ALASKA RETIREMENT MANAGEMENT BOARD

DECEMBER 13-14, 2018

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, DECEMBER 13, 2018

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 – September 20-21, 2018**
VII.	**9:10**	**Election of Officers**
VIII.	**9:15**	**Staff Reports**

1. Retirement & Benefits Division Report
   Ajay Desai, Director, Division of Retirement & Benefits
   Christina Maiquis, Acting CFO, Division of Retirement & Benefits

2. Treasury Division Report
   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
   Christina Maiquis, Acting CFO, Division of Retirement & Benefits

VIII.	**9:45**	**Reports**

6. Chair Report, *Rob Johnson*

7. Committee Reports
   A. Audit Committee, *Rob Johnson, Chair*
   B. Actuarial Committee, *Kris Erchinger, Chair*
   C. Defined Contrib. Plan Committee, *Bob Williams, Chair*

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

10:00–10:30 9. KPMG – Audit Report
Melissa Beedle, KPMG

10:30AM – 10 MINUTE BREAK

10:40-11:10 10. 2014-2018 Experience Study
Kris Erchinger, Chair, Actuarial Committee

Action: Relating to Acceptance of Experience Study
Actuarial Assumptions
Resolution 2018-19

11:15–12:00 11. Thoughts on Strategic Asset Allocation
Bob Mitchell, Chief Investment Officer

LUNCH – 12:00PM - 1:15PM

1:15-2:00 12. Private Equity Review
Gary Robertson, Callan LLC

2:05–2:50 13. Performance Review – 3rd Quarter
Paul Erlendson and Steve Center,
Callan LLC

2:50PM – 10 MINUTE BREAK

3:00-3:30 14. Is International Investing Still Worthwhile?
Dr. Jerrold Mitchell, ARMB Investment Advisor

3:35–4:05 15. Farmland Portfolio
Nicholas Orr, Manager of Real Assets

Action: Real Assets Investments - Farmland
Resolution 2018-20

RECESS

FRIDAY, DECEMBER 14, 2018

9:00		Call to Order
9:00-10:00	16.	Bridgewater Risk Parity Overview *Patrick Dimick and Joel Whidden* *Bridgewater Associates, LP*
10:05–10:50	17.	Sands Capital Management – Emerging Markets Growth *Ashraf Haque and Luke Iglehart,* *Sands Capital Management*

10:50AM – 10 MINUTE BREAK

11:00–11:45	18.	Emerging Markets Equity *Patricia Ribeiro and Walt McGhee* *American Century Investments*

LUNCH – 11:45AM - 1:00PM

1:00-1:30	19.	U.S. Micro Cap Value *Kelly Carbone, Greg Ramsby, and Randy Renfrow* *DePrince, Race, & Zollo, Inc.*
1:35-2:05	20.	International Small Cap Equity Portfolio *Todd Rittenhouse and Aidan Nicholson* *Mondrian Investment Partners Limited*
2:10-2:40	21.	BMO Disciplined Small-Cap Core Strategy *Chris Jenks and Niamh Fitzgerald* *BMO Global Asset Management*

2:40AM – 10 MINUTE BREAK

2:50-3:35	22.	Internal Equity Management *Mark Moon, Manager, Internal Public Equity*

3:35- 23. Investment Actions

A. EM Growth Manager Hire

B. Internally Managed Pilot Portfolio

Bob Mitchell, Chief Investment Officer

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:
Atwood Building
550 West Seventh Avenue
Anchorage, Alaska

MINUTES OF
September 20-21, 2018

Thursday, September 20, 2018

CALL TO ORDER

CHAIR ROBERT JOHNSON called the meeting of the Alaska Retirement Management Board (ARMB) to order at 8:59 a.m.

ROLL CALL

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

Board Members Present
Robert Johnson, *Chair*
Gail Schubert, *Vice Chair*
Gayle Harbo, *Secretary*
Tom Brice
Kristin Erchinger
Commissioner Sheldon Fisher
Norman West
Bob Williams - Arrived Late

Board Members Absent
Commissioner Leslie Ridle

Investment Advisory Council Members Present
Dr. William Jennings
Robert Shaw

Investment Advisory Council Members Absent
Dr. Jerrold Mitchell

Department of Revenue Staff Present
Bob Mitchell, Chief Investment Officer
Scott Jones, State Comptroller

Pamela Leary, Director, Treasury Division
Nicholas Orr, Manager of Real Assets
Stephanie Alexander, Board Liaison

Department of Administration Staff Present
Ajay Desai, Director, Division of Retirement and Benefits (DRB)
Christina Maiquis, Acting Chief Financial Officer, DRB (phone)

Consultants, Invited Participants, and Others Present
David Kershner, Buck Consultants
Craig Noble, Brookfield Private Advisors LLC
Richard Torykian, Brookfield Private Advisors LLC
Steve Center, Callan LLC
Paul Erlendson, Callan LLC
Andy Iseri, Callan LLC
Stuart Goering, Department of Law, Assistant Attorney General
Paul Burrastom, IFM Investors
Nick Moller, JP Morgan Asset Management
Jeffry Shields, JP Morgan Asset Management
Tony Dote Jr., Lazard Asset Management
Edward Keating, Lazard Asset Management
Ivy Flores, Legal & General Invt Mgmt America
Shaun Murphy, Legal & General Invt Mgmt America
Jim Chambliss, Pathway Capital
Canyon Lew, Pathway Capital
Kimberly Cook, State Street Global Advisors
Craig DeGiacomo, State Street Global Advisors
Karl Schneider, State Street Global Advisors
Chris Cunningham, The Townsend 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. MR. WEST seconded the motion.

The agenda was approved without objection.

PUBLIC/MEMBER PARTICIPATION, COMMUNICATIONS, AND APPEARANCES

MS. ALEXANDER informed one communication is included in the packet and was provided by COMMISSIONER RIDLE. It is an email from the City Manager of Seward regarding a proposed amendment to the Public Employees' Retirement System (PERS) regulation.

APPROVAL OF MINUTES: June 22 - 23, 2018

MS. HARBO moved to approve the minutes of the June 22 - 23, 2018 meeting. MS. ERCHINGER seconded the motion.

The minutes were approved without objection.

STAFF REPORTS

1. RETIREMENT & BENEFITS DIVISION REPORT

CHAIR JOHNSON introduced Director AJAY DESAI, who provided the status report on the multi-year IT modernization project. The first step in the two-phase process is seeking an appropriate management firm that may have experience with public and private sectors' benefit plans, specializing in information technology and project management. The second step is utilizing the management firm to develop a Request for Proposal (RFP), to oversee the project process end-to-end, provide risk management, product verifications and validation. The budget has been appropriated in the FY19 capital budget. The initial public notice RFP was posted on the website on August 31, 2018, and closed in early September. The deadline for company selection is the first week in December.

Acting Chief Financial Officer CHRISTINA MAIQUIS advised the Membership Statistical Reports for FY18, through June 30, 2018, were included in the Board packet. She reviewed the decrease in active members by plan, the increase of retirements for PERS, and the decrease of retirements for Teacher Retirement System (TRS). MS. MAIQUIS presented the report on the actuarial expenses for the fourth quarter, ended June 30, 2018. The new items included in the report are the GASB 75 expenses, the increase between last year and this year, which she explained to be the difference in cost between GASB 74 and GASB 75. Requests and expenses for the miscellaneous House Finance Committee line item are covered under general funding.

2. TREASURY DIVISION REPORT

A. ARMB FY20 Budget - Action

CHAIR JOHNSON invited Treasury Division Director PAMELA LEARY to present the Treasury Division Report. MS. LEARY commented on the Treasury's level of involvement during the fall, including planning for the education conference, attending December meetings, and creating the proposed budget. The action item before the Board today was reviewed during the Budget Committee meeting. The proposed 2020 budget will be presented to OMB and the Legislature in 2019. Attachments to the memo contain 2016 through 2018 actuals compared to the budget for FY 2018.

MS. LEARY advised the personal services cost line item will request an expansion of $700,000 to accommodate a support position, as well as personal services increases. The

Salary Review Committee specifically discussed these changes, which were spurred by the resignation of two investment officers. MS. LEARY noted the investment management fees have decreased by $3.9 million and is a direct result of the move to more internal management of investments within the Treasury.

VICE-CHAIR SCHUBERT, as Chair of the Budget Committee, moved to adopt the Fiscal Year 2020 Proposed Budget as attached, with the understanding that components will be subject to appropriation by OMB and the Legislature.

VICE-CHAIR SCHUBERT reported an extensive discussion in yesterday's Budget Committee meeting. It was determined that staff will develop a compensation plan to establish peer-based salary ranges for each exempt position and for each level within each position. As Chair of the Committee, she requested the Commissioner of Revenue discuss the proposed plan with the Salary Review Committee prior to the December Committee meetings. Additionally, as Chair, she requested current furloughs be eliminated. A resolution is in draft to create an Operations Committee that combines committees, and adds responsibilities to the current Budget and Salary Review Committee relating to policy and procedures. VICE-CHAIR SCHUBERT commented on the discussions regarding the recent departure of two staff members. She noted the importance of remaining competitive to ensure excellent staff is recognized for their contributions and maintained.

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

COMMISSIONER FISHER informed action will be taken between now and the December meeting regarding immediate differences for some of the key employees. This will be in addition to and independent from the final comprehensive budget and salary proposal presented at the next Board meeting.

3. CALENDAR/DISCLOSURE

MS. ALEXANDER stated the disclosure memo is included in the packet and there are no transactions requiring additional review. The remaining 2018 calendar and the finalized 2019 calendar are also provided in the packet.

4. CIO REPORT

BOB MITCHELL, Chief Investment Officer (CIO), reviewed the report entitled Summary of Portfolio Moves. He apologized for not including the additional column referencing the authority for each transaction, as requested by CHAIR JOHNSON. MR. MITCHELL gave a general description and noted his intent to include explicit allocations in future reports. His authority for the transactions in this report comes primarily from three sources:

- Resolution 2017-05, Delegation of Authority to the CIO, which allows the CIO to adjust asset allocation within Board-approved parameters;
- Resolution 2012-07, Rebalancing Policy, which gives the CIO discretion to adjust the asset class weights within the Board-approved bands;
- Board actions and specific direction to staff.

MR. MITCHELL provided a summary of the 53 items contained in the report. There were a total of nine rebalancing transactions during the months of June, July, and August relating to liquidating assets to satisfy outflows for the Military Fund, equalizing the relative weights of all the plans, and receiving the annual additional State contribution. The collective amount received this year was about $268 million. Approximately $250 million of that was invested into fixed income to cover the underweight to fixed income.

MR. MITCHELL explained the next section; Futures Rolls and Adjustments. Items 2 and 3 were rolled future positions in the Cash Equitization Program. Items 3 and 4 were the corresponding rolls of the futures positions in the Portable Alpha Program. Items 6 through 8 are small adjustments to the hedging positions. Item 9 contains multiple relative small adjustments to the cash positions in the margin accounts required for the futures positions.

MR. MITCHELL characterized the impact of the rebalancing transactions. Items 10 through 41, under Investment Actions moved the broader portfolio closer to the strategic asset allocation. The investment manager liquidations are the continuation of previous Board decisions. MR. MITCHELL reported a net outflow during June through August of approximately $60 million, which was comprised of only employer contributions less benefit payments, and does not include the additional State contribution. MR. MITCHELL discussed the two asset classes that did not move closer to their strategic asset allocation during this period were private equity and international equities. Performance in private equity was greater relative to the rest of the portfolio and its balance increased over time. International equities were overweight the strategic target by almost 1% during June and were reduced. Subsequent to the reductions, the international market underperformed the broader portfolio, which resulted in the current underweight to international equities.

MR. WEST asked if there was a net movement from outside investment managers to internally managed accounts. MR. MITCHELL stated that movement was not specifically tracked. He did not recall any meaningful allocation to internally managed equity strategies during this period.

MR. WILLIAMS requested additional information regarding the approximations of the futures rolls and adjustments. MR. MITCHELL noted the approximations are representative of the values because of the nature of the executions. The Board can be provided with the exact data. The instructions for the Cash Equitization Program are more precise on the number of contracts in which to engage while the market is moving. The exact amount is known after-the-fact. The Portable Alpha Program has a long position in the S&P 500 E-Mini future and a short position in its corresponding small cap portion of the Russell 2000. The instructions are to trade those contracts based on a relationship between the two contracts. The execution is specified with the intent to manage the impact to relative performance.

CHAIR JOHNSON emphasized the importance for the Board to be aware of the level and amount of transactions that occur pursuant to Board delegations to Department of Revenue staff. CHAIR JOHNSON expressed appreciation to MR. MITCHELL for his explanation of the source of delegation, as well as the descriptions of the separate transactions.

MR. MITCHELL continued the presentation describing Items 42 and 43 under Watch List. He explained a manager can be terminated by the ARMB at any time. Staff diligently reviews managers on an ongoing basis. Placing a manager on the watch list is part of a disciplined process. The criteria considered are contained in resolution. The qualitative criterion centers around the departure of key personnel, organizational changes, change in ownership, or intensified legal issues. The quantitative criterion focuses on lagging performance. A manager will be recommended for the watch list based on performance if they underperform their benchmark and style by more than 1% over a six-year period, and if they underperform more than 65% of their peers.

MR. MITCHELL recommended Lazard Emerging Markets Equity be placed on the watch list for performance reasons. Staff believes the strategy has been out of favor in an extreme way and the magnitude of Lazard's underperformance has been significant, warranting a watch list recommendation. MR. MITCHELL informed the ARMB had three emerging market equity managers. One manager was terminated at the previous meeting and the remaining two are underperforming.

MS. HARBO moved to place Lazard Emerging Markets Equity on the watch list. COMMISSIONER FISHER seconded the motion.

COMMISSIONER FISHER expressed concern about the emerging market sector. He requested a future discussion by staff and Callan regarding the nature of the out-of-favor characterization and a suitable way to approach the sector.

VICE-CHAIR SCHUBERT inquired as to the possibility of termination of the mandate. MR. MITCHELL suggested emerging markets is in a unique time where a narrow component of the index, primarily Chinese internet platforms, is dramatically outperforming. Active management in emerging markets has been challenged over the past couple of years. Managers who are underweight the Chinese internet platforms will lag the benchmark. MR. MITCHELL described the long periods of narrowness in the market have historically corrected. MR. MITCHELL has no concerns regarding Lazard as an asset manager or the approach in the long-term. His bias is to give Lazard more time to let the market adjust.

CHAIR JOHNSON asked what makes putting Lazard on the watch list distinctive from the challenges the remaining manager is experiencing. MR. MITCHELL explained the other emerging market manager is underperforming, but does not have a six-year track record to trigger the quantitative criterion for the watch list. Staff is in the process of engaging in two manager searches, one for an emerging market growth manager to replace the firm that was terminated, and one for an emerging market China-only manager to diversify the exposure within China.

MR. WILLIAMS commented the plan is paying higher fees for active management of emerging markets and the managers are underperforming their benchmarks. He noted a passive indexing would be outperforming the current returns. MR. WILLIAMS requested the rationale for maintaining active management in emerging markets. MR. MITCHELL informed the plan currently has exposure to passive international equities, combined

developed and emerging markets. He does not have the exact breakdown between passive and active, but will provide it at a later date. A presentation will be given today, as a result of discussion at the June meeting, to split the existing passive exposure in international equities to separate mandates for developed international and emerging markets. MR. MITCHELL believes emerging markets are less efficient and have a better chance of outperforming the benchmark with active management. STEVE CENTER of Callan LLC advised Callan typically recommends active management over passive management in emerging markets and Callan's research shows consistent outperformance by active management in this area.

MR. WEST requested further information on the next steps once the manager is placed on the watch list. MR. MITCHELL explained if subsequent developments are such that staff changes their view on the markets going forward or the ability of the manager to outperform, staff would come before the Board recommending termination. If the manager heals their performance, staff will come back before the Board and recommend the manager be taken off the watch list. There are currently four managers on the watch list. MR. WEST asked if staff provides regular reports to the Board showing who is on the watch list and for what period of time. MR. MITCHELL noted he would be happy to start providing a report as such.

MR. WEST suggested the watch list criteria need reasonable adjustment to accommodate for managers who do not have a six-year track record, rather than being exempt for six years. He noted the possibility of the ARMB refraining from investing with managers who do not have a history of at least six years.

CHAIR JOHNSON noted the Board previously has worked through issues relating to the application of the watch list criteria and he believes it may be time for staff to revisit the issues during a presentation to the Board.

MR. SHAW advised the watch list is a formal process of notification to the manager, as well as informing the Board regarding issues that have surfaced. The six-year performance cycle measurement is within the appropriate time period of a market cycle. MR. SHAW believes the emerging markets conversation is important. He agrees having some passive exposure in emerging markets makes sense. MR. SHAW commented emerging markets are hitting a point of pain in underperformance that may lead to desire to terminate a manager. He believes that could be a regrettable decision in the long-term. MR. SHAW gave the example that active large cap US managers in 1998 and 1999 were doing very poorly versus the index, and then three or four years later, most of those managers were strongly outperforming.

MS. ERCHINGER reiterated managers can be terminated at any time. She wanted to ensure it was clear that managers are not left to languish for six years after being placed on the watch list and then terminated.

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

MR. MITCHELL informed staff recommends placing Paamco Prisma on the watch list for qualitative reasons. The two co-CEOs of the business are stepping back and filling advisory roles, and a new six-person executive team will be running the day-to-day operations of the

firm. Staff has conducted due diligence and there are no concerns that would warrant anything beyond a watch list recommendation at this point.

MS. HARBO moved to place Paamco Prisma on the watch list. MS. ERCHINGER seconded the motion.

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

MR. MITCHELL continued under Other Actions, and explained Items 44 through 49 reflect implementations of previous Board decisions. Items 50 through 52 relate to participant inquiries. Two of the participants inquired about the combination of the interest income and stable value fund into one stable value fund. MR. MITCHELL believes staff successfully answered all the questions.

MR. MITCHELL informed the third participant specifically requested the ARM Board divest of a handful of stocks that were benefitting or getting federal government business involved with separating families at the border. MR. MITCHELL explained staff contacted Assistant Attorney General STUART GOERING and received counsel on how to most thoughtfully and effectively respond. The summary of the response is included in the packet. Lastly, MR. MITCHELL announced Item 53 is the successful replacement of one of the two recent staff vacancies, filled by a member of the internal equity team.

CHAIR JOHNSON inquired regarding participant reaction to the manager change-over for the socially responsible fund. MR. MITCHELL stated he is not aware of any responses.

5. FUND FINANCIAL PRESENTATION

CHAIR JOHNSON introduced State Comptroller SCOTT JONES and MS. MAIQUIS to present the Fund Financial Report. MR. JONES advised the Fund Financial Report as of July 31, 2018, was included in the packet. There were no questions. MR. JONES noted as of August 31, 2018, the PERS plan was at $19 billion, TRS was at $9.2 billion, Judicial Retirement System (JRS) was at $218 million, National Guard and Naval Militia Retirement System (NGNMRS) was at $41 million, SBS was at $4 billion, Deferred Comp was at $972 million. The total nonparticipant-directed plans were at $27 billion and the participant-directed plans were at $6.5 billion, for a total of $33.5 billion. Year-to-date investment income was $991.5 million, with a net inflow of $37.5 million. The plans were up roughly 3.16%, and approximately 3% of that was due to investment income.

MS. MAIQUIS reported total contributions during the quarter for the funds were $359 million and expenses were $194 million. The State of Alaska column shows the additional contributions for PERS, TRS, and JRS, totaling $268 million. The NGNMRS received $851,000 in funding. There were no questions.

REPORTS

6. CHAIR REPORT

CHAIR JOHNSON reported on his significant interface with staff regarding the creation of the Operations Committee referenced earlier by VICE-CHAIR SCHUBERT. The proposal is to combine the responsibilities of both the Budget Committee and the Salary Committee, and add additional responsibilities regarding policies and procedures. The proposed charter is being drafted to ensure the existing resolutions from each of the committee are consolidated and adopted. A resolution proposing the creation of the Operations Committee is likely to be presented to the Board at the December meeting.

CHAIR JOHNSON expressed his great appreciation for the efforts of MR. MITCHELL and staff, particularly for applying review and compliance measures to ensure mandates are being followed.

7. COMMITTEE REPORTS

A. Audit Committee

CHAIR JOHNSON, as Chair of the Audit Committee, informed the Audit Committee met yesterday and heard presentations by KPMG and DRB. KPMG's DAN MITCHELL will be leaving and his colleague BECKY STUART from the Seattle office will become the ARMB's representative. KPMG reviewed their attentive and skeptical risk assessment process and all appears to be in order. A clean opinion is expected.

CHAIR JOHNSON noted DRB is engaged in various field audits among subdivisions and the process is advancing, as planned. An amendment is proposed to the Charter adding the sentence, "The Chair of the Committee shall be the primary contact with the external auditors between meetings of the Committee, if communications between the external auditors and the Committee are deemed necessary or desirable."

VICE-CHAIR SCHUBERT moved to amend the Audit Committee Charter Section 2B, adding the sentence, "The Chair of the Committee shall be the primary contact with the external auditors between meetings of the Committee, if communications between the external auditors and the Committee are deemed necessary or desirable." MS. HARBO seconded the motion.

The motion passed with no objection.

B. Actuarial Committee

MS. ERCHINGER, as Chair of the Actuarial Committee, noted the bulk of the report will be presented during agenda Item 9. She informed the proposed State assistance contributions for FY20 for PERS is $159 million and TRS is $141 million. Buck reported those contribution amounts are consistent with expectations. The PERS overall employer contribution rate for the DB Plan is 28.62% for FY20, compared with 27.58% for FY19. The TRS overall employer contribution rate is 30.47 for FY20, compared with 28.90% for FY19. The current assumption rates were used in the calculations for FY20. Beginning in FY21, the new assumptions rates, based on the most recent experience study, will be used in the calculations.

C. Defined Contribution Plan Committee

MR. WILLIAMS reported the Defined Contribution Committee met yesterday and heard a presentation by KATHY LEA, Chief Pension Officer, which included updates on effective plan communication and member engagement. MR. WILLIAMS informed the State's deferred compensation option, which is open now to school districts, municipalities, and others, has continued its slow response with only 10 signing up. MR. WILLIAMS believes additional work needs to occur to obtain higher participation rates for member access.

MR. WILLIAMS noted information was presented by MR. MITCHELL, SHANE CARSON, and representatives from T.Rowe Price exploring multiple strategies that could be provided as future options for DC members. Examples of the strategies included level income, staged graduated income, purchasing power preservation, maximum flexibility with liquidity and portability, and survivor benefit preservation. Discussion occurred outlining the differentiators between retail pricing and institutional pricing. MR. MITCHELL was encouraged with the level of discussion at this early stage.

D. Budget/Salary Committee

VICE-CHAIR SCHUBERT noted the report she provided earlier was complete. She reiterated a recommendation for the proposed Operations Committee will be brought before the Board.

MS. ERCHINGER commented on the concerns expressed yesterday regarding staff turnover and the consistent theme of needed support for sufficient incentives to attract and retain the high caliber key personnel in both the Department of Revenue and Department of Administration. She requested a future agenda topic to review best practices in other states regarding pension plan organizational structure, primarily with respect to salaries and the ability to attract and retain personnel. MS. ERCHINGER discussed a strict personnel payroll schedule based around a government structure may lack the flexibility that is necessary.

CHAIR JOHNSON agreed the subject warrants discussion. He referenced it would be helpful to review legislative archives, and specifically the proposed legislation to create a pension fund akin to the Permanent Fund, embracing the functions of DOA and DOR.

E. Alaska Retiree Health Plan Advisory Board

MS. HARBO, ARMB Advisory Board member, informed the August 29th Committee meeting was coordinated the day after Aetna's quarterly meeting in Juneau. The seven-member Committee maintains four meetings annually, and includes this one face-to-face meeting. MS. HARBO described the update Aetna gave on current claims, issues, and major cost areas. DRB provided the first of its Tele-Town Hall meetings in August and the second one is being held today. The topic in August addressed the Employee Group Waiver Program (EGWP). There were 4,000 retirees who registered and over 1,000 people participated. Retirees had to register using a land line phone. MS. HARBO commented the Division did an excellent job. A fact sheet about EGWP was provided prior to the meeting and Chief Health Policy

Administrator EMILY RITCHIE answered all the questions. The survey received after the first call was positive.

MS. HARBO advised the new pharmacy benefit manager OptumRx will continue to provide information to retirees over the next few months. An RFP will go out soon for the third-party administrator (TPA) and will be awarded the summer of 2019, to begin service in January 2020. The current TPA is Aetna. MS. HARBO informed MARK FOSTER chaired a subcommittee that is reviewing at the Department's modernization plan. He provided a report on the progress and impact on stakeholders. The subcommittee will continue its analysis.

MS. HARBO noted the afternoon was devoted to discussion of EGWP. The final action of the Board was passed with unanimous vote a resolution to adopt and implement an enhanced EGWP, as outlined in the proposal. Details are on the website. MS. HARBO expressed appreciation to the entire staff of the health care group, COMMISSIONER RIDLE, and a special thanks to MR. FOSTER for his positive and productive work. MS. HARBO noted his term was complete in October and unfortunately, he will not be returning. The next meeting is scheduled by teleconference in November.

8. LEGAL REPORT

MR. GOERING noted there are two items of litigation being followed that may potentially impact the funds. The first item regards the Metcalfe v. State litigation, in which former employees who cashed out of their DB plans are asking for reemployment rights and the ability to reinstate in the DB plans. The summary judgment was issued by the Superior Court on June 14th, and since then, the plaintiffs have filed a notice of appeal. The case is pending briefing in the Supreme Court.

MR. WILLIAMS inquired as to the number of people who are part of this litigation. MR. GOERING explained the difficulties in answering that question. He noted one reason the Supreme Court sent it back to the Superior Court is it had not yet been certified as a class. It was certified as a class in the Superior Court. The class of people is undefined and it remains a real ambiguity about the Metcalfe case because there is really no way for the State to know how many of those people are still in the workforce, how many are still alive, how many would want to be employed, or even how many are eligible for reemployment.

MR. GOERING described the second case involving retiree dental changes. MR. GOERING advised the State had a setback in the sense the Court ruled the dental benefits were potentially subject to the Constitutional diminishment provision and that it was a factual issue about whether diminishment had actually occurred. This was the subject matter of the trial and it is currently pending decision in the Superior Court. Depending on the outcome, there may be an appeal. MR. GOERING will continue to provide updates to the Board.

CHAIR JOHNSON recessed the meeting from 10:22 a.m. to 10:36 a.m.

9. 2014-2018 EXPERIENCE STUDY

Action: Relating to Acceptance of Experience Study Actuarial Assumptions Resolution 2018-19

MS. ERCHINGER, as Chair of the Actuarial Committee, reported the Committee met yesterday. MS. ERCHINGER explained the Committee did not take action on Resolution 2018-19 because the resolution accepts the Experience Study, as well as the assumptions and method changes recommended therein. Concerns were expressed specifically about the change in inflation assumption that was used for the purposes of moving forward with the analysis. No formal action by the Board has been taken to accept the inflation assumption change from 3.12% to 2.5%. The Committee requested Callan to opine before the full Board regarding the inflation assumption change.

PAUL ERLENDSON of Callan, LLC noted discussions occurred at the previous Board meeting suggesting Callan's 10-year and longer-term inflation outlook is 2.25%. The inflation expectation for 2018 could spike around 2.6%. MR. ERLENDSON discussed the uptick in energy prices are driving the Consumer Price Index (CPI) this year. He explained the macro-economic forces going forward are not expected to continue the wage growth that was seen this year.

MR. ERLENDSON explained the 2.25% is Callan's midpoint range for longer periods of time, even though over smaller segments of time, the inflation rate may deviate markedly from close to zero, as it was just a few years ago, to as high as 3.75%. For modeling purposes, the midpoint of 2.25% is used, but the range could be plus or minus 1.5% around that number. MR. ERLENDSON reported Callan utilizes a separate firm as a second opinion regarding their assumptions. That firm's projected 10-year inflation outlook is at 2.15% and the longer-term inflation outlook is at 2.2%.

COMMISSIONER FISHER commented on his recollection that Buck's summary of inflation assumptions contained a range of opinions with 2.25% at the low end and into the 3% range at the high end. COMMISSIONER FISHER indicated the 2.5% inflation assumption was in the middle of the range and that is part of the reason he was comfortable with change.

MS. ERCHINGER agreed the discussions at the previous meeting contained inflation ranges, which appeared to give comfort to moving in the direction of a 2.5% inflation assumption. The experience analysis was prepared using the 2.5% inflation rate. MS. ERCHINGER reiterated the real return assumption is not changing from the current 4.88%. The target return decreases from the previous 8% to the current 7.38%, because the inflation assumption decreased from 3.12% to 2.5%. The recommended economic assumption changes would go into effect in FY21 and would not impact the FY20 rates that will be approved later today.

MS. ERCHINGER summarized the additional recommended economic assumption changes contained in the Experience Study:

- Remove the administrative fees from the investment return target calculation and add them as an explicit cost to the normal cost each year;
- Reduce the payroll growth rate from 3.62% to 2.75%;
- Reduce the salary trend rates based on actual experience;

- Increase the ultimate trend rate from 4% to 4.5%;
- Increase real GDP growth rate expectation from 0.88% to 2%.

MS. ERCHINGER reviewed the recommended demographic assumption change contained in the Experience Study:

- Initiate use of the RP24 with MP 2017 generational improvement mortality tables for PERS and TRS.

MS. ERCHINGER reviewed the recommended funding method changes contained in the Experience Study:

- Replace the closed 25-year amortization period for the unfunded liability to a layered approach by reopening a new amortization period for each year's unfunded liability addition;
- Replace the level dollar amortization method for healthcare costs with the level percentage of pay method.

MS. ERCHINGER requested a written opinion from the Attorney General's (AG) Office through MR. GOERING regarding the proposed change in the amortization method of the unfunded liability, specifically addressing if the ARMB should make this change and if the ARMB is allowed to make the change.

MS. ERCHINGER moved the Alaska Retirement Management Board approve Resolution 2018-19, the Public Employees Retirement System, Teachers' Retirement System, Judicial Retirement System, and Alaska National Guard and Naval Militia Retirement Systems actuarial experience analysis, as of June 30, 2017, and the assumption and method changes recommended therein prepared by Buck. MS. HARBO seconded the motion.

MR. WEST noted the report includes the recommendation to use a layering amortization approach. MR. WEST believes the recommendation needs to be specifically excluded.

MR. WEST made a motion to amend Resolution 2018-19, excluding the adoption of the proposed UAAL amortization methodology. MS. HARBO seconded the motion.

COMMISSIONER FISHER commented his take-away from the meeting yesterday was the view that the real decisions underlying the Experience Study were to be left open for a future meeting. COMMISSIONER FISHER requested clarity on the motion before the Board because it seems to adopt the study and all of the assumptions within it.

MS. ERCHINGER noted she specifically remembers MR. WEST's comments with respect to the layered approach and agreeing to follow up through the AG's Office. She remembers discussing wanting to have Callan speak about the reasonableness of the inflation assumption before the vote today.

MR. WEST recollected discussing the impact of the timeframe for adopting the recommendations. He noted it was suggested the analysis could be accepted without accepting the assumptions. MR. WEST commented he understood MS. ERCHINGER

wanted the Board to specifically agree to and adopt the 2.5% inflation rate as a separate and distinct motion, rather than combining the inflation rate with any other items to be approved.

MS. HARBO made a motion to table the adoption of Resolution 2018-19 to the December Board meeting.

A roll call vote was taken, and the motion to table the adoption of Resolution 2018-19 to the December Board meeting passed unanimously.

COMMISSIONER FISHER informed MS. ERCHINGER encouraged him to think deeply about his concerns and come prepared today to continue the discussion. COMMISSIONER FISHER provided a thorough description of his concerns. He referenced an answer given by Buck that a table in the document with a list of forecasted State assistance payments would not change at all if the layering amortization method was adopted. COMMISSIONER FISHER reflected and does not believe it is accurate that no change would occur, because the Experience Study would result in approximately $1.2 billion of a new unfunded liability, which would be layered over a 25-year period. COMMISSIONER FISHER requested Buck create the table using the inputs if the layering method was adopted and show the results to the Board.

COMMISSIONER FISHER referenced the discussion about EGWP and believes Buck suggested it could be an improvement to the unfunded liability of between $500 million and $700 million. COMMISSIONER FISHER requested the schedule be revised to show the benefits of EGWP. He believes this information will be helpful to policy-makers.

COMMISSIONER FISHER requested the history of layering utilized by the ARMB in the past be presented to the Board. This will be in addition to the layering opinion provided by MR. GOERING. COMMISSIONER FISHER requested the legal opinion include any legislative history as to whether or not this was a topic that was discussed.

COMMISSIONER FISHER described his last concern is with the healthcare trend assumption and it seems counterintuitive. He asked for additional explanation regarding the underlying elements to ensure the Board is comfortable that the trend assumption is reasonable.

MS. ERCHINGER expressed appreciation to COMMISSIONER FISHER and MR. WEST for refreshing her memory. She apologized for having forgotten the agreement yesterday was to table this issue.

MS. ERCHINGER explained she understood Buck's comments regarding the layered amortization approach for newly created unfunded liabilities was to use a new 25-year period to amortize just that year's unfunded liability. She commented continuing to amortize newly unfunded liabilities within the current 25-year closed period creates tremendous volatility. Reducing volatility in the final years of the plan is the reason for considering the layered amortization approach. MS. ERCHINGER requested additional information on best practices for amortization in closed plans.

MS. ERCHINGER suggested an explicit resolution regarding the inflation assumption change be brought before the Board at the December meeting. She agreed with COMMISSIOINER FISHER it is important to include EGWP in the estimation results to be reviewed at the December meeting. MS. ERCHINGER noted Buck informed a delay of accepting the assumption changes until December would not adversely affect their ability to provide rates to approve in time for the 2021 rate setting. She wanted to ensure the Board is aware of the challenges the delay is imposing on Buck.

MS. ERCHINGER requested MS. ALEXANDER to ask LESLIE THOMPSON of Gabriel Roeder Smith to reiterate her overall summary of their acceptance of the experience analysis and include it in the December meeting packet.

MR. BRICE requested Resolution 2018-19 explicitly state and define the assumptions and method changes recommended therein to clearly establish the record. CHAIR JOHNSON asked if an attached chart of critical changes would be appropriate. MR. BRICE agreed an appendix could be used.

DAVID KERSHNER, Buck Consultants, informed staff will prepare charts clarifying the trend rates, as requested by COMMISSIONER FISHER. MR. KERSHNER explained even though the inflation rate has lowered from 3.12% to 2.5%, the ultimate trend rate is increasing, but this is partly due to how the prior ultimate trend rate was set. There is inconsistency between how the trend rate was set and how it is being set now, based on the Getzen model. The 4.5% from the Getzen model is the proposed inflation rate of 2.5% and the assumed real GDP growth of 2%. MR. MITCHELL noted the trend rate converges to the GDP assumption over the longer-periods of time.

MR. KERSHNER clarified his comment yesterday regarding the layered approach having no impact because the change would be prospective only, starting June 30, 2018. The new layer would be created effective June 30, 2019, and any deviation from the expected change in unfunded liability that occurs between June 30, 2018, and June 30, 2019, would then be amortized on a layered approach. However, if the Board decided to implement the layered approach effective June 30, 2018, the projected additional State contributions would be impacted.

MR. KERSHNER commented that even though the DB plans are closed, there is a substantial amount of tail-end to the plan. The current benefit payments are about $1.2 billion. The expected benefit payments that are payable to existing retirees and future retirees from the current active population are expected to peak in 2039 at about $2.5 billion and decrease to about $2.2 billion by 2047. Under the current assumptions, the actuarial liability for PERS is just under $22 billion. It is expected to peak in 2039 at just under $27 billion, and then tail off by 2047 to about $17 billion.

10. ACTUARIAL RESOLUTIOINS - FY20 CONTRIBUTION RATE SETTING

Information: History of PERS/TRS Employer Contribution Rates

Action: Relating to FY20 PERS Contribution Rate
Resolution 2018-07

MS. ERCHINGER noted the Actuarial Committee did accept each of the next resolutions at the meeting yesterday and recommends them for approval by the full Board.

MS. ERCHINGER, as Chair of the Actuarial Committee, moved to accept Resolution 2018-07, relating to the FY20 actuarially determined contribution rate attributable to employers participating in the Public Employees Retirement System, with the rate set at 28.62%, composed of the contribution rate for defined benefit pension of 18.29%, the contribution rate for post-employment healthcare of 4.89%, and the contribution rate for the defined contribution pension of 5.44%.

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

Action: Relating to FY20 PERS RMMI Contribution Rate
Resolution 2018-08

MS. ERCHINGER, as Chair of the Actuarial Committee, moved to approve Resolution 2018-08, setting the FY20 employer contribution rate for the retiree major medical insurance for the Public Employees Defined Contribution Retirement Plan at 1.32%.

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

Action: Relating to FY20 PERS ODD Contribution Rate
Resolution 2018-09

MS. ERCHINGER, as Chair of the Actuarial Committee, moved to approve Resolution 2018-09, relating to the FY20 employer contribution rate for Public Employees Defined Contribution Retirement Plan occupational death and disability benefit rates, which would set the FY20 employer contribution rate for the Public Employees occupational death and disability benefit at 0.72% for peace officers and fire fighters, and at 0.26% for all other Public Employees Defined Contribution Retirement Plan employees.

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

Action: Relating to FY20 TRS Contribution Rate
Resolution 2018-10

MS. ERCHINGER, as Chair of the Actuarial Committee, moved to approve Resolution 2018-10, relating to the FY 20 employer contribution rate for the Teachers Retirement System, which would set the rate for FY 20 of the actuarially determined contribution rate attributable to employers participating in the Teachers Retirement System at 30.47%, composed of the contribution rate for the defined benefit pension of 20.71%, the contribution rate for post-employment healthcare at 3.91%, and the contribution rate for defined contribution pension of 5.85%.

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

Action: Relating to FY20 TRS RMMI Contribution Rate
Resolution 2018-11

MS. ERCHINGER, as Chair of the Actuarial Committee, moved to approve Resolution 2018-11, relating to the FY20 employer contribution rate for Teachers Defined Contribution Retirement Plan retiree major medical insurance rate, which would set the FY 20 employer contribution rate for the retiree major medical insurance for the Teachers Defined Contribution Retirement Plan at 1.09%.

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

Action: Relating to FY20 TRS ODD Contribution Rate
Resolution 2018-12

MS. ERCHINGER, as Chair of the Actuarial Committee, moved to approve Resolution 2018-12, relating to the FY20 employer contribution rate for the Teachers Defined Contribution Retirement Plan occupational death and disability benefit rate, which would set the FY20 employer contribution rate for the Teachers occupational death and disability benefit at 0.08% for all Teachers Defined Contribution Retirement Plan employees.

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

Action: Relating to FY20 NGNMRS Contribution Rate
Resolution 2018-13

MS. ERCHINGER, as Chair of the Actuarial Committee, moved to approve Resolution 2018-13, relating to the FY20 contribution amount for the Alaska National Guard and Naval Militia Retirement System, that the FY20 contribution amount for the State of Alaska Department of Military and Veterans Affairs to the Alaska National Guard and Naval Militia Retirement System be set at $860,686.

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

Information: JRS Contribution

MS. ERCHINGER advised the informational item of the JRS contribution of 74.42% is included in the Board packet. The action was taken by the Commissioner and does not require action of the Board.

CHAIR JOHNSON expressed appreciation to MS. ERCHINGER and the Actuarial Committee for their hard work.

11. REVIEW OF HEALTHCARE TRANSFORMATION STRATEGY

MR. MITCHELL introduced the subject matter noting staff began discussions about a year ago with McKinley Capital regarding their newly developed Healthcare Transformation Strategy. Staff conducted due diligence and came to the conclusion there was merit and warranted further consideration by the ARM Board. As a normal practice with a new mandate and a new active manager, it is appropriate for Callan to conduct a review of the strategy. Staff also believes additional scrutiny is deserved because the mandate is unfunded and ARMB would be the first investor.

MR. MITCHELL reviewed that McKinley presented the main features of the strategy at the last meeting with the anticipation to place the strategy within the global equity component of the portfolio. MR. MITCHELL noted the Board will hear today that Callan would prefer to place the strategy within the opportunistic component of the portfolio. After Callan's presentation, staff is prepared to recommend an action to invest $250 million in the Healthcare Transformation Strategy within the opportunistic asset class.

CHAIR JOHNSON commented Alaska recently lost an important figure, BOB GILLAM, the founder and CEO of McKinley Capital. MR. MITCHELL agreed the passing of MR. GILLAM was a significant event. He expressed no concerns regarding succession arrangements, as ROB GILLAM has been CEO for about a decade. Staff is monitoring the situation. MR. MITCHELL encouraged the Board to seek Callan's views on this occurrence.

MR. ERLENDSON commented succession planning of leadership, intellectual wisdom and ownership of the firm is important. He believes McKinley Capital's succession plan is extensive and deliberate for BOB GILLAM. MR. ERLENDSON noted the succession plan for ROB GILLAM, who is to become the new principal shareholder and thought leader, will have to be reviewed going forward.

MR. ERLENDSON described the critical evaluation considerations Callan used in its analysis process of the Global Healthcare Transformation Strategy:

- Soundness of the firm;
- Team structure;
- Investment premise and viability;
- Characteristics of the strategy;
- Potential merits and considerations of the strategy;
- Possible placement with the ARMB portfolio.

MR. ERLENDSON summarized the goal of the analysis is to provide a framework where a reasonable person could conduct the appropriate due diligence and reach a conclusion based on the set of criteria that people from different perspectives could determine if the strategy meets or fails to meet the critical evaluation considerations. MR. ERLENDSON introduced his colleague ANDY ISERI, who led the investigation. The report has additionally been reviewed by multiple personnel within Callan.

MR. ISERI gave a detailed description of Callan's assessment of each of the six critical evaluation considerations. Based on the findings from this evaluation process and materials

provided by McKinley, Callan does not believe an allocation to the Global Healthcare Transformation strategy is appropriate for the global public equity portfolio because Callan does not typically recommend tilts for the public equity portfolio. Callan does, however, believe an allocation to the Global Healthcare Transformation strategy is viable as an opportunistic allocation within the defined benefit plans.

MR. ISERI conveyed the investment case is very compelling and Callan recognizes McKinley is well-aligned to capture this single-themed tactical strategy. MR. ISERI explained special attention should be given to idea-generation with the strategy as a signal of continued viability in investment opportunities in this single-themed strategy.

MR. MITCHELL informed McKinley offered ARMB benefits for being the initial capital investor. These were the subject of executive session at the last meeting.

MR. WILLIAMS requested additional information regarding Callan's opinion on McKinley's declining assets under management (AUM) since 2007. MR. ISERI explained declining AUM is a concern, but the fact that $4.6 billion AUM still remains is positive compared to other momentum managers.

MR. SHAW inquired as to Callan's opinion what metrics should be used for performance evaluation and the designation of an appropriate benchmark. MR. ISERI agreed evaluation will be difficult because there is no clear benchmark. He suggested using the ACWI IMI for evaluation. MR. ERLENDSON commented using the broad market benchmark will show if the strategy is outperforming and adding value. Using the ETF benchmark will show how well the strategy is being implemented.

VICE-CHAIR SCHUBERT moved to allocate $250 million amount to McKinley Global Healthcare Transformation Fund. MR. WILLIAMS seconded the motion.

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

CHAIR JOHNSON instructed staff to move forward with appropriate negotiations.

CHAIR JOHNSON recessed the meeting from 12:02 p.m. to 1:15 p.m.

12. A. Real Assets FY19 Annual Plan

EXECUTIVE SESSION: 1:16 p.m.

MR. WILLIAMS moved to go into executive session for the purposes of discussing matters, the immediate knowledge of which could have an adverse impact on the value of the funds. MR. WEST seconded the motion.

The motion passed with no objection.

CHAIR JOHNSON called the meeting back to order at 2:26 p.m., and informed no decisions were made during executive session.

B. Consultant Evaluation of Real Estate Plan:
Diversification, Compliance, & Performance Measurement

NICHOLAS ORR, Manager of Real Assets, introduced real estate consultant CHRIS CUNNINGHAM of The Townsend Group, who presented the real estate performance over the last quarter. MR. CUNNINGHAM began with an overview of the current market. Townsend expects global economic growth throughout various developed countries will continue. This is likely to fuel higher inflation and consequently, lead to higher interest rates across the globe. Higher inflation and growth should be positive for real estate. Fundamentals remain strong in the US and valuations are pretty full. It is critical to be very selective in identifying and investing in the right subsectors and submarkets. Transactions across the board, except in the industrial properties, have slowed in the last year.

COMMISSIONER FISHER requested discussion regarding the point at which rising interest rates dampen real estate investments. MR. CUNNINGHAM noted there is no simple answer or specific interest rate that would severely impact returns. He referenced the substantial interest rate increases experience in the '80s would be bad, but he does not anticipate a rise to 17% is likely. MR. CUNNINGHAM explained there are many different factors in the market that could adversely effect real estate investments.

MR. CUNNINGHAM reviewed the plan is currently about $300 million above its real estate target. Townsend is comfortable with the current positioning and expects it to even out over time as changes are made. The portfolio has performed very well over the last 12 months, outperforming the benchmark by 90 basis points, which is $16.7 million in additional value to the fund.

COMMISSIONER FISHER asked if the comparison of the portfolio to the benchmark was net of fees or gross of fees. MR. CUNNINGHAM discussed the comparison is a gross number because the current benchmark NCREIF Property Index (NPI) is not investable. MR. CUNNINGHAM informed Townsend planned to recommend later in the meeting changing the benchmark going forward to the Open-End Diversified Core Equity Index (ODCE) because it is technically investable. The underlying funds that comprise the index are investable.

MR. CUNNINGHAM described the public portfolio is essentially passively investing through internal means in the REIT market. The portfolio is tracking the overall index very well and has had a reasonable return of almost 5% for the last year.

MR. CUNNINGHAM conveyed the private portfolio drives the majority of the collective returns, being over 90% of the total real estate performance of the portfolio. The returns in the core sector and non-core assets had strong recent performance. The annualized income return for the last five years was robust at 4.5%. MR. CUNNINGHAM noted the annualized

rates of return have been decreasing and moderating during the last four years, consistent with other asset classes. Overall, Townsend is very pleased with portfolio performance.

MR. CUNNNGHAM reported all of the funded investments are in compliance with the required components. Townsend feels the single manager limit which is set at 45% is high and could be considered for revision. The portfolio's exposure to UBS remains high, but has been decreasing. Townsend will continue to discuss with staff the concerns of having a 30-year portfolio exposed to one manager.

MR. CUNNINGHAM reviewed the performance of the underlying separate accounts and the comprehensive core portfolio. He informed UBS Trumbull Property Fund has underperformed and is in the process of redeeming. LaSalle has underperformed the benchmark for all time periods. The remaining investments have performed reasonably well compared to the benchmark over all time periods. The recent investment in the BlackRock US Core Property Fund has been very strong for the quarter.

MR. CUNNINGHAM highlighted a chart showing most of ARMB's non-core commitments were made prior to the Global Financial Crisis and no investments were made during the recovery between 2009 and 2013, which means a large amount of capital was invested during an inopportune time. Townsend is advocating to consistently spread investments over all time periods and to be tactical with non-core investments, when appropriate. MR. CUNNINGHAM reported the plan is well-diversified within the real estate sector. Townsend agrees with the plan's current weightings; an overweight to apartments and industrial properties, and an underweight to office. The portfolio is well-diversified in geography, with a slight overweight to the Pacific Region.

MR. CUNNINGHAM informed Townsend agrees with the recommendations staff is making regarding the real estate portfolio. The recommendations are as follows:

- Decrease the core real estate allocation;
- Transition the separate account assets into open-ended funds;
- Increase the REIT allocation;
- Increase the non-core real estate commitments;
- Adopt a new investable benchmark to better reflect the overall peer set.

MS. ERCHINGER requested discussion regarding leverage now, as compared to before the Global Financial Crisis. MR. CUNNINGHAM explained the review of leverage includes multiple components such as availability, use, structure, covenants, interest rates, high loan-to-value ratios, prepayment terms, recourse debt, and cross-collateralization. Before the financial crisis, leverage use was excessive and there were non-real estate related reasons to hold a real estate asset, which were unfortunately driving decisions. MR. CUNNINGHAM believes the banks, other financial institutions, investment managers and investors have generally become more reasonable, conservative, and have heeded the lessons learned.

C. Adoption: Real Assets FY19 Plan & Policies
Board Discussion

MR. MITCHELL advised the ARM Board revisits its real assets plan each year and is manifested in a series of resolutions. MR. ORR described each of the recommended revisions for consideration.

The Real Estate Guidelines proposed to:

- Clarify that investment in private debt is permitted;
- Modify the total return requirements from 5% real return over rolling 5-year periods to a net-of-fee total return between public equities and fixed income over rolling 6-year periods;
- Change the benchmark from 90% NCREIF Property Index / 10% NAREIT Equity Index to 80% NFI-ODCE Index / 20% NAREIT Equity Index;
- Remove requirement for a minimum of three separate account managers.

MR. CENTER commented Callan is supportive of the recommendation by Townsend regarding the real estate benchmark changes.

MR. ORR continued his description of the recommendations.

The Farmland Guidelines proposed to:

- Modify the total return requirements from 5% real over rolling 5-year periods to a net-of-fee total return between public equities and fixed income over rolling 6-year periods;
- Change the allocation target from 80% row crop / 20% permanent crop to 50% row crop / 50% permanent crop;
- Allow for investments in OECD countries.

The Timberland Guidelines propose to:

- Modify the total return requirements from 5% real return over rolling 5-year periods to a net-of-fee total return between public equities and fixed income over rolling 6-year periods;
- Remove requirement for a minimum of two timberland advisors;
- Remove language indicating that all timberland investments will be managed via separate accounts.

The Infrastructure Guidelines propose to:

- Modify the total return requirements from 5% real return over rolling 5-year periods to a net-of-fee total return between public equities and fixed income over rolling 6-year periods;
- Remove language stating the "portfolio shall reflect the lowest expected risk profile required to achieve return objectives";
- Change benchmark to reflect the addition of CPI + 4 and the Alerian MLP Index to the Infrastructure benchmark composite and define inflation index as the CPI All Urban Index.

Action: **Real Assets FY19 Annual Plan**
Resolution 2018-14

VICE-CHAIR SCHUBERT moved to approve Resolution 2018-14, which adopts the Real Assets Annual Investment Plan for Fiscal Year 2019. MS. HARBO seconded the motion.

MR. BRICE expressed he will vote against the resolution. He appreciates the proposal and the suggestions, but is anxious about some of the big moves, including farmland offshore. MR. BRICE expressed concern at this particular time with the amount of information provided.

COMMISSIONER FISHER expressed strong support for the specific portfolio moves and the intent of increasing the returns closer to peer group return comparisons.

CHAIR JOHNSON requested staff to confirm the actual Investment Plan documentation that should be attached to the Resolution was complete. He asked for a motion to table this resolution until tomorrow to allow for clarification.

MR. BRICE moved to table Resolution 2018-14 until 9:00 a.m. tomorrow. MS. HARBO seconded the motion.

The motion to table Resolutions 2018-14 until 9:00 a.m. tomorrow passed with no objection.

Action: **Revised Investment Guidelines**
Resolution 2018-15 Real Estate
Resolution 2018-16 - Farmland
Resolution 2018-17 - Timber
Resolution 2018-18 - Infrastructure

VICE-CHAIR SCHUBERT moved to table Resolutions 2018-15 through 2018-18 until 9:00 a.m. tomorrow. MS. HARBO seconded the motion.

The motion to table Resolutions 2018-15 through 2018-18 until 9:00 a.m. tomorrow passed with no objection.

CHAIR JOHNSON recessed the meeting from 3:06 p.m. to 3:18 p.m.

13. PATHWAY CAPITAL

MR. MITCHELL informed Pathway Capital is one of the two gatekeepers for private equity utilized by the ARM Board. They were hired in 2002, and currently manage just over $1 billion in assets on behalf of the ARM Board. This represents approximately 43% of the $2.5 billion private equity portfolio. MR. MITCHELL introduced JIM CHAMBLISS, Managing Director of Pathway Capital. MR. CHAMBLISS advised he and his colleague CANYON LEW, Managing Director, will present to the Board today. MR. CHAMBLISS described Pathway as a private equity gatekeeper, who makes investments in the private equity marketplace through primary funds, secondary investments, and co-investments into companies alongside the general partners. Pathway was founded 27 years ago by four individuals, of which three of them remain active with the firm. The fourth individual retired

about six years ago. Pathway has four offices around the world, and both MR. CHAMBLISS and MR. LEW work out of the headquarters in Irvine, California.

MR. CHAMBLISS informed Pathway has just over $50 billion in AUM, and has begun to branch out into private infrastructure and private credit. Pathway is 100% owned by its 19 partners. Growth of the organization continues. There is a particular focus on hiring at the junior analyst level and mentoring within the organization. Functional areas like legal, accounting, and compliance have also experienced recent growth. MR. CHAMBLISS noted a partner announced a few years ago his intention to retire, and that will occur at the end of this year. The transition should be seamless because the successor has been running the office for the last several years. There are no other significant departures to note. Stability is a hallmark of Pathway. There has been one promotion to partner and he is the head of the Hong Kong office.

MR. CHAMBLISS discussed private equity has experienced a sustained period of strong performance. The asset class has grown in size, become more efficient, and become more competitive. Prices are expensive. MR. CHAMBLISS explained private equity is a long-term asset class. The investments made are within partnerships that can remain up to 15 years. Consistency in investing capital in the asset class is important because market timing plays are very difficult. Pathway is focused on balancing strategies in the portfolio to capture opportunities and provide alpha. Pathway prefers managers who have experience through market dislocations because they will be better positioned

COMMISSIONER FISHER inquired as to expectations for returns since the sector has become more efficient. MR. CHAMBLISS believes the premium spread is decreasing and feels the outperformance to the public markets is closer to the range of 200 to 300 basis points over the long-term. MR. CHAMBLISS noted the managers are targeting gross returns of high teens. The one year net return for the period ended March 31, 2018, was quite favorable at 18.6%. This was an outperformance compared to the Russell 3000 by 480 basis points and an outperformance compared to the MSCI World Index by 440 basis points.

VICE-CHAIR SCHUBERT asked for Pathway's fee structure. MR. CHAMBLISS informed the fees are 18 basis points off of the committed capital to the underlying fund.

MR. LEW discussed the portfolio generated $300 million in gains and $500 million in distributions since Pathway was in front of the Board two-and-a-half years ago. The since-inception return increased to 13.8%. The portfolio will have reported 28 consecutive quarters of gains, when the June 30, 2018 performance numbers are finalized. MR. LEW reiterated the favorable market conditions will not last forever. Pathway is happy with the current portfolio composition.

MR. LEW described the portfolio is on track to reach the target tactical plan for 2018 of $210 million in commitments. Since the program's inception in 2002, $2.5 billion has been committed to 219 partnerships and co-investments from 73 different managers. The portfolio is just over 80% committed and has over 2,600 active underlying holdings. Seventy-nine percent of the commitments, which is $1.89 billion, have been contributed and those

contributions have grown to a total value of $3 billion as of the June 30, 2018 performance numbers. A key milestone occurred since the last presentation; cumulative distributions now exceed cumulative contributions.

MR. LEW reviewed the portfolio's investment strategy diversification. The current allocation is 49% acquisitions, 26% venture capital, and 25% special situations. The portfolio remains comfortably within all of its long-term targets. It is well-diversified by strategy, industry, and geographic region. MR. LEW noted the second quarter ending June 30, 2018 numbers are close to being finalized and are coming in very strong. It will be the strongest quarter by gain since the program's inception, with an un-annualized quarterly return of 6.4% and $66 million in gains. MR. LEW highlighted the strong IPO and M&A activity within the portfolio.

MR. LEW explained the co-investment portfolio provides opportunities where equity investments are made alongside primary fund managers at a no-fee, no-carry basis. The co-investment portfolio was established in May of 2016. Currently, up to 15% of the annual allocation is reserved for co-investments, with a target of eight to 12 deals per year. Initial performance has been strong and additive to the portfolio's overall returns. MR. LEW reviewed the co-investment portfolio is well-diversified by region and industry, and is achieving its objectives.

14. ASSET/LIABILITY STUDY

MR. MITCHELL provided background regarding the asset/liability study. The previous asset/liability study was conducted in 2009. It was recommended by the process auditor for an asset/liability study to be conducted every four or five years. MR. MITCHELL explained he has been delaying the asset/liability study, while waiting for the resolution to the experience study. This would generate new actuarial assumptions that will be utilized. MR. MITCHELL noted Callan will conduct the study and is presenting today on the process that will be used and the decision variables to consider. Callan believes the study can be concluded in April. MR. MITCHELL noted a key benefit to the study is the consideration of the strategic asset allocation and its liquidity profile for the ARM Board as it interacts with the liability stream over time.

MR. ERLENDSON advised the scope of the project will be divided into segments, including review of the current investment program, setting of the portfolio assumptions, and integrating actuarial valuation and experience study information. MR. ERLENDSON believes the included timeline can still be met to be in a position to make a decision at the April meeting about the asset allocation going forward. MR. ERLENDSON discussed asset allocation decisions are influenced by people's perspectives on what they expect, time horizon, and other philosophical views. There is no one correct answer. All the data will be processed the same, but the evaluation is the primary driver. MR. ERLENDSON believes the most valuable part of this exercise is agreeing what the objectives are that the ARMB wants the portfolio to achieve.

MR. ERLENDSON explained the valuation will reflect the changes in regulations of GASB 67 and GASB 68. The three key policies that interact to govern assets are Investment Policy,

Funding Policy and Benefit Policy. Investments focus on highest returning assets. The funding has to pay for the program, and the ability to make benefit payments in a timely manner is important. MR. ERLENDSON outlined the modeling process. The two main components are liabilities and asset projections. Determining the liability projections include considering the current valuation, assumptions, mortality rates, longevity rates, compensation rates, and building a year-by-year progression of the participants and the flows that will be coming out of the plan.

MR. ERELNDSON discussed the benefits are known in advance and can be closely matched to the actuarial projection. The most uncertainty is contained in the asset projections. The variables that have to be determined are; which asset classes are to be used, what sort of volatility to assume, what fee level is appropriate to pay? All of the projected rates of return will be shown net of investment fees. MR. ERLENDSON noted discussion at the April meeting will include the modeling of the portfolios based on different allocation levels to the various asset classes, overall funded status of the plan, and assumptions of investment returns to reach full-funded status.

MR. ERLENDSON reviewed the current PERS target and five alternative asset mixes. The 10-year geometric return is 6.6% and the current target is 8%. He noted any areas where the net-of-fee results are better than the benchmark will increase the 6.6% expected return. The portfolio's time horizon is important to determine when the money will need to come out of the program and the appropriate time period for evaluating the success of the program. The range of returns is defined by how much of the assets are in risk assets and how highly correlated they are. The projections use one-year, 10-year, 20-year, and 30-year horizons. The ultimate goal is to improve the financial health of the plan relative to the obligations. MR. ERLENDSON advised the process of implementation after the asset allocation policy is determined will be to maximize value and maintain liquidity needs.

MR. MITCHELL highlighted the analysis is operating under the assumption the contributions will be sufficient to fully fund the plans by FY39. One of the active components of the current analysis is to evaluate potentially moving to a layered approach addressing the unfunded liability, which may introduce additional complexity to the analysis. MR. MITCHELL requested Callan be given guidance at the December meeting on the structure of that paradigm.

COMMISSIONER FISHER expressed concern using 10-year assumption numbers when it seems the real stress and liquidity challenges are out beyond 10 years. MR. CENTER advised there is more confidence in the ability to predict capital market performance over the next 10 years. Capital market assumptions become less and less reliable, the longer the time period. COMMISSIONER FISHER inquired as to reconciling the disconnect between current assumptions at 6.8% and actuarial assumptions at 7.38%. MR. ERLENDSON suggested the modeling work assumptions will be adjusted in terms of the actuary's projections to maintain consistency across all scenarios. Variables will be normalized to create a common standardized set of assumptions for both sets of data.

MR. MITCHELL informed the action item related to this issue will be taken up tomorrow. He asked to provide a few comments regarding the real asset portfolio resolutions. There was no objection. MR. MITCHELL recommended moving the tabled resolutions from 9:00 a.m. tomorrow to 3:00 p.m. There was no objection to the agenda change.

MR. MITCHELL commented on his difficulty in gauging the level of desired Board participation in the staff deliberative process regarding the real assets recommendations. MR. MITCHELL suggested the Board consider either allowing staff to unpack the recommendations in a deep-dive review during meetings over the next year or to refer the process to a committee to interact with staff. This will provide staff with greater feedback and give the Trustees a better appreciation for the thought process behind the underlying recommendations. MR. MITCHELL posed the current process makes it difficult for the Board to make changes because it does not lend itself to deliberation necessary for changes to occur.

COMMISSIONER FISHER suggested the Board begin to think about the possibility of creating an investment committee. Determinations would have to be made regarding what categories are reviewed by the investment committee and what components come before the full Board. COMMISSIONER FISHER finds the manager presentations very interesting, but believes the full Board spends too much time with manager presentations. He feels the Board's time would be better spent on broader-brush issues, discussions and decisions suggested by MR. MITCHELL.

MR. WILLIAMS suggested the possibility of staff creating informational webinars for Trustees to review in advance of meetings that would deepen Trustee's understanding of the topics to be presented at the meeting. MR. WILLIAMS noted he has heard comments that the previous real assets committee added value to the Board.

CHAIR JOHNSON posed the real assets issues and investment issues could be added to the Budget, Salary and Operations Committee. He noted the Board decreased the number of Board meetings two years ago and there may be sufficient information now to return to the original number of annual Board meetings. CHAIR JOHNSON commented the plain fact of the matter is the Board's real input to staff can only come when the Board is gathered together collectively. He believes the broad-brush issues, discussions about real assets, plans and policies are critical.

CHAIR JOHNSON expressed the Board looks forward to hearing proposals and recommendations from MR. MITCHELL regarding the tabled motions tomorrow.

RECESS FOR THE DAY

CHAIR JOHNSON recessed the meeting at 4:34 p.m.

Friday, September 21, 2018

CALL BACK TO ORDER

CHAIR JOHNSON reconvened the meeting at 9:00 a.m.

Trustees Schubert, Harbo, Brice, Erchinger, Fisher, West, and Williams were also present.

15. IFM INFRASTRUCTURE

MR. MITCHELL informed the ARM Board has two private infrastructure managers and two public infrastructure managers. IFM Investors has been managing private infrastructure assets for ARMB since 2015. The allocation is just over $400 million. MR. MITCHELL introduced PAUL BURRASTOM, who is a Director at IFM. MR. BURRASTOM noted IFM began 23 years ago. He described IFM's Australian history and unique ownership structure comprised of 27 general partners. ARMB is a limited partner (LP). The ownership structure creates alignment with the LPs and provides benefits by reinvesting the profits into the firm directly to the investment staff to retain talent. It was also announced in June, IFM would return 7.5% of the fees paid by LPs from the last fiscal year.

MR. BURRASTOM explained IFM approaches infrastructure investing through an open-end construct. Asset management is a large component of the IFM business and sellers want the long-term partners to be good stewards of the assets. IFM has done well at enhancing and protecting the assets and service provided, which include water utilities, electricity, and toll roads. The open-end fund structure offers the option of quarterly liquidity. The investment lens for IFM is long-term, mainly 20 to 30 years. Some of the assets are in perpetuity. The Indiana Toll Road, for instance, has a 64-year concession, and $260 million worth of enhancements have been completed.

MR. BURRASTOM focused on the IFM team members who execute their business. The senior advisors are deeply seasoned from around the world. There are more than 70 investors located at the eight offices, with the main offices in Melvin, London, and New York. MR. BURRASTOM outlined the process taken for new projects. An independent risk officer is established to focus solely on the risks involved. A second deal team is created in a different geography to review the project merits and complete an evaluation and underwriting of the deal. Both visions are then compared.

MR. BURRASTOM explained the Global Infrastructure Fund targets core infrastructure in OECD countries that can return 8% to 12% net through the cycle. The three main sectors of IFM core infrastructure are transport, midstream energy, and utilities. The portfolio is diversified and healthy at $18.3 billion deployed in 13 main assets, comprised of 52 individual assets.

MR. ERLENDSON requested additional information regarding the currency effect in the portfolio for the limited partners. MR. BURRASTOM informed a hedged feeder is established in each country to reduce the currency risk as much as possible.

MR. MITCHELL requested explanation of why this is considered a core strategy as opposed to a core-plus strategy. MR. BURRASTOM explained core assets tend to exist already in place, a toll road, for example. Core-plus is a measure of a value-add to the infrastructure, an asset in the development phase that gets improved and sold. The risk profile of the current portfolio keeps it in the core category. He believes there are a few investments that could be approaching the fringe of core-plus. MR. BURRASTOM expressed the importance of the revenue drivers and concessions of the infrastructure asset.

COMMISSIONER FISHER congratulated IFM on its impressive performance. He inquired as to the large performance delta between the benchmark and the portfolio. He requested feedback from IFM, Callan, and IAC if the benchmark is appropriate for the portfolio. MR. BURRASTOM believes the outperformance is an anomaly. There has been a strong equity bull market since the Global Financial Crisis and principal values have increased. MR. BURRASTOM noted large amounts of funding from abroad have been chasing infrastructure. This has provided selling opportunities and created outsized performance. MR. BURRASTOM commented IFM considers itself to be a total return manager and there is not really a wholesome benchmark for infrastructure today.

MR. MITCHELL informed an action later in the meeting addresses the benchmark issue directly and asks the Board to consider changing the benchmark for private infrastructure to CPI plus four. Staff recognizes the current equity benchmark is not helpful when assessing performance of infrastructure managers. As private infrastructure benchmarks are developed, they will be evaluated by staff. MR. CENTER expressed Callan agrees with staff's recommendation. He acknowledged the difficulties in benchmarking private infrastructure. MR. CENTER stated infrastructure reflects more of an absolute return IRR focus than a market benchmark relative focus.

16. JP MORGAN INFRASTRUCTURE

MR. MITCHELL informed JP Morgan Asset Management is the second of ARMB's two private infrastructure managers. The allocation is about $113 million in the Infrastructure Investments Fund. MR. MITCHELL introduced JEFF SHIELDS, Client Advisor, and NICK MOLLER, Investment Specialist, of JP Morgan. MR. MOLLER discussed the strategy for the open-ended core private infrastructure fund focuses on diversification, inflation protection, and yield by investing in contracted and regulated assets in high OECD countries.

MR. MOLLER informed assets under management have grown to $10 billion, which has provided significant diversification of 16 companies, managing 310 underlying assets. The fund was started in 2007. The target net returns are between 8% and 12%. MR. MOLLER explained the expectation in the current market is an 8% net return with a 5% to 7% cash yield. The cash yield last year was about 7.5%. The strategy is highly focused on cash yield and aligns with the lower risk core-focused outcome.

MR. MOLLER described the governance aspect of the fund, taking control positions within the businesses, sitting on the Boards of Directors, and directing the strategies of the

businesses toward a long-term contracted yield-focused outcome. In 2017, 86% of the portfolio company revenues were contracted or regulated. The goal is to be less sensitive economically to the downside and to the upside volatility of equity market environments. The diversified utility companies include water, gas, electricity, contracted power, wind, solar, and GDP-sensitive companies that include railcar leasing, liquid bulk storage, and airports. The 69 investment team professionals are solely dedicated to this fund and the leadership team has been in place for about five-and-a-half years. The vast majority of the 260 global investors are corporate, government or multi-employee union pension plans seeking inflation protection.

MR. MOLLER explained the businesses are typically in the middle market range between $100 million and $300 million. Operational and financial synergy is achieved by incrementally adding-on investments where there is an intrinsic advantage to merging with existing businesses. MR. MOLLER showed the breakdown of the portfolio by individual company. The largest single asset currently is NorteGas at almost 8%. The intent is to increase the size of the fund to further diversify the strategy, with the largest company holding at no more than 5%. MR. MOLLER advised the portfolio contains no emerging markets or periphery OECD and contains no telecommunications.

MR. MOLLER reviewed the history of being unhedged. An optional foreign currency hedging program for investors is being launched and investors can now choose whether they want to hedge or not to hedge going forward. The investment team will remain focused on managing the net local return currency aspect. The returns for the ARM Board portfolio are shown in US dollars and are net of fees. MR. MOLLER noted the current market environment with the potential of rising interest rates and inflation is positive for the asset class. Many of the regulated and contracted assets pass through inflation under their contract of regulatory structure.

MR. SHAW requested additional information regarding underwriting individual assets and determining the leverage profile. MR. MOLLER discussed the review is transaction-specific, as well as asset-specific. The general expectation return on assets or the discount rate ranges from 7.5% to 12%, with net expectation of 8%. The amount of leverage is dependent upon the risk profile on the underlying business, with a focus on shadow investment grade leverage. Leverage is an integral part of the total return and the approach is to take moderate levels of risk with moderate levels of leverage.

MR. MITCHELL asked what the impact of leverage has been on the performance of the fund since inception. MR. MOLLER noted the fund has never had any company bankruptcies. During the financial crisis, there were two companies retaining cash to pay down debt. No companies came close to imminent risk. The leverage was all investment grade. The contracting and regulated cash flows were consistent during the financial crisis, but lacked growth. The amount of leverage in the portfolio is slowly trending down over time because of the market environment and very attractive rates of leverage. The UK utilities tend to have higher leverage based on their regulatory structure. Adding different types of assets and extending maturities has consequently lowered the levels of leverage.

MR. ERLENDSON inquired as to the departure of the Director of Research earlier in the year, the importance and function of the role to the fund, and the plans to fill the role. MR. MOLLER informed the previous Director of Research had been with the fund about 10 years and decided to take a new role working with clients at a different strategy for a personal change of pace. Research is integral to the process. A person from the Municipal Bond Research Group at JP Morgan has joined the team to fill the role. The Head of Research, who sits on the Investment Committee, has not changed and continues to manage the Director of Research position.

17. BROOKFIELD LISTED INFRASTRUCTURE

MR. MITCHELL advised Brookfield Listed Infrastructure is one of the ARMB's publically listed infrastructure managers. They have been managing assets for ARMB since 2014, and currently manage an allocation of approximately $113 million on behalf of the ARMB. MR. MITCHELL introduced RICK TORYKIAN, Client Services, and CRAIG NOBLE, CEO, founder of Global Infrastructure Securities, and Portfolio Manager for Brookfield Investment Management.

MR. TORYKIAN noted Brookfield is one of the largest global leaders in real assets. The portfolio selection is bottom-up, driven by value and cash flows. The portfolio has an owner/operator mentality because the corporate parent owns and operates a significant amount of the assets globally. The companies tend to have a very monopolistic business with long-dated visible cash flows and very high barriers to entry. MR. TORYKIAN informed the diverse team of 12 investment professionals are based in Chicago and have experience including private market infrastructure, public market infrastructure, and regulatory expertise.

MR. NOBLE described the investment approach focuses on owning hard assets including, toll roads, airports, oil and gas pipelines, and communication towers that offer attributes such as stable cash flows, predictable growth, good income and high barriers of entry. There are 48 holdings in the portfolio. MR. NOBLE believes this size provides the intersection of high conviction, concentration, best ideas and beneficial diversification. The investment philosophy is active management focused intensely on research and generating excess returns over the long-term. The longer-term perspective in the public markets and the approach to value leads the portfolio to being somewhat contrarian, while maintaining a respect for diversification and a macro overlay of the global trends.

MR. NOBLE believes there is a heightened geopolitical uncertainty, domestically and around the world today, that includes the risks surrounding trade wars. Negative or zero interest rates pose a concern because it is not prudent to make investments where the thesis hinges on interest rates staying artificially low in areas like continental Europe and Japan. The portfolio has a fair amount of exposure in the North American energy space and US pipelines.

MR. NOBLE informed the portfolio does not invest in master limited partnerships (MLPs) by design and mandate. There are other mandates that have the ability to invest in MLPs. MR. ERLENDSON requested Brookfield's view on MLPs since they are utilized in other mandates. MR. NOBLE noted Brookfield has a dedicated North American energy MLP

investment team based in Houston. He believes MLPs are cheap now and there is a bifurcation in the market between companies who have simplified their capital structure and more importantly their governance structure, and companies who are externally managed and continue to be penalized.

MR. MITCHELL noted there is a fair amount of capital available in the private equity side awaiting investment. He requested Brookfield's views on whether publically listed pipeline companies are at a competitive advantage or disadvantage versus privately owned pipeline companies. MR. NOBLE described publically listed pipeline companies, whether they are MLPs or corporations, are at a disadvantage compared to their private counterpart, in terms of cost and capital. The stock prices are really cheap compared to the private market value of the exact same types of assets. MR. NOBLE explained the public pipeline companies are having a difficult time issuing fresh equity or have chosen not to issue fresh equity at these depressed prices and are cutting their dividend instead to fund the capital expenditure programs.

MR. NOBLE continued the presentation discussing the portfolio seeks to pay the right price for an asset and then it is focused on risk mitigation. The bigger risks include changes in regulation, changes in the political environment that could impact the companies, and then the rare specific catastrophic operational events. The portfolio experienced two of the rare events this year; the horrific bridge collapse in Italy and the Columbia utility gas explosions. The bridge was owned by Atlantia and the Columbia utility was owned by NiSource. The portfolio had a very small position in each of these companies.

COMMISSIONER FISHER inquired as to the level of control over the assets Brookfield maintains. MR. NOBLE explained the investment team is actively selecting the assets, but does not manage the assets and does not have a seat on the Board of Directors. This is different from the private equity direct investing counterparts where there is actually control of the operations of a company. MR. NOBLE discussed the investment process for public markets reviews quality of the asset, valuation of the asset, and quality of the company, which specifically and separately includes quality of the management team, operations, capital structure, and strategic corporate governance.

COMMISSIONER FISHER asked if Brookfield believes the two issues that arose this year were the result of failure of management. MR. NOBLE noted these issues are not supposed to happen. He thinks there were many factors and quality of management was one of them. He does not think they were negligent. The root causes of the issues with Columbia are yet to be determined. Atlantia had wanted to spend more capital on the bridge, and the government and regulators were resistant because it would cause the tolls to increase and shut down the bridge for a period of time.

MR. NOBLE described the portfolio positioning by sector and by region. The account was funded in March of 2014. Energy infrastructure exposure is at 32% and is divided into pipelines and midstream. There are no commodities in the portfolio. However, the unforeseen collapse of the energy prices beginning in November 2014 from $100 a barrel of oil down to $27 a barrel had a much bigger negative impact than expected on absolute

performance and relative to the indexes. The portfolio was down 16% in 2015, but has since had a good recovery. The 2016 return was up 13%, the 2017 return was up 15%, and year-to-date is doing fine. Production volumes and fundamentals of the portfolio's energy companies are strong.

MR. MITCHELL asked if Brookfield feels the S&P Global Infrastructure is an appropriate benchmark comparison, and MR. SHAW asked if there were any companies in the S&P Global Infrastructure benchmark this portfolio would not own. MR. NOBLE believes the three best indexes for portfolio comparison are the Dow Jones Brookfield Global Infrastructure, the FTSE Global Core Infrastructure 50/50, and the S&P Global Infrastructure. He noted none of them are perfect, but provide a fair representation of the portfolio's universe. MR. NOBLE described the characteristics of each benchmark and noted there are two small companies in the S&P Global he does not agree belong in infrastructure, specifically an airline meals catering company.

MR. NOBLE discussed infrastructure as an asset class has underperformed the broad equity market for the last few years mainly because of rising interest rates and the strong equity impacts of vogue technology stocks. He feels the market has absorbed the continued expected rise in interest rates and that the broad equity market is now expensive. Infrastructure assets are relatively cheap and there are many opportunities to maintain a balanced approach.

18. LAZARD LISTED INFRASTRUCTURE

MR. MITCHELL advised Lazard is the second of the ARMB's publically listed infrastructure managers. They manage approximately $151 million in assets on behalf of ARMB. MR. MITCHELL introduced TONY DOTE, Managing Director, and ED KEATING, Portfolio Manager, of Lazard Asset Management. MR. DOTE informed the publically traded infrastructure strategy began about 11 years ago and currently has $13 billion under management. The strategy was closed to new investors three years ago. The investable universe for the strategy is narrow and represents preferred high quality companies that tend to function more like monopolies. The companies are cash flow generative with good management. The intent is to have a defensive performance in down markets with a predictable outcome. The strategy is global, with no emerging market stocks in the portfolio.

MR. DOTE discussed the investment team is based in Sydney, London, and New York, and they work very closely together. The strategy is expected to outperform inflation by 5%. The benchmark was changed in June. The strategy is unhedged and has outperformed over the last three years by 650 basis points. The compounded return since inception has been a little over 10%. MR. KEATING explained the portfolio is comprised of 27 value-focused companies that have positive absolute expected returns. A large allocation is in the top 10 investments of the portfolio. The managers invest with a bottom-up style. There are no sector calls and no top-down calls in the portfolio.

MR. KEATING showed value graphs of the preferred infrastructure universe of stocks ranked by sector and ranked by country. US businesses are highly attractive from a management and quality standpoint, but are too expensive to own now. The portfolio has a small 20%

allocation to US for this reason. MR. ERLENDSON asked how much of the expensive valuation is a result of the underlying currency asset to a dollar-based investor. MR. KEATING noted the valuation is fully based on the asset and there is no currency implementation. The portfolio is invested as a local investor strictly on the fundamentals and valuations of the assets and not on currency direction. MR. KEATING explained the stocks that are attractive today are predominantly in Europe. They have predictable assets with stable businesses and valuations have been kept low because of the stressful political uncertainty.

MR. KEATING discussed the top 10 positions and noted the top five stocks represent about 8% of the equity in the portfolio. He highlighted the fourth largest position is the Italian toll road company Atlantia, which owns the Morandi Bridge that tragically collapsed in Genoa. The position has fallen about 30% since August. The portfolio remains owners. The company has been adamant and public with respect to its ability to prove it maintained the asset according to the concession agreement. The portfolio managers have updated their model and believe the worst case scenario for Atlantia is still attractive. The managers have added to the portfolio position.

MR. ERLENDSON asked if the investment decision process includes an on-the-ground evaluation of the asset. MR. KEATING explained the majority of the work is on the financial side and meeting with management to understand their plans of capital commitment. The process does include visiting the assets.

CHAIR JOHNSON inquired if the Morandi Bridge collapse was likely to be an existential threat to Atlantia. MR. KEATING discussed Lazard does not believe so, but the real cause of the bridge collapse has not yet been determined. MR. KEATING provided a background of Atlantia, noting it is effectively an infrastructure holding company that owns 88% of the Autostrade, which is the concession deed that covers 3,000 kilometers of roads within Italy, including the Morandi Bridge. Atlantia has an investment in Rome Airport and is in the process of buying a large Spanish company called Abertis. It has several very attractive other investments in Latin America. MR. KEATING discussed the possibility of the government removing the concession from Atlantia's power, but not without compensation. The Italian government would have to compensate Atlantia on the present value of the future cash flows of the next 24 years, which would be billions of dollars, and is highly unlikely.

MR. KEATING highlighted specific transactional activity in the portfolio. He reviewed the since inception performance has been 10.5% per year, which is in excess of infrastructure equities and compares well against other major asset classes. The 2018 returns have been quite volatile and are down about 2% over the short-term. He believes the objective of 5% in excess of inflation is still very achievable over five-year periods, given valuations today and the portfolio's style of management. The benchmark for this portfolio was changed in July from the FTSE Infrastructure Index, the FTSE 50/50 Index to the MSCI World Core Infrastructure Index. The portfolio is benchmark unaware and this change will be referenced in paperwork, but will not impact or change the portfolio investments.

CHAIR JOHNSON asked if the benchmark change would create a contractual imposition. MR. MITCHELL was not sure about the contractual benchmark. He discussed evaluation compares against the benchmark the portfolio is using, as well as the S&P benchmark for the asset class. There is a fair amount of dispersion because this portfolio is relatively concentrated and is not benchmark-aware.

MR. WILLIAMS asked for more information from Lazard regarding due diligence of monitoring or training to ensure a catastrophic failure with Atlantia does not occur again. MR. KEATING noted asset failures are rare, but when they do happen they are incredibly impactful and watched boldly. The Morandi Bridge was going through the process of being maintained and repaired in accordance with civil servants and authorities. No one predicted the bridge was going to fall during the powerful storm that day. Lazard believes there are political effects around the asset, as well, that will be highlighted in Genoa and on a national level. There was a planned bypass for the Morandi Bridge which was going to be funded by the European Union during the time of bitter populism and nationalism, and Italy effectively rejected the asset. MR. KEATING informed there are many different elements regarding the asset. Political and regulatory risks are key risks to investing in infrastructure assets around the world. The portfolio mitigates these risks by maintaining the highest quality infrastructure companies within the universe, being brutally conservative in the valuation of the businesses, and diversifying the portfolio sensibly.

COMMISSIONER FISHER commented to staff and consultants regarding the four presentations today, and how two of them contained the same asset that suffered from the bridge collapse. He noted the use of different managers is probably in the hopes to get more diversification, and in fact, the risks may not be as diversified as expected. COMMISSIONER FISHER requested in the future to block out time for staff and consultants to provide their views on the managers individually, the collection of managers, and the correlation to the portfolio.

19. PASSIVE CAP WTD. NON-US DM AND EM

MR. MITCHELL informed the ARM Board accepted a staff recommendation in June to change the way passively international equities are managed. There is currently about $1.6 billion with two managers in broad international exposures, which include developed and emerging markets. Staff recommended separating passive investments in the developed markets from passive investments in the emerging markets. This will provide staff with additional levers to make adjustments to the international equity asset allocation.

Staff engaged a number of firms to ascertain their ability to manage passive indices against the developed and emerging markets. The evaluation criteria included track record, team experience, cost, and tracking error. Staff is prepared to bring forward later in the meeting a recommendation to engage State Street Global Advisors (SSGA) to manage the two mandates. SSGA is next to present to the Board.

CRAIG DEGIACOMO, Head of Public Funds and Taft-Hartley, introduced KIM COOK, Senior Relationship Manager, and KARL SCHNEIDER, Portfolio Manager within Global

Equity Beta Solutions (GEBS) of SSGA. MR. DEGIACOMO expressed appreciation to the Board for its broad relationship since the early '90s. He noted the length of the relationship and stated he will forego updates on the company and get right into the investment portfolio presentation. If the Board has questions regarding the organization or structure, he is happy to answer those at any time. There were no questions.

MR. SCHNEIDER described the differentiators in evaluating index providers and why SSGA is the best partner for ARMB. The investment team is experienced and highly tenured with an average experience of 18 years. There are approximately 60 portfolio managers worldwide and approximately 27 portfolio managers at the headquarters in Boston managing equity index assets. Index tracking is the main goal of an index manager and the portfolio has consistently delivered on that objective. The process does not just replicate the index. The executions are traded in a more thoughtful manner to take advantage of possible opportunities that add incremental value in the portfolio to potentially negate some of the transaction costs that inevitably come with managing an index mandate.

MR. SCHNEIDER discussed SSGA is client-focused and has resources available for staff to utilize. The SSGA research function is comprised of a core indexing research group within the portfolio management team and a smart beta research team that evaluates strategies from third-parties or within SSGA's proprietary strategies. SSGA takes asset stewardship seriously as the holders of capital and managers on behalf of the ARMB. SSGA engages directly with companies and takes opportunities to effect change from an asset stewardship perspective. MR. SCHENEIDER reviewed the organizational chart of the company, including portfolio managers, systems team, research team, and trading team.

MR. SCHNEIDER explained the size and scale of being a large index manager helps with efficiencies and keeping costs down. The breadth and diversity of the asset base is also a large component of making the efficiencies possible. This allows for internal liquidity and crossing between different portfolios without having to go to the market, without the market impact of commissions, spreads, or trading costs. CHAIR JOHNSON asked if the number of internal trades could be quantified by month. MR. SCHNEIDER noted he does not have that specific information with him today, but directed the Board's attention to the slide with the case studies showing between 2015 and 2017, SSGA traded approximately $31 billion internally without transaction costs, providing a savings of $71 million. The EAFE trading costs are 30 basis points in the open market. A benefit of being a comingled vehicle is one participant is buying and another participant is selling. This is an accounting transaction and provides an additional layer of crossing and cost savings available to participants. The Department of Labor exemption allows cross securities to be implemented at the closing price.

MR. SCHNEIDER discussed the broad categories of the portfolio managers' daily decisions and duties to ensure the indexes are tightly tracked without giving up unnecessary wealth in the portfolio. Index reconstitutions occur daily, along with demanding liquidity events. He explained how it may be better tactically to pre-trade securities ahead of an index event or to post-trade securities after an index event, and other times it actually is best to trade the securities on the index event, market-on-close. The evaluations are balanced and on a case-

by-case basis. Some of the index changes are pretty small and do not impact the overall tracking and risk/return characteristics of the portfolio. MR. SCHNEIDER highlighted the importance of SSGA's expertise in index reconstitution, portfolio rebalancing, index events, and core beta research.

20. SCIENTIFIC BETA MF NON-US DM AND EM

MR. MITCHELL provided background and informed staff were given authority by the ARM Board in June of 2016 to begin managing smart beta indices in domestic equity, benchmarked against the Scientific Beta Multi-Beta, Multi-Strategy Four Factor Equal Weight Index. In April of 2017, staff requested permission to invest in international equities developed markets. Staff is still studying and the plan is to come back to the Board in June 2019 with an assessment of feasibility, in terms of the complexity for internal staff. In June 2018, staff presented a plan that included recommendations for restructuring the international equity portfolio. One element was to introduce smart beta passive investment for developed markets and emerging markets, very similar to what is being implemented on the domestic side.

MR. MITCHELL informed staff received the ARM Board's approval to engage external management. After appropriate due diligence, staff is prepared to recommend Legal & General for those mandates in an action later today. A component of the understanding with Legal & General is if staff should ultimately come to the conclusion to manage the developed portion of the international equity portfolio internally, staff would take over the component from Legal & General. There is also an emerging markets element that is being contemplated.

MR. MITCHELL introduced IVY FLORES, Senior Investment Director, and SHAUN MURPHY, Head of US Index, of Legal & General. MS. FLORES gave a history of Legal & General that began in the UK in the 1830's by a group of lawyers. It was first an insurance company and the insurance service was rolled out to the general public. Legal & General has been managing index assets since the 1980's, is the largest index provider in the UK, and the fifth largest institutional asset manager globally, with $1.3 trillion of assets under management across multiple asset classes. MS. FLORES showed a list of representative clients in the US, including other public funds.

MS. FLORES stated Legal & General's goal is to meet the objectives of the mandates and also be a value-added partner over time. During the course of conversations with staff, Legal & General is willing and able to be an extension or staff's resources, and to assist staff in the possibility and process of taking the developed ex-US assets in-house.

MR. MURPHY informed most of the client experience outside of the US focuses on UK and European pension funds and sovereign wealth funds. The two management capabilities are separately managed accounts and pooled funds. The ARMB is considering one of each today; a separately managed account for the developed ex-US portfolio and a comingled pooled fund for the emerging markets account. As a public plan, the pooled fund will be in the collective invest trust (CIT) aspect of the pooled funds for emerging markets. The team consists of 18 consultants, 11 investment professionals, including five portfolio managers, two strategists,

and one software developer. The intent is to keep the number of accounts per portfolio manager to less than 10 in order to ensure the portfolios get the attention they need in tracking the risk and return characteristics of the index and finding ways to add value.

MR. MURPHY explained Legal & General's success is due to the transparency of the philosophy, process, and construction of managing the funds, an operating model that is aligned with investors, the relationship between the trustee of the pooled fund and the affiliated service providers, the overall value proposition, and client engagement and training. MR. MURPHY provided historical information on the CIT fund structure developed in the 1930's. CITs started getting traction in 2000 when they were added to the NSCC clearing platform. CITs tended to be useful to DC plans because they were better value for the money, less expensive to run and maintain, and more flexible. CITs were closely followed by DB plans, public plans, and Taft Hartley plans. CITs are built on a collective bank trust structure with a trustee who is the fiduciary of the fund and hires service providers, including asset managers, custodians, and lending agents. The company or trust bank will usually hire themselves in as many capacities as possible for ease and efficiencies in scale.

MR. MURPHY described some CITs did poorly during the financial crisis because of the structure of the governance and securities lending. The securities lending portion of the offering was increasing the risk profile of the lending agreements. As a result, there were big issues with the lending crisis and some funds were essentially closed to investors to leave. Liquidity was impossible to seek and many lawsuits were sought. The lessons the industry learned surrounded the decisions of a trustee can be opaque if they are also looking at the amount of revenue and profits the affiliated service providers could make from a certain function. Dodd-Frank changed the ways fees and costs were disclosed to the client after the financial crisis. The CIT fund costs include management fees, administration fees for the trustee, fund accounting, safekeeping, audit, legal, and other costs that fall within the fund itself. MR. MURPHY noted staff has performed their due diligence regarding costs and the total expense ratio.

MR. MURPHY continued the presentation focusing on philosophy and process. The philosophy for all index managers should be to match the risk and return characteristics of the index itself. The detractors to this include transaction costs and tracking error. Time is spent in the portfolio to add very small fractions of basis points to offset some of the fees and costs of trading. The process begins with understanding, defining, and controlling risk and cost. Both of the portfolios Legal & General are proposing will be fully replicated because they are big enough, liquid enough, and narrow enough to provide for replication.

MR. MITCHELL asked for an estimation of the cost of engaging in a trade in the US in large cap developed international and emerging market international. MR. MURPHY likened costs to an iceberg. There are the above the waterline costs that are transparent and easy to define, such as commissions, taxes and fees. Below the waterline, they are called implied costs or implicit costs, and include costs of the bid/ask spread, opportunity costs, and market impact. The US equity market is the most liquid and well-covered. It is the cheapest from a commission standpoint to trade. It costs about one basis point to trade in the US marketplace. Less liquid securities will have a little higher cost. The costs in developed international are

the taxes for buying and selling securities overseas. In UK, the stamp duty for every security is 50 basis points. In Ireland, it is 45 to 100 basis points for every security bought. In Hong Kong, it is 12 basis points.

MR. MURPHY described the emerging markets commissions tend to be a lot higher, at around 12 basis points, and there are many explicit costs in emerging markets that are not seen in developed markets. The foreign exchange dynamic in developed markets freely trades currencies across nations and recognizes an execution at the benchmark point of 4:00 p.m. WM/Reuters rate. Most of emerging markets, 70%, do not allow free trade of currencies and a transaction must occur through a sub-custodian, which requires a physical certification that the trade occurred. This results in opportunity costs that can either work positively or negatively. There are also capital gains taxes in certain emerging market countries, even for tax-exempt institutions. This affects the performance of the fund relative to the benchmark.

MR. MITCHELL asked for an explanation of the distinction between the capital gains taxes being referenced and the MSCI gross and net index. MR. MURPHY explained index providers are referencing taxes on income related to the dividend and not taxes on capital gains. The index treats taxes on dividends three different ways. The price-only benchmark return excludes dividends all together, and assumes they are not even paid. The gross return assumes there is a zero tax on dividends, no matter what country. The net return is effectively taking the worst case tax scenario in the world, which is Luxembourg at 30%, and paying that tax. The US has a reciprocal tax agreement, tax reclaims, with every developed country to get all or part of the dividend taxation back, resulting in a US tax exempt fund immediately outperforming the net return of the benchmark. MR. MURPHY discussed how the optimizer is applied to the portfolio and how futures are traded in the efficient portfolio management process.

MR. ERLENDSON requested discussion on how to minimize the frictional costs and timing decisions to accommodate corporate actions within the index. MR. MURPHY explained the management team determines if the event's impact will change the risk profile of the portfolio relative to the index. The team reviews corporate methodologies and decides on ways to avoid wealth erosion by trading before the close, at the close, or after the close.

21. PERFORMANCE MEASUREMENT - 2ND QUARTER

CHAIR JOHNSON introduced MR. ERLENDSON and MR. CENTER of Callan, LLC to present the 2nd Quarter Performance Measurement for the quarter ending June 30, 2018. MR. ERLENDSON discussed real GDP growth is the actual growth in the economy minus the rate of inflation. Real GDP growth has been generally positive. The second revision of the GDP numbers for the second quarter came in at 4.2%. This is dramatic because inflation has been increasing.

MR. ERLENDSON informed the major driver in the growth of the economy was the acceleration in exports and the one-time uptick in GDP due to the threatened trade policies and sanctions. The US is essentially at full employment and the unemployment rate has been improving. The challenge going forward is finding the available skill sets required in the

current economy. Wage growth has not been as strong as it has out of other recoveries. MR. ERLENDSON reviewed a chart showing the strength of economic expansions. The length of the recovery since the second quarter of 2009 has been fairly long and has been at a lower rate of recovery. MR. ERLENDSON discussed a chart from JP Morgan and the IMF showing GDP would decrease 1.4% across the US, Europe, and China if a 10% increase in tariffs occurred. In the capital markets, small caps stocks showed a significant uptick in performance about the time trade sanctions were being discussed. MR. ERLENDSON noted small cap companies are generally more immune to trade issues because they are typically more domestically oriented in their business. Over half of the earning of the S&P 500 companies come from outside the US, making them more sensitive to the impact of trade sanctions.

MR. ERLENDSON reviewed the periodic table of the different benchmarks ending June 30th for the 20-year, 10-year, 5-year, 3-year, 1-year, and last quarter time periods. Over the last 20 years, emerging markets had the highest return at 8.9%. This time period is capturing two macro events, the global financial crisis and the telecom bubble bursting. The shift of domestic stocks performing better is when the timeline gets shortened. The S&P 500 has performed best over the last three and five years, followed by the Russell 2000 small cap stocks. As of September 30th, the Russell 2000 was up 13% year-to-date. Treasury bills were at 1.2% for the first six months, which is a significant increase from a zero-base for the last eight years.

MR. MITCHELL commented the allocation balance between US stocks versus international developed and emerging market stocks over long periods of time can significantly impact the overall portfolio performance. He requested discussion regarding what allocation is recommended for US stocks and what allocation is recommended for international developed and emerging market stocks. MR. CENTER noted the typical recommendation is a baseline allocation that is similar to the capitalization of the US versus non-US and emerging markets versus developed. There is no strategic overweight position necessarily to emerging markets versus US, unless the return goals are such to warrant a higher level of return volatility.

MR. ERLENDSON reviewed the concentration of index returns and noted the four FANG stocks, Facebook, Amazon, Netflix, and Google, have a market cap of $2.3 trillion. Across the MSCI Index of market cap weightings for countries, those four stocks would be the fourth largest market in the world, behind US, England, and Japan. A portfolio without a market weight of these stocks will deviate from the benchmark return. MR. ERLENDSON showed the top 10 contributors to the S&P 500 return for the first six months are over 120% of the index return.

CHAIR JOHNSON commented the five FAANG stocks, Facebook, Amazon, Apple, Netflix, Google, are so powerful that the industry must be spending time trying to assess what influences could impact those companies. He asked if Callan views a particular set of trends that are unfavorable and should be watched. MR. ERLENDSON believes the huge moves toward passive management and factor-based investing are reactionary.

MR. ERLENDSON discussed yield curve changes. In 2007, cash was returning almost 5%. The yield on bonds decreased dramatically when the financial crisis hit in 2008. This has held yields down for quite some time. Longer-dated bonds have not increased in interest rate. Short-term bonds have increased in interest rate. The yield curve has flattened. The common interpretation is when short rates are the same as long rates, there is no benefit for taking additional risk. MR. CENTER advised the yield curve directly impacts the ARMB's internally managed bond portfolio. The upward movement in the yield curve in the short to intermediate term has resulted in a slightly negative performance in the internally managed portfolio. MR. ERLENDSON commented the last five years have proven to be a great market environment for taking risk. Callan has seen signals that taking additional risk is starting to get less certain, in terms of the payoffs going forward.

MR. ERLENDSON noted the next portion of the presentation will review the current positioning of the portfolio and how that performance has accrued to the benefit of the trust. MR. CENTER focused the Board's attention to the asset allocation versus the target allocation. The PERS plan is used as an illustrator for all the plans. The actual asset allocation is within the stated guidelines of the target, with a slight overweight to real assets, a slight underweight to fixed income, opportunistic equity, domestic equity, and non-US equity. As compared with Callan's database of public funds, PERS has a lower allocation to fixed income than most peers and a higher allocation to both real assets and alternatives than most peers. The differences drive performance at times.

MR. CENTER reported the PERS performance versus peers was above median over the last one year, three years and five years. The PERS performance versus peers over the last 10 years was below median and was driven mostly by performance in 2009, coming out of the global financial crisis when the private assets, consisting of real assets and private equity, struggled. MR. CENTER explained the returns for private assets did not decrease in the 2007/2008 period like the public markets. There was an echoing effect and the returns decreased in 2009, and then recovered. COMMISSIONER FISHER asked if it was reasonable to view the values as high going into the financial crisis and the portfolio may have overpaid for those real assets. MR. CENTER agreed and believes it can be viewed as implementation cost of real assets going into the financial crisis.

MR. MITCHELL believes two dynamics occurred in 2009. The first was the underperformance of the alternative illiquid assets. The second was the lag compared to peers recovering with a higher weight in public markets. COMMISSIONER FISHER requested additional information because his mindset has been having an overweight to illiquid assets benefits the portfolio long-term, and what the numbers are reflecting is the overweight has not benefited the portfolio. MR. CENTER stated real assets have had a negative impact on the total plan performance for the 10-year period. Private equity has had a positive impact on the total plan performance for the 10-year period.

COMMISSIONER FISHER requested insight as to how to allocate going forward, given corrections will occur again. MR. ERLENDSON expressed some of the impact was because of the unfortunate timing when the portfolio was implemented. The shorter time periods show the success of the program going forward. MR. CENTER added one of the changes the

ARMB and staff have made is to continue to invest in the alternative asset classes, the private market asset classes, on a systemic basis to diversify away from having an investment period that hits on the top of valuations. Callan also agrees the recommended changes to the real assets portfolio that were discussed yesterday make sense.

MR. CENTER reported the PERS Sharpe ratio ranked above median versus peers over the last three years and five years, and slightly below median over 10 years. The standard deviation of the plan over the last three years and five years exhibited a slightly higher risk profile than peers, and a lower than median standard deviation over 10 years. This is due to the peers having a higher allocation to publically traded equities and PERS having a higher allocation to private market assets, which tend to exhibit a lower standard deviation.

MR. CENTER advised the preliminary numbers for the quarter ending June 30th show the PERS plan trailed its benchmark by 25 basis points. The key drivers to the underperformance were non-US equity managers and private equity. COMMISSIONER FISHER asked if the reported numbers were gross or net. MR. CENTER noted most of the private assets are reported net and the publically traded assets are reported gross. He realized the net return for the fiscal year-end should have been provided and will send the numbers to the Board members. The PERS plan outperformed its benchmark by 75 basis points for the one-year. This was driven by a strong performance from private equity and the real assets portfolio.

MR. CENTER informed both PERS and TRS outperformed their target with second quartile performance over the last one, two, three, five, and seven-year periods. The 10-year performance underperformed the median and the benchmark. Both PERS and TRS outperformed the benchmark by approximately 10 basis points over the long-term of 26 ¾ years. MR. CENTER reviewed PERS asset class performance versus each benchmark. The total domestic equity portfolio outperformed the benchmark for the last quarter and last year, and has slightly trailed the benchmark over the last three, five, six, and 10-years. The active large cap allocation trailed the benchmark during the quarter. There were quite a few changes during the quarter with the removal of Barrow Hanley, QMA, and Alliance active large cap strategies. This makes the large cap equity portfolio almost all passively managed now.

MR. ERLENDSON explained tracking error is a measure of the variability of the returns above or below the benchmark. Lower tracking error suggests greater consistency relative to the benchmark. Higher tracking error suggests a greater uncertainty relative to the benchmark. MR. CENTER discussed the large cap equity portfolio had a low tracking error over the last five years. MR. MITCHELL noted the passive mandates are not managing explicitly against the Russell 3000, and he expects some measure of tracking error as a result. MR. CENTER informed the small cap portfolio has performed well versus the benchmarks over the last year and last five years with low tracking error. The micro cap exposure has performed well and has been additive to the portfolio over the last 5 years.

MR. WILLIAMS commented the small cap domestic equity numbers are shown gross of fee and he would like to include the net of fee numbers for a benchmark comparison. MR. CENTER explained he will include the net of fee performance for the small cap pool in the

next quarter's report in a table format. The net of fee performance information for the peer group is unavailable and is why gross numbers are compared to the peer group distribution.

MR. CENTER advised the performance of the international equity portfolio has outpaced the benchmark over all time periods. One strategy was exited in the international equity portfolio. There was strong performance from the developed market portfolio, all outperforming their indices. MR. CENTER focused on the emerging market portfolio. The newly funded DePrince, Race, and Zollo (DRZ) emerging market strategy that replaced the Parametric Eaton Vance strategy was off to a bumpy start, down 10% during the quarter. Lazard continues to struggle because their contrarian value style is substantially out of favor. In 2017, the rally was driven by growth and value underperformed by 20%. Additionally, Lazard is underweight China and since it is a value strategy, the portfolio cannot allocate to two of the best performing growth stocks, TenCent and Alibaba. In the last year, Lazard basically returned zero-percent and the index returned 8.5%. Lazard has remained consistent with their philosophy and staff feels they continue to be a good choice for a value-focused manager. Staff believes replacing Eaton Vance with another growth manager will add value to the overall emerging market portfolio.

MR. CENTER discussed the total fixed income portfolio over the last year was down 70 basis points, which was due to movements on the shorter end of the yield curve. The overall opportunistic portfolio has performed well over the last year, at a positive 5.25%. Both tactical and municipal fixed income have performed well. Emerging market debt portfolios have struggled due to the impact of the strength of the US dollar. MR. CENTER noted real assets performance was discussed in detail yesterday. The preliminary numbers for the absolute return portfolio shows performance was below peers.

MR. CENTER gave an overview of the Defined Contribution (DC) plans. PERS and TRS CD plans continue to experience net positive flows on a quarterly basis. The Deferred Comp plan has experienced net negative outflows on a quarterly basis for the last couple of years. MR. CENTER described the stoplight charts for the investment options. Overall, performance was positive, with very good performance from the active side. There was an error in reporting the Alliance Socially Responsible Fund and should be corrected from the one-month return number of 0.4% to the one-quarter return number of 2.4%. As a result, the one year changes to 15.7%, and the three-year changes to 10.7%. The passive funds showed minor deviation from a couple of the index funds on the positive side with better risk numbers than the benchmark. The TIPS market has been notoriously difficult to manage on a passive basis because the benchmark has no trading costs. There are only 30 securities in the portfolio and passive replication consistently lags the benchmark.

CHAIR JOHNSON recessed the meeting from 2:36 p.m. to 2:42 p.m.

22. INVESTMENT ACTIONS

MR. MITCHELL addressed many of the following action items have been the focus of presentations and have been discussed. For those action items, staff will provide the

recommendation and additional examination will occur, as desired by Trustees. The action items that have not been reviewed will be described fully.

A. Scientific Beta Non-US Manager Selection

MR. MITCHELL stated staff recommends the Alaska Retirement Management Board direct staff to contract with Legal & General to manage a passive mandate benchmarked against the Scientific Beta Developed Ex-US Multi-Beta Multi-Strategy Four-Factor Equal Weight Index and the Scientific Beta Emerging Multi-Beta Multi-Strategy Four-Factor Equal Weight Index, subject to successful contract and fee negotiations.

MR. BRICE moved to direct staff to contract with Legal & General to manage a passive mandate benchmarked against the Scientific Beta Developed Ex-US Multi-Beta Multi-Strategy Four-Factor Equal Weight Index and the Scientific Beta Emerging Multi-Beta Multi-Strategy Four-Factor Equal Weight Index, subject to successful contract and fee negotiations. MR. WILLIAMS seconded the motion.

CHAIR JOHNSON requested the amount proposed for this recommendation. MR. MITCHELL advised the initial investments will be in the range of $100 million to $200 million each.

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

B. Non-US Cap Weighted Manager Selection

MR. MITCHELL stated staff recommends the Alaska Retirement Management Board direct staff to terminate the existing mandates with SSGA and BlackRock benchmarked against the MSC All Country World Ex-USA IMI. Additionally, ARM Board direct staff to contract with SSGA to manage a passive mandate benchmarked against the MSCI World Ex-USA Investable Market Index and a passive mandate benchmarked against the MSCI Emerging Markets Index, subject to successful contract and fee negotiations.

MR. WEST moved to direct staff to terminate the existing mandates with SSGA and BlackRock benchmarked against the MSC All Country World Ex-USA IMI. Additionally, ARM Board direct staff to contract with SSGA to manage a passive mandate benchmarked against the MSCI World Ex-USA Investable Market Index and a passive mandate benchmarked against the MSCI Emerging Markets Index, subject to successful contract and fee negotiations. MS. HARBO seconded the motion.

COMMISSIONER FISHER inquired if deliberations were considered from both BlackRock and SSGA for the new mandates. MR. MITCHELL agreed.

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

C. Analytic Treasuries

MR. MITCHELL provided background information regarding the next action item. The ARM Board manager Analytic manages a Buy-Write strategy. Components of the strategy include the purchase of a passive S&P mandate, a set of derivative option overlays, and equity futures, which require margin cash and buffer cash for the derivatives. The current investment guidelines do not allow for the investment of that cash and it is sitting uninvested. Staff recommends the Alaska Retirement Board direct staff to modify the contract with Analytic to allow investment in US Treasury positions with maturities up to 12 months, and that the US Treasury positions count toward the existing 10% limit on cash equivalents in the portfolio.

MS. HARBO moved to direct staff to modify the contract with Analytic to allow investment in US Treasury positions with maturities up to 12 months, and that the US Treasury positions count toward the existing 10% limit on cash equivalents in the portfolio. MS. ERCHINGER seconded the motion.

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

D. Asset Liability Study

MR. MITCHELL recalled in March of 2003, Independent Fiduciary Services presented a fiduciary audit report to the ASPIB, which included a recommendation to conduct an asset liability study for the portfolio every five years, as best practice. The ARM Board conducted its most recent asset liability study in 2009. Staff believes it is appropriate timing to conduct the next liability study, particularly in light of the experience study process and revision of actuarial assumptions. The asset liability study will more explicitly combine the assets and liabilities and forecast of how the potential portfolio performance, using the Monte Carlo analysis to identify the risk profile of the portfolio with respect to paying the liabilities in the future. Staff recommends the Alaska Retirement Management Board authorize an asset liability study to be conducted by Callan.

MS. HARBO moved to authorize an asset liability study to be conducted by Callan. MS. ERCHINGER seconded the motion.

MR. WEST inquired regarding the cost of the study and the timing of the study; why it was not pursued every five years, as recommended. He believes the liability study would be a more valuable tool on a continuing basis creating a comparison track record of studies. MR. MITCHELL stated the cost will be $105,000, and noted the concerns of MR. WEST.

MR. WEST suggested the liability study could be embedded in Callan's contract in the future.

MR. CENTER acknowledged corporate pension plans conduct asset liability studies on a more frequent basis, every three to five-years, than do public funds. He agreed the asset liability study for the portfolio should be performed more often.

CHAIR JOHNSON asked for the expected completion date of the study. MR. MITCHELL noted Callan is optimistic the April Board meeting timeline can be reached, even with tabling the Experience Study assumptions resolution until the December meeting.

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

E. RFP for General Consultant

MR. MITCHELL described the last two action items relate to a request to conduct an RFP for the two consultants; general consultant and real estate specialist consultant. Staff recommends the scope of the specialist consultant be expanded to include the entire real assets asset class. MR. MITCHELL believes having a specialist consultant is advisable. Staff recommends the Alaska Retirement Management Board direct staff to issue an RFP for a general consultant in a timeframe that will result in a general consultant contract being in place by July 1, 2019. The performance period of the contract will be for three years, with two optional one-year extensions.

MS. HARBO moved to direct staff to issue an RFP for a general consultant in a timeframe that will result in a general consultant contract being in place by July 1, 2019. The performance period of the contract will be for three years, with two optional one-year extensions. MS. ERCHINGER seconded the motion.

CHAIR JOHNSON inquired if one or more of the ARM Board members are involved in the review stage of the contract. MR. MITCHELL agreed.

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

F. RFP for Real Assets Consultant

MR. MITCHELL stated staff recommends the Alaska Retirement Management Board direct staff to prepare and issue an RFP for a real assets consultant for the Board in a timeframe that will result in a real assets consultant contract being in place by July 1, 2019. The performance period of the contract will be for three years, with two optional one-year extensions.

MS. HARBO moved to direct staff to prepare and issue an RFP for a real assets consultant for the Board in a timeframe that will result in a real assets consultant contract being in place by July 1, 2019. The performance period of the contract will be for three years, with two optional one-year extensions. MS. ERCHINGER seconded the motion.

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

C. Adoption: Real Assets FY19 Plan & Policies
Resolution 2018-14

VICE-CHAIR SCHUBERT moved to take from the table Resolutions 2018-14 through 2018-18. MS. HARBO seconded the motion.

A roll call vote was taken, and the motion to take from the table Resolutions 2018-14 through 2018-18 passed unanimously.

VICE-CHAIR SCHUBERT withdrew her previous motion to adopt Resolutions 2018-14 through 2018-18. MS. HARBO withdrew her second.

CHAIR JOHNSON informed no vote is need for a withdrawal of a motion by the maker and the second. CHAIR JOHNSON opened the subject matter for discussion and requested MR. MITCHELL to proceed. MR. MITCHELL expressed appreciation to the Board for their patience and indulgence in these matters. He apologized for the lack of coherence in the presentation of the previous request to approve Resolution 2018-14. The primary exhibit was presented during executive session. MR. MITCHELL noted the members have received a presentation staff created, which is the Annual Real Assets Investment Plan. The Board will be asked to adopt the annual plan, which is the provided presentation. A vote to adopt the resolution will keep the existing resolutions in force until they are changed, will eliminate the TIPS portfolio, will adopt the changes included in the plan, as presented, and will accept the information regarding staff's recommendations on real estate and infrastructure for informational purposes only. The Board will take action on real estate and infrastructure separately. It is staff's intent to present to the Board in December regarding the timberland and farmland subcomponents.

MR. MITCHELL reviewed the highlights of the Annual Real Assets Investment Plan. Staff proposed changes to the approach involving language, objectives, strategy, and return expectations. Staff recommends termination of the TIPS portfolio. MR. ORR discussed the major elements of the recommendations in the real estate infrastructure investment guidelines includes reweighting the real asset portfolio that would decrease the allocation to core real estate and private core real estate, and increase the REIT allocation and the non-core allocation. Within each of the private core real estate allocation, staff is recommending a shift from separate accounts to open-ended core comingled funds. The UBS account would be used as a source of liquidity to fund the increase to the non-core allocation. The LaSalle account would sell assets that are currently being prepared to market and transfer two assets to the BlackRock US Core Property Fund. The requirement for a minimum of three separate account managers will have to be removed.

MR. ORR continued to describe the plan and noted the recommendation to invest the non-core space in a more even way going forward, both in pace and in size. Staff recommends changing the guidelines to make it explicitly clear investments in private debt can be executed. The recommendation for infrastructure is to change the benchmark to be more reflective of what is contained in the portfolio. Staff recommends the ARM Board approve Resolution 2018-14, which adopts the Real Assets Annual Investment Plan.

MS. HARBO moved to approve Resolution 2018-14, which adopts the Real Assets Annual Investment Plan. MS. ERCHINGER seconded the motion.

MR. WILLIAMS requested additional information regarding what is being represented on the TIPS slide. MR. MITCHELL explained the slide is demonstrating the real yields have fallen over the past 10 years and are at low levels. It has a fair amount of interest rate risk and it is not really generating a return that is sufficient to warrant keeping it in the real assets portfolio.

MS. ERCHINGER requested staff's view on the impact of the move from private core real estate to non-core on the decision regarding comingled funds and separate accounts. MR. MITCHELL noted it has been 10 years since the portfolio experienced any difficulty in the real assets portfolio. The recommendations to move to comingled vehicles are driven by the anticipation of better prospects for performance, better quality attention, and more diversified portfolios. MR. MITCHELL expressed concern both comingled funds and separate accounts would have liquidity issues in another event like the global financial crisis.

CHAIR JOHNSON requested clarification if the Real Estate Recommendations Core section regarding the transfer of Sentinel's separate accounts are contemplated in this action before the Board and would constitute delegation. MR. MITCHELL informed staff's intent is to bring those recommendations before the full Board for consideration prior to making any changes.

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

Action: Revised Investment Guidelines
Resolution 2018-15 Real Estate

MR. MITCHELL related a second packet has been provided to Board members, which is an action item detailing the proposed changes to the real estate and infrastructure portfolios. Also included in the packet is the red-lined version of the changes to the underlying investment guidelines. Staff recommends the ARM Board approve Resolution 2018-15, which adopts the Revised Real Estate Investment Guidelines.

MS. HARBO moved to approve Resolution 2018-15, which adopts the Revised Real Estate Investment Guidelines. MS. ERCHINGER seconded the motion.

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

Resolution 2018-16 - Infrastructure

MR. MITCHELL stated staff recommends the ARM Board approve Resolution 2018-16, which adopts the Revised Infrastructure Investment Guidelines.

MS. HARBO moved to approve Resolution 2018-16, which adopts the Revised Infrastructure Investment Guidelines. MS. ERCHINGER seconded the motion.

COMMISSIONER FISHER requested additional explanation for the proposed benchmark for infrastructure set at CPI plus four. This is below the target for the fund. MR. MITCHELL explained the CPI plus four was chosen because it is consistent with the current Callan capital

assumptions for the asset class. The broader role of the real assets portfolio is to have returns between equities and fixed income. COMMISSIONER FISHER referred to the presentations given regarding the targets the managers expect are within the range of 8% to 12%. This is materially higher than CPI plus four. He believes this benchmark change is setting a low bar compared to what the managers believe they can achieve. COMMISSIONER FISHER noted an under-allocation to infrastructure could occur because the return is expected to be between 6% and 10%.

CHAIR JOHNSON requested Callan and IAC members comment on the reasonability of the resolution. MR. ERLENDSON noted a target of 10% to 12% nominal rate of return assumes an 8% to 10% real return, which he believes is aspirational. He feels to plan on those returns occurring is a set up for disappointment. MR. ERLENDSON agrees the proposal brought forth by staff is reasonable and the return for this asset class falls between stocks and bonds. MR. SHAW commented each asset class has some level of normalized real return assumption. He believes 4% is reasonable for real returns on infrastructure assets. DR. JENNINGS concurred the return for this asset class is between stocks and bonds. He noted the aspirational rates of return are assuming a project is successful. In two presentations the Board heard today, catastrophes occurred, which will affect the realized results below the 8% to 10% range.

MR. WILLIAMS inquired as to the possibilities of changing from CPI plus four to CPI plus eight or CPI plus 4.5. MR. MITCHELL informed CPI plus four is a general number. The exact Callan number was not used.

MR. WEST commented the possibility of allowing the managers to underperform by using a CPI plus four benchmark is unadvisable. If the managers returned a CPI plus 4.5 for the next 10 years, it is above the benchmark, but not near the returns promised. He feels the benchmark should be what the managers are telling the Board they expect and would be in favor of CPI plus six.

A roll call vote was taken, and the motion passed, with COMMISSIONER FISHER, MR. WEST, MR. WILLIAMS voting against.

CHAIR JOHNSON expressed appreciation to MR. MITCHELL, staff, and Board members for their indulgence in these complex matters.

UNFINISHED BUSINESS

MS. ERCHINGER stated for the record the Actuarial Committee deliberated on the actuarially-determined recommended contribution amount for the National Guard and Naval Militia Retirement System (NGNMRS) that exceeds the funded ratio. The legislative intent language in House Bill 286 requests the Board take into consideration the funded status of NGNMRS when setting the contribution rate. The plan was funded in excess of 100%. The reason for accepting the actuarially-determined contribution amount is the uncertainty of the historical data received from employers in the plan that does not identify all of the potential retirees who could be eligible for benefits. The plan beneficiaries receive a set dollar amount

and the plan is not subject to inflationary pressures. To the extent the plan has under-identified potential retirees, they are not fully accounted for when setting the actuarial required contributions.

NEW BUSINESS

CHAIR JOHNSON noted the record will reflect the items to be brought before the Board at the December meeting.

OTHER MATTERS TO PROPERLY COME BEFORE THE BOARD
None

PUBLIC/MEMBER COMMENTS
None

INVESTMENT ADVISORY COUNCIL COMMENTS

DR. JENNINGS commented there was much information received regarding infrastructure and he anticipates more being discussed at the upcoming education conference. DR. JENNINGS believes there are good reasons to have infrastructure in the portfolio, above and beyond the return numbers, including the importance of the liability hedging and the inflation sensitivity. He provided a few comments to frame the thinking during the conference. Public infrastructure feels like a sector fund and much of what is discussed sounds like essentially a fundamental governmental function.

DR. JENNINGS noted he was not ready to respond adequately to the previous question from COMMISSIONER FISHER regarding manager structure. DR. JENNINGS reminded the Board that a $250 million allocation is only about 1% of the portfolio size. Manager risk and manager confidence are two considerations necessary in determining the amount of the allocations for different managers. DR. JENNINGS expressed the tendency is to want to split the allocation and have two managers. He argued for resisting the general temptations to split. Cross-referencing to other parts of the portfolio is advised when considering allocations. On the private side of the portfolio there are typically smaller manager allocations for private real estate and private equity that may lead to multiple managers in small positions in private infrastructure. If the view is taken that public infrastructure is another active manager in public equities, the conclusion may be that $100 million is a small allocation in public equities, whereas $100 million on the private side is a large allocation.

MR. SHAW announced BOB GILLAM's funeral service will be held at the Hotel Captain Cook, Sunday at 2:00 p.m.

TRUSTEE COMMENTS

CHAIR JOHNSON expressed appreciation to the staff in their efforts providing presentations and being responsive to inquiries and questions, particularly with the tabling of the real assets policies and procedures and the reconsideration today. CHAIR JOHNSON expressed

appreciation for COMMISSIONER FISHER for his questions and comments. He believes today showed the process of deliberation at work. CHAIR JOHNSON urged staff to proceed with caution and pay special attention to the contract drafting and details during negotiations with the McKinley Capital mandate. CHAIR JOHNSON voted against the investment because of the cautionary comments from Callan regarding being the first investor and considering the significant passing of MR. GILLAM. He believed it was an appropriate time to go slowly.

MR. WILLIAMS expressed particular appreciation to staff, MR. MITCHELL, and IAC members for their patience in taking the time to explain and frame issues in a way that help him become more effective and competent as a Board member. He found the presentations to be very informative and thoughtful.

FUTURE AGENDA ITEMS

CHAIR JOHNSON suggested some of the items discussed as new business may appropriately relate to future agenda items. A review of the record will show what items are being carried forward to December and otherwise.

ADJOURNMENT

There being no objection and no further business to come before the Board, the meeting was adjourned at 3:50 p.m. on September 21, 2018, on a motion made by MS. HARBO 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
December 13, 2018

Retirement System Membership Activity as of September 30, 2018 –

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

- September 30, 2018

We see net increases in active members from last quarter, primarily in PERS Tier 4 and TRS Tier 3 members:

- PERS Tier 1-3 active members decreased from 13,611 to 13,300, or a decrease of 311.
- PERS Tier 4 active members increased from 20,811 to 21,406, or an increase of 595.
- PERS active members had a net increase of 248.

- TRS Tier 1-2 active members increased from 4,457 to 4,507, or an increase of 50.
- TRS Tier 3 active members increased from 4,937 to 5,933, or an increase of 996.
- TRS active members had a net increase of 1,046.

Retiree counts have changed in the following manner:

- PERS retirees increased from 35,187 to 35,485, or an increase of 298 (Tier 1-4).
- TRS retirees increased from 12,978 to 13,285, or an increase of 307 (Tier 1-3).

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Retirement System Membership Activity as of September 30, 2018

ACTION: _____

DATE: December 13, 2018

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 September 30, 2018.

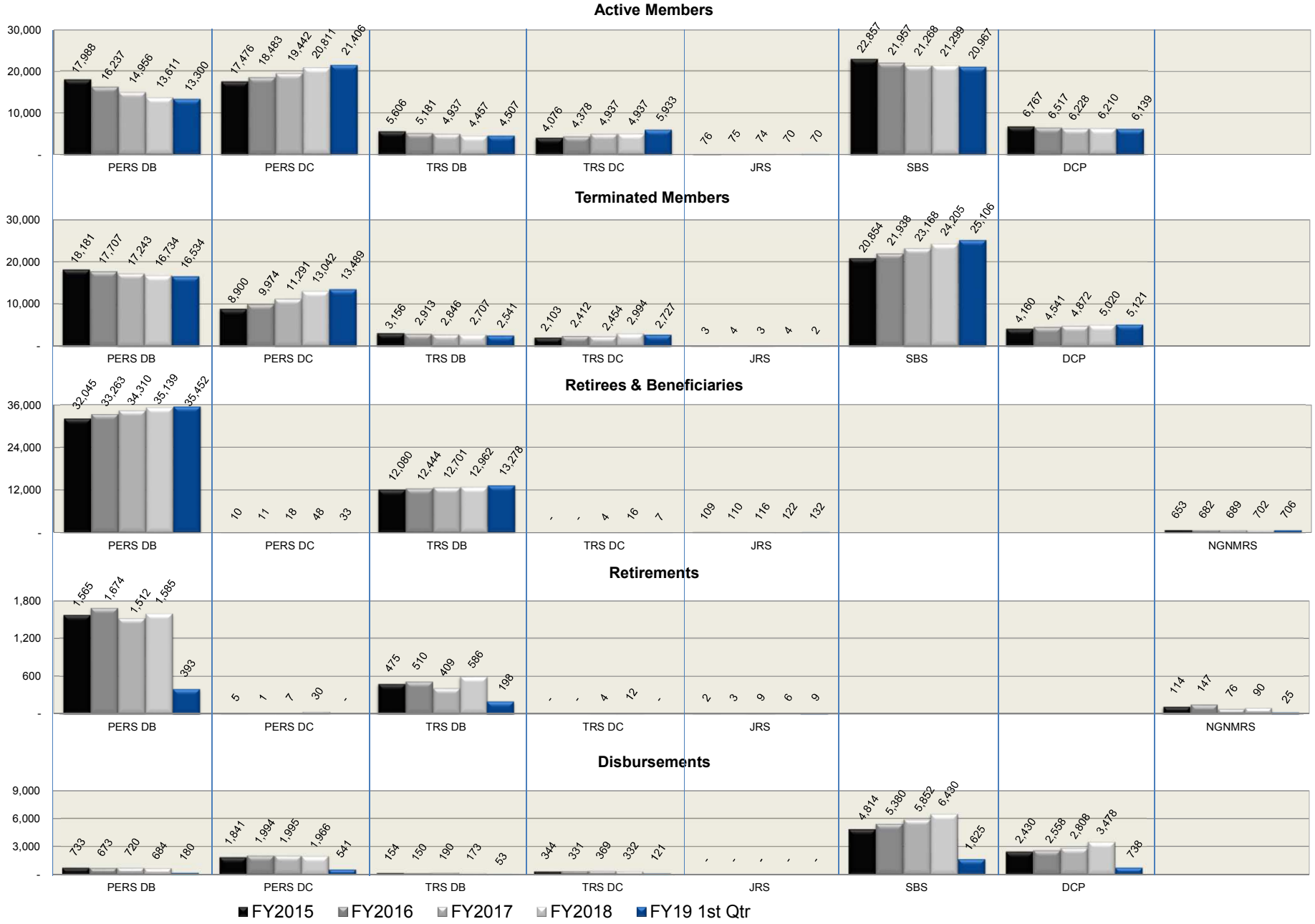
MEMBERSHIP STATISTICS AS OF SEPTEMBER 30, 2018

	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	1,180	3,390	8,730	13,300	21,406	34,706	338	4,169	4,507	5,933	10,440	70	n/a	20,967	6,139
Terminated Members															
Entitled to Future Benefits	354	2,069	3,105	5,528	1,212	6,740	39	647	686	528	1,214	2	n/a	25,106	5,121
Other Terminated Members	1,090	2,163	7,753	11,006	12,277	23,283	264	1,591	1,855	2,199	4,054	-	n/a	n/a	n/a
Total Terminated Members	1,444	4,232	10,858	16,534	13,489	30,023	303	2,238	2,541	2,727	5,268	2	n/a	25,106	5,121
Retirees & Beneficiaries	23,674	7,891	3,887	35,452	33	35,485	10,648	2,630	13,278	7	13,285	132	706	n/a	n/a
Managed Accounts	n/a	n/a	n/a	n/a	5,608	5,608	n/a	n/a	n/a	1,501	1,501	n/a	n/a	1,824	1,987
Retirements - 1st QTR FY18	93	169	131	393	-	393	61	137	198	-	198	9	25	n/a	n/a
Full Disbursements - 1st QTR FY18	27	35	118	180	468	648	15	38	53	102	155	-	n/a	526	170
Membership information as of Decembe	n/a	n/a	n/a	n/a	73	73	n/a	n/a	n/a	19	19	n/a	n/a	1,099	568

Alaska Division of Retirement and Benefits

FY 2019 QUARTERLY REPORT OF MEMBERSHIP STATISTICS

Annual & Quarterly Trends as of September 30, 2018



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
December 13, 2018

Summary of Monthly Billings / Buck –

Attached for your information are the quarterly payments related to actuarial services provided by the Division's consulting actuary, Buck.

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

The listed costs are charged to the System or Plan noted on the column headings.

Summary through the three months ended September 30, 2018

New for this quarter is the fiscal year 2020 final PERS/TRS contribution rates.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Summary of Monthly Billings - Buck

DATE: December 13, 2018

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 three months ended September 30, 2018.

Conduent Human Resource Services
Billing Summary
For the Three Months Ended September 30, 2018

	PERS	TRS	JRS	NGNMRS	EPORS	AHF	RHF	SBS	DCP	TOTAL
Actuarial valuations	$ 77,700	31,546	4,481	11,495	-	-	-	-	-	$ 125,222
KPMG audit information request	5,125	2,091	36	174	-	-	-	-	-	7,426
ARMB presentations and meeting attendance	100,265	40,915	715	3,413	-	-	-	-	-	145,308
FY20 final PERS/TRS contribution rates	9,693	3,956	-	-	-	-	-	-	-	13,649
GASB 68 valuation reports as of 6/30/17 (PERS/TRS/ JRS/NGNMRS)	9,505	4,201	96	490	-	-	-	-	-	14,292
GASB 67 valuation reports as of 6/30/17 (PERS/TRS/ JRS/NGNMRS)	19,527	8,632	197	1,005	-	-	-	-	-	29,361
GASB 74 valuation reports as of 6/30/17 (PERS/TRS/ JRS)	18,682	6,937	62	-	-	-	-	-	-	25,681
GASB 75 valuation reports as of 6/30/17 (PERS/TRS/ JRS)	1,852	689	6	-	-	-	-	-	-	2,547
TOTAL	$ 242,349	98,967	5,593	16,577	-	-	-	-	-	$ 363,486
For the Three Months Ended September 30, 2017	$ 84,243	33,373	1,865	599	-	-	23	745	185	$ 121,033

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Division of Retirement & Benefits Report
December 13, 2018

FY 2020 Health Reimbursement Arrangement employer contribution amounts –

Attached for your information is the memorandum establishing the FY 2020 Health Reimbursement Arrangement (HRA) employer contribution amount as determined by Alaska Statute 39.30.370.

Also attached is a summary spreadsheet for Fiscal Years 2008 - 2020.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Fiscal Year 2020 Health Reimbursement Arrangement amounts for employers	ACTION:	
DATE:	December 13, 2018	INFORMATION:	X

BACKGROUND:

AS 39.30.350 "Employer Contribution Fund" states that Teachers' and Public Employees' Retiree health reimbursement arrangement plan trust fund is an employer contribution fund. Employee contributions are not permitted.

AS 39.30.360 "Management and Investment of the Fund" states that "The Alaska Retirement Management Board is the fiduciary of the fund and has the same powers and duties under this section in regard to the fund as are provided under AS 37.10.220."

AS 39.30.370 "Contributions by Employers" states that "For each member of the plan, an employer shall contribute to the teachers' and public employees' retiree health reimbursement arrangement plan trust fund an amount equal to three percent of the average annual compensation of all employees of all employers in the TRS and PERS." The Division of Retirement & Benefits calculates the HRA amount annually and reports this to all affected employers for proper payroll reporting each fiscal year.

STATUS:

Attached is the memorandum from the Division of Retirement & Benefits for Fiscal Year 2020's Health Reimbursement Arrangement employer contribution per pay period. The amounts have been reported to employers.

Also attached is a summary spreadsheet for fiscal years 2008 - 2020.

MEMORANDUM

STATE OF ALASKA
DEPARTMENT OF ADMINISTRATION
Division of Retirement and Benefits

To: Ajay Desai
Director

Date: November 21, 2018

Thru: Christina Maiquis CM
Interim Chief Financial Officer

From: Agnes Elizarde
Accountant IV

Subject: FY 2020 HRA Employer Contribution Amounts

Alaska Statute 39.30.370 "Contributions by Employers" relates to the employer contributions required to fund the Health Reimbursement Arrangement (HRA) Plan for Public Employees' Retirement System (PERS) and Teachers' Retirement System (TRS) Defined Contribution Retirement (DCR) Plan members. The statute states in part:

> *For each member of the plan, an employer shall contribute to the teachers' (TRS) and public employees' (PERS) retiree health reimbursement arrangement plan trust fund an amount equal to three percent of the average annual compensation of all employees of all employers in the teachers' retirement system and public employees' retirement system. The administrator shall maintain a record for each member to account for employer contributions on behalf of that member.*

In order to compute the dollar amount required to fund the PERS and TRS HRA Plan, a rate of 3.00% is applied to the average annual compensation of all employees of all employers in PERS and TRS. Contributions to a DCR members HRA account are required each pay period in which the employee is enrolled in the Defined Contribution Retirement (DCR) Plan, regardless of the compensation paid during the calendar year. By definition, the HRA employer contribution is a dollar amount.

The Fiscal Year 2020 HRA employer contribution amounts are shown below:

FY 2019 HRA Amounts

Annual	Quarterly	Monthly	Semi-monthly	Bi-weekly	Weekly	Hourly
$2,121.60	$530.40	$176.80	$88.40	$81.60	$40.80	$1.36

The attached document shows a comparative of HRA rates since Fiscal Year 2008.

Approved:

Christina Maiquis, Interim Chief Financial Officer

11/21/18
Date

Attachment

G:\DRB\Accounting\HRA\HRA Contribution Amounts\FY 2020\FY 2020 HRA Contribution Approval Memo.doc

Division of Retirement & Benefits
Health Reimbursement Arrangement (HRA)
Employer contribution amounts by fiscal year

Fiscal Year	Annual	Annual Percentage of Change	Quarterly	Monthly	Semi-monthly	Bi-weekly	Weekly	Hourly
2008	1,531.27	-	382.82	127.61	63.80	58.89	-	0.98
2009	1,616.81	5.59%	404.20	134.73	67.37	62.18	-	1.04
2010	1,699.71	5.13%	424.93	141.64	70.82	65.37	-	1.09
2011	1,720.70	1.23%	430.17	143.39	71.70	66.18	-	1.10
2012	1,778.09	3.34%	444.52	148.17	74.09	68.39	-	1.14
2013	1,848.43	3.96%	462.11	154.04	77.02	71.09	-	1.18
2014	1,896.60	2.61%	474.15	158.05	79.03	72.95	-	1.22
2015	1,960.53	3.37%	490.13	163.38	81.69	75.41	37.70	1.26
2016	2,004.52	2.24%	501.13	167.04	83.52	77.10	38.55	1.28
2017	2,049.36	2.24%	512.34	170.78	85.39	78.82	39.41	1.31
2018	2,084.16	1.70%	521.04	173.68	86.84	80.16	40.08	1.34
2019	2,102.88	0.90%	525.72	175.24	87.62	80.88	40.44	1.35
2020	2,121.60	0.89%	530.40	176.80	88.40	81.60	40.80	1.36

NOTE: For fiscal year 2007, HRA amounts were computed by employer rather than the HRA as a plan. Beginning fiscal year 2008, HRA amounts were computed and applied uniformly to all members and are reflected above.

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Disclosure - Calendar Update
December 13, 2018

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

The 2018 ARMB calendar-to-date and the finalized 2019 ARMB calendar are also attached.

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: November 29, 2018
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.

3rd Quarter – July 1, 2018 to September 30, 2018

Name	Position Title	Disclosure Type	Disclosure Date
Scott Jones	State Comptroller	Equities	10/01/2018
Bob Mitchell	Chief Investment Officer	Equities	09/18/2018

ALASKA RETIREMENT MANAGEMENT BOARD
2018 Meeting Calendar

DATE	LOCATION	DESCRIPTION
December 12 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee
December 13-14 Thursday-Friday	**Anchorage, AK**	**Board of Trustees Meeting:** **Audit Report - KPMG* **Performance Measurement – 3rd Quarter* **Manager Review (Questionnaire)* **Private Equity Review* **Manager Presentations*

ALASKA RETIREMENT MANAGEMENT BOARD
2019 Meeting Calendar

DATE	LOCATION	DESCRIPTION
February 11 Monday	Telephonic	Actuarial Committee
April 3 Wednesday	Juneau, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee
April 4-5 Thursday-Friday	**Juneau, AK**	**Board of Trustees Meeting:** **Performance Measurement – 4th Quarter* **Absolute Return Annual Plan* **Conduent Draft Actuary Report/GRS Draft Actuary Certification* **Capital Markets – Asset Allocation* **Manager Presentations*
May 2 Thursday	Anchorage, AK or Telephonic	Actuarial Committee **As necessary: follow-up/additional discussion/questions on valuations*
May 3 Friday	**Anchorage, AK**	**Board of Trustees Meeting** **As necessary*
June 19 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee
June 20-21 Thursday - Friday	**Anchorage, AK**	**Board of Trustees Meeting:** **Final Actuary Reports/Adopt Valuation* **Adopt Asset Allocation* **Review Private Equity Annual Plan* **Performance Measurement - 1st Quarter* **Manager Presentations*
September 18 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee Budget Committee
September 19-20 Thursday - Friday	**Anchorage, AK**	**Board of Trustees Meeting:** **Set Contribution Rates* **Audit Results/Assets – KPMG* **Approve Budget* **Performance Measurement – 2nd Quarter* **Real Estate Annual Plan* **Real Estate Evaluation – Townsend Group* **Manager Presentations*
November 7-8 Thurs.- Fri. (placeholder)	**New York, NY**	**Board of Trustees Meeting: Investment Education Conference**
November 15 Friday (placeholder)	Telephonic	Audit Committee
December 11 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee
December 12-13 Thursday-Friday	**Anchorage, AK**	**Board of Trustees Meeting:** **Audit Report - KPMG* **Performance Measurement – 3rd Quarter* **Manager Review (Questionnaire)* **Private Equity Review* **Manager Presentations*

Summary of Portfolio Moves
September - October 2018

Item	Action	Date	Amount	Description/Summary	Authority
	Rebalance Transactions:				
1	Rebalance Retirement Funds	9/18, 9/25, 10/17, 10/25,		Available upon request.	
	Futures Rolls and Adjustments:				
2	Cash Equitization - Large Cap	9/13/2018	$14,875,260	Sold Sept. 2018 S&P 500 eMini contracts.	ARMB Resolution 2017-05
3	Cash Equitization - Large Cap	9/13/2018	($14,901,010)	Bought Dec. 2018 S&P 500 eMini contracts.	ARMB Resolution 2017-05
4	Cash Equitization - Small Cap	9/13/2018	$13,303,650	Sold Sept. 2018 Russell 2000 eMini contracts.	ARMB Resolution 2017-05
5	Cash Equitization - Small Cap	9/13/2018	($13,343,563)	Bought Dec. 2018 Russell 2000 eMini contracts.	ARMB Resolution 2017-05
6	Portable Alpha - Large Cap	9/14/2018	$457,875,280	Sold Sept. 2018 S&P 500 eMini contracts.	ARMB Resolution 2017-05
7	Portable Alpha - Large Cap	9/14/2018	($458,671,160)	Bought Dec. 2018 S&P 500 eMini contracts.	ARMB Resolution 2017-05
8	Portable Alpha - Small Cap	9/14/2018	($382,873,750)	Bought Sept. 2018 Russell 2000 eMini contracts.	ARMB Resolution 2017-05
9	Portable Alpha - Small Cap	9/14/2018	$384,002,063	Sold Dec. 2018 Russell 2000 eMini contracts.	ARMB Resolution 2017-05
10	Portable Alpha Cash Transfers	Multiple Dates		Directed multiple transfers of cash into or out of PA futures accounts to maintain necessary margin positions; copies of transactions available upon request.	ARMB Resolution 2017-05
	Investment Actions:				
11	ARMB TIPS	9/25/2018	($56,024,618)	Liquidated from strategy.	ARMB action.
12	Short-Term Investment Pool	9/25/2018	$56,024,618	Invested in strategy.	ARMB action.
13	Short-Term Investment Pool	9/26/2018	($50,000,000)	Liquidated from strategy.	ARMB Resolution 2017-05
14	Intermediate US Treasuries	9/26/2018	$50,000,000	Invested in strategy.	ARMB Resolution 2017-05
15	Lazard Emering Income	10/5/2018	($20,000,000)	Liquidated from strategy.	ARMB Resolution 2017-05
16	Short-Term Investment Pool	10/5/2018	$20,000,000	Invested in strategy.	ARMB Resolution 2017-05
17	Tortoise Capital Advisors	10/7 - 10/31	($40,000,000)	Liquidated from strategy.	ARMB Resolution 2017-05
18	Short-term Investment Pool	10/7 - 10/31	$40,000,000	Invested in strategy.	ARMB Resolution 2017-05
19	Advisory Research	10/8 - 10/29	($40,000,000)	Liquidated from strategy.	ARMB Resolution 2017-05
20	Short-term Investment Pool	10/8 - 10/29	$40,000,000	Invested in strategy.	ARMB Resolution 2017-05
21	MacKay Shields High Yield	10/16, 10/22 & 10/31	($53,200,000)	Liquidated from strategy.	ARMB Resolution 2017-05
22	Short-term Investment Pool	10/16, 10/22 & 10/31	$53,200,000	Invested in strategy.	ARMB Resolution 2017-05
23	Stable Value Account	10/25/2018	($2,589)	Liquidated from strategy.	ARMB Resolution 2017-05
24	Interest Income Account	10/25/2018	$2,589	Invested in strategy.	ARMB Resolution 2017-05
25	Lord Abbett Micro Cap	10/31/2018	($30,000,000)	Liquidated from strategy.	ARMB Resolution 2017-05
26	DRZ Micro Cap	10/31/2018	($30,000,000)	Liquidated from strategy.	ARMB Resolution 2017-05
27	Zebra Micro Cap	10/31/2018	($20,000,000)	Liquidated from strategy.	ARMB Resolution 2017-05
28	BlackRock ACWI ex-US IMI	10/31/2018	($80,000,000)	Liquidated from strategy.	ARMB Resolution 2017-05
29	Short-Term Investment Pool	10/31/2018	$160,000,000	Invested in strategy.	ARMB Resolution 2017-05
30	Short-Term Investment Pool	10/31/2018	($320,000,000)	Liquidated from strategy.	ARMB Resolution 2017-05
31	Intermediate US Treasuries	10/31/2018	($80,000,000)	Liquidated from strategy.	ARMB Resolution 2017-05
32	Fidelity Signaling Portfolio	10/31/2018	$200,000,000	Invested in strategy.	ARMB action.
33	PineBridge	10/31/2018	$200,000,000	Invested in strategy.	ARMB action.
34	ARMB TIPS	10/31/2018	($27,198)	Liquidated from strategy.	ARMB action.
35	Short-Term Investment Pool	10/31/2018	$27,198	Invested in strategy.	ARMB action.
	Watch List:				
36	Lazard Emering Income	Apr. 2017		Performance	
37	DRZ Micro Cap	Oct. 2017		Performance	
38	Tortoise Capital Advisors	Dec. 2017		Departure of founders.	
39	Mondrian International Small Cap	Jun. 2018		Performance	
40	Lazard EM Equity	Sep. 2018		Performance	
41	Prisma Absolute Return	Sep. 2018		Transition of co-CEOs to advisory roles.	
	Other Actions:				
42	Warburg Pincus Global Growth	Oct. 2018		Committed $40 million to the fund.	
	Announcements:				
43	John McGurk, Founder of Almanac passed away.	09/27/2018		Founder of Almanac Realty Investors retired, and subsequently passed away.	

	6 year Performance	Test 1	Test 2	Test 3
Lazard Emerging Income	0.08%			
LIBOR 3 months	0.67%	Pass		
DePrince, Race & Zollo Micro Cap	14.08%			
Russell Micro Value Index	15.39%	Fail		
CAI Micro Cap Value Style (Gross)	15.88%		Fail	
Peer Group Percentile	74%			Fail
Tortoise Capital MLP (last 5-1/2 years)	5.23%			
Alerian MLP Index	-0.17%	Pass		
CAI Master Limited Partnership (Gross)	3.40%		Pass	
Peer Group Percentile	20%			Pass
Mondrian Intl Sm Cap	10.90%			
EAFE Small Cap Index	12.85%	Fail		
CAI International Small Cap Style (Gross)	13.97%		Fail	
Peer Group Percentile	94%			Fail
Lazard Emerging	2.60%			
MSCI Emerging Mkts Idx	5.03%	Fail		
CAI Emerging Markets Equity DB (Gross)	4.62%		Fail	
Peer Group Percentile	90%			Fail
Prisma Capital	4.84%			
Fund of Funds Index	4.08%	Pass		
T-Bills+5%	5.37%	Pass		
Absolute Return Hedge FoF Style (Net)	4.42%		Pass	
Peer Group Percentile	36%			Pass

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Watch List Guidelines

Resolution 2012-25

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 established qualitative and quantitative criteria to evaluate investment manager performance; and

WHEREAS, the Board will from time to time as necessary modify guidelines for the evaluation.

NOW THEREFORE BE IT RESOLVED THAT THE ALASKA RETIREMENT MANAGEMENT BOARD adopt the Watch List Guidelines, attached hereto and made a part hereof.

This resolution repeals and replaces Resolution 2006-01

DATED at Fairbanks, Alaska this 20th day of September, 2012.

Chair

ATTEST:

Gayle Harbo

Secretary

GUIDELINES FOR MANAGER "WATCH LIST"

The performance of the Board's investment managers will be monitored on an ongoing basis. The Board may place a manager on a "Watch List" at any time. The Board may also terminate a manager at any time whether or not a manager is on the "Watch List".

Managers may be placed on a "Watch List" for a variety of reasons: Personnel changes, violation of policy and investment guidelines, style deviation, underperformance and asset allocation changes. The ARMB has two clearly stated fund performance objectives in the investment guidelines, the preservation of capital and consistent positive returns. These "Watch List" guidelines were formulated with these objectives as a foundation. There are various factors that should be taken into account when considering placing a manager on a "Watch List". These can be separated into two broad categories – qualitative and quantitative factors. The former focuses on personnel, organizational and legal issues while the latter addresses performance.

Placing a manager on the "Watch List" is an intermediate step which may be taken to either resolve the problem or terminate the manager. Managers may only be removed from the "Watch List" under these two conditions.

QUALITATIVE FACTORS

Below are *qualitative* factors that may be considered in determining whether an investment manager should be placed on the "Watch List."

FACTOR	***EVALUATION***	**ACTION STEPS**
• Violation of investment guidelines	• Review portfolio holdings vis-a-vis the investment guidelines - individual securities. - their percentage weight in the portfolio.	Correct violation. Review violations with manager to reestablish appropriate guidelines. Manager to compensate ARMB for any losses that occurred from violation. Place on watch list for one year – may terminate on additional violation.
• Deviation from stated investment style and philosophy	• Style mapping – total fund analysis. • Style attribution – manager specific style analysis.	Place on watch list. Monitor for ongoing fit with asset allocation policy. Terminate if no longer consistent with asset allocation structure.
• Changes in ownership	Require immediate notification of any pending changes in ownership.	Place on watch list for 18 months. Qualitatively determine if change may detrimentally affect asset performance.
• Turnover of key personnel	Require manager to establish a list of key personnel, and rank in level of importance, at the inception of the account. Manager updates on an as needed basis.	Place on watch list. May terminate if 60% of the key personnel turnover on the account (as specified in the manager-provided list) and/or 2 out of the top 3 people leave.
• Litigation	Require manager to notify immediately if entity which manages the funds is involved in any litigation.	Evaluate seriousness and likely impact of changes on the investment process and take appropriate action.

QUANTITATIVE FACTORS

Below are *quantitative* factors that may be considered in determining the appropriateness of placing an investment manager on the "Watch List."

⇒ Minimum of six years of performance required prior to placement on the watch list.
⇒ Three out of three (where applicable) performance tests must be failed for watch list.

PERFORMANCE TEST	***BENCHMARK***	**FAIL CRITERIA**
Test 1: Trailing 6 year results	Annualized performance relative to the agreed upon market index.	Fail if underperform index by 1% per annum over measurement period, gross of fees.
Test 2: Trailing 6 year results	Relative to an appropriate style index (if applicable).	Fail if underperform style index by 1% per annum over measurement period, gross of fees.
Test 3: Peer group comparison	Performance compared to that of an appropriate peer group.	Fail if cumulative performance is at 65% percentile or lower over relevant timeframe.

The following factors are important to monitor on an ongoing basis to understand and track the performance of the investment managers who have been placed on the watch list:

FACTOR	***EVALUATION TECHNIQUE***
Consistency of returns	• Rolling 6 year returns relative to market index. • Rolling 6 year returns relative to appropriate style group. • Rolling correlations to market index.
Risk-adjusted performance	• Rolling 6 year information ratio. • Risk reward chart. • Sharpe ratio. • Treynor ratio.

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Fund Financials – Cash Flow Report
December 13, 2018

Scott Jones, State Comptroller, Department of Revenue

As of October month-end, total plan assets were as follows: PERS - $18.2 billion, TRS - $8.8 billion, JRS - $208 million, NGNMRS - $39 million, SBS - $3.8 billion, DCP - $922 million. Total non-participant direct plans totaled $25.7 billion, and participant-directed plans totaled $6.2 billion. Total assets were $32 billion.

Year-to-date income was a loss of $383 million, and the plans experienced a net withdrawal of $145 million. Total assets were down 1.63% year-to-date.

