ALASKA RETIREMENT MANAGEMENT BOARD

BOARD OF TRUSTEES
AGENDA

April 20-21, 2017

Dena'Ina Convention Center
K'enakatnu Room
600 W. 7th Avenue
Anchorage, AK
907 263-2850

Teleconference # 1-800-315-6338 Pass Code 12762#

Thursday, April 20, 2017

I.	9:00 am	Call to Order
II.		Roll Call
III.		Public Meeting Notice
IV.		Approval of Agenda
V.		Communications, Public/Member Participation, and Appearances (Three Minute Limit)
VI.		Approval of Minutes: March 2-3, 2017
VII.	9:10	Reports
		1. Chair Report
		2. Committee Reports
		A. Actuarial Committee, *Kris Erchinger, Chair*
		B. Evaluation Committee, _____, *Chair*
	9:15-10:45	3. TIR – Portfolio Update [Executive Session] *Tom Johnson, Mark Seaman, Chris Mathis*
		10:45 – Break 10 Minutes
	10:55-11:25	4. Lazard Asset Management – Emerging Income *Tony Dote and Ardra Belitz*
	11:30-12:15	5. Private Equity Tactical Plan Action: Resolution 2017-02 – Private Equity Plan *Zachary Hanna, State Investment Officer*
		Lunch – 12:15 – 1:30 pm
	1:30	6. DRB Report
		A. Legislative Update *Ajay Desai, DRB Director*

7. Treasury Division Report
Action: Review Actuary RFP
Action: Meeting Structure/Calendar
Pamela Leary, Treasury Division Director

8. CIO Report
Bob Mitchell, Acting Chief Investment Officer

9. Fund Financial Report
Scott Jones, State Comptroller, Treasury Division
Kevin Worley, CFO, Division of Retirement & Benefits

2:00- 10. Actuary Reports

2:00-2:15 A. 2016 Actuarial Valuation Review
DB and DCR Plans
Public Employees' Retirement System (PERS)
Teachers' Retirement System (TRS)
Leslie Thompson, Gabriel Roeder Smith

2:20-2:50 B. 2016 Actuarial Valuation
DB and DCR: PERS and TRS Plans
Larry Langer, David Kershner, & Melissa Bissett

2:50-3:00 C. Audit Findings Recap
Kris Erchinger, Chair, Actuarial Committee

Action: Board Approval of Resolved Findings

3:00 – Break
10 Minutes

3:10-3:20 11. Small Cap Growth Manager Search
Bob Mitchell, Acting Chief Investment Officer

3:25-3:55 A. T Rowe Price
Chris Dyer, Sudhir Nanda, and John Plowright

4:00-4:30 B. Arrowmark Partners
Brian Schaub and Chris Dunne

4:35- C. Board Discussion/Selection/Action

Recess

Friday, April 21, 2017

9:00 Call to Order

9:00-10:00 12. Performance Measurement – 4th Quarter
Steve Center, Callan Associates, Inc.

10:05-10:35 13. Review: Internal Equity Management
Bob Mitchell, Acting Chief Investment Officer

10:35 – Break
10 Minutes

10:45-11:15 14. Brandes Investment Partners (DB and DC)
Glenn Carlson, Jeffrey Germain and Lawrence Taylor

11:20-12:00 15. Benchmark Review
Bob Mitchell, Acting Chief Investment Officer

12:00-12:20 16. Investment Actions
- A. Investment Advisory Council Position
- B. Internal Mandate: Large Cap Equal Weight
- C. Internal Mandate: Scientific Beta International
- D. Move Russell 2000 Value and Growth to S&P 600

VIII. Unfinished Business
1. Disclosure Reports
2. Meeting Schedule
3. Legal Report

IX. New Business
X. Other Matters to Properly Come Before the Board
XI. Public/Member Comments
XII. Investment Advisory Council Comments
XIII. Trustee Comments
XIV. Future Agenda Items
XV. Adjournment

(Times are approximate. Every attempt will be made to stay on schedule; however, adjustments may be made.)

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
MEETING

Location
Centennial Hall
Egan Room
Juneau, Alaska

MINUTES OF
March 2 - 3, 2017

Thursday, March 2, 2017

CALL TO ORDER

CHAIR GAIL SCHUBERT called the meeting of the Alaska Retirement Management Board (ARMB) to order at 9:00 a.m.

ROLL CALL

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

Board Members Present
Gail Schubert, *Chair*
Robert Johnson, *Vice-Chair*
Gayle Harbo, *Secretary*
Kristin Erchinger (telephonic)
Commissioner Sheldon Fisher
Commissioner Randall Hoffbeck
Norman West
Tom Brice
Bob Williams

Board Members Absent
None

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

Investment Advisory Council Members Absent
Robert Shaw

Department of Revenue Staff Present
Jerry Burnett, Deputy Commissioner
Bob Mitchell, Acting Chief Investment Officer
Zachary Hanna, State Investment Officer
Shane Carson, State Investment Officer
Victor Djajalie, State Investment Officer
Casey Colton, State Investment Officer
Kayla Wisner, Accountant V
Kelli Barkov, Accountant III
Pamela Leary, Director, Treasury Division
Judy Hall, Board Liaison

Department of Administration Staff Present
Kevin Worley, Chief Financial Officer, Division of Retirement & Benefits
Ajay Desai, Director, Division of R & B
Ryan Colgan, Deputy Commissioner, DOA

Consultants, Invited Participants, and Others Present
Stuart Goering, Department of Law, Assistant Attorney General
Kevin Clark, Analytic Investors
Greg McMurran, Analytic Investors
Megan Miller, Analytic Investors
Greg Ramsby, DePrince Race Zollo
Kelly Carbone, DePrince Race Zollo
John Holmgren, Zebra Capital Management
Roger Ibbotson, Zebra Capital Management
Chris Dyer, T. Rowe Price
Charles Shriver, T. Rowe Price
Toby Thompson, T. Rowe Price
John Plowright, T. Rowe Price
Paul Erlendson, Callan Associates, Inc.
Steve Center, Callan Associates, Inc.
Greg Murphy, Tortoise Capital Advisors
Braden Cielocha, Tortoise Capital Advisors
Jim Cunnane, Advisory Research Inc.
Jamie MacMillan, Schroders Investment Management
Richard Sennett, Schroders Investment Management
Todd Rittenhouse, Mondrian Investment Partners Ltd.
Aidan Nicholson, Mondrian Investment Partners Ltd.

PUBLIC MEETING NOTICE

JUDY HALL confirmed that public meeting notice requirements had been met.

APPROVAL OF AGENDA

MRS. HARBO moved to approve the agenda. MR. WEST seconded the motion.

The agenda was approved.

PUBLIC/MEMBER PARTICIPATION, COMMUNICATIONS AND APPEARANCES

None.

APPROVAL OF MINUTES: December 8-9, 2016

MRS. HARBO moved to approve the minutes of the December 8 - 9, 2016 meeting of the ARM Board. MR. WILLIAMS seconded the motion.

The minutes were approved.

REPORTS

1. CHAIR REPORT

CHAIR SCHUBERT said that she had nothing to report.

2. COMMITTEE REPORTS

A. Audit Committee

MR. JOHNSON reported that the Audit Committee had a relatively brief meeting on March 1 with some interesting presentations. Mr. Desai, the new Director of the Division of Retirement and Benefits, discussed the auditing of employers participating in the plans. Mr. Worley gave a presentation on GASB 68, which adopted a regulation allowing the DRB to engage in audits. Also, Director Leary and Mr. McKnight gave a compliance report and update. In the past, State Street had provided this as part of its custodial contract, but now they wanted to charge for it, so the Treasury Department had done a cost-benefit analysis and decided it would cover compliance itself.

B. Actuarial Committee

MS. ERCHINGER reported that the Actuarial Committee met the day before the Board meeting, and had a presentation from Mr. Worley about the allocation of administrative and investment expenses between the various plans and allocation of assets between the police and fire plan and

other. They also discussed normal cost as a minimum contribution requirement, which the committee had been interested in hearing more about. Conduent (formerly Buck Consultants) gave a presentation regarding the actuarial valuation, which was the first draft the committee had seen; the full valuation report will come before the Board for acceptance at the April meeting.

MS. ERCHINGER said that they also spent a lot of time on the new committee manual that they are developing for the Actuarial Committee, the purpose of which is to document actions that have been taken by the committee and the Board with respect to the actuarial assumptions, and discussions that have affected the setting of the contribution rate.

MS. HARBO thanked Kevin Worley for his work on the allocation of expenses between plans and thanked Ms. Hall and Ms. Thompson for their work on the committee manual.

C. DC Plan Committee

MR. WILLIAMS reported that the DC Plan Committee had met the day before this Board meeting. The committee heard presentations from Kathy Lea on the Division of Retirement and Benefits updates, and from Marilyn Collister of Empower about the fiduciary rule requiring fiduciaries to act in the best interests of their clients, which has been delayed under the new presidential administration. The committee also had a discussion on some possible action items to present to the Board later today, on which they and Callan had different recommendations, so the committee declined to take a strong position.

3. DIVISION OF RETIREMENT & BENEFITS REPORT

A. Membership Statistics/Buck Invoices/HRA Rates

MR. WORLEY introduced some DRB employees, who work in Juneau and were able to attend the meeting, and the new director, AJAY DESAI, who started on January 6th.

MR. WORLEY then reviewed retirement membership activity, and noted that as PERS DB had lately been surpassed by the PERS DC plan, now the TRS DC has overtaken the TRS DB in December 2016. Also, there have been two retirements from the DC plan for teachers and more are coming up.

Conduent is the new name of Buck Consultants, and the billing summary was included in the meeting materials. Also included was a memo about the FY 18 HRA amounts, which will be $2,084.

B. Legislative Update

MR. WORLEY reported that he was recently at a committee meeting for House Bill 47, which affects employers that had a 25 percent population decline from 2000 to 2010. It's sometimes called the "Galena Bill", though there are five PERS employers meeting the criteria. The bill would change the salary floor from FY 2008 to FY 2012, which would decrease it for those five

employers. The bill would also make the penalty rate for late contributions negotiable for the plan administrator and the employer.

MR. WILLIAMS thanked MR. WORLEY for introducing his staff. MR. WILLIAMS then asked about two TRS DC retirements in the first quarter of FY 17, and said he'd like to see as time goes on how many years of service people in that category had and how much they will be retiring with so the Board could get a sense of that. MR. WORLEY said that he would work on providing that information.

4. TREASURY DIVISION REPORT

DIRECTOR PAM LEARY introduced four members of the accounting staff who were present: Kelli Barkov, Sam Dobbs, Joshua Clark, and Kayla Wisner.

MS. LEARY explained that since Gary Bader retired at the end of January, the CIO position is vacant. The Department of Revenue provides investment staff to the ARM Board, and Commissioner Hoffbeck has appointed Bob Mitchell as acting CIO. Resolution 2017-01 would officially delegate certain responsibilities to Mr. Mitchell.

MR. BRICE moved to adopt Resolution 2017-01. MS. HARBO seconded the motion.
A roll call vote was taken, and the motion passed unanimously.

MS. LEARY also said that a contract has been signed to have an executive recruiting firm called DHR conduct a thorough national search for a chief investment officer, which could take up to six months. MR. HOFFBECK commented that he is very confident about the delegation of Bob Mitchell, who may ultimately be selected as CIO, but it is incumbent upon them to do due diligence with such a large fund and responsibility as they have.

MS. LEARY discussed another action item in the meeting packet about an RFP for an actuarial review. The contract with Gabriel Roeder Smith ends in June at the end of FY 17, and a new actuary must be in place by July 1, 2017 to conduct the required reviews of the 2017 valuations and the scheduled experience analysis that will be conducted by Conduent Human Resource Services. CHAIR SCHUBERT requested that Kris Erchinger, Rob Johnson, and Gayle Harbo serve on the selection committee.

MS. LEARY gave a budget update, stating that the budget that she presented for 2018 has gone forward to the Office of Management and Budget and to the legislature, and so far it is substantially intact.

5. CHIEF INVESTMENT OFFICER REPORT

Acting Chief Investment Officer BOB MITCHELL commented that he is going to miss working with Gary Bader and wishes him the best in his retirement.

MR. MITCHELL went through his report on rebalances in various plans and transactions with fund

managers.

MR. MITCHELL recommended that Allianz/RCM Socially Responsible Investment Fund be placed on the watch list for performance reasons over a six-year period.

MRS. HARBO moved to have the Board place Allianz/RCM Socially Responsible Investment Fund be placed on the watch list. MR. BRICE seconded the motion.
A roll call vote was taken, and the motion passed by unanimous consent.

MR. MITCHELL noted that State Street Global Advisors investment management division is going to be placed into a wholly owned subsidiary of the company to comply with Dodd-Frank regulations; the company has indicated that this will not affect in any way the level or types of services that they provide to the ARM Board. However, the name in the mandate will change from State Street Bank to State Street Global Advisors Trust Company.

MR. MITCHELL reported that KKR Prisma is merging with PAAMCO. Also, KKR announced that Eric Falk, the global head of private credit and co-head of the direct lending strategy, is leaving, and Callan issued an opinion that this is a negative development. Staff will monitor this as part of their due diligence for a third fund that KKR is offering, but they do not recommend placing KKR on the watch list at this time.

MR. MITCHELL announced that their newest hire, Kevin Buckland, started about two weeks ago as part of the fixed income team. He previously worked for the Alaska Mental Health Trust and the Permanent Fund.

MR. MITCHELL concluded by describing what he anticipates over the next few months, acknowledging that someone with a different perspective may end up being the CIO so he doesn't want to make changes that may be difficult or expensive to reverse. He said that his goal is to improve how they manage the portfolios for the ARM Board, and he described some actions that staff are currently working on. MR. MITCHELL proposed that at the April board meeting they spend time reviewing strategies and benchmarks, and defer the discussion of asset allocations until June. There were no objections.

6. FUND FINANCIAL REPORT

CFO KEVIN WORLEY congratulated the Department of Revenue on hiring Kevin Buckland. MR. WORLEY then responded to a question from Trustee Brice about HB 57, stating that the additional state contribution for PERS is $72.5 million, and for TRS, $111.7 million. They also have a past service contribution via unrestricted general funds of $5.4 million for the Judicial Retirement System.

State Accountant KAYLA WISNER presented the fund financials for the period ending January 31, 2017. The ending invested assets in PERS were $16.8 billion; TRS, $8.2 billion; JRS, $184.6 million; National Guard/Naval Militia, $37.2 million; the Supplemental Annuity Plan, $3.5 billion; Deferred Compensation, $847.5 million. The total for nonparticipant-directed plans was $24.1

billion and $5.5 billion in participant plans, for total assets of $29.6 billion. Fiscal year-to-date investment income was $1.8 billion, and net withdrawals were $405.2 million. Plan assets were up 4.88 percent, and of that, 6.36 percent was due to investment income.

MR. WORLEY responded to a question from Mrs. Harbo of how much money was received from RDS and Aetna pharmacy rebates. For the seven months through January 31, 2017, they have received $16 million from Aetna through pharmacy rebates, and $11 million for the Retiree Drug Subsidy. MRS. HARBO noted that about $31 million went out to DC participants who got full disbursements, so about $52 million per year goes to people who take their money and leave the state.

7. ANALYTIC INVESTORS

MR. MITCHELL introduced KEVIN CLARK of Analytic Investors, which has managed a Buy Write strategy within the alternative equity program since 2011. With Mr. Clark were portfolio manager MEGAN MILLER and GREG McMURRAN, CIO.

MR. CLARK stated that in September of 2016 Wells Fargo purchased Analytic. It was a cash purchase with one third of the buyout up front and two thirds after four years, which gives the team and the firm a strong incentive to stay and be engaged in the business. MR. CLARK said that Wells Fargo has no plans to make changes to the management team, but areas such as technology systems, compliance, and human resources are being incorporated into Wells Fargo. The deal gives Analytic global distribution without having to hire and manage global salespeople.

MR. CLARK said that Analytic is based in Los Angeles; they have 19 investment professionals and 11 people working in client services and marketing. Twenty percent of their client base is public, and they work in three strategies: core equity; low volatility equity; and alternatives, including long/short equity, market neutral, and covered call, which is the type of fund they manage for the ARM Board. He reviewed the team shown in their meeting materials, and MR. McMURRAN added that one important person not shown in the picture is Mr. Ding, a Ph.D. from UC San Diego, who is one of the top specialists in the world in volatility forecasting models, which are integral to Analytic's value-added process.

MR. McMURRAN reviewed Analytic's objectives and results, stating that the ARM Board's portfolio has performed well compared to the BXM and the S&P 500, with much lower risk. MS. MILLER and MR. McMURRAN described their process and the role that volatility plays. DR. JENNINGS commented that volatility seems lower than one might expect when considering the uncertainty now surrounding federal policy and foreign events, and MR. McMURRAN concurred that it seems inevitable that volatility will increase, as current levels seem unsustainable.

CHAIR SCHUBERT recessed the meeting from 10:29 a.m. to 10:41 a.m.

8. DePRINCE, RACE, & ZOLLO

KELLY CARBONE described DePrince, Race, & Zollo as an employee-owned firm with a value

methodology that they have been using for 31 years. They manage $5.6 billion for exclusively institutional clients. DRZ was hired in 2011 by the ARM Board as a domestic micro cap manager. The U.S. Micro Cap Value Strategy was closed to new business shortly after the ARM Board got into it, because with too much money in it they would have been forced to drift into small cap, not true micro cap. MS. CARBONE explained their investment methodology and their criteria for stocks eligible for purchase. They only invest in stocks that yield dividends, in the belief that companies that share capital with their shareholders tend to be better stewards of capital, and in fact dividends have contributed almost 45 percent of the total return in the ARM Board's portfolio.

MR. RAMSBY commented that this year they are happy to have good results to report. He acknowledged that the longer-term numbers are still behind the index, but said they are confident that next time it will look better. He pointed out that around early 2016 value started to outperform growth after six years of it being the other way around, which he thinks are the early stages of a cycle that favors value. MR. RAMSBY reviewed an example of a regional bank in California that is overcapitalized, and said that the ARMB portfolio has significant exposure to similar small banks and thrifts, which are high quality companies that pay nice dividends. DRZ looks for good companies that are undervalued and tries to sell when the stocks reach DRZ's target valuation.

9. ZEBRA CAPITAL MANAGEMENT

Zebra Capital manages another micro cap domestic equity strategy and two absolute return strategies for the ARM Board. ROGER IBBOTSON and President JOHN HOLMGREN reported on the micro cap equity strategy, for which Zebra was hired in 2015.

MR. HOLMGREN reported that Zebra had a good last year, outperforming in pretty much all of their strategies. They spend a lot of time on research, looking for less popular stocks that are fundamentally strong. MR. HOLMGREN explained that trading is very important in micro cap, and it's an expensive area to trade in, but they try to minimize costs as much as possible. They have $1.2 billion in assets now, and about half of their clients are pension funds. MR. HOLMGREN described Zebra as a very stable organization, having no change in personnel. About half of their AUM is long only, and the other half is long-short. Their three long-only strategies are an all cap Japan, a U.S. small cap, and a U.S. micro cap. In absolute returns, they have global equity in higher and lower volatilities.

MR. HOLMGREN noted that micro cap and small cap had a very good year last year relative to large cap, with a lot of gains in the fourth quarter. The portfolio is more than 25 percent financials, with healthcare and technology also big parts, and some telecoms and utilities. Healthcare, particularly biotech, was the one negative area of micro cap last year.

MR. IBBOTSON then went over Zebra's strategy of focusing on companies that are less popular but have strong fundamentals. In the long-short arena, they short the overly popular stocks and the ones with weak fundamentals. They measure popularity by turnover, and the strategy they use works best in the micro cap and small cap areas, allowing them to take advantage of increasing popularity and the associated gains. Their objective is to outperform the Russell Micro Cap Index by 2 percent. MR. IBBOTSON showed that from July 2015 through the end of last year, they have

had a realized return of a little over 15 percent, compared to 5 percent for the Russell Micro Cap Index, but he cautioned that they can't expect this 10 percent annualized performance every year. However, he noted that the portfolio is lower risk than the index.

In response to a question from MR. ERLENDSON, MR. IBBOTSON acknowledged that this type of portfolio is sensitive to capital changes such as acquisitions, mergers, and buy-backs, as outsiders are attracted to the same type of fundamentally strong but undervalued companies that this strategy targets. MR. ERLENDSON then asked, if merger and acquisition activity tapers off, whether that would cause the excess returns in this portfolio to decrease. MR. HOLMGREN answered that the strategy itself is not dependent on that activity; however, 10 percent excess returns may be.

Reviewing performance, MR. IBBOTSON said that gross performance was driven partly by their particular methods and partly by the overall performance of micro cap. He said that they tend to outperform in down markets, but in up markets they tend to stay up with it. MR. IBBOTSON said that in 2016 and 2017 they've done well in both up and down markets, with a great quarter last November and December.

CHAIR SCHUBERT recessed the meeting from 11:33 a.m. to 1:15 p.m.

10. T. ROWE PRICE

MR. MITCHELL introduced T. Rowe Price as the manager of a substantial portion of the participant-directed options. JOHN PLOWRIGHT introduced CHARLES SHRIVER, who heads the balanced and target risk strategies and is co-head of the asset allocation committee, and has been with the firm for 17 years. He also introduced TOBY THOMPSON, who joined them in 2007 and has over 23 years of experience, previously working as the director of investments for IAM National Pension Fund. MR. PLOWRIGHT noted that CHRIS DYER has been involved in the firm's relationship with the ARM Board from the beginning, working with Gary Bader to kick it off in 1991.

MR. SHRIVER noted that the end of March will mark the 25th anniversary of the inception of the balanced trust, and in 1996 they introduced the target date portfolios into the Alaska plan, the first target date offerings T. Rowe Price had done. Now they have 13 multi-asset portfolios, of which 11 are target date offerings dated between 2010 and 2060. MR. SHRIVER explained that the Alaska targeted glide path reflects the best thinking of their asset allocation research, starting 40 years before retirement and continuing 30 years into and through retirement. They emphasize risk-adjusted performance, consistent with the risk parameters set out by the State of Alaska, in a very cost-competitive structure.

MR. SHRIVER discussed the structure of the portfolios and answered questions from trustees and consultants about structure and fees. He explained the investment philosophy of T. Rowe Price and the three key risks they look at in designing the portfolios: longevity risk, the risk of an investor outliving his assets; inflation risk, the purchasing power of assets over time; and market risk, the risk of adverse near-term events impairing the long-term viability of the offering. They consider an investor's time horizon as to how much risk to take at a given point along the glide path, starting off

with higher risk and becoming more conservative over time. They also prioritize longevity risk to ensure that they have enough growth of assets to sustain distribution of income over a 30-year time horizon.

MR. THOMPSON talked about performance and attribution and contributing factors. He reviewed management fees, and pointed out that in Callan's peer group rankings, the ARM Board has had very strong performance, in the top quartile and even the top 5 percent.

11. CAPITAL MARKETS ASSUMPTIONS

PAUL ERLENDSON and STEVE CENTER from Callan Associates discussed how they assess opportunities, and the risks of investing in the future. MR. ERLENDSON commented that while they spend 90 percent of their time talking about managers, actually managers affect only about 10 percent of what actually happens with capital, and over 90 percent of what happens is driven by which asset classes are selected and how large the exposure is. He emphasized that the single most important decision a board makes is which asset classes to use and how much to allocate to different classes.

MR. ERLENDSON discussed how Callan develops their 10-year forward-looking capital market assumptions. He noted that Callan is currently working with staff and will be working with the Investment Advisory Council to customize some of the individual assumptions that go into the customized optimizations that they will present at the June meeting.

MR. ERLENDSON explained that while no one can know what is going to happen, it is possible to get a sense of the direction in which things are headed and what type of assets will do better. People also want to know the level of certainty about the estimates. MR. ERLENDSON said that the probability of meeting the actuarial return assumption over 10 years is not likely, but it's possible, especially at the margins, which is why they customize their assumptions for this fund. The ARM Board has consciously structured their funds differently from other possible ways to offset some of the implied volatility and reduce risk.

MR. ERLENDSON showed how Callan looks at longer term trends and many variables in developing their assumptions. He said that they try to build a forward-looking view based on long-term relationships, and adjust their assumptions based on their starting point. He said that the starting point has a lot to do with the long-term risks of various asset classes, but when investing for a 75-year time horizon, longer-term cycles must be considered. MR. ERLENDSON commented that the idea of a glide path as explained by T. Rowe Price was instructive about how as the end of the time horizon for investing approaches, risk tolerance decreases.

MRS. HARBO commented that MR. BADER had periodically given presentations on liquidity studies, and they should probably have another soon so new trustees can see what happens. COMMISSIONER HOFFBECK noted that their actuarial assumptions right now don't assume a glide path, so to start including that, they would need great returns now or lower expectations in the future. MR. CENTER and MR. ERLENDSON replied that there will come a time when the ARM Board needs to change the risk profile, but not yet.

MR. ERLENDSON discussed the benefit of having an engaged, informed, and experienced staff who can apply informed judgment to optimize returns. They can look for areas within the broad equity market where active management has a demonstrable benefit above just buying the index, and strive to match or exceed the market return at less risk. Also, in some areas such as real estate hedge funds, private equity, commodities, investors can't just buy the index fund. There are indexes, but they are not investable, so passive investment isn't possible. It is necessary to do more due diligence about the managers, the people, and the access points.

MR. ERLENDSON presented a histogram showing the past 228 years to illustrate how rare certain rates of return are. The vast majority of returns have been between minus 10 to plus 20. He showed how volatility works, and said that pension funds don't work the same way. They rebalance and have cash flows in and out, as opposed to indexes which assume you put a dollar in at the beginning and don't touch it until the end.

MR. ERLENDSON noted that an announcement the day of this meeting said that the unemployment rate is the lowest in a long time; however, the Federal Reserve also says that the percentage of Americans who are employed is at an historic low. A big part of this is retirement. In 2008 and 2009 when the recession hit, the economy actually shrank. Since then, the growth rate has slowed, and projections show lower growth rates in the future, so returns on assets are likely to be lower.

MR. ERLENDSON explained that the yield curve has shifted up since the U.S. election in November, and as yields rise, the value of a bond goes down. But given the long-term nature of the investment program, rising rates allow for reinvestment at a better rate. MR. ERLENDSON noted that the P/E ratio for the S&P 500 has continued to rise, calling into question whether the U.S stock market is approaching being overvalued. He said that when the economy is growing, it's good to own equities, but when the economy is not growing, fixed income can be more beneficial.

MR. ERLENDSON showed that using the assumptions that they had in 1995, with a target of 7.5 percent rate of return, 100 percent fixed income would have achieved that with a volatility around 6 percent. An index fund could have achieved that between 1995 and 2004. However, in 2014, to achieve 7.5 percent, the risk would have to be increased, and there would be active management fees and increased volatility. MR. ERLENDSON stated that based on Callan's 2017 assumptions, there is no portfolio that is expected at the median to generate a return as high as 7.5 percent. He reviewed some historical data showing that their projections weren't far off, but the trend lately is lower returns every year. He explained that it is wiser not to increase the risk in striving for higher returns.

MR. ERLENDSON emphasized that investing is about being patient and appropriately positioned to take advantage of opportunities when they arise. A great manager contributes less than 10 percent, but presence in the asset class is what really counts. Lowering implementation costs can help a lot. DR. MITCHELL asked if this is an argument for non-complexity, just investing in three asset classes. MR. ERLENDSON replied that the longer the time horizon, the more the returns converge on one another. Having diverse asset classes can diversify risk, but it also can increase

cost and complexity so much that it is possible to be overdiversified. He explained correlation and said that it is more beneficial to diversify into asset classes that are not closely correlated.

COMMISSIONER FISHER commented that he has learned a lot from the Callan projections and appreciates them. He commented that the board spends a lot of time discussing returns and might want to focus more on risks.

MR. MITCHELL commented that though there may be a diminishing benefit to having multiple managers in an asset class, the various managers do use different strategies, and it offsets the risk if something happens with one particular firm.

MR. ERLENDSON concluded with a few observations: First, when people talk about returns, the conversation should really be about time horizons. Second, downside risk is much more problematic than upside risk is beneficial. Third, of all the capital markets available, equities continue to be the most attractive on a risk-adjusted basis. And finally, he commented that it is a real pleasure to work with investors who have a longer time horizon, which matches up liabilities with assets, and is the right way to go about it.

CHAIR SCHUBERT recessed the meeting from 2:58 p.m. to 3:09 p.m.

12. TORTOISE CAPITAL ADVISORS

GREG MURPHY said that Tortoise Capital Advisors specializes in energy infrastructure, specifically MLPs (master limited partnerships). MR. MURPHY introduced BRADEN CIELOCHA, who has been on Tortoise's portfolio management team for over seven years and is one of their specialists in crude oil. The account with Tortoise was funded in 2012, investing in energy midstream infrastructure, such as the pipes and tanks that deliver crude oil and natural gas from the fields to the users. These assets are not directly exposed to commodity prices, but are affected by energy prices; prices drive volume and volume drives returns. They are high-dividend-paying securities and dividends have continued to grow. Absolute performance since inception on an annualized basis has been over 8 percent, and they expect returns to be around 12 to 14 percent in the coming year.

MR. MURPHY noted that the Energy Information Agency just published their outlook through 2050, and while the U.S. has been a net importer of energy since 1953, it is expected to shift to being a net exporter by 2026, which should be a good opportunity for infrastructure investments.

MR. MURPHY stated that they manage about $16.3 billion in mandates similar to that of the ARM Board, for a diverse group of institutional clients. He said that over 75 percent of the portfolio is long-haul pipelines with fee-based cash flows. The ARM Board's contributions of about $232 million have grown to about $285 million.

MR. CIELOCHA noted that after the market peak in 2014, 2015 was a difficult year, but although the market was down 30 percent, the cash flow generated by the companies in this portfolio were up 20 percent. In 2016 cash flows were up 16 percent, and they expect 2017 to be similar. The new

government seems to be supportive of energy as a sector and of infrastructure. The regulatory burdens will probably be relaxed, and the OPEC agreement also sets up the U.S. to capture more market share in the near and longer term.

CHAIR SCHUBERT inquired about Tortoise's outlook on Alaska, and MR. CIELOCHA replied that it may require a sustained and less volatile price of oil to bring back investment in Alaska. He noted that Tesoro Logistics, which is part of the portfolio, has been investing significantly in Alaska. MR. CIELOCHA said that some MLP players had not been getting enough fund flows and were worried about getting more investment, but the 2017 average year-to-date fund flows over two months have been about $50 million per day of new money coming in, which is up from $26 million in 2015 and $17 million in 2015. For the two months so far this year, MLPs have raised about $7 billion of equity, on track to be the best quarter of equity rise in the last two years.

MR. CIELOCHA discussed crude oil supply and demand, increasing production and rig counts, new natural gas pipeline construction, and increasing demand for ethane and other products of natural gas as factors in their positive outlook for 2017. The current income yield on the portfolio is about 7 percent.

MR. MURPHY stated that of the assets under management, about $16 billion is in separately managed, institutional accounts like the ARM Board's, and most of the rest is in closed-end funds, with about $3 billion of the AUM as part of a retail segment. MR. CIELOCHA added that he thinks institutional investors were quicker to recognize the opportunity, but retail investment has been slower to trickle in.

MR. WILLIAMS asked how much of Tortoise is involved in the controversial projects like the Dakota Access Pipeline, and MR. CIELOCHA answered 21 percent. He explained that the underlying fundamentals of those companies are very good despite the poor public relations. MR. MURPHY recommended that concerned trustees read the court case in which the Standing Rock Sioux Tribe sued the U.S. Army Corps of Engineers to learn how it differs from the media portrayal.

13. ADVISORY RESEARCH INC.

JIM CUNNANE presented information about Advisory Research, which is another MLP manager hired in 2012. He stated that their performance is on target; though the absolute returns have been substandard for the index for the past couple of years, the outlook is improving and they project 10-percent-plus returns this year and next.

MR. CUNNANE noted that they have the longest MLP track record, managing MLPs for 22 years. Their portfolio is about 98 percent midstream assets, and they use a quality score card to gain a competitive advantage. They have about $4.6 billion in assets under management, making them one of the largest MLP managers. He described their team as dedicated and experienced, with no turnover for nearly eight years. Their parent company is Piper Jaffray, and Advisory Research is the dedicated MLP team. They focus on two specific strategies, MLP equity, which the ARM Board is invested in, and MLP balanced, which invests across the capital structure.

MR. CUNNANE reviewed the guidelines for this strategy, and explained that there are some securities that are similar to MLPs but technically aren't MLPs because they are C corporations. He said that over 100 MLPs are now in existence, and the ARMB portfolio includes 27 of them.

MR. CUNNANE reviewed the performance of the fund and the factors driving it. He explained their quality scorecard which is based on five factors: asset quality, financial strength, management, parent/sponsor, and diversification. By these measures they eliminate the bottom 20 percent from further consideration, and they believe that since inception, that has driven a fair amount of the excess return in this portfolio. MR. CUNNANE said that management teams do asset tours, cash flow modeling, and relative valuation. Their principle is to seek strong risk-adjusted returns.

MR. CUNNANE discussed market environments and how they are affected by legislative and regulatory changes. He explained that a lot of their cash flows are fee-based contracts that are more tied to the demand side of the market than supply. MR. CUNNANE said they prefer MLPs that have improving distribution coverage and reasonable growth. They like demand-oriented infrastructure, and they are biased toward midstream. They have a preference for the natural-gas-liquid-exposed infrastructure, and they invest in some small caps.

Asked whether they are invested in MLPs that are currently in controversial projects, like the Dakota Access Pipeline, MR. CUNNANE replied that several of the largest MLPs are in controversial projects, but Advisory's quality scorecard considers environmental safety records. They don't invest in the more environmentally exposed entities, and they hope that incentivizes good stewardship of the world.

The meeting was recessed from 4:30 p.m. until 9:00 a.m. Friday.

14. SCHRODERS INVESTMENT MANAGEMENT

JAMIE MacMILLAN, a client services and business development specialist from New York, and RICHARD SENNETT from London, one of the leaders of the international small cap team for Schroders, attended the ARMB meeting.

MR. MacMILLAN explained that Schroders has been family-owned for eight generations, with the family ownership stake now at 40 percent. Employees own about 6 percent, and the rest is publicly held and traded on the London Stock Exchange. They manage about $480 billion in a variety of strategies, and have managed an international small cap mandate for the ARM Board since 2010.

MR. SENNETT went over Schroders' strategies, their team, their performance and positioning, and their outlook. He emphasized that Schroders is a big and long-lived organization with a lot of resources. One recently added resource is the Data Insights Unit which does research about the companies they are investing in. In discussing performance, he broke it down into geographical areas, and he discussed some potential implications of Brexit. MR. SENNETT said that because Schroders is spread widely throughout Europe, they don't see Brexit as a particularly big issue for them. He noted that there is also uncertainty associated with elections coming up in various

European nations, but he thinks the markets are aware and perhaps have already partly discounted the risks in prices.

MR. WEST asked whether they plan any changes in the way they do things, to which MR. SENNETT replied no, they will continue to look for stocks on which they can find an upside to their fair values. They reexamine the investment case weekly to consider whether they should still own those stocks. MR. SENNETT explained that about 60 percent of their selling is because the stocks have hit their fair value. About 20 percent is because they believe the opportunity cost of holding them is greater than the benefit, and in the other 20 percent, something has happened with the company to change their value.

15. MONDRIAN INVESTMENT PARTNERS LTD.

MR. MITCHELL introduced Mondrian as the second of the two international small cap managers for the ARM Board. TODD RITTENHOUSE, who works in clients services in Philadelphia, and AIDAN NICHOLSON, a senior portfolio manager based in London, presented for Mondrian.

MR. RITTENHOUSE explained that Mondrian is independent and employee-owned, and they manage over $59 billion, primarily for institutional investors. He showed the asset class breakdown, and reminded board members that the strategy they are in is in a soft-close, so existing clients can add to their portfolios, but it's closed to external investors.

MR. NICHOLSON explained that Mondrian is a value-oriented defensive manager. They use a discounted dividend methodology, and they try to minimize risk by looking for well-capitalized balance sheets and defendable market positions, with the aim of providing a rate of return that is meaningfully greater than the domestic rate of inflation. They aim to preserve capital during weaker periods, therefore their performance is usually less volatile than the index and other international small cap managers. Mondrian puts a strong emphasis on company visits, talking to management, and doing research to validate what they find out so as to understand not only the stock that they are investing in but also the wider context of that industry. They do scenario analysis and avoid stocks in which the worst case scenario is very bad. They take advantage of the relative purchasing power of various currencies as well. MR. NICHOLSON talked about areas in which they see opportunities, and what they anticipate as Brexit proceeds.

16. FIXED INCOME UPDATE

MR. MITCHELL stated that the Department of Revenue manages just over a billion dollars in the intermediate Treasury mandate within the fixed income pool, as well as the cash for the ARM Board, which ranges from zero to about $300 million or so. They also have a TIPS mandate that is currently just over $50 million. He introduced VICTOR DJAJALIE, who has been with the division since 2004 and has been the manager of fixed income since June of 2015.

MR. DJAJALIE introduced the other three fixed income staff people, Casey Colton, Emily Howard, and Kevin Buckland.

MR. DJAJALIE stated that the fixed income allocation of the ARM Board is about 13.3 percent, and they manage about 5.8 percent internally. In constructing the portfolio, they identify a range of rates and movements and optimize so the portfolio outperforms in all of those categories. He discussed their investment outlook. Interest rates are still low but rising, and demand for bonds continues to be strong. He said that the portfolio has consistently outperformed the index since inception. They maintain a high quality portfolio with mainly asset-backed securities that are rated triple A and some corporate bonds that are rated single A. Trustees congratulated staff on the performance in this area.

CHAIR SCHUBERT said that she thinks they should try to expand on the in-house management, because the investment staff is strong and the more they can be challenged and given opportunities, the less likely they will be lost to outside entities that could pay them more. MR. MITCHELL said that they anticipate bringing forth more proposals for in-house management over the next couple of meetings.

17. INVESTMENT ACTIONS/INFORMATION

A. Absolute Return Manager

MR. MITCHELL said that staff recommended the termination of one of the fund-of-funds absolute return managers, GAM. They were hired in 2010 and placed on the watch list in September of 2016 after organizational changes, including the departure of the CIO.

MR. WEST moved to liquidate the GAM portfolio and terminate the contract. MRS. HARBO seconded the motion.
A roll call vote was taken, and the motion passed unanimously.

B. Alternative Beta Search

MR. MITCHELL requested to engage Callan to conduct a search for one or more alternative beta managers for an initial mandate of up to $300 million. He explained that they believe they can gain exposure to these nontraditional or "alternative" beta at a low cost and help achieve the purpose of the absolute return asset class within the overall portfolio.

MR. BRICE moved to direct staff to engage Callan Associates to conduct a search for one or more alternative beta managers for an initial mandate of up to $300 million. MRS. HARBO seconded the motion.

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

C. DC Plan Report Recommendations

MR. MITCHELL explained that a set of action memos had been presented to the Defined Contribution Committee the day before this meeting, but although they had some discussion, they

did not reach a consensus on the items. The committee recommended bringing the issue before the Board so they could decide whether to proceed or defer the items back to the committee. Board members agreed to give the DC Committee more time to consider the items and bring them back to the June meeting.

UNFINISHED BUSINESS

1. **Disclosure Reports**

MS. HALL stated that the disclosure reports were included in the meeting packet, and there was nothing unusual to disclose.

2. **Meeting Schedule**

The meeting calendar for the rest of the year was included, and MS. HALL reported no additions.

3. **Legal Report**

MR. GOERING reported that there is nothing new in litigation, but he commented that there does seem to be a trend of increasing pressure on investors to get involved in litigation such as class action and antitrust suits, from which the ARM Board will probably see some settlements. He said he tries to insulate the Board and staff from that kind of thing and to avoid increasing staff's workload as a result of litigation, and he hopes this upward trend doesn't continue.

NEW BUSINESS

COMMISSIONER FISHER described the retiree health plan as somewhat antiquated, and said that they are interested in trying to modernize it. They've been discussing with retirees establishing an advisory board for this effort, and they would like a member of the ARM Board to participate. MRS. HARBO commented that over 70 percent of the retirees in the current DB tiers are on Medicare, and there is a wellness component. Also, under PERS and TRS they used to have a healthcare committee, and she thinks it is a good idea.

VICE-CHAIR JOHNSON added that when PERS and TRS were abolished in 2005, it left a void for constituents to have a forum and the Department of Administration to have an advisory board. However, he noted there is a question of who has the appointing authority for such a board, and their PDA has taken the position that the Governor ought to have the authority, so the commissioner isn't appointing the people who will advise him. MR. JOHNSON said that he agrees it should be done as soon as possible.

COMMISSIONER FISHER also noted that he was questioned by the Senate Finance Committee about the pension, the unfunded liability, and strategies that might be employed. He said that some senators had ideas, many of which could not be implemented under the anti-diminishment protections, but he wanted the Board to know about that discussion and that the legislators are thinking about this looming issue.

OTHER MATTERS TO PROPERLY COME BEFORE THE BOARD

None.

PUBLIC/MEMBER COMMENTS

Former Board member SAM TRIVETTE spoke about Gary Bader on behalf of the Retired Public Employees of Alaska. MR. TRIVETTE said that Alaska is a much better place because of Mr. Bader's presence, his work, his energy, his dedication, his leadership, and his personal sacrifices. They want Mr. Bader to know that retirees have observed the value of his contributions, and they want to acknowledge his accomplishments and let him know how much they appreciate his tireless work. On behalf of all retirees, MR. JOHNSON wished Mr. Bader a rewarding life in retirement, and thanked him for his lifetime of work. MR. BADER thanked everyone, and said he is overwhelmed by their appreciation of his public service.

INVESTMENT ADVISORY COUNCIL COMMENTS

DR. MITCHELL commented that Gary Bader has been a great leader and astute investment professional, and a thoughtful friend, and he will miss him.

DR. MITCHELL commented that mergers and acquisitions such as the Wells Fargo/Analytic deal have implications that the ARM Board should consider. He also said that he agrees with several presenters that the U.S. stock market is somewhat rich now and value might outperform growth in the near future. He noted that Tortoise and Advisory Research made succinct, clear, educational presentations, and are a good example for other managers. DR. MITCHELL also said that he thinks Callan made a few good points, including that the longer time horizon is critical, how important it is to be conscious of risk as well as return, and the idea that it might be a better use of time considering asset class allocations rather than considering managers.

TRUSTEE COMMENTS

COMMISSIONER HOFFBECK commented that he thinks there is increasing support among the legislature and the administration for doing more management in-house. MR. HOFFBECK said that he would like to see a list of the various managers and what their individual strategies are to see if there is overlap and where there is diversification. MR. MITCHELL said that he would work on compiling that information for the next meeting.

MR. WEST commented that he notices a lot of fund managers give more of a sales presentation than a performance review, and he would like to direct them to talk more about performance, strategies, challenges, and such information to help board members understand the asset class and their ability as a manager. Several board members agreed, and MR. MITCHELL said he thinks staff may be able to help focus the managers on what is important before they give their presentations.

CHAIR SCHUBERT concluded with the comment that it has been a pleasure working with Gary Bader, whom she has known for decades, and she is proud to work with world-class investment people on this board.

FUTURE AGENDA ITEMS

None.

ADJOURNMENT

There being no objection and no further business to come before the board, the meeting was adjourned at 11:08 a.m. on March 3, 2017, on a motion made by MRS. HARBO and seconded by MR. BRICE.

Chair of the Board of Trustees
Alaska Retirement Management Board

ATTEST:

_____
Corporate Secretary

Lazard Asset Management

Mandate: Emerging Income **Hired**: 2008

Firm Information

Lazard Asset Management is a subsidiary of Lazard Freres & Co., a limited liability company.

As of 12/31/16, the firm's total assets under management were approximately $179 billion.

The Lazard Emerging Income team manages three commingled vehicles, various separate accounts, and other funds.

Key Executives Emerging Income Team:
John Reinsberg, *Deputy Chairman*
Ardra Belitz, *Managing Director, PM/Analyst*
Ganesh Ramachandran, CFA, *Managing Director, PM/Analyst*
Aristotel Kondili, *Director, Portfolio Manager/Analyst*
Steve Nelson, *Vice President, Portfolio Analyst*
Andrew Raab, *Vice President, Research Analyst*
Michael S. Ives, *Research Analyst*
Anthony Dote, *Managing Director, Marketing Representative*

Investment Approach

The Lazard Emerging Income portfolio (LEI) management team has full discretion to make decisions for the portfolio. Members of the LEI team are responsible for the purchase and sale of all securities as well as the risk monitoring process to ensure that the portfolio is adequately diversified.

Co-Portfolio Managers/Analysts Ardra Belitz and Ganesh Ramachandran are responsible for investment strategy, asset allocation, country selection and portfolio construction, with input from the team.

The investment process begins with an active research effort resulting in the creation and monitoring of an evolving 50+ country universe. A country's inclusion into the universe is based on whether or not a foreign investor is able to continually access that market with two-way liquidity (entry and exit at will).

In the past year, there were no changes to the key portfolio management team members.

Benchmark: 3-month LIBOR

Total ARMB Mandate & Fees

Assets Managed:

12/31/16 $108,913,209

Fee Schedule:

Management Fee:
0.75% management fee per annum and up to 0.25% operational expenses.

Concerns: Performance versus the index.

12/31/2016 Performance (gross of fees)

	Last Quarter	1 Year	3 Year Annualized	5 Year Annualized	Since Inception
Lazard (LEI, Ltd.)	-1.61%	4.43%	-2.11%	0.30%	1.03%
Benchmark (3-month Libor)	0.20%	0.66%	0.38%	0.38%	0.62%

LAZARD
ASSET MANAGEMENT

Alaska Retirement Management Board
Lazard Emerging Income

April 20, 2017

Ardra Belitz
Managing Director, Portfolio Manager/Analyst

Tony Dote
Managing Director

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Please refer to the Important Information section for additional information about risks.

Agenda

A. Introduction

B. The Case for Short Duration EM Local Debt within a Fixed Income Asset Allocation

C. Portfolio Review

D. Market Review and Outlook

E. Appendix

- Biographies
- Composite Data
- Disclosures

A

Introduction

Why Lazard Emerging Income Strategies?

Why Short Duration EM Local Debt?

- Compelling source of yield
- Powerful diversifier in a fixed income portfolio
- Alpha opportunity in a rising interest rate environment
- Highly liquid underlying investments

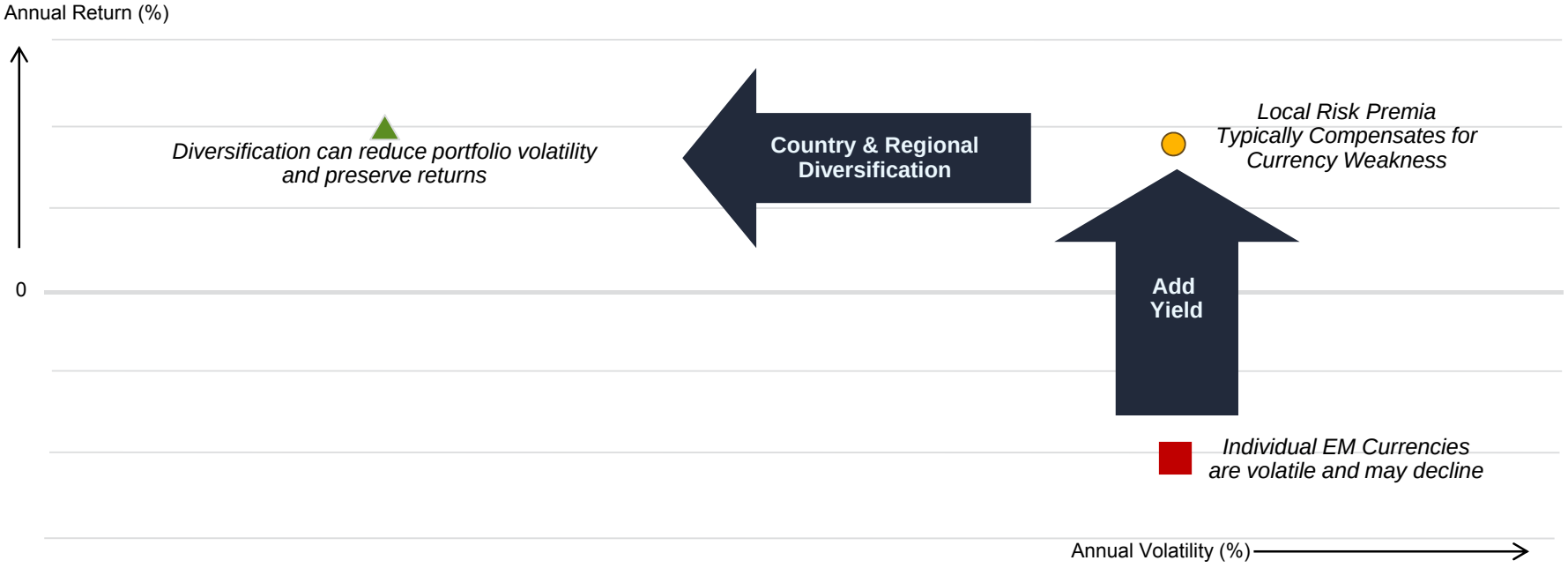
Why Lazard?

- Veteran managers experienced in emerging local markets
- 21-year track record with modest volatility
- Stress-tested through EM and global crisis periods
- Differentiated strategy
- Draws on Lazard's broad emerging market platform
- Extensive network of contacts in local emerging markets

The success of the LEI strategies' activities will be affected by general economic and market conditions, such as interest rates, availability of credit, inflation rates, economic uncertainty, changes in laws, trade barriers, currency exchange controls and national and international political circumstances. These factors may affect the level and volatility of prices and the liquidity of the strategies' investments. Volatility or illiquidity could impair the strategies' profitability or result in losses.
The LEI strategies' will generally invest in securities denominated in the local currency of the obligor and will maintain significant exposure to such local currencies.

Investment Thesis
Constructing a Local Currency Portfolio

Constructing a Local Currency Portfolio



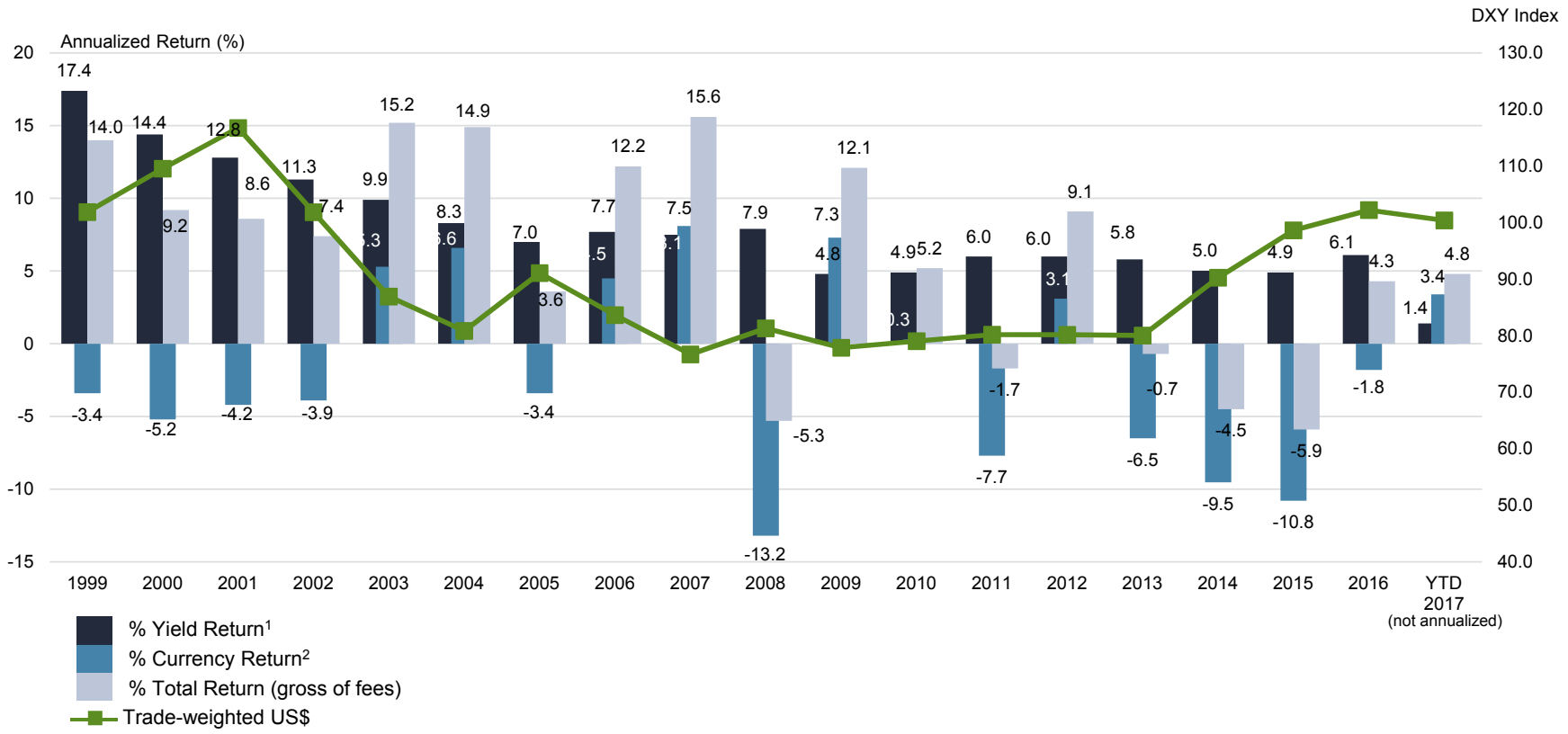
- Individual EM currencies are highly volatile and have historically depreciated versus USD
- Domestic short-term yields have historically compensated for currency weakness resulting in a positive but risky money market return in USD. Adding the yield component increases the individual currency returns, but does not lower the risk level
- A well-diversified local currency portfolio exhibits markedly lower volatility with no reduction in expected return

A diversified portfolio can dramatically reduce risk while capturing the returns available in emerging markets.

Shown for illustrative purposes only.

Generalized Sources of Return (Gross)

Lazard Emerging Income



As of 31 March 2017.

1 Represents the weighted average portfolio yield.

2 Represents the non-yield sources of return (i.e., currency and duration).

Investment characteristics are based upon a portfolio that represents the proposed investment for a fully discretionary account.

Performance is that of a representative account. The performance quoted represents past performance. Past performance is not a reliable indicator of future results.

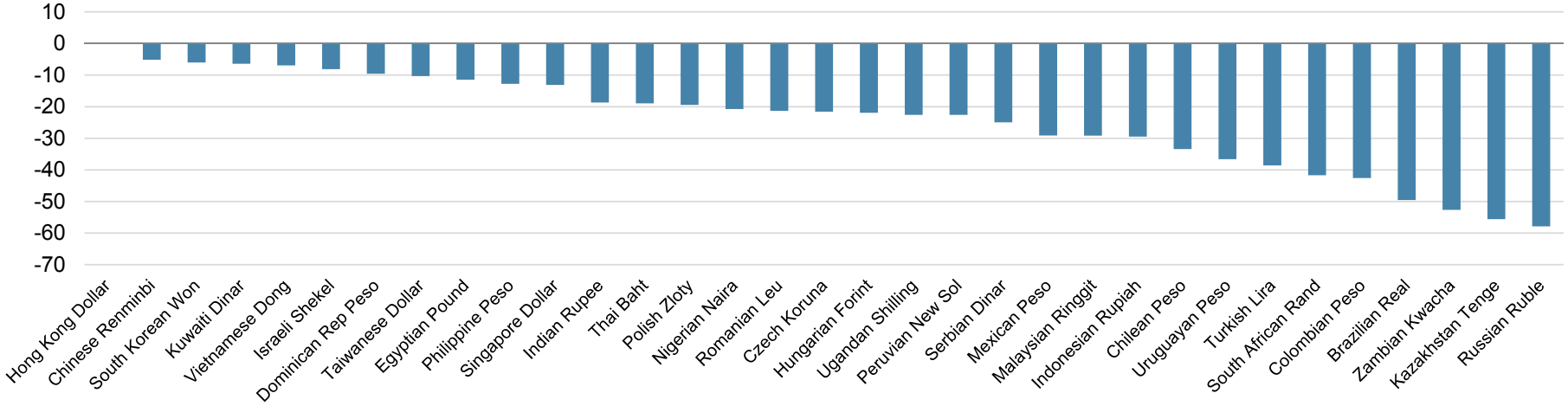
All representative performance contained herein is presented supplemental to Lazard's GIPS composite performance. Please refer to "GIPS® Composite Information" for the most recent final performance and additional information.

Source: Lazard, Bloomberg

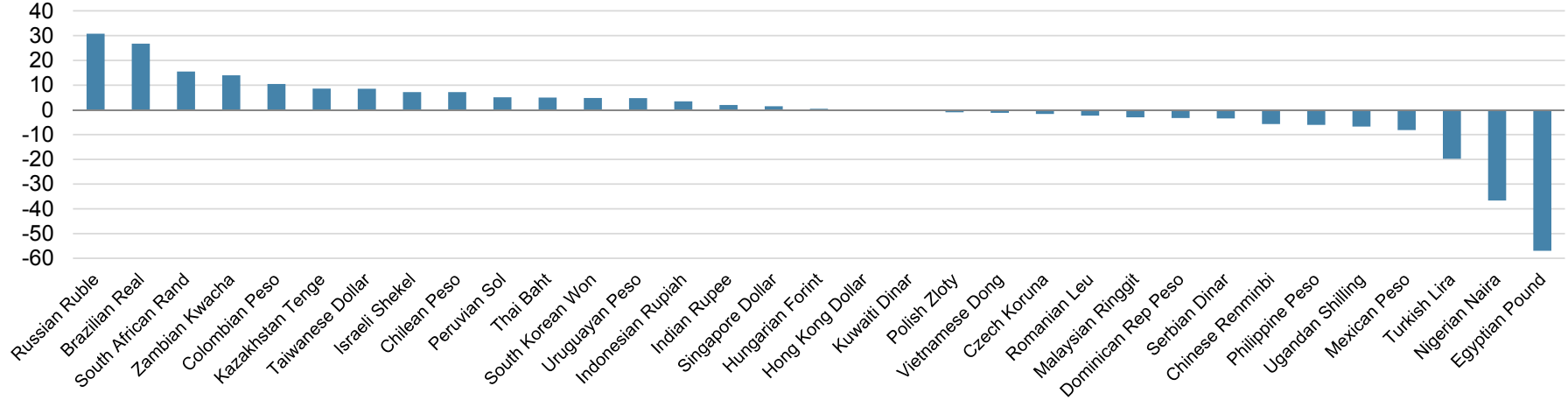
EM Currency Performance

Broad EM Currency Weakness in 2013-15 Gave Way to Differentiation in 2016-17

Post Taper Tantrum EM Currency Spot Performance May 2013 – December 2015 (%)



2016-17 EM Currency Spot Performance (%)



- Following 2+ years of universally negative currency results, EM currencies exhibited differentiation and resilience in 2016
- Despite nascent recovery in 2016-17 , we believe EM currencies still have significant room to appreciate further

As of 31 March 2017. Currency returns vs. U.S. Dollar.
The performance quoted represents past performance. Past performance is not a reliable indicator of future results. Past performance is provided for illustrative purposes only.
Source: Lazard, Bloomberg.

B

The Case for Short Duration EM Local Debt within a Fixed Income Asset Allocation

LEI: Low Volatility, Powerful Diversifier

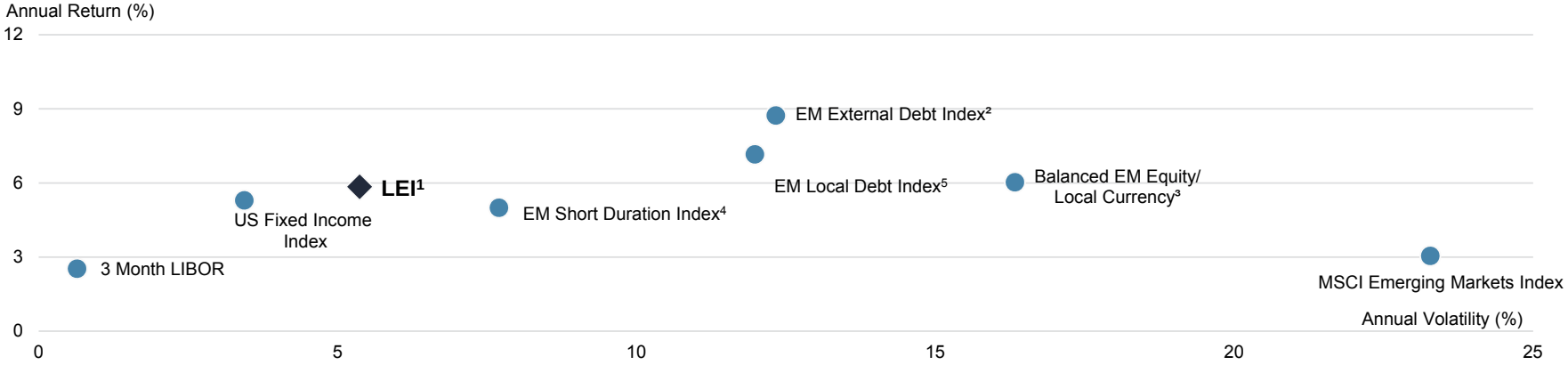
Low betas suggest that LEI is an attractive diversifier

	LEI Beta	LEI Correlation	Sharpe Ratio	Annualized Volatility (%)
Lazard Emerging Income	**—**	**—**	**0.64**	**5.4**
EM External Debt (JPMorgan EMBI+ Index)	0.29	0.66	0.53	12.3
EM Local Debt (JPMorgan GBI-EM Index)	0.42	0.90	0.38	12.0
EM Short-Duration Local Debt (JPMorgan ELMI+ Index)	0.59	0.84	0.33	7.7
EM Equities (MSCI Emerging Market Index)	0.17	0.76	0.14	23.8
US Fixed Income (Barclays Capital Aggregate Index)	0.29	0.18	0.86	3.4
US High Yield (Merrill Lynch HY Master II Index)	0.34	0.58	0.52	9.1
Non-US Fixed Income (Barclays Global Aggregate Total Return Index (Hedged USD))	0.24	0.12	1.06	2.8
US Equities (S&P 500 Index)	0.20	0.56	0.36	15.2
International Equities (MSCI EAFE Index)	0.21	0.67	0.12	16.9
Commodities (S&P Goldman Sachs Commodity Index)	0.08	0.34	-0.18	22.8

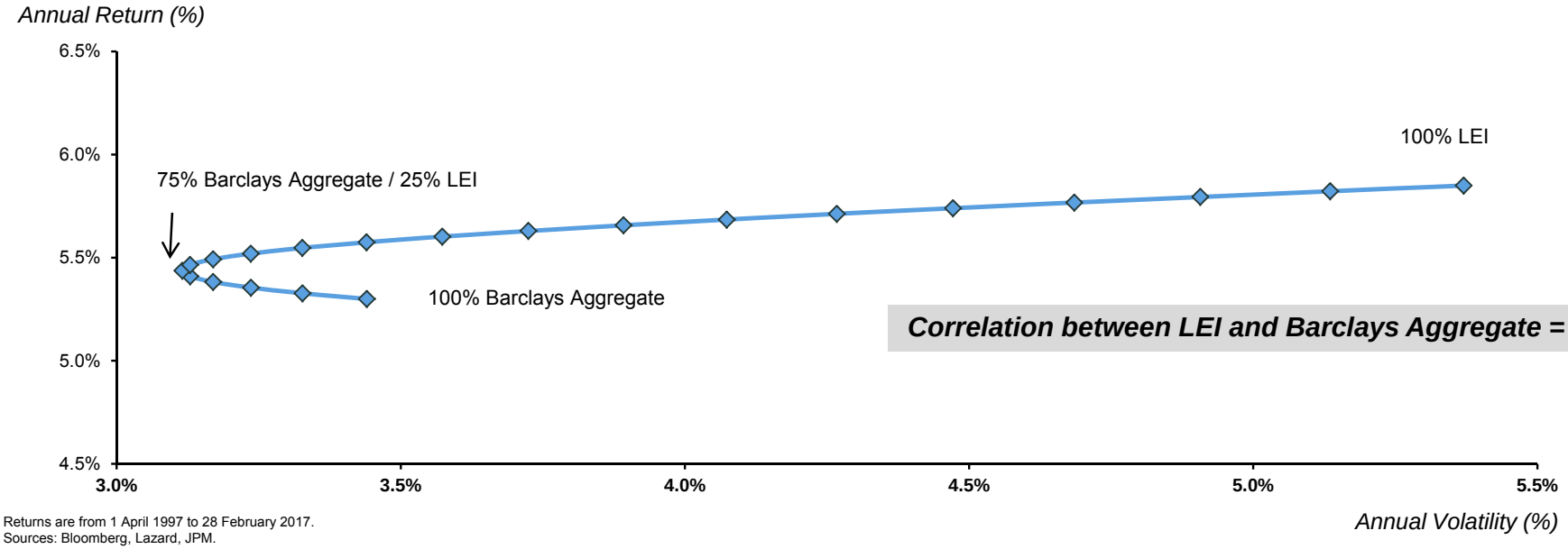
Returns are from 1 April 1997 to 28 February 2017.
Sources: Bloomberg, Lazard, JPM.
Statistics of monthly returns for Lazard Emerging Income Composite. Shown for informational purposes only.
The performance quoted represents past performance and is shown gross of fees. Past performance is not a reliable indicator of future results.
Performance is provided for illustrative purposes only. It is not possible to invest directly in an index. Indices are unmanaged and have no fees.

LEI: Low Volatility, Powerful Diversifier

Risk / Return



A Modest Allocation to LEI can Enhance Vol-Adjusted Returns



Correlation between LEI and Barclays Aggregate = 0.18

Returns are from 1 April 1997 to 28 February 2017.
Sources: Bloomberg, Lazard, JPM.

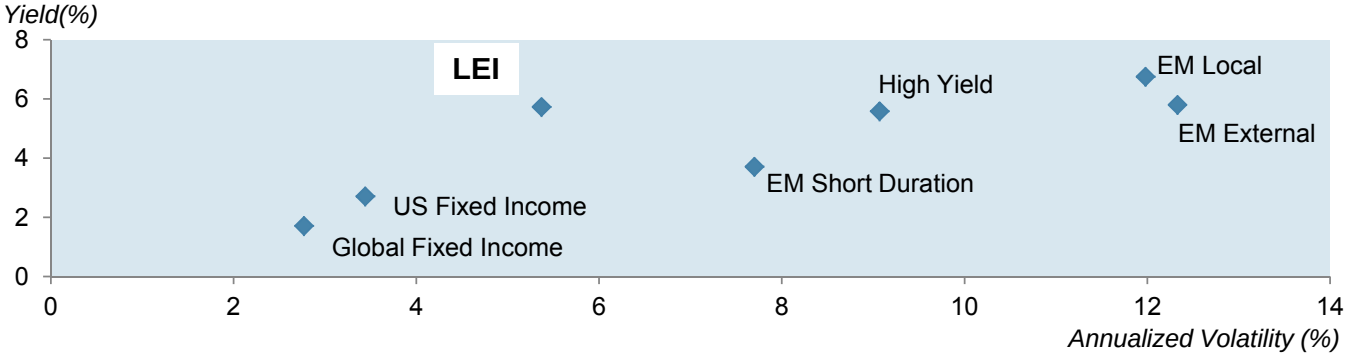
1 Please refer to 'Performance Disclosures Lazard Emerging Income Composite' for additional disclosures about the performance presented on this page and net of fees performance. The inception date of Lazard Emerging Income Composite is 1 April 1997.
2 Represents the JPMorgan EMBI+ Index
3 Comprised of 60% MSCI EM and 40% JPM ELMI+
4 Represents the JPMorgan ELMI+ Index
5 Represents the JPMorgan GBI-EM Global Diversified Index. All data related to this index begins 31 December 2002.
5 Statistics of monthly returns for Lazard Emerging Income Composite. Shown for informational purposes only.

The performance quoted represents past performance and is shown gross of fees. Past performance is not a reliable indicator of future results. Performance is provided for illustrative purposes only. It is not possible to invest directly in an index. Indices are unmanaged and have no fees.

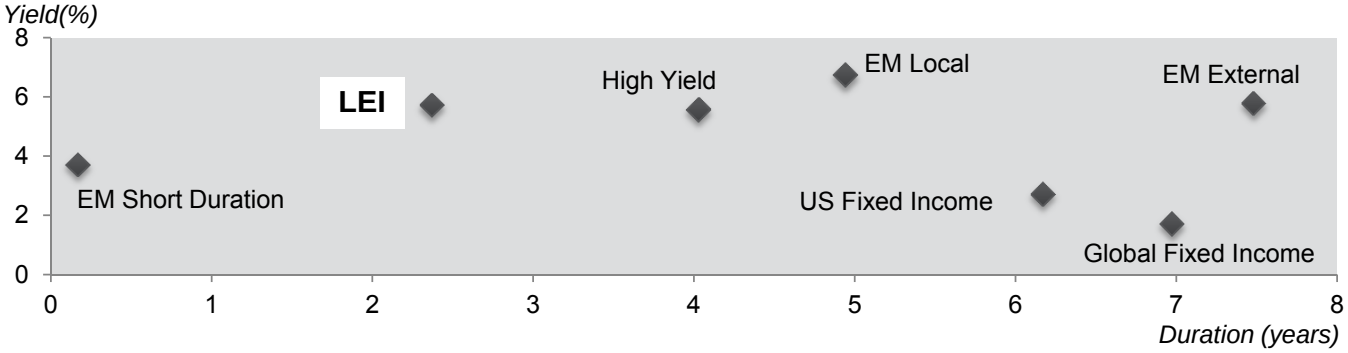
Yield, Duration, and Volatility

Lazard Emerging Income vs. Other Fixed Income Asset Classes

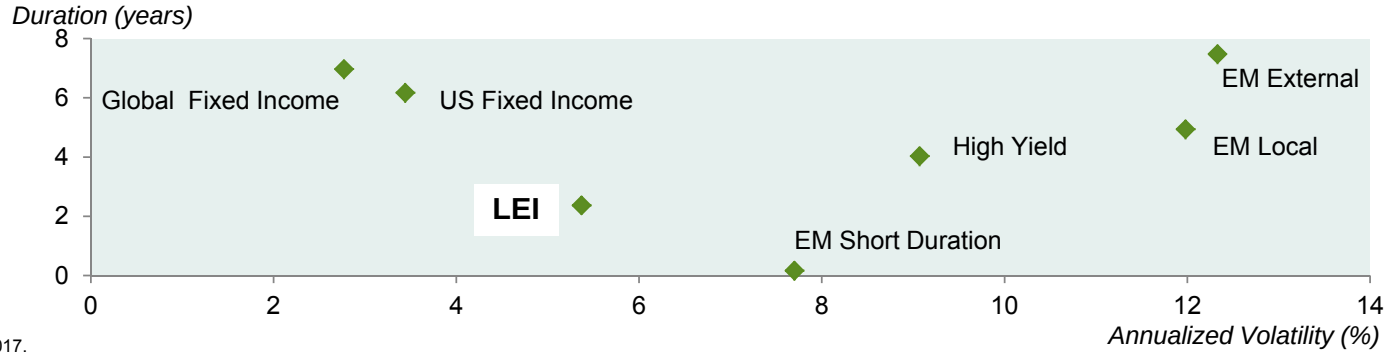
LEI has highest yield per unit of volatility



LEI offers high yield with limited duration risk



LEI has limited duration risk and low volatility



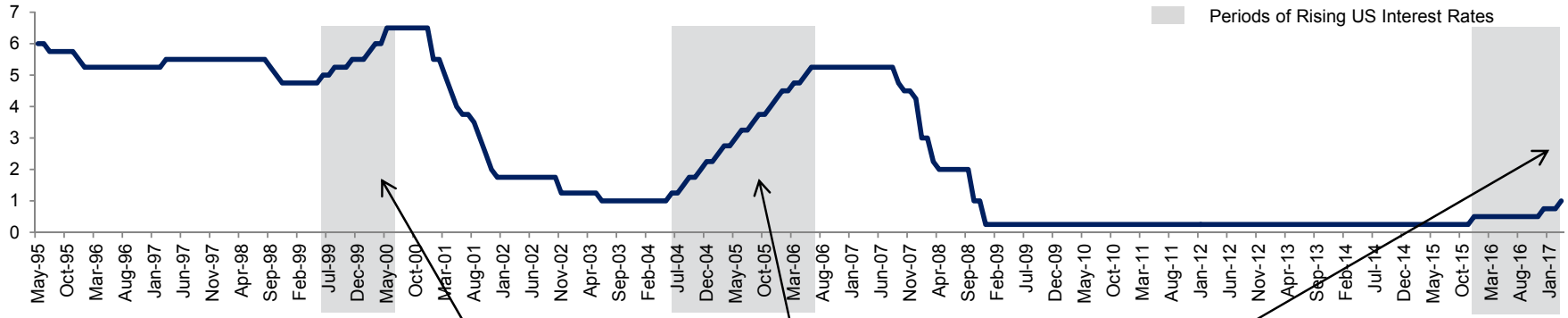
As of 28 February 2017.
Volatility for all indices is for the period 1 April 1997 through 28 February 2017, expect EM Local Debt which is for the period 1 January 2003 through 28 February 2017
Allocations are based on a representative account and subject to change. Numbers may not sum to 100% due to rounding. Where indicated, currency exposure is hedged. The performance quoted represents past performance. Past performance is not a reliable indicator of future results.

Emerging Income Strategy
Outperformance in Rising Rate Environments (Fed Funds)

LEI during previous rising rate environments

- During previous periods of rising rates (whether measured by rising US 10-year or Fed Funds rates), LEI has:
  - Outperformed its performance targets,
  - With volatility at or below its stated objective

US Fed Funds Rate

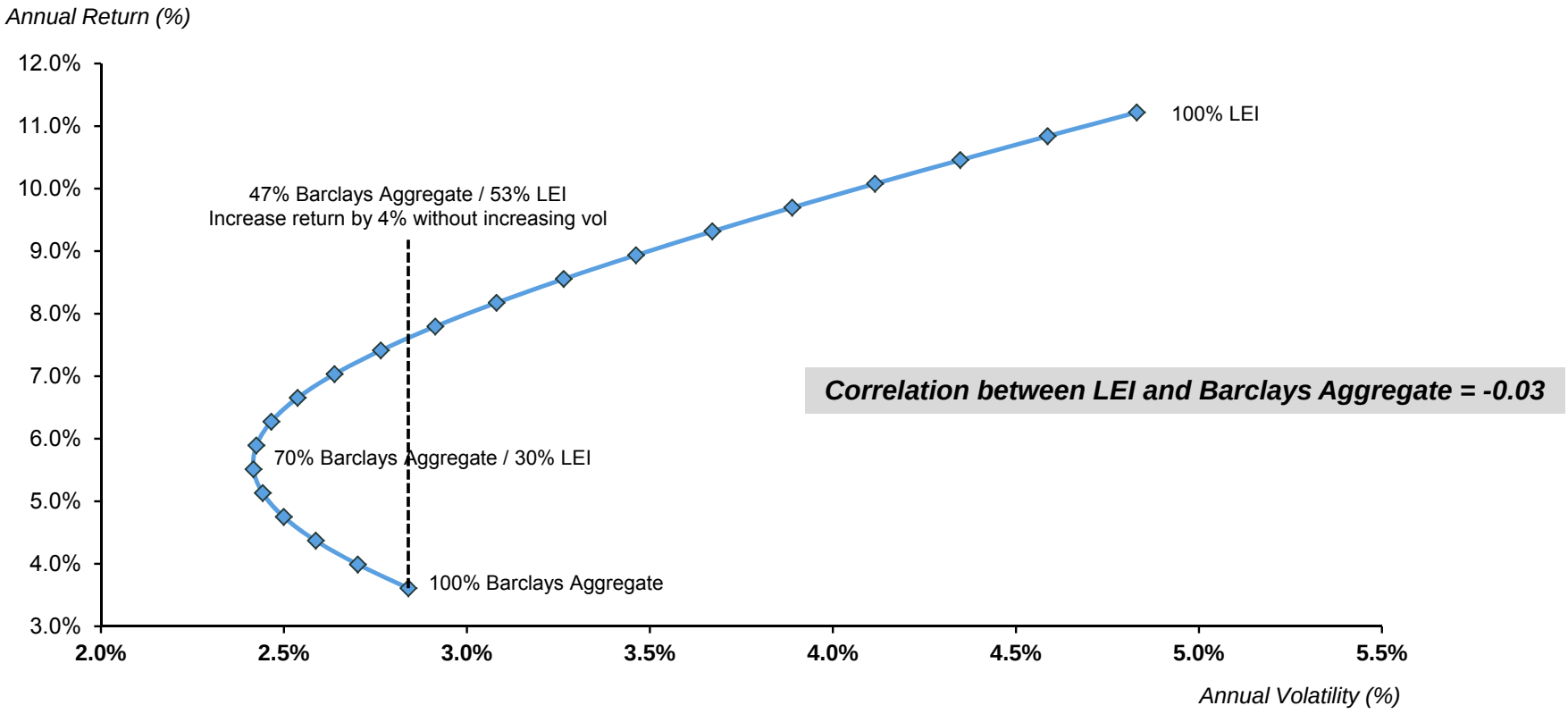


	June 1999 – May 2000 (annualized)	June 2004 – July 2006 (annualized)	January 2016 – current (annualized)
LEI Return	11.9%	11.2%	7.6%
LEI Volatility	3.5%	4.8%	5.6%
Fed Funds Rate	5.0% → 6.5%	1.25% → 5.25%	0.25 → ?

Performance and volatility statistics are annualized.
Data as of 31 March 2017
Sources: Bloomberg, Lazard, Bloomberg.
The performance quoted represents past performance. Past performance is not a reliable indicator of future results. The performance set forth above reflects performance of the Lazard Emerging Income Composite and does not reflect the actual performance of Lazard Emerging Income, L.P. or Lazard Emerging Income, Ltd. for which Lazard Asset Management LLC serves as investment manager. Please refer to "Performance Disclosures Lazard Emerging Income Composite" for additional disclosures about the performance presented on this page.

Efficient Frontier
Lazard Emerging Income

LEI Provided Enhanced Risk-Adjusted Results During the Previous Fed Hiking Cycle (June 2004 – July 2006)

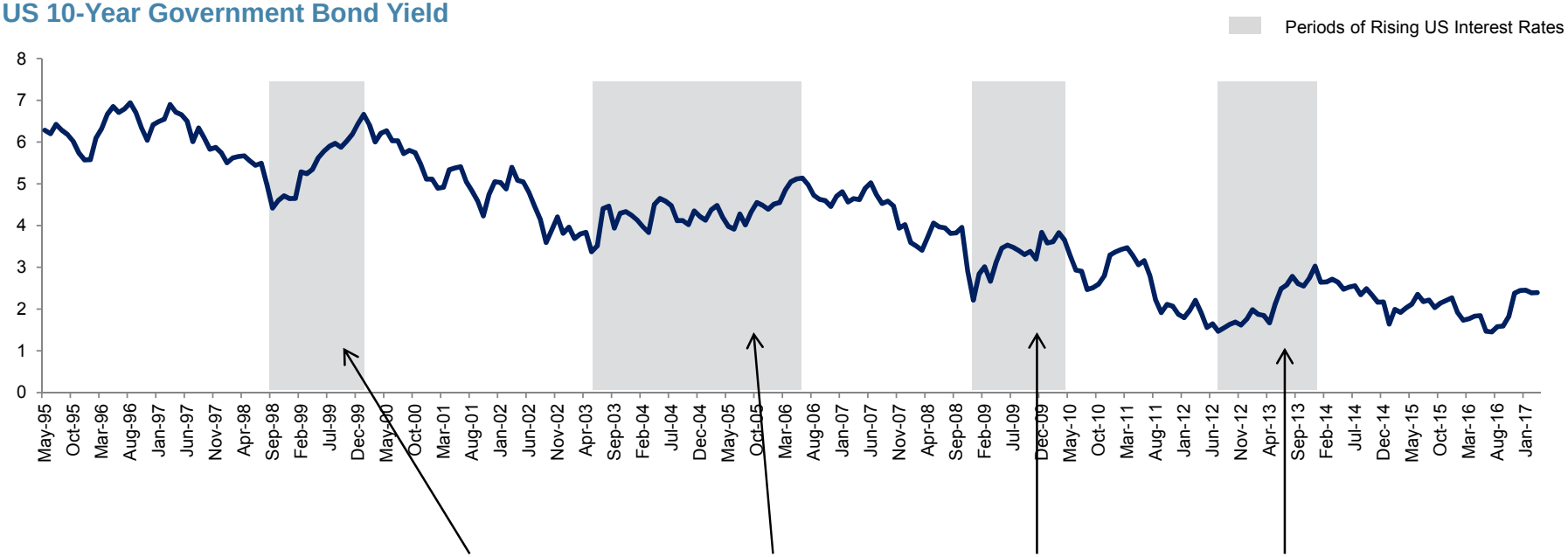


Data is for the period 1 June 2004 through 31 July 2006.
The performance quoted represents past performance. Past performance is not a reliable indicator of future results.

Emerging Income Strategy

Outperformance in Rising Rate Environments (US 10-yr)

US 10-Year Government Bond Yield



	Sep 1998 – Jan 2000 (annualized)	May 2003 – Jun 2006 (annualized)	Jan 2009 – Mar 2010 (annualized)	Jun 2012 – Dec 2013 (annualized)
LEI Net Return	16.4%	10.3%	12.9%	4.7%
LEI Volatility	3.1%	4.9%	3.3%	4.5%
US 10-yr Yield	4.4% → 6.7%	3.4% → 5.1%	2.2% → 3.8%	1.4% → 3.0%

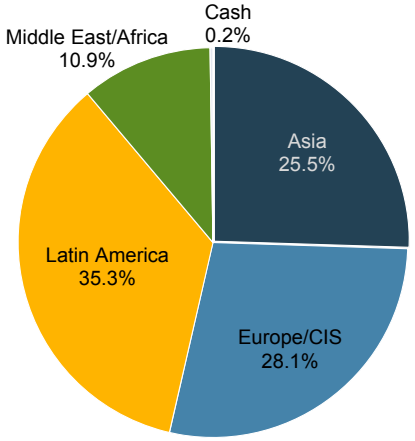
Performance and volatility statistics are annualized.
Data as of 31 March 2017
Sources: Bloomberg, Lazard, Bloomberg.
The performance quoted represents past performance. Past performance is not a reliable indicator of future results. The performance set forth above reflects performance of the Lazard Emerging Income Composite and does not reflect the actual performance of Lazard Emerging Income, L.P. or Lazard Emerging Income, Ltd. for which Lazard Asset Management LLC serves as investment manager. Please refer to "Performance Disclosures Lazard Emerging Income Composite" for additional disclosures about the performance presented on this page.

C

Portfolio Review

Exposure by Country
Lazard Emerging Income

Lazard Emerging Income Exposure by Region[1]



Portfolio Characteristics[1]

Duration	22 months
Yield	6.1%

Investment Instrument (% of portfolio)	
Forwards	52.0
EM Nominal Debt	40.9
EM Inflation-Linked Debt	6.8
Cash (USD)	0.2

Exposure Summary (% of portfolio)	
Frontier EMFX	21.1
Non-Frontier EMFX	66.2
FX-Hedged Country Risk	12.4
Cash (USD)	0.2

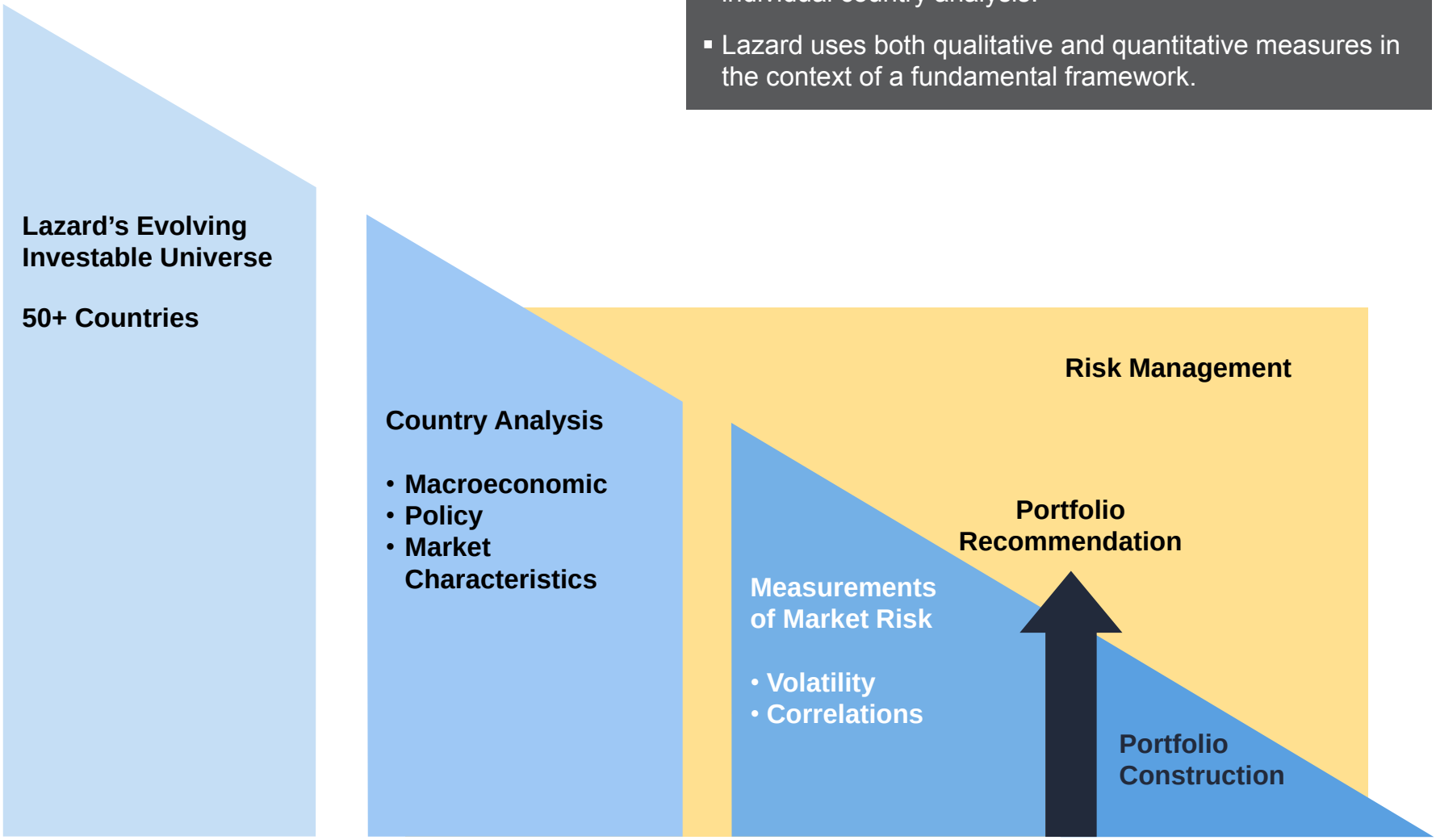
Developed Market Currency Hedges (% of portfolio)	
EUR	-6.4
CAD	-1.0

	Country	Currency Weight (%)	Country Weight (%)[1]
Asia		**25.5**	**25.5**
	China	3.2	3.2
	India	5.0	5.0
	Indonesia	5.0	5.0
	Malaysia	4.7	4.7
	Philippines	3.0	3.0
	South Korea	2.5	2.5
	Thailand	2.0	2.0
Europe/ CIS Baltics		**24.8**	**28.1**
	Czech Republic	6.0	6.0
	Hungary	3.0	3.0
	Kazakhstan	3.0	3.0
	Poland	3.1	3.1
	Romania*	1.0	2.0
	Russia*	2.7	4.9
	Serbia	1.1	1.1
	Turkey	5.0	5.0
Latin America		**28.0**	**35.3**
	Argentina	4.5	4.5
	Brazil*	5.5	8.1
	Chile	2.0	2.0
	Colombia	4.6	4.6
	Dominican Republic	1.1	1.1
	Mexico*	3.7	8.4
	Peru	3.5	3.5
	Uruguay	3.1	3.1
Middle East/ Africa		**9.0**	**10.9**
	Egypt	6.1	6.1
	South Africa	0.8	0.8
	Uganda*	2.1	4.0
Cash			**0.2**
Total		**87.3**	**100.0**

As of 30 March 2017.
* Exposure is FX-hedged in full, or in part.
The LEI strategy generally invests in securities denominated in the local currency of the obligor and will maintain significant exposure to such local currencies.
The allocations mentioned are based upon a portfolio that represents the proposed investment for a fully discretionary account. Allocations are subject to change.

Investment Process

- Econometric models alone can ignore the subtleties of individual country analysis.
- Lazard uses both qualitative and quantitative measures in the context of a fundamental framework.



Note: Lazard's investment process is presented here as sequential steps for illustrative purposes only. In practice, the process is not sequential and will, as needed, weigh certain criteria over others.

Country Analysis

Macroeconomic Analysis

- Economic stabilization
  - Current account sustainability
  - Fiscal deficit sustainability
- GDP growth
  - Drivers
  - Trends
- Public finances
  - Structure / composition of debt
  - Debt sustainability

Policy Analysis

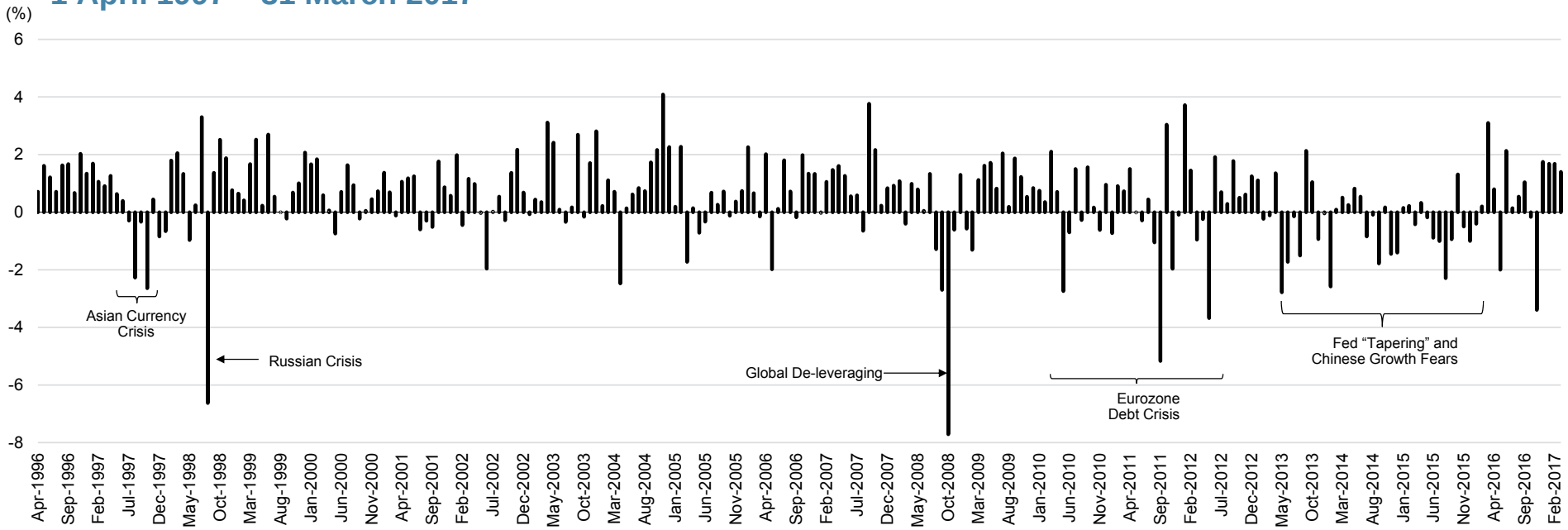
- Central Bank
  - Monetary policy stance
  - Credibility
    - Independence
    - Reserve coverage
  - Monetary policy instruments
- Government / Political
  - Upcoming elections
  - Political uncertainty
  - Fiscal policy trends
- Microeconomic agenda
  - Structural reforms

Market Characteristics

- Ownership structure
- Foreign / domestic
- Regulations
- Liquidity
- Capital flows
  - Capital flow stability
  - Short-term flows
  - Seasonal flows
  - Foreign Direct Investments (FDI)

Monthly Returns
Lazard Emerging Income

1 April 1997 – 31 March 2017



	YTD 2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)	2011 (%)	2010 (%)	2009 (%)	2008 (%)	2007 (%)	2006 (%)	2005 (%)	2004 (%)	2003 (%)	2002 (%)	2001 (%)	2000 (%)	1999 (%)	1998 (%)	1997* (%)	Annualized Return Since Inception (%)	Annualized Volatility Since Inception (%)
LEI Composite	4.8	4.4	-5.9	-4.5	-0.8	9.1	-1.7	5.2	12.1	-5.3	15.6	12.2	3.6	14.9	15.2	7.4	8.6	9.2	14.0	7.6	-3.1	**5.9**	**5.4**
3-month LIBOR[1]	0.2	0.7	0.2	0.2	0.3	0.5	0.3	0.3	0.8	3.0	5.3	5.2	3.7	1.6	1.2	1.8	4.0	6.5	5.4	5.6	4.3	2.5	0.6

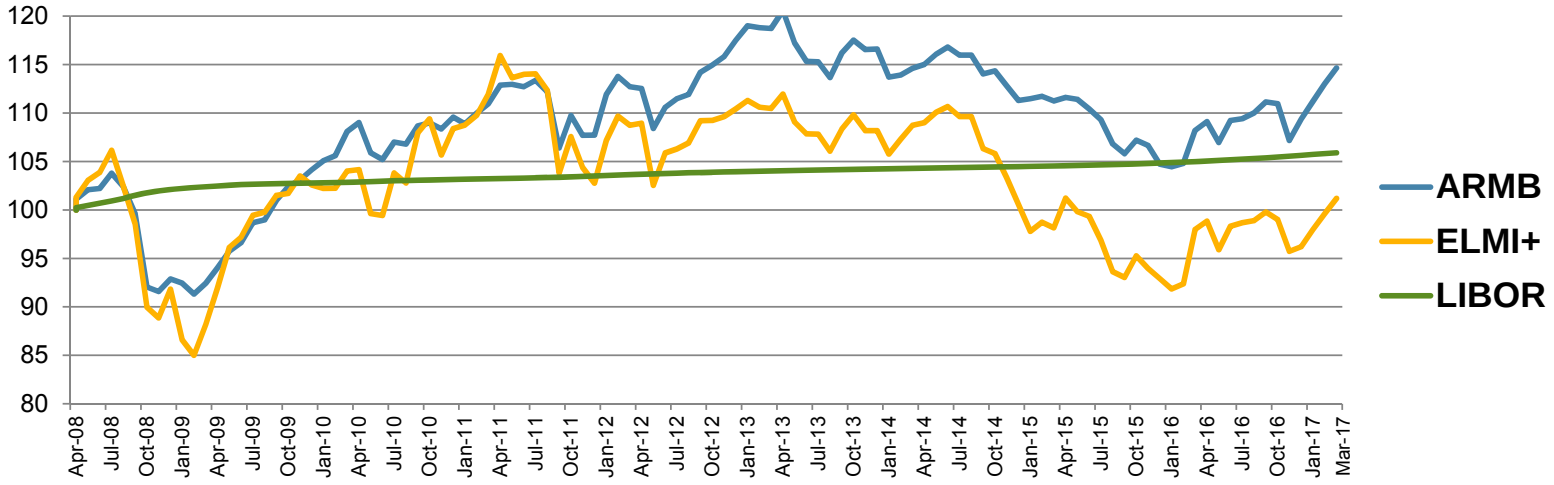
As 31 March 2017. March performance is estimated. Performance is preliminary and presented gross of fees. Please refer to "GIPS® Composite Information" for the most recent final performance and additional information. The performance quoted represents past performance. Past performance is not a reliable indicator of future results.

* 1997 performance represents the period from 1 April 1997 through 31 December 1997 and is not annualized.

1 LIBOR is the average month-end non-reserve adjusted London Interbank Offered Rate for U.S. dollar deposits reported by the British Bankers Association. LEI uses various investment techniques not reflected in this hurdle.

Performance Summary

Alaska Retirement Management Board



Performance as of 31 March 2017 (%)

	YTD 2017	2016	2015	2014	2013	2012	2011	2010	2009	2008 (Apr-Dec)	Annualized Since Inception (1 April 2008)
Alaska Retirement Management Board (Net of Fees)	**4.66**	**3.29**	**-7.07**	**-5.68**	**-1.96**	**7.24**	**-2.81**	**3.56**	**10.34**	**-7.70**	**0.31**
3 Month LIBOR	0.22	0.78	0.34	0.24	0.27	0.43	0.35	0.35	0.66	2.11	0.64

2017 Monthly Performance (%)

	YTD 2017	Mar	Feb	Jan
Alaska Retirement Management Board (Net of Fees)	**4.66**	**1.44**	**1.55**	**1.59**

Market Value as of 31 March 2017

	Market Value
Alaska Retirement Management Board	**$113,768,081**

Performance data as of 31 March 2017. The performance quoted represents past performance. Past performance is not a reliable indicator of future results..
LIBOR is the average month-end non-reserve adjusted London Interbank Offered Rate for U.S. dollar deposits reported by the British Bankers Association.

Attribution Summary – YTD 2017

Lazard Emerging Income

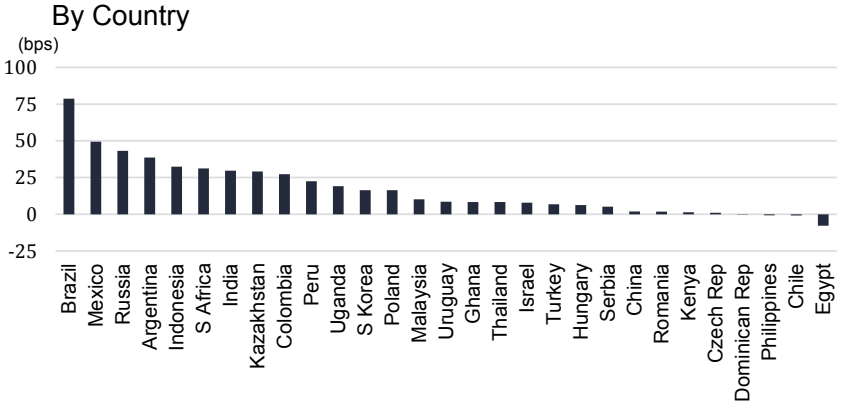
What Helped

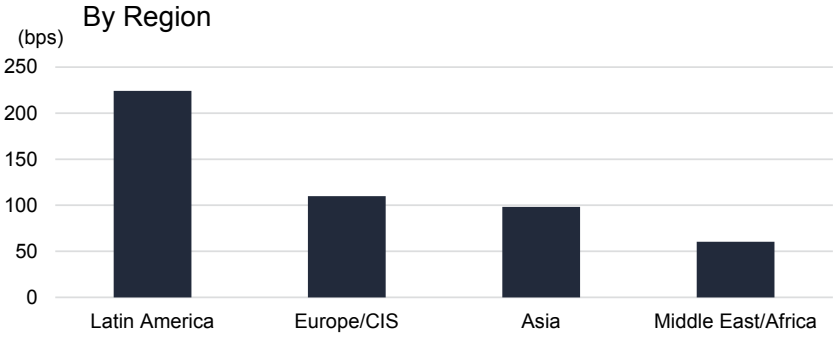
- Sizeable FX exposure and favorable security selection across local currency and debt markets of Brazil, Indonesia, S. Africa, and Uganda delivered healthy outperformance relative to their money market results.
- Argentine peso strength and high carry due to central bank's tight monetary stance and offshore portfolio flows into fixed-rate peso bonds.
- Indian money market's high risk-adjusted result propelled by solid financing of its small C/A deficit, offshore equity inflows, and local election outcome which augers well for the administration's continued reform momentum.
- Kazakh money market exposure returned more than 8% due to improving y/y balance of payments, near-10% annualized carry, and ongoing tenge recovery following the 2015 currency float (i.e., devaluation).

What Hurt

- Egypt suffered a modest detraction due to intra-quarter volatility. However, a high money market yield, resumption of portfolio inflows, and external financing from the IMF and Gulf States bodes well for our recently rebuilt strategic position over the coming quarters.
- In the Philippines, continued capital imports have not been offset by portfolio and FDI inflows as we had anticipated due to political risk surrounding President Duterte.
- Modest exposure to top-performing Mexican peso and Russian ruble FX markets limited upside, though security selection in local debt propelled sizeable YTD attribution.
- No exposure to low-yielding Taiwan and Singapore limited upside from uncharacteristically sharp currency appreciation. Material non-resident inflows into Taiwanese equities, a soft US dollar and markedly reduced currency intervention in both countries (perhaps pre-empting a "currency manipulator" label by the US administration) propelled gains.

YTD 2017 Attribution





As of 30 March 2017.

The success of LEI 's activities will be affected by general economic and market conditions, such as interest rates, availability of credit, inflation rates, economic uncertainty, changes in laws, trade barriers, currency exchange controls and national and international political circumstances. These factors may affect the level and volatility of prices and the liquidity of the strategy's investments. Volatility or illiquidity could impair the strategy's profitability or result in losses. The LEI strategy generally invests in securities denominated in the local currency of the obligor and will maintain significant exposure to such local currencies.

Attribution is based upon a representative portfolio and is provided for illustrative purposes only, as values are calculated based on returns gross of fees. Performance would be lower if fees and expenses were included. Past performance is not a reliable indicator of future results.

The securities mentioned are not necessarily held by Lazard for all client portfolios, and their mention should not be considered a recommendation or solicitation to purchase or sell these securities. It should not be assumed that any investment in these securities was, or will prove to be, profitable, or that the investment decisions we make in the future will be profitable or equal to the investment performance of securities referenced herein. There is no assurance that any securities referenced herein are currently held in the portfolio or that securities sold have not been repurchased. The securities mentioned may not represent the entire portfolio.

Attribution Summary – Full Year 2016

Lazard Emerging Income

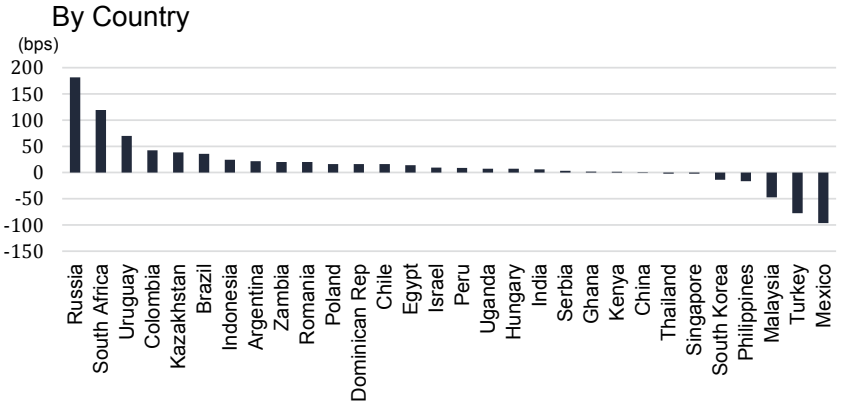
What Helped

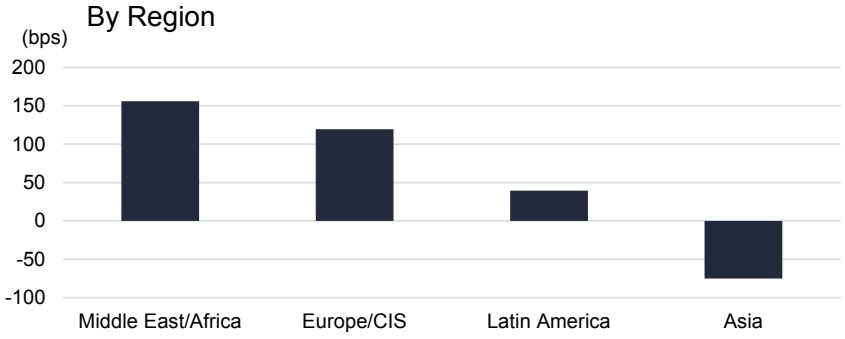
- Russia (+182 bps) benefitted from its high yield, current account surplus, shrinking capital outflows, disinflation, central bank credibility, and emergence from recession.
- South Africa (+120 bps) benefitted from security selection in local debt and active currency management.
- Active management of Frontier market exposures (Uruguay, Kazakhstan, Zambia, Uganda, Dominican Republic, Argentina, Egypt, Ghana, Kenya, and Serbia) contributed 197 bps on an average allocation of 14% of NAV.
- Colombia benefitted from higher oil, improved external balance, and a hawkish central bank to combat rising inflation.
- Poland, Romania, and China garnered positive contribution from active management despite negative full year results in those markets.

What Hurt

- Mexico detracted -96 bps as the peso weakened due to concerns over Trump's rhetoric and its convenient use as a risk hedge due to ample liquidity and low interest rates.
- Turkey cost -77 bps as FX and local debt weakened following an attempted coup in July, external financing fragilities, and policy risk.
- The Asian region detracted -51 bps in aggregate. Low yields have not insulated regional currencies from volatility throughout the year. Malaysia (-47 bps) accounted for the bulk of the detraction due to continued headlines surrounding corruption at the 1MDB Group, and sensitivity to a potential Fed rate increase (due to heavy investor positioning in local fixed income assets).

2016 Attribution





As of 31 December 2016.

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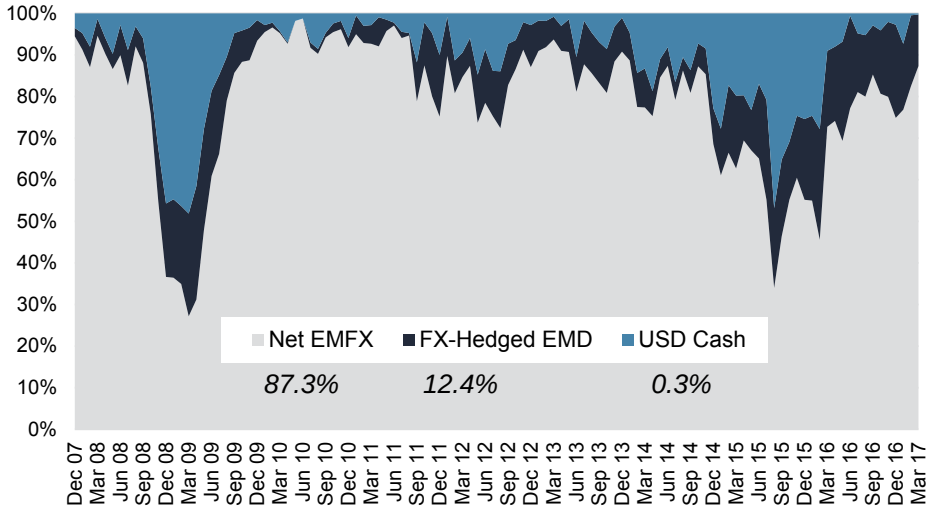
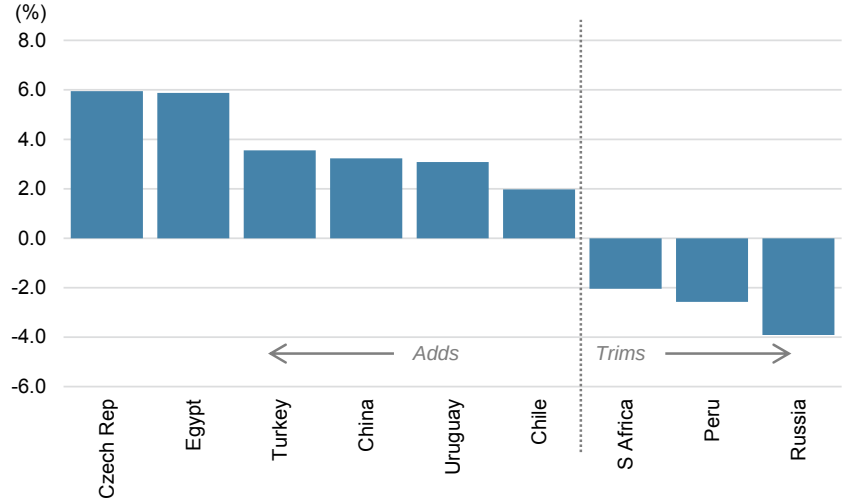
Exposure Review

Active Risk Management Tools

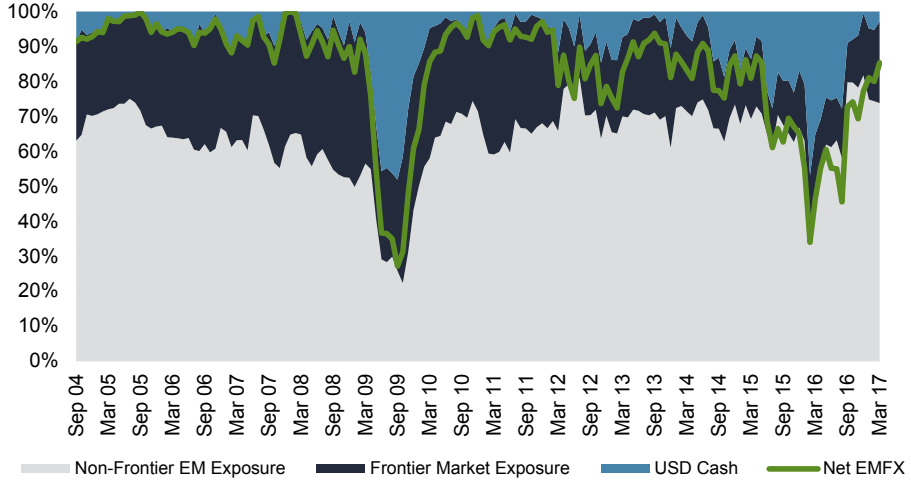
Dynamic exposure to EMFX, FX-Hedged EM Local Debt, and Cash



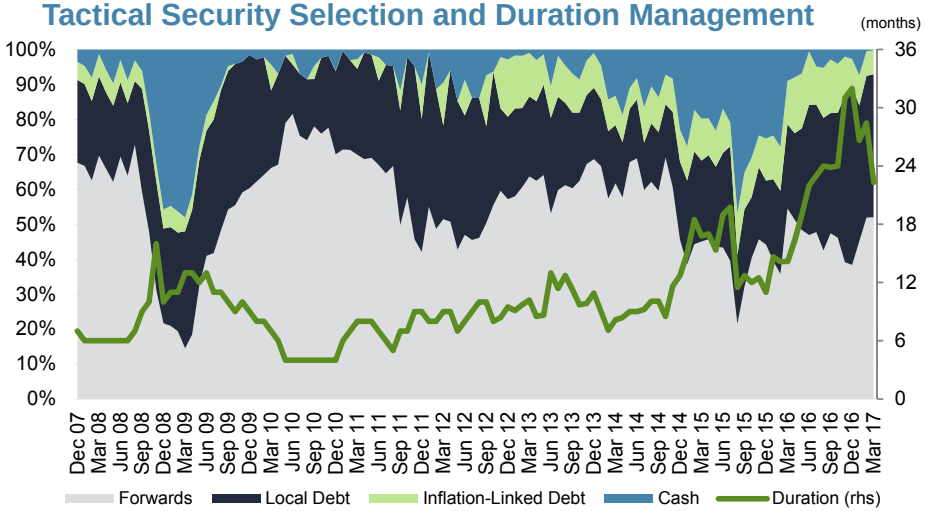
Notable FX Exposure Changes: Q1-17 vs Q4-16



Frontier markets provide idiosyncratic alpha and dampen portfolio volatility



Tactical Security Selection and Duration Management



As of 30 March 2017.
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D

Market Review and Outlook

Emerging Income Asset Class Report Card

EM developments over the past year versus our expectations

Our expectations	Status check	Developments
1) EM growth fears were overblown	✓	EM GDP is expected to rise in absolute and relative terms
2) Fear indicators near all-time highs in 4Q15/Jan '16 were a contrarian buying signal	✓	Fear receded during 2016 which has led to a recovery in EM assets
3) Don't fear the Fed	✓	Fed lift-off has occurred. USD has weakened and most EM currencies have begun to recover off multi-year lows
4) Recent years' US dollar strength has priced and is impacting monetary policy	✓	Fed minutes explicitly stated they are watching "international developments," and competitive EM currency devaluations are over
5) Chinese "hard landing fears" are overblown	✓	No hard landing in China; social and economic stability is a stated goal for 2017
6) Commodity stability would help EM sentiment and flows	✓	Price collapse of 2H 2015 has ceased. Stability / rebound 2016-17
7) In absence of continued capital outflow, EM currencies should stabilize or begin to recover	✓	Consistent outflows from EM asset classes from mid-2013 through early 2016 have ceased and EM currencies have stabilized and/or recovered.
8) Institutional investor base would remain committed to EM asset classes	✓	Institutional investors maintained EM equity and debt weightings; retail exodus has ended. Scope for retail rebuild
9) Recovering global economy should lead to increased demand for EM exports	✓	Commodity prices and manufacturing exports have begun to recover
10) Developed Market capital spending recovery will benefit EM exporters		Developed market capex?

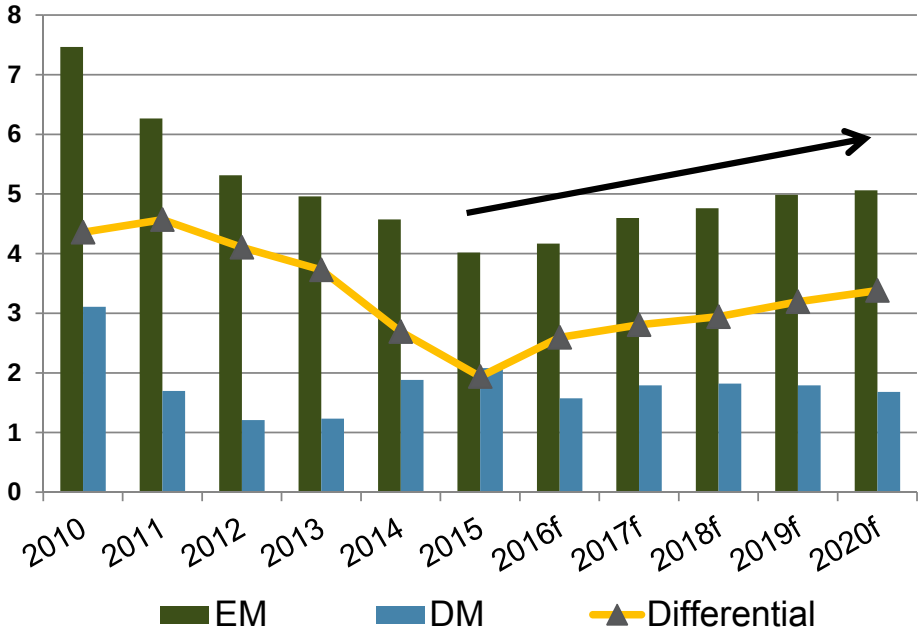
Opinions as of 31 March 2017 and are subject to change.

Catalyst #1: EM Growth Improving

"Growth in emerging market and developing economies is expected to strengthen slightly in 2016 to 4.2 percent after five consecutive years of decline, accounting for over three-quarters of projected world growth this year. Although longer-term prospects for advanced economies remain muted, given demographic headwinds and weak productivity growth, the forecast envisages a further strengthening of growth in emerging market and developing economies over the medium term."

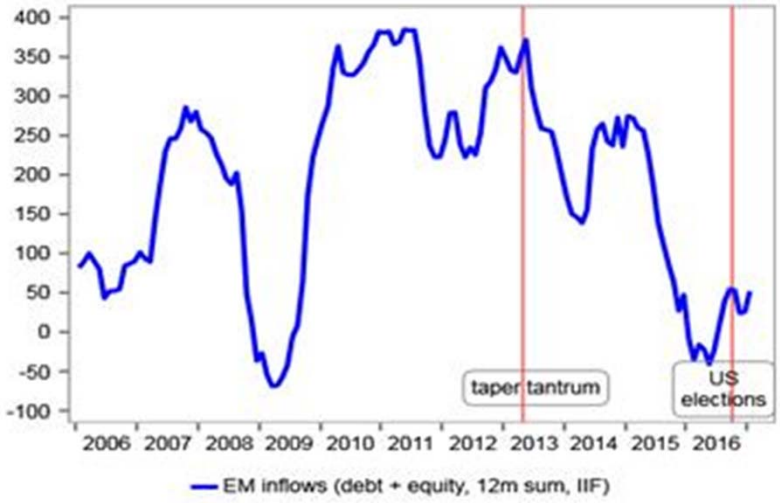
— IMF, World Economic Outlook, October 2016

GDP growth (%)



Growth estimates as of 4 October 2016. Source: IMF World Economic Outlook.
Forecasted or estimated results do not represent a promise or guarantee of future results and are subject to change.

Light Investor Positioning – Room for Inflows



Data as of March 2017
Source: Deutsche Bank, IIF Lazard.

Catalyst #1: EM Growth
Inflows Benefit EM Currencies

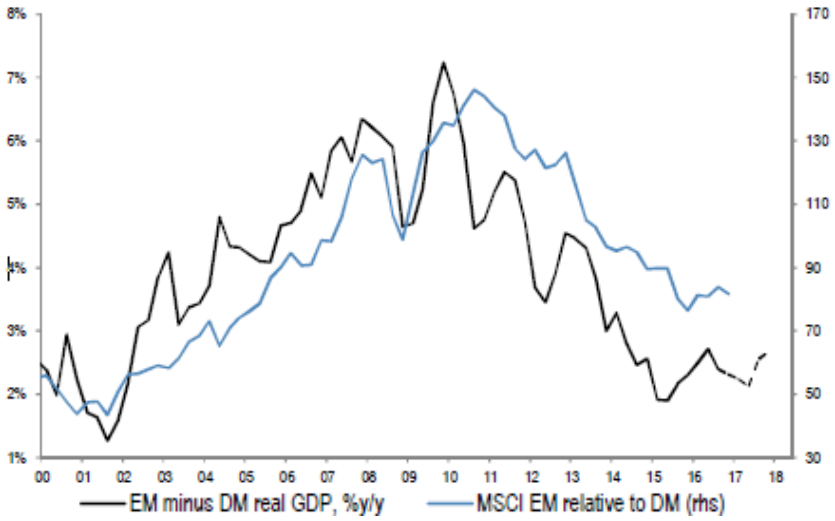
Global PMIs Have Risen, EM FX Typically Follows

Data through March 2017
Source: Deutsche Bank

EM Export Cycle is in Upswing, Led by Asia

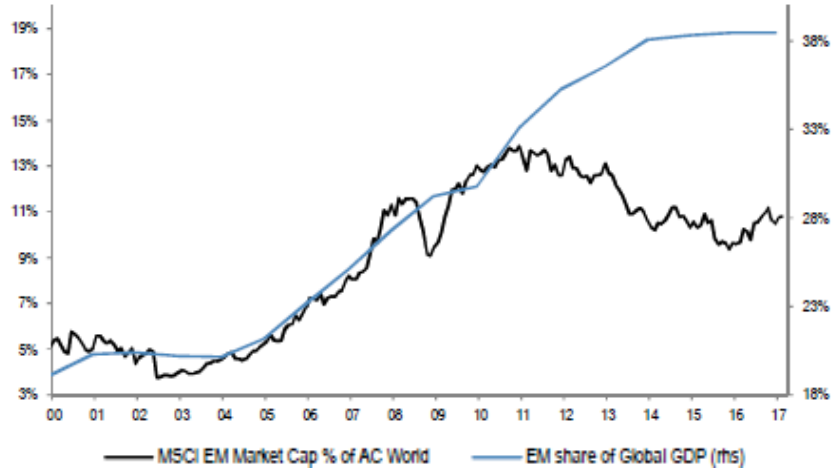
Data through March 2017
Source: Deutsche Bank

EM Equity Performance Linked to GDP Growth Differential



Data as of March 2017
Source: Datastream, JPMorgan (dotted line denotes forecasted values)

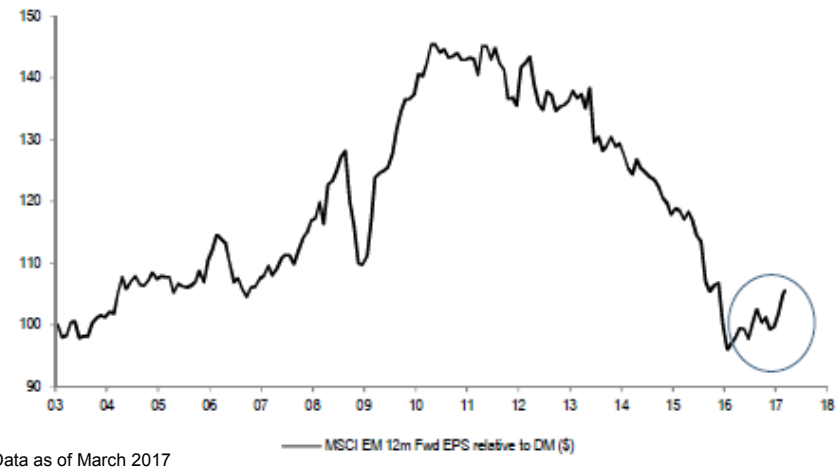
EM Equities Are Under-Owned Relative to EM Share of GDP



Data as of March 2017
Source: Datastream, IMF, JPMorgan

Catalyst #2: EM Equity Should Attract Portfolio Inflows
Which Benefits EM Currencies

EM Equity Earnings Have Bottomed

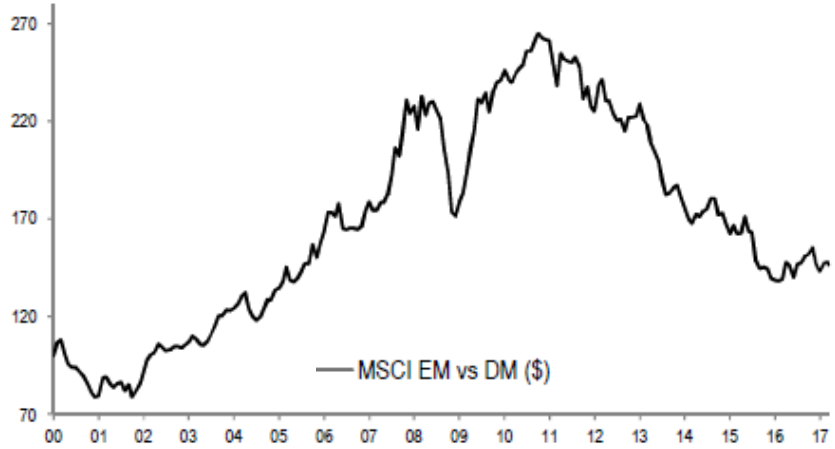


Data as of March 2017
Source: JPMorgan, IBES.

EM Equities Are the Cheapest Since 2003 (on P/B metric)

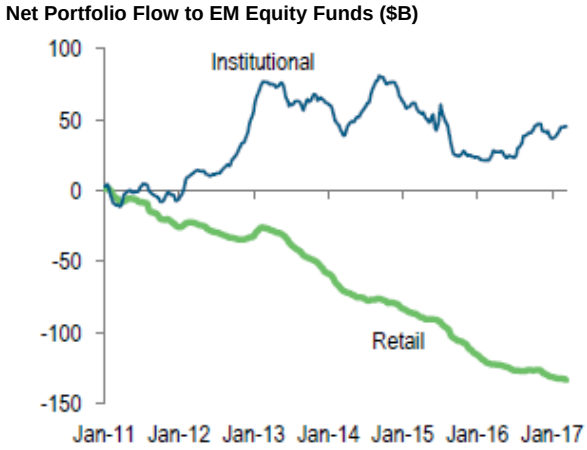
Data as of March 2017
Source: Datastream, JPMorgan

EM Equities Have Underperformed DM Equities by 50%



Data as of March 2017
Source: Datastream, JPMorgan.

EM Equities: Room for Retail Investors to Re-Engage



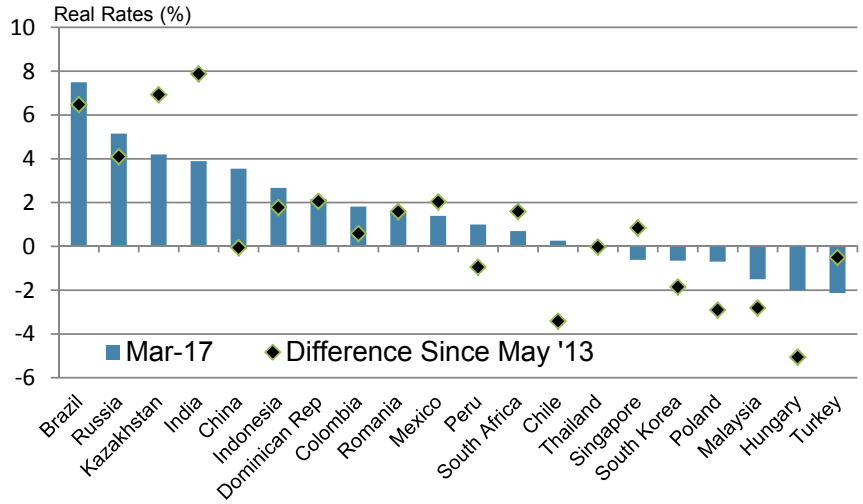
Data as of March 2017
Source: EPFR, Standard Chartered Research.

Catalyst #3: EM Debt Relative Value Favors Local Markets
Local Yields and Currencies are Attractive

EM Credit Spreads Have Narrowed…

Data as of March 2017
Source: Bloomberg, JPMorgan.

…While EM Real Yields Have Risen



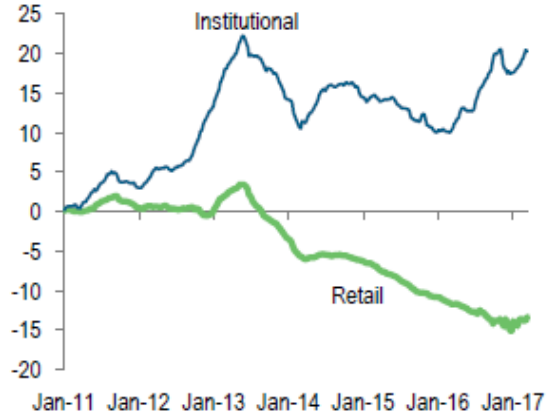
Data as of 27 March 2017
Real rates is the difference between the policy rate and headline CPI
Source: Bloomberg, Lazard.

EM Currencies are Undervalued

Data as of March 2017
Source: Deutsche Bank, IIF Lazard.

EM Local Debt: Room for Retail Investors to Re-Engage

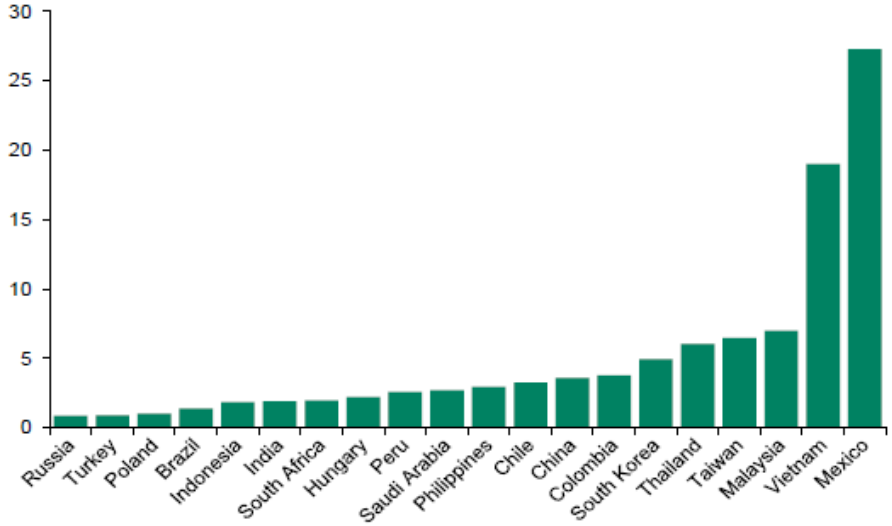
Net Portfolio Flow to EM Local Currency Debt Funds ($B)



Data as of March 2017
Source: EPFR, Standard Chartered Research.

