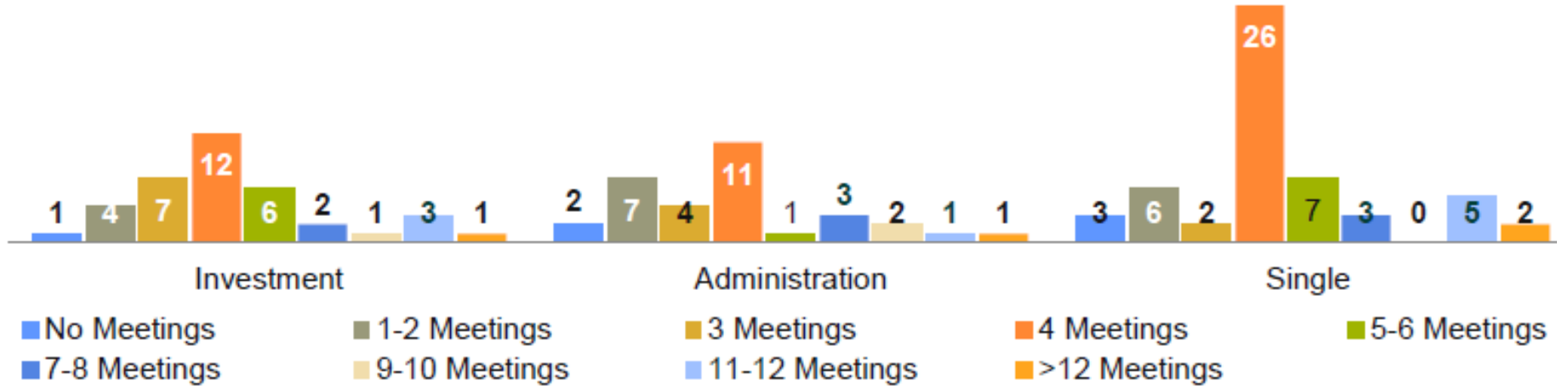


= **6.4** members, with minimum of 3 and maximum of 16



Number of meetings held annually

Meeting frequency varies widely



- The most common period to meet for all types of committees is quarterly.
- Investment Committees tend to meet more frequently than Administrative or Single Committees.

A selection of additional readings

The following publications present a variety of governance and best practice suggestions. While they may not always agree, they provide the reader with informed points of view.

- The “Uniform Management of Public Employee Retirement Systems Act” (UMPERA, 1997), 67 pages. UMPERA is a model law drafted by the National Conference of Commissioners on Uniform State Laws. It addresses prudent investment rules; trustee liability; and disclosures among other issues. Available online at: http://www.uniformlaws.org/shared/docs/management_public_employee_retirement_systems/umpera_final_97.pdf
- “A Practical Guide for 21st Century Public Pension Trustees” offered by the Funston Advisory Services LLC (2017). Available for purchase at www.Amazon.com and through the International Foundation of Employee Benefit Plans www.IFEBP.org
- “The Cambridge Handbook of Institutional Investment and Fiduciary Duty” (2014), >460 pages. Available for purchase at www.Amazon.com.
- “Best Practices for Plan Fiduciaries” (2013), 70 pages. Produced by the Vanguard Group. Available online at <https://institutional.vanguard.com/iam/pdf/BestPracticesPlanFiduciaries.pdf>
- “A Primer for Investment Trustees” (2011), 120 pages. Published by the Research Foundation of CFA Institute. Available online at <http://www.cfapubs.org/doi/pdf/10.2470/rf.v2011.n1.1>
- The “CFA Institute Asset Manager Code” (2017), 2 pages. The CFAI urges code adoption by asset managers. Available at: https://www.cfainstitute.org/ethics/Documents/amc_outreach_flyer.pdf

A selection of additional readings (continued)

- “Clapman Report 2.0: Model Governance Provisions to Support Pension Fund Best Practice Principles” (2013), 85 pages. Published by The Stanford Institutional Investors’ Forum Committee on Fund Governance. It is an update to the earlier “Clapman Report” released May 2007. Available online at: https://law.stanford.edu/index.php?webauth-document=event/392911/media/slspublic/ClapmanReport_6-6-13.pdf
- “Best Governance Practices for Investment Committees” (2014), 60 pages. Published by the Greenwich Roundtable. Addresses roles and responsibilities of the Board, Chair, Investment Committee, and Chief Investment Officer. Also discusses the investment policy statement. Available online at: <https://www.cfainstitute.org/ethics/Documents/GR%20BP%20Governance.pdf>
- “Enhancing Public Retiree Pension Plan Security: Best Practice Policies for Trustees and Pension Systems” (2009), 44 pages. Published by the American Federation of State, Municipal and County Employees (AFSCME) and available online at: <https://www.afscme.org/news/publications/for-leaders/pdf/AFSCME-report-pension-best-practices-1.pdf>
- “How Group Dynamics Affect Decisions” (2013), 4 pages. Published by Bain & Co. Available at: http://www.bain.com/Images/Decision_Insights_How_group_dynamics_affect_decisions.pdf
- “OECD Guidelines For Pension Fund Governance” (2009), 13 pages. Published by OECD. Available online at: <https://www.oecd.org/finance/private-pensions/34799965.pdf>
- “Developing an effective governance operating model: A guide for financial services boards and management teams” (2013), 16 pages. Published by Deloitte Development LLC. Available online at: <http://deloitte.wsj.com/riskandcompliance/files/2013/06/Developinganeffectivegovernance.pdf>

A selection of additional readings (continued)

- “10 Tips from Successful Investment Committees” (2016), 9 pages. Published by Callan Associates Inc. Available online at: <https://www.callan.com/wp-content/uploads/2017/03/Callan-10-Tips-From-Successful-Investment-Committees.pdf>
- “Ethical Mindfulness: A Guide for New Financial Services Professionals” (2014), 9 pages. By Donald C. Langevoort, published by the CFA Institute. Available online at: <https://www.cfainstitute.org/learning/future/Documents/Ethical%20Mindfulness.pdf>
- “Public Pension Governance That Works” (2014), 18 pages. White paper by Randy Miller and Rick Funston, Funston Advisory Services LLC. Available online at: <http://www.nasra.org/Files/Topical%20Reports/Governance%20and%20Legislation/FunstonGovernance1403.pdf>
- “Best Governance Practices for Public Retirement Systems” (2012), 5 pages. White paper published by the National Conference on Public Employee Retirement Systems. Available online at: http://www.ncpers.org/Files/2012_ncpers_best_governance_practices.pdf
- “Duty, opportunity, mastery: Investment committee best practices” (2017), 21 pages. White paper published by Vanguard. Available online at: <https://institutional.vanguard.com/iam/pdf/ISGICBP.pdf?cbdForceDomain=false>
- “Investment Committees: Vanguard’s Views of Best Practices” (2004), 12 pages. The Vanguard Group. Available online at: http://www.vanguard.com/pdf/ICRIC_062004.pdf

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Callan Investment Structure Evaluation
Diversified Real Assets

ACTION: _____

DATE: October 5, 2017

INFORMATION: X

BACKGROUND

On February 18, 2016, the ARMB directed staff to engage Callan to conduct a governance and quality review of the Defined Contribution Retirement Plans, Deferred Compensation Plan, and Alaska Supplemental Annuity Plan (collectively called Plans). The review was to focus on seven priorities including an evaluation of the investment structure available to participants in the Plans.

On September 30, 2016, Callan presented the results of their review to the ARMB.

The Plans currently offer the U.S. Treasury Inflation Protected Securities (TIPS) Index Fund and the U.S. Real Estate Investment Trust (REIT) Index Fund both managed by SSgA.

As of June 30, 2017, approximate participant assets invested in the U.S. Treasury Inflation Protected Securities Index Fund were \$52 million and the U.S. Real Estate Investment Trust Index Fund were \$71 million.

Callan Recommendation:

Combine the existing TIPS and REIT options into a single multi-asset class real asset fund.

Staff recommends the ARMB task staff with exploring product offerings and at a later date bring for consideration a multi-asset class real asset investment option or a recommendation of no change to the existing lineup.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Callan Investment Structure Evaluation
Non-U.S. Equity

ACTION: _____

DATE: October 5, 2017

INFORMATION: X

BACKGROUND

On February 18, 2016, the ARMB directed staff to engage Callan to conduct a governance and quality review of the Defined Contribution Retirement Plans, Deferred Compensation Plan, and Alaska Supplemental Annuity Plan (collectively called Plans). The review was to focus on seven Priorities including an evaluation of the investment structure available to participants in the Plans.

On September 30, 2016, Callan presented the results of their review to the ARMB.

The Plans currently offer the All Country World Equity Ex-U.S. Index Fund managed by SSgA and the multi-manager International Equity Fund which contains managers Brandes Investment Partners and Allianz Global Investors.

As of June 30, 2017, approximate participant assets invested in the All Country World Equity Ex-U.S. Index Fund were \$112 million and the International Equity Fund were \$160 million.

Callan Recommendation:

Combine the passive international fund with the active counterpart into a single multi-manager offering.

Staff recommends the All Country World Equity ex-U.S. Index Fund and the multi-manager International Equity Fund remain in the Plans as stand-alone options.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Callan Investment Structure Evaluation
U.S. Large and All Cap Equity

ACTION: _____

DATE: October 5, 2017

INFORMATION: X

BACKGROUND

On February 18, 2016, the ARMB directed staff to engage Callan to conduct a governance and quality review of the Defined Contribution Retirement Plans, Deferred Compensation Plan, and Alaska Supplemental Annuity Plan (collectively called Plans). The review was to focus on seven priorities including an evaluation of the investment structure available to participants in the Plans.

On September 30, 2016, Callan presented the results of their review to the ARMB.

The Plans currently offer the Russell 3000 Index Fund managed by SSgA, the S&P 500 Index Fund managed by SSgA and BlackRock, and the U.S. Small Cap Trust managed by T.Rowe Price. In the Defined Contribution Retirement Plans and the Alaska Supplemental Annuity Plan the S&P 500 Index Fund is managed by SSgA and in the Deferred Compensation Plan the S&P 500 Index Fund is managed by BlackRock.

As of June 30, 2017, approximate participant assets invested in the Russell 3000 Index Fund were \$127 million, the S&P 500 Index Funds were \$723 million and the U.S. Small Cap Trust were \$349 million

Callan Recommendation:

Map assets from the Russell 3000 to the S&P 500 Index.

Staff recommends the Russell 3000 Index Fund remain in the Plans as a stand-alone option.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Callan Investment Structure Evaluation
Socially Responsible

ACTION: X

DATE: October 5, 2017

INFORMATION: _____

BACKGROUND

On February 18, 2016, the ARMB directed staff to engage Callan to conduct a governance and quality review of the Defined Contribution Retirement Plans, Deferred Compensation Plan, and Alaska Supplemental Annuity Plan (collectively called Plans). The review was to focus on seven priorities including an evaluation of the investment structure available to participants in the Plans.

On September 30, 2016, Callan presented the results of their review to the ARMB.

The Plans currently offer the Allianz/RCM Socially Responsible Investment Fund managed by Allianz Global Investors (AGI).

As of June 30, 2017, approximate participant assets invested in the Allianz/RCM Socially Responsible Investment Fund were \$67 million.

Callan Recommendation:

Remove the socially responsible fund.

The Defined Contribution Committee concurs with Callan's recommendation.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Callan Investment Structure Evaluation
Self-Directed Brokerage

ACTION: _____

DATE: October 5, 2017

INFORMATION: X

BACKGROUND

On February 18, 2016, the ARMB directed staff to engage Callan to conduct a governance and quality review of the Defined Contribution Retirement Plans, Deferred Compensation Plan, and Alaska Supplemental Annuity Plan (collectively called Plans). The review was to focus on seven priorities including an evaluation of the investment structure available to participants in the Plans.

On September 30, 2016, Callan presented the results of their review to the ARMB.

The Plans currently do not offer participants a self-directed brokerage window.

Callan Recommendation:

Add a brokerage window.

Staff recommends not adding a self-directed brokerage window at this time.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Callan Target Date Suitability Study
Glide Path Risk

ACTION: _____

DATE: October 5, 2017

INFORMATION: X

BACKGROUND

On February 18, 2016, the ARMB directed staff to engage Callan to conduct a governance and quality review of the Defined Contribution Retirement Plans, Deferred Compensation Plan, and Alaska Supplemental Annuity Plan (collectively called Plans). The review was to focus on seven priorities including an evaluation of the Plans' target date fund glide path suitability.

On September 30, 2016, Callan presented the results of their review to the ARMB.

The Plans currently offer 11 target date fund options called Alaska Target Date Trusts that are managed by T.Rowe Price. The target date funds currently span expected retirement dates from 2010 to 2060 in five year increments.

As of June 30, 2017, participant assets invested in target date funds totaled approximately \$1,290 million.

Callan Recommendation:

Given the high predicted replacement ratios along with the fact that there is some overlap between the SBS and PERS plan populations, the Plans could explore whether there is room to take less risk throughout the glide path and still reach successful outcomes with a reasonable degree of certainty.

Staff recommends the risk profile of the target date funds not be altered to take less risk throughout the glide path.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Callan Investment Structure Evaluation
Asset Allocation Options

ACTION: X

DATE: October 5, 2017

INFORMATION: _____

BACKGROUND

On February 18, 2016, the ARMB directed staff to engage Callan to conduct a governance and quality review of the Defined Contribution Retirement Plans, Deferred Compensation Plan, and Alaska Supplemental Annuity Plan (collectively called Plans). The review was to focus on seven priorities including an evaluation of the investment structure available to participants in the Plans.

On September 30, 2016, Callan presented the results of their review to the ARMB.

The Plans currently offer three balanced funds as investment options: the Alaska Balanced Trust and the Alaska Long-Term Balanced Trust managed by T.Rowe Price and the Global Balanced Fund managed by SSgA.

As of June 30, 2017, approximate participant assets invested in the Alaska Balanced Trust were \$1,204 million, the Alaska Long-Term Balanced Trust were \$658 million, and the Global Balanced Fund were \$121 million.

Callan Recommendation:

Remove the balanced funds and map participants to the age-appropriate target date fund.

Staff recommends mapping participants in the SSgA Global Balanced Fund to the Alaska Long-Term Balanced Trust in the Plans.

RECOMMENDATION

The ARMB direct staff to map participants in the SSgA Global Balanced Fund to the Alaska Long-Term Balanced Trust in the Plans.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Callan Investment Structure Evaluation
Capital Preservation

ACTION: X

DATE: October 5, 2017

INFORMATION: _____

BACKGROUND

On February 18, 2016, the ARMB directed staff to engage Callan to conduct a governance and quality review of the Defined Contribution Retirement Plans, Deferred Compensation Plan, and Alaska Supplemental Annuity Plan (collectively called Plans). The review was to focus on seven Priorities including an evaluation of the investment structure available to participants in the Plans.

On September 30, 2016, Callan presented the results of their review to the ARMB.

The Defined Contribution Retirement Plans currently offer the Alaska Money Market Master Trust managed by T.Rowe Price. The Deferred Compensation Plan and the Supplemental Annuity Plan currently offer a stable value investment option also managed by T.Rowe Price. The four Plans also offer a Treasury Money Market option managed by SSgA.

As of June 30, 2017, approximate participant assets invested in the Alaska Money Market Master Trust were \$8 million, the Treasury Money Market option were \$57 million and the stable value options in the Deferred Compensation Plan and Supplemental Annuity Plan were \$547 million.

Callan Recommendation:

Remove the money market options and proceed with stable value as the principal protection option.

Staff recommends combining and adding a stable value option in the Defined Contribution Retirement (DCR) Plans and maintaining the US Treasury Money Market option across all plans. Staff recommends removing the Alaska Money Market Trust as a stand-alone investment option from the DCR Plans and mapping participants into the US Treasury Money Market option.

RECOMMENDATION

The ARMB direct staff to combine and add a stable value option in the Defined Contribution Retirement (DCR) Plans and maintain the US Treasury Money Market option across all plans.

Additionally, the ARMB directs staff to remove the Alaska Money Market Trust as a stand-alone investment option from the DCR Plans and map participants into the US Treasury Money Market option.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Callan Investment Structure Evaluation
Fixed Income

ACTION: X

DATE: October 5, 2017

INFORMATION: _____

BACKGROUND

On February 18, 2016, the ARMB directed staff to engage Callan to conduct a governance and quality review of the Defined Contribution Retirement Plans, Deferred Compensation Plan, and Alaska Supplemental Annuity Plan (collectively called Plans). The review was to focus on seven priorities including an evaluation of the investment structure available to participants in the Plans.

On September 30, 2016, Callan presented the results of their review to the ARMB.

The Plans currently offer a Long U.S. Treasury Bond Index fund and a World Government Bond ex-U.S. Index fund managed by SSgA as well as a Government/Credit Bond Index fund and an Intermediate Bond fund managed by BlackRock.

As of June 30, 2017, approximate participant assets invested in the Long U.S. Treasury Bond Index fund were \$23 million, the World Government Bond ex-U.S. Index fund were \$14 million, the Government/Credit Bond Index fund were \$118 million, and the Intermediate Bond fund were \$96 million.

Callan Recommendation:

Consolidate the existing fixed income options into a custom multi-manager fixed income fund.

Staff recommends creating a stand-alone, passive fixed income investment option benchmarked to the Bloomberg Barclays U.S. Aggregate Bond Index and mapping the existing stand-alone fixed income options to it. Staff also recommends the ARMB task staff with evaluating active, core-plus options for consideration at a later date.

RECOMMENDATION

The ARMB direct staff to create a stand-alone, passive fixed income investment option benchmarked to the Bloomberg Barclays U.S. Aggregate Bond Index and map the existing stand-alone fixed income options to it.

Additionally, ARMB direct staff evaluate active, core-plus options for consideration at a later date.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Callan Target Date Suitability Study
Glide Path and Implementation Review
Periodicity

ACTION: X

DATE: October 5, 2017

INFORMATION: _____

BACKGROUND

On February 18, 2016, the ARMB directed staff to engage Callan to conduct a governance and quality review of the Defined Contribution Retirement Plans, Deferred Compensation Plan, and Alaska Supplemental Annuity Plan (collectively called Plans). The review was to focus on seven priorities including an evaluation of the Plans' target date fund glide path suitability.

On September 30, 2016, Callan presented the results of their review to the ARMB.

The Plans currently offer 11 target date fund options called Alaska Target Date Trusts that are managed by T.Rowe Price. The target date funds currently span expected retirement dates from 2010 to 2060 in five year increments.

As of June 30, 2017, participant assets invested in target date funds totaled approximately \$1,290 million.

Callan Recommendation:

On a periodic basis revisit the glide path and implementation of the funds given the Plans' underlying demographics and plan design.

Staff recommends revisiting the glide path and implementation of the target date funds every five years absent a triggering event.

RECOMMENDATION

The ARMB directs staff to revisit the glide path and implementation of the target date funds every five years absent a triggering event.

Callan Investment Structure Evaluation and Target Date Suitability Study Staff Recommendations

Bob Mitchell, Chief Investment Officer
Shane Carson, Manager of External
Public Equity and DC Investments

October 2017

Current Participant-Directed Plan's Investment Options Menu

	DCR	Deferred Comp	SBS	Combined Assets	Percent	Active/Passive
Cash						
Alaska Money Market Master Trust	X			\$7,951,029	0.1%	Active
Interest Income Fund		X		\$182,473,417	3.1%	Active
Stable Value Fund			X	\$364,821,723	6.3%	Active
State Street Institutional Treasury Money Market Fund	X	X	X	\$56,887,658	1.0%	Active
Domestic Equity						
TRowe Price Small-Cap Stock Trust	X	X	X	\$349,235,331	6.0%	Active
S&P 500 Stock Index Fund	X	X	X	\$722,592,070	12.5%	Passive
Russell 3000 Index	X	X	X	\$126,962,950	2.2%	Passive
Allianz/RCM Socially Responsible Investment Fund	X	X	X	\$67,399,540	1.2%	Active
US Real Estate Investment Trust Index	X	X	X	\$71,244,574	1.2%	Passive
International Equity						
International Equity Fund	X	X	X	\$160,053,013	2.8%	Active
World Equity Ex-US Index	X	X	X	\$112,304,447	1.9%	Passive
Domestic Bonds						
Government/Credit Bond Index Fund	X	X	X	\$118,379,457	2.0%	Passive
Intermediate Bond Fund	X	X	X	\$95,755,603	1.7%	Passive
Long US Treasury Bond Index	X	X	X	\$22,519,453	0.4%	Passive
US Treasury Inflation Protected Securities Index	X	X	X	\$51,517,909	0.9%	Passive
International Bonds						
World Government Bond Ex-US Index	X	X	X	\$13,701,398	0.2%	Passive
Balanced/Target Date						
SSgA Global Balanced Fund	X	X	X	\$121,451,523	2.1%	Active
Alaska Long-Term Balanced Trust	X	X	X	\$658,090,035	11.4%	Active
Alaska Balanced Trust	X	X	X	\$1,204,394,011	20.8%	Active
Alaska Target Date Retirement Trusts (2010-2060)	X	X	X	\$1,289,920,595	22.2%	Active
Total				<u>\$5,797,655,734</u>	<u>100.0%</u>	

As of 6/30/2017

Summary of Callan Recommendations Resulting in No Recommended Action Items

Callan Recommendations - Investment Structure Evaluation

<u>Topic</u>	<u>Option Description</u>	<u>Callan Recommendation</u>	<u>Staff Recommendation</u>
II - Core Options	Diversified Real Assets	Combine the existing TIPS and REIT options into a single multi-asset class real asset fund.	Task staff with exploring product offerings and at a later date bring for consideration a multi-asset class real asset investment option or a recommendation of no change to the existing lineup.
II - Core Options	Non-US Equity	Combine the passive international fund with the active counterpart into a single multi-manager offering.	Staff recommends the All Country World Equity ex-US Index Fund and the multi-manager non-US fund remain in the Plans as stand-alone options.
II - Core Options	US Large and All Cap Equity	Map assets from the Russell 3000 to the S&P 500 Index.	Staff recommends the Russell 3000 Index Fund remain in the Plans as a stand-alone option.
III - Specialty Options	Socially Responsible	Remove the socially responsible fund.	Staff recommends the Socially Responsible Investment Fund remain in the Plans as a stand-alone option.
III - Specialty Options	Self-Directed Brokerage	Add a brokerage window.	Staff recommends not adding a self-directed brokerage window at this time.

Summary of Callan Recommendations Resulting in No Recommended Action Items

Callan Recommendations - Target Date Suitability Study

<u>Topic</u>	<u>Description</u>	<u>Callan Recommendation</u>	<u>Staff Recommendation</u>
Target Date	Glide Path and Implementation Review Periodicity	Given the high predicted replacement ratios along with the fact that there is some overlap between the SBS and PERS plan populations, the Plans could explore whether there is room to take less risk throughout the glide path and still reach successful outcomes with a reasonable degree of certainty.	Staff recommends the risk profile of the target date funds not be altered to take less risk throughout the glide path.

Summary of Callan Recommendations Resulting in Action Items

Callan Recommendations - Investment Structure Evaluation

<u>Topic</u>	<u>Option Description</u>	<u>Callan Recommendation</u>	<u>Staff Recommendation</u>
I - Asset Allocation	Balanced Funds	Remove the balanced funds and map participants to the age-appropriate target date fund.	Staff recommends mapping participants in the SSgA Global Balanced Fund to the Alaska Long-Term Balanced Trust in the Plans.
II - Core Options	Capital Preservation	Remove the money market options and proceed with stable value as the principal protection options.	Staff recommends combining and adding a stable value option in the Defined Contribution Retirement (DCR) Plans and maintaining the US Treasury Money Market option across all plans. Staff recommends removing the Alaska Money Market Trust as a stand-alone investment option from the DCR Plans and mapping participants into the US Treasury Money Market option.
II - Core Options	Fixed Income	Consolidate the existing fixed income options into a custom multi-manager fixed income fund.	Staff recommends creating a stand-alone, passive fixed income investment option benchmarked to the Bloomberg Barclays US Aggregate Bond Index and mapping the existing stand-alone fixed income options to it. Staff also recommends the ARMB task staff with evaluating active, core-plus options for consideration at a later date.

Callan Recommendations - Target Date Suitability Study

<u>Topic</u>	<u>Description</u>	<u>Callan Recommendation</u>	<u>Staff Recommendation</u>
Target Date	Glide Path and Implementation Review Periodicity	On a periodic basis revisit the glide path and implementation of the funds given the Plans' underlying demographics and plan design.	Staff recommends revisiting the glide path and implementation of the target date funds every five years absent a triggering event.

Investment Structure Evaluation

Callan's Investment Structure

Philosophical Tenets

- Based on lessons from behavioral finance, an investment structure should:
 - Adhere to a three-tier framework.
 - Emphasize simplicity
 - The number of choices affect participants' allocation decisions.
 - Offer sufficient diversification while minimizing participant confusion.
 - Utilize scale
 - Employ white label funds to further diversify within the investment option.
 - Cost is important.

Investment Structure Evaluation

Callan Observations

- As currently constituted, the lineup can appear confusing to participants without basic investment knowledge.
- The lineup can be redesigned to cater to those who:
 - Wish to delegate asset allocation decisions (Tier I).
 - Wish to make high level asset allocation decisions (Tier II).
 - Want access to more specific investment themes (Tier III).
- Staff's analysis of Callan's observations that attempt to strike a balance between objectives of the three tiers are detailed on the following slides.
- Staff provides recommendations that attempt to evaluate whether Callan's observations are beneficial, on balance, for plan participants.

Investment Structure Evaluation

Tier I: Asset Allocation Options

Callan recommends removing the balanced funds and mapping participants to the age-appropriate target date fund.

Staff recommends terminating the SSgA Global Balanced Fund and mapping those participants to the Long-Term Balanced Fund for the following reasons:

- The balanced funds are heavily used by participants and migrating them to target date funds would remove unique offerings and would impact a large number of participants.
- Migrating the SSgA Global Balanced Fund would reduce the number of investment options without materially impacting the range of available options.
- The SSgA Global Balanced Fund has a risk profile that is similar to the Long-Term Balanced Fund.

Investment Structure Evaluation

Tier II: Core Options – Capital Preservation

Callan recommends removing the money market options and proceeding with stable value as the principal protection option.

Staff recommends adding a stable value option in the Defined Contribution Retirement (DCR) Plans and maintaining the US Treasury Money Market option across all Plans. Staff recommends removing the Alaska Money Market Trust from the DCR Plans and mapping participants into the US Treasury Money Market option. Staff believes this will:

- Offer additional diversification in the DCR Plans due to the risk/return profile of stable value relative to money market.
- Continue to offer the security of a Treasury Money Market option.
- Map participants into the option with a similar risk profile.
- Move to align the option menu across the Plans.

Investment Structure Evaluation

Tier II: Core Options – Fixed Income

Callan recommends consolidating the existing fixed income options into a custom multi-manager fixed income fund.

Staff recommends creating a stand-alone, passive fixed income investment option benchmarked to the Bloomberg Barclays US Aggregate Bond Index and mapping the existing stand-alone fixed income options to it. Staff also recommends evaluating active, core-plus options for consideration at a later date. Staff believes this will:

- Simplify the current investment option menu.
- Utilize scale through consolidation.
- Allow for additional time to research active and more diversified stand-alone options.
- Maintain cost sensitivity by employing passive investment options.

Investment Structure Evaluation

Tier II: Core Options – Diversified Real Assets

Callan recommends combining the existing TIPS and REIT options into a single multi-asset class real asset fund.

Staff recommends the ARMB task staff with exploring product offerings and at a later date bring for consideration a multi-asset class real asset investment option or a recommendation of no change to the existing lineup. Staff believes this will:

- Maintain diversification benefits within the existing investment options.
- Allow for study and further consideration of a multi-asset class real asset fund.

Investment Structure Evaluation

Tier II: Core Options – Non-US Equity

Callan recommends combining the passive international fund with the active counterpart into a single multi-manager offering.

Staff recommends the All Country World Equity ex-US Index Fund and the multi-manager non-US fund remain in the Plans as stand-alone options. Staff believes this will:

- Be cost sensitive by offering a lower cost passive option alongside the more expensive active option.

Investment Structure Evaluation

Tier II: Core Options – US Large and All Cap Equity

Callan recommends mapping assets from the Russell 3000 to the S&P 500.

Staff recommends the Russell 3000 Index Fund remain in the Plans as a stand-alone option. Staff believes this will:

- Be cost sensitive by offering a lower cost all-cap passive option.

Investment Structure Evaluation

Tier III: Specialty Options – Socially Responsible

Callan recommends removing the socially responsible fund.

Staff recommends the Socially Responsible Investment Fund remain in the Plans as a stand-alone option. Staff believes this will:

- Preserve an equity investment option for those participants who strongly desire a portfolio of companies with strong environmental, social, and governance records.

Investment Structure Evaluation

Tier III: Specialty Options – Self-Directed Brokerage

Callan recommends adding a brokerage window.

Staff recommends not adding a self-directed brokerage window at this time. Staff believes this will:

- Effectively manage the number of investment options due to limited anticipated participant usage.
- Be sensitive to costs as the participant will experience any fees associated with the brokerage window as well as fees on investments purchased through the window.

Target Date Suitability Study

Target Date Suitability Study Framework

- The Employee Benefits Security Administration (EBSA) released a guide on Target Date Retirement Funds, *Tips for ERISA Plan Fiduciaries* which established eight elements for plan sponsors to remember when choosing Target Date Funds (TDFs). Callan used the following summarized bullets as a framework for this study:
 - Establish a process for comparing and selecting TDFs.
 - Establish a process for the periodic review of selected TDFs.
 - Understand the fund's investments, allocations and how they will change.
 - Review the fund's fees and investment expenses.
 - Inquire about whether a custom or non-proprietary TDF would be a better fit.
 - Develop effective employee communications.
 - Take advantage of available sources of information to evaluate the TDF.
 - Document the process.

Target Date Suitability Study

Callan Observations

- These custom funds provide participants a reasonable probability of reaching a successful retirement. Much of this depends on the continuation of the current mandatory deferral rates and match structure.

Target Date Suitability Study

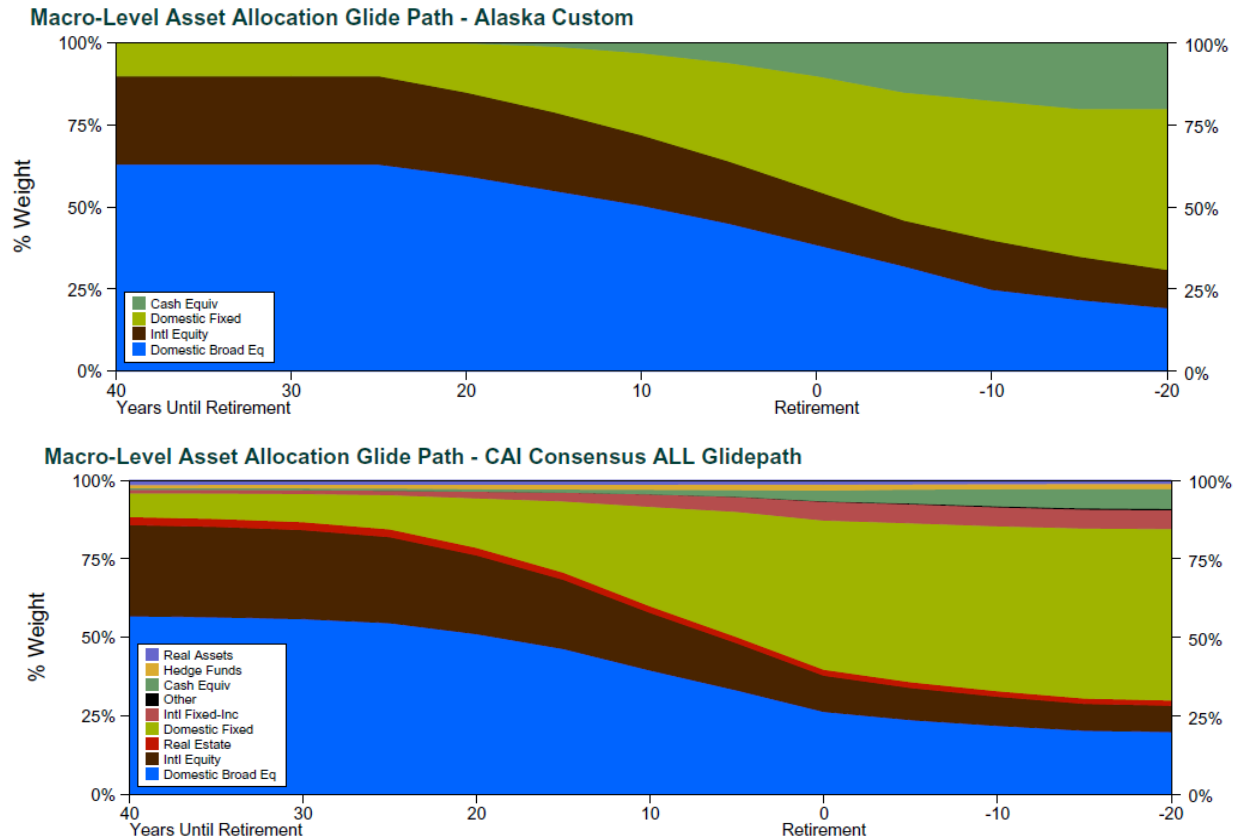
Glide Path Risk

Callan recommends that given the high predicted replacement ratios along with the fact that there is some overlap between the SBS and PERS plan populations, the Plans could explore whether there is room to take less risk throughout the glide path and still reach successful outcomes with a reasonable degree of certainty.

Staff recommends the risk profile of the target date funds not be altered to take less risk throughout the glide path.

- The objective of the TDF will dictate the risk profile of the glide path. The Alaska Target Date Retirement Trusts pursue an asset allocation strategy that promotes accumulation prior to retirement while supporting lifetime income withdrawals after retirement. To accomplish this objective, the current glide path has a higher equity allocation in transition to retirement than the industry average.

Asset Roll Down

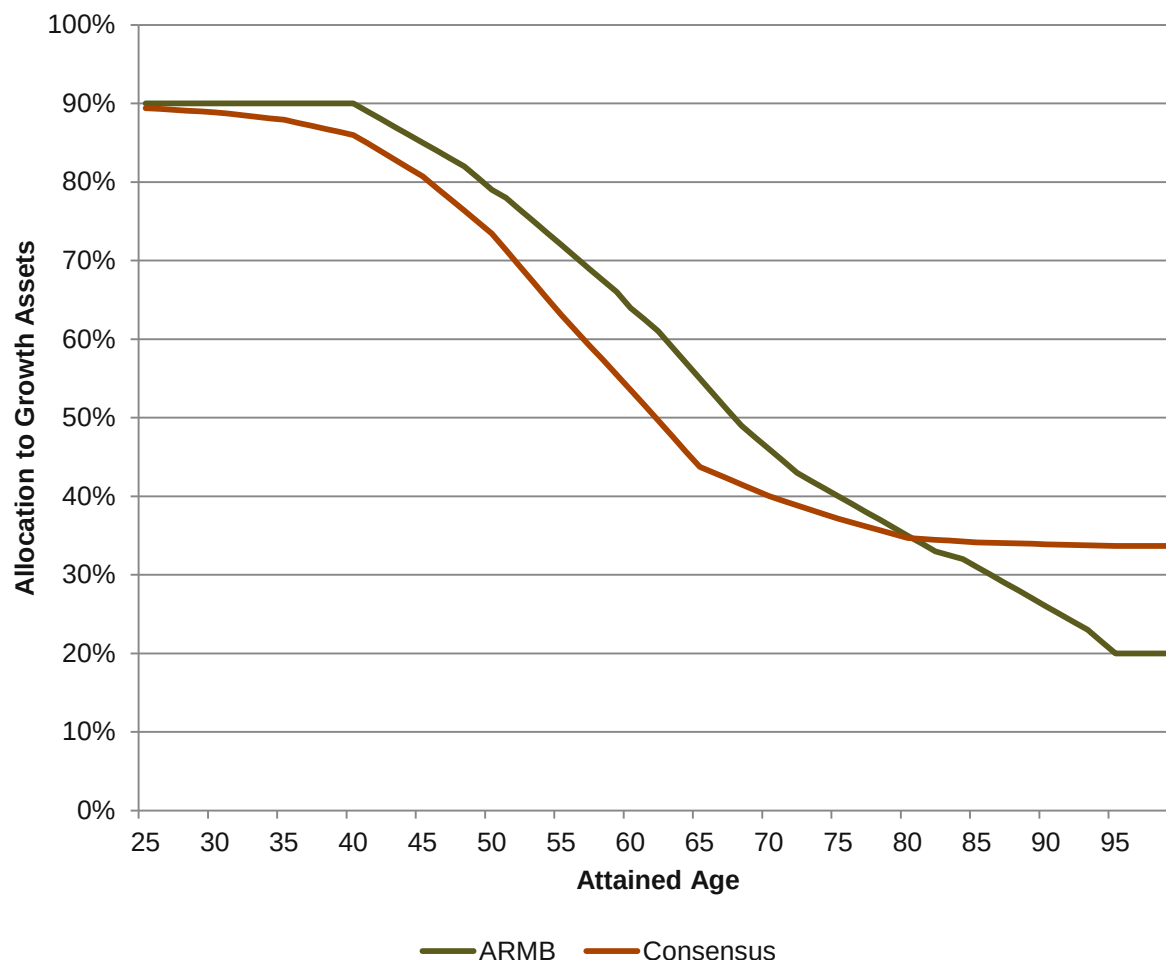


This roll down chart illustrates how the underlying asset allocation evolves as a participant ages.

As the allocation to fixed income (green shades) increases, the allocation to equity (international and domestic) decreases.

Relative to the Callan Consensus, the custom Alaska Funds have a higher allocation to cash, entering the glide path at roughly 10 years prior to retirement.

Growth Asset Rolldown*



This rolldown chart takes into consideration equity as well as equity-like asset classes (e.g., high yield fixed income and REITs) and gives a more accurate image of a “risk rolldown” than equity only illustrations.

As shown, for much of the glide path the Target Retirement Trusts have a higher growth asset allocation relative to the Callan Consensus. This is consistent with T. Rowe Price’s belief in the long-term benefits of the equity risk premium.

The glide path continues to roll down until age 95. This is also the case with the flagship off-the-shelf T. Rowe Price target date fund.

**See Appendix II for full definition.*

Target Date Suitability Study

Glide Path and Implementation Review Periodicity

Callan recommends that on a periodic basis ARMB revisit the glide path and implementation of the funds given the Plans' underlying demographics and plan design.

Staff recommends revisiting the glide path and implementation of the funds every five years absent a triggering event.

- In discussion with Callan, their clients generally review their target date fund glide path every three to five years absent a triggering event such as a change in plan design, participant demographics, or significant change in capital market assumptions.
- Note: Staff can synchronize the target date review with the addition of the next successive target date fund (2018).

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Investment Guidelines for Domestic and
International Equities

ACTION: X

DATE: October 6, 2017

INFORMATION:

BACKGROUND

The “Investment Guidelines for Domestic, International, and Alternative Equities” (Guidelines) were most recently revised and approved by the Alaska Retirement Management Board (ARMB) in April 2016 to broaden the scope of ARMB’s commission recapture program while removing the requirement for participating in the commission recapture program.

At the June 2017 board meeting, the Opportunistic asset class was created, replacing the Alternative Equity asset class and expanding the scope to include equities as well as other investment asset classes. The Opportunistic asset class benchmark is 60% Russell 1000 Index and 40% Bloomberg Barclays US Aggregate Bond Index.

STATUS

Considering the recent asset class change removing the Alternative Equity asset class and replacing it with Opportunistic, the Guidelines are no longer reflective of the current asset class line-up.

Staff recommends changing the Guidelines to reflect the changes that resulted from the approval of the FY18 asset allocation.

RECOMMENDATION

The Alaska Retirement Management Board approve Resolution 2017-18 amending the Guidelines to reflect the removal of Alternative Equity.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Investment Guidelines for
Domestic, ~~and~~ International ~~and Alternative~~ Equities

Resolution ~~2016~~2017-07~~18~~

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, the Board contracts an independent consultant to provide experience and expertise in asset allocation and other investment matters to come before the Board; and

WHEREAS, the Board has established an asset allocation for the funds that considers earnings and liabilities on a current as well as a future basis; and

WHEREAS, the Board has authorized investment in domestic and international equities; and

WHEREAS, the Board will establish and from time to time as necessary modify guidelines for domestic and international equities.