Internally managed assets totaled $8.7 billion

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

ALASKA RETIREMENT MANAGEMENT BOARD
FINANCIAL REPORT

As of October 31, 2018

ALASKA RETIREMENT MANAGEMENT BOARD
Schedule of Investment Income and Changes in Invested Assets by Fund
Fiscal Year-to-Date through October 31, 2018

	Beginning Invested Assets	Investment Income [1]	Net Contributions (Withdrawals)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income [2]
Public Employees' Retirement System (PERS)						
Defined Benefit Plans:						
Retirement Trust	$ 9,279,978,252	$ (101,993,186)	$ (28,996,481)	$ 9,148,988,585	-1.41%	-1.10%
Retirement Health Care Trust	7,653,992,293	(82,448,689)	(101,517,092)	7,470,026,512	-2.40%	-1.08%
Total Defined Benefit Plans	16,933,970,545	(184,441,875)	(130,513,573)	16,619,015,097	-1.86%	-1.09%
Defined Contribution Plans:						
Participant Directed Retirement	1,041,422,342	(25,444,904)	28,965,812	1,044,943,250	0.34%	-2.41%
Health Reimbursement Arrangement	356,026,985	(4,248,417)	12,812,130	364,590,698	2.41%	-1.17%
Retiree Medical Plan	99,169,627	(1,187,592)	3,679,888	101,661,923	2.51%	-1.18%
Defined Benefit Occupational Death and Disability:						
Public Employees	20,872,152	(249,468)	751,340	21,374,024	2.40%	-1.17%
Police and Firefighters	9,776,610	(115,944)	301,585	9,962,251	1.90%	-1.17%
Total Defined Contribution Plans	1,527,267,716	(31,246,325)	46,510,755	1,542,532,146	1.00%	-2.02%
Total PERS	**18,461,238,261**	**(215,688,200)**	**(84,002,818)**	**18,161,547,243**	-1.62%	-1.17%
Teachers' Retirement System (TRS)						
Defined Benefit Plans:						
Retirement Trust	5,466,056,988	(59,767,909)	(14,513,402)	5,391,775,677	-1.36%	-1.09%
Retirement Health Care Trust	2,883,838,182	(30,983,598)	(39,734,628)	2,813,119,956	-2.45%	-1.08%
Total Defined Benefit Plans	8,349,895,170	(90,751,507)	(54,248,030)	8,204,895,633	-1.74%	-1.09%
Defined Contribution Plans:						
Participant Directed Retirement	442,323,051	(10,712,091)	5,872,086	437,483,046	-1.09%	-2.41%
Health Reimbursement Arrangement	105,665,716	(1,213,478)	2,512,635	106,964,873	1.23%	-1.13%
Retiree Medical Plan	36,357,065	(414,461)	681,519	36,624,123	0.73%	-1.13%
Defined Benefit Occupational Death and Disability	3,797,783	(42,385)	32,348	3,787,746	-0.26%	-1.11%
Total Defined Contribution Plans	588,143,615	(12,382,415)	9,098,588	584,859,788	-0.56%	-2.09%
Total TRS	**8,938,038,785**	**(103,133,922)**	**(45,149,442)**	**8,789,755,421**	-1.66%	-1.16%
Judicial Retirement System (JRS)						
Defined Benefit Plan Retirement Trust	176,358,294	(2,004,328)	2,711,864	177,065,830	0.40%	-1.13%
Defined Benefit Retirement Health Care Trust	31,621,813	(348,946)	(61,656)	31,211,211	-1.30%	-1.10%
Total JRS	**207,980,107**	**(2,353,274)**	**2,650,208**	**208,277,041**	0.14%	-1.12%
National Guard/Naval Militia Retirement System (MRS)						
Defined Benefit Plan Retirement Trust	39,449,053	(731,056)	288,013	39,006,010	-1.12%	-1.85%
Other Participant Directed Plans						
Supplemental Annuity Plan	3,905,659,481	(50,527,830)	(12,339,237)	3,842,792,414	-1.61%	-1.30%
Deferred Compensation Plan	938,806,799	(10,908,453)	(6,213,322)	921,685,024	-1.82%	-1.17%
Total All Funds	**32,491,172,486**	**(383,342,735)**	**(144,766,598)**	**31,963,063,153**		
Total Non-Participant Directed	26,162,960,813	(285,749,457)	(161,051,937)	25,716,159,419	-1.71%	-1.10%
Total Participant Directed	6,328,211,673	(97,593,278)	16,285,339	6,246,903,734	-1.28%	-1.54%
Total All Funds	**$ 32,491,172,486**	**$ (383,342,735)**	**$ (144,766,598)**	**$ 31,963,063,153**	**-1.63%**	**-1.18%**

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 October 31, 2018

	Beginning Invested Assets	Investment Income [1]	Net Contributions (Withdrawals)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income [2]
Public Employees' Retirement System (PERS)						
Defined Benefit Plans:						
Retirement Trust	$ 9,574,747,238	$ (384,458,893)	$ (41,299,760)	$ 9,148,988,585	-4.45%	-4.02%
Retirement Health Care Trust	7,802,431,830	(312,629,206)	(19,776,112)	7,470,026,512	-4.26%	-4.01%
Total Defined Benefit Plans	17,377,179,068	(697,088,099)	(61,075,872)	16,619,015,097	-4.36%	-4.02%
Defined Contribution Plans:						
Participant Directed Retirement	1,103,202,792	(66,085,706)	7,826,164	1,044,943,250	-5.28%	-5.97%
Health Reimbursement Arrangement	376,133,104	(15,076,268)	3,533,862	364,590,698	-3.07%	-3.99%
Retiree Medical Plan	104,902,144	(4,205,128)	964,907	101,661,923	-3.09%	-3.99%
Defined Benefit Occupational Death and Disability:						
Public Employees	22,034,109	(883,791)	223,706	21,374,024	-3.00%	-3.99%
Police and Firefighters	10,296,000	(412,826)	79,077	9,962,251	-3.24%	-3.99%
Total Defined Contribution Plans	1,616,568,149	(86,663,719)	12,627,716	1,542,532,146	-4.58%	-5.34%
Total PERS	**18,993,747,217**	**(783,751,818)**	**(48,448,156)**	**18,161,547,243**	-4.38%	-4.13%
Teachers' Retirement System (TRS)						
Defined Benefit Plans:						
Retirement Trust	5,651,685,555	(226,814,964)	(33,094,914)	5,391,775,677	-4.60%	-4.03%
Retirement Health Care Trust	2,938,017,527	(117,700,255)	(7,197,316)	2,813,119,956	-4.25%	-4.01%
Total Defined Benefit Plans	8,589,703,082	(344,515,219)	(40,292,230)	8,204,895,633	-4.48%	-4.02%
Defined Contribution Plans:						
Participant Directed Retirement	461,219,063	(28,186,852)	4,450,835	437,483,046	-5.15%	-6.08%
Health Reimbursement Arrangement	110,277,544	(4,417,075)	1,104,404	106,964,873	-3.00%	-3.99%
Retiree Medical Plan	37,855,962	(1,516,117)	284,278	36,624,123	-3.25%	-3.99%
Defined Benefit Occupational Death and Disability	3,917,602	(156,942)	27,086	3,787,746	-3.31%	-3.99%
Total Defined Contribution Plans	613,270,171	(34,276,986)	5,866,603	584,859,788	-4.63%	-5.56%
Total TRS	**9,202,973,253**	**(378,792,205)**	**(34,425,627)**	**8,789,755,421**	-4.49%	-4.12%
Judicial Retirement System (JRS)						
Defined Benefit Plan Retirement Trust	184,883,880	(7,422,523)	(395,527)	177,065,830	-4.23%	-4.02%
Defined Benefit Retirement Health Care Trust	32,504,722	(1,302,296)	8,785	31,211,211	-3.98%	-4.01%
Total JRS	**217,388,602**	**(8,724,819)**	**(386,742)**	**208,277,041**	-4.19%	-4.02%
National Guard/Naval Militia Retirement System (MRS)						
Defined Benefit Plan Retirement Trust	40,771,449	(1,583,076)	(182,363)	39,006,010	-4.33%	-3.89%
Other Participant Directed Plans						
Supplemental Annuity Plan	4,014,083,280	(171,828,002)	537,136	3,842,792,414	-4.27%	-4.28%
Deferred Compensation Plan	969,841,280	(46,213,672)	(1,942,584)	921,685,024	-4.97%	-4.77%
Total All Funds	**33,438,805,081**	**(1,390,893,592)**	**(84,848,336)**	**31,963,063,153**		
Total Non-Participant Directed	26,890,458,666	(1,078,579,360)	(95,719,887)	25,716,159,419	-4.37%	-4.02%
Total Participant Directed	6,548,346,415	(312,314,232)	10,871,551	6,246,903,734	-4.60%	-4.77%
Total All Funds	**$ 33,438,805,081**	**$ (1,390,893,592)**	**$ (84,848,336)**	**$ 31,963,063,153**	**-4.41%**	**-4.16%**

Notes:

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

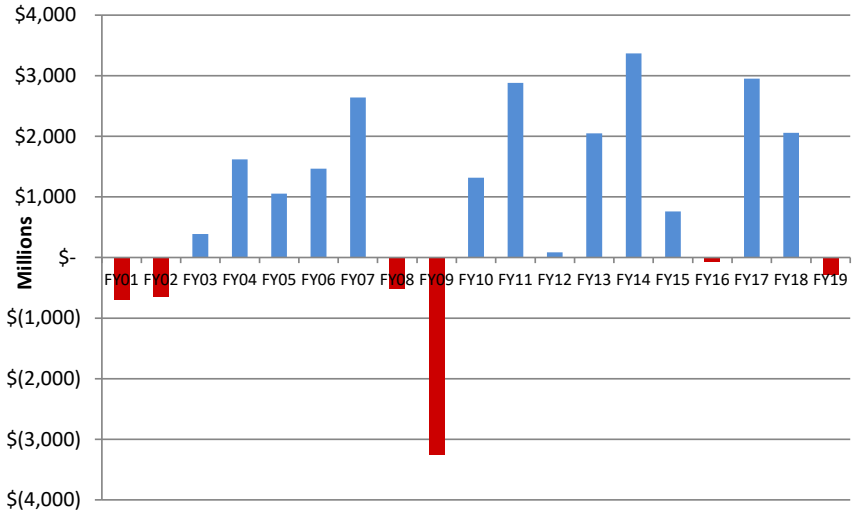
(2) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates and can be found at: http://www.revenue.state.ak.us/treasury/programs/programs/other/armb/investmentresults.aspx

Total Non Participant Directed Assets

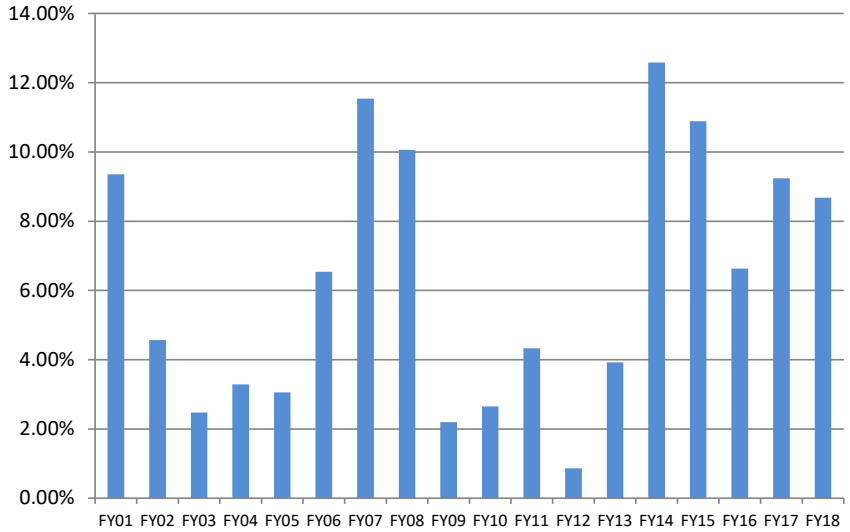
As of October 31, 2018

Total Assets History

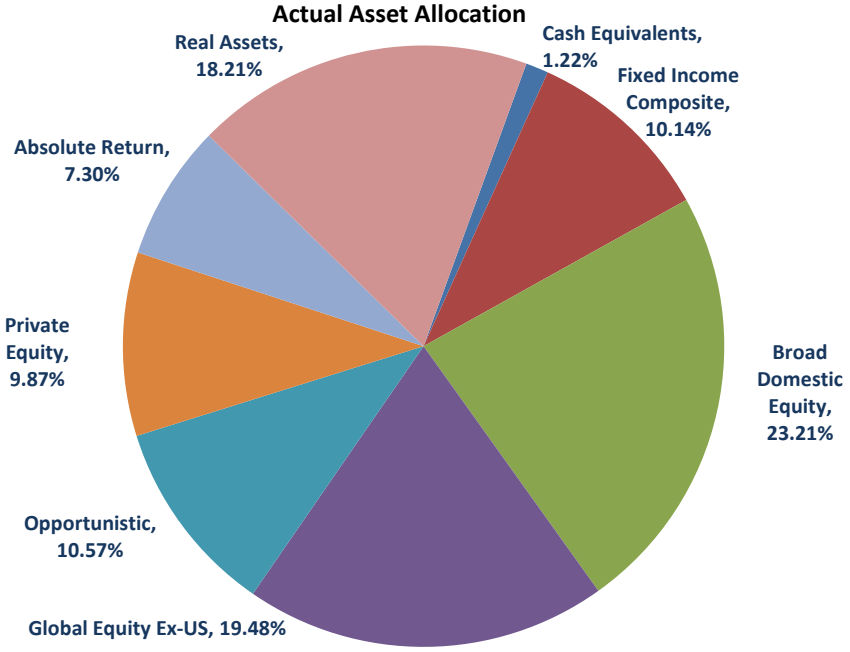
Income by Fiscal Year



5-year Annualized Returns as of Fiscal Year End

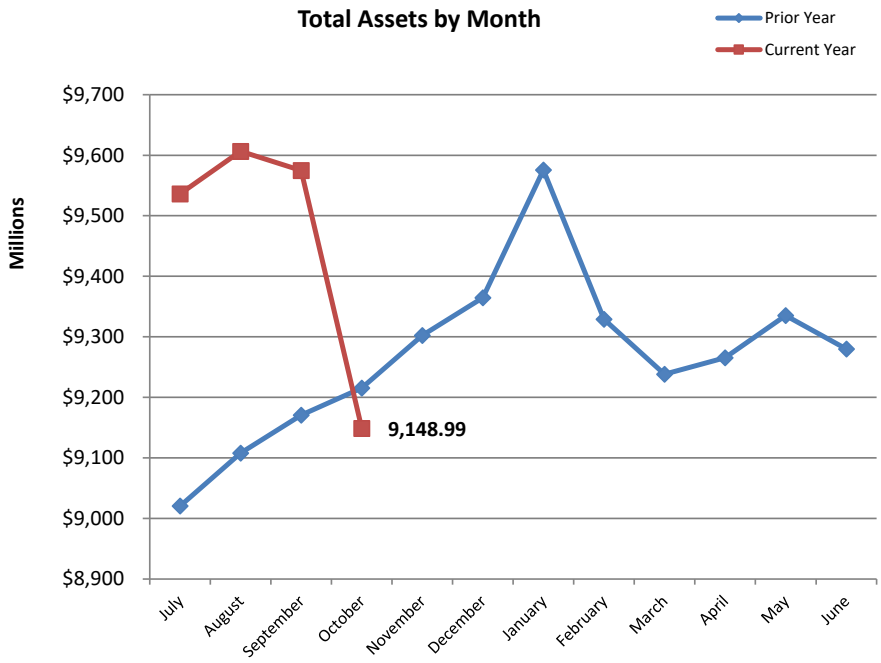


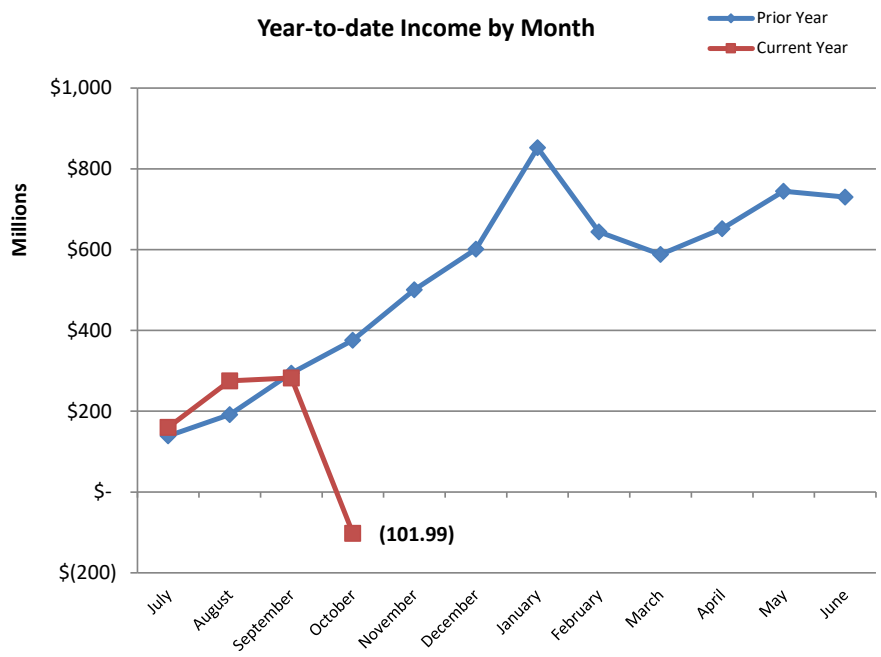
Actual Asset Allocation

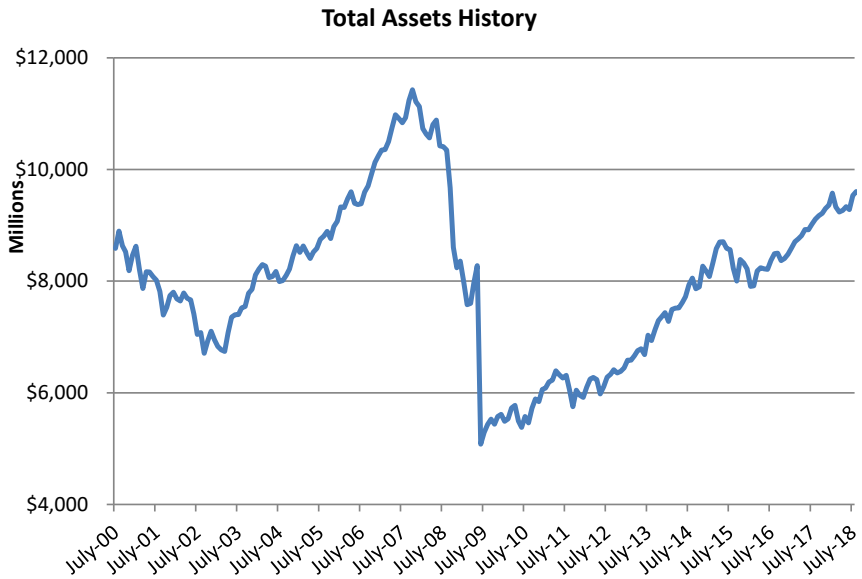


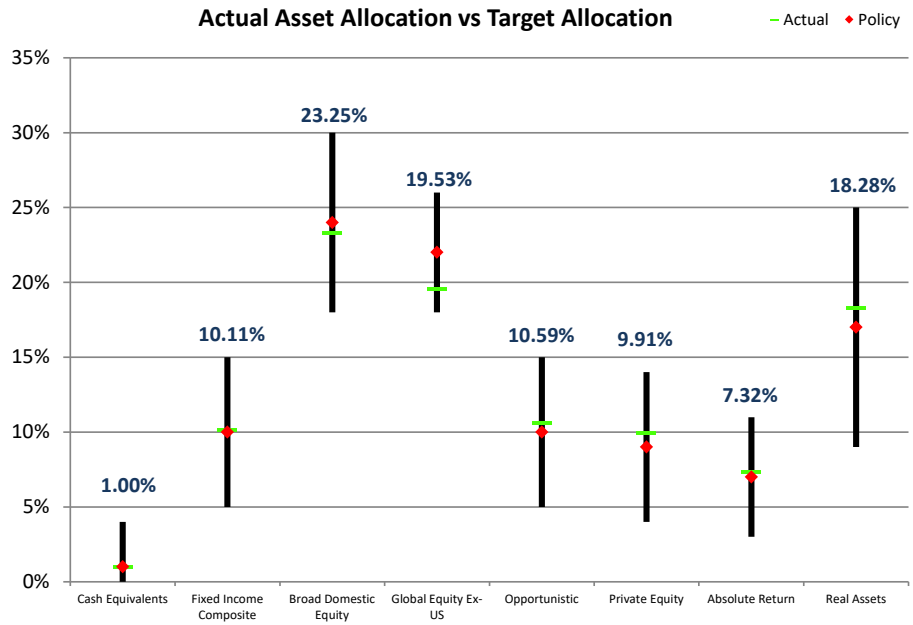
Public Employees' Retirement Pension Trust Fund

Fiscal Year-to-Date through October 31, 2018



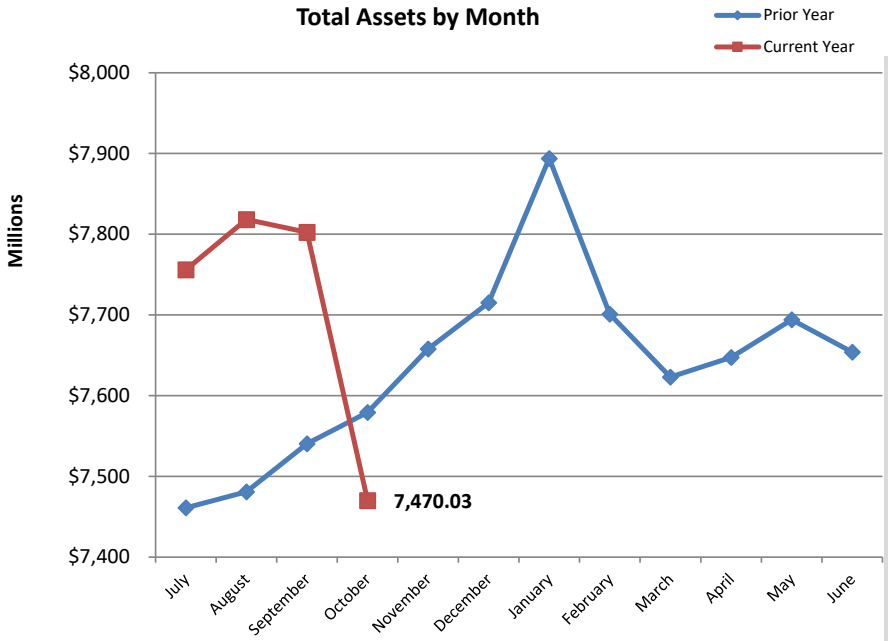


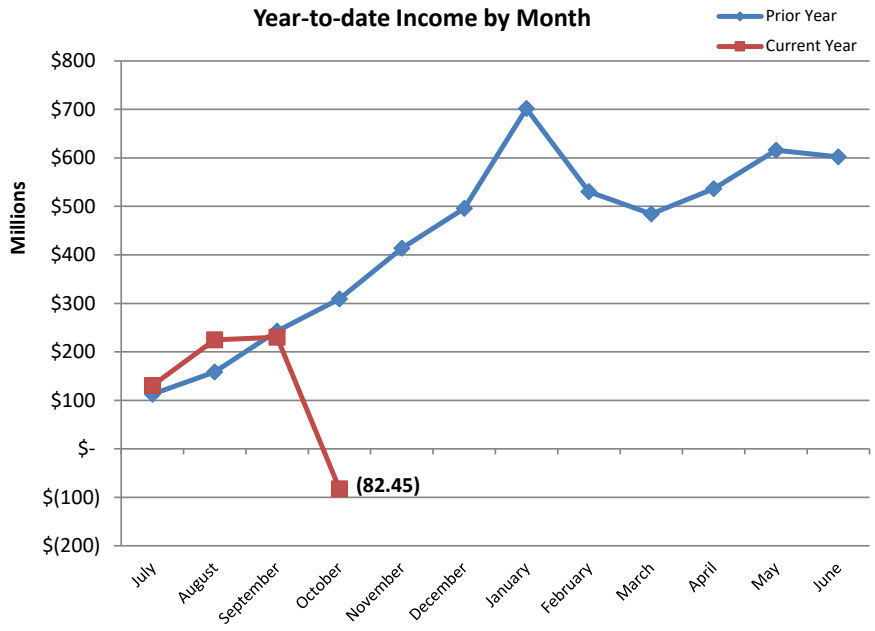


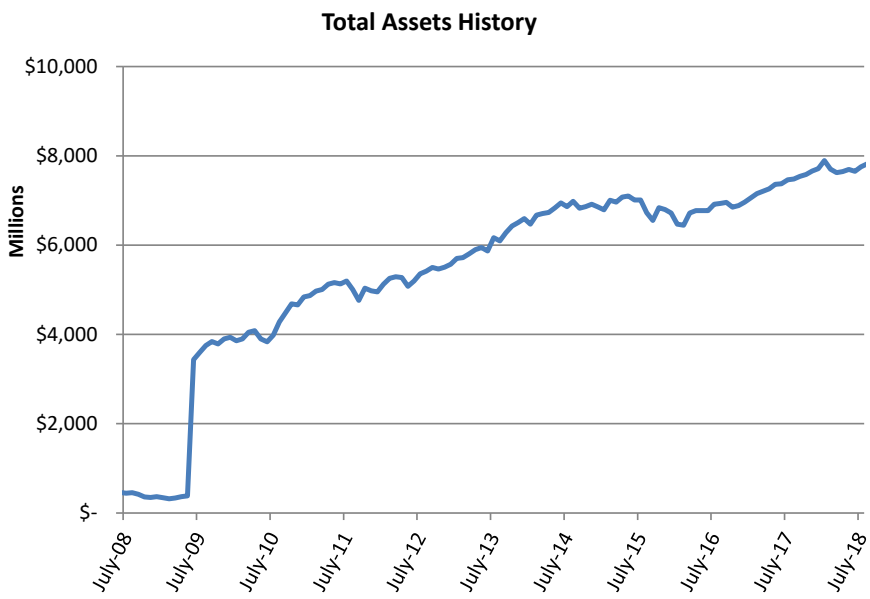


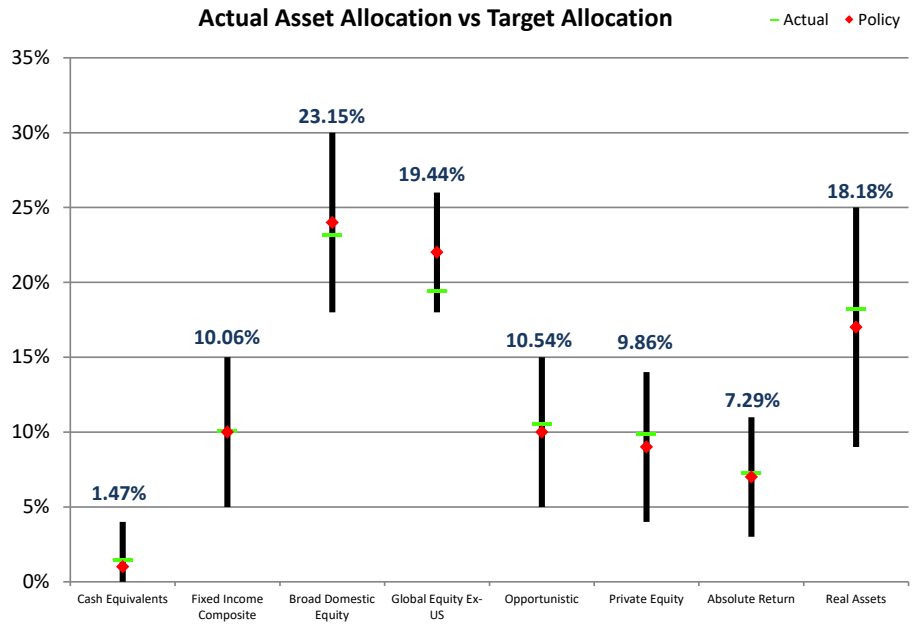
Public Employees' Retirement Health Care Trust Fund

Fiscal Year-to-Date through October 31, 2018



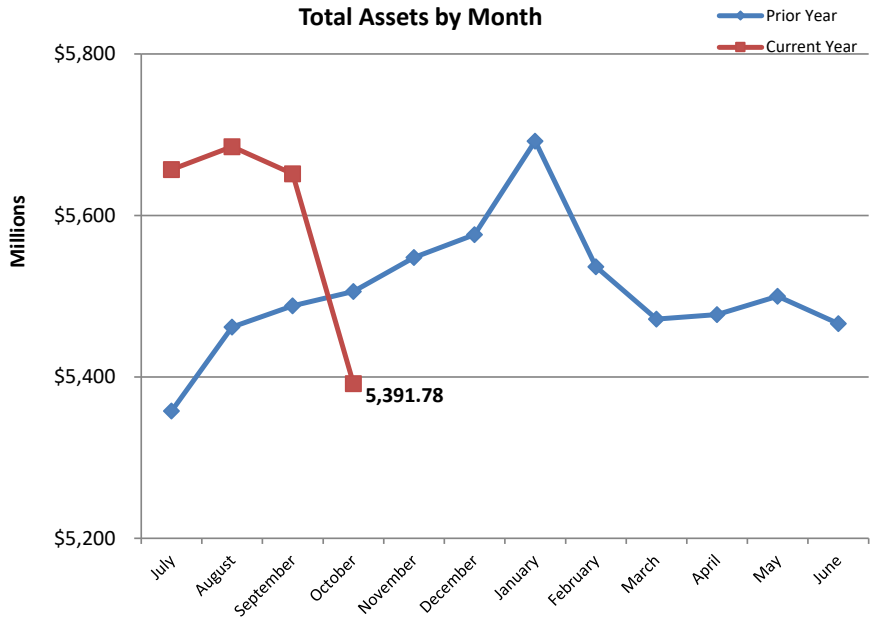


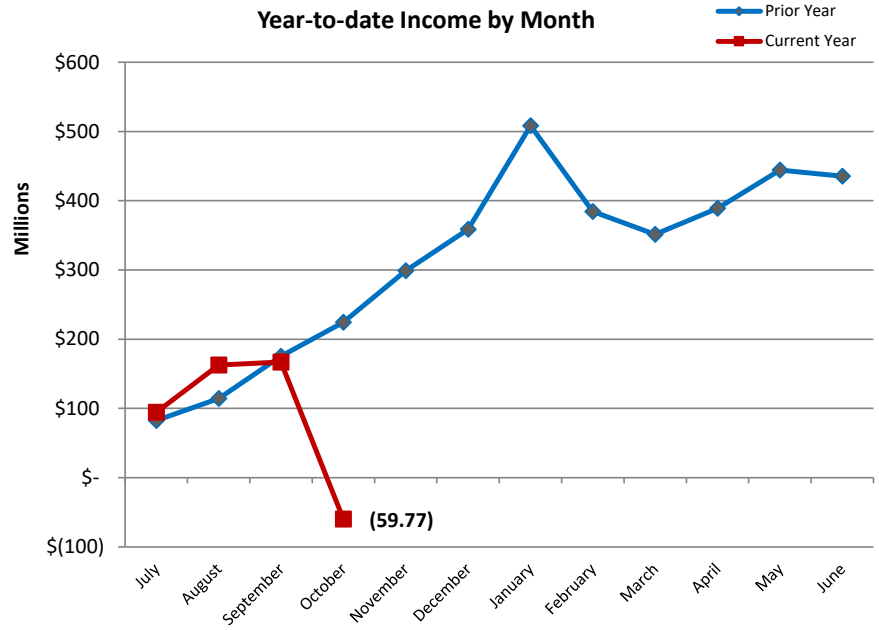


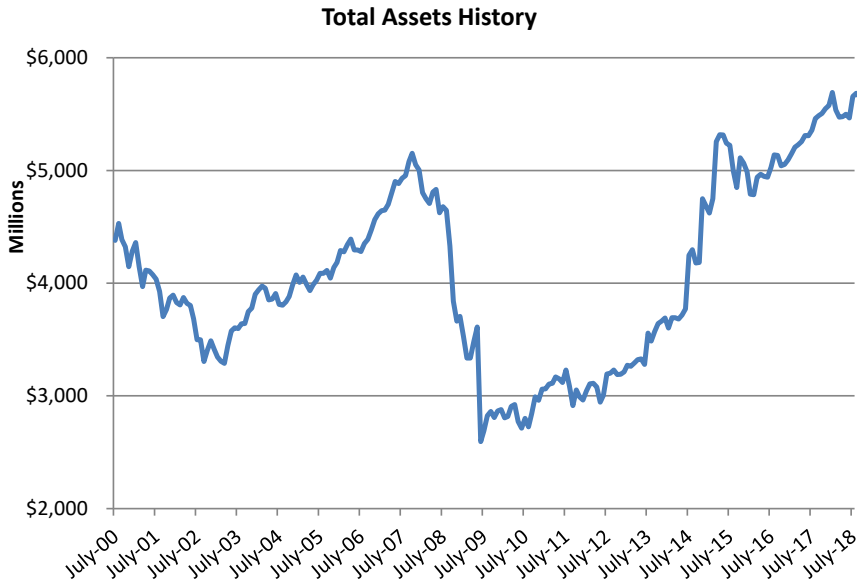


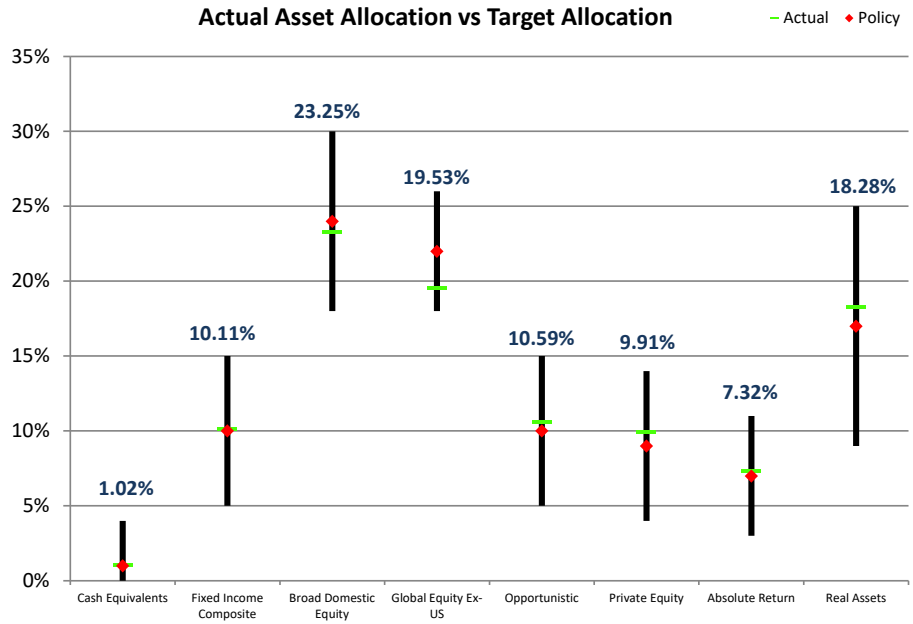
Teachers' Retirement Pension Trust Fund

Fiscal Year-to-Date through October 31, 2018



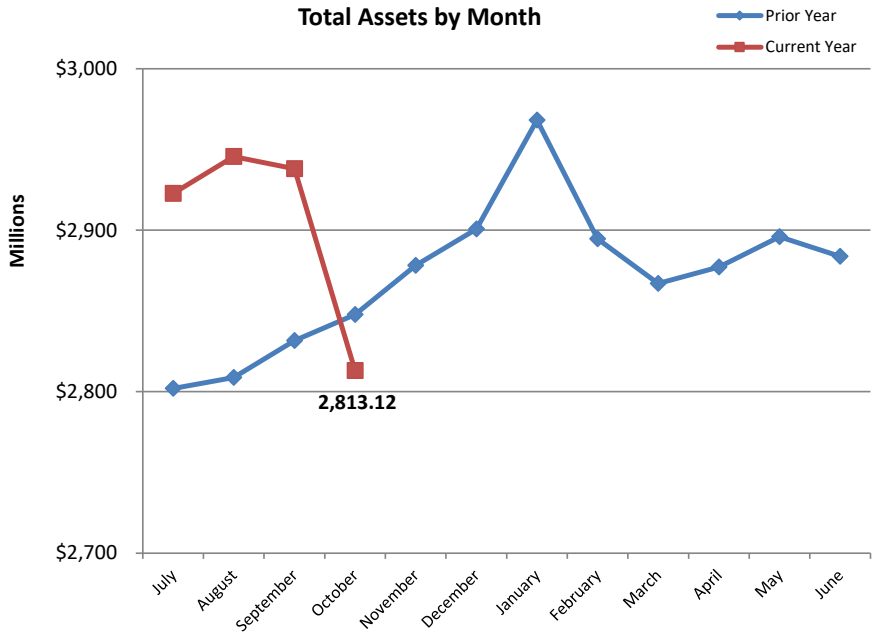


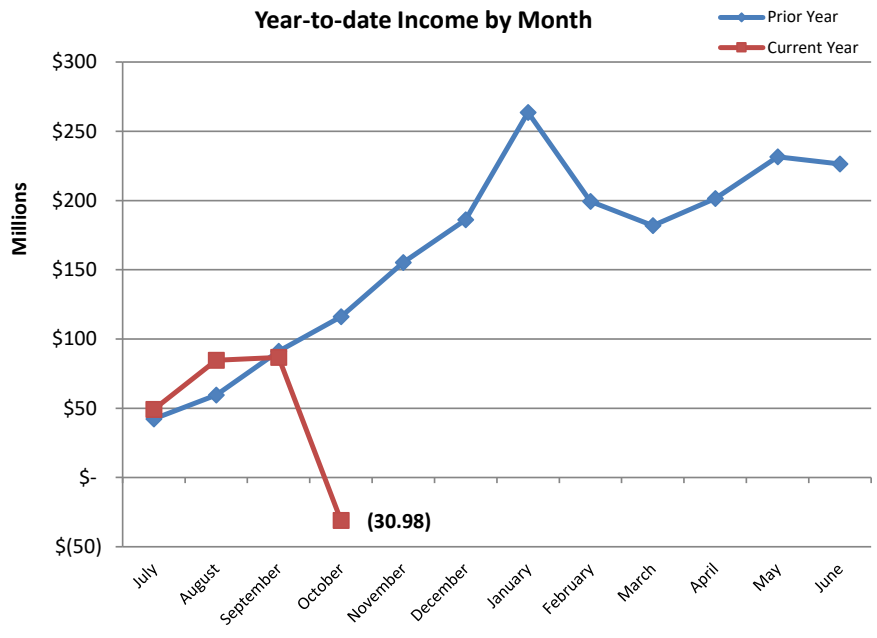


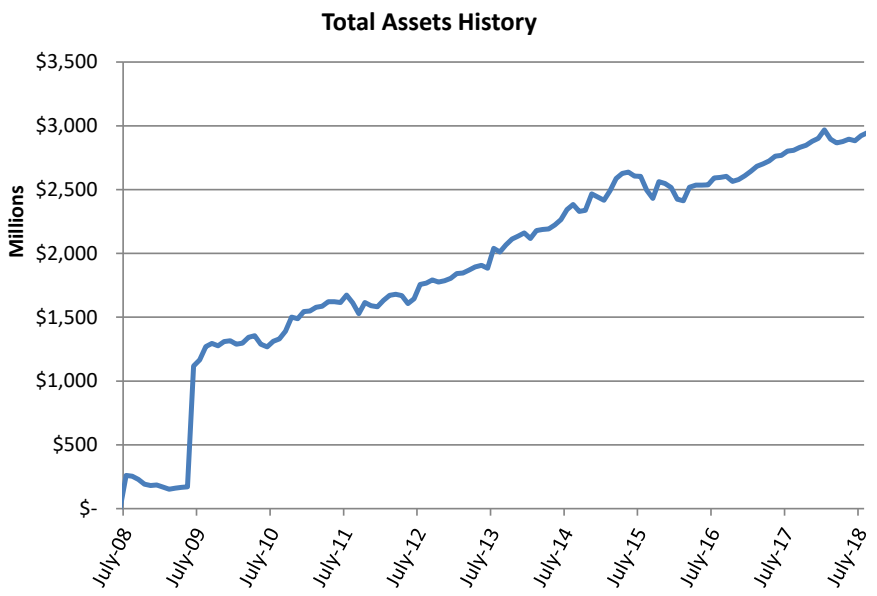


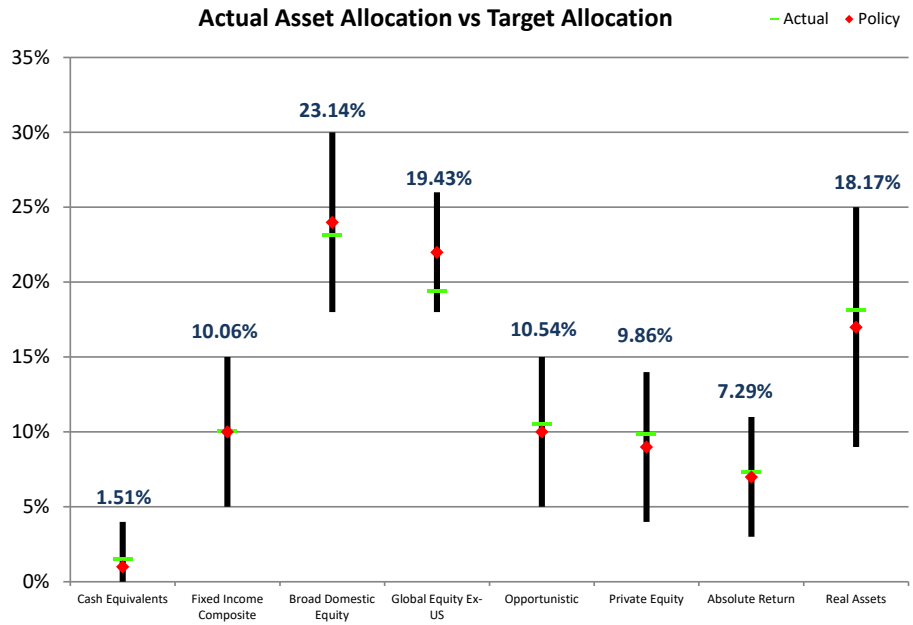
Teachers' Retirement Health Care Trust Fund

Fiscal Year-to-Date through October 31, 2018



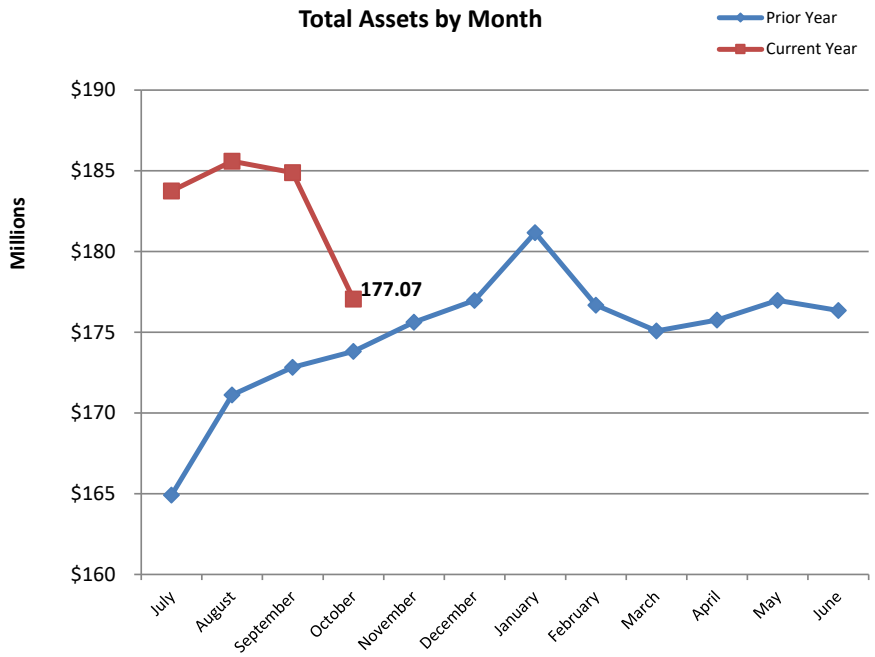


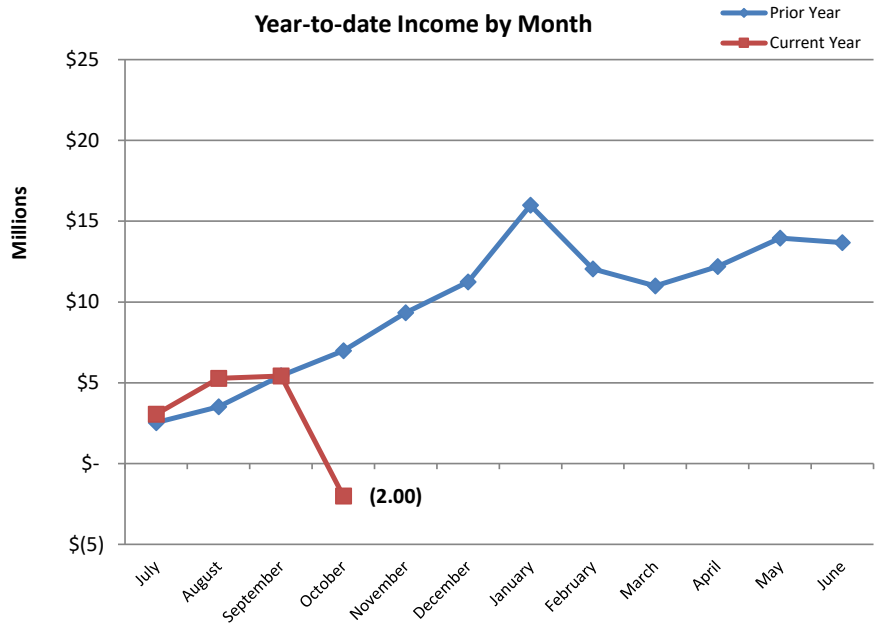


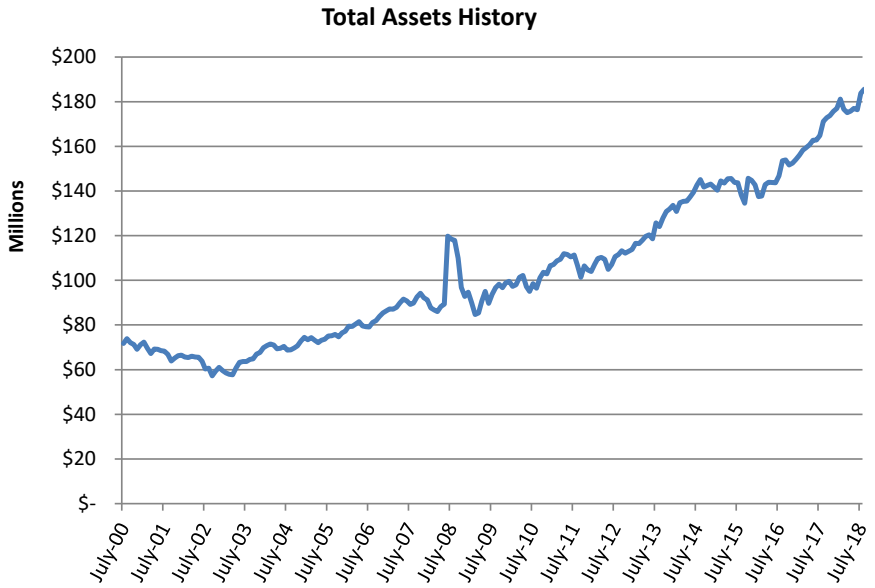


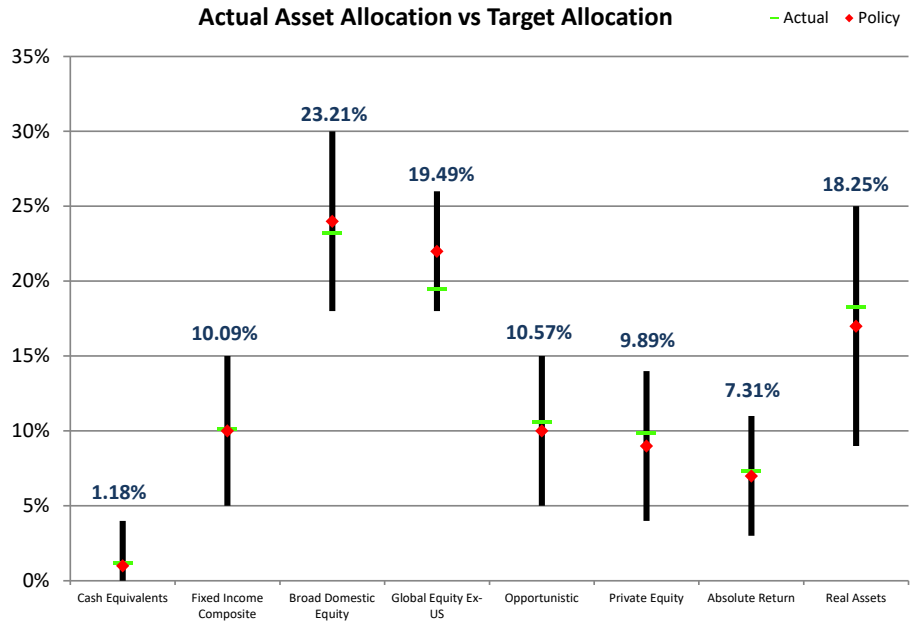
Judicial Retirement Pension Trust Fund

Fiscal Year-to-Date through October 31, 2018



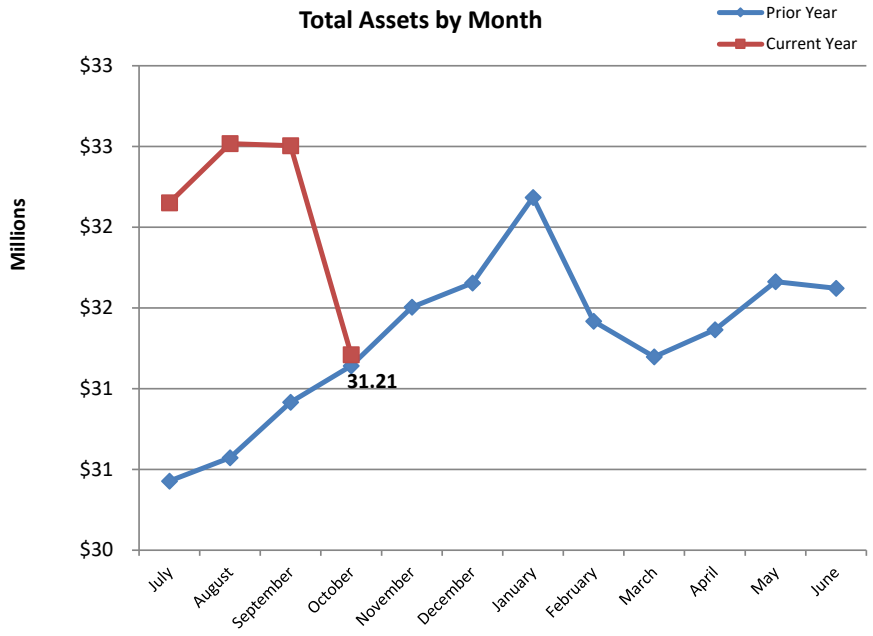


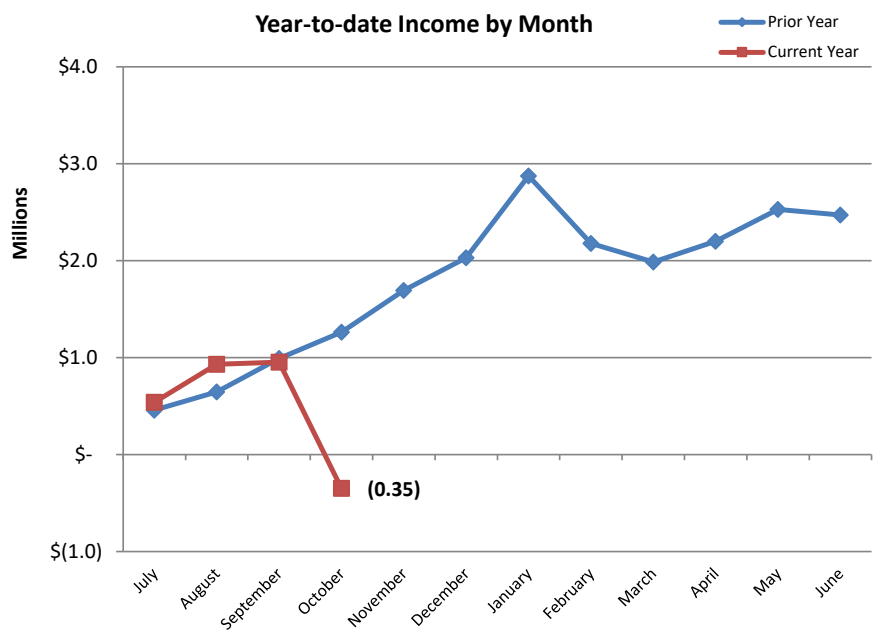


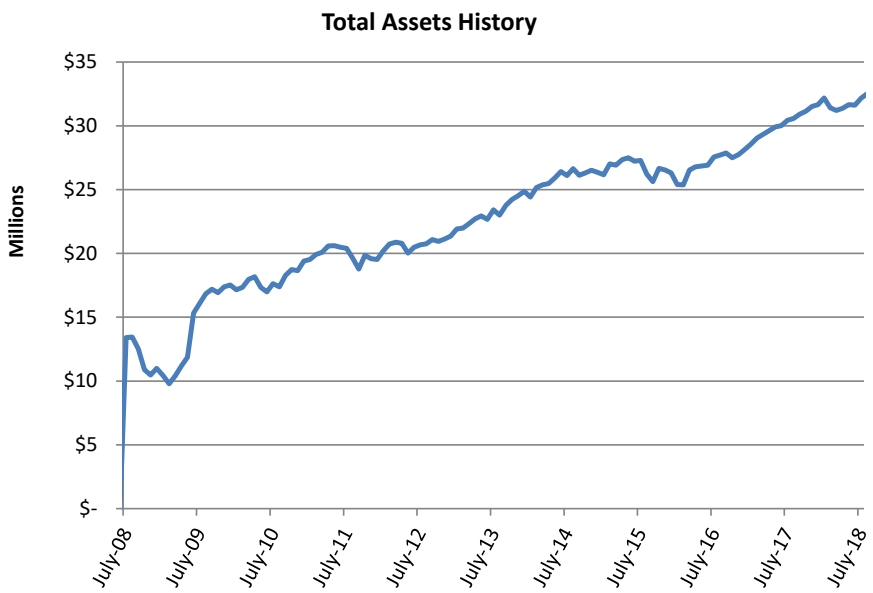


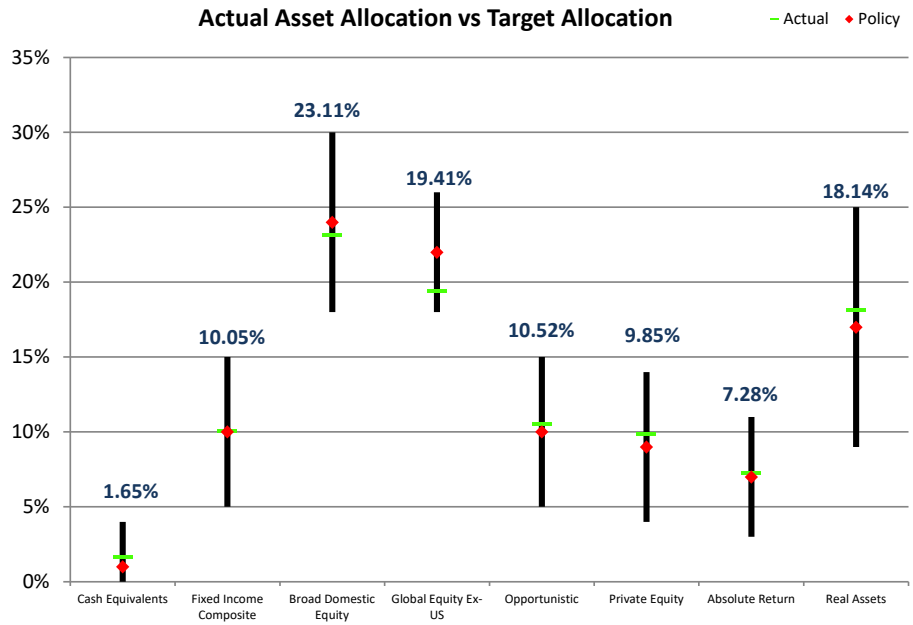
Judicial Retirement Health Care Trust Fund

Fiscal Year-to-Date through October 31, 2018



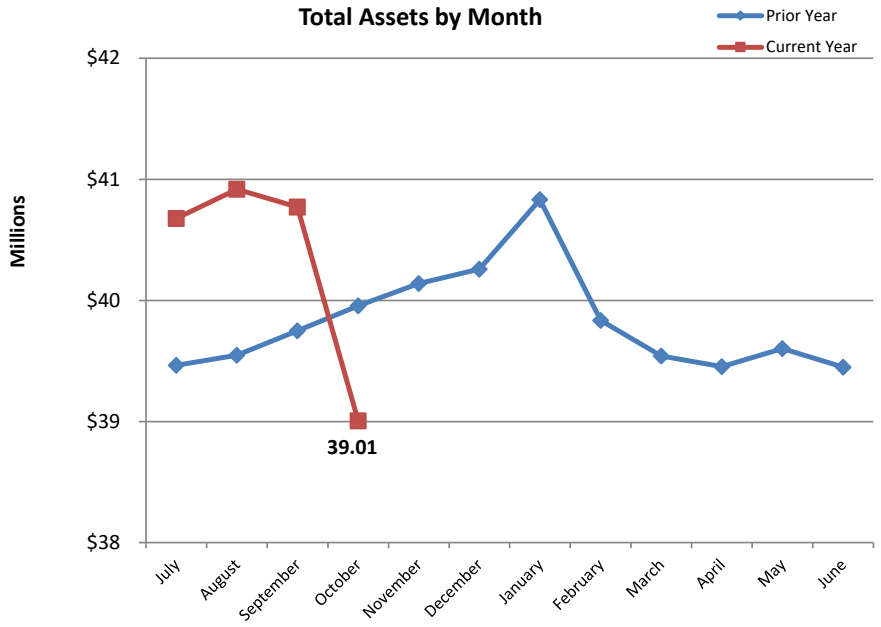


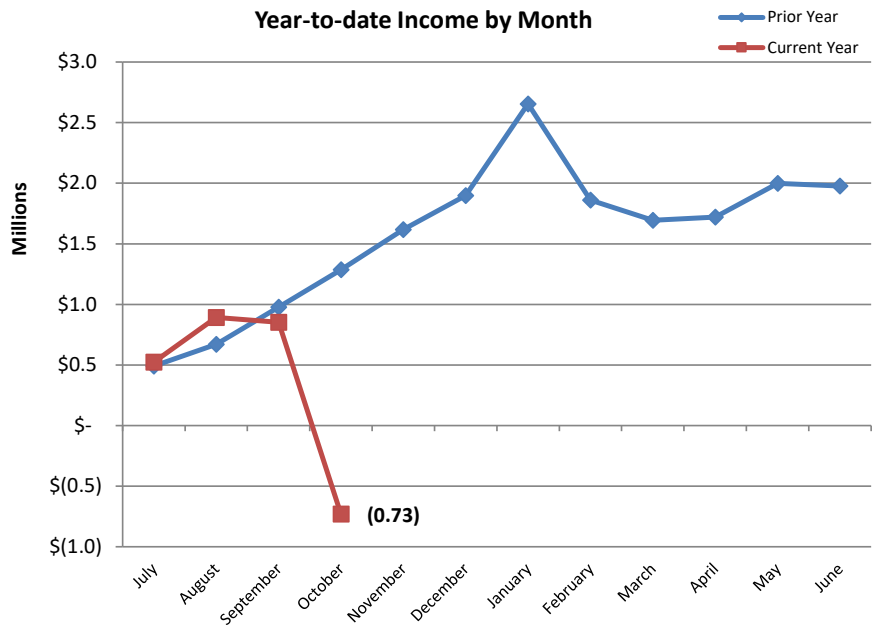


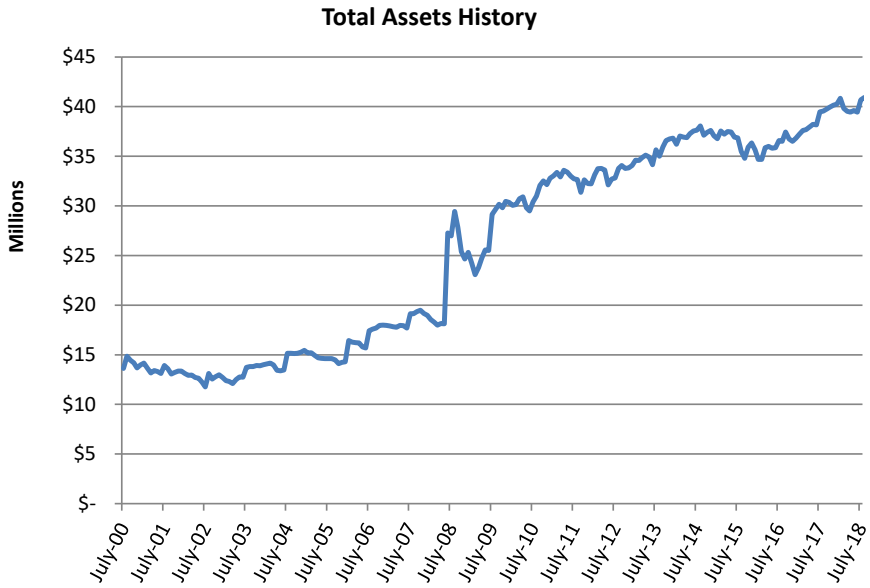


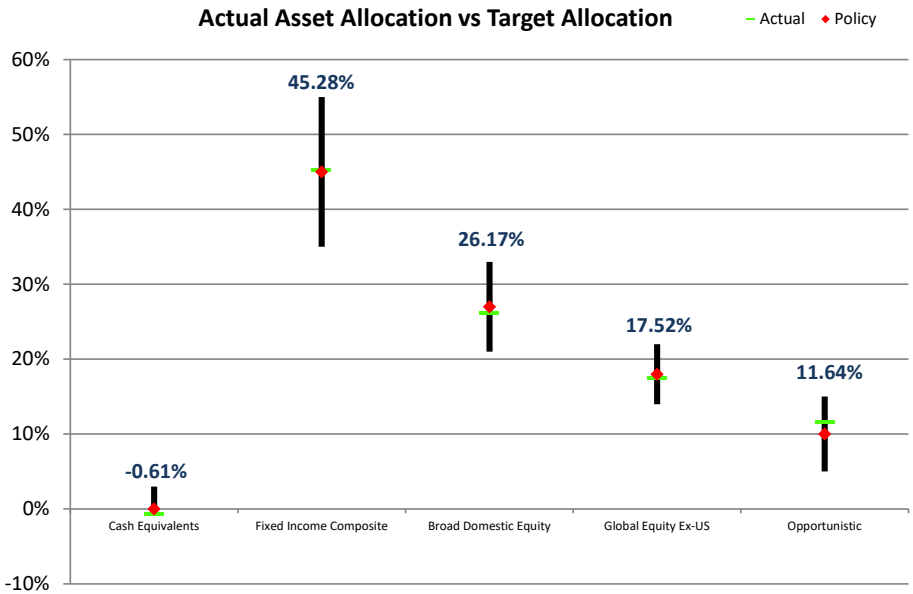
Military Retirement Trust Fund

Fiscal Year-to-Date through October 31, 2018









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 October 31, 2018

	Beginning Invested Assets	Investment Income	Net Contributions and (Withdrawals)	Ending Invested Assets	% increase (decrease)	% Change due to Investment Income
Cash						
Short-Term Fixed Income Pool	$ 350,652,276	$ 821,630	$ (37,025,352)	$ 314,448,554	-10.32%	0.25%
Securities Lending Income Pool	119,867	181,049	(125,393)	175,523	46.43%	316.68%
Total Cash	350,772,143	1,002,679	(37,150,745)	314,624,077	-10.31%	0.30%
Fixed Income						
ARMB US Treasury Fixed Income	2,686,959,981	593,357	(80,100,000)	2,607,453,338	-2.96%	0.02%
Domestic Equities						
Small Cap						
Passively Managed						
ARMB S&P 600	170,047,534	(17,767,828)	-	152,279,706	-10.45%	-10.45%
SSgA Russell 2000 Growth	17,668	568	-	18,236	3.21%	3.21%
SSgA Russell 2000 Value	180,313	3,194	(153,113)	30,394	-83.14%	3.08%
Total Passive	170,245,515	(17,764,066)	(153,113)	152,328,336	-10.52%	-10.44%
Actively Managed						
ARMB Futures Small Cap	2,416,847	(1,461,284)	611	956,174	-60.44%	-60.45%
Arrowmark	57,629,034	(5,538,741)	114,097	52,204,390	-9.41%	-9.60%
BMO Global Asset Management	56,028,703	(7,192,322)	-	48,836,381	-12.84%	-12.84%
DePrince, Race & Zollo Inc.- Micro Cap	125,305,485	(11,419,567)	(29,681,021)	84,204,897	-32.80%	-10.34%
Fidelity (FIAM) Small Company	(9,019)	(462)	462	(9,019)	-	5.26%
Frontier Capital Mgmt. Co.	105,764,726	(11,705,593)	228,018	94,287,151	-10.85%	-11.06%
Jennison Associates, LLC	76,035,901	(8,631,089)	139,456	67,544,268	-11.17%	-11.34%
Lord Abbett & Co.- Micro Cap	130,688,824	(22,576,206)	(30,000,000)	78,112,618	-40.23%	-19.51%
T. Rowe Small Cap Growth	50,658,578	(5,383,412)	-	45,275,166	-10.63%	-10.63%
Transition Account	(1,520)	-	-	(1,520)	-	-
Victory Capital Management	128,405,375	(11,003,223)	-	117,402,152	-8.57%	-8.57%
Zebra Capital Management	115,643,573	(9,850,771)	(19,831,036)	85,961,766	-25.67%	-9.32%
Total Active	848,566,507	(94,762,670)	(79,029,413)	674,774,424	-20.48%	-11.71%
Total Small Cap	1,018,812,022	(112,526,736)	(79,182,526)	827,102,760	-18.82%	-11.49%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended October 31, 2018

Large Cap						
Passively Managed						
ARMB Russell 1000 Growth	1,701,191,081	(152,054,334)	-	1,549,136,747	-8.94%	-8.94%
ARMB Russell 1000 Value	1,424,155,097	(73,555,187)	153,113	1,350,753,023	-5.15%	-5.16%
ARMB Russell Top 200	416,970,218	(27,494,676)	-	389,475,542	-6.59%	-6.59%
Total Passive	3,542,316,396	(253,104,197)	153,113	3,289,365,312	-7.14%	-7.15%
Actively Managed						
Allianz Global Investors	5,635	5	-	5,640	0.09%	0.09%
ARMB Equity Yield	388,166,031	(22,563,027)	10,815	365,613,819	-5.81%	-5.81%
ARMB Futures Large Cap	4,380,208	(1,063,607)	883	3,317,484	-24.26%	-24.28%
ARMB Portable Alpha	461,700,290	(32,758,465)	604,411	429,546,236	-6.96%	-7.09%
ARMB S&P 500 Equal Weight	385,680,060	(27,728,822)	-	357,951,238	-7.19%	-7.19%
ARMB Scientific Beta	391,972,559	(25,266,566)	56,453	366,762,446	-6.43%	-6.45%
Barrow, Hanley, Mewhinney & Strauss	13,679	4,340	-	18,019	31.73%	31.73%
Lazard Freres	354,893,484	(26,302,956)	199,455	328,789,983	-7.36%	-7.41%
Transition Account	2	-	-	2	-	-
Total Active	1,986,811,948	(135,679,098)	872,017	1,852,004,867	-6.79%	-6.83%
Total Large Cap	5,529,128,344	(388,783,295)	1,025,130	5,141,370,179	-7.01%	-7.03%
Total Domestic Equity	6,547,940,366	(501,310,031)	(78,157,396)	5,968,472,939	-8.85%	-7.70%
Global Equities Ex US						
Small Cap						
Mondrian Investment Partners	192,822,501	(19,613,204)	344,358	173,553,655	-9.99%	-10.16%
Schroder Investment Management	209,370,779	(26,217,636)	-	183,153,143	-12.52%	-12.52%
Total Small Cap	402,193,280	(45,830,840)	344,358	356,706,798	-11.31%	-11.39%
Large Cap						
Allianz Global Investors	1,042,069	(2,025)	-	1,040,044	-0.19%	-0.19%
Arrow Street Capital	390,430,822	(31,621,781)	-	358,809,041	-8.10%	-8.10%
Baillie Gifford Overseas Limited	379,606,963	(44,347,298)	-	335,259,665	-11.68%	-11.68%
Blackrock ACWI Ex-US IMI	621,491,473	(53,198,426)	(80,000,000)	488,293,047	-21.43%	-9.15%
Brandes Investment Partners	812,245,861	(45,758,938)	666,119	767,153,042	-5.55%	-5.63%
Cap Guardian Trust Co	573,479,575	(51,909,926)	-	521,569,649	-9.05%	-9.05%
Lazard Freres	330,736,226	(23,456,945)	101,451	307,380,732	-7.06%	-7.09%
McKinley Capital Management	360,536,845	(33,920,869)	446,434	327,062,410	-9.28%	-9.40%
State Street Global Advisors	1,001,518,221	(83,155,024)	460,630	918,823,827	-8.26%	-8.30%
Total Large Cap	4,471,088,055	(367,371,232)	(78,325,366)	4,025,391,457	-9.97%	-8.29%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended October 31, 2018

Emerging Markets Equity						
DePrince, Race, and Zollo Emerging Markets	282,416,819	(25,527,934)	-	256,888,885	-9.04%	-9.04%
Lazard Asset Management	392,044,603	(20,395,384)	-	371,649,219	-5.20%	-5.20%
Total Emerging Markets	674,461,422	(45,923,318)	-	628,538,104	-6.81%	-6.81%
Total Global Equities	5,547,742,757	(459,125,390)	(77,981,008)	5,010,636,359	-9.68%	-8.33%
Opportunistic						
Alternative Equity Strategy						
Analytic Buy Write Account	759,864,127	(40,959,317)	405,654	719,310,464	-5.34%	-5.39%
ARMB STOXX Min Var	639,958,123	(22,366,063)	-	617,592,060	-3.49%	-3.49%
Quantitative Management Associates MPS	(675,211)	(1,161,479)	-	(1,836,690)	-172.02%	-172.02%
Total Alternative Equity Strategy	1,399,147,039	(64,486,859)	405,654	1,335,065,834	-4.58%	-4.61%
Opportunistic Fixed Income						
Fidelity Inst. Asset Mgmt. High Yield CMBS	104,091,375	(254,114)	-	103,837,261	-0.24%	-0.24%
Fidelity Institutional Asset Management.	204,952,456	(2,528,120)	-	202,424,336	-1.23%	-1.23%
Lazard Emerging Income	86,476,699	(336,296)	(20,000,000)	66,140,403	-23.52%	-0.44%
MacKay Shields, LLC	160,087,146	(1,160,689)	(53,200,000)	105,726,457	-33.96%	-0.87%
Mondrian Investment Partners	96,467,816	(1,257,392)	105,104	95,315,528	-1.19%	-1.30%
Western Asset Management	56,477,990	(764,338)	-	55,713,652	-1.35%	-1.35%
Total Opportunistic Fixed Income	708,553,482	(6,300,949)	(73,094,896)	629,157,637	-11.21%	-0.94%
Other Opportunities						
Project Pearl	10,049,468	-	-	10,049,468	-	-
Schroders Insurance Linked Securities	341,877,874	1,461,514	-	343,339,388	0.43%	0.43%
Total Other Opportunities	351,927,342	1,461,514	-	353,388,856	0.42%	0.42%
Tactical Allocation Strategies						
Columbia Threadneedle	4,095	(3,510)	-	585	-85.71%	-85.71%
Eaton Vance High Yield	44,725	(21,321)	-	23,404	-47.67%	-47.67%
Fidelity Signals	-	-	200,000,000	200,000,000	100.00%	-
PineBridge	-	-	200,000,000	200,000,000	100.00%	-
Total Tactical Allocation Strategies	48,820	(24,831)	400,000,000	400,023,989	819285.48%	-0.01%
Total Opportunistic	2,459,676,683	(69,351,125)	327,310,758	2,717,636,316	10.49%	-2.64%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended October 31, 2018

Private Equity						
Abbott Capital	979,944,695	2,470,630	(11,259,400)	971,155,925	-0.90%	0.25%
Advent International GPE Fund VIII-B	17,473,014	-	-	17,473,014	-	-
Angelo, Gordon & Co.	64,699	-	-	64,699	-	-
Dyal Capital Partners III	24,328,645	413,957	(861,395)	23,881,207	-1.84%	1.73%
Glendon Opportunities	37,800,497	-	-	37,800,497	-	-
Glendon Opportunities II	-	-	-	-	-	-
KKR Lending Partners II	55,035,785	658,211	-	55,693,996	1.20%	1.20%
Lexington Capital Partners VIII	31,216,712	-	(922,697)	30,294,015	-2.96%	-
Lexington Partners VII	22,887,852	-	(505,257)	22,382,595	-2.21%	-
Merit Capital Partners	14,166,259	-	(489,587)	13,676,672	-3.46%	-
NB SOF III	30,035,517	-	-	30,035,517	-	-
NB SOF IV	6,271,594	-	729,745	7,001,339	11.64%	-
New Mountain Partners IV	23,528,357	-	-	23,528,357	-	-
New Mountain Partners V	12,514,884	-	-	12,514,884	-	-
NGP XI	52,051,628	-	-	52,051,628	-	-
Onex Partnership III	13,812,348	-	-	13,812,348	-	-
Pathway Capital Management LLC	1,111,166,946	(7,461,408)	(3,319,462)	1,100,386,076	-0.97%	-0.67%
Resolute Fund III	19,642,781	-	(2,946)	19,639,835	-0.01%	-
Summit Partners GE IX	18,093,544	-	-	18,093,544	-	-
Warburg Pincus X	14,220,090	-	-	14,220,090	-	-
Warburg Pincus XI	28,394,311	-	-	28,394,311	-	-
Warburg Pincus XII	46,417,040	-	-	46,417,040	-	-
Total Private Equity	2,559,067,198	(3,918,610)	(16,630,999)	2,538,517,589	-0.80%	-0.15%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended October 31, 2018

Absolute Return						
Allianz Global Investors	349,308,843	5,120,418	-	354,429,261	1.47%	1.47%
Crestline Investors, Inc.	462,733,482	7,461,495	(9,289,874)	460,905,103	-0.40%	1.63%
Crestline Specialty Fund	37,440,945	-	(953,158)	36,487,787	-2.55%	-
Crestline Specialty Lending Fund II	14,387,413	-	-	14,387,413	-	-
JPM Systemic Alpha	177,224,364	(1,106,116)	-	176,118,248	-0.62%	-0.62%
KKR Apex Equity Fund	80,753,933	239,909	-	80,993,842	0.30%	0.30%
Man Group Alternative Risk Premia	212,209,487	1,605,294	-	213,814,781	0.76%	0.76%
Prisma Capital Partners	429,290,277	(1,160,939)	-	428,129,338	-0.27%	-0.27%
Zebra Global Equity Advantage Fund	37,691,745	(1,126,371)	-	36,565,374	-2.99%	-2.99%
Zebra Global Equity Fund	76,124,348	(1,265,530)	-	74,858,818	-1.66%	-1.66%
Total Absolute Return Investments	1,877,164,837	9,768,160	(10,243,032)	1,876,689,965	-0.03%	0.52%
Real Assets						
Farmland						
Hancock Agricultural Investment Group	267,290,263	-	250,000	267,540,263	0.09%	-
UBS Agrivest, LLC	580,502,027	-	-	580,502,027	-	-
Total Farmland	847,792,290	-	250,000	848,042,290	0.03%	-
Timber						
Hancock Natural Resource Group	96,533,654	-	-	96,533,654	-	-
Timberland Invt Resource LLC	263,618,531	-	(1,000,000)	262,618,531	-0.38%	-
Total Timber	360,152,185	-	(1,000,000)	359,152,185	-0.28%	-
Energy						
EIG Energy Fund XIV-A	14,135,151	218,345	-	14,353,496	1.54%	1.54%
EIG Energy Fund XV	26,456,735	470,430	(187,412)	26,739,753	1.07%	1.78%
EIG Energy Fund XVI	59,813,454	(644,822)	(1,445,603)	57,723,029	-3.49%	-1.09%
Total Energy	100,405,340	43,953	(1,633,015)	98,816,278	-1.58%	0.04%
REIT						
REIT Transition Account	-	-	-	-	-	-
ARMB REIT	203,565,411	(5,302,622)	-	198,262,789	-2.60%	-2.60%
Total REIT	203,565,411	(5,302,622)	-	198,262,789	-2.60%	-2.60%
TIPS						
ARMB Treasury Inflation Protected Securities	27,198	-	(27,198)	-	-100.00%	-
Master Limited Partnerships						
Advisory Research MLP	357,364,526	(25,454,144)	(39,467,938)	292,442,444	-18.17%	-7.54%
Tortoise Capital Advisors	541,245,889	(37,212,777)	(39,304,269)	464,728,843	-14.14%	-7.13%
Total Master Limited Partnerships	898,610,415	(62,666,921)	(78,772,207)	757,171,287	-15.74%	-7.29%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended October 31, 2018

Infrastructure Private						
IFM Global Infrastructure Fund-Private	417,823,871	8,035,106	-	425,858,977	1.92%	1.92%
JP Morgan Infrastructure Fund-Private	115,395,118	-	-	115,395,118	-	-
Total Infrastructure Private	533,218,989	8,035,106	-	541,254,095	1.51%	1.51%
Infrastructure Public						
Brookfield Investment Mgmt.-Public	105,492,908	(2,474,024)	183,644	103,202,528	-2.17%	-2.34%
Lazard Asset Mgmt.-Public	149,051,150	(2,685,655)	-	146,365,495	-1.80%	-1.80%
Total Infrastructure Public	254,544,058	(5,159,679)	183,644	249,568,023	-1.95%	-2.03%
Real Estate						
Core Commingled Accounts						
JP Morgan	257,474,178	2,326,829	(1,882,438)	257,918,569	0.17%	0.91%
UBS Trumbull Property Fund	126,664,120	1,542,788	(37,039,659)	91,167,249	-28.02%	1.43%
Total Core Commingled	384,138,298	3,869,617	(38,922,097)	349,085,818	-9.12%	1.06%
Core Separate Accounts					-	
LaSalle Investment Management	200,267,050	-	(708,218)	199,558,832	-0.35%	-
Sentinel Separate Account	242,128,203	-	(956,653)	241,171,550	-0.40%	-
UBS Realty	510,343,062	-	(1,892,105)	508,450,957	-0.37%	-
Total Core Separate	952,738,315	-	(3,556,976)	949,181,339	-0.37%	-
Non-Core Commingled Accounts					-	
Almanac Realty Securities V	2,020,878	-	-	2,020,878	-	-
Almanac Realty Securities VII	33,753,045	-	-	33,753,045	-	-
BlackRock Diamond Property Fund	69,377	(410)	-	68,967	-0.59%	-0.59%
BlackRock US Core Property Fund	201,418,071	3,626,784	-	205,044,855	1.80%	1.80%
Clarion Ventures 4	23,108,222	-	-	23,108,222	-	-
Colony Investors VIII, L.P.	1,637,059	-	-	1,637,059	-	-
Coventry	265,083	-	-	265,083	-	-
ING Clarion Development Ventures III	2,482,226	-	-	2,482,226	-	-
KKR Real Estate Partners Americas II	4,823,956	199,274	607,653	5,630,883	16.73%	3.89%
KKR Real Estate Partners Americas LP.	22,628,370	1,116,498	102,731	23,847,599	5.39%	4.92%
Silverpeak Legacy Pension Partners II, L.P.	6,091,339	-	-	6,091,339	-	-
Silverpeak Legacy Pension Partners III, L.P.	4,487,072	-	-	4,487,072	-	-
Tishman Speyer Real Estate Venture VI	22,157,920	-	-	22,157,920	-	-
Tishman Speyer Real Estate Venture VII	999,584	-	-	999,584	-	-
Total Non-Core Commingled	325,942,202	4,942,146	710,384	331,594,732	1.73%	1.51%
Total Real Estate	1,662,818,815	8,811,763	(41,768,689)	1,629,861,889	-1.98%	0.54%
Total Real Assets	4,861,134,701	(56,238,400)	(122,767,465)	4,682,128,836	-3.68%	-1.17%
Total Assets	$ 26,890,458,666	$ (1,078,579,360)	$ (95,719,887)	$ 25,716,159,419	-4.37%	-4.02%

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
October 31, 2018

	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							
Stable Value Fund	$ 369,543,897	$ 773,815	$ (651,063)	$ 3,773,892	$ 373,440,541	1.05%	0.21%
Small Cap Stock Fund	189,729,455	(16,005,454)	(357,454)	(443,048)	172,923,499	-8.86%	-8.45%
Alaska Balanced Trust	1,144,919,857	(31,847,838)	(5,017,326)	(3,949,109)	1,104,105,584	-3.56%	-2.79%
Long Term Balanced Fund	690,402,521	(31,654,803)	406,466	(4,293,375)	654,860,809	-5.15%	-4.60%
AK Target Date 2010 Trust	10,476,863	(354,980)	(2,770)	420,532	10,539,645	0.60%	-3.32%
AK Target Date 2015 Trust	85,682,069	(3,297,517)	(811,422)	(327,157)	81,245,973	-5.18%	-3.87%
AK Target Date 2020 Trust	97,662,776	(4,472,808)	270,996	(266,549)	93,194,415	-4.58%	-4.58%
AK Target Date 2025 Trust	79,144,560	(4,134,113)	285,020	141,529	75,436,996	-4.68%	-5.21%
AK Target Date 2030 Trust	60,271,688	(3,488,508)	566,765	161,604	57,511,549	-4.58%	-5.75%
AK Target Date 2035 Trust	56,190,001	(3,551,897)	507,032	376,272	53,521,408	-4.75%	-6.27%
AK Target Date 2040 Trust	56,549,050	(3,786,854)	658,672	186,733	53,607,601	-5.20%	-6.65%
AK Target Date 2045 Trust	64,635,526	(4,462,475)	832,469	(51,995)	60,953,525	-5.70%	-6.86%
AK Target Date 2050 Trust	73,411,494	(5,063,782)	1,047,998	(162,151)	69,233,559	-5.69%	-6.86%
AK Target Date 2055 Trust	61,791,262	(4,282,704)	1,489,721	(224,710)	58,773,569	-4.88%	-6.86%
AK Target Date 2060 Trust	4,120,908	(303,076)	(11,894)	538,784	4,344,722	5.43%	-6.91%
Total Investments with T. Rowe Price	3,044,531,927	(115,932,994)	(786,790)	(4,118,748)	2,923,693,395		
State Street Global Advisors							
State Street Treasury Money Market Fund - Inst.	43,079,529	76,611	(145,764)	3,107,233	46,117,609	7.05%	0.17%
S&P 500 Stock Index Fund Series A	488,706,455	(33,603,122)	527,633	5,373,802	461,004,768	-5.67%	-6.83%
Russell 3000 Index	77,680,729	(5,690,856)	172,940	737,171	72,899,984	-6.15%	-7.28%
US Real Estate Investment Trust Index	35,137,862	(895,710)	82,945	(247,297)	34,077,800	-3.02%	-2.56%
World Equity Ex-US Index	58,201,987	(4,759,852)	209,987	947,630	54,599,752	-6.19%	-8.10%
US Treasury Inflation Protected Securities Index	38,180,164	(559,477)	29,027	1,672,482	39,322,196	2.99%	-1.43%
Total Investments with SSGA	740,986,726	(45,432,406)	876,768	11,591,021	708,022,109		
BlackRock							
Passive U.S. Bond Index Fund	107,002,719	(845,098)	155,687	(6,312,197)	100,001,111	-6.54%	-0.81%
Brandes/Baillie Gifford							
AK International Equity Fund	68,018,237	(5,906,516)	199,107	(492,130)	61,818,698	-9.11%	-8.70%
Northern Trust							
Environmental, Social, and Governance Fund	53,543,671	(3,710,988)	92,364	(667,946)	49,257,101	-8.01%	-6.97%
Total All Funds	$ 4,014,083,280	$ (171,828,002)	$ 537,136	$ -	$ 3,842,792,414	-4.27%	-4.28%

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

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

(2) This investment is comprised of two funds, Brandes International Equity Fund and Baillie Gifford International Equity Fund.

Supplemental Annuity Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
October 31, 2018
$ (Thousands)

Invested Assets (at fair value)	**July**	**August**	**September**	**October**
Investments with T. Rowe Price				
Stable Value Fund	$ 355,917	$ 363,879	$ 369,544	$ 373,441
Small Cap Stock Fund	181,818	192,895	189,729	172,923
Alaska Balanced Trust	1,149,694	1,155,054	1,144,920	1,104,106
Long Term Balanced Fund	690,744	693,992	690,403	654,861
AK Target Date 2010 Trust	10,224	10,332	10,477	10,540
AK Target Date 2015 Trust	85,669	85,913	85,682	81,246
AK Target Date 2020 Trust	95,933	97,261	97,663	93,194
AK Target Date 2025 Trust	77,962	79,810	79,145	75,437
AK Target Date 2030 Trust	58,998	60,191	60,272	57,512
AK Target Date 2035 Trust	54,648	56,123	56,190	53,521
AK Target Date 2040 Trust	54,939	56,321	56,549	53,608
AK Target Date 2045 Trust	62,116	63,775	64,636	60,954
AK Target Date 2050 Trust	71,313	72,734	73,411	69,234
AK Target Date 2055 Trust	58,693	60,532	61,791	58,774
AK Target Date 2060 Trust	3,459	4,069	4,121	4,345
State Street Global Advisors				
State Street Treasury Money Market Fund - Inst.	42,005	40,850	43,080	46,118
S&P 500 Stock Index Fund Series A	469,954	484,173	488,706	461,005
Russell 3000 Index	76,432	78,281	77,681	72,900
US Real Estate Investment Trust Index	35,067	36,342	35,138	34,078
World Equity Ex-US Index	55,690	55,661	58,202	54,600
Long US Treasury Bond Index	12,732	-	-	-
US Treasury Inflation Protected Securities Index	33,228	36,218	38,180	39,322
World Government Bond Ex-US Index	12,569	-	-	-
Investments with BlackRock				
Passive U.S. Bond Index Fund	-	111,572	107,003	100,001
Government/Credit Bond Fund	49,922	-	-	-
Intermediate Bond Fund	41,183	-	-	-
Investments with Brandes/Baillie Gifford				
AK International Equity Fund	69,890	68,052	68,018	61,819
Investments with Northern Trust				
Environmental, Social, and Governance Fund	54,712	53,437	53,544	49,257
Total Invested Assets	**$ 3,965,512**	**$ 4,017,465**	**$ 4,014,083**	**$ 3,842,792**
Change in Invested Assets				
Beginning Assets	$ 3,905,659	$ 3,965,512	$ 4,017,465	$ 4,014,083
Investment Earnings	64,770	58,603	(2,073)	(171,828)
Net Contributions (Withdrawals)	(4,918)	(6,650)	(1,309)	537
Ending Invested Assets	**$ 3,965,512**	**$ 4,017,465**	**$ 4,014,083**	**$ 3,842,792**

Source data provided by the record keeper, Empower Retirement.

Deferred Compensation Plan
Schedule of Invested Assets and Changes in Invested Assets
for the Month Ended
October 31, 2018

Participant Options	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
T. Rowe Price							
Stable Value Fund	$ 178,901,038	$ 374,954	$ (389,212)	$ 2,261,451	$ 181,148,231	1.26%	0.21%
Small Cap Stock Fund	119,170,462	(10,048,980)	(211,734)	(389,312)	108,520,436	-8.94%	-8.45%
Alaska Balanced Trust	30,452,918	(851,131)	(102,211)	283,753	29,783,329	-2.20%	-2.79%
Long Term Balanced Fund	90,274,958	(4,105,837)	(624,336)	(584,825)	84,959,960	-5.89%	-4.58%
AK Target Date 2010 Trust	4,033,409	(133,450)	1,188	(182,345)	3,718,802	-7.80%	-3.38%
AK Target Date 2015 Trust	9,462,420	(365,524)	(223,373)	30,662	8,904,185	-5.90%	-3.90%
AK Target Date 2020 Trust	26,247,664	(1,199,934)	(199,979)	(59,719)	24,788,032	-5.56%	-4.59%
AK Target Date 2025 Trust	18,796,041	(977,654)	119,032	(42,529)	17,894,890	-4.79%	-5.19%
AK Target Date 2030 Trust	12,393,893	(716,947)	100,159	(15,969)	11,761,136	-5.11%	-5.77%
AK Target Date 2035 Trust	7,175,315	(456,018)	93,531	190,628	7,003,456	-2.40%	-6.23%
AK Target Date 2040 Trust	8,258,089	(549,241)	80,453	(128,649)	7,660,652	-7.23%	-6.67%
AK Target Date 2045 Trust	6,019,833	(419,668)	76,451	(91,385)	5,585,231	-7.22%	-6.98%
AK Target Date 2050 Trust	4,122,945	(284,054)	67,556	20,584	3,927,031	-4.75%	-6.82%
AK Target Date 2055 Trust	4,308,683	(295,416)	24,238	(44,572)	3,992,933	-7.33%	-6.87%
AK Target Date 2060 Trust	884,540	(62,238)	9,065	39,226	870,593	-1.58%	-6.85%
Total Investments with T. Rowe Price	520,502,208	(20,091,138)	(1,179,172)	1,286,999	500,518,897		
State Street Global Advisors							
State Street Treasury Money Market Fund - Inst.	13,946,644	24,266	(415,263)	315,084	13,870,731	-0.54%	0.17%
Russell 3000 Index	46,616,242	(3,417,443)	170,522	1,179,463	44,548,784	-4.44%	-7.23%
US Real Estate Investment Trust Index	12,769,773	(320,179)	35,223	82,773	12,567,590	-1.58%	-2.50%
World Equity Ex-US Index	18,531,076	(1,522,630)	88,205	480,946	17,577,597	-5.15%	-8.09%
US Treasury Inflation Protected Securities Index	15,603,145	(227,803)	22,210	288,582	15,686,134	0.53%	-1.45%
Total Investments with SSGA	107,466,880	(5,463,789)	(99,103)	2,346,848	104,250,836		
BlackRock							
S&P 500 Index Fund	226,416,967	(15,485,424)	(488,385)	(97,642)	210,345,516	-7.10%	-6.85%
Passive U.S. Bond Index Fund	55,702,369	(441,542)	(66,810)	(2,325,675)	52,868,342	-5.09%	-0.81%
Total Investments with BlackRock	282,119,336	(15,926,966)	(555,195)	(2,423,317)	263,213,858		
Brandes/Baillie Gifford							
AK International Equity Fund	36,339,997	(3,142,939)	(27,942)	(571,118)	32,597,998	-10.30%	-8.72%
Northern Trust							
Environmental, Social, and Governance Fund	23,412,859	(1,588,840)	(81,172)	(639,412)	21,103,435	-9.86%	-6.89%
Total All Funds	$ 969,841,280	$ (46,213,672)	$ (1,942,584)	$ -	$ 921,685,024	-4.97%	-4.77%

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 Baillie Gifford International Equity Fund.

Deferred Compensation Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
October 31, 2018
$ (Thousands)

Invested Assets (at fair value)	**July**	**August**	**September**	**October**
Investments with T. Rowe Price				
Interest Income Fund	$ 175,629	$ -	$ -	$ -
Stable Value Fund	-	179,111	178,901	181,148
Small Cap Stock Fund	114,946	121,797	119,170	108,520
Alaska Balanced Trust	29,501	30,253	30,453	29,783
Long Term Balanced Fund	91,224	91,105	90,275	84,960
AK Target Date 2010 Trust	4,051	4,078	4,033	3,719
AK Target Date 2015 Trust	9,541	9,477	9,462	8,904
AK Target Date 2020 Trust	26,229	26,594	26,248	24,788
AK Target Date 2025 Trust	17,470	18,025	18,796	17,895
AK Target Date 2030 Trust	11,744	12,182	12,394	11,761
AK Target Date 2035 Trust	6,910	7,082	7,175	7,003
AK Target Date 2040 Trust	7,998	8,245	8,258	7,661
AK Target Date 2045 Trust	5,688	5,882	6,020	5,585
AK Target Date 2050 Trust	3,958	4,104	4,123	3,927
AK Target Date 2055 Trust	4,248	4,300	4,309	3,993
AK Target Date 2060 Trust	399	873	885	871
State Street Global Advisors				
State Street Treasury Money Market Fund - Inst.	13,653	13,538	13,947	13,871
Russell 3000 Index	43,890	45,212	46,616	44,549
US Real Estate Investment Trust Index	12,810	13,334	12,770	12,568
World Equity Ex-US Index	18,373	18,043	18,531	17,578
Long US Treasury Bond Index	5,169	-	-	-
US Treasury Inflation Protected Securities Index	13,533	14,313	15,603	15,686
World Government Bond Ex-US Index	4,626	-	-	-
Investments with BlackRock				
S&P 500 Index Fund	220,701	226,134	226,417	210,346
Passive U.S. Bond Index Fund	-	57,464	55,702	52,868
Government/Credit Bond Fund	27,364	-	-	-
Intermediate Bond Fund	22,131	-	-	-
Investments with Brandes/Baillie Gifford				
AK International Equity Fund	38,417	37,121	36,340	32,598
Investments with Northern Trust				
Environmental, Social, and Governance Fund	23,391	23,420	23,413	21,103
Total Invested Assets	**$ 953,592**	**$ 971,688**	**$ 969,841**	**$ 921,685**
Change in Invested Assets				
Beginning Assets	$ 938,807	$ 953,592	$ 971,688	$ 969,841
Investment Earnings	17,321	18,962	(977)	(46,214)
Net Contributions (Withdrawals)	(2,536)	(866)	(869)	(1,943)
Ending Invested Assets	**$ 953,592**	**$ 971,688**	**$ 969,841**	**$ 921,685**

Source data provided by the record keeper, Empower Retirement.

Defined Contribution Retirement - Participant Directed PERS
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
October 31, 2018

Participant Options	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
T. Rowe Price							
Stable Value Fund	$ 27,851,984	$ 74,002	$ (111,807)	$ 15,192,161	$ 43,006,340	54.41%	0.21%
Small Cap Stock Fund	78,139,550	(6,599,933)	92,096	(703,886)	70,927,827	-9.23%	-8.48%
Alaska Balanced Trust	27,771,893	(775,965)	40,008	(560,170)	26,475,766	-4.67%	-2.82%
Long Term Balanced Fund	21,415,172	(951,666)	33,475	(2,156,547)	18,340,434	-14.36%	-4.68%
AK Target Date 2010 Trust	2,485,428	(82,967)	7,880	64,751	2,475,092	-0.42%	-3.29%
AK Target Date 2015 Trust	12,061,476	(457,989)	86,941	(130,666)	11,559,762	-4.16%	-3.80%
AK Target Date 2020 Trust	32,961,300	(1,521,345)	317,213	(24,208)	31,732,960	-3.73%	-4.60%
AK Target Date 2025 Trust	52,639,964	(2,762,691)	703,427	29,454	50,610,154	-3.86%	-5.21%
AK Target Date 2030 Trust	55,869,310	(3,235,071)	431,836	(392,156)	52,673,919	-5.72%	-5.79%
AK Target Date 2035 Trust	66,600,093	(4,206,889)	711,897	(149,788)	62,955,313	-5.47%	-6.29%
AK Target Date 2040 Trust	79,081,398	(5,293,921)	806,964	(72,340)	74,522,101	-5.77%	-6.66%
AK Target Date 2045 Trust	102,389,211	(7,056,378)	1,041,814	(424,459)	95,950,188	-6.29%	-6.87%
AK Target Date 2050 Trust	121,128,408	(8,360,542)	1,335,060	(313,271)	113,789,655	-6.06%	-6.87%
AK Target Date 2055 Trust	100,844,045	(6,984,789)	1,909,186	(125,174)	95,643,268	-5.16%	-6.87%
AK Target Date 2060 Trust	992,602	(69,208)	(10,538)	(2,805)	910,051	-8.32%	-7.02%
Total Investments with T. Rowe Price	782,231,834	(48,285,352)	7,395,452	10,230,896	751,572,830		
State Street Global Advisors							
Money Market	10,109,408	18,087	(71,345)	864,110	10,920,260	8.02%	0.17%
S&P 500 Stock Index Fund Series A	104,740,512	(7,163,618)	304,963	871,438	98,753,295	-5.72%	-6.80%
Russell 3000 Index	11,692,790	(862,379)	76,766	40,703	10,947,880	-6.37%	-7.34%
US Real Estate Investment Trust Index	15,806,268	(402,957)	5,231	(26,638)	15,381,904	-2.68%	-2.55%
World Equity Ex-US Index	49,117,387	(4,039,433)	130,183	1,450,309	46,658,446	-5.01%	-8.09%
US Treasury Inflation Protected Securities Index	17,903,869	(264,263)	(86,258)	1,228,035	18,781,383	4.90%	-1.43%
Total Investments with SSGA	209,370,234	(12,714,563)	359,540	4,427,957	201,443,168		
BlackRock							
Passive U.S. Bond Index Fund	55,842,410	(420,714)	(96,585)	(14,659,696)	40,665,415	-27.18%	-0.87%
Brandes/Baillie Gifford							
AK International Equity Fund	45,451,639	(3,956,134)	156,039	171,417	41,822,961	-7.98%	-8.67%
Northern Trust							
Environmental, Social, and Governance Fund	10,306,675	(708,943)	11,718	(170,574)	9,438,876	-8.42%	-6.93%
Total All Funds	$ 1,103,202,792	$ (66,085,706)	$ 7,826,164	$ -	$ 1,044,943,250	-5.28%	-5.97%

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 Baillie Gifford International Equity Fund.

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
October 31, 2018
$ (Thousands)

Invested Assets (at fair value)	**July**	**August**	**September**	**October**
Investments with T. Rowe Price				
Alaska Money Market	$ 5,386	$ -	$ -	$ -
Stable Value Fund	-	14,421	27,852	43,006
Small Cap Stock Fund	78,194	80,707	78,140	70,928
Alaska Balanced Trust	27,299	27,398	27,772	26,476
Long Term Balanced Fund	24,785	23,022	21,415	18,340
AK Target Date 2010 Trust	2,508	2,531	2,485	2,475
AK Target Date 2015 Trust	11,859	12,041	12,061	11,560
AK Target Date 2020 Trust	32,186	32,603	32,961	31,733
AK Target Date 2025 Trust	51,239	52,236	52,640	50,610
AK Target Date 2030 Trust	54,629	55,604	55,869	52,674
AK Target Date 2035 Trust	64,604	65,985	66,600	62,955
AK Target Date 2040 Trust	76,369	78,405	79,081	74,522
AK Target Date 2045 Trust	98,208	100,893	102,389	95,950
AK Target Date 2050 Trust	116,864	119,654	121,128	113,790
AK Target Date 2055 Trust	95,705	98,774	100,844	95,643
AK Target Date 2060 Trust	815	862	993	910
State Street Global Advisors				
Money Market	4,623	10,005	10,109	10,920
S&P 500 Stock Index Fund Series A	98,610	102,254	104,741	98,753
Russell 3000 Index	10,944	11,591	11,693	10,948
US Real Estate Investment Trust Index	16,265	16,461	15,806	15,382
World Equity Ex-US Index	46,988	47,280	49,117	46,658
Long US Treasury Bond Index	1,210	-	-	-
US Treasury Inflation Protected Securities Index	14,922	16,824	17,904	18,781
World Government Bond Ex-US Index	7,351	-	-	-
Investments with BlackRock				
Government/Credit Bond Fund	49,222	-	-	-
Passive U.S. Bond Index Fund	-	68,174	55,842	40,665
Intermediate Bond Fund	22,335	-	-	-
Investments with Brandes/Baillie Gifford				
AK International Equity Fund	45,645	45,336	45,452	41,823
Investments with Northern Trust				
Environmental, Social, and Governance Fund	10,616	10,404	10,307	9,439
Total Invested Assets	**$ 1,069,378**	**$ 1,093,466**	**$ 1,103,203**	**$ 1,044,943**
Change in Invested Assets				
Beginning Assets	$ 1,041,422	$ 1,069,378	$ 1,093,466	$ 1,103,203
Investment Earnings	23,080	17,895	(334)	(66,086)
Net Contributions (Withdrawals)	4,876	6,192	10,071	7,826
Ending Invested Assets	**$ 1,069,378**	**$ 1,093,466**	**$ 1,103,203**	**$ 1,044,943**

Source data provided by the record keeper, Empower Retirement.

Defined Contribution Retirement - Participant Directed TRS
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
October 31, 2018

Participant Options	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
T. Rowe Price							
Stable Value Fund	$ 10,958,572	$ 29,279	$ 72,115	$ 6,194,156	$ 17,254,122	57.45%	0.21%
Small Cap Stock Fund	33,875,859	(2,854,163)	75,375	(390,244)	30,706,827	-9.35%	-8.46%
Alaska Balanced Trust	11,456,226	(320,301)	53,903	(112,590)	11,077,238	-3.31%	-2.80%
Long Term Balanced Fund	8,893,396	(394,011)	28,612	(907,476)	7,620,521	-14.31%	-4.66%
AK Target Date 2010 Trust	843,209	(29,080)	9,144	(98,175)	725,098	-14.01%	-3.64%
AK Target Date 2015 Trust	3,354,093	(129,115)	34,640	(38,665)	3,220,953	-3.97%	-3.85%
AK Target Date 2020 Trust	9,992,445	(457,636)	68,730	(3,225)	9,600,314	-3.92%	-4.56%
AK Target Date 2025 Trust	17,113,427	(896,785)	257,040	62	16,473,744	-3.74%	-5.20%
AK Target Date 2030 Trust	20,232,515	(1,173,440)	326,246	(1,252)	19,384,069	-4.19%	-5.75%
AK Target Date 2035 Trust	30,167,040	(1,897,937)	286,423	(27,895)	28,527,631	-5.43%	-6.26%
AK Target Date 2040 Trust	32,147,702	(2,130,172)	419,694	(223,458)	30,213,766	-6.02%	-6.61%
AK Target Date 2045 Trust	49,641,218	(3,412,201)	720,902	(266,665)	46,683,254	-5.96%	-6.84%
AK Target Date 2050 Trust	69,023,856	(4,744,009)	753,294	12,681	65,045,822	-5.76%	-6.84%
AK Target Date 2055 Trust	32,751,209	(2,260,244)	861,785	(26,070)	31,326,680	-4.35%	-6.81%
AK Target Date 2060 Trust	250,495	(17,461)	1,852	2,801	237,687	-5.11%	-6.91%
Total Investments with T. Rowe Price	330,701,262	(20,687,276)	3,969,755	4,113,985	318,097,726		
State Street Global Advisors							
Money Market	2,676,521	4,868	27,376	185,161	2,893,926	8.12%	0.17%
S&P 500 Stock Index Fund Series A	42,944,084	(2,932,715)	104,514	270,376	40,386,259	-5.96%	-6.80%
Russell 3000 Index	3,757,481	(275,910)	36,538	(13,397)	3,504,712	-6.73%	-7.32%
US Real Estate Investment Trust Index	6,396,156	(162,360)	30,763	(52,352)	6,212,207	-2.88%	-2.54%
World Equity Ex-US Index	22,069,359	(1,814,964)	104,206	715,370	21,073,971	-4.51%	-8.07%
US Treasury Inflation Protected Securities Index	6,486,407	(96,295)	34,640	514,102	6,938,854	6.98%	-1.42%
Total Investments with SSGA	84,330,008	(5,277,376)	338,037	1,619,260	81,009,929		
BlackRock							
Passive U.S. Bond Index Fund	21,597,054	(163,407)	78,168	(5,702,409)	15,809,406	-26.80%	-0.87%
Brandes/Baillie Gifford							
AK International Equity Fund	20,320,303	(1,765,023)	42,681.00	109,535	18,707,496	-7.94%	-8.65%
Northern Trust							
Environmental, Social, and Governance Fund	4,270,436	(293,770)	22,194.00	(140,371)	3,858,489	-9.65%	-6.98%
Total All Funds	$ 461,219,063	$ (28,186,852)	$ 4,450,835	$ -	$ 437,483,046	-5.15%	-6.08%

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 Baillie Gifford International Equity Fund.

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
October 31, 2018
$ (Thousands)

Invested Assets (at fair value)	**July**	**August**	**September**	**October**
Investments with T. Rowe Price				
Alaska Money Market	$ 1,894	$ -	$ -	$ -
Stable Value Fund	-	5,764	10,959	17,254
Small Cap Stock Fund	34,424	35,326	33,876	30,707
Alaska Balanced Trust	11,394	11,458	11,456	11,077
Long Term Balanced Fund	10,335	9,630	8,893	7,621
AK Target Date 2010 Trust	826	836	843	725
AK Target Date 2015 Trust	3,397	3,396	3,354	3,221
AK Target Date 2020 Trust	9,951	9,943	9,992	9,600
AK Target Date 2025 Trust	16,938	17,131	17,113	16,474
AK Target Date 2030 Trust	20,121	20,288	20,233	19,384
AK Target Date 2035 Trust	29,766	29,990	30,167	28,528
AK Target Date 2040 Trust	31,409	31,857	32,148	30,214
AK Target Date 2045 Trust	48,740	49,511	49,641	46,683
AK Target Date 2050 Trust	68,156	69,233	69,024	65,046
AK Target Date 2055 Trust	32,138	32,606	32,751	31,327
AK Target Date 2060 Trust	179	195	250	238
State Street Global Advisors				
Money Market	690	2,573	2,677	2,894
S&P 500 Stock Index Fund Series A	41,127	42,492	42,944	40,386
Russell 3000 Index	3,621	3,663	3,757	3,505
US Real Estate Investment Trust Index	6,751	6,695	6,396	6,212
World Equity Ex-US Index	21,323	21,370	22,069	21,074
Long US Treasury Bond Index	306	-	-	-
US Treasury Inflation Protected Securities Index	5,367	6,094	6,486	6,939
World Government Bond Ex-US Index	2,765	-	-	-
Investments with BlackRock				
Government/Credit Bond Fund	20,232	-	-	-
Passive U.S. Bond Index Fund	-	26,480	21,597	15,809
Intermediate Bond Fund	8,292	-	-	-
Investments with Brandes/Baillie Gifford				
AK International Equity Fund	20,619	20,325	20,320	18,707
Investments with Northern Trust				
Environmental, Social, and Governance Fund	4,614	4,398	4,270	3,858
Total Invested Assets	**$ 455,376**	**$ 461,254**	**$ 461,219**	**$ 437,483**

Change in Invested Assets				
Beginning Assets	$ 442,323	$ 455,376	$ 461,254	$ 461,219
Investment Earnings	10,017	7,587	(129)	(28,187)
Net Contributions (Withdrawals)	3,036	(1,709)	95	4,451
Ending Invested Assets	**$ 455,376**	**$ 461,254**	**$ 461,219**	**$ 437,483**

Source data provided by the record keeper, Empower Retirement.

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Fund Financials – Cash Flow Report
December 13, 2018

Christina Maiquis, Acting Chief Financial Officer, Department of Administration, Division of Retirement & Benefits

Presented is the Division of Retirement & Benefits (DRB) Supplement to the Treasury Division's Financial Report as of:

- October 31, 2018

DRB's supplement report expands on the ARMB Financial Report column "Net Contributions (Withdrawals)" located on pages 1 and 2. DRB reports the summary totals of actual employer, State of Alaska, and other revenue contributions, as well as benefit payments, refunds / distributions, and combined administrative / investment expenditures. DRB's report presents cash inflows / outflows for the 4 months ended October 31, 2018 (page 1) and the month of October 2018 (page 2).

Also presented are participant-directed distributions by plan and by type for the 4-month period on page 3.

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

ALASKA RETIREMENT MANAGEMENT BOARD

FINANCIAL REPORT
(Supplement to the Treasury Division Report)

As of October 31, 2018

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 Four Months Ending October 31, 2018

	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)									
Defined Benefit Plans:									
Retirement Trust	$ 120,795,688	$ 135,367,000	$ 7,849	$ 256,170,537	$ (279,136,436)	$ (3,752,076)	$ (2,278,506)	$ (285,167,018)	$ (28,996,481)
Retirement Health Care Trust	32,278,763	-	18,063,527	50,342,290	(146,446,943)	-	(5,412,439)	(151,859,382)	(101,517,092)
Total Defined Benefit Plans	153,074,451	135,367,000	18,071,376	306,512,827	(425,583,379)	(3,752,076)	(7,690,945)	(437,026,400)	(130,513,573)
Defined Contribution Plans:									
Participant Directed Retirement	50,640,266	-	-	50,640,266	-	(19,431,853)	(2,242,601)	(21,674,454)	28,965,812
Health Reimbursement Arrangement [a]	12,898,485	-	-	12,898,485	(33,587)	-	(52,768)	(86,355)	12,812,130
Retiree Medical Plan [a]	3,779,525	-	7,047	3,786,572	(90,157)	-	(16,527)	(106,684)	3,679,888
Occupational Death and Disability: [a]									
Public Employees	796,237	-	-	796,237	(41,708)	-	(3,189)	(44,897)	751,340
Police and Firefighters	384,172	-	-	384,172	(81,045)	-	(1,542)	(82,587)	301,585
Total Defined Contribution Plans	68,498,685	-	7,047	68,505,732	(246,497)	(19,431,853)	(2,316,627)	(21,994,977)	46,510,755
Total PERS	**221,573,136**	**135,367,000**	**18,078,423**	**375,018,559**	**(425,829,876)**	**(23,183,929)**	**(10,007,572)**	**(459,021,377)**	**(84,002,818)**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Trust	17,674,294	128,174,000	8,490	145,856,784	(157,996,824)	(1,138,712)	(1,234,650)	(160,370,186)	(14,513,402)
Retirement Health Care Trust	4,423,092	-	5,857,011	10,280,103	(47,992,367)	-	(2,022,364)	(50,014,731)	(39,734,628)
Total Defined Benefit Plans	22,097,386	128,174,000	5,865,501	156,136,887	(205,989,191)	(1,138,712)	(3,257,014)	(210,384,917)	(54,248,030)
Defined Contribution Plans:									
Participant Directed Retirement	12,936,210	-	-	12,936,210	-	(6,291,696)	(772,428)	(7,064,124)	5,872,086
Health Reimbursement Arrangement [a]	2,539,813	-	-	2,539,813	(11,414)	-	(15,764)	(27,178)	2,512,635
Retiree Medical Plan [a]	743,497	-	3,644	747,141	(58,732)	-	(6,890)	(65,622)	681,519
Occupational Death and Disability [a]	40,960	-	-	40,960	(8,097)	-	(515)	(8,612)	32,348
Total Defined Contribution Plans	16,260,480	-	3,644	16,264,124	(78,243)	(6,291,696)	(795,597)	(7,165,536)	9,098,588
Total TRS	**38,357,866**	**128,174,000**	**5,869,145**	**172,401,011**	**(206,067,434)**	**(7,430,408)**	**(4,052,611)**	**(217,550,453)**	**(45,149,442)**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	2,150,748	4,909,000	-	7,059,748	(4,306,596)	-	(41,288)	(4,347,884)	2,711,864
Defined Benefit Retirement Health Care Trust	223,027	-	57,869	280,896	(323,788)	-	(18,764)	(342,552)	(61,656)
Total JRS	**2,373,775**	**4,909,000**	**57,869**	**7,340,644**	**(4,630,384)**	**-**	**(60,052)**	**(4,690,436)**	**2,650,208**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust [a]	851,686	-	-	851,686	(528,692)	-	(34,981)	(563,673)	288,013
Other Participant Directed Plans									
Supplemental Annuity Plan	61,998,794	-	-	61,998,794	-	(72,398,834)	(1,939,197)	(74,338,031)	(12,339,237)
Deferred Compensation Plan	15,306,523	-	-	15,306,523	-	(20,866,753)	(653,092)	(21,519,845)	(6,213,322)
Total All Funds	**340,461,780**	**268,450,000**	**24,005,437**	**632,917,217**	**(637,056,386)**	**(123,879,924)**	**(16,747,505)**	**(777,683,815)**	**(144,766,598)**
Total Non-Participant Directed	199,579,987	268,450,000	24,005,437	492,035,424	(637,056,386)	(4,890,788)	(11,140,187)	(653,087,361)	(161,051,937)
Total Participant Directed	140,881,793	-	-	140,881,793	-	(118,989,136)	(5,607,318)	(124,596,454)	16,285,339
Total All Funds	**$ 340,461,780**	**$ 268,450,000**	**$ 24,005,437**	**$ 632,917,217**	**$ (637,056,386)**	**$ (123,879,924)**	**$ (16,747,505)**	**$ (777,683,815)**	**$ (144,766,598)**

(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 October 31, 2018

	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)									
Defined Benefit Plans:									
Retirement Trust	$ 30,528,213	$ -	$ 374	$ 30,528,587	$ (70,393,958)	$ (1,154,521)	$ (279,868)	$ (71,828,347)	$ (41,299,760)
Retirement Health Care Trust	8,589,503	-	12,084,319	20,673,822	(39,333,207)	-	(1,116,727)	(40,449,934)	(19,776,112)
Total Defined Benefit Plans	39,117,716	-	12,084,693	51,202,409	(109,727,165)	(1,154,521)	(1,396,595)	(112,278,281)	(61,075,872)
Defined Contribution Plans:									
Participant Directed Retirement	13,404,442	-	-	13,404,442	-	(5,070,567)	(507,711)	(5,578,278)	7,826,164
Health Reimbursement Arrangement [(a)]	3,550,327	-	-	3,550,327	(12,747)	-	(3,718)	(16,465)	3,533,862
Retiree Medical Plan [(a)]	981,063	-	5,205	986,268	(19,625)	-	(1,736)	(21,361)	964,907
Occupational Death and Disability: [(a)]									
Public Employees	234,335	-	-	234,335	(10,429)	-	(200)	(10,629)	223,706
Police and Firefighters	99,439	-	-	99,439	(20,262)	-	(100)	(20,362)	79,077
Total Defined Contribution Plans	18,269,606	-	5,205	18,274,811	(63,063)	(5,070,567)	(513,465)	(5,647,095)	12,627,716
Total PERS	**57,387,322**	**-**	**12,089,898**	**69,477,220**	**(109,790,228)**	**(6,225,088)**	**(1,910,060)**	**(117,925,376)**	**(48,448,156)**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Trust	7,000,362	-	3,274	7,003,636	(39,697,885)	(268,447)	(132,218)	(40,098,550)	(33,094,914)
Retirement Health Care Trust	1,782,657	-	3,937,317	5,719,974	(12,496,928)	-	(420,362)	(12,917,290)	(7,197,316)
Total Defined Benefit Plans	8,783,019	-	3,940,591	12,723,610	(52,194,813)	(268,447)	(552,580)	(53,015,840)	(40,292,230)
Defined Contribution Plans:									
Participant Directed Retirement	5,546,531	-	-	5,546,531	-	(864,100)	(231,596)	(1,095,696)	4,450,835
Health Reimbursement Arrangement [(a)]	1,108,709	-	-	1,108,709	(3,184)	-	(1,121)	(4,305)	1,104,404
Retiree Medical Plan [(a)]	294,210	-	2,138	296,348	(11,345)	-	(725)	(12,070)	284,278
Occupational Death and Disability [(a)]	29,142	-	-	29,142	(2,025)	-	(31)	(2,056)	27,086
Total Defined Contribution Plans	6,978,592	-	2,138	6,980,730	(16,554)	(864,100)	(233,473)	(1,114,127)	5,866,603
Total TRS	**15,761,611**	**-**	**3,942,729**	**19,704,340**	**(52,211,367)**	**(1,132,547)**	**(786,053)**	**(54,129,967)**	**(34,425,627)**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	719,932	-	-	719,932	(1,108,869)	-	(6,590)	(1,115,459)	(395,527)
Defined Benefit Retirement Health Care Trust	74,590	-	43,454	118,044	(104,988)	-	(4,271)	(109,259)	8,785
Total JRS	**794,522**	**-**	**43,454**	**837,976**	**(1,213,857)**	**-**	**(10,861)**	**(1,224,718)**	**(386,742)**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust [(a)]	-	-	-	-	(173,561)	-	(8,802)	(182,363)	(182,363)
Other Participant Directed Plans									
Supplemental Annuity Plan	18,757,307	-	-	18,757,307	-	(17,622,220)	(597,951)	(18,220,171)	537,136
Deferred Compensation Plan	3,268,404	-	-	3,268,404	-	(5,017,480)	(193,508)	(5,210,988)	(1,942,584)
Total All Funds	**95,969,166**	**-**	**16,076,081**	**112,045,247**	**(163,389,013)**	**(29,997,335)**	**-**	**(196,893,583)**	**(84,848,336)**
Total Non-Participant Directed	54,992,482	-	16,076,081	71,068,563	(163,389,013)	(1,422,968)	(1,976,469)	(166,788,450)	(95,719,887)
Total Participant Directed	40,976,684	-	-	40,976,684	-	(28,574,367)	(1,530,766)	(30,105,133)	10,871,551
Total All Funds	**$ 95,969,166**	**$ -**	**$ 16,076,081**	**$ 112,045,247**	**$ (163,389,013)**	**$ (29,997,335)**	**$ (3,507,235)**	**$ (196,893,583)**	**$ (84,848,336)**

(a) Employer only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Four Months Ending October 31, 2018

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	$ 7,343	$ -	$ 73,141	$ 75,886	$ 156,370	0.1%
Death Benefit	195,085	14,154	3,432,148	583,141	4,224,528	3.6%
Disability / Hardship	45,694	-	1,104	59,915	106,713	0.1%
Minimum Required Distribution	38,057	4,270	2,630,834	900,963	3,574,124	3.0%
Qualified Domestic Relations Order	392,975	-	1,955,398	291,916	2,640,289	2.2%
Separation from Service / Retirement	18,752,699	6,273,272	64,003,316	18,923,328	107,952,615	90.7%
Purchase of Service Credit	-	-	302,893	31,604	334,497	0.3%
Transfer to a Qualifying Plan	-	-	-	-	-	0.0%
TOTAL	$ 19,431,853	$ 6,291,696	$ 72,398,834	$ 20,866,753	$ 118,989,136	100.0%

Notes for the DRB Supplement to the Treasury Report

October 2018

This report is the DRB supplement to the Financial Report presented by the Treasury Division. It 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 four months of Fiscal Year 2019, while page two shows only the month of October 2018.

Highlights – On page one, for the **four months** ending October 31, 2018:

- PERS DB Pension – Average employer and employee contributions of $30.2 million per month; benefit payments of approximately $69.8 million per month; refunds average $938 thousand; and Administrative and Investment expenditures of $570 thousand per month (DOR and DRB).
- PERS DB Healthcare – Average employer contributions of $8.1 million per month; other income of $5.8 million from Aetna Rx rebates (most recently received in September for 1st Quarter CY2018) and $12.1 million from Medicare drug subsidy (most recently received in October for 2nd Quarter CY2018); benefit payments of approximately $36.6 million per month; and average Administrative and Investment expenditures of $1.4 million per month (DOR and DRB).
- PERS DC Pension – Average employer and employee contributions of $12.7 million per month; participant disbursements average $4.9 million per month; and average Administrative and Investment expenditures of $561 thousand per month (DOR and DRB).
- PERS DCR Health – For HRA, RMP, and OD&D, only employer contributions average $4.5 million per month on behalf of participating employees; benefit payments of approximately $62 thousand per month. Currently 39 benefits are being paid from the Occupational Death & Disability plans, 29 retirees are participating in RMP, and 31 retirees are participating in HRA. Administrative and investment expenditures were approximately $19 thousand per month (DOR and DRB).
- TRS DB Pension - Average employer and employee contributions of $4.4 million per month; benefit payments of approximately $39.5 million per month; refunds average $285 thousand; and average Administrative and Investment expenditures of $309 thousand per month (DOR and DRB).
- TRS DB Healthcare – Average employer contributions of $1.1 million per month; other income of $1.9 million from Aetna Rx rebates (most recently received in September for 1st Quarter CY2018) and $3.9 million from Medicare drug subsidy (most recently received in October for 2nd Quarter CY2018); benefit payments of approximately $12 million per month; and average Administrative and Investment expenditures of $506 thousand per month (DOR and DRB).

- TRS DC Pension – Average employer and employee contributions of $3.2 million per month; participant disbursements average $1.6 million per month; and average Administrative and investment expenditures of $193 thousand per month (DOR and DRB).
- TRS DCR Health – For HRA, RMP, and OD&D, only employer contributions average $831 thousand per month on behalf of participating employees; benefit payments of approximately $20 thousand per month. Currently 8 benefits are being paid from the Occupational Death & Disability plans, 13 retirees are participating in RMP, and 12 retirees are participating in HRA. Administrative and investment expenditures were approximately $6 thousand per month (DOR and DRB).
- JRS Pension – Average employer and employee contributions of $538 thousand per month; benefit payments of approximately $1.1 million per month; and average Administrative and Investment expenditures of $10 thousand per month (DOR and DRB).
- JRS Healthcare – Average employer contributions of $56 thousand per month; other income of $14 thousand from Aetna Rx rebates (most recently received in September for 1st Quarter CY2018) and $43 thousand from Medicare drug subsidy (most recently received in October for 2nd Quarter CY2018); benefit payments of approximately $81 thousand per month; and average Administrative and Investment expenditures of $5 thousand per month (DOR and DRB).
- NGNMRS – Annual contribution from DMVA in the amount of $852 thousand was received in July; combination of lump-sum and monthly benefit payments of $132 thousand per month; and average Administrative and Investment expenditures of $9 thousand per month (DOR and DRB).
- SBS – Average employer and employee contributions and transfers in of $15.5 million per month. Participant disbursements average of $18.1 million per month; and average Administrative and Investment expenditures of $485 thousand per month (DOR and DRB).
- Deferred Compensation – Average member-only contributions and transfers in of $3.8 million per month; participant disbursements average of $5.2 million per month; and average Administrative and Investment expenditures of $163 thousand per month (DOR and DRB).

Highlights – On page two, activity for the **one month** of October 2018 only:

- PERS DB Healthcare – $12.1 million from Medicare drug subsidy.
- TRS DB Healthcare – $3.9 million from Medicare drug subsidy.
- JRS Healthcare – $43 thousand from Medicare drug subsidy.
- All other funds – Nothing significant to report

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

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Fund Financials – Cash Flow Report
December 13, 2018

Christina Maiquis, Acting Chief Financial Officer, Department of Administration, Division of Retirement & Benefits

Presented is the Division of Retirement & Benefits (DRB) Supplement to the Treasury Division's Financial Report as of:

- September 30, 2018

DRB's supplement report expands on the ARMB Financial Report column "Net Contributions (Withdrawals)" located on pages 1 and 2. DRB reports the summary totals of actual employer, State of Alaska, and other revenue contributions, as well as benefit payments, refunds / distributions, and combined administrative / investment expenditures. DRB's report presents cash inflows / outflows for the 3 months ended September 30, 2018 (page 1) and the month of September 2018 (page 2).

Also presented are participant-directed distributions by plan and by type for the 3-month period on page 3.

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

ALASKA RETIREMENT MANAGEMENT BOARD

FINANCIAL REPORT
(Supplement to the Treasury Division Report)

As of September 30, 2018

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 Three Months Ending September 30, 2018

	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)									
Defined Benefit Plans:									
Retirement Trust	$ 90,267,475	$ 135,367,000	$ 7,475	$ 225,641,950	$ (208,742,478)	$ (2,597,555)	$ (1,998,638)	$ (213,338,671)	$ 12,303,279
Retirement Health Care Trust	23,689,260	-	5,979,208	29,668,468	(107,113,736)	-	(4,295,712)	(111,409,448)	(81,740,980)
Total Defined Benefit Plans	113,956,735	135,367,000	5,986,683	255,310,418	(315,856,214)	(2,597,555)	(6,294,350)	(324,748,119)	(69,437,701)
Defined Contribution Plans:									
Participant Directed Retirement	37,235,824	-	-	37,235,824	-	(14,361,286)	(1,734,890)	(16,096,176)	21,139,648
Health Reimbursement Arrangement [a]	9,348,158	-	-	9,348,158	(20,840)	-	(49,050)	(69,890)	9,278,268
Retiree Medical Plan [a]	2,798,462	-	1,842	2,800,304	(70,532)	-	(14,791)	(85,323)	2,714,981
Occupational Death and Disability: [a]									
Public Employees	561,902	-	-	561,902	(31,279)	-	(2,989)	(34,268)	527,634
Police and Firefighters	284,733	-	-	284,733	(60,783)	-	(1,443)	(62,226)	222,507
Total Defined Contribution Plans	50,229,079	-	1,842	50,230,921	(183,434)	(14,361,286)	(1,803,163)	(16,347,883)	33,883,038
Total PERS	**164,185,814**	**135,367,000**	**5,988,525**	**305,541,339**	**(316,039,648)**	**(16,958,841)**	**(8,097,513)**	**(341,096,002)**	**(35,554,663)**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Trust	10,673,932	128,174,000	5,216	138,853,148	(118,298,939)	(870,265)	(1,102,432)	(120,271,636)	18,581,512
Retirement Health Care Trust	2,640,435	-	1,919,694	4,560,129	(35,495,439)	-	(1,602,001)	(37,097,440)	(32,537,311)
Total Defined Benefit Plans	13,314,367	128,174,000	1,924,910	143,413,277	(153,794,378)	(870,265)	(2,704,433)	(157,369,076)	(13,955,799)
Defined Contribution Plans:									
Participant Directed Retirement	7,389,679	-	-	7,389,679	-	(5,427,596)	(540,831)	(5,968,427)	1,421,252
Health Reimbursement Arrangement [a]	1,431,104	-	-	1,431,104	(8,230)	-	(14,642)	(22,872)	1,408,232
Retiree Medical Plan [a]	449,287	-	1,506	450,793	(47,387)	-	(6,165)	(53,552)	397,241
Occupational Death and Disability [a]	11,818	-	-	11,818	(6,072)	-	(484)	(6,556)	5,262
Total Defined Contribution Plans	9,281,888	-	1,506	9,283,394	(61,689)	(5,427,596)	(562,122)	(6,051,407)	3,231,987
Total TRS	**22,596,255**	**128,174,000**	**1,926,416**	**152,696,671**	**(153,856,067)**	**(6,297,861)**	**(3,266,555)**	**(163,420,483)**	**(10,723,812)**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	1,430,816	4,909,000	-	6,339,816	(3,197,727)	-	(34,697)	(3,232,424)	3,107,392
Defined Benefit Retirement Health Care Trust	148,437	-	14,415	162,852	(218,800)	-	(14,494)	(233,294)	(70,442)
Total JRS	**1,579,253**	**4,909,000**	**14,415**	**6,502,668**	**(3,416,527)**	**-**	**(49,191)**	**(3,465,718)**	**3,036,950**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust [a]	851,686	-	-	851,686	(355,131)	-	(26,179)	(381,310)	470,376
Other Participant Directed Plans									
Supplemental Annuity Plan	43,241,487	-	-	43,241,487	-	(54,776,614)	(1,341,245)	(56,117,859)	(12,876,372)
Deferred Compensation Plan	12,038,119	-	-	12,038,119	-	(15,849,273)	(459,586)	(16,308,859)	(4,270,740)
Total All Funds	**244,492,614**	**268,450,000**	**7,929,356**	**520,871,970**	**(473,667,373)**	**(93,882,589)**	**(13,240,269)**	**(580,790,231)**	**(59,918,261)**
Total Non-Participant Directed	144,587,505	268,450,000	7,929,356	420,966,861	(473,667,373)	(3,467,820)	(9,163,717)	(486,298,910)	(65,332,049)
Total Participant Directed	99,905,109	-	-	99,905,109	-	(90,414,769)	(4,076,552)	(94,491,321)	5,413,788
Total All Funds	**$ 244,492,614**	**$ 268,450,000**	**$ 7,929,356**	**$ 520,871,970**	**$ (473,667,373)**	**$ (93,882,589)**	**$ (13,240,269)**	**$ (580,790,231)**	**$ (59,918,261)**

(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 September 30, 2018

	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)									
Defined Benefit Plans:									
Retirement Trust	$ 31,402,142	$ -	$ 5,604	$ 31,407,746	$ (69,678,721)	$ (723,571)	$ (246,896)	$ (70,649,188)	$ (39,241,442)
Retirement Health Care Trust	8,858,873	-	5,825,373	14,684,246	(34,802,696)	-	(1,082,912)	(35,885,608)	(21,201,362)
Total Defined Benefit Plans	40,261,015	-	5,830,977	46,091,992	(104,481,417)	(723,571)	(1,329,808)	(106,534,796)	(60,442,804)
Defined Contribution Plans:									
Participant Directed Retirement	13,229,183	-	-	13,229,183	-	(3,026,251)	(131,660)	(3,157,911)	10,071,272
Health Reimbursement Arrangement [(a)]	3,373,832	-	-	3,373,832	(5,561)	-	(4,534)	(10,095)	3,363,737
Retiree Medical Plan [(a)]	971,560	-	1,842	973,402	(23,494)	-	(1,831)	(25,325)	948,077
Occupational Death and Disability: [(a)]									
Public Employees	223,422	-	-	223,422	(10,426)	-	(241)	(10,667)	212,755
Police and Firefighters	120,389	-	-	120,389	(20,261)	-	(138)	(20,399)	99,990
Total Defined Contribution Plans	17,918,386	-	1,842	17,920,228	(59,742)	(3,026,251)	(138,404)	(3,224,397)	14,695,831
Total PERS	**58,179,401**	**-**	**5,832,819**	**64,012,220**	**(104,541,159)**	**(3,749,822)**	**(1,468,212)**	**(109,759,193)**	**(45,746,973)**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Trust	2,315,513	-	78	2,315,591	(39,585,057)	(359,551)	(132,525)	(40,077,133)	(37,761,542)
Retirement Health Care Trust	593,591	-	1,862,713	2,456,304	(11,600,008)	-	(407,891)	(12,007,899)	(9,551,595)
Total Defined Benefit Plans	2,909,104	-	1,862,791	4,771,895	(51,185,065)	(359,551)	(540,416)	(52,085,032)	(47,313,137)
Defined Contribution Plans:									
Participant Directed Retirement	1,858,908	-	-	1,858,908	-	(1,710,717)	(53,543)	(1,764,260)	94,648
Health Reimbursement Arrangement [(a)]	433,315	-	-	433,315	(2,551)	-	(1,371)	(3,922)	429,393
Retiree Medical Plan [(a)]	103,286	-	1,506	104,792	(4,602)	-	(813)	(5,415)	99,377
Occupational Death and Disability [(a)]	9,996	-	-	9,996	(2,024)	-	(38)	(2,062)	7,934
Total Defined Contribution Plans	2,405,505	-	1,506	2,407,011	(9,177)	(1,710,717)	(55,765)	(1,775,659)	631,352
Total TRS	**5,314,609**	**-**	**1,864,297**	**7,178,906**	**(51,194,242)**	**(2,070,268)**	**(596,181)**	**(53,860,691)**	**(46,681,785)**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	241,911	-	-	241,911	(1,087,167)	-	(6,607)	(1,093,774)	(851,863)
Defined Benefit Retirement Health Care Trust	24,922	-	14,018	38,940	(70,239)	-	(3,961)	(74,200)	(35,260)
Total JRS	**266,833**	**-**	**14,018**	**280,851**	**(1,157,406)**	**-**	**(10,568)**	**(1,167,974)**	**(887,123)**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust [(a)]	-	-	-	-	(97,820)	-	(8,020)	(105,840)	(105,840)
Other Participant Directed Plans									
Supplemental Annuity Plan	14,452,444	-	-	14,452,444	-	(15,379,799)	(381,592)	(15,761,391)	(1,308,947)
Deferred Compensation Plan	3,434,271	-	-	3,434,271	-	(4,165,718)	(137,632)	(4,303,350)	(869,079)
Total All Funds	**81,647,558**	**-**	**7,711,134**	**89,358,692**	**(156,990,627)**	**(25,365,607)**	**(2,602,205)**	**(184,958,439)**	**(95,599,747)**
Total Non-Participant Directed	48,672,752	-	7,711,134	56,383,886	(156,990,627)	(1,083,122)	(1,897,778)	(159,971,527)	(103,587,641)
Total Participant Directed	32,974,806	-	-	32,974,806	-	(24,282,485)	(704,427)	(24,986,912)	7,987,894
Total All Funds	**$ 81,647,558**	**$ -**	**$ 7,711,134**	**$ 89,358,692**	**$ (156,990,627)**	**$ (25,365,607)**	**$ (2,602,205)**	**$ (184,958,439)**	**$ (95,599,747)**

(a) Employer only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Three Months Ending September 30, 2018

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	$ 6,543	$ -	$ 32,318	$ 60,969	$ 99,830	0.1%
Death Benefit	191,416	-	2,543,365	480,049	3,214,830	3.6%
Disability / Hardship	-	-	834	51,029	51,863	0.1%
Minimum Required Distribution	22,520	2,646	1,704,769	623,112	2,353,047	2.6%
Qualified Domestic Relations Order	350,068	-	1,572,489	282,466	2,205,023	2.4%
Separation from Service / Retirement	13,790,739	5,424,950	48,656,409	14,321,097	82,193,195	90.9%
Purchase of Service Credit	-	-	266,430	30,551	296,981	0.3%
Transfer to a Qualifying Plan	-	-	-	-	-	0.0%
TOTAL	$ 14,361,286	$ 5,427,596	$ 54,776,614	$ 15,849,273	$ 90,414,769	100.0%

Notes for the DRB Supplement to the Treasury Report

September 2018

This report is the DRB supplement to the Financial Report presented by the Treasury Division. It 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 three months of Fiscal Year 2019, while page two shows only the month of September 2018.

Highlights – On page one, for the **three months** ending September 30, 2018:

- PERS DB Pension – Average employer and employee contributions of $30.1 million per month; benefit payments of approximately $69.6 million per month; refunds average $866 thousand; and Administrative and Investment expenditures of $666 thousand per month (DOR and DRB).
- PERS DB Healthcare – Average employer contributions of $7.9 million per month; other income of $5.8 million from Aetna Rx rebates (most recently received in September for 1st Quarter CY2018) and $100 thousand from claim reimbursements; benefit payments of approximately $35.7 million per month; and average Administrative and Investment expenditures of $1.4 million per month (DOR and DRB).
- PERS DC Pension – Average employer and employee contributions of $12.4 million per month; participant disbursements average $4.8 million per month; and average Administrative and Investment expenditures of $578 thousand per month (DOR and DRB).
- PERS DCR Health – For HRA, RMP, and OD&D, only employer contributions on behalf of participating employees; currently 38 benefits are being paid from the Occupational Death & Disability plans; 31 are for Public Employees and 7 are for Police and Firefighters, 36 due to disability and 2 to death. Currently 24 retirees are participating in RMP and 28 are participating in HRA. Administrative and investment expenditures were approximately $23 thousand per month (DOR and DRB)
- TRS DB Pension - Average employer and employee contributions of $3.6 million per month; benefit payments of approximately $39.4 million per month; refunds average $290 thousand; and average Administrative and Investment expenditures of $367 thousand per month (DOR and DRB).
- TRS DB Healthcare – Average employer contributions of $880 thousand per month; other income of $1.9 million from Aetna Rx rebates (most recently received in September for 1st Quarter CY2018) and $37 thousand from claim reimbursements; benefit payments of approximately $11.8 million per month; and average Administrative and Investment expenditures of $534 thousand per month (DOR and DRB).

- TRS DC Pension – Average employer and employee contributions of $2.5 million per month; participant disbursements average $1.8 million per month; and average Administrative and investment expenditures of $180 thousand per month (DOR and DRB).
- TRS DCR Health – For HRA, RMP, and OD&D, only employer contributions on behalf of participating employees; currently 8 benefits are being paid from the Occupational Death & Disability Plan. Currently 12 retirees are participating in RMP and 11 are participating in HRA. Administrative and investment expenditures were approximately $7 thousand per month (DOR and DRB)
- JRS Pension – Average employer and employee contributions of $477 thousand per month; benefit payments of approximately $1.1 million per month; and average Administrative and Investment expenditures of $12 thousand per month (DOR and DRB).
- JRS Healthcare – Average employer contributions of $49 thousand per month; other income of $14 thousand from Aetna Rx rebates (most recently received in September for 1st Quarter CY2018); benefit payments of approximately $73 thousand per month; and average Administrative and Investment expenditures of $5 thousand per month (DOR and DRB).
- NGNMRS – Annual contribution from DMVA in the amount of $852 thousand was received in July 2018; combination of lump-sum and monthly benefit payments of $118 thousand per month; and average Administrative and Investment expenditures of $9 thousand per month (DOR and DRB).
- SBS – Average employer and employee contributions and transfers in of $14.4 million per month. Participant disbursements average of $18.3 million per month; and average Administrative and Investment expenditures of $447 thousand per month (DOR and DRB).
- Deferred Compensation – Average member-only contributions and transfers in of $4 million per month; participant disbursements average of $5.3 million per month; and average Administrative and Investment expenditures of $153 thousand per month (DOR and DRB).

Highlights – On page two, activity for the **one month** ending September 30, 2018 only:

- PERS DB Health – other income of $5.8 million from Aetna Rx rebates.
- TRS DB Health – other income of $1.9 million from Aetna Rx rebates.
- All other funds – nothing significant to report

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

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Fund Financials – Cash Flow Report
December 13, 2018

Christina Maiquis, Acting Chief Financial Officer, Department of Administration, Division of Retirement & Benefits

Presented is the Division of Retirement & Benefits (DRB) Supplement to the Treasury Division's Financial Report as of:

- August 31, 2018

DRB's supplement report expands on the ARMB Financial Report column "Net Contributions (Withdrawals)" located on pages 1 and 2. DRB reports the summary totals of actual employer, State of Alaska, and other revenue contributions, as well as benefit payments, refunds / distributions, and combined administrative / investment expenditures. DRB's report presents cash inflows / outflows for the two months ended August 31, 2018 (page 1) and the month of August 2018 (page 2).

Also presented are participant-directed distributions by plan and by type for the 2-month period on page 3.

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

ALASKA RETIREMENT MANAGEMENT BOARD

FINANCIAL REPORT
(Supplement to the Treasury Division Report)

As of August 31, 2018

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 Two Months Ending August 31, 2018

	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)									
Defined Benefit Plans:									
Retirement Trust	$ 58,865,333	$ 135,367,000	$ 1,871	$ 194,234,204	$ (139,063,757)	$ (1,873,984)	$ (1,751,743)	$ (142,689,484)	$ 51,544,720
Retirement Health Care Trust	14,830,387	-	153,835	14,984,222	(72,311,040)	-	(3,212,800)	(75,523,840)	(60,539,618)
Total Defined Benefit Plans	73,695,720	135,367,000	155,706	209,218,426	(211,374,797)	(1,873,984)	(4,964,543)	(218,213,324)	(8,994,898)
Defined Contribution Plans:									
Participant Directed Retirement	24,006,641	-	-	24,006,641	-	(11,335,035)	(1,603,231)	(12,938,266)	11,068,375
Health Reimbursement Arrangement [(a)]	5,974,326	-	-	5,974,326	(15,279)	-	(44,516)	(59,795)	5,914,531
Retiree Medical Plan [(a)]	1,826,902	-	-	1,826,902	(47,038)	-	(12,960)	(59,998)	1,766,904
Occupational Death and Disability: [(a)]									
Public Employees	338,480	-	-	338,480	(20,853)	-	(2,748)	(23,601)	314,879
Police and Firefighters	164,344	-	-	164,344	(40,522)	-	(1,305)	(41,827)	122,517
Total Defined Contribution Plans	32,310,693	-	-	32,310,693	(123,692)	(11,335,035)	(1,664,760)	(13,123,487)	19,187,206
Total PERS	**106,006,413**	**135,367,000**	**155,706**	**241,529,119**	**(211,498,489)**	**(13,209,019)**	**(6,629,303)**	**(231,336,811)**	**10,192,308**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Trust	8,358,419	128,174,000	5,138	136,537,557	(78,713,882)	(510,714)	(969,907)	(80,194,503)	56,343,054
Retirement Health Care Trust	2,046,844	-	56,981	2,103,825	(23,895,431)	-	(1,194,110)	(25,089,541)	(22,985,716)
Total Defined Benefit Plans	10,405,263	128,174,000	62,119	138,641,382	(102,609,313)	(510,714)	(2,164,017)	(105,284,044)	33,357,338
Defined Contribution Plans:									
Participant Directed Retirement	5,530,771	-	-	5,530,771	-	(3,716,879)	(487,290)	(4,204,169)	1,326,602
Health Reimbursement Arrangement [(a)]	997,789	-	-	997,789	(5,679)	-	(13,272)	(18,951)	978,838
Retiree Medical Plan [(a)]	346,001	-	-	346,001	(42,785)	-	(5,352)	(48,137)	297,864
Occupational Death and Disability [(a)]	1,822	-	-	1,822	(4,048)	-	(446)	(4,494)	(2,672)
Total Defined Contribution Plans	6,876,383	-	-	6,876,383	(52,512)	(3,716,879)	(506,360)	(4,275,751)	2,600,632
Total TRS	**17,281,646**	**128,174,000**	**62,119**	**145,517,765**	**(102,661,825)**	**(4,227,593)**	**(2,670,377)**	**(109,559,795)**	**35,957,970**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	1,188,905	4,909,000	-	6,097,905	(2,110,560)	-	(28,090)	(2,138,650)	3,959,255
Defined Benefit Retirement Health Care Trust	123,515	-	397	123,912	(148,561)	-	(10,533)	(159,094)	(35,182)
Total JRS	**1,312,420**	**4,909,000**	**397**	**6,221,817**	**(2,259,121)**	**-**	**(38,623)**	**(2,297,744)**	**3,924,073**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust [(a)]	851,686	-	-	851,686	(257,311)	-	(18,159)	(275,470)	576,216
Other Participant Directed Plans									
Supplemental Annuity Plan	28,789,043	-	-	28,789,043	-	(39,396,815)	(959,655)	(40,356,470)	(11,567,427)
Deferred Compensation Plan	8,603,848	-	-	8,603,848	-	(11,683,555)	(321,955)	(12,005,510)	(3,401,662)
Total All Funds	**162,845,056**	**268,450,000**	**218,222**	**431,513,278**	**(316,676,746)**	**(68,516,982)**	**(10,638,072)**	**(395,831,800)**	**35,681,478**
Total Non-Participant Directed	95,914,753	268,450,000	218,222	364,582,975	(316,676,746)	(2,384,698)	(7,265,941)	(326,327,385)	38,255,590
Total Participant Directed	66,930,303	-	-	66,930,303	-	(66,132,284)	(3,372,131)	(69,504,415)	(2,574,112)
Total All Funds	**$ 162,845,056**	**$ 268,450,000**	**$ 218,222**	**$ 431,513,278**	**$ (316,676,746)**	**$ (68,516,982)**	**$ (10,638,072)**	**$ (395,831,800)**	**$ 35,681,478**

(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 August 31, 2018

	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)									
Defined Benefit Plans:									
Retirement Trust	$ 27,244,481	$ -	$ 1,244	$ 27,245,725	$ (69,555,947)	$ (1,181,064)	$ (1,279,725)	$ (72,016,736)	$ (44,771,011)
Retirement Health Care Trust	7,780,165	-	100,443	7,880,608	(37,966,416)	-	(1,947,879)	(39,914,295)	(32,033,687)
Total Defined Benefit Plans	35,024,646	-	101,687	35,126,333	(107,522,363)	(1,181,064)	(3,227,604)	(111,931,031)	(76,804,698)
Defined Contribution Plans:									
Participant Directed Retirement	11,816,909	-	-	11,816,909	-	(5,512,646)	(111,884)	(5,624,530)	6,192,379
Health Reimbursement Arrangement [a]	2,870,097	-	-	2,870,097	(8,510)	-	(37,676)	(46,186)	2,823,911
Retiree Medical Plan [a]	865,324	-	-	865,324	(11,159)	-	(10,787)	(21,946)	843,378
Occupational Death and Disability: [a]									
Public Employees	204,298	-	-	204,298	(10,425)	-	(2,333)	(12,758)	191,540
Police and Firefighters	91,599	-	-	91,599	(20,260)	-	(1,104)	(21,364)	70,235
Total Defined Contribution Plans	15,848,227	-	-	15,848,227	(50,354)	(5,512,646)	(163,784)	(5,726,784)	10,121,443
Total PERS	**50,872,873**	**-**	**101,687**	**50,974,560**	**(107,572,717)**	**(6,693,710)**	**(3,391,388)**	**(117,657,815)**	**(66,683,255)**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Trust	619,224	-	1,750	620,974	(39,572,167)	(222,760)	(734,209)	(40,529,136)	(39,908,162)
Retirement Health Care Trust	223,191	-	37,111	260,302	(12,397,135)	-	(729,459)	(13,126,594)	(12,866,292)
Total Defined Benefit Plans	842,415	-	38,861	881,276	(51,969,302)	(222,760)	(1,463,668)	(53,655,730)	(52,774,454)
Defined Contribution Plans:									
Participant Directed Retirement	363,404	-	-	363,404	-	(2,030,064)	(42,783)	(2,072,847)	(1,709,443)
Health Reimbursement Arrangement [a]	80,310	-	-	80,310	(3,099)	-	(11,218)	(14,317)	65,993
Retiree Medical Plan [a]	28,515	-	-	28,515	(23,105)	-	(4,257)	(27,362)	1,153
Occupational Death and Disability [a]	1,781	-	-	1,781	(2,024)	-	(369)	(2,393)	(612)
Total Defined Contribution Plans	474,010	-	-	474,010	(28,228)	(2,030,064)	(58,627)	(2,116,919)	(1,642,909)
Total TRS	**1,316,425**	**-**	**38,861**	**1,355,286**	**(51,997,530)**	**(2,252,824)**	**(1,522,295)**	**(55,772,649)**	**(54,417,363)**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	705,173	-	-	705,173	(1,068,556)	-	(22,198)	(1,090,754)	(385,581)
Defined Benefit Retirement Health Care Trust	73,351	-	260	73,611	(92,283)	-	(6,729)	(99,012)	(25,401)
Total JRS	**778,524**	**-**	**260**	**778,784**	**(1,160,839)**	**-**	**(28,927)**	**(1,189,766)**	**(410,982)**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust [a]	-	-	-	-	(119,646)	-	(7,171)	(126,817)	(126,817)
Other Participant Directed Plans									
Supplemental Annuity Plan	13,796,406	-	-	13,796,406	-	(20,071,270)	(374,895)	(20,446,165)	(6,649,759)
Deferred Compensation Plan	4,968,653	-	-	4,968,653	-	(5,699,419)	(135,081)	(5,834,500)	(865,847)
Total All Funds	**71,732,881**	**-**	**140,808**	**71,873,689**	**(160,850,732)**	**(34,717,223)**	**(5,459,757)**	**(201,027,712)**	**(129,154,023)**
Total Non-Participant Directed	40,787,509	-	140,808	40,928,317	(160,850,732)	(1,403,824)	(4,795,114)	(167,049,670)	(126,121,353)
Total Participant Directed	30,945,372	-	-	30,945,372	-	(33,313,399)	(664,643)	(33,978,042)	(3,032,670)
Total All Funds	**$ 71,732,881**	**$ -**	**$ 140,808**	**$ 71,873,689**	**$ (160,850,732)**	**$ (34,717,223)**	**$ (5,459,757)**	**$ (201,027,712)**	**$ (129,154,023)**

(a) Employer only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Two Months Ending August 31, 2018

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	$ 5,743	$ -	$ 8,800	$ 34,935	$ 49,478	0.1%
Death Benefit	100,665	-	1,620,790	394,103	2,115,558	3.2%
Disability / Hardship	-	-	556	42,624	43,180	0.1%
Minimum Required Distribution	6,455	2,646	1,178,457	360,708	1,548,266	2.3%
Qualified Domestic Relations Order	240,490	-	1,124,653	202,384	1,567,527	2.4%
Separation from Service / Retirement	10,981,682	3,714,233	35,349,915	10,639,425	60,685,255	91.7%
Purchase of Service Credit	-	-	113,644	9,376	123,020	0.2%
Transfer to a Qualifying Plan	-	-	-	-	-	0.0%
TOTAL	$ 11,335,035	$ 3,716,879	$ 39,396,815	$ 11,683,555	$ 66,132,284	100.0%

Notes for the DRB Supplement to the Treasury Report
August 2018

This report is the DRB supplement to the Financial Report presented by the Treasury Division. It 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 two months of Fiscal Year 2019, while page two shows only the month of August 2018.

Highlights – On page one, for the **two months** ending August 31, 2018:

- PERS DB Pension – Average employer and employee contributions of $29.4 million per month; benefit payments of approximately $69.5 million per month; refunds average $937 thousand; and Administrative and Investment expenditures of $876 thousand per month (DOR and DRB).

- PERS DB Healthcare – Average employer contributions of $7.4 million per month; other income of $154 thousand, mostly from claim reimbursements; benefit payments of approximately $36.2 million per month; and average Administrative and Investment expenditures of $1.6 million per month (DOR and DRB).

- PERS DC Pension – Average employer and employee contributions of $12 million per month; participant disbursements average $5.7 million per month; and average Administrative and Investment expenditures of $802 thousand per month (DOR and DRB).

- PERS DCR Health – For HRA, RMP, and OD&D, only employer contributions on behalf of participating employees; currently 33 benefits are being paid from the Occupational Death & Disability plans, 25 are for Public Employees and 7 are for Police and Firefighters, 31 due to disability and 2 to death. Currently 20 retirees are participating in RMP and 39 are participating in HRA. Administrative and investment expenditures were approximately $31 thousand per month (DOR and DRB)

- TRS DB Pension - Average employer and employee contributions of $4.2 million per month; benefit payments of approximately $39.4 million per month; refunds average $255 thousand per month; and average Administrative and Investment expenditures of $485 thousand per month (DOR and DRB).

- TRS DB Healthcare – Average employer contributions of $1 million per month; other income of $57 thousand, mostly from claim reimbursements; benefit payments of approximately $11.9 million per month; and average Administrative and Investment expenditures of $597 thousand per month (DOR and DRB).

- TRS DC Pension – Average employer and employee contributions of $2.8 million per month; participant disbursements average $1.9 million per month; and average Administrative and investment expenditures of $244 thousand per month (DOR and DRB).

- TRS DCR Health – For HRA, RMP, and OD&D, only employer contributions on behalf of participating employees; currently 7 benefits are being paid from the Occupational Death & Disability Plan. Currently 12 retirees are participating in RMP and 18 are participating in HRA. Administrative and investment expenditures were approximately $10 thousand per month (DOR and DRB)

- JRS Pension – Average employer and employee contributions of $594 thousand per month; benefit payments of approximately $1.1 million per month; and average Administrative and Investment expenditures of $14 thousand per month (DOR and DRB).

- JRS Healthcare – Average employer contributions of $62 thousand per month; benefit payments of approximately $74 thousand per month; and average Administrative and Investment expenditures of $5 thousand per month (DOR and DRB).

- NGNMRS – Annual contribution from DMVA in the amount of $852 thousand was received in July 2018; combination of lump-sum and monthly benefit payments of $129 thousand per month; and average Administrative and Investment expenditures of $9 thousand per month (DOR and DRB).

- SBS – Average employer and employee contributions and transfers in of $14.4 million per month. Participant disbursements average of $19.7 million per month; and average Administrative and Investment expenditures of $480 thousand per month (DOR and DRB).

- Deferred Compensation – Average member-only contributions and transfers in of $4.3 million per month; participant disbursements average of $5.8 million per month; and average Administrative and Investment expenditures of $161 thousand per month (DOR and DRB).

Highlights – On page two, activity for the **one month** ending August 31, 2018 only:

- PERS DB Health – Other income of $100 thousand from claim reimbursements

- TRS DB Health – Other income of $37 thousand from claim reimbursements

- All other funds – Nothing significant to report

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

KPMG

Alaska Division of Retirement and Benefits Audit results

Financial statements for the year ended June 30, 2018

December 12, 2018

Introduction

To the Audit Committee of the Alaska Retirement Management Board

We are pleased to have the opportunity to meet with you on December 12, 2018 to discuss the results of our audits of the financial statements of the following plans as of and for the year ended June 30, 2018:

Public Employees' Retirement System (PERS)

Teachers' Retirement System (TRS)

Judicial Retirement System (JRS)

Deferred Compensation Plan (DCP)

Supplemental Benefits System (SBS)

Our audit was conducted in accordance with the terms established in the audit engagement letter dated June 27, 2018.

We are providing this document in advance of our meeting to enable you to consider our findings and hence enhance the quality of our discussions. This document should be read in conjunction with our audit plan, presented on June 20, 2018. We will be pleased to elaborate on the matters covered in this document when we meet.

Our audit is complete. We have issued our opinions on the financial statements dated November 21, 2018.

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Our audit results

Auditors' report

Have we:

— modified the opinion in our auditors' report?	No
— include an emphasis-of-matter or other-matter paragraph in our auditors' report?	Yes

Uncorrected audit misstatements

None identified

Control deficiencies

Material weaknesses	No

Audit matters

Were any significant financial statement matters identified related to:

Significant accounting practices

— **Accounting policies?**	No
— **Accounting estimates?**	No
— **Financial statement disclosures?**	No
Other matters	No

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Other Matters Included in Auditors' Reports

— Language of other matters in the reports:

- Prior-Year Comparative Information

  We have previously audited the System's 2017 combining financial statements and we expressed an unmodified opinion on those financial statements in our report dated December 5, 2017. in our opinion, the summarized comparative information presented herein as of and for the year then ended June 30, 2017 is consistent, in all material respects, with the audited financial statements from which it has been derived.

- Required Supplementary Information

  U.S. generally accepted accounting principles require that the management's discussion and analysis and the schedule of changes in employer net pension and OPEB liabilities and related ratios, schedules of employer and nonemployer contributions, and schedules of investment returns be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the GASB, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries with management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

- Supplemental Schedules

  Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise the System's basic financial statements. The supplemental schedules are presented for purposes of additional analysis and are not a required part of the basic financial statements. The supplemental schedules are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the supplemental schedules are fairly stated in all material respects in relation to the basic financial statements as a whole.

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Significant accounting policies

Description of significant accounting policies	Audit findings
— The significant accounting policies are described in the notes to the financial statements.	**Qualitative aspects** — The significant accounting policies are consistent with prior years. — We did not identify indication of significant elements of management bias.

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Significant accounting estimates

Description of significant accounting estimates

— The calculation of the Net Pension Liabilities and Net OPEB Liabilities are considered significant estimates.

Audit findings

Management's process used to develop the estimates

— The ARMB has contracted with Buck to assess the Net Pension and Net OPEB Liabilities based on actuarial methods described in GASB Statements No. 67 and 74 and assumptions adopted by the Alaska Retirement Management Board.

— There have been no changes to management's process in the current year.

Significant assumptions used that have a high degree of subjectivity

— Investment rate of return

— Discount rate

— Healthcare cost trend rates

— Salary Scales

— Retirement Rates

— Termination Rates

Conclusions

— The assumptions used were reasonable and supported.

— There were no indicators of management bias identified.

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Internal control related matters

KPMG responsibilities

- The purpose of our audit was to express an opinion on the financial statements
- Our audit included consideration of internal control over financial reporting in order to design audit procedures that are appropriate in the circumstances but not for the purpose of expressing an opinion on the effectiveness of internal control.
- We are not expressing an opinion on the effectiveness of internal control
- Our consideration of internal control was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies, and therefore, material weaknesses or significant deficiencies may exist that were not identified.

Material weakness

A deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected, on a timely basis. A reasonably possibility exists when the likelihood of an event occurring is either reasonably possible or probably. Reasonably possible is defined as the chance of the future event or events occurring is more than remote but less than likely. Probable is defined as the future event or events are likely to occur.

Significant deficiency

A deficiency, or a combination of deficiencies, in internal control over financial reporting that is less severe than a material weakness yet important enough to merit attention by those charged with governance.

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Significant deficiencies and material weaknesses in internal control

Material weaknesses

Description	Potential effects	Status
None identified		

Significant deficiencies

Description	Potential effects	Status
None identified		

All other deficiencies in ICFR noted during the audit that are of a lesser magnitude than a material weakness or significant deficiency [have been communicated to management.

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Required communications and other matters

Type	Response
Related parties	No significant findings and issues arising during the audit in connection with the entity's related parties.
Fraud	No actual or suspected fraud involving management, employees with significant roles in internal control, or others when fraud results in a material misstatement in the financial statements were identified during the audit.
Noncompliance with laws and regulations	No matters to report.
Subsequent events	No matters to report.
Other information	We have read the Management's Discussion and Analysis and no matters came to our attention that cause us to believe that such information or its presentation is inconsistent with the information or presentation in the financial statements. KPMG will review the draft CAFRs for PERS and TRS when they are provided to us.

Type	Response
Significant difficulties, if any, encountered during the audit	No matters to report.
Disagreements with management, if any	No matters to report.
Significant findings or issues discussed, or the subject of correspondence, with management	No matters to report.
Management's consultation with other accountants	No matters to report.
Other findings or issues	No matters to report.
Written representations	Management representation letters and engagement letter to be distributed under separate cover.

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Audit fees (billed through November 5, 2018)

	2018	2017
Treasury Division	$ 121,306	$ 123,878
Retirement System	$ 339,795	$ 427,384
Total fees	**$ 461,101**	**$ 551,262**

Fee amounts include out of pocket travel expenses

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Responsibilities

Management responsibilities – Financial statements	— Preparation and fair presentation of the financial statements, including disclosures in conformity with U.S. GAAP — Adjusting the financial statements to correct material misstatements and affirming in the representation letter that the effects of any uncorrected misstatements aggregated by the auditor are immaterial, both individually and in the aggregate, to the financial statements taken as a whole
Management responsibilities – ICFR	— Design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error
Management responsibilities – Other	— To provide the auditor with: 1) access to all information of which management is aware is relevant to the preparation and fair presentation of the financial statements, such as records, documentation, and other matters; 2) additional information that the auditor may request from management for the purpose of the audit; and 3) unrestricted access to persons within the entity from whom the auditor determines it necessary to obtain audit evidence — Identifying and ensuring that the Systems comply with laws and regulations applicable to its activities, and for informing the auditor of any known material violations of such laws and regulations — Providing the auditor with a letter confirming certain representations made during the audit, that includes but is not limited to management's: 1) disclosure of all significant deficiencies, including material weaknesses, in the design or operation of internal controls that could adversely affect the System's financial reporting 2) acknowledgement of their responsibility for the design, implementation, and maintenance of internal controls to prevent and detect fraud
Audit Committee responsibilities	— Oversight of the financial reporting process and ICFR — Oversight of the establishment and maintenance by management of programs and controls designed to prevent, deter, and detect fraud
Management and the Audit Committee responsibilities	— Setting the proper tone and creating and maintaining a culture of honesty and high ethical standards — Ensuring that the entity's operations are conducted in accordance with the provisions of laws and regulations, including compliance with the provisions of laws and regulations that determine the reported amounts and disclosures in the entity's financial statements.

The audit does not relieve management or the Audit Committee of their responsibilities.

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Responsibilities (continued)

KPMG – Audit objectives	— Forming and expressing an opinion about whether the financial statements that have been prepared by management with the oversight of the Audit Committee are prepared, in all material respects, in accordance with U.S. GAAP
KPMG responsibilities – Audit	— Performing the audit in accordance with U.S. GAAS and that the audit is designed to obtain reasonable, rather than absolute, assurance about whether the financial statements as a whole are free from material misstatement — Performing an audit of financial statements includes consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control over financial reporting
KPMG responsibilities – Other information in documents containing financial statements	— The auditors' report on the financial statements does not extend to other information in documents containing audited financial statements, excluding required supplementary information — The auditor's responsibility is to make appropriate arrangements with management or the Audit Committee to obtain information prior to the report release date and to read the other information to identify material inconsistencies with the audited financial statements or misstatement of facts — Any material inconsistencies or misstatement of facts that are not resolved prior to the report release date, and that require revision of the other information, may result in KPMG modifying or withholding the auditors' report or withdrawing from the engagement — Communicate any procedures performed relating to the other information and the results of those procedures.

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Responsibilities (continued)

KPMG responsibilities – Communications	— Communicating significant matters related to the financial statement audit that are in our professional judgment, relevant to the responsibilities of the Audit Committee in overseeing the financial process. U.S. GAAS does not require us to design procedures for the purpose of identifying matters to communicate to the Audit Committee — Communicating if we suspect or identify noncompliance with laws and regulations exist, unless matters are clearly inconsequential — Communicating to management and the Audit Committee in writing all significant deficiencies and material weaknesses in internal control identified during the audit, including those that were remediated during the audit and reporting to management in writing all deficiencies noted during our audit that, in our professional judgment, are of sufficient importance to merit management's attention. The objective of our audit of the financial statements is not to report on the Systems' internal control — Conducting the audit in accordance with professional standards and complying with the rules and responsibility of the Code of Professional Conduct of the American Institute of Certified Public Accountants and the official standards of relevant CPA Societies, and relevant state boards of accountancy — Communicating to the Audit Committee circumstances, if any, that affect the form and content of the auditors' report — Communicating if we plan to withdraw from the engagement and the reasons for the withdrawal — Communicating to the Audit Committee if we conclude no reasonable justification for a change of the terms of the audit engagement exists and we are not permitted by management to continue the original audit engagement — When applicable, we are also responsible for communicating particular matters required by law or regulation, by agreement with the entity, or by additional requirements applicable to the engagement — Communicating if we have identified or suspect fraud involving; (a) management, (b) employees who have significant roles in internal control, (c) others, when the fraud results in a material misstatement in the financial statements, and (d) other matters related to fraud that are, in the auditors' professional judgment, relevant to the responsibilities of the Audit Committee — Communicating significant findings and issues arising during the audit in connection with the entity's related parties. — Communicating conditions and events, considered in the aggregate, that raise substantial doubt about an entity's ability to continue as a going concern for a reasonable period of time

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Questions?

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State of Alaska
PERS, TRS, NGNMRS and JRS Retirement Systems

ACTUARIAL REVIEW OF THE JUNE 30, 2017 EXPERIENCE STUDY

GRS

GRS Retirement Consulting

P: 720.274.7270 | F: 303.694.0633 | www.grsconsulting.com

November 20, 2018

Mr. Bob Mitchell
Chief Investment Officer
State of Alaska
333 Willoughby, 11th Floor
Juneau, AK 99801

Subject: Actuarial Review of June 30, 2017 Experience Study Conducted by Buck

Dear Bob:

We have performed an actuarial review of the June 30, 2017 Experience Study for the State of Alaska PERS, TRS, NGNMRS, and JRS performed by Buck.

This report includes a review of:

- demographic assumptions and related recommendations;
- economic assumptions and related recommendations;
- post-retirement Healthcare assumptions and related recommendations;
- actuarial methods and related recommendations.

The results of the experience study become the basis for the assumptions used in determining contribution rates. Assumptions that are either too conservative or too aggressive could lead to future resource pressures that do not support the policies of the stakeholders. This review examines the recommendations and provides commentary with the perspective of maintaining the most appropriate set of assumptions that lead to a reasonable contribution rate. Although we have a few areas of professional disagreement, we have found the experience study to be generally consistent with the Actuarial Standards of Practice.

A major part of the review is a review of the experience data and the conclusions drawn from the data. In addition, we have conducted this review while keeping in mind the Actuarial Standards of Practice which all actuaries must follow. The Actuarial Standards of Practice that are applicable to this experience study include No. 4 (Measuring Pension Obligations and Determining Pension Plan Costs or Contributions), No. 6 (Measuring Retiree Group Benefit Obligations), No. 27 (Selection of Economic Assumptions for Measuring Pension Obligations), and No. 35 (Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations).

Sincerely,

Gabriel, Roeder, Smith & Company

Leslie L. Thompson, FSA, FCA, EA, MAAA
Senior Consultant

Paul Wood, ASA, FCA, MAAA
Consultant

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SECTION 1

EXECUTIVE SUMMARY

Executive Summary

Gabriel, Roeder, Smith & Co. (GRS) was engaged by the Alaska Retirement Management Board to conduct a review of the June 30, 2017 experience study performed by Buck for PERS, TRS, NGNMRS and JRS.

Although we have some areas of difference in professional judgement, we have found Buck's actuarial work is reasonable, appropriate, and accurate, as well as following generally accepted actuarial principles and practices. We also found that the experience study was reasonable and in compliance with Actuarial Standards of Practice. In summary, we found the overall set of recommendations for assumptions to be reasonable, with the following comments:

- Buck did not make a recommendation for the investment return assumption. Thus, we cannot provide comments on a Buck recommendation for that assumption.
- We have provided comments based on what we have seen relative to the investment return assumption. We do not purport to take the place of the retained actuary in making a recommendation; but rather, we provide a level of oversight for the recommendation on the investment return assumption.

This scope of this review is to review the work of Buck to the degree necessary for GRS to express opinions regarding the accuracy and/or reasonableness of the following:

- Demographic and economic assumptions;
- Proper application of the funding and asset smoothing method.

In the course of the review, GRS conducted a complete review of all data, but not a duplication of experience study data compilations.

The outstanding items which were not mentioned in the Buck experience study but which require consideration include:

- Dual Coverage Assumption for the retiree medical elections;
- Relative value between DCR and DB healthcare plans;
- DCR plan .2% per year decrease in costs;
- EGWP assumption on perpetual subsidy;
- Population growth assumption (for the roll forward contribution requirement and for the projections).

SECTION 2

ECONOMIC ASSUMPTIONS

Economic Assumptions

General

These assumptions simulate the impact of economic forces on the amounts and values of future benefits. Key economic assumptions are the assumed rate of inflation, the assumed rate of investment return and assumed rates of future salary increases and total payroll growth.

Inflation Assumption

The current inflation assumption is 3.12%. Buck recommends lowering the inflation assumption to a rate between 2.50% and 3.00%. We concur with lowering this assumption. Our work in this area has led us to recommend to our clients an inflation assumption no higher than 2.50% While Buck does not reference other measures in their experience study report, we have reported that the Social Security Administration (another long-term retirement plan) has set their expectation for inflation at 2.60%. Further, in a closed plan we recommend considering long-term rates that are no longer than a 20-year horizon (rather than a more typical 30-year period). The model used by Buck estimates that under approach #1 (reversion to higher economic conditions that existed in the past), the 20-year inflation assumptions to be 2.86% and under approach #2 the 20-year inflation assumptions to be 2.56%. This would further cause us to lean closer to 2.50% for a recommended inflation rate assumption.

Investment Return Assumption

The current assumption is 8.00%. Buck states that "we believe the current investment return assumption of 8.00% could be maintained. However, the ARMB may decide to adopt something less than 8.00% to reflect a margin for adverse deviation."

Maintaining the 8.00% return assumption with the 2.50% to 3.00% recommended inflation assumption implies an assumption for the real return of 5.00% to 5.50%. We have found that these real returns, coupled with higher inflation, to be outside the bounds for representing a reasonable rate for our clients. We recommend a real return assumption in the range of 4.50% to 5.00% depending on their own specific asset allocation.

Approach #1 for GEMS and Building Block both indicate that very high real rates of return are achievable. However, the underlying assumption for approach #1 implies an overwhelmingly positive economic forecast which the models with which we work do not predict. Approach #2, which Buck has explained represents a "new normal", shows expected real returns (for 20 years) at 4.48% to 4.51%. Applying those rates of return with Buck's recommendation of inflation at 2.50% to 3.00% produces an assumption for investment returns of approximately 7.00% to 7.50%.

Buck presents 10, 20, and 20 year expected returns under various approaches and models. This information can be used to calculate implied expected rates of return for years one through ten, eleven through twenty, and twenty-one through thirty. The table below shows the implied return expectations.

Implied Returns Based on Buck's Analysis				
	Approach #1		Approach #2	
	GEMS	Building Block	GEMS	Building Block
Rates of Return for Years One Through Ten	7.59%	7.28%	5.85%	5.71%
Rates of Return for Years Eleven Through Twenty	9.44%	8.42%	7.46%	7.15%
Rates of Return for Years Twenty-One Through Thirty	9.71%	9.27%	7.64%	7.85%
Ten Year Average	7.59%	7.28%	5.85%	5.71%
Twenty Year Average	8.51%	7.85%	6.65%	6.43%
Thirty Year Average	8.91%	8.32%	6.98%	6.90%

If you look at the GEMS – Approach #1, the implied return for the first ten years is 7.59%, the implied return for the next ten years is 9.44%, and the implied return for the ten years after that is 9.71%. These implied returns, along with the results under Building Block – Approach #1, are much higher than most, if not all, investment consultants are anticipating. We believe this is further evidence that an 8.0% rate of return assumption cannot be supported.

Setting this assumption too high results in a tremendous amount of contribution risk down the road. The benefits promised must be paid through a combination of contributions and investment income. If actual returns going forward are much lower than anticipated, contributions rates will most certainly rise putting benefit security and plan sustainability at risk.

Basing a recommendation on the Buck data, the Buck models and accounting for the fact that these plans are closed produces a range for recommendation of 7.00% to 7.50%. We do not concur with Buck that the 8.00% could be maintained. It would appear, based on the Buck model, that the 8.00% could be maintained only if one believes in the underlying economic prosperity of Approach #1.

Salary Increase Assumption

In actuarial models, assumed rates of pay increase are often constructed as the total of several components:

> Base salary increases -- base pay increases that include price inflation and general "standard of living" or productivity increases.
>
> An allowance for Merit, Promotion, and Longevity – This portion of the assumption is not related to inflation. In the context of a typical pay grid, pay levels are set out for various employment grades with step increases for longevity:
>
> The base salary increase assumption reflects overall growth in the entire grid, and the Merit, Promotion, and Longevity pay increase assumption reflects movement of members through the grid, both step increases and promotional increases.

The current Base Salary Increase Assumption (also known as the wage inflation assumption) is 3.62%. The 3.62% is comprised of 3.12% for general inflation and 0.50% for productivity increases. Buck recommends a wage inflation assumption that is 0.25% above the inflation assumption. We concur with this recommendation.

As described above, the Merit, Promotion, and Longevity pay increase assumption represents pay increases due to movement through the pay grid. This is based on longevity and job performance. In most models, it is recognized that step increases and promotions are very rare late in careers. Thus, this allowance should trail away from relatively high levels for young or short service members to virtually nothing late in careers. We would expect that, as members approach retirement, this component would fade away. We concur that the new assumptions appear to be reasonable.

Payroll Increase Assumption

The current payroll growth assumption is 3.62%. This is intended to represent the growth in annual payroll for the total population of the DB and DCR members. This rate is used to spread the cost of paying off the unfunded accrued liability over future payrolls. In practice that means the higher the payroll growth assumption the lower the first year amortization payment, because that amortization payment is assumed to grow as payroll grows. A zero percent payroll growth assumption will mean the amortization payment will not grow, because payroll is not growing. This is commonly referred to as level dollar amortization.

The current payroll growth assumption of 3.62% is comprised of 3.12% for general inflation plus 0.50%. Buck recommends changing the payroll growth assumption to be inflation plus 25 basis points. We concur with that recommendation. This implies that a 2.50% inflation assumption would lead to a 2.75% payroll growth assumption.

Population Growth Assumption

Although a population growth assumption is not used in the actuarial valuation, it is used in the projections and in the determination of the contribution rate. The “roll forward “ procedure that was developed a few years ago to eliminate the lag in the rate increases makes an assumption about the growth in the population. In recent discussions the question was raised about the population growth being used and whether a separate one ought to be used for the roll forward, since the roll forward is a prediction of a shorter and “better known” period of time. Population growth is very important especially in times of a contracting workforce. If there is an expectation that the workforce may be contracting, it may be worthwhile to include a provision that addresses this issue. Buck has not addressed the population growth assumption in their experience study.

Summary

For the slate of economic assumptions Buck has presented two alternative scenarios:

Buck Suggestions	Assumed Investment Return	Assumed Inflation Assumption	Assumed growth in total payroll
Current	**8.00%**	**3.12%**	**3.62%**
Approach #1	**7.75%**	**2.75%**	**3.00%**
Approach #2	**7.50%**	**2.50%**	**2.75%**

Buck has indicated their belief that all these scenarios would be reasonable. We do not concur. When accounting for the closed nature of the plans (a shorter horizon) and the data supplied on capital market expectations we do not believe the current set of assumptions is reasonable.

SECTION 3

DEMOGRAPHIC ASSUMPTIONS

Demographic Assumptions

Healthy mortality during active service and after termination
We concur with the recommendation to move to RP-2014 tables with MP 2017 generational improvement (and with the various credibility adjustments).

Disabled mortality
We concur with the recommendations to move to the RP 2014 disabled table with MP 2017 generational improvement (and with the various credibility adjustments).

Withdrawal from service before retirement (termination)
We were originally concerned because Buck's annual gain/loss by source in the valuation had consistent losses. This would have implied that more termination liability was being generated than expected and we expected the assumptions to be changed in a way to accommodate this experience. However, Buck explained that their annual gain/loss by source for this category also included retirement. There is still an open issue of covering the losses for these "deferred" retirees (retirees who have left employment, but not applied for benefits). Thus we concur with this recommendation on the assumption.

We do question why Buck is raising the rates of termination for teachers at older ages.

Retirement
The proposed rates look reasonable based on the data presented in the experience study report.

Disability
The proposed rates look reasonable based on the data presented in the experience study report.

Withdrawal of contributions at termination
The proposed rates look reasonable based on the data presented in the experience study report.

Other Demographic Assumptions

Marriage
We concur with the assumption recommendation. Buck is going to change the name of this assumption from marriage rates to "spousal coverage election rates". This assumption is impacted by dual coverages. We understand that initially Buck was going to alter the marriage assumption to account for dual coverage but that upon reflection they have decided against that approach.

Age difference between husbands and wives
We concur with the recommendation.

Number of dependent children
We concur with the recommendation.

Alaska residency for COLA
We concur with the recommendation.

Number of Unused Sick Days (TRS only)
We concur with the recommendation.

Part-time service earned during the year
We concur with the recommendation.

Occupational vs Non-occupational death and disability
We concur with the recommendation.

Rehires
We concur with the recommendation.

SECTION 4

POST-RETIREMENT HEALTHCARE ASSUMPTIONS

Post-retirement Healthcare Assumptions

Healthcare Cost Trend Rates

The proposed rates look reasonable based on the data presented in the experience study report. We were originally concerned over a statement that many "leave" the State when they retire, and we were concerned the 100% assumption may have been too high. Buck has indicated that the Aetna retiree census file showed 39% of the retirees participating in the plan do not have an address in Alaska. The current assumption is 100% of the participants who do not have to make a contribution will participate in the plan. Even though they have left Alaska, the data is indicating they are still participating, thus we concur with the 100% participation rate assumption for non-paying retirees. We concur with the recommendation on the other participation rates.

Morbidity (aging factors)

The proposed rates look reasonable based on the data presented.

Participation Rates

The proposed rates look reasonable based on the data presented.

Healthcare Assumptions not covered in the Experience Study report

Dual coverage assumption

This assumption is for estimating the number of retiree health care participants who are married to other retiree health care participants. In the power point presentations earlier this year Buck indicated they would assume 13% of retiring members would be dual participants (and not elect spousal coverage). In further clarification Buck indicated that they recommended a percent married assumption to be 10% lower than the current assumption, which is consistent with about 13% of the inactive population having dual coverage. They further stated that they did not want to alter this assumption on the pension side since the dual coverage issue does not affect pension liabilities. We recommend clarification on how the dual coverage assumption will be implemented.

Relative value between DCR and DB healthcare plans

Buck makes an assumption that the DCR plan is less costly due to its underlying structure. The assumption is derived from Buck's proprietary software. We concur with this approach.

DCR plan .2% per year decrease in costs

We do not concur with this assumption. Historically there is no basis for this assumption. No basis was given in the valuation for this assumption.

Rx Drug Rebate

In the PowerPoint presentations Buck reported that this assumption was based on a recent single year of data and we concur with the reasonableness of this assumption.

EGWP assumption

We understand Alaska is expecting to move to an EGWP effective January 1, 2019. Buck had recommended waiting until they select an EGWP vendor and then obtain an updated estimate from that vendor. We concur with that approach. As for the method of valuing the EGWP subsidy, we feel Buck is not unreasonable in

their method of assuming the subsidy for EGWP will continue indefinitely. The law is unclear. However, we feel this should be mentioned that it is an assumption and has an inherent risk since if repealed the costs would immediately increase.

SECTION 5

ACTUARIAL METHODS

Actuarial Methods

Funding Method

Buck proposes changing the method for developing costs for the post-retirement healthcare benefit be changed from a level dollar basis to a level percent of pay basis (I thought this was just for the normal cost-need to clarify). The basis for this proposal is to align these costs with the methods used for the accounting valuations performed under GASB 74 and GASB 75.

We do not find the proposed change unreasonable although we do not share the opinion that accounting and funding need to be in alignment. The valuations used to develop contribution rates now differ significantly from those used in accounting and alignment has lost much of its value. We do recommend the board be informed that this reduces the contribution requirements for the retiree health care plan.

Asset Valuation Method

No change is recommended to the asset valuation method.

Amortization Method

Buck is proposing changed to a "layered approach" for amortization. We concur with Buck that method be considered. We cannot comment on the legality of the approach, since the statutes state that the UAL should be amortized on a level percent of pay basis over a closed 25-year period.

State of Alaska

Summary of Current and Proposed Assumptions/Methods from 2017 Experience Study

Prepared by Buck for the December 12, 2018 Actuarial Committee Meeting

1. Economic Assumptions

Assumption	Current	Proposed
Inflation Rate	3.12%	2.50%[1]
Real Rate of Return	4.88%	4.88%[1]
Investment Return[2]	8.00% net of all expenses	7.38% net of investment expenses
Payroll Growth Rate	Inflation + 50 bp (3.62%)	Inflation + 25 bp (2.75%)
Salary Increase Rates[3]	See Table 1	See Table 1
Trend Rates	See Table 2	See Table 2

2. Demographic Assumptions

Assumption	Current	Proposed
Pre-Retirement Mortality - Healthy		
• PERS and NGNMRS	60% (male) and 65% (female) of post-termination healthy mortality rates	100% (male and female) of RP-2014 employee table with MP-2017 generational improvement
• TRS and JRS	68% (male) and 60% (female) of post-termination healthy mortality rates	100% (male and female) of RP-2014 white collar employee table with MP-2017 generational improvement
Post-Termination Mortality - Healthy		
• PERS and NGNMRS	96% of RP-2000, 2000 Base Year projected to 2018 with Scale BB	91% (male) and 96% (female) of RP-2014 healthy annuitant table with MP-2017 generational improvement
• TRS and JRS	94% (male) and 97% (female) of RP-2000, 2000 Base Year projected to 2018 with Scale BB, 3-yr setback for males and 4-yr setback for females	93% (male) and 90% (female) of RP-2014 white collar healthy annuitant table with MP-2017 generational improvement
Post-Retirement Mortality - Disabled	RP-2000 Disabled Retiree Table, 2000 Base Year projected to 2018 with Scale BB	RP-2014 disabled table with MP-2017 generational improvement
Retirement - Unreduced	See Table 3	See Table 3
Retirement - Reduced	See Table 4	See Table 4
Retirement – Deferred Vested	Earliest age eligible for unreduced retirement benefit	No change
Withdrawal - Select[4]	See Table 5	See Table 5
Withdrawal – Ultimate[5]	See Table 6	See Table 6
Disability[5]	See Table 7	See Table 7
Occupational-Related Death/Disability		
• PERS	50% (P/F), 70% (Others)	40% (P/F), 75% (Others)
• TRS	15%	No change

[1] Selected by the ARMB.
[2] For PERS, TRS and JRS. No change is being proposed to the 7% investment return net of investment expenses for NGNMRS.
[3] For PERS and TRS only. No changes are being proposed to the salary increase rates for JRS.
[4] For PERS DCR only. No changes are being proposed to the select withdrawal rates for all other plans.
[5] For PERS, TRS and NGNMRS. No changes are being proposed to the ultimate withdrawal rates for JRS.

Withdrawal of Contributions at Termination[6]		
• PERS	15% (P/F), 10% (Others)	10% (P/F), 5% (Others)
• TRS	5%	0%
Percent Covering Dependent Spouse at Retirement Without Dual Coverage[7]		
• PERS P/F	85% (male), 60% (female)	75% (male), 50% (female)
• PERS Others	75% (male), 70% (female)	65% (male), 60% (female)
• TRS	85% (male), 75% (female)	65% (male), 60% (female)
Age Difference	3 years older (male), 3 years younger (female)	No change (male), 2 years younger (female)
Alaska Residency		
• PERS P/F	65%	No change
• PERS Others	70%	No change
• TRS	60%	No change
Part-Time Service Earned During the Year		
• PERS P/F	1.00	No change
• PERS Others	0.65	0.75
• TRS	0.75	No change
Healthcare Participation - DB[8]		
• If System-Paid	100% when first eligible	No change
• If not System-Paid	10% when first eligible	20% when first eligible
Healthcare Participation - DCR	See Table 8	See Table 8
Healthcare Morbidity	See Table 9	See Table 9
Rehires[9]		
• Pension	14.23% (PERS), 18.49% (TRS)	18.77% (PERS), 15.57% (TRS)
• Healthcare	17.24% (PERS), 10.39% (TRS)	17.09% (PERS), 12.03% (TRS)
Number of Dependent Children[8]	Benefits valued only for members currently covering dependent children. Coverage for dependent children assumed through age 23 (for life if dependent child is disabled).	No change
Number of Unused Sick Days[10]	4.5 days for each year of service	No change
Active Population Growth[11]	0%	No change
Form of Payment[12]	100% elect lump sum (actives), 100% elect annuity (deferred vested)	70% of actives and deferred vested elect lump sum

[6] In all cases, the assumption is 100% if member is not vested at termination.
[7] Proposed assumption is set to include an allowance for future covered children. Applicable for healthcare benefits only (no change is being proposed for pension benefits).
[8] For PERS and TRS.
[9] For DB only. Percentages shown are loads to the Normal Cost.
[10] For TRS only.
[11] For PERS and TRS DB/DCR overall.
[12] For NGNMRS only.

3. Funding Methods

Method	Current	Proposed
Healthcare Normal Cost and Actuarial Accrued Liability	Level Dollar	Level % of Pay
Administrative Expenses[13]		
• PERS pension	None	4.9%
• PERS healthcare	None	7.9%
• TRS pension	None	5.1%
• TRS healthcare	None	10.0%
• PERS DCR ODD	None	0.5%
• PERS DCR RM	None	0.4%
• TRS DCR ODD	None	3.9%
• TRS DCR RM	None	1.5%
Unfunded Actuarial Accrued Liability (UAAL) Amortization Period[14]	25-year closed period established effective 6/30/14	For UAAL that exists on 6/30/18 prior to proposed assumptions/methods, no change to 25-year closed period that was established effective 6/30/14. For effects on UAAL at 6/30/18 due to proposed assumptions/methods, and all future years' changes in UAAL, separate 25-year closed periods. Level % of pay amortization is unchanged.

Note: The proposed change in UAAL amortization period can be made at any time. The change does not have to be made effective 6/30/18 in conjunction with the 2017 experience study.

[13] Percentages are loads to Normal Cost. The percentages shown above are different than the percentages shown in our 9/19/18 meeting materials for two reasons: (i) we are now using a more refined calculation versus an estimated approach used previously; and (ii) we have excluded ASO fees from the administrative expenses based on additional information provided to us since the 9/19/18 meeting. The percentages shown above are based on the average of administrative expenses paid from the trust in FY16 and FY17. For the 6/30/18 valuations, we will use the average of the amounts paid from the trust in FY17 and FY18.

[14] For PERS and TRS DB only. No changes are being proposed for all other plans.

Note: Tables 1 to 9 provide the detailed rates related only to the assumptions for which we are proposing changes based on the 2017 experience study.

Table 1 – Salary Increase Rates (DB and DCR)

	PERS P/F		PERS Others		TRS	
Years of Service	Current	Proposed	Current	Proposed	Current	Proposed
0	9.66%	7.75%	8.55%	6.75%	8.11%	6.75%
1	8.66%	7.25%	7.36%	6.25%	7.51%	6.25%
2	7.16%	6.75%	6.35%	5.75%	6.91%	5.75%
3	7.03%	6.25%	6.11%	5.25%	6.41%	5.25%
4	6.91%	5.75%	5.71%	4.75%	6.11%	4.75%
5	6.41%	5.25%	Age Based	4.25%	6.11%	4.25%
6	5.66%	4.75%	Age Based	3.75%	5.90%	3.75%
7	4.92%	4.25%	Age Based	3.65%	5.69%	3.65%
8	4.92%	3.75%	Age Based	3.55%	5.55%	3.55%
9	4.92%	3.65%	Age Based	3.45%	5.40%	3.45%
10	4.92%	3.55%	Age Based	3.35%	5.26%	3.35%
11	4.92%	3.45%	Age Based	3.25%	5.11%	3.25%
12	4.92%	3.35%	Age Based	3.15%	4.96%	3.15%
13	4.92%	3.25%	Age Based	3.05%	4.84%	3.05%
14	4.92%	3.15%	Age Based	2.95%	4.72%	2.95%
15	4.92%	3.05%	Age Based	2.85%	4.60%	2.85%
16	4.92%	2.95%	Age Based	2.75%	4.49%	2.75%
17	4.92%	2.85%	Age Based	2.75%	4.37%	2.75%
18	4.92%	2.75%	Age Based	2.75%	4.27%	2.75%
19	4.92%	2.75%	Age Based	2.75%	4.17%	2.75%
20+	4.92%	2.75%	Age Based	2.75%	4.07%*	2.75%

* Current assumption for TRS is 3.97% at 21 years of service and 3.87% at 22+ years of service.

Table 2 – Trend Rates

Current

Fiscal Year	Medical Pre-65	Medical Post-65	Prescription Drugs	RDS/EGWP	Retiree Contributions
2018	8.0%	5.5%	9.0%	6.5%	8.0%
2019	7.5%	5.5%	8.5%	6.2%	7.6%
2020	7.0%	5.4%	8.0%	6.0%	7.2%
2021	6.5%	5.4%	7.5%	5.7%	6.8%
2022	6.3%	5.4%	7.1%	5.5%	6.5%
2023	6.1%	5.4%	6.8%	5.4%	6.3%
2024	5.9%	5.4%	6.4%	5.2%	6.0%
2025	5.8%	5.4%	6.1%	5.0%	5.9%
2026	5.6%	5.4%	5.7%	4.8%	5.6%
2027	5.4%	5.4%	5.4%	4.7%	5.4%
2028	5.4%	5.4%	5.4%	4.7%	5.4%
2029	5.4%	5.4%	5.4%	4.7%	5.4%
2030	5.4%	5.4%	5.4%	4.7%	5.4%
2031	5.4%	5.4%	5.4%	4.7%	5.4%
2032	5.4%	5.4%	5.4%	4.7%	5.4%
2033	5.4%	5.4%	5.4%	4.7%	5.4%
2034	5.4%	5.4%	5.4%	4.7%	5.4%
2035	5.4%	5.4%	5.4%	4.7%	5.4%
2036	5.4%	5.4%	5.4%	4.7%	5.4%
2037	5.4%	5.4%	5.4%	4.7%	5.4%
2038	5.4%	5.4%	5.4%	4.7%	5.4%
2039	5.4%	5.4%	5.4%	4.7%	5.4%
2040	5.4%	5.4%	5.4%	4.7%	5.4%
2041	5.2%	5.2%	5.2%	4.6%	5.2%
2042	5.1%	5.1%	5.1%	4.5%	5.1%
2043	5.0%	5.0%	5.0%	4.5%	5.0%
2044	4.8%	4.8%	4.8%	4.4%	4.8%
2045	4.7%	4.7%	4.7%	4.3%	4.7%
2046	4.5%	4.5%	4.5%	4.2%	4.5%
2047	4.4%	4.4%	4.4%	4.2%	4.4%
2048	4.3%	4.3%	4.3%	4.1%	4.3%
2049	4.1%	4.1%	4.1%	4.0%	4.1%
2050+	4.0%	4.0%	4.0%	4.0%	4.0%

Table 2 – Trend Rates

Proposed

Fiscal Year	Medical Pre-65	Medical Post-65	Prescription Drugs/EGWP	RDS	Retiree Contributions
2018	8.0%	5.5%	9.0%	4.7%	8.0%
2019	7.5%	5.5%	8.5%	4.7%	7.6%
2020	7.0%	5.4%	8.0%	4.7%	7.2%
2021	6.5%	5.4%	7.5%	4.6%	6.8%
2022	6.3%	5.4%	7.1%	4.6%	6.5%
2023	6.1%	5.4%	6.8%	4.6%	6.3%
2024	5.9%	5.4%	6.4%	4.6%	6.0%
2025	5.8%	5.4%	6.1%	4.6%	5.9%
2026	5.6%	5.4%	5.7%	4.6%	5.6%
2027	5.4%	5.4%	5.4%	4.5%	5.4%
2028	5.4%	5.4%	5.4%	4.5%	5.4%
2029	5.4%	5.4%	5.4%	4.5%	5.4%
2030	5.4%	5.4%	5.4%	4.5%	5.4%
2031	5.4%	5.4%	5.4%	4.5%	5.4%
2032	5.4%	5.4%	5.4%	4.5%	5.4%
2033	5.4%	5.4%	5.4%	4.5%	5.4%
2034	5.4%	5.4%	5.4%	4.5%	5.4%
2035	5.4%	5.4%	5.4%	4.5%	5.4%
2036	5.4%	5.4%	5.4%	4.5%	5.4%
2037	5.4%	5.4%	5.4%	4.5%	5.4%
2038	5.4%	5.4%	5.4%	4.5%	5.4%
2039	5.4%	5.4%	5.4%	4.5%	5.4%
2040	5.4%	5.4%	5.4%	4.5%	5.4%
2041	5.3%	5.3%	5.3%	4.5%	5.3%
2042	5.2%	5.2%	5.2%	4.5%	5.2%
2043	5.1%	5.1%	5.1%	4.5%	5.1%
2044	5.1%	5.1%	5.1%	4.5%	5.1%
2045	5.0%	5.0%	5.0%	4.5%	5.0%
2046	4.9%	4.9%	4.9%	4.5%	4.9%
2047	4.8%	4.8%	4.8%	4.5%	4.8%
2048	4.7%	4.7%	4.7%	4.5%	4.7%
2049	4.6%	4.6%	4.6%	4.5%	4.6%
2050+	4.5%	4.5%	4.5%	4.5%	4.5%

Getzen Model Components of Ultimate Trend Rates	Current	Proposed
Inflation	3.12%	2.50%
Real GDP	0.88%[15]	2.00%
Ultimate Trend Rate	4.00%	4.50%

[15] The real GDP growth rate of 0.88% has been used to set the ultimate trend rates since the 6/30/14 valuations.

