ALASKA RETIREMENT MANAGEMENT BOARD

JUNE 22-23, 2017

BOARD OF TRUSTEES MEETING

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

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

THURSDAY, JUNE 22, 2017

I. **9:00 am** **Call to Order**

II. **Roll Call**

III. **Public Meeting Notice**

IV. **Approval of Agenda**

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

VI. **Approval of Minutes – April 20-21, 2017**

VII. **9:10** **Staff Reports**

1. Retirement & Benefits Division Report
   A. Conduent Consulting Invoices (informational)
   B. Membership Statistics
   C. DRB Update
   Ajay Desai, Director, DRB
   Kevin Worley, Chief Financial Officer, DRB

2. Treasury Division Report
   Pamela Leary, Director, Treasury Division

3. Calendar/Disclosure
   Stephanie Alexander, Liaison Officer

4. CIO Report
   Bob Mitchell, Chief Investment Officer

5. Fund Financial Presentation
   Scott Jones, Comptroller, DOR
   Kevin Worley, CFO, Division of Retirement & Benefits

VIII. **9:20** **Trustee Reports**

6. Chair Report, *Gail Schubert*

7. Committee Reports
   A. Audit Committee, *Rob Johnson, Chair*
   B. Actuarial Committee, *Kris Erchinger, Chair*

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

9:30-10:00 9. Cyber-Security Report
Ajay Desai, Director, DRB
Scott Jones, Comptroller, DOR

10:05-10:20 10. Actuarial Review/Acceptance-Certification of
FY2016 Review Reports and Valuations
Kris Erchinger, Chair, Actuarial Committee

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

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

10:20AM – 10 MINUTE BREAK

10:30-11:10 11. Asset Allocation Review and Approval
Bob Mitchell, Chief Investment Officer

Adopt Asset Allocation:
Resolution 2017-03:
DB PERS/TRS/JRS
PERS/TRS/JRS Retiree Health Trusts
Retiree Major Medical HRAP/ODD

Resolution 2017-04: DB NGNMRS

11:15-12:00 12. Performance Measurement – 1st Quarter
Paul Erlendson, Callan Associates, Inc

LUNCH – 12:00PM - 1:15PM

1:15-2:00	13.	Alternative Beta *Eugene Podkaminer, Callan Associates Inc.*
2:05	14.	Alternative Beta Manager Search *Bob Mitchell, Chief Investment Officer*
2:10-2:40		A. J.P. Morgan Systematic Alpha
2:45-3:15		B. Man Alternative Risk Premia

3:15PM – 10 MINUTE BREAK

3:25-4:05	15.	Legal Framework for Trustees *Stuart Goering, Assistant Attorney General*

FRIDAY, JUNE 23, 2017

9:00-9:30 16. Emerging Market Value Strategy
Kelly Carbone and Marc Miller, DePrince, Race & Zollo

9:35-10:15 17. Crestline Investors
Doug Bratton, Keith Williams and James Delaune

10:15AM – 10 MINUTE BREAK

10:25-12:00 18. TIR Update – Executive Session

LUNCH – 12:00PM - 1:15PM

1:15 TIR Update – Executive Session (Continuation)

19. Investment Actions
    - A. Callan Contract Option
    - B. Townsend Contract Option
    - C. Crestline Investors Mandate
    - D. DRZ Emerging Market Mandate
    - E. Alternative Beta Manager Selection

    Bob Mitchell, Chief Investment Officer

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

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

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
MEETING

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

MINUTES OF
April 20-21, 2017

Thursday, April 20, 2017

CALL TO ORDER

CHAIR GAIL SCHUBERT called the meeting of the Alaska Retirement Management Board (ARMB) to order at 9:03 a.m.

ROLL CALL

Eight 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
Commissioner Sheldon Fisher
Commissioner Randall Hoffbeck - arrived late
Tom Brice
Norman West
Bob Williams

Board Members Absent
None

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

Investment Advisory Council Members Absent
None

Department of Revenue Staff Present
Jerry Burnett, Deputy Commissioner
Bob Mitchell, Acting Chief Investment Officer
Scott Jones, State Comptroller
Zachary Hanna, State Investment Officer
Pamela Leary, Director, Treasury Division
Judy Hall, Board Liaison
Stephanie Alexander, Board Liaison

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

Consultants, Invited Participants, and Others Present
Chris Dunne, ArrowMark Partners
Brian Schaub, ArrowMark Partners
Glenn Carlson, Brandes Investment Partners
Jeffrey Germain, Brandes Investment Partners
Lawrence Taylor, Brandes Investment Partners
Steven Center, Callan Associates, Inc.
Melissa Bissett, Conduent
David Kershner, Conduent
Larry Langer, Conduent
Stuart Goering, Department of Law, Assistant Attorney General
Leslie Thompson, Gabriel Roeder Smith
Paul Wood, Gabriel Roeder Smith
Ardra Belitz, Lazard Asset Management
Tony Dote, Lazard Asset Management
Tom Johnson, TIR
Chris Mathis, TIR
Mark Seaman, TIR
Chris Dyer, T.Rowe Price
Sudhir Nanda, T.Rowe Price
John Plowright, T.Rowe Price

PUBLIC MEETING NOTICE

JUDY HALL, Board Liaison, confirmed public meeting notice requirements had been met.

APPROVAL OF AGENDA

A motion was made to approve the agenda. The motion was seconded.

VICE-CHAIR JOHNSON corrected an error in the minutes of March 2 - 3, 2017, page 17, noting the words "Their PDA" should read "RPEA".

There was no objection to the approval of the agenda.

PUBLIC/MEMBER PARTICIPATION, COMMUNICATIONS, AND APPEARANCES
None

APPROVAL OF MINUTES: March 2 - 3, 2017

MRS. HARBO moved to approve the minutes of the March 2 - 3, 2017 meeting. MR. WILLIAMS seconded the motion.

The minutes were approved without objection.

REPORTS

1. CHAIR REPORT

CHAIR SCHUBERT congratulated MR. WILLIAMS on the recent announcement of being the first Alaskan inducted to the National Teachers' Hall of Fame.

CHAIR SCHUBERT requested Treasury Division Director PAMELA LEARY introduce the new Board Liaison. MS. LEARY informed MS. HALL will be retiring May 15th, and introduced her replacement, STEPHANIE ALEXANDER, who currently is the Special Assistant to COMMISSIONER HOFFBECK. MS. LEARY gave a description of her background and expressed gratitude for her transition into the Treasury Division.

2. COMMITTEE REPORTS

A. Actuarial Committee

MS. ERCHINGER reported the Actuarial Committee met the day before the Board meeting and focused primarily on the preparation for the upcoming experience analysis. MS. ERCHINGER noted the Committee has been in existence approximately one year and has made great progress in reducing the initial 16 pages of individual audit items down to three outstanding items.

MS. ERCHINGER acknowledged the positive collaboration efforts between the actuaries Conduent and Gabriel Roeder Smith (GRS) in resolving issues, thus enhancing the Committee's effectiveness. The Committee will be conducting a deeper review over the next year on the various actuarial assumptions, including the investment return assumption and the inflation assumption. MS. ERCHINGER informed the use of retiree healthcare proxy data has been replaced with actual retiree demographic data. MS. ERCHINGER expressed appreciation to the members of the Committee for their endeavors.

CHAIR SCHUBERT expressed appreciation to MS. ERCHINGER.

B. Evaluation Committee

None

3. TIR - PORTFOLIO UPDATE
EXECUTIVE SESSION: 9:12 a.m.

VICE-CHAIR JOHNSON moved to go into executive session to discuss matters, the identification of which would impact potential competitiveness and raise confidentiality issues regarding a potential investment. MS. ERCHINGER seconded the motion.

The motion passed unanimously.

CHAIR SCHUBERT called the meeting back to order at 11:47 a.m. and advised staff to move forward as discussed and to increase the budget for this project from $5 million to $6 million.

4. LAZARD ASSET MANAGEMENT

CHAIR SCHUBERT introduced Marketing Representative TONY DOTE and Portfolio Manager ARDRA BELITZ, who gave the presentation on the Emerging Income Strategy. MR. DOTE reported the strategy has been in place for 21 years and focuses on sources of return from income and currency. Prior to 2013, the strategy was very predictable, generating returns between 4% and mid-teens. MR. DOTE explained the environment changed and the currency markets sold off in 2013, 2014, and 2015. The portfolio was managed as conservatively as possible, with up to 50% of the portfolio in cash, but incurred negative returns and underperformed the benchmark during this anomalous period. MR. DOTE reviewed the 2008 since-inception audited returns of the portfolio at 31 basis points versus the Libor index at 64 basis points.

MR. DOTE noted improvement over the last five quarters and through close of business yesterday, the portfolio is up 4.7% and Libor is up 23 basis points The portfolio is now fully invested. He believes this setting will continue because the currency markets are under-priced. The strategy is uncorrelated with global fixed income instruments, and provides return pick-up, return enhancement, liquidity, and diversification within the portfolio.

MS. BELITZ continued the presentation describing the investment process which utilizes frontier market opportunities within a 55-country universe to provide alpha and geographic diversification. Macroeconomic indicators and the balance of payment pressures are considered to allocate the capital for the highest prospective of return per unit of risk. MS. BELITZ reviewed the portfolio's holdings as of quarter-end; duration currently stands at 1.5 years, the yield is up to 6.5%, and diversification is extraordinarily broad.

MS. BELITZ is encouraged by the recovery in performance over the recent five quarters and expects the performance opportunities to continue. The portfolio is well-positioned to take advantage of the risk premia in local currency debt asset markets supported by the stabilization of the global macroeconomic data. MS. BELITZ discussed the improvements in emerging market foreign exchange reserves and the balance of payment trends.

CHAIR SCHUBERT recessed the meeting from 12:18 p.m. to 1:31 p.m.

5. PRIVATE EQUITY TACTICAL PLAN

State Investment Officer ZACHARY HANNA reported that the summary of the detailed written plan is included in the Board packet. The presentation is part of the end review and planning cycle for the ARM Board's investments in private equity. Abbott, Pathway and Callan have reviewed the plan and recommendations. MR. HANNA gave an overview of the private equity asset class, noting the private company investments are generally illiquid and long-term. Fund sponsors invest in private equity for higher returns, with diversification as a secondary factor.

MR. HANNA explained the ARM Board's return expectation is 350 basis points over the Russell 3000 Index. The asset class has delivered results in excess of the expectation over the long-term. Relative performance has been good in comparison with other partnerships and is in the middle of the second quartile. The portfolio's internal rate of return (IRR) since inception through 2016 is 10.9%, 366 basis points above the Russell 3000 at 7.45%. This is MR. HANNA noted the asset class has become more efficient over time and lower excess returns are anticipated. Going forward, staff may recommend reducing the premium return expectation to better reflect the increased efficiency and may also recommend using the Callan Composite Index to better reflect the international and small cap character of the private equity program.

MR. HANNA suggested the appeal to private equity is driven by factors including the number of opportunities, less efficient pricing, strong alignment of interest between owners and management, and the ability to focus on longer-term value. The less than positive characteristics include illiquidity, high fees, potential for high leverage, transparency evaluation issues, and incomplete benchmarks.

MR. HANNA described the private equity structure. Investments are made through limited partners (LPs) like the ARM Board. LPs often use advisors like Abbot, Pathway and Callan. General partners (GPs) provide the private investment expertise. The GPs share in the profits and have full discretion. Initially, the LP makes a commitment of capital to the partnership. The partnership makes investment in underlying portfolio companies. The GP then calls capital from the LP as investments are made. Capital is then distributed back to the LP as investments are sold. Most partnerships have a 10-year life with a possibility of extensions. The period of heaviest distributions is years three through eight.

MR. HANNA noted there are three primary private equity strategies and the ARMB portfolio target is comprised of 25% venture capital funds, 40% buyout funds, and 35% special situations funds. The portfolio is in line with the targets. Manager selection and diversification is critical for portfolio implementation. The largest source of liquidity for private equity is the M&A market. The second largest source of liquidity is the public equity market through initial public offerings. Both of these markets decreased in 2016. The remaining source of liquidity is through recapitalizations, which increased in 2016. Fundraising has been relatively stable and terms are relatively balanced. Access to top managers is becoming more challenging, with quick closes and allocation issues more common. Investment activity has been high for three years. MR. HANNA believes liquidity will remain strong in 2017, if the bull market continues. Fundraising is expected to remain stable.

VICE-CHAIR JOHNSON asked if the private equity market now is more favorable for buyers or sellers, in terms of negotiating. MR. HANNA noted 2007 was an extreme sellers' market and once the financial crisis hit, it became a buyers' market for several years. He believes the current market is balanced and only on the margins are GPs changing their economic terms. MR. HANNA described a couple of occurrences last year when commitment levels were cut back because the investment cap had been reached.

MR. HANNA reviewed the recommended 2017 tactical plan. Staff recommends maintaining the long-term private equity target of 12%. The actual asset allocation for this year to private equity is 9%. The outlined commitment schedule gradually increases the allocation over a 10-year planning cycle to reach the 12% target. Staff recommends adoption of Resolution 2017-02 approving the 2017 annual tactical plan.

MRS. HARBO moved to adopt Resolution 2017-02 approving the 2017 annual tactical plan. MS. ERCHINGER seconded the motion.

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

6. DRB REPORT

A. Legislative Update

CHAIR SCHUBERT introduced DRB Director AJAY DESAI to present the legislative update. House Bill (HB) 5 is now following HB 23, and the next hearing is scheduled for April 19th. HB 11, regarding the retirement incentive program, is scheduled for a hearing today. HB 47, regarding municipal PERS contribution, was referred to the Ruled Committee to be placed on the calendar. HB 224 is a new bill allowing the reemployment of DRS retirees while continuing to receive retirement benefits. The first hearing is scheduled on April 18th.

7. TREASURY DIVISION REPORT

MS. LEARY reminded Board members of Alaska Statute (AS) 37.10.220 requiring a review actuary examine the results of the experience analysis and the actuarial assumptions each year. The request for proposals (RFP) went out on March 6th. The Review Actuary Committee, Chaired by MRS. HARBO, received the responses and unanimously decided on a recommendation.

MRS. HARBO, as Chair of the Review Actuary Committee, moved to issue a notice of intent to award the contract, and following the expiration of the 10-day protest period, a contract be entered into with Gabriel Roeder Smith . MR. WEST seconded the motion.

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

MS. LEARY described the second action item before the Board regarding the meeting structure and 2018 calendar. MS. LEARY stated the recommendation is based on comments from the March meeting by IAC members, Callan representatives, and Board members. The first proposed item is for managers to develop presentations that emphasize a broader focus for Trustees. Managers might participate in a panel discussion on larger economic trends. Staff will provide more frequent manager due diligence updates to the trustees.

MS. LEARY explained the second proposed item creates a consent agenda that includes the following reports; Calendar/Disclosure, DRB, Treasury Division, CIO, and Fund Financials Reports. Each report will be presented with a one-page memo and the opportunity for questions will occur.

MS. LEARY described the third proposed item is the combination of the February and April meetings into one meeting in late March in Juneau. The proposed 2018 calendar includes a Juneau meeting on March 22nd and 23rd, and Anchorage meetings on June 21st and 22nd, September, December, and an education conference in either October or November. Staff recommends the action item as set forth.

<u>MR. WEST moved the Board approve the conceptual plan for future meeting structure and agendas as set forth above; staff will structure the next meeting agenda as outline and also provide the 2018 calendar for approval at the June meeting.</u> <u>COMMISSIONER HOFFBECK seconded the motion.</u>

VICE-CHAIR JOHNSON expressed concern regarding the compression from five meetings to four meetings, particularly in regard to eliminating the ability for the Board to build appropriate records and paper trails on its very important decisions. He agreed investment manager presentations could be restructured.

MRS. HARBO agreed with the concern of compressing the meetings. She referenced past manager panel discussions were helpful and believes they would be helpful again.

MS. ERCHINGER commented the recent compression from a two-day meeting to a day-and-a-half meeting is unordinary. It is usually stressful to accomplish the work within two days. MS. ERCHINGER liked the idea of streamlining the manager presentations to allow more time for content on discussions of broader issues. She believes the consent agenda items need more consideration and would prefer to keep the CIO Report and Fund Financial Report off a consent agenda.

MR. WILLIAMS expressed his support for consent agendas because the compression frees up time in the meeting. He believes the Board needs to have a discussion about the content of the consent agenda. MR. WILLIAMS expressed excitement regarding the education conference being scheduled in October/November. He believes the Board needs to have further discussion regarding the compression of five meetings to four meetings.

MS. LEARY requested direction from the Board regarding how to proceed with each of the proposed items.

MR. WEST withdrew the motion to approve the conceptual plan for future meeting structure and agendas as set forth above; staff will structure the next meeting agenda as outline and also provide the 2018 calendar for approval at the June meeting. COMMISSIONER HOFFBECK withdrew his second to the motion.

CHAIR SCHUBERT believes the 2018 calendar meeting dates in March, June, September, and December work with all schedules. She asked for the desire of the Board regarding an additional meeting date.

MR. BRICE stated if a fifth meeting were to be scheduled, he suggests a date outside the legislative window.

MRS. HARBO commented the Board met intentionally during the legislative session the first year to have a presence. She expressed concern about eliminating the April meeting and the possible effect on the actuaries.

MS. ERCHINGER suggested additional time to coordinate the meeting dates to consider the implications to the actuary, review actuary, and Actuarial Committee. She requested MS. HALL's input. MS. HALL informed she has talked with GRS regarding the proposed schedule and the specifics of the valuation timeline, but has not spoken with Conduent. She believes the proposed schedule would work for the actuaries, assuming their work goes as smoothly and timely as it did this year.

CHAIR SCHUBERT summarized the Board member comments and believes the February/March/April timeframe is when a possible additional meeting could be scheduled, and the other proposed dates are fine. There was no objection to the summarization.

VICE-CHAIR JOHNSON suggested it may be worthwhile for investment managers to present to the Board when their performance is not doing well.

8. CIO REPORT

Acting Chief Investment Officer BOB MITCHELL presented the CIO Report. MR. MITCHELL noted he streamlined his report from 56 pages at the last meeting to 16 pages this meeting and reviewed the summary of transaction. Funds were rebalanced to equalize the asset allocations in the plans. The allocation to U.S. Treasuries and to cash was increased, in part to fund outflows for benefit payments. A $4.5 million capital call from Crestline was funded. The internally managed smart beta strategy approved by the Board was funded.

MR. MITCHELL noted futures contracts were rolled out in the portable alpha program and cash equitization programs. He directed members' attention to the attached schedule requested by MR. WILLIAMS providing detail on the size and frequency of the cash flows into the margin accounts for the portable alpha program. Allianz/RCM Socially Responsible Investment Fund was notified of placement on the watch list.

MR. MITCHELL referenced VICE-CHAIR JOHNSON's recommendation to hear from managers who were performing poorly, and noted the reason Lazard Asset Management, Emerging Income (LEI) presented today is because of their underperformance compared to the benchmark over the last six years. Staff recommends LEI be placed on the watch list because of the six-year underperformance.

MRS. HARBO moved to place Lazard Asset Management Emerging Income on the watch list. MR. WILLIAMS seconded the motion.

The motion passed unanimously.

MR. MITCHELL informed the detail of staff's due diligence of first quarter manager review is included in the packet. As requested by COMMISSIONER HOFFBECK, brief descriptions of each public equity managers is included in the report. MR. MITCHELL reported a change in leadership at McKinley Capital occurred, with Robert A. Gillam replacing his father Robert B. Gillam as President of the company. Robert B. Gillam will continue as Chairman and CEO for the company, and Robert A. Gillam will continue as CIO.

9. FUND FINANCIAL REPORT

State Comptroller SCOTT JONES and Chief Financial Officer of the Division of Retirement and Benefits KEVIN WORLEY presented the Fund Financial Report. MR. JONES reviewed the financial statements for the month ended February 2017, and fiscal year-to-date. The approximate numbers are: the PERS system ended with $17 billion, the TRS system with $8.3 billion, the JRS with $187 million, the National Guard and Naval Militia (NGNMRS) with $37.6 million, SBS with $3.6 billion, and Deferred Comp with $863 million, for a total of $30.1 billion, of which $24.5 billion is nonparticipant-directed assets and $5.6 billion is participant-directed assets. All of the funds are close to targets and within the asset allocation bands.

MR. WORLEY reported on the retiree drug subsidies received for the eight months ending in February; $11.3 million for PERS Health Fund, $3.7 million for TRS, and $40,000 for JRS. The pharmacy rebates from Aetna are also included in the report. Employer collections are on track and discussions are occurring with the few smaller employers who have not been contributing. MR. WORLEY informed the requested Retirement System funding for FY 18 remains in the current bill before the Legislature.

MR. WORLEY expressed appreciation to MS. HALL on behalf of the Division for her fine work and service.

10. ACTUARY REPORTS

A. 2016 Actuarial Valuation Review

DB and DCR Plans,
Public Employees' Retirement System (PRS),
Teachers' Retirement System (TRS)

LESLIE THOMPSON and PAUL WOOD, consulting actuaries with Gabriel Roeder Smith (GRS), presented the results of the successful actuarial audit for the Defined Benefit Plan (DB) and Defined Contribution Plan (DC) for both PERS and TRS. MS. THOMPSON expressed appreciation to the Actuarial Committee and to Conduent for their cooperation and time spent on debating and vetting actuarial issues. Because of the work from the Actuarial Committee and the monthly calls with Conduent, the list of approximately 50 issues has been reduced and resolved to approximately five issues currently, none of which have a material impact on the plan.

MR. WOOD described the process and major components of the recent clean audit and informed all of the issues were resolved in the 2016 valuation or will be implemented in the 2017 valuation. MR. WOOD outlined the recommendations for the Employer Group Waiver Program (EGWP) to include enhanced disclosure in the report regarding the large decrease in cost and the sunset of some of the federal subsidies in 2020 that may not be reauthorized, given the current political environment.

MS. THOMPSON expressed appreciation to MS. HALL for her high level of competency serving the Committee well.

B. 2016 Actuarial Valuation
DB and DCR: PERS and TRS Plans

LARRY LANGER, DAVID KERSHNER and MELISSA BISSET of Conduent presented the 2016 Actuarial Valuation results. MR. LANGER expressed appreciation to staff and GRS for the peaceful collaborative process during the actuarial valuation. He reviewed the estimates developed compared to the actual events that occurred which materially impacted the results. The actual events included a near flat return in 2016, less than the assumed return of 8%, a lower than anticipated Post Retirement Pension Adjustment (PRPA), lower than expected retiree medical claims, a one-time increase in liability because of improvements to medical data collection, and lower projected costs from the adoption of the DC Retired Medical Plan design.

MR. LANGER showed the slight decrease in the funded ratio for all plans, primarily due to the lower than expected investment return. He noted the outlook for the funded ratio, if all the assumptions in the valuation are realized, is anticipated to reach 100% by 2039. The current contribution rates for PERS and TRS increased because of the decrease in the funded ratio. MR. LANGER informed the results are similar for the DCR, JRS, and National Guard plans.

MR. LANGER stated the June 30, 2017 valuation will occur later this year. The selection of the actuarial assumptions to be used for the next four years will occur this year. Robust discussions have begun, particularly regarding the 8% investment return and the mortality table. The extensive discussion and decisions will be documented by the Actuarial Committee and ultimately presented to the Board for final approval.

VICE-CHAIR JOHNSON noted the discussions in the Actuarial Committee yesterday regarding concerns of the possible change in the 8% investment return assumption and mortality assumption were focussed and robust. He believes anyone interested in reviewing considerations and deliberations should review the Actuarial Committee's discussions, as well as the discussion at the full Board level.

MS. ERCHINGER commented on part of the discussions that occurred yesterday in the Actuarial Committee regarding the importance of looking at assumptions in the aggregate, rather than pulling out individual assumptions. She pointed out the actuarial loss on healthcare costs was due to receiving better specific retiree healthcare data and the loss offset the healthcare gains in the previous year. MS. ERCHINGER believes it is important to view the state assistance contributions relative to a few years ago, when discussions occurred about a nearly billion-dollar state assistance contribution.

C. Audit Findings Recap

MS. ERCHINGER reviewed the Actuarial Committee's list of findings and recommendations included in the Board packets.

Action: Board Approval of Resolved Findings

MS. ERCHINGER, on behalf of the Actuarial Committee, moved the resolutions and findings indicated on the audit findings list dated April 20th, 2017, be accepted as resolved with no further action needed.

MS. ERCHINGER informed there are three or four outstanding items on the list, but otherwise they are considered resolved.

The motion passed unanimously.

CHAIR SCHUBERT recessed the meeting from 2:55 p.m. to 3:12 p.m.

11. Small Cap Growth Manager Search

MR. MITCHELL informed the Board directed staff in December to engage Callan to conduct a search for a small cap growth manger to replace a manager that had been fired. In March, Callan provided a list of five finalists, and after staff due diligence, the two finalists were selected and will give presentations today.

A. T.Rowe Price

T.Rowe Price's CHRIS DYER, Institutional Business Development Executive, JOHN PLOWRIGHT, Institutional Client Service, and SUDHIR NANDA, Portfolio Manager, gave the presentation on QM U.S. Small Cap Growth Equity Strategy. MR. DYER stated he has been involved with the investment relationship between T.Rowe Price and the State of Alaska since it began in 1991. MR. DYER reported the QM Small Cap Growth Strategy's successful track record of over 10 years averaged 2.5% outperformance versus the benchmark, including the global financial crisis. This strategy provides a high level of style consistency in the small growth style box, which positively complements the Board's current small cap allocation.

MR. NANDA spoke briefly about the Quantitative Equity Group team members. The investment philosophy of the strategy is to provide steady outperformance, preserve wealth in down markets, and keep turnover low at below 20% a year. The investment process is disciplined and very structured utilizing fundamental metrics for stock selection. The bias is on valuation and quality stocks. Because of this stable process and composition MR. NANDA utilizes during stock selection, the portfolio tends to outperform in down or low-return markets, and tends to lag or keep up with the benchmark is very big up markets. MR. NANDA provided a detailed description of the metrics he uses in the ranking and selection of stocks in different sectors. MR. NANDA explained cash in the portfolio averages about a half-percent. The portfolio consists of 300 stocks and the largest position size is limited to one percent. The portfolio is indexed to the MSCI Small Cap Growth Index.