NOW THEREFORE BE IT RESOLVED THAT THE ALASKA RETIREMENT MANAGEMENT BOARD adopt the Investment Guidelines for Domestic, ~~and~~ International ~~and Alternative~~ Equities, attached hereto and made a part hereof, regarding investment in domestic, ~~and~~ international ~~and alternative~~ equities.

This resolution repeals and replaces Resolution ~~2015~~2016-06~~07~~

DATED at Anchorage, Alaska this ____ day of ~~April~~October, ~~2016~~2017.

Chair

ATTEST:

Secretary

ALASKA RETIREMENT MANAGEMENT BOARD (ARMB)

**INVESTMENT GUIDELINES FOR DOMESTIC ~~AND~~, INTERNATIONAL, ~~AND~~
~~ALTERNATIVE~~ EQUITIES**

- A. **Purpose.** The portfolio will have a primary emphasis on diversification to minimize risk.
- B. **Investment Structure.** Permissible domestic, ~~and~~ international, ~~and alternative~~ equity investments include:
1. equity and equity related securities of corporations incorporated in the United States that are listed on recognized stock exchanges where recognized stock exchanges are those acknowledged by a manager as a source of prudent investments for the fund; and
 2. international equity and equity related securities listed on recognized stock exchanges where recognized stock exchanges are those acknowledged by a manager as a source of prudent investments for the fund; and
 3. American depository receipts, American depository securities and global depository securities; and
 4. convertible debentures; and
 5. publicly traded partnerships listed on recognized stock exchanges, where recognized stock exchanges are those acknowledged by a manager as a source of prudent investments for the fund; and
 6. investments owned as a result of a corporate action and not a direct purchase, including, but not limited to securities delisted and/or deregistered if held at a value deemed to be de minimis and compliant with the manager's specific investment mandate or strategy; and
 7. equity related composite instruments including, but not limited to exchange traded funds (ETFs) and closed end funds if specified in the investment management agreement or determined to be fundamental to the manager's investment mandate or strategy; and
 8. equity related derivative instruments including futures contracts, forward contracts, options, and swaps if specified in the investment management agreement or determined to be fundamental to the manager's investment mandate or strategy.
- C. **External Equity Management.** The manager must represent and warrant:
1. that it is an "investment advisor" or "bank" as defined in the Investment Advisors Act of 1940 as amended; and

2. that it has completed, obtained and performed all registrations, filings, approvals, authorizations, consents or examinations required by any government or governmental authority for acts contemplated by this contract; and
3. that it is a "Fiduciary", as that term is defined in Section 3(21)(a)(ii) of ERISA with respect to the securities, and that it will discharge its duties with respect to the securities solely in the interest of the ARMB and the beneficiaries of the funds administered by the ARMB; and
4. that it has and will maintain all forms of insurance and other prerequisites required by the ARMB.

D. Investment Management Service to be Performed. From time to time, equity managers shall invest and reinvest the cash and securities allocated to it and deposited in their account, without distinction between principal and income, in a portfolio consisting of stocks or other securities when market conditions warrant alternatives to stock. These securities will be selected and retained by the manager solely on the basis of their independent judgment relating to economic conditions, financial conditions, market timing, or market analysis, and will not be subject to direction from the ARMB; provided, however, that in the event the aggregate total of any security held by the ARMB exceeds five percent (5%) of total shares outstanding, the ARMB may direct portfolio managers to sell securities until the aggregate is below five percent (5%). This guideline does not pertain to shares of mutual funds. Other securities shall be limited to:

1. obligations of the United States government; and
2. obligations of United States government agencies; and
3. certificates of deposit; and
4. corporate debt obligations; and
5. commercial paper; and
6. warrants; and
7. bankers acceptances; and
8. repurchase agreements.

E. Managers will be Authorized. Managers are authorized to invest or reinvest or dispose of any cash or securities held in their account or invest the proceeds of any disposition, provided that:

1. no more than ten percent of the voting stock of any corporation is acquired or held; and

2. certificates of deposit have been issued by domestic United States banks or trust companies which are members of the Federal Deposit Insurance Corporation, and are readily saleable in a recognized secondary market for such instruments; and
3. corporate debt obligations are rated A or better by Moody's, Standard & Poor's or Fitch rating services (Note: This rating restriction does not apply to convertible debentures); and
4. commercial paper bears the highest rating assigned by Moody's, Standard & Poor's or Fitch rating services; and
5. bankers' acceptances must have been drawn on and accepted by United States banks which have capital and surplus of at least \$200 million each; and
6. repurchase agreements must be secured by the debt obligations set forth in 2 through 5 above; and
7. except as provided in Section B, Investment Structure, future contracts for sale of investments or for the sale of currencies may be entered into only for the purpose of hedging an existing ownership in these investments; and
8. except as provided in Section B, Investment Structure, futures and options will be authorized for the purposes of implementing a portfolio reallocation to gain immediate exposure to the appropriate country weighting:
 - a. contracts are traded on recognized exchanges, or that OTC instruments are traded with AA rated or equivalent counterparts and no contracts exceed a period of twelve months; and
 - b. futures and options are not used to leverage the portfolio; and
 - c. all futures and options positions must be reported to the client each month. The report must show both the nominal position and the "economic impact" of all derivative positions; and
9. except as provided in Section B, Investment Structure, standardized equity index futures will be authorized for the purpose of cash equitization; and
10. purchases in commodities or the commodities of futures market of any kind are specifically prohibited; and
11. no more than ten percent (10%) of any international portfolio benchmarked against the MSCI EAFE Index or the MSCI EAFE Small Cap Index may be invested in emerging markets.

F. Cash Held in Portfolio. Managers are expected to maintain fully invested equity portfolios. The ARMB considers a portfolio to be fully invested as long as cash levels are below a maximum of 5 percent for small capitalization and international equity managers and 3 percent for all other equity managers, calculated using a 10-day moving average. In implementing this portion of the equity guidelines, the Chief Investment Officer will

consider any cash in an individual equity account in excess of the maximum to be available for use as a funding source for other ARMB needs. Any manager that expects to exceed the maximum cash level in the short-term as the result of a specific strategy must notify ARMB in writing in advance. Such notice will temporarily exempt the manager from the maximum cash rebalancing threshold. Staff shall regularly report all equity manager net cash holdings.

G. Performance Standards. Managers are expected to have returns, over time, in excess of their appropriate contractual benchmark, net of fees.

H. Performance Benchmarks. ARMB's asset class level benchmarks for domestic and international equities are as follows:

Broad Domestic Equity – Russell 3000 Index

Global Equity ex US – MSCI ACWI ex US [IMI](#) Index

~~Alternative Equity – S&P 500 Index (50%), CBOE Buy Write (30%), Bank of America Yield Alternatives Index (20%)~~

I. Brokerage and Commissions. In carrying out its functions, a manager will use its best efforts to obtain prompt execution of orders at the most favorable prices reasonably obtainable, and in doing so, will consider a number of factors, including, without limitation, the overall direct net economic result to the ARMB (including commissions, which may not be the lowest available but which ordinarily will not be higher than the generally prevailing competitive range), the financial strength and stability of the broker, the efficiency with which the transaction is effected, the ability to effect the transaction at all where a large block is involved, the availability of the broker to stand ready to execute possible difficult transactions in the future and other matters involved in the receipt of “brokerage and research services” as defined in and in compliance with Section 28(e) of the Securities Exchange Act of 1934, as amended, and regulations thereunder.

If the manager determines execution only transactions do not result in the greatest net benefit to ARMB considering the factors described in this section I, the manager is encouraged to execute transactions with a brokerage firm participating in a commission recapture program with the ARMB.

The Chief Investment Officer will evaluate and report the commission recapture program to the ARMB that will include:

1. total commission dollars recaptured; and
2. actual percentage of commissions recaptured; and
3. a full analysis of the commission recapture program with recommendations for expanding the program.

J. Voting and Other Action. The managers shall vote any or all of the securities held by or for the account of the ARMB, unless written instructions to the contrary have been provided by

ARMB. In voting securities of the ARMB, the managers shall act prudently in the interest and for the benefit of the ARMB and the beneficiaries of the funds administered by the ARMB. The manager is to furnish, on an annual basis, copies of the contractor's policy and voting records in regards to voting proxies.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Investment Guidelines for
Domestic and International Equities

Resolution 2017-18

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, the Board contracts an independent consultant to provide experience and expertise in asset allocation and other investment matters to come before the Board; and

WHEREAS, the Board has established an asset allocation for the funds that considers earnings and liabilities on a current as well as a future basis; and

WHEREAS, the Board has authorized investment in domestic and international equities; and

WHEREAS, the Board will establish and from time to time as necessary modify guidelines for domestic and international equities.

NOW THEREFORE BE IT RESOLVED THAT THE ALASKA RETIREMENT MANAGEMENT BOARD adopt the Investment Guidelines for Domestic and International Equities, attached hereto and made a part hereof, regarding investment in domestic and international equities.

This resolution repeals and replaces Resolution 2016-07

DATED at Anchorage, Alaska this ____ day of October, 2017.

Chair

ATTEST:

Secretary

ALASKA RETIREMENT MANAGEMENT BOARD (ARMB)

INVESTMENT GUIDELINES FOR DOMESTIC AND INTERNATIONAL EQUITIES

- A. Purpose.** The portfolio will have a primary emphasis on diversification to minimize risk.
- B. Investment Structure.** Permissible domestic and international equity investments include:
1. equity and equity related securities of corporations incorporated in the United States that are listed on recognized stock exchanges where recognized stock exchanges are those acknowledged by a manager as a source of prudent investments for the fund; and
 2. international equity and equity related securities listed on recognized stock exchanges where recognized stock exchanges are those acknowledged by a manager as a source of prudent investments for the fund; and
 3. American depository receipts, American depository securities and global depository securities; and
 4. convertible debentures; and
 5. publicly traded partnerships listed on recognized stock exchanges, where recognized stock exchanges are those acknowledged by a manager as a source of prudent investments for the fund; and
 6. investments owned as a result of a corporate action and not a direct purchase, including, but not limited to securities delisted and/or deregistered if held at a value deemed to be de minimis and compliant with the manager's specific investment mandate or strategy; and
 7. equity related composite instruments including, but not limited to exchange traded funds (ETFs) and closed end funds if specified in the investment management agreement or determined to be fundamental to the manager's investment mandate or strategy; and
 8. equity related derivative instruments including futures contracts, forward contracts, options, and swaps if specified in the investment management agreement or determined to be fundamental to the manager's investment mandate or strategy.
- C. External Equity Management.** The manager must represent and warrant:
1. that it is an "investment advisor" or "bank" as defined in the Investment Advisors Act of 1940 as amended; and
 2. that it has completed, obtained and performed all registrations, filings, approvals, authorizations, consents or examinations required by any government or governmental authority for acts contemplated by this contract; and

3. that it is a "Fiduciary", as that term is defined in Section 3(21)(a)(ii) of ERISA with respect to the securities, and that it will discharge its duties with respect to the securities solely in the interest of the ARMB and the beneficiaries of the funds administered by the ARMB; and
4. that it has and will maintain all forms of insurance and other prerequisites required by the ARMB.

D. Investment Management Service to be Performed. From time to time, equity managers shall invest and reinvest the cash and securities allocated to it and deposited in their account, without distinction between principal and income, in a portfolio consisting of stocks or other securities when market conditions warrant alternatives to stock. These securities will be selected and retained by the manager solely on the basis of their independent judgment relating to economic conditions, financial conditions, market timing, or market analysis, and will not be subject to direction from the ARMB; provided, however, that in the event the aggregate total of any security held by the ARMB exceeds five percent (5%) of total shares outstanding, the ARMB may direct portfolio managers to sell securities until the aggregate is below five percent (5%). This guideline does not pertain to shares of mutual funds. Other securities shall be limited to:

1. obligations of the United States government; and
2. obligations of United States government agencies; and
3. certificates of deposit; and
4. corporate debt obligations; and
5. commercial paper; and
6. warrants; and
7. bankers acceptances; and
8. repurchase agreements.

E. Managers will be Authorized. Managers are authorized to invest or reinvest or dispose of any cash or securities held in their account or invest the proceeds of any disposition, provided that:

1. no more than ten percent of the voting stock of any corporation is acquired or held; and
2. certificates of deposit have been issued by domestic United States banks or trust companies which are members of the Federal Deposit Insurance Corporation, and are readily saleable in a recognized secondary market for such instruments; and

3. corporate debt obligations are rated A or better by Moody's, Standard & Poor's or Fitch rating services (Note: This rating restriction does not apply to convertible debentures); and
4. commercial paper bears the highest rating assigned by Moody's, Standard & Poor's or Fitch rating services; and
5. bankers' acceptances must have been drawn on and accepted by United States banks which have capital and surplus of at least \$200 million each; and
6. repurchase agreements must be secured by the debt obligations set forth in 2 through 5 above; and
7. except as provided in Section B, Investment Structure, future contracts for sale of investments or for the sale of currencies may be entered into only for the purpose of hedging an existing ownership in these investments; and
8. except as provided in Section B, Investment Structure, futures and options will be authorized for the purposes of implementing a portfolio reallocation to gain immediate exposure to the appropriate country weighting:
 - a. contracts are traded on recognized exchanges, or that OTC instruments are traded with AA rated or equivalent counterparts and no contracts exceed a period of twelve months; and
 - b. futures and options are not used to leverage the portfolio; and
 - c. all futures and options positions must be reported to the client each month. The report must show both the nominal position and the "economic impact" of all derivative positions; and
9. except as provided in Section B, Investment Structure, standardized equity index futures will be authorized for the purpose of cash equitization; and
10. purchases in commodities or the commodities of futures market of any kind are specifically prohibited; and
11. no more than ten percent (10%) of any international portfolio benchmarked against the MSCI EAFE Index or the MSCI EAFE Small Cap Index may be invested in emerging markets.

F. Cash Held in Portfolio. Managers are expected to maintain fully invested equity portfolios. The ARMB considers a portfolio to be fully invested as long as cash levels are below a maximum of 5 percent for small capitalization and international equity managers and 3 percent for all other equity managers, calculated using a 10-day moving average. In implementing this portion of the equity guidelines, the Chief Investment Officer will consider any cash in an individual equity account in excess of the maximum to be available for use as a funding source for other ARMB needs. Any manager that expects to exceed the maximum cash level in the short-term as the result of a specific strategy must notify ARMB

in writing in advance. Such notice will temporarily exempt the manager from the maximum cash rebalancing threshold. Staff shall regularly report all equity manager net cash holdings.

G. Performance Standards. Managers are expected to have returns, over time, in excess of their appropriate contractual benchmark, net of fees.

H. Performance Benchmarks. ARMB's asset class level benchmarks for domestic and international equities are as follows:

Broad Domestic Equity – Russell 3000 Index

Global Equity ex US – MSCI ACWI ex US IMI Index

I. Brokerage and Commissions. In carrying out its functions, a manager will use its best efforts to obtain prompt execution of orders at the most favorable prices reasonably obtainable, and in doing so, will consider a number of factors, including, without limitation, the overall direct net economic result to the ARMB (including commissions, which may not be the lowest available but which ordinarily will not be higher than the generally prevailing competitive range), the financial strength and stability of the broker, the efficiency with which the transaction is effected, the ability to effect the transaction at all where a large block is involved, the availability of the broker to stand ready to execute possible difficult transactions in the future and other matters involved in the receipt of "brokerage and research services" as defined in and in compliance with Section 28(e) of the Securities Exchange Act of 1934, as amended, and regulations thereunder.

If the manager determines execution only transactions do not result in the greatest net benefit to ARMB considering the factors described in this section I, the manager is encouraged to execute transactions with a brokerage firm participating in a commission recapture program with the ARMB.

The Chief Investment Officer will evaluate and report the commission recapture program to the ARMB that will include:

1. total commission dollars recaptured; and
2. actual percentage of commissions recaptured; and
3. a full analysis of the commission recapture program with recommendations for expanding the program.

J. Voting and Other Action. The managers shall vote any or all of the securities held by or for the account of the ARMB, unless written instructions to the contrary have been provided by ARMB. In voting securities of the ARMB, the managers shall act prudently in the interest and for the benefit of the ARMB and the beneficiaries of the funds administered by the ARMB. The manager is to furnish, on an annual basis, copies of the contractor's policy and voting records in regards to voting proxies.

Abbott Capital Management, LLC

Mandate: Private Equity

Hired: 1998

Firm Information

Abbott is a leading independent investment management firm founded in 1986. Abbott creates and manages private equity separate accounts and fund of funds for institutional investors worldwide. The firm currently manages over \$7 billion in assets. Abbott focuses on private equity investments in venture capital, buyouts and special situations.

Abbott is registered as an investment advisor with the SEC in the United States and has an office in London.

Abbott has over 50 employees, including 17 investment professionals.

Key Executives:

Jonathan Roth, President
Katie Stokel, Chief Operating Officer
Matthew Smith, Managing Director

Investment Approach

Abbott's decision-making process uses a team approach; no one individual has authority to make decisions regarding portfolio management without the input of other senior professionals.

Abbott is extremely selective in choosing private equity investment funds. Every partnership must meet rigid standards regarding the overall quality of the investment opportunity, such as:

- Target markets that can support private equity investing;
- Long-term and proven private equity business model;
- Stable management team operating under a consistent firm culture;
- Proven access to high-quality investment opportunities and resources;
- Strong track record.

Final investment decisions are made using a consensus-driven approach. Investment decisions are made based on a team effort emphasizing the ongoing responsibility and accountability of Abbott's investment staff with analysis and further review designed to meet the rigorous levels of Abbott's managing directors and investment staff.

Benchmark: Internal Rate of Return and Thomson/Cambridge vintage year peer comparison.

Total ARMB Mandate

Assets Under Management: (7/31/17)
Commitments: \$2,579 million
Market Value: \$ 837 million

CY 16 Management Fees: \$2.0 million

Concerns: None

Performance

The since inception internal rate of return (IRR) for Abbott's ARMB portfolio is 9.7% through 03/31/2017 compared to the Cambridge median and upper quartile returns of 8.2% and 15.5% respectively. The Abbott multiple of invested capital is 1.5x compared to the Cambridge median and upper quartile multiples of 1.3x and 1.7x.

For each vintage year from 1998 through 2012, the Abbott portfolio is in the first quartile two years and in the second quartile for twelve years.

Alaska Retirement Management Board Client Review

October 2017

Table of Contents

Section	
I	Abbott Organizational Update
II	Investment Activity
III	Portfolio Review
IV	Private Equity Market Review
V	Appendix

Abbott Organizational Update

Organization

- Founded in 1986; over 30 year track record focused solely on private equity
- Over \$7 billion in AUM
- First customized mandate launched in 1986; first commingled fund raised in 1995
- SEC registered and FCA authorized investment advisers with offices in New York and London
- Stable, multi-generational management team

Experience

- **Relationship Advantage**
 - ✓ Deep relationships and networks among GPs and LPs
 - ✓ Strong primary platform, and specialist portfolios
 - ✓ Demonstrated capacity with fund managers
 - ✓ Over 100 advisory board seats
- **Information Advantage**
 - ✓ Proprietary database of information on over 7,500 primary funds
 - ✓ Over 500 primary investments typically reviewed annually
 - ✓ \$10 billion in secondary transactions typically reviewed annually
- **Focus Advantage**
 - ✓ Disciplined underwriting standards
 - ✓ Restrained growth in AUM enables access to capacity constrained managers across client base
 - ✓ Highly selective portfolios

Abbott's platform offers a distinctive combination of scale and focus to benefit our clients

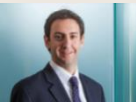
Abbott's Private Equity-Focused Organization

As of 08/31/2017

Independent team of over 50 professionals dedicated to private equity investing

Investment Team

Managing Directors

	Jonathan Roth Managing Director President 25/25 years		Katie Stokel Managing Director Chief Operating Officer 31/19 years
	Matthew Smith Managing Director 17/17 years		Meredith Rerisi Managing Director 16/16 years
	Tim Maloney Managing Director 17/13 years		Len Pangburn Managing Director 12/12 years
	Young Lee Managing Director 12/9 years		

	Martha Cassidy Director 33 years		Zohair Tariq Senior Associate 6 years		Brian Susetka Associate 7 years
	Jobst Klemme Director 18 years		Jonathan Tubiana Senior Associate 9 years		Shaf A. Shaikh Senior Analyst 2 years
	Jennie Benza Vice President 11 years		Moritz Turck Senior Associate 6 years		Dan Brown Analyst 3 years
					Dillon Schriver Analyst 1 year


Charles van Horne
Managing Director
Client Relations
32/16 years
 
Mary Hornby
Managing Director
General Counsel
21/12 years

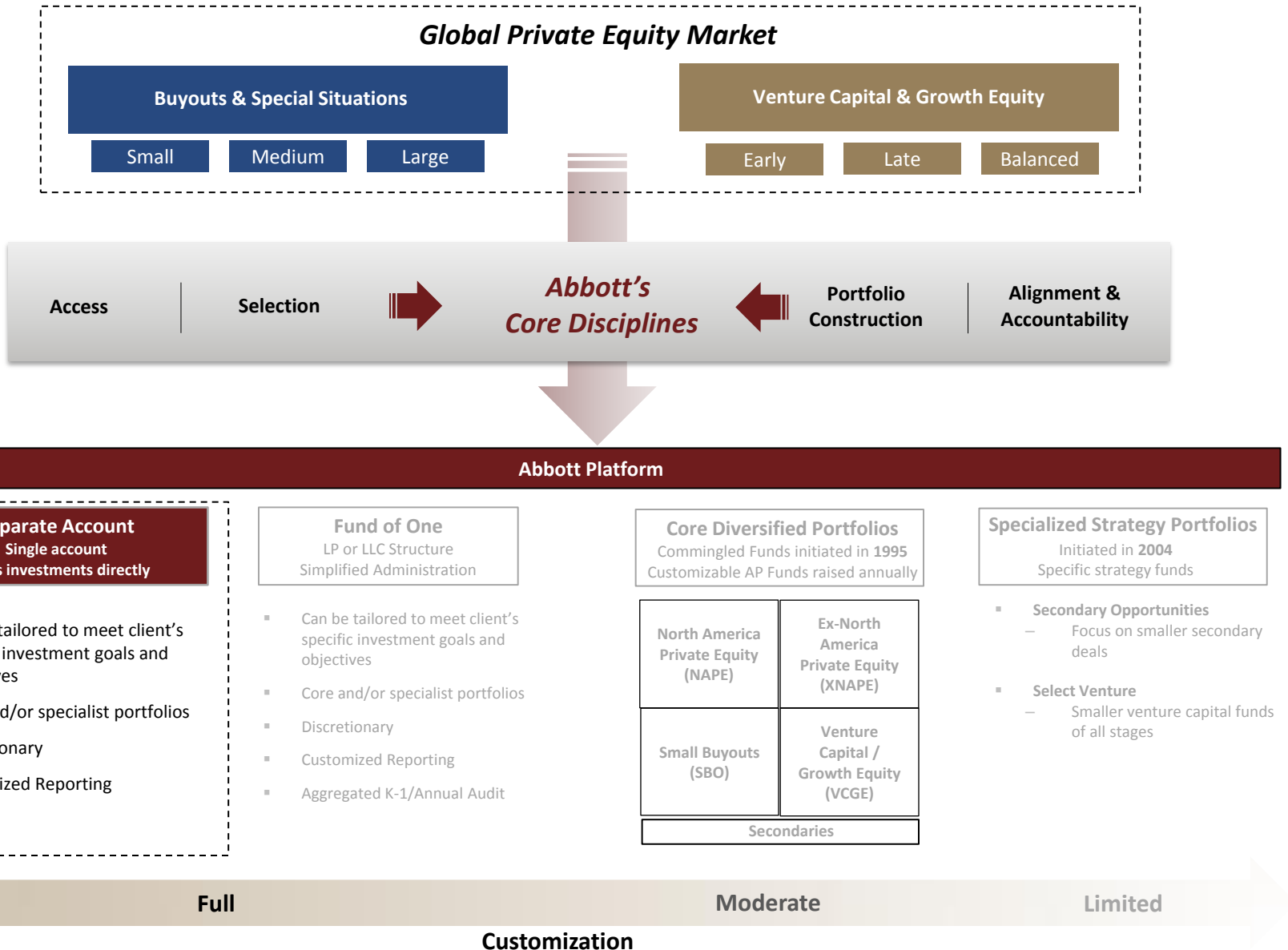

Lauren Massey
Managing Director
Finance & Administration
26/22 years
 
Paolo Parziale
Managing Director
Corp. & Fund Acct.
17/15 years

- One-team philosophy: experienced and diverse perspectives
- Well-resourced investment team of 17 evaluates opportunities across all private equity strategies
- Operations, finance, and client relations team of over 40 professionals
- Owner-managed; strong alignment with Limited Partners

Abbott's Managing Directors have an average of 21 years experience and 16 years working together

Years indicated are of total private equity experience / years with Abbott are shown for the Managing Directors only as of June 30, 2017.
See Appendix for complete biographies.

Institutional Private Equity Solutions



Managing Risk: Pre-Investment Primary Due Diligence

Abbott seeks to identify alpha generators through our rigorous process:

- Multiple meetings with the GP attended by senior members of the investment staff
- Peer-group analysis
- Partner attribution to determine deal-leaders and successes
- Reference calls to GPs and portfolio company management teams

Iterative and collaborative process ensures investment staff perspective is considered throughout due diligence process:



Proprietary database of 7,500+ managers, with over 500 primary funds typically reviewed each year

Managing Risk: Post-Investment

Pre-Investment Due Diligence



Approved for Investment

Portfolio Construction

Goal: Enable index-beating performance while mitigating portfolio risks

Appropriate diversification

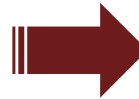
- Number of funds
- Strategy and style
- Vintage year
- Region

High-conviction commitments

- Limited number of holdings
- Position size

Bottom-up focus with macro framework

- Cycle-tested managers
- Avoid overlap and unintended concentration



Active Monitoring

Goal: Identify potential issues and minimize impact on fund performance

Investment Monitoring

- Adherence to strategy
- Changes to team
- Monitor valuation policies and valuations
- Participation in annual meetings and underlying fund advisory committees (where available)
- Ongoing contact with fund management teams

Legal/Operational Monitoring

- Record and reconcile investment activity
- Ongoing portfolio fund review and reconciliation
- Calculation of performance metrics
- Review and negotiation of extensions/amendments to LPAs

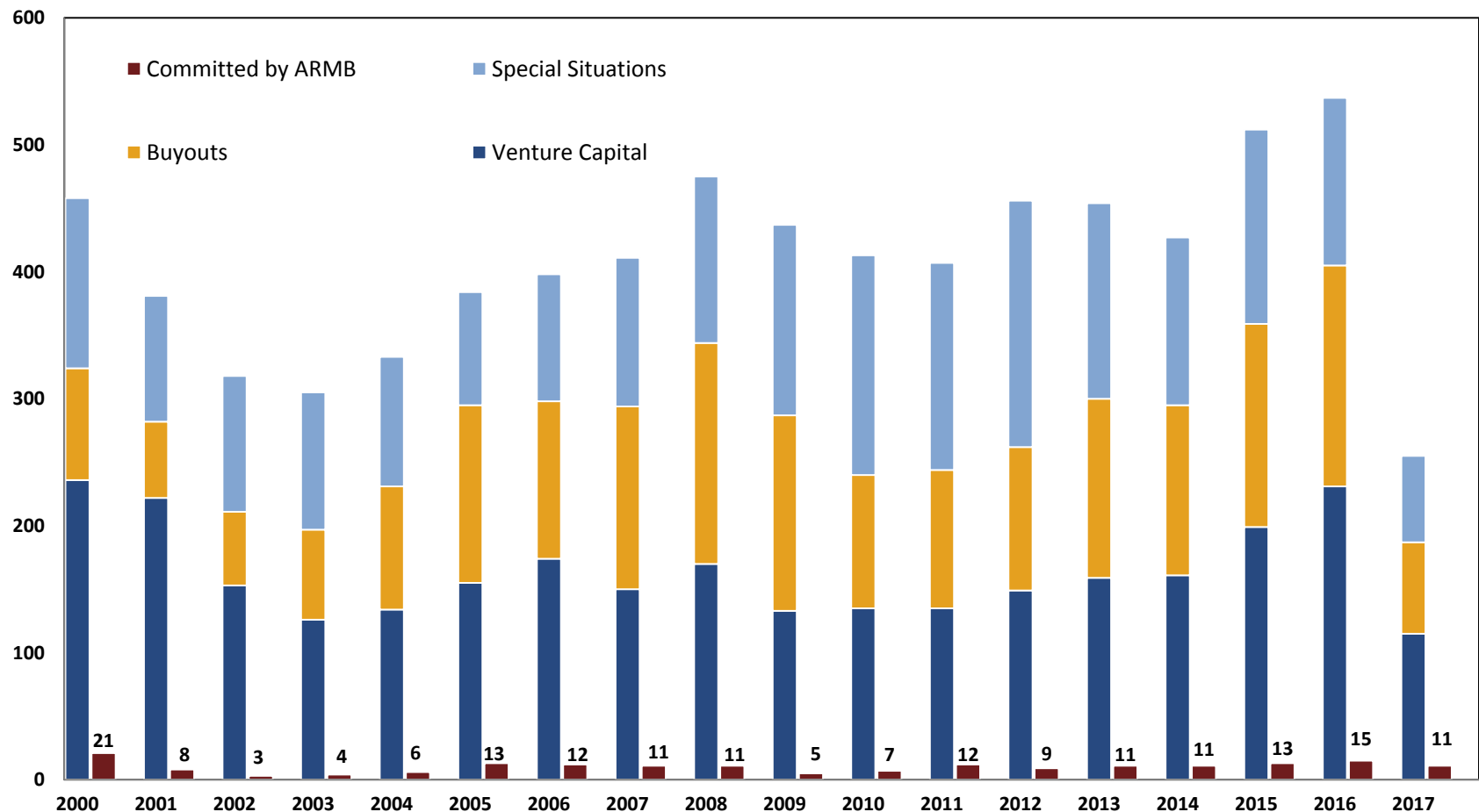
Abbott holds 116 active Advisory Board seats

Although the foregoing describes the typical areas reviewed by Abbott when monitoring an investment, not every monitoring item occurs nor is every factor considered by Abbott in each instance it evaluates an investment.

Investment Activity

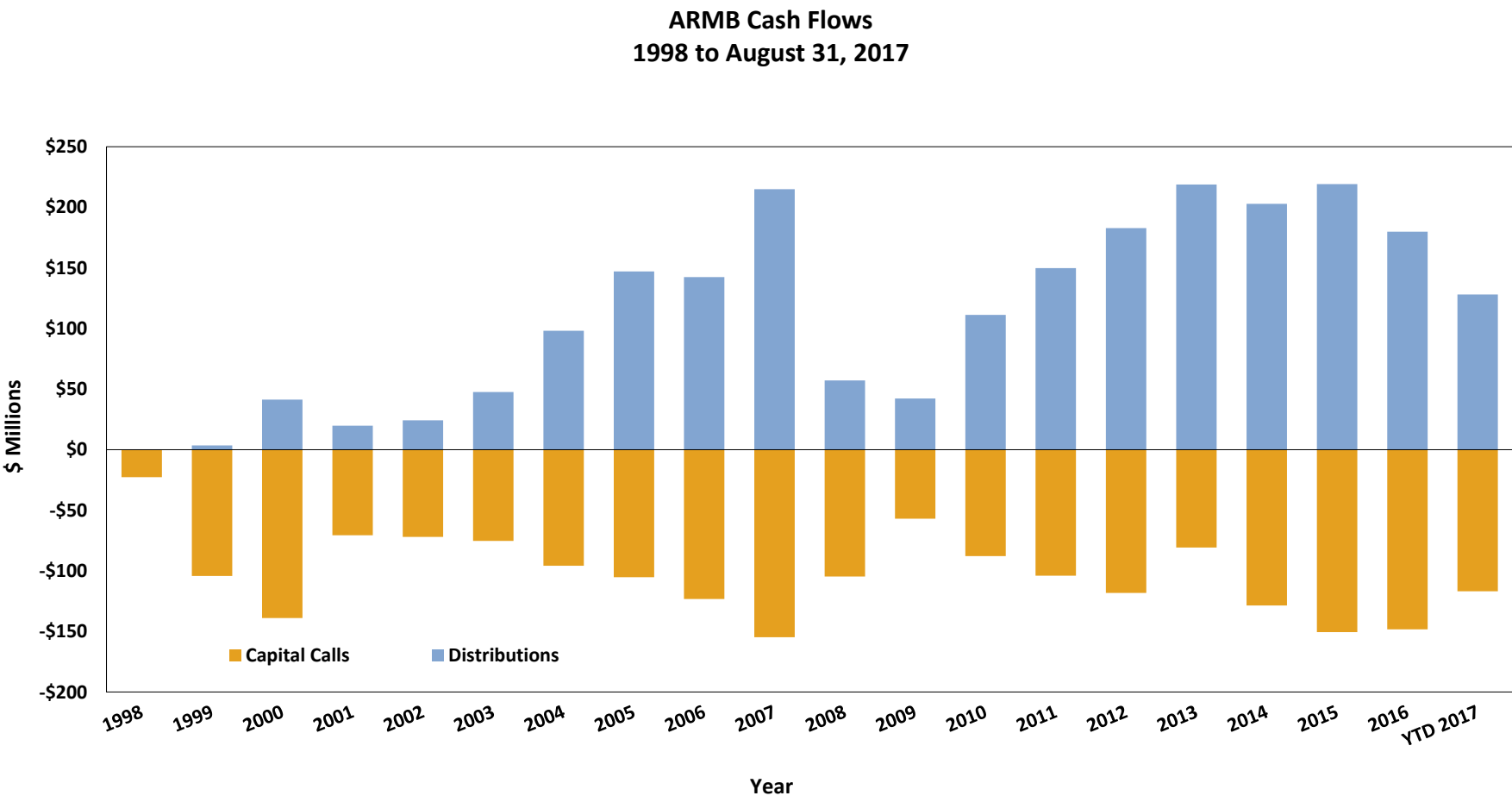
Abbott Deal Flow and ARMB Primary Commitments

Abbott Deal Flow
ARMB Primary Commitments
2000 to August 31, 2017



Abbott Deal Flow represents primary investment opportunities presented to, or reviewed by, Abbott during the referenced period for all client accounts. Investment opportunities presented to Abbott and still under review in a subsequent calendar year may be reflected in the totals for both the years.

ARMB Historic Cash Flows

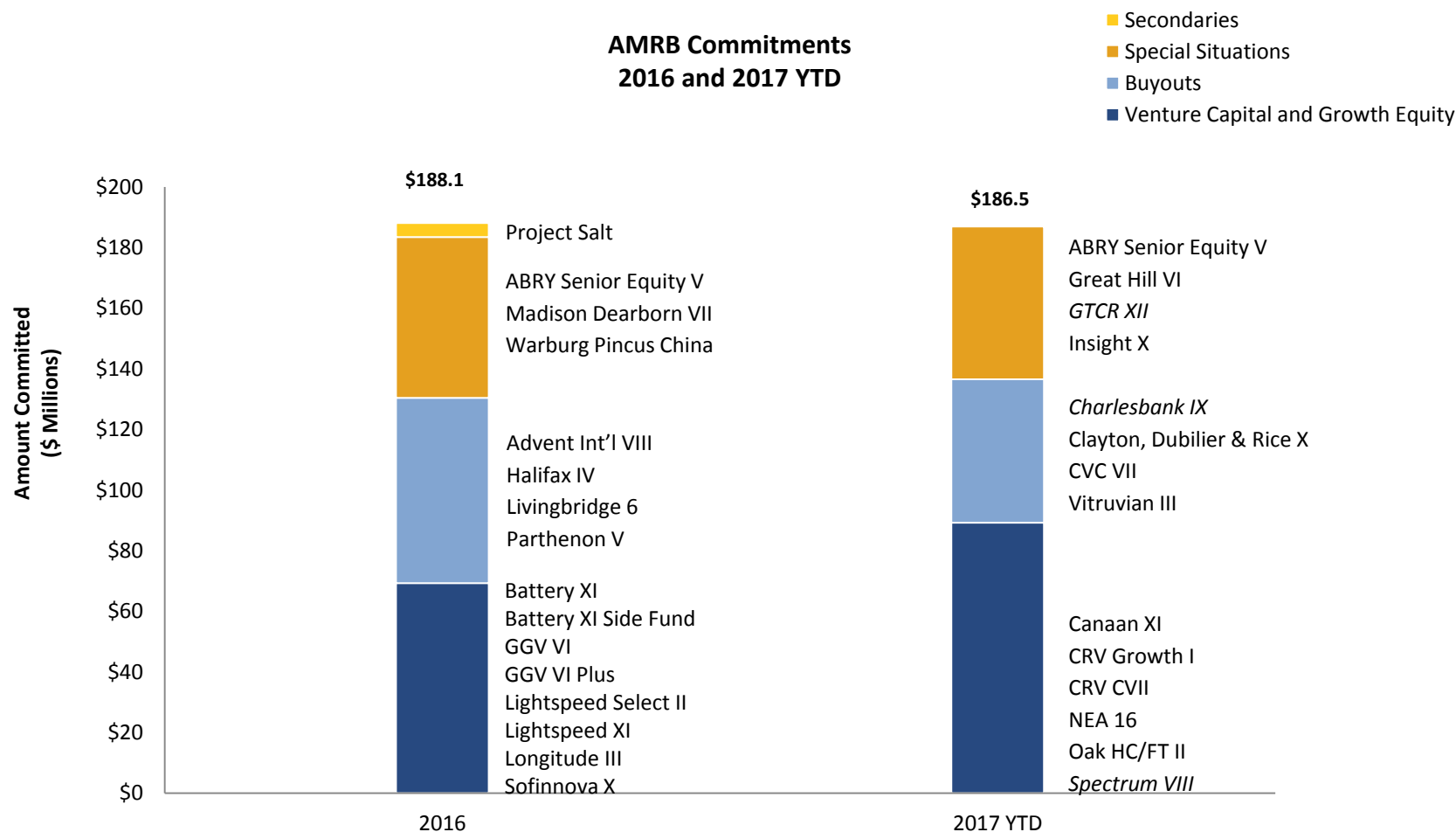


Past performance is not a guide to future results and is not indicative of expected realized returns. No assurances can be given that cash flows will continue at this pace in the future or that the Abbott funds will make any further distributions. See Important Information page and Definitions at the back of this document and Abbott's Form ADV Part 2a for disclosures on risk and performance.

2016 and 2017 Commitment Activity

2016 and 2017 commitment target: \$200 million and \$210 million

- \$188.1 million committed to portfolio funds in 2016
- Commitment pace on target for 2017



Italics represent commitments made since August 31, 2017.