Table 3 – Retirement Rates (Unreduced)

PERS P/F

	Female		Male	
Age	**Current**	**Proposed**	**Current**	**Proposed**
<47	0.060000	0.060000	0.080000	0.088000
47	0.150000	0.150000	0.080000	0.088000
48	0.150000	0.150000	0.130000	0.143000
49	0.150000	0.150000	0.130000	0.143000
50	0.150000	0.150000	0.150000	0.165000
51	0.150000	0.150000	0.150000	0.165000
52	0.150000	0.150000	0.185000	0.203500
53	0.150000	0.150000	0.185000	0.203500
54	0.250000	0.250000	0.185000	0.203500
55	0.200000	0.200000	0.250000	0.275000
56	0.150000	0.150000	0.250000	0.275000
57	0.150000	0.150000	0.250000	0.275000
58	0.150000	0.150000	0.250000	0.275000
59	0.150000	0.150000	0.250000	0.275000
60	0.250000	0.250000	0.300000	0.330000
61	0.200000	0.200000	0.250000	0.275000
62	0.300000	0.300000	0.250000	0.275000
63	0.500000	0.500000	0.250000	0.275000
64	0.500000	0.500000	0.200000	0.220000
65	0.500000	0.500000	0.200000	0.220000
66	0.500000	0.500000	0.250000	0.275000
67	0.500000	0.500000	0.500000	0.550000
68	0.500000	0.500000	0.500000	0.550000
69	0.500000	0.500000	0.500000	0.550000
70+	1.000000	1.000000	1.000000	1.000000

Table 3 – Retirement Rates (Unreduced)

PERS Others

Age	Female		Male	
	Current (rounded)	Proposed (rounded)	Current (rounded)	Proposed (rounded)
<50	0.10	0.11	0.10	0.11
50	0.35	0.39	0.30	0.33
51	0.35	0.39	0.33	0.36
52	0.35	0.39	0.33	0.36
53	0.35	0.39	0.33	0.36
54	0.35	0.39	0.35	0.38
55	0.30	0.33	0.30	0.33
56	0.20	0.22	0.20	0.22
57	0.18	0.20	0.20	0.22
58	0.18	0.20	0.20	0.22
59	0.18	0.20	0.20	0.22
60	0.21	0.23	0.20	0.22
61	0.20	0.22	0.20	0.22
62	0.20	0.22	0.20	0.22
63	0.20	0.22	0.20	0.22
64	0.20	0.22	0.20	0.22
65	0.26	0.29	0.23	0.25
66	0.26	0.29	0.25	0.28
67	0.22	0.24	0.20	0.22
68	0.22	0.24	0.23	0.25
69	0.22	0.24	0.25	0.28
70	0.22	0.24	0.25	0.28
71	0.22	0.24	0.25	0.28
72	0.25	0.28	0.25	0.28
73	0.25	0.28	0.25	0.28
74	0.35	0.39	0.25	0.28
75-79	0.50	0.55	0.50	0.55
80-89	0.50	1.00	0.50	1.00
90+	1.00	1.00	1.00	1.00

Table 3 – Retirement Rates (Unreduced)

TRS

	Female		Male	
Age	**Current**	**Proposed**	**Current**	**Proposed**
<45	0.03	0.03	0.03	0.03
45	0.05	0.05	0.05	0.05
46	0.08	0.08	0.05	0.05
47	0.08	0.08	0.05	0.05
48	0.08	0.08	0.05	0.05
49	0.08	0.08	0.05	0.05
50	0.13	0.14	0.05	0.05
51	0.12	0.13	0.08	0.08
52	0.12	0.13	0.15	0.15
53	0.13	0.14	0.15	0.15
54	0.14	0.15	0.15	0.15
55	0.16	0.17	0.20	0.20
56	0.16	0.17	0.17	0.17
57	0.16	0.17	0.15	0.15
58	0.16	0.17	0.20	0.20
59	0.22	0.23	0.20	0.20
60	0.22	0.23	0.25	0.25
61	0.22	0.23	0.18	0.18
62	0.20	0.21	0.18	0.18
63	0.20	0.21	0.18	0.18
64	0.25	0.26	0.18	0.18
65	0.20	0.21	0.30	0.30
66	0.20	0.21	0.25	0.25
67	0.20	0.21	0.25	0.25
68	0.25	0.26	0.25	0.25
69	0.25	0.26	0.35	0.35
70	0.25	0.26	0.30	0.30
71	0.35	0.37	0.30	0.30
72	0.35	0.37	0.30	0.30
73	0.35	0.37	0.30	0.30
74	0.35	0.37	0.30	0.30
75-79	0.50	0.50	0.50	0.50
80-84	0.50	1.00	0.50	1.00
85+	1.00	1.00	1.00	1.00

Table 4 – Retirement Rates (Reduced)

PERS P/F

	Female		Male	
Age	**Current**	**Proposed**	**Current**	**Proposed**
<50	N/A		N/A	
50	0.087041	0.050000	0.087041	0.050000
51	0.085580	0.070000	0.085580	0.050000
52	0.072383	0.070000	0.072383	0.070000
53	0.076688	0.070000	0.076688	0.070000
54	0.075561	0.350000	0.075561	0.070000
55	0.077429	0.080000	0.077429	0.070000
56	0.077106	0.080000	0.077106	0.070000
57	0.076730	0.080000	0.076730	0.070000
58	0.076820	0.080000	0.076820	0.070000
59	0.200000	0.200000	0.200000	0.200000
60+	N/A	N/A	N/A	N/A

PERS Others

	Female		Male	
Age	**Current**	**Proposed**	**Current**	**Proposed**
<50	N/A	N/A	N/A	N/A
50	0.06	0.08	0.04	0.06
51	0.06	0.08	0.04	0.06
52	0.08	0.08	0.06	0.09
53	0.08	0.08	0.06	0.09
54	0.14	0.15	0.14	0.20
55	0.06	0.06	0.05	0.06
56	0.06	0.06	0.05	0.06
57	0.06	0.06	0.05	0.06
58	0.06	0.06	0.05	0.06
59	0.16	0.20	0.14	0.15
60+	N/A	N/A	N/A	N/A

TRS

	Female		Male	
Age	**Current**	**Proposed**	**Current**	**Proposed**
<50	N/A	N/A	N/A	N/A
50	0.08	0.10	0.08	0.10
51	0.08	0.10	0.08	0.10
52	0.08	0.10	0.08	0.10
53	0.08	0.12	0.08	0.10
54	0.16	0.12	0.16	0.10
55	0.08	0.08	0.08	0.15
56	0.08	0.08	0.08	0.10
57	0.08	0.08	0.08	0.10
58	0.08	0.08	0.08	0.10
59	0.16	0.08	0.16	0.10
60+	N/A	N/A	N/A	N/A

Table 4 – Retirement Rates (NGNMRS)

	Current		Proposed	
Age	Male	Female	Male	Female
<51	10%	10%	13%	13%
51-52	10%	10%	13%	13%
53	12%	12%	15%	15%
54	15%	15%	20%	20%
55	20%	20%	25%	25%
56	25%	25%	35%	35%
57	30%	30%	40%	40%
58	35%	35%	45%	45%
59	40%	40%	50%	50%
60	45%	45%	55%	55%
61-64	50%	50%	60%	60%
65+	100%	100%	100%	100%

Table 5 – Withdrawal Rates (Select)

PERS DCR P/F

Years of Service	Female		Male	
	Current	Proposed (rounded)	Current	Proposed (rounded)
0	0.17	0.21	0.18	0.19
1	0.13	0.16	0.14	0.15
2	0.11	0.14	0.10	0.11
3	0.10	0.13	0.09	0.09
4	0.09	0.11	0.08	0.08

PERS DCR Others

Years of Service	Female		Male	
	Current	Proposed (rounded)	Current	Proposed (rounded)
0	0.27	0.28	0.23	0.24
1	0.21	0.22	0.20	0.21
2	0.17	0.18	0.16	0.17
3	0.14	0.14	0.13	0.13
4	0.18	0.12	0.09	0.09

Table 6 – Withdrawal Rates (Ultimate)

PERS P/F (5 or more years of service)

	Female		Male			Female		Male	
Age	**Current**	**Proposed**	**Current**	**Proposed**	**Age**	**Current**	**Proposed**	**Current**	**Proposed**
20	0.080000	0.068000	0.040894	0.047000	45	0.033802	0.032800	0.019012	0.018100
21	0.080000	0.068000	0.040894	0.047000	46	0.033527	0.032500	0.019506	0.018500
22	0.080000	0.068000	0.040894	0.047000	47	0.033251	0.032300	0.020000	0.019000
23	0.080000	0.068000	0.038801	0.044600	48	0.032862	0.031900	0.023333	0.022200
24	0.080000	0.068000	0.036708	0.042200	49	0.032474	0.031500	0.026667	0.025300
25	0.080000	0.068000	0.034616	0.039800	50	0.032085	0.064200	0.030000	0.031800
26	0.080000	0.068000	0.032523	0.037400	51	0.031581	0.063200	0.040000	0.042400
27	0.080000	0.068000	0.030430	0.035000	52	0.030941	0.061900	0.040000	0.042400
28	0.078000	0.066300	0.028877	0.033200	53	0.030201	0.060400	0.040000	0.042400
29	0.076000	0.064600	0.027324	0.031400	54	0.060402	0.030000	0.040000	0.042400
30	0.074000	0.062900	0.025771	0.029600	55	0.060402	0.020000	0.040000	0.030000
31	0.072000	0.061200	0.024218	0.027900	56	0.060402	0.020000	0.040000	0.030000
32	0.070000	0.059500	0.022665	0.026100	57	0.060402	0.020000	0.040000	0.030000
33	0.063077	0.053600	0.021722	0.025000	58	0.060402	0.020000	0.040000	0.030000
34	0.056154	0.047700	0.020779	0.023900	59	0.060402	0.020000	0.040000	0.030000
35	0.049231	0.041800	0.019836	0.022800	60	0.060402	0.020000	0.040000	0.030000
36	0.042308	0.036000	0.018893	0.021700	61	0.060402	0.020000	0.040000	0.030000
37	0.035385	0.030100	0.017950	0.020600	62	0.060402	0.020000	0.040000	0.030000
38	0.035234	0.029900	0.017866	0.020500	63	0.060402	0.020000	0.040000	0.030000
39	0.035082	0.029800	0.017782	0.020400	64	0.060402	0.020000	0.040000	0.030000
40	0.034930	0.033900	0.017699	0.016800	65	0.060402	0.020000	0.040000	0.030000
41	0.034779	0.033700	0.017615	0.016700	65+	0.060402	0.020000	0.040000	0.030000
42	0.034627	0.033600	0.017531	0.016700					
43	0.034352	0.033300	0.018025	0.017100					
44	0.034077	0.033100	0.018519	0.017600					

Table 6 – Withdrawal Rates (Ultimate)

PERS Others (5 or more years of service)

	Female		Male			Female		Male	
Age	Current	Proposed	Current	Proposed	Age	Current	Proposed	Current	Proposed
20	0.136735	0.129900	0.095000	0.114000	45	0.045685	0.048000	0.039880	0.043900
21	0.136735	0.129900	0.095000	0.114000	46	0.043828	0.046000	0.039357	0.043300
22	0.136735	0.129900	0.095000	0.114000	47	0.041972	0.044100	0.038834	0.042700
23	0.128522	0.122100	0.090250	0.108500	48	0.041891	0.044000	0.038701	0.042600
24	0.120309	0.114300	0.085500	0.102600	49	0.041809	0.043900	0.038568	0.042400
25	0.112096	0.106500	0.080750	0.096900	50	0.041566	0.044500	0.038170	0.036300
26	0.103883	0.098700	0.076000	0.091200	51	0.041365	0.044300	0.037844	0.036000
27	0.095670	0.090900	0.071250	0.085500	52	0.041121	0.044000	0.037460	0.035600
28	0.091756	0.087200	0.069160	0.083000	53	0.040844	0.043700	0.037023	0.035200
29	0.087842	0.083400	0.067060	0.080500	54	0.057924	0.062000	0.043859	0.041700
30	0.083927	0.079700	0.064960	0.078000	55	0.057924	0.050000	0.043859	0.030000
31	0.080013	0.076000	0.062870	0.075400	56	0.057924	0.050000	0.043859	0.030000
32	0.076099	0.072300	0.060770	0.072900	57	0.057924	0.050000	0.043859	0.030000
33	0.072399	0.068800	0.058280	0.069900	58	0.057924	0.050000	0.043859	0.030000
34	0.068699	0.065300	0.055780	0.066900	59	0.057924	0.050000	0.043859	0.030000
35	0.064999	0.061700	0.053290	0.063900	60	0.057924	0.050000	0.043859	0.030000
36	0.061299	0.058200	0.050790	0.061000	61	0.057924	0.050000	0.043859	0.030000
37	0.057599	0.054700	0.048300	0.058000	62	0.057924	0.050000	0.043859	0.030000
38	0.056330	0.053500	0.046930	0.056300	63	0.057924	0.050000	0.043859	0.030000
39	0.055061	0.052300	0.045560	0.054700	64	0.057924	0.050000	0.043859	0.030000
40	0.053792	0.056500	0.044190	0.048600	65+	0.057924	0.050000	0.043859	0.030000
41	0.052523	0.055100	0.042820	0.047100					
42	0.051254	0.053800	0.041450	0.045600					
43	0.049398	0.051900	0.040930	0.045000					
44	0.047541	0.049900	0.040400	0.044400					

Table 6 – Withdrawal Rates (Ultimate)

TRS (8 or more years of service)

	Female		Male			Female		Male	
Age	Current	Proposed	Current	Proposed	Age	Current	Proposed	Current	Proposed
15	0.037185	0.038300	0.031209	0.026500	40	0.036224	0.027500	0.030159	0.022600
16	0.037157	0.038300	0.031170	0.026500	41	0.036155	0.027500	0.030085	0.022600
17	0.037138	0.038300	0.031138	0.026500	42	0.036086	0.027400	0.030010	0.022500
18	0.037129	0.038200	0.031107	0.026400	43	0.035976	0.027300	0.029866	0.022400
19	0.037120	0.038200	0.031091	0.026400	44	0.035867	0.027300	0.029721	0.022300
20	0.036848	0.038000	0.030847	0.026200	45	0.035757	0.027200	0.029577	0.022200
21	0.036848	0.038000	0.030831	0.026200	46	0.035648	0.027100	0.029432	0.022100
22	0.036839	0.037900	0.030799	0.026200	47	0.035538	0.027000	0.029288	0.022000
23	0.036839	0.037900	0.030776	0.026200	48	0.035380	0.026900	0.029046	0.021800
24	0.036830	0.037900	0.030736	0.026100	49	0.035221	0.026800	0.028805	0.021600
25	0.036830	0.037900	0.030705	0.026100	50	0.035063	0.044200	0.028563	0.034300
26	0.036820	0.037900	0.030673	0.026100	51	0.034847	0.043900	0.028248	0.033900
27	0.036762	0.037900	0.030642	0.026000	52	0.034595	0.043600	0.027878	0.033500
28	0.041480	0.042700	0.030610	0.026000	53	0.034296	0.043200	0.027468	0.033000
29	0.046198	0.047600	0.030579	0.026000	54	0.059961	0.075600	0.046305	0.030000
30	0.050917	0.052400	0.030555	0.026000	55	0.059285	0.050000	0.045414	0.020000
31	0.055635	0.057300	0.030540	0.026000	56	0.058410	0.050000	0.044334	0.020000
32	0.060353	0.062200	0.030516	0.025900	57	0.057288	0.050000	0.043012	0.020000
33	0.055569	0.057200	0.030500	0.025900	58	0.056018	0.050000	0.041567	0.020000
34	0.050784	0.052300	0.030455	0.025900	59	0.054401	0.050000	0.039826	0.020000
35	0.046000	0.047400	0.030431	0.025900	60	0.052569	0.050000	0.037868	0.020000
36	0.041215	0.042500	0.030407	0.025800	61	0.050523	0.050000	0.035694	0.020000
37	0.036431	0.037500	0.030383	0.025800	62	0.048197	0.050000	0.033170	0.020000
38	0.036362	0.037500	0.030308	0.025800	63	0.045540	0.050000	0.030294	0.020000
39	0.036293	0.037400	0.030234	0.025700	64	0.042653	0.050000	0.027176	0.020000
					65+	0.066000	0.050000	0.054000	0.020000

Table 6 – Withdrawal Rates (Ultimate)

PERS DCR P/F (5 or more years of service)

	Female		Male			Female		Male	
Age	Current	Proposed	Current	Proposed	Age	Current	Proposed	Current	Proposed
20	0.085500	0.119700	0.048000	0.055200	45	0.078800	0.110300	0.049678	0.057100
21	0.085500	0.119700	0.048000	0.055200	46	0.078400	0.109800	0.049061	0.056400
22	0.085500	0.119700	0.048000	0.055200	47	0.078000	0.109200	0.048444	0.055700
23	0.085500	0.119700	0.049120	0.056500	48	0.077400	0.108400	0.052256	0.060100
24	0.085500	0.119700	0.050240	0.057800	49	0.076800	0.107500	0.056067	0.064500
25	0.085500	0.119700	0.051360	0.059100	50	0.076200	0.106700	0.059878	0.068900
26	0.085500	0.119700	0.052480	0.060400	51	0.075600	0.105800	0.063689	0.073200
27	0.085500	0.119700	0.053600	0.061600	52	0.075000	0.105000	0.067500	0.077600
28	0.085275	0.119400	0.053528	0.061600	53	0.076154	0.106600	0.069300	0.079700
29	0.085050	0.119100	0.053456	0.061500	54	0.077308	0.108200	0.071100	0.081800
30	0.084825	0.118800	0.053384	0.061400	55	0.078462	0.109800	0.072900	0.083800
31	0.084600	0.118400	0.053312	0.061300	56	0.079615	0.111500	0.074700	0.085900
32	0.084375	0.118100	0.053239	0.061200	57	0.080769	0.113100	0.076500	0.088000
33	0.084214	0.117900	0.053119	0.061100	58	0.081923	0.114700	0.078480	0.090300
34	0.084054	0.117700	0.052998	0.060900	59	0.083077	0.116300	0.080460	0.092500
35	0.083893	0.117500	0.052878	0.060800	60	0.084231	0.117900	0.082440	0.094800
36	0.083732	0.117200	0.052757	0.060700	61	0.085385	0.119500	0.084420	0.097100
37	0.083571	0.117000	0.052636	0.060500	62	0.086538	0.121200	0.086400	0.099400
38	0.082857	0.116000	0.052415	0.060300	63	0.087692	0.122800	0.107600	0.123700
39	0.082143	0.115000	0.052194	0.060000	64	0.088846	0.124400	0.128800	0.148100
40	0.081429	0.114000	0.051972	0.059800	65+	0.090000	0.126000	0.150000	0.172500
41	0.080714	0.113000	0.051751	0.059500					
42	0.080000	0.112000	0.051529	0.059030					
43	0.079600	0.111400	0.050912	0.058500					
44	0.079200	0.110900	0.050295	0.057800					

Table 6 – Withdrawal Rates (Ultimate)

PERS DCR Others (5 or more years of service)

	Female		Male			Female		Male	
Age	Current	Proposed	Current	Proposed	Age	Current	Proposed	Current	Proposed
20	0.150000	0.165000	0.109667	0.137100	45	0.071847	0.079000	0.061728	0.077200
21	0.150000	0.165000	0.109667	0.137100	46	0.068938	0.075800	0.060789	0.076000
22	0.150000	0.165000	0.109667	0.137100	47	0.066029	0.072600	0.059850	0.074800
23	0.150067	0.165100	0.109674	0.137100	48	0.065749	0.072300	0.061414	0.076800
24	0.150133	0.165100	0.109681	0.137100	49	0.065469	0.072000	0.062977	0.078700
25	0.150200	0.165200	0.109689	0.137100	50	0.065189	0.071700	0.064541	0.080700
26	0.150267	0.165300	0.109696	0.137100	51	0.064908	0.071400	0.066104	0.082600
27	0.150333	0.165400	0.109703	0.137100	52	0.064628	0.071100	0.067668	0.084600
28	0.144910	0.159400	0.107312	0.134100	53	0.066022	0.072600	0.067714	0.084600
29	0.139486	0.153400	0.104921	0.131200	54	0.067416	0.074200	0.067760	0.084700
30	0.134062	0.147500	0.102529	0.128200	55	0.068809	0.075700	0.067806	0.084800
31	0.128638	0.141500	0.100138	0.125200	56	0.070203	0.077200	0.067853	0.084800
32	0.123214	0.135500	0.097747	0.122200	57	0.071597	0.078800	0.067899	0.084900
33	0.117230	0.129000	0.093219	0.116500	58	0.074069	0.081500	0.070131	0.087700
34	0.111246	0.122400	0.088692	0.110900	59	0.076541	0.084200	0.072363	0.090500
35	0.105261	0.115800	0.084164	0.105200	60	0.079014	0.086900	0.074595	0.093200
36	0.099277	0.109200	0.079637	0.099500	61	0.081486	0.089600	0.076827	0.096000
37	0.093293	0.102600	0.075110	0.093900	62	0.083958	0.092400	0.079059	0.098800
38	0.090749	0.099800	0.072996	0.091200	63	0.095528	0.105100	0.082239	0.102800
39	0.088205	0.097000	0.070883	0.088600	64	0.107097	0.117800	0.085420	0.106800
40	0.085661	0.094200	0.068770	0.086000	65+	0.118667	0.130500	0.088600	0.110800
41	0.083117	0.091400	0.066657	0.083200					
42	0.080573	0.094300	0.064544	0.080700					
43	0.077664	0.085400	0.063605	0.079500					
44	0.074756	0.082200	0.062667	0.078300					

Table 6 – Withdrawal Rates (Ultimate)

TRS DCR (5 or more years of service)

	Female		Male			Female		Male	
Age	Current	Proposed	Current	Proposed	Age	Current	Proposed	Current	Proposed
20	0.066811	0.083100	0.062959	0.094100	45	0.064754	0.080900	0.060332	0.090500
21	0.066811	0.083100	0.062959	0.094100	46	0.064544	0.080700	0.059957	0.089900
22	0.066811	0.083100	0.062959	0.094100	47	0.064333	0.080400	0.059583	0.089400
23	0.066773	0.083100	0.062903	0.094100	48	0.063975	0.080000	0.059053	0.088600
24	0.066735	0.083100	0.062847	0.094100	49	0.063617	0.079500	0.058522	0.087800
25	0.066697	0.083100	0.062791	0.094100	50	0.063259	0.079100	0.057992	0.087000
26	0.066659	0.083200	0.062735	0.094100	51	0.062901	0.078600	0.057461	0.086200
27	0.066621	0.083300	0.062679	0.094000	52	0.062543	0.078200	0.056931	0.085400
28	0.066583	0.083200	0.062623	0.093900	53	0.061818	0.077300	0.055800	0.083700
29	0.066544	0.083200	0.062567	0.093900	54	0.061093	0.076400	0.054670	0.082000
30	0.066506	0.083100	0.062512	0.093800	55	0.060367	0.075500	0.053539	0.080300
31	0.066467	0.083100	0.062456	0.093700	56	0.059642	0.074600	0.052409	0.078600
32	0.066429	0.083000	0.062400	0.093600	57	0.058917	0.073600	0.051278	0.076900
33	0.066351	0.082900	0.062360	0.093500	58	0.060021	0.075000	0.051711	0.077600
34	0.066273	0.082800	0.062320	0.093500	59	0.061125	0.076400	0.052144	0.078200
35	0.066194	0.082700	0.062280	0.093400	60	0.062230	0.077800	0.052578	0.078900
36	0.066116	0.082600	0.062240	0.093400	61	0.063334	0.079200	0.053011	0.079500
37	0.066038	0.082500	0.062200	0.093300	62	0.064438	0.080500	0.053444	0.080200
38	0.065908	0.082400	0.062051	0.093100	63	0.066292	0.082900	0.057296	0.085900
39	0.065777	0.082200	0.061902	0.092900	64	0.068146	0.085200	0.061148	0.091700
40	0.065647	0.082100	0.061753	0.092600	65+	0.070000	0.087500	0.065000	0.097500
41	0.065516	0.081900	0.061604	0.092400					
42	0.065386	0.081700	0.061455	0.092200					
43	0.065175	0.081500	0.061081	0.091600					
44	0.064965	0.081200	0.060706	0.091100					

Table 6 – Withdrawal Rates (Ultimate)

NGNMRS

	Female		Male			Female		Male	
Age	**Current**	**Proposed**	**Current**	**Proposed**	**Age**	**Current**	**Proposed**	**Current**	**Proposed**
22	0.089621	0.170300	0.089621	0.134400	45	0.053593	0.101800	0.053593	0.080400
23	0.085762	0.162900	0.085762	0.128600	46	0.051041	0.097000	0.051041	0.076600
24	0.082654	0.157000	0.082654	0.124000	47	0.047548	0.090300	0.047548	0.071300
25	0.080193	0.152400	0.080193	0.120300	48	0.043086	0.081900	0.043086	0.064600
26	0.078275	0.148700	0.078275	0.117400	49	0.037790	0.071800	0.037790	0.056700
27	0.076794	0.145900	0.076794	0.115200	50	0.032580	0.061900	0.032580	0.048900
28	0.075648	0.143700	0.075648	0.113500	51	0.028500	0.054200	0.028500	0.042700
29	0.074735	0.142000	0.074735	0.112100	52	0.025530	0.048500	0.025530	0.038300
30	0.073955	0.140500	0.073955	0.110900	53	0.023415	0.044500	0.023415	0.035100
31	0.073215	0.139100	0.073215	0.109800	54	0.021825	0.041500	0.021825	0.032700
32	0.072431	0.137600	0.072431	0.108600	55	0.020670	0.039300	0.020670	0.031000
33	0.071529	0.135900	0.071529	0.107300	56	0.020130	0.038200	0.020130	0.030200
34	0.070452	0.133900	0.070452	0.105700	57	0.020205	0.038400	0.020205	0.030300
35	0.069165	0.131400	0.069165	0.103700	58	0.020760	0.039400	0.020760	0.031100
36	0.067656	0.128500	0.067656	0.101500	59	0.021810	0.041400	0.021810	0.032700
37	0.065945	0.125300	0.065945	0.098900	60	0.021810	0.045000	0.021810	0.035000
38	0.064121	0.121800	0.064121	0.096200					
39	0.062309	0.118400	0.062309	0.093500					
40	0.060618	0.115200	0.060618	0.090900					
41	0.059132	0.112400	0.059132	0.088700					
42	0.057884	0.110000	0.057884	0.086800					
43	0.056726	0.107800	0.056726	0.085100					
44	0.055397	0.105300	0.055397	0.083100					

Table 7 – Disability Rates

PERS P/F

Age	Unisex Current	Male Proposed	Female Proposed	Age	Unisex Current	Male Proposed	Female Proposed
20	0.000224	0.000179	0.000112	40	0.001027	0.000822	0.000514
21	0.000224	0.000179	0.000112	41	0.001068	0.000854	0.000534
22	0.000224	0.000179	0.000112	42	0.001108	0.000887	0.000554
23	0.000305	0.000244	0.000153	43	0.001221	0.000977	0.000611
24	0.000387	0.000310	0.000194	44	0.001333	0.001066	0.000666
25	0.000468	0.000374	0.000234	45	0.001446	0.001157	0.000723
26	0.000550	0.000440	0.000275	46	0.001559	0.001247	0.000780
27	0.000631	0.000505	0.000316	47	0.001671	0.001337	0.000836
28	0.000658	0.000526	0.000329	48	0.001828	0.001462	0.000914
29	0.000685	0.000548	0.000342	49	0.001985	0.001588	0.000992
30	0.000712	0.000570	0.000356	50	0.002142	0.001714	0.001071
31	0.000739	0.000591	0.000369	51	0.002299	0.001839	0.001150
32	0.000765	0.000612	0.000383	52	0.002456	0.001965	0.001228
33	0.000793	0.000634	0.000396	53	0.002868	0.002294	0.001434
34	0.000821	0.000657	0.000410	54	0.003280	0.002624	0.001640
35	0.000849	0.000679	0.000425				
36	0.000877	0.000702	0.000439				
37	0.000905	0.000724	0.000452				
38	0.000946	0.000757	0.000473				
39	0.000986	0.000789	0.000493				

PERS Others

	Female		Male			Female		Male	
Age	Current	Proposed	Current	Proposed	Age	Current	Proposed	Current	Proposed
20	0.000188	0.000376	0.000218	0.000327	40	0.000381	0.000762	0.000489	0.000734
21	0.000188	0.000376	0.000218	0.000327	41	0.000397	0.000794	0.000510	0.000765
22	0.000188	0.000376	0.000218	0.000327	42	0.000413	0.000826	0.000531	0.000797
23	0.000200	0.000400	0.000240	0.000360	43	0.000454	0.000908	0.000586	0.000879
24	0.000212	0.000424	0.000261	0.000392	44	0.000495	0.000990	0.000641	0.000962
25	0.000224	0.000448	0.000283	0.000425	45	0.000536	0.001072	0.000695	0.001043
26	0.000236	0.000472	0.000304	0.000456	46	0.000577	0.001154	0.000750	0.001125
27	0.000248	0.000496	0.000326	0.000489	47	0.000618	0.001236	0.000805	0.001208
28	0.000255	0.000510	0.000334	0.000501	48	0.000680	0.001360	0.000886	0.001329
29	0.000262	0.000524	0.000342	0.000513	49	0.000742	0.001484	0.000967	0.001451
30	0.000269	0.000538	0.000349	0.000524	50	0.000804	0.001608	0.001048	0.001572
31	0.000277	0.000554	0.000357	0.000536	51	0.000867	0.001734	0.001129	0.001694
32	0.000284	0.000568	0.000365	0.000548	52	0.000929	0.001858	0.001210	0.001815
33	0.000293	0.000586	0.000377	0.000566	53	0.001084	0.002168	0.001421	0.002132
34	0.000303	0.000606	0.000389	0.000584	54	0.001239	0.002478	0.001633	0.002450
35	0.000312	0.000629	0.000401	0.000602					
36	0.000322	0.000644	0.000413	0.000620					
37	0.000331	0.000662	0.000425	0.000638					
38	0.000348	0.000696	0.000446	0.000669					
39	0.000364	0.000728	0.000467	0.000701					

Table 7 – Disability Rates

TRS

	Female		Male			Female		Male	
Age	**Current**	**Proposed**	**Current**	**Proposed**	**Age**	**Current**	**Proposed**	**Current**	**Proposed**
20	0.000560	0.000612	0.000560	0.000337	40	0.000703	0.000703	0.000703	0.000387
21	0.000563	0.000612	0.000563	0.000337	41	0.000718	0.000718	0.000718	0.000395
22	0.000565	0.000612	0.000565	0.000337	42	0.000733	0.000733	0.000733	0.000403
23	0.000574	0.000612	0.000574	0.000337	43	0.000770	0.000770	0.000770	0.000423
24	0.000583	0.000612	0.000583	0.000337	44	0.000806	0.000806	0.000806	0.000443
25	0.000593	0.000612	0.000593	0.000337	45	0.000843	0.000843	0.000843	0.000464
26	0.000602	0.000612	0.000602	0.000337	46	0.000879	0.000879	0.000879	0.000483
27	0.000611	0.000612	0.000611	0.000337	47	0.000916	0.000916	0.000916	0.000504
28	0.000611	0.000612	0.000611	0.000337	48	0.000975	0.000975	0.000975	0.000536
29	0.000612	0.000612	0.000612	0.000337	49	0.001034	0.001034	0.001034	0.000569
30	0.000612	0.000612	0.000612	0.000337	50	0.001093	0.001093	0.001093	0.000601
31	0.000613	0.000613	0.000613	0.000337	51	0.001152	0.001152	0.001152	0.000634
32	0.000613	0.000613	0.000613	0.000337	52	0.001211	0.001211	0.001211	0.000666
33	0.000622	0.000622	0.000622	0.000342	53	0.001356	0.001356	0.001356	0.000746
34	0.000631	0.000631	0.000631	0.000347	54	0.001501	0.001501	0.001501	0.000826
35	0.000641	0.000641	0.000641	0.000353					
36	0.000650	0.000650	0.000650	0.000357					
37	0.000659	0.000659	0.000659	0.000362					
38	0.000674	0.000674	0.000674	0.000371					
39	0.000689	0.000689	0.000689	0.000379					

Table 8 – DCR Healthcare Participation Rates

If Retire Directly from Disability

Age	Current	Proposed
<55	73.00%	75.0%
55	73.00%	75.0%
56	77.50%	77.5%
57	79.75%	80.0%
58	82.00%	82.5%
59	84.25%	85.0%
60	86.50%	87.5%
61	88.75%	90.0%
62	91.00%	92.5%
63	93.25%	95.0%
64	95.50%	97.5%
65+	94.40%	100.0%

If Retire Directly from Employment (pre-age 65)

Age	Current	Proposed*
55	40%	50%
56	50%	55%
57	55%	60%
58	60%	65%
59	65%	70%
60	70%	75%
61	75%	80%
62	80%	85%
63	85%	90%
64	90%	95%
65	N/A	100%

* Proposed assumption is a combination of (i) the proposed service-based rates for retirement from employment at age 65+, and (ii) the proposed age-based rates for retirement from employment before age 65.

If Retire Directly from Employment (age 65+)

Years of Service	Current	Proposed
< 15	70.5%	75%
15-19	75.2%	80%
20-24	79.9%	85%
25-29	89.3%	90%
30+	94.0%	95%

Table 9 – Healthcare Morbidity

Age	Current		Proposed	
	Medical	Prescription Drugs	Medical	Prescription Drugs
< 45	2.0%	4.5%	2.0%	4.5%
45-54	2.5%	3.5%	2.5%	3.5%
55-64	3.5%	3.0%	2.5%	1.5%
65-74	4.0%	1.5%	3.0%	2.0%
75-84	1.5%	0.5%	2.0%	(0.5)%
85-94	0.5%	0.0%	0.3%	(2.5)%
95	0.5%	0.0%	0.0%	0.0%
96+	0.0%	0.0%	0.0%	0.0%

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Acceptance of Experience Analysis

ACTION: X

DATE: December 13, 2018

INFORMATION: _____

BACKGROUND:

AS 37.10.220(a)(9) prescribes that the Alaska Retirement Management Board (Board) "review actuarial assumptions prepared and certified by a member of the American Academy of Actuaries and conduct experience analyses of the retirement systems not less than once every four years".

In addition, under AS 37.10.220(a)(9), "the results of all actuarial assumptions prepared under this paragraph shall be reviewed and certified by a second member of the American Academy of Actuaries before presentation to the board".

STATUS:

Buck has completed the following experience analyses and the reports have been presented to the Board:

(1) an experience analysis of the Public Employees' Retirement System and Teachers' Retirement System Defined Benefit Retirement Plans for the period July 1, 2013 to June 30, 2017;
(2) an experience analysis of the Public Employees' Retirement System and Teachers' Retirement System Defined Contribution Retirement Plans for the period July 1, 2013 to June 30, 2017;
(3) an experience analysis of the Judicial Retirement System for the period July 1, 2013 to June 30, 2017; and
(4) an experience analysis of the National Guard and Naval Militia Retirement System for the period July 1, 2013 to June 30, 2017.

Gabriel Roeder Smith & Company (GRS), the Board's actuary, has reviewed these experience analyses and has provided their report to the Board.

RECOMMENDATION:

That the Alaska Retirement Management Board approves Resolution 2018-19, accepting the experience analyses prepared by Buck, as well as the assumption and method changes recommended therein.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the actuarial experience analysis for the Public Employees' Retirement System, Teachers' Retirement System, Judicial Retirement System, and Alaska National Guard and Naval Militia Retirement System

Resolution 2018-19

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 the funds of the Public Employees' Retirement System, Teachers' Retirement System, Judicial Retirement System, and Alaska National Guard and Naval Militia Retirement System; 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;

WHEREAS, AS 37.10.220(a)(9) requires the Board to conduct an experience analyses of the retirement systems not less than once every four years, except for health cost assumptions which shall be reviewed annually, and that the results of all actuarial assumptions prepared under this paragraph shall be reviewed and certified by a second actuary before presentation to the board;

NOW THEREFORE BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, that the Public Employees' Retirement System's, Teachers' Retirement System's, Judicial Retirement System's, and Alaska National Guard and Naval Militia Retirement System's Actuarial Experience Analysis as of June 30, 2017, as well as the assumption and method changes recommended therein, prepared by Buck be approved.

DATED at Anchorage, Alaska this 13th day of December, 2018.

_____
Chair

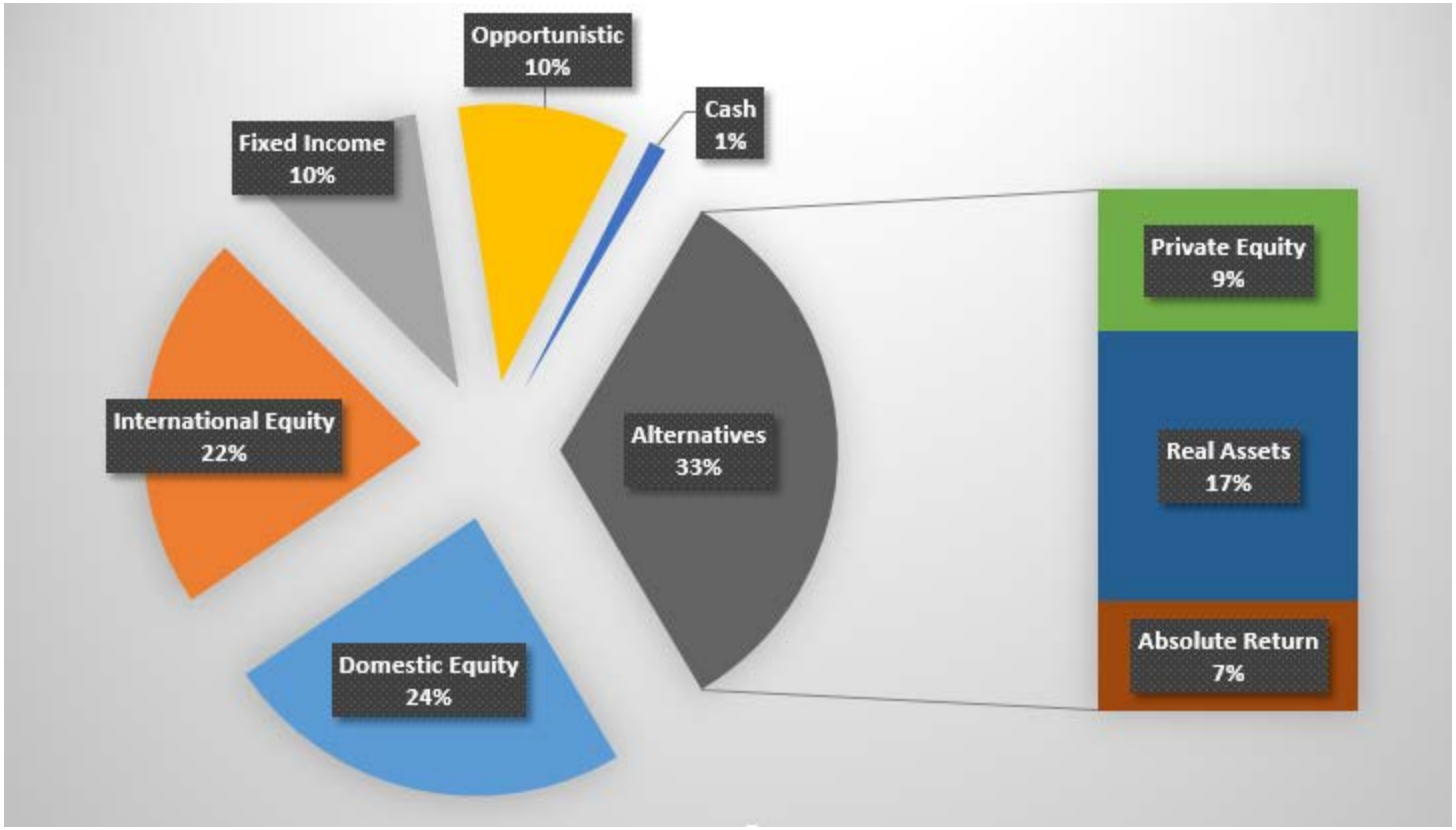
ATTEST:

_____
Secretary

Thoughts on Strategic Asset Allocation

Bob Mitchell, CFA – Chief Investment Officer
December 13, 2018

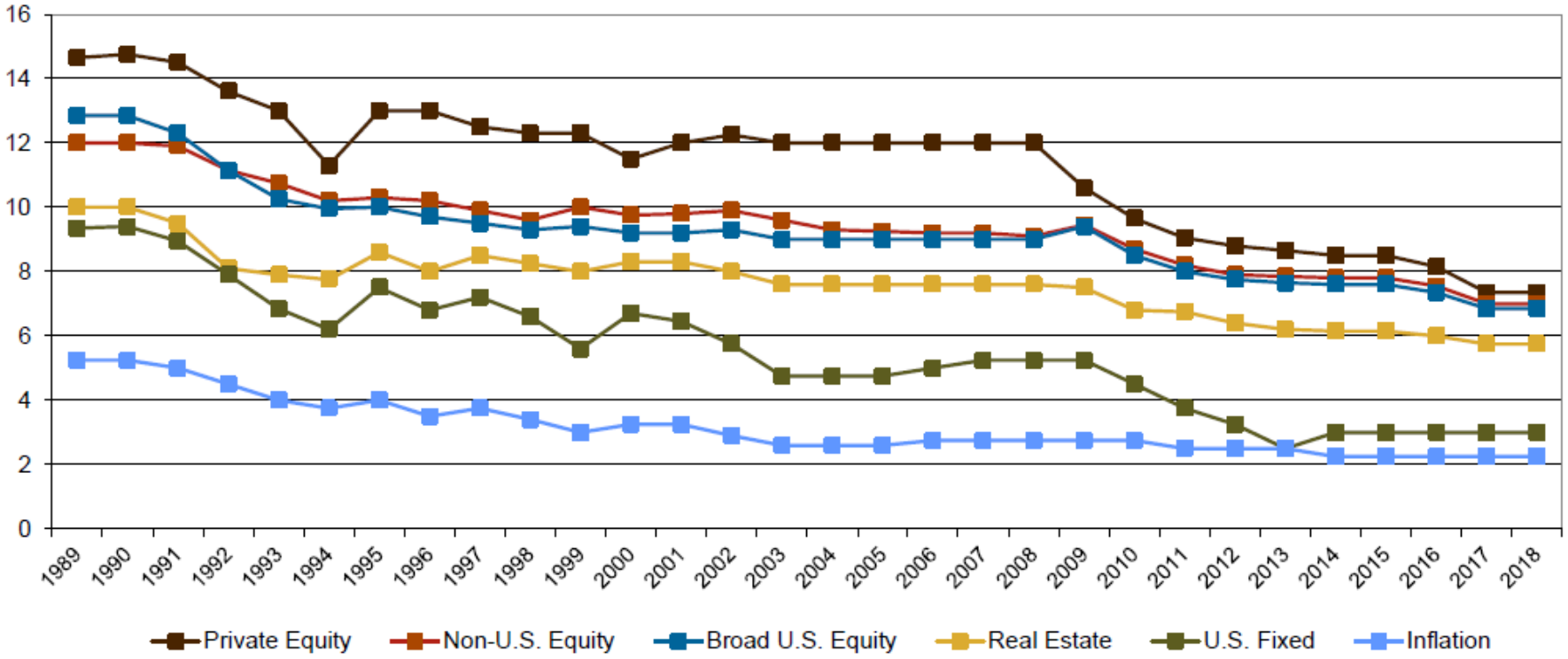
FY19 Strategic Asset Allocation



30-Year Expected Rate of Return 7.4%
10-Year Expected Rate of Return 6.6%
Standard Deviation (Risk) 14.7%

Return Projections

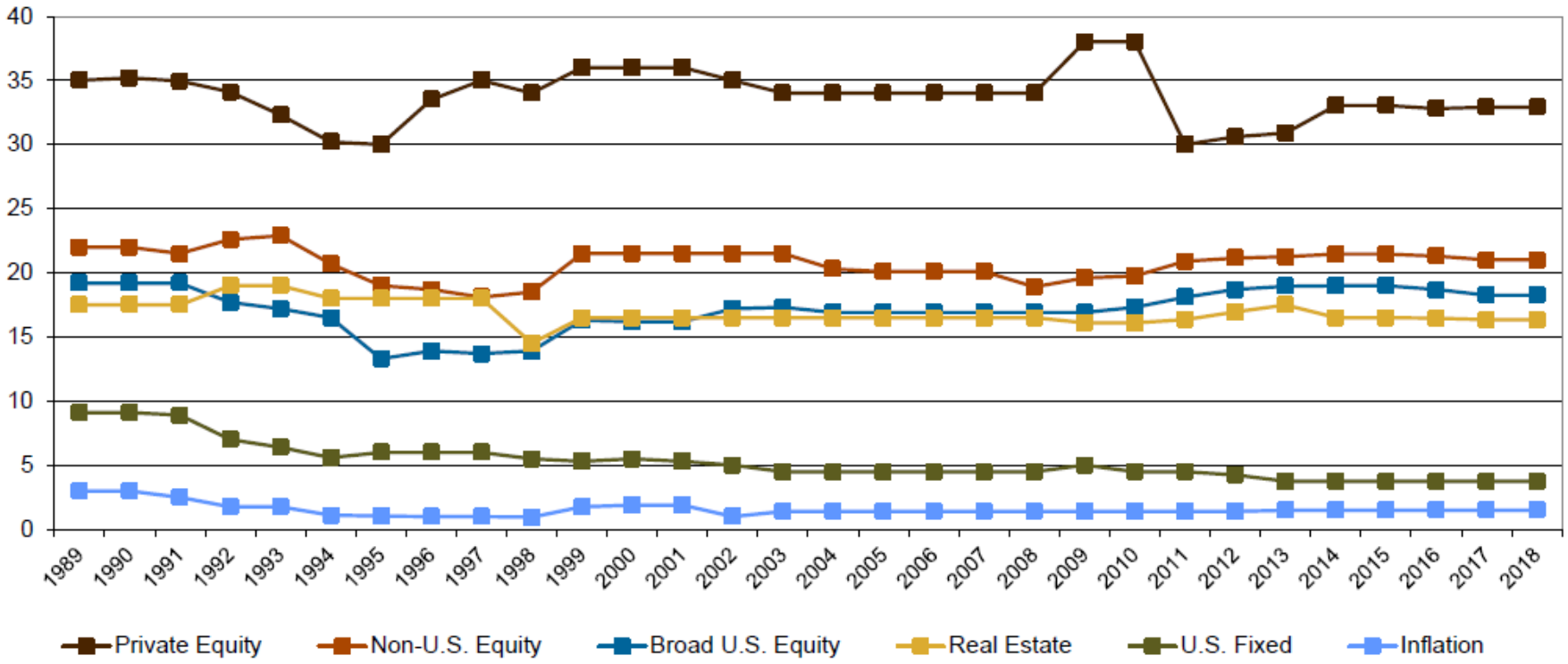
1989 – 2018



Source: Callan Institute, January 2018

Risk Projections

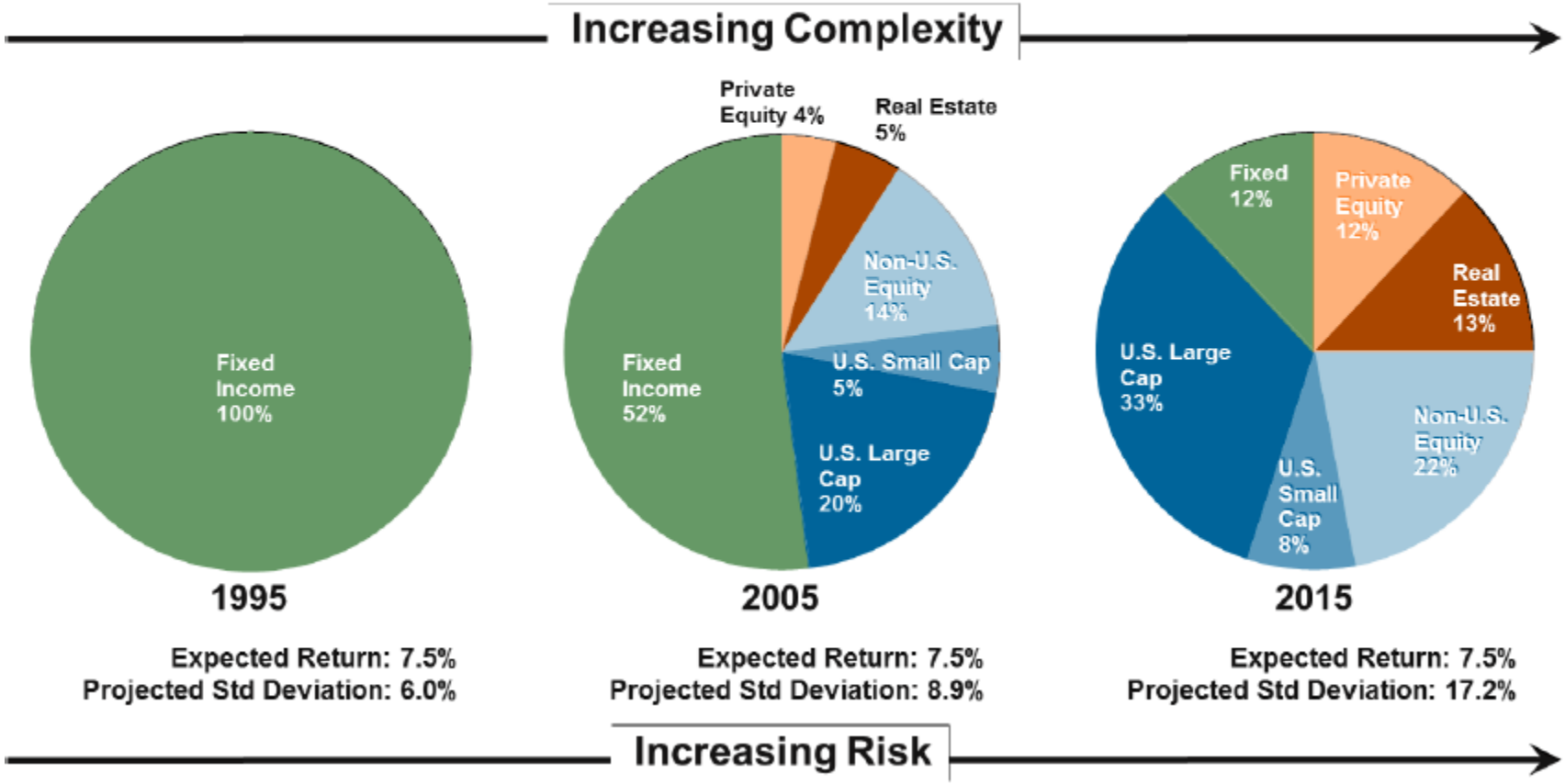
1989 – 2018



Source: Callan Institute, January 2018

Increasing Volatility and Complexity

Expected Portfolio Returns Over Past 20+ Years

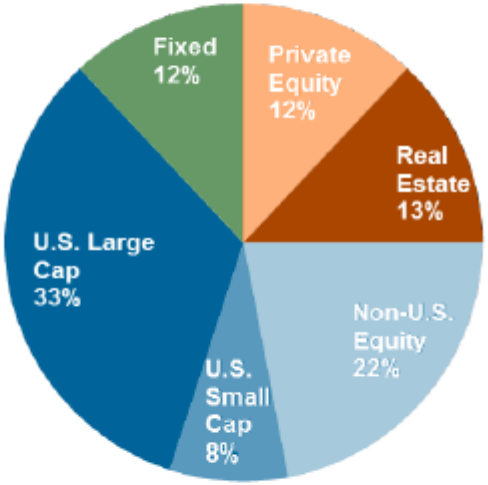


Source: Callan Institute, January 2018

Increasing Volatility and Complexity

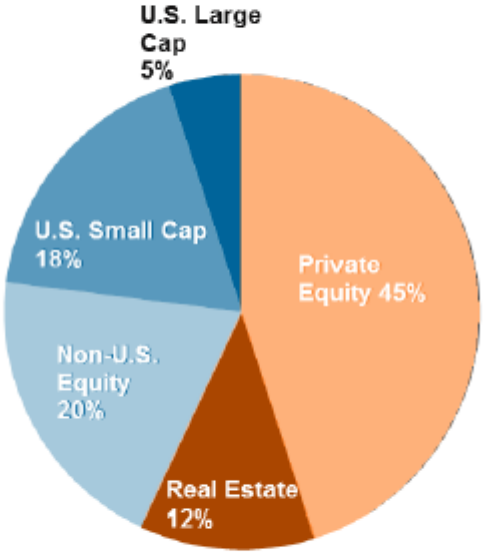
Expected Portfolio Returns Over Past 20+ Years

Increasing Complexity



2015

Expected Return: 7.5%
Projected Std Deviation: 17.2%



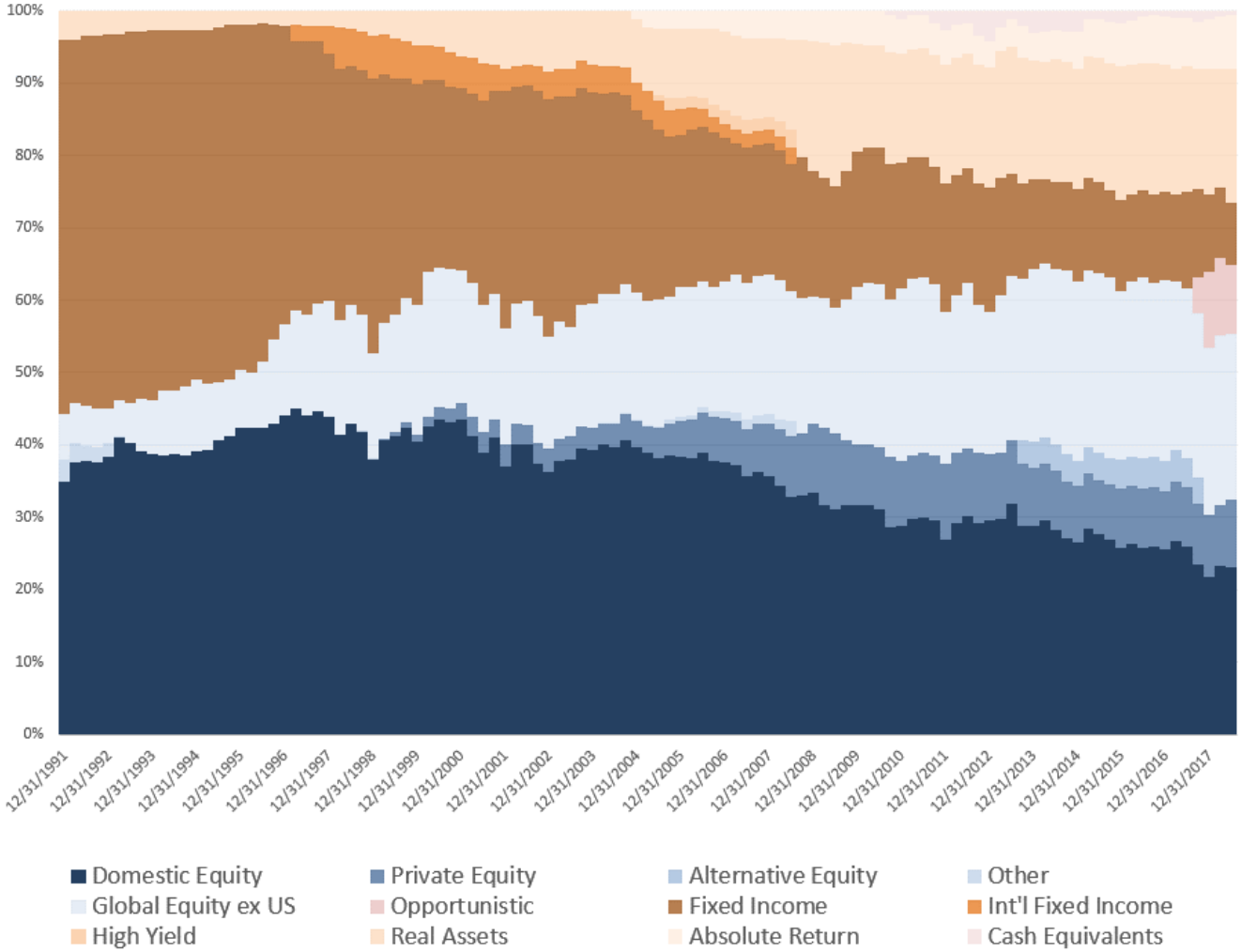
2017

Expected Return: 7.5%
Projected Std Deviation: 24.4%

Increasing Risk

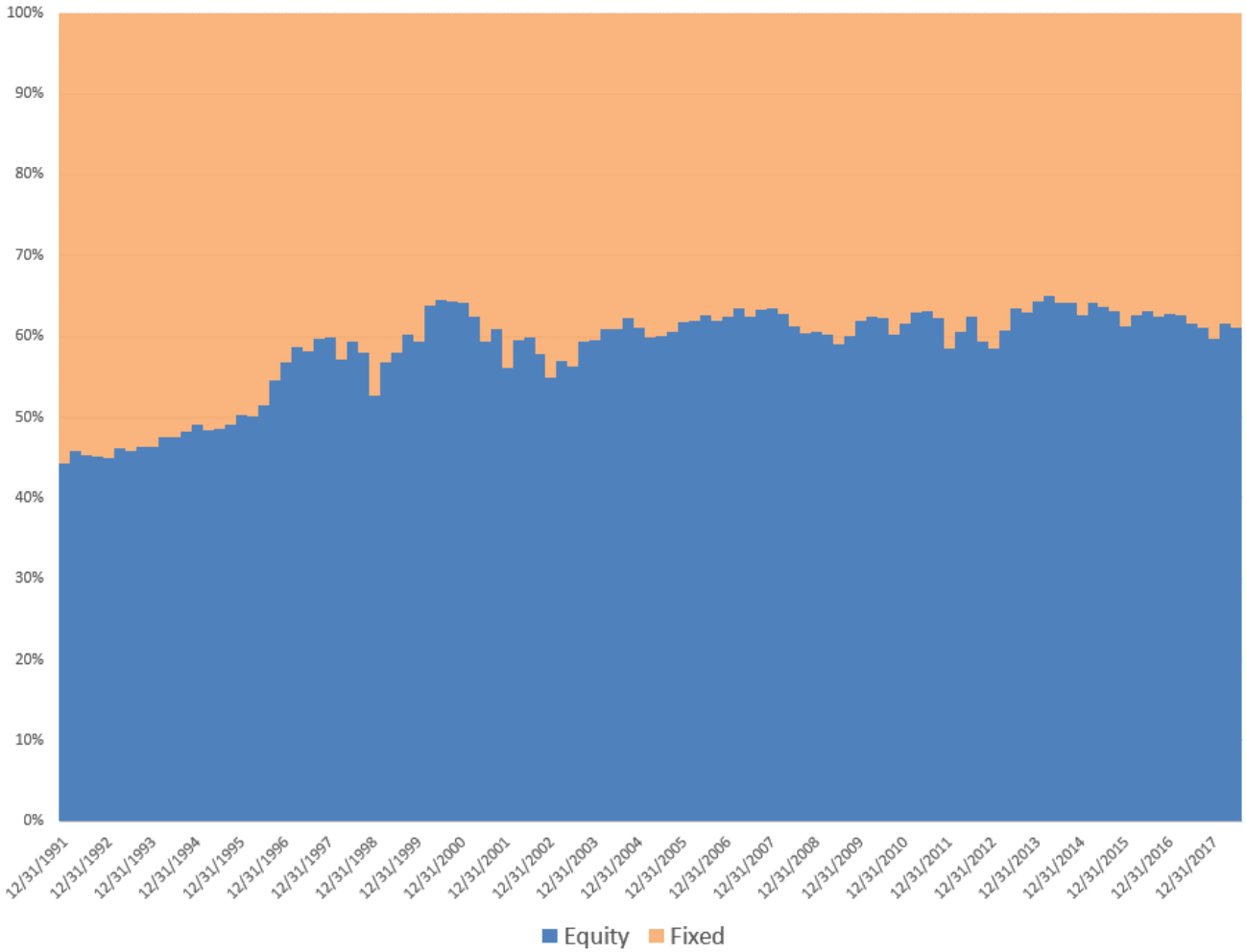
Source: Callan Institute, January 2018

ARMB Asset Allocation



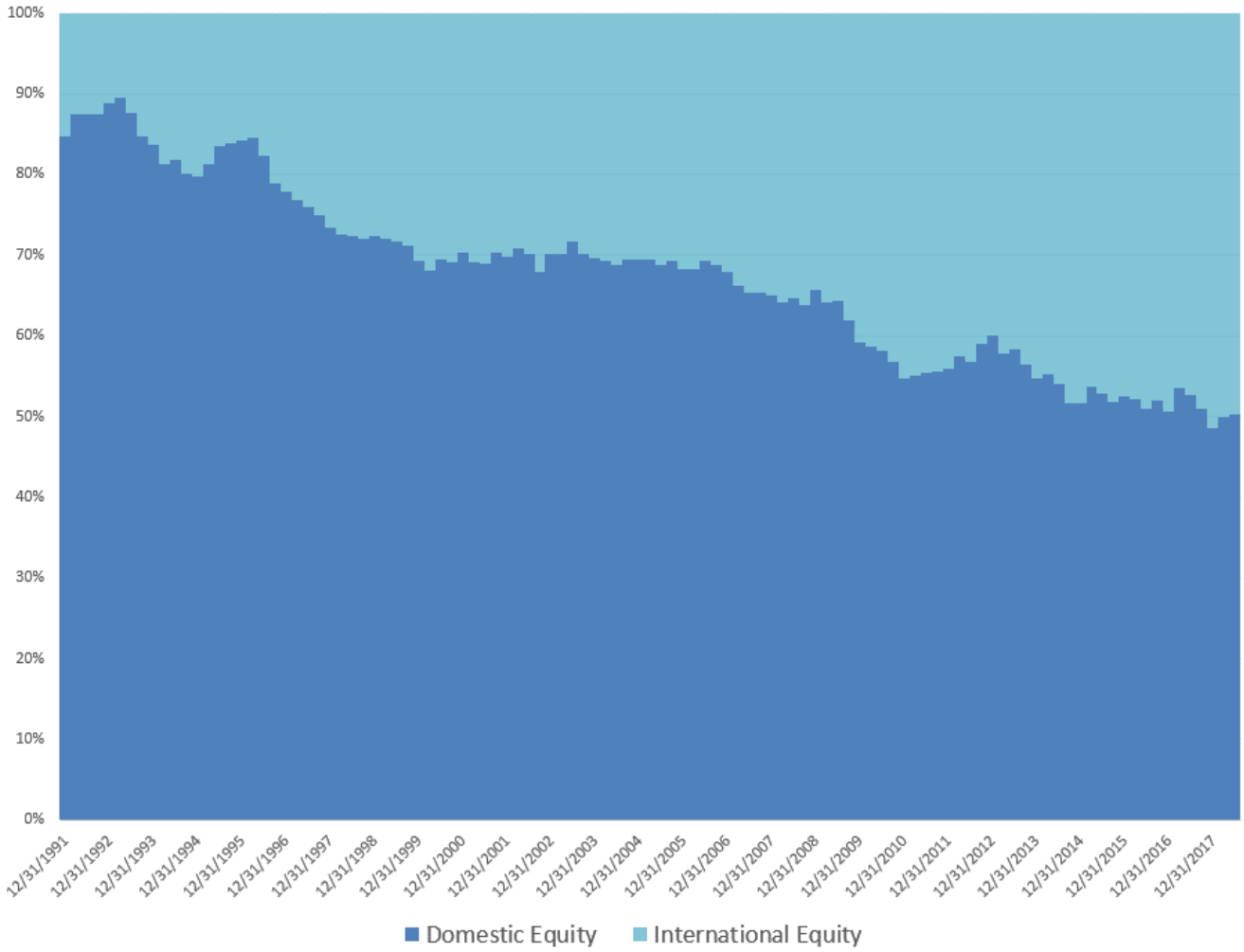
Source: Callan

“Equity” versus “Fixed Income”



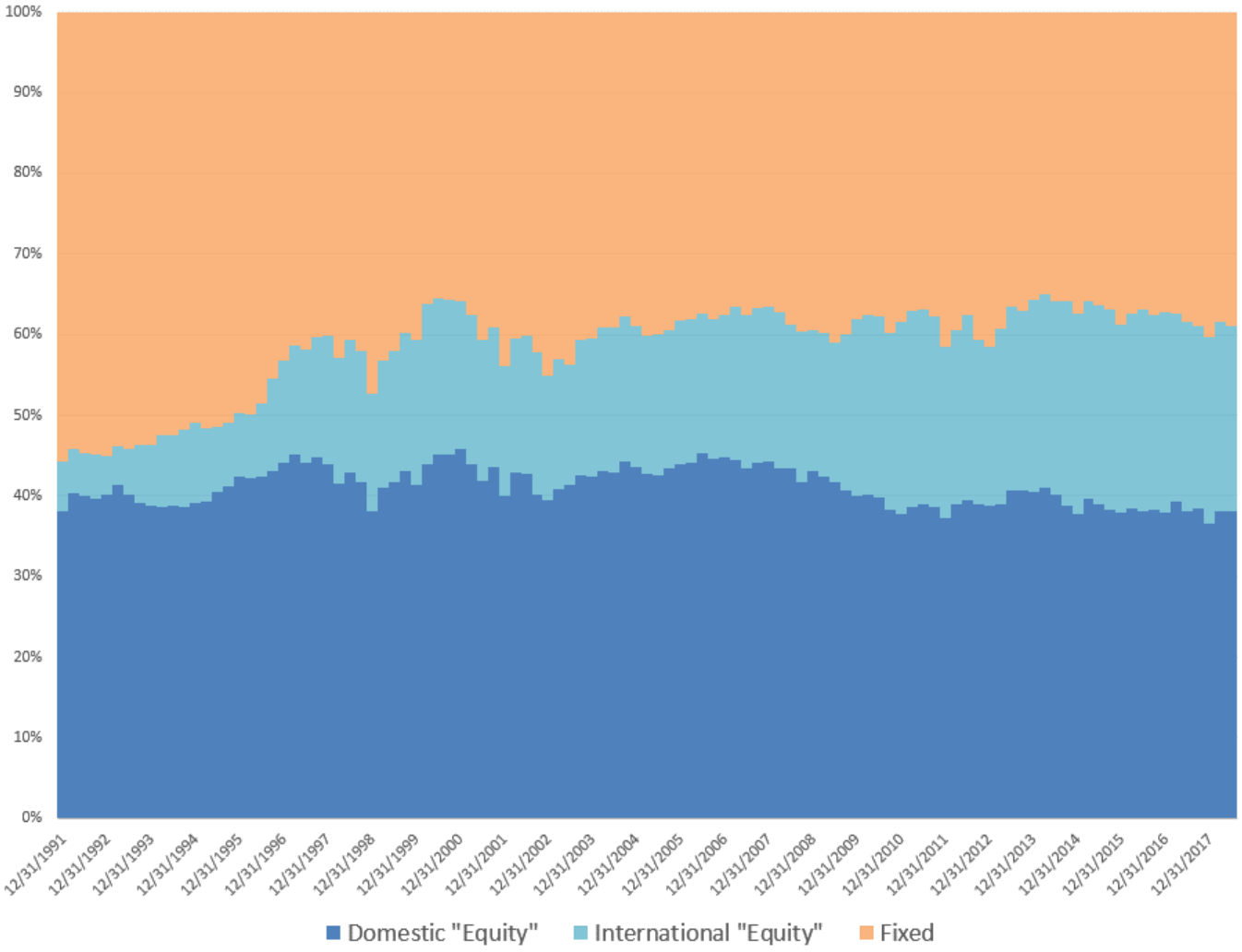
Source: Callan
“Equity” = Domestic Equity, International Equity, Private Equity, Alternative Equity, Other
“Fixed Income” = Fixed Income, International Fixed Income, High Yield, Real, Absolute Return, Cash Equivalents

Domestic versus International Equity



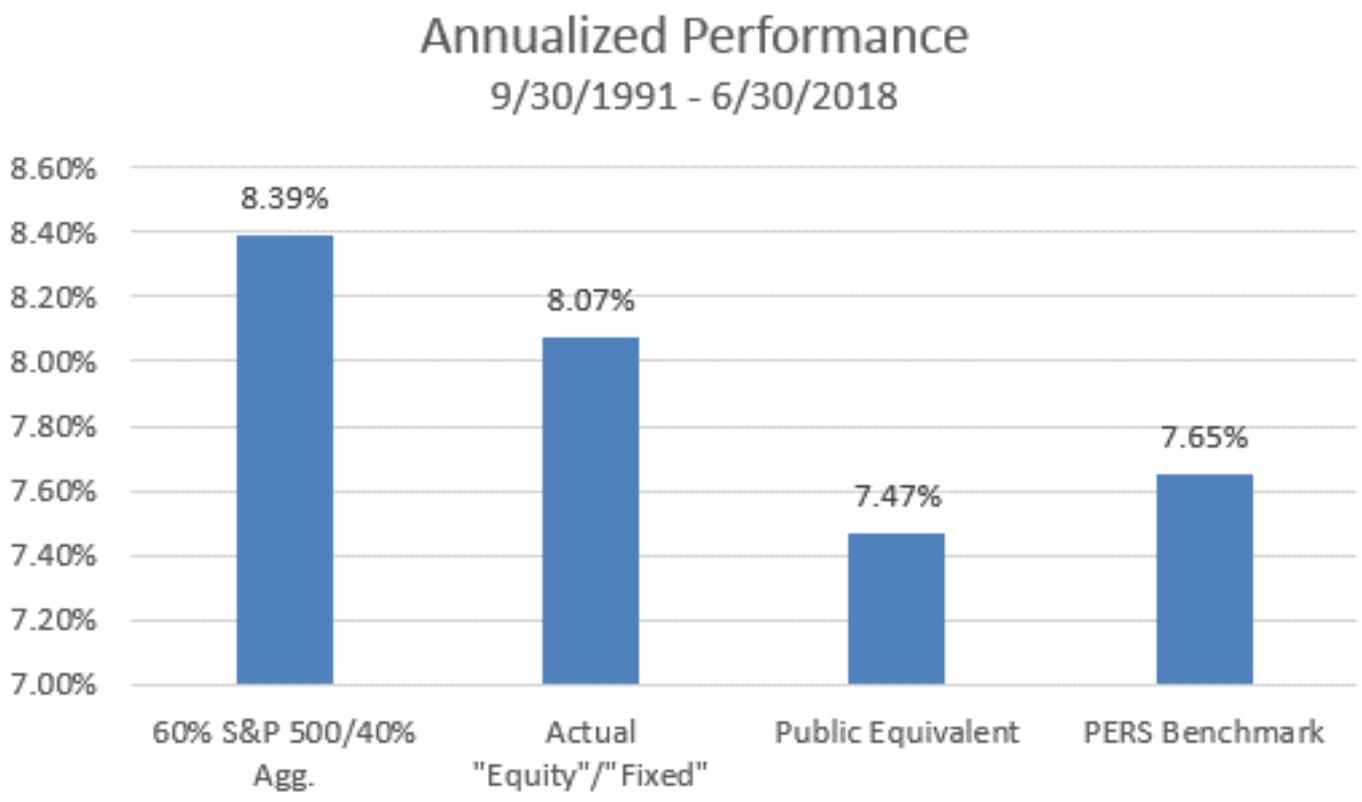
Source: Callan

Domestic & Int'l. "Equity" & "Fixed Income"



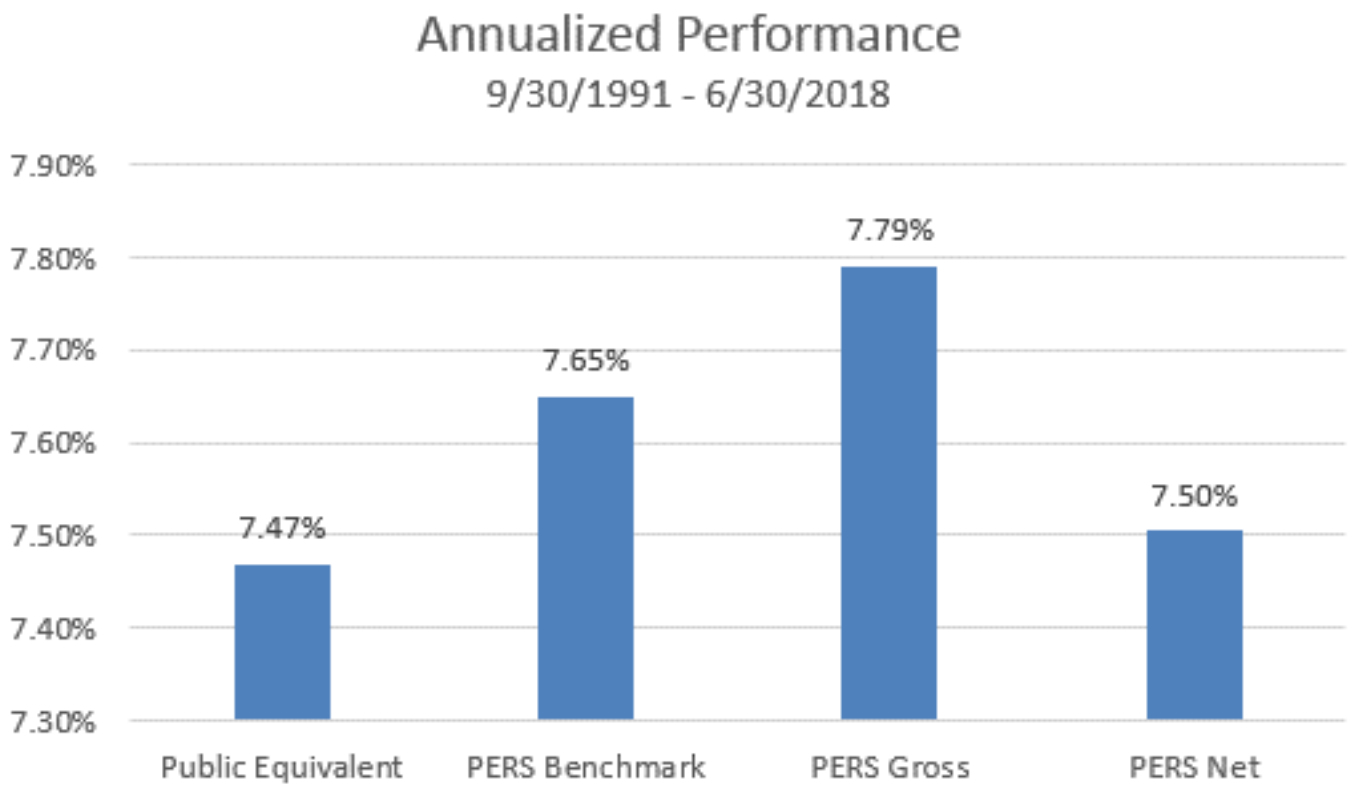
Source: Callan

“60/40” versus PERS – Nuanced View



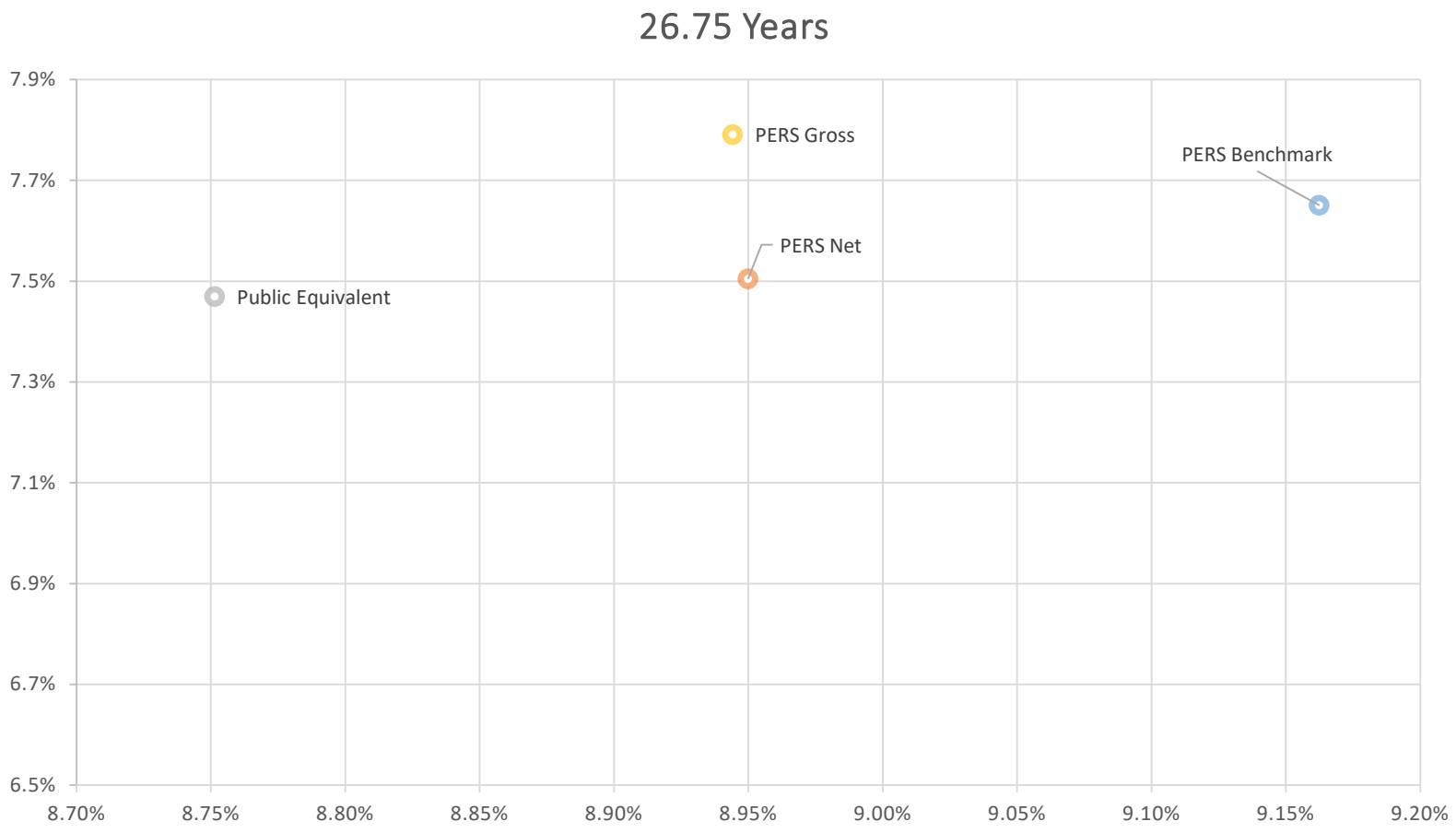
Source: Callan, Bloomberg

“60/40” versus PERS – Nuanced View



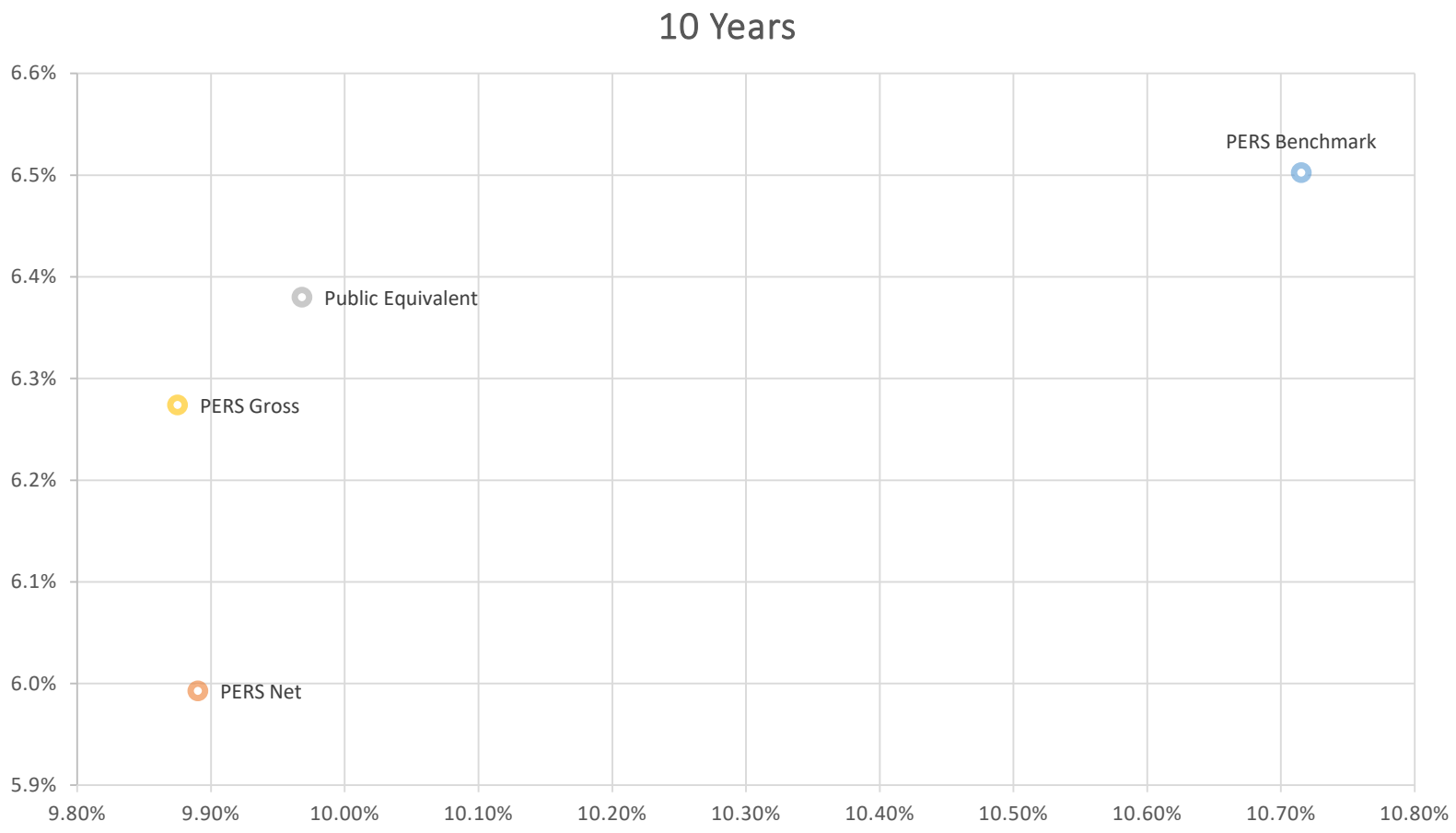
Source: Callan, Bloomberg

Long Term Return and Risk



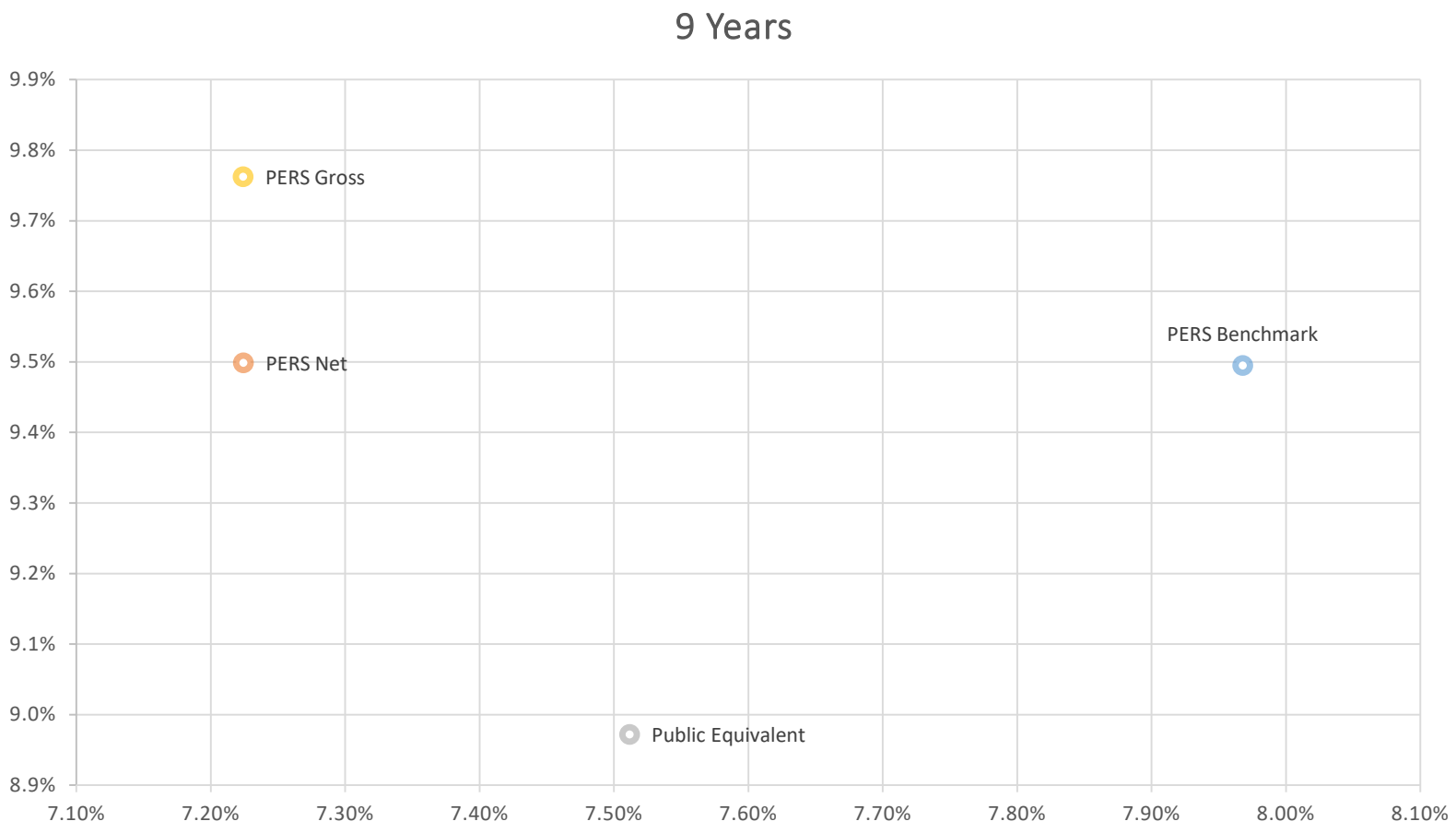
Source: Callan, Bloomberg

10 Year Return and Risk



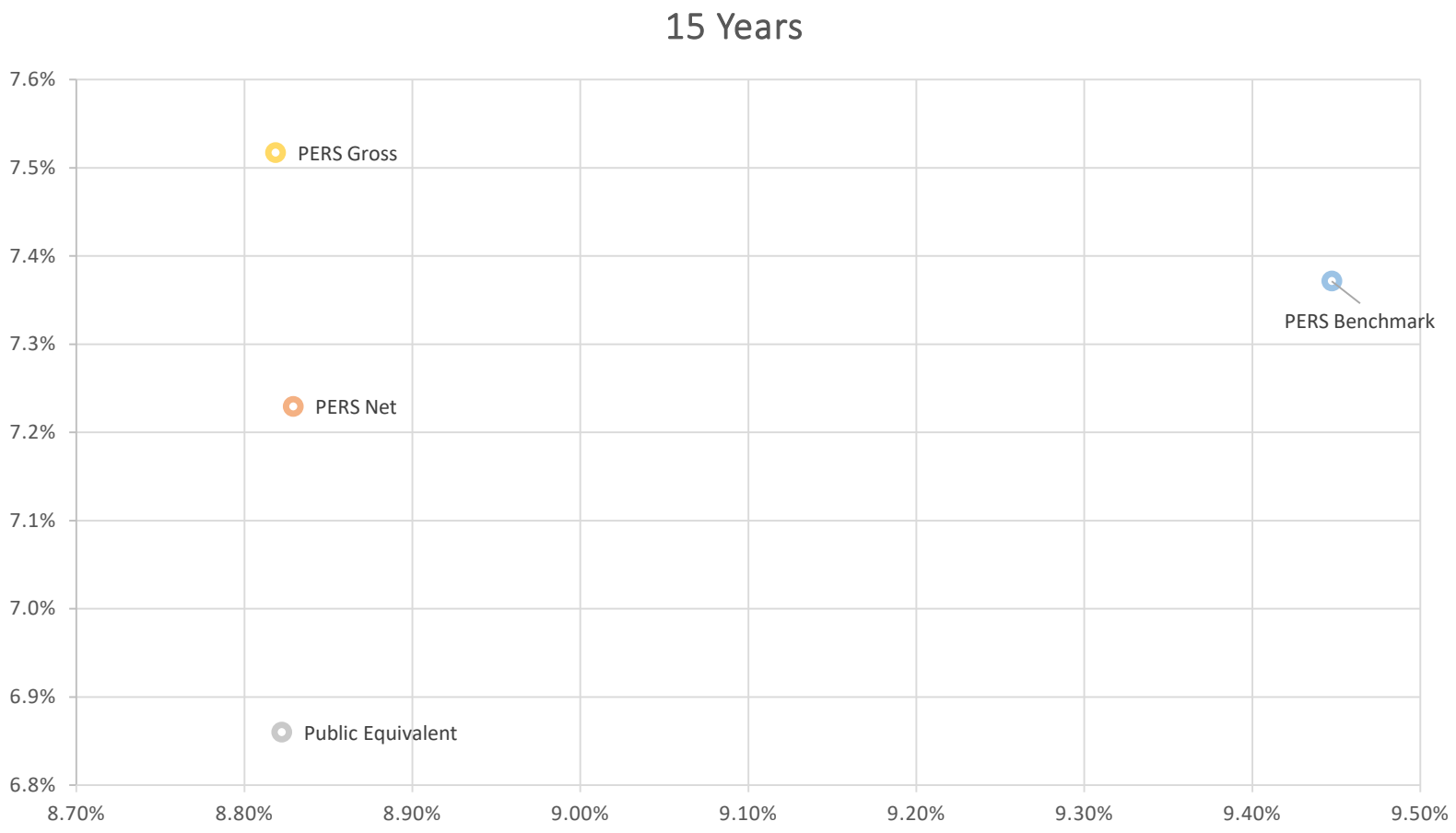
Source: Callan, Bloomberg

9 Year Return and Risk



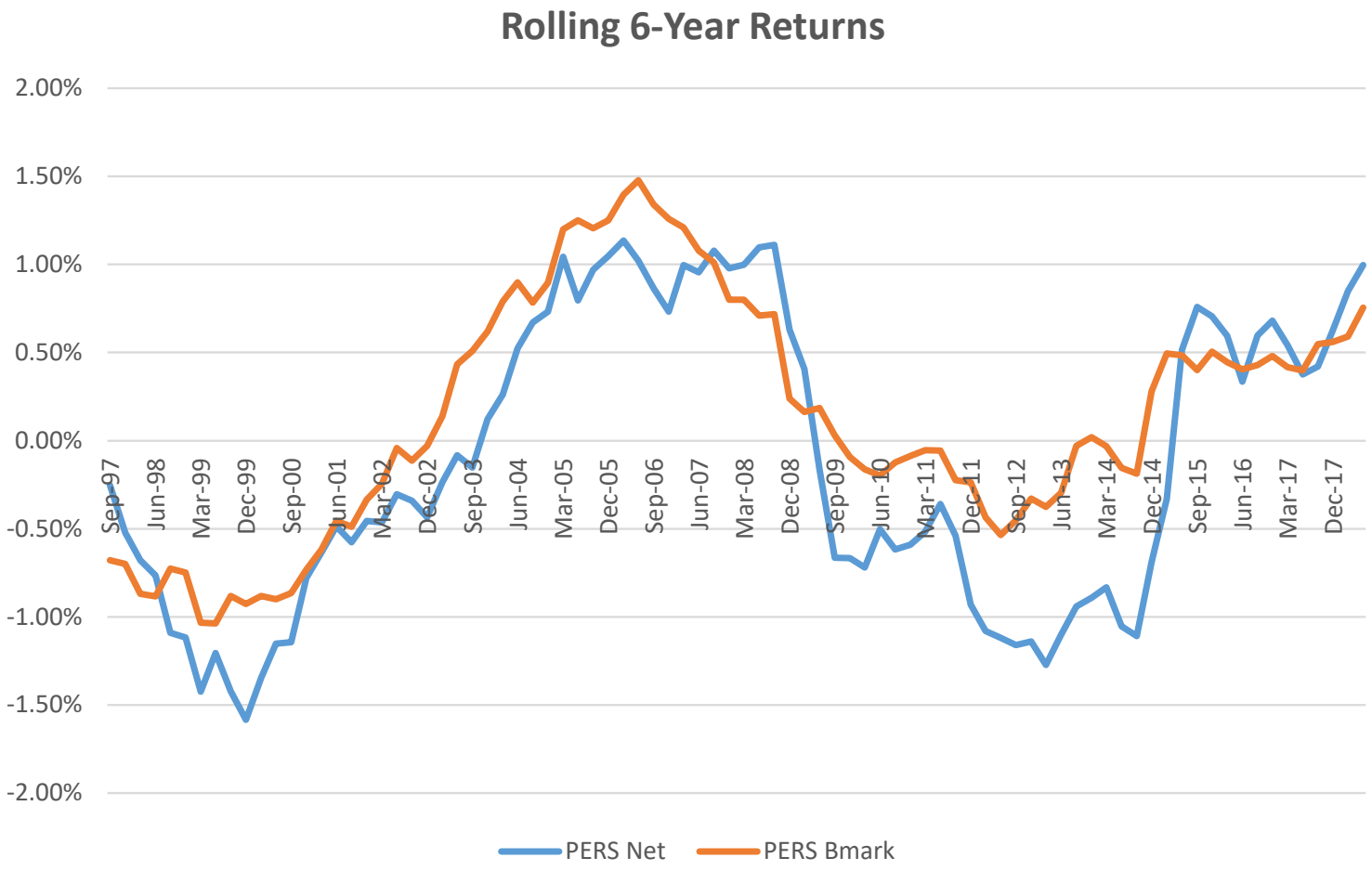
Source: Callan, Bloomberg

15 Year Return and Risk



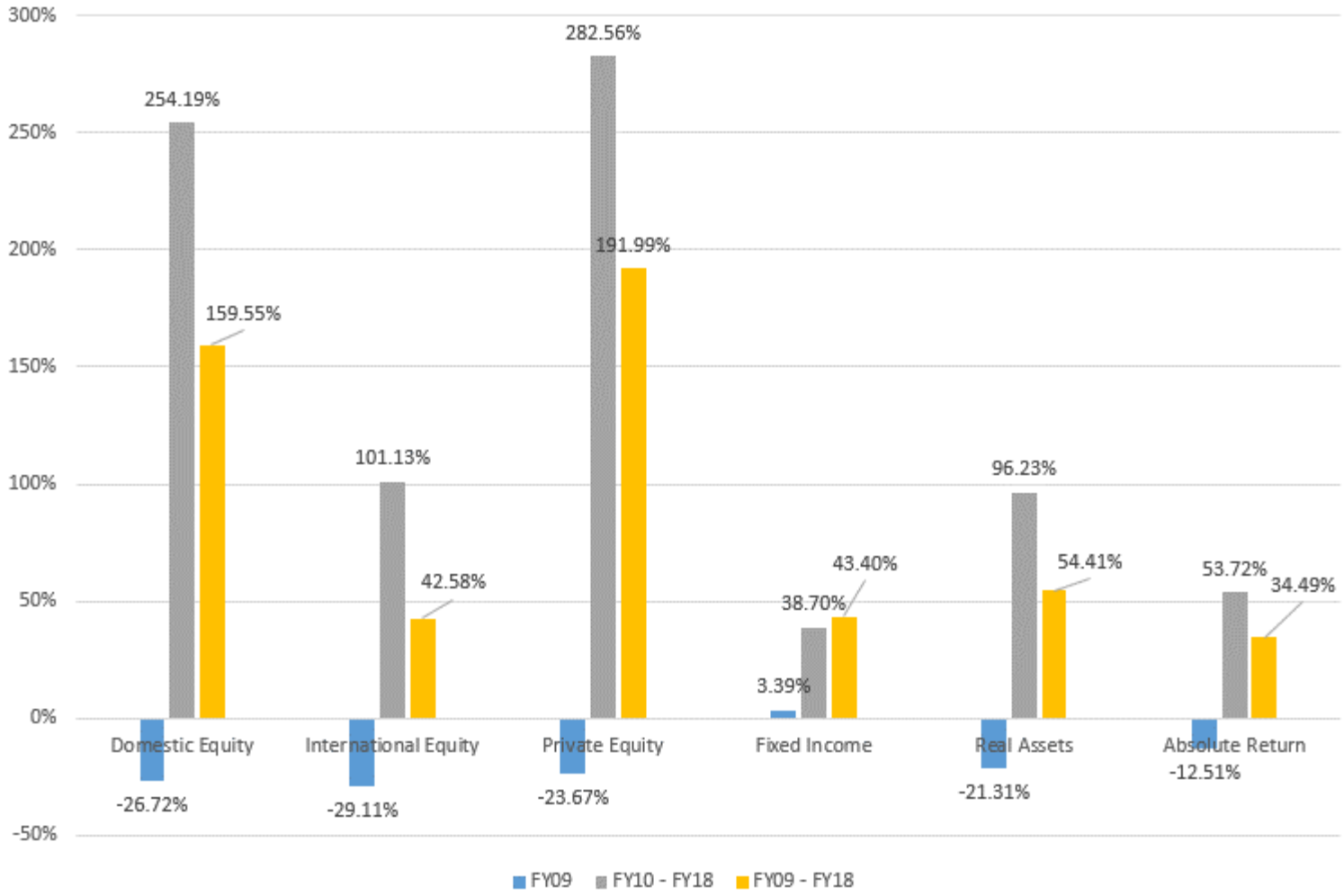
Source: Callan, Bloomberg

Returns Relative to Public Equivalent



Source: Callan, Bloomberg

Asset Class Level Performance – FY09 & After



Source: Callan

Takeaways

- The public markets provide a low-cost and readily-available investment option for the ARMB.
- Alternatives often involve sacrificing liquidity and transparency. We should invest if we expect a material improvement in risk-adjusted returns, relative to the public markets.
- The PERS strategic allocation to alternatives has outperformed public equivalents over long periods of time.
- Any comparison between competing investment portfolios is sensitive to the start and end dates used. One should do so with caution.
- Staff believes it is reasonable to evaluate net-of-fee performance of alternatives over rolling 6- to 10-year periods.

Questions to Explore

- How should we think about weighting public and alternative asset classes? (next time)
- What is the best strategy for international equity going forward?

International Equities

Range 12/31/1969 - 11/23/2018 Period Daily No. of Period 17859 Day(s) Table

	Security	Currency	Price Change	Total Return	Difference	Annual Eq
1)	SPX Index	USD	2759.61%	12132.55%	6759.64%	10.32%
2)	NDDUEAFE Index	USD	5372.92%	5372.92%	--	8.52%
3)						
4)						
5)						
6)						

1M 3M 6M YTD 1Y 2Y 3Y 5Y 10Y

Source: Bloomberg

International Equities

Range 12/31/1969 - 03/28/2008 Period Daily No. of Period 13967 Day(s) Table

	Security	Currency	Price Change	Total Return	Difference	Annual Eq
1)	SPX Index	USD	1328.65%	4767.80%	268.68%	10.69%
2)	NDDUEAFE Index	USD	4499.12%	4499.12%	--	10.52%
3)						
4)						
5)						
6)						

1M 3M 6M YTD 1Y 2Y 3Y 5Y 10Y

Source: Bloomberg

International Equities

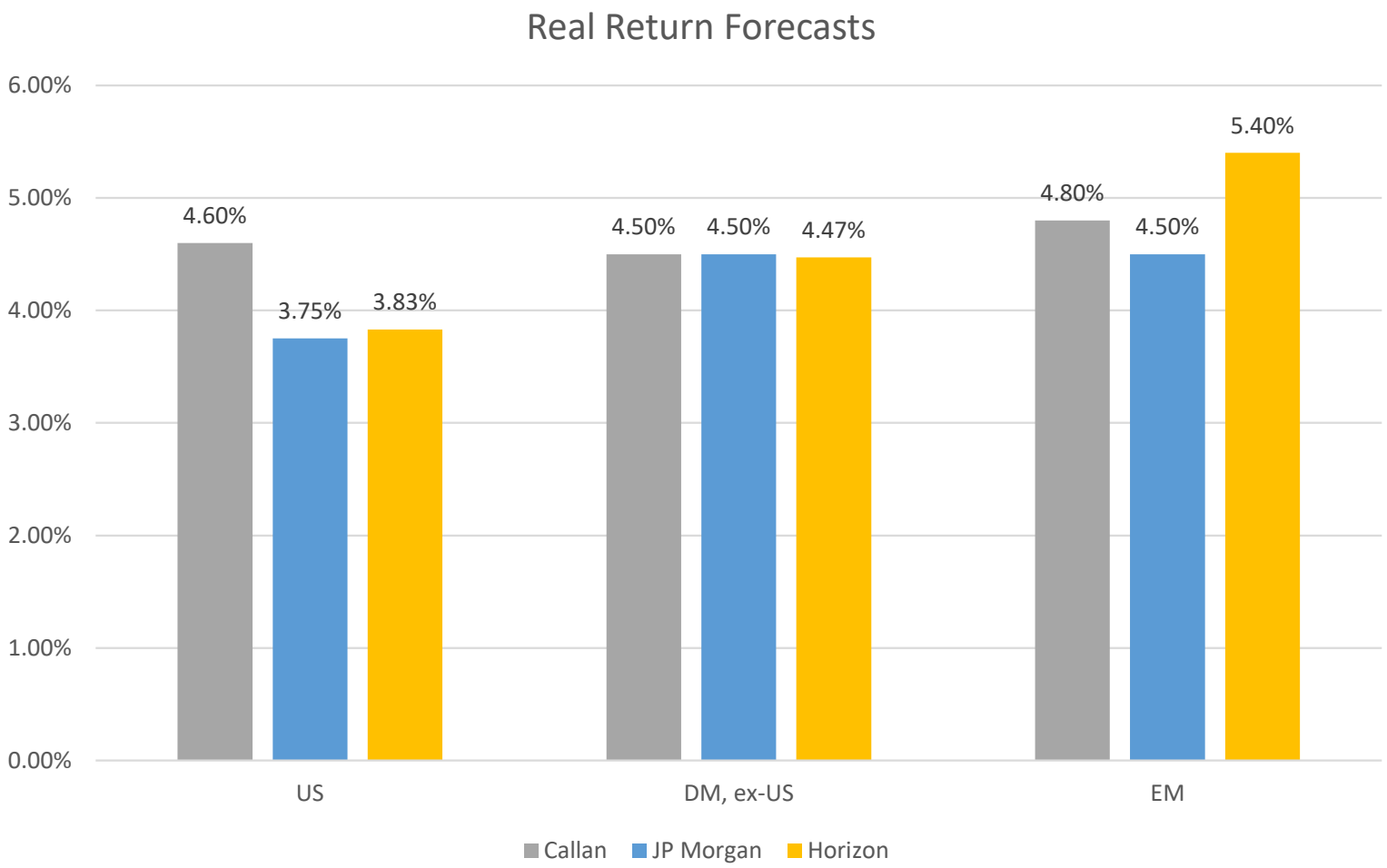
Range 03/28/2008 - 11/23/2018 Period Daily No. of Period 3892 Day(s) Table

	Security	Currency	Price Change	Total Return	Difference	Annual Eq
1)	SPX Index	USD	100.16%	151.30%	132.30%	9.03%
2)	NDDUEAFE Index	USD	19.00%	19.00%	--	1.64%
3)						
4)						
5)						
6)						

1M 3M 6M YTD 1Y 2Y 3Y 5Y 10Y

Source: Bloomberg

International Equities



Source: Bloomberg

Callan

December 13, 2018

ARMB Private Equity Portfolio

Annual Review and Performance Analysis

Gary Robertson
Senior Vice President

Private Equity Discussion Topics

- How Private Equity Works (Cash Flows)
- ARMB Private Equity Program Overview
- Market Conditions
- ARMB Private Equity Performance
  - Portfolio and Manager Performance
  - Vintage Year Benchmarking
  - Strategy Diversification
- How Private Equity Works (Cash Flows)
- Corporate Governance Portfolio
- Summary

How Private Equity Works

ARMB invests in all major private corporate finance strategies ("private equity"):

- **Venture Capital**
  - Smaller technology/medical companies
- **Buyouts and Special Situations**
  - Larger company equity, traditional industries
- **Subordinated Debt (Mezzanine)**
  - Private high yield, senior to equity, junior to bank debt, equity-linked
- **Distressed Debt**
  - Larger company restructuring, restarting good businesses

* ARMB's strategy targets are governed by the Investment Policy Guidelines and the Annual Tactical Plan

* For distressed debt and mezzanine, the tactical plan takes into account other ARMB investment activity in this strategy

How Private Equity Works

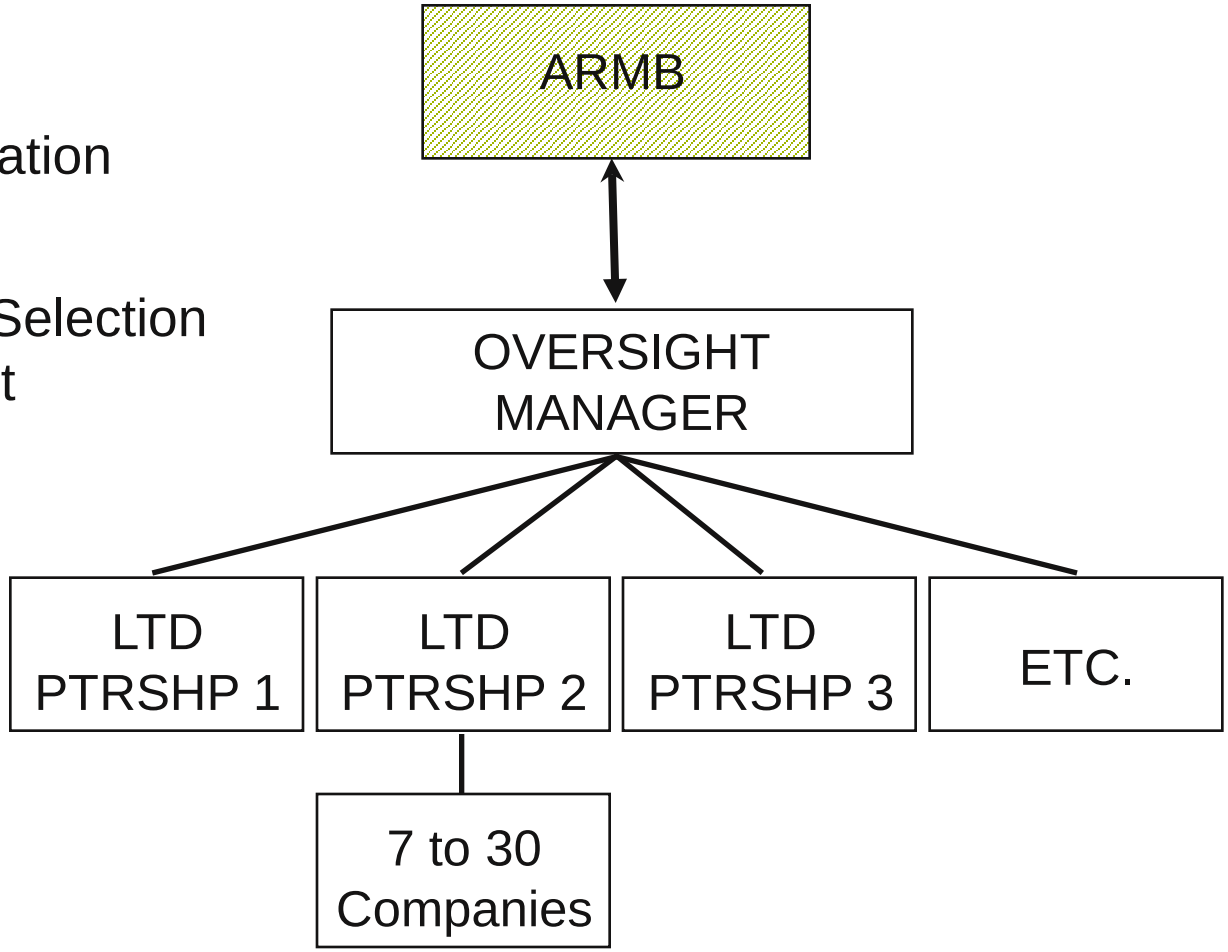
Private Equity Partnerships Program Structure

Policy
Strategic Planning
Performance Evaluation

Proactive Security Selection
Active Management
Reporting

Mini-Conglomerate
(Security)

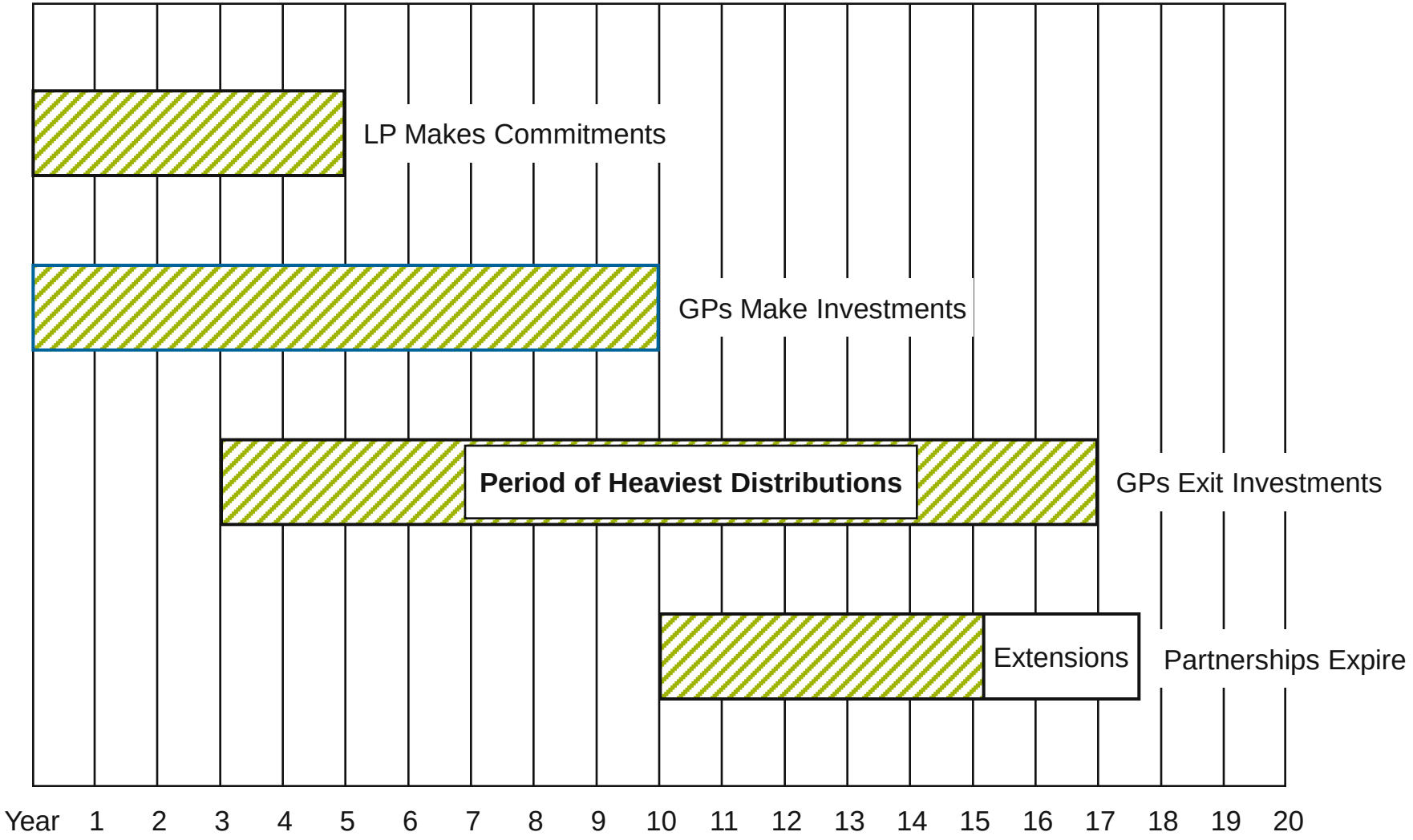
Divisions



How Private Equity Works

A Private Equity Investment Program Requires a Long-Term Horizon

Source: *The Private Equity Analyst*



ARMB Private Equity Program Overview

Timeline

- 1998 - ARMB initiates a 3% allocation 19 years ago and hires Abbott to invest in partnerships
- 2001 - ARMB raises the allocation to 6%
- 2001 - Hires Pathway to develop a second partnerships portfolio
- 2006 - Private equity allocation raised to 7%
- 2007 - ARMB initiates In-House private equity portfolio
- 2011 - Private equity allocation raised to 8%
- 2013 - Private equity allocation raised to 9%
- 2016 – Corporate governance partnerships exited

ARMB Private Equity Program Overview

Funding

- ARMB's total assets increased $1.1 billion (4%) during the 12-month period, so the private equity target increased by $98 million (4%) proportionately
- The total private equity NAV increased $350 million (16%)
- The private equity funding increased 0.9% and is within 70 basis points of the 9% target

As of June 30, 2018

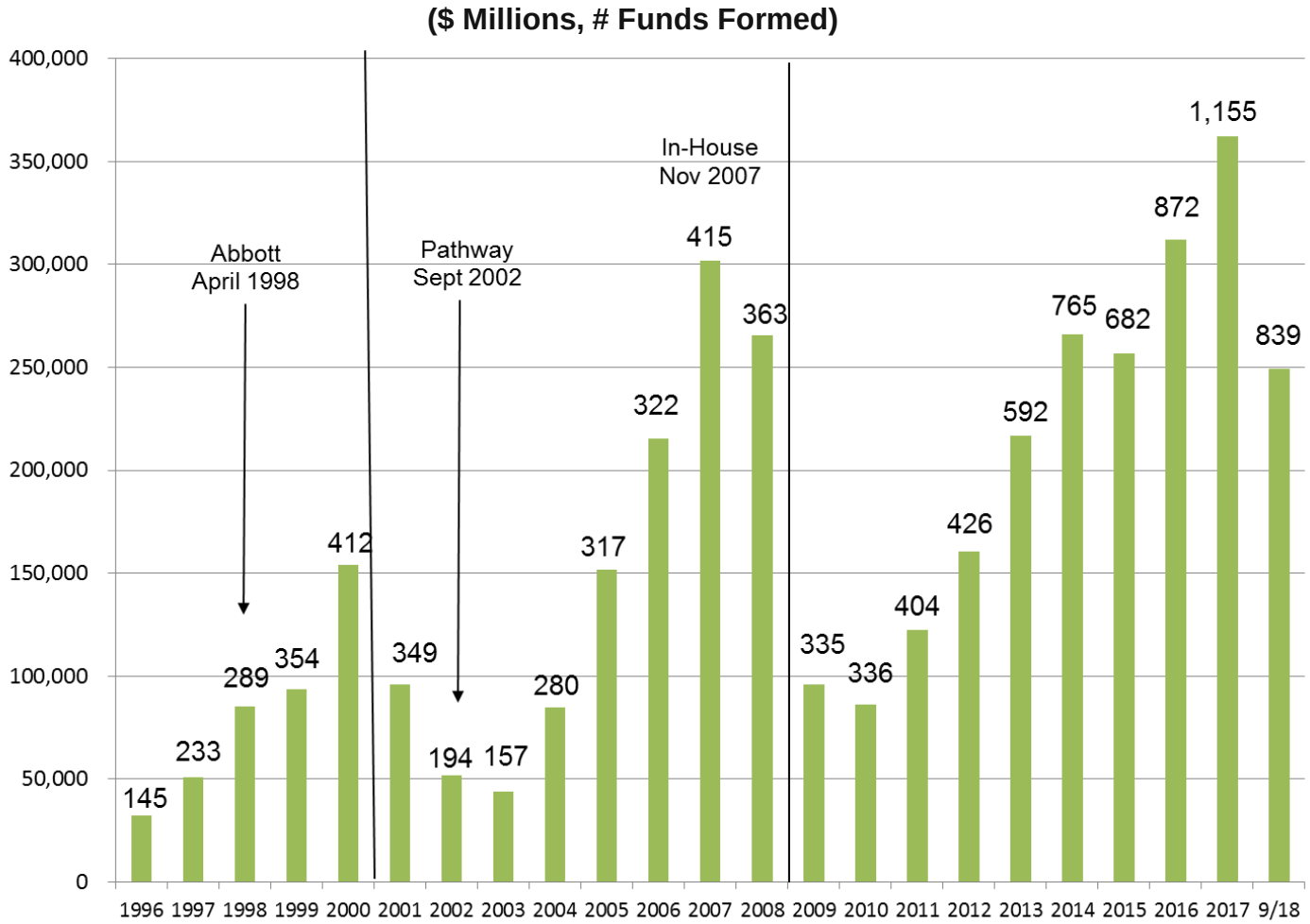
Measure	2017	2018	%
Total Assets*	25,179,002,927	26,269,456,562	
PE % Target	9.0%	9.0%	
PE $ Target	2,266,110,263	2,364,251,091	
Abbott	869,191,719	979,944,695	38%
Pathway	951,322,851	1,111,166,946	43%
In-House	387,598,703	467,955,557	18%
Total Private Equity	2,208,113,273	2,559,067,198	100%
% PE	8.8%	9.7%	
Difference from Target	-57,996,990	194,816,107	

* Treasury Financials less MRS which doesn't invest in PE. 2018 value is adjusted for June 30, 2018 actual private equity valuations.

- ARMB's uncalled capital fell to 51% of NAV compared to 60% last year. The uncalled will support the NAV near the target level, the reduction in the amount is sensible given the length of the bull market
- Given asset valuations, Callan is encouraging clients to be mindful of "denominator effects"

Private Equity Market Conditions

Industry Commitments To Partnerships



Source: *Private Equity Analyst*

ARMB's portfolio is in its third market cycle. The recent economic expansion has been considered relatively weak but long. However, financial asset returns have been robust

Private Equity Market Conditions

Economic Expansion, Strong Returns and Liquidity Continue

- In 2017, equity markets experienced an upward surge (Russell 3000 Index: +21.1%), a large increase from 2016's 12.7% return. Private equity also performed well (Cambridge PE Index +19.1%)
- Distributions remained strong for a fifth year, and the new company investment pace remained moderate due to high prices and competition from strategic acquirers
- Fundraising jumped to $362 billion (from $312 billion) as strong distributions continued and total plan valuations rose significantly
  - Large partnerships have experienced a receptive market, with record-sized funds raised in the U.S., Europe, and Asia
- Average U.S. buyout deal pricing remained above 10.0x EBITDA for a third year, and public equity valuations escalated
- Credit is readily available; Financial Regulations have relaxed Dodd-Frank bank guideline lending limits of 6x EBITDA bank and leverage has been rising
  - A growing cadre of non-bank lenders without regulatory limits are increasing supply
  - Equity contributions remain relatively large
- Exits and distributions have continued to be very strong for investors with mature portfolios
  - Companies purchased after the financial crisis are now being exited, and some legacy companies remain
- The length of the global economic expansion, rising interest rates, elevated government debt levels, and high asset prices, have the potential to cause future fluctuations in liquidity - to which private equity is keenly sensitive

Private Equity Market Conditions

Private Equity Industry Returns
IRRs through June 30, 2018

Strategy	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
Venture	20.1%	9.1%	17.4%	10.8%	10.7%	17.8%
Buyouts	18.0%	13.9%	14.8%	9.7%	14.5%	12.2%
Mezzanine	12.9%	10.4%	10.3%	9.2%	9.8%	8.6%
All Private Equity	**18.0%**	**12.1%**	**14.4%**	**10.1%**	**13.2%**	**12.7%**
S&P 500	14.4%	11.9%	13.4%	10.2%	9.3%	6.5%

Source: Thomson/Cambridge, Standard & Poor's

- All Private Equity has provided the expected return premium over longer time periods
- All Private Equity outperforms public equity over all horizons except 10-years (with 1 bp lag). The long-term performance is attractive
- The recent public market volatility since December 2017 has boosted private equity's relative standing in the short-term due to its less volatile appraisal valuation methodology
- It has been nine years since public markets bottomed in 1Q2009 and the bull market began
- Venture capital's strong recent run (1 and 5 years) has helped lift diversified portfolios' returns

ARMB Private Equity Performance

Total Portfolio: 12-Month Changes, June 30, 2018 ($000)

Year	Committed	Paid-In	Uncalled	Distributed	NAV	DPI	RVPI	TVPI	IRR	%PI
2017	5,621,856	4,342,127	1,328,780	4,294,389	2,208,113	0.99	0.51	1.50	11.2%	77%
2018	6,186,603	4,871,540	1,315,377	4,891,153	2,559,067	1.00	0.53	1.53	11.4%	79%
Change	**564,747**	**529,413**	**(13,403)**	**596,764**	**350,954**	**0.02**	**0.02**	**0.03**	**0.2%**	**2%**
% Chg	10%	12%	-1%	14%	16%	2%	3%	2%	2%	2%

All manager holdings are June 30 actual values and cash flows.
NAV differs from Treasury Financials as manager data is June 30, 2018 actuals, Treasury figures are 1Q18 adjusted for 2Q18 cash flows
DPI = Distributions as a ratio of (divided by) Paid-In capital
RVPI = Residual Value (Net Asset Value) as a ratio of (divided by) Paid-In Capital
TVPI = Total Value (Distributions + NAV) as a ratio of (divided by) Paid-In Capital

Key Metrics	
$ Gross Distributions	596,764
Gross Distribution Yield(1)	27.0%
$ Net Distributions	67,350
Net Distribution Yield(2)	**3.1%**
$ NAV Increase	357,210
% NAV Increase	**16.2%**
$ Total Increase	424,560
% Total Increase	**19.2%**

(1) Gross Distributions / Starting NAV
(2) Gross Distributions / Starting NAV
(Both include return of capital and gains)

1. Total investments: up 45 from last year; including 27 partnerships and 18 co-investments
2. Commitments increased by $565 million (10%), up from $461 million (9%) the prior year
3. Paid-in capital increased $529 million (12%), down slightly from $548 million (14%) last year
4. Uncalled capital fell $13 million (-1%), slightly less than the $63 million (-5%) decline last year
5. The portfolio is 79% paid-in (mature), up from 77% last year (Abbott 81%, Pathway 80%, and ARMB 64%)
6. The portfolio distributed $597 million, a 27% gross cash flow return (distributions divided by beginning NAV); dollar increased from $575 million, but the percentage decreased from last years 31%
7. Net cash flow to ARMB was $67 million (3%), up from $27 million (2%) last year
8. NAV increased by $351 million (16%), down from $372 million (20%) last year
9. Total portfolio appreciation was $423 million (19%), compared to $399 million (22%) last year
10. IRR of 11.4% is second quartile versus the Thomson/Cambridge All Region composite since 1998, which has a top quartile of 17.3% and a median of 9.1% (43rd percentile)
11. Performance ratios all increased. The TVPI of 1.53x is second quartile versus the Thomson/Cambridge upper quartile of 1.80x and a median of 1.37x (40th percentile)
12. ARMB's private equity time-weighted return for the last 10 years is 11.31% versus the Russell 3000's 7.98%; applying ARMB's policy statement premium of 3.50% results in a private equity lag of 38 basis points
13. ARMB's 10 year 11.31% return is above the Cambridge Database index's return of 10.09%

ARMB Private Equity Performance

Total Portfolio Summary Change Metrics: Last 12 Years Ended June 30, 2018 ($000)

ARMB Summary Changes Metrics - Fiscal Years ended June 30 ($000)

Cumulative Values	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Commitments	2,095,104	2,474,744	2,742,373	2,863,483	3,137,245	3,376,366	3,536,444	3,969,626	4,610,928	5,160,640	5,621,856	6,186,603
Paid-In	1,383,305	1,698,786	1,882,191	2,043,035	2,285,180	2,546,467	2,812,066	3,073,494	3,474,104	3,794,225	4,342,127	4,871,540
% PI	66%	69%	69%	71%	73%	75%	80%	77%	75%	74%	77%	79%
Uncalled	711,799	773,553	857,745	818,549	850,282	830,317	803,896	995,506	1,266,675	1,513,668	1,328,780	1,315,377
Distributed	828,482	1,053,166	1,135,362	1,278,525	1,565,519	1,859,734	2,332,346	2,792,318	3,306,981	3,719,577	4,294,389	4,891,153
NAV	1,061,115	1,283,311	1,069,319	1,289,123	1,497,378	1,604,129	1,610,963	1,726,998	1,831,824	1,836,486	2,208,113	2,565,323

Annual Changes	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Commitments	273,848	379,640	267,629	121,110	273,762	239,121	160,078	433,182	641,302	549,712	461,216	564,747
Paid-In	283,329	315,481	183,405	160,844	242,145	261,287	265,599	261,428	400,610	320,121	**547,902**	**529,413**
Uncalled	(9,482)	61,754	84,192	(39,196)	31,733	(19,965)	(26,421)	191,610	271,169	246,993	(184,888)	(13,403)
Gross Distributed	300,837	224,684	82,196	143,163	286,994	294,215	472,612	459,972	**514,663**	412,596	**574,812**	**596,764**
Net Cash Flow	17,508	(90,797)	(101,209)	(17,681)	44,849	32,928	**207,013**	198,544	114,053	92,475	26,910	67,350
NAV	201,726	222,196	(213,992)	219,804	208,255	106,751	6,834	116,035	104,826	4,662	**371,628**	**357,210**
Total Appreciation	219,234	131,399	(315,201)	202,123	253,104	139,679	213,847	314,579	218,879	97,137	**398,538**	**424,560**

Annual Results (Change/Prior NAV)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Gross Cash Flow Return	35%	21%	6%	13%	22%	20%	29%	29%	30%	23%	31%	27%
Paid-In Change	33%	30%	14%	15%	19%	17%	17%	16%	23%	17%	30%	24%
Net Cash Flow Return	2%	-9%	-8%	-2%	3%	2%	13%	12%	7%	5%	1%	3%
NAV % Increase	23%	21%	-17%	21%	16%	7%	0%	7%	6%	0%	20%	16%
Total Portfolio Appreciation	26%	12%	-25%	19%	20%	9%	13%	20%	13%	5%	22%	19%

PE Funded Versus Target	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Target	7.0%	7.0%	6.6%	7.0%	8.0%	8.0%	8.0%	9.0%	9.0%	9.0%	9.0%	9.0%
% Funded	6.7%	8.5%	8.7%	9.6%	9.2%	9.9%	8.9%	8.2%	7.6%	8.0%	8.8%	9.7%
Over/(Under) Target	-0.3%	1.5%	2.1%	2.6%	1.2%	1.9%	0.9%	-0.8%	-1.4%	-1.0%	-0.2%	0.7%

Key:	Low	Muted	Moderate	High

Performance Ratios	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2017
DPI	0.60	0.62	0.60	0.63	0.69	0.73	0.83	0.91	0.95	0.98	0.99	1.00
RVPI	0.77	0.76	0.57	0.63	0.66	0.63	0.57	0.56	0.53	0.48	0.51	0.53
TVPI	1.37	1.38	1.17	1.26	1.34	1.36	1.40	1.47	1.48	1.46	1.50	1.53

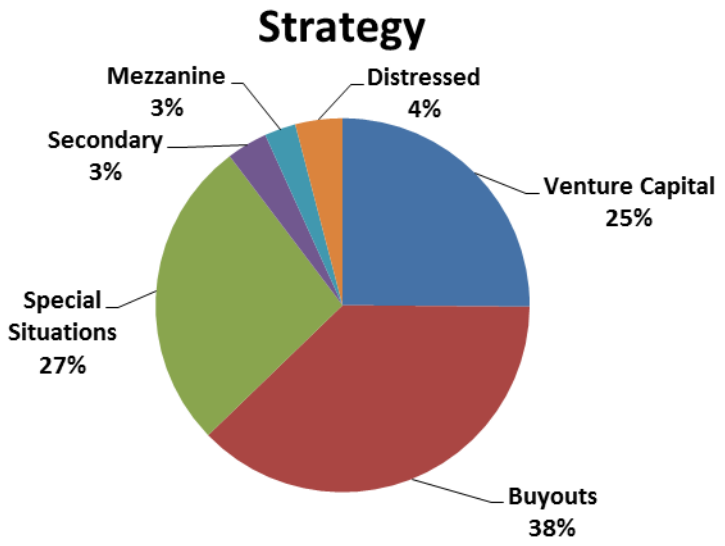
Color coding characterizations are qualitative and provided in the context of market and portfolio dynamics—not performance assessment

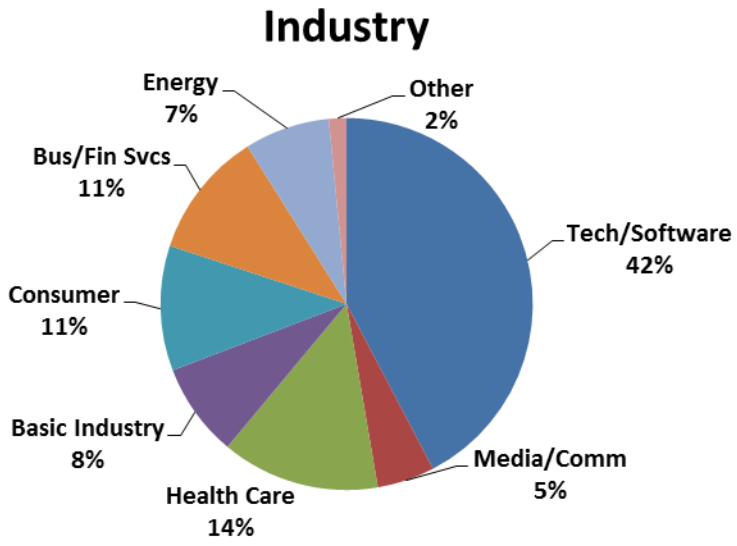
Increasing Paid-In offsetting strong Gross Cash Flow has recently reduced Net Cash Flow

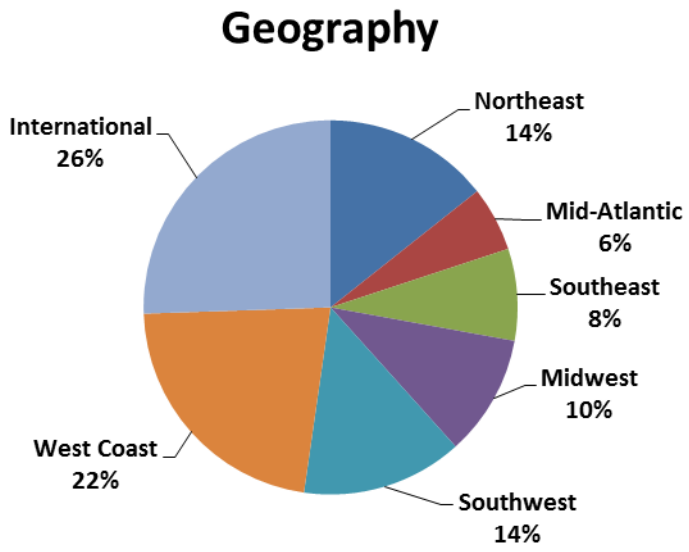
Positive Net Cash Flow and NAV increases have resulted in continued Total Portfolio Appreciation

2018 saw high “liquidity,” relatively low volatility, and healthy appreciation; with a moderate Paid-In decrease

ARMB Portfolio Diversification June 30, 2018 ($000)







International = Europe 18%, Asia 3%, and Rest-of-World 5%

Note: Strategy allocations based on partnership NAV and includes ACM, PCM and ARMB.
Industry and Geography allocations based underlying portfolio companies and include ACM and PCM.

Abbott Capital Management Profile

- Founded in 1986. The firm is an independent registered investment advisor and is employee-owned by Abbott's 10 Managing Directors (90%) and two retired co-founders (10%)
- ACM has 10 senior investment professionals, 8 junior investment professionals and a total staff of 56 employees
- ACM has had a stable team with little senior professional turnover. In August 2017, one long-standing Managing Director retired, the head of Investor Relations will retire at the end of 2018, and another Managing Director will retire at the end of 2020. Abbott gives clients about two-years notice. Abbott has, and is adding staff to compensate the pending departures.
- The firm is headquartered in New York and has an additional office in London
- The firm has $9.3 billion in AUM (Uncalled + NAV), in both fund-of-funds and separate accounts, and has a large established client base. ARMB represents 11% of the ACM's AUM
- ACM's ARMB investment program started in mid-1998 and represents 38% of the ARMB's private equity portfolio NAV
- ACM invests in all key private equity strategies, except distressed debt, in a diversified manner. The firm has strong relationships in venture capital and an expertise in non-US investing
- Callan would characterize ACM as a conservative global boutique, with strong historical experience in venture capital and European private equity investing. The firm also has long-standing with highly-developed corporate finance funds

ARMB Private Equity Performance

Abbott Portfolio: 12-Month Changes, June 30, 2018 ($000)

Year	Committed	Paid-In	Uncalled	Distributed	NAV	DPI	RVPI	TVPI	IRR	%PI
2017	2,533,814	2,024,736	509,077	2,197,833	869,192	1.09	0.43	1.51	9.9%	80%
2018	2,713,945	2,209,321	504,624	2,434,173	979,945	1.10	0.44	1.55	10.3%	81%
Change	**180,131**	**184,585**	**(4,453)**	**236,339**	**110,753**	**0.02**	**0.01**	**0.03**	**0.4%**	**1%**
% Chg	7%	9%	-1%	11%	13%	2%	3%	2%	4%	2%

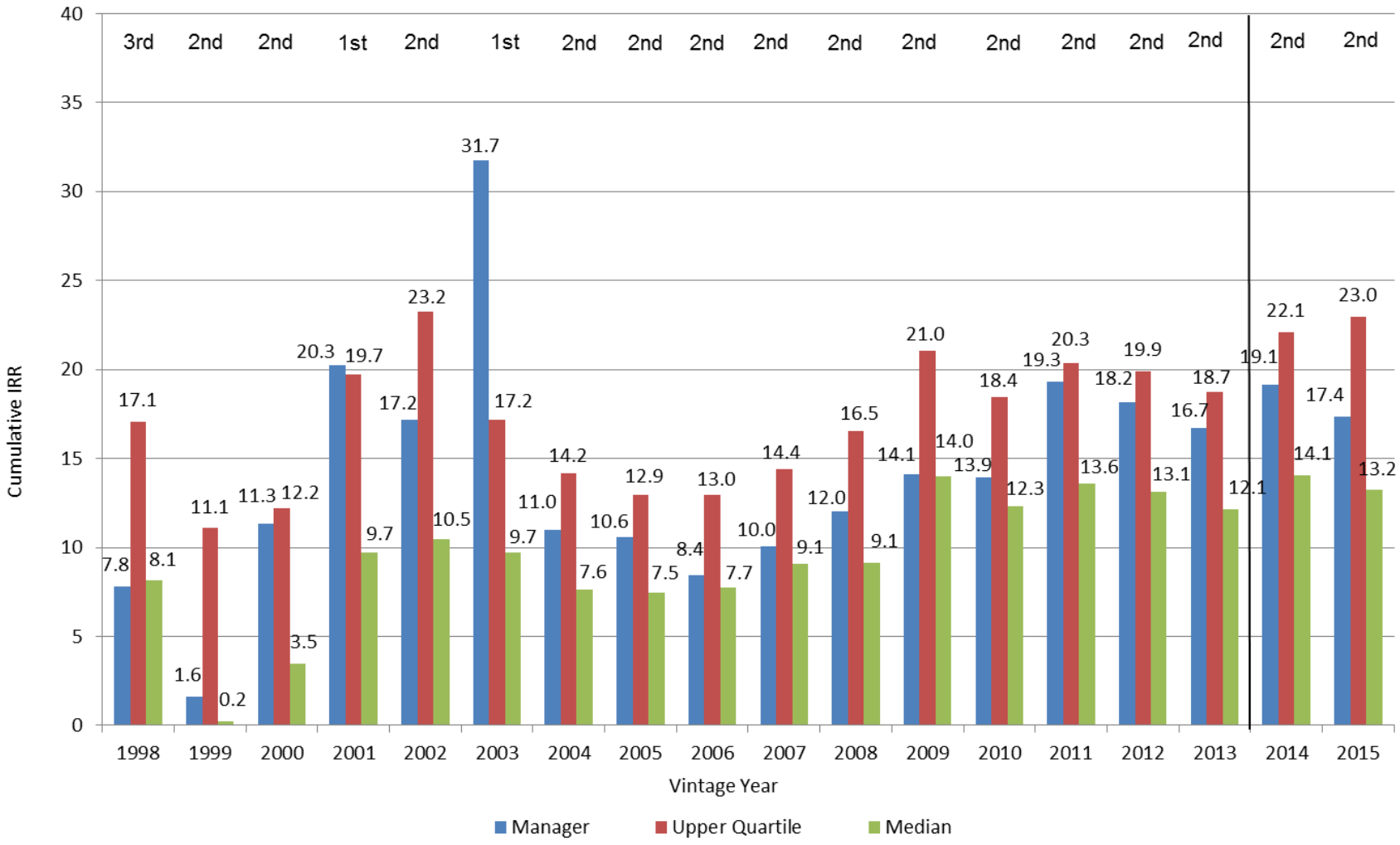
Key Metrics	
$ Gross Distributions	236,339
Gross Distribution Yield	27.2%
$ Net Distributions	51,755
Net Distribution Yield	**6.0%**
$ NAV Increase	110,753
% NAV Increase	**12.7%**
$ Total Increase	162,508
% Total Increase	**18.7%**

1. Initiated in 1998, invested in 221 partnerships (+15), 38% of total private equity NAV
2. Commitments increased $180 million (7%), up from $173 million (7%) last year
3. Paid-in increased $185 million (9%), down from $204 million (11%) last year
4. The portfolio is 81% paid-in (*fully* mature) being *net cash flow positive since inception* for its fourth year
5. Uncalled capital decreased $4 million (-1%), less than the $31 million (-6%) decrease last year
6. The portfolio distributed $236 million (27% cash flow yield), down somewhat from $253 million (33%)
7. Portfolio net cash flow was a positive $51 million (6%) as more capital was distributed than paid-in, similar to the positive $49 million (6%) in the prior year
8. NAV rose $110 million (13%), similar to last year's rise of $100 million (13%)
9. Total portfolio appreciation was $162 million (19%), comparable to the $149 million (19%) last year
10. Abbott's 10.3% IRR is second quartile versus the Thomson/Cambridge All Region composite since 1998, which has a top quartile of 17.3% and a median of 9.1% (46th percentile)
11. The 1.55x TVPI is also second quartile versus a top quartile of 1.80x and a median of 1.37x (40th percentile)

DPI = Distributions as a ratio of (divided by) Paid-In capital
RVPI = Residual Value (Net Asset Value) as a ratio of (divided by) Paid-In Capital
TVPI = Total Value (Distributions + NAV) as a ratio of (divided by) Paid-In Capital
Benchmarks are Thomson/Cambridge All Regions 6/30/18

Abbott: Cambridge Vintage Year Peer Group Benchmark

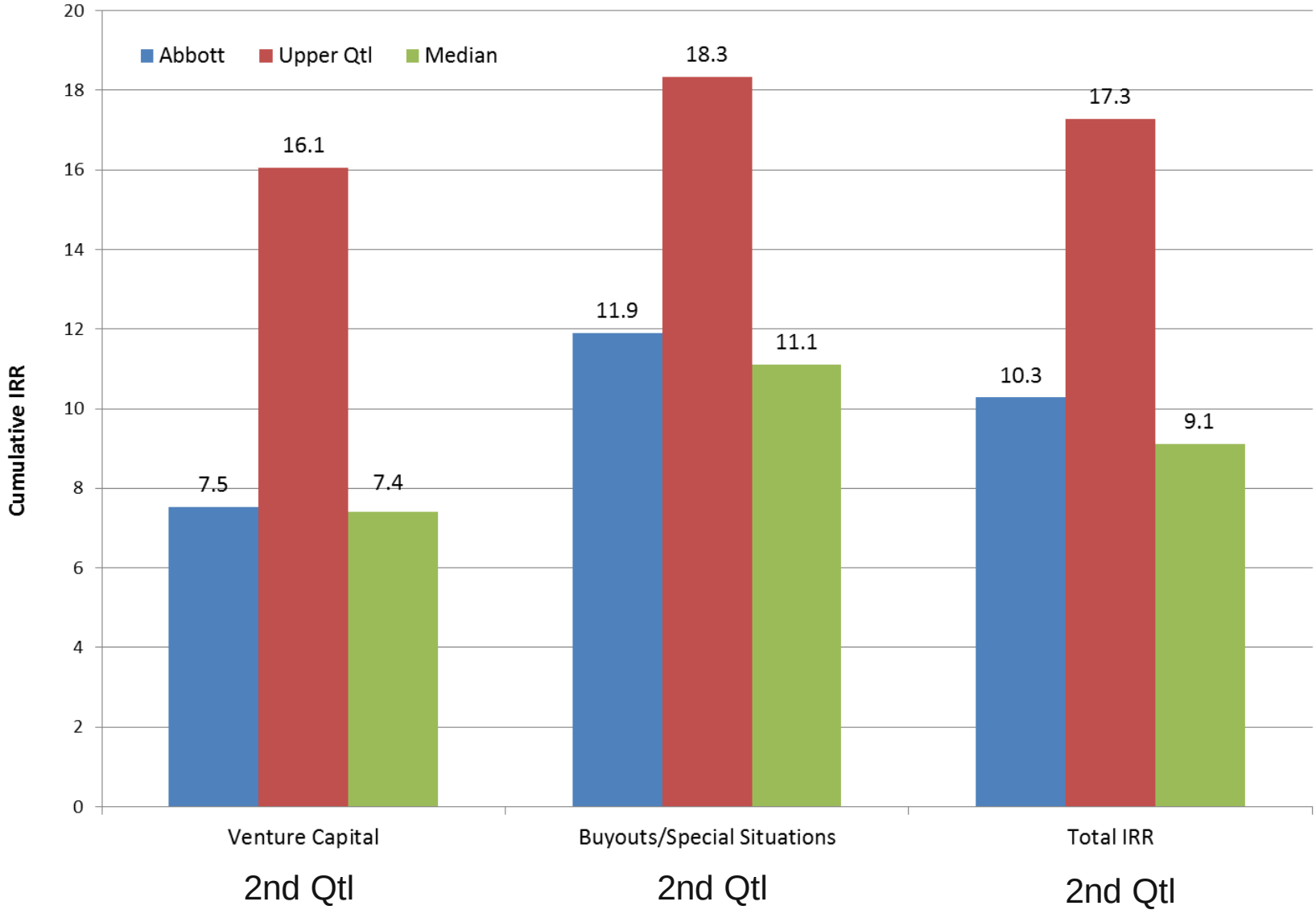
IRRs and All Region Benchmarks as of June 30, 2018



1st Quartile: 2 years 2nd Quartile: 15 years Below Median: 1 years

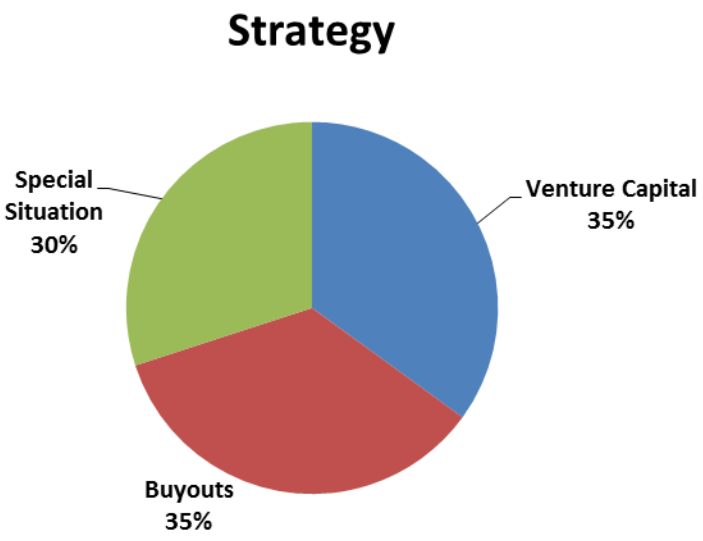
Abbott: Cambridge Strategy Peer Group Benchmark

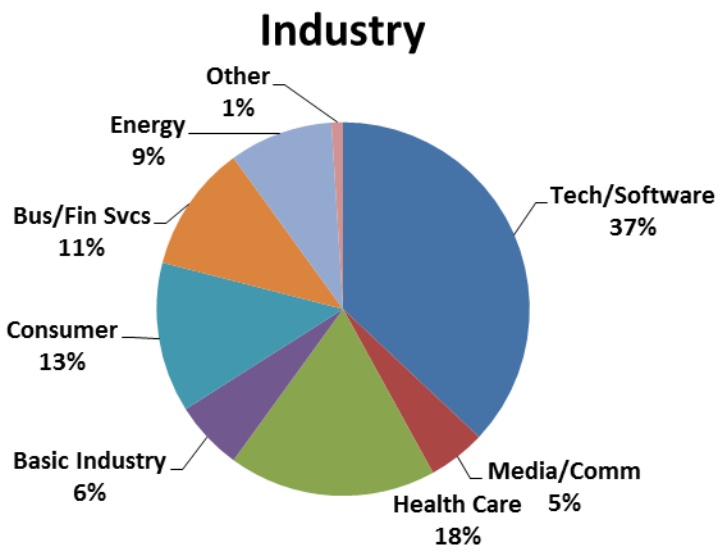
Cumulative Composite Benchmarks Inception through 6/30/2018

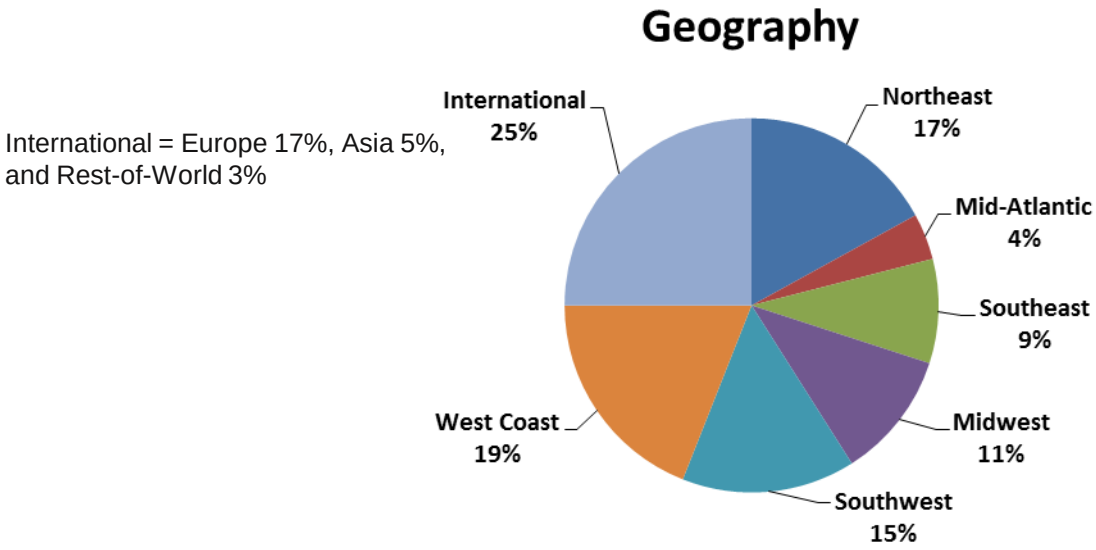


All Composites: VY 1998 – 2018

ACM Portfolio Diversification June 30, 2018 ($000)







Note: Strategy allocations are based on partnership NAV, Industry and Geography allocations are based on underlying portfolio company valuations

Pathway Capital Management Profile

- Founded in 1991. The firm is an independent registered investment advisor and is wholly owned by its 19 partners. PCM has 17 senior investment professionals and 42 junior investment professionals, with 159 total employees
- The firm is headquartered in Irvine, CA and has additional offices located in London and Rhode Island and Hong Kong. PCM also has a Pacific Basin alliance with its client Tokyo Marine
- PCM has had a generally stable team. There have been four senior departures in recent years, in early-2012 one of the three founding partners departed, in 2013 a director departed, and in 2015 a managing director and director in the Rhode Island office both retired. A Managing Director in the London office will be retiring at the end of 2018. The firm maintains a deep staff
- Total AUM is $52.9 billion (NAV plus uncalled), with a large established client base. ARMB represents 2% of the PCM's AUM
- Pathway's portfolio initiated in mid-2002 and represents 43% of the ARMB's private equity portfolio NAV
- Pathway states that they use a market-weighting investment strategy and do not tend to overweight particular investment strategies. The investment approach is conservative, investing with highly developed general partners with proven track records and experience investing through market cycles, primarily in developed markets
- Callan would characterize PCM as a conservative global boutique core manager that invests in key private equity strategies, except mezzanine and has an expertise in non-US investing. The firm's corporate finance investments have a mid- to large-buyouts orientation

ARMB Private Equity Performance

Pathway Portfolio: 12-Month Changes, June 30, 2018 ($000)

Year	Committed	Paid-In	Uncalled	Distributed	NAV	DPI	RVPI	TVPI	IRR	%PI
2017	2,215,140	1,730,198	484,942	1,761,723	951,323	1.02	0.55	1.57	13.6%	78%
2018	2,424,756	1,951,740	473,016	2,016,194	1,111,167	1.03	0.57	1.60	14.0%	80%
Change	**209,616**	**221,542**	**(11,926)**	**254,471**	**159,844**	**0.01**	**0.02**	**0.03**	**0.3%**	**2%**
% Chg	9%	13%	-2%	14%	17%	1%	4%	2%	2%	3%

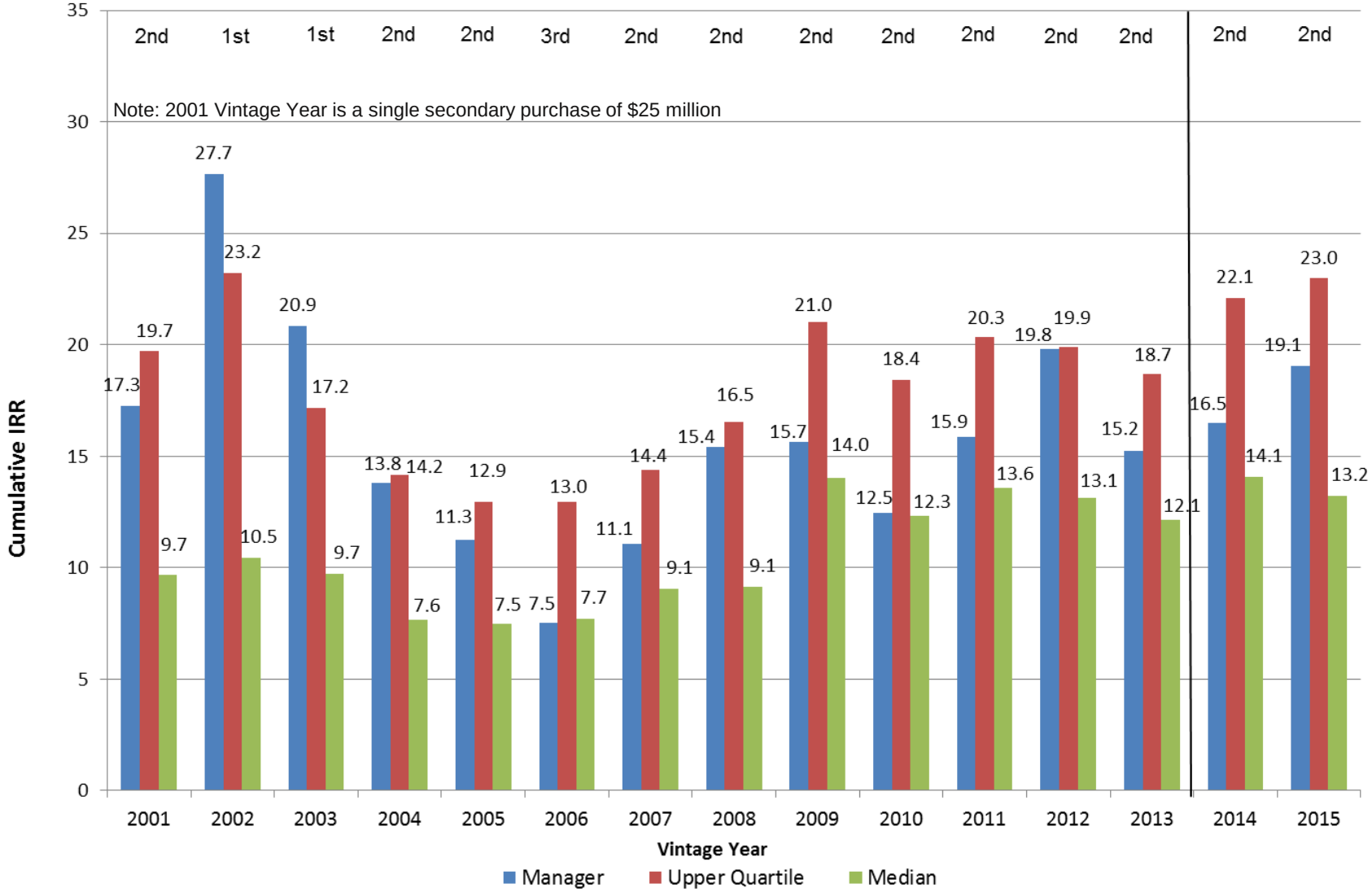
Key Metrics	
$ Gross Distributions	254,471
Gross Distribution Yield	26.7%
$ Net Distributions	32,929
Net Distribution Yield	**3.5%**
$ NAV Increase	159,844
% NAV Increase	**16.8%**
$ Total Increase	192,773
% Total Increase	**20.3%**

1. Initiated in mid-2002, invested in 192 partnerships (+12) and 24 co-investments (+12), 43% of total PE NAV
2. Commitments increased $210 million (9%), down from $238 million (12%) last year
3. Paid-in increased $222 million (13%), up from $186 million (12%) last year
4. The portfolio is 80% paid-in and is *fully* mature, being cumulatively cash flow positive for a second year
5. Uncalled capital declined $12 million (12%), versus a $52 million (12%) increase last year
6. Distributions were $255 million (27% cash flow yield), similar to the $238 million (29%)
7. Portfolio net cash flow was $33 million or 4% of initial NAV (distributions exceeded paid-in), down from $52 million (6%) last year
8. NAV increased $160 million (17%), up from $132 million (16%) last year
9. Total portfolio appreciation was $193 million (20%), similar to $184 million (22%) last year
10. Pathway's 14.0% IRR is second quartile versus the Thomson/Cambridge All Region composite since 2002, which has a top quartile of 17.7% and a median of 9.9% (37th percentile)
11. The 1.60x TVPI is also second quartile versus the top quartile and median of 1.80x and 1.38x (37th percentile)

DPI = Distributions as a ratio of (divided by) Paid-In capital
RVPI = Residual Value (Net Asset Value) as a ratio of (divided by) Paid-In Capital
TVPI = Total Value (Distributions + NAV) as a ratio of (divided by) Paid-In Capital
Benchmarks are Thomson ONE All Regions 6/30/18

Pathway: Cambridge Vintage Year Peer Group Benchmark

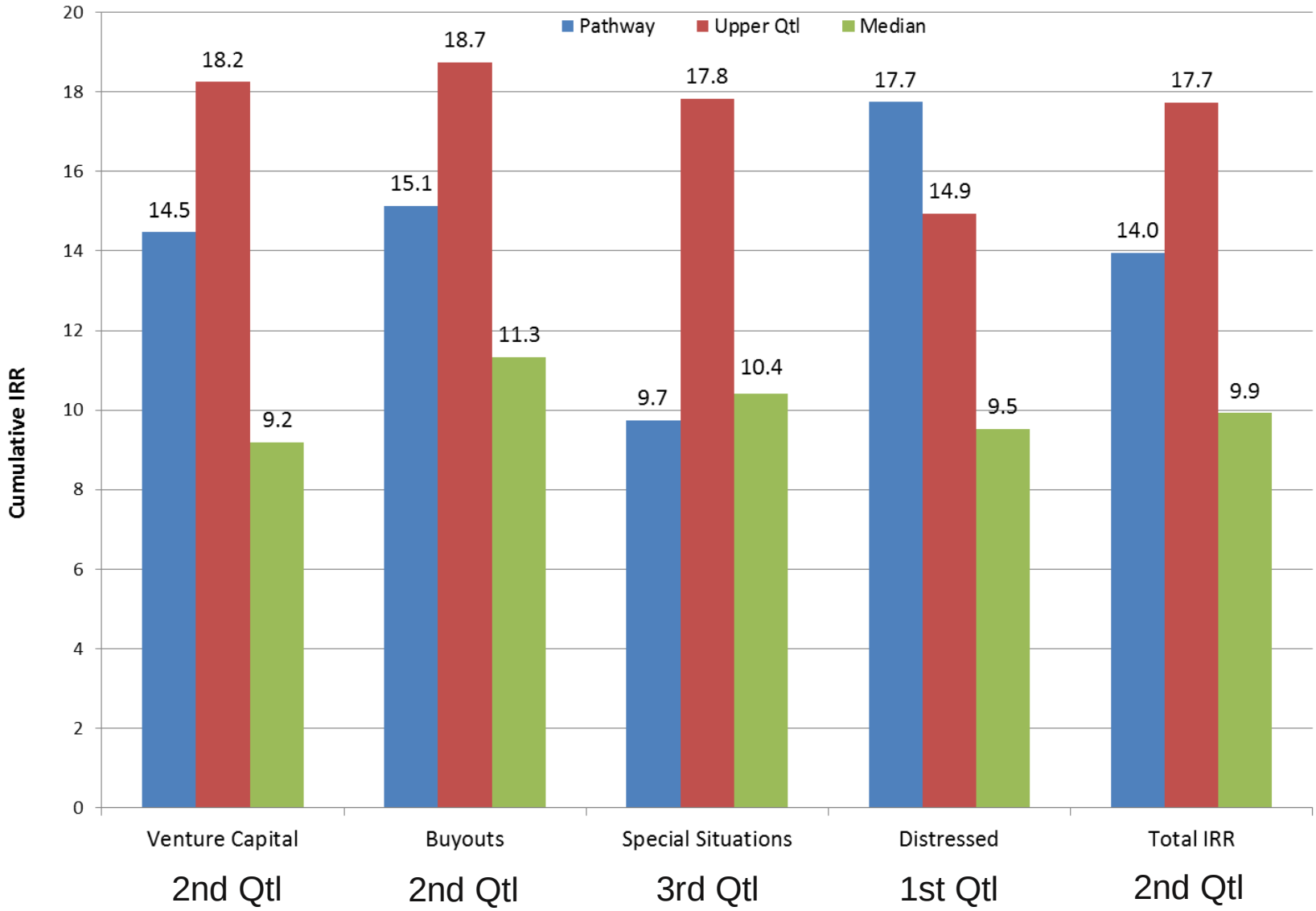
IRRs and All Region Benchmarks as of June 30, 2018



1st Quartile: 2 years 2nd Quartile: 12 years Below Median: 1 years

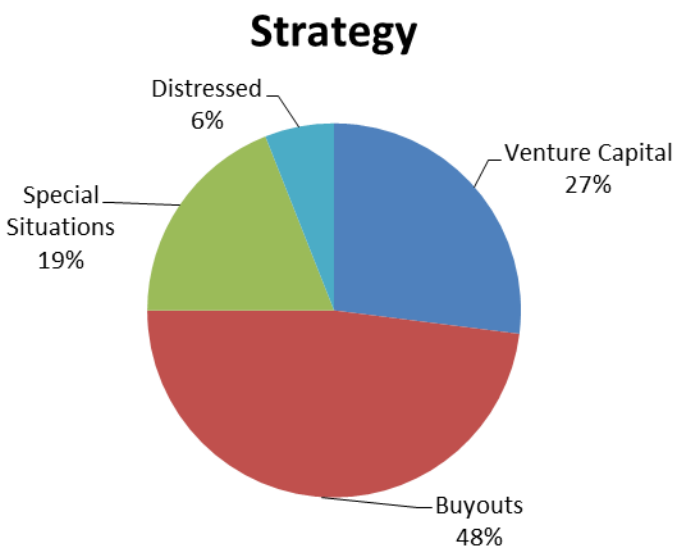
Pathway: Cambridge Strategy Peer Group Benchmark

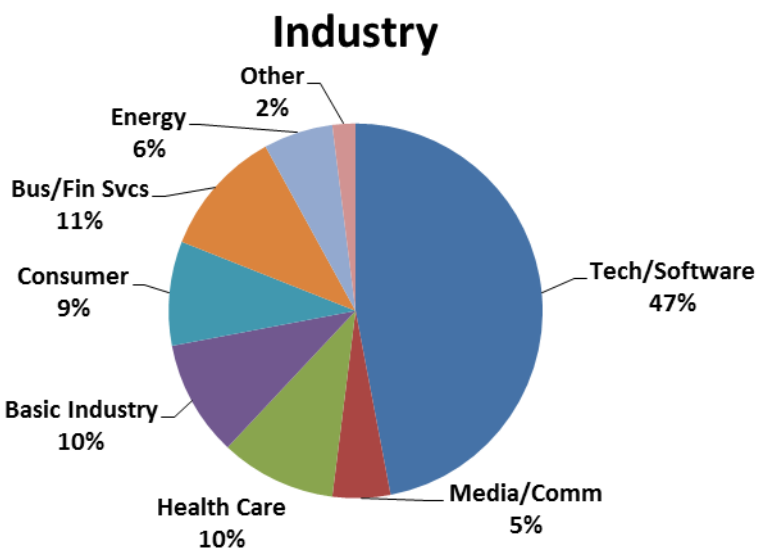
Cumulative Composite Benchmarks Inception through 6/30/2018

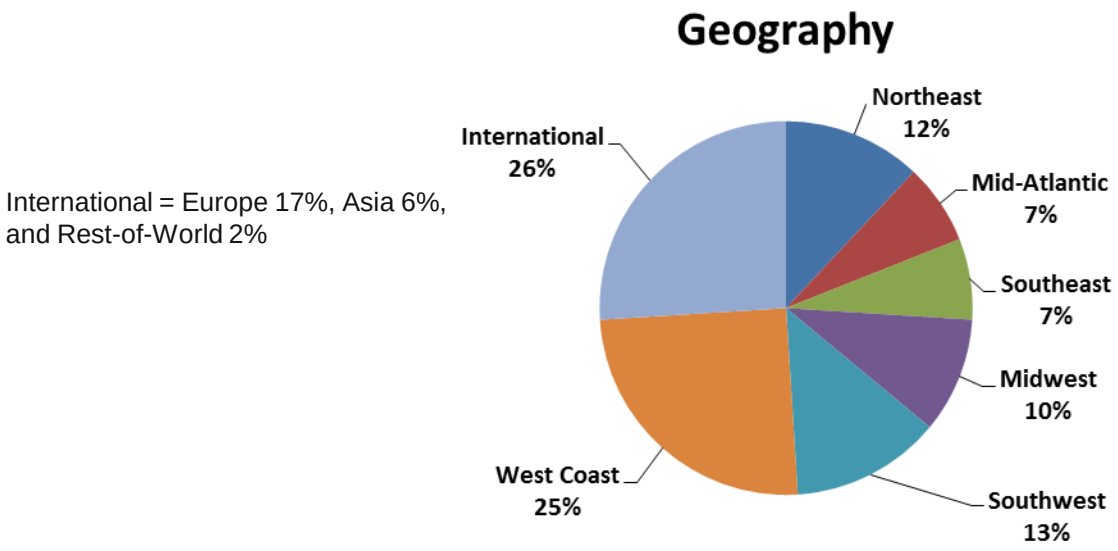


All Composites: VY 2002 – 2018

PCM Portfolio Diversification June 30, 2018 ($000)





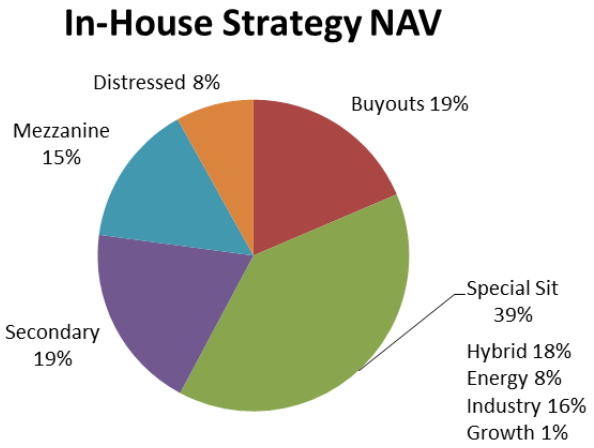


Note: Strategy allocations are based on partnership NAV, Industry and Geography allocations are based on underlying portfolio company valuations

In-House Portfolio Overview June 30, 2018 ($000)

	Partnership	VY	Strategy	Overlap	Committed	Paid-In	% PI
1	Warburg X	2007	Special Sit	ACM	30,000,000	30,274,298	101%
2	AG CRP VI	2008	Distressed	None	25,000,000	25,000,000	100%
3	Onex III	2008	Buyout	PCM	25,000,000	26,642,174	107%
4	Lexington VII	2010	Secondary	None	75,000,000	68,621,972	91%
5	Merit V	2010	Mezzanine	None	25,000,000	23,555,102	94%
6	Warburg XI	2013	Special Sit	ACM	30,000,000	32,157,507	107%
7	NB SOF III	2013	Secondary	None	50,000,000	22,176,896	44%
8	Resolute III	2014	Buyout	ACM/PCM	20,000,000	22,260,947	111%
9	New Mountain IV	2014	Buyout	None	25,000,000	20,456,483	82%
10	Glendon Opps	2014	Distressed	PCM	40,000,000	29,981,992	75%
11	KKR Lending II	2015	Credit	None	100,000,000	107,413,499	107%
12	NGP XI	2015	Energy	None	50,000,000	41,473,143	83%
13	Lexington VIII	2015	Secondary	None	50,000,000	30,472,087	61%
14	Warburg XII	2015	Special Sit	None	65,000,000	42,705,000	66%
15	Dyal III	2015	Special Sit	None	50,000,000	32,529,293	65%
16	Advent VIII	2016	Buyout	ACM/PCM	25,000,000	16,225,000	65%
17	Summit IX	2017	Special Sit	PCM	40,000,000	23,372,000	58%
18	NB SOF IV	2017	Secondary	None	50,000,000	4,640,092	9%
19	New Mountain V	2017	Buyout	None	50,000,000	12,619,288	25%
20	Glendon Opps II	2018	Distressed	PCM	75,000,000	0	0%
21	Resolute IV	2018	Buyout	ACM/PCM	50,000,000	0	0%
	Total				**950,000,000**	**612,576,773**	**64%**

VY	# Fds	Committed	%
2007	1	30,000,000	3%
2008	2	50,000,000	5%
2010	2	100,000,000	11%
2013	2	80,000,000	8%
2014	3	85,000,000	9%
2015	5	315,000,000	33%
2016	1	25,000,000	3%
2017	3	140,000,000	15%
2018	2	125,000,000	13%
Total	21	950,000,000	100%



- The portfolio is well-balanced and represents all key strategies except venture capital (although some VC exposure will be provided by Warburg)
- The portfolio spans 12 years with commitments in 9 vintage years, with two-thirds of commitments have been made in the last 4 years
- The investment pace by partnerships is tracking well, with funds more than three years old being highly paid-in

ARMB Private Equity Performance

In-House Portfolio: 12-Month Changes, June 30, 2018 ($000)

Year	Committed	Paid-In	Uncalled	Distributed	NAV	DPI	RVPI	TVPI	IRR	%PI
2017	775,000	489,290	334,447	258,897	387,599	0.53	0.79	1.32	12.4%	57%
2018	950,000	612,577	337,423	364,850	467,956	0.60	0.76	1.36	13.0%	64%
Change	**175,000**	**123,287**	**2,976**	**105,954**	**80,357**	**0.07**	**(0.03)**	**0.04**	**0.5%**	**8%**
% Chg	23%	25%	1%	41%	21%	13%	-4%	3%	4%	13%

Key Metrics	
$ Gross Distributions	105,954
Gross Distribution Yield	27.3%
$ Net Distributions	(17,334)
Net Distribution Yield	**-4.5%**
$ NAV Increase	80,357
% NAV Increase	**20.7%**
$ Total Increase	63,023
% Total Increase	**16.3%**

1. Initiated November 2007, 21 partnerships (+3); 18% of NAV (unchanged from last year)
2. Commitments increased $175 million (+23%), down from 150 million (+33%) last year
3. Paid-in capital increased $123 million (25%), down from $158 million (48%) last year
4. Portfolio is 64% paid-in, up from 57% last year
5. Uncalled capital increased $3 million (-1%), a reversal from an $85 million (-20%) decrease last year
6. Distributions were $106 million (27% of NAV), up from $84 million (34%) last year
7. Net cash flow was negative $17 million (-5%) as paid-in exceeded distributions, a smaller outflow (portfolio funding) than the negative $74 million (-30%) last year
8. NAV increased $80 million (21%), down from $140 million (57%) last year
9. Total portfolio appreciation was $63 million (16%), down slightly from $66 million (27%). The portfolio is gaining return momentum after starting just before the Financial Crisis
10. The portfolio is still early for benchmarking, since only 4 of 8 full years and 27% of commitments are greater than 4 years old. The initial thee years are all second quartile, and the fourth year is first quartile by TVPI
11. The 13.0% IRR is second quartile versus a database upper quartile of 17.4% and median of 10.1% (40th percentile)
12. The 1.36x TVPI is second quartile versus an upper quartile of 1.57x and median of 1.28x (43 percentile)

Benchmark = VY 2007, 2008, 2010, 2013-2018 for Buyout, Mezzanine, Distressed, Energy, Growth, Secondary

ARMB Summary

Observations

- ARMB's private equity portfolio is mature, has provided good performance, and is well-diversified
  - It has overcome initial tech-bubble timing issue and target increases
  - The portfolio became cumulatively cash flow positive by $19.6 million this year: DPI increased to 1.004x vs. 0.99x
  - The private equity allocation is close to target (70 bp above).
  - The uncalled backlog has decreased to 51% of NAV from 60% last year
  - Callan suggests conservative positioning at this time should the public market rally abate

- Performance is second quartile versus a database of partnerships selected by other professionally-managed programs (~ 30% above median, 60% below 1st quartile)
  - ARMB's performance remains highly competitive relative to its peer group of institutional investors
  - Both external managers are performing well relative to benchmarks and their strategy mixes are complementary
  - The In-House portfolio appreciated 16%. Paid-in capital increased significantly during the year, and distributions are increasing as the allocation matures
  - The portfolio is composed of tenured, high-quality general partners
  - ARMB has an attractive strategy mix for a large fund, and is well-diversified by other measures

ARMB Summary

Observations

- ARMB's private equity portfolio had another good year
  - The fiscal year saw a strong public equity markets rise in the first six months followed by increased volatility; but the volatility did not affect overall returns
  - Performance was similar to last year but with slightly more cash flow and slightly less unrealized appreciation: 27% gross distributed cash return, and 19% total appreciation from positive net cash flow of $67 million (3%) to ARMB, and a $351 million (16%) NAV increase

- Looking forward
  - Since late-December 2017 the market has been choppy and private equity market prices have held steady
  - So far capital market liquidity is continuing to support velocity in private equity activity by all measures: fundraising, company investment, and distributions
  - ARMB's portfolio is becoming mature, so year-over-year performance changes may become smaller
  - With the seller's-market environment, we expect general partners will stay focused on portfolio exits, so distributions will continue to be as strong a practicable
  - With lower expected returns for public equity and growing efficiency in the private equity sector it is reasonable to expect that private equity's historical premium will diminish
  - Callan is cautioning clients to be mindful of the "denominator effect" if public markets contract

Callan

December 13, 2018

ARMB Board Meeting

Investment Performance
Periods Ended September 30, 2018

Steve Center, CFA
Senior Vice President

Paul Erlendson
Senior Vice President

Agenda

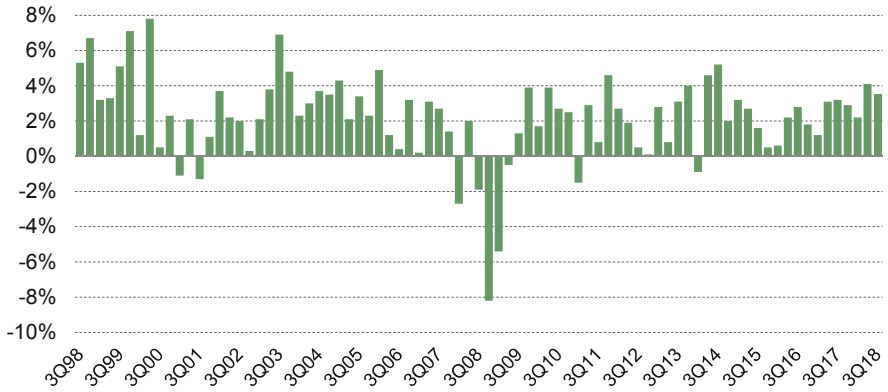
- Market and Economic Environment
- Total Fund Performance
  - Major Asset Classes

U.S. Economy

September 30, 2018

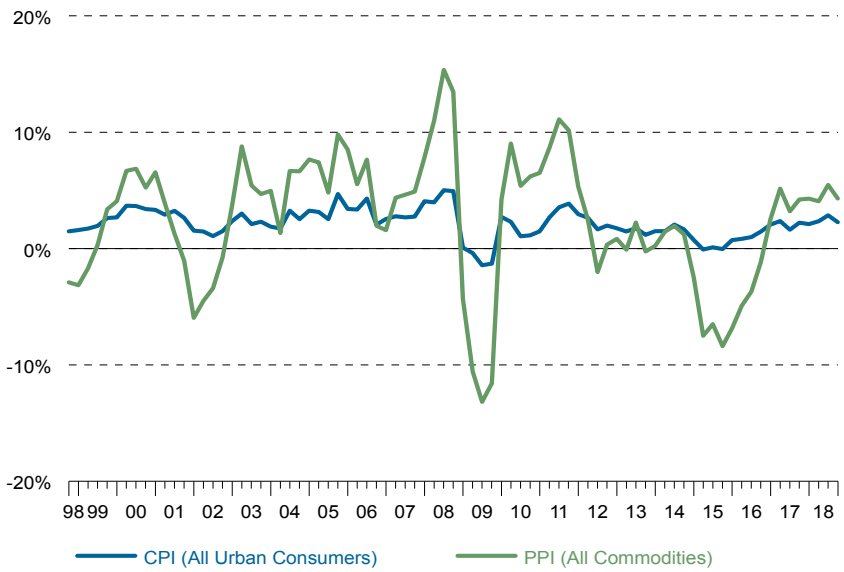
- The initial estimate of third quarter GDP growth came in at 3.5% (annualized)
  - Down from 4.2% in the second quarter
  - Consumer spending up 4.0% (annualized); up from a strong 3.8% in Q2
- Labor market strong
  - Unemployment reached 3.7% in September; lowest since 1969
  - About 185,000 nonfarm payrolls were added per month during the third quarter
- Inflation remained contained
  - Headline CPI was 2.3% in September (y/y); Core CPI was 2.2% (y/y)
  - Core PCE in line with Fed's 2% target
- The Fed raised rates as expected
  - A 25 bp hike in September brought the target range to 2.00% – 2.25%; "accommodative" dropped from language
  - The Fed expects one more rate hike this year and three in 2019

Quarterly Real GDP Growth (20 Years)



Source: Bureau of Economic Analysis

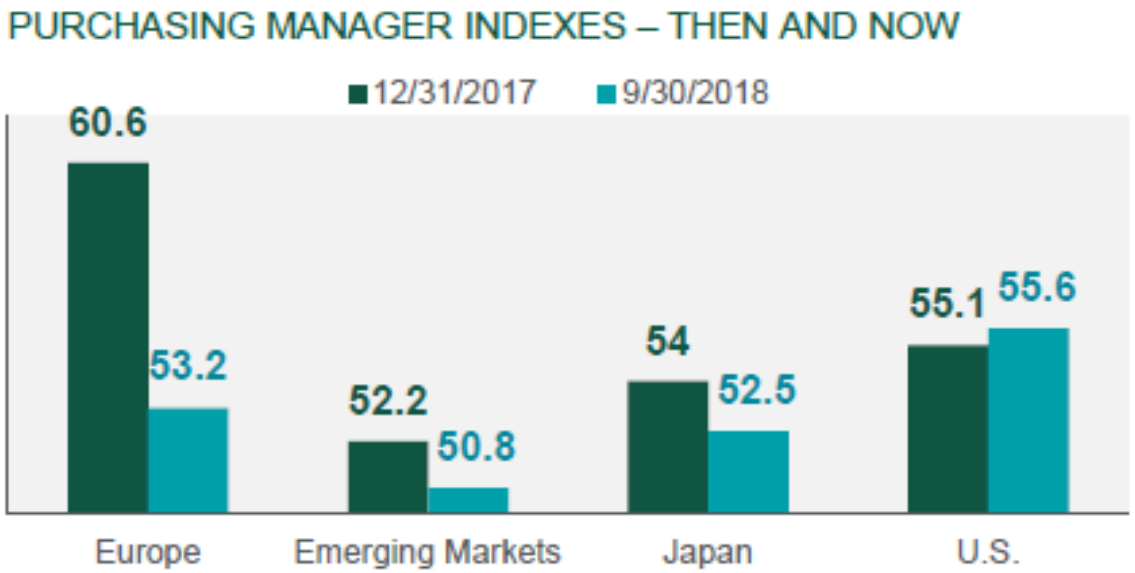
Inflation Year-Over-Year



Source: Bureau of Labor Statistics

Global Purchasing Manager Indexes

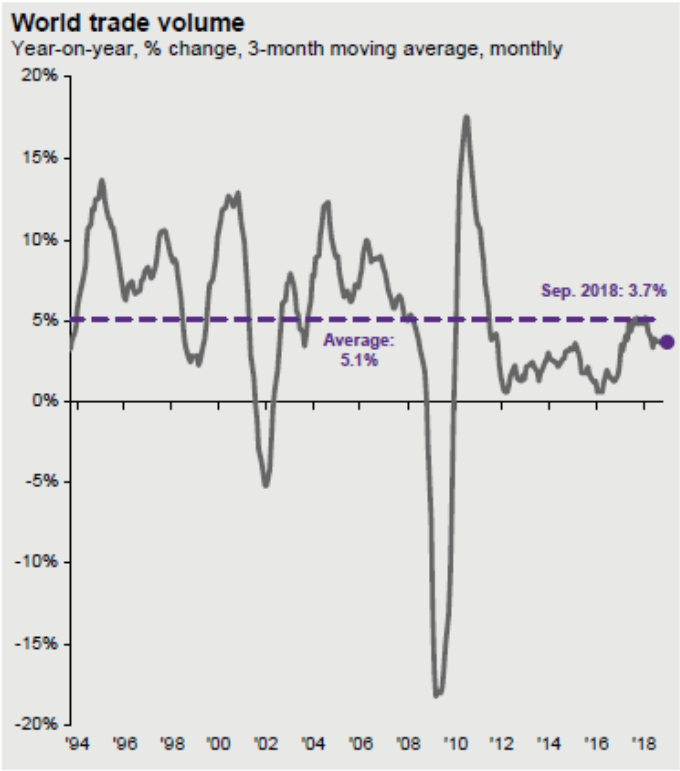
Readings > 50 Indicate Growth

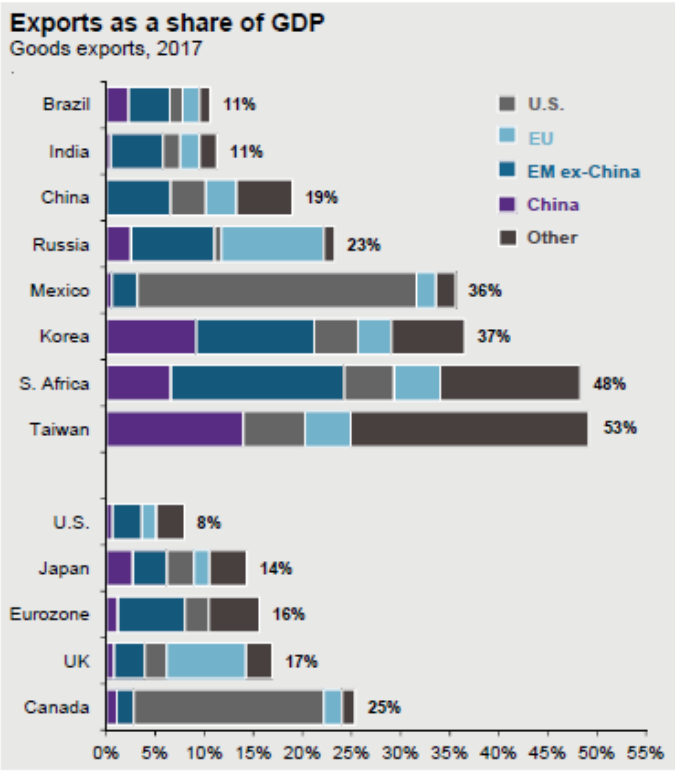


- U.S. economic growth has accelerated while the rest of the world has slowed down.
- BREXIT negotiations.
- Rise of Populist coalition in Italy.
- Continued U.S. Fed hikes and rising dollar.
- Turkish Lira down 37%, Argentinian Peso down 55% YTD as of 09/30/2018.
- Turkey and Argentina: poor governance and finances amplified by trade concerns and global growth divergence.