MR. SHAW inquired if the success of the alpha additions to the process have been tracked. MR. NANDA stated the model has been monitored and the data shows value has been added, especially in avoiding bad stocks that have scenarios that could cause deterioration.

STEVE CENTER, Vice President of Callan, noted the GIPS disclosure showed assets under management in the strategy have double in the last three years. He requested more information regarding closing the strategy because of capacity constraints. MR. NANDA explained small caps have tripled since the early 2000's, and the most important consideration in capacity relates to turnover and trading style. A high turnover process cannot sustain high capacity, because the capacity constraints come from the friction when trading stocks. MR. NANDA informed he monitors capacity very closely and the strategy is not open on commercial databases.

B. Arrowmark Partners

CHRIS DUNNE and BRIAN SCHAUB of ArrowMark Partners gave the presentation on the Small Cap Growth Strategy. MR. DUNNE shared the three core values of ArrowMark, 1) the belief in risk-first fundamental research, 2) the creation of an investment-centric culture predicated around people, and 3) the creation of an alignment of interest with clients. MR. DUNNE informed both investment managers, MR. SCHAUB and CHAD MEADE, invest a meaningful part of their own capital side-by-side with clients.

CHAIR SCHUBERT commented most of the partners were employed with Janus prior to breaking off in 2007. MR. DUNNE noted five of the seven partners worked together previously at Janus and have an aligned belief in the culture and fundamental research process. There are currently 60 employees and $11.7 billion in assets under management.

MR. SCHAUB described the investment philosophy that includes value manager techniques to analyze growth company through fundamental research, thinking about risk before reward, and a long time horizon. Turnover is low at about 50% per year in dollar turnover, and 25% per year in name turnover. The portfolio contains between 80 and 120 stocks, with a weighted average market cap of $1.5 billion. The portfolio's goal is to deliver 80% downside protection during turbulent bear market environments, and secondarily to deliver 100% or more upside participation during bull market environments.

MR. SCHAUB believes ArrowMark's unique collaborative co-portfolio manager structure provides the benefits to deliver on the portfolio's goal utilizing checks and balances, discipline, and the replacement of emotion with objective analysis to turn volatility into alpha. MR. SCHAUB and MR. MEADE have been working together for 15 years, 12 years at Janus and three years at ArrowMark, and plan to continue the relationship for at least the next 10 years. MR. SCHAUB gave a detailed explanation of the investment process and an extensive description of the categories of stocks that are selected for portfolio construction.

MR. SCHAUB discussed the three best operating environments for the portfolio include high volatility in the market, when the market is declining, and when the market is being led by high quality stocks. Lagging underperformance is expected in markets when the lowest quality stocks are outperforming and the market is driven by high momentum.

C. Board Discussion/Selection/Action

MR. MITCHELL informed the action memo in the Board packets requests hiring both presenting managers, T.Rowe Price and ArrowMark Partners, with funding up to $100 million each, subject to successful contract and fee negotiations. MR. MITCHELL discussed the reasons and considerations for selecting two managers to replace one manager.

<u>MR. BRICE moved to direct staff to enter into negotiations with T.Rowe Price and ArrowMark Partners to fund each initially up to $100 million in a domestic small cap growth strategy, subject to successful contract and fee negotiations.</u> <u>MRS. HARBO seconded the motion</u>.

MR. WEST commented the ArrowMark strategy has a very short track record and was curious regarding their portfolio performance at Janus. MR. MITCHELL believes the portfolio managers outperformed the index while at Janus, but does not have specific performance numbers.

VICE-CHAIR JOHNSON requested DR. JERROLD MITCHELL's opinion. He believes both presentations were very good and their value approach to small cap growth is legitimate.

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

RECESS FOR THE DAY

CHAIR SCHUBERT recessed the meeting at 4:25 p.m.

Friday, April 21, 2017

CALL BACK TO ORDER

CHAIR SCHUBERT reconvened the meeting at 9:03 a.m.

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

12. PERFORMANCE MEASUREMENT - 4th QUARTER

CHAIR SCHUBERT introduced MR. CENTER, who provided the performance measurement review for the fourth quarter 2016. MR. CENTER informed he will be absent the next Board meeting and MR. ERLENDSON, who is absent today, will be present. MR. CENTER gave a broad overview of the markets in the fourth quarter, and noted gross domestic product (GDP) came in at 1.9% trailing the 3.5% third quarter GDP. Positive economic figures within the U.S. continue and employment numbers have improved. The actual unemployment numbers came in at 4.7% in the fourth quarter. The Fed has increased the overnight rate in December from 0.5 to 0.75, resulting in negative returns across the fixed income space. Another interest rate move occurred during the first quarter. The bond market has stabilized since the election, while the equity market has performed quite well. TIPS outperformed treasuries due to expectations of rising inflation.

MR. CENTER reviewed the asset class performance for the periods as of December 31st, for 10-year, five-year, three-year, one-year, and last quarter. The Russell 2000 U.S. small cap stocks were the best performers in the fourth quarter, the one-year and the 10-year periods, and the second best performer in the three-year and five-year periods. The S&P 500 U.S. large cap stocks were the best performers in the three-year and five-year periods, and the second best performers for the quarter, the one-year and the 10-year periods. Emerging markets and developed market non-U.S. equities have struggled due to falling energy prices and the strong U.S. dollar. However, emerging markets' year-to-date return is up over 12%.
MR. CENTER showed the U.S. equity returns by economic sector. Financials and industrials drove performance, while REITs and healthcare dragged performance.

MR. CENTER continued the presentation focussing on the PERS plan as a proxy for all of the plans. Asset allocation is fairly close to the long-term strategic targets, slightly overweight to equities and slightly underweight to fixed income and private equity. MR. CENTER discussed the comparison between the PERS asset allocation and Callan's public fund peer group consisting of 230 peers. PERS has a much lower allocation to fixed income, and a slightly higher allocation to non-U.S. equities and real assets.

MR. BRICE asked if the overweight to international equity should be reevaluated given today's market environment. MR. CENTER explained Callan is having the discussion regarding international equities with all clients. He does not believe non-U.S. equities should be underweighted, and the slight overweight in the portfolio is not enough to have much of an impact versus the global economy. MR. CENTER does not believe the currency headwind over the last five years will be systematic and continue in the long-term.

MR. CENTER informed new exhibits have been added to the presentation. One of them identifies the plan's performance on a risk-adjusted basis. MR. CENTER reported on the plans relative to peers and noted the plans performed at or above median for the last three years and five years, and slightly below median over the last 10-years. Another new exhibit compares the PERS performance Sharpe ratio to the public fund database over the same time periods. The plans is very much close to the median over all time periods. Another new exhibit compares the maximum draw-down for public plans over the same time periods. Over the last three and five years, draw-downs have remained about the same, and over 10 years, the plan is near the median. The final new exhibit compares standard deviation and it is better to have a lower ranking versus peers. Over the last five and 10 years, the plan is at or below median.

MR. CENTER reviewed most of the performance is driven by the manager effect and over the last quarter, this has been positive due to strong performance in the real asset space, along with the absolute return portfolio. Over the last year, manager effect was slightly negative, primarily due to performance in global equity and private equity. However, there are no areas of concern. MR. CENTER showed long-term performance versus the asset allocation policy return and the actuarial target return. Plan performance versus the target benchmark has been very much in line over all calendar time periods shown.

MR. CENTER reviewed the asset class performance and noted the PERS domestic equity program returned 4.55%, ahead of both the S&P 500 and the Russell 3000 benchmarks. Over the last year, the plan slightly outperformed the S&P 500 and slightly trailed the Russell 3000. Performance has been very much in line with both benchmarks over longer periods of time. MR. CENTER informed fourth quarter international equity performance figures were pulled back by weaker performance in emerging markets, but long-term performance compares favorably to the MSCI ACWIxUS Index. MR. CENTER provided details regarding underlying manager performance and struggles. Overall, there are no areas of concern.

MR. CENTER described the fixed income program structure for PERS, and performance over the last year was quite solid. Performance in the real assets space was mixed, but came in at 1.6% for the quarter and 7.87% for the year. REITs struggled because they are impacted by market investment behavior that is outside real estate as a whole. REITs are more correlated to fixed income and when bonds pull back, REITs will pull back as well. Timberland was flat for the quarter, and TIPS were down for the quarter and negative for the year. MLP investments showed continued positive improvement. Energy was positive. The absolute return composite had very strong performance for the quarter at 4.3% and the last year at 3.6%, well ahead of the HFRI Fund-of-Funds Composite.

MR. CENTER gave a detailed review of the PERS DC Plan on an asset allocation basis and on an asset growth basis. The portfolio is 57% invested in asset allocation funds, with the remainder spread across the Tier II and Tier III portfolios. Asset growth has been driven primarily by contributions and market returns. Withdrawals have been negative over the last five quarters, but not nearly enough to impact the overall size of the plan. The one investment on the active equity side on the watch list is Allianz Socially Responsible Fund. Performance continues to struggle, trailing its benchmark over last quarter, year, five, and seven-years. The remaining funds continue to perform in line with their benchmarks and there are no other areas of concern.

COMMISSIONER FISHER believes the performance measurement given by Callan should be a primary focus of the Board. He did not pause to ask questions because he felt the scope and breadth of the material goes beyond the time allotted for discussion. COMMISSIONER FISHER advocated for additional exploration and understanding of details, either by the full Board or in a subcommittee. He recommended spending less time with manager presentations and more time spent on topics in the performance measurement report. CHAIR SCHUBERT agreed a deeper dive would be helpful. MR. CENTER suggested a session occur with the Board and Callan to discuss all the various outputs included in a performance report by asset class.

MR. WILLIAMS expressed interest in receiving a plan of improvement for himself, perhaps from the Investment Advisory Committee, that lists items he should know and work on. He is impressed with the breadth and quality of the work and how much he has to learn.

MRS. HARBO repeated a previous suggestion to utilize the Advisory Committee each meeting to give a 20-minute insightful presentation on a rotating basis.

MR. BRICE found attending the three-day Callan College very educational and helpful because of its intense, focused discussion on performance measures. CHAIR SCHUBERT agreed and requested the dates for the next session. MR. CENTER informed the next Callan College is scheduled in San Francisco on July 25th and 26th, and Trustees can attend free of charge, with no registration fee. MR. CENTER requested anyone interested to contact him.

13. REVIEW: INTERNAL EQUITY MANAGEMENT

MR. MITCHELL believes it is timely to discuss internal equity management as it relates to the broader portfolio and external equity management. Over the last four years, a concerted effort has been made to bring additional assets in-house. The goal of the presentation is to provide the Board with an update on the progress of bringing assets in-house and the development of overall portfolio structure. MR. MITCHELL showed a breakdown of externally managed passive strategies, externally managed active strategies, and internally managed strategies by asset class.

MR. MITCHELL defined internal management for publically traded securities, domestic equities, international equities, fixed income, REITs and TIPS as actual management by staff on the 11th floor of the State office building. Internal management for private equity and absolute return investments is described as staff making investment decision about underlying investments, such as a fund-of-funds manager. MR. MITCHELL reviewed the progression of the amount of assets under internal management over time. The first equity-like strategy was implemented in 2004.

MR. MITCHELL gave a detailed description of each equity strategy implemented in-house totally approximately $1.2 billion in assets. A dedicated internal management team was created about a year ago and their efforts have streamlined many processes significantly, including trading. MR. MITCHELL explained integration of internal strategies and external strategies begin with a market cap allocation of the domestic equity benchmark, with about 90% large cap and about 10% small cap. The first decision to make is determining the tracking error at the broad asset class level, which is then attenuated by varying the proportion of the passive underlying investments. The historical 25-year tracking error of the portfolio is 1.7%, but the 10-year tracking error has been more muted at .9%.

MR. MITCHELL discussed the array of strategies staff will be bringing forth and the evolution going forward. He noted staff is recommending later in the meeting to place the equity yield strategy with the domestic equity strategy. MR. MITCHELL explained historically, managers were hired because of their intent to outperform a passive benchmark. The hurdle is now higher because the manager has to achieve better risk-adjusted returns than the internal managers' structural tilts or complement the internal strategies by smoothing and improving outcomes. This is an evolving construct to deliver better returns.

MR. MITCHELL reported that over the past two years, four positions have been added, and two of those are currently vacant. Personnel changes included three people left positions, one of which moved out of Juneau, and the two others moved positions. He is excited about the quality of the new hires. MRS. HARBO expressed interest in seeing those positions filled in order to manage more money internally.

MR. MITCHELL continued the presentation discussing using individual engineered structural tilts combined with active management that are not perfectly correlated to smooth aggregate performance. Staff will be requesting the ARM Board's approval at the end of the meeting for two equal weight mandates. One is an S&P 500 equal weight strategy and the other is an international smart beta strategy. Staff believes both strategies are complementary to existing strategies. MR. MITCHELL reviewed the hypothetical relative performance of strategies and structural portfolios to show combining an array of tilts results in a smoother risk-adjusted performance compared to individual tilts over the long-term. He noted there will be shorter periods of underperformance that will certainly occur. The timing is unknown and this needs to be an accepted tolerance for outperformance over long periods of time.

MR. MITCHELL believes staff provided validating examples to capture and build an array of strategies that look like what can be achieved externally, at a lower cost, with more control over assets. This is an evolutionary strategy and it is the responsibility of staff to further improve the process within a structural framework.

CHAIR SCHUBERT recessed the meeting from 10:15 a.m. to 10:34 a.m.

14. BRANDES INVESTMENT PARTNERS

CHAIR SCHUBERT introduced GLENN CARLSON, Executive Director, JEFF GERMAIN, Director Investments Group, and LAWRENCE TAYLOR, Institutional Portfolio Manager of Brandes Investment Partners, who gave the presentation on the Brandes International Equity Fund. MR. CARLSON informed Brandes is an independent employee-owned firm with 300 employees, managing approximately $28 billion is assets. MR. CARLSON described the management philosophy and process of estimating the value of an international company and purchasing undervalued companies when the opportunity in the market exists.

MR. TAYLOR provided an overview of current market conditions cycle. Quantitative easing has caused some risk assets to be mispriced. Indexing has driven prices up in general, and there has been a move to more quality, low volatility stocks. The value style underperformed growth style in 2015, and outperformed in 2016. Currently, the MSCI Europe Index is the least expensive it has ever been.

MR. GERMAIN expressed the importance of understanding the investment style is absolute value-based and benchmark agnostic overweighting in companies that are inexpensive and zero-weighting in expensive companies. MR. GERMAIN explained the value opportunities and reasons the portfolio currently has a high overweight in oil and gas. The portfolio currently has a zero allocation to metals and mining companies, because of their high multiples.

MR. GERMAIN discussed emerging markets and the concerns and opportunities available today. The DB portfolio has the maximum allowed investment exposure to emerging markets. Valuations remain low in emerging markets. The portfolio investment committee consists of five managers, who make the decisions regarding portfolio construction to keep in line with policy guidelines. MR. GERMAIN reviewed the portfolio's net-of-fee returns have been positive and above the benchmark for the 1-year, 3-year, 5-year, 7-year, 10-year, and 15-year time periods. The portfolio size is $715 million, and $343 million has been taken out.

MR. GERMAIN noted the managers' conviction in certain areas of the market, including oil and gas, UK, France, and food and retail. Values in Germany are not attractive and still are trading at premiums to fundamentals. The investment professionals are very deliberate and cautious in actions, which can been seen in the 16% low turnover last year. The portfolio contains 52 companies, of which 30% is in the top 10 companies. MR. GERMAIN expressed appreciation to the Board for being long-term loyal clients.

15. BENCHMARK REVIEW

MR. MITCHELL directed the Board's attention to the third tab in the packet. Staff conducted a review of the policy benchmarks used to evaluate performance of the portfolio verus its target asset allocation. No Board action will be asked to occur at this meeting, but feedback is requested on the recommendations presented. None of the recommendations will necessitate changes in mandates for any of the existing managers. Motivations for the changes include structural noise in private equity and absolute return compared to the target benchmark that may lower the value of the analysis.

MR. MITCHELL reported that the summary of recommendations is on page three. Staff discussed these recommendations with IAC and Callan, is characterized as a subset of those broad-ranging discussions. One evaluated recommendation is to change the international equity benchmark to a sister benchmark in the same series that includes more small cap, thus more closely aligning the structural mismatch to reflect actual investments. Another recommendation is to change the absolute return strategies benchmark to the HFRI Fund-of-Funds Composite Index, which is better correlated and will improve the quality of the evaluation. The private equity benchmark is recommended to be changed because of structural mismatches and unfair comparisons and to remove the one-quarter lag on the private equity portfolio data. Impacts to making a shift include the one time period when the change is made and the two quarters of private equity performance would not be reflected. It would be logistically difficult to restate returns historically and to mitigate the impact, the goal is to make the change either in the first quarter or the third quarter of the fiscal year, so it does not line up with the calendar or fiscal year-end.

MR. MITCHELL explained another recommendation is to increase the expected return from private equity by 150 basis points over the Callan assumptions. This is a reflection of the mature and quality of the existing private equity portfolio and the performance achieved since inception. Raising the expected return will result in taking less risk systematically to achieve a given return target.

MRS. HARBO requested more information on the strategy to exit private equity in the closed DB funds. MR. MITCHELL informed the expected private equity strategy is invested for 10 years, and the expected projections for the peak level of assets under management is 20 to 25 years from now. The issue will not have to be addressed for quite some time.

MR. MITCHELL commented the changes are not a panacea to the performance issues. Staff believes it is appropriate to address structural sources of noise that can be identified. He explained one recommended change is to retask the alternative equity asset class and call it opportunistic. Staff feels a benchmark of 60% equities and 40% fixed income presents a more general set of opportunities to implement strategies. The current benchmark is very specific to the incumbent assets held. Staff recommends moving the equity yield strategy from alternative equity to the domestic large cap portfolio because the correlation is more appropriate with large cap. Staff recommends moving the two low volatility strategies in the large cap portfolio to what will become the opportunistic asset class because the equity sensitivity is lower. The total number of asset classes will remain the same.

MR MITCHELL continued the presentation explaining staff recommendation for the real portfolio is to change the weights of the policy benchmark to align and reflect the long-term benchmark in place for real assets. All of the recommendations are for the FY18 target asset allocation.

COMMISSIONER FISHER requested to hear the Advisory Committee's view on proposed changes. MS. ERCHINGER requested feedback and comments from the IAC. MR. SHAW noted he has experience in similar moves of equities in fixed income. He gave anecdotal information of reasons the moves were made. MR. SHAW informed he has gone through a similar exercise with fixed income to ensure the manager lineup represented the benchmarks. He believes the outline MR. MITCHELL presented makes sense.

DR. JENNINGS commented the overall recommended changes are sensible. The opportunistic label does not seem to capture all the subtleties of investments that could be placed in the class. He is comfortable with the 60/40 benchmark proposed.

DR. JERROLD MITCHELL believes the proposals are logical and are a good idea. He commented the benchmarks should be in place for an extended period of time to be useful and if the Board approves the proposal, the benchmark should remain long-term.

16. INVESTMENT ACTIONS

A. Investment Advisory Council Position

MR. BRICE moved to reappoint DR. JENNINGS to a three-year term on the IAC beginning July 1, 2017, and ending June 30th, 2020. VICE-CHAIR JOHNSON seconded the motion.

MR. BRICE commented Dr. Jennings' advice is extremely insightful, personable, and he is a valuable asset to the Board and to the public.

The motion passed unanimously.

B. Internal Mandate: Large Cap Equal Weight

MRS. HARBO moved to authorize staff to make an initial investment up to $100 million in an internally-managed S&P 500 equal weighted portfolio. MR. WILLIAMS seconded the motion.

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

C. Internal Mandate: Scientific Beta International

MRS. HARBO moved to 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. MS. ERCHINGER seconded the motion.

VICE-CHAIR JOHNSON asked if the IAC agrees with the motion. CHAIR SCHUBERT voiced all members responded nonverbally in the affirmative.

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

D. Move Russell 2000 Value and Growth to S&P 600

MRS. HARBO moved to direct staff to move the SSGA Russell 2000 Growth Index and the SSGA Russell 2000 Value Index investments into the internally-managed S&P Small Cap 600 Index. MR. BRICE seconded the motion.

DR. JENNINGS expressed his support and commented there may be a time when it is necessary to have a two sub-funds, and making that change in the future should not be seen as a reversal.

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

UNFINISHED BUSINESS

1. Disclosure Reports
2. Meeting Schedule

MS. HALL stated there is nothing unusual regarding the disclosure reports; and there have been no changes to the 2017 calendar placed in Trustee packets.

3. Legal Report

MR. GOERING indicated he has no legal report. He joined in wishing MS. HALL well in her next endeavors. MR. GOERING expressed appreciation for the caliber and integrity MS. HALL has shown in her work. He looks forward to working with MS. ALEXANDER and believes making opportunities for advancements within the state helps with retention.

NEW BUSINESS

None

OTHER MATTERS TO PROPERLY COME BEFORE THE BOARD

VICE-CHAIR JOHNSON requested COMMISSIONER FISHER provide an update on the process of establishing a Health Advisory Board. COMMISSIONER FISHER reported the process is ongoing as to the appropriate way to establish the board. He will provide more information at the next meeting as the evaluation and creation moves forward.

COMMISSIONER FISHER described a request from the Legislature, signed by Co-Chairs from the House and the Senate, was received regarding forward-looking evaluations by Buck. The information was provided. The Legislature requested an update of the data, which is currently being processed. COMMISSIONER FISHER brings this to the attention of the Board and believes the Legislature is sensitive to future expectations around State assistance payments and the impact on the budget.

PUBLIC/MEMBER COMMENTS

None

INVESTMENT ADVISORY COUNCIL COMMENTS

DR. JENNINGS reflected on the number of investment organizations who have moved investment operations to financial centers outside of their operating locale. He believes the ARM Board and Alaska investment offices have taken a wiser course. DR. JENNINGS believes location can inform the strategy. The local talent in Alaska has been developed well. He suggested revisiting the bigger conversation regarding active and passive investing. DR. JENNINGS expressed appreciation to members and to MS. HALL.

TRUSTEE COMMENTS

MR. WEST expressed appreciation to MS. HALL for her service. MR. WEST believes the Board should consider investment risks also in terms of social and reputational impacts.

MS. ERCHINGER noted she did not attend the last meeting and wanted to express on the record her appreciation to MR. BADER for his service. She expressed gratitude to MS. HALL for being a backbone of the ARM Board for many years. MS. ERCHINGER welcomed MS. ALEXANDER and thanked MR. MITCHELL for his energy and involvement.

MR. WILLIAMS expressed appreciation to MS. HALL for her help and reassurance. He will be absent the next meeting because it coincides with induction to the National Teacher Hall of Fame. MR. WILLIAMS thanked staff for their dedication, and to members for their diligence and competence. He is honored to be engaged with this meaningful work.

CHAIR SCHUBERT expressed appreciation on behalf of ASPIB and ARM Board to MS. HALL for fulfilling the critically important role of her executive assistant, knowing the job inside-out and anticipating her needs. CHAIR SCHUBERT informed this made her job immensely easier to do. She wished MS. HALL the best in her retirement.

FUTURE AGENDA ITEMS

None

ADJOURNMENT

There being no objection and no further business to come before the Board, the meeting was adjourned at 12:03 p.m. on April 21, 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

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Division of Retirement & Benefits Report
June 22, 2017

Summary of Monthly Billings / Conduent HR Services -

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

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

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

<u>Summary through the Nine Months ended March 31, 2017 (last page of report)</u>
Cost increases from prior year totals associated with JRS and NGNMRS represent the bi-annual actuarial valuation process as full actuarial valuation reports are prepared on even years, and roll-forward valuation letters (updates) are prepared on the odd years.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Summary of Monthly Billings - Conduent Human Resource Services	ACTION:	
DATE:	June 22, 2017	INFORMATION:	X

BACKGROUND:

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

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

STATUS:

Attached are the summary totals for the nine months ended March 31, 2017.

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

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

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

For the Three Months Ended December 31, 2016

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

For the Three Months Ended March 31, 2017

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

Summary through the Nine Months Ended March 31, 2017

	PERS	TRS	JRS	NGNMRS	EPORS	AHF	RHF	SBS	DCP	TOTAL
Actuarial Valuations	$ 202,352	125,505	41,419	17,483	10,628	-	6,757	-	-	$ 404,144
ARMB presentations and meeting attendance	44,754	17,598	278	1,331	-	-	16	-	-	63,977
GASB 68 work for PERS and TRS	31,952	14,146	-	-	-	-	-	-	-	46,098
GASB 67 valuation reports as of 6/30/16 (PERS/TRS/JRS/NGNMRS)	14,152	6,282	35	194	-	-	-	-	-	20,663
Retiree medical data review	52,421	19,614	168	-	-	-	202	-	-	72,405
JRS alternative contribution pattern	-	-	2,220	-	-	-	-	-	-	2,220
NGNMRS conversion factors	-	-	-	1,869	-	-	-	-	-	1,869
KPMG audit out-of-scope investment return assumption review	4,781	2,117	-	-	-	-	-	-	-	6,898
GRS - regular discussions and past audit cleanup	5,409	2,177	31	162	-	-	2	-	-	7,781
Additional valuation data to account for rehires	1,470	603	-	-	-	-	-	-	-	2,073
Additional data preparation work for NGNMRS	-	-	-	26,599	-	-	-	-	-	26,599
Replacement rate support	2,740	912	-	-	-	-	-	-	-	3,652
Misc emails and phone calls	3,067	1,367	774	848	169	-	3	-	-	6,228
TOTAL	$ 363,098	190,321	44,925	48,486	10,797	-	6,980	-	-	$ 664,607
Summary through the Nine Months Ended March 31, 2016	$ 437,789	250,220	24,483	20,962	280	-	1	-	-	$ 733,735

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Division of Retirement & Benefits Report
June 22, 2017

Retirement System Membership Activity as of March 31, 2017 –

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

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

Active member counts for defined benefit (DB) and defined contribution retirement (DCR)have increased overall for both the PERS and TRS from September 30 to March 31, with decreases in the DB member counts and increases in the DCR member counts at each snap shot date.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Retirement System Membership Activity as of March 31, 2017

ACTION: ______

DATE: June 22, 2017

INFORMATION: X

BACKGROUND:

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

STATUS:

Membership information as of March 31, 2017.