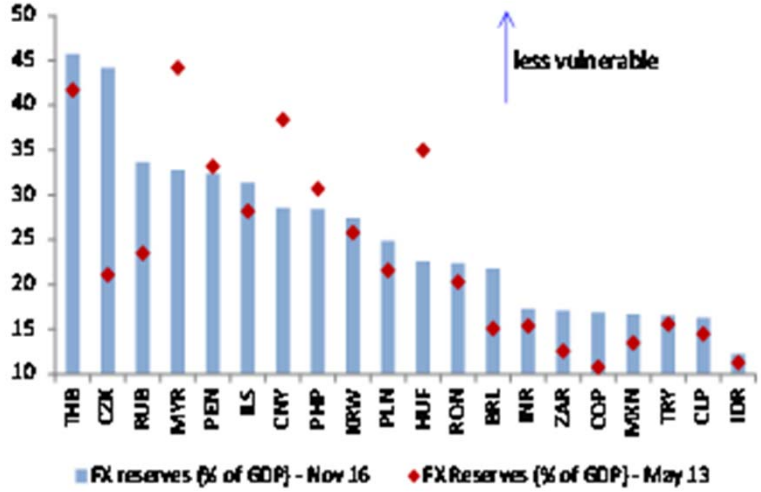
Isolated EM Vulnerabilities, Improved Fundamentals

Gross Goods Exports to US (% of GDP)



Data through 30 June 2016
Source: IMF DOTS, Macrobond, BNP Paribas.

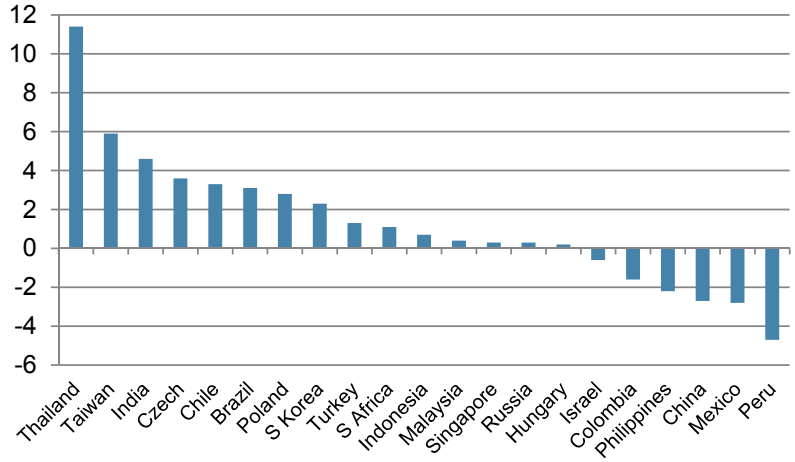
Rising EM FX Reserves Since 2013



Data through November 2016
Source: Deutsche Bank

Basic Balance of Payments (Current Account + FDI) Much Improved Since Taper Tantrum

(Difference Between May 2013 and Nov 2016 as a % of GDP)



Data as of November 2016
Source: Deutsche Bank, Lazard

Outlook

EM Outlook

- Growth and monetary divergence by country
- Healthy remittances to EM
- Policy tools, flexibility to use them
- Sensitivity to potential trade tensions
- Differentiation to continue
- Favorable capital flow catalysts

Risks

- US-led trade war leads to global recession
- Quick rise in US inflation
- Chinese hard-landing

Opportunities

- LEI has historically performed well in rising rate environment
- Basic balance of payments improvements in EM
- Higher EM risk premia:
  - Real interest rates
  - Currency and equity valuations
- Potential reflationary efforts from fiscal boost

- Active management for alpha generation:
  - Growth drivers and monetary divergence by country
  - Trade sensitivity vs. US
  - Idiosyncratic policy bias – fiscal vs monetary impulse, flexibility, usage
  - Capital flows – push vs pull factors

Opinions as of 31 March 2017 and are subject to change.

The success of the portfolio's activities will be affected by general economic and market conditions, such as interest rates, availability of credit, inflation rates, economic uncertainty, changes in laws, trade barriers, currency exchange controls and national and international political circumstances. These factors may affect the level and volatility of prices and the liquidity of the portfolios' investments. Volatility or illiquidity could impair the portfolios' profitability or result in losses.

The portfolio will generally invest in securities denominated in the local currency of the obligor and will maintain significant exposure to such local currencies.

E

Appendix

Lazard Emerging Income Updated Fee Structure

	Prior Fee Structure	New Fee Structure*
Management Fee:	1.00%	0.75%
Incentive Fee:	10% in excess of hurdle (the higher of US 3-Month LIBOR or 3%)	none
Expense Cap:	none	0.25%

Effective 1 January 2017

Biographies
Emerging Income Management Team

Ardra Belitz
Managing Director, Portfolio Manager/Analyst
Lazard Asset Management LLC (New York)
Ardra Belitz is a Managing Director of Lazard Asset Management LLC and a Portfolio Manager/Analyst specializing in emerging markets currency and debt. She has been a member of the Emerging Income management team since 1998. Ardra began working in the investment industry in 1994. Prior to joining Lazard in 1996, she worked at Bankers Trust Company. Ardra has her BA in Economics from Brandeis University, from which she graduated Phi Beta Kappa.

Ganesh Ramachandran, CFA
Managing Director, Portfolio Manager/Analyst
Lazard Asset Management LLC (Singapore)
Ganesh Ramachandran is a Managing Director of Lazard Asset Management LLC and a Portfolio Manager/Analyst specializing in emerging markets currency and debt. Ganesh has been a member of the Emerging Income management team since early 2001. He began working in the investment field in 1997 when he joined the Firm. Ganesh has his MBA from the University of Rochester, Simon School of Business and a BS in Chemical Engineering from the Indian Institute of Technology at Madras.

Aristotel Kondili
Director, Portfolio Manager/Analyst
Lazard Asset Management LLC (New York)
Aristotel Kondili is a Portfolio Manager/Analyst on the Emerging Income team specializing in emerging market currency and debt. He has been a member of the Emerging Income management team since October 2004. Previously Aristotel was a supervisor in the operations group of Lazard Asset Management LLC. In that role, he was responsible for all index-related data, security pricing and operational support for the Emerging Income portfolios. Prior to joining Lazard in 2001, Aristotel worked at PortfolioPR, an investor relations/public relations firm. He has a BBA from Pace University.

Steven R. Nelson
Vice President, Portfolio Analyst
Lazard Asset Management LLC (New York)
Steve Nelson is a Portfolio Analyst on the Emerging Income team, where his responsibilities include client communications and portfolio analysis. He began working in the investment field in 1999. Prior to joining Lazard in 2002, Steve was an associate at Barclays Global Investors. He has a BS in Management from the State University of New York at Geneseo. Steve holds NASD (now FINRA) Series 7, 31, and 66 licenses.

Biographies
Emerging Income Management Team

Andrew T. Raab
Vice President, Research Analyst
Lazard Asset Management LLC (New York)
Andrew Raab is a Research Analyst on the Emerging Income team specializing in emerging market currency and debt. He started his career in 2004 at Lazard Asset Management where first he managed security pricing in the firm's portfolio accounting system and later joined the Alternative Investment Operations group. Andrew has an MBA from the Stern School of Business at New York University and a BS in Business Administration from Georgetown University.

Michael S. Ives
Research Analyst
Lazard Asset Management LLC (New York)
Michael Ives is a Research Analyst on the Emerging Income team. He began working in the investment field in 2011 upon joining Lazard. At Lazard, Michael started as an Associate working with the Financial Institutional Group. He graduated cum laude from Williams College with a BA in Mathematics/Statistics and Economics.

GIPS Composite Information

Lazard Emerging Income

Benchmark: 3-month LIBOR Index
Reporting Date: 31 December 2016
Composite Inception Date: 01 April 1997
Reporting Currency: U.S. Dollar

Composite Description

The composite returns represent the total returns of all fully discretionary portfolios with an Emerging Income investment mandate and a minimum of $5 million in assets under management. Lazard Emerging Income "LEI" is a globally diversified emerging markets currency and local debt strategy that attains exposure to emerging market countries by investing in local market instruments, including currency forwards and local currency debt. LEI takes an index-agnostic approach to emerging markets local market opportunities, seeking high risk-adjusted results from amongst Lazard's evolving, diverse universe which currently spans the global markets. LEI seeks an absolute return of U.S. 3-Month LIBOR plus 4% to 5%, net of all fees, in a volatility range of 3% to 6% per annum over a full market cycle. Target returns do not represent a promise or guarantee of future results, and there is no guarantee that the strategy's risk and performance objectives will be achieved. This strategy continually makes use of derivative instruments by material use of short duration emerging markets currency forwards to gain exposure to local money market performance. Other risks include fixed income interest rate risk, credit risk, risks associated with emerging market investments including currency fluctuation, devaluation, confiscatory taxation, and counterparty risk associated with usage of derivative instruments.

Calculation of Performance Returns

Lazard's account inclusion policy is the earlier of the first full month or the end of the month in which the account is fully invested. The returns of the individual portfolios within the composite are time-weighted, use trade date accounting, are based upon monthly portfolio valuations, and include the reinvestment of all earnings as of the payment date. The composite returns are asset-weighted based upon beginning period market values. Additional information regarding policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request. Composite returns are shown before taxes and the deduction of custody fees (except for mutual funds which includes all fees). The composite returns are reported net of foreign withholding taxes on dividends, interest and capital gains. The composite returns presented represent past performance and is not a reliable indicator of future results, which may vary. The value of foreign investments is affected by changes in currency rates, application of foreign tax laws, changes in government administration or economic and monetary policy.

Fee Schedule

Lazard's standard fee schedule for Emerging Income accounts is 0.75% on the first $100 million of assets, 0.65% on the next $150 million of assets, and 0.55% on the balance. (This fee schedule may be presented in non-US local currency equivalents based on prevailing exchange rates.) Actual account fees, inclusive of performance-based fees (if applicable) are used in the construction of composite net of fee performance unless otherwise noted. A complete list and description of all Lazard composites is available upon request.

Benchmark Information

LIBOR stands for London InterBank Offered Rate. The 3 month US Dollar (USD) LIBOR interest rate is the average interest rate at which a selection of banks in London are prepared to lend to one another in American dollars with a maturity of 3 months.

GIPS Compliance and Verification Status

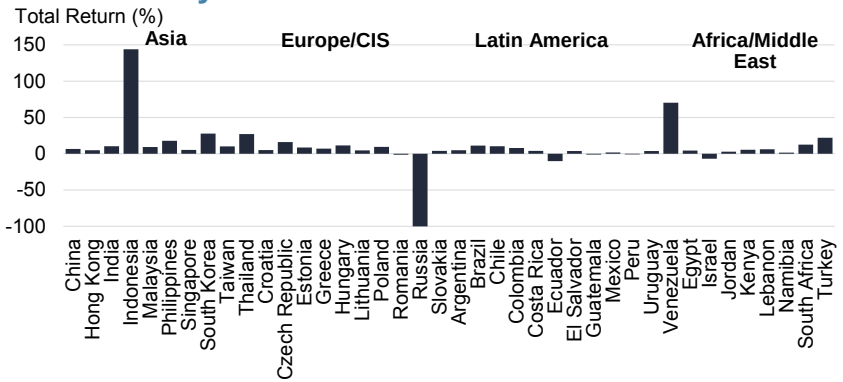
Lazard Asset Management claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. Lazard Asset Management has been independently verified for the period of January 1, 1993 through December 31, 2015. The verification reports 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. Lazard Asset Management is the "Firm" to which the GIPS Standards apply (Frankfurt office included in Firm definition as of January 1, 2003). GIPS is a registered trademark of CFA Institute. CFA Institute has not been involved in the preparation or review of this presentation. The composite creation date is January 1, 2003.

	Calendar											Annualized				
	QTD	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	1 YR	3 YR	5 YR	10 YR	Since Inception
Lazard Rate of Return (%; Gross of Fees)	-1.61	4.43	-5.91	-4.55	-0.76	9.08	-1.69	5.21	12.14	-5.29	15.62	4.43	-2.11	0.30	2.57	5.73
Benchmark (%; Rate of Return)	0.20	0.66	0.23	0.23	0.29	0.51	0.27	0.33	0.75	3.04	5.31	0.66	0.38	0.38	1.15	2.54
Composite Standard Deviation (3-yr. Ann.)		4.64	4.02	5.24	6.14	6.07	5.37	6.30	6.36	6.56	4.18					
Benchmark Standard Deviation (3-yr. Ann.)		0.06	0.02	0.04	0.04	0.06	0.10	0.36	0.54	0.31	0.25					
# of Portfolios	1	1	1	1	2	2	2	2	2	2	2					
Composite Dispersion (Asset Wtd. Std. Dev.)	N/A	N/A	N/A	N/A	0.05	0.20	0.07	0.09	0.40	0.14	0.06					
Composite Assets (USD Millions)	219.5	219.5	308.6	680.2	1678.1	1691.8	1937.7	2208.3	1157.1	1174.1	751.5					
Total Firm Assets (USD Billions)	168.0	168.0	160.1	171.4	161.6	148.3	124.4	140.6	116.5	79.8	126.9					

Correlations are Surprisingly Low

Money Market Returns by Country

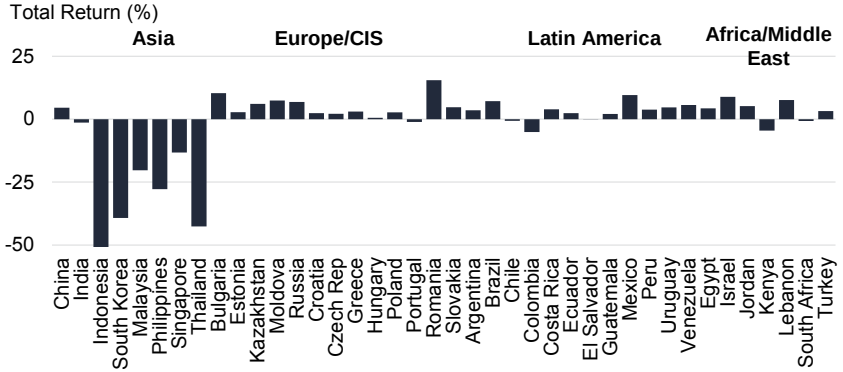
Russia: July–December 1998



Even with the Russian default, a well-diversified local markets portfolio produced positive returns.

Return for Russia:	-100%
LEI Composite Return[1]:	+3.5%
JPM Ext Debt Index (EMBI+):	-13.4%

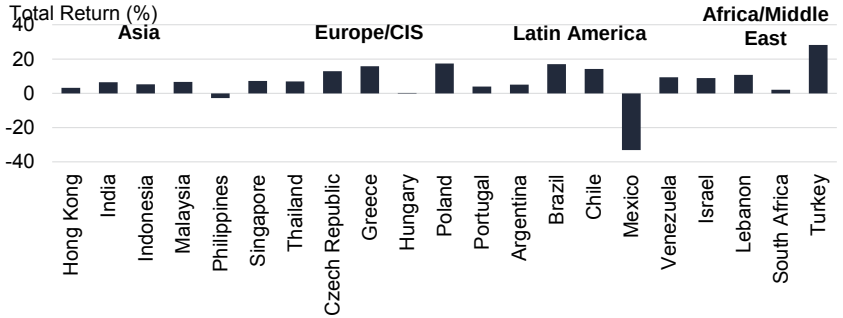
Asia: July–December 1997



During the Asian currency crisis, inter-regional correlations were low enough to insulate a well-diversified portfolio.

LEI Composite Return[1]: -6.1%

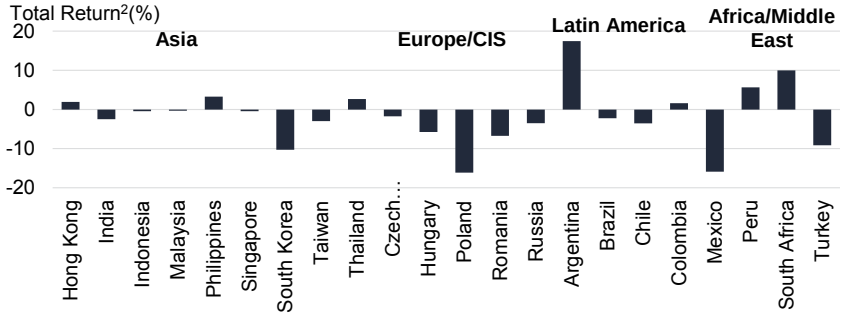
Mexico: December 1994–May 1995



Despite a 45% devaluation of the Mexican Peso, local debt returns in other Latin American countries were actually positive.

Return for an Equal Weighted Portfolio: 4.8%

Global Financial Crisis: September 2008–August 2009



During the Global Financial Crisis, most EM currencies declined, but differentiation did occur during the rebound (post February-2009)

Net Return for LEI: -4.2%

1 Gross of fees

2 Total Return = ((1+Spot Return)*(1+Interest Return))-1

Returns are country returns of the JP Morgan Emerging Local Markets Index Plus where available; for other countries, returns are calculated by Lazard, for the instrument Lazard considers to be the sovereign benchmark instrument in each country, typically a 1m or 3m T-bill. Please refer to Lazard internal study for details about the methodology used. Past performance is not a reliable indicator of future results.

Lazard Asset Management LLC conducted a study of emerging markets local currency debt. The data above is provided to show results obtained during that study. For additional information on the study, refer to the "Lazard's Emerging Market Local Currency Study" in the Appendix. Please refer to "Performance Disclosures Lazard Emerging Income Composite" for additional disclosures about the performance presented on this page and net of fees performance.

Source: Lazard, JP Morgan, Bloomberg

Risk Disclosures

An investment in any alternative investment is speculative, involves a high degree of risk, and may lose value. Investors should be prepared to lose all or a substantial portion of their investment.

There can be no assurance that LAM's investment professionals will continue to be associated with LAM and the failure to retain such investment professionals could have an adverse effect on the strategy.

The strategies may leverage their investment positions by borrowing funds from securities broker-dealers, banks or others. From time to time, the strategies may borrow significant amounts to take advantage of perceived opportunities, such as short-term price disparities between markets or related securities. Such leverage increases both the possibilities for profit and the risk of loss.

The strategies may invest in securities of non-U.S. companies and which trade on non-U.S. exchanges. These investments are denominated or traded in currencies other than U.S. dollars involve certain considerations not typically associated with investments in U.S. issuers or securities denominated or traded in U.S. dollars. There may be less publicly available information about issuers in non-U.S. countries that may not be subject to uniform accounting, auditing and financial reporting standards and other disclosure requirements comparable to those applicable to U.S. issuers.

Equity securities will fluctuate in price which may result in a loss. Emerging Market securities carry special risks, such as less developed or less efficient trading markets, a lack of company information, and differing auditing and legal standards. The securities markets of emerging market countries can be extremely volatile and performance can also be influenced by political, social, and economic factors affecting companies in emerging market countries.

The strategies may take short sale positions. Short selling can, in some circumstances, substantially increase the impact of adverse price movements on the strategies' portfolio. A short sale creates the risk of a theoretically unlimited loss, in that the price of the underlying security could theoretically increase without limit, thus increasing the cost to the strategy of buying securities to cover the short position.

The strategies invest primarily in short-term emerging market local currencies and debt positions. The strategies will generally invest in currency and debt investments denominated in emerging market currencies and the strategies will maintain significant exposure to such local currencies. As such, an investment in the strategies is subject to the general risks associated with fixed income investing, such as interest rate risk and credit risk, as well as the risks associated with emerging market investments, including currency fluctuation, devaluation and confiscatory taxation. The strategies may use derivative instruments that are subject to counterparty risk.

Investments in global currencies are subject to the general risks associated with fixed income investing, such as interest rate risk, as well as the risks associated with non-domestic investments, which include, but are not limited to, currency fluctuation, devaluation and confiscatory taxation. Furthermore, certain investment techniques required to access certain emerging markets currencies, such as swaps, forwards, structured notes, and loans of portfolio securities, involve risk that the counterparty to such instruments or transactions will become insolvent or otherwise default on its obligation to perform as agreed. In the event of such default, an investor may have limited recourse against the counterparty and may experience delays in recovery or loss.

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ALASKA RETIREMENT MANAGEMENT BOARD

Private Equity 2017 Tactical Plan

Staff Summary and Overview

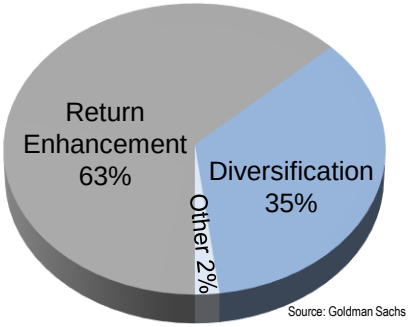
Zachary Hanna, CFA
State Investment Officer

ARMB Private Equity Program

- Private Equity Overview
- Market Review
- ARMB Portfolio
- Diversification
- 2016 Commitments
- 2017 Outlook & Tactical Plan

Overview – Private Equity Investment

- Private equity – unregistered investments in operating companies.
- Why do fund sponsors invest in private equity?



- Private equity is expected to deliver long-term returns in excess of the public markets.

Private Equity Returns through September 30, 2016

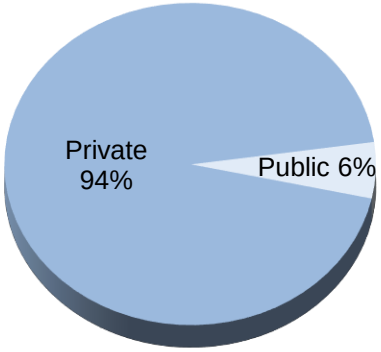
Investment Type	5 Year	10 Year	20 Year
Venture Capital	14.8%	10.5%	20.9%
Growth Equity	12.3%	11.2%	13.6%
Buyouts	13.7%	10.4%	12.6%
Distressed	11.9%	9.4%	10.7%
Energy	1.3%	5.2%	9.4%
All Private Equity	**12.5%**	**10.1%**	**13.1%**
Public Equity: Russell 3000	**16.4%**	**7.4%**	**8.0%**

Source: Cambridge Associates, Frank Russell Company, Thomson Reuters Datastream. The private equity returns are pooled IRR's across all regions and do not represent top quartile returns. All Private Equity includes buyout, venture capital, growth equity, mezzanine, distressed and energy. The ARMB groups growth equity with venture capital and the other non-buyout strategies with special situations. Russell 3000 returns are time-weighted and not directly comparable to IRR's.

Overview – Unique Characteristics

- Positive Characteristics:
  - Larger, more diverse investment universe
  - Less efficient companies – opportunity to create value
  - Less efficient markets – pricing opportunities
  - Control and alignment of interests
  - Managed for long-term value

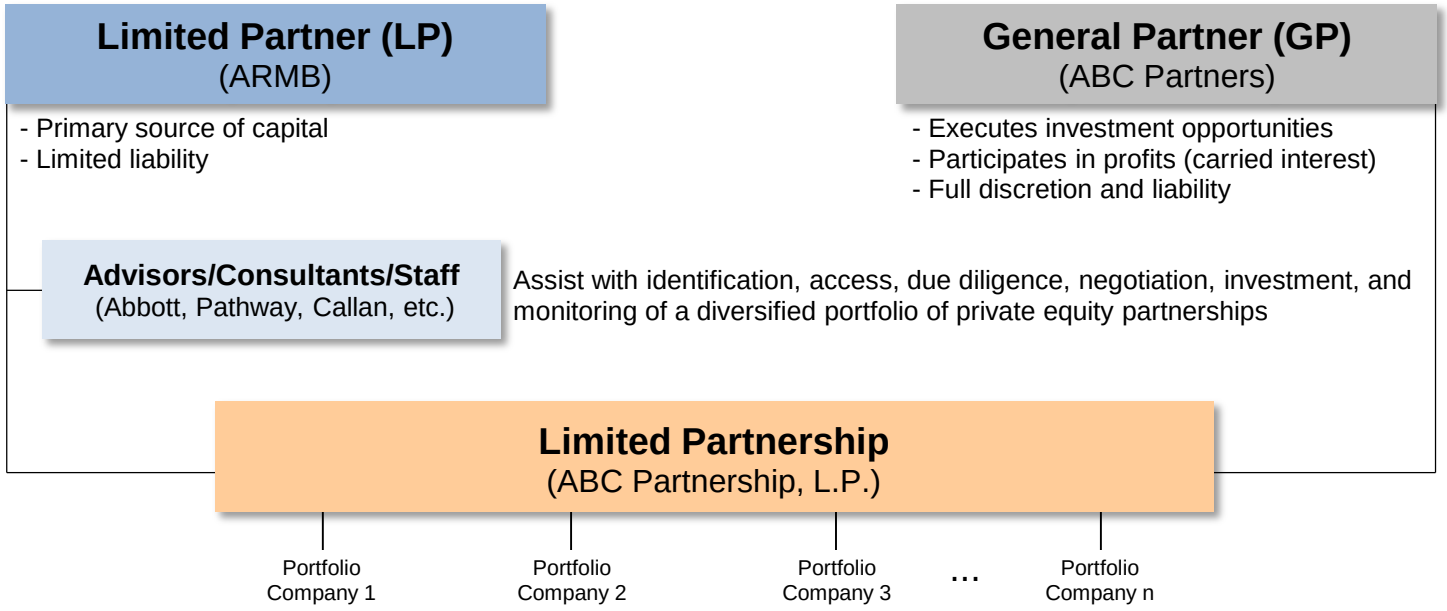
Public and Private Companies: Hoovers 2012
57,428 Companies $25+ million in Revenue



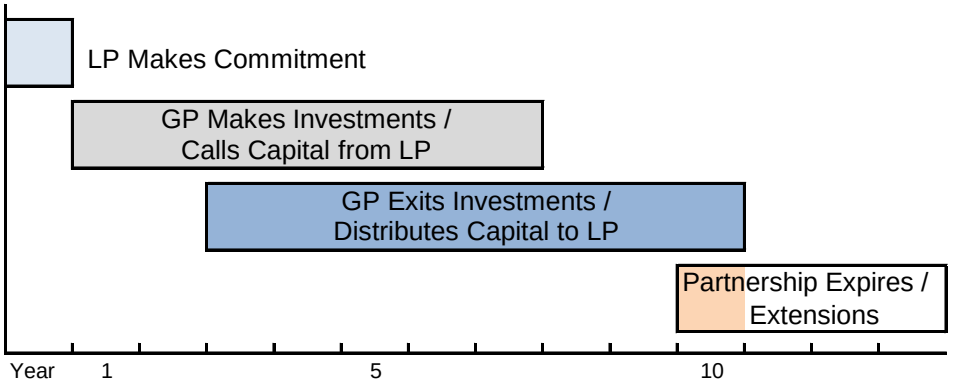
- Other Characteristics:
  - Illiquid, long-term investments
  - High fees and J-curve
  - Potential for high leverage
  - Portfolio transparency and valuation issues
  - Incomplete data and benchmarks

Overview – Structure

- Private equity investments are typically made through limited partnerships:



- Private equity liquidity and cash flow characteristics:



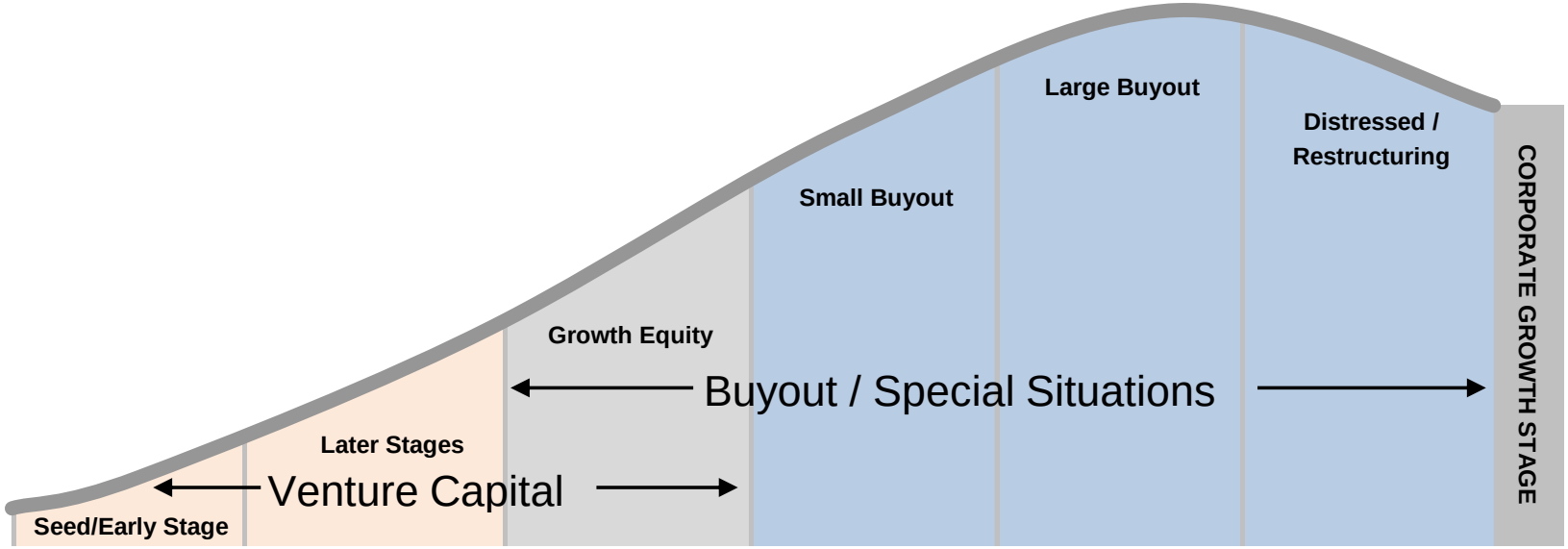
Overview – Primary Strategies

Private equity partnerships are classified into three primary groups:

Venture Capital Investments in companies developing new products and services. Value creation focuses on managing entrepreneurial companies through high growth.

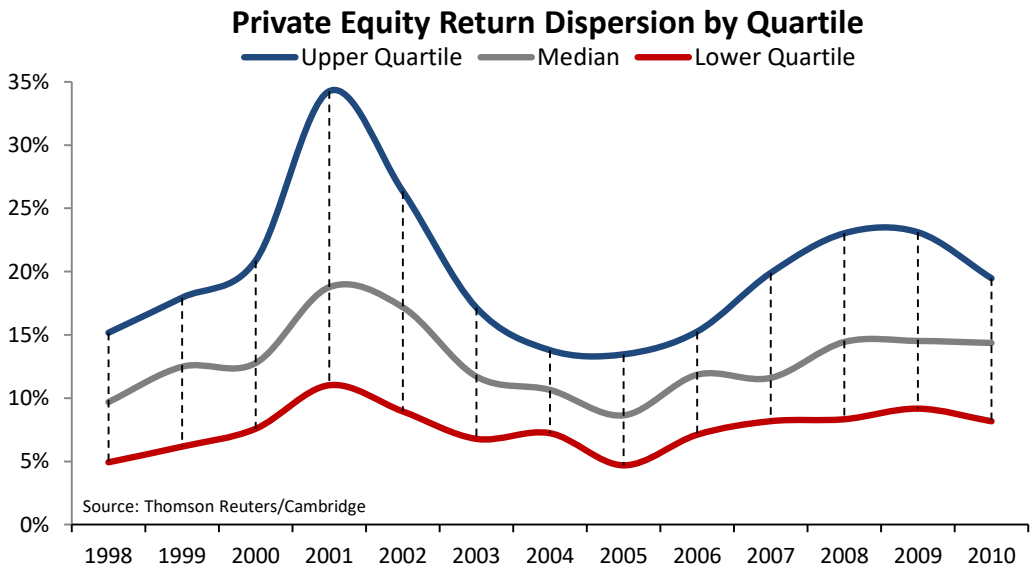
Buyout Control investments in more mature operating companies. Value creation generally focuses on driving operational and capital structure efficiency.

Special Situations Generally buyout style investments with a specialty focus; including groups that have a specific industry, investment style, or capital structure focus. Value creation focuses on specialized skills and efficiency.



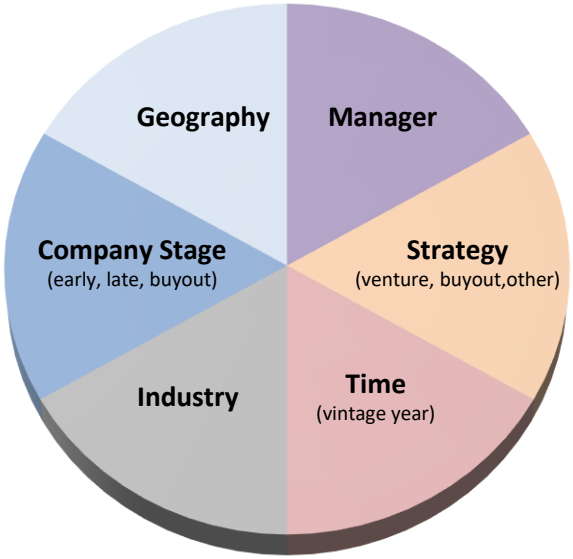
Private Equity Program Implementation

- Manager access, selection, and diligence are important. Investing consistently with high quality managers is critical.



- Long-term diversification is important.

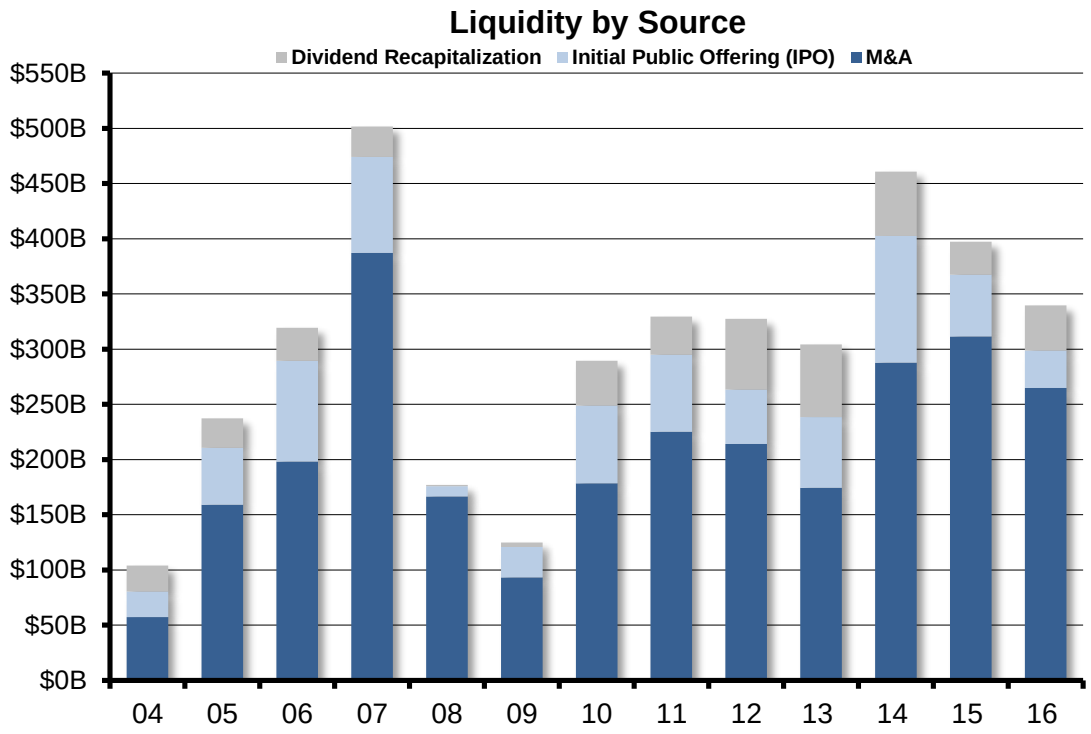
- The goal is to build a portfolio of quality partnerships diversified by strategy, industry, geography, company stage, manager, and time.



Market – Exit Opportunities

Private equity exit activity has been strong for seven years, but decreased again in 2016

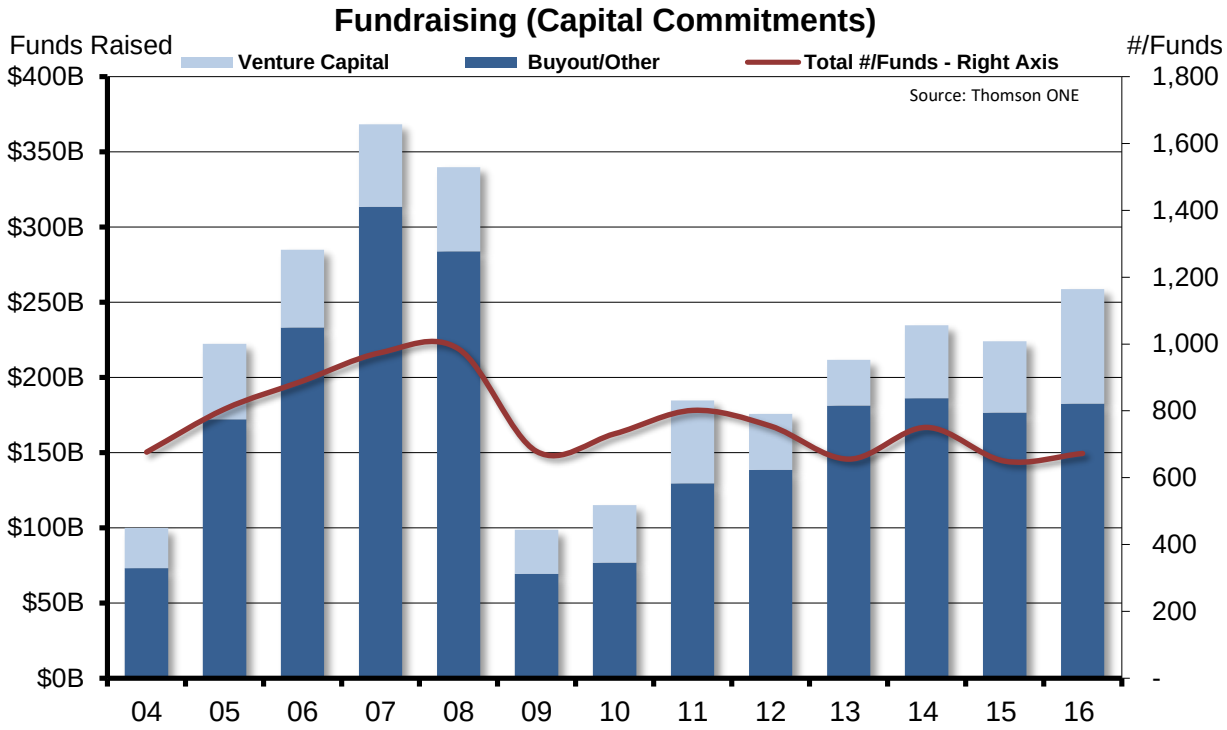
- Merger and acquisition activity decreased to $265 billion.
- Public market exits decreased to $34 billion.
- Dividend recapitalizations increased to $41 billion.



Source: Thomson Reuters & S&P. Global developed markets, except dividend recapitalization data which is U.S. only.

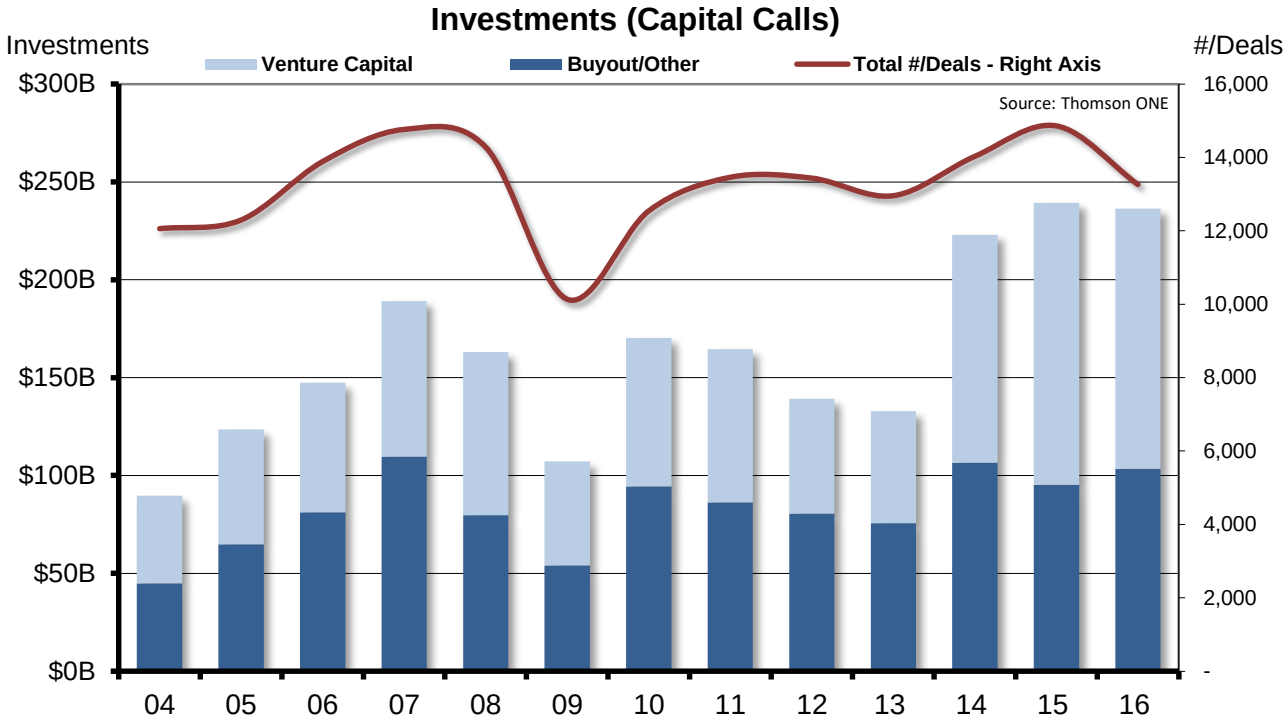
Market – Fundraising

- There was a notable increase in venture capital fundraising in 2016.
- Terms are balanced, but sought-after managers have increasing market power.

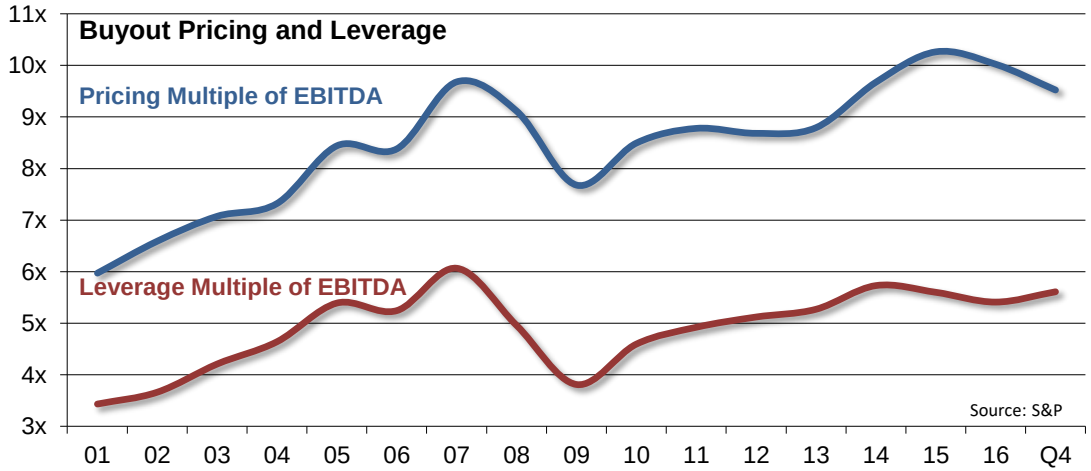


Market – Investing

- There was a high level of investment activity for both buyout and venture funds as credit markets were accommodative and market participants were willing to transact at high prices.
- Investment activity was roughly equal to fundraising levels – dry powder remained the same overall.

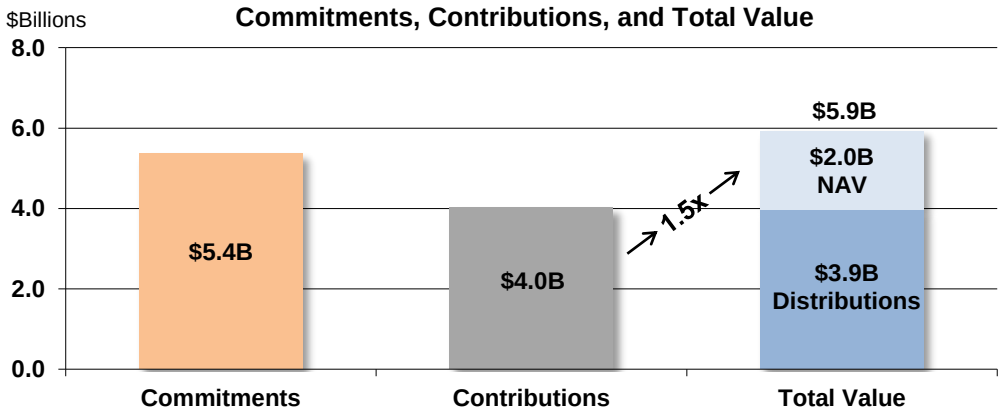


- Deal pricing and leverage multiples remain high, but pricing decreased from the 2015 peak.



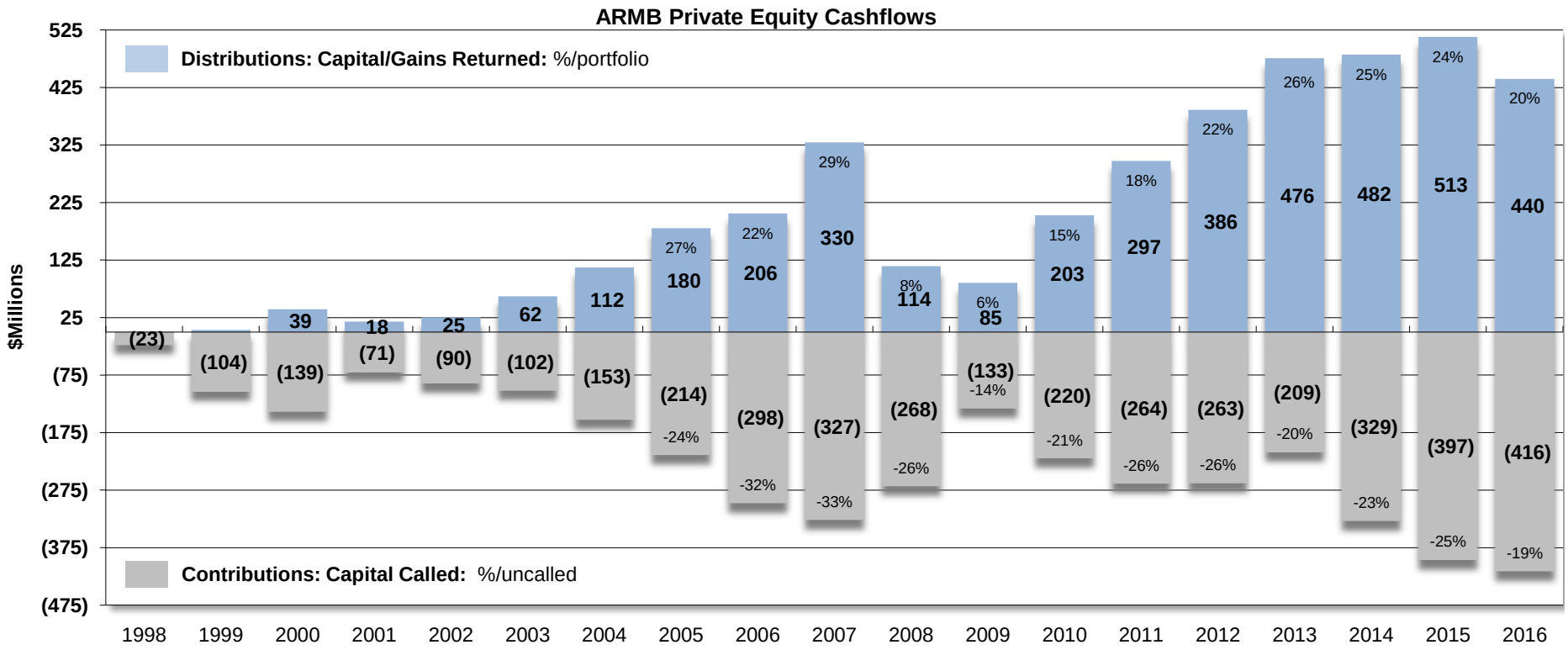
ARMB Portfolio Performance

- The ARMB directly invests in private equity and uses gatekeepers, Abbott Capital Management (1998) and Pathway Capital Management (2001). The current asset allocation has increased from 3% to 9%.
- Private equity has been volatile since the ARMB first invested in 1998. Technology and venture capital excesses gave way to a buyout dominated market. The market peak in 2007 was characterized by strong returns, but also by high prices and leverage. Private equity didn't fall as far as the public market through the recent downturn and has now returned to a period of high returns, pricing, and leverage.
- The ARMB and its advisors have built a diversified portfolio of quality partnerships. Manager selection has been strong. Callan recently reported on fourteen vintage years through 2011 – two were top quartile, 11 were second quartile, and one is third quartile. Overall the program is in the second quartile.
- Portfolio performance has been strong. The internal rate of return through 2016 is 10.9% versus a public market equivalent of 7.3% for the Russell 3000 and 7.4% for the Callan equity composite.
- The 10 year time weighted return for the private equity portfolio is 11.0% versus 7.4% for the Russell 3000 and 5.5% for the ARMB equity composite.
- Since inception, the ARMB's private equity program has generated $925 million in additional fund value compared to investing in the public equity markets.



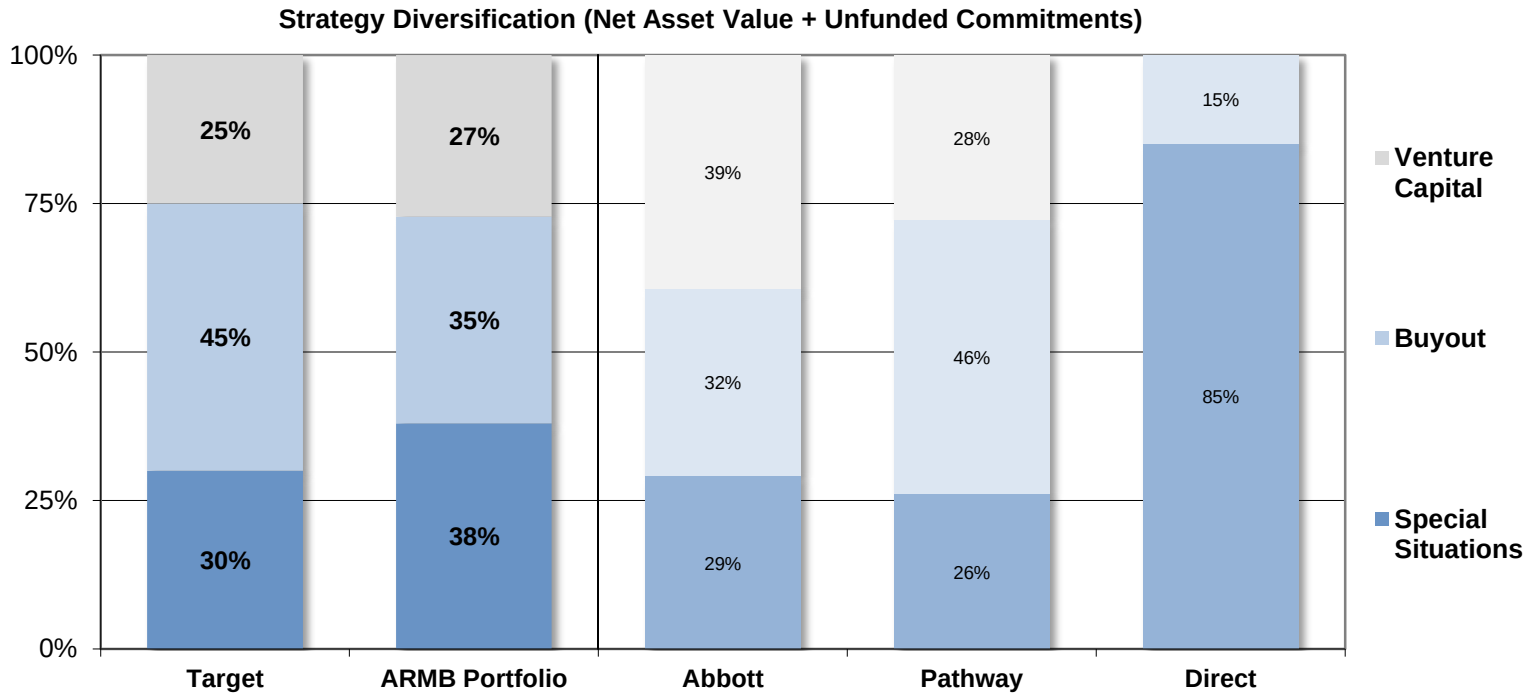
Portfolio Cash Flows

- Distributions decreased 14% to $440 million.
- Contributions increased 5% to $416 million.
- Net cash flows inflows over the past five years has been $700 million.



Diversification by Strategy

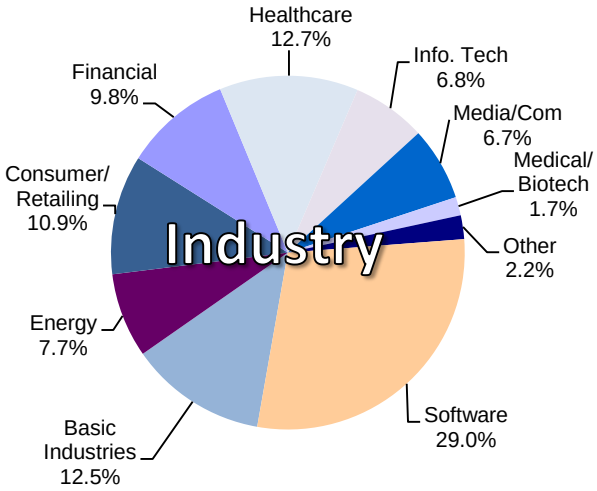
- The portfolio is well diversified by private equity strategy across venture capital, buyout, and special situations partnerships.
- Strategy exposure is within policy bands.
- The direct partnership portfolio is weighted towards well diversified special situations investments.

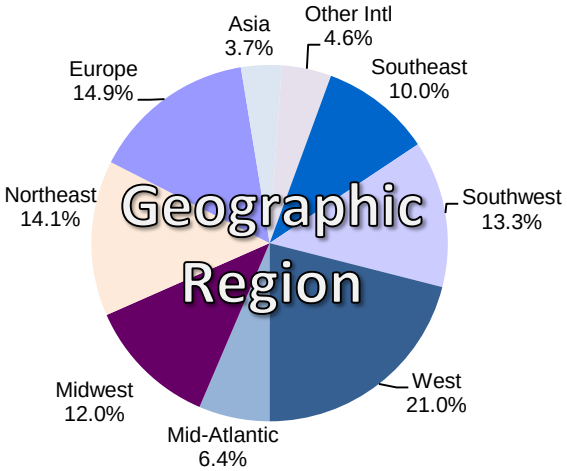


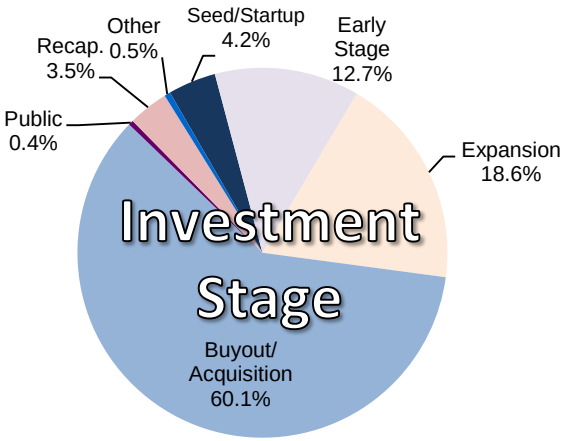
Diversification by Portfolio Company

The portfolio is well diversified and composed of over 2,000 underlying companies:

- Industry – The portfolio is well diversified by industry. The inherently diversified software sector makes up 29.0% of the portfolio.
- Geographic Region – The portfolio is well diversified geographically. International is 23.2% of the portfolio.
- Investment Stage – By investment stage, buyout/acquisition is the highest at 60.1% since the portfolio is buyout focused.







2016 Commitments

- The commitment target for 2016 was $530.0 million.
- $577.7 million was committed during the year.
- $188.1 million by Abbott, $224.6 million by Pathway, and $165.0 million directly.
- The new co-investment program made six investments totaling $20 million.
- Commitments were well diversified by investment strategy.

Manager	**Target**	**Actual**	**Number of Investments**	**Investment Strategy**					
				Venture	%	Buyout	%	Special Situations	%
Abbott	$200.0	$188.1	16	$73.9	39%	$86.1	46%	$28.1	15%
Pathway	$200.0	$224.6	21	$65.9	29%	$131.0	58%	$27.7	12%
Direct	$130.0	$165.0	4	$0.0	0%	$25.0	15%	$140.0	85%
Total	**$530.0**	**$577.7**	**41**	**$139.8**	**24%**	**$242.1**	**42%**	**$195.8**	**34%**

2017 Outlook

- ***Exits linked to public markets.*** The exit environment for private equity is tied to the strength of public equity markets. The current bull market is extended and as long as it continues, mergers and acquisitions should remain at high levels due to abundant corporate cash and modest internal growth prospects. Similarly, the initial public offering and credit markets should also continue to supply exit opportunities.

- ***Stable fundraising.*** Fundraising has been relatively stable for the past several years and is expected to continue at roughly the same pace since many firms have been actively returning capital and the investment pace has picked up over the past two years. Getting access to the highest quality partnerships will continue to be challenging and closing times have decreased markedly for sought-after firms.

- ***More moderate investment pacing and pricing.*** After peaking in 2015, deal pricing decreased in 2016 and leverage increased modestly. Both should remain in the similar range unless market volatility increases, which could lead to better buying opportunities.

2017 Tactical Plan

- Private equity is expected to continue to deliver meaningful premiums over public market equities. Staff recommends maintaining the ARMB's 12% long term allocation to private equity.

- Staff is recommending a 2017 commitment target of $560 million. $205 million for Abbott and Pathway and $150 million in direct partnership investments with a measured increase in commitment pacing over the planning horizon designed to reach the 12% asset allocation over the next ten years.

Private Equity Funding Schedule	2016	2017	2018	2019	2020	**2021**	2022	2023	2024	2025	**2026**
Beginning Fund Assets($MM)	**22,968,043**	23,783,837	24,547,645	25,296,185	26,072,558	**26,835,343**	27,562,397	28,235,471	28,853,185	29,414,531	**29,910,755**
Fund Net Growth Rate	**3.6%**	3.2%	3.0%	3.1%	2.9%	**2.7%**	2.4%	2.2%	1.9%	1.7%	**1.5%**
Additions from Net Fund Growth	**815,793**	763,809	748,539	776,373	762,785	**727,055**	673,073	617,714	561,346	496,224	**442,523**
Ending Fund Assets	**23,783,837**	24,547,645	25,296,185	26,072,558	26,835,343	**27,562,397**	28,235,471	28,853,185	29,414,531	29,910,755	**30,353,277**
Asset Value by Manager ($MM)											
Abbott	**795,643**	837,834	884,180	934,428	984,750	**1,025,819**	1,087,692	1,139,770	1,179,601	1,209,195	**1,231,029**
Pathway	**846,876**	884,699	931,791	983,797	1,030,494	**1,067,539**	1,124,623	1,167,166	1,201,039	1,224,389	**1,240,392**
Direct Investments	**317,658**	411,343	509,190	615,737	726,614	**833,988**	919,888	1,003,613	1,074,325	1,130,450	**1,177,000**
Total Projected Asset Value	**1,960,178**	2,133,876	2,325,161	2,533,962	2,741,858	**2,927,346**	3,132,202	3,310,549	3,454,965	3,564,034	**3,648,421**
Private Equity % of Fund	**8.2%**	8.7%	9.2%	9.7%	10.2%	**10.6%**	11.1%	11.5%	11.7%	11.9%	**12.0%**
Annual Commitments ($MM)											
Abbott	**188,100**	205,000	210,000	215,000	220,000	**225,000**	225,000	225,000	225,000	225,000	**225,000**
Pathway	**224,600**	205,000	210,000	215,000	220,000	**225,000**	225,000	225,000	225,000	225,000	**225,000**
Direct Investments	**165,000**	150,000	170,000	190,000	220,000	**225,000**	225,000	225,000	225,000	225,000	**225,000**
Total Commitments by Year	**577,700**	560,000	590,000	620,000	660,000	**675,000**	675,000	675,000	675,000	675,000	**675,000**

ALASKA RETIREMENT MANAGEMENT BOARD

2017 ANNUAL TACTICAL PLAN FOR PRIVATE EQUITY

The Alaska Retirement Management Board's (ARMB) "Private Equity Partnerships Portfolio Policies and Procedures" calls for the preparation and adoption of an "Annual Tactical Plan" (Plan). The Plan reviews the current status of the portfolio, historical and prospective market conditions, and the annual investment strategy designed to further the ARMB's goals and objectives for the private equity program.

The Plan consists of an overview and summary prepared by staff with integrated tactical plans prepared by the ARMB's private equity investment managers. Staff's overview and summary of the ARMB's consolidated private equity portfolio addresses the following:

I. 2016 Investment Activity
II. Funding Position
III. Diversification
IV. Market Conditions
V. 2017 Tactical Plan

OVERVIEW AND SUMMARY

Quality private equity portfolios have historically provided high long-term returns with lower correlation to bonds and public equities. The Alaska retirement systems started investing in private equity in 1998 to enhance returns and further diversify the portfolio. The ARMB makes direct partnership investments and employs investment managers, or gatekeepers, who have discretion to make investments in private equity partnerships on the systems' behalf.

The initial gatekeeper, Abbott Capital Management, was hired in 1998 with an allocation of 3% of the Fund. In 2001, the allocation to private equity was increased to 6% and an additional gatekeeper, Pathway Capital Management, was hired. The following year, the allocation to private equity was increased to 7%. In 2007, the ARMB delegated authority to the CIO to make direct investments in private equity partnerships. The long term allocation has increased gradually to the current allocation of 12% adopted in 2016. For the 2017 tactical plan, staff recommends that the ARMB maintain the long term allocation target of 12% for private equity.

The ARMB and its advisors have discretion to carefully select and invest in high quality partnerships while preserving diversification across strategy, industry, geography, and investment stage. Through 2016, the Alaska retirement systems have committed $5.4 billion to private equity partnerships. This capital is typically drawn down over 5-7 year periods and 75% has been drawn through 2016. The invested value at the end of calendar year 2016 was $2.0 billion, or 8.2% of the Fund's asset allocation.

The private equity landscape has been dynamic since Alaska's initial investment in 1998. The collapse of the technology-focused market of the late 1990's gave way to a period of slow rebuilding in the early 2000's. By 2005, private equity was again realizing high returns driven by

buyout-oriented investments. The market peak in 2007 was characterized by strong returns, but also by high prices and leverage. In 2008, the severe dislocation in the capital markets slowed private equity activity and lowered returns. The sharp market rebound in 2009 and 2010 benefited private equity portfolios, but also resulted in a shorter buying opportunity than usually accompanies a recession. The last several years through 2016 have marked the return of high distributions and gains and also high prices and leverage.

Throughout this dynamic period, the ARMB has assembled a strong and diversified portfolio of high quality partnerships using a disciplined investment approach. The portfolio has performed well when compared with the Cambridge private equity universe. For the fourteen vintage years from 1998 through 2011, the ARMB portfolio was in the top quartile for two years, the second quartile for eleven years, and the third quartile for one year. Overall the program is in the middle of the second quartile.

The internal rate of return (IRR) for the portfolio is 10.9% from inception through 2016. The ARMB's private equity return compares favorably with public market equity investments. A public market equivalent return analysis treats the ARMB's private equity cash flows as if they had been used to buy or sell shares of a public market index. The 10.9% IRR for the ARMB private equity portfolio compares well with public market equivalent returns of 7.3% for the Russell 3000 and 7.4% for the ARMB public equity policy benchmark. The ARMB's long term benchmark for private equity is the Russell 3000 public market index plus 350 basis points and the actual outperformance has been 366 basis points. The 10 year time weighted return for the private equity portfolio is 11.0% versus 7.4% for the Russell 3000 and 5.5% for the ARMB public equity policy benchmark. Since inception, the ARMB's private equity program has generated $925 million in additional fund value compared to investing in the public equity markets.

Private equity is expected to continue to deliver meaningful premiums over public market equities. The ARMB has adopted a long term asset allocation target for private equity of 12%. Consistent with this target, staff is recommending an allocation of $560 million in new commitments to be placed in quality, well diversified partnerships by Abbott, Pathway, and the ARMB. This commitment pace should allow the ARMB private equity portfolio to achieve the long term allocation over the ten year planning horizon.

I. 2016 INVESTMENT ACTIVITY

A. COMMITMENTS

The commitment target for 2016 was $530.0 million and the ARMB closed on a combined total of $577.7 million in new primary and secondary commitments.

Manager	Target	Actual	Number of Investments	Investment Strategy					
				Venture	%	Buyout	%	Special Situations	%
Abbott	$200.0	$188.1	16	$73.9	39%	$86.1	46%	$28.1	15%
Pathway	$200.0	$224.6	21	$65.9	29%	$131.0	58%	$27.7	12%
Direct	$130.0	$165.0	4	$0.0	0%	$25.0	15%	$140.0	85%
Total	**$530.0**	**$577.7**	**41**	**$139.8**	**24%**	**$242.1**	**42%**	**$195.8**	**34%**

The ARMB made 41 investments across 35 partnership groups. Abbott, Pathway and the Direct portfolio all invested in Advent International's latest fund and Abbott and Pathway both invested in Madison Dearborn Capital Partners VII.

The following tables summarize the commitments made during 2016:

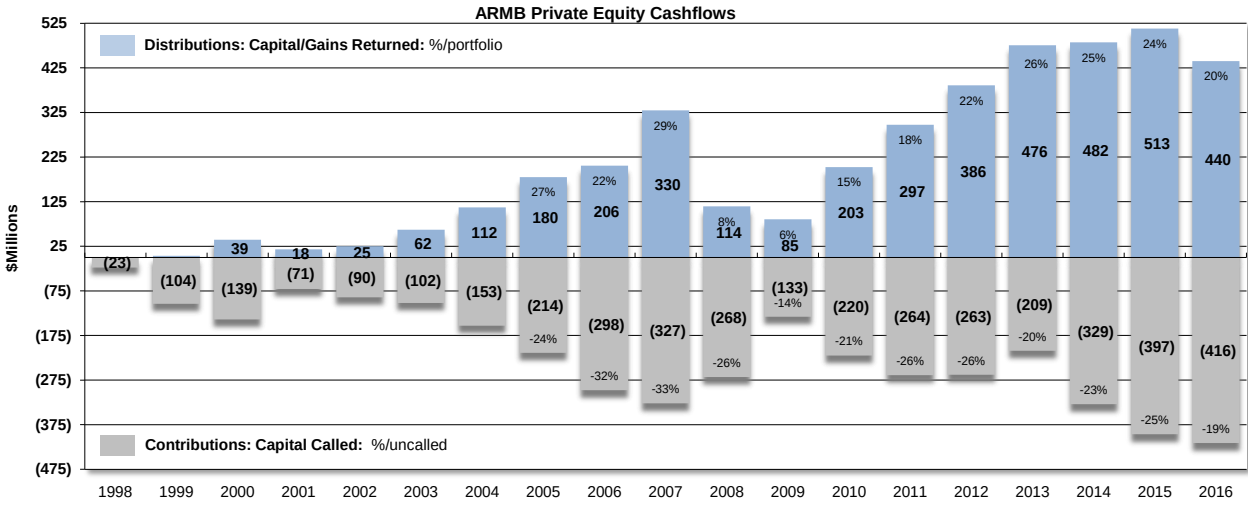
Strategy	Partnership Fund	Description	Amount	% Total	Date	Manager
Venture Capital	Battery Ventures XI	Fund XI is a multi-stage venture fund focused on investing in technology companies.	$10.6	1.8%	2/16/16	Abbott
	Battery Ventures XI - Side Fund	Fund XI - Side Fund invests alongside Battery Ventures XI in more mature companies originated from the growth and buyout partners.	$5.0	0.9%	2/16/16	Abbott
	GGV Capital VI	Fund VI invests in early-stage and later-stage companies in consumer, on-demand apps, social, mobile, games, Internet of Things (IOT).	$5.0	0.9%	2/12/16	Abbott
	GGV Capital VI Plus	Fund VI Plus invests in early-stage and later-stage companies in consumer, on-demand apps, social, mobile, games, Internet of Things (IOT).	$1.7	0.3%	2/12/16	Abbott
	Holtzbrinck Co-Investment	Late-stage venture capital investments in existing, outperforming Holtzbrinck Ventures portfolio companies.	$6.7	1.2%	7/26/16	Pathway
	Lightspeed Venture Partners Select II	Fund Select II will make primarily later-stage investments in enterprise IT and consumer Internet.	$5.2	0.9%	3/4/16	Abbott
	Lightspeed Venture Partners XI	Fund XI will make early-stage investments (~80%) in enterprise IT and consumer Internet companies.	$5.2	0.9%	3/4/16	Abbott
	Longitude Venture Partners III	Venture growth investments in drug development, medical technology, and special situations across privately-held and publicly-traded companies.	$11.7	2.0%	5/11/16	Abbott
	Mayfield Select	Later-stage financing rounds in existing Mayfield portfolio companies/new investments in which Mayfield funds have received an appropriate allocation.	$2.0	0.3%	4/27/16	Pathway
	Mayfield XV	Fund XV invests in seed- and early-stage venture capital companies in information technology in the U.S., India and China.	$3.6	0.6%	4/27/16	Pathway
	IVP VII & VIII and Insight VI (Secondaries)	Secondary interest in a portfolio of three venture capital partnerships focused on late-stage and growth equity investments.	$3.7	0.6%	7/1/16	Pathway
	Shasta V	Early-stage information technology investments in the consumer, enterprise, and connected device sectors in the United States.	$25.0	4.3%	6/30/16	Pathway
	Sofinnova Venture Partners X	Invests primarily in later-stage biotech investments with a bias for financing companies around later-stage products focused on orphan diseases.	$25.0	4.3%	8/9/16	Abbott
	TCV IX	Fund IX makes growth equity and late-stage investments in companies operating in the Internet, software, infrastructure, and service sectors.	$25.0	4.3%	2/19/16	Pathway
	UV Partneers IV and Pelion Ventures V (Secondaries)	Early-stage fund focused on technology investments.	$4.6	0.8%	11/7/16	Abbott
	Venture Capital Subtotals		***$139.8***	***24.2%***		

Strategy	Partnership Fund	Description	Amount	% Total	Date	Manager
Buyouts	Advent International GPE VIII-B	Fund VIII-B will make investments in buyout and recapitalization opportunities in Western European and North American companies.	$25.0	4.3%	2/5/16	Pathway
	Advent International GPE VIII-B	Fund VIII-B will make investments in buyout and recapitalization opportunities in Western European and North American companies.	$25.0	4.3%	2/5/16	Abbott
	Advent International GPE VIII-B	Fund VIII-B will make investments in buyout and recapitalization opportunities in Western European and North American companies.	$25.0	4.3%	3/1/16	Direct
	Co-Investment 2016-7	Co-investment 2016-7 invested in a U.S.-based provider of business-intelligence software used for data analysis and visualization.	$1.8	0.3%	8/22/16	Pathway
	Co-Investment 2016-8	Co-investment 2016-8 invested in a U.S.-based provider of comprehensive intellectual property and scientific information.	$4.0	0.7%	9/14/16	Pathway
	Co-Investment 2016-9	Co-investment 2016-9 invested in a specialty designer, marketer, and distributor of carpet and soft-floor covering products.	$1.7	0.3%	11/21/16	Pathway
	Co-Investment 2016-10	Co-investment 2016-10 invested in a provider of cloud-based human capital management software.	$4.0	0.7%	11/23/16	Pathway
	Co-Investment 2016-11	Co-investment 2016-11 invested in a Medicare Advantage health plan and card provider.	$4.0	0.7%	11/29/16	Pathway
	Co-Investment 2016-12	Co-investment 2016-12 invested in a provider of cloud-based software solutions for faith-based organizations.	$4.0	0.7%	11/30/16	Pathway
	Halifax Capital Partners IV	Fund IV invests in value-oriented control investments in lower middle-market health and wellness, franchising and logistics/distribution businesses.	$9.2	1.6%	12/8/16	Abbott
	Livingbridge 6	Invests in fast-growing companies in the U.K. lower middle market focusing on consumer, business services, healthcare and education and TMT.	$17.7	3.1%	7/28/16	Abbott
	Madison Dearborn Capital Partners VII	Buyout and growth equity investments in middle- and upper-middle-market market companies primarily in the U.S.	$20.0	3.5%	7/13/16	Pathway
	Madison Dearborn Capital Partners VII	Buyout and growth equity investments in middle- and upper-middle-market market companies primarily in the U.S.	$25.0	4.3%	5/25/16	Abbott
	Marlin Heritage Europe	Small and middle-market buyouts of companies experiencing situational, operational, and/or financial distress.	$14.9	2.6%	7/11/16	Pathway
	Parthenon Investors V	Invests in middle market growth companies in financial services, healthcare services and business and technology services in the U.S.	$9.3	1.6%	5/27/16	Abbott
	Permira VI	Buyouts of upper-mid-market and large-cap companies, broadly diversified by both geography and industry.	$24.7	4.3%	7/1/16	Pathway
	Thoma Bravo XII	Control investments in middle-and large-market software- and technology-enabled services companies.	$10.0	1.7%	2/23/16	Pathway
	Trident VII (Stone Point)	Control positions or substantial minority positions in companies operating in the global insurance and financial services industries.	$16.9	2.9%	9/22/16	Pathway
	Buyout Subtotals		***$242.1***	***41.9%***		
Special Situations	ABRY Senior Equity V	Fund V is raising $1.05B to pursue senior equity transactions within the broadly-defined media, communications, business and information services.	$10.2	1.8%	11/21/16	Abbott
	Centerbridge SCP III	Non-control distressed investments primarily in North America and Europe.	$7.5	1.3%	5/17/16	Pathway
	Centerbridge SCP III - Flex	Non-control distressed investments primarily in North America and Europe.	$17.5	3.0%	5/17/16	Pathway
	Dyal Capital Partners III	Dyal will construct a portfolio of 10-12 minority stake investments in high quality GP's of private equity firms and other alternative asset managers.	$50.0	8.7%	11/1/16	Direct
	Fortissimo IV (Secondary)	Fortissimo IV seeks control and significant non-control equity-related investments in global technology and industrial companies.	$2.7	0.5%	9/15/16	Pathway
	Neuberger Berman Secondary Opportunities Fund IV	Invests primarily in U.S. and Western Europe buyout funds in a variety of industries.	$50.0	8.7%	6/1/16	Direct
	Summit XI	Buyouts/growth equity in high-growth companies that have proven business models and based primarily in the U.S.	$40.0	6.9%	6/1/16	Direct
	Warburg Pincus China	Early stage/growth in healthcare, consumer/financial services, TMT, real estate, energy and business services.	$17.9	3.1%	12/12/16	Abbott
	Special Situations Subtotals		***$195.8***	***33.9%***		
Abbott Subtotal			**$188.1**	**32.6%**		
Pathway Subtotal			**$224.6**	**38.9%**		
Direct Subtotal			**$165.0**	**28.6%**		
TOTAL ($MM)			**$577.7**	**100.0%**		

B. INVESTMENT ACTIVITY

The ARMB's capital commitments are called down by private equity partnerships as they make investments in underlying portfolio companies. Capital calls made during 2016 by the ARMB's private equity groups totaled $415.9 million, a 5% increase from the level of 2015 investments. Capital calls were 19% of uncalled capital, below the long term average and likely a reflection of the high priced environment. Capital calls by strategy were 44% buyout, 32% special situations, and 24% venture capital.

The ARMB received $440.2 million in distributions from private equity partnerships in 2016, a 14% decrease from 2015 due largely to a decrease in public offerings. Distributions were 20% of the portfolio for 2016, below the pace of 2014 and 2015 and well below the 2007 peak of 29%. The distributions were split 39%, 44% and 17% between the Abbott, Pathway and Direct portfolios respectively.



C. STOCK DISTRIBUTIONS

During 2016, Abbott and Pathway sold $20.5 million in stock distributed in-kind to the ARMB. The ARMB experienced a 4.5% loss on the $12.8 million sold by Abbott and a 2.5% loss on the $7.8 million sold by Pathway. Losses of 5% or more are not uncommon due to the potential for significant selling pressure when a general partner distributes large stock holdings to limited partners. The ARMB has processes in place to avoid some of the selling pressure, but the sales process is still volatile. Staff reviewed the 2016 sales and is satisfied with the process that was used to liquidate the in-kind distributions.

II. FUNDING POSITION

A. FUNDING POSITION AS OF DECEMBER 31, 2016

The net asset value of the ARMB's private equity portfolio was $2.0 billion as of 12/31/16, an increase of $146.4 million from 2015. The private equity portfolio represented 8.2% of total assets, below the current asset allocation target of 9%.

Total Fund Market Value 12/31/16 ($MM)	$23,783.8
Target Percent for Private Equity	9.0%
Target Private Equity Allocation	**$2,140.5**
Abbott Net Asset Value	$795.6
Pathway Net Asset Value	846.9
Direct Net Asset Value	317.7
Total Private Equity Portfolio Value	**$1,960.2**
Fund Percent 12/31/16	**8.2%**

Private equity is an illiquid, long-term asset class and the economic environment can significantly affect asset values and cash flows from year-to-year. As a result, private equity has a wide 5% band above and below the ARMB's asset allocation.

B. PROJECTED FUNDING POSITION 2021 – BASED ON FUNDING MODEL IN APPENDIX I

Projected Fund Market Value Year End 2021 ($MM):	$27,562.4
Projected Private Equity Asset Value:	$2,923.1
Percent of Total Fund:	10.6%

The recommended long term allocation to private equity is 12% and with the suggested commitment pacing, the ARMB is expected to reach this target within 10 years.

C. FUNDING BY STRATEGY

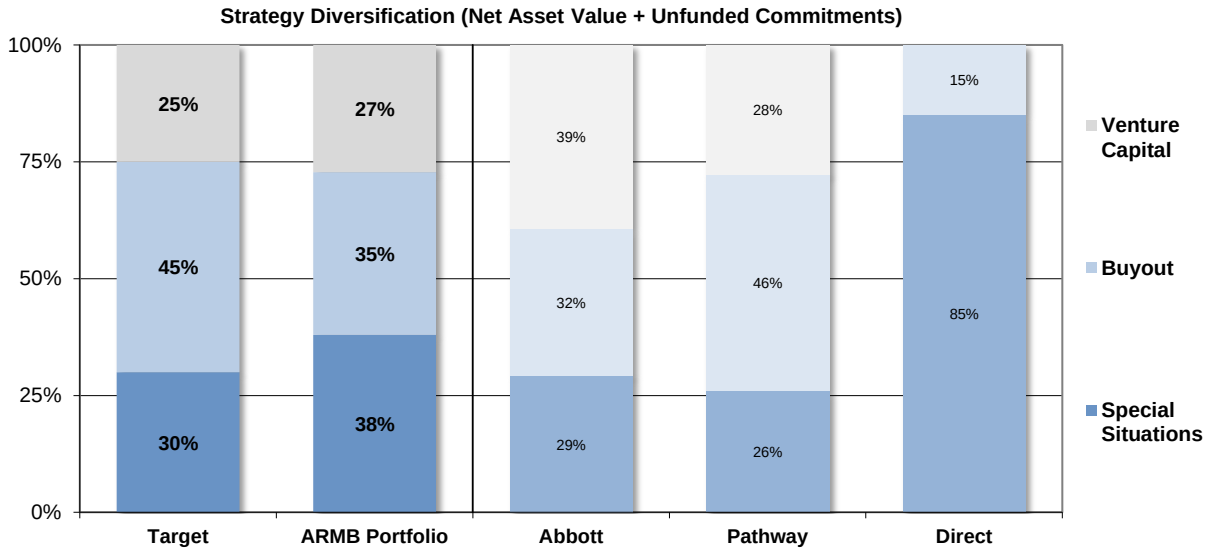
The private equity portfolio has long-term strategy diversification targets with a broad range between minimum and maximum exposure. The portfolio is within acceptable strategy ranges for 2016.

Strategy	Target	Min	Max	Commitments	Capital Called	Unfunded + Capital Called
Venture Capital	25%	15%	40%	25.2%	26.9%	24.9%
Buyouts	45%	30%	60%	36.9%	37.3%	37.9%
Special Situations/Other	30%	20%	40%	37.9%	35.8%	37.2%
Total	**100%**			**100.0%**	**100.0%**	**100.0%**

III. DIVERSIFICATION

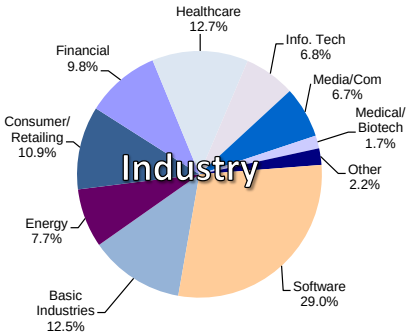
A. INVESTMENT STRATEGY BY PARTNERSHIP AS OF DECEMBER 31, 2016

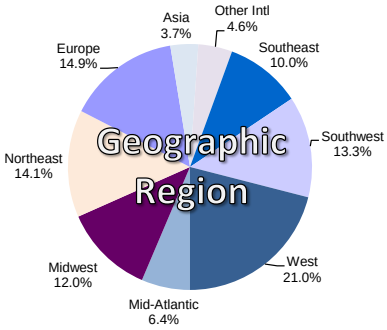
The net asset value of the ARMB's private equity portfolio was $2.0 billion, with Abbott representing 41%, Pathway 43%, and Direct investments 16%. The portfolio is well diversified by investment strategy. Both the Abbott and Pathway portfolios are well diversified across venture capital, buyout, and special situations, although Abbott's portfolio is at the high end of the venture capital range. The direct partnership portfolio has significant investments in special situations, secondary, and multi-strategy funds that are inherently well diversified. Staff expects that long term diversification will be maintained since managers are focused on making new commitments to a diverse set of high quality funds.

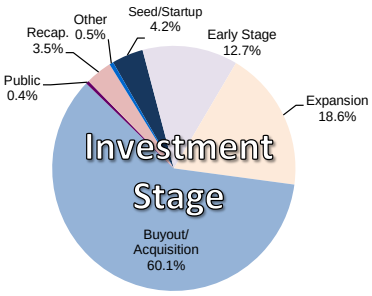


B. INDUSTRY, GEOGRAPHIC REGION AND INVESTMENT STAGE ON SEPTEMBER 30, 2016

The portfolio is well diversified by industry. The largest allocation is 29.0% to software, which is inherently well diversified by underlying sector exposure. By geography, the portfolio is well diversified within the United States and has strong international exposure at 23.2% of the portfolio. By investment stage, buyout/acquisition is the highest at 60.1% since the portfolio is buyout focused.





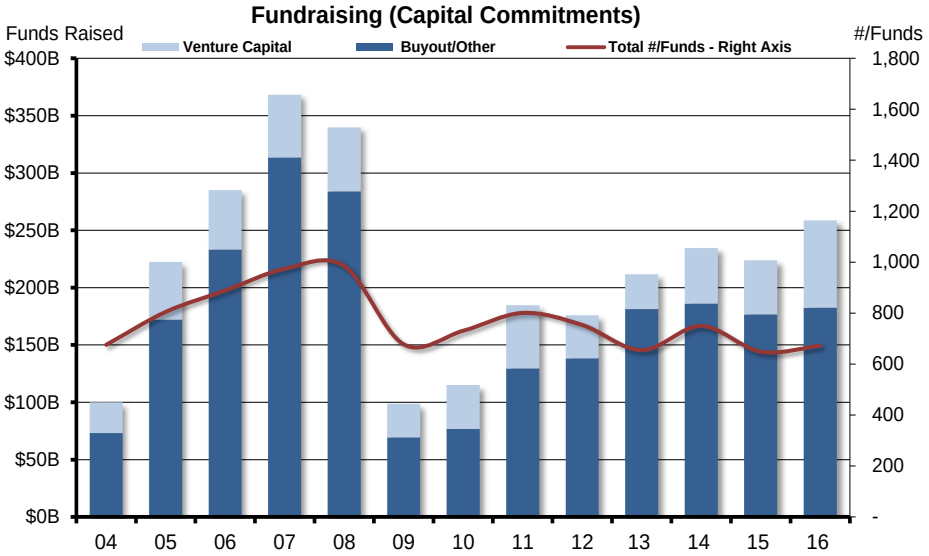


IV. MARKET CONDITIONS

A. 2016 SUMMARY

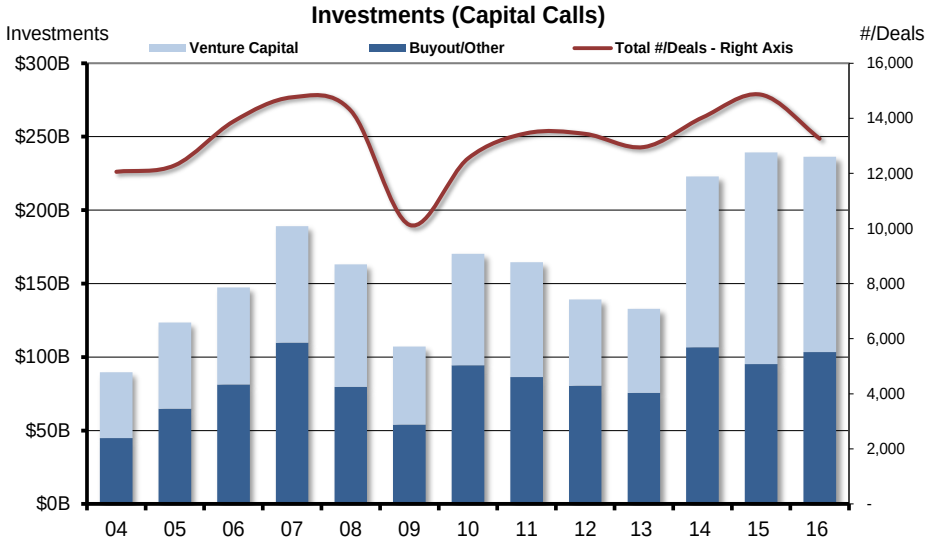
FUNDRAISING

- Fundraising has been stable, with a notable increase in venture capital for 2016.
- Terms are balanced, but trending towards more GP-friendly as sought-after managers have increasing market power.



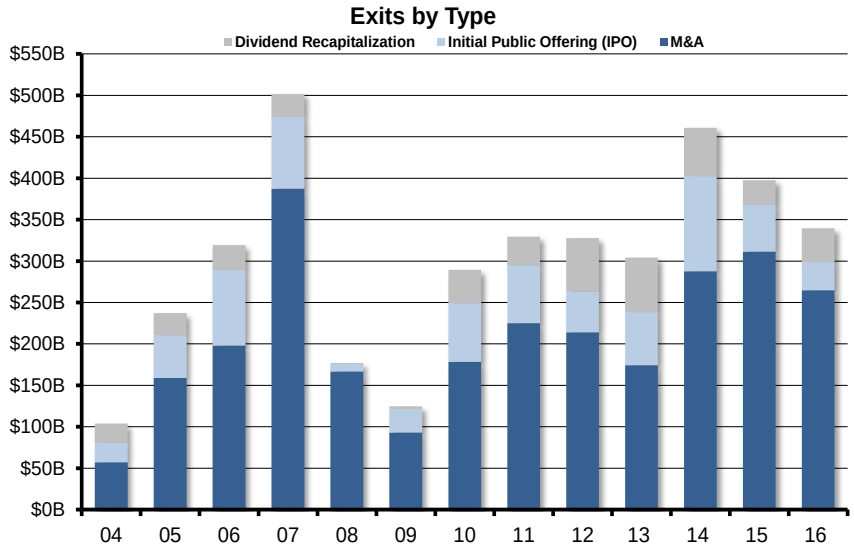
INVESTMENT ACTIVITY

- Investment activity continued at a high level for both buyout and venture funds as credit markets were accommodative and market participants were willing to transact at high prices.
- Investment activity was roughly equal to fundraising levels – dry powder remained roughly the same overall.
- Deal pricing remains high, but has decreased from the 2015 peak.



EXIT OPPORTUNITIES

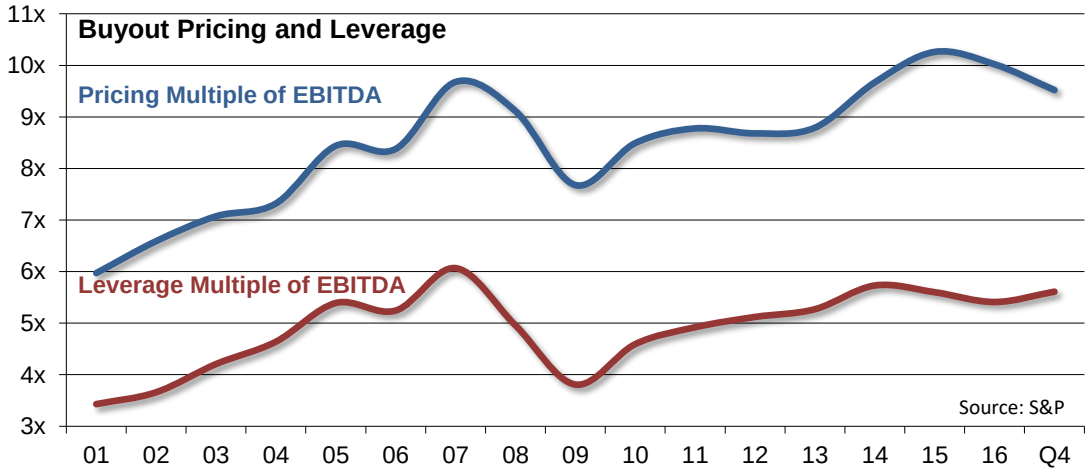
- Private equity exits have been strong for seven years, but decreased in 2016 due to the impact higher public market volatility had on IPO's and M&A.
- Merger and acquisition activity decreased to $265 billion.
- Public market exits peaked in 2014, but decreased again in 2016 to $34 billion.
- Debt recapitalizations increased from last year's level to $41 billion.



Sources: Thomson ONE & S&P. Global developed markets, except dividend recapitalization data which is U.S. only.

B. FORWARD OUTLOOK FOR 2017

- ***Exits linked to public markets.*** The exit environment for private equity is tied to the strength of public equity markets. The current bull market is extended and as long as it continues, mergers and acquisitions should remain at high levels due to abundant corporate cash and modest internal growth prospects. Similarly, the initial public offering and credit markets should also continue to supply opportunities for liquidity.
- ***Stable fundraising.*** Fundraising has been relatively stable for the past several years and is expected to continue at roughly the same pace since many firms have been actively returning capital and the investment pace has picked up over the past two years. Getting access to the highest quality partnerships will continue to be challenging and closing times have decreased markedly for sought-after firms.
- ***More moderate investment pacing and pricing.*** After peaking in 2015, deal pricing decreased in 2016 and leverage increased modestly. Both should remain in a similar range unless market volatility increases.



V. 2017 TACTICAL PLAN

Staff recommends a commitment target of $560 million for 2017 with an increase in commitment pacing over the next ten years as detailed in Appendix I.

A. TARGET COMMITMENTS FOR 2017

Manager	Target Commitments	Number	Size per Fund	Strategies
Abbott	$205 million	8-14	$10-$30M	Venture capital, buyout, special situations, other
Pathway	$205 million	8-14	$10-$30M	
Direct Investments	$150 million	2-5	$10-$75M	
Total	**$560 million**	**18-33**	**$10-$75M**	

Abbott and Pathway have the ability to commit up to 50% beyond their target allocation with CIO approval to access additional opportunities. The chief investment officer also has the delegated authority to commit up to 1% of total defined benefit assets in addition to the targeted amount for direct partnership investments.

B. TARGET STRATEGIES FOR 2017

The investment opportunities are expected to be balanced by strategy and by the ARMB's other diversification guidelines. The absolute quality of the underlying manager continues to be more important than strict adherence to diversification characteristics. The manager-specific tactical plans for Abbott and Pathway follow in Appendix II and III.

APPENDIX I – PRIVATE EQUITY FUNDING PROJECTIONS

Private Equity Funding Schedule	2016	2017	2018	2019	2020	**2021**	2022	2023	2024	2025	**2026**
Beginning Fund Assets($MM)	**22,968,043**	23,783,837	24,547,645	25,296,185	26,072,558	**26,835,343**	27,562,397	28,235,471	28,853,185	29,414,531	**29,910,755**
Fund Net Growth Rate	**3.6%**	3.2%	3.0%	3.1%	2.9%	**2.7%**	2.4%	2.2%	1.9%	1.7%	**1.5%**
Additions from Net Fund Growth	**815,793**	763,809	748,539	776,373	762,785	**727,055**	673,073	617,714	561,346	496,224	**442,523**
Ending Fund Assets	**23,783,837**	24,547,645	25,296,185	26,072,558	26,835,343	**27,562,397**	28,235,471	28,853,185	29,414,531	29,910,755	**30,353,277**
Asset Value by Manager ($MM)											
Abbott	**795,643**	837,834	884,180	934,428	984,750	**1,025,819**	1,087,692	1,139,770	1,179,601	1,209,195	**1,231,029**
Pathway	**846,876**	884,699	931,791	983,797	1,030,494	**1,067,539**	1,124,623	1,167,166	1,201,039	1,224,389	**1,240,392**
Direct Investments	**317,658**	411,343	509,190	615,737	726,614	**833,988**	919,888	1,003,613	1,074,325	1,130,450	**1,177,000**
Total Projected Asset Value	**1,960,178**	2,133,876	2,325,161	2,533,962	2,741,858	**2,927,346**	3,132,202	3,310,549	3,454,965	3,564,034	**3,648,421**
Private Equity % of Fund	**8.2%**	8.7%	9.2%	9.7%	10.2%	**10.6%**	11.1%	11.5%	11.7%	11.9%	**12.0%**
Annual Commitments ($MM)											
Abbott	**188,100**	205,000	210,000	215,000	220,000	**225,000**	225,000	225,000	225,000	225,000	**225,000**
Pathway	**224,600**	205,000	210,000	215,000	220,000	**225,000**	225,000	225,000	225,000	225,000	**225,000**
Direct Investments	**165,000**	150,000	170,000	190,000	220,000	**225,000**	225,000	225,000	225,000	225,000	**225,000**
Total Commitments by Year	**577,700**	560,000	590,000	620,000	660,000	**675,000**	675,000	675,000	675,000	675,000	**675,000**

NOTES ON FUNDING PROJECTION MODEL

- The Fund's projected net growth rates are based on current actuarial projections adjusted for actual 12/31/16 Fund values.
- Investment commitments, distributions, and both unrealized and realized gains are modeled at a level commensurate with past industry performance and future expectations.
- Commitments are scheduled at a pace to achieve the ARMB's long term private equity allocation and preserve vintage year time diversification.

Abbott Capital Management Annual Tactical Plan

I. 2016 INVESTMENT ACTIVITY

A. 2016 Fund Commitments

On behalf of ARMB, Abbott committed $188.1 million to 15 primary commitments and one secondary transaction in 2016 versus a target of $200 million.

1. Primary Activity

In 2016, Abbott closed on 15 primary commitments totaling $183.5 million on ARMB's behalf as listed below:

Primary Fund Commitments: 2016			
Fund	**Strategy**	**Commitment**	
GGV Capital VI	VC – Multi-stage	$5.0	million
GGV Capital VI Plus	VC – Multi-stage	1.7	million
Battery Ventures XI	VC – Multi-stage	10.6	million
Battery Ventures XI Side Fund	VC – Later-stage	5.0	million
Lightspeed Venture Partners XI	VC – Early-stage	5.2	million
Lightspeed Venture Partners Select II	VC – Later-stage	5.2	million
Longitude Venture Partners III	VC – Later-stage	11.7	million
Sofinnova Venture Partners X	VC – Later-stage	25.0	million
Madison Dearborn Capital Partners VII	Special Situations – Hybrid	25.0	million
Parthenon Investors V	Medium Buyout	9.3	million
ABRY Senior Equity V	Special Situations – Subordinated Debt	10.2	million
Halifax Capital Partners IV	Small Buyout	9.2	million
Advent International GPE VIII	Large Buyout	25.0	million
Livingbridge 6*	Small Buyout	17.7	million
Warburg Pincus China	Special Situations – Hybrid	17.9	million
		$183.5	**million**

*Commitment to Livingbridge 6 was £13.5. Commitments with respect to partnerships denominated in non-U.S. currency reflect the USD commitment amounts at the time of closing. Slight differences may exist due to rounding.

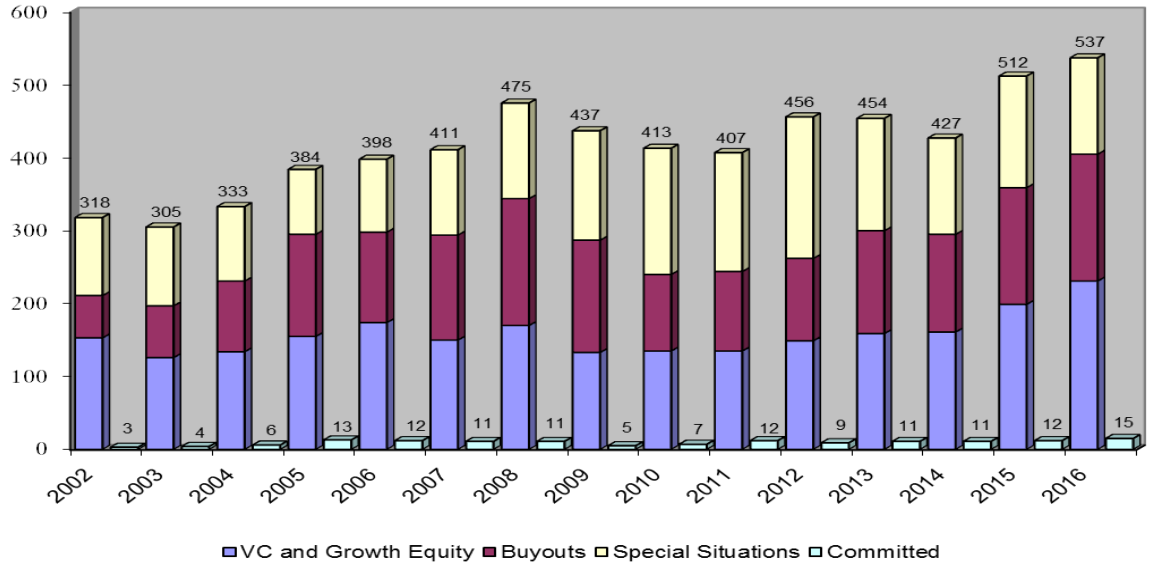
2. Secondary Activity

In 2016, Abbott committed to one secondary transaction on behalf of ARMB, **UV Partners IV & Pelion Ventures V**, two early-stage funds focused on technology investments, for $4.6 million maximum cash outlay.[1]

[1] Maximum cash outlay equals the purchase price plus the unfunded commitments at the time of purchase.

B. Deal Flow

Abbott reviewed 537 primary fund opportunities across all categories of private equity in 2016, the highest amount reviewed in the past 15 years. Abbott committed to 15 of these funds on behalf of ARMB.



II. ARMB PORTFOLIO REVIEW

A. Review and Analysis of ARMB's Program Activity

From the inception of ARMB's private equity program in 1998 through December 31, 2016, Abbott has committed $2.41 billion to 200 private equity funds through primary commitments across the three broad categories of diversification (venture capital and growth equity, buyouts and special situations). ARMB's average commitment amount to these partnerships is approximately $12.1 million. Abbott has been notified that six of these partnerships were fully liquidated in 2016: Austin Ventures VI, CVC European Equity Partners II, GTCR Fund VI, Morgenthaler Partners VI, Welsh, Carson, Anderson & Stowe VIII, and Welsh, Carson, Anderson & Stowe IX. ARMB has also purchased 22 secondary interests in 20 funds totaling $26.6 million in maximum cash outlay. As of December 31, 2016, ARMB has cumulatively made 222 partnership investments representing $2.44 billion in primary commitments and secondary maximum cash outlay.

Based on information available to Abbott as of the report date, ARMB's portfolio should be able to achieve the year-end 2021 Net Asset Value Target through continued deployment of capital over the next five tactical plan periods. At December 31, 2016, the active portfolio was valued at $796.1 million, including a pooled partnership net asset value of $795.6 million and $0.5 million of publicly-traded stock (pending sale or settlement) held by ARMB as of December 31, 2016.[2] As evidenced in prior years, investment/distribution activity combined with valuation changes may cause the portfolio to be somewhat over or under its target allocation depending on the economic cycle. However, provided that the portfolio experiences a consistent level of commitments and distributions, ARMB's private equity funding projections indicate that the Net Asset Value will remain near its targeted level as the portfolio matures.

[2] The pooled portfolio value for the ARMB account included herein is based on the aggregate portfolio fund values as of September 30, 2016, adjusted by all cash flows through December 31, 2016, plus the value of distributed stock not yet sold as of December 31, 2016. Pursuant to the request of ARMB, ARMB receives an expedited statement on the last business day of each month, and therefore, the pooled portfolio value reported by ARMB elsewhere in this report reflects an estimated year-end pooled portfolio value based on portfolio fund values as of September 30, 2016, adjusted solely for cash flows through December 31, 2016 and the value of distributed stock not yet sold as of December 31, 2016. Actual values as of December 31, 2016 will differ from those reported above.

B. Portfolio Performance

The ARMB IRR since inception, net of management fees paid to Abbott, was 9.5% as of September 30, 2016; the IRR remained constant from last year. Although private equity is an asset class that should be measured over the long term, ARMB's one-year return on the portfolio, gross of investment management fees paid to Abbott, was 10.0% as of September 30, 2016.

ARMB's long-term performance as of September 30, 2016 is also favorable when compared to various public indices in a public market equivalent ("PME") calculation. Through September 30, 2016, the long-term performance of the ARMB program outperformed the S&P 500 and Russell 3000 by 435 and 372 basis points, respectively, according to Abbott's public market equivalent analysis.

As of September 30, 2016	**Performance**	**Outperformance**
ARMB IRR (net of Abbott fees)	9.5%	**N/A**
PME Benchmark (S&P 500)	5.1%	**4.4%**
PME Benchmark (Russell 3000)	5.7%	**3.7%**

III. GENERAL MARKET OVERVIEW

A. Venture Capital and Growth Equity

Investment activity within venture capital and growth equity remained robust in 2016 with $122.1 billion invested globally, a slight decrease from $138.7 billion in 2015. While 2016 saw a nominal decrease in venture capital investing, the total invested amount remains well above the $64.3 billion average invested between 2001 and 2013. Venture investments from corporate investors, benefitting from strong balance sheets, continue to increase and accounted for more than 13% of all venture capital deals in the U.S. last year compared to 10% in 2015. Global venture capital fundraising continued to remain healthy, with many larger, experienced general partners raising capital for new funds, and investors willing and able to deploy capital into venture capital and growth equity strategies.

Corporate acquisitions and private equity mergers and acquisitions have continued to account for the largest portion of venture-backed exits, accounting for over 94% of all exits. Strategic acquirers that are not traditionally associated with technology have been able to look to the venture market to find companies that are operationally additive and bring fresh technological innovation. Walmart and Unilever are good examples as evidenced by their large purchases of Jet.com and Dollar Shave Club, respectively. Furthermore, major private equity firms have raised rather large tech-focused funds that will bolster venture-backed M&A exits. The acquisitions of Marketo, Qlik Technologies, and Ping Identity are examples of large sales to private equity in 2016. Venture capital public offerings produced $4.2 billion of total transaction value in 2016, a 64% decrease from $11.8 billion in 2015. A total of 39 venture-backed companies went public in 2016 which is approximately half the number of IPOs from 2015. Furthermore, this is the lowest number of public offerings since 2009 when there were only 10 venture-backed IPOs following the global financial crisis. IPO activity is projected to increase in 2017 with around 20 venture-backed companies currently in registration. The successful and highly-anticipated IPO of Snap is expected to serve as a bellwether of market reception for additional venture-backed public exits yet to occur in 2017.

The past year saw the highest amount of venture capital raised for funds in at least a decade with $59.0 billion raised in 2016 compared to $47.0 billion in 2015, a 25% increase. Despite the increase in capital raised by venture and growth equity funds, the total number of funds closed in 2016 declined slightly for the second consecutive year. At a total of 405 funds seeking capital, there were 2% fewer funds in the market than in 2015. Larger venture firms came back to the market in 2016 closing $1 billion+ funds which coincided with more capital being managed by fewer funds, leading to an increased concentration of capital in the venture industry. U.S. funds raised $42.0 billion in capital, a 20% increase over the $35 billion raised in 2015.

Although global venture capital and growth equity investments decreased 9%, the number of transactions decreased at a higher rate of 16% from 2015 to 2016. Private valuations and deal sizes grew or stayed flat during 2016 keeping deal value high on a relative basis. However, outsized venture funding rounds were returned to a more manageable level as there were 40% fewer $100 million+ financings in 2016 than in 2015. A trend throughout the venture capital

and growth equity industry during 2016 focused on investors setting a higher benchmark for startup funding with a return to evaluating core company fundamentals rather than simply growth metrics. This is in contrast to the venture activity in 2014 and 2015 that saw massive funding rounds for Uber, Airbnb, and Snap.

B. Buyouts and Special Situations

Distribution activity was again the headline from 2016 within the buyout and special situations segment, continuing a trend that has been in place since 2013. Portfolio liquidity was brought about by a strong year for mergers and acquisitions, dominated by strategic purchases by corporate buyers. Buyout IPO activity was mixed globally with NAPE transaction value down 52% vs. 2015, but ex-NAPE transaction value up 61% and SBO transaction value up 45% vs. 2015. In general, distributions continue to exceed capital calls.

Leverage and shadow capital also continues to be available in the current low interest rate environment.

Buyout and special situations firms globally raised $178.7 billion, a 14% increase from 2015. Approximately $50 billion went to small-and-medium buyout funds globally. North America based firms raised 6% more capital compared to 2015, accumulating $98.4 billion, while ex-North America domiciled firms raised $30.0 billion in 2016, roughly flat compared to the prior year. Demand was driven by U.S. pensions seeking to fund growing liability gaps, sovereign wealth funds similarly seeking to fill funding gaps in a prolonged low commodity price environment as well as growing demand from retail high net worth investors. All in, dry powder reached another record level in 2016 and deal prices accordingly reached the highest levels since 2006.

Despite the influx of capital, global investment activity within buyouts fell nearly 29% from 2015. NAPE buyouts experienced a 21% decline in capital invested in the most recent election year and ex-NAPE buyouts experienced a 27% decline in capital invested due to concerns about Brexit and slowing emerging market growth. Globally, buyout and special situations firms invested $15.6 billion in nearly 855 companies.

C. Secondary Activity

Secondary transaction volume declined in 2016 to $37 billion following two record years of over $40 billion in annual transaction volume. A primary driver of volume compression was smaller average transaction size, which declined from approximately $200 million in 2015 to $180 million in 2016. While the trade of limited partner positions still dominates the type of secondary sales at 75% of all volume, general partner-led transactions such as secondary directs, fund restructurings, recapitalizations, spin-outs, and tender offers have expanded, composing 25% of activity versus 22% in 2015. The secondary market continues to be highly concentrated, with the top 10 largest buyers accounting for approximately 58% of transaction volume in 2016, down from 62% in 2015. The estimated level of dry powder for secondaries rose to a record high of over $70 billion at year-end 2016, up from $65 billion in 2015. The price of secondary deals remains competitive given sustained buy-side demand, although prices appear to have moderated slightly in 2016 due to public market volatility and a higher proportion of tail-end funds that were sold in the secondary market in 2016 compared to prior years. Pricing of buyout interests increased modestly to 95% of NAV in 2016, up from 94% in 2015. Furthermore, venture capital pricing increased by 3% to 78% of NAV in 2016. The increase in pricing for venture and buyout assets is largely a result of buyers demonstrating a flight to quality and an increased appetite for more recent vintage funds with strong perceived upside.

Endowments and foundations were the most active seller type, representing 24% of 2016 deal count yet only 11% of total volume. In terms of volume, public pensions continued to be the largest seller type accounting for almost one-third of deal flow in 2016. Buyout and venture funds continued to represent the bulk of the interests that trade on the secondary market accounting for 54% and 21% of funds sold in 2016, respectively.

End Notes to Market Conditions section
The information and charts presented in this document were generally sourced from the following materials.

Bain & Company: Global Private Equity Report 2017.
Greenhill Cogent: Secondary Market Trends Outlook, January 2017.
McKinsey & Company: McKinsey Global Private Markets Review, February 2017.

Lizard: Secondary Market – Lazard Review 2016.
Pitchbook: Venture Monitor, 4Q 2016.
Pitchbook: 2016 Annual, PE & VC Exits.
Setter Capital: Volume Report FY 2016.
Thomson Reuters/Thomson ONE database (Fundraising, Investments, M&A, IPOs). Data retrieved from Thomson Reuters is continuously updated and is therefore subject to change. All data in Thomson One derived from either Thomson Financial sources or public filings.
Venture Capital Journal: January 2017, Issue 1. "What to Expect in 2017."

IV. DIVERSIFICATION – SEE STAFF SUMMARY

A. Venture Capital and Growth Equity

ARMB has accumulated a well-diversified portfolio of 76 active venture and growth equity funds (not including 15 secondary commitments to existing funds). Abbott will continue to identify opportunities to build on ARMB's existing relationships with top-performing groups while selectively pursuing relationships with high-quality groups not currently in the ARMB portfolio.

B. Buyout and Special Situations

ARMB has a well-diversified portfolio of 93 active buyout and special situations partnerships (not including three secondary commitments). Similar to venture managers, Abbott will continue to seek to develop relationships with strong-performing groups and selectively seek high-quality firms that can augment the ARMB portfolio and add incremental diversification. We anticipate a strong year in terms of buyout and special situations commitments given funds currently in the market raising capital as well as Abbott's projected pipeline of opportunities, which includes a number of existing ARMB managers as well as potential new relationships.

C. International

ARMB's Private Equity Partnerships Portfolio Policies and Procedures provide target ranges for the eligible investment strategies. Global/International is currently allocated a range of up to 35%. In 2016, Abbott made three commitments to international partnerships on behalf of ARMB: **Advent International GPE VIII**, a large buyout fund that invests globally, **Livingbridge 6**, a lower-middle market buyout fund that invests in fast growing companies primarily in the UK, and **Warburg Pincus China**, a hybrid fund that will invest in Chinese firms.

V. MONITORING

A. Specific situations being monitored

Abbott has made 222 commitments (primary and secondary) to 202 partnerships on behalf of ARMB, 187 of which were active as of December 31, 2016. Abbott actively monitors these funds on an ongoing basis.

Among the partnership groups in ARMB's portfolio, many have advisory or valuation committees. Abbott serves on approximately half of these committees, which generally meet formally two to four times per year. Abbott also seeks to attend each annual meeting held for partnerships in the ARMB portfolio. Abbott regularly visits general partners in their offices as part of our ongoing due diligence, and general partners frequently visit Abbott to provide us with updates. Outside of formal meetings, Abbott speaks to general partners on a regular basis to deepen our understanding of the portfolio investments as well as the dynamics of the general partner groups. This process enables Abbott to make informed decisions regarding whether groups in the portfolio should be supported in the future. Abbott has periodic conference calls with ARMB staff to review and discuss current issues affecting the portfolio.

VI. EXITING

A. Pending Distributions or Liquidations

As detailed below, ARMB's portfolio experienced a decrease in distributions and capital calls in 2016 compared to the robust levels in 2015. Despite this dynamic, ARMB's portfolio was still highly cash generative in 2016 as total distributions, including distributed stock, outpaced capital calls by a 1.2:1 ratio, compared to a 1.5:1 ratio in 2015. In the near term, liquidity is expected to remain constant given strong merger and acquisition activity as IPO filings remain at low levels.

B. Any Other Relevant Considerations Relating to Exiting ARMB's Investments

In 2016, ARMB received cash distributions of $169 million compared to $199 million received in 2015. During 2016, ARMB also received securities valued at $10.9 million with a cost basis of $1.6 million. Distributed stock liquidated in 2016 (including distributed stock held as of December 31, 2015 pending settlement) was converted into net cash proceeds of $12.8 million during 2016. In aggregate, ARMB ultimately received $181.8 million in net cash proceeds[3] resulting from 2016 transaction activity, representing an approximate $34.8 million decrease over the net proceeds received in 2015.

VII. 2017 GOALS AND STRATEGY

Candidates Abbott is Aware of and/or Planning to Pursue

Abbott will continue to review partnerships that meet the guidelines of ARMB's strategic portfolio structure across all three broad categories of diversification. We anticipate several top-tier venture capital and growth equity, buyout and special situations groups currently in ARMB's portfolio will return to the market to raise fresh capital in 2017. Abbott expects new quality partnership opportunities will also arise, which will selectively be added to ARMB's portfolio mix. Whether a new or existing relationship, we will continue to apply our rigorous due diligence process to each opportunity.

Abbott will continue to focus on larger dollar commitments to top-tier private equity partnerships. It should be noted, however, that access to high-quality funds is frequently a significant barrier for limited partners, particularly those new to the asset class. As such, Abbott recommends that ARMB remain flexible with respect to commitment sizes, which will provide the portfolio the widest possible access to high-quality private equity partnerships. Subject to an acceptable pipeline of opportunities, Abbott will seek to prudently commit capital on ARMB's behalf at an average annual level of $215 million over the next five years. We note, however, that the fundraising market is cyclical and no assurances can be made that the stated commitment goals will be attained in any given year.

Year-to-date, ARMB has committed $30.4 million to three funds: **ABRY Senior Equity V, Clayton, Dubilier & Rice X** and **Oak HC/FT Partners II.** ABRY, a longstanding existing relationship for Abbott, has multiple products investing in the broadly-defined media, communications and business and information services sectors. The 2017 commitment was an increased allocation to the 2016 commitment in ABRY Senior Equity V. Clayton, Dubilier & Rice, a new relationship, invests in upper middle-market buyout opportunities predominantly in North America but with a small focus in Europe. Oak HC/FT, an existing relationship, focuses on early-stage and growth equity investments in healthcare services and financial technology companies.

VIII. SUMMARY

ARMB experienced another active year in 2016, with respect to distributions and investments across all segments of their private equity portfolio. As a result, ARMB received total net cash proceeds of $181.8 million, a 16% decrease from the prior year, while capital calls decreased 2%. The year's strong commitment activity combined with valuation declines led to a 1 basis point decrease in ARMB's total estimated year-end 2016 pooled portfolio gross IRR, to 9.66%. Abbott ultimately committed to 15 primary fund commitments on ARMB's behalf during the year, totaling $183.5 in commitments.

In 2017, Abbott will continue developing ARMB's strategic portfolio with a focus on committing larger dollar amounts to top-tier private equity partnerships, while retaining the flexibility to commit lesser amounts to certain opportunities should the situation warrant. As always, Abbott will maintain its rigorous selection criteria with the goal of building a high-performing, diversified portfolio across venture capital and private equity.

[3] Net of related brokerage commissions, fees and expenses and any gain or loss realized upon the sale of distributed stock.

APPENDIX III – PATHWAY TACTICAL PLAN

Pathway Capital Management Annual Tactical Plan

Pathway Portfolio Overview

From the inception of the Pathway/ARMB private equity program in 2002 through December 31, 2016, Pathway committed $2.1 billion to 170 private equity investments across 72 managers on behalf of the Alaska Retirement Management Board (ARMB). Of the $2.1 billion committed, $1.6 billion, or 79% of total commitments, had been drawn and $1.6 billion in distributions had been received as of year-end 2016. The portfolio has produced a total value of $2.5 billion, which represents 152% of cumulative contributions, and has generated a since-inception net IRR of 13.0%.[1]

The portfolio generated solid performance during 2016: each of the portfolio's four core strategies posted positive results during the year, which resulted in an annual gain of $59.9 million and a return of 5.9%. Particularly strong performance was exhibited by the portfolio's buyout- and special situation–focused partnerships, which collectively generated a 1-year gain of $49.8 million, or 83% of the annual total, and an IRR of 7.9%. The portfolio has now generated positive returns in 29 of the past 31 quarters, which has resulted in $765.0 million in gains and a 450-basis-point improvement in the portfolio's since-inception net IRR since March 31, 2009.

Both contribution and distribution activity were robust during 2016. ARMB's underlying partnerships deployed $152.1 million during the year, which was only moderately below the $157.2 million drawn in 2015 and represented the third-highest annual contribution total since the program's inception. Distribution activity was similarly strong but also weaker than 2015 levels. Distributions totaled $195.1 million in 2016, a 19% decrease from the $239.6 million returned in the prior year. The decrease in distributions was largely attributable to a sharp pullback in activity during the first quarter of 2016, which was characterized by high-level volatility, constrained credit markets, and depressed levels of IPO activity. Notably, distribution activity increased by 20% or more in each of the subsequent quarters of the year, culminating in the fourth quarter with distributions of $72.5 million—the second-highest quarterly distribution total since the portfolio's inception. Further, distributions exceeded contributions in all four quarters of the year, which resulted in the sixth-consecutive year that the portfolio has been cash flow positive. During this 6-year period, distributions outpaced contributions by $415.5 million. The continued strong positive cash flow enabled the program to achieve a key milestone in 2016: cumulative distributions exceeded cumulative contributions for the first time since the program's inception.

1. Performance is based on September 30, 2016, market values adjusted for cash flows and currency fluctuations through December 31, 2016. Returns do not include any appreciation or depreciation in market value that occurred during the fourth quarter of 2016. As of September 30, 2016, the program had a since-inception net IRR of 13.4%.

2016 Review

Commitments

A summary of 2016 commitment activity by investment strategy, compared with the 2016 Tactical Plan allocation targets, is provided in table 1. Pathway continued to maintain its rigorous due diligence process and strict partnership selection criteria during 2016, reviewing 560 partnership opportunities before ultimately selecting 15 for inclusion in the ARMB portfolio. In addition, Pathway added six co-investments to the portfolio during the year. As shown in the table, Pathway committed $224.6 million on behalf of ARMB in 2016 and was within the target ranges for all strategies during the year.

Table 1. ARMB's 2016 Private Equity Activity vs. 2016 Annual Tactical Plan

	2016 Plan		2016 Actual	
Investment Strategies	No. of Investments	Commitments ($MM)	No. of Investments	Total Commitments ($MM)
Buyouts	Up to 10	Up to 125	6	111.5
Venture Capital	Up to 10	Up to 100	6	65.9
Special Situations	Up to 8	Up to 75	1	2.7
Restructuring	Up to 6	Up to 50	2	25.0
Subordinated Debt	–	–	–	–
Co-investments	Up to 12	Up to 30	6	19.5
Total		**Up to 235[a]**	**21**	**224.6**

NOTE: Amounts may not foot due to rounding.
[a]Increased to $235 million from $200 million with ARMB's approval.

During 2016, ARMB committed the largest portion of its capital to buyout partnerships: $111.5 million was committed to six partnerships; two of these partnerships, Madison CP VII and Marlin Heritage Europe, represented new manager relationships for ARMB. In terms of geographic segmentation, three of these buyout funds will focus on U.S. opportunities, two will focus primarily on opportunities in Western Europe, and one will focus on opportunities in both the United States and Western Europe.

ARMB committed $65.9 million to six venture capital–focused partnerships, including one secondary transaction, during the year, which accounted for the second-largest portion of 2016 commitment activity by strategy. Of the six commitments, five were made to existing managers in the portfolio and one (Shasta V) represented a new manager relationship. Also during the year, ARMB committed $25.0 million to two restructuring partnerships and $2.7 million to one special situation manager through a secondary transaction. Further, ARMB made its first co-investment during the third quarter of 2016. Through year-end, ARMB had committed $19.5 million to six co-investments, each alongside an existing manager in the portfolio.

Performance

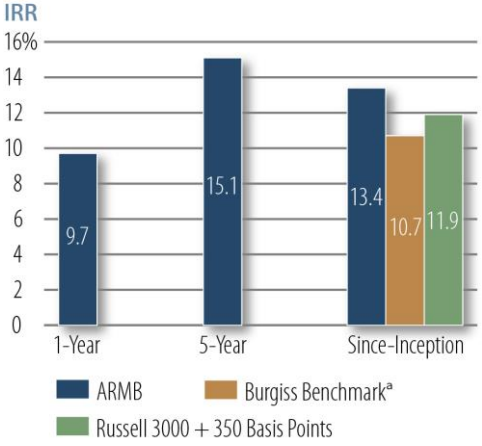
The ARMB portfolio generated a net gain of $59.9 million and an annual return of 5.9% during 2016. Performance was broadly based: all four of the portfolio's core strategies and both U.S. and international partnerships posted positive returns. In total, 100 of the portfolio's 157 active partnerships generated gains during the year, including 26 partnerships that posted gains in excess of $1.0 million.

The portfolio's buyout-focused partnerships accounted for the majority of gains by strategy during 2016, collectively generating $35.2 million in gains and a 7.2% return. The special situations

strategy posted the strongest 1-year return at 9.3% and also contributed $14.6 million in gains. The portfolio's restructuring strategy posted a solid 6.7% return during the year, which resulted in $2.8 million in gains. Venture capital partnerships collectively posted a positive but more modest return of 2.5% and contributed $7.3 million in gains during the year. Notably, 2016 marked the sixth of the past seven years in which all four of the portfolio's core strategies contributed to the portfolio's positive return.

The long-term performance of ARMB's private equity portfolio remains strong and continues to compare favorably with public and private equity benchmarks. As shown in figure 1, since-inception performance exceeds the portfolio's public benchmark (Russell 3000 plus 350 basis points) on a dollar-weighted basis by 150 basis points. In addition, the portfolio outperforms the Burgiss pooled horizon returns for 2001- through 2016-vintage private equity funds by 270 basis points. At the partnership level, the portfolio's mature vintages (2001–2011) continue to perform well: as of September 30, 2016, all 11 generations ranked in the top half of private equity funds in their vintage years.

Figure 1. ARMB Performance vs. Private and Public Market Benchmarks
At September 30, 2016

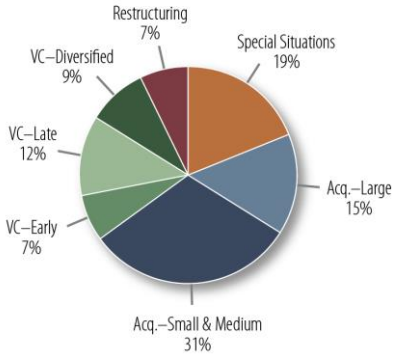


[a]Burgiss Private iQ global all private equity pooled horizon return for 2001- through 2016-vintage funds, as of September 30, 2016, as produced using Burgiss data.

Diversification

One of Pathway's objectives in constructing the ARMB private equity portfolio is to reduce risk by ensuring that the portfolio is well diversified by various metrics, including time, investment strategy, industry, geographic region, and investment manager. Pathway believes that ARMB's portfolio is currently well diversified: as of December 31, 2016, the portfolio consisted of 161 primary partnerships, six co-investments, and three secondary transactions across 17 vintage years and 72 managers and contained more than 2,000 underlying portfolio companies. The current diversification of ARMB's private equity portfolio by investment strategy at the partnership level, based on partnership market value plus unfunded commitments through December 31, 2016, is illustrated in figure 2.

Figure 2. Investment Strategy Diversification



NOTE: Based on partnership market values and unfunded partnership commitments through December 31, 2016.

Buyouts and Special Situations

As intended, buyout partnerships represent the largest portion of the ARMB portfolio, collectively accounting for 46% of total exposure (partnership market value plus unfunded commitments) at December 31, 2016. This exposure falls near the midpoint of the recommended target range of 30%–60%. The buyouts strategy is further diversified by industry and regional focus, as well as by transaction type and size. The portfolio currently consists of commitments to 76 buyout partnerships: 47 partnerships that target small- and mid-cap companies and 29 partnerships that target large-cap companies (i.e., having enterprise values over $1.0 billion). Twenty-two of the portfolio's buyout partnerships focus primarily on investments in Western Europe and two focus on investments in Asia. Pathway committed $111.5 million to six buyout-focused funds during 2016: Advent Int'l GPE VIII-B, Madison CP VII, Marlin Heritage Europe, Permira VI, Thoma Bravo XII, and Trident VII (Stone Point). Also during the year, Pathway committed $19.5 million to six buyout-related co-investments, which are also included in the buyout portion of the portfolio's investment strategy diversification. These co-investments were made alongside five unique general partners and comprised two mid-cap and four large-cap companies.

ARMB's special situation investments currently represent 19% of the total portfolio and are also within Pathway's recommended target range. The special situations strategy consists of 36 partnerships of varying sizes and with different areas of focus: 19 that implement multiple investment strategies, 15 that utilize industry-focused approaches, and two that specialize in turnaround opportunities. During the year, Pathway made one commitment to a special situation partnership (Fortissimo IV) through a secondary transaction.

The portfolio's buyout and special situation partnerships posted a combined return of 7.9% during 2016, and collectively generated gains of $49.8 million, which represented 83% of the portfolio's total gains for the year. Buyout-focused partnerships distributed $103.0 million during the year. The annual distribution total represented a 23% decrease from record levels in 2015 but represented the fifth-consecutive year that distributions have exceeded $100 million for the strategy. Special situation partnerships showed a 13% increase in distribution activity over the prior year: $40.6 million was returned during 2016 compared with $36.1 million in 2015, which is in line with the record high $41.9 million that was distributed in 2014. The buyouts and special situations strategies continue to demonstrate strong long-term performance: the strategies have generated 5-year and since-inception returns of 13.0% and 12.3%, respectively.

Venture Capital

The ARMB portfolio currently comprises 34 venture capital partnerships that employ a variety of early-, late-, and multistage investment strategies. These partnerships represent 28% of the portfolio's total exposure, which was comfortably within Pathway's recommended target range of 15%–40%. During the year, Pathway committed $86.9 million to six venture capital funds (including one secondary transaction): Holtzbrinck COIF, Mayfield XV, Mayfield Select, Project Wildcat (secondary), Shasta V, and TCV IX.

During 2016, ARMB's venture capital partnerships posted a 2.5% return and $7.3 million in gains. Positive performance generated by partnerships focused on late- and multistage strategies was partially offset by negative performance from the portfolio's early-stage partnerships. Notably, despite the strategy's modest annual returns, TCV VII, a venture capital fund focused on late-stage investing, generated $4.6 million in gains—the largest individual gain in the portfolio for any strategy. Distribution activity was robust during the year but down from recent record levels: $43.2 million was distributed in 2016, compared with $63.5 million in 2015. ARMB's venture capital partnerships continue to show attractive long-term performance, having generated 5-year and since-inception returns of 17.7% and 14.0%, respectively, as of December 31, 2016.

Restructuring

As of December 31, 2016, the ARMB portfolio included 18 distressed debt partnerships, which employ trading and control-oriented strategies. These partnerships, which account for 7% of the portfolio's total exposure, target debt or other securities of distressed or troubled companies and are generally less correlated to traditional buyout and venture capital investments. During 2016, Pathway committed $25.0 million to two restructuring partnerships: $7.5 million to Centerbridge SCP III and $17.5 million to Centerbridge SCP III-Flex. Centerbridge SCP III will employ a value-based, non-control-oriented approach to investing in debt securities of upper-middle-market and large-market distressed companies. Centerbridge SCP III-Flex will employ the same investment strategy as Centerbridge SCP III and is being established as a reserve fund that will be activated only if market conditions and potential investment opportunities warrant doing so.

Following a period of difficult market conditions for the distressed debt strategy, ARMB's restructuring portfolio posted a 1-year return of 6.7% and a $2.8 million gain during 2016. Distributions totaled $8.4 million during the year, which represented a 19% increase from 2015. The restructuring strategy continues to produce strong long-term performance, generating a 5-year return of 8.0% and a since-inception return of 17.9%.

International

Pathway has diversified ARMB's portfolio by geographic region by committing to partnerships that target a variety of regions outside the United States. As of December 31, 2016, the ARMB portfolio's international exposure totaled 17% and was within its long-term target range of 0%–35%. The portfolio currently comprises 33 partnerships: 24 buyout partnerships, five special situation partnerships, three venture capital partnerships, and one restructuring/distressed partnership across 18 managers focused on Europe, Asia, and Israel. During 2016, Pathway made commitments totaling $74.0 million to five international partnerships (including one secondary transaction): $25.0 million to Advent Int'l GPE VIII-B, €22.2 million ($24.7 million) to Permira VI, €13.5 million ($14.9 million) to Marlin Heritage Europe, €6.1 million ($6.7 million) to Holtzbrinck COIF, and $2.7 million to Fortissimo IV (secondary).

The portfolio's international partnerships performed well during 2016, collectively generating an 11.0% return and $7.8 million in gains. Three international partnerships posted gains that exceeded $1.0 million during the year: Advent Int'l VII ($2.8 million), CVC European V ($1.8 million), and BC Capital IX ($1.2 million). ARMB's international portfolio continues to deliver strong longer-term performance, generating a 5-year return of 11.4% and a since-inception return of 9.3%.