Source: Northern Trust

World Trade and GDP Impact





Source: FactSet, J.P. Morgan Asset Management; (Left) Netherlands Policy Analysis; (Right) IMF.
Guide to the Markets – U.S. Data are as of September 30, 2018.

- World trade volume has been below average since 2012.
- Mexico, Taiwan, Korea, S. Africa and Canada have high exports as a share of GDP so could be more adversely impacted by trade sanctions.

Asset Class Performance

Periodic Table of Investment Returns for Periods Ended September 30, 2018

Best

Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 20 Years
S&P:500 7.7%	Russell:2000 Index 11.5%	S&P:500 17.9%	S&P:500 17.3%	S&P:500 13.9%	S&P:500 12.0%	MSCI:EM Gross 10.2%
Russell:2000 Index 3.6%	S&P:500 10.6%	Russell:2000 Index 15.2%	Russell:2000 Index 17.1%	Russell:2000 Index 11.1%	Russell:2000 Index 11.1%	Russell:2000 Index 9.4%
MSCI:EAFE 1.4%	3 Month T-Bill 1.3%	MSCI:EAFE 2.7%	MSCI:EM Gross 12.8%	MSCI:EAFE 4.4%	MSCI:EM Gross 5.8%	S&P:500 7.4%
3 Month T-Bill 0.5%	MSCI:EAFE (1.4%)	3 Month T-Bill 1.6%	MSCI:EAFE 9.2%	MSCI:EM Gross 4.0%	MSCI:EAFE 5.4%	MSCI:EAFE 5.2%
Blmbg:Aggregate 0.0%	Blmbg:Aggregate (1.6%)	Blmbg:Commodity Price Idx **0.9%**	Blmbg:Aggregate 1.3%	Blmbg:Aggregate 2.2%	Blmbg:Aggregate 3.8%	Blmbg:Aggregate 4.5%
MSCI:EM Gross (0.9%)	Blmbg:Commodity Price Idx **(3.4%)**	MSCI:EM Gross (0.4%)	3 Month T-Bill 0.8%	3 Month T-Bill 0.5%	3 Month T-Bill 0.3%	3 Month T-Bill 1.9%
Blmbg:Commodity Price Idx **(2.5%)**	MSCI:EM Gross (7.4%)	Blmbg:Aggregate (1.2%)	Blmbg:Commodity Price Idx **(1.0%)**	Blmbg:Commodity Price Idx **(7.7%)**	Blmbg:Commodity Price Idx **(6.6%)**	Blmbg:Commodity Price Idx **(0.3%)**

Worst

U.S. Equity Market

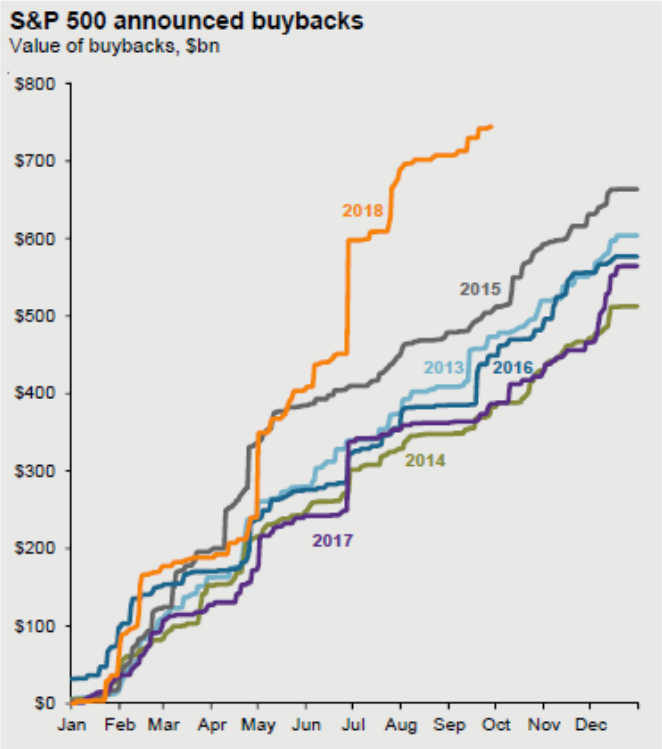
September 30, 2018

- The S&P 500 Index rose 7.7%
  - Best quarterly result since 4Q 2013
  - Health Care (+14.5%) and Industrials (+10.0%) led the way in the third quarter
- Growth continued to outperform Value, widening year-to-date divergence
  - R1000 Growth (+9.2%) vs. R1000 Value (+5.7%)
- Large caps outperformed small caps and pulled ahead year-to-date
  - Last Quarter: R1000 (+7.4%) vs. R2000 (+3.6%)

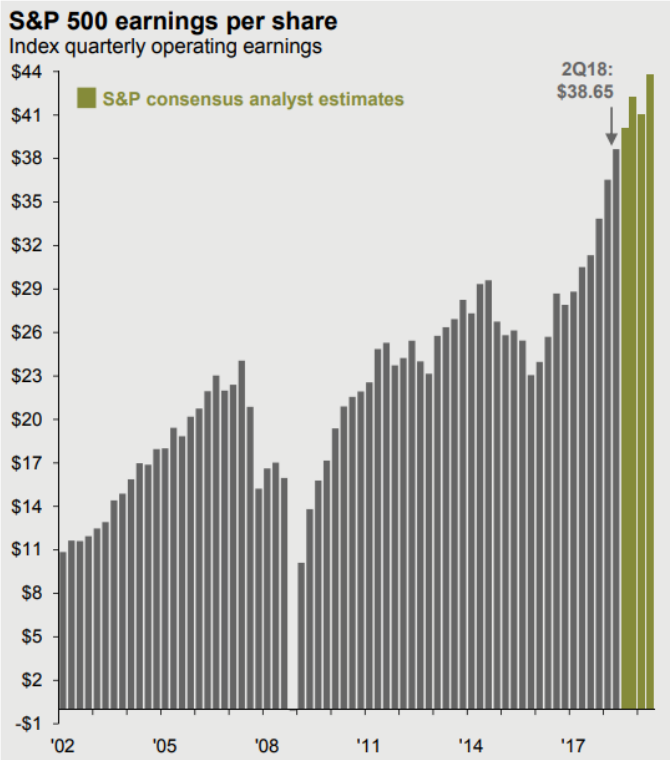
Large Cap Equity	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Russell 1000 Index	7.42	10.49	17.76	17.07	13.67	12.09
Russell 1000 Growth	9.17	17.09	26.30	20.55	16.58	14.31
Russell 1000 Value	5.70	3.92	9.45	13.55	10.72	9.79
Mid Cap Equity						
Russell Midcap Index	5.00	7.46	13.98	14.52	11.65	12.31
Russell Midcap Growth	7.57	13.38	21.10	16.65	13.00	13.46
Russell Midcap Value	3.30	3.13	8.81	13.09	10.72	11.29
Small Cap Equity						
Russell 2000 Index	3.58	11.51	15.24	17.12	11.07	11.11
Russell 2000 Growth	5.52	15.76	21.06	17.98	12.14	12.65
Russell 2000 Value	1.60	7.14	9.33	16.12	9.91	9.52

S&P 500 Earnings

September 30, 2018



Source: JP Morgan Guide to the Markets. As of September 30, 2018

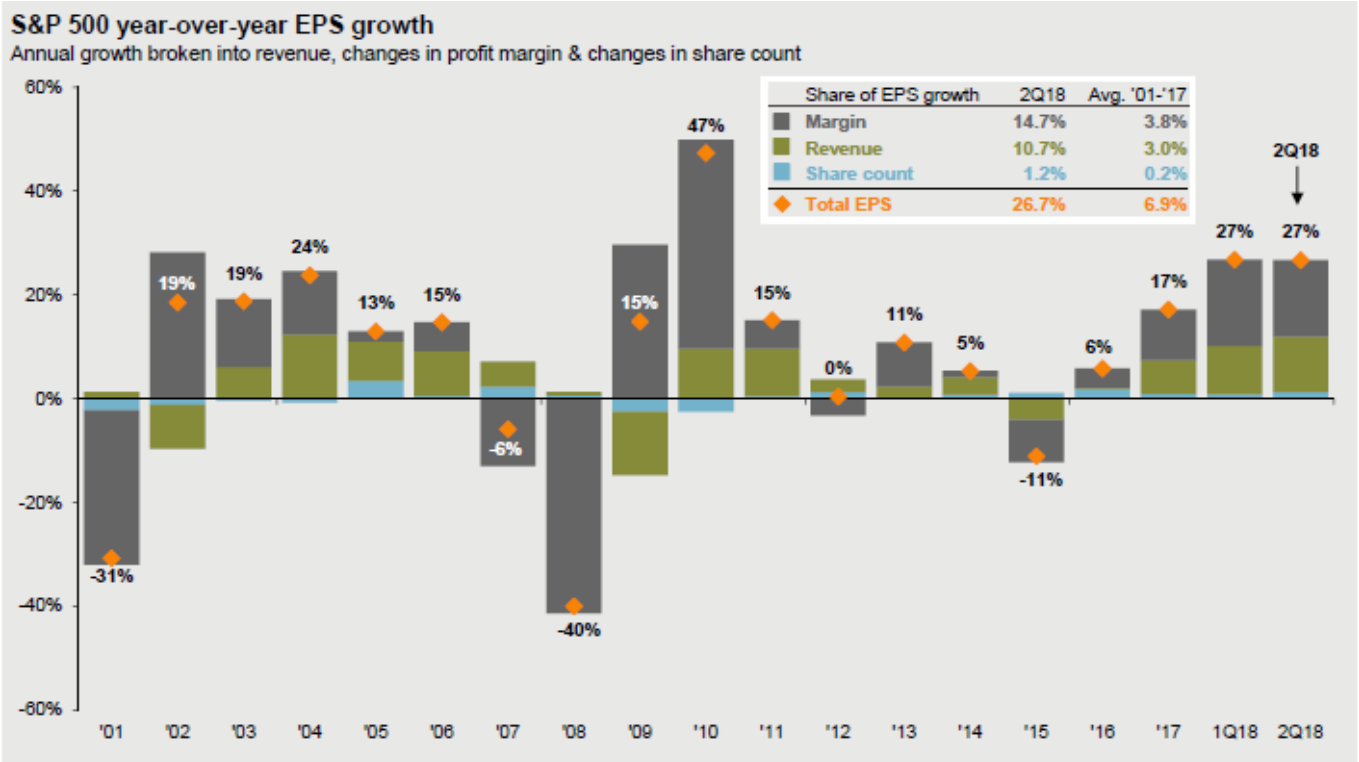


Source: JP Morgan Guide to the Markets. As of September 30, 2018

- For Q3 2018 (with 92% of the companies in the S&P 500 reporting actual results for the quarter), 78% of S&P 500 companies have reported a positive EPS surprise and 61% have reported a positive sales surprise.
- For Q3 2018, the blended earnings growth rate for the S&P 500 is 25.7%. If 25.7% is the actual growth rate for the quarter, it will mark the highest earnings growth since Q3 2010.
  - Nine sectors are reporting double-digit earnings growth, led by the Energy, Financials, Communication Services, and Materials sectors.
- Buybacks and tax cuts fueling EPS growth in 2018.

Source: FACTSET; Earnings Insight as of November 16, 2018

S&P 500 Earnings/Share Growth: High Relative to Long-Term Average



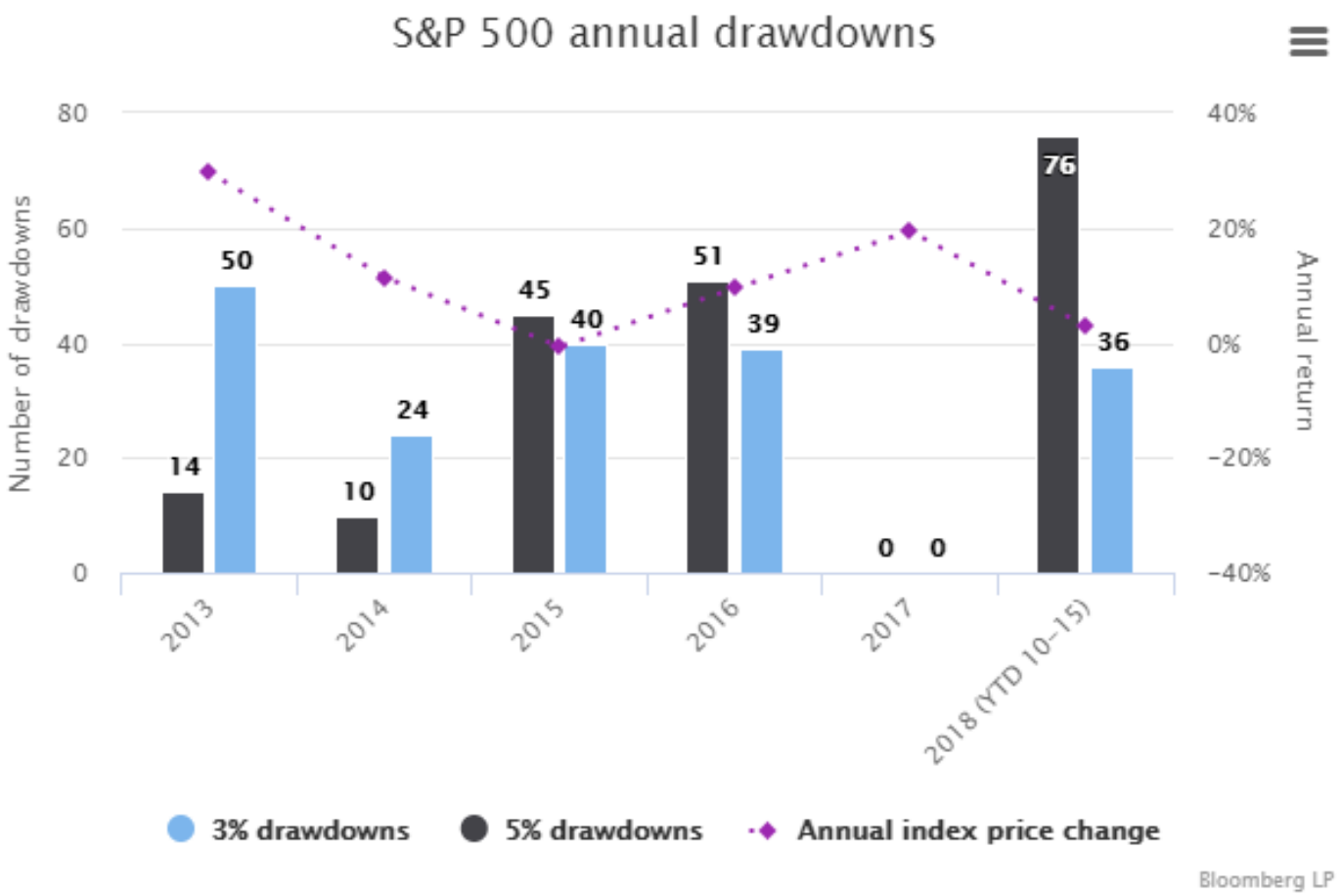
Source: Compustat, FactSet, Standard & Poor's, J.P. Morgan Asset Management.
EPS levels are based on annual operating earnings per share except for 2018, which is quarterly. Percentages may not sum due to rounding. Past performance is not indicative of future returns.
Guide to the Markets – U.S. Data are as of September 30, 2018.

S&P 500 performance vs. earnings growth.

EPS growth (year over year)	**S&P 500 gain per annum**
Over 20%	2.6%
5% to 20%	7.1%
-20% to 5%	12.1%
-20% and below	-13.6%

Source: Ned David Research, as of 9/30/2018.

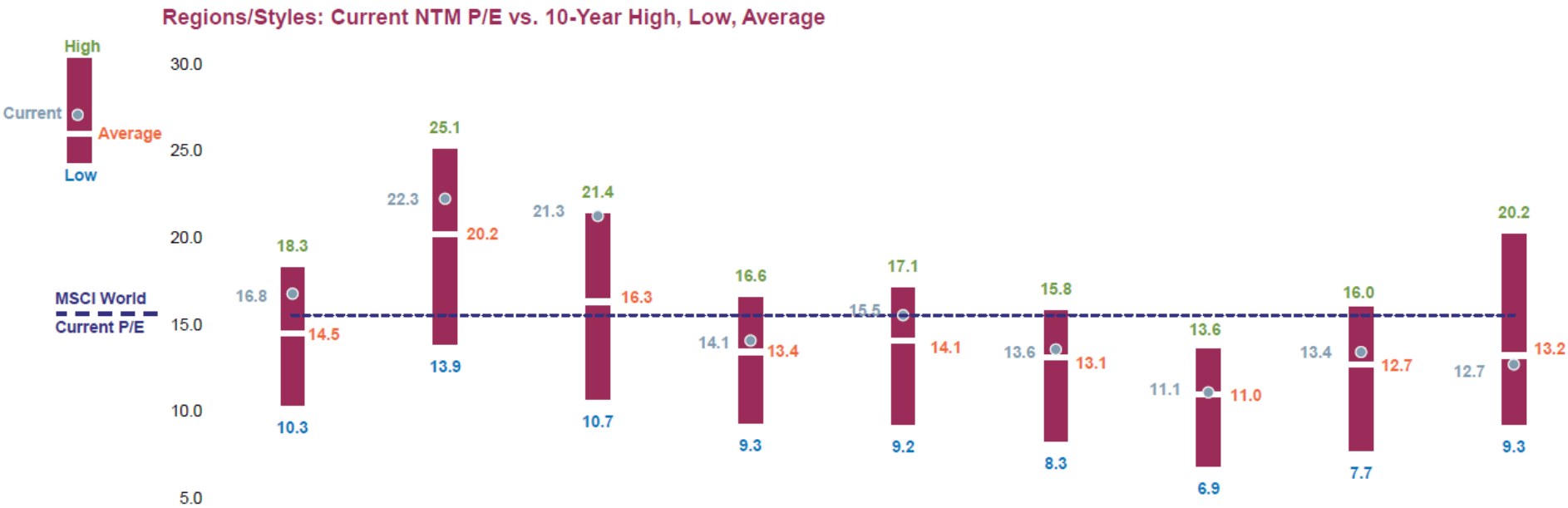
S&P 500 Intra-Day Drawdowns



- Volatility and drawdowns were exceptionally low in 2017.
- Equity market volatility has risen in 2018.

Global Equity Valuation Measures

September 30, 2018



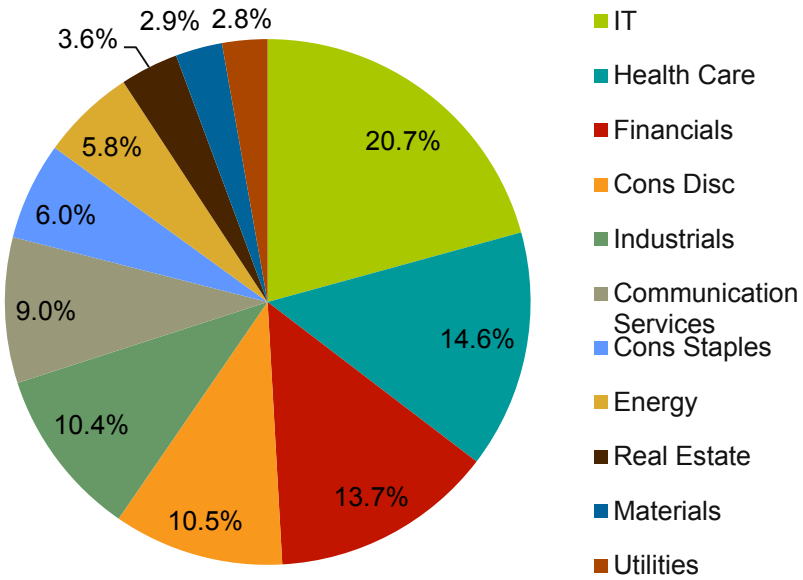
	S&P 500	Russell 2000	Russell 1000 Growth	Russell 1000 Value	MSCI World	MSCI EAFE	MSCI EM	MSCI Europe	MSCI AC Asia Pac
High Date	11/17	9/17	1/18	2/17	1/18	5/15	7/09	3/15	7/09
Low Date	9/11	9/11	11/08	9/11	10/08	10/08	10/08	10/08	10/08

Source: Eaton Vance. FactSet. NTM P/E is market price per share divided by expected earnings per share over the next twelve months.

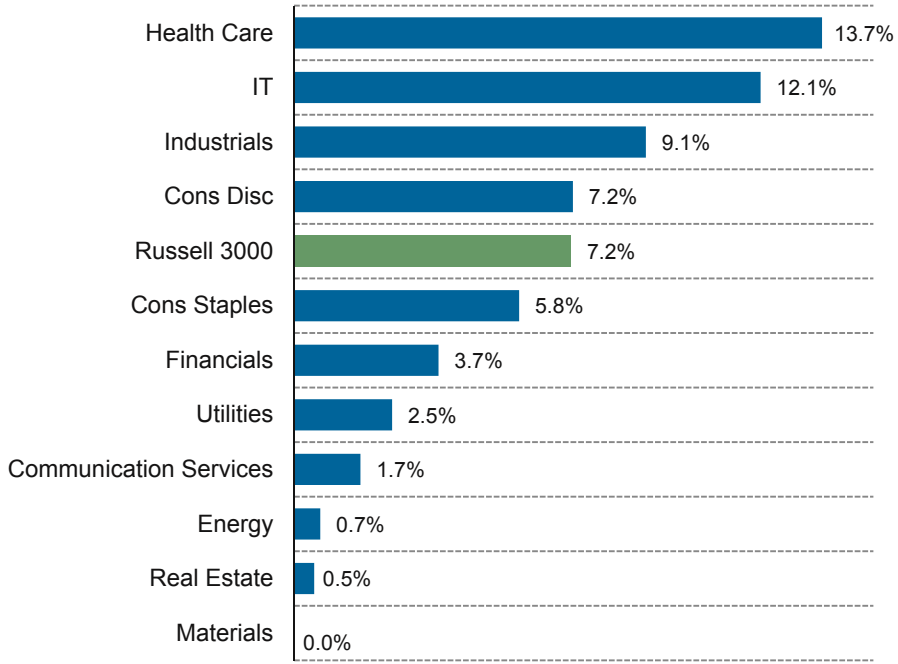
U.S. Equity Returns

September 30, 2018

Economic Sector Exposure (Russell 3000)



Quarterly Returns (Russell 3000)

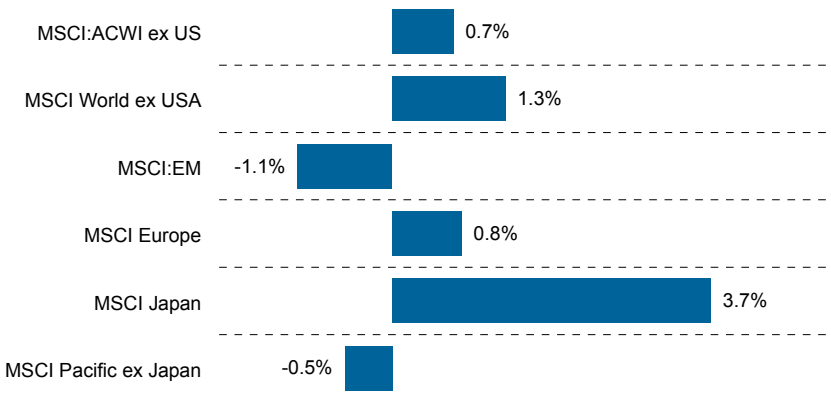


- The Russell 1000 Index was up 7.4% in the third quarter. Health Care (+14.3%) and Information Technology (+12.5%) drove gains, while Materials (-0.1%) and Real Estate (+1.0%) weighed on returns.
- The Russell 2000 Index was up 3.6% in the third quarter. Communication Services (+12.9%) and Health Care (+7.7%) drove gains, while Energy (-2.9%) and Consumer Staples (-1.4%) weighed on returns.

International Equity Returns

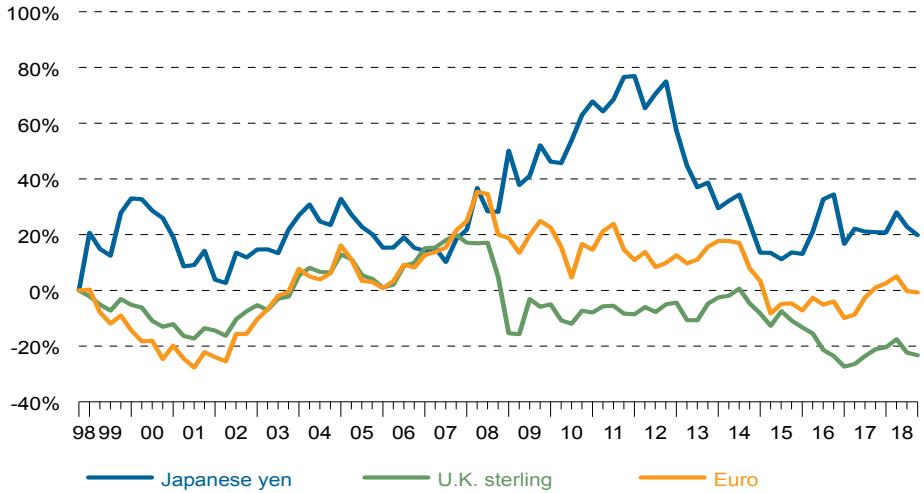
September 30, 2018

Regional Quarterly Performance (U.S. Dollar)



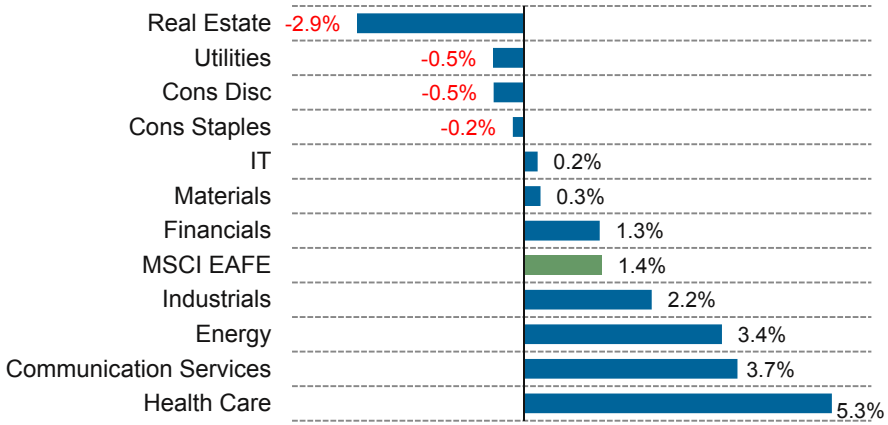
Source: MSCI

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



Source: MSCI

MSCI EAFE Sector Returns

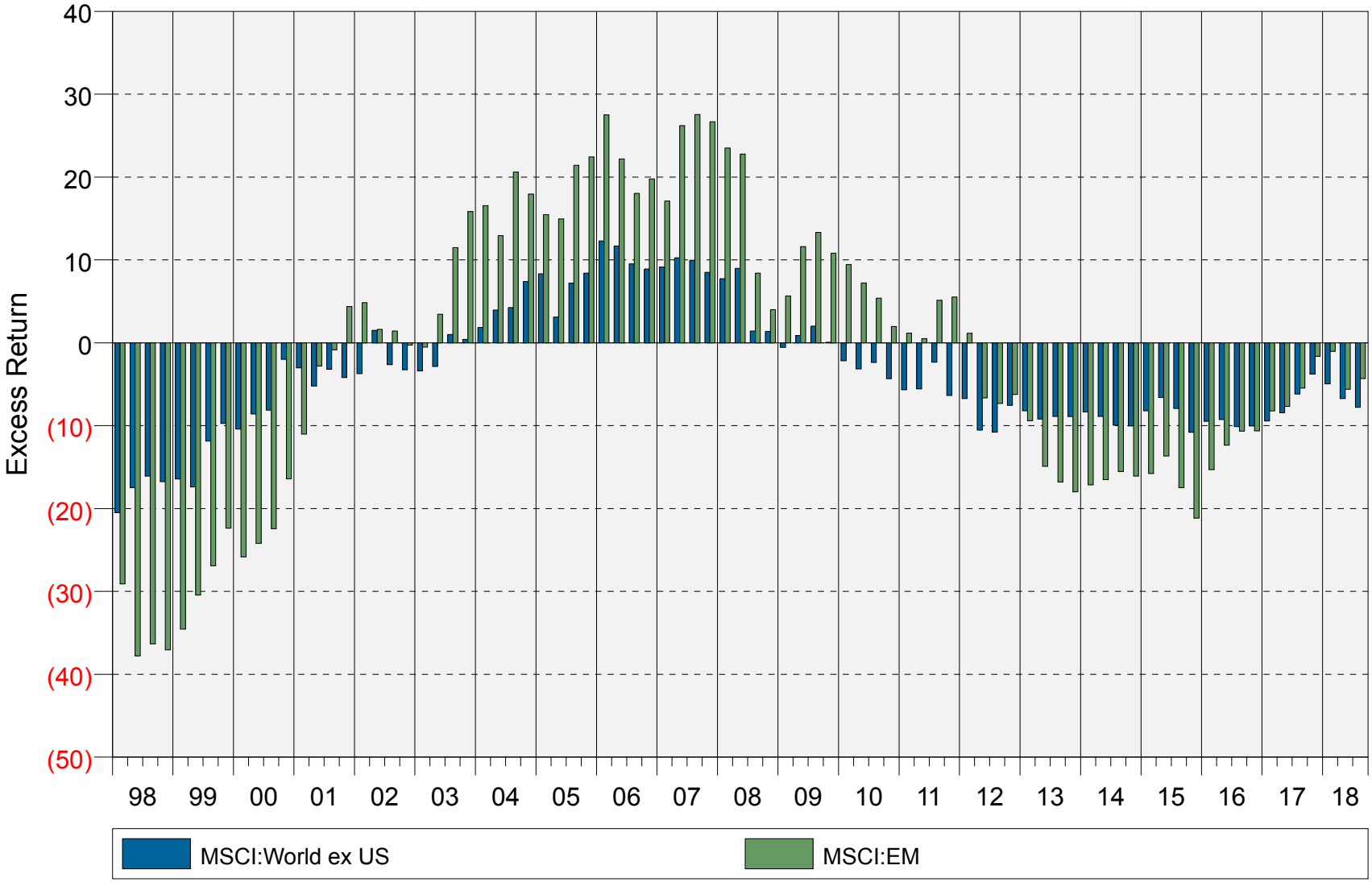


Source: MSCI

- Japan was the strongest performing region (+3.7%).
- The dollar appreciated against most major currencies in the third quarter. The pound fell by 1.2%, the euro dropped by 0.5% and the yen lost 2.5% against the dollar.
- Health Care outshined other sectors in the third quarter, while Real Estate and Utilities lagged.

Global Regions' Performance Has Moved in Cycles

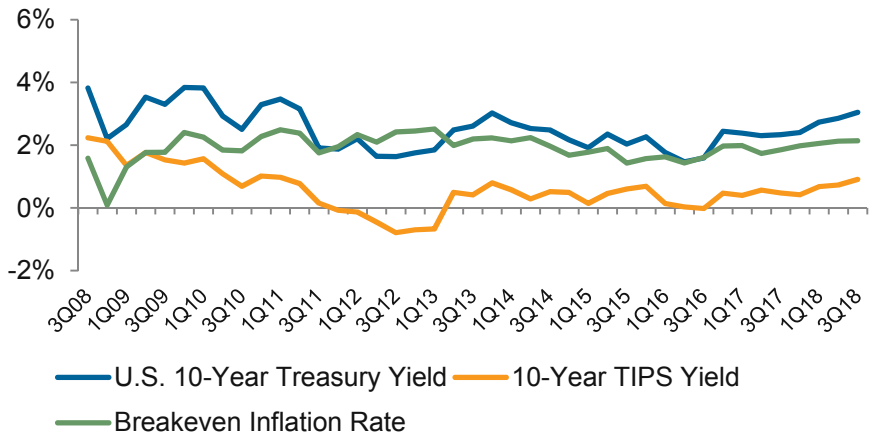
Rolling 12 Quarter Excess Return Relative To Russell:3000 Index
for 20 3/4 Years Ended September 30, 2018



Yield Curve Changes

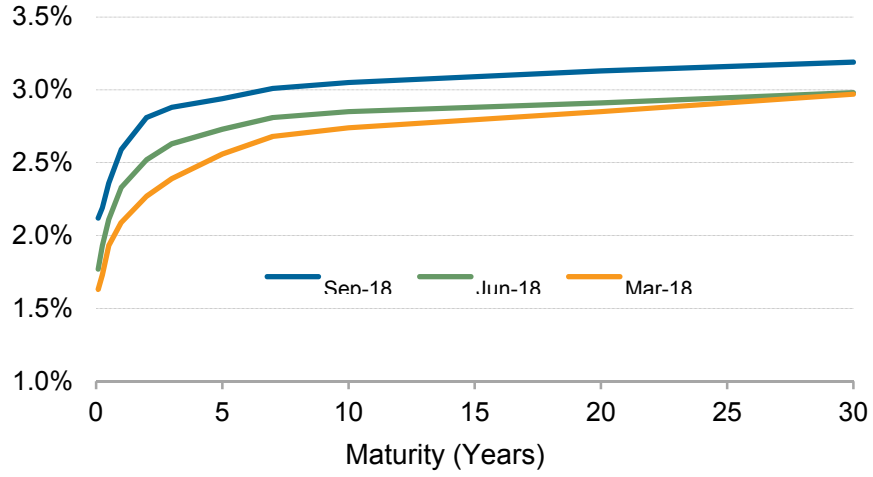
September 30, 2018

Historical 10-Year Yield



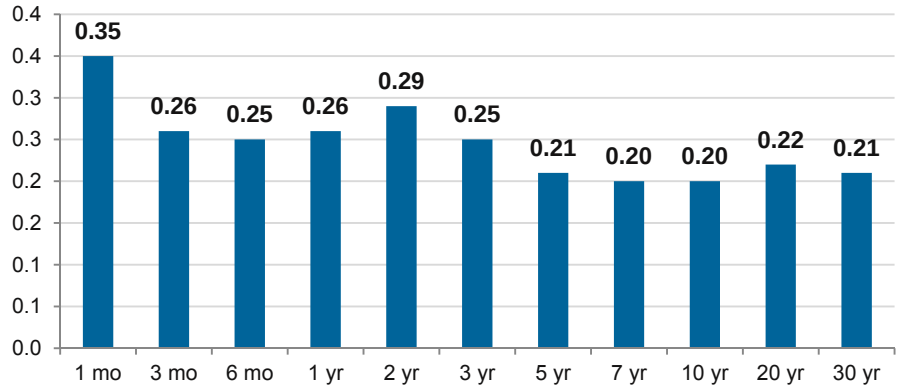
Source: Bloomberg

Treasury Yield Curve



- The Treasury yield curve continued to flatten during the third quarter. The 2-year yield increased 29 basis points while the 10-year only increased 20 basis points and the 30-year by 21 basis points.
- The spread between the 2- and 10-year is down from 33 bps last quarter to 24 bps.

Changes June-September 2018

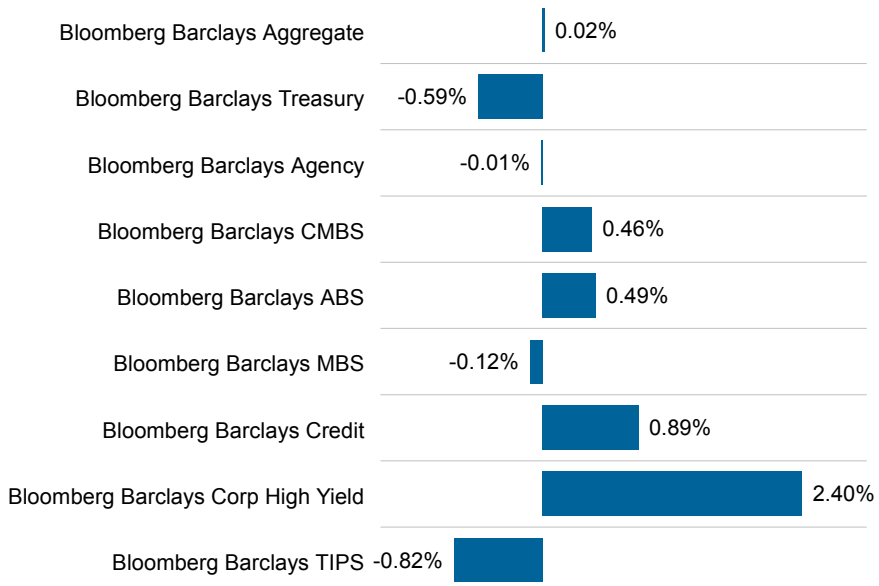


Source: U.S. Department of the Treasury

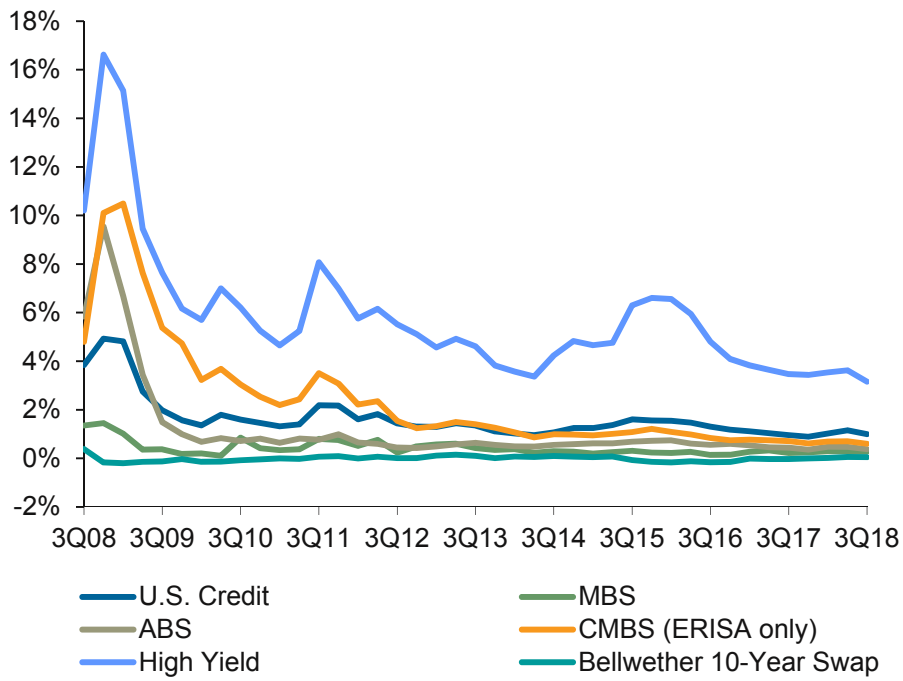
Total Rates of Return by Bond Sector

September 30, 2018

Total Returns



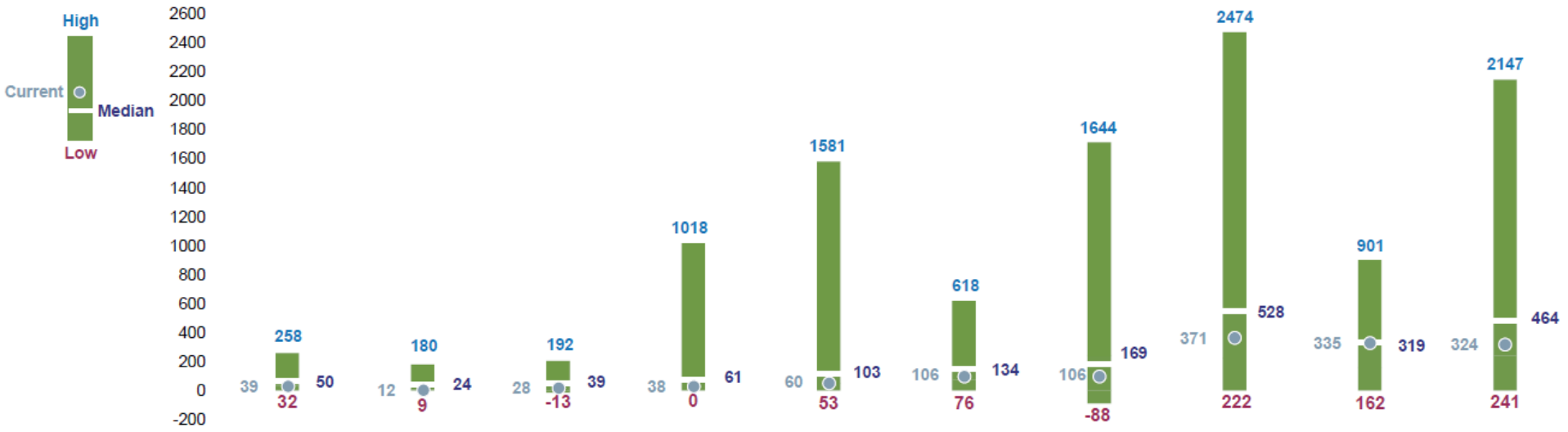
Effective Yield Over Treasuries



- The Bloomberg Aggregate Index was flat for the quarter while underlying sectors were mixed.
- Strong corporate earnings and limited issuance boosted performance of investment grade and high yield credit.
- The more interest rate sensitive sectors, such as Treasuries and MBS, declined as rates rose across the curve.
- TIPS was the worst performing sector in the quarter amid rising real yields.

Fixed Income Spread Analysis

September 30, 2018



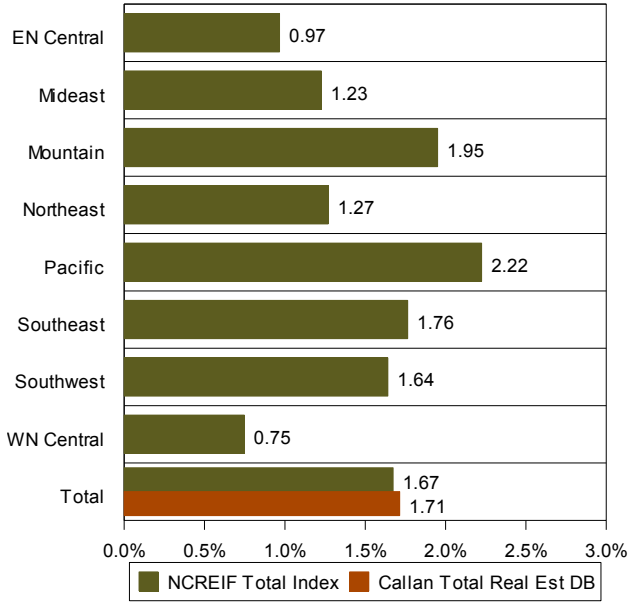
	Aggregate	Agency	MBS	ABS	CMBS	Corporate	Preferred	Floating-Rate Loans	Emerging Markets (USD)	High Yield
Max Spread Date	12/3/2008	11/20/2008	12/3/2008	1/6/2009	11/21/2008	12/3/2008	3/9/2009	12/19/2008	10/24/2008	12/15/2008
Min Spread Date	2/23/2005	3/12/2013	7/27/2010	10/1/2009	12/8/2004	3/11/2005	12/6/2017	3/31/2006	6/1/2007	6/1/2007
Spread on 12/31/17	36	14	25	36	62	93	-30	405	285	358
Spread on 12/31/16	43	21	15	59	75	123	213	465	342	422
Spread on 12/31/15	56	21	24	72	121	165	158	714	415	695

Source: Eaton Vance; FactSet

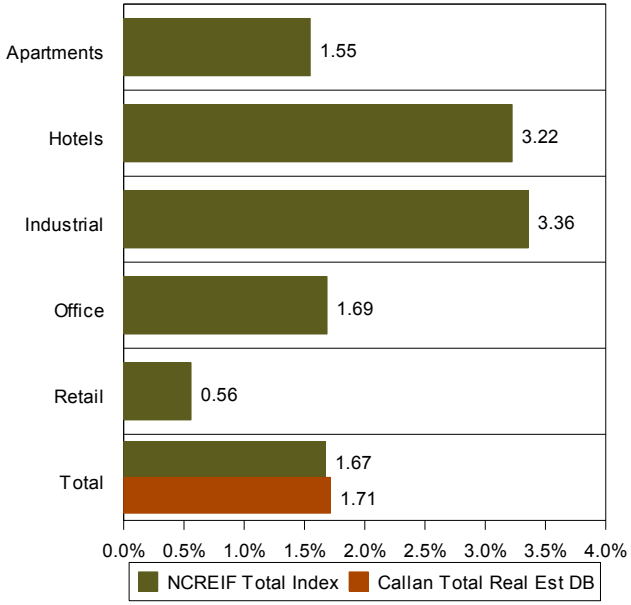
Source: Factset as of 9/30/18. Spread history measures past 15 years. Data provided is for informational use only. Past performance is no guarantee of future results. See end of report for important additional information. All fixed-income spreads are in basis points and measure option-adjusted yield spread relative to comparable maturity U.S. Treasuries using daily data. Loan Index spread represents the three-year discounted spread over LIBOR. Aggregate represented by Bloomberg Barclays US Aggregate Index. Agency represented by Bloomberg Barclays U.S. Agency Index. MBS represented by Bloomberg Barclays U.S. Mortgage Backed Securities (MBS) Index. ABS represented by Bloomberg Barclays U.S. Asset Backed Securities (ABS) Index. CMBS represented by Bloomberg Barclays U.S. CMBS Investment Grade Index. Corporate represented by Bloomberg Barclays U.S. Corporate Investment Grade Index. Preferred represented by ICE BofA ML Fixed Rate Preferred Securities Index. Floating-Rate Loans represented by S&P/LSTA Leveraged Loan Index. Emerging Markets(USD) represented by JPMorgan Emerging Markets Bond Index (EMBI) Global Diversified. High Yield represented by ICE BofA ML US High Yield Index.

Real Estate Overview

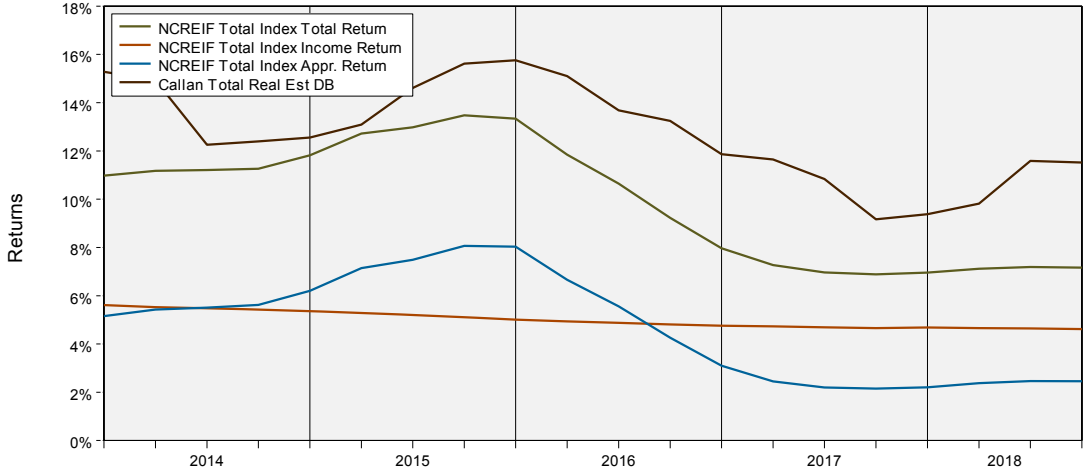
NCREIF Total Index Returns by Geographic Area
Quarter Ended September 30, 2018



NCREIF Total Index Returns by Property Type
Quarter Ended September 30, 2018



Rolling 1 Year Returns



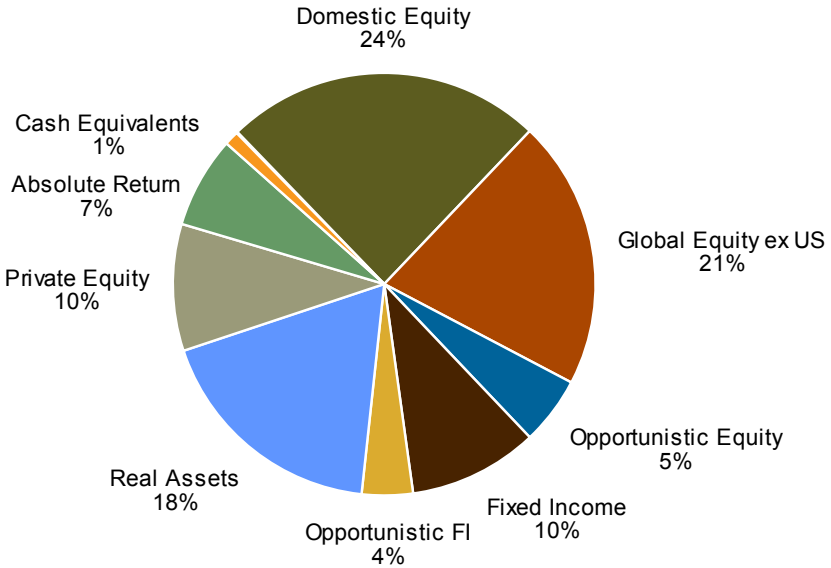
Callan

Pension Plan

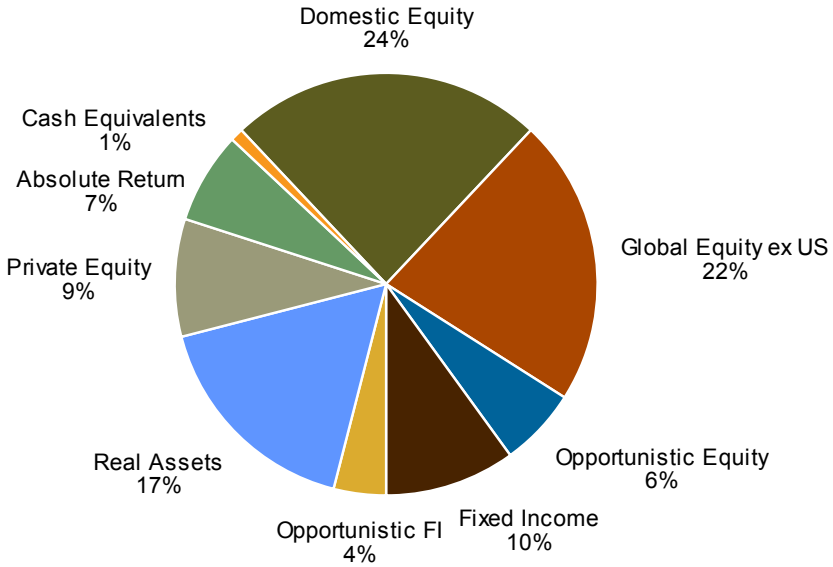
Asset Allocation – Public Employees' Retirement System

Quarter Ending September 30, 2018

Actual Asset Allocation



Target Asset Allocation



Asset Class	$000s Actual	Weight Actual	Target	Percent Difference	$000s Difference
Domestic Equity	2,335,887	24.3%	24.0%	0.3%	28,670
Global Equity ex US	1,979,756	20.6%	22.0%	(1.4%)	(135,193)
Opportunistic Equity	499,142	5.2%	6.0%	(0.8%)	(77,662)
Fixed Income	950,552	9.9%	10.0%	(0.1%)	(10,789)
Opportunistic FI	378,341	3.9%	4.0%	(0.1%)	(6,195)
Real Assets	1,751,623	18.2%	17.0%	1.2%	117,344
Private Equity	934,050	9.7%	9.0%	0.7%	68,843
Absolute Return	675,430	7.0%	7.0%	0.0%	2,492
Cash Equivalents	108,624	1.1%	1.0%	0.1%	12,490
Total	9,613,406	100.0%	100.0%		

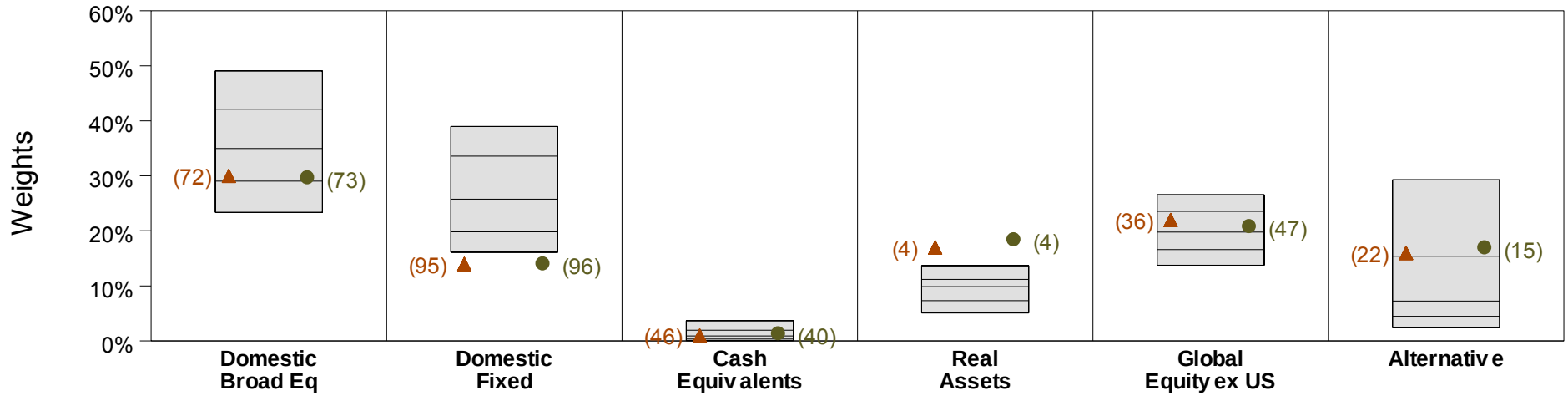
PERS is used as illustrative throughout the presentation.

The other plans exhibit similar modest and understandable variations from strategic target allocations.

Asset Allocation vs. Public Funds (PERS)

Callan Public Fund Database

Asset Class Weights vs Callan Public Fund Sponsor Database



	Domestic Broad Eq	Domestic Fixed	Cash Equivalents	Real Assets	Global Equity ex US	Alternative
10th Percentile	49.08	38.95	3.68	13.67	26.55	29.30
25th Percentile	42.11	33.57	1.94	11.19	23.56	15.39
Median	34.95	25.74	0.93	9.88	19.79	7.25
75th Percentile	29.02	19.83	0.35	7.30	16.60	4.49
90th Percentile	23.34	16.11	0.05	5.07	13.75	2.41
Fund ●	29.49	13.82	1.13	18.22	20.59	16.74
Target ▲	30.00	14.00	1.00	17.00	22.00	16.00

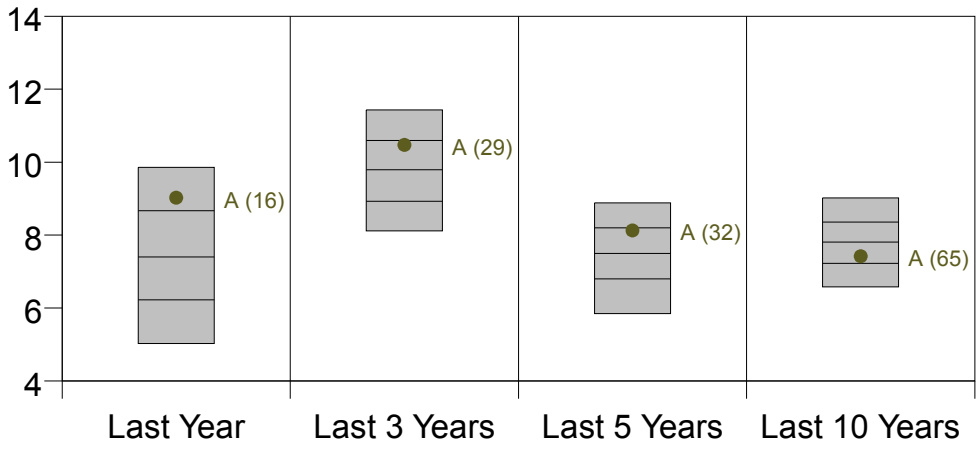
- Real Assets, Global Equity ex U.S., and Alternatives are overweight while other asset classes are slightly underweight. Fixed income is close to target but well below the “average” weighting of other public funds.
- Weightings to real assets and alternatives remain high relative to other public funds.
- ARMB’s pension funds’ asset allocation targets reflect a “growth” orientation.

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

Total Fund Return vs Public Funds (PERS)

Callan Public Fund Database

Returns
for Periods Ended September 30, 2018
Group: Callan Public Fund Sponsor Database



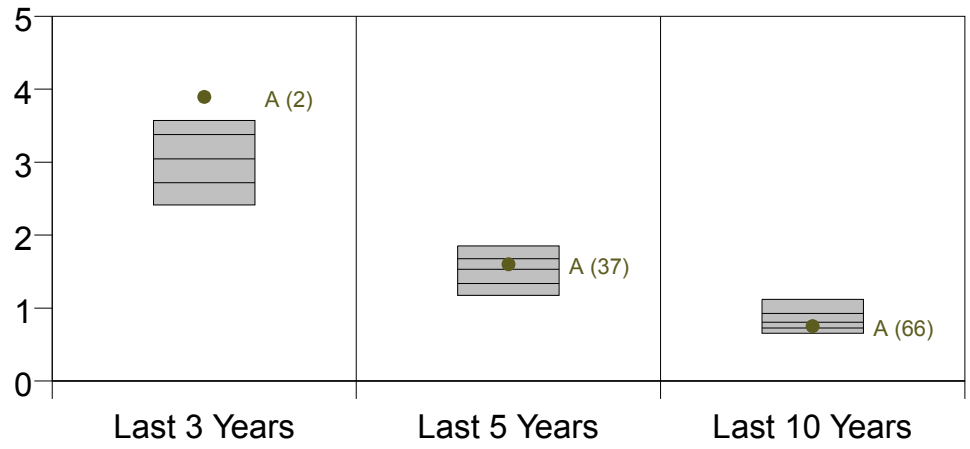
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	9.86	11.44	8.89	9.02
25th Percentile	8.67	10.60	8.20	8.36
Median	7.40	9.79	7.50	7.81
75th Percentile	6.23	8.93	6.80	7.23
90th Percentile	5.03	8.12	5.85	6.59
Member Count	175	174	168	148
ARMB - PERS - Total Fund ● A	9.03	10.48	8.13	7.42

- As displayed on the previous slide, ARMB's pension portfolio allocation policy reflects an orientation toward capital growth as opposed to income generation.
- It is worth noting that the Funds' lower weighting to Domestic Equity compared to Public Fund peers will reflect relative return rankings versus that peer group based on domestic equity results.

Total Fund Sharpe Ratio Rankings vs Public Funds (PERS)

Callan Public Fund Database

Sharpe Ratio
for Periods Ended September 30, 2018
Group: Callan Public Fund Sponsor Database



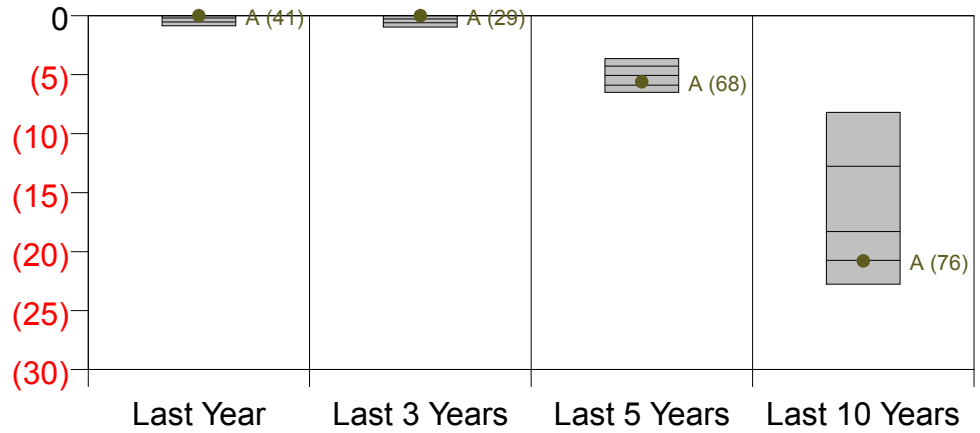
	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	3.57	1.85	1.12
25th Percentile	3.38	1.68	0.93
Median	3.05	1.53	0.81
75th Percentile	2.72	1.34	0.73
90th Percentile	2.42	1.17	0.66
Member Count	174	168	148
ARMB - PERS - Total Fund ● A	3.90	1.60	0.75

- Sharpe ratio is a risk-adjusted measure of return.
- ARMB's risk-adjusted return (Sharpe ratio) was above the Public Funds median for the three- and five-year periods.
- ARMB's Sharpe ratio was below median for the ten-year period ended September 30, 2018.

Total Maximum Drawdown Rankings vs Public Funds (PERS)

Callan Public Fund Database

Maximum Drawdown
for Periods Ended September 30, 2018
Group: Callan Public Fund Sponsor Database



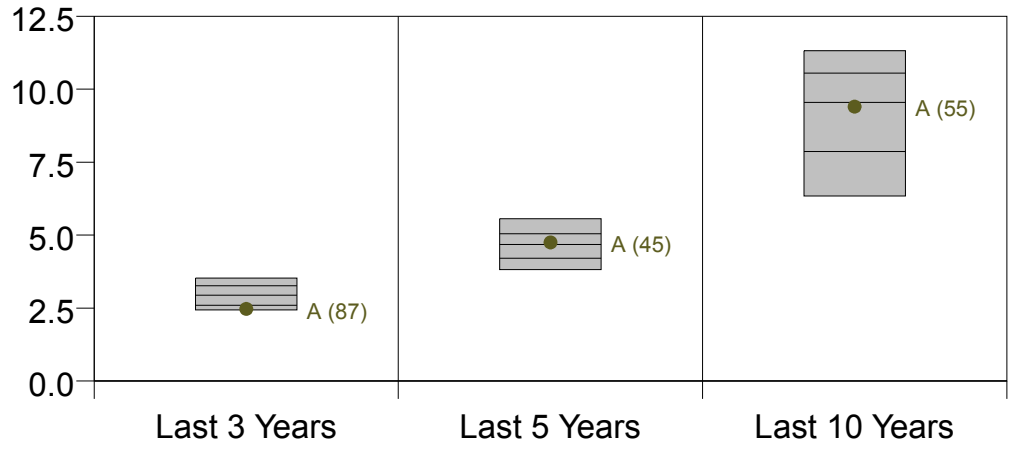
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	0.00	0.00	(3.63)	(8.19)
25th Percentile	0.00	0.00	(4.26)	(12.76)
Median	(0.18)	(0.26)	(5.05)	(18.29)
75th Percentile	(0.53)	(0.60)	(5.88)	(20.72)
90th Percentile	(0.85)	(0.95)	(6.50)	(22.75)
Member Count	175	174	168	148
ARMB - PERS - Total Fund ● A	0.00	0.00	(5.60)	(20.78)

- "Maximum drawdown" is a measure of the largest loss from peak to trough in a given period.
- Lower rankings reflect larger drawdowns (i.e. bigger losses). ARMB's below-median rankings reflect the higher potential drawdowns associated with the growth orientation.
- Drawdowns in the last three years are very small across the majority of Public Pension Plan sponsors.

Standard Deviation Ranking vs Public Funds (PERS)

Callan Public Fund Database

Standard Deviation
for Periods Ended September 30, 2018
Group: Callan Public Fund Sponsor Database



	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	3.53	5.56	11.33
25th Percentile	3.27	5.06	10.56
Median	2.94	4.68	9.55
75th Percentile	2.60	4.21	7.87
90th Percentile	2.44	3.82	6.34
Member Count	174	168	148
ARMB - PERS - Total Fund ● A	2.47	4.75	9.41

- "Standard deviation" measures variability of returns. It is one measurement of investment risk.
- Less standard deviation results in lower rankings. A lower ranking of standard deviation is good.
- ARMB's portfolio diversification has resulted in moderate levels of volatility compared to peers.

PERS Performance – 3rd Quarter 2018 & Trailing Year

Relative Attribution Effects for Quarter ended September 30, 2018

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	23%	24%	6.95%	7.12%	(0.04%)	(0.03%)	(0.08%)
Fixed-Income	10%	10%	(0.06%)	(0.12%)	0.01%	(0.00%)	0.00%
Opportunistic	9%	10%	3.45%	4.46%	(0.09%)	(0.01%)	(0.11%)
Real Assets	19%	17%	2.32%	1.50%	0.15%	(0.02%)	0.13%
Global Equity ex US	21%	22%	0.35%	0.39%	(0.01%)	0.02%	0.02%
Private Equity	10%	9%	2.16%	4.21%	(0.20%)	0.01%	(0.19%)
Absolute Return	7%	7%	2.60%	0.21%	0.17%	(0.00%)	0.17%
Cash Equivalents	1%	1%	0.56%	0.49%	0.00%	(0.00%)	0.00%
Total			**2.82% =**	**2.88% +**	**(0.01%) +**	**(0.05%)**	**(0.06%)**

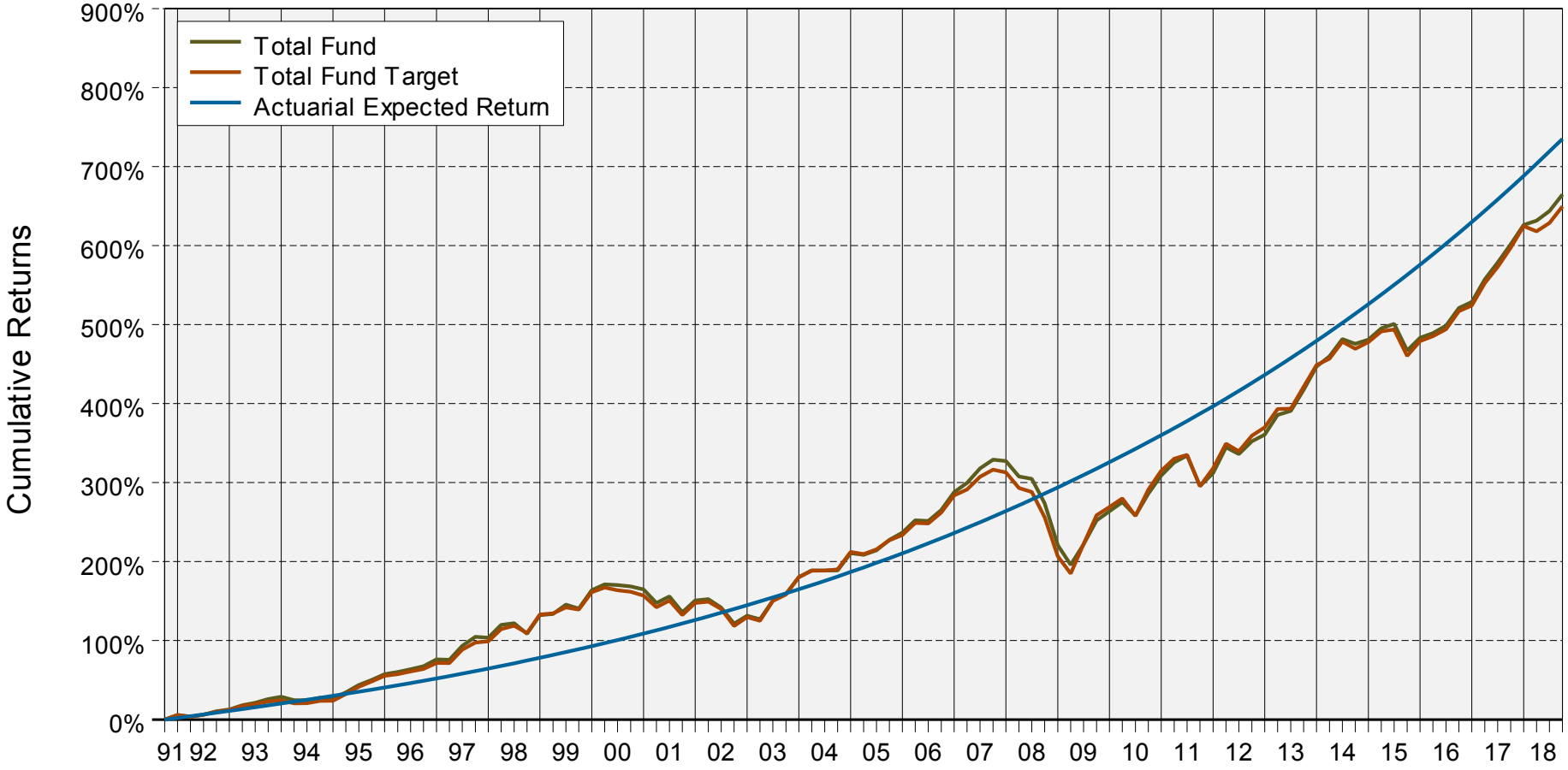
One Year Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	23%	24%	17.55%	17.58%	(0.00%)	(0.11%)	(0.11%)
Opportunistic	10%	10%	6.97%	9.90%	(0.28%)	(0.02%)	(0.30%)
Fixed-Income	10%	10%	(1.15%)	(1.22%)	0.01%	(0.01%)	(0.00%)
Real Assets	18%	17%	8.75%	4.76%	0.67%	(0.01%)	0.66%
Global Equity ex US	23%	22%	2.06%	1.79%	0.08%	(0.00%)	0.08%
Private Equity	9%	9%	23.82%	11.88%	0.96%	0.01%	0.97%
Absolute Return	7%	7%	6.76%	3.01%	0.27%	(0.01%)	0.26%
Cash Equivalents	1%	1%	1.77%	1.59%	0.00%	(0.01%)	(0.00%)
Total			**9.03% =**	**7.48% +**	**1.70% +**	**(0.15%)**	**1.55%**

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

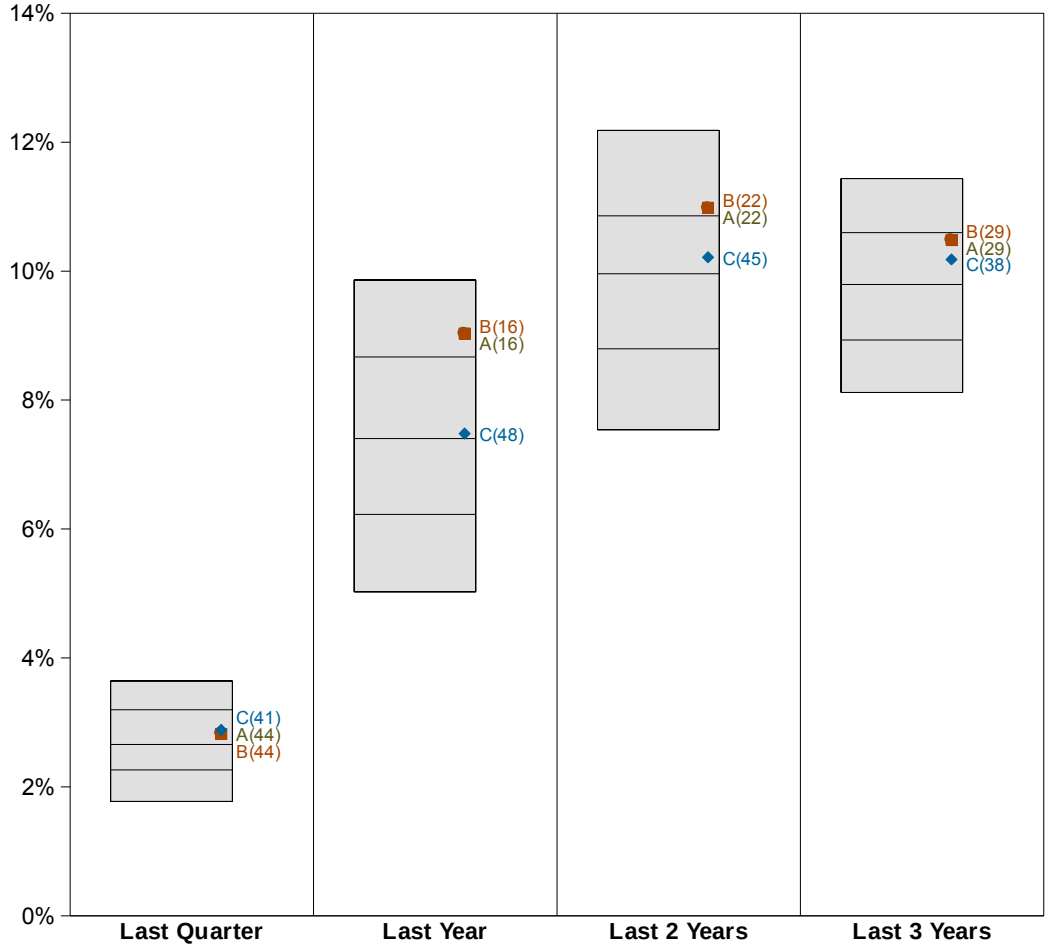
PERS Long-Term Total Fund Performance as of 9/30/18

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.

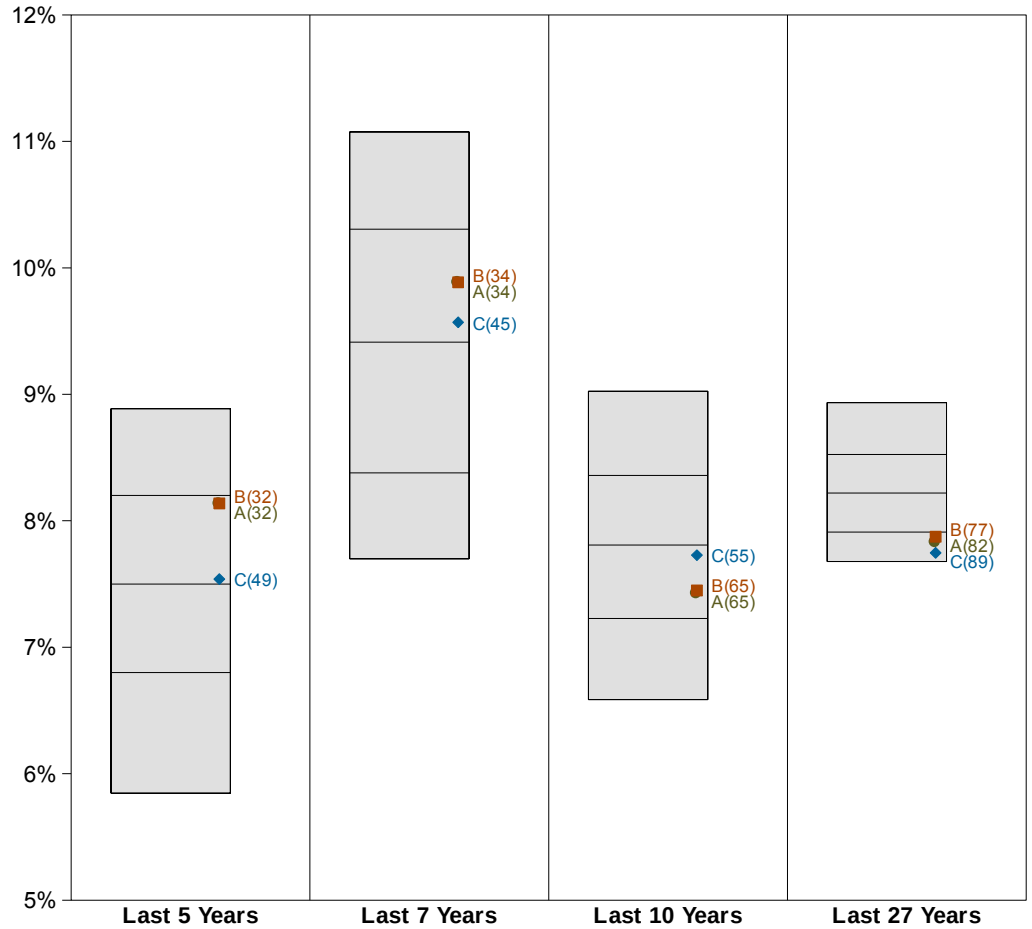
Annualized Total Fund Returns as of 9/30/18



	Last Quarter	Last Year	Last 2 Years	Last 3 Years
10th Percentile	3.64	9.86	12.18	11.44
25th Percentile	3.20	8.67	10.86	10.60
Median	2.66	7.40	9.96	9.79
75th Percentile	2.26	6.23	8.80	8.93
90th Percentile	1.77	5.03	7.54	8.12
PERS Total Plan ● A	2.82	9.03	10.97	10.48
TRS Total Plan ■ B	2.82	9.03	10.98	10.48
Target Index ◆ C	2.88	7.48	10.22	10.18

- PERS and TRS have outperformed their target for the last year, two year, and three year periods.
- PERS 3rd quarter performance trailed the target by six basis points. Underperformance in Private Equity was the primary detractor.

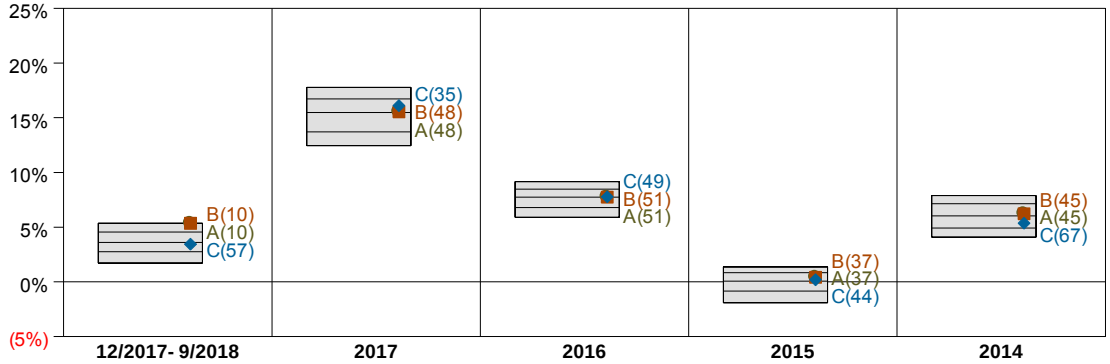
Longer-Term Total Fund Returns as of 9/30/18



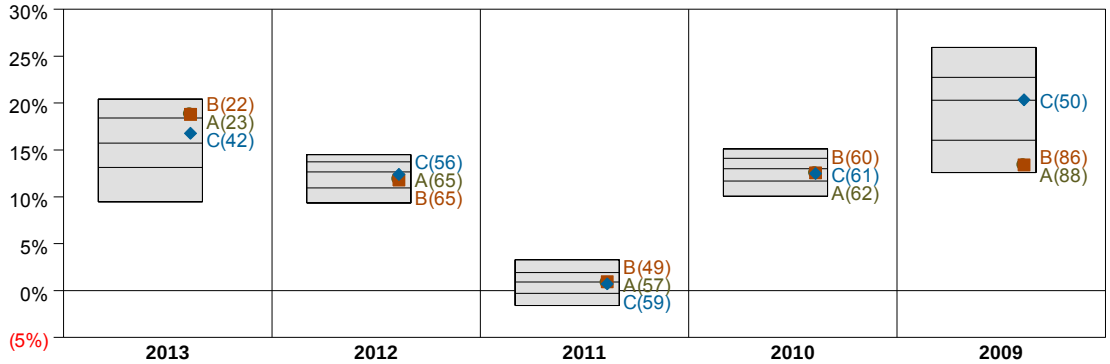
		Last 5 Years	Last 7 Years	Last 10 Years	Last 27 Years
10th Percentile		8.89	11.08	9.02	8.93
25th Percentile		8.20	10.31	8.36	8.52
Median		7.50	9.41	7.81	8.22
75th Percentile		6.80	8.38	7.23	7.91
90th Percentile		5.85	7.70	6.59	7.68
PERS Total Plan	● A	8.13	9.88	7.42	7.83
TRS Total Plan	■ B	8.14	9.89	7.45	7.87
Target Index	◆ C	7.54	9.57	7.73	7.75

- 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 31 basis points.
- 27 year return for PERS beats the target by eight basis points.

Calendar Period Total Fund Performance



	12/2017- 9/2018	2017	2016	2015	2014
10th Percentile	5.36	17.77	9.16	1.35	7.89
25th Percentile	4.55	16.71	8.47	0.83	7.14
Median	3.60	15.46	7.75	0.06	6.03
75th Percentile	2.75	13.71	6.79	(0.84)	4.93
90th Percentile	1.72	12.45	5.90	(1.92)	4.08
PERS Total Plan ● A	5.34	15.52	7.74	0.40	6.22
TRS Total Plan ■ B	5.34	15.54	7.74	0.41	6.22
Target Index ◆ C	3.43	16.11	7.77	0.18	5.35



	2013	2012	2011	2010	2009
10th Percentile	20.41	14.49	3.29	15.11	25.92
25th Percentile	18.40	13.73	1.93	14.10	22.73
Median	15.73	12.66	0.91	12.99	20.29
75th Percentile	13.13	10.96	(0.30)	11.68	16.03
90th Percentile	9.45	9.34	(1.58)	10.07	12.59
PERS Total Plan ● A	18.74	11.81	0.77	12.45	13.31
TRS Total Plan ■ B	18.79	11.79	0.95	12.55	13.40
Target Index ◆ C	16.78	12.38	0.72	12.49	20.33

- 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 9/30/18

Performance vs Public Fund - Domestic Equity (Gross)

		Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile		7.32	19.79	17.92	13.86	15.32	12.68
25th Percentile		7.01	18.41	17.17	13.40	14.98	12.27
Median		6.60	17.30	16.77	13.07	14.66	11.89
75th Percentile		6.17	15.88	16.15	12.40	14.02	11.51
90th Percentile		5.74	14.58	15.28	11.52	13.31	11.10
Domestic Equity Pool	● A	6.95	17.56	16.48	12.94	14.54	11.62
Standard & Poor's 500	■ B	7.71	17.91	17.31	13.95	14.83	11.97
Russell 3000 Index	▲	7.12	17.58	17.07	13.46	14.78	12.01

Domestic Equity Component Returns

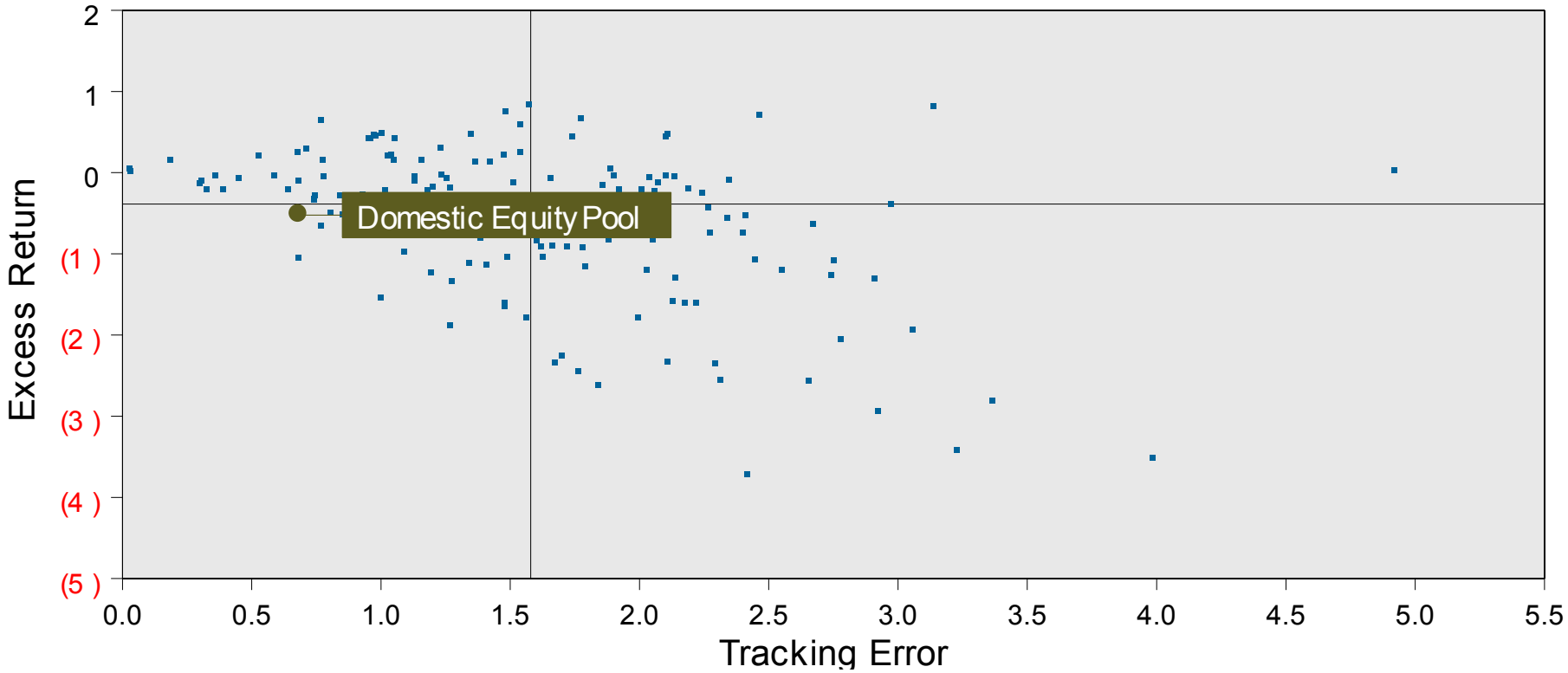
Returns for Periods Ended September 30, 2018

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years
Total Dom Equity Pool	6.95%	17.56%	16.48%	12.94%	14.54%
Russell 3000 Index	7.12%	17.58%	17.07%	13.46%	14.78%
Large Cap Managers	7.44%	17.55%	16.58%	13.48%	14.76%
Large Cap Active	6.53%	15.17%	15.85%	13.08%	14.68%
Large Cap Passive	7.65%	18.26%	17.17%	13.82%	14.91%
Russell 1000 Index	7.42%	17.76%	17.07%	13.67%	14.85%
Small Cap Managers	4.44%	18.06%	17.44%	11.76%	15.23%
Small Cap Active	4.55%	18.75%	17.68%	11.98%	15.48%
Small Cap Passive	4.74%	16.75%	17.04%	11.17%	13.74%
Russell 2000 Index	3.58%	15.24%	17.12%	11.07%	14.03%
Opportunistic Equity	5.62%	13.16%	11.42%	9.16%	9.37%

- The active large cap allocation (fourth line in the table above) has trailed its benchmark (the Russell 1000 index) over all periods shown.
- The overall small cap allocation has contributed positive excess return when compared to its benchmark (the Russell 2000 index).

Domestic Equity Excess Return and Risk

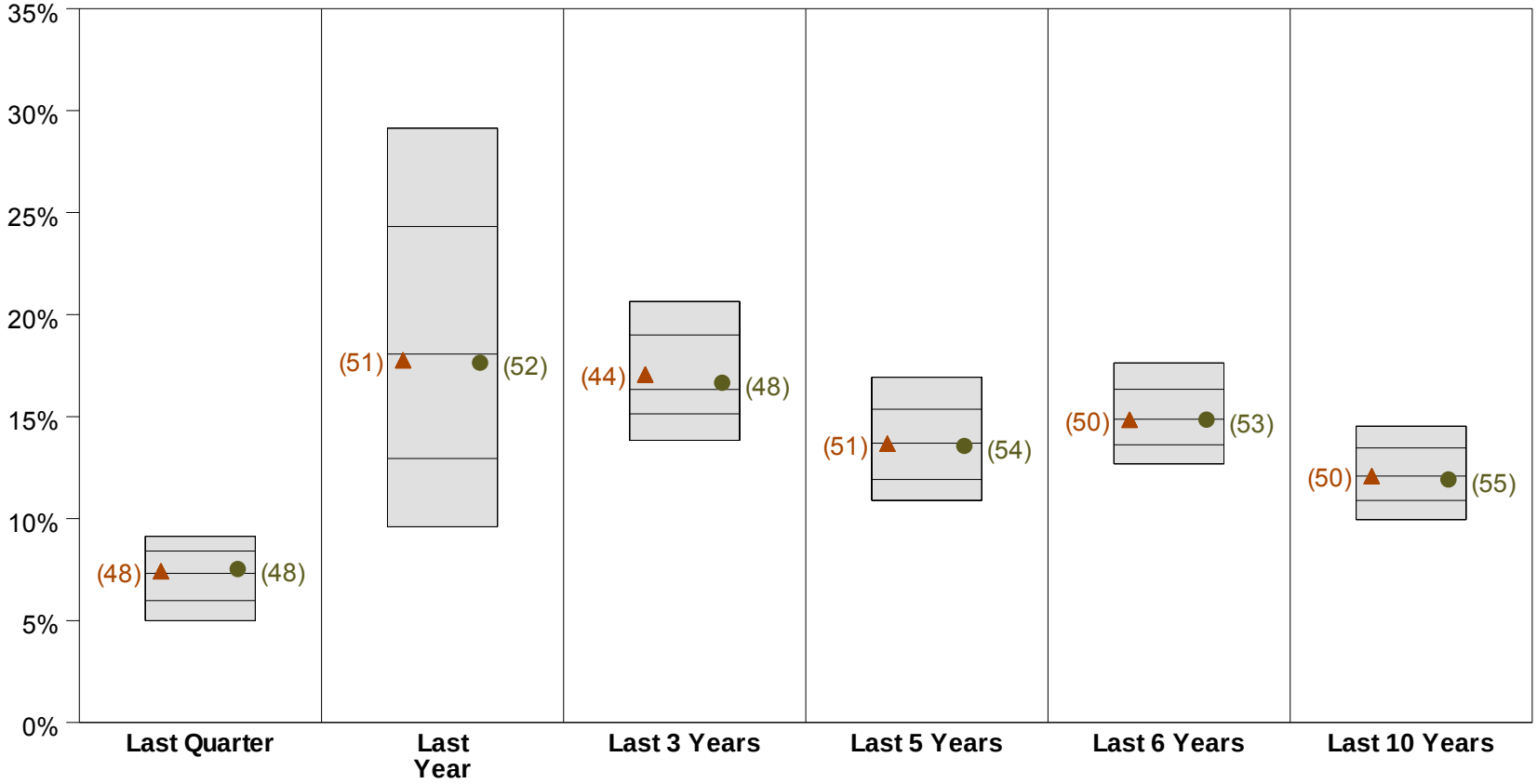
Risk Analysis vs. Public Fund – Domestic Equity (Gross)
Five Years Ended September 30, 2018



- The Domestic Equity Pool has slightly underperformed the Russell 3000 Index over five years but exhibits very tight tracking (low tracking error) to the benchmark relative to public fund peers.

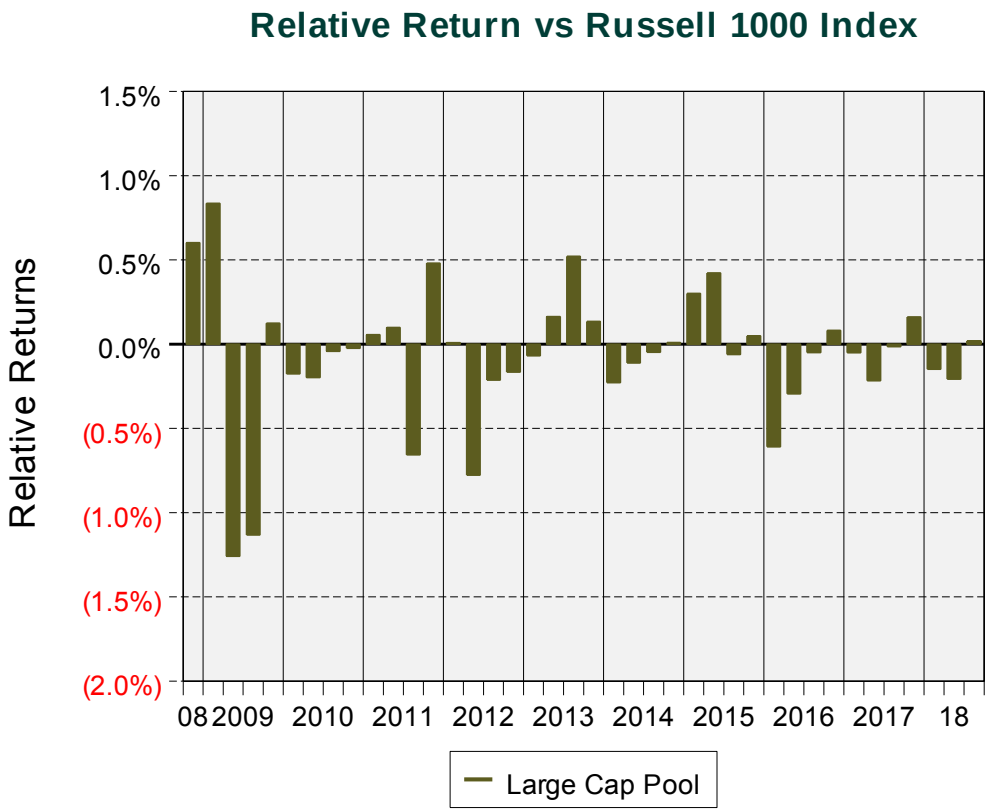
Large Cap Domestic Equity through 9/30/18

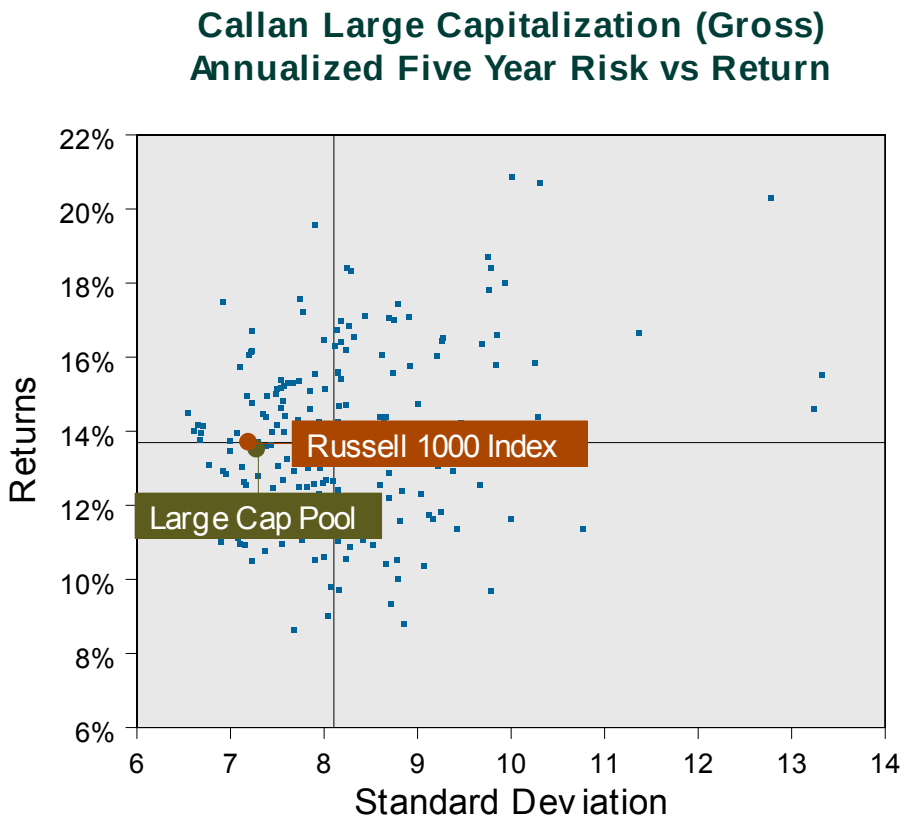
Performance vs Callan Large Capitalization (Gross)



	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	9.13	29.14	20.64	16.92	17.63	14.53
25th Percentile	8.41	24.32	19.01	15.37	16.34	13.47
Median	7.31	18.07	16.33	13.69	14.87	12.08
75th Percentile	5.98	12.95	15.14	11.92	13.62	10.89
90th Percentile	5.00	9.60	13.84	10.89	12.68	9.95
Large Cap Pool ●	7.44	17.55	16.58	13.48	14.76	11.83
Russell 1000 Index ▲	7.42	17.76	17.07	13.67	14.85	12.09

Large Cap Domestic Equity as of 9/30/18

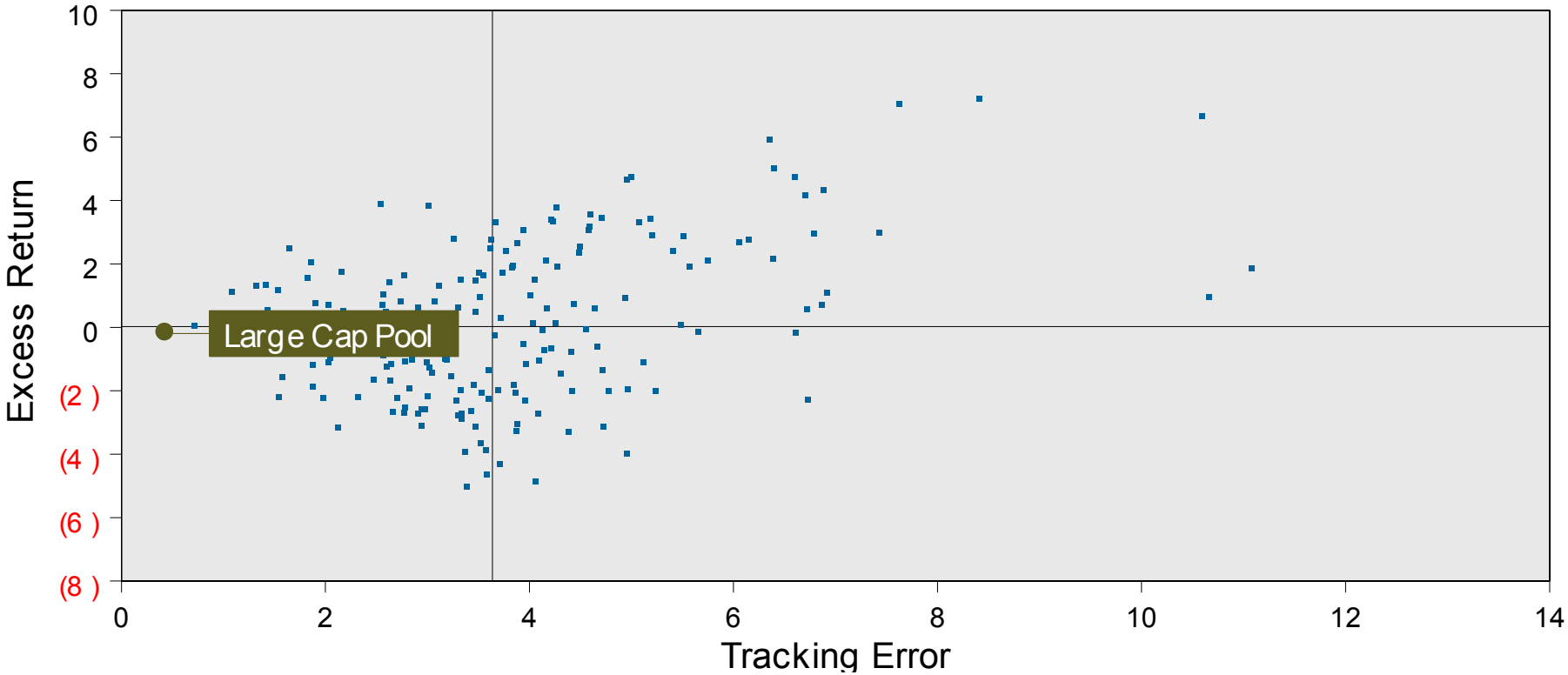




- Over half of the large cap allocation is passively managed.
- Long-term performance exhibits market-like returns with similar risk.

Large Cap Domestic Equity Excess Return and Risk

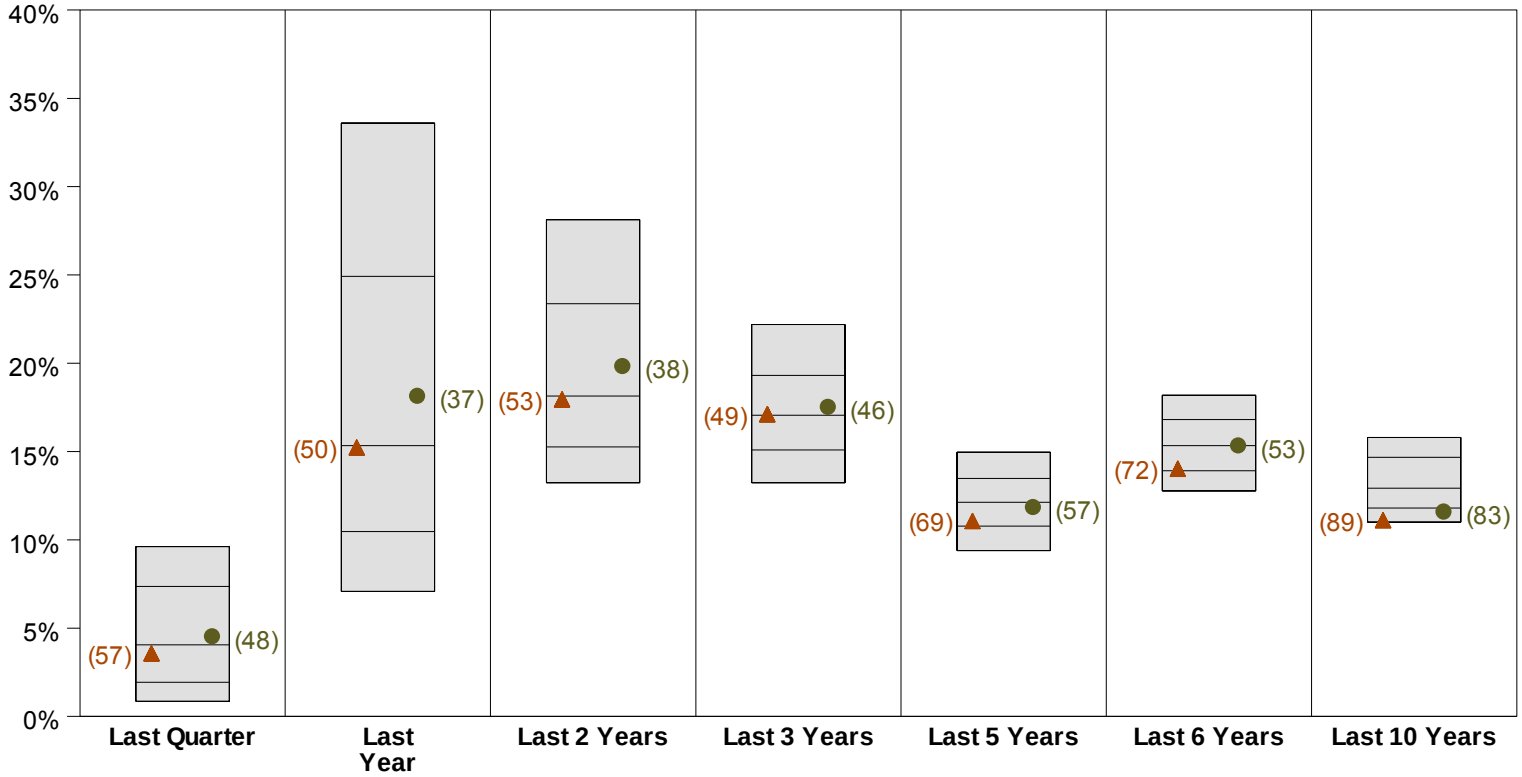
Risk Analysis vs. Callan Large Capitalization (Gross)
Five Years Ended September 30, 2018



- The Large Cap Domestic Equity Pool has performed in line with the Russell 1000 Index over five years but exhibits extremely tight tracking (low tracking error) to the benchmark relative to large cap peers.

Small Cap Domestic Equity through 9/30/18

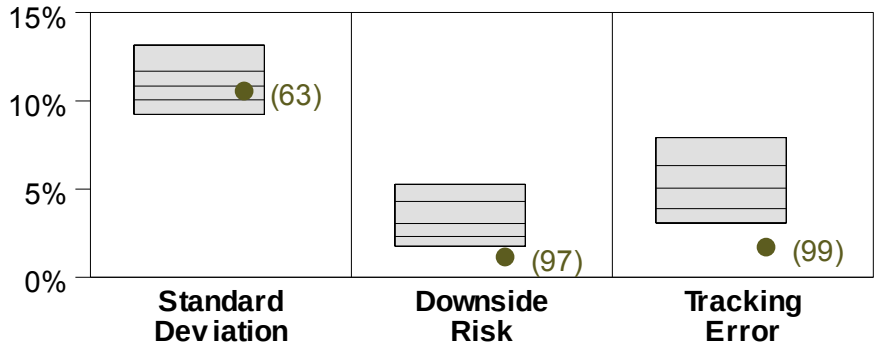
Performance vs Callan Small Capitalization (Gross)



	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	9.62	33.60	28.13	22.20	14.96	18.19	15.80
25th Percentile	7.36	24.92	23.38	19.32	13.48	16.81	14.67
Median	4.06	15.34	18.15	17.06	12.14	15.34	12.93
75th Percentile	1.94	10.48	15.26	15.09	10.78	13.91	11.81
90th Percentile	0.86	7.08	13.23	13.24	9.40	12.77	11.00
Small Cap Pool ●	4.44	18.06	19.75	17.44	11.76	15.23	11.51
Russell 2000 Index ▲	3.58	15.24	17.96	17.12	11.07	14.03	11.11

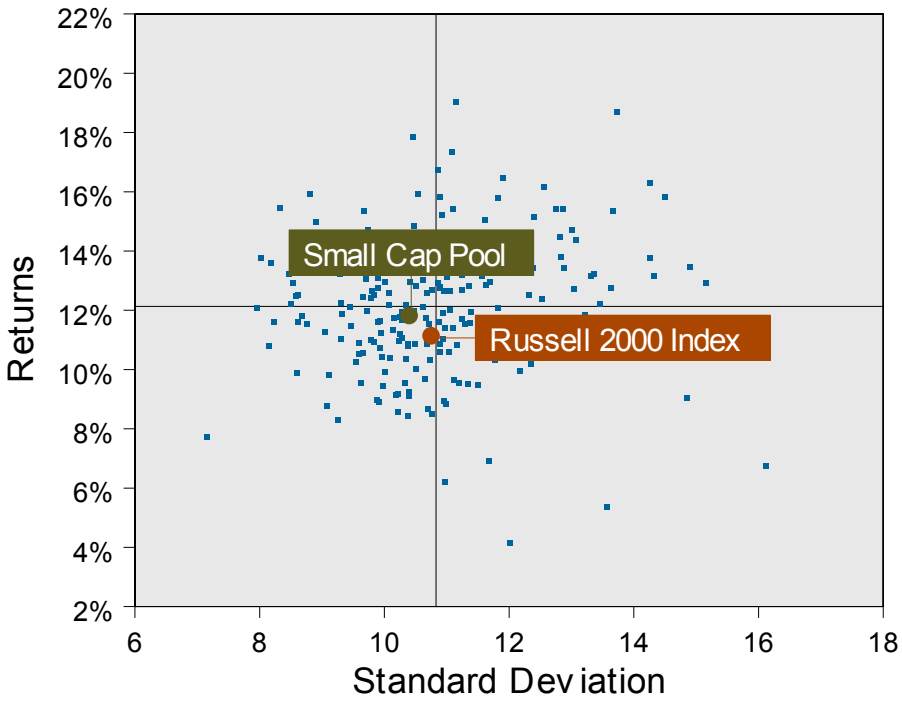
- The composite has outperformed the index across all time periods shown and ranks above median for periods out to three years.

Small Cap Domestic Equity through 9/30/18



	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	13.16	5.27	7.91
25th Percentile	11.68	4.30	6.32
Median	10.83	3.05	5.04
75th Percentile	10.06	2.32	3.89
90th Percentile	9.22	1.75	3.08
Small Cap Equity Pool ●	10.43	1.05	1.60

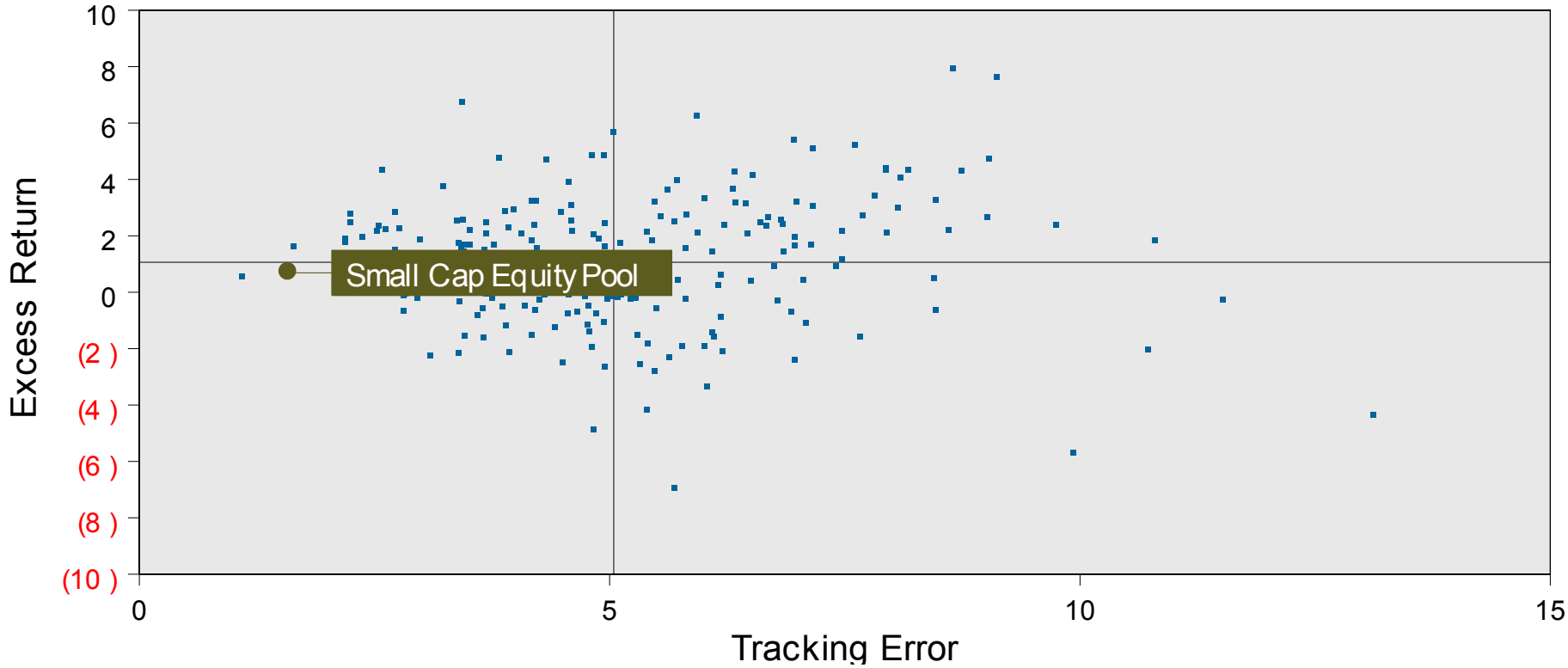
Callan Small Capitalization (Gross)
Annualized Five Year Risk vs Return



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

Small Cap Domestic Equity Excess Return and Risk

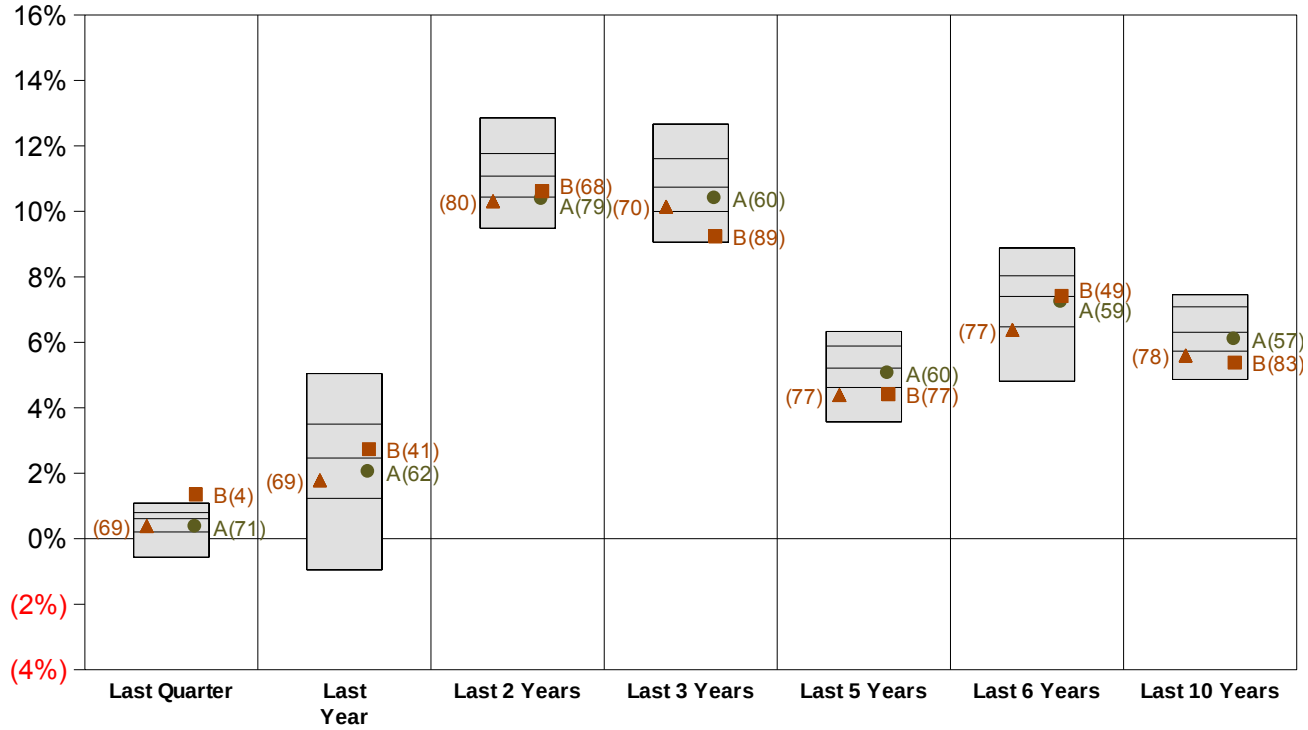
Risk Analysis vs. Callan Small Capitalization (Gross)
Five Years Ended September 30, 2018



- The Small Cap Domestic Equity Pool has outperformed the Russell 2000 Index over five years while exhibiting very tight tracking (low tracking error) to the benchmark relative to small cap peers.

International Equity through 9/30/18

Performance vs Public Fund - International Equity (Gross)

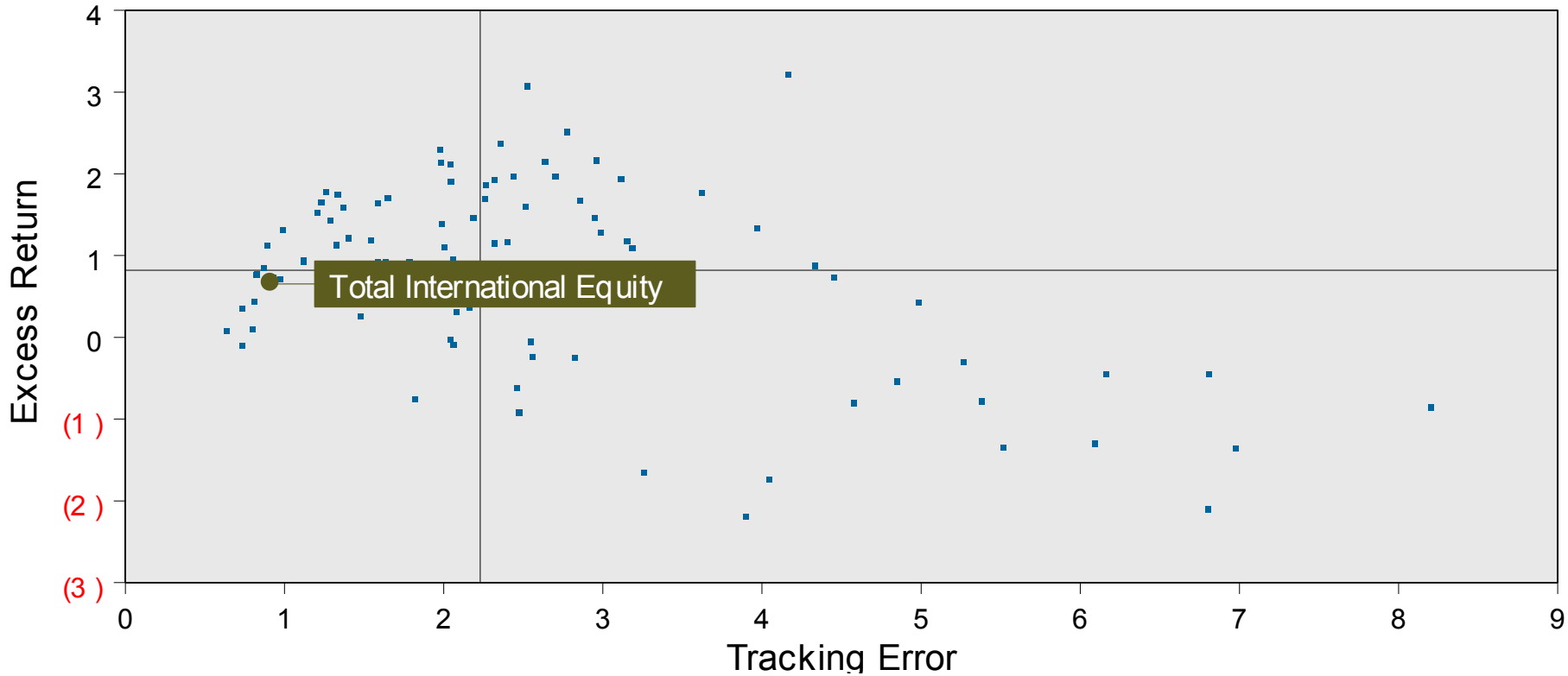


		Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile		1.09	5.05	12.86	12.67	6.34	8.89	7.45
25th Percentile		0.80	3.50	11.77	11.61	5.89	8.03	7.09
Median		0.61	2.46	11.08	10.74	5.21	7.40	6.31
75th Percentile		0.21	1.23	10.43	10.00	4.62	6.47	5.73
90th Percentile		(0.56)	(0.95)	9.48	9.06	3.57	4.81	4.87
Total International Equity	● A	0.35	2.03	10.36	10.38	5.04	7.22	6.07
MSCI EAFE Index	■ B	1.35	2.74	10.62	9.23	4.42	7.42	5.38
MSCI ACWI ex US IMI	▲	0.39	1.79	10.31	10.14	4.39	6.38	5.60

- The composite has outperformed the benchmark over all trailing periods of one year and longer.

International Equity Excess Return and Risk

Risk Analysis vs. Public Fund – International Equity (Gross)
Five Years Ended September 30, 2018



- The Total International Equity portfolio has outperformed the MSCI ACWI ex US IMI over five years while exhibiting very tight tracking (low tracking error) to the benchmark relative to public fund peers.

International Equity ex Emerging Markets through 9/30/18

Performance vs Callan Non-US Equity (Gross)

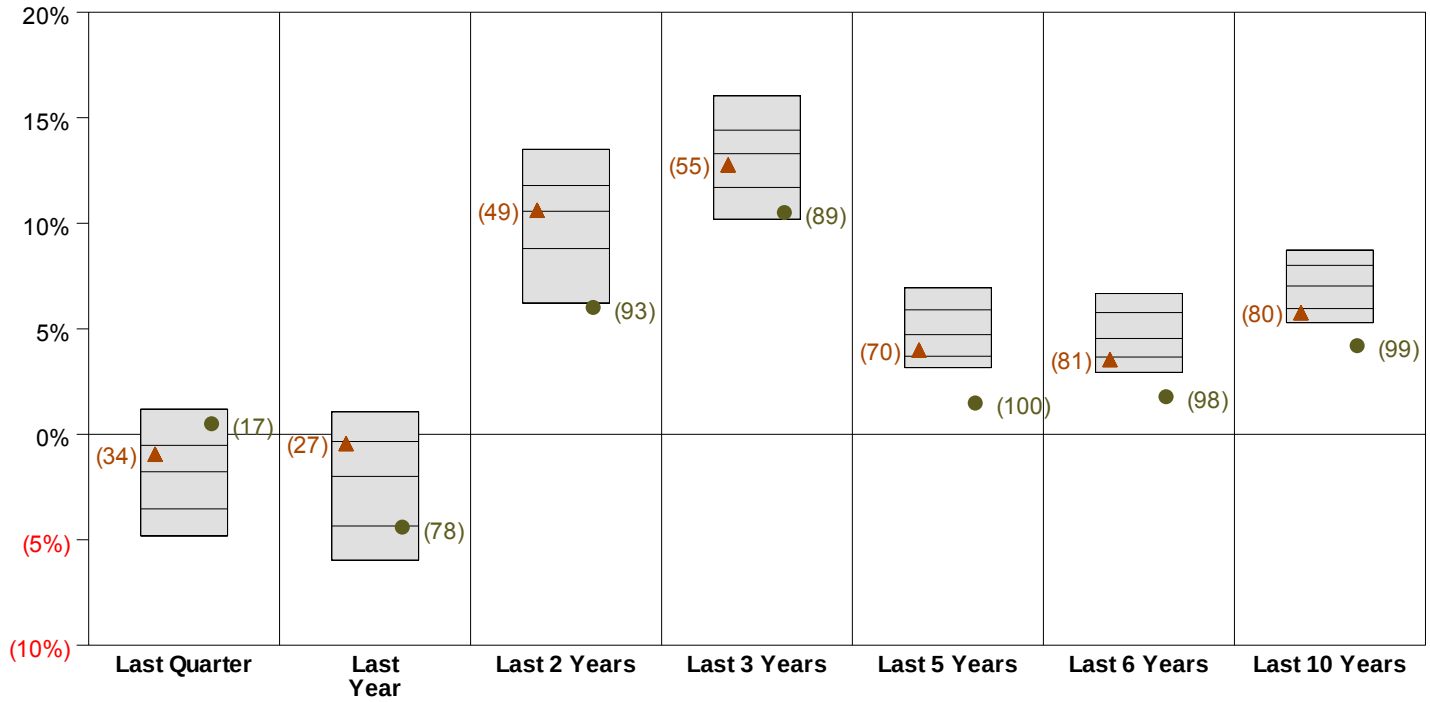
	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	2.54	8.26	14.10	13.27	7.65	10.50	8.99
25th Percentile	1.64	4.96	12.97	11.48	6.72	9.34	7.95
Median	0.91	2.53	11.12	9.96	5.66	8.33	6.91
75th Percentile	0.32	0.51	9.56	8.66	4.64	7.24	5.93
90th Percentile	(0.46)	(1.17)	8.29	7.65	3.71	6.55	5.12
Int'l Equity Pool (ex Emerging. Mkt) ●	0.48	3.31	11.20	10.49	5.53	8.02	6.05
MSCI EAFE ▲	1.35	2.74	10.62	9.23	4.42	7.42	5.38

International Equity ex Emerging Markets through 9/30/18

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Int'l Equity Pool (ex Emerging Market)	**0.48%**	**3.31%**	**10.49%**	**5.53%**	**6.05%**
Arrowstreet ACWI ex -US	1.82%	3.94%	11.86%	-	-
Baillie Gifford ACWI ex US	(1.25%)	3.46%	12.46%	-	-
Blackrock ACWI ex US IMI	0.44%	2.10%	10.43%	4.65%	-
Brandes Investment	1.07%	4.99%	9.16%	5.65%	6.02%
Capital Guardian	0.31%	6.52%	13.45%	6.16%	7.08%
Lazard Asset Intl	0.55%	1.60%	7.78%	4.59%	6.36%
McKinley Capital	(0.06%)	2.31%	10.29%	8.31%	6.17%
SSgA Int'l	0.44%	2.06%	10.37%	4.67%	-
Schroder Inv Mgmt	(1.36%)	3.02%	12.46%	9.28%	-
Mondrian Intl Sm Cap	(0.28%)	6.81%	13.28%	7.20%	-
MSCI EAFE Index	1.35%	2.74%	9.23%	4.42%	5.38%
MSCI ACWI ex-US IMI Index	0.39%	1.79%	10.14%	4.39%	5.60%

Emerging Markets through 9/30/18

Performance vs Callan Emerging Broad (Gross)



	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	1.19	1.07	13.51	16.04	6.94	6.67	8.73
25th Percentile	(0.52)	(0.34)	11.79	14.41	5.90	5.77	8.01
Median	(1.77)	(2.00)	10.57	13.30	4.72	4.54	7.02
75th Percentile	(3.53)	(4.35)	8.80	11.70	3.70	3.66	5.96
90th Percentile	(4.82)	(5.97)	6.22	10.19	3.16	2.93	5.29
Emerging Markets Pool ●	0.42	(4.48)	5.94	10.43	1.40	1.70	4.12
MSCI EM Gross ▲	(0.95)	(0.44)	10.62	12.77	3.99	3.54	5.76

- After underperforming by 3.76% in 2Q17, 1.38% in 3Q17, 1.68% in 4Q17, and 4.03% in 2Q18, the Emerging Markets Pool lags the benchmark and ranks below median for all trailing periods shown except the current quarter.

Emerging Markets Pool through 9/30/18

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Emerging Markets Pool	**0.42%**	**(4.48%)**	**10.43%**	**1.40%**	**4.12%**
DRZ Emerging (net)	3.25%	-	-	-	-
Lazard Emerging (net)	(1.63%)	(7.84%)	10.08%	0.82%	4.00%
MSCI Emerging Mkts Idx	(0.95%)	(0.44%)	12.77%	3.99%	5.76%

Total Fixed Income as of 9/30/18

Performance vs Public Fund - Domestic Fixed (Gross)

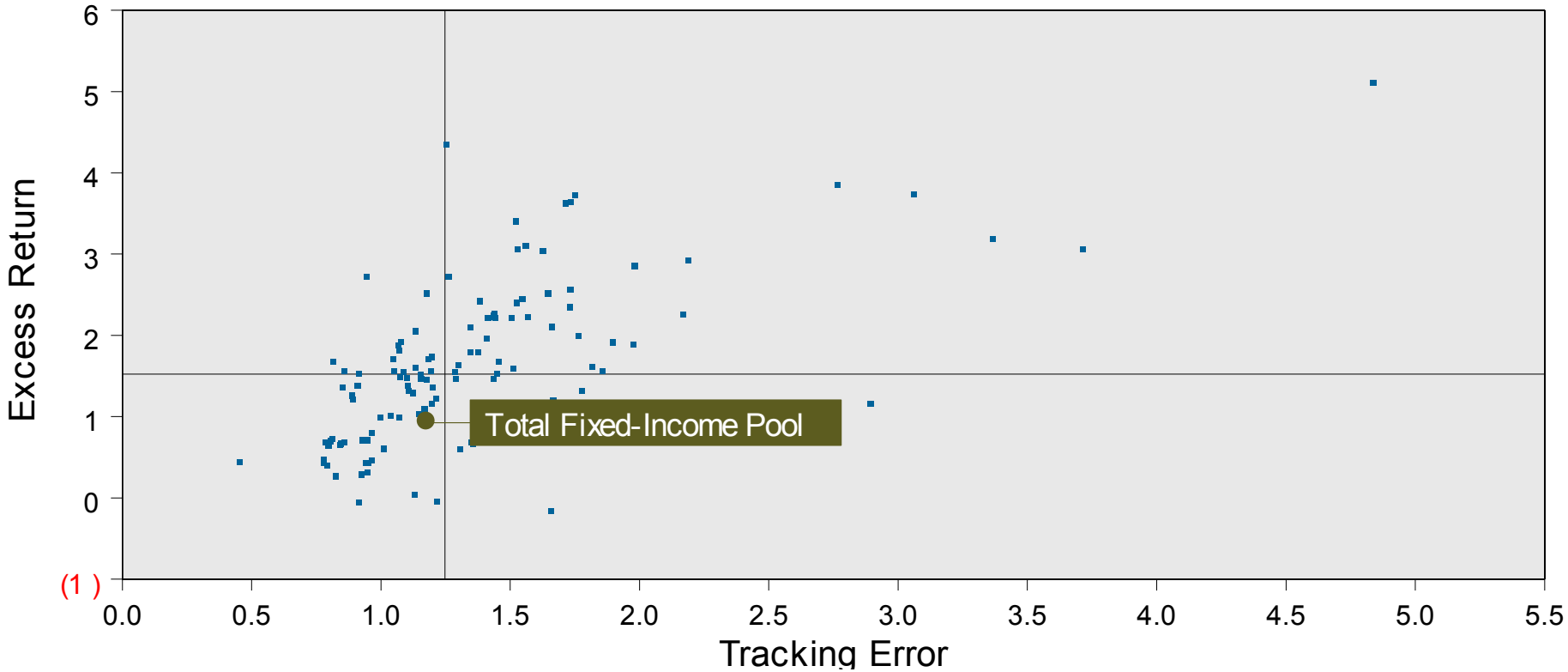
	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	0.78	1.22	2.47	4.18	4.17	3.75	6.35
25th Percentile	0.56	0.25	1.48	3.49	3.32	2.68	5.53
Median	0.31	(0.35)	0.44	2.25	2.67	2.02	4.68
75th Percentile	0.16	(0.81)	(0.15)	1.35	2.12	1.44	3.37
90th Percentile	0.03	(1.08)	(0.45)	0.97	1.56	1.11	2.73
Total Fixed-Income Pool ●	(0.06)	(1.15)	0.18	2.66	2.08	1.68	3.91
Fixed-Income Target ▲	(0.12)	(1.22)	(0.79)	0.98	1.15	0.87	3.36

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

Includes In-House and External Portfolios

Total Fixed Income Excess Return and Risk

Risk Analysis vs. Public Fund – Domestic Fixed (Gross)
Five Years Ended September 30, 2018



- The Total Fixed Income portfolio has outperformed the Fixed Income Target over five years and exhibits modest tracking error to the benchmark relative to public fund peers despite the custom nature of the benchmark.

Opportunistic through 9/30/18

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Opportunistic	**3.46%**	**6.85%**	**-**	**-**	**-**
Opportunistic Equity	**5.62%**	**13.16%**	**11.42%**	**9.16%**	**-**
ARMB STOXX Min Var	6.36%	16.58%	-	-	-
Analytic SSgA/Buy Write	5.00%	9.61%	10.91%	9.16%	-
Russell 1000 Index	7.42%	17.76%	17.07%	13.67%	12.09%
Taxable Muni Composite	**(0.20%)**	**0.36%**	**5.28%**	**6.59%**	**-**
Western Asset Taxable Muni	(0.20%)	0.34%	5.53%	6.77%	-
Blmbg Gov/Credit Bd	0.06%	(1.37%)	1.45%	2.23%	3.95%
Blmbg Aggregate Index	0.02%	(1.22%)	1.31%	2.16%	3.77%
Blmbg Intmdt Treas	(0.12%)	(1.22%)	0.17%	0.93%	2.20%
Blmbg Muni Tax Bd Idx	(0.59%)	(0.36%)	4.77%	6.43%	6.51%
International Fixed Income Pool	**(2.36%)**	**(4.00%)**	**2.95%**	**(0.88%)**	**1.62%**
Lazard Emerging Income	(2.89%)	(5.53%)	1.46%	(1.28%)	0.36%
Mondrian Investment Partners	(1.85%)	(2.28%)	4.34%	(0.23%)	2.44%
Citi Non-US Gvt Bd Idx	(2.19%)	(1.57%)	2.39%	(0.23%)	1.99%
Mondrian Benchmark	(2.08%)	(3.32%)	3.25%	(0.61%)	1.86%
Tactical FI					
FIAM Tactical Bond	1.30%	1.42%	5.00%	-	-
Schroders Insurance Linked	1.24%	(5.61%)	-	-	-
Blmbg Aggregate Index	0.02%	(1.22%)	1.31%	2.16%	3.77%
T-Bills + 6%	1.94%	7.59%	6.84%	6.52%	6.34%
High Yield	**2.33%**	**3.58%**	**6.79%**	**5.36%**	**8.40%**
FIAM High Yield CMBS	2.05%	3.85%	3.87%	-	-
MacKay Shields	2.49%	4.13%	8.78%	6.53%	9.01%
High Yield Target(1)	2.44%	2.94%	8.19%	5.54%	9.38%

(1) ML Hi Yield Master II from 12/31/06; ML Hi Yield Cash Pay prior to 12/31/06.

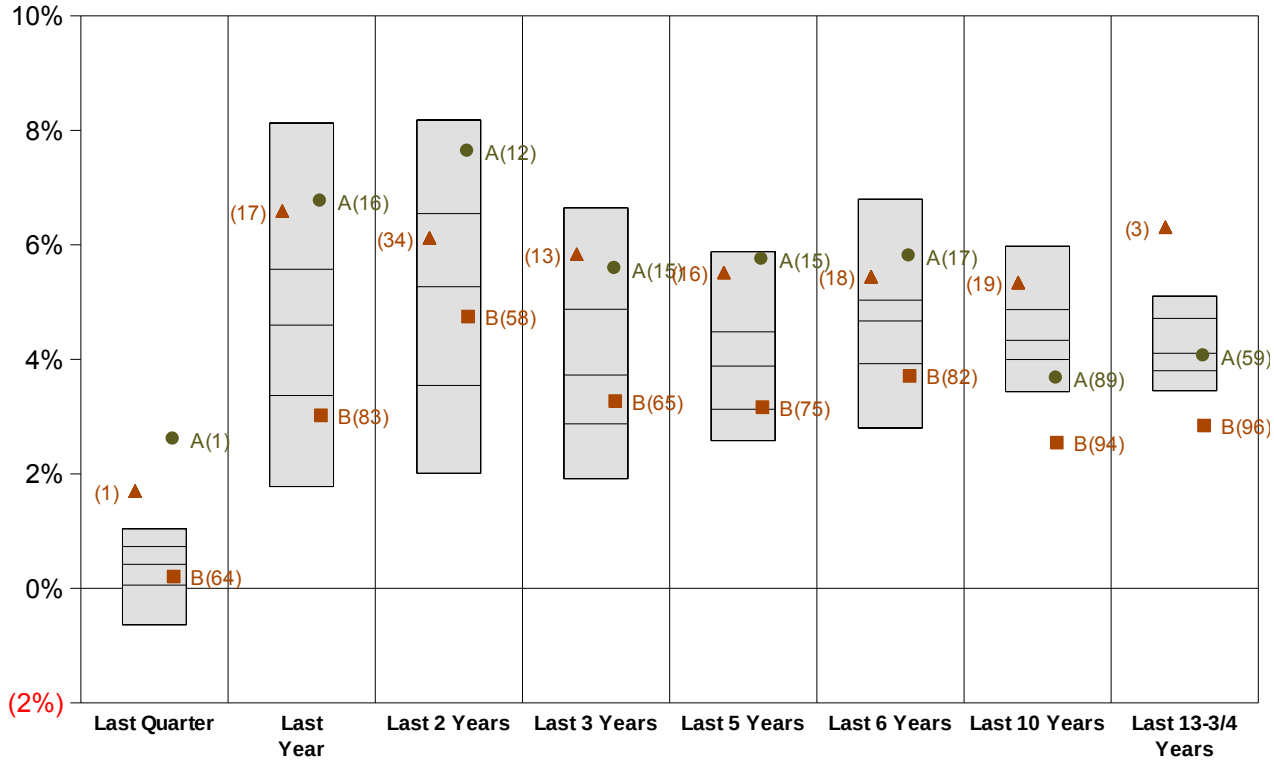
Real Assets through 9/30/18

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years
Real Assets	**2.32%**	**8.82%**	**7.60%**	**7.18%**	**7.69%**
Real Assets Target (1)	1.50%	4.76%	6.42%	7.46%	7.56%
Real Estate Pool	1.57%	7.52%	8.59%	9.94%	9.81%
Real Estate Target (2)	1.56%	6.93%	7.91%	9.63%	9.78%
Private Real Estate	1.65%	8.19%	8.44%	9.99%	9.97%
NCREIF Total Index	1.67%	7.16%	7.75%	9.57%	9.81%
ARMB REIT	0.87%	4.73%	8.94%	9.55%	8.92%
NAREIT Equity Index	0.50%	4.31%	8.97%	9.57%	9.00%
Total Farmland	0.56%	3.81%	4.22%	5.24%	7.05%
UBS Farmland	0.45%	3.76%	4.45%	5.68%	8.02%
Hancock Agricultural	0.79%	3.89%	3.74%	4.44%	5.38%
ARMB Farmland Target (3)	1.21%	6.46%	5.67%	6.94%	8.68%
Total Timber	0.45%	5.17%	1.16%	4.47%	4.88%
Timberland Investment Resources	0.60%	5.29%	1.38%	4.33%	4.55%
Hancock Timber	0.06%	4.95%	0.56%	4.42%	5.32%
NCREIF Timberland Index	1.02%	4.00%	3.52%	5.99%	6.60%
Total Energy Funds *	3.60%	8.32%	(2.80%)	(5.79%)	(4.39%)
CPI + 5%	1.37%	7.34%	6.96%	6.36%	6.30%
MLP Composite *	3.55%	1.71%	4.42%	0.08%	-
Advisory Research (FKA FAMCO) MLP	4.22%	2.02%	2.82%	(1.43%)	-
Tortoise Capital Adv MLP	2.96%	1.48%	5.88%	1.47%	-
Alerian MLP Index	6.57%	4.89%	4.43%	(2.72%)	0.32%
Total Infrastructure *	2.73%	10.42%	11.35%	-	-
Brookfield	(0.54%)	(1.94%)	7.17%	-	-
Lazard	(0.66%)	(1.83%)	13.75%	-	-
JPM Infrastructure	(1.48%)	9.60%	6.07%	-	-
IFM Infrastructure	6.17%	19.88%	13.67%	-	-
Global Infrastructure Idx	(1.61%)	(2.84%)	8.01%	6.14%	7.22%

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

Absolute Return Composite through 9/30/18

Performance vs Callan Absolute Rtn Hedge Fund of Funds (Net)



		Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years	Last 13-3/4 Years
10th Percentile		1.04	8.13	8.18	6.65	5.88	6.80	5.98	5.11
25th Percentile		0.73	5.57	6.55	4.87	4.48	5.03	4.87	4.72
Median		0.42	4.60	5.27	3.73	3.88	4.67	4.33	4.11
75th Percentile		0.06	3.37	3.54	2.87	3.13	3.92	4.00	3.80
90th Percentile		(0.63)	1.78	2.01	1.92	2.58	2.80	3.44	3.45
Absolute Return	● A	2.60	6.76	7.63	5.58	5.74	5.80	3.66	4.05
HFRI Fund of Funds Compos	■ B	0.21	3.02	4.75	3.27	3.17	3.71	2.55	2.85
T-Bills + 5%	▲	1.70	6.59	6.12	5.84	5.52	5.45	5.34	6.31

- The absolute return composite outperformed the HFRI FoF Index for all trailing periods shown.