Portfolio Review

ARMB Summary – Current & Liquidated Portfolio

As of 8/31/2017

Portfolio Summary: ARMB Commitments

Total Portfolio Fund Commitments	\$2,579.8 million
Primary Investments	\$2,553.2 million
Secondary Transactions	\$26.6 million
Number of Portfolio Fund Investments (Primary/Secondary)	210/22

Portfolio Fund Metrics

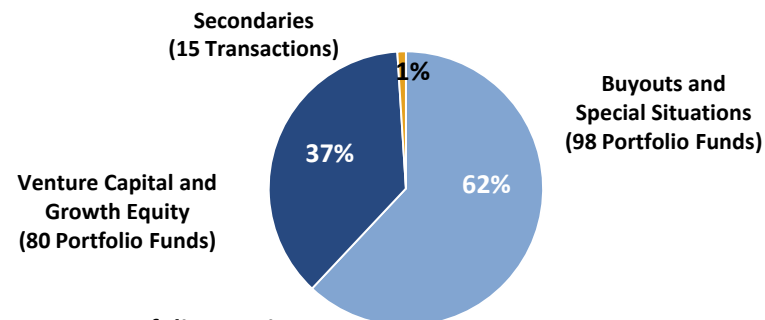
Amount Paid-In <i>As a % of Commitments</i>	\$2,058.9 million (79.8%)
Amount Distributed <i>As a % of Amount Contributed</i>	\$2,231.5 million (108.4%)
Latest Valuation	\$881.0 million
Pooled IRR	10.01%
Multiple (TVPI)	1.51x

Portfolio Company Metrics – As of 3/31/2017

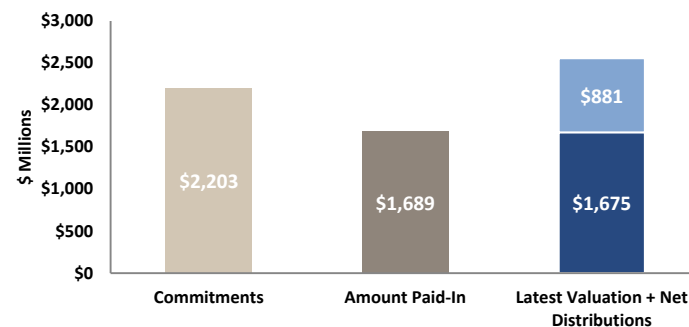
Underlying portfolio companies	2,254
Underlying portfolio company investments	2,530
Average age of portfolio companies	4.7 years
Number/Percent of Investments valued above cost	1,333/ 53%
Number/Percent of Investments valued at cost	429/ 17%
Number/Percent of Investments valued below cost	769/ 30%

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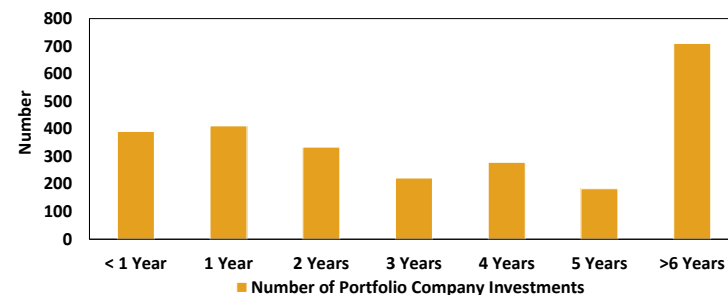
Current Portfolio Diversification | By Amount Committed



Current Portfolio Metrics



Portfolio Company Age – As of 3/31/2017



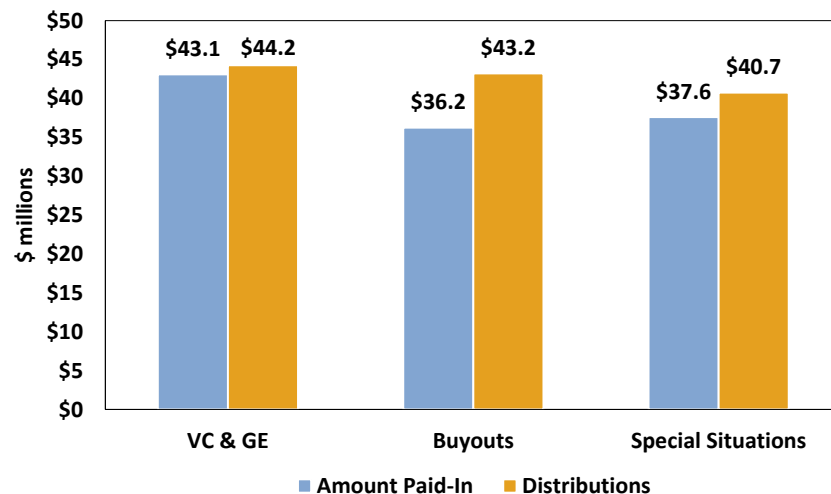
Portfolio Fund Cash Flows For the Period 1/1/2017 to 8/31/2017

Capital Calls and Distributions by Portfolio Fund Vintage Year

Portfolio Fund Vintage Year	Amount Paid-In	Distributions	Net Cash Flows
1998		\$16,966	\$16,966
1999		\$41,294	\$41,294
2000		\$1,283,521	\$1,283,521
2001	(\$589,159)	\$3,563,249	\$2,974,090
2002		\$211,507	\$211,507
2003	(\$16,401)	\$2,252,530	\$2,236,129
2004	(\$44,787)	\$2,709,950	\$2,665,163
2005	\$25,386	\$11,365,685	\$11,391,071
2006	(\$435,937)	\$15,046,973	\$14,611,036
2007	(\$821,437)	\$7,915,372	\$7,093,935
2008	(\$988,425)	\$12,412,970	\$11,424,545
2009	(\$207,000)	\$3,441,787	\$3,234,787
2010	(\$1,087,202)	\$14,073,957	\$12,986,755
2011	(\$1,967,186)	\$7,336,281	\$5,369,095
2012	(\$6,547,736)	\$24,364,075	\$17,816,338
2013	(\$5,056,354)	\$8,649,385	\$3,593,031
2014	(\$31,638,234)	\$9,024,551	(\$22,613,683)
2015	(\$22,294,030)	\$3,631,445	(\$18,662,585)
2016	(\$43,839,539)	\$855,170	(\$42,984,369)
2017	(\$1,400,000)	\$0	(\$1,400,000)
Total	(\$116,908,041)	\$128,196,668	\$11,288,627

Capital Calls and Distributions by Portfolio Fund Strategy

Portfolio Fund Strategy	Amount Paid-In	Distributions	Net Cash Flows
VC & GE	(\$43,087,585)	\$44,245,280	\$1,157,695
Buyouts	(\$36,235,061)	\$43,213,333	\$6,978,272
Special Situations	(\$37,585,395)	\$40,738,054	\$3,152,659
Total	(\$116,908,041)	\$128,196,668	\$11,288,627



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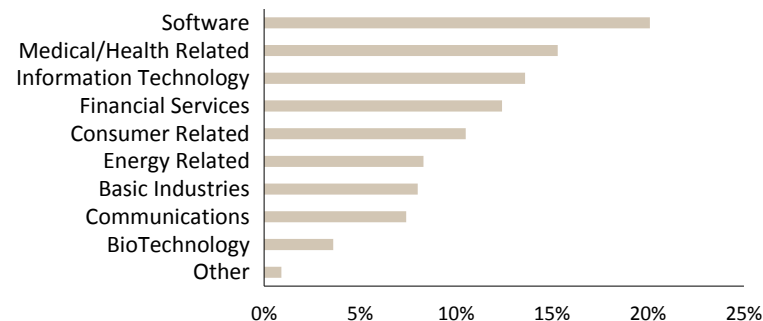
Current Portfolio Company Diversification

As of 3/31/2017

Geography Diversification by Value



Industry Diversification by Value



Top Ten Portfolio Companies By Proportionate Value

Company Name	Portfolio Fund Name
Tesaro, Inc. ¹	New Enterprise Associates 13
Coupa Software ¹	Battery Ventures VIII, El Dorado Ventures VII
Zayo Bandwidth ¹	GTCR Fund X
CloudFlare, Inc	Project Salt, New Enterprise Associates 13
Formula One Group ¹	CVC European Equity Partners IV
Tallgrass Energy Partners ¹	Kelso Investment Associates VIII
Lanai Holdings, LLC	Madison Dearborn Capital Partners VII
Casa Systems, Inc.	Summit Partners Private Equity Fund VII-A
Cotiviti Holdings, Inc	Advent International GPE VI-A
Securitas Direct	Hellman & Friedman Capital Partners VII
Total Top Ten Portfolio Companies	\$50,815,409
	6.1% of Latest Valuation

¹Denotes publicly traded company.

Portfolio companies are not held directly by the fund. Proportionate Value is calculated based on the fund's share of the total capital committed by all investors of the relevant portfolio fund. Diversification will not guarantee profitability or protection against loss.

Private Equity Market Review

Private Equity Fundraising Environment

Buyouts and Special Situations

Continuing Sellers' Market

- High purchase price multiples
- Readily available, borrower-friendly credit

Challenging Investment Environment

- High purchase price multiples
- Consolidations of fragmented industries – multi-site healthcare practice management companies, in particular, have seen significant interest by private equity firms
- Increased competition in lower and middle market as large players come down market

Venture Capital and Growth Equity

Strong Fundraising Environment

- Robust appetite for Venture Capital and Growth Equity funds
- Re-emergence of overage funds due to robust LP demand

Unicorns / Unsteady Exit Environment

- 2017 Unicorn IPOs – mixed performance
- Private vs. Public

Looking Ahead

Investor Appetite for Private Equity Remains High

- Long-term PE outperformance compared to the public markets and other alternative strategies
- Robust demand for Private Equity and Venture Capital funds

IT Investment Continuing to Surge

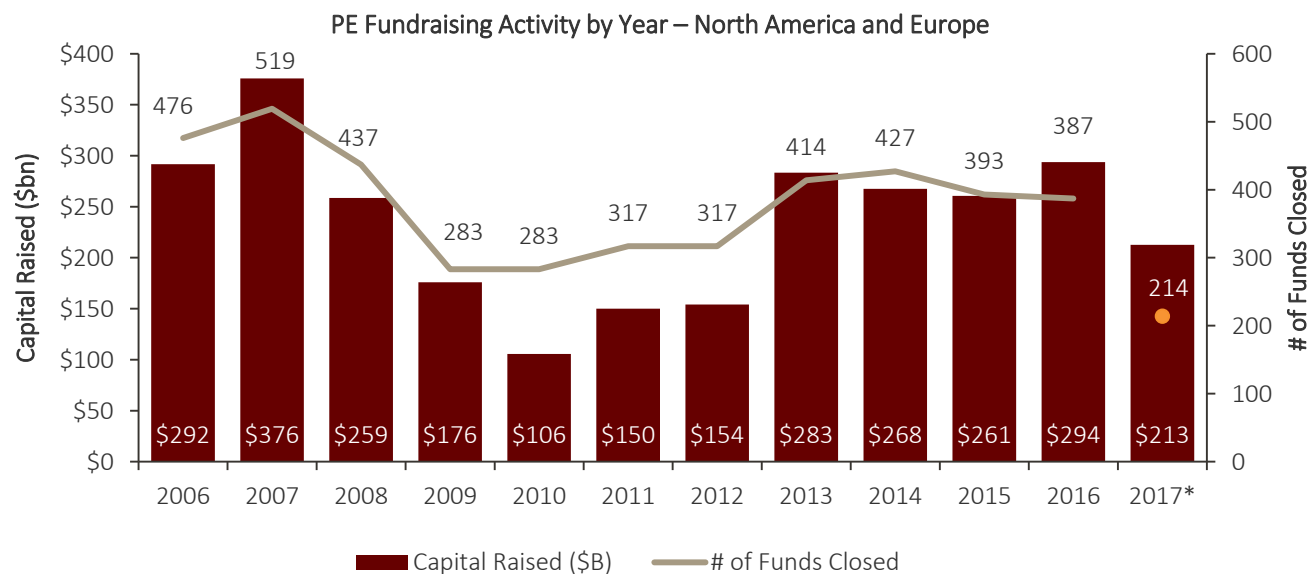
- iPhone celebrates its 10-year anniversary; iPhone introduced us to the world of mobile apps – the platform for many of today's Unicorns
- Continued growing interest in software

Macroeconomic Outlook

- Increased uncertainty with regard to various political and economic factors across the globe has led to an increase in perceived market volatility
- Easing of accommodative monetary policies in the U.S. and potential easing in Europe, "Brexit," and potential healthcare and tax reform in the U.S. could meaningfully affect the public markets during the second half of the year

Private Equity Fundraising Environment

Robust private equity fundraising environment



- 2017 is on pace to meet or surpass 2016 fundraising

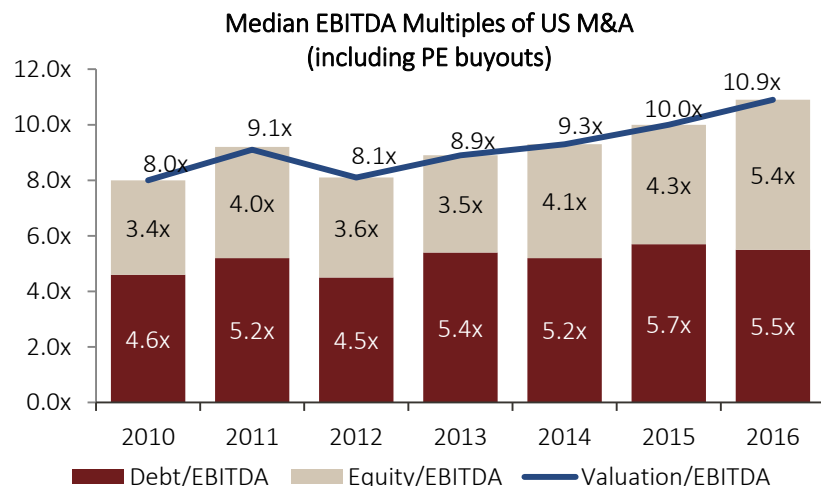
*as of 8/1/2017

High quality funds of **all sizes** remain in demand

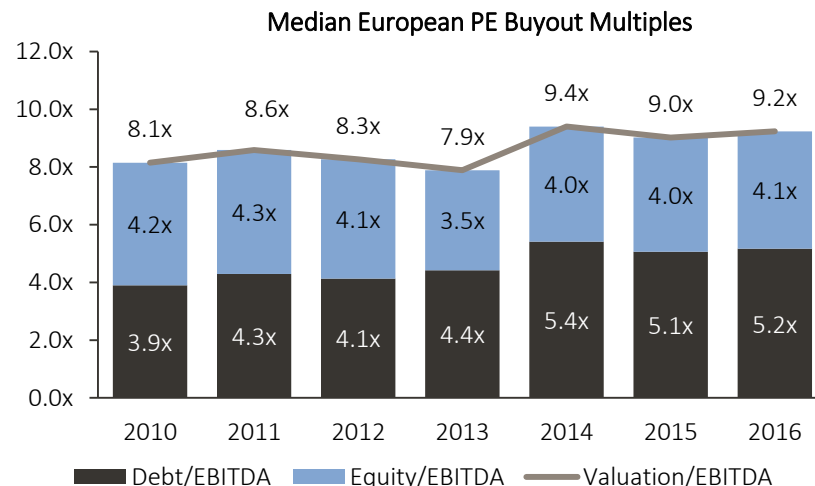
General Partner	Strategy	Status	Fund Size
CVC VII	Buyout	Closed / Oversubscribed	€ 16.40 billion
GTCR XII	Special Situations	In-process / Oversubscribed	\$ 5.25 billion
Charlesbank Equity Fund IX	Buyout	In-process / Oversubscribed	\$ 2.75 billion
Vitruvian Investment Partnership III	Buyout	Closed / Oversubscribed	€ 2.27 billion
Chequers Capital XVII	Buyout	Closed / Oversubscribed	€ 1.01 billion

Private Equity Investment Environment

While fundraising remains robust, current conditions favor sellers over buyers



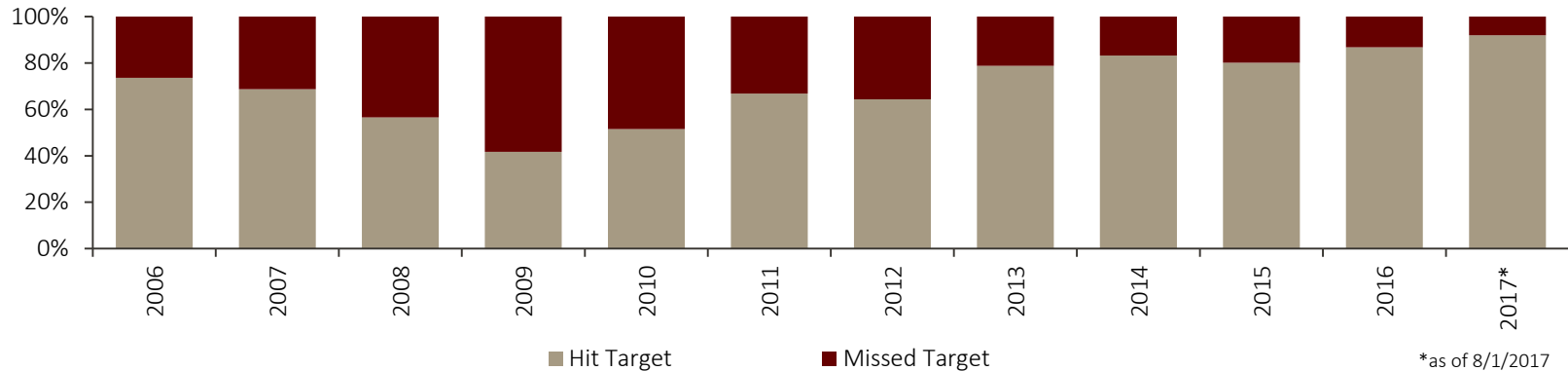
- Increased purchase price multiples
- Recent Debt/EBITDA ranges from ~ 5.0 – 5.5X
- Equity contribution increasing



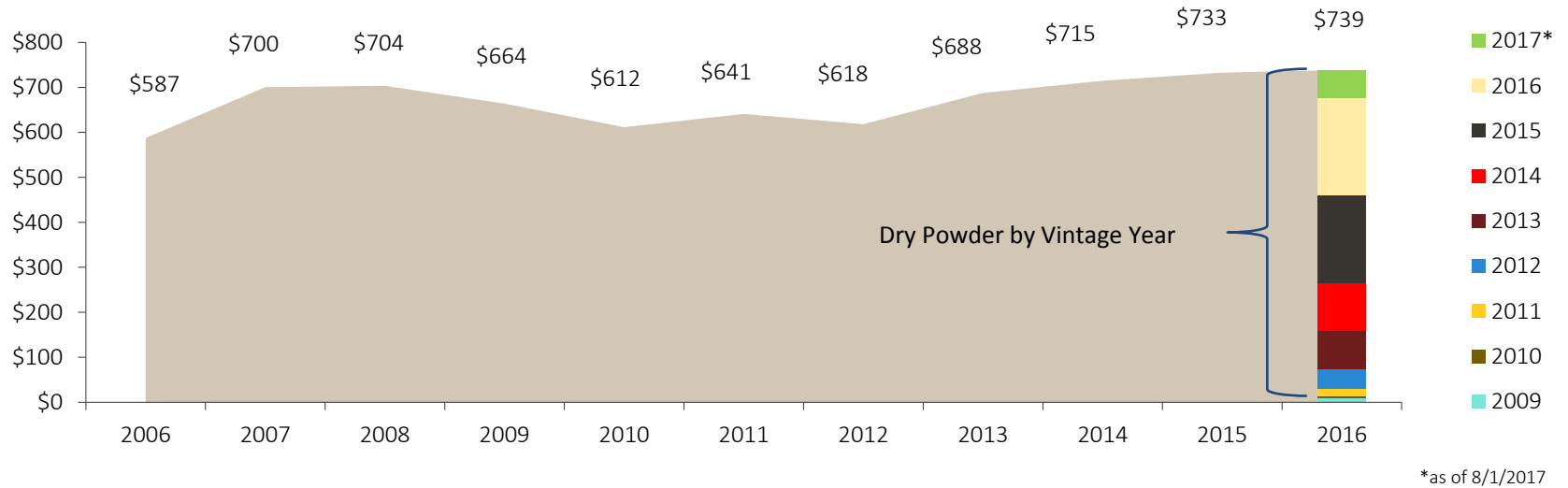
- Stable purchase price multiples since 2014, but slightly below U.S.
- Recent Debt/EBITDA ranges from ~ 5.0 – 5.5X

Private Equity: Dry Powder Mountain

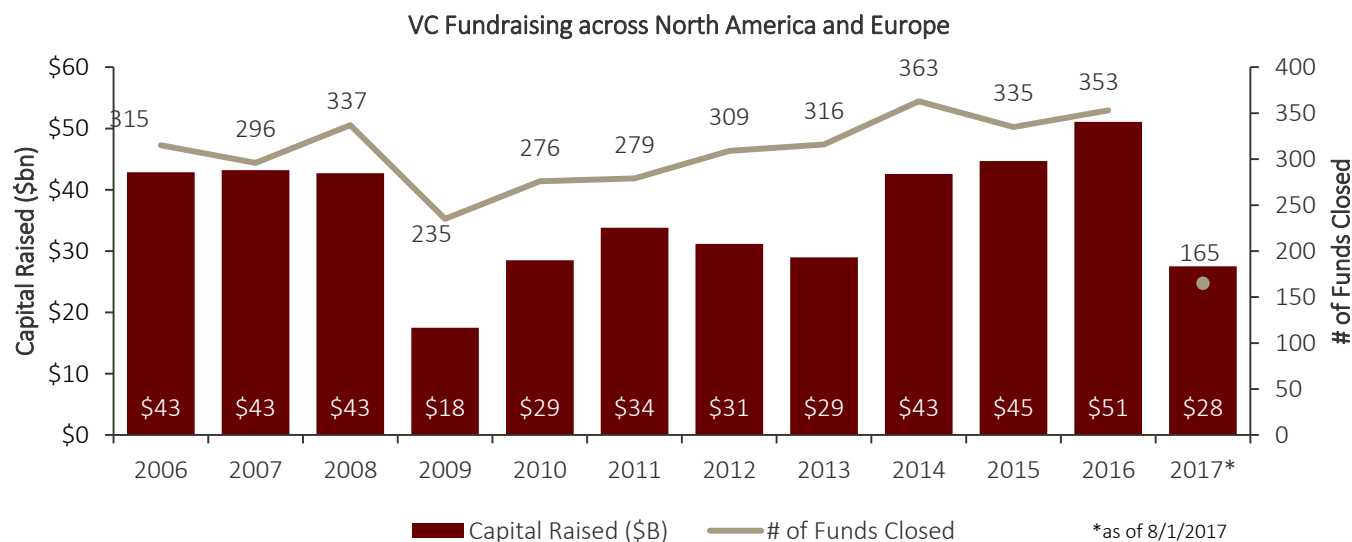
No. of PE Funds that Hit v. Miss Fundraising Target



Cumulative PE Capital Overhang (\$bn) by Year



Venture Capital Fundraising Environment



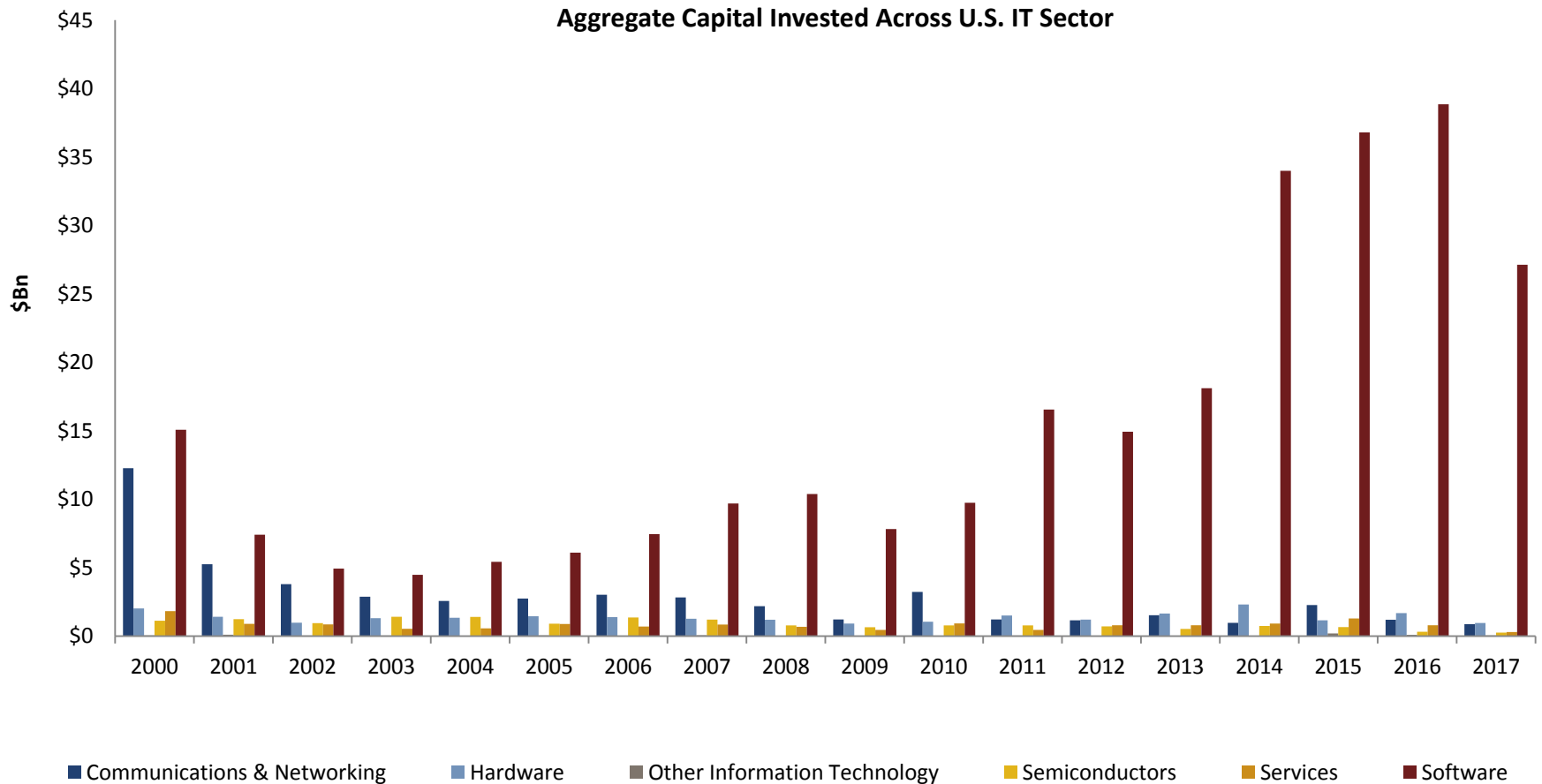
- 2017 is predicted to be a record-setting year – set to approach or surpass 2016's \$51bn aggregate fundraise

High quality funds of **all sizes** remain in demand

General Partner	Strategy	Status	Fund Size
NEA 16	Venture Capital – Multi-Stage	Closed / Oversubscribed	\$3.3 billion
Spectrum Equity Investors VIII	Venture Capital / Growth Equity	In-process / Oversubscribed	\$1.25 billion
Canaan XI	Venture Capital - Early Stage	Closed / Oversubscribed	\$800 million
Oak HC/FT II	Venture Capital	Closed / Oversubscribed	\$500 million
Charles River Partnership XVII	Venture Capital - Early Stage	Closed / Oversubscribed	\$450 million

U.S. Venture Capital Investment Activity

Software continues to attract a majority of the VC dollars invested in Information Technology



*As of 6/30/2017

Market and Client Portfolio Summary

Robust Fundraising Environment for PE and VC/GE Funds

- “Best” funds of all sizes are in high demand by limited partners
- Dry powder builds...

High Purchase Price Multiples/Entry Valuations

- Sellers’ market for Growth Equity, Buyout and Special Situations leading to more exits/distributions
- Strong Venture Capital returns mostly reflect unrealized value appreciation
 - Increasing number of Unicorns, but...
 - Weak VC-backed IPO market for technology companies... mixed IPO performance of Unicorn Class of 2017

Intense focus on maintaining ARMB’s steady commitment pace despite increasing distributions

- Distributions on pace to exceed \$200mm in 2017, and should exceed capital calls
- Seek to complete additional commitments towards \$210 million target
- Closely monitor portfolio exposure to Venture Capital & Growth Equity relative to Buyouts and Special Situations
- Position ARMB portfolio for the next cycle...not if, but when

Appendix

Statement of Current Investments

As of 8/31/2017

Venture Capital and Growth Equity Funds	Vintage Year	Total Commitment	Amount Paid-In	Total Distributions	Latest Valuation	Total Value	TVPI
ABS Capital Partners VII	2012	\$9,000,000	\$8,193,719	\$0	\$10,674,882	\$10,674,882	1.30
Alta Partners VIII	2006	\$4,000,000	\$4,000,000	\$6,652,202	\$1,787,986	\$8,440,188	2.11
Atlas Venture Fund VI	2001	\$6,200,000	\$6,200,000	\$4,047,858	\$2,084,569	\$6,132,427	0.99
Atlas Venture Fund VII	2006	\$9,000,000	\$9,000,000	\$10,313,417	\$4,054,781	\$14,368,198	1.60
Austin Ventures IX	2006	\$6,000,000	\$5,942,535	\$6,450,029	\$1,708,242	\$8,158,271	1.37
Austin Ventures VII	1999	\$8,000,000	\$8,000,000	\$6,370,742	\$78,957	\$6,449,699	0.81
Austin Ventures VIII	2001	\$5,533,333	\$5,533,333	\$8,911,770	\$275,070	\$9,186,840	1.66
Battery Ventures IX	2011	\$2,700,000	\$2,601,765	\$2,423,456	\$3,831,113	\$6,254,569	2.40
Battery Ventures VII	2005	\$800,000	\$800,000	\$1,426,333	\$13,763	\$1,440,096	1.80
Battery Ventures VIII	2007	\$2,300,000	\$2,300,000	\$4,080,815	\$1,542,844	\$5,623,659	2.45
Battery Ventures VIII Side Fund	2008	\$920,000	\$864,800	\$2,220,543	\$206,243	\$2,426,786	2.81
Battery Ventures X	2013	\$4,050,000	\$3,268,348	\$322,754	\$3,541,654	\$3,864,408	1.18
Battery Ventures X Side Fund	2013	\$1,600,000	\$1,460,000	\$491,520	\$1,729,899	\$2,221,419	1.52
Battery Ventures XI	2016	\$10,600,000	\$5,368,900	\$0	\$5,248,839	\$5,248,839	0.98
Battery Ventures XI Side Fund	2016	\$5,000,000	\$2,632,500	\$0	\$2,697,029	\$2,697,029	1.02
Canaan IX	2012	\$9,000,000	\$8,010,000	\$6,042,380	\$9,606,529	\$15,648,909	1.95
Canaan VII	2005	\$8,000,000	\$8,000,000	\$16,539,582	\$3,084,779	\$19,624,361	2.45
Canaan VIII	2007	\$8,000,000	\$7,840,000	\$8,296,760	\$3,508,385	\$11,805,145	1.51

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Statement of Current Investments

As of 8/31/2017

Venture Capital and Growth Equity Funds	Vintage Year	Total Commitment	Amount Paid-In	Total Distributions	Latest Valuation	Total Value	TVPI
Canaan X	2015	\$20,500,000	\$13,120,000	\$912,031	\$12,820,369	\$13,732,400	1.05
Canaan XI	2017	\$20,262,500	\$0	\$0	\$0	\$0	0.00
ChrysCapital VI	2012	\$5,000,000	\$4,850,196	\$1,625,196	\$5,726,576	\$7,351,772	1.52
CRV Growth I	2017	\$7,775,000	\$0	\$0	\$0	\$0	0.00
CRV XVII	2017	\$5,200,000	\$0	\$0	\$0	\$0	0.00
El Dorado Ventures VI	2000	\$10,000,000	\$8,480,000	\$7,222,531	\$141,356	\$7,363,887	0.87
El Dorado Ventures VII	2005	\$10,000,000	\$9,700,000	\$5,231,328	\$6,934,470	\$12,165,798	1.25
GGV Capital VI	2016	\$4,950,000	\$1,584,000	\$0	\$1,584,000	\$1,584,000	1.00
GGV Capital VI Plus	2017	\$1,650,000	\$0	\$0	\$0	\$0	0.00
Insight Venture Partners IX	2015	\$12,500,000	\$8,937,500	\$334,992	\$10,324,482	\$10,659,474	1.19
InterWest Partners IX	2005	\$9,000,000	\$9,000,000	\$9,145,554	\$3,100,660	\$12,246,215	1.36
InterWest Partners VIII	2000	\$7,500,000	\$7,500,000	\$3,886,123	\$1,198,094	\$5,084,217	0.68
JMI Equity Fund V	2005	\$3,900,000	\$3,900,898	\$19,932,767	\$791,851	\$20,724,618	5.31
JMI Equity Fund VI	2007	\$6,800,000	\$6,800,526	\$11,228,962	\$420,367	\$11,649,329	1.71
JMI Equity Fund VII	2011	\$6,500,000	\$6,357,000	\$3,121,875	\$5,827,922	\$8,949,797	1.41
JMI Equity Fund VIII	2015	\$20,100,000	\$9,607,800	\$0	\$9,828,218	\$9,828,218	1.02
Lightspeed Venture Partners Select	2014	\$3,300,000	\$2,904,000	\$3,490	\$3,287,104	\$3,290,593	1.13
Lightspeed Venture Partners Select II	2016	\$5,200,000	\$2,392,000	\$0	\$2,401,880	\$2,401,880	1.00

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Venture Capital and Growth Equity Funds	Vintage Year	Total Commitment	Amount Paid-In	Total Distributions	Latest Valuation	Total Value	TVPI
Lightspeed Venture Partners X	2014	\$3,300,000	\$2,541,000	\$0	\$2,489,665	\$2,489,665	0.98
Lightspeed Venture Partners XI	2016	\$5,200,000	\$1,820,000	\$0	\$1,758,801	\$1,758,801	0.97
LLR Equity Partners IV	2014	\$10,000,000	\$8,200,000	\$2,436,524	\$8,955,947	\$11,392,471	1.39
Longitude Venture Partners III	2016	\$11,725,000	\$959,321	\$0	\$725,173	\$725,173	0.76
M/C Venture Partners V	2000	\$10,000,000	\$9,946,344	\$15,991,897	\$171,645	\$16,163,542	1.63
M/C Venture Partners VI	2006	\$9,000,000	\$8,906,695	\$18,763,142	\$309,498	\$19,072,640	2.14
M/C Venture Partners VII	2014	\$10,000,000	\$6,912,287	\$0	\$7,885,063	\$7,885,063	1.14
Mayfield XI	2000	\$9,000,000	\$7,740,000	\$3,930,280	\$1,302,339	\$5,232,618	0.68
Morgan Stanley Dean Witter Venture Partners IV	1999	\$4,500,000	\$4,501,306	\$3,576,746	\$109,432	\$3,686,178	0.82
Morgenthaler Partners VII	2001	\$12,000,000	\$12,000,000	\$9,796,814	\$700,825	\$10,497,639	0.87
New Enterprise Associates 10	2000	\$10,000,000	\$10,013,479	\$9,283,891	\$3,374,954	\$12,658,845	1.26
New Enterprise Associates 11	2004	\$12,000,000	\$12,000,000	\$26,007,752	\$3,162,999	\$29,170,751	2.43
New Enterprise Associates 12	2006	\$17,000,000	\$16,745,000	\$19,315,443	\$5,057,292	\$24,372,735	1.46
New Enterprise Associates 13	2009	\$11,000,000	\$10,615,000	\$7,852,297	\$14,334,103	\$22,186,400	2.09
New Enterprise Associates 14	2012	\$20,000,000	\$18,800,000	\$2,109,888	\$29,240,030	\$31,349,918	1.67
New Enterprise Associates 15	2015	\$23,500,000	\$15,980,000	\$0	\$20,006,411	\$20,006,411	1.25
New Enterprise Associates 16	2017	\$20,000,000	\$1,400,000	\$0	\$1,353,335	\$1,353,335	0.97
New Enterprise Associates 9	1999	\$11,000,000	\$10,798,353	\$3,765,144	\$1,062,398	\$4,827,542	0.45

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Venture Capital and Growth Equity Funds	Vintage Year	Total Commitment	Amount Paid-In ¹	Total Distributions	Latest Valuation	Total Value	TVPI
New Enterprise Associates VIII	1998	\$13,000,000	\$13,031,307	\$20,290,412	\$1,220,083	\$21,510,495	1.65
Oak HC/FT Partners	2014	\$25,000,000	\$17,740,399	\$1,356,152	\$20,562,543	\$21,918,695	1.24
Oak HC/FT Partners II	2017	\$20,000,000	\$0	\$0	\$0	\$0	0.00
Oak Investment Partners IX	1999	\$10,000,000	\$10,000,000	\$6,341,444	\$233,570	\$6,575,014	0.66
Oak Investment Partners X	2001	\$15,000,000	\$15,000,000	\$15,280,977	\$2,960,605	\$18,241,583	1.22
Oak Investment Partners XI	2004	\$15,000,000	\$15,000,000	\$8,955,156	\$3,803,874	\$12,759,030	0.85
Oak Investment Partners XII	2006	\$12,000,000	\$12,000,000	\$8,465,364	\$3,788,168	\$12,253,532	1.02
Oak Investment Partners XIII	2010	\$11,500,000	\$11,500,000	\$1,302,957	\$10,145,962	\$11,448,919	1.00
Sofinnova Venture Partners IX	2014	\$8,000,000	\$4,960,000	\$634,076	\$4,989,839	\$5,623,915	1.13
Sofinnova Venture Partners X	2017	\$25,000,000	\$0	\$0	\$0	\$0	0.00
Spectrum Equity Investors VII	2014	\$25,000,000	\$20,937,500	\$1,473,759	\$22,849,086	\$24,322,845	1.16
Summit Partners Growth Equity Fund VIII	2012	\$20,000,000	\$21,305,094	\$11,913,838	\$21,274,659	\$33,188,497	1.56
Summit Partners Private Equity Fund VII-A	2006	\$17,500,000	\$17,500,000	\$25,420,421	\$9,195,060	\$34,615,481	1.98
Summit Partners Venture Capital Fund III-A	2012	\$9,500,000	\$10,763,500	\$5,284,650	\$11,339,529	\$16,624,179	1.54
Summit Ventures VI-B	2001	\$10,000,000	\$10,000,000	\$21,132,171	\$396,909	\$21,529,080	2.15
TA X	2006	\$15,000,000	\$14,475,000	\$18,487,500	\$536,891	\$19,024,391	1.31
TA XI	2010	\$20,000,000	\$19,650,000	\$20,071,119	\$16,814,655	\$36,885,774	1.88
TA XII	2016	\$11,750,000	\$4,053,750	\$528,750	\$3,988,890	\$4,517,640	1.11

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Venture Capital and Growth Equity Funds	Vintage Year	Total Commitment	Amount Paid-In	Total Distributions	Latest Valuation	Total Value	TVPI	IRR
Thomas, McNerney & Partners II	2006	\$6,500,000	\$6,256,250	\$12,390,912	\$1,899,048	\$14,289,959	2.28	
Trident Capital Fund-V	2000	\$7,058,666	\$7,015,865	\$10,606,079	\$1,166,911	\$11,772,990	1.68	
Trident Capital Fund-VI	2005	\$10,000,000	\$10,000,000	\$5,434,253	\$6,823,697	\$12,257,950	1.23	
Trident Capital Fund-VII	2010	\$6,500,000	\$6,123,713	\$5,484,544	\$3,649,473	\$9,134,017	1.49	
U.S. Venture Partners VII	2000	\$7,791,667	\$7,791,667	\$2,720,207	\$554,095	\$3,274,302	0.42	
U.S. Venture Partners VIII	2001	\$7,500,000	\$7,380,000	\$8,918,552	\$381,757	\$9,300,309	1.26	
U.S. Venture Partners X	2008	\$9,100,000	\$8,543,080	\$5,264,642	\$9,114,680	\$14,379,322	1.68	
Weston Presidio V	2005	\$6,500,000	\$6,457,436	\$13,532,730	\$1,108,547	\$14,641,277	2.27	
Total Venture Capital and Growth Equity Funds		\$814,266,166	\$622,513,165	\$501,355,494	\$380,861,352	\$882,216,846	1.42	6.91%

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Statement of Current Investments

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Buyout and Special Situations Funds	Vintage Year	Total Commitment	Amount Paid-In	Total Distributions	Latest Valuation	Total Value	TVPI
ABRY Partners VII	2011	\$3,000,000	\$3,059,583	\$3,309,911	\$1,919,506	\$5,229,417	1.71
ABRY Partners VIII	2015	\$10,500,000	\$8,090,676	\$161,631	\$8,295,165	\$8,456,796	1.05
ABRY Senior Equity III	2010	\$4,500,000	\$4,516,983	\$6,784,797	\$290,664	\$7,075,461	1.57
ABRY Senior Equity IV	2012	\$5,000,000	\$4,924,761	\$1,835,117	\$4,520,364	\$6,355,481	1.29
ABRY Senior Equity V	2016	\$10,550,000	\$795,393	\$9,189	\$743,367	\$752,556	0.95
Advent International GPE V-D	2005	\$15,955,246	\$15,219,276	\$35,866,224	\$1,283,734	\$37,149,957	2.44
Advent International GPE VI-A	2008	\$17,000,000	\$17,000,000	\$26,763,869	\$9,113,135	\$35,877,004	2.11
Advent International GPE VII-B	2012	\$20,000,000	\$18,000,000	\$7,600,018	\$21,608,256	\$29,208,274	1.62
Advent International GPE VIII-B	2016	\$25,000,000	\$7,787,500	\$0	\$8,145,881	\$8,145,881	1.05
AEA Investors Fund VI	2016	\$15,250,000	\$4,894,451	\$0	\$4,684,714	\$4,684,714	0.96
Apollo Investment Fund IV	1998	\$10,000,000	\$10,157,001	\$16,820,651	\$16,464	\$16,837,115	1.66
Archer Capital Fund 5	2012	\$2,629,660	\$2,025,561	\$521,901	\$1,793,809	\$2,315,710	1.14
BCI Growth V	1999	\$10,000,000	\$9,477,376	\$4,119,485	\$171,254	\$4,290,739	0.45
Berkshire Fund IX	2016	\$17,500,000	\$2,074,418	\$0	\$1,829,729	\$1,829,729	0.88
Berkshire Fund VIII	2011	\$6,500,000	\$6,328,878	\$1,310,073	\$6,474,236	\$7,784,309	1.23
Blackstone Capital Partners IV	2003	\$15,000,000	\$17,261,321	\$40,329,332	\$1,660,110	\$41,989,441	2.43
Blackstone Communications Partners I	2000	\$10,000,000	\$8,915,132	\$12,707,489	\$59,203	\$12,766,692	1.43
Candover 2008 Fund	2008	\$2,097,858	\$2,056,907	\$40,525	\$41,326	\$81,851	0.04