2017 Investment Plan

In 2017, Pathway will continue to expand and diversify ARMB's portfolio, adding commitments to both existing managers and new managers that meet Pathway's strict selection criteria and that complement the current portfolio. Pathway's objective is to target commitments of $205 million, subject to the availability of high-quality investment opportunities. Pathway expects to commit between $10.0 million and $25.0 million per primary partnership and up to $4.0 million per co-investment. In addition, Pathway will selectively consider secondary partnership interests, consistent with its approach to date. ARMB's 2017 Tactical Plan is summarized in table 2.

Table 2. ARMB's 2017 Annual Tactical Plan

By Strategy

Investment Strategy	No. of Investments	Total Commitments ($MM)
Buyouts	Up to 10	Up to 125
Venture Capital	Up to 10	Up to 100
Special Situations	Up to 8	Up to 75
Restructuring	Up to 6	Up to 50
Subordinated Debt	–	–
Co-investments	Up to 12	Up to 30
Total		**Up to 205**

When selecting partnerships for the ARMB portfolio, Pathway will continue to follow an opportunistic investment philosophy while maintaining its disciplined investment process and rigorous selection criteria to ensure that each partnership is a high-quality partnership. Because Pathway seeks only high-quality investment opportunities, the amount committed to any one strategy may vary from year to year depending on what opportunities are perceived to be the most attractive at the time. Under no circumstance will Pathway commit ARMB's capital to a partnership that does not meet its high-quality standards.

2017 Plan to Date

Through March 14, 2017, Pathway committed $47.6 million on behalf of ARMB, or 23% of the 2017 Tactical Plan allocation target, to three primary partnerships (including one follow-on investment) and three co-investments. In January, ARMB made a $4.6 million follow-on commitment to Trident VII (Stone Point); ARMB had previously committed $16.9 million to the fund in September 2016. Also in January, ARMB committed $0.8 million to Co-inv 2017-1, a co-investment alongside Quad-C in a global contract research organization that focuses on small- and mid-sized biotech and pharmaceutical companies. In February, ARMB committed $4.0 million to Co-inv 2017-2, a co-investment alongside Ridgemont in a non-asset-based provider of third-party logistics solutions to U.S.-based small- and medium-sized businesses, and $3.2 million to Co-inv 2017-3, a co-investment alongside Clearlake in a provider of user management, security, and industrial mobility software and solutions for IT professionals and businesses. In March, ARMB committed $15.0 million to EnCap XI, a special situation fund focused on the acquisition and exploitation of oil and natural gas reserves, and $20.0 million to Quad-C IX, a buyout fund that will target control positions in middle-market companies in conjunction with existing management teams. Pathway anticipates that the flow of new opportunities will be robust for the remainder of 2017 and has identified a number of potential investments for the ARMB portfolio, including 11 partnerships being raised by existing manager relationships, which span all four of the portfolio's core strategies. It is too early to determine, however, whether these partnerships will be included in ARMB's portfolio in 2017; some may not meet Pathway's rigorous investment

criteria and others may postpone fundraising until the following year, depending on market conditions and the general partners' investment pace.

Monitoring

Pathway's goals in monitoring ARMB's private equity portfolio are (1) to protect the portfolio's investments by reducing the occurrence of negative events in the portfolio, (2) to take full advantage of the rights offered to ARMB through its limited partnership agreements, and (3) to enhance the portfolio's returns. In 2017, Pathway will continue to fulfill its role as an active investor by maintaining active dialogue with general partners, attending regular meetings, and representing ARMB on advisory boards. During 2016, Pathway participated in 215 advisory board/monitoring meetings, attended 60 annual meetings, and reviewed 34 amendments related to the ARMB portfolio. Pathway will continue to monitor the investment pace of the portfolio and the partnerships' adherence to their stated investment strategies to ensure that the investments stay within the guidelines set forth by ARMB. Pathway will also continue to closely monitor the compliance of ARMB's partnerships with regard to ASC 820 (formerly SFAS 157) accounting standards.

Pathway will keep ARMB informed of developments in the portfolio by maintaining regular contact with ARMB staff and by providing quarterly reports on the performance and status of ARMB's private equity investments, as well as through Pathway's Online Management System (POMS), which provides a database of ARMB investments that is regularly updated with cash flows, market values, portfolio company valuations, and performance measurements.

Exiting

Distribution activity remained robust during 2016 but was down moderately from the record levels of recent years. Underlying partnerships returned $195.1 million during the year, the fourth-largest annual distribution total since the portfolio's inception. Following a slow start to the year—which was characterized by high levels of volatility, constrained credit markets, and depressed levels of IPO activity—distribution activity accelerated. The second half of 2016 saw particularly strong distribution activity, during which $125.9 million was distributed—the second-highest two-quarter total since the portfolio's inception and 65% of the annual total. ARMB's annual distribution activity came from all four of the portfolio's core strategies; the portfolio's buyouts strategy generated its fifth-consecutive year of annual distributions of more than $100 million, and the special situations strategy posted the second-highest 1-year distribution total since the portfolio's inception. Overall, 52 of the portfolio's 157 active partnerships made distributions in excess of $1.0 million during the year, including eight that distributed more than $5.0 million.

Summary

Over the past 15 years, Pathway has developed a strong foundation for its portion of ARMB's private equity portfolio. In order to continue the development of the portfolio, Pathway recommends that ARMB adopt the following 2017 Tactical Plan:

- Target commitments of $205 million during the 2017 calendar year, subject to the availability of high-quality investment opportunities.

- Invest up to $25.0 million per partnership in up to 20 partnerships during 2017, in opportunities from both existing manager relationships and new manager relationships. Investments will typically range from between $10.0 million and $25.0 million; however, Pathway may invest smaller amounts in highly sought-after, oversubscribed funds if there is a strong likelihood that ARMB will be able to commit a larger amount to these general partners' next funds.

- Invest up to $4.0 million per investment in up to 12 co-investments during 2017. Co-investments will be made primarily alongside buyout and special situation partnerships, both from within the ARMB portfolio and from Pathway's broader portfolio of relationships. Close consideration will be given to the impact that co-investments will have on the overall portfolio, with emphasis on limiting exposure to any one company, manager, strategy, geographic region, industry, or vintage year.

- Selectively consider secondary partnership interests.

- Continue to adhere to the long-term target allocation ranges by strategy (buyouts, 30%–60%; venture capital, 15%–40%; and special situations, 20%–40%[2]) and by geographic region (up to 35% in international partnerships), while maintaining a flexible posture in order to invest in only high-quality partnerships.

Pathway will continue to maintain a highly selective approach, with an emphasis on identifying cohesive management teams that possess significant investment experience and that have demonstrated strong performance across multiple business and economic cycles.

2. Includes restructuring and distressed debt partnerships.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Annual Tactical Plan for Private Equity	ACTION:	**X**
	Resolution 2017-02		
DATE:	April 20, 2017	INFORMATION:	

BACKGROUND:

The Alaska Retirement Management Board's (ARMB) "Private Equity Partnerships Portfolio Policies and Procedures" calls for the preparation and adoption of an "Annual Tactical Plan" (Plan). The Plan reviews the current status of the portfolio, historical and prospective market conditions, and the annual investment strategy designed to further the ARMB's goals and objectives for the private equity program.

STATUS:

The Plan consists of an overview and summary prepared by staff with integrated tactical plans prepared by the ARMB's private equity investment managers. Staff's overview and summary of the ARMB's consolidated private equity portfolio addresses the following:

I. 2016 Investment Activity
II. Funding Position
III. Diversification
IV. Market Conditions
V. 2017 Tactical Plan

RECOMMENDATION:

That the Alaska Retirement Management Board adopt Resolution 2017-02 approving the 2017 Annual Tactical Plan.

Attachment: ARMB 2017 Annual Tactical Plan for Private Equity

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD

Relating to Private Equity Annual Tactical Plan
Resolution 2017-02

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

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

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

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

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

WHEREAS, the Board has authorized investment in private equity assets for the State of Alaska Retirement and Benefits Plans; and

WHEREAS, the Board will establish, and on an annual basis review, an investment plan for private equity;

NOW THEREFORE, BE IT RESOLVED THAT THE ALASKA RETIREMENT MANAGEMENT BOARD adopts the 2017 Annual Tactical Plan for Private Equity which is attached hereto and made a part hereof.

DATED at Anchorage, Alaska this _____ day of April, 2017.

_____
Chair

ATTEST:

_____
Secretary

Division of Retirement & Benefits
Director's Report - Alaska Retirement Management Board

Legislative Update

April 20, 2017

Bill	Sponsor	Referrals	Summary	Status
HB 5 – Health Insurance Payment for Dependents of Peace Officers / Firefighters	Rep. MILLETT, Kawasaki, Kito, Gara, Drummond, Kopp, Westlake	None	The purpose of the bill is to allow for retirement system-paid medical benefits for survivors of Peace Officer/Firefighter who suffer an occupational death. This includes a 100% premium subsidy for Tier IV Peace Officer/Firefighters.	No hearings scheduled.
HB 11 - Retirement Incentive Program (RIP)	Rep. KAWASAKI, Tuck	H-State Affairs and H-Finance	Allows employers to offer eligible employees a 3-year credit to be used to meet either service or age eligibility for retirement. Employer pays full actuarial cost for additional benefits and employee pays contributions for the three years of credit. Incentive for higher paid workers to retire with employers either eliminating the position or hiring a lower paid employee.	Referred to House State Affairs on 1/18/2017. No hearings scheduled
HB 23 - Health Insurance Payment for Dependents of Peace Officers / Firefighters	REPRESENTATIVES JOSEPHSON, Kawasaki, Kito, Tuck, Wool, LeDoux, Grenn, Westlake, Kopp, Gara, Guttenberg, Millett, Drummond, Parish, Spohnholz, Rauscher, FanslerSENATORS Micciche, Coghill,	H-Finance and Senate Finance	The bill establishes a fund to be used by the commissioner of Public Safety to pay the cost of continuing MAJOR medical insurance coverage for survivors of peace officer and firefighters lost as the result of the occupational death of a state. It allows municipalities to participate on a voluntary basis to provide coverage for survivors of municipality peace officer or firefighters lost as the result of occupational death. The state fund will be financed through legislative appropriation, and donations. The municipal fund will be financed through municipal contributions and private donations. The surviving spouse's eligibility would end after 10 years, reaching age 65 or upon eligibility for other major medical coverage. Dependent children's eligibility end at age 26 unless	Referred to Senate Finance 3/15/2017, first hearing was 4/5/2017.

Bill	Sponsor	Referrals	Summary	Status
	Costello, Giessel, Stevens, Gardner, Bishop, Egan, Hughes, Begich, Wielechowski, Olson, Wilson, Meyer, Kelly, von Imhof, Dunleavy, MacKinnon, Stedman		incapacitated, or upon becoming eligible for other major medical coverage.	
HB 37 – PERS Workers' Comp for Peace Officers / Firefighters	Rep. JOSEPHSON, Gara, Tuck, Guttenberg	H-Finance	Allows DB P/F members on WKC to accrue PERS service with no charge. Requires employers to continue making employer contributions for DC P/F during the WKC period.	No hearings scheduled.
HB 47 – Municipal PERS Contributions/ Interest	Rep. Foster	H-Community & Regional Affairs, Finance	Reduces the FY 2008 salary floor for communities whose population declined by more than 25% between the 2000 and 2010 census. Five PERS communities (Galena, Pelican, St. George, Anderson, and Atka) are impacted, but only four (all but Atka) would see a reduction in the salary floor. The bill also introduces language that allows the administrator to negotiate the penalty interest rate on late/outstanding payments for these impacted employers, rather than the current statutory rate of 12%.	Referred to House Finance, held over after initial hearing
HB 57 – Appropriations: Operating Budget/ Loans/Funds	House Rules Committee by Request of the Governor	At House for consideration	An Act making appropriations for the operating and loan program expenses of state government and for certain programs; capitalizing funds, repealing appropriations; making supplemental appropriations and re-appropriations; making appropriations under art. IX, sec. 17(c), Constitution of the State of Alaska, from the	Transmitted to the Senate on 3/24; as of 4/6, Senate transmitted to House as amended as version SCS CSHB 57(FIN)

Bill	Sponsor	Referrals	Summary	Status
			constitutional budget reserve fund; and providing for an effective date.	
HB 83 – An Opportunity to choose between the DB and DC Plan	Rep. KITO, Tarr, Tuck, Parish	H-Labor & Commerce, H-State Affairs, H-Finance	Allows new employees to choose between the DB plan or the DC plan within 90 days of employment. The new DB plan tier will have the same employee contribution rate as the DC plan and will have a similar premium cost share structure as the DC plan. Health benefits will be the same plan as the DC plan.	First hearing was held on 3/25/2017, bill introduced.
HB 196 – Opioid Tax	REPRESENTATIVE KREISS-TOMKINS	H-Health and Social Services	Establishes an excise tax of $0.01 per morphine milligram equivalent for each opioid manufactured, imported for sale, or distributed in the State. The revenue for the tax is to be used for drug abuse treatment and prevention programs.	Referred to House Health and Social Service, scheduled for a hearing on 4/10/2017.
SB 22 - Appropriations: Operating Budget/ Loans/Funds	Senate Rules Committee by Request of the Governor	See HB 57	An Act making appropriations for the operating and loan program expenses of state government and for certain programs; capitalizing funds, repealing appropriations; making supplemental appropriations and re-appropriations; making appropriations under art. IX, sec. 17(c), Constitution of the State of Alaska, from the constitutional budget reserve fund; and providing for an effective date.	See status of HB 57 – operating bill
SB 38 – Pharmacy Benefit Manager	SENATOR GIESSEL BY REQUEST	S- Labor and Commerce	Requires Pharmacy Benefits Managers to be licensed in the state, outlines appeals process, inserts Division of Insurance into the appeals process, limits the ability to apply Maximum Allowable Cost limits to single source and multi-source generic medication.	Referred to Senate Labor and Commerce, no hearing scheduled.
SB 48 - Health Insurance Payment for Dependents of P/F	SENATORS COGHILL, Giessel, Stevens, Micciche, Gardner, Hughes,	S-Finance	The bill establishes a fund to be used by the commissioner of Public Safety for certain survivors to pay the cost of continuing medical insurance coverage lost as the result of the occupational death of a state or 50% of the cost for small municipality peace officer or firefighters. The fund	Referred to Senate Finance 3/10/2017. Heard on 4/5/2017.

Bill	Sponsor	Referrals	Summary	Status
	Begich, Olson, Wilson, Meyer, Kelly, Bishop		will be financed through legislative appropriation, and donations. The bill mandates municipalities to participate and fund 100% of the cost of continuing survivor medical benefits for peace officer/firefighters of large municipalities, or 50% of the cost for small municipalities (10,000 people). The surviving spouse's eligibility would end upon reaching Medicare eligibility or upon eligibility for other MAJOR medical coverage, whichever came first. Dependent children's eligibility end at age 26 unless, or upon becoming eligible for other coverage whichever came first.	
SB 52 - An Opportunity to choose between the DB and DC Plan	Sen. EGAN	S-Community and Regional Affairs, S-Finance	Same as above. This is a companion to the House bill.	No hearing scheduled
SB 97 - Pension Obligation Bonds	Senate Finance	No referrals as of 4/7	The bill stipulates a new requirement to submit a proposal regarding Pension Obligation Bond (POB) issuance to the Legislative Budget and Audit Committee (LB&A). In addition, new subsections define that 45 days shall elapse before POBs are issued, unless LB&A recommends to proceed with the issuance sooner. If there is a recommendation to not proceed within that 45-day window, the subsidiary corporation shall again review the proposal and provide LB&A with a statement of reasons if moving forward with a POB transaction. The bill reduces the POB limit from $5 billion to $2.5 billion (not to exceed).	Held for third reading

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Meeting Structure and 2018 Calendar

ACTION: **X**

INFORMATION: _____

DATE: April 20, 2017

BACKGROUND:

The annual meeting calendar for the Alaska Retirement Management Board (Board) is typically presented for approval at the April meeting, and traditionally has consisted of five board meetings and until recently a trustee education conference. At the March 2-3 trustee meeting in Juneau, the IAC members and Callan advised trustees that meeting agendas should include more of a focus on policy issues and strategic planning topics. These might include asset allocation, performance, manager number and size, and risk.

STATUS:

To address these concerns, staff is proposing a revised meeting structure and calendar going forward with these proposed changes:

1. Staff will work with managers to develop presentations that emphasize a broader focus for trustees rather than simply a review of individual manager mandates. Fewer and shorter manager presentations will be scheduled; managers invited might participate in a panel discussion on larger economic trends, or discussion focused by asset class. Staff will provide more frequent manager due diligence updates to the trustees.

2. Consent Agenda items are listed at the beginning of the agenda. These would include:

   Calendar/Disclosure Report
   DRB Report
   Treasury Division Report
   CIO Report
   Fund Financial Report

Each person responsible for a report would provide a one-page Information Memo drawing trustee attention to any important items to review. Each of the consent agenda topics will be presented to the trustees with an opportunity for questions.

3. Combine the February and April meetings into a single meeting to take place in late March in Juneau; this allows a more traditional quarterly meeting schedule; the Education Conference provides the fifth meeting. The 2018 calendar* might look like this:

March 22-23, 2018	Juneau	
June 21-22, 2018	Anchorage	
September 20-21	Anchorage	
October or November	Education Conference	New York City
December 13-14	Anchorage	

*these proposed dates are not in place contractually, but do take into account the 2018 APFC meeting schedule.

RECOMMENDATION:

That the Board approve the conceptual plan for future meeting structure and agendas as set forth above; Staff will structure the next meeting agenda as outlined and also provide the 2018 calendar for approval at the June meeting.

CIO Report

April 21-22, 2017

Item	Action	Date	Amount	Description/Summary
1	Rebalance Retirement Funds	02/24/2017, 02/27/2017, 03/10/2017, 03/23/2017, 03/27/2017		Available upon request.
	Transfers:			
2	Columbia Threadneedle High Yield	02/15/2017	($30,000,000)	Liquidated from domestic high yield investment.
3	Intermediate US Treasury Fund	02/15/2017	$30,000,000	Invested in intermediate U.S. Treasury portfolio.
4	Mondrian International Fixed Income	02/24/2017	($50,000,000)	Liquidated from international fixed income investment.
5	Intermediate US Treasury Fund	02/24/2017	$50,000,000	Invested in intermediate U.S. Treasury portfolio.
6	SSgA Russell Top 200	02/24/2017	($200,000,000)	Liquidated from domestic equity investment.
7	Scientific Beta Multi-Beta Multi-Strategy Fund	02/24/2017	$200,000,000	Funded domestic equity investment.
8	BlackRock ACWI Ex-US IMI	03/03/2017	($50,000,000)	Liquidated from international equity investment.
9	Eaton Vance High Yield	03/03/2017	($30,000,000)	Liquidated from domestic high yield investment.
10	Intermediate US Treasury Fund	03/03/2017	$80,000,000	Invested in intermediate U.S. Treasury portfolio.
11	Large Cap Portable Alpha Fund	03/09/2017	$488,000,000	Rolled futures contract from March to June expiry.
12	Small Cap Futures Portable Alpha Fund	03/09/2017	($396,000,000)	Rolled futures contract from March to June expiry.
13	Large Cap Cash Equitization Fund	03/09/2017	$16,000,000	Rolled futures contract from March to June expiry.
14	Small Cap Cash Equitization Fund	03/09/2017	$16,000,000	Rolled futures contract from March to June expiry.
15	SSgA Russell Top 200	03/17/2017	($125,000,000)	Liquidated from domestic equity investment.
16	Allianz Large Cap	03/17/2017	($75,000,000)	Liquidated from domestic equity investment.
17	BHMS Large Cap	03/17/2017	($50,000,000)	Liquidated from domestic equity investment.
18	Mondrian International Fixed Income	03/17/2017	($25,000,000)	Liquidated from international fixed income investment.
19	Intermediate US Treasury Fund	03/17/2017	$275,000,000	Invested in intermediate U.S. Treasury portfolio.
20	Eaton Vance High Yield	03/20/2017	($25,000,000)	Liquidated from domestic high yield investment.
21	Intermediate US Treasury Fund	03/20/2017	$25,000,000	Invested in intermediate U.S. Treasury portfolio.
22	SSgA S&P 500 Index Fund (Analytic)	03/24/2017	($6,500,000)	Liquidated passive equity component of Analytic investment strategy.
23	Analytic Investors	03/24/2017	$6,500,000	Invested in derivative overlay component of Analytic investment strategy.
24	Large Cap Futures	03/29/2017	($15,400,000)	Removed excess margin cash from cash equitization account.
25	Small Cap Futures	03/29/2017	($11,800,000)	Removed excess margin cash from cash equitization account.
26	Short-term Investment Pool	03/29/2017	$27,200,000	Invested in cash.
27	Blue Glacier Fund	03/31/2017	$4,514,376	Invested in Crestline's Blue Glacier Fund.
28	Short-term Investment Pool	03/31/2017	($4,514,376)	Liquidated cash.
29	MacKay Shields High Yield	04/07/2017	($25,000,000)	Liquidated from domestic high yield investment.
30	Eaton Vance High Yield	04/07/2017	($25,000,000)	Liquidated from domestic high yield investment.
31	Short-term Investment Pool	04/07/2017	$50,000,000	Invested in cash.
32	Brandes International	04/07/2017	($100,000,000)	Liquidated from international equity investment.
33	Capital Guardian International	04/07/2017	($100,000,000)	Liquidated from international equity investment.
34	Intermediate US Treasury Fund	04/07/2017	$200,000,000	Invested in intermediate U.S. Treasury portfolio.
35	Portable Alpha Cash Transfers	Multiple Dates		Directed multiple transfers of cash into or out of PA futures accounts to maintain necessary margin positions; summary attached to this packet; copies of transactions available upon request.
	Watch List:			
36	Allianz Socially Responsible Fund	03/06/2017		Notified manager of watch list placement due to underperformance.
37	Lazard Emerging Income			Recommend placing on the watch list due to underperformance.

CIO Report

April 21-22, 2017

Item	Action	Date	Amount	Description/Summary
	Other Actions:			
38	Per Board direction, terminated GAM contractual relationship	03/06/2017		Directed liquidation of portfolio.
39	Wrote letter to CFA Institute requesting additional test sites in Alaska, particularly in Juneau	03/20/2017		
40	Conducted Manager Due Diligence			Staff conducted telephonic or on-site due diligence with X managers.
41	Prepared Public Equity Manager Summary			Per request, included is a report that briefly summarizes the ARMB's public equity investments.
	Announcements:			
42	McKinley Capital named Robert A. Gillam president; announces ESG capability	04/03/2017		

Transfers INTO and OUT OF Portable Alpha

Date	Direction of Transfer	Transfers	Portable Alpha NAV	Notes
7/26/2016	Transfer INTO Portable Alpha	$7,500,000	$0	Futures trades on 07/28
8/2/2016	Transfer INTO Portable Alpha	$7,500,000	$64,133,479	Futures trades on 08/04
8/9/2016	Transfer INTO Portable Alpha	$7,500,000	$118,823,975	Futures trades on 08/11
8/17/2016	Transfer INTO Portable Alpha	$4,500,000	$176,904,879	Futures trades on 08/19
9/12/2016	Transfer INTO Portable Alpha	$4,500,000	$229,822,652	Futures trades on 09/12 and 09/13
10/27/2016	Transfer INTO Portable Alpha	$1,700,000	$295,663,397	Futures trades on 10/27
10/28/2016	Transfer INTO Portable Alpha	$4,900,000	$340,170,249	Futures trades on 10/27
11/14/2016	Transfer INTO Portable Alpha	$7,200,000	$407,594,417	
11/14/2016	Transfer INTO Portable Alpha	$8,000,000	$407,594,417	
11/15/2016	Transfer INTO Portable Alpha	$4,400,000	$415,815,008	
11/21/2016	Transfer INTO Portable Alpha	$1,800,000	$417,281,264	
11/23/2016	Transfer INTO Portable Alpha	$800,000	$420,871,803	Futures trades on 11/23
11/25/2016	Transfer INTO Portable Alpha	$4,500,000	$427,346,395	
11/28/2016	Transfer INTO Portable Alpha	$1,900,000	$427,394,565	
12/9/2016	Transfer INTO Portable Alpha	$4,000,000	$441,873,010	Futures trades on 12/09
12/13/2016	Transfer OUT OF Portable Alpha	($1,200,000)	$443,455,066	
12/15/2016	Transfer INTO Portable Alpha	$500,000	$441,450,073	
12/19/2016	Transfer INTO Portable Alpha	$1,000,000	$441,999,696	
12/23/2016	Transfer INTO Portable Alpha	$1,200,000	$444,429,613	
1/27/2017	Transfer OUT OF Portable Alpha	($3,000,000)	$474,255,449	
2/6/2017	Transfer INTO Portable Alpha	$1,000,000	$472,774,725	
2/10/2017	Transfer INTO Portable Alpha	$1,000,000	$477,566,024	
2/22/2017	Transfer OUT OF Portable Alpha	($2,000,000)	$487,739,408	
2/24/2017	Transfer INTO Portable Alpha	$1,000,000	$488,163,901	
3/1/2017	Transfer INTO Portable Alpha	$500,000	$494,699,284	
3/7/2017	Transfer INTO Portable Alpha	$1,500,000	$490,527,951	

Manager Watch List Performance

as of 12/31/2016

Legend

Test 1 Manager's 6 year return performance is within 1% of the manager's official index

Test 2 Manager's 6 year return performance is within 1% of the manager's Style Group

Test 3 Manager's 6 year return performance is in the 65th percentile or higher of the Manager's Peer Group

DB Plan

	Return	Test 1	Test 2	Test 3
Lazard Emerging Income	-1.02%			
LIBOR 3 months	0.39%	**Fail**		

Participant Directed Plans (PERS, TRS, Def. Comp., SBS)

Allianz/RCM Socially Responsible Investment Fund (Net)	10.12%			
Benchmark	11.60%	**Fail**		
CAI MF - Core Equity Style (Net)	12.25%		**Fail**	
Peer Group Percentile	87%			**Fail**

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:

Dayle 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.

Manager Due Diligence

January 1, 2017 - March 31, 2017

Date	Manager	Asset Class	Location
02/02/2017	Allianz	Absolute Return	On Site
01/17/2017	Crestline	Absolute Return	Juneau
02/06/2017	Crestline	Absolute Return	Telephonic
02/02/2017	KKR Prisma	Absolute Return	On Site
02/14/2017	KKR Prisma	Absolute Return	Telephonic
03/01/2017	Zebra	Absolute Return	Juneau
01/26/2017	Columbia Threadneedle	Fixed Income	On Site
01/23/2017	Guggenheim Partners	Fixed Income	On Site
03/02/2017	Schroder Investment Management	Fixed Income	On Site
02/08/2017	Western Asset Management Company	Fixed Income	On Site
02/28/2017	Abbott	Private Equity	Telephonic
03/29/2017	Abbott	Private Equity	Telephonic
01/31/2017	Angelo Gordon	Private Equity	On Site
02/23/2017	Dyal	Private Equity	Juneau
01/19/2017	Glendon	Private Equity	Telephonic
03/30/2017	H.I.G.	Private Equity	Juneau
01/31/2017	Jordan Company	Private Equity	On Site
01/19/2017	KKR Credit	Private Equity	Telephonic
01/24/2017	KKR Credit	Private Equity	Telephonic
02/28/2017	KKR Credit	Private Equity	Telephonic
03/09/2017	KKR Credit	Private Equity	On Site
03/08/2017	New Mountain	Private Equity	On Site
02/22/2017	NGP	Private Equity	Telephonic
02/07/2017	Pathway	Private Equity	Telephonic
02/10/2017	Pathway	Private Equity	Telephonic
02/16/2017	Pathway	Private Equity	Telephonic
02/01/2017	Stone Point	Private Equity	On Site
01/25/2017	Summit Partners	Private Equity	Juneau
1/29/2017	Allianz	Public Equity	Telephonic
03/24/2017	Arrowstreet	Public Equity	On Site
2/10/2017	Barrow, Hanley, Mewhinney & Strauss	Public Equity	Telephonic
03/14/2017	BMO	Public Equity	On Site
03/16/2017	DePrince, Race, Zollo	Public Equity	On Site
3/24/2016	Fidelity	Public Equity	On Site
1/25/2016	Jennison Associates, LLC	Public Equity	Telephonic
1/30/2017	Lazard Asset Management	Public Equity	Telephonic
03/22/2017	Lord Abbett	Public Equity	On Site
03/22/2017	QMA	Public Equity	On Site
1/18/2017	Zebra Capital	Public Equity	Telephonic
02/15/2017	EIG	Real Assets	Juneau
2/14/2017	Brookfield	Real Assets	Telephonic
1/24/2017	Clarion Realty	Real Assets	Telephonic
3/3/2017	Clarion Realty	Real Assets	Telephonic
3/1/2017	Hancock Agriculture	Real Assets	Telephonic
2/22/2017	Hancock Timber	Real Assets	Telephonic
3/22/2017	IFM	Real Assets	Telephonic
2/7/2017	JP Morgan Asset Management	Real Assets	Telephonic
2/14/2017	JP Morgan Infrastructure	Real Assets	Telephonic
2/21/2017	KKR REPA I	Real Assets	Telephonic
2/24/2017	LaSalle Realty	Real Assets	Telephonic
2/16/2017	Lazard	Real Assets	Telephonic
1/25/2017	Sentinel	Real Assets	Juneau
3/2/2017	Sentinel	Real Assets	Telephonic
3/8/2017	TIR	Real Assets	Telephonic
3/6/2017	UBS Agriculture	Real Assets	Telephonic
2/23/2017	UBS Realty	Real Assets	Telephonic
2/15/2017	UBS Trumbull Fund	Real Assets	Telephonic

Public Equity Manager Summaries

Manager	Benchmark/Index	Management Active/Passive	Style Region | Size | Style	Research Fundamental/ Quantitative	Investment Philosophy/Key Metrics
Lazard Asset Management (Domestic Component of Global Mandate)	Russell 1000	Active	US | Large | Core	Fundamental	Lazard's relative value investment philosophy is based on value creation through the process of bottom-up stock selection. This philosophy is implemented by assessing the trade-off between valuation and financial productivity for an individual security. P/E, ROE
Allianz Global Investors	S&P 500	Active	US | Large | Growth	Fundamental	Growth, quality and valuation are the key focus areas for identifying potential portfolio holdings. Allianz looks for company management teams that have demonstrated wise and shareholder-friendly capital allocation. Time horizon for investment decision is approximately 2-3 years. Earnings Growth, P/E, P/E to Growth Ratio, FCF Yield
McKinley Capital	Russell 1000 Growth	Active	US | Large | Growth	Quantitative	McKinley employs a systematic process focused on growth where excess market returns are achieved through the construction and management of a diversified, fundamentally sound portfolio of inefficiently priced common stocks whose earnings growth rates are accelerating above market expectations. Earnings Acceleration, Risk Adjusted Relative Return, Volatility, ROE
Barrow, Hanley, Mewhinney & Strauss	Russell 1000 Value	Active	US | Large | Value	Fundamental	This strategy is implemented by constructing portfolios of individual stocks that reflect value characteristics such as price/earnings and price/book ratios below the market and dividend yields above the market (S&P 500). P/E, P/B, Dividend Yield
Quantitative Management Associates	Russell 1000 Value	Active	US | Large | Value	Quantitative	QMA believes that adaptively complementing low P/E (most effective measure for identifying value) with analysts' earnings revisions and the current market environment as measured by dispersion of valuations, will lead to outperformance relative to the mandate's benchmark. P/E, Earnings Estimate Revisions
State Street Global Advisors	Russell 1000 Growth	Passive	US | Large | Growth		Index Replication
State Street Global Advisors	Russell 1000 Value	Passive	US | Large | Value		Index Replication
State Street Global Advisors	Russell Top 200	Passive	US | Large | Core		Index Replication
State Street Global Advisors	Russell 1000	Passive	US | Large | Core	Quantitative	The strategy employs an optimization-based approach seeking to minimize total portfolio risk compared to a market cap index, subject to a series of constraints. The constraints aim to provide diversification across securities, sector and industries. Low Volatility, Total Portfolio Absolute Risk

Public Equity Manager Summaries

Manager	Benchmark/Index	Management Active/Passive	Style Region | Size | Style	Research Fundamental/ Quantitative	Investment Philosophy/Key Metrics
Staff	STOXX USA 900 Minimum Variance Unconstrained	Passive	US | Large | Core	Quantitative	Using Axioma's factor model approach, the strategy seeks to minimize volatility employing a consistently applied and rules-based methodology. Index Replication - Low Volatility
Staff	SciBeta US Multi-Beta Multi-Strat 4-Factor EW	Passive	US | Large | Core	Quantitative	Scientific Beta MBMS 4-Factor Equal Weight indices are formed by equally weighting four smart factor indices that are designed to efficiently capture the long-term risk premium associated with widely documented risk factors while utilizing diversification methods to improve risk-adjusted returns. Index Replication - Value, Size, Volatility, Momentum
BMO Global Asset Management	Russell 2000	Active	US | Small | Core	Quantitative/ Fundamental	BMO invests utilizing proprietary quantitative models to rank stocks based on attractive valuation, quality/sustainability of fundamentals, and improving investor interest while controlling for portfolio/stock specific risk and transaction costs. A fundamental review is conducted prior to investment. P/CF, P/E, Profit Margin Growth, Short Interest, Price Momentum
Jennison Associates, LLC	Russell 2000	Active	US | Small | Core	Fundamental	Bottom-up fundamental research can add significant value in uncovering inefficiencies that exist in the small cap asset class. The underlying philosophy is to buy businesses rather than just stocks. Earnings and CF Growth, Projected ROE, P/E, and P/CF
Fidelity Small Company	Russell 2000	Active	US | Small | Core	Fundamental	The Small Company discipline seeks small cap stocks with superior growth and financial characteristics that have valuations close to or below the average valuation of the market. The strategy attempts to add value over it's benchmark through a combination of stock selection and sector positioning. P/E, P/B, P/CF, EPS Growth, ROE
Barrow, Hanley, Mewhinney & Strauss	Russell 2000 Value	Active	US | Small | Value	Fundamental	The strategy seeks companies in which the value of the business is significantly greater than the market price as indicated by below-average P/E ratios (on normalized earnings), above-average free cash flow yields, and better than market levels of internal growth and return on capital. Normalized P/E, FCF Yield, Internal Growth and Return of Capital
Lord Abbett	Russell 2000 Growth	Active	US | Small | Growth	Fundamental	The team employs fundamental analysis to identify rapidly emerging and financially sound growth companies whose products or services are transformative and innovative. The team also evaluates the fundamental momentum of a stock relative to its industry and sector to take advantage of behavioral market biases. Revenue Growth, Earnings, P/S, Fundamental Momentum, Low Debt/Capital

Public Equity Manager Summaries

Manager	Benchmark/Index	Management Active/Passive	Style Region | Size | Style	Research Fundamental/ Quantitative	Investment Philosophy/Key Metrics
Frontier Capital Management	Russell 2000 Value	Active	US | Small | Value	Fundamental	Frontier purchases companies with prospects for improving businesses that have multiple levers to drive the stock price and that are selling at reasonable valuations. P/E, P/B, EV/Sales, ROIC
Sycamore (Victory) Capital Management	Russell 2000 Value	Active	US | Small | Value	Fundamental	Sycamore believes companies possessing all three attributes offer best downside protection without sacrificing upside: sustainable business model and above-average financial strength, a dislocation in the current price and estimate of intrinsic value, and fundamental drivers that will narrow the valuation gap. EV/EBITDA, EV/S, P/E, P/B, P/CF, Sum-of-the-Parts, DCF
State Street Global Advisors	Russell 2000 Growth	Passive	US | Small | Growth		Index Replication
State Street Global Advisors	Russell 2000 Value	Passive	US | Small | Value		Index Replication
State Street Global Advisors	Russell 2000	Passive	US | Small | Core	Quantitative	The strategy employs an optimization-based approach seeking to minimize total portfolio risk compared to a market cap index, subject to a series of constraints. The constraints aim to provide diversification across securities, sector and industries. Low Volatility, Total Portfolio Absolute Risk
Staff	S&P 600	Passive	US | Small | Core		Index Replication
Lord Abbett	Russell Microcap Growth	Active	US | Micro | Growth	Fundamental	The team employs fundamental analysis to identify rapidly emerging and financially sound growth companies whose products or services are transformative and innovative. The team also evaluates the fundamental momentum of a stock relative to its industry and sector to take advantage of behavioral market biases. Revenue Growth, Earnings, P/S, Fundamental Momentum, Low Debt/Capital
Deprince, Race & Zollo	Russell Microcap Value	Active	US | Micro | Value	Fundamental	DRZ's value income philosophy is based on the belief that undervalued stocks with at least a 1% dividend yield and a near term fundamental catalyst provide the opportunity for superior long-term total returns. Dividend Yield, P/E, P/B, P/CF
Zebra Capital Management	Russell Microcap	Active	US | Micro | Core	Quantitative/ Fundamental	Zebra seeks to identify Micro Cap securities that are relatively less popular but fundamentally strong. Portfolio construction is designed to maximize exposure to less popular fundamentally strong names while eliminating unintended risks. Popularity, Profitability, Value, Quality

Public Equity Manager Summaries

Manager	Benchmark/Index	Management Active/Passive	Style Region | Size | Style	Research Fundamental/ Quantitative	Investment Philosophy/Key Metrics
Lazard Asset Management (Non-US Component of Global Mandate)	MSCI ACWI ex-US	Active	Non-US | Large/Mid | Core	Fundamental	Lazard's relative value investment philosophy is based on value creation through the process of bottom-up stock selection. This philosophy is implemented by assessing the trade-off between valuation and financial productivity for an individual security. P/E, ROE
Brandes Investment Partners	MSCI EAFE	Active	Non-US Developed | Large/Mid | Value	Fundamental	Brandes buys securities at discount to estimated value which is driven in part to behavioral factors in the marketplace. Estimation of value is derived through a discounted cash flow analysis as well as an understanding of industry, country and macro factors. P/FCF, P/B, P/E, DCF
Capital Guardian	MSCI EAFE	Active	Non-US Developed | Large/Mid | Core	Fundamental	Capital manages portfolios with inputs from multiple portfolio managers and an analyst portfolio. Investment styles and philosophies vary by portfolio manager assigned to the strategy. Specific to Each Portfolio Manager
McKinley Capital	MSCI ACWI ex-US Growth	Active	Non-US | Large/Mid | Growth	Quantitative	McKinley employs a systematic process focused on growth where excess market returns are achieved through the construction and management of a diversified, fundamentally sound portfolio of inefficiently priced common stocks whose earnings growth rates are accelerating above market expectations. Earnings Acceleration, Risk Adjusted Relative Return, Volatility, ROE
Allianz - NFJ	MSCI ACWI ex-US	Active	Non-US | Large/Mid | Value	Fundamental	NFJ's investment philosophy is based on research suggesting portfolios consisting of low P/E dividend-paying stocks have substantially outperformed market indices over time. The inefficiencies in the market that allow high dividend yielding, low P/E stocks to add value primarily stem from behavioral finance. Dividend Yield, P/E, Price Momentum
Arrowstreet Capital	MSCI ACWI ex-US	Active	Non-US | Large/Mid | Core	Quantitative	Arrowstreet believes the key to generating alpha involves evaluating the prospects of a security considering both the characteristics of the stock itself as well as the characteristics of other related stocks. Valuation, Momentum, Quality, Catalysts, Extreme Sentiment
Baillie Gifford	MSCI ACWI ex-US	Active	Non-US | Large/Mid | Growth	Fundamental	Baillie Gifford believes that stock markets have a recurring tendency to underappreciate the value of long term compounded growth. BG seeks businesses that exhibit potential for above average and sustained growth with attractive financials. Investment time horizon is five years. Revenue Growth, Management Track Record, Margin Sustainability

Public Equity Manager Summaries

Manager	Benchmark/Index	Management Active/Passive	Style Region | Size | Style	Research Fundamental/ Quantitative	Investment Philosophy/Key Metrics
Mondrian Investment Partners, Ltd.	MSCI EAFE Small Cap	Active	Non-US Developed | Small | Core	Fundamental	Mondrian is a value-oriented defensive manager investing 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 the decision making process. Dividend Discount Model
Schroder Investment Management	MSCI EAFE Small Cap	Active	Non-US Developed | Small | Core	Fundamental	Schroders believes that the identification of mispriced companies exhibiting visible growth and sustainable returns is the key driver of excess returns. Smaller companies remain under-researched and an information advantage can exist through rigorous research. Earnings Growth, ROIC, ROE, Management Quality
Lazard Asset Management	MSCI Emerging Markets	Active	Emerging Markets | Large/Mid | Core	Fundamental	Lazard's relative value investment philosophy is based on value creation through the process of bottom-up stock selection. This philosophy is implemented by assessing the trade-off between valuation and financial productivity for an individual security. P/E, ROE
Eaton Vance/Parametric	MSCI Emerging Markets	Active	Emerging Markets | Large/Mid | Core	Quantitative	Parametric's rules-based, top-down process employs a modified equal-weight country-weighting, using tiers defined by size and liquidity, to reduce concentration risks and overall portfolio volatility versus the index. The strategy structurally underweights the largest countries, sectors and securities. Country, Market Cap, Liquidity
State Street Global Advisors	MSCI ACWI ex-US IMI	Passive	Non-US IMI | Large/Mid/Small | Core		Index Replication
BlackRock	MSCI ACWI ex-US IMI	Passive	Non-US IMI | Large/Mid/Small | Core		Index Replication

McKinley Capital Management, LLC

INFORMATIONAL MEMORANDUM

April 3, 2017

McKinley Capital Management, LLC ("McKinley Capital") is a global growth specialist managing a wide range of capitalization and risk-specific investment portfolios including U.S., Non-U.S. and Global strategies. The firm's investment team employs a systematic investment process with a qualitative overlay.

McKinley Capital wants to update its clients on two important developments: (1) Robert A. ("Rob") Gillam has been named President of the firm and (2) the firm recently released a policy statement on ESG investing.

Robert A. Gillam named President
Effective April 1, 2017, Robert A. Gillam has been appointed President of McKinley Capital, a role previously held by his father, Robert B. Gillam. Robert B. ("Bob") Gillam remains Chairman of the Board and Chief Executive Officer.

Rob Gillam joined McKinley Capital in 1994. He is and remains the Chief Investment Officer (CIO) of the firm, a role he has held since 2008. He oversees a team of investment professionals and data scientists who research, build and manage custom equity solutions for clients worldwide. In conjunction with internal staff, he further directs a unique group of Scientific Advisors, including well-known academics and practitioners, with specific expertise in the important areas of portfolio construction, risk management, misalignment of factors, trade cost analytics, high-frequency trading and large input optimization. Prior to becoming CIO, he worked as a Portfolio Manager with a focus on non-U.S. and global strategies. Mr. Gillam serves on the firm's Executive Management Committee, where he is actively involved in defining and executing the firm's business strategy, and is also a member of the firm's Board of Directors. Mr. Gillam is a CFA Charter holder and an Advisory Board Member of the Jacobs Levy Equity Management Center for Quantitative Financial Research at the Wharton School, University of Pennsylvania. He is a member of the Wharton Global Family Alliance and the Family Office Roundtable.

As part of the firm's thoughtful and transparent approach to succession planning and in connection with the day-to-day management of functions supporting the firm's investment process, Denali Kemppel was hired as the Chief Operating Officer in 2015. Ms. Kemppel supports the firm and Rob Gillam by overseeing investment operations, IT, data science, marketing support, performance evaluation, sales and client service. She works closely with Rob Gillam to ensure that the firm's operations align with and support the investment process. Prior to joining McKinley Capital, Ms. Kemppel was a senior executive who led the sourcing, execution, and oversight of an alternative investments platform at a private company. Ms. Kemppel brings additional experience relating to her time as a lawyer at Ropes & Gray LLP in Boston, MA. She has an undergraduate degree from Dartmouth College, as well as a J.D. from Duke Law School. She is a board member of Covenant House Alaska and a member of 100 Women in Finance.

We believe these changes have been made in a thoughtful manner as part of our long-term effort to enhance our succession planning, the capability of our investment team and to achieve the goals set forth in our mission statement.

McKinley Capital's ESG Statement
McKinley Capital recently released a statement on its capabilities and perspectives on ESG investing. A copy of this policy is below. A copy of this policy statement can also be found on the firm's website (www.mckinleycapital.com) under the heading "ESG."

McKinley Capital's goal is to improve risk-adjusted performance for our clients. As a systematic manager, McKinley Capital looks for, tests and validates statistically significant sources of alpha. Environmental, Social, Governance ("ESG") considerations afford our firm the ability to identify new sources of alpha, align investment practices with clients' investing views, and broaden the impact of our work beyond the realm of exclusively financial returns.

Using a disciplined, quantitatively driven investment process permits McKinley Capital to produce products that aim for outperformance, yet are also customizable to meet individual client needs. As such, McKinley Capital incorporates ESG factors into its investment process in three main ways:

(1) Testing and assessment of ESG factors as potential sources of alpha.
McKinley Capital is committed to a robust applied quantitative research agenda regarding ESG. The Moskowitz Prize is a global award which recognizes outstanding academic research on ESG topics in the investment field. Our quantitative team is headed by a Moskowitz Prize winner, who has earned significant recognition in the field of socially responsible investing. To date, McKinley Capital has identified several promising areas of study in ESG, especially within the Governance arena. Typically, Environmental and Social factors are proxy for sector bets, which can lead to increased relative risk. Within Governance, however, we have found attractive sources of alpha which complement our overall investment process, and we apply those in our portfolios. Our assessment of ESG variables is continuous. We collaborate with several data providers as well as revisit older sources as they develop additional granularity. For example, we are currently partnering with the Wharton School at the University of Pennsylvania on research relating to a long-term and robust study of ESG.

(2) Select use of exclusionary screens.
McKinley Capital has the capacity to meet clients' different ESG needs as well as specific requirements, and has a robust procedure to implement client guidelines in our investment process. In addition, McKinley Capital has extensive experience in investing through the application of exclusionary screens. Our experience ranges the continuum -- from identifying and removing stocks related to various issues to the creation of complex, custom environmental portfolios.

(3) Maximizing the impact of proxy voting rights.
To further advance its responsible investing footprint, McKinley Capital offers its investors the option to leverage either (i) a corporate governance-centered voting policy or (ii) a sustainability-centered voting policy. Both these policies were developed with a leading ESG solutions service provider. McKinley Capital's corporate governance-centered policy is custom-developed, and promotes long-term shareholder value and risk mitigation through responsible corporate governance requirements. In addition to considering the preservation and enhancement of shareholder value, McKinley Capital's sustainability-based proxy voting policy promotes support for sustainable business practices advocating stewardship of environment, fair labor practices, non-discrimination, and the protection of human rights.

As an active systematic investment adviser, McKinley Capital is committed to responsible investment. Through this commitment, we seek to have a positive impact on the world, and the communities in which we live and work. We believe that our systematic investment process is adept at the customization and optimization of the risk/return relationship, including the incorporation of ESG considerations.

Please contact us at (907) 563-4488 or (800) 563-9969 should you have any questions.

Sincerely,

Robert B. Gillam
Chief Executive Officer

3301 C Street, Suite 500, Anchorage, Alaska 99503 USA
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ALASKA RETIREMENT MANAGEMENT BOARD
FINANCIAL REPORT

As of February 28, 2017

ALASKA RETIREMENT MANAGEMENT BOARD
Schedule of Investment Income and Changes in Invested Assets by Fund
Fiscal Year-to-Date through February 28, 2017

	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	$ 8,209,687,323	$ 687,482,249	$ (192,439,196)	$ 8,704,730,376	6.03%	8.47%
Retirement Health Care Trust	6,773,545,245	560,423,270	(178,295,470)	7,155,673,045	5.64%	8.38%
Total Defined Benefit Plans	14,983,232,568	1,247,905,519	(370,734,666)	15,860,403,421	5.85%	8.43%
Defined Contribution Plans:						
Participant Directed Retirement	667,523,128	70,768,971	58,791,118	797,083,217	19.41%	10.15%
Health Reimbursement Arrangement	224,830,912	19,776,188	23,225,449	267,832,549	19.13%	8.36%
Retiree Medical Plan	59,563,867	5,338,062	8,267,788	73,169,717	22.84%	8.38%
Defined Benefit Occupational Death and Disability:						
Public Employees	14,541,982	1,258,543	946,875	16,747,400	15.17%	8.38%
Police and Firefighters	7,181,338	617,123	326,228	8,124,689	13.14%	8.40%
Total Defined Contribution Plans	973,641,227	97,758,887	91,557,458	1,162,957,572	19.44%	9.59%
Total PERS	**15,956,873,795**	**1,345,664,406**	**(279,177,208)**	**17,023,360,993**	6.68%	8.51%
Teachers' Retirement System (TRS)						
Defined Benefit Plans:						
Retirement Trust	4,939,784,971	413,139,782	(146,549,485)	5,206,375,268	5.40%	8.49%
Retirement Health Care Trust	2,537,521,837	209,856,312	(65,122,710)	2,682,255,439	5.70%	8.38%
Total Defined Benefit Plans	7,477,306,808	622,996,094	(211,672,195)	7,888,630,707	5.50%	8.45%
Defined Contribution Plans:						
Participant Directed Retirement	286,112,304	30,370,213	17,827,086	334,309,603	16.85%	10.29%
Health Reimbursement Arrangement	68,360,784	5,921,318	5,433,513	79,715,615	16.61%	8.33%
Retiree Medical Plan	23,621,452	2,061,832	2,083,096	27,766,380	17.55%	8.36%
Defined Benefit Occupational Death and Disability	3,137,633	262,724	(12,243)	3,388,114	7.98%	8.39%
Total Defined Contribution Plans	381,232,173	38,616,087	25,331,452	445,179,712	16.77%	9.80%
Total TRS	**7,858,538,981**	**661,612,181**	**(186,340,743)**	**8,333,810,419**	6.05%	8.52%
Judicial Retirement System (JRS)						
Defined Benefit Plan Retirement Trust	143,723,441	12,333,585	2,266,169	158,323,195	10.16%	8.51%
Defined Benefit Retirement Health Care Trust	26,917,606	2,250,373	(121,705)	29,046,274	7.91%	8.38%
Total JRS	**170,641,047**	**14,583,958**	**2,144,464**	**187,369,469**	9.80%	8.49%
National Guard/Naval Militia Retirement System (MRS)						
Defined Benefit Plan Retirement Trust	35,866,581	2,003,955	(280,669)	37,589,867	4.80%	5.61%
Other Participant Directed Plans						
Supplemental Annuity Plan	3,419,489,723	224,764,357	(26,113,940)	3,618,140,140	5.81%	6.60%
Deferred Compensation Plan	808,795,367	64,623,645	(10,810,939)	862,608,073	6.65%	8.04%
Total All Funds	**28,250,205,494**	**2,313,252,502**	**(500,579,035)**	**30,062,878,961**		
Total Non-Participant Directed	23,068,284,972	1,922,725,316	(540,272,360)	24,450,737,928	5.99%	8.43%
Total Participant Directed	5,181,920,522	390,527,186	39,693,325	5,612,141,033	8.30%	7.51%
Total All Funds	**$ 28,250,205,494**	**$ 2,313,252,502**	**$ (500,579,035)**	**$ 30,062,878,961**	**6.42%**	**8.26%**

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 February 28, 2017

	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	$ 8,593,074,451	$ 150,359,871	$ (38,703,946)	$ 8,704,730,376	1.30%	1.75%
Retirement Health Care Trust	7,058,247,031	122,656,333	(25,230,319)	7,155,673,045	1.38%	1.74%
Total Defined Benefit Plans	15,651,321,482	273,016,204	(63,934,265)	15,860,403,421	1.34%	1.75%
Defined Contribution Plans:						
Participant Directed Retirement	771,267,615	18,149,025	7,666,577	797,083,217	3.35%	2.34%
Health Reimbursement Arrangement	260,394,534	4,502,006	2,936,009	267,832,549	2.86%	1.72%
Retiree Medical Plan	70,969,576	1,226,252	973,889	73,169,717	3.10%	1.72%
Defined Benefit Occupational Death and Disability:						
Public Employees	16,355,318	283,291	108,791	16,747,400	2.40%	1.73%
Police and Firefighters	7,959,125	138,093	27,471	8,124,689	2.08%	1.73%
Total Defined Contribution Plans	1,126,946,168	24,298,667	11,712,737	1,162,957,572	3.20%	2.15%
Total PERS	**16,778,267,650**	**297,314,871**	**(52,221,528)**	**17,023,360,993**	1.46%	1.77%
Teachers' Retirement System (TRS)						
Defined Benefit Plans:						
Retirement Trust	5,148,225,662	90,084,763	(31,935,157)	5,206,375,268	1.13%	1.76%
Retirement Health Care Trust	2,643,920,833	45,915,586	(7,580,980)	2,682,255,439	1.45%	1.74%
Total Defined Benefit Plans	7,792,146,495	136,000,349	(39,516,137)	7,888,630,707	1.24%	1.75%
Defined Contribution Plans:						
Participant Directed Retirement	323,594,640	7,682,611	3,032,352	334,309,603	3.31%	2.36%
Health Reimbursement Arrangement	77,523,598	1,337,300	854,717	79,715,615	2.83%	1.72%
Retiree Medical Plan	27,010,713	466,179	289,488	27,766,380	2.80%	1.72%
Defined Benefit Occupational Death and Disability	3,337,656	57,909	(7,451)	3,388,114	1.51%	1.74%
Total Defined Contribution Plans	431,466,607	9,543,999	4,169,106	445,179,712	3.18%	2.20%
Total TRS	**8,223,613,102**	**145,544,348**	**(35,347,031)**	**8,333,810,419**	1.34%	1.77%
Judicial Retirement System (JRS)						
Defined Benefit Plan Retirement Trust	156,061,115	2,728,611	(466,531)	158,323,195	1.45%	1.75%
Defined Benefit Retirement Health Care Trust	28,562,122	496,113	(11,961)	29,046,274	1.70%	1.74%
Total JRS	**184,623,237**	**3,224,724**	**(478,492)**	**187,369,469**	1.49%	1.75%
National Guard/Naval Militia Retirement System (MRS)						
Defined Benefit Plan Retirement Trust	37,237,377	584,196	(231,706)	37,589,867	0.95%	1.57%
Other Participant Directed Plans						
Supplemental Annuity Plan	3,558,849,748	64,304,974	(5,014,582)	3,618,140,140	1.67%	1.81%
Deferred Compensation Plan	847,557,440	17,118,398	(2,067,765)	862,608,073	1.78%	2.02%
Total All Funds	**29,630,148,554**	**528,091,511**	**(95,361,104)**	**30,062,878,961**		
Total Non-Participant Directed	24,128,879,111	420,836,503	(98,977,686)	24,450,737,928	1.33%	1.75%
Total Participant Directed	5,501,269,443	107,255,008	3,616,582	5,612,141,033	2.02%	1.95%
Total All Funds	**$ 29,630,148,554**	**$ 528,091,511**	**$ (95,361,104)**	**$ 30,062,878,961**	**1.46%**	**1.79%**

Notes:

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

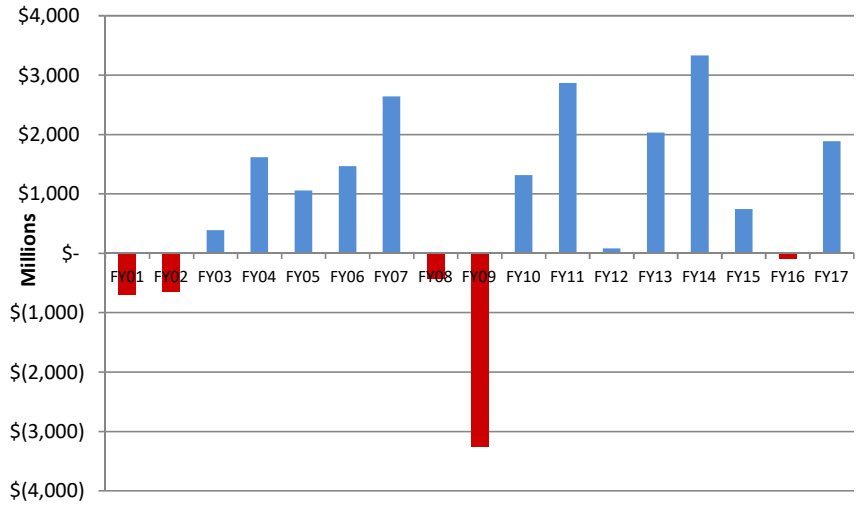
(2) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates and can be found at: http://www.revenue.state.ak.us/treasury/programs/programs/other/armb/investmentresults.aspx

Total Defined Benefit Assets

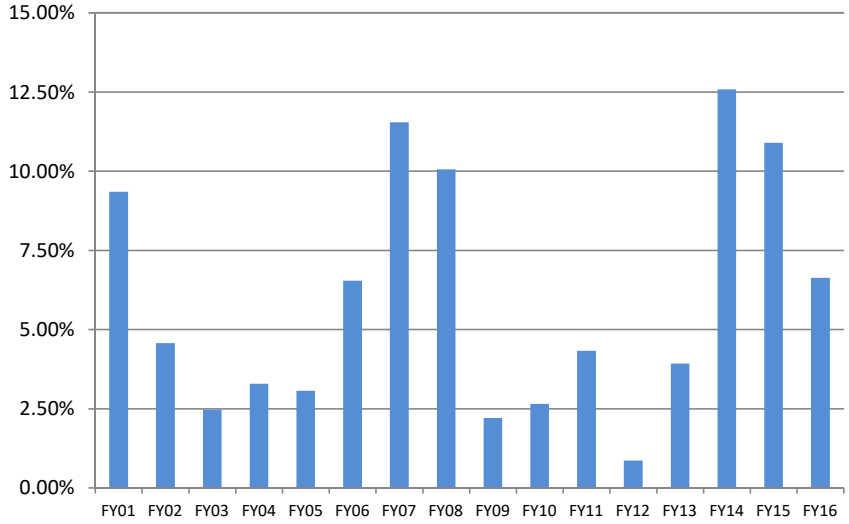
As of February 28, 2017

Total Assets History

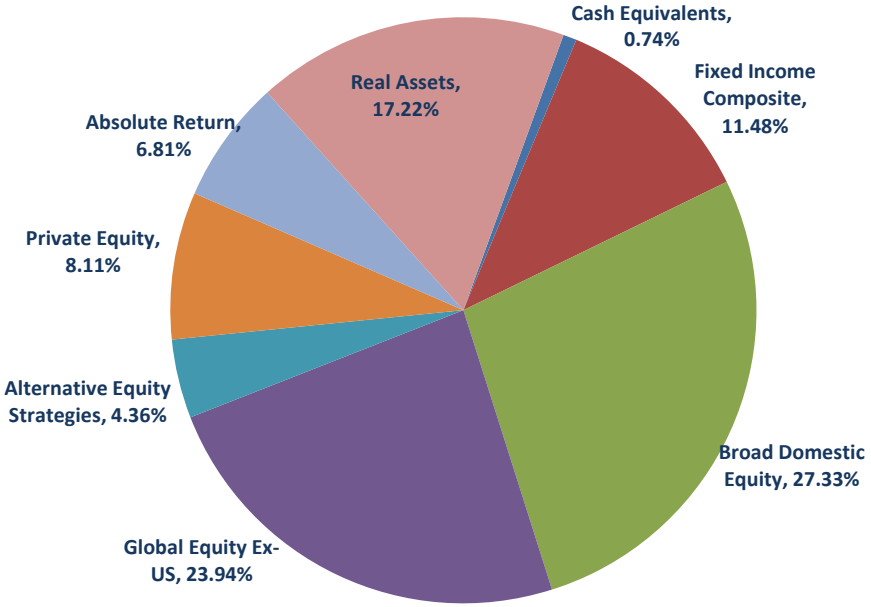
Income by Fiscal Year



5-year Annualized Returns as of Fiscal Year End

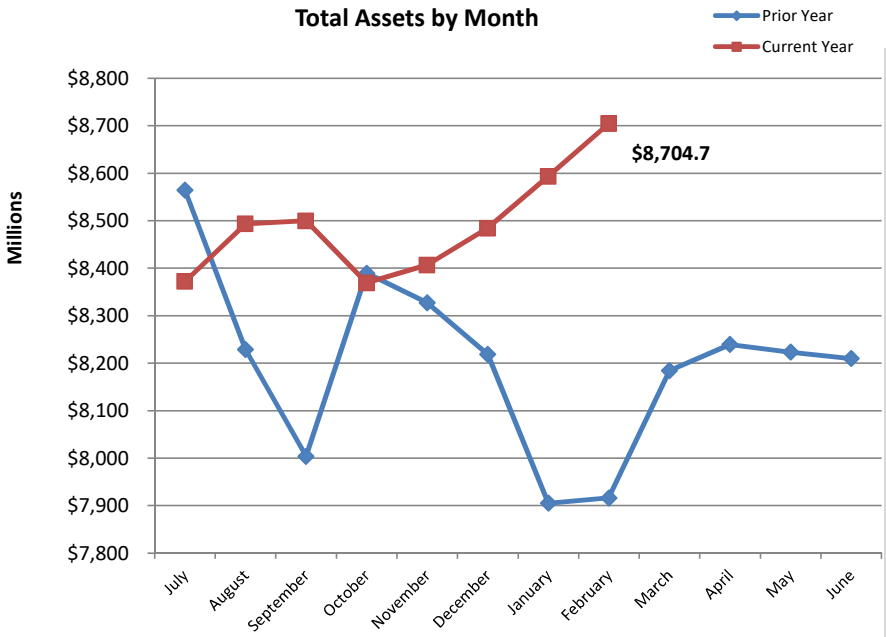


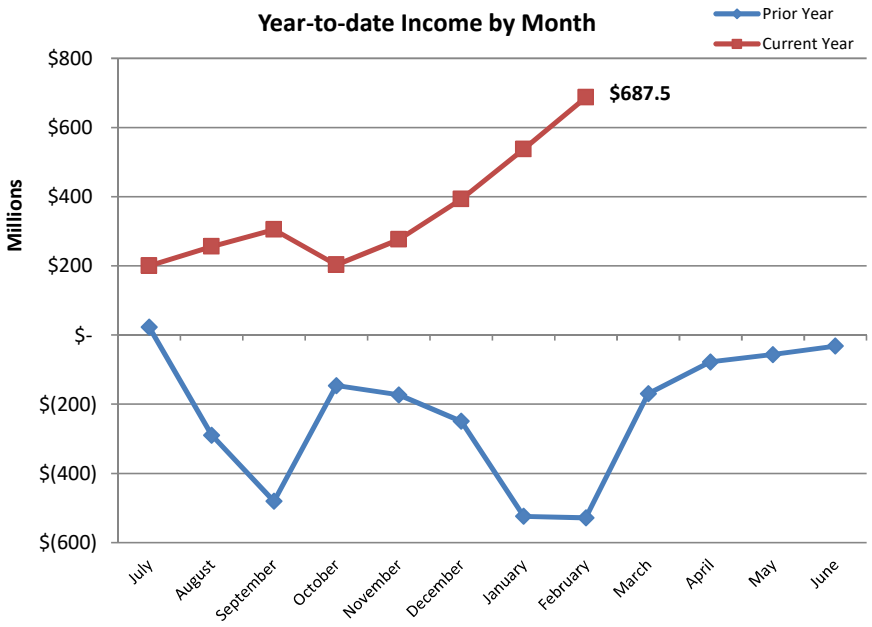
Actual Asset Allocation

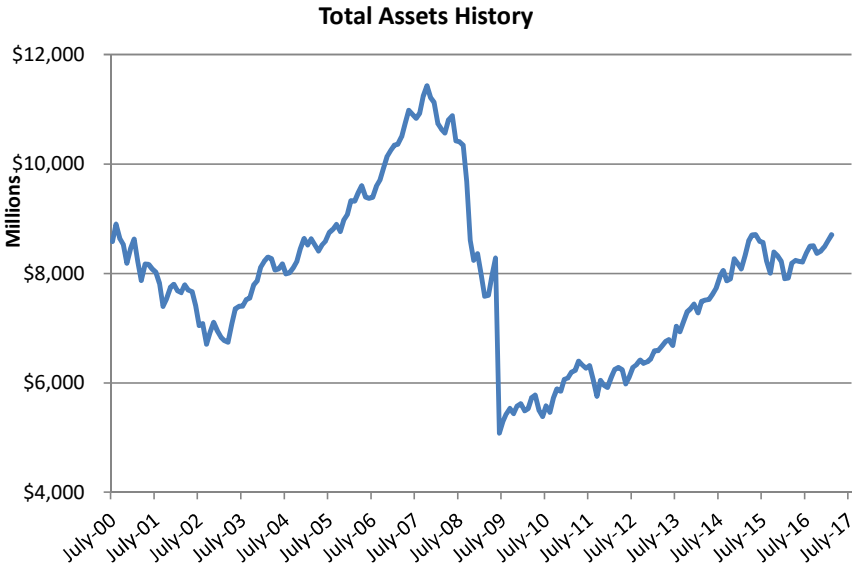


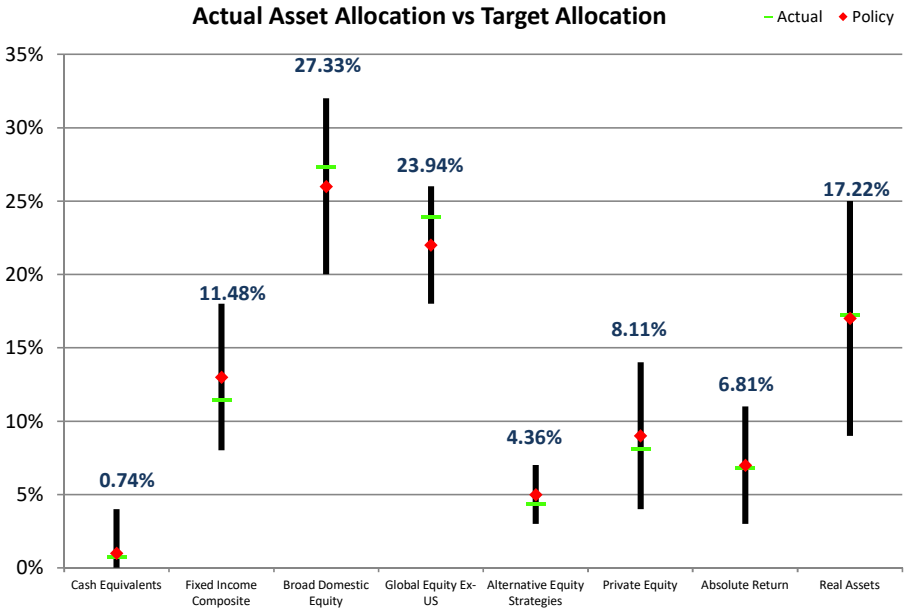
Public Employees' Retirement Pension Trust Fund

Fiscal Year-to-Date through February 28, 2017



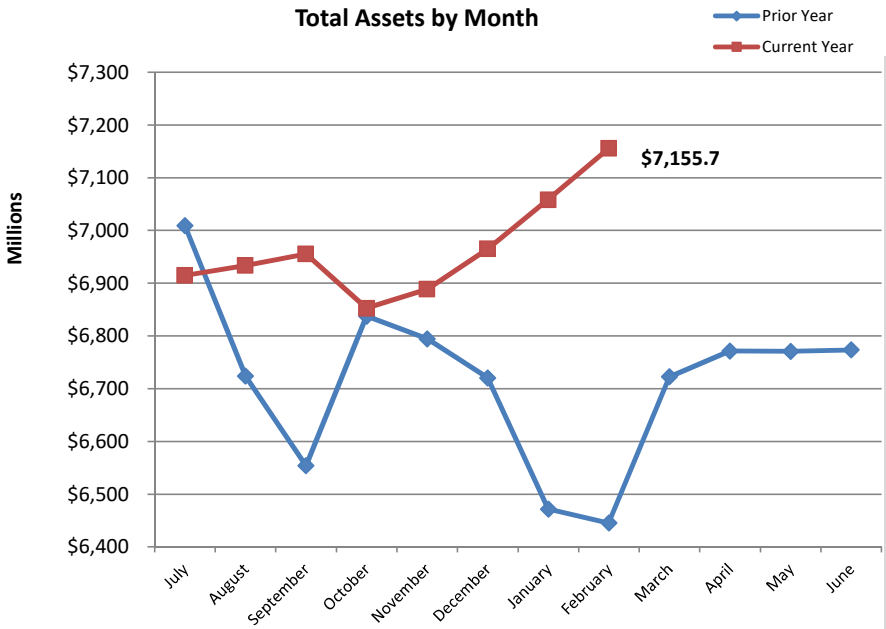


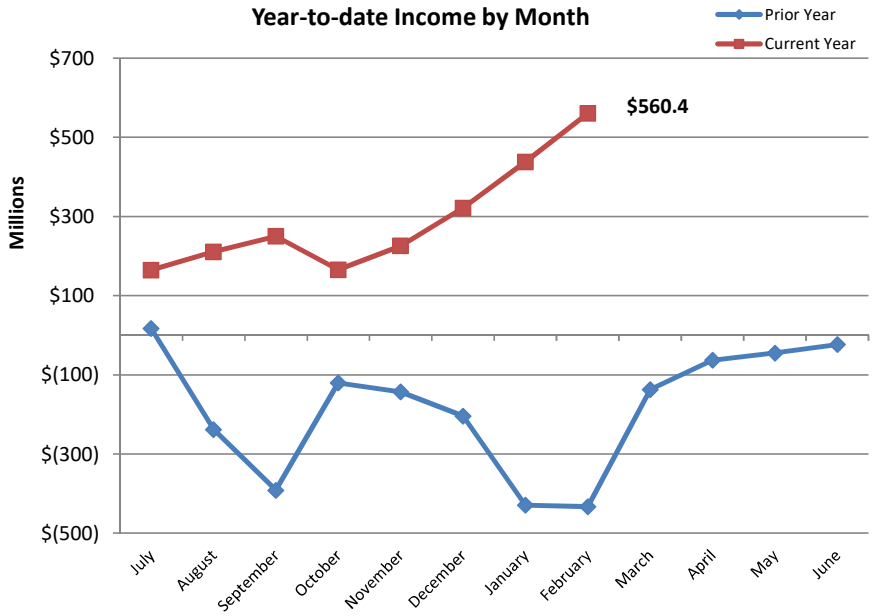


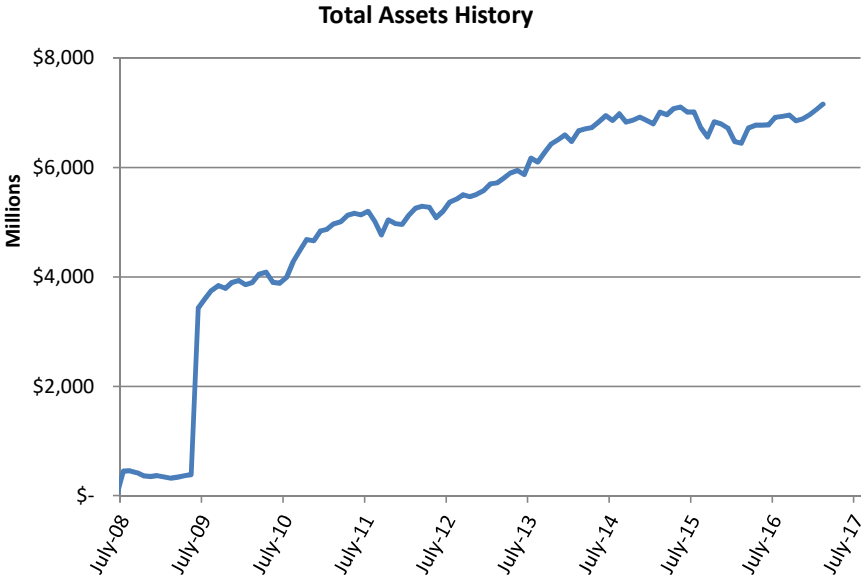


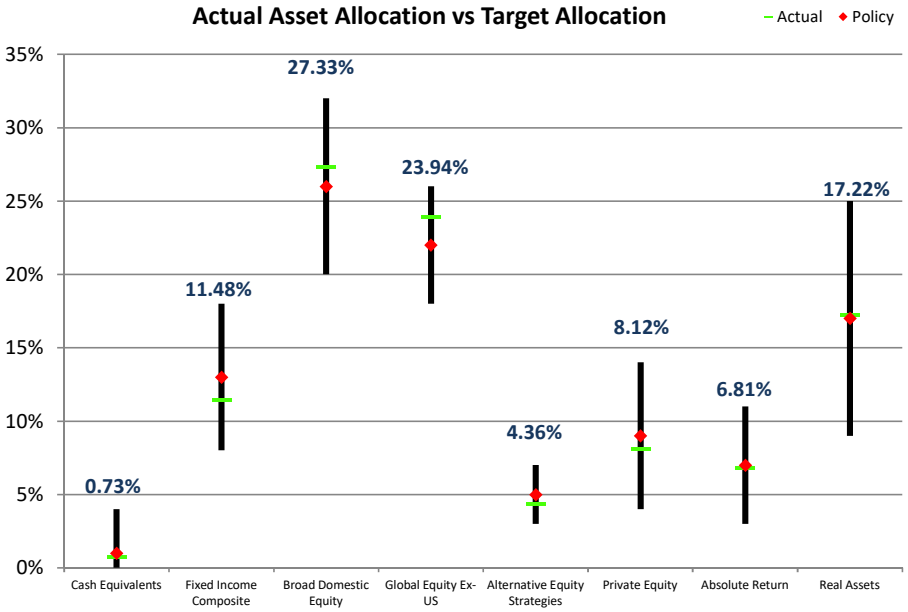
Public Employees' Retirement Health Care Trust Fund

Fiscal Year-to-Date through February 28, 2017



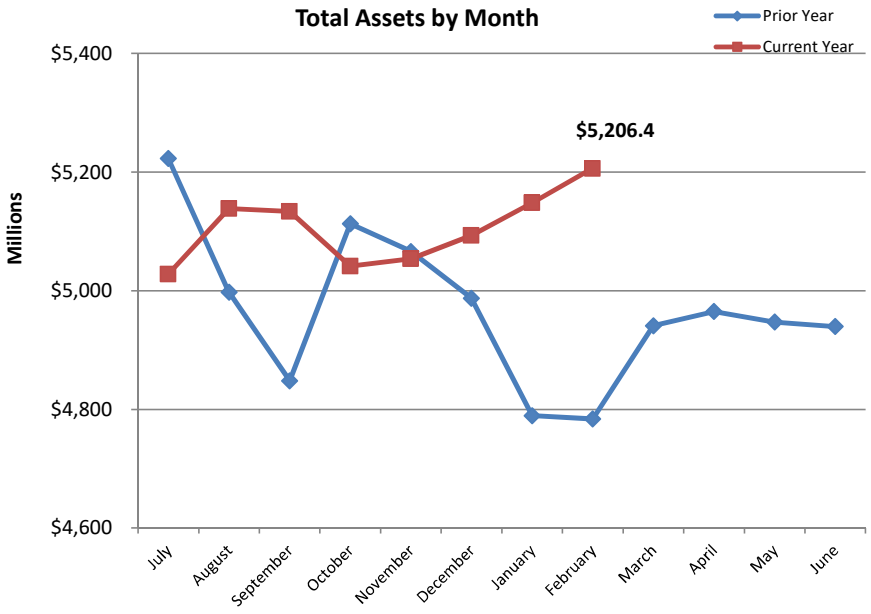


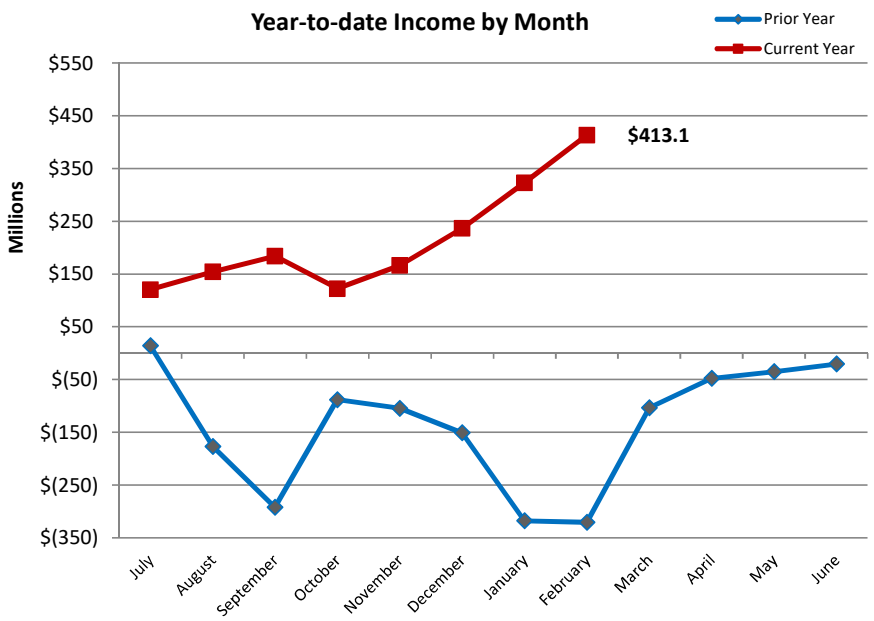


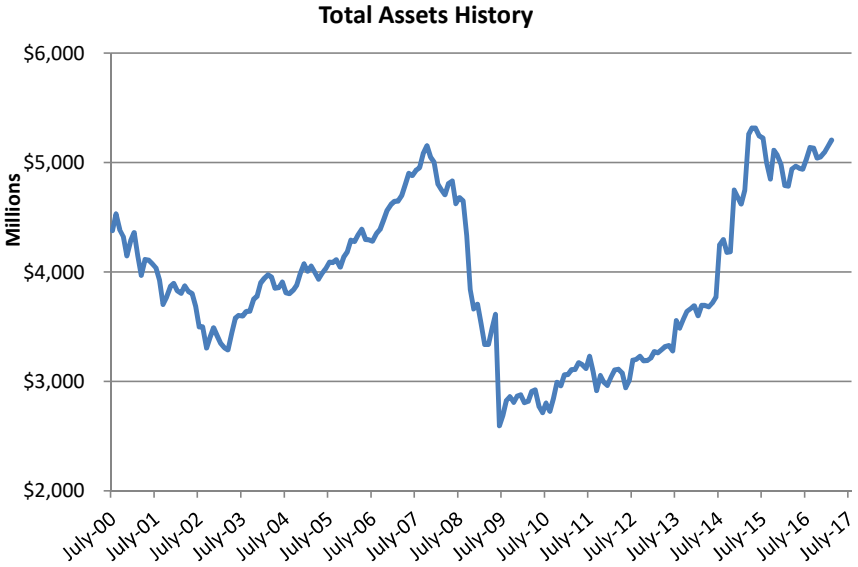


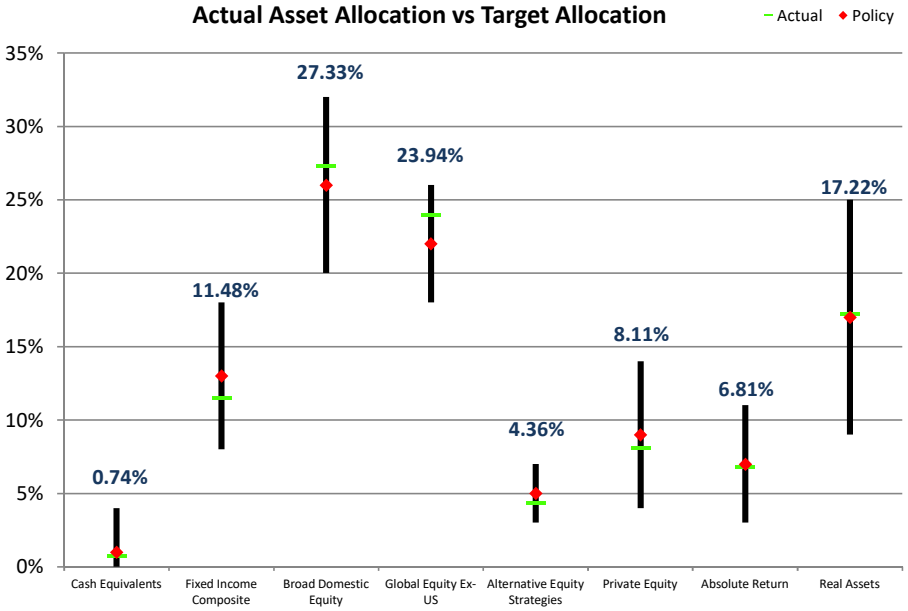
Teachers' Retirement Pension Trust Fund

Fiscal Year-to-Date through February 28, 2017



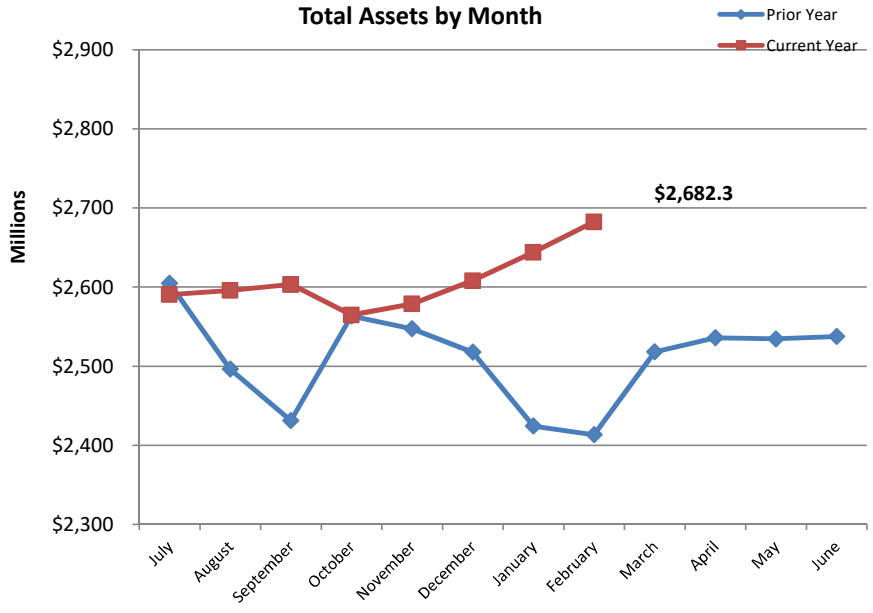


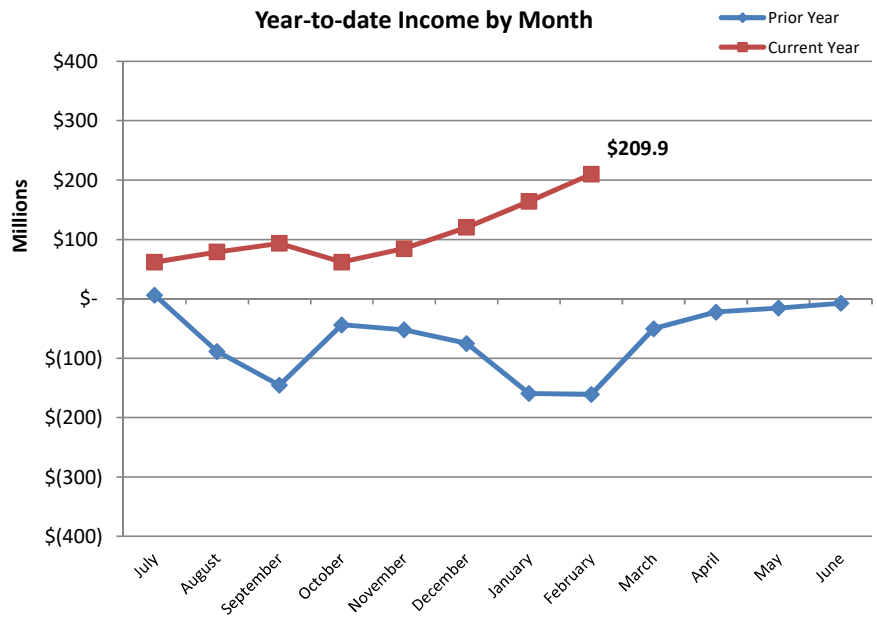


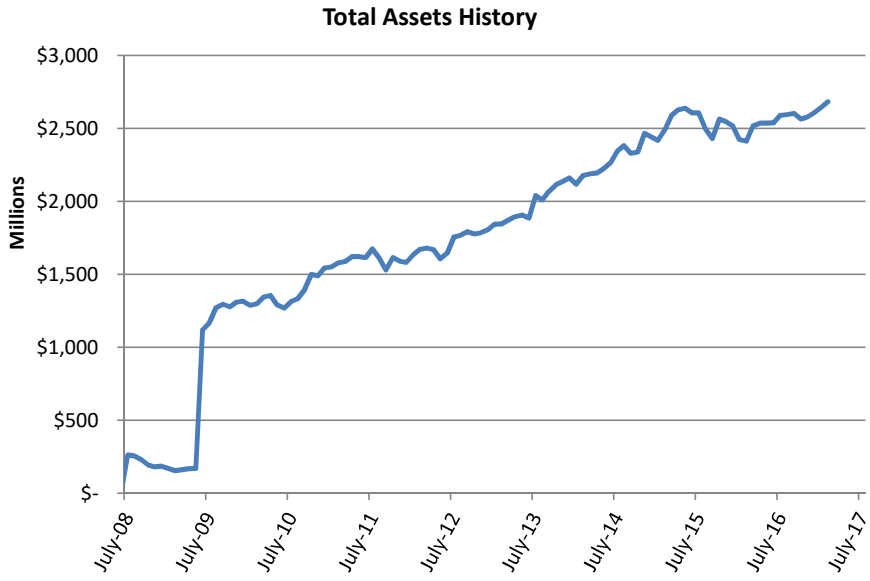


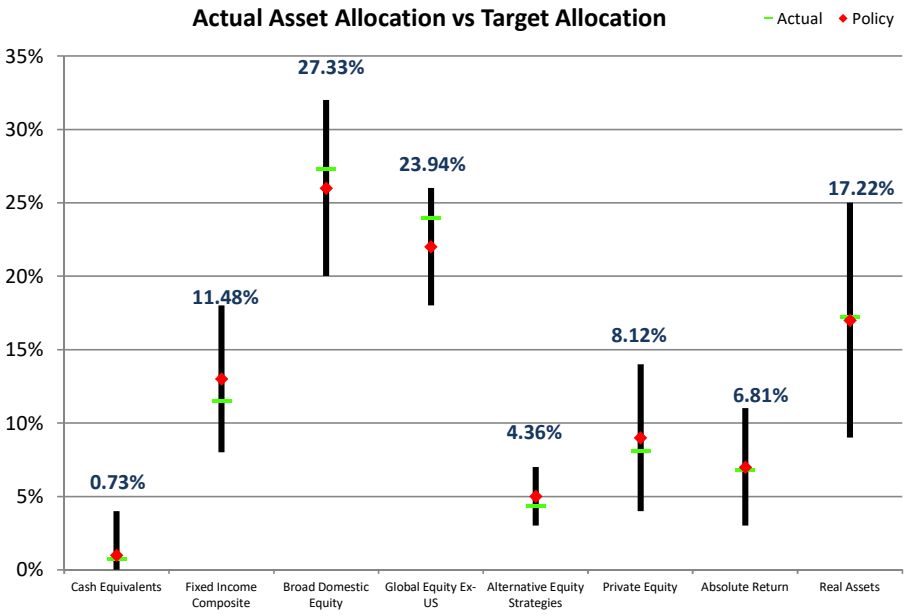
Teachers' Retirement Health Care Trust Fund

Fiscal Year-to-Date through February 28, 2017



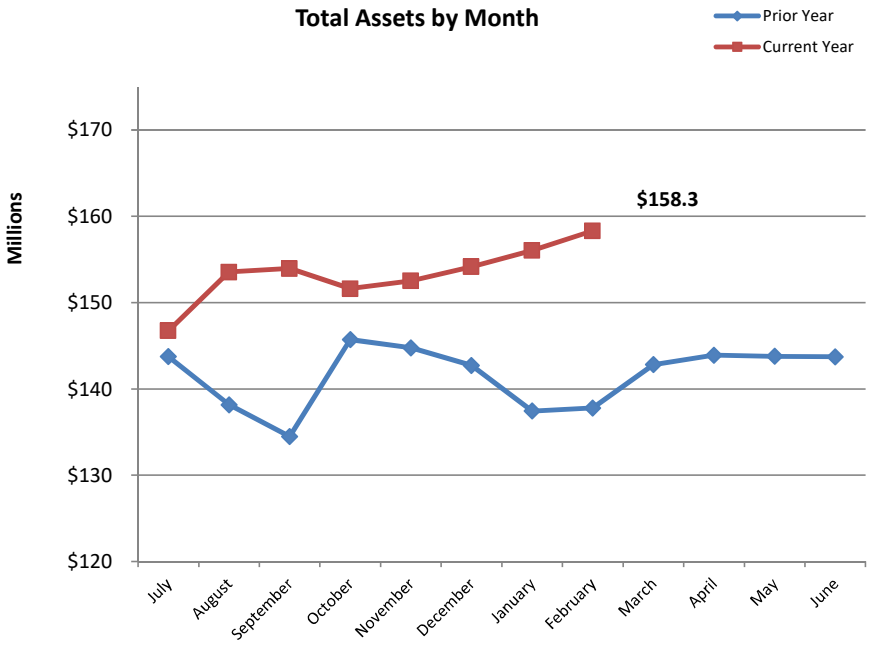


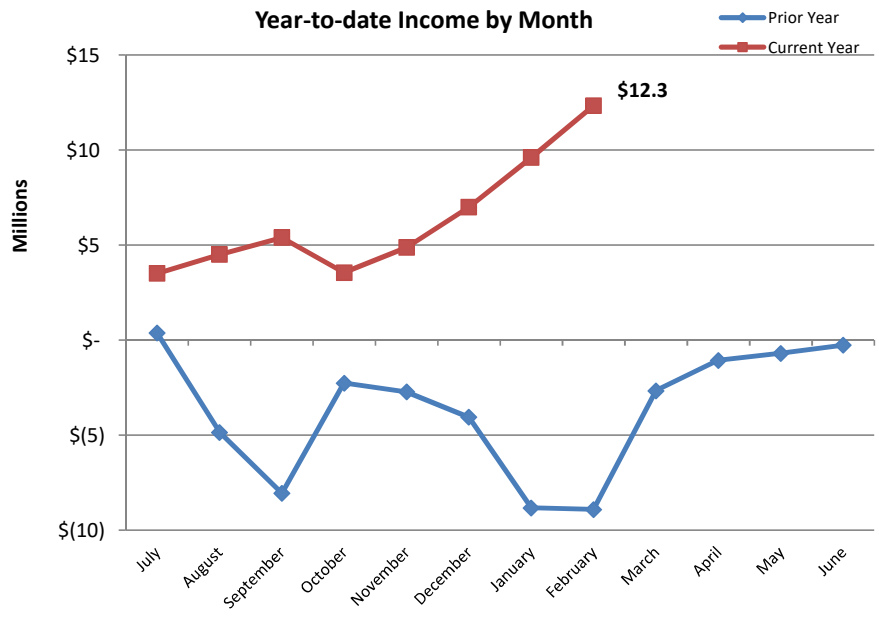


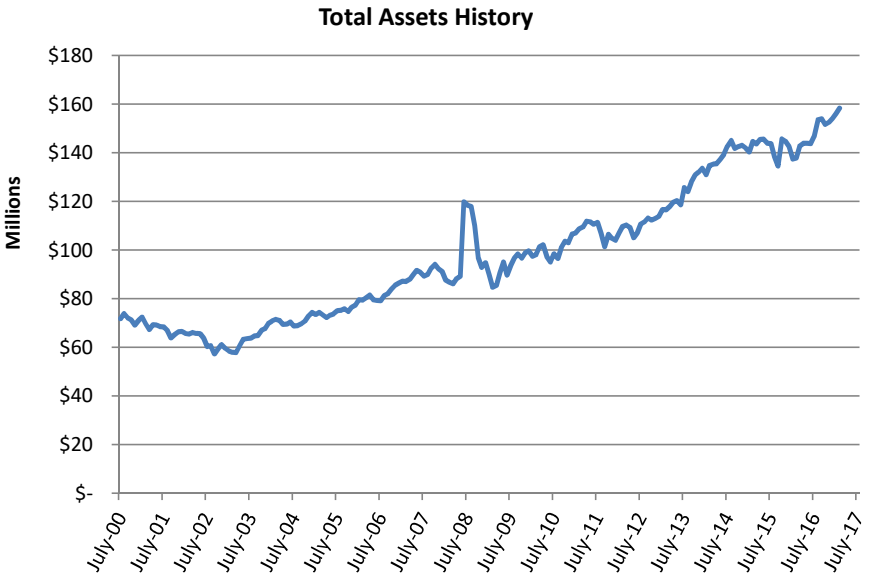


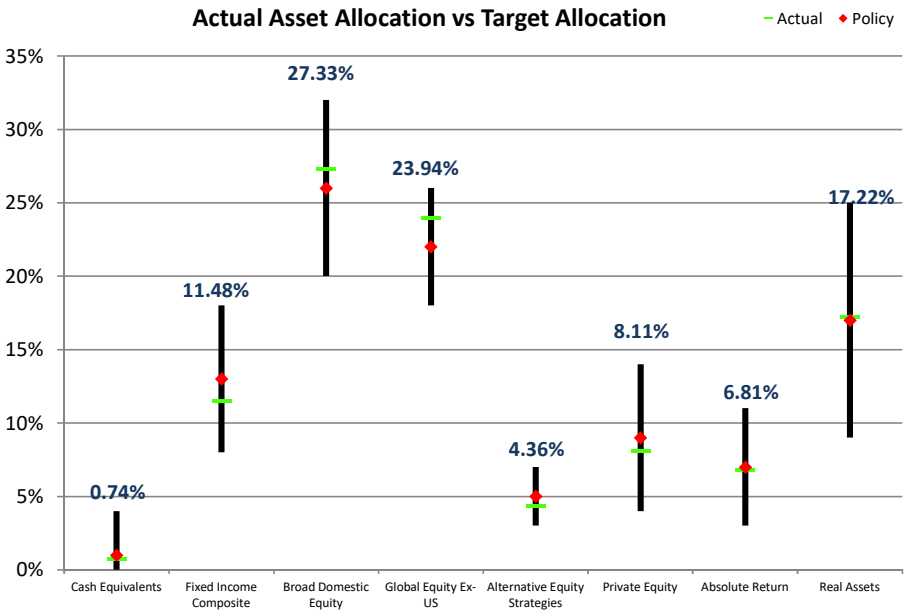
Judicial Retirement Pension Trust Fund

Fiscal Year-to-Date through February 28, 2017



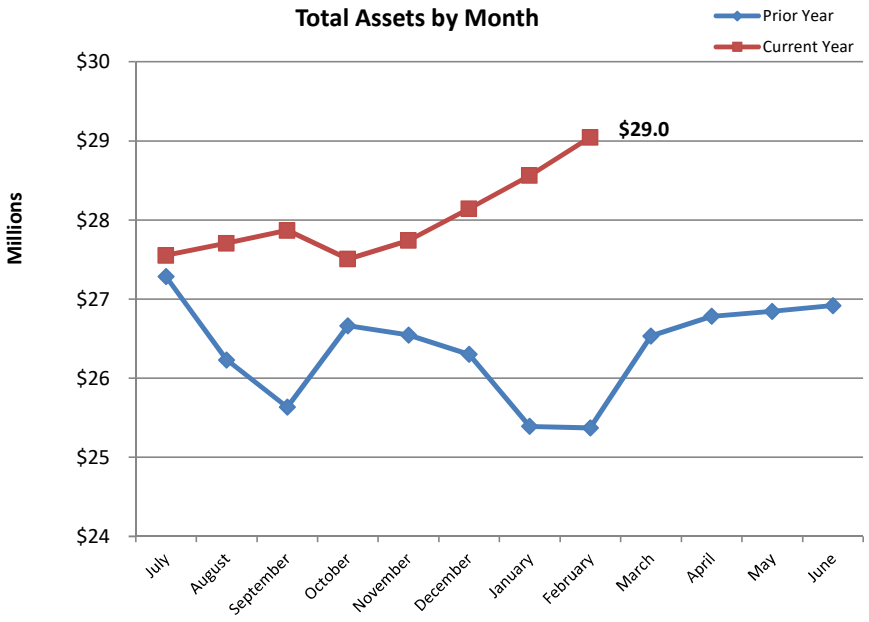


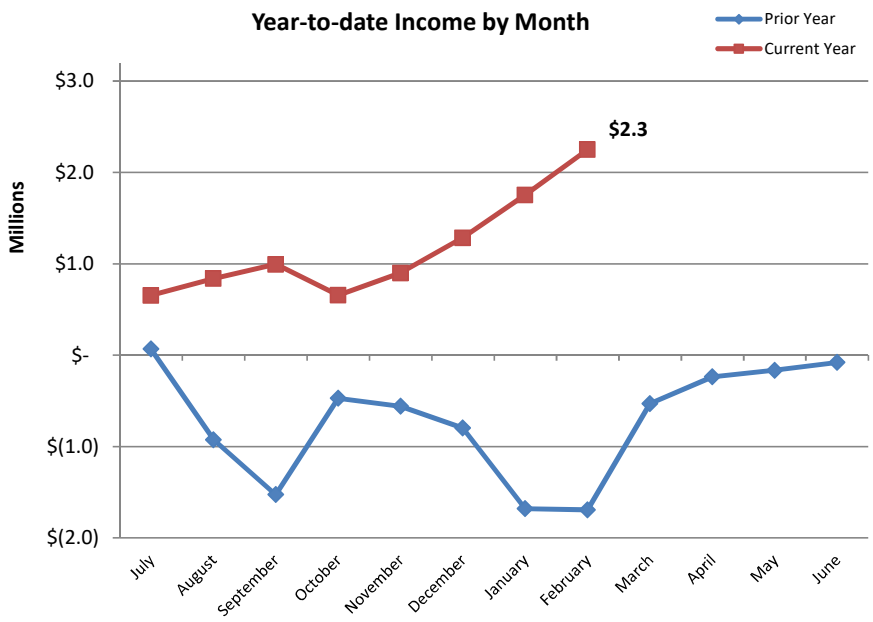


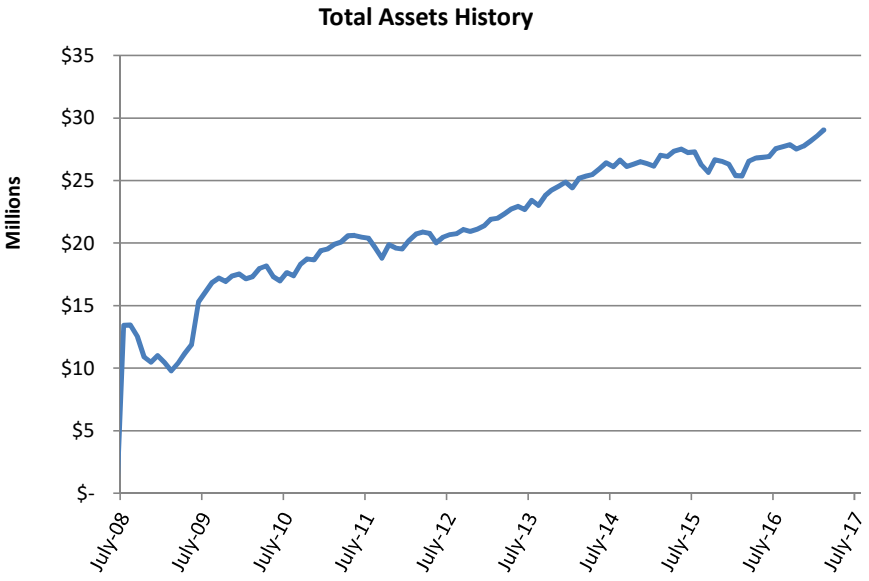


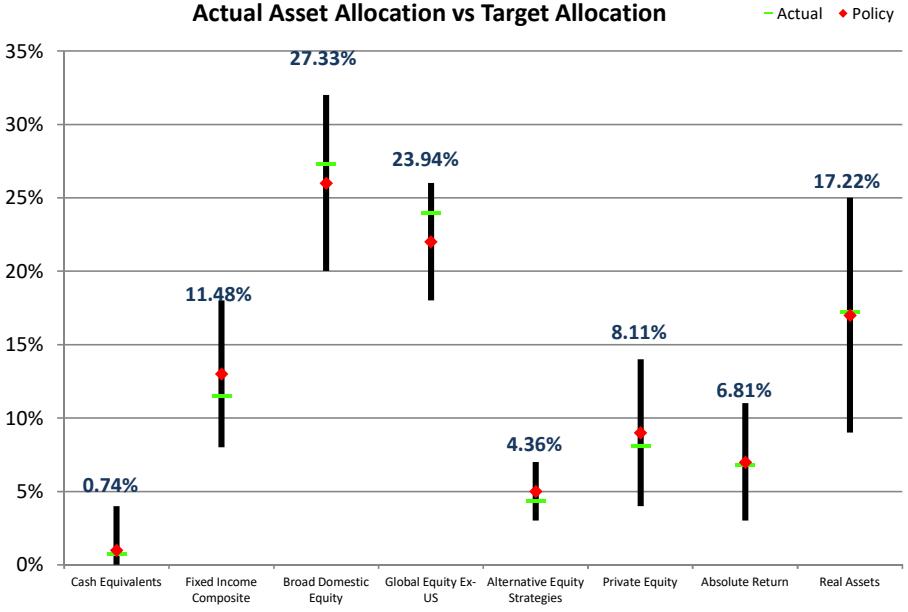
Judicial Retirement Health Care Trust Fund

Fiscal Year-to-Date through February 28, 2017



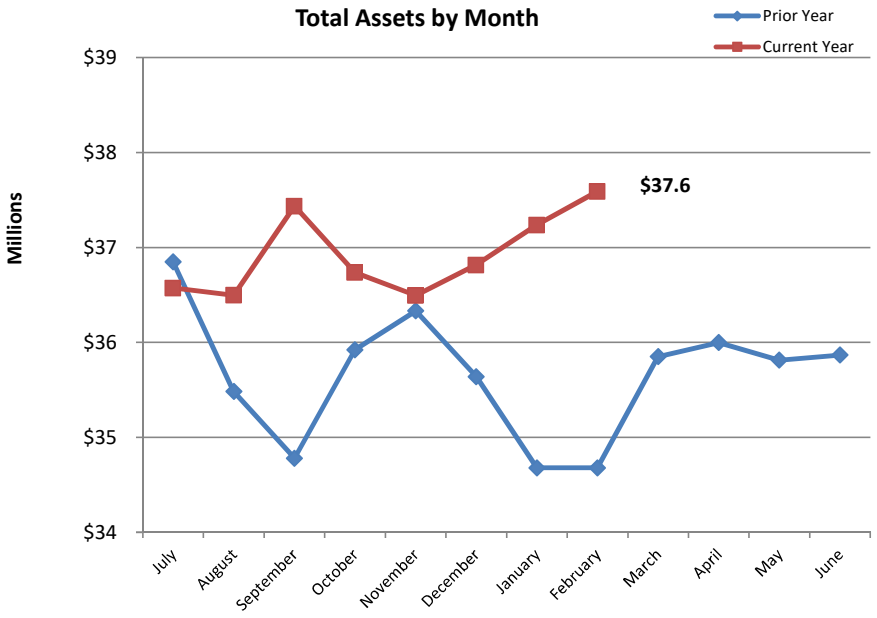


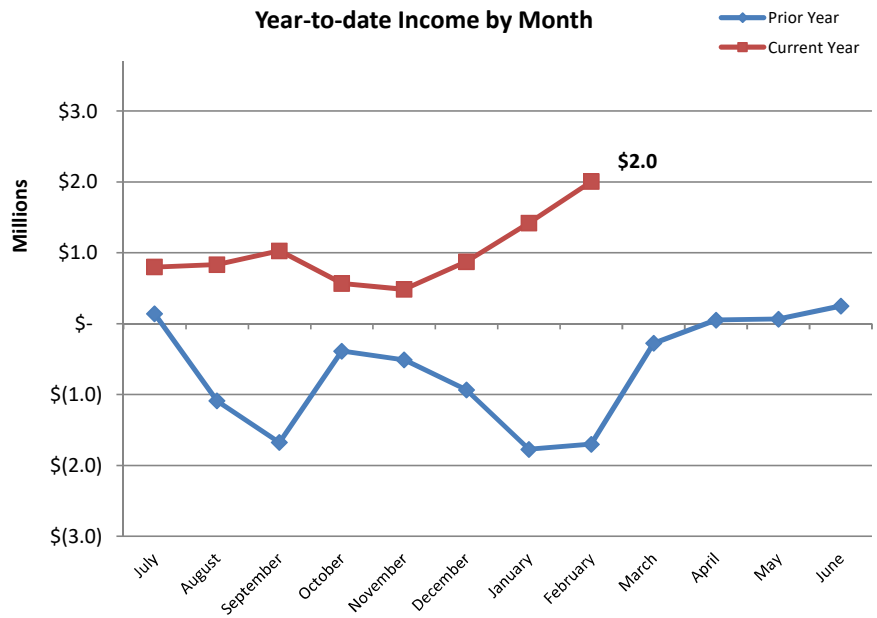


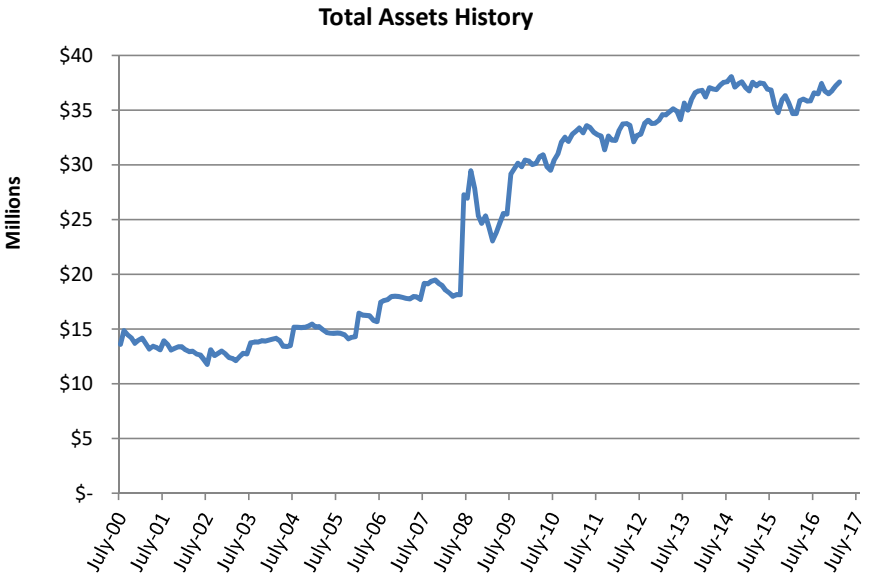


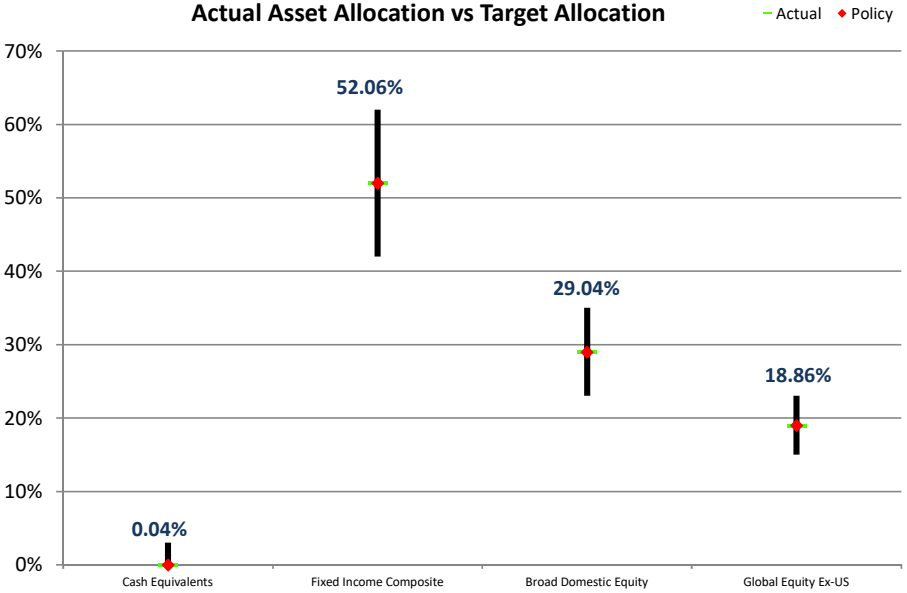
Military Retirement Trust Fund

Fiscal Year-to-Date through February 28, 2017









ALASKA RETIREMENT MANAGEMENT BOARD

Reporting of Funds by Manager

All Non-Participant Directed Plans

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended February 28, 2017

	Beginning Invested Assets	Investment Income	Net Contributions and (Withdrawals)	Ending Invested Assets	% increase (decrease)
Cash					
Short-Term Fixed Income Pool	$ 254,161,041	$ 196,513	$ (74,337,439)	$ 180,020,115	-29.17%
Total Cash	254,161,041	196,513	(74,337,439)	180,020,115	-29.17%
Fixed Income					
US Treasury Fixed Income	1,049,123,474	3,345,083	79,880,000	1,132,348,557	7.93%
Taxable Municipal Bond Pool					
Western Asset Management	102,545,670	1,672,670	72,020	104,290,360	1.70%
Guggenheim Partners	96,682,726	1,560,313	-	98,243,039	1.61%
	199,228,396	3,232,983	72,020	202,533,399	1.66%
Alternative Fixed Income Pool					
Fidelity Institutional Asset Management.	131,928,180	1,309,925	-	133,238,105	0.99%
Schroders Innsurance Linked Securities	61,257,371	247,565	102,007	61,606,943	0.57%
	193,185,551	1,557,490	102,007	194,845,048	0.86%
International Fixed Income Pool					
Mondrian Investment Partners	345,268,538	2,552,100	(49,659,472)	298,161,166	-13.64%
High Yield Pool					
MacKay Shields, LLC	242,175,746	2,978,189	-	245,153,935	1.23%
Fidelity Instit. Asset Mgmt. High Yield CMBS	205,876,880	458,835	-	206,335,715	0.22%
Columbia Threadneedle	228,106,324	3,180,209	(30,000,000)	201,286,533	-11.76%
Eaton Vance High Yield	226,729,978	2,822,733	-	229,552,711	1.24%
	902,888,928	9,439,966	(30,000,000)	882,328,894	-2.28%
Emerging Debt Pool					
Lazard Emerging Income	110,273,996	2,294,277	-	112,568,273	2.08%
Total Fixed Income	2,799,968,883	22,421,899	394,555	2,822,785,337	0.81%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended February 28, 2017

Domestic Equities					
Small Cap Pool					
Passively Managed					
SSgA Russell 2000 Growth	20,453,728	501,171	-	20,954,899	2.45%
SSgA Russell 2000 Value	38,492,527	566,395	-	39,058,922	1.47%
Total Passive	58,946,255	1,067,566	-	60,013,821	1.81%
Actively Managed					
Barrow, Haney, Mewhinney & Strauss	29,590,445	272,074	-	29,862,519	0.92%
DePrince, Race & Zollo Inc.- Micro Cap	100,438,011	1,027,267	-	101,465,278	1.02%
Fidelity (FIAM) Small Company	134,819,572	2,148,131	-	136,967,703	1.59%
Frontier Capital Mgmt. Co.	77,022,936	206,233	-	77,229,169	0.27%
Jennison Associates, LLC	95,131,788	1,619,620	-	96,751,408	1.70%
Lord Abbett Small Cap Growth Fund	49,858,511	1,842,791	-	51,701,302	3.70%
Lord Abbett & Co.- Micro Cap	87,383,853	2,095,904	-	89,479,757	2.40%
SSgA Futures Small Cap	13,605,339	314,464	-	13,919,803	2.31%
Transition Account	-	-	-	-	-
Sycamore Capital	137,641,064	2,513,763	-	140,154,827	1.83%
S&P 600 Internally Managed	22,157,419	355,008	-	22,512,427	1.60%
SSgA Volatility-Russell 2000	88,471,927	1,800,503	-	90,272,430	2.04%
Zebra Capital Management	89,479,442	162,362	-	89,641,804	0.18%
BMO Global Asset Management	74,419,193	1,006,769	-	75,425,962	1.35%
Total Active	1,000,019,500	15,364,889	-	1,015,384,389	1.54%
Total Small Cap	1,058,965,755	16,432,455	-	1,075,398,210	1.55%
Large Cap Pool					
Passively Managed					
SSgA Russell 1000 Growth	1,061,832,306	43,996,395	-	1,105,828,701	4.14%
SSgA Russell 1000 Value	1,011,770,822	36,347,542	-	1,048,118,364	3.59%
SSgA Russell 200	897,876,135	38,733,246	(200,000,000)	736,609,381	-17.96%
Total Passive	2,971,479,263	119,077,183	(200,000,000)	2,890,556,446	-2.72%
Actively Managed					
Allianz Global Investors	328,992,352	11,229,856	-	340,222,208	3.41%
Barrow, Haney, Mewhinney & Strauss	304,120,842	8,620,148	-	312,740,990	2.83%
Lazard Freres	395,172,992	14,525,973	-	409,698,965	3.68%
McKinley Capital Mgmt.	247,041,568	9,946,873	-	256,988,441	4.03%
Quantitative Management Assoc.	239,937,088	8,580,130	-	248,517,218	3.58%
SSgA Futures large cap	16,548,321	647,633	-	17,195,954	3.91%
Transition Account	6,354	(281,222)	200,000,000	199,725,132	3143197.64%
SSgA Volatility-Russell 1000	89,836,128	3,827,810	-	93,663,938	4.26%
Portable Alpha	469,601,176	16,714,908	1,000,000	487,316,084	3.77%
Internally Managed Large Cap.	334,832,645	15,513,551	-	350,346,196	4.63%
Total Active	2,426,089,466	89,325,660	201,000,000	2,716,415,126	11.97%
Total Large Cap	5,397,568,729	208,402,843	1,000,000	5,606,971,572	3.88%
Total Domestic Equity	6,456,534,484	224,835,298	1,000,000	6,682,369,782	3.50%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended February 28, 2017

Alternative Equity Strategies					
Alternative Equity Strategy Pool					
Relational Investors, LLC	1,080,855	-	-	1,080,855	-
Analytic Buy Write Account	322,724,998	4,627,097	95,443	327,447,538	1.46%
Quantitative Management Associates MPS	209,897,338	5,797,802	-	215,695,140	2.76%
ARMB Equity Yield Strategy	299,466,589	9,861,882	-	309,328,471	3.29%
Alternative Equity Strategies Transition Account	-	-	-	-	-
Total Alternative Equity Strategy Pool	833,169,780	20,286,781	95,443	853,552,004	2.45%
Convertible Bond Pool					
Advent Capital	208,846,523	2,877,391	-	211,723,914	1.38%
Total Alternative Equity Strategies	1,042,016,303	23,164,172	95,443	1,065,275,918	2.23%
Global Equities Ex US					
Small Cap Pool					
Mondrian Investment Partners	149,881,346	3,956,309	269,026	154,106,681	2.82%
Schroder Investment Management	162,869,511	3,342,807	-	166,212,318	2.05%
Total Small Cap	312,750,857	7,299,116	269,026	320,318,999	2.42%
Large Cap Pool					
Blackrock ACWI Ex-US IMI	566,691,546	9,902,840	101,463	576,695,849	1.77%
Brandes Investment Partners	731,684,337	5,438,182	678,099	737,800,618	0.84%
Cap Guardian Trust Co	749,617,589	8,208,935	-	757,826,524	1.10%
Lazard Freres	349,758,956	5,981,725	-	355,740,681	1.71%
McKinley Capital Management	516,037,304	12,097,995	597,715	528,733,014	2.46%
SSgA Futures International	-	-	-	-	-
Allianz Global Investors	261,450,108	3,035,694	-	264,485,802	1.16%
Arrow Street Capital	321,684,273	3,585,640	360,080	325,629,993	1.23%
Baillie Gifford Overseas Limited	386,478,284	3,964,017	-	390,442,301	1.03%
State Street Global Advisors	834,931,094	14,579,780	-	849,510,874	1.75%
Total Large Cap	4,718,333,491	66,794,808	1,737,357	4,786,865,656	1.45%
Emerging Markets Equity Pool					
Lazard Asset Management	473,391,895	13,000,613	-	486,392,508	2.75%
Eaton Vance	252,481,858	5,652,579	-	258,134,437	2.24%
Total Emerging Markets Pool	725,873,753	18,653,192	-	744,526,945	2.57%
Total Global Equities	5,756,958,101	92,747,116	2,006,383	5,851,711,600	1.65%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended February 28, 2017

Private Equity Pool					
Abbott Capital	800,510,217	6,778,712	(14,736,705)	792,552,224	-0.99%
Angelo, Gordon & Co.	1,987,987	(8,120)	(210,310)	1,769,557	-10.99%
Advent International GPE Fund VIII-B	406,449	-	1,825,000	2,231,449	449.01%
Lexington Partners VII	31,625,555	-	(1,001,205)	30,624,350	-3.17%
Merit Capital Partners	17,689,539	-	-	17,689,539	-
NB SOF III	26,340,903	-	-	26,340,903	-
NB SOF IV	-	-	-	-	-
Resolute Fund III	9,709,190	-	974,591	10,683,781	10.04%
Glendon Opportunities	27,206,019	2,544,788	-	29,750,807	9.35%
New Mountain Partners IV	16,738,269	-	703,700	17,441,969	4.20%
KKR Lending Partners II	63,255,885	3,311,447	-	66,567,332	5.24%
NGP XI	24,902,202	-	-	24,902,202	-
Lexington Capital Partners VIII	11,715,369	-	-	11,715,369	-
Onex Partnership III	20,479,933	-	-	20,479,933	-
Pathway Capital Management LLC	854,569,607	10,535,517	(3,902,367)	861,202,757	0.78%
Summit Partners GE IX	-	-	-	-	-
Dyal Capital Partners III	10,706,264	-	-	10,706,264	-
Warburg Pincus X	14,910,869	-	-	14,910,869	-
Warburg Pincus XI	29,312,766	-	-	29,312,766	-
Warburg Pincus XII	10,712,842	-	1,527,500	12,240,342	14.26%
Total Private Equity	1,972,779,865	23,162,344	(14,819,796)	1,981,122,413	0.42%
Absolute Return Pool					
Global Asset Management (USA) Inc.	228,620,571	(902,836)	-	227,717,735	-0.39%
Prisma Capital Partners	372,799,490	3,262,531	-	376,062,021	0.88%
Crestline Investors, Inc.	398,285,057	-	(9,663,856)	388,621,201	-2.43%
Allianz Global Investors	346,854,955	1,841,385	-	348,696,340	0.53%
Crestline Specialty Fund	27,813,884	848,586	(691,040)	27,971,430	0.57%
KKR Apex Equity Fund	92,365,911	921,655	-	93,287,566	1.00%
Zebra Global Equity Fund	134,183,464	(3,784,239)	-	130,399,225	-2.82%
Zebra Global Equity Advantage Fund	74,169,771	(3,913,166)	-	70,256,605	-5.28%
Total Absolute Return Investments	1,675,093,103	(1,726,084)	(10,354,896)	1,663,012,123	-0.72%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended February 28, 2017

Real Assets					
Farmland Pool					
UBS Agrivest, LLC	556,866,051	-	-	556,866,051	-
Hancock Agricultural Investment Group	269,383,136	-	-	269,383,136	-
Total Farmland Pool	826,249,187	-	-	826,249,187	-
Timber Pool					
Timberland Invt Resource LLC	266,535,050	-	-	266,535,050	-
Hancock Natural Resource Group	97,010,811	-	-	97,010,811	-
Total Timber Pool	363,545,861	-	-	363,545,861	-
Energy Pool					
EIG Energy Fund XV	28,567,036	1,924,143	(401,536)	30,089,643	5.33%
EIG Energy Fund XD	396,395	(129,701)	-	266,694	-32.72%
EIG Energy Fund XIV-A	10,690,441	715,772	-	11,406,213	6.70%
EIG Energy Fund XVI	37,031,873	5,431,110	5,000,000	47,462,983	28.17%
Total Energy Pool	76,685,745	7,941,324	4,598,464	89,225,533	16.35%
REIT Pool					
REIT Trans Account	-	-	-	-	-
REIT Holdings	336,265,466	13,604,401	-	349,869,867	4.05%
Total REIT Pool	336,265,466	13,604,401	-	349,869,867	4.05%
Treasury Inflation Proof Securities					
TIPS Internally Managed Account	55,215,183	255,852	-	55,471,035	0.46%
Master Limited Partnerships					
Advisory Research MLP	253,484,728	421,053	-	253,905,781	0.17%
Tortoise Capital Advisors	285,213,702	4,712,254	-	289,925,956	1.65%
Total Master Limited Partnerships	538,698,430	5,133,307	-	543,831,737	0.95%
Infrastructure Private Pool					
IFM Global Infrastructuer Fund-Private	228,582,881	2,168,903	25,000,000	255,751,784	11.89%
JP Morgan Infrastructure Fund-Private	100,597,293	(1,639,960)	-	98,957,333	-1.63%
Total Infrastructure Private Pool	329,180,174	528,943	25,000,000	354,709,117	7.76%
Infrastructure Public Pool					
Brookfield Investment Mgmt.-Public	95,181,344	3,487,567	163,071	98,831,982	3.84%
Lazard Asset Mgmt.-Public	115,682,607	5,169,088	180,480	121,032,175	4.62%
Total Infrastructure Public Pool	210,863,951	8,656,655	343,551	219,864,157	4.27%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended February 28, 2017

Real Estate					
Core Commingled Accounts					
JP Morgan	243,074,314	293,999	-	243,368,313	0.12%
UBS Trumbull Property Fund	123,704,544	-	-	123,704,544	-
Total Core Commingled	366,778,858	293,999	-	367,072,857	0.08%
Core Separate Accounts					
LaSalle Investment Management	213,718,670	-	(429,211)	213,289,459	-0.20%
Sentinel Separate Account	184,846,471	-	(587,297)	184,259,174	-0.32%
UBS Realty	493,686,956	(379,236)	(1,116,923)	492,190,797	-0.30%
Total Core Separate	892,252,097	(379,236)	(2,133,431)	889,739,430	-0.28%
Non-Core Commingled Accounts					
Almanac Realty Securities IV	51,405	-	(50,450)	955	-98.14%
Almanac Realty Securities V	5,548,918	-	-	5,548,918	-
Almanac Realty Securities VII	18,082,155	-	-	18,082,155	-
BlackRock Diamond Property Fund	290,613	-	-	290,613	-
Clarion Ventures 4	41,850,937	-	(27,777,365)	14,073,572	-66.37%
Colony Investors VIII, L.P.	11,061,481	-	(3,517,292)	7,544,189	-31.80%
Cornerstone Apartment Venture III	44,542	-	-	44,542	-
Coventry	437,016	-	-	437,016	-
ING Clarion Development Ventures III	6,902,641	-	-	6,902,641	-
KKR Real Estate Partners Americas LP.	33,561,974	-	574,587	34,136,561	1.71%
LaSalle Medical Office Fund II	196	-	-	196	-
Lowe Hospitality Partners	333,058	-	-	333,058	-
Silverpeak Legacy Pension Partners II, L.P.	11,544,914	-	-	11,544,914	-
Silverpeak Legacy Pension Partners III, L.P.	5,690,370	-	-	5,690,370	-
Tishman Speyer Real Estate Venture VI	34,111,227	-	-	34,111,227	-
Tishman Speyer Real Estate Venture VII	6,120,932	-	-	6,120,932	-
Total Non-Core Commingled	175,632,379	-	(30,770,520)	144,861,859	-17.52%
Total Real Estate	1,434,663,334	(85,237)	(32,903,951)	1,401,674,146	-2.30%
Total Real Assets	4,171,367,331	36,035,245	(2,961,936)	4,204,440,640	0.79%
Total Assets	$ 24,128,879,111	$ 420,836,503	$ (98,977,686)	$ 24,450,737,928	1.33%

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
February 28, 2017

	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (2)
Participant Options							
T. Rowe Price							
Stable Value Fund	$ 368,117,026	$ 609,670	$ (2,232,542)	$ 3,337,290	$ 369,831,444	0.47%	0.17%
Small Cap Stock Fund	151,635,032	3,722,122	20,347	559,637	155,937,138	2.84%	2.45%
Alaska Balanced Trust	1,151,599,059	14,923,178	(3,225,728)	(2,829,811)	1,160,466,698	0.77%	1.30%
Long Term Balanced Fund	564,282,318	10,894,729	780,287	(974,697)	574,982,637	1.90%	1.93%
AK Target Date 2010 Trust	9,433,685	140,036	275	(132,763)	9,441,233	0.08%	1.49%
AK Target Date 2015 Trust	87,392,565	1,499,623	(260,774)	(373,521)	88,257,893	0.99%	1.72%
AK Target Date 2020 Trust	80,957,700	1,597,566	(291,908)	308,897	82,572,255	1.99%	1.97%
AK Target Date 2025 Trust	56,931,393	1,252,355	348,423	(298,217)	58,233,954	2.29%	2.20%
AK Target Date 2030 Trust	43,017,475	1,034,130	268,819	(269,755)	44,050,669	2.40%	2.40%
AK Target Date 2035 Trust	39,200,905	1,011,352	381,642	911,000	41,504,899	5.88%	2.54%
AK Target Date 2040 Trust	39,797,178	1,064,971	310,861	83,084	41,256,094	3.67%	2.66%
AK Target Date 2045 Trust	43,076,833	1,172,083	347,029	74,103	44,670,048	3.70%	2.71%
AK Target Date 2050 Trust	48,951,412	1,331,693	474,709	63,003	50,820,817	3.82%	2.71%
AK Target Date 2055 Trust	37,589,519	1,023,797	522,433	136,328	39,272,077	4.48%	2.70%
AK Target Date 2060 Trust	278,777	8,084	1,149	18	288,028	3.32%	2.89%
Total Investments with T. Rowe Price	2,722,260,877	41,285,389	(2,554,978)	594,596	2,761,585,884		
State Street Global Advisors							
State Street Treasury Money Market Fund - Inst.	42,741,424	13,704	(538,216)	(412,455)	41,804,457	-2.19%	0.03%
S&P 500 Stock Index Fund Series A	378,304,697	15,011,038	(109,788)	779,943	393,985,890	4.15%	3.96%
Russell 3000 Index	67,526,081	2,516,703	(220,046)	711,339	70,534,077	4.45%	3.71%
US Real Estate Investment Trust Index	43,131,025	1,440,563	(47,804)	(1,335,047)	43,188,737	0.13%	3.39%
World Equity Ex-US Index	30,122,953	482,535	(68,321)	(56,267)	30,480,900	1.19%	1.61%
Long US Treasury Bond Index	17,124,226	240,609	(247,213)	(1,061,498)	16,056,124	-6.24%	1.46%
US Treasury Inflation Protected Securities Index	23,628,841	107,561	(499,998)	85,002	23,321,406	-1.30%	0.46%
World Government Bond Ex-US Index	6,973,183	18,997	(27,897)	(302,037)	6,662,246	-4.46%	0.28%
Global Balanced Fund	55,078,781	1,068,001	(976,688)	39,874	55,209,968	0.24%	1.96%
Total Investments with SSGA	664,631,211	20,899,711	(2,735,971)	(1,551,146)	681,243,805		
BlackRock							
Government/Credit Bond Fund	39,153,046	302,331	48,181	173,552	39,677,110	1.34%	0.77%
Intermediate Bond Fund	33,349,062	97,799	(127,935)	1,384,036	34,702,962	4.06%	0.29%
Total Investments with Barclays Global Investors	72,502,108	400,130	(79,754)	1,557,588	74,380,072		
Brandes/Allianz (3)							
AK International Equity Fund	59,808,971	499,985	139,555	(701,386)	59,747,125	-0.10%	0.84%
RCM							
Sustainable Core Opportunities Fund	39,646,581	1,219,759	216,566	100,348	41,183,254	3.88%	3.06%
Total All Funds	$ 3,558,849,748	$ 64,304,974	$ (5,014,582)	$ -	$ 3,618,140,140	1.67%	1.81%

Notes: Source data provided by the record keeper, Empower Retirement. (1) Represents net contributions in transit to/from the record keeper.
(2) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.
(3) This investment is comprised of two funds, Brandes International Equity Fund and Allianz NFJ International Fund effective March 30, 2015.