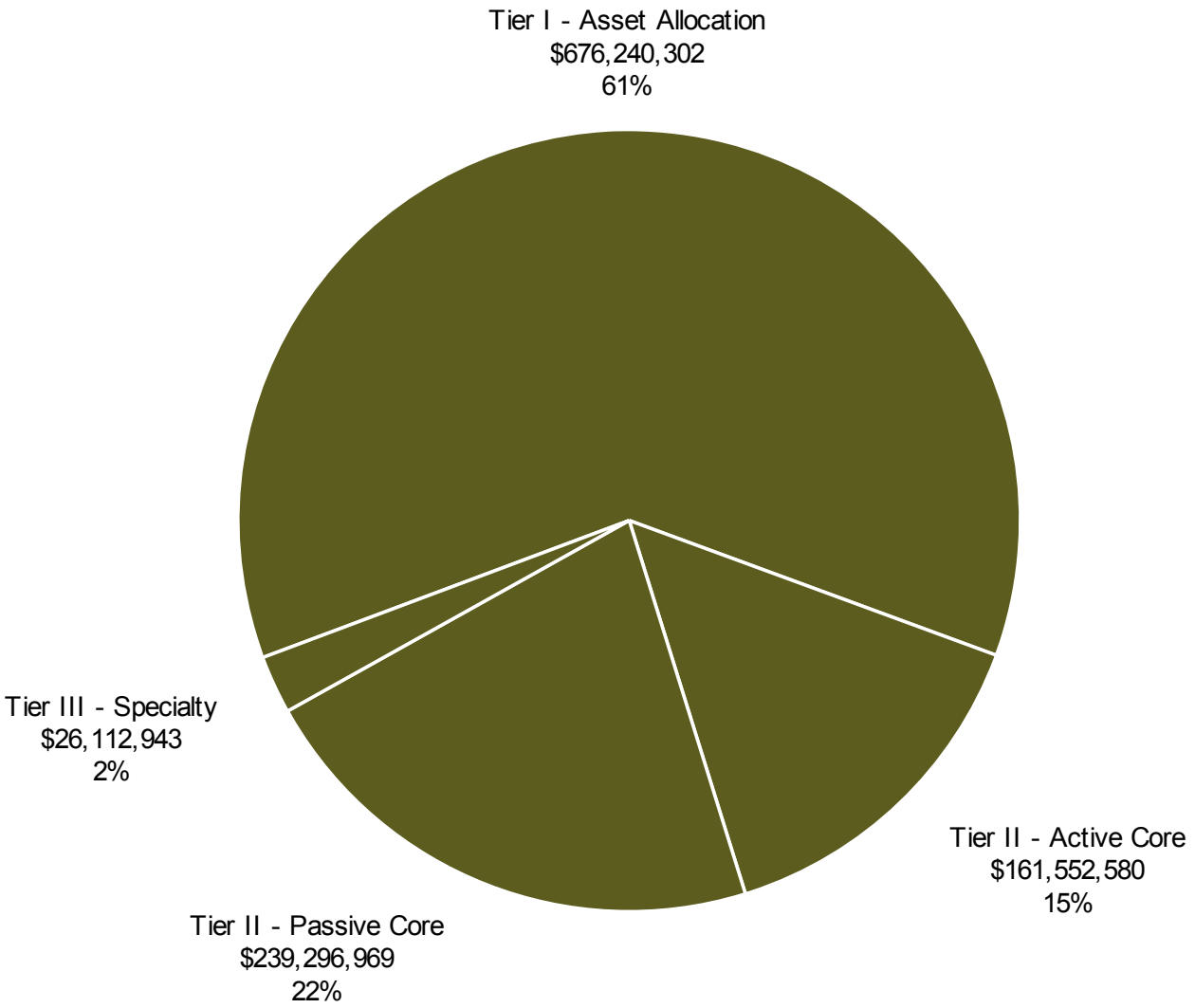
Absolute Return Composite through 9/30/18

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Absolute Return	**2.60%**	**6.76%**	**5.58%**	**5.74%**	**3.66%**
Crestline ABS	2.62%	8.10%	8.19%	8.99%	5.46%
Prisma ABS	0.54%	3.52%	2.78%	3.34%	-
Allianz Stuctured Alpha 1000+	4.57%	9.96%	11.45%	-	-
KKR Apex Equity Fund	(3.42%)	(1.70%)	0.27%	-	-
Crestline Specialty Lending Fund	2.57%	13.46%	11.63%	-	-
Zebra Global Equity	0.42%	(3.43%)	-	-	-
Zebra Global Advantage	0.88%	(8.18%)	-	-	-
JP Morgan Systematic Alpha	(2.36%)	-	-	-	-
Man Group Alternative Risk Premia	(1.39%)	-	-	-	-
HFRI Fund of Funds Index	0.21%	3.02%	3.27%	3.17%	2.55%

Defined Contribution Plan

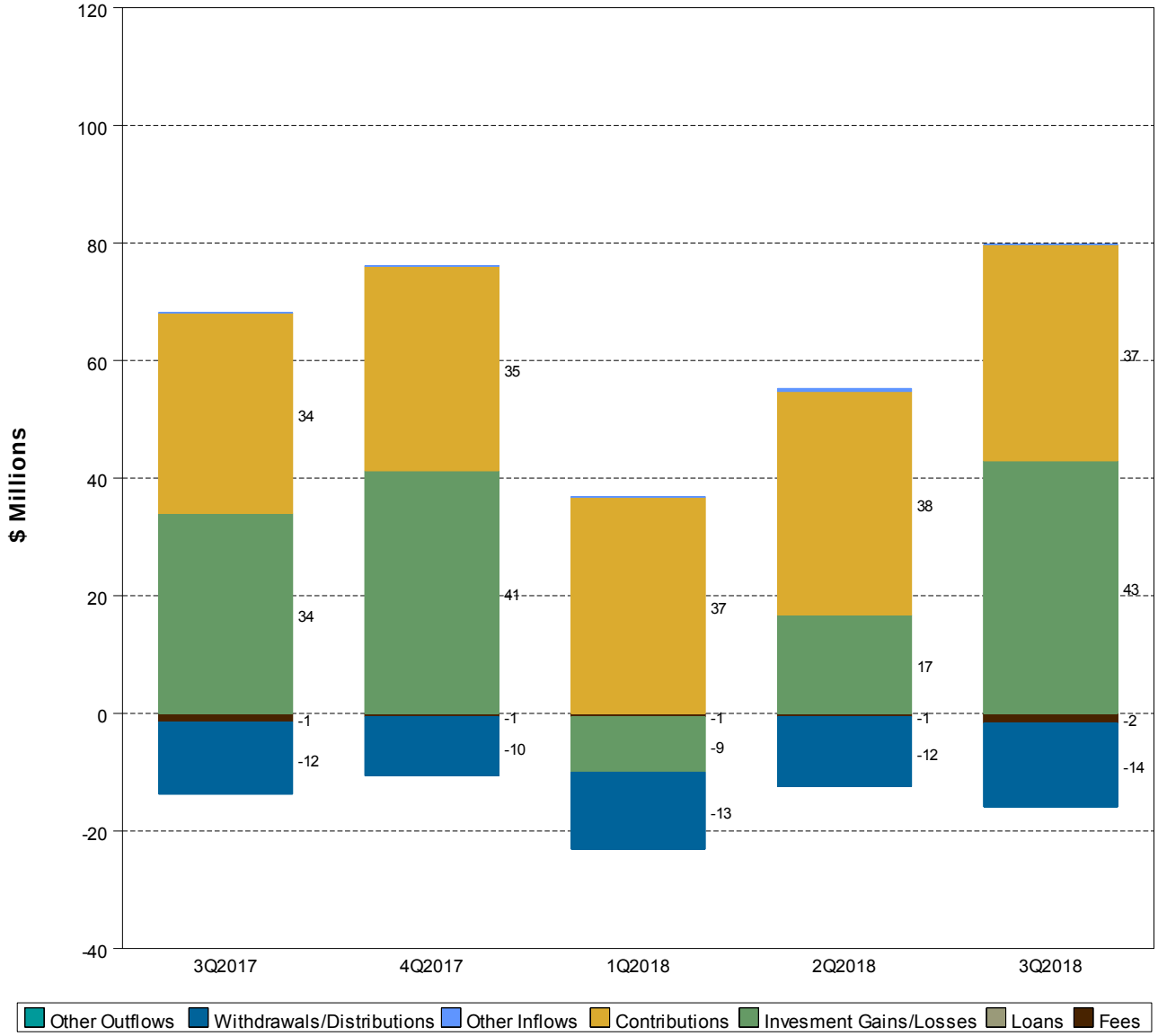
PERS DC Plan

September 30, 2018



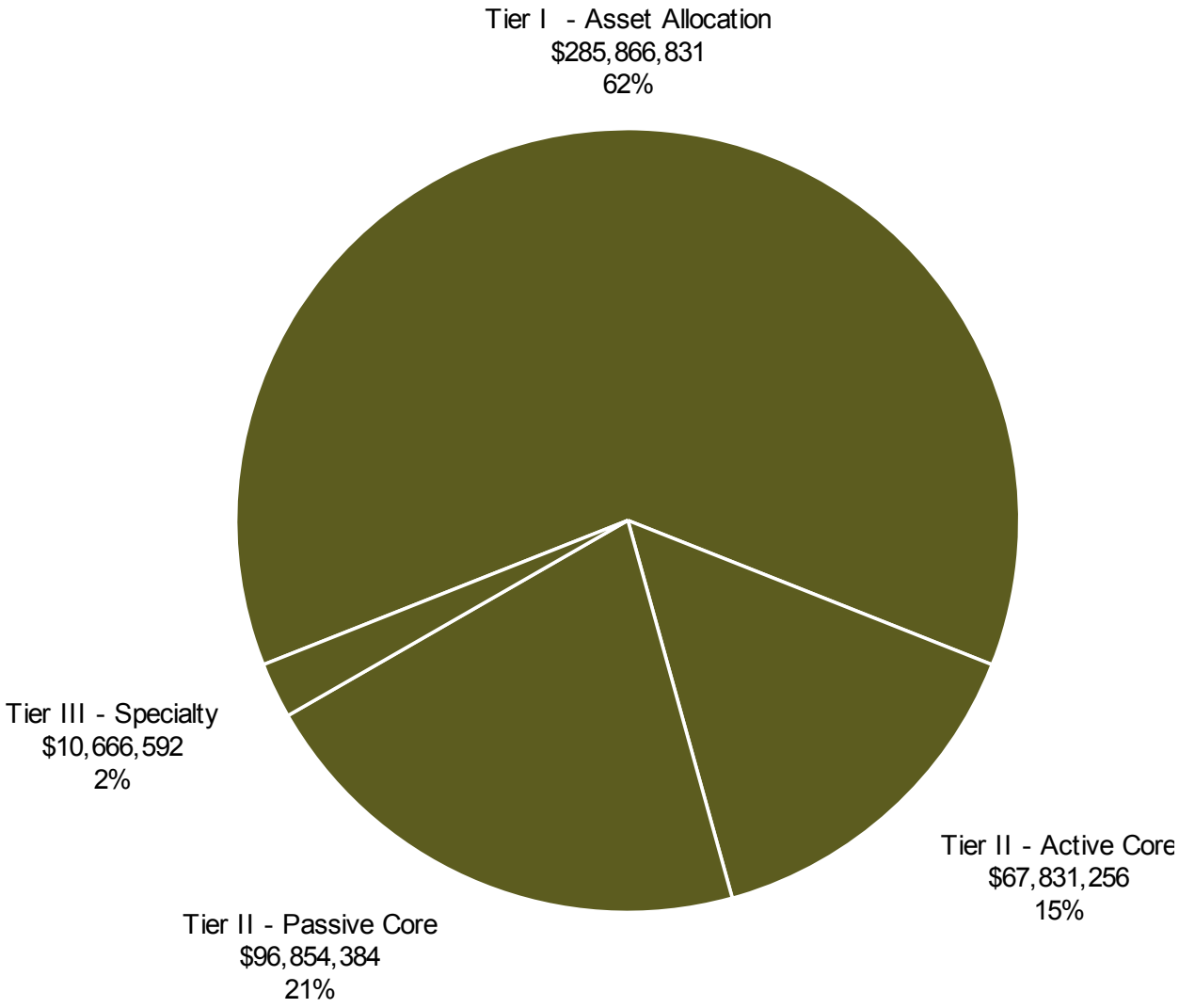
PERS DC Plan: Asset Changes

September 30, 2018



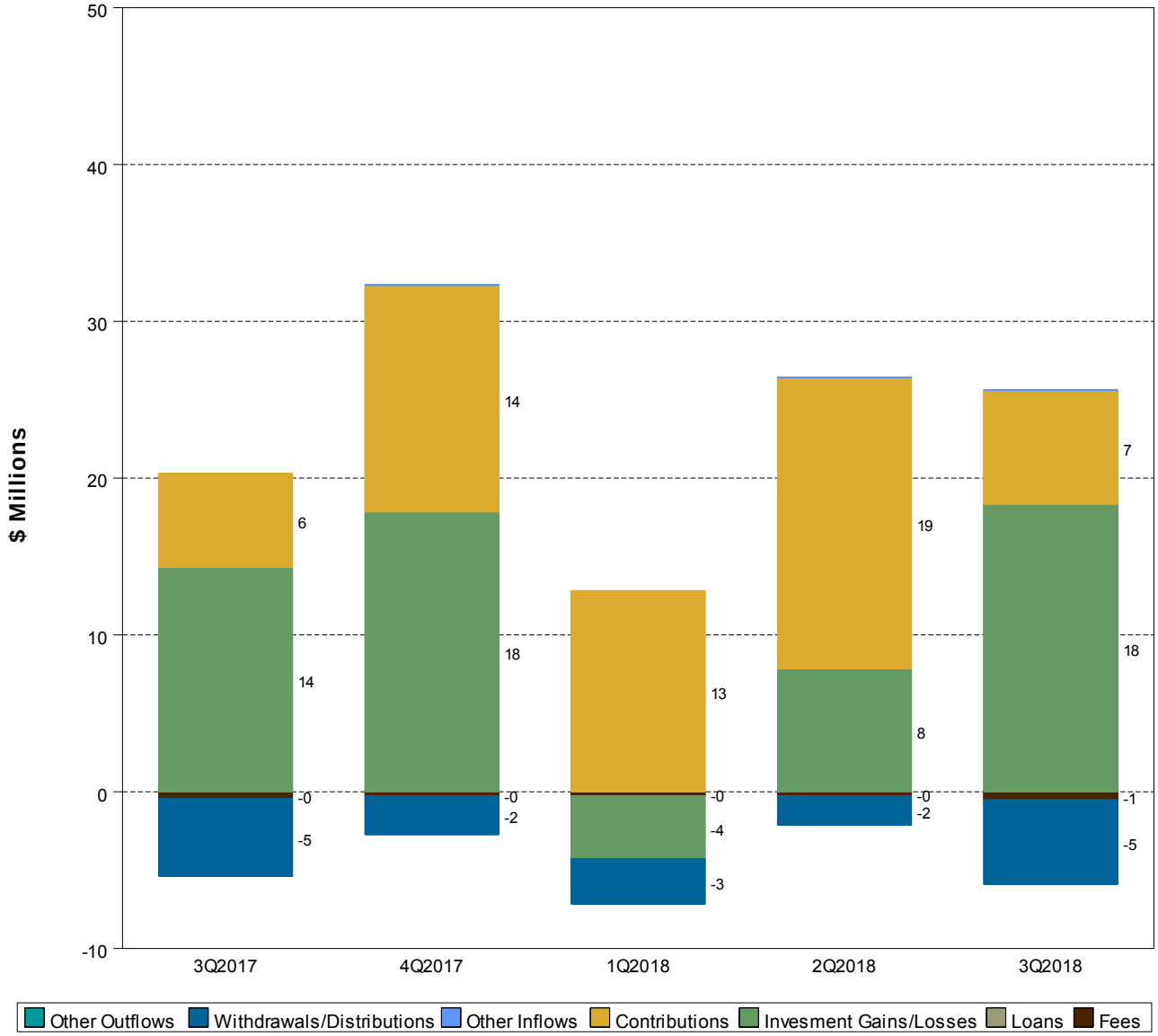
TRS DC Plan

September 30, 2018



TRS DC Plan: Asset Changes

September 30, 2018



Deferred Comp Plan

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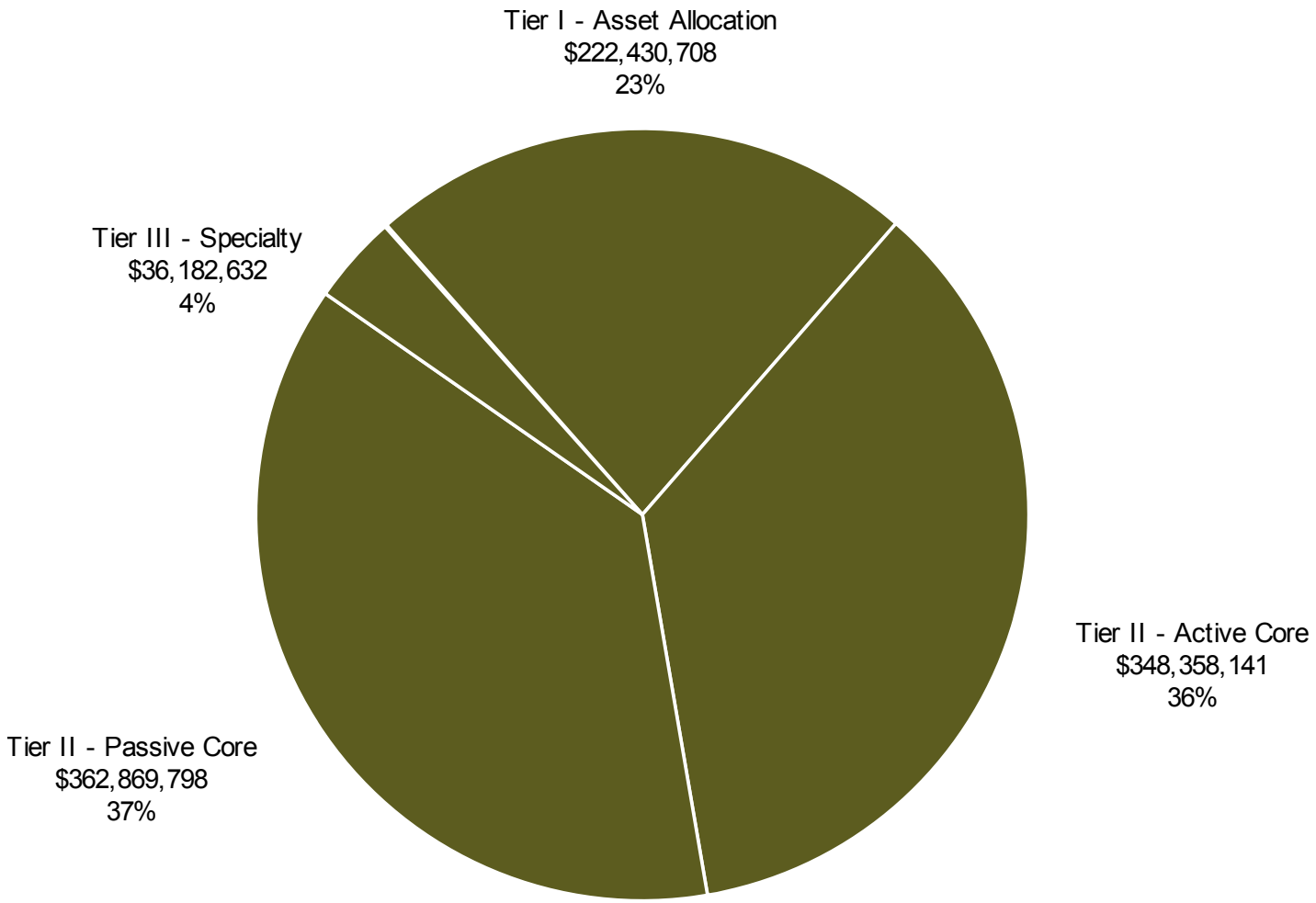
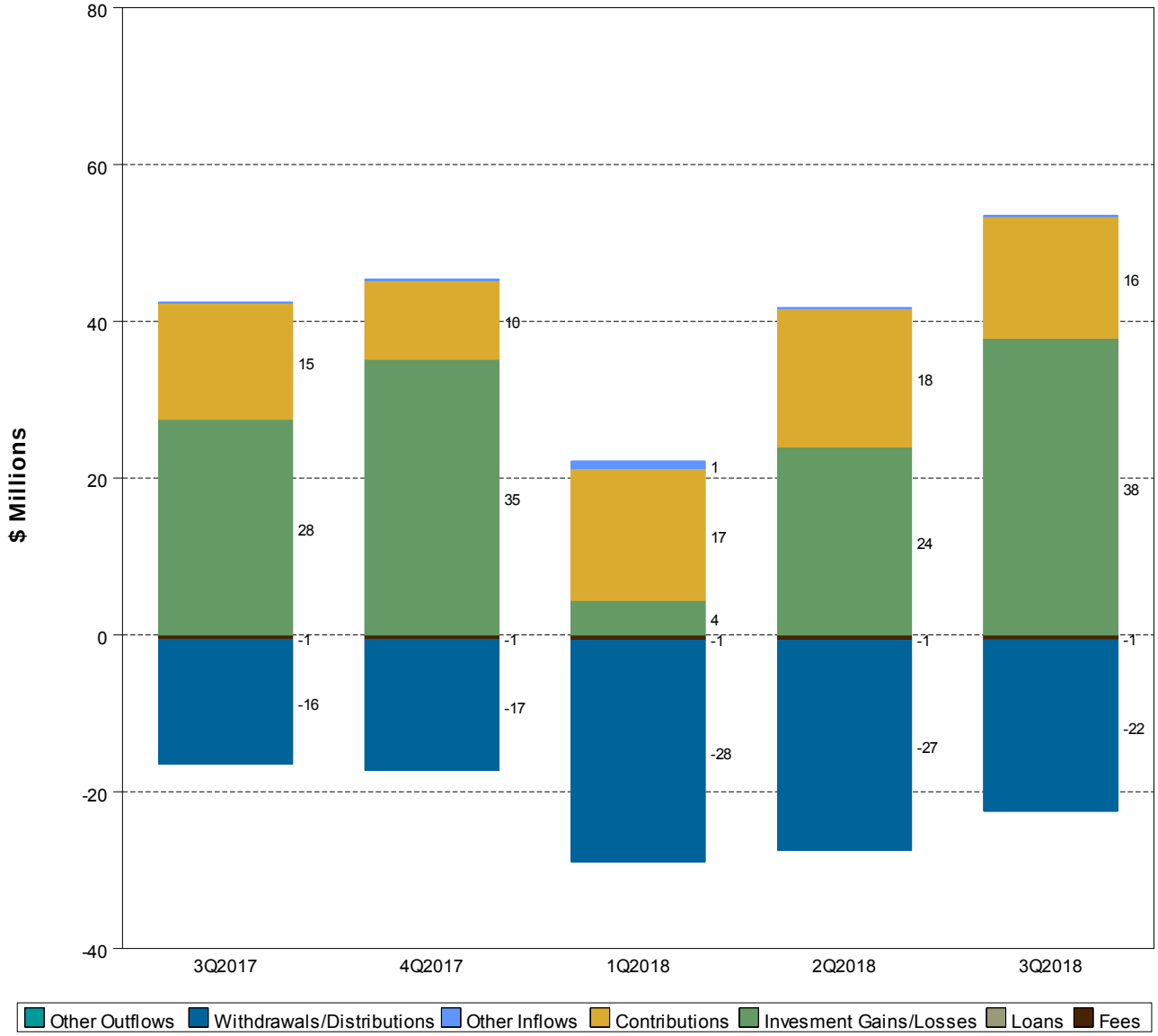


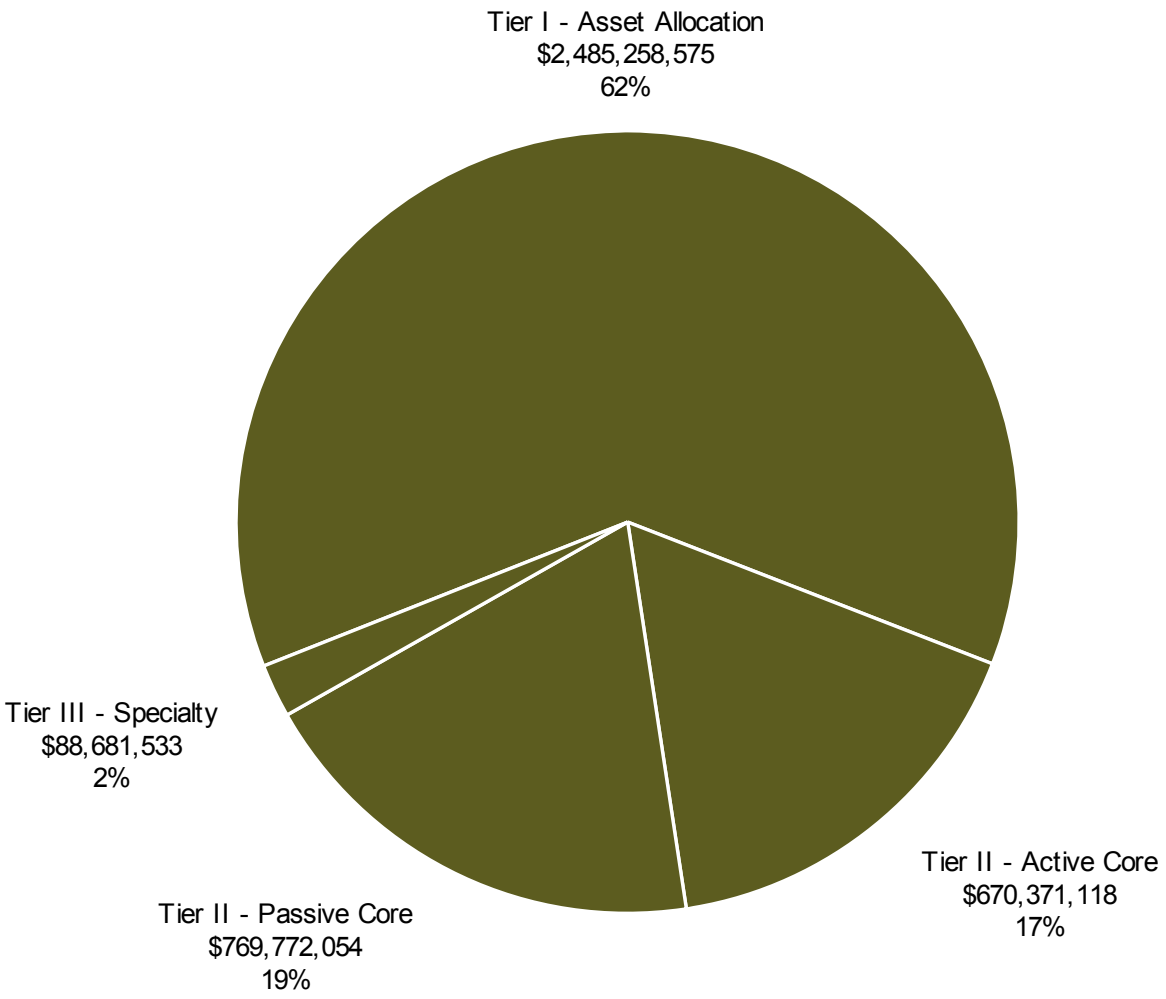
Deferred Comp Plan: Asset Changes

September 30, 2018



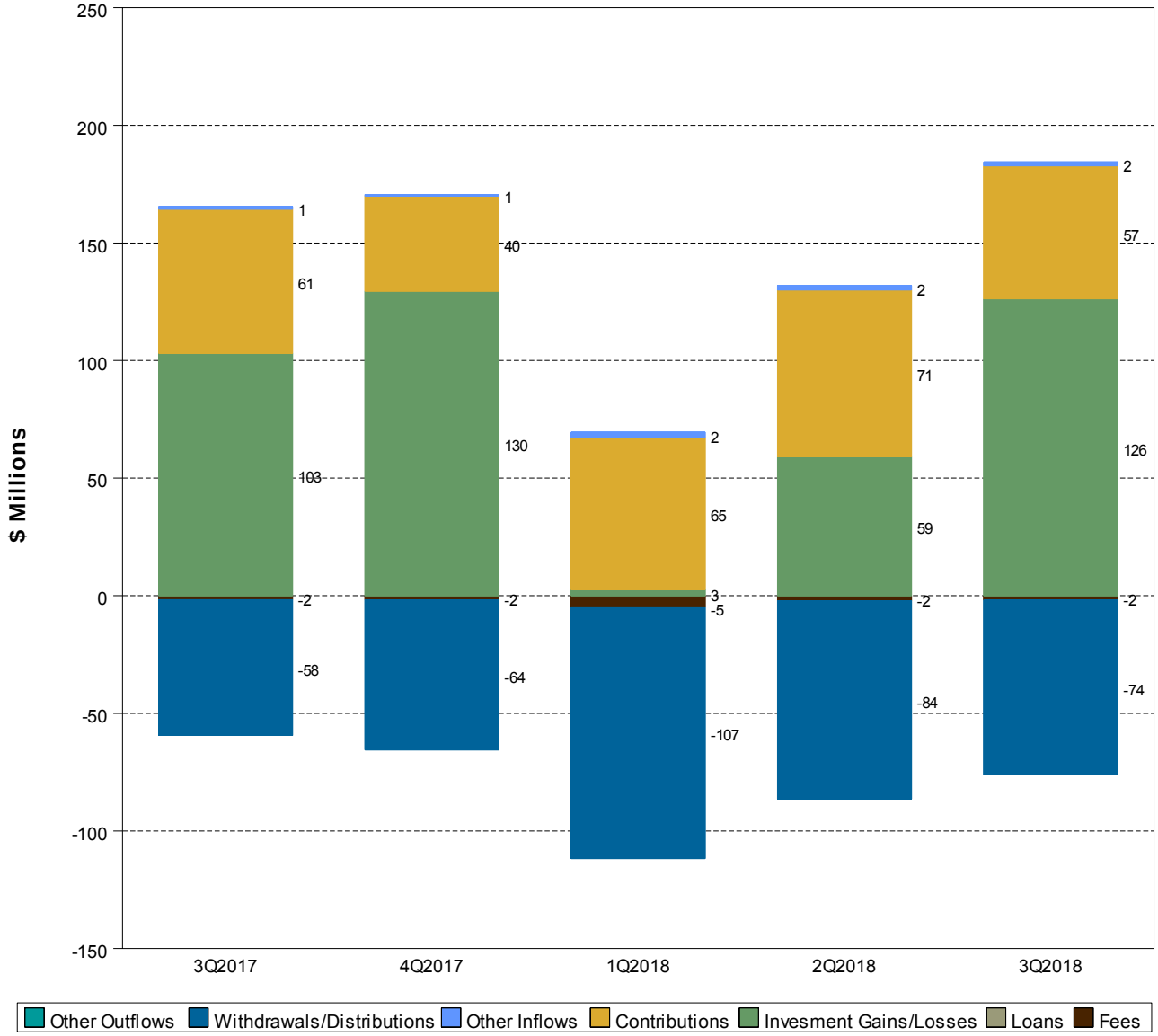
SBS Fund

September 30, 2018



SBS Fund: Asset Changes

September 30, 2018



Individual Account Option Performance: 9/30/18

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	**1.8** 35	**3.9** 25	**5.8** 37	**5.0** 27	**6.4** 37	**2.8** 82		**-0.3** 67	**0.2** 100	**1.6** 24
CAI MA Tgt Alloc Cons MFs										
Passive Target	1.9 30	4.2 22	6.0 35	5.1 25	6.3 38	2.9 81				1.6 27
Alaska Long-Term Balanced	**3.0** 31	**7.0** 27	**9.2** 33	**7.2** 25	**9.5** 22	**4.5** 71		**-0.7** 79	**0.3** 100	**1.5** 41
CAI MA Tgt Alloc Mod MFs										
Passive Target	3.1 27	7.5 20	9.5 23	7.4 23	9.5 22	4.5 66				1.5 41
Target 2010 Trust	**2.3** 8	**5.4** 7	**7.1** 31	**5.8** 27	**7.8** 18	**3.4** 75		**-0.2** 59	**0.2** 100	**1.5** 16
CAI Tgt Date 2010										
Custom Index	2.3 8	5.5 7	7.2 30	5.8 26	7.8 18	3.5 67				1.5 22
Target 2015 Trust	**2.7** 6	**6.4** 8	**8.3** 17	**6.7** 9	**9.0** 11	**4.1** 44		**0.1** 31	**0.2** 100	**1.5** 22
CAI Tgt Date 2015										
Custom Index	2.6 6	6.4 7	8.3 17	6.6 11	9.0 11	4.2 37				1.5 32
Target 2020 Trust	**3.2** 2	**7.6** 3	**9.6** 7	**7.6** 3	**10.2** 5	**4.7** 31		**0.0** 7	**0.2** 100	**1.5** 24
CAI Tgt Date 2020										
Custom Index	3.1 2	7.7 2	9.7 6	7.6 3	10.2 5	4.9 24				1.5 35
Target 2025 Trust	**3.6** 1	**8.5** 3	**10.8** 6	**8.3** 3	**11.3** 4	**5.3** 28		**-0.0** 9	**0.3** 99	**1.5** 21
CAI Tgt Date 2025										
Custom Index	3.6 2	8.7 2	10.8 5	8.3 3	11.3 4	5.4 21				1.4 33
Target 2030 Trust	**4.0** 3	**9.4** 5	**11.7** 7	**8.9** 4	**12.1** 6	**5.8** 39		**-0.2** 22	**0.3** 100	**1.4** 23
CAI Tgt Date 2030										
Custom Index	3.9 3	9.6 3	11.9 6	9.0 1	12.2 5	6.0 30				1.4 31
Target 2035 Trust	**4.3** 5	**10.2** 6	**12.6** 13	**9.5** 4	**12.8** 4	**6.2** 44		**-0.2** 22	**0.3** 100	**1.4** 15
CAI Tgt Date 2035										
Custom Index	4.3 6	10.5 5	12.8 10	9.5 3	12.9 3	6.4 34				1.4 25
Target 2040 Trust	**4.6** 4	**10.9** 5	**13.3** 6	**9.9** 5	**13.3** 3	**6.6** 47		**-0.1** 21	**0.3** 100	**1.4** 16
CAI Tgt Date 2040										
Custom Index	4.5 4	11.1 4	13.5 3	9.9 5	13.3 3	6.7 32				1.4 26
Target 2045 Trust	**4.7** 4	**11.1** 6	**13.5** 6	**10.0** 5	**13.4** 5	**6.6** 62		**-0.2** 23	**0.3** 99	**1.4** 12
CAI Tgt Date 2045										
Custom Index	4.7 4	11.5 5	13.7 3	10.1 5	13.4 5	6.8 50				1.4 20

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:

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

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

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

Individual Account Option Performance: 9/30/18

Balanced & Target Date Funds

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Target 2050 Trust	**4.8** 4	**11.2** 7	**13.5** 7	**10.0** 4	**13.4** 3	**6.6** 68		**-0.1** 28	**0.3** 100	**1.4** 15
CAI Tgt Date 2050 Custom Index	4.7 4	11.5 5	13.7 4	10.1 4	13.4 3	6.8 55				1.4 19
Target 2055 Trust	**4.7** 6	**11.2** 10	**13.5** 10	**10.0** 8	**13.4** 8	**6.6** 76		**-0.1** 40	**0.3** 100	**1.4** 13
CAI Tgt Date 2055 Custom Index	4.7 6	11.5 7	13.7 8	10.1 8	13.4 8	6.8 62				1.4 21
Target 2060 Trust	**4.7** 6	**11.0** 14								
CAI Tgt Date 2060 Custom Index	4.7 6	11.5 7								

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: 9/30/18

Active Equity, Stable Value, and Money Market

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Active and Other Funds										
International Equity Fund	**-1.2** 91	**0.1** 71	**6.1** 97						**2.7** 75	
CAI Mut Fd: Non-U.S. Equity Style										
MSCI ACWI ex US Index	0.8 37	2.3 46	10.5 19	4.6 46	7.7 77	9.8 52				0.4 54
T. Rowe Price Small Cap	**6.3** 41	**19.7** 43	**18.6** 27	**12.6** 21	**18.1** 15	**9.6** 88		**0.6** 4	**3.1** 95	**1.3** 13
CAI Mut Fd: Sm Cap Broad Style										
Russell 2000 Index	3.6 56	15.2 50	17.1 43	11.1 45	16.4 45	10.8 59				1.0 40
T. Rowe Price Stable Value	**0.5** 82	**2.3** 25	**2.3** 7	**2.4** 7	**2.5** 7	**0.1** 85		**11.8** 26	**0.1** 6	**35.1** 15
CAI Stable Value Database										
5 Yr U.S. Treas Rolling	0.4 97	1.6 97	1.4 97	1.4 98	1.6 94	0.1 68				13.6 63
SSgA Inst Treasury Money Market	**0.5** 14	**1.5** 9	**0.7** 11	**0.4** 12	**0.3** 14	**0.3** 5		**-3.1** 100	**0.0** 98	**-0.3** 12
Callan Money Market Funds										
FTSE 3 Mo T-Bill	0.5 3	1.6 4	0.8 2	0.5 2	0.4 3	0.3 2				-0.1 2

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:

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

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

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

Other Options: 9/30/18

Passive Strategies

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Index Funds										
SSgA S&P 500 Index Fund (i)	**7.7** 7	**17.9** 9	**17.3** 7	**13.9** 5	**16.9** 2	**7.3** 23		**-0.9** 5	**0.0** 78	**1.8** 9
Callan S&P 500 Index MFs										
S&P 500 Index	7.7 6	17.9 5	17.3 7	13.9 1	16.9 1	7.3 52				1.9 1
BlackRock S&P 500 Index Fund (i)	**7.7** 14	**17.9** 9	**17.3** 12	**13.9** 12	**16.9** 1	**7.3** 29		**-1.8** 15	**0.0** 99	**1.8** 9
Callan S&P 500 Index MFs										
S&P 500 Index	7.7 6	17.9 5	17.3 7	13.9 1	16.9 1	7.3 52				1.9 1
SSgA Russell 3000 Index Fund (i)	**7.1** 53	**17.5** 52	**17.0** 43	**13.5** 45	**16.8** 45	**7.3** 89		**-0.1** 46	**0.0** 100	**1.8** 14
CAI Mut Fd: Large Cap Broad Style (Net)										
Russell 3000 Index	7.1 52	17.6 52	17.1 43	13.5 45	16.9 45	7.3 89				1.8 15
SSgA World Equity ex-US Index Fund (i)	**0.8** 39	**1.9** 51	**10.1** 28	**4.2** 57	**7.5** 81	**9.8** 53		**0.2** 48	**0.8** 99	**0.4** 57
CAI MF: Non-U.S. Equity Style										
MSCI ACWI x U.S. Index (Net)	0.7 43	1.8 54	10.0 32	4.1 58	7.2 89	9.8 53				0.4 61
SSgA US TIPS (i)	**-0.8** 73	**0.3** 64	**2.0** 54	**1.3** 28	**1.2** 51	**3.7** 49		**-3.1** 97	**0.0** 99	**0.2** 28
CAI TIPS MFs										
Blmbg U.S. TIPS Index	-0.8 69	0.4 50	2.0 51	1.4 26	1.3 39	3.7 49				0.2 23
SSgA US REIT Index Fund (i)	**0.7** 50	**4.5** 28	**6.7** 56	**8.9** 45	**11.2** 48	**12.1** 11		**-2.7** 99	**0.1** 100	**0.7** 66
CAI Mut Fd: Real Estate Database										
DJ US Select REIT Index	0.7 50	4.6 27	6.9 54	9.1 33	11.5 36	12.1 6				0.7 56

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:

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

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

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

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

IS INTERNATIONAL INVESTING STILL WORTHWHILE?

1.

2.

3.

4.

5.

Farmland Portfolio

Overview and Recommendations

Nicholas Orr, CFA

Farmland: Row & Permanent Crops

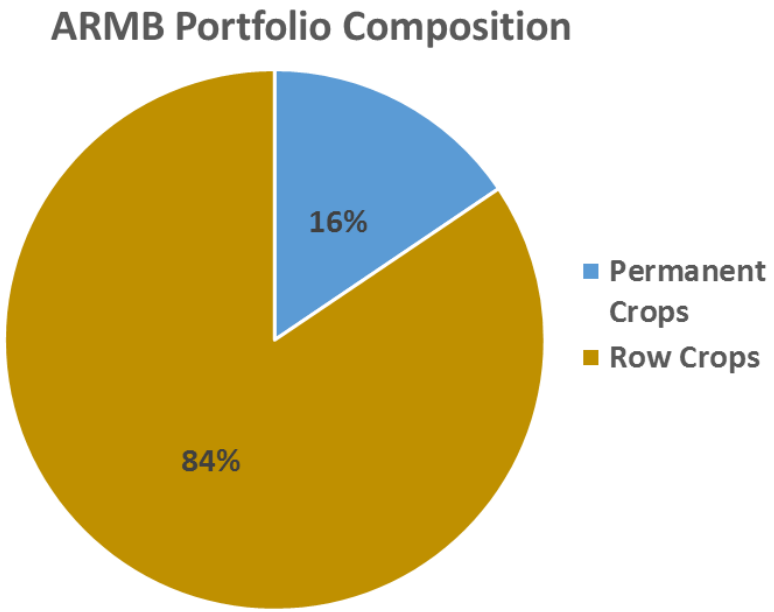
- The ARMB started investing in farmland in 2004 and has a $852 million portfolio.

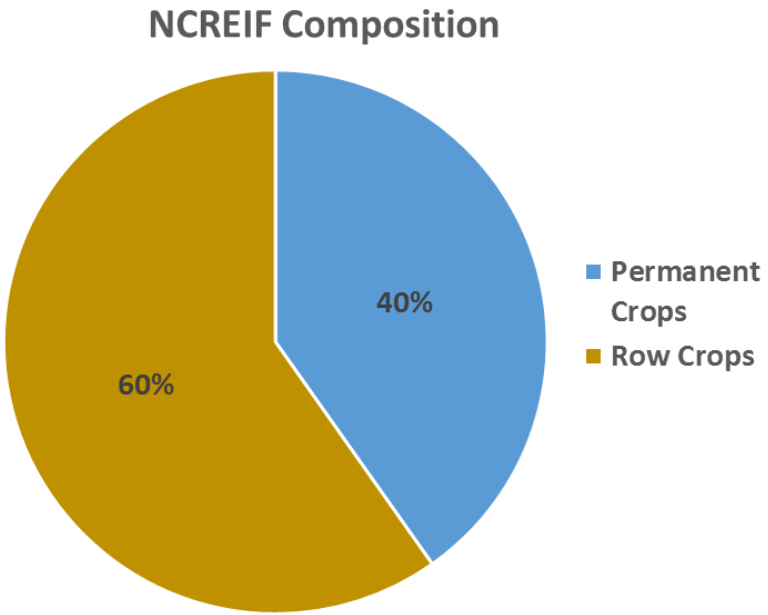
- Farmland is categorized into two main crop types, row and permanent.

Row Crops
- Planted and cultivated on a seasonal basis - vegetables and commodity crops like corn and soy
- Potential to change crop type
- Normally planted and harvested with a machine / tractor (minimal labor costs)
- Typically leased
- Multiple potential uses for crop (livestock feed, fuel, industrial applications, food)
- Yield expectations: 3-5%

Permanent Crops
- Planted once and maintained over a long period of time
- No potential to quickly change crop type
- Can be labor intensive to maintain and harvest
- Can be leased, but typically directly operated
- Typically single use for crop: food
- Yield expectations: 7-9%

ARMB Farmland Portfolio



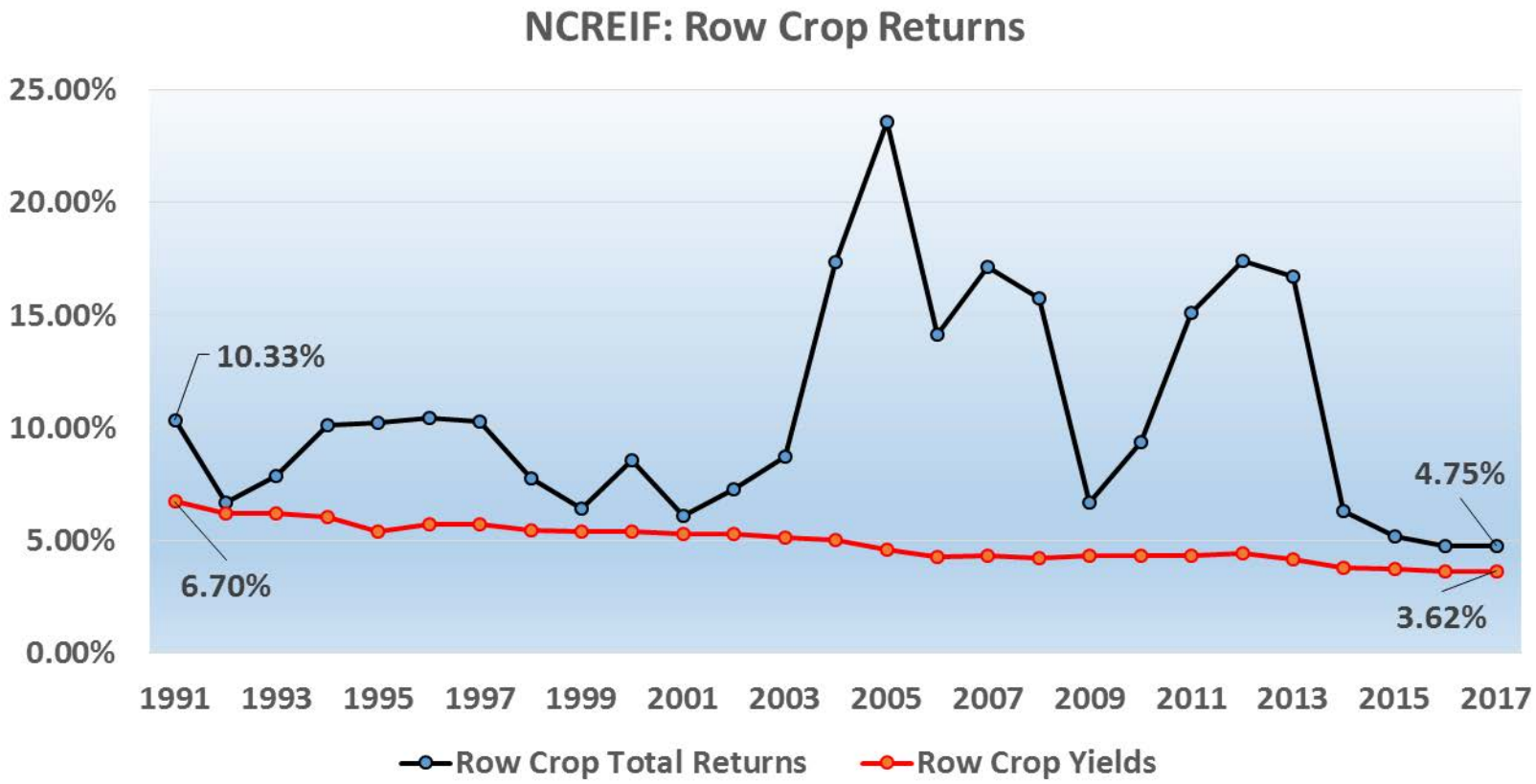


Lower Prospective Row Crop Returns

Issue

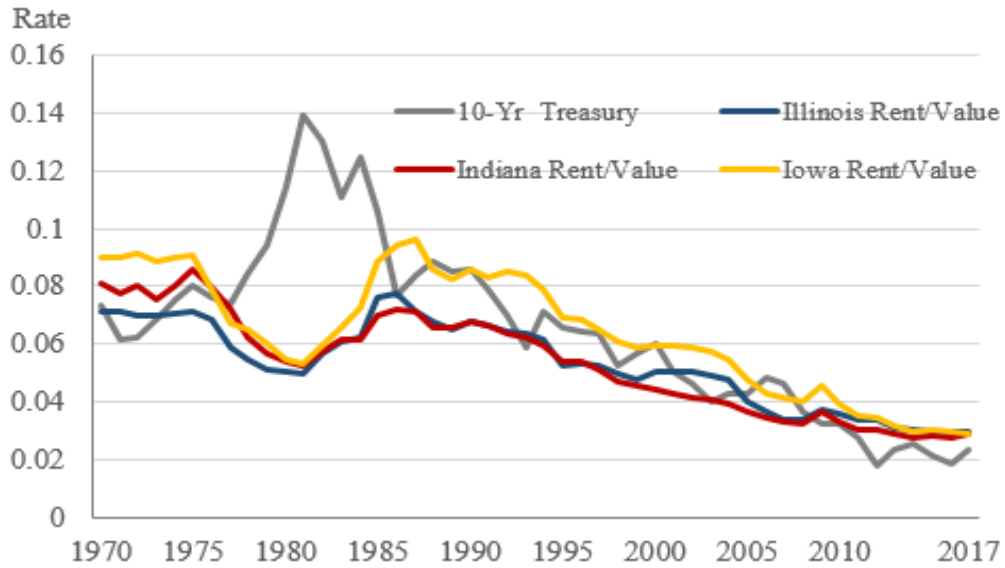
- Row Crop returns have been excellent, but row crops are unlikely to have outsized performance going forward.
- A 3-5% return is low for an illiquid asset class.

	Current Yield Expectations
Row Crops	3 - 5%
Permanent Crops	7 - 9%

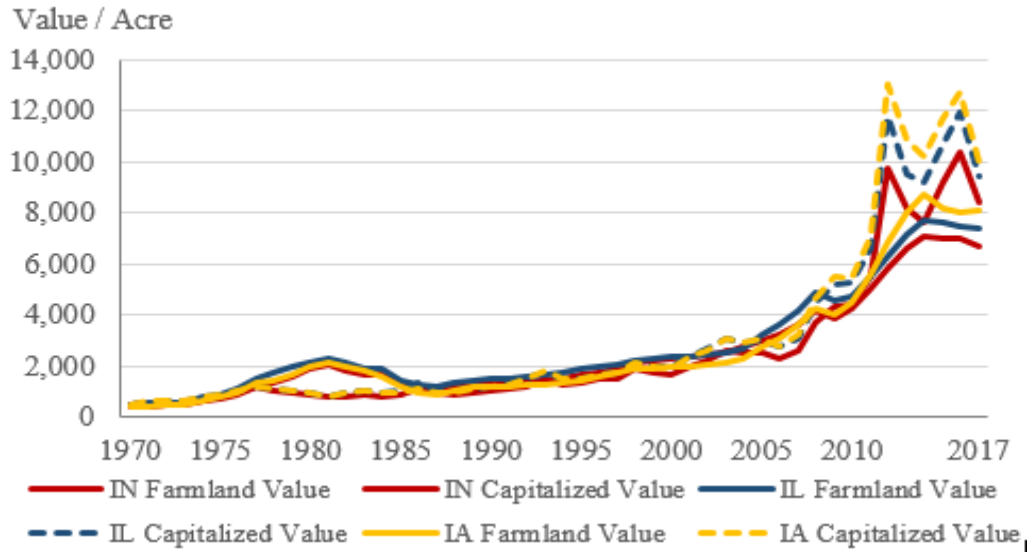


Row Crops

- Row crop price appreciation has closely tracked interest rates.



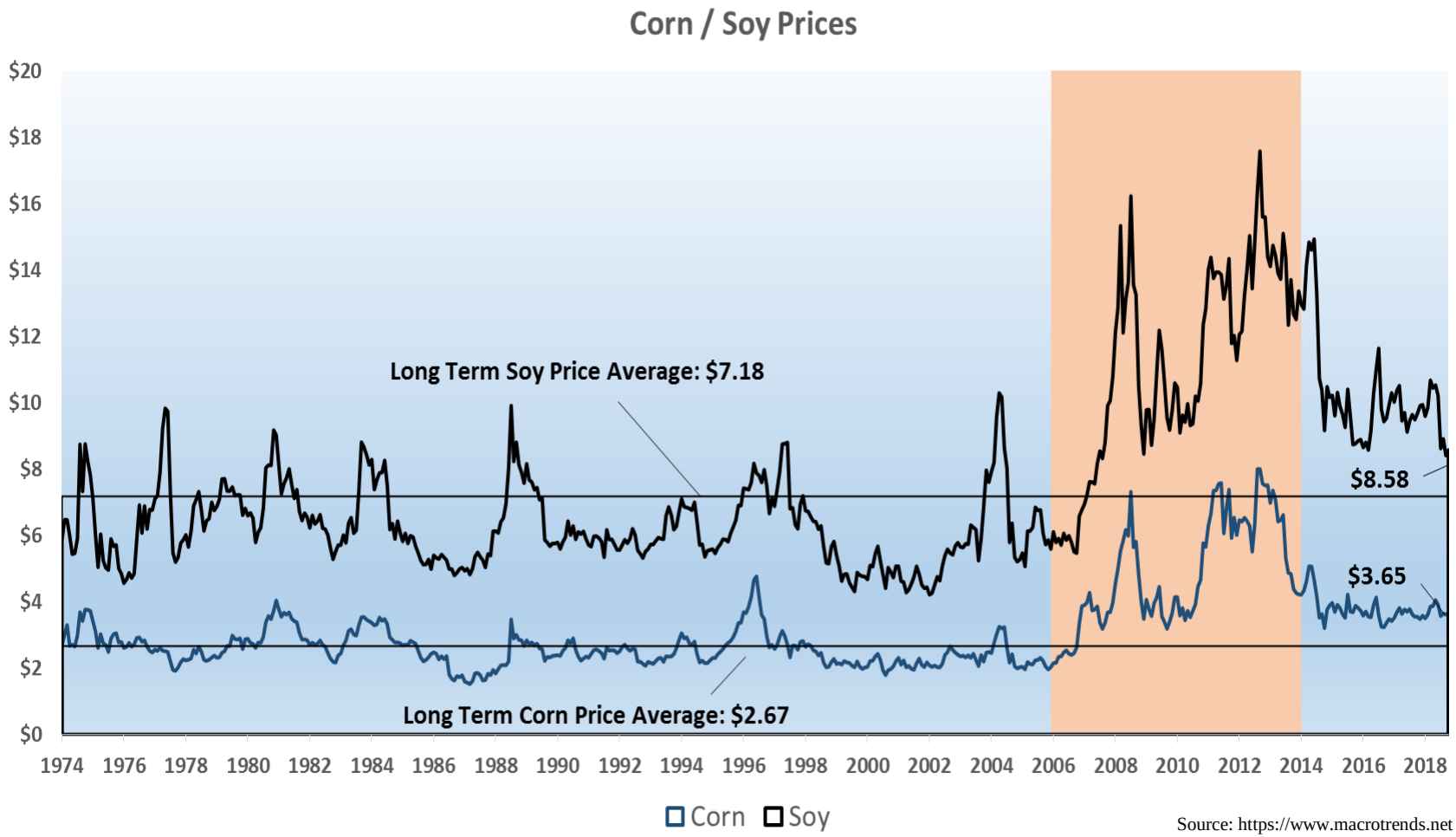
- With interest rates rising or staying flat, row crop price appreciation will be challenged.



Source: https://www.farmermac.com/

Corn and Soy Prices

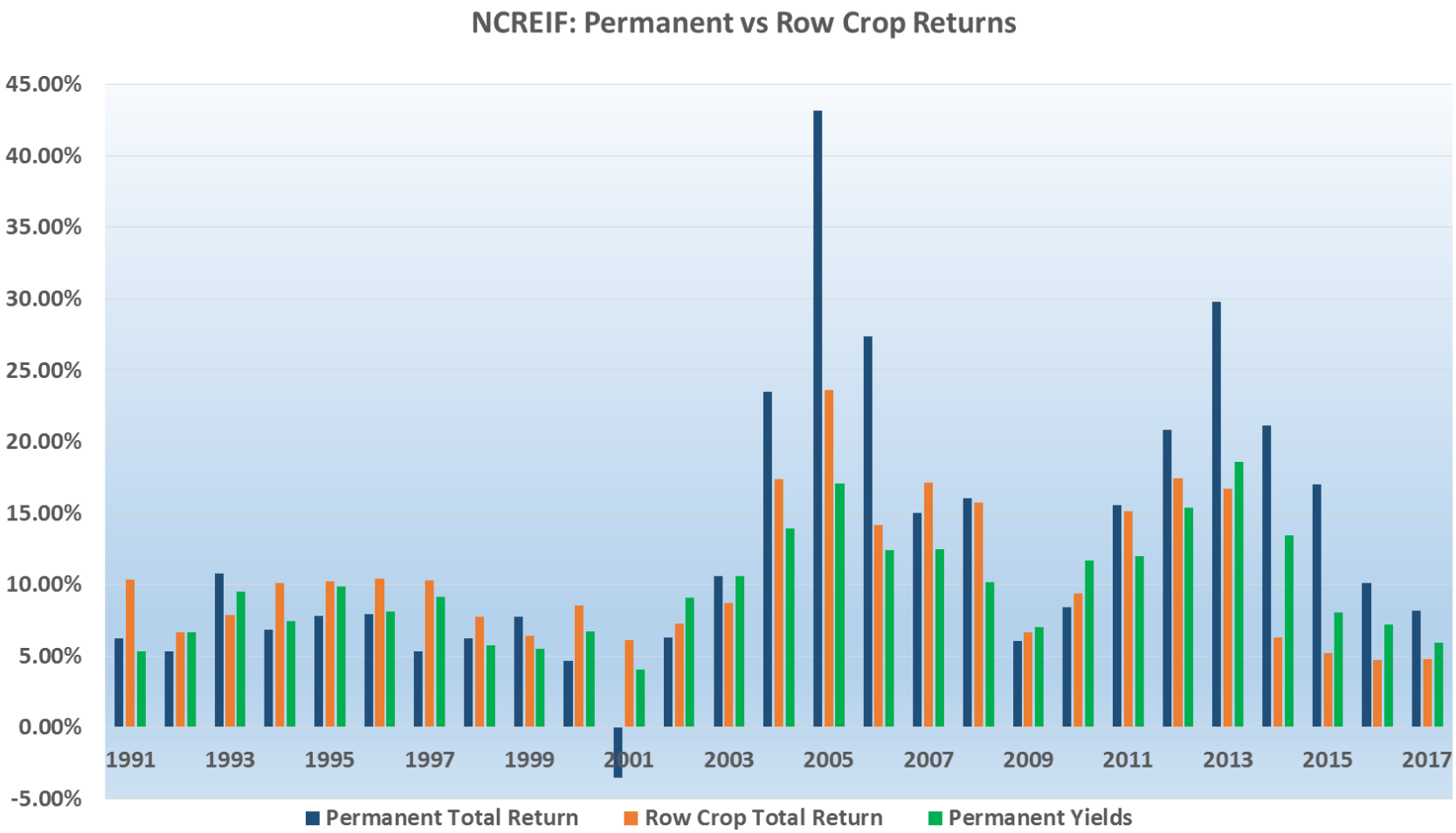
- After an ethanol-related spike in prices, corn and soy prices have returned to a range consistent with their long term averages.



Source: https://www.macrotrends.net

Permanent vs Row Crop Returns

- Permanent crop returns have consistently beaten or kept pace with row crops.
- Permanent crop yields constitute a large portion of return.



Farmland Portfolio Diversification Benefits

Correlations

- Both Row and Permanent crops have been uncorrelated with the S&P 500 Equity Index and the Bloomberg Barclays Aggregate Bond Index (1991 – 2017).

	S&P 500	Bloomberg Barclays Agg	Permanent Crops	Row Crops
S&P 500	1.00			
Bloomberg Barclays Agg	0.07	1.00		
Permanent Crops	0.01	(0.40)	1.00	
Row Crops	(0.08)	(0.13)	0.75	1.00

Permanent Crops: Directly Operated

Issue

- The permanent crop space is dominated by directly operated properties (86%). ARMB guidelines allow for investment only in leased properties and as a result, the ARMB is not able to fully benefit from permanent crops.

- There are several reasons the permanent crop space primarily uses the directly operated investment structure:

  - Higher returns – most investors opt to directly operate their properties because the returns are higher over time.
  - Control – allows for property owners to have control over tree and vine improvements.
  - Lack of information – in some cases, it may be hard to know what improvements were made to trees / vines, making it difficult for farmers to determine an appropriate leasing price.
  - Leasing duration mismatch – the long duration of return on capital expenditures periodically required for permanent properties doesn't always match with lease terms.

Recommendations

- **Issue:** Large row crop commodity exposure with limited return potential.

  Recommendation:

  Change allocation from 80% row crops / 20% permanent crops to 60% row crops / 40% permanent crops.

- **Issue:** Not being able to invest in directly operated permanent crops hinders investment in the permanent crop universe and lowers potential returns.

  Recommendation:

  Allow for investment in directly operated permanent crop properties.

Appendix

Statistics

Annualized NCREIF Returns

	5 year	10 year	15 year	20 year	Since Inception
Total Farmland	11.31%	12.08%	14.65%	12.42%	11.46%
Row Crops	7.44%	10.07%	12.04%	10.81%	10.44%
Permanent Crops	16.97%	15.09%	17.80%	14.24%	12.36%

Correlations (Annual; 1991 – 2017)

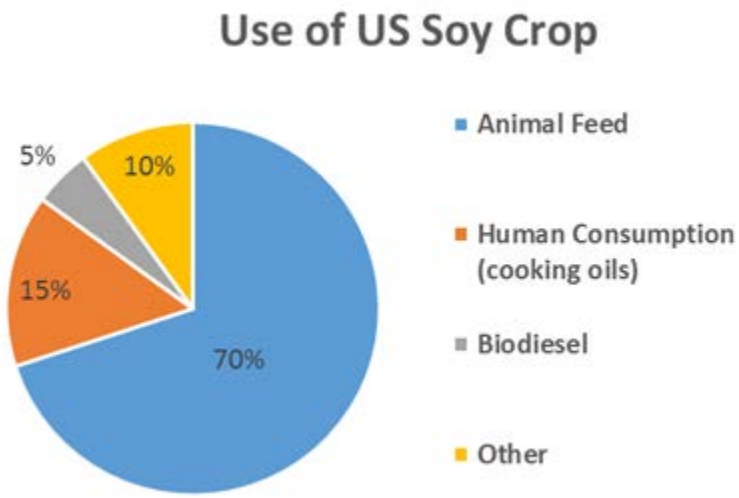
	S&P 500	Bloomberg Barclays Agg	Permanent Crops	Row Crops
S&P 500	1.00			
Bloomberg Barclays Agg	0.07	1.00		
Permanent Crops	0.01	(0.40)	1.00	
Row Crops	(0.08)	(0.13)	0.75	1.00

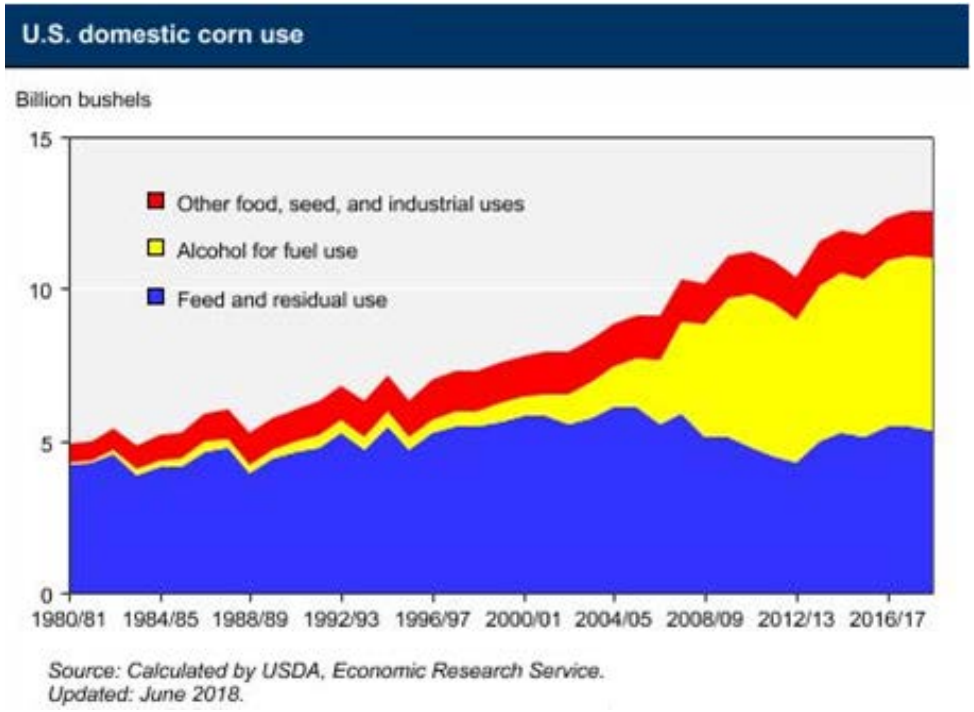
Annual NCREIF Total Returns

	All Farmland	Row Crops	Permanent Crops
2017	6.19%	4.75%	8.14%
2016	7.09%	4.71%	10.13%
2015	10.35%	5.18%	17.00%
2014	12.63%	6.30%	21.12%
2013	20.91%	16.72%	29.77%
2012	18.58%	17.41%	20.80%
2011	15.16%	15.10%	15.53%
2010	8.81%	9.36%	8.37%
2009	6.32%	6.65%	6.05%
2008	15.84%	15.73%	16.05%
2007	15.90%	17.12%	15.02%
2006	21.15%	14.16%	27.37%
2005	33.90%	23.60%	43.15%
2004	20.50%	17.36%	23.51%
2003	9.68%	8.71%	10.60%
2002	6.86%	7.25%	6.27%
2001	2.01%	6.08%	-3.50%
2000	6.98%	8.55%	4.67%
1999	6.95%	6.40%	7.72%
1998	7.24%	7.73%	6.22%
1997	8.80%	10.28%	5.29%
1996	9.80%	10.42%	7.91%
1995	9.66%	10.23%	7.81%
1994	9.35%	10.11%	6.84%
1993	8.49%	7.85%	10.74%
1992	6.34%	6.65%	5.31%
1991	8.88%	10.33%	6.21%

Commodity Crops: Usage

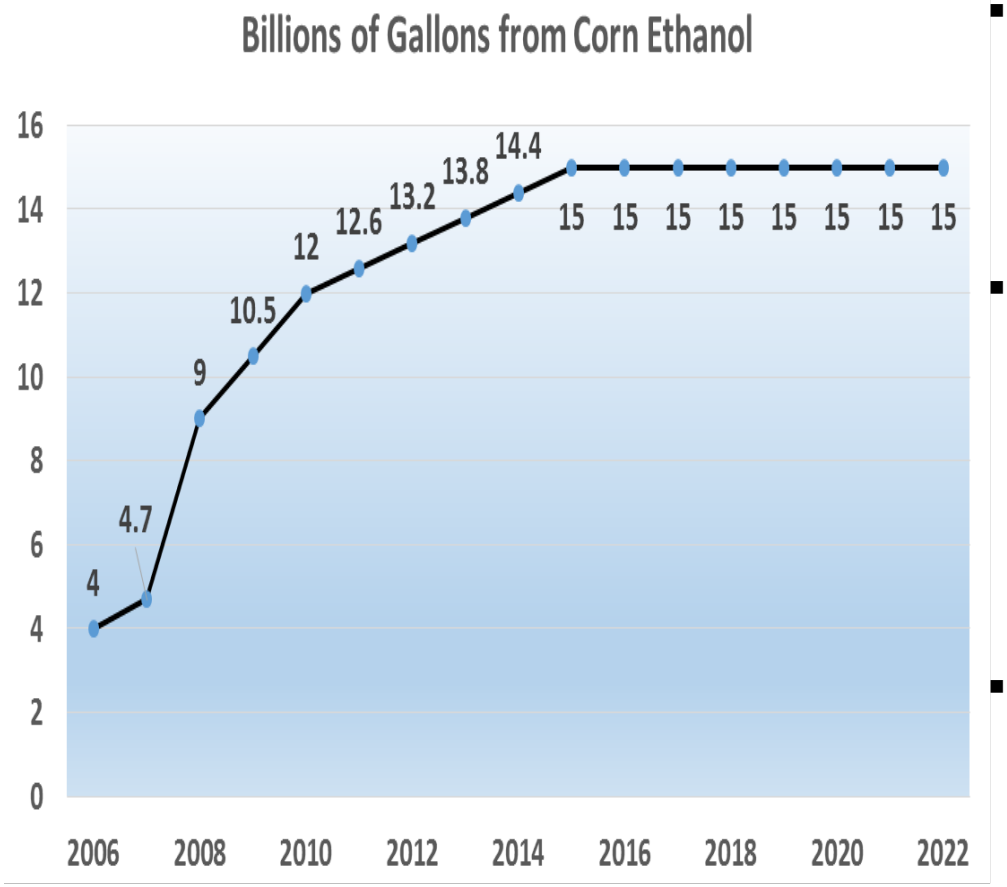
- Another rationale for commodity crops is they are closer to the consumer.
  - Not supported by data
- A large portion is used for animal feed and fuel.
- ~48% of the portfolio has exposure to corn or soy.
  - ~17% of portfolio are properties that are primarily corn/soy.





https://www.ers.usda.gov/webdocs/charts/83915/cornuse.jpg?v=0
https://www.usda.gov/sites/default/files/documents/coexistence-soybeans-factsheet.pdf

Ethanol and Corn Prices



- 4B gallons mandated by Renewable Fuel Standard (RFS1) Energy Policy Act of 2005, superseded by the Energy Independence and Security Act of 2007 (RFS2)
- Reuters has noted two schools of thought regarding ethanol demand on corn prices:
  - Some analysts believe ethanol demand adds about $0.75-1.00 per bushel of corn as a rule of thumb.
  - Other analysts believe it adds ~20%
- A paper authored by professors from UC Davis and UC Berkeley estimates that corn prices are ~30% greater than if there was no ethanol mandate.

Congressional Research Service "Renewable Fuel Standard (RFS): Overview and Issues" Randy Schnepf, Brent Yacobucci 10/14/2010

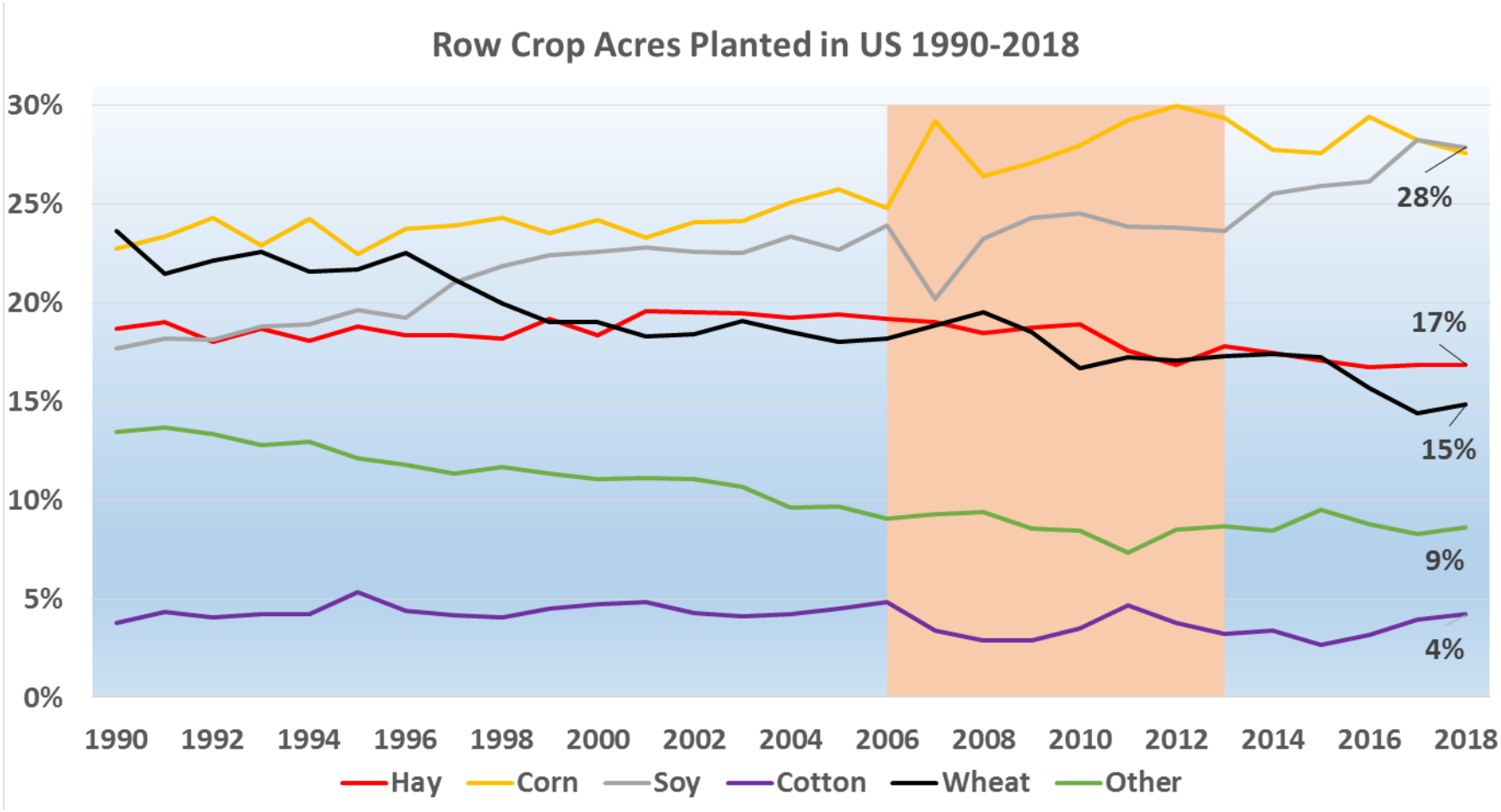
https://books.google.com/books?id=ZJcjNprDS3EC&printsec=https://books.google.com/books?id=ZJcjNprDS3EC&lpg=PP1&dq=renewable%20fuel%20standard&pg=PP1#v=onepage&q=renewable%20fuel%20standard&f=false

https://uk.reuters.com/article/food-corn-ethanol/analysis-ethanol-no-longer-seen-as-big-driver-of-food-price-idUKN2338007820081023

http://www.ourenergypolicy.org/wp-content/uploads/2013/07/The-Effect-oftheUS-Ethanol-Mandate-on-Corn-Prices-.pdf

Farmland: Row Crop Acres Planted in US

- One rationale for row crops is the ability to switch crops. However, there are limited options for switching since row crops are dominated by 5 commodity crops.



http://usda.mannlib.cornell.edu/usda/current/htrcp/htrcp-04-12-2018.txt

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Real Assets Investment Guidelines	ACTION:	X
	Policies, Procedures and Guidelines		
DATE:	December 13, 2018	INFORMATION:	

BACKGROUND

As part of ongoing portfolio review activities, staff have identified changes to the Farmland portfolio that are necessary to help the ARMB plan achieve its targeted rate of return. Specifically, row crop return expectations are low and opportunities exist in the permanent crop space that will be accretive to the ARMB plan. Since most of the permanent crop space is comprised of directly operated properties, language has been added to the farmland guidelines to explicitly allow for ownership of such properties. Additionally, language has been added to the farmland guidelines to bring total return expectations in-line with those approved in the real assets annual plan at the September 20, 2018 board meeting.

STATUS

The Farmland Guidelines have been revised to:

- Change the allocation target from 80% row crop / 20% permanent crop to from 60% row crop / 40% permanent crop
- Add wording to the Farmland Guidelines that explicitly allows directly operated permanent crops.

RECOMMENDATION

The ARMB approve Resolution 2018-20 which adopts the revised Farmland Investment Guidelines.

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.~~ 60% to row crops and 40% 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~~ 6 year periods, the equity Farmland investment portfolio is expected to generate a net-of-fee total return between public equities and fixed income ~~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 %
(ARMB can liquidate within 180 days –targeted, not guaranteed))	
Non-Controlled Investments:	50%
(ARMB cannot liquidate within 180 days)	

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:* *(acquisition cost plus projected capital additions and improvements)*	15%
Single-Tenant/Sub-Tenant (any one firm):	15%
Crop Type (with a band of +/- 10%)	
Row Crop	~~80%~~ 60%
Permanent Crop	~~20%~~ 40%
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. Directly Operated Agriculture Properties

Directly operated agriculture properties are permitted. Managers will select operators for agricultural properties who have relevant experience and who have demonstrated expertise in operating that property's crop type.

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F. 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.

G~~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~~H. 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~~I. 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~~J. *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.

K~~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~~L. *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 though 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	**UBS Farmland Investors LLC** James B. McCandless 10 State House Square, 15th Floor Hartford, CT 06103-3604 *Telephone*: 860-616-9200 *Fax*: 860-616-9204

Telephone: 617-747-1645 *Fax*: 617-747-8645 *E-mail*: owilliams@hnrg.com *Web site*: www.haig.jhancock.com	*E-mail*: james.mccandless@ubs.com *Web site*: 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 R = Recommend G = Grade M = Monitor P = Prepare					

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 60% to row crops and 40% 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 6 year periods, the equity Farmland investment portfolio is expected to generate a net-of-fee total return between public equities and fixed income 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 %
(ARMB can liquidate within 180 days –targeted, not guaranteed))	
Non-Controlled Investments:	50%
(ARMB cannot liquidate within 180 days)	

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:* *(acquisition cost plus projected capital additions and improvements)*	15%
Single-Tenant/Sub-Tenant (any one firm):	15%
Crop Type (with a band of +/- 10%)	
Row Crop	60%
Permanent Crop	40%
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. Directly Operated Agriculture Properties

Directly operated agriculture properties are permitted. Managers will select operators for agricultural properties who have relevant experience and who have demonstrated expertise in operating that property's crop type.

F. 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.

G. 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.

H. 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.

I. 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.

J. 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.

K. 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.

L. 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 though 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

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This document is to be reviewed no less than annually and revised as appropriate.

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Web site: www.haig.jhancock.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 R = Recommend G = Grade M = Monitor P = Prepare					

Risk Parity Education Session

December 2018

One Glendinning Place
Westport, CT 06880
(203) 226-3030
www.bridgewater.com

High Level Summary of Risk Parity

- **What is risk parity?**
  - An asset allocation approach prioritizing diversification over concentration.
- **Why consider it?** Because better diversification unlocks an attractive choice;
  - Decrease expected contributions (via higher expected portfolio returns) without taking any more risk than the traditional approach, <u>or</u> …
  - Reduce contribution *volatility* (by lowering portfolio risk) without giving up expected return relative to the traditional approach.
- **How is the portfolio actually built?**
  - Step 1: Determine what asset class weights will make your portfolio neutralized to turbulent growth and inflation surprises, be they high or low.
  - Step 2: Size that environmentally balanced portfolio as needed in order to hit either your expected return target or your risk tolerance.
  - Leverage isn't central to risk parity, though it can be utilized as needed.
- **How do institutions incorporate this concept?**
  - For most its a learning lab. Some apply the concepts more broadly at the plan level. And for others its just treated as a good return stream.

ASSET ALLOCATION IS BY FAR YOUR MOST IMPORTANT DECISION

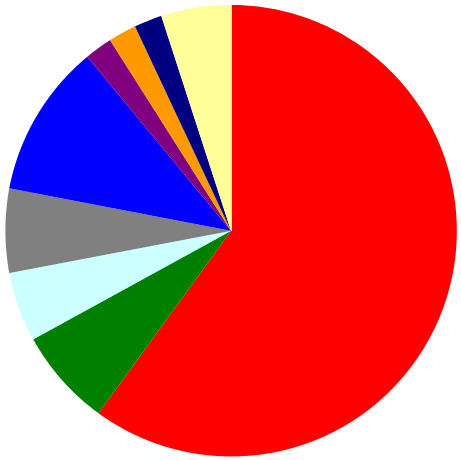
- There are only two ways to earn returns over cash – holding risky assets (asset allocation) and betting on markets (active views).
- Given the limited impact that active tilts typically have on portfolios, the strategic asset allocation decision overwhelmingly determines one's fate.

U.S. Traditional Portfolio Total Return		Cash		Asset Allocation (~90% risk)		Active Views (~10% risk)
Since 1970						
9.8%	=	5.1%	+	4.5%	+	?
Expected						
?	=	2.8%	+	?	+	?

Data shown through 10/31/2018. The beta return since 1970 is calculated by subtracting the return of the risk free rate since 1970 from the Traditional portfolio total return since 1970. "Traditional Portfolio" refers to the traditional allocation described in the "U.S. Traditional Portfolio Disclosure". Past results are not necessarily indicative of future results HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

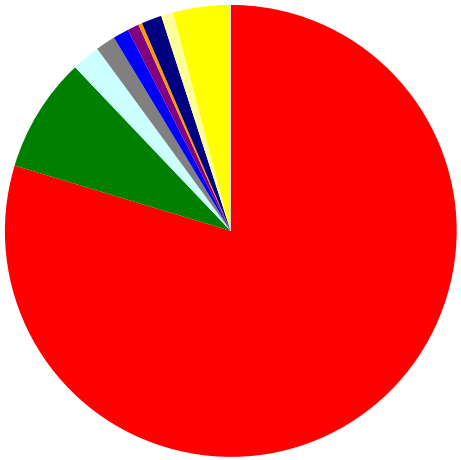
THE TRADITIONAL PORTFOLIO IS CONCENTRATED IN EQUITIES

U.S. Traditional Portfolio Capital Allocation



- Equities: 60%
- Nominal Bonds: 11%
- Real Estate: 7%
- MBS: 6%
- Hedge Fund: 5%
- Corporate Bonds: 5%
- High Yield Bonds: 2%
- IL Bonds: 2%
- Commodities: 2%

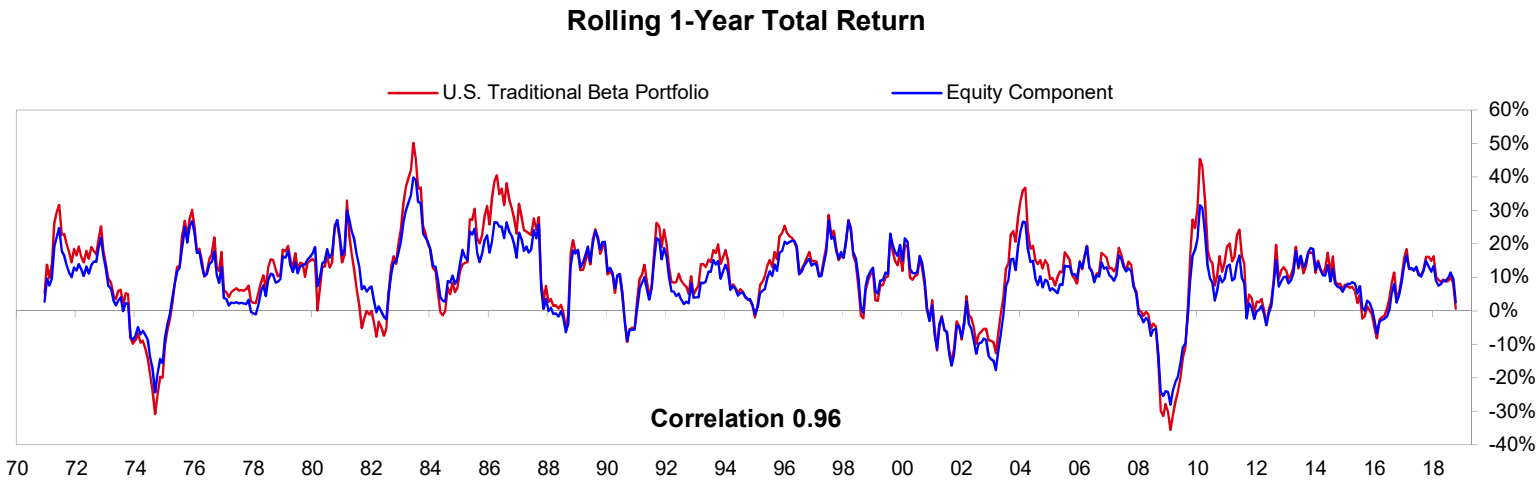
U.S. Traditional Portfolio Risk Impact

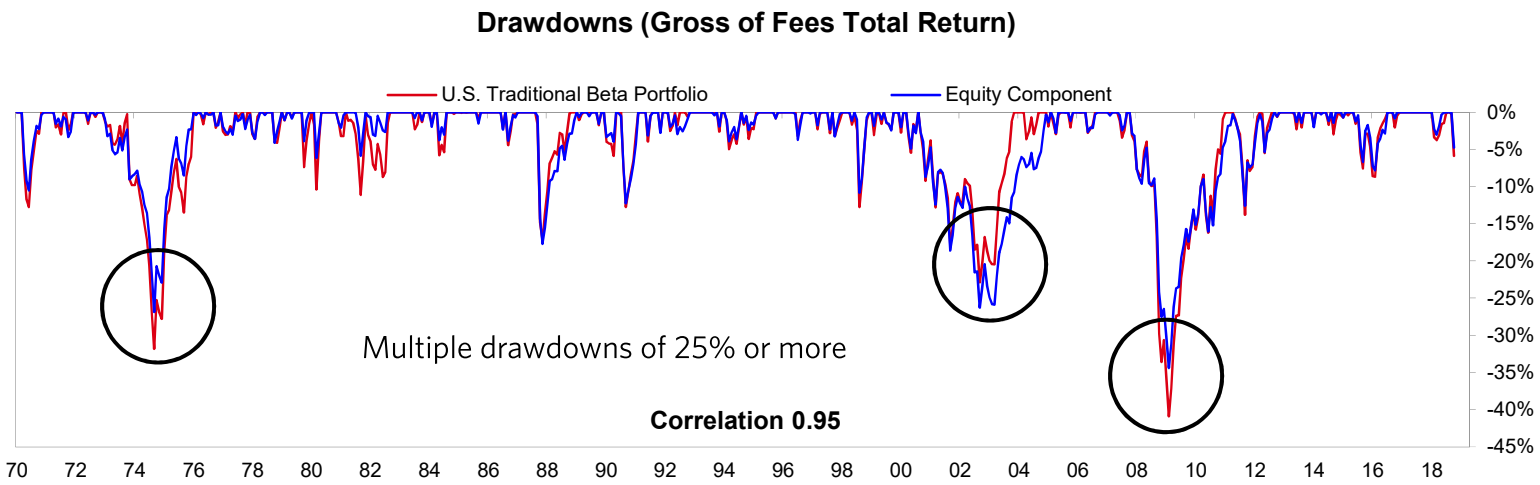


- Equities: 80%
- Real Estate: 8%
- FX: 4%
- Corporate Bonds: 2%
- High Yield Bonds: 1%
- MBS: 1%
- Nominal Bonds: 1%
- Hedge Fund: 1%
- Commodities: 1%
- IL Bonds: 0%

"U.S. Traditional Portfolio" refers to the traditional allocation described in the "U.S. Traditional Portfolio Disclosure." Please review the "Important Disclosures and Other Information" located at the end of this presentation.

CONCENTRATED EXPOSURE LEADS TO BOOMS AND BUSTS





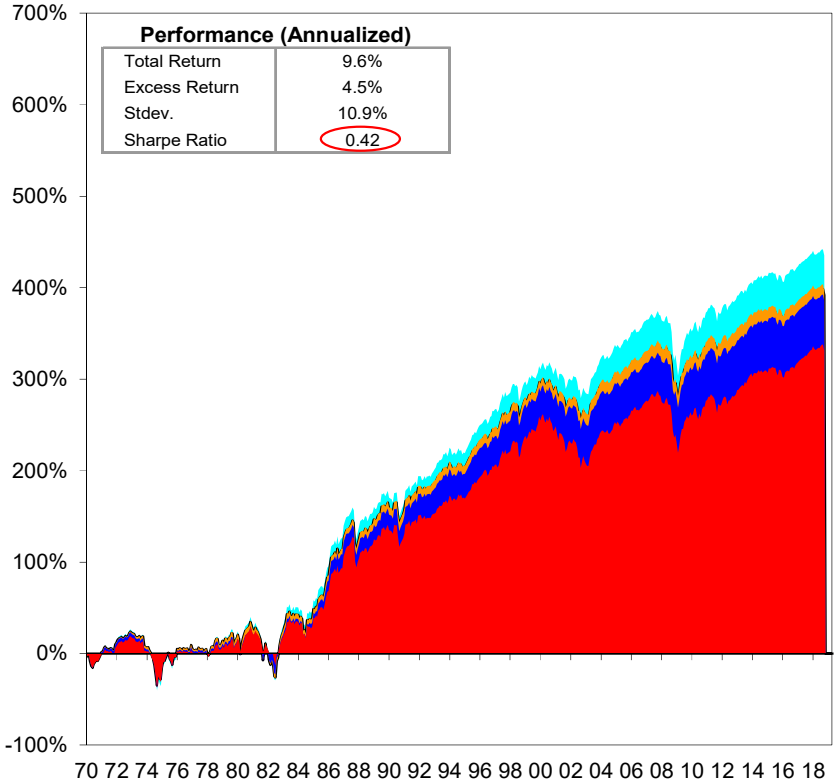
Data through 10/31/2018. Rolling 1-year total return refers to gross of fees return. Past results are not necessarily indicative of future results. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

DIVERSIFICATION WORKS BY NOT RELYING ON JUST ONE THING

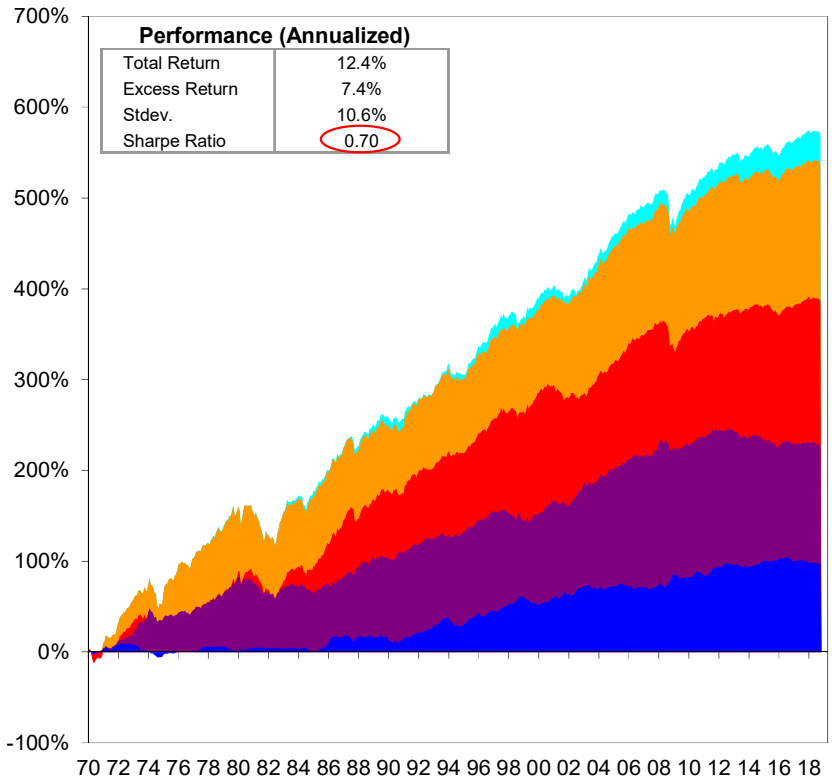
Cumulative Performance Attribution (ln)

Equities | Nominal Bonds | IL Bonds | Commodities | Other

Traditional Portfolio

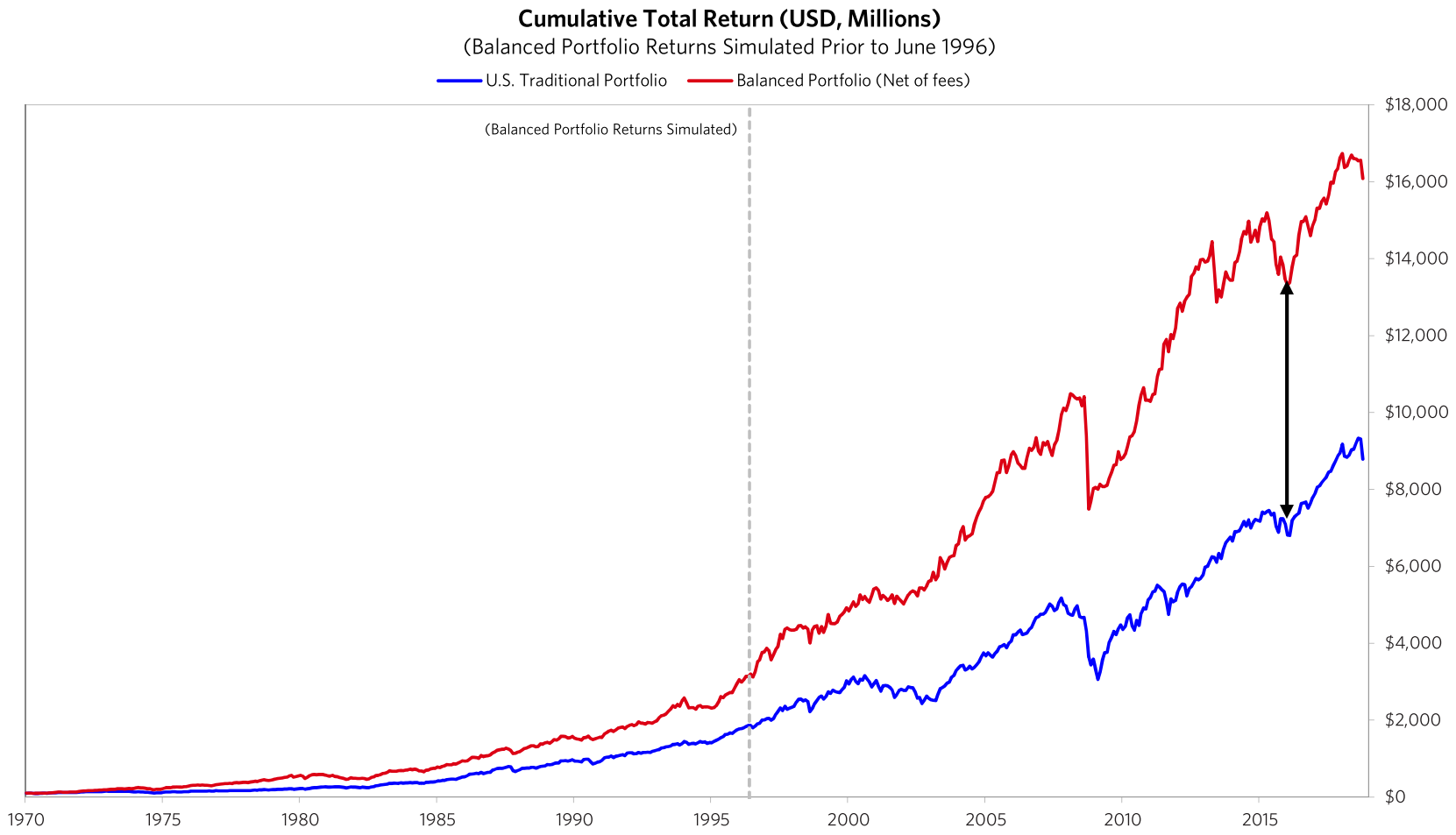


Balanced Portfolio (Simulated)



Data through October 2018. "Traditional Portfolio" refers to the U.S. Traditional Portfolio. "Balanced Portfolio" is simulated using the All Weather Asset Mix as described in the "All Weather Asset Mix Disclosure." Returns are cumulative excess returns above cash, shown gross of fees. It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

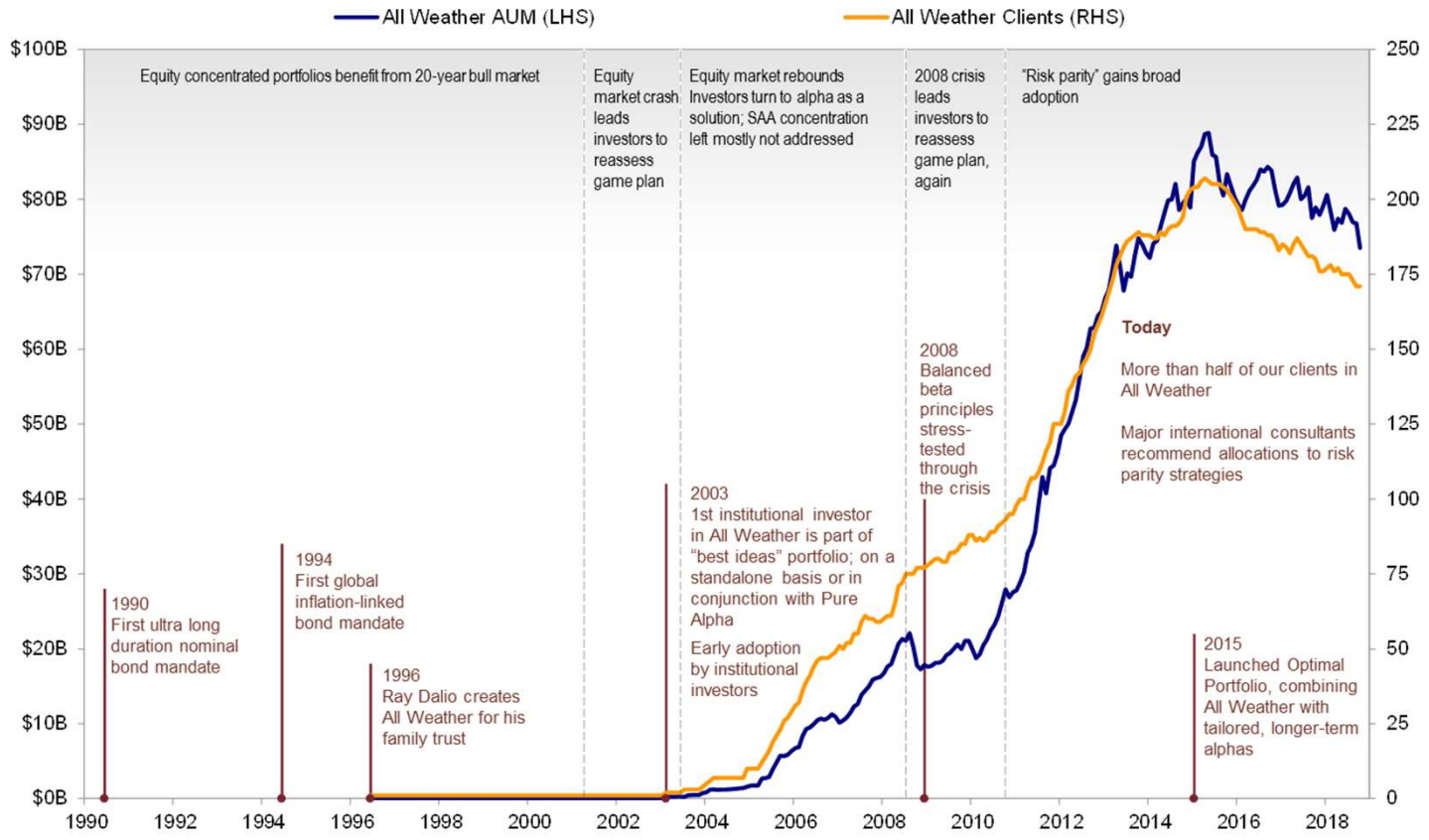
MORE DIVERSIFICATION MEANS MORE WEALTH TO PAY BENEFITS



Assumes starting capital of $100 Million. Data through Oct. 2018. Diversification does not guarantee a profit nor protect against loss. "U.S. Traditional Portfolio" refers to the traditional allocation described in the "U.S. Traditional Portfolio Disclosure". "Balanced Portfolio" refers to the All Weather Strategy as described in the "All Weather Strategy" disclosure. Before June 1996, returns are simulated using the All Weather Strategy Simulation as detailed in the "All Weather Strategy Simulation Disclosure". Returns are cumulative total returns, shown gross of fees. It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

INSTITUTIONAL ADOPTION OF RISK PARITY

- A variety of major international consultants recommend risk parity allocations, and about a third of surveyed institutional investors have one.*
- 25.3% of AW investors (by AUM) are public.
- All Weather was the first risk parity strategy, and since we created it in 1996 over half of our clients have allocated to the strategy.



*Source: aiCIO magazine 2015 Risk Parity Survey. Data through Oct-18. Note: AW AUM and number of clients includes clients invested in the BW OP Strategy. AUM shown is inclusive of additions and/or withdrawals made as of the first business day of the following month. Client count includes client relationships initiated/terminated as of the first business day of the following month. Figures do not include non-AW Bridgewater mandates that were used to apply the concepts (IL bonds, 25-year zero, Commodity + IL mandates, etc). Please review the "Important Disclosures and Other Information" located at the end of this presentation.

HOW DO INVESTORS USE RISK PARITY?

- Investors slot risk parity into their portfolios in a lot of different ways:
  - Allocation to risk parity within a broader portfolio bucket (e.g. absolute return, multi-asset, diversifying strategies).
  - Create a specific risk parity bucket, as a ‘pilot program’ to observe and learn about the approach through time.
  - Apply risk parity principles across their entire plan
- And they implement it differently:
  - In-house or through an external manager
  - Passive or actively managed

Data as of October 2018. Please review the “Important Disclosures and Other Information” located at the end of this presentation.

Reliable diversification

THE SOLUTION: GO BACK TO FUNDAMENTAL BUILDING BLOCKS

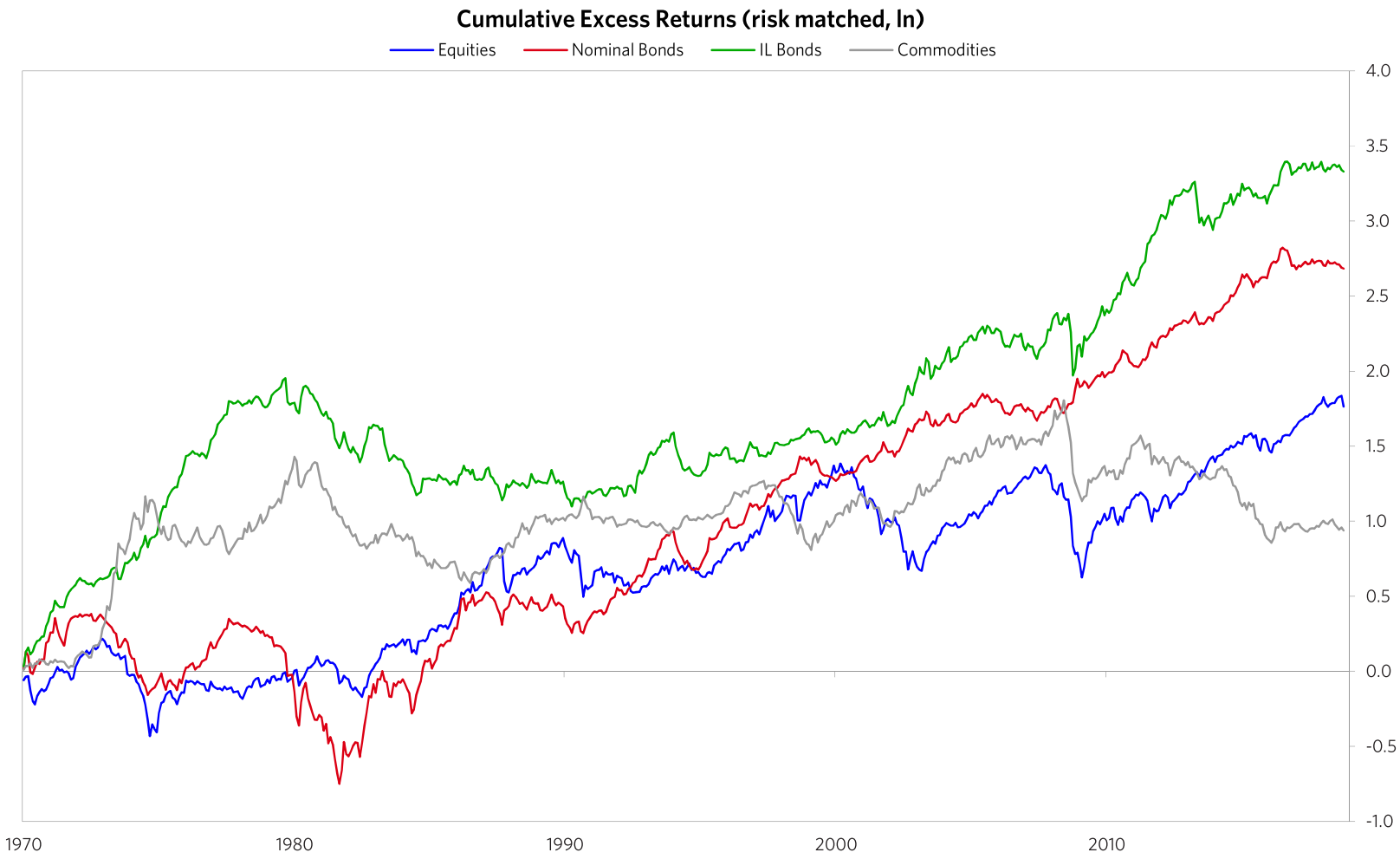
- An investment is an exchange of money today for money tomorrow (i.e., an exchange of cash flows).
- The price you're willing to pay is the present value of the expected future cash flows (those future cash flows get 'discounted').
- These expected future cash flows and the discount rate reflect **expectations about the future economic environment**.
- Because asset returns are largely changes in price, and prices embed expectations about the future economic environment, it follows that any asset's return will be driven by surprises in how the economy *actually* evolves (e.g., growth, inflation).

THE DETERMINANTS OF ASSET PRICING

$$\text{Asset Price} = \frac{\text{Expected Future Cash Flows}}{\text{Discount Rate}}$$

$$= \frac{\text{Discounted Conditions}}{\text{Risk Free Rate} + \text{Risk Premium}}$$

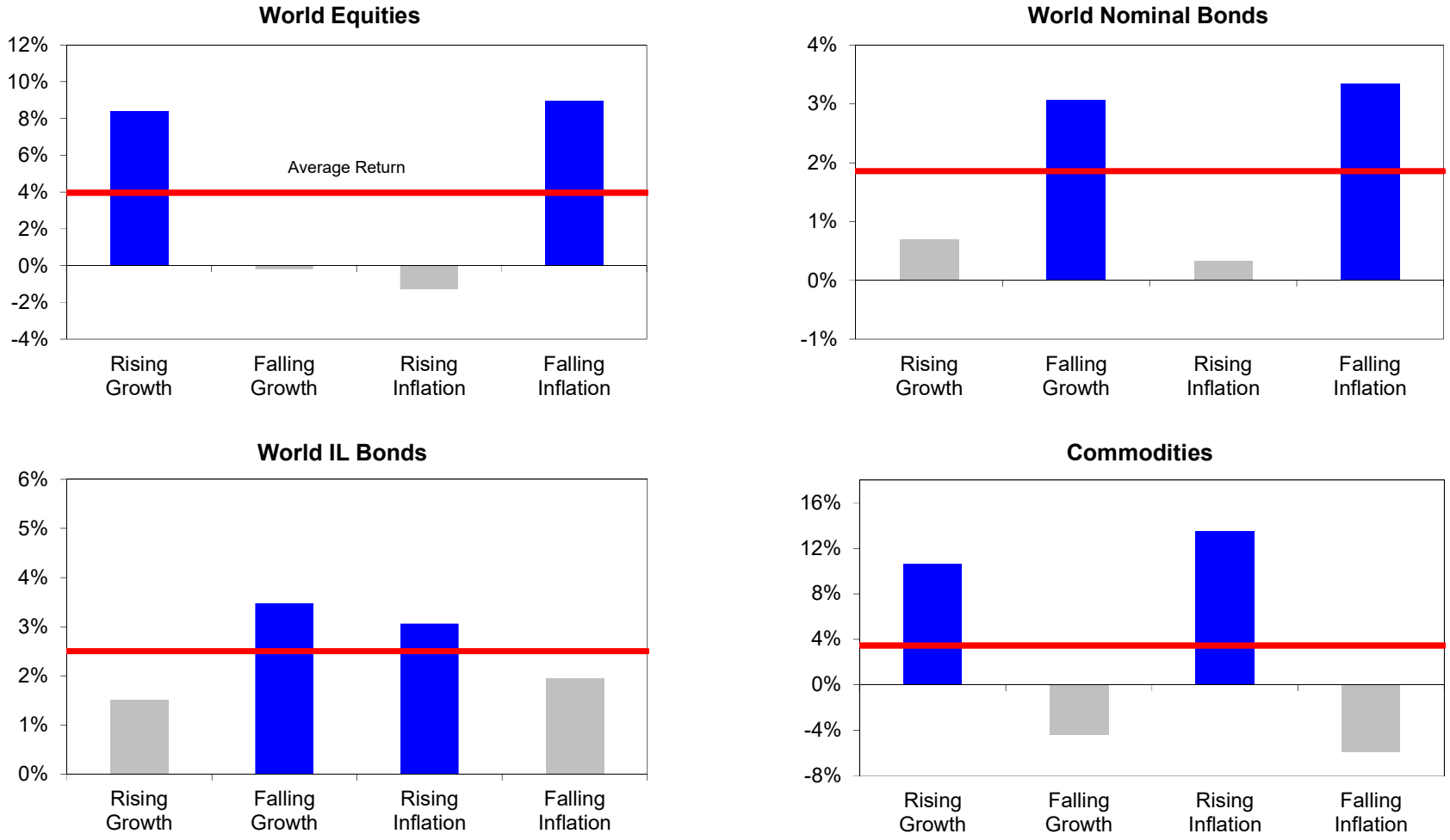
EACH ASSET COMPENSATES SAVERS OVER TIME BUT WITH LOTS OF VOLATILITY ALONG THE WAY



Data through October 2018. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

ASSET CLASSES HAVE LOGICAL, RELIABLE ECONOMIC BIASES

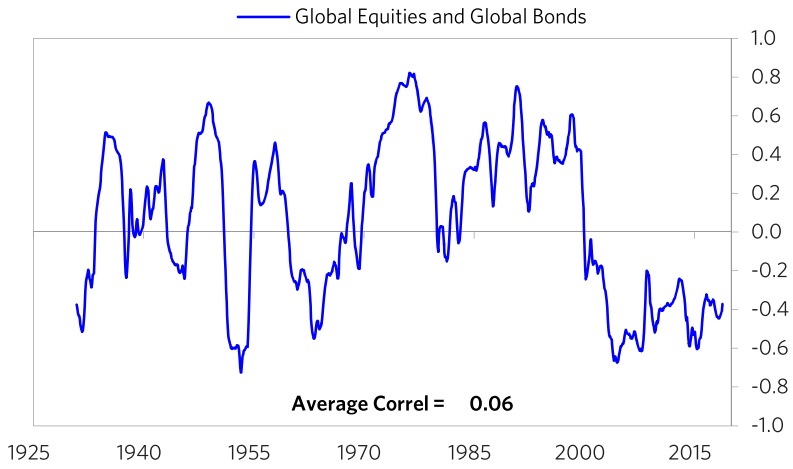
Annual Asset Class Excess Returns in Economic Environments (1970 – Present)

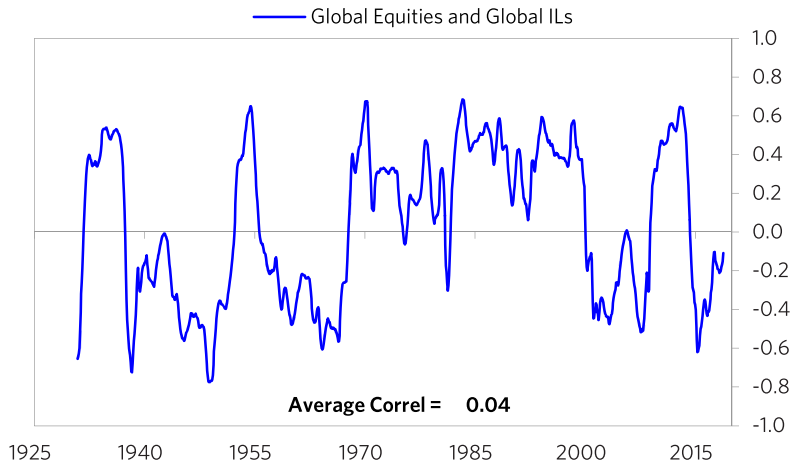


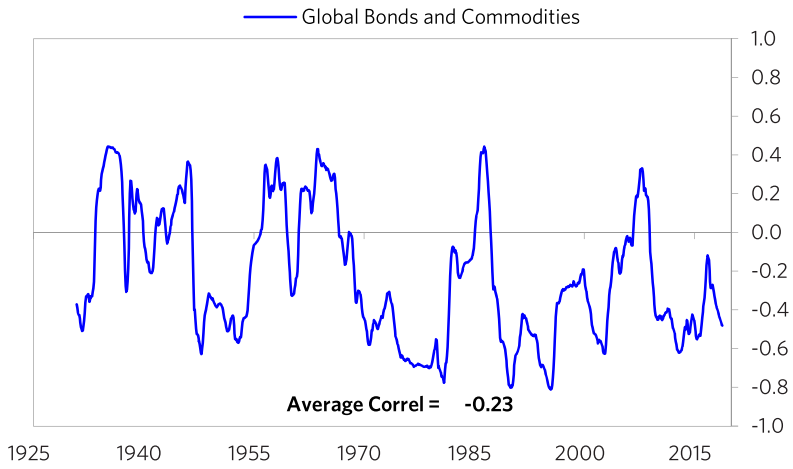
A rising (falling) inflation month is defined as a month in which the current rate of inflation is greater (lower) than the 12-month moving average rate of inflation. A rising (falling) growth month is defined as a month in which the current rate of real GDP growth is greater (lower) than the 12-month moving average rate of real GDP growth. Data through Jun 2018. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

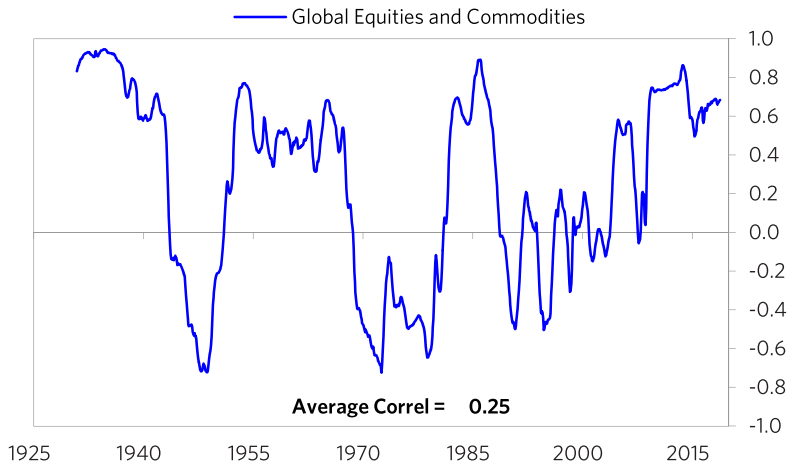
CORRELATIONS ARE UNKNOWABLE

Rolling 5-yr Correlation of Annual Excess Returns









Data from 1925 through October 2018. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

RELIABLE DIVERSIFICATION BALANCES PORTFOLIOS TO THE FUNDAMENTAL DRIVERS: GROWTH AND INFLATION SURPRISES

	Growth	Inflation
Rising	25% of Risk Equities Commodities	25% of Risk IL Bonds Commodities
Falling	25% of Risk Nominal Bonds IL Bonds	25% of Risk Nominal Bonds Equities
	Risk Premiums & Discount Rates	

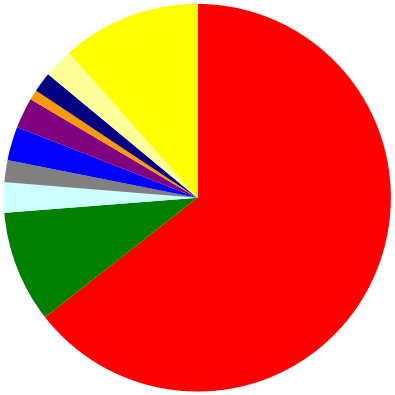
Please review the "Important Disclosures and Other Information" located at the end of this presentation.

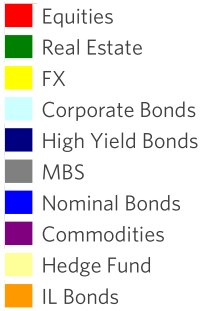
THE RESULT

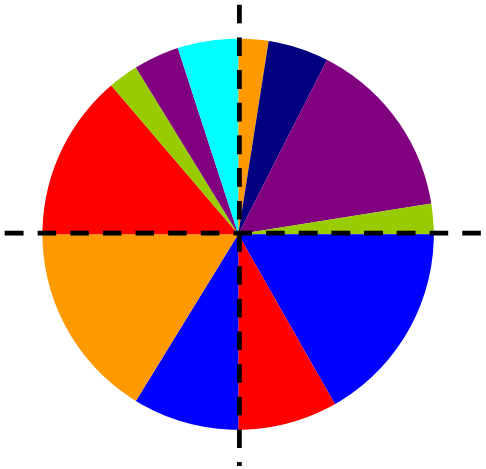
Traditional Portfolio

Balanced Portfolio

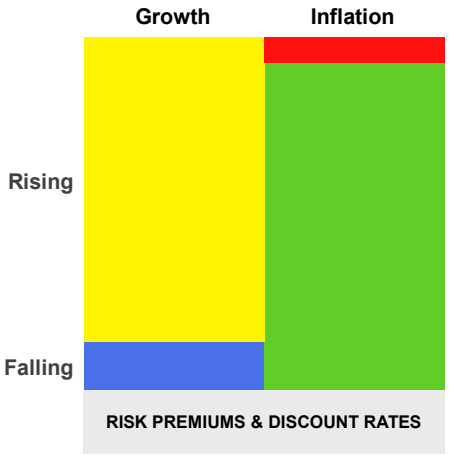
Risk Allocation

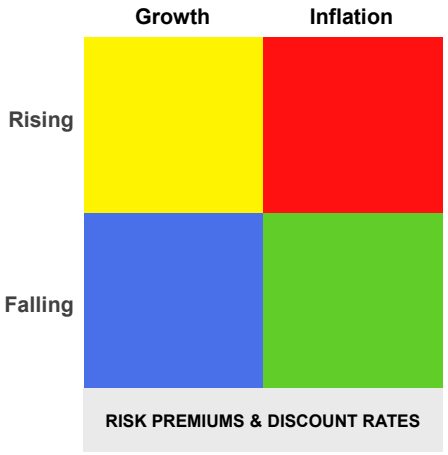






Environmental Balance



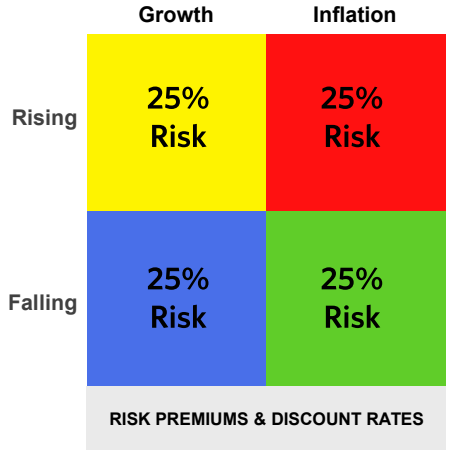


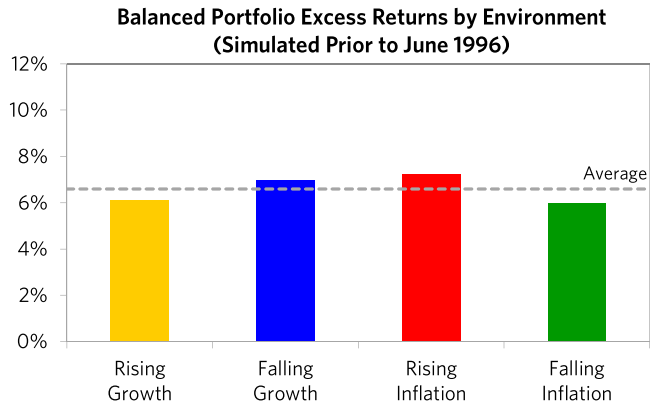
All Weather equities are hedged with interest rates. Risk allocations are shown in Var terms and do not take into account correlations. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

Performance Characteristics

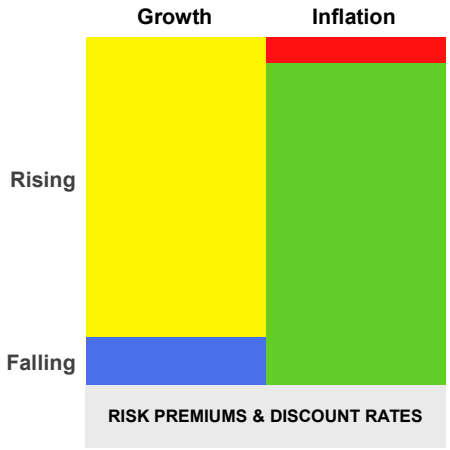
BALANCING RISK TO ECONOMIC ENVIRONMENTS: MORE CONSISTENCY THROUGH ECONOMIC SURPRISES

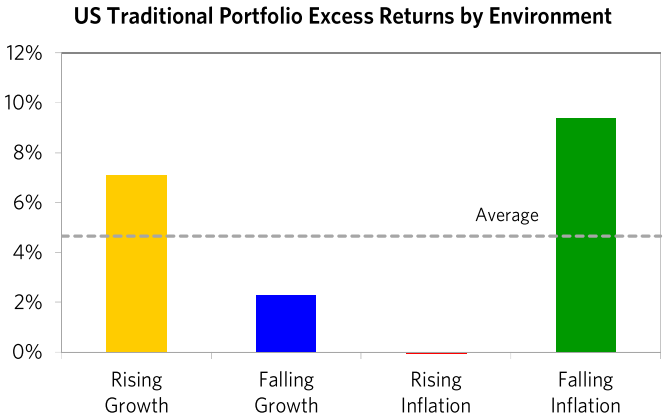
Balanced Portfolio





Traditional Portfolio



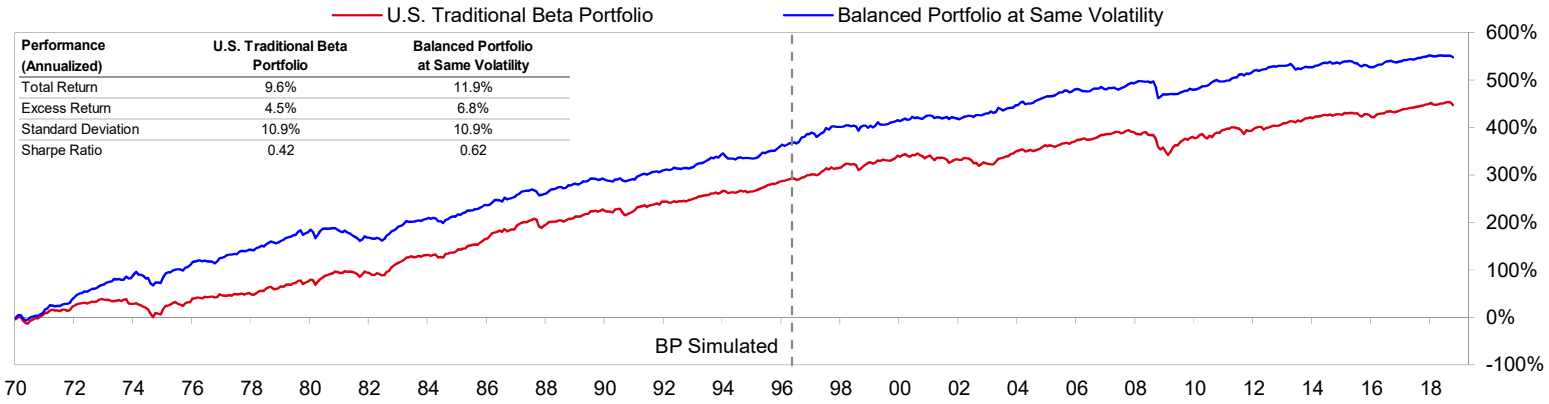


"Balanced Portfolio" refers to the All Weather Strategy as described in the "All Weather Strategy" disclosure. Returns are shown gross of fees. Before June 1996, returns are simulated using the All Weather Strategy Simulation as detailed in the "All Weather Strategy Simulation Disclosure". It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. . "U.S. Traditional Portfolio" refers to the traditional allocation described in the "U.S. Traditional Portfolio Disclosure". A rising (falling) inflation month is defined as a month in which the current rate of inflation is greater (lower) than the 12-month moving average rate of inflation. A rising (falling) growth month is defined as a month in which the current rate of real GDP growth is greater (lower) than the 12-month moving average rate of real GDP growth. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

BALANCE ENABLES SMALLER TOTAL CONTRIBUTIONS FOR THE SAME CONTRIBUTION VARIABILITY…

Cumulative Gross of Fees Total Return (ln)

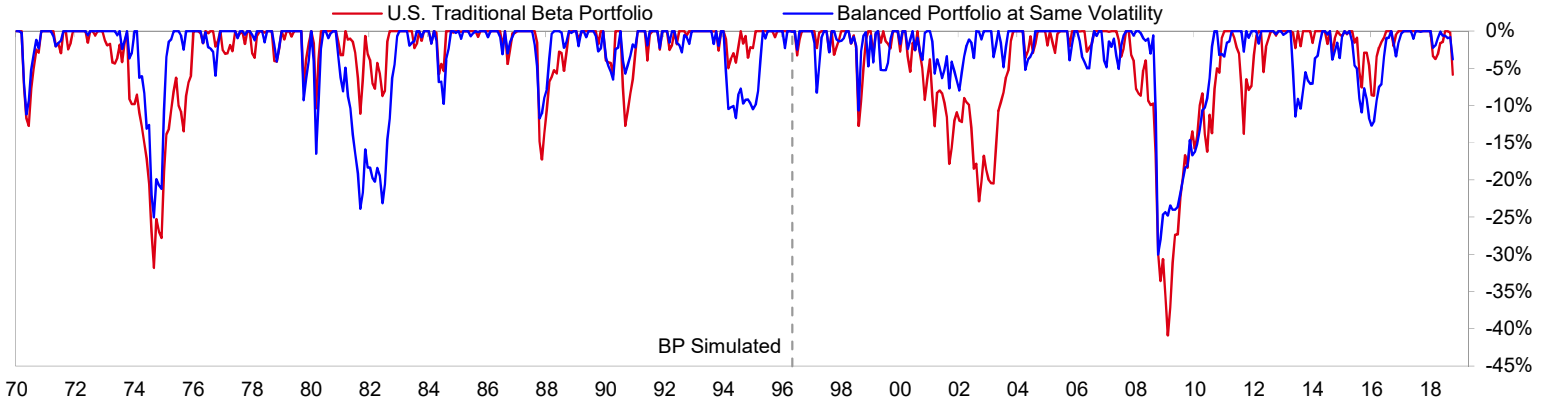
(Balanced Porfolio Returns Simulated Prior to June 1996)



Performance (Annualized)	U.S. Traditional Beta Portfolio	Balanced Portfolio at Same Volatility
Total Return	9.6%	11.9%
Excess Return	4.5%	6.8%
Standard Deviation	10.9%	10.9%
Sharpe Ratio	0.42	0.62

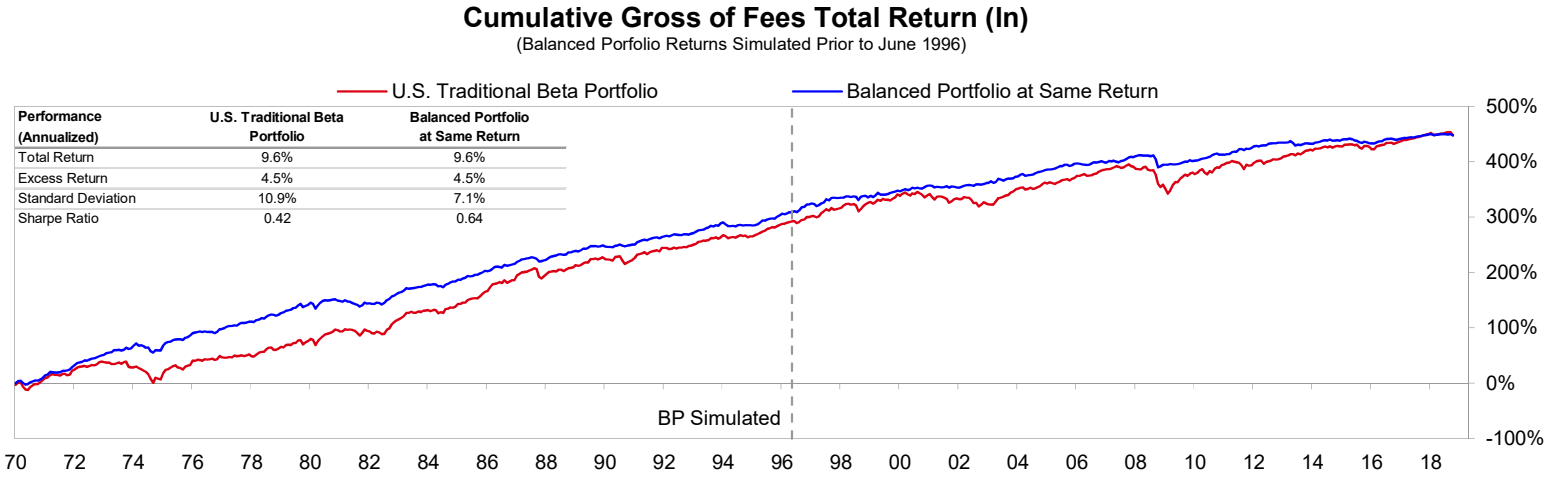
Drawdowns (Gross of Fees Total Return)

(Balanced Porfolio Returns Simulated Prior to June 1996)

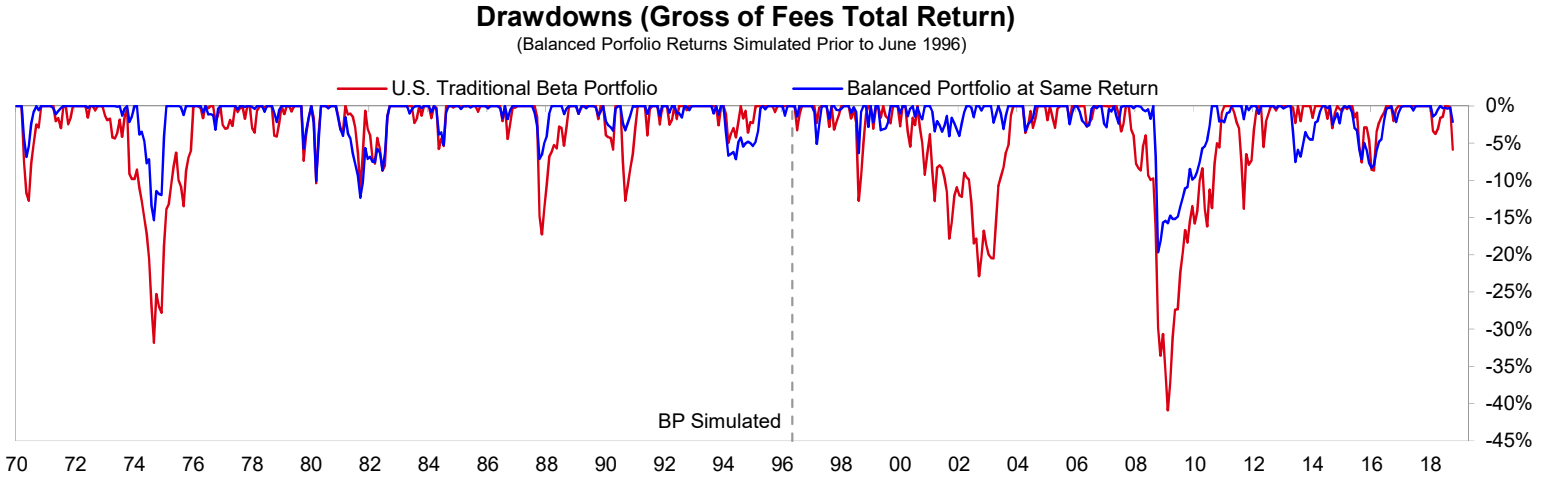


Data through 10/31/2018. "U.S. Traditional Portfolio" refers to the traditional allocation described in the "U.S. Traditional Portfolio Disclosure". "Balanced Portfolio" refers to the All Weather Strategy as described in the "All Weather Strategy" disclosure. Before June 1996, returns are simulated using the All Weather Strategy Simulation, as described in the "All Weather Strategy Simulation Disclosure." It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

…OR MORE STABLE CONTRIBUTIONS FOR THE SAME TOTAL AMOUNT OF CONTRIBUTIONS



Performance (Annualized)	U.S. Traditional Beta Portfolio	Balanced Portfolio at Same Return
Total Return	9.6%	9.6%
Excess Return	4.5%	4.5%
Standard Deviation	10.9%	7.1%
Sharpe Ratio	0.42	0.64



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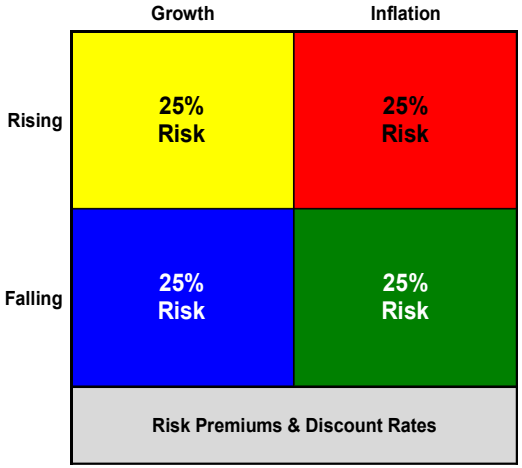
How Is The Balanced Portfolio Actually Built?

TRANSLATING ALL WEATHER PRINCIPLES INTO A PORTFOLIO

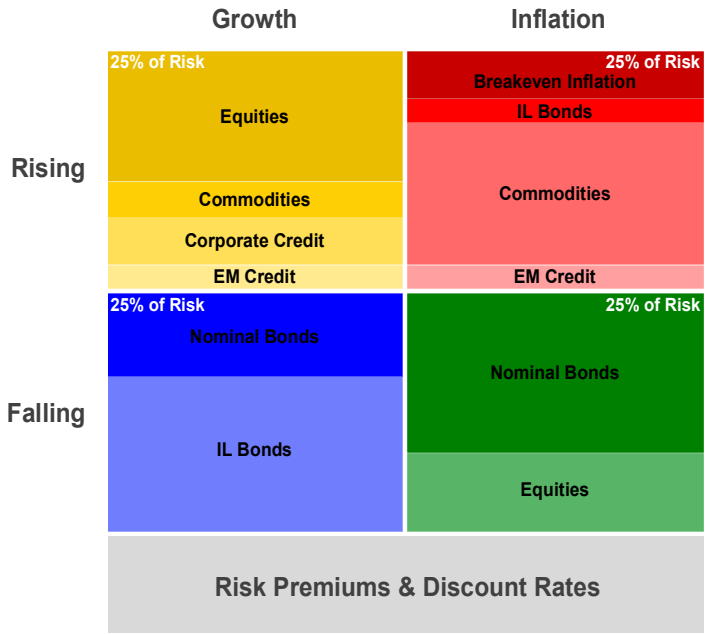


1. Group asset classes according to the economic environments in which they outperform and balance risk evenly across the environments.

2. Combine the four subportfolios and then proportionately scale each position until the total portfolio has the right amount of expected return or risk.

Please review the "Important Disclosures and Other Information" located at the end of this presentation.

THE FIRST STEP: A BALANCED PORTFOLIO'S RISK ALLOCATION



- The risk weights given to each market are a function of the benefits of regional diversification and market liquidity
- Positions implemented through cost-effective instruments (e.g. physicals, plain-vanilla futures and swaps)

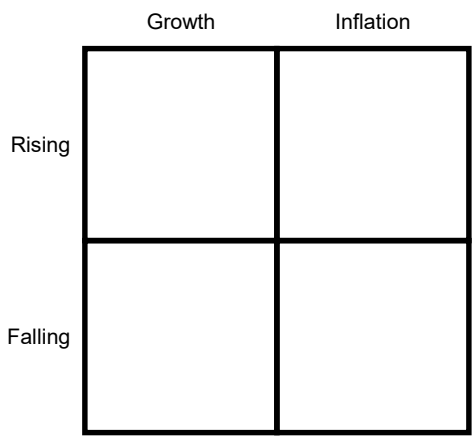
Markets Used in All Weather

Global Nominal Interest Rates	Global IL Bonds	EM Credit Spreads	Commodities
Australia	Australia	Argentina	Aluminum
Canada	Canada	Brazil	Coffee
China	France	Colombia	Copper
Czech Republic	Germany	Indonesia	Corn
Germany	Sweden	Mexico	Cotton
Hungary	UK	Peru	Gold
India	US	Philippines	Lean Hogs
Japan		Russia	Live Cattle
Malaysia	**Global Equities**	South Africa	Natural Gas
Mexico	Australia	Turkey	Nickel
Norway	Canada		Oil & Petroleum Products
Poland	Emerging Markets	**Corporate Credit Spreads**	Silver
Singapore	Euroland	Europe	Soybean Meal
South Africa	France	North America	Soybean Oil
South Korea	Germany		Soybeans
Sweden	Hong Kong		Sugar
Taiwan	Japan		Wheat
Thailand	UK		Zinc
Turkey	US		
UK			
US			

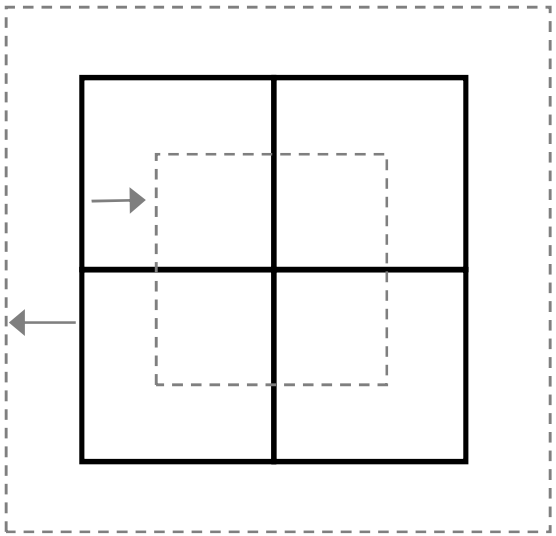
Please review the "Important Disclosures and Other Information" located at the end of this presentation.

THE SECOND STEP: AFTER GETTING ENVIRONMENTALLY BALANCED PROPORTIONS, SCALE UP OR DOWN AS NEEDED

① START WITH BALANCE



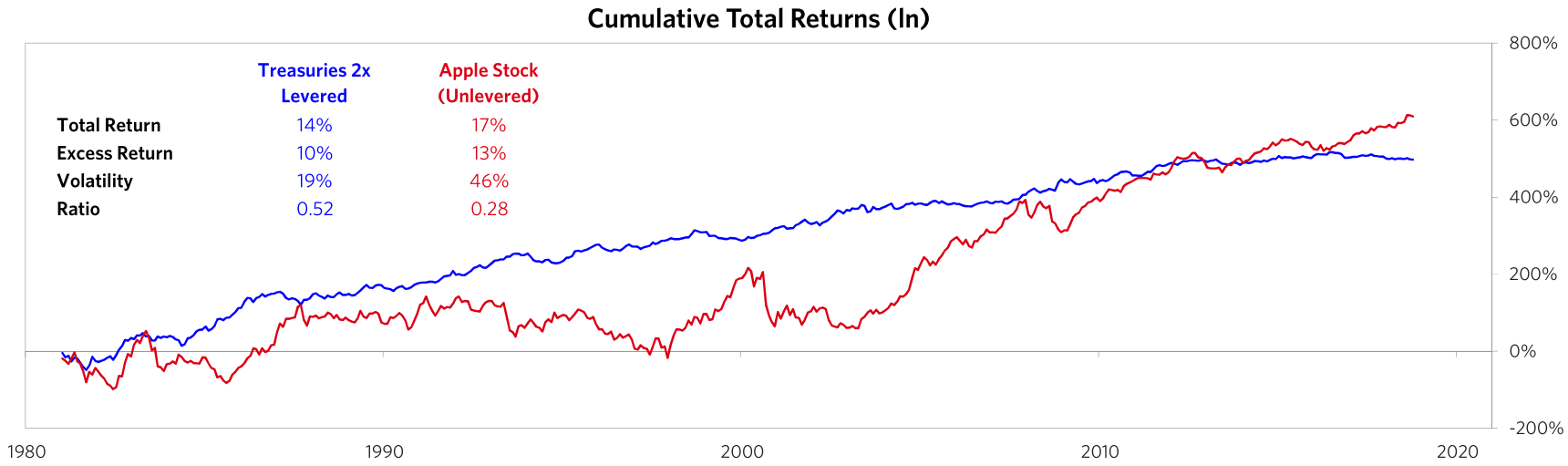
② MORE OR LESS TOTAL RISK

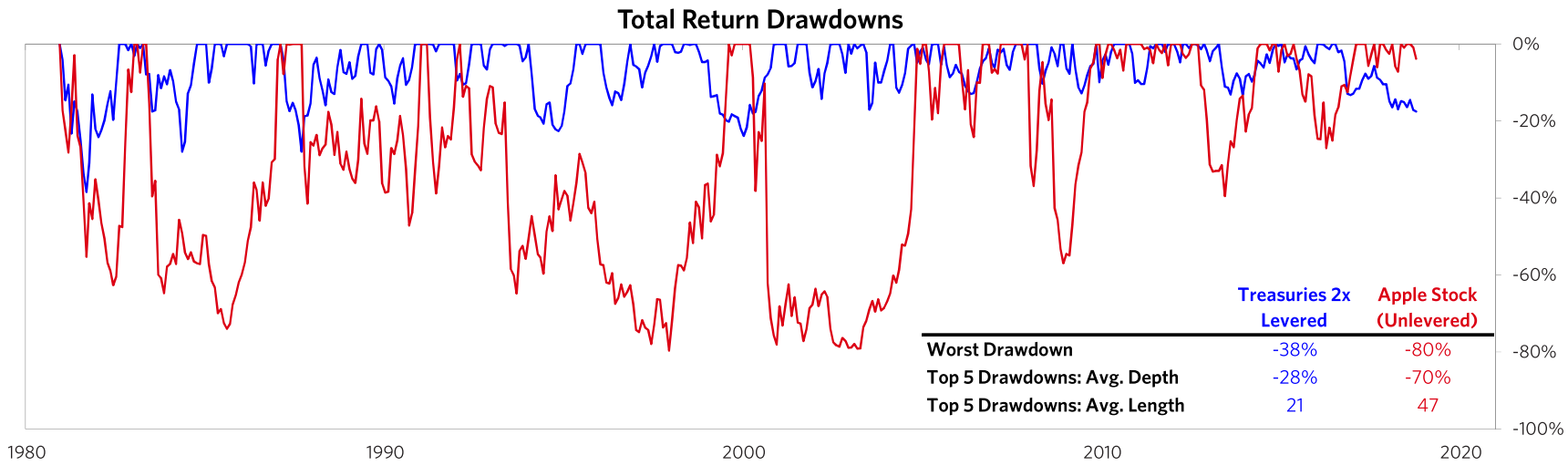


LEVERAGE

- Leverage is already utilized in most institutional portfolios.
  - Real estate, private equity, private debt, infrastructure, public equity
- Leverage does not equal risk.
- It is neither good nor bad. It is merely a tool that can be used wisely or dangerously.
  - Wise applications apply modest leverage to liquid assets in order to enable diversification across different sources of risk.
  - Dangerous applications apply high amounts of leverage to illiquid assets in order amplify an existing exposure to one source of risk.

LEVERAGE DOES NOT EQUAL RISK

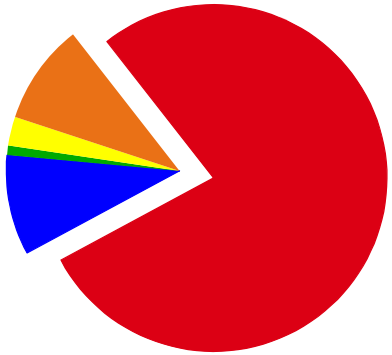




Data through October 2018. "Treasuries 2x Levered" are 10 year constant duration US Treasuries scaled by a factor of 2. Returns are cumulative excess returns above cash. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

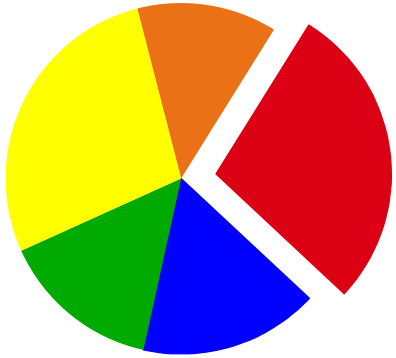
LEVERAGE, WHEN UTILIZED TO ENABLE DIVERSIFICATION, ACTUALLY REDUCES YOUR PORTFOLIO RISK FOR A GIVEN RETURN

Traditional Portfolio



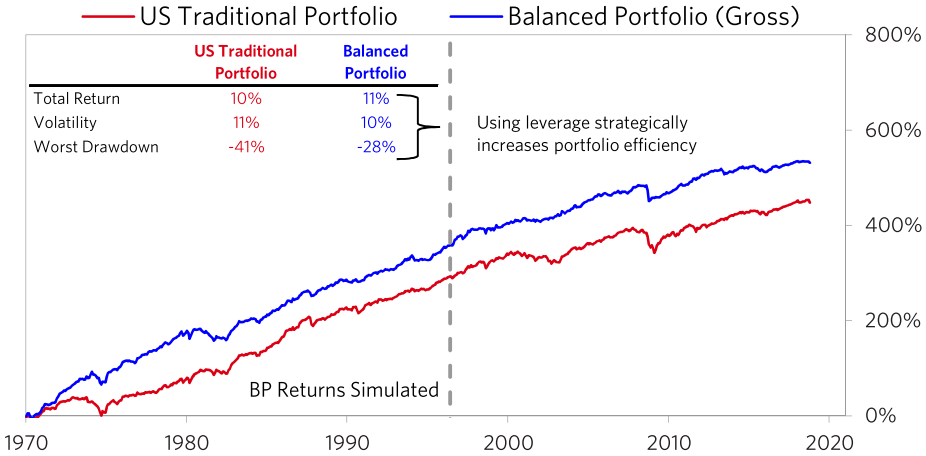
Equities
Nominal Bonds
Inflation Linked Bonds
Commodities
Other

Balanced Portfolio



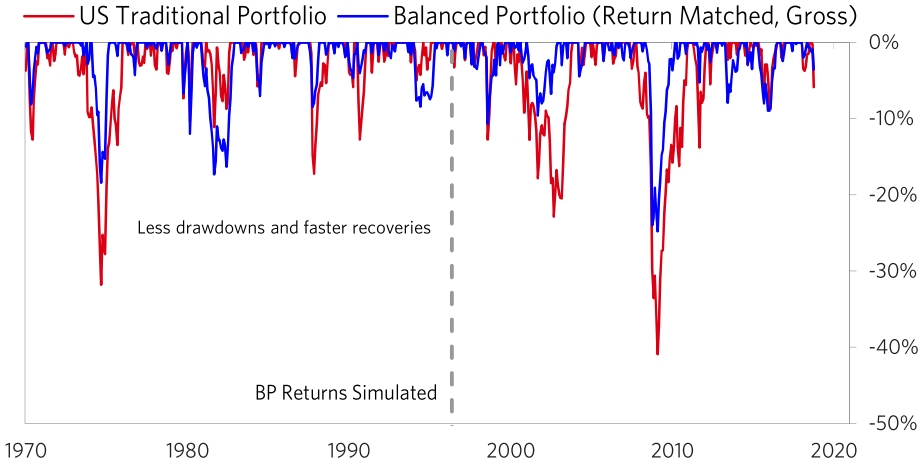
More Diversification, More Return, or...

(Balanced Portfolio Simulated Prior to June 1996)
(Cumulative Total Returns, Ln)



...Less Risk

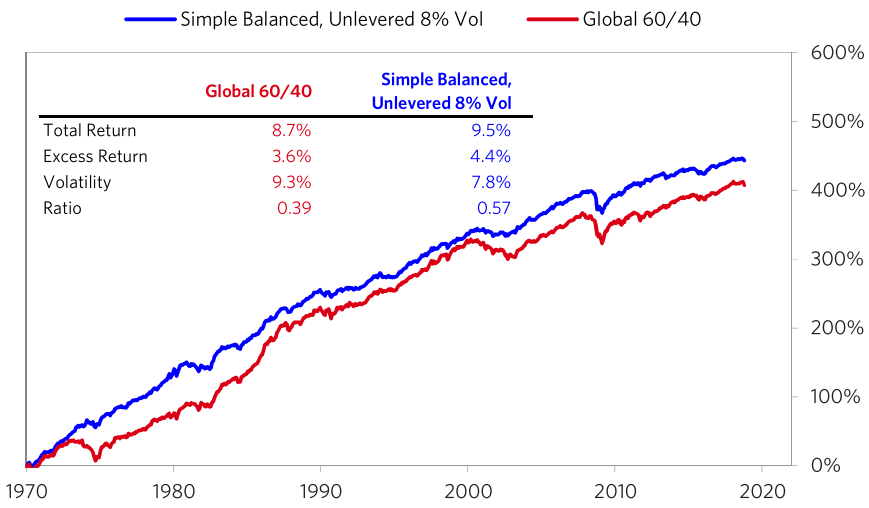
(Balanced Portfolio Simulated Prior to June 1996)



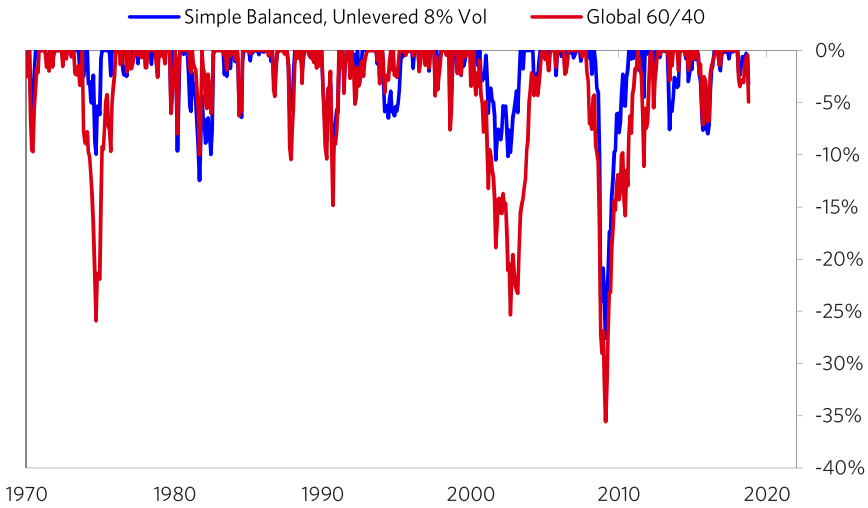
Data through October 2018. "U.S. Traditional Portfolio" refers to the traditional allocation described in the "U.S. Traditional Portfolio Disclosure". "Balanced Portfolio" refers to the All Weather Strategy as described in the "All Weather Strategy" disclosure. Before June 1996, returns are simulated using the All Weather Strategy Simulation as detailed in the "All Weather Strategy Simulation Disclosure". Returns are cumulative excess returns above cash, shown gross of fees. "Risk" refers to standard deviation of excess returns. It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

THE PRINCIPLES BEHIND BALANCE ARE SIMPLE TO IMPLEMENT

- While sophisticated implementations of balance add value, the basic principles can be implemented with even a small number of easily investible assets.
- Below we show a simple version of a balanced portfolio with allocations to equities, long duration nominal bonds, long duration inflation-linked bonds, a commodity index, and gold.
- Even this simple version of a balanced portfolio has historically provided higher returns than a traditional concentrated portfolio for less risk.



	Global 60/40	Simple Balanced, Unlevered 8% Vol
Total Return	8.7%	9.5%
Excess Return	3.6%	4.4%
Volatility	9.3%	7.8%
Ratio	0.39	0.57

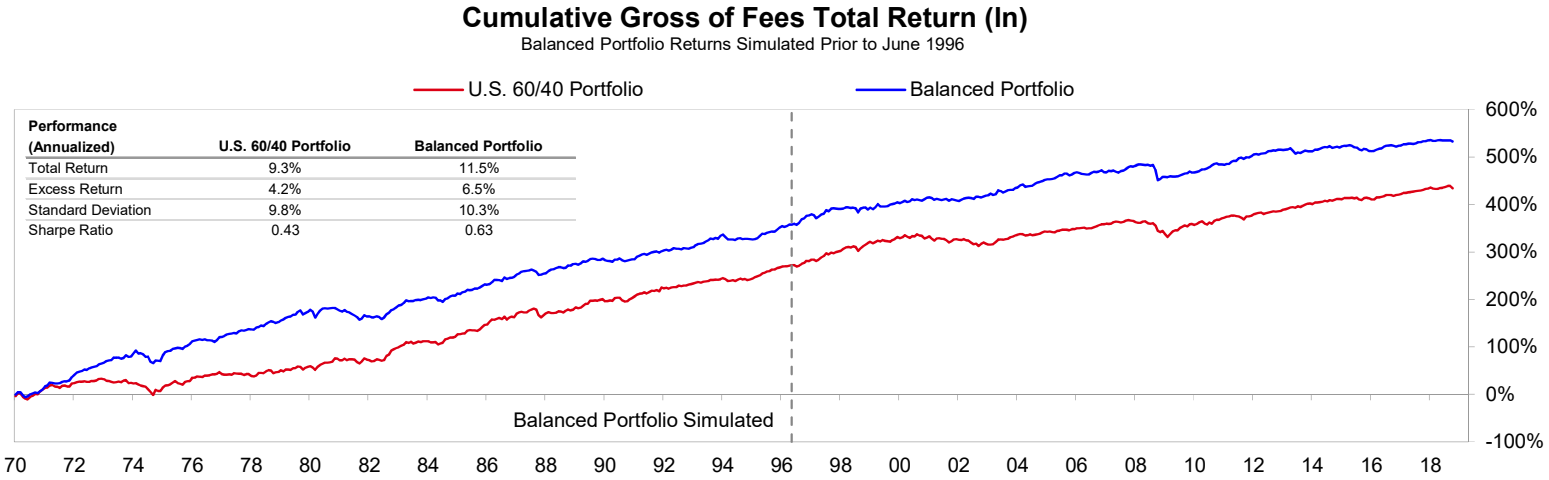


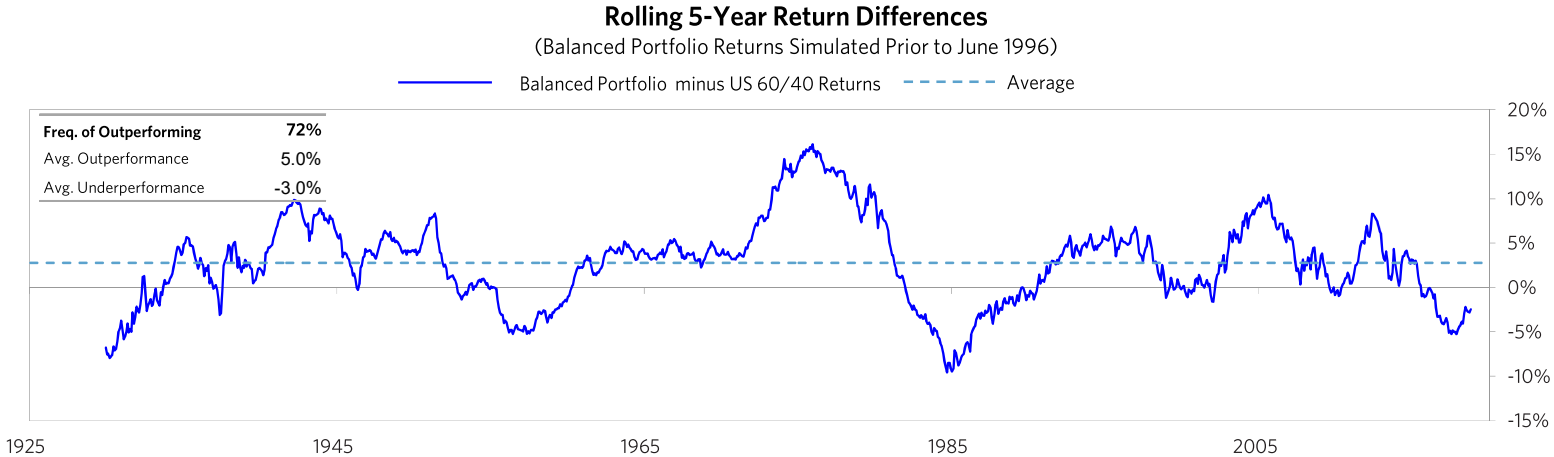
Global 60/40 is comprised of an allocation of 60% world equities and 40% world bonds. All return series are hedged to USD.
"Simple Balanced, Unlevered 8% Vol" holds 39% world equities, 14% 20y duration world government bonds, 25% 20y duration world inflation linked bonds, 14% Bloomberg commodity index, and 7% gold.
Please review the "Important Disclosures and Other Information" located at the end of this presentation.

Additional Topics

Risk Parity vs. The 60/40 / Peer Risk

BETTER DOESN'T MEAN BETTER AT ALL TIMES... KNOW WHAT TO EXPECT





Data through 10/31/2018. Rolling 5-Year returns are shown gross of fees. The "U.S 60/40 Portfolio" is 60% US Equities and 40% US Government Bonds. All return series are hedged to USD. "Balanced Portfolio" refers to the All Weather Strategy as described in the "All Weather Strategy" disclosure. Before June 1996, returns are simulated using the All Weather Strategy Simulation, as described in the "All Weather Strategy Simulation Disclosure." It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

AS TIME GOES ON, THE ODDS OF A BALANCED PORTFOLIO OUTPERFORMING INCREASE

Balanced Portfolio
Expected Sharpe Ratio

0.6

Global 60/40
Expected Sharpe Ratio

0.4

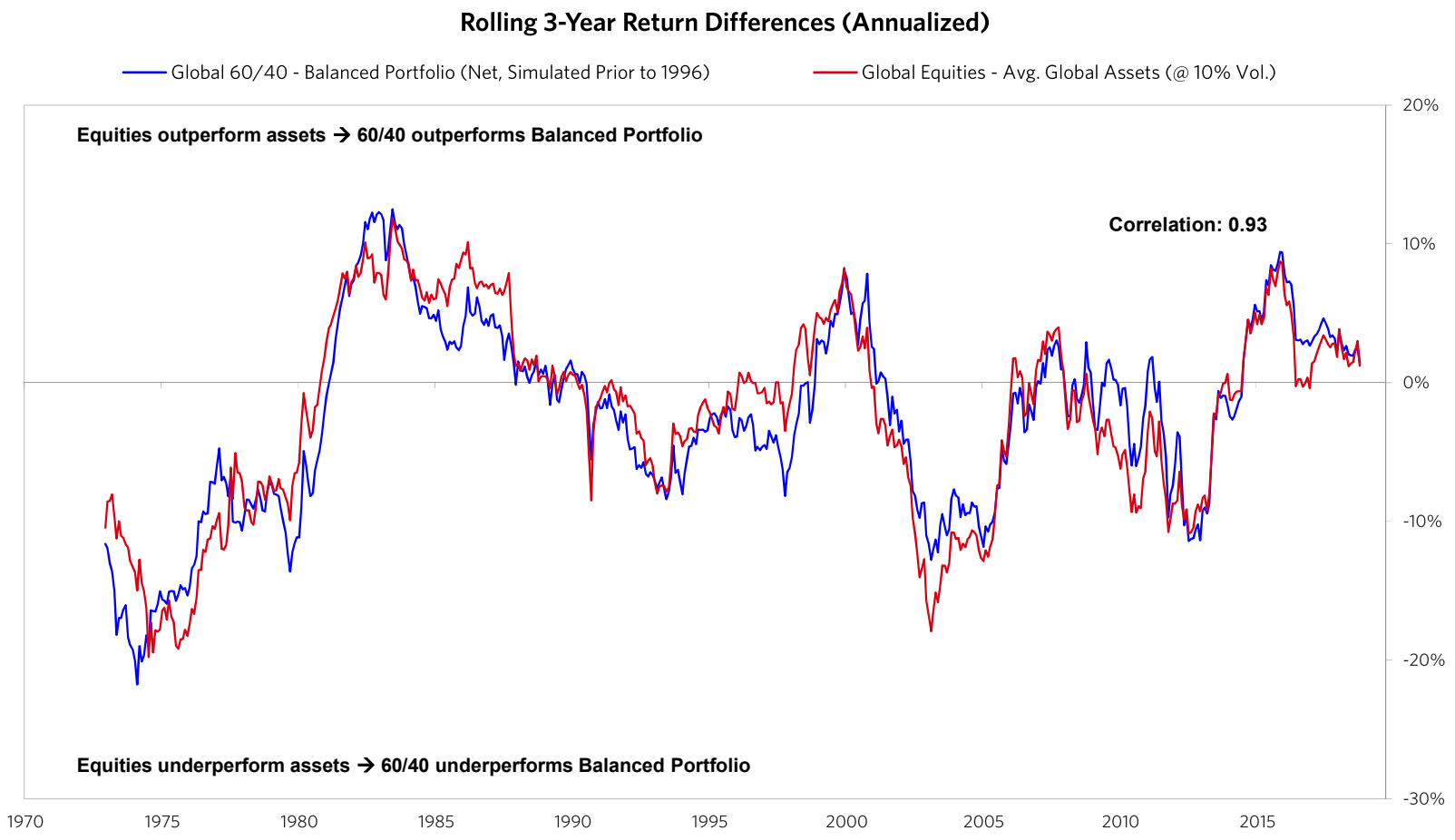
Frequency of Outperformance

Balanced Portfolio (Simulated Prior to June 1996) vs. Global 60/40

Time Frame	Expected	Historical (1925-Present)
1-Year	61%	59%
3-Year	69%	69%
5-Year	74%	72%
10-Year	82%	81%
20-Year	90%	97%
30-Year	94%	100%

Data through October 2018 The global 60/40 is 60% World Equities and 40% World Bonds. All return series are hedged to USD. For the purposes of this analysis, the expected monthly correlation between the 60/40 Portfolio and All Weather is assumed to be 0.60. "Balanced Portfolio" refers to the All Weather Strategy as described in the "All Weather Strategy" disclosure and is shown gross of fees. Before June 1996, returns are simulated using the All Weather Strategy Simulation, as described in the "All Weather Strategy Simulation Disclosure." It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

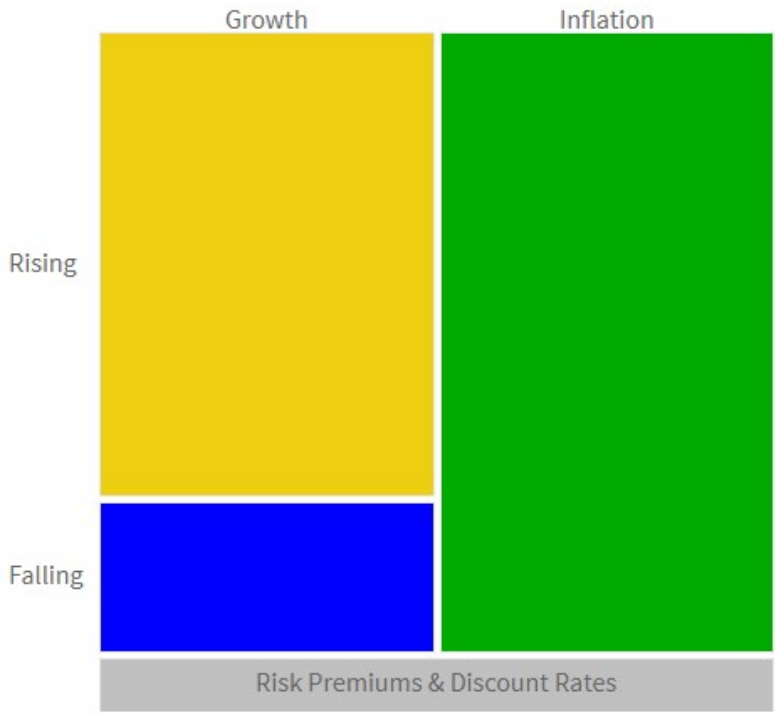
WHEN EQUITIES ARE THE BEST PERFORMING ASSET CLASS THE EQUITY CONCENTRATED 60/40 OUTPERFORMS BALANCE



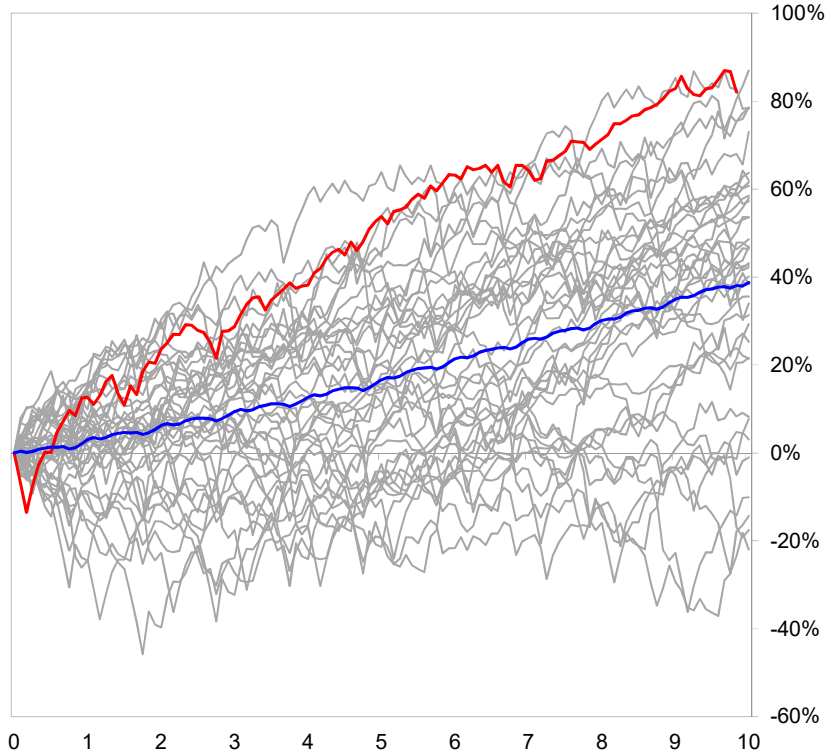
"Balanced Portfolio" refers to the All Weather Strategy as described in the "All Weather Strategy" disclosure. Data shown through October net of fees. "Average of Major World Asset Classes" is a portfolio with equal risk in stocks, commodities, nominal bonds, and IL bonds. The global 60/40 is comprised of 60% global equities and 40% global nominal government bonds. Before June 1996 the returns shown for All Weather are simulated using the All Weather Strategy Simulation (see All Weather Strategy Simulation Disclosure). It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

IT'S BEEN A GREAT PERIOD FOR TRADITIONAL PORTFOLIOS: IT SHOULD NOT BE EXTRAPOLATED

U.S. 60/40 Portfolio Environmental Biases



US 60/40 Portfolio Cumulative Excess Returns Over All 10-Year Periods Since 1970 (In)

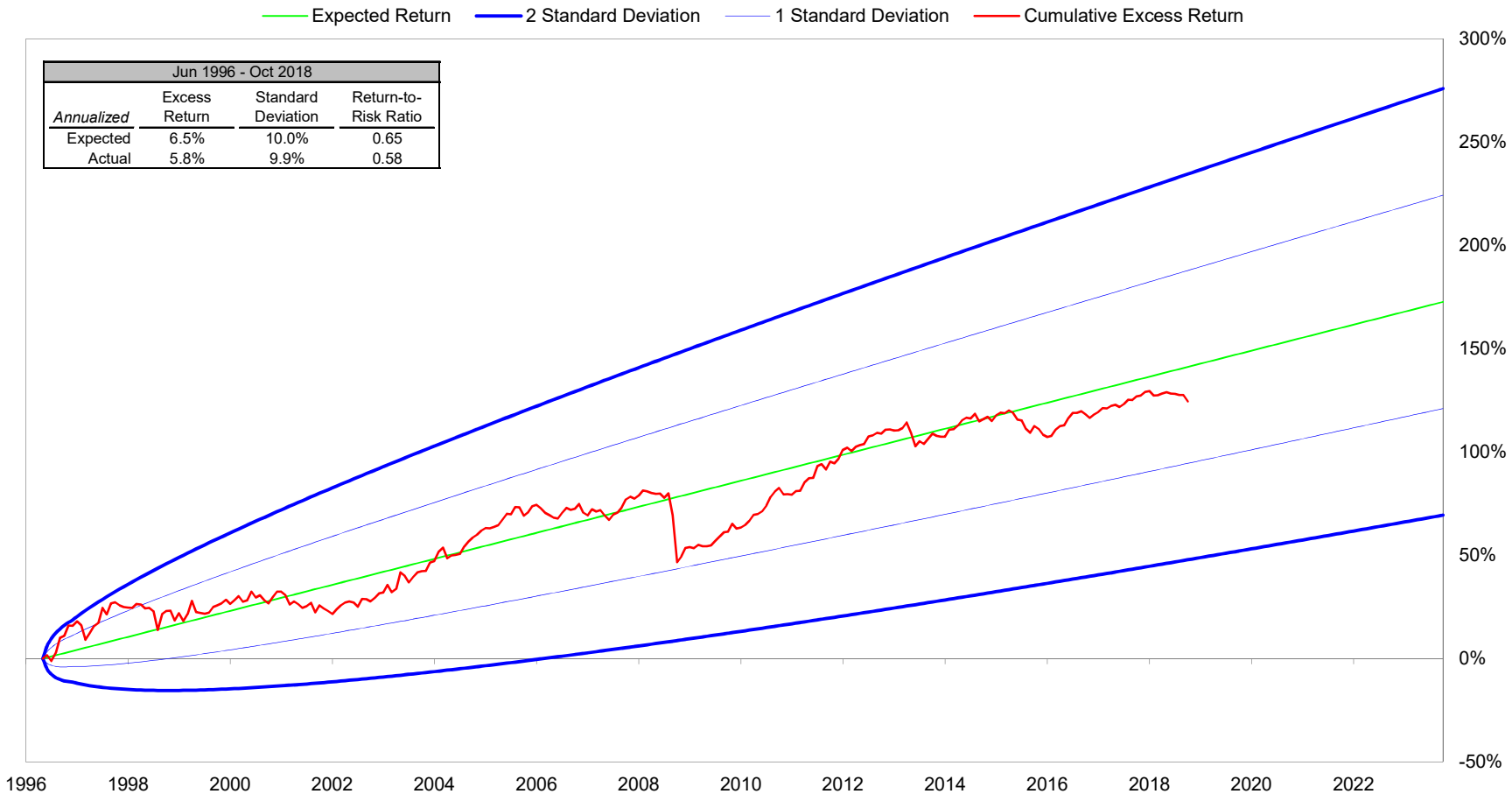


Data through October 2018. The U.S. 60/40 Portfolio is a portfolio of 60% capital weight U.S. Equities, and 40% weight on U.S. Govt. Bonds. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

Benchmarking

THE RIGHT WAY TO ASSESS ALL WEATHER IS AGAINST ITS OWN RETURN AND RISK EXPECTATIONS

Bridgewater All Weather Strategy
Gross Cumulative Excess Return vs. Expectations (ln)



Jun 1996 - Oct 2018			
Annualized	Excess Return	Standard Deviation	Return-to-Risk Ratio
Expected	6.5%	10.0%	0.65
Actual	5.8%	9.9%	0.58

Please review the "Important Disclosures and Other Information" located at the end of this presentation. . PAST RESULTS ARE NOT NECESSARILY INDICATIVE OF FUTURE RESULTS.

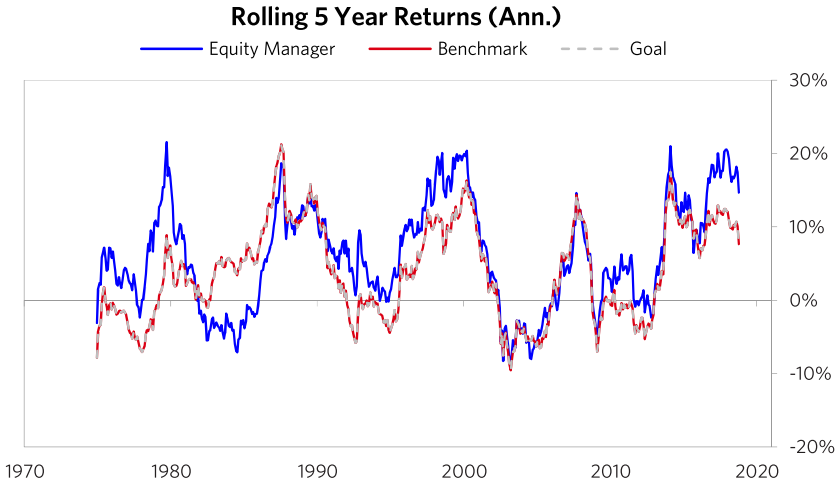
SHORT TERM COMPARISONS TO MORE CONCENTRATED ASSET MIXES WON'T TELL YOU IF DIVERSIFICATION IS THE RIGHT CHOICE

Equity Manager (Illustrative)

Goal: Outperform World Equities

Benchmark: World Equities

Effectiveness: Since the goal and the benchmark are tied together, comparing performance to the benchmark tells you if the strategy is working.

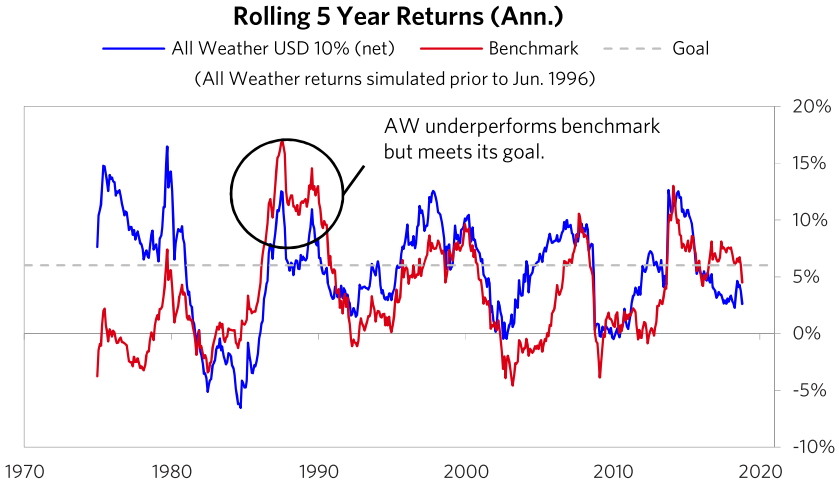


All Weather

Goal: Highest return one can get holding assets (~6% at 10% risk)

Benchmark: 60/40

Effectiveness: Since the strategy isn't built to beat a benchmark, any asset/strategy benchmark will be uninformative.



Data through October 2018. "Equity Manager (Illustrative)" refers to a hypothetical return stream that combines alpha with a 0.25 ratio and 10% volatility with hedged world equities. Before June 1996, All Weather returns are simulated using the All Weather Strategy Simulation, as described in the "All Weather Strategy Simulation Disclosure." It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

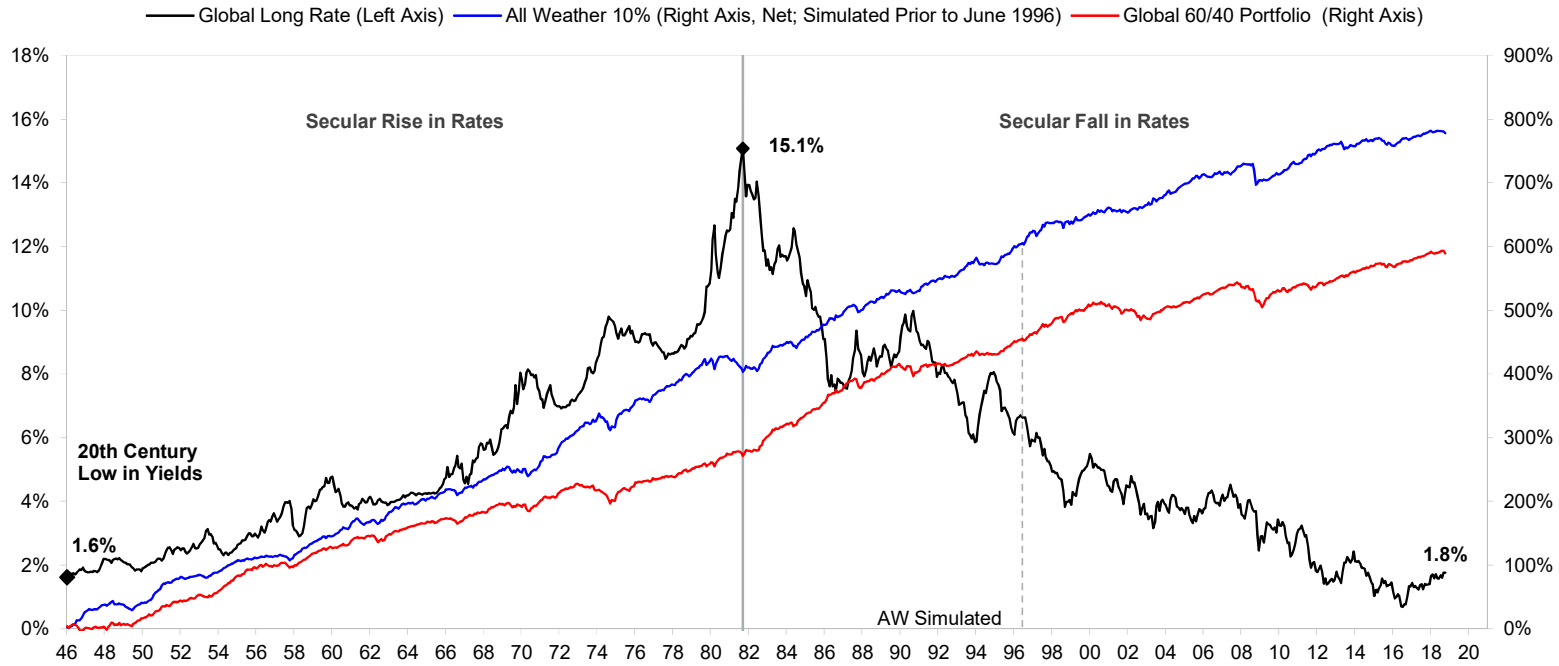
Risk Parity in Rising Interest Rates

ALL WEATHER IN RISING INTEREST RATE ENVIRONMENTS

- All Weather is a balanced portfolio, not a bond portfolio.
- Asset returns are driven by how conditions transpire in relation to what was already discounted. The bond market is currently discounting rates to rise.
- By design, All Weather is balanced to the main drivers of interest rate changes: shifts in discounted growth and inflation.
- Like all assets and asset portfolios, All Weather is sensitive to rising interest rates due to tightening liquidity.

Please review the "Important Disclosures and Other Information" located at the end of this presentation.

ALL WEATHER VS. GLOBAL 60/40 DURING SECULAR MOVES IN YIELDS



	All Weather 10%			Global 60/40		
Annualized Performance	**1946 - Sep. 1981**	**Oct. 1981 - Present**	**Full Period**	**1946 - Sep. 1981**	**Oct. 1981 - Present**	**Full Period**
Total Return	11.9%	10.6%	11.3%	7.9%	9.0%	8.4%
Excess Return	7.6%	6.4%	7.0%	3.5%	4.8%	4.1%
Standard Deviation	9.0%	9.5%	9.2%	7.2%	8.5%	7.9%
Sharpe Ratio	0.84	0.68	0.76	0.49	0.56	0.52

Simulated Prior to June 1996

Simulated performance through Oct-2018. Simulated performance hedged to USD. The returns shown for All Weather are simulated prior to June 1996 using the All Weather Strategy Simulation (see All Weather Strategy Simulation Disclosure) and are shown gross of fees. Prior to 1970, the global 60/40 is comprised of 60% U.S. equities and 40% U.S. nominal government bonds. After 1970, the global 60/40 is comprised of 60% global equities and 40% global nominal government bonds. Prior to 1970, the global long rate is based on the U.S. 10-year Treasury yield and after 1970 it is based on a GDP-weighted average of U.S., Germany, Japan, U.K., Canada and Australia 10-year yields. It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data.

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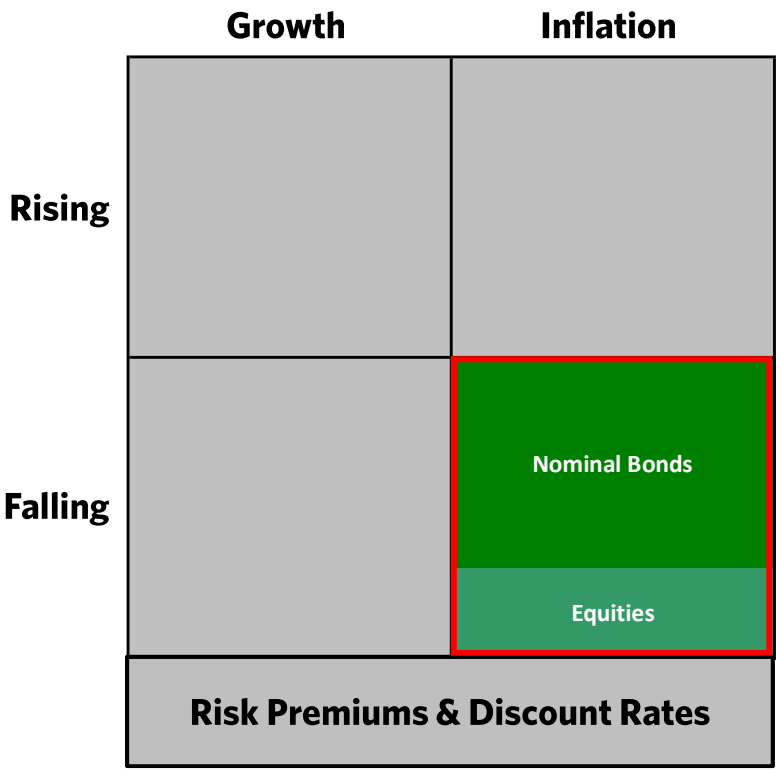
Appendix

ILLUSTRATIVE EXAMPLE: RISK SHARE TO CAPITAL SHARE



	Desired Risk Share	Asset Volatility	Capital Share
	A	B	A/B (scaled)
Nominal Bonds	70%	8%	82%
Equities	30%	16%	18%
Total	100%	-	100%

(25% of portfolio risk)

Please review the "Important Disclosures and Other Information" located at the end of this presentation.

LEVERAGE IS A PROBLEM WHEN YOU START WITH A LOT OF IT AND THEN CAN'T SELL WHEN PRICES FALL

	Initial Investment	After 10% Loss	After Rebalancing	Another 10% Loss
Modest Leverage in Liquid Markets	Assets: $200 Equity: $100 Net Leverage: 2.0x	Sell $20 to keep leverage constant (liquid) Assets: $180 Equity: $80 Net Leverage: 2.3x	Assets: $160 Equity: $80 Net Leverage: 2.0x	Down 36% Assets: $144 Equity: $64 Net Leverage: 2.3x
Excessive Leverage in Illiquid Markets	Assets: $500 Equity: $100 Net Leverage: 5.0x	Can't sell to rebalance (illiquid) Assets: $450 Equity: $50 Net Leverage: 9.0x	Assets: $450 Equity: $50 Net Leverage: 9.0x	Down 95%, wiped out Assets: $405 Equity: $5 Net Leverage: 81.0x

Leverage increases, but only slightly

Leverage almost doubles

Leverage is out of control

For illustrative purposes only. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

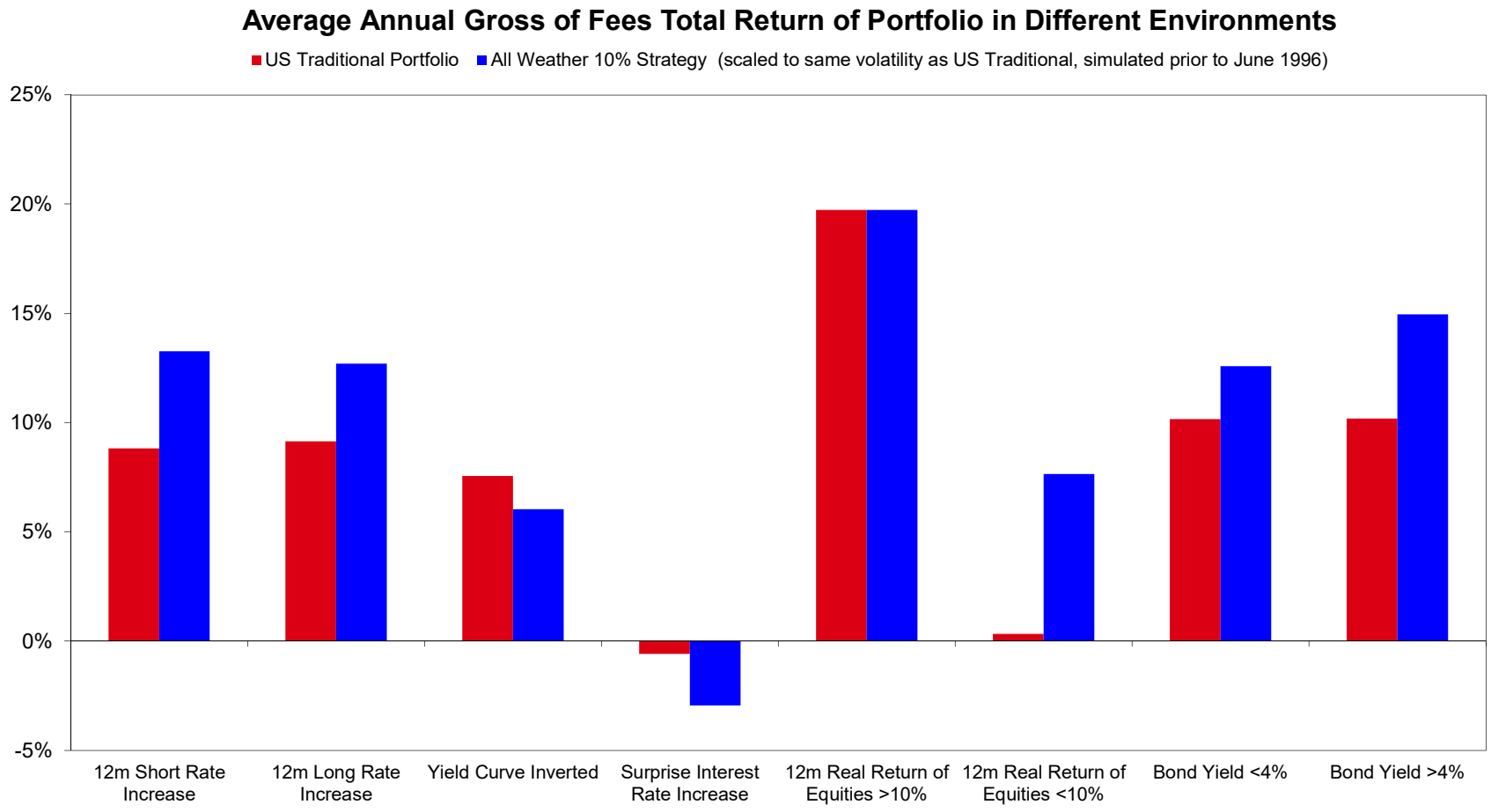
ALL WEATHER VS. 60/40 DURING BOND BEAR MARKETS

- Through these cycles, All Weather would have outperformed the 60/40 and cash.
- Rising interest rate environments were typically good for some assets and bad for others.
- Some of these periods were driven by tight money (highlighted in red), and were therefore bad for all assets and asset portfolios.