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Buyout and Special Situations Funds	Vintage Year	Total Commitment	Amount Paid-In ¹	Total Distributions	Latest Valuation	Total Value	TVPI
Cinven Fifth Fund	2012	\$17,254,501	\$17,577,857	\$10,401,684	\$14,243,504	\$24,645,188	1.40
Cinven Fourth Fund	2006	\$11,546,644	\$11,694,823	\$15,338,138	\$1,241,885	\$16,580,023	1.42
Cinven Third Fund	2001	\$34,481,610	\$37,149,604	\$75,573,692	\$195,675	\$75,769,368	2.04
Clayton, Dubilier & Rice Fund X	2017	\$10,000,000	\$0	\$0	\$0	\$0	0.00
CVC Capital Partners VI	2014	\$17,894,487	\$9,949,568	\$860,731	\$11,631,780	\$12,492,511	1.26
CVC Capital Partners VII	2017	\$21,893,752	\$0	\$0	\$0	\$0	0.00
CVC European Equity Partners III	2001	\$15,000,000	\$14,914,184	\$41,620,280	\$1,018,643	\$42,638,923	2.86
CVC European Equity Partners IV	2005	\$25,938,802	\$23,144,655	\$45,764,323	\$758,693	\$46,523,016	2.01
CVC European Equity Partners V	2008	\$16,916,589	\$16,716,399	\$21,481,329	\$7,961,315	\$29,442,644	1.76
ECI 8	2005	\$9,310,723	\$9,181,512	\$4,934,271	\$1,295,075	\$6,229,347	0.68
ECI 9	2009	\$10,518,960	\$9,743,696	\$15,012,630	\$2,480,620	\$17,493,249	1.80
EIF United States Power Fund IV	2011	\$7,000,000	\$7,542,453	\$2,151,930	\$7,206,049	\$9,357,979	1.24
EnCap Energy Capital Fund IX	2013	\$16,000,000	\$16,396,347	\$10,176,042	\$11,089,204	\$21,265,247	1.30
EnCap Energy Capital Fund VIII	2010	\$3,500,000	\$3,618,519	\$1,770,001	\$1,549,440	\$3,319,440	0.92
EnCap Energy Capital Fund VIII Co-Investors	2011	\$900,000	\$904,350	\$167,651	\$855,127	\$1,022,778	1.13
EnCap Energy Capital Fund X	2015	\$23,500,000	\$13,501,395	\$3,275,971	\$11,783,991	\$15,059,962	1.12
Energy Spectrum Partners VI	2010	\$7,000,000	\$5,781,657	\$3,799,753	\$2,322,348	\$6,122,101	1.06
Energy Spectrum Partners VII	2014	\$15,000,000	\$6,120,628	\$0	\$5,645,588	\$5,645,588	0.92

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Buyout and Special Situations Funds	Vintage Year	Total Commitment	Amount Paid-In ¹	Total Distributions	Latest Valuation	Total Value	TVPI
Eos Capital Partners IV	2007	\$5,000,000	\$5,031,673	\$4,011,377	\$3,740,475	\$7,751,852	1.54
EQT IV	2004	\$10,690,566	\$12,048,131	\$25,307,046	\$23,256	\$25,330,303	2.10
EQT V	2006	\$12,009,440	\$13,751,025	\$17,700,046	\$1,491,680	\$19,191,727	1.40
First Reserve Fund X	2004	\$10,000,000	\$10,000,000	\$18,242,898	\$42,535	\$18,285,433	1.83
First Reserve Fund XI	2006	\$15,000,000	\$15,918,142	\$9,374,794	\$1,089,786	\$10,464,580	0.66
First Reserve Fund XII	2008	\$20,000,000	\$21,468,904	\$9,452,771	\$5,598,936	\$15,051,707	0.70
Flexpoint Fund III	2016	\$7,000,000	\$1,893,953	\$0	\$1,636,791	\$1,636,791	0.86
Flexpoint Special Assets Fund	2016	\$2,400,000	\$459,320	\$133,917	\$357,846	\$491,763	1.07
Gilde Buyout Fund V	2016	\$24,732,976	\$6,035,771	\$0	\$5,444,979	\$5,444,979	0.90
Great Hill Equity Partners V	2014	\$10,000,000	\$9,255,000	\$1,330,000	\$9,262,108	\$10,592,108	1.14
Great Hill Equity Partners VI	2017	\$20,000,000	\$0	\$0	-\$48,800	-\$48,800	0.00
Green Equity Investors V	2007	\$10,000,000	\$10,186,838	\$14,282,737	\$6,247,273	\$20,530,010	2.02
Green Equity Investors VI	2012	\$20,000,000	\$21,294,249	\$6,648,014	\$21,057,543	\$27,705,557	1.30
GTCR Fund IX	2006	\$10,000,000	\$9,521,991	\$15,885,906	\$864,100	\$16,750,006	1.76
GTCR Fund VIII	2003	\$10,000,000	\$9,252,480	\$15,289,511	\$725,034	\$16,014,545	1.73
GTCR Fund X	2011	\$20,000,000	\$18,649,721	\$23,875,797	\$14,238,239	\$38,114,036	2.04
GTCR Fund XI	2014	\$20,000,000	\$15,850,000	\$2,953,632	\$16,076,375	\$19,030,007	1.20
Halifax Capital Partners IV	2017	\$9,150,000	\$0	\$0	\$0	\$0	0.00

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Harvest Partners VI	2011	\$10,000,000	\$9,924,199	\$8,453,104	\$8,298,187	\$16,751,291	1.69
Harvest Partners VII	2016	\$21,000,000	\$6,405,533	\$0	\$5,743,001	\$5,743,001	0.90
Hellman & Friedman Capital Partners VII	2011	\$10,000,000	\$9,482,824	\$4,951,813	\$13,862,280	\$18,814,093	1.98
Hellman & Friedman Capital Partners VIII	2016	\$21,000,000	\$5,748,987	\$360,123	\$5,370,314	\$5,730,437	1.00
Insight Venture Partners X	2017	\$10,000,000	\$0	\$0	\$0	\$0	0.00
JZI Fund III	2015	\$7,478,106	\$2,934,422	\$152,180	\$3,201,794	\$3,353,973	1.14
Kelso Investment Associates VII	2004	\$25,000,000	\$25,280,105	\$40,531,315	\$607,482	\$41,138,797	1.63
Kelso Investment Associates VIII	2007	\$20,000,000	\$19,058,274	\$13,319,728	\$9,774,263	\$23,093,991	1.21
KKR 2006 Fund	2006	\$10,000,000	\$10,689,498	\$12,432,373	\$4,482,090	\$16,914,463	1.58
Livingbridge 5	2012	\$8,954,555	\$7,955,653	\$3,145,005	\$6,679,482	\$9,824,487	1.23
Livingbridge 6	2016	\$17,378,002	\$1,834,668	\$0	\$1,643,331	\$1,643,331	0.90
Madison Dearborn Capital Partners IV	2000	\$13,000,000	\$13,090,656	\$24,233,807	\$1,241,433	\$25,475,240	1.95
Madison Dearborn Capital Partners V	2006	\$15,000,000	\$14,050,262	\$19,358,390	\$3,054,159	\$22,412,549	1.60
Madison Dearborn Capital Partners VI	2008	\$20,000,000	\$20,015,187	\$29,499,722	\$7,867,784	\$37,367,506	1.87
Madison Dearborn Capital Partners VII	2016	\$25,000,000	\$6,280,263	\$256,746	\$5,915,270	\$6,172,016	0.98
Montagu IV	2011	\$9,609,728	\$9,619,638	\$5,783,506	\$7,570,683	\$13,354,189	1.39
Oak Hill Capital Partners	1999	\$10,000,000	\$10,122,564	\$18,176,070	\$35,371	\$18,211,441	1.80
Oak Hill Capital Partners II	2004	\$25,000,000	\$27,301,467	\$39,515,220	\$1,637,677	\$41,152,897	1.51

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Oak Hill Capital Partners III	2007	\$20,000,000	\$22,366,486	\$22,732,858	\$12,861,217	\$35,594,075	1.59
Parthenon Investors V	2016	\$9,250,000	\$500,696	\$0	\$400,663	\$400,663	0.80
Sentinel Capital Partners V	2014	\$3,300,000	\$2,033,407	\$170,555	\$2,397,533	\$2,568,088	1.26
Spectrum Equity Investors V	2006	\$15,000,000	\$14,062,500	\$31,442,506	\$1,173,140	\$32,615,646	2.32
Spectrum Equity Investors VI	2010	\$7,500,000	\$6,881,250	\$8,810,566	\$4,772,303	\$13,582,869	1.97
Sterling Group Partners IV	2016	\$11,750,000	\$4,066,265	\$146,478	\$3,642,818	\$3,789,296	0.93
Summit Partners Subordinated Debt Fund IV-A	2009	\$8,000,000	\$8,501,554	\$7,976,741	\$3,207,130	\$11,183,871	1.32
TA Subordinated Debt Fund III	2010	\$5,000,000	\$4,875,000	\$4,575,000	\$2,545,595	\$7,120,595	1.46
The Resolute Fund	2002	\$20,000,000	\$19,512,447	\$48,695,171	\$35,204	\$48,730,375	2.50
The Resolute Fund II	2007	\$20,000,000	\$18,935,892	\$17,050,183	\$10,967,272	\$28,017,455	1.48
The Resolute Fund III	2013	\$20,000,000	\$11,099,999	\$5,550,008	\$9,080,629	\$14,630,637	1.32
Thomas H. Lee Equity Fund VI	2006	\$10,000,000	\$10,799,614	\$10,836,349	\$6,381,940	\$17,218,289	1.59
Trident V (Stone Point)	2010	\$15,000,000	\$17,016,429	\$9,228,497	\$15,321,477	\$24,549,974	1.44
Trident VI (Stone Point)	2014	\$20,000,000	\$15,054,245	\$2,446,675	\$15,926,939	\$18,373,613	1.22
Vestar Capital Partners IV	1999	\$7,813,277	\$7,789,673	\$13,752,875	\$108,307	\$13,861,182	1.78
Vestar Capital Partners V	2005	\$12,000,000	\$12,001,336	\$12,967,710	\$3,228,875	\$16,196,585	1.35
Vitruvian Investment Partners II	2013	\$9,036,781	\$7,221,626	\$300,213	\$8,574,979	\$8,875,193	1.23
Vitruvian Investment Partnership III	2017	\$9,503,201	\$0	\$0	\$0	\$0	0.00

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Warburg Pincus China	2016	\$17,875,000	\$3,289,000	\$0	\$3,099,976	\$3,099,976	0.94	
Warburg Pincus Energy	2014	\$25,000,000	\$12,325,000	\$989,077	\$11,081,180	\$12,070,257	0.98	
Warburg Pincus Private Equity VIII	2001	\$20,000,000	\$20,069,361	\$43,902,208	\$2,553,943	\$46,456,151	2.31	
Warburg Pincus Private Equity X	2007	\$20,000,000	\$20,000,000	\$20,961,640	\$9,313,339	\$30,274,979	1.51	
Warburg Pincus Private Equity XI	2012	\$20,000,000	\$18,830,000	\$6,276,380	\$19,559,008	\$25,835,388	1.37	
Warburg, Pincus Equity Partners	1998	\$25,000,000	\$25,000,000	\$41,228,630	\$142,048	\$41,370,678	1.65	
Welsh, Carson, Anderson & Stowe X	2005	\$15,000,000	\$14,786,770	\$24,162,991	\$918,036	\$25,081,027	1.70	
Welsh, Carson, Anderson & Stowe XI	2009	\$20,000,000	\$19,849,052	\$17,518,269	\$13,798,448	\$31,316,717	1.58	
Total Buyouts and Special Situations		\$1,364,570,464	\$1,043,801,860	\$1,146,887,763	\$489,854,611	\$1,636,742,375	1.57	13.26%

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Statement of Current Investments

As of 8/31/2017

Venture Capital and Growth Equity Secondary Transactions	Vintage Year	Invested Capital	Amount Paid-In	Total Distributions	Latest Valuation	Total Value	TVPI	IRR
Austin Ventures VIII	2001	\$21,945	\$21,945	\$217,433	\$96,443	\$313,876	14.30	
M/C Venture Partners V	2000	\$2,705,634	\$2,691,457	\$3,097,975	\$45,354	\$3,143,329	1.17	
Morgenthaler Partners VII	2001	\$690,962	\$690,961	\$627,874	\$45,458	\$673,332	0.97	
Oak Investment Partners IX - Project Oak 2003	1999	\$322,387	\$322,387	\$630,459	\$25,836	\$656,295	2.04	
Oak Investment Partners X	2001	\$311,998	\$311,999	\$416,921	\$78,539	\$495,460	1.59	
Oak Investment Partners X - Project Oak 2003	2001	\$701,390	\$701,390	\$997,701	\$202,775	\$1,200,476	1.71	
Oak Investment Partners XII	2006	\$571,266	\$571,266	\$570,760	\$270,862	\$841,622	1.47	
Oak Investment Partners XII	2006	\$3,207,162	\$3,207,162	\$2,748,781	\$1,578,123	\$4,326,904	1.35	
Pelion Ventures V-A - Project Salt II	2012	\$1,742,550	\$1,549,739	\$0	\$1,601,303	\$1,601,303	1.03	
Summit Partners Private Equity Fund VII-A	2006	\$2,245,401	\$2,245,401	\$3,569,603	\$1,518,320	\$5,087,923	2.27	
TA X	2006	\$364,663	\$336,027	\$578,864	\$29,283	\$608,147	1.81	
U.S. Venture Partners VII	2000	\$245,954	\$245,954	\$560,011	\$187,214	\$747,225	3.04	
U.S. Venture Partners VIII	2001	\$903,065	\$840,138	\$3,605,125	\$200,175	\$3,805,300	4.53	
UV Partners IV-A - Project Salt II	2007	\$2,838,955	\$2,838,955	\$82,416	\$3,294,024	\$3,376,440	1.19	
Total Venture Capital and Growth Equity Secondary Transactions		\$16,873,332	\$16,574,781	\$17,703,923	\$9,173,709	\$26,877,633	1.62	17.09%

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Statement of Current Investments

As of 8/31/2017

Buyouts and Special Secondary Transactions	Vintage Year	Invested Capital	Amount Paid-In	Total Distributions	Latest Valuation	Total Value	TVPI	IRR
Advent International GPE V-B	2005	\$2,518,680	\$2,314,068	\$2,962,087	\$234,312	\$3,196,399	1.38	
The Resolute Fund	2002	\$3,366,380	\$3,101,622	\$5,544,681	\$9,113	\$5,553,794	1.79	
Trident V (Stone Point)	2010	\$964,831	\$952,699	\$357,364	\$904,298	\$1,261,662	1.32	
Total Buyouts and Special Situations Secondary Transactions		\$6,849,891	\$6,368,389	\$8,864,132	\$1,147,723	\$10,011,855	1.57	28.48%

	Total Commitments	Amount Paid-In	Total Distributions	Latest Valuation	Total Value	TVPI	IRR
Total Current Portfolio Funds	\$2,202,559,852	\$1,689,258,196	\$1,674,811,313	\$881,037,396	\$2,555,848,709	1.51	10.40%

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Statement of Liquidated Investments

As of 8/31/2017

Liquidated Venture Capital and Growth Equity Portfolio Funds	Vintage Year	Total Commitment	Amount Paid-In	Total Distributions	Total Value	TVPI	IRR
Austin Ventures VI	1998	\$5,000,000	\$5,199,527	\$3,251,358	\$3,251,358	0.63	
CCEP II (QP) - Riviera	1999	\$157,550	\$157,550	\$4,025	\$4,025	0.03	
Columbia Capital Equity Partners II	1999	\$5,842,450	\$5,839,926	\$4,742,274	\$4,742,274	0.81	
El Dorado Ventures V	1999	\$5,000,000	\$5,000,000	\$2,827,439	\$2,827,439	0.57	
M/C Venture Partners IV	1999	\$7,500,000	\$6,937,500	\$5,202,148	\$5,202,148	0.75	
Mayfield X	1999	\$2,300,000	\$2,300,000	\$489,547	\$489,547	0.21	
Mayfield X Annex	2002	\$338,553	\$220,059	\$244,574	\$244,574	1.11	
Morgenthaler Partners VI	2000	\$6,000,000	\$6,000,000	\$3,394,860	\$3,394,860	0.57	
Oak Investment Partners VIII	1998	\$8,000,000	\$8,000,000	\$14,404,680	\$14,404,680	1.80	
TA IX	2000	\$20,000,000	\$19,400,000	\$47,009,636	\$47,009,636	2.42	
U.S. Venture Partners VI	1999	\$5,000,000	\$5,000,000	\$6,148,071	\$6,148,071	1.23	
Total Liquidated Venture Capital and Growth Equity Portfolio Funds		\$65,138,553	\$64,054,563	\$87,718,612	\$87,718,612	1.37	6.94%

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Statement of Liquidated Investments

As of 8/31/2017

Liquidated Buyouts and Special Situations Portfolio Funds	Vintage Year	Total Commitment	Amount Paid-In	Total Distributions	Total Value	TVPI
Alta Communications VII	1998	\$12,000,000	\$12,000,000	\$11,485,347	\$11,485,347	0.96
Alta Communications VIII	2000	\$15,000,000	\$14,700,000	\$10,218,445	\$10,218,445	0.70
Candover 2005 Fund	2005	\$10,978,193	\$11,135,479	\$4,918,864	\$4,918,864	0.44
Cinven Second Fund	1998	\$18,344,198	\$17,796,052	\$28,715,724	\$28,715,724	1.61
CVC European Equity Partners II	1998	\$10,000,000	\$9,216,773	\$22,085,451	\$22,085,451	2.40
First Reserve Fund IX	2001	\$15,000,000	\$15,000,000	\$44,971,370	\$44,971,370	3.00
First Reserve Fund VIII	1998	\$20,000,000	\$20,019,582	\$39,941,067	\$39,941,067	2.00
GTCR Fund VI	1998	\$25,000,000	\$25,000,000	\$22,226,969	\$22,226,969	0.89
GTCR Fund VII	2000	\$15,000,000	\$14,889,743	\$35,069,817	\$35,069,817	2.36
GTCR Fund VIIA	2001	\$5,000,000	\$3,312,500	\$9,250,772	\$9,250,772	2.79
Kelso Investment Associates VI	1998	\$25,000,000	\$21,147,011	\$29,514,170	\$29,514,170	1.40

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Statement of Liquidated Investments

As of 8/31/2017

Liquidated Buyouts and Special Situations Portfolio Funds	Vintage Year	Total Commitment	Amount Paid-In	Total Distributions	Total Value	TVPI	IRR
Madison Dearborn Capital Partners III	1999	\$15,000,000	\$15,039,155	\$22,901,617	\$22,901,617	1.52	
Mezzanine Management Fund III	2000	\$8,000,000	\$7,845,672	\$9,826,759	\$9,826,759	1.25	
Phildrew Ventures Fifth Fund	1999	\$3,753,538	\$3,701,952	\$1,969,162	\$1,969,162	0.53	
TA Subordinated Debt Fund	2000	\$15,000,000	\$15,000,000	\$22,249,326	\$22,249,326	1.48	
Thomas H. Lee Equity Fund IV	1998	\$9,079,413	\$9,021,376	\$7,834,457	\$7,834,457	0.87	
Thomas H. Lee Equity Fund V	2000	\$25,000,000	\$26,168,254	\$43,888,659	\$43,888,659	1.68	
Three Cities Fund III	1999	\$9,558,084	\$9,549,242	\$17,766,936	\$17,766,936	1.86	
VS&A Communications Partners III	1999	\$7,500,000	\$7,440,476	\$10,260,611	\$10,260,611	1.38	
Welsh, Carson, Anderson & Stowe IX	2000	\$20,000,000	\$19,800,000	\$32,907,011	\$32,907,011	1.66	
Welsh, Carson, Anderson & Stowe VIII	1998	\$25,000,000	\$25,000,000	\$32,204,566	\$32,204,566	1.29	
Total Liquidated Buyouts and Special Situations Portfolio Funds		\$309,213,427	\$302,783,267	\$460,207,101	\$460,207,101	1.52	9.36%

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Statement of Liquidated Investments

As of 8/31/2017

Liquidated Secondary Transactions	Vintage Year	Invested Capital	Amount Paid-In	Total Distributions	Total Value	TVPI	IRR
M/C Venture Partners IV	1999	\$775,000	\$700,000	\$493,184	\$493,184	0.70	
Morgenthaler Partners VI	2000	\$147,000	\$147,000	\$169,740	\$169,740	1.15	
Oak Investment Partners VIII - Project Oak 2003	1998	\$75,508	\$75,508	\$192,012	\$192,012	2.54	
Three Cities Fund III	1999	\$1,794,926	\$1,790,505	\$7,814,039	\$7,814,039	4.36	
U.S. Venture Partners VI	1999	\$57,271	\$57,271	\$131,982	\$131,982	2.30	
Total Liquidated Secondary Transactions		\$2,849,705	\$2,770,284	\$8,800,958	\$8,800,958	3.18	28.54%

	Total Commitments	Amount Paid-In	Total Distributions	Total Value	TVPI	IRR
Total Liquidated Portfolio Funds	\$377,201,685	\$369,608,114	\$556,726,671	\$556,726,671	1.51	9.11%

	Total Commitments	Amount Paid-In	Distributions & Realizations	Latest Valuation	Total Value	TVPI	IRR
Grand Total All Current & Liquidated Portfolio Funds	\$2,579,761,537	\$2,058,866,309	\$2,231,537,984	\$881,037,396	\$3,112,575,380	1.51	10.01%

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Team Biographies

Managing Directors



Jonathan D. Roth – Managing Director, President

Mr. Roth has 25 years of private equity investment experience and is responsible for the overall management of the firm. He also works closely with clients to develop and implement private equity investment programs. Mr. Roth reviews investment opportunities, with specific emphasis on the analysis and due diligence for prospective investments, and is engaged in the negotiation of business and legal issues, ongoing monitoring of investments and profit realization from distributed securities. Mr. Roth also serves on several partnership advisory boards. Prior to joining Abbott in 1992, Mr. Roth was an Associate at Elmrock Partners and a Financial Analyst with Amoco Corporation. Prior to obtaining his M.B.A., he worked for Chemical Bank as a corporate lending officer. Mr. Roth received his A.B. in Economics from Cornell University and his M.B.A. from The Fuqua School of Business at Duke University.



Kathryn J. Stokel, CFA – Managing Director, Chief Operating Officer

Ms. Stokel has 31 years of private equity investment experience and oversees the firm's internal operations and human resource activities. She reviews investment opportunities, with specific emphasis on analysis and due diligence for prospective investments, and is engaged in the negotiation of business and legal issues, ongoing monitoring of investments and profit realization from distributed securities. Ms. Stokel also serves on several partnership advisory boards. Prior to joining Abbott in 1998, Ms. Stokel was a Portfolio Manager of a \$3.5 billion private equity portfolio at General Motors Investment Management Corporation. Ms. Stokel received her B.S. in Mathematics from the University of Michigan, her M.B.A. in Finance from The Wharton School at the University of Pennsylvania and is a CFA® charterholder.

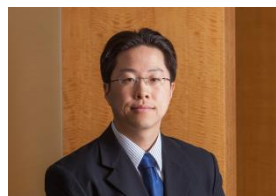
Team Biographies

Managing Directors



Mary T. Hornby – Managing Director, General Counsel

Ms. Hornby has 21 years of experience in private equity matters and assists the investment team in the review, legal analysis and negotiation of underlying fund investments and directs all legal aspects relating to the formation and maintenance of Abbott's pooled investment funds. In addition, Ms. Hornby assists in the legal aspects of daily operations, including client relationships and contracts, regulatory compliance and internal corporate structuring matters. Prior to joining Abbott in 2005, Ms. Hornby was Counsel and a member of the Private Equity Group at Testa, Hurwitz & Thibault, LLP, representing investment advisers, funds of funds, public pension plans and other limited partner investors, as well as general partner groups, in all aspects of private equity fund formation. Ms. Hornby received her B.A., magna cum laude, from Boston College and her J.D. from Boston College Law School. She is a member of the Bar of the Commonwealth of Massachusetts.



Young Lee, CFA – Managing Director

Mr. Lee has 12 years of private equity experience. He reviews investment opportunities, with specific emphasis on analysis and due diligence for prospective investments, and is engaged in the negotiation of business and legal issues, ongoing monitoring of investments and profit realization from distributed securities. Mr. Lee also serves on several partnership advisory boards. Prior to joining Abbott in 2007, Mr. Lee was an associate at The Henry J. Kaiser Family Foundation in Menlo Park, sourcing and leading due diligence on prospective private equity and hedge fund investments. Mr. Lee also worked as a product manager in the Online Business Services Division at Silicon Valley Bank and co-founded a company that matched university-based start-ups with angel investors. Mr. Lee received his B.A. in Economics from Stanford University, his M.B.A. from Columbia University and is a CFA® charterholder.



Timothy W. Maloney, CPA – Managing Director

Mr. Maloney has 17 years of private equity experience. He reviews investment opportunities, with specific emphasis on analysis and due diligence for prospective investments, and is engaged in the negotiation of business and legal issues, ongoing monitoring of investments and profit realization from distributed securities. Mr. Maloney also serves on several partnership advisory boards. Prior to joining Abbott in 2004, Mr. Maloney was an associate at Frye-Louis Capital Management in Chicago, working on screening and due diligence for venture capital, buyouts and special situations partnerships. Mr. Maloney also worked as a senior analyst at General American Transportation Corporation and at Hewitt Associates as a pension consultant. Mr. Maloney received his B.S. in Accounting from DePaul University, his M.B.A. in Finance from New York University and his C.P.A. from the State of Illinois.

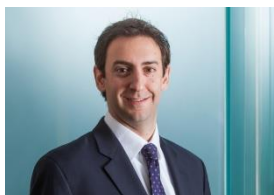
Team Biographies

Managing Directors



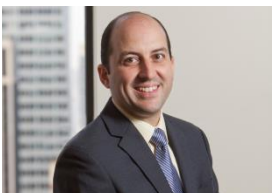
Lauren M. Massey, CPA – Managing Director, Finance & Administration

Ms. Massey has 26 years of financial services experience. She oversees the firm's fund investment recordkeeping activities, separate account reporting and the calculation of various performance analytics. Prior to joining Abbott in 1995, Ms. Massey was an Audit Manager in the Financial Services Division of Ernst & Young, where she had an asset management industry focus and was responsible for audit planning and management. Ms. Massey received her B.S. in Accounting from the State University of New York at Binghamton, her M.B.A. in Finance and Marketing from New York University and her C.P.A. from the State of New York.



Leonard C. Pangburn – Managing Director

Mr. Pangburn has 12 years of private equity experience. He reviews investment opportunities, with specific emphasis on analysis and due diligence for prospective investments, and is engaged in the negotiation of business and legal issues, ongoing monitoring of investments and profit realization from distributed securities. Mr. Pangburn also serves on several partnership advisory boards. Prior to joining Abbott Capital in 2005, Mr. Pangburn was a supervisor of global operations at International Fund Services in New York, where he managed and reconciled all aspects of the global security database. Mr. Pangburn received his B.S. in Finance from Bentley University and his M.B.A. from New York University.



Paolo Parziale, CPA – Managing Director, Corporate & Fund Accounting

Mr. Parziale has 17 years of financial services experience. He oversees the financial accounting and administration of all fund of funds products, including the preparation of all fund financial reports and tax filings as well as Abbott's corporate accounting function. Prior to joining Abbott in 2002, Mr. Parziale was an Audit Senior at Ernst & Young, where he worked on audits of investment management firms and various types of commingled funds. Mr. Parziale received his B.S. in Accounting from St. John's University, his M.B.A. in Finance from New York University and his C.P.A. from the State of New York.

Team Biographies

Managing Directors



Meredith L. Rerisi – Managing Director

Ms. Rerisi has 16 years of private equity investment experience. She reviews investment opportunities, with specific emphasis on analysis and due diligence for prospective investments, and is engaged in the negotiation of business and legal issues, ongoing monitoring of investments and profit realization from distributed securities. Ms. Rerisi also serves on several partnership advisory boards. Ms. Rerisi originally joined Abbott in 1998 and returned in the fall of 2002, following receipt of her M.B.A. Prior to joining Abbott, Ms. Rerisi was an equity analyst at American High Growth Equities Corporation. Ms. Rerisi received her B.S. in Applied Economics and Business Management from Cornell University and her M.B.A. from The Fuqua School of Business at Duke University.



Matthew M. Smith – Managing Director

Mr. Smith has 17 years of private equity investment experience. He is responsible for reviewing investment opportunities with specific emphasis on analysis and due diligence for prospective investments and is engaged in the negotiation of business and legal issues, ongoing monitoring of investments and profit realization from distributed securities. Mr. Smith, as Abbott's ESG Officer, is responsible for building upon the strong foundation Abbott has set in adopting the UN Principles for Responsible Investment and integrating ESG considerations into Abbott's investment process. In addition, Mr. Smith oversees the operations of Abbott Capital (Europe), Ltd, Abbott's subsidiary which is authorized and regulated by the UK Financial Conduct Authority and located in London. Prior to joining Abbott in 2000, he was a financial examiner at the Federal Reserve Bank of New York. He also worked for First Trust Washington and Bank of America as a trust officer. Mr. Smith received his A.B. in History and his M.B.A. in Finance from Georgetown University.



Charles H. van Horne – Managing Director

Mr. van Horne has 32 years of experience in private equity and is responsible for managing the firm's marketing and client services functions, including communicating with clients about Abbott's investment practices and providing assistance to clients in the development of their private equity strategies. Prior to joining Abbott in 2001, Mr. van Horne was a founding Managing Director of AIG Capital Partners, Inc., responsible for AIG Capital Partners' fund development and client services. Mr. van Horne also served on the investment committees for several AIG private equity funds. Prior to joining AIG, Mr. van Horne was Managing Director of Creditanstalt International Advisors, where he established and managed its private equity investment activities. He also worked for Bankers Trust and for UBS Securities, Inc. in various capacities including merchant banking, mergers and acquisitions and project finance. Mr. van Horne received his B.A. in Sociology from the University of Pennsylvania.

Team Biographies

Investments



B. Martha Cassidy – Director

Ms. Cassidy has 33 years of private equity investment experience. She is primarily focused on the firm's sourcing, due diligence, and negotiations associated with secondary investments, and participates in investment discussions and decisions for all investments. Prior to joining Abbott in 2013, Ms. Cassidy was a Managing Director at Capital Dynamics, Inc. where she developed and managed the firm's secondary business. She also worked at Overture Capital Partners, Madison Investment Partners, Chemical Venture Partners, and Bankers Trust and gained operating experience at two private equity backed middle market manufacturing companies. Ms. Cassidy received her B.A. in French and Political Science from Wellesley College cum laude and her M.B.A. in Finance and Marketing from The Wharton School at the University of Pennsylvania.



Jobst Klemme – Director

Mr. Klemme has 18 years of private equity investment experience. He reviews investment opportunities with specific emphasis on analysis and due diligence for prospective investments. Mr. Klemme manages Abbott Capital (Europe), Ltd, Abbott's subsidiary which is authorized and regulated by the UK Financial Conduct Authority and located in London. Mr. Klemme worked for Bethmann Bank AG as Director in its Private Equity Solutions group. Prior to working at Bethmann Bank, he worked at Credit Suisse as Vice President, also in its Private Equity Solutions group. Mr. Klemme received his M.B.A from ESCP Europe and his Bachelors of Arts in Business Administration from Georg-August University Goettingen.



Jennie Benza – Vice President

Ms. Benza reviews investment opportunities with specific emphasis on analysis and due diligence for prospective investments. Prior to joining Abbott Capital in 2016, Ms. Benza was a Vice President with aPriori Capital Partners (DLJ Merchant Banking Partners). She also worked at Thomas H. Lee Partners, and Merrill Lynch as a member of the M&A group. Ms. Benza received her B.S. in Finance & Accounting from New York University and her M.B.A from the Harvard Business School.



Zohair Tariq – Senior Investment Associate

Mr. Tariq reviews investment opportunities with specific emphasis on analysis and due diligence for prospective investments. Prior to joining Abbott Capital in 2016, Mr. Tariq was an Investment Analyst at Raytheon Company where he constructed private equity and private real estate portfolios. Mr. Tariq received his B.S. in Corporate Finance & Accounting from Bentley University.



Jonathan Tubiana – Senior Investment Associate

Mr. Tubiana reviews investment opportunities with specific emphasis on analysis and due diligence for prospective investments. Prior to joining Abbott Capital in 2009, Mr. Tubiana was an Associate in the European investment team of Altius Associates where he was involved in European due diligence, portfolio analysis, and research activities. Mr. Tubiana received a Master of Science in Management from Grenoble Ecole de Management (France) and his M.B.A. from New York University.

Team Biographies

Investments



Moritz Turck – Senior Investment Associate

Mr. Turck reviews investment opportunities with specific emphasis on analysis and due diligence for prospective investments. Before joining the investment team in 2017, Mr. Turck was a Senior Associate on the Global Investment Team of Pavilion Alternatives, where he was responsible for evaluating and reviewing private equity managers across the EMEA region, and particularly in Western and Northern Europe. Mr. Turck received his M.S. in Accounting and Finance from Kings College London and his B.A. in Management Studies with French from the University of Nottingham.



Brian Susetka – Investment Associate

Mr. Susetka reviews investment opportunities with specific emphasis on analysis and due diligence for prospective investments. Before joining the investment team in 2014, Mr. Susetka worked on Abbott's operations team for three years. Prior to joining Abbott Capital in 2010, Mr. Susetka worked in financial reporting at AllianceBernstein, where he assisted with the creation and development of custom client reports. Mr. Susetka received his B.S. in Business from the Kelley School of Business at Indiana University.



Shaf A. Shaikh – Senior Investment Analyst

Mr. Shaikh reviews investment opportunities with specific emphasis on analysis and due diligence for prospective investments. Before joining the investment team in 2017, Mr. Shaikh worked at Northwestern Mutual Capital where he had experience in primary, secondary and co-investment transactions. Mr. Shaikh received his B.S. in Finance from the Kelley School of Business at Indiana University.



Dan Brown – Investment Analyst

Mr. Brown reviews investment opportunities with specific emphasis on analysis and due diligence for prospective investments. Before joining the investment team in 2016, Mr. Brown worked on Abbott's operations team for two years. Prior to joining Abbott Capital in 2014, Mr. Brown worked at Axelrod Energy Projects LLC. Mr. Brown received his B.B.A. in Finance from Baruch College.



Dillon P. Schriver – Investment Analyst

Mr. Schriver reviews investment opportunities with specific emphasis on analysis and due diligence for prospective investments. Before joining the investment team in 2016, Mr. Schriver received his B.A. in Mathematics and East Asian Language and Culture from University of Pennsylvania and his Master of Management Studies from the Fuqua School of Business at Duke University.

Team Biographies

Client Relations



Ryan Green – Director

Mr. Green assists in all marketing, client services and business development activities. Prior to joining Abbot Capital in 2017, Mr. Green was a Director at LGT Capital Partners, working closely with institutions, consultants, family offices and distribution partners. Mr. Green held a similar role as a member of the institutional sales team at Commonfund and during his tenure at Seasons Capital Management. Before joining Seasons Capital, Mr. Green was a Vice President within the institutional sales desk at DoubleRock. Mr. Green was the co-founder to TrainerLink Inc., a technology start-up and received his B.S. from Rutgers University.



Daniel Kettner – Vice President

Mr. Kettner assists in all marketing, client services and business development activities. Prior to joining Abbott Capital in 2015, Mr. Kettner was a Vice President at Neuberger Berman, focusing on relationship management with investment consultants. Mr. Kettner previously was a member of the sales team at Aviva Investors North America, and worked at Credit Suisse Asset Management in various capacities. Mr. Kettner received his B.A. in English Literature from Hamilton College and his M.B.A. in Finance from New York University.



Sean P. Long – Vice President

Mr. Long assists in all marketing, client services and business development activities. Prior to joining Abbott Capital in 2017, Mr. Long was a Senior Vice President at EnTrustPermal (formerly of The Permal Group), responsible for managing global relationships with both current and prospective investors, distributors, and large institutions. Mr. Long previously worked at Southport Harbor Associates, Coleman Research Group, and the Kellogg Capital Group where he assisted in researching and evaluating investment opportunities. Mr. Long received his B.A. in English from the University of San Diego.



John Thomas – Vice President

Mr. Thomas assists in all marketing, client services and business development activities. Prior to joining Abbott Capital in 2014, Mr. Thomas was as an investment advisor to families and institutions at Papamarkou Wellner Asset Management in New York and at Barclays Wealth in London. Mr. Thomas received his B.S.c. in Chemistry from Hobart and William Smith Colleges and his M.B.A. from London Business School.

Compliance



Karen Hager – Chief Compliance Officer

Ms. Hager has 23 years of compliance experience and is responsible for Abbott's compliance programs. Prior to joining Abbott in 2014, Ms. Hager worked as Director of Global Compliance and Chief Compliance Officer at The Permal Group and as Director of Compliance at Dominick & Dominick Advisors LLC. Previously, Ms. Hager was a Senior Securities Compliance Examiner/Staff Accountant of the US Securities and Exchange Commission. Ms. Hager received her B.S. in Accounting from Brooklyn College of the City University of New York.

Important Information

Past performance is not a guide to future results and is not indicative of expected realized returns. This presentation contains confidential and proprietary information regarding Abbott Capital Management, LLC ("Abbott"), its affiliates and investment program, funds sponsored by Abbott (the "Abbott Funds") and Abbott's managed account clients (collectively "Abbott Clients") as well as underlying portfolio funds held by the Abbott Clients' and portfolio companies held by these funds. This presentation and the information contained in this presentation may not be reproduced or distributed to persons other than the recipient or its advisors, to the extent they are bound by a duty of confidentiality.

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Abbott may have arrangements with certain or prospective investors pursuant to which those investors receive additional portfolio information.

Performance Information: Where Abbott performance returns have been included in this presentation, Abbott has included herein important information relating to the calculation of these returns as well as other pertinent performance related definitions.

References to market or composite indices, benchmarks or other measures of relative market performance over a specified period of time are provided for your information only and do not imply that an Abbott Client will achieve returns, volatility or results similar to the index, or that these are appropriate benchmarks to be used for comparison for a private equity investment. The market volatility, liquidity and other characteristics of private equity investments are materially different from publicly-traded securities. In addition, the composite of the index may not reflect the manner in which the Abbott Client portfolio is constructed in relation to expected or achieved returns, portfolio guidelines, restrictions, sectors, correlations or volatility, all of which are subject to change over time. The index returns will generally reflect the reinvestment of dividends, if any, but do not reflect the deduction of any fees or expenses which would reduce returns. An investor cannot invest directly in an index.

All investments are subject to risk, including the loss of the principal amount invested. Private equity related risks include, among others: those associated with leverage, illiquidity and restrictions on transferability and resale of the investment and the speculative nature of private equity investments in general. Fund of fund risks include dependence on the performance of underlying managers, Abbott's ability to allocate assets incurred at the Abbott Client and underlying portfolio fund levels. Exchange rate fluctuations may affect returns. Diversification will not guarantee profitability or protection against loss. There is no assurance that an Abbott Client's objective will be attained. Performance may be volatile and the value of an investment(s) may fluctuate. Please refer to Abbott's Form ADV, Part 2a for additional risk disclosures.