Supplemental Annuity Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
February 28, 2017
$ (Thousands)

Invested Assets (at fair value)	July	August	September	October	November	December	January	February
Investments with T. Rowe Price								
Stable Value Fund	$ 376,543	$ 373,305	$ 376,379	$ 379,815	$ 380,007	$ 372,966	$ 368,117	$ 369,831
Small Cap Stock Fund	128,981	131,621	131,789	125,799	142,649	149,590	151,635	155,937
Alaska Balanced Trust	1,173,354	1,167,198	1,164,532	1,151,484	1,141,515	1,144,420	1,151,599	1,160,467
Long Term Balanced Fund	548,289	548,555	548,939	543,446	548,169	555,012	564,282	574,983
AK Target Date 2010 Trust	9,976	10,012	10,366	10,362	10,461	9,552	9,434	9,441
AK Target Date 2015 Trust	90,467	89,013	88,031	86,598	86,694	87,478	87,393	88,258
AK Target Date 2020 Trust	78,030	77,667	78,641	77,615	79,689	80,609	80,958	82,572
AK Target Date 2025 Trust	51,632	51,790	52,376	51,977	52,956	55,484	56,931	58,234
AK Target Date 2030 Trust	38,154	38,809	38,947	39,037	40,150	41,608	43,017	44,051
AK Target Date 2035 Trust	35,727	35,875	36,294	36,574	37,954	38,350	39,201	41,505
AK Target Date 2040 Trust	35,051	35,401	35,716	36,082	37,058	38,337	39,797	41,256
AK Target Date 2045 Trust	38,002	38,321	38,670	38,741	40,697	42,208	43,077	44,670
AK Target Date 2050 Trust	43,080	43,355	44,203	44,213	45,859	47,358	48,951	50,821
AK Target Date 2055 Trust	32,450	32,932	33,820	34,014	35,352	36,414	37,590	39,272
AK Target Date 2060 Trust	116	112	115	114	182	231	279	288
State Street Global Advisors								
State Street Treasury Money Market Fund - Inst.	39,523	38,279	38,739	40,846	41,718	41,611	42,741	41,804
S&P 500 Stock Index Fund Series A	348,876	350,812	349,621	343,289	359,690	371,957	378,305	393,986
Russell 3000 Index	70,910	68,574	66,830	63,869	66,689	66,991	67,526	70,534
US Real Estate Investment Trust Index	49,651	49,140	49,189	43,984	40,967	43,402	43,131	43,189
World Equity Ex-US Index	28,316	27,211	26,910	27,551	26,950	28,651	30,123	30,481
Long US Treasury Bond Index	28,731	29,447	27,978	24,553	20,360	16,847	17,124	16,056
US Treasury Inflation Protected Securities Index	22,342	22,450	22,886	23,460	23,163	23,285	23,629	23,321
World Government Bond Ex-US Index	8,979	8,896	8,860	8,068	7,139	7,102	6,973	6,662
Global Balanced Fund	53,169	53,749	54,101	53,381	53,165	54,142	55,079	55,210
Investments with BlackRock								
Government/Credit Bond Fund	42,821	42,464	41,482	41,102	39,852	39,170	39,153	39,677
Intermediate Bond Fund	31,560	32,277	32,853	33,009	32,280	32,437	33,349	34,703
Investments with Brandes/Allianz Institutional								
AK International Equity Fund	58,730	60,653	61,754	61,073	58,748	59,480	59,809	59,747
Investments with RCM								
Sustainable Core Opportunities Fund	40,377	39,498	39,019	37,121	37,513	38,398	39,647	41,183
Total Invested Assets	**$ 3,503,837**	**$ 3,497,417**	**$ 3,499,041**	**$ 3,457,178**	**$ 3,487,626**	**$ 3,523,090**	**$ 3,558,850**	**$ 3,618,140**
Change in Invested Assets								
Beginning Assets	$ 3,419,490	$ 3,503,837	$ 3,497,417	$ 3,499,041	$ 3,457,178	$ 3,487,626	$ 3,523,090	$ 3,558,850
Investment Earnings	77,719	5,163	6,144	(44,468)	31,775	38,615	45,512	64,305
Net Contributions (Withdrawals)	6,629	(11,583)	(4,521)	2,605	(1,327)	(3,151)	(9,752)	(5,015)
Ending Invested Assets	**$ 3,503,837**	**$ 3,497,417**	**$ 3,499,041**	**$ 3,457,178**	**$ 3,487,626**	**$ 3,523,090**	**$ 3,558,850**	**$ 3,618,140**

Source data provided by the record keeper, Empower Retirement.

Supplemental Annuity Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
February 28, 2017
$ (Thousands)

Invested Assets (at fair value)	July	August	September	October	November	December	January	February
Investments with T. Rowe Price								
Stable Value Fund	$ 376,543	$ 373,305	$ 376,379	$ 379,815	$ 380,007	$ 372,966	$ 368,117	$ 369,831
Small Cap Stock Fund	128,981	131,621	131,789	125,799	142,649	149,590	151,635	155,937
Alaska Balanced Trust	1,173,354	1,167,198	1,164,532	1,151,484	1,141,515	1,144,420	1,151,599	1,160,467
Long Term Balanced Fund	548,289	548,555	548,939	543,446	548,169	555,012	564,282	574,983
AK Target Date 2010 Trust	9,976	10,012	10,366	10,362	10,461	9,552	9,434	9,441
AK Target Date 2015 Trust	90,467	89,013	88,031	86,598	86,694	87,478	87,393	88,258
AK Target Date 2020 Trust	78,030	77,667	78,641	77,615	79,689	80,609	80,958	82,572
AK Target Date 2025 Trust	51,632	51,790	52,376	51,977	52,956	55,484	56,931	58,234
AK Target Date 2030 Trust	38,154	38,809	38,947	39,037	40,150	41,608	43,017	44,051
AK Target Date 2035 Trust	35,727	35,875	36,294	36,574	37,954	38,350	39,201	41,505
AK Target Date 2040 Trust	35,051	35,401	35,716	36,082	37,058	38,337	39,797	41,256
AK Target Date 2045 Trust	38,002	38,321	38,670	38,741	40,697	42,208	43,077	44,670
AK Target Date 2050 Trust	43,080	43,355	44,203	44,213	45,859	47,358	48,951	50,821
AK Target Date 2055 Trust	32,450	32,932	33,820	34,014	35,352	36,414	37,590	39,272
AK Target Date 2060 Trust	116	112	115	114	182	231	279	288
State Street Global Advisors								
State Street Treasury Money Market Fund - Inst.	39,523	38,279	38,739	40,846	41,718	41,611	42,741	41,804
S&P 500 Stock Index Fund Series A	348,876	350,812	349,621	343,289	359,690	371,957	378,305	393,986
Russell 3000 Index	70,910	68,574	66,830	63,869	66,689	66,991	67,526	70,534
US Real Estate Investment Trust Index	49,651	49,140	49,189	43,984	40,967	43,402	43,131	43,189
World Equity Ex-US Index	28,316	27,211	26,910	27,551	26,950	28,651	30,123	30,481
Long US Treasury Bond Index	28,731	29,447	27,978	24,553	20,360	16,847	17,124	16,056
US Treasury Inflation Protected Securities Index	22,342	22,450	22,886	23,460	23,163	23,285	23,629	23,321
World Government Bond Ex-US Index	8,979	8,896	8,860	8,068	7,139	7,102	6,973	6,662
Global Balanced Fund	53,169	53,749	54,101	53,381	53,165	54,142	55,079	55,210
Investments with BlackRock								
Government/Credit Bond Fund	42,821	42,464	41,482	41,102	39,852	39,170	39,153	39,677
Intermediate Bond Fund	31,560	32,277	32,853	33,009	32,280	32,437	33,349	34,703
Investments with Brandes/Allianz Institutional								
AK International Equity Fund	58,730	60,653	61,754	61,073	58,748	59,480	59,809	59,747
Investments with RCM								
Sustainable Core Opportunities Fund	40,377	39,498	39,019	37,121	37,513	38,398	39,647	41,183
Total Invested Assets	**$ 3,503,837**	**$ 3,497,417**	**$ 3,499,041**	**$ 3,457,178**	**$ 3,487,626**	**$ 3,523,090**	**$ 3,558,850**	**$ 3,618,140**
Change in Invested Assets								
Beginning Assets	$ 3,419,490	$ 3,503,837	$ 3,497,417	$ 3,499,041	$ 3,457,178	$ 3,487,626	$ 3,523,090	$ 3,558,850
Investment Earnings	77,719	5,163	6,144	(44,468)	31,775	38,615	45,512	64,305
Net Contributions (Withdrawals)	6,629	(11,583)	(4,521)	2,605	(1,327)	(3,151)	(9,752)	(5,015)
Ending Invested Assets	**$ 3,503,837**	**$ 3,497,417**	**$ 3,499,041**	**$ 3,457,178**	**$ 3,487,626**	**$ 3,523,090**	**$ 3,558,850**	**$ 3,618,140**

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
February 28, 2017

	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
Participant Options							
T. Rowe Price							
Interest Income Fund	$ 184,260,986	$ 317,718	$ (1,025,354)	$ 638,893	$ 184,192,243	-0.04%	0.17%
Small Cap Stock Fund	100,910,298	2,470,633	(117,685)	(1,271,200)	101,992,046	1.07%	2.47%
Alaska Balanced Trust	23,925,780	310,823	(154,157)	11,959	24,094,405	0.70%	1.30%
Long Term Balanced Fund	48,450,668	938,125	(248,156)	695,146	49,835,783	2.86%	1.93%
AK Target Date 2010 Trust	3,489,606	51,809	2,818	(31,683)	3,512,550	0.66%	1.49%
AK Target Date 2015 Trust	9,358,289	158,972	(135,618)	(32,628)	9,349,015	-0.10%	1.71%
AK Target Date 2020 Trust	20,016,358	397,421	84,763	(7,399)	20,491,143	2.37%	1.98%
AK Target Date 2025 Trust	11,569,907	253,683	131,617	424,161	12,379,368	7.00%	2.14%
AK Target Date 2030 Trust	8,029,727	192,729	114,148	(63,052)	8,273,552	3.04%	2.39%
AK Target Date 2035 Trust	5,083,969	132,719	82,328	155,427	5,454,443	7.29%	2.55%
AK Target Date 2040 Trust	5,180,130	137,648	75,449	84,895	5,478,122	5.75%	2.62%
AK Target Date 2045 Trust	3,870,043	105,785	51,808	(32,804)	3,994,832	3.22%	2.73%
AK Target Date 2050 Trust	2,578,970	71,201	14,056	61,275	2,725,502	5.68%	2.72%
AK Target Date 2055 Trust	2,987,408	83,469	45,625	34,750	3,151,252	5.48%	2.76%
AK Target Date 2060 Trust	89,222	2,476	1,562	(39,263)	53,997	-39.48%	3.52%
Total Investments with T. Rowe Price	429,801,361	5,625,211	(1,076,796)	628,477	434,978,253		
State Street Global Advisors							
State Street Treasury Money Market Fund - Inst.	13,037,977	4,249	(96,720)	11,625	12,957,131	-0.62%	0.03%
Russell 3000 Index	32,301,601	1,210,909	7,871	582,269	34,102,650	5.58%	3.71%
US Real Estate Investment Trust Index	15,216,169	524,862	(14,609)	(382,221)	15,344,201	0.84%	3.49%
World Equity Ex-US Index	10,520,940	171,741	(10,667)	(242,872)	10,439,142	-0.78%	1.65%
Long US Treasury Bond Index	6,823,787	92,885	3,257	(1,040,080)	5,879,849	-13.83%	1.47%
US Treasury Inflation Protected Securities Index	9,620,460	43,499	(69,422)	(93,109)	9,501,428	-1.24%	0.46%
World Government Bond Ex-US Index	2,822,379	7,461	(26,157)	(104,103)	2,699,580	-4.35%	0.27%
Global Balanced Fund	37,530,125	730,059	(119,857)	(195,387)	37,944,940	1.11%	1.95%
Total Investments with SSGA	127,873,438	2,785,665	(326,304)	(1,463,878)	128,868,921		
BlackRock							
S&P 500 Index Fund	192,365,107	7,636,046	(518,674)	(189,336)	199,293,143	3.60%	3.98%
Government/Credit Bond Fund	25,501,814	196,240	(29,014)	220,828	25,889,868	1.52%	0.77%
Intermediate Bond Fund	19,868,554	58,008	(113,269)	140,279	19,953,572	0.43%	0.29%
Total Investments with Barclays Global Investors	237,735,475	7,890,294	(660,957)	171,771	245,136,583		
Brandes/Allianz (2)							
AK International Equity Fund	35,292,603	298,599	(26,834)	(21,218)	35,543,150	0.71%	0.85%
RCM							
Sustainable Core Opportunities Fund	16,854,563	518,629	23,126	684,848	18,081,166	7.28%	3.01%
Total All Funds	$ 847,557,440	$ 17,118,398	$ (2,067,765)	$ -	$ 862,608,073	1.78%	2.02%

Notes: Source data provided by the record keeper, Empower Retirement.
(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.
(2) This investment is comprised of two funds, 50% Brandes International equity Fund and 50% Allianz NFJ International Fund effective March 30, 2015.

Deferred Compensation Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
February 28, 2017
$ (Thousands)

Invested Assets (at fair value)	July	August	September	October	November	December	January	February
Investments with T. Rowe Price								
Interest Income Fund								
Cash and cash equivalents	$ 7,197	$ 6,432	$ 7,076	$ 7,524	$ 5,779	$ 11,382	$ 12,701	$ 12,582
Synthetic Investment Contracts	176,609	176,781	177,152	177,958	177,650	171,136	171,560	171,611
Small Cap Stock Fund	91,928	93,241	92,738	88,964	97,900	100,408	100,910	101,992
Alaska Balanced Trust	22,932	23,002	23,321	23,570	23,600	23,567	23,926	24,094
Long Term Balanced Fund	48,902	48,607	48,083	47,584	47,534	47,948	48,451	49,836
AK Target Date 2010 Trust	3,469	3,389	3,672	3,599	3,765	3,532	3,490	3,513
AK Target Date 2015 Trust	9,656	9,413	9,229	9,196	9,087	9,249	9,358	9,349
AK Target Date 2020 Trust	18,790	19,034	19,312	18,872	19,481	20,038	20,016	20,491
AK Target Date 2025 Trust	10,182	10,572	11,102	10,796	11,085	11,598	11,570	12,379
AK Target Date 2030 Trust	6,994	7,013	7,124	7,403	8,373	8,467	8,030	8,274
AK Target Date 2035 Trust	4,227	4,271	4,447	4,439	4,651	4,930	5,084	5,454
AK Target Date 2040 Trust	4,656	4,849	4,883	4,767	4,889	5,104	5,180	5,478
AK Target Date 2045 Trust	3,166	3,237	3,269	3,251	3,514	3,764	3,870	3,995
AK Target Date 2050 Trust	2,077	2,088	2,130	2,094	2,221	2,286	2,579	2,726
AK Target Date 2055 Trust	3,307	3,264	3,291	3,224	3,319	2,896	2,987	3,151
AK Target Date 2060 Trust	82	89	91	90	246	253	89	54
State Street Global Advisors								
State Street Treasury Money Market Fund - Inst.	11,620	11,143	12,015	12,098	13,591	13,044	13,038	12,957
Russell 3000 Index	29,474	29,617	29,161	28,712	31,041	31,167	32,302	34,103
US Real Estate Investment Trust Index	17,592	16,625	16,450	15,403	15,011	16,250	15,216	15,344
World Equity Ex-US Index	9,475	9,675	9,703	9,214	9,133	9,908	10,521	10,439
Long US Treasury Bond Index	10,409	10,278	9,939	8,963	7,061	6,028	6,824	5,880
US Treasury Inflation Protected Securities Index	9,423	9,275	9,511	9,601	9,545	9,446	9,620	9,501
World Government Bond Ex-US Index	3,793	3,670	3,627	3,464	2,919	2,792	2,822	2,700
Global Balanced Fund	37,942	37,904	38,056	37,520	37,248	37,308	37,530	37,945
Investments with BlackRock								
S&P 500 Index Fund	184,379	184,364	183,196	178,983	185,798	189,902	192,365	199,293
Government/Credit Bond Fund	27,541	26,915	26,728	26,608	25,693	25,701	25,502	25,890
Intermediate Bond Fund	20,511	20,567	20,403	20,366	19,814	19,669	19,869	19,954
Investments with Brandes/Allianz								
AK International Equity Fund	35,708	35,932	35,984	35,409	34,480	34,952	35,293	35,543
Investments with RCM								
Sustainable Opportunities Fund	17,305	17,205	17,044	16,480	16,795	16,635	16,855	18,081
Total Invested Assets	**$ 829,346**	**$ 828,452**	**$ 828,735**	**$ 816,153**	**$ 831,224**	**$ 839,361**	**$ 847,557**	**$ 862,608**
Change in Invested Assets								
Beginning Assets	$ 808,795	$ 829,346	$ 828,452	$ 828,735	$ 816,153	$ 831,224	$ 839,361	$ 847,557
Investment Earnings	20,447	2,062	602	(12,170)	15,213	10,544	10,807	17,118
Net Contributions (Withdrawals)	104	(2,955)	(320)	(411)	(142)	(2,407)	(2,611)	(2,068)
Ending Invested Assets	**$ 829,346**	**$ 828,452**	**$ 828,735**	**$ 816,153**	**$ 831,224**	**$ 839,361**	**$ 847,557**	**$ 862,608**

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
February 28, 2017

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 (2)
T. Rowe Price							
Alaska Money Market	$ 8,847,441	$ 4,231	$ (3,564)	$ (520,197)	$ 8,327,911	-5.87%	0.05%
Small Cap Stock Fund	64,794,877	1,590,262	286,769	(80,946)	66,590,962	2.77%	2.45%
Alaska Balanced Trust	13,390,221	173,867	2,065	(50,790)	13,515,363	0.93%	1.30%
Long Term Balanced Fund	8,464,418	164,114	30,911	209,832	8,869,275	4.78%	1.91%
AK Target Date 2010 Trust	2,129,034	31,644	29,950	(2,202)	2,188,426	2.79%	1.48%
AK Target Date 2015 Trust	9,688,336	167,467	89,151	-	9,944,954	2.65%	1.72%
AK Target Date 2020 Trust	24,279,580	484,027	303,916	(892)	25,066,631	3.24%	1.98%
AK Target Date 2025 Trust	36,525,042	803,385	449,937	(99,983)	37,678,381	3.16%	2.19%
AK Target Date 2030 Trust	37,983,926	912,489	600,629	(4,182)	39,492,862	3.97%	2.38%
AK Target Date 2035 Trust	44,727,874	1,147,377	709,238	27,863	46,612,352	4.21%	2.54%
AK Target Date 2040 Trust	53,006,843	1,426,546	898,837	(165,947)	55,166,279	4.07%	2.67%
AK Target Date 2045 Trust	66,068,880	1,801,929	858,295	(26,085)	68,703,019	3.99%	2.71%
AK Target Date 2050 Trust	78,782,827	2,150,385	1,061,717	3,311	81,998,240	4.08%	2.71%
AK Target Date 2055 Trust	55,239,783	1,512,480	1,374,785	(67,376)	58,059,672	5.10%	2.71%
AK Target Date 2060 Trust	92,227	2,512	1,828	(456)	96,111	4.21%	2.70%
Total Investments with T. Rowe Price	504,021,309	12,372,715	6,694,464	(778,050)	522,310,438		
State Street Global Advisors							
Money Market	4,107,910	1,292	(28,822)	(513,947)	3,566,433	-13.18%	0.03%
S&P 500 Stock Index Fund Series A	71,366,845	2,839,151	321,768	745,512	75,273,276	5.47%	3.95%
Russell 3000 Index	21,083,389	789,884	116,258	(895,576)	21,093,955	0.05%	3.82%
US Real Estate Investment Trust Index	16,482,116	571,960	(55,928)	(278,472)	16,719,676	1.44%	3.51%
World Equity Ex-US Index	33,746,062	538,571	174,361	361,947	34,820,941	3.19%	1.58%
Long US Treasury Bond Index	1,182,482	18,497	10,289	(18,928)	1,192,340	0.83%	1.57%
US Treasury Inflation Protected Securities Index	11,536,666	53,496	18,851	152,720	11,761,733	1.95%	0.46%
World Government Bond Ex-US Index	6,336,387	16,887	23,227	(455,344)	5,921,157	-6.55%	0.28%
Global Balanced Fund	11,962,963	235,171	34,032	969,775	13,201,941	10.36%	1.89%
Total Investments with SSGA	177,804,820	5,064,909	614,036	67,687	183,551,452		
BlackRock							
Government/Credit Bond Fund	29,862,574	228,962	92,587	90,066	30,274,189	1.38%	0.76%
Intermediate Bond Fund	16,730,455	49,477	30,781	721,574	17,532,287	4.79%	0.29%
Total Investments with Barclays Global Investors	46,593,029	278,439	123,368	811,640	47,806,476		
Brandes/Allianz (3)							
AK International Equity Fund	39,557,715	331,116	214,968	(162,113)	39,941,686	0.97%	0.84%
RCM							
Sustainable Core Opportunities Fund	3,290,742	101,846	19,741	60,836	3,473,165	5.54%	3.06%
Total All Funds	$ 771,267,615	$ 18,149,025	$ 7,666,577	$ -	$ 797,083,217	3.35%	2.34%

Notes:Source data provided by the record keeper, Empower Retirement. (1) Represents net contributions in transit to/from the record keeper.
(2) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.
(3) This investment is comprised of two funds, 50% Brandes International Equity Fund and 50% Allianz NFJ International Fund effective March 30, 2015.

Defined Contribution Retirement - Participant Directed PERS
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
February 28, 2017
$ (Thousands)

Invested Assets (at fair value)	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**
Investments with T. Rowe Price								
Alaska Money Market	$ 8,618	$ 8,791	$ 9,030	$ 9,061	$ 9,084	$ 8,998	$ 8,847	$ 8,328
Small Cap Stock Fund	60,872	61,549	60,916	59,046	64,758	64,879	64,795	66,591
Alaska Balanced Trust	14,964	14,487	14,177	13,944	13,457	13,202	13,390	13,515
Long Term Balanced Fund	10,894	9,679	8,782	8,697	8,535	8,361	8,464	8,869
AK Target Date 2010 Trust	2,096	2,089	1,974	1,989	2,055	2,073	2,129	2,188
AK Target Date 2015 Trust	9,092	8,999	9,042	9,109	9,301	9,367	9,688	9,945
AK Target Date 2020 Trust	22,302	22,573	22,755	22,670	23,162	23,651	24,280	25,067
AK Target Date 2025 Trust	32,368	32,816	33,308	33,364	34,337	35,189	36,525	37,678
AK Target Date 2030 Trust	33,667	34,367	34,781	34,998	35,901	36,819	37,984	39,493
AK Target Date 2035 Trust	39,047	39,870	40,468	40,745	42,183	43,188	44,728	46,612
AK Target Date 2040 Trust	46,696	47,581	47,885	47,943	49,606	51,055	53,007	55,166
AK Target Date 2045 Trust	57,906	59,229	59,773	59,873	62,306	63,956	66,069	68,703
AK Target Date 2050 Trust	68,378	70,113	70,862	71,088	73,905	76,029	78,783	81,998
AK Target Date 2055 Trust	45,309	47,035	47,909	48,558	50,951	52,778	55,240	58,060
AK Target Date 2060 Trust	34	35	36	72	82	88	92	96
State Street Global Advisors								
Money Market	2,986	3,159	3,510	3,599	3,805	4,033	4,108	3,566
S&P 500 Stock Index Fund Series A	52,701	56,952	60,293	60,835	65,523	68,993	71,367	75,273
Russell 3000 Index	36,790	32,117	28,398	26,276	24,920	22,240	21,083	21,094
US Real Estate Investment Trust Index	16,951	16,226	15,866	15,338	15,477	16,445	16,482	16,720
World Equity Ex-US Index	35,145	32,463	30,476	30,431	30,600	32,338	33,746	34,821
Long US Treasury Bond Index	1,545	1,576	1,599	1,441	1,294	1,203	1,182	1,192
US Treasury Inflation Protected Securities Index	10,105	10,690	11,181	11,242	11,033	11,119	11,537	11,762
World Government Bond Ex-US Index	5,263	5,750	6,234	6,057	5,797	6,011	6,336	5,921
Global Balanced Fund	7,850	8,693	9,329	9,633	10,244	11,144	11,963	13,202
Investments with BlackRock								
Government/Credit Bond Fund	30,417	30,105	29,844	29,764	28,768	29,215	29,863	30,274
Intermediate Bond Fund	12,018	13,351	14,318	14,718	15,051	15,868	16,730	17,532
Investments with Brandes/Allianz								
International Equity Fund	29,899	34,377	37,382	37,251	36,955	38,420	39,558	39,942
Investments with RCM								
Sustainable Opportunities Fund	3,178	3,201	3,156	3,079	3,172	3,174	3,291	3,473
Total Invested Assets	**$ 697,093**	**$ 707,874**	**$ 713,283**	**$ 710,820**	**$ 732,260**	**$ 749,839**	**$ 771,268**	**$ 797,083**
Change in Invested Assets								
Beginning Assets	$ 667,523	$ 697,093	$ 707,874	$ 713,283	$ 710,820	$ 732,260	$ 749,839	$ 771,268
Investment Earnings	22,468	2,247	1,662	(12,849)	13,006	12,111	13,974	18,149
Net Contributions (Withdrawals)	7,102	8,533	3,748	10,385	8,433	5,468	7,455	7,667
Ending Invested Assets	**$ 697,093**	**$ 707,874**	**$ 713,283**	**$ 710,820**	**$ 732,260**	**$ 749,839**	**$ 771,268**	**$ 797,083**

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
February 28, 2017

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 (2)
T. Rowe Price							
Alaska Money Market	$ 2,866,152	$ 1,406	$ (24,830)	$ (149,645)	$ 2,693,083	-6.04%	0.05%
Small Cap Stock Fund	28,041,828	684,896	96,677	(361,013)	28,462,388	1.50%	2.45%
Alaska Balanced Trust	6,183,084	80,314	19,994	(59,181)	6,224,211	0.67%	1.30%
Long Term Balanced Fund	3,764,985	72,557	6,568	55,224	3,899,334	3.57%	1.91%
AK Target Date 2010 Trust	525,594	7,839	(32,639)	-	500,794	-4.72%	1.54%
AK Target Date 2015 Trust	2,760,789	47,561	26,737	-	2,835,087	2.69%	1.71%
AK Target Date 2020 Trust	7,171,981	142,012	63,339	-	7,377,332	2.86%	1.97%
AK Target Date 2025 Trust	11,559,733	255,128	188,816	9,521	12,013,198	3.92%	2.19%
AK Target Date 2030 Trust	13,043,264	314,276	260,997	9,502	13,628,039	4.48%	2.38%
AK Target Date 2035 Trust	19,639,474	503,826	304,724	8,759	20,456,783	4.16%	2.55%
AK Target Date 2040 Trust	20,709,339	558,845	232,478	120,003	21,620,665	4.40%	2.68%
AK Target Date 2045 Trust	33,053,325	900,822	441,888	9,470	34,405,505	4.09%	2.71%
AK Target Date 2050 Trust	46,234,514	1,258,701	535,377	9,470	48,038,062	3.90%	2.71%
AK Target Date 2055 Trust	16,633,707	455,855	490,286	6,480	17,586,328	5.73%	2.70%
AK Target Date 2060 Trust	50,782	1,378	154	-	52,314	3.02%	2.71%
Total Investments with T. Rowe Price	212,238,551	5,285,416	2,610,566	(341,410)	219,793,123		
State Street Global Advisors							
Money Market	236,579	80	3,564	50,363	290,586	22.83%	0.03%
S&P 500 Stock Index Fund Series A	29,389,431	1,166,518	97,136	66,008	30,719,093	4.52%	3.96%
Russell 3000 Index	8,734,158	326,436	60,458	(523,721)	8,597,331	-1.57%	3.84%
US Real Estate Investment Trust Index	6,310,072	219,871	28,838	(131,542)	6,427,239	1.86%	3.51%
World Equity Ex-US Index	14,610,540	232,935	76,648	278,591	15,198,714	4.03%	1.58%
Long US Treasury Bond Index	280,702	3,858	2,906	(47,272)	240,194	-14.43%	1.49%
US Treasury Inflation Protected Securities Index	4,436,683	20,310	9,843	45,431	4,512,267	1.70%	0.45%
World Government Bond Ex-US Index	3,068,435	8,187	13,440	(221,440)	2,868,622	-6.51%	0.28%
Global Balanced Fund	5,695,017	111,465	11,620	488,256	6,306,358	10.73%	1.87%
Total Investments with SSGA	72,761,617	2,089,660	304,453	4,674	75,160,404		
BlackRock							
Government/Credit Bond Fund	13,606,712	104,844	49,957	125,635	13,887,148	2.06%	0.77%
Intermediate Bond Fund	6,807,032	20,160	14,146	374,936	7,216,274	6.01%	0.29%
Total Investments with Barclays Global Investors	20,413,744	125,004	64,103	500,571	21,103,422		
Brandes/Allianz Institutional (3)							
AK International Equity Fund	16,814,383	140,481	49,583	(174,423)	16,830,024	0.09%	0.84%
RCM							
Sustainable Core Opportunities Fund	1,366,345	42,050	3,647	10,588	1,422,630	4.12%	3.06%
Total All Funds	$ 323,594,640	$ 7,682,611	$ 3,032,352	$ -	$ 334,309,603	3.31%	2.36%

Notes: Source data provided by the record keeper, Empower Retirement. (1) Represents net contributions in transit to/from the record keeper.
(2) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.
(3) This investment option is comprised of two funds, 50% Brandes International equity Fund and 50% Allianz NFJ International Fund effective March 30, 2015.

Defined Contribution Retirement - Participant Directed TRS
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
February 28, 2017
$ (Thousands)

Invested Assets (at fair value)	July	August	September	October	November	December	January	February
Investments with T. Rowe Price								
Alaska Money Market	$ 2,895	$ 2,897	$ 2,911	$ 2,946	$ 2,917	$ 2,944	$ 2,866	$ 2,693
Small Cap Stock Fund	26,278	26,588	26,452	25,552	27,985	28,018	28,042	28,462
Alaska Balanced Trust	7,066	6,760	6,595	6,392	6,175	6,118	6,183	6,224
Long Term Balanced Fund	4,916	4,351	3,949	3,757	3,764	3,731	3,765	3,899
AK Target Date 2010 Trust	490	487	496	501	500	514	526	501
AK Target Date 2015 Trust	2,657	2,538	2,537	2,561	2,619	2,692	2,761	2,835
AK Target Date 2020 Trust	6,571	6,551	6,650	6,626	6,825	7,086	7,172	7,377
AK Target Date 2025 Trust	10,506	10,517	10,640	10,625	10,889	11,259	11,560	12,013
AK Target Date 2030 Trust	11,516	11,417	11,610	11,695	12,119	12,570	13,043	13,628
AK Target Date 2035 Trust	17,502	17,490	17,674	17,836	18,378	19,019	19,639	20,457
AK Target Date 2040 Trust	18,576	18,512	18,708	18,756	19,220	19,929	20,709	21,621
AK Target Date 2045 Trust	29,696	29,659	29,930	29,954	31,079	32,029	33,053	34,406
AK Target Date 2050 Trust	41,678	41,573	41,947	41,778	43,227	44,715	46,235	48,038
AK Target Date 2055 Trust	13,833	13,836	14,050	14,334	15,009	15,838	16,634	17,586
AK Target Date 2060 Trust	9	5	6	6	6	6	51	52
State Street Global Advisors								
Money Market	219	222	223	227	281	249	237	291
S&P 500 Stock Index Fund Series A	21,625	23,391	24,718	24,988	27,064	28,461	29,389	30,719
Russell 3000 Index	15,824	13,628	11,964	10,960	10,335	9,196	8,734	8,597
US Real Estate Investment Trust Index	6,520	6,197	6,065	5,741	5,975	6,394	6,310	6,427
World Equity Ex-US Index	15,330	14,046	13,199	13,143	13,270	14,016	14,611	15,199
Long US Treasury Bond Index	238	277	284	278	278	276	281	240
US Treasury Inflation Protected Securities Index	3,889	3,999	4,173	4,195	4,137	4,244	4,437	4,512
World Government Bond Ex-US Index	2,575	2,808	3,050	2,937	2,757	2,893	3,068	2,869
Global Balanced Fund	3,975	4,302	4,593	4,689	4,910	5,329	5,695	6,306
Investments with BlackRock								
Government/Credit Bond Fund	14,047	13,662	13,465	13,359	12,975	13,270	13,607	13,887
Intermediate Bond Fund	4,774	5,278	5,692	5,885	6,018	6,435	6,807	7,216
Investments with Brandes/Allianz								
AK International Equity Fund	12,625	14,495	15,825	15,793	15,733	16,352	16,814	16,830
Investments with RCM								
Sustainable Opportunities Fund	1,263	1,240	1,244	1,221	1,259	1,292	1,366	1,423
Total Invested Assets	**$ 297,096**	**$ 296,728**	**$ 298,649**	**$ 296,732**	**$ 305,705**	**$ 314,874**	**$ 323,595**	**$ 334,310**
Change in Invested Assets								
Beginning Assets	$ 286,112	$ 297,096	$ 296,728	$ 298,649	$ 296,732	$ 305,705	$ 314,874	$ 323,595
Investment Earnings	9,751	1,009	715	(5,446)	5,578	5,113	5,968	7,683
Net Contributions (Withdrawals)	1,232	(1,376)	1,206	3,529	3,394	4,057	2,753	3,032
Ending Invested Assets	**$ 297,096**	**$ 296,728**	**$ 298,649**	**$ 296,732**	**$ 305,705**	**$ 314,874**	**$ 323,595**	**$ 334,310**

Source data provided by the record keeper, Empower Retirement.

ALASKA RETIREMENT MANAGEMENT BOARD

FINANCIAL REPORT
(Supplement to the Treasury Division Report)

As of February 28, 2017

Prepared by the Division of Retirement & Benefits

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Eight Months Ending February 28, 2017

	Contributions				Expenditures				Net
	Contributions EE and ER	State of Alaska	Other	Total Contributions	Benefits	Refunds & Disbursements	Administrative & Investment	Total Expenditures	Contributions/ (Withdrawals)
Public Employees' Retirement System (PERS)									
Defined Benefit Plans:									
Retirement Trust	$ 234,218,518	$ 99,166,576	$ 24,924	$ 333,410,018	$ (509,412,025)	$ (6,489,714)	$ (9,947,475)	$ (525,849,214)	$ (192,439,196)
Retirement Health Care Trust	86,217,624	-	22,065,587	108,283,211	(270,362,453)	-	(16,216,228)	(286,578,681)	(178,295,470)
Total Defined Benefit Plans	320,436,142	99,166,576	22,090,511	441,693,229	(779,774,478)	(6,489,714)	(26,163,703)	(812,427,895)	(370,734,666)
Defined Contribution Plans:									
Participant Directed Retirement	88,007,076	-	-	88,007,076	-	(27,100,146)	(2,115,812)	(29,215,958)	58,791,118
Health Reimbursement Arrangement [a]	23,259,295	-	-	23,259,295	(34)	-	(33,812)	(33,846)	23,225,449
Retiree Medical Plan [a]	8,303,374	-	-	8,303,374	(33)	-	(35,553)	(35,586)	8,267,788
Occupational Death and Disability: [a]									
Public Employees	1,034,914	-	-	1,034,914	(76,680)	-	(11,359)	(88,039)	946,875
Police and Firefighters	476,447	-	-	476,447	(139,940)	-	(10,279)	(150,219)	326,228
Total Defined Contribution Plans	121,081,106	-	-	121,081,106	(216,687)	(27,100,146)	(2,206,815)	(29,523,648)	91,557,458
Total PERS	**441,517,248**	**99,166,576**	**22,090,511**	**562,774,335**	**(779,991,165)**	**(33,589,860)**	**(28,370,518)**	**(841,951,543)**	**(279,177,208)**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Trust	41,714,985	116,699,959	7,486	158,422,430	(297,809,375)	(1,864,496)	(5,298,044)	(304,971,915)	(146,549,485)
Retirement Health Care Trust	13,461,423	-	7,201,648	20,663,071	(79,738,086)	-	(6,047,695)	(85,785,781)	(65,122,710)
Total Defined Benefit Plans	55,176,408	116,699,959	7,209,134	179,085,501	(377,547,461)	(1,864,496)	(11,345,739)	(390,757,696)	(211,672,195)
Defined Contribution Plans:									
Participant Directed Retirement	27,016,331	-	-	27,016,331	-	(8,447,930)	(741,315)	(9,189,245)	17,827,086
Health Reimbursement Arrangement [a]	5,448,419	-	-	5,448,419	(4,657)	-	(10,249)	(14,906)	5,433,513
Retiree Medical Plan [a]	2,118,054	-	-	2,118,054	(7,026)	-	(27,932)	(34,958)	2,083,096
Occupational Death and Disability [a]	-	-	-	-	-	-	(12,243)	(12,243)	(12,243)
Total Defined Contribution Plans	34,582,804	-	-	34,582,804	(11,683)	(8,447,930)	(791,739)	(9,251,352)	25,331,452
Total TRS	**89,759,212**	**116,699,959**	**7,209,134**	**213,668,305**	**(377,559,144)**	**(10,312,426)**	**(12,137,478)**	**(400,009,048)**	**(186,340,743)**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	4,649,922	5,412,366	-	10,062,288	(7,649,262)	-	(146,857)	(7,796,119)	2,266,169
Defined Benefit Retirement Health Care Trust	383,449	-	69,490	452,939	(511,948)	-	(62,696)	(574,644)	(121,705)
Total JRS	**5,033,371**	**5,412,366**	**69,490**	**10,515,227**	**(8,161,210)**	**-**	**(209,553)**	**(8,370,763)**	**2,144,464**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust [a]	866,905	-	-	866,905	(999,873)	-	(147,701)	(1,147,574)	(280,669)
Other Participant Directed Plans									
Supplemental Annuity Plan	108,607,201	-	96	108,607,297	-	(130,705,496)	(4,015,741)	(134,721,237)	(26,113,940)
Deferred Compensation Plan	28,434,532	-	-	28,434,532	-	(38,240,229)	(1,005,242)	(39,245,471)	(10,810,939)
Total All Funds	**674,218,469**	**221,278,901**	**29,369,231**	**924,866,601**	**(1,166,711,392)**	**(212,848,011)**	**(45,886,233)**	**(1,425,445,636)**	**(500,579,035)**
Total Non-Participant Directed	422,153,329	221,278,901	29,369,135	672,801,365	(1,166,711,392)	(8,354,210)	(38,008,123)	(1,213,073,725)	(540,272,360)
Total Participant Directed	252,065,140	-	96	252,065,236	-	(204,493,801)	(7,878,110)	(212,371,911)	39,693,325
Total All Funds	**$ 674,218,469**	**$ 221,278,901**	**$ 29,369,231**	**$ 924,866,601**	**$ (1,166,711,392)**	**$ (212,848,011)**	**$ (45,886,233)**	**$ (1,425,445,636)**	**$ (500,579,035)**

(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 February 28, 2017

	Contributions				Expenditures				Net
	Contributions EE and ER	State of Alaska	Other	Total Contributions	Benefits	Refunds & Disbursements	Administrative & Investment	Total Expenditures	**Contributions/ (Withdrawals)**
Public Employees' Retirement System (PERS)									
Defined Benefit Plans:									
Retirement Trust	$ 27,947,950	$ -	$ 1,670	$ 27,949,620	$ (64,547,714)	$ (815,518)	$ (1,290,334)	$ (66,653,566)	$ (38,703,946)
Retirement Health Care Trust	9,844,336	-	-	9,844,336	(33,002,791)	-	(2,071,864)	(35,074,655)	(25,230,319)
Total Defined Benefit Plans	37,792,286	-	1,670	37,793,956	(97,550,505)	(815,518)	(3,362,198)	(101,728,221)	(63,934,265)
Defined Contribution Plans:									
Participant Directed Retirement	10,835,158	-	-	10,835,158	-	(3,090,970)	(77,611)	(3,168,581)	7,666,577
Health Reimbursement Arrangement [(a)]	2,953,392	-	-	2,953,392	(34)	-	(17,349)	(17,383)	2,936,009
Retiree Medical Plan [(a)]	984,034	-	-	984,034	(9)	-	(10,136)	(10,145)	973,889
Occupational Death and Disability: [(a)]									
Public Employees	124,611	-	-	124,611	(9,587)	-	(6,233)	(15,820)	108,791
Police and Firefighters	51,134	-	-	51,134	(17,975)	-	(5,688)	(23,663)	27,471
Total Defined Contribution Plans	14,948,329	-	-	14,948,329	(27,605)	(3,090,970)	(117,017)	(3,235,592)	11,712,737
Total PERS	**52,740,615**	**-**	**1,670**	**52,742,285**	**(97,578,110)**	**(3,906,488)**	**(3,479,215)**	**(104,963,813)**	**(52,221,528)**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Trust	6,368,284	-	5,764	6,374,048	(37,328,365)	(236,144)	(744,696)	(38,309,205)	(31,935,157)
Retirement Health Care Trust	2,029,731	-	-	2,029,731	(8,843,346)	-	(767,365)	(9,610,711)	(7,580,980)
Total Defined Benefit Plans	8,398,015	-	5,764	8,403,779	(46,171,711)	(236,144)	(1,512,061)	(47,919,916)	(39,516,137)
Defined Contribution Plans:									
Participant Directed Retirement	4,205,383	-	-	4,205,383	-	(1,142,708)	(30,323)	(1,173,031)	3,032,352
Health Reimbursement Arrangement [(a)]	860,154	-	-	860,154	(210)	-	(5,227)	(5,437)	854,717
Retiree Medical Plan [(a)]	293,990	-	-	293,990	(3)	-	(4,499)	(4,502)	289,488
Occupational Death and Disability [(a)]	-	-	-	-	-	-	(7,451)	(7,451)	(7,451)
Total Defined Contribution Plans	5,359,527	-	-	5,359,527	(213)	(1,142,708)	(47,500)	(1,190,421)	4,169,106
Total TRS	**13,757,542**	**-**	**5,764**	**13,763,306**	**(46,171,924)**	**(1,378,852)**	**(1,559,561)**	**(49,110,337)**	**(35,347,031)**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	544,299	-	-	544,299	(980,350)	-	(30,480)	(1,010,830)	(466,531)
Defined Benefit Retirement Health Care Trust	50,706	-	-	50,706	(53,319)	-	(9,348)	(62,667)	(11,961)
Total JRS	**595,005**	**-**	**-**	**595,005**	**(1,033,669)**	**-**	**(39,828)**	**(1,073,497)**	**(478,492)**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust [(a)]	-	-	-	-	(214,776)	-	(16,930)	(231,706)	(231,706)
Other Participant Directed Plans									
Supplemental Annuity Plan	13,131,147	-	-	13,131,147	-	(16,700,807)	(1,444,922)	(18,145,729)	(5,014,582)
Deferred Compensation Plan	3,483,940	-	-	3,483,940	-	(5,431,701)	(120,004)	(5,551,705)	(2,067,765)
Total All Funds	**83,708,249**	**-**	**7,434**	**83,715,683**	**(144,998,479)**	**(27,417,848)**	**-**	**(179,076,787)**	**(95,361,104)**
Total Non-Participant Directed	52,052,621	-	7,434	52,060,055	(144,998,479)	(1,051,662)	(4,987,600)	(151,037,741)	(98,977,686)
Total Participant Directed	31,655,628	-	-	31,655,628	-	(26,366,186)	(1,672,860)	(28,039,046)	3,616,582
Total All Funds	**$ 83,708,249**	**$ -**	**$ 7,434**	**$ 83,715,683**	**$ (144,998,479)**	**$ (27,417,848)**	**$ (6,660,460)**	**$ (179,076,787)**	**$ (95,361,104)**

(a) Employer only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Eight Months Ending February 28, 2017

PARTICIPANT DIRECTED DISBURSEMENTS BY PLAN AND BY TYPE

	PERS DCR Plan	TRS DCR Plan	Supplemental Annuity Plan	Deferred Compensation	TOTAL	% of Total
Payment to Beneficiary	3,849	-	114,670	110,428	228,948	0.1%
Death Benefit	721,910	59,868	5,129,134	520,463	6,431,375	3.1%
Disability / Hardship	114,558	-	286,579	72,889	474,026	0.2%
Minimum Required Distribution	32,087	14,680	4,041,347	1,515,525	5,603,638	2.7%
Qualified Domestic Relations Order	345,734	20,678	3,792,381	790,408	4,949,200	2.4%
Separation from Service / Retirement	25,882,008	8,352,704	116,570,963	35,096,260	185,901,936	90.9%
Purchase of Service Credit	-	-	770,422	134,256	904,678	0.4%
Transfer to a Qualifying Plan	-	-	-	-	-	0.0%
TOTAL	27,100,146	8,447,930	130,705,496	38,240,229	204,493,801	100.0%

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Month Ending February, 28 2017

PARTICIPANT DIRECTED DISBURSEMENTS BY PLAN AND BY TYPE

	PERS DCR Plan	TRS DCR Plan	Supplemental Annuity Plan	Deferred Compensation	TOTAL	% of Total
Payment to Beneficiary	-	-	37,103	8,100	45,202	0.2%
Death Benefit	-	-	686,896	120,050	806,946	3.1%
Disability / Hardship	-	-	258	-	258	0.0%
Minimum Required Distribution	3,720	317	204,954	81,419	290,410	1.1%
Qualified Domestic Relations Order	13,750	20,678	304,893	48,076	387,397	1.5%
Separation from Service / Retirement	3,073,500	1,121,714	15,330,687	5,174,056	24,699,957	93.7%
Purchase of Service Credit	-	-	136,016	-	136,016	0.5%
Transfer to a Qualifying Plan	-	-	-	-	-	0.0%
TOTAL	3,090,970	1,142,708	16,700,807	5,431,701	26,366,186	100.0%

Notes for the DRB Supplement to the Treasury Report
February 2017

This report is the DRB supplement to the Financial Report presented by the Treasury Division, and expands the "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 eight months of Fiscal Year 2017, while page two shows only the month of February 2017.

Highlights – On page one, for the **eight months** ending February 28, 2017:

- PERS DB Pension – Average employer and employee contributions of $29.3 million per month; benefit payments of approximately $63.7 million per month; refunds average $811 thousand with a HIGH of $1.1 million in July 2016 and a LOW of $433 thousand in December 2016; and Administrative and Investment expenditures of $1.2 million per month (DOR and DRB).

- PERS DB Healthcare – Average employer contributions of $10.8 million per month; other income from Rx rebates and similar total of $22.1 million; benefit payments of approximately $33.8 million per month; and average Administrative and Investment expenditures of $2 million per month (DOR and DRB).

- PERS DC Pension – Average employer and employee contributions of $11 million per month; participant disbursements average $3.4 million per month; and average Administrative and Investment expenditures of $264 thousand per month (DOR and DRB).

- PERS DC Health – For HRA, RMP, and OD&D, only employer contributions on behalf of participating employees; currently eleven (11) benefits are being paid from the Occupational Death & Disability plans; 5 are for Public Employees (5 Occ Dis) and 6 are for Police and Firefighters (2 Occ Death and 4 Occ Dis).

- TRS DB Pension - Average employer and employee contributions of $5.2 million per month; benefit payments of approximately $37.2 million per month; refunds average $233 thousand with a HIGH of $309 thousand in August 2016 and a LOW of $152 thousand in July 2016; and average Administrative and Investment expenditures of $662 thousand per month (DOR and DRB).

- TRS DB Healthcare – Average employer contributions of $1.7 million per month; other income from Rx rebates and similar total of $7.2 million; benefit payments of approximately $10 million per month; and average Administrative and Investment expenditures of $756 thousand per month (DOR and DRB).

- TRS DC Pension – Average employer and employee contributions of $3.4 million per month; participant disbursements average $1.1 million per month; and average Administrative and investment expenditures of $93 thousand per month (DOR and DRB).

- TRS DC Health – For HRA, RMP, and OD&D, only employer contributions on behalf of participating employees; currently no benefits paid from any category; and minor Administrative and Investment expenditures for each category (DOR and DRB).

- JRS Pension – Average employer and employee contributions of $581 thousand per month; benefit payments of approximately $956 thousand per month; and average Administrative and Investment expenditures of $18 thousand per month (DOR and DRB).

- JRS Healthcare – Average employer contributions of $48 thousand per month; other income from Rx rebates and similar total of $69 thousand; benefit payments of approximately $64 thousand per month; and average Administrative and Investment expenditures of 7837.18375 per month (DOR and DRB).

- NGNMRS – Annual contribution from DMVA in the amount of $867 thousand was received in September 2016; combination of lump-sum and monthly benefit payments of $125 thousand per month with a HIGH of $218 thousand in October 2016 and a LOW of $55 thousand in December 2016; and average Administrative and Investment expenditures of $18 thousand per month (DOR and DRB).

- SBS – Average employer and employee contributions and transfers in of $13.6 million per month. Participant disbursements average of $16.3 million per month with a HIGH of $19.7 million in August 2016 and a LOW of $13.5 million in November 2016; and average Administrative and Investment expenditures of $502 thousand per month (DOR and DRB). Distributions have exceeded contributions in 6 of the last 8 months.

- Deferred Compensation – Average member-only contributions and transfers in of $3.6 million per month; participant disbursements average of $4.8 million per month; and average Administrative and Investment expenditures of $126 thousand per month (DOR and DRB). Distributions have exceeded contributions in 7 of the last 8 months.

Highlights – On page two, activity for the **one month** ending February 28, 2017 only: Nothing significant to report.

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

GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

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ALASKA RETIREMENT MANAGEMENT BOARD

ACTUARIAL REVIEW OF PENSION AND POSTEMPLOYMENT HEALTHCARE PLANS FOR PERS AND TRS

APRIL 5, 2017

GRS
Gabriel Roeder Smith & Company
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April 5, 2017

Mr. Bob Mitchell
Acting Chief Investment Officer
Department of Revenue, Treasury Division
Alaska Retirement Management Board
P.O. Box 110405
Juneau, AK 99811-0405

Subject: Actuarial Review of June 30, 2016 valuations for the State of Alaska Public Employees' Retirement System (PERS) and Teachers' Retirement System (TRS).

Dear Bob:

We have performed an actuarial review of the June 30, 2016 Actuarial Valuations for PERS and TRS.

This report includes a review of:

- Pension Assumptions and Benefits
- Health Care Cost Assumptions
- Actuarial Valuation Methods and Procedures
- Contribution Rate Determination
- Actuarial Valuation Report
- Potential Areas for Future Review

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A major part of the review is a thorough analysis of the test lives provided by Conduent (formerly Buck Consultants). The report includes exhibits which summarize the detailed analysis of these sample test cases for PERS and TRS, as well as a comparison of the results between Conduent and GRS. We wish to thank the staff of the State of Alaska Treasury Division and Conduent without whose willing cooperation this review could not have been completed.

Sincerely,

Gabriel, Roeder, Smith & Company

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

Paul Wood, ASA, FCA, MAAA
Consultant

cc: Ms. Judy Hall

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SECTION 1

EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

Gabriel, Roeder, Smith & Co. was engaged by the Alaska Retirement Management Board (ARMB) to review the June 30, 2016 Actuarial Valuation of the State of Alaska Public Employees' Retirement System (PERS) and Teachers' Retirement System (TRS).

This report presents our findings in the following areas:

- General Approach
- Review of Assumptions
- Review of Actuarial Valuation Methods and Procedures (including the test lives review)
- Review of Contribution Rate Determination
- Review of Actuarial Valuation Report
- Potential Areas for Future Review
- Summary and Conclusions

In general, we found that the Conduent's actuarial results and reports were reasonable and find the assumptions consistent with generally accepted actuarial practice. In this audit report we do make note of certain items which merit further review in the course of the upcoming experience study.

Monthly conference calls initiated by Conduent and conducted between Conduent and GRS were made this year and contributed greatly to resolving issues more quickly and thoroughly. Those issues, even if resolved, are highlighted in this report.

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KEY FINDINGS FROM THE AUDIT OF THE JUNE 30, 2016 VALUATIONS

The primary findings from the audit of the June 30, 2016 actuarial valuations that are new this year relate to smaller elements in the calculation of the pension liabilities. A few other questions exist from the draft valuation reports.

Conduent is now using the actual retiree data in valuing the retiree health care benefits. They were previously using "Proxy" data. We have used the term Proxy data to describe the use of pension data as a proxy for the healthcare data now being collected. Use of the actual data, as supplied by the Aetna data warehouse, has changed the valuation results for the retiree health care plans and will be discussed in further detail in this report.

In addition to the fix implemented in the final results, we recommend that retiree healthcare elections and eligibility for the premium subsidy be a part of the census data collection process in future years. We recommend that the election rates, dual coverages, and insurance coverages be studied in the upcoming experience study.

The second data related finding was in regards to the valuation of current disabled annuitants. GRS identified that disabled retirees who had elected joint and survivor options were being valued as a life annuity. This issue was identified prior to the release of the draft 2015 report and remedied.

In the course of last year's audit we made a number of comments concerning the wording of the valuation reports. Specifically, we made suggestions concerning funding policy. Conduent has updated the language in the valuation.

As a part of the annual audit, we take a historical look at the gains and losses on the accrued liability. Gains and losses may measure "how closely" experience matches the actuarial assumption. Recurring gains or losses may indicate an assumption that is not meeting the actual experience for this population.

As was recommended last year, Conduent has added an assumption to account for the continuing rehire loss. That assumption has been added to the normal cost effective for 7/1/2016, thus there will be a loss shown below on the gain/loss charts to cover the period 7/1/2015 through 6/30/2016.

We had recommended that "other" be explained when it is in one of the largest categories. Conduent provided additional details for each plan regarding the "other" gains and losses.

Retirement losses for PERS and retirement gains for TRS were small this year. Termination continued to be a source of losses for both plans year after year. For both plans, rehires are a continued source of loss but this loss should tail off after this valuation as Conduent has introduced an assumption regarding new hires.

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Termination losses continue every year. We recommend the experience study review and change assumptions so that the termination benefit liabilities may be adequately funded. We note this was the same recommendation made at the commencement of the experience study four years ago. This assumption has shown a bias toward losses year over year and that is a clear indication of the need for a change in the assumption.

PERS Historical Pension Gains and (Losses) by Source
($ in thousands)

Source	2016 Valuation	2015 Valuation	2014 Valuation	2013 Valuation	2012 Valuation	2011 Valuation	2010 Valuation
Retirement	**$(1,035)**	**$(3,813)**	**$(14,713)**	**$(14,528)**	**$(2,103)**	**$(8,116)**	**$3,730**
Termination	**(8,713)**	**(2,435)**	**(23,435)**	**(23,716)**	**(19,932)**	**(39,980)**	**(33,532)**
Mortality	**23,872**	**34,564**	**(3,129)**	**(7,403)**	**8,809**	**(2,020)**	**(17,350)**
Disability	**(687)**	**(2,073)**	**(1,163)**	**15**	**224**	**177**	**(1,837)**
Rehires	**(31,814)**	**(21,255)**	**(29,681)**	**(23,427)**	**(24,172)**	**(25,953)**	
Other	**520**	**(44,211)**	**23,781**	**(19,679)**	**10,356**	**(42,015)**	**(28,765)**
Salary	**69,532**	**91,053**	**36,677**	**(10,070)**	**(25,024)**	**(13,845)**	**4,617**
COLA and PRPA	**132,576**	**67,117**	**3,048**	**42,579**	**8,995**	**39,219**	**86,479**
Total	**184,251**	**$118,947**	**$(8,615)**	**$(56,229)**	**$(42,847)**	**$(92,533)**	**$13,342**

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TRS Historical Pension Gains and (Losses) by Source
($ in thousands)

Source	2016 Valuation	2015 Valuation	2014 Valuation	2013 Valuation	2012 Valuation	2011 Valuation	2010 Valuation
Retirement	**$7,046**	**$(101)**	**$4,456**	**$3,268**	**$6,990**	**$3,809**	**$7,922**
Termination	**(9,687)**	**(10,284)**	**(17,047)**	**(11,010)**	**(11,029)**	**(14,197)**	**(9,763)**
Mortality	**(5,612)**	**8,784**	**(5,927)**	**(3,833)**	**4,375**	**(5,625)**	**(17,413)**
Disability	**(369)**	**(407)**	**(347)**	**(696)**	**(850)**	**(974)**	**(556)**
Rehires	**(8,470)**	**(11,622)**	**(11,674)**	**(11,100)**	**(8,174)**	**(14,236)**	
Other	**(34,154)**	**(2,799)**	**10,945**	**(29,965)**	**(12,877)**	**8,225**	**(20,959)**
Salary	**32,576**	**25,558**	**30,302**	**23,829**	**9,947**	**8,514**	**(35,479)**
COLA and PRPA	**84,426**	**46,292**	**(3,681)**	**28,399**	**632**	**26,347**	**58,823**
Total	**$65,756**	**$55,421**	**$7,027**	**$(1,108)**	**($10,986)**	**$11,863**	**($17,425)**

PERS Historical Healthcare Gains and (Losses) by Source
($ in thousands)

Source	2016 Valuation	2015 Valuation	2014 Valuation	2013 Valuation	2012 Valuation	2011 Valuation
Retirement	**$(7,873)**	**$2,568**	**$(16,221)**	**$(34,739)**	**$15,150**	**$38,051**
Termination	**(13,620)**	**(12,263)**	**(3,541)**	**775**	**(8,950)**	**(801)**
Mortality	**20,654**	**34,903**	**3,600**	**(145)**	**16,677**	**7,197**
Disability	**(1,966)**	**(2,927)**	**(2,680)**	**(2,460)**	**(1,431)**	**(951)**
Rehires	**(8,617)**	**(9,547)**	**(14,325)**	**(11,840)**	**(21,194)**	**(24,647)**
Other	**21,567**	**47,916**	**56,638**	**(3,656)**	**74,109**	**(28,778)**
Medical Claims	**(198,836)**	**884,823**	**279,808**	**215,974**	**508,005**	**107,501**
Methodology						**291,475**
Total	**$184,251**	**$945,473**	**$303,279**	**$163,909**	**$582,366**	**$389,047**

TRS Historical Healthcare Gains and (Losses) by Source
($ in thousands)

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Source	2016 Valuation	2015 Valuation	2014 Valuation	2013 Valuation	2012 Valuation	2011 Valuation
Retirement	**$1,691**	**$(90)**	**$3,389**	**$6,694**	**$10,429**	**$13,839**
Termination	**(3,040)**	**(2,923)**	**(8,171)**	**(5,549)**	**(6,345)**	**(5,629)**
Mortality	**5,240**	**22,470**	**(371)**	**(1,738)**	**1,815**	**531**
Disability	**466**	**(660)**	**(290)**	**(207)**	**(492)**	**(567)**
Rehires	**(584)**	**(202)**	**(2,333)**	**(4,161)**	**(3,151)**	**(5,570)**
Other	**5,597**	**52,883**	**16,232**	**(2,518)**	**20,386**	**(14,040)**
Medical Claims	**24,266**	**311,407**	**128,195**	**(90,606)**	**180,457**	**47,990**
Methodology						**24,904**
Total	**$33,636**	**$382,885**	**$136,651**	**$83,127**	**$203,099**	**$61,458**

Commencing with the 2016 valuation Conduent used actual retiree data to value to retiree health care liabilities. In the course of reviewing the data, Conduent saw that there was a fairly significant amount of dual coverage. Conduent's model then changed to recognize there are much fewer people over which to spread the claim costs. This, coupled with unfavorable claims experience, resulted in a much smaller gain for the TRS plan and a sizable loss for the PERS plan.

Summary Of Test Life Review

We have included as a part of this report a detailed test life results summary.

- We matched the present value of benefits closely in total on all testlives submitted. We have included exhibits in Section 4 of the report which summarize the differences in calculations by decrement for the test lives analyzed. Differences between actuarial firms will always occur due to system differences and other nuances in the calculations.
- Although GRS is able to closely replicate the total projected benefits for the sample lives that were reviewed, GRS would use a different methodology to subsequently assign these projected costs to the accrued liability and normal costs. This was discussed and resolved in 2015-Conduent determined the cost difference was 9 basis points and recommended no change and the committee agreed.
- The actuarial basis (the assumptions and methods) used for the funding of the plan has a few assumptions for which we have some concerns. The concerns raised involve the long term rate of return assumption of 8.00%, the long-term inflation assumption of 3.12%, the mortality assumption for TRS, and the termination assumption for all plans. We understand these will all come under review in the upcoming experience study.

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Newly identified issues for 2016				
	Issue	**GRS Recommendations**	**Status**	**Conduent Comments**
1.	**PERS Pension**			
(a)	DV death eligibility to age 60 while DV Dth AK cola eligibility at 65.	These two ages should be the same.		Conduent agrees with our recommendations and will reflect this in next year's valuation
(b)	Mismatch on present value of benefits on a disabled life	N/A		Conduent provided sufficient additional detail and we were able to match the PVB
(c)	PERS healthcare disabled life spouse benefit mismatch on the PVB	N/A		Conduent provided sufficient additional detail and we were able to match the PVB
2.	**TRS Pension**			
(a)	DV death eligibility to age 60 while DV Dth AK cola eligibility at 65.	These two ages should be the same		Conduent agrees with our recommendations and will reflect this in next year's valuation
(b)	For the NonOcc Married Death and NonOcc Dth Marr AK Cola there is an extra percent withdrawal assumption.	Currently assumes 10% but should be 5%		Conduent agrees with our recommendations and will reflect this in next year's valuation

SECTION 2

GENERAL APPROACH

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GENERAL APPROACH

Gabriel, Roeder, Smith & Co. was charged with reviewing the actuarial assumptions of the pension and health care provisions of the actuarial valuations of TRS and PERS.

We requested a number of items from Conduent in order to perform the actuarial review and health cost assumption review:

1. We received the draft reports on February 17, 2017 for the regular Defined Benefit Plans and for the Defined Contribution Retirement Plans. In December of 2016, we received valuation data for pension and healthcare for both plans, and we received the pension and healthcare test lives for PERS and TRS.

2. Monthly conference calls between Conduent and GRS occurred, with the agenda items including timing of deliverables and the discussion of audit matters.

In performing our review, we:

1. Reviewed actuarial assumptions – we checked to see if they were consistent, comprehensive, and appeared reasonable.
2. Reviewed the actuarial valuation reports as of June 30, 2016 for completeness, GASB compliance and a review of financial determinations.
3. Reviewed, in detail, the sample members provided us – This provided us with a perspective on the actuarial process utilized by Conduent with respect to the plan and allowed us to review the valuation methods and procedures.
4. Reviewed the health cost assumptions and trend.
5. Identified areas for future more detailed review and items for study in the upcoming experience study.

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KEY ACTUARIAL CONCEPTS

An actuarial valuation is a detailed statistical simulation of the future operation of a retirement system using the set of actuarial assumptions adopted by the Board. It is designed to simulate all of the dynamics of such a system for each current system member including:

1. Earning future service and making contributions,
2. Receiving changes in compensation,
3. Leaving the system through job change, disablement, death, or retirement, and
4. Determination of and payment of benefits from the System.

This simulated dynamic is applied to each active member of the System. It results in a set of expected future benefit payments to that member. Bringing those expected payments to present

value, at the assumed rate of investment return, produces the Present Value (PV) of future Benefits for that member. In like manner, a PV of future salaries is determined.

The PV of future benefits and the PV of future salaries for the entire System are the total of these values across all members. The remainder of the actuarial valuation process depends upon these building blocks.

Once the basic results are derived, an actuarial method is applied in order to develop information on contribution levels and funding status. An actuarial method splits the PV of future benefits into two components:

1. PV of Future Normal Costs, and
2. Actuarial Accrued Liability ("AAL").

The actuarial method in use by the State of Alaska is known as the Entry Age Normal (EAN) method. Under EAN, the Normal Cost for a member is that portion of the PV of the increase in the value of that member's benefit for service during the upcoming year. The AAL is the difference between the total PVB and the PV of all future normal costs.

For TRS and PERS, the PV of future benefits applies to the following benefits:

- Retirement benefits
- Withdrawal benefits
- Disability benefits
- Death benefits
- Return of contributions
- Medical benefits
- Indebtedness (from contributions which might be redeposited)

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The medical benefits are based on potential future health care benefits, while the others are a type of post-employment income replacement benefit, based on salary. For the medical benefits, estimates must be made of the future health care costs. This is done by determining current per capita health care claim costs by age of retiree, and projecting them into the future based on anticipated future health care inflation.

SECTION 3

REVIEW OF ASSUMPTIONS

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REVIEW OF PENSION ASSUMPTIONS

Conduent released an experience study in 2014 and the Board approved a new assumption set to be used beginning with the actuarial valuation as of June 30, 2014.

Although this audit examines many assumptions and methods, not all of them are equal in terms of their ultimate impact on contribution rates. It is not the intention of this audit to imply that all proposed changes would have a similar impact on the liabilities. For example, the investment return assumption may be the greatest lever in influencing contribution rates. Thus, where options exit for spending time and resources studying assumptions, we recommend studying those with the largest impact first.

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 investment return and assumed rates of future salary increase.

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Economic assumptions are normally defined by an underlying inflation assumption. Conduent has cited 3.12% as its inflation assumption. In recent years, long-term inflation forecasts have been declining. With the decline, the 3.12% inflation assumption is now at the higher end of the generally accepted range. Many of our clients at 3.00% inflation are choosing to move down to 2.75%. Social Security has recently adopted 2.60% for its long term "mid-range" inflation assumption.

Investment Return Assumption

The nominal investment return assumption is 8.00%. The assumption is net of all investment and administrative expenses. This net return assumption implies that the Trust must earn more than 8% in order to cover the administrative expenses. The rate of 8.00% is no longer commonly seen within the public sector. Combined with the 3.12% inflation assumption, this yields a 4.88% real net rate of return.

Although Conduent's analysis supported an 8.00% return, this analysis did not seem in line with what we have seen from our capital market assumption modeler as well as models from other actuaries. The discount rate is one of the most important assumptions used in the valuation. If investment returns are less than expected, the asset losses can dwarf the impact of the liability gains and losses due to demographic experience.

Member Pay 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.

Base Salary Increase Assumption

The 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 0.5% for productivity increases.

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Merit, Promotion, and Longevity Pay Increase Assumption

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.

The pay increase assumption appears to be on the "high" side based on the gains seen year over year.

We would also offer that the manner in which pays change over time for teachers in comparison to public employees tends to differ. Since most teachers have a specific skill set, the approach to their compensation tends to follow a more consistent trend. Public Employees however (except for Peace officers and Firefighters) tend to represent a multitude of different skills – from a more generalized, labor intensive capacity (e.g., custodial) to more specialized training (ex. Accounting).

COLA and PRPA

This is another assumption which has exhibited a perpetual bias over the last eight years. These gains in all years would be an indication that the assumption has been set to "overestimate" the amount of COLA to be granted. We expect that this is in direct relation to the low rates of inflation. Since inflation is a component of investment return, salary increase and the COLA/PRPA we recognize that a change in the inflation assumption would have a ripple effect throughout all the economic assumptions. We understand this will be reviewed in the upcoming experience study.

DEMOGRAPHIC ASSUMPTIONS

The demographic assumptions are not unreasonable. The assumption set includes a static mortality table which, although not unreasonable, may not be best practice. For example, GRS has a standard recommended practice of recommending fully generational mortality tables to our clients. This does not mean that a static table is inappropriate, but it does mean that the plan may continue to face longevity risk as life expectancy continues to improve with each generation. As the longer expected lifetimes emerge, upward pressure will come to bear on the contribution rates.

This static mortality table used in the June 30, 2016 valuation is based on a standard mortality table projected to 2018. Although projecting to 2018 does provide some provision for increasing life expectancies, it will likely be necessary to include additional improvement to life expectancies at the next experience study. Some plans are choosing to adopt generational mortality tables which automatically incorporate improvement in life expectancies – a retiree aged 55 in 2016 will live slightly longer than a retiree aged 55 in 2015, etc.

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The gain/loss by source does show that there is still a margin in the mortality assumption for PERS ($23,872 gain for the 2016 valuation). However, for TRS there is a loss ($5,612). We often see teachers outliving other populations and we anticipate this will be examined in the upcoming experience study.

The termination assumption appears to be predicting many more members leave the plan than anticipated. For PERS and TRS pension there has been a loss due to that assumption for seven out of the last seven years. We recommend a review of this assumption and we expect that the assumption would be set in such a way to eliminate the persistent bias in the liabilities for each year.

Conduent has added a specific assumption to cover the annual rehire liability losses. These losses occur every year, and for the 2016 valuation Conduent has added a cost to the annual normal cost. That cost has been added to the 7/1/2016 normal cost, and will be effective for the FY2018 contribution rates. This method of adding the rehire liability loss through the normal cost is an interim method. In the course of the upcoming experience study Conduent will review

the method for valuing rehire liability and will determine the optimal course to take for valuing that liability.

SUMMARY

Based on the gains and losses by source, and subject to the review of the questions surrounding some of those items, the set of actuarial assumptions appear to be in need of greater review. In particular, the assumed rate of return and mortality assumptions may need to be updated to reflect future expectations. The termination assumption in PERS and TRS appears to have a bias creating losses in nearly all years shown, so we would expect those termination assumptions to be changed in order to better reflect the behavior of the population.

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REVIEW OF HEALTH CARE COST ASSUMPTIONS

GENERAL

Change in Data

This is the first year that Conduent has used the actual participant data for those members who are participating in the retiree health care plan and who are in pay status. Data was received from the Aetna data warehouse, and in the 2016 valuation report Conduent has provided a reconciliation of the data provided.

Net retiree records are 38,670. Of those retiree records, there were 5,923 members that have dual coverage. Conduent then reduced the number of net retiree records since, without those dual members they would have assumed each of those members have a spouse that would receive coverage. That brings the net retiree records down to 32,747. Next, there were retiree records who were not in the Aetna data warehouse (presumably these are retirees that did not elect coverage). Finally, Conduent found 585 records that were in the Aetna data warehouse but not in the net retiree data-these are most likely new enrollees and they will be "captured" in the next valuation cycle.

That brings the total of retirees actually participating in the plan to 31,847.

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The total number of retirees as shown on page 50 of the valuation report is 29,756. We recognize how fluid the counts can be in a health plan so we conclude these numbers are within the range of reasonableness.

For PERS, there were 68,806 records on the file. Conduent removed 1,296 that were deaths/transfers/end of pension benefit payments that would be ignored for health valuation; arriving at 67,510. Conduent then removed 14,420 closed records and 15,981 actives, re-employed retirees, non-vested terminations and QDROs that would not be in the retiree medical plan netting to 37,109. Conduent then removed 7,353 dual coverage members and those not indicated as enrolled on Aetna file. The final count is 29,756 retirees enrolled for medical.

For TRS, there were 21,135 records on the file. Conduent removed 308 that were deaths/transfers/end of pension benefit payments that would be ignored for health valuation; arriving at 20,827. Conduent then removed 3,419 closed records and 5,042 actives, re-employed retirees, non-vested terminations and QDROs that would not be in the retiree medical plan netting to 12,366. Conduent then removed 1,032 dual coverage members and those not indicated as enrolled on Aetna file. The final count is 11,334 retirees enrolled for medical.

Claims Cost and Medicare Offset

We analyzed the trend in the per capita claim costs over the last seven years:

	PERS and TRS Age 65 Per Capitas for Fiscal Year Ending								
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Medical: Pre-Medicare	7,670	7,503	8,606	9,497	9,856	11,125	12,362	11,724	14,380
Medical: Medicare A&B only	1,296	1,336	1,563	1,551	1,628	1,726	1,657	1,461	1,707
Medical: Medicare B only	3,384	4,754	6,654	6,936	6,219	6,676	7,920	6,700	8,562
Rx	2,379	2,419	2,600	2,799	2,736	2,621	2,624	2,753	3,320

	PERS and TRS Health Care Cost Trend								
	09-10	**10-11**	**11-12**	**12-13**	**13-14**	**14-15**	**15-16**	**17-18**	**Avg.**
Medical: Pre-Medicare	-2.2%	14.7%	10.4%	3.8%	12.9%	11.1%	-5.2%	22.7%	8.2%
Medical: Medicare A&B only	3.1%	17.0%	-0.8%	5.0%	6.0%	-4.0%	-11.8%	16.8%	3.5%
Medical: Medicare B only	40.5%	40.0%	4.2%	-10.3%	7.3%	18.6%	-15.4%	27.8%	12.3%
Rx	1.7%	7.5%	7.7%	-2.3%	-4.2%	0.1%	4.9%	20.6%	4.3%

	PERS and TRS Health Care Cost Trend		
	17-18 Actual	**17-18 Assumed**	**Gain/ Loss**
Medical: Pre-Medicare	22.7%	8.8%	Loss
Medical: Medicare A&B only	16.8%	5.8%	Loss
Medical: Medicare B only	27.8%	5.8%	Loss
Rx	20.6%	5.4%	Loss

There were losses in all categories. A contributing factor to the losses was the growth in the per capita claim costs. These grew, in large part, due to the reduction in the number of participating members in the retiree health care program. This change in population was a result of moving from the "proxy" data to using actual retiree medical participant data that was provided by the Aetna data warehouse.

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Method and Contributions

Nothing to recommend

Assumptions

Now that the actual retiree data is available, we recommend studying the participation rate, election rate and potentially setting a dual coverage assumption.

Relative to the long term trend assumption we understand the Getzen model converges the long term health care cost trend rates to the long term growth of the GDP. Conduent departs from that assumption, assuming a perpetual growth in healthcare in the US economy. We suggest revisiting that assumption since that would imply a budget displacement that would reach untenable limits.

Cadillac Tax

Under the provisions of the Patient Protection and Affordable Care Act (PPACA), an additional tax is to be levied on plans with premiums that exceed a certain threshold. This tax, commonly referred to as the "Cadillac tax," is equal to 40% of the excess of the plan's premium over the statutorily set limits. Conduent indicates that the Cadillac Tax will produce a minimal impact to valuation results. Conduent estimates a tax less than $1.05 million for TRS and PERS combined. Conduent does not expect additional costs due to the tax to impact the trend over the long term.

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The following table shows the PPACA limits for 2018. Please note that these limits are not effective until the year 2020 and the limits below may be indexed prior to 2020.

2018 PPACA Limit	Single	Two Person	Family
Retirees 55 to 64	**$11,850**	**$30,950**	**$30,950**
Retiree 65+	**$10,200**	**$27,500**	**$27,500**

The weighted average fiscal year 2017 incurred claims cost rates at the average age for pre-Medicare retirees is $14,901 ($12,037 for medical plus $2,864 for prescription, shown on page 86 of PERS report and 71 of TRS report). Pre-Medicare claims costs have reached the PPACA limit. The weighted average fiscal year 2017 incurred claims cost rates for post-Medicare retirees is $5,908. Post-Medicare costs are well below the PPACA limits.

Conduent indicates that they are using a method which blends pre and post-Medicare claims costs in order to estimate the excise (Cadillac) tax. Conduent estimates the tax at less than $775,000. Given the low post-Medicare claims costs and the high number of post-Medicare retirees, the blended claims costs fall well below the PPACA limit. Therefore, under this method, it does appear that the Cadillac tax will have minimal impact to the valuation. Guidance is still

forthcoming on whether pre and post-Medicare costs can be blended for purposes of this calculation. Until this issue is clarified, it does not seem unreasonable to do so.

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SECTION 4

REVIEW OF ACTUARIAL VALUATION METHODS AND PROCEDURES

INCLUDES SAMPLE LIFE REVIEW

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REVIEW OF ACTUARIAL VALUATION METHODS AND PROCEDURES

I. Background

An actuarial valuation is a detailed statistical simulation of the future operation of a retirement system using the set of actuarial assumptions adopted by the Board.

The actuarial values generated from this process are based not only on these assumptions, but also on the additional assumptions built into each actuarial firm's pension valuation software.

Our scope for performing the review did not include a complete replication of the valuation results as determined by Conduent at June 30, 2016. Rather, we reviewed a number of sample test lives from Conduent in great detail, and made our determinations as to whether the methods and assumptions being employed were being done so properly. We also reviewed the report in order to examine the aggregate results and conclusions of this actuarial valuation.

Though this approach is not intended to meet the rigors of a full scale replication of results – it still serves as a strong indicator of the appropriateness of the assumptions and methods being used to value the liabilities and determine the costs for these plans.

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II. Process:

Our review process can be summarized as follows:

Computation: Valuation Liabilities

We analyzed test cases to compare the Actuarial Liability under the EAN funding method for the test cases of the PERS and TRS Systems. As a starting point, we wanted to first replicate Conduent test case liabilities by using their assumptions and methods to ensure that the computations were in sync with the descriptions listed in the valuation report.

When conducting an actuarial audit, and reviewing the testlives, we look at the projected benefits at each age for each decrement type. We also look at the component of the benefit (final average earnings and years of service). This is critical to understanding what the valuation system is actually valuing and making sure that the valuation is not "right for the wrong reasons", (meaning, errors could occur in two different directions making total liabilities approximate a correct value.)

We also review the construction of the commutation functions- the varying probabilities for each decrement and the discounting to the valuation date.

III. Actuarial Method:

Findings:

An actuarial cost method is a mathematical process for allocating the dollar amount of the total present value of plan benefits (PVB) between future normal costs and actuarial accrued liability (AAL). The retained actuary uses the Entry Age Normal actuarial cost method (EAN Method), characterized by:

(1) Normal Cost – the level percent of payroll contribution, paid from each participant's date of hire to date of retirement, which will accumulate enough assets at retirement to fund the participant's projected benefits from retirement to death.

(2) Actuarial Accrued Liability – the assets which would have accumulated to date had contributions been made at the level of the normal cost since the date of the first benefit accrual, if all actuarial assumptions had been exactly realized, and there had been no benefit changes.

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The EAN Method is the most prevalent funding method in the public sector. It is appropriate for the public sector because it produces costs that remain stable as a percentage of payroll over time, resulting in intergenerational equity for taxpayers and budget predictability. The recent Public Fund Survey, published in January 2015, surveyed 126 retirement systems (mostly statewide). Over 75% of the plans reported using the EAN Method. Therefore, the retained actuary's stated funding methods for TRS and PERS are certainly in line with national trends.

Application of Cost Method

In order to determine the normal cost as a level percentage of pay, the valuation must first determine the future compensation that each individual member is expected to receive over the course of their career (which is also the compensation used to generate contributions). The projection of the future compensation should be based on the salary that the participant is expected to receive according to the timing of the expected departures from active service (or, decrements).

Conclusion:

The level percent of pay method for both amortization of the unfunded accrued liability and the normal cost are both appropriate as a funding policy, considering that the payroll is not closed (as promulgated under SB 123.) For GASB reporting purposes (as opposed to funding purposes), a different set of numbers may need to be disclosed to account for the closed nature of the group.

Additionally, to account for the Part D subsidy in the retiree medical plan, a different set of numbers may need to be disclosed for GASB reporting purposes (again, as opposed to funding purposes). The report also recognizes that a different discount rate will need to be utilized for the GASB numbers for the retiree medical liabilities, in order to recognize the partially funded nature of that plan.

IV. Actuarial Calculations:

BACKGROUND

We reviewed sample test cases used for the June 30, 2016 valuation draft reports. In order to accomplish this, we requested a number of sample cases from Conduent with intermediate statistics to assist us in analyzing the results. We combined this with our understanding of the plan provisions in an attempt to analyze the liability values produced by Conduent for these sample cases only.

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We received sample test cases this year for the following sample members:

- PERS (Pension and Post-retirement Health): Three actives, three retirees (two healthy, one disabled), two vested terminations and one beneficiary
- TRS (Pension and Post-retirement Health): Three actives, one retiree, one vested termination and one beneficiary

Note that the active test lives analyzed are not necessarily exposed to all of the possible benefits under the plans (i.e. already beyond the eligibility period for certain benefits, or not eligible for particular benefits). Therefore, findings may occur for these other benefits in future audits depending on the set of test lives chosen for review at that time. However, the vast majority of the liability for each plan is due to the retirement benefits (included for all active test lives), and retirement-related withdrawal benefits (one active testlife included per plan), so any future findings are also expected to be de minimus. Also, the impact for any one test life may not be representative of the impact on the total plan.

When employing Conduent's methods and assumptions, we matched the present value of benefits in total closely for the test cases submitted under the Pension plans for PERS and TRS, and present value of retirement benefits under the PERS and TRS Retiree Health plan. In addition we have analyzed the calculations of the ancillary benefits and have provided a summary of this detailed analysis at the end of this section. These exhibits provide a comparison of the calculations by decrement provided to us from Conduent against our replication of those benefits as we interpret them from the plan provisions and assumptions.

In matching the present value of benefits, it is being determined that all benefits are being valued, and that the valuation of the liability for those benefits is consistent with the stated assumptions and methods.

Findings - Assumptions

In the review of the test lives as well as the report we confirmed that the assumptions shown in the report were the assumptions used in the PERS and TRS valuations. There are a few small exceptions which have been highlighted on page 7 of this audit report.

We expect that any changes would have minimal impact to the overall June 30, 2016 results.

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Quantitative Results

When performing the replication, we were able to match the total present value of future benefits all test cases (active and inactive, PERS and TRS, pension and healthcare) to within a percent. This would be considered as an overall match for purposes of the valuation.

Actuarial Review - June 30, 2016
Comparison of Present Value of Benefits

Active Pension		**GRS**	**Conduent**	**% Diff**
TRS	Active Test Case 1 - Tier 2	321,986	321,626	0.1%
TRS	Active Test Case 2 - Tier 2	294,112	297,173	-1.0%
TRS	Active Test Case 3 - Tier 2	332,943	336,164	-1.0%
PERS	Active Test Case 1 - Other Tier 2	697,988	697,082	0.1%
PERS	Active Test Case 2 - Other Tier 3	346,273	347,109	-0.2%
PERS	Active Test Case 3 - P/F Tier 3	546,293	547,850	-0.3%
Inactive Pension		**GRS**	**Conduent**	**% Diff**
TRS	Vested Termination - Female	100,336	100,155	0.2%
TRS	Retiree - Female, Tier 1, J&S	700,316	713,051	-1.8%
TRS	Beneficiary - Male, Tier 1, SLA	74,071	73,862	0.3%
PERS	Vested Termination - Other Tier 2 - Female	298,207	299,352	-0.4%
PERS	Vested Termination - P/F Tier 3 - Male	19,477	19,985	-2.5%
PERS	Disabled - PF Tier 2 - Male	449,138	445,921	0.7%
PERS	Retiree - Other Tier 2 -Male	539,937	534,180	1.1%
PERS	Beneficiary - Other Tier 1 - Female	119,445	119,808	-0.3%
PERS	Retiree - PF Tier 2 - Male	246,522	246,522	0.0%
Active Healthcare		**GRS**	**Conduent**	**% Diff**
TRS	Active Test Case 1 - Tier 2	126,054	126,612	-0.4%
TRS	Active Test Case 2 - Tier 2	139,832	140,269	-0.3%
TRS	Active Test Case 3 - Tier 2	137,387	138,883	-1.1%
PERS	Active Test Case 1 - Other Tier 2	95,689	95,670	0.0%
PERS	Active Test Case 2 - Other Tier 3	208,423	208,251	0.1%
PERS	Active Test Case 3 - P/F Tier 3	161,025	161,016	0.0%
Inactive Healthcare		**GRS**	**Conduent**	**% Diff**
TRS	Vested Termination - Female	207,654	205,723	0.9%
TRS	Retiree - Female, Tier 1, J&S	134,522	134,355	0.1%
TRS	Beneficiary - Male, Tier 1, SLA	152,869	153,979	-0.7%
PERS	Vested Termination - Other Tier 2 - Female	193,334	193,292	0.0%
PERS	Vested Termination - P/F Tier 3 - Male	4,444	4,443	0.0%
PERS	Disabled - PF Tier 2 - Male	436,692	436,635	0.0%
PERS	Retiree - Other Tier 2 -Male	317,084	317,035	0.0%
PERS	Beneficiary - Other Tier 1 - Female	176,059	176,034	0.0%
PERS	Retiree - PF Tier 2 - Male	149,954	149,939	0.0%

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NOTE

Ancillary or non-retirement benefits such as death and disability tend to be low probability events (and hence low liability) and they also tend to have many "bells and whistles" which can be valued in different ways by different actuaries. When looking at the test life results, it may be most informative to review the decrement (retirement, termination, disability, death) totals rather than each particular segment of the decrement (married non-occupational death, etc.). For all ancillary benefits comprising less than 0.1% of the total PVB for that individual, we checked the amounts for reasonableness, but did not replicate. Those amounts are indicated in blue.

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ALASKA RETIREMENT MANAGEMENT BOARD
Actuarial Review of Pension and Health Plans - June 30, 2016

Comparison of Present Value of Benefits - **TRS Pension**
Active Test Case 1 - Tier 2

Basic Data:	Current Age 47.87	Credited Service 14.40	Gender Female
Present Value of Benefits (PVB)	**GRS Replicate***	**Conduent**	**% Diff**
Retirement:			
Main Retirement Benefit	279,664.29	279,336.23	0.1%
AK COLA	8,347.00	8,345.46	0.0%
Total Retirement PVB	**288,011.29**	**287,681.69**	**0.1%**
Withdrawal:			
Non Vested Term	-	-	0.0%
Vested Term	28,321.31	28,324.22	0.0%
Vested Term AK COLA	878.58	878.12	0.1%
Vested Term (take LS)	943.45	943.44	0.0%
Vested Term (death during deferral)	132.31	132.51	-0.2%
Vested Term (death during deferral AK COLA)	8.44	8.27	2.1%
Vested Term (death, single)	47.51	45.75	3.8%
Total Withdrawal PVB	**30,331.60**	**30,332.31**	**0.0%**
Death:			
Non Vested NonOcc 1<svc<5 LS Dth	-	-	0.0%
NonOcc Dth Marr	905.24	835.91	8.3%
NonOcc Dth Marr AK COLA	23.33	21.59	8.1%
NonOcc Married LS Dth	35.11	35.04	0.2%
NonOcc Single LS Dth	234.09	233.85	0.1%
Occ Dth (Pre-NR Conversion Benefit)	29.40	29.39	0.0%
Occ Dth (Post-NR Conversion Benefit)	432.08	455.58	-5.2%
Occ Dth Marr AK COLA (Pre-NR)	-	-	0.0%
Occ Dth Marr AK COLA (Post-NR)	11.93	12.24	-2.5%
Occ Single LS Dth	-	-	0.0%
Total Death PVB	**1,671.18**	**1,623.60**	**2.9%**
Disability:			
Non-vested LS Ben	-	-	0.0%
Dis (Pre-NR Conversion Benefit)	410.35	410.71	-0.1%
Dis (Post-NR Conversion Benefit)	1,454.60	1,469.84	-1.0%
Dis AK COLA (Pre-NR)	24.00	24.01	0.0%
Dis AK COLA (Post-NR)	81.00	81.29	-0.4%
Dis Death Ben	2.23	2.23	0.0%
Dis Death Ben AK COLA	0.12	0.12	0.0%
Dis Child Ben	-	-	0.0%
Dis Child Ben AK COLA	-	-	0.0%
Total Disability PVB	**1,972.30**	**1,988.20**	**-0.8%**
GRAND TOTAL PVB	**321,986.37**	**321,625.80**	**0.1%**

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ALASKA RETIREMENT MANAGEMENT BOARD
Actuarial Review of Pension and Health Plans - June 30, 2016

Comparison of Present Value of Benefits - **TRS Pension**
Active Test Case 2 - Tier 2

Basic Data:	Current Age 37.15	Credited Service 13.00	Gender Female
Present Value of Benefits (PVB)	**GRS Replicate**	**Conduent**	**% Diff**
Retirement:			
Main Retirement Benefit	269,493.99	272,526.04	-1.1%
AK COLA	5,351.47	5,350.50	0.0%
Total Retirement PVB	**274,845.46**	**277,876.54**	**-1.1%**
Withdrawal:			
Non Vested Term	-	-	0.0%
Vested Term	14,415.22	14,487.36	-0.5%
Vested Term AK COLA	446.75	446.79	0.0%
Vested Term (take LS)	1,088.22	1,088.22	0.0%
Vested Term (death during deferral)	104.46	104.41	0.0%
Vested Term (death during deferral AK COLA)	5.43	5.28	2.8%
Vested Term (death, single)	52.04	52.98	-1.8%
Total Withdrawal PVB	**16,112.12**	**16,185.04**	**-0.5%**
Death:			
Non Vested NonOcc 1<svc<5 LS Dth	-	-	0.0%
NonOcc Dth Marr	687.15	639.18	7.5%
NonOcc Dth Marr AK COLA	11.56	10.68	8.2%
NonOcc Married LS Dth	25.35	25.32	0.1%
NonOcc Single LS Dth	168.90	168.73	0.1%
Occ Dth Marr (Pre-NR Conversion Benefit)	22.24	22.23	0.0%
Occ Dth Marr (Post-NR Conversion Benefit)	348.10	344.58	1.0%
Occ Dth Marr AK COLA (Pre-NR)	-	-	0.0%
Occ Dth Marr AK COLA (Post-NR)	6.00	6.01	-0.2%
Occ Single LS Dth	-	-	0.0%
Total Death PVB	**1,269.30**	**1,216.73**	**4.3%**
Disability:			
Non-vested LS Ben	-	-	0.0%
Dis (Pre-NR Conversion Benefit)	508.60	508.61	0.0%
Dis (Post-NR Conversion Benefit)	1,032.26	1,041.93	-0.9%
Dis AK COLA (Pre-NR)	29.32	29.32	0.0%
Dis AK COLA (Post-NR)	57.36	57.37	0.0%
Dis Death Ben	18.46	18.50	-0.2%
Dis Death Ben AK COLA	1.00	1.01	-1.0%
Dis Child Ben	224.90	224.89	0.0%
Dis Child Ben AK COLA	12.76	12.76	0.0%
Total Disability PVB	**1,884.66**	**1,894.39**	**-0.5%**
GRAND TOTAL PVB	**294,111.54**	**297,172.70**	**-1.0%**

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ALASKA RETIREMENT MANAGEMENT BOARD
Actuarial Review of Pension and Health Plans - June 30, 2016

Comparison of Present Value of Benefits - **TRS Pension**
Active Test Case 3 - Tier 2

Basic Data:	Current Age 36.00	Credited Service 9.80	Gender Male
Present Value of Benefits (PVB)	**GRS Replicate**	**Buck**	**% Diff**
Retirement:			
Main Retirement Benefit	298,518.43	301,909.72	-1.1%
AK COLA	6,574.65	6,580.49	-0.1%
Total Retirement PVB	**305,093.08**	**308,490.21**	**-1.1%**
Withdrawal:			
Non Vested Term	-	-	0.0%
Vested Term	19,026.17	19,128.21	-0.5%
Vested Term AK COLA	585.59	585.99	-0.1%
Vested Term (take LS)	1,357.00	1,357.02	0.0%
Vested Term (death during deferral)	256.37	257.30	-0.4%
Vested Term (death during deferral AK COLA)	13.68	13.33	2.6%
Vested Term (death, single)	58.00	58.78	-1.3%
Total Withdrawal PVB	**21,296.81**	**21,400.63**	**-0.5%**
Death:			
Non Vested NonOcc 1<svc<5 LS Dth	-	-	0.0%
NonOcc Dth Marr	1,997.04	1,745.63	14.4%
NonOcc Dth Marr AK COLA	36.48	31.72	15.0%
NonOcc Married LS Dth	63.84	63.78	0.1%
NonOcc Single LS Dth	225.10	224.96	0.1%
Occ Dth Marr (Pre-NR Conversion Benefit)	105.09	105.07	0.0%
Occ Dth Marr (Post-NR Conversion Benefit)	901.69	869.41	3.7%
Occ Dth Marr AK COLA (Pre-NR)	(1.00)	-	0.0%
Occ Dth Marr AK COLA (Post-NR)	17.02	17.02	0.0%
Occ Single LS Dth	-	-	0.0%
Total Death PVB	**3,345.26**	**3,057.59**	**9.4%**
Disability:			
Non-vested LS Ben	-	-	0.0%
Dis (Pre-NR Conversion Benefit)	1,217.88	1,217.88	0.0%
Dis (Post-NR Conversion Benefit)	1,298.43	1,308.34	-0.8%
Dis AK COLA (Pre-NR)	68.99	68.98	0.0%
Dis AK COLA (Post-NR)	73.68	73.67	0.0%
Dis Death Ben	105.42	105.63	-0.2%
Dis Death Ben AK COLA	5.59	5.62	-0.5%
Dis Child Ben	414.08	411.95	0.5%
Dis Child Ben AK COLA	23.46	23.33	0.6%
Total Disability PVB	**3,207.53**	**3,215.40**	**-0.2%**
GRAND TOTAL PVB	**332,942.68**	**336,163.83**	**-1.0%**

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ALASKA RETIREMENT MANAGEMENT BOARD
Actuarial Review of Pension and Health Plans - June 30, 2016

Comparison of Present Value of Benefits - **PERS Active Pension**
Active Test Case 1 - Other Tier 2

Basic Data:	Current Age 56.6	Credited Service 29.0	Gender Male
Present Value of Benefits (PVB)	**GRS**	**Conduent**	**% Diff**
Retirement:			
Main Retirement Benefit	660,423	659,594	0.1%
AK COLA	27,490	27,486	0.0%
Total Retirement PVB	**687,914**	**687,080**	**0.1%**
Withdrawal:			
Non Vested Term	-	-	0.0%
Vested Term	-	-	0.0%
Vested Term AK COLA	-	-	0.0%
Vested Term (take LS)	-	-	0.0%
Vested Term (death during deferral)	-	-	0.0%
Vested Term (death during deferral AK COLA)	-	-	0.0%
Total Withdrawal PVB	**-**	**-**	**0.0%**
Death:			
Non Vested NonOcc <1 svc LS Dth	-	-	0.0%
Non Vested NonOcc 1<svc<5 LS Dth	-	-	0.0%
NonOcc Dth Marr	2,432	2,422	0.4%
NonOcc Dth Marr AK COLA	107	105	1.7%
NonOcc Married LS Dth	136	136	-0.2%
NonOcc Single LS Dth	453	455	-0.2%
Occ Dth Marr (Pre-NR Conversion Benefit)	17	17	0.0%
Occ Dth Marr (Post-NR Conversion Benefit)	6,207	6,143	1.0%
Occ Dth Marr AK COLA (Post-NR)	269	269	-0.1%
Occ Single LS Dth	453	455	-0.2%
Total Death PVB	**10,075**	**10,002**	**0.7%**
Disability:			
Non-vested LS Ben	-	-	0.0%
NonOcc Dis	-	-	0.0%
NonOcc Dis AK COLA	-	-	0.0%
Occ Dis (Pre-NR Conversion Benefit)	-	-	0.0%
Occ Dis (Post-NR Conversion Benefit)	-	-	0.0%
Occ Dis AK COLA (Pre-NR)	-	-	0.0%
Occ Dis AK COLA (Post-NR)	-	-	0.0%
Dis Death Ben	-	-	0.0%
Dis Death Ben AK COLA	-	-	0.0%
Total Disability PVB	**-**	**-**	**0.0%**
GRAND TOTAL PVB	**697,988**	**697,082**	**0.1%**

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ALASKA RETIREMENT MANAGEMENT BOARD
Actuarial Review of Pension and Health Plans - June 30, 2016

Comparison of Present Value of Benefits - **PERS Active Pension**
Active Test Case 2 - Other Tier 3

Basic Data:	Current Age 49.3	Credited Service 16.0	Gender Female
Present Value of Benefits (PVB)	**GRS**	**Conduent**	**% Diff**
Retirement:			
Main Retirement Benefit	284,162	284,698	-0.2%
AK COLA	12,020	12,020	0.0%
Total Retirement PVB	**296,182**	**296,718**	**-0.2%**
Withdrawal:			
Non Vested Term	-	-	0.0%
Vested Term	39,775	39,959	-0.5%
Vested Term AK COLA	1,423	1,423	0.0%
Vested Term (take LS)	1,971	1,976	-0.3%
Vested Term (death during deferral)	222	234	-5.5%
Vested Term (death during deferral AK COLA)	18	19	-2.0%
Total Withdrawal PVB	**43,409**	**43,611**	**-0.5%**
Death:			
Non Vested NonOcc <1 svc LS Dth	-	-	0.0%
Non Vested NonOcc 1<svc<5 LS Dth	-	-	0.0%
NonOcc Dth Marr	1,144	1,151	-0.6%
NonOcc Dth Marr AK COLA	41	40	1.3%
NonOcc Married LS Dth	72	73	-0.9%
NonOcc Single LS Dth	310	312	-0.9%
Occ Dth Marr (Pre-NR Conversion Benefit)	519	519	0.0%
Occ Dth Marr (Post-NR Conversion Benefit)	2,318	2,377	-2.5%
Occ Dth Marr AK COLA (Post-NR)	100	101	-0.9%
Occ Single LS Dth	310	312	-0.9%
Total Death PVB	**4,812**	**4,886**	**-1.5%**
Disability:			
Non-vested LS Ben	-	-	0.0%
NonOcc Dis	761	767	-0.7%
NonOcc Dis AK COLA	48	48	0.0%
Occ Dis (Pre-NR Conversion Benefit)	466	466	0.0%
Occ Dis (Post-NR Conversion Benefit)	533	551	-3.3%
Occ Dis AK COLA (Pre-NR)	30	30	0.0%
Occ Dis AK COLA (Post-NR)	31	32	-3.3%
Dis Death Ben	1	1	0.0%
Dis Death Ben AK COLA	0	0	0.0%
Total Disability PVB	**1,870**	**1,895**	**-1.3%**
GRAND TOTAL PVB	**346,273**	**347,109**	**-0.2%**

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ALASKA RETIREMENT MANAGEMENT BOARD
Actuarial Review of Pension and Health Plans - June 30, 2016

Comparison of Present Value of Benefits - **PERS Active Pension**
Active Test Case 3 - P/F Tier 3

Basic Data:	Current Age 35.3	Credited Service 10.0	Gender Male
Present Value of Benefits (PVB)	**GRS**	**Conduent**	**% Diff**
Retirement:			
Main Retirement Benefit	508,829	510,154	-0.3%
AK COLA	8,944	8,946	0.0%
Total Retirement PVB	**517,773**	**519,100**	**-0.3%**
Withdrawal:			
Non Vested Term	-	-	0.0%
Vested Term	13,212	13,289	-0.6%
Vested Term AK COLA	435	436	0.0%
Vested Term (take LS)	2,910	2,910	0.0%
Vested Term (death during deferral)	242	251	-3.5%
Vested Term (death during deferral AK COLA)	14	14	0.4%
Total Withdrawal PVB	**16,814**	**16,900**	**-0.5%**
Death:			
Non Vested NonOcc <1 svc LS Dth	-	-	0.0%
Non Vested NonOcc 1<svc<5 LS Dth	-	-	0.0%
NonOcc Dth Marr	816	820	-0.5%
NonOcc Dth Marr AK COLA	12	12	0.3%
NonOcc Married LS Dth	70	70	-0.4%
NonOcc Single LS Dth	82	82	-0.4%
Occ Dth Marr (Pre-NR Conversion Benefit)	742	742	0.0%
Occ Dth Marr (Post-NR Conversion Benefit)	4,580	4,638	-1.2%
Occ Dth Marr AK COLA (Post-NR)	76	76	-0.4%
Occ Single LS Dth	191	192	-0.4%
Total Death PVB	**6,569**	**6,634**	**-1.0%**
Disability:			
Non-vested LS Ben	-	-	0.0%
NonOcc Dis	1,064	1,074	-0.9%
NonOcc Dis AK COLA	63	64	-0.8%
Occ Dis (Pre-NR Conversion Benefit)	1,263	1,264	0.0%
Occ Dis (Post-NR Conversion Benefit)	2,320	2,384	-2.7%
Occ Dis AK COLA (Pre-NR)	78	78	0.0%
Occ Dis AK COLA (Post-NR)	123	127	-2.7%
Dis Death Ben	214	214	0.0%
Dis Death Ben AK COLA	12	12	0.0%
Total Disability PVB	**5,137**	**5,215**	**-1.5%**
GRAND TOTAL PVB	**546,293**	**547,850**	**-0.3%**

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Actuarial Review of Pension and Health Plans Active Pension Test Case Legend	
Benefit	**Extended Description**
Retirement:	
Main Retirement Benefit	Early/Normal Retirement (base) Benefit
AK COLA	Alaska Cost of Living Allowance (10% of Ret base benefit)
Withdrawal:	
Non Vested Term	Refund of employee contributions upon termination of non-vested member
Vested Term	Deferred retirement (base) Benefit (deferred to early retirement eligibility)
Vested Term AK COLA	Alaska Cost of Living Allowance (10% of Term base benefit)
Vested Term (take LS)	Refund of employee contributions upon termination of (vested) member
Vested Term (death during deferral)	Death (base) Benefit payable upon death after withdrawal but before benefit commencement
Vested Term (death during deferral AK COLA)	Alaska Cost of Living Allowance (10% of DV Dth base benefit)
Vested Term (death, single)	Return of employee contributions upon death during deferral period for single members
Death:	
Non Vested NonOcc 1<svc<5 LS Dth	Refund of employee contributions upon death of non-vested member
NonOcc Dth Marr	Non-Occupational Death (base) benefit
NonOcc Dth Marr AK COLA	Alaska Cost of Living Allowance (10% of Non-Occupational Dth base benefit)
NonOcc Married LS Dth	Refund of employee contributions upon non-occupational death of married (vested) member
NonOcc Single LS Dth	Refund of employee contributions upon non-occupational death of single (vested) member
Occ Dth Marr (Pre-NR Conversion Benefit)	Occupational Death (base) benefit until normal retirement conversion
Occ Dth Marr (Post-NR Conversion Benefit)	Occupational Death (base) benefit after normal retirement conversion
Occ Dth Marr AK COLA (Pre-NR)	Alaska Cost of Living Allowance (10% of Occupational Dth base benefit pre-conversion)
Occ Dth Marr AK COLA (Post-NR)	Alaska Cost of Living Allowance (10% of Occupational Dth base benefit post-conversion)
Occ Single LS Dth	Refund of employee contributions upon occupational death of single (vested) member
Disability:	
Non-vested LS Ben	Refund of employee contributions payable upon disability before vested
Dis (Pre-NR Conversion Benefit)	Disability benefit prior to normal retirement conversion
Dis (Post-NR Conversion Benefit)	Disability benefit after normal retirement conversion
Dis AK COLA (Pre-NR)	Alaska Cost of Living Allowance (10% of pre-conversion disability benefit)
Dis AK COLA (Post-NR)	Alaska Cost of Living Allowance (10% of post-conversion disability benefit)
Dis Death Ben	Death (base) Benefit payable upon death after disability
Dis Death Ben AK COLA	Alaska Cost of Living Allowance (10% of Dis Dth base benefit)
Dis Child Ben	Disability (base) Child Benefit payable until eligible for normal retirement
Dis Child Ben AK COLA	Alaska Cost of Living Allowance (10% of Temp Dis Child base benefit)

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Actuarial Review of Pension and Health Plans - June 30, 2016

Comparison of Present Value of Benefits - **TRS Retiree Health**

Actives	**Test Case 1 - Tier 2, high svc**			**Test Case 2 - Tier 2, mid svc**			**Test Case 3 - Tier 2, mid svc**		
Basic Data:									
Sex	Female			Female			Male		
Current Age	47.87			37.15			36.00		
Current Credited Service	14.40			13.00			9.80		
Present Value of Benefits (PVB)	**GRS***	**Conduent**	**% Diff**	**GRS***	**Conduent**	**% Diff**	**GRS***	**Conduent**	**% Diff**
Retirement:									
Tier x <Member>	87,611.56	87,810.15	-0.2%	90,698.67	90,961.93	-0.3%	72,492.93	72,667.20	-0.2%
Tier x <Spouse>	48,188.41	48,581.07	-0.8%	56,496.92	56,697.32	-0.4%	70,911.48	72,254.62	-1.9%
Post 65 Part D Tier 2 <Member>	(4,420.30)	(4,432.35)	-0.3%	(2,799.37)	(2,814.58)	-0.5%	(2,317.90)	(2,329.76)	-0.5%
Post 65 Part D Tier 2 <Spouse>	(3,332.37)	(3,353.99)	-0.6%	(2,134.11)	(2,145.87)	-0.5%	(1,933.31)	(1,943.51)	-0.5%
Contrib <Member>	(1,140.76)	(1,140.46)	0.0%	(1,392.36)	(1,392.00)	0.0%	(952.89)	(952.63)	0.0%
Contrib <Spouse>	(852.19)	(851.96)	0.0%	(1,038.09)	(1,037.82)	0.0%	(813.48)	(813.27)	0.0%
Total Retirement PVB	**126,054.34**	**126,612.46**	**-0.4%**	**139,831.65**	**140,268.98**	**-0.3%**	**137,386.84**	**138,882.65**	**-1.1%**

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Inactives - PVB	**GRS***	**Conduent**	**% Diff**
Vested Termination - Female	207,654	205,723	0.9%
Retiree - Female, Tier 1, J&S	134,522	134,355	0.1%
Beneficiary - Male, Tier 1, SLA	152,869	153,979	-0.7%

** GRS' audit of Conduent's calculation includes review of the benefit amounts, annuity values, assumptions and other factors related to the PVB calculation at each projected age. Differences may exist due to different interpretations of the statutes, as well as additional items as discussed throughout this audit report.*

Benefits - Conduent Valuation Terminology	**Description***
Retirement:	
Tier x <Member>	Base Benefit Paid to Employee
Tier x <Spouse>	Base Benefit Paid to Spouse
Contrib <Member>	Employee Pre-Retirement Contributions
Contrib <Spouse>	Spouse Pre-Retirement Contributions
Post 65 Part D <Member>	Employee Post-Age 65 Medicare Part D Reimbursement
Post 65 Part D <Spouse>	Spouse Post-Age 65 Medicare Part D Reimbursement

Actuarial Review of Pension and Health Plans - June 30, 2016

Comparison of Present Value of Benefits - **PERS Retiree Health**

Actives	**Test Case 1 - Other Tier 3**			**Test Case 2 - Other Tier 2**			**Test Case 3 - PF Tier 3**		
Basic Data:									
Sex	Female			Male			Male		
Current Age	49.26			56.64			35.25		
Current Credited Service	16.03			28.98			10.01		
Present Value of Benefits (PVB)	**GRS***	**Conduent**	**% Diff**	**GRS***	**Conduent**	**% Diff**	**GRS***	**Conduent**	**% Diff**
Retirement:									
Tier x <Member>	68,273.45	68,258.57	0.0%	112,060.40	111,972.36	0.1%	85,097.49	85,093.11	0.0%
Tier x <Spouse>	34,527.95	34,521.79	0.0%	107,314.61	107,216.88	0.1%	83,525.88	83,521.94	0.0%
Contrib Tier 3 <Member>	378.68	378.58	0.0%	6,307.70	6,300.03	0.1%	1,855.72	1,855.22	0.0%
Contrib Tier 3 <Spouse>	263.86	263.79	0.0%	4,644.20	4,638.44	0.1%	1,586.29	1,585.88	0.0%
Post 65 Part D Tier 3 <Member>	3,815.51	3,814.59	0.0%	-	-	0.0%	2,271.35	2,272.42	0.0%
Post 65 Part D Tier 3 <Spouse>	2,654.02	2,653.51	0.0%	-	-	0.0%	1,884.63	1,885.71	-0.1%
Total Retirement PVB	95,689.33	95,669.89	**0.0%**	208,423.11	208,250.77	**0.1%**	161,025.37	161,015.82	**0.0%**

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Inactives - PVB	**GRS***	**Conduent**	**% Diff**
Vested Termination - Other Tier 2 - Female	193,334	193,292	0.0%
Vested Termination - P/F Tier 3 - Male	4,444	4,443	0.0%
Disabled - PF Tier 2 - Male	436,692	436,635	0.0%
Retiree - Other Tier 2 -Male	317,084	317,035	0.0%
Beneficiary - Other Tier 1 - Female	176,059	176,034	0.0%
Retiree - PF Tier 2 - Male	149,954	149,939	0.0%

** GRS' audit of Conduent's calculation includes review of the benefit amounts, annuity values, assumptions and other factors related to the PVB calculation at each projected age. Differences may exist due to different interpretations of the statutes, as well as additional items as discussed throughout this audit report.*

Benefits - Conduent Valuation Terminology	**Description***
Retirement:	
Tier x <Member>	Base Benefit Paid to Employee
Tier x <Spouse>	Base Benefit Paid to Spouse
Contrib <Member>	Employee Pre-Retirement Contributions
Contrib <Spouse>	Spouse Pre-Retirement Contributions
Post 65 Part D <Member>	Employee Post-age 65 Medicare Part D Reimbursement
Post 65 Part D <Spouse>	Spouse Post-age 65 Medicare Part D Reimbursement

SECTION 5

REVIEW OF CONTRIBUTION RATE DETERMINATION

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REVIEW OF CONTRIBUTION RATE DETERMINATION

Beginning with the actuarial valuations as of June 30, 2014, in accordance with Senate Bill 119 and House Bill 385, a contribution calculation methodology was incorporated in order to recognize the timing lag and recognize expected changes in the unfunded liability during the two-year delay.

GRS analyzed the new roll forward methodology for the FY2019 Contribution Rate Calculation and verified the contribution rate computation (as shown in pages 17 and 18 of the PERS valuation report and pages 11 and 12 of the TRS valuation report). The projected unfunded accrued liability is amortized over 21 years and compared to projected FY 2019 payroll to determine the amortization rate. This amortization rate combined with the projected FY 2019 normal cost rate form the basis of the FY 2019 contributions.

As noted in the Conduent report, the compensation used to develop the rates is a combination of both this plan's compensation, as well as the DCR compensation.

Finally, Conduent has determined two different compensation amounts-the "valuation" compensation which is the compensation used to determine future plan benefits and the liabilities for those benefits. This compensation annualizes permanent-part timer pay. The "rate" payroll is the payroll upon which the contributions are expected to be made, and does not annualize permanent part timer pay. GRS was able to replicate both forms of compensation.

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FINDINGS:

The calculations were generally reasonable and consistent with actuarial practice.

SECTION 6

REVIEW OF ACTUARIAL VALUATION REPORT

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REVIEW OF ACTUARIAL VALUATION REPORT

VALUATION REPORT:

GRS reviewed the June 30, 2016 valuation report for scope as well as content to determine if actuarial statistics were being reflected fairly and if the details of the plan were being correctly communicated. GRS did not review GASB 67/68 Accounting Information which was provided in a separate report.

We consider the scope and content of Conduent's report to be effective in communicating the financial position and contribution requirements of PERS and TRS.

A three-year certain normal form of payment is included in the valuation methods to approximate the modified cash refund and as was recommended last year has been included in the assumptions section of the report this year.

Some plans are beginning to incorporate increased investment risk metrics in their reports. Furthermore, in December 2014, the actuarial Standards Board released an discussion draft of a proposed actuarial standard of practice titled Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions. In the discussion draft, risk is defined as "the potential of future deviation of actual results from expectations derived from actuarial assumptions"

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The discussion draft would require the actuary to include an assessment of significant risks such as investment risk, interest rate risk, asset/liability mismatch risk, longevity risk, and other risks. The risks would be assessed through stress testing, scenario testing, and sensitivity testing and stochastic modeling.

For example, what would the change be to the contribution requirement if the plan experienced a -10 percent investment return on assets? This could provide added value to the Alaska Retirement Management Board.

In the course of this 2016 valuation audit, we submitted some comments to Conduent and have received their comments in return:

FOR ALL PLAN VALUATION REPORTS WE RECOMMEND THE FOLLOWING:

- For the Cadillac tax, disclose the method of the computation and the estimated dollar amount of impact.
  - Conduent has disclosed a discussion of their method and an estimated dollar amount of the Cadillac tax.
- Obtain the actual retiree medical plan data rather than using assumptions on the pension plan data.
  - Conduent is now using actual retiree data for the retiree medical plan.

- Provide a more detailed breakout of "other" in the gain/loss by source.
    - Conduent has added explanations in the footnotes. Conduent provided additional details on the PERS healthcare other gain via email. According to the email, the gains were due to census data changes. We would recommend this explanation be included in the final report. For TRS, $31.2 million dollars in loss occurred due to a data cleanup process which found about 500 retirees that had been valued as a straight life annuity and needed to be valued as a joint and survivor annuity.
- When programming changes are referenced provide a description and impact summary of the programming changes made.
    - Conduent will include this in the final reports, if applicable.

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GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

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ALASKA RETIREMENT MANAGEMENT BOARD

ACTUARIAL REVIEW OF THE PUBLIC EMPLOYEES' TIER IV AND TEACHERS' TIER III DEFINED CONTRIBUTION RETIREMENT PLAN

FOR OCCUPATIONAL DEATH AND DISABILITY AND RETIREE MEDICAL BENEFITS

APRIL 5, 2017

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April 5, 2017

Mr. Bob Mitchell
Acting Chief Investment Officer
Department of Revenue, Treasury Division
Alaska Retirement Management Board
P.O. Box 110405
Juneau, AK 99811-0405

Subject: Actuarial Review of June 30, 2016, Defined Contribution Retirement (DCR) Plan Valuations for the State of Alaska Public Employees' Tier IV (PERS) and Teachers' Tier III (TRS)

Dear Bob:

We have performed an actuarial review of the June 30, 2016, DCR Actuarial Valuations for PERS and TRS.

This report includes a review of:

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- Occupational Death and Disability Assumptions and Benefits
- Actuarial Valuation Methods and Procedures
- Actuarial Valuation Report
- Potential Areas for Future Review

A major part of our review is the analysis of the test lives provided by Conduent (formerly Buck Consultants). We have included exhibits in our report which summarize the detailed analysis of these sample test cases for the PERS and TRS DCR Plans, as well as a comparison of the results between Conduent and GRS. We wish to thank the staff of the State of Alaska Treasury Division and Conduent without whose willing cooperation this review could not have been completed.

Since the last valuation, additional documentation regarding the OPEB plan was developed. Based on this, and the summary found in Section 5 of the Conduent report, we are able to state that the contribution rates shown for the DCR retiree medical portion of the plan are an adequate and appropriate recognition of the costs of this plan. As discussed further in this report, we would encourage Conduent to provide more details on the Employer Group Waiver Program (EGWP) and its implications on future valuation results.

Sincerely,

Gabriel, Roeder, Smith & Company

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

Paul T. Wood, ASA, FCA, MAAA
Consultant

cc: Ms. Judy Hall

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SECTION 1

EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

Gabriel, Roeder, Smith & Co. was engaged by the Alaska Retirement Management Board (ARMB) to review the Actuarial Valuations as of June 30, 2016, for the Public Employee's Retirement System Defined Contribution Retirement (DCR) Plan and the Teachers' Retirement System (TRS) Defined Contribution Plan.

This report presents our findings in the following areas:

- General Approach
- Pension Assumptions and Benefits
- Actuarial Valuation Methods and Procedures
- Contribution Rate Determination
- Actuarial Valuation Report
- Potential Areas for Future Review
- Summary and Conclusions

In general, we found that Conduent's actuarial results and reports were reasonable and find the assumptions consistent with generally accepted actuarial practice. In this audit report we do make note of certain items which merit further review in the course of the upcoming experience study.

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Monthly conference calls initiated by Conduent and conducted between Conduent and GRS were made this year and contributed greatly to resolving issues more quickly and thoroughly. Those issues, even if resolved, are highlighted in this report.

KEY FINDINGS FROM THE AUDIT OF THE JUNE 30, 2016 VALUATIONS

Purpose of the audit

One of the primary purposes of the audit is to partner with the Alaska Retirement Management Board (ARMB) in their task of recommending the contribution rates for the various plans. Below is a brief summary of our audit findings.

What plan is to be valued?

Over the past few years, plan design work was underway for the DCR retiree medical plan. In July of 2016, a formal plan document was adopted. Thus, the contribution rates in the 2016 Conduent report represent the first time in which the contribution rates are based on actual plan design.

Conduent described the new plan design in Section 5.1 of their respective reports. One of the largest changes in the new plan design is the participation in an Employer Group Waiver Program or EGWP. According to Conduent, participating in the EGWP will result in significant savings over the current RDS arrangement. Starting in 2018, the assumed RDS savings are increased by 60 percent to account for EGWP. Furthermore, the valuation assumes these savings will continue in perpetuity. We would recommend that Conduent provide further education and details of EGWP. This includes the source of the large savings, details on the funding of the various subsidies, and the likelihood that the savings will be permanent.

Assumptions and Methodology

The demographic assumptions were unchanged for PERS and TRS valuations through the test life review completed with this audit; we generally matched the results of Conduent. The assumptions were incorporated correctly.

Conduent is now using the actual retiree data in valuing the retiree health care benefits. They were previously using what they termed "Proxy" data. Use of the actual data, as supplied by the Aetna data warehouse, has changed the valuation results for the retiree health care plans and will be discussed in further detail in this report.

In addition to the fix implemented in the final results, we recommend that retiree healthcare elections and eligibility for the premium subsidy be a part of the census data collection process in future years. We recommend that the election rates, dual coverages, and insurance coverages be studied in the upcoming experience study.

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Decrement Gain/(Loss)

As a part of the annual audit, we take a historical look at the gains and losses on the accrued liability. Gains and losses may measure "how closely" experience matches the actuarial assumption. Recurring gains or losses may indicate an assumption that is not meeting the actual experience for this population. For PERS, for the second time in at least five years, termination was a source of gain. Mortality and disability also continue to be sources of gains. For TRS, termination, mortality and disability continue to be a source of gains year after year.

As was recommended last year, Conduent has added an assumption to account for the continuing rehire loss. That assumption has been added to the normal cost effective for 7/1/2016, thus there will be a loss shown below on the gain/loss charts to cover the period 7/1/2015 through 6/30/2016.

We had recommended that "other" be explained when it is in one of the largest categories. Conduent provided additional details for each plan regarding the "other" gains and losses. The large "Other" loss on the healthcare side, according to Conduent, is due to the updated understanding of the retiree medical contributions which were clarified in the adopted plan design.

Conduent also provided us with additional details on the DCR occupational death gain that we have been seeing the last few years. Conduent confirmed with the State that there have been deaths but non-occupational ones, so there is not a data issue. Based on this, Conduent suggested, and we agree, that the occupational death assumption will need to be reviewed, most likely as part of next years' experience review.

The gain/(loss) analysis in the valuation reports show the following trends:

TOTAL HEALTHCARE AND PENSION---PERS DCR Gain/(Loss) In thousands					
	2016	2015	2014	2013	2012
Mortality	$955	$968	$716	$981	$672
Termination	1,154	1,155	(973)	(1,149)	(828)
Disability	1,715	1,067	1,360	788	1,036
New Entrants	(1,695)	(1,899)	(2,513)	(2,466)	(848)
Rehires	(1,054)	(822)	(878)	(738)	(154)
Other Demographic Experience	(3,935)	(317)	1,160	(788)	(117)
Salary Increases	24	55	(8)	(7)	32
Medical Claims Costs	(11,515)	5,699	4,879	2,887	959
EGWP Impact	19,559	N/A	N/A	N/A	N/A
Total Gains/(Losses)	$5,208	$5,906	$3,743	($492)	$752

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TOTAL HEALTHCARE AND PENSION---TRS DCR Gain/(Loss) In thousands					
	2016	2015	2014	2013	2012
Mortality	$36	$33	$25	$24	$26
Termination	1,309	204	2,096	1,410	238
Disability	137	117	40	40	40
New Entrants	(1,176)	(787)	(1,103)	(936)	(286)
Rehires	0	(1,314)	(1,010)	(804)	(269)
Other Demographic Experience	(968)	19	(62)	(1,067)	(227)
Salary Increases	0	0	1	0	0
Medical Claims Costs	(3,632)	1,955	1,624	1,038	311
EGWP Impact	6,400	N/A	N/A	N/A	N/A
Total Gains/(Losses)	$2,106	$227	$1,611	($295)	($167)

HEALTHCARE ONLY---PERS DCR Gain/(Loss) In thousands				
	2015	2014	2013	2012
Mortality	($17)	($13)	$3	$5
Termination	1,146	(1,013)	(1,176)	(784)
Disability	(60)	161	84	47
New Entrants	(1,786)	(2,360)	(2,326)	(729)
Rehires	(795)	(838)	(720)	(140)
Other Demographic Experience	701	1,035	(834)	(389)
Medical claims cost	5,699	4,879	2,887	959
Total Gains/(Losses)	**$4,888**	**$1,851**	**($2,082)**	**($1,031)**

HEALTHCARE ONLY---TRS DCR Gain/(Loss) In thousands				
	2015	2014	2013	2012
Mortality	($17)	($24)	($17)	($5)
Termination	206	2,095	1,407	238
Disability	(16)	(17)	(11)	(4)
New Entrants	(786)	(1,099)	(932)	(281)
Rehires	(1,313)	(1,006)	(802)	(267)
Other Demographic Experience	20	(63)	(1,069)	(244)
Medical claims cost	1,955	1,624	1,038	311
Total Gains/(Losses)	**$49**	**$1,510**	**($386)**	**($252)**

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As shown above, the healthcare portion of the PERS and TRS plans (separated from the Occupational Death and Disability benefits) had net gains for the past three years. Previously, this had been driven by favorable experience on the medical claims. In 2016, the gain was mainly attributable to the valuation of the EGWP subsidies. This large gain was offset by the significant medical claims loss. Commencing with the 2016 valuation Conduent used actual retiree data to value to retiree health care liabilities. In the course of reviewing the data, Conduent saw that there was a fairly significant amount of dual coverage. Conduent' s model then changed to recognize there are much fewer people over which to spread the claim costs. Therefore, a loss on the medical claims was generated.

Claim costs were estimated based on the claim costs in the defined benefit plan. Conduent made adjustments to these claim costs to reflect the different population and differing plan provisions. We concur with this approach, but have not been provided support for the modification of this adjustment value.

TEST LIFE OBSERVATIONS

As part of our usual audit process we identified three potential issues, two of which have been resolved and one that Conduent has agreed to change for the 2017 valuation:

Benefit for a Surviving Spouse of a Disabled Member

Conduent added a benefit for the surviving spouse of a disabled member. The benefit is equal to 40% of compensation payable until the stop date provided by the client.

COLA for Surviving Spouse of a Disabled Member for PERS and TRS

Conduent is valuing a COLA equal to 75% of the CPI. We raised the issue as to whether or not this COLA should be 50% of CPI and not 75% of CPI. Conduent responded with the following:

> *It appears we have a difference in interpretation of the plan as to how to treat the survivor of an occupationally disabled participant who dies – does the survivor receive a disability benefit (which is based on 75% of CPI and an immediate payment form), or is it an occupational death benefit (which would be based on 50% of CPI and a deferred benefit). We will confirm with the State.*

Conduent received confirmation from the State that the COLA should be based on 50% of CPI and will fix this as part of the 2017 valuation. We have reflected this in our test life checking and the impact is highlighted in yellow on page 21.

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Death During Disability for Other and PF test lives

As part of our review, we identified that in the death during disability decrement for the Other and PF test lives, the marriage percent was being double counted. Conduent reviewed this issue and corrected it early on in the process.

PERS/TRS Retiree Healthcare

We identified a new valuation approach that applies specifically to the liability for the spousal benefits. Conduent responded that the main reason for the difference is that they learned last year as a part of the DCR plan design work that younger covered spouses and dependents of Medicare/subsidy-eligible retirees would also fall under the retiree's level of subsidy. Furthermore, they stated that the statute language was not entirely clear and that they worked with the State to verify the intent.

Conduent implemented this change along with the adopted 2016 design, which included EGWP effective in 2018 based upon initial estimates in work done last spring.

SUMMARY OF TEST LIFE REVIEW

We have included as a part of this report a detailed test life results summary.

- We matched the present value of benefits closely in total on test lives submitted for PERS Other, PERS-PF and TRS DCR plans, with the benefit exceptions noted above. We have included exhibits in Section 4 of the report which summarize the differences in calculations by decrement for the test lives analyzed. Differences between actuarial firms will always occur due to system differences and other nuances in the calculations

- For the retiree healthcare benefits, the math and actuarial calculations are consistent with the plan as described in the updated plan document.

The following table shows the newly identified issues and the resolution of the issue.

Newly Identified Issues for 2016				
Issue	**GRS Recommendations**	**Plan**		**Conduent Comments**
1. Death During Disability	**Revise to not double count marriage assumption**	**DCR PERS**	✓	**Conduent agreed to change and was correctly revised in 2016**
2. COLA for Death during Disability	**Confirm whether or not COLA should be 50% of CPI and not 75% of CPI**	**DCR PERS – Other and TRS**	✓	**Conduent confirmed with the State that the 50% of CPI COLA is correct and will fix this in the 2017 valuation.**
3. PERS and TRS Healthcare	**Review spousal benefit calculation**	**DCR PERS, TRS**	✓	**Conduent verified that the subsidy is provided to non-Medicare spouses while the member is Medicare eligible.**

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SECTION 2

GENERAL APPROACH

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General Approach

Gabriel, Roeder, Smith & Co. was charged with reviewing the actuarial valuations of TRS and PERS DCR plans.

We requested a number of items from Conduent in order to perform the actuarial review:

1. We received the draft reports on February 17, 2017, for the Defined Contribution Retirement Plans. In January of 2017, we received valuation data for pension and healthcare for both plans, and we received the pension and healthcare test lives for the PERS and TRS DCR plans.

In performing our review, we:

1. Reviewed actuarial assumptions – we checked to see if they were consistent, comprehensive, and appeared reasonable.
2. Reviewed the actuarial valuation reports as of June 30, 2016, for completeness, GASB compliance and a review of financial determinations.
3. Reviewed, in detail, the sample members provided us – This provided us with a perspective on the actuarial process utilized by Conduent with respect to the plan and allowed us to review the valuation methods and procedures.
4. Identified areas for future review.

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Key Actuarial Concepts

An actuarial valuation is a detailed statistical simulation of the future operation of a retirement system using the set of actuarial assumptions adopted by the Board. It is designed to simulate all of the dynamics of such a system for each current system member including:

1. Earning future service and making contributions,
2. Receiving changes in compensation,
3. Leaving the system through job change, disablement, death, or retirement, and
4. Determination of and payment of benefits from the System.

This simulated dynamic is applied to each active member of the System. It results in a set of expected future benefit payments to that member. Bringing those expected payments to present value, at the assumed rate of investment return, produces the Present Value (PV) of future Benefits for that member. In like manner, a PV of future salaries is determined.
The PV of future benefits and the PV of future salaries for the entire System are the total of these values across all members. The remainder of the actuarial valuation process depends upon these building blocks.

Once the basic results are derived, an actuarial method is applied in order to develop information on contribution levels and funding status. An actuarial method splits the PV of future benefits into two components:

1. PV of Future Normal Costs, and
2. Actuarial Accrued Liability ("AAL").

The actuarial method in use by the State of Alaska is known as the Entry Age Normal (EAN) method. Under this method, benefits are projected to the assumed occurrence of future events based on future salary levels and service to date. The Normal Cost is the present value of benefits to be earned for the current year while the Actuarial Accrued Liability (AAL) is the present value of benefit earned for all prior years.

For TRS and PERS DCR plans, the actuarial present value of future benefits applies to the following benefits:

- Occupational Disability benefits
- Occupational Death benefits
- Retiree Medical benefits

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The retiree medical benefits are based on potential future retiree health care benefits, while the others are a type of post-employment income replacement benefit, based on salary. For the medical benefits, estimates must be made of the future health care costs. This is done by determining current per capita health care claim costs by age of retiree, and projecting them into the future based on anticipated future health care inflation.

Since the DCR plan is relatively new and based on members hired after 2006 with different health plan rules, Conduent has used the claim costs from the defined benefit plan with adjustments for this particular population. Conduent has indicated that it is the intent to have the DCR medical plan designed at 96.9 percent of the value of the Defined Benefit retiree medical plan and 88.8 percent of the value of the Defined Benefit prescription drug plan. We concur with this approach generally, but have not been provided support for this adjustment value.

SECTION 3

REVIEW OF ASSUMPTIONS

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REVIEW OF ASSUMPTIONS

Conduent released an experience study in 2014 and the Board approved a new assumption set to be used beginning with the actuarial valuation as of June 30, 2014.

GENERAL

In our review of the testlives as well as the report we confirmed that the assumptions shown in the report were the assumptions used in the PERS and TRS DCR valuations.