		Average Annual Returns (Since 1970, Adjusted to 10% Volatility) All Weather Simulated Prior to June 1996							
Trough to Peak Rises in Global Yields		Asset Class Excess Returns					Portfolio Total Return		
Start Date	End Date	Global Equities	Global Bonds	Global IL Bonds	Commodities	Cash	All Weather Simulation	Global 60/40	All Weather 10%
Mar-72	Aug-74	-11.9%	-15.4%	6.7%	35.0%	6.7%	9.7%	-7.6%	--
Sep-77	Mar-80	0.8%	-19.5%	-2.3%	15.6%	9.3%	11.7%	5.9%	--
Jul-80	Sep-81	-4.2%	-36.5%	-24.4%	-16.9%	14.3%	-16.7%	2.3%	--
May-83	May-84	-1.5%	-18.5%	-23.7%	-1.6%	9.8%	0.0%	4.5%	--
Apr-87	Sep-90	-4.3%	-5.7%	-4.5%	11.5%	7.7%	6.7%	2.5%	--
Jan-94	Dec-94	-3.0%	-17.9%	-18.9%	7.7%	4.3%	-6.2%	-2.3%	--
Oct-98	Jan-00	20.3%	-8.9%	-2.4%	3.8%	5.1%	18.8%	22.2%	--
Jun-03	Jun-07	10.9%	-1.0%	0.2%	6.0%	3.1%	17.1%	13.4%	9.8%
Jan-09	Dec-09	21.3%	0.9%	16.8%	11.8%	0.2%	26.4%	20.7%	10.1%
Aug-12	Dec-13	16.3%	1.8%	-10.6%	-5.8%	0.1%	2.1%	16.0%	0.0%
Avg. Ann. Returns (Rising Rate Periods)		**2.9%**	**-10.6%**	**-4.4%**	**8.8%**	**6.0%**	**8.4%**	**6.6%**	**--**
Avg. Ann. Returns (Full Period)		**3.0%**	**4.5%**	**5.6%**	**1.7%**	**5.1%**	**12.3%**	**8.9%**	**--**

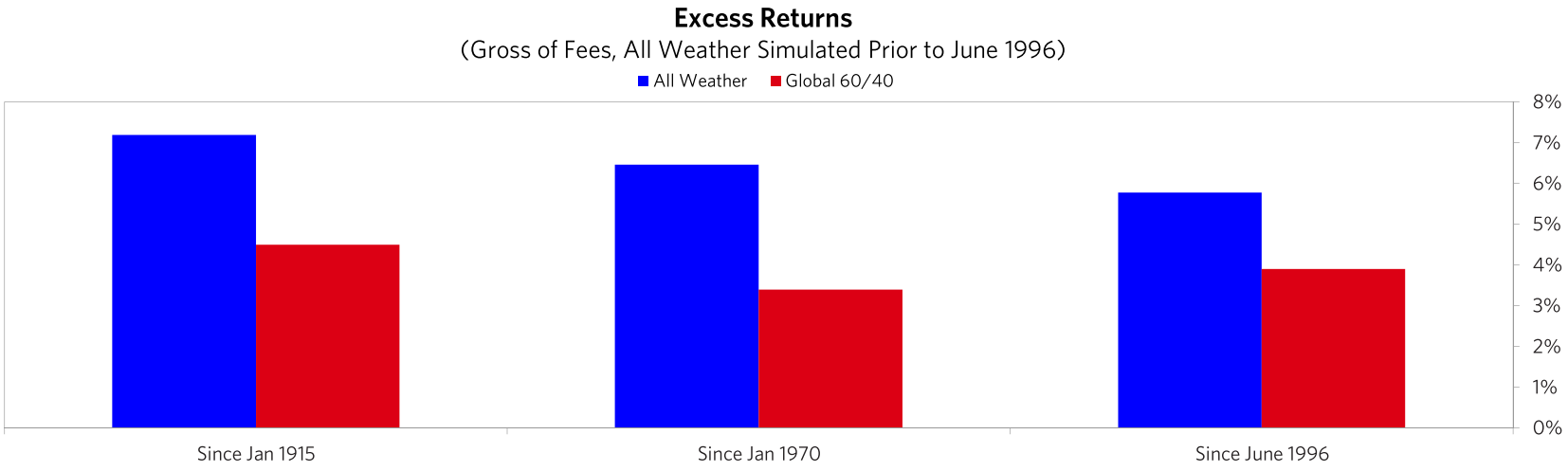
Simulated performance is shown through Oct-2018. Simulated performance is hedged to USD. Global 60/40 portfolio is comprised of 60% global equities and 40% global nominal government bonds. The global long rate is based on a GDP-weighted average of U.S., Germany, Japan, U.K., Canada and Australia 10-year yields. The returns shown for All Weather are simulated prior to June 1996 using the All Weather Strategy Simulation (see All Weather Strategy Simulation Disclosure). It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

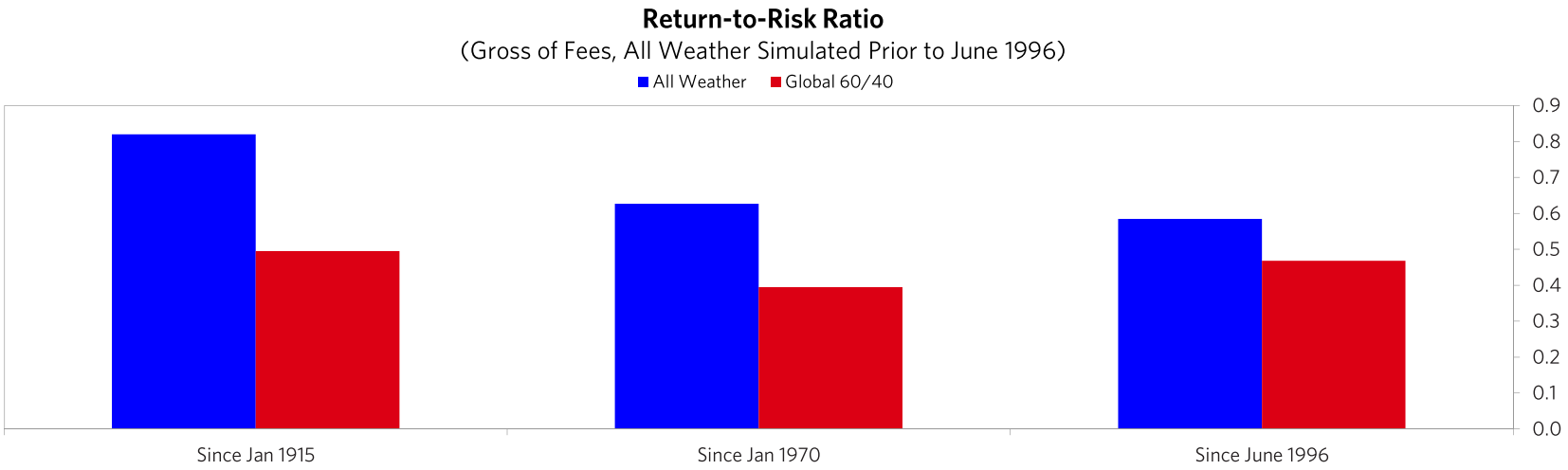
ALL WEATHER VS. TRADITIONAL PORTFOLIO IN DIFFERENT ENVIRONMENTS



Return comparisons are shown from January 1920 to October 2018. "Interest Rate Surprise" comparison uses return histories from January 1970 to October 2018. "Traditional Portfolio" refers to the USD Traditional Portfolio. Please note the returns shown for All Weather are simulated prior to June 1996 using the All Weather Strategy Simulation (see All Weather Strategy Simulation Disclosure). It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

ALL WEATHER STRESS-TESTING





Data through October 2018. Before June 1996, "All Weather" returns are simulated using the All Weather Strategy Simulation, as described in the "All Weather Strategy Simulation Disclosure." The "Global 60/40" is comprised of an allocation of 60% World Equities and 40% World Bonds. All return series are hedged to USD. It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data.. HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT, IF ANY, OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. Past performance is not indicative of future results. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

Important Disclosures and Other Information

Please read carefully the following important disclosures and other information as they provide additional information relevant to understanding the assumptions, research and performance information presented herein. Additional information is available upon request except where the proprietary nature of the information precludes its dissemination.

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Bridgewater's investment process seeks to understand the cause and effect linkages that drive markets over time. To assess and refine its understanding of these linkages, Bridgewater performs historical stress tests across a wide range of timeframes and market environments. From these stress tests, Bridgewater is able to simulate how its strategies would have performed prior to their inception. For strategies that include active decision making, Bridgewater often "humbles" its simulated alpha returns (by systematically adjusting downward the simulated results that Bridgewater's current alpha investment logic produces) to account for the possibility that it could be wrong. Because this stress testing is a core component of Bridgewater's investment process, it shares these simulations with current and prospective investors to demonstrate its thinking. However, because they do not demonstrate actual results, these simulations are inherently limited and should not be relied upon to make an investment decision.

HYPOTHETICAL PERFORMANCE RESULTS HAVE MANY INHERENT LIMITATIONS, SOME OF WHICH ARE DESCRIBED BELOW. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. IN FACT, THERE ARE FREQUENTLY SHARP DIFFERENCES BETWEEN HYPOTHETICAL PERFORMANCE RESULTS AND THE ACTUAL RESULTS SUBSEQUENTLY ACHIEVED BY ANY PARTICULAR TRADING PROGRAM.

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Bridgewater believes that a particular return stream should be evaluated against its expected performance or its benchmark. To that end, Bridgewater demonstrates whether its strategies are operating as expected via a cone chart, which shows the performance of a particular strategy over time relative to the strategy's benchmark and also within bands of standard deviation from that benchmark. Separately, to demonstrate the impact of market conditions on the strategies it manages, Bridgewater explains the macro-economic pressures and market conditions that effected performance in the context of client letters, account reviews, or other publications that Bridgewater provides to each current and prospective investor on a regular basis. Additional information about how Bridgewater thinks about setting expectations for its strategies via a benchmark is available upon request.

IMPORTANT DISCLOSURES

Any tables, graphs or charts relating to past performance, whether hypothetical, simulated or actual, included in this presentation are intended only to illustrate the performance of indices, strategies, or specific accounts for the historical periods shown. When creating such tables, graphs and charts, Bridgewater may incorporate assumptions on trading, positions, transactions costs, market impact estimations and the benefit of hindsight. For example, transaction cost estimates used in simulations are based on historical measured costs and/or modeled costs, and attribution is derived from a process of attributing positions held at a point in time to specific market views and is inherently imprecise. Such tables, graphs and charts are not intended to predict future performance and should not be used as a basis for making any investment decision. Bridgewater has no obligation to update or amend such tables, graphs or charts.

Statements regarding target performance or target ratios related to assumed risk budgets, liabilities, volatility, target volatility, tracking error or other targets should not be considered a guarantee that such results can or will be achieved. For example, Bridgewater may adjust returns to match, for instance, the annualized standard deviation of two or more return series but this adjustment does not suggest that the returns or assets are similar with respect to other aspects of the risk such as liquidity risk. Any statements with respect to the ability to risk match or risk adjust in the future are not a guarantee that the realized risks will be similar and material divergences could occur. All performance and risk targets contained herein are subject to revision by Bridgewater and are provided solely as a guide to current targets.

Discussions related to the risk controlling capabilities of low risk portfolios, diversification, passive investing, risk management, risk adjusting, and any other risk control theories, statements, measures, calculations and policies contained herein should not be construed as a statement that Bridgewater has the ability to control all risk or that the investments or instruments discussed are low risk. Active trading comes with a monetary cost and high risk and there is no guarantee the cost of trading will not have a materially adverse impact on any account, fund, portfolio or other structure. Bridgewater manages accounts, funds and strategies not referred to herein. Additionally, even where accounts, funds or strategies are traded similarly, performance may materially diverge based on, among other factors, timing, the approved instruments, markets, and target risk for each strategy or market. The price and value of the investments referred to in this presentation and the income, if any, derived therefrom may fluctuate.

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Where shown, information related to markets traded may not necessarily indicate the actual historical or current strategies of Bridgewater. Markets listed may or may not be currently traded and are subject to change without notice. Markets used for illustrative purposes may not represent the universe of markets traded or results available and may not include actual trading results of Bridgewater. Other markets or trading, not shown herein, may have had materially different results. Attribution of performance or designation of markets and the analysis of performance or other performance with respect to scenario analysis or the determination of biases is based on Bridgewater's analysis. Statements made with respect to the ability of Bridgewater, a fund, a strategy, a market or instrument to perform in relation to any other market, instrument or manager in absolute terms or in any specific manner in the future or any specified time period are not a guarantee of the desired or targeted result.

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ALL WEATHER STRATEGY DISCLOSURE

All Weather Strategy Performance (Net of Fees)

	Total Return in USD
Last 1 Year	-1.3%
Last 3 Years	4.3%
Last 5 Years	3.1%
Last 7 Years	4.1%
Last 10 Years	7.8%

Annualized Returns (Jun-96 through Oct-18)

Net Since Inception Jun-96 through Oct-18

	Total Return in USD
Annualized Return	7.5%
Standard Deviation	9.9%
Sharpe Ratio	0.53

Past results are not necessarily indicative of future results.

Standard deviation is calculated using gross of fees performance.

Bridgewater All Weather Strategy Performance Disclosure:

For the period June 1996 (the inception of the strategy) through August 2001 the performance is based on the total return of the Bridgewater All Weather strategy as implemented for Bridgewater's principals and their affiliates and was not fully hedged to the US Dollar. The All Weather strategy is structured to be fully hedged, and the performance reflected after August 2001 includes these hedging transactions. For the period of August 2001 through present the performance shown is the actual total returns of the longest running fully funded All Weather account. For the entire history excess returns are calculated by subtracting an approximation of a U.S. cash rate from the total returns described above. Of note, the All Weather strategy's target leverage, volatility and return, as well as the asset mix varied from June 1996 to July 2005. From August 2005 through the present the strategy has targeted 10% volatility. Bridgewater manages additional All Weather portfolios not included in this performance history.

Gross of fees performance is gross of management fees and includes the reinvestment of interest, gains, and losses. Returns will be reduced by the investment advisory fees and any other expenses that may be incurred in the management of the account.

Net of fees performance has been calculated using our standard fee schedule for a minimum size account, which are the highest fees we have or would currently charge an account. Investment advisory fees are described in Bridgewater's ADV Part 2A.

No representation is being made that any account will or is likely to achieve returns similar to those shown. Trading in futures is risky and can result in losses as well as profits. PAST RESULTS ARE NOT NECESSARILY INDICATIVE OF FUTURE RESULTS. Performance as of the current month is estimated and subject to change.

US TRADITIONAL PORTFOLIO

This page contains the allocation information for the historical simulation of the US Traditional portfolio, from 1970 onwards, as well as forward looking assumptions for expected returns, volatility, tracking error, and correlations used in this analysis. The portfolio capital allocation weights (illustrated below) are estimates based either upon Bridgewater Associates' understanding of standard asset allocation (which may change without notice) or information provided by or publicly available from the recipient of this presentation. Asset class returns are actual market returns where available and otherwise a proxy index constructed based on Bridgewater Associates understanding of global financial markets. Information regarding specific indices and simulation methods used for proxies is available upon request (except where the proprietary nature of information precludes its dissemination). Results are hypothetical or simulated and gross of fees unless otherwise indicated. HYPOTHETICAL PERFORMANCE RESULTS HAVE MANY INHERENT LIMITATIONS, SOME OF WHICH ARE DESCRIBED BELOW. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. IN FACT, THERE ARE FREQUENTLY SHARP DIFFERENCES BETWEEN HYPOTHETICAL PERFORMANCE RESULTS AND THE ACTUAL RESULTS SUBSEQUENTLY ACHIEVED BY ANY PARTICULAR TRADING PROGRAM. ONE OF THE LIMITATIONS OF HYPOTHETICAL PERFORMANCE RESULTS IS THAT THEY ARE GENERALLY PREPARED WITH THE BENEFIT OF HINDSIGHT. IN ADDITION, HYPOTHETICAL TRADING DOES NOT INVOLVE FINANCIAL RISK, AND NO HYPOTHETICAL TRADING RECORD CAN COMPLETELY ACCOUNT FOR THE IMPACT OF FINANCIAL RISK IN ACTUAL TRADING. FOR EXAMPLE, THE ABILITY TO WITHSTAND LOSSES OR TO ADHERE TO A PARTICULAR TRADING PROGRAM IN SPITE OF TRADING LOSSES ARE MATERIAL POINTS WHICH CAN ALSO ADVERSELY AFFECT ACTUAL TRADING RESULTS. THERE ARE NUMEROUS OTHER FACTORS RELATED TO THE MARKETS IN GENERAL OR TO THE IMPLEMENTATION OF ANY SPECIFIC TRADING PROGRAM WHICH CANNOT BE FULLY ACCOUNTED FOR IN THE PREPARATION OF HYPOTHETICAL PERFORMANCE RESULTS AND ALL OF WHICH CAN ADVERSELY AFFECT ACTUAL TRADING RESULTS.

Asset Type	Benchmark	Nominal Exposure	Fx Exposure	Beta Volatility	Beta Ratio	Alpha Volatility	Alpha Ratio
Equities	U.S. Equities	15.0%	---	14.6%	0.25	---	---
Equities	U.S. Equities	15.0%	---	14.6%	0.25	5.0%	0.25
Equities	Dev. World Equities Ex-US	18.0%	Unhedged	14.7%	0.30	5.0%	0.30
Equities	Emerging Market Equities	3.0%	Unhedged	17.5%	0.25	5.0%	0.30
Nominal Bonds	U.S. Gov't Bonds	4.5%	---	3.8%	0.25	---	---
Nominal Bonds	U.S. Gov't Bonds	4.5%	---	3.8%	0.25	2.0%	0.25
Corporate Bonds	U.S. Corporate Bonds	5.0%	---	6.5%	0.30	3.0%	0.25
MBS	U.S. MBS	6.0%	---	3.9%	0.25	2.0%	0.25
IL Bonds	U.S. IL Bonds	1.0%	---	5.9%	0.25	---	---
IL Bonds	U.S. IL Bonds	1.0%	---	5.9%	0.25	1.0%	0.25
High Yield Bonds	U.S. High Yield	2.0%	---	10.9%	0.30	4.0%	0.25
Nominal Bonds	World Gov't Bonds Ex-US	2.0%	Hedged	3.6%	0.30	2.0%	0.30
Equities	U.S. PE / VC	9.0%	---	23.4%	0.25	10.0%	0.25
Real Estate	U.S. Real Estate	5.0%	---	18.5%	0.25	6.0%	0.25
Real Estate	World Real Estate	2.0%	Unhedged	17.3%	0.30	6.0%	0.30
Commodities	Bloomberg Commodity Index	2.0%	---	16.9%	0.20	---	---
Hedge Fund	Cash	5.0%	---	---	---	7.0%	0.70

ALL WEATHER ASSET MIX DISCLOSURE

All Weather Asset Mix Performance (Net of Fees)

	Total Return in USD
Last 1 Year	-2.6%
Last 3 Years	5.0%
Last 5 Years	3.6%
Last 7 Years	4.6%
Last 10 Years	9.3%

Annualized Returns (Jan-70 through Oct-18)

Net Since Inception Jan-70 through Oct-18

	Total Return in USD
Annualized Return	11.9%
Standard Deviation	10.6%
Sharpe Ratio	0.64

Standard deviation is calculated using gross of fees performance. Past results are not necessarily indicative of future results. HYPOTHETICAL PERFORMANCE RESULTS HAVE MANY INHERENT LIMITATIONS, SOME OF WHICH ARE DESCRIBED BELOW. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. IN FACT, THERE ARE FREQUENTLY SHARP DIFFERENCES BETWEEN HYPOTHETICAL PERFORMANCE RESULTS AND THE ACTUAL RESULTS SUBSEQUENTLY ACHIEVED BY ANY PARTICULAR TRADING PROGRAM.

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All Weather Asset Mix Simulation Performance Disclosure

Where shown all performance of the Bridgewater All Weather Asset Mix is based on simulated, hypothetical performance and not the returns of Bridgewater's All Weather strategy. Bridgewater's investment selection and trading strategies are systematic and rules-based. However, they are not fully automated and they do include human input. As a result, back-tested returns are designed based on assumptions about how Bridgewater would have implemented the All Weather Asset Mix, prior to its existence. These assumptions are intended to approximate such implementation, but are inherently speculative.

The simulated performance for the All Weather Asset Mix was derived by applying Bridgewater's current investment systems and portfolio construction logic to historical market returns across the markets selected for the All Weather Asset Mix. A table of the markets used appears below. We use actual market returns when available as an input for our hypothetical returns and otherwise use Bridgewater Associates' proprietary estimates, based on other available data and our fundamental understanding of asset classes. In certain cases, market data for an exposure which otherwise would exist in the simulation may be omitted if the relevant data is unavailable, deemed unreliable, immaterial or accounted for using proxies. Proxies are assets that existed and for which data is available, which Bridgewater believes would approximate returns for an asset that did not exist or for which reliable data is not available. For example, before reliable commodity futures returns data can be found Bridgewater estimates futures returns by using the spot commodity returns and their typical relationship to futures returns. Examples of omitted markets or accounted for using proxies include, but are not limited to, emerging market equities, emerging market debt, and certain commodities. The mix and weightings of markets traded for All Weather Asset Mix are subject to change in the future.

The All Weather Asset Mix maintains the desired strategic asset allocation and level of risk regardless of market conditions. Accordingly, the All Weather Asset Mix does not alter the desired strategy asset allocation and level of risk based on the strategic management process employed in the All Weather Strategy.

Simulated asset returns are subject to considerable uncertainty and potential error, as a great deal cannot be known about how assets would have performed in the absence of actual returns. The All Weather Asset Mix is an approximation of our current process but not an exact replication and may have differences including but not limited to the precise mix of markets used and the weights applied to those markets. It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology (including the addition/removal of asset classes) and the underlying market data. There is no guarantee that previous results would not be materially different. Future strategy changes could materially change previous simulated returns in order to reflect the changes accurately across time.

Transaction costs are accounted for and are estimates themselves based on historical measured costs and/or modeled costs. Actual transaction costs experienced could have been higher or lower than those reflected. Where noted, the All Weather Asset Mix net of fees returns have been calculated using our standard fee schedule for a minimum size account, which are the highest fees we have or would currently charge an account. Investment advisory fees are described in Bridgewater's ADV Part 2A. Gross of fees performance (i) excludes the deduction of management fees, and other operating expenses (the "fees and expenses") and (ii) includes the reinvestment of interest, gains and losses. Including the fees and expenses would lower performance. There is no guarantee regarding the All Weather Asset Mix's ability to perform in absolute returns or relative to any market in the future, during market events not represented or during market events occurring in the future. Market conditions and events vary considerably, are unpredictable and can have unforeseen impacts resulting in materially adverse results.

Markets included in the All Weather Asset Mix Simulation

The All Weather Asset Mix Simulation includes returns from the following markets: global nominal interest rates, global inflation linked bonds, emerging market credit spreads, corporate credit spreads, global equities, and commodities.

ALL WEATHER STRATEGY SIMULATION DISCLOSURE

All Weather Simulation Performance (Net of Fees)

	Total Return in USD
Last 1 Year	-1.6%
Last 3 Years	4.0%
Last 5 Years	2.8%
Last 7 Years	4.0%
Last 10 Years	8.3%

Annualized Returns (Jan-70 through Oct-18)

Net Since Inception Jan-70 through Oct-18

	Total Return in USD
Annualized Return	11.8%
Standard Deviation	10.1%
Sharpe Ratio	0.67

Standard deviation is calculated using gross of fees performance. Past results are not necessarily indicative of future results. HYPOTHETICAL PERFORMANCE RESULTS HAVE MANY INHERENT LIMITATIONS, SOME OF WHICH ARE DESCRIBED BELOW. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. IN FACT, THERE ARE FREQUENTLY SHARP DIFFERENCES BETWEEN HYPOTHETICAL PERFORMANCE RESULTS AND THE ACTUAL RESULTS SUBSEQUENTLY ACHIEVED BY ANY PARTICULAR TRADING PROGRAM.

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All Weather Strategy Simulation Performance Disclosure

From June 1996 to present, any performance shown will be based on the performance of the All Weather Strategy or a variation of the All Weather Strategy expressed in a different currency or volatility. For additional information about the characteristics of such returns, please refer to the relevant disclosure page provided at the end of the materials. Prior to June 1996, performance of the Bridgewater All Weather Strategy Simulation is based on simulated, hypothetical performance and not the actual returns of Bridgewater's All Weather Strategy. Bridgewater's investment selection and trading strategies are systematic and rules-based. However, they are not fully automated and they do include human input. As a result, back-tested returns are designed based on assumptions about how Bridgewater would have implemented the All Weather Strategy, prior to its existence. These assumptions are intended to approximate such implementation, but are inherently speculative.

The simulated performance for the All Weather Strategy Simulation was derived by applying Bridgewater's current investment systems and portfolio construction logic to historical market returns across the markets selected for the All Weather Strategy Simulation. A list of the markets used appears below. We use actual market returns when available as an input for our hypothetical returns and otherwise use Bridgewater Associates' proprietary estimates, based on other available data and our fundamental understanding of asset classes. In certain cases, market data for an exposure which otherwise would exist in the simulation may be omitted if the relevant data is unavailable, deemed unreliable, immaterial or accounted for using proxies. Proxies are assets that existed and for which data is available, which Bridgewater believes would approximate returns for an asset that did not exist or for which reliable data is not available. For example, before reliable commodity futures returns data can be found Bridgewater estimates futures returns by using the spot commodity returns and their typical relationship to futures returns. Examples of omitted markets or accounted for using proxies include, but are not limited to, emerging market equities, emerging market debt, and certain commodities. The mix and weightings of markets traded for All Weather Strategy Simulation are subject to change in the future.

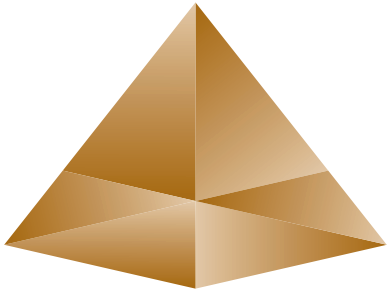
The All Weather Strategy Simulation includes periodic adjustments that are made to the All Weather Strategy Simulation's desired strategic asset allocation and level of risk pursuant to Bridgewater's systematic strategic management process. Such strategic management is based on a systematic process that assesses whether the assumptions underlying the All Weather Strategy (that assets will outperform cash, and that assets can be reasonably balanced against each other) are under threat, and systematically adjusts or reduces exposures accordingly. When applicable, the returns of the All Weather Strategy Simulation reflect adjustments based on this systematic strategic management process.

Simulated asset returns are subject to considerable uncertainty and potential error, as a great deal cannot be known about how assets would have performed in the absence of actual returns. The All Weather Strategy Simulation is an approximation of our current process but not an exact replication and may have differences including but not limited to the precise mix of markets used and the weights applied to those markets. It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology (including the addition/removal of asset classes) and the underlying market data. There is no guarantee that previous results would not be materially different. Future strategy changes could materially change previous simulated returns in order to reflect the changes accurately across time.

Transaction costs are accounted for and are estimates themselves based on historical measured costs and/or modeled costs. Actual transaction costs experienced could have been higher or lower than those reflected. Where noted, the All Weather Strategy Simulation net of fees returns have been calculated using our standard fee schedule for a minimum size account, which are the highest fees we have or would currently charge an account. Investment advisory fees are described in Bridgewater's ADV Part 2A. Gross of fees performance (i) excludes the deduction of management fees, and other operating expenses (the "fees and expenses") and (ii) includes the reinvestment of interest, gains and losses. Including the fees and expenses would lower performance. There is no guarantee regarding the All Weather Strategy Simulation's ability to perform in absolute returns or relative to any market in the future, during market events not represented or during market events occurring in the future. Market conditions and events vary considerably, are unpredictable and can have unforeseen impacts resulting in materially adverse results.

Markets included in the All Weather Strategy Simulation

The All Weather Strategy Simulation includes returns from the following markets: global nominal interest rates, global inflation linked bonds, emerging market credit spreads, corporate credit spreads, global equities, and commodities.



SANDS CAPITAL

Alaska Retirement Management Board

December 14, 2018

Emerging Markets Growth

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SANDS CAPITAL

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Our Mission

Sands Capital exists to add value and enhance the wealth of our clients with prudence over time.

Why Partner with Sands Capital?

Results-Oriented

Demonstrated record of alpha generation over most full market cycles

Client-Focused

Commitment to independence and exclusive focus on growth investing allows for meaningful alignment of long-term interests

Criteria-Driven

Integrated, collaborative, and transparent global research process drives concentrated, conviction-weighted portfolios

What Distinguishes Sands Capital?

1. Exclusive focus on owning leading *growth* businesses
2. Long-term investment horizon
3. Deep, proprietary, business-focused global research
4. Concentrated investment approach
5. Risk management from a business owner's perspective
6. Independence, size, and stability
7. Continuity of investment process and personnel
8. Our only business is investment management

Firm Overview

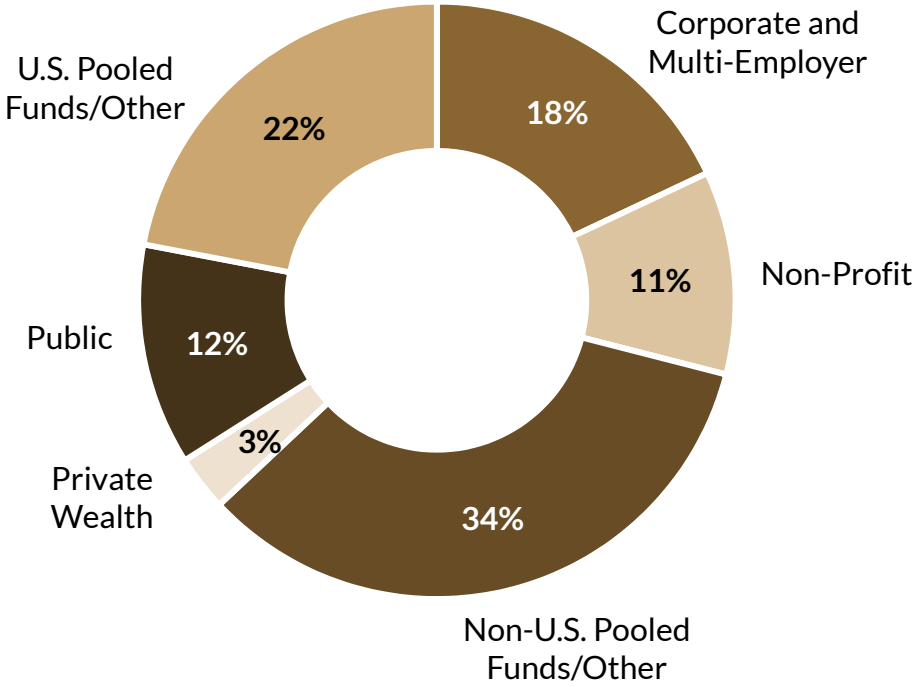
We are staff-owned, committed to our independence, and we do only one thing: growth investing

Founded: **1992**	Total Staff: **118**	Investment Style: **Concentrated Growth**
Ownership: **100% Staff Owned**	Investment Team: **40**	Investment Process: **Independent, Bottom-up, Research-driven**

Assets by Client Type (As of 9/30/18)

Total Assets Under Management Approximately $42.7B

Select Growth: $21.4B	Global Growth: $16.9B
Emerging Markets Growth: $3.0B	Global Leaders: $396.7M



Representative Clients

Corporate and Multi-Employer
- Con Edison
- General Mills
- Halliburton

Non-Profit
- National Gallery of Art
- Sutter Health
- Wheaton College

Pooled Funds/Other
- Alberta Investment Management Corporation
- Lombard Odier
- MLC (National Australia Bank)
- Touchstone Investments

Public
- District of Columbia Retirement Board
- Minnesota State Board of Investment
- San Francisco Employees' Retirement System

Total staff and investment team figures are as of 9/30/18. Sands Capital Management selected institutional, fully discretionary, equity accounts which are indicative of the various types and locales of its client base for inclusion in this Representative Client List. The client's consent to be included on this list should not be construed as approval or disapproval by these clients of Sands Capital Management or its advisory services.

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Investment Strategies and Results (As of 9/30/18)

	Inception Date	Strategy Assets	Results	3Q18	YTD	1 Year	Annualized 3 Years	Annualized 5 Years	Annualized 10 Years	Annualized Since Inception
Select Growth	2/29/92	$21.4B	*Gross (%)*	6.9	29.9	34.9	22.4	15.5	17.9	13.2
			Net (%)	6.7	29.4	34.3	21.8	14.9	17.3	12.6
Russell 1000® Growth Index				9.2	17.1	26.3	20.6	16.6	14.3	9.5
Gross Value Added (bps)				*-230*	*1,280*	*860*	*180*	*-110*	*360*	*370*
Global Growth	12/31/08	$16.9B	*Gross (%)*	2.0	11.5	17.3	20.5	12.6	—	21.0
			Net (%)	1.8	10.8	16.3	19.5	11.7	—	19.9
MSCI All Country World Index				4.3	3.8	9.8	13.4	8.7	—	11.3
Gross Value Added (bps)				*-230*	*770*	*750*	*710*	*390*	—	*970*
Global Leaders	3/31/17	$0.4B	*Gross (%)*	6.6	15.7	23.0	—	—	—	25.9
			Net (%)	6.4	15.0	22.0	—	—	—	24.8
MSCI All Country World Index				4.3	3.8	9.8	—	—	—	13.2
Gross Value Added (bps)				*230*	*1,190*	1,320	—	—	—	1,270
Emerging Markets Growth	12/31/12	$3.0B	*Gross (%)*	-9.7	-8.3	-3.8	12.6	6.6	—	7.4
			Net (%)	-10.0	-9.1	-5.0	11.2	5.2	—	6.1
MSCI Emerging Markets Index				-1.1	-7.7	-0.8	12.4	3.6	—	2.3
Gross Value Added (bps)				*-860*	*-60*	*-300*	*20*	*300*	—	*510*

The investment results shown are gross and net of advisory fees and reflect the reinvestment of dividends and any other earnings. Gross of fee returns do not reflect the deduction of investment advisory fees and any other costs incurred in the management of an account. Investment results presented are that of the Tax-Exempt Institutional Equity Composite, Global Growth Equity Composite, Global Leaders Equity Composite, and Emerging Markets Growth Composite. GIPS®-compliant presentations and additional disclosures for the related composites may be found at http://sandscapital.com/media/Sands_Capital_Annual_Disclosure_Presentation.pdf or at the end of this presentation. Past performance is not indicative of future results. Source: SCM, MSCI, FTSE Russell.

SCMISR0918

Global Research Team

Frank M. Sands, CFA
Chief Investment Officer
Chief Executive Officer
Joined Sands Capital in 2000

Frank M. Sands, Sr., CFA
Chairman Emeritus
Founder
Founded Sands Capital in 1992

EMERGING MARKETS GROWTH

Brian A. Christiansen, CFA
Joined Sands Capital in 2006

Ashraf A. Haque
Joined Sands Capital in 2008

Neil Kansari
Joined Sands Capital in 2008

SELECT GROWTH

Wesley A. Johnston, CFA
Joined Sands Capital in 2004

Frank M. Sands, CFA
Joined Sands Capital in 2000

A. Michael Sramek, CFA
Joined Sands Capital in 2001

Thomas H. Trentman, CFA
Joined Sands Capital in 2005

GLOBAL GROWTH

David E. Levanson, CFA
Re-joined Sands Capital in 2002

Sunil H. Thakor, CFA
Joined Sands Capital in 2004

T. Perry Williams, CFA
Joined Sands Capital in 2004

GLOBAL LEADERS

Sunil H. Thakor, CFA
Joined Sands Capital in 2004

CONSUMER

Davis M. Catlin, CFA
Sr. Research Analyst

Matthew W. Luneburg, CFA
Research Analyst

Eric M. Burns, CFA
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Massimo Marolo, CFA
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Christina Hang
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Hari Manikandan
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FINANCIAL SERVICES

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Teeja Boye, CFA
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Research Analyst

Eric C. Black
Sr. Research Associate

Danielle J. Menichella, CFA
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Quinlan S. Smith
Research Associate

LIFE SCIENCES

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Daniel H. Cheng
Research Analyst

Job Taylor, PhD
Research Analyst

Michael J. Ginder, CFA
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Sarah E. Olijar
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Michael J. Clarke
Portfolio Manager, Sr. Research Analyst

Daniel Pilling
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Andrew C. Gavlin
Research Associate

Barron B. Martin, Jr., CFA
Sr. Research Analyst

Judy D. Jiao, CFA
Sr. Research Associate

Gordon G. McAlister
Research Associate

Thomas H. Trentman, CFA
Portfolio Manager, Sr. Research Analyst

Thomas A. Rogers, CFA
Sr. Research Associate

Emerson F. Bluhm, CFA
Research Analyst

Mindy Y. Wan, CFA
Sr. Research Associate

OTU-SCMTEAM1118

Investment Philosophy

"As long-term investors, we buy leading growth businesses…we do not trade stocks."

—Frank M. Sands, Sr., Founder

We believe that over time common stock prices will reflect the earnings power and growth of the underlying businesses. To be successful we must:

- Identify the few truly exceptional businesses with sustainable growth.
- Construct a concentrated conviction-weighted portfolio.
- Accept short-term market volatility in exchange for long-term wealth creation.

Investment Strategy

The cornerstone of our investment strategy is our proprietary global research: fundamental, bottom-up, and business-focused.

We seek to identify leading growth businesses that meet the following criteria:

1. **Sustainable above-average earnings growth**
2. Leadership position in a promising business space
3. Significant competitive advantages/unique business franchise
4. Clear mission and value-added focus
5. Financial strength
6. Rational valuation relative to the market and business prospects

Research Process

The objective of our research effort is to identify great wealth-creating businesses and determine if they meet our six investment criteria.

Evolution of New Opportunities

1 IDEA GENERATION

Sourcing Activities

Industry Focused:

- In-house sector expertise
- Strategic landscape analysis
- Extensive travel to key markets
- Read industry and trade periodicals
- Attend industry conferences
- Conduct quantitative screens and analysis

Company Focused:

- Meet with company management teams
- Analyze company filings

2 PRELIMINARY REVIEW

Review Activities

- Initial review relative to six investment criteria
- Identify key questions and research focus
- Review with PM Team and establish priorities
- Add to "new opportunities list" (10-20 companies)

3 RESEARCH & ANALYSIS

Research Activities

- Conduct "deep dive" to expand initial evaluation
- Interview vendors, suppliers, competitors, customers, and industry experts
- Meet with company management team
- Travel to relevant markets, visit stores, test products, etc.
- Review public filings and Street research

Identify and Assess:

- Key drivers and metrics for business/industry
- Company-specific risks

Develop:

- Written investment case relative to six investment criteria
- Proprietary financial model and scenario analysis
- Hypothetical "sell case"

4 DISCUSSION & DEBATE

Evaluation Activities

- Analyst, Sector Team, and PM Team assess strength/fit with six investment criteria
- Identify additional research needs
- Iterative process
- Recommendation made to PM Team

5 INVESTMENT DECISION

Decision Activities

- Final decision to purchase, pass, or monitor is made by PM Team
- Portfolio-level risk and exposure assessment
- Portfolio weight decision

6 MONITORING EXISTING HOLDINGS

Continuous Research & Assessment

- Build cumulative knowledge over time using long-term lens
- Continuously:
  - Check in with value chain, experts, and users
  - Monitor company events and earnings
  - Conduct field research to identify new insights
  - Perform anticipatory, proactive research
- Company/model reviews
- Sector reviews
- Devil's advocate

SELL DISCIPLINE

Key Drivers

- Significant change in fundamentals
- Flaw in original investment case
- Meaningful overvaluation vs. underlying business
- Funding source for a new opportunity
- Risk management decision

SCMPROC0816

Principle-Based Risk Management Process

The primary risk we seek to manage is the risk of a permanent loss of capital resulting from a negative business or investment outcome. Risk management is integrated throughout our entire research and portfolio construction process.

Key Sources of Risk

These are general risk management principles the implementation of which is subject to the discretion of the Sands Capital Management and clients' specific portfolio mandates. No assurance can be given that the investment objective of the portfolio will be achieved. Past performance is not an indication of future results.

SCMRISK0313

Applying Our Investment Criteria to Emerging Markets

Our criteria typically lead us to growth businesses benefitting from local demand.

Emerging Markets Growth

Representative Secular Drivers

Rise of Internet Penetration

- Ecommerce
- Search
- Online Gaming
- Payments
- Online-to-Offline/Local Services
- Cloud Computing
- Online Travel Booking

Retail Formalization

- Food Retail
- Pharmacy and Personal Care
- Convenience Stores
- Food Outside the Home

Hard and Soft Infrastructure

- Personal Finance/Credit
- Healthcare
- Energy, Engineering, and Construction
- Port Infrastructure Development

The companies illustrated represent a sub-set of the holdings in the Emerging Markets Growth portfolio. These companies were chosen because they are the best examples of the holdings in the Emerging Markets Growth portfolio benefitting from the secular growth trends listed. The views expressed represent the opinions of SCM and are not intended as a forecast, a guarantee of future results, investment recommendations, or an offer to buy or sell any securities. There is no assurance that any securities listed will remain in the portfolio. A company's fundamentals or earnings growth is no guarantee that its share price will increase. The views expressed were current as of the date indicated and are subject to change. Company logos and website images are used for illustrative purposes only and were obtained directly from the company websites. Company logos and website images are trademarks or registered trademarks of their respective owners and use of a logo does not imply any connection between Sands Capital and the company. GIPS®-compliant presentations and additional disclosures for the related composites may be found at http://sandscapital.com/media/Sands_Capital_Annual_Disclosure_Presentation.pdf or at the end of this presentation.

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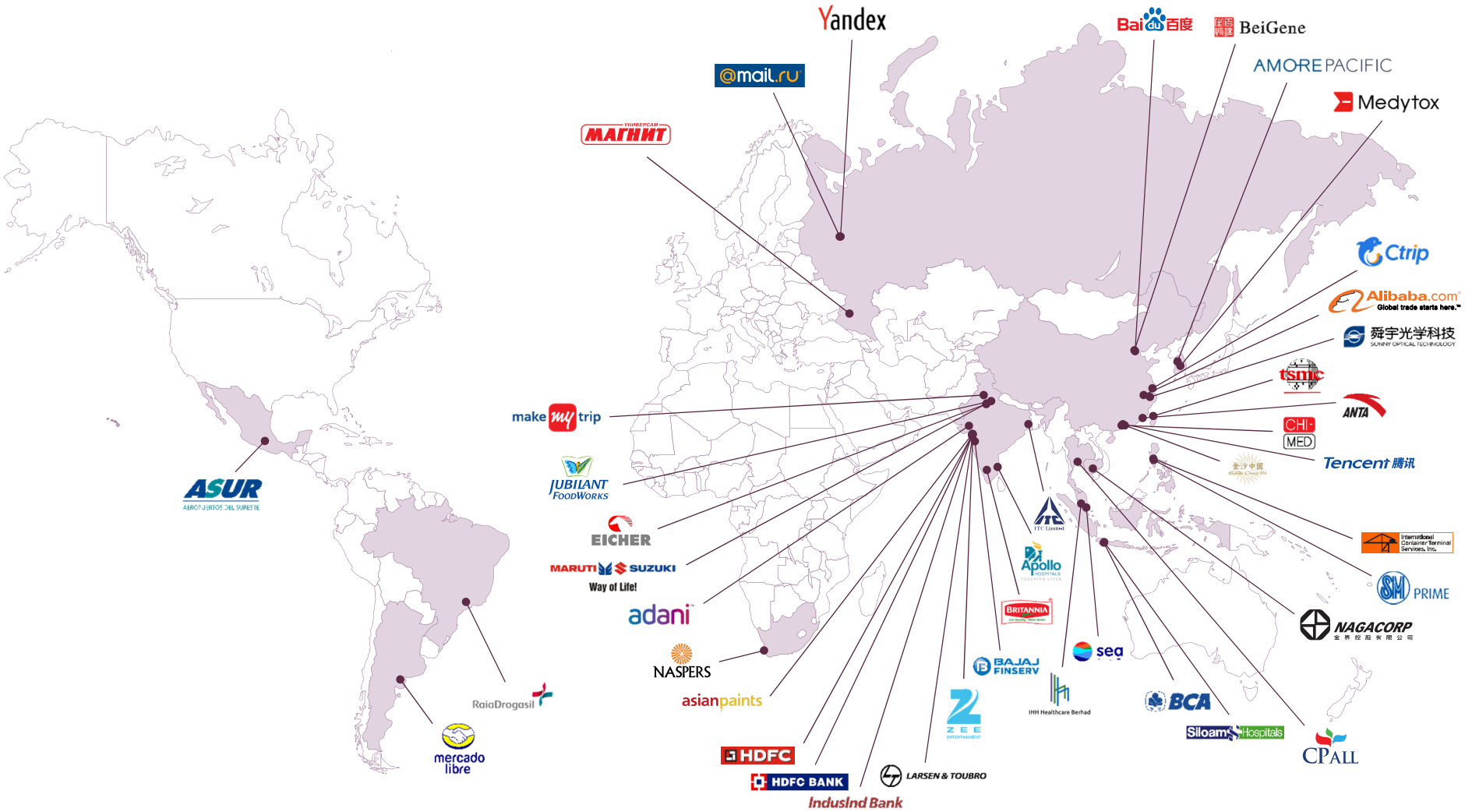
Our Emerging Markets Growth Portfolio (As of 9/30/18)

Our approach to investment research, portfolio construction, and risk management should result in a portfolio of high-quality, leading growth businesses located around the world.



The above information is that of the Emerging Markets Growth Composite. Company logos and website images are used for illustrative purposes only and were obtained directly from the company websites. Company logos and website images are trademarks or registered trademarks of their respective owners and use of a logo does not imply any connection between Sands Capital and the company. GIPS®-compliant presentations and additional disclosures for the related composites may be found at http://sandscapital.com/media/Sands_Capital_Annual_Disclosure_Presentation.pdf or at the end of this presentation.

EMGPORT0918

Sector Comparison and Portfolio Characteristics (As of 9/30/18)

GICS Sector	Company	SCM Business Space	Domicile	Portfolio (%)		MSCI EM (%)	
Consumer Discretionary	Anta Sports Products	Textile Apparel and Luxury Goods	China	3.1	**25.4**	0.1	**9.0**
	Ctrip[1]	Online Travel Reservation Service	China	3.6		0.3	
	Eicher Motors	Consumer Automobiles	India	1.5		0.1	
	Jubilant Foodworks	Quick Service Restaurants	India	3.2		n/a	
	MakeMyTrip	Online Travel Services	India	2.2		n/a	
	Maruti Suzuki	Automobile Manufacturing	India	1.2		0.2	
	NagaCorp	Integrated Casino Resort Development	Cambodia	2.1		n/a	
	Naspers	Satellite TV, Online Communications, and Ecommerce	South Africa	4.4		1.8	
	Sands China	Integrated Casino Resort Development	China	2.3		n/a	
	Zee Entertainment	Media	India	1.8		0.1	
Consumer Staples	Amorepacific	Cosmetics and Personal Care Products	Korea	1.7	**8.4**	0.1	**6.6**
	Britannia	Packaged Foods	India	1.1		0.0	
	CP All	Food Retail	Thailand	2.5		0.2	
	ITC	Tobacco, Paper, Consumer Goods, and Hotels	India	1.1		0.3	
	Magnit	Food Retail	Russia	0.6		0.1	
	Raia Drogasil	Pharmacy Retail	Brazil	1.4		0.1	
Energy					**—**		**8.2**
Financials	Bajaj Finance	Consumer Durables Financing	India	1.3	**11.5**	0.1	**23.2**
	Bank Central Asia	Diversified Banking and Financial Services	Indonesia	1.7		0.3	
	HDFC Bank	Commercial Banks	India	2.9		n/a	
	Housing Development Finance	Mortgage Financing and Financial Services	India	3.3		0.7	
	IndusInd Bank	Banking Operations and Services	India	2.3		n/a	
Health Care	Apollo Hospitals	Hospital Owner/Operator, Pharmacy Owner/Operator	India	2.6	**7.4**	n/a	**3.0**
	BeiGene[1]	Biotech Therapeutic Drugs	U.S.	0.5		n/a	
	Hutchison China MediTech[1]	Biotech Therapeutic Drugs	China	0.5		n/a	
	IHH Healthcare	Hospital Owner and Operator	Malaysia	0.3		0.1	
	Medy-Tox	Pharmaceuticals	Korea	3.4		0.0	
	Siloam International Hospitals	Hospital Owner and Operator	Indonesia	0.1		n/a	
Industrials	Adani Ports	Port Operations and Services	India	2.4	**7.7**	0.0	**5.4**
	Grupo Aeroportuario del Sureste	Airport Development and Operations	Mexico	2.2		0.1	
	International Container	Ports and Terminals Operations	Philippines	1.3		0.0	
	Larsen & Toubro	Engineering and Construction	India	1.8		0.2	
Information Technology	Alibaba[1]	Internet Retail	China	8.5	**33.2**	3.7	**26.9**
	Baidu[1]	Internet Search and Media	China	4.2		1.2	
	Mail.ru	Internet Communications and Entertainment	Russia	1.6		n/a	
	MercadoLibre	Online Marketplace and Payment Service	Argentina	3.0		n/a	
	Sea	Internet Software and Services	Singapore	1.2		n/a	
	Sunny Optical Technology	Electronic Equipment Instruments and Components	China	1.6		0.2	
	Taiwan Semiconductor[1]	Semiconductors and Semiconductor Equipment	Taiwan	2.9		4.1	
	Tencent	Internet Communications and Entertainment	China	5.7		4.5	
	Yandex	Internet Search and Media	Russia	4.5		n/a	
Materials	Asian Paints	Paints and Chemicals	India	1.3	**1.3**	0.1	**7.9**
Real Estate	SM Prime	Real Estate Management and Development	Philippines	1.4	**1.4**	0.1	**2.9**
Telecommunication Services					**—**		**4.5**
Utilities					**—**		**2.4**
[Cash]					**3.7**		**—**

Key Portfolio Metrics

	EMG	MSCI EM
Number of Holdings	42	1,151
Number of Countries	15	24
Top 10 Holdings	44%	24%
Active Share[2]	84%	n/a
Weighted Avg. Market Cap ($B)	86.7	87.3
Median Market Cap ($B)	12.8	6.0
Consensus Long-Term EPS Growth Forecast[3]	18%	14%
Forward P/E – Next 12 mos.	24x	11x

[1] ADRs. [2] Active Share represents the share of portfolio holdings that differ from the benchmark, with 0% meaning perfect index replication and 100% indicating pure active management. [3] SCM's internal weight adjusted long-term EPS growth forecast is 25%, which can meaningfully differ from consensus due to different expectations and/or lack of consensus coverage.

Data presented is that of the Emerging Markets Growth Composite ("EMGC"). Forward earnings projections are not predictors of stock price or investment performance, and do not represent past performance. There is no guarantee that the forward earnings projections will accurately predict the actual earnings experience of any of the companies involved, and no guarantee that owning securities of companies with relatively high price to earnings ratios will cause the portfolio to outperform its benchmark or index. The index represented will differ in characteristics, holdings, and sector weightings from that of the composite. GIPS®-compliant presentations and additional disclosures for the related composites may be found at http://sandscapital.com/media/Sands_Capital_Annual_Disclosure_Presentation.pdf or at the end of this presentation. Source: Factset, SCM, MSCI.

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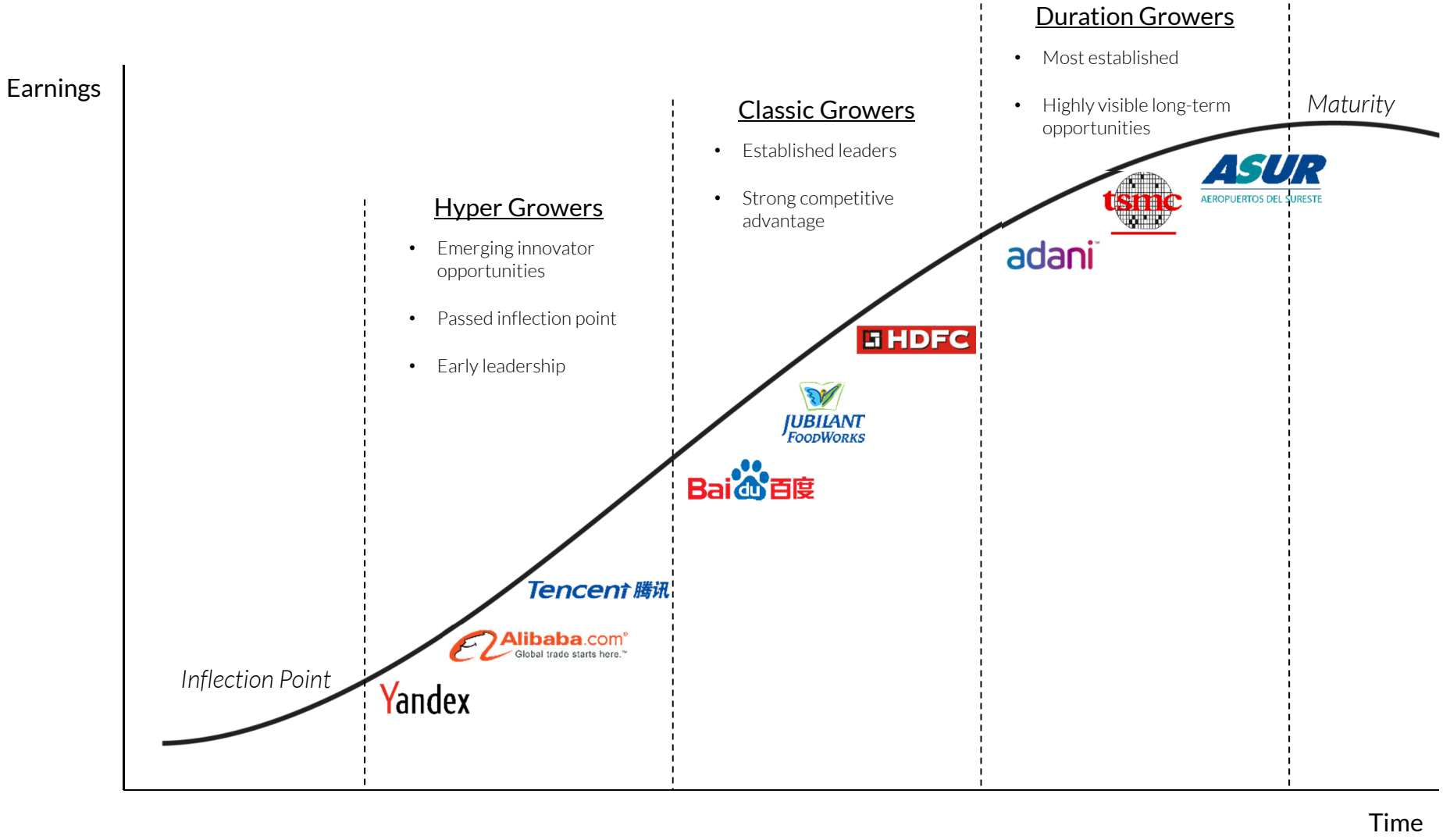
Focus on Sustainable Growth Over Life Cycle



The companies illustrated represent a subset of the Emerging Markets Growth portfolio. There is no assurance that any security listed will remain in the portfolio. These examples were selected based on their sectors and SCM's assessment of where each company is within the lifecycle. This assessment of each business is based on SCM's estimate of its long-term market opportunity, the degree to which that market opportunity has been penetrated, the company growth rate, and the market growth rate, among other factors. Company logos and website images are used for illustrative purposes only and were obtained directly from the company websites. Company logos and website images are trademarks or registered trademarks of their respective owners and use of a logo does not imply any connection between Sands Capital and the company. GIPS®-compliant presentations and additional disclosures for the related composites may be found at http://sandscapital.com/media/Sands_Capital_Annual_Disclosure_Presentation.pdf or at the end of this presentation.

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Portfolio Exposures—By Region and Country of Domicile[1] (As of 9/30/18)

Emerging Markets Growth (EMG)

MSCI Emerging Markets Index (MSCI EM)

Region	EMG	MSCI EM
Emerging Asia	69.3	47.4
Developed Asia ex Japan	9.3	27.2
Europe	6.8	6.3
Latin America	6.5	11.3
Middle East & Africa	4.4	7.8

Country	EMG	MSCI EM
India	30.1	8.5
China	30.0	31.0
Philippines	2.6	1.0
Thailand	2.5	2.5
Cambodia	2.0	—
Indonesia	1.8	1.9
Malaysia	0.3	2.4
Pakistan	—	0.1
Korea	5.1	14.9
Taiwan	2.9	12.3
Singapore	1.3	—
Russia	6.8	3.7
Poland	—	1.2
Turkey	—	0.6
Hungary	—	0.3
Greece	—	0.3
Czech Republic	—	0.2
Argentina	3.0	—
Mexico	2.2	3.2
Brazil	1.3	6.2
Chile	—	1.1
Peru	—	0.4
Colombia	—	0.4
South Africa	4.4	6.1
Qatar	—	0.9
UAE	—	0.7
Egypt	—	0.1

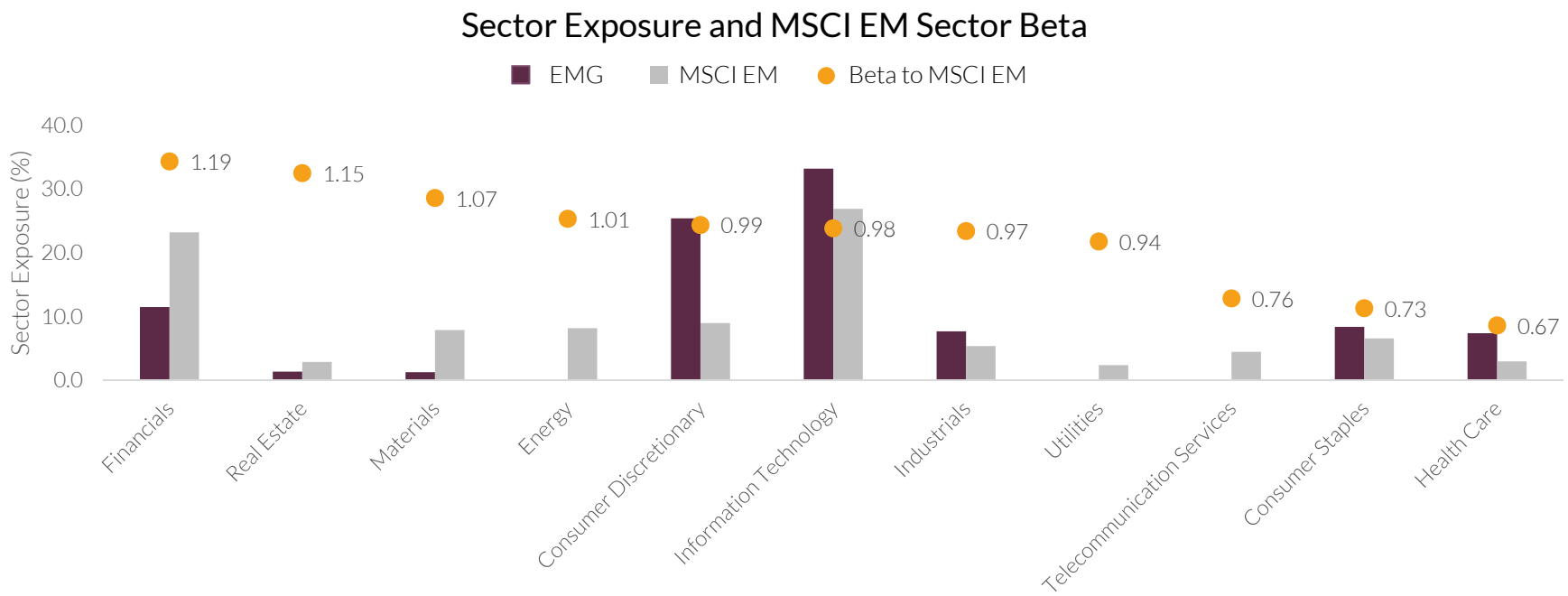
[1] Figures are presented as a percentage. EMG contains 3.7% cash.

Based on the Sands Capital Management Emerging Markets Growth Composite. The index represented will differ in characteristics, holdings, and sector weightings from that of the composite. The index does not contain cash. GIPS®-compliant presentations and additional disclosures for the related composites may be found at http://sandscapital.com/media/Sands_Capital_Annual_Disclosure_Presentation.pdf or at the end of this presentation. Source: SCM, MSCI.

EMGEXP0918

Risk Statistics – EMG vs. MSCI EM (As of 9/30/18)

Our investment criteria tend to lead us away from higher-beta sectors such as energy and materials.



5 Year Risk Statistics – EMG vs. MSCI EM

Beta	Annualized Up Capture Ratio	Annualized Down Capture Ratio	Max Drawdown
0.85	91.3 %	82.5 %	-18.1 % EMG vs. -22.1 % MSCI EM

"EMG" represents the Emerging Markets Growth Composite ("EMGC"). EMGC returns were used to calculate all statistics shown and are net of advisory fees and reflect the reinvestment of dividends and any other earnings. The MSCI Emerging Markets Index ("MSCI EM") is a free float-adjusted market capitalization weighted index designed to measure the equity market performance of emerging markets. EMGC may hold securities not included in the MSCI EM. Sectors are based on GICS classifications.

Beta is a measure of an asset's risk in relation to the market, as typically represented by a broad index. Annualized Up Capture Ratio is a measure of the manager's performance during phases of positive benchmark returns. Annualized Down Capture Ratio is a measure of the manager's performance during phases of negative benchmark returns. Max Drawdown is the maximum of the peak-to-trough declines during a specific period.

GIPS®-compliant presentations and additional disclosures for the related composites may be found at http://sandscapital.com/media/Sands_Capital_Annual_Disclosure_Presentation.pdf or at the end of this presentation. Investment cannot be made directly in an index. Past performance is not indicative of future results. The chart above is shown for illustrative purposes only and is not intended as a forecast, guarantee of future results, investment recommendation, or an offer to buy or sell any securities. Characteristics and sector exposure are subject to change and should not be considered as recommendations. Source: SCM, MSCI.

EMGRISK0918

Portfolio Guidelines and Construction

A concentrated and conviction-weighted portfolio based on fit with our six investment criteria is the primary source of value added.

Guidelines

Number of Holdings:	30-50
Position Size:	Average of 2-3%; maximum of 6-8%
Turnover:	Low
Sector Exposure:*	Outcome of research process; monitor exposure to revenue drivers at portfolio level
Currency:	Not actively managed
Cash Position:	Residual
Benchmark:	MSCI Emerging Markets Index

Construction

* As defined by GICS.
Information presented is a high-level summary, which has been condensed and aggregated and is inherently limited.

EMGGUIDECONST0315

Why Partner with Sands Capital?

Results-Oriented

Demonstrated record of alpha generation over most full market cycles

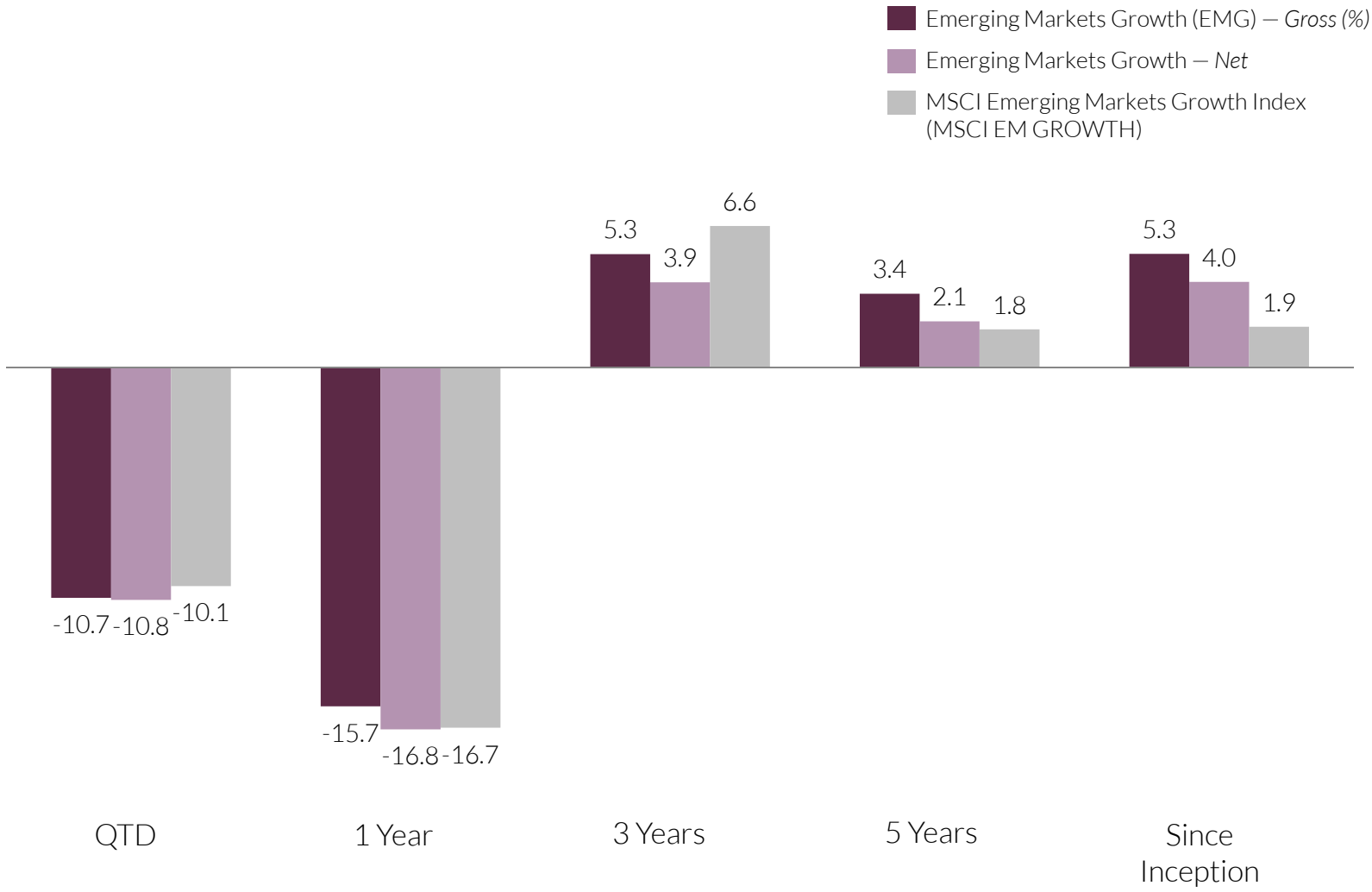
Client-Focused

Commitment to independence and exclusive focus on growth investing allows for meaningful alignment of long-term interests

Criteria-Driven

Integrated, collaborative, and transparent global research process drives concentrated, conviction-weighted portfolios

EMG Investment Results vs. MSCI EM GROWTH[1] (As of 10/31/18)



[1]Periods greater than one year are annualized.

Inception date is December 31, 2012. The investment results shown are gross and net of advisory fees and reflect the reinvestment of dividends and any other earnings. Gross of fee returns do not reflect the deduction of investment advisory fees, and any other costs incurred in the management of an account. Investment results are that of the Emerging Markets Growth Composite. GIPS®-compliant presentations and additional disclosures for the related composites may be found at http://sandscapital.com/media/Sands_Capital_Annual_Disclosure_Presentation.pdf or at the end of this presentation. Past performance is not indicative of future results. Source: SCM, MSCI.

EMGINVR(NET)1018

Investment Results

Emerging Markets Growth (EMG) — *Gross and Net (%)*

As of October 31, 2018

	EMG Gross	EMG Net	MSCI EM GROWTH Index	Relative Value Added (Gross, bps)	Cumulative Value Added (Gross, bps)
2013	14.0	12.6	-0.2	1,420	1,420
2014	7.0	5.7	-0.4	740	2,260
2015	-7.8	-8.9	-11.3	350	2,440
2016	3.8	2.5	7.6	-380	2,200
2017	40.8	39.1	46.8	-600	2,530
2018YTD	-18.1	-18.9	-20.0	190	2,330
1Q	3.8	3.5	1.2	260	2,980
2Q	-2.1	-2.4	-7.0	490	3,610
3Q	-9.7	-10.0	-5.4	-430	2,690
4QTD	-10.7	-10.8	-10.1	-60	2,330
Cumulative Since Inception (12/31/12 – 10/31/18)	34.8	25.4	11.5	2,330	
Annualized Since Inception	**5.3**	**4.0**	**1.9**	**340**	

The investment results shown are gross and net of advisory fees and reflect the reinvestment of dividends and any other earnings. Gross of fee returns do not reflect the deduction of investment advisory fees, and any other costs incurred in the management of an account. Investment results are that of the Emerging Markets Growth Composite. GIPS®-compliant presentations and additional disclosures for the related composites may be found at http://sandscapital.com/media/Sands_Capital_Annual_Disclosure_Presentation.pdf or at the end of this presentation. Past performance is not indicative of future results. Source: SCM, MSCI.

EMGIR(NET)1018

Significant Transactions

Emerging Markets Growth Portfolio

April 1, 2018 – September 30, 2018

	Purchases	SCM Sector	Sales	SCM Sector
2Q18			Netshoes (NETS-US)	Consumer
3Q18	Bajaj Finance (500034-IN)	Financial Services	Avenue Supermarts (540376-IN)	Consumer
	BeiGene (BGNE)	Life Sciences	Credicorp (BAP)	Financial Services
	Hutchison China MediTech (HCM)	Life Sciences		

The securities identified represent new securities purchased and sold within the prior six month period but do not include weight changes. The list above does not include in progress purchase investment actions. Upon request, a complete list of securities purchased and sold in the Sands Capital Emerging Markets Growth Composite will be provided. It should not be assumed that these holdings were or will be profitable. GIPS®-compliant presentations and additional disclosures for the related composites may be found at http://sandscapital.com/media/Sands_Capital_Annual_Disclosure_Presentation.pdf or at the end of this presentation.

EMGSTS0918

Investment Professionals — *Emerging Markets Growth Portfolio Management Team*

Brian A. Christiansen, CFA
Sr. Portfolio Manager, Research Analyst,
Executive Managing Director
Joined Sands Capital in 2006

Research Analyst (2008-2013)
Research Associate (2006-2008)

Yale University
MBA, School of Management (2009)
BA, Economics (2005)

Ashraf A. Haque
Sr. Portfolio Manager, Research Analyst
Joined Sands Capital in 2008

Research Analyst (2008-2013)

Chesapeake Partners (2007-2008)
Baltimore, MD • Investment Analyst

McKinsey & Company (2003-2005)
Chicago, IL • Business Analyst

GH Smart & Company (2001-2003)
Chicago, IL • Director, Business Development

Harvard University
MBA, Harvard Business School (2007)

Northwestern University
BA, Mathematical Methods in the Social Sciences
and Economics (2001)

Neil Kansari
Sr. Portfolio Manager, Research Analyst
Joined Sands Capital in 2008

Research Analyst (2008-2013)

PRTM, part of PricewaterhouseCoopers LLP (2002-2006)
Waltham, MA • Associate, Sr. Business Analyst

University of Virginia (1999-2002)
Charlottesville, VA • Graduate Research Assistant,
Department of Electrical Engineering

Millennium Solutions; Universal Impex (1997-1999)
Mumbai, India • Application Analyst

Mahajan & Aibara: Shah Gupta & Co. (1996-1997)
Mumbai, India • Accounting Trainee

University of Virginia
MBA, Darden School (2008)
MS, Electrical Engineering (2002)

University of Mumbai (Bombay)
BE, Electronics Engineering (1996)

Investment Professionals

Emerson F. Bluhm, CFA
Research Analyst
Joined Sands Capital in 2010

Sr. Research Associate (2012-2014)
Research Associate (2010-2011)

Washington & Lee University
BS, Accounting and Business Administration (2009)

Teeja Boye, CFA
Research Analyst
Joined Sands Capital in 2014

Research Intern (2014)

Insparo Asset Management (2008-2013)
London, UK • Investment Analyst

UBS (2006-2008)
London, UK • Associate Analyst

London School of Economics
BSc, Economics and Economic History (2006)

Davis M. Catlin, CFA
Sr. Research Analyst
Joined Sands Capital in 2007

Research Analyst (2010-2017)
Research Associate (2007-2010)

Columbia University
MBA, Columbia Business School (2013)

London Business School
MBA, London Business School (2013)

Washington & Lee University
BS, Business Administration (2007)

Daniel H. Cheng
Research Analyst
Joined Sands Capital in 2013

Stifel Equity Research (2011-2013)
New York, NY • Senior Associate

Johnson & Johnson/Centocor (2009-2011)
Horsham, PA • Financial Analyst

Analysis Group, Inc. (2004-2007)
Los Angeles, CA • Economic Consultant

Non-Profit Outreach (2002-2004)
Anaheim, CA • Project Coordinator

University of Pennsylvania
MBA, Finance, The Wharton School of Business (2009)

University of California, Berkley
BS, Business Administration, Haas School (2002)

Brian A. Christiansen, CFA
Sr. Portfolio Manager, Research Analyst,
Executive Managing Director
Joined Sands Capital in 2006

Research Analyst (2008-2013)
Research Associate (2006-2008)

Yale University
MBA, School of Management (2009)
BA, Economics (2005)

Michael J. Clarke
Portfolio Manager, Sr. Research Analyst
Joined Sands Capital in 2011

Portfolio Manager, Research Analyst (2013-2016)
Research Analyst (2011-2013)

FBR Capital Markets (2007-2011)
Arlington, VA • Senior Associate

Greenberg Traurig, LLP (2003-2005)
Washington, DC • Case Law Manager

George Washington University
MBA, Finance (2007)

University of Redlands
BA, Business Administration & Biological Sciences (2002)

Michael J. Ginder, CFA
Research Analyst
Joined Sands Capital in 2011

Sr. Research Associate (2014-2016)
Research Associate (2011-2013)

University of Virginia
BS, McIntire School of Commerce (2011)

Jennifer A. Greene, CFA
Research Analyst
Joined Sands Capital in 2013

Sr. Research Associate (2013-2014)

Credit Suisse Securities Private Fund Group (2007-2011)
New York, NY • Associate

Johns Hopkins University
Pre-Medical Post-Baccalaureate Program (2012)

University of Virginia
BS, McIntire School of Commerce and Philosophy (2007)

Ashraf A. Haque
Sr. Portfolio Manager, Research Analyst
Joined Sands Capital in 2008

Research Analyst (2008-2013)

Chesapeake Partners (2007-2008)
Baltimore, MD • Investment Analyst

McKinsey & Company (2003-2005)
Chicago, IL • Business Analyst

GH Smart & Company (2001-2003)
Chicago, IL • Director, Business Development

Harvard University
MBA, Harvard Business School (2007)

Northwestern University
BA, Mathematical Methods in the Social Sciences
and Economics (2001)

Jason S. Harden, CFA
Research Analyst
Joined Sands Capital in 2012

Sr. Research Associate (2015-2016)
Research Associate (2012-2014)

Washington & Lee University
BA, Economics and Spanish (2012)

Wesley A. Johnston, CFA
Portfolio Manager, Sr. Research Analyst
Joined Sands Capital in 2004

Sr. Research Analyst (2009-2015)
Research Analyst (2006-2008)
Research Associate (2004-2006)

University of Pennsylvania
BS, Economics (2002)

SCMBIO0618

Investment Professionals

Neil Kansari
Sr. Portfolio Manager, Research Analyst
Joined Sands Capital in 2008

Research Analyst (2008-2013)

PRTM, part of PricewaterhouseCoopers LLP (2002-2006)
Waltham, MA • Associate, Sr. Business Analyst

University of Virginia (1999-2002)
Charlottesville, VA • Graduate Research Assistant, Department of Electrical Engineering

Millennium Solutions; Universal Impex (1997-1999)
Mumbai, India • Application Analyst

Mahajan & Aibara: Shah Gupta & Co. (1996-1997)
Mumbai, India • Accounting Trainee

University of Virginia
MBA, Darden School (2008)
MS, Electrical Engineering (2002)

University of Mumbai (Bombay)
BE, Electronics Engineering (1996)

Brian X. Keegan, CFA
Research Analyst
Joined Sands Capital in 2011

Sr. Research Associate (2014-2016)
Research Associate (2011-2013)

Washington & Lee University
BA, Economics and Politics (2011)

David E. Levanson, CFA
Sr. Portfolio Manager, Research Analyst, Executive Managing Director
Re-Joined Sands Capital in 2002

Research Analyst, Portfolio Manager (2002-2006)

MFS Investment Management (1999-2002)
Boston, MA • Research Analyst

State Street Research & Management (1996-1999)
Boston, MA • Research Analyst, Vice President

Sands Capital Management (1992-1994)
Arlington, VA • Research Analyst

The Capital Management Group
Folger Nolan Fleming Douglas, Inc. (1990-1992)
Washington, DC • Research Analyst

University of Virginia
MBA, Darden School (1996)

University of Florida
BSBA, Finance (1990)

Matthew W. Luneburg, CFA
Research Analyst
Joined Sands Capital in 2006

Research Associate (2006-2009)

Washington & Lee University
BA, Economics (2006)

Massimo Marolo, CFA
Sr. Research Analyst
Joined Sands Capital in 2018

JP Morgan Asset Management (2009-2018)
New York / Singapore • Sr. Research Analyst

Highbridge Capital (2007-2009)
New York, NY • Research Analyst

TAMRO Capital (2003-2007)
Alexandria, VA • Research Analyst

Johns Hopkins SAIS
MA, International Relations (1999)

Georgetown University
BA, Middle Eastern Studies (1997)

Barron B. Martin, Jr., CFA
Sr. Research Analyst
Joined Sands Capital in 2008

Research Analyst (2011-2017)
Sr. Research Associate (2011)
Research Associate (2008-2010)

Washington & Lee University
BS, Business Administration (2008)
BA, Geology (2008)

Danielle J. Menichella, CFA
Research Analyst
Joined Sands Capital in 2013

Ashmore Equity Investment Management (2010-2013)
Arlington, VA • Senior Analyst

Emerging Markets Management (1997-2010)
Arlington, VA • Analyst

Duke University
AB, Economics and Public Policy (1997)

Daniel Pilling
Research Analyst
Joined Sands Capital in 2018

Balyasny Asset Management (2015-2017)
New York, NY • Analyst

Millennium Capital Partners (2014-2015)
London, UK • Analyst

QVT Financial (2012-2014)
London, UK • Analyst

Fidelity (2010-2011)
London, UK • Research Associate

Greenhill & Co. (2007-2009)
London, UK • Analyst

Cambridge University
MPhil, Finance (2007)

Manchester Business School
BA, Business Finance and Economics (2006)

Michael F. Raab, CFA
Sr. Research Analyst, Associate Director of Research
Joined Sands Capital in 2007

Research Analyst, Associate Director of Research (2009-2016)
Research Associate (2007-2009)

SNL Financial (2006-2007)
Charlottesville, VA • Analyst

University of Maryland
MBA, Robert H. Smith School of Business (2011)

University of Virginia
BA, Economics (2006)

Investment Professionals

Frank M. Sands, CFA
Chief Investment Officer, Chief Executive Officer
Joined Sands Capital in 2000

President, Director of Research (2004-2008)
Managing Director, Director of Research,
Sr. Portfolio Manager (2000-2004)

Fayez Sarofim & Co. (1994-2000)
Houston, TX • Research Analyst, Portfolio Manager, Principal

Walker & Dunlop (1989-1991)
Washington, DC • Commercial Real Estate Leasing and Sales

University of Virginia
MBA, Darden School (1994)

Johns Hopkins University
MS, Real Estate Finance & Development (1993)

Washington & Lee University
BA, Economics (1989)

Frank M. Sands, Sr., CFA
Chairman, Founder
Founded Sands Capital in 1992

Chief Executive Officer, Chief Investment Officer,
Sr. Portfolio Manager (1992-2008)

The Capital Management Group, Folger Nolan
Fleming Douglas, Inc. (1986-1992)
Washington, DC • Chief Investment Officer

Eppler, Guerin & Turner, Inc. (1983-1986)
Dallas, TX • Director of Research, Member of Board of Directors

David L. Babson & Company, Inc. (1972-1983)
Boston, MA • Director of Research, Member of Board of Directors

Loomis, Sayles & Company (1969-1972)
Boston, MA • Research Analyst

University of Virginia
MBA, Darden School (1963)

Dickinson College
BA, Economics (1960)

A. Michael Sramek, CFA
Sr. Portfolio Manager, Research Analyst,
Managing Director
Joined Sands Capital in 2001

Research Analyst, Portfolio Manager (2001-2007)

Mastrapasqua & Associates (2000)
Nashville, TN • Research Analyst

BARRA/RogersCasey (1995-1998)
Darien, CT • Associate, Plan Sponsor Services

Vanderbilt University
MBA, Owen Graduate School of Management (2000)

Princeton University
AB, History (1995)

Job Taylor, PhD
Research Analyst
Joined Sands Capital in 2015

Research Consultant (2015)

Veda Healthcare Partners (2011-2014)
Chevy Chase, MD • Partner

Oppenheimer and Company (2008-2011)
New York, NY • Director

FBR Capital Markets (2006-2008)
Arlington, VA • Senior Associate

University of Virginia (2004-2005)
Charlottesville, VA • Postdoctoral Fellow

University of Virginia
PhD, Biology (2003)

College of William and Mary
BS, Biology (1994)

Sunil H. Thakor, CFA
Sr. Portfolio Manager, Research Analyst
Joined Sands Capital in 2004

Research Analyst, Portfolio Manager (2007-2008)
Research Analyst (2005-2007)
Research Intern (2004)

Charles River Associates, Inc. (1999-2004)
Los Angeles, CA • Associate
Boston, MA • Analyst

Columbia University
MBA, Columbia Business School (2006)

Colby College
BA, Economics-Mathematics (1999)

Thomas H. Trentman, CFA
Portfolio Manager, Sr. Research Analyst
Joined Sands Capital in 2005

Portfolio Manager, Research Analyst (2011-2016)
Research Analyst (2008-2010)
Research Associate (2005-2008)

Washington & Lee University
BS, Physics-Engineering (2005)
BA, Chemistry (2005)

T. Perry Williams, CFA
President, Director of Research
Joined Sands Capital in 2004

Sr. Portfolio Manager, Research Analyst (2010-2015)
Research Analyst, Portfolio Manager (2006-2009)
Director, Client Relations (2004-2006)

Mercer Investment Consulting, Inc. (1995-2004)
Atlanta, GA • Consultant, Principal

Northwestern University
MM, Kellogg Graduate School of Management (1999)

University of Virginia
BS, McIntire School of Commerce (1994)

Client Relations Professionals

Matthew B. Alsted
Director, Portfolio Analysis and Communications
Joined Sands Capital in 2016

Calvert Investments (2004-2015)
Bethesda, MD • Vice President

Riggs Bank (2002-2004)
Washington, DC • Vice President

T. Rowe Price (1996-2002)
Baltimore, MD • Assistant Vice President

BayBanks, NA (1994-1996)
Waltham, MA • Product Development Officer

Babson College
BS, Marketing, International Business (1993)

Andrew P. Giordano
Director, Client Relations
Joined Sands Capital in 2010

Manager, Client Relations (2012-2014)
Wealth Management Associate (2010-2012)

Friedman, Billings, Ramsey Capital Markets (2008-2010)
Arlington, VA • Vice President

Friedman, Billings, Ramsey Capital Markets (2006-2008)
Arlington, VA • Associate Vice President

Friedman, Billings, Ramsey Group (2004-2006)
Arlington, VA • Sales Assistant

Columbia University
MBA, Columbia Business School (2016)

London Business School
MBA, London Business School (2016)

Middlebury College
BA, International Politics and Economics (2004)

Luke C. Iglehart
Executive Managing Director, Client and Consultant Relations
Joined Sands Capital in 2011

Director, Consultant Relations (2011-2015)

Cambridge Associates (2006-2011)
Arlington, VA • Sr. Investment Consultant

U.S. Representative Harold Ford, Jr. (2001-2004)
Washington, DC • Sr. Legislative Assistant

University of Virginia
MBA, Darden School (2006)

Wake Forest University
BA, Political Science (2001)

Josephine A. Lewis
Director, Client Relations
Joined Sands Capital in 2016

Harding Loevner (2005-2015)
Bridgewater, NJ • Portfolio Manager/Analyst

Piti Suksa/Chiang Rai Montessori (2003-2004)
Chiang Rai, Thailand • Teacher

Cambridge Associates (1999-2003)
Arlington, VA • Senior Consulting Associate

ICQ/American Online (1998)
Tel Aviv, Israel • Business Associate

University of Maryland
MBA, Finance, Robert H. Smith School of Business (2006)

Tulane University
BSM, Finance, A.B. Freeman School of Business (1997)

Jeff D. Lockhart
Director, Client Relations
Joined Sands Capital in 2011

Manager, Client Relations (2014-2015)
Sr. Client Service Specialist (2011-2014)

Bentz Whaley Flessner (2010-2011)
Arlington, VA • Sr. Research Analyst

Cambridge Associates (2003-2007)
Arlington, VA • Client Services Manager, International Product

Duke University
MBA, Fuqua School of Business (2009)

Vanderbilt University
BA, Economics (2000)

Kevin G. Murphy, CFA
Sr. Director, Client Relations
Joined Sands Capital in 2002

Director, Wealth Management Group, Portfolio Manager (2002-2015)

Marriott International (1999-2001)
Washington, DC • Sr. Manager, Business Strategy/ Business Analysis

Advisory Board Company (1996-1997)
Washington, DC • Marketing Associate

Dole/Kemp '96 (1995-1997)
Washington, DC • Sr. Budget Manager

Bush/Quayle '92 Campaign Committee, Inc. (1991-1993)
Washington, DC • Compliance Analyst

Georgetown University
MBA, McDonough School of Business (1999)

The Colorado College
BA, Political Science (1991)

Client Relations Professionals

Stephen F. Nimmo
Executive Managing Director, Business Development and Client Relations
Joined Sands Capital in 2010

Head of Business Development,
Director, Client Relations (2010-2013)

Martin Currie Inc. (2008-2010)
New York, NY • Sr. Client Director

Gartmore Investment Management (1997-2008)
London, UK • European Sales Director

The WM Company (1996-1997)
Edinburgh, UK • Client Director

The Sedgewick Group Ltd. (1991-1996)
Edinburgh, UK • Client Director

Durham University
BA, Economics and History (1991)

Katherine B. Okon
Manager, Client Relations
Re-Joined Sands Capital in 2012

Portfolio Communications Analyst (2012-2014)
Assistant to the CEO (2007-2010)

University of Virginia
MBA, Darden School (2012)

Lafayette College
BA, Government and Law (2007)

Samantha L. Toler
Sr. Director, Client Relations and Business Development
Joined Sands Capital in 2006

Director, Client Relations (2006-2015)

Goldman Sachs, & Co. (2000-2006)
New York, NY • Vice President

SCA Consulting (1995-1998)
New York, NY • Consultant

Neuberger Berman (1994-1995)
New York, NY • Portfolio Assistant

New York University
MBA, Stern School of Business (2000)

Brown University
BA, American Civilization Studies (1994)

Sands Capital Management, LLC

Tax-Exempt Institutional Equity Composite (TEIEC) Annual Disclosure Presentation

Year End	Number of Accounts	Assets at End of Period (USD Millions)	TEIEC			Russell 1000® Growth (R1000G)		Percentage of Firmwide Assets	Percentage in Bundled Fee Assets	Asset Weighted Standard Deviation	Firm's Total Assets (USD Millions)
			Net Return	Gross Return	Annualized 3 Yr. Ex-Post Standard Deviation	R1000G	Annualized 3 Yr. Ex-Post Standard Deviation				
2017	102	$11,646.37	35.15	35.74	15.07	30.21	10.54	28.18	0.00	0.48	$41,331.26
2016	115	$10,192.82	-7.13	-6.70	15.58	7.08	11.15	29.19	0.00	0.18	$34,914.29
2015	146	$14,686.78	2.92	3.40	14.56	5.67	10.70	33.23	0.00	0.50	$44,192.42
2014	155	$17,737.17	8.95	9.63	14.51	13.05	9.59	37.22	0.00	0.18	$47,659.83
2013	155	$16,244.61	42.19	42.95	15.55	33.48	12.18	38.62	0.00	0.17	$42,067.92
2012	141	$11,421.39	24.08	24.69	18.39	15.26	15.66	42.30	0.94	0.22	$27,001.96
2011	122	$8,572.50	2.47	3.02	19.92	2.64	17.76	45.70	1.33	0.15	$18,759.70
2010	111	$8,403.52	26.53	27.22	27.20	16.71	22.11	52.33	1.46	0.26	$16,057.27
2009	113	$7,420.73	71.37	72.23	25.10	37.21	19.73	53.51	1.48	0.47	$13,867.06
2008	142	$4,164.02	-48.67	-48.37	20.59	-38.44	16.40	55.03	2.19	0.28	$8,384.73

Sands Capital Management ("Sands Capital" and "SCM") is an independent registered investment advisor. Sands Capital claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS® standards. Sands Capital has been independently verified for the periods February 7, 1992 through March 31, 2018.

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. The Tax-Exempt Institutional Equity Composite ("TEIEC") has been examined for the periods February 29, 1992 through March 31, 2018. The verification and performance examination reports are available upon request.

The TEIEC contains all fee-paying, tax-exempt institutional equity accounts managed according to the Select Growth Equity Strategy on a fully discretionary basis and for comparison purposes is measured against the Russell 1000® Growth Index ("R1000G"). The Select Growth Equity strategy (formerly "Large Cap Growth") is a concentrated portfolio that typically includes 25 to 30 companies. Portfolio investments are typically U.S. domiciled large-capitalization leaders in their respective business spaces and usually operate on a global basis. The portfolio may invest in mid-capitalization companies. While primarily constructed of domestic companies, the portfolio may contain foreign securities that trade on a U.S. exchange. The Russell 1000® Growth Index measures the performance of those Russell 1000 companies with higher price-to-book ratios and higher forecasted growth values. The TEIEC holds securities that are not included in the R1000G, and Sands Capital Management, LLC may invest in securities not covered by the index. Performance results in presentations prior to January 1, 2002 were measured against the S&P 500 Index. The benchmark was changed to be more representative of the composite strategy, however, information regarding the comparison to the S&P 500 is available upon request. Effective April 1, 1997, the minimum account size for this composite is $3 million. The minimum account size was $1 million from February 7, 1992 through March 31, 1997.

The annual composite dispersion presented is an asset-weighted standard deviation calculated of performance dispersion for accounts in the composite for the entire year, using beginning of period values. Returns are presented gross and net of management fees and performance fees, if applicable, and include the reinvestment of all income. For periods prior to 2013, gross returns are shown as supplemental information and are stated gross of all fees and transaction costs for bundled fee accounts; net returns are reduced by all fees and transaction costs incurred. Bundled fee accounts pay a fee based on a percentage of assets under management. Other than brokerage commissions this fee may have included portfolio monitoring, consulting services, and in some cases, custodial services. As of January 1, 2013, bundled fee accounts are no longer included in the TEIEC. The U.S. Dollar is the currency used to express performance.

Policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request. A list of composite descriptions is available upon request. Past performance is not indicative of future results.

The investment management fee schedule for this strategy is 0.75% on the first $50 million of assets under management and 0.50% on assets under management greater than $50 million. In addition to the management fee, some accounts may also pay an incentive fee. Additional information regarding the incentive fee is available upon request.

The Select Growth Equity Strategy of the portfolio manager was created and fully invested February 7, 1992. The TEIEC was created on February 29, 1992.

Russell 1000® Growth Index is a trademark of the Frank Russell Company.

Sands Capital Management, LLC

Global Growth Equity Composite (GGEC) Annual Disclosure Presentation

Year End	Number of Accounts	Assets at End of Period (USD Millions)	GGEC			MSCI All Country World Index (MSCI ACWI)		Percentage of Firmwide Assets	Percentage of Non-Paying Accounts	Asset Weighted Standard Deviation[1]	Firm's Total Assets (USD Millions)
			Net Return	Gross Return	Annualized 3 Yr. Ex-Post Standard Deviation	MSCI ACWI	Annualized 3 Yr. Ex-Post Standard Deviation				
2017	14	$10,812.64	38.88	40.01	13.85	23.97	10.36	26.16	0.00	0.20	$41,331.26
2016	21	$9,019.25	0.54	1.41	14.56	7.86	11.06	25.83	0.00	0.12	$34,914.29
2015	18	$9,129.68	0.40	1.27	13.92	-2.36	10.79	20.66	0.00	0.18	$44,192.42
2014	19	$9,285.34	5.37	6.26	13.72	4.16	10.50	19.48	0.00	0.25	$47,659.83
2013	18	$7,531.91	27.89	28.97	16.28	22.80	13.94	17.90	0.00	0.25	$42,067.92
2012	11	$3,746.92	20.38	21.37	18.55	16.13	17.13	13.87	0.00	0.21	$27,001.96
2011	<5	$1,544.95	-1.98	-1.14	22.67	-7.35	20.59	8.24	0.00	n.m.	$18,759.70
2010	<5	$1,529.67	27.67	28.74	—[2]	12.67	—[2]	9.53	0.00	n.m.	$16,057.27
2009	<5	$1,223.16	86.69	88.18	—[2]	34.63	—[2]	8.82	0.19	n.m.	$13,867.06

[1] n.m. – Not statistically meaningful, five or less accounts in the composite for the entire year. [2] The 3-year annualized standard deviation is not shown due to having less than 36 months of returns.

Sands Capital Management ("Sands Capital" and "SCM") is an independent registered investment advisor. Sands Capital claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS® standards. Sands Capital has been independently verified for the periods February 7, 1992 through March 31, 2018.

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. The Global Growth Equity Composite ("GGEC") has been examined for the periods December 31, 2008 through March 31, 2018. The verification and performance examination reports are available upon request.

The GGEC reflects information from all fee paying and non-fee paying accounts managed in the Global Growth Equity Strategy on a fully discretionary basis. The Global Growth Equity strategy is a concentrated global portfolio that typically includes 30 to 50 companies that are domiciled around the world. Portfolio investments are typically large-capitalization leaders in their respective business spaces. The portfolio may invest in mid-capitalization companies. The portfolio may invest a significant percentage of its assets in U.S. companies, ADRs, and foreign securities traded on foreign exchanges, and may include the use of derivative access products to gain exposure to certain foreign markets where direct investment is not always practical or cost efficient. There is no account minimum. The benchmark for the GGEC is the MSCI All Country World Index ("MSCI ACWI"). The MSCI ACWI is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets. The GGEC holds securities not included in the MSCI ACWI and Sands Capital Management, LLC may invest in securities not covered by the index.

The annual composite dispersion presented is an asset-weighted standard deviation calculated of performance dispersion for accounts in the composite for the entire year, using beginning of period values. The U.S. dollar is the currency used to express performance. Returns include the effect of foreign currency exchange rates. Returns are presented gross and net of management fees and include the reinvestment of all income. Composite performance is presented net of foreign withholding taxes on dividends, interest income, and capital gains. Withholding taxes may vary according to the investor's domicile. The benchmark return is net of withholding taxes from a Luxembourg tax perspective. Net of fee performance was calculated by deducting the highest applicable fee of 0.85% from the monthly gross composite return.

Sands Capital may use access products as needed to gain exposure to securities of companies in markets that restrict foreign ownership of local companies. (1) A Low Exercise Price Warrant ('LEPW') is a warrant in which the value and performance of its intrinsic value is effectively identical to that of the underlying security. LEPWs are used to allow participation in the performance of a foreign equity security where there are legal or financial obstacles to purchasing the underlying directly. (2) Participation Notes ("P-Notes") are unsecured, bearer securities typically issued by financial institutions, the performance of which is generally linked to the performance of the underlying listed shares of a company in an emerging market (for example, the shares in a company incorporated in India). Investors in P-Notes do not have or receive any rights relating to the underlying shares, and the issuers of the notes may not be obligated to hold any shares in the underlying companies. LEPWs and P-Notes bear counterparty risk and may bear additional liquidity risk.

Policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request. A list of composite descriptions is available upon request. Past performance is not indicative of future results.

The investment management fee schedule for the strategy is 0.85% on the first $50 million, 0.65% on assets between $50 and $250 million, 0.60% on assets between $250 and $500 million, and 0.55% on all assets above $500 million. Actual investment advisory fees incurred by clients may vary.

The Global Growth Equity strategy of the portfolio manager was created and fully invested December 31, 2008. The GGEC was created on February 26, 2009.

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SANDS CAPITAL

Sands Capital Management, LLC

Global Leaders Equity Composite (GLEC) Annual Disclosure Presentation

Period Ending	Number of Accounts	Assets at End of Period (USD Millions)	GLEC			MSCI All Country World Index (MSCI ACWI)		Percentage of Firmwide Assets	Percentage of Non-Paying Accounts	Asset Weighted Standard Deviation	Firm's Total Assets (USD Millions)
			Net Return	Gross Return	Annualized 3 Yr. Ex-Post Standard Deviation	MSCI ACWI	Annualized 3 Yr. Ex-Post Standard Deviation				
12/31/2017[3]	<5	$49.95	21.30	22.04	—[2]	15.96	—[2]	0.12	3.10	n.m.[1]	$41,331.26

[1] n.m. – Not applicable as the composite's inception date is March 31, 2017 . [2] The 3-year annualized standard deviation is not shown due to having less than 36 months of returns. [3] Returns are calculated from 3/31/17 to 03/31/18 for both the composite and the index.

Sands Capital Management ("Sands Capital" and "SCM") is an independent registered investment advisor. Sands Capital claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS® standards. Sands Capital has been independently verified for the periods February 7, 1992 through March 31, 2018. A copy of 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. The Global Leaders Equity Composite ("GLEC") has been examined for the periods March 31, 2017 through March 31, 2018. The verification and performance examination reports are available upon request.

The GLEC reflects information from all fee paying and non-fee paying accounts managed in the Global Leaders Equity Strategy on a fully discretionary basis. The Global Leaders Equity strategy is a concentrated portfolio of primarily large- and mid-capitalization growth businesses that the manager considers to be leaders in their country, industry, or globally in terms of products, services or execution. The portfolio normally consists of the equity securities of 30 to 50 issuers that the manager believes are capable of generating sustainable, above-average, and relatively stable rates of earnings per share growth and strong free cash flow. Portfolio investments are domiciled in both developed and emerging markets. Eligible securities include equity and equity-related securities, such as American depositary receipts; exchange-traded funds; global depositary receipts; low exercise price warrants; and participatory notes, quoted or traded on global regulated exchanges. There is no account minimum. The benchmark for the GLEC is the MSCI All Country World Index ("MSCI ACWI"). The MSCI ACWI is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets. The GLEC holds securities not included in the MSCI ACWI and Sands Capital Management, LLC may invest in securities not covered by the index.

The annual composite dispersion presented is an asset-weighted standard deviation calculated of performance dispersion for accounts in the composite for the entire year, using beginning of period values. The U.S. dollar is the currency used to express performance. Returns include the effect of foreign currency exchange rates. Returns are presented gross and net of management fees and include the reinvestment of all income. Composite performance is presented net of foreign withholding taxes on dividends, interest income, and capital gains. Withholding taxes may vary according to the investor's domicile. The benchmark return is net of withholding taxes from a Luxembourg tax perspective. Net of fee performance was calculated by deducting the highest applicable fee of 0.85% from the monthly gross composite return.

This presentation was updated on December 20, 2017 to reflect correct information that was overstated as of 09/30/17 in prior presentations. The previous Percentage of Non-Paying Accounts was 3.59 and was updated to reflect the correct figure of 3.17.

Sands Capital may use access products as needed to gain exposure to securities of companies in markets that restrict foreign ownership of local companies. (1) A Low Exercise Price Warrant ('LEPW') is a warrant in which the value and performance of its intrinsic value is effectively identical to that of the underlying security. LEPWs are used to allow participation in the performance of a foreign equity security where there are legal or financial obstacles to purchasing the underlying directly. (2) Participation Notes ("P-Notes") are unsecured, bearer securities typically issued by financial institutions, the performance of which is generally linked to the performance of the underlying listed shares of a company in an emerging market (for example, the shares in a company incorporated in India). Investors in P-Notes do not have or receive any rights relating to the underlying shares, and the issuers of the notes may not be obligated to hold any shares in the underlying companies. LEPWs and P-Notes bear counterparty risk and may bear additional liquidity risk.

Policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request. A list of composite descriptions is available upon request. Past performance is not indicative of future results.

The investment management fee schedule for the strategy is 0.85% on the first $50 million, 0.65% on the next $200 million, and 0.55% on assets on all assets above $250 million. Actual investment advisory fees incurred by clients may vary.

The Global Leaders Equity strategy of the portfolio manager was created and fully invested March 1, 2017. The GLEC was created on March 8, 2017.

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Sands Capital Management, LLC

Emerging Markets Growth Composite (EMGC) Annual Disclosure Presentation

Year End	Number of Accounts	Assets at End of Period (USD Millions)	EMGC			MSCI Emerging Markets Index (MSCI EM)		Percentage of Firmwide Assets	Percentage of Non-Paying Accounts	Asset Weighted Standard Deviation[1]	Firm's Total Assets (USD Millions)
			Net Return	Gross Return	Annualized 3 Yr. Ex-Post Standard Deviation	MSCI EM	Annualized 3 Yr. Ex-Post Standard Deviation				
2017	9	$2,010.72	39.12	40.82	14.51	37.28	15.35	4.86	0.08	0.28	$41,331.26
2016	9	$1,114.66	2.51	3.81	16.03	11.19	16.07	3.19	0.10	0.24	$34,914.29
2015	8	$776.57	-8.90	-7.76	15.43	-14.92	14.06	1.76	0.14	0.30	$44,192.42
2014	<5	$444.88	5.71	7.04	—[2]	-2.19	—[2]	0.93	0.34	n.m.	$47,659.83
2013	<5	$1.17	12.64	14.02	—[2]	-2.60	—[2]	0.00	100.0	n.m.	$42,067.92

[1] n.m. – Not statistically meaningful, five or less accounts in the composite for the entire year. [2] The 3-year annualized standard deviation is not shown due to having less than 36 months of returns.

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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. The Emerging Markets Growth Composite ("EMGC") has been examined for the periods December 31, 2012 through March 31, 2018. The verification and performance examination reports are available upon request.

The EMGC reflects information from all fee-paying and non-fee paying accounts managed in the Emerging Markets Growth Strategy on a fully discretionary basis. The Emerging Markets Growth strategy is a concentrated portfolio that typically includes 30 to 50 companies that are domiciled, listed, or that derive over half their revenues or profits from countries classified as MSCI Emerging and Frontier Market countries. Portfolio companies can be small, mid, or large capitalization companies that have attractive growth opportunities ahead of them and are leaders in their respective business spaces. The portfolio may invest in developed market businesses that derive a substantial portion of their revenues from emerging markets. The portfolio may invest in ADRs, foreign securities traded on foreign exchanges, and may include the use of derivative access products to gain exposure to certain foreign markets where direct investment is not always practical or cost efficient. There is no account minimum. The benchmark for the EMGC is the MSCI Emerging Markets Index ("MSCI EM"). The MSCI EM is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of emerging markets. The EMGC may hold securities not included in the MSCI EM and Sands Capital Management, LLC may invest in securities not covered by the index.

The annual composite dispersion presented is an asset-weighted standard deviation calculated of performance dispersion for accounts in the composite for the entire year, using beginning of period values. The U.S. dollar is the currency used to express performance. Returns include the effect of foreign currency exchange rates. Returns are presented gross and net of management fees and include the reinvestment of all income. Composite performance is presented net of foreign withholding taxes on dividends, interest income, and capital gains. Withholding taxes may vary according to the investor's domicile. The benchmark return is net of withholding taxes from a Luxembourg tax perspective. Net of fee performance was calculated by deducting the highest applicable annual fee of 1.25% from the monthly gross composite return.

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Policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request. A list of composite descriptions is available upon request. Past performance is not indicative of future results.

The investment management fee schedule for the strategy is 1.00% on the first $100 million and 0.80% on all assets above $100 million. Actual investment advisory fees incurred by clients may vary.

The Emerging Markets Growth strategy of the portfolio manager was created and fully invested December 31, 2012. The EMGC was created on May 28, 2013.

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American Century Investments®

Alaska Retirement Management Board

Emerging Markets Equity

December 14, 2018

Patricia Ribeiro
Senior Vice President
Senior Portfolio Manager
Patricia_Ribeiro@americancentury.com

Walt McGhee
Vice President
Institutional Business Development
Walt_McGhee@americancentury.com

American Century Investments

Patricia Ribeiro
Senior Vice President
Senior Portfolio Manager

Patricia co-manages the Emerging Markets strategy and provides fundamental equity research and analysis for the strategy. Prior to joining American Century Investments in 2006, Patricia served as an independent consultant for Medley Global Advisors and Black Arrow Capital Management. Previously, she was Head of Latin America Research at Citigroup Asset Management and Head of Latin American Equity Research for J.P. Morgan Investment Management. Patricia has worked in the investment industry since 1984. She earned a bachelor's degree in accounting from Rutgers University.

Walt McGhee
Vice President
Business Development, Global Institutional

Walt is responsible for developing U.S. and Canadian institutional client relationships. Before joining American Century Investments in 2015, Walt was director, institutional business development at Allianz Global Investors, focusing on corporate, endowment, foundation and public plans. Prior to that, Walt was a vice president with Sanford C. Bernstein & Co. He previously served in sales executive roles in firms including Xerox and Texas Instruments. Walt has worked in the investment industry since 1999. He earned a bachelor's of science degree in mechanical engineering from the University of New Hampshire and a master's degree in business administration concentrating in finance from the University of Pittsburgh. He holds FINRA Series 7 and 66 licenses and has passed the Chartered Financial Analyst Level I and II exams.

American Century Investments is a privately held, global asset management firm founded in 1958 with headquarters based in Kansas City, MO. We are committed to making a positive impact to humanity through our ownership by the Stowers Institute for Medical Research. Our firm has $171.6B in AUM with $3.7B invested in Emerging Markets strategies as of 9/30/2018.

The Emerging Markets portfolio uses a distinct growth philosophy, focusing on companies that we believe are exhibiting accelerating and sustainable growth which has been underestimated by the market. The strategy employs deep, fundamental stock research with close attention to risk management, emphasizing stock selection over sector or characteristic tilts.

American Century Investments

Introducing American Century Investments

Actively Investing in Our Clients' Success

Performance-Focused for 60 Years

Our investment culture focuses on delivering superior, long-term, risk-adjusted performance.

We provide solutions to match our clients' goals and expectations.

Pure Play Business Model

Investment management is our sole business focus.

We are not conflicted or constrained by organizational pressures; we put our clients' interests first.

Privately Controlled and Independent

Unburdened by quarterly earnings pressure, our ownership structure allows us to maintain a long-term view in the best interests of clients.

All decision making is rooted in how we consistently meet the needs of our clients; this inspires a commitment to do the right thing and helps us remain untainted by ethical lapses.

Prosper With Purpose®

Jim and Virginia Stowers established and endowed the Stowers Institute for Medical Research, a world-class biomedical research organization dedicated to uncovering the causes, treatments and prevention of genetically-based diseases, like cancer.

The Stowers Institute for Medical Research owns a controlling interest in American Century Investments, and through this unique ownership structure, our dividend payments ensure the ongoing support of important work that can improve human health and save lives.

American Century Investments

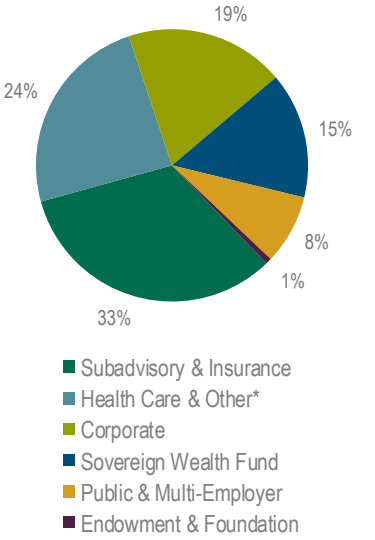
Serving Institutional Clients

Representative Clients

Alabama Trust Fund
Alaska Electrical Pension Fund
Alaska Plumbing and Pipefitting Industry Pension Trust Fund
Charles Schwab
Chrysler Canada, Inc.
Florida Deferred Compensation Plan
Fulton County DC 401(a) Plan
Hallmark Cards, Inc.
Kansas City Employees Retirement System
Kansas City Firefighters Pension System
Kansas State Treasurer
Oklahoma Public Employees Retirement System
Overland Park, Kansas
Tennessee Consolidated Retirement System
The Dow Chemical Co.
University of Missouri System
University of Texas System
Zurich Investment Management Limited

Institutional Assets: $74 billion

Represents 43% of firm assets
As of 9/30/2018



*Predominately DC omnibus plans.

Client list as of 9/30/2018. Representative clients are selected based on a variety of factors, including size, organization type and investment mandate. Representation on this list is not an endorsement of American Century Investments, nor does it indicate whether or not the client approves of the advisory services received.

American Century Investments

American Century Investments Emerging Markets

STRATEGY INTRODUCTION

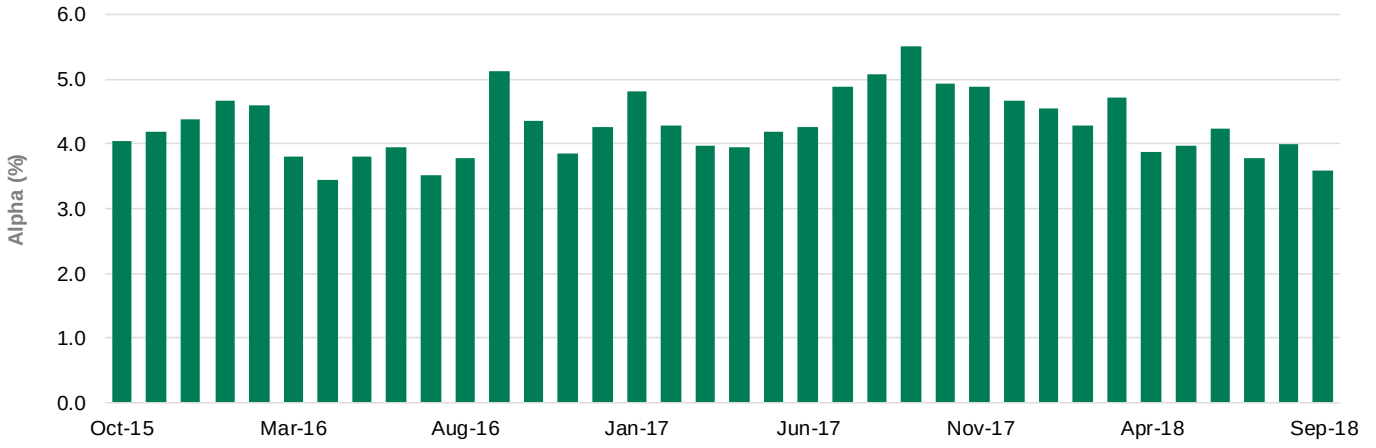
- Distinct growth philosophy and process broadens opportunity set
- Bottom-up process focused on company fundamentals rather than broad macro trends
- Tight knit team focused on collaboration and efficiency
- Pure play in emerging markets investing across the full capitalization range
  - Seeks to outperform the benchmark by 2-3% annualized over a market cycle
  - Expected tracking error: 3-5% versus benchmark
  - Number of holdings: 80-110 companies

OUR RESULTS

- Emerging Markets has delivered positive alpha in 36 out of 36 rolling five-year periods (100%)
- Result: average annualized rolling five-year alpha of 4.28%

Rolling Five-Year Alpha

Emerging Markets vs. MSCI Emerging Markets



Data from 10/31/2015 to 9/30/2018. Performance in USD, gross of fees. Periods greater than one year have been annualized.
Source: FactSet

Strategy:
Emerging Markets Equity

Benchmark:
MSCI Emerging Markets

Composite Inception:
November 1, 1997

Strategy Assets:
$3.66 billion

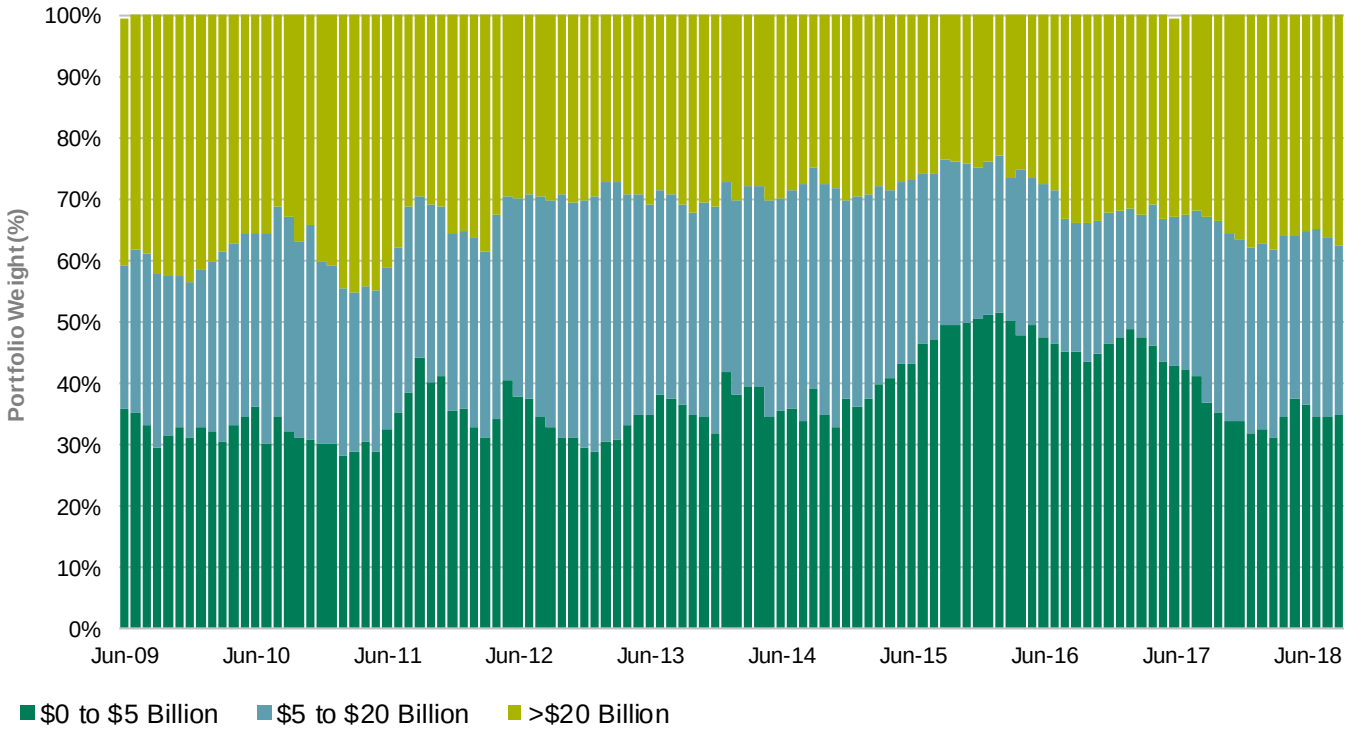
Data as of 9/30/2018

American Century Investments

Historic Cap Exposure

- Distinct growth philosophy leads to a unique opportunity set that may be different than competitors
- Historical commitment to a consistently all-cap, bottom-up, dedicated emerging market portfolio

Portfolio by Market Cap
Emerging Markets



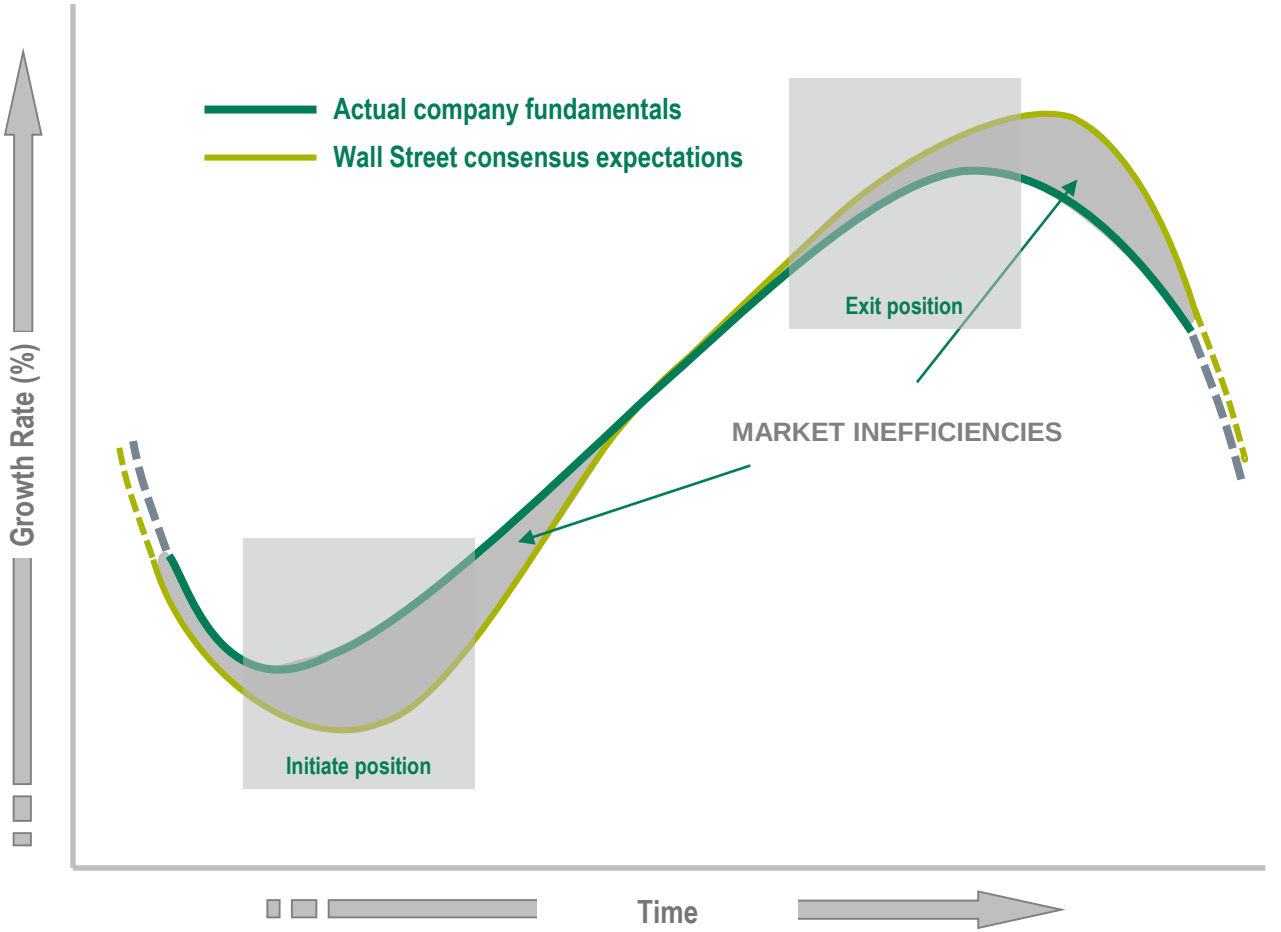
Data from 6/30/2009 to 9/30/2018
Source: FactSet

Based on cumulative gross of fee returns from 6/30/2009 to 9/30/2018, Emerging Markets was 123% vs. 72% for the MSCI EM.

- 43% of Emerging Markets' return was derived from securities with market caps of less than $5 billion.

American Century Investments

Exploiting Market Inefficiencies



Persistent Inefficiencies

- Market is slow to recognize positive **inflection points** in the earnings cycles of individual companies.
- Market is inefficient in extrapolating current operating trends into future earnings around these inflection points.

I Inflection

S Sustainability

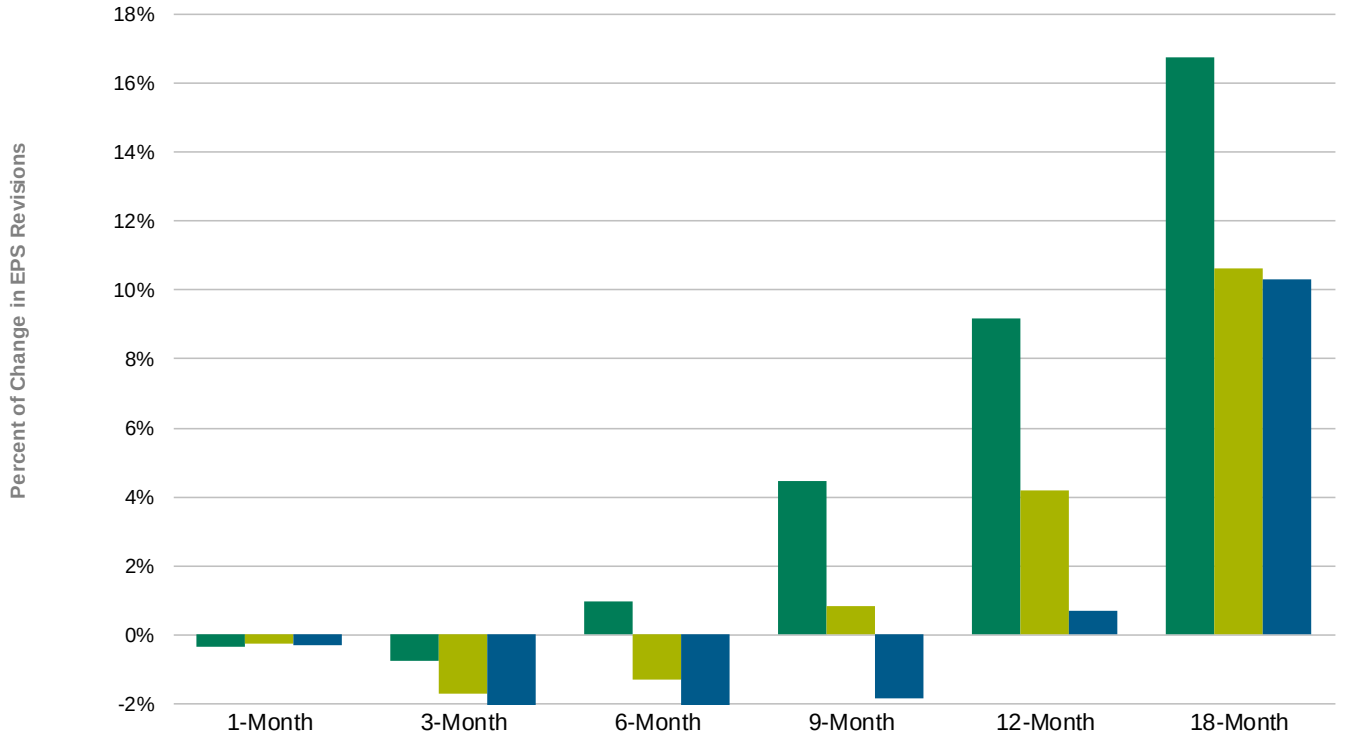
G Earnings Gap

V Valuation/Risk-Reward

American Century Investments

Capturing Inflecting Earnings

Change in Earnings Revisions
Emerging Markets vs. MSCI EM and MSCI EM Growth



	1-Month	3-Month	6-Month	9-Month	12-Month	18-Month
Portfolio	-0.33%	-0.78%	0.94%	4.44%	9.18%	16.77%
Index (Core)	-0.25%	-1.73%	-1.30%	0.83%	4.20%	10.63%
Index (Growth)	-0.31%	-2.69%	-2.28%	-1.87%	0.70%	10.32%

Holdings: 9/30/2018, estimates: 9/30/2018. Evaluates the weighted average change of current FactSet consensus 2018 EPS estimates relative to estimates 1, 3, 6, 9, 12, and 18 months ago for portfolio and index holdings in stock currencies.

Forecasts are not a reliable indicator of future performance.
Source: FactSet

Notes

American Century Investments

Experienced Investment Team With a Global Perspective

Keith Creveling, CFA
Co-Chief Investment Officer, Global Growth Equity

Global Growth	Non-U.S. Growth	Emerging Markets	Non-U.S. Small-Mid Cap Non-U.S. Small Cap	Global Small Cap
Portfolio Managers Keith Creveling, CFA Brent Puff Ted Harlan, CFA	Portfolio Managers Rajesh Gandhi, CFA Jim Zhao, CFA	Portfolio Managers Patricia Ribeiro Sherwin Soo, CFA	Portfolio Managers Trevor Gurwich Federico Laffan Pratik Patel	Portfolio Managers Trevor Gurwich Federico Laffan

Investment Analysts		Investment Analysts	Investment Analysts	
Nathan Churchill, CFA Bruce Badner Jonathan Chung Joseph Calabrese, CFA	Derek De Vries, CFA Alexei Babazadeh, CFA Alex Goldman Charlie Lim	David Choi, CFA Carla Cantreva-Baessler Emily Killion Nikhil Malpani, CFA Evelyn Yeow, CFA	Federico Laffan Pratik Patel Vital Magnin, CFA Jonathan Silverman Maneesh Singhal, CFA	David Thompson Drew Galligan, CFA Nick Pai Mike Harold, CFA Shannon Berry, CFA

Client Portfolio Managers	Quantitative Analyst	Global Equity Trading	ESG Specialist
Bernard Chua, CFA Laura Granger, CFA Nathan Chaudoin Jim Shore, CFA	Ping Zhang	Chris Spurlock Shari Freifield Jessica Carballal George Nakos David Riekhof Jim Doran, CFA	Guillaume Mascotto Hannah Herold

- Average years of experience: 20
- Languages/dialects spoken: 20

Collaborative Culture

- Central location
- Integrated communication
- Alignment through compensation

Singular Focus

- Common definition of growth
- Dedicated support
- Accountability

American Century Investments

American Century Investments Emerging Markets – Investment Team

EMERGING MARKETS TEAM

Averages 20 years of industry experience
Manages $3.7 billion across two strategies

LATIN AMERICA

Carla Cantreva-Baessler
Latin America
Yrs in Industry: 26

EUROPE/MIDDLE EAST

Patricia Ribeiro
Europe
Yrs in Industry: 31

Emily Killion
Turkey, Russia
Yrs in Industry: 13

AFRICA/MIDDLE EAST

Carla Cantreva-Baessler
Middle East
Yrs in Industry: 26

Nikhil Malpani, CFA
South Africa/Pakistan
Yrs in Industry: 13

ASIA

Sherwin Soo, CFA
China/Thailand
Yrs in Industry: 21

Evelyn Yeow, CFA
China/Thailand/Malaysia
Yrs in Industry: 8

David Choi, CFA
Korea/Taiwan
Yrs in Industry: 21

Emily Killion
Korea/Indonesia/Philippines
Yrs in Industry: 13

Nikhil Malpani, CFA
India
Yrs in Industry: 13

PORTFOLIO MANAGEMENT

Patricia Ribeiro
Senior Portfolio Manager
Yrs in Industry: 31

Sherwin Soo, CFA
Portfolio Manager
Yrs in Industry: 21

Nathan Chaudoin
Sr. Client Portfolio Manager
Yrs in Industry: 18

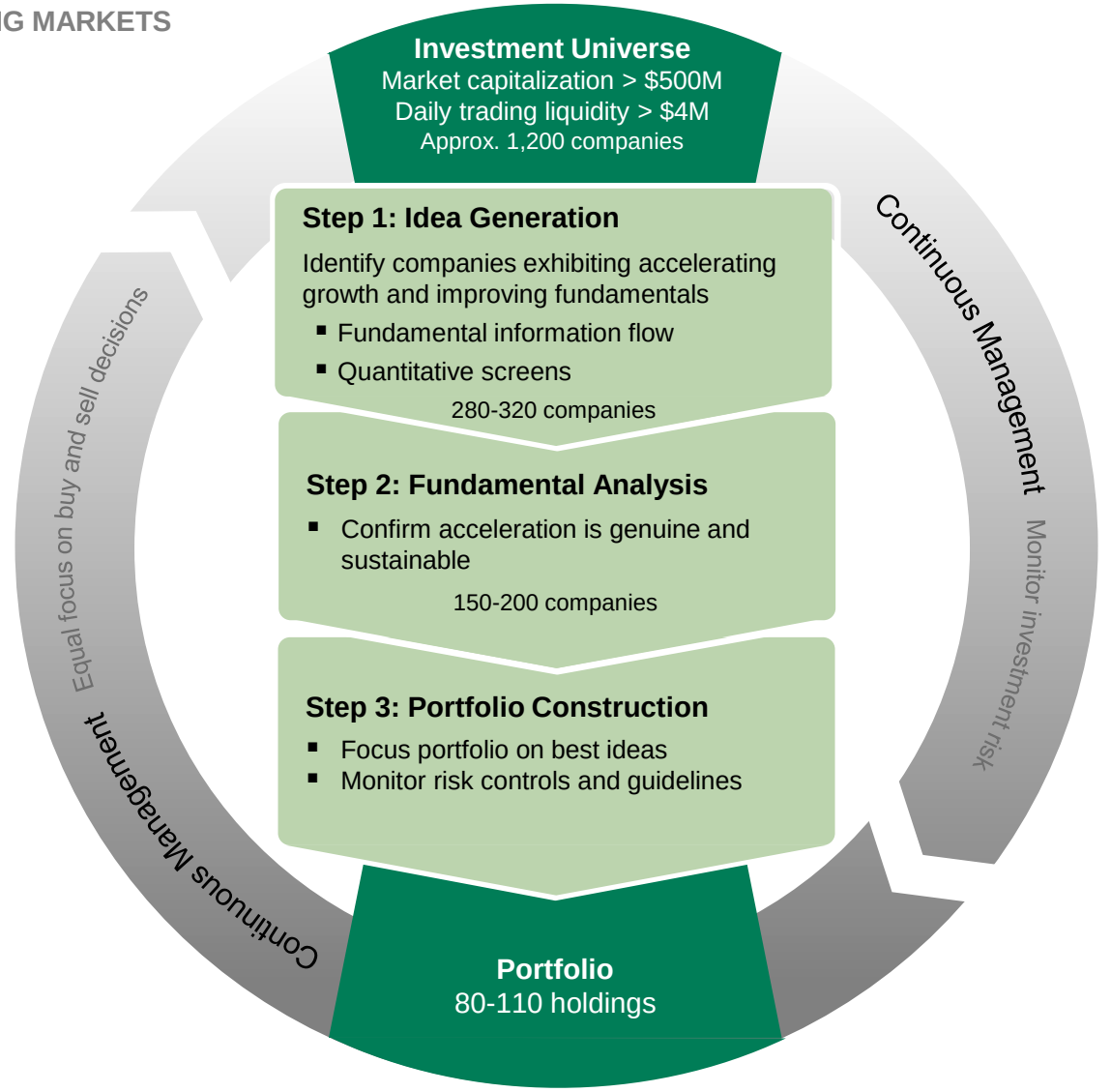
Jim Shore, CFA
Sr. Client Portfolio Manager
Yrs in Industry: 26

Data as of 9/30/2018. Years in industry include professional experience in investment-related occupations, such as accounting, financial communications, or professional occupations relating to their industry or market area.

American Century Investments

Our Process: Achieving Repeatability

EMERGING MARKETS

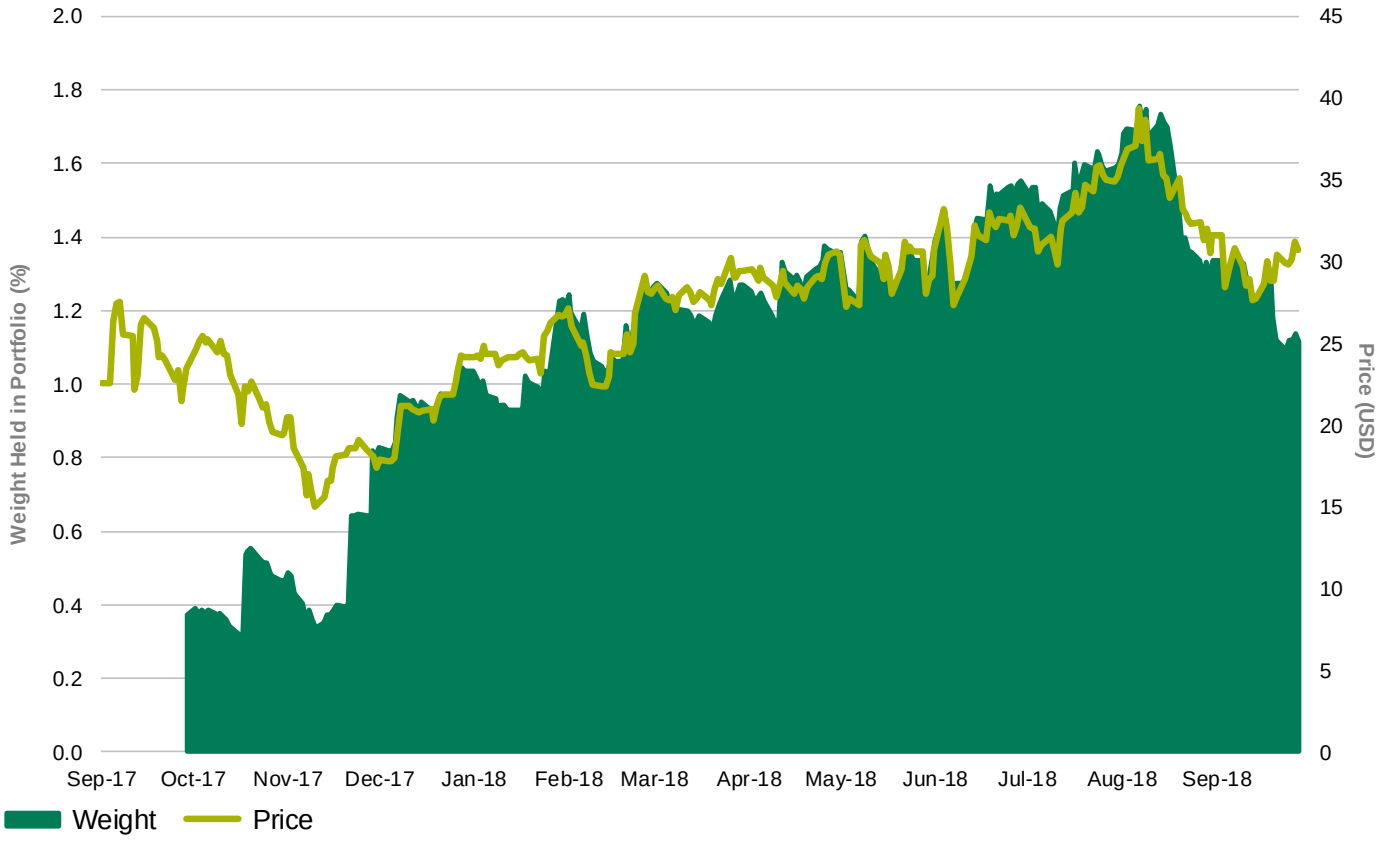


- I — Inflection
- S — Sustainability
- G — Earnings Gap
- V — Valuation/Risk-Reward

American Century Investments

Buy Example – Magazine Luiza S.A.

Magazine Luiza S.A.
Emerging Markets Weight vs. Daily Closing Price (U.S. Dollar)
Data from 9/1/2017 to 9/28/2018



Source: FactSet

Magazine Luiza is one of the largest retail chains in Brazil, focusing on durable goods for middle-income families. Magazine Luiza offers a wide variety of electronic goods, home appliances, and furniture through an omnichannel structure of physical and virtual stores. Additional offerings include consumer credit (Luizacred), insurance (Luizaseg), and consortium (Consorcio Luiza).

References to specific securities are for illustrative purposes only, and are not intended as recommendations to purchase or sell securities. Opinions and estimates offered constitute our judgment and along with other portfolio data, are subject to change without notice.

Inflection

- Following weak financial performance in 2015, performance in 2016, showed significant improvement despite a weak economic backdrop.
- Margins expanded and same-store-sales saw momentum improvement.
- Working capital and capital expenditure discipline also improved allowing faster than expected deleveraging.

Sustainability

- Economic conditions in Brazil are improving: real wage growth and lower inflation and unemployment rates, which benefits the emerging middle class.
- Low penetration of appliance and consumer electronics sales.
- E-commerce penetration is in its early stages in Brazil.
- Management plans to accelerate the roll-out of virtual and brick & mortar stores.

Gap

- Benefits of the accelerating economy and stronger operating leverage have not been incorporated into estimates.

Valuation

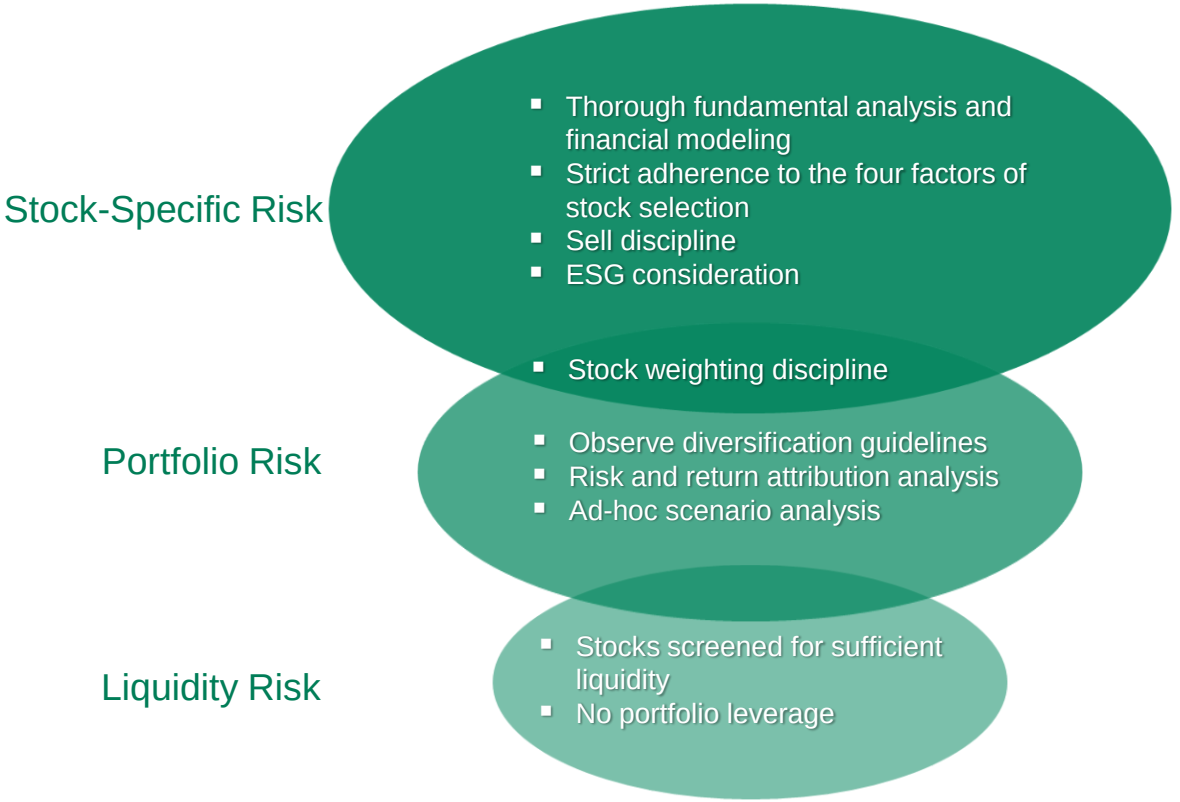
- Despite strong growth prospects in both e-commerce and brick & mortar operations and increasing market share, still at a relative discount to peers.

American Century Investments

Multiple Layers of Risk Management

Portfolio construction within a risk aware framework allows stock selection to drive consistent, predictable returns.

- We believe risk is best managed by understanding the fundamentals of the companies we own.
- In building client portfolios, we strictly adhere to our proven philosophy, while minimizing unintended risks.
- Portfolios follow diversification guidelines.



Risk management does not imply no risk.

- Analysts and portfolio managers are responsible for understanding stock specific risk.
- Portfolio managers work alongside the Global Analytics team to understand portfolio level risk.
- Top-down portfolio level risk is continuously assessed in an effort to avoid taking unintended risks driven by exposures to factors, countries, industries, currencies, etc.
  - Collaboration between global analytics team and portfolio managers to understand the sources of the portfolio level risk.
  - Our robust process considers risk from a variety of different approaches including, but not limited to, scenario analysis on various factors to assess potential impacts on the portfolio.

American Century Investments

Risk-Aware Framework

STRATEGY RISK GUIDELINES	Emerging Markets
Benchmark	MSCI Emerging Markets
Expected # of holdings	80-110
Security weights (at purchase)	Maximum 3% overweight to benchmark
Sector guidelines	+/- 10% of benchmark weight
Regional guidelines[1]	+/- 10% of benchmark weight
Country guidelines	None
Cash (% AUM)	Maximum of 3%

[1]Refers to Emerging Asia, Africa, Emerging Europe, Latin America.
Portfolio construction guidelines document operational policies and not necessarily investment restrictions imposed on management of the strategy.

Additional Oversight

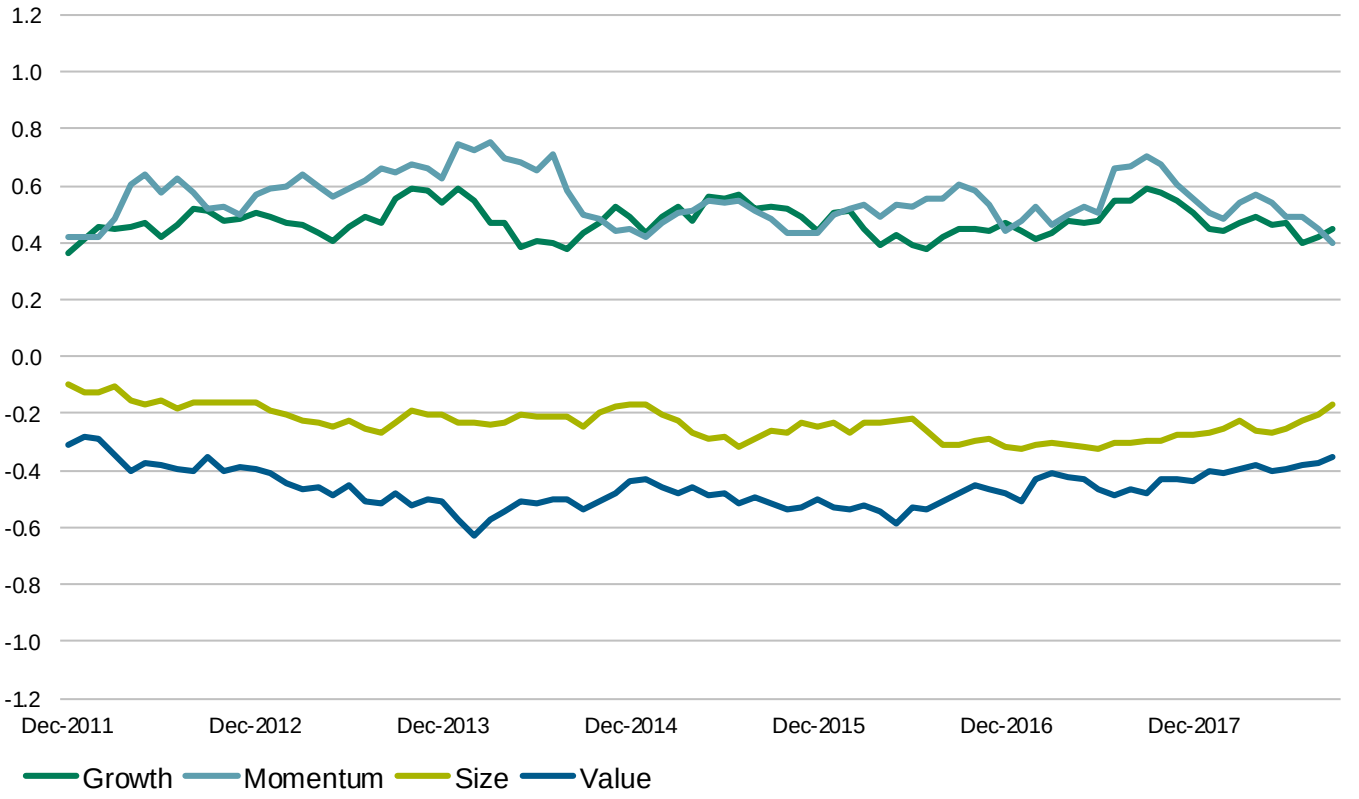
- Quantitative performance monitoring
- Expected performance contours
- Integrated compliance function

American Century Investments

Ensuring Consistency Through Risk Models

- Barra Global Equity Model (GEM2) utilized on post-portfolio construction basis to check for unintended exposures.
- We seek to take on informed risk in the portfolio, understanding the sources of risk at all times.

Active Risk Exposure
Emerging Markets vs. MSCI EM



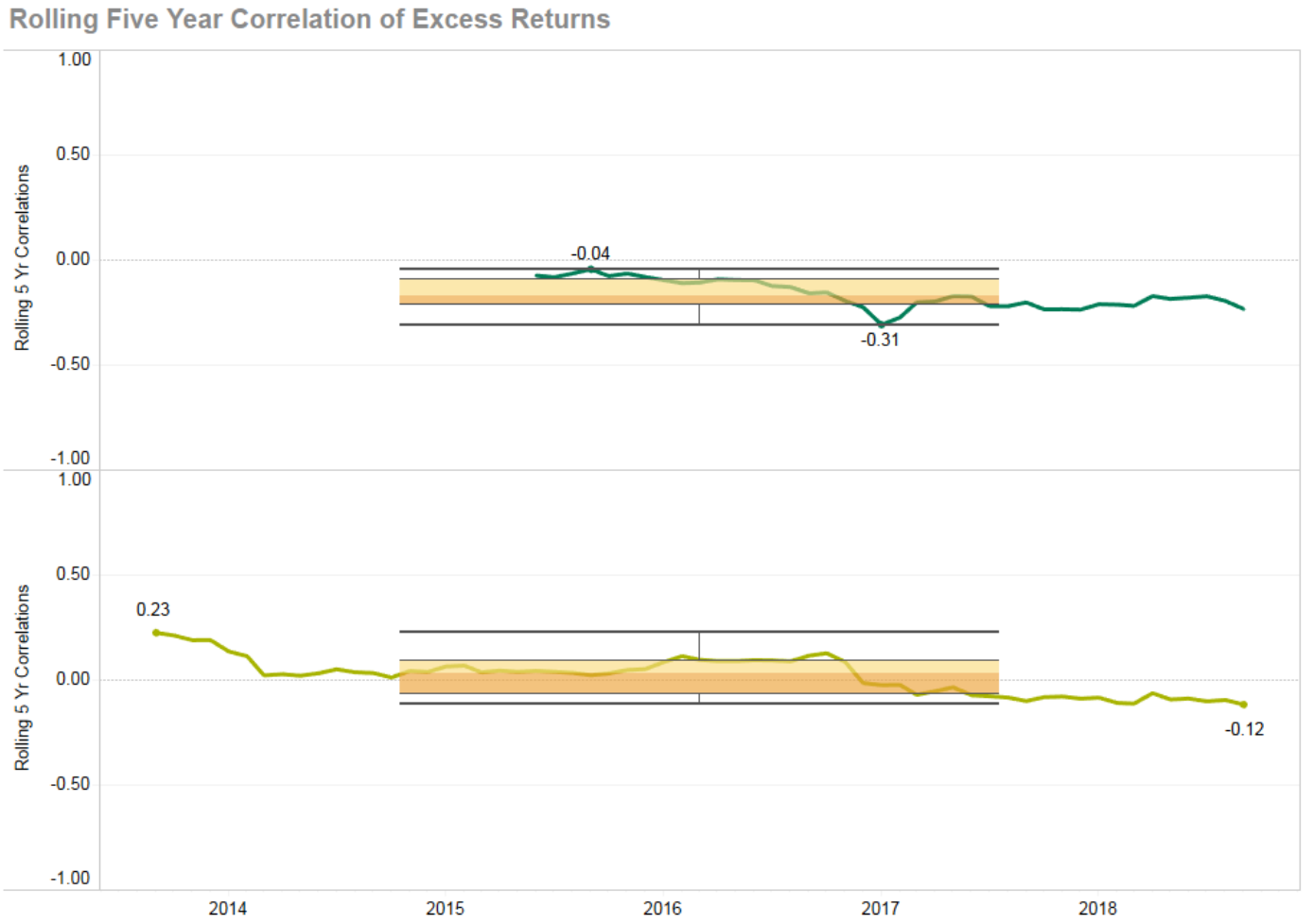
Data from 12/30/2011 to 9/28/2018
Source: FactSet

Risk management does not imply low risk.

Notes

American Century Investments

Consistent Plan Diversification



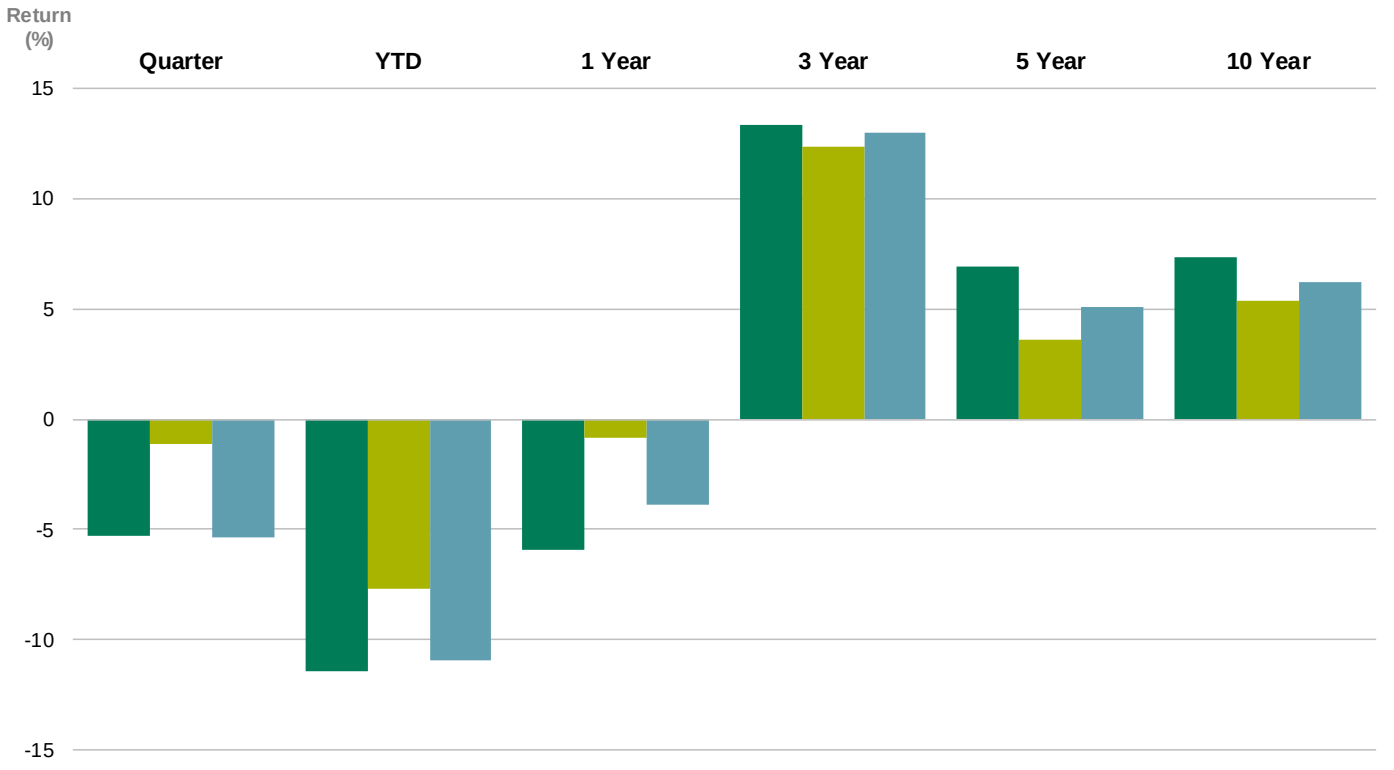
ARMB Value Strategy 1 vs. American Century Emerging Markets
ARMB Value Strategy 2 vs. American Century Emerging Markets

Data as of 9/30/2018
Rolling 5 year correlations relative to MSCI Emerging Markets Index
Source: eVestment

Correlation of excess returns with American Century Emerging Markets over a rolling 5 year basis

American Century Investments

Performance



- Emerging Markets
- MSCI Emerging Markets
- MSCI Emerging Markets Growth

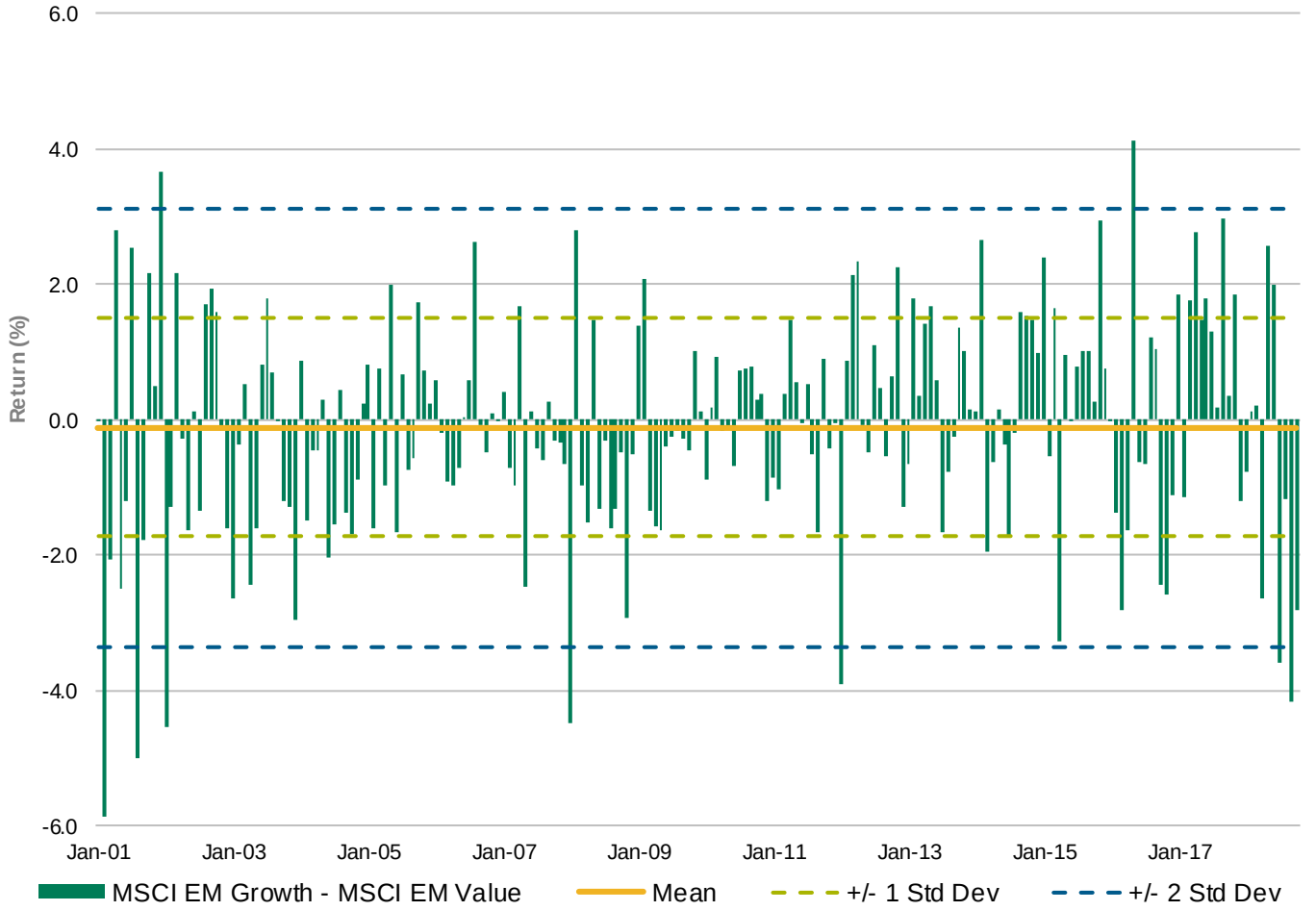
	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
Emerging Markets	**-5.27**	**-11.45**	**-5.96**	**13.37**	**6.95**	**7.33**
MSCI Emerging Markets	-1.09	-7.68	-0.81	12.35	3.61	5.40
MSCI Emerging Markets Growth	-5.38	-10.94	-3.89	13.02	5.08	6.18
Excess Return (MSCI EM)	**-4.18**	**-3.77**	**-5.15**	**1.02**	**3.34**	**1.93**
Excess Return (MSCI EM Growth)	**0.11**	**-0.51**	**-2.07**	**0.35**	**1.87**	**1.15**

Data as of 9/30/2018. Performance in USD, gross of fees. Periods greater than one year have been annualized.
Source: FactSet

American Century Investments

Growth/Value Rotation

Monthly Returns
MSCI EM Growth Less MSCI EM Value

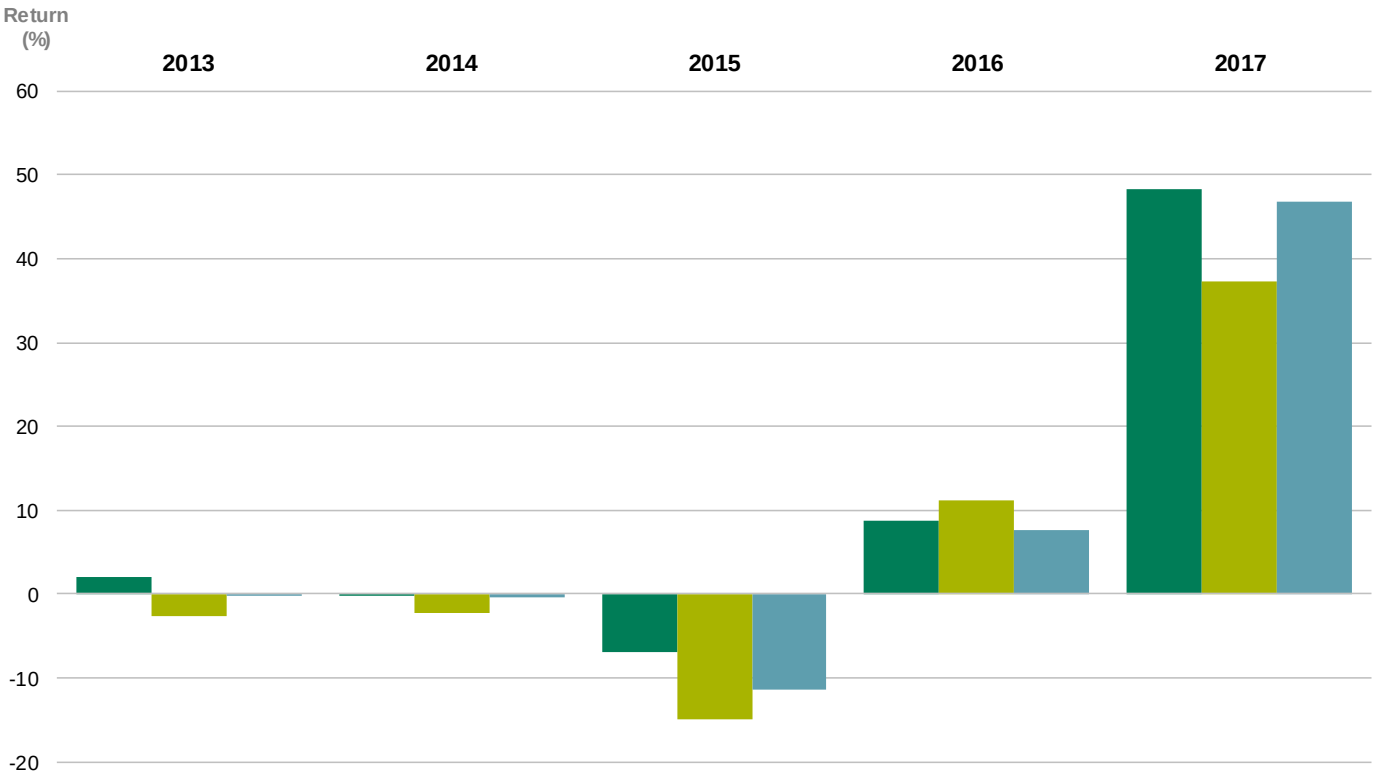


Data from 1/1/2001 to 10/31/2018
Source: FactSet

- 2 of the past 7 periods where value has outperformed growth by more than two standard deviations have occurred during the 3rd quarter of 2018.
  - July 2018 and September 2018 were two of the most significant periods of value outperformance since 2001.
- Our data suggests recent bouts of volatility are driven primarily by a risk-off sentiment.