This presentation is for informational purposes only and is not an offer or a solicitation to subscribe for any fund and does not constitute investment, legal, regulatory, business, tax, financial, accounting or other advice or a recommendation regarding any securities of Abbott, of any fund or vehicle managed by Abbott, or of any other issuer of securities. Interests in the Abbott Funds have not been and will not be registered under the U.S. Securities Act of 1933, as amended, any U.S. State securities laws or the laws of any non-US Jurisdiction. None of the Abbott Funds are registered as an Investment Company under the U.S. Investment Company Act of 1940, as amended nor is it expected that they will be in the future. Interests in the Abbott Funds have not been approved or disapproved by The U.S. Securities and Exchange Commission or by any securities regulatory authority of any U.S. State or non-U.S. jurisdiction and neither the SEC nor any such authority has passed upon the accuracy or adequacy of this communication or the merits of Abbott or any Abbott Fund, nor is it intended that the SEC or any such authority will do so. Investment in the Abbott Funds may not be suitable for all investors; investors should carefully consider risks and other information and consult their professional advisers regarding suitability, legal, tax and economic consequences of an investment.

Abbott is a registered investment adviser. Registration as an investment adviser does not imply a certain level of skill or training. The information in this presentation has not been approved or verified by the U.S. Securities and Exchange Commission ("SEC") or by any State securities authority.

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Definitions: Portfolio Funds

Not all definitions included on this page may appear in the presentation.

Alaska Retirement Management Board ("ARMB") has expressly requested that Abbott Capital Management, LLC ("Abbott") revise its reporting practice and, on a going forward basis, provide a standard monthly report to ARMB, on an expedited basis, that is, on the last business day of each month. Delivery of this report replaces in its entirety any obligation of Abbott to provide ARMB a standard monthly report as of the last business day of each month within 5 to 10 business days of month end. ARMB should be aware that any information or any outstanding matter or issue in respect of any underlying partnership investment or transaction that may be obtained or resolved subsequent to preparation of this report will not be included herein but may be included or taken into account with respect to any monthly report issued by Abbott to another client(s) with such partnership investment in its portfolio. By its receipt hereof, ARMB agrees and acknowledges that such differences may exist and that there is no obligation of Abbott to notify ARMB of such additional information or correct such matter or issue prior to ARMB's next regularly scheduled monthly report. Information set forth herein speaks as of the date set forth above or otherwise as of the report date set forth herein. Delivery hereof shall not under any circumstances create the implication that no change has occurred in such information or the affairs of Abbott, Abbott's client portfolios, the portfolio funds or their underlying portfolio companies.

Amount Contributed or Paid-in, Contributions

Cumulative amount paid-in (as of the *Report Date*) to underlying portfolio funds including amount paid-in as a result of interest charges, management fees or expenses payable in addition to the total committed, less any temporary returns of capital distributed by any of the underlying portfolio funds. *Amount Paid-in* may reflect adjustments for individual distributions of callable capital to the extent such distributions were expressly identified as callable by the managing entity of the underlying portfolio fund.

With respect to underlying portfolio funds purchased through the secondary market, *Amount Paid-in* includes the purchase price of the secondary interest plus capital paid in subsequent to the purchase date.

Fund Size

Fund Size of an underlying portfolio fund is based on information provided by the General Partner of that fund as of the Report Date and may not reflect most recent or final fund size. *Fund Size* includes commitments to any parallel fund vehicles, where that information is available.

(Latest) Valuation

Fair value based on financial information provided by the general partners of the underlying portfolio fund investments and may be adjusted by amounts necessary to reflect fair value, as determined during Abbott's most recent valuation review. Fair value is net of any management fees, expenses and carried interest of the underlying portfolio funds, but is not net of management fees, expenses and carried interest charged by Abbott.

With respect to underlying portfolio funds denominated in non-U.S. currency, any *Valuation* reported in a foreign currency is translated at the relevant exchange rate at the close business on the Report Date.

Not Meaningful ("NM")

With respect to primary investments, Abbott deems only those returns greater than three years of age to be mature enough to provide meaningful comparative data. Information is available upon request.

Commitments, Total Commitment, Amount Committed

Amount Committed to an underlying portfolio fund including those purchased on the secondary market. Total commitment may reflect additional management fees or interest payments paid in excess of the amount committed to an underlying portfolio fund.

With respect to underlying portfolio funds denominated in non-U.S. currency, total committed reflects the amount paid to the underlying portfolio funds in U.S. dollars plus the unfunded portion of the foreign-denominated commitment amount converted to U.S. dollars at the relevant exchange rate at the close business.

With respect to underlying portfolio funds purchased through the secondary market, total committed reflects the purchase price of each secondary interest plus the unfunded capital commitment of each investment at the time of purchase. At times referred to as Invested Capital.

Distributions, Total Distributions, Amount Distributed

Distributions of cash or stock from an underlying portfolio fund as of the Report Date. Unless otherwise noted, distributions of stock are valued as reported by the underlying portfolio fund and such valuation does not take into account any gains or losses realized upon the sale of such stock by Abbott. *Total Distributions* includes proceeds from the sale of interests on the secondary market, and excludes any temporary returns of capital received.

Total Distributions may reflect adjustments for individual distributions of callable capital to the extent such distributions were expressly identified as callable by the managing entity of the underlying portfolio fund.

Total Value

Total Value equals *Total Distributions* plus *Latest Valuation*

Net Multiple (TVPI)

TVPI represents *Total Value* divided by *Amount Paid-in*.

TVPI is net of all fees, expenses and carried interest charged by the underlying portfolio funds, but unless otherwise noted is not net of one or more of the following: (1) Abbott's management fees; (2) carried interest paid or allocated, if any; (3) adjustments resulting from the gains and losses realized upon the sale of distributed stock; and (4) other account related expenses.

TVPI for any underlying portfolio fund may differ materially from the TVPI stated in this document to the extent *Total Distributions* and *Amount Paid-in* have not been adjusted for callable capital.

Vintage Year

Vintage Year represents the year in which the underlying portfolio fund made its initial capital call.

Definitions: Performance Calculations

Report Date

The Report Date is the “as of” date indicated in the performance charts.

Abbott Fund Performance

Abbott Fund – Net of Fees IRR

Net IRR measures the internal rate of return over the period from the Abbott Fund’s initial capital call through the *Report Date* using the (1) *Latest Valuation* of the relevant Abbott Fund’s net assets reported as of the *Report Date* (excluding the capital account of the relevant general partner and any affiliated limited partner, as defined in the relevant limited partnership agreement) and (2) net monthly cash flows between the relevant Abbott Fund and non-affiliated limited partners.

IRRs are net of all fees, expenses, and carried interest (if any) charged by the general partner of the underlying portfolio funds and *net* of management fees paid to Abbott and carried interest (if any) paid or allocated to the relevant Abbott Fund’s general partner. Returns portrayed may also reflect the reinvestment of realized proceeds and other earnings by the relevant Abbott Fund.

Net IRR for an individual investor in an Abbott Fund may differ from those disclosed herein due to varying limited partner closing dates, management fees, and commitment amounts.

Abbott Fund – Underlying Strategy IRR (Gross of Fees)

IRRs are calculated based on information reported to the Abbott Fund by the managing entity of the underlying portfolio funds in that strategy.

IRRs are calculated using the (1) *Latest Valuation* of the underlying portfolio fund investments at the *Report Date* and (2) net monthly cash flows between the Abbott Fund and the portfolio funds.

IRRs are *net* of all fees, expenses and carried interest charged by the underlying portfolio funds but are *not net* of Abbott’s management fees, carried interest (if any) paid to the Abbott Fund’s General Partner, Abbott fund level expenses and adjustments resulting from the gains and losses realized upon the sale of distributed stock. Actual returns to an individual investor in an Abbott Fund would be reduced for such fees and Abbott fund level expenses and include an adjustment for gains/losses from the sale of distributed stock.

Underlying Portfolio Funds – IRR

IRRs are calculated based on information reported to the Abbott Fund by the managing entity of the underlying portfolio fund(s). This report has not been reviewed, verified, or in any way sanctioned or approved by the managing entity or the advisor of the underlying portfolio funds listed or any of their affiliates.

IRRs are calculated using the (1) *Latest Valuation* of the underlying portfolio fund investment at the *Report Date* and (2) net monthly cash flows between the Abbott Fund and the portfolio fund(s).

IRRs are *net* of all fees, expenses and carried interest charged by the underlying portfolio funds but are *not net* of Abbott’s management fees, carried interest (if any) paid to the Abbott Fund’s general partner, account level expenses and adjustments resulting from the gains and losses realized upon the sale of distributed stock. Actual returns to an individual investor in an Abbott Fund would be reduced for such fees and account level expenses and include an adjustment for gains/losses from the sale of distributed stock.

Performance Specific Disclosures

Past performance is not a guide to future results and is not indicative of expected realized returns.

Unrealized investments may not be realized at the values used when calculating returns as the valuations of unrealized investments depend upon assumptions that may be reasonable under the circumstances at the time made, while actual realized returns on unrealized investments will depend upon, among other factors, future operating results, the value of the assets and market conditions at the time of disposition, any related transaction costs and the timing and manner of sale, all of which may differ from the assumptions used for the valuations incorporated herein. Accordingly, actual realized returns on unrealized investments may be higher or lower than the returns included in this presentation.

Interim performance data regarding an underlying portfolio fund or client account client (in particular in relation to unrealized investments) may not accurately reflect the current or expected future performance of the underlying portfolio fund or account or the fair value of the interest of any Abbott discretionary client. Such performance data should not be used to compare returns among multiple private equity funds due to, among other factors, differences in vintage year, investment strategy, investment size, etc., and has not been calculated, reviewed, verified or in any way sanctioned or approved by the general partner or the advisor of the underlying portfolio fund or any of their affiliates.

There can be no assurance that any Abbott Fund or discretionary separate account client, its underlying portfolio fund investments and portfolio companies held by these funds or the private and public equity and debt markets in general, will perform, or continue to perform, similarly to prior periods, funds, investments, or accounts. It should not be assumed that any fund organized, or investment made, in the future will ultimately be profitable or will equal the performance of the funds, investments, or accounts listed in this presentation.

Arrowstreet Capital, L.P.

Relevant Mandates: International Equity

Hired: 2014

Firm Information	Investment Approach	Total ARMB Mandate
Arrowstreet Capital, L.P. is an independent private partnership that serves as a discretionary institutional global asset manager. Arrowstreet is wholly-owned and controlled by members of their senior management team and non-executive directors. As of 6/30/17, the firm's total assets under management were \$82,776 million. Key Executives: Peter Rathjens, Ph.D., <i>Partner, CIO</i> Anthony W. Ryan, CFA, <i>Partner, President & CEO</i> Manolis Liodakis, Ph.D., <i>Partner, Head of PM</i> John Campbell, Ph.D., <i>Partner, Co-Head of Research</i> Tuomo Vuolteenaho, Ph.D., <i>Partner, Co-Head of Research</i> Alex Ogan, <i>Partner, Portfolio Manager</i> Bryan Roda, CFA, CPA, <i>Client Relationship Manager</i>	Arrowstreet believes that for information to add value in an active investment process it must be both relevant to share prices and slowly reflected in share prices. In fact, the most valuable (and often overlooked) insights for forecasting equity returns are often found by observing information pertaining to related securities. This information is not as obvious and, as a result, is generally reflected more slowly in share prices. Arrowstreet considers relevant information from related securities which are linked in some way, including country and sector affiliations or other related companies identified by our proprietary expanded linkages model. Arrowstreet believes the key to generating alpha involves evaluating securities on an integrated basis taking into consideration direct effects and indirect, or spillover, effects. The components of their model are based on the experiences and insights of their Investment Committee. This integrated and dynamic model measures a stock's expected excess return by including the following influences: • Direct effects - characteristics of the company itself; and • Indirect effects - characteristics of other companies that are related. Quantitative tools allow Arrowstreet to evaluate a broad set of investment signals (e.g., measures of valuation, momentum, catalysts, high frequency, quality, and extreme sentiment) on both a direct and indirect basis across the globe. Specific signals are selected based on their intuitive investment appeal, historical ability to forecast future returns, statistical and economic significance, and ability to work well in a variety of market environments and across different universes of stocks. Furthermore, quantitative tools enable Arrowstreet to leverage their insights over a broader universe of stocks more efficiently, provide a mechanism to trade off expected returns against risk and transaction costs, and provide an objective and disciplined process for making investment decisions. Benchmark: MSCI ACWI Ex-US Index	Assets Under Management: 6/30/17 \$350,772,324

Concerns: None

6/30/17 Performance

	<u>Last Quarter</u>	<u>1-Year</u>	<u>3-Years Annualized</u>	<u>5-Years Annualized</u>	<u>6-Years Annualized</u>
Arrowstreet	5.80%	20.25%	N/A	N/A	N/A
Arrowstreet (net)	5.68%	19.69%			
MSCI ACWI Ex-US	5.99%	21.00%			

ARROWSTREET CAPITAL
LIMITED PARTNERSHIP



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Alaska Retirement Management Board

October 6, 2017

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Firm **Overview**



SPECIALIST GLOBAL EQUITIES MANAGER

Strategy built from sound investment intuition

Multi-dimensional forecasting approach

Work exclusively with institutional investors



COMMITMENT TO ONGOING RESEARCH PROGRAM

Strong ties to academic community



OWNED AND CONTROLLED BY SENIOR MANAGEMENT

Senior Investment Resources

Peter Rathjens, Ph.D. | Partner, CIO

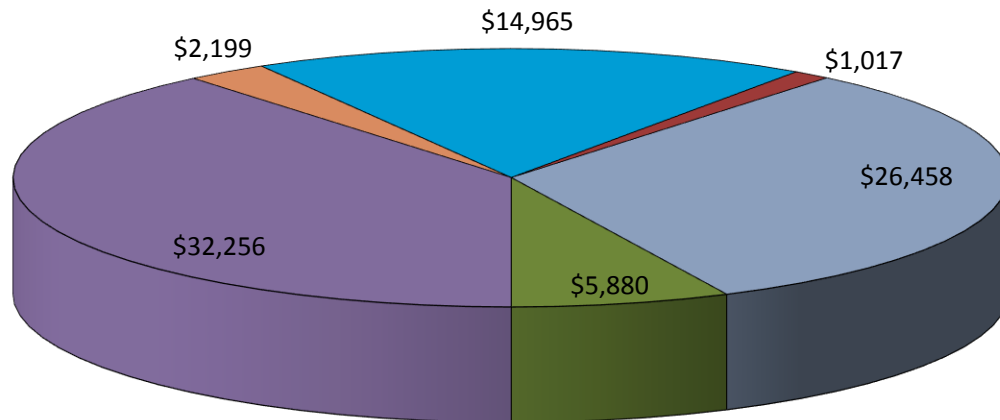
PORTFOLIO MANAGEMENT				INVESTMENT PROCESSES				RESEARCH				INVESTMENT SERVICES			
Name	Joined ASC	Industry Exp.		Name	Joined ASC	Industry Exp.		Name	Joined ASC	Industry Exp.		Name	Joined ASC	Industry Exp.	
Manolis Liodakis, Ph.D. <i>Partner, Head of Portfolio Management</i>	2012	18		Sam Thompson, Ph.D. <i>Partner, Head of Investment Processes</i>	2005	11		John Campbell, Ph.D. <i>Partner, Co-Head of Research</i>	1999	24		Katie McHardy <i>Partner, Head of Investment Services</i>	2010	16	
John Capeci, Ph.D. <i>Partner</i>	1999	22		Marta Campillo, Ph.D. <i>Partner</i>	1999	20		Tuomo Vuolteenaho, Ph.D. <i>Partner, Co-Head of Research</i>	2004	13					
Alex Ogan <i>Partner</i>	2005	11						Yosef Klein <i>Partner</i>	2012	9					
George Pararas - Carayannis, CFA <i>Partner</i>	2002	20						Alex Merlis, CFA <i>Partner</i>	2006	15					
Zach Vernon, CFA <i>Partner</i>	2008	10						Derek Vance, CFA <i>Partner</i>	2008	9					
Michael Zervas, CFA <i>Partner</i>	2004	15						Yijie Zhang, Ph.D. <i>Partner</i>	2006	10					

- » Manage all portfolios and strategies using a team-based approach
- » Average industry experience of 17 years; average of 12 years with Arrowstreet
- » Supported by 49 associate-level investment professionals

Assets Under Management (AUM) as of June 30, 2017: \$83 billion



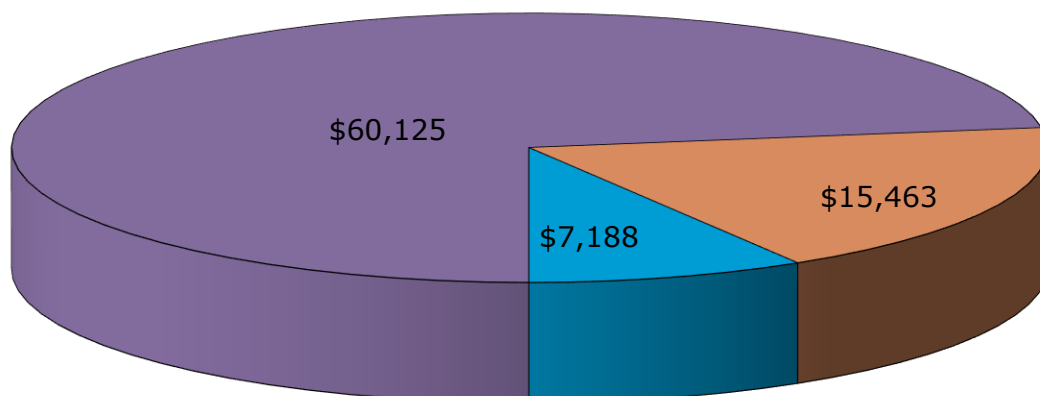
AUM BY STRATEGY AS OF JUNE 30, 2017 (\$MM)



- Global Equities
- Global Small Cap Equities
- Global/International Alpha Extension Equities
- Global Long/Short Equities
- International Equities
- Emerging Markets Equities



AUM BY CLIENT DOMICILE AS OF JUNE 30, 2017 (\$MM)

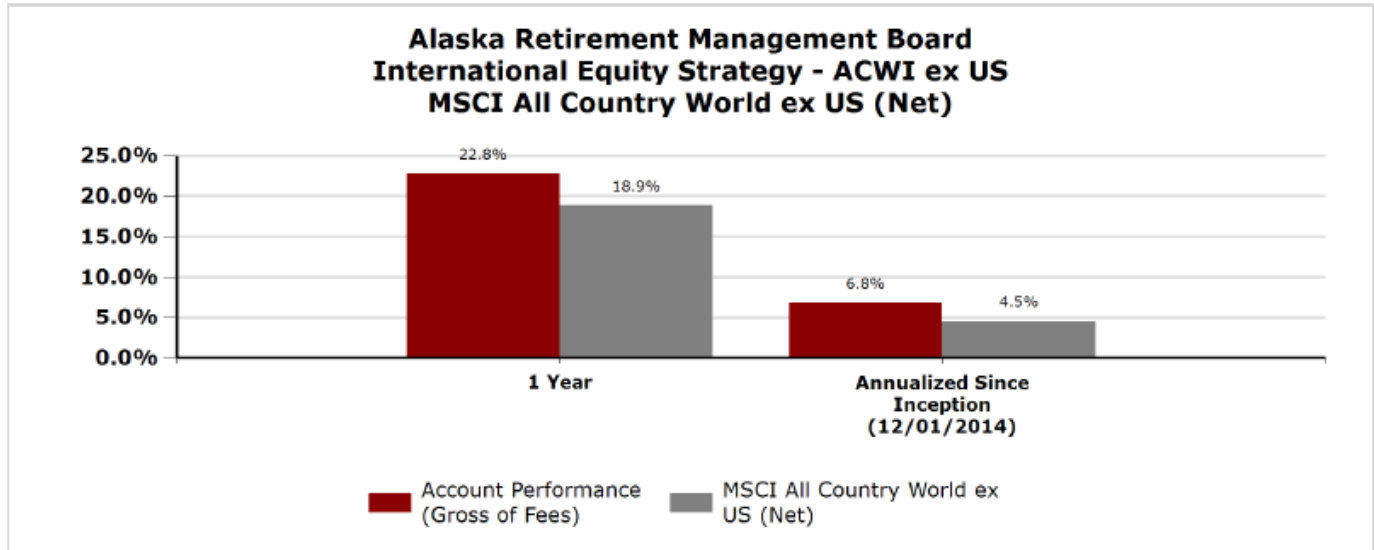


- North America
- UK and Continental Europe
- Australasia



As of August 31, 2017

PERFORMANCE SINCE INCEPTION



Gross Performance	MTD	QTD	YTD
Account Performance (Gross of Fees)	1.5%	5.4%	21.0%
Benchmark Return	0.5%	4.2%	18.9%
Value Added (Gross of Fees)	1.0%	1.2%	2.1%

Additional Statistics	Since Inception
Tracking Error	3.1%
Information Ratio	0.74
Annualized Value Added (Gross of Fees)	2.3%

The information presented herein is preliminary and subject to change upon account reconciliation. Information presented is gross of investment management fees. Applying such fees would lower the results. Gross of investment management fees performance presented is based on the accounting, pricing and asset valuation methodologies of BNY Mellon Asset Servicing, which maintains the back office records for Arrowstreet. Results may differ from those of the account's official custodian. The benchmark name presented reflects the account's current benchmark. The benchmark may have changed over time and as such all presented benchmark performance figures were calculated with respect to the benchmark applicable at each point in time. All returns are calculated in USD. Source: MSCI. MSCI makes no express or implied warranties or representations and shall have no liability whatsoever with respect to any MSCI data contained herein. The MSCI data may not be further redistributed or used as a basis for other indices or any securities or financial products. This report is not approved, reviewed or produced by MSCI.

End of Period: 2nd Quarter 2017

PORTFOLIO BASED PERFORMANCE ATTRIBUTION

Country	Total	Consumer Discretionary	Consumer Staples	Energy	Financials	Health Care	Industrials	Information Technology	Materials	Real Estate	Telecomm. Services	Utilities
Total	(24)	0	(15)	46	(21)	(4)	11	4	(32)	(8)	(6)	1
DEV AUSTRALIA	19	4	4	2	18	(2)	3	0	(13)	3	1	0
DEV AUSTRIA	0			(1)	0		0		1			
DEV BELGIUM	3	0	4		(1)	1		(1)	0		0	
DEV CANADA	41	1	(2)	17	9	(1)	6	3	8	0	0	0
DEV DENMARK	(4)	2	0		0	(5)	0		0		0	0
DEV FINLAND	4	1		0	0	0	2	(3)	4		0	0
DEV FRANCE	(7)	(4)	(1)	7	4	1	(5)	(11)	1	0	1	(1)
DEV GERMANY	(9)	0	0		(5)	(1)	6	3	(8)	(1)	(3)	(1)
DEV HONG KONG	(11)	(2)	0		(6)		0	0		(4)	0	0
DEV IRELAND	2	0	0		0		0		2			
DEV ISRAEL	0				0	0	0	0	0	0	0	
DEV ITALY	0	(5)		5	0	0	(1)				1	0
DEV JAPAN	3	11	(10)	(5)	0	(3)	(5)	24	(9)	(2)	3	(1)
DEV NETHERLANDS	3	0	3	0	1		2	(2)	(3)		0	
DEV NEW ZEALAND	3	0	0			0	3		(1)	0	0	0
DEV NORWAY	1	0	1	0	(1)				1		(1)	
DEV PORTUGAL	1		0	0								0
DEV SINGAPORE	0	0	0		(2)		1			0	1	
DEV SPAIN	(16)	0	0	(1)	(9)	0	1	4			(8)	(3)
DEV SWEDEN	1	2	0	0	2	0	1	0	(4)		0	
DEV SWITZERLAND	3	(2)	(5)		(1)	7	3	0	1	0	0	
DEV UNITED KINGDOM	(20)	(4)	(4)	10	(6)	(2)	(7)	0	(11)	1	1	2
EMK BRAZIL	(15)	1	0	3	(23)	0	0	0	2	0	0	1
EMK CHILE	0	0	0	0	0		0		0		0	(1)
EMK CHINA	(56)	(8)	1	6	(12)	0	0	(35)	(1)	(4)	(2)	0
EMK COLOMBIA	0			0	0				0			0
EMK CZECH REPUBLIC	0				0						0	0
EMK EGYPT	0				0					0	0	
EMK GREECE	1	0			(1)				0		0	2
EMK HUNGARY	(1)			0	0	0						
EMK INDIA	2	0	(2)	1	(1)	2	0	3	0		0	0
EMK INDONESIA	(4)	0	(1)	(1)	(1)	0	0		0	0	(1)	0
EMK KOREA	13	2	(2)	(2)	5	(2)	(2)	17	(4)		0	1
EMK MALAYSIA	1	0	0	0	(1)	0	0		0	0	0	0
EMK MEXICO	(1)	1	0		0		0		0	0	(1)	0
EMK PAKISTAN	0			0	0				0			
EMK PERU	(1)				(1)				0			
EMK PHILIPPINES	(1)	0	0		0		0			(1)	0	0
EMK POLAND	1	0	0	2	(1)				0		0	0
EMK QATAR	2			0	1		0			0	0	0
EMK RUSSIA	1		1	3	(4)				0		1	0
EMK SOUTH AFRICA	4	(1)	1	0	1	0	0		3	0	1	
EMK TAIWAN	4	1	0	0	0	0	0	2	0	0	0	
EMK THAILAND	(4)	0	(1)	(3)	0	0	0	0	0	0	0	0
EMK TURKEY	16	0	0	2	13		2		0	0	0	
EMK UAE	0	0			0		0			0	0	
FMK KAZAKHSTAN	0			0								

Legend

Added Value (Active weight > 15 bps)	X
Lost Value (Active weight > 15 bps)	(X)
Added Value (Active weight < -15 bps)	X
Lost Value (Active weight < -15 bps)	(X)

Summary Attribution Results: ALASKA

	Developed	Emerging & Frontier	Total
Allocation	0.48	-0.04	0.43
Selection	-0.33	-0.33	-0.67
Currency Effect	0.06	-0.01	0.05
Cash Effect			-0.04
Compounding Effect			-0.03
Trade Cost & Unexplained Effects			0.27
Value Added (%)			0.02

Note: Basket grid shows value added contributions in basis points. The portfolio performance attribution assesses performance from a country, sector, basket, and stock perspective. The information above is presented gross of management fees. If fees had been deducted, performance would be lower. Please see important disclosure information at the end of this letter.



As of August 31, 2017

ACTIVE (BENCHMARK RELATIVE) PORTFOLIO WEIGHTS

Country	Total	Consumer Discretionary	Consumer Staples	Energy	Financials	Health Care	Industrials	Information Technology	Materials	Real Estate	Telecomm. Services	Utilities
Total		-3.43	-3.06	-4.70	7.68	-4.77	2.56	5.87	-1.06	-1.28	0.85	0.55
DEV AUSTRALIA	-1.81	0.67	-0.37	-0.23	-2.04	0.06	0.08	0.13	0.30	-0.41	-0.07	0.07
DEV AUSTRIA	0.45			-0.04	0.28		0.12		0.09			
DEV BELGIUM	-0.65	-0.02	-0.45		-0.02	-0.04			-0.09		-0.03	
DEV CANADA	-2.51	-0.34	-0.27	-1.42	0.11	-0.02	0.68	-0.21	-0.71	-0.02	-0.16	-0.14
DEV DENMARK	-1.29	-0.06	-0.06		-0.15	-0.57	-0.30		-0.10		-0.02	-0.04
DEV FINLAND	-0.41	-0.02		-0.03	-0.11	-0.02	-0.16	-0.18	0.18		-0.03	-0.04
DEV FRANCE	-0.21	-0.85	-0.23	-0.59	2.79	-0.73	0.10	0.35	-0.37	-0.23	-0.20	-0.25
DEV GERMANY	-1.19	-0.56	0.04		0.20	-0.34	-0.53	-0.55	-0.73	-0.17	0.81	0.64
DEV HONG KONG	-0.75	-0.26	0.00		-0.82		-0.34	-0.02		0.98	-0.04	-0.26
DEV IRELAND	-0.30	-0.03	-0.07		-0.04		-0.02		-0.14			
DEV ISRAEL	-0.25				-0.08	-0.08	-0.02	-0.02	-0.03	-0.01	-0.01	
DEV ITALY	0.67	-0.19		-0.29	0.25	-0.02	0.20	0.06			-0.08	0.74
DEV JAPAN	9.58	0.52	1.20	0.12	0.87	-0.08	0.29	4.79	1.04	-0.52	1.31	0.03
DEV NETHERLANDS	1.33	-0.05	-0.79	-0.01	1.15		1.77	-0.49	-0.18		-0.06	
DEV NEW ZEALAND	0.21	0.03				-0.01	0.14		-0.02		0.11	-0.04
DEV NORWAY	-0.06	-0.02	0.11	-0.10	0.10				-0.08		-0.07	
DEV PORTUGAL	-0.11		-0.02	-0.04								-0.04
DEV SINGAPORE	-0.90	-0.06	-0.03		-0.39		-0.14			-0.17	-0.11	
DEV SPAIN	2.88	-0.20	-0.02	-0.14	1.45	-0.04	0.71	-0.02			0.62	0.52
DEV SWEDEN	0.24	-0.12	-0.13	-0.02	0.80	-0.02	-0.15	-0.15	0.13		-0.10	
DEV SWITZERLAND	-1.13	-0.33	-1.36		1.66	-1.68	0.69	0.09	-0.11	-0.03	-0.06	
DEV UNITED KINGDOM	-3.51	0.30	0.98	-1.65	-2.08	-0.63	0.39	0.00	-0.06	-0.16	-0.55	-0.05
EMK BRAZIL	2.26	0.17	-0.24	-0.20	1.91	-0.03	-0.10	-0.04	0.97	-0.03	-0.05	-0.10
EMK CHILE	-0.30	-0.04	-0.04	-0.03	-0.06		-0.02		-0.04		-0.01	-0.08
EMK CHINA	-2.14	-0.68	-0.13	-0.02	1.81	-0.14	-0.14	-2.63	0.03	-0.23	0.16	-0.17
EMK COLOMBIA	-0.04			-0.01	0.00				-0.02			-0.01
EMK CZECH REPUBLIC	-0.04				-0.02						0.00	-0.01
EMK EGYPT	-0.03				-0.03						0.00	
EMK GREECE	-0.05	-0.02			-0.05				-0.01		-0.02	0.04
EMK HUNGARY	-0.09			-0.02	-0.05	-0.02						
EMK INDIA	-2.15	-0.26	-0.20	-0.26	-0.53	-0.14	-0.13	-0.30	-0.23		-0.07	-0.04
EMK INDONESIA	-0.36	-0.08	-0.08	0.17	-0.20	-0.01	-0.01		-0.02	-0.02	-0.10	-0.01
EMK KOREA	2.53	-0.12	-0.22	0.23	0.42	-0.09	-0.30	2.77	-0.20		0.11	-0.05
EMK MALAYSIA	-0.55	-0.05	-0.05	-0.02	-0.17	-0.02	-0.08		-0.02	0.00	-0.05	-0.08
EMK MEXICO	-0.74	-0.07	-0.25		-0.13		-0.08		-0.16	-0.02	-0.01	-0.01
EMK PAKISTAN	-0.02			0.00	-0.01				-0.01			
EMK PERU	-0.10				-0.07				-0.03			
EMK PHILIPPINES	-0.22	0.04	-0.01		-0.08		-0.07			-0.07	-0.02	-0.01
EMK POLAND	0.22	-0.03	0.00	0.03	0.29				-0.04		-0.01	-0.02
EMK QATAR	-0.15			-0.01	-0.09		-0.02			-0.02	-0.01	-0.01
EMK RUSSIA	-0.16		-0.06	-0.38	0.43				-0.10		-0.03	-0.02
EMK SOUTH AFRICA	-1.59	-0.63	-0.13	-0.01	-0.40	-0.06	-0.02		-0.11	-0.11	-0.12	
EMK TAIWAN	1.63	-0.01	-0.06	-0.02	-0.33	-0.01	-0.04	2.32	-0.13	-0.01	-0.08	
EMK THAILAND	-0.31	-0.03	-0.06	0.10	-0.11	-0.02	-0.06	-0.01	-0.06	0.00	-0.04	-0.01
EMK TURKEY	1.32	-0.02	-0.04	0.18	1.08		0.12		-0.02	0.03	-0.02	
EMK UAE	-0.18	0.00			-0.05		-0.02			-0.07	-0.04	
FMK ARGENTINA	0.19				0.19							

Legend	Color Code
> 0.15	
< -0.15	

Note: Portfolio weights are measured at the end of the calendar period indicated. Weights may temporarily drift beyond position limits in between trading sessions because of price movements.



As of August 31, 2017

ACTIVE (BENCHMARK RELATIVE) PORTFOLIO WEIGHT SHIFTS

Country	Total	Consumer Discretionary	Consumer Staples	Energy	Financials	Health Care	Industrials	Information Technology	Materials	Real Estate	Telecomm. Services	Utilities
Total		-0.72	-0.24	0.07	0.01	-0.13	-0.77	0.20	0.26	0.20	0.59	0.55
DEV AUSTRALIA	0.31	-0.01	-0.01	-0.01	0.09	-0.01	0.01	-0.07	0.29	0.00	0.01	0.00
DEV AUSTRIA	0.05			0.00	0.01		0.04		0.00			
DEV BELGIUM	-0.01	0.00	0.01		0.00	0.00		-0.02	0.00		0.00	
DEV CANADA	-0.65	0.00	-0.16	0.05	-0.05	0.00	-0.44	0.00	-0.04	0.00	0.00	0.00
DEV DENMARK	-0.04	0.00	0.00		0.01	-0.04	0.01		-0.01		0.00	0.00
DEV FINLAND	-0.43	0.00		0.00	0.00	0.00	-0.35	-0.07	-0.01		0.00	0.00
DEV FRANCE	-0.19	-0.02	0.00	-0.01	-0.11	-0.01	-0.03	0.00	0.00	0.00	0.00	-0.01
DEV GERMANY	0.62	-0.19	0.00		-0.01	-0.05	-0.01	0.00	-0.21	-0.01	0.39	0.70
DEV HONG KONG	0.11	-0.01	0.00		0.01		0.00	0.00		0.09	0.00	0.01
DEV IRELAND	0.00	0.00	0.00		0.00		0.00		0.00			
DEV ISRAEL	0.20				0.00	0.07	0.00	0.13	0.00	0.00	0.00	
DEV ITALY	0.28	-0.02		0.01	0.00	0.00	0.10	0.06			0.01	0.13
DEV JAPAN	1.40	-0.32	0.57	0.01	0.16	-0.04	0.18	0.09	0.25	0.15	0.33	0.04
DEV NETHERLANDS	-0.62	0.00	0.01	0.00	-0.22		-0.05	-0.01	-0.36		0.00	
DEV NEW ZEALAND	-0.03	-0.01				0.00	0.00		0.00		-0.02	0.00
DEV NORWAY	-0.23	0.00	-0.01	0.00	-0.21				-0.01		0.00	
DEV PORTUGAL	0.00		0.00	0.00								0.00
DEV SINGAPORE	0.02	0.00	0.00		0.01		0.00			0.00	0.01	
DEV SPAIN	-1.15	0.01	0.00	0.00	-0.44	0.00	0.25	-0.55			-0.04	-0.38
DEV SWEDEN	-0.27	0.00	0.00	0.00	-0.07	0.00	-0.03	-0.18	0.01		0.00	
DEV SWITZERLAND	-0.44	-0.01	0.00		-0.06	0.02	-0.39	0.00	0.00	0.00	0.00	
DEV UNITED KINGDOM	-0.27	-0.26	-0.60	0.04	0.16	-0.08	-0.05	-0.02	0.36	0.00	0.03	0.15
EMK BRAZIL	0.32	0.09	-0.01	0.00	0.12	0.00	-0.01	0.01	0.21	0.00	0.00	-0.09
EMK CHILE	-0.02	0.00	0.00	0.00	0.00		0.00		0.00		0.00	0.00
EMK CHINA	-0.92	0.02	-0.01	0.00	0.46	0.00	0.00	-1.02	-0.01	-0.02	-0.35	0.00
EMK COLOMBIA	0.06			0.00	0.06				0.00			0.00
EMK CZECH REPUBLIC	0.00				0.00						0.00	0.00
EMK EGYPT	0.00				0.00						0.00	
EMK GREECE	0.00	0.00			0.00				0.00		0.00	0.00
EMK HUNGARY	-0.01			0.00	0.00	0.00						
EMK INDIA	0.02	0.01	0.00	-0.01	0.01	0.01	0.00	0.01	-0.01		0.00	0.00
EMK INDONESIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
EMK KOREA	1.29	0.00	0.00	0.01	-0.05	0.00	0.02	1.27	-0.10		0.14	0.00
EMK MALAYSIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
EMK MEXICO	0.14	0.00	0.00		0.00		0.01		0.00	0.00	0.13	0.00
EMK PAKISTAN	0.00			0.00	0.00				0.00			
EMK PERU	-0.01				-0.01				0.00			
EMK PHILIPPINES	0.02	0.01	0.00		0.00		0.00			0.00	0.00	0.00
EMK POLAND	0.21	0.00	0.00	0.00	0.22				0.00		0.00	0.00
EMK QATAR	0.01			0.00	0.01		0.00			0.00	0.00	0.00
EMK RUSSIA	-0.07		-0.01	-0.01	-0.03				-0.01		0.00	0.00
EMK SOUTH AFRICA	-0.15	-0.01	0.00	0.00	-0.02	0.00	0.00		-0.10	0.00	-0.01	
EMK TAIWAN	0.44	-0.01	-0.01	0.00	-0.06	0.00	-0.01	0.55	0.01	0.00	-0.02	
EMK THAILAND	-0.05	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00
EMK TURKEY	0.01	0.00	0.00	0.01	0.00		0.00		0.00	0.00	0.00	
EMK UAE	0.00	0.00			0.00		0.00			0.00	0.00	
FMK ARGENTINA	0.03				0.03							

Legend	Color Code
> 0.15	
< -0.15	

Note: Portfolio weights are measured at the end of the calendar period indicated. Weights may temporarily drift beyond position limits in between trading sessions because of price movements.