MEMBERSHIP STATISTICS AS OF SEPTEMBER 30, 2016

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

MEMBERSHIP STATISTICS AS OF DECEMBER 31, 2016

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

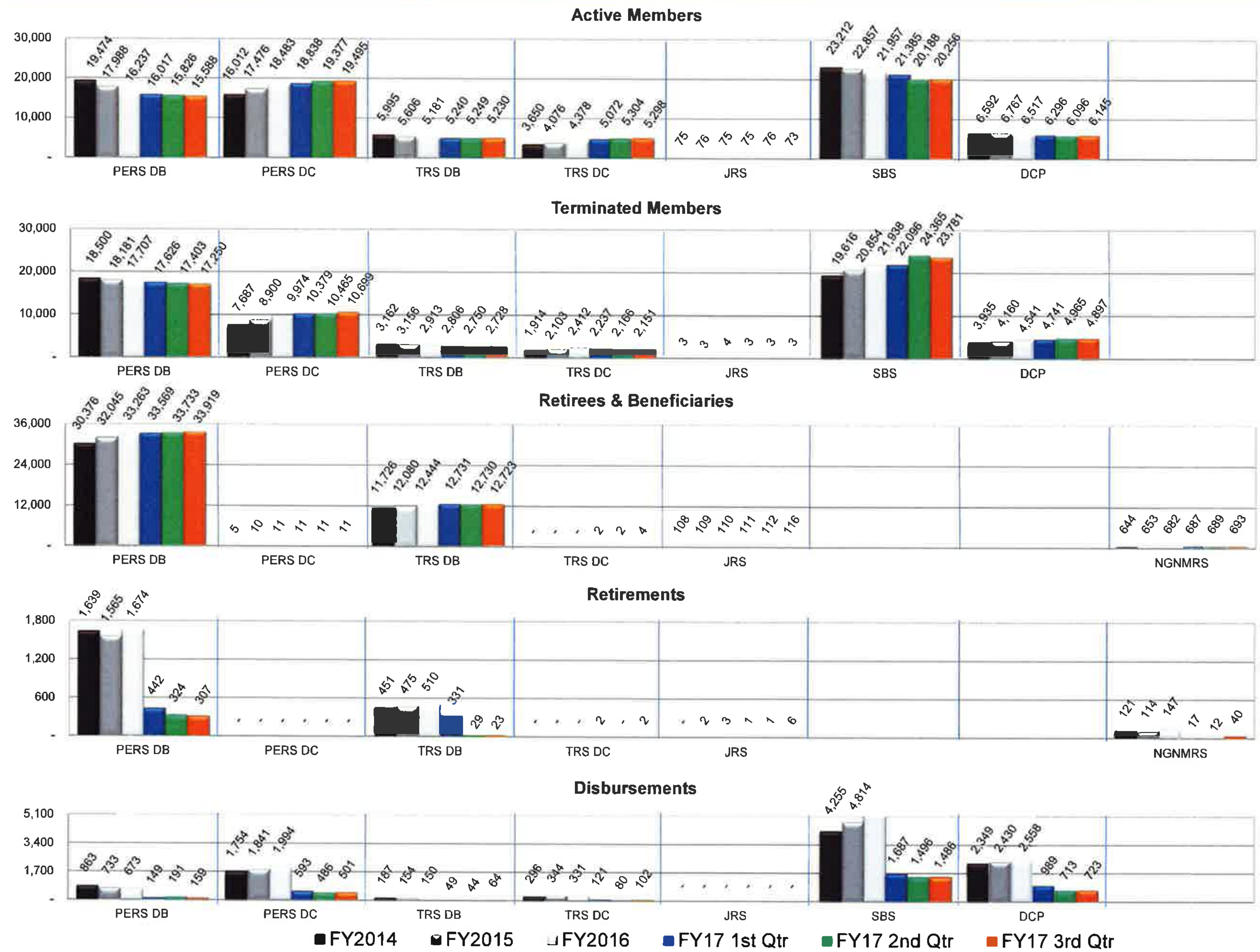
MEMBERSHIP STATISTICS AS OF MARCH 31, 2017

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

Alaska Division of Retirement and Benefits

FY 2017 QUARTERLY REPORT OF MEMBERSHIP STATISTICS

Annual & Quarterly Trends as of March 31, 2017



LEGEND

Active Members - All active members at the time of the data pull,
except SBS & DCP, which are counts of contributors during the final quarter of each period.
Terminated Members - All members who have terminated without refunding their account,
except SBS & DCP, which are counts of members with balances at the end of the period less active members.
Retirees & Beneficiaries - All members who have retired from the plans, including beneficiaries eligible for benefits.
Managed Accounts - Individuals who have elected to participate in the managed accounts option with Great West.
Retirements - The number of retirement applications processed.
Full Disbursements - All types of disbursements that leave the member balance at zero.
Partial Disbursements - All types of disbursements that leave the member balance above zero. If more than one
partial disbursement is completed during the quarter for a member, they are counted only once for statistical purposes.

THE STATE
of ALASKA
GOVERNOR BILL WALKER

Department of
Administration

DIVISION OF RETIREMENT AND BENEFITS
6th Floor State Office Building
333 Willoughby Avenue
P.O. Box 110203
Juneau, AK 99811-0203
FAX: (907) 465-3086
Phone: (907) 465-4460
Toll-Free: (800) 821-2251

Memorandum

To:	Sheldon Fisher Commissioner Department of Administration	Date:	June 2, 2017
Thru:	Ajay Desai Director Division of Retirement & Benefits	Phone:	(907) 465-4471
From:	Melanie Helmick Division Auditor Division of Retirement and Benefits	Subject:	4th Quarter State Fiscal Year 2017 DRB Audit Unit Report to Management

---

This report contains the following information concerning the 4th Quarter of State Fiscal Year (SFY) 2017 work performed by the Division of Retirement and Benefit's Audit Unit:

A. SFY 2017 Summary Comments
B. SFY 2017 4th Quarter Audit Totals
C. SFY 2017 Audits Scheduled
D. SFY 2017 Common Employer Audit Issues to Date
E. SFY 2017 Additional Work Performed by Audit Unit
F. SFY 2018 Employers Identified for Audit
G. SFY 2018 Employers Identified for Assessment

A. SFY 2017 Summary Comments

The Audit Unit operated under the supervision of Division Director Ajay Desai.

As of May 31, 2017, 32 audits have been completed, and the number of employees reviewed totaled 11,333. Of that total, 5,305 PERS employees and 1,591 TRS employees were reviewed for system compliance.

The Audit Unit has created and submitted their SFY 2018 audit and travel plans for approval. Several small employers have been identified for assessment in SFY 2018. Auditors will assess each employer identified; this assessment may or may not result in a complete audit.

B. SFY 2017 4th Quarter Audit Totals

Audits are performed on a calendar year basis to coincide with our auditees Federal Forms W2, W3, and 1099 Misc. reporting requirements, but the Audit Unit travel budgets and auditee lists are prepared by a state fiscal year.

32 Audits Completed

SFY 2016 Audits Completed in SFY 2017 - 23
Ilisagvik College (Barrow), Anchorage Community Development Authority, Petersburg Borough, Petersburg Medical Center, Kodiak Island Borough, Kodiak Island Borough School District, City of Bethel, Inter-Island Ferry Authority (Hollis), City of Thorne Bay, Lower Kuskokwim School District (Bethel), Southeast Island School District (Thorne Bay), Hydaburg School District, North Slope Borough School District (Barrow), City of Kodiak, Special Education Service Agency (Anchorage), City of Craig, Yupiit School District (Akiachak), Klawock City Schools, Craig City Schools, City of Klawock, Kashunamiut School District (Chevak), Kuspuk School District (Aniak), Lower Yukon School District.

SFY 2017 Audits - 9
Municipality of Anchorage, City of Kacahmak, City of Palmer, City of Cordova, Cordova Medical Center, Cordova City Schools, Copper River School District (Glennallen), Copper River Basin Regional Housing Authority (Tazlina), Alaska Gateway School District (Tok).

24 Audits in Progress

4 - Director/Chief Review or in Preliminary Status – City of Wrangell, Wrangell City School District, Kake City School District, Mat-Su Borough School District.

1 - Fieldwork Completed –Juneau School District.

7 – Desk Audits in Progress – Chatham School District, City of Pelican, Pelican School District, City of Seldovia, Tanana City Schools, City of Huslia, City of Nualto.

5 - Fieldwork Scheduled – Southeast Regional Resource Center (May 30, 2017), Bristol Bay Housing Authority, City of Dillingham, Dillingham City Schools, Southwest Regional School District, Cook Inlet Housing Authority (June 19-22, 2017).

7 – Intent to Audit Letters Sent – Yukon Flats School District, City of Fort Yukon, Yukon-Koyukuk School District, Interior Regional Housing Authority, Annette Island School District, Denali Borough School District, Denali Borough.

8 - Audits Moved to SFY 2018 – Bristol Bay Borough, Bristol Bay Borough School District, Bristol Bay Housing Authority, City of Galena, City of Sand Point, Kenai Peninsula Borough, Kenai Peninsula Borough School District, Northwest Arctic Borough.

C. SFY 2017 Audits Scheduled

The SFY 2017 auditees are listed below (audits have been completed, and reports have been issues for highlighted employers). Auditees and travel are subject to change due to a variety of unforeseen circumstances.

Alaska Gasline Development Corp.	City of Nulato	Interior Regional Housing Authority
Alaska Gateway School District	City of Palmer	Kake City School District
Annette Island School District	City of Pelican	Kenai Peninsula Borough
Bristol Bay Borough	City of Sand Point	Kenai Peninsula Borough School District
Bristol Bay Borough School District	City of Seldovia	Mat-Su Borough School District
Bristol Bay Regional Housing Authority	City of Wrangell	Municipality of Anchorage
Chatham School District	Cook Inlet Housing Authority	Northwest Arctic Borough
City and Borough of Juneau School District	Copper River Basin Regional Housing Authority	Pelican City School District
City of Cordova	Copper River School District	Southeast Regional Resource Center
City of Dillingham	Cordova City Schools	Southwest Regional School District
City of Ft. Yukon	Cordova Community Hospital	Tanana School District
City of Galena	Denali Borough	Wrangell City Schools
City of Huslia	Denali Borough School District	Yukon Flats School District
City of Kachemak	Dillingham City Schools	Yukon-Koyukuk School District

D. SFY 2017 Common Employer Audit Issues to Date (in order of prevalence)

Part-time Employees not enrolled in PERS
SBS Eligibility
SBS Participation Agreements
Temporary Employees
Rehired Retirees
PERS Participation Agreement Errors
49% Teaching Contracts/Lack of PERS Part-time Enrollment
Contract Employees filling PERS positions/groups
Elected Officials
PERS Probationary Periods

E. SFY 2017 Additional Work Performed by Audit Unit

- Work with Chief Pension Officer on new SBS rehired annuitant guidance.

- Collaborative work with DRB Active Payroll, Finance and Employer Counseling and Benefit Education Units to solve system issues and ensure consistency across the Division continues.

State Social Security Administrator Duties: Helmick

- Answer employer social security and Medicare eligibility questions on a weekly basis;
- Continued work with employers to correct social security withholding errors discovered during PERS/TRS audits;
- Create education opportunities for employers;
- Serve on three National Conference of State Social Security Administrator committees.

F. SFY 2018 Employers Identified for Audit (50)

Akutan, City of	Haines Borough	Nome, City of
Alaska Housing Finance Corp.	Haines Borough School District	North Pacific Management Council
Aleutians East Borough	Iditarod Area School District	North Pacific Rim Housing Authority
Aleutians East Borough SD	Juneau, City and Borough of	NW Arctic Borough
Anchorage School District	Kenai Peninsula Borough	NW Arctic Borough SD
Bartlett Regional Hospital	Kenai Peninsula Borough SD	NW Inupiat Housing Authority
Bearing Straights Housing Authority	Ketchikan Gateway Borough	Sand Point, City of
Bearing Straights School District	Ketchikan Gateway Borough SD	Saxman Seaport
Bristol Bay Borough	Ketchikan, City of	Saxman, City of
Bristol Bay Borough School District	Kotzebue, City of	Skagway School District
Delta Junction, City of	Lake and Peninsula Borough	Skagway, Municipality of
Delta-Greely School District	Lake and Peninsula Borough SD	Unalaska, City of
Fairbanks North Star Borough	Mat-Su Borough	Unalaska, City Schools
Fairbanks North Star Borough	Nenana City Schools	Valdez City School District
Fairbanks, City of	Nenana, City of	Valdez, City of
Galena City Schools	Nome City Schools	Wasilla, City of
Galena, City of	Nome Joint Utilities	Whittier, City of

G. SFY 2018 Employers Identified for Assessment (16)

Allakaket, City of	Hooper Bay, City of	St. Paul, City of
Anderson, City of	Kaltag, City of	Tanana, City of
Aniak, City of	King Cove, City of	Unalakleet, City of
Atka, City of	Pribilof School District	Upper Kalskag, City of
Egigik, City of	St. George, City of	
Elim, City of	St. Mary's School District	

Alaska Retirement Management Board

SMART Goal: DRB Modernization

Ajay Desai
Director

June 2017

Division of Retirement and Benefits (DRB)

Table of Contents

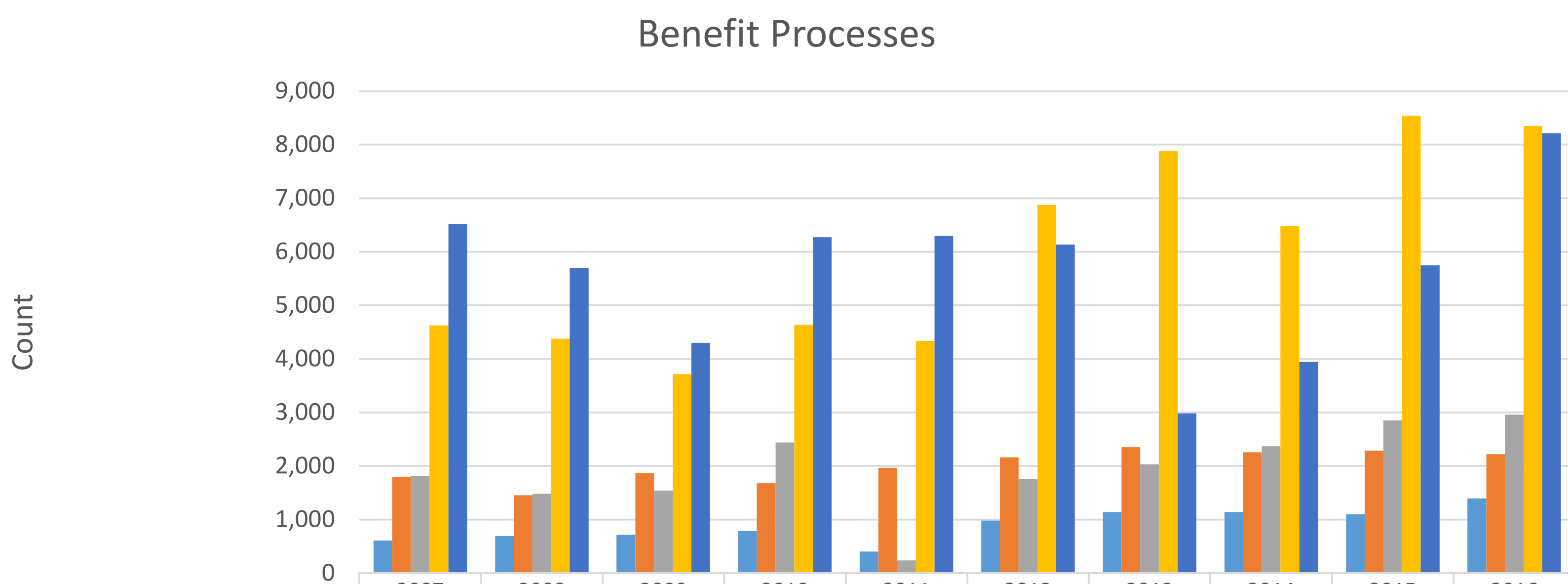
SMART Goal: Efficiency, accuracy and security of core functions

Who Are We?

DRB is administering five Defined Benefits (DB), four Defined Contribution Retirement (DCR) plans and multiple health plans with highly complex rules. The combined value of the plans, over $28 billion in assets and over $40 million in operation, is supported through paper-based, labor intensive systems. DRB administrators has fiduciary responsibility for:

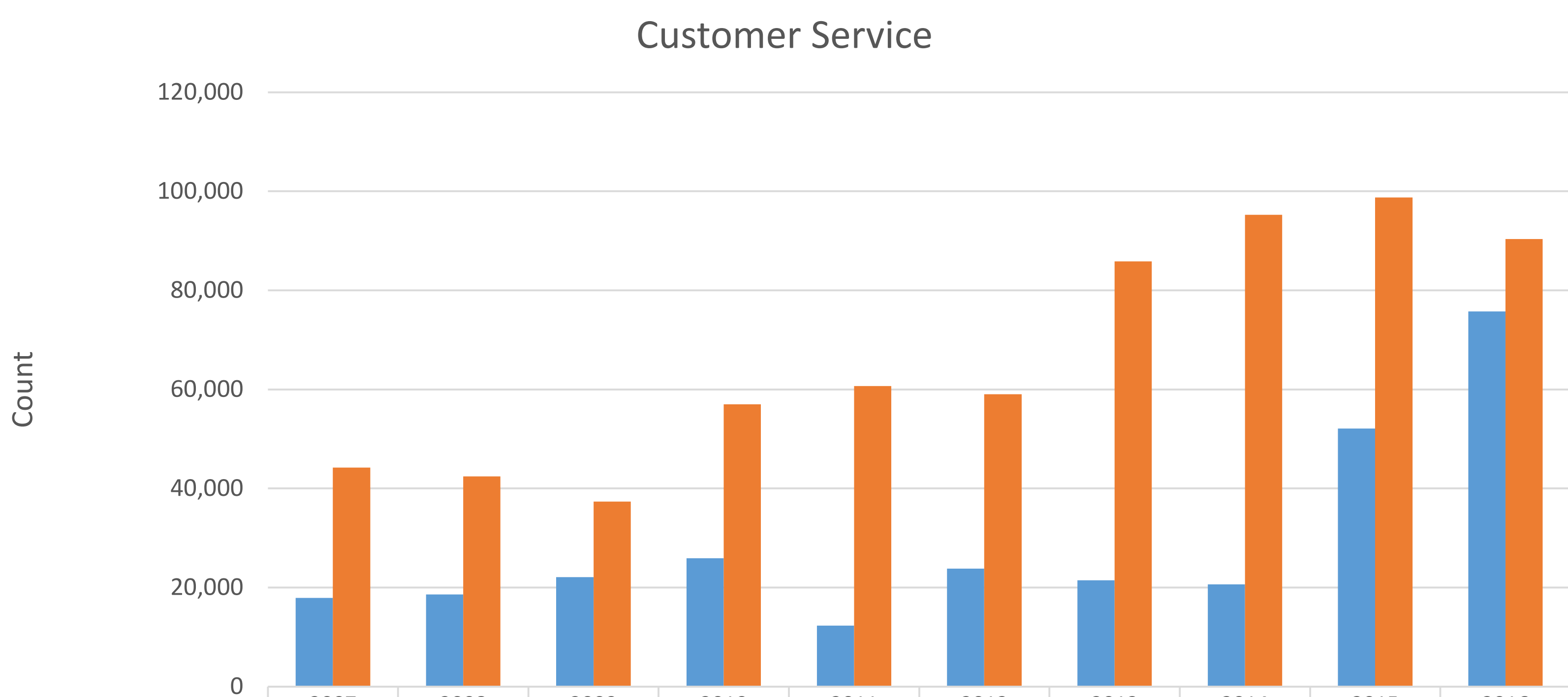
- Record keeping and counseling services of involving 89,000 members.
- Monthly recurring pension payments over $105 million for 48,000+ retirees.
- Provide health coverage for approximately 87,000 active employees, retirees, and dependents under AlaskaCare Employee and Retiree Health plans.
- Processing approximately 2,200 applications for retirement annually.
- Retirement seminars in various locations for over 5,000 members each year.
- Provides individual benefits counseling for 8,350 members statewide.
- In 2016, the division answered over 90,000 phone calls with the Member Services Contact Center handling over 65,000 of those calls.

Work Volume Expected to Increase - Benefits



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Death Benefits	608	692	715	784	401	982	1143	1141	1099	1,396
Retirement Applications	1,795	1,452	1,866	1,675	1,966	2,161	2,351	2,254	2,286	2,219
Benefit Adjustments (COLA, LIO)	1,812	1,485	1,540	2,437	237	1,755	2,032	2,366	2,850	2,959
Counseling	4,623	4,374	3,717	4,637	4,332	6,875	7,878	6,481	8,539	8,350
Benefit Projections	6,521	5,697	4,301	6,270	6,295	6,134	2,984	3,943	5,743	8,213

Work Volume Expected to Increase – Customer Sevice



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Email/Correspondence	17,883	18,578	22,113	25,896	12,297	23,777	21,454	20,648	52,103	75,752
Phone calls	44,223	42,423	37,317	57,003	60,682	59,033	85,835	95,248	98,731	90,381

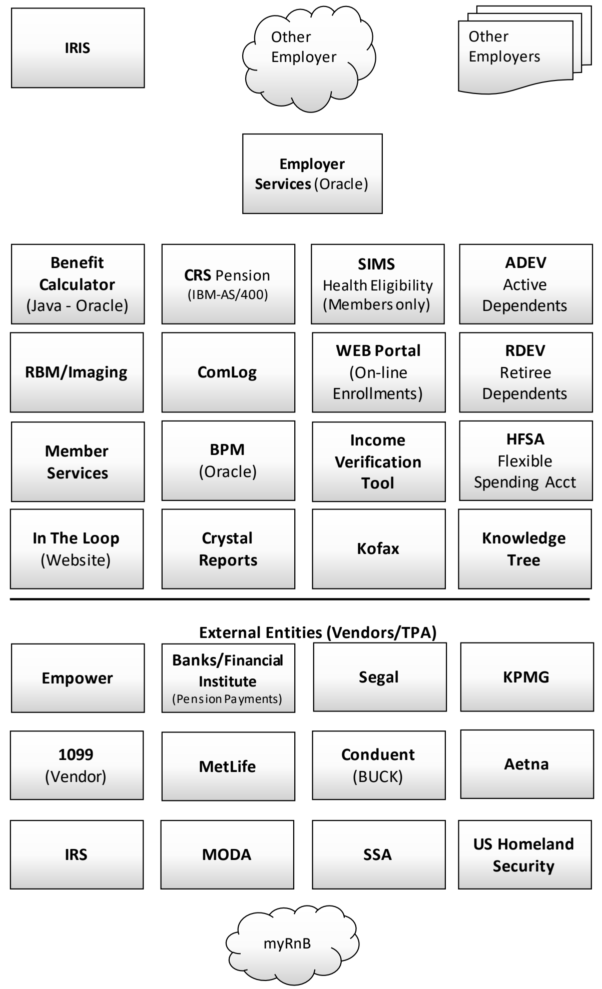
Current-State Challenges

Over the last 25 years, the DRB has operated successfully with the decentralized management of many of its core business processes for benefits administration. Today, however, DRB is facing many internal and external challenges that require a re-evaluation of our core business processes and core IT systems.

- DRB lacks a solid foundation of the core system and the software applications.
- Very heavy load of manual work requiring a lookup in multiple systems to complete a single process.
- The business units are highly dependent on IT staff to pull/push data and create reports for themselves or Third Party Administrators (TPA)/Consultants.
- The division is indirectly but rapidly moving into a direction where the DRB have a high dependency on external entities (TPAs) for employees' and retirees' data.
- Demographic data is lacking the Single Source of Truth – SSOT.
- Create an unattractive work environment for DRB staff.
- Cause labor inefficiencies and impede customer service.

View of Current-State

Division of Retirement and Benefits (DRB) - Current State



- **Platform**: Multiple platforms for hardware and software
  - Sun/Oracle (Java)
  - IBM AS/400 (mainframe replacement for Combined Retirement System (CRS) – migrated from HP 3000) – Aging and Obsolete System
  - Microsoft (Dell – Windows Server 2008) – Older version – 4 generation behind

- **Backup**: Inconsistent backup and disaster recovery solutions
  - Due to multiple platforms exist in DRB, the backup standards are vary based on the platform.
  - Legacy applications and databases have a multiple back-ups/restore capability that supports disaster recovery situation.
  - The newer databases are backed up locally for the system failure. However, it lacks the disaster recovery solution due to incompatibility between the platforms.

- **Data Integrity/Duplications:** Lack of automated integration across the business applications
  - Lack of invalidation rules or inconsistent data collection allowed by such applications causes data integrity issues across the various platforms.
  - Manual processes and data entry in multiple applications results in inconsistent and duplicate data in various applications.
  - Lack of synchronization of data across the multiple platforms causes variations in valuation data for the TPA, which is a high risk for inaccurate reports.