American Century Investments

Annual Performance



Emerging Markets
MSCI Emerging Markets
MSCI Emerging Markets Growth

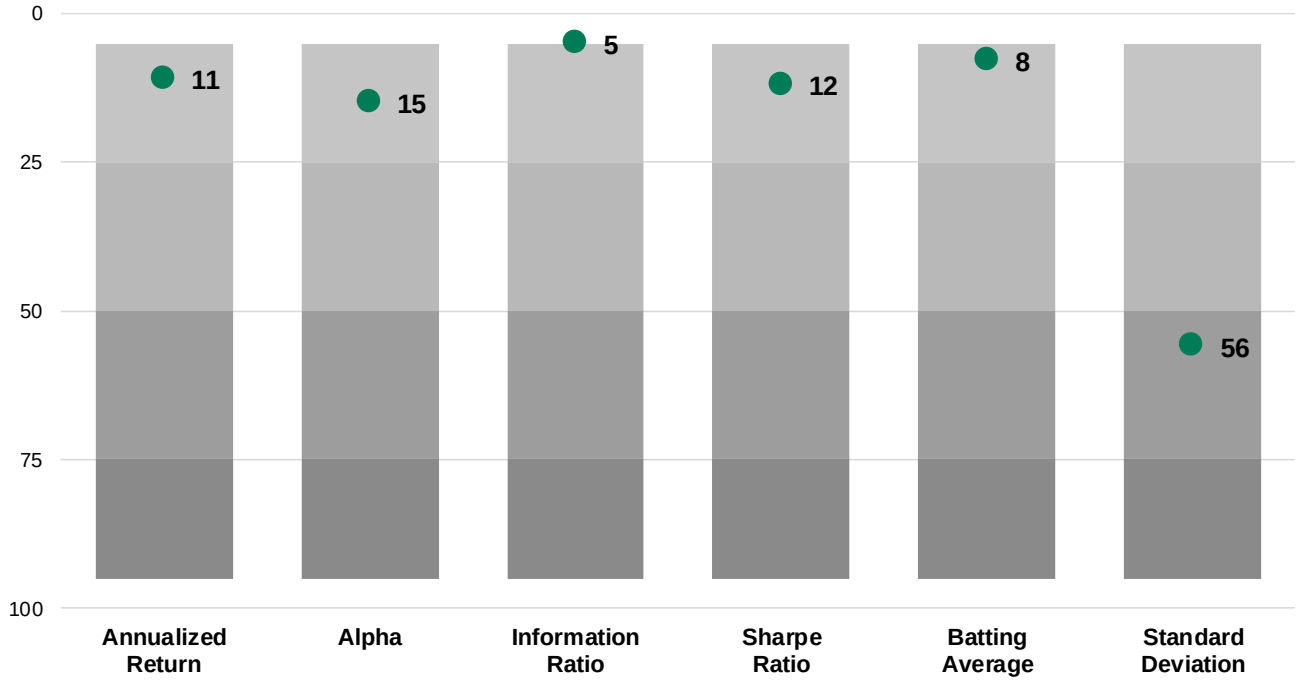
	2013	2014	2015	2016	2017
Emerging Markets	**1.98**	**-0.13**	**-6.96**	**8.78**	**48.29**
MSCI Emerging Markets	-2.60	-2.19	-14.92	11.19	37.28
MSCI Emerging Markets Growth	-0.18	-0.35	-11.34	7.59	46.80
Excess Return (MSCI EM)	**4.58**	**2.06**	**7.96**	**-2.41**	**11.01**
Excess Return (MSCI EM Growth)	**2.16**	**0.22**	**4.38**	**1.19**	**1.49**

Performance in USD, gross of fees.
Source: FactSet

American Century Investments

Risk-Adjusted Statistics vs. All Cap Peers

Universe: eA Emerging Mkts All Cap Equity
Benchmark MSCI EMF (Emerging Markets) Growth
Period: October 2013 to September 2018



	Annualized Return	Alpha	Information Ratio	Sharpe Ratio	Batting Average	Standard Deviation
American Century Inv: Emerging Markets	6.96	1.98	0.60	0.46	55.00	14.00
Peer Median	4.64	-0.15	-0.09	0.29	48.33	14.28
Number of Managers in Universe	222					

Composite returns are in USD, gross of fees
Source: FactSet, eVestment

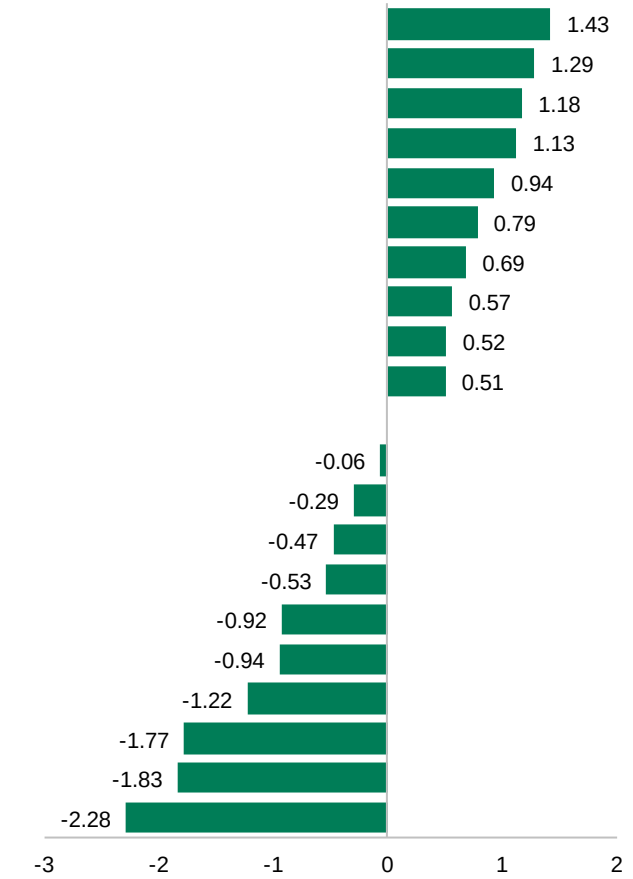
Notes

American Century Investments

Country/Regional Allocations

Portfolio: EMERGING MARKETS

Benchmark: MSCI Emerging Markets



Country	Portfolio Weight (%)	Benchmark Weight (%)
Mexico	4.59	3.16
United Kingdom	1.29	0.00
India	9.71	8.53
Hungary	1.42	0.29
Indonesia	2.89	1.95
Czech Republic	0.98	0.19
Peru	1.10	0.41
Russia	4.27	3.70
Brazil	6.71	6.19
Thailand	2.99	2.48
Pakistan	0.00	0.06
Greece	0.00	0.29
Colombia	0.00	0.47
South Korea	14.35	14.88
Taiwan	11.37	12.29
Qatar	0.00	0.94
Poland	0.00	1.22
Malaysia	0.66	2.43
South Africa	4.26	6.09
China	28.71	30.99

Region	Portfolio Wgt (%)	Bnchmrk Wgt (%)
Latin America	13.6	11.3
Emerging Europe	7.6	6.3
Africa	4.9	6.2
Emerging Asia	72.7	76.2

Data as of 9/30/2018

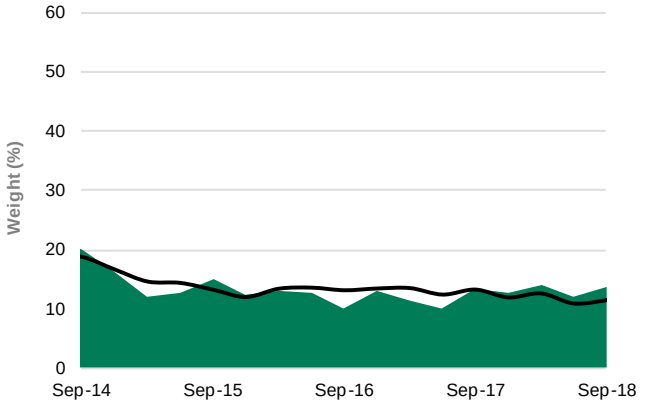
Source: FactSet

American Century Investments

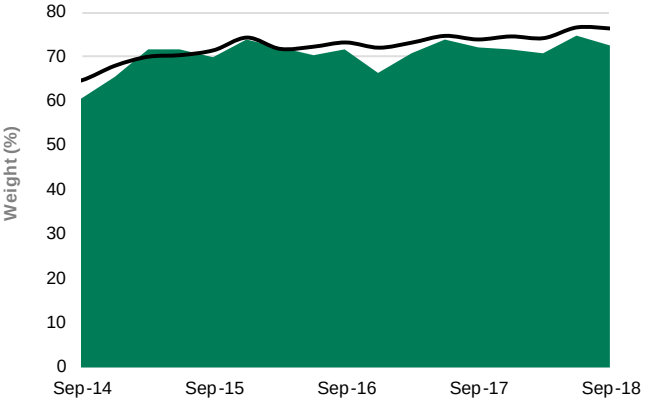
Diversifying Across Regions

Portfolio: EMERGING MARKETS
Benchmark: MSCI EMERGING MARKETS

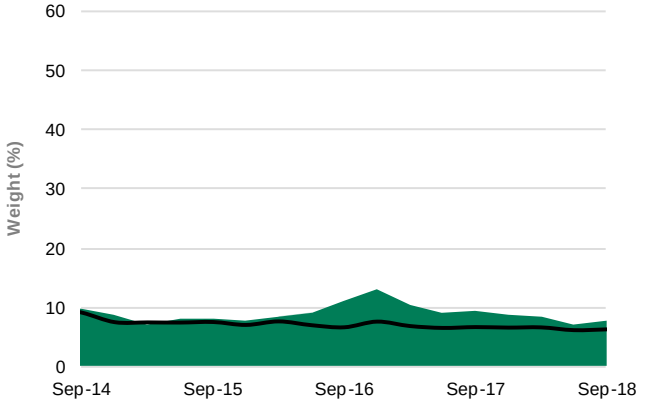
Latin America



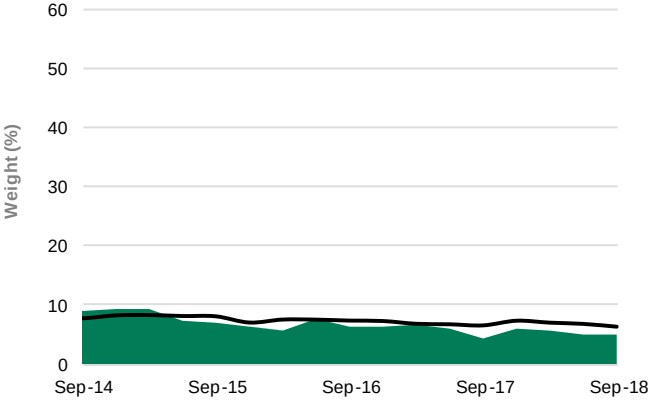
Emerging Asia



Emerging Europe



Africa



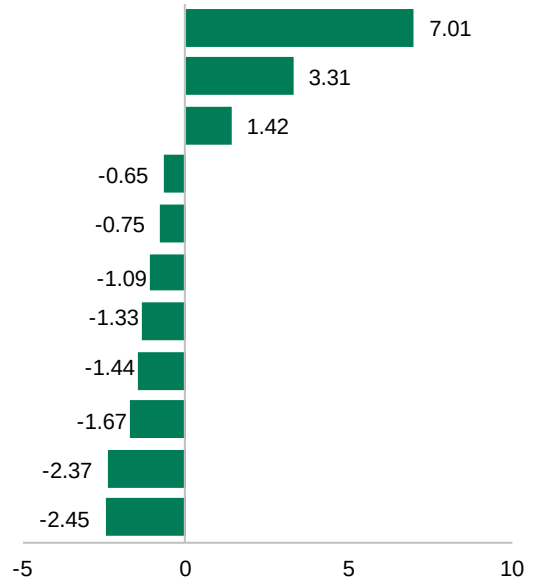
Data as of 9/30/2018
Source: FactSet

Notes

American Century Investments

Sector Allocation

Portfolio: EMERGING MARKETS
Benchmark: MSCI Emerging Markets



Sector	Portfolio Weight (%)	Benchmark Weight (%)
Consumer Discretionary	15.98	8.97
Consumer Staples	9.88	6.57
Industrials	6.86	5.44
Financials	22.62	23.27
Information Technology	26.17	26.92
Health Care	1.95	3.04
Real Estate	1.45	2.78
Utilities	0.97	2.41
Materials	6.22	7.89
Telecommunication Services	2.12	4.49
Energy	5.77	8.22

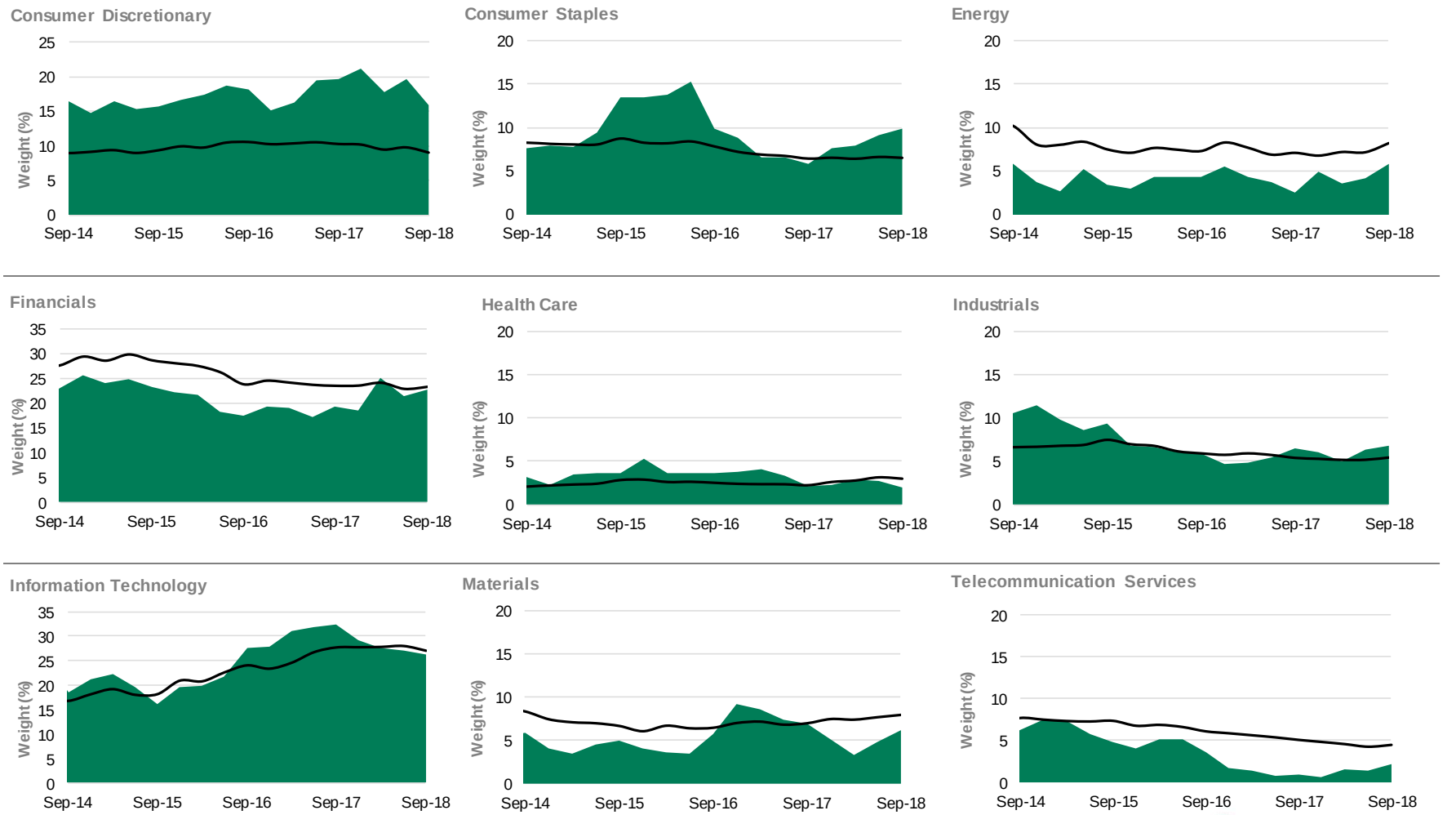
Data as of 9/30/2018
Source: FactSet

Notes

American Century Investments

Diversifying Across Sectors

Portfolio: **EMERGING MARKETS**
Benchmark: MSCI EMERGING MARKETS



Data as of 9/30/2018
Source: FactSet

American Century Investments

Portfolio Characteristics

Portfolio: **EMERGING MARKETS**
Benchmark1: MSCI Emerging Markets
Benchmark2: MSCI Emerging Markets Growth

	Portfolio	Benchmark1	Benchmark2
Weighted Average Market Capitalization	$51.7 B	$48.7 B	$75.9 B
Median Market Capitalization	$4.7 B	$1.9 B	$2.1 B
P/E Ratio, Forecasted 1-Year	14.3 x	11.8 x	16.1 x
EPS Growth, Historical 1-Year	34.2%	29.9%	38.6%
EPS Growth, Forecasted 1-Year	20.0%	15.7%	19.4%
ROE, Historical 1-Year	20.6%	17.8%	22.3%
% in Cash	0.7%	0.0%	0.0%
Turnover, 1-Year	39%	2%	22%
Number of Holdings	92	1151	532

Data as of 9/30/2018 in USD. Forecasts are not a reliable indicator of future performance.
Source: FactSet

Notes

American Century Investments

Benefits for the Alaska Retirement Management Board

American Century Emerging Markets offers the Alaska Retirement Management Board:

- Consistent growth factor exposures to complement existing value factor exposures, providing the opportunity to add alpha while dampening overall plan volatility.
- Diversified exposure to small, mid and large-cap emerging market equities, across more emerging market countries, aimed at a consistent return profile and strong risk-adjusted returns.
- Differentiated growth philosophy, allowing us to identify growth and add value across diverse market cycles.

Notes

American Century Investments

Appendix

- Client Relationship Management
- Performance Attribution
- Market Outlook
- China
- Biographies
- Performance Disclosures

American Century Investments

Client Relationship Management

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American Century Investments

Our Commitment – Client Relationship Management

Supporting Your Efforts

Our client relationship management philosophy is designed to understand the unique needs of each client – and to exceed client expectations.

Delivering Customized Resources

Design	Implement	Monitor	Evaluate

Customized, comprehensive service that:

- Provides a dedicated relationship management team
- Is your single point of contact
- Provides resources to effectively monitor your investment strategy
- Delivers American Century Investments to your firm

American Century Investments

Knowing What You Can Expect From American Century Investments

"It's my belief that if we make others successful, they in turn will make us successful."

–James E. Stowers Jr., Founder

Our client relationship management philosophy is designed to understand the unique needs of each client – and to exceed client expectations.

- Dedicated client relationship managers who provide:
  - Proactive communication and information
  - Thoughtful investment reviews
  - Effective coordination between internal and external business partners
  - Timely, transparent and direct resolution of issues
- Client-specific reporting and site visits
- Consultant and advisor due diligence
- Account-specific attribution and commentary
- Investment insights, including white papers, outlooks and industry perspectives

Your Dedicated Relationship Management Team

Chat Cowherd
Vice President
Head of Global Client Relationship Management
816-340-3233
chat_cowherd@americancentury.com

Christina Marra
Director
Client Relationship Management
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Angie Paredes
Senior Account Associate
Client Relationship Management
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Matt Bittel
Senior Account Associate
Client Relationship Management
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matt_bittel@americancentury.com

American Century Investments

Biography

Chat Cowherd
Vice President
Head of Global Client Relationship Management

Chat is responsible for managing client relationships, which includes public and corporate retirement plans, endowments and foundations. Before joining American Century Investments in 2014, Chat was an Executive Director with JPMorgan Retirement Plan Services supporting the consultant/advisor channels. Previously, Chat was a Relationship Manager for American Century Investments. Chat has worked in the institutional investment industry since 1988. He earned a bachelor's degree from the University of Missouri and a master's degree in business administration University of Missouri-Kansas City. Chat holds a Certified Pension Consultant (CPC) designation from the American Society of Pension Professionals and Actuaries (ASPPA). Chat holds FINRA 6, 63, 7, and 24 licenses.

American Century Investments

Performance Attribution

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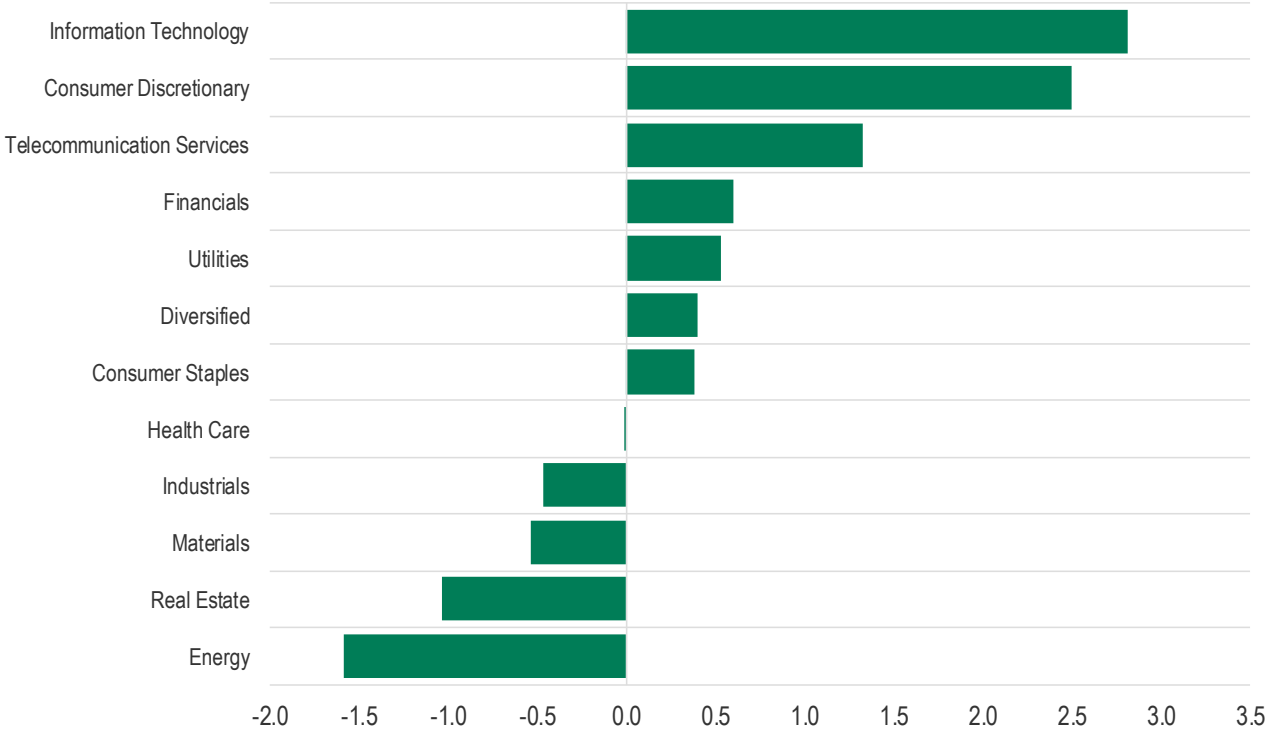
American Century Investments

Performance Attribution – Three Years

THREE YEARS ENDING 9/30/2018

Portfolio: EMERGING MARKETS
Benchmark: MSCI Emerging Markets



	Ann. 3 Year Return (%)
Portfolio	**13.37**
Benchmark	12.35
Excess Return	1.02

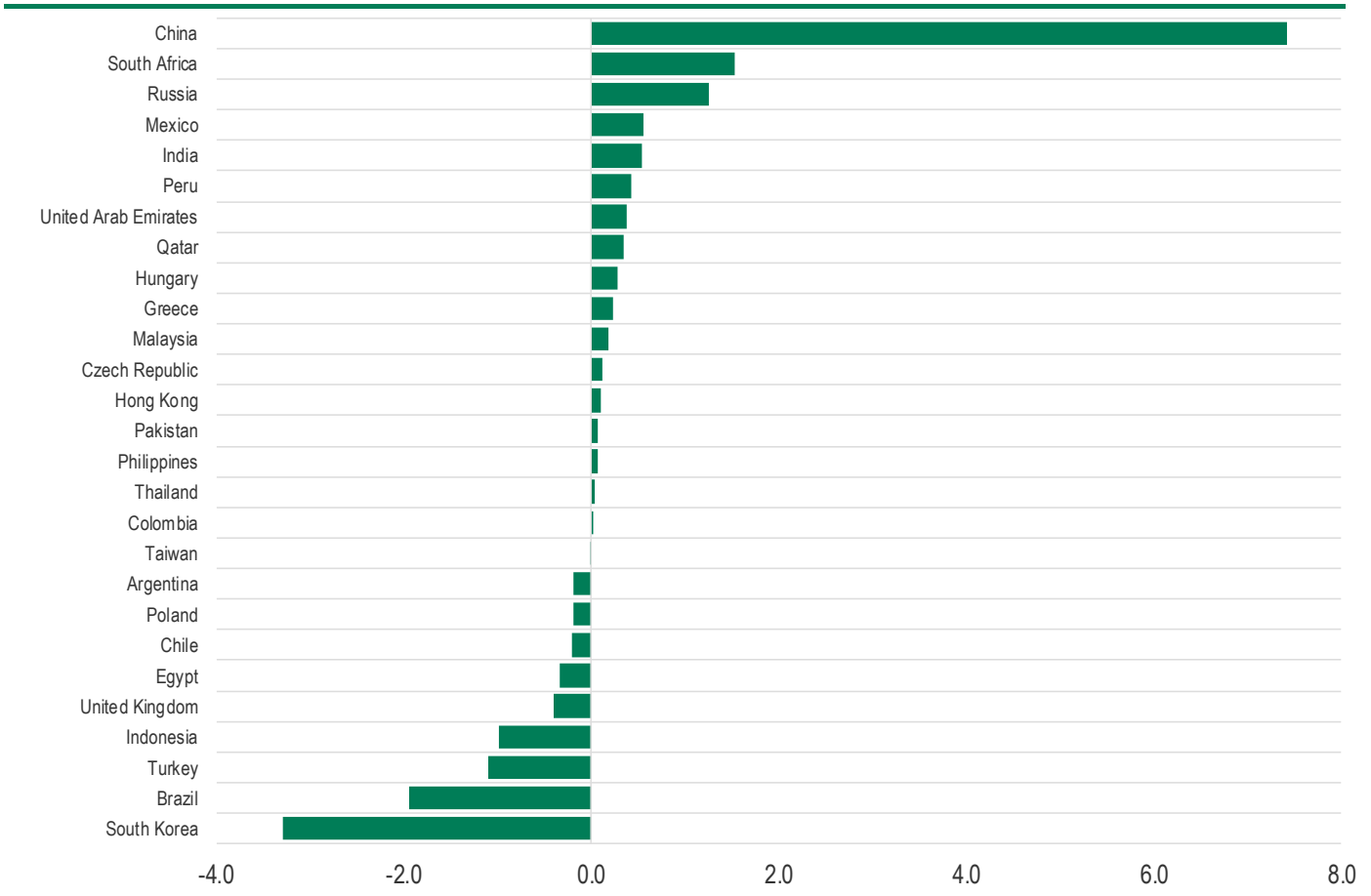
Data from 9/30/2015 to 9/30/2018. Performance in USD, gross of fees. Periods greater than one year have been annualized.
Source: FactSet
Diversified sector includes portfolio holdings that cannot be attributed to a specific sector.

American Century Investments

Performance Attribution – Three Years

THREE YEARS ENDING 9/30/2018

Portfolio: EMERGING MARKETS
Benchmark: MSCI Emerging Markets



	Ann. 3 Year Return (%)
Portfolio	**13.37**
Benchmark	12.35
Excess Return	1.02

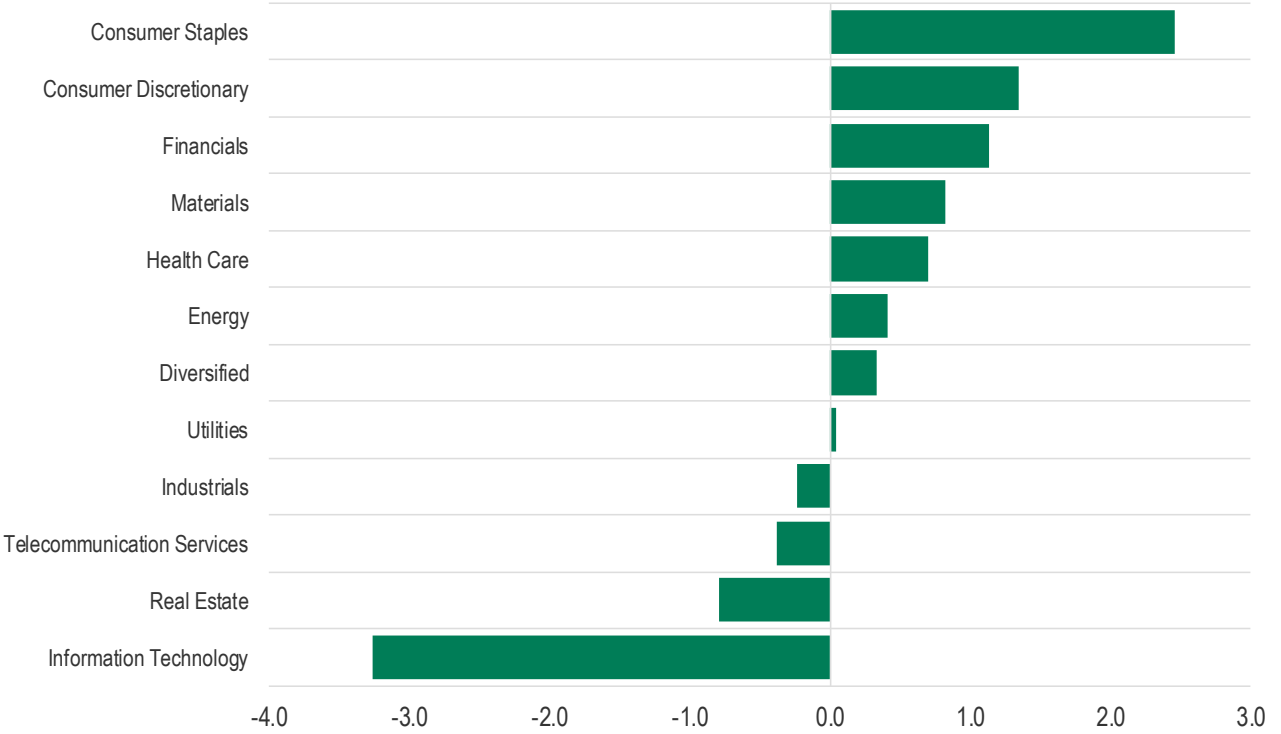
Data from 9/30/2015 to 9/30/2018. Performance in USD, gross of fees. Periods greater than one year have been annualized.
Source: FactSet

American Century Investments

Performance Attribution – Three Years

THREE YEARS ENDING 9/30/2018

Portfolio: EMERGING MARKETS
Benchmark: MSCI Emerging Markets Growth



	Ann. 3 Year Return (%)
Portfolio	**13.37**
Benchmark	13.02
Excess Return	0.35

Data from 9/30/2015 to 9/30/2018. Performance in USD, gross of fees. Periods greater than one year have been annualized.

Source: FactSet

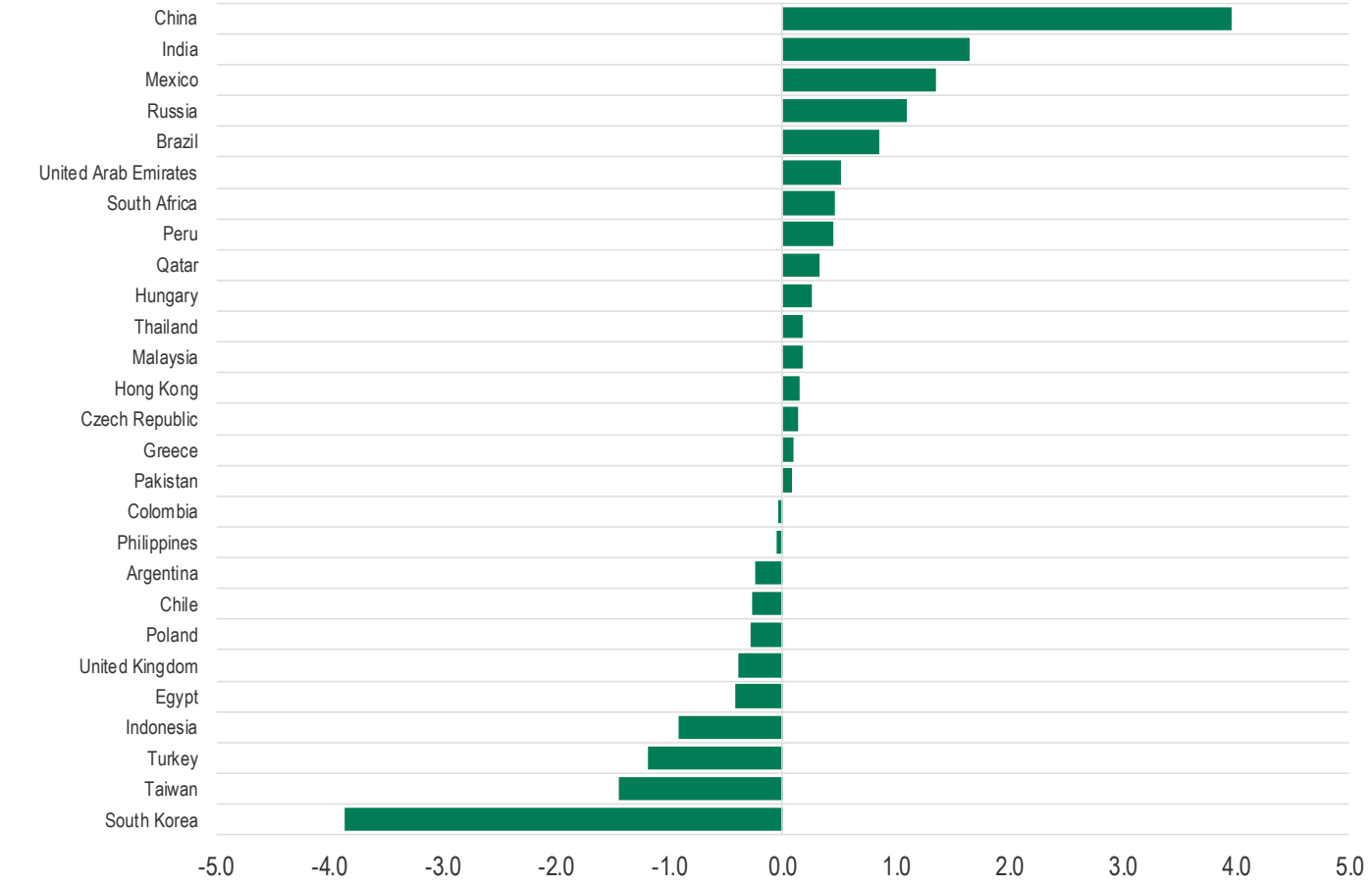
Diversified sector includes portfolio holdings that cannot be attributed to a specific sector.

American Century Investments

Performance Attribution – Three Years

THREE YEARS ENDING 9/30/2018

Portfolio: EMERGING MARKETS
Benchmark: MSCI Emerging Markets Growth



	Ann. 3 Year Return (%)
Portfolio	**13.37**
Benchmark	13.02
Excess Return	0.35

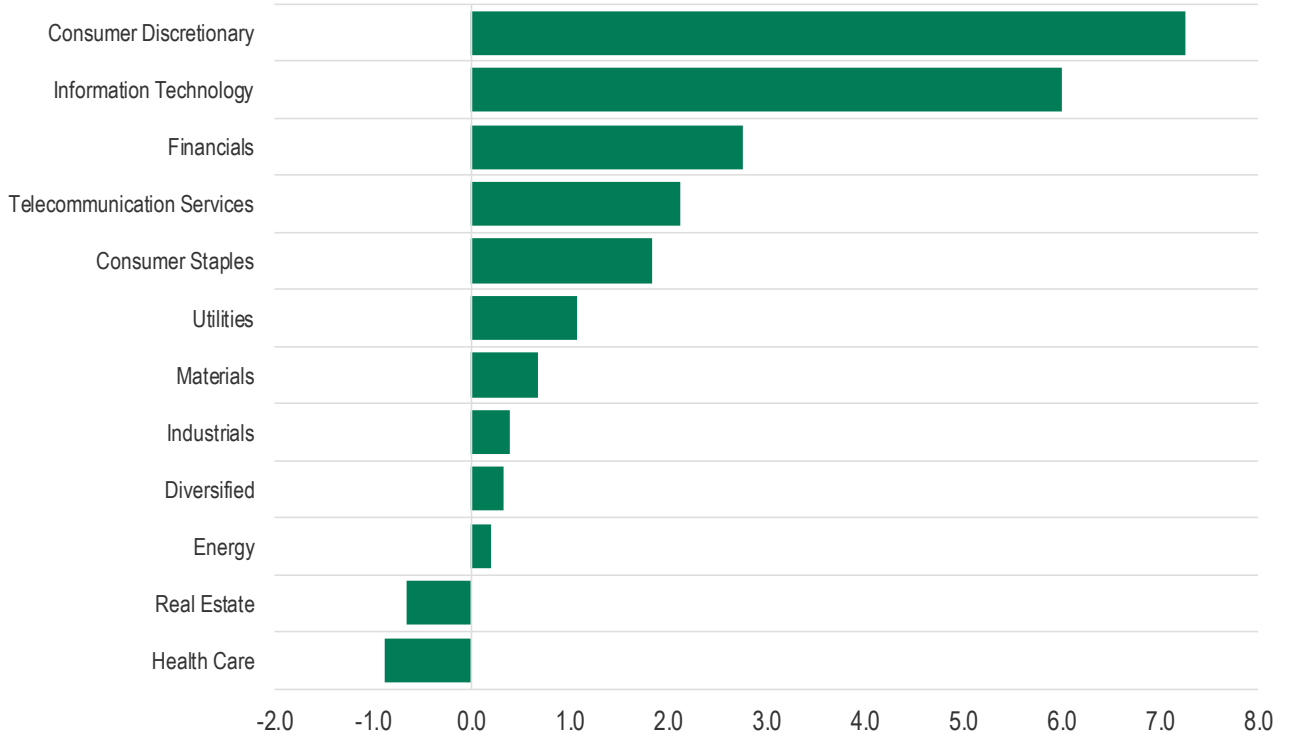
Data from 9/30/2015 to 9/30/2018. Performance in USD, gross of fees. Periods greater than one year have been annualized.
Source: FactSet

American Century Investments

Performance Attribution – Five Years

FIVE YEARS ENDING 9/30/2018

Portfolio: EMERGING MARKETS
Benchmark: MSCI Emerging Markets



	Ann. 5 Year Return (%)
Portfolio	**6.95**
Benchmark	3.61
Excess Return	3.34

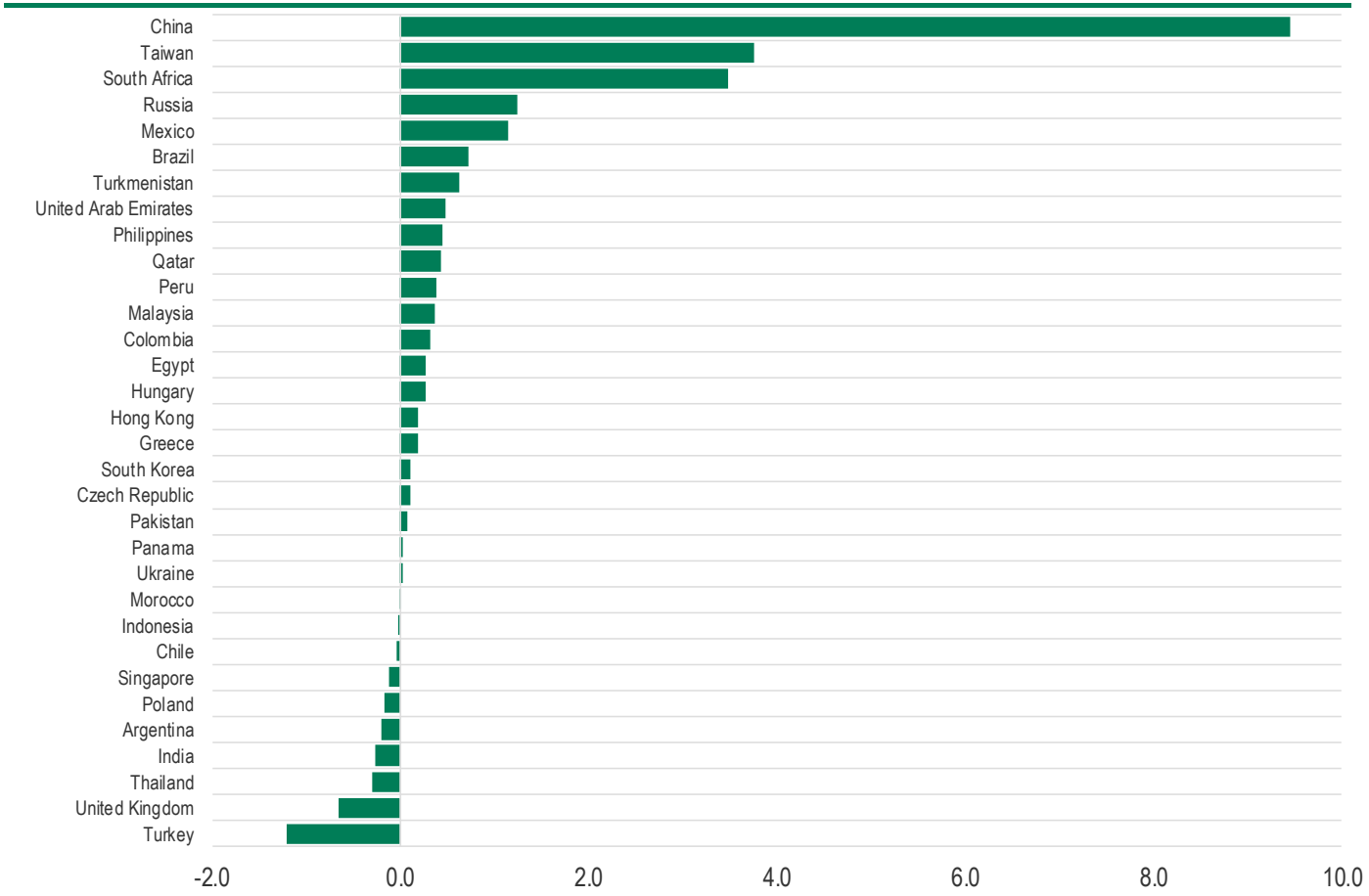
Data from 9/30/2013 to 9/30/2018. Performance in USD, gross of fees. Periods greater than one year have been annualized.
Source: FactSet
Diversified sector includes portfolio holdings that cannot be attributed to a specific sector.

American Century Investments

Performance Attribution – Five Years

FIVE YEARS ENDING 9/30/2018

Portfolio: EMERGING MARKETS
Benchmark: MSCI Emerging Markets



	Ann. 5 Year Return (%)
Portfolio	**6.95**
Benchmark	3.61
Excess Return	3.34

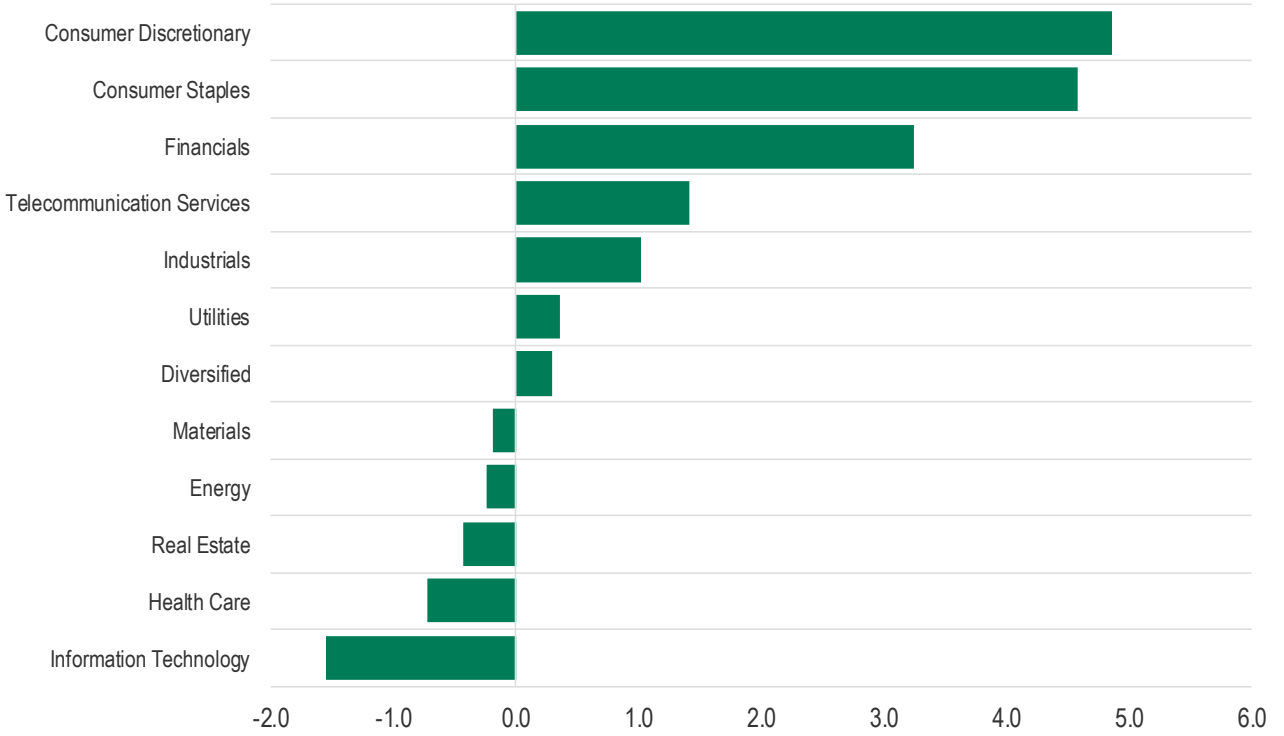
Data from 9/30/2013 to 9/30/2018. Performance in USD, gross of fees. Periods greater than one year have been annualized.
Source: FactSet

American Century Investments

Performance Attribution – Five Years

FIVE YEARS ENDING 9/30/2018

Portfolio: EMERGING MARKETS
Benchmark: MSCI Emerging Markets Growth



	Ann. 5 Year Return (%)
Portfolio	**6.95**
Benchmark	5.08
Excess Return	1.87

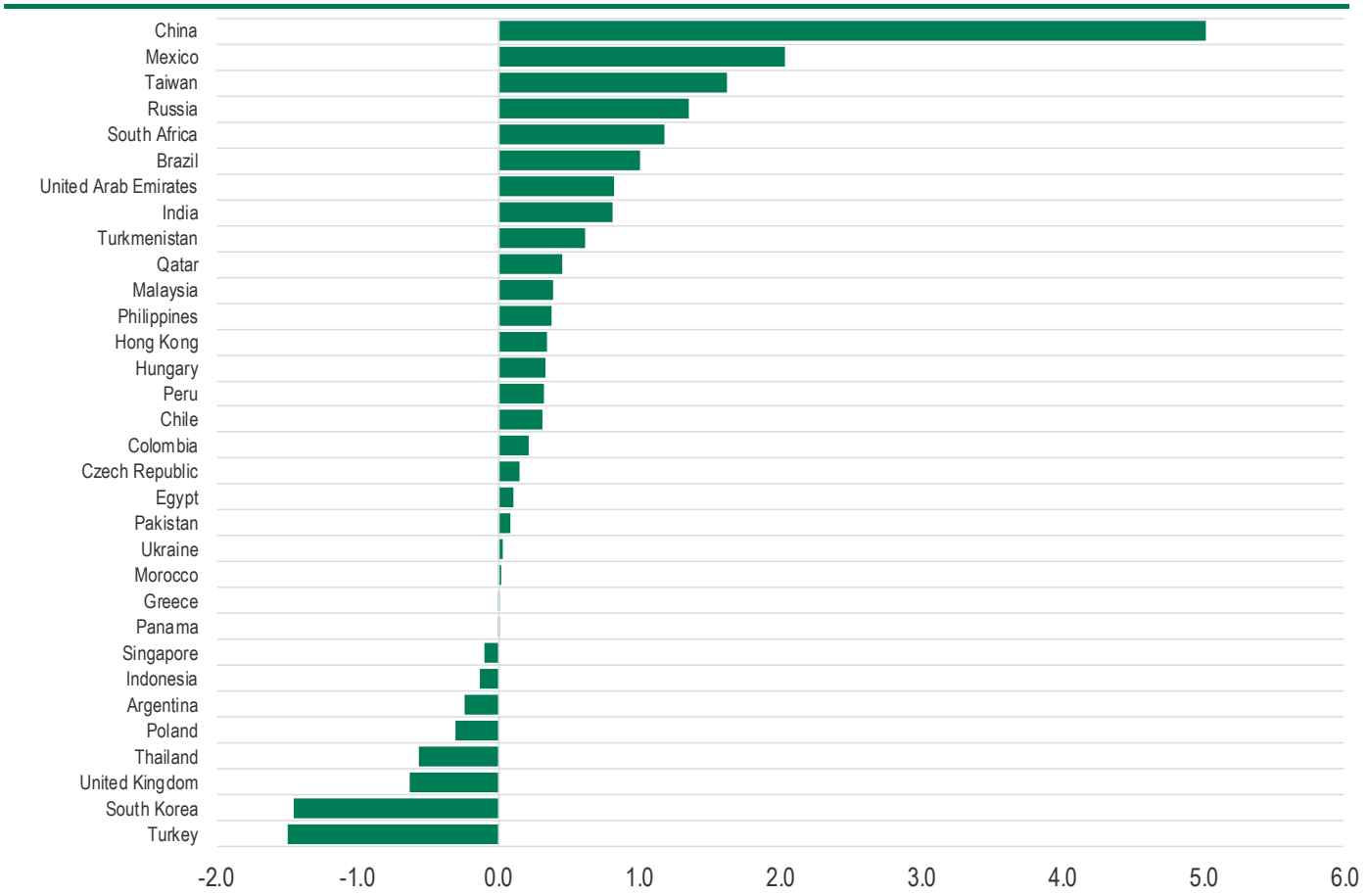
Data from 9/30/2013 to 9/30/2018. Performance in USD, gross of fees. Periods greater than one year have been annualized.
Source: FactSet
Diversified sector includes portfolio holdings that cannot be attributed to a specific sector.

American Century Investments

Performance Attribution – Five Years

FIVE YEARS ENDING 9/30/2018

Portfolio: EMERGING MARKETS
Benchmark: MSCI Emerging Markets Growth



Data from 9/30/2013 to 9/30/2018. Performance in USD, gross of fees. Periods greater than one year have been annualized.
Source: FactSet

	Ann. 5 Year Return (%)
Portfolio	**6.95**
Benchmark	5.08
Excess Return	1.87

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Macro Outlook

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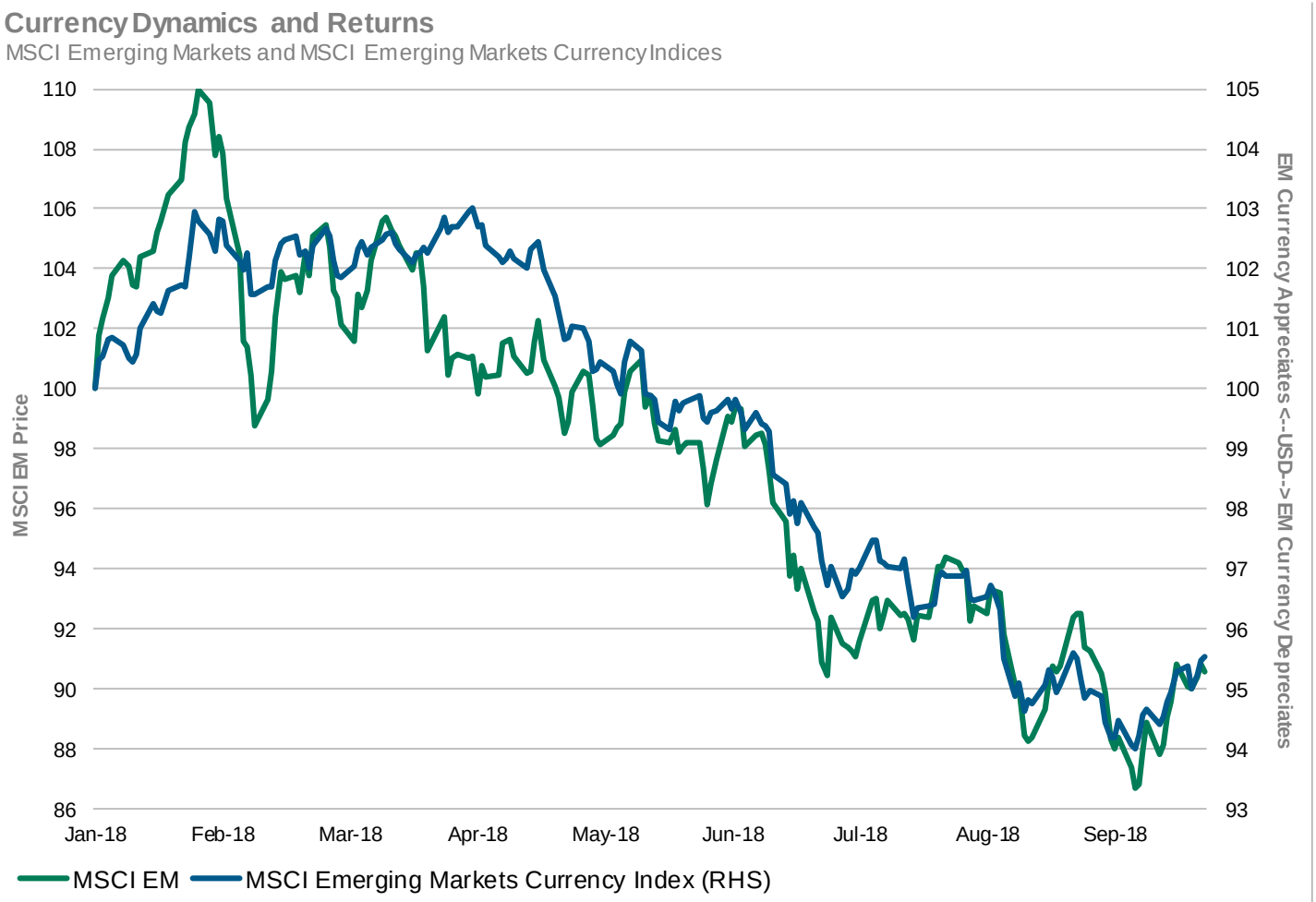
Influence of the U.S. Dollar on EM Equity Returns



1/1/2018 = 100. MSCI Emerging Markets Currency Index shows emerging market currencies relative to the U.S. Dollar where the weight of each currency is equal to its country weight in the MSCI EM index.
Data from 1/1/2018 to 9/28/2018
Source: Bloomberg

- EM equities have a strong inverse correlation to USD.
- Expectations are that the USD will peak with the cyclical momentum of the U.S. economy.

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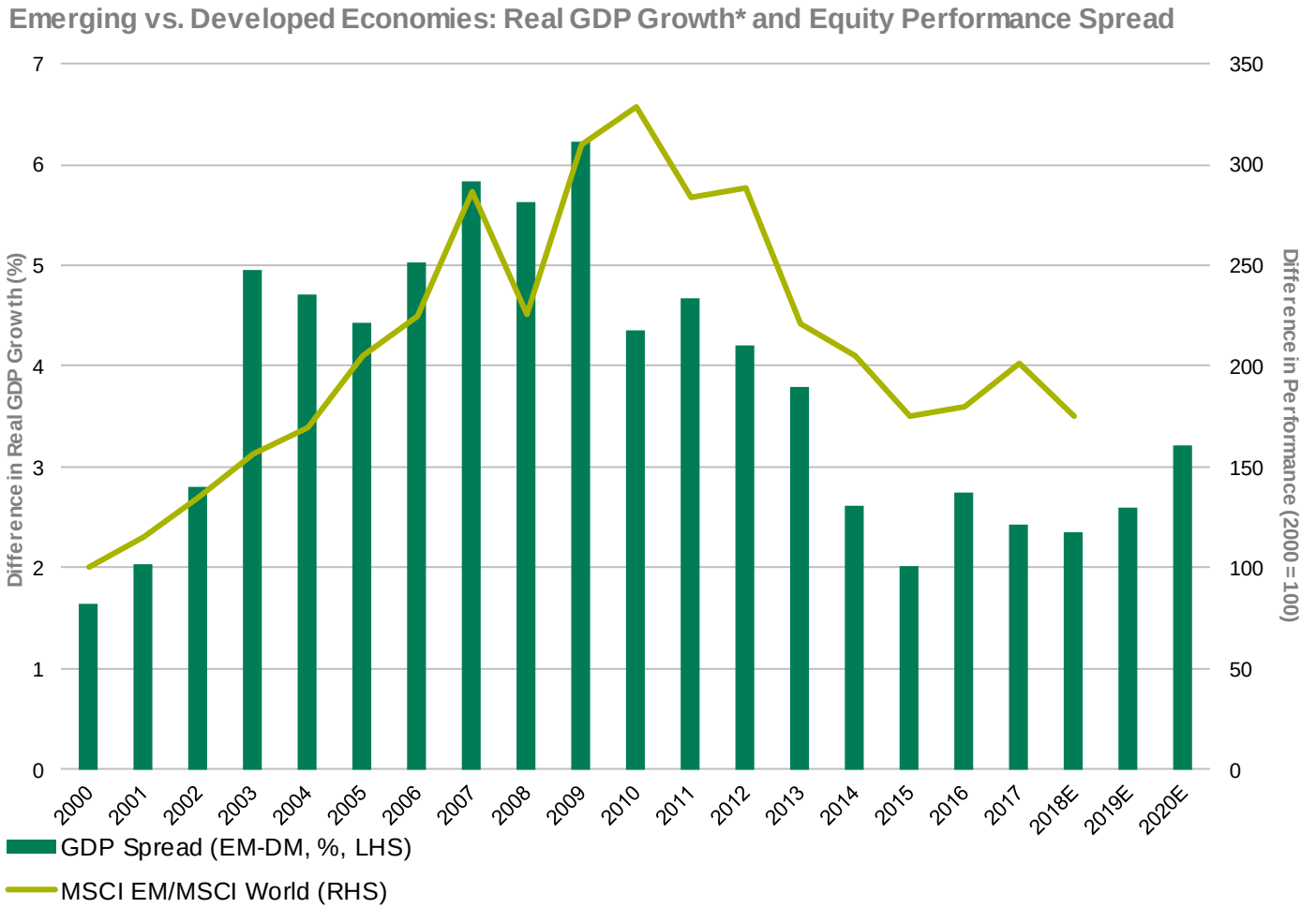
Growth Differentials Remain Supportive



Data as of: 9/30/2018. *GDP growth rate for 2018 based on full year estimates. Forecasts are not a reliable indicator of future performance.
Source: FactSet, IMF World Economic Outlook

- The change in annual EM-DM GDP growth differentials has correlated well with relative annual EM vs. DM market performance.
- Growth forecasts remain intact despite the trade issues.

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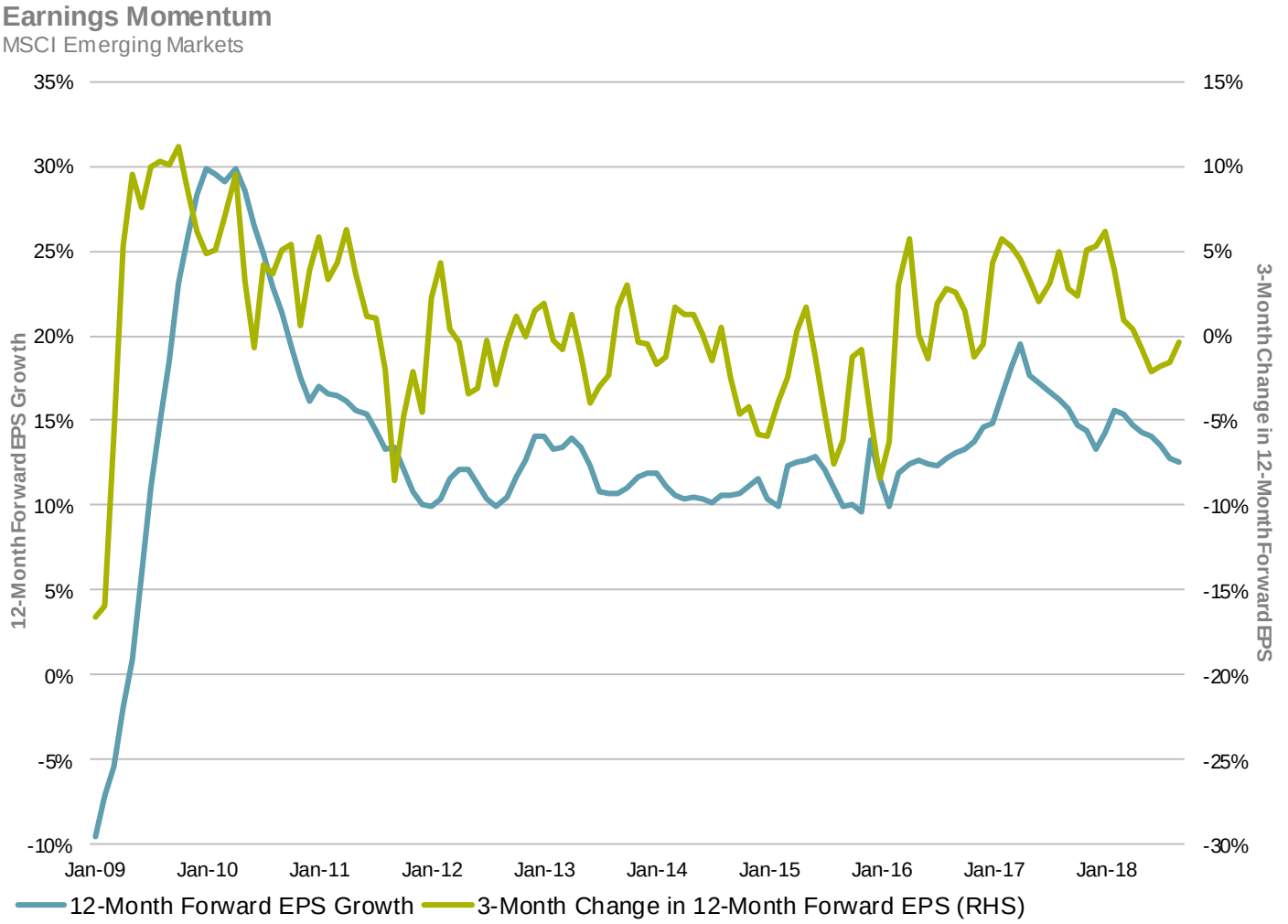
EM Earnings Growth Holding Up



Data from 1/31/2009 to 9/30/2018. Data in USD.
Source: FactSet

- Earnings momentum is steady and sits in solid double digits. ROE improvement continues.
- Expectations are that EM assets will begin to recover as growth stabilizes coupled with the market's already-lowered growth expectations.

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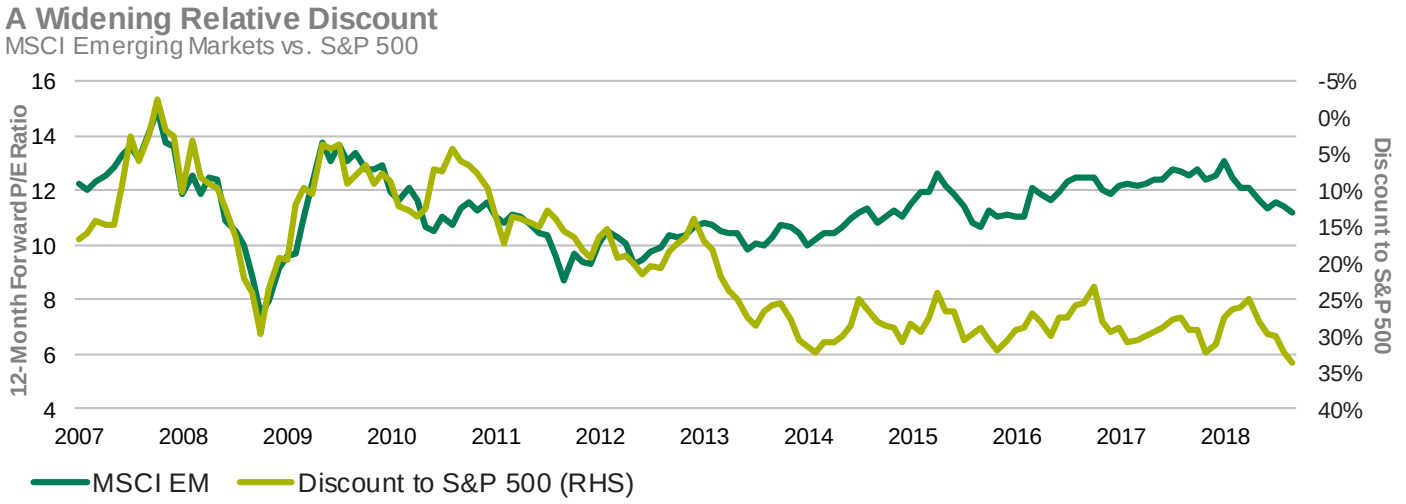
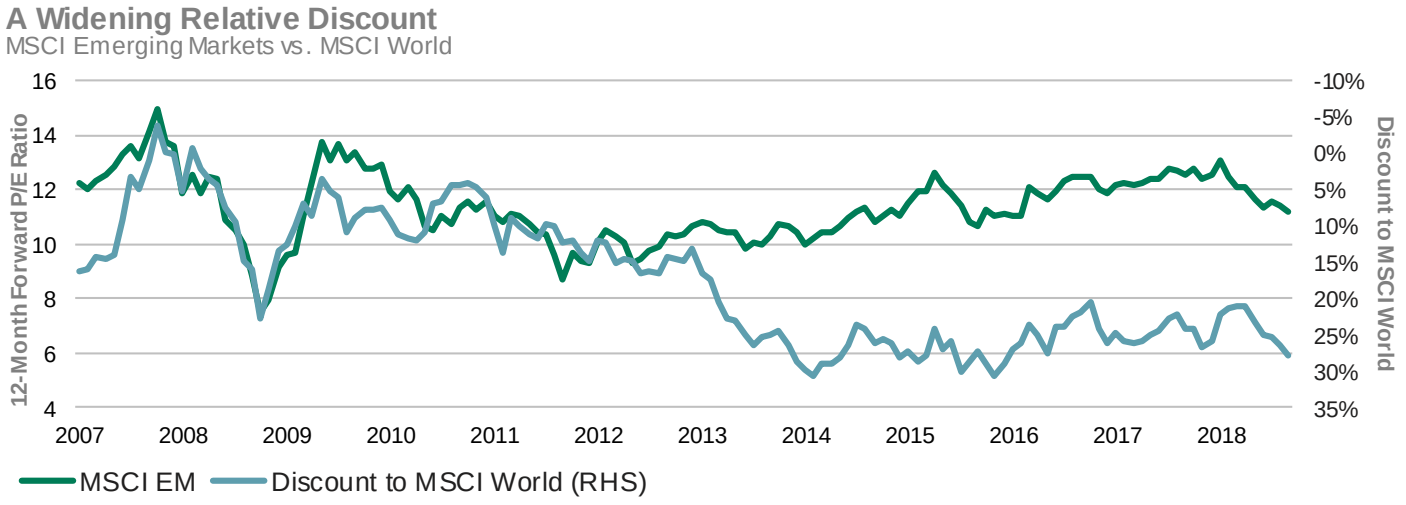
EM Equity Valuations Remain Attractive



Data from 1/31/2007 to 9/30/2018
Source: FactSet



Data from 1/31/2007 to 9/30/2018
Source: FactSet

Discounts exist between EM and DM (greater volatility of EM asset prices, perceived weaker corporate governance) but now the spreads are too wide.

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China

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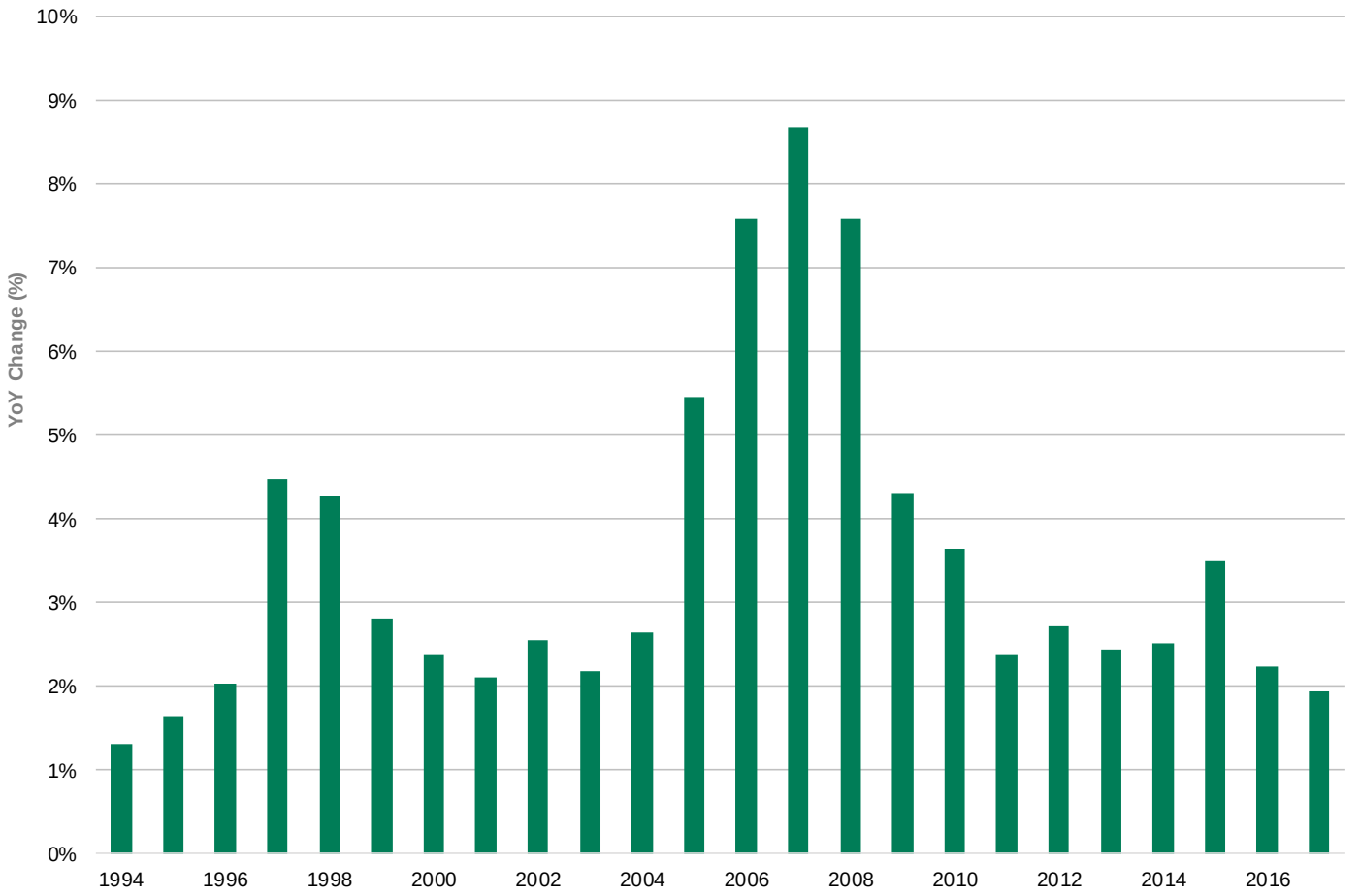
Chinese Net Exports

China: Net Exports as a Percentage of Nominal GDP



Data from 12/31/1994 to 12/31/2017
Source: NSB- National Bureau of Statistics China, FactSet

China is now a more domestic demand-driven economy. Net exports accounted for 2% of China's nominal GDP last year, down from 8.6% in 2007.

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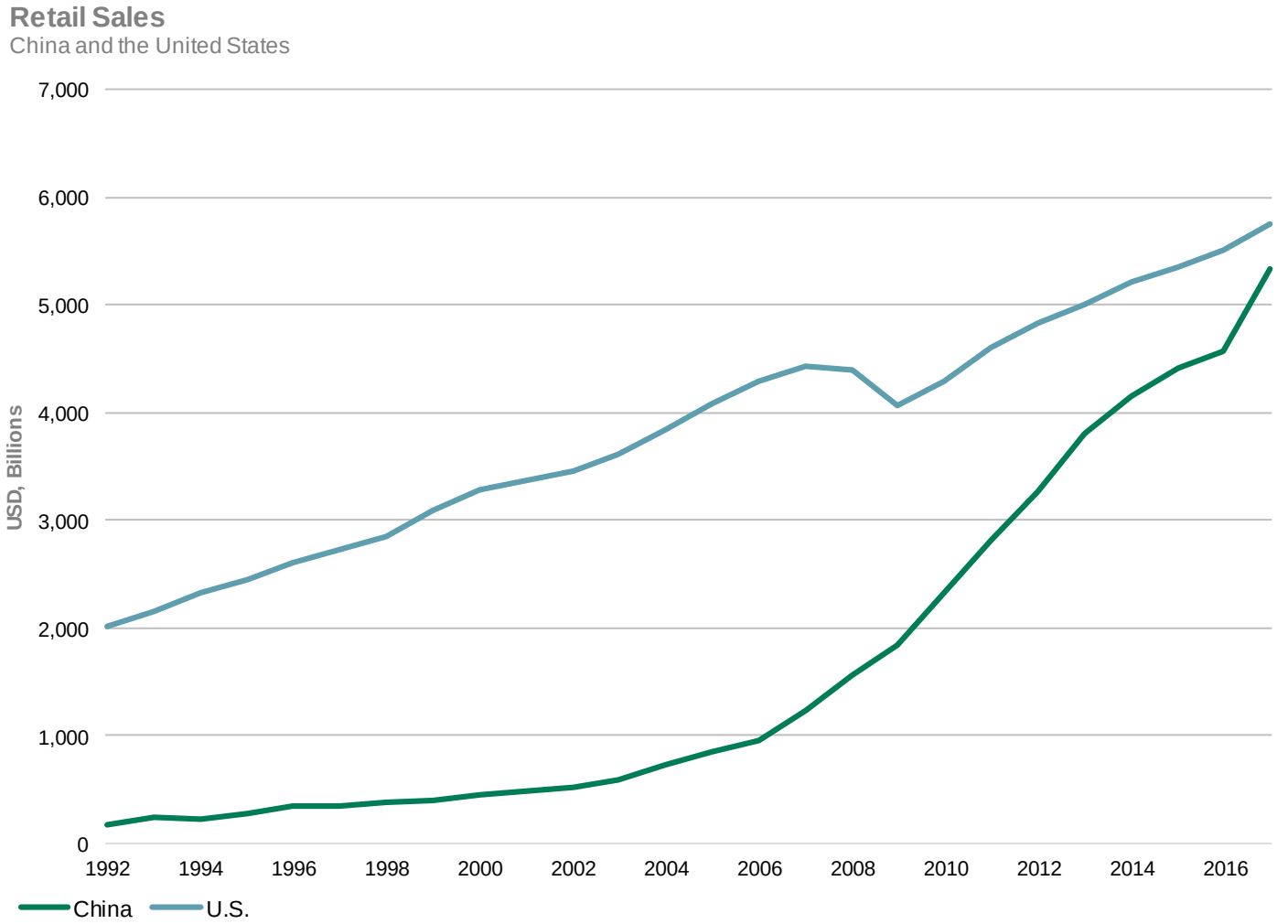
Retail Sales



Data from 12/31/1992 to 12/29/2017
Source: Bloomberg

- The U.S. is not as important an export market as it used to be, accounting for only 19% of China's exports last year, while China's own domestic market is now almost as big as the U.S. in consumption terms.
- Retail spending in China was 94% of U.S. retail spending last year, up from 14% in 2000.

American Century Investments

Alaska Retirement Management Board – Fee Proposal

Collective Investment Trust (Net of Fees)	
AC Emerging Markets Trust	
Class II: $100-$200 million	75 basis points
Class III: over $200 million	65 basis points

Daily valued; custodial fees included

Information presented above are intended to supplement discussions between ACI and tax-qualified retirement, pension, profit-sharing, stock bonus, and other employee benefit trusts and certain eligible governmental plans (defined as “Eligible Plan” in the Declaration of Trust exempt under Revenue Ruling 81-100 (1981-1 C.B. 326) (as may be amended). The above information is not applicable if you are not an Eligible Plan. This does not constitute an offer or solicitation of any security or product, nor constitute a recommendation of suitability of any investment strategy for a particular investor. Material presented is prepared from information sources believed to be accurate, but there is no guarantee of accuracy. Any potential purchaser may pay actual expenses that are more or less than those presented above, and their investment may lose value. There is no guarantee, contract, or agreement, expressed or implied with the recipient of this information that the above expenses will be received.

As of 9/30/2018

Notes

American Century Investments

Composite Performance and Fee Schedule

December 31, 2017

Emerging Markets Equity (USD)

Benchmark: MSCI Emerging Markets Index

Year	Gross Total Return (%)	Net Total Return (%)	Benchmark Return (%)	Composite Annualized 3-Yr Standard Deviation (%)	Benchmark Annualized 3-Yr Standard Deviation (%)	Number of Portfolios	Non-Fee Paying Portfolios (%)	Composite Dispersion (%)	Composite Assets (USD in 000s)	Total Firm Assets (USD in 000s)
2008	-59.09	-59.77	-53.18	30.41	28.68	Five or Fewer	0.00	N/A	$412,872	$70,216,875
2009	72.29	69.24	75.70	34.00	32.08	Five or Fewer	0.00	N/A	$711,414	$86,002,779
2010	19.81	17.80	19.33	34.69	32.40	Five or Fewer	0.00	N/A	$798,469	$103,557,347
2011	-20.43	-21.76	-18.97	28.26	25.94	Five or Fewer	0.00	N/A	$702,733	$109,483,940
2012	26.74	24.70	20.56	23.69	21.70	Five or Fewer	0.00	N/A	$839,710	$124,740,627
2013	1.98	0.45	-0.18	20.86	19.08	Five or Fewer	0.00	N/A	$880,369	$139,308,411
2014	-0.13	-1.45	-2.19	15.10	14.39	6	1.13	0.31	$914,196	$145,752,355
2015	-6.96	-8.16	-14.92	14.00	14.04	6	2.80	0.14	$1,029,352	$146,186,455
2016	8.78	7.46	11.19	14.83	16.07	6	6.16	0.43	$1,323,545	$156,826,943
2017	48.29	46.91	37.28	14.32	15.57	9	21.65	0.83	$2,928,999	$173,311,771

Effective January 1, 2014, the benchmark for this composite was changed from the MSCI Emerging Markets Growth Index to the MSCI Emerging Markets Index.
Prior to April 1, 2009 the benchmark for this composite was the MSCI Emerging Markets Index.

The standard management fee schedule for a separate account is:

Separate Account

First $50 million:	85 bps
Next $50 million:	80 bps
Over $100 million:	75 bps

American Century Investments

Performance Disclosures
December 31, 2017

Emerging Markets Equity (USD)

For purposes of compliance with the Global Investment Performance Standards ("GIPS®"), the Firm is defined as American Century Investment Management, Inc. ("ACIM" or "the Firm").

American Century 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. ACIM has been independently verified for the periods January 1, 1992 to December 31, 2017.

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. The Emerging Markets Equity composite has been examined for the periods January 1, 2008 to December 31, 2017. The verification and performance examination reports are available upon request.

The Emerging Markets Equity strategy seeks to provide a total return that exceeds the benchmark (MSCI Emerging Markets Index) over a market cycle by investing in large, mid and small cap companies in emerging countries utilizing a growth investment strategy.

Performance results are expressed and calculated in U.S. dollars. The return may increase or decrease as a result of currency fluctuations.

Consultants and investors supplied with these performance results are advised to use this data in accordance with guidelines issued by the United States Securities and Exchange Commission. Past performance may not be indicative of future returns. The value of any investment may rise or fall over time. Principal is not guaranteed and investors may receive less than the full amount of principal invested at the time of redemption if asset values have declined.

The performance for this composite is net of foreign income tax withholding and includes the effect of foreign currency where applicable. The foreign income tax withholding rate varies by country and is recorded at the tax rate specified by each country's tax treaty with the U.S.

The composite's dispersion of annual returns is measured by the asset-weighted standard deviation of individual portfolio annual returns. Only portfolios that have been managed within the composite for the full year are included in the asset-weighted standard deviation calculation. Dispersion is not calculated for composites that have five or fewer portfolios for the full calendar year.

The Firm utilizes a time-weighted total rate of return methodology to calculate performance. All portfolios are valued daily based on principal market values plus accrued income. The market value of an account is the sum of a portfolio's total assets, including accrued interest and dividends, cash and cash equivalents, short-term instruments, and securities valued at current market prices. Security transactions are recognized based on trade-date accounting. Interest is recorded on an accrual basis and dividends are recorded on the ex-dividend date. Portfolio returns are calculated monthly. For the Firm's pooled accounts (i.e. mutual funds, collective investment trusts, UCITS-compliant funds), portfolio returns are calculated monthly using an account's beginning and ending month-end unitized value and distributions of income and capital gains, if applicable.

For the Firm's non-pooled accounts, portfolio returns are calculated daily using the change in an account's market value after taking into account cash flows on the account. All cash flows are assumed to have been invested at the start of the day they are processed. Daily returns are geometrically linked to determine the monthly return. Gross-of-fee returns include all trading costs and are calculated before management fees, administrative fees, custody fees and distribution and service fees, as applicable. Net-of-fee returns are calculated after all trading costs, actual management fees, custody fees, distribution and services fees, as applicable. Actual management fees are used except for accounts with performance-based fee structures, where fees are applied based on the highest tier of the account's fee schedule. The composite returns are calculated monthly by weighting each account's monthly return by its beginning market value as a percent of the composite's total beginning market value. Quarterly and annual composite returns are calculated by geometrically linking the monthly composite returns. Policies for valuing portfolios, calculating performance and preparing compliant presentations are available upon request.

Effective January 1, 2014, the benchmark for this composite was changed from the MSCI Emerging Markets Growth Index to the MSCI Emerging Markets Index, as it was determined to be more indicative of the composite's investment style. Prior to April 1, 2009 the benchmark for this composite was the MSCI Emerging Markets Index. The MSCI Emerging Markets Index represents the performance of stocks in global emerging market countries. The previous benchmarks were net of foreign income tax withholding. Benchmark return information is provided for comparative and referential purposes only. Benchmark information is provided by third party sources, and is considered to be accurate. The performance results for the MSCI Emerging Markets Index are net of foreign income tax withholding. The assumed tax rate varies from 0% to 35%, using the perspective of a Luxembourg holding company. The benchmark return and the benchmark annualized 3-year standard deviation were not subject to examination by the independent accountant.

The Firm established a $5 million minimum portfolio size for inclusion in the composite.

New portfolios are generally included in the composite rate of return calculations at the beginning of the month immediately following the date they were funded. If a portfolio's funding occurs after the 21st day of a month, the portfolio is included in performance reporting as of the first day of the second full month after opening. Portfolios that change investment strategies are transferred between composites in the first full monthly reporting period the portfolios are managed under the new style. Terminated portfolios are included in the composite rate of return calculations through the completion of their last full month under management. In the event that an addition or withdrawal is equal to or greater than 10% of the account's value, the Firm may choose to treat the addition/withdrawal as a temporary new account depending on the facts and circumstances at the time.

Leverage is not utilized in this composite. Futures (and currency forwards and futures, where applicable or appropriate) are occasionally used to manage portfolio risk. Other derivative instruments may be used, as allowed, as part of the investment strategy.

The creation date for this composite is June 2000.

A complete list of the Firm's composite descriptions is available upon request.

American Century Investments

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DePrince, Race & Zollo, Inc.

Mandate: **Micro Cap Value** **Hired:** **2011**

Firm Information

DePrince, Race & Zollo, Inc. is a 100% employee owned company that was founded in 1995. The firm is based in Winter Park, Florida.

As of 9/30/2018, the firm's total assets under management were $5.0 billion.

Key Executives:

Victor A. Zollo, Jr.
Founding Partner & Co-Chief Executive Officer

Gregory T. Ramsby
Managing Partner, Portfolio Manager

Kelly W. Carbone
Managing Partner, Director of Marketing

Investment Approach

DePrince, Race & Zollo, Inc. (DRZ) believes undervalued stocks with an above average yield and a fundamental catalyst provide the opportunity for superior long-term total returns. DRZ seeks to own undervalued stocks with a minimum 1% dividend yield and a fundamental catalyst to obtain superior long-term total returns. Bottom-up stock selection is the key component to performance. Research moves up from company to industry and economy, to a confirmation of improving fundamental prospects.

Benchmark: Russell Micro Cap Value Index

Total ARMB Mandate

Assets Under Management:
9/30/2018: $126 Million

Concerns: Manager Watch List - Performance

9/30/2018 Performance

	Last Quarter	1-Year	3-Years Annualized	5-Years Annualized	6-Years Annualized
DRZ Micro Cap Value (gross)	2.06%	15.74%	22.63%	12.05%	13.92%
Russell Micro Cap Value Index	-1.26%	11.97%	17.79%	11.10%	14.09%

Alaska Retirement Management Board

DePrince, Race & Zollo, Inc.
U.S. Micro Cap Value

September 30, 2018

DePrince, Race & Zollo, Inc.
250 Park Avenue South • Suite 250 • Winter Park, Florida 32789
407-420-9903

Firm Overview

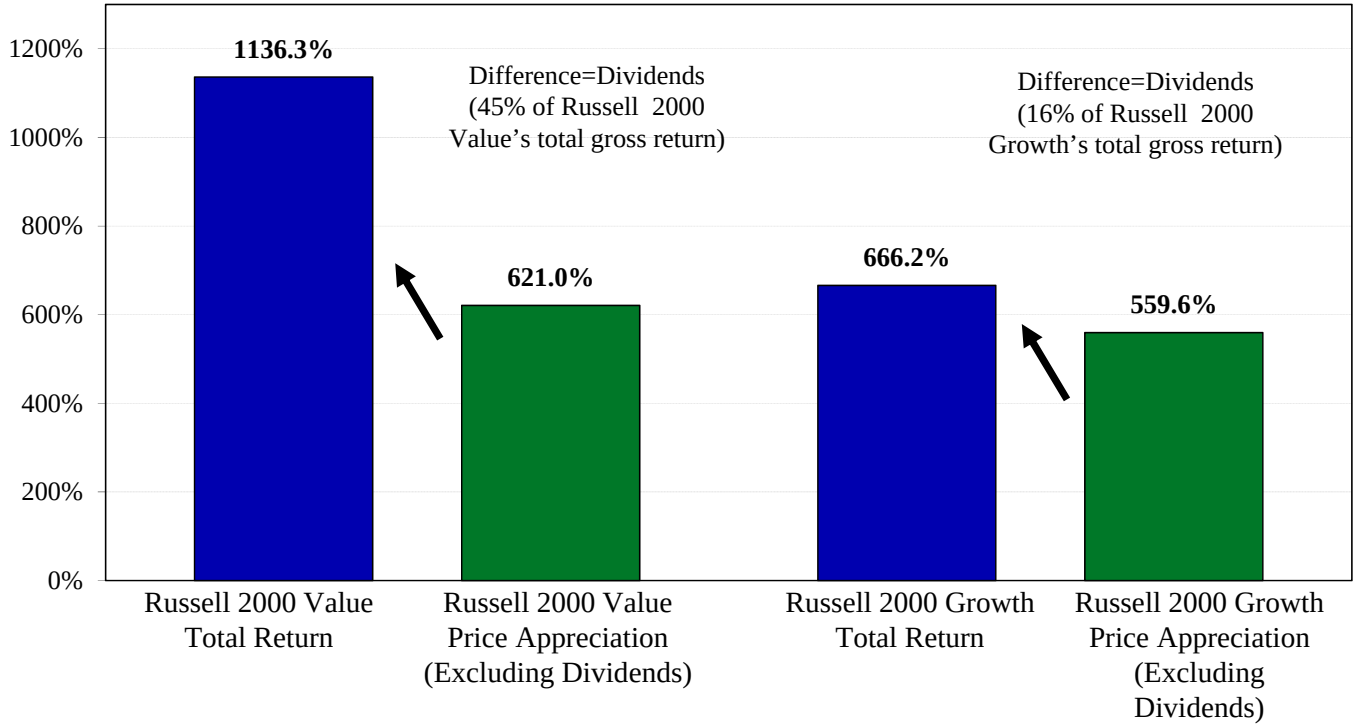
- Independently owned
- Style consistency
  - 32 year execution of our Value methodology
- Small, focused firm with goal to provide superior performance and service to the institutional marketplace
- Total firm assets: $5.0 Billion as of 09/30/18
- Conservative asset caps on all strategies
  - U.S. Large Value
  - U.S. Small Value
  - U.S. Micro Value
  - U.S. SMID Value
  - International Small Cap Value
  - Emerging Markets Value
- Long-term continuity of team
  - 23 Investment Professionals
  - 11 Administrative Staff

DRZ Micro Cap Value Strategy

- **Proven Value Methodology**
  - DRZ has consistently and successfully implemented its Value Methodology for more than 32 years.
  - Our Micro Cap Value Strategy utilizes a similar philosophy and methodology for buying and selling stocks.
  - Activity is driven by the consistent execution of our buy/sell decision process.
  - Active share consistently exceeds 90% versus the Russell Micro Cap Value Index.
- **Dividend Yield**
  - Dividends represent 45% of the Russell 2000 Value Index's total return since inception on 05/31/93.
  - Our 1% minimum dividend yield requirement yields a robust investable universe of over 1,000 companies in the Micro Cap universe.

The Importance of Dividends

Cumulative performance since inception of the indexes, 05/31/1993–09/30/2018



Three Equally Balanced Factors

DRZ

BUY DECISION

Yield

- Identify a universe of stocks with a 1% minimum dividend yield and a market capitalization that does not exceed the largest market capitalization in the Russell Micro Cap Value Index

Relative Valuation

- Within this universe, select undervalued stocks by reviewing the following criteria:

  10-year relative valuation
  - Yield
  - Price to Book
  - Price to Earnings
  - Price to Cash Flow

Fundamental Catalyst

- Fundamental analysis to identify improving prospects

Decision

- Establish relative price targets for stocks which meet all three criteria
- Buy stocks with expected upside two times the downside

SELL DECISION

Yield

- Yield on the stock falls below a 1% dividend yield

Relative Valuation

- Relative price target has been achieved:
  - Expected upside now half the downside
- There are other stocks in our buy process which have better risk/reward prospects

Fundamental Catalyst

- The company is not performing as expected
  - Review fundamentals and valuation target
- The sector begins to look less favorable
  - Review fundamentals and valuation target

Decision

- If one of the three criteria is violated, the stock is sold

Additional risk controls
- 65-80 Average # of Holdings
- Position Size
- Liquidity

Micro Cap Value Screening Process

DRZ

Universe of Stocks

8,000

- Starting universe of US listed stocks

800

- Market capitalization below the largest market cap in the Russell Micro Cap Value Index
- Dividend Yield of at least 1%

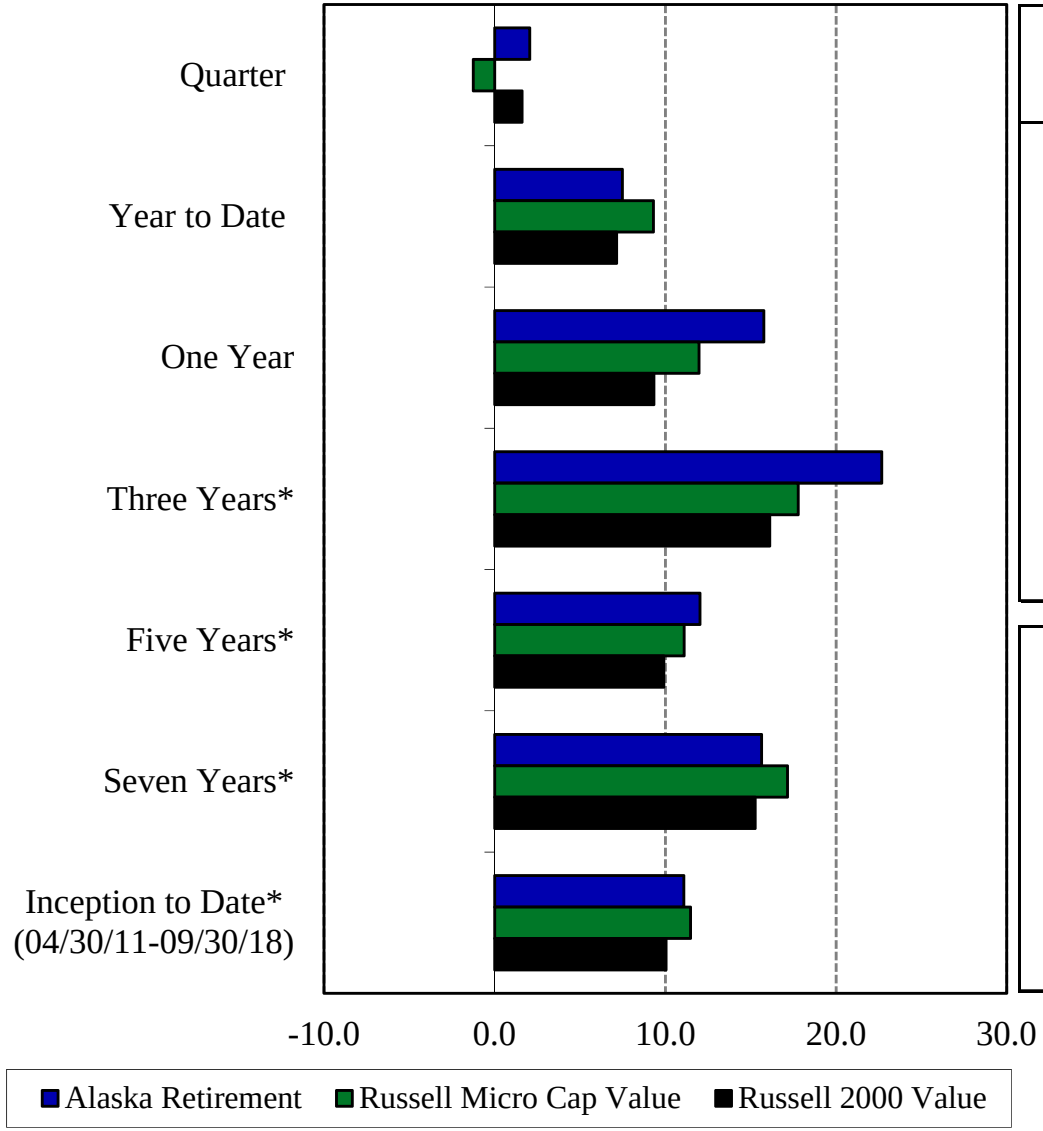
150

- DRZ Relative Valuation analysis identifies stocks trading at lower end of their historical ranges

Micro Cap Value Performance

As of September 30, 2018

Alaska Retirement Management Board



Annualized*	Alaska Retirement	Russell Micro Cap Value	Russell 2000 Value
Quarter	2.05%	-1.26%	1.60%
Year to Date	7.48%	9.30%	7.14%
One Year	15.77%	11.97%	9.33%
Three Years*	22.67%	17.79%	16.12%
Five Years*	12.03%	11.10%	9.91%
Seven Years*	15.64%	17.16%	15.26%
Inception to Date* (04/30/11-09/30/18)	11.08%	11.48%	10.04%

Market Value on 12/31/17	$116,823,605
Contributions	0
Withdrawals	0
Gain (Loss)	6,104,184
Interest and Dividends	2,636,182
Market Value on 09/30/18	$125,563,971

As of September 30, 2018. Performance over 1 Year is Annualized
Returns for ARMB are Gross of Fees

2018 Value/Growth Returns

Value vs. Growth

Source: Factset, As of 09/30/2018

- DRZ's Micro Cap portfolio is decidedly more "Value" than the majority of its peers. Since ARMB's inception in 2011, we have witnessed an extended Growth market where the Russell Micro Cap Growth Index outperformed the Russell Micro Cap Value Index in 6 out of the last 9 years. This was mostly the result of the Fed's multiple iterations of QE, which encouraged risk taking and rewarded speculative, Momentum driven stocks.

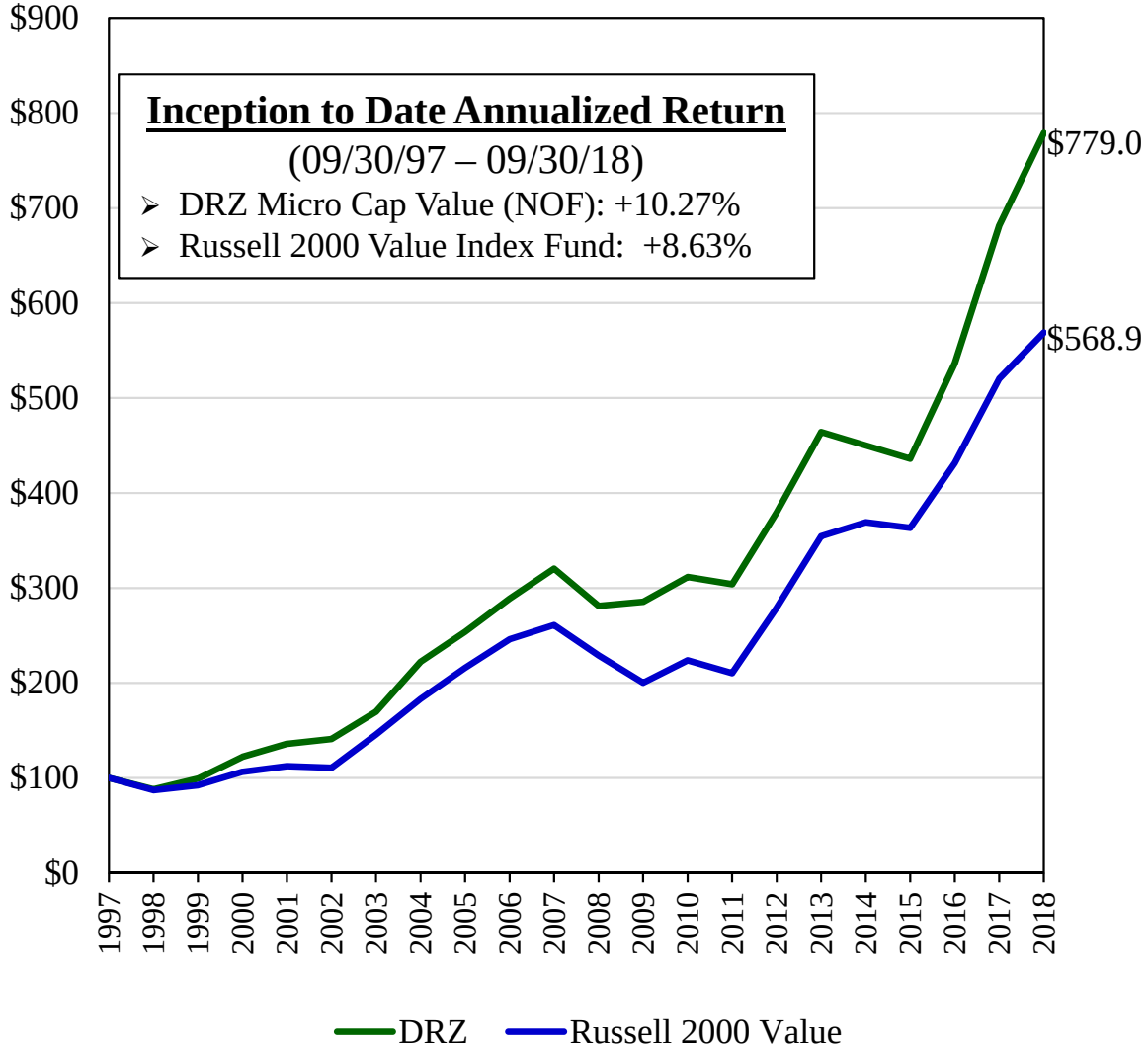
- 2012 through mid-2015 were particularly tough years for our Value Methodology as many of the Value stocks in the portfolio could not keep pace in a Growth/Momentum driven market. Once these stiff and unsustainable headwinds began to abate in mid-2015 through the end of 2017, we outperformed the Russell Micro Cap Value Index by +1998 bps.

- eVestment ranks DRZ's U.S. Micro Cap Value strategy's 3 year return ended 09/30/18 in the 9th percentile versus our Value peers, +475 bps per year above the RMCV Index (DRZ +22.54 vs. RMCV Index +17.79).

Decades of Alpha Net of Fees

DRZ

Growth of $100 Million: Net of Fees



As of 09/30/18

- DRZ's long-term track record (20+ years) illustrates our ability to add alpha via stock picking.
- Prior to ARMB's inception, the DRZ Micro Cap Value strategy outperformed the Russell 2000 Value in 10 out of 13 years, an annualized outperformance of +289 bps (NOF).
  - Since the inception of the Russell Micro Cap Value Index in 2006, DRZ beat the Russell Micro Cap Value Index in 4 out of the 5 years prior to ARMB's inception, an annualized outperformance of +750 bps (NOF).
- A passive approach would have been a costly mistake.
  - DRZ NOF cumulative outperformance vs. Russell 2000 Value Index: $210 million
- We believe the portfolio is well positioned as we enter the late stages of a historical bull market and we're beginning to see tremors in Growth/Momentum investing.
  - As the economic cycle peaks, Momentum investing should struggle. DRZ's investment process is Anti-Momentum.
  - Dividends and low relative valuations should return to favor in a more normalized, lower return environment (investors become more risk averse).

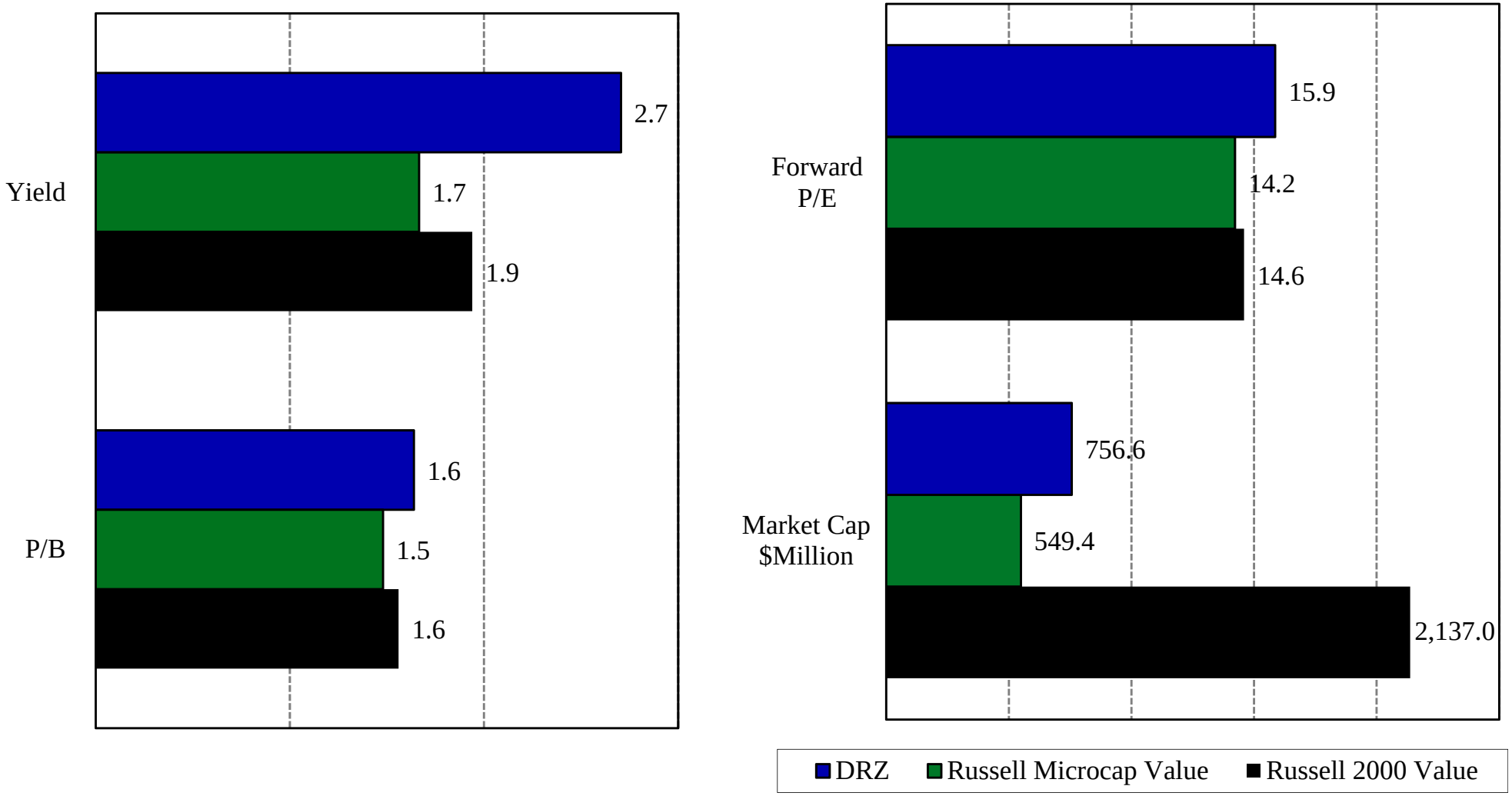
Downside Protection

Down Market Protection
Micro-Cap Value Strategy
September 30, 1997 – September 30, 2018

Number of Months Russell 2000 Index Generated Negative Returns	Frequency of DRZ Micro-Cap Value Outperformance	**DRZ Cumulative Outperformance in Down Markets**
100 months	73 out of 100 months	**401.89%**

Source: Advent

Equity Characteristics



As of 09/30/2018

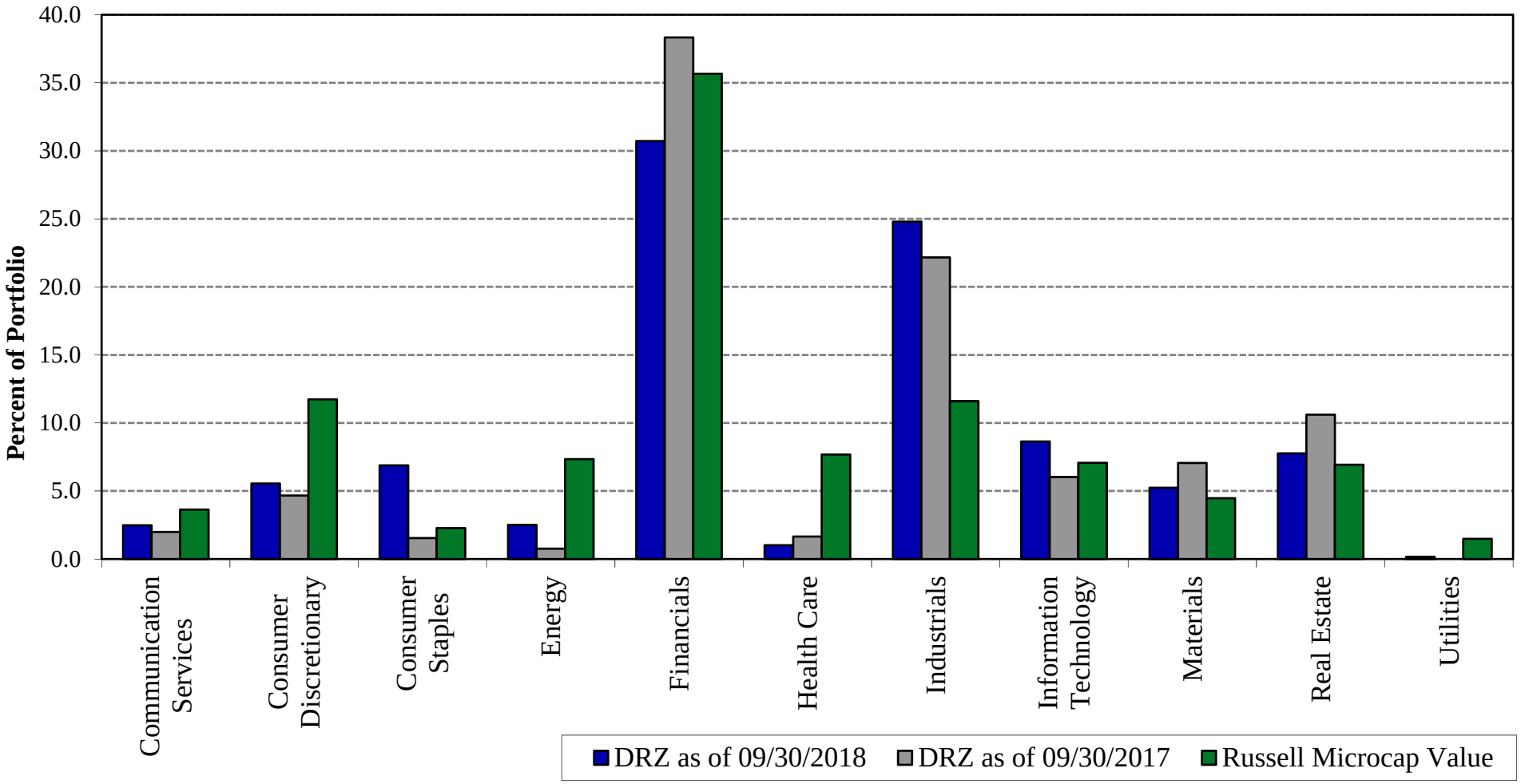
Top Ten Positions

DRZ

	Sector	%Portfolio	Yield
Luxfer Holdings PLC	Industrials	5.1	2.2
Cooper Tire & Rubber Co.	Consumer Discretionary	3.5	1.5
Innophos Holdings, Inc.	Materials	3.2	4.3
Knoll, Inc.	Industrials	3.0	2.6
Powell Industries, Inc.	Industrials	2.9	2.9
CatchMark Timber Trust, Inc.	Real Estate	2.9	4.7
Xperi Corp.	Information Technology	2.7	5.4
Universal Corp	Consumer Staples	2.6	4.6
National Bank Holdings Corp.	Financials	2.6	1.5
Graham Corp.	Industrials	2.6	1.4

Weight as of 09/30/2018

Portfolio Positioning



- While the portfolio still maintains a Cyclical bent, we have recently found select opportunities in Defensive sectors, such as Consumer Staples.

As of 09/30/18

Financial Opportunity

DRZ

TriCo Bancshares, TCBK

Overview:

TriCo Bancshares is a bank holding company with $4 Billion in assets operating 70 branches throughout Northern and Central California. The bank offers financial services and provides a diversified line of products and services to both consumers and businesses.

Dividend Yield: 1.80%

Market Capitalization: $770 Million

Relative Valuation:

We value TCBK on a relative P/B range of 0.60 – 1.00X vs. the S&P 600. We determine the range by linking our historical valuation analysis with our fundamental research. The stock is a candidate for purchase when the expected upside versus downside is two to one. We purchased TCBK when it was trading at the lower end of its relative P/B range. The valuation remains compelling at the current price.

Fundamental Catalysts:

- TCBK is using excess capital to grow loans and return capital to shareholders through dividends and potential share repurchases.
- The company is leveraging new investments in technology to drive the efficiency ratio lower.
- Loan demand continues to improve, and the company has a strong pipeline. We expect TCBK to generate strong loan growth in 2017.
- Cash and securities represent 33% of assets. As excess cash is deployed into higher yielding loans, we expect profitability to improve.

Industrial Opportunity

DRZ

Kforce Inc., KFRC

Overview:

Kforce is a U.S. centric, full service staffing firm providing flexible and permanent staffing solutions. The company specializes in project based activities within the technology, financial, and health care industries.

Dividend Yield: 1.9%

Market Capitalization: $630 Million

Relative Valuation:

We value KFRC on a relative P/E range of 0.55 – 1.00X vs. the S&P 600. We determine the range by linking our historical valuation analysis with our fundamental research. The stock is a candidate for purchase when the expected upside versus downside is two to one. We purchased KFRC when it was trading at the lower end of its relative P/E range.

Fundamental Catalysts:

- Veterans Affairs Next Generation: The VA awarded KFCR prime contractor status on the VA T4NG contract, a multi-year, multi-vendor award totaling $22 Billion.
- We expect significant consultant hiring in 2016 and 2017 to drive revenue growth and margin expansion going forward.
- Financial Services: We believe the company's large exposure to financial service firms will be beneficial in light of the more favorable interest rate and regulatory environment in 2017 and 2018.

Materials Opportunity

DRZ

Innophos Holdings, IPHS

Overview:

Innophos Holdings, Inc. engages in the production of specialty ingredients solutions for the food, health, nutrition, and industrial markets.

Dividend Yield: 4.1%

Market Capitalization: $850 Million

Relative Valuation:

We value IPHS on relative P/CF range of 0.5 – 1.25X vs. the S&P 600. We determine the range by linking our historical valuation analysis with our fundamental research. The stock is a candidate for purchase when the expected upside versus downside is two to one. We purchased IPHS when it was trading at the lower end of its relative P/CF range.

Fundamental Catalysts:

- Innophos is realizing top line growth through investments and positioning within the Food, Health and Nutrition segments.
- Management recently completed a $16mm cost savings program and will recognize another $13mm by Q1 of 2018.
- Working capital savings are benefiting free cash flow generation which has been used with discipline for share repurchases and dividends.

Portfolio Value Recognized through M/A

DRZ

Date	Acquirer	Acq Price	Cost Basis	% Chg
1/3/2017	DK	$12.64	$6.95	82%

- Delek US Holdings acquired its remaining 53% stake in Alon USA Energy for $511.3 million in stock at an 82% premium to our cost basis. Located in Dallas, Alon USA Energy is a petroleum refiner, as well as an operator of retail gasoline and convenient stores.

Date	Acquirer	Acq Price	Cost Basis	% Chg
1/10/2017	COLB	$27.85	$10.51	165%

- Columbia Banking System agreed to acquire Oregon-based bank, Pacific Continental Corp., for $649 million at a 165% premium to our cost basis. The transaction strengthens Columbia Banking System Inc.'s position in the regional bank community.

Date	Acquirer	Acq Price	Cost Basis	% Chg
7/10/2017	Apollo	$17.12	$13.23	29%

- Private equity firm Apollo Global Management acquired ClubCorp Holdings Inc. for $1.1 billion in a cash transaction. ClubCorp was a top 10 portfolio position when the transaction was announced and the shares were up more than +30% in the month of July. Based in Texas, ClubCorp owns and operates private golf, country, business, sports and alumni clubs.

Source: FactSet

Portfolio Value Recognized through M/A

DRZ

PARKSTERLING
Answers You Can Bank On.®

Date	Acquirer	Acq Price	Cost Basis	% Chg
4/27/2017	SSB	$13.00	$6.67	95%

- South State Corp. agreed to acquire Park Sterling Corp. for $686 million in stock at a 95% premium to our cost basis. Once completed, the merger will create a combined entity with $14.5 billion in assets and offices in Virginia, Georgia, and the Carolinas.

CalgonCarbon® Pure Water. Clean Air. Better World.

Date	Acquirer	Acq Price	Cost Basis	% Chg
9/25/2017	Kuraray	$21.50	$14.16	52%

- Japan's Kuraray Co. Company entered into a definitive agreement to acquire top ten holding Calgon Carbon Corp. in a cash transaction. Kuraray will purchase the water treatment and food company for $1.1 billion at a 52% premium to our cost basis. The acquisition will enhance Kuraray Co.'s position in the activated carbon and filtration media.

General Cable

Date	Acquirer	Acq Price	Cost Basis	% Chg
12/4/2017	PRY	$30.00	$17.82	74%

- Prysmian Group and General Cable Corp entered into a definitive merger agreement under which Prysmian acquired General Cable for $30 per share in cash. The transaction values General Cable at approximately $3 Billion and represents an 81% premium to General Cable closing price of $16.55 per share on 7/14/17, the last day of trading before General Cable announced its review of strategic alternatives. General Cable is headquartered in Kentucky and is a leader in the manufacturing and distribution of fiber optic wire and cable products.

Source: FactSet

Portfolio Value Recognized through M/A

DRZ

Date	Acquirer	Acq Price	Cost Basis	% Chg
4/24/2018	CSFL	$23.53	$17.34	36%

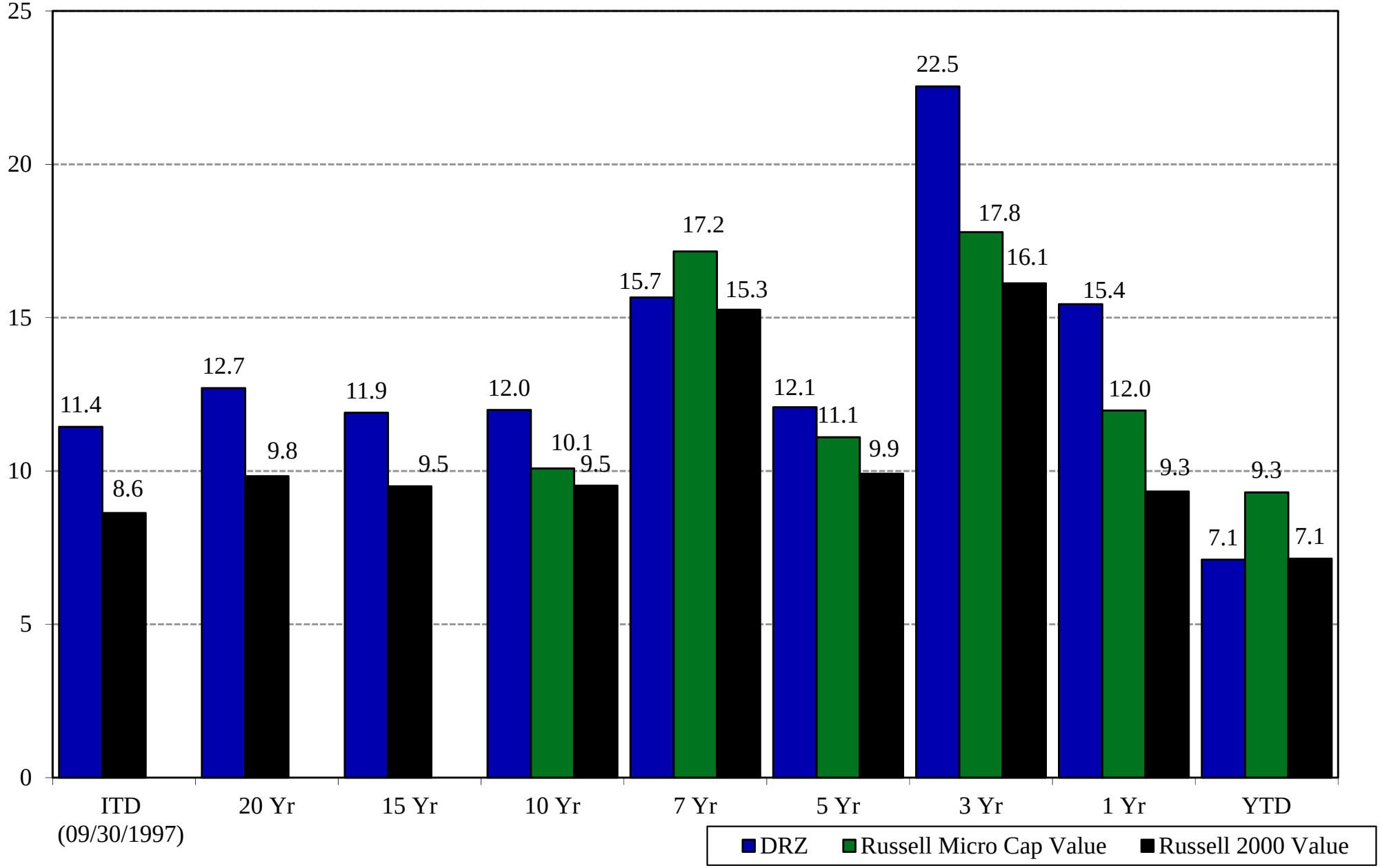
- CenterState Bank Corp. announced a definitive merger agreement with Georgia-based bank Charter Financial Corp in a cash deal. The transaction equates to an aggregate value of $360 million, which is a 36% premium to our cost basis. The acquisition of Charter represents CenterState's first entry into commercial banking in Georgia and Alabama.

Date	Acquirer	Acq Price	Cost Basis	% Chg
8/8/2018	WSFS	$19.61	$16.11	22%

- WSFS Financial Corp. and Beneficial Bancorp (BNCL) entered into a definitive merger agreement under which WSFS will purchase BNCL for $19.61 per share at a 22% premium to our cost basis. The stock/cash deal values Beneficial Bancorp at $1.5 billion and is expected to close in the first quarter of 2019. The acquisition creates the largest, locally-headquartered community bank in the Greater Delaware Valley with the sixth largest deposit market share.

Source: FactSet

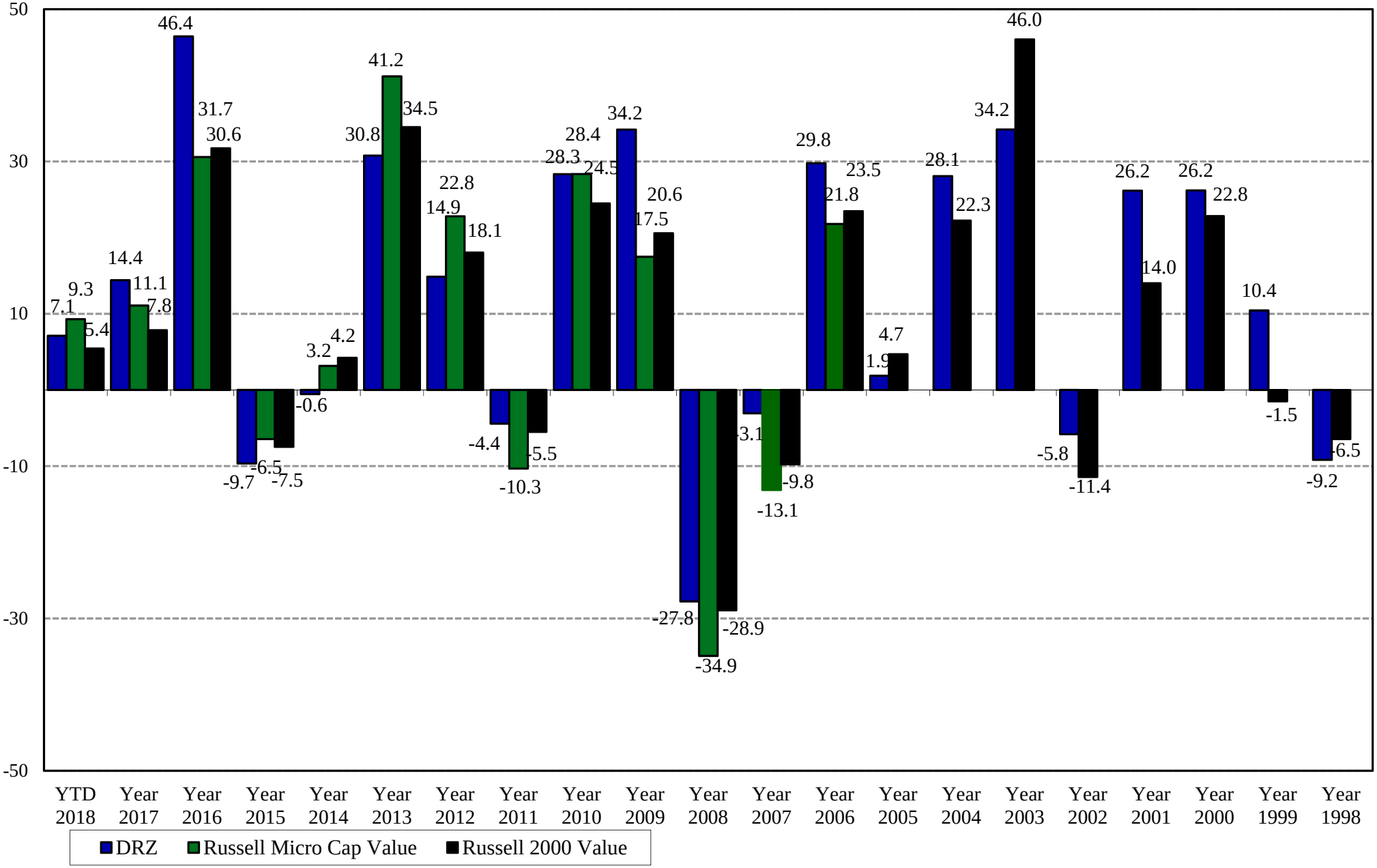
Micro Cap Value Performance



As of September 30, 2018. Performance over 1 Year is Annualized

*The Russell Micro Cap Value Index inception 2006

Micro Cap Value Performance



*The Russell Micro Cap Value Index inception 2006

Source: Advent, As of 09/30/2018

Mondrian Investment Partners

Mandate: **International Small Cap** **Hired:** **2010**

Firm Information	Investment Approach	Total ARMB Mandate
Mondrian Investment Partners Limited ("Mondrian") is 100% owned by an employee partnership. As of 9/30/18, the firm's total assets under management were $55 billion. **Key Executives:** **Dr. Ormala Krishnan**, *CIO – Small Cap Equities* **Aidan Nicholson**, *Portfolio Manager* **Todd Rittenhouse**, *Client Services*	Mondrian's value driven investment philosophy is based on the belief that investments need to be evaluated in terms of their fundamental long-term value. Mondrian is an active value-oriented defensive manager that evaluates developed markets on a consistent currency adjusted real return basis. In the management of international/global equity assets, Mondrian invests in securities where rigorous dividend discount analysis identifies value in terms of the long-term flow of income. The use of a discounted dividend approach allows Mondrian to compare and select the most attractive investment opportunities across developed markets at the market and security level. Mondrian's methodology is applied consistently to individual securities across all markets and industries. **Benchmark:** MSCI EAFE Small Cap Index	**Assets Under Management:** 9/30/2018: $193 Million

Concerns: Manager Watch List - Performance

9/30/2018 Performance

	Last Quarter	1-Year	3-Years Annualized	5-Years Annualized	6-Years Annualized
Mondrian (gross)	-0.28%	6.81%	13.28%	7.20%	9.27%
MSCI EAFE Small Cap Index	-0.88%	3.73%	12.39%	7.96%	11.27%

December 14, 2018

Representing Mondrian:

Aidan Nicholson
Senior Portfolio Manager
Mondrian Investment Partners Limited

E. Todd Rittenhouse
Senior Vice President, Client Services
Mondrian Investment Partners (U.S.), Inc.

Presentation to:

Alaska Retirement Management Board

International Small Cap Equity Portfolio

Agenda

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55 Appendix

Mondrian Investment Partners Limited
Fifth Floor
10 Gresham Street
London EC2V 7JD
Telephone 020 7477 7000

Mondrian Investment Partners (U.S.), Inc.
Two Commerce Square
2001 Market Street, Suite 3810
Philadelphia, PA 19103
Telephone (215) 825-4500

Mondrian Investment Partners Limited is authorised and regulated by the Financial Conduct Authority

www.mondrian.com

Biographies

MONDRIAN INVESTMENT PARTNERS

Aidan Nicholson, CFA

Senior Portfolio Manager
Mondrian Investment Partners Limited **London**

Mr. Nicholson graduated from Pembroke College, Oxford with a Masters in Engineering, Economics & Management. He started his career at Cazenove & Co. in the UK Smaller Companies Team, before moving to Mondrian in 2003 to work on the International Small Capitalisation Team. Mr. Nicholson is a CFA Charterholder and a member of the CFA Institute and the CFA Society of the UK.

E. Todd Rittenhouse

Senior Vice President, Client Services
Mondrian Investment Partners (U.S.), Inc. **Philadelphia**

Mr. Rittenhouse is a graduate of LaSalle University where he earned a Bachelor of Science degree in Business Administration. He worked at Mondrian's former affiliate from 1992 to 1999, where he was a Vice President in the Client Services Group. Prior to rejoining Mondrian in 2007, he was a Partner in the Client Services Group at Chartwell Investment Partners, where he worked for eight years. In his present position, Mr. Rittenhouse is responsible for client service, consultant relations, and marketing.

181214 AlaskaRetMgtBrd ISC

Organization

Our Organization

September 30, 2018

MONDRIAN INVESTMENT PARTNERS

A Successful, Well-Managed Company

- Founded in 1990
- Over 25 years of stable, consistent leadership
- Approximately USD 55 billion under management

An Independent, Employee-Owned Company

- Equity ownership plan designed to attract, retain and motivate highly skilled people
- Mondrian is employee owned
- Approximately 80 employees are partners today, up from 60 in 2004

A Time-Tested Investment Philosophy and Process

- All products utilize an income-oriented value discipline
- Consistently applied since the company's founding in 1990
- In-depth global fundamental research

A Well-Resourced Team

- Highly experienced team of 55 investment professionals in London
- Low turnover of professional staff
- Strong culture of client service and support

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Organization

October 12, 2018

MONDRIAN INVESTMENT PARTNERS

INVESTMENT

Clive Gillmore
Chief Investment Officer

Emerging Markets Equities

Andrew Miller
Chief Investment Officer
Emerging Markets Equities

Ginny Chong
Gregory Halton
Boris Veselinovich
Senior Portfolio Managers

Dan Kelly
Sam Wyatt
Portfolio Managers

Michael Bray
Research Analyst

Small Cap Equities

Ormala Krishnan
Chief Investment Officer
Small Cap Equities

Brendan Baker
Graeme Coll
Frances Cuthbert
Bhavin Manek
Aidan Nicholson
Senior Portfolio Managers

Alastair Cornwell
Portfolio Manager

Charl Basson
Benjamin Hall
Assistant Portfolio Managers

Elina Grinchenko
Research Analyst

International and Global Equities

Elizabeth Desmond
Chief Investment Officer
International Equities

Clive Gillmore
Chief Investment Officer

Hamish Parker
Director

Aileen Gan
Head of Global Equities

Brendan Baker
Nigel Bliss
Steven Dutaut
Andrew Porter
Alex Simcox
Jonathan Spread
Senior Portfolio Managers

Harry Hewitt
Natasha Nussbaum
Research Analysts

Christopher Davis
James Francken
Charlie Hill
Zsolt Mester
Melissa Platt
Paul Thompson
Portfolio Managers

Global Fixed Income & Currency

David Wakefield
Chief Investment Officer
Global Fixed Income & Currency

Joanna Bates
Matt Day
Solomon Peters
Senior Portfolio Managers

David Cudmore
Kevin Fenwick
Sarah Mitchell
Portfolio Managers

Bruno Vignoto
Assistant Portfolio Manager

Implementation

Brian Heywood
Head of Implementation
+ Team (4)

Trading

Clark Simpson
Head of Trading
+ Senior Traders (3)

CLIENT SERVICES

LONDON

Russell Mackie
Global Head of Client Services & Marketing

Jess Hsia
Senior Client Services Executive

Andrew Kiely
Manager

Paul Danaswamy
Client Services Executive

Nicola Hilliard
Internal Client Services Assistant

PHILADELPHIA

Paul Ross
President

Patricia Karolyi
Executive Vice President

Jim Brecker
Laura Conlon
David Hogan
Henry Orvin
Justin Richards
Todd Rittenhouse
Stephen Starnes
Senior Vice Presidents

Peter Riviello
Jackie Stampone
Carol Starr
Vice Presidents

Bridget Cooper
Rebecca Farnsworth
Elizabeth Taverna
Assistant Vice Presidents

+ Team (16)

BUSINESS MANAGEMENT

Clive Gillmore
Chief Executive Officer

David Tilles
Executive Chairman

Rothko Investment Strategies

Daniel Philps
Head of Rothko Investment Strategies
+ Team (2)

Warren Shirvell
Chief Operating Officer

Compliance & Risk

Ed Lambert
Chief Compliance Officer/ MLRO
+ Team (4)

Legal

Jason Menegakis
General Counsel

Nicola Clarke
Senior Legal Counsel

+ Team (2)
(1 in MIP US)

Human Resources

Kate Delmi
Head of Human Resources
+ Team (2)

Office Admin
Team (2)

PA Support

Liane Gilbey
Secretarial Services Manager
Team (6)

Internal Audit

Lisa Debenham
Internal Audit Manager

Information Technology

Paul Fournel
Chief Technology Officer

Dan Atkinson
Technology Manager

Gary Aylett
Michael Williams
Business Applications Managers
+ Team (12)

Operations

Jason Andrews
Head of Investment Operations

Rob Houghton
Investment Support Services Manager

+ Team (24)

Performance

David Lourens
Head of Investment Performance
+ Team (3)

Elaine Baker
Marketing and Client Presentations Manager
+ Team (2)

Business Management

Jamie Shearer
Senior Finance Manager

Tatiana Cotonet
Finance Manager
+ Team (4)

Ian Cooke
Senior Partnership Manager

Darren Wells
Senior Business Manager

This chart is designed to indicate the staffing resources and management structure at Mondrian Investment Partners Limited and Mondrian Investment Partners (U.S.), Inc. The chart does not attempt to show all functions nor reporting and delegation lines, details of which are maintained in separate records.
Please note some people may appear on this chart more than once, reflecting various responsibilities.

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Representative Client List
North America

MONDRIAN INVESTMENT PARTNERS

Government and Labor

Alameda County Employees' Retirement Association
Alaska Permanent Fund Corporation
Baltimore County Employees' Retirement System
California State Teachers' Retirement System (CalSTRS)
Carpenters Trusts of Western Washington
City of Baltimore Employees' Retirement System
City of Hartford Municipal Employees' Retirement Fund
City of Phoenix Employees' Retirement System
Colorado Public Employees' Retirement Association
Cook County Annuity & Benefit Fund
El Paso Firemen & Policemen's Pension Fund
ERFC (Fairfax County)
Florida State Board of Administration
Fresno County Employees' Retirement Association
Georgia Division of Investment Services
Howard County Government
IATSE National Pension Fund
Idaho Public Employee Retirement System
Illinois Municipal Retirement Fund
International Union of Painters and Allied Trades
Iron Workers District Council of New England Pension Fund
Kent County Employees Retirement System
Los Angeles County Metropolitan Transportation Authority
Louisiana State Employees' Retirement System
Maryland Prepaid College Trust
Massachusetts Pension Reserves Investment Management Board
Mendocino County Employees Retirement Association
Municipal Fire and Police Retirement System of Iowa
National Grid Investment Management
New York City Deferred Compensation Plan
New York State Common Retirement Fund
Oklahoma Law Enforcement Retirement System
Oklahoma Police Pension & Retirement System
Oklahoma Public Employees Retirement System
Oklahoma State Regents for Higher Education
Orange County Retirement System
Parkland Health & Hospital System
Parochial Employees' Retirement System of Louisiana
Prince George's County Pension System
Public Employees' Retirement System of Mississippi
Sacramento County Employees' Retirement System
San Bernardino County Employees' Retirement Association
San Mateo County E.R.A.
South Carolina Retirement Systems
Southern California UFCW
St. Louis County, Missouri
State Universities Retirement System (SURS)
Teachers' Retirement System of the State of Illinois
Tennessee Consolidated Retirement System
The North Central States Regional Council of Carpenters Pension Fund
Vermont State Treasurer's Office
Washington State Investment Board

Corporations

A.O. Smith Corporation
American Hospital Association
Amphenol Corporation
Aon Hewitt Group Trust
Archdiocese of Los Angeles
Ascension Investment Management
Ash Grove Cement Company
Axel Johnson, Inc.
Bank of America Corporation
Blue Cross & Blue Shield of Massachusetts, Inc.
Care New England
Central Michigan University
Children's Hospital of Los Angeles
ConAgra Brands, Inc.
Cooperative Banks Employees Retirement Association
CSX Corporation, Inc.
Dartmouth-Hitchcock Medical Center
Edgewell Personal Care Company
Eversource Energy
Farmers Group, Inc.
Henry Ford Health Systems
Huntington Ingalls Industries, Inc.
International Paper Company
Kaiser Foundation Health Plan of Washington (KFHPW)
Martin's Point Health Care, Inc.
Merck & Co., Inc.
Mercy Health
Ministers and Missionaries Benefit Board
National Grid Investment Management
OhioHealth
Orlando Health, Inc.
Pfizer Inc.
Renown Health
Sappi Fine Paper North America
Savings Banks Employees Retirement Association (SBERA)
SECURA Insurance Companies
Sisters of Mercy Health System
Southern California Edison
Southern Company
Springpoint Senior Living, Inc.
The Dow Chemical Company
The Green-Wood Cemetery
TI Group Automotive Systems
Tufts Associated Health Maintenance Organization, Inc.
University of Maine System
University of Ottawa
Valley Children's Hospital
Verity Health System
Verizon Investment Management Corp.
Wal-Mart Stores, Inc.
Wells Fargo & Company Cash Balance Plan
Wespath Investment Management

This representative client list includes all separately managed accounts and investors in Mondrian's commingled vehicles not subject to confidentiality limitations, where the clients are based in the United States and Canada. It is therefore not a complete list of all Mondrian's clients. It is not known whether the listed clients approve or disapprove of Mondrian or the services provided.

Updated: September 2018

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Representative Client List
North America

MONDRIAN INVESTMENT PARTNERS

Endowments and Foundations

Archdiocese of Los Angeles
Augustana College
Baylor Oral Health Foundation
Boys Town
Central Michigan University
Community Foundation of Greater Des Moines
Donald B. & Dorothy L. Stabler Foundation
Furman University
General Conference Corporation of Seventh-day Adventists
George I. Alden Trust
Gonzaga University
Goucher College
Greater Worcester Community Foundation, Inc.
Henry Ford Health Systems
Indianapolis Symphony Orchestra
InFaith Community Foundation
Kemper & Ethel Marley Foundation
Lenoir-Rhyne University
Marin Community Foundation
Missouri Botanical Garden
Northwest Area Foundation
Richard King Mellon Foundation
Riverside Healthcare Foundation
Roswell Park Alliance Foundation
Rotary International
Savannah College of Art & Design, Inc.
Simpson College
Sunnyside Foundation, Inc.
Texas Tech University System
The Batchelor Foundation, Inc.
The Boston Foundation
The Butler Family Foundation
The Carle Foundation
The Community Foundation for Greater New Haven
The Samuel Roberts Noble Foundation, Inc.
University of Maine System
University of Ottawa
University of Vermont
UNLV Foundation
VNA Foundation
Washington State University Foundation
Wesleyan College
Western Illinois University
William Caspar Graustein Memorial Fund

Insurance

ALAS Investment Services Limited
Ascension Investment Management
CIT Group Inc.
Highmark Health
Nuclear Electric Insurance Limited

Sub-advisory

Lincoln Financial Group
Macquarie Investment Management
MD Financial Management Inc.
Mercer Global Investments Canada Limited
Mercer Investment Management, Inc.
Olive Street Investment Advisers, LLC
(an affiliate of Edward Jones)
Pavilion Advisory Group Ltd.
UBS Global Asset Management (Americas) Inc.

High Net Worth

Meristem, LLP
New Brookdale Partners, L.P.
Richard King Mellon Foundation
Sentinel Trust Company
Shapiro Family
SMT Investors, LLC

This representative client list includes all separately managed accounts and investors in Mondrian's commingled vehicles not subject to confidentiality limitations, where the clients are based in the United States and Canada. It is therefore not a complete list of all Mondrian's clients. It is not known whether the listed clients approve or disapprove of Mondrian or the services provided.

Updated: September 2018

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Business Profile

September 30, 2018

MONDRIAN INVESTMENT PARTNERS

Diverse Investment Products

Developed Markets Equity

- International Equity ex-US
- International Equity ESG ex-US
- Focused International Equity ex-US
- Global Equity

All Country World Equity

- All Country World Equity ex-US
- Focused All Country World Equity ex-US
- Global All Country World Equity

Emerging Markets Equity

- Emerging Markets Equity
- Focused Emerging Markets Equity
- Emerging Markets Wealth

Small Cap Equity

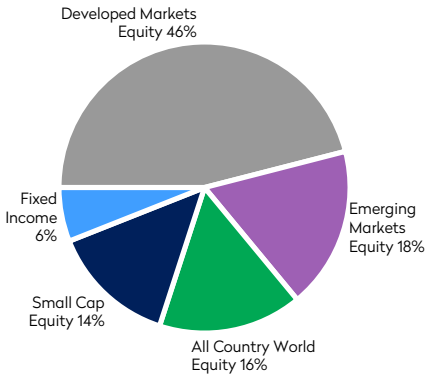
- International Small Cap Equity ex-US
- Emerging Markets Small Cap Equity
- US Small Cap Equity

Fixed Income

- Global Fixed Income (Sovereign and Aggregate)
- International Fixed Income ex-US
- Emerging Markets Debt (Local, Hard and Blended currency)
- Global Debt Opportunities
- Regional Fixed Income
- Global Inflation-Linked

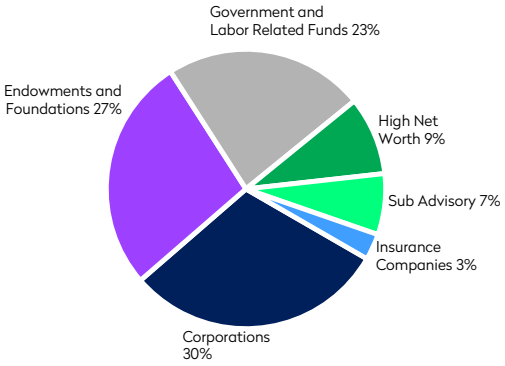
Type of Assets Managed

(Assets Under Management)



Type of Clients Served

(Number of Client Relationships)



A number of vehicles are available in each of the above product areas, including separate accounts, limited partnerships, registered mutual funds and UCITS. Please refer to additional information at the end of the book regarding available vehicles and minimum account sizes.

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International Small Cap Team Chart

October 12, 2018

MONDRIAN INVESTMENT PARTNERS

Developed Markets Equity

(Market/Sector Centric)

Clive Gillmore
CEO & Group CIO

Elizabeth Desmond
Deputy CEO
CIO International Equities

+ team of 16

Global Fixed Income & Currency

(Currency/Inflation)

David Wakefield
CIO Global Fixed Income & Currency

Matt Day
Solomon Peters
Senior Portfolio Managers
+ team of 5

International Small Cap Team

Ormala Krishnan
CIO Small Cap Equities

Frances Cuthbert
Aidan Nicholson
Bhavin Manek
Senior Portfolio Managers

Alastair Cornwell
Portfolio Manager

Charl Basson
Assistant Portfolio Manager

Trading

Clark Simpson
Head of Trading
+ team of 3

Implementation

Brian Heywood
Head of Implementation
+ team of 4

Emerging Markets

(Market/Sector Centric)

Andrew Miller
CIO Emerging Markets Equities

Ginny Chong
Greg Halton
Boris Veselinovich
Senior Portfolio Managers

+ team of 3

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Investment Philosophy

Equity Investment Summary

MONDRIAN INVESTMENT PARTNERS

Mondrian Investment Partners is a value-oriented defensive manager

We invest in stocks where rigorous dividend discount analysis isolates value in terms of the long-term flow of dividends. Dividend yield and future real growth play a central role in our decision making process and over time the dividend component is expected to be a meaningful portion of expected total return.

Potential Benefits

- An approach that focuses on providing a **rate of return** meaningfully **greater than** the client's domestic rate of **inflation**
- Client portfolios that seek to **preserve capital** during protracted global market declines
- Portfolio performance that has been **less volatile*** than the International Small Cap Benchmarks and the performance of most other international small cap managers

*Please refer to the Standard Deviation chart further on in this chapter.

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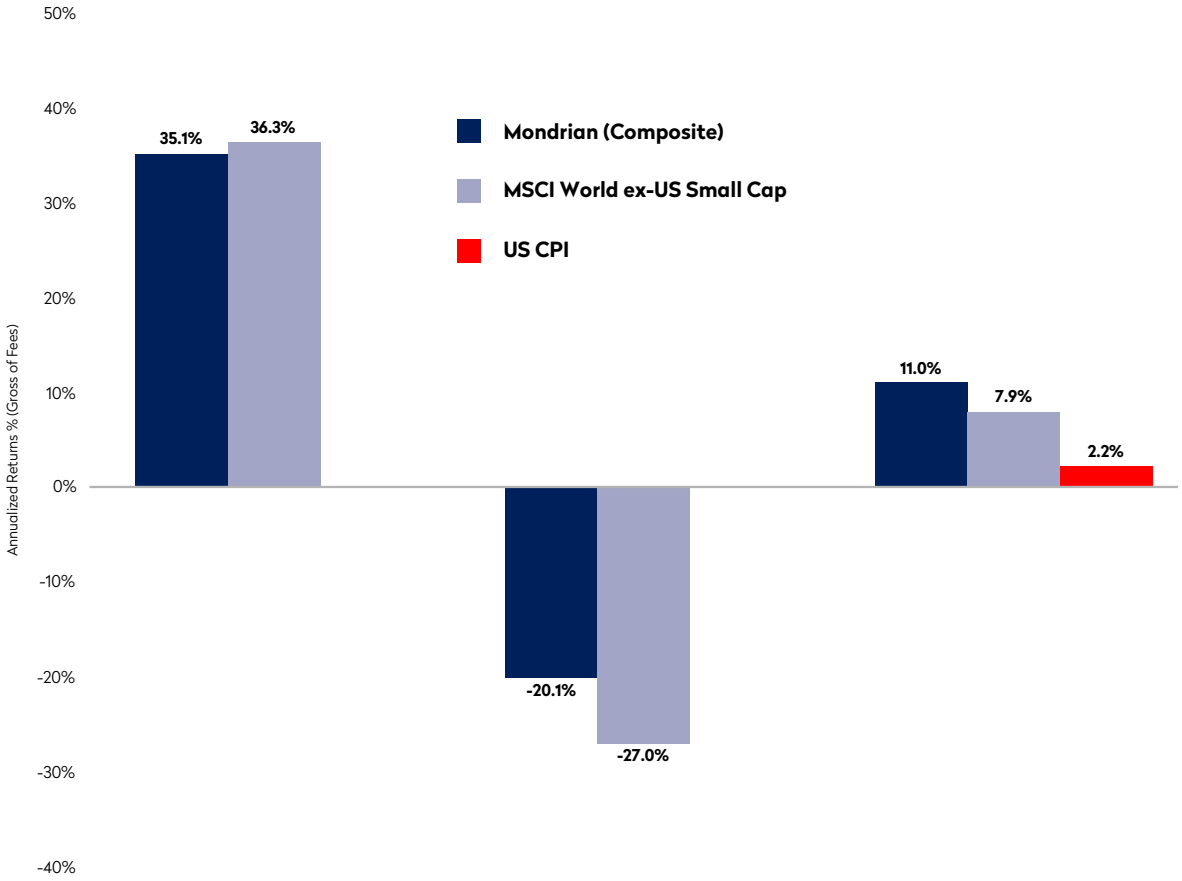
Defensive Characteristics

Mondrian International Small Cap Equity Composite
Since Inception: January 1, 1998 to September 30, 2018

MONDRIAN INVESTMENT PARTNERS



	Bull Market	Bear Market	Total
Number of Quarters	52	31	83
Mondrian (Composite) Aggregate Performance	4,875.9%	-82.5%	771.3%
MSCI World ex-US Small Cap Index Aggregate Performance	5,497.6%	-91.3%	385.9%

Source: Mondrian Investment Partners and MSCI

A Bull Market quarter is defined as one in which the benchmark showed a positive return, and a Bear Market quarter when the benchmark showed a negative return.

Please review this Bull Bear in conjunction with the composite disclosure, which includes performance, in the appendix. The composite definition is provided on the composite disclosure page. A composite includes all discretionary accounts managed by Mondrian to the same investment strategy.

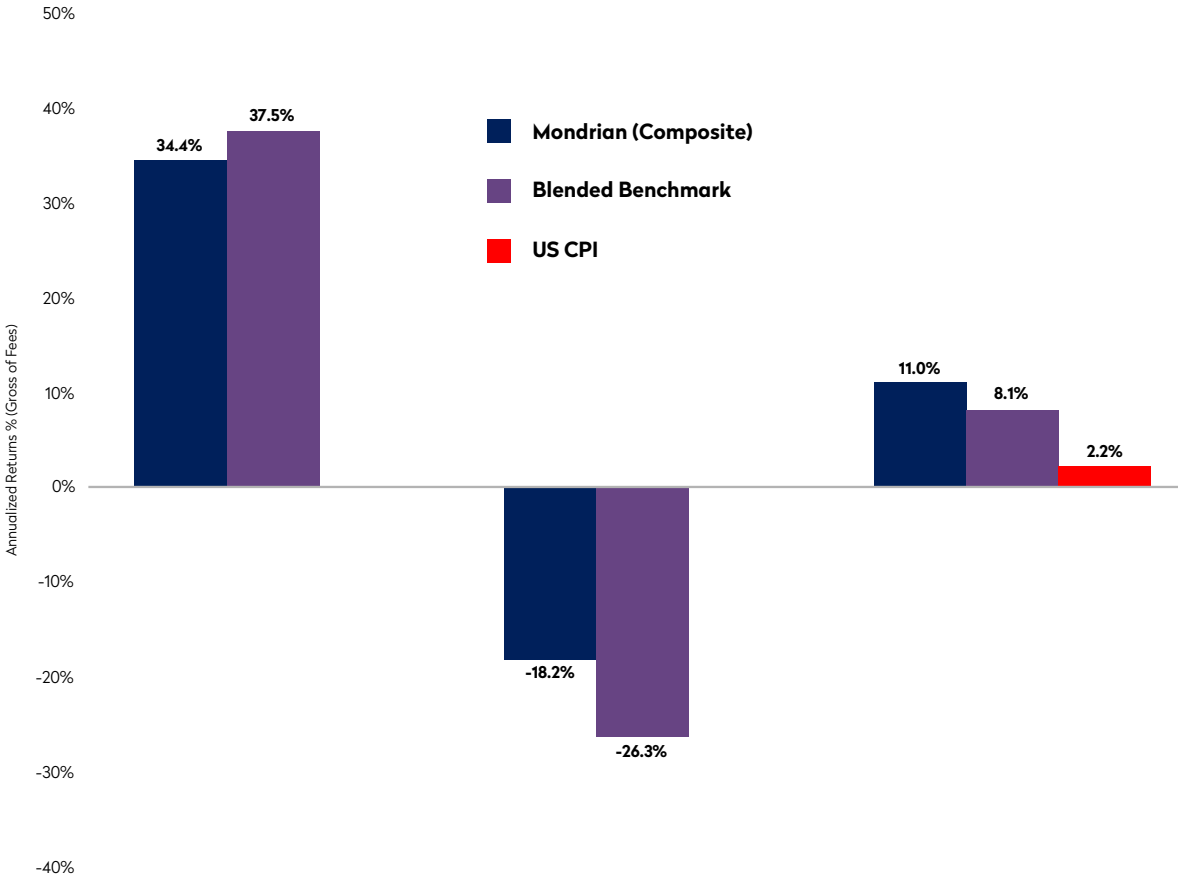
The returns presented on this page are gross of advisory fees and other expenses associated with managing an investment advisory account. Actual returns will be reduced by such fees and expenses. Please carefully review the disclosures and notes concerning performance calculation and GIPS compliance in the appendix. These provide more information concerning gross performance results including an illustration of the negative effect of advisory fees on performance. Past performance is not a guarantee of future results.

181214 AlaskaRetMgtBrd ISC

Defensive Characteristics

Mondrian International Small Cap Equity Composite
Since Inception: January 1, 1998 to September 30, 2018

MONDRIAN INVESTMENT PARTNERS



	Bull Market	Bear Market	Total
Number of Quarters	51	32	83
Mondrian (Composite) Aggregate Performance	4,227.6%	-79.9%	771.2%
Blended Benchmark Aggregate Performance	5,685.2%	-91.3%	401.0%

Blended Benchmark: For the period January 1, 1998 to January 31, 2001, the benchmark shown is the MSCI World ex US Small Cap. From February 1, 2001 to present, the benchmark is MSCI EAFE Small Cap (net dividends reinvested).

Source: Mondrian Investment Partners and MSCI

A Bull Market quarter is defined as one in which the benchmark showed a positive return, and a Bear Market quarter when the benchmark showed a negative return.

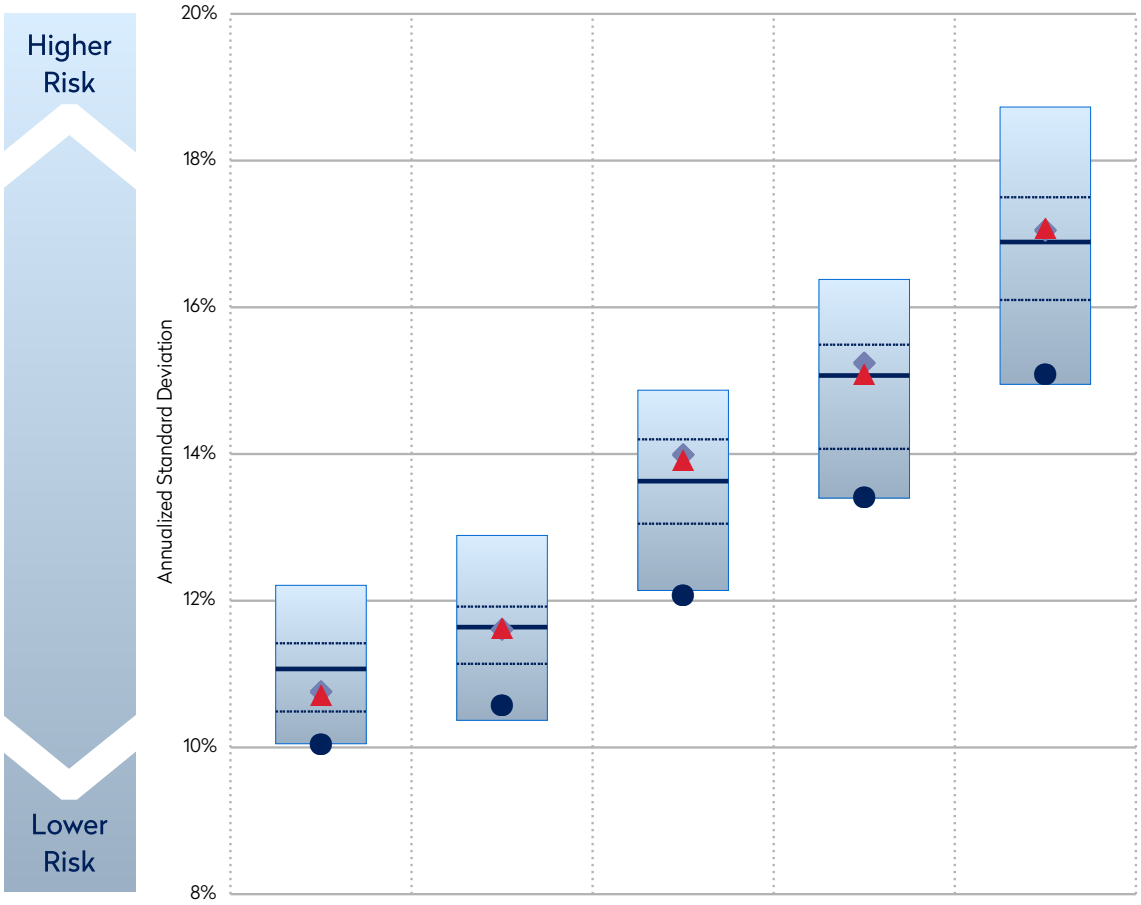
Please review this Bull Bear in conjunction with the composite disclosure, which includes performance, in the appendix. The composite definition is provided on the composite disclosure page. A composite includes all discretionary accounts managed by Mondrian to the same investment strategy.

The returns presented on this page are gross of advisory fees and other expenses associated with managing an investment advisory account. Actual returns will be reduced by such fees and expenses. Please carefully review the disclosures and notes concerning performance calculation and GIPS compliance in the appendix. These provide more information concerning gross performance results including an illustration of the negative effect of advisory fees on performance. Past performance is not a guarantee of future results.

Historically Low Standard Deviation International Small Cap Universe

Mondrian International Small Cap Equity Composite
September 30, 2018

MONDRIAN INVESTMENT PARTNERS



	5 Years Ending September 30, 2018	5 Years Ending September 30, 2017	5 Years Ending September 30, 2016	5 Years Ending September 30, 2015	5 Years Ending September 30, 2014
5th Percentile	10.1	10.4	12.1	13.4	15.0
25th Percentile	10.5	11.1	13.1	14.1	16.1
Median	11.1	11.6	13.7	15.1	16.9
75th Percentile	11.4	11.9	14.2	15.5	17.5
95th Percentile	12.2	12.9	14.9	16.4	18.8
Annualized Standard Deviation:					
Member Count	53	58	54	50	46
Mondrian Composite ●	**10.0**	**10.6**	**12.1**	**13.4**	**15.1**
MSCI World ex-US Small Cap ◆	**10.8**	**11.6**	**14.0**	**15.2**	**17.1**
MSCI EAFE Small Cap ▲	**10.7**	**11.6**	**13.9**	**15.1**	**17.1**

Source: Mondrian Investment Partners and Recognized Financial and Statistical Reporting Service.

The standard deviation of returns is computed based on returns gross advisory fees and other expenses associated with managing an investment advisory account. Actual returns will be reduced by such fees and expenses. Please carefully review the disclosure in the appendix for more information concerning these gross performance results including an illustration of the negative effect of advisory fees on performance. Past performance is not a guarantee of future results. Supplemental Information complements the Mondrian International Small Cap Composite disclosure in the appendix.

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Investment Process

MONDRIAN INVESTMENT PARTNERS

Stocks, Markets and Currencies

- A **value-oriented dividend discount analysis** at both the individual security and market level isolates value across geographic and industrial borders in a unified manner

- A long-term oriented **purchasing power parity approach**, supplemented by shorter-term probability assessment is the cornerstone of on-going currency analysis

- Extensive **world-wide fundamental research** with the **emphasis on company visits** where material risk factors, including environmental, social and governance issues, are incorporated into **long-term qualitative and quantitative analysis**

181214 AlaskaRetMgtBrd ISC

Implementation

International Small Cap Equity Framework for Decision Making

MONDRIAN INVESTMENT PARTNERS

Implementation

Top Down

20%

80%

Bottom Up

Country Analysis

- Focus on demographics, productivity, debt and politics
- Regular research trips
- Inputs from bottom-up, security research

Currency Analysis

- Defensive approach
- Long-term purchasing power parity analysis
- Shorter term considerations

International Small Cap Investment Committee

- Checks stock valuation for consistency and quality
- Scenario analysis for stocks
- Risk evaluation of portfolios

Client Portfolio
70-120 holdings

Security Research

- Balance sheet, income and cash flow analysis
- Industry studies and meetings with management
- Inputs from top-down, country analysis
- Long-term, forward-looking dividend discount model (4 stage)

Screening

- Maximum market cap at inception: US$3.5bn
- Interactive based multi-factor quantitative screen
- Cuts universe of over 5,000 stocks to a manageable list
- Utilisation of conferences and research trips

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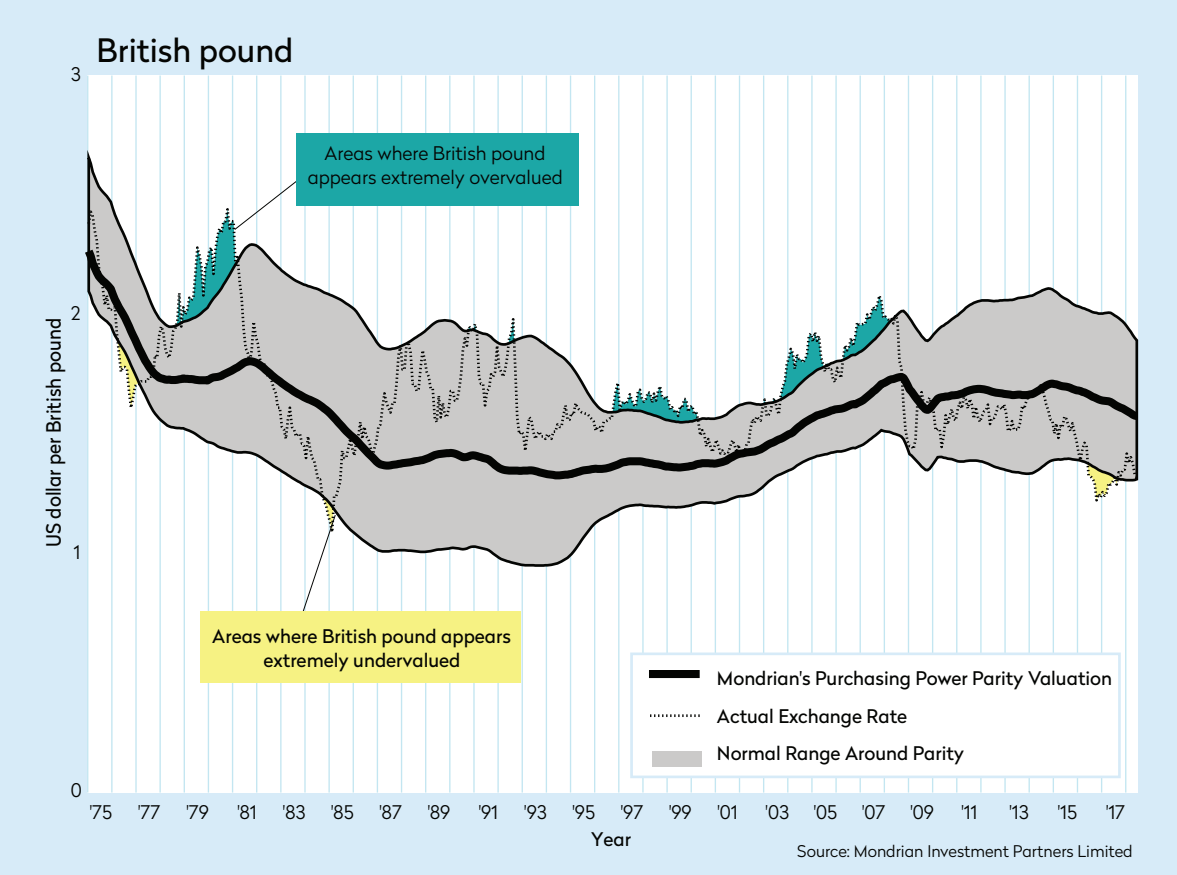
Currency Analysis
A Purchasing Power Parity Approach

MONDRIAN INVESTMENT PARTNERS

- A long-term oriented purchasing power parity approach supplemented by shorter term probability assessment is the cornerstone of on-going currency analysis.

Mondrian's Currency Approach

A Defensive Strategy



Purchasing power parity (PPP) is a theory which states that exchange rates between currencies are in equilibrium when their purchasing power is the same in each of the two countries. In the chart above, the black solid line represents our calculation of the fair value of an exchange rate. The dotted line is the actual exchange rate and the gray area represents our calculation of the normal trading range.

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Purchasing Power Parity Valuations versus US Dollar

September 30, 2018

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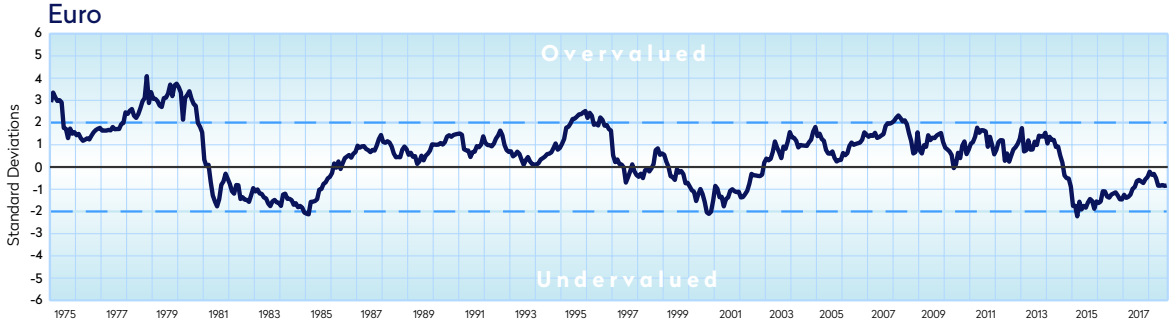
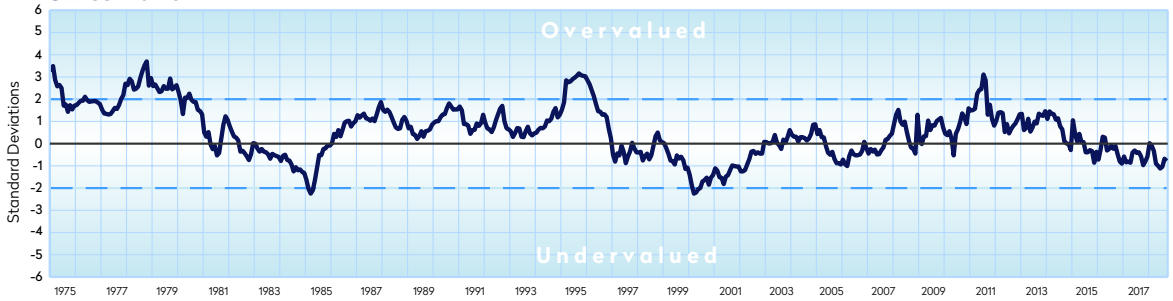
Euro

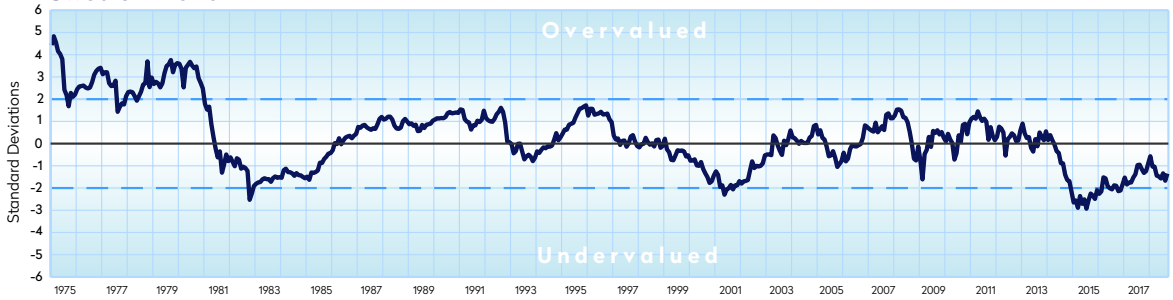


Our euro PPP calculations weight individual euro zone countries' currencies and prices by their 2000 GDP weights for dates prior to 1999.

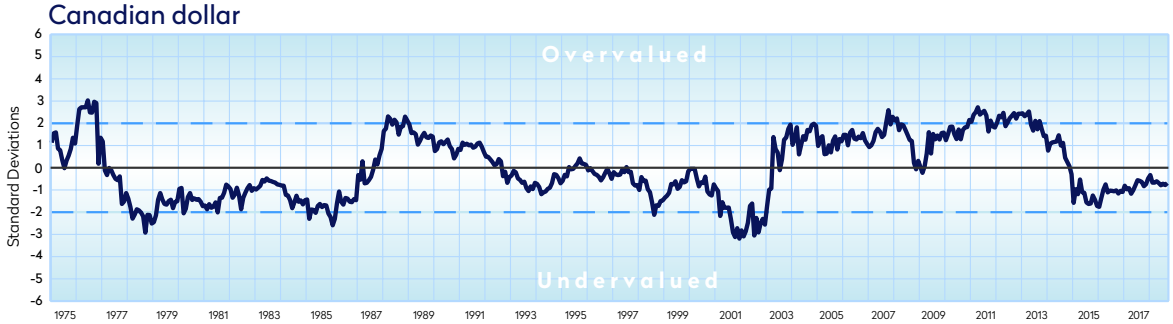
Swiss franc



Swedish krona



Canadian dollar



Source: Mondrian Investment Partners

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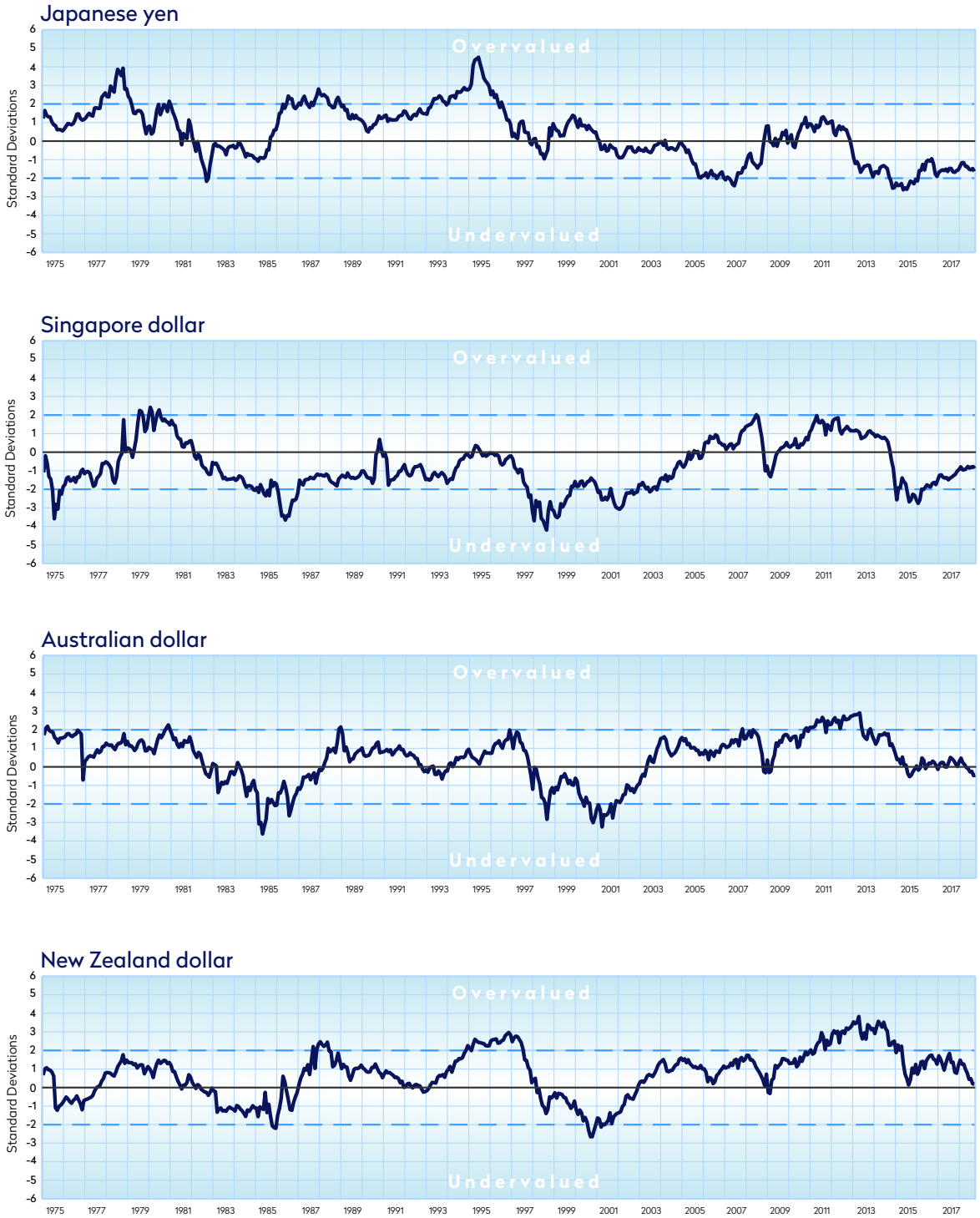
Purchasing Power Parity Valuations versus US Dollar

September 30, 2018

MONDRIAN INVESTMENT PARTNERS



Source: Mondrian Investment Partners

Implementation

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Sell Discipline

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Positive Triggers	Negative Triggers
• **Price appreciation** leading to overvaluation against a predetermined value level.	• A **change in the financial/ business fundamentals** which adversely affects ongoing appraisal of value.
• More **attractive alternatives**.	• A **change in the political/ regulatory environment** which has implications for the investment's future prospects.
• Market capitalization and size of holding significantly in **excess of targeted ceiling**.	• A **change in corporate governance**.