As of August 31, 2017

CURRENCY POSITIONS

Currency	Portfolio Weight*	Benchmark Weight	Active Weight*	Active Weight Shifts*
DEV AUSTRALIAN DOLLAR	3.47	5.38	(1.91)	0.67
DEV BRITISH POUND	8.87	11.03	(2.16)	(0.78)
DEV CANADIAN DOLLAR	4.09	6.58	(2.49)	(0.63)
DEV DANISH KRONE	0.01	1.30	(1.29)	(0.04)
DEV EURO	24.31	22.83	1.48	(1.48)
DEV HONG KONG DOLLAR	1.70	2.42	(0.72)	0.11
DEV ISRAELI NEW SHEKEL	0.08	0.32	(0.25)	0.20
DEV JAPANESE YEN	25.60	16.02	9.58	1.40
DEV NEW ZEALAND DOLLAR	0.33	0.12	0.21	(0.03)
DEV NORWEGIAN KRONER	0.48	0.47	0.01	(0.16)
DEV SINGAPORE DOLLAR	0.01	0.87	(0.86)	0.02
DEV SWEDISH KRONA	2.25	2.01	0.24	(0.28)
DEV SWISS FRANC	4.57	5.70	(1.13)	(0.44)
DEV US DOLLAR	0.57	0.06	0.51	(0.14)
EMK BRAZILIAN REAL	4.06	1.78	2.28	0.33
EMK CHILEAN PESO	0.00	0.33	(0.33)	(0.02)
EMK CHINESE YUAN RENMINBI	5.03	7.24	(2.21)	(0.92)
EMK CHINESE YUAN RENMINBI - OFFSHORE	0.04	0.00	0.04	0.01
EMK COLOMBIAN PESO	0.07	0.11	(0.04)	0.06
EMK CZECH KORUNA	0.00	0.04	(0.04)	0.00
EMK EGYPTIAN POUND	0.00	0.03	(0.03)	0.00
EMK HUNGARIAN FORINT	0.00	0.09	(0.09)	(0.01)
EMK INDIAN RUPEE	0.00	2.15	(2.15)	0.02
EMK INDONESIAN RUPIAH	0.20	0.56	(0.36)	0.00
EMK KOREAN WON	6.14	3.60	2.54	1.30
EMK MALAYSIAN RINGGIT	0.00	0.55	(0.55)	0.00
EMK MEXICAN PESO	0.14	0.90	(0.76)	0.14
EMK PAKISTAN RUPEE	0.00	0.02	(0.02)	0.00
EMK PERUVIAN NUEVO SOL	0.00	0.10	(0.10)	(0.01)
EMK PHILIPPINE PESO	0.05	0.27	(0.22)	0.02
EMK POLISH ZLOTY	0.56	0.34	0.23	0.22
EMK QATARI RIAL	0.00	0.15	(0.15)	0.01
EMK RUSSIAN ROUBLE	0.64	0.80	(0.16)	(0.07)
EMK SOUTH AFRICAN RAND	0.09	1.80	(1.71)	0.01
EMK TAIWAN DOLLAR	4.59	2.92	1.67	0.47
EMK THAI BAHT	0.24	0.53	(0.30)	(0.05)
EMK TURKISH LIRA, NEW	1.62	0.30	1.32	0.01
EMK UNITED ARAB EMIRATES DIRHAM	0.00	0.20	(0.20)	0.00
FMK ARGENTINE PESO	0.19	0.03	0.16	0.03
FMK NIGERIAN NAIRA	0.00	0.05	(0.05)	0.00

Legend	Color Code
> 1.00	
< -1.00	

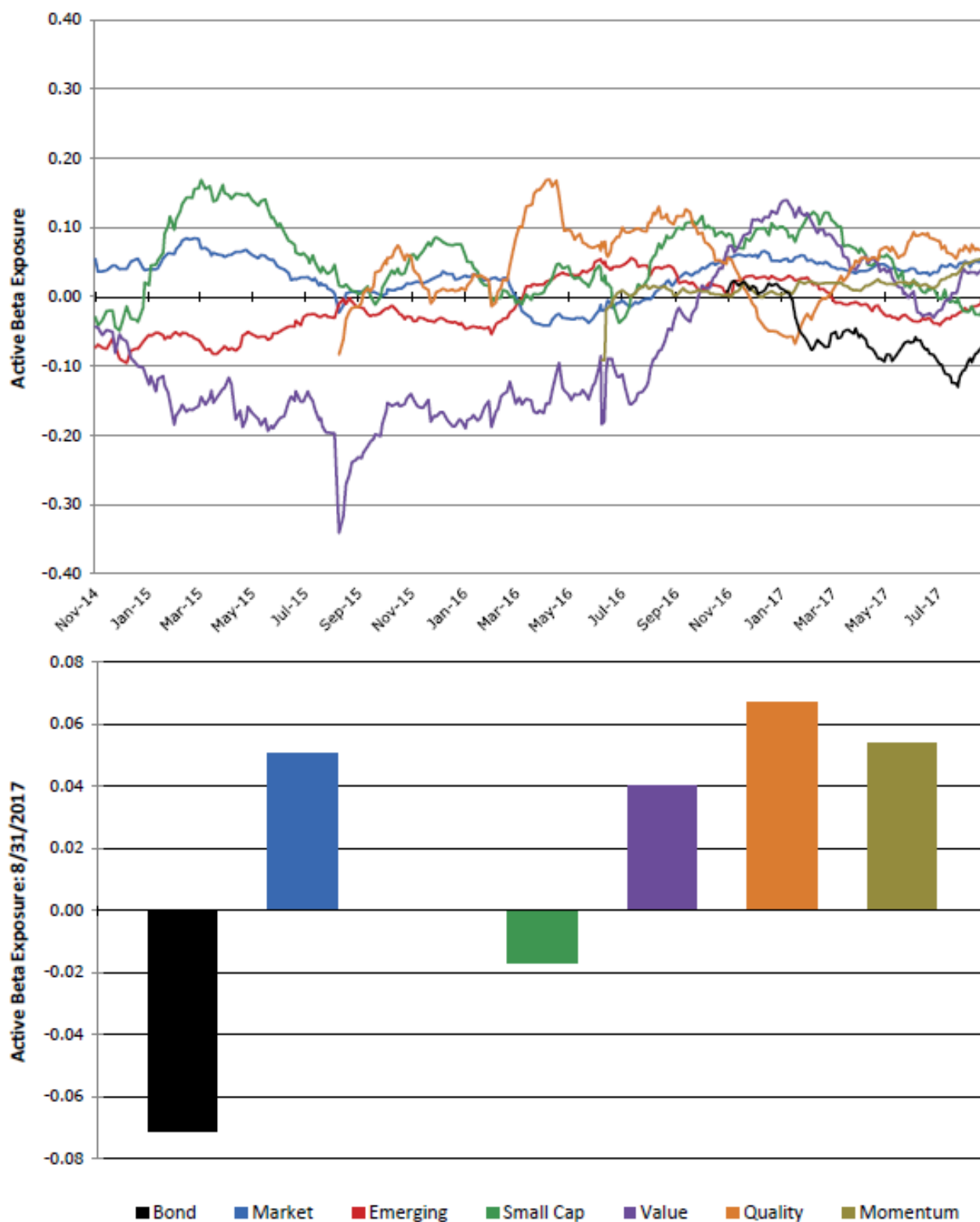
Note: Portfolio weights are measured at the end of the calendar period indicated. Weights may temporarily drift beyond position limits in between trading sessions because of pricing movements. The currency exposure of individual securities is based on Arrowstreet's research classification which can vary from the currency classification used by the benchmark provider.



As of August 31, 2017

ACTIVE BETA EXPOSURES

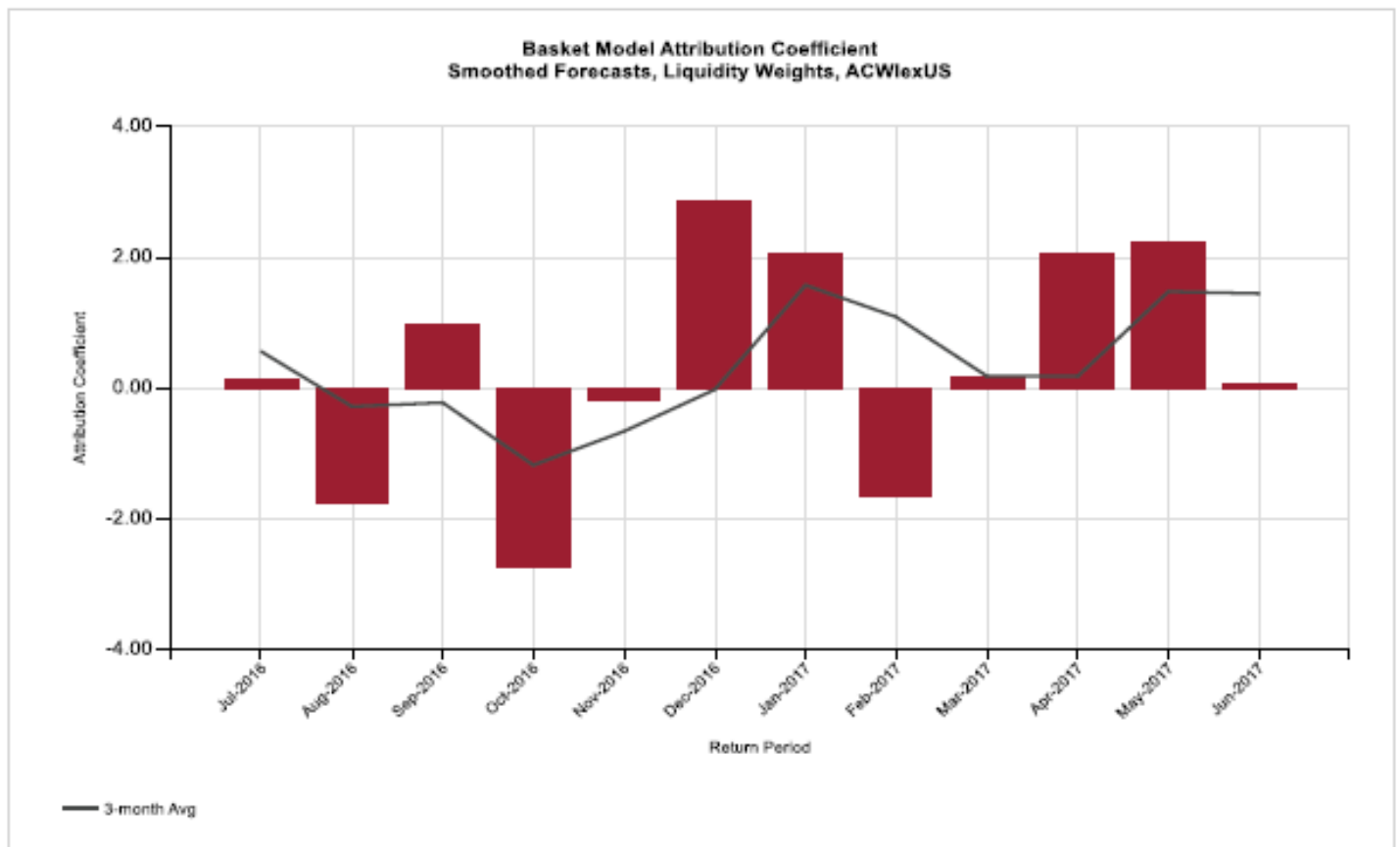
Active Beta Exposure : ALASKA





End of Period: June 30, 2017

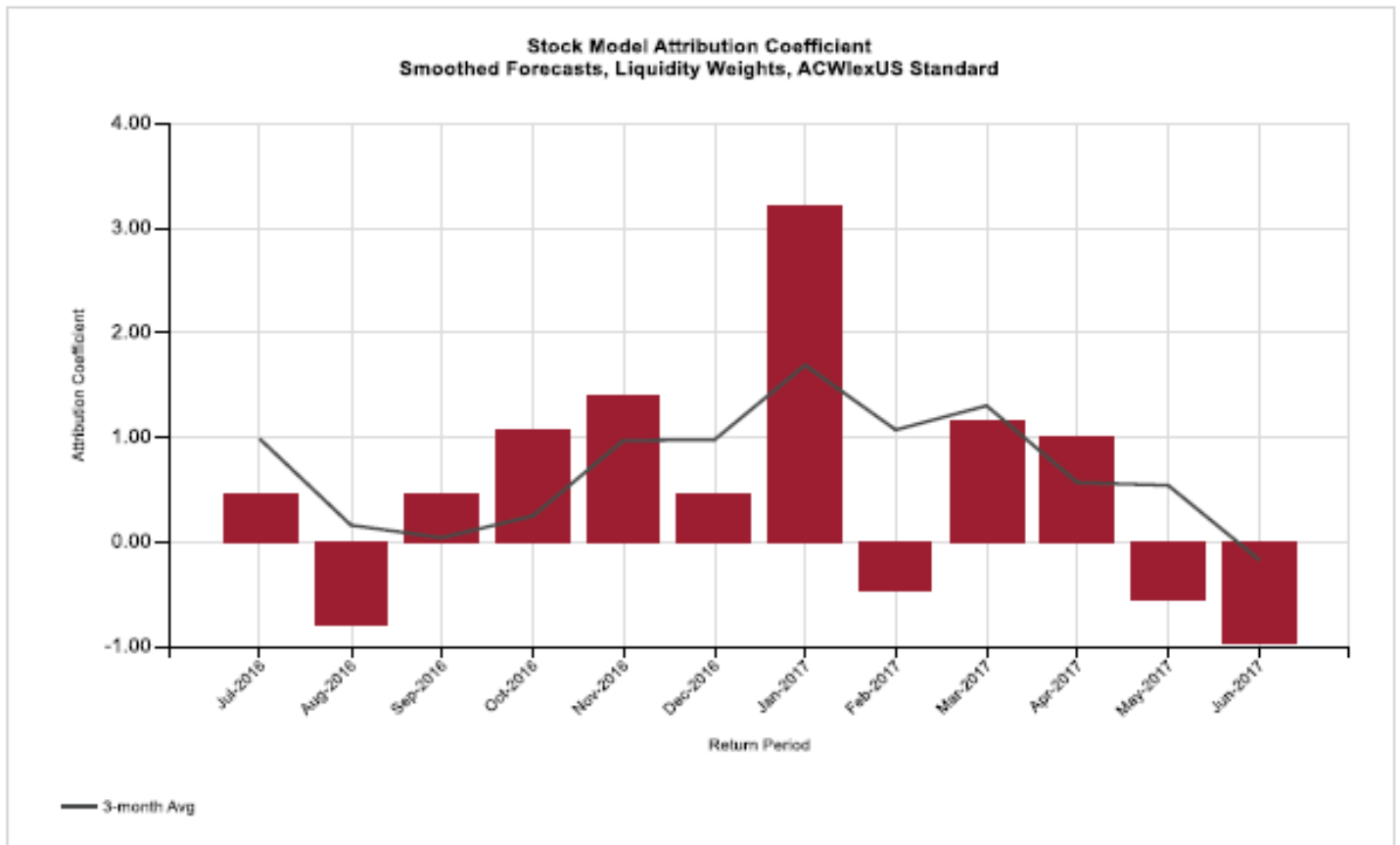
BASKET MODEL ATTRIBUTION – ACWI EX US





End of Period: June 30, 2017

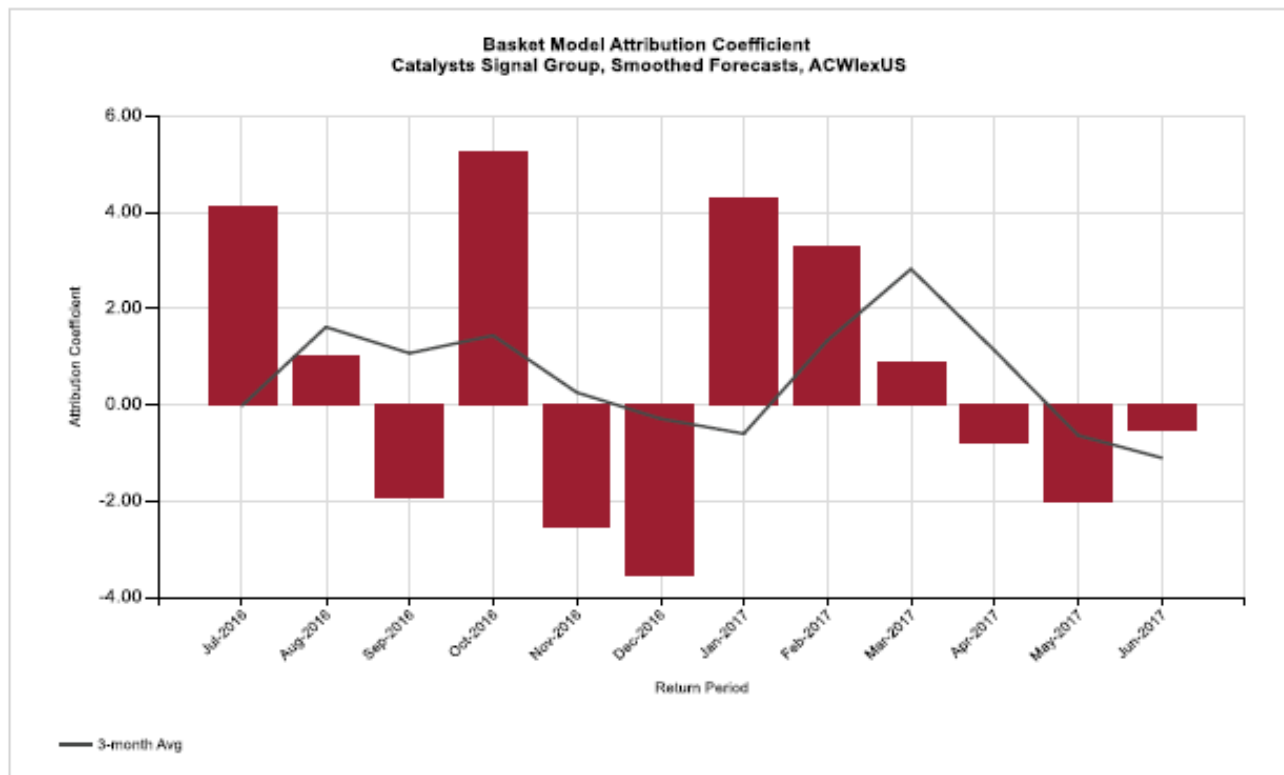
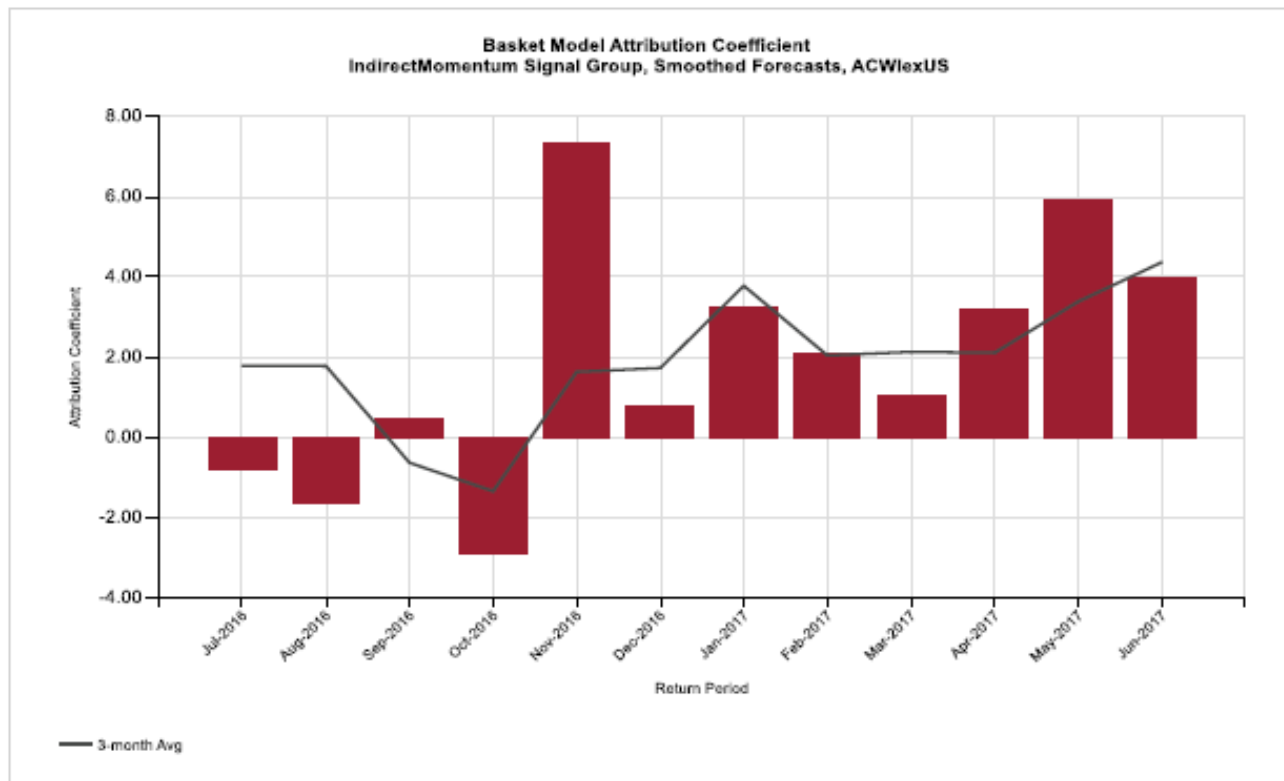
STOCK MODEL ATTRIBUTION – ACWI EX US





End of Period: June 30, 2017

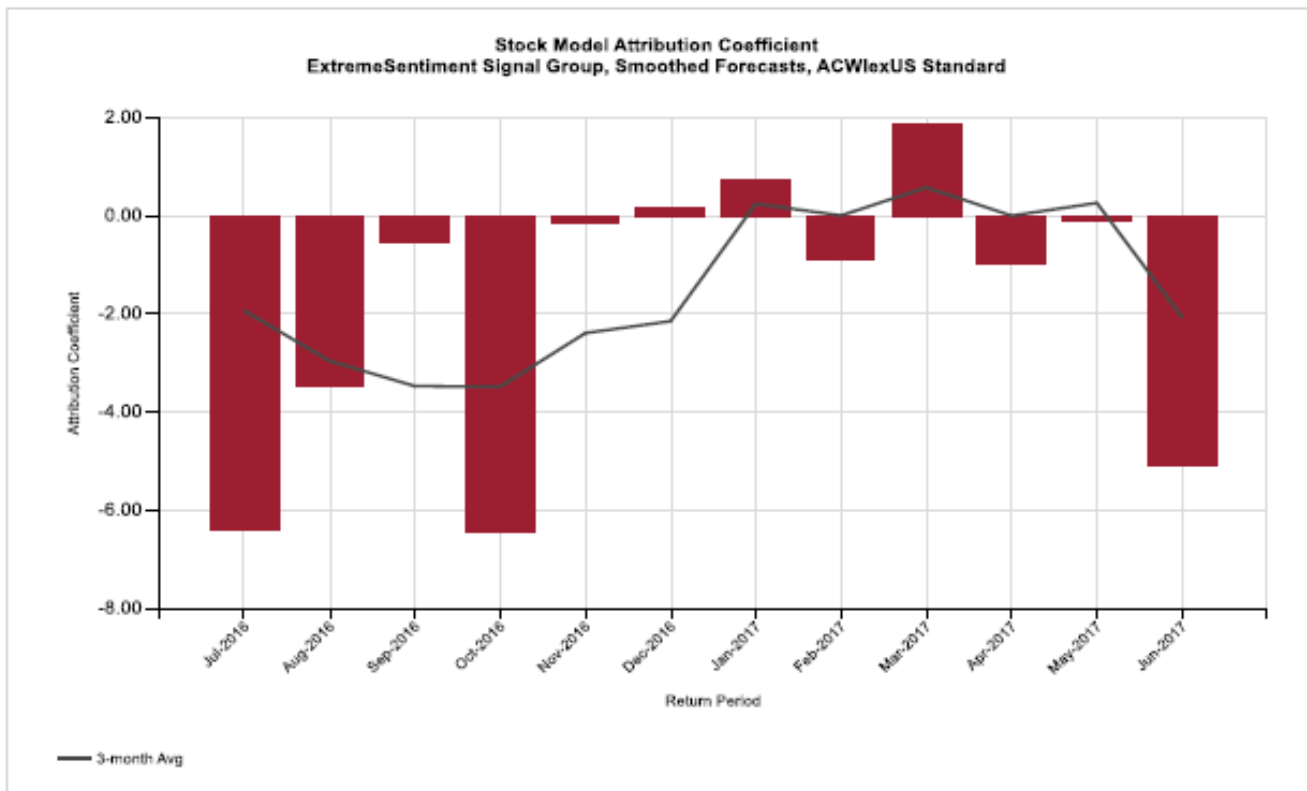
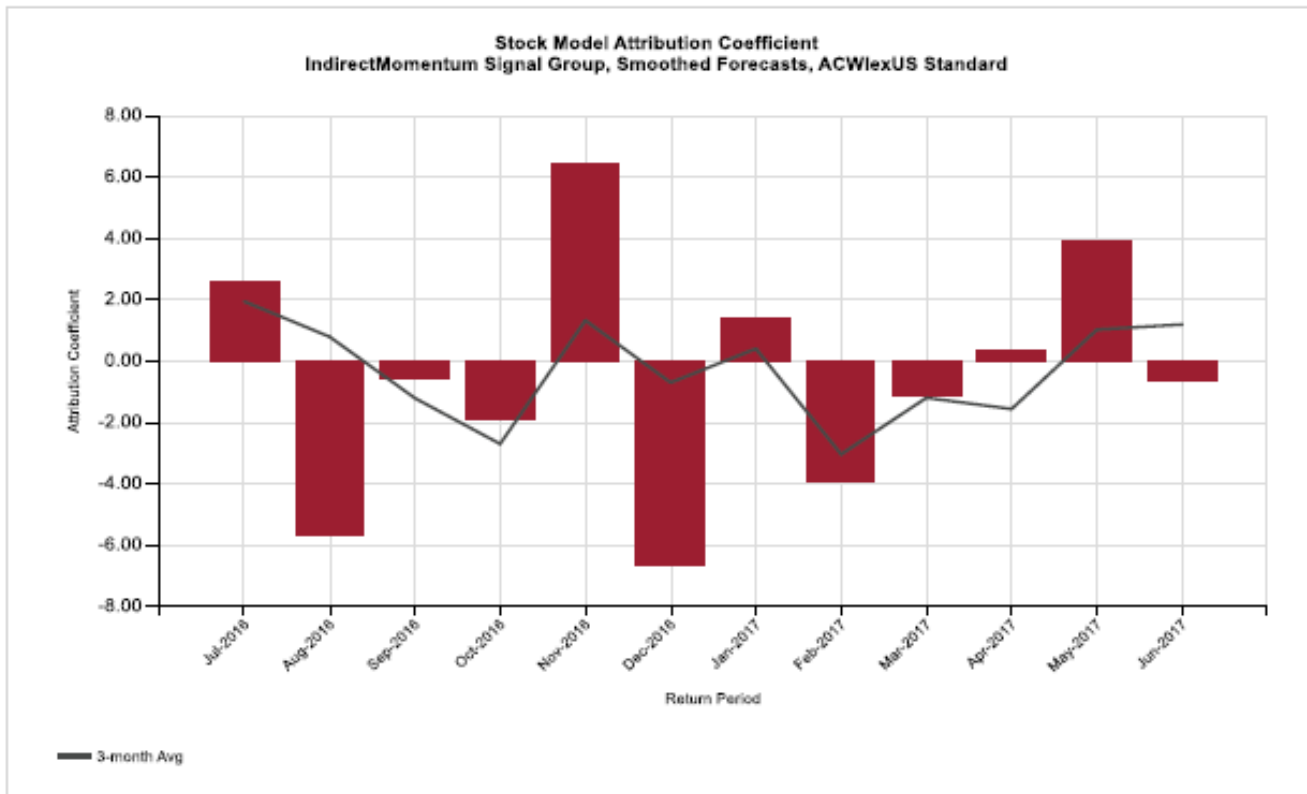
BASKET MODEL ATTRIBUTION DETAIL – ACWI EX US





End of Period: June 30, 2017

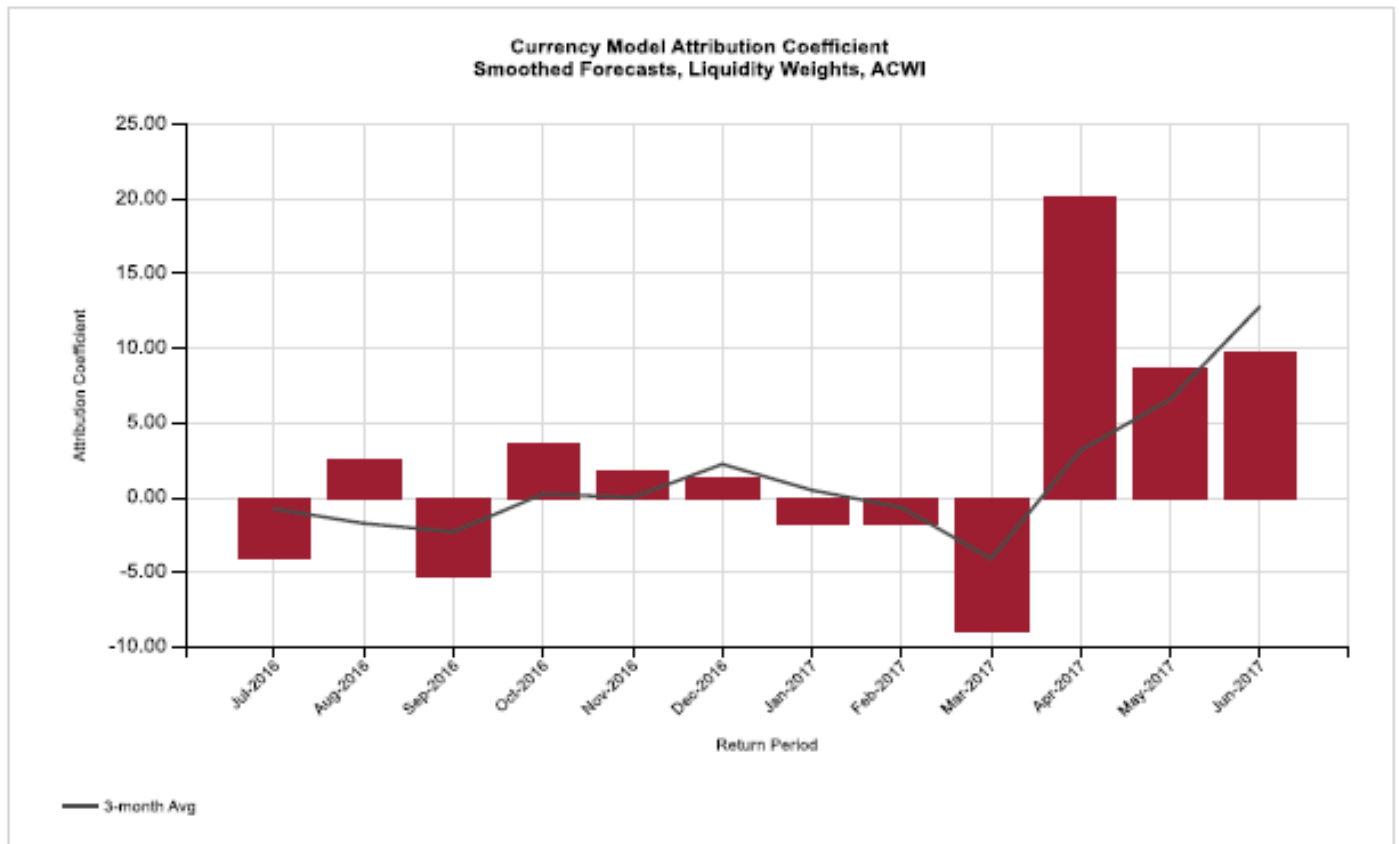
STOCK MODEL ATTRIBUTION DETAIL – ACWI EX US





End of Period: June 30, 2017

CURRENCY MODEL ATTRIBUTION – ACWI EX US



International Equity – ACWI ex US *Strategy Objectives*



CONSISTENTLY OUTPERFORM BROAD INTERNATIONAL INDICES

Target Outperformance: 3% per year over a market cycle

Target Risk: 3% – 7% per year



CORE INVESTMENT STYLE

Style neutral over long periods

Risk controlled

Outperform during a broad range of market environments



DIVERSIFICATION FROM OTHER MANAGERS

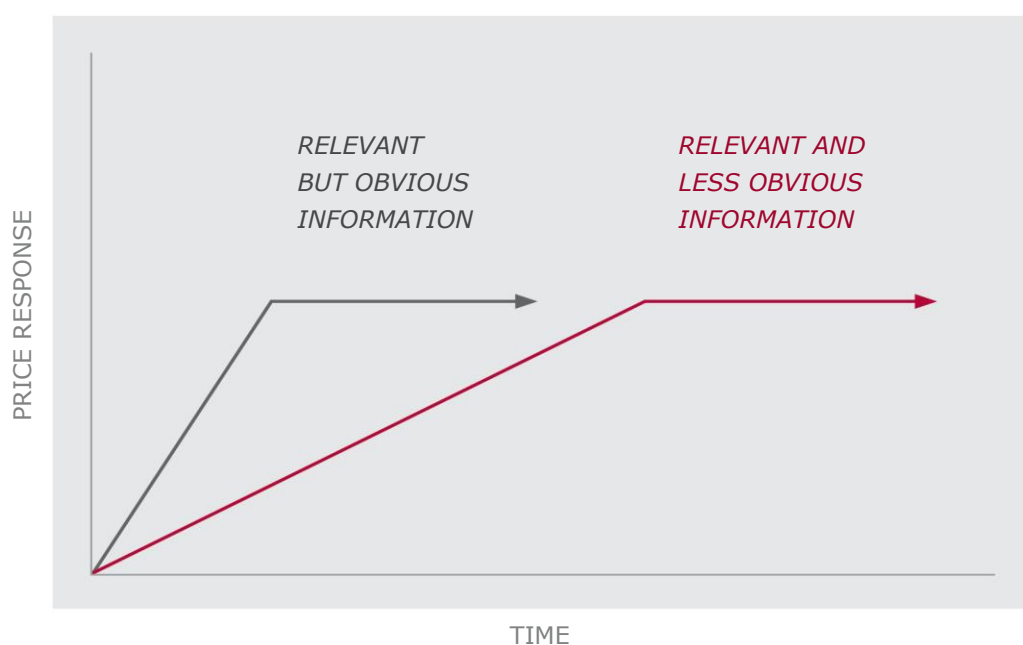
PORTFOLIO CONSTRUCTION

Client portfolios built considering forecasts, risks and transaction costs



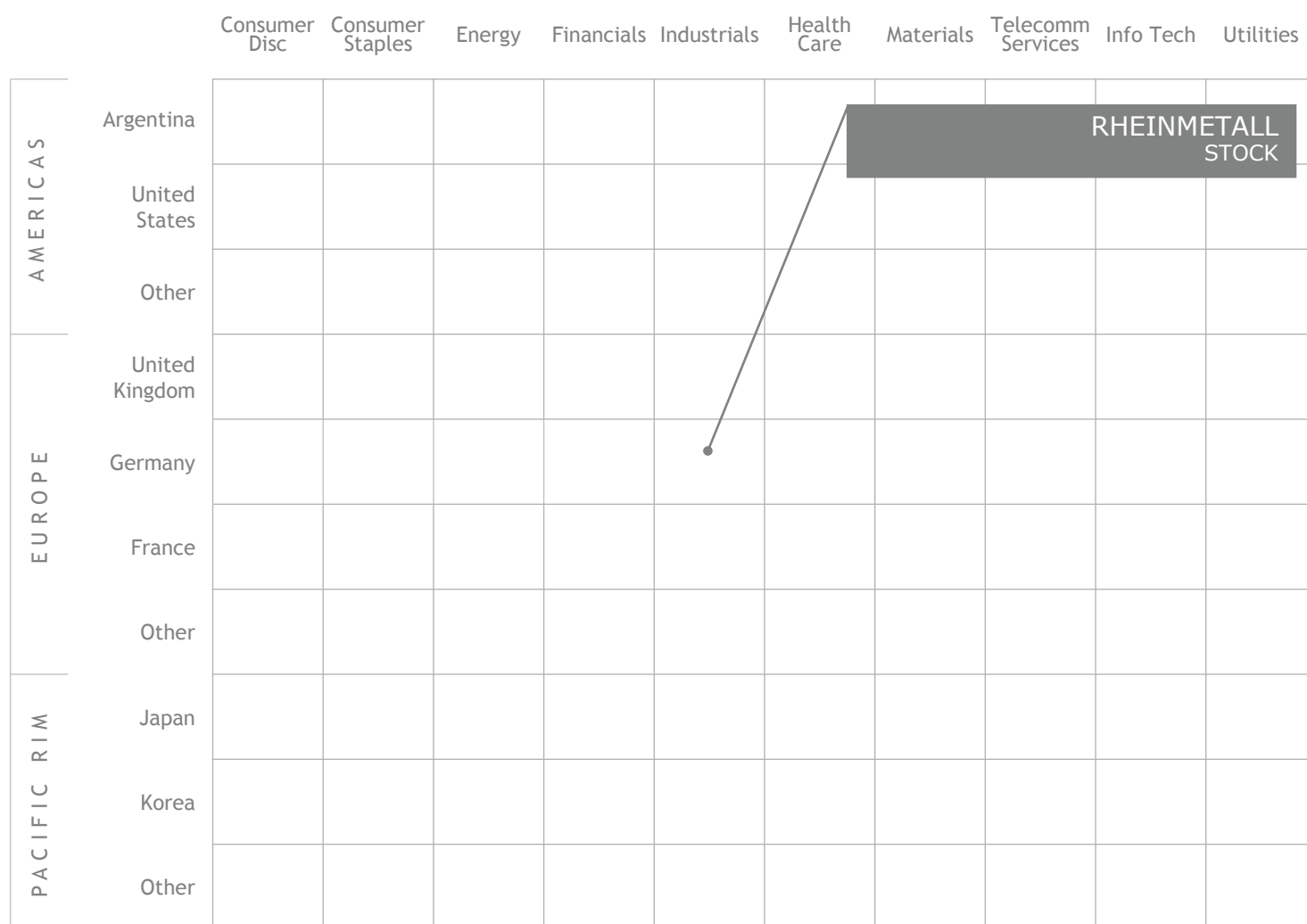
INVESTMENT PHILOSOPHY

Adding value by identifying investment signals that are relevant to prices and less obvious to investors