BACKGROUND

The findings below are based on the detailed review of the following test lives summarized in exhibits at the end of Section 4:

Pension Plans

- PERS Peace Officer/Firefighter (PERS-PF) : One active and one disabled retiree e
- PERS – Other: One active and one disabled retiree
- TRS: One active

Medical Plans

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- PERS Peace Officer/Firefighter (PERS-PF) : One active
- PERS – Other: One active
- TRS: One active

Note that the active test lives analyzed are not necessarily exposed to all of the possible benefits under the plans (i.e. already beyond the eligibility period for certain benefits, or not eligible for particular benefits). Therefore, findings may occur for these other benefits in future audits depending on the set of test lives chosen for review at that time. Also, the impact for any one test life may not be representative of the impact on the total plan.

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 investment return and assumed rates of future salary increase.

Economic assumptions are normally defined by an underlying inflation assumption. Conduent has cited 3.12 percent as its inflation assumption. In recent years, long-term inflation forecasts have been declining. With the decline, the 3.12 percent inflation assumption is now at the higher

end of the generally accepted range. Many of our clients at 3.00 percent inflation are choosing to move down to 2.75 percent or lower. In fact, in a recent survey of eight different investment consulting firms, the inflation assumptions used as part of their Capital Asset Pricing Model were between 2.11 percent and 2.50 percent.

Investment Return Assumption

The nominal investment return assumption is 8.00%. The assumption is net of all investment and administrative expenses. This net return assumption implies that the Trust must earn more than 8% in order to cover the administrative expenses. The rate of 8.00% is no longer commonly seen within the public sector. Combined with the 3.12% inflation assumption, this yields a 4.88% real net rate of return.

Although Conduent's analysis supported an 8.00% return, this analysis did not seem in line with what we have seen from our capital market assumption modeler as well as models from other actuaries. The discount rate is one of the most important assumptions used in the valuation. If investment returns are less than expected, the asset losses can dwarf the impact of the liability gains and losses due to demographic experience.

Retiree Medical Plan Assumptions

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The following assumptions were used in the June 30, 2016, valuations for the DCR plans. Relative value refers to the value of the DCR benefits compared to those provided by the Defined Benefit retiree plan. These assumptions changed after the plan document was adopted in July 2016.

- Relative value of medical benefits is 96.9%;
- Relative value of pharmacy benefits is 88.8%;
- Member cost-sharing offset is 0.2%, reflecting cost equality in sharing future trend between retirees and the plan:
- Impact of Medicare Coordination under new plan design is 66.2% for Medicare Part A and B Medical.

The basis for this discount of 3.1 percent rests with higher initial copays, deductibles, out of pocket limits and member cost sharing compared to the DB medical plan. As experience emerges we recommend the discount be tested to ensure this assumption is supporting the liabilities of the plan.

The impact of Medicare Coordination is a new assumption this year based on the newly adopted plan document. Through our test life checking, we identified that this assumption was not disclosed in the valuation report. Conduent agrees and will add the assumption to Section 5.3 of the report.

In the June 30, 2012, valuation, the assumption change on cost-sharing results was the single most important factor in the increase in the contribution requirements. As noted in the Executive Summary, we have not been provided enough documentation on this, the relative value adjustment, or the Medicare Coordination adjustment to conclude that the revised June 30, 2016, assumptions currently in use are appropriate for developing the costs of the retiree medical plan.

Other Assumptions

Since this is a relatively new plan, the expectation is that payroll growth will be high initially and then level out. The assumption used in the valuation is that payroll will grow at a rate of 3.63 percent per year. In 2016, the covered payroll grew 12 percent compared to 14 percent in the prior year. The low growth in 2013 may have been due to salaries not increasing significantly or due to turnover and hiring new entrants at a lower pay level.

Valuation year ending June 30	PERS and TRS Covered Payroll Growth
2016	12%
2015	14%
2014	14%
2013	5%
2012	20%
2011	17%
2010	34%
2009	55%
2008	94%

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SECTION 4

REVIEW OF ACTUARIAL VALUATION METHODS AND PROCEDURES

INCLUDES SAMPLE LIFE REVIEW

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REVIEW OF ACTUARIAL VALUATION METHODS AND PROCEDURES

I. ***Background***

An actuarial valuation is a detailed statistical simulation of the future operation of a retirement system using the set of actuarial assumptions adopted by the Board.

The actuarial values generated from this process are based not only on these assumptions, but also on the additional assumptions built into each actuarial firm's pension valuation software.

Our scope for performing the review did not include a complete replication of the valuation results as determined by Conduent at June 30, 2016. Rather, we reviewed a number of sample test lives from Conduent in great detail, and made our determinations as to whether the methods and assumptions being employed were being done so properly. We also reviewed the report in order to examine the aggregate results and conclusions of this actuarial valuation.

Though this approach is not intended to meet the rigors of a full scale replication of results – it still serves as a strong indicator of the appropriateness of the assumptions and methods being used to value the liabilities and determine the costs for these plans.

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II. ***Process:***

Our review process can be summarized as follows:

Computation: Valuation Liabilities

We analyzed test cases to compare the Actuarial Liability under the EAN funding method for the test cases of the PERS and TRS DCR Plans. As a starting point, we wanted to first replicate Conduent's test case liabilities by using their assumptions and methods to ensure that the computations were in sync with the descriptions listed in the valuation report.

When conducting an actuarial audit, and reviewing the testlives, we look at the projected benefits at each age for each decrement type. We also look at the component of the benefit (final average earnings and years of service). This is critical to understanding what the valuation system is actually valuing and making sure that the valuation is not "right for the wrong reasons", (meaning, errors could occur in two different directions making total liabilities approximate a correct value.)

We also review the construction of the commutation functions- the varying probabilities for each decrement and the discounting to the valuation date.

III. Actuarial Method:

Findings:

The actuarial method used for producing PERS and TRS DCR June 30, 2016, Actuarial Valuations is known as the Entry Age Normal (EAN) Method. Under this method, benefits are projected to the assumed occurrence of future events based on future salary levels and service to date. The Normal Cost is the present value of benefits to be earned for the current year while the Actuarial Accrued Liability (AAL) is the present value of benefit earned for all prior years.

Conclusion:

The EAN method is the most commonly used method in the public sector. The EAN method tends to produce the most stable costs- a tool widely appreciated for its budgeting purposes.

To account for the Part D subsidy in the retiree medical plan, a different set of numbers may need to be disclosed for GASB reporting purposes (as opposed to funding purposes). This is a slightly conservative approach given participation in the EGWP. EGWP subsidies can be used to offset the liabilities of the plan for GASB accounting purposes.

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IV. Actuarial Calculations:

We reviewed sample test cases used for the DCR June 30, 2016, valuation draft reports. In order to accomplish this, we requested a number of sample cases from Conduent with intermediate statistics to assist us in analyzing the results.

We combined this with our understanding of the plan provisions in an attempt to analyze the liability values produced by Conduent for these sample cases only.

Conclusion and Results:

As part of our usual audit process we identified three potential issues, two of which have been resolved and one that Conduent has agreed to change for the 2017 valuation:

COLA for Surviving Spouse of a Disabled Member for PERS and TRS

Conduent is valuing a COLA equal to 75% of the CPI. We raised the issue as to whether or not this COLA should be 50% of CPI and not 75% of CPI. Conduent responded with the following:

It appears we have a difference in interpretation of the plan as to how to treat the survivor of an occupationally disabled participant who dies – does the survivor receive a disability benefit (which is based on 75% of CPI and an immediate payment form), or is it an occupational death benefit (which would be based on 50% of CPI and a deferred benefit). We will confirm with the State.

Conduent received confirmation from the State that the COLA should be based on 50% of CPI and will fix this as part of the 2017 valuation. The impact on the test lives is highlighted in yellow on page 21.

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Death During Disability for Other and PF test lives

As part of our review, we identified that in the death during disability decrement for the Other and PF test lives, the marriage percent was being double counted. Conduent reviewed this issue and corrected it early on in the process.

PERS Active Healthcare

We identified an issue that applies specifically to the liability for the spousal benefits. Conduent responded that the main reason for the difference is that they learned last year as a part of the DCR plan design work that younger covered spouses and dependents of Medicare/subsidy-eligible retirees would also fall under the retiree's level of subsidy. Furthermore, they stated that the statute language was not entirely clear and that they worked with the State verify the intent.

Conduent implemented this change along with the adopted 2016 design, which included EGWP effective in 2018 based upon initial estimates in work done last spring.

The exhibits that follow provide a comparison of the calculations by decrement provided to us from Conduent against our replication of those benefits as we interpret them from the plan provisions and assumptions. We completed this detail for all active test lives under the PERS and TRS DCR and for one disabled test life.

DEATH AND DISABILITY PLANS

For all plans, the active and disabled test lives actuarial present value match was within a percent on the test case shown. This would be considered as an overall match for purposes of the valuation. The difference for PERS Other and TRS active test cases, which are highlighted in the exhibit below, are attributable to the application of the COLA discussed throughout this report.

RETIREE HEALTH PLANS

For all of the retiree health plans, the test life actuarial present value match on the retirement benefits decrement for active members was within a percent. This is considered a reasonable match, as the retirement benefit decrement consists of approximately 90% of the total actuarial present value.

We conclude that the test lives are calculated correctly using the underlying assumptions except for the issue with the COLA for the surviving spouse if death occurred while disabled:

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ALASKA RETIREMENT MANAGEMENT BOARD

Actuarial Review of DCR Pension and Health Plans - June 30, 2016

Comparison of Present Value of Benefits - **DCR PERS and TRS Pension**

Actives	**Test Case 1 - PERS Other**		
Basic Data:		*Basic Data:*	
Sex	Male	Tier	4
Current Age	32.55	Full time %	100%
Current Credited Service	4.82		
Present Value of Benefits (PVB)	**GRS***	**Conduent**	**% Diff**
Disability:			
DCR	554.13	554.10	0.0%
DCR Death during Disability	70.77	81.23	-12.9%
Total Disability PVB	**624.90**	**635.33**	**-1.6%**
Death:			
DCR - married only	562.86	562.86	0.0%
Total Death PVB	**562.86**	**562.86**	**0.0%**
GRAND TOTAL PVB	**1,187.76**	**1,198.19**	**-0.9%**

Actives	**Test Case 2 - PERS PF**		
Basic Data:		*Basic Data:*	
Sex	Male	Tier	4
Current Age	39.00	Full time %	100%
Current Credited Service	4.11		
Present Value of Benefits (PVB)	**GRS***	**Conduent**	**% Diff**
Disability:			
DCR Deferred - single	408.01	408.02	0.0%
DCR Deferred - married	3,753.30	3,753.37	0.0%
DCR Immediate	3,134.29	3,134.39	0.0%
DCR Imm. Death during Disable	530.27	530.29	0.0%
Total Disability PVB	**7,825.87**	**7,826.07**	**0.0%**
Death:			
DCR - married only	2,006.12	2,006.12	0.0%
Total Death PVB	**2,006.12**	**2,006.12**	**0.0%**
GRAND TOTAL PVB	**9,831.99**	**9,832.19**	**0.0%**

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Actives	**Test Case 3 - TRS**		
Basic Data:		*Basic Data:*	
Sex	Female	Tier	3
Current Age	29.79	Full time %	100%
Current Credited Service	6.30		
Present Value of Benefits (PVB)	**GRS***	**Conduent**	**% Diff**
Disability:			
DCR	338.40	338.40	0.0%
DCR Death during Disability	11.06	13.17	-16.0%
Total Disability PVB	**349.46**	**351.57**	**-0.6%**
Death:			
DCR - married only	71.17	71.14	0.0%
Total Death PVB	**71.17**	**71.14**	**0.0%**
GRAND TOTAL PVB	**420.63**	**422.71**	**-0.5%**

Benefits - Conduent Valuation Terminology	
Disability:	
DCR Deferred Ben	Disability benefit payable upon eligibility for retirement (based on ret plan formula)
DCR Immed Ben	Disability benefit payable until eligible for normal retirement (based on ret plan formula)
DCR	Occupational base disability benefit based on percent of pay (40% of salary)
DCR Death during Disable	Death benefit payable upon death while on disability
Death:	
DCR - married only	Occupational death benefit payable as annuity to spouse

** GRS' audit of Conduent's calculation includes review of the benefit amounts, annuity values, assumptions and other factors related to the PVB calculation at each projected age. Differences may exist due to different interpretations of the statutes, as well as additional items as discussed throughout this audit report.*

ALASKA RETIREMENT MANAGEMENT BOARD

Actuarial Review of DCR Pension and Health Plans - June 30, 2016

Comparison of Present Value of Benefits - **DCR PERS and TRS Retiree Health**

Actives	**Test Case 1 - PERS Other**		
Basic Data:		*Basic Data:*	
Sex	Male	Tier	4
Current Age	32.55	Full time %	100%
Current Credited Service	4.82		
Present Value of Benefits (PVB)	**GRS***	**Conduent**	**% Diff**
Retirement:			
Post 65 DCR <Member>	2,484.27	2,462.52	0.9%
Post 65 DCR <Spouse>	2,909.44	2,894.54	0.5%
Contrib DCR <Member>	(207.06)	(206.28)	0.4%
Contrib DCR <Spouse>	(258.85)	(259.37)	-0.2%
Post 65 Part D DCR <Member>	413.70	411.35	0.6%
Post 65 Part D DCR <Spouse>	320.91	319.08	0.6%
Total Retirement PVB	**5,662.41**	**5,621.84**	**0.7%**

Actives	**Test Case 2 - PERS PF**		
Basic Data:		*Basic Data:*	
Sex	Male	Tier	4
Current Age	39.00	Full time %	100%
Current Credited Service	4.11		
Present Value of Benefits (PVB)	**GRS***	**Conduent**	**% Diff**
Retirement:			
Post 65 DCR <Member>	4,767.99	4,776.61	-0.2%
Post 65 DCR <Spouse>	6,191.12	6,230.10	-0.6%
Contrib DCR <Member>	(447.36)	(447.40)	0.0%
Contrib DCR <Spouse>	(635.45)	(638.70)	-0.5%
Post 65 Part D DCR <Member>	797.67	801.69	-0.5%
Post 65 Part D DCR <Spouse>	704.50	707.57	-0.4%
Total Retirement PVB	**11,378.47**	**11,429.87**	**-0.4%**

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Actives	**Test Case 3 - TRS**		
Basic Data:		*Basic Data:*	
Sex	Female	Tier	3
Current Age	29.79	Full time %	100%
Part-Time Credited Service	6.30		
Present Value of Benefits (PVB)	**GRS***	**Conduent**	**% Diff**
Retirement:			
Post 65 DCR <Member>	3,198.82	3,172.71	0.8%
Post 65 DCR <Spouse>	2,073.23	2,053.72	0.9%
Contrib DCR <Member>	(267.14)	(264.77)	0.9%
Contrib DCR <Spouse>	(173.38)	(171.61)	1.0%
Post 65 Part D DCR <Member>	527.38	524.96	0.5%
Post 65 Part D DCR <Spouse>	339.44	337.59	0.5%
Total Retirement PVB	**5,698.34**	**5,652.60**	**0.8%**

Benefits - Conduent Valuation Terminology	
Retirement:	
Post 65 DCR <Member>	Base benefit paid to employee while employee is at least 65
Post 65 DCR <Spouse>	Base benefit paid to spouse while employee is at least 65
Contrib DCR <Member>	Employee pre-retirement contributions
Contrib DCR <Spouse>	Spouse pre-retirement contributions
Post 65 Part D DCR <Member>	Employee post-age 65 Medicare Part D reimbursement
Post 65 Part D DCR <Spouse>	Spouse post-age 65 Medicare Part D reimbursement

** GRS' audit of Conduent's calculation includes review of the benefit amounts, annuity values, assumptions and other factors related to the PVB calculation at each projected age. Differences may exist due to different interpretations of the statutes, as well as additional items as discussed throughout this audit report.*

ALASKA RETIREMENT MANAGEMENT BOARD

Actuarial Review of DCR Pension and Health Plans - June 30, 2016

Comparison of Present Value of Benefits - **DCR PERS Disability**

Retirees	**Test Case 4 - PERS Other**		
Basic Data:		*Basic Data:*	
Sex	Male	Tier	4
Current Age	50.19	Type	Disability
Annual Benefit	14,814.00	Stop date	4/30/2031
	GRS*	**Conduent**	**% Diff**
PVB	128,634.22	128,659.00	0.0%
GRAND TOTAL PVB	**128,634.22**	**128,659.00**	**0.0%**

Retirees	**Test Case 5 - PERS PF**		
Basic Data:		*Basic Data:*	
Sex	Male	Tier	4
Current Age	35.55	Type	Disability
Annual Benefit	35,462.04	Stop date	12/31/2045
	GRS*	**Conduent**	**% Diff**
PVB	583,292.52	587,649.00	-0.7%
GRAND TOTAL PVB	**583,292.52**	**587,649.00**	**-0.7%**

** GRS' audit of Conduent's calculation includes review of the benefit amounts, annuity values, assumptions and other factors related to the PVB calculation at each projected age. Differences may exist due to different interpretations of the statutes, as well as additional items as discussed throughout this audit report.*

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SECTION 5

REVIEW OF CONTRIBUTION RATE DETERMINATION

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REVIEW OF CONTRIBUTION RATE DETERMINATION

GRS was to analyze the funding method being used and verify its computation. The goal here is to start with the Actuarial Accrued Liabilities and the Normal Costs that are developed from the data and valuation software and compare this to the Assets in the system. The difference between the two, the Unfunded Actuarial Accrued Liability (UAAL) in conjunction with the Normal Cost forms the basis of the contributions that the Actuary recommends the system make in order to ensure that benefits can be provided for current and future retirees.

FINDINGS:

The calculations were reasonable and consistent with actuarial practice.

Conduent has determined two different compensation amounts-the "valuation" compensation which is the compensation used to determine future plan benefits and the liabilities for those benefits. This compensation annualizes permanent-part timer pay. The "rate" payroll is the payroll upon which the contributions are expected to be made, and does not annualize permanent part timer pay. GRS was able to replicate both forms of compensation.

Since the retiree medical plan has been fully described and adopted, we are able to state that these contribution rates support the plan.

DRAFT

SECTION 6

REVIEW OF ACTUARIAL VALUATION REPORT

DRAFT

REVIEW OF ACTUARIAL VALUATION REPORT

GASB DISCLOSURE:

For purposes of Plan Reporting for the fiscal year ending June 30, 2016, Alaska PERS and TRS will need to follow the reporting guidelines set out in GASB No. 67, which is in effect for Plan Years beginning after June 15, 2013. As stated in the Conduent reports, Per KPMG, the new accounting standards under GASB 67 are not applicable to the Occupational Death & Disability benefits under this Plan. The Plan may be subject to GASB Statement No. 73 reporting requirements which extend the provisions of GASB Statement No. 68 to plans that do not have a qualified trust, as defined by GASB. This statement will be effective for fiscal years beginning after June 15, 2016. We recommend that Conduent confirm the applicability of this GASB statement with KPMG. GRS did not review the GASB Nos. 67 or 68 reports but did review the GASB No. 43 disclosures found in the funding reports.

Findings:

No issues to report.

Conclusion:

DRAFT

Conduent has indicated that they calculate the actuarial present value of assumed Part D Retiree Drug Subsidy (RDS) and the EGWP payments separately. For funding purposes, the total healthcare liability is offset by the applicable RDS and EGWP amounts to conform to the ARMB's current policy of funding discounted net cash flow. Figures used for GASB 43 purposes have been illustrated without the RDS subsidy, which we assume also includes the CMS-related reimbursement for pharmacy as a result of the EGWP. Conduent could consider reflecting only the two remaining years of the RDS subsidy in the GASB accounting disclosures and not including the impact of EGWP.

VALUATION REPORT:

GRS reviewed the June 30, 2016, DCR valuation reports for scope as well as content to determine if actuarial statistics were being reflected fairly and if the details of the plan were being correctly communicated.

Findings:

- We consider the scope and content of Conduent's report to be effective in communicating the financial position and contribution requirements of the PERS and TRS DCR plans. We believe it is in accordance with standard actuarial reporting methodologies for public sector systems.

- The accrued liability pertaining to the Part D RDS that is disclosed throughout the report includes two years of the RDS and the CMS-related reimbursement for pharmacy as a result of the EGWP. Conduent has agreed to add a footnote and provide some additional disclosure.

- Some plans are beginning to incorporate increased investment risk metrics in their reports. Furthermore, in December 2014, the actuarial Standards Board released an discussion draft of a proposed actuarial standard of practice titled Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions. In the discussion draft, risk is defined as "the potential of future deviation of actual results from expectations derived from actuarial assumptions"

  The discussion draft would require the actuary to include an assessment of significant risks such as investment risk, interest rate risk, asset/liability mismatch risk, longevity risk, and other risks. The risks would be assessed through stress testing, scenario testing, and sensitivity testing and stochastic modeling.

  For example, what would the change be to the contribution requirement if the plan experienced a -10 percent investment return on assets? This could provide added value to the Alaska Retirement Management Board.

Conclusion:

DRAFT

- We recommend and Conduent has agreed to provide some clarification on the Medicare Part D RDS amounts shown throughout the report.

FOR ALL PLAN VALUATION REPORTS WE RECOMMEND THE FOLLOWING:

- For the Cadillac tax, disclose the method of the computation and the estimated dollar amount of impact.
  - Conduent has disclosed a discussion of their method and an estimated dollar amount of the Cadillac tax.
- Obtain the actual retiree medical plan data rather than using assumptions on the pension plan data.
  - Conduent is now using actual retiree data for the retiree medical plan.
- Provide a more detailed breakout of "other" in the gain/loss by source.
  - Conduent has added explanations in the footnotes.
- When programming changes are referenced provide a description and impact summary of the programming changes made.
  - Conduent will include this in the final reports, if applicable.

CONDUENT

State of Alaska Retirement Systems

Valuation Results as of June 30, 2016

PERS / TRS / JRS / NGNMRS

Presentation to the ARMB

April 20, 2017

Conduent HR Services

Agenda

- Valuation Background
- Key Results – PERS & TRS
- Key Results – JRS & NGNMRS
- Next Steps

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An actuarial valuation is generally performed on each retirement System annually as of the end of the fiscal year*. The main purposes of the actuarial valuations detailed in this report are:

1. To determine the Employer/State contributions necessary to meet the ARMB's funding policy for the Systems;
2. To disclose the funding assets and liability measures as of the valuation date;
3. To disclose the healthcare accounting measures for the System required by GASB No. 43 for the last fiscal year;
4. To review the current funded status of the Systems and assess the funded status as an appropriate measure for determining future actuarially determined contributions;
5. To compare actual and expected experience under the Systems; and
6. To report trends in contributions, assets, liabilities, and funded status over the last several years.

* Valuations for JRS and NGNMRS, and EPORS are performed once every two years.

Valuation Process

The process uses various inputs to develop certain critical results.

Over the short term, contributions are determined by the actuarial valuation based upon estimated investment return, benefits and expenses using assumptions and methods recommended by the actuary and adopted by the ARMB.

Over the long term, contributions are adjusted to reflect actual investment return, benefits and expenses.

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Inputs

Member Data

Asset Data

Benefit Provisions

Actuarial Assumptions

Funding Methodology

Outputs

Actuarial Value of Assets

Actuarial Accrued Liability

Net Actuarial Gain/Loss

Funded Ratio

Contributions (ER and State Assistance)

Projections

Key Observations from FY2016 Valuations

The actuarial valuation is done each year to refine the estimates the actuary developed in the prior valuation and reflect the actual events that occurred. This past year, as is common, events happened that were either not anticipated or were different from expected and materially impacted the results:

More significant events causing an impact:

- FY16 investment return was (0.7)%, which was less than the assumed return of 8.0%
- For FY16, the actual Post Retirement Pension Adjustment (PRPA) was 0.33%, which was less than the assumed increase of 3.12%
- Retiree medical claims were less than expected
- Changes in the development of the per capita claims cost due to using real retiree health plan enrollment data
- DCR retiree medical plan design was adopted which resulted in lower projected costs compared to the previous valuation

Less significant, yet still material, events causing an impact:

- Salary increases were less than expected
- More deaths than expected

Results – Funded Status

CONDUENT

PERS & TRS

Funded Status as of June 30 ($ in 000s)	PERS 2015	PERS 2016	TRS 2015	TRS 2016
DB - Pension				
a. Actuarial Accrued Liability	$ 13,337,929	$ 13,633,033	$ 7,051,724	$ 7,159,788
b. Valuation Assets	8,931,160	9,056,662	5,422,651	5,428,687
c. Funded Ratio based on Valuation Assets (b)/(a)	67.0%	66.4%	76.9%	75.8%
DB - Healthcare				
a. Actuarial Accrued Liability	$ 7,310,734	$ 7,736,457	$ 2,677,393	$ 2,747,836
b. Valuation Assets	7,242,299	7,411,330	2,686,272	2,771,704
c. Funded Ratio based on Valuation Assets (b)/(a)	99.1%	95.8%	100.3%	100.9%
DB - Total				
a. Actuarial Accrued Liability	$ 20,648,663	$ 21,369,490	$ 9,729,117	$ 9,907,624
b. Valuation Assets	16,173,459	16,467,992	8,108,923	8,200,391
c. Funded Ratio based on Valuation Assets (b)/(a)	78.3%	77.1%	83.3%	82.8%
DCR - Pension				
a. Actuarial Accrued Liability	$ 5,049	$ 6,763	$ 29	$ 19
b. Valuation Assets	19,014	23,176	3,114	3,323
c. Funded Ratio based on Valuation Assets (b)/(a)	376.6%	342.7%	10,737.9%	17,489.5%
DCR - Healthcare				
a. Actuarial Accrued Liability	$ 58,683	$ 70,289	$ 19,768	$ 21,988
b. Valuation Assets	44,188	63,851	17,733	25,410
c. Funded Ratio based on Valuation Assets (b)/(a)	75.3%	90.8%	89.7%	115.6%
DCR - Total				
a. Actuarial Accrued Liability	$ 63,732	$ 77,052	$ 19,797	$ 22,007
b. Valuation Assets	63,202	87,027	20,847	28,733
c. Funded Ratio based on Valuation Assets (b)/(a)	99.2%	112.9%	105.3%	130.6%

The funded ratios are different when the fair value of assets is used.

The Funded Status is the ratio of the actuarial value of assets to the actuarial accrued liability.

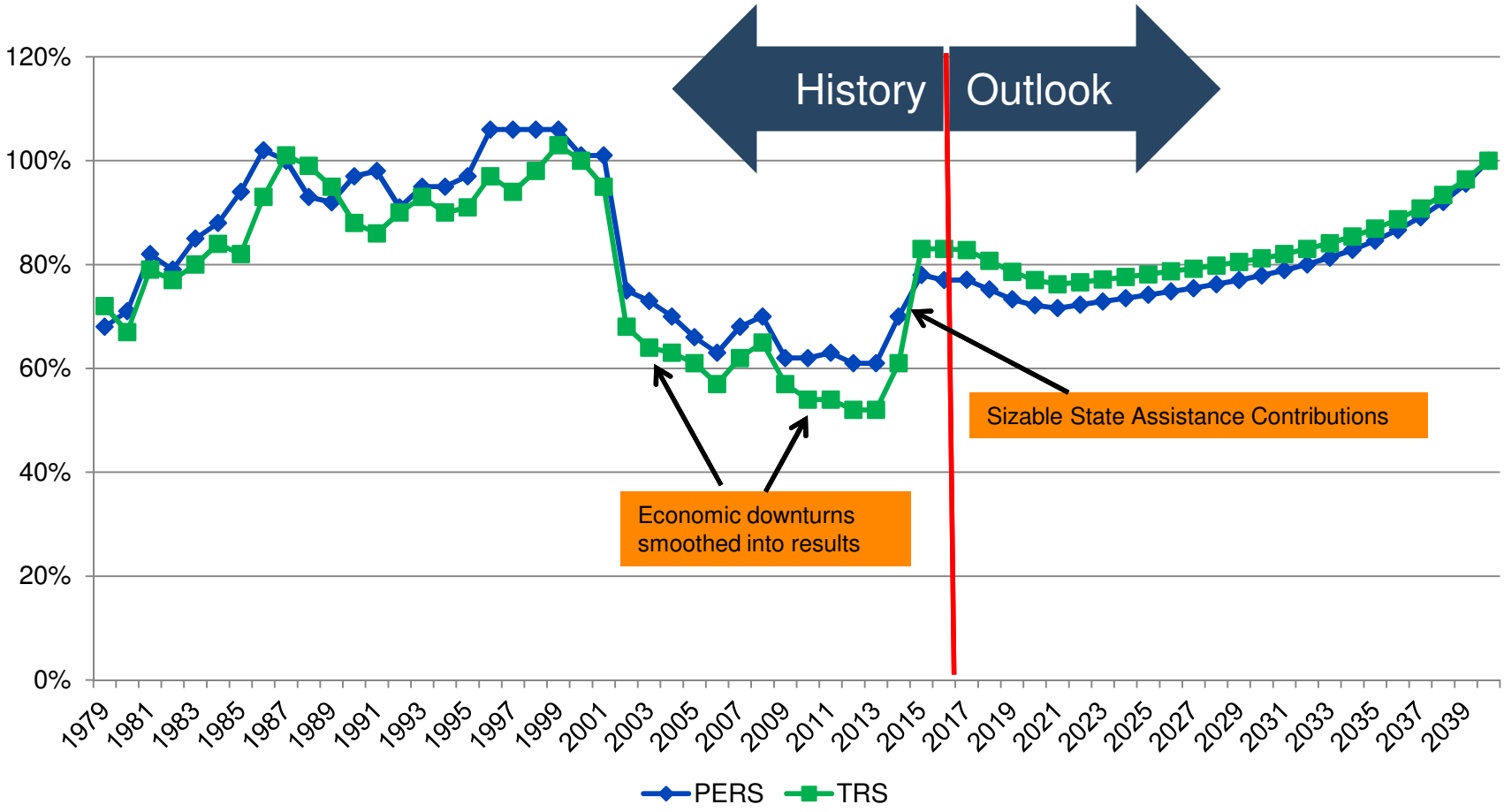
The Funded Status decreased during FY16 primarily due to lower than expected investment return. For the healthcare funds, the Funded Status also decreased during FY16 due to changes in the methods used to develop the per capita claims.

A detailed summary of the AAL is provided in Section 1 of the actuarial reports. A detailed summary of the AVA is provided in Section 2 of the actuarial reports.

Funded Status – History and Outlook

CONDUENT

PERS & TRS



Results – Liability Gain / (Loss)

CONDUENT

PERS & TRS

($ in 000s)	PERS Pension	PERS Healthcare	PERS Total	TRS Pension	TRS Healthcare	TRS Total
Demographic Experience						
- Retirement	$ (1,035)	$ (7,873)	$ (8,908)	$ 7,046	$ 1,691	$ 8,737
- Termination	(8,713)	(13,620)	(22,333)	(9,687)	(3,040)	(12,727)
- Mortality (actives)	6,916	(1,540)	5,376	2,108	(300)	1,808
- Mortality (inactives)	16,956	22,194	39,150	(7,720)	5,540	(2,180)
- Disability	(687)	(1,966)	(2,653)	(369)	466	97
Rehires	(31,814)	(8,617)	(40,431)	(8,470)	(584)	(9,054)
Salary Increases	69,532	0	69,532	32,576	0	32,576
COLA/PRPA Increases	132,576	0	132,576	84,426	0	84,426
Medical Claims Experience	0	(198,836)	(198,836)	0	24,266	24,266
Programming Changes	(15,351)	0	(15,351)	(981)	0	(981)
Miscellaneous & Data Changes	15,871	21,567	37,438	(33,173)	5,597	(27,576)
Total	**$ 184,251**	**$ (188,691)**	**$ (4,440)**	**$ 65,756**	**$ 33,636**	**$ 99,392**
Actuarial Accrued Liability (AAL)	$13,633,033	$7,736,457	$21,369,490	$7,159,788	$2,747,836	$9,907,624
Total Gain/Loss as % of AAL	**1.35%**	**2.44%**	**0.02%**	**0.92%**	**1.22%**	**1.00%**

The actuarial accrued liability loss of $4 million (PERS) and gain of $99 million (TRS) means that the actuarial accrued liability was $4 million higher (PERS) and $99 million lower (TRS) than we would have expected based on the assumptions.

The AAL gain/(loss) is provided in the Executive Summary of the actuarial reports.

Results – Contribution Rates

CONDUENT

PERS & TRS

	PERS		TRS	
	FY18	FY19	FY18	FY19
DB Plan Costs				
- Normal Cost Rate	8.54%	9.34%	8.65%	9.70%
- Past Service Rate	15.28%	17.54%	17.76%	19.89%
- Total Actuarial Rate	23.82%	26.88%	26.41%	29.59%
DCR Plan Costs				
- Normal Cost Rate	4.62%	4.87%	5.03%	5.27%
- Past Service Rate	0.01%	0.01%	0.00%	0.00%
- Total Actuarial Rate	4.63%	4.88%	5.03%	5.27%
Total Plan Costs				
- Normal Cost Rate	13.16%	14.21%	13.68%	14.97%
- Past Service Rate	15.29%	17.55%	17.76%	19.89%
- Total Actuarial Rate	28.45%	31.76%	31.44%	34.86%
Sources of Contributions				
- Total Actuarial Rate	28.45%	31.76%	31.44%	34.86%
- Less Member Contributions	-3.44%	-3.23%	-4.66%	-4.41%
- Total Employer Actuarial Rate	25.01%	28.53%	26.78%	30.45%
- Less Employer Contribution Cap	-22.00%	-22.00%	-12.56%	-12.56%
- State Assistance Contribution Rate	3.01%	6.53%	14.22%	17.89%

All contribution rates are expressed as a % of total (DB and DCR) payroll.

FY18 is final based on June 30, 2015 valuation and the rates adopted by the ARMB in September 2016. FY19 is preliminary based on June 30, 2016 valuation. Two-year roll-forward with 0% population growth used in both years.

Allocation of DCR Plan Costs between Normal Cost Rate and Past Service Cost Rate is approximate for purposes of this slide.

The contribution rates are provided in the Comparative Summary of Key Actuarial Valuation Results in the actuarial reports.

Results – DCR Plans

CONDUENT

PERS & TRS

($ in 000s)	PERS Occ D&D	PERS Ret Med	PERS Total	TRS Occ D&D	TRS Ret Med	TRS Total
a. Actuarial Accrued Liability	$ 6,763	$ 70,289	$ 77,052	$ 19	$ 21,988	$ 22,007
b. Actuarial Value of Assets	23,176	63,851	87,027	3,323	25,410	28,733
c. Unfunded Actuarial Accrued Liability (a)-(b)	$(16,413)	$ 6,438	$ (9,975)	$ (3,304)	$ (3,422)	$ (6,726)
d. Funded Ratio (b)/(a)	342.7%	90.8%	112.9%	17489.5%	115.6%	130.6%
e. Employer Contribution						
- Normal Cost	$ 3,421	$ 9,288	$ 12,709	$ 238	$ 2,372	$ 2,610
- Amortization of Unfunded Liability	(1,133)	586	(547)	(238)	(171)	(409)
- Total	$ 2,288	$ 9,874	$ 12,162	$ -	$ 2,201	$ 2,201
f. Contribution Rate as % of DCR Payroll						
- Normal Cost	0.32%	0.88%	1.20%	0.08%	0.79%	0.87%
- Amortization of Unfunded Liability	-0.11%	0.06%	-0.05%	-0.08%	-0.06%	-0.14%
- Total	0.21%	0.94%	1.15%	0.00%	0.73%	0.73%
g. Contribution Rate as % of DB/DCR Payroll						
- Normal Cost	0.15%	0.40%	0.55%	0.03%	0.32%	0.35%
- Amortization of Unfunded Liability	-0.05%	0.03%	-0.02%	-0.03%	-0.02%	-0.05%
- Total	0.10%	0.43%	0.53%	0.00%	0.30%	0.30%

Contribution rates shown are the employer / state contribution rates for FY19

Results – JRS and NGNMRS

CONDUENT

($ in 000s)	JRS					
	June 30, 2015 Valuation*			June 30, 2016 Valuation		
	Pension	Healthcare	Total	Pension	Healthcare	Total
a. Actuarial Accrued Liability	$ 205,161	$ 18,304	$ 223,465	$ 205,548	$ 15,731	$ 221,279
b. Actuarial Value of Assets	142,191	26,800	168,991	152,889	28,455	181,344
c. Unfunded Actuarial Accrued Liability (a)-(b)	$ 62,970	$ (8,496)	$ 54,474	$ 52,659	$ (12,724)	$ 39,935
d. Funded Ratio (b)/(a)	69.3%	146.4%	75.6%	74.4%	180.9%	82.0%
e. Employer Contribution as of Valuation Date						
- Normal Cost	$ 6,025	$ 606	$ 6,631	$ 6,227	$ 630	$ 6,857
- Amortization of Unfunded Liability	5,014	(413)	4,601	4,571	(679)	3,892
- Total	$ 11,039	$ 193	$ 11,232	$ 10,798	$ (49)	$ 10,749
f. Employer Contribution as % of Payroll**						
- Normal Cost	43.05%	4.33%	47.38%	44.20%	4.47%	48.67%
- Less Member Contribution Rate	-6.05%	0.00%	-6.05%	-6.06%	0.00%	-6.06%
- Amortization of Unfunded Liability	35.83%	-2.95%	32.88%	32.45%	-4.82%	27.63%
- Total	72.83%	1.38%	74.21%	70.59%	-0.35%	70.24%

($ in 000s)	NGNMRS	
	June 30, 2015 Valuation* Total	June 30, 2016 Valuation Total
a. Actuarial Accrued Liability	$ 38,313	$ 31,184
b. Actuarial Value of Assets	37,855	38,440
c. Unfunded Actuarial Accrued Liability (a)-(b)	$ 458	$ (7,256)
d. Funded Ratio (b)/(a)	98.8%	123.3%
e. Employer Contribution**		
- Normal Cost	$ 603	$ 611
- Amortization of Unfunded Liability	72	(1,136)
- Expense Load	232	241
- Total (not less than 0)	$ 907	$ -

* Based on roll-forward of June 30, 2014 valuation.

** June 30, 2015 valuation determines FY18 contributions. June 30, 2016 valuation determines FY19 contributions.

Key Observations from FY2016 Valuations

CONDUENT

The actuarial valuation is done each year to refine the estimates the actuary developed in the prior valuation and reflect the actual events that occurred. This past year, as is common, events happened that were either not anticipated or were different from expected and materially impacted the results:

More significant events causing an impact:

- FY16 investment return was (0.7)%, which was less than the assumed return of 8.0%
- For FY16, the actual Post Retirement Pension Adjustment (PRPA) was 0.33%, which was less than the assumed increase of 3.12%
- Retiree medical claims were less than expected
- Changes in the development of the per capita claims cost due to using real retiree health plan enrollment data
- DCR retiree medical plan design was adopted which resulted in lower projected costs compared to the previous valuation

Less significant, yet still material, events causing an impact:

- Salary increases were less than expected
- More deaths than expected

Next Steps

CONDUENT

The groundwork is being laid for the experience review of all assumptions and methods used in the valuations. The review will begin later this year, with assumptions finalized in 2018 for use in the June 30, 2018 valuations.

Anticipated recommendations on the assumptions and methods used include:

- Lower inflation assumption, which directly impacts investment return, salary scale, and health care trend assumptions
- Reflect latest mortality improvement recommendation from the Society of Actuaries
- Rehire assumption to be refined
- Explicit expense assumption to be added to Normal Cost
- Layered amortizations of plan experience
- Contribution collars

Certification

CONDUENT

The data, assumptions, methods, and plan provisions used in the results shown in this presentation were provided in the June 30, 2016 actuarial valuation reports for PERS (DB & DCR), TRS (DB & DCR), JRS, and NGNMRS.

The results were prepared under the direction of Larry Langer and David Kershner who meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. These results have been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions about them. Melissa Bissett is responsible for all assumptions related to the average annual per capita health claims cost and the health care cost trend rates, and hereby affirms her qualification to render opinions in such matters, in accordance with the Qualification Standards of the American Academy of Actuaries.

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

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T.RowePrice℠
INVEST WITH CONFIDENCE

QM US SMALL-CAP GROWTH EQUITY STRATEGY

ALASKA RETIREMENT MANAGEMENT BOARD | 20 APRIL 2017

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Portfolio Manager

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T. ROWE PRICE—PRESENTERS

Institutional Sales

Christopher W. Dyer
Vice President—Institutional Business Development Executive
- 33 years of experience in institutional investment management sales;
- 29 years with T. Rowe Price.

Portfolio Management

Sudhir Nanda, CFA, Ph.D.
Vice President—Portfolio Manager
- 17 years of investment experience;
- 16 years with T. Rowe Price.

Portfolio Specialist

Brian C. Dausch, CFA
Vice President—Portfolio Specialist: U.S. Equities
- 19 years of investment experience;
- 18 years with T. Rowe Price.

Client Service

John D. Plowright, CFA
Vice President—Institutional Client Service, North America
- 25 years of investment experience;
- 12 years with T. Rowe Price.

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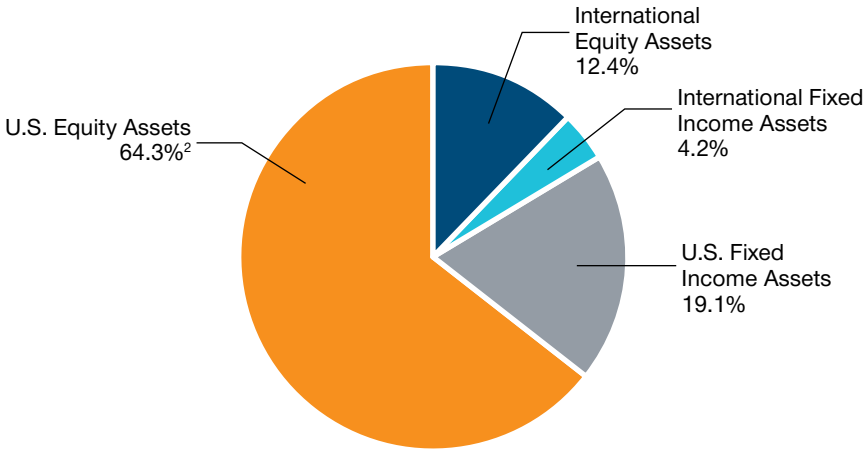
2016-GL-5292

ORGANIZATIONAL OVERVIEW

T. ROWE PRICE BUSINESS SNAPSHOT

Assets Under Management: 810.8 Billion USD[1]

As of 31 December 2016



Institutional accounts represent over 50% of the firm's assets under management.[3]

[1] The combined assets under management of the T. Rowe Price group of companies. The T. Rowe Price group of companies includes T. Rowe Price Associates, Inc., T. Rowe Price International Ltd, T. Rowe Price Hong Kong Limited, T. Rowe Price Singapore Private Ltd., and T. Rowe Price (Canada), Inc.

[2] Includes U.S. Equity and U.S. Balanced assets.

[3] Corporate, Public, Non-Profit, Taft-Hartley clients, and Endowments/Foundations.

Numbers may not add to 100% due to rounding.

ABOUT T. ROWE PRICE

As of 31 December 2016

Independent investment organization

- Focused solely on investment management and related services
- Public holding company structure with substantial employee ownership

Globally diversified organization managing 810.8 billion USD[1]

- Investment capabilities span all major public asset classes
- Balanced by distribution channel

Proprietary fundamental research is our lifeblood

- 248 research analysts worldwide[2]

Highly stable organization

- Seasoned portfolio management teams—average 20 years of investment experience and 15 years tenure with T. Rowe Price
- Management Committee averages 16 years of experience with T. Rowe Price
- Strong financial position allows us to continue to invest in our global team of investment professionals

Our organizational independence helps to foster an environment where our clients' interests come first.

[1] The combined assets under management of the T. Rowe Price group of companies. The T. Rowe Price group of companies includes T. Rowe Price Associates, Inc., T. Rowe Price International Ltd, T. Rowe Price Hong Kong Limited, T. Rowe Price Singapore Private Ltd., and T. Rowe Price (Canada), Inc.

[2] 11 Sector Portfolio Managers, 140 Investment Analysts, 45 Associate Analysts, 47 Quantitative Analysts, and 5 Specialty Analysts.

EQUITY RESEARCH TEAM

As of 1 January 2017

HEADS OF EQUITY

Christopher D. Alderson LON
Global Co-Head

Robert W. Sharps BAL
Global Co-Head

Eric L. Veiel, CFA BAL
U.S.

DIRECTORS OF EQUITY RESEARCH

Kamran Baig LON
EMEA and Latin America

Stephon Jackson, CFA BAL
North America

Jason Polun, CFA BAL
North America

Mitchell Todd, CA LON
Developed Europe

Kes Visuvalingam, CFA SGP
Asia

Thomas Watson, CFA BAL
North America

ASSOCIATE DIRECTORS OF EQUITY RESEARCH

Jai Kapadia HKG
Asia

Tobias Mueller LON
Developed Europe

Viral Patel SYD
Australia

HEALTH CARE

Ziad Bakri, CFA, MD[1] BAL
U.S. Biotech

Melissa Gallagher, Ph.D. LON
OUS Pharma/Biotech

John Hall, Ph.D. BAL
Small-Cap Biotech

Rachel Jonas BAL
U.S. SMID Healthcare

Adam Poussard, CFA BAL
U.S. Services & Equipment

Kyle Rasbach, Ph.D., Pharm.D. BAL
Pharma

I-hung Shih, Ph.D BAL
U.S. Biotech

Dai Wang HKG
Chinese Healthcare

Jon Wood BAL
U.S. Medical Devices/Tools

Rouven Wool-Lewis, Ph.D. BAL
U.S. Services & Hospitals

INDUSTRIALS

Jason Adams BAL
U.S. Aerospace and Defense

Peter Bates, CFA[1] BAL
U.S. Conglomerates

Andrew Chang SGP
Japan and Asia Ex Japan Auto/Steel

Andrew Davis BAL
U.S. Transports

Ryan Ferro, CFA BAL
U.S. SMID Industrials

Joel Grant, CFA BAL
U.S. Autos & Distributors

Gianluca Guicciardi, CFA LON
Industrials/Capital Goods

Hiromasa Ikeda HKG
Japan Small-Cap Industrials

Curt Organt, CFA[1] BAL
U.S. Small-Cap Generalist

Melanie Rizzo, CFA BAL
U.S. Trucking/Machinery

Eunbin Song, CFA HKG
Asia Ex Japan Auto/C&E

Rupinder Vig LON
Industrials/Capital Goods

BUSINESS SERVICES

Shaun Currie, CFA BAL
U.S. Business Services

Jon Friar BAL
U.S. Business Services

Ian McDonald, CFA BAL
U.S. Business Services

Jared Murphy BAL
U.S. Bus. Serv./Industrials

TECHNOLOGY

Kennard Allen[1] BAL
U.S. Hardware/Software

Greg Dunham, CFA BAL
U.S. Software

Tobias Mueller, CFA LON
Europe Semi./Software

Emily Scudder, CFA, CPA BAL
U.S. Hardware

Joshua Spencer, CFA[1] BAL
U.S. Semi./Equipment

Alan Tu, CFA BAL
U.S. Software

Alison Yip HKG
Asia Ex-Japan Hardware

MEDIA/TELECOM

Paul Cho BAL
Cable/Telecom

Paul Greene[1] BAL
U.S. Advertising/Internet

Aden Lau SGP
Asia Ex-Japan Telecom/Fin.

Jacqueline Liu HKG
Asia Ex-Japan Internet

Jeff Nathan BAL
U.S. Advertising/Media

Corey Shull, CFA BAL
U.S. Media/Internet

Christopher Whitehouse LON
Europe Media/Telecom

CONSUMER/RETAIL

Gbemi Adeniyi-Williams LON
EMEA Generalist/Consumer

Paulina Amieva BAL
Latin America Generalist

Ira Carnahan, CFA BAL
U.S. Consumer Discretionary

Eric DeVilbiss, CFA BAL
U.S. Restaurants/Agriculture

Amanda Hall, CFA LON
Europe Consumer

Michael Jacobs TOK
Japan Retail/Leisure

Jacob Kann, CFA BAL
Discretionary

Rekha Marda BAL
U.S. Food Retail/Durables

Sridhar Nishtala SGP
Asia Ex-Japan Staples

Robert Quinn, Jr. BAL
U.S. Consumer Staples

Sebastian Schrott LON
European Luxury/Retail

Vivian Si BAL
U.S. Mass Merch. / Apparel

Brian Solomon, CFA BAL
U.S. Cruise/Lodging

Konstantin Stoev, CFA LON
European Staples and Auto

John Williams, CFA BAL
Large-Cap Consumer Staples

Eric Yuan HKG
Regional Gaming

FINANCIAL SERVICES

Malik Asif LON
EMEA Banks

Jon Casper BAL
U.S. Financials

Vincent DeAugustino, CFA BAL
U.S. SMID Financials

Christopher Fortune, CFA BAL
U.S. Small Cap Banks

Yoichiro Kai, CMA SGP
Asian Banks incl. Japan and Japanese Insurance

Gregory Locraft, Jr. BAL
U.S. P&C Insurance

Jihong Min SGP
Southeast Asia Banks

Thibault Nardin LON
Europe Banks

Matt Snowling, CFA BAL
Capital Markets

Gabriel Solomon[1] BAL
U.S. Money Center/Insur.

Zenon Voyiatzis LON
Europe Insur./Financials

REAL ESTATE

Dan McCulley, CFA BAL
U.S. Real Estate

Preeta Ragavan, CFA BAL
U.S. Real Estate

NATURAL RESOURCES

Haider Ali HKG
Asia Ex-Japan Oil & Gas

Sheena Barbosa, CFA HKG
Asia Ex-Japan Utilities/Infra.

Ryan Burgess, CFA[1] BAL
U.S. Chemicals/Industrials

Chris Driessen BAL
Metals & Mining

Shawn Driscoll[1] BAL
U.S. E&P

Ryan Hedrick, CFA BAL
U.S. Coal/Utilities

Jon Hussey BAL
U.S. Agriculture

Shinwoo Kim BAL
U.S. Energy Services

Matt Mahon BAL
U.S. Chemicals

Ryan Martyn SYD
Australia Energy/Industrials

Chris O'Neill BAL
U.S. E&P

Timothy Parker, CFA[1] BAL
U.S. E&P

Vivek Rajeswaran, CFA BAL
U.S. Equip. & Services/ Waste

Thomas Shelmerdine SYD
Australian Metals & Mining

John Sherman LON
European Chemicals/Indus.

Christopher Wheaton LON
Energy Majors

REGIONAL GENERALISTS

Ulle Adamson, CFA[1] LON
EMEA

Martin Baylac LON
Latin America

Simon Cheng, CFA, CPA HKG
Greater China Small-Cap

Archibald Ciganer, CFA[1] TOK
Japan Transports/Consumer

Anouk Dey, CFA BAL
U.S. Small-Cap Growth

Vishnu Gopal HKG
India & ASEAN Small-Cap

Ben Griffiths, CFA[1] LON
Europe Small-Cap

Nabil Hanano, CFA BAL
Europe

Tetsuji Inoue, CPA TOK
Japan Small-Cap/Real Estate, Japan Technology

Randal Jenneke[1] SYD
Australia Media/Consumer

Jai Kapadia HKG
Asia Real Estate/Conglom.

Mark Lawrence, CFA LON
EMEA

Oxana Lyalina LON
EMEA

Michael Niedzielski LON
Europe Small-Cap

Paul O'Sullivan, ACA SYD
Australia Financials/H.C.

Seun Oyegunle, CFA LON
EMEA

Viral Patel SYD
Australia REITS/Retail

Alexander Roik BAL
U.S. Small-Cap Value

Sin Dee Tan, CFA LON
Europe Small-Cap

Verena Wachnitz, CFA[1] LON
Latin America

Hiroshi Watanabe, CFA[1] TOK
Japan SMID-Cap

Marta Yago LON
Latin America

154 Equity Research Professionals worldwide[2]

BAL **Baltimore**
HKG **Hong Kong**
LON **London**
SGP **Singapore**
SYD **Sydney**
TOK **Tokyo**

[1] Also has portfolio management responsibilities.

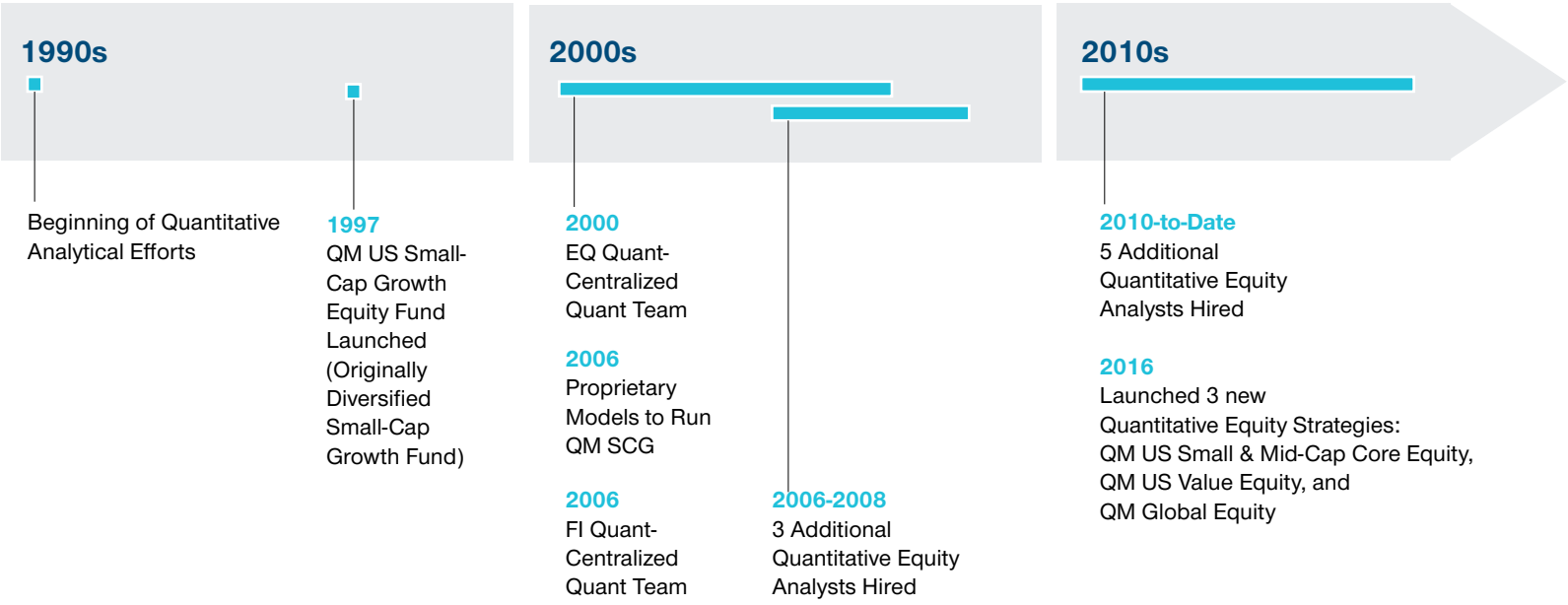
[2] 11 sector portfolio managers, 90 research analysts, 42 associate research analysts, 6 quantitative analysts, and 5 specialty analysts as of 31 December 2016.

T. ROWE PRICE QUANTITATIVE CAPABILITIES

T. Rowe Price Quantitative Equity Management

Total AUM of Quantitative Strategies: 5.5 Billion USD

As of 31 December 2016



QM US SMALL-CAP GROWTH EQUITY STRATEGY

TEAM
PHILOSOPHY
PROCESS

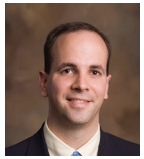
QM U.S. SMALL-CAP GROWTH EQUITY INVESTMENT TEAM[1]

As of 31 December 2016

Portfolio Manager

Sudhir Nanda, Ph.D, CFA
- 17 years of investment experience
- 16 years with T. Rowe Price

Portfolio Specialist

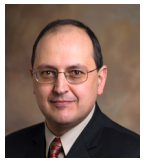


Brian Dausch, CFA
- 19 years of investment experience
- 18 years with T. Rowe Price

Analysts

Vinit Agrawal, CFA
- 6 years of investment experience;
- 6 years with T. Rowe Price.
- Consumer
- U.S. Large Value/OUS SMID-Cap

Vidya Kadiyam, CFA
- 8 years of investment experience
- 8 years with T. Rowe Price
- Healthcare and Utilities
- U.S. Large and Mid-Cap Value



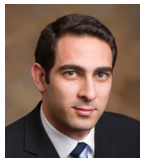
Boyko Atanassov, Ph.D, CFA
- 10 years of investment experience
- 6 years with T. Rowe Price
- Energy & Materials
- U.S. Small-Cap Core and Natural Resources

Navneesh Malhan, CFA
- 6 years of investment experience
- 1 year with T. Rowe Price
- Consumer
- Global Consumer

George Gao, Ph.D
- <1 year of investment experience
- <1 year with T. Rowe Price
- Business Services

Jordan Pryor
- <1 year of investment experience
- 2 years with T. Rowe Price
- Generalist

Prashant G. Jeyaganesh, CFA
- 10 years of investment experience
- 10 years with T. Rowe Price
- Industrials and Technology
- Emerging Markets/Global



Farris G. Shuggi, CFA
- 8 years of investment experience
- 8 years with T. Rowe Price
- Financials and Telecom
- U.S. Small-Cap Value

Dedicated 5 Member IT Team

■ Quant Focus Area ■ Fundamental Team Collaboration

INVESTMENT PHILOSOPHY

OBJECTIVE

- Provide Steady Performance
- Keep Turnover Low

ACHIEVED THROUGH

PROCESS

- A disciplined process and stock selection model based on fundamental metrics
- Well-diversified portfolio with minimal sector bets
- Portfolio constructed using model input, Portfolio Manager judgement, and fundamental research overlay as needed

RESULTS IN

PORTFOLIO PROFILE

- Bias Towards Value and Quality
- Lower Risk Profile than the Benchmark

INVESTMENT PROCESS

Defining the Universe

- All stocks in the MSCI U.S. Small-Cap Growth Index
  - MSCI includes stocks ranked 751–2500 by market cap (eliminates micro-caps)
  - Greater stability with two rebalancings in May and November plus minor changes in February and August
  - More intuitive definitions of "growth" and "value" stocks

Source for MSCI data: MSCI. MSCI makes no express or implied warranties or representations and shall have no liability whatsoever with respect to any MSCI data contained herein. The MSCI data may not be further redistributed or used as a basis for other indices or any securities or financial products. This report is not approved, reviewed, or produced by MSCI.

MODEL COMPONENTS

- **Valuation** metrics have been shown to provide good discrimination between winners and losers
- **Capital Allocation** measures capture the effectiveness of capital allocation and shareholder friendly management actions
- Higher **quality** stocks tend to perform better in down markets
- Estimate revisions and price **momentum**

SMALL-CAP GROWTH MODEL

Metric	Preference	Weight
Valuation	▪ Prefer low valuation relative to sector and universe ▪ Valuation metrics differ by sector and global region ▪ Emphasis on Cash Flow based metrics	40–45%
Profitability and Capital Allocation Earnings Quality	▪ High Return on Equity ▪ Efficient capital expenditure in high return projects ▪ Buying back stock or dividend policy ▪ Cash Flow exceeds Income ▪ Increase in Current Assets is not excessive	35–40%
Momentum	▪ Positive price momentum and estimate revisions	15–20%

A weighted average rank determines the overall rank of a stock.

Attractive stocks in the model tend to be cheaper than their universe and have higher quality.

INVESTMENT PROCESS

Stock Selection	▪ Buy stocks ranked one to four by the model (on a scale of 10) ▪ Additional fundamental analysis and check-ups if needed ▪ Sell stocks ranked seven to ten by the model ▪ Observation of negative issues such as earnings quality can override our model view

Position Sizing/ Risk Control	▪ Maximum position size is around 1%, with exceptions to let outperformers run up to reasonable limits as long as they rank high in the model
	▪ Position size depends on:
	  ▪ alpha potential
	  ▪ risk of stock
	  ▪ benchmark weight

Portfolio Characteristics	▪ Typically around 300 holdings ▪ Minimal sector bets; performance from stock selection ▪ Fully invested with cash typically less than 1%, primarily for transactional needs ▪ Predicted tracking error less than 3% ▪ Turnover target in the 20–40% range

RISK MANAGEMENT

Regular portfolio monitoring by Investment Risk Group

- PM meets with Risk Group regularly
- Risk group also provides reports to Head of Equity
- Risk reports updated daily

IT Support and Infrastructure

- Dedicated hardware resides in T. Rowe Price Corporate IT infrastructure
- Dedicated IT support team follows all corporate IT risk and software change protocols
- Model software changes require multiple checks in the IT group and by Quantitative Equity group

Model Risk

- Quantitative Group has structured process on model development and model changes
- Model changes are documented and require multiple approvals

TRADING

- All trades through centralized trading desk. Trading desks in Baltimore, London, Hong Kong, and Sydney
- Each portfolio has an assigned trader. Traders specialize by style and sector
- Quantitative portfolios trade in low cost venues when possible
- Pre- and post-trade Transaction Cost Analysis

PORTFOLIO TURNOVER

Investors, not traders

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
QM US Small-Cap Growth Equity Representative Portfolio	47%	30%	28%	19%	17%	15%	13%	17%	10%	10%
Morningstar Small Growth Funds Average[1]	117	125	131	107	101	98	133	80	83	64

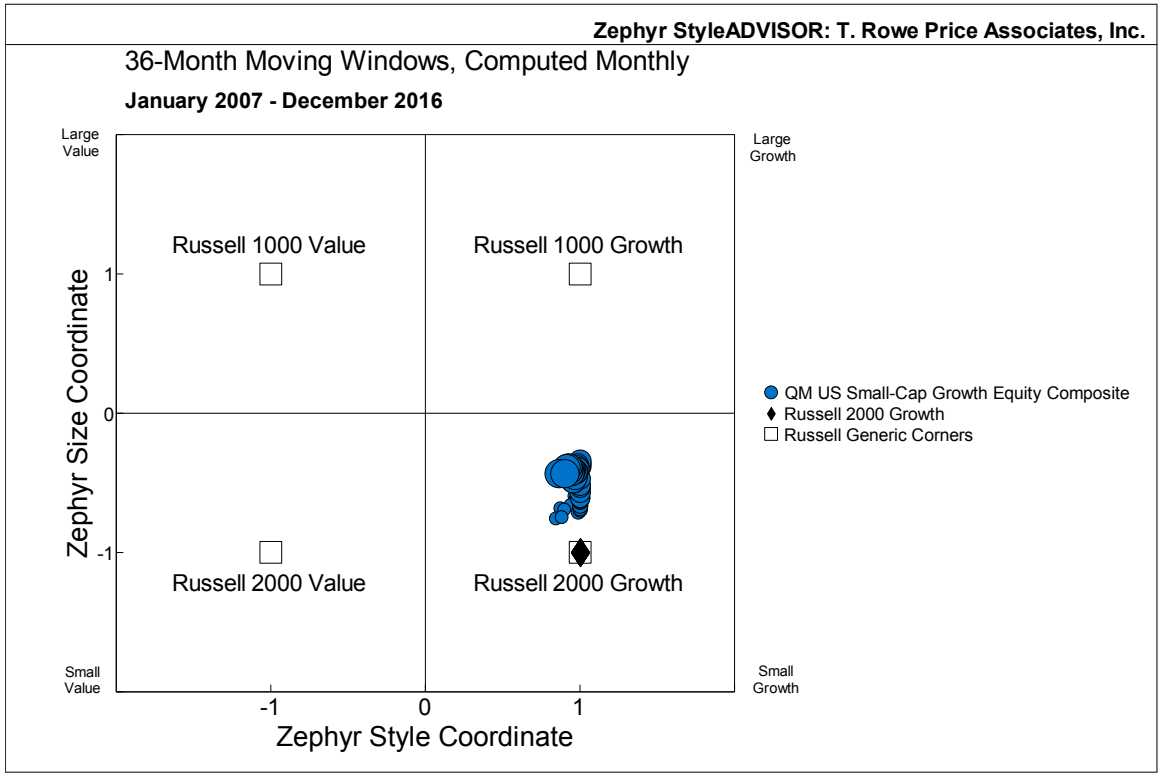
Our low turnover approach should reduce trading costs, which has a positive impact on return and allows wealth to compound.

[1] Source: Morningstar, December 2016.
The representative portfolio is an account in the composite we believe most closely reflects current portfolio management style for the strategy. Performance is not a consideration in the selection of the representative portfolio. Information regarding the representative portfolio and, where applicable, the other accounts in the composite is available upon request. Please see the GIPS® Disclosure page for additional information on the composite.
Supplemental information.

PORTFOLIO CHARACTERISTICS

STYLE CONSISTENCY

Zephyr StyleADVISOR: T. Rowe Price Associates, Inc.



Portfolio resides in the middle of the growth box.

Zephyr StyleADVISOR performs a constrained quadratic optimization to determine the portfolio's (style, size) coordinate relative to the indices shown. This rolling window analysis displays the smaller data points to represent the oldest time period and larger data points to represent the most recent time period.

T. Rowe Price Associates, Inc., and Zephyr Associates, Inc., are not affiliated companies.

Supplemental information.

Russell Investment Group is the source and owner of the trademarks, service marks, and copyrights related to the Russell indexes. Russell® is a trademark of Russell Investment Group.

PORTFOLIO SNAPSHOT

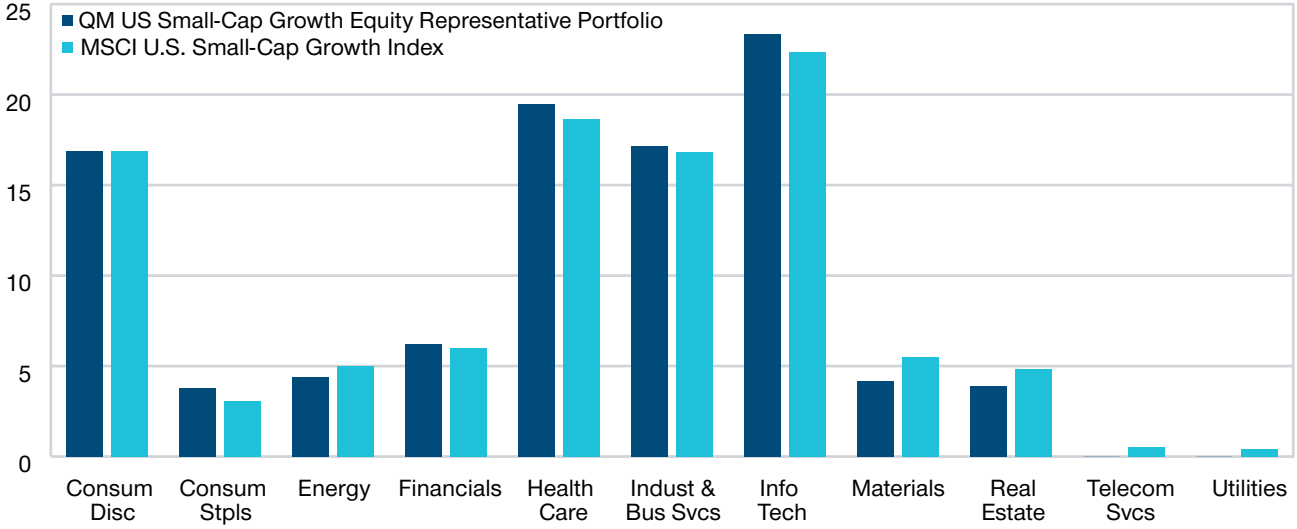
As of 31 December 2016

TOP 10 HOLDINGS

Company	% of Portfolio
Burlington Stores	1.0%
Vail Resorts	1.0
Toro	1.0
Domino's Pizza	1.0
Casey's General Stores	0.8
Teledyne Technologies	0.8
MarketAxess Holdings	0.8
Microsemi	0.8
Berry Plastics	0.8
John Bean Technologies	0.8
Total	9.0%

SECTOR DIVERSIFICATION

Percent



PORTFOLIO CHARACTERISTICS	Portfolio	MSCI U.S. Small-Cap Growth Index
Projected Earnings Growth Rate[1]	14.9%	15.0%
Earnings Growth Rate (Past Three Years)	14.2%	14.8%
Price to Earnings (12 Months Forward)[1]	23.6X	24.3X
Enterprise Value over EBITDA	14.1X	12.5X
Return on Equity (Last Five Years)	16.2%	13.5%
Return on Invested Capital (Last Five Years)	10.6%	8.2%
Investment-Weighted Average Market Capitalization (Millions USD)	4,166	2,747
Investment-Weighted Median Market Capitalization (Millions USD)	3,703	2,529
20 Largest Holdings	16.0%	8.5%

[1] Source: IBES.

The representative portfolio is an account in the composite we believe most closely reflects current portfolio management style for the strategy. Performance is not a consideration in the selection of the representative portfolio. Information regarding the representative portfolio and, where applicable, the other accounts in the composite is available upon request. Please see the GIPS® Disclosure page for additional information on the composite.

The specific securities identified and described do not represent all of the securities purchased, sold, or recommended for clients in the composite, and no assumptions should be made that the securities identified and discussed were or will be profitable.

The information shown does not reflect any exchange-traded funds that may be held in the portfolio.

Numbers may not total due to rounding.

Supplemental information.

Statistics are investment-weighted median unless otherwise noted.

T. Rowe Price uses the MSCI/S&P Global Industry Classification Standard (GICS) for sector and industry reporting. Each year, MSCI and S&P review the GICS structure. The last change occurred on 31 August 2016. T. Rowe Price will adhere to all future updates to GICS for prospective reporting.

Source for MSCI data: MSCI. MSCI makes no express or implied warranties or representations and shall have no liability whatsoever with respect to any MSCI data contained herein. The MSCI data may not be further redistributed or used as a basis for other indices or any securities or financial products. This report is not approved, reviewed, or produced by MSCI.

RECENT PORTFOLIO CHANGES

QM US Small-Cap Growth Equity Representative Portfolio

Three Months Ended 31 December 2016

Major Purchases	Beginning Weight	Ending Weight	Market Capitalization (Millions USD)	Business Description
Curtiss-Wright[1]	0.0%	0.4%	4,350	Curtiss-Wright is a provider of engineered products and services to the commercial, defense, energy and industrial markets.
NuVasive[1]	0.0	0.3	3,391	NuVasive is a medical device company in the spine market. The Company focuses on developing minimally-disruptive surgical products and procedurally-integrated solutions for the spine.
NCR[1]	0.0	0.4	5,034	NCR is a technology company that provides products and services that enable businesses to connect, interact and transact with their customers.
Empire State Realty Trust[1]	0.0	0.3	3,130	Empire State Realty Trust is a real estate investment trust. The Company owns, manages, operates, acquires and repositions office and retail properties in Manhattan and the greater New York metropolitan area.
RSP Permian[1]	0.0	0.3	6,333	RSP Permian is an independent oil and natural gas company focused on the acquisition, exploration, development and production of unconventional oil and associated liquids-rich natural gas reserves in the Permian Basin of West Texas.

Major Sales	Beginning Weight	Ending Weight	Market Capitalization (Millions USD)	Business Description
Waste Connections[2]	0.3%	0.0%	13,757	Waste Connections, formerly Progressive Waste Solutions Ltd, is a Canada-based waste management company.
Cepheid[2,3]	0.3	0.0	N/A	Cepheid is a molecular diagnostics company. The Company develops, manufactures and markets fully-integrated systems for testing in the Clinical and Non-Clinical markets.
Jones Lang LaSalle[2]	0.2	0.0	4,568	Jones Lang LaSalle is a financial and professional services firm specializing in real estate. The Company operates through four business segments: Americas; Europe, Middle East and Africa (EMEA); Asia Pacific, and LaSalle.
Teradyne	0.2	0.1	5,111	Teradyne supplies automation equipment for test and industrial applications.
Avis Budget Group	0.1	0.0	3,224	Avis Budget Group is a provider of vehicle rental and car sharing services. The Company operates three brands, which include Avis, Budget and Zipcar.

[1] New Holding.

[2] Eliminated.

[3] Cepheid was acquired by Danaher on 4 November 2016.

The representative portfolio is an account in the composite we believe most closely reflects current portfolio management style for the strategy. Performance is not a consideration in the selection of the representative portfolio. Information regarding the representative portfolio and, where applicable, the other accounts in the composite is available upon request. Please see the GIPS® Disclosure page for additional information on the composite.

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The specific securities identified and described do not represent all of the securities purchased, sold, or recommended for clients in the composite, and no assumptions should be made that the securities identified and discussed were or will be profitable.

The information shown does not reflect any exchange-traded funds that may be held in the portfolio.

Supplemental information.

PERFORMANCE

TOTAL RETURN PERFORMANCE

QM US Small-Cap Growth Equity Composite

Periods Ended 31 December 2016
Figures are Calculated in U.S. Dollars

			Annualized				
	Three Months	One Year	Three Years	Five Years	Ten Years	Since Manager Inception 1 Oct 2006[2]	Fifteen Years
QM US Small-Cap Growth Equity Composite (Gross of Fees)	3.97%	12.11%	7.45%	15.99%	11.16%	11.45%	9.49%
QM US Small-Cap Growth Equity Composite (Net of Fees)[1]	3.83	11.50	6.86	15.36	10.55	10.84	8.89
Linked Benchmark[3,4]	3.15	13.44	4.81	14.36	8.91	9.56	8.23

Calendar Years	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
QM US Small-Cap Growth Equity Composite (Gross of Fees)	10.44%	-35.81%	39.61%	35.47%	2.30%	16.63%	45.11%	7.26%	3.16%	12.11%
QM US Small-Cap Growth Equity Composite (Net of Fees)[1]	9.84	-36.18	38.86	34.74	1.74	15.99	44.34	6.68	2.59	11.50
Linked Benchmark[3,4]	9.71	-40.11	41.97	30.71	-1.53	17.57	44.50	4.69	-3.05	13.44

Past performance cannot guarantee future results.

[1] Net-of-fees performance reflects the deduction of the highest applicable management fee (Model Net Fee) that would be charged based on the fee schedule appropriate to you for this mandate, without the benefit of breakpoints. Please be advised that the composite may include other investment products that are subject to management fees that are inapplicable to you but are in excess of the Model Net Fee. Therefore, the actual performance of all the portfolios in the composite on a net-fee basis will be different and may be lower than the Model Net Fee performance. However, such Model Net Fee performance is intended to provide the most appropriate example of the impact management fees would have by applying management fees relevant to you to the gross performance of the composite.

Supplemental information. Please see the GIPS® Disclosure page for additional information on the composite. Monthly composite performance is available upon request.

[2] Effective 1 October 2006, Sudhir Nanda assumed portfolio management responsibility for the strategy.

[3] Returns shown with gross dividends reinvested.

[4] Effective 2 October 2006, the benchmark for the composite changed to the MSCI U.S. Small-Cap Growth Index. Prior to this change, the benchmark was the Russell 2000 Growth Index. The change was made because the firm viewed the new benchmark to be a better representation of the investment strategy of the composite. Historical benchmark representations have not been restated.

Source for MSCI data: MSCI. MSCI makes no express or implied warranties or representations and shall have no liability whatsoever with respect to any MSCI data contained herein. The MSCI data may not be further redistributed or used as a basis for other indices or any securities or financial products. This report is not approved, reviewed, or produced by MSCI.

TOTAL RETURN PERFORMANCE

QM US Small-Cap Growth Equity Composite

Periods Ended 28 February 2017
Figures are Calculated in U.S. Dollars

			Annualized				
	Quarter-to-Date	One Year	Three Years	Five Years	Ten Years	Since Manager Inception 1 Oct 2006[2]	Fifteen Years
QM US Small-Cap Growth Equity Composite (Gross of Fees)	5.59%	28.70%	8.43%	14.50%	11.56%	11.84%	10.50%
QM US Small-Cap Growth Equity Composite (Net of Fees)[1]	5.50	28.00	7.84	13.88	10.95	11.23	9.90
Linked Benchmark[3,4]	4.01	29.55	4.79	12.83	9.00	9.82	9.27

Past performance cannot guarantee future results.

[1] Net-of-fees performance reflects the deduction of the highest applicable management fee (Model Net Fee) that would be charged based on the fee schedule appropriate to you for this mandate, without the benefit of breakpoints. Please be advised that the composite may include other investment products that are subject to management fees that are inapplicable to you but are in excess of the Model Net Fee. Therefore, the actual performance of all the portfolios in the composite on a net-fee basis will be different and may be lower than the Model Net Fee performance. However, such Model Net Fee performance is intended to provide the most appropriate example of the impact management fees would have by applying management fees relevant to you to the gross performance of the composite.

Supplemental information. Please see the GIPS® Disclosure page for additional information on the composite. Monthly composite performance is available upon request.

[2] Effective 1 October 2006, Sudhir Nanda assumed portfolio management responsibility for the strategy.

[3] Returns shown with gross dividends reinvested.

[4] Effective 2 October 2006, the benchmark for the composite changed to the MSCI U.S. Small-Cap Growth Index. Prior to this change, the benchmark was the Russell 2000 Growth Index. The change was made because the firm viewed the new benchmark to be a better representation of the investment strategy of the composite. Historical benchmark representations have not been restated.

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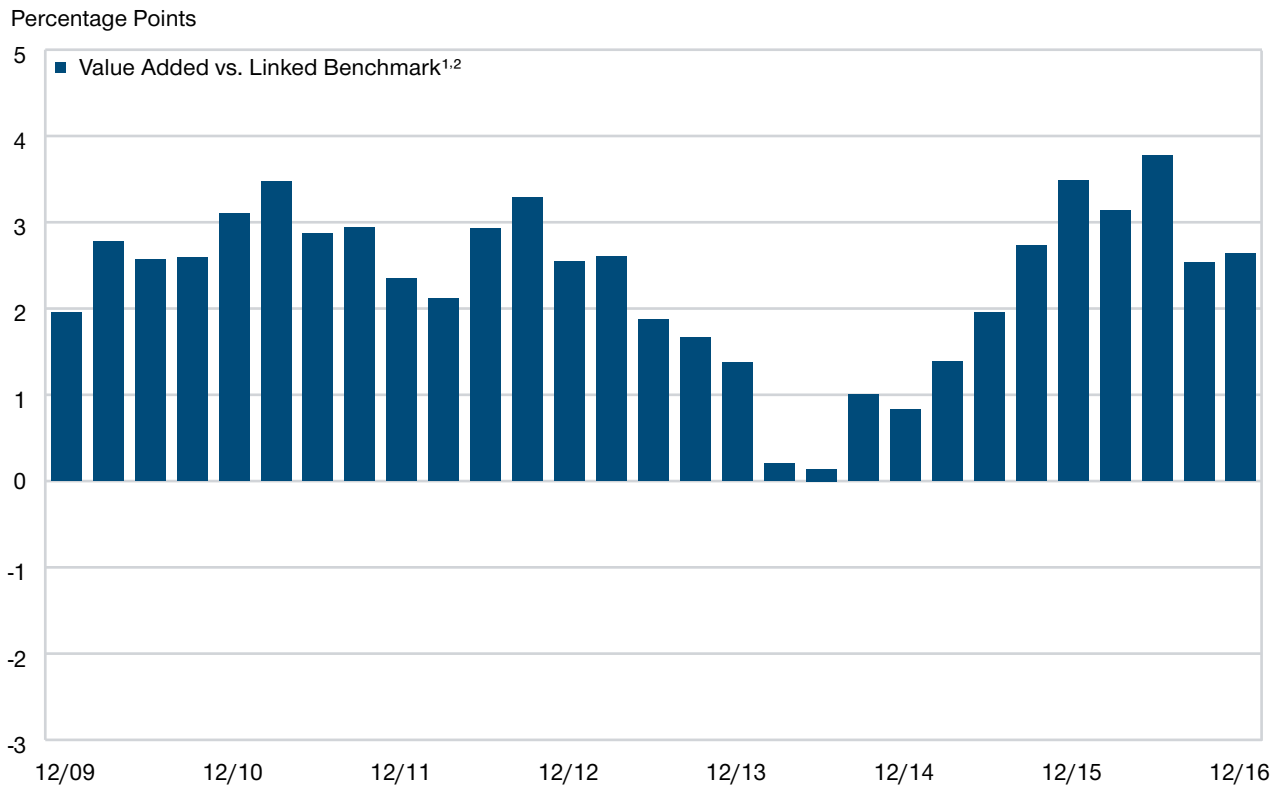
TOTAL RETURN PERFORMANCE

Value Added in QM US Small-Cap Growth Equity Composite vs. Linked Benchmark[1,2]—Rolling Three-Year Periods (Annualized Gross of Fees)

Calculated Quarterly from 31 December 2006 Through 31 December 2016
Figures are Calculated in U.S. Dollars



Past performance cannot guarantee future results.

[1] Returns shown with gross dividends reinvested.

[2] Effective 2 October 2006, the benchmark for the composite changed to the MSCI U.S. Small-Cap Growth Index. Prior to this change, the benchmark was the Russell 2000 Growth Index. The change was made because the firm viewed the new benchmark to be a better representation of the investment strategy of the composite. Historical benchmark representations have not been restated.

Each bar measures the difference in performance between the composite and the benchmark for a three-year annualized period.

Figures shown gross of fees. Returns would have been lower as the result of the deduction of applicable fees.

Supplemental information.

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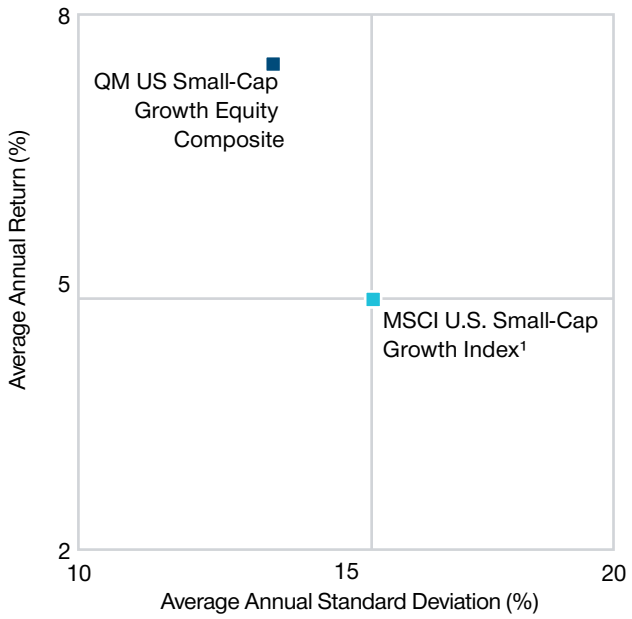
TOTAL RETURN PERFORMANCE

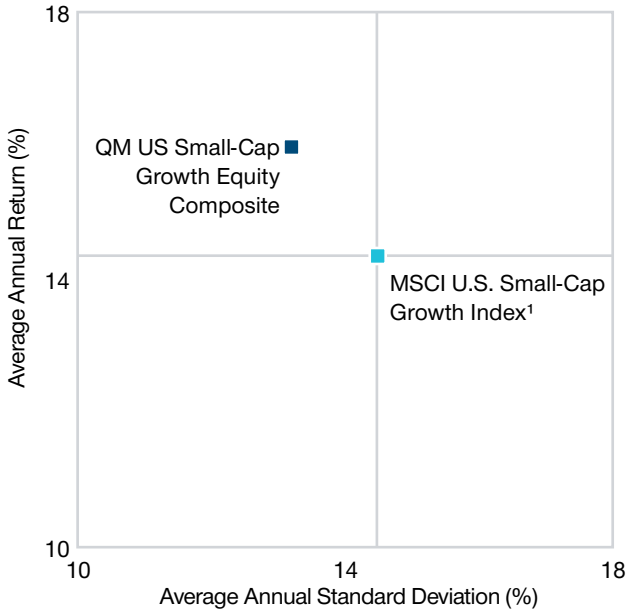
Risk/Return Characteristics

Periods Ended 31 December 2016
Figures are Calculated in U.S. Dollars

	Three Years	
	QM US Small-Cap Growth Equity Composite	**MSCI U.S. Small-Cap Growth Index[1]**
Annualized Total Return	7.45%	4.81%
Annualized Standard Deviation	13.63%	15.50%
Historical Tracking Error	3.42%	0.00%
Beta	0.86	1.00
R-Squared	0.96	1.00
Alpha	3.06%	0.00%
Sharpe Ratio	0.53	0.30
Information Ratio	0.77	0.00



	Five Years	
	QM US Small-Cap Growth Equity Composite	**MSCI U.S. Small-Cap Growth Index[1]**
Annualized Total Return	15.99%	14.36%
Annualized Standard Deviation	13.19%	14.48%
Historical Tracking Error	3.04%	0.00%
Beta	0.89	1.00
R-Squared	0.96	1.00
Alpha	2.83%	0.00%
Sharpe Ratio	1.20	0.98
Information Ratio	0.54	0.00



Past performance cannot guarantee future results.

[1] Returns shown with gross dividends reinvested.

This information demonstrates, in part, the firm's Risk/Return analysis. This material is provided for informational purposes only and is not intended to be investment advice or a recommendation to take any particular investment action.

Statistics based on monthly gross returns. Returns would have been lower as the result of the deduction of applicable fees.

Supplemental information.

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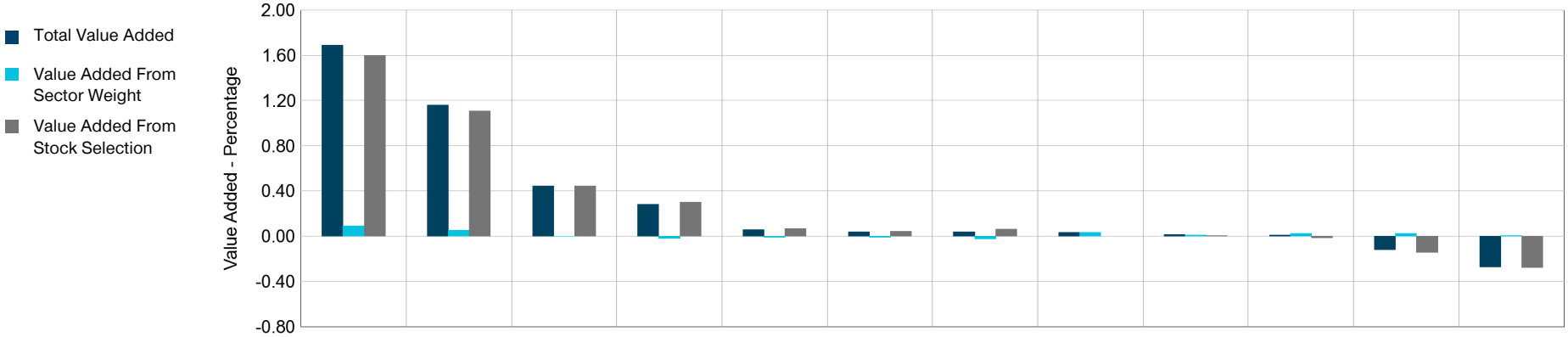
ATTRIBUTION ANALYSIS (USD)

QM US Small-Cap Growth Equity Representative Portfolio vs. MSCI U.S. Small-Cap Growth Index[1]

Five Years Ended 31 December 2016

BY SECTOR



	Total	Health Care	Industrials & Bus Svcs	Materials	Consumer Staples	Telecom Svcs	Financials	Utilities	Consumer Disc	Real Estate	Information Technology	Energy
Over (Under) Weight	–	1.58	-0.38	-0.94	0.38	-0.44	-0.50	-0.29	-0.31	-1.02	1.09	0.83
Portfolio Weight (Ending)	100.00	19.60	17.27	4.21	3.80	0.00	6.28	0.00	17.00	3.94	23.51	4.41
Index Weight (Ending)	100.00	18.02	17.64	5.15	3.43	0.44	6.77	0.29	17.30	4.96	22.42	3.58
Portfolio Performance	16.12	24.16	19.03	16.26	15.97	21.97	18.45	0.00	13.96	-0.63	15.04	-10.34
Index Performance	14.44	18.53	16.17	9.67	15.19	11.39	17.52	14.71	14.13	2.00	15.66	-5.33

Past performance cannot guarantee future results.

[1] Returns shown with gross dividends reinvested.

The representative portfolio is an account in the composite we believe most closely reflects current portfolio management style for the strategy. Performance is not a consideration in the selection of the representative portfolio. Information regarding the representative portfolio and, where applicable, the other accounts in the composite is available upon request. Please see the GIPS® Disclosure page for additional information on the composite.

Supplemental information.

Numbers may not add to 100% due to rounding; all numbers are percentages.

Analysis represents the equity-only performance of the portfolio as calculated by the Wilshire Atlas attribution model and is exclusive of cash, trusts, mutual funds, delisted securities, and other non-equity holdings. Returns will not match official T. Rowe Price performance because Wilshire uses different pricing and exchange rate sources and does not capture intraday trading or fair-value pricing. Performance for each security is obtained in the local currency and, if necessary, is converted using an exchange rate determined by an independent third party.

Source: Wilshire Atlas, MSCI/S&P Global Industry Classification Standard (GICS) sectors; analysis by T. Rowe Price Associates, Inc. T. Rowe Price uses the MSCI/S&P GICS for sector and industry reporting. Each year, MSCI and S&P review the GICS structure. The last change occurred on 31 August 2016. T. Rowe Price will adhere to all future updates to GICS for prospective reporting.

Figures are shown gross of fees.

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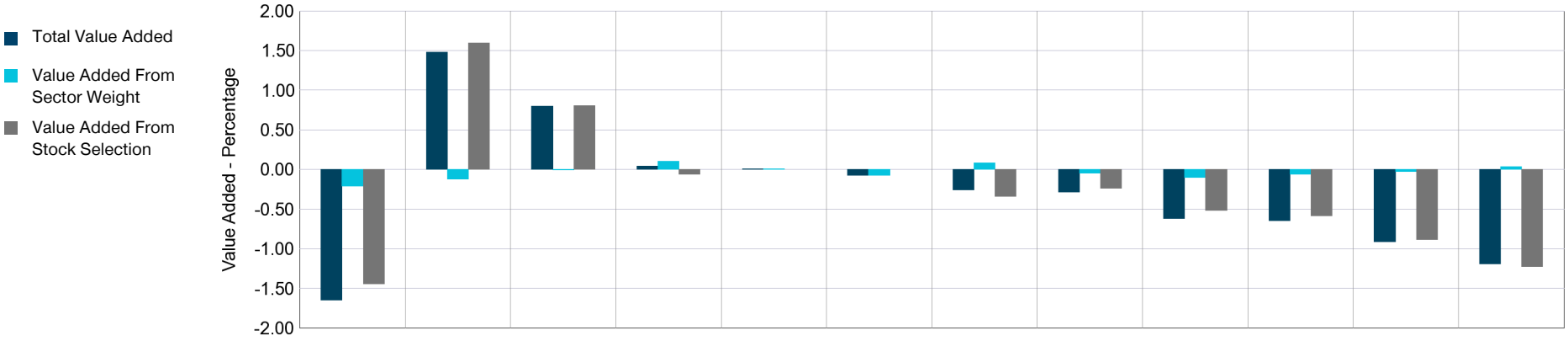
ATTRIBUTION ANALYSIS (USD)

QM US Small-Cap Growth Equity Representative Portfolio vs. MSCI U.S. Small-Cap Growth Index[1]

One Year Ended 31 December 2016

BY SECTOR



	Total	Health Care	Consumer Disc	Real Estate	Telecom Svcs	Utilities	Industrials & Bus Svcs	Consumer Staples	Materials	Financials	Energy	Information Technology
Over (Under) Weight	–	1.58	-0.01	-0.74	-0.44	-0.29	-0.33	0.38	-0.94	-0.50	0.83	1.25
Portfolio Weight (Ending)	100.00	19.60	17.00	3.94	0.00	0.00	17.27	3.80	4.21	6.28	4.41	23.51
Index Weight (Ending)	100.00	18.02	17.00	4.68	0.44	0.29	17.60	3.43	5.15	6.77	3.58	22.25
Portfolio Performance	12.28	1.60	14.26	-3.10	0.00	0.00	28.17	4.94	19.60	16.61	17.98	11.10
Index Performance	13.93	-5.58	10.49	-1.85	9.57	37.88	30.19	10.75	35.33	23.40	47.59	16.27

Past performance cannot guarantee future results.

[1] Returns shown with gross dividends reinvested.

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Source: Wilshire Atlas, MSCI/S&P Global Industry Classification Standard (GICS) sectors; analysis by T. Rowe Price Associates, Inc. T. Rowe Price uses the MSCI/S&P GICS for sector and industry reporting. Each year, MSCI and S&P review the GICS structure. The last change occurred on 31 August 2016. T. Rowe Price will adhere to all future updates to GICS for prospective reporting.

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EXHIBITS

BIOGRAPHICAL BACKGROUNDS
FEE SCHEDULE
GIPS® DISCLOSURE

BIOGRAPHICAL BACKGROUNDS

T. Rowe Price—Presenters

Christopher W. Dyer

Chris Dyer is a U.S. institutional sales executive for the Global Investment Services division of T. Rowe Price, the organization responsible for the firm's institutional business worldwide. Mr. Dyer is a vice president of T. Rowe Price Group, Inc., and T. Rowe Price Associates, Inc.

Mr. Dyer has 33 years of investment experience in institutional investment management sales, 29 of which have been with T. Rowe Price. Prior to his current position, Mr. Dyer was responsible for defined contribution plan sales and client service for public and nonprofit organizations for T. Rowe Price Retirement Plan Services, the firm's defined contribution plan subsidiary. Prior to joining the firm in 1987, he was a pension supervisor with The Calvert Group.

Mr. Dyer earned a B.A. in political science from the University of Maryland. He is a Series 7, 63, and 65 registered representative.

Sudhir Nanda, CFA, Ph.D.

Sudhir Nanda is the head of the Quantitative Equity Group as well as a portfolio manager. He is president of the Investment Advisory Committee of the US Structured Active Small-Cap Growth Equity Strategy, QM U.S. Small-Cap Growth Equity, QM U.S. Value Equity, QM U.S. Small & Mid-Cap Core Equity, and QM Global Equity Funds. Mr. Nanda is a vice president of T. Rowe Price Group, Inc.

Mr. Nanda has 17 years of investment experience, 16 of which have been with T. Rowe Price. Before joining the firm in 2000, he was an assistant professor of finance at Penn State University, Harrisburg. Mr. Nanda has several years of international experience in financial and general management positions with Tata Steel in India.

Mr. Nanda earned a B.A., with honors, in mathematics from St. Stephen's College, Delhi, and an M.B.A. from the Indian Institute of Management, Calcutta. He also received a Ph.D. in finance from the University of Massachusetts, Amherst. He has earned the Chartered Financial Analyst designation. Mr. Nanda served on the Financial Accounting Standards Board's (FASB) User Advisory Council and has had several articles published in the areas of investments, mergers and acquisitions, and international finance. His papers have appeared in The Journal of Portfolio Management, Financial Management, and the Handbook of Equity Style Management.

BIOGRAPHICAL BACKGROUNDS

T. Rowe Price—Presenters

Brian C. Dausch, CFA

Brian Dausch is a portfolio specialist in the U.S. Equity Division of T. Rowe Price. He is a member of the Global Natural Resources Equity, US Mid-Cap Growth Equity, US Small-Cap Growth Equity, QM US Small-Cap Growth Equity, and Health Sciences Strategy teams, working closely with institutional clients, consultants, and prospects. Mr. Dausch is a vice president of T. Rowe Price Group, Inc.

Mr. Dausch has 19 years of investment experience, 18 of which have been at T. Rowe Price. He joined the firm in 1998; prior to his current position, he managed the U.S. Equity Portfolio Analysis Group. Mr. Dausch also served as an associate research analyst in the U.S. Equity Division in health care, specializing in biotechnology and pharmaceutical company research.

Mr. Dausch earned a B.S. in business administration, with a concentration in finance, from the University of Delaware. He also has earned the Chartered Financial Analyst designation.

John D. Plowright, CFA

John Plowright is a North America client service executive for Global Investment Services, the organization responsible for the firm's institutional business worldwide. He is a vice president of T. Rowe Price Group, Inc., and T. Rowe Price Associates, Inc.

Mr. Plowright has 25 years of investment experience, 12 of which have been at T. Rowe Price. Before joining T. Rowe Price in 2004, he was a director of client services with RCM Capital Management, and prior to that, he was a director and fixed income specialist with RCM Capital Management.

Mr. Plowright earned a B.A. in religion from Earlham College, cum laude, and a master's degree in international management from American Graduate School of International Management. Mr. Plowright has earned the Chartered Financial Analyst designation and is a Series 7 and 63 registered representative.

FEE SCHEDULE

QM US Small-Cap Growth Equity Composite

As of 31 December 2016

The QM US Small-Cap Growth Equity Composite seeks long-term capital appreciation primarily through investment in small-cap companies with potential for above-average earnings growth. The strategy applies quantitative and active management techniques to achieve its investment objectives. (Created June 2006) (Formerly known as the US Structured Active Small-Cap Growth Equity Composite.)

First 250 million (USD)	55 basis points
Above 250 million (USD)	50 basis points
Minimum separate account size	50 million (USD)

GIPS® DISCLOSURE

QM US Small-Cap Growth Equity Composite

Period Ended December 31, 2016
Figures Shown in U.S. dollar

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Gross Annual Returns (%)	10.44	-35.81	39.61	35.47	2.30	16.63	45.11	7.26	3.16	12.11
Net Annual Returns (%)[1]	9.84	-36.18	38.86	34.74	1.74	15.99	44.34	6.68	2.59	11.50
Benchmark (%)[2]	9.71	-40.11	41.97	30.71	-1.53	17.57	44.50	4.69	-3.05	13.44
Composite 3-Yr St. Dev.	12.20	19.61	23.12	26.23	23.08	20.44	16.77	12.37	12.97	13.63
Benchmark 3-Yr St. Dev.	14.13	21.77	25.94	28.68	24.82	20.62	17.01	13.09	14.16	15.50
Composite Dispersion	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Comp. Assets (Millions)	694.1	485.3	643.1	900.5	938.9	1,313.2	2,479.9	2,914.1	3,977.4	5,414.7
# of Accts. in Comp.	3	3	3	3	3	3	3	3	3	4
Total Firm Assets (Billions)	397.5	275.7	395.2	485.0	493.1	579.8	696.3	749.6	772.4	817.2

[1]Reflects deduction of highest applicable fee schedule without benefit of breakpoints. Investment return and principal value will vary. Past performance cannot guarantee future results. Monthly composite performance is available upon request. **See below for further information related to net of fee calculations**.

[2]Effective October 2, 2006, the benchmark for the composite changed to the MSCI U.S. Small-Cap Growth Index. Prior to this change, the benchmark was the Russell 2000 Growth Index. The change was made because the firm viewed the new benchmark to be a better representation of the investment strategy of the composite. Historical benchmark representations have not been restated.

T. Rowe Price (TRP) has prepared and presented this report in compliance with the Global Investment Performance Standards (GIPS®). TRP has been independently verified for the 20-year period ended June 30, 2016 by KPMG LLP. The verification report is available upon request. Verification assesses whether (1) the firm has complied with all the composite construction requirements of the GIPS standards on a firm-wide basis and (2) the firm's policies and procedures are designed to calculate and present performance in compliance with the GIPS standards. Verification does not ensure the accuracy of any specific composite presentation.

TRP is a U.S. investment management firm with various investment advisers registered with the U.S. Securities and Exchange Commission, the U.K. Financial Conduct Authority, and other regulatory bodies in various countries and holds itself out as such to potential clients for GIPS purposes. TRP further defines itself under GIPS as a discretionary investment manager providing services primarily to institutional clients with regard to various mandates, which include U.S., international, and global strategies but excluding the services of the Private Asset Management group. The minimum asset level for equity portfolios to be included in composites is $5 million and prior to January 2002 the minimum was $1 million. The minimum asset level for fixed income and asset allocation portfolios to be included in composites is $10 million; prior to October 2004 the minimum was $5 million; and prior to January 2002 the minimum was $1 million. Valuations are computed and performance reported in U.S. dollars.

Gross performance returns are presented before management and all other fees, where applicable, but after trading expenses. Net of fees performance reflects the deduction of the highest applicable management fee that would be charged based on the fee schedule appropriate to you for this mandate, without the benefit of breakpoints. Gross and net performance returns are net of nonreclaimable withholding taxes on dividends, interest income, and capital gains. Effective June 30, 2013, portfolio valuation and assets under management are calculated based on the closing price of the security in its respective market. Previously portfolios holding international securities may have been adjusted for after-market events. Policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request. Dispersion is measured by the standard deviation across asset-weighted portfolio returns represented within a composite for the full year. Dispersion is not calculated for the composites in which there are five or fewer portfolios.

Some portfolios may trade futures, options, and other potentially high-risk derivatives which generally represent less than 10% of a portfolio.

Benchmarks are taken from published sources and may have different calculation methodologies, pricing times, and foreign exchange sources from the composite.

Composite policy requires the temporary removal of any portfolio incurring a client initiated significant cash inflow or outflow greater than or equal to 15% of portfolio assets. The temporary removal of such an account occurs at the beginning of the measurement period in which the significant cash flow occurs and the account re-enters the composite on the last day of the current month after the cash flow. Additional information regarding the treatment of significant cash flows is available upon request.

The firm's list of composite descriptions and/or a presentation that adheres to the GIPS® standards are available upon request.

A portfolio management change occurred effective October 2, 2006. There were no changes to the investment program or strategy related to this composite.

APPENDIX

ANNOUNCED MERGERS

PREMIUM AND CONTRIBUTION ARE CALCULATED USING THE ONE-DAY PREMIUM DEFINITION[1]

T. Rowe Price QM US Small-Cap Growth Equity Strategy Announced Acquisitions
(2006 Through 31 December 2016)

Calendar Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	18 companies 21% average premium	34 companies 28% average premium	11 companies 37% average premium	12 companies 44% average premium	26 companies 34% average premium	15 companies 32% average premium	19 companies 33% average premium	11 companies 26% average premium	21 companies 36% average premium	19 companies 26% average premium	12 companies 31% average premium
	Digitas	Respironics, Inc.	Epicor Software[4]	Chattem	Dionex	Pharmasset	TNS, Inc.	ViroPharma	Riverbed Technology[2]	Heartland Payment Systems	Team Health Holdings
	Station Casinos	MGI Pharma	Sciele Pharma	Avocent Corp.	Tenet Healthcare	Alberto-Culver	Warnaco Group	Digital Generation	Cubist Pharmaceuticals	ZS Pharma	Cepheid
	Digital Insights	Philips Lighting	Philadelphia Consolidated	Perot Systems	Verigy Ltd.	HealthSpring	OPNET Technologies	Sourcefire	Actuate Corp	Rite-Aid	Medivation
	Open Solutions	Pharmion Corp.	Foundry Networks	Omniture, Inc.	J. Crew Group	Complete Production	Ancestry.com	ONYX Pharmaceuticals	Avanir Pharmaceuticals	SolarWinds	Press Ganey Holdings
	Myogen	Visual Sciences	Hercules	Marvel Entertainment	Bucyrus Intl	PharMerica	Cymer	True Religion Apparel	TIBCO Software	Team Health Holdings	Polycom
	Symbol Technologies	United Industrial	W-H Energy Services	SPSS	Atlas Energy	AMAG Pharmaceuticals	Kenexa	ebix.com	Athlon Energy	Sirona Dental Systems[4]	Integrated Device Technology, Inc.
	FileNet	Leap Wireless	DRS Technology	Varian	Art Technology	Blackboard	Robbins & Myers	Power-One	Concur Technologies	Strategic Hotels & Resorts	Medivation, Inc.
	Michaels Stores	Rare Hospitality	LifeCell	Medarex Inc.	Syniverse Holdings	CTC Media	RailAmerica	Lufkin	Auxilium Pharmaceuticals[2,4]	Thoratec Corp	Anacor Pharmaceuticals, Inc.
	Inter-Tel Inc.[3]	Kyphon	Ansoft LLC	Wind River Systems	CommScope	Varian Semiconductor	Par Pharmaceutical	Gardner Denver	Conversant	Receptos	FEI Co.
	Parlux Fragrances	Applebee's Intl.	Choicepoint Precision	Foundation Coal	Gymboree	Vital Images	Amerigroup	Acme Packet	InterMune	Health Net	Diamond Resorts International, Inc.
	The Sportsman's Guide	Chaparral Steel	Bright Horizons Family	Emulex Corp.	ZymoGenetics	American Medican	Ariba	MAP Pharmaceuticals	Bally Technologies	Rosetta Resources	Starz
	Applied Films	Dobson Communications	Triad Hospitals	Interwoven, Inc.	NBTY, Inc.	Epicor Software	Human Genome Sciences	Illumina	Rockwood Holdings	Synageva BioPharma	Affymetrix
	Stone Energy	Ventana Medical	TODCO		Valeant Pharmaceuticals[4]	SRA International	Catalyst Health Solutions		MICROS Systems	Informatica	
	KCS Energy	Color Kinetics	Aeroflex[2]		American Italian Pasta	Danvers Bancorp	Knology		TW Telecom	Pharmacyclics	
	Education Management Corp	Digene	Hyperion Solutions		Eclipsys Corp.	Atheros Communications	Quest Software		Idenix Pharmaceuticals	Aruba Networks[5]	
	MatrixOne, Inc.	Cytyc Corp	Florida Rock Industries		Psychiatric Solutions		Taleo		Hittite Microwave	Salix Pharmaceuticals	
	Lifeline Systems	aQuantive	Hydril		Sybase		Thomas & Betts		Susser Holdings	Advent Software	
	Hughes Supply	Inter-Tel[3]	Witness Systems		inVentiv Health		Solutia, Inc.		Questcor Pharmaceuticals	MWI Veterinary Supply	
		Inforte Corp.	Investors Financial		CyberSource		Illumina		Cadence Pharmaceuticals	NPS Pharmaceuticals	
		Armor Holdings	United Surgical Partners		Phase Forward				Aaron's		
		International Securities Exchange			DynCorp Intl.				ArthroCare		
		Covansys Corp.			Arena Resources[4]				Riverbed Technology[2]		
		Symbion			RiskMetrics						
		Lone Star Technologies			OSI Pharmaceuticals						
		InfraSource Services			Airgas, Inc.						
					Brink's Home Security						
Estimated Contribution to absolute return (in bps)	116	265	105	132	247	117	194	72	200	154	87

Past performance cannot guarantee future results.

[1] One-day premium= (Offer price per share-Target's closing price one trading day prior to announcement)/Target's closing price one trading day prior to announcement.
Not all M&A is profitable for the strategy; a positive 1-day premium does not imply that the holding was profitable for the strategy over a longer time period. Additional information is available upon request.
The chart represents all M&A activity of the strategy's holdings each year; it does not represent all of the strategys holdings. NO assumption should be made as to when the stock was bought or sold, or if it is stil held by the strategy.

[2] Firm received multiple competing offers. Largest one-day premium used in calculation.

[3] First offer was cancelled or withdrawn before second offer was announced.

[4] Acquisition activity is not included in the premium or estimated contribution to absolute return calculation since the takeover price was below the market and thus reflects no premium.

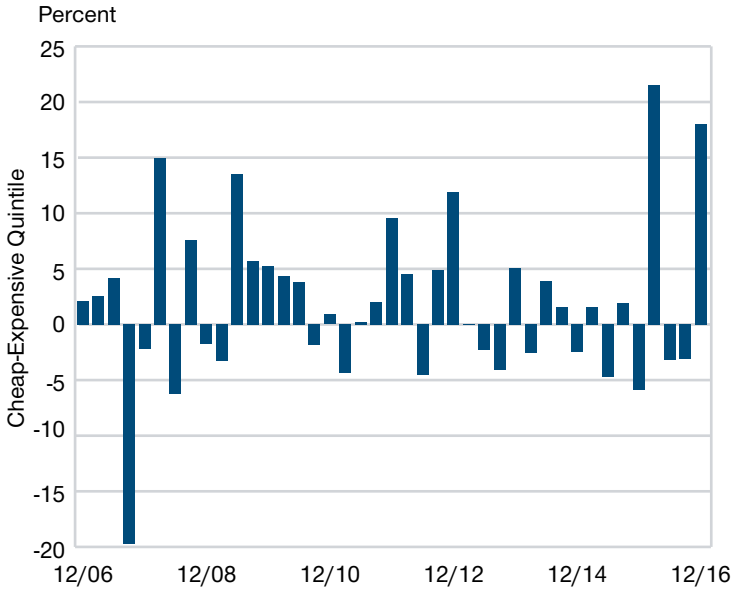
[5] Due to market rumors, shares rose significantly prior to the official announcement. As a result, the official 1-day premium was calculated using the date the rumors surfaced instead of the official announcement date. Had the announcement date been used, the average premium for 2015 would have been 25% instead of 26%, and the estimated contribution to absolute return would have been 152 bps instead of 154 bps.

Source: FactSet.

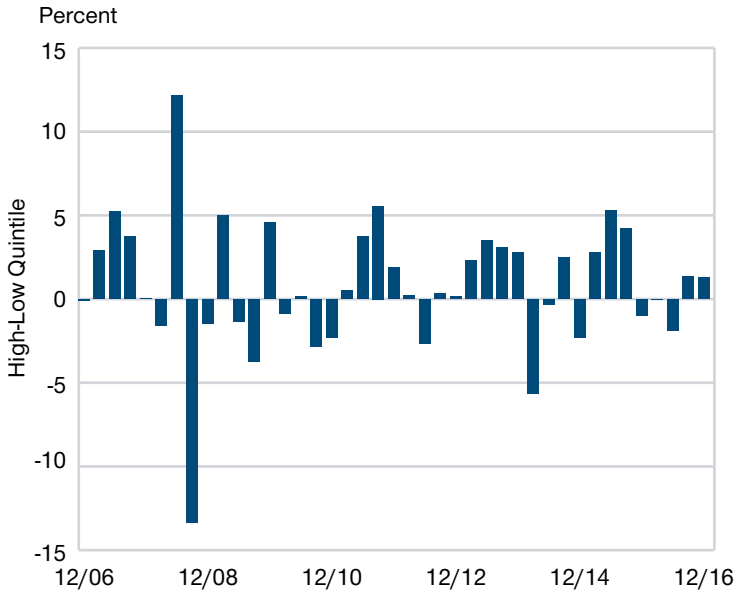
FACTOR RETURNS

31 December 2006 Through 31 December 2016

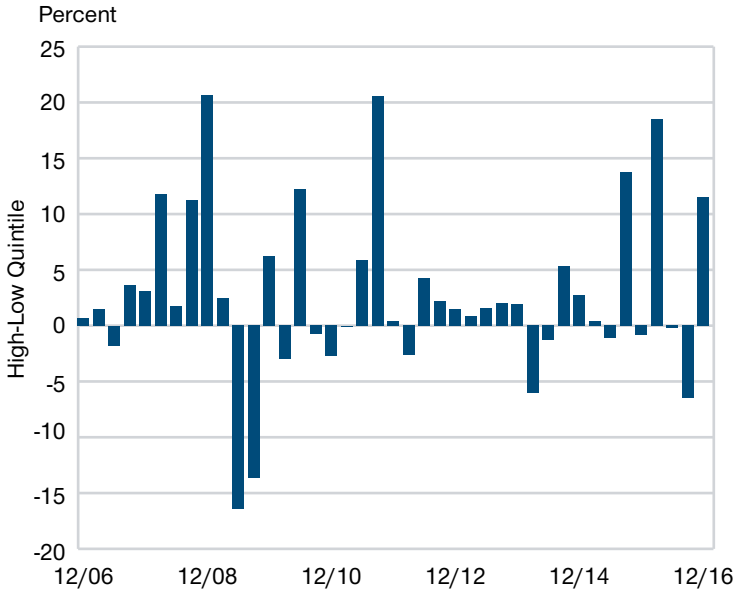
VALUATION COMPOSITE



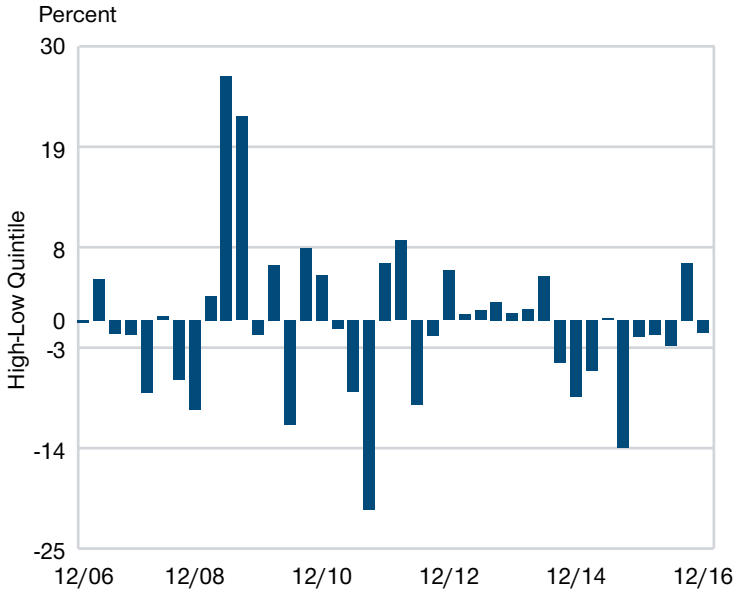
GROWTH COMPOSITE



QUALITY COMPOSITE



BETA



Each bar represents the return differential for a trailing twelve month period ending on a rolling quarterly basis based on the constituents of the MSCI U.S. Small-Cap Growth Index.
Sources: Compustat, Thomson Reuters.

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ARROWMARK
PARTNERS

FORMERLY ARROWPOINT PARTNERS

SMALL CAP GROWTH

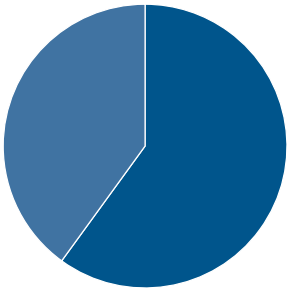
PREPARED FOR ALASKA RETIREMENT MANAGEMENT BOARD

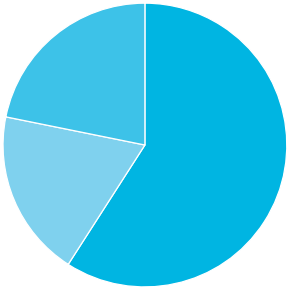
ArrowMark Partners At-A-Glance

Established in 2007 by veteran investment professionals with proven track record of delivering results and preserving capital across market cycles

- 33 tenured investment professionals with an average of 16 years of experience
- Active investment process, driven by proprietary fundamental research and analysis
- Investment expertise in credit-oriented fixed income and select equity strategies, along with absolute return alternative solutions
- Skilled ability to identify asymmetric risk-reward investment opportunities in specialized and niche areas of the markets
- 100% employee-owned
- Offering both alternative and traditional investment strategies for high net-worth individuals, financial advisors and institutions
- Headquartered in Denver, CO with offices in California and New York

$11.0 billion **in Assets Under Management**
(as of 12/31/2016)





BY ASSET CLASS ($B)

Equities
$6.6

Fixed Income
$4.4

BY CLIENT TYPE ($B)

Institutional
$6.5

Financial Intermediaries
$2.4

Family Office
$2.1

AUM as of 12/31/2016
Past performance is no guarantee of future results. There is no assurance the objectives may be met.

ArrowMark Partners Advantage

Team Experience and Continuity	▪ Intensely collaborative, highly integrated culture ▪ Decades of experience working together through multiple market cycles ▪ In-depth knowledge across the capital structure
Specialized and Agile Platform	▪ Established platform for capturing opportunities from compelling, niche markets ▪ Focused on segments where our size and agility offer a distinct competitive edge ▪ Select credit, alternative fixed income and equity strategies
Risk-First Fundamental Research	▪ Accomplished ability identifying complex, asymmetric risk/reward opportunities ▪ Strong belief that downside mitigation is critical for long-term success ▪ Disciplined investment process based on proprietary, fundamental analysis
Clients at Our Core	▪ Privately held firm driven by client needs, not corporate mandates ▪ Deep passion for solving challenges and building strong partnerships ▪ Long-term perspective that places client best interests at the core of all we do

ArrowMark Partners Experience

Our breadth and depth of experience, combined with trusted and tenured partnerships, informs our foundational culture and keeps our clients at the center of all we do

David Corkins, Founding Partner and Portfolio Manager
30 Years of Investment Experience
Alternative Multi-Strategy and Fixed Income Solutions, Large Cap Equities
1997-2007 - Janus Capital Group, Portfolio Manager
1995-1997 - Janus Capital Group, Equity Research Analyst and Assistant Portfolio Manager
1988-1995 - Chase Manhattan, CFO Mortgages

Minyoung Sohn, CFA, Founding Partner and Portfolio Manager
18 Years of Investment Experience
U.S. Large Cap Equities
2004-2007 - Janus Capital Group, Portfolio Manager
1998-2004 - Janus Capital Group, Equity Research Analyst

Karen Reidy, CFA, Founding Partner and Portfolio Manager
25 Years of Investment Experience
Corporate Credit, Equity and Income Strategies
2000-2005 - Janus Capital Group, Portfolio Manager
1998-2000 - Janus Capital Group, Equity Research Analyst and Assistant Portfolio Manager

Sanjai Bhonsle, Partner and Portfolio Manager
21 Years of Investment Experience
Leveraged Finance
2005-2009 - GSO Capital Partners, Senior Portfolio Manager
2001-2005 - RBC Capital Partners, Assistant Portfolio Manager

Kaelyn Abrell, Partner and Co-Portfolio Manager
17 Years of Investment Experience
Structured Credit, Securitized Assets
2004-2008 - Janus Capital Group, Fixed Income Research Analyst
1998-2004 - Great-West Life, Assistant Portfolio Manager

Chad Meade, Partner and Portfolio Manager
17 Years of Investment Experience
U.S. Small and Mid Cap Equities
2006-2013 - Janus Capital Group, Co-Portfolio Manager
2001-2006 - Janus Capital Group, Equity Research Analyst

Brian Schaub, CFA, Partner and Portfolio Manager
16 Years of Investment Experience
U.S. Small and Mid Cap Equities
2006-2013 - Janus Capital Group, Co-Portfolio Manager
2000-2006 - Janus Capital Group, Equity Research Analyst

ArrowMark Partners Platform

Our specialized expertise and proprietary fundamental research allow us to identify opportunities across the capital structure with the goal of delivering attractive risk-adjusted returns for our clients

Fixed Income

We look to avoid crowded markets by focusing on niche opportunities offering positive asymmetric return profiles

- Regulatory Capital Relief
- Securitized Debt
- Structured Credit
- Collateralized Loan Obligations
- Middle Market Loans

Alternative Solutions

Our original multi and single sector solutions are designed to deliver attractive risk-adjusted returns and preserve capital in all market environments

- Income Opportunity Fund
- Fundamental Opportunity Fund
- Global Opportunity Fund
- Specialty Finance Fund

Long Only Equity

Our equity strategies focus in areas where we can invest with high conviction, capacity is scarce, or a special situation is emerging

- Focused Equity
- Small Cap Growth
- Small and Mid Cap Growth
- Contrarian

ARROWMARK PARTNERS

FORMERLY ARROWPOINT PARTNERS

ArrowMark Partners

Small Cap Growth Strategy

Appendix

Small Cap Growth Key Characteristics

Fundamental Research Driven Process	▪ Fundamental research is at the core of the investment process ▪ Identify high-quality businesses and differentiated business models with a sustainable competitive advantage
Risk Before Return	▪ Prioritize downside risk before potential return
Long Time Horizon	▪ Average holding period of around four years ▪ Investors not traders

Small Cap Growth Differentiation

A unique perspective drives our view of active management

Manager Structure

- Portfolio Managers developed investment approach together and emphasize adherence to the disciplined, repeatable process
- Co-portfolio manager structure provides checks and balances to help mitigate mistakes
- Manager structure encourages objective analysis during difficult market cycles

Risk-First Approach

- Position size is driven purely by the risk profile of the company
- Team continuously monitors competitive landscape of portfolio holdings
- DCF scenario analysis includes a best/base/worst case for each position in the portfolio

View of Volatility

- Process preys on volatility
- Team utilizes bottoms-up fundamental research to identify dislocations
- Team maintains active wish list to deploy capital during volatile markets

Small Cap Growth Team

SMALL CAP GROWTH

Chad Meade
Co-Portfolio Manager
17 Years of Experience

&

Brian Schaub
Co-Portfolio Manager
16 Years of Experience

Fundamental Research Team
6 Equity Investment Analysts
Average of 13 Years of Experience

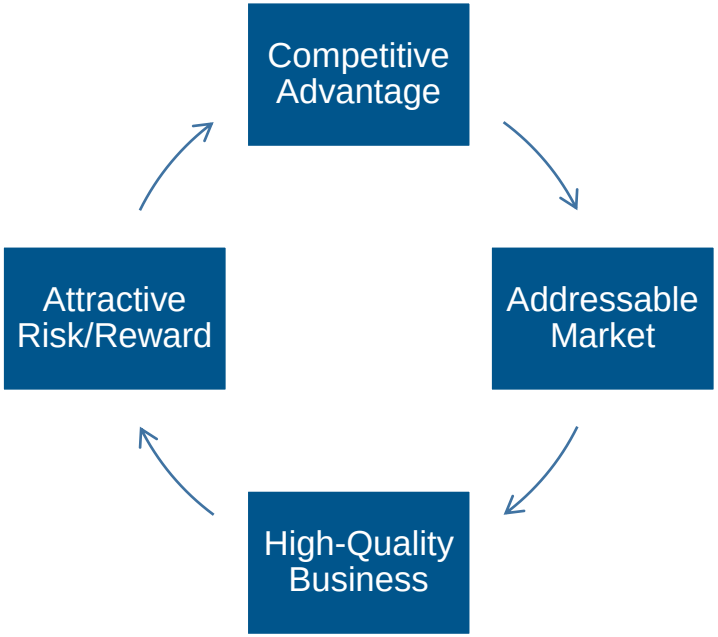
Risk Committee Oversight by Founding Partners
Average of 24 Years of Industry Experience

Operations and Compliance
Average of 15 Years of Industry Experience

Client Service
Average of 17 Years of Industry Experience

Investment Process Stock Selection

Security selection drives outperformance



Competitive Advantage

- High barriers to entry
- Product differentiation
- Pricing power

Addressable Market

- Increasingly large market opportunity
- Low existing penetration
- Secular tailwinds
- Longer period of rapid growth

High-Quality Business

- Scalable model
- Predictable and recurring revenue stream
- Improving margins and return on invested capital

Attractive Risk/Reward

- Determine range of possible outcomes rather than target price
- Focus on downside risk

Getting a Step Ahead

Knowing what not to own in small cap has a big impact on absolute and relative returns

Best

Worst

Russell 2000® Growth 5-Year Total Return				
Quintile	2016	2015	2014	2013
1	312%	305%	395%	751%
2	133%	84%	147%	222%
3	60%	25%	75%	109%
4	-1%	-26%	15%	30%
5	-73%	-82%	-63%	-55%

Russell 1000® Growth 5-Year Total Return				
Quintile	2016	2015	2014	2013
1	267%	234%	287%	533%
2	133%	109%	155%	232%
3	84%	60%	102%	155%
4	40%	15%	58%	95%
5	-33%	-52%	-22%	15%

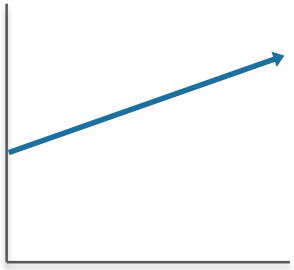
Quintile definition: A statistical value of a data set that represents 20% of a given population. These tables represent the performance of the Russell 2000 Growth Index and the Russell 1000 Growth Index over a five-year period for each corresponding end year listed above.

Past performance is no guarantee of future results.

Source: Factset as of 12/31/2016.

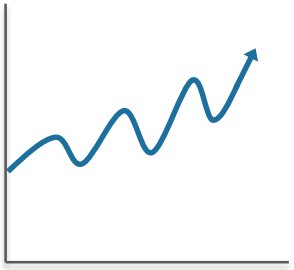
Portfolio Outputs Common Company Types

Stable Growth



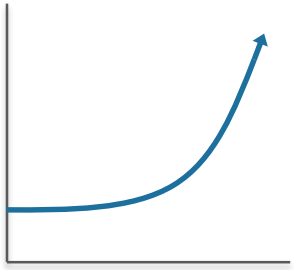
- Consistent growth
- Low risk of surprises
- Proven track record

Cyclical Share Gainers



- Capturing market share
- Above-market growth over the full market cycle
- Strong competitive position

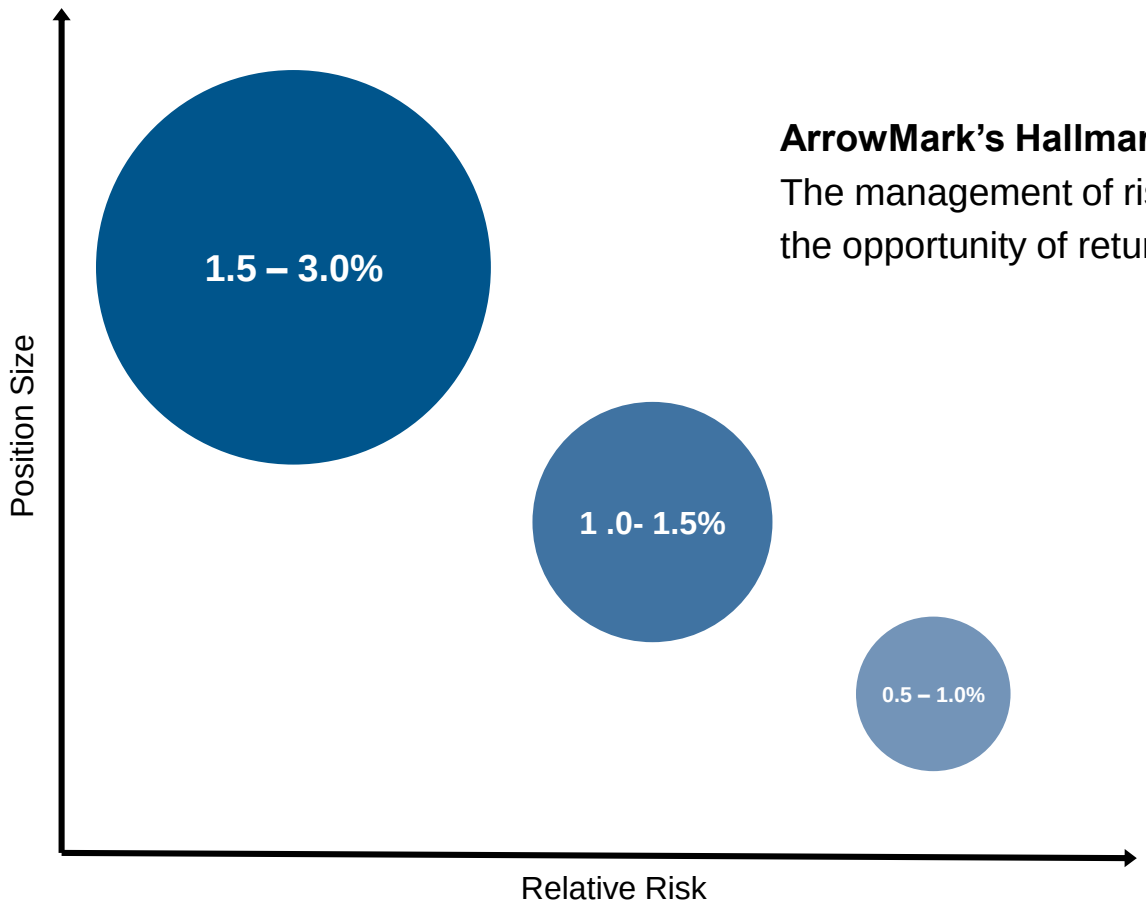
Game-Changing Growth



- Highly differentiated product or service
- Rapid growth through any macroeconomic environment
- Low share of large addressable market

Investment Process Portfolio Construction

Risk determines position size



ArrowMark's Hallmark Principle:
The management of risk before the opportunity of return

Investment Process Sell Discipline

Rules-based

- Market cap exceeds≈ $4 billion
- Position size becomes too large for risk appetite
- Market price exceeds “best case” estimate of fair value
- Comparable name presents better risk/reward profile

Research-based

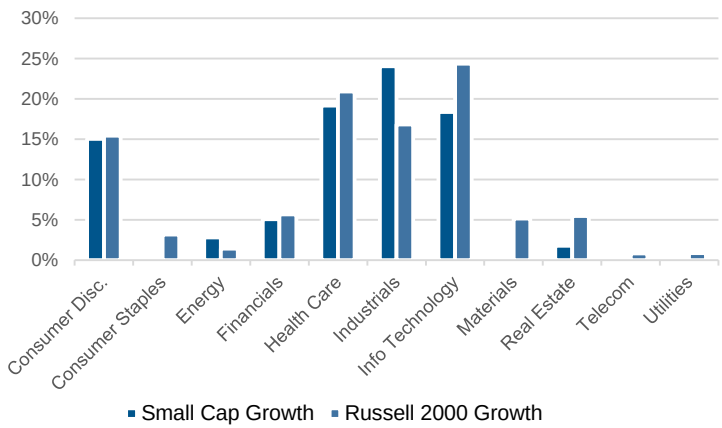
- Investment thesis is tested
- Competitive advantage deteriorates
- Poor capital allocation decision by management and board of directors
- Regulatory environment becomes unpredictable
- Company loses control of its own economic destiny

Small Cap Growth Characteristics

December 31, 2016

Portfolio Characteristics	
Number of Holdings	105
Weighted Average Market Cap *(USD mm)*	$1,529
Price-to-Earnings	29.43
Price-to-Book	2.96
Price-to-Sales	1.63
Price-to-Cash Flow	14.21

Sector Weightings



Top Ten Holdings	Weighting (%)
Sally Beauty Holdings, Inc.	2.72%
Heritage-Crystal Clean, Inc.	2.40%
CEB, Inc.	2.29%
INC Research Holdings, Inc.	2.11%
Evolution Petroleum Corp.	2.02%
InnerWorkings, Inc.	1.89%
Grand Canyon Education, Inc.	1.82%
TriNet Group, Inc.	1.81%
Wolverine World Wide, Inc.	1.61%
BATS Global Markets, Inc.	1.61%

Past performance is no guarantee of future results.
Portfolio holdings and sectors are subject to change. Characteristics shown are based on a representative account. Top ten holdings are based on total portfolio assets, including cash, and are subject to change.