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Performance Attribution

Performance

Alaska Retirement Management Board
September 30, 2018

MONDRIAN INVESTMENT PARTNERS

	Portfolio (Gross)	Portfolio (Net)	MSCI World ex-US Small Cap	Relative to MSCI World ex-US Small Cap	MSCI EAFE Small Cap	CPI
Oct. 1 - Dec. 31, 2010	9.8%	9.6%	12.9%	-2.7%	11.8%	0.3%
2011	-8.0%	-8.7%	-15.8%	9.3%	-15.9%	3.0%
2012	25.8%	24.8%	17.5%	7.1%	20.0%	1.7%
2013	18.4%	17.5%	25.6%	-5.7%	29.3%	1.5%
2014	-4.0%	-4.7%	-5.3%	1.4%	-4.9%	0.7%
2015	3.8%	3.1%	5.5%	-1.5%	9.6%	0.7%
2016	1.0%	0.3%	4.3%	-3.1%	2.2%	2.0%
Quarter 1, 2017	9.8%	9.6%	7.6%	2.1%	8.0%	1.0%
Quarter 2, 2017	8.0%	7.8%	7.3%	0.6%	8.1%	0.4%
Quarter 3, 2017	6.0%	5.8%	7.3%	-1.2%	7.5%	0.8%
Quarter 4, 2017	6.1%	6.0%	5.8%	0.3%	6.1%	-0.1%
2017	33.4%	32.5%	31.0%	1.8%	33.0%	2.1%
January	3.0%	2.9%	4.7%	-1.6%	5.1%	0.5%
February	-2.9%	-2.9%	-3.9%	1.1%	-3.5%	0.5%
March	-1.4%	-1.4%	-1.1%	-0.3%	-1.1%	0.2%
Quarter 1, 2018	-1.4%	-1.6%	-0.5%	-0.9%	0.2%	1.2%
April	1.3%	1.2%	1.5%	-0.2%	1.4%	0.4%
May	1.7%	1.7%	-0.7%	2.4%	-1.0%	0.4%
June	-0.7%	-0.8%	-1.7%	1.0%	-1.9%	0.2%
Quarter 2, 2018	2.3%	2.1%	-0.9%	3.2%	-1.6%	1.0%
July	-0.9%	-1.0%	0.6%	-1.5%	0.7%	0.0%
August	0.5%	0.4%	-0.7%	1.2%	-0.8%	N/A
September	0.8%	0.7%	-0.7%	1.5%	-0.7%	N/A
Quarter 3, 2018	0.3%	0.1%	-0.9%	1.2%	-0.9%	N/A
Year to Date	1.2%	0.6%	-2.3%	3.5%	-2.2%	2.2%
1 Year	7.4%	6.6%	3.4%	3.8%	3.7%	2.1%
3 Years (annualized)	13.5%	12.7%	12.2%	1.1%	12.4%	1.9%
5 Years (annualized)	7.3%	6.6%	7.1%	0.2%	8.0%	1.5%
Since Inception October 1, 2010 (cumulative)	**104.5%**	**92.8%**	**86.9%**	**9.4%**	**101.9%**	**15.4%**
Since Inception October 1, 2010 (annualized)	**9.3%**	**8.5%**	**8.1%**	**1.1%**	**9.2%**	**1.8%**

Source: Mondrian Investment Partners and MSCI for World Ex-US Small Cap Index

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International Small Cap Equity Composite Performance

September 30, 2018

MONDRIAN INVESTMENT PARTNERS

	Mondrian Composite	MSCI World ex-US Small Cap	Relative
1998	7.2%	4.3%	2.7%
1999	25.5%	18.4%	6.0%
2000	-1.2%	-8.8%	8.3%
2001	-4.8%	-10.7%	6.6%
2002	-8.6%	-7.4%	-1.3%
2003	51.4%	61.8%	-6.5%
2004	28.9%	29.4%	-0.4%
2005	15.6%	25.0%	-7.6%
2006	37.2%	19.5%	14.8%
2007	12.6%	3.3%	9.0%
2008	-43.3%	-48.0%	9.1%
2009	57.8%	50.8%	4.6%
2010	31.0%	24.5%	5.2%
2011	-8.0%	-15.8%	9.2%
2012	25.7%	17.5%	7.0%
2013	18.2%	25.6%	-5.8%
2014	-4.2%	-5.3%	1.2%
2015	3.6%	5.5%	-1.8%
2016	1.0%	4.3%	-3.2%
Quarter 1, 2017	9.8%	7.6%	2.0%
Quarter 2, 2017	7.9%	7.3%	0.6%
Quarter 3, 2017	6.0%	7.3%	-1.2%
Quarter 4, 2017	6.1%	5.8%	0.3%
2017	33.3%	31.0%	1.7%
January	3.0%	4.7%	-1.6%
February	-2.9%	-3.9%	1.0%
March	-1.4%	-1.1%	-0.3%
Quarter 1, 2018	-1.4%	-0.5%	-0.9%
April	1.3%	1.5%	-0.2%
May	1.7%	-0.7%	2.4%
June	-0.7%	-1.7%	1.0%
Quarter 2, 2018	2.2%	-0.9%	3.2%
July	-0.9%	0.6%	-1.5%
August	0.5%	-0.7%	1.2%
September	0.8%	-0.7%	1.5%
Quarter 3, 2018	0.3%	-0.9%	1.2%
Year to Date	1.1%	-2.3%	3.5%
1 Year	7.3%	3.4%	3.8%
3 Years (annualized)	13.4%	12.2%	1.1%
5 Years (annualized)	7.2%	7.1%	0.1%
7 Years (annualized)	10.9%	10.3%	0.6%
10 Years (annualized)	10.9%	9.0%	1.7%
15 Years (annualized)	12.2%	9.1%	2.8%
20 Years (annualized)	12.0%	8.7%	3.1%
Composite Inception January 1, 1998 (cumulative)	**771.3%**	**385.9%**	**79.3%**
Composite Inception January 1, 1998 (annualized)	**11.0%**	**7.9%**	**2.9%**

Source: Mondrian Investment Partners, MSCI World ex-US Small Cap Index

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Small Cap Equity Market Returns

September 30, 2018

MONDRIAN INVESTMENT PARTNERS

	Quarter 3, 2018			Year to Date to September 30, 2018		
	Local Market Return %	Currency Change vs. USD %	USD Return %	Local Market Return %	Currency Change vs. USD %	USD Return %
North America	**-2.3**	**1.8**	**-0.6**	**-0.1**	**-3.1**	**-3.2**
Canada	-2.3	1.8	-0.6	-0.1	-3.1	-3.2
Pacific	**1.7**	**-2.2**	**-0.5**	**-0.3**	**-2.1**	**-2.3**
Australia	1.3	-2.1	-0.8	5.6	-7.5	-2.3
Hong Kong	-7.7	0.3	-7.4	-18.2	-0.1	-18.3
Japan	2.4	-2.5	-0.1	-0.4	-0.8	-1.2
New Zealand	3.4	-2.1	1.2	13.2	-6.8	5.6
Singapore	1.1	-0.2	0.9	-3.5	-2.0	-5.4
Europe & Middle East	**-0.7**	**-0.4**	**-1.1**	**1.4**	**-3.5**	**-2.1**
Austria	2.1	-0.5	1.5	2.6	-3.3	-0.7
Belgium	0.0	-0.5	-0.5	-1.5	-3.3	-4.8
Denmark	-3.0	-0.6	-3.6	15.0	-3.4	11.1
Finland	-2.3	-0.5	-2.8	-2.0	-3.3	-5.2
France	-2.6	-0.5	-3.2	-6.3	-3.3	-9.3
Germany	-0.2	-0.5	-0.8	-2.2	-3.3	-5.4
Ireland	-4.9	-0.5	-5.4	8.8	-3.3	5.2
Israel	14.0	0.4	14.5	16.3	-3.2	12.5
Italy	0.2	-0.5	-0.3	0.3	-3.3	-3.0
Netherlands	-0.6	-0.5	-1.0	-2.6	-3.0	-5.5
Norway	4.9	0.1	5.0	21.0	0.4	21.6
Portugal	-4.0	-0.5	-4.5	-2.0	-3.3	-5.2
Spain	-0.6	-0.5	-1.1	1.5	-3.3	-1.8
Sweden	4.3	0.6	4.9	10.9	-7.9	2.1
Switzerland	-4.3	1.7	-2.7	-7.2	-0.2	-7.4
United Kingdom	-2.7	-1.2	-3.9	0.6	-3.6	-3.0
World ex US SC	**0.0**	**-0.9**	**-0.9**	**0.6**	**-2.8**	**-2.3**
EAFE Small Cap	**0.3**	**-1.1**	**-0.9**	**0.7**	**-2.8**	**-2.2**

Source: MSCI

Performance Summary

Alaska Retirement Management Board
Quarter 3, 2018

MONDRIAN INVESTMENT PARTNERS

Performance Attribution %

	Currency Contribution	Market Contribution	Stock Contribution	Relative Return
MSCI World ex-US Small Cap	+0.4	-0.6	+1.4	+1.2
MSCI EAFE Small Cap	+0.6	-0.5	+1.1	+1.2

POSITIVE NEGATIVE

Stock Contribution

- **Canada**
  Cineplex
- **UK**
  Cineworld
  Victrex
- **Japan**
  Ariake

- **Japan**
  Hogy Medical
  Nifco
- **Switzerland**
  u-blox
- **France**
  Ingenico

Currency Contribution

- Underweight Japanese yen
- Overweight Canadian dollar

Market Contribution

- Overweight New Zealand
- Overweight Singapore

- Underweight Japan
- No exposure to Israel

Performance Attribution

Source: Mondrian Investment Partners and MSCI for World ex-US Small Cap Index

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Performance Summary

Alaska Retirement Management Board
Year to Date to September 30, 2018

MONDRIAN INVESTMENT PARTNERS

Performance Attribution %

	Currency Contribution	Market Contribution	Stock Contribution	Relative Return
MSCI World ex-US Small Cap	-0.2	-0.4	+4.2	+3.5
MSCI EAFE Small Cap	-0.2	+0.1	+3.5	+3.4

POSITIVE NEGATIVE

Stock Contribution

- **Norway**
  Elkem
- **Sweden**
  AAK
- **UK**
  Spirax-Sarco Engineering
  Victrex
- **Germany**
  Fielmann
- **France**
  Ingenico
- **Australia**
  Invocare
- **Japan**
  Nifco

Currency Contribution

- Overweight Hong Kong dollar
- Underweight Japanese yen
- Overweight Australian dollar

Market Contribution

- Overweight New Zealand
- Underweight Japan
- Overweight Hong Kong/China
- No exposure to Israel

Source: Mondrian Investment Partners and MSCI for World ex-US Small Cap Index

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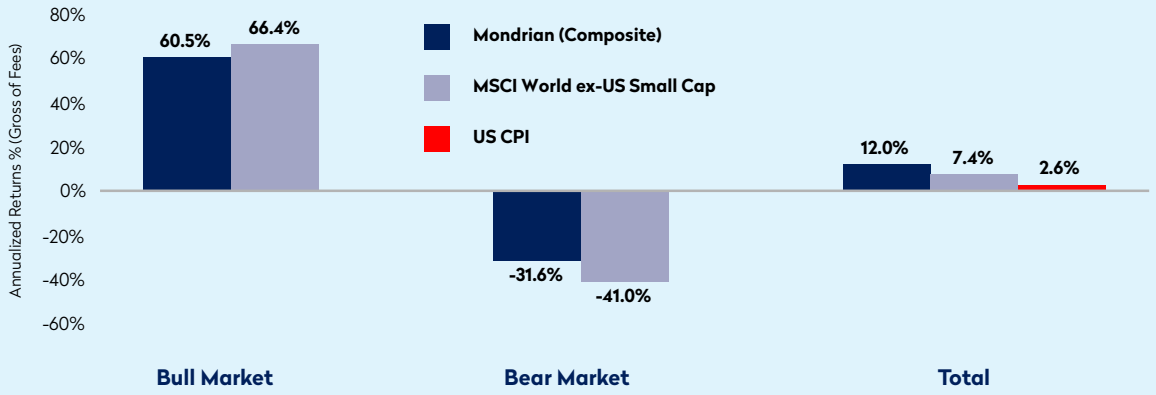
Recent Performance History

Defensive Performance Characteristics

Mondrian International Small Cap Equity Composite

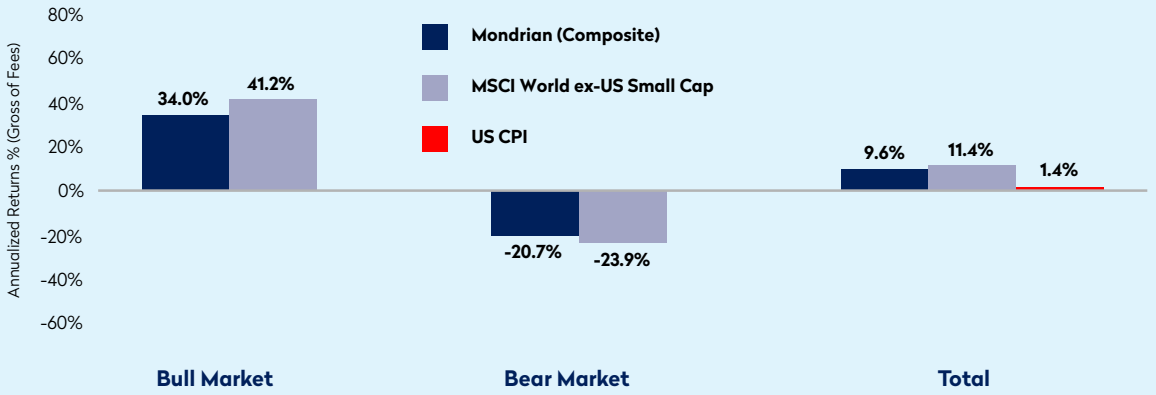
MONDRIAN INVESTMENT PARTNERS

Long-term Performance History – 1998 to 2012



- Defensive, value performance characteristics showing downside protection with significant upside capture
- Long-term outperformance with capital preservation

Recent Performance Challenged – 2013 to 2017



- Unable to provide as much downside protection and upside capture relative to history

Source: Mondrian Investment Partners and MSCI

A Bull Market month is defined as one in which the benchmark showed a positive return, and a Bear Market month when the benchmark showed a negative return.

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International Small Cap Equity Composite Performance

September 30, 2018

MONDRIAN INVESTMENT PARTNERS

	Mondrian Composite	MSCI World ex-US SC	Relative to World ex-US SC
1998	7.2%	4.3%	2.7%
1999	25.5%	18.4%	6.0%
2000	-1.2%	-8.8%	8.3%
2001	-4.8%	-10.7%	6.6%
2002	-8.6%	-7.4%	-1.3%
2003	51.4%	61.8%	-6.5%
2004	28.9%	29.4%	-0.4%
2005	15.6%	25.0%	-7.6%
2006	37.2%	19.5%	14.8%
2007	12.6%	3.3%	9.0%
2008	-43.3%	-48.0%	9.1%
2009	57.8%	50.8%	4.6%
2010	31.0%	24.5%	5.2%
2011	-8.0%	-15.8%	9.2%
2012	25.7%	17.5%	7.0%
2013	18.2%	25.6%	-5.8%
2014	-4.2%	-5.3%	1.2%
2015	3.6%	5.5%	-1.8%
2016	1.0%	4.3%	-3.2%
Quarter 1, 2017	9.8%	7.6%	2.0%
Quarter 2, 2017	7.9%	7.3%	0.6%
Quarter 3, 2017	6.0%	7.3%	-1.2%
Quarter 4, 2017	6.1%	5.8%	0.3%
2017	33.3%	31.0%	1.7%
January	3.0%	4.7%	-1.6%
February	-2.9%	-3.9%	1.0%
March	-1.4%	-1.1%	-0.3%
Quarter 1, 2018	-1.4%	-0.5%	-0.9%
April	1.3%	1.5%	-0.2%
May	1.7%	-0.7%	2.4%
June	-0.7%	-1.7%	1.0%
Quarter 2, 2018	2.2%	-0.9%	3.2%
July	-0.9%	0.6%	-1.5%
August	0.5%	-0.7%	1.2%
September	0.8%	-0.7%	1.5%
Quarter 3, 2018	0.3%	-0.9%	1.2%
Year to Date	1.1%	-2.3%	3.5%
1 Year	7.3%	3.4%	3.8%
3 Years (annualized)	13.4%	12.2%	1.1%
5 Years (annualized)	7.2%	7.1%	0.1%
7 Years (annualized)	10.9%	10.3%	0.6%
10 Years (annualized)	10.9%	9.0%	1.7%
15 Years (annualized)	12.2%	9.1%	2.8%
20 Years (annualized)	12.0%	8.7%	3.1%
Composite Inception January 1, 1998 (cumulative)	**771.3%**	**385.9%**	**79.3%**
Composite Inception January 1, 1998 (annualized)	**11.0%**	**7.9%**	**2.9%**

Source: Mondrian Investment Partners, MSCI World ex-US Small Cap Index
The Blended Benchmark used was MSCI World ex-US Index from inception up until February 2001 and thereafter the MSCI EAFE Small Cap Index.

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Recent Challenges and Actions

MONDRIAN INVESTMENT PARTNERS

Challenges:	Actions:
Distortions in Equity Markets ● Accommodative monetary policy (low policy rates and QE) ● Abundant liquidity ● Expectations of a strong recovery	● Continue to remain defensively positioned to help withstand gradual normalization in monetary policy by major central banks
Style Out of Favor ● Defensive, value-orientated portfolio ● Well capitalized companies with strong cash-flow generation	● Continue to focus on long-term fundamentals: seeking well capitalized companies that enjoy structural growth with stable and strong cash-flows to support growth and dividends
Strategies Penalized ● Lack of exposure to interest rate sensitive, cyclical companies, particularly in Europe ● Underestimation of downside risk to industrials exposed to commodity-linked sectors, primarily in the UK ● Asset allocation within Asian markets: underweight Japan, overweight defensive Singapore	● Increased exposure to smaller de-correlated and fiscally strong economies that have the ability to undertake counter-cyclical fiscal policies such as New Zealand and Canada ● A reduction in the UK weight implemented in late 2015/2016 ● Removal of exposure to oil/coal related stocks across the value chain (late 2014-2016)

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Outlook

MONDRIAN INVESTMENT PARTNERS

- Debt overhang, slow progress in deleveraging and a lack of structural reforms in developed markets leading to lower trend growth, modest inflation and lower policy rates relative to history.
- The shift towards a gradual tightening stance by major central banks will likely alter risk appetite bringing a normalization to markets.
- Markets are unlikely to observe a significant derating but periods of uncertainty will continue.
- Whilst the magnitude of volatility has been kept subdued due to abundant liquidity, market fluctuations are likely with uncertainty and the presence of economic and social tail risks.
- In an environment of likely slow rising markets with limited upside, investing in an inefficient asset class such as international small cap offers alpha opportunities.
- These present opportunities for a manager like Mondrian which adopts a disciplined investment approach focused on targeting both real rate of returns and downside protection.

Portfolio

Country Allocation

Alaska Retirement Management Board
September 30, 2018

MONDRIAN INVESTMENT PARTNERS

	1	2	3	4	5	6
	Min/Max Allocation %	Portfolio Allocation %	MSCI World ex-US Small Cap %	Over/Under Weight %	MSCI EAFE Small Cap %	Currency Hedge %
North America		**12.8**	**8.8**	**4.0**		
Canada	0 - 15	12.8	8.8	4.0		
Asia Pacific		**38.7**	**38.8**	**-0.1**	**42.5**	
Australia	0 - 20	7.9	6.3	1.6	7.0	
Hong Kong/China	0 - 20	3.5	1.7	1.7	1.9	
Japan	0 - 40	16.3	28.4	-12.1	31.1	
New Zealand	0 - 10	4.3	0.8	3.5	0.9	✓
Singapore	0 - 20	6.7	1.5	5.2	1.6	
Europe & Middle East		**46.0**	**52.4**	**-6.4**	**57.5**	
Denmark	0 - 15	—	1.6	-1.6	1.8	
France	0 - 25	6.1	3.4	2.7	3.7	
Germany	0 - 25	9.2	5.4	3.8	5.9	
Ireland	0 - 15	1.8	0.7	1.1	0.8	
Italy	0 - 15	—	3.3	-3.3	3.7	
Netherlands	0 - 20	2.4	2.4	0.0	2.6	
Norway	0 - 15	2.3	1.8	0.4	2.0	
Spain	0 - 15	—	2.4	-2.4	2.6	
Sweden	0 - 15	4.7	5.0	-0.2	5.4	
Switzerland	0 - 15	4.0	4.0	0.0	4.4	
United Kingdom	0 - 45	15.6	16.6	-1.0	18.2	

- A minimum/maximum country allocation policy seeks to allow broad flexibility while guarding against over or underconcentration relative to the Index. If the governing documents for the account contain min/max guidelines, these guidelines are reflected above. If the governing documents for the account do not contain min/max guidelines, the min/max allocations above represent Mondrian's current internal policy and can be changed at any time in Mondrian's discretion.
- Portfolio Allocation.
- MSCI World ex-US Small Cap Index Weights.
- Over/Underweight to MSCI World ex-US Small Cap Index Weights.
- MSCI EAFE Small Cap Index Weights.
- Defensive currency hedges are put into place if appropriate and permissible under client objectives.

Source: Mondrian Investment Partners and MSCI for World ex-US Small Cap Index

Portfolio

Alaska Retirement Management Board
September 30, 2018

MONDRIAN INVESTMENT PARTNERS

	Industry	Holdings %			P/E Ratio		Dividend Yield %	
		Portfolio	Index	EAFE SC	Portfolio	Index	Portfolio	Index
NORTH AMERICA		**12.8**	**8.8**		**23.1**	**26.1**	**3.8**	**2.5**
CANADA		**12.8**	**8.8**		**23.1**	**26.1**	**3.8**	**2.5**
Boralex	Ind Power and Renewable Elec	1.6			62.2		3.5	
CAE	Aerospace & Defense	2.2			19.9		1.5	
Cineplex	Media	1.9			25.9		5.0	
Innergex Renewable Energy	Ind Power and Renewable Elec	1.9			91.4		5.2	
Northview Apartment REIT	Equity Real Estate Invest Trusts	0.9			5.6		6.4	
Ritchie Bros	Commercial Services & Supplies	1.4			33.7		2.0	
TransAlta Renewables	Ind Power and Renewable Elec	1.0			14.9		8.2	
WSP Global	Construction & Engineering	2.0			30.9		2.1	
ASIA PACIFIC		**38.7**	**38.8**	**42.5**	**19.8**	**17.9**	**2.7**	**2.3**
AUSTRALIA		**7.9**	**6.3**	**7.0**	**15.0**	**20.2**	**4.3**	**3.1**
Altium	Software	1.2			77.9		1.0	
Charter Hall Retail REIT	Equity Real Estate Invest Trusts	1.2			11.2		6.7	
Costa	Food Products	1.0			19.3		1.9	
Inghams	Food Products	1.3			12.6		5.4	
Invocare	Diversified Consumer Services	1.4			15.9		3.6	
Pact	Containers & Packaging	0.5			15.2		6.2	
SCA Property Group REIT	Equity Real Estate Invest Trusts	1.2			9.6		5.8	
HONG KONG/CHINA		**3.5**	**1.7**	**1.9**	**20.6**	**14.1**	**2.1**	**3.8**
ASM Pacific	Semiconductor & Semiconductor Equip	0.4			11.8		3.3	
HKBN	Diversified Telecom Services	1.1			33.2		3.7	
Microport	Health Care Equipment & Supplies	1.0			101.5		0.2	
Nexteer Automotive	Auto Components	1.0			10.7		1.8	
JAPAN		**16.3**	**28.4**	**31.1**	**25.7**	**18.0**	**1.2**	**1.8**
Ariake	Food Products	1.8			43.5		0.6	
Asahi Intecc	Health Care Equipment & Supplies	0.7			63.8		0.4	
Digital Arts	Software	0.4			61.6		0.6	
en-Japan	Professional Services	1.9			37.5		0.8	
FCC	Auto Components	1.0			16.0		1.3	
Hogy Medical	Health Care Equipment & Supplies	0.8			34.0		1.6	
Infomart	Software	1.3			125.6		0.5	
Kyudenko	Construction & Engineering	0.3			12.9		2.0	
Misumi	Machinery	1.1			32.7		0.8	
Musashi Seimitsu	Auto Components	0.9			9.8		2.2	
Nifco	Auto Components	2.4			15.0		2.1	
Nihon M&A	Professional Services	2.3			73.1		0.7	
Resorttrust	Hotels Restaurants & Leisure	1.4			15.9		2.5	
NEW ZEALAND		**4.3**	**0.8**	**0.9**	**19.3**	**16.0**	**3.9**	**4.7**
Auckland International Airport	Transportation Infrastructure	1.9			20.1		3.0	
Mercury NZ	Electric Utilities	1.6			20.1		4.5	
Sky City Entertainment	Hotels Restaurants & Leisure	0.7			16.0		5.0	
SINGAPORE		**6.7**	**1.5**	**1.6**	**16.9**	**14.2**	**4.3**	**5.3**
Ascendas REIT	Equity Real Estate Invest Trusts	1.3			16.4		5.7	
CapitaLand Mall Trust REIT	Equity Real Estate Invest Trusts	1.9			12.0		5.1	
SATS	Transportation Infrastructure	2.2			21.7		3.4	
Sheng Siong	Food & Staples Retailing	1.3			23.4		3.0	

Continued overleaf

Source: Mondrian Investment Partners and MSCI
Note: 'Index' denotes MSCI World ex-USA Small Cap Index

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Portfolio

Alaska Retirement Management Board
September 30, 2018

MONDRIAN INVESTMENT PARTNERS

	Industry	Holdings %			P/E Ratio		Dividend Yield %	
		Portfolio	Index	EAFE SC	Portfolio	Index	Portfolio	Index
EUROPE & MIDDLE EAST		**46.0**	**52.4**	**57.5**	**23.2**	**19.3**	**2.0**	**2.5**
FRANCE		**6.1**	**3.4**	**3.7**	**17.2**	**22.9**	**2.4**	**2.1**
Ingenico	Elect. Equip Instruments & Comp	1.6			22.4		2.4	
Korian	Health Care Providers & Services	1.8			15.6		1.9	
LISI	Aerospace & Defense	0.9			15.3		1.5	
Rubis	Gas Utilities	1.8			16.5		3.2	
GERMANY		**9.2**	**5.4**	**5.9**	**19.8**	**22.9**	**2.0**	**2.2**
Duerr	Machinery	1.0			14.6		2.8	
Fielmann	Specialty Retail	2.0			25.9		3.6	
Gerresheimer	Life Sciences Tools & Services	1.0			16.7		1.5	
JOST	Auto Components	0.9			12.0		1.5	
Nemetschek	Software	0.8			59.6		0.6	
NORMA	Machinery	1.2			14.6		1.9	
Rational	Machinery	0.8			50.5		1.4	
Stabilus	Machinery	1.5			20.7		1.1	
IRELAND		**1.8**	**0.7**	**0.8**	**25.7**	**20.7**	**1.7**	**1.5**
Glanbia	Food Products	1.8			25.7		1.7	
NETHERLANDS		**2.4**	**2.4**	**2.6**	**21.4**	**21.8**	**3.7**	**2.7**
B&S	Distributors	1.3			21.4		N/A	
Boskalis Westminster	Construction & Engineering	1.0			N/A		3.7	
NORWAY		**2.3**	**1.8**	**2.0**	**32.7**	**22.0**	**N/A**	**2.1**
Elkem	Chemicals	2.3			32.7		N/A	
SWEDEN		**4.7**	**5.0**	**5.4**	**24.7**	**17.8**	**1.7**	**2.5**
AAK	Food Products	2.7			31.7		1.1	
AF	Professional Services	2.1			19.3		2.4	
SWITZERLAND		**4.0**	**4.0**	**4.4**	**27.4**	**24.4**	**2.0**	**2.5**
Belimo	Building Products	0.7			33.3		1.8	
Burckhardt Compression	Machinery	1.1			40.2		1.8	
Daetwyler	Machinery	0.6			25.7		1.6	
Landis+Gyr	Elect. Equip Instruments & Comp	0.7			34.5		3.5	
u-blox	Elect. Equip Instruments & Comp	0.9			16.7		1.6	
UNITED KINGDOM		**15.6**	**16.6**	**18.2**	**26.6**	**17.3**	**1.8**	**2.7**
Cineworld	Media	2.2			19.6		2.2	
ContourGlobal	Ind Power and Renewable Elec	1.6			87.6		0.9	
Croda	Chemicals	0.4			27.9		1.6	
Diploma	Trading Companies & Distributors	1.4			32.2		1.7	
Elementis	Chemicals	0.6			17.5		2.5	
Equiniti	IT Services	1.2			74.1		1.7	
Greene King	Hotels Restaurants & Leisure	0.4			7.8		6.8	
Halma	Elect. Equip Instruments & Comp	1.4			35.5		1.0	
Spectris	Elect. Equip Instruments & Comp	0.8			16.4		2.4	
Spirax-Sarco Engineering	Machinery	2.4			30.8		1.2	
Ultra Electronics	Aerospace & Defense	0.9			24.0		3.1	
Victrex	Chemicals	2.1			24.5		1.6	
Cash		**2.5**	**–**	**0.0**	**–**	**–**		**–**
TOTAL		**100.0**	**100.0**	**100.0**	**21.7**	**19.1**	**2.5**	**2.4**

Source: Mondrian Investment Partners and MSCI
Note: 'Index' denotes MSCI World ex-USA Small Cap Index

Sector Allocation

Mondrian International Small Cap Equity Representative Account
September 30, 2018

MONDRIAN INVESTMENT PARTNERS

	Representative Account %	MSCI World ex-US Small Cap %	Relative %
Consumer Discretionary	**17.7**	**14.4**	**3.3**
Automobiles & Components	6.2	1.7	4.5
Auto Components	6.2	1.6	4.5
Automobiles	-	0.0	-0.0
Consumer Durables & Apparel	-	3.2	-3.2
Household Durables	-	1.7	-1.7
Leisure Products	-	0.7	-0.7
Textiles Apparel & Luxury Goods	-	0.8	-0.8
Consumer Services	4.0	3.6	0.4
Diversified Consumer Services	1.4	0.3	1.1
Hotels Restaurants & Leisure	2.6	3.3	-0.7
Media	4.2	2.1	2.1
Media	4.2	2.1	2.1
Retailing	3.3	3.8	-0.4
Distributors	1.3	0.4	0.9
Internet & Direct Marketing Retail	-	0.8	-0.8
Multiline Retail	-	0.5	-0.5
Specialty Retail	2.0	1.9	0.0
Consumer Staples	**10.1**	**6.4**	**3.7**
Food & Staples Retailing	1.3	1.6	-0.3
Food & Staples Retailing	1.3	1.6	-0.3
Food Beverage & Tobacco	8.7	4.1	4.7
Beverages	-	0.8	-0.8
Food Products	8.7	3.2	5.5
Tobacco	-	0.0	-0.0
Household & Personal Products	-	0.8	-0.8
Household Products	-	0.3	-0.3
Personal Products	-	0.5	-0.5
Energy	-	**4.5**	**-4.5**
Energy	-	4.5	-4.5
Energy Equipment & Services	-	1.7	-1.7
Oil Gas & Consumable Fuels	-	2.7	-2.7
Financials	-	**11.3**	**-11.3**
Banks	-	4.2	-4.2
Banks	-	3.7	-3.7
Thrifts & Mortgage Finance	-	0.4	-0.4
Diversified Financials	-	5.1	-5.1
Diversified Financial Services	-	1.3	-1.3
Consumer Finance	-	0.5	-0.5
Capital Markets	-	3.4	-3.4
Insurance	-	2.1	-2.1
Insurance	-	2.1	-2.1
Health Care	**5.5**	**7.4**	**-1.9**
Health Care Equipment & Services	4.4	3.3	1.1
Health Care Equipment & Supplies	2.6	1.8	0.8
Health Care Providers & Services	1.8	1.3	0.5
Health Care Technology	-	0.2	-0.2
Pharmaceuticals, Biotechnology & Life Sciences	1.0	4.1	-3.1
Biotechnology	-	1.3	-1.3
Life Sciences Tools & Services	1.1	0.8	0.3
Pharmaceuticals	-	2.0	-2.0

Continued overleaf

Source: Mondrian Investment Partners and MSCI

The information shown above is based on an account which represents the strategy having similar guidelines and objectives. All international small cap mandates, whether separate account or commingled fund, are managed in a similar fashion. Sector weightings between portfolios are not materially different.

Sector Allocation

Mondrian International Small Cap Equity Representative Account
September 30, 2018

MONDRIAN INVESTMENT PARTNERS

	Representative Account %	MSCI World ex-US Small Cap %	Relative %
Industrials	**31.0**	**21.1**	**9.9**
Capital Goods	19.2	13.8	5.4
Aerospace & Defense	4.0	0.6	3.4
Building Products	0.7	1.5	-0.8
Construction & Engineering	3.3	2.8	0.6
Electrical Equipment	-	0.9	-0.9
Industrial Conglomerates	-	0.5	-0.5
Machinery	9.8	5.7	4.1
Trading Companies & Distributors	1.4	1.9	-0.5
Commercial & Professional Services	7.6	4.1	3.5
Commercial Services & Supplies	1.4	2.4	-1.0
Professional Services	6.2	1.6	4.6
Transportation	4.2	3.3	0.9
Air Freight & Logistics	-	0.5	-0.5
Airlines	-	0.3	-0.3
Marine	-	0.4	-0.4
Road & Rail	-	1.3	-1.3
Transportation Infrastructure	4.2	0.9	3.3
Information Technology	**10.8**	**10.6**	**0.2**
Semiconductors & Semiconductor Equipment	1.3	1.4	-0.1
Semiconductors & Semiconductor Equipment	1.3	1.4	-0.1
Software & Services	5.1	5.9	-0.8
Internet Software & Services	1.4	1.5	-0.1
IT Services	1.3	2.3	-1.1
Software	2.5	2.1	0.4
Technology Hardware & Equipment	4.4	3.4	1.0
Communications Equipment	-	0.2	-0.2
Electronic Equipment Instruments & Components	4.4	2.6	1.8
Technology Hardware, Storage & Peripherals	-	0.6	-0.6
Materials	**6.0**	**9.8**	**-3.8**
Materials	6.0	9.8	-3.8
Chemicals	5.4	2.8	2.6
Construction Materials	-	0.6	-0.6
Containers & Packaging	0.5	1.1	-0.6
Metals & Mining	-	4.2	-4.2
Paper & Forest Products	-	1.0	-1.0
Real Estate	**6.5**	**10.7**	**-4.2**
Real Estate	6.5	10.7	-4.2
Equity Real Estate Investment Trusts (REITs)	6.5	6.6	0.0
Real Estate Management & Development	-	4.2	-4.2
Telecommunication Services	**1.1**	**1.3**	**-0.2**
Telecommunication Services	1.1	1.3	-0.2
Diversified Telecommunication Services	1.1	1.0	0.1
Wireless Telecommunication Services	-	0.3	-0.3
Utilities	**9.6**	**2.5**	**7.1**
Utilities	9.6	2.5	7.1
Electric Utilities	1.6	0.7	0.9
Gas Utilities	1.8	0.4	1.4
Independent Power and Renewable Electricity Producers	6.2	0.5	5.6
Multi-Utilities	-	0.6	-0.6
Water Utilities	-	0.1	-0.1
Cash	**1.7**	**-**	**1.7**

Source: Mondrian Investment Partners and MSCI

The information shown above is based on an account which represents the strategy having similar guidelines and objectives. All international small cap mandates, whether separate account or commingled fund, are managed in a similar fashion. Sector weightings between portfolios are not materially different.

Transaction Summary

Alaska Retirement Management Board
2018

MONDRIAN INVESTMENT PARTNERS

Buy

Country	Stock	Date
Japan	Infomart	Q1
Australia	Altium	Q1
Norway	Elkem	Q1
Netherlands	B&S Group	Q1
Japan	Digital Arts	Q2
Singapore	Sheng Siong	Q2
Japan	en-Japan	Q2
Japan	Kyudenko	Q3

Sell

Country	Stock	Date
Netherlands	Refresco	Q1
France	Boiron	Q2
Germany	MTU Aero Engines	Q2
UK	Laird Group	Q3
Germany	Qiagen	Q3
Hong Kong/China	Skyworth Digital	Q3

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Portfolio Market Capitalization Characteristics

Alaska Retirement Management Board
September 30, 2018

MONDRIAN INVESTMENT PARTNERS

	Weighted Average Market Cap (USD bn)	Median Market Cap (USD bn)
Portfolio	3.3	2.5
MSCI World ex-US Small Cap Index	2.7	1.1
MSCI EAFE Small Cap Index	2.8	1.1

	Portfolio Turnover
12 Months to September 30, 2018	18.6%
12 Months to September 30, 2017	13.2%

Why Mondrian?

Why Mondrian Investment Partners? Our Competitive Advantages

MONDRIAN INVESTMENT PARTNERS

Employee Owned

- Long-term stability and continuity
- Broad equity ownership amongst employees
- Attracts, retains and motivates highly skilled personnel

Well Resourced Team

- Dedicated and focused team
- Draws on the breadth and depth of research and investment experience from across the firm
- Team consensus decision making

Disciplined Process

- Consistent long-term investment philosophy and process across all Mondrian investment products
- Structured analytical inflation-adjusted dividend discount methodology
- Combination of quantitative and qualitative analysis
- Detailed fundamental value stock analysis incorporating long-term risks, including environmental, social and governance factors

Value Approach

Focus on:

- Long-term real returns
- Low volatility of returns
- Downside protection
- Attractive value characteristics

Appendix

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57 What is Small Cap?

59 Performance Disclosure

60 Summary Biographies

62 Product Availability

64 Important Information

The Case for Non-US Small Cap

MONDRIAN INVESTMENT PARTNERS

International Small Cap is an inefficient asset class consisting of a large universe of stocks (>5000) which we believe is under-researched. This creates mispricing which allows alpha generation through stock selection. Moreover it offers diversification benefits. We believe this makes it an appealing asset class with the potential for upside return.

Key features of the Small Cap Asset Class are summarized below:

Inefficient asset class

Following the Global Financial Crisis there has been a shift towards consolidation in the stock broking and investment banking sectors which has led to a similar consolidation in the number of stocks that are covered by those analysts. This translates into less broker-related research into small cap stocks. Public information about smaller companies is often not well disseminated and not well analyzed. This can create inefficient pricing of these stocks and allow for dramatic swings in pricing as events that might normally be discounted occur unexpectedly. MIFID II is likely to further exacerbate this on-going trend. Mondrian believes it can benefit from its detailed fundamental research on these companies by carefully evaluating as much public information as possible that might not have been fully discounted by the market.

Moreover, given the nature of their small size and limited liquidity, small cap stock prices can fluctuate significantly on the basis of liquidity flows. This means that simple market flows may create pricing anomalies within the small cap arena, which can be exploited by an experienced investor, such as Mondrian, who has a specific valuation target based on a company's long-term underlying business strength.

Correlation

Whilst the correlation between indices has increased over time, the International Small Cap asset class has a relatively lower level of correlation with the MSCI US index and other major indices, offering diversification benefits.

Valuation

Throughout history, this asset class has typically shown premium returns. However, during the 1990s the asset class suffered a de-rating due to the relative deterioration in small cap companies underlying operational and financial results. Since then these companies have embarked on a drive to improve profitability and balance sheet utilization. Mondrian seeks to identify mispriced companies through detailed fundamental analysis which includes management visits and modeling the long term prospects of companies.

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What is Small Cap?

MONDRIAN INVESTMENT PARTNERS

There is clearly no dominant index covering the international small cap equity asset class. Surveys conducted by investment consultants show that the small cap indices commonly used are the S&P/Citigroup EMI ex-US/EPAC and the MSCI World ex-US/EAFE Small Cap indices.

The S&P/Citigroup EMI ex-US Index includes stocks which are ranked at the bottom 20th percentile by available market capitalization in each local market index. This is successful in expressing the smaller companies in each market but creates a universe of companies with extreme market capitalizations that range from huge (several billion USD in Switzerland) to tiny (less than USD 100 million in Singapore or New Zealand). As of October 2008, the S&P/Citigroup EMI ex-US/EPAC Index has been renamed as the S&P Developed ex-US/EPAC SmallCap Index to incorporate recent enhancements on the series of global equity indices. The enhanced S&P Developed ex-US/EPAC SmallCap Index includes stocks which are ranked at approximately the bottom 15th percentile by available market capitalization in each local market index. The new enhanced classification helps limit the dispersion of extreme market capitalizations within the aggregate small cap universe.

The MSCI World ex-US/EAFE Small Cap Index traditionally defined its universe of small cap stocks based on market capitalization in the range of USD 120 million to USD 2.5 billion. Commencing from June 2008, MSCI has implemented enhancements to its series of global equity indices. The enhanced MSCI Small Cap Index includes stocks which are ranked at approximately the bottom 15th percentile by available market capitalization in each local market index. The enhanced methodology incorporates further requirements such as liquidity, minimum size range and free-float adjusted market capitalization market coverage target. As with the enhanced S&P index, this helps limit the dispersion of extreme market capitalizations within the aggregate small cap universe.

We believe that both these indices represent an appropriate proxy of available opportunity set offering broad exposure to small capitalization securities within the international markets against which to measure performance and risk of international small cap equity products. We therefore do not recommend one over the other.

The Mondrian International Small Cap product defines its universe of small cap stocks based on market capitalization limits. Our 'buy' universe includes stocks with a total market capitalization of up to USD 3.5 billion at purchase across all markets. This level is both small enough to be genuinely small cap and large enough to allow relevant comparison to the available indices.

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Disclosure - International Small Cap Equity Composite

MONDRIAN INVESTMENT PARTNERS

Annual Performance

Year	Total Gross USD Return	Total Net of Fees USD Return	Benchmark USD Return	Composite Standard Deviation	Benchmark Standard Deviation	Number of Portfolios	Composite Dispersion	Composite Assets (USD millions)	% of Firm Assets	Total Firm Assets (USD millions)
2008	-43.31%	-43.75%	-48.03%	22.05%	22.79%	9	0.38%	666.0	1.38	48,233
2009	57.77%	56.56%	50.82%	25.09%	26.94%	9	0.70%	1,718.8	2.67	64,395
2010	31.04%	30.03%	24.51%	27.06%	29.18%	17	0.79%	4,241.1	6.20	68,386
2011	-8.04%	-8.74%	-15.81%	20.26%	23.08%	23	0.27%	4,958.9	7.53	65,891
2012	25.67%	24.71%	17.48%	17.49%	19.83%	24	0.19%	6,523.7	9.56	68,248
2013	18.21%	17.30%	25.55%	13.85%	16.27%	22	0.22%	7,585.0	10.78	70,356
2014	-4.19%	-4.93%	-5.35%	11.08%	13.34%	22	0.12%	6,953.8	10.85	64,102
2015	3.58%	2.78%	5.46%	10.17%	11.49%	21	0.20%	6,269.7	11.03	56,857
2016	0.98%	0.20%	4.32%	11.36%	12.31%	20	0.15%	5,728.5	9.70	59,033
2017	33.31%	32.28%	31.04%	10.89%	11.52%	20	0.15%	6,950.7	11.08	62,751
2018 (to Sep 30)	1.12%	0.54%	-2.28%	9.65%	10.70%	16	0.11%	5,391.6	9.96	54,148

Accompanying Notes Concerning Performance Calculation and GIPS® Compliance

- This composite was created in January 1998.
- Past performance is not a guarantee of future results.
- A complete list and description of all firm composites is available on request.

Mondrian Investment Partners Limited ("Mondrian") claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the Global Investment Performance Standards (GIPS®). Mondrian has been independently verified for the periods 1 January 1993 to 31 December 2017.

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. Additional third party Performance Examination under GIPS of this composite's results has also been undertaken from 1 January 1998 to 31 December 2017. The verification and performance examination reports are available upon request.

The Firm is defined as all discretionary portfolios managed by Mondrian.

Mondrian is a value-oriented defensive manager seeking to achieve high real returns for its clients. Mondrian invests mainly in securities where rigorous dividend discount analysis identifies value in terms of the long-term flows of income. Mondrian's methodology is applied consistently to markets and individual securities, both bonds and equities.

The International Small Cap Equity Composite includes US dollar based discretionary fee paying portfolios, measured against the Morgan Stanley Capital International World ex US Small Cap Index, or an equivalent Index net of US withholding taxes. The portfolios are invested in non-US based small capitalisation equities with the allowance for hedging.

Portfolios are valued on a trade date basis using accrual accounting. Returns are calculated using the modified Dietz method and then weighted by using beginning-of-period market values to calculate the monthly composite returns. Portfolio returns are calculated net of irrecoverable withholding tax on dividend income. New portfolios are included in the first full month of investment in the composite's strategy. Terminated portfolios remain in the composite through the last full month of investment. Additional information regarding the valuing of portfolios, calculating performance, and preparing compliant presentations are available upon request.

Composite and benchmark standard deviation are measured as the rolling 3 year annualised standard deviation of monthly returns. The dispersion of annual returns of portfolios within the composite (Composite Dispersion), is measured by the standard deviation of the equal-weighted returns of portfolios represented within the composite for the full year.

Performance results marked "Gross" do not reflect deduction of investment advisory fees. Investment returns will be reduced accordingly. For example, if a 1.00% advisory fee were deducted quarterly (0.25% each quarter) and the three year gross annual returns were 10.00%, 3.00% and -2.00%, giving an annualized return of 3.55% before deduction of advisory fees, then the deduction of advisory fees would result in three year net annual returns of 8.91%, 1.98% and -2.97% giving an annualized net return of 2.52%.

Performance returns marked "Net" reflect deduction of investment advisory fees and are calculated by deducting a quarterly indicative fee from the quarterly composite return. The indicative fee is defined as being the effective fee rate (or average weighted fee) at the composite's minimum account size as set out below. Actual net composite performance would be higher than the indicative performance shown because some accounts have sliding fee scales and accordingly lower effective fee rates.

Mondrian's investment advisory fees are described in Part II of its Form ADV. A representative United States fee schedule for institutional accounts is provided below, although it is expected that from time to time the fee charged will differ from the below schedule depending on the country in which the client is located and the nature, circumstances requirements of individual clients. The fees will be charged as follows: the first US$50m at 0.85%; the next US$50m at 0.70%; and amounts over US$100m at 0.65%. Minimum segregated portfolio size is currently US$100 million (or fees equivalent thereto).

Summary Biographies

October 12, 2018

MONDRIAN INVESTMENT PARTNERS

Appendix

Investment Professionals

Name	Position/Title	Discipline	Former Employer	Years with MIP	Industry Experience
David Tilles	Executive Chairman	Strategy	Hill Samuel	27	44
Clive Gillmore	CEO and Group CIO	Strategy and Global Equities	Hill Samuel	27	35
Elizabeth Desmond	Deputy CEO, CIO International Equities	Equities/International	Hill Samuel	27	31
Hamish Parker	Director	Equities/International	Hill Samuel	27	37
Ormala Krishnan	CIO Small Cap Equities	Equities/Small Cap	Koeneman Capital Management	18	25
Andrew Miller	CIO Emerging Markets Equities	Equities/Emerging Markets	PricewaterhouseCoopers	18	20
David Wakefield	CIO GFI & Currency	Fixed Income & Currency	Bank of England	17	26
Daniel Philps	Head of Rothko Investment Strategies	Equities	Dresdner Bank	20	23
Aileen Gan	Head of Global Equities	Equities/Global	Accenture	13	18
Brendan Baker	Senior Portfolio Manager	Equities/Global/Small Cap	Lombard Street Research	17	28
Joanna Bates	Senior Portfolio Manager	Fixed Income & Currency	Hill Samuel	21	35
Nigel Bliss	Senior Portfolio Manager	Equities/International	Cazenove & Co.	23	25
Ginny Chong	Senior Portfolio Manager	Equities/Emerging Markets	PriceWaterhouseCoopers	18	23
Graeme Coll	Senior Portfolio Manager	Equities/Small Cap	Ernst & Young	13	20
Frances Cuthbert	Senior Portfolio Manager	Equities/Small Cap	Deutsche Bank	19	20
Matt Day	Senior Portfolio Manager	Fixed Income	Buck Consultants	11	16
Steven Dutaut	Senior Portfolio Manager	Equities/International	Baillie Gifford	11	14
Gregory Halton	Senior Portfolio Manager	Equities/Emerging Markets	Deutsche Asset Management Ltd	14	18
Bhavin Manek	Senior Portfolio Manager	Equities/Small Cap	Mercer Investment Consulting	12	15
Aidan Nicholson	Senior Portfolio Manager	Equities/Small Cap	Cazenove & Co	15	17
Solomon Peters	Senior Portfolio Manager	Fixed Income & Currency	CEBR	18	22
Andrew Porter	Senior Portfolio Manager	Equities/International	Frank Russell	15	19
Alex Simcox	Senior Portfolio Manager	Equities/International	Ernst & Young LLP	11	15
Jonathan Spread	Senior Portfolio Manager	Equities/Global	Morley Fund Management	13	19
Boris Veselinovich	Senior Portfolio Manager	Equities/Emerging Markets	Challenger International	17	20
Alastair Cornwell	Portfolio Manager	Equities/Small Cap	PricewaterhouseCoopers	10	11
David Cudmore	Portfolio Manager	Fixed Income & Currency	Credit Suisse	5	8
Christopher Davis	Portfolio Manager	Equities/International	PricewaterhouseCoopers	4	7
Kevin Fenwick	Portfolio Manager	Fixed Income & Currency	Wilshire Associates	10	14
James Francken	Portfolio Manager	Equities/Global	Investec	9	11
Charlie Hill	Portfolio Manager	Equities/Global	Neptune Investment Management	2	5
Daniel Kelly	Portfolio Manager	Equities/Emerging Markets	Deloitte LLP	9	12
Zsolt Mester	Portfolio Manager	Equities/International	Sanford C. Bernstein	4	7
Sarah Mitchell	Portfolio Manager	Fixed Income & Currency	Royal Bank of Scotland	7	14
Melissa Platt	Portfolio Manager	Equities/International	FundSource Research	14	20
Paul Thompson	Portfolio Manager	Equities/Global	Deloitte LLP	9	12
Sam Wyatt	Portfolio Manager	Equities/Emerging Markets	Deloitte LLP	5	10
Charl Basson	Assistant Portfolio Manager	Equities/Small Cap	PricewaterhouseCoopers	2	6
Benjamin Hall	Assistant Portfolio Manager	Equities/Small Cap	None	8	8
David Miller	Assistant Portfolio Manager	Equities	None	6	6
Bruno Vignoto	Assistant Portfolio Manager	Fixed Income & Currency	Moody's Analytics	3	8
Michael Bray	Research Analyst	Equities/Emerging Markets	None	6	6
Richard Fairbairn	Research Analyst	Equities	Informer Global Markets	5	6
Elina Grinchenko	Research Analyst	Equities/Small Cap	None	6	6
Harry Hewitt	Research Analyst	Equities/Global	None	4	4
Natasha Nussbaum	Research Analyst	Equities/International	None	2	2

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Summary Biographies

October 12, 2018

MONDRIAN INVESTMENT PARTNERS

Investment Professionals

Name	Position/Title	Discipline	Former Employer	Years with MIP	Industry Experience
Brian Heywood	Head of Implementation	Implementation	Mercury Asset Management	22	23
Alan Fedarb	Portfolio Managers' Assistant	Implementation	Gartmore Fund Managers	21	28
Magnus Paterson	Portfolio Managers' Assistant	Implementation	M&G	5	14
Vinit Shah	Portfolio Managers' Assistant	Implementation	State Street Bank	13	21
Stuart Thomas	Portfolio Managers' Assistant	Implementation	ABN AMRO Asset Management	10	18
Clark Simpson	Head of Trading	Trading Desk	None	17	17
Martin Shaw	Senior Trader	Trading Desk	HSBC	4	32
Ian Taylor	Senior Trader	Trading Desk	Invesco Asset Management Ltd	8	25
Arthur van Hoogstraten	Senior Trader	Trading Desk	Banque Paribas	20	30

Client Service Professionals

Name	Position/Title	Former Employer	Years with MIP	Industry Experience
London				
Russell Mackie	Global Head of Client Services & Marketing	Hodgson Martin Ltd.	21	23
Andrew Kiely	Manager, Client Services, London	Bank of Ireland Asset Management	12	21
Jessica Hsia	Senior Client Service Executive	Delaware Investments	14	15
Paul Danaswamy	Client Services Executive	BNY Mellon Asset Servicing	7	12
Philadelphia				
Paul Ross	President, MIP (U.S.), Inc., Philadelphia	The Travelers Corporation	*25	37
Patricia Karolyi	Executive Vice President	Blank, Rome, Comisky & McCauley	*29	29
James Brecker III	Senior Vice President, Client Services	None	*18	18
Laura Conlon	Senior Vice President, Client Services	Morgan Lewis & Bockius, LLP	*21	21
David Hogan	Senior Vice President, Client Services	Charles Schwab	3	31
Henry Orvin	Senior Vice President, Client Services	Amundi Pioneer	<1	32
Justin Richards	Senior Vice President, Client Services	Delaware Investments	18	18
Todd Rittenhouse	Senior Vice President, Client Services	Chartwell Investment Partners	*18	27
Stephen Starnes	Senior Vice President, Client Services	1838 Investment Advisers	*16	37
Peter Riviello	Vice President, Client Services	None	*15	15
Jackie Stampone	Vice President, Client Services	None	*21	21
Carol Starr	Vice President, Client Services	None	*36	36
Bridget Cooper	Assistant Vice President, Client Services	Rorer Asset Management	13	20
Rebecca Farnsworth	Assistant Vice President, Client Services	None	14	14
Elizabeth Taverna	Assistant Vice President, Client Services	None	10	10

* Prior to joining Mondrian Investment Partners (U.S.), Inc. in September 2004, these individuals worked with Delaware Investments. Delaware Investments was an affiliate of Mondrian Investment Partners Limited prior to the management buy-out and name change of September 2004.
The listing for "Former Employer" denotes the individual's employer prior to joining Delaware Investments. The listing for "Years with MIP" includes both years with Delaware Investments and MIP (U.S.), Inc. Todd Rittenhouse rejoined in 2007 after having worked with Delaware Investments from 1992 – 1999.

Mondrian Equity Products

U.S. Investors
September 30, 2018

MONDRIAN INVESTMENT PARTNERS

Mondrian Product and Typical Benchmark	Vehicle			
	Separate Account	Limited Partnership	Collective Investment Trust	Registered Mutual Fund
Non-US Equity • MSCI EAFE	Soft close Open to existing investors	Open Minimum: $5 million	Open Minimum: $3 million	Open Mondrian Int. Equity Fund: DPIEX Minimum: $1 million
Non-US Equity ESG • MSCI EAFE		Open Minimum: $2 million		
Focused Non-US Equity • MSCI EAFE	Open Minimum: $100 million			
Global Equity • MSCI World	Open Minimum: $50 million	Open Minimum: $2 million		
Global All Countries World Equity • MSCI ACW	Open Minimum: $100 million	Open Minimum: $3 million		
All Countries World ex-US Equity • MSCI ACW ex-US	Soft close Open to existing investors	Open Minimum: $5 million	Open Minimum: $5 million	
Focused All Countries World ex-US Equity • MSCI ACW ex-US	Open Minimum: $300 million[1] Minimum: $100 million[2]			
Emerging Markets Equity • MSCI EM	Soft close Open to existing investors	Soft close Open to existing investors		
Focused Emerging Markets Equity • MSCI EM	Soft close Open to existing investors	Soft close Open to existing investors		Open Mondrian EM Equity Fund: LEMNX Minimum: $1 million
Emerging Markets Wealth • MSCI EM	Open Minimum: $100 million	Open Minimum: $1 million	Open Minimum: $3 million	
Non-US Small Cap Equity • MSCI World ex-US Small Cap	Soft close Open to existing investors	Soft close Open to existing investors		
Emerging Markets Small Cap Equity • MSCI EM Small Cap	Open Minimum: $150 million Maximum: $300 million	Open Minimum: $5 million		
US Small Cap Equity • Russell 2000 Index	Open	Open Minimum: $1 million		

1. Utilizing separate account only
2. Utilizing commingled fund for emerging markets exposure

Mondrian may, from time to time, reduce and/or increase the minimum amounts listed above. The above is for information purposes only and intended solely for the person to whom it has been delivered. It is not an offer or solicitation with respect to the purchase of any securities. Any investment decision in connection with any investment vehicle should be based on the information contained in its written offering materials.

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Mondrian Fixed Income Products

U.S. Investors
September 30, 2018

MONDRIAN INVESTMENT PARTNERS

Mondrian Product and Typical Benchmark	Vehicle			
	Separate Account	Limited Partnership	Collective Investment Trust	Registered Mutual Fund
Global Fixed Income • FTSE WGBI • Bloomberg Barclays Global Agg. Bond Index • JPMorgan Global Gov. Bond Index	Open Minimum: $50 million	Open Minimum: $1 million		
International Fixed Income • FTSE WGBI ex-US • Bloomberg Barclays Global Agg. ex-USD Bond Index • JPMorgan Global Gov. Bond ex-US Index	Open Minimum: $50 million	Open Minimum: $1 million		Open Mondrian Intl. Govt. FI Fund: LIFNX Minimum: $1 million
Global Inflation-Linked Bonds • Bloomberg Barclays World Government Inflation-Linked Bond Index	Open Minimum: $50 million	Open Minimum: $1 million		
US Aggregate Fixed Income • Bloomberg Barclays US Agg. Bond Index	Open Minimum: $50 million	Open Minimum: $1 million		
Global Debt Opportunities • 80% FTSE WGBI/ 20% JPMorgan GBI-EM Global Diversified	Open Minimum: $50 million	Open Minimum: $1 million		
Local Currency Emerging Markets Debt • JPMorgan GBI-EM Global Diversified	Open Minimum: $50 million	Open Minimum: $1 million		
Hard Currency Emerging Markets Debt • JPMorgan EMBI Global Diversified	Open Minimum: $50 million	Open Minimum: $5 million		
Blended Currency Emerging Markets Debt • 50% JPMorgan GBI-EM Global Diversified/ 50% JPMorgan EMBI Global Diversified	Open Minimum: $50 million	Open Minimum: $10 million		

FTSE World Government Bond Index was formerly known as Citigroup World Government Bond Index.

Mondrian may, from time to time, reduce and/or increase the minimum amounts listed above. The above is for information purposes only and intended solely for the person to whom it has been delivered. It is not an offer or solicitation with respect to the purchase of any securities. Any investment decision in connection with any investment vehicle should be based on the information contained in its written offering materials.

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Important Information

MONDRIAN INVESTMENT PARTNERS

Term/Issue	Description/Disclosure
Benchmark:	Mondrian benchmarks the International Small Cap Equity product against the MSCI World ex-US Small Cap Index. Surveys conducted by investment consultants show that this is the most commonly used small cap index. This index includes stocks which are ranked at approximately the bottom 15th percentile by available market capitalization in each local market index. One cannot invest in an index. Neither MSCI nor any other party involved in or related to compiling, computing or creating the MSCI data makes any express or implied warranties or representations with respect to such data (or the results to be obtained by the use thereof), and all such parties hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of such data. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in or related to compiling, computing or creating the data have any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) even if notified of the possibility of such damages. No further distribution or dissemination of the MSCI data is permitted without MSCI's express written consent.
Confidentiality:	This document is confidential and only for the use of the party named on its cover and its advisers. It may not be redistributed or reproduced, in whole or in part.
Current Views:	Views expressed were current as of the date indicated, are subject to change, and may not reflect current views. Views should not be considered a recommendation to buy, hold or sell any security and should not be relied on as research or investment advice.
Forecast "Real" Annualized Market Returns:	These forecast "real" annualized market returns are used solely as a basis for making judgements about country allocation weightings and are not intended to be indications of expected returns.
Forward-looking Statements:	This document may include forward-looking statements. All statements other than statements of historical facts are forward-looking statements (including words such as "believe", "estimate", "anticipate", "may", "will", "should", "expect"). Although we believe that the expectations reflected in such forward-looking statements are reasonable, we can give no assurance that such expectations will prove to be correct. Various factors could cause actual results or performance to differ materially from those reflected in such forward-looking statements.
Portfolio Characteristics:	Portfolio Turnover, Market Capitalization, Price to Book Value Ratio, Price to Cash Flow Ratio, Price to Earnings Ratio and Dividend Yield are each based on generally accepted industry standards. All portfolio characteristics are derived by first calculating the characteristics for each security, and then calculating the weighted-average of these values for the portfolio. The details of exact calculations can be provided on request.
Purchasing Power Parity Valuations:	Using proprietary Mondrian models. Further information on these models can be provided on request.
Universe Information:	The information provided in the Standard Deviation chart is from InterSec Research Corp.
Consumer Price Index:	Data provided through OECD; this data may be up to two months in arrears, depending on the reporting date.

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BMO Global Asset Management

Mandate: **Small Cap Core** **Hired:** **2016**

Firm Information	Investment Approach	Total ARMB Mandate
BMO Global Asset Management is a corporation and wholly owned subsidiary of BMO Financial Corporation which is a wholly owned subsidiary of Bank of Montreal. As of 9/30/2018, the firm's total assets under management were $256 billion. **Key Executives:** **David Corris**, *Portfolio Manager* **Tom Lettenberger**, *Portfolio Manager* **John Mirante,** *Relationship Manager*	BMO Global Asset Management (BMO) believes that company fundamentals drive stock prices over the long-term, but in the short-term prices will become dislocated from fundamentals due to behavioral biases. BMO employs a systematic, data-driven process that avoids behavioral biases and bases all decisions on time-tested investment principles. **Benchmark:** Russell 2000 Index	**Assets Under Management:** 9/30/2018: $92 Million

Concerns: ITD relative performance.

9/30/2018 Performance

	Last Quarter	1-Year	ITD Annualized
BMO (gross)	2.52%	12.48%	12.76%
Russell 2000 Index	3.58%	15.24%	15.07%

BMO Disciplined Small-Cap Core Strategy

as of September 2018

Alaska Retirement Management Board

December 14, 2018

BMO Global Asset Management

This information provided herein is confidential and is provided for a one-on-one presentation for institutional use only.

Alaska Account Summary

Contact Information	John Mirante, CFA, CPA Relationship Manager Tel: 312.461.6298 John.Mirante@bmo.com
Structure	Disciplined Small-Cap Core - Separately Managed Account
Investment Objective	To outperform the Russell 2000 Index by 3%–4% per year over a full market cycle with risk similar to that of the benchmark.
Strategy	Disciplined Small-Cap Core
Ownership	BMO Global Asset Management is a corporation and a wholly owned subsidiary of BMO Financial Corp. (BMO FC), which is a wholly owned subsidiary of Bank of Montreal (NYSE, TSX: BMO), a publicly traded, diversified financial services firm headquartered in Toronto, Canada. We are a majority owned firm.

Account	Investment Strategy	Benchmark	AUM (as of 09/30/2018)	Portfolio Manager	Inception Date
Alaska Retirement Management Board	BMO Disciplined Small-Cap Core	Russell 2000 Index	$91,566,730.35	David Corris, CFA Tom Lettenberger, CFA, CPA	12/16/2016

Table of Contents

I. Organizational Update

II. BMO Disciplined Small-Cap Core Strategy

III. Market Environment

IV. Portfolio Review

V. Market Monitor Observations

Organizational Update

Firm Profile

Facts at a glance

$256 Billion AUM[1]

Investing since **1925**[2]

20 offices in **14** countries

Top 100[3] Money Managers

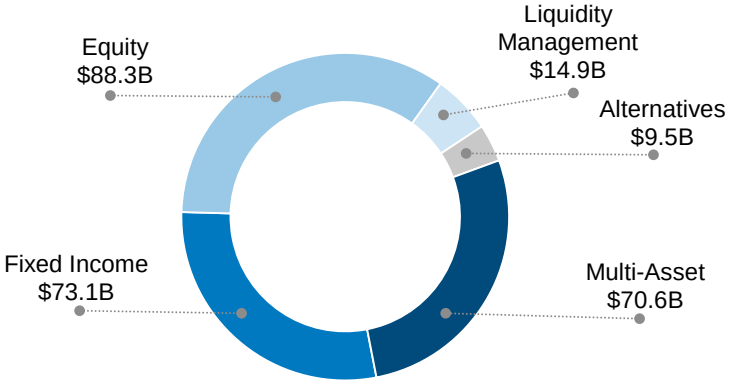
What sets us apart

Global presence
Part of the BMO Financial Group — one of North America's largest financial institutions

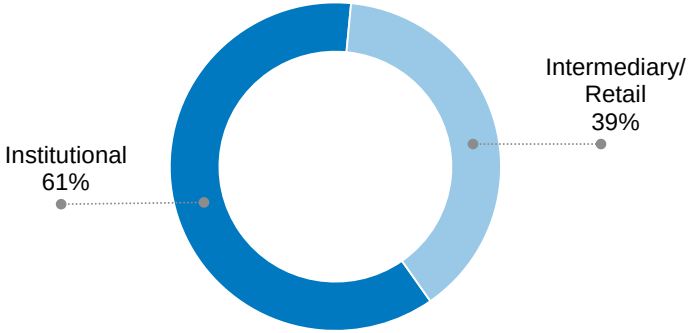
Specialized investment teams
Independent teams that are empowered to deliver strong, consistent results while minimizing unnecessary risk

Culture of partnership and innovation
Working in partnership with clients to create and deliver innovative solutions

Expertise across asset classes



Client breakdown



[1]Assets under management reported as of June 30, 2018 and includes BMO Global Asset Management (Canada), BMO Global Asset Management (U.S.), BMO Global Asset Management (EMEA) along with three investment teams: LGM Investments, Pyrford International and Taplin, Canida & Habacht. AUM includes discretionary and non-discretionary AUM. All figures are in U.S. dollars.
[2]Our roots trace back to 1925, when the Bank of Montreal began offering investment services. BMO Financial Group is a part of the Bank of Montreal (NYSE, TSX:BMO), a Canadian-based organization founded in 1817.
[3]BMO Global Asset Management has been recognized by Pensions & Investments as one of the Top 100 Money Managers based on worldwide institutional assets under management as of December 31, 2017.

BMO Disciplined Small-Cap Core Strategy

BMO U.S. Disciplined Equity Update

Who We Are

Experienced	Since 1985, our focus has been on quantitative investing
Consistent	One investment philosophy and process across all strategies since inception
Research Driven	Culture supports continuous innovation of investment process
Well Resourced	Backed by the deep resources and stability of BMO Financial Group

What's Happening

- Launched a Global Market Neutral Strategy
- Global Long/Short Equity Strategy established a 3-Year track record

Team at a glance

$21.7B
Total AUM

1985
Quantitative Investing Since

15
Investment Professionals

18
Average Years of Experience

Team expertise

U.S. Equity	$20.0B
Global/International Equity	$1.2B
Low Volatility	$486M

All figures as of September 30, 2018. Total AUM Includes discretionary AUM of $17.4B and non-discretionary AUM of $4.3B from model-based mandates.

Disciplined Equity Investment Capabilities

U.S.	Inception	Benchmark	Since Inception	Benchmark	Relative Performance	AUM (millions)
Large-Cap Growth Strategy	Apr-96	Russell 1000 Growth Index	9.8%	9.1%	**0.7%**	$2,919
Large-Cap Equity Strategy	Jan-92	S&P 500 Index	11.0%	9.7%	**1.2%**	$8,689
Large-Cap Value Strategy	Jan-00	Russell 1000 Value Index	9.1%	6.9%	**2.2%**	$3,095
Mid-Cap Value Strategy	Jan-00	Russell MidCap Value Index	11.4%	10.2%	**1.2%**	$201
Small/Mid-Cap Core Strategy	Feb-01	Russell 2500 Index	9.2%	9.2%	**0.0%**	$241
Small-Cap Growth Strategy	Oct-07	Russell 2000 Growth Index	11.5%	9.6%	**1.9%**	$456
Small-Cap Core Strategy	Jul-10	Russell 2000 Index	18.1%	14.8%	**3.3%**	$193
Small-Cap Value Strategy	Jul-10	Russell 2000 Value Index	16.9%	13.2%	**3.7%**	$742
Micro-Cap Strategy	Jul-07	Russell Microcap Index	12.6%	6.7%	**5.9%**	$91
International						
International Equity Strategy	Apr-07	MSCI EAFE GD Index	3.1%	2.6%	**0.5%**	$1,188
Low Volatility						
U.S. Low Volatility Equity Strategy	Jan-11	Russell 1000 Index	13.8%	13.7%	**0.0%**	$250
Global Low Volatility Equity Strategy	Apr-12	MSCI ACWI GD Index	10.8%	10.1%	**0.7%**	$235
Long/Short						
Global Long/Short Equity Strategy	Oct-15	50% ACWI GD Index / 50% 3-Mo T-Bill	10.2%	7.4%	**2.9%**	$23

As of September 30, 2018. Inception date reflects the inception date of the composite. Time-weighted return, annualized for periods longer than one year. Performance data quoted represents past performance, which does not guarantee future results. Total AUM Includes discretionary AUM of $17.4B and non-discretionary AUM of $4.3B from model-based mandates. Full GIPS disclosures available upon request.

BMO U.S. Disciplined Equity Team — Small-Cap

Lead Portfolio Managers

Tom Lettenberger, CFA, CPA
Portfolio Manager
M.A., University of Michigan
13 years with BMO/24 total

David Corris, CFA
Portfolio Manager
Head of Disciplined Equity
M.B.A., Harvard University
10 years with BMO/19 total

Investment Team

Ernesto Ramos, Ph.D.
Portfolio Manager
Head of Quantitative Equity Strategy
Ph.D., Harvard University
13 years with BMO/26 total

Jason Hans, CFA
Portfolio Manager
M.B.A., University of Notre Dame
10 years with BMO/20 total

Casey Sambs, CFA
Portfolio Manager
M.B.A., University of Wisconsin
17 years with BMO/17 total

Kenneth Conrad, Ph.D., CFA
Portfolio Manager
Ph.D., George Mason University
10 years with BMO/13 total

Jay Kaufman, CFA
Portfolio Manager
M.B.A., University of Chicago
8 years with BMO/12 total

David Rosenblatt, CFA
Portfolio Manager
M.B.A., University of Chicago
6 years with BMO/12 total

Christopher Jenks, CFA
Client Portfolio Manager
B.S., DePaul University
2 years with BMO/11 total

Lei Zhu, CFA
Research Analyst
M.S., University of Waterloo
7 years with BMO/10 total

Steven Minturn, CFA
Research Analyst
M.B.A., University of Chicago
3 years with BMO/4 total

J.P. Gurnee, CFA
Research Analyst
B.A., Hillsdale College
<1 year with BMO/3 total

Traders

Phillip Krauss
Senior Trader
B.B.A., Lewis University
14 years with BMO/40 total

David Canon
Senior Trader
B.S., Northern Illinois University
10 years with BMO/27 total

Cathy Oddo
Trader
M.B.A., Dominican University
1 year with BMO/35 total

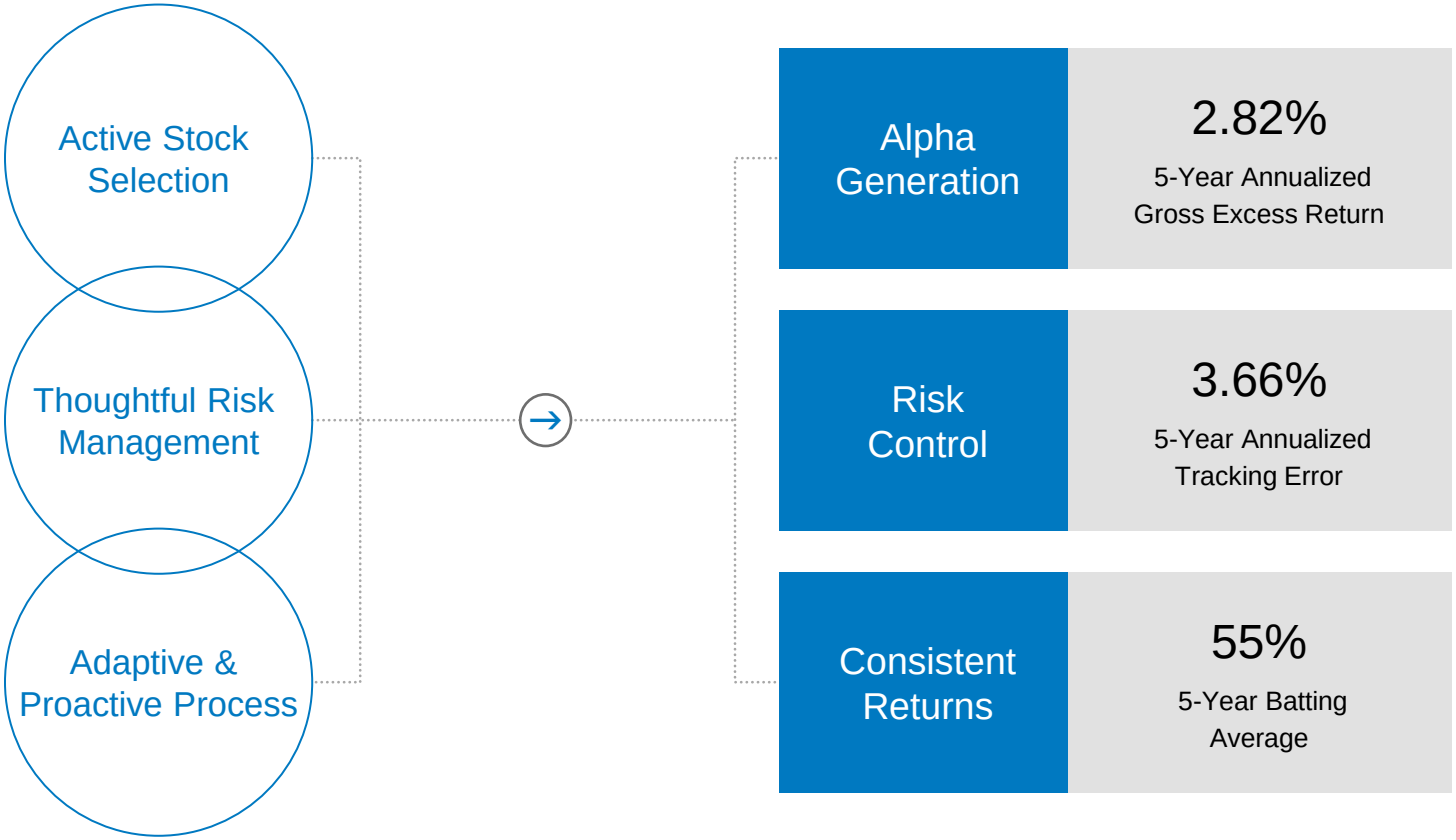
Philosophy

Our clients benefit from integrating the complementary strengths of fundamental and quantitative analysis.

Fundamental Perspective	Quantitative Implementation
We believe markets are inefficient due to predictable investor biases. Our research shows that fundamentally strong, attractively valued companies with growing investor interest will outperform over the long run.	We believe a quantitative approach to return/risk analysis and portfolio construction leads to consistent long-term outperformance.

Objective

To outperform the Russell 2000 Index by 3%–4% per year over a full market cycle with risk similar to that of the benchmark.



Alpha generation, risk control and consistent returns are objectives of the approach and are not intended to be promissory. Annualized excess return, tracking error and batting average are historical figures based on performance for the 5-years ending September 30, 2018; gross of fees. See GIPS disclosure pages following this presentation. **Past performance does not guarantee future results.**

Investment Process

Universe Definition

- Russell 2000 constituents and similar stocks

Risk and Return Analysis

Company Evaluation

Forecast a security's relative attractiveness based on three groups of proprietary factors:

- Fundamentals
- Valuation
- Investor Interest

Risk Assessment

Analyze risk through multiple perspectives:

- Fundamental
- Macroeconomic
- Statistical

Market Monitor

Interpret and adapt to current market environment:

- Factor mispricing
- Factor volatility
- Correlation breakdown

Portfolio Construction

Objective: Maximize expected return while controlling:

- Position limits
- Systematic risk factors
- Tracking error
- Liquidity & trading costs
- Turnover

Qualitative & Quantitative Review

Final Portfolio

- 150–250 stocks
- Composed of fundamentally strong, attractively valued companies with growing investor interest
- Style consistent with small-cap core

For illustration purposes only.

Market Environment

Disciplined Equity Market Environment

Momentum Leads

Momentum factors continued their strong year after recovering from a brief reversal in June. With many consistent themes driving market returns over the last 12 months (i.e. beta, quality, growth), previous winners continued to outpace previous losers, resulting in strong returns for momentum.

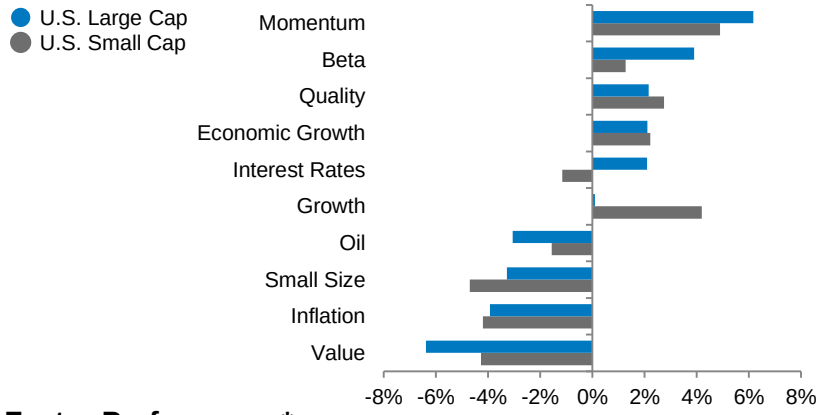
Quality in Favor

As tensions mounted over a strong dollar and the potential impact from trade wars, investors preferred higher quality companies with greater profitability. Longer-term, quality factors have been some of the best performers in the U.S. market.

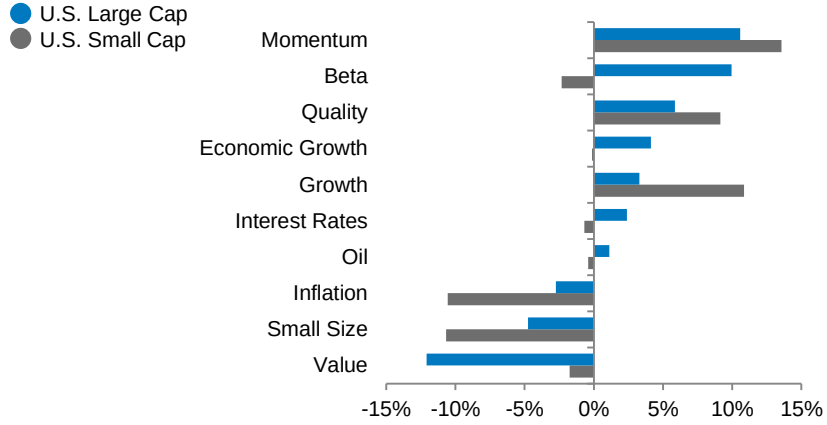
Growth vs. Value

After weakness in July, growth factors recovered in August, ending yet another quarter in positive territory. While performance of growth in the Large Cap universe was less positive compared to previous quarters, value continued to struggle mightily, marking an exceptionally difficult 12 month period.

Factor Performance*
Most Recent Quarter



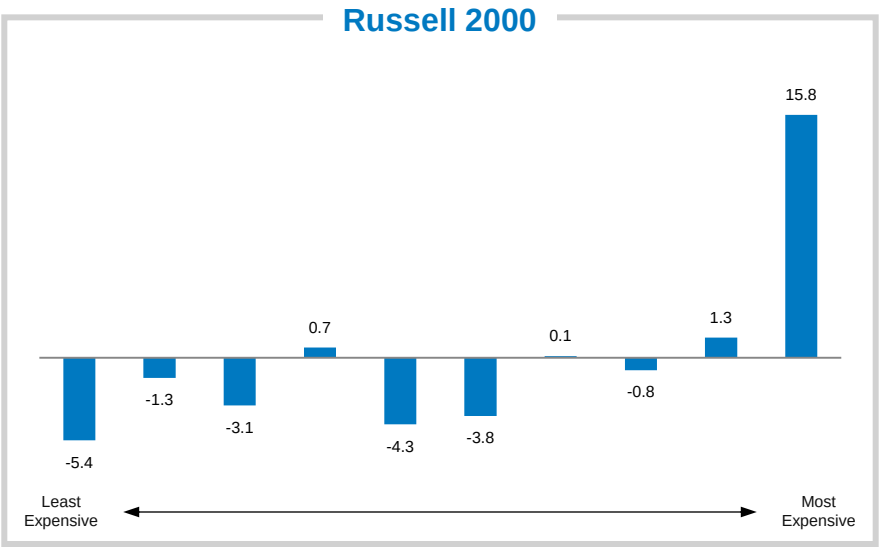
Factor Performance*
Trailing One Year



As of September 30, 2018. *Factor performance calculated as Q1 minus Q5 cumulative performance. Source: BMO Global Asset Management, FactSet, Axioma, Russell.

Underperformance of Value

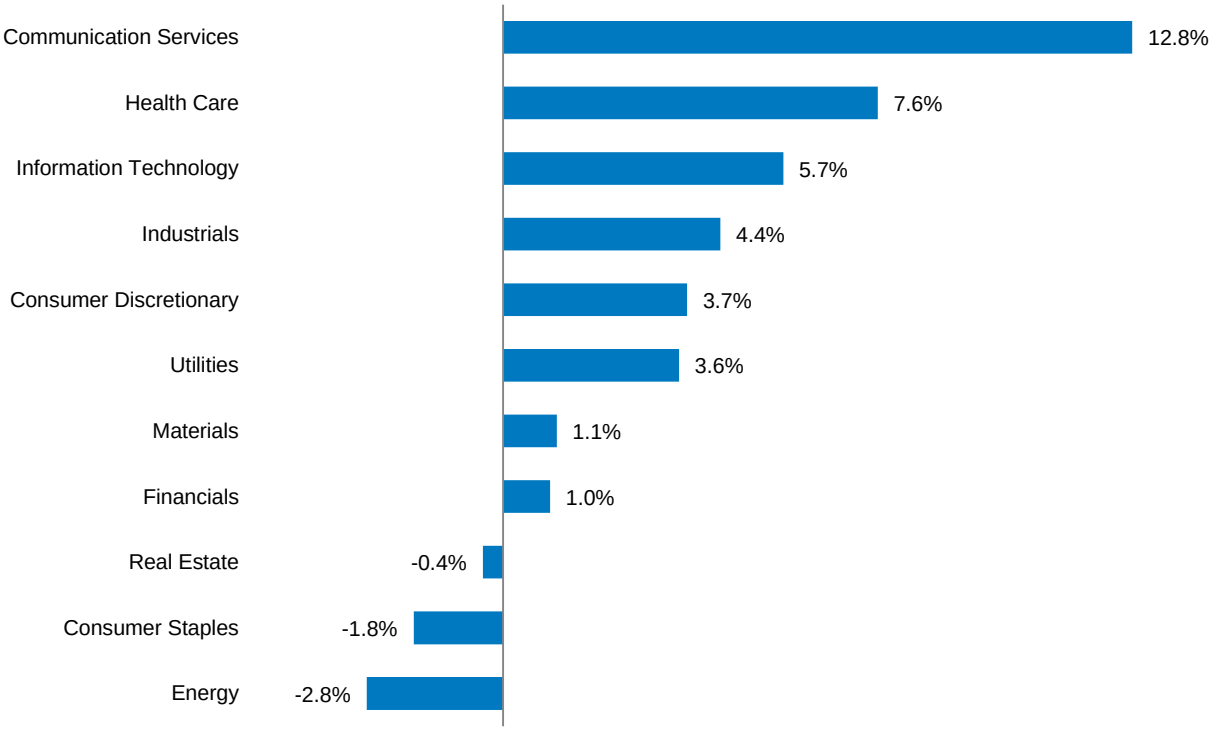
2018 has been a historically challenging year for value investing, where only the most expensive decile of the small-cap universe has outperformed.



For the period from January 1, 2018 through September 30, 2018. Source: BMO Global Asset Management, FactSet, Russell. Performance measured in excess of the Russell 2000 Index.

Returns by Sector

During the quarter, higher growth stocks in Communication Services and Healthcare outperformed, while Energy struggled as concerns mounted over the potential impact of trade tariffs.



For the period from July 1, 2018 to September 30, 2018. Source: BMO Global Asset Management, FactSet, Axioma, Russell 2000 Index.

Portfolio Review

Alaska Retirement Management Board Performance Summary

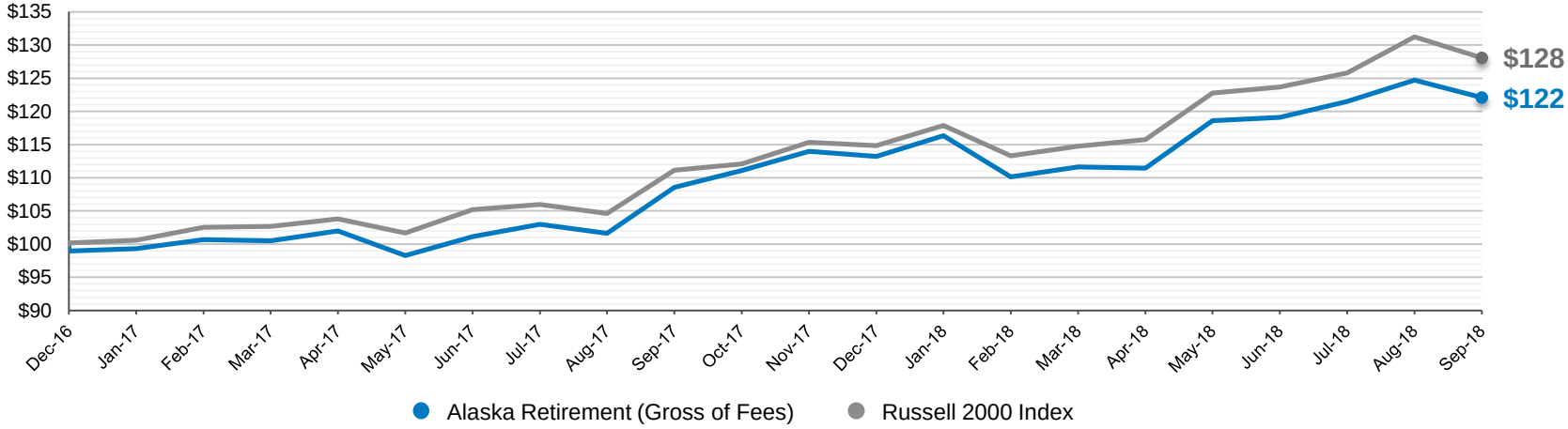
Account Performance

Market Value: $91,566,730

	MRQ	Year To Date	One Year	Three Years[1]	Five Years[1]	Ten Years[1]	Since Inception[2]
Alaska Retirement Management Board (Gross of Fees)	2.52%	7.84%	12.48%	-	-	-	11.80%
Russell 2000 Index	3.58%	11.51%	15.24%	-	-	-	14.32%
Relative Performance (Gross of Fees)	-1.05%	-3.68%	-2.76%	-	-	-	-2.52%

Growth $100

Gross of Fees



1. Annualized. 2. Account inception as of December 16, 2016 . Gross performance results do not reflect the deduction of advisory fees, brokerage or other commissions and other expenses a client would have paid and returns will be reduced accordingly. The net of fees returns reflect the deduction of actual fees as determined by the fee schedule for the individual strategy. Actual fees will vary depending on, among other things, the applicable fee schedule and account size. Performance data quoted represents past performance and does not guarantee future results. See Appendix for additional disclosures.

Small-Cap Core Strategy QTD Performance Attribution

Top/Bottom Relative Contributors

By Sector

	Average Portfolio Weight	Average Index Weight	Portfolio Total Return	Index Total Return	Sector Allocation Effect	Stock Selection Effect	Total Effect
Communication Services	1.8%	3.0%	6.5%	12.8%	-0.1%	-0.1%	-0.2%
Consumer Discretionary	14.3%	12.2%	2.8%	3.7%	0.0%	-0.1%	-0.1%
Consumer Staples	1.3%	2.7%	-7.1%	-1.8%	0.1%	-0.1%	0.0%
Energy	5.1%	4.7%	-8.1%	-2.8%	0.0%	-0.3%	-0.3%
Financials	15.6%	17.9%	0.5%	1.0%	0.0%	-0.1%	0.0%
Health Care	19.3%	15.9%	9.6%	7.6%	0.1%	0.4%	0.5%
Industrials	13.8%	15.1%	3.3%	4.4%	0.0%	-0.1%	-0.2%
Information Technology	16.9%	13.9%	1.2%	5.7%	0.1%	-0.7%	-0.6%
Materials	4.4%	4.2%	-1.5%	1.1%	0.0%	-0.1%	-0.1%
Real Estate	4.8%	7.0%	-1.0%	-0.4%	0.1%	0.0%	0.1%
Utilities	2.6%	3.1%	3.6%	3.6%	0.0%	0.0%	0.0%
Total Portfolio	**100.0%**	**100.0%**	**2.6%**	**3.6%**	**0.3%**	**-1.3%**	**-1.0%**

Top/Bottom Relative Contributors

By Company

		Sector	Average Portfolio Weight	Average Index Weight	Total Effect
WTI	W&T Offshore, Inc.	Energy	0.8%	0.0%	0.3%
PCRX	Pacira Pharmaceuticals, Inc.	Health Care	0.7%	0.1%	0.2%
NVCR	Novocure Ltd.	Health Care	0.6%	0.1%	0.2%
SUPN	Supernus Pharmaceuticals, Inc.	Health Care	0.9%	0.1%	-0.2%
SRI	Stoneridge, Inc.	Consumer Discretionary	0.9%	0.0%	-0.2%
XENT	Intersect ENT Inc	Health Care	0.7%	0.0%	-0.2%

For the period from July 1, 2018 to September 30, 2018. All attribution effects are computed using FactSet, linked through time, and do not reflect all fees, expenses or transaction costs. The information shown is derived from a representative account with no investment restrictions deemed to appropriately represent the management styles herein. Each investor's portfolio is individually managed and may vary from the information shown. Returns are shown gross of fees and calculated using daily buy and hold returns and are therefore not GIPS compliant. Gross performance results do not reflect the deduction of advisory fees, brokerage or other commissions and other expenses a client would have paid and returns will be reduced accordingly. Past performance does not guarantee future results. The mention of specific securities is not a recommendation or solicitation for any person to buy, sell or hold any particular security. The securities identified and described do not represent all of the securities purchased, sold or recommended for client accounts. The reader should not assume that an investment in the securities identified was or will be profitable. Due to rounding, amounts presented herein may not add up precisely to the total. Please see GIPS disclosure pages located in the Appendix for additional disclosures.

Small-Cap Core Strategy 1-Year Performance Attribution

Top/Bottom Relative Contributors

By Sector

	Average Portfolio Weight	Average Index Weight	Portfolio Total Return	Index Total Return	Sector Allocation Effect	Stock Selection Effect	Total Effect
Communication Services	1.8%	2.6%	15.1%	20.6%	-0.1%	-0.1%	-0.2%
Consumer Discretionary	12.0%	11.7%	32.4%	22.5%	-0.1%	1.0%	1.0%
Consumer Staples	2.0%	2.6%	3.4%	11.5%	0.0%	-0.2%	-0.2%
Energy	3.7%	4.1%	10.0%	10.4%	0.0%	-0.2%	-0.2%
Financials	15.7%	18.1%	4.2%	7.9%	0.1%	-0.6%	-0.5%
Health Care	18.8%	15.9%	24.2%	29.3%	0.4%	-0.9%	-0.5%
Industrials	15.5%	15.2%	9.2%	11.8%	-0.1%	-0.3%	-0.4%
Information Technology	18.5%	15.4%	9.3%	19.6%	0.2%	-1.7%	-1.5%
Materials	5.0%	4.4%	3.6%	5.4%	0.0%	0.0%	0.0%
Real Estate	4.4%	6.7%	6.8%	3.1%	0.2%	0.2%	0.4%
Utilities	2.6%	3.3%	1.0%	6.1%	0.0%	-0.1%	-0.2%
Total Portfolio	**100.0%**	**100.0%**	**12.8%**	**15.2%**	**0.6%**	**-3.0%**	**-2.4%**

Top/Bottom Relative Contributors

By Company

		Sector	Average Portfolio Weight	Average Index Weight	Total Effect
INGN	Inogen, Inc.	Health Care	0.9%	0.1%	0.7%
WTI	W&T Offshore, Inc.	Energy	0.5%	0.0%	0.7%
BJRI	BJ's Restaurants, Inc.	Consumer Discretionary	0.7%	0.0%	0.5%
HTH	Hilltop Holdings Inc.	Financials	0.8%	0.1%	-0.3%
OSUR	OraSure Technologies, Inc.	Health Care	0.7%	0.0%	-0.3%
TEN	Tenneco Inc. Class A	Consumer Discretionary	0.9%	0.1%	-0.3%

For the period from October 1, 2017 to September 30, 2018. All attribution effects are computed using FactSet, linked through time, and do not reflect all fees, expenses or transaction costs. The information shown is derived from a representative account with no investment restrictions deemed to appropriately represent the management styles herein. Each investor's portfolio is individually managed and may vary from the information shown. Returns are shown gross of fees and calculated using daily buy and hold returns and are therefore not GIPS compliant. Gross performance results do not reflect the deduction of advisory fees, brokerage or other commissions and other expenses a client would have paid and returns will be reduced accordingly. Past performance does not guarantee future results. The mention of specific securities is not a recommendation or solicitation for any person to buy, sell or hold any particular security. The securities identified and described do not represent all of the securities purchased, sold or recommended for client accounts. The reader should not assume that an investment in the securities identified was or will be profitable. Due to rounding, amounts presented herein may not add up precisely to the total. Please see GIPS disclosure pages located in the Appendix for additional disclosures.

Small-Cap Core Portfolio Characteristics

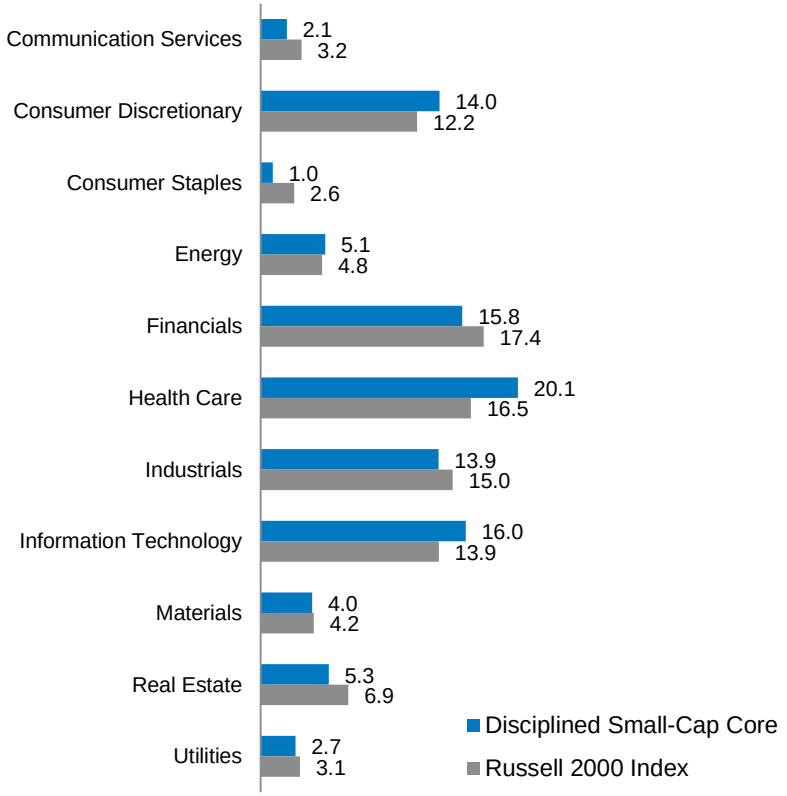
Portfolio Characteristics

		Benchmark[1]
Weighted Average Market Cap	**$2.2B**	$2.4B
Price/Earnings Ratio (Forward 1-Yr)	**15.4**	17.8
Price/Cash Flow Ratio (Trailing 1-Yr)	**9.8**	10.7
EPS Growth (Trailing 3-Yr)	**18.1**	12.0
ROE (Trailing 1-Yr)	**11.3**	5.7
Number of Holdings	**159**	2040
Portfolio Turnover[2]	**73.8**	—
Active Share	**88.0**	—

Risk/Return Statistics

Annualized Excess Return	**2.8**
Tracking Error	**3.7**
Information Ratio	**0.8**
Realized Beta	**0.9**
Upside Capture Ratio	**104**
Downside Capture Ratio	**90**
Batting Average	**55**

Sector Allocations



As of September 30, 2018. 1) Relative to the Russell 2000 Index. 2) As of June 30, 2018. The information shown is derived from a representative account deemed to appropriately represent the management styles herein. Weights and portfolio holdings are subject to change. Due to rounding, amounts presented herein may not add up precisely to the total. Risk/Return statistics are based on 5-year Composite monthly returns gross of fees against the Russell 2000 Index. See Appendix for additional disclosures. **Past performance does not guarantee future results.**

Small-Cap Core Strategy QTD Position Changes

Changes to Portfolio

September 30, 2018

Ticker	Company	Sector	Change Made	Change in Weight	Ending Weight
NVCR	Novocure Ltd.	Health Care	*Add*	**1.0%**	1.0%
AXL	American Axle & Manufacturing Holdings, Inc.	Consumer Discretionary	*Add*	**0.7%**	0.7%
WCC	WESCO International, Inc.	Industrials	*Add*	**0.7%**	0.7%
ATKR	Atkore International Group Inc.	Industrials	*Add*	**0.6%**	0.6%
LMNX	Luminex Corp	Health Care	*Add*	**0.6%**	0.6%
MGLN	Magellan Health, Inc.	Health Care	*Delete*	**-0.6%**	0.0%
COTV	Cotiviti Holdings, Inc.	Health Care	*Delete*	**-0.6%**	0.0%
CSGS	CSG Systems International, Inc.	Information Technology	*Delete*	**-0.7%**	0.0%
HRI	Herc Holdings, Inc.	Industrials	*Delete*	**-0.8%**	0.0%
CAMP	CalAmp Corp.	Information Technology	*Delete*	**-0.8%**	0.0%

NVCR

- NovoCure Limited engages in the development, manufacture, and commercialization of Tumor Treating Fields for the treatment of solid tumors.
- Added to the portfolio during the quarter as the stock ranked in the top-ten percent within the U.S. small cap universe, driven by strong investor interest and improving fundamentals..

CAMP

- CalAmp Corp. provides in telematics systems, and software and subscription services worldwide.
- The position was eliminated based on the deterioration of stocks ranking in investor interest led by increased organic investments that had moderated margin gains.

As of September 30, 2018 . Weights and portfolio holdings are subject to change. Changes to Portfolio shown reflect the ten largest changes according to weight. Highlighted position changes reflect the largest addition to and largest deletion from the portfolio according to change in weight. The mention of specific securities is not a recommendation or solicitation for any person to buy, sell or hold any particular security. The securities identified and described do not represent all of the securities purchased, sold or recommended for client accounts. The reader should not assume that an investment in the securities identified was or will be profitable. The information shown is derived from a representative account deemed to appropriately represent the management styles herein. Each investor's portfolio is individually managed and may vary from the information shown. Due to rounding, amounts presented herein may not add up precisely to the total. See Appendix for additional disclosures.

Small-Cap Core Strategy Key Holdings

Top 5 Overweights

September 30, 2018

Ticker	Company	Sector	Portfolio Weight	Active Weight[1]
WTI	W&T Offshore, Inc.	Energy	1.2%	1.2%
ITGR	Integer Holdings Corporation	Health Care	1.1%	1.0%
CMTL	Comtech Telecommunications Corp.	Information Technology	1.0%	1.0%
CIEN	Ciena Corporation	Information Technology	1.2%	1.0%
PRI	Primerica, Inc.	Financials	1.2%	1.0%

Top 10 Holdings

September 30, 2018

Ticker	Company	Sector	Portfolio Weight	Active Weight[1]
WTI	W&T Offshore, Inc.	Energy	1.2%	1.2%
PRI	Primerica, Inc.	Financials	1.2%	1.0%
CIEN	Ciena Corporation	Information Technology	1.2%	1.0%
ETSY	Etsy, Inc.	Consumer Discretionary	1.1%	0.9%
ITGR	Integer Holdings Corporation	Health Care	1.1%	1.0%
PNM	PNM Resources, Inc.	Utilities	1.1%	0.9%
GWB	Great Western Bancorp, Inc.	Financials	1.0%	0.9%
TSE	Trinseo SA	Materials	1.0%	0.9%
POR	Portland General Electric Company	Utilities	1.0%	0.9%
DECK	Deckers Outdoor Corporation	Consumer Discretionary	1.0%	0.9%
	Total		11.0%	

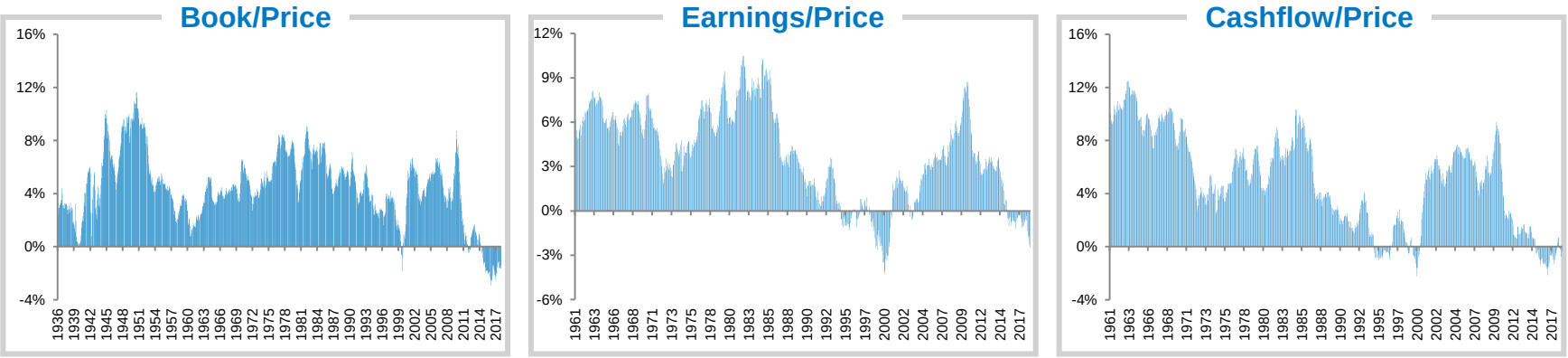
1) Relative to the Russell 2000 Index. Weights and portfolio holdings are subject to change. The mention of specific securities is not a recommendation or solicitation for any person to buy, sell or hold any particular security. The securities identified and described do not represent all of the securities purchased, sold or recommended for client accounts. The reader should not assume that an investment in the securities identified was or will be profitable. The information shown is derived from a representative account deemed to appropriately represent the management styles herein. Each investor's portfolio is individually managed and may vary from the information shown. See Appendix for additional disclosures.

Market Monitor Observations

Historic Underperformance of Value

Recent underperformance of value investing is comparable only to the 1990s tech bubble.

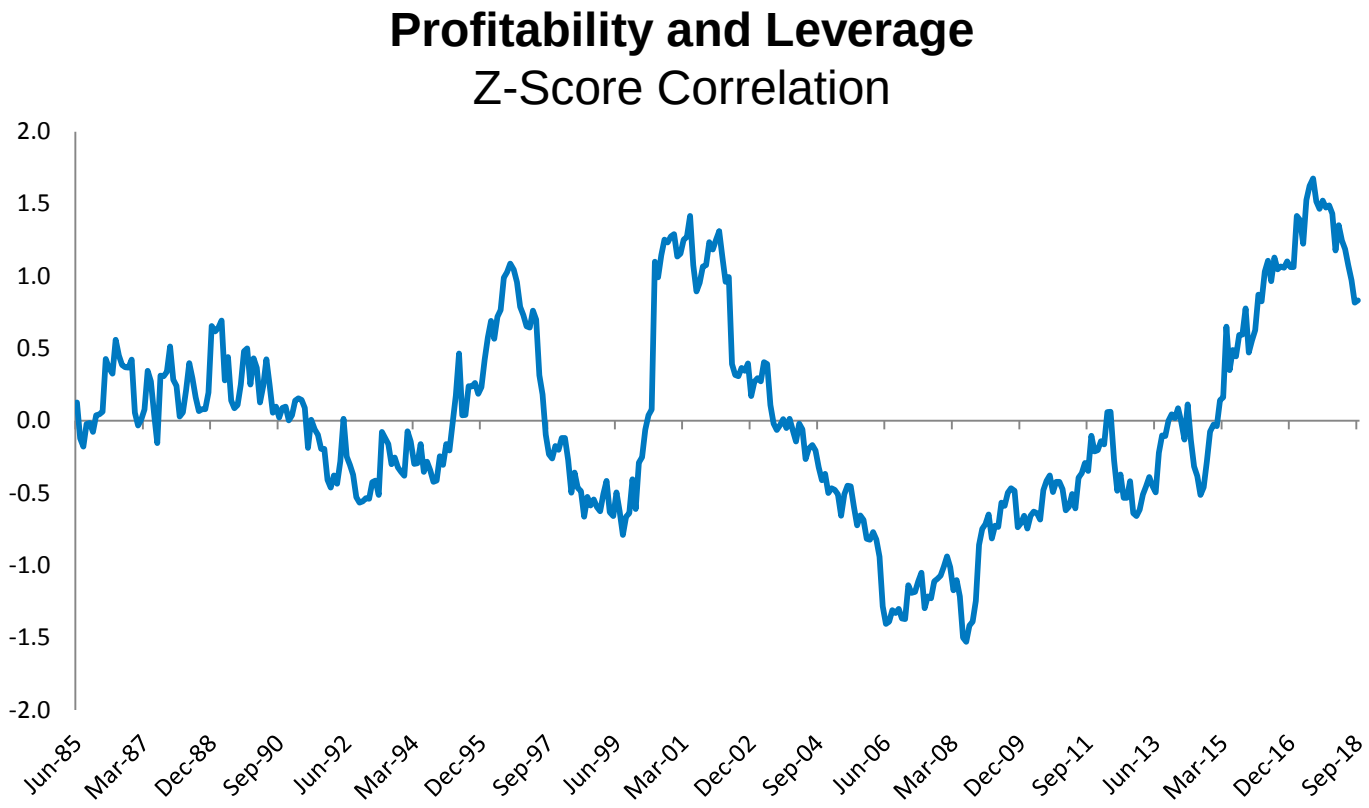
Rolling 10 Year Annualized Returns of Standard Valuation Factors



As of June 30, 2018. Source: BMO Global Asset Management,. Ken French Data Library. Book/Price returns reflect the "High Minus Low (HML)" factor from the Fama-French three factor model. Underlying data 7/1926 - 5/2018 for Book/Price, 7/1951-4/2018 for Earnings/Price, and 7/1951-5/2018 for Cashflow/Price based on data availability

Correlation of Profitability and Leverage

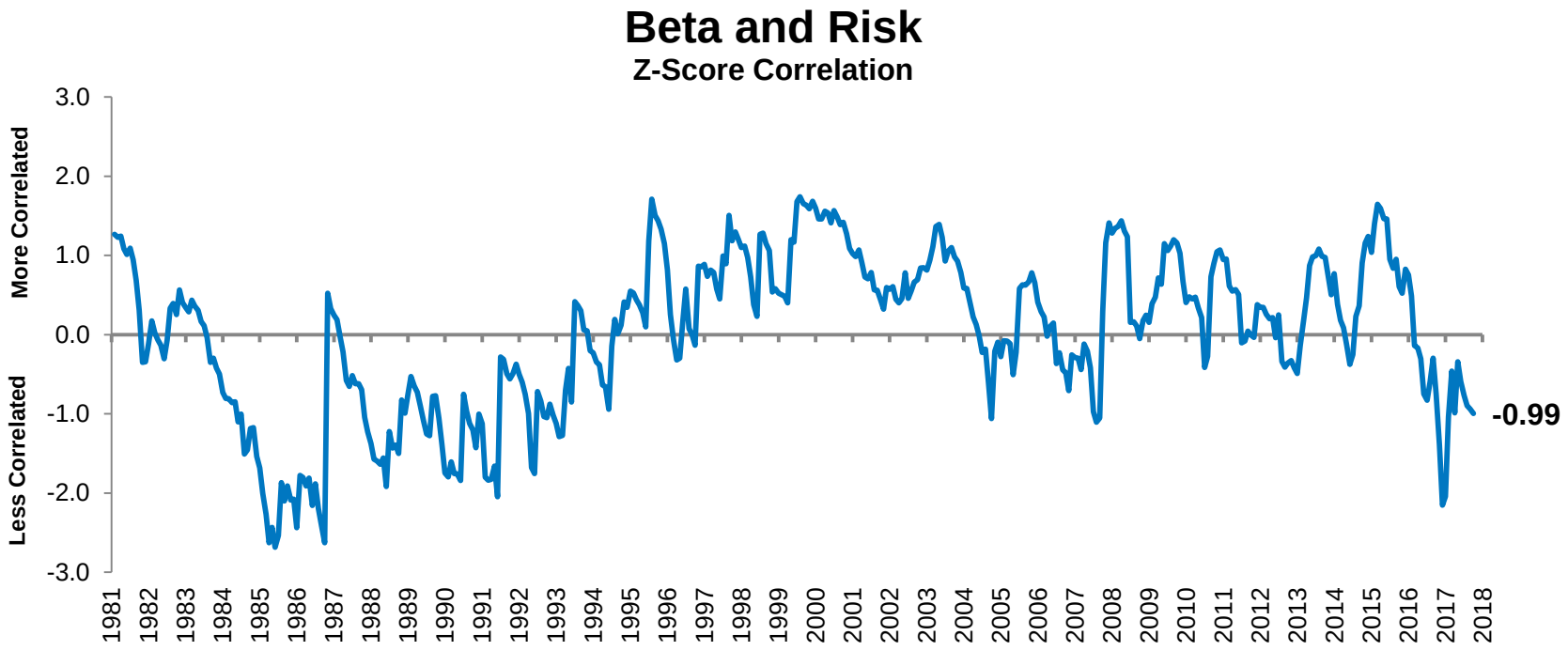
The correlation between profitable and levered companies in the U.S. large cap market have reached historically-high levels.



As of September 30, 2018. Source: BMO Global Asset Management, FactSet.

Beta and Risk

Over the last year, beta and risk have become less correlated than normal, suggesting they are starting to capture different elements of risk.



As of September 30, 2018. Source: BMO Global Asset Management, FactSet, Axioma, Russell.

Appendix

Disclosure

BMO Asset Management Corp., a registered investment adviser, is a wholly owned subsidiary of BMO Financial Corp., a wholly owned subsidiary of Bank of Montreal (BMO). This is not intended to serve as a complete analysis of every material fact regarding any company, industry or security. The opinions expressed here reflect our judgment at this date and are subject to change. Information has been obtained from sources we consider to be reliable, but we cannot guarantee the accuracy. This publication is prepared for general information only. This material does not constitute investment advice and is not intended as an endorsement of any specific investment. It does not have regard to the specific investment objectives, financial situation and the particular needs of any specific person who may receive this report. Investors should seek advice regarding the appropriateness of investing in any securities or investment strategies discussed or recommended in this report and should understand that statements regarding future prospects may not be realized. Investment involves risk. Market conditions and trends will fluctuate. The value of an investment as well as income associated with investments may rise or fall. Accordingly, investors may receive back less than originally invested. Investments cannot be made in an index. **Past performance is not necessarily a guide to future performance.**

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BMO Asset Management U.S. consists of BMO Asset Management Corp.

All investments involve risk, including the possible loss of principal.

Investment products are: **Not a Deposit** - **Not FDIC Insured – No Bank Guarantee – May Lose Value**.

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BMO Disciplined Small-Cap Core Strategy

As of December 31, 2017

GIPS Composite statistics and performance

Calendar year ended	2017	2016	2015	2014	2013	2012	2011	2010 [2]
Gross annual returns (%)	14.30	25.47	1.64	9.18	49.16	16.72	4.17	26.67
Net annual returns (%)	13.33	24.41	0.73	8.20	47.82	15.67	3.24	26.09
3-year composite deviation	13.76	14.91	13.59	12.83	16.93	—	—	—
Russell 2000® Index (%)	14.65	21.31	-4.41	4.89	38.82	16.35	-4.18	29.38
3-year index deviation	13.91	15.76	13.96	13.12	16.45	—	—	—
Composite dispersion (%)	0.30	0.51	0.30	0.06	0.02	—	—	—
Composite assets ($M)	137.9	53.9	41.6	35.2	21.4	4.8	4.6	0.5
Number of accounts in composite	12	11	9	8	7	< 5	< 5	< 5
Total strategy assets ($M) [1]	177.8	128.5	41.6	35.2	22.4	4.8	4.6	0.5
Total firm assets ($M)	37,843	34,556	36,595	36,630	33,953	32,621	12,208	11,641

Past performance does not guarantee future results.

"—" is shown on the composite dispersion because the information is not statistically meaningful due to an insufficient number of portfolios in the composite for the entire year. "—" is shown on the 3 Yr Std Deviation for the composite and index because 36 monthly returns are not available on the composite.

[1] Strategy assets include composite and non-composite accounts that have the same investment mandate. Non-composite accounts are excluded from the composite due to size, specific client guidelines, or other strategy limitations.

[2] 2010 returns for both the Composite and the Russell 2000® Index represent a partial year return. Composite inception is July 1, 2010

BMO AM claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS® standards. BMO AM has been independently verified for the periods 01/01/1992 through 06/30/2017. The verification report(s) is/are 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.

The U.S. dollar is the currency used to express performance. Returns are presented gross and net of management fees and include the reinvestment of all income. Gross returns will be reduced by investment advisory fees and other expenses that may be incurred in the management of the account. The annual composite dispersion presented is an asset-weighted standard deviation calculated for the accounts in the composite the entire year. Additional information regarding the policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request. Net-of-fee results are calculated by taking the highest fee a separately managed account would be charged applicable at the time, and deducting one-twelfth of this annual fee from each monthly gross return. The fee schedule shown is the current fee schedule. Prior fee schedules are available upon request. Actual investment advisory fees incurred by clients may vary. Results are based on fully discretionary accounts under management, including those accounts no longer with the firm. Non-fee paying accounts represented the following percentage of assets in the composite for these years: 100% for 2010 and 10.29% for 2011.

Please contact us to receive a complete list and description of BMO Asset Management Corp.'s composites.

BMO Disciplined Small-Cap Core Strategy

As of December 31, 2017

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The current separate account fee schedule is listed below.

First $25 million	0.85%
Next $75 million	0.75%
Next $100 million	0.65%
Thereafter	0.60%

The **BMO Disciplined Small-Cap Core Composite** includes all institutional portfolios invested in small-cap equity securities with our Disciplined Small-Cap Core equity strategy. The strategy is designed to outperform the benchmark over full market cycles while maintaining moderate risk controls. The benchmark is the Russell 2000® Index. Prior to May 31, 2013, the composite was named the BMO Disciplined Small-Cap Core Diversified Composite. Prior to December 31, 2011, the composite was named the Small-Cap Core Diversified Composite. The composite was created July 1, 2010.

The **Russell 2000® Index** measures the performance of the 2,000 smallest companies in the Russell 3000® Index, which represents approximately 8% of the total market capitalization of the Russell 3000® Index. Investments cannot be made in an index.

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ALASKA RETIREMENT MANAGEMENT BOARD

Internal Equity Management

December 2018

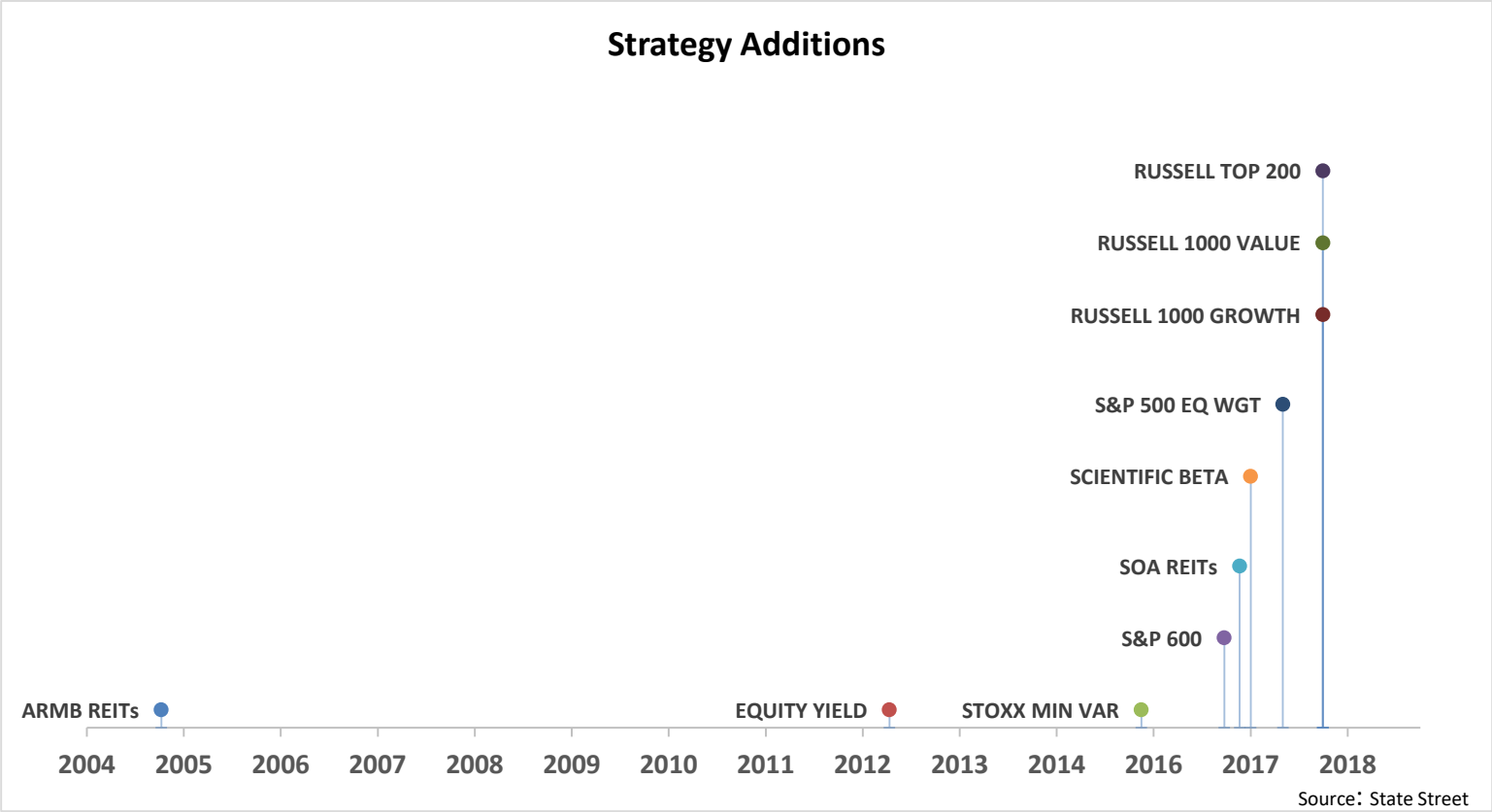
Mark Moon, Manager, Internal Public Equity

Why internal equity management?

- Improve net-of-fee returns eliminating external manager fees
- Deepen roster of personnel with investment expertise
- Offer better insights into market dynamics

Brief history of internal equity management

- Began 2004 with REITs strategy; next added was Equity Yield in 2013
- Numerous mandates added in 2017



Current Internal Equity Strategies

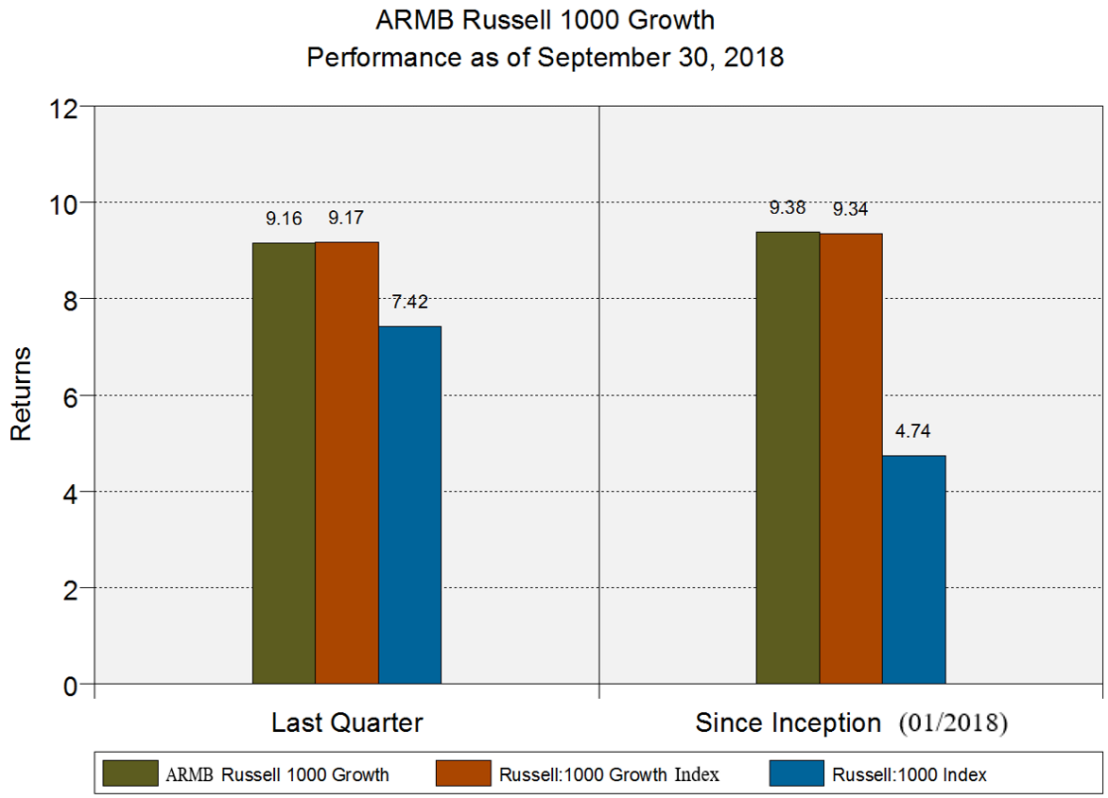
- Nine internal equity strategies
- Six of nine strategies part of ARMB Large-cap Equity Pool

Russell Top 200	S&P 500 Equal Weight	*STOXX US 900 Minimum Variance
Russell 1000 Growth	Equity Yield	*REITs (ARMB and SOA)
Russell 1000 Value	Scientific Beta 4 Factor	*S&P 600

*Strategy not considered in Consolidated Large-Cap Equity Pool

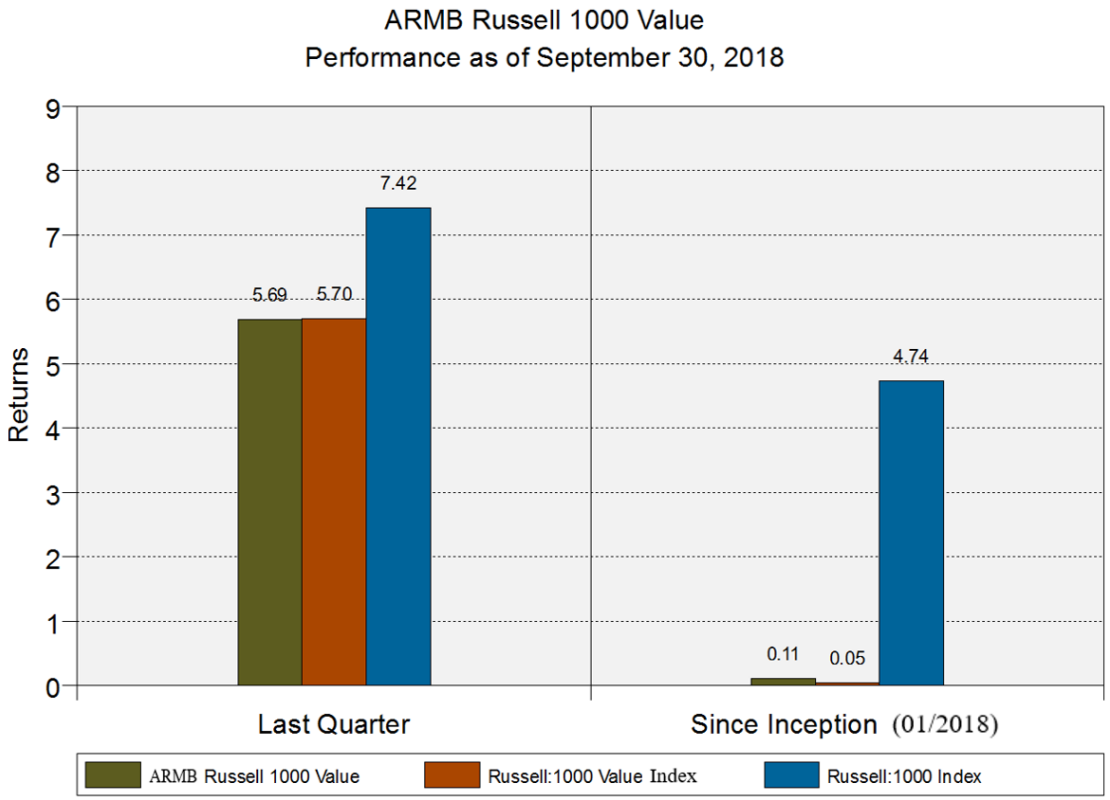
ARMB Russell 1000 Growth Strategy

- Portfolio size: $1,701 million as of September 30, 2018
- Inception: December 2017
- Objective: deliver performance consistent with Russell 1000 Growth Index
- Comprises a portion of ARMB Domestic Large-cap Equity allocation
- Benchmark: Russell 1000 Growth Index
- Imparts tilts within ARMB Domestic Large-cap Equity allocation toward low value and high momentum
- Currently managed within 10bp tracking error of benchmark



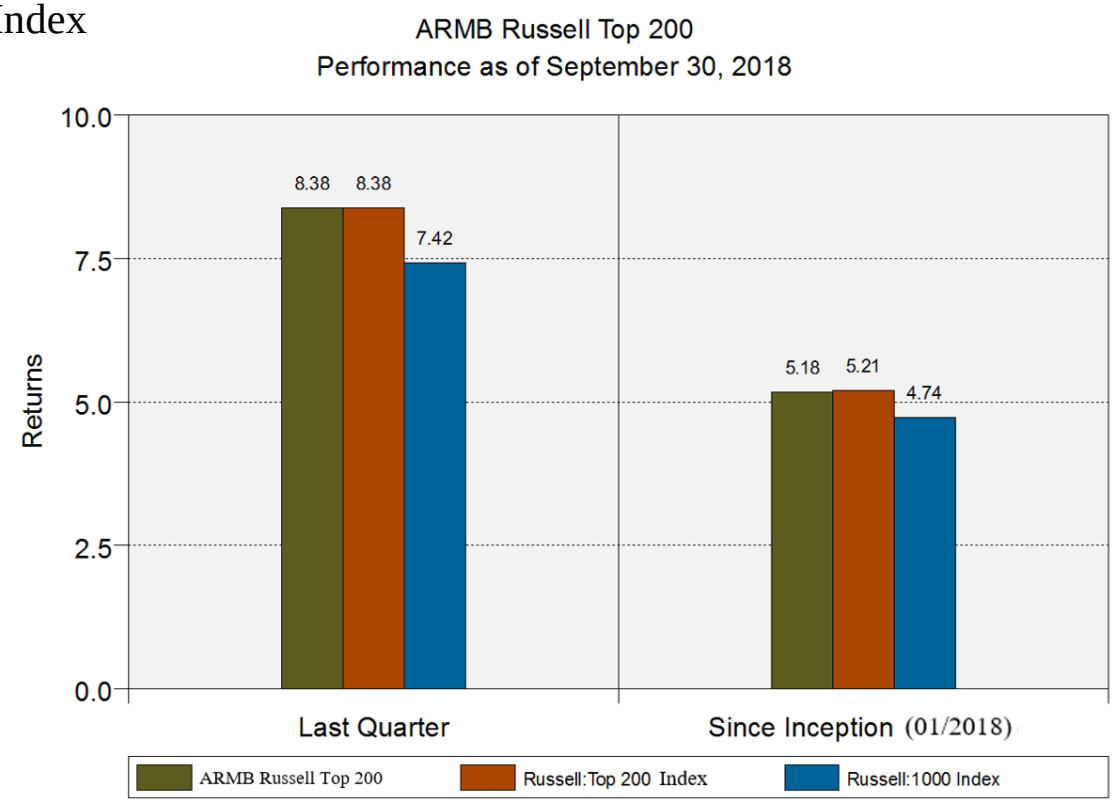
ARMB Russell 1000 Value Strategy

- Portfolio size: $1,424 million as of September 30, 2018
- Inception: December 2017
- Objective: deliver performance consistent with Russell 1000 Value Index
- Comprises a portion of ARMB Domestic Large-cap Equity allocation
- Benchmark: Russell 1000 Value Index
- Imparts tilts within ARMB Domestic Large-cap Equity allocation towards high value and low momentum
- Currently managed within 10bp tracking error of benchmark



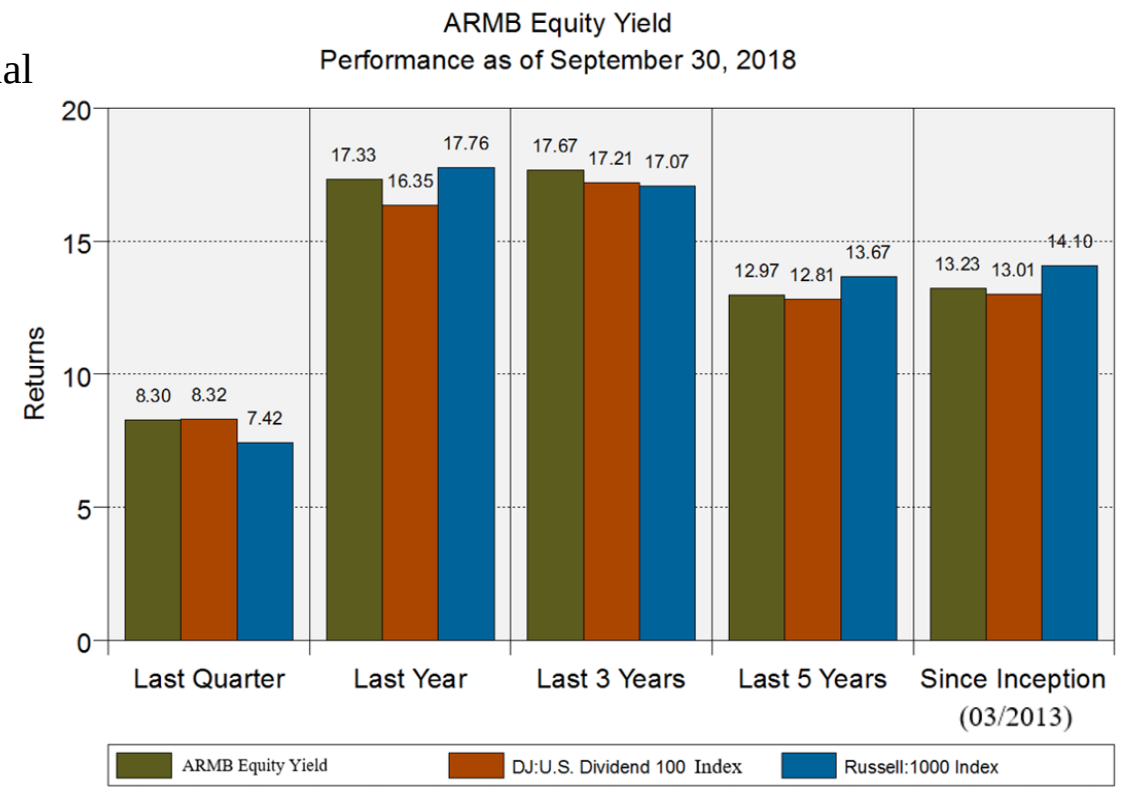
ARMB Russell Top 200 Strategy

- Portfolio size: $417 million as of September 30, 2018
- Inception: December 2017
- Objective: deliver performance consistent with Russell Top 200 Index, providing exposure to the largest US stocks
- Comprises a portion of ARMB Domestic Large-cap Equity allocation
- Benchmark: Russell Top 200 Index
- Imparts tilts within ARMB Domestic Large-cap Equity allocation towards large size and low volatility
- Currently managed within 10bp tracking error of benchmark



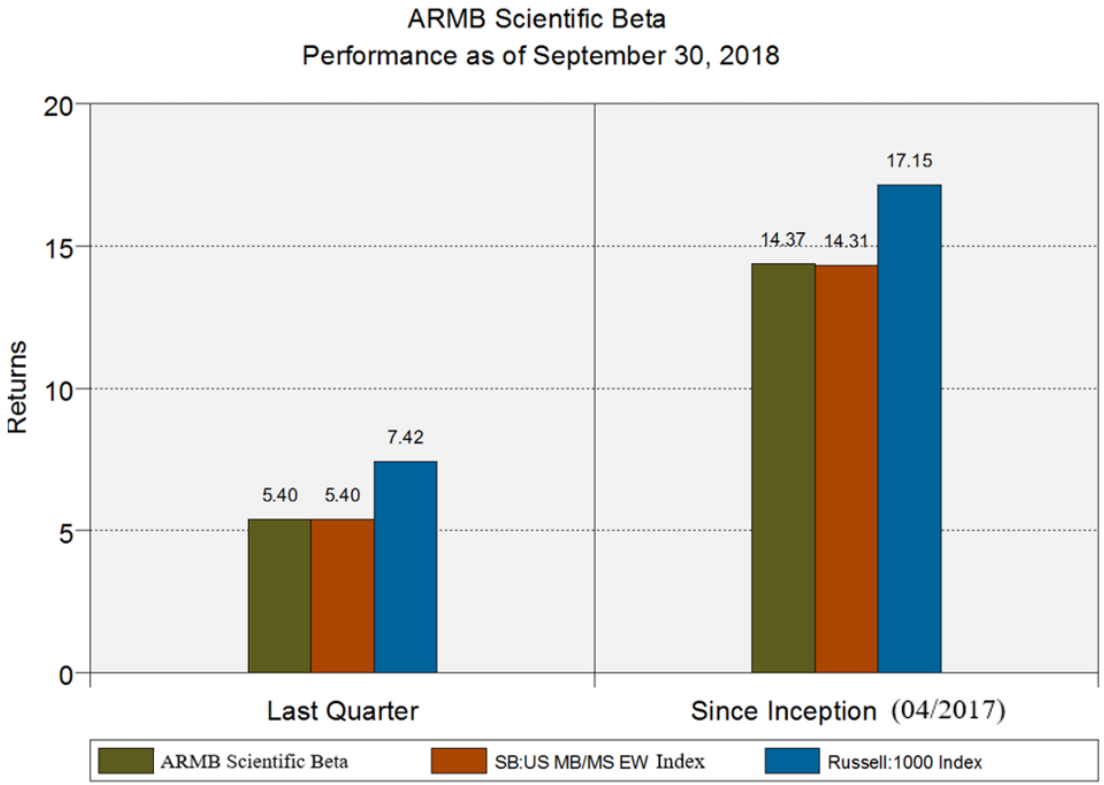
ARMB Equity Yield Strategy

- Portfolio size: $388 million as of September 30, 2018
- Inception: February 2013
- Objective: deliver performance of domestic large-cap dividend paying stocks
- Comprises a portion of ARMB Domestic Large-cap Equity allocation
- Benchmark: Dow Jones US Dividend 100 Index
- Formerly portfolio tilted toward/(away from) individual large-cap dividend paying stocks using internal equity analyst discretion
- Imparts tilts within ARMB Domestic Large-cap Equity allocation towards high value and low momentum
- Recently approach moved to passive within 10bp tracking error of benchmark



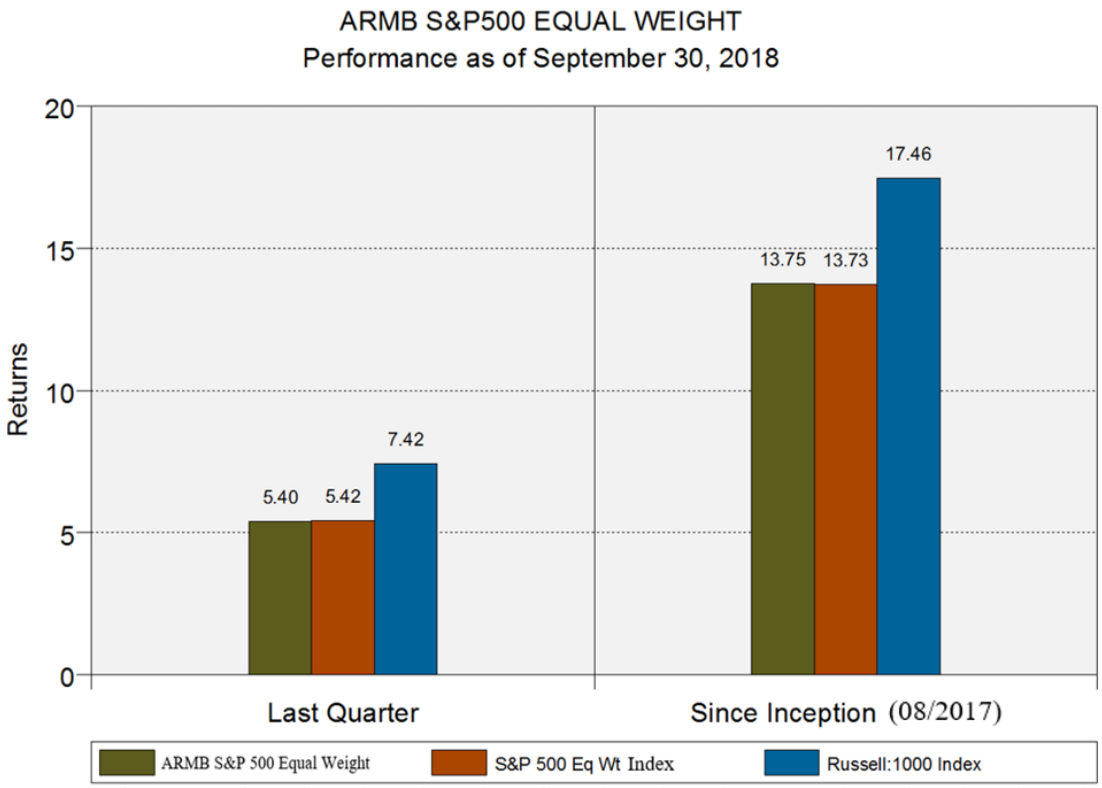
Scientific Beta US Multi-Beta Four-Factor EW

- Portfolio size: $392 million as of September 30, 2018
- Inception: March 2017
- Objective: deliver returns from domestic large-cap portfolio tilted toward four systematic factors including: low size, high value, low volatility and high momentum
- Comprises a portion of ARMB Domestic Large-cap Equity allocation
- Benchmark: Scientific Beta US Multi-Beta Four-Factor EW Index
- Overall portfolio tends to have slightly lower beta than typical long-only portfolio due to preference for low volatility stocks (0.89 vs. 1.00)
- Tracking error to Russell 1000 Index 292bp
- Currently managed within 10bp tracking error of Scientific Beta benchmark



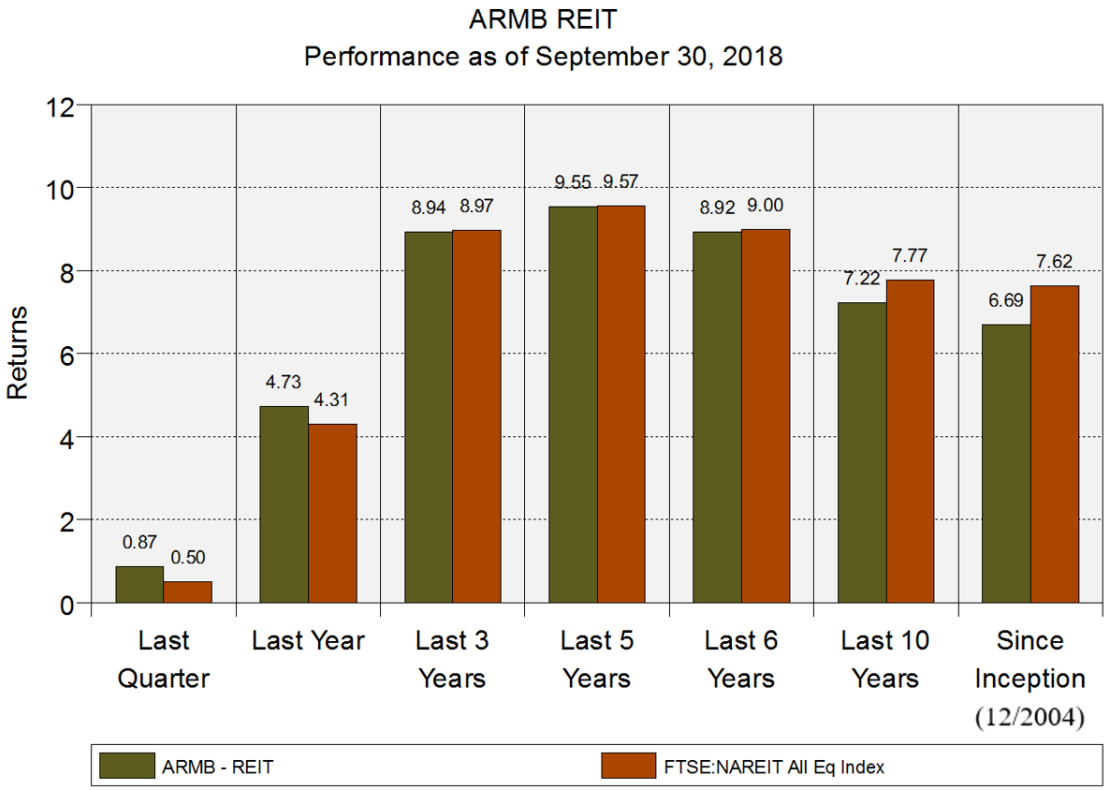
S&P 500 Equal Weight Index

- Portfolio size: $386 million as of September 30, 2018
- Inception: July 2017
- Objective: deliver returns consistent with the S&P 500 Equal Weight Index of domestic large-cap stocks
- Imparts a tilt within ARMB Domestic Large-cap Equity allocation towards smaller size
- Comprises a portion of ARMB Domestic Large-cap Equity allocation
- Benchmark: S&P 500 Equal Weight Index
- Currently managed within 10bp tracking error of benchmark



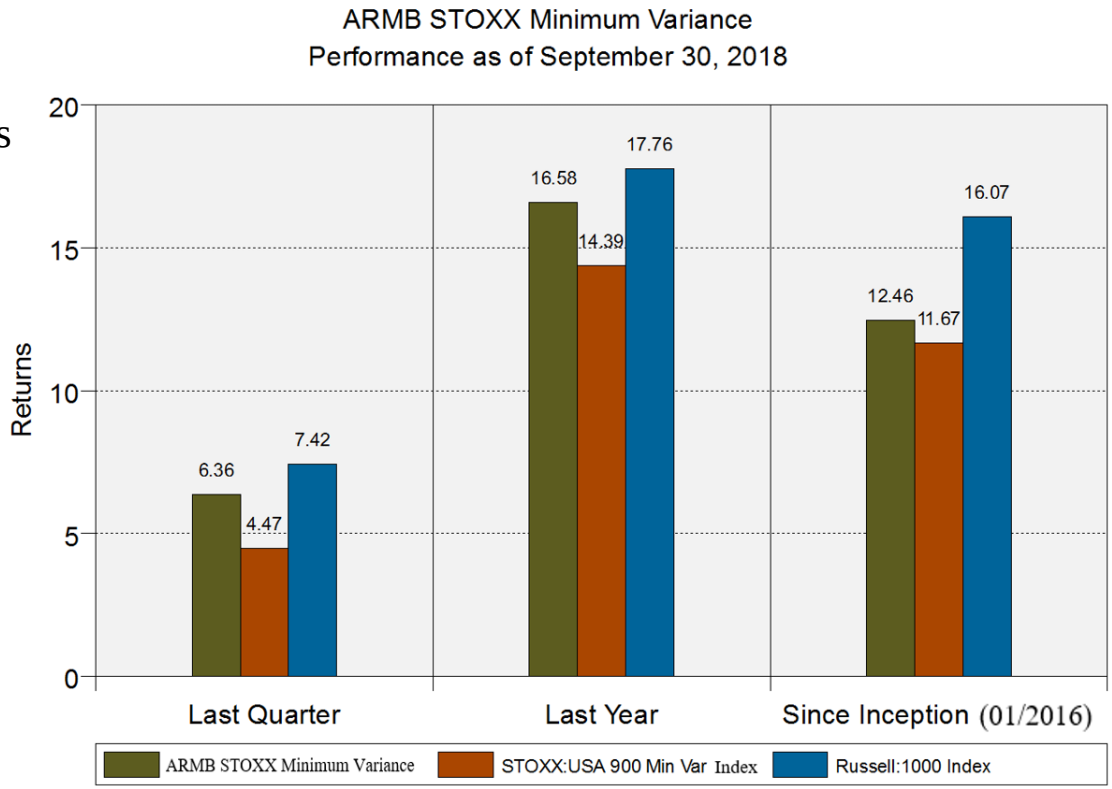
ARMB REITs Strategy

- Portfolio size: $204 million as of September 30, 2018
- Inception: November 2004
- Objective: provide exposure to domestic REIT market
- Comprises a portion of ARMB Real Assets allocation
- Benchmark: FTSE NAREIT All Equity REITs Index
- Formerly portfolio was tilted toward/(away from) individual REITs with high/(low) recommendations from Green Street
- In current year approach moved to passive within 10bp tracking error of benchmark



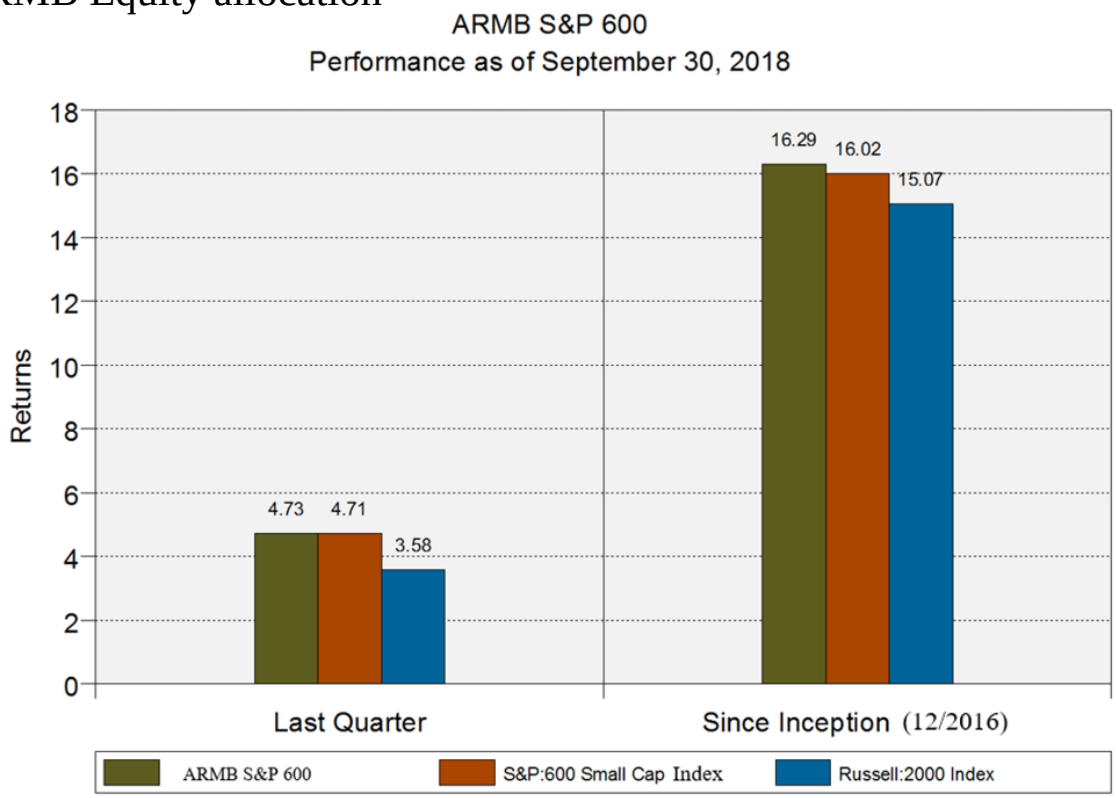
STOXX Minimum Variance Strategy

- Portfolio size: $640 million as of September 30, 2018
- Inception: December 2015
- Objective: portfolio optimized to produce lowest expected portfolio variance from a universe of domestic large-cap equities
- Comprises a portion of ARMB Opportunistic Equity allocation
- Benchmark: STOXX USA 900 Minimum Variance Unconstrained Index
- Portfolio tends to favor stocks with recent low correlation to broad equity market movements such as takeover stocks, Utilities and mortgage REITs
- Currently managed within 10bp tracking error of benchmark



S&P 600 Index

- Portfolio size: $277 million as of September 30, 2018
- Inception: November 2016
- Objective: deliver returns consistent with S&P 600 Index of domestic small-cap stocks
- Comprises a portion of ARMB Domestic Small-cap Equity allocation
- Imparts a tilt within overall ARMB Equity allocation towards small size
- Selects stocks from fundamentally different universe than most other ARMB internal equity strategies (i.e., not many small-cap stocks in other strategies)
- Benchmark: S&P 600 Index
- Currently managed within 10bp tracking error of benchmark



Idea for Improvement

- Combining individual domestic large-cap portfolios into one large-cap portfolio would reduce fees, redundant trading and operational complexity
- Currently, we manage individual, siloed portfolios
  - Frequent trading within individual strategies in response to index changes
  - Some redundant trading between strategies

Create Pilot Portfolio

- What is it?
  - Prototype consolidation of large-cap mandates
  - Large-cap portfolio built from large-cap universe to have desired existing strategic tilts and benchmarked to Russell 1000 Index
  - Essentially an enhanced index, picking stocks from a similar universe to the benchmark, but increasing some weights and decreasing other weights to emphasize desired tilts
  - Can be created and managed by internal equity staff using various existing tools
    - ClariFI/S&P Capital IQ
    - Internal equity Linux R/MySQL server
    - Bloomberg

Pilot Portfolio (cont.)

- Why?
  - Utilize pilot portfolio as a proof of concept for consolidating large-cap mandates into single portfolio
  - Scale portfolio such that can demonstrate efficacy of concept without affecting the existing mandates
- Longer-term plan
  - If approved, run pilot portfolio alongside of existing large-cap mandates for several quarters and report back to ARMB
  - Possible recommendation at that point to roll out pilot portfolio concept to large-cap mandates more generally

Structure of Pilot Portfolio

- US large-cap portfolio with strategic tilts toward:
  - Smaller Size
  - Higher Value
  - Lower Volatility
  - Higher Momentum (i.e., longer-term price performance)
  - Lower Reversal (i.e., recent 30 days' performance)
- Universe: largest 1,000 US stocks
- Benchmark: Russell 1000 Index
- Optimized to limit sector differences (±3%) and tracking error (≤200bp) relative to benchmark
- Rebalanced monthly such that annual turnover does not exceed 120%

Optimizing Pilot Portfolio

- Portfolio optimization represents standard current industry approach to managing quantitatively-driven equity portfolios against a benchmark
- Currently used by almost every quantitative investment manager/investor
- Optimization problem: choose portfolio weights on each stock so as to maximize expected return on portfolio penalized by a function of portfolio tracking error
  - Maximize {portfolio expected return minus function of (tracking error)}
  - Subject to various constraints on sum of portfolio weights, individual weights, sector limitations, etc.
- Current tools that internal equity can use for optimization
  - Existing optimizer within ClariFI system
  - Existing optimizer within Bloomberg system
  - Open source optimizers such as the convex optimization tool set available within R called CVXR

Strategic Tilts of Existing Portfolios

- Measured as differences in position-weighted means between each portfolio and Russell 1000 Index computed from composite factor scores for each stock

Exposure Differences from Russell 1000

Strategy	Size	Value	Volatility	Momentum	Reversal
Russell Top 200	0.36	-0.00	-0.13	0.07	0.06
Russell 1000 Growth	0.02	-0.28	0.07	0.36	0.03
Russell 1000 Value	-0.02	0.28	-0.07	-0.37	-0.04
Equity Yield	0.08	0.28	-0.02	-0.27	0.09
S&P 500 Eq. Wgt.	-0.51	0.10	0.24	-0.29	-0.06
Scientific Beta 4 Factor	-0.45	0.14	0.06	-0.16	-0.04
STOXX Min. Variance	-0.46	0.15	-0.17	-0.13	-0.02
ARMB REITs	-1.14	-0.52	-0.27	-0.60	-0.51
S&P 600 Small-cap	-2.03	-0.03	0.58	-0.07	-0.44

as of September 28, 2018

Source: S&P ClariFI and internal analytics

Conceptual Model for Strategic Tilt Portfolios

- Composite factor exposures (strategic tilts) were created for Russell 3000 stocks for various factors of interest on a monthly basis going back 20 years
- A subset of the largest 1000 stocks ranked on Size was then used for analysis of factor tilts within a large-cap universe
- Factor long/short returns were created for portfolios of stocks ranking in the highest 1/3 of the factor minus returns of stocks ranking in the lowest 1/3
- A combined strategic tilt portfolio (Combo) was formed as follows:

  0.25 * negative Size long/short portfolio

  0.25 * positive Value long/short portfolio

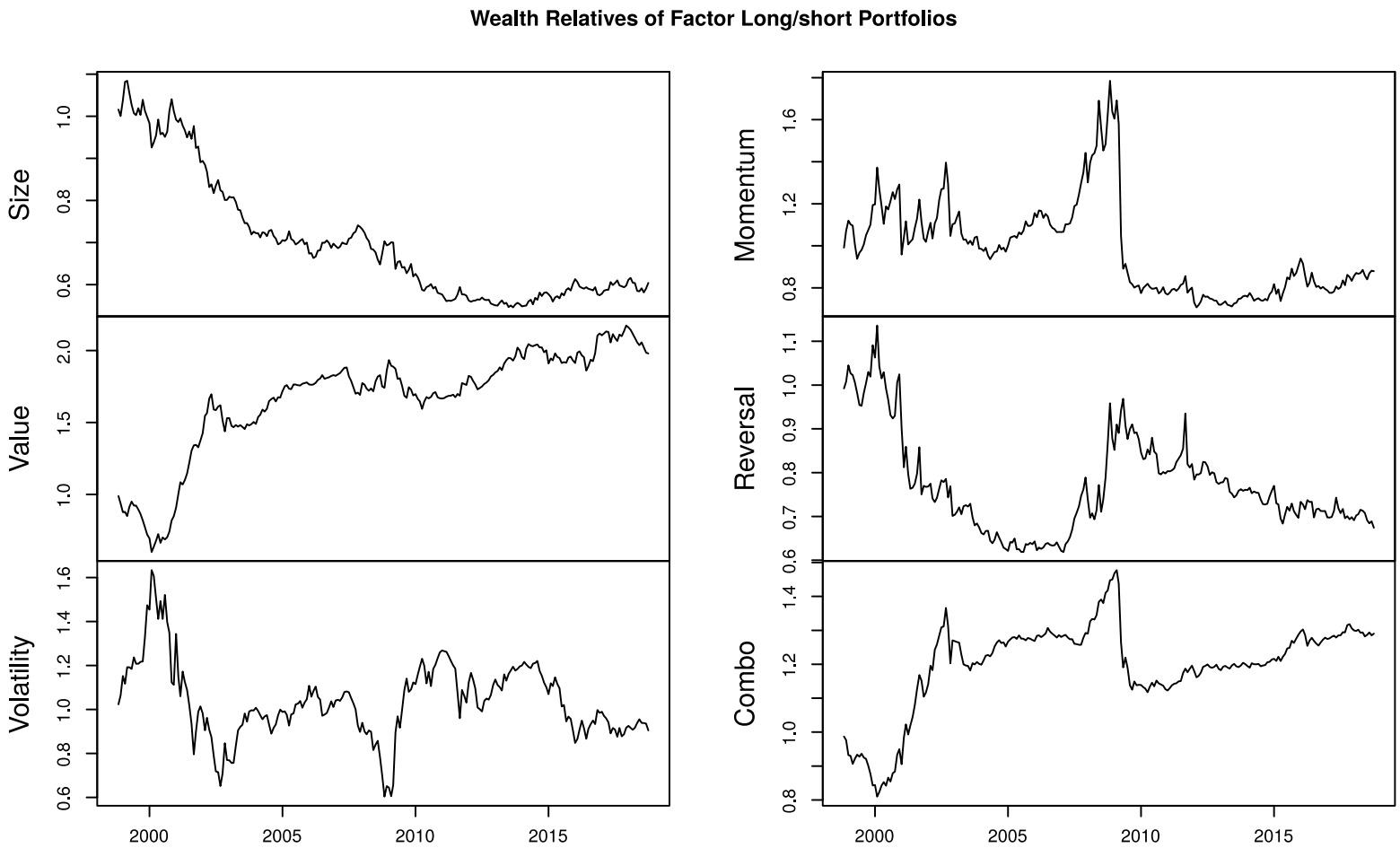
  0.25 * negative Volatility long/short portfolio

  0.125 * positive Momentum long/short portfolio

  0.125 * negative Reversal long/short portfolio

Contributions of Strategic Tilt (Factor) Portfolios

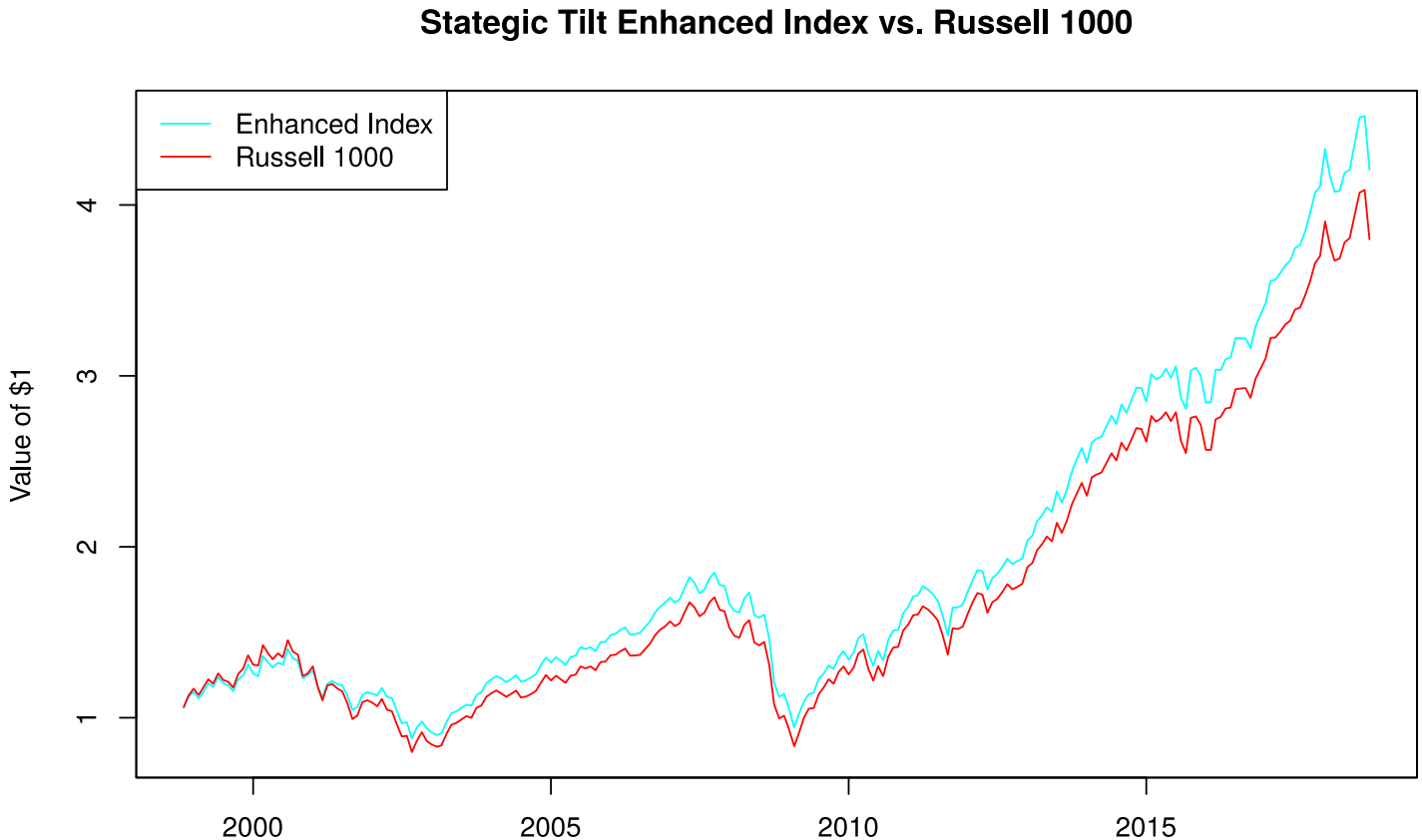
- Composite large-cap factor long/short portfolios past 20 years



Source: S&P ClariFI and internal analytics

Combining Strategic Tilts with Russell 1000

- Create an enhanced index by combining strategic tilts with Russell 1000 Index
- To do this, we added a 0.25 weight of the "Combo" strategic tilt portfolio to the Russell 1000 Benchmark (approximately 25% of ARMB large-cap NAV tilts away from Russell 1000 benchmark)



Source: S&P ClariFI and internal analytics

Value Added of Strategic Tilts

- Large-cap Russell 1000 portfolio enhanced with a strategic tilt overlay generates positive value over past 20 years (Alpha 54bp over R1000; IR 0.32)

Enhanced Index Performance

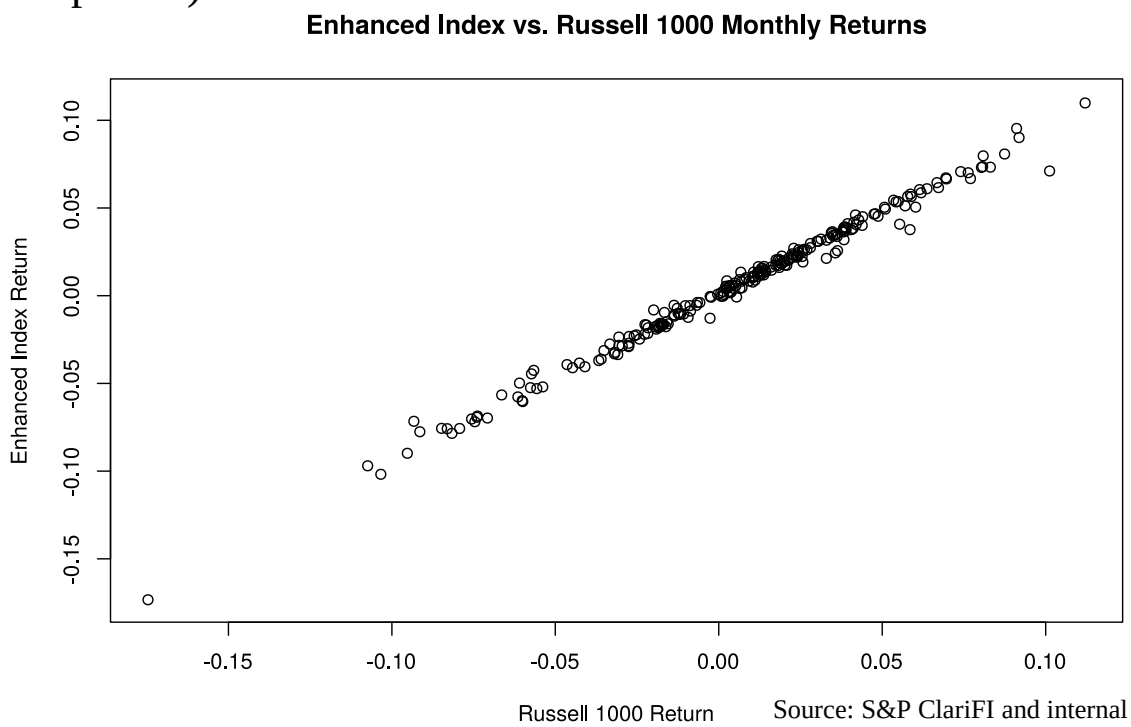
	Enhanced	R1000	Alpha
1998	0.1232	0.1295	-0.0063
1999	0.1681	0.2091	-0.0410
2000	-0.0473	-0.0779	0.0306
2001	-0.0808	-0.1245	0.0437
2002	-0.1845	-0.2165	0.0320
2003	0.2823	0.2989	-0.0166
2004	0.1260	0.1140	0.0120
2005	0.0671	0.0627	0.0044
2006	0.1581	0.1546	0.0034
2007	0.0594	0.0577	0.0016
2008	-0.3562	-0.3760	0.0197
2009	0.2191	0.2843	-0.0652
2010	0.1592	0.1610	-0.0017
2011	0.0312	0.0150	0.0162
2012	0.1626	0.1642	-0.0016
2013	0.3350	0.3311	0.0039
2014	0.1355	0.1324	0.0031
2015	0.0244	0.0092	0.0152
2016	0.1191	0.1205	-0.0014
2017	0.2234	0.2169	0.0065
2018	0.0237	0.0267	-0.0030
CAGR	0.0745	0.0690	0.0054
vol	0.1366	0.1461	0.0168
mean_mo	0.0068	0.0065	0.0003
median_mo	0.0117	0.0115	0.0003

Nov-1998 thru Oct-2018

Source: S&P ClariFI and internal analytics

Risk Profile Differences

- Over the past 20 years of monthly data, enhanced index returns are
  - highly correlated to Russell 1000 returns (correlation of 0.995; beta of 0.93)
  - slightly less volatile (13.66% volatility for enhanced index vs. 14.61% for Russell 1000)
  - with annualized tracking error of 1.68% (and significantly less most of time period)



Source: S&P ClariFI and internal analytics

Sample Optimized Portfolio Inputs

- Run in ClariFI system as of Sept. 28, 2018
- Universe: largest 1,000 stocks in Russell 3000 Index
- Benchmark: Russell 1000 Index
- Expected alphas: linear function of stocks' size, valuation, volatility, momentum and reversal composite z-scores
- Risk model: S&P Capital IQ US Short-term
- Constraints: sector exposures ±3%; limit position weights to be at least 1bp

Sample Optimized Portfolio Results

- Beta 0.97
- Tracking error 144bp
- Number of stocks 151

Exposures of Optimized Portfolio and Russell 1000

Portfolio	Holdings	Size	Value	Volatility	Momentum	Reversal
Optimized	151	1.68	0.58	-0.84	0.40	0.08
Russel 1000	984	1.96	0.17	-0.47	0.38	0.37
Difference	-833	-0.28	0.41	-0.37	0.02	-0.29

as of September 28, 2018

Sector Weights of Optimized Portfolio and Russell 1000

Sector	Optimized	Russell 1000	Difference
Information Technology	0.2737	0.2611	0.0126
Health Care	0.1279	0.1450	-0.0171
Financials	0.1644	0.1344	0.0300
Consumer Discretionary	0.1188	0.1306	-0.0118
Industrials	0.1008	0.1005	0.0003
Consumer Staples	0.0331	0.0631	-0.0300
Energy	0.0538	0.0580	-0.0042
Real Estate	0.0222	0.0329	-0.0107
Utilities	0.0293	0.0276	0.0017
Materials	0.0576	0.0276	0.0300
Telecommunication Services	0.0183	0.0190	-0.0007

as of September 28, 2018

Source: S&P ClariFI and internal analytics

Concluding Thoughts

- Internal equities team currently equipped to run existing mandates and, if approved, a Pilot Portfolio which offers potential for single, consolidated, strategic tilt large-cap portfolio
- Data/analytic infrastructure being developed may offer insights/tools more broadly to additional investment areas and investment problems
- Orienting internal equities generally toward managing various *systematic* internal equity strategies most likely represents highest value-generating use

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Emerging Markets Growth Manager Hire

ACTION: X

DATE: December 13-14, 2018

INFORMATION: _____

BACKGROUND:

At the June 2018 Alaska Retirement Management Board (ARMB) meeting, the board directed staff to engage Callan Associates (Callan) to conduct a search for one Emerging Markets growth equity manager. Additionally, the ARMB directed staff to evaluate the Callan search results and bring a recommendation to the board at a future meeting.

On August 17, 2018, Callan concluded their search and provided the final search document which included nine investment managers.

Subsequently, staff analyzed and conducted due diligence on each manager. Staff selected two managers to present to the ARMB at the December 2018 ARMB meeting for final hiring decision.

Both managers were chosen for their expertise investing equities in Emerging Markets with a growth style and their prospective outperformance of the MSCI Emerging Markets Growth Index, net of fee.

STATUS:

The two firms have presented to the ARMB.

Staff is recommending the ARMB select one manager to manage an Emerging Markets growth equity strategy with an initial investment of up to $200 million.

RECOMMENDATION:

The Alaska Retirement Management Board direct staff to contract with _____ to manage an initial investment of up to $200 million in an Emerging Markets growth equity strategy subject to successful contract and fee negotiations.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Internally Managed Pilot Portfolio

ACTION: X

DATE: December 13-14, 2018

INFORMATION: _____

BACKGROUND:

Staff began investing equity assets internally starting with a REITs portfolio in 2004, subsequently adding an equity yield portfolio in 2013, followed by multiple mandates leading up to $6 billion across nine strategies ending the fourth quarter of 2018 as detailed below.

Russell Top 200	S&P 500 Equal Weight	STOXX US 900 Minimum Variance
Russell 1000 Growth	Equity Yield	REITs
Russell 1000 Value	Scientific Beta 4 Factor	S&P 600

Staff believes that consolidating the internally-managed, domestic, large-cap equity mandates into one large-cap equity portfolio while maintaining similar existing aggregate systematic factor exposures will result in lower fees, lower trading costs, greater operational efficiency and improved risk and return characteristics.

STATUS:

Staff recommends implementing a pilot portfolio as proof of concept for consolidating the large-cap mandates into a single portfolio running alongside the existing large-cap mandates for several quarters.

Staff will then report back to the board the results of the pilot portfolio with the intent of the board considering rolling out a more inclusive domestic, large-cap equity investment program.

RECOMMENDATION:

The Alaska Retirement Management Board (ARMB) direct staff to invest and manage internally an initial investment of $100 million in a pilot portfolio incorporating factor exposures as described in the Internal Equity Management presentation to ARMB in December 2018.

ALASKA RETIREMENT MANAGEMENT BOARD
Meeting Summary – December 13-14, 2018

The Alaska Retirement Management Board (ARMB) re-elected Mr. Robert M. Johnson as the Board Chair, Mrs. Gail Schubert as the Vice Chair, and Mrs. Gayle Harbo as the Secretary. These positions are voted upon annually.

The Alaska Retirement Management Board (ARMB) tabled agenda item number 10, "2014-2018 Experience Study" and its action to a future meeting.

The ARMB moved to take Tortoise Capital MLP off the watch list.

The ARMB approved Resolution 2018-20 which adopts the revised Farmland Investment Guidelines.

The ARMB directed staff to invest and manage internally an initial investment of $100 million in a pilot portfolio incorporating factor exposures as described in the Internal Equity Management presentation to ARMB in December 2018.

The ARMB directed staff to contract with Sands Capital to manage an initial investment of up to $200 million in an Emerging Markets growth equity strategy subject to successful contract and fee negotiations.