DEFINING DIRECT EFFECTS

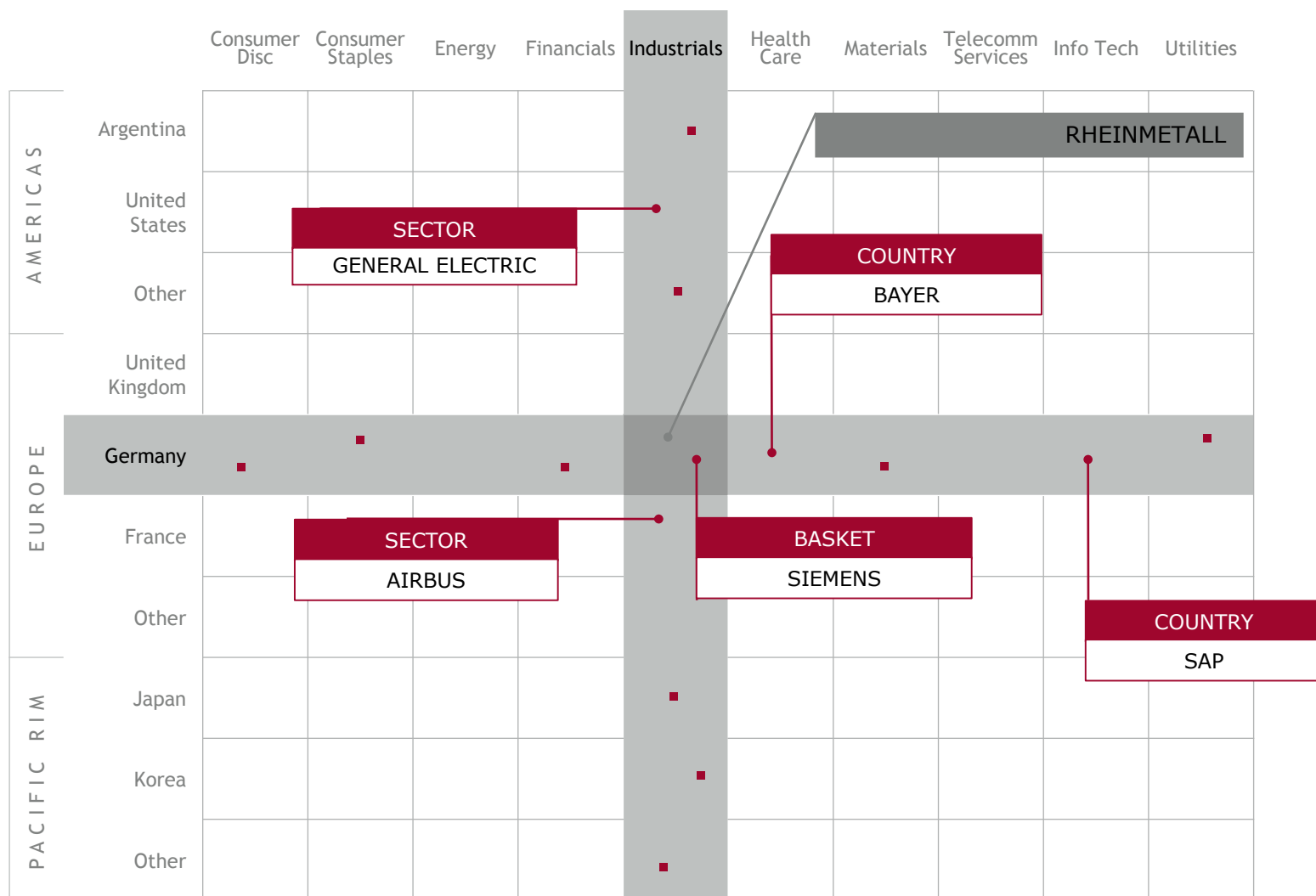
INFLUENCE OF STOCK INFORMATION



- » VALUATION
- » MOMENTUM
- » QUALITY
- » HIGH FREQUENCY
- » CATALYSTS
- » EXTREME SENTIMENT

DEFINING INDIRECT EFFECTS

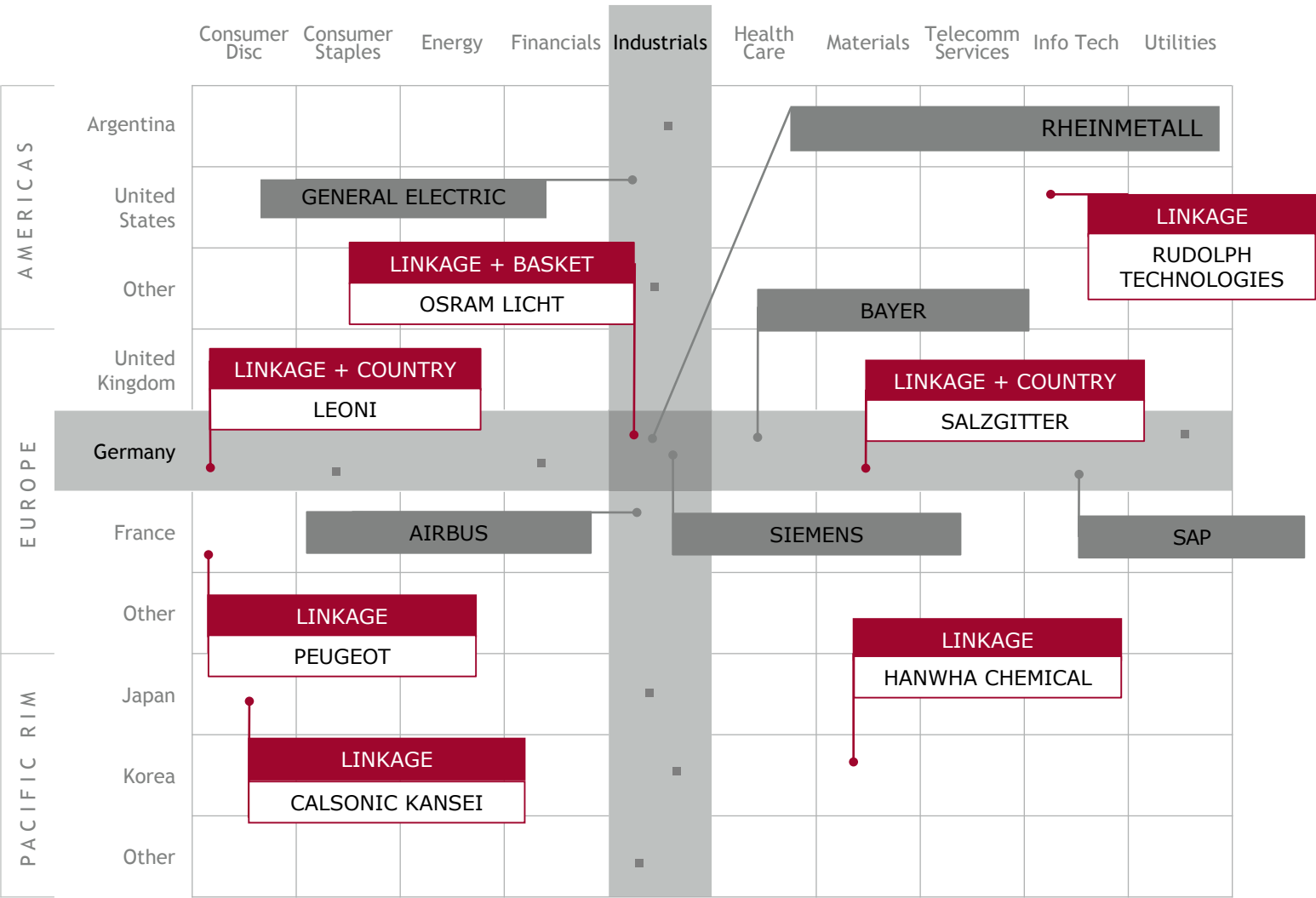
INFLUENCE OF SECTOR, COUNTRY & BASKET INFORMATION



- » VALUATION
- » MOMENTUM
- » QUALITY
- » CATALYSTS
- » EXTREME SENTIMENT

DEFINING INDIRECT EFFECTS

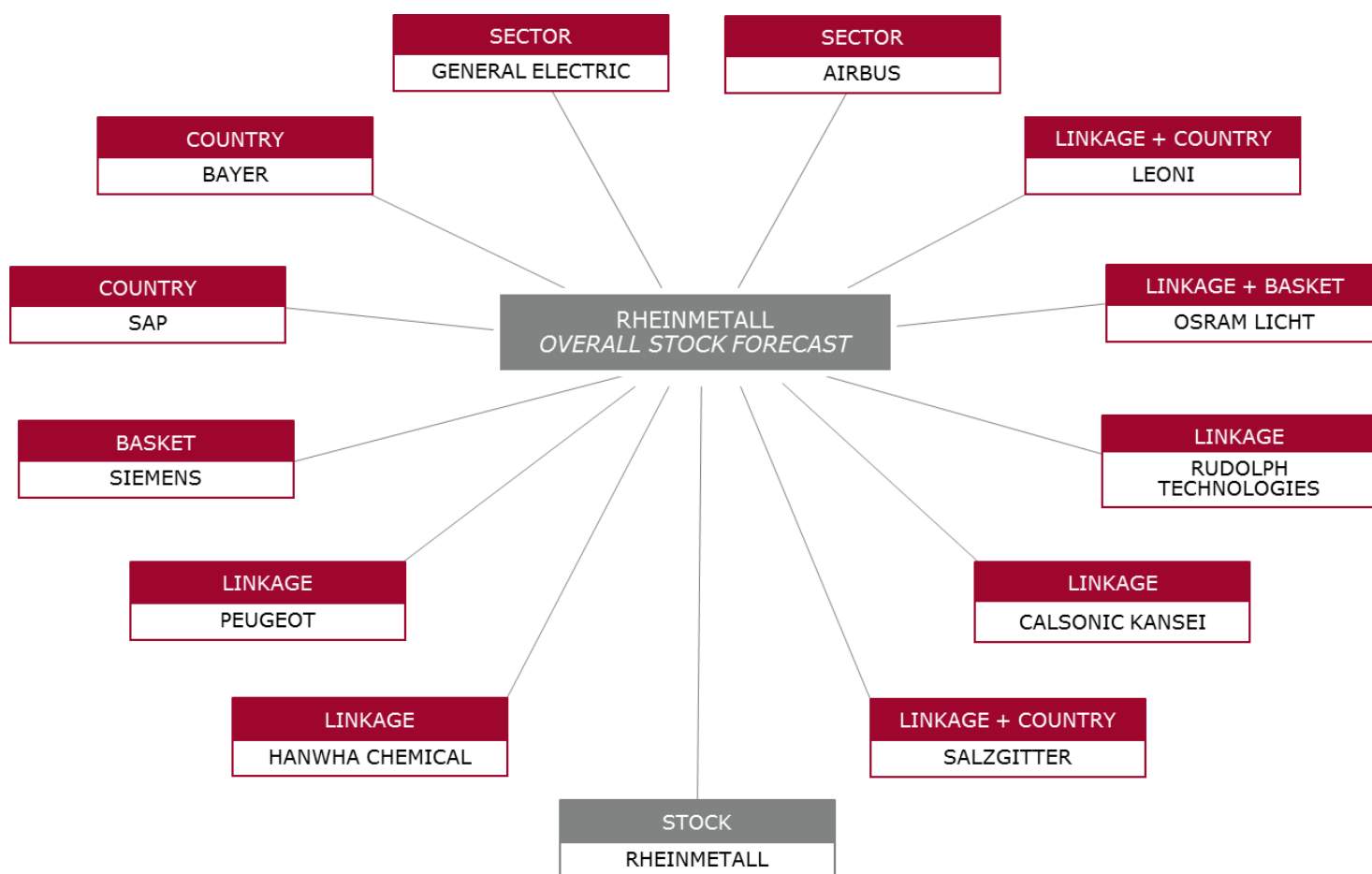
INFLUENCE OF EXPANDED LINKAGES



» VALUATION

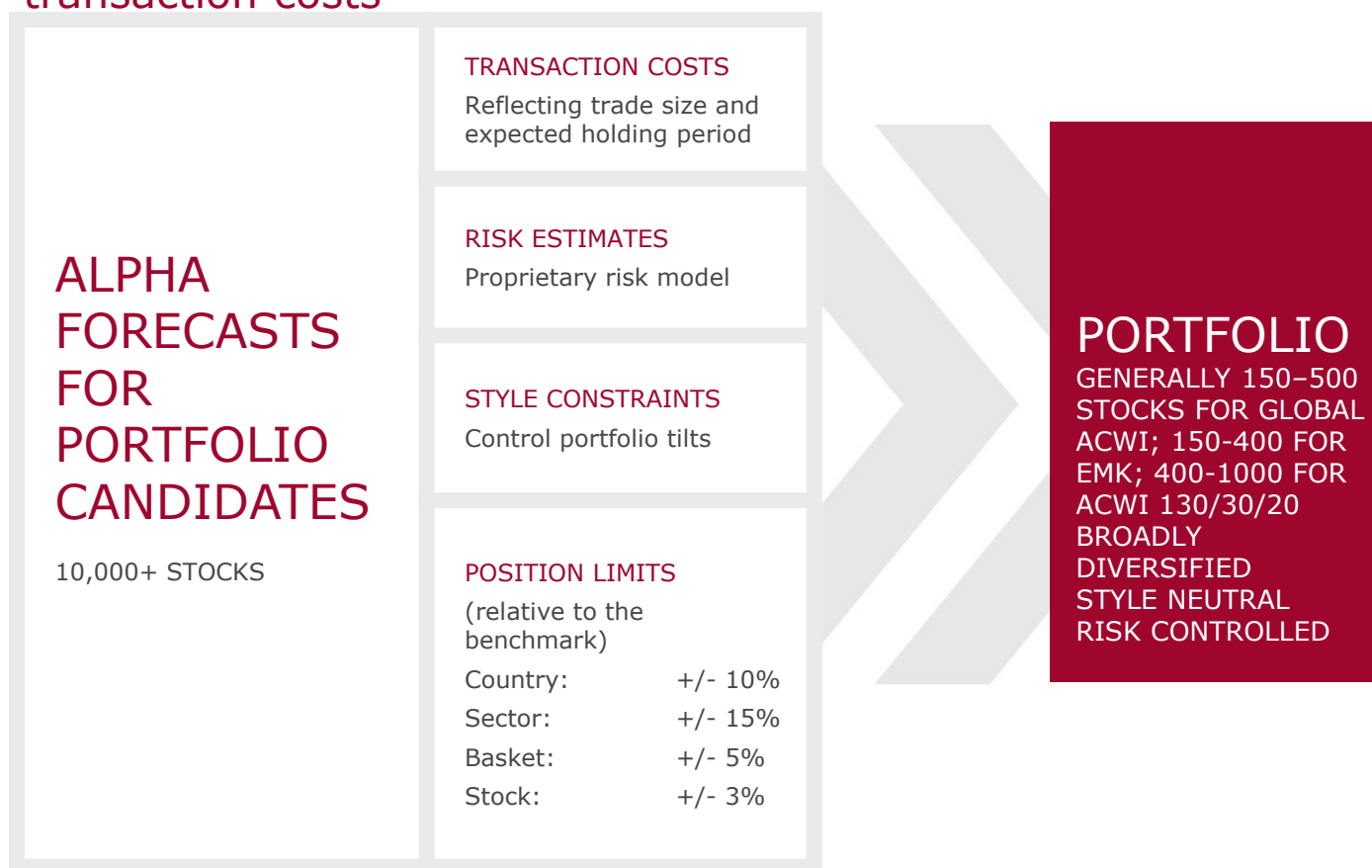
» MOMENTUM

INVESTMENT PROCESS



PORTFOLIO CONSTRUCTION

Client portfolios built considering forecasts, risks and transaction costs





EXPANDED LINKAGES EXAMPLE

STOCK: RHEINMETALL

COUNTRY: GERMANY

SECTOR: INDUSTRIALS

Largest Basket Constituents

	Stock	Country	Sector	MktCap (\$US mil)
1	SIEMENS AG	Germany	Industrials	90,416
2	DEUTSCHE POST AG	Germany	Industrials	35,358
3	MAN SE	Germany	Industrials	14,442
4	BRENTAG AG	Germany	Industrials	8,853
5	GEA GROUP AG	Germany	Industrials	7,796

Largest Country Constituents (Different Basket)

	Stock	Country	Sector	MktCap (\$US mil)
1	BAYER AG	Germany	Health Care	110,431
2	SAP AG	Germany	Information Technology	97,113
3	DAIMLER AG	Germany	Consumer Discretionary	93,452
4	DEUTSCHE TELEKOM AG	Germany	Telecommunications	85,312
5	ALLIANZ SE	Germany	Financials	81,001

Largest Sector Constituents (Different Country)

	Stock	Country	Sector	MktCap (\$US mil)
1	GENERAL ELECTRIC	U.S.	Industrials	286,534
2	BOEING CO	U.S.	Industrials	98,454
3	3M COMPANY	U.S.	Industrials	97,277
4	UNITED TECHNOLOGIES	U.S.	Industrials	85,864
10	AIRBUS GROUP SE	France	Industrials	56,732

Most Linked Securities (Ranked)

	Stock	Country	Sector	MktCap (\$US mil)
1	PEUGEOT SA	France	Consumer Discretionary	14,094
2	MAN SE	Germany	Industrials	14,442
3	LEONI AG	Germany	Consumer Discretionary	1,282
4	RENAULT	France	Consumer Discretionary	29,838
5	OSRAM LICHT AG	Germany	Industrials	6,119
6	SALZGITTER AG	Germany	Materials	1,696
7	USG PEOPLE N.V.	Netherlands	Industrials	1,260
8	FAURECIA SA	France	Consumer Discretionary	4,842
9	RUDOLPH TECHNOLOGIES	U.S.	Information Technology	447
10	NORMA GROUP SE	Germany	Industrials	1,660
11	VALEO SA	France	Consumer Discretionary	12,137
12	DMG MORI AG	Germany	Industrials	3,196
13	JENOPTIK AG	Germany	Information Technology	920
14	APERAM	France	Materials	2,366
15	ELRINGKLINGER AG	Germany	Consumer Discretionary	1,442
16	MCDERMOTT INT'L INC	U.S.	Energy	1,278
17	CALSONIC KANSEI CORP	Japan	Consumer Discretionary	2,216
18	KUKA AG	Germany	Industrials	3,093
19	SGL CARBON SE	Germany	Industrials	1,379
20	FFP S.A.	France	Financials	1,831
21	DAIMLER AG	Germany	Consumer Discretionary	90,758
22	HANWHA CHEMICAL CORP	Korea	Materials	3,285
23	KION GROUP AG	Germany	Industrials	4,797
24	BUZZI UNICEM SPA	Italy	Materials	407
25	SUPERIOR INDUSTRIES	U.S.	Consumer Discretionary	502



EXAMPLE TRADE

Stock:	Rheinmetall AG		30-Nov-15
Region:	Europe		
Country:	Germany		Buy 0.10
Sector:	Industrials		
Direct Effects			
	Level	Change Since	
Stock Factors	30-Nov	29-Nov	24-Nov
Catalyst Signals	0.17	-0.01	-0.16
Extreme Sentiment Signals	0.20	0.03	0.03
High Frequency Signals	0.08	0.13	0.18
Momentum Signals	0.25	0.00	0.03
Quality Signals	0.06	0.00	-0.01
Value Signals	-0.01	0.00	-0.01
Indirect Effects			
	Level	Change Since	
Country/Sector Basket Factors	30-Nov	29-Nov	24-Nov
Catalyst Signals	-0.12	0.04	0.06
Extreme Sentiment Signals	-0.01	-0.01	-0.01
Momentum Signals	0.27	0.03	0.10
Quality Signals	0.04	0.00	0.00
Value Signals	0.07	-0.01	-0.02
Country Factors			
Momentum Signals	0.08	0.02	0.04
Sector Factors			
Momentum Signals	0.15	0.01	0.05
Expanded Linkages			
Valuation Signals	-0.21	-0.01	-0.02
Momentum Signals	0.22	0.07	0.08
Return Forecasts			
	Level	Change Since	
	30-Nov	29-Nov	24-Nov
Monthly Excess Return Forecast	2.46	0.39	0.41
Annualized Excess Return Forecast	29.48		
Portfolio Construction (Optimization)			
	New	Initial	
	Position	Position	Change
Portfolio Weight	0.10	0.00	0.10
Benchmark Weight	0.01	0.01	
Active Weight	0.09	-0.01	
Transaction Cost Estimate	0.21 (average)		
Risk Contribution	Increase Risk (Small Cap Beta)		



BIOGRAPHIES

NAME/TITLE	RESPONSIBILITIES	BEGAN FIRM	YRS. EXP.	EDUCATION	PRIOR EXPERIENCE
SENIOR MANAGEMENT					
Peter Rathjens, Ph.D. PARTNER, CHIEF INVESTMENT OFFICER	Responsible for the firm's investment products; Chairs the firm's Investment Committee	1999	35	Princeton University, Ph.D. in Economics: 1990; Oberlin College, B.A. in Economics and Mathematics: 1981	1998-1999: CIO, PanAgora 1995-1999: Director of Global Investments, PanAgora 1991-1995: Director of Research, PanAgora 1990-1991: Equity Analyst, Colonial Management 1988-1990: Assistant Professor of Economics, Brandeis University 1986-1988: Instructor of Economics, Princeton University 1983-1984: Quantitative Analyst, Lehman Brothers 1981-1983: Analyst, Data Resources
Anthony Ryan, CFA PARTNER, CHIEF EXECUTIVE OFFICER	Develops and implements the firm's strategic business plan	2011	29	London School of Economics, M.Sc.: 1986; University of Rochester, B.A.: 1985	2009-2011: Chief Administrative Officer, Fidelity Investments 2006-2009: U.S. Treasury Department 2000-2006: Partner, Head of Global Business Development & Client Relations, Grantham, Mayo, van Otterloo & Co. LLC 1994-2000: State Street Global Advisors, Principal, State Street Corporation 1988-1994: Manager, Global Investments, PanAgora Asset Management 1987-1988: Manager, Equity Investments, The Boston Company
John Campbell, Ph.D. PARTNER	Develops and implements the firm's research agenda	1999	24	Yale University, Ph.D. in Economics: 1984; Oxford University, B.A. in Economics: 1979	1994-Present: Professor of Applied Economics, Harvard University 1998-1999: Director of External Research, PanAgora 1992-1998: Academic Advisory Committee, PanAgora 1984-1994: Professor of Economics, Princeton University



BIOGRAPHIES

NAME/TITLE	RESPONSIBILITIES	BEGAN FIRM	YRS. EXP.	EDUCATION	PRIOR EXPERIENCE
INVESTMENT PROFESSIONALS					
John Capeci, Ph.D. PARTNER	Implements the firm's investment strategies	1999	22	Princeton University, Ph.D. in Economics: 1990; Harvard University, A.B. in Economics: 1984	1998-1999: Director of Research, PanAgora 1994-1998: Senior Investment Manager, PanAgora 1990-1995: Assistant Professor, Brandeis University
Manolis Liodakis, Ph.D. PARTNER	Implements the firm's investment strategies	2012	18	City University, London, Ph.D. in Finance: 1999; University of Birmingham, MBA in Finance: 1996; Athens University of Economics & Business, B.S. in Economics & Business: 1994	2008-2011: Managing Director of Global Equities Hybrid Strategies, Citadel Asset Management 2001-2008: Managing Director-Head of European Quantitative Equity Research, Citigroup Global Markets 2000-2001: Strategist, Morgan Stanley 1998-2000: Associate, Salomon Brothers
Alex Ogan PARTNER	Implements the firm's investment strategies	2005	11	Harvard College, A.B. in Economics: 2005	2003-2004: Project Engineer, Aaxis Technologies
George Pararas-Carayannis, CFA PARTNER	Implements the firm's investment strategies	2002	20	Babson College, MBA in Finance: 2011; Georgetown University, B.S. in Business Administration: 1996	2000-2002: Analyst, Putnam Investments 1998-2000: Senior Investment Associate, PanAgora 1996-1998: Registered Representative, Fidelity Investments
Michael Zervas, CFA PARTNER	Implements the firm's investment strategies	2004	15	Stonehill College, B.S. in Business Administration: 2001	2001-2004: Consultant, FactSet Research Systems



BIOGRAPHIES

NAME/TITLE	RESPONSIBILITIES	BEGAN FIRM	YRS. EXP.	EDUCATION	PRIOR EXPERIENCE
INVESTMENT PROFESSIONALS					
Sam Thompson, Ph.D. PARTNER	Designs, develops, and maintains the investment systems used to support the management of client portfolios	2005	10	University of California at Berkeley, Ph.D. in Economics and M.A. in Statistics: 2000; Yale University, B.A. in Economics: 1995	2005-2006: Consultant, Arrowstreet Capital 2004-2005: Associate Professor of Economics, Harvard University 2000-2004: Assistant Professor of Economics, Harvard University
Marta Campillo, Ph.D. PARTNER	Designs, develops, and maintains the investment systems used to support the management of client portfolios	1999	19	Boston University, Ph.D. in Economics: 2000; Universidad Complutense, M.A.: 1992; Institute of Fiscal Studies, M.A.: 1990; Universidad de Autonoma, B.S.: 1989	1997-1999: Teaching Assistant - Dept. of Economics, Boston University 1995-1997: Research Assistant - Prof. Jeffrey Miron, Boston University 1990-1993: Research Associate - Foundation of Applied Economics Studies, FEDEA
Tuomo Vuolteenaho, Ph.D. PARTNER	Develops and implements the firm's research agenda	2004	12	University of Chicago, Ph.D. in Finance: 2000; Helsinki School of Economics and Business Administration, M.S. in Economics: 1995	2004: Consultant, Arrowstreet Capital 2000-2004: Assistant Professor of Economics, Harvard University 1995-2000: Teaching Assistant, University of Chicago
Alex Merlis, CFA PARTNER	Develops and enhances the firm's forecasting and risk models	2006	14	Boston University, M.A. in Mathematical Finance: 2006; Harvard University, A.B. in Physics and S.M. in Engineering Sciences: 1996	2003-2005: Quantitative Long/Short Analyst, Citadel Investment Group 2002-2003: Quantitative Analyst, StarMine Corp.
Derek Vance, CFA PARTNER	Develops and enhances the firm's forecasting and risk models	2008	8	Harvard College, A.B. in Economics: 2007	2007-2008: Analyst, Goldman Sachs
Yijie Zhang, Ph.D. PARTNER	Develops and enhances the firm's forecasting and risk models	2006	9	Yale University, Ph.D. in Finance: 2006; Rutgers University, M.S. in Economics: 2000; Tsinghua (Qinghua) University, B.A. in Finance: 1997	2003-2006: Teaching Assistant, Yale University



BIOGRAPHIES

NAME/TITLE	RESPONSIBILITIES	BEGAN FIRM	YRS. EXP.	EDUCATION	PRIOR EXPERIENCE
CLIENT RELATIONSHIP MANAGEMENT					
Michael Stanton, CFA PARTNER	Responsible for the firm's sales and marketing efforts	2006	22	Colby College, B.A. in Government: 1992	2000-2006: Managing Director of Consultant Relations, Babson Capital Management 1994-2000: Consultant Relations Associate, Putnam Investments 1993-1994: Investor Services, Putnam Investments
Jon Simon, CFA MANAGER	Responsible for client service efforts	2014	25	Boston College, M.S. In Finance: 2004 and B.S. in Finance: 1991	2004-2014: Director, Client Service, Batterymarch Financial Management 2001-2002: Institutional Client Service, Barclays Global Investors 1994-2001: Defined Contribution Specialist, MFS Investment Management 1992-1994: Associate, Aetna Investment Services
Bryan F. Roda, CFA, CPA Client Relationship Manager	Responsible for servicing institutional client relationships	2016	8	Cornell University, Johnson Graduate School of Management, MBA in Finance: 2008 Bucknell University, BS in Accounting: 2000	2014-2016: Director, Global Relationship Management, Manulife Asset Management 2008-2014: Manager, Client Service, Batterymarch Financial Management 2003-2006: Manager, Transaction Advisory Services, Ernst & Young LLP 2000-2003: Supervisory Senior Associate, Assurance and Advisory Business Services, Ernst & Young LLP



PERFORMANCE ATTRIBUTION DISCLOSURES

Portfolio Attribution: A Guide to Reading the Charts

Arrowstreet Capital, Limited Partnership's ("Arrowstreet") portfolio attribution measures performance simultaneously from a country, sector, basket, and stock perspective, consistent with the way we make our portfolio decisions. Analysis in this form is different from traditional country or sector based attribution, which implicitly assumes a manager's decision begins from a country or sector perspective and then moves to the selection of securities within each country or sector group.

Basket Based Performance Attribution

Each cell in the attribution table represents the combined value added (lost) from both the basket over- or underweighting decision relative to the benchmark and active security selection within each basket using a geometric calculation methodology for the periods covered. Baskets with significant under-weight or over-weight positions (as defined by an active weight of greater than 15 bps or less than -15 bps) are displayed with shading while all others are displayed without shading.

Attribution Results:

This section shows the key components of the realized cumulative results of all actual portfolio weights and characteristics (Portfolio Value Added).

- **Allocation** value added estimates presented in the table are a function of daily basket weights and returns in excess of the benchmark. They represent the portion of the total portfolio value added that is attributed to Basket Selection.
- **Selection** value added estimates presented in the table are a function of daily stock weights in excess of the basket itself. They represent the portion of the total portfolio value added that is attributed to Active Stock Selection.
- **Currency Effects** are the value added or lost from currency exposures that differ from those of the benchmark.
- **Cash Effect** reflects the value added (lost) as a result of cash held in the portfolio.
- **Compounding** occurs during the geometric linking of historical attribution effects. Because subsequent portfolio and benchmark returns can distort intra period attribution results, we separately measure and account for this as the **Compounding Effect**.
- **Total Effect** is the sum of Allocation, Selection, Currency Effects, and the Cash Effect. The Total Effect differs from actual **Value Added** because of the impact of **Trading Costs and Unexplained Effects**. This latter category is a residual.

Notes:

1. The FactSet® Portfolio Attribution product has been used to perform the attribution analysis.
2. The data is gross of all management fees. Any fees charged will reduce actual performance. The firm's management fees are described in its Form ADV. For example, if an account appreciated by 10% each year for ten years with no fees deducted, the average annualized return would be 10%. If the account was charged investment management fees of 0.75% for each of the ten years, then the average annualized return would have been 9.18%. Past performance is no guarantee of future results.
3. MSCI GICS is the source for sector classification and the relevant index provider is the source for the country classification.
4. The pricing source primarily used by the Portfolio Attribution product is MSCI, although alternate pricing sources (mainly IDC, Reuters and ExShare) may be used where MSCI prices are not readily available.
5. All portfolio records are maintained by a third party back office service provider (BNY Mellon Asset Servicing). The Portfolio Value Added number is computed using these records and the official benchmark return as provided by the relevant index provider. The difference between the official benchmark return and the benchmark return used in the attribution analysis, calculated from unofficial pricing sources, has been determined to usually be immaterial. This difference is included in the Trading Costs and Unexplained Effects line item in the Attribution Results section.



ADDITIONAL DISCLOSURES

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- The data source provider’s disclosures are as follows:

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ARROWSTREET CAPITAL, LIMITED PARTNERSHIP
200 Clarendon Street, 30th Floor
Boston, MA 02116 / 617.919.0000

www.arrowstreetcapital.com

ALASKA RETIREMENT MANAGEMENT BOARD

Review of Peer Earnings Assumptions

Bob Mitchell, Chief Investment Officer

Zachary Hanna, Deputy Chief Investment Officer

Overview

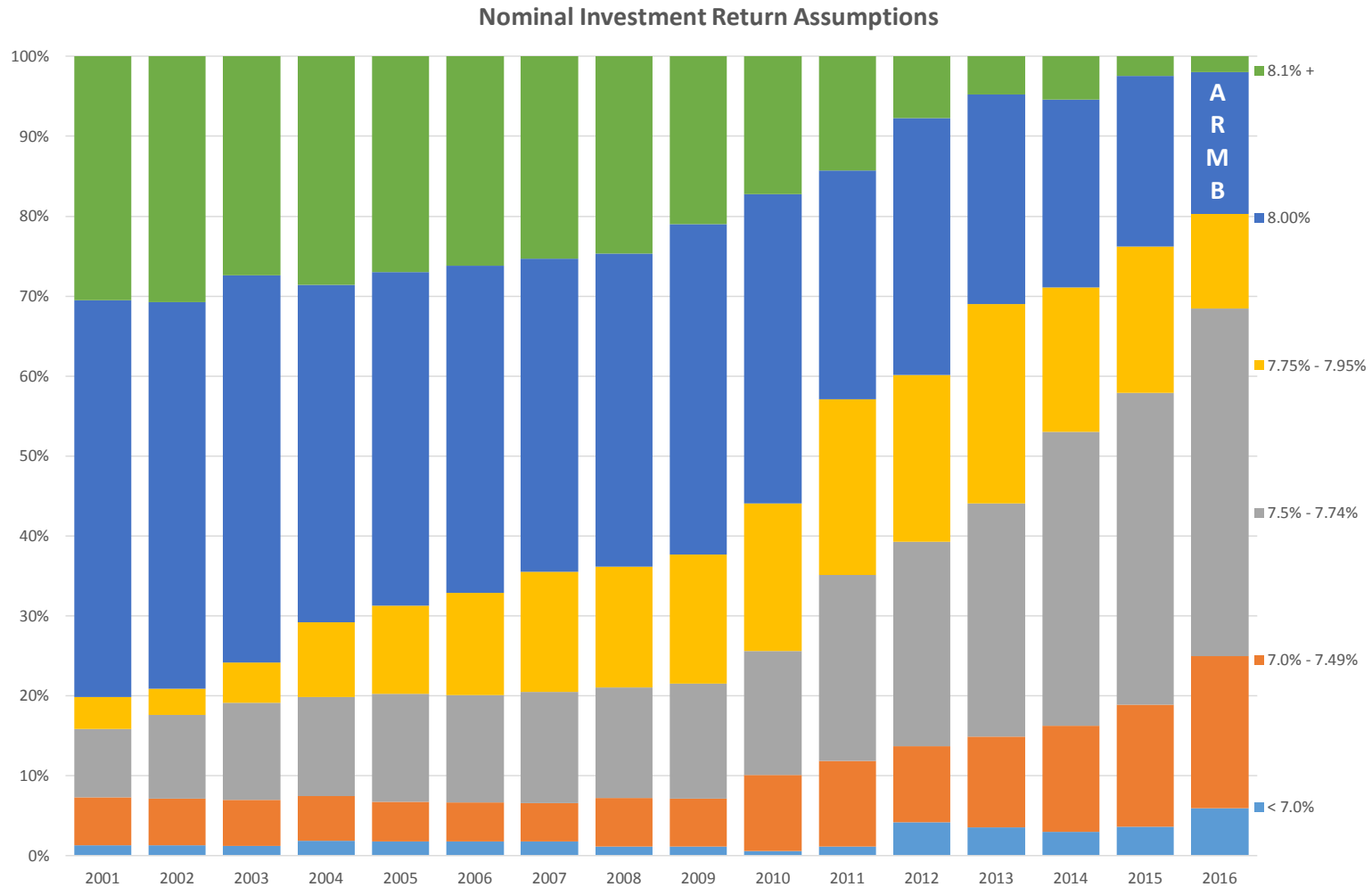
Staff review of peer earnings assumptions:

- Analyzed plan level data for 170 state and local pension plans.

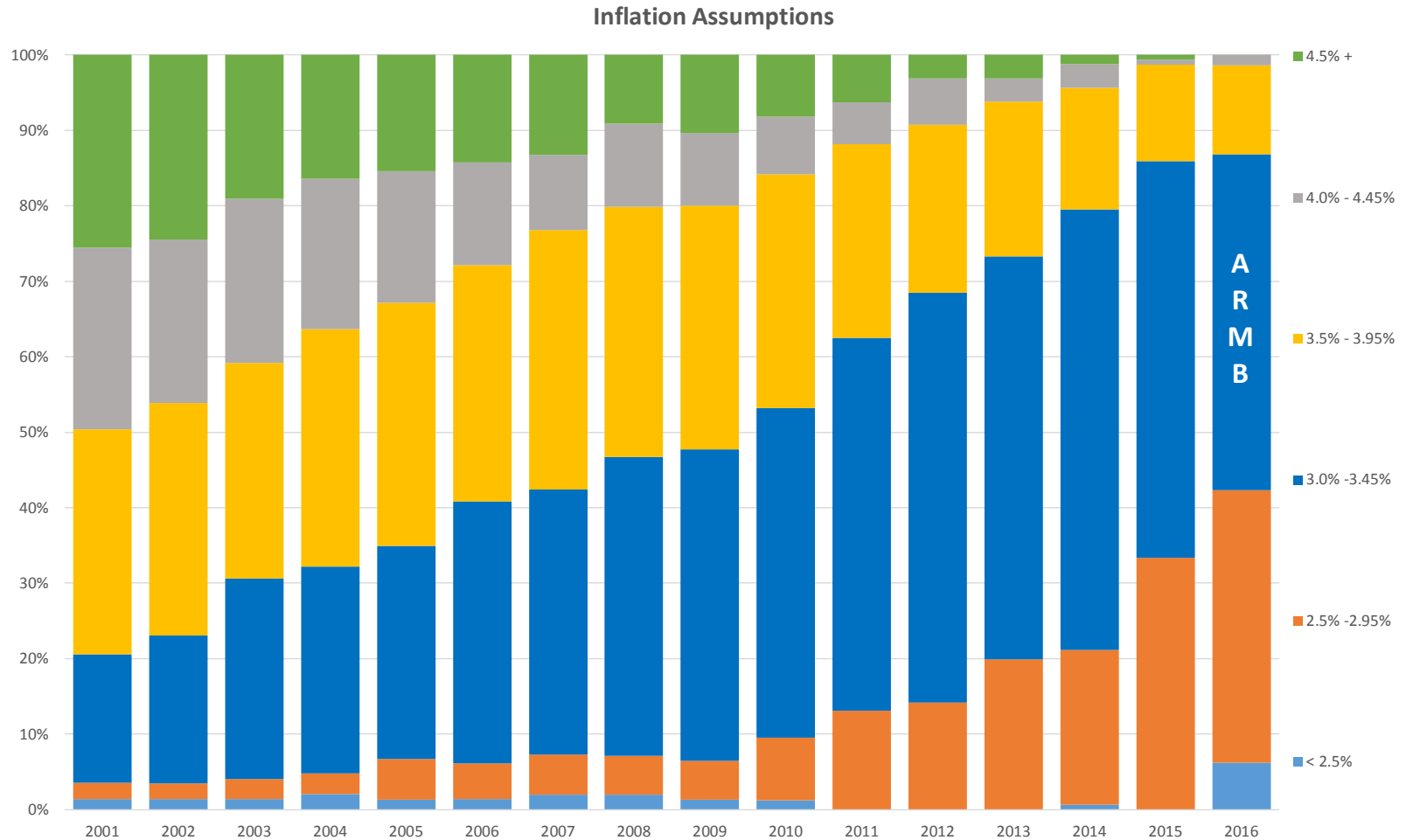
[Public Plans Data. 2001-2016. Center for Retirement Research at Boston College, Center for State and Local Government Excellence, and National Association of State Retirement Administrators]

- Examined nominal earnings rates, inflation assumptions, resulting real earnings rates, and asset allocations over 16 years

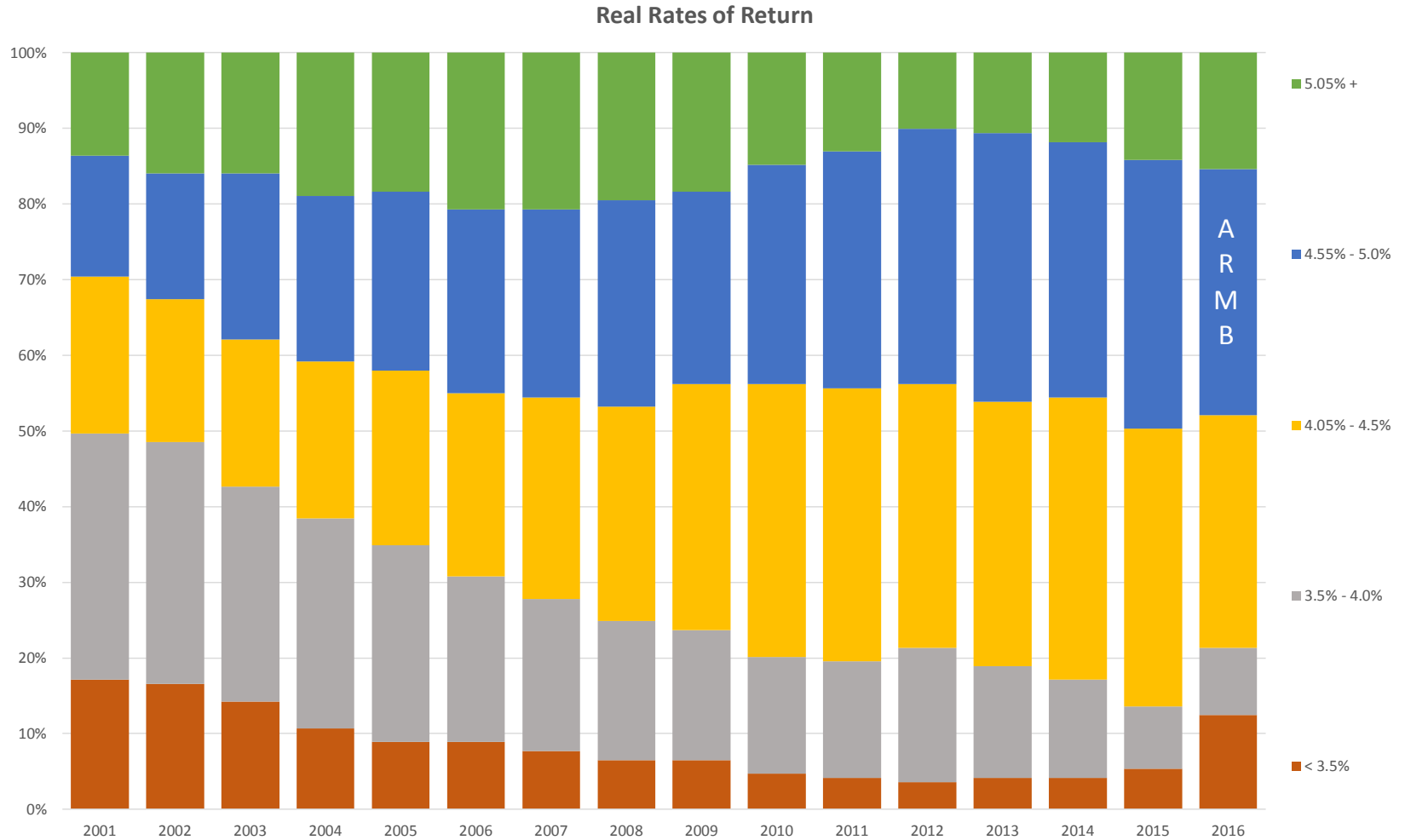
Investment Return Assumptions



Inflation Assumptions

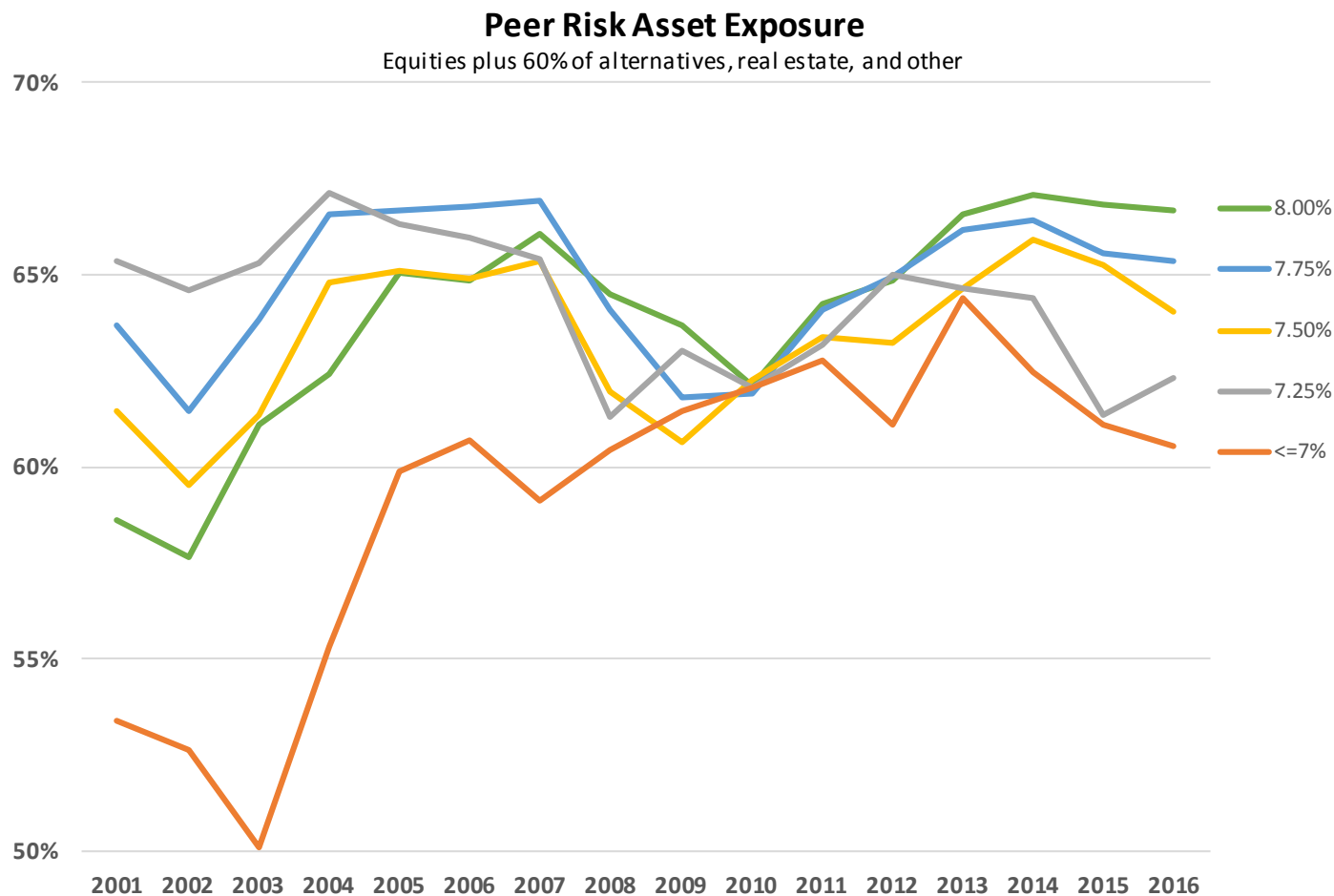


Real Returns



Asset Allocation and Risk Exposure

- Staff characterized the risk exposure of plan asset allocations over time
- Risk exposure was consistent with 2016 earnings assumptions – plans with higher earnings assumptions had asset allocations with higher expected returns



Summary

- The ARMB's nominal earnings assumption is 50 bps above the median, the inflation assumption is 12 bps above the median, and the real return is 31 bps above the median.