Business Case Hypothesis

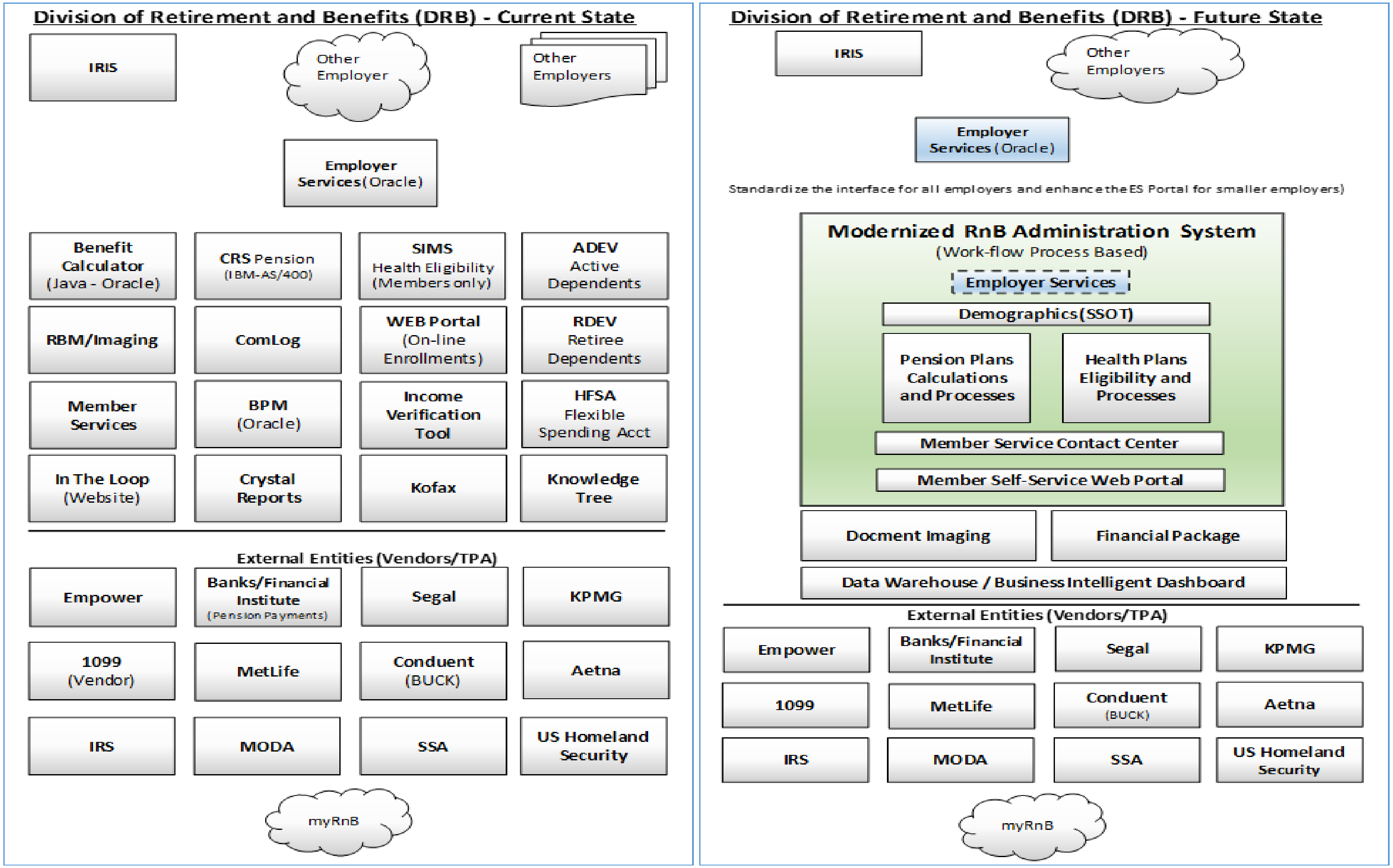
Three Key Drivers of Business Case

1. DRB can reduce IT costs (mainly licensing and contracts) due to migrating to a simpler IT environment.

2. DRB can optimize its business processes.
   a) 42% of DRB core functions rely on manual process.
   b) 100% of DRB core functions requires use of multiple systems/tools.
   c) Address growth in demand.

3. DRB can improve business operations.
   a) Speed
   b) Accuracy
   c) Integrity of data

Possible Alternative Future-State



Scope and Strategy

DRB requires fully integrated enterprise-wide multi-module software applications to improve, standardize and automate a wide range of division operations that includes:

- Benefit administrations
- Internal Finance-General/Ledger reporting
- Contributions/premium collections
- Payment disbursements
- Customer service
- Management control
- Operational control
- Industry Standard data exchange interfaces for external vendors

  (Such as Financial institutes, Actuaries, Consultants, TPAs, Participating School District and Political Subdivision Employers)
- Modern backup software – which include snapshot management, DR elements, cloud support, VM protection – backups can do so much more than simply restoring data in the event of a storage or server failure.

Implementing a DRB modernization project will require a massive, multi-year effort that will integrate processes across functional departments and external vendors and substantially reduce, if not eliminate, manual, paper-based work-processes and silo systems.

Notional High-Level Timeline/Schedule

Modernization Project - 2017	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Project Discussion												
Current-state Analysis												
Draft Business Case Document												
Project Update to ARMB												
Project Review with OMB												
Vendor Search and Assessment												
Cost Analysis and Timeline												
Final Business Case Document												
Project Update to ARMB												
Budget Process												
Project Kick-off												

Questions?

Appendix A

Pension Section Work Allocation in Percentage								
Sources	Manual (No System)	CRS	SIMS	Java Calculator (Oracle)	Imaging	MS Excel	T-Value 5	IRIS
Appeals	74%	14%	1%	3%	5%	3%	0%	0%
Audit Data	25%	25%	0%	0%	50%	0%	0%	0%
Back to Work	38%	14%	0%	3%	5%	20%	20%	0%
Claims	25%	40%	0%	0%	5%	30%	0%	0%
COLA Admin	25%	30%	0%	0%	5%	20%	20%	0%
Continuing Eligibility-Dis	80%	15%	0%	0%	5%	0%	0%	0%
Counseling	45%	20%	5%	25%	5%	0%	0%	0%
Deferred Comp-Leave CI	8%	2%	0%	0%	0%	70%	0%	20%
Disability incept	70%	15%	0%	10%	5%	0%	0%	0%
IRS Levies/CSEO	50%	50%	0%	0%	0%	0%	0%	0%
Open Enrollment	80%	0%	20%	0%	0%	0%	0%	0%
Over/Under payments	56%	14%	0%	3%	5%	2%	20%	0%
Projections	20%	25%	0%	50%	5%	0%	0%	0%
PRPA	80%	20%	0%	0%	0%	0%	0%	0%
QDRO	11%	14%	0%	20%	5%	50%	0%	0%
Retirement Inception	4%	40%	0%	50%	5%	1%	0%	0%
Statements	80%	20%	0%	0%	0%	0%	0%	0%
Survivor-disbursement	31%	32%	0%	0%	5%	32%	0%	0%
Survivor-last check	31%	32%	0%	0%	5%	32%	0%	0%
Survivor-monthly	4%	40%	0%	50%	5%	1%	0%	0%
Valuation Data	80%	20%	0%	0%	0%	0%	0%	0%
VSB Adjustments	0%	0%	50%	0%	0%	0%	0%	50%
Overall Allocation	41.68%	21.91%	3.45%	9.73%	5.45%	11.86%	2.73%	3.18%

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Treasury Division
June 22, 2017

Staffing:

1. Bob Mitchell was announced as the new Chief Investment Officer on May 12, after a search conducted by global executive search firm DHR International. The final candidates interviewed were well vetted and highly qualified for the position but Mr. Mitchell stood out as the clear choice to take the helm.

2. Zach Hanna was identified to succeed Mr. Mitchell as the Deputy Chief Investment Officer in addition to heading the Private Equity and Absolute Return Section.

3. Approval to hire two experienced investment officers to the internal public equity team was received from the Governor's office and both applicants have accepted. Start dates will be determined after the State's budget is approved.

4. Two summer interns started work in May to support the investment team. They are both accomplished students and presidents of the UAA and UAF Investment Clubs. We hope this is a mutually beneficial experience that will lead students to consider working as investment officers for the State upon graduation.

5. One investment officer vacancy remains.

Budget:

1. As of June 13, the state operating budget had not been approved. However, the conference committee did approve all open items for the Department of Revenue, including two additional investment officers for the Treasury Division.

2. State shutdown procedures have been identified and Treasury functions are expected to be continued at a minimal level to preserve the state's financial assets including those overseen by the Alaska Retirement Management Board.

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Disclosure - Calendar Update
June 22, 2017

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

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

Nothing further to report.

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

To: ARMB Trustees
From: Stephanie Alexander
Date: June 13, 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	5/17/17 5/24/17
Victor Djajalie	Fixed Income Manager	Equities	6/12/17

Alaska Retirement Management Board
2017 Meeting Calendar

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

ALASKA RETIREMENT MANAGEMENT BOARD
2018 Meeting Calendar

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

ALASKA RETIREMENT MANAGEMENT BOARD

CIO REPORT

Treasury Division
June 22, 2017

Item	Action	Date	Amount	Description/Summary
1	Rebalance Retirement Funds	4/26/2017, 5/19/2017		Available upon request.
	Transfers:			
2	Large Cap Transition Account	5/8/2017	($207,443)	Moved residual cash from transition portfolio.
3	SSgA Russell Top 200	5/8/2017	$78,382	Received residual cash from transition portfolio.
4	Scientific Beta Multi-Beta Multi-Strategy	5/8/2017	$129,060	Received residual cash from transition portfolio.
5	Capital Guardian International	05/10/2017	($150,000,000)	Liquidated from international equity portfolio.
6	Short-term Investment Pool	05/10/2017	$150,000,000	Invested in cash.
7	Mondrian International Fixed Income	05/12/2017	($100,000,000)	Liquidated from international fixed income portfolio.
8	Intermediate US Treasury	05/12/2017	$100,000,000	Invested in intermediate U.S. Treasury portfolio.
9	Columbia Threadneedle	05/16/2017	($30,000,000)	Liquidated from domestic high yield portfolio.
10	Intermediate US Treasury	05/16/2017	$30,000,000	Invested in intermediate U.S. Treasury portfolio.
11	Advent Capital Convertible Bond	05/16/2017	($25,000,000)	Liquidated from convertible bond portfolio.
12	Intermediate US Treasury	05/16/2017	$25,000,000	Invested in intermediate U.S. Treasury portfolio.
13	Columbia Threadneedle	05/17/2017	($20,000,000)	Liquidated from domestic high yield portfolio.
14	Intermediate US Treasury	05/17/2017	$20,000,000	Invested in intermediate U.S. Treasury portfolio.
15	QMA MPS	05/10/2017	($50,000,000)	Liquidated from alternative equity portfolio.
16	Short-term Investment Pool	05/10/2017	$50,000,000	Invested in cash.
17	SSgA Russell 2000 Growth	05/19/2017	($136,761)	Moved residual cash from Russell 2000 Value portfolio.
18	SSgA Russell 2000 Value	05/19/2017	($608,673)	Moved residual cash from Russell 2000 Growth portfolio.
19	Small Cap Transition Account	05/19/2017	$745,434	Received residual cash into transition portfolio.
20	Allianz/RCM Large Cap	05/23/2017	($50,000,000)	Liquidated from domestic equity portfolio.
21	McKinley Large Cap	05/23/2017	($50,000,000)	Liquidated from domestic equity portfolio.
22	BHMS Large Cap	05/23/2017	($50,000,000)	Liquidated from domestic equity portfolio.
23	Short-term Investment Pool	05/23/2017	$150,000,000	Invested in cash.
24	Analytic Equity Strategies	05/24/2017	($50,000,000)	Liquidated from alternative equity portfolio.
25	Short-term Investment Pool	05/24/2017	$50,000,000	Invested in cash.
26	Eaton Vance High Yield	05/24/2017	($25,000,000)	Liquidated from domestic high yield portfolio.
27	Intermediate US Treasury	05/24/2017	$25,000,000	Invested in intermediate U.S. Treasury portfolio.
28	Intermediate US Treasury	05/25/2017	($25,000,000)	Liquidated from intermediate U.S. Treasury portfolio.
29	Schroders Insurance Linked Securities	05/25/2017	$25,000,000	Invested in insurance linked security portfolio.

ALASKA RETIREMENT MANAGEMENT BOARD

CIO REPORT

Treasury Division
June 22, 2017

Item	Action	Date	Amount	Description/Summary
30	MacKay Shields High Yield	05/26/2017	($75,000,000)	Liquidated from domestic high yield portfolio.
31	Intermediate US Treasury	05/27/2017	$75,000,000	Invested in intermediate U.S. Treasury portfolio.
32	Intermediate US Treasury	05/30/2017	($50,000,000)	Liquidated from intermediate U.S. Treasury portfolio.
33	Lazard Emerging Income	05/30/2017	$50,000,000	Invested in emerging market debt portfolio.
34	Small Cap Transition Account	6/6/2017	($60,002,371)	Moved residual cash from transition portfolio.
35	S&P 600	6/6/2017	$60,002,371	Invested in domestic equity portfolio.
36	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:			
37	Lazard Emerging Income	04/24/2017		Notified manager of watch list placement due to underperformance.
	Other Actions:			
38	Committed $50 million to New Mountain Capital Partners V Limited Partnership	05/10/2017		Committed to private equity investment, exercising delegation to invest in managers in good standing.
39	Member Communication	06/02/2017		Received request from member to change deferred compensation program to enable members to roll over deferred compensation assets into an externally-managed IRA. Referred to Division of Retirement and Benefits.
40	Conducted Manager Due Diligence			Staff conducted telephonic or on-site due diligence with managers. Details attached.
	<u>Announcements:</u>			
41	Employee theft and fraud charges levied against Eaton Vance employee.	04/24/2017		Charges filed against former Eaton Vance employee. Activity did not impact ARMB portfolio; nor is activity considered systemic in nature. Will continue to monitor developments in this matter.
42	Cap Guardian Portfolio Manager Departure	06/09/2017		Portfolio manager Rudolf Staehelin will be retiring and will be replaced by Eu-Gene Cheah. Staff does not believe this change warrants inclusion on the watch list. The portfolio is run within a multiple-portfolio manager structure. Additionally, Eu-Gene Cheah has long history within the firm. These facts mitigate the impact of Mr. Staehelin's departure. Staff will continue to monitor.

Manager Due Diligence

April 1, 2017 - May 31, 2017

Date	Manager	Asset Class	Location
4/3/2017	New Mountain	Private Equity	Juneau
4/3 - 4/4/2017	UBS Trumbull Fund	Real Estate	Miami
4/4/2017	Blackrock	Private Equity	Juneau
4/4/2017	Crestline	Absolute Return	Telephonic
4/4/2017	UBS Realty	Real Estate	Miami
4/5/2017	UBS Agriculture	Agriculture	South Florida
4/6/2017	JPM SPF	Real Estate	Miami
4/7/2017	Balyasny	Absolute Return	Juneau
4/7/2017	CFM	Absolute Return	Juneau
4/11/2017	Callan	Private Equity	Telephonic
4/12/2017	HIG	Private Equity	Telephonic
4/13/2017	Burgiss	Private Equity	Telephonic
4/13/2017	Crestline	Private Equity	Telephonic
4/13/2017	First Avenue	Private Equity	Telephonic
4/13/2017	Macquarie	Private Equity	Telephonic
4/17/2017	Bloomberg	Private Equity	Telephonic
4/17/2017	Cambridge Assocs	Private Equity	Telephonic
4/17/2017	Crestline	Absolute Return	Juneau
4/17/2017	Preqin	Private Equity	Telephonic
4/18/2017	Crestline	Absolute Return	Juneau
4/20/2017	Brandes Investment Partners	Public Equity	Anchorage
4/20/2017	Columbia Threadneedle	Fixed Income	Telephonic
4/24/2017	Bloomberg	Private Equity	Telephonic
4/24/2017	Sentinel	Real Estate	Philadelphia
4/25/2017	Callan	Private Equity	Telephonic
4/25/2017	Clarion	Real Estate	Connecticut
4/26/2017	Silver Lake	Private Equity	Telephonic
4/26/2017	Silverpeak	Real Estate	Telephonic
4/26 - 4/27/2017	Tishman Speyer	Real Estate	New York
4/27/2017	Farallon	Absolute Return	Telephonic
4/27/2017	JPM SPF	Real Estate	Telephonic
4/28/2017	Abbott	Private Equity	Telephonic
4/28/2017	JPM SPF	Real Estate	New York
4/28/2017	State Street Risk	Portfolio	Telephonic
5/2/2017	KKR	Real Estate	Telephonic
5/4/2017	Almanac	Real Estate	Telephonic
5/5/2017	Callan	Absolute Return	Telephonic
5/5/2017	Schroders	Fixed Income	Telephonic
5/9/2017	QMA	Public Equity	Juneau
5/10/2017	Putnam	Absolute Return	Telephonic
5/11/2017	Man	Absolute Return	Juneau
5/12/2017	Clarion	Real Estate	Telephonic
5/12/2017	Stoxx	Absolute Return	Juneau
5/15/2017	Callan	Absolute Return	Telephonic
5/15 - 5/17/2017	IFM	Infrastructure	Chicago
5/16/2017	Callan	Absolute Return	Telephonic
5/16/2017	Frontier Capital Management	Public Equity	Telephonic
5/16/2017	JPM Infrastructure	Infrastructure	Telephonic
5/16/2017	UBS Trumbull Fund	Real Estate	Telephonic
5/17/2017	Capital Group	Public Equity	Telephonic
5/17/2017	Eaton Vance	Fixed Income	Telephonic
5/17/2017	LaSalle	Real Estate	Chicago
5/17/2017	Monroe Capital	Private Equity	Telephonic
5/17/2017	Portfolio Advisors	Private Equity	Telephonic
5/18/2017	Callan	Absolute Return	Telephonic
5/18/2017	Sycamore Capital Management	Public Equity	Telephonic
5/18/2017	Two Sigma	Absolute Return	Telephonic
5/18/2017	UBS Realty	Real Estate	Chicago
5/18/2017	UBS Trumbull Fund	Real Estate	Chicago
5/19/2017	Crestline	Absolute Return	Telephonic

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Fund Financials – Cash Flow Report
June 22, 2017

Scott Jones, State Comptroller, Department of Revenue

As of April month-end, total plan assets were as follows: PERS - $17.3 billion, TRS - $8.4 billion, JRS - $190 million, NGNMRS - $38 million, SBS - $3.7 billion, and Deferred Comp - $871 million. Total non-participant directed plans totaled $24.8 billion and participant-directed plans $5.7 billion. Total Assets were $30.5 billion.

Year-to-date income was $2.9 billion and the plans experienced a net withdrawal of $676 million. Total assets were up 7.9% year-to-date.

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

Kevin Worley, Chief Financial Officer, Department of Administration

Presented here is the Division of Retirement & Benefits' (DRB) supplement report to the Treasury Division's Financial Report as of April 30, 2017. DRB's supplemental report expands on Treasury's report of "Net Contributions (Withdrawals)" from page 1 and 2 of their report. DRB reports the summary totals of actual employer, member, State of Alaska, and other revenue contributions, as well as benefit payments, refunds / disbursements, and combined administrative / investment expenditures. DRB's report represents cash inflows / outflows for the 10-months ending April 30, 2017 (page 1), and for the month of April 2017. Also presented are participant directed disbursements by plan and by type for the 10-months. At the end of the report, notes to the DRB report are presented on page 4 and page 5, which includes information for the healthcare plans regarding total receipts for Rx rebates from Aetna as well as Retiree Drug Subsidies (RDS) received from CMS.

ALASKA RETIREMENT MANAGEMENT BOARD
FINANCIAL REPORT

As of April 30, 2017

ALASKA RETIREMENT MANAGEMENT BOARD
Schedule of Investment Income and Changes in Invested Assets by Fund
Fiscal Year-to-Date through April 30, 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	$ 873,903,040	$ (265,882,022)	$ 8,817,708,341	7.41%	10.82%
Retirement Health Care Trust	6,773,545,245	714,887,717	(225,174,258)	7,263,258,704	7.23%	10.73%
Total Defined Benefit Plans	14,983,232,568	1,588,790,757	(491,056,280)	16,080,967,045	7.33%	10.78%
Defined Contribution Plans:						
Participant Directed Retirement	667,523,128	85,355,560	75,295,714	828,174,402	24.07%	12.10%
Health Reimbursement Arrangement	224,830,912	25,621,088	29,571,704	280,023,704	24.55%	10.69%
Retiree Medical Plan	59,563,867	6,937,913	10,387,578	76,889,358	29.09%	10.71%
Defined Benefit Occupational Death and Disability:						
Public Employees	14,541,982	1,622,823	1,196,697	17,361,502	19.39%	10.72%
Police and Firefighters	7,181,338	793,404	408,199	8,382,941	16.73%	10.74%
Total Defined Contribution Plans	973,641,227	120,330,788	116,859,892	1,210,831,907	24.36%	11.66%
Total PERS	**15,956,873,795**	**1,709,121,545**	**(374,196,388)**	**17,291,798,952**	8.37%	10.84%
Teachers' Retirement System (TRS)						
Defined Benefit Plans:						
Retirement Trust	4,939,784,971	524,486,194	(208,538,096)	5,255,733,069	6.40%	10.85%
Retirement Health Care Trust	2,537,521,837	267,765,388	(80,969,050)	2,724,318,175	7.36%	10.72%
Total Defined Benefit Plans	7,477,306,808	792,251,582	(289,507,146)	7,980,051,244	6.72%	10.80%
Defined Contribution Plans:						
Participant Directed Retirement	286,112,304	36,615,678	25,040,982	347,768,964	21.55%	12.26%
Health Reimbursement Arrangement	68,360,784	7,661,032	7,267,771	83,289,587	21.84%	10.64%
Retiree Medical Plan	23,621,452	2,667,653	2,705,103	28,994,208	22.75%	10.68%
Defined Benefit Occupational Death and Disability	3,137,633	335,991	(12,328)	3,461,296	10.32%	10.73%
Total Defined Contribution Plans	381,232,173	47,280,354	35,001,528	463,514,055	21.58%	11.86%
Total TRS	**7,858,538,981**	**839,531,936**	**(254,505,618)**	**8,443,565,299**	7.44%	10.86%
Judicial Retirement System (JRS)						
Defined Benefit Plan Retirement Trust	143,723,441	15,727,492	1,238,645	160,689,578	11.80%	10.90%
Defined Benefit Retirement Health Care Trust	26,917,606	2,878,581	(167,924)	29,628,263	10.07%	10.73%
Total JRS	**170,641,047**	**18,606,073**	**1,070,721**	**190,317,841**	11.53%	10.87%
National Guard/Naval Militia Retirement System (MRS)						
Defined Benefit Plan Retirement Trust	35,866,581	2,656,258	(563,152)	37,959,687	5.84%	7.46%
Other Participant Directed Plans						
Supplemental Annuity Plan	3,419,489,723	270,727,982	(35,551,518)	3,654,666,187	6.88%	7.96%
Deferred Compensation Plan	808,795,367	74,485,132	(11,970,065)	871,310,434	7.73%	9.28%
Total All Funds	**28,250,205,494**	**2,915,128,926**	**(675,716,020)**	**30,489,618,400**		
Total Non-Participant Directed	23,068,284,972	2,447,944,574	(728,531,133)	24,787,698,413	7.45%	10.78%
Total Participant Directed	5,181,920,522	467,184,352	52,815,113	5,701,919,987	10.03%	8.97%
Total All Funds	**$ 28,250,205,494**	**$ 2,915,128,926**	**$ (675,716,020)**	**$ 30,489,618,400**	**7.93%**	**10.44%**

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 April 30, 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	$ 8,757,453,343	$ 99,812,599	$ (39,557,601)	$ 8,817,708,341	0.69%	1.14%
Retirement Health Care Trust	7,206,802,198	81,095,425	(24,638,919)	7,263,258,704	0.78%	1.13%
Total Defined Benefit Plans	15,964,255,541	180,908,024	(64,196,520)	16,080,967,045	0.73%	1.14%
Defined Contribution Plans:						
Participant Directed Retirement	811,089,672	9,796,607	7,288,123	828,174,402	2.11%	1.20%
Health Reimbursement Arrangement	273,971,531	3,077,388	2,974,785	280,023,704	2.21%	1.12%
Retiree Medical Plan	75,055,913	842,737	990,708	76,889,358	2.44%	1.12%
Defined Benefit Occupational Death and Disability:						
Public Employees	17,054,061	191,635	115,806	17,361,502	1.80%	1.12%
Police and Firefighters	8,257,072	92,672	33,197	8,382,941	1.52%	1.12%
Total Defined Contribution Plans	1,185,428,249	14,001,039	11,402,619	1,210,831,907	2.14%	1.18%
Total PERS	**17,149,683,790**	**194,909,063**	**(52,793,901)**	**17,291,798,952**	0.83%	1.14%
Teachers' Retirement System (TRS)						
Defined Benefit Plans:						
Retirement Trust	5,227,289,661	59,596,032	(31,152,624)	5,255,733,069	0.54%	1.14%
Retirement Health Care Trust	2,702,012,962	30,403,573	(8,098,360)	2,724,318,175	0.83%	1.13%
Total Defined Benefit Plans	7,929,302,623	89,999,605	(39,250,984)	7,980,051,244	0.64%	1.14%
Defined Contribution Plans:						
Participant Directed Retirement	339,949,174	4,174,253	3,645,537	347,768,964	2.30%	1.22%
Health Reimbursement Arrangement	81,497,721	915,860	876,006	83,289,587	2.20%	1.12%
Retiree Medical Plan	28,377,256	318,911	298,041	28,994,208	2.17%	1.12%
Defined Benefit Occupational Death and Disability	3,422,865	38,483	(52)	3,461,296	1.12%	1.12%
Total Defined Contribution Plans	453,247,016	5,447,507	4,819,532	463,514,055	2.27%	1.20%
Total TRS	**8,382,549,639**	**95,447,112**	**(34,431,452)**	**8,443,565,299**	0.73%	1.14%
Judicial Retirement System (JRS)						
Defined Benefit Plan Retirement Trust	159,414,646	1,817,540	(542,608)	160,689,578	0.80%	1.14%
Defined Benefit Retirement Health Care Trust	29,334,634	329,975	(36,346)	29,628,263	1.00%	1.13%
Total JRS	**188,749,280**	**2,147,515**	**(578,954)**	**190,317,841**	0.83%	1.14%
National Guard/Naval Militia Retirement System (MRS)						
Defined Benefit Plan Retirement Trust	37,673,610	421,092	(135,015)	37,959,687	0.76%	1.12%
Other Participant Directed Plans						
Supplemental Annuity Plan	3,625,746,324	33,201,301	(4,281,438)	3,654,666,187	0.80%	0.92%
Deferred Compensation Plan	865,032,042	7,665,019	(1,386,627)	871,310,434	0.73%	0.89%
Total All Funds	**30,249,434,685**	**333,791,102**	**(93,607,387)**	**30,489,618,400**		
Total Non-Participant Directed	24,607,617,473	278,953,922	(98,872,982)	24,787,698,413	0.73%	1.14%
Total Participant Directed	5,641,817,212	54,837,180	5,265,595	5,701,919,987	1.07%	0.97%
Total All Funds	**$ 30,249,434,685**	**$ 333,791,102**	**$ (93,607,387)**	**$ 30,489,618,400**	**0.79%**	**1.11%**