Small Cap Growth Composite

December 31, 2016

	3-Month	YTD 2016	1-Year	Since Inception (Annualized)*
Small Cap Growth Composite (Gross)	3.07%	22.66%	22.66%	12.12%
Small Cap Growth Composite (Net)	2.85%	21.57%	21.57%	11.21%
Russell 2000® Growth	3.57%	11.32%	11.32%	5.05%
Excess Return	*-0.72%*	*10.25%*	*10.25%*	*6.16%*

Past performance is no guarantee of future results. Share price, principal value, yield and return will vary, and you may have a gain or loss when you sell your shares. Separately managed accounts and related investment advisory services are provided by ArrowMark, a federally registered investment adviser.

Separately managed accounts and related investment advisory services are provided by ArrowMark, a federally registered investment adviser. Please see slide 27 for additional risk disclosures.

*The inception date of the composite is 1/1/2014.

Small Cap Growth Expectations

Strategy Outperformance

- Portfolio is expected to outperform on a relative basis in down markets
- Process identifies market leaders that gain share during economic downturns and stable growers that provide ballast in turbulent bear markets
- High quality businesses with strong management teams find ways to create shareholder value through a cycle

Strategy Underperformance

- Relative portfolio underperformance is expected in strong bull markets, prolonged absences of volatility and markets driven by a rally in low quality names
- Intention is to keep pace with the benchmark during these periods

ArrowMark Small Cap Growth Composite
ArrowMark Colorado Holdings, LLC
January 1, 2014 through December 31, 2016

Year	Gross-of-Fees Return (%)	Net-of-Fees Return (%)	Benchmark Return (%)	Composite 3-Yr St Dev (%)	Benchmark 3-Yr St Dev (%)	Number of Portfolios	Internal Dispersion (%)	Total Composite Assets (USD mil)	Total Firm Assets (USD mil)
YTD 2016	22.66%	21.57%	11.32%	14.91%	16.67%	8	n/a	$929	$6,346
2015	-5.07%	-5.73%	-1.38%	n/a	n/a	6	n/a	$406	$3,772
2014	21.03%	19.99%	5.60%	n/a	n/a	<5	n/a	$110	$3,809

ArrowMark Institutional claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. ArrowMark Institutional has been independently verified for the periods 7/01/09 – 12/31/15. The verification report is available upon request. Verification assesses whether (1) the firm has complied with all the composite construction requirements of the GIPS standards on a firm-wide basis and (2) the firm's policies and procedures are designed to calculate and present performance in compliance with the GIPS standards. Verification does not ensure the accuracy of any specific composite presentation.

Firm and Composite Information

ArrowMark Colorado Holdings, LLC ("ArrowMark Partners") is a Denver, Colorado-based investment adviser registered with the Securities and Exchange Commission under the Investment Advisors Act of 1940. ArrowMark manages multiple strategies and multiple investment vehicles. *ArrowMark Institutional* (claims GIPS compliance) – Includes long-oriented strategies that are typically managed relative to an index. ArrowMark Institutional is presented to investors as a separate entity through a mutual fund or through the associated ArrowMark Institutional separate and sub-advised accounts. ArrowMark Institutional accounts are generally overseen by portfolio managers who are dedicated entirely to ArrowMark Institutional account management.
The ArrowMark Small Cap Growth Composite seeks long-term growth of capital by investing primarily in equity securities of small capitalization companies. Under normal circumstances, at least 80% of the Composite's assets will be invested in U.S. equity securities of small capitalization companies. The Composite may also invest up to 20% of its assets in securities of companies of any market capitalization.
Accounts included are comprised of all actively managed long only equity accounts that are measured to the Russell 2000 Growth Index and invested using a fundamental research approach. These accounts invest primarily in small capitalization growth securities.

The ArrowMark Small Cap Growth Composite was created in May 2014. A complete list and description of firm composites is available upon request.

Benchmark

The Russell 2000® Growth Index measures the performance of the small-cap growth segment of the U.S. equity universe. It includes those Russell 2000 companies with higher price-to-value ratios and higher forecasted growth values.

Performance Calculations

Valuations and returns are computed and stated in U.S. Dollars. Results reflect the reinvestment of dividends and other earnings.

Gross-of-fees returns are presented before management and custodial fees, but after all trading expenses and withholding taxes. Net-of-fees returns are calculated using actual management fees that were paid and are presented before custodial fees but after management fees, all trading expenses, and withholding taxes.

The standard management fee for the ArrowMark Small Cap Growth Composite is 1.00% per annum on the first $25 million USD, 0.90% on the next $75 million and 0.70% over $100 million. Additional information regarding ArrowMark's fees is included in its Part II of Form ADV.

Internal dispersion is calculated using the asset-weighted standard deviation of all accounts included in the composite for the entire year; it is not presented for periods less than one year or when there were five or fewer portfolio in the composite for the entire year.

The three-year annualized standard deviation measures the variability of the composite and the benchmark returns over the preceding 36-month period. The 3-year ex-post standard deviation is not presented for 2014 and 2015 because 36 monthly composite returns were not available.

Policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request.

Past performance does not guarantee future results.

ARROWMARK PARTNERS

FORMERLY ARROWPOINT PARTNERS

ArrowMark Partners

Small Cap Growth Strategy

Appendix

Key Personnel Portfolio Managers

CHAD MEADE | Partner, Portfolio Manager

Chad is a Partner and Portfolio Manager at ArrowMark Partners and has 17 years of experience in the financial industry. He previously served as the Co-Portfolio Manager and Executive Vice President of the Janus Triton Fund (2006-2013) and the Janus Venture Fund (2010-2013). While an equity research analyst at Janus Capital (2001-2011), he focused on small and mid capitalization stocks in the healthcare and industrials sectors. Prior to joining Janus Capital, he was a financial analyst for Goldman Sachs' global investment research team. Chad graduated summa cum laude from Virginia Tech with a bachelor's degree in Finance and was a member of the Omicron Delta Kappa Honor Society.

BRIAN SCHAUB, CFA | Partner, Portfolio Manager

Brian is a Partner and Portfolio Manager at ArrowMark Partners and has 16 years of experience in the financial industry. He previously served as the Co-Portfolio Manager and Executive Vice President of the Janus Triton Fund (2006-2013) and the Janus Venture Fund (2010-2013). During his time as an equity research analyst at Janus Capital (2000-2011), he focused on small and mid capitalization stocks in the communications sector. Brian graduated cum laude from Williams College with a bachelor's degree in Economics and won the Arthur B. Graves, Class of 1858, Essay Prize in Economics for his work on Dell Computer. He holds the Chartered Financial Analyst designation.

Key Personnel Founding Partners

DAVID CORKINS | Partner, Portfolio Manager

David is a Co-Founder, Partner and Portfolio Manager at ArrowMark Partners. Prior to founding ArrowMark Partners, he served as Executive Vice President and Portfolio Manager at Janus Capital, managing $20 billion for multiple investment strategies: Janus Fund, Janus Mercury Fund and Janus Growth & Income Fund, as well as institutional separate accounts (1997-2007). David was also an Assistant Portfolio Manager and equity analyst for various equity, international and balanced portfolios (1995-1997). Prior to joining Janus Capital, David served as Chief Financial Officer of Chase US Consumer Services, Inc., a Chase Manhattan mortgage business (1988-1995). Before being named CFO, David worked in a broad variety of businesses at Chase, including international banking, commercial lending and asset-backed finance. David graduated cum laude from Dartmouth College with a bachelor's degree in English and Russian and earned an MBA at Columbia University.

KAREN REIDY, CFA | Partner, Portfolio Manager

Karen is a Co-Founder, Partner and Portfolio Manager at ArrowMark Partners. Prior to founding ArrowMark Partners, she served as Executive Vice President and Portfolio Manager at Janus Capital, managing $10 billion for two strategies: Janus Balanced Fund and Janus Core Equity Fund, as well as institutional separate accounts (2000-2005). Karen was also Assistant Portfolio Manager of the Janus Fund (1998-2000). She joined Janus Capital as an equity analyst in 1995. Prior to Janus Capital, she worked at PricewaterhouseCoopers LLC in the audit and mergers and acquisitions departments. Karen graduated from the University of Colorado with a bachelor’s degree in Accounting, and holds the Chartered Financial Analyst designation.

MINYOUNG SOHN, CFA | Partner, Portfolio Manager

Minyoung is a Partner and Portfolio Manager at ArrowMark Partners. He previously served as Executive Vice President and Portfolio Manager at Janus Capital, managing $10 billion for the Janus Growth & Income Fund (2004-2007) and the Janus Fundamental Equity Fund (2005-2007). Minyoung joined Janus Capital in 1998 as an equity analyst covering a broad range of sectors and was appointed Assistant Portfolio Manager in 2004. Minyoung graduated cum laude from Dartmouth College with a bachelor’s degree in Government and Economics, and holds the Chartered Financial Analyst designation.

Key Personnel Leadership Structure

Founding Partners
David Corkins, Karen Reidy, Minyoung Sohn

Investments

Equity

Small Cap/SMID

Chad Meade
Partner, Portfolio Manager
17 Years Experience

Brian Schaub, CFA
Partner, Portfolio Manager
16 Years Experience

Equity Income

Minyoung Sohn, CFA
Partner, Portfolio Manager
18 Years Experience

Contrarian

James England, CFA
Portfolio Manager
21 Years Experience

Alternatives

Fixed Income

Kaelyn Abrell
Partner, Co-Portfolio Manager
17 Years Experience

Credit Opportunities

Sanjai Bhonsle
Partner, Portfolio Manager
21 Years Experience

Compliance/Operations

Rick Grove
CCO, COO
24 Years Experience

Investor Relations

Chris Dunne
Managing Director
23 Years Experience

Compliance and Operational Infrastructure

A strong, scalable operational infrastructure is critical in fulfilling our fiduciary responsibilities, servicing clients and managing future growth

PERSONNEL

- Dedicated team to manage best-in-class internal and external operational infrastructure

SYSTEMS AND TECHNOLOGY

- Significant investment in technology to enhance controls and operational efficiency

INTERNAL CONTROLS AND OVERSIGHT

- Implement best practice controls and oversight policies commensurate with our business and investment strategy

SERVICE PROVIDERS

- Extend functional expertise of operations team through strategic alignment with independent service providers

Compliance and Operational Infrastructure

Function	Infrastructure
Systems and Technology	▪ Order management system (EzeCastle) ▪ External portfolio accounting system (Broadridge Financial Solutions) ▪ Attribution and risk management (Bloomberg Proprietary Overlays) ▪ Proxy analysis, voting and reporting (Glass, Lewis & Co.) ▪ Business continuity (Viawest co-location) ▪ Bond analytics (Intex Solutions/YieldBook/Proprietary Overlays)
Service Providers	▪ Tannenbaum, Helpern, Syracuse & Hirschtritt (Private Fund Counsel) ▪ KPMG LLP (Independent Private Fund Auditor) ▪ ALPS Fund Services (Private Fund Administrator) ▪ Goldman Sachs (Prime Broker) ▪ Dechert LLP (Adviser Counsel) ▪ Davis Graham & Stubbs LLP (Fund Counsel) ▪ ACA Compliance Associates (Compliance Partner) ▪ Battea (Class Action Services) ▪ Bank of New York (Mutual Fund Administrator and Transfer Agent) ▪ PricewaterhouseCoopers LLP (Independent Mutual Fund Auditor)
Internal Controls and Oversight	▪ Registered with US Securities and Exchange Commission ▪ Internal policies and procedures ▪ Designated compliance and operations team ▪ All assets held at third party custodian ▪ Committee structure provides oversight of key areas: investment, risk, trading, valuation

Investment Strategies Long-Only Equity

	Objective	Asset Class	Benchmark	Inception Date	Assets	Vehicle Options
Small and Mid Cap Growth	▪ Long-term capital appreciation ▪ Focus on downside risk	Small and Mid Cap Equity	Russell 2500™ Growth Index	8/01/1984	$4.6 bn	▪ Separate Account ▪ Mutual Fund
Small Cap Growth	▪ Long-term capital appreciation ▪ Focus on downside risk	Small Cap Equity	Russell 2000® Growth Index	12/16/2013	$996 mm	▪ Separate Account ▪ Mutual Fund ▪ UCITS
Contrarian	▪ Long-term capital appreciation ▪ Focus on turnaround candidates, depressed valuations	All Cap Equity	Russell 2500™ Index	2/10/1994	$582 mm	▪ Separate Account ▪ Mutual Fund
Equity Income	▪ Long-term capital appreciation with managed volatility ▪ Above average dividend income	Concentrated Large Cap Equity	S&P 500 Index	1/31/2005	$48 mm	▪ Separate Account ▪ Mutual Fund
Customized Solutions	▪ Tailored for specific return and volatility needs	Can entail opportunistic allocation to a specific sector or asset class	n/a	n/a	n/a	▪ Separate Account

AUM as of 12/31/2016

Disclosures

Past performance is no guarantee of future results.

The representative portfolio performance information shown is derived from a representative account deemed to appropriately represent this management style and is the portfolio that has been in existence the longest prior to the inception of the composite. In this instance, the representative portfolio is an open-ended mutual fund advised by ArrowMark Colorado Holdings, LLC.

There are risks involved with any investment. The principal risks associated with an investment in this strategy, which could adversely affect its net asset value, yield and return, are further defined in the offering documents or the Prospectus. Please see the section "Further Information About Principal Risks" in the Prospectus or offering documents for a more detailed discussion of these risks and other factors you should carefully consider before deciding to invest in the strategy. The portfolio may include securities of smaller capitalization companies and less-seasoned companies that have limited operating histories and may not yet be profitable. Investing in small or mid cap funds will be more volatile and loss of principal could be greater than investing in large cap or more diversified funds.

Current performance may be lower or higher than the quoted past performance, which cannot guarantee future results. Share price, principal value, yield and return will vary and you may have a gain or loss when you sell your shares.

Separately managed accounts and related investment advisory services are provided by ArrowMark, a federally registered investment adviser.

The Russell 2500 Growth™ Index measures the performances of the small to mid-cap growth segment of the U.S. equity universe. It includes those Russell 2500 Index companies with higher price-to-book ratios and higher forecasted growth values.

The Russell 2000 Index® measures the performance of the small-cap segment of the U.S. equity universe. The Russell 2000 is a subset of the Russell 3000 Index representing approximately 10% of the total market capitalization of that index. It includes approximately 2000 of the smallest securities based on a combination of their market cap and current index membership.

Not FDIC-Insured, Not Bank Guaranteed, May Lose Value.

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ArrowMark Partners is a trade name for ArrowMark Colorado Holdings, LLC, a registered investment adviser. ALPS Distributors, Inc., is not affiliated with ArrowMark.

MRD000257 EXP 5/01/2017

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Chris Dunne and Kristin Fenik are Registered Representatives of ALPS Distributors, Inc.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: U.S. Small Cap Growth Manager Hire

ACTION: X

DATE: April 20-21, 2017

INFORMATION: _____

BACKGROUND:

Excluding index funds and the managed volatility strategy, ARMB currently contracts with three domestic small cap core managers, three domestic small cap value managers, and one domestic small cap growth manager.

Staff identified a need to add an additional small cap growth manager in order to increase diversification from a single, dedicated small cap growth manager.

At the December 2016 Alaska Retirement Management Board (ARMB) meeting, the Board directed staff to engage Callan Associates to conduct a search for one U.S. small cap growth manager with an expected initial investment up to $100 million.

Callan has provided staff with a list of five prospective small cap growth managers as listed below. In March 2017 staff conducted due diligence on the five managers resulting in the selection of two finalist candidates.

ArrowMark Partners (formerly Arrowpoint), Brown Investment Advisory & Trust Company, Loomis Sayles & Company, RBC Global Asset Management and T. Rowe Price Associates, Inc..

STATUS:

ArrowMark Partners is a Denver-based SEC-registered investment adviser. The firm was founded in December 2007 and is privately owned by its principals. As of December 31, 2016 total firm assets under management were approximately $11.0 billion.

T. Rowe Price Associates, Inc. is a globally diversified, publicly traded corporation established in 1937. As of December 31, 2016 total firm assets under management were approximately $810.8 billion.

RECOMMENDATION:

The Alaska Retirement Management Board direct staff to contract with T. Rowe Price Associates, Inc. and ArrowMark Partners to each initially manage up to $100 million in a domestic small cap growth strategy subject to successful contract and fee negotiations.

Callan

April 2017

ARMB Board Meeting

Investment Performance
(Final Real Assets)
Periods Ended December 31, 2016

Steve Center, CFA
Senior Vice President

Paul Erlendson
Senior Vice President

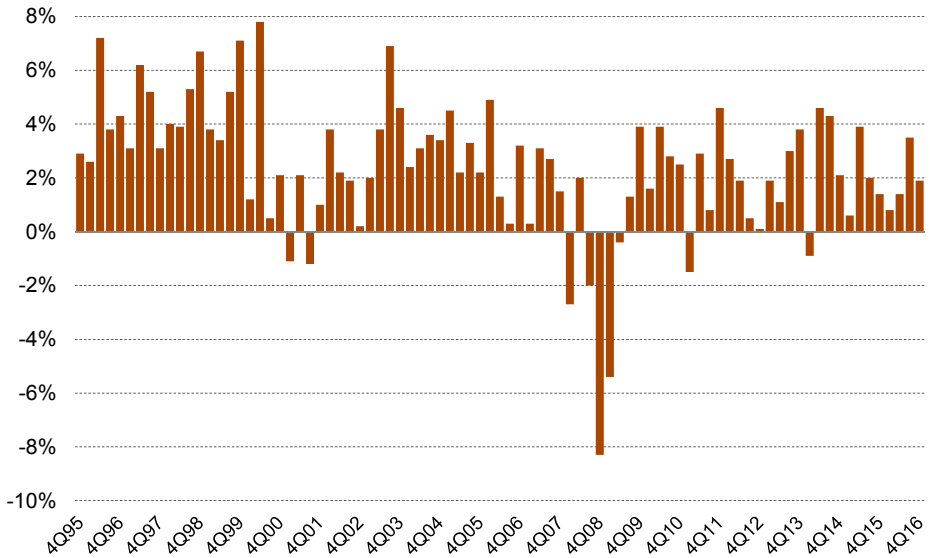
Agenda

- Market and Economic Environment
- Total Fund Performance
  - Major Asset Classes
- Review of Major Activities

U.S. Economy

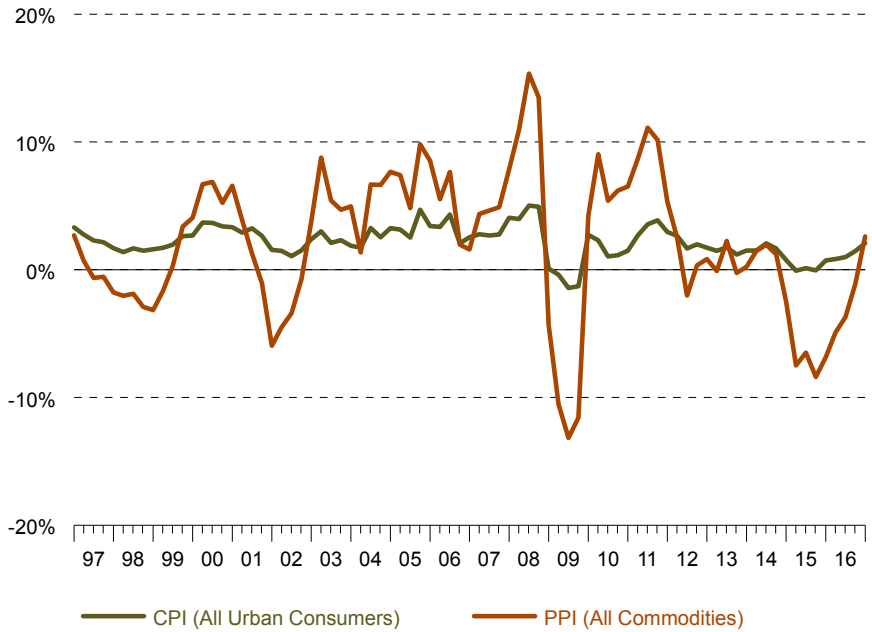
Periods Ending December 31, 2016

Quarterly Real GDP Growth (20 Years)



Source: Bureau of Economic Analysis

Inflation Year-Over-Year



Source: Bureau of Labor Statistics

- The first estimate of 4th quarter GDP came out at 1.9%, lagging the 3rd quarter, up 3.5%.
- December headline inflation rose 2.1% over the trailing twelve months. Core CPI increased 2.2%.
- December unemployment was 4.7% (down 0.3% from September) and the labor force participation rate fell to 62.7% (down 0.2%).
- The Fed increased the target overnight rate to 0.50% - 0.75% on December 14.
- Post the U.S. presidential election, markets diverged – equities up, bonds down

Asset Class Performance

- US small cap stocks (Russell 2000) was the best performer last quarter, returning 8.8%.
- Emerging markets (EM) fell 4.2% last quarter. EM lags over the last three and five years.
- Developed non-US markets (MSCI EAFE) underperformed U.S. markets in the fourth quarter, losing 0.7%.
- US large cap stocks (S&P 500) rose 3.8% last quarter and is the best performer over the three and five year time frames.

	QTD (4/3/2017)	YTD (4/3/2017)
Russell 3000	-0.3%	5.5%
S&P 500	-0.2%	5.9%
Russell 2000	-1.2%	1.3%
MSCI EAFE	-0.4%	6.8%
MSCI EM	0.7%	12.2%
BC Aggregate	0.3%	1.1%

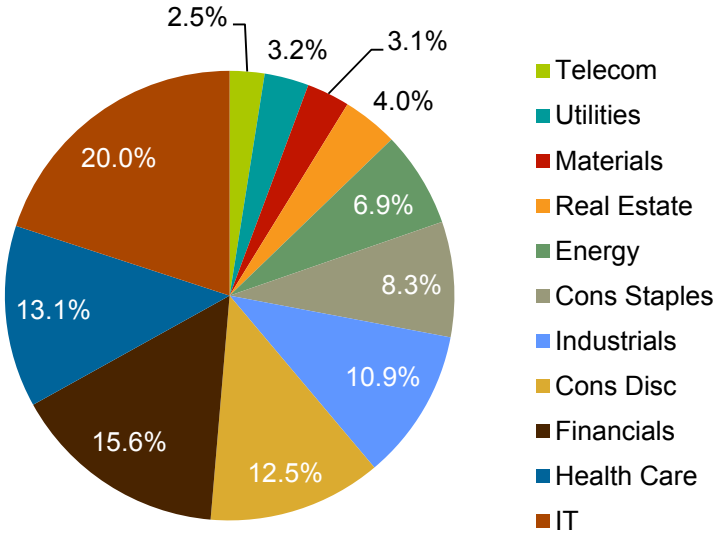
Periodic Table of Investment Returns for Periods Ended December 31, 2016

Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Russell:2000 Index 8.8%	Russell:2000 Index 21.3%	S&P:500 8.9%	S&P:500 14.7%	Russell:2000 Index 7.1%
S&P:500 3.8%	S&P:500 12.0%	Russell:2000 Index 6.7%	Russell:2000 Index 14.5%	S&P:500 6.9%
3 Month T-Bill 0.1%	MSCI:EM 11.2%	Blmbg:Aggregate 3.0%	MSCI:EAFE 6.5%	Blmbg:Aggregate 4.3%
MSCI:EAFE (0.7%)	Blmbg:Aggregate 2.6%	3 Month T-Bill 0.1%	Blmbg:Aggregate 2.2%	MSCI:EM 1.8%
Blmbg:Aggregate (3.0%)	MSCI:EAFE 1.0%	MSCI:EAFE (1.6%)	MSCI:EM 1.3%	3 Month T-Bill 0.8%
MSCI:EM (4.2%)	3 Month T-Bill 0.3%	MSCI:EM (2.6%)	3 Month T-Bill 0.1%	MSCI:EAFE 0.7%

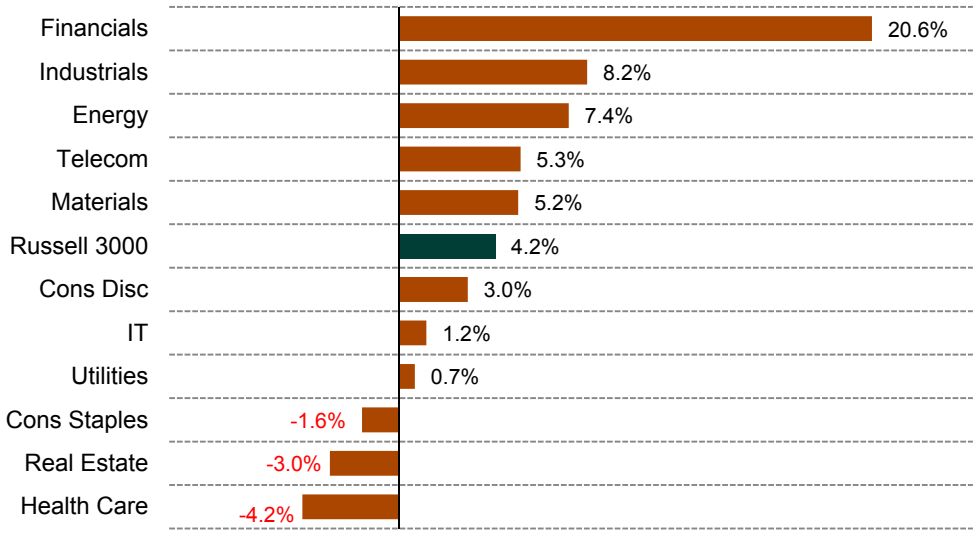
U.S. Equity Returns

Periods Ending December 31, 2016

Economic Sector Exposure (Russell 3000)



Russell 3000 Sector Returns



Source: Barrow Hanley Quarterly Benchmark Review

- The RU 1000 was up 3.8% - Financials (+20.3%) and Industrials (+7.7%) were the best performing sectors.
- The RU 2000 was up 8.7% - Financials (+23.3%) and Energy (+17.9%) were the best performing sectors.
- Some top performing sectors through June lagged in fourth quarter - Utilities (+0.7%); Consumer Staples (-1.6%), and REITS (-3.0%).

U.S. Equity Style Returns

Periods Ending December 31, 2016

	4Q 2016		
	Value	Core	Growth
Large	6.7%	3.8%	1.0%
Mid	5.5%	3.2%	0.5%
Small	14.1%	8.8%	3.6%

	Annualized 1 Year Returns		
	Value	Core	Growth
Large	17.3%	12.1%	7.1%
Mid	20.0%	13.8%	7.3%
Small	31.7%	21.3%	11.3%

- Represents 3 best performing asset classes in time period
- Represents 3 middle performing asset classes in time period
- Represents 3 worst performing asset classes in time period

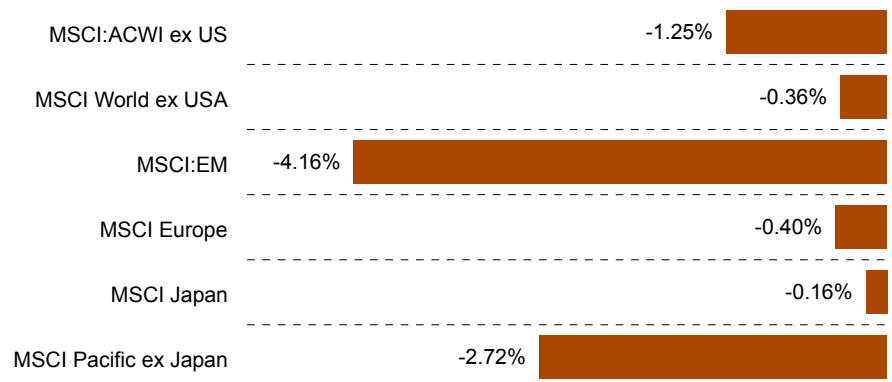
- Last Quarter: Small cap and value outperformed
- Last Year: Small cap outperformed; growth underperformed

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

International Equity Returns

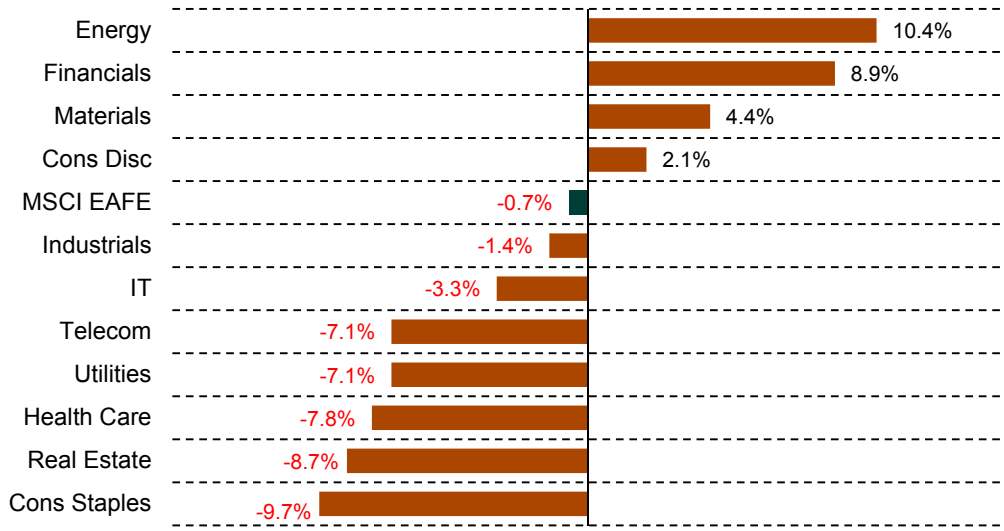
Periods Ending December 31, 2016

Regional Quarterly Performance (U.S. Dollar)



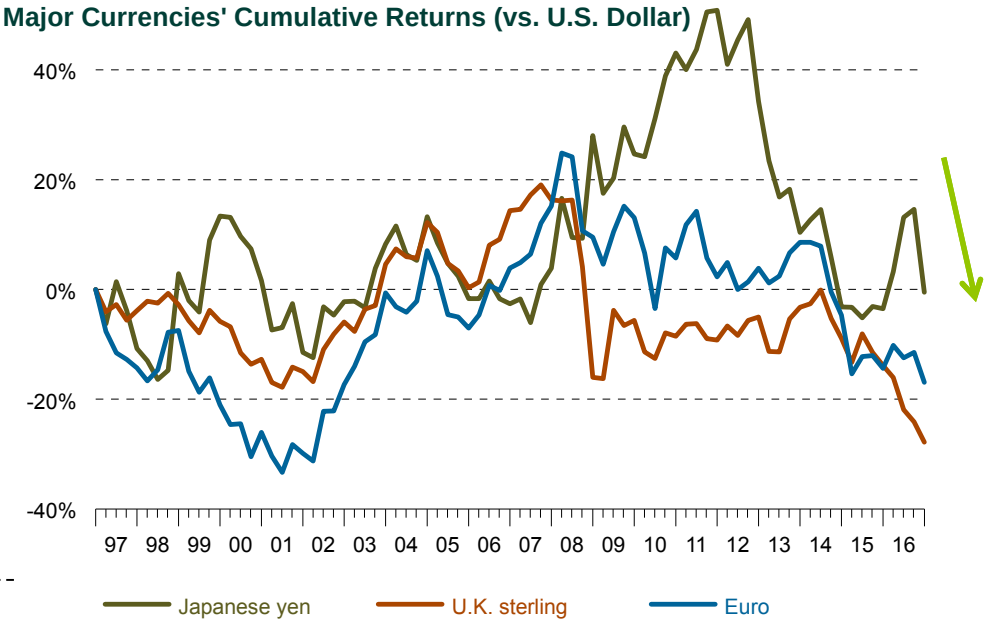
Source: MSCI

MSCI EAFE Sector Returns



Source: Barrow Hanley Quarterly Benchmark Review

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

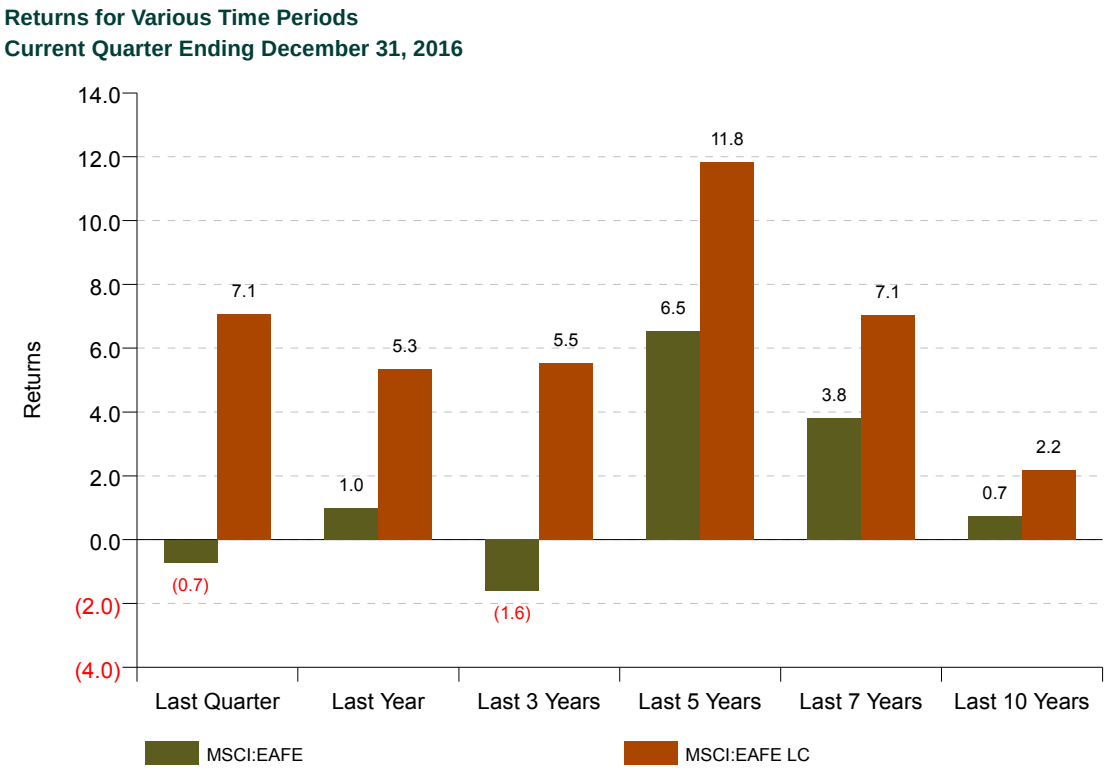


*Euro returns from 1Q99. German mark prior to 1Q99.
Source: MSCI

- Best performing region was Japan (-0.2%).
- Dollar strength hurt returns: yen (-13%), euro (-6%), and the pound (-5%).
- Energy and Financials were the top and Consumer Staples and REITS the worst performing sectors.

Domestic vs. Local Currency Returns

Currency Effect on U.S. Investors' International Equity Returns

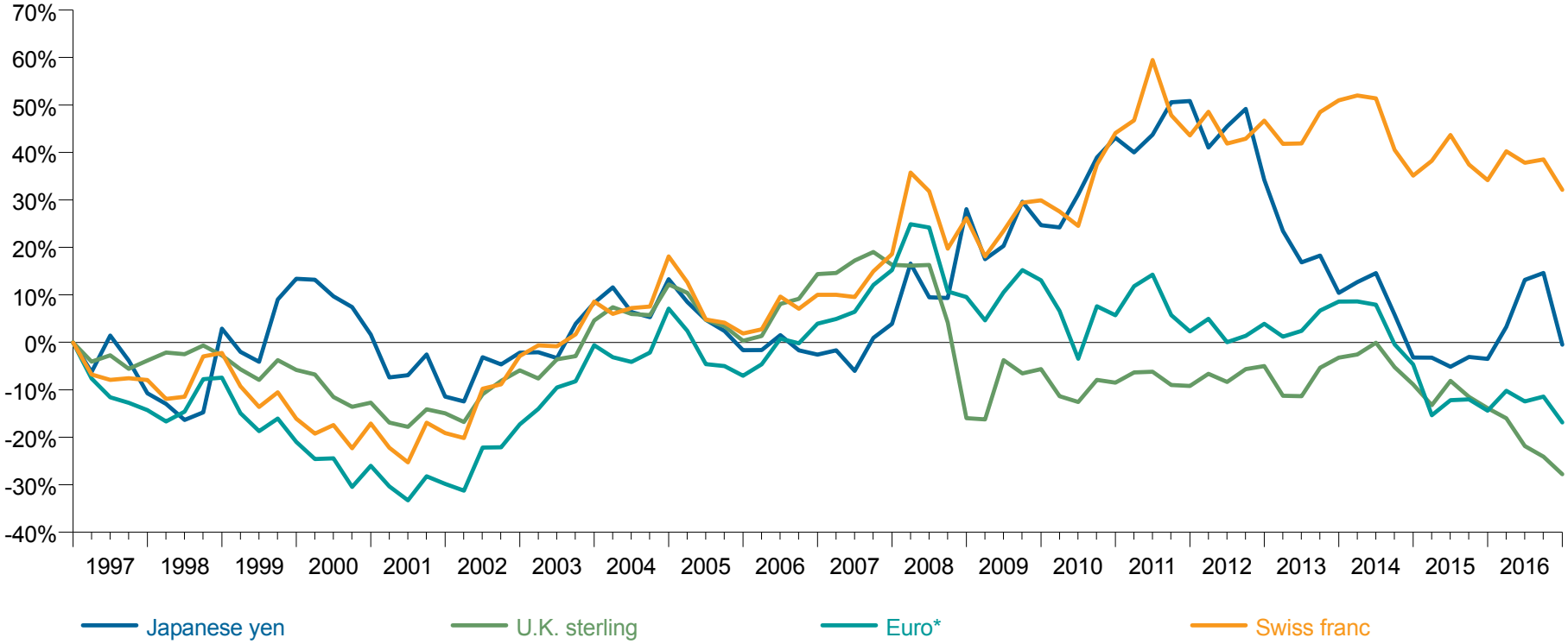


- U.S. investors' gains on international equities were hampered over the last year by the amount that the U.S. dollar strengthened against local market currencies.
- Over the last five years, dollar strength has cost U.S. investors 5.3% (11.8% return in local currency, but only 6.5% when returns are adjusted by local currency declines versus the dollar).

Non-U.S. Equity

Currencies

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



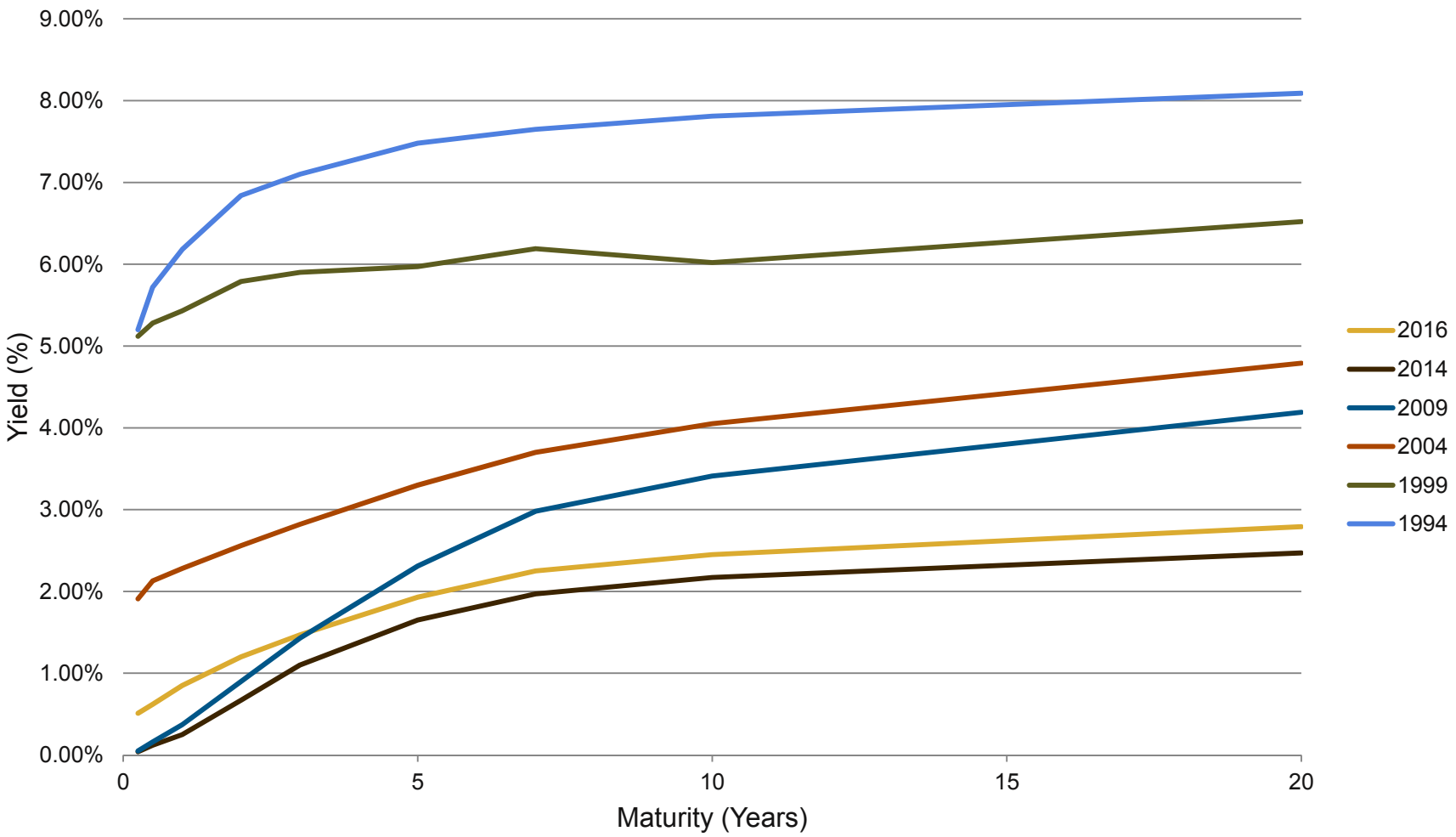
- The dollar's strength hampered returns for U.S. investors from non-U.S. equity markets; local investors fared better.
- The U.S. dollar hit a multi-year high versus the euro and the yen and appreciated roughly 7% compared to a basket of currencies.

* Euro returns from 1Q99. German mark prior to 1Q99. Source: MSCI

Historic Yield Curves

As of December 31, 2016

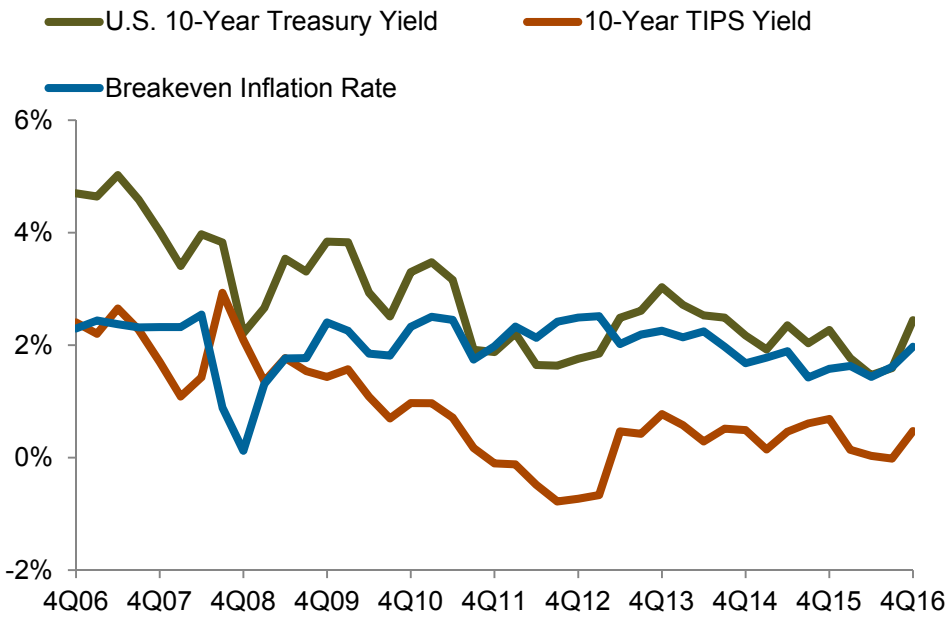
Treasury Yield Curve



Yield Curve Changes

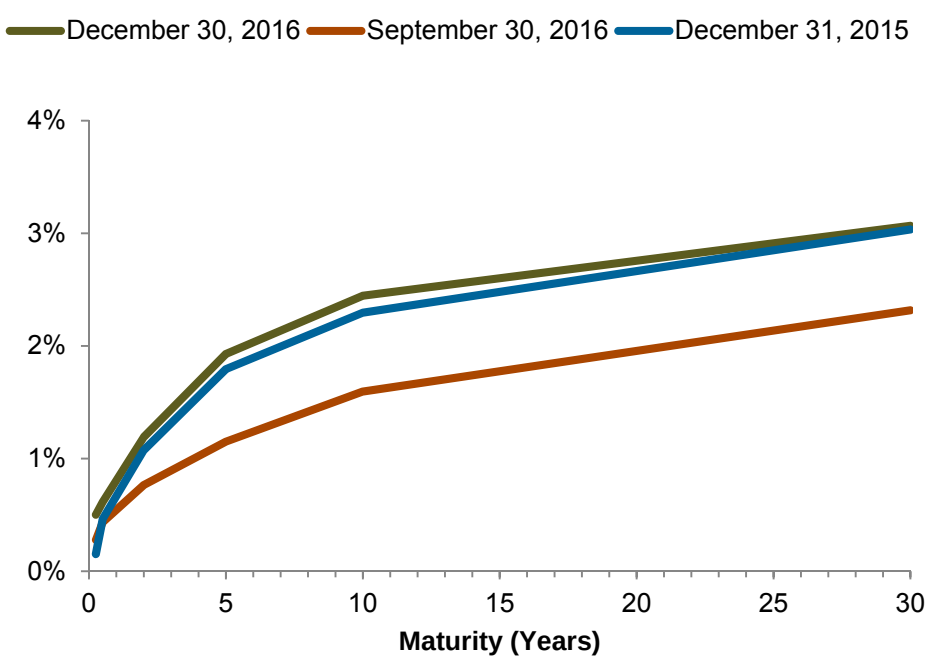
Periods Ending December 31, 2016

Historical 10-Year Yields



Source: Bloomberg

U.S. Treasury Yield Curves



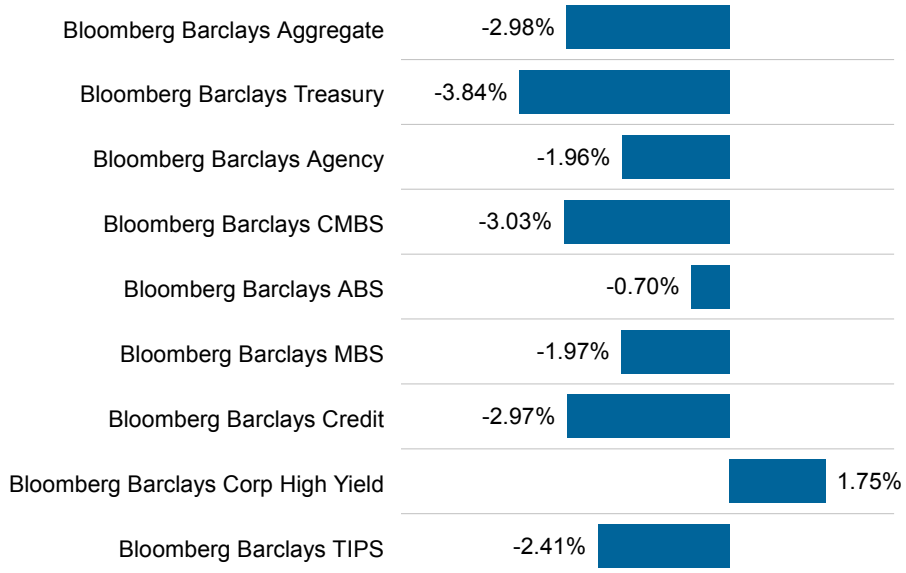
Source: U.S. Department of the Treasury

- Treasury yields rose across all segments of the curve, most notably near the middle and at the end where increases were greatest. The yield on the 10-year increased 85 bps and the 30-year increased 74 bps.
- Breakeven inflation edged higher on healthy core inflation figures and stable oil prices.
- Worldwide, rates still remain low.

Total Rates of Return by Bond Sector

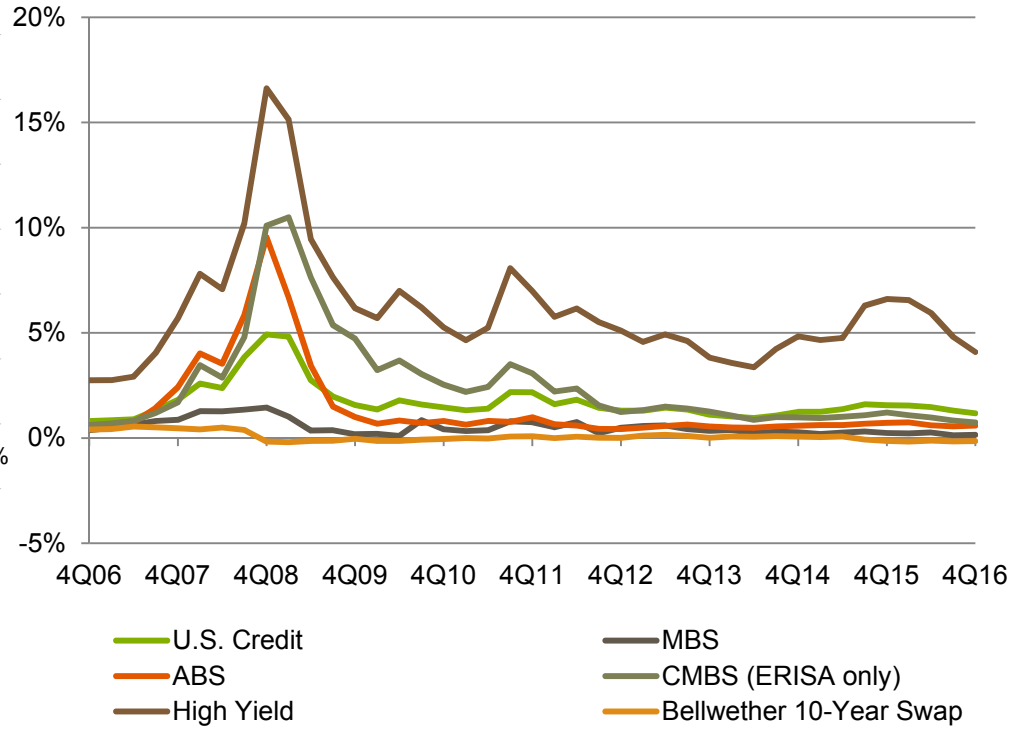
Periods Ending December 31, 2016

Total Returns



Source: Bloomberg Barclays

Effective Yield Over Treasuries



- Rising rates produced negative returns for all sectors except high yield (+1.8%).
- Worst performing sector of the Aggregate was Treasuries (-3.8%).
- Treasury Inflation Protected Securities (TIPS) outperformed Treasuries on rising inflation expectations (-2.4%).

Does Improving Economic Data Indicate Underlying Health?

Source: 9 March 2017 The Economist

Real Estate

Style medians and index returns

Style Median and Index Returns* for Periods ended December 31, 2016

Private Real Estate	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 15 Years
Real Estate Database (net of fees)	1.87	8.34	8.34	11.89	11.89	4.56	7.57
NCREIF Property**	1.73	7.97	7.97	11.02	10.91	6.93	9.00
NFI-ODCE (value wtd-net)	1.88	7.79	7.79	11.04	11.16	4.84	7.15
Public Real Estate							
REIT U.S. Database	-2.66	6.87	6.87	13.59	12.26	5.65	11.85
FTSE NAREIT Equity	-2.89	8.52	8.52	13.38	12.01	5.08	10.80
Global Real Estate							
Global REIT Database	-5.11	3.97	3.97	7.26	10.83	2.82	10.55
EPRA/NAREIT Developed REITs	-5.39	4.99	4.99	6.78	10.34	2.23	9.84
EPRA/NAREIT Developed REITs ex-US	-7.68	1.97	1.97	0.61	8.42	0.12	9.24

Sources: Callan, Citigroup, JPMorgan Chase & Co.

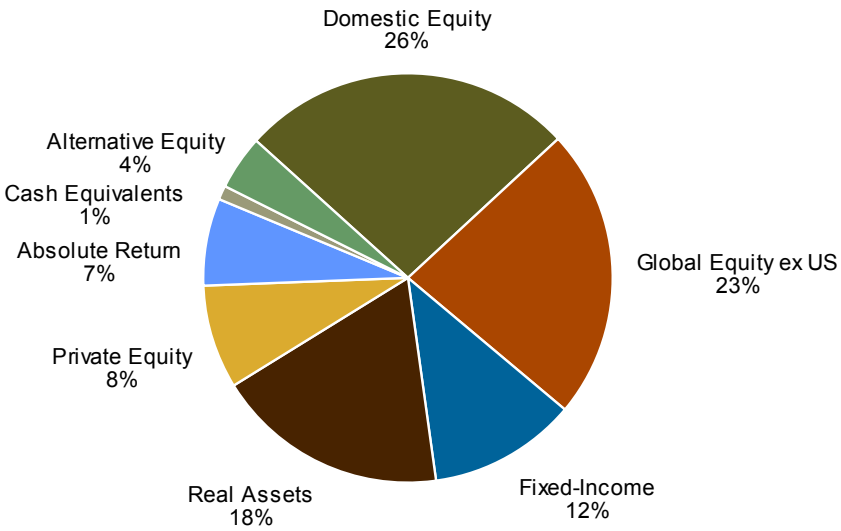
- The NCREIF Property index returned 1.73% in the fourth calendar quarter of 2016.
- The NFI-ODCE rose 1.88% (0.84% from income and 1.04% from appreciation).
- U.S. REITs, measured by the FTSE NAREIT Equity REITs Index, lost 2.89% for the quarter.

Pension Plan

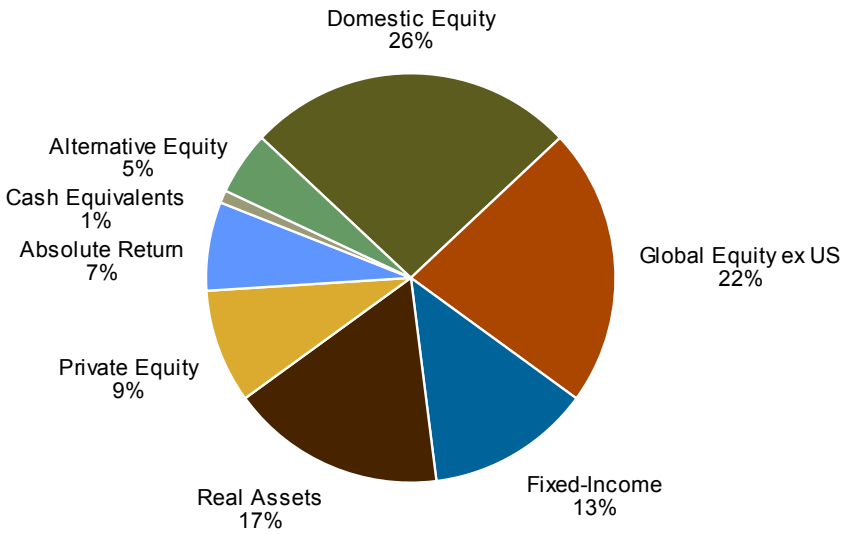
Asset Allocation – Public Employees' Retirement System

Quarter Ending December 31, 2016

Actual Asset Allocation



Target Asset Allocation



Asset Class	$000s Actual	Weight Actual	Target	Percent Difference	$000s Difference
Domestic Equity	2,266,064	26.4%	26.0%	0.4%	37,905
Global Equity ex US	1,973,530	23.0%	22.0%	1.0%	88,165
Fixed-Income	1,002,561	11.7%	13.0%	(1.3%)	(111,519)
Real Assets	1,571,564	18.3%	17.0%	1.3%	114,691
Private Equity	700,348	8.2%	9.0%	(0.8%)	(70,938)
Absolute Return	591,408	6.9%	7.0%	(0.1%)	(8,481)
Cash Equivalents	95,678	1.1%	1.0%	0.1%	9,979
Alternative Equity	368,689	4.3%	5.0%	(0.7%)	(59,803)
Total	8,569,842	100.0%	100.0%		

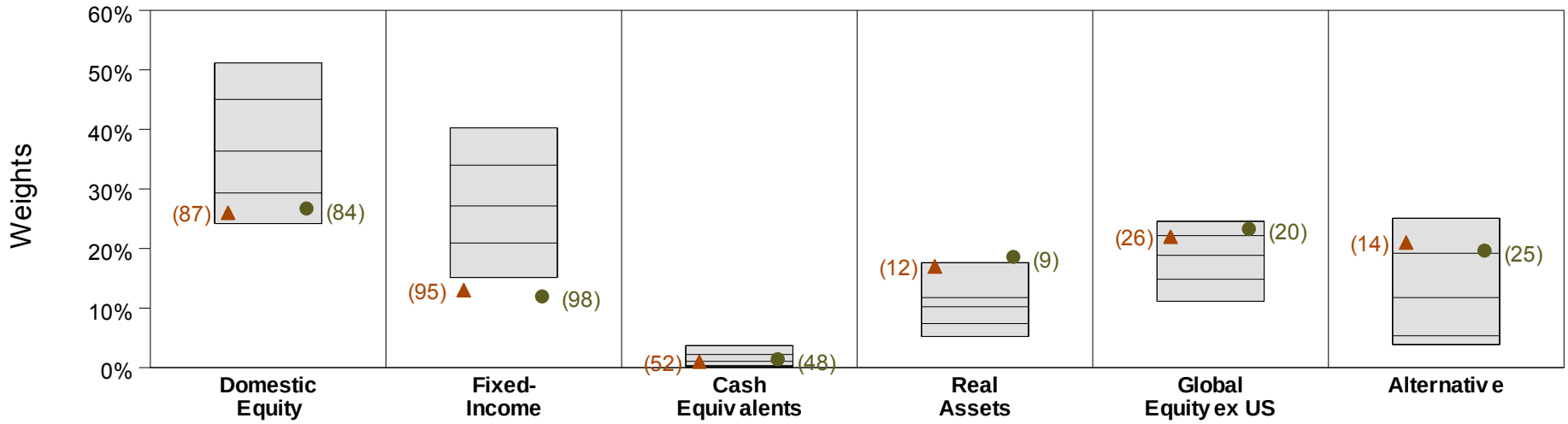
PERS is used as illustrative throughout the presentation.

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 CAI Public Fund Sponsor Database



	Domestic Equity	Fixed-Income	Cash Equivalents	Real Assets	Global Equity ex US	Alternative
10th Percentile	51.17	40.27	3.68	17.61	24.59	25.09
25th Percentile	45.05	34.00	2.19	11.77	22.16	19.20
Median	36.38	27.15	1.07	10.21	18.85	11.76
75th Percentile	29.33	20.93	0.36	7.40	14.81	5.35
90th Percentile	24.18	15.14	0.14	5.23	11.14	3.87
Fund ●	26.44	11.70	1.12	18.34	23.03	19.38
Target ▲	26.00	13.00	1.00	17.00	22.00	21.00
% Group Invested	98.88%	97.75%	69.10%	62.92%	97.75%	49.16%

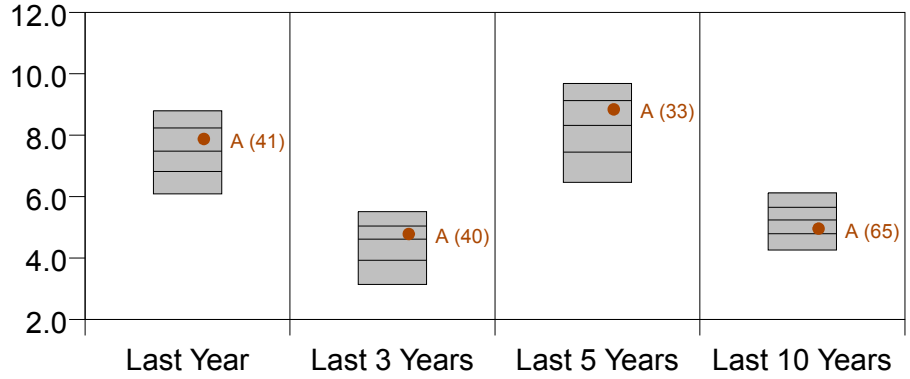
- All positions are close to their targets. Fixed income is a low allocation when compared to other public funds. Real assets are high when compared to other public funds. Policy is “growth” oriented as opposed to “income” oriented.

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

Total Fund Return vs Public Funds (PERS)

Callan Public Fund Database

Returns
for Periods Ended December 31, 2016
Group: CAI Public Fund Sponsor Database



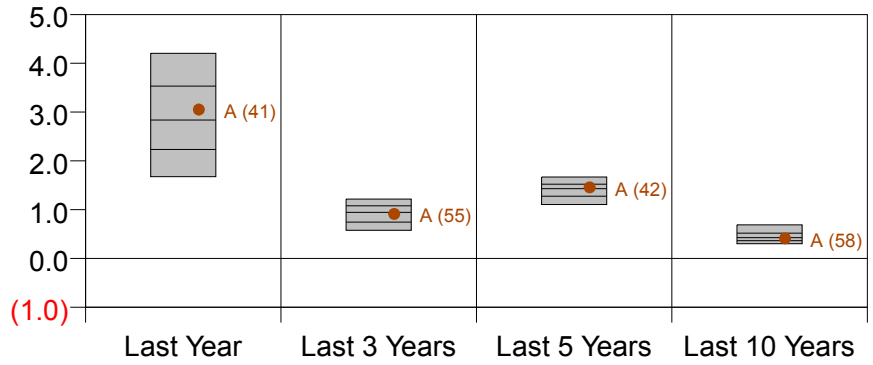
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	8.80	5.51	9.69	6.12
25th Percentile	8.24	5.05	9.13	5.66
Median	7.49	4.62	8.32	5.25
75th Percentile	6.82	3.93	7.45	4.79
90th Percentile	6.09	3.14	6.47	4.26
Member Count	229	220	209	172
ARMB - PERS - Total Fund ● A	7.88	4.78	8.84	4.96

- Return rankings do not take risk into account.
- As displayed on the previous slide, the “growth” orientation of the portfolio lends itself to aggressive positioning.

Total Fund Sharpe Ratio Rankings vs Public Funds (PERS)

Callan Public Fund Database

Sharpe Ratio
for Periods Ended December 31, 2016
Group: CAI Public Fund Sponsor Database



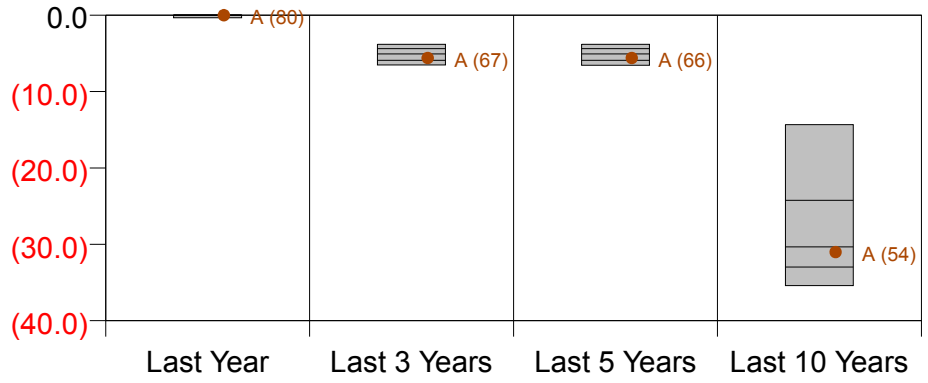
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	4.21	1.22	1.67	0.69
25th Percentile	3.53	1.08	1.52	0.52
Median	2.84	0.95	1.43	0.43
75th Percentile	2.24	0.75	1.28	0.37
90th Percentile	1.68	0.58	1.11	0.31
Member Count	229	220	209	172
ARMB - PERS - Total Fund ● A	3.06	0.92	1.46	0.41

- Sharpe ratio is a risk adjusted return measure.
- Excess return above the risk free rate (T-Bills) is divided by the standard deviation of excess return.
- The portfolio exhibits a near median risk adjusted return for al time periods.

Total Maximum Drawdown Rankings vs Public Funds (PERS)

Callan Public Fund Database

Maximum Drawdown
for Periods Ended December 31, 2016
Group: CAI Public Fund Sponsor Database



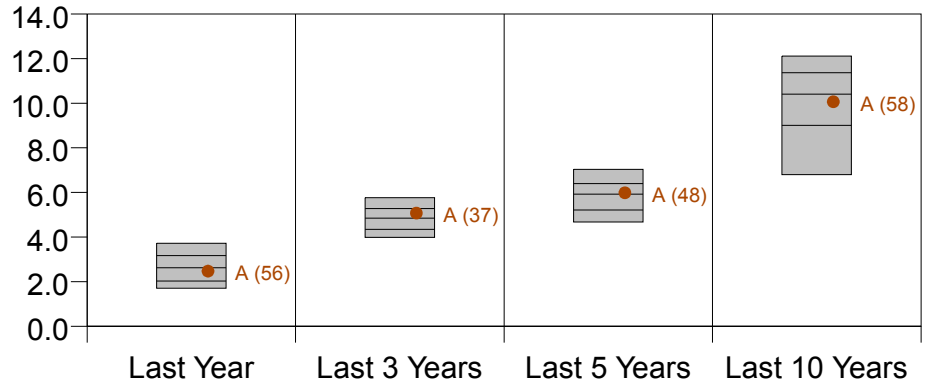
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	0.00	(3.79)	(3.79)	(14.33)
25th Percentile	0.00	(4.37)	(4.36)	(24.22)
Median	0.00	(5.05)	(5.05)	(30.33)
75th Percentile	0.00	(5.90)	(5.89)	(32.96)
90th Percentile	(0.32)	(6.49)	(6.54)	(35.39)
Member Count	229	220	209	172
ARMB - PERS - Total Fund ● A	0.00	(5.60)	(5.60)	(30.99)

- Maximum drawdown is a measure of the largest loss from peak to trough in a given period.
- Bigger losses result in lower rankings.
- The compressed distribution over the last year, 3-year, and 5-year time frames is due in part to the consistent bull market.

Standard Deviation Ranking vs Public Funds (PERS)

Callan Public Fund Database

Standard Deviation
for Periods Ended December 31, 2016
Group: CAI Public Fund Sponsor Database



	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	3.73	5.76	7.04	12.12
25th Percentile	3.17	5.28	6.40	11.37
Median	2.63	4.85	5.92	10.41
75th Percentile	2.03	4.35	5.21	9.02
90th Percentile	1.71	3.99	4.68	6.80
Member Count	229	220	209	172
ARMB - PERS - Total Fund ● A	2.47	5.08	5.99	10.07

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

PERS Performance – 4th Quarter 2016 & Trailing Year

Relative Attribution Effects for Quarter ended December 31, 2016

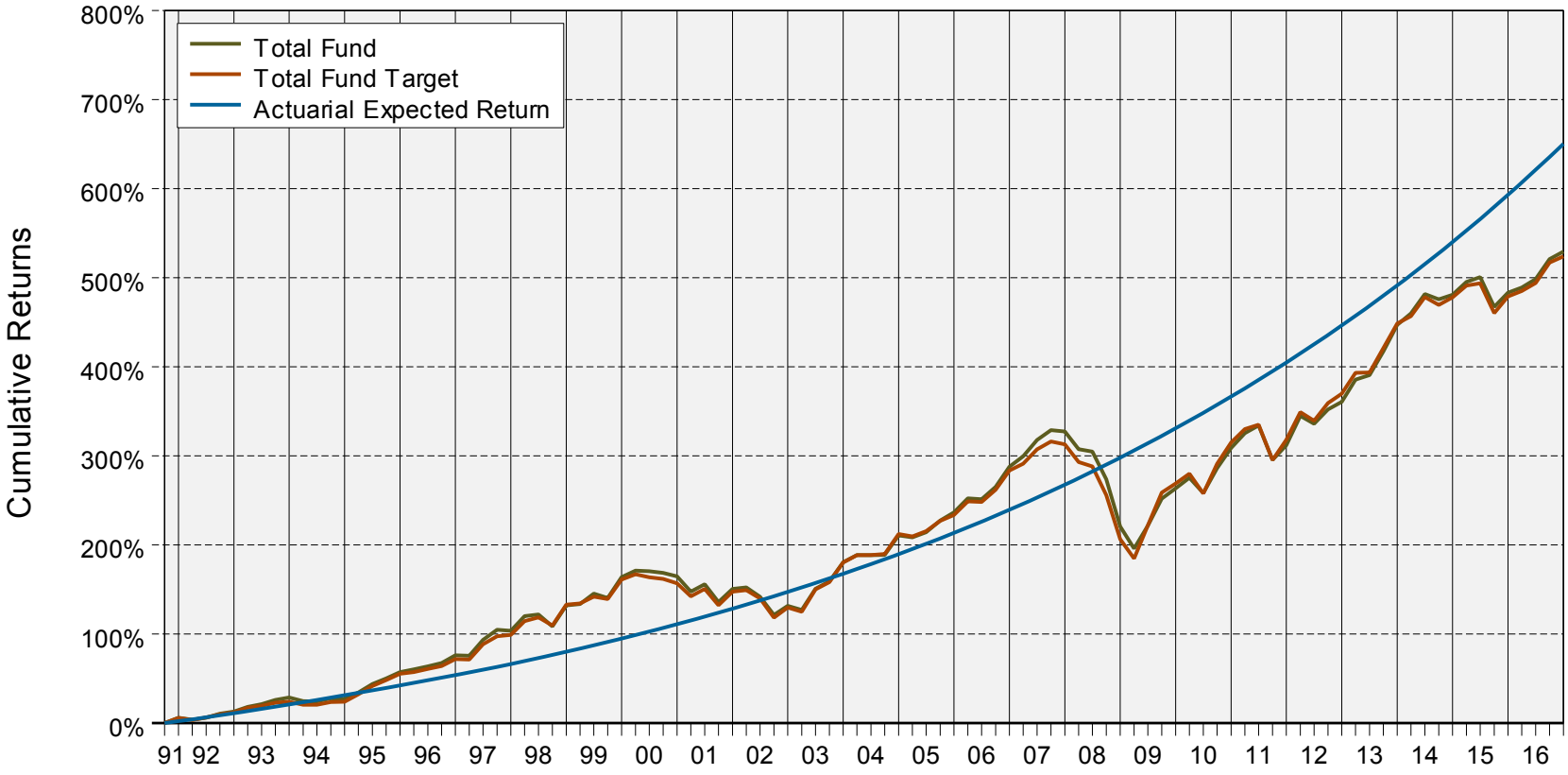
Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	25%	26%	4.71%	4.21%	0.13%	(0.02%)	0.11%
Fixed-Income	12%	13%	(2.30%)	(2.55%)	0.03%	0.03%	0.06%
Real Assets	18%	17%	1.52%	0.34%	0.21%	(0.01%)	0.20%
Global Equity ex US	25%	22%	(2.13%)	(1.20%)	(0.23%)	(0.07%)	(0.30%)
Private Equity	8%	9%	4.06%	3.98%	0.01%	(0.03%)	(0.03%)
Absolute Return	7%	7%	3.12%	1.31%	0.12%	(0.00%)	0.12%
Alternative Equity	4%	5%	2.64%	2.80%	(0.01%)	(0.01%)	(0.02%)
Cash Equivalents	1%	1%	0.18%	0.09%	0.00%	0.00%	0.00%
Total			**1.30%** =	**1.15%** +	**0.26%** +	**(0.11%)**	**0.15%**

One Year Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	26%	26%	12.53%	12.74%	(0.05%)	(0.02%)	(0.08%)
Fixed-Income	12%	12%	5.97%	2.99%	0.37%	0.07%	0.43%
Real Assets	18%	17%	7.78%	7.37%	0.07%	0.01%	0.08%
Global Equity ex US	24%	24%	4.07%	5.01%	(0.24%)	0.02%	(0.22%)
Private Equity	8%	9%	9.49%	11.26%	(0.15%)	(0.00%)	(0.15%)
Absolute Return	7%	6%	3.28%	5.33%	(0.12%)	0.01%	(0.11%)
Alternative Equity	4%	4%	10.33%	10.10%	0.01%	0.01%	0.01%
Cash Equivalents	1%	2%	0.75%	0.33%	0.00%	0.08%	0.09%
Total			**7.84%** =	**7.77%** +	**(0.10%)** +	**0.17%**	**0.07%**

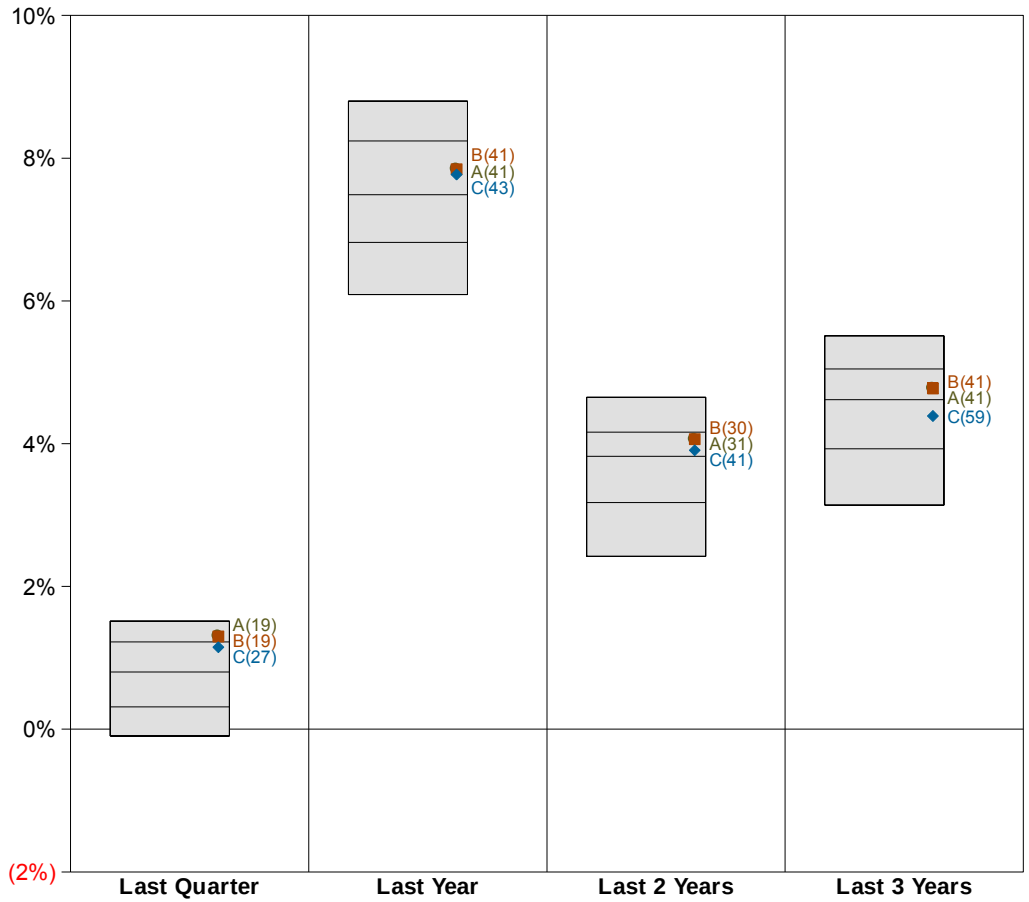
PERS Long-Term Performance as of 12/31/16

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.

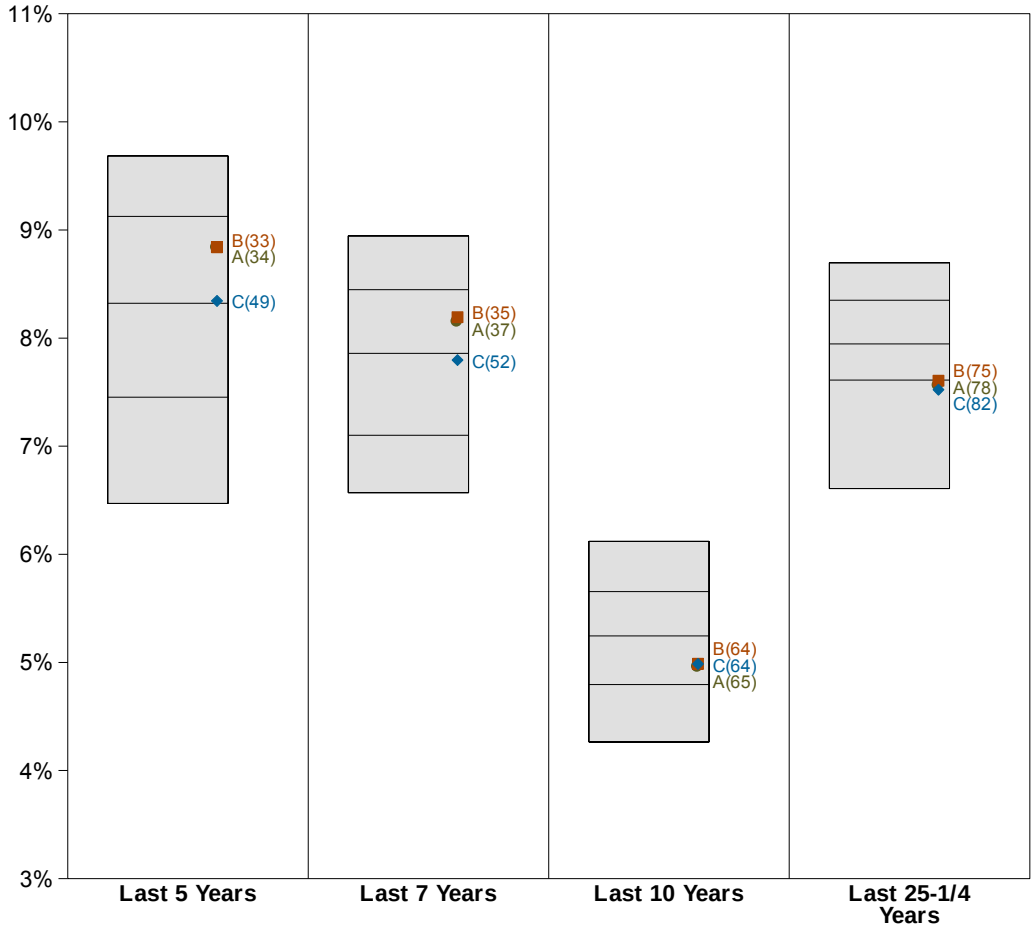
Cumulative Total Fund Returns as of 12/31/16



	Last Quarter	Last Year	Last 2 Years	Last 3 Years
10th Percentile	1.51	8.80	4.65	5.51
25th Percentile	1.22	8.24	4.16	5.05
Median	0.80	7.49	3.82	4.62
75th Percentile	0.31	6.82	3.17	3.93
90th Percentile	(0.09)	6.09	2.42	3.14
PERS Total Plan ● A	1.30	7.84	4.06	4.77
TRS Total Plan ■ B	1.30	7.84	4.06	4.78
Target Index ◆ C	1.15	7.77	3.91	4.39

- PERS and TRS have outperformed their target for the last quarter, year, two-year and three-year time frames.
- 4th quarter performance beats the target by 15 basis points.

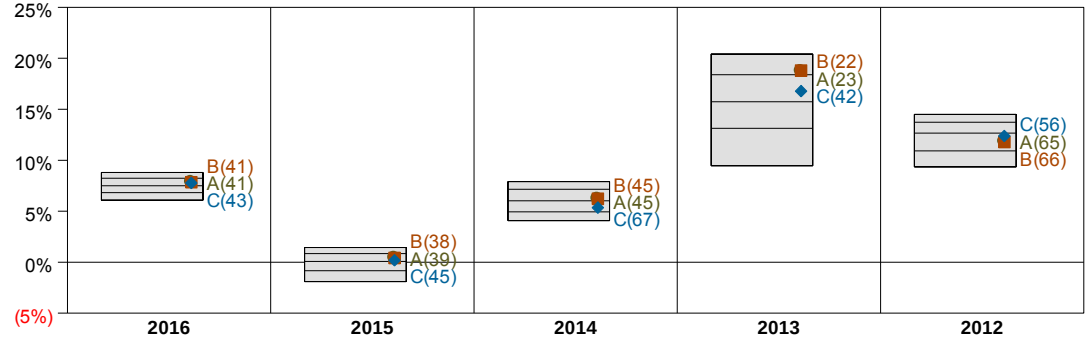
Longer-Term Returns as of 12/31/16



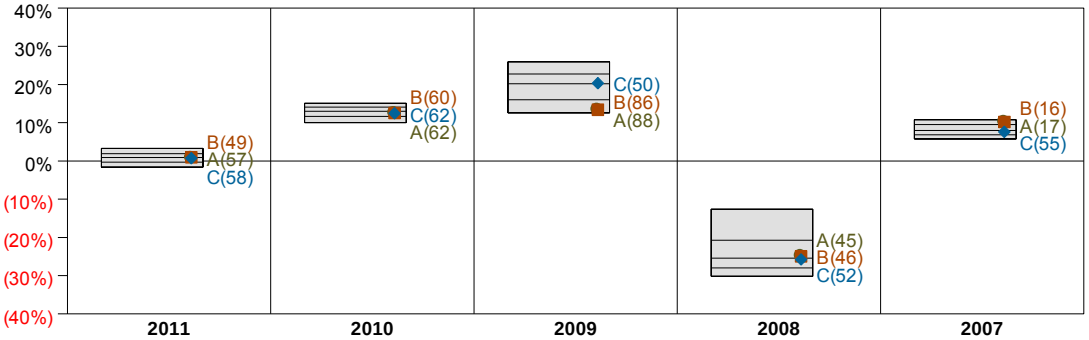
	Last 5 Years	Last 7 Years	Last 10 Years	Last 25-1/4 Years
10th Percentile	9.69	8.95	6.12	8.70
25th Percentile	9.13	8.45	5.66	8.35
Median	8.32	7.86	5.25	7.95
75th Percentile	7.45	7.10	4.79	7.61
90th Percentile	6.47	6.57	4.26	6.61
PERS Total Plan ● A	8.83	8.15	4.95	7.56
TRS Total Plan ■ B	8.84	8.19	4.99	7.61
Target Index ◆ C	8.34	7.80	4.99	7.52

- Five-year performance is above target and median.
- Seven-year performance is also above target and median.
- 10-year return is below median. PERS trails the target return by three basis points.
- 25 and ¼-year return beats target.

Calendar Period Performance



	2016	2015	2014	2013	2012
10th Percentile	8.80	1.44	7.89	20.41	14.49
25th Percentile	8.24	0.85	7.14	18.40	13.73
Median	7.49	0.07	6.03	15.73	12.66
75th Percentile	6.82	(0.84)	4.93	13.13	10.92
90th Percentile	6.09	(1.90)	4.08	9.45	9.34
PERS Total Plan ● A	7.84	0.40	6.22	18.74	11.81
TRS Total Plan ■ B	7.84	0.41	6.22	18.79	11.79
Target Index ◆ C	7.77	0.18	5.35	16.78	12.38

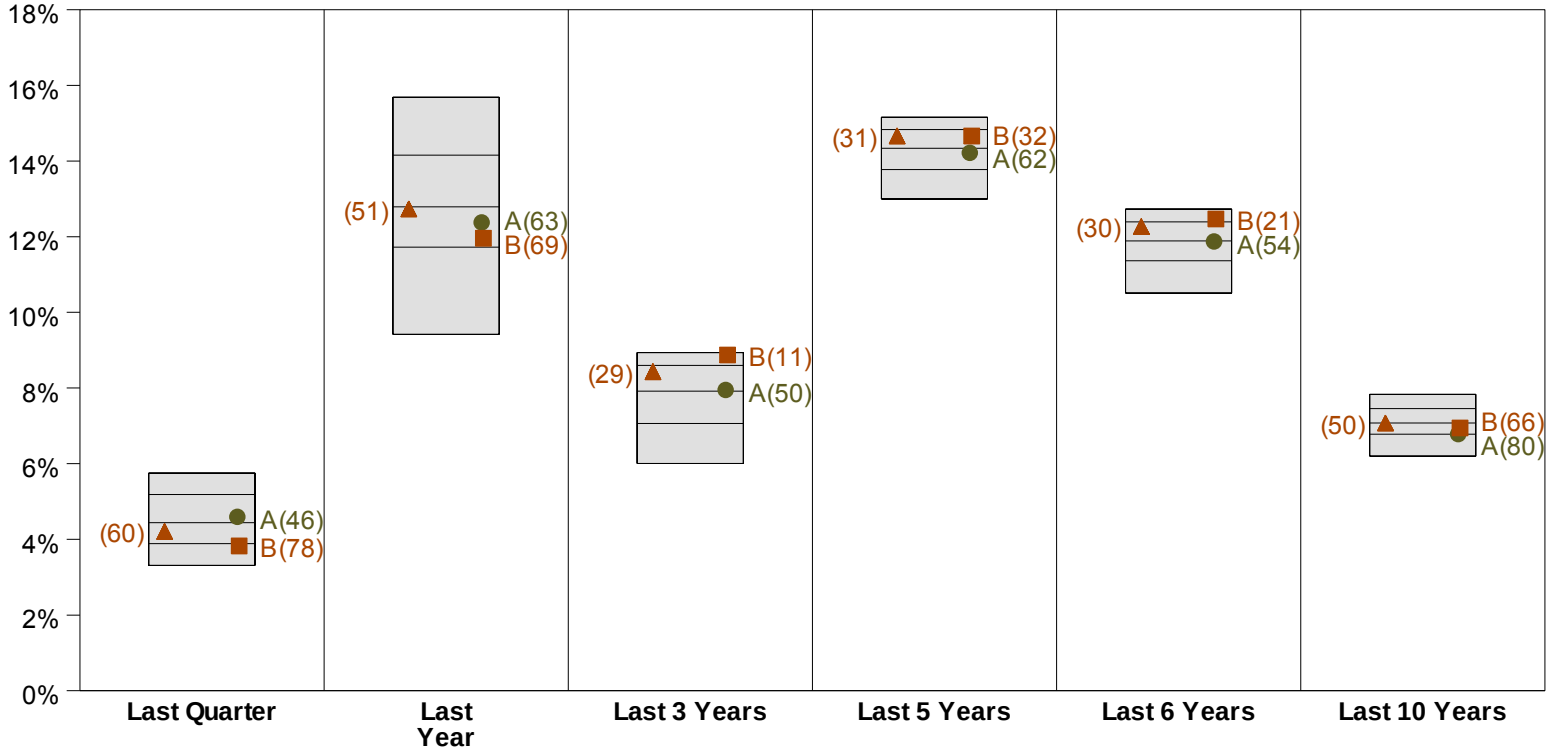


	2011	2010	2009	2008	2007
10th Percentile	3.31	15.10	25.93	(12.58)	10.77
25th Percentile	1.92	14.11	22.73	(20.71)	9.53
Median	0.91	13.00	20.23	(25.43)	7.97
75th Percentile	(0.30)	11.68	16.02	(27.97)	6.84
90th Percentile	(1.58)	10.06	12.57	(30.14)	5.75
PERS Total Plan ● A	0.77	12.45	13.31	(24.91)	10.17
TRS Total Plan ■ B	0.95	12.55	13.40	(24.98)	10.20
Target Index ◆ C	0.72	12.49	20.33	(25.74)	7.64

- PERS and TRS had the same return during 2016 and 2014.
- Peer group range of returns during 2016, 2015, and 2014 were very tight.
- Wide range of peer group returns during calendar 2013 due to varying fixed-income allocations within the Public Fund universe.
- PERS ranks above median in six and TRS ranks above median in seven of the ten periods shown.

Total Domestic Equity through 12/31/16

Performance vs Pub Pln- Domestic Equity (Gross)



		Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile		5.75	15.69	8.93	15.16	12.73	7.83
25th Percentile		5.19	14.16	8.60	14.83	12.39	7.46
Median		4.44	12.79	7.92	14.34	11.89	7.08
75th Percentile		3.89	11.72	7.06	13.78	11.36	6.78
90th Percentile		3.31	9.42	6.00	13.00	10.51	6.20
Domestic Equity Pool	● A	4.55	12.33	7.90	14.17	11.83	6.74
Standard & Poor's 500	■ B	3.82	11.96	8.87	14.66	12.47	6.95
Russell 3000 Index	▲	4.21	12.74	8.43	14.67	12.27	7.07

Domestic Equity Component Returns

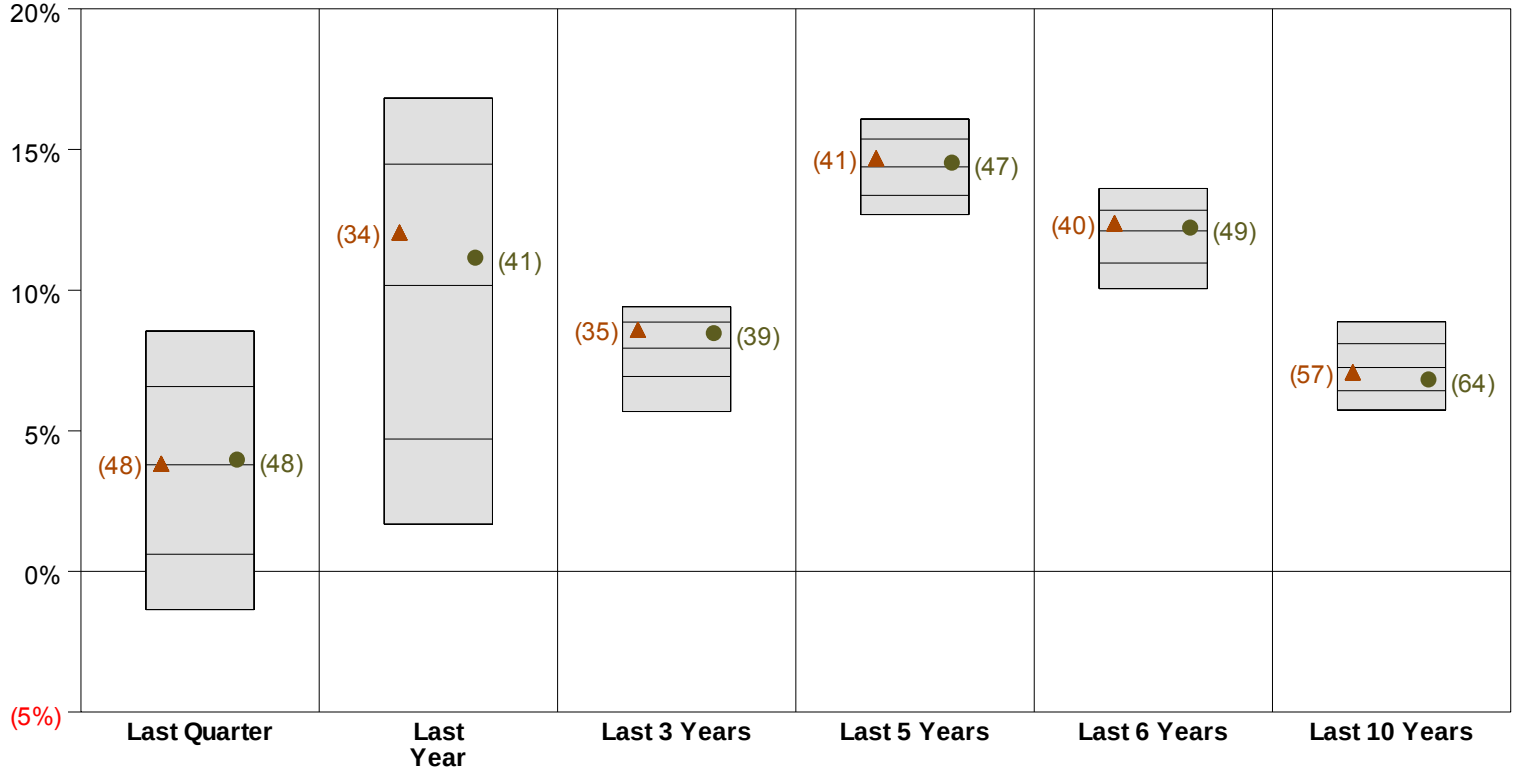
Returns for Periods Ended December 31, 2016

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years
Total Dom Equity Pool	4.55%	12.33%	7.90%	14.17%	11.83%
Russell 3000 Index	4.21%	12.74%	8.43%	14.67%	12.27%
Large Cap Managers	3.91%	11.09%	8.40%	14.47%	12.16%
Large Cap Active	5.09%	11.56%	8.48%	14.45%	12.06%
Large Cap Passive	3.74%	11.62%	8.60%	14.68%	12.38%
Russell 1000 Index	3.83%	12.05%	8.59%	14.69%	12.38%
Small Cap Managers	8.77%	20.35%	6.53%	14.79%	11.74%
Small Cap Active	8.93%	19.83%	6.45%	14.84%	12.23%
Small Cap Passive	9.44%	23.58%	7.24%	14.43%	10.66%
Russell 2000 Index	8.83%	21.31%	6.74%	14.46%	11.12%
Alternative Equity	2.59%	10.28%	5.62%	8.88%	7.90%

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

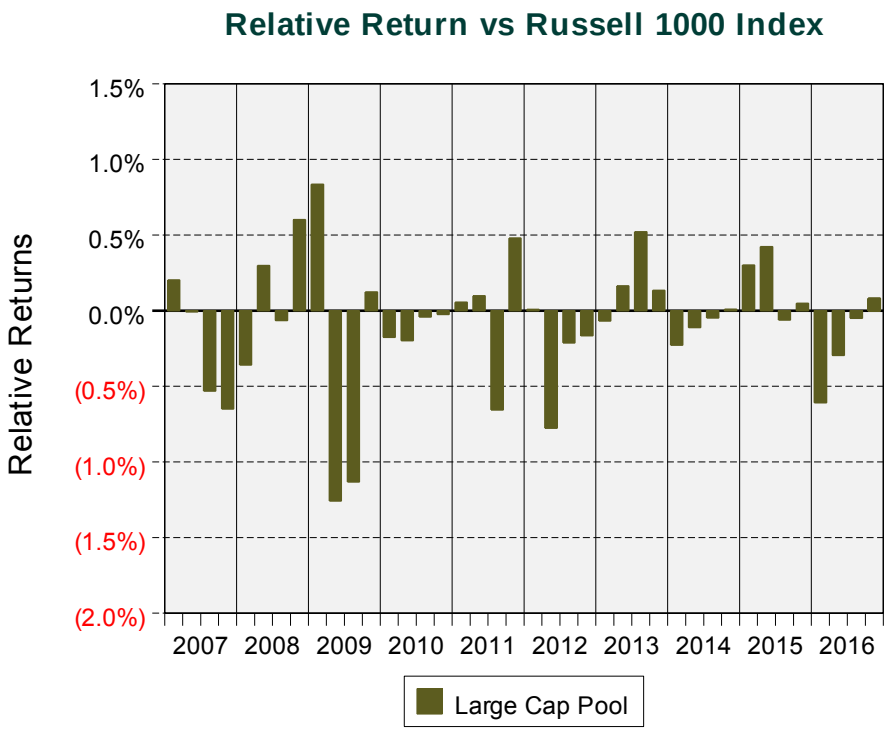
Large Cap Domestic Equity Pool through 12/31/16

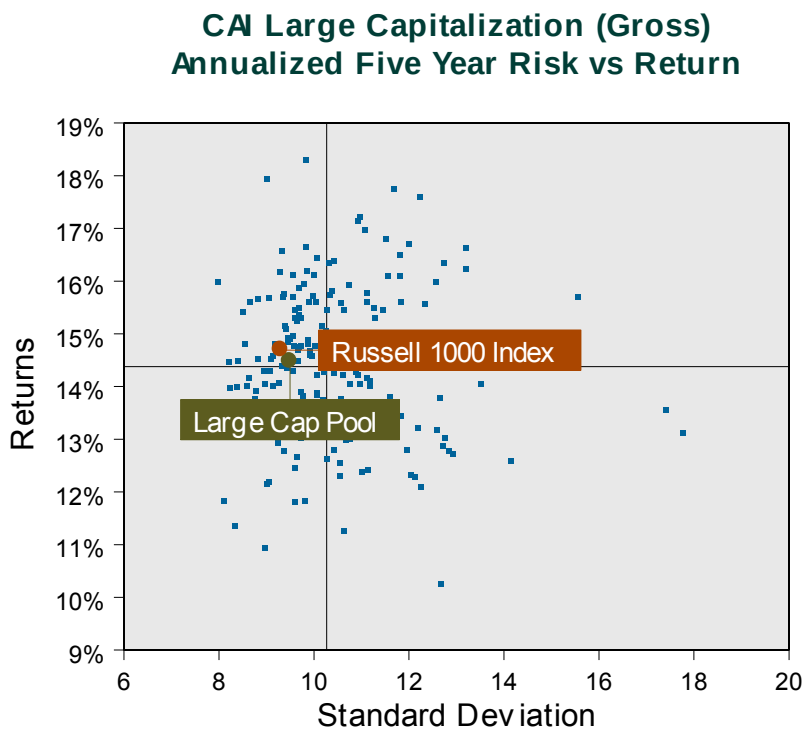
Performance vs CAI Large Capitalization (Gross)



	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	8.55	16.83	9.42	16.09	13.62	8.88
25th Percentile	6.57	14.48	8.86	15.37	12.84	8.10
Median	3.79	10.17	7.93	14.38	12.11	7.25
75th Percentile	0.61	4.70	6.94	13.37	10.96	6.43
90th Percentile	(1.35)	1.68	5.69	12.69	10.06	5.74
Large Cap Pool ●	3.91	11.09	8.40	14.47	12.16	6.76
Russell 1000 Index ▲	3.83	12.05	8.59	14.69	12.38	7.08

Large Cap Domestic Equity Pool as of 12/31/16

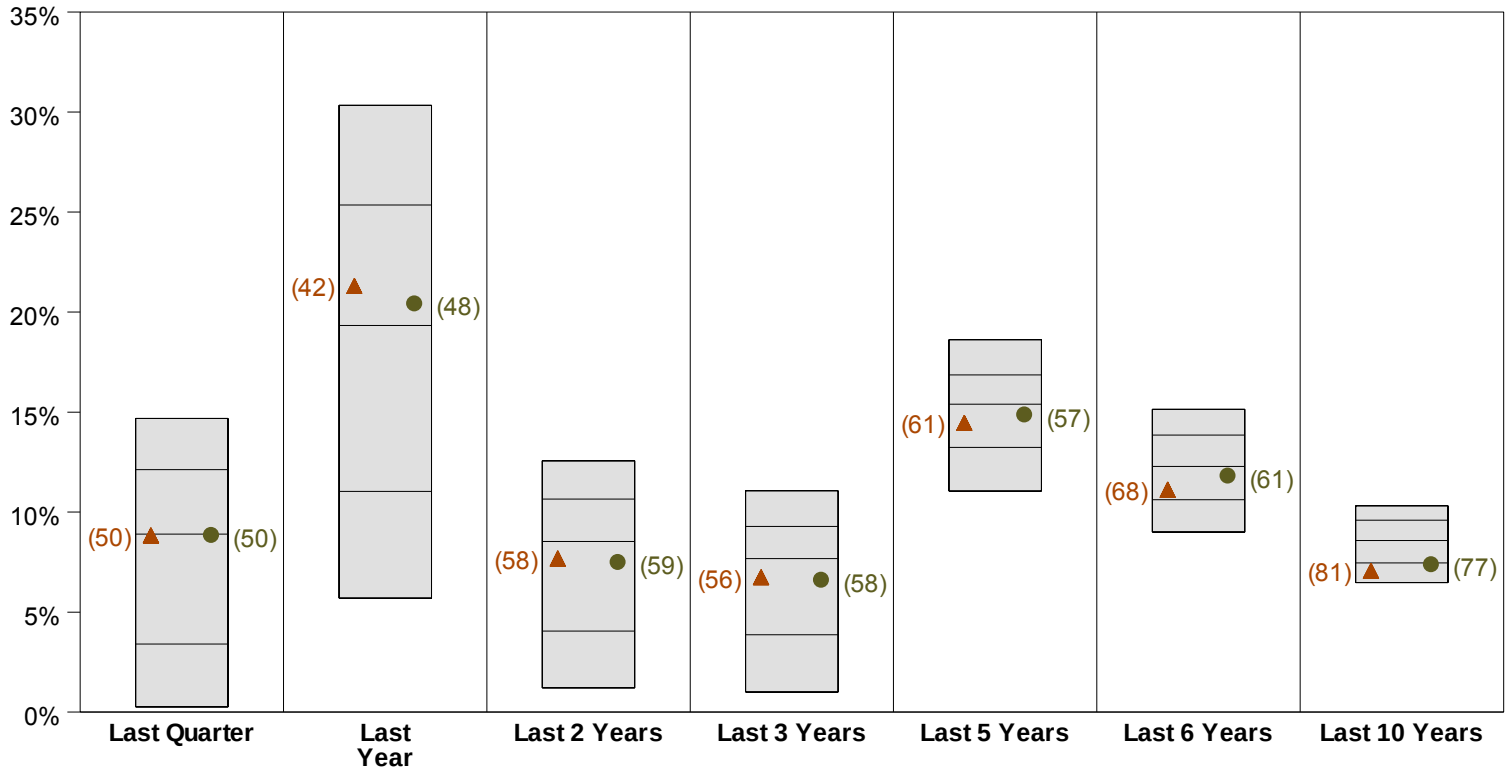




- Nearly 3/5 of large cap allocation is passively managed.
- Long-term performance exhibits market-like returns with similar risk.

Small Cap Domestic Equity Pool through 12/31/16

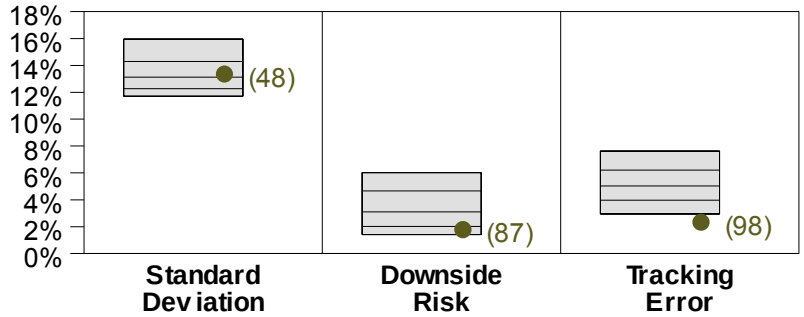
Performance vs CAI Small Capitalization (Gross)



	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	14.69	30.34	12.57	11.07	18.62	15.14	10.31
25th Percentile	12.12	25.35	10.66	9.28	16.85	13.85	9.59
Median	8.90	19.33	8.54	7.68	15.40	12.28	8.58
75th Percentile	3.40	11.03	4.05	3.87	13.23	10.61	7.45
90th Percentile	0.27	5.70	1.21	1.00	11.05	9.01	6.48
Small Cap Pool ●	8.77	20.35	7.41	6.53	14.79	11.74	7.31
Russell 2000 Index ▲	8.83	21.31	7.68	6.74	14.46	11.12	7.07

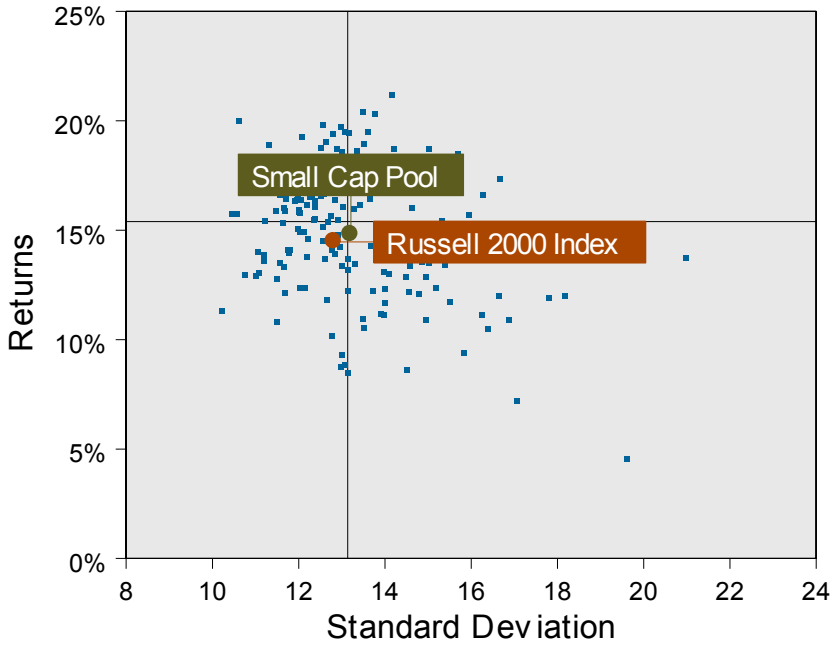
- Returns compare favorably versus the index across the five, six, and 10 year time frames.

Small Cap Pool through 12/31/16



	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	15.96	6.01	7.62
25th Percentile	14.29	4.66	6.21
Median	13.14	3.10	5.03
75th Percentile	12.26	2.03	3.96
90th Percentile	11.72	1.40	2.95
Small Cap Equity Pool ●	13.21	1.64	2.19

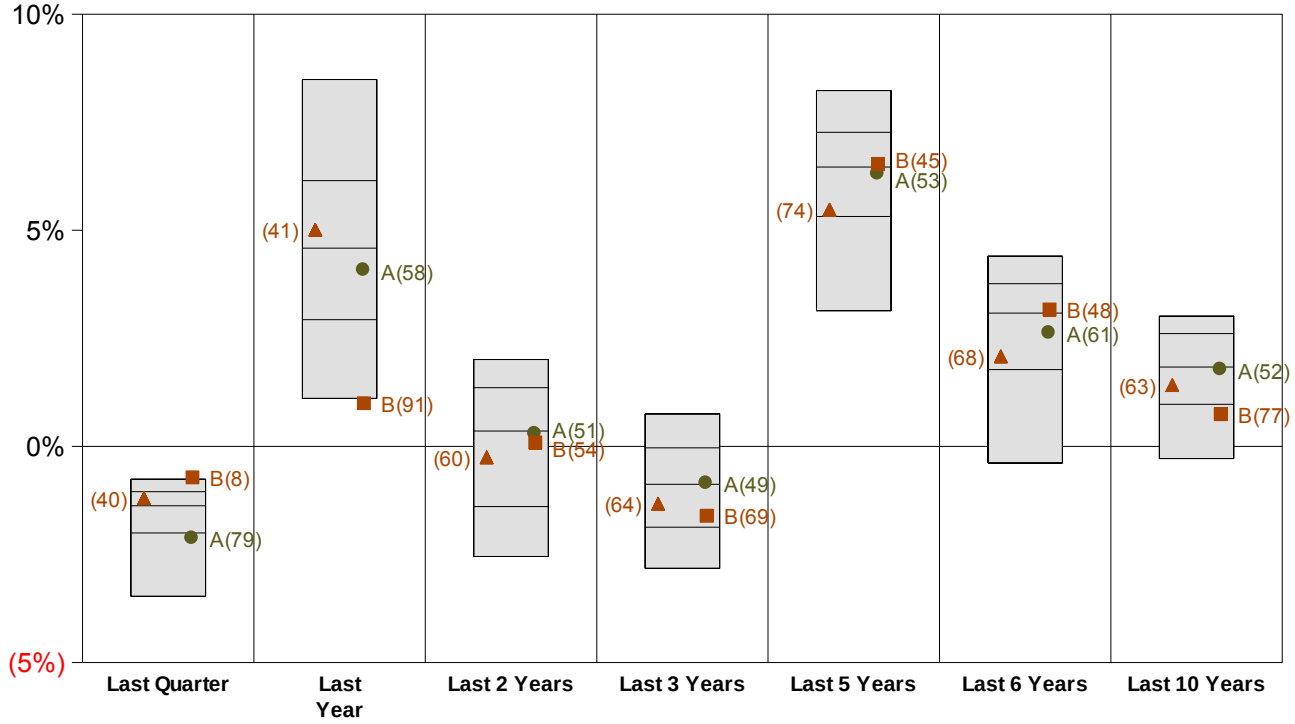
CAI Small Capitalization (Gross)
Annualized Five Year Risk vs Return



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

International Equity through 12/31/16

Performance vs Pub Pln- International Equity (Gross)

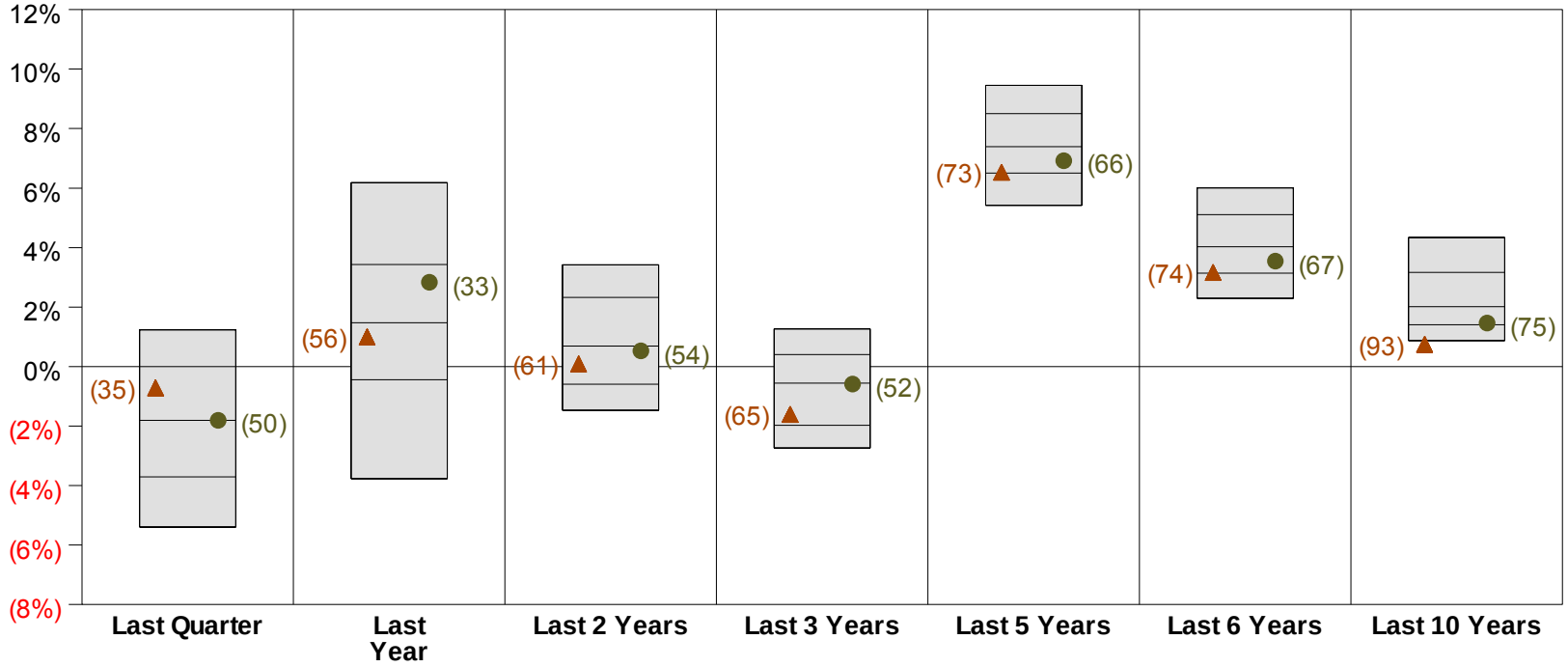


		Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile		(0.76)	8.49	2.01	0.75	8.23	4.40	3.01
25th Percentile		(1.04)	6.15	1.36	(0.03)	7.27	3.77	2.61
Median		(1.37)	4.59	0.36	(0.88)	6.46	3.08	1.84
75th Percentile		(2.00)	2.93	(1.39)	(1.87)	5.32	1.78	0.98
90th Percentile		(3.47)	1.11	(2.55)	(2.82)	3.14	(0.39)	(0.28)
Employees' Total Int'l Equity	● A	(2.13)	4.07	0.28	(0.86)	6.29	2.62	1.77
MSCI EAFE Index	■ B	(0.71)	1.00	0.09	(1.60)	6.53	3.17	0.75
MSCI ACWIxUS Gross	▲	(1.20)	5.01	(0.25)	(1.32)	5.48	2.09	1.42

- Fourth quarter performance figures were tempered by weak performance in emerging markets.

International Equity ex Emerging Markets through 12/31/16

Performance vs CAI Non-U.S. Equity Style (Gross)



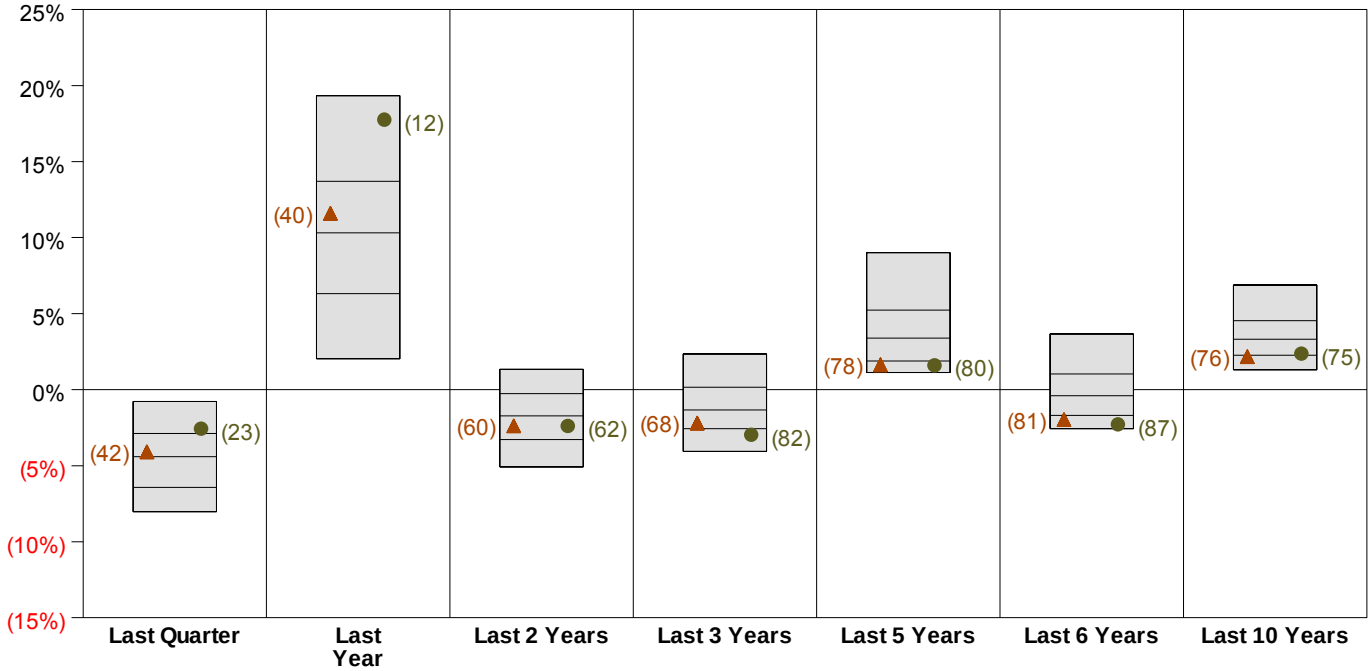
	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	1.23	6.19	3.42	1.26	9.45	6.01	4.34
25th Percentile	0.00	3.43	2.32	0.40	8.50	5.11	3.16
Median	(1.80)	1.47	0.69	(0.55)	7.39	4.03	2.01
75th Percentile	(3.70)	(0.44)	(0.59)	(1.97)	6.50	3.14	1.41
90th Percentile	(5.39)	(3.77)	(1.47)	(2.73)	5.42	2.29	0.87
Int'l Equity Pool (ex Emerging. Mkt) ●	(1.87)	2.77	0.46	(0.65)	6.86	3.48	1.40
MSCI EAFE ▲	(0.71)	1.00	0.09	(1.60)	6.53	3.17	0.75

International Equity ex Emerging Markets through 12/31/16

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Int'l Equity Pool (ex Emerging Market)	**(1.87%)**	**2.77%**	**(0.65%)**	**6.86%**	**1.40%**
Allianz Global Investors	(1.15%)	(4.84%)	-	-	-
Arrowstreet ACWI ex -US	(0.85%)	5.10%	-	-	-
Baillie Gifford ACWI ex US	(7.30%)	1.17%	-	-	-
Blackrock ACWI ex US IMI	(1.57%)	4.63%	(1.24%)	-	-
Brandes Investment	2.24%	3.60%	1.02%	8.16%	2.11%
Capital Guardian	(2.00%)	3.41%	(1.72%)	7.23%	1.80%
Lazard Asset Intl	(3.69%)	0.53%	(0.98%)	7.08%	2.47%
McKinley Capital	(4.15%)	(0.29%)	1.80%	7.97%	0.89%
SSgA Int'l	(1.58%)	4.54%	(1.19%)	5.63%	-
Schroder Inv Mgmt	(3.79%)	(1.19%)	2.51%	10.70%	-
Mondrian Intl Sm Cap	(6.43%)	1.02%	0.23%	8.42%	-
MSCI EAFE Index	(0.71%)	1.00%	(1.60%)	6.53%	0.75%
MSCI ACWI ex-US IMI Index	(1.57%)	4.41%	(1.44%)	5.35%	1.22%

Emerging Markets Pool through 12/31/16

Performance vs Emerging Markets Equity DB (Gross)



	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	(0.78)	19.33	1.34	2.35	9.01	3.66	6.89
25th Percentile	(2.88)	13.70	(0.26)	0.16	5.23	1.03	4.54
Median	(4.40)	10.31	(1.72)	(1.33)	3.39	(0.40)	3.32
75th Percentile	(6.43)	6.32	(3.28)	(2.57)	1.88	(1.69)	2.26
90th Percentile	(8.03)	2.03	(5.08)	(4.05)	1.13	(2.57)	1.32
Emerging Markets Pool ●	(2.67)	17.65	(2.50)	(3.07)	1.49	(2.40)	2.26
MSCI EM Gross ▲	(4.08)	11.60	(2.37)	(2.19)	1.64	(1.96)	2.17

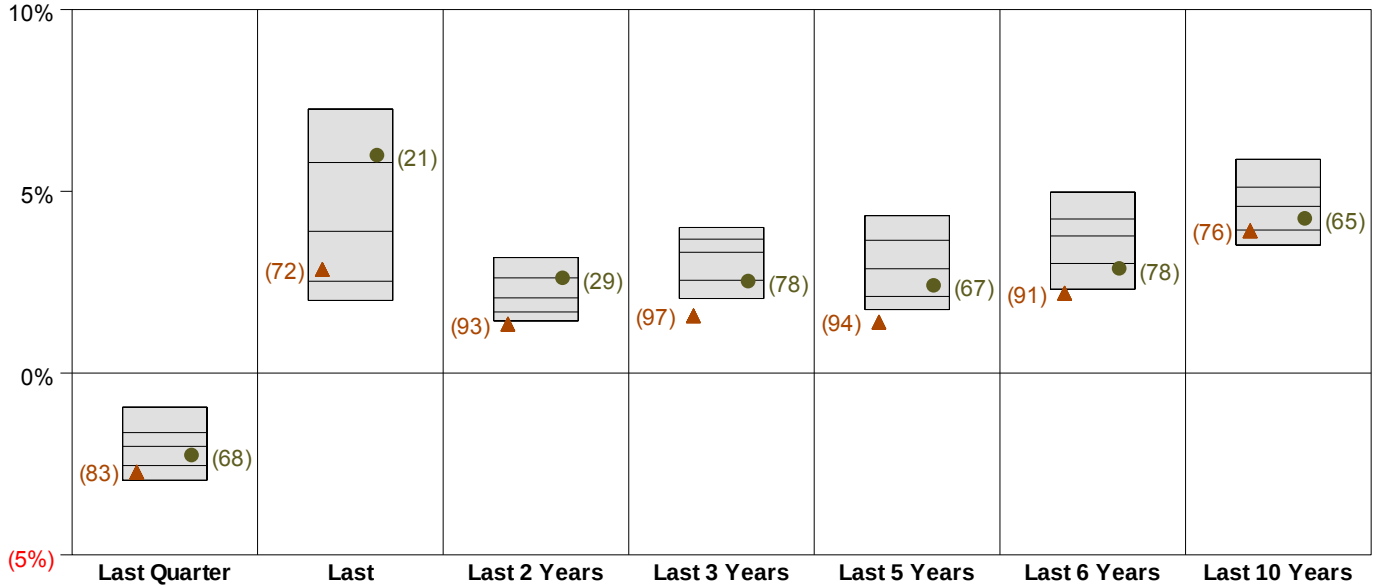
- The Emerging Markets Pool outperformed fourth quarter, over the trailing 12 months, and over the 10-year time frame.

Emerging Markets Pool through 12/31/16

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Emerging Markets Pool	**(2.67%)**	**17.65%**	**(3.07%)**	**1.49%**	**2.26%**
Lazard Emerging	(2.80%)	20.52%	(2.66%)	2.28%	-
Eaton Vance Emerging(net)	(2.43%)	12.34%	(3.32%)	1.77%	-
MSCI Emerging Mkts Idx	(4.08%)	11.60%	(2.19%)	1.64%	2.17%

Total Bond as of 12/31/16

Performance vs Pub Pln- Domestic Fixed (Gross)



	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	(0.94)	7.26	3.18	4.00	4.33	4.98	5.88
25th Percentile	(1.64)	5.79	2.62	3.68	3.65	4.24	5.12
Median	(2.02)	3.90	2.07	3.32	2.87	3.77	4.59
75th Percentile	(2.54)	2.53	1.68	2.55	2.10	3.01	3.93
90th Percentile	(2.95)	2.00	1.43	2.05	1.75	2.31	3.52
Total Fixed-Income Pool ●	(2.30)	5.95	2.57	2.48	2.37	2.83	4.21
Fixed-Income Target ▲	(2.72)	2.85	1.35	1.58	1.40	2.20	3.91

- The Total Bond portfolio has a custom target, intermediate in nature, that reflects a cautious view on the risk of rising rates.
- The strategy's returns outperform the benchmark over all time periods.
- Columbia Threadneedle High Yield strategy was funded during 1Q16

Includes In-House and External Portfolios

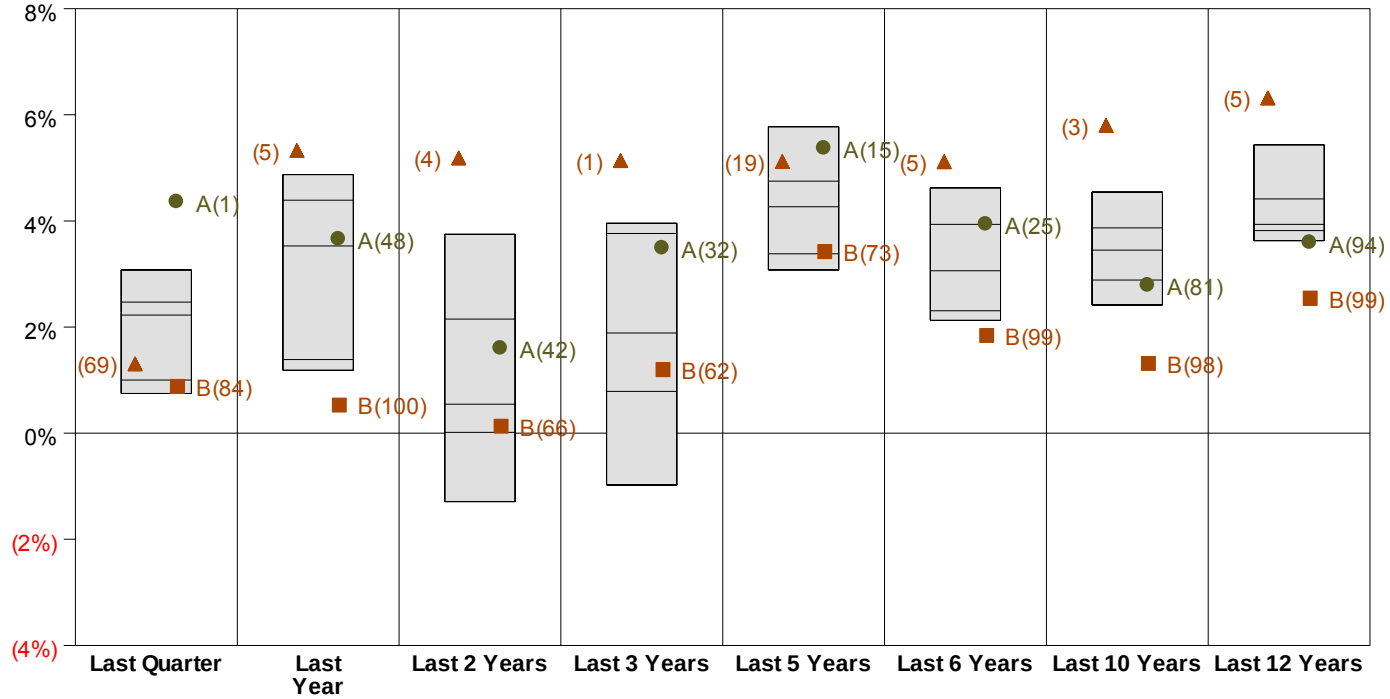
Real Assets through 12/31/16

	Last Quarter	Fiscal YTD	Last Year	Last 3 Years	Last 5 Years
Real Assets	**1.61%**	**2.84%**	**7.87%**	**6.58%**	**8.30%**
Real Assets Target (1)	0.34%	1.79%	7.37%	8.36%	8.55%
Real Estate Pool	2.18%	2.90%	9.21%	11.84%	10.99%
Real Estate Target (2)	1.23%	2.72%	8.07%	11.25%	11.08%
Private Real Estate	2.23%	3.40%	7.82%	11.11%	10.63%
NCREIF Total Index	1.73%	3.53%	7.97%	11.02%	10.91%
REIT Internal Portfolio	(3.41%)	(4.57%)	8.34%	12.72%	11.80%
NAREIT Equity Index	(3.28%)	(4.44%)	8.63%	12.66%	11.98%
Total Farmland	0.87%	1.94%	5.40%	5.50%	10.09%
UBS Farmland	0.96%	2.07%	5.63%	6.15%	11.29%
Hancock Agricultural	0.69%	1.69%	4.92%	4.15%	7.95%
ARMB Farmland Target (3)	1.26%	2.35%	5.28%	6.45%	10.39%
Total Timber	(0.28%)	0.11%	(0.43%)	5.42%	5.36%
Timberland Investment Resources	(0.33%)	0.25%	0.02%	4.73%	5.09%
Hancock Timber	(0.13%)	(0.28%)	(1.76%)	6.32%	5.64%
NCREIF Timberland Index	1.18%	1.86%	2.59%	5.96%	7.06%
TIPS Internal Portfolio	(2.42%)	(1.41%)	4.69%	2.26%	0.93%
BC US TIPS Index	(2.41%)	(1.47%)	4.68%	2.26%	0.89%
Total Energy Funds *	2.00%	8.08%	(22.04%)	(17.38%)	(10.05%)
CPI + 5%	1.18%	2.51%	6.99%	5.90%	6.17%
MLP Composite	3.14%	6.49%	19.23%	(1.15%)	-
Advisory Research (FKA FAMCO) MLP	3.27%	7.65%	22.06%	(2.36%)	-
Tortoise Capital Adv MLP	3.03%	5.48%	16.88%	(0.02%)	-
Alerian MLP Index	2.04%	3.14%	18.31%	(5.80%)	2.25%
Total Infrastructure	(0.25%)	1.02%	8.00%	-	-
Brookfield	(5.82%)	(3.19%)	13.13%	-	-
Lazard	(1.18%)	4.00%	8.58%	-	-
JPM Infrastructure	1.46%	0.55%	3.00%	-	-
IFM Infrastructure (funded May 2015)	2.01%	1.61%	8.87%	-	-
Global Infrastructure Idx	(4.06%)	(1.45%)	12.43%	4.00%	7.67%

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

Absolute Return Composite through 12/31/16

Performance vs CAI Absolute Return 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 12 Years
10th Percentile		3.08	4.87	3.75	3.96	5.78	4.62	4.55	5.43
25th Percentile		2.47	4.39	2.15	3.76	4.75	3.94	3.87	4.42
Median		2.23	3.53	0.55	1.89	4.27	3.06	3.45	3.93
75th Percentile		1.00	1.39	0.01	0.79	3.38	2.31	2.89	3.82
90th Percentile		0.75	1.19	(1.29)	(0.98)	3.08	2.13	2.42	3.63
Absolute Return Composite	● A	4.35	3.64	1.59	3.48	5.36	3.93	2.78	3.58
HFRI Fund of Funds Compos	■ B	0.88	0.53	0.13	1.20	3.42	1.84	1.32	2.55
T-Bills + 5%	▲	1.31	5.33	5.19	5.14	5.12	5.12	5.80	6.32

- Absolute return allocation has exceeded HFRI FoF Index over each trailing time period shown.