Public Pension Rate Assumptions	Assumed Return	Assumed Inflation	Real Rate of Return*
Minimum	6.50%	2.25%	3.00%
Maximum	8.50%	4.00%	5.75%
Average - Median	7.50%	3.00%	4.57%
Average - Mean	7.55%	2.94%	4.61%
Standard Deviation	0.36%	0.36%	0.48%
 ARMB	 8.00%	 3.12%	 4.88%
Difference: ARMB-Median	0.50%	0.12%	0.31%
Difference: ARMB-Mean	0.45%	0.18%	0.27%
ARMB Z-Score	1.3	0.5	0.6

*Note: Real rate statistics are at the plan level and do not foot using nominal and inflation

- The ARMB's nominal return assumptions are 1.3 standard deviations from the mean and the real return assumptions are 0.6 standard deviations from the mean.
- Overall, plan risk exposures are consistent with higher earnings assumptions

Appendix: 2016 Individual Plan Data #1-72

Sorted by real return, then assumed return, then alphabetically

Order	Plan name	Fiscal Year	Real Rate of Return	Assumed Return	Assumed Inflation
1	Connecticut Teachers	2016	5.75%	8.50%	2.75%
2	Houston Firefighters	2016	5.50%	8.50%	3.00%
3	Michigan Public Schools	2016	5.50%	8.00%	2.50%
4	New York State Teachers	2016	5.50%	8.00%	2.50%
5	Texas Teachers	2016	5.50%	8.00%	2.50%
6	Missouri PEERS	2016	5.50%	7.75%	2.25%
7	Missouri Teachers	2016	5.50%	7.75%	2.25%
8	Minneapolis ERF	2016	5.25%	8.00%	2.75%
9	Minnesota GERP	2016	5.25%	8.00%	2.75%
10	Minnesota Police and Fire Reti	2016	5.25%	8.00%	2.75%
11	Minnesota State Employees	2016	5.25%	8.00%	2.75%
12	Minnesota Teachers	2016	5.25%	8.00%	2.75%
13	Louisiana Teachers	2016	5.25%	7.75%	2.50%
14	Michigan Municipal	2016	5.25%	7.75%	2.50%
15	Atlanta Police Fund	2016	5.25%	7.50%	2.25%
16	South Carolina Police	2016	5.25%	7.50%	2.25%
17	South Carolina RS	2016	5.25%	7.50%	2.25%
18	Missouri State Employees	2016	5.15%	7.65%	2.50%
19	New Jersey Teachers	2016	5.15%	7.65%	2.50%
20	Ohio Police & Fire	2016	5.00%	8.25%	3.25%
21	Alabama ERS	2016	5.00%	8.00%	3.00%
22	Alabama Teachers	2016	5.00%	8.00%	3.00%
23	Arizona SRS	2016	5.00%	8.00%	3.00%
24	Kansas PERS	2016	5.00%	8.00%	3.00%
25	Omaha School Employee Retire	2016	5.00%	8.00%	3.00%
26	Texas County & District	2016	5.00%	8.00%	3.00%
27	Chicago Teachers	2016	5.00%	7.75%	2.75%
28	Denver Employees	2016	5.00%	7.75%	2.75%
29	New Mexico PERA	2016	5.00%	7.75%	2.75%
30	North Dakota Teachers	2016	5.00%	7.75%	2.75%
31	Ohio Teachers	2016	5.00%	7.75%	2.75%
32	Florida RS	2016	5.00%	7.60%	2.60%
33	Arkansas PERS	2016	5.00%	7.50%	2.50%
34	Birmingham Retirement & Relie	2016	5.00%	7.50%	2.50%
35	Ohio PERS	2016	5.00%	7.50%	2.50%
36	Oklahoma Teachers	2016	5.00%	7.50%	2.50%

Order	Plan name	Fiscal Year	Real Rate of Return	Assumed Return	Assumed Inflation
37	Alaska PERS	2016	4.88%	8.00%	3.12%
38	Alaska Teachers	2016	4.88%	8.00%	3.12%
39	Colorado Municipal	2016	4.85%	7.25%	2.40%
40	Colorado School	2016	4.85%	7.25%	2.40%
41	Colorado State	2016	4.85%	7.25%	2.40%
42	Denver Schools	2016	4.85%	7.25%	2.40%
43	NY State & Local ERS	2016	4.80%	7.50%	2.70%
44	NY State & Local Police & Fire	2016	4.80%	7.50%	2.70%
45	Connecticut Municipal	2016	4.75%	8.00%	3.25%
46	Nebraska Schools	2016	4.75%	8.00%	3.25%
47	Louisiana SERS	2016	4.75%	7.75%	3.00%
48	Mississippi PERS	2016	4.75%	7.75%	3.00%
49	Missouri DOT and Highway Pa	2016	4.75%	7.75%	3.00%
50	Montana PERS	2016	4.75%	7.75%	3.00%
51	New Mexico Educational	2016	4.75%	7.75%	3.00%
52	Atlanta General Employees Pen	2016	4.75%	7.50%	2.75%
53	California PERF	2016	4.75%	7.50%	2.75%
54	City of Austin ERS	2016	4.75%	7.50%	2.75%
55	Georgia ERS	2016	4.75%	7.50%	2.75%
56	Georgia Teachers	2016	4.75%	7.50%	2.75%
57	Hartford Municipal Employee f	2016	4.75%	7.50%	2.75%
58	Jacksonville General Employee	2016	4.75%	7.50%	2.75%
59	Pennsylvania State ERS	2016	4.75%	7.50%	2.75%
60	Rhode Island ERS	2016	4.75%	7.50%	2.75%
61	Rhode Island Municipal	2016	4.75%	7.50%	2.75%
62	New Hampshire Retirement Sys	2016	4.75%	7.25%	2.50%
63	Vermont State Employees	2016	4.70%	7.95%	3.25%
64	Vermont Teachers	2016	4.70%	7.95%	3.25%
65	Delaware State Employees	2016	4.70%	7.20%	2.50%
66	Maryland PERS	2016	4.65%	7.55%	2.90%
67	Maryland Teachers	2016	4.65%	7.55%	2.90%
68	LA County ERS	2016	4.63%	7.63%	3.00%
69	Louisiana Municipal Police	2016	4.63%	7.50%	2.88%
70	Utah Noncontributory	2016	4.60%	7.20%	2.60%
71	Utah Public Safety	2016	4.60%	7.20%	2.60%
72	New Jersey PERS	2016	4.57%	7.65%	3.08%

Appendix: 2016 Individual Plan Data #73-144

Sorted by real return, then assumed return, then alphabetically

Order	Plan name	Fiscal Year	Real Rate of Return	Assumed Return	Assumed Inflation
73	New Jersey Police & Fire	2016	4.57%	7.65%	3.08%
74	Hawaii ERS	2016	4.50%	7.00%	2.50%
75	New York City ERS	2016	4.50%	7.00%	2.50%
76	New York City Police	2016	4.50%	7.00%	2.50%
77	New York City Teachers	2016	4.50%	7.00%	2.50%
78	Virginia Retirement System	2016	4.50%	7.00%	2.50%
79	Michigan SERS	2016	4.50%	8.00%	3.50%
80	Nevada Police Officer and Fire	2016	4.50%	8.00%	3.50%
81	Nevada Regular Employees	2016	4.50%	8.00%	3.50%
82	North Dakota PERS	2016	4.50%	8.00%	3.50%
83	Providence Employees Retirement	2016	4.50%	8.00%	3.50%
84	Texas ERS	2016	4.50%	8.00%	3.50%
85	Texas LECOS	2016	4.50%	8.00%	3.50%
86	Montana Teachers	2016	4.50%	7.75%	3.25%
87	Wyoming Public Employees	2016	4.50%	7.75%	3.25%
88	Arizona State Corrections Office	2016	4.50%	7.50%	3.00%
89	California Teachers	2016	4.50%	7.50%	3.00%
90	Chicago Municipal Employees	2016	4.50%	7.50%	3.00%
91	Fairfax County Employees' Retirement	2016	4.50%	7.50%	3.00%
92	Illinois Teachers	2016	4.50%	7.50%	3.00%
93	Iowa Municipal Fire and Police	2016	4.50%	7.50%	3.00%
94	Iowa PERS	2016	4.50%	7.50%	3.00%
95	Ohio School Employees	2016	4.50%	7.50%	3.00%
96	Oklahoma PERS	2016	4.50%	7.50%	3.00%
97	Oklahoma Police Pension and	2016	4.50%	7.50%	3.00%
98	Oregon PERS	2016	4.50%	7.50%	3.00%
99	Pennsylvania School Employee	2016	4.50%	7.50%	3.00%
100	TN Political Subdivisions	2016	4.50%	7.50%	3.00%
101	TN State and Teachers	2016	4.50%	7.50%	3.00%
102	West Virginia PERS	2016	4.50%	7.50%	3.00%
103	West Virginia Teachers	2016	4.50%	7.50%	3.00%
104	Fairfax County Schools	2016	4.50%	7.25%	2.75%
105	Illinois Universities	2016	4.50%	7.25%	2.75%
106	Louisiana Schools	2016	4.50%	7.13%	2.63%
107	Detroit Police and Fire Retirement	2016	4.47%	7.47%	3.00%
108	Connecticut SERS	2016	4.40%	6.90%	2.50%

Order	Plan name	Fiscal Year	Real Rate of Return	Assumed Return	Assumed Inflation
109	Philadelphia Municipal Retiree	2016	4.40%	7.70%	3.30%
110	Alameda County Employee's Retirement	2016	4.35%	7.60%	3.25%
111	Illinois SERS	2016	4.25%	7.00%	2.75%
112	Texas Municipal	2016	4.25%	6.75%	2.50%
113	Idaho PERS	2016	4.25%	7.50%	3.25%
114	Kentucky County	2016	4.25%	7.50%	3.25%
115	Kentucky ERS	2016	4.25%	7.50%	3.25%
116	Kern County Employees Retirement	2016	4.25%	7.50%	3.25%
117	Los Angeles City Employees' Retirement	2016	4.25%	7.50%	3.25%
118	Los Angeles Fire and Police	2016	4.25%	7.50%	3.25%
119	Sacramento County ERS	2016	4.25%	7.50%	3.25%
120	San Francisco City & County	2016	4.25%	7.50%	3.25%
121	Los Angeles Water and Power	2016	4.25%	7.25%	3.00%
122	North Carolina Local Government	2016	4.25%	7.25%	3.00%
123	North Carolina Teachers and State	2016	4.25%	7.25%	3.00%
124	San Diego County	2016	4.25%	7.25%	3.00%
125	University of California	2016	4.25%	7.25%	3.00%
126	City of Miami Firefighters and Police	2016	4.17%	7.42%	3.25%
127	St. Paul Teachers	2016	4.00%	8.00%	4.00%
128	Illinois Municipal	2016	4.00%	7.50%	3.50%
129	Kentucky Teachers	2016	4.00%	7.50%	3.50%
130	Massachusetts SRS	2016	4.00%	7.50%	3.50%
131	Massachusetts Teachers	2016	4.00%	7.50%	3.50%
132	Phoenix ERS	2016	4.00%	7.50%	3.50%
133	Missouri Local	2016	4.00%	7.25%	3.25%
134	South Dakota RS	2016	4.00%	7.25%	3.25%
135	Wisconsin Retirement System	2016	4.00%	7.20%	3.20%
136	San Diego City ERS	2016	3.95%	7.00%	3.05%
137	Indiana PERF	2016	3.75%	6.75%	3.00%
138	Indiana Teachers	2016	3.75%	6.75%	3.00%
139	Baltimore Fire and Police Employee	2016	3.75%	7.50%	3.75%
140	Arizona Public Safety Personnel	2016	3.50%	7.50%	4.00%
141	Maine Local	2016	3.38%	6.88%	3.50%
142	Maine State and Teacher	2016	3.38%	6.88%	3.50%
143	DC Police & Fire	2016	3.00%	6.50%	3.50%
144	DC Teachers	2016	3.00%	6.50%	3.50%

ALASKA RETIREMENT MANAGEMENT BOARD

Liquidity Analysis

Bob Mitchell, Chief Investment Officer

Zachary Hanna, Deputy Chief Investment Officer

Overview

- **Understanding the ARMB's liquidity needs**
 - The ARMB has a relatively low allocation to cash and fixed income
 - The ARMB has a somewhat high relative allocation to illiquid alternatives
 - The DB plans are closed with increasing cash needs over time

- **Questions to explore:**
 - Does the ARMB have enough liquidity now?
 - How do the ARMB's liquidity needs change over time?
 - If liquidity needs increase over time, how does that impact earnings?

Uses of Liquidity

- Liquidity is needed to make benefit payments, fund new investments, and rebalance the portfolio.

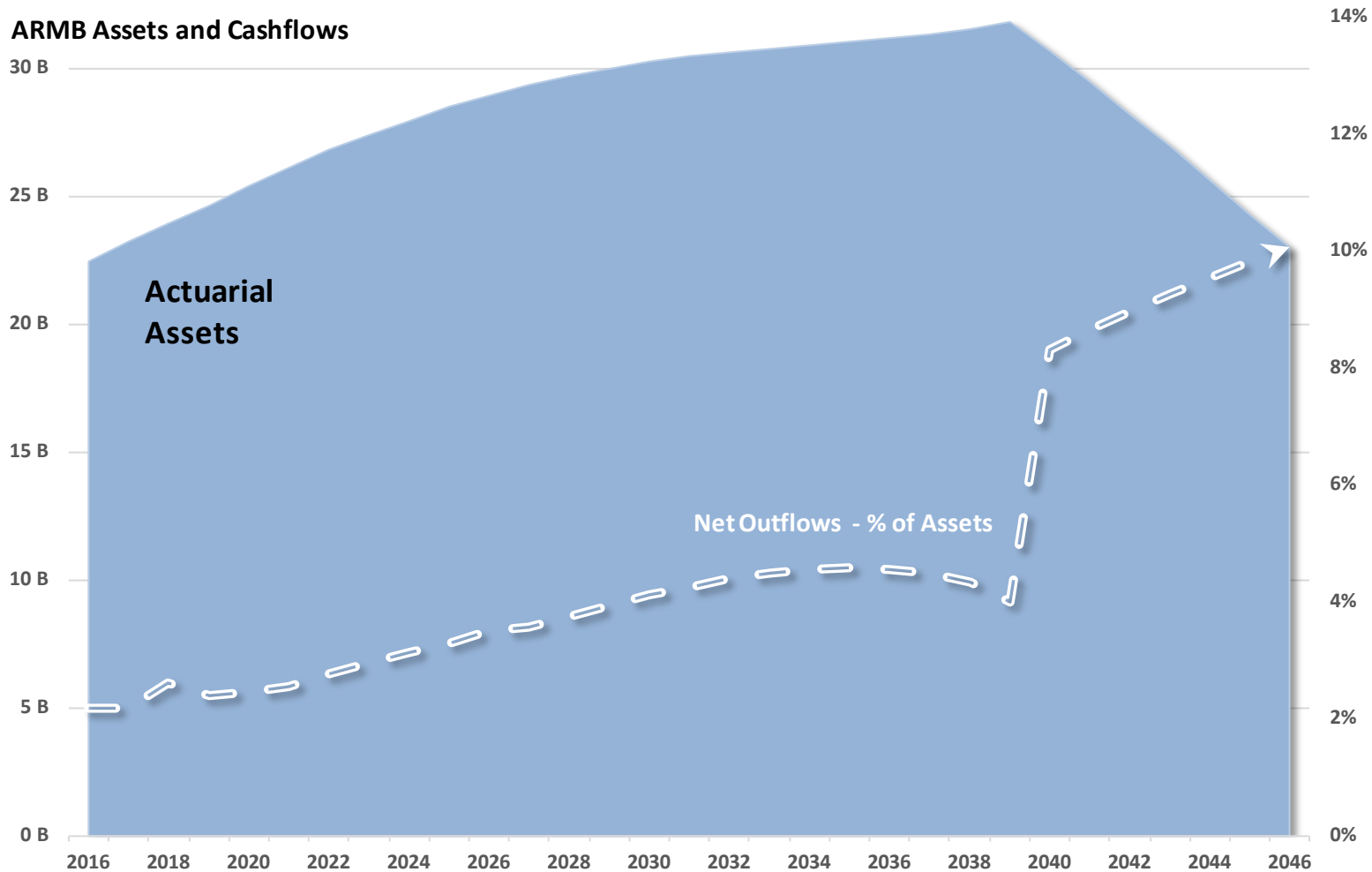
- Under normal market conditions, there are many sources of liquidity:
 - Incoming contributions to the plans
 - Portfolio yield – income and dividends
 - Sales of liquid assets, both equities and fixed income

- Under market stress conditions, significant liquidity may be needed to buy equities or to opportunistically buy other impacted assets

- Only contributions, yield, and the sale of the highest quality fixed income can typically be used for liquidity during significant market stress

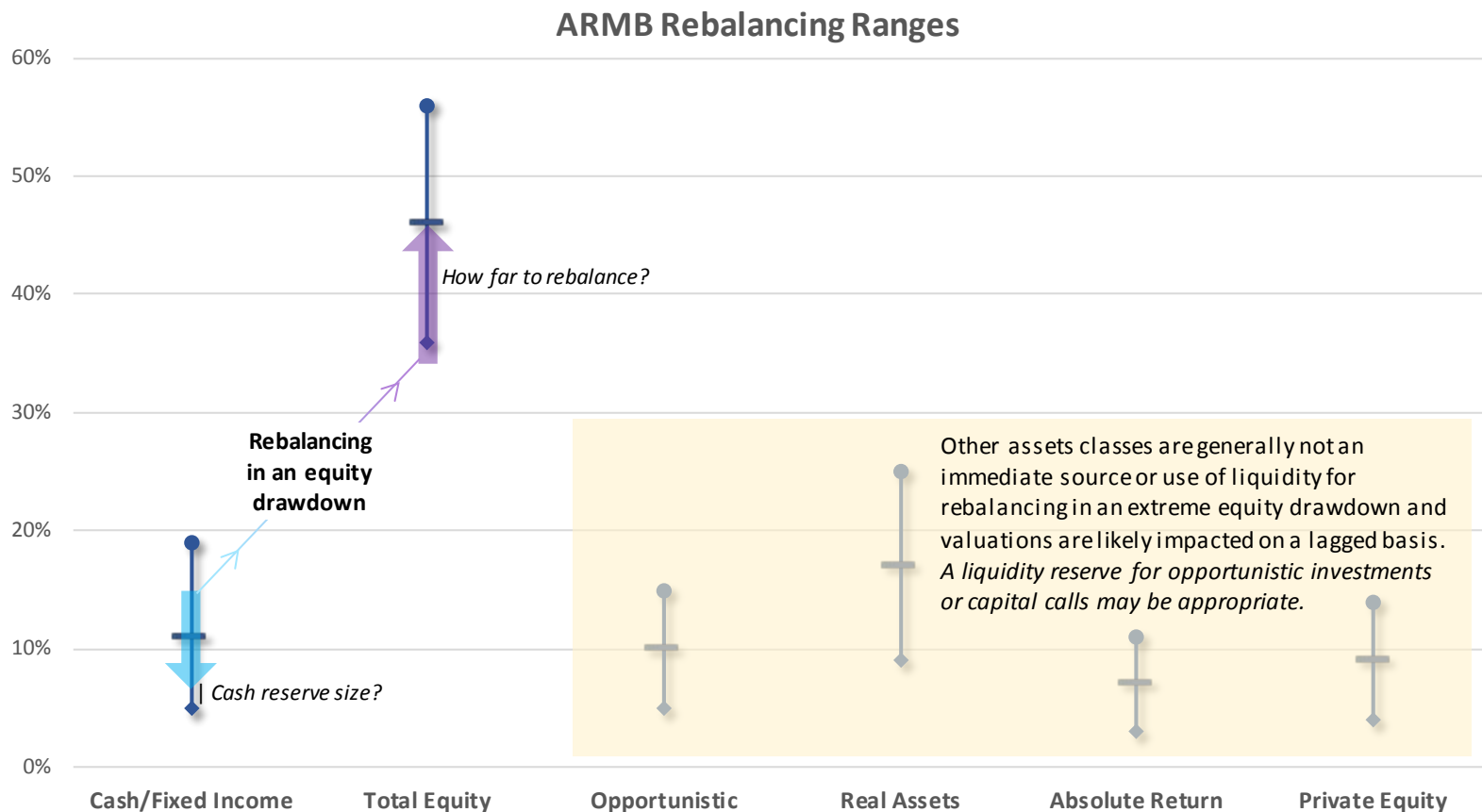
ARMB Assets and Cashflows Over Time

- Based on actuarial assumptions, the ARMB's assets should continue to grow through 2039
- Outflows, net of contributions and yield, start at 2.2% of assets and grow to 4.5% over this period
- Assets decrease and net outflows increase rapidly after 2039



ARMB Rebalancing

- Rebalancing is important to maintain the ARMB's strategic asset allocation and risk posture
- Public equities have a collective target of 46% and a wide rebalancing range of $\pm 10\%$
- Cash/Fixed Income has a target of 11% and can go down 6% to the lower band of 5%



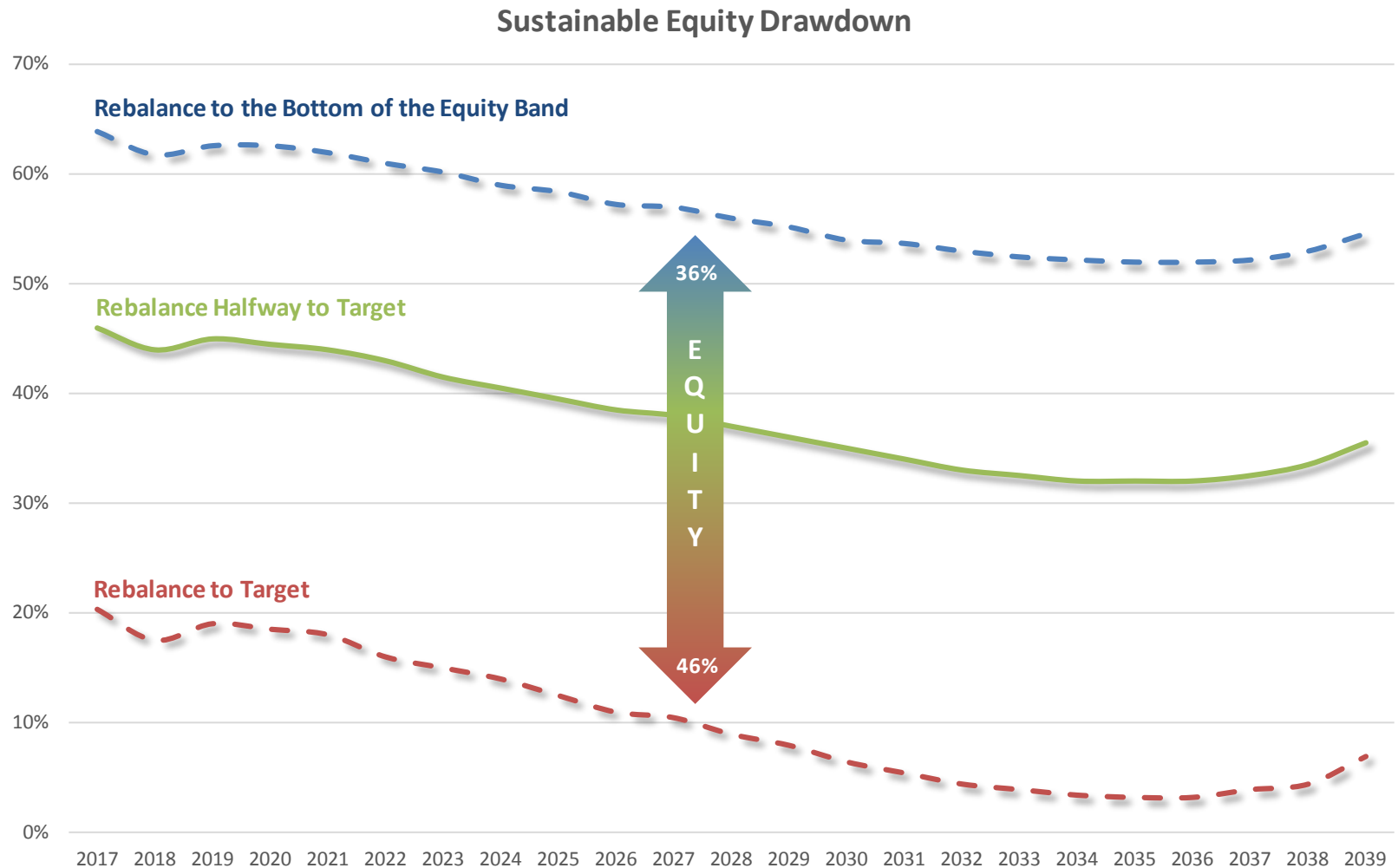
Liquidity Stress Analysis

- Liquidity to make benefit payments and maintain the asset allocation is most constrained during times of market stress
- The ability of the system to meet liquidity needs under varying degrees of market stress and liquidity levels was analyzed
- The analysis provides insight into how much stress can be sustained, how much liquidity is needed over time, and the return implications of increasing liquidity needs over time
- Assumptions:
 - Cash reserves for one year of benefit payments net of contributions and yield
 - An additional cash reserve of 1% to allow for alternative investments net outflows
 - Illiquid assets were modeled with an observed equity beta of 0.40 to allow for the denominator impact of the lagged write-down of these assets. Fixed income was modeled with zero correlation to equities.

Liquidity Analysis:

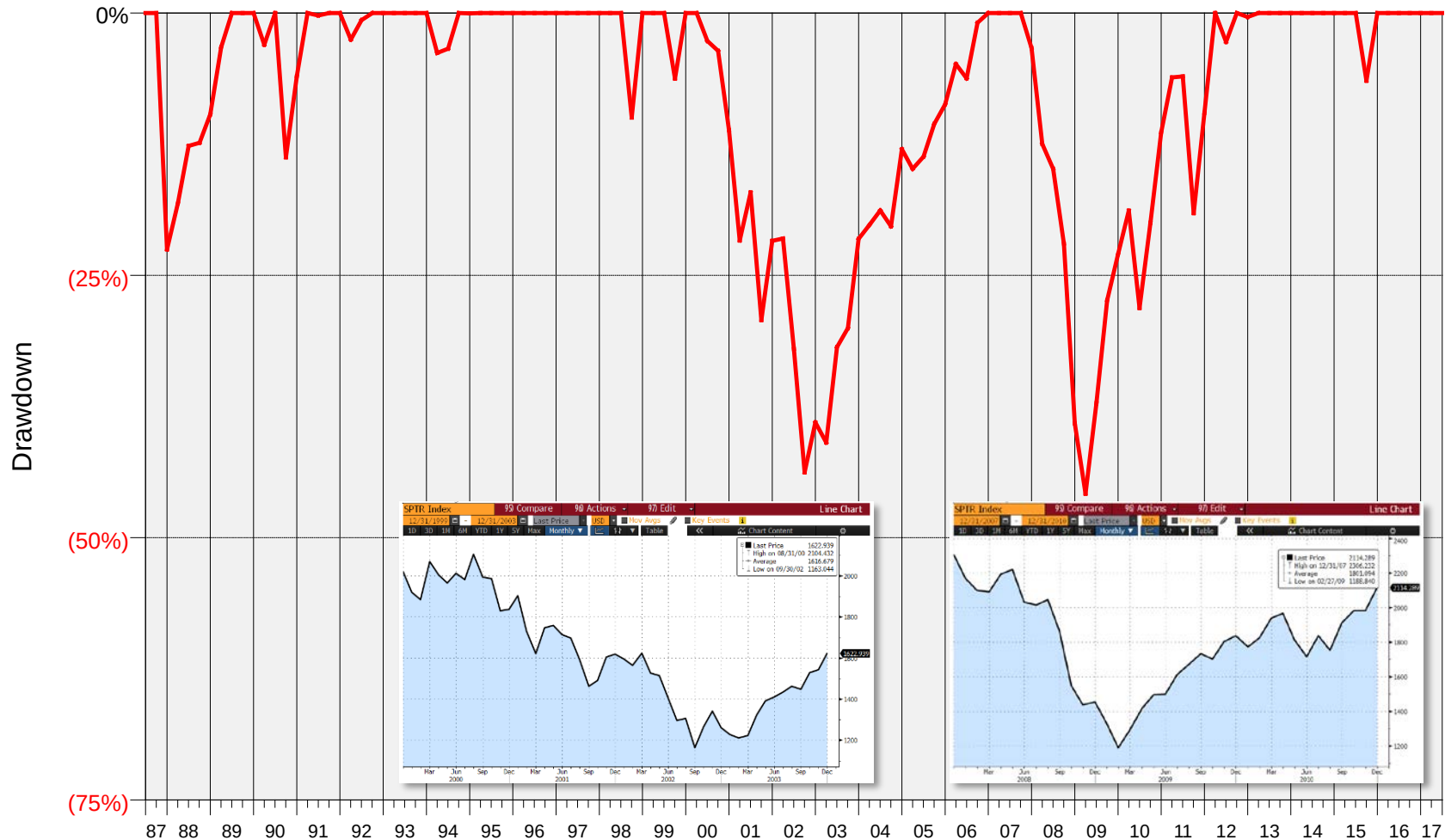
Sustainable drawdown with current liquidity

- The equity drawdown that can be sustained with existing liquidity varies materially with how far toward target equity is rebalanced



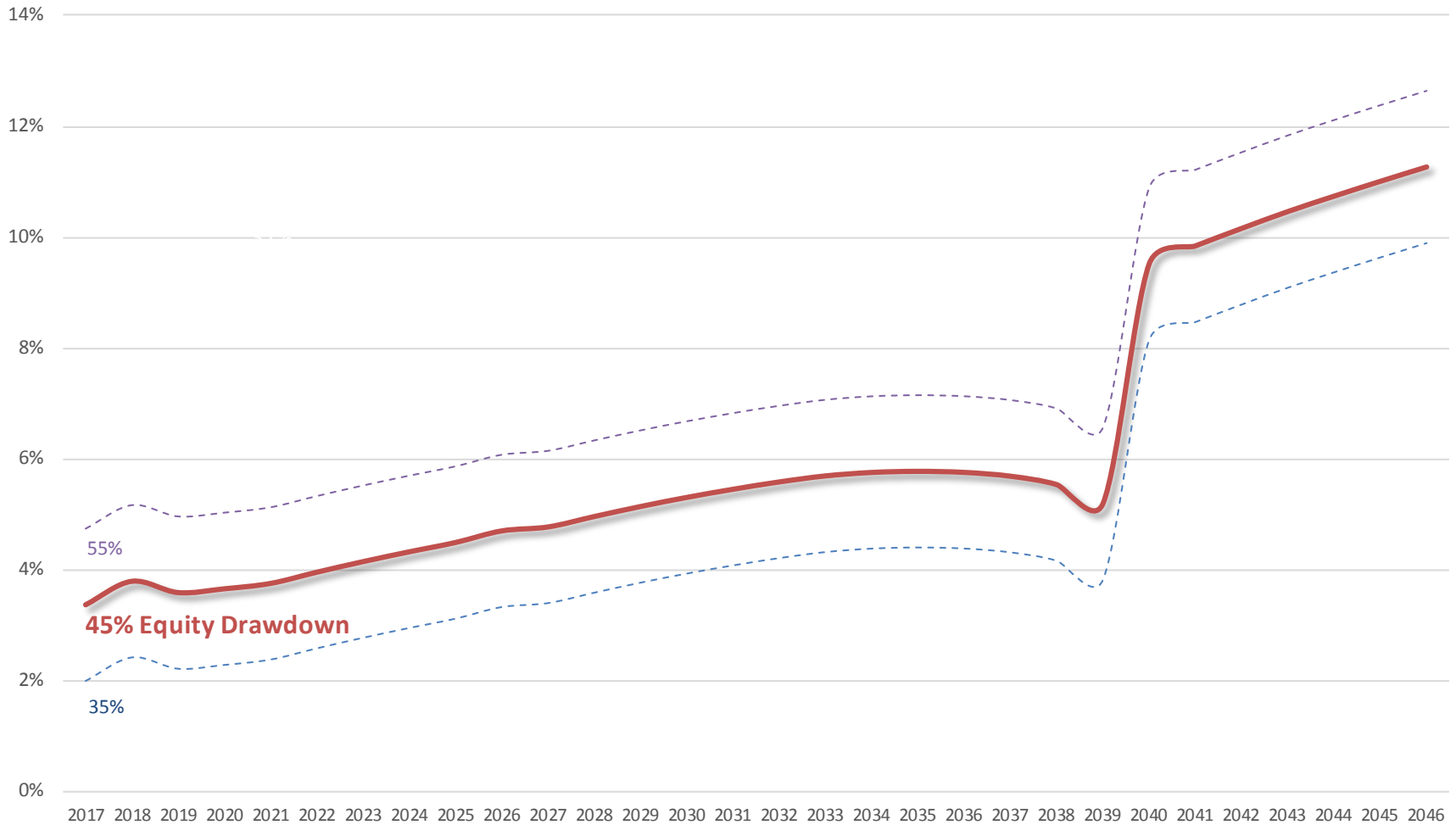
Historic Equity Market Drawdowns

S&P:500 Drawdown
for 30 Years Ended June 30, 2017

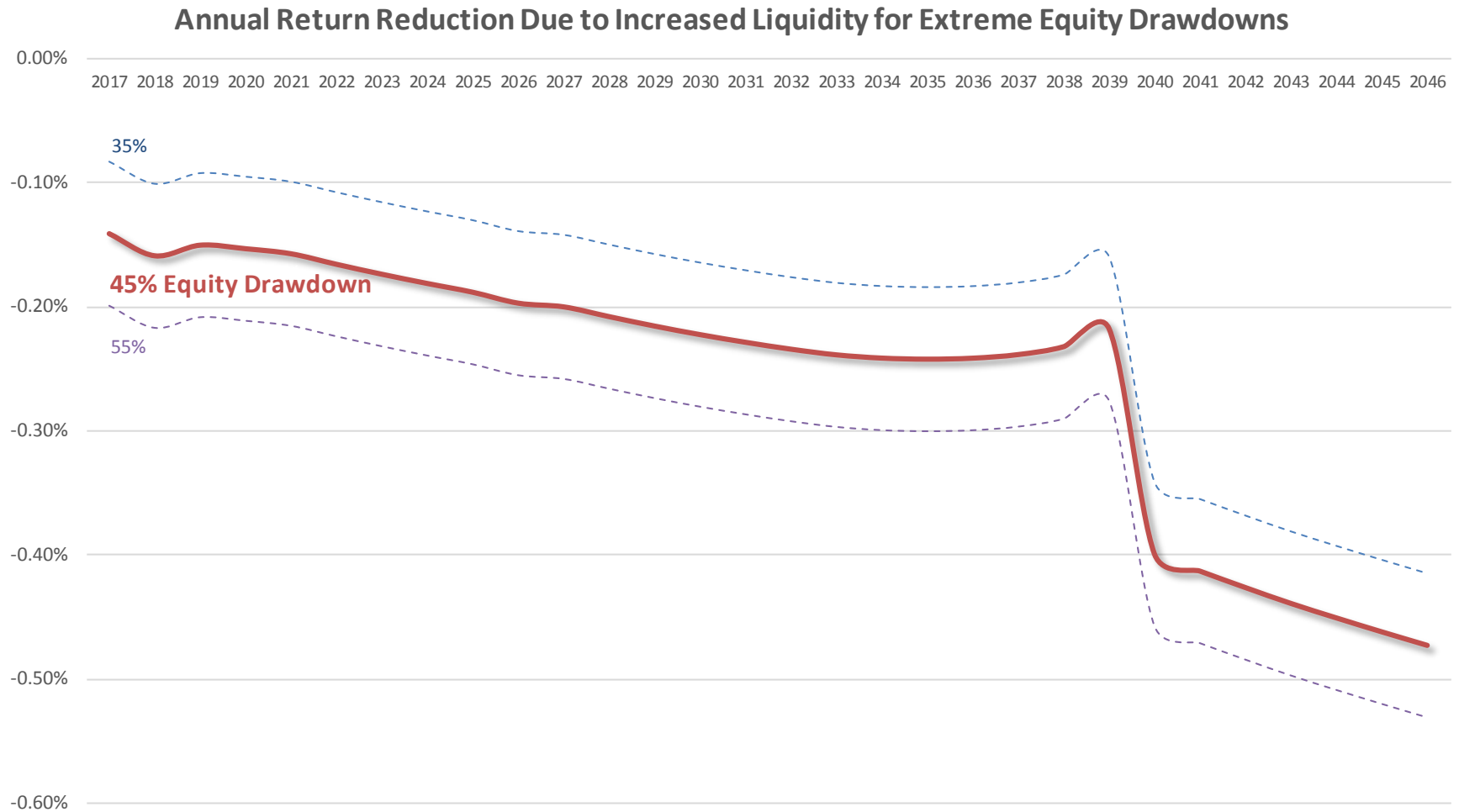


Liquidity Analysis: Extreme Equity Drawdowns

Additional Liquidity Needed for Extreme Equity Drawdowns



Liquidity Analysis: Return Implications of Additional Fixed Income



Early Conclusions

- Currently, the ARMB has adequate liquidity to meet benefit payments and rebalance through significant market shocks, but not extreme market shocks like 2008.
- To manage through extreme shocks, the ARMB would need to rebalance to less than target or consider using some combination of additional liquidity and derivatives to rebalance.
- The increase in liquidity needs over time appears manageable over the next 20 years. This is partially due to the repayment of the unfunded liability through 2039.
- Once the unfunded liability is repaid in 2040, the liquidity needs go up substantially and more material asset allocation changes may be necessary.