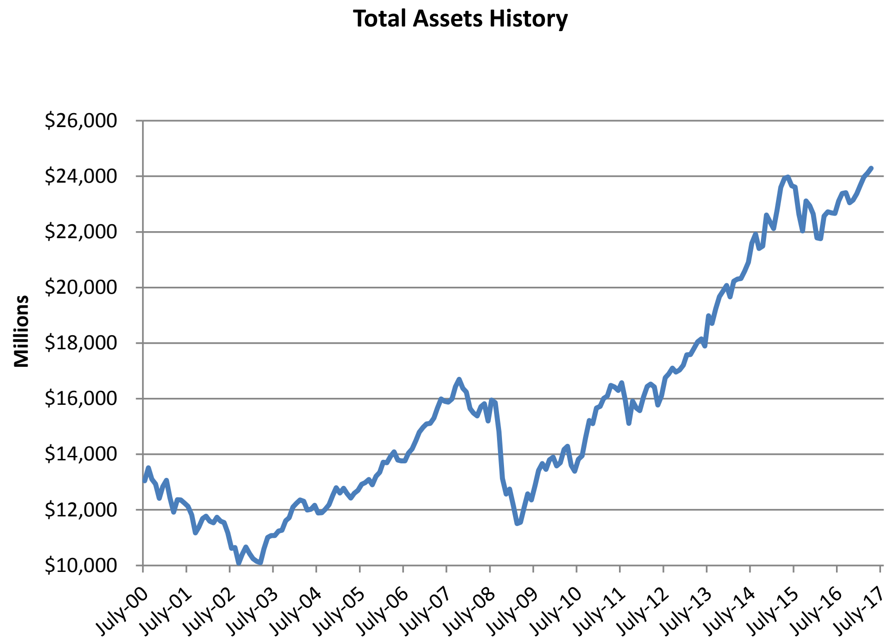
Notes:

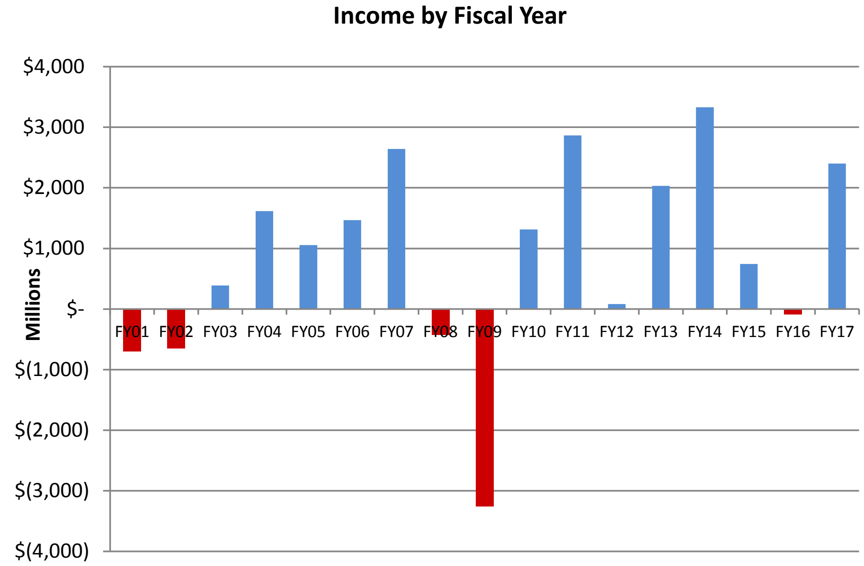
(1) Includes interest, dividends, securities lending, expenses, realized and unrealized gains/losses

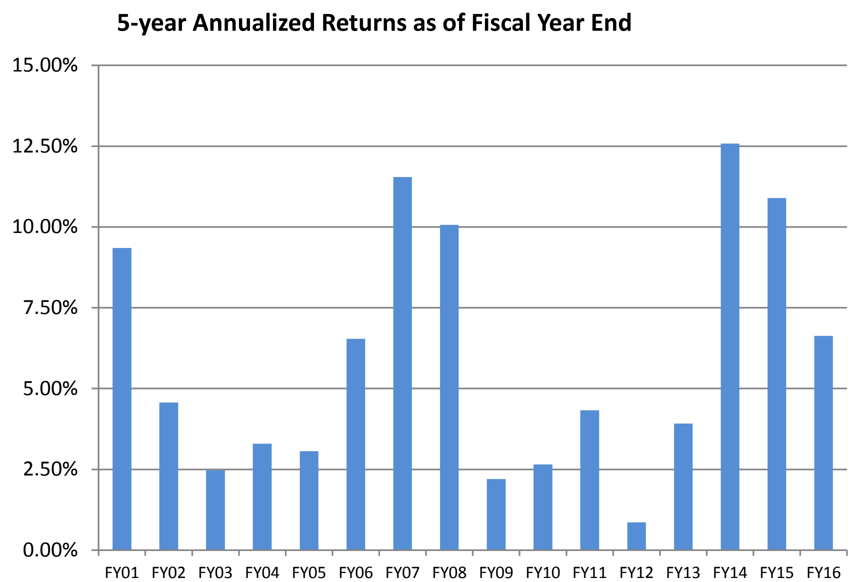
(2) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates and can be found at: http://www.revenue.state.ak.us/treasury/programs/programs/other/armb/investmentresults.aspx

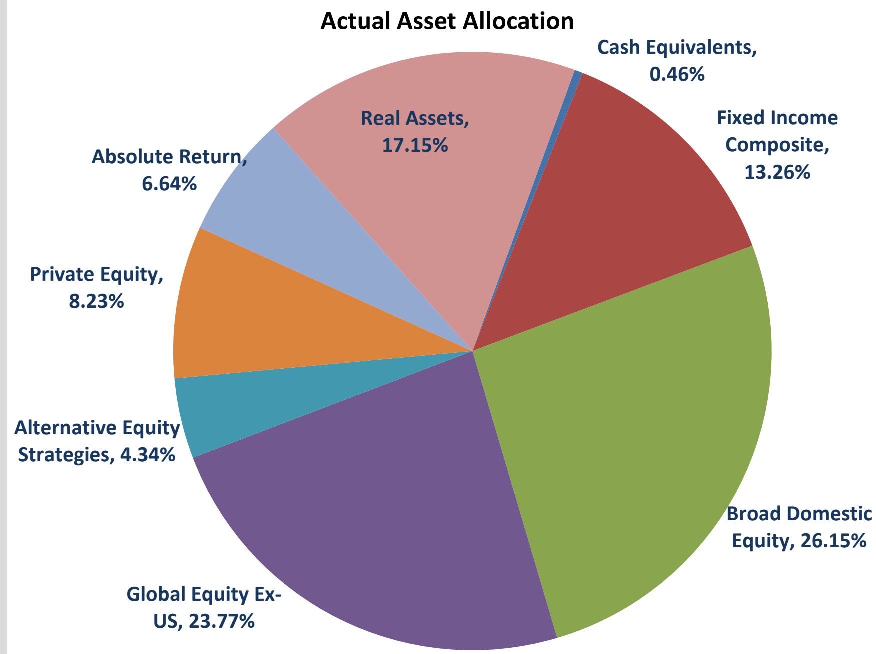
Total Defined Benefit Assets

As of April 30, 2017



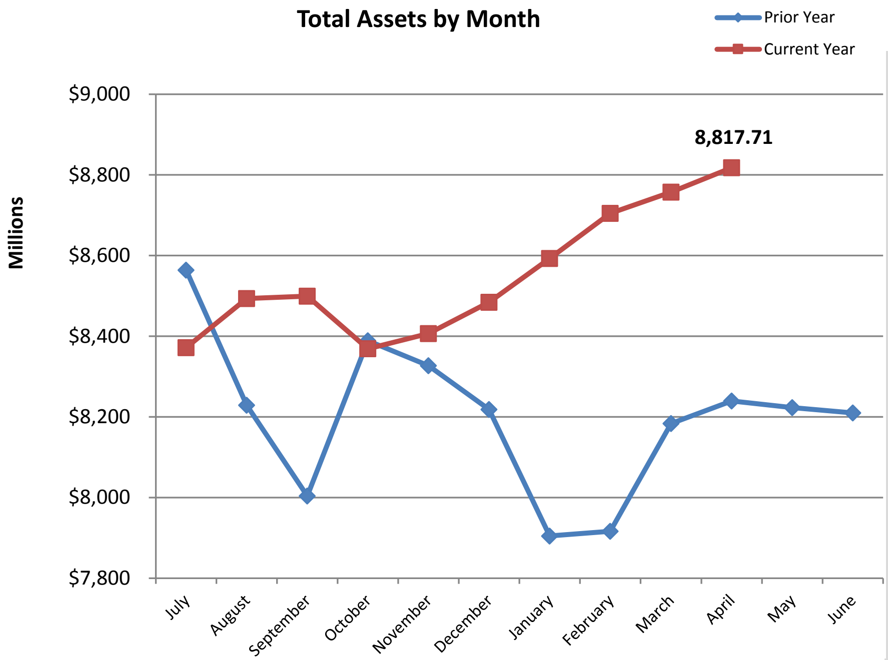


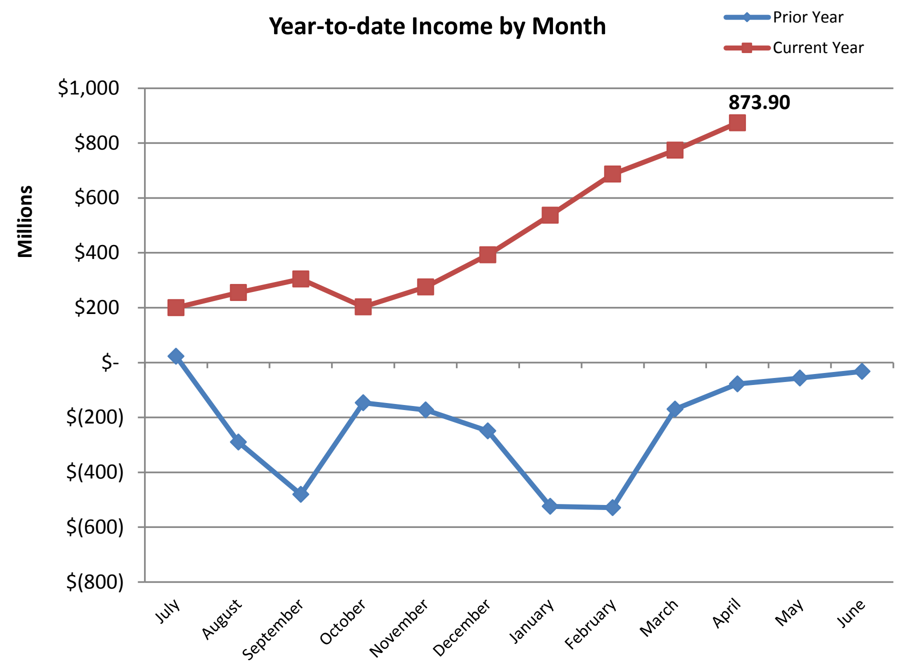


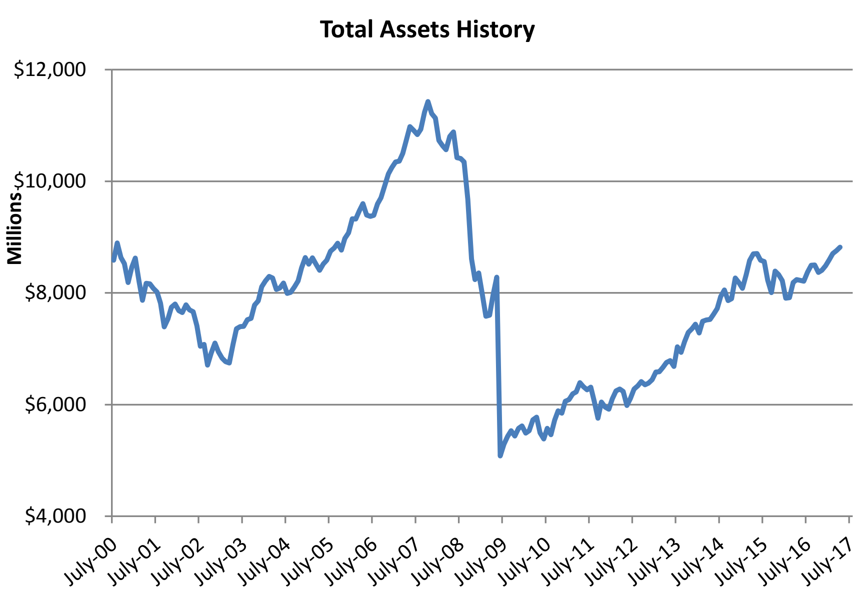


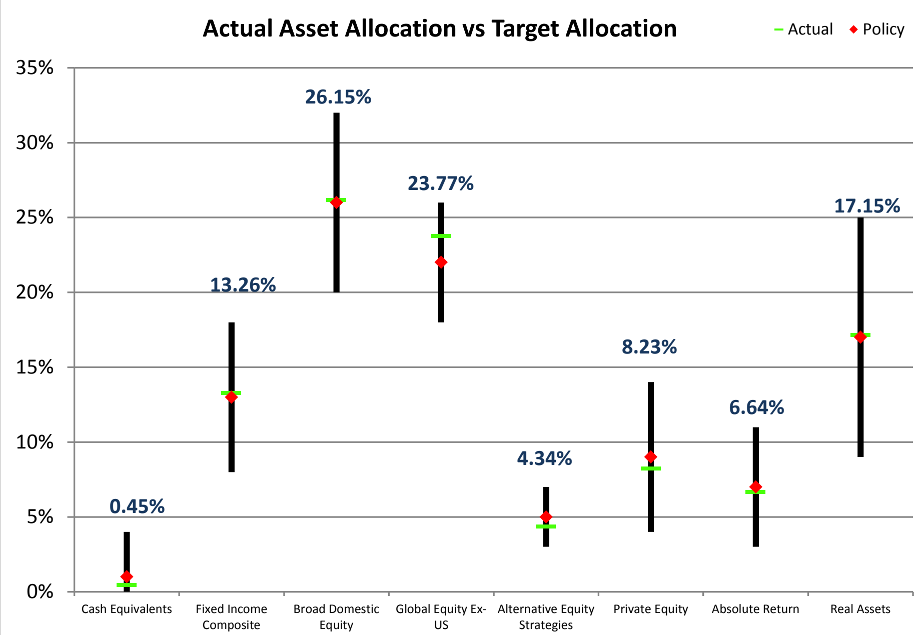
Public Employees' Retirement Pension Trust Fund

Fiscal Year-to-Date through April 30, 2017



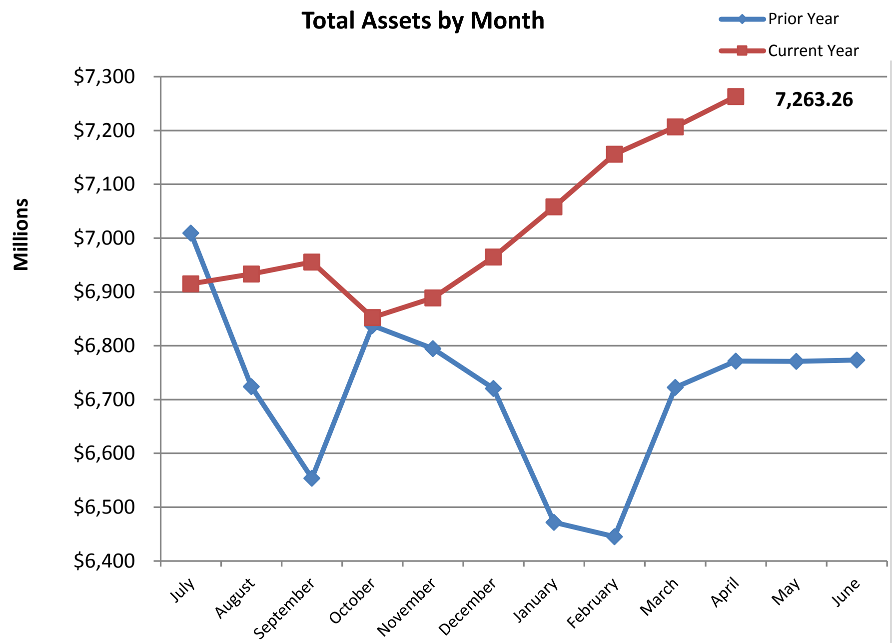


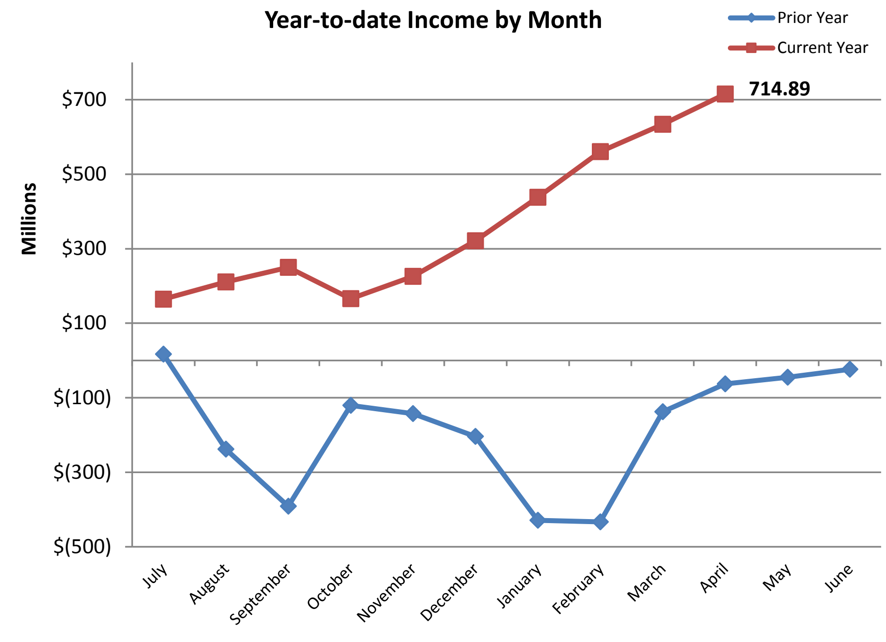


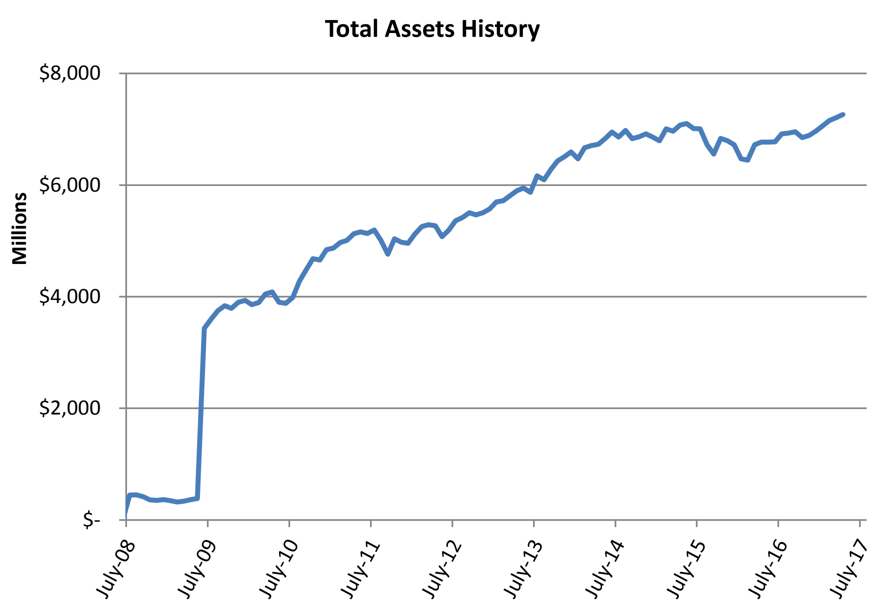


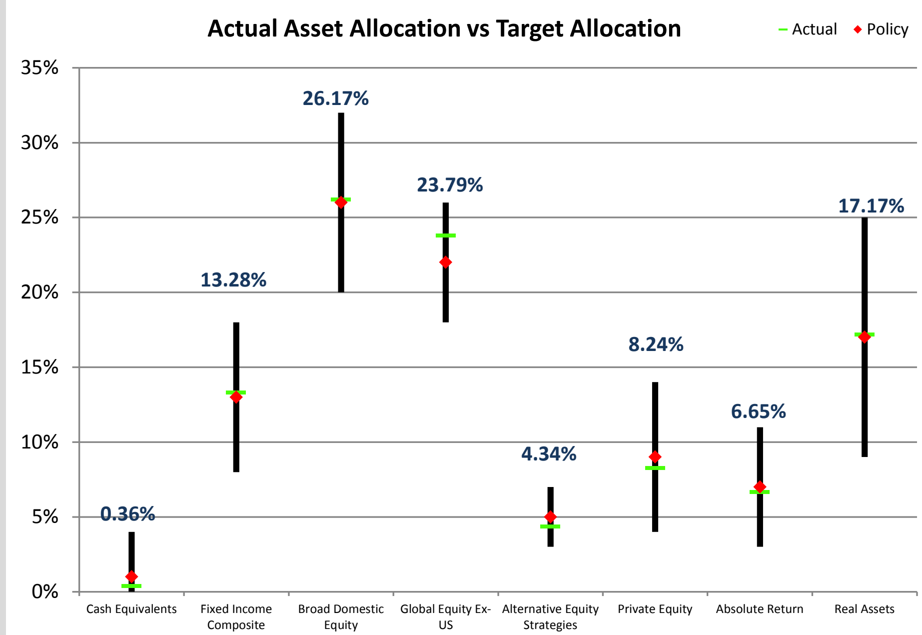
Public Employees' Retirement Health Care Trust Fund