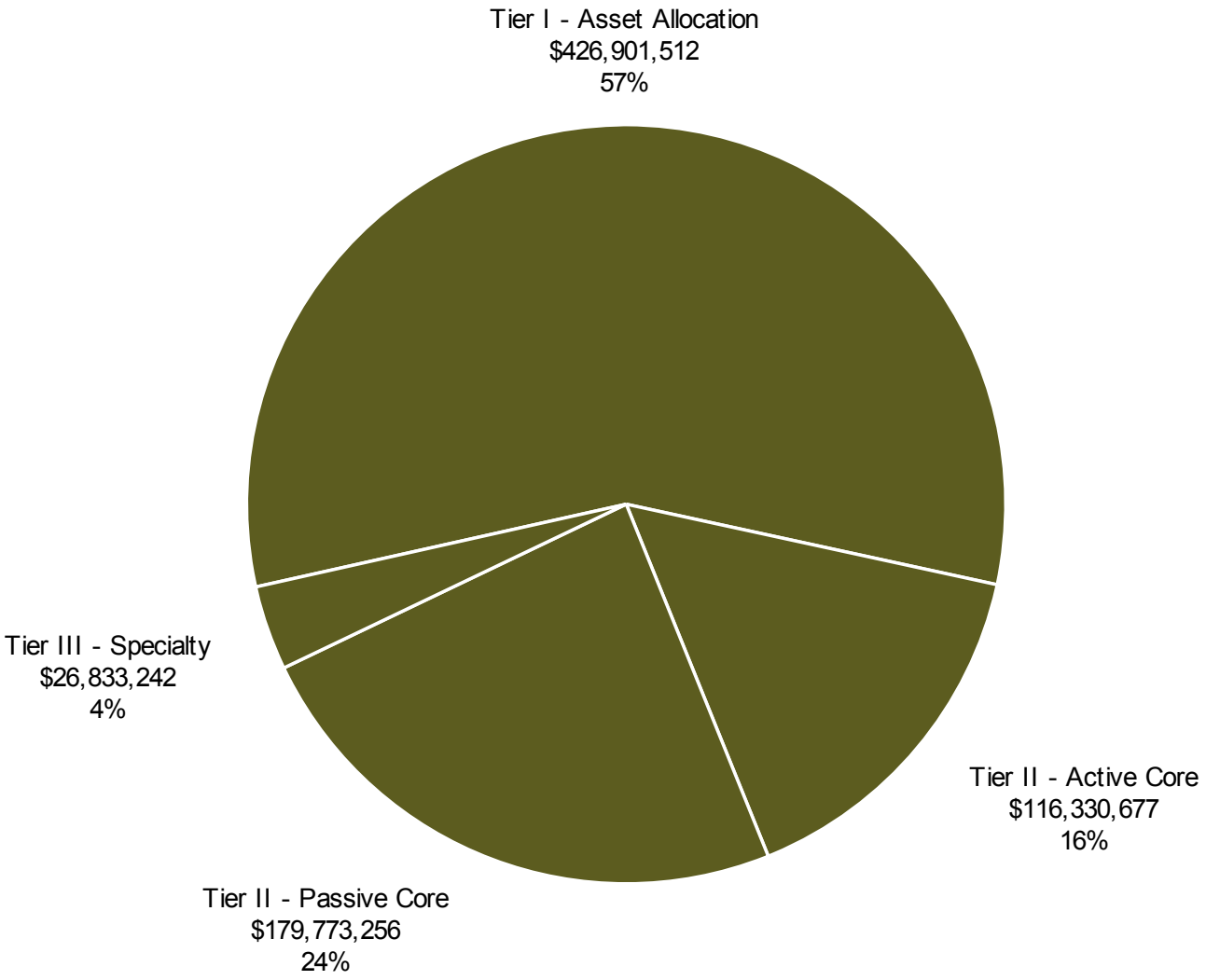
Absolute Return Composite through 12/31/16

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Absolute Return	**3.12%**	**3.28%**	**4.36%**	**5.29%**	**2.87%**
Crestline ABS	9.65%	12.97%	9.40%	8.25%	4.24%
Glob Asset Mgt	0.51%	(0.60%)	1.27%	4.23%	-
Prisma ABS	1.59%	(1.13%)	1.00%	4.68%	-
Allianz Stuctured Alpha 1000+	2.91%	11.21%	-	-	-
KKR Apex Equity Fund	(2.84%)	(2.15%)	-	-	-
Crestline Specialty Lending Fund	1.35%	10.53%	-	-	-
Zebra Global Equity	1.07%	-	-	-	-
Zebra Global Advantage	2.40%	-	-	-	-
HFRI Fund of Funds Index	0.88%	0.53%	1.20%	3.42%	1.32%

Defined Contribution Plan

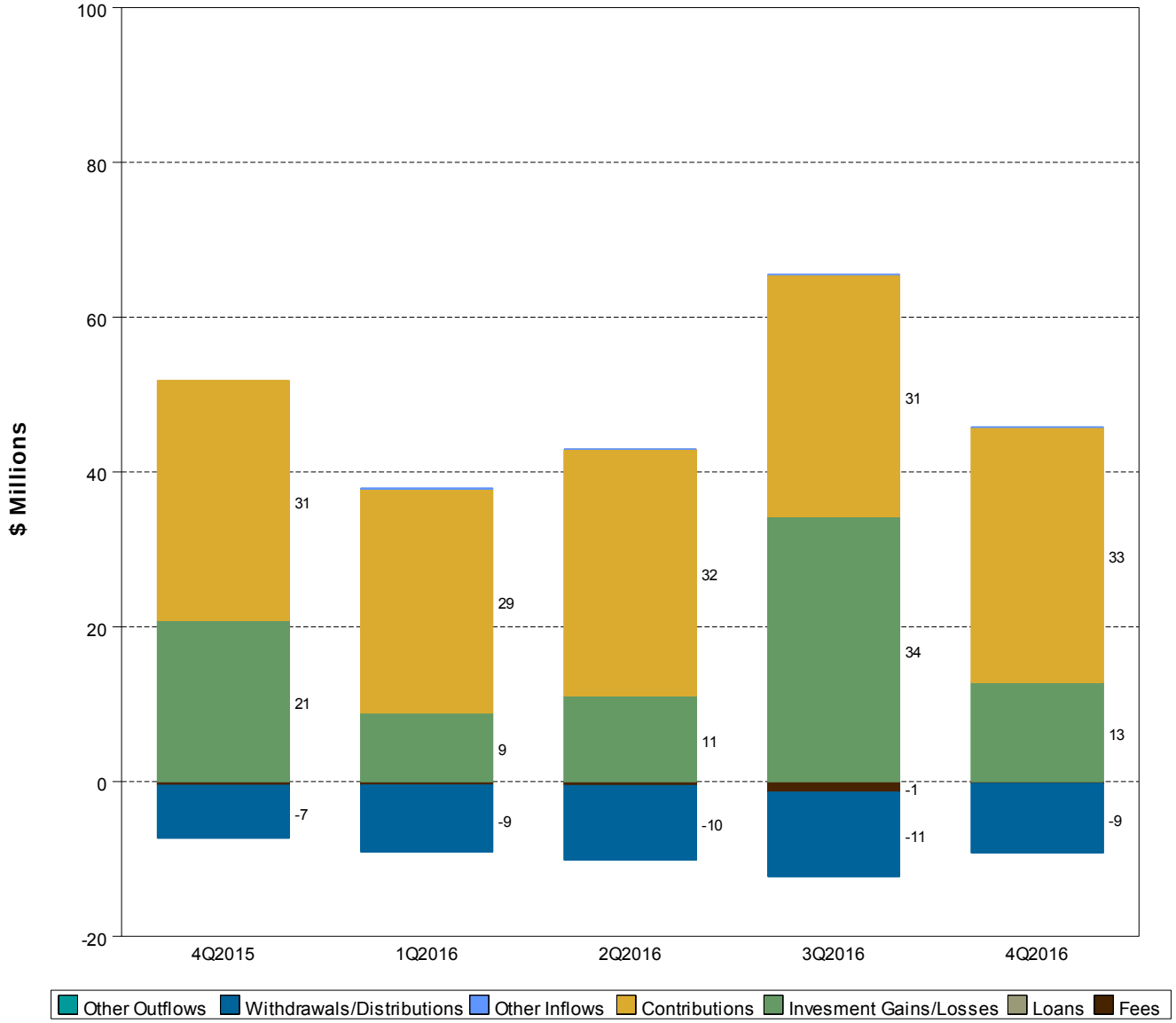
PERS DC Plan

December 31, 2016



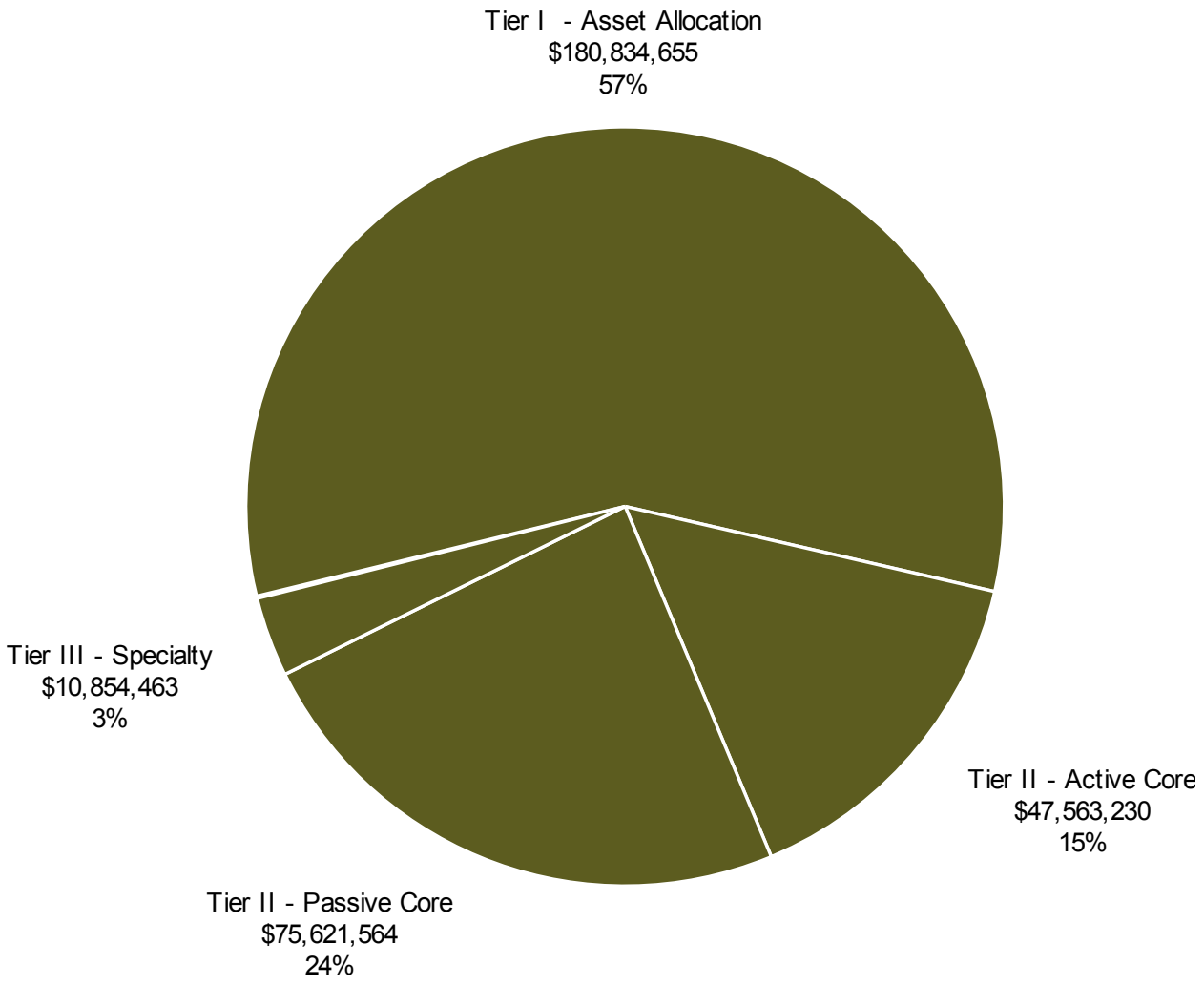
PERS DC Plan: Asset Changes

December 31, 2016



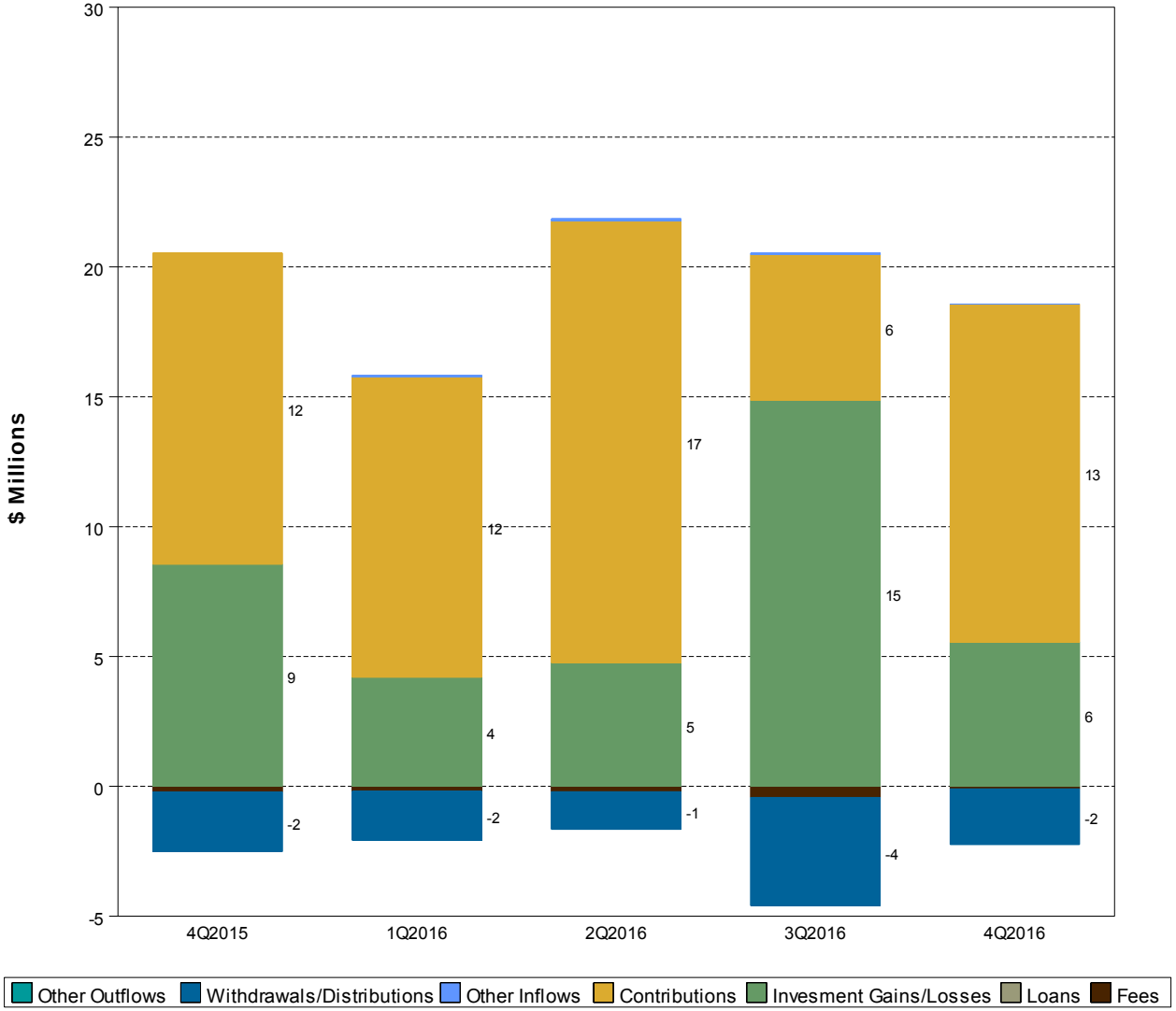
TRS DC Plan

December 31, 2016



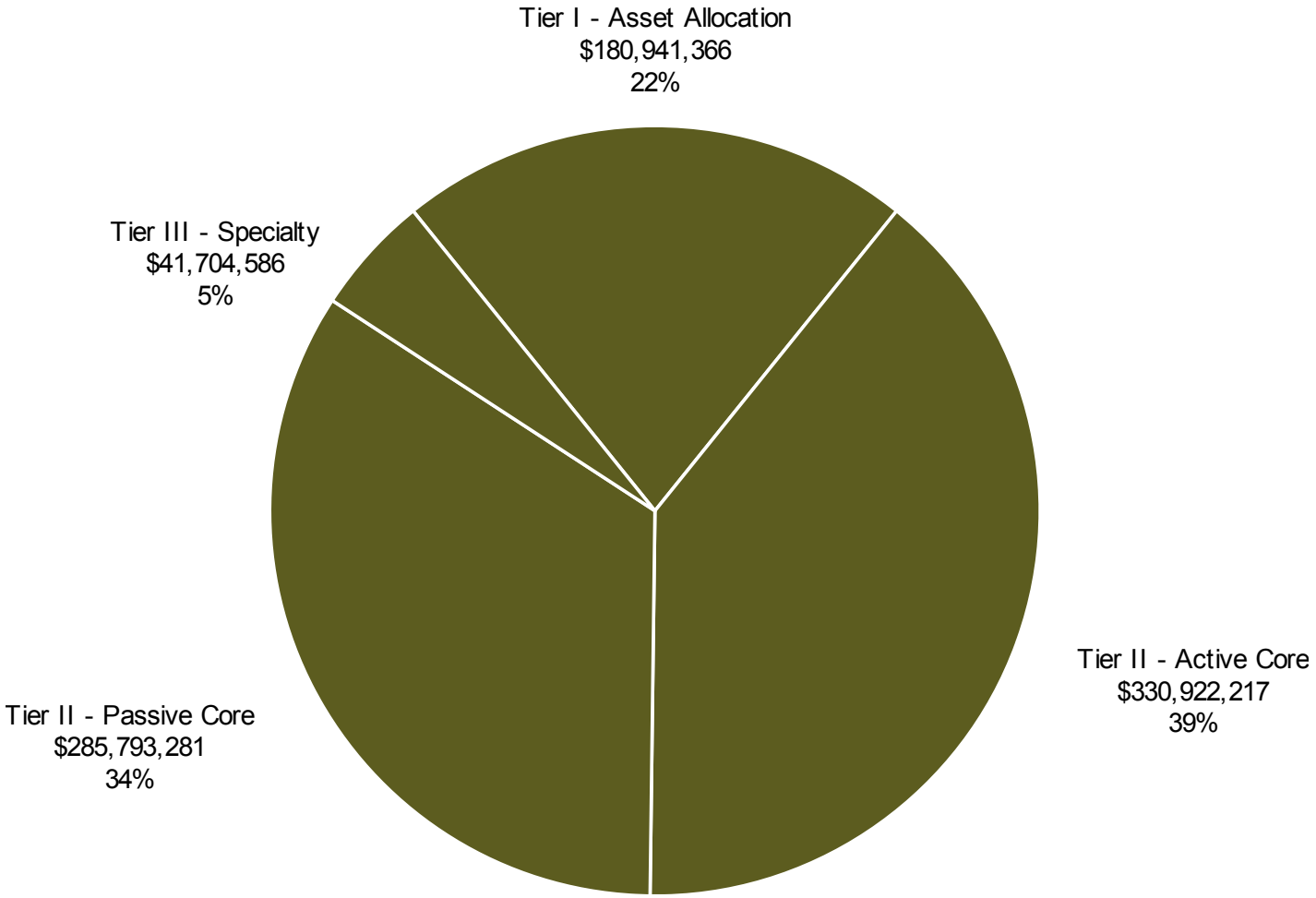
TRS DC Plan: Asset Growth Changes

December 31, 2016



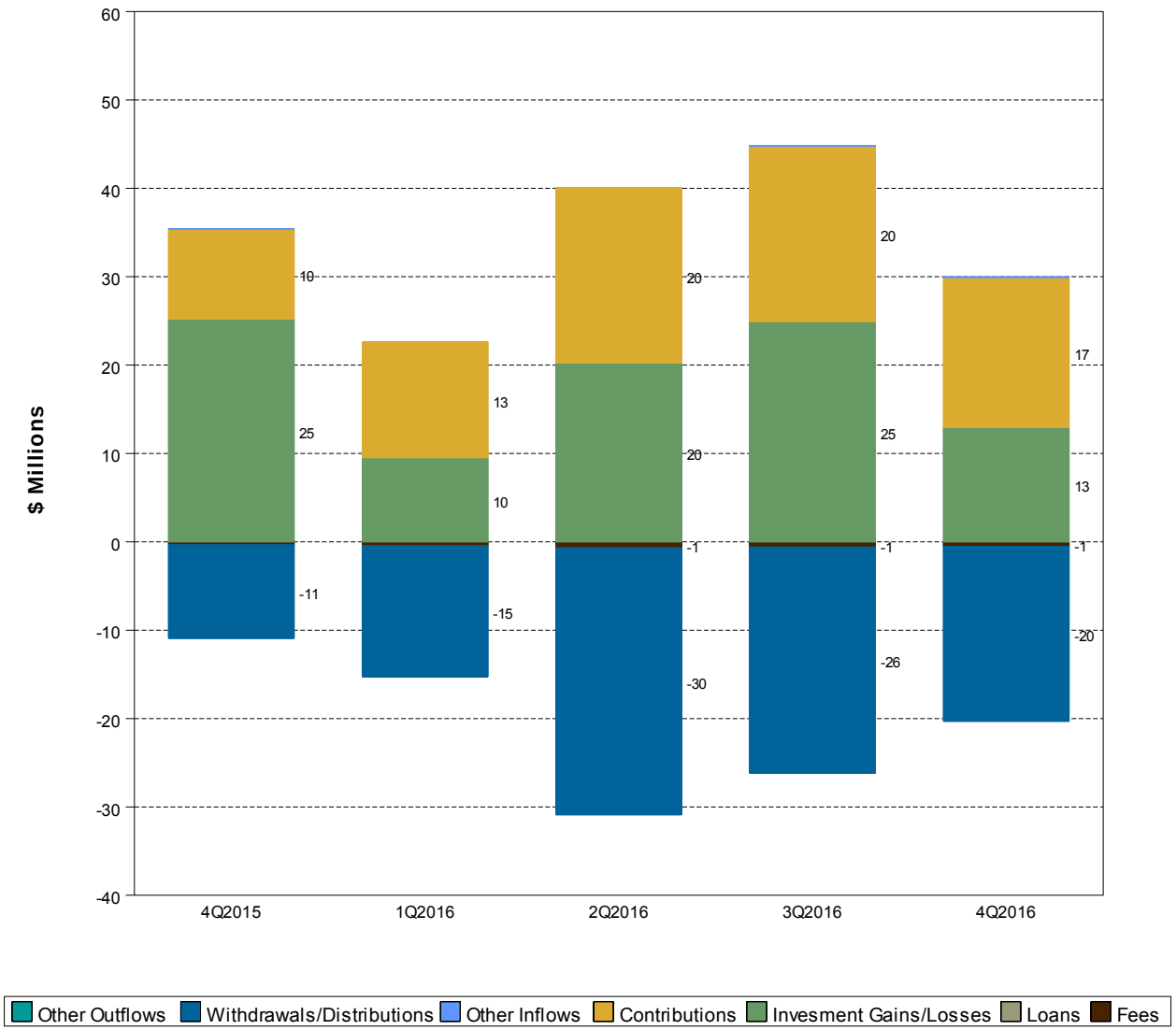
Deferred Comp Plan

December 31, 2016



Deferred Comp Plan: Quarterly Asset Changes

December 31, 2016



Individual Account Option Performance: 12/31/16

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	**-0.4** 47	**5.2** 58	**3.7** 20	**5.9** 34	**6.2** 29	**3.6** 80		**0.7** 34	**0.2** 100	**1.6** 30
CAI MA Tgt Alloc Cons MFs										
Passive Target	-0.3 44	5.1 64	3.7 20	5.7 41	6.1 31	3.5 80				1.6 30
Alaska Long-Term Balanced	**0.8** 44	**7.2** 40	**4.4** 27	**8.4** 26	**8.1** 22	**5.7** 62		**0.5** 27	**0.2** 100	**1.4** 36
CAI MA Tgt Alloc Mod MFs										
Passive Target	0.8 44	7.2 43	4.5 27	8.3 27	8.0 23	5.7 65				1.4 37
SSgA Global Balanced (i)	**-1.2** 74	**6.2** 38	**2.9** 46	**6.5** 31	**6.0** 33	**6.0** 69		**0.9** 7	**0.3** 100	**1.1** 27
Intl/Global Balanced DB										
Global Balanced Custom Benchmark	-1.3 75	5.8 47	2.7 50	6.2 35	5.7 38	6.1 62				1.0 34
Target 2010 Trust	**0.4** 2	**5.7** 58	**3.7** 17	**7.0** 8	**6.9** 7	**4.6** 52		**0.0** 8	**0.2** 100	**1.5** 10
CAI Tgt Date 2010										
Custom Index	0.4 2	5.6 61	3.7 17	7.0 8	6.9 7	4.7 52				1.5 11
Target 2015 Trust	**0.6** 4	**6.5** 44	**4.1** 6	**8.1** 3	**7.7** 3	**5.5** 32		**0.2** 3	**0.2** 100	**1.4** 12
CAI Tgt Date 2015										
Custom Index	0.7 4	6.4 47	4.1 10	8.1 3	7.7 3	5.6 26				1.4 13
Target 2020 Trust	**1.0** 1	**7.4** 21	**4.5** 4	**9.1** 3	**8.5** 2	**6.3** 28		**0.2** 2	**0.2** 100	**1.4** 7
CAI Tgt Date 2020										
Custom Index	1.0 1	7.3 24	4.4 8	9.1 4	8.4 2	6.4 26				1.4 10
Target 2025 Trust	**1.3** 4	**8.1** 16	**4.8** 3	**9.9** 6	**9.1** 2	**7.0** 33		**0.0** 5	**0.3** 100	**1.4** 5
CAI Tgt Date 2025										
Custom Index	1.3 3	8.0 18	4.7 4	9.9 6	9.1 2	7.2 23				1.4 10
Target 2030 Trust	**1.6** 5	**8.7** 12	**5.0** 3	**10.6** 4	**9.5** 2	**7.7** 29		**0.1** 4	**0.3** 100	**1.4** 3
CAI Tgt Date 2030										
Custom Index	1.6 5	8.7 13	5.0 3	10.6 4	9.5 2	7.8 26				1.3 6
Target 2035 Trust	**1.9** 7	**9.3** 10	**5.2** 2	**11.2** 4	**9.9** 2	**8.2** 40		**0.1** 3	**0.3** 100	**1.4** 3
CAI Tgt Date 2035										
Custom Index	1.9 7	9.1 12	5.1 3	11.2 4	9.9 2	8.4 30				1.3 6

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:

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

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

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

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Target 2040 Trust	**2.1** 8	**9.6** 13	**5.3** 1	**11.5** 2	**10.1** 1	**8.5** 61		**0.1** 2	**0.3** 100	**1.3** 2
CAI Tgt Date 2040										
Custom Index	2.1 9	9.6 13	5.2 1	11.5 2	10.1 1	8.7 33				1.3 4
Target 2045 Trust	**2.2** 9	**9.8** 8	**5.3** 2	**11.5** 2	**10.1** 2	**8.5** 67		**0.2** 2	**0.3** 100	**1.3** 3
CAI Tgt Date 2045										
Custom Index	2.1 10	9.7 11	5.3 2	11.5 3	10.1 2	8.7 49				1.3 4
Target 2050 Trust	**2.2** 8	**9.8** 14	**5.3** 4	**11.5** 3	**10.1** 1	**8.5** 80		**0.1** 2	**0.3** 100	**1.3** 3
CAI Tgt Date 2050										
Custom Index	2.1 8	9.7 15	5.3 6	11.5 3	10.1 1	8.7 69				1.3 3
Target 2055 Trust	**2.2** 10	**9.8** 11	**5.3** 3	**11.5** 4	**10.1** 3	**8.5** 73		**0.1** 3	**0.3** 100	**1.3** 5
CAI Tgt Date 2055										
Custom Index	2.1 10	9.7 15	5.3 4	11.5 6	10.1 3	8.7 66				1.3 6
Target 2060 Trust	**2.1** 16	**9.7** 22								
CAI Tgt Date 2060										
Custom Index	2.1 16	9.7 24								

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:

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

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

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

Other Options: 12/31/16

Active Equity, Stable Value, and Interest Income

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Active and Other Funds										
International Equity Fund	**0.0** 22	**-0.1** 51								
CAI Mut Fd: Non-U.S. Equity Style										
MSCI ACWI ex US Index	-1.2 37	5.0 13	-1.3 41	5.5 79	3.4 66	11.8 67				0.5 71
Allianz/RCM Socially Responsible	**1.0** 83	**5.9** 80	**5.7** 79	**11.2** 89	**9.6** 87	**9.6** 62		**-0.9** 99	**2.0** 86	**1.2** 91
CAI Mut Fd: Core Equity Style										
Custom Benchmark	2.9 57	11.7 26	7.6 41	13.6 49	12.1 33	9.0 80				1.5 43
T. Rowe Price Small Cap	**7.6** 41	**18.9** 38	**7.4** 19	**15.5** 15	**15.4** 5	**12.1** 79		**0.5** 4	**2.7** 100	**1.3** 9
CAI Mut Fd: Sm Cap Broad Style										
Russell 2000 Index	8.8 40	21.3 31	6.7 28	14.5 28	13.2 30	12.8 64				1.1 27
T. Rowe Price Stable Value	**0.6** 1	**2.4** 1	**2.4** 1	**2.6** 1	**2.9** 2	**0.1** 40		**13.2** 11	**0.0** 98	**20.3** 14
CAI Stable Value Database										
5 Yr U.S. Treas Rolling	0.3 94	1.2 91	1.3 90	1.5 85	2.0 67	0.2 18				8.5 88
Def Comp Interest Income Fund	**0.7** 1	**2.7** 1	**2.8** 1	**3.0** 1	**3.3** 1	**0.1** 26		**28.2** 1	**0.0** 98	**20.4** 13
CAI Stable Value Database										
5 Yr U.S. Treas Rolling	0.3 94	1.2 91	1.3 90	1.5 85	2.0 67	0.2 18				8.5 88

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:

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

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

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

Passive Options: 12/31/16

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)	**3.8** 49	**12.0** 20	**8.9** 29	**14.7** 41	**12.8** 42	**9.1** 86		**-0.3** 69	**0.0** 99	**1.6** 21
CAI Large Cap Core Style										
S&P 500 Index	3.8 51	12.0 20	8.9 28	14.7 41	12.8 42	9.1 86				1.6 20
BlackRock S&P 500 Index Fund (i)	**3.8** 45	**11.9** 37	**8.8** 34	**14.7** 44	**12.9** 41	**9.1** 75		**-0.2** 62	**0.0** 99	**1.6** 16
CAI Mut Fd: Core Equity Style (Gross)										
S&P 500 Index	3.8 45	12.0 37	8.9 33	14.7 44	12.8 41	9.1 75				1.6 16
SSgA Russell 3000 Index Fund (i)	**4.2** 38	**12.7** 24	**8.5** 11	**14.7** 17	**12.9** 11	**9.4** 82		**0.1** 11	**0.1** 100	**1.5** 7
CAI Mut Fd: Large Cap Broad Style (Net)										
Russell 3000 Index	4.2 39	12.7 24	8.4 12	14.7 17	12.9 11	9.5 82				1.5 7
SSgA World Equity ex-US Index Fund (i)	**-1.3** 38	**5.2** 13	**-1.7** 52	**5.1** 87	**3.0** 82	**11.7** 72		**0.1** 85	**0.9** 100	**0.4** 80
CAI MF: Non-U.S. Equity Style (Net)										
MSCI ACWI x U.S. Index (Net)	-1.3 38	4.5 16	-1.8 53	5.0 87	2.9 83	11.9 65				0.4 85
SSgA Long US Treasury Bond (i)	**-11.7** 60	**1.3** 63	**7.8** 26	**2.5** 59	**7.0** 66	**12.2** 31		**-0.1** 58	**0.1** 99	**0.2** 53
CAI Mut Fd: Extended Mat Fixed Income										
Blmbg Long Treasury Index	-11.7 59	1.3 62	7.8 27	2.5 59	7.0 66	12.1 37				0.2 53
SSgA US TIPS (i)	**-2.5** 68	**4.5** 49	**2.1** 24	**0.8** 41	**3.2** 29	**5.1** 40		**-4.6** 99	**0.0** 100	**0.1** 46
CAI TIPS MFs										
Blmbg U.S. TIPS Index	-2.4 66	4.7 45	2.3 22	0.9 30	3.4 20	5.1 40				0.2 32
SSgA World Gov't Bond ex-US (i)	**-10.9** 100	**1.7** 74	**-2.3** 95	**-2.0** 93	**-0.0** 97	**8.7** 1		**-0.6** 100	**0.0** 100	**-0.2** 90
CAI Mut Fd: Global Fixed Income Style										
Citi WGBI Non-U.S. Index	-10.8 100	1.8 74	-2.2 94	-1.9 93	0.0 96	8.7 1				-0.2 90
SSgA US REIT Index Fund (i)	**-2.6** 47	**6.5** 57	**13.5** 19	**11.5** 40	**13.3** 40	**11.8** 32		**-3.5** 100	**0.1** 99	**1.0** 56
CAI Mut Fd: Real Estate Database										
DJ US Select REIT Index	-2.5 46	6.7 50	13.7 13	11.8 28	13.6 25	11.8 23				1.0 49
BlackRock Govt/Credit (i)	**-3.4** 100	**3.0** 47	**3.0** 35	**2.2** 78	**3.7** 69	**3.6** 1		**-1.7** 99	**0.1** 99	**0.6** 90
CAI Mut Fd: Core Bond Style										
Blmbg Gov t/Credit Bd	-3.4 100	3.0 46	3.0 29	2.3 73	3.8 58	3.6 1				0.6 82

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:

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

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

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

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
BlackRock Intermediate Gov't Bond (i)	**-2.2** 66	**1.0** 72	**1.5** 65	**0.9** 84	**2.2** 77	**2.1** 61		**-3.5** 100	**0.0** 98	**0.4** 89
CAI MF: Intermediate Fixed Income Style										
Blmbg Gov Inter	-2.2 66	1.1 70	1.6 56	1.0 74	2.3 70	2.1 60				0.4 84

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:

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

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

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

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

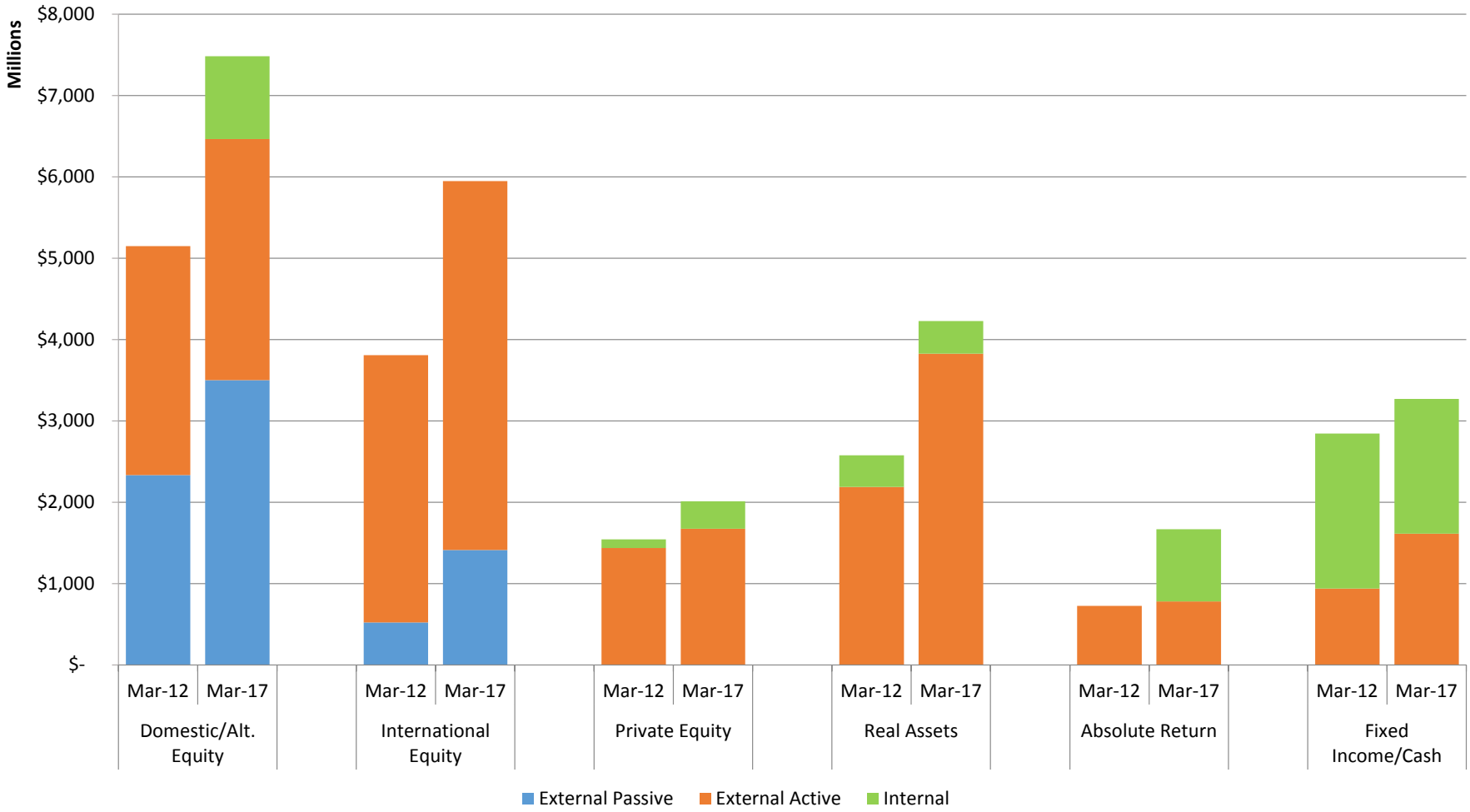
Alaska Retirement Management Board

Internal Public Equity Management

Bob Mitchell, CFA
Anchorage, Alaska
April 20-21, 2017

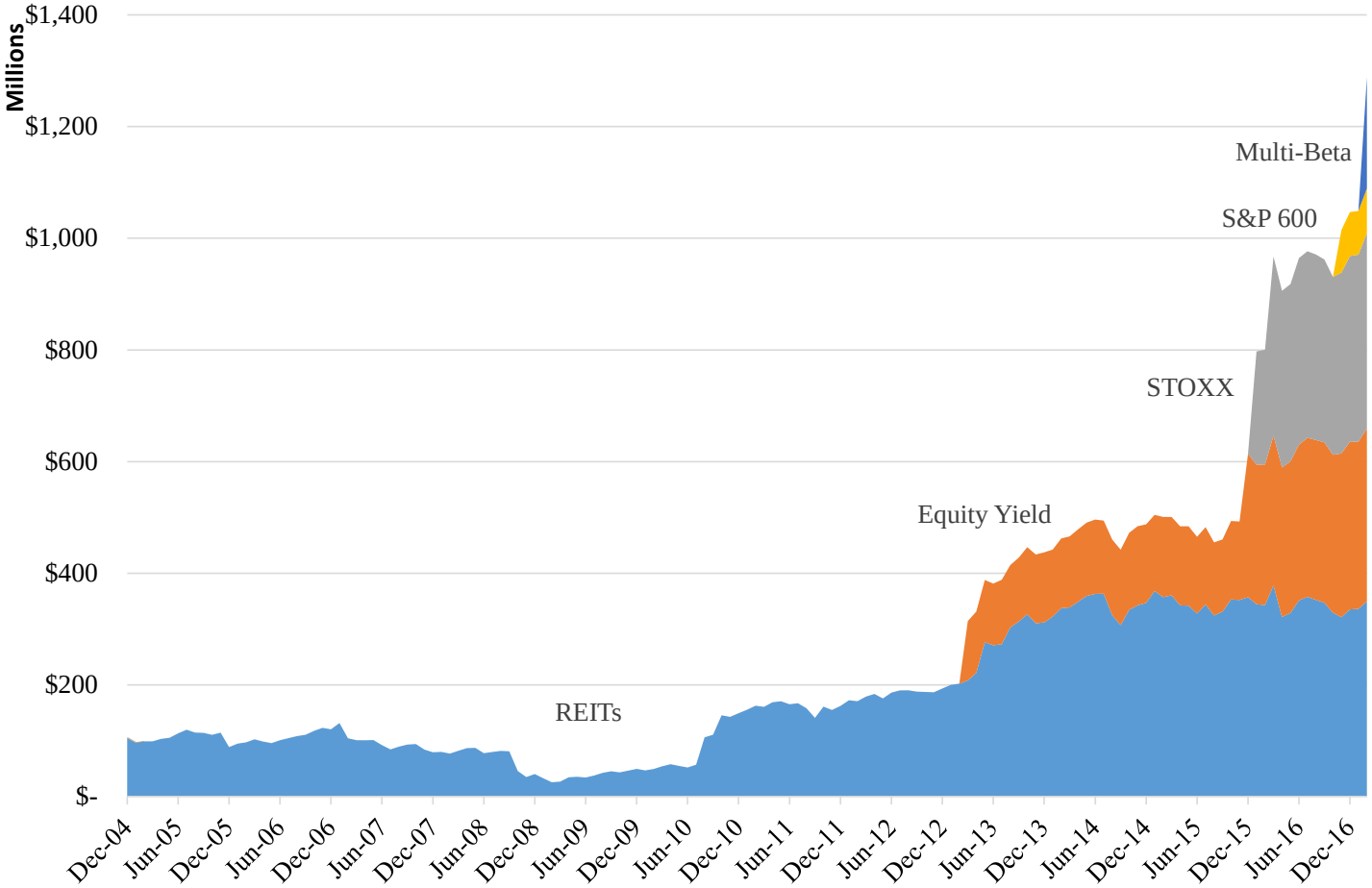
Internal Equity Management

Asset Class Breakdown by Overall Strategy



Internal Equity Management

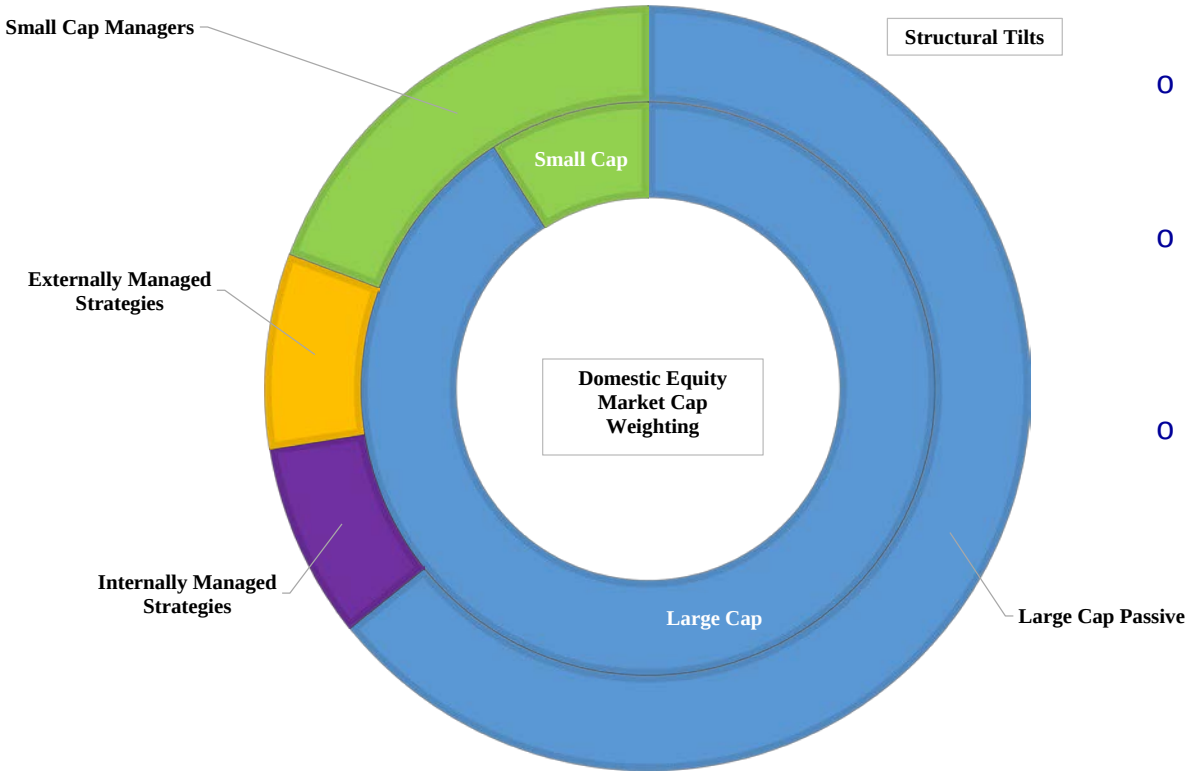
Market Value of Internally Managed Public Equity Strategies over Time



(as of 3/31/2017)	REITs	Equity Yield	STOXX	S&P 600	Multi-Beta
Market Value	$ 344,401,721	$ 309,800,054	$ 349,418,891	$ 79,565,849	$199,027,057
# Holdings	129	102	139	601	460
Inception Date	Nov-2004	Feb-2013	Dec-2015	Nov-2016	Mar-2017

Internal Equity Management

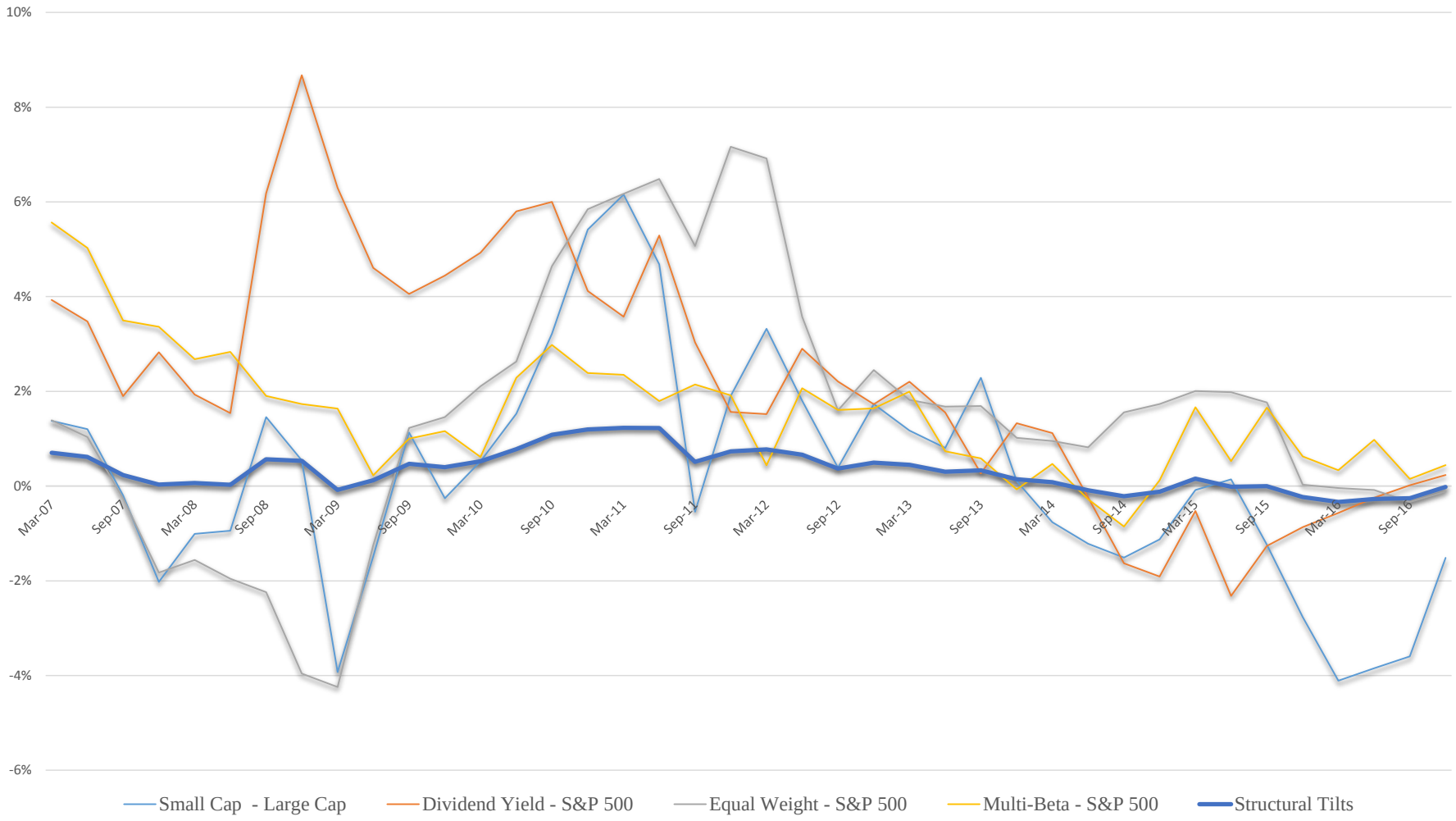
Domestic Equity – Stylized Example of Framework



- Passive strategies provide complete market exposure, control costs, and manage volatility of relative returns.
- Internal strategies are used to gain exposure to attributes which have historically outperformed.
- External active strategies are employed to complement passive and internal strategies with the goal of improving prospective risk-adjusted relative returns for the asset class.
- The size of each component will depend upon staff's assessment of:
  - Tolerance for deviating from the benchmark index over intermediate time periods
  - Prospects for active management
  - Magnitude of potential diversification benefits
  - Management costs

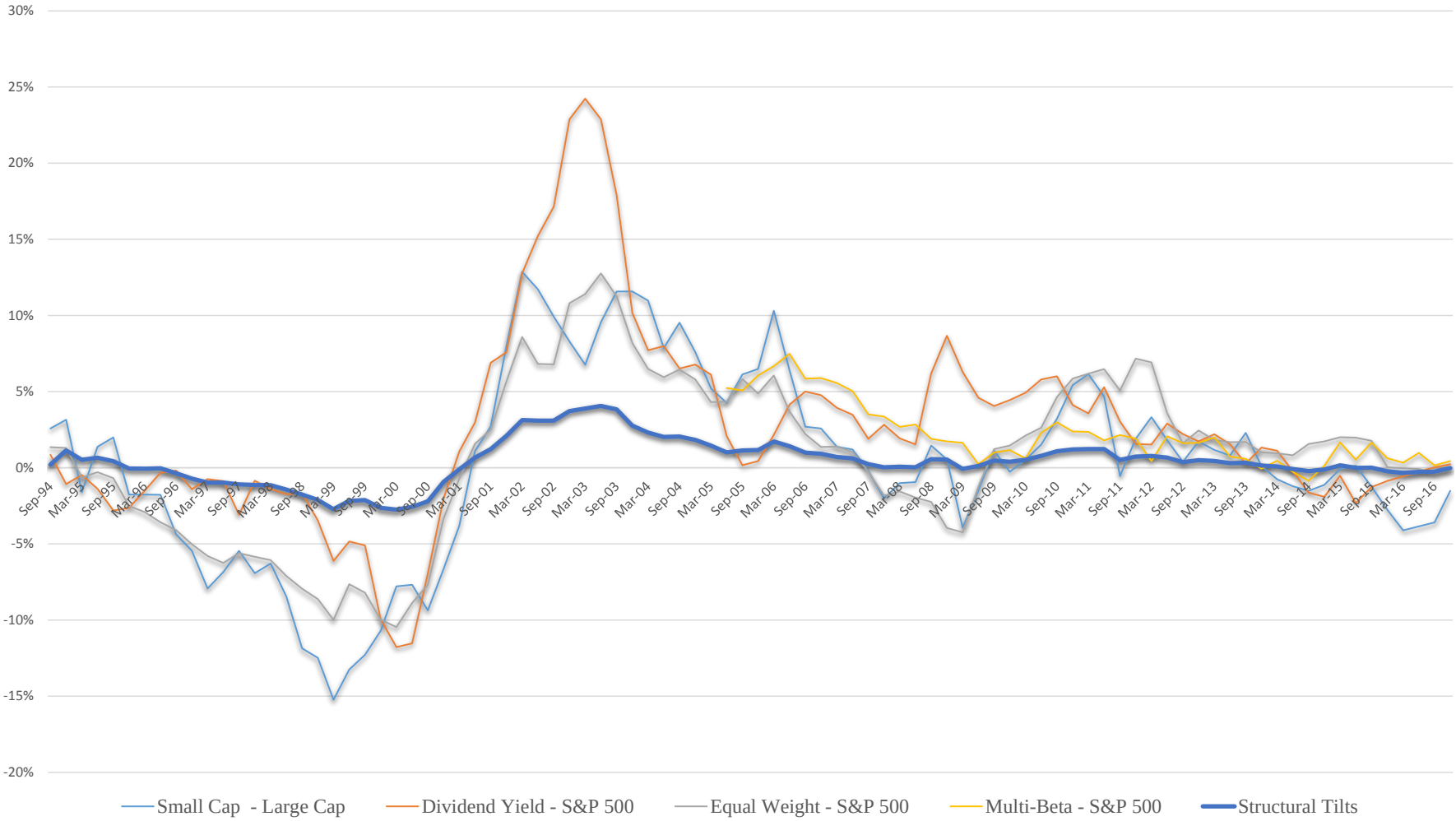
Internal Equity Management

Rolling 3-Year Relative Performance of Strategies and Structural Portfolio: 2007-2016



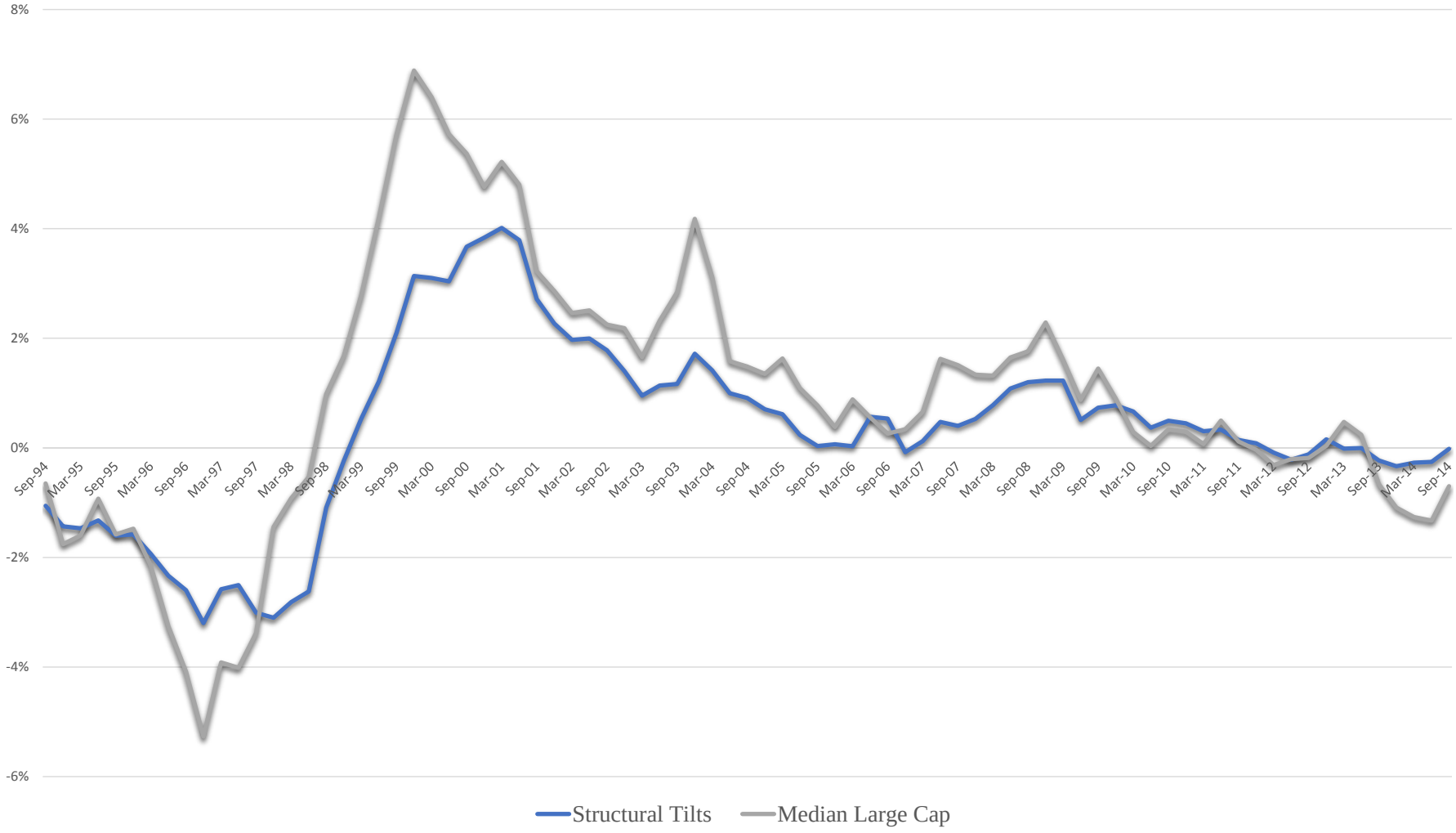
Internal Equity Management

Rolling 3-Year Relative Performance of Strategies and Structural Portfolio: 1994-2016



Internal Equity Management

Rolling 3-Year Relative Performance of Structural and Median Peer: 1994-2016



Internal Equity Management

Next Steps

- Implement domestic equal-weight strategy.
- Build out international equity components, starting with multi-beta.
- Position internally managed and active strategies.
  - Determine tolerable level of deviation from benchmark returns.
  - Size the external passive, internal, and external active strategy components to achieve high prospective risk-adjusted returns.
- Trading - broaden brokerage relationships.
- Continue to develop internal equity strategies where structural tilts can be targeted to produce excess return over time in a cost efficient manner.

Brandes Investment Partners, L.P.

Relevant Mandates: **International Equity** **Hired:** **1997**

Firm Information

Brandes Investment Partners, L.P. (Brandes) is an Investment Advisory firm that was founded in March 1974. The firm became a Delaware limited partnership in October 2004. The firm was first registered with the Securities and Exchange Commission in 1975.

As of 12/31/16, the firm's total assets under management were $28.0 billion.

Key Executives:

Lawrence Taylor, *Institutional Portfolio Manager*

Glenn Carlson, *Executive Director*

Investment Approach

Value Approach

Brandes employs the Graham and Dodd investment approach introduced in the book *Security Analysis*. Brandes performs fundamental analysis to determine an estimate of a company's "intrinsic" long-term value, by considering the company's earnings power and cash flow generation.

The discount of a stock's current market price to the *intrinsic value* is what Brandes defines as "margin of safety" capturing the potential risk-adjusted capital appreciation of a security.

Brandes expects that over time other investors will recognize each company's true long-term business value resulting in a price move to meet or exceed Brande's estimate of the company's *intrinsic value*. While it is also possible that the estimated *intrinsic value* might not be realized, consistently buying businesses with attractive *margins of safety* will enable Brandes to achieve the goal of outperforming relevant benchmarks over the long term.

Active Management

Portfolio weightings are a by-product of bottom-up security selection and do not attempt to match broad market indices.

Benchmark: MSCI EAFE Index

Total ARMB Mandate

Assets Under Management:

12/31/16 $716,309,673

Concerns: None

12/31/2016 Performance

	Last Quarter	1-Year	3-Years Annualized	5-Years Annualized	6-Years Annualized
Brandes	2.24%	3.60%	1.02%	8.16%	4.88%
Brandes (net)	2.15%	3.20%	0.64%	7.76%	4.48%
MSCI EAFE	-0.71%	1.00%	-1.60%	6.53%	3.17%

INTERNATIONAL EQUITY

Alaska Retirement Management Board
Wilmington Trust CIT – Brandes International Equity Fund

Lawrence Taylor
Institutional Portfolio Manager

Glenn Carlson, CFA
Executive Director

Jeff Germain, CFA
Director, Investments Group

April 21, 2017

BRANDES INVESTMENT PARTNERS

FOR INSTITUTIONAL ONE-ON-ONE USE ONLY

Agenda

- **Firm Update**
- **Market Discussion**

  - 2016

    Value recognition may have started

    Valuation of Stable/Low Vol stocks stretched

    Regional relative attractiveness

    Geopolitical disruptions (Brexit, Brazilian impeachment, Turkish coup attempt, US election)

  - 2017

    Has Value turned?

    European growth pick up

    US geopolitical/economic policies and effects unclear
- **Performance Review**

BRANDES INVESTMENT PARTNERS

Brandes at-a-Glance

Year Firm Founded:	**1974**
Total Assets Under Management:	**$28.0 Billion**
Total Institutional/Private Client Assets[1]:	$23.0 Billion
Total SMA Division Assets[2]:	$5.0 Billion
Investment Style:	**Graham & Dodd, bottom-up value**
Headquarters Located:	**San Diego, California**
Other Offices:	**Dublin, Ireland** **Milwaukee, Wisconsin** **Singapore** **Toronto, Canada**
Total Employees Worldwide:	**305**
Investment Professionals:	**50, including 24 security analysts**
Ownership:	**100% employee owned**

Global	International (Non-U.S.)	United States	Fixed Income
Global Balanced	Asia Pacific (ex-Japan) Equity	U.S. Small Cap Value Equity	Core Plus Fixed Income
Global Equity	Canadian Equity	U.S. Small-Mid Cap Value Equity	Corporate Focus Fixed Income
Global Equity Income	Emerging Markets Equity	U.S. Value Equity	Enhanced Income
Global Opportunities Value	Emerging Markets Opportunities		
Global Small Cap Equity	Emerging Markets Value Equity		
Global Small-Mid Cap Equity	European Equity		
	International Equity		
	International Small Cap Equity		
	International Small-Mid Cap Equity		
	Japan Equity		

AS OF DECEMBER 31, 2016 | [1] Assets include institutional accounts, pooled investment vehicles and high net worth accounts outside of SMA ("wrap-fee") programs. [2] The SMA Division encompasses the firm's "Separately Managed Account" business (subadvisory "wrap-fee" business with brokerage firms). Also includes UMA ("unified managed account") assets.

PHILOSOPHY & PROCESS

Brandes Believes

Price matters to long-term returns

- Share prices frequently do not reflect the long-term value of businesses

Comfortable with a contrarian view

- The ability to be different from the benchmark provides opportunities for outperformance

The value of independence

- As a 100% employee-owned firm, Brandes is able to think long-term in our investment decisions, our business and our client relationships

Teamwork

- Our investment committee structure allows for diverse perspectives and inputs

Patience is critical

- A long-term perspective may help investors look beyond short-term market fluctuations, giving their portfolios the potential to grow over time

BRANDES INVESTMENT PARTNERS

How Brandes Works

PORTFOLIO

Part 1 ANALYSIS

- 24 Analysts
- 8 Global sector teams
- Search for value
- Produce a research report that recommends a company valuation

Part 2 VALUATION

- Investment Committee
- Seasoned professionals
- Value each business in conjunction with the Analyst

Part 3 CONSTRUCTION

- Investment Committee makes decisions for an entire strategy
- Aim to build portfolios with high margin of safety
- Client portfolio management and trading implement portfolio decisions at the client level

AS OF DECEMBER 31, 2016 | Margin of Safety: The margin of safety for any security is defined as the discount of its market price to what the firm believes is the intrinsic value of that security. Brandes has six equity investment committees: Large-Cap International, Large-Cap Global, Emerging Markets, Small-Cap, Small-Mid Cap and All-Cap.

Analysis — Understanding a Business

Companies Operate in Context

Fundamental, Company-Focused

Industry Factors

- Threat of New Entrants
- Threat of Substitutes
- Buyer Power
- Supplier Power
- Rivalry

Country Factors

- Regulation
- Politics
- Fiscal Stability

Macro Factors

- Business Cycle
- Currencies
- Demographics

Analysis — Disciplined Research Process

Objective: Estimate a Company's Value

Typical Targets

Identifying Undervalued Companies

- Attractive valuation characteristics
- Sufficient financial history
- Proven ability to generate free cash flow
- Adequate liquidity
- Record of growing shareholder wealth
- Bias for conservative capitalization structures

Focus on Underlying Business Value

Determining Value of the Business

- Sustainable profits
- Brand strength
- Downside risks
- Competitive advantage
- Barriers to entry
- Governance issues
- Market position
- Differentiated product or service
- Regulatory/policy environment

Intrinsic Values Assessed/Updated by Analysts

*Intrinsic Value: The actual value of a company or an asset based on an underlying perception of its true value.

Analysis — Fundamental Research

Screening Metrics & Valuation Methods Vary by Sector

Sector Name	Sector-Specific Examples
1. Basic Materials	NAV of Commodity Reserves, P/B, P/E
2. Consumer Products	P/E, Sales/Square Foot, P/FCF
3. Financial Institutions	P/TBV, Deposit Premium, P/Pre Provision Income
4. Healthcare	P/E, DCF, Book Value + Capitalized R&D
5. Industrials	P/E, P/B, DCF
6. Technology	P/FCF, DCF, P/E
7. Telecommunications	P/FCF, DCF, P/E
8. Utilities	P/B, P/E, EV/Regulatory Asset Base

Adjustments to book value and normalization of earnings or cash flow vary by sector.

Deposit Premium: valuing a bank as a percentage of (or at a premium to) its deposits. Discounted Cash Flow: discounting future cash flow using a discount rate/cost of capital to calculate its present value. Enterprise Value: a measure of a company's total value. Net Asset Value of Reserves: the value of a company's commodity assets less any associated liabilities. Price/Book: price per share divided by book value per share. Price/Earnings: price per share divided by earnings per share. Price/Cash Flow: price per share divided by cash flow per share. Price/Free Cash Flow: market capitalization divided by free cash flow. Price/Pre-Provision Income: price per share divided by the pre-provision income for financial institutions. Price to Tangible Book Value: share price divided by tangible book value per share.

BRANDES INVESTMENT PARTNERS

Valuation — Intrinsic Value

Investment Committee (IC) Establishes Intrinsic Value Estimate

Analyst/Investment Committee Interaction

- IC formally meets weekly
- IC establishes intrinsic value estimate for each company based on:
  - Analyst's comprehensive report
  - Other publicly available information
  - Knowledge and experience
- IC scrutiny process - analysis from multiple points of view:
  - Key drivers specific to company/industry
  - Risk factors
  - Cyclical vs. secular risks

BRANDES INVESTMENT PARTNERS

Construction — Portfolios

Based on Margin of Safety

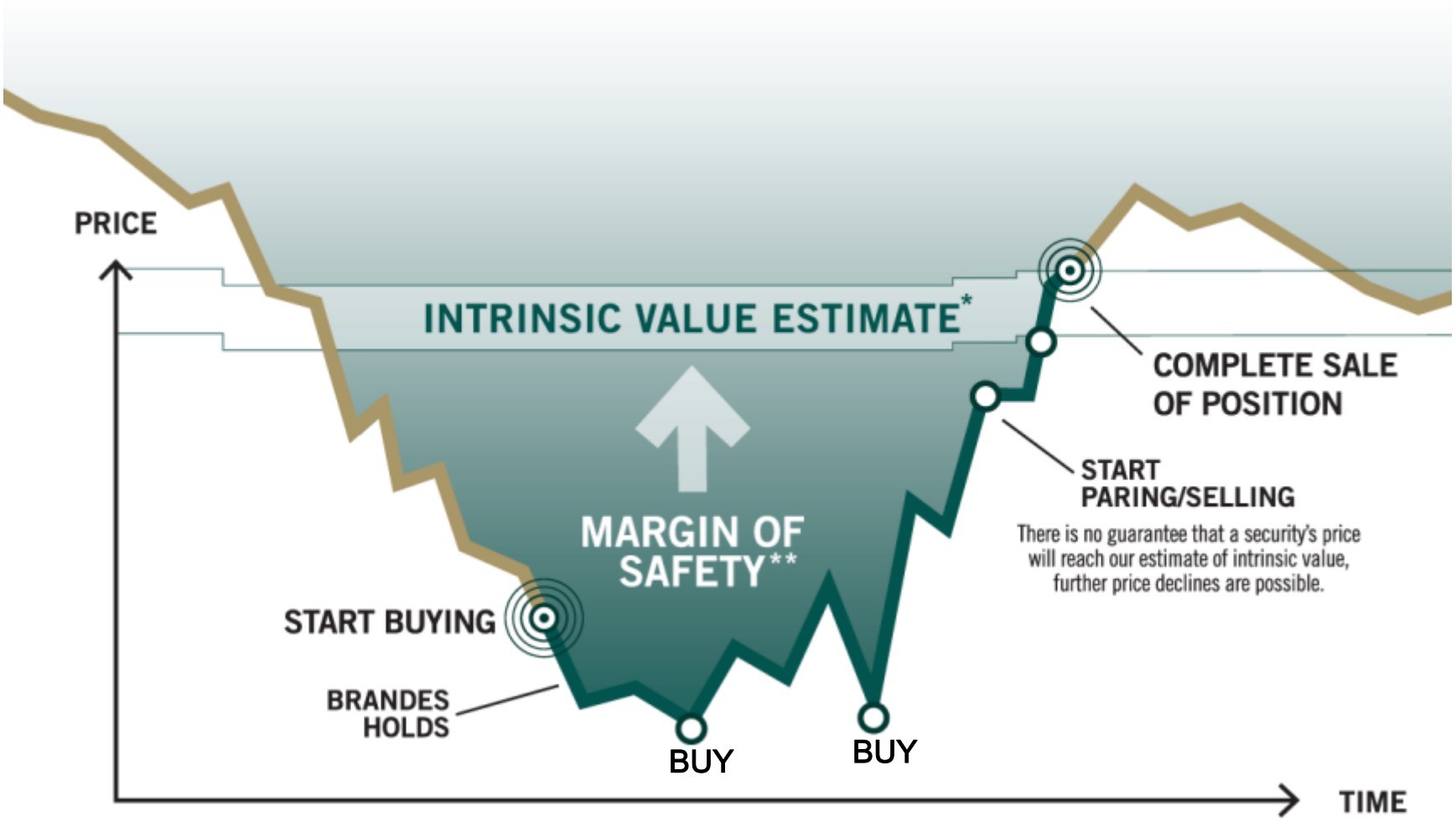
- Portfolios typically hold 35 to 85 positions: depends on strategy and opportunity set
- Allocations to individual securities primarily depend on **margin of safety**
- Other allocation factors include:
  - Correlated risks
  - Liquidity
  - Diversification guidelines
  - Range of intrinsic value estimates

Monitoring Portfolios

- Investment Committees review weekly reports and large moves daily
- Reports show current margin of safety and allocation for every holding based on latest share price

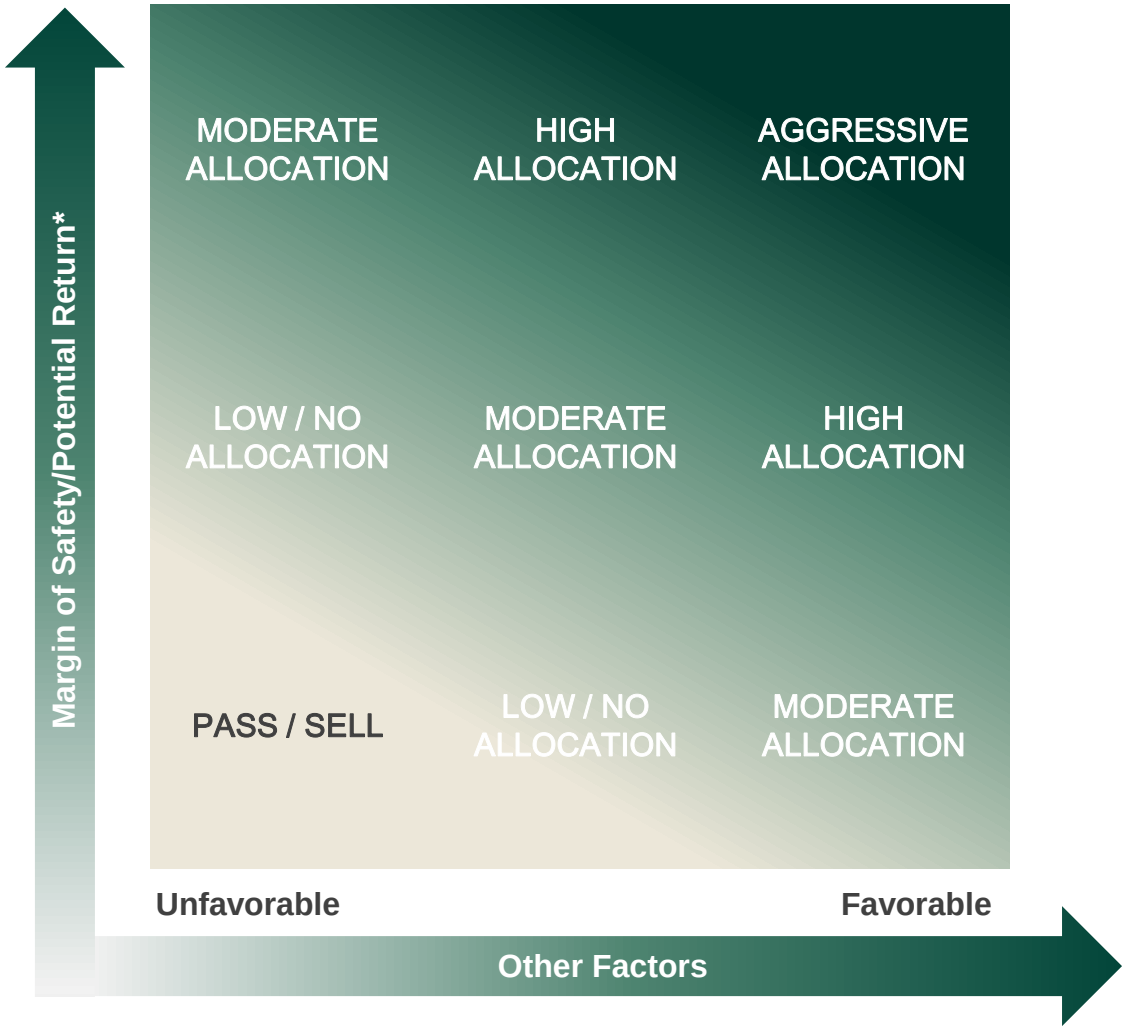
Margin of Safety: The margin of safety for any security is defined as the discount of its market price to what the firm believes is the intrinsic value of that security.

Construction — Margin of Safety



This is a hypothetical illustration of value investing concepts. It does not represent the performance of any specific security. It assumes intrinsic value changes over time. Actual results will vary. No investment strategy can assure a profit or protect against loss.*Intrinsic value: "In general terms it is understood to be that value which is justified by the facts, e.g., the assets, earnings, dividends, definite prospects, as distinct, let us say, from market quotations established by artificial manipulation or distorted by psychological excess"— Security Analysis, 1934, page 17. **The margin of safety for any security is defined as the discount of its market price to what the firm believes is the intrinsic value of that security.

Construction — Allocation Factors



Other Factors

- Correlated risks
- Liquidity
- Diversification guidelines
- Range of intrinsic value estimates**

*The margin of safety for any security is defined as the discount of its market price to what the firm believes is the intrinsic value of that security.
**Intrinsic value estimates can change over time.

Construction — Equity Sell Discipline

Investment Committee Decision

- Full sale when a security's price reaches estimate of intrinsic value
- Full or partial sale may occur if our estimated intrinsic value declines, making the margin of safety unattractive
- Partial or full sale may occur to free up cash for other securities with estimated higher margin of safety

Average Annual Portfolio Turnover Typically = 20 - 40%

Margin of safety: The margin of safety for any security is defined as the discount of its current market price to what we believe is the intrinsic value of that security.

Strategy Profile & Guidelines

Alaska Retirement Management Board	
Investable Universe	Primarily non-U.S. companies with a market capitalization generally greater than $5 billion at time of purchase
# of Holdings	Bottom-up portfolio construction with typically 35-85
Annual Portfolio Turnover	Typically 20-40%
Individual Issue Maximum	Typically less than 5% at time of purchase
Country & Industry Guidelines	Maximum: Typically greater of 20% or 1.5x MSCI EAFE Index weight at time of purchase Minimum: None
Emerging Markets Exposure	Maximum 10% at market
Cash Weight	Max 5% Cash
Currency Management	Diversified through individual stock selection driving exposure to multiple currencies
Inception Date	August 11, 1997

Please refer to Brandes Form ADV Part 2A for complete strategy guidelines.

Active, Fundamental Risk Management

Part 1 ANALYSIS

Screening Level

- Seeks to find compelling areas and avoid expensive ones using global insights

Part 2 VALUATION

Security Level

Intrinsic value estimate* considers spectrum of risks

- **Company-level risks**
  - Business, balance sheet, corporate governance and regulatory risk
- **Macro-level risks**
  - Sensitive to economic or specific cycles and events
  - Foreign exchange

Part 3 CONSTRUCTION

Portfolio Level

Margin of safety** is primary risk control:

- **Further considerations**
  - Correlated risks
  - Liquidity
  - Diversification
  - Intrinsic value estimate

ORGANIZATION LEVEL

· Investment Oversight Committee monitors exposures across multiple strategies
· Conservative business management of the firm · Team approach · Co-investment

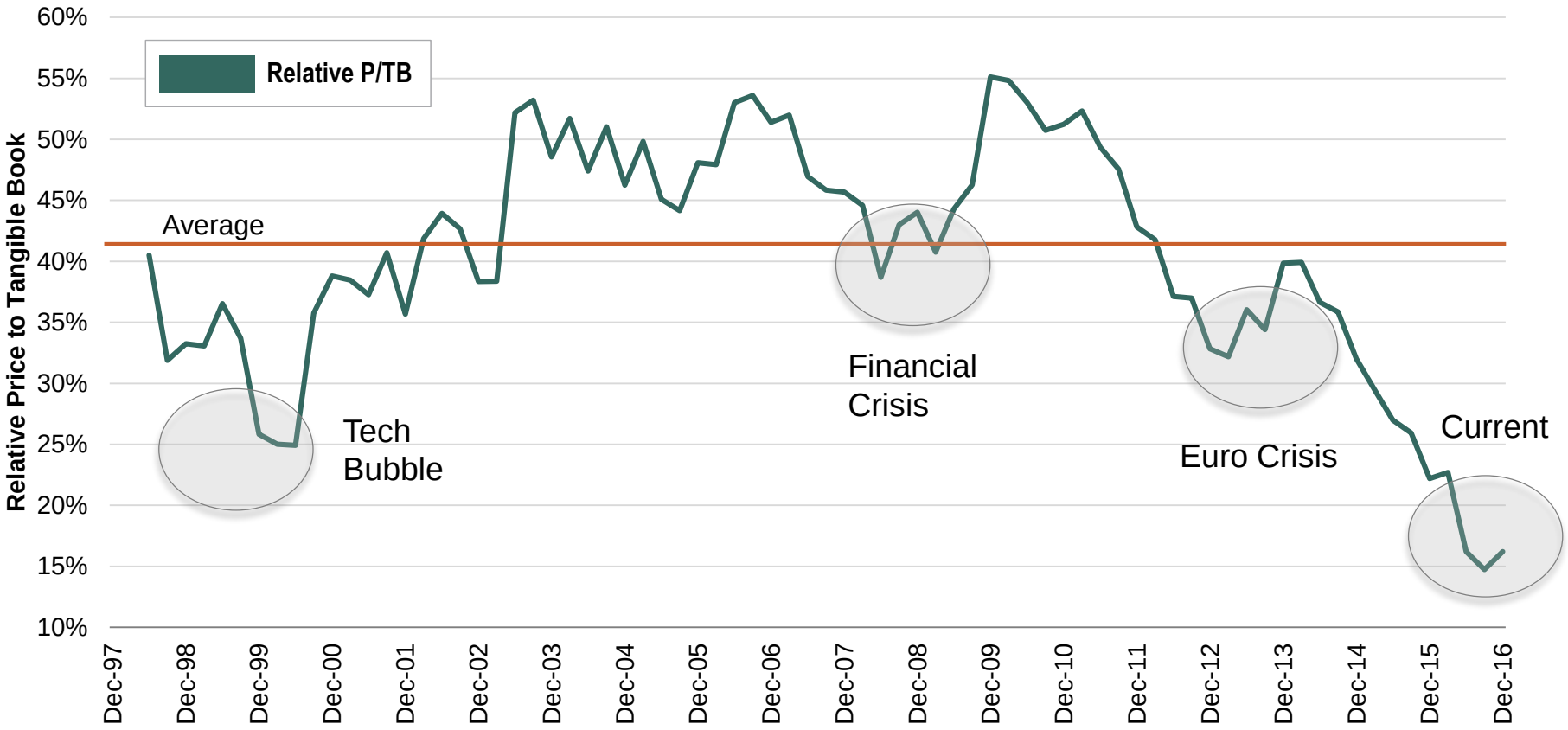
*Intrinsic value estimates can change over time.
**The margin of safety for any security is defined as the discount of its market price to what the firm believes is the intrinsic value of that security.
Diversification does not assure a profit or protect against loss in a declining market.

GLOBAL INSIGHTS

BRANDES
INVESTMENT PARTNERS

Relative performance Leads To Price Differential

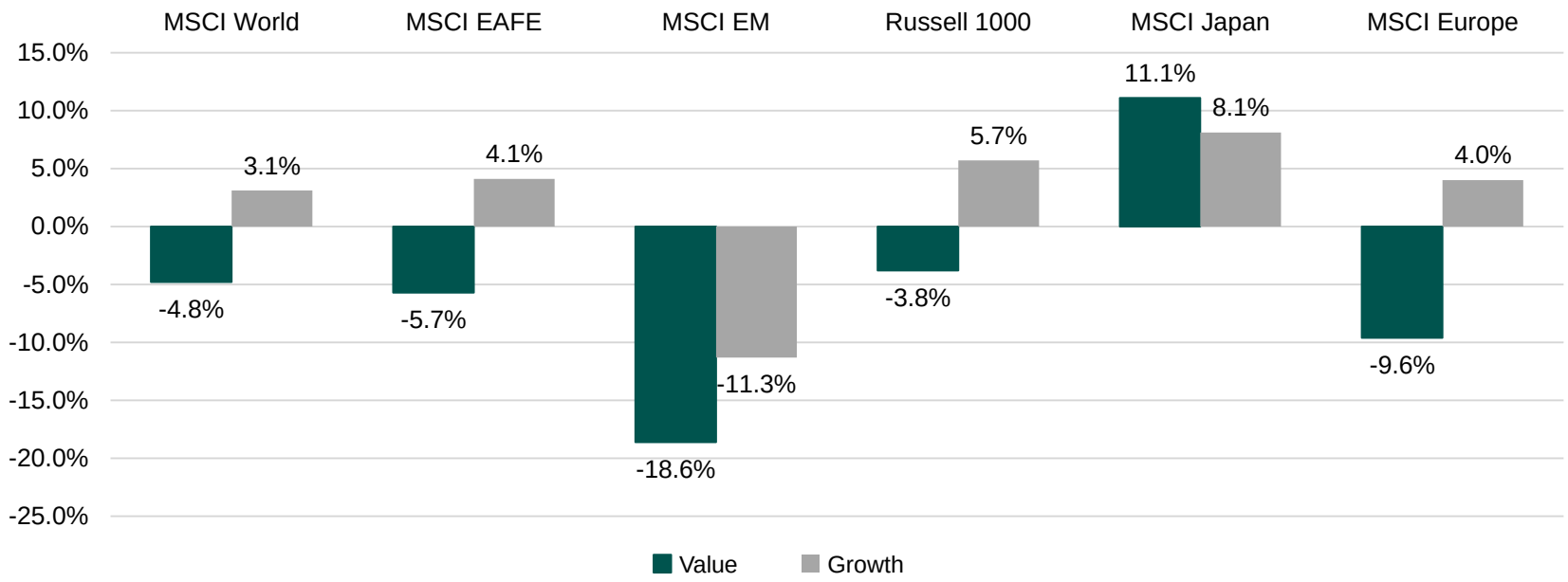
MSCI World Value as % of MSCI World Growth Price to Tangible Book



AS OF DECEMBER 31, 2016 | Source: Bloomberg, MSCI. Past performance is not a guarantee of future results. Please note that all indices are unmanaged and are not available for direct investment. **MSCI World Growth Index:** The MSCI World Growth Index with net dividends measures equity market performance of developed markets. The attributes for growth index construction are long-term forward earnings per share (EPS) growth rate, short-term forward EPS growth rate, current internal growth rate, long-term historical EPS growth trend, and long-term historical sales per share growth trend. **MSCI World Value Index:** The MSCI World Value Index with net dividends measures equity market performance of developed markets. The attributes for value index construction are book value-to-price ratio, 12-months forward earnings-to-price ratio, and dividend yield. **Price to Tangible Book**: Price per share divided by tangible equity per share. MSCI has not approved, reviewed or produced this report, makes no express or implied warranties or representations and is not liable whatsoever for any data in the report. You may not redistribute the MSCI data or use it as a basis for other indices or investment products.

2015 Value Style Underperformance

2015 Index Performance

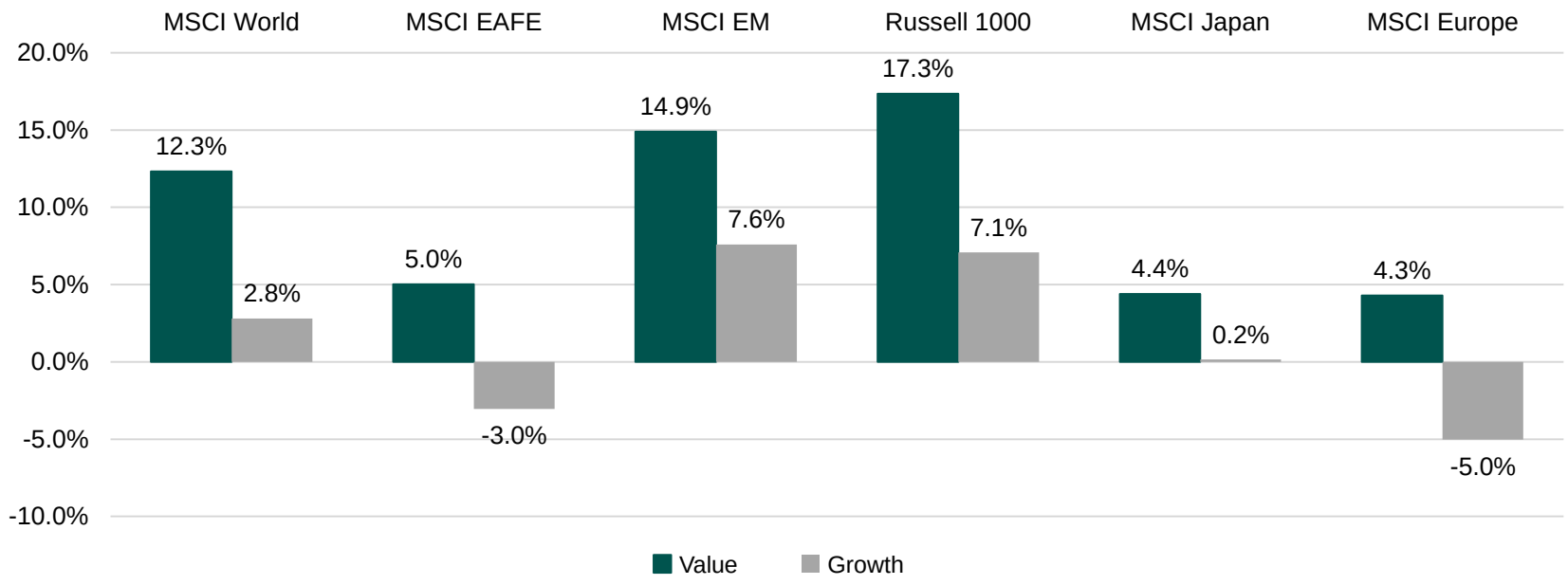


	MSCI World	MSCI EAFE	MSCI EM	Russell 1000	MSCI Japan	MSCI Europe
Value Relative to Growth	-7.9%	-9.8%	-7.3%	-9.5%	3.0%	-13.6%

AS OF DECEMBER 31, 2015 | Source: Factset, MSCI. Past performance is not a guarantee of future results. Please note that all indices are unmanaged and are not available for direct investment. See full index definitions located at the end of the presentation.

2016 Value Style Outperformance

2016 Index Performance

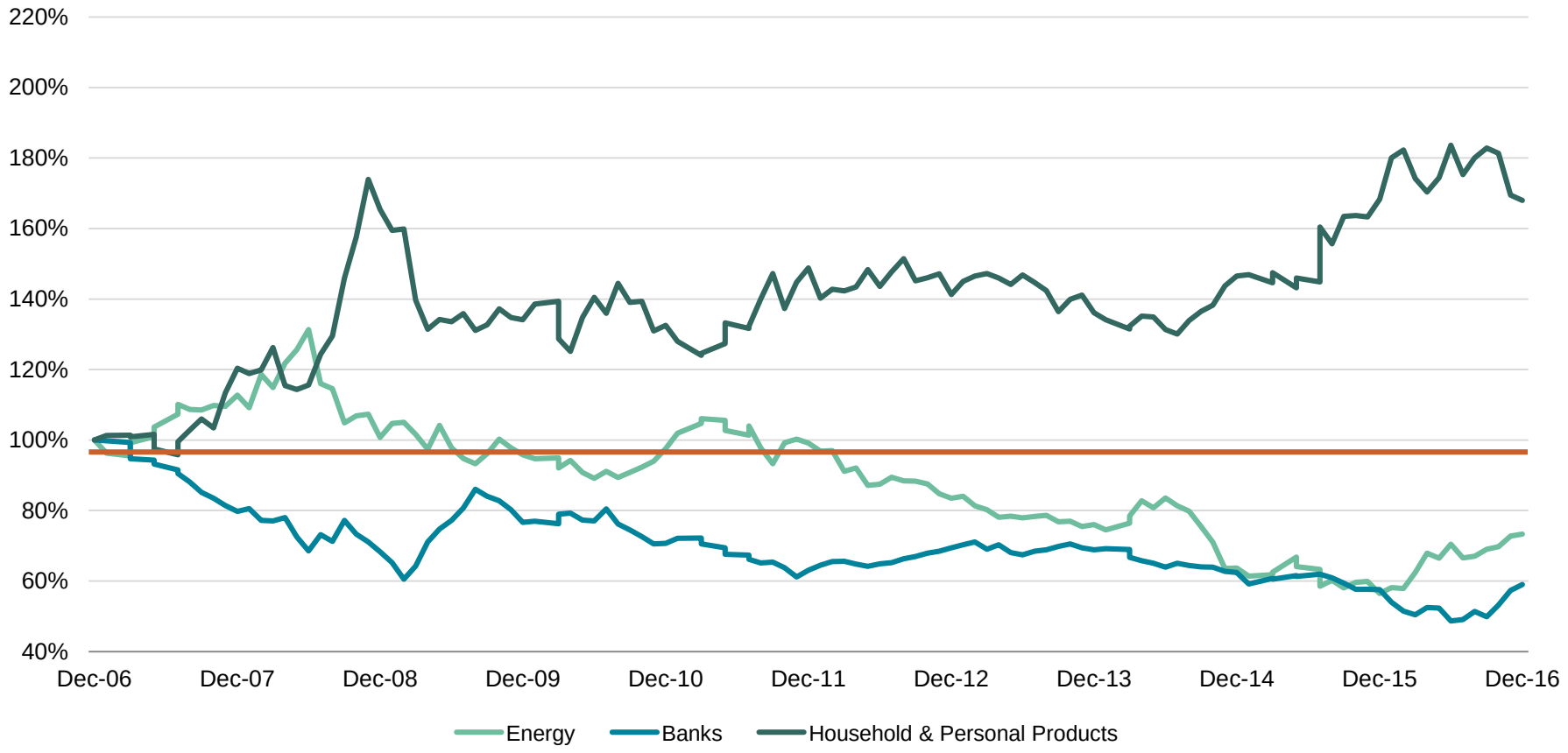


	MSCI World	MSCI EAFE	MSCI EM	Russell 1000	MSCI Japan	MSCI Europe
Value Relative to Growth	9.5%	8.1%	7.3%	10.3%	4.2%	9.3%

AS OF DECEMBER 31, 2016 | Source: Factset, MSCI. Past performance is not a guarantee of future results. Please note that all indices are unmanaged and are not available for direct investment. See full index definitions located at the end of the presentation.

Flows to Low-Volatility Have Led to Rising Valuations

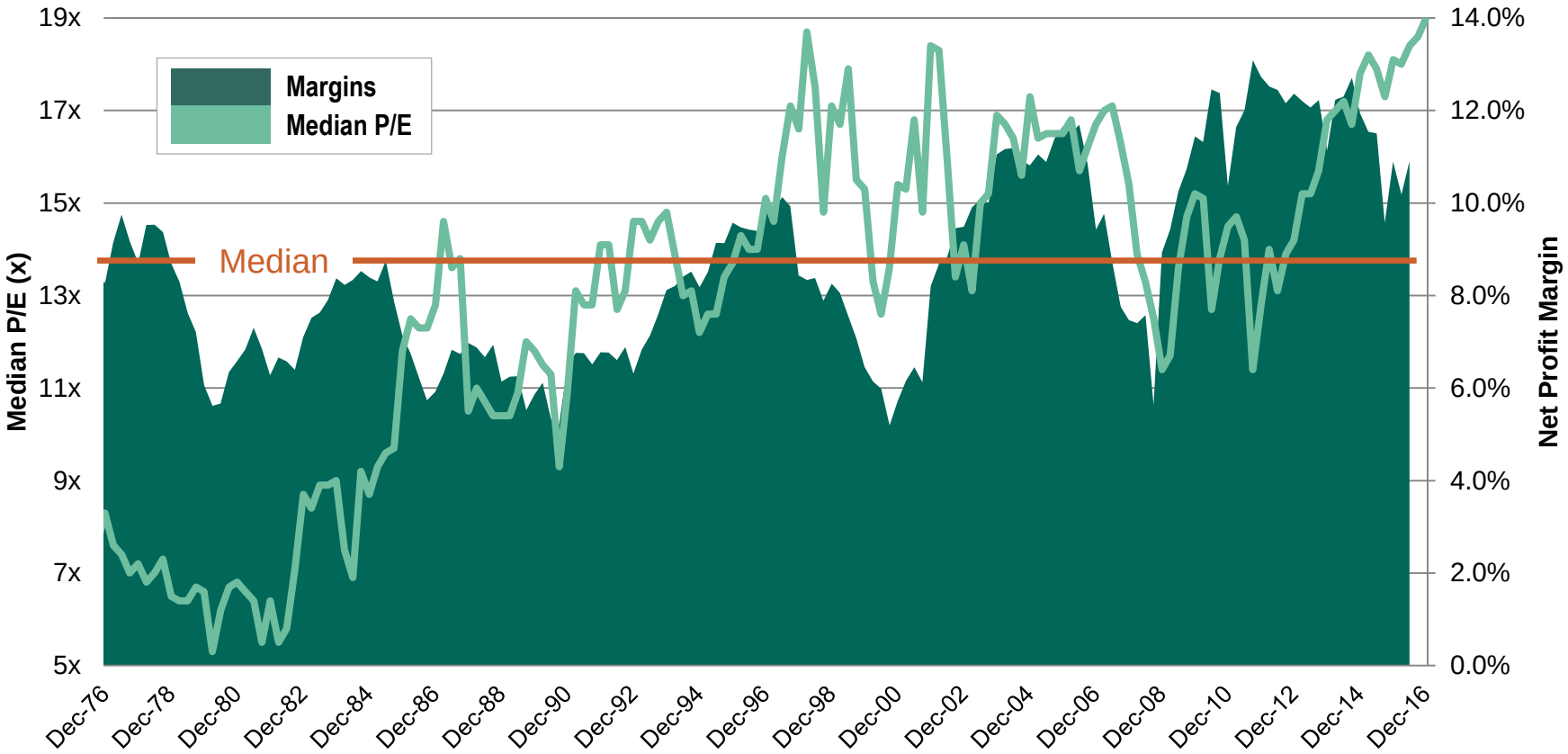
Relative Price-to-Book of Industries vs. MSCI World



AS OF DECEMBER 31, 2016 | Source: Factset, Bloomberg, Worldscope via FactSet.. Past performance is not a guarantee of future results.

Elevated Valuations & Profits

S&P 500 Median Forward P/E & Domestic Profit Margins



DECEMBER 31, 2016 FOR MEDIAN P/E
JULY 1, 2016 FOR U.S. NET MARGINS | Source: Goldman Sachs and St. Louis FRED Database. Gross Domestic Income defined as corporate profits with inventory valuation and capital consumption adjustments for domestic industries: Profits after tax with adjustments divided by gross value added of nonfinancial and financial corporate business. lease note that all indices are unmanaged and are not available for direct investment. Past performance is not a guarantee of future results

BRANDES INVESTMENT PARTNERS

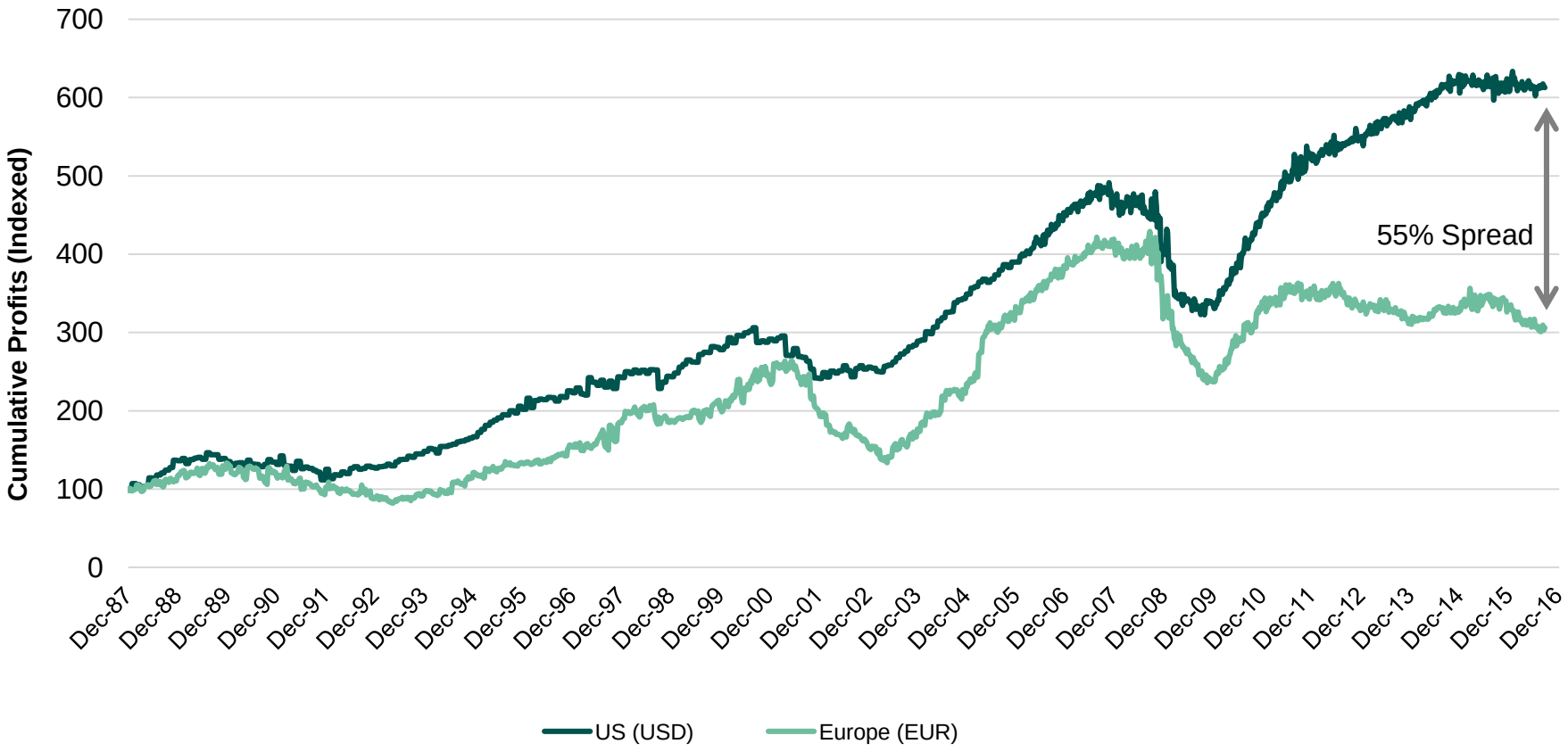
Europe Among its Least Expensive Ever vs. U.S.

MSCI Europe Index CAPE Divided by S&P 500 Index CAPE

NOVEMBER 30, 1979 – DECEMBER 31, 2016 | Source: Morgan Stanley, MSCI, S&P, various national sources; CAPE (cyclically adjusted price/earnings) attempts to show the relationship between price and multi-year average company earnings in order to better estimate long-term earnings power. This valuation measure seeks to smooth out earnings fluctuations caused by business cycles while also reflecting the long-term effects of inflation. In this chart, a reading above 1.0 indicates that prices for Europe stocks are more expensive than U.S. stocks in relation to their underlying long-term company earnings. A reading below 1.0 indicates U.S. stocks are more expensive on a long-term price/earnings basis. Past performance is not a guarantee of future results. The MSCI Europe Index was launched on Mar. 31, 1986. Data prior to the launch date is from back-tested data provided by MSCI. There are frequently material differences between back-tested performance and actual results.

U.S. vs. Europe Profits

Spread at Peak Levels



DECEMBER 31, 1987 – DECEMBER 31, 2016 | Source: UBS, Thomson Datastream. Start date is the earliest data is available. U.S. and Europe companies represented by those in S&P500 Index and MSCI Europe Index, respectively.

The Value Brandes Sees in Europe

SELECT BRANDES HOLDINGS AS OF DECEMBER 31, 2016

UNITED KINGDOM

Grocers

- Real estate value = majority of enterprise value
- Declining pound may lead to food price inflation which could benefit food retailers

Multinationals

- Strong global brands
- Majority of earnings outside U.K.
- Dividend yields > 4%

GERMANY

Fewer value opportunities due to perceived safe haven by investors

SWITZERLAND

Banks

- Primarily global wealth management businesses
- Trading near book value or below

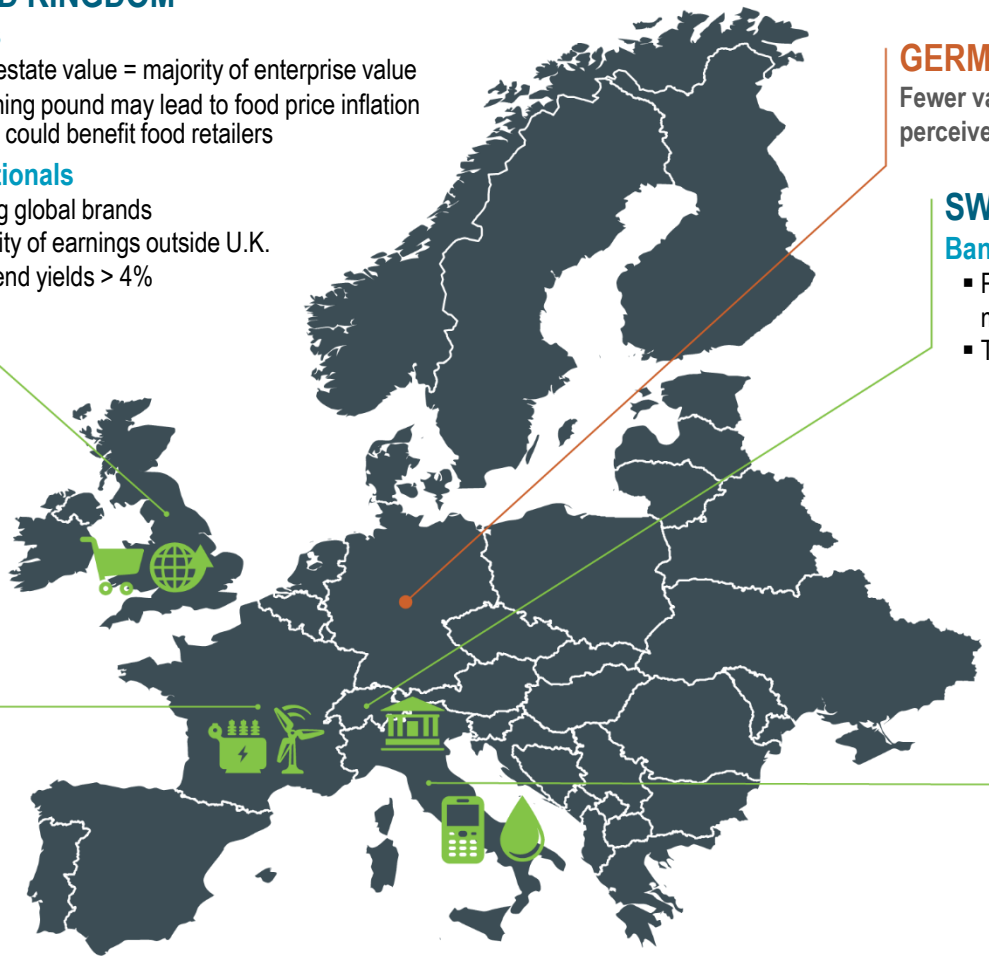
FRANCE

Utility

- Leading independent power producer with multinational operations
- Trading < book value
- Dividend yield > 7%

Electrical Equipment

- Global leader in energy management and automation
- Majority of sales and growth comes from outside of Europe
- Dividend yield over 2.5%



ITALY

Telecom

- Dominant position in Italian wireless, fixed line and broadband

Oil & Gas

- Integrated company with oil fields in Italy/North Sea/ Africa and refining and transportation across Europe
- Trading < book value
- Dividend yield > 5%

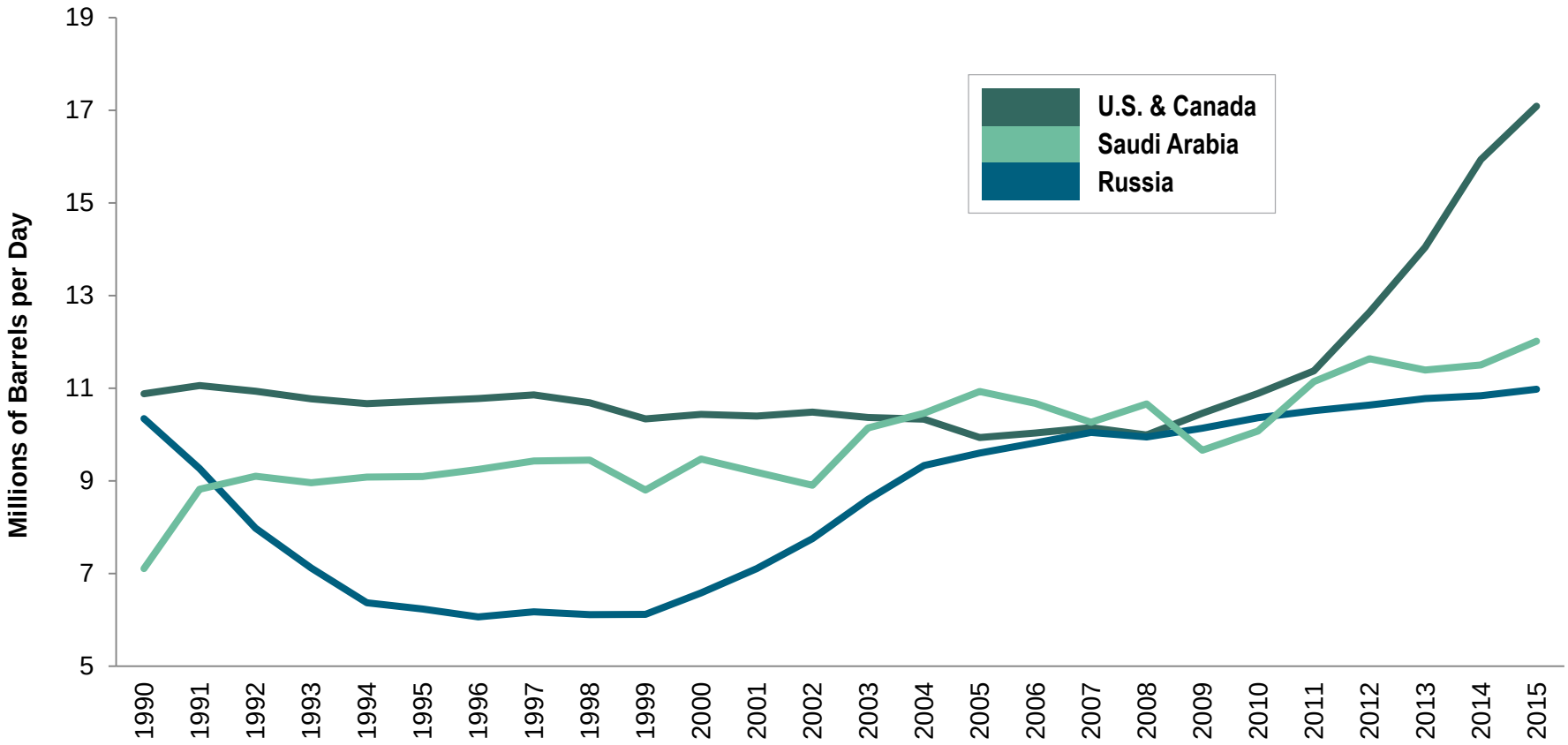
AS OF DECEMBER 31, 2016 | Source: Brandes, Bloomberg. The portfolio characteristics shown relate to a single account as of date noted, deemed by Brandes to be generally representative of the strategy. Not every account will have these exact characteristics. The actual characteristics with respect to any particular account will vary based on a number of factors including but not limited to: (i) the size of the account; (ii) investment restrictions applicable to the account, if any; and (iii) market exigencies at the time of investment. Data is updated on a quarterly basis. The securities identified and described do not represent all of the securities purchases, sold, or recommended for client accounts. The viewer should not assume that an investment in the securities identified was or will be profitable.

Oil & Gas Sector

- Low Price / Oversupply
- OPEC's diminishing influence / growth in North American production
- Potential demand weakness – particularly from emerging markets
- Alternative energy – long term implications
- High leverage of many companies

Supply Growth

Largely coming from North America

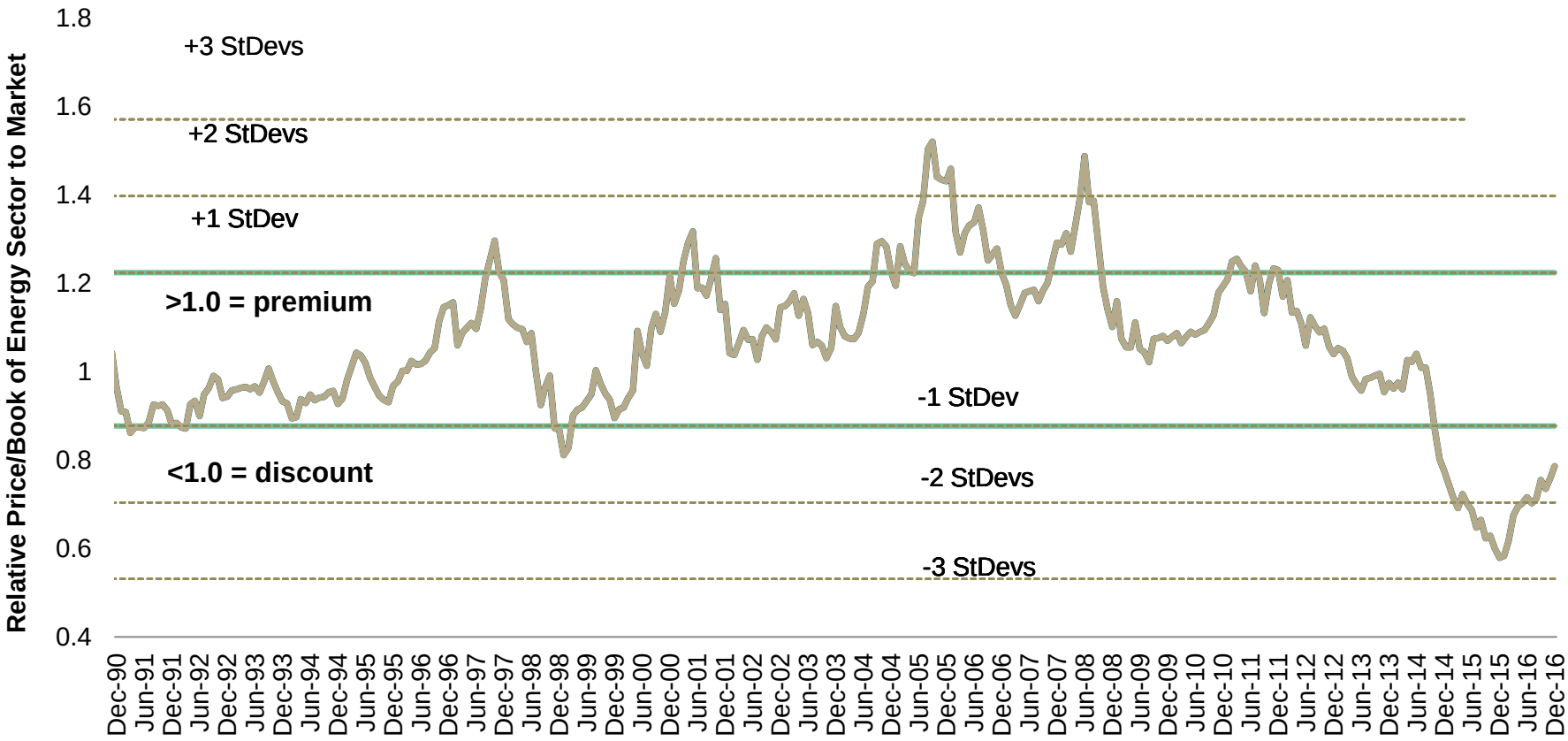


AS OF DECEMBER 31, 2016 | Source: BP Statistical Review of World Energy 2016

BRANDES INVESTMENT PARTNERS

Historic Low Valuations for Sector

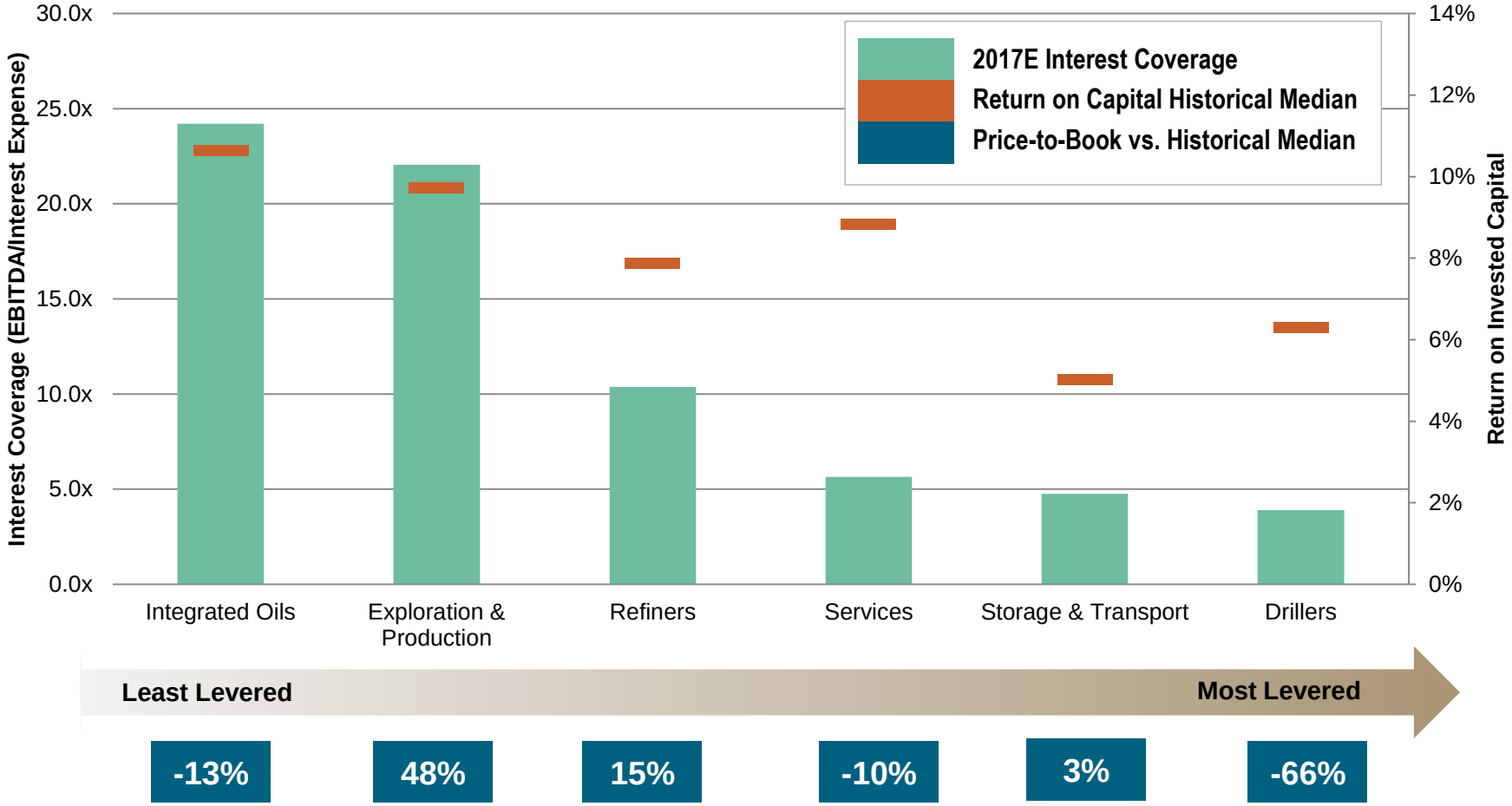
Price-to-Book History



AS OF DECEMBER 31, 2016 | Source: Factset, Bloomberg, CapitalIQ, Worldscope via FactSet. Market defined as the top 25% of companies in the world including Emerging Markets based on market cap, after exclusion of securities with free float market cap <US$100 million. As of December 31, 2016, this generally included all companies with market caps in excess of US$500 million. Past performance is not a guarantee of future results.

Best Value Potential: Integrated Oils

Least Leverage, Strong Returns on Capital, Discounted Valuation



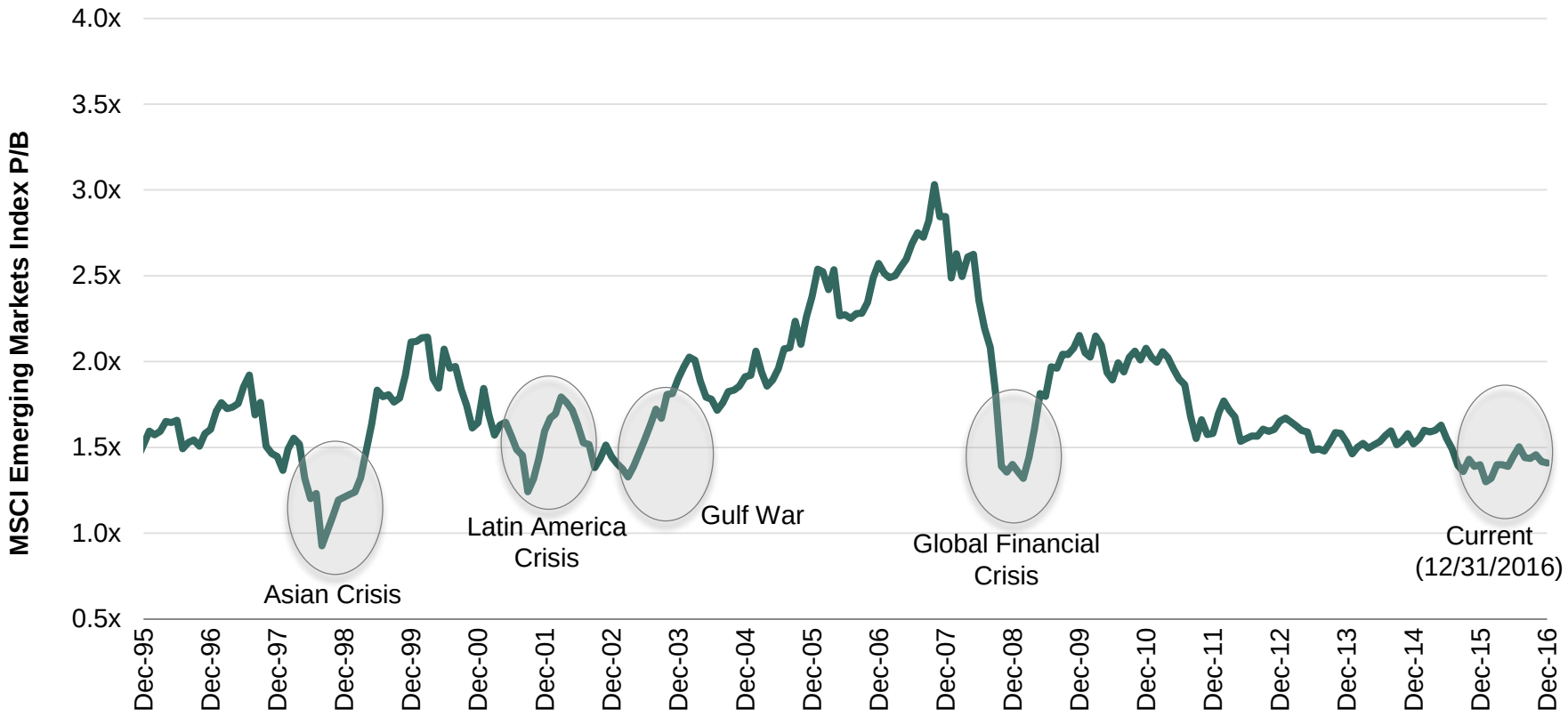
AS OF DECEMBER 31, 2016 | Source: CapitalIQ. Median of 10 largest companies within each industry by Enterprise Value (Market Cap + Net Debt). Interest Coverage: EBITDA/Interest Expense. There is no assurance that a forecast will be accurate. Because of the many variables involved, an investor should not rely on forecasts without realizing their limitations.

Emerging Markets

- Slowing growth in China – and the ripple effect in the EM world
- Threat of competitive currency devaluations
- Buildup in debt at the corporate level
- Potential US interest rate increase

Emerging Markets
Valuations Near Prior Crisis Levels

Price-to-Book Time Series of MSCI Emerging Markets Index



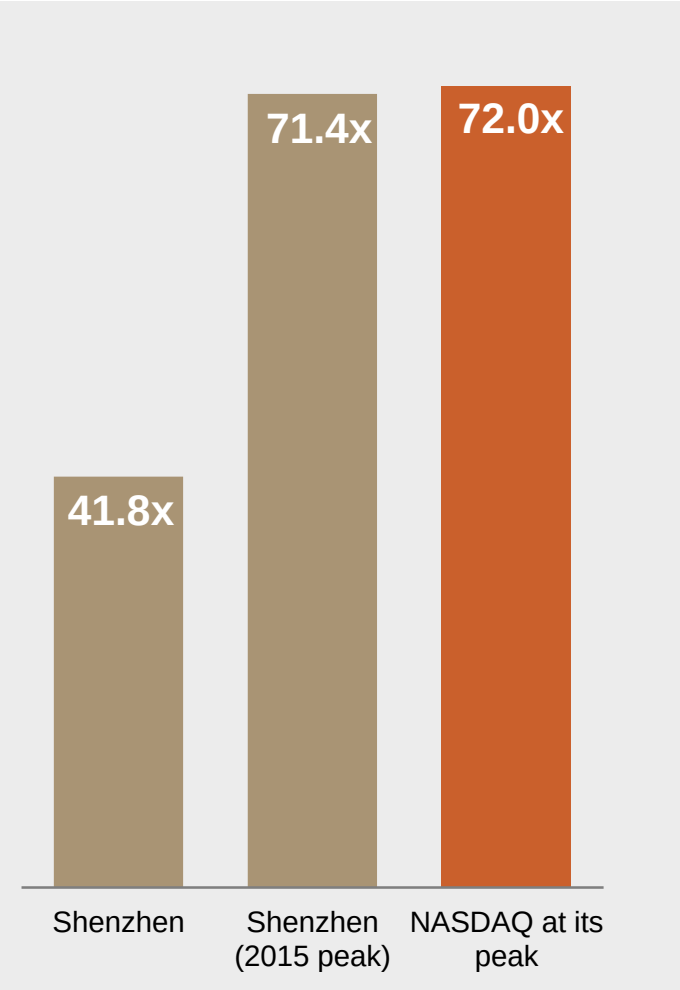
MSCI EM INDEX P/B: DECEMBER 31, 1995 TO DECEMBER 31, 2016 | Source: MSCI. Past performance is not a guarantee of future results. Please note that all indices are unmanaged and are not available for direct investment.