Fiscal Year-to-Date through April 30, 2017



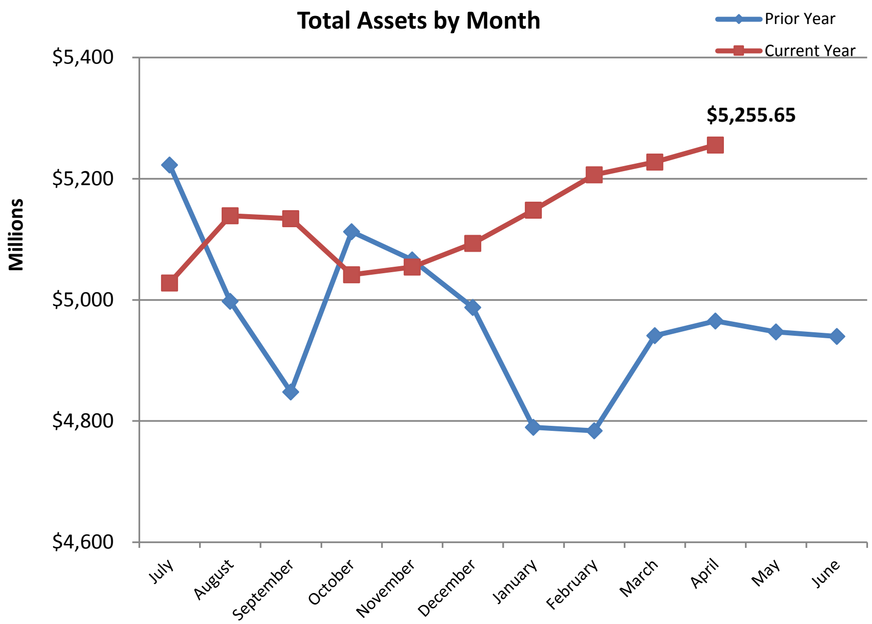


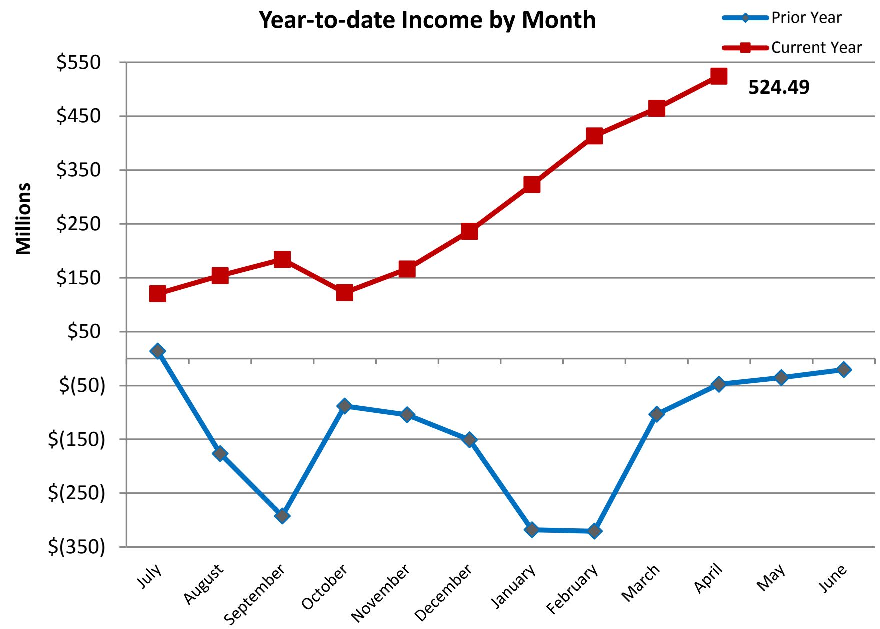


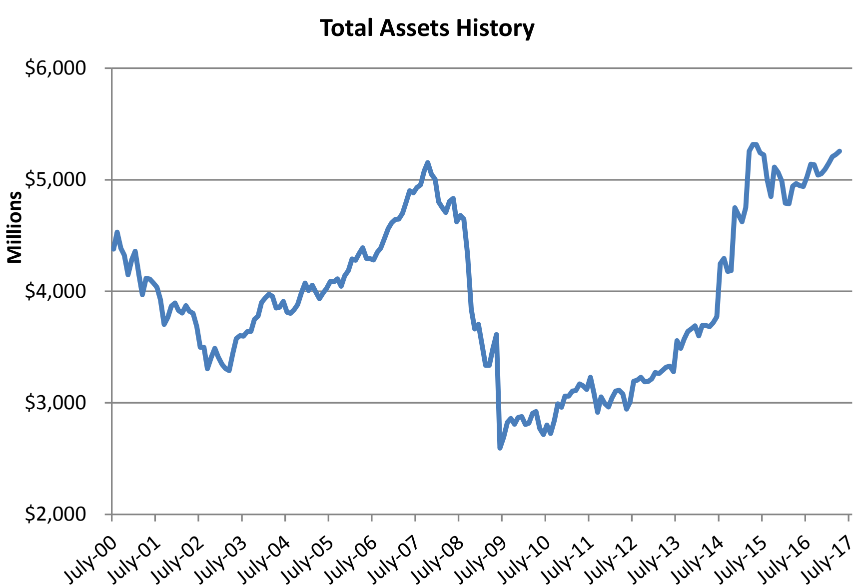


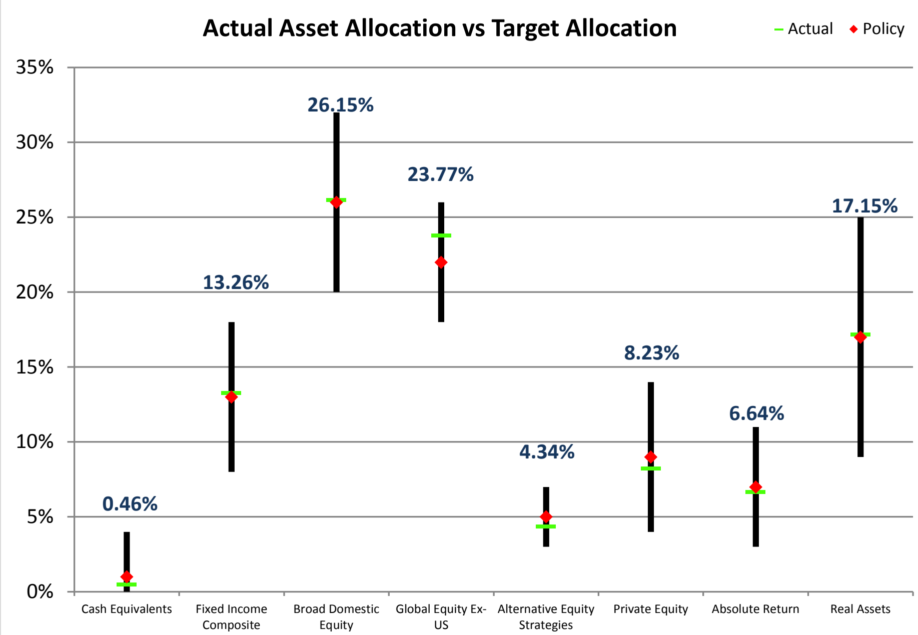
Teachers' Retirement Pension Trust Fund

Fiscal Year-to-Date through April 30, 2017



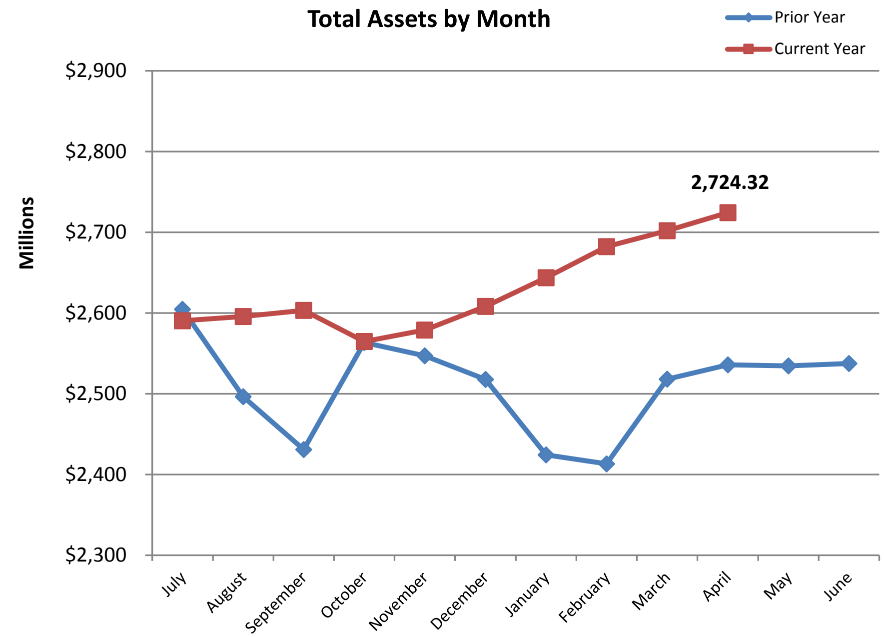


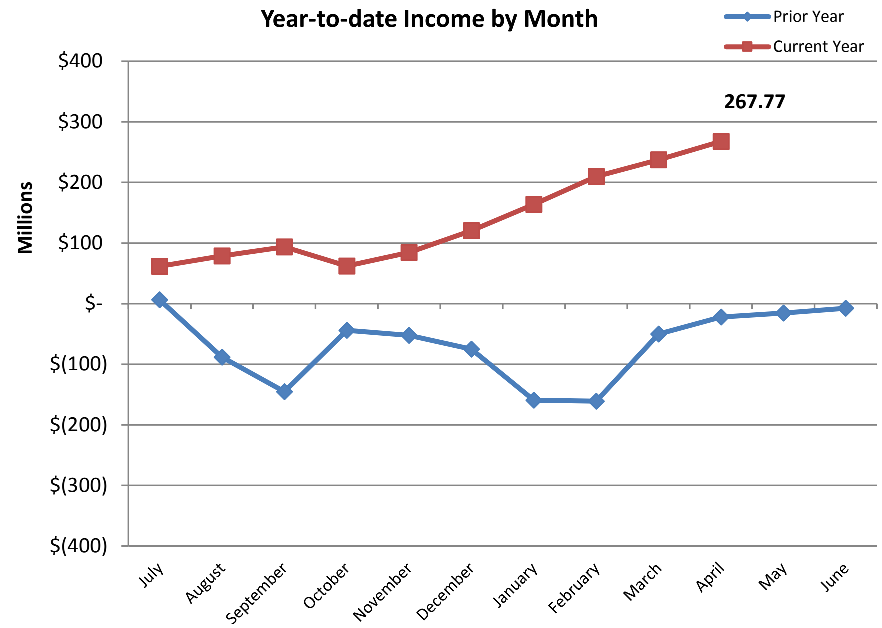


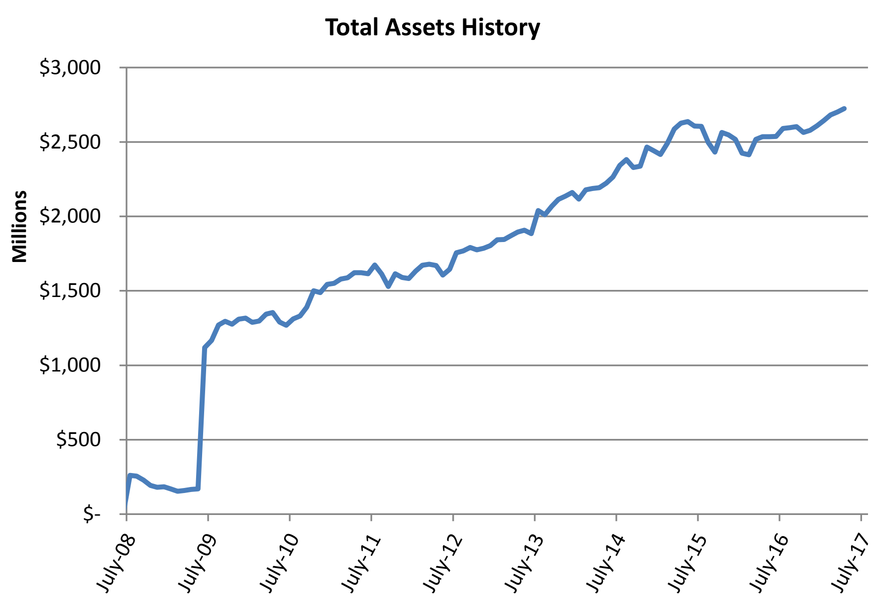


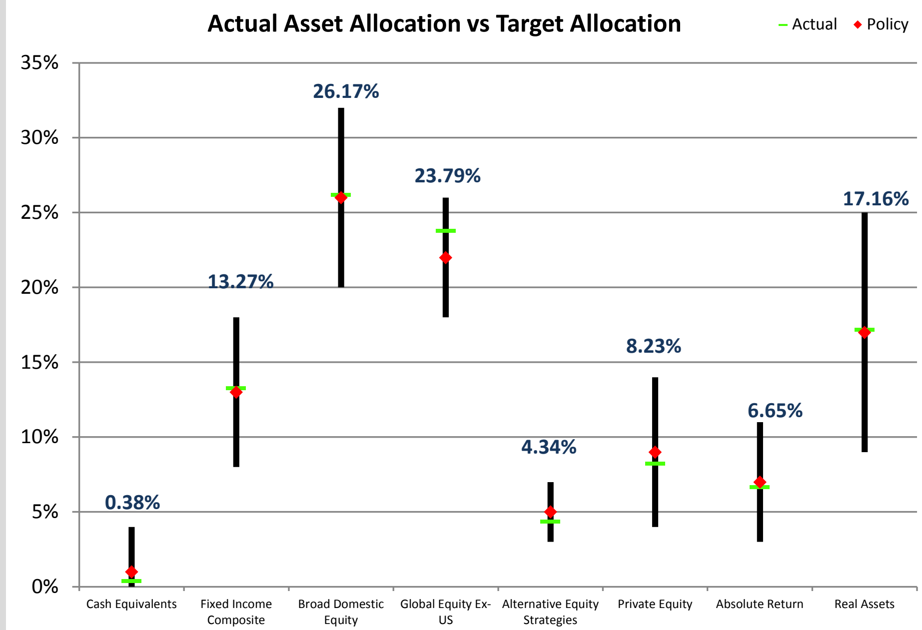
Teachers' Retirement Health Care Trust Fund

Fiscal Year-to-Date through April 30, 2017



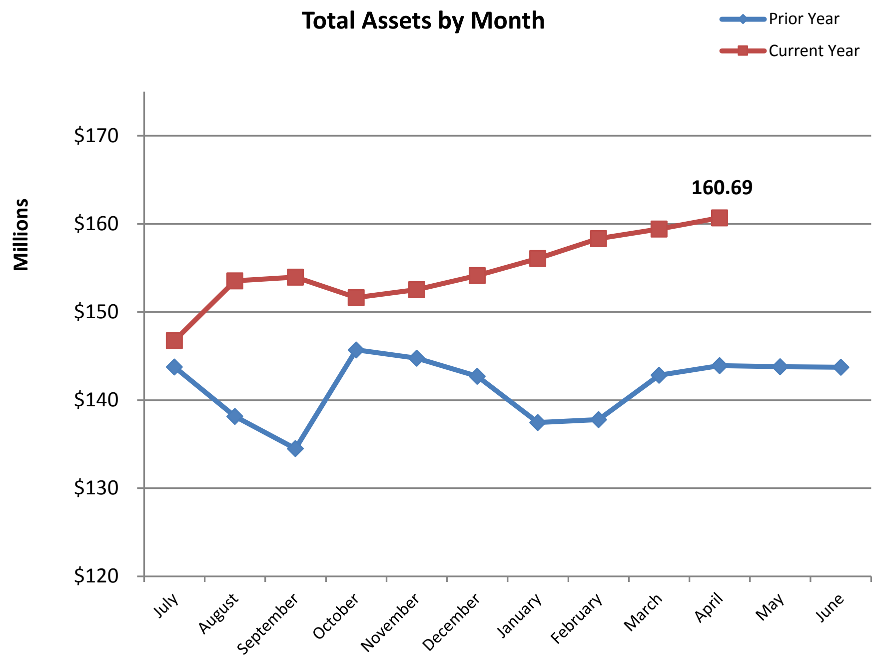


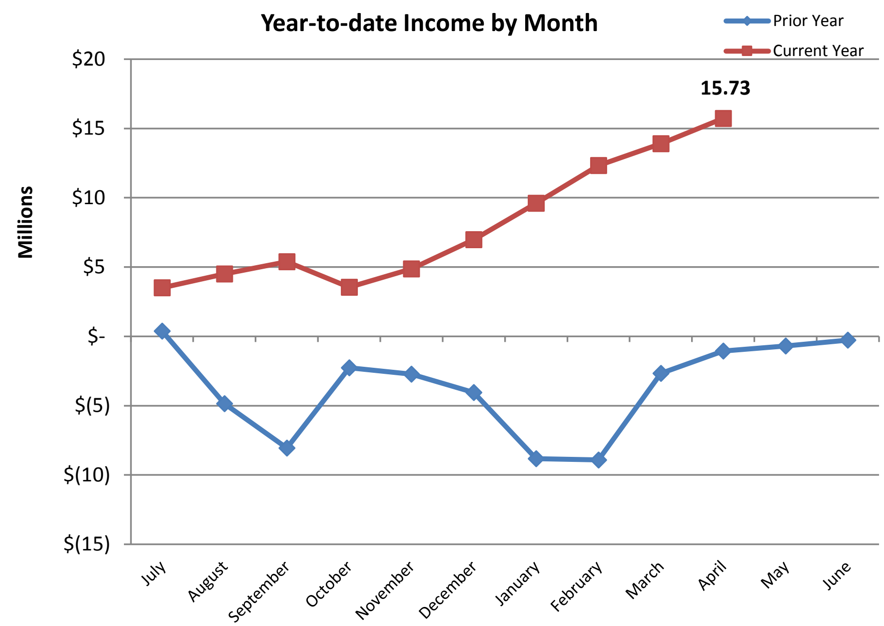


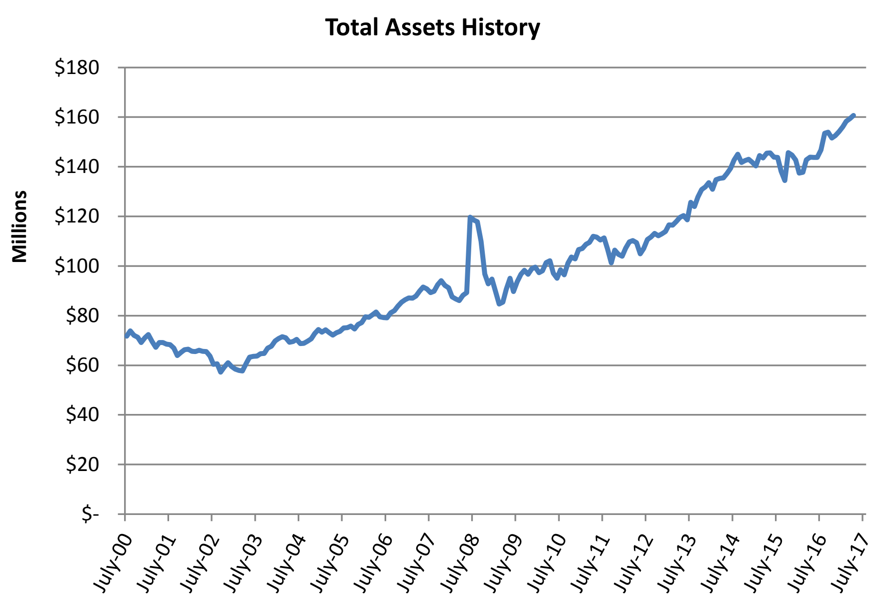


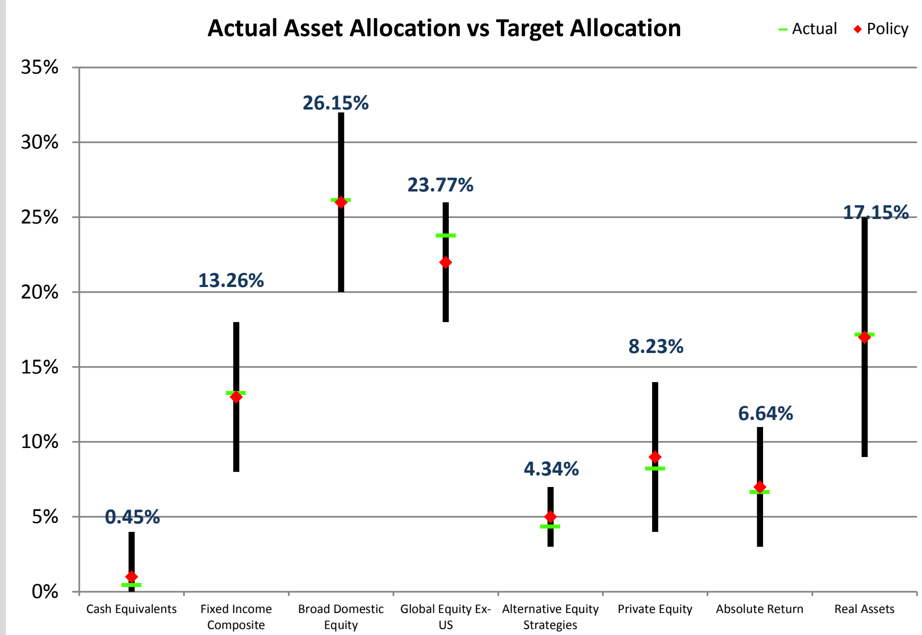
Judicial Retirement Pension Trust Fund

Fiscal Year-to-Date through April 30, 2017



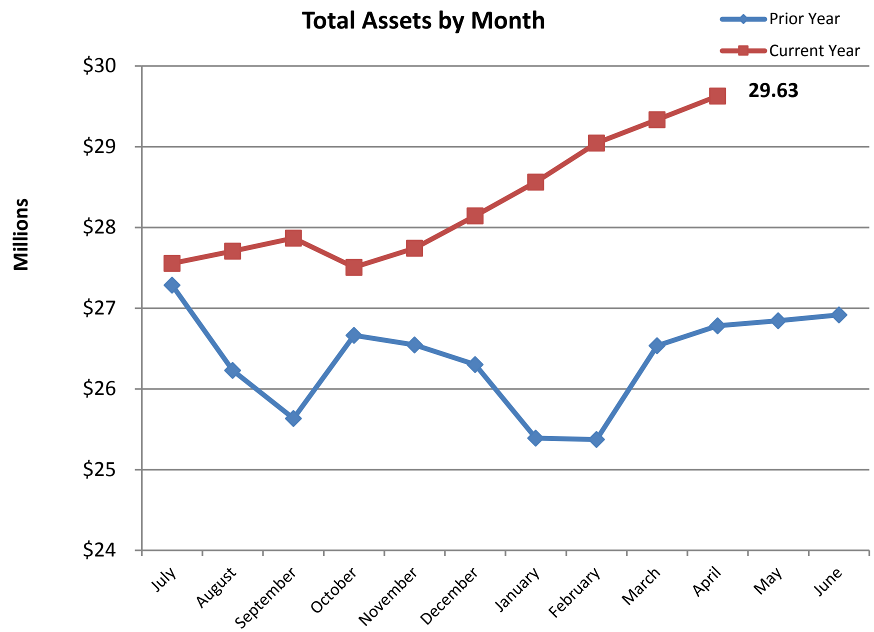


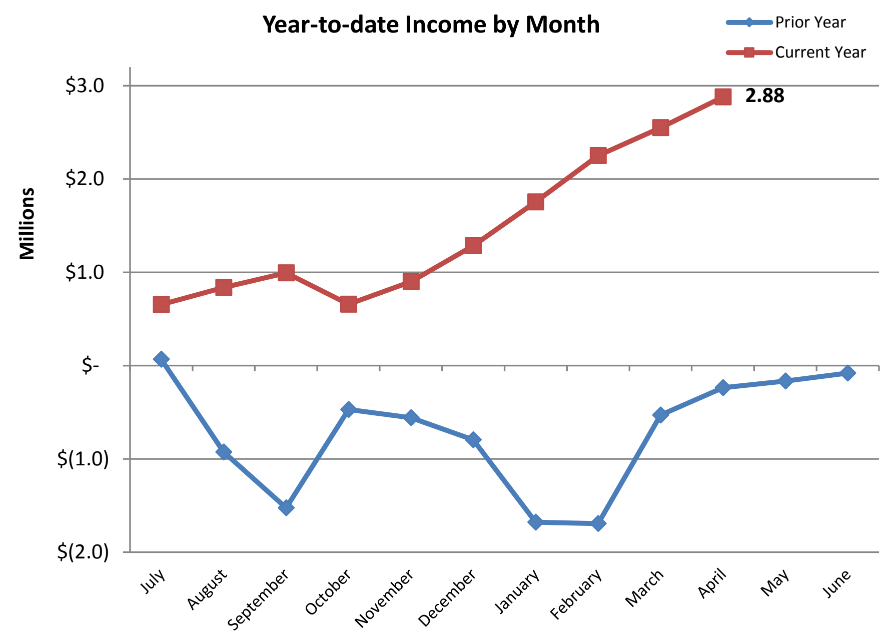


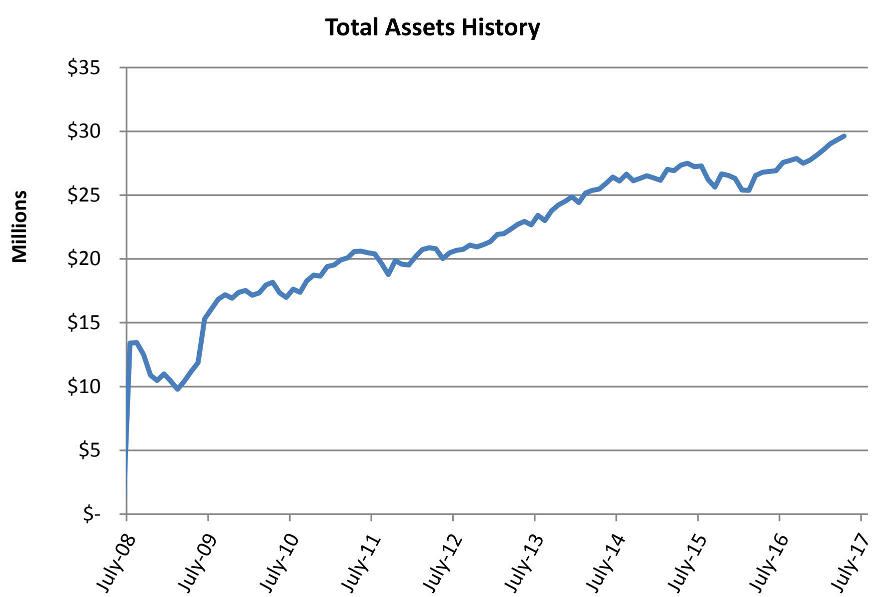


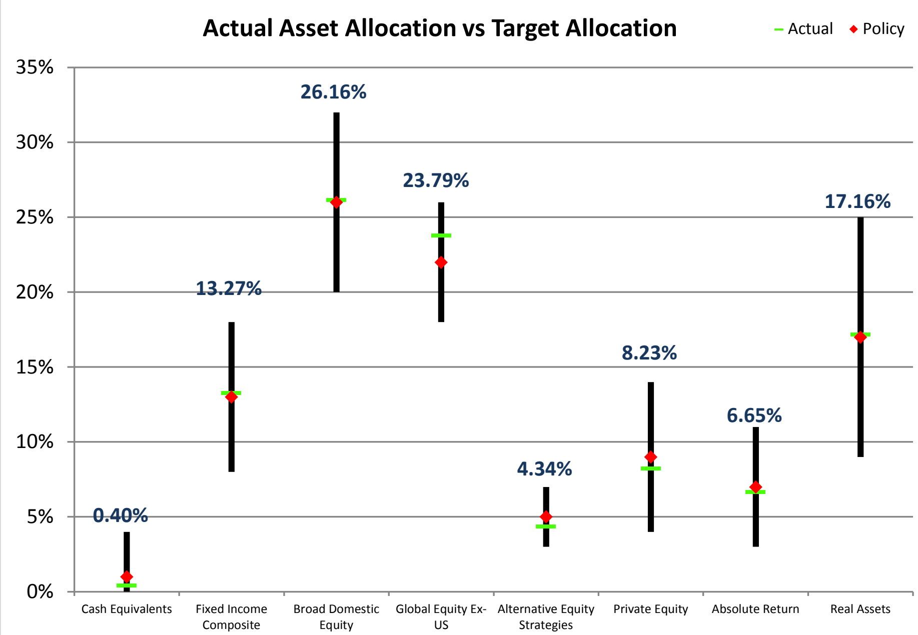
Judicial Retirement Health Care Trust Fund

Fiscal Year-to-Date through April 30, 2017



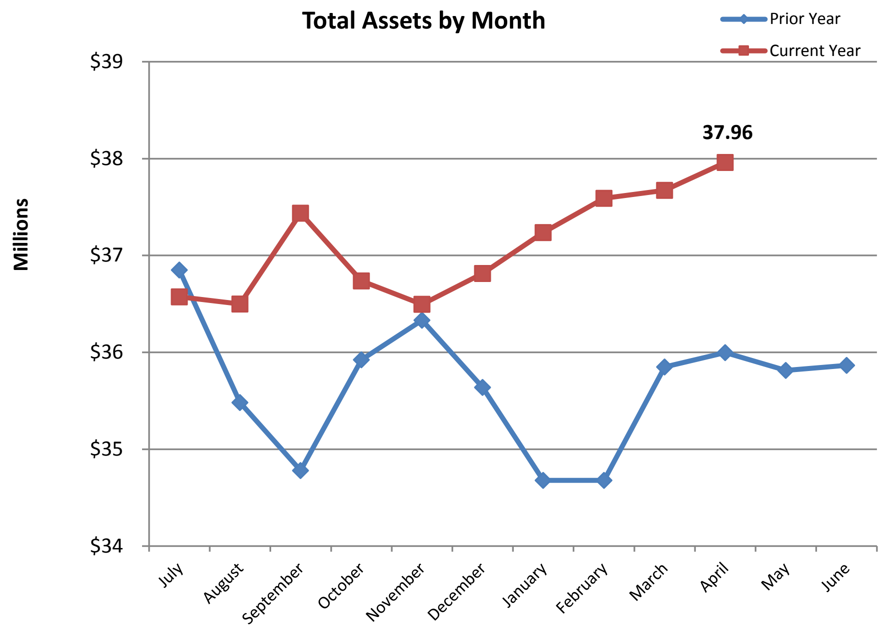


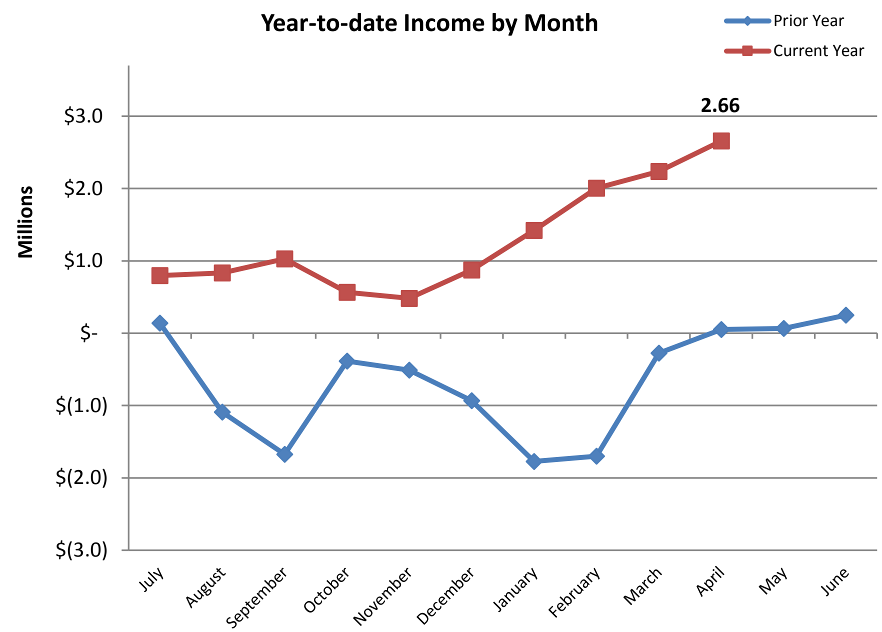


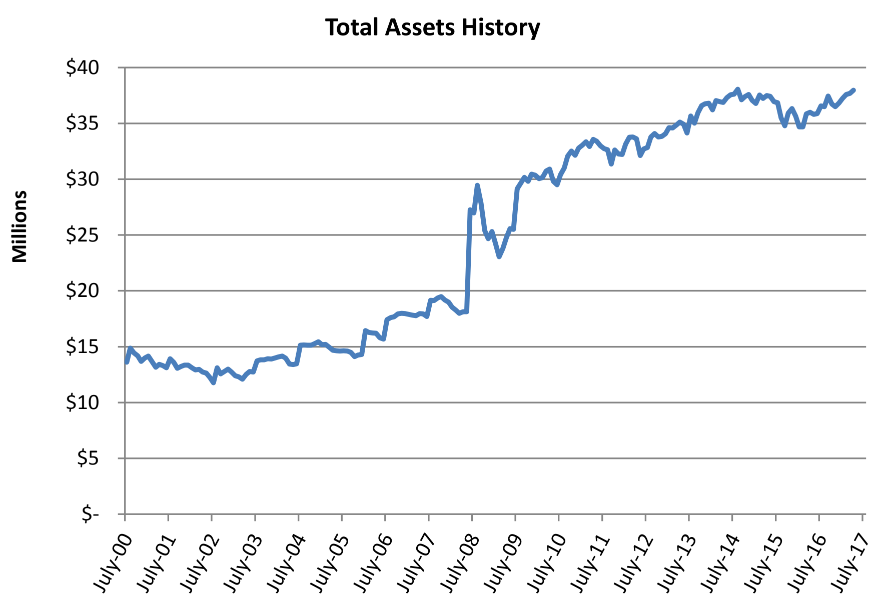


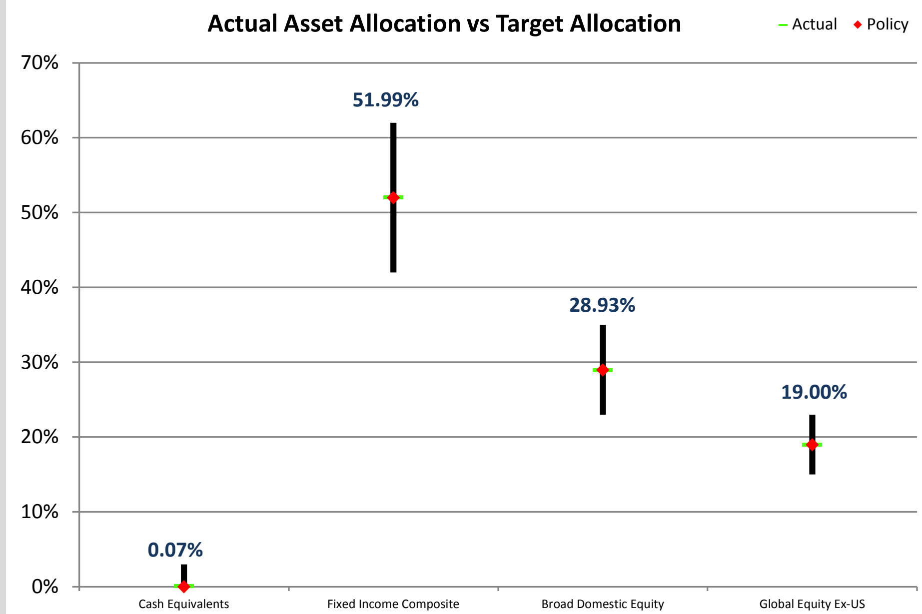
Military Retirement Trust Fund

Fiscal Year-to-Date through April 30, 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 April 30, 2017

	Beginning Invested Assets	Investment Income	Net Contributions and (Withdrawals)	Ending Invested Assets	% increase (decrease)
Cash					
Short-Term Fixed Income Pool	$ 142,515,822	$ 542,709	$ (38,507,874)	$ 104,550,657	-26.64%
Total Cash	142,515,822	542,709	(38,507,874)	104,550,657	-26.64%
Fixed Income					
US Treasury Fixed Income	1,514,882,669	8,868,016	200,000,000	1,723,750,685	13.79%
Taxable Municipal Bond Pool					
Western Asset Management	103,628,465	922,680	-	104,551,145	0.89%
Guggenheim Partners	98,098,101	1,379,803	-	99,477,904	1.41%
	201,726,566	2,302,483	-	204,029,049	1.14%
Alternative Fixed Income Pool					
Fidelity Institutional Asset Management.	133,310,815	1,082,726	-	134,393,541	0.81%
Schroders Innsurance Linked Securities	61,811,612	221,147	-	62,032,759	0.36%
	195,122,427	1,303,873	-	196,426,300	0.67%
International Fixed Income Pool					
Mondrian Investment Partners	276,939,040	4,433,393	-	281,372,433	1.60%
High Yield Pool					
MacKay Shields, LLC	244,066,511	2,414,796	(25,000,000)	221,481,307	-9.25%
Fidelity Instit. Asset Mgmt. High Yield CMBS	206,832,255	1,530,789	-	208,363,044	0.74%
Columbia Threadneedle	200,789,823	2,479,064	-	203,268,887	1.23%
Eaton Vance High Yield	173,790,295	1,885,075	(25,000,000)	150,675,370	-13.30%
	825,478,884	8,309,724	(50,000,000)	783,788,608	-5.05%
Emerging Debt Pool					
Lazard Emerging Income	113,878,651	244,492	-	114,123,143	0.21%
Total Fixed Income	3,128,028,237	25,461,981	150,000,000	3,303,490,218	5.61%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended April 30, 2017

Domestic Equities					
Small Cap Pool					
Passively Managed					
S&P 600 Internally Managed	22,490,225	206,236	-	22,696,461	0.92%
SSgA Russell 2000 Growth	21,196,083	397,149	-	21,593,232	1.87%
SSgA Russell 2000 Value	38,738,687	165,833	-	38,904,520	0.43%
Total Passive	82,424,995	769,218	-	83,194,213	0.93%
Actively Managed					
Barrow, Haney, Mewhinney & Strauss	30,107,437	(135,625)	-	29,971,812	-0.45%
DePrince, Race & Zollo Inc.- Micro Cap	101,877,286	(216,391)	-	101,660,895	-0.21%
Fidelity (FIAM) Small Company	136,614,586	(940,257)	-	135,674,329	-0.69%
Frontier Capital Mgmt. Co.	76,417,831	536,435	-	76,954,266	0.70%
Jennison Associates, LLC	97,736,650	1,455,021	-	99,191,671	1.49%
Lord Abbett Small Cap Growth Fund	51,947,855	392,684	-	52,340,539	0.76%
Lord Abbett & Co.- Micro Cap	93,028,621	497,898	-	93,526,519	0.54%
Luther King Capital Management	-	-	-	-	-
SSgA Futures Small Cap	2,119,005	164,965	-	2,283,970	7.79%
Transition Account	-	-	-	-	-
Sycamore Capital	139,877,658	1,110,751	-	140,988,409	0.79%
SSgA Volatility-Russell 2000	90,454,915	2,087,128	-	92,542,043	2.31%
Zebra Capital Management	90,830,461	1,720,351	-	92,550,812	1.89%
BMO Global Asset Management	75,232,874	1,080,007	-	76,312,881	1.44%
Total Active	986,245,179	7,752,967	-	993,998,146	0.79%
Total Small Cap	1,068,670,174	8,522,185	-	1,077,192,359	0.80%
Large Cap Pool					
Passively Managed					
Internally Managed Large Cap.	349,418,891	3,935,662	-	353,354,553	1.13%
SSgA Russell 1000 Growth	1,118,515,655	25,512,080	-	1,144,027,735	2.28%
SSgA Russell 1000 Value	1,037,627,613	(1,700,036)	-	1,035,927,577	-0.16%
SSgA Russell 200	613,030,243	7,146,986	-	620,177,229	1.17%
Total Passive	3,118,592,402	34,894,692	-	3,153,487,094	1.12%
Actively Managed					
Allianz Global Investors	268,313,997	5,498,150	-	273,812,147	2.05%
Barrow, Haney, Mewhinney & Strauss	262,335,328	700,813	-	263,036,141	0.27%
Lazard Freres	410,227,106	3,202,579	-	413,429,685	0.78%
McKinley Capital Mgmt.	259,979,600	7,969,262	-	267,948,862	3.07%
Quantitative Management Assoc.	244,431,022	(1,629,500)	-	242,801,522	-0.67%
SSgA Futures large cap	1,811,889	144,826	-	1,956,715	7.99%
Transition Account	113,685	2,646	-	116,331	2.33%
SSgA Volatility-Russell 1000	93,972,882	1,055,166	-	95,028,048	1.12%
Portable Alpha	488,866,332	1,846,512	4,000,000	494,712,844	1.20%
Scientific Beta, Internally Managed	199,027,057	2,139,782	-	201,166,839	1.08%
Total Active	2,229,078,898	20,930,236	4,000,000	2,254,009,134	1.12%
Total Large Cap	5,347,671,300	55,824,928	4,000,000	5,407,496,228	1.12%
Total Domestic Equity	6,416,341,474	64,347,113	4,000,000	6,484,688,587	1.07%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended April 30, 2017

Alternative Equity Strategies					
Alternative Equity Strategy Pool					
Relational Investors, LLC	1,080,878	-	-	1,080,878	-
Analytic SSgA Account	320,858,941	3,181,884	-	324,040,825	0.99%
Analytic Buy Write Account	8,037,282	214,560	97,074	8,348,916	3.88%
Analytic Buy Write Account	328,896,223	3,396,444	97,074	332,389,741	1.06%
Quantitative Management Associates MPS	215,433,390	562,103	-	215,995,493	0.26%
ARMB Equity Yield Strategy	309,800,054	1,386,250	-	311,186,304	0.45%
Alternative Equity Strategies Transition Account	-	-	-	-	-
Total Alternative Equity Strategy Pool	855,210,545	5,344,797	97,074	860,652,416	0.64%
Convertible Bond Pool					
Advent Capital	212,568,879	1,017,832	-	213,586,711	0.48%
Total Alternative Equity Strategies	1,067,779,424	6,362,629	97,074	1,074,239,127	0.60%
Global Equities Ex US					
Small Cap Pool					
Mondrian Investment Partners	158,179,222	6,532,545	-	164,711,767	4.13%
Schroder Investment Management	171,255,138	9,071,972	-	180,327,110	5.30%
Total Small Cap	329,434,360	15,604,517	-	345,038,877	4.74%
Large Cap Pool					
Blackrock ACWI Ex-US IMI	540,068,537	12,447,615	-	552,516,152	2.30%
Brandes Investment Partners	754,862,653	8,099,986	(100,000,000)	662,962,639	-12.17%
Cap Guardian Trust Co	780,480,303	24,427,409	(100,000,000)	704,907,712	-9.68%
Lazard Freres	365,009,805	10,490,178	-	375,499,983	2.87%
McKinley Capital Management	539,619,272	15,547,387	-	555,166,659	2.88%
SSgA Futures International	-	-	-	-	-
Allianz Global Investors	270,278,650	2,632,313	-	272,910,963	0.97%
Arrow Street Capital	331,523,607	7,854,559	-	339,378,166	2.37%
Baillie Gifford Overseas Limited	403,847,981	14,291,865	-	418,139,846	3.54%
State Street Global Advisors	871,115,350	20,252,658	-	891,368,008	2.32%
Total Large Cap	4,856,806,158	116,043,970	(200,000,000)	4,772,850,128	-1.73%
Emerging Markets Equity Pool					
Lazard Asset Management	497,980,011	9,043,905	-	507,023,916	1.82%
Eaton Vance	263,976,957	3,768,408	-	267,745,365	1.43%
Total Emerging Markets Pool	761,956,968	12,812,313	-	774,769,281	1.68%
Frontier Market Pool					
Everest Capital Frontier Markets Equity	-	-	-	-	-
Total Global Equities	5,948,197,486	144,460,800	(200,000,000)	5,892,658,286	-0.93%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended April 30, 2017

Private Equity Pool					
Abbott Capital	805,942,108	2,437,447	333,036	808,712,591	0.34%
Angelo, Gordon & Co.	1,769,557	-	-	1,769,557	-
Advent International GPE Fund VIII-B	5,569,790	-	-	5,569,790	-
Lexington Partners VII	29,857,300	-	(617,127)	29,240,173	-2.07%
Merit Capital Partners	19,407,485	-	(795,772)	18,611,713	-4.10%
NB SOF III	26,858,893	-	-	26,858,893	-
NB SOF IV	-	-	1,000,000	1,000,000	-
Resolute Fund III	11,770,525	-	-	11,770,525	-
Glendon Opportunities	29,750,807	-	-	29,750,807	-
New Mountain Partners IV	18,358,249	-	624,110	18,982,359	3.40%
KKR Lending Partners II	64,695,869	-	2,627,541	67,323,410	4.06%
NGP XI	26,128,139	-	-	26,128,139	-
Lexington Capital Partners VIII	10,358,004	-	1,250,652	11,608,656	12.07%
Onex Partnership III	21,524,617	-	-	21,524,617	-
Pathway Capital Management LLC	867,816,632	10,901,423	6,887,635	885,605,690	2.05%
Summit Partners GE IX	-	(88,255)	2,400,000	2,311,745	-
Dyal Capital Partners III	11,926,264	-	(431,870)	11,494,394	-3.62%
Warburg Pincus X	14,745,904	-	-	14,745,904	-
Warburg Pincus XI	29,026,216	-	840,000	29,866,216	2.89%
Warburg Pincus XII	14,491,913	-	(175,500)	14,316,413	-1.21%
Total Private Equity	2,009,998,272	13,250,615	13,942,705	2,037,191,592	1.35%
Absolute Return Pool					
Global Asset Management (USA) Inc.	215,348,432	1,363,685	(16,000,000)	200,712,117	-6.80%
Prisma Capital Partners	379,113,438	3,431,631	-	382,545,069	0.91%
Crestline Investors, Inc.	401,433,857	1,052,976	(19,209,062)	383,277,771	-4.52%
Allianz Global Investors	348,601,697	5,291,835	-	353,893,532	1.52%
Crestline Specialty Fund	27,971,430	-	-	27,971,430	-
KKR Apex Equity Fund	94,176,238	(58,181)	-	94,118,057	-0.06%
Zebra Global Equity Fund	130,559,993	807,439	-	131,367,432	0.62%
Zebra Global Equity Advantage Fund	69,879,049	852,268	-	70,731,317	1.22%
Total Absolute Return Investments	1,667,084,134	12,741,653	(35,209,062)	1,644,616,725	-1.35%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended April 30, 2017

Real Assets					
Farmland Pool					
UBS Agrivest, LLC	558,783,761	-	-	558,783,761	-
Hancock Agricultural Investment Group	267,245,460	-	-	267,245,460	-
Total Farmland Pool	826,029,221	-	-	826,029,221	-
Timber Pool					
Timberland Invt Resource LLC	265,613,308	-	(1,000,000)	264,613,308	-0.38%
Hancock Natural Resource Group	96,587,854	-	-	96,587,854	-
Total Timber Pool	362,201,162	-	(1,000,000)	361,201,162	-0.28%
Energy Pool					
EIG Energy Fund XV	30,429,649	82,312	-	30,511,961	0.27%
EIG Energy Fund XD	261,481	-	-	261,481	-
EIG Energy Fund XIV-A	11,382,119	-	-	11,382,119	-
EIG Energy Fund XVI	48,070,946	-	(2,722,834)	45,348,112	-5.66%
Total Energy Pool	90,144,195	82,312	(2,722,834)	87,503,673	-2.93%
REIT Pool					
REIT Trans Account	-	-	-	-	-
REIT Holdings	344,401,721	918,234	-	345,319,955	0.27%
Total REIT Pool	344,401,721	918,234	-	345,319,955	0.27%
Treasury Inflation Proof Securities					
TIPS Internally Managed Account	55,414,395	328,798	-	55,743,193	0.59%
Master Limited Partnerships					
Advisory Research MLP	251,443,150	(4,201,479)	-	247,241,671	-1.67%
Tortoise Capital Advisors	286,565,613	(3,520,984)	-	283,044,629	-1.23%
Total Master Limited Partnerships	538,008,763	(7,722,463)	-	530,286,300	-1.44%
Infrastructure Private Pool					
IFM Global Infrastructuer Fund-Private	255,817,857	8,209,985	25,000,000	289,027,842	12.98%
JP Morgan Infrastructure Fund-Private	98,957,333	-	-	98,957,333	-
Total Infrastructure Private Pool	354,775,190	8,209,985	25,000,000	387,985,175	9.36%
Infrastructure Public Pool					
Brookfield Investment Mgmt.-Public	101,224,160	1,360,341	-	102,584,501	1.34%
Lazard Asset Mgmt.-Public	128,475,706	5,156,646	-	133,632,352	4.01%
Total Infrastructure Public Pool	229,699,866	6,516,987	-	236,216,853	2.84%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended April 30, 2017

Real Estate					
Core Commingled Accounts					
JP Morgan	244,786,818	2,408,174	(1,911,039)	245,283,953	0.20%
UBS Trumbull Property Fund	123,704,544	1,424,257	23,988,763	149,117,564	20.54%
Total Core Commingled	368,491,362	3,832,431	22,077,724	394,401,517	7.03%
Core Separate Accounts					
LaSalle Investment Management	216,157,757	-	(33,221,917)	182,935,840	-15.37%
Sentinel Separate Account	188,696,499	-	(629,427)	188,067,072	-0.33%
UBS Realty	503,309,743	-	(946,524)	502,363,219	-0.19%
Total Core Separate	908,163,999	-	(34,797,868)	873,366,131	-3.83%
Non-Core Commingled Accounts					
Almanac Realty Securities IV	-	-	-	-	-
Almanac Realty Securities V	5,892,867	-	(1,640,839)	4,252,028	-27.84%
Almanac Realty Securities VII	18,082,155	533,515	(112,008)	18,503,662	2.33%
BlackRock Diamond Property Fund	290,613	(3,948)	-	286,665	-1.36%
Clarion Ventures 4	18,666,770	-	-	18,666,770	-
Colony Investors VIII, L.P.	7,544,189	(1,027,900)	-	6,516,289	-13.63%
Cornerstone Apartment Venture III	43,854	-	-	43,854	-
Coventry	437,016	404,155	-	841,171	92.48%
ING Clarion Development Ventures III	6,926,453	-	-	6,926,453	-
KKR Real Estate Partners Americas LP.	35,022,264	-	-	35,022,264	-
LaSalle Medical Office Fund II	279	-	-	279	-
Lowe Hospitality Partners	188,862	-	-	188,862	-
Silverpeak Legacy Pension Partners II, L.P.	11,544,914	(285,684)	-	11,259,230	-2.47%
Silverpeak Legacy Pension Partners III, L.P.	5,662,980	-	-	5,662,980	-
Tishman Speyer Real Estate Venture VI	34,318,040	-	-	34,318,040	-
Tishman Speyer Real Estate Venture VII	5,721,494	-	-	5,721,494	-
Total Non-Core Commingled	150,342,750	(379,862)	(1,752,847)	148,210,041	-1.42%
Total Real Estate	1,426,998,111	3,452,569	(14,472,991)	1,415,977,689	-0.77%
Total Real Assets	4,227,672,624	11,786,422	6,804,175	4,246,263,221	0.44%
Total Assets	$ 24,607,617,473	$ 278,953,922	$ (98,872,982)	24,787,698,413.00	0.73%

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
April 30, 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							
Stable Value Fund	$ 373,791,677	$ 669,024	$ (2,724,508)	$ 4,108,671	$ 375,844,864	0.55%	0.18%
Small Cap Stock Fund	152,139,776	2,194,443	(145,303)	(955,028)	153,233,888	0.72%	1.45%
Alaska Balanced Trust	1,153,461,764	9,740,132	(2,529,189)	(5,302,777)	1,155,369,930	0.17%	0.85%
Long Term Balanced Fund	578,561,467	6,149,451	682,757	(1,341,906)	584,051,769	0.95%	1.06%
AK Target Date 2010 Trust	10,109,813	82,674	4,631	(450,067)	9,747,051	-3.59%	0.84%
AK Target Date 2015 Trust	89,134,847	830,088	(978,841)	(877,332)	88,108,762	-1.15%	0.94%
AK Target Date 2020 Trust	83,752,833	889,171	253,534	(177,682)	84,717,856	1.15%	1.06%
AK Target Date 2025 Trust	60,157,970	711,508	370,436	1,552,259	62,792,173	4.38%	1.16%
AK Target Date 2030 Trust	44,958,913	562,090	372,598	627,540	46,521,141	3.47%	1.24%
AK Target Date 2035 Trust	42,124,396	551,940	482,652	590,392	43,749,380	3.86%	1.29%
AK Target Date 2040 Trust	42,086,144	565,358	393,772	66,195	43,111,469	2.44%	1.34%
AK Target Date 2045 Trust	45,785,274	617,699	608,123	(227,044)	46,784,052	2.18%	1.34%
AK Target Date 2050 Trust	51,853,023	706,246	732,325	(31,647)	53,259,947	2.71%	1.35%
AK Target Date 2055 Trust	40,734,988	542,930	672,807	(500,524)	41,450,201	1.76%	1.33%
AK Target Date 2060 Trust	475,620	7,214	1,893	53,816	538,543	13.23%	1.43%
Total Investments with T. Rowe Price	2,769,128,505	24,819,968	(1,802,313)	(2,865,134)	2,789,281,026		
State Street Global Advisors							
State Street Treasury Money Market Fund - Inst.	40,196,658	20,337	(191,583)	501,597	40,527,009	0.82%	0.05%
S&P 500 Stock Index Fund Series A	392,082,444	4,015,716	(682,961)	1,406,687	396,821,886	1.21%	1.02%
Russell 3000 Index	70,608,282	730,313	(154,578)	(1,156,840)	70,027,177	-0.82%	1.04%
US Real Estate Investment Trust Index	39,662,348	(89,991)	(196,815)	214,937	39,590,479	-0.18%	-0.23%
World Equity Ex-US Index	33,479,332	740,326	(155,916)	1,139,810	35,203,552	5.15%	2.18%
Long US Treasury Bond Index	15,369,697	226,693	19,228	(129,259)	15,486,359	0.76%	1.48%
US Treasury Inflation Protected Securities Index	23,703,411	137,990	(319,830)	(648,018)	22,873,553	-3.50%	0.59%
World Government Bond Ex-US Index	6,322,939	99,769	(62,926)	(61,044)	6,298,738	-0.38%	1.59%
Global Balanced Fund	54,939,672	720,887	(222,501)	(1,028,255)	54,409,803	-0.96%	1.33%
Total Investments with SSGA	676,364,783	6,602,040	(1,967,882)	239,615	681,238,556		
BlackRock							
Government/Credit Bond Fund	40,771,177	337,654	(66,251)	(8,942)	41,033,638	0.64%	0.83%
Intermediate Bond Fund	37,276,340	200,852	(113,135)	2,371,115	39,735,172	6.60%	0.52%
Total Investments with Barclays Global Investors	78,047,517	538,506	(179,386)	2,362,173	80,768,810		
Brandes/Allianz (2)							
AK International Equity Fund	61,543,681	580,394	(69,666)	(225,738)	61,828,671	0.46%	0.95%
RCM							
Sustainable Core Opportunities Fund	40,661,838	660,393	(262,191)	489,084	41,549,124	2.18%	1.62%
Total All Funds	$ 3,625,746,324	$ 33,201,301	$ (4,281,438)	$ -	$ 3,654,666,187	0.80%	0.92%

Notes: Source data provided by the record keeper, Empower Retirement.
(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.
(2) This investment is comprised of two funds, 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
April 30, 2017
$ (Thousands)