Brandes Emerging Markets Equity (Brazil)

Brazilian Holdings Well Diversified

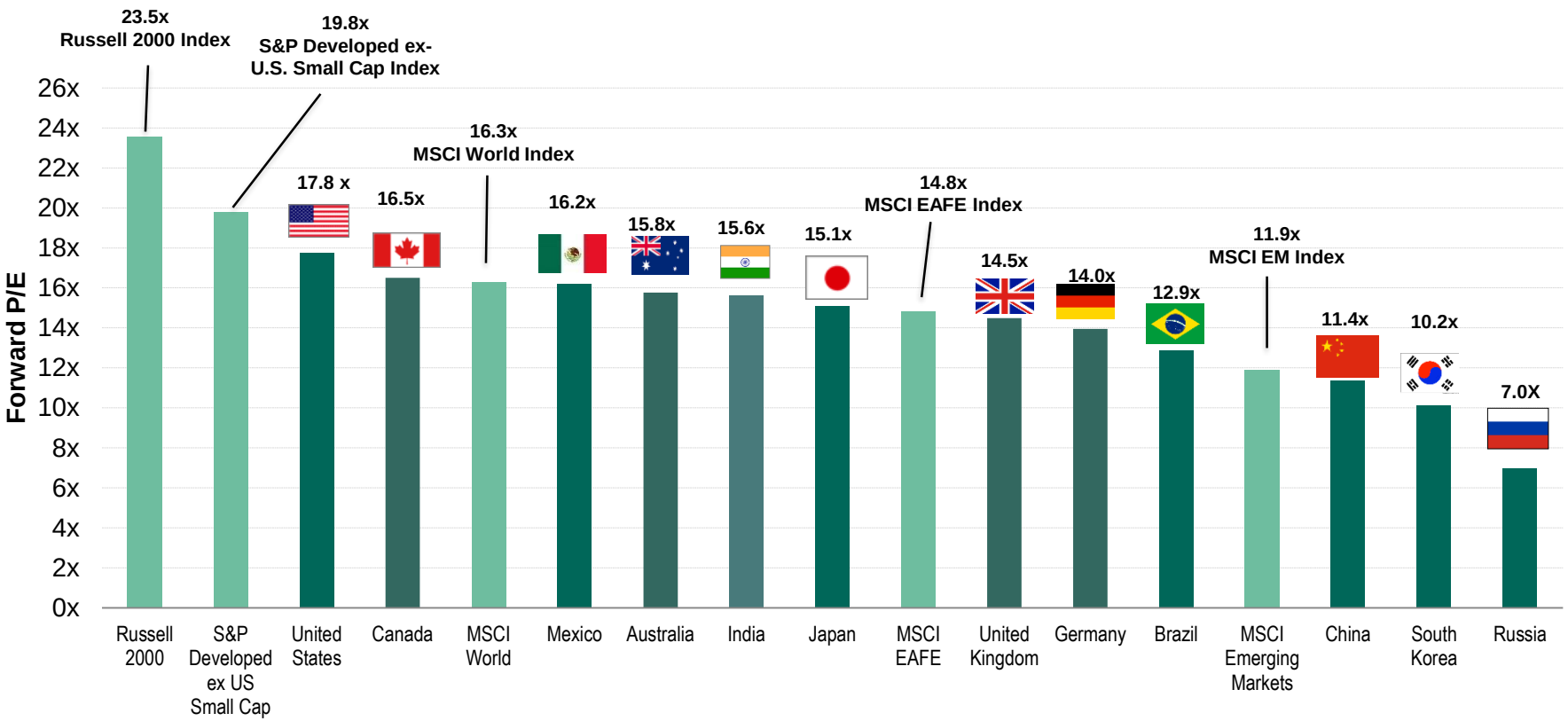
Divergence within China Valuations

P/E Ratio



AS OF DECEMBER 31, 2016; MAY 31, 2015 FOR SHENZHEN PEAK; MARCH 24, 2000 FOR NASDAQ PEAK | Source: Bloomberg, MSCI via FactSet. Price/Earnings for each security provided by Bloomberg, L.P. Please note that Bloomberg does not provide negative numbers in the data feed. Index fundamentals are calculated from holdings data as provided by the relevant index or by Thomson Reuters Worldscope, excluding negative numbers for consistency. Thus, index fundamentals calculated by Brandes may differ from those computed and published by index providers. Price/Earnings average is an asset-weighted harmonic average. Please note that all indices are unmanaged and are not available for direct investment.

Valuations Globally



AS OF DECEMBER 31, 2016 | Source: FactSet. Forward P/E is Price / Next Twelve Months Time-Weighted Annual estimates via FactSet Market Aggregates.

In Summary

1.	**Attractiveness of Value –** Valuations of value stocks are near 20 year lows relative to growth
2.	**Oil & Gas** – Value in integrated oils
3.	**Europe –** Value throughout the continent
4.	**Challenging Markets for Value** – China

ALASKA RETIREMENT MANAGEMENT BOARD

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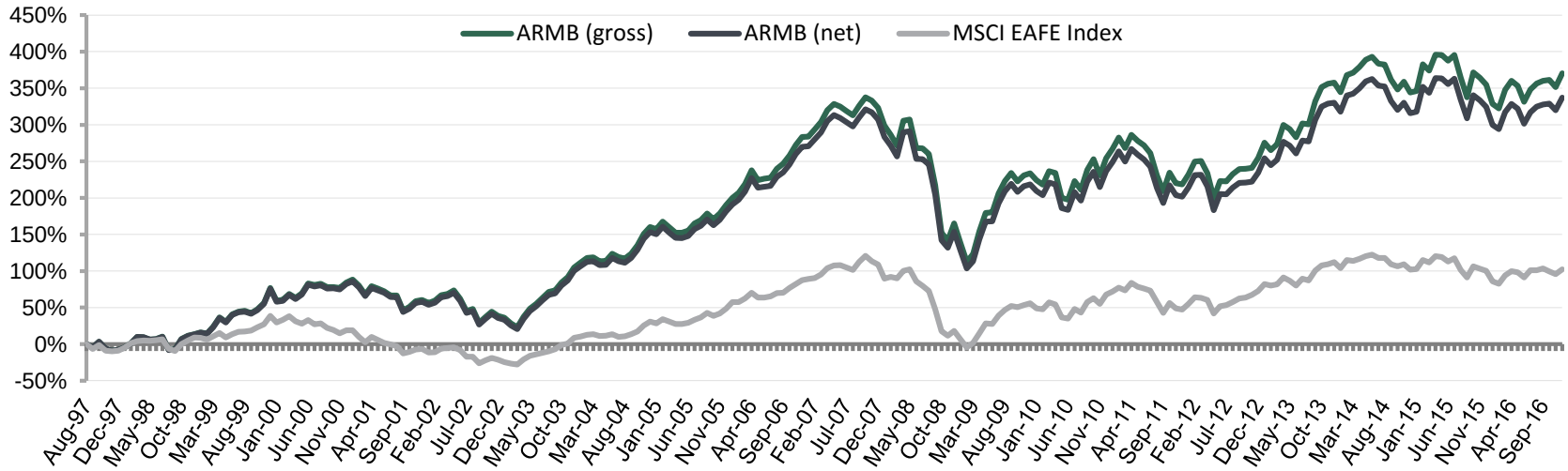
BRANDES INVESTMENT PARTNERS

Alaska Retirement Management Board Portfolio Performance* vs. Index



Results*	Account (gross) %	Account (net) %	MSCI EAFE %	Added Value (gross) %	Added Value (net) %
1 Year:	3.43	3.03	1.00	+2.43	+2.03
3 Years:	0.92	0.53	-1.60	+2.52	+2.13
5 Years:	8.13	7.71	6.53	+1.60	+1.18
7 Years:	5.03	4.63	3.81	+1.22	+0.82
10 Years:	2.07	1.68	0.75	+1.32	+0.93
15 Years:	7.44	7.02	5.28	+2.16	+1.74
From Inception:	8.31	7.90	3.70	+4.61	+4.20

Account Value: $715,515,500

Net Capital Contributed: -$343,257,641

Inception Date: 8/11/1997

AS OF DECEMBER 31, 2016

*Cumulative total return since inception – both gross and net of management fees are displayed. All figures one year and above are annualized. All performance is historical and is not a guarantee of future results. Indices are unmanaged and are not available for direct investment. International and emerging markets investing is subject to certain risks such as currency fluctuation and social and political changes; such risks may result in greater share price volatility.

Alaska Retirement Management Board International Equity

KEY PERFORMANCE FACTORS[1]

Calendar Year 2016

Positive Factors

- Holdings in the following industries:
  - Pharmaceuticals (Taisho, Mitsuibishi Tanabe, Daichi Sankyo)
  - Oil Gas & Consumable Fuels (Petrobras, Repsol, BP)
  - Food & Staples Retailing (Wm. Morrison, Tesco)
- Holdings in the following countries:
  - Brazil (Telefonica Brasil, SABESP, Eletrobras)
  - United Kingdom (HSBC, GSK, Sky)
  - South Korea (Hana Financial, Posco, Hyundai Mobis)

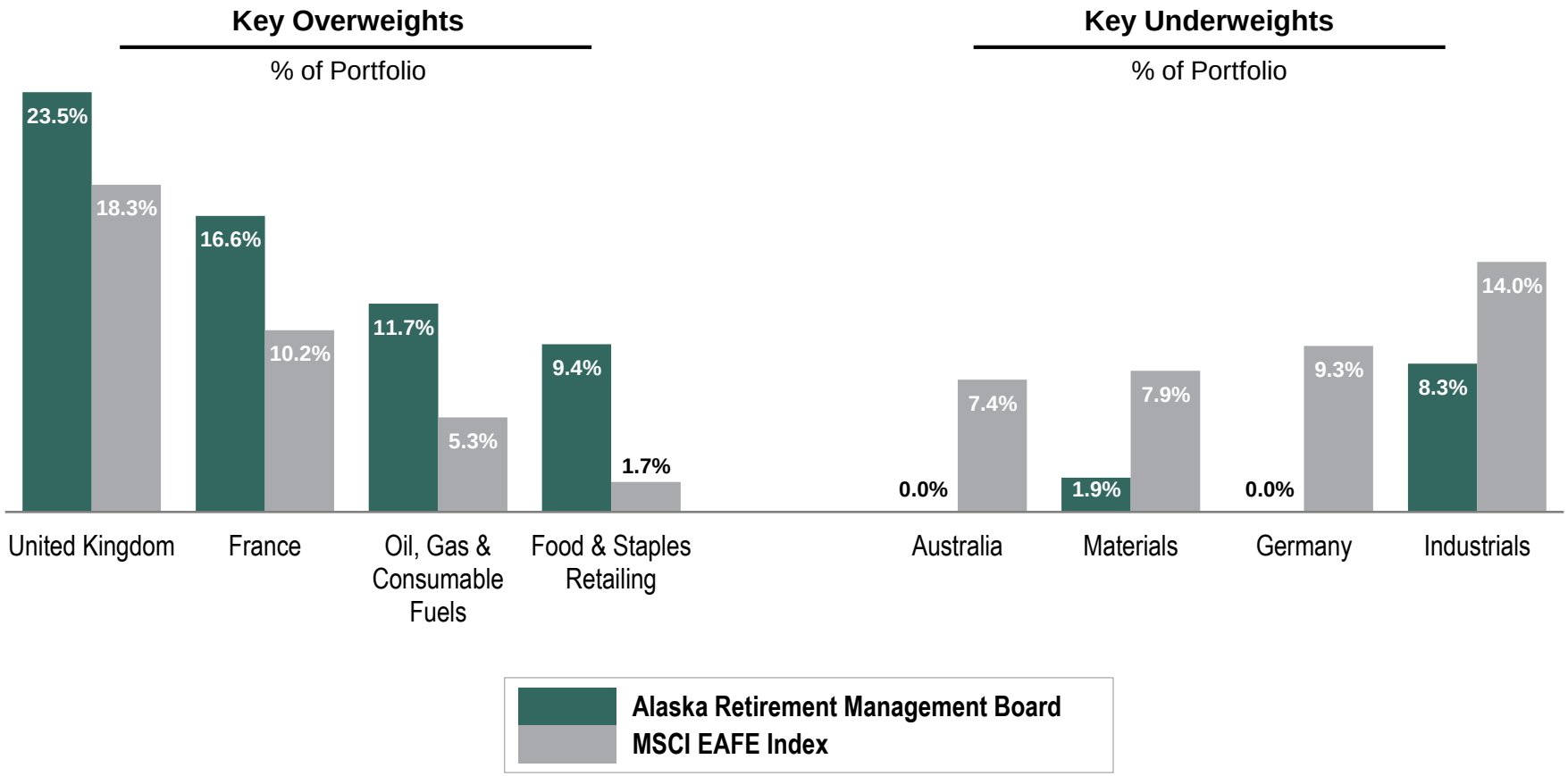
Negative Factors

- Holdings in the following industries:
  - Aerospace & Defense (Embraer)
  - Multiline Retail (Marks & Spencer)
  - Communications Equipment (Ericsson, Nokia)
- Holdings in the following countries:
  - Lack of Australia
  - France (Engie, Carrefour, Orange)
  - Switzerland (Credit Suisse, UBS, Swatch)

[1] Relative to the index. The MSCI EAFE (Europe, Australasia, Far East) Index with net dividends measures equity market performance of developed markets in Europe, Australasia, and the Far East. The information provided in this material should not be considered a recommendation to purchase or sell any particular security. It should not be assumed that any security transactions, holdings, or sectors discussed were or will be profitable, or that the investment recommendations or decisions we make in the future will be profitable or will equal the investment performance discussed herein. Strategies discussed herein are subject to change at any time by the investment manager in its discretion due to market conditions or opportunities.

Alaska Retirement Management Board Brandes is Different

Select Differentials vs. Benchmark



AS OF DECEMBER 31, 2016 | Source: Brandes Investment Partners and MSCI. Portfolio allocations are subject to change at any time. Brandes reserves the right to modify its current investment strategies and techniques based on changing market dynamics or client needs. It should not be assumed that any of the securities transactions or holdings discussed were or will prove to be profitable, or that the investment recommendations or decisions we make in the future will be profitable or will equal the investment performance of the securities discussed herein.

BRANDES INVESTMENT PARTNERS

Alaska Retirement Management Board
Summary of Portfolio Changes

Calendar Year 2016

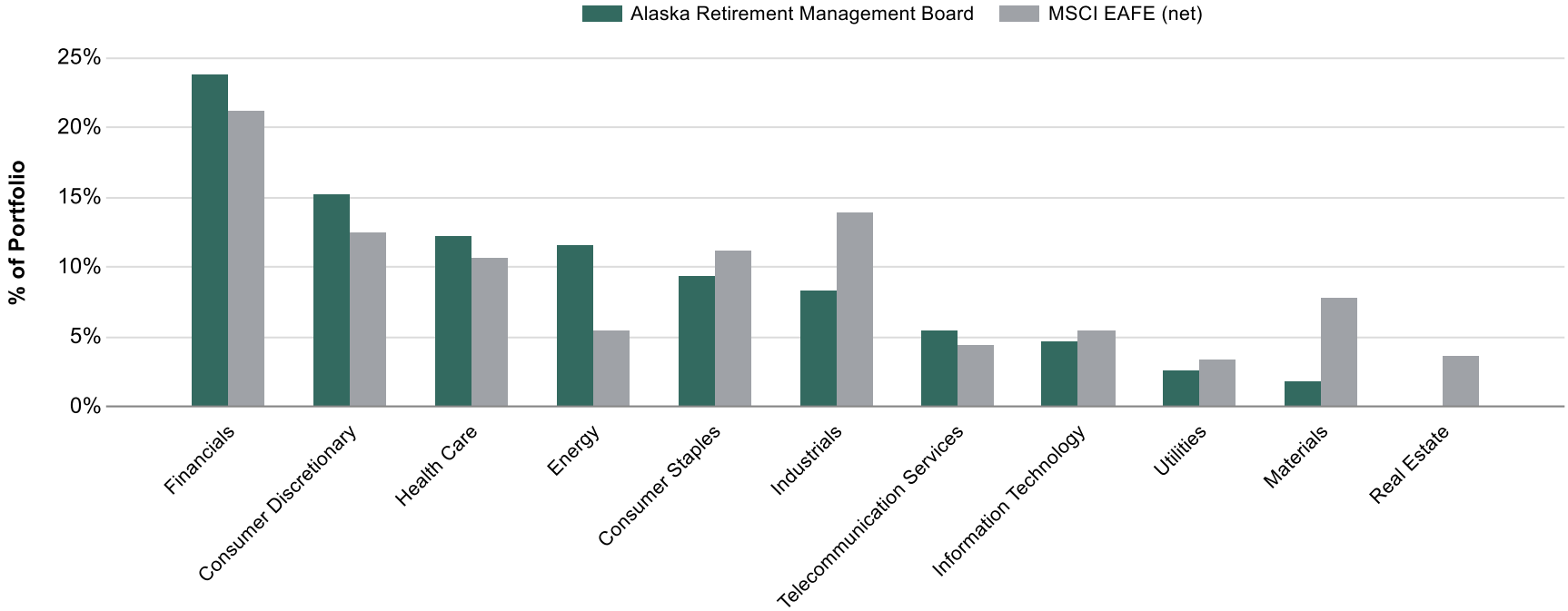
New Issuers

Company	Industry	Country
China Mobile Ltd	Wireless Telecom Services	China
Nokia Oyj	Communications Equipment	Finland
Sky PLC	Media	United Kingdom
Telefonica Brasil S.A.	Diversified Telecom Services	Brazil

Complete Sale of Positions

Banco Santander (Brasil) SA	Banks	Brazil
Centrais Eletricas Brasileiras	Electric Utilities	Brazil
CIA Saneamento Basico	Water Utilities	Brazil
CRH Plc	Construction Materials	Ireland
H. Lundbeck A/S	Pharmaceuticals	Denmark
Italcementi SPA	Construction Materials	Italy
Koninklijke Ahold N.V.	Food & Staples Retailing	Netherlands

Alaska Retirement Management Board Sector Exposure



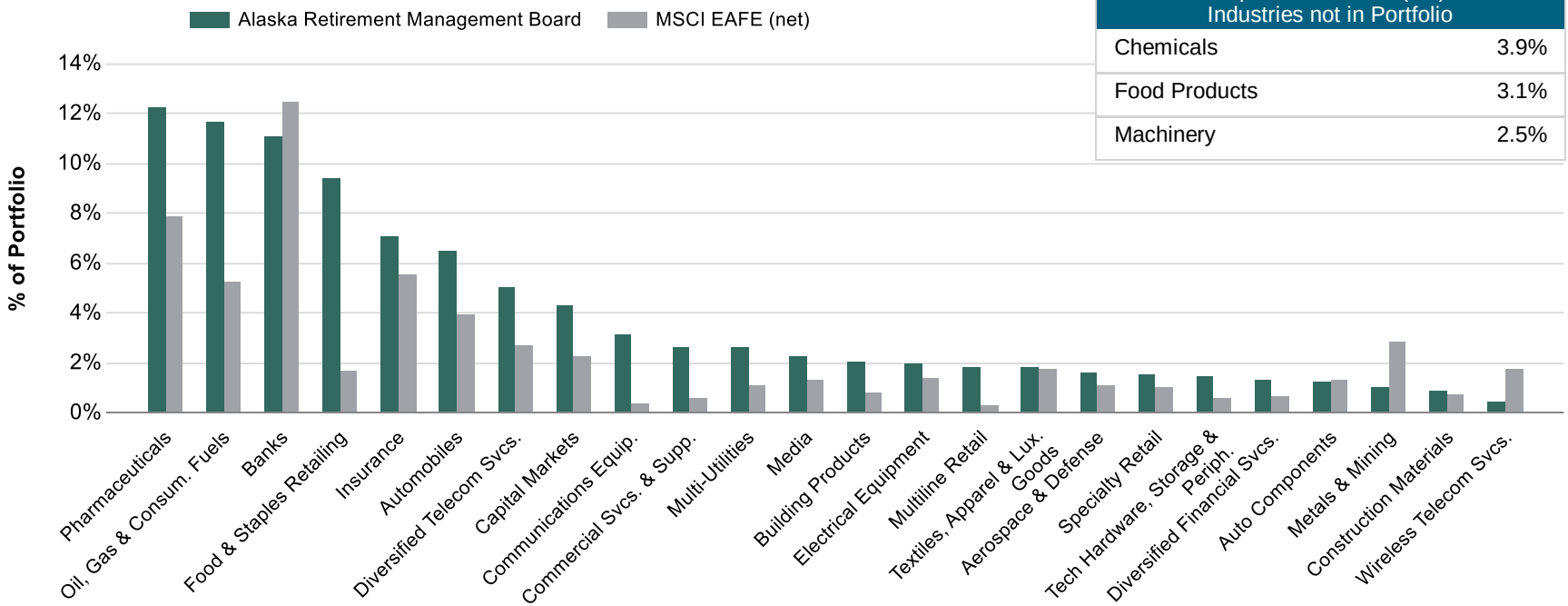
Largest Sector Weighting Increases	12/31/2016	12/31/2015	Change
Energy	11.6%	8.3%	+3.3%
Consumer Discretionary	15.2%	13.3%	+1.9%
Industrials	8.3%	7.1%	+1.2%

Largest Sector Weighting Decreases	12/31/2016	12/31/2015	Change
Health Care	12.3%	16.4%	-4.1%
Materials	1.9%	4.3%	-2.4%
Utilities	2.6%	4.7%	-2.1%

As of December 31, 2016

Portfolio allocations are subject to change at any time.

Alaska Retirement Management Board Industry Exposure



Top 3 MSCI EAFE (net) Industries not in Portfolio	
Chemicals	3.9%
Food Products	3.1%
Machinery	2.5%

Largest Industry Weighting Increases	12/31/2016	12/31/2015	Change
Oil, Gas & Consum. Fuels	11.6%	8.3%	+3.3%
Media	2.2%	0.0%	+2.2%
Communications Equip.	3.2%	1.6%	+1.6%

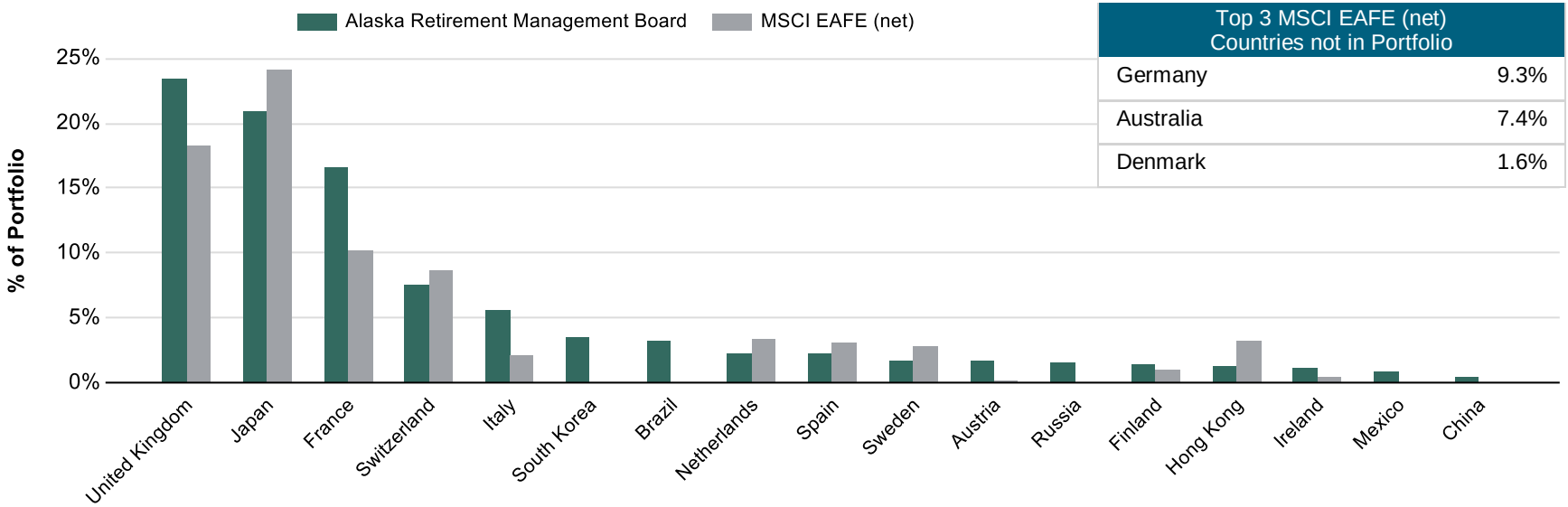
Largest Industry Weighting Decreases	12/31/2016	12/31/2015	Change
Pharmaceuticals	12.3%	16.4%	-4.1%
Construction Materials	0.9%	3.5%	-2.6%
Multi-Utilities	2.6%	3.6%	-1.0%

- Total number of industries in Portfolio: 24
- No exposure to industries that represent 40.3% of benchmark

As of December 31, 2016

Portfolio allocations are subject to change at any time.

Alaska Retirement Management Board Country Exposure



Top 3 MSCI EAFE (net) Countries not in Portfolio	
Germany	9.3%
Australia	7.4%
Denmark	1.6%

Regional Weightings	12/31/2016	12/31/2015	Change
Europe	65.1%	62.4%	+2.7%
Latin America	4.1%	4.1%	0.0%
Asia	26.1%	28.7%	-2.6%

Market Weightings	12/31/2016	12/31/2015	Change
Developed Markets	85.9%	86.1%	-0.2%
Emerging Markets	9.5%	9.1%	+0.4%
Cash	4.6%	4.8%	-0.2%

- Total number of countries in Portfolio: 17
- No exposure to countries that represent 22.4% of benchmark

As of December 31, 2016

Portfolio allocations are subject to change at any time.

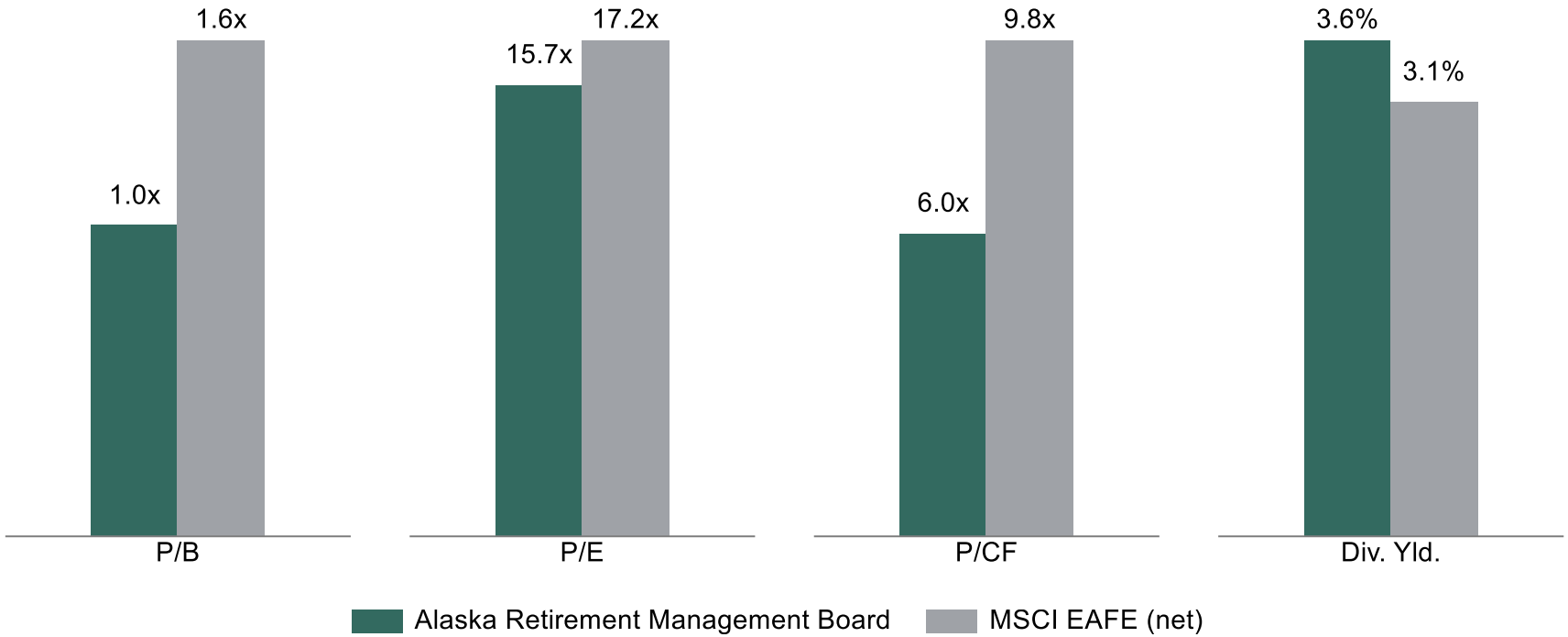
Alaska Retirement Management Board
Top Ten Holdings

Company	%	Country	Industry
BP Plc	3.69%	United Kingdom	Oil, Gas & Consum. Fuels
ENI S.p.A.	3.48%	Italy	Oil, Gas & Consum. Fuels
Wm. Morrison Supermkts Plc	3.02%	United Kingdom	Food & Staples Retailing
Sanofi SA	2.97%	France	Pharmaceuticals
GlaxoSmithKline Plc	2.95%	United Kingdom	Pharmaceuticals
Nissan Motor Co., Ltd.	2.94%	Japan	Automobiles
Engie SA	2.63%	France	Multi-Utilities
Honda Motor Company	2.50%	Japan	Automobiles
Tesco Plc	2.46%	United Kingdom	Food & Staples Retailing
Takeda Pharma Co Ltd	2.30%	Japan	Pharmaceuticals
Top 10 as % of Portfolio	**28.94%**		

Total Number of Companies: 52

As of December 31, 2016
Portfolio allocations are subject to change at any time.

Alaska Retirement Management Board Fundamental Information



Fundamental Information as of December 31, 2016

Portfolio allocations are subject to change at any time.

Price/Book, Price/Earnings, Price/Cash Flow and Dividend Yield for each security provided by Bloomberg, L.P. Please note that Bloomberg does not provide negative numbers in the data feed. Index fundamentals are calculated from holdings data as provided by the relevant index or by Thomson Reuters Worldscope, excluding negative numbers for consistency. Thus, index fundamentals calculated by Brandes may differ from those computed and published by index providers.

International Value – What Makes Us Confident

- Attractive absolute and relative valuations
- After healthy 2016, robust opportunity set
- Steadily improving company margins and returns
- Improving sentiment (e.g. Europe, Brazil, Russia)
- Potential volatility is an opportunity
  - We are built to take advantage of such situations
- Value's return to continue…
  - Growth is losing its scarcity premium as broad-based growth recovers
  - Value's relative mean valuations are more attractive than Growth's

BRANDES INVESTMENT PARTNERS

WILMINGTON TRUST CIT

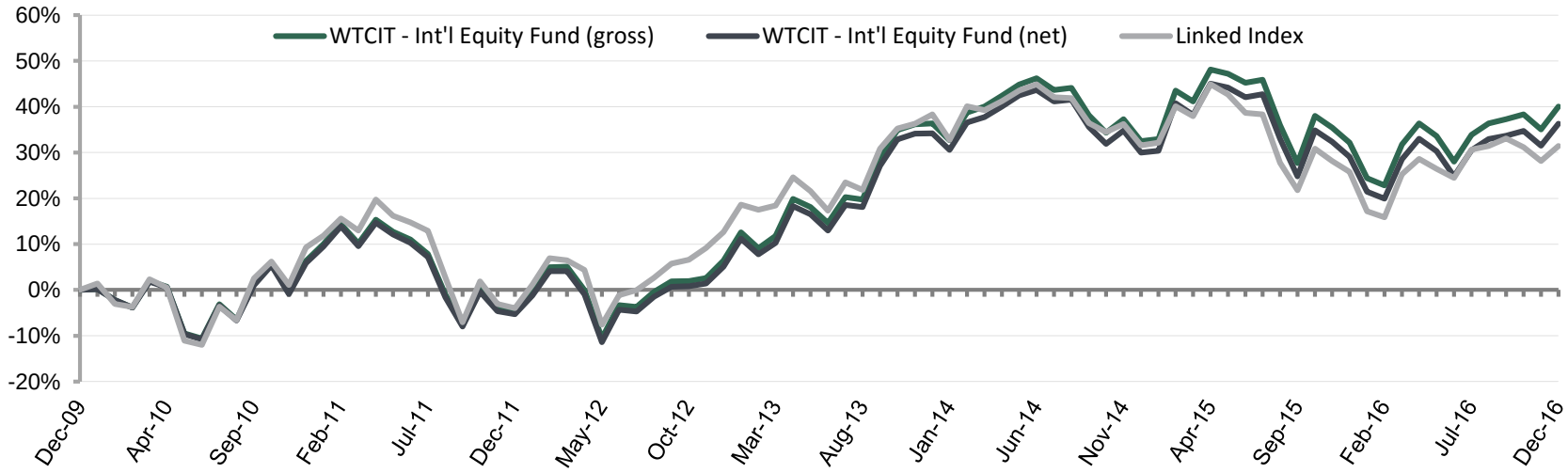
BRANDES
INVESTMENT PARTNERS

Strategy Profile & Guidelines

Wilmington Trust CIT – Brandes International Equity Fund	
Investable Universe	Primarily non-U.S. companies with a market capitalization generally greater than $5 billion at time of purchase
# of Holdings	Bottom-up portfolio construction with 50-75 holdings, historically
Annual Portfolio Turnover	Typically 20-40%
Individual Issue Maximum	Typically less than 5% at time of purchase
Country & Industry Guidelines	Maximum: Typically greater of 20% or 1.5x MSCI EAFE Index weight at time of purchase Minimum: None
Emerging Markets Exposure	Up to 30% of the portfolio at time of purchase
Cash Weight	Typically less than 5-10%
Currency Management	Diversified through individual stock selection driving exposure to multiple currencies
Inception Date	December 1, 2009

Please refer to Brandes Form ADV Part 2A for complete strategy guidelines.

Wilmington Trust CIT
Portfolio Performance* vs. Index



Results*	Account (gross) %	Account (net) %	Linked† Index %	Added Value (gross) %	Added Value (net) %
1 Year:	5.96	5.59	4.50	+1.46	+1.09
3 Years:	0.89	0.51	-1.69	+2.58	+2.20
5 Years:	7.95	7.54	6.47	+1.48	+1.07
7 Years:	4.90	4.49	3.77	+1.13	+0.72
From Inception:	4.87	4.46	3.93	+0.94	+0.53

Account Value: $75,714,034.67

Inception Date: 12/1/2009

AS OF DECEMBER 31, 2016

†Linked Index: MSCI EAFE (net) from inception through 3/31/15, and MSCI AC World Ex-US (net) from 4/1/15 through the present.

*Cumulative total return since inception – both gross and net of management fees are displayed. All figures one year and above are annualized. All performance is historical and is not a guarantee of future results. Indices are unmanaged and are not available for direct investment. International and emerging markets investing is subject to certain risks such as currency fluctuation and social and political changes; such risks may result in greater share price volatility.

Wilmington Trust CIT International Equity

KEY PERFORMANCE FACTORS[1]

Calendar Year 2016

Positive Factors

- Holdings in the following industries:
  - Pharmaceuticals (Taisho, GSK, Mitsubishi Tanabe)
  - Oil Gas & Consumable Fuels (Petrobras, Repsol, BP)
  - Construction Materials (Cemex, CRH)
- Holdings in the following countries:
  - Brazil (Telefonica Brasil, SABESP, Eletrobras)
  - South Korea (Hana Financial, Posco, Hyundai Mobis)
  - United Kingdom (Wm. Morrison, Tesco, HSBC)

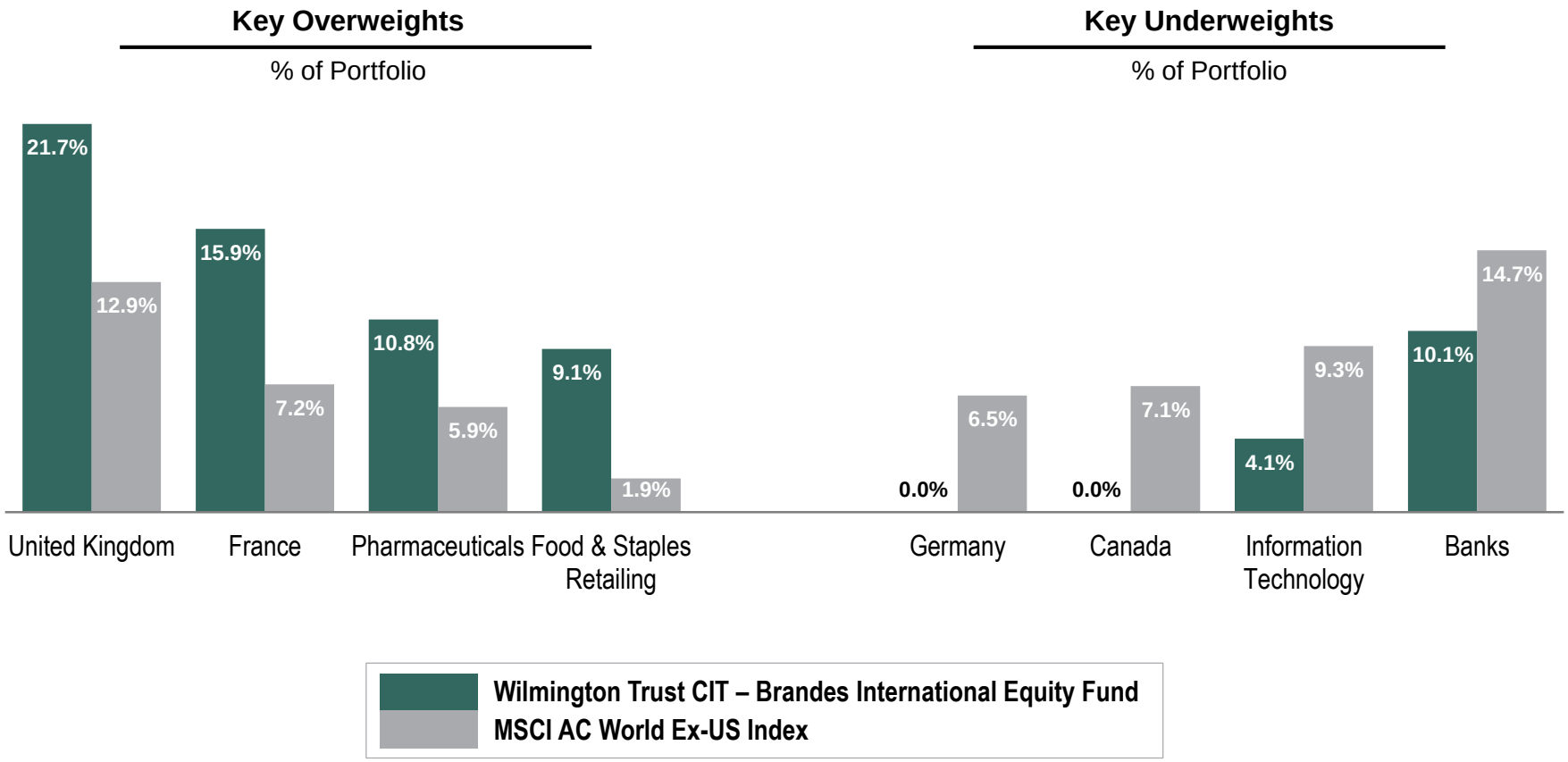
Negative Factors

- Holdings in the following industries:
  - Aerospace & Defense (Embraer)
  - Multiline Retail (Marks & Spencer)
  - Communications Equipment (Ericsson, Nokia)
- Holdings in the following countries:
  - Lack of Canada and Australia
  - France (Engie, Carrefour, Orange)
  - Switzerland (Credit Suisse, UBS, Swatch)

[1] Relative to the index. The MSCI All Country World ex-U.S. Index with net dividends measures equity market performance of developed and emerging markets excluding the United States. The information provided in this material should not be considered a recommendation to purchase or sell any particular security. It should not be assumed that any security transactions, holdings, or sectors discussed were or will be profitable, or that the investment recommendations or decisions we make in the future will be profitable or will equal the investment performance discussed herein. Strategies discussed herein are subject to change at any time by the investment manager in its discretion due to market conditions or opportunities.

Wilmington Trust CIT
Brandes is Different

Select Differentials vs. Benchmark



AS OF DECEMBER 31, 2016 | Source: Brandes Investment Partners and MSCI. Portfolio allocations are subject to change at any time. Brandes reserves the right to modify its current investment strategies and techniques based on changing market dynamics or client needs. It should not be assumed that any of the securities transactions or holdings discussed were or will prove to be profitable, or that the investment recommendations or decisions we make in the future will be profitable or will equal the investment performance of the securities discussed herein.

BRANDES INVESTMENT PARTNERS

Wilmington Trust CIT
Summary of Portfolio Changes

Calendar Year 2016

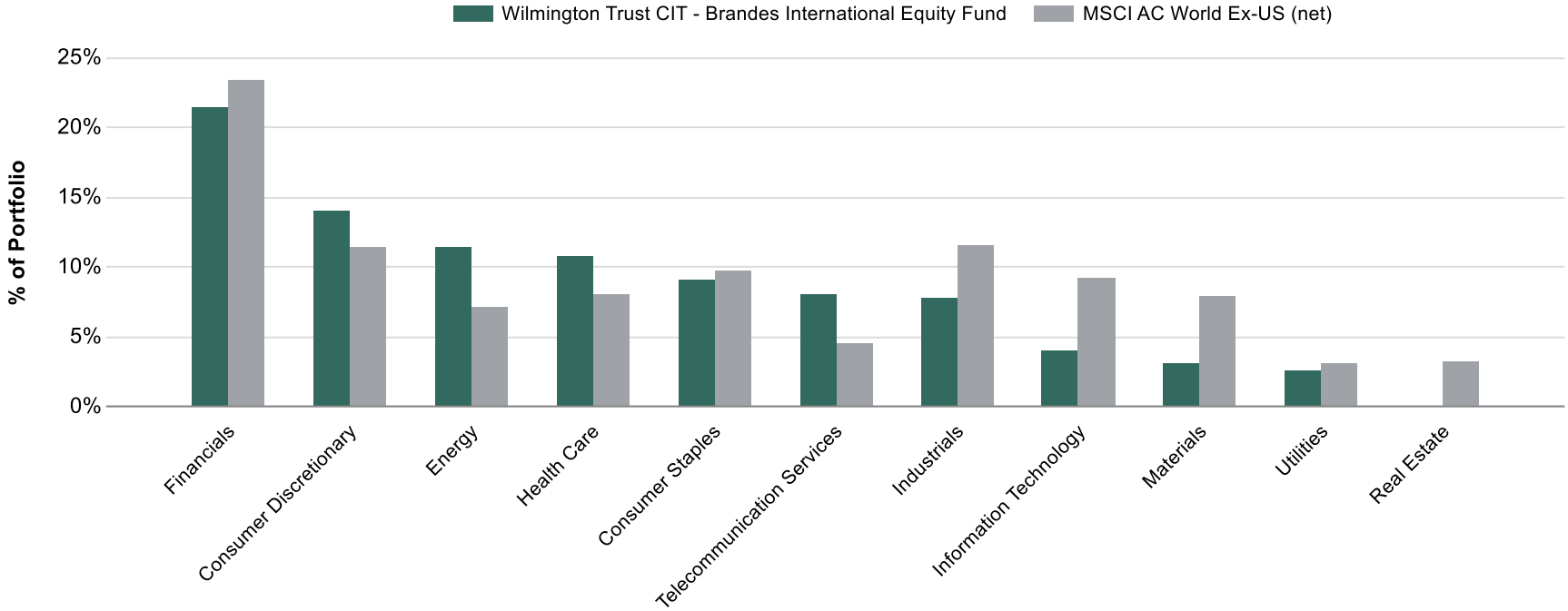
New Issuers

Company	Industry	Country
Hyundai Motor Company	Automobiles	South Korea
Nokia Oyj	Communications Equipment	Finland
Publicis Groupe SA	Media	France

Complete Sale of Positions

Banco Santander (Brasil) SA	Banks	Brazil
Centrais Eletricas Brasileiras	Electric Utilities	Brazil
CIA Saneamento Basico	Water Utilities	Brazil
CRH Plc	Construction Materials	Ireland
Italcementi SPA	Construction Materials	Italy
Koninklijke Ahold N.V.	Food & Staples Retailing	Netherlands

Wilmington Trust CIT
Sector Exposure



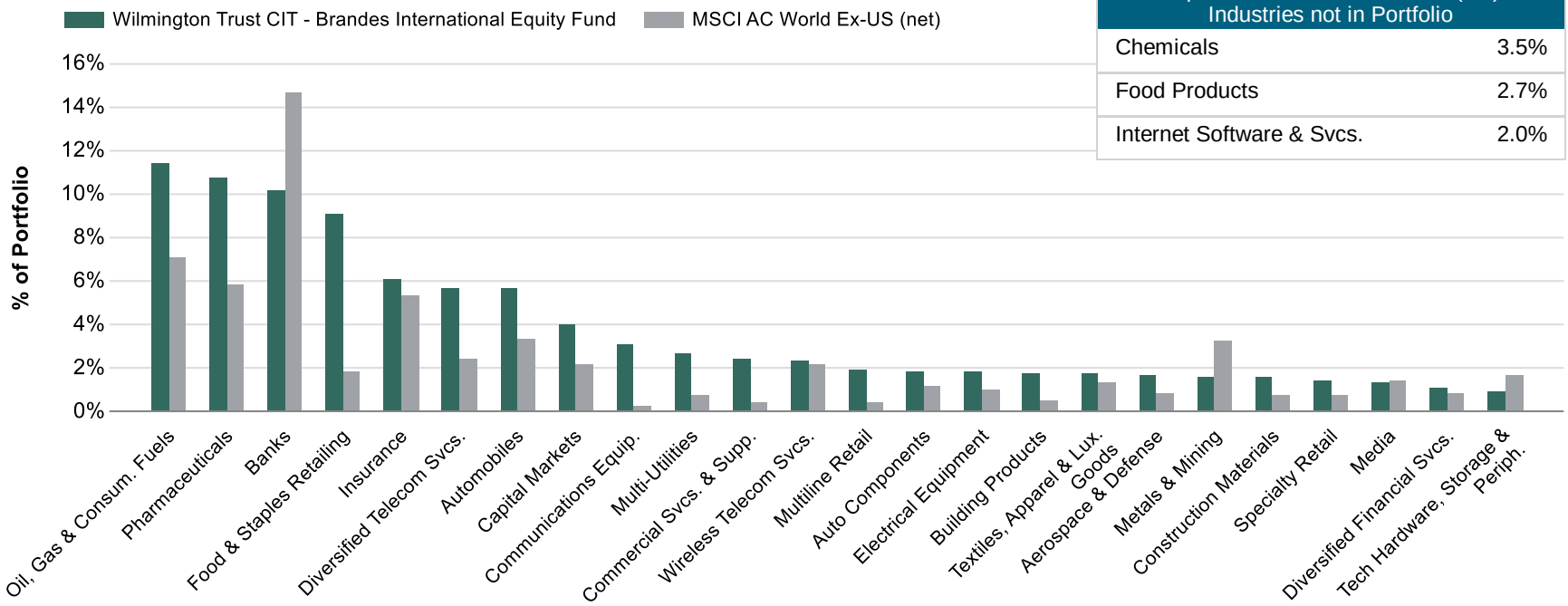
Largest Sector Weighting Increases	12/31/2016	12/31/2015	Change
Information Technology	4.1%	2.4%	+1.7%
Energy	11.5%	10.0%	+1.5%
Telecommunication Services	8.1%	6.8%	+1.3%

Largest Sector Weighting Decreases	12/31/2016	12/31/2015	Change
Health Care	10.8%	14.6%	-3.8%
Utilities	2.7%	5.6%	-2.9%
Materials	3.2%	5.1%	-1.9%

As of December 31, 2016

Portfolio allocations are subject to change at any time.

Wilmington Trust CIT Industry Exposure



Top 3 MSCI AC World Ex-US (net) Industries not in Portfolio	
Chemicals	3.5%
Food Products	2.7%
Internet Software & Svcs.	2.0%

Largest Industry Weighting Increases	12/31/2016	12/31/2015	Change
Communications Equip.	3.1%	0.5%	+2.6%
Oil, Gas & Consum. Fuels	11.5%	10.0%	+1.5%
Media	1.3%	0.0%	+1.3%

- Total number of industries in Portfolio: 24

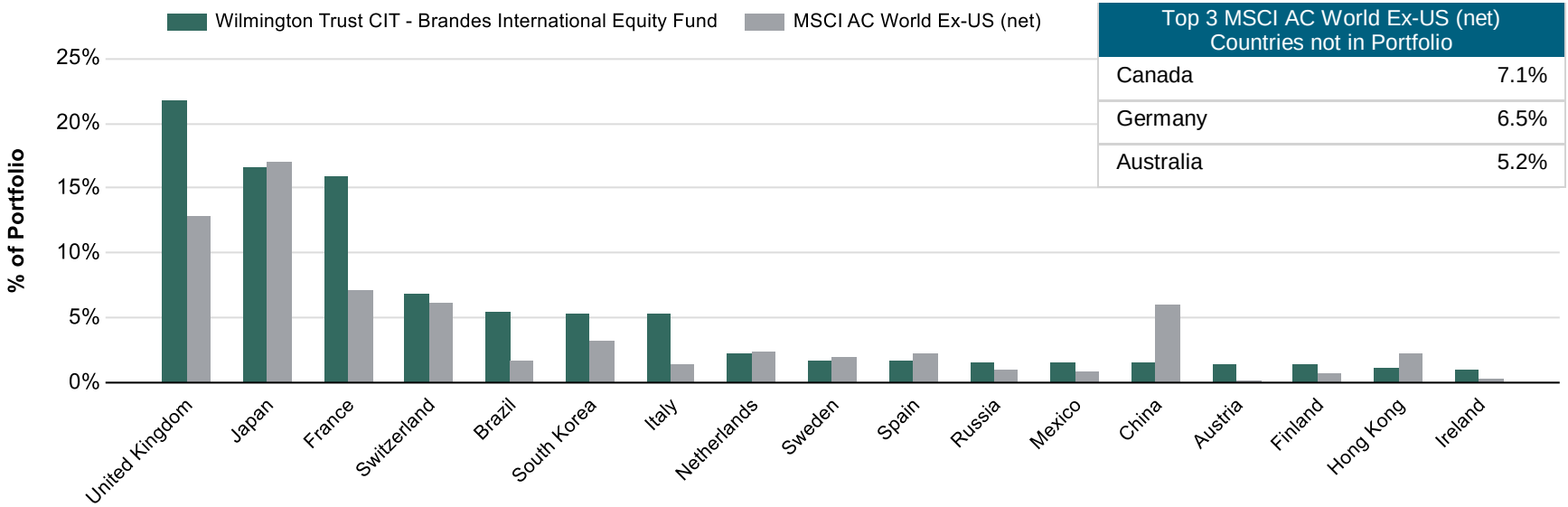
Largest Industry Weighting Decreases	12/31/2016	12/31/2015	Change
Pharmaceuticals	10.8%	14.6%	-3.8%
Construction Materials	1.6%	3.6%	-2.0%
Multi-Utilities	2.7%	4.1%	-1.4%

- No exposure to industries that represent 38.9% of benchmark

As of December 31, 2016

Portfolio allocations are subject to change at any time.

Wilmington Trust CIT Country Exposure



Top 3 MSCI AC World Ex-US (net) Countries not in Portfolio	
Canada	7.1%
Germany	6.5%
Australia	5.2%

Regional Weightings	12/31/2016	12/31/2015	Change
Europe	61.0%	57.7%	+3.3%
Latin America	7.1%	8.9%	-1.8%
Asia	24.7%	30.6%	-5.9%

Market Weightings	12/31/2016	12/31/2015	Change
Developed Markets	77.2%	79.9%	-2.7%
Emerging Markets	15.6%	17.2%	-1.6%
Cash	7.2%	2.8%	+4.4%

- Total number of countries in Portfolio: 17
- No exposure to countries that represent 32.6% of benchmark

As of December 31, 2016

Portfolio allocations are subject to change at any time.

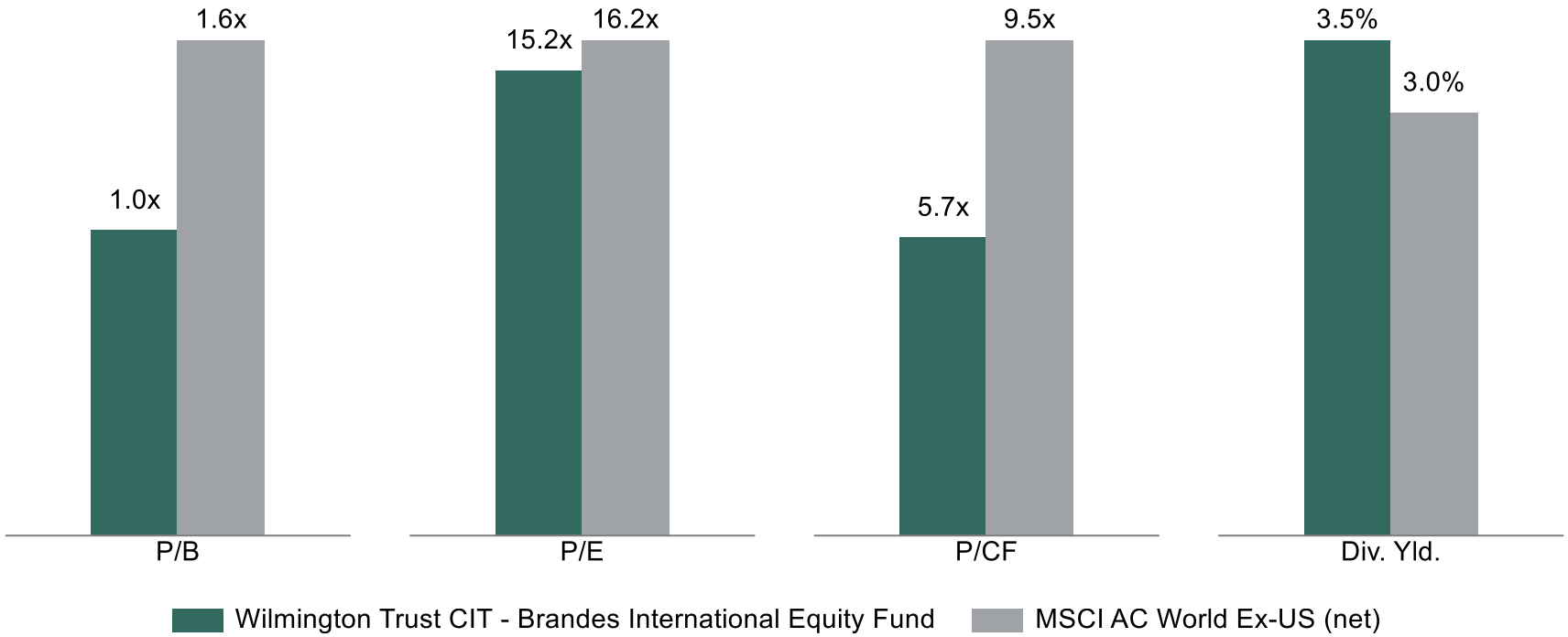
Wilmington Trust CIT
Top Ten Holdings

Company	%	Country	Industry
BP Plc	3.53%	United Kingdom	Oil, Gas & Consum. Fuels
ENI S.p.A.	3.26%	Italy	Oil, Gas & Consum. Fuels
Wm. Morrison Supermkts Plc	2.80%	United Kingdom	Food & Staples Retailing
Sanofi SA	2.74%	France	Pharmaceuticals
Engie SA	2.70%	France	Multi-Utilities
GlaxoSmithKline Plc	2.58%	United Kingdom	Pharmaceuticals
Tesco Plc	2.40%	United Kingdom	Food & Staples Retailing
Takeda Pharma Co Ltd	2.33%	Japan	Pharmaceuticals
Aegon NV	2.26%	Netherlands	Insurance
Orange SA	2.11%	France	Diversified Telecom Svcs.
Top 10 as % of Portfolio	**26.71%**		

Total Number of Companies: 53

As of December 31, 2016
Portfolio allocations are subject to change at any time.

Wilmington Trust CIT
Fundamental Information



Fundamental Information as of December 31, 2016

Portfolio allocations are subject to change at any time.

Price/Book, Price/Earnings, Price/Cash Flow and Dividend Yield for each security provided by Bloomberg, L.P. Please note that Bloomberg does not provide negative numbers in the data feed. Index fundamentals are calculated from holdings data as provided by the relevant index or by Thomson Reuters Worldscope, excluding negative numbers for consistency. Thus, index fundamentals calculated by Brandes may differ from those computed and published by index providers.

APPENDIX

Assets by Strategy

Global Equity	Inst./PC[1] ($ Mil)	SMA[2] ($ Mil)
Global Balanced	34	143
Global Equity	4,846	1,821
Global Equity Income	2	0
Global Opportunities Value	215	0
Global Small Cap Equity	741	0
Global Small-Mid Cap Equity	172	146

International Equity (Non-U.S.)	Inst./PC[1] ($ Mil)	SMA[2] ($ Mil)
Asia Pacific ex-Japan Equity	21	0
Canadian Equity	23	0
Emerging Markets Equity	2,228	0
Emerging Markets Opportunities	4	35
Emerging Markets Value Equity	2,146	0
European Equity	1,031	13
International Equity	7,597	2,082
International Small Cap Equity	2,087	0
International Small-Mid Cap Equity	92	0
Japan Equity	819	0

United States	Inst./PC[1] ($ Mil)	SMA[2] ($ Mil)
U.S. Small Cap Value Equity	108	18
U.S. Small-Mid Cap Value Equity	8	0
U.S. Value Equity	263	447

Fixed Income	Inst./PC[1] ($ Mil)	SMA[2] ($ Mil)
Core Plus Fixed Income	418	224
Corporate Focus Fixed Income	113	0
Enhanced Income	2	92

AS OF DECEMBER 31, 2016 | [1] Assets include institutional accounts, pooled investment vehicles and high net worth accounts outside of SMA ("wrap-fee") programs. [2] The SMA Division encompasses the firm's "Separately Managed Account" business (subadvisory "wrap-fee" business with brokerage firms). Also includes UMA ("unified managed account") assets.

International Large-Cap Investment Committee

Committee Member	Title	Years with Firm	Years on Committee	Total Years of Brandes IC[1] Experience
Jeffrey Germain, CFA	Director, Investments Group	15	7	7
Amelia Maccoun Morris, CFA	Director, Investments Group	18	18	18
Shingo Omura, CFA	Director, Investments Group	11	3	3
Luiz G. Sauerbronn	Director, Investments Group	15	3	12
Brent V. Woods, CFA	Chief Executive Officer	21	21	20

AS OF DECEMBER 2016 | [1] Investment Committee

International Large-Cap Investment Committee

Jeffrey Germain, CFA
Director, Investments Group
Limited partner of the firm's parent company

Experience

Current Responsibilities:
- Analyst responsibilities on the Basic Materials Research Team
- Member of the International Large-Cap Investment Committee
- Experience began in 2001
- Joined Brandes Investment Partners in 2001

Prior Career Highlights
- Financial Analyst with Harcourt
- CFO of Golf Destinations

Education
- BS in business administration with a concentration in finance from the University of North Carolina at Chapel Hill

Amelia Maccoun Morris, CFA
Director, Investments Group
Limited partner of the firm's parent company

Experience

Current Responsibilities:
- Analyst and Team Leader responsibilities on the Consumer Products Research Team
- Member of the International Large-Cap Investment Committee
- Experience began in 1986
- Joined Brandes Investment Partners in 1998

Prior Career Highlights
- Member of the Emerging Markets Investment Committee with Brandes Investment Partners
- Member of the Investment Oversight Committee with Brandes Investment Partners
- Member of the Brandes Institute Advisory Board

Education
- MBA from the University of Chicago Booth School of Business
- Degree in economics (Phi Beta Kappa and cum laude) from the University of California, Davis

Shingo Omura, CFA
Director, Investments Group
Limited partner of the firm's parent company

Experience

Current Responsibilities:
- Analyst and Team Leader responsibilities on the Health Care Research Team
- Member of the International Large-Cap Investment Committee
- Primary Product Coordinator for the Japan Equity strategy
- Member of the Corporate Governance Committee
- Experience began in 2001
- Joined Brandes Investment Partners in 2005

Prior Career Highlights
- Sell-Side Research Analyst (as a member of both the Basic Materials and Utilities Teams) in Japan

Education
- MBA from the Haas School of Business at the University of California, Berkeley
- BA in economics from Keio University in Tokyo, Japan

International Large-Cap Investment Committee

Luiz G. Sauerbronn
Director, Investments Group
Limited partner of the firm's parent company

Experience

Current Responsibilities:

- Analyst responsibilities on the Industrials Research Team
- Member of the International Large-Cap and Small-Cap Investment Committees
- Member of the Corporate Governance Committee
- Experience began in 1995
- Joined Brandes Investment Partners in 2001

Prior Career Highlights

- Summer Associate with J.P. Morgan
- Manager of Mergers and Acquisitions Advisory Team with Banco Brascan (part of Brookfield Asset Management) in Brazil
- Trainee with Royal Dutch Shell

Education

- MBA from the Haas School of Business at the University of California, Berkeley
- BS in economics from the Federal University of Rio de Janeiro

Brent V. Woods, CFA
Chief Executive Officer
Limited partner of the firm's parent company

Experience

Current Responsibilities:

- Chief Executive Officer, leading the firm's Senior Management Team, which is responsible for day-to-day operations and long-term strategic direction
- Member of the Large Cap Investment Committee
- Experience began in 1995
- Joined Brandes Investment Partners in 1995

Prior Career Highlights

- Managing Director, Investments Group with Brandes Investment Partners, responsible for the firm's securities research efforts and oversight of the product investment committees

Education

- JD (cum laude) from Harvard Law School
- Master's in international studies from St. John's College at Cambridge University, England
- AB (Phi Beta Kappa) from Princeton University

Investment Committees

All-Cap Investment Committee
Major Strategies: Global Opportunities

Committee Members:
Ralph Birchmeier, CFA
Charles H. Brandes, CFA
Michael Hutchens, CFA
Kenneth Little, CFA
Gerardo Zamorano, CFA

Emerging Markets Investment Committee
Major Strategies: Emerging Markets, Emerging Markets Value, Asia Pacific (ex-Japan)

Committee Members:
Mauricio Abadia
Douglas C. Edman, CFA
Christopher J. Garrett, CFA
Louis Y. Lau, CFA
Gerardo Zamorano, CFA

Fixed Income Investment Committee
Major Strategies: Core, Core Plus, Corporate Focus, Enhanced Income

Committee Members:
Timothy M. Doyle, CFA
David J. Gilson
Charles S. Gramling, CFA

Global Large-Cap Investment Committee
Major Strategies: Global, Global Equity Income, U.S. Value, Global Balanced

Committee Members:
Brent Fredberg
Ted Kim, CFA
Kenneth Little, CFA
Brian A. Matthews, CFA

International Large-Cap Investment Committee
Major Strategies: International, Europe, Japan

Committee Members:
Jeffrey Germain, CFA
Amelia Maccoun Morris, CFA
Shingo Omura, CFA
Luiz G. Sauerbronn
Brent V. Woods, CFA

Investment Oversight Committee

Committee Members:
Charles H. Brandes, CFA
Jeffrey A. Busby, CFA
Glenn R. Carlson, CFA
Ian Sunder, CFA

Small-Cap Investment Committee
Major Strategies: Global Small Cap, International Small Cap, U.S. Small Cap, Canadian Equity

Committee Members:
Ralph Birchmeier, CFA
Yingbin Chen, CFA
Mark Costa, CFA
Luiz G. Sauerbronn

Small-Mid Cap Investment Committee
Major Strategies: Global Small-Mid Cap, International Small-Mid Cap, U.S. Small-Mid Cap

Committee Members:
Chris Duncan, CFA
Michael Hutchens, CFA
Greg Rippel, CFA

Research Teams

Basic Materials

Team Leader: Kenneth Little, CFA

Chemicals	Amy Minning, CFA
Containers & Packaging	Jeffrey Germain, CFA
Energy, Equip & Svcs.	Chris Duncan, CFA
Metals & Mining	Jeffrey Germain, CFA
Oil & Gas	Doug Edman, CFA
	Chris Duncan, CFA
Paper & Forest Products	Jeffrey Germain, CFA

Research Associates: Michael Funk, Jim Harrison, Alexander Shih, Alexander Sobrado

Consumer Products

Team Leader: Amelia Morris, CFA

Beverages	Jonathan Menor, CFA
Casinos & Gaming	Greg Rippel, CFA
Distributors	Greg Rippel, CFA
Food & Drug Retailing, Internet & Catalog Retail, Multiline Retail, Specialty Retail	Greg Rippel, CFA (Global X-Europe)
	Amelia Morris, CFA (Europe)
Luxury Goods	Amelia Morris, CFA
Food Products	Chris Duncan, CFA (Developed Markets)
	Greg Rippel, CFA (Emerging Markets)
Hotels, Resorts & Cruise Lines	Greg Rippel, CFA
Household Durables	Brent Fredberg
Household Products	Jonathan Menor, CFA

Consumer Products (Continued)

Team Leader: Amelia Morris, CFA

Leisure Facilities	Greg Rippel, CFA
Leisure Equipment & Products	Greg Rippel, CFA
Personal Products	Jonathan Menor, CFA
Restaurants	Jonathan Menor, CFA
Textiles & Apparel	Greg Rippel, CFA
Tobacco	Jonathan Menor, CFA

Research Associate: Brian Boyd, Patrick Voigt

Financial Institutions

Team Leader: Ralph Birchmeier, CFA

Banking	Bryan Barrett, CFA (Trust Banks, US Thrifts)
	Michael Hutchens, CFA (Global, US Money Center Banks, Japan, Brazil, Europe)
	Louis Lau, CFA (Emerging Markets, Europe)
	Ralph Birchmeier, CFA (US Regional Banks, Peripheral Europe)
	Anita Krishnamoorthy, CFA (Asia-ex)
Insurance	Bryan Barrett, CFA (US)
	Ralph Birchmeier, CFA (EM)
	Anita Krishnamoorthy, CFA (Asia-ex)
Real Estate	Bryan Barrett, CFA (US)
	Louis Lau, CFA (EM)
	Ralph Birchmeier, CFA (RoW)
	Anita Krishnamoorthy, CFA (Asia-ex)

Financial Institutions (Continued)

Team Leader: Ralph Birchmeier, CFA

Diversified Financials	Bryan Barrett, CFA (Exchanges)
	Louis Lau, CFA
	Michael Hutchens, CFA
	Ralph Birchmeier, CFA (Holding Companies)
	Anita Krishnamoorthy, CFA (Asian Conglomerates)

Research Associates: Brett Dorendorf, Rebecca Ludford, Bradley McMullin

Healthcare

Team Leader: Shingo Omura, CFA

Biotechnology	Shingo Omura, CFA
Health Care Equipment & Supplies	Shingo Omura, CFA
Health Care Providers & Services	Shingo Omura, CFA
Pharmaceuticals	Shingo Omura, CFA

Research Associate: Julia Leung

Industrials

Team Leader: Ted Kim, CFA

Air Freight & Logistics	Steven Leonard, CFA
Airlines	Steven Leonard, CFA
Automobiles	Ted Kim, CFA
Auto Components	Ted Kim, CFA
Building Products	Mark Costa, CFA
	Luiz Sauerbronn
Environmental Services	Steven Leonard, CFA

AS OF DECEMBER 2016

Research Teams (Cont.)

Industrials (Continued)

Team Leader: Ted Kim, CFA	
Trading Companies & Distribution	Ted Kim, CFA
Machinery: Industrial / Engineering	Mark Costa, CFA
Machinery: Heavy Trucks	Ted Kim, CFA
	Steven Leonard, CFA
Machinery: Construction & Farm	Bryan Barrett, CFA
Marine	Steven Leonard, CFA
Road & Rail	Steven Leonard, CFA
Transportation Infrastructure	Steven Leonard, CFA
Construction & Engineering	Luiz Sauerbronn
Construction Materials	Luiz Sauerbronn
Electrical Components & Equipment	Bryan Barrett, CFA
Heavy Electrical Equipment	Steven Leonard, CFA
Industrial Conglomerates	Mark Costa, CFA
Aerospace & Defense	Mark Costa, CFA
Research Associates: Andrew Anderson, Connor Daly, Brett Dorendorf, John Harris	

Technology

Team Leader: Brent Fredberg	
Commercial Services & Supplies	Brent Fredberg Mark Robertson, CFA
Communications Equipment	Yingbin Chen, CFA

Technology (Continued)

Team Leader: Brent Fredberg	
Computers & Peripherals	Brent Fredberg
Electronic Equipment & Instruments	Brent Fredberg
	Mark Robertson, CFA
Internet Software & Svcs.	Yingbin Chen, CFA
IT Consulting & Services	Brent Fredberg
Office Electronics	Yingbin Chen, CFA
Semiconductor Equip. & Semiconductors	Brent Fredberg
	Mark Robertson, CFA
Software	Yingbin Chen, CFA
	Brent Fredberg
Research Associates: Thoman Bender, Michael Zhang	

Telecommunications

Team Leader: Gerardo Zamorano, CFA	
Diversified & Wireless Telecomm	Amelia Morris, CFA (Europe)
	Brian Matthews, CFA (Asia, Canada, EMEA)
	Gerardo Zamorano, CFA (US, Latam, EMEA)
Media	Brian Matthews, CFA (Global)
Research Associates: J.T. Adlard, Corey Leung	

Utilities

Team Leader: Kenneth Little, CFA	
Electric, Gas, Water & Multi-Utilities	Mauricio Abadia
	Luiz Sauerbronn (Latin America)

Utilities (Continued)

Team Leader: Kenneth Little, CFA
Research Associates: Michael Funk, Alexander Shih, Alexander Sobrado

Your Portfolio Management Team

Glenn R. Carlson, CFA

Executive Director

Limited partner of the firm's parent company

Experience

Current Responsibilities

- Member of the Investment Oversight Committee, which monitors the processes and activities of the firm's investment committees
- Member of the Brandes Institute Advisory Board

- Relevant experience began in 1983
- Joined Brandes Investment Partners in 1986

Education

- BA from the University of California, San Diego

Lawrence Taylor

Institutional Portfolio Manager

Experience

Current Responsibilities

- Works with institutional clients and their consultants to provide insights and interpretation of the firm's portfolio strategies and investment philosophy, and coordinates with Investment Committees to ensure that we accommodate client-specific guidelines and consider existing portfolio allocations when implementing investment decisions

- Relevant experience began in 1993
- Joined Brandes Investment Partners in 1995

Prior Career Highlights

- Associate Portfolio Manager / Analyst with Brandes Investment Partners
- Investment Analyst with San Diego City Employees' Retirement System

Education

- BA from the University of California, San Diego

Institutional Portfolio Management Members

- **Kole Anderson**– Client Associate Portfolio Manager
- **Sam Arredondo** – Client Associate Portfolio Manager
- **Rhonda Berger** – Director, Institutional Portfolio Manager
- **Scott Davis** – Institutional Portfolio Manager
- **Emily Garcia** – Client Associate Portfolio Manager
- **Christopher Garrett** – Director, Institutional Group
- **Dan Head –** Mutual Fund Services Manager
  Michael Israel – Director, Institutional Group, Institutional Portfolio Manager and Product Manager
- **Shingo Omura** – Director, Investments Group
- **John Otis** – Institutional Portfolio Manager
- **Marsha Riley** – Director, Mutual Fund Sales & Portfolio Management
- **Clifford Schireson** – Director, Institutional Services
- **Ian Sunder** – President, Brandes Investment Partners (Europe)
- **Lawrence Taylor** – Institutional Portfolio Manager

AS OF DECEMBER 2016

Alaska Retirement Management Board Return Contribution by Sector (1 year)

	Portfolio			MSCI EAFE Index			Difference		
Sector	Weight	Total Return (1 Year)	Contribution to Return	Weight	Total Return (1 Year)	Contribution to Return	Weight	Total Return (1 Year)	Contribution to Return
Health Care	12.3%	5.6%	1.1%	10.7%	-11.8%	-1.5%	+1.6%	+17.4%	**+2.5%**
Energy	11.7%	32.4%	3.2%	5.5%	26.8%	1.2%	+6.2%	+5.7%	**+2.0%**
Consumer Staples	9.4%	6.9%	0.7%	11.2%	-2.8%	-0.3%	-1.8%	+9.7%	**+1.0%**
Real Estate	-	-	-	3.7%	-6.6%	-0.3%	-3.7%	+6.6%	**+0.3%**
Telecom Services	5.5%	-9.1%	-0.5%	4.5%	-7.3%	-0.4%	+1.0%	-1.7%	**-0.1%**
Financials	23.7%	-1.0%	-0.4%	21.2%	1.4%	-0.3%	+2.6%	-2.4%	**-0.1%**
Utilities	2.6%	-12.7%	-0.3%	3.4%	-5.5%	-0.2%	-0.8%	-7.2%	**-0.1%**
Consumer Discretionary	15.2%	-5.0%	-0.7%	12.5%	-1.3%	-0.2%	+2.7%	-3.7%	**-0.5%**
Materials	1.9%	29.7%	1.1%	7.9%	24.3%	1.7%	-6.0%	+5.3%	**-0.5%**
Industrials	8.3%	-0.5%	0.0%	14.0%	6.7%	0.9%	-5.7%	-7.2%	**-0.9%**
Information Technology	4.7%	-18.0%	-0.9%	5.5%	3.6%	0.2%	-0.8%	-21.6%	**-1.1%**

AS OF DECEMBER 31, 2016

Source: Brandes, MSCI. Past performance is not a guarantee of future results. Please note that all indices are unmanaged and are not available for direct investment. Performance shown is gross of investment management fees.

Alaska Retirement Management Board Return Contribution by Country (1 year)

	Portfolio			MSCI EAFE Index			Difference		
Country	Weight	Total Return (1 Year)	Contribution to Return	Weight	Total Return (1 Year)	Contribution to Return	Weight	Total Return (1 Year)	Contribution to Return
Brazil	3.2%	38.9%	1.4%	-	-	-	+3.2%	+38.9%	**+1.4%**
United Kingdom	23.5%	5.3%	1.2%	18.3%	-0.1%	0.0%	+5.2%	+5.4%	**+1.2%**
South Korea	3.4%	25.1%	0.9%	-	-	-	+3.4%	+25.1%	**+0.9%**
Spain	2.3%	35.9%	0.6%	3.1%	-1.0%	-0.1%	-0.9%	+36.9%	**+0.7%**
Japan	20.9%	4.8%	0.9%	24.1%	2.4%	0.5%	-3.2%	+2.5%	**+0.4%**
Ireland	1.2%	10.7%	0.3%	0.5%	-7.1%	0.0%	+0.7%	+17.8%	**+0.3%**
Mexico	0.9%	49.2%	0.3%	-	-	-	+0.9%	+49.2%	**+0.3%**
Italy	5.6%	0.1%	0.0%	2.1%	-10.5%	-0.3%	+3.5%	+10.6%	**+0.3%**
Hong Kong	1.3%	8.0%	0.1%	3.2%	2.3%	0.1%	-1.9%	+5.8%	**+0.0%**
Netherlands	2.3%	10.9%	0.2%	3.3%	4.8%	0.2%	-1.0%	+6.0%	**+0.0%**
Russia	1.5%	1.2%	0.0%	-	-	-	+1.5%	+1.2%	**+0.0%**
China	0.5%	-2.9%	0.0%	-	-	-	+0.5%	-2.9%	**-0.0%**
Austria	1.6%	-4.4%	-0.1%	0.2%	11.3%	0.0%	+1.4%	-15.7%	**-0.1%**
Finland	1.4%	-16.1%	-0.2%	1.0%	-4.7%	-0.1%	+0.5%	-11.4%	**-0.1%**
Sweden	1.7%	-36.7%	-0.7%	2.8%	0.6%	0.0%	-1.1%	-37.3%	**-0.7%**
Switzerland	7.5%	-15.5%	-1.3%	8.7%	-4.9%	-0.5%	-1.1%	-10.6%	**-0.8%**
France	16.6%	-2.8%	-0.4%	10.2%	4.9%	0.5%	+6.4%	-7.7%	**-0.9%**
Denmark	-	-4.3%	0.0%	1.6%	-15.8%	-0.3%	-1.6%	+11.4%	**+0.3%**
Germany	-	-	-	9.3%	2.8%	0.3%	-9.3%	-2.8%	**-0.3%**
Australia	-	-	-	7.4%	11.4%	0.9%	-7.4%	-11.4%	**-0.9%**

AS OF DECEMBER 31, 2016

Source: Brandes, MSCI. Past performance is not a guarantee of future results. Please note that all indices are unmanaged and are not available for direct investment. Performance shown is gross of investment management fees.

Wilmington Trust CIT
Return Contribution by Sector (1 year)

	Portfolio			MSCI AC World Ex-US Index			Difference		
Sector	Weight	Total Return (1 Year)	Contribution to Return	Weight	Total Return (1 Year)	Contribution to Return	Weight	Total Return (1 Year)	Contribution to Return
Health Care	10.8%	4.9%	1.0%	8.1%	-13.1%	-1.3%	+2.7%	+18.0%	**+2.3%**
Energy	11.5%	38.2%	3.8%	7.3%	31.2%	1.9%	+4.2%	+7.0%	**+1.9%**
Consumer Staples	9.1%	8.4%	0.8%	9.8%	-1.9%	-0.1%	-0.6%	+10.4%	**+0.9%**
Telecom Services	8.1%	5.2%	0.4%	4.7%	-4.1%	-0.2%	+3.4%	+9.3%	**+0.6%**
Real Estate	-	-	-	3.3%	-7.3%	-0.3%	-3.3%	+7.3%	**+0.3%**
Materials	3.2%	40.1%	1.9%	8.0%	27.6%	1.9%	-4.8%	+12.4%	**+0.0%**
Utilities	2.7%	-9.2%	-0.1%	3.2%	-3.3%	-0.1%	-0.5%	-5.9%	**-0.0%**
Consumer Discretionary	14.1%	-6.3%	-0.9%	11.5%	-0.6%	-0.1%	+2.6%	-5.7%	**-0.7%**
Industrials	7.8%	-5.0%	-0.3%	11.7%	6.3%	0.7%	-3.8%	-11.4%	**-1.1%**
Financials	21.4%	1.8%	-0.3%	23.4%	6.1%	1.0%	-2.0%	-4.3%	**-1.3%**
Information Technology	4.1%	-15.5%	-0.6%	9.3%	10.7%	1.0%	-5.2%	-26.1%	**-1.6%**

AS OF DECEMBER 31, 2016

Source: Brandes, MSCI. Past performance is not a guarantee of future results. Please note that all indices are unmanaged and are not available for direct investment. Performance shown is gross of investment management fees.

Wilmington Trust CIT
Return Contribution by Country (1 year)

	Portfolio			MSCI AC World Ex-US Index			Difference		
Country	Weight	Total Return (1 Year)	Contribution to Return	Weight	Total Return (1 Year)	Contribution to Return	Weight	Total Return (1 Year)	Contribution to Return
Brazil	5.5%	51.2%	3.3%	1.7%	66.2%	0.8%	+3.8%	-15.0%	**+2.5%**
South Korea	5.4%	28.7%	1.6%	3.3%	8.7%	0.3%	+2.1%	+20.0%	**+1.3%**
United Kingdom	21.7%	6.1%	1.1%	12.9%	-0.1%	-0.1%	+8.9%	+6.2%	**+1.2%**
Mexico	1.6%	49.9%	0.7%	0.8%	-9.2%	-0.1%	+0.8%	+59.1%	**+0.8%**
Spain	1.7%	35.5%	0.5%	2.2%	-1.0%	-0.1%	-0.5%	+36.5%	**+0.5%**
Italy	5.3%	1.8%	0.0%	1.5%	-10.5%	-0.2%	+3.9%	+12.3%	**+0.3%**
Ireland	1.1%	9.2%	0.2%	0.3%	-7.1%	0.0%	+0.7%	+16.2%	**+0.3%**
Japan	16.6%	3.1%	0.3%	17.0%	2.4%	0.2%	-0.4%	+0.7%	**+0.1%**
Hong Kong	1.1%	8.0%	0.1%	2.3%	2.3%	0.1%	-1.1%	+5.8%	**+0.1%**
Netherlands	2.3%	5.9%	0.1%	2.3%	4.8%	0.1%	-0.1%	+1.1%	**-0.0%**
Finland	1.4%	-1.1%	-0.1%	0.7%	-4.7%	0.0%	+0.8%	+3.6%	**-0.0%**
China	1.5%	-3.6%	0.0%	6.0%	0.9%	0.0%	-4.5%	-4.5%	**-0.1%**
Austria	1.5%	-4.4%	-0.1%	0.1%	11.3%	0.0%	+1.3%	-15.7%	**-0.1%**
Russia	1.6%	1.9%	0.0%	1.0%	54.8%	0.4%	+0.6%	-52.9%	**-0.3%**
Sweden	1.7%	-36.7%	-0.5%	2.0%	0.6%	0.0%	-0.3%	-37.3%	**-0.5%**
Switzerland	6.9%	-16.6%	-1.1%	6.1%	-4.9%	-0.4%	+0.8%	-11.7%	**-0.7%**
France	15.9%	-5.0%	-0.7%	7.2%	4.9%	0.3%	+8.7%	-9.9%	**-1.0%**
Taiwan	-	-	-	2.8%	18.5%	0.5%	-2.8%	-18.5%	**-0.5%**
Australia	-	-	-	5.2%	11.4%	0.6%	-5.2%	-11.4%	**-0.6%**
Canada	-	-	-	7.1%	24.6%	1.6%	-7.1%	-24.6%	**-1.6%**

AS OF DECEMBER 31, 2016

Source: Brandes, MSCI. Past performance is not a guarantee of future results. Please note that all indices are unmanaged and are not available for direct investment. Performance shown is gross of investment management fees.

Performance Table Relating to Rolling Three-Year Annualized Returns

MSCI EAFE Value Index versus MSCI EAFE Growth Index – Rolling Three-Year Annualized Returns

Period ending	MSCI EAFE Value Index	MSCI EAFE Growth Index
12/31/1978	19.8%	13.9%
12/31/1979	19.7%	15.4%
12/31/1980	18.7%	19.1%
12/31/1981	9.6%	5.3%
12/31/1982	8.0%	2.7%
12/31/1983	9.9%	1.8%
12/31/1984	8.8%	9.9%
12/31/1985	28.0%	27.3%
12/31/1986	41.1%	42.3%
12/31/1987	52.7%	45.9%
12/31/1988	42.1%	37.6%
12/31/1989	25.1%	17.6%
12/31/1990	5.4%	0.2%

Period ending	MSCI EAFE Value Index	MSCI EAFE Growth Index
12/31/1991	-0.3%	-3.1%
12/31/1992	-8.5%	-9.4%
12/31/1993	11.1%	7.5%
12/31/1994	11.3%	4.4%
12/31/1995	20.0%	13.4%
12/31/1996	10.4%	6.4%
12/31/1997	7.1%	5.6%
12/31/1998	9.1%	8.9%
12/31/1999	14.0%	17.3%
12/31/2000	12.3%	6.1%
12/31/2001	-0.7%	-9.7%
12/31/2002	-12.8%	-21.8%
12/31/2003	-0.1%	-5.8%

Period ending	MSCI EAFE Value Index	MSCI EAFE Growth Index
12/31/2004	15.0%	8.8%
12/31/2005	27.2%	20.2%
12/31/2006	22.6%	17.2%
12/31/2007	16.3%	17.3%
12/31/2008	-8.2%	-6.5%
12/31/2009	-7.4%	-4.8%
12/31/2010	-8.1%	-5.9%
12/31/2011	6.8%	8.5%
12/31/2012	2.2%	4.9%
12/31/2013	8.3%	8.0%
12/31/2014	11.0%	11.0%
12/31/2015	3.1%	6.8%
12/31/2016	-2.1%	-1.2%

Past performance is not a guarantee of future results. One cannot invest directly in an index.

Disclosures

The Bloomberg Barclays U.S. Aggregate Bond Index is a broad-based benchmark that measures the investment-grade, U.S. dollar-denominated, fixed-rate taxable bond market. This index is a total return index which reflects the price changes and interest of each bond in the index.

The Bloomberg Barclays U.S. Treasury Index is an unmanaged index consisting of U.S. dollar-denominated, fixed-rate, publicly issued bonds. The index is a total return index which reflects the price changes and interest of each bond in the index.

The MSCI All Country World Index with net dividends measures equity market performance of developed and emerging markets.

The MSCI All Country World ex-U.S. Index with net dividends measures equity market performance of developed and emerging markets excluding the United States. Data prior to 2001 is gross dividend and linked to the net dividend returns.

The MSCI EAFE (Europe, Australasia, Far East) Index with net dividends measures equity market performance of developed markets in Europe, Australasia, and the Far East.

The MSCI EAFE (Europe, Australasia, Far East) Growth Index with gross dividends measures equity market performance of developed markets excluding the United States and Canada. The attributes for growth index construction are long-term forward earnings per share (EPS) growth rate, short-term forward EPS growth rate, current internal growth rate, long-term historical EPS growth trend, and long-term historical sales per share growth trend.

The MSCI EAFE (Europe, Australasia, Far East) Value Index with net dividends measures equity market performance of developed markets excluding the United States and Canada. The attributes for value index construction are book value-to-price ratio, 12-months forward earnings-to-price ratio, and dividend yield.

The MSCI Emerging Markets Index with gross dividends measures equity market performance of emerging markets.

The MSCI World Index with net dividends measures equity market performance of developed markets.

The S&P 500 Index with gross dividends measures equity performance of 500 leading companies in industries of the U.S. economy.

The MSCI Japan Index with net dividends measures equity market performance in Japan.

The MSCI Europe Index with net dividends measures equity market performance of developed markets in Europe.

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Book Value: Assets minus liabilities. Also known as shareholders' equity.

Correlation: A statistical measure of how two securities move in relation to each other.

EV/Sales: Enterprise value divided by sales.

EV/EBITDA: Enterprise value divided by earnings before interest, taxes, depreciation and amortization.

Price/4-Yr Earnings: Price per share divided by average earnings per share from the last four years.

Price/Book: Price per share divided by book value per share.

Price/Cash Flow: Price per share divided by cash flow per share.

Price/Earnings: Price per share divided by earnings per share.

Price/Tangible Book Value: Price per share divided by tangible book value per share.

ROE (Return on Equity): Earnings per share divided by equity value per share

Yield: Annual income from the investment (dividend, interest, etc.) divided by the current market price of the investment.

The information provided in this material should not be considered a recommendation to purchase or sell any particular security. It should not be assumed that any security transactions, holdings, or sectors discussed were or will be profitable, or that the investment recommendations or decisions we make in the future will be profitable or will equal the investment performance discussed herein. Portfolio holdings and allocations are subject to change at any time and should not be considered a recommendation to buy or sell particular securities. Strategies discussed herein are subject to change at any time by the investment manager in its discretion due to market conditions or opportunities. Indices are unmanaged and are not available for direct investment. Market conditions may impact performance. The performance results presented were achieved in particular market conditions which may not be repeated. Moreover, the current market volatility and uncertain regulatory environment may have a negative impact on future performance. International and emerging markets investing is subject to certain risks such as currency fluctuation and social and political changes; such risks may result in greater share price volatility. Stocks of small companies usually experience more volatility than mid and large sized companies.

Unlike bonds issued or guaranteed by the U.S. government or its agencies, stocks and other bonds are not backed by the full faith and credit of the United States. Stock and bond prices will experience market fluctuations. Please note that the value of government securities and bonds in general have an inverse relationship to interest rates. Bonds carry the risk of default, or the risk that an issuer will be unable to make income or principal payment. There is no assurance that private guarantors or insurers will meet their obligations. The credit quality of the investments in the portfolio is no guarantee of the safety or stability of the portfolio. Investments in Asset Backed and Mortgage Backed Securities include additional risks that investors should be aware of such as credit risk, prepayment risk, possible illiquidity and default, as well as increased susceptibility to adverse economic developments. International and emerging markets investing is subject to certain risks such as currency fluctuation and social and political changes; such risks may result in greater share price volatility.

The foregoing reflects the thoughts and opinions of Brandes Investment Partners exclusively and is subject to change without notice.

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BRANDES INVESTMENT PARTNERS, L.P.

International Equity Annual Performance Presentation

As of December 31 Period End

Reporting Currency: USD

	Annual Performance %			Composite Characteristics					Annualized 3 Year Standard Deviation % (2)	
Period	Composite Gross*	Composite Net*	Benchmark (a)	Assets $Millions	Number of Accounts	Internal Dispersion (1)	Non-Fee Paying Accounts (%)	Total Firm Assets $ Millions	Composite Gross	Benchmark (a)
2015	-1.17	-1.70	-0.81	5,121	461	0.46	<1	20,666	13.46	12.46
2014	-4.03	-4.59	-4.90	5,458	543	0.56	<1	20,722	13.48	13.03
2013	28.70	27.95	22.78	6,654	599	0.73	<1	21,464	15.82	16.25
2012	11.25	10.59	17.32	7,695	746	0.64	<1	22,171	17.84	19.37
2011	-10.10	-10.63	-12.14	9,649	1043	0.92	<1	26,658	20.96	22.43
2010	5.62	5.00	7.75	14,820	1272	0.97	<1	38,659	25.38	26.23
2009	22.86	22.14	31.78	16,785	1604	1.91	<1	42,152	23.07	23.58
2008	-37.15	-37.53	-43.38	15,038	1765	1.24	<1	40,591	18.95	19.24
2007	8.64	8.01	11.17	29,222	2020	1.03	<1	83,242	8.87	9.43
2006	29.01	28.35	26.34	30,154	2172	1.06	<1	85,974	9.72	9.33

(1) The measure of dispersion is the asset-weighted standard deviation for annual period gross returns in USD. No measure is displayed when there are five or fewer portfolios in the composite for an entire annual period. As such, measure may not be meaningful.

(2) The three-year annualized ex-post standard deviation measures the variability of the monthly gross composite returns and the benchmark returns over the preceding 36-month period. It is not presented for periods with less than 36 monthly composite returns..

* The net and gross annual returns, calculated in USD, presented for the Brandes International Equity composite were calculated on a time-weighted and asset-weighted, total return basis, including reinvestment of all dividends, interest and income, realized and unrealized gains or losses and are net of brokerage commissions, execution costs, and any applicable foreign withholding taxes, without provision for federal and state income taxes, if any. Securities transactions are accounted for on the trade date. Dividend and interest income is accounted for on an accrual basis. Cash and cash equivalents are included in performance returns. Returns prior to 4/1/06 reflect the deduction of administrative fees. Returns for some accounts in the composite reflect the deduction of a broker fee that includes transaction costs and may include advisory, custody, and other administrative fees.

As of 9/30/2013, Brandes Investment Partners includes the non-SMA Division of Brandes Investment Partners L.P., Brandes Investment Partners (Europe) Limited, Brandes Investment Partners (Asia) Pte Ltd and the Brandes Investment Partners & Co. assets sub-advised by Brandes Investment Partners, L.P. The firm was redefined to reflect the expansion of the organization. As of 1/1/2006, Brandes Investment Partners was divided into two separate divisions: the SMA Division of Brandes Investment Partners, which acts as a discretionary manager to SMA or "wrap fee" program clients, including those who may invest in an SMA product; and the non-SMA Division of Brandes Investment Partners (Brandes), which acts as a discretionary manager for all other types of clients which may include pooled investment vehicles, institutional accounts and high net worth clients outside of wrap fee programs. Although the divisions may share portfolio management and other personnel, each division serves a particular target market, may trade in a different manner and may offer investment advice which differs from the other depending upon the individualized needs of the clients served. The performance data presented does not contain any SMA Division accounts.

This composite was created in 1990.

Prior to April 2014 accounts were removed from the composite when an account's market value falls below US$50,000 due to capital withdrawals.

The Brandes International Equity Composite seeks to achieve long-term capital appreciation by investing primarily in the equity securities of non-U.S. issuers whose equity market capitalizations exceed $5 billion at the time of purchase. Generally, no more than 30% of the composite total assets, measured at the time of purchase, may be invested in securities of companies located in emerging and frontier countries throughout the world.

The Brandes International Equity composite results include all actual, fee-paying and non-fee-paying, fully discretionary International Equity accounts under management by Brandes Investment Partners after one full calendar month beginning 6/30/1990 (except for the Brandes International Equity pooled account which was fully invested at its inception), that have substantially the same investment objectives, policies, techniques and restrictions.

The 2015 composite performance after management fee return was calculated using actual fees. From 2007-2014 composite performance after management fee returns were determined by reducing the gross of fee returns monthly by the highest applicable fee schedule per account. Prior to 2007 composite performance after management fee returns were calculated using actual fees. The composite may include accounts with performance-based fees.

Standard fee schedule - From $100,000 but less than $10 million: First $5 million 1.00%; Next $5 million 0.90%; From $10 million and over: First $25 million 0.75%; Next $25 million 0.60%; Next $50 million 0.50%; Next $50 million 0.45%; Amounts over $150 million 0.40%. Brandes' investment advisory fees are detailed in Part 2A of its Form ADV.

Brandes claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. Brandes has been independently verified for the annual periods 1995 through 2015. 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 International Equity composite has been examined for the periods since inception through year end 2015. The verification and performance examination reports are available upon request.

The complete list and description of Brandes' composites and additional information regarding policies for valuing portfolios, calculating performance and preparing compliant presentations are available upon request. Contact client service at 800-237-7119 or write 11988 El Camino Real, Suite 600, P.O. Box 919048, San Diego, California 92191-9048 or email ClientService@Brandes.com.

Investors should not rely on prior performance results as a reliable indication of future results.

(a) The MSCI EAFE (Europe, Australasia, Far East) Index with net dividends measures the equity market performance of developed markets in Europe, Australasia, and the Far East. MSCI has not approved, reviewed or produced this report, makes no express or implied warranties or representations and is not liable whatsoever for any data in the report. You may not redistribute the MSCI data or use it as a basis for other indices or investment products. The benchmark returns are not covered by the report of independent verifiers.

Alaska Retirement Management Board

ARMB Benchmarks and Asset Classes

Bob Mitchell, CFA
Anchorage, Alaska
April 20-21, 2017

ARMB Asset Classes and Benchmarks

Objectives of Benchmark Review

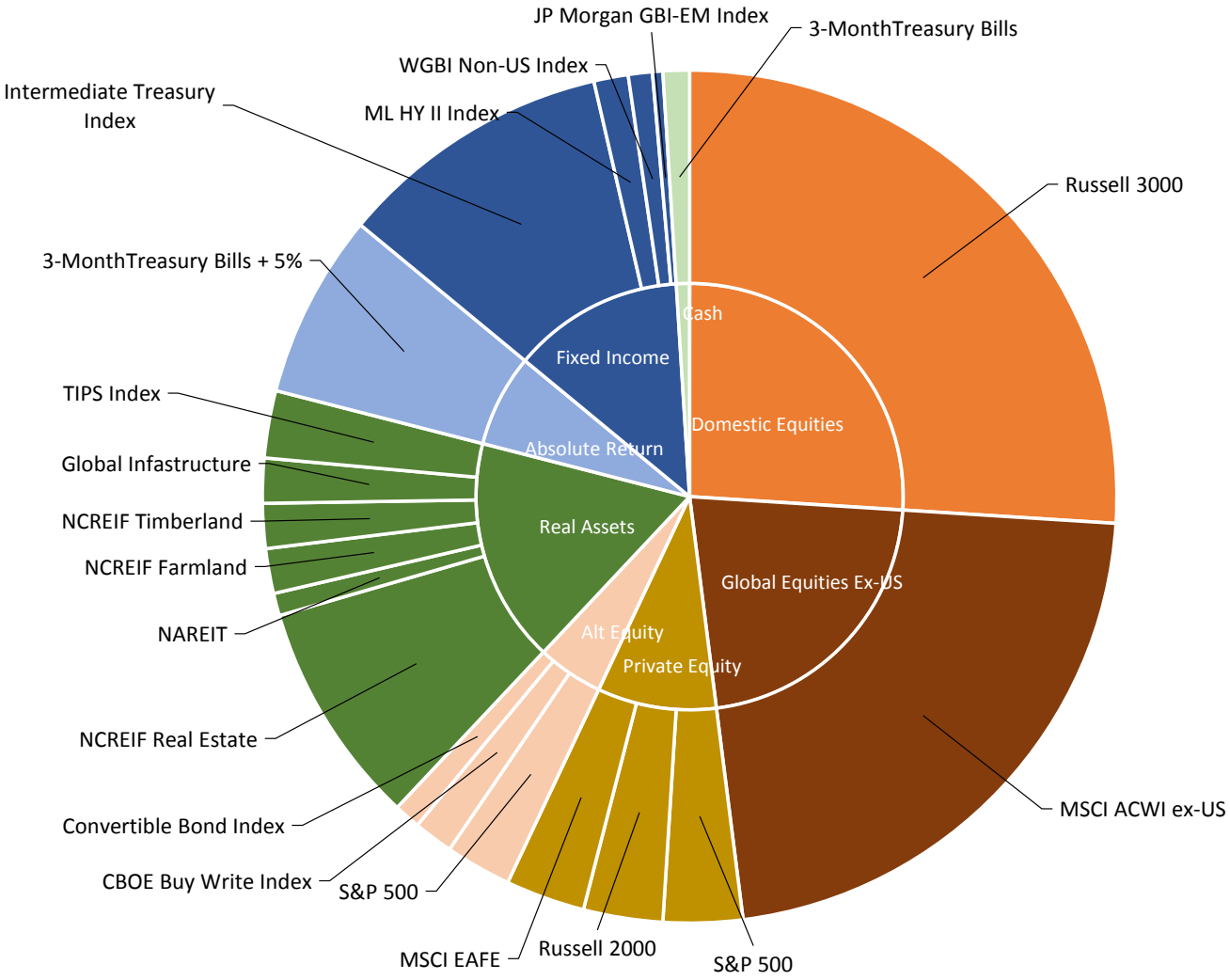
- Identify and address data lag issues in private market asset classes.
- Improve the degree to which the benchmark represents the opportunity set.
- Identify components that may not be sufficiently flexible to accommodate changes in investment structure over time.

ARMB Benchmarks and Asset Classes

Summary Recommendations

- Expand Global Equity Ex-US benchmark to include international small cap.
- Change Absolute Return policy benchmark to HFRI Fund-of-Funds Composite Index.
- Remove reporting lag for all private market investments in final Callan performance report.
- Retask Alternative Equity as "Opportunistic." Change benchmark to 60% Russell 1000 / 40% Aggregate. Move equity yield strategy to Domestic Large Cap. Move large cap low volatility strategies to Opportunistic.
- Change fixed income benchmark to 100% Intermediate Treasury Index. Move non-Treasury strategies to Opportunistic.
- Change Real Assets policy benchmark to match long-term benchmark mixes.

ARMB Benchmarks and Asset Classes

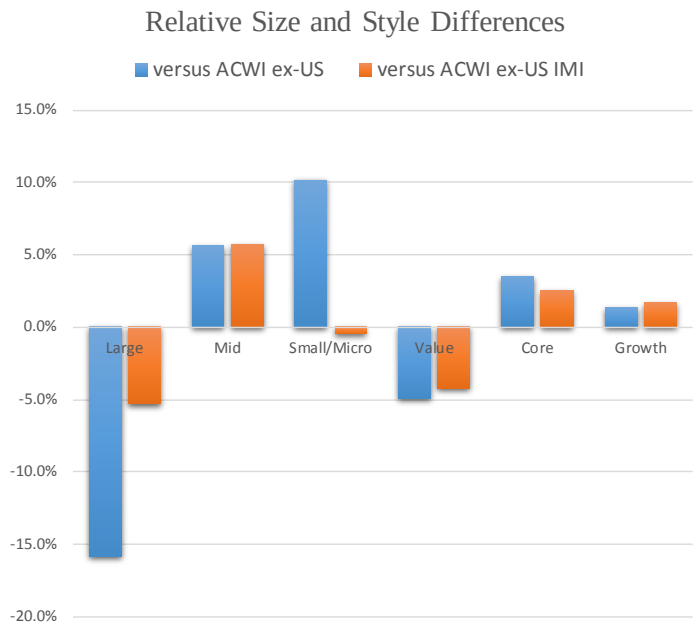


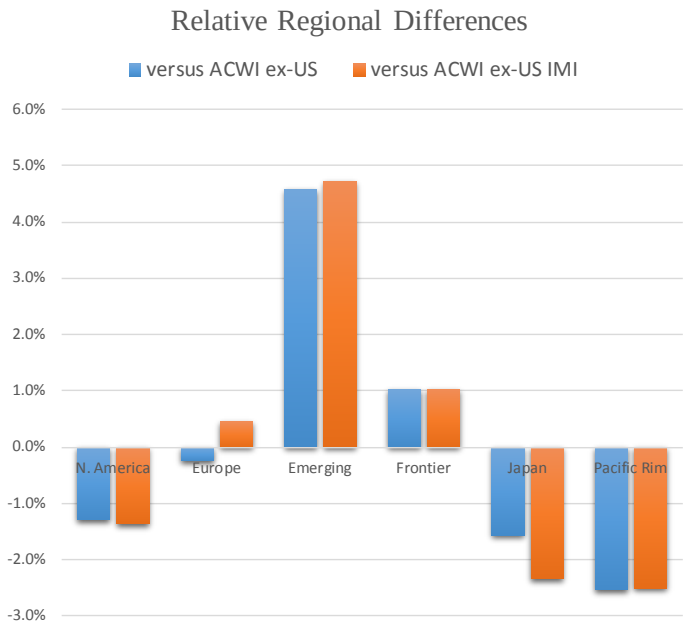
ARMB Benchmarks and Asset Classes

Global Equities ex-US

- Description – non-U.S., publicly-traded equity securities.
- Policy Benchmark – MSCI ACWI ex-U.S.
  - The MSCI ACWI ex-U.S. Index captures large and mid cap representation across 22 of 23 Developed Markets countries (excluding the US) and 23 Emerging Markets countries.
- Issues Identified:
  - ACWI ex-U.S. Investable Market Index benchmark is more representative of investment mix.

- Recommended Action:
  - Change benchmark to MSCI ACWI ex-U.S. Investable Market Index Net.

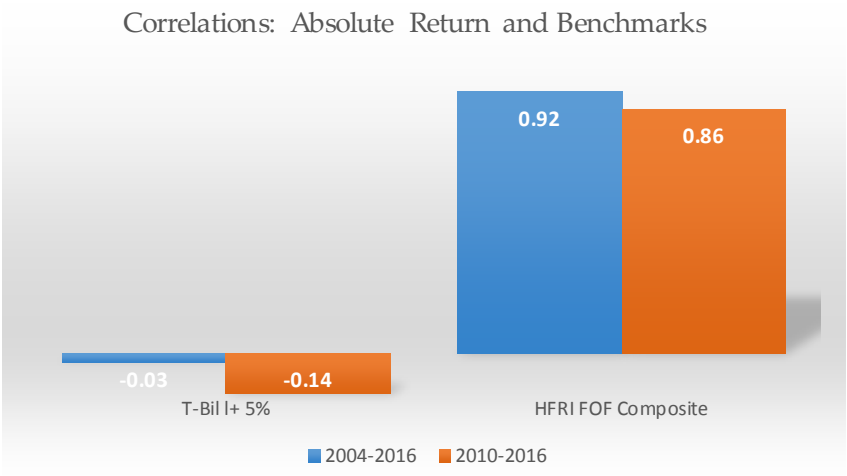


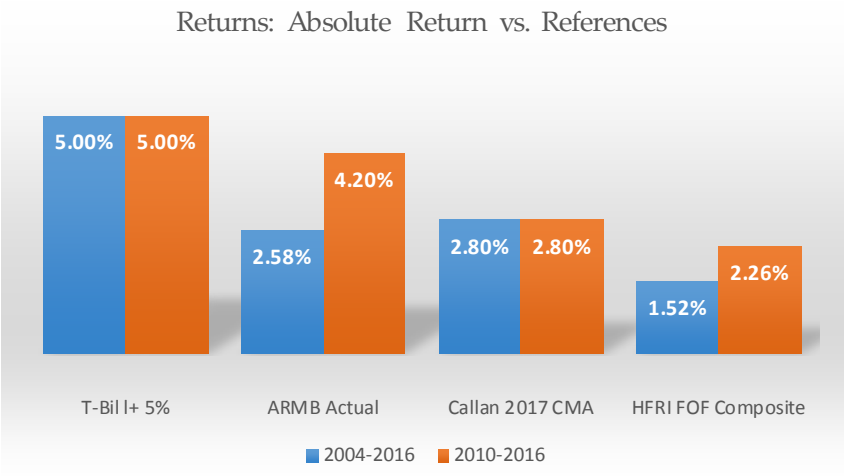


ARMB Benchmarks and Asset Classes

Absolute Return

- Description – diversified hedge fund strategies that aim to provide returns uncorrelated with traditional asset classes.
- Policy Benchmark – 3-month Treasury Bill + 5%.
- Issues Identified:
  - The policy benchmark is not investable.
  - Benchmark returns are not correlated with the investment set – attribution differences are noise.
  - The absolute level of policy benchmark investment return is high for the level of risk.
  - The returns have a reporting lag of one month.
- Recommended Actions:
  - Adopt the HFRI Fund of Funds Composite Index to better reflect the opportunity set in the asset class and the embedded risk exposures.
  - Remove reporting lag in final Callan performance report.

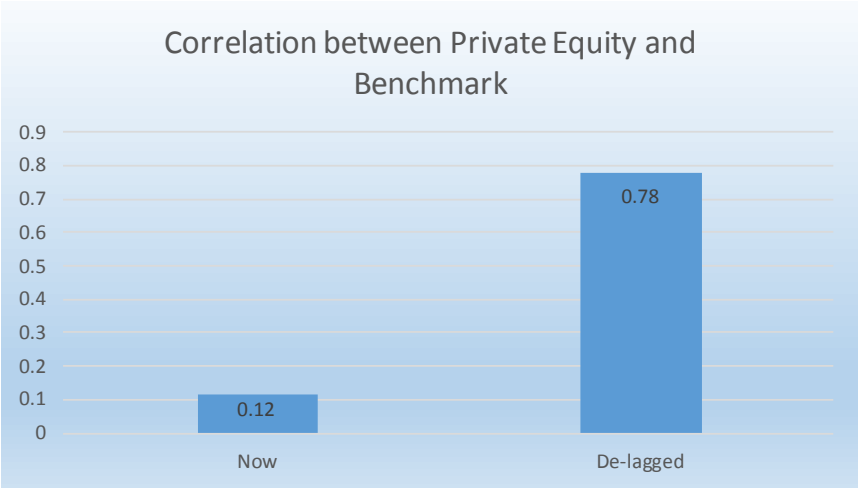


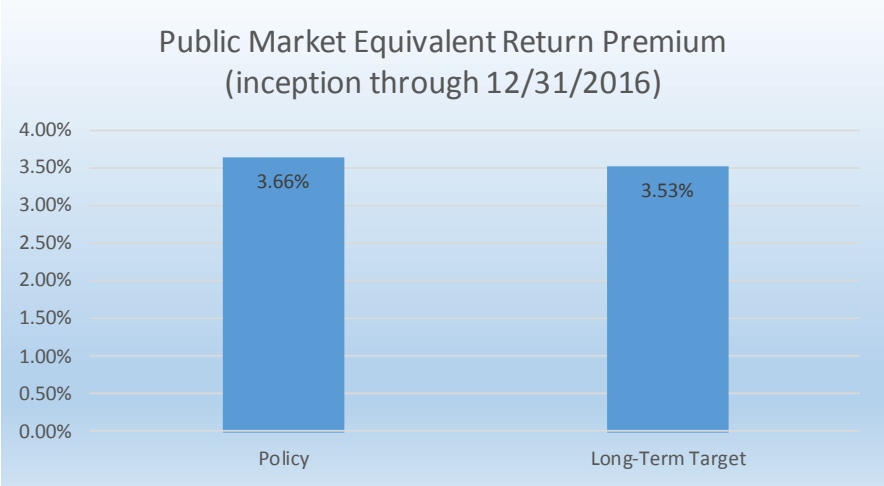


ARMB Benchmarks and Asset Classes

Private Equity

- Description – generally, unregistered equity investments in private companies.
- Policy Benchmark – 1/3 S&P 500, 1/3 Russell 2000, 1/3 MSCI EAFE
- Issues Identified:
  - Asset class returns have a roughly one-quarter reporting lag.
- Recommended Action:
  - Remove reporting lag in final Callan performance report.
- Additional note:
  - Incorporate a roughly 150 basis points adjustment to Callan's capital market return assumptions.

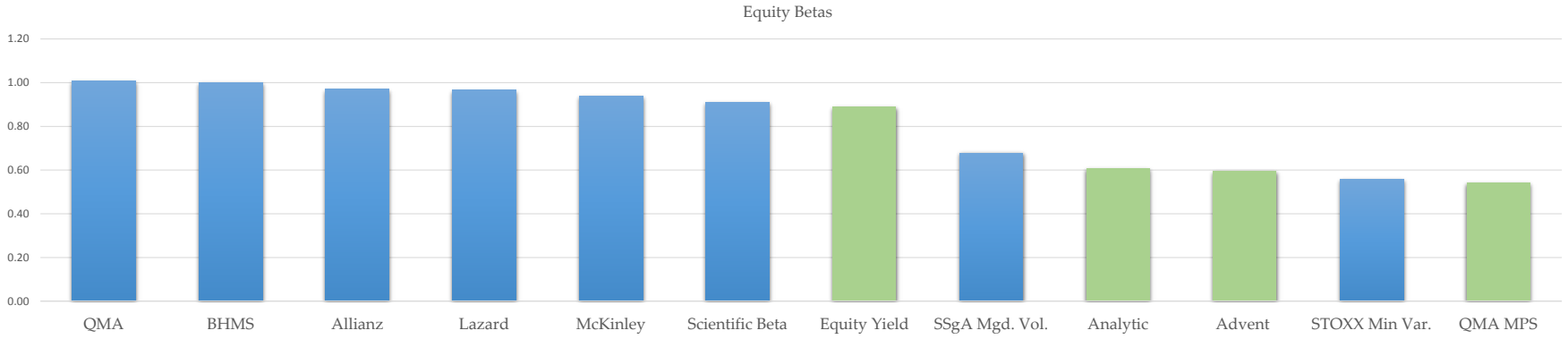




ARMB Benchmarks and Asset Classes

Alternative Equity

- Description – contains strategies that have a primary emphasis on diversification to lower risk, including equity yield (29%), buy-write (31%), QMA Market Participation Strategy (20%) and convertible bonds (20%).
- Policy Benchmark – 50% S&P 500 Index, 30% CBOE Buy-Write Index, 20% BofA Merrill Lynch Yield Alternative Convertibles Index.
- Issues Identified:
  - Equity yield strategy is less defensive than other Alternative Equity strategies; managed and minimum volatility strategies are more defensive than other Domestic Equity strategies.
  - Benchmarks are highly attuned to the existing set of investments. A more generalized benchmark would create more flexibility in the underlying set of investments over time while also facilitating the understanding of the role the asset class plays in the broader portfolio.
- Recommended Actions:
  - Change benchmark to 60% Russell 1000 / 40% Aggregate.
  - Change name to "Opportunistic." Change purpose to, "Contains securities and strategies with performance characteristics similar to a blend of stocks and bonds."
  - Move equity yield strategy into Domestic Equity asset class; move low volatility strategies to Opportunistic.

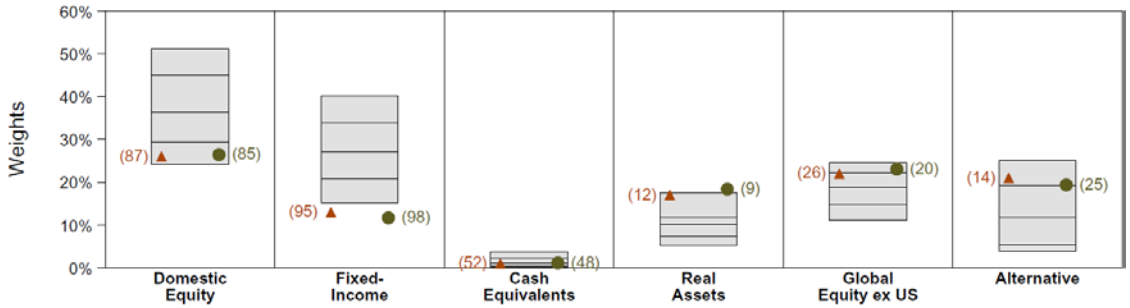


ARMB Benchmarks and Asset Classes

Fixed Income

- Description – domestic and international fixed income securities.
- Purpose – dampen volatility and maintain a high level of liquidity for the broader portfolio.
- Policy Benchmark – 80% Intermediate Treasury Index, 10% BofA Merrill Lynch High Yield Master II Constrained Index, 7% WGBI Non-US, 3% JPM GBI-EM Global.
- Issues Identified:
  - Non-Treasury securities tend to be correlated to equity market performance, particularly during periods of stress.
  - Non-Treasury securities are less liquid than U.S. Treasuries.
- Recommended Actions:
  - Convert benchmark to 100% Intermediate Treasury Index.
  - Move non-Treasury strategies (e.g. high yield, international debt, taxable municipal securities) into Opportunistic asset class.

Asset Class Weights vs CAI Public Fund Sponsor Database



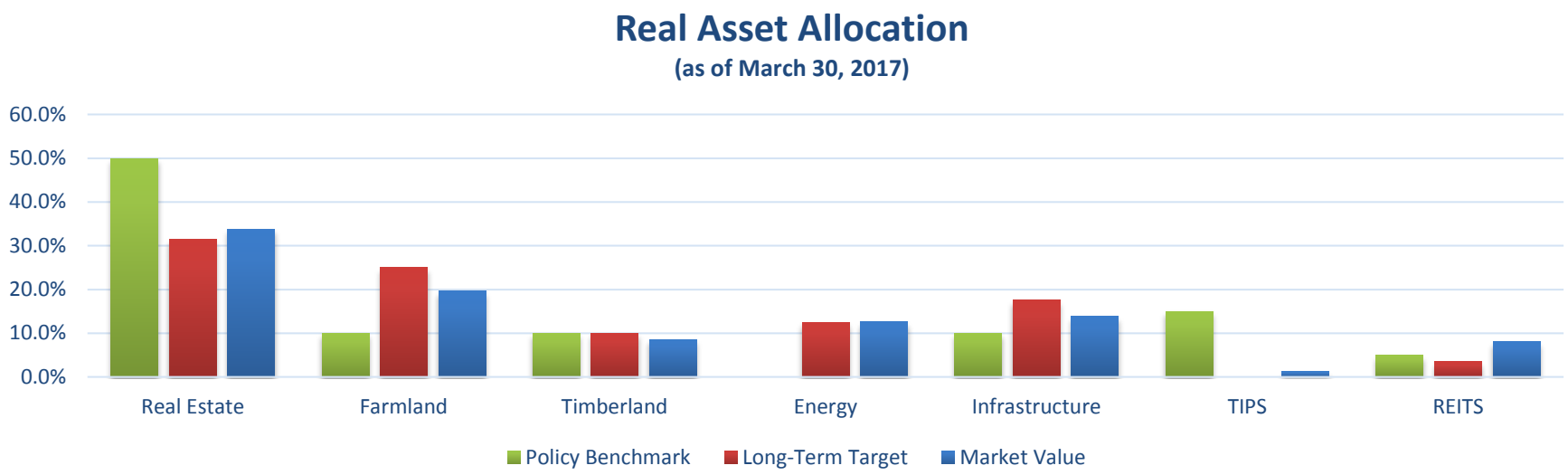
	Domestic Equity	Fixed-Income	Cash Equivalents	Real Assets	Global Equity ex US	Alternative
10th Percentile	51.17	40.27	3.68	17.61	24.59	25.09
25th Percentile	45.05	34.00	2.19	11.77	22.16	19.20
Median	36.38	27.15	1.07	10.21	18.85	11.76
75th Percentile	29.33	20.93	0.36	7.40	14.81	5.35
90th Percentile	24.18	15.14	0.14	5.23	11.14	3.87
Fund ●	26.43	11.69	1.12	18.37	23.02	19.37
Target ▲	26.00	13.00	1.00	17.00	22.00	21.00
% Group Invested	98.88%	97.75%	69.10%	62.92%	97.75%	49.16%

ARMB Benchmarks and Asset Classes

Real Assets

Description – composed primarily of unlisted, illiquid assets expected to generate attractive returns while providing diversification and inflation hedging.

- Policy Benchmark – 50% NCREIF Total Index, 15% BB Barclays US TIPS Index, 10% NCREIF Farmland Index, 10% NCREIF Timberland Index, 10% Global Infrastructure, 5% FTSE NAREIT All Equity Index.
- Long-Term Benchmarks – CPI + 500 basis points; 35% real estate, 25% farmland, 15% timberland, 12.5% infrastructure, 12.5% energy, 0% TIPS.
- Issues Identified:
  - The policy and long-term benchmarks have different weights.
  - Long-term benchmark indices are not specified.
- Recommended Actions:
  - Policy Benchmark: reweight component indices to be consistent with the long-term benchmark.

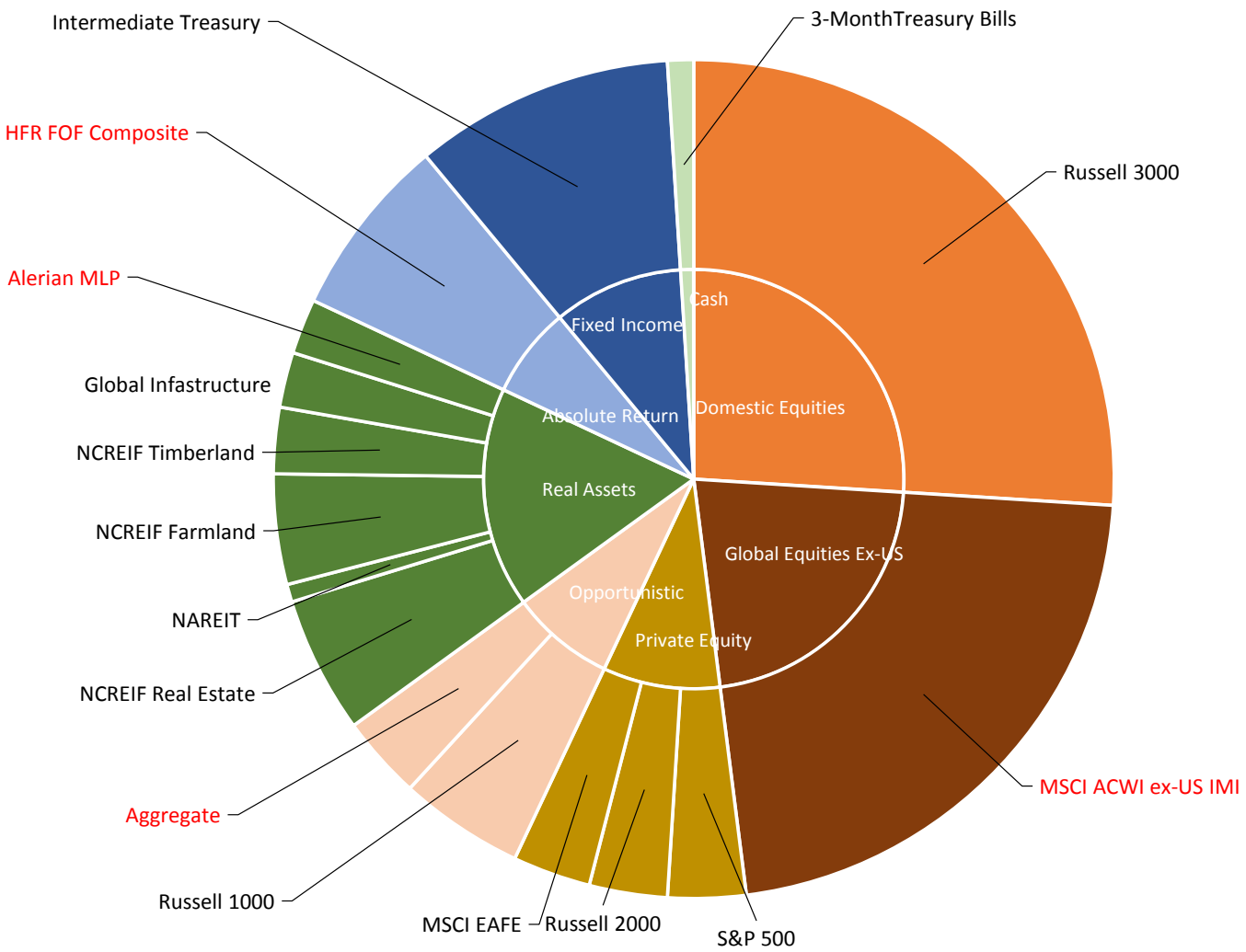


ARMB Benchmarks and Asset Classes

Mapping Asset Classes

Existing	Proposed		
Domestic Large Cap	**Domestic Large Cap**	**Opportunistic**	**Fixed Income**
Allianz Global Investors	Allianz Global Investors		
Lazard Asset Management	Lazard Asset Management		
McKinley Capital	McKinley Capital		
Barrow, Hanley, Mewhinney & Strauss	Barrow, Hanley, Mewhinney & Strauss		
Quantitative Management Associates	Quantitative Management Associates		
SSgA Russell 1000 Growth	SSgA Russell 1000 Growth		
SSgA Russell 1000 Value	SSgA Russell 1000 Value		
SSGA Large Cap Managed Volatility		SSGA Large Cap Managed Volatility	
SSgA Russell 200	SSgA Russell 200		
STOXX Minimum Variance		STOXX Minimum Variance	
Scientific Beta	Scientific Beta		
Portable Alpha	Portable Alpha		
Alternative Equity			
ARMB Equity Yield Strategy	ARMB Equity Yield Strategy		
Quantitative Management Associates MPS		Quantitative Management Associates MPS	
Analytic Buy-Write		Analytic Buy-Write	
Advent Capital		Advent Capital	
Fixed Income			
US Treasury Fixed Income Pool			US Treasury Fixed Income Pool
Western Asset Management Co		Western Asset Management Co	
Guggenheim Partners, LLC		Guggenheim Partners, LLC	
MacKay Shields, LLC		MacKay Shields, LLC	
Fidelity Real Estate High Income		Fidelity Real Estate High Income	
Columbia Threadneedle		Columbia Threadneedle	
Eaton Vance High Yield		Eaton Vance High Yield	
Mondrian Investment Partners, Inc.		Mondrian Investment Partners, Inc.	
Fidelity Tactical Bond		Fidelity Tactical Bond	
Schroders ILC		Schroders ILC	
Lazard Emerging Income		Lazard Emerging Income	

ARMB Benchmarks and Asset Classes



ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Investment Advisory Council Member Contract Expiration

DATE: April 21, 2017

ACTION: X

INFORMATION: _____

BACKGROUND:

AS 37.10.270 provides that the Alaska Retirement Management Board (Board) may appoint an investment advisory council (IAC) composed of at least three and not more than five members. Members shall possess experience and expertise in financial investments and management of investment portfolios for public, corporate, or union pension benefit funds, foundations or endowments. Currently, three IAC members are under contract to provide advisory services to the board and its staff. The three advisory positions are designated by areas of expertise: an academic advisor, an advisor with experience as trustee/manager of a public fund or endowment, and an advisor with experience as a portfolio manager. IAC members currently attend Board meetings, an annual manager review meeting, and the annual education conference.

STATUS:

Dr. William Jennings holds the seat designated for the academic advisor. Dr. Jennings has been an IAC member for ASPIB and the Board since 2003. Dr. Jennings was the successful applicant in a search conducted in early 2014, and was appointed to a three-year term that expires June 30, 2017.

RECOMMENDATION:

That the Board reappoint Dr. Jennings to a three-year term on the Investment Advisory Council beginning July 1, 2017 and ending June 30. 2020.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: S&P 500 Equal-Weighted Portfolio

ACTION: X

DATE: April 21, 2017

INFORMATION: _____

BACKGROUND:

Equal-weighted (EW) portfolios have historically outperformed market value-weighted portfolios. Studies suggest that EW portfolios benefit approximately equally from greater risk exposures to smaller companies and value stocks than their market-capitalization weighted counterparts, and from the short-term reversal in share price movements over a one-month horizon.

An EW portfolio, as the name suggests, is one in which each constituent comprises an equal percentage of the overall portfolio. This is in contrast to traditional market value-weighted portfolios, like the S&P 500, where constituents are held in proportion to their total market capitalization (number of shares * price per share).

Passive approaches, such as EW index strategies, are well suited for low cost internal equity management by Department of Revenue staff. Staff has been managing equity portfolios since 2004 and currently manages five equity portfolios for ARMB totaling approximately $1.2 billion.

STATUS:

EW portfolios provide an opportunity to further diversify and bolster the existing set of internally-managed strategies in the ARMB's equity portfolio. Specifically, EW portfolios have demonstrated the following characteristics:

- EW portfolios tend to have higher standard deviations and sensitivity to equity market movement. This is in contrast to existing internally-managed strategies, which have lower standard deviations and lower equity sensitivities.

- EW portfolios provide exposure to short-term price reversals, and broader diversification from idiosyncratic risks.

These attributes would serve to complement the existing set of internally managed equity strategies, thereby smoothing out the relative performance of these strategies when combined together in the ARMB's domestic large cap equity portfolio. Below is the correlation of excess returns of the internally managed strategies and an equal-weighted S&P 500, relative to the S&P 500 over 10 years of monthly returns ending December 31, 2016.

	Div. Yield	*Equal Weight*	*Multi-Beta*
Div. Yield	1.00		
Equal Weight	-0.23	1.00	
Multi-Beta	0.13	0.07	1.00

RECOMMENDATION:

The Alaska Retirement Management Board authorize staff to make an initial investment of up to $100 million in an internally managed S&P 500 equal-weighted portfolio.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Scientific Beta Multi-Beta Multi-Strategy Equal-Weighted Developed Ex-US Strategy	ACTION:	X
DATE:	April 21, 2017	INFORMATION:	

BACKGROUND:

Factors can be thought of as characteristics of a group of securities that are important in explaining their return and risk. A large body of academic research spanning several decades suggests that long term equity portfolio performance can be explained by factors, also known as betas or risk premia.

Certain equity factors have historically earned a long-term risk premium, including high book/market value, small market capitalization, low price volatility and price momentum. Until recent years, active managers were best positioned to seek these risk premia. Transparent, rules-based indices have become available over the last decade, providing the potential to outperform market capitalization-weighted indices at costs below traditional active management.

Scientific Beta has created a set of global indices that attempt to provide exposure to historically-rewarded risk factors in a diversified manner. Indices have also been created that seek exposure to multiple factors in an attempt to achieve more consistent relative outperformance.

The Alaska Retirement Management Board authorized staff to internally manage a domestic equity strategy benchmarked to Scientific Beta's U.S. multi-beta multi-strategy equal-weighted index in June 2016. Staff concluded contract negotiations and has implemented this strategy.

STATUS:

Scientific Beta has a similar index focused on international equity securities located in developed markets excluding the U.S.

RECOMMENDATION:

Authorize staff to broaden its contract with Scientific Beta to receive the constituents of the Developed ex-USA Multi-Beta Multi-Strategy index and to initially invest up to $200 million in an international equity strategy reflecting this approach benchmarked against the MSCI World index.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Move SSgA Russell 2000 Growth and SSgA Russell 2000 Value Index to S&P 600

ACTION: X

DATE: April 21, 2017

INFORMATION: _____

BACKGROUND:

The Alaska Retirement Management Board's (ARMB) passively managed small cap investments include the Russell 2000 Growth Index, Russell 2000 Value Index, and the S&P Small Cap 600 Index. State Street Global Advisors (SSgA) has managed the Russell 2000 Growth and Value portfolios for the ARMB since 2007.

On June 24, 2016, the ARMB approved the funding of the internally managed S&P Small Cap 600 Index with the objectives of lowering the aggregate management fee, further developing staff capabilities, and managing Alaskan assets in Alaska. This portfolio was subsequently funded with an initial investment of $75 million on November 17, 2016.

STATUS:

As of December 31, 2016, the SSgA Russell 2000 Growth and SSgA Russell 2000 Value investments had a combined market value of $58.9 million compared to the internally managed S&P Small Cap 600 market value of $78.7 million.

Index returns for the period ending December 31, 2016 are as follows:

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
S&P Small Cap 600	11.13	26.56	9.47	16.62	9.03
Russell 2000 Growth	3.57	11.32	5.05	13.74	7.76
Russell 2000 Value	14.07	31.74	8.31	15.07	6.26

Given the relatively small investments in the Russell 2000 Growth and Value portfolios and staff's favorable view of the S&P Small Cap 600, a consolidation would help reduce the number of investment accounts, further increase ARMB's internally managed portfolios, and simplify rebalancing decisions.

RECOMMENDATION:

The Alaska Retirement Management Board direct staff to move the SSgA Russell 2000 Growth Index and SSgA Russell 2000 Value Index investments into the internally managed S&P Small Cap 600 Index.

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

To: ARMB Trustees
From: Judy Hall
Date: April 7, 2017
Subject: Financial Disclosures

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

Name	Position Title	Disclosure Type	Disclosure Date
Scott Jones	Comptroller	Equities	2/23/17 3/20/17

Alaska Retirement Management Board
2017 Meeting Calendar

April 19 – Wednesday	Committee Meetings: Actuarial Committee
April 20-21 Thursday-Friday Anchorage	*Adopt Asset Allocation *Performance Measurement – 4th Quarter *Buck Consulting Actuary Report *GRS Actuary Certification *Review Private Equity Annual Plan *Manager Presentations
June 21 – Wednesday	Committee Meetings: Actuarial Audit Defined Contribution
June 22-23 Friday Anchorage	*Final Actuary Report/Adopt Valuation *Performance Measurement – 1st Quarter *Manager Presentations
October 4 – Wednesday	Committee Meetings: Actuarial Audit Budget Defined Contribution
October 5-6 Thursday-Friday Anchorage	*Audit Results/Assets – KPMG *Approve Budget *Performance Measurement – 2nd Quarter *Real Estate Annual Plan *Real Estate Evaluation – Townsend Group *Manager Presentations
November ____	Audit Committee
November 9-10 New York City	Education Conference
December 6 – Wednesday	Committee Meetings: Actuarial Audit
December 7-8 Thursday-Friday Anchorage	Audit Report - KPMG Performance Measurement – 3rd Quarter Manager Review (Questionnaire) Private Equity Review *Manager Presentations