Invested Assets (at fair value)	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**	**March**	**April**
Investments with T. Rowe Price										
Stable Value Fund	$ 376,543	$ 373,305	$ 376,379	$ 379,815	$ 380,007	$ 372,966	$ 368,117	$ 369,831	$ 373,792	$ 375,845
Small Cap Stock Fund	128,981	131,621	131,789	125,799	142,649	149,590	151,635	155,937	152,140	153,234
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	1,153,462	1,155,370
Long Term Balanced Fund	548,289	548,555	548,939	543,446	548,169	555,012	564,282	574,983	578,561	584,052
AK Target Date 2010 Trust	9,976	10,012	10,366	10,362	10,461	9,552	9,434	9,441	10,110	9,747
AK Target Date 2015 Trust	90,467	89,013	88,031	86,598	86,694	87,478	87,393	88,258	89,135	88,109
AK Target Date 2020 Trust	78,030	77,667	78,641	77,615	79,689	80,609	80,958	82,572	83,753	84,718
AK Target Date 2025 Trust	51,632	51,790	52,376	51,977	52,956	55,484	56,931	58,234	60,158	62,792
AK Target Date 2030 Trust	38,154	38,809	38,947	39,037	40,150	41,608	43,017	44,051	44,959	46,521
AK Target Date 2035 Trust	35,727	35,875	36,294	36,574	37,954	38,350	39,201	41,505	42,124	43,749
AK Target Date 2040 Trust	35,051	35,401	35,716	36,082	37,058	38,337	39,797	41,256	42,086	43,111
AK Target Date 2045 Trust	38,002	38,321	38,670	38,741	40,697	42,208	43,077	44,670	45,785	46,784
AK Target Date 2050 Trust	43,080	43,355	44,203	44,213	45,859	47,358	48,951	50,821	51,853	53,260
AK Target Date 2055 Trust	32,450	32,932	33,820	34,014	35,352	36,414	37,590	39,272	40,735	41,450
AK Target Date 2060 Trust	116	112	115	114	182	231	279	288	476	539
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	40,197	40,527
S&P 500 Stock Index Fund Series A	348,876	350,812	349,621	343,289	359,690	371,957	378,305	393,986	392,082	396,822
Russell 3000 Index	70,910	68,574	66,830	63,869	66,689	66,991	67,526	70,534	70,608	70,027
US Real Estate Investment Tr ###	49,651	49,140	49,189	43,984	40,967	43,402	43,131	43,189	39,662	39,590
World Equity Ex-US Index	28,316	27,211	26,910	27,551	26,950	28,651	30,123	30,481	33,479	35,204
Long US Treasury Bond Index	28,731	29,447	27,978	24,553	20,360	16,847	17,124	16,056	15,370	15,486
US Treasury Inflation Protected Securities Index	22,342	22,450	22,886	23,460	23,163	23,285	23,629	23,321	23,703	22,874
World Government Bond Ex-US Index	8,979	8,896	8,860	8,068	7,139	7,102	6,973	6,662	6,323	6,299
Global Balanced Fund ###	53,169	53,749	54,101	53,381	53,165	54,142	55,079	55,210	54,940	54,410
Investments with BlackRock										
Government/Credit Bond Fund	42,821	42,464	41,482	41,102	39,852	39,170	39,153	39,677	40,771	41,034
Intermediate Bond Fund	31,560	32,277	32,853	33,009	32,280	32,437	33,349	34,703	37,276	39,735
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	61,544	61,829
Investments with RCM										
Sustainable Core Opportunities Fund	40,377	39,498	39,019	37,121	37,513	38,398	39,647	41,183	40,662	41,549
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**	**$ 3,625,746**	**$ 3,654,666**
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	$ 3,618,140	$ 3,625,746
Investment Earnings	77,719	5,163	6,144	(44,468)	31,775	38,615	45,512	64,305	12,762	33,201
Net Contributions (Withdrawals)	6,629	(11,583)	(4,521)	2,605	(1,327)	(3,151)	(9,752)	(5,015)	(5,156)	(4,281)
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**	**$ 3,625,746**	**$ 3,654,666**

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
April 30, 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 (1)**
T. Rowe Price							
Interest Income Fund	$ 185,382,698	$ 348,909	$ (1,351,644)	$ 2,181,935	$ 186,561,898	0.64%	0.19%
Small Cap Stock Fund	99,967,641	1,446,932	(44,142)	(1,161,388)	100,209,043	0.24%	1.46%
Alaska Balanced Trust	24,496,027	206,039	53,263	(329,311)	24,426,018	-0.29%	0.85%
Long Term Balanced Fund	49,948,811	528,501	43,327	23,106	50,543,745	1.19%	1.06%
AK Target Date 2010 Trust	4,148,219	33,650	2,650	(212,620)	3,971,899	-4.25%	0.83%
AK Target Date 2015 Trust	9,714,989	89,941	(317,488)	(93,508)	9,393,934	-3.30%	0.95%
AK Target Date 2020 Trust	20,796,916	226,625	100,212	277,145	21,400,898	2.90%	1.08%
AK Target Date 2025 Trust	12,755,558	148,981	165,613	1,900	13,072,052	2.48%	1.16%
AK Target Date 2030 Trust	8,507,912	108,563	55,491	245,347	8,917,313	4.81%	1.25%
AK Target Date 2035 Trust	5,495,198	72,363	73,004	48,971	5,689,536	3.54%	1.30%
AK Target Date 2040 Trust	5,581,817	73,981	48,159	(36,109)	5,667,848	1.54%	1.32%
AK Target Date 2045 Trust	4,102,991	51,503	57,699	(163,932)	4,048,261	-1.33%	1.27%
AK Target Date 2050 Trust	2,796,926	37,703	52,860	(6,761)	2,880,728	3.00%	1.34%
AK Target Date 2055 Trust	3,166,158	40,262	35,753	(124,402)	3,117,771	-1.53%	1.29%
AK Target Date 2060 Trust	86,872	1,175	758	351	89,156	2.63%	1.34%
Total Investments with T. Rowe Price	436,948,733	3,415,128	(1,024,485)	650,724	439,990,100		
State Street Global Advisors							
State Street Treasury Money Market Fund - Inst.	13,750,032	6,759	(62,514)	(301,681)	13,392,596	-2.60%	0.05%
Russell 3000 Index	34,435,702	378,114	141,352	845,547	35,800,715	3.96%	1.08%
US Real Estate Investment Trust Index	14,487,180	(39,434)	28,531	(25,205)	14,451,072	-0.25%	-0.27%
World Equity Ex-US Index	12,053,573	270,518	9,461	599,504	12,933,056	7.30%	2.19%
Long US Treasury Bond Index	5,401,813	77,772	3,490	230,335	5,713,410	5.77%	1.41%
US Treasury Inflation Protected Securities Index	10,108,308	60,037	(23,938)	(139,888)	10,004,519	-1.03%	0.60%
World Government Bond Ex-US Index	2,646,837	42,710	(1,913)	(49,623)	2,638,011	-0.33%	1.63%
Global Balanced Fund	38,113,622	510,529	(1,150)	(150,310)	38,472,691	0.94%	1.34%
Total Investments with SSGA	130,997,067	1,307,005	93,319	1,008,679	133,406,070		
BlackRock							
S&P 500 Index Fund	197,311,247	2,008,194	(445,547)	(1,067,063)	197,806,831	0.25%	1.02%
Government/Credit Bond Fund	26,013,431	212,932	(101,716)	(65,170)	26,059,477	0.18%	0.82%
Intermediate Bond Fund	20,806,634	111,400	16,909	263,657	21,198,600	1.88%	0.53%
Total Investments with Barclays Global Investors	244,131,312	2,332,526	(530,354)	(868,576)	245,064,908		
Brandes/Allianz (2)							
AK International Equity Fund	35,231,998	322,290	55,449	(762,156)	34,847,581	-1.09%	0.92%
RCM							
Sustainable Core Opportunities Fund	17,722,932	288,070	19,444	(28,671)	18,001,775	1.57%	1.63%
Total All Funds	$ 865,032,042	$ 7,665,019	$ (1,386,627)	$ -	$ 871,310,434	0.73%	0.89%

Notes: Source data provided by the record keeper, Empower Retirement.
(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.
(2) This investment is comprised of two funds, 50% Brandes International equity Fund and 50% Allianz 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
April 30, 2017
$ (Thousands)

Invested Assets (at fair value)	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**	**March**	**April**
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	$ 13,721	$ 14,995
Synthetic Investment Contracts	176,609	176,781	177,152	177,958	177,650	171,136	171,560	171,611	171,662	171,567
Small Cap Stock Fund	91,928	93,241	92,738	88,964	97,900	100,408	100,910	101,992	99,968	100,209
Alaska Balanced Trust	22,932	23,002	23,321	23,570	23,600	23,567	23,926	24,094	24,496	24,426
Long Term Balanced Fund	48,902	48,607	48,083	47,584	47,534	47,948	48,451	49,836	49,949	50,544
AK Target Date 2010 Trust	3,469	3,389	3,672	3,599	3,765	3,532	3,490	3,513	4,148	3,972
AK Target Date 2015 Trust	9,656	9,413	9,229	9,196	9,087	9,249	9,358	9,349	9,715	9,394
AK Target Date 2020 Trust	18,790	19,034	19,312	18,872	19,481	20,038	20,016	20,491	20,797	21,401
AK Target Date 2025 Trust	10,182	10,572	11,102	10,796	11,085	11,598	11,570	12,379	12,756	13,072
AK Target Date 2030 Trust	6,994	7,013	7,124	7,403	8,373	8,467	8,030	8,274	8,508	8,917
AK Target Date 2035 Trust	4,227	4,271	4,447	4,439	4,651	4,930	5,084	5,454	5,495	5,690
AK Target Date 2040 Trust	4,656	4,849	4,883	4,767	4,889	5,104	5,180	5,478	5,582	5,668
AK Target Date 2045 Trust	3,166	3,237	3,269	3,251	3,514	3,764	3,870	3,995	4,103	4,048
AK Target Date 2050 Trust	2,077	2,088	2,130	2,094	2,221	2,286	2,579	2,726	2,797	2,881
AK Target Date 2055 Trust	3,307	3,264	3,291	3,224	3,319	2,896	2,987	3,151	3,166	3,118
AK Target Date 2060 Trust	82	89	91	90	246	253	89	54	87	89
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	13,750	13,393
Russell 3000 Index	29,474	29,617	29,161	28,712	31,041	31,167	32,302	34,103	34,436	35,801
US Real Estate Investment Trust Index	17,592	16,625	16,450	15,403	15,011	16,250	15,216	15,344	14,487	14,451
World Equity Ex-US Index	9,475	9,675	9,703	9,214	9,133	9,908	10,521	10,439	12,054	12,933
Long US Treasury Bond Index	10,409	10,278	9,939	8,963	7,061	6,028	6,824	5,880	5,402	5,713
US Treasury Inflation Protected Securities Index	9,423	9,275	9,511	9,601	9,545	9,446	9,620	9,501	10,108	10,005
World Government Bond Ex-US Index	3,793	3,670	3,627	3,464	2,919	2,792	2,822	2,700	2,647	2,638
Global Balanced Fund	37,942	37,904	38,056	37,520	37,248	37,308	37,530	37,945	38,114	38,473
Investments with BlackRock										
S&P 500 Index Fund	184,379	184,364	183,196	178,983	185,798	189,902	192,365	199,293	197,311	197,807
Government/Credit Bond Fund	27,541	26,915	26,728	26,608	25,693	25,701	25,502	25,890	26,013	26,059
Intermediate Bond Fund	20,511	20,567	20,403	20,366	19,814	19,669	19,869	19,954	20,807	21,199
Investments with Brandes/Allianz										
AK International Equity Fund	35,708	35,932	35,984	35,409	34,480	34,952	35,293	35,543	35,232	34,848
Investments with RCM										
Sustainable Core Opportunities Fund	17,305	17,205	17,044	16,480	16,795	16,635	16,855	18,081	17,723	18,002
Total Invested Assets	**$ 829,346**	**$ 828,452**	**$ 828,735**	**$ 816,153**	**$ 831,224**	**$ 839,361**	**$ 847,557**	**$ 862,608**	**$ 865,032**	**$ 871,310**
Change in Invested Assets										
Beginning Assets	$ 808,795	$ 829,346	$ 828,452	$ 828,735	$ 816,153	$ 831,224	$ 839,361	$ 847,557	$ 862,608	$ 865,032
Investment Earnings	20,447	2,062	602	(12,170)	15,213	10,544	10,807	17,118	2,196	7,665
Net Contributions (Withdrawals)	104	(2,955)	(320)	(411)	(142)	(2,407)	(2,611)	(2,068)	228	(1,387)
Ending Invested Assets	**$ 829,346**	**$ 828,452**	**$ 828,735**	**$ 816,153**	**$ 831,224**	**$ 839,361**	**$ 847,557**	**$ 862,608**	**$ 865,032**	**$ 871,310**

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
April 30, 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 (1)
T. Rowe Price							
Alaska Money Market	$ 7,401,808	$ 4,776	$ 49,855	$ (814,525)	$ 6,641,914	-10.27%	0.07%
Small Cap Stock Fund	66,717,016	983,694	246,112	(253,195)	67,693,627	1.46%	1.47%
Alaska Balanced Trust	13,499,844	113,407	55,809	(75,748)	13,593,312	0.69%	0.84%
Long Term Balanced Fund	9,489,204	105,530	38,870	427,232	10,060,836	6.02%	1.09%
AK Target Date 2010 Trust	2,169,788	18,290	(47,551)	1	2,140,528	-1.35%	0.85%
AK Target Date 2015 Trust	10,019,121	95,153	85,568	(78,737)	10,121,105	1.02%	0.95%
AK Target Date 2020 Trust	25,494,353	273,558	205,221	19,778	25,992,910	1.96%	1.07%
AK Target Date 2025 Trust	38,605,853	448,929	484,812	(53,252)	39,486,342	2.28%	1.16%
AK Target Date 2030 Trust	40,273,238	501,835	586,738	244,340	41,606,151	3.31%	1.23%
AK Target Date 2035 Trust	47,669,596	619,212	610,045	27,962	48,926,815	2.64%	1.29%
AK Target Date 2040 Trust	56,310,474	757,527	856,576	(65,011)	57,859,566	2.75%	1.34%
AK Target Date 2045 Trust	70,499,937	956,987	1,126,514	(149,235)	72,434,203	2.74%	1.35%
AK Target Date 2050 Trust	83,992,727	1,137,281	1,078,986	(194,594)	86,014,400	2.41%	1.35%
AK Target Date 2055 Trust	60,058,154	817,951	1,082,372	(78,441)	61,880,036	3.03%	1.35%
AK Target Date 2060 Trust	111,887	1,504	1,913	16,561	131,865	17.86%	1.24%
Total Investments with T. Rowe Price	532,313,000	6,835,634	6,461,840	(1,026,864)	544,583,610		
State Street Global Advisors							
Money Market	3,583,127	1,849	21,489	214,182	3,820,647	6.63%	0.05%
S&P 500 Stock Index Fund Series A	76,836,788	805,706	248,802	1,024,516	78,915,812	2.71%	1.04%
Russell 3000 Index	18,565,996	169,792	97,047	(2,450,943)	16,381,892	-11.76%	0.98%
US Real Estate Investment Trust Index	15,694,818	(32,323)	57,491	(475,895)	15,244,091	-2.87%	-0.21%
World Equity Ex-US Index	36,657,826	818,183	103,150	827,417	38,406,576	4.77%	2.20%
Long US Treasury Bond Index	1,123,662	16,769	15,202	36,567	1,192,200	6.10%	1.46%
US Treasury Inflation Protected Securities Index	11,962,959	70,856	34,742	(267,227)	11,801,330	-1.35%	0.60%
World Government Bond Ex-US Index	4,765,256	71,182	3,982	(978,868)	3,861,552	-18.96%	1.66%
Global Balanced Fund	15,231,258	219,756	38,174	1,570,267	17,059,455	12.00%	1.37%
Total Investments with SSGA	184,421,690	2,141,770	620,079	(499,984)	186,683,555		
BlackRock							
Government/Credit Bond Fund	30,863,132	255,337	53,613	305,738	31,477,820	1.99%	0.82%
Intermediate Bond Fund	19,101,679	102,687	(60,425)	993,443	20,137,384	5.42%	0.52%
Total Investments with Barclays Global Investors	49,964,811	358,024	(6,812)	1,299,181	51,615,204		
Brandes/Allianz (2)							
AK International Equity Fund	40,872,529	403,887	189,845	236,729	41,702,990	2.03%	0.98%
RCM							
Sustainable Core Opportunities Fund	3,517,642	57,292	23,171	(9,062)	3,589,043	2.03%	1.63%
Total All Funds	$ 811,089,672	$ 9,796,607	$ 7,288,123	$ -	$ 828,174,402	2.11%	1.20%

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

Defined Contribution Retirement - Participant Directed PERS
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
April 30, 2017
$ (Thousands)

Invested Assets (at fair value)	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**	**March**	**April**
Investments with T. Rowe Price										
Alaska Money Market	$ 8,618	$ 8,791	$ 9,030	$ 9,061	$ 9,084	$ 8,998	$ 8,847	$ 8,328	$ 7,402	$ 6,642
Small Cap Stock Fund	60,872	61,549	60,916	59,046	64,758	64,879	64,795	66,591	66,717	67,694
Alaska Balanced Trust	14,964	14,487	14,177	13,944	13,457	13,202	13,390	13,515	13,500	13,593
Long Term Balanced Fund	10,894	9,679	8,782	8,697	8,535	8,361	8,464	8,869	9,489	10,061
AK Target Date 2010 Trust	2,096	2,089	1,974	1,989	2,055	2,073	2,129	2,188	2,170	2,141
AK Target Date 2015 Trust	9,092	8,999	9,042	9,109	9,301	9,367	9,688	9,945	10,019	10,121
AK Target Date 2020 Trust	22,302	22,573	22,755	22,670	23,162	23,651	24,280	25,067	25,494	25,993
AK Target Date 2025 Trust	32,368	32,816	33,308	33,364	34,337	35,189	36,525	37,678	38,606	39,486
AK Target Date 2030 Trust	33,667	34,367	34,781	34,998	35,901	36,819	37,984	39,493	40,273	41,606
AK Target Date 2035 Trust	39,047	39,870	40,468	40,745	42,183	43,188	44,728	46,612	47,670	48,927
AK Target Date 2040 Trust	46,696	47,581	47,885	47,943	49,606	51,055	53,007	55,166	56,310	57,860
AK Target Date 2045 Trust	57,906	59,229	59,773	59,873	62,306	63,956	66,069	68,703	70,500	72,434
AK Target Date 2050 Trust	68,378	70,113	70,862	71,088	73,905	76,029	78,783	81,998	83,993	86,014
AK Target Date 2055 Trust	45,309	47,035	47,909	48,558	50,951	52,778	55,240	58,060	60,058	61,880
AK Target Date 2060 Trust	34	35	36	72	82	88	92	96	112	132
State Street Global Advisors										
Money Market	2,986	3,159	3,510	3,599	3,805	4,033	4,108	3,566	3,583	3,821
S&P 500 Stock Index Fund Series A	52,701	56,952	60,293	60,835	65,523	68,993	71,367	75,273	76,837	78,916
Russell 3000 Index	36,790	32,117	28,398	26,276	24,920	22,240	21,083	21,094	18,566	16,382
US Real Estate Investment Trust Index	16,951	16,226	15,866	15,338	15,477	16,445	16,482	16,720	15,695	15,244
World Equity Ex-US Index	35,145	32,463	30,476	30,431	30,600	32,338	33,746	34,821	36,658	38,407
Long US Treasury Bond Index	1,545	1,576	1,599	1,441	1,294	1,203	1,182	1,192	1,124	1,192
US Treasury Inflation Protected Securities Index	10,105	10,690	11,181	11,242	11,033	11,119	11,537	11,762	11,963	11,801
World Government Bond Ex-US Index	5,263	5,750	6,234	6,057	5,797	6,011	6,336	5,921	4,765	3,862
Global Balanced Fund	7,850	8,693	9,329	9,633	10,244	11,144	11,963	13,202	15,231	17,059
Investments with BlackRock										
Government/Credit Bond Fund	30,417	30,105	29,844	29,764	28,768	29,215	29,863	30,274	30,863	31,478
Intermediate Bond Fund	12,018	13,351	14,318	14,718	15,051	15,868	16,730	17,532	19,102	20,137
Investments with Brandes/Allianz										
International Equity Fund	29,899	34,377	37,382	37,251	36,955	38,420	39,558	39,942	40,873	41,703
Investments with RCM										
Sustainable Core Opportunities Fund	3,178	3,201	3,156	3,079	3,172	3,174	3,291	3,473	3,518	3,589
Total Invested Assets	**$ 697,093**	**$ 707,874**	**$ 713,283**	**$ 710,820**	**$ 732,260**	**$ 749,839**	**$ 771,268**	**$ 797,083**	**$ 811,090**	**$ 828,174**
Change in Invested Assets										
Beginning Assets	$ 667,523	$ 697,093	$ 707,874	$ 713,283	$ 710,820	$ 732,260	$ 749,839	$ 771,268	$ 797,083	$ 811,090
Investment Earnings	22,468	2,247	1,662	(12,849)	13,006	12,111	13,974	18,149	4,790	9,797
Net Contributions (Withdrawals)	7,102	8,533	3,748	10,385	8,433	5,468	7,455	7,667	9,216	7,288
Ending Invested Assets	**$ 697,093**	**$ 707,874**	**$ 713,283**	**$ 710,820**	**$ 732,260**	**$ 749,839**	**$ 771,268**	**$ 797,083**	**$ 811,090**	**$ 828,174**

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
April 30, 2017

	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
Participant Options							
T. Rowe Price							
Alaska Money Market	$ 2,478,157	$ 1,609	$ 14,910	$ (246,342)	$ 2,248,334	-9.27%	0.07%
Small Cap Stock Fund	28,407,364	420,146	144,930	(155,058)	28,817,382	1.44%	1.48%
Alaska Balanced Trust	6,109,873	50,905	29,698	(147,464)	6,043,012	-1.09%	0.84%
Long Term Balanced Fund	4,039,488	44,747	19,534	199,503	4,303,272	6.53%	1.08%
AK Target Date 2010 Trust	512,667	4,391	(2,701)	-	514,357	0.33%	0.86%
AK Target Date 2015 Trust	2,875,608	27,583	27,023	-	2,930,214	1.90%	0.95%
AK Target Date 2020 Trust	7,397,131	79,443	75,232	(5,133)	7,546,673	2.02%	1.07%
AK Target Date 2025 Trust	12,272,286	143,235	186,938	12	12,602,471	2.69%	1.16%
AK Target Date 2030 Trust	14,031,723	174,886	253,483	-	14,460,092	3.05%	1.24%
AK Target Date 2035 Trust	20,990,470	272,596	285,561	(12,259)	21,536,368	2.60%	1.29%
AK Target Date 2040 Trust	22,052,494	295,329	299,167	(44,252)	22,602,738	2.50%	1.33%
AK Target Date 2045 Trust	35,041,655	474,987	496,450	(49,415)	35,963,677	2.63%	1.35%
AK Target Date 2050 Trust	48,986,007	665,331	665,762	(8,520)	50,308,580	2.70%	1.35%
AK Target Date 2055 Trust	18,202,851	251,470	527,745	-	18,982,066	4.28%	1.36%
AK Target Date 2060 Trust	52,875	868	113	9,655	63,511	20.12%	1.50%
Total Investments with T. Rowe Price	223,450,649	2,907,526	3,023,845	(459,273)	228,922,747		
State Street Global Advisors							
Money Market	353,337	179	4,936	-	358,452	1.45%	0.05%
S&P 500 Stock Index Fund Series A	31,408,444	330,179	180,667	443,143	32,362,433	3.04%	1.04%
Russell 3000 Index	7,387,741	64,492	47,267	(1,203,800)	6,295,700	-14.78%	0.95%
US Real Estate Investment Trust Index	6,033,510	(13,038)	31,962	(162,039)	5,890,395	-2.37%	-0.22%
World Equity Ex-US Index	16,084,888	362,401	82,048	486,111	17,015,448	5.79%	2.21%
Long US Treasury Bond Index	237,493	3,632	3,149	129	244,403	2.91%	1.52%
US Treasury Inflation Protected Securities Index	4,593,799	27,625	20,841	58,494	4,700,759	2.33%	0.60%
World Government Bond Ex-US Index	2,258,230	32,704	9,162	(641,127)	1,658,969	-26.54%	1.68%
Global Balanced Fund	7,395,167	108,162	35,008	883,298	8,421,635	13.88%	1.38%
Total Investments with SSGA	75,752,609	916,336	415,040	(135,791)	76,948,194		
BlackRock							
Government/Credit Bond Fund	14,173,509	117,071	64,167	233,244	14,587,991	2.92%	0.82%
Intermediate Bond Fund	7,986,208	43,050	34,965	458,783	8,523,006	6.72%	0.52%
Total Investments with Barclays Global Investors	22,159,717	160,121	99,132	692,027	23,110,997		
Brandes/Allianz Institutional (2)							
AK International Equity Fund	17,144,780	166,887	94,817	(75,048)	17,331,436	1.09%	0.97%
RCM							
Sustainable Core Opportunities Fund	1,441,419	23,383	12,703	(21,915)	1,455,590	0.98%	1.63%
Total All Funds	$ 339,949,174	$ 4,174,253	$ 3,645,537	$ -	$ 347,768,964	2.30%	1.22%

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

Defined Contribution Retirement - Participant Directed TRS
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
April 30, 2017
$ (Thousands)

Invested Assets (at fair value)	July	August	September	October	November	December	January	February	March	April
Investments with T. Rowe Price										
Alaska Money Market	$ 2,895	$ 2,897	$ 2,911	$ 2,946	$ 2,917	$ 2,944	$ 2,866	$ 2,693	$ 2,478	$ 2,248
Small Cap Stock Fund	26,278	26,588	26,452	25,552	27,985	28,018	28,042	28,462	28,407	28,817
Alaska Balanced Trust	7,066	6,760	6,595	6,392	6,175	6,118	6,183	6,224	6,110	6,043
Long Term Balanced Fund	4,916	4,351	3,949	3,757	3,764	3,731	3,765	3,899	4,039	4,303
AK Target Date 2010 Trust	490	487	496	501	500	514	526	501	513	514
AK Target Date 2015 Trust	2,657	2,538	2,537	2,561	2,619	2,692	2,761	2,835	2,876	2,930
AK Target Date 2020 Trust	6,571	6,551	6,650	6,626	6,825	7,086	7,172	7,377	7,397	7,547
AK Target Date 2025 Trust	10,506	10,517	10,640	10,625	10,889	11,259	11,560	12,013	12,272	12,602
AK Target Date 2030 Trust	11,516	11,417	11,610	11,695	12,119	12,570	13,043	13,628	14,032	14,460
AK Target Date 2035 Trust	17,502	17,490	17,674	17,836	18,378	19,019	19,639	20,457	20,990	21,536
AK Target Date 2040 Trust	18,576	18,512	18,708	18,756	19,220	19,929	20,709	21,621	22,052	22,603
AK Target Date 2045 Trust	29,696	29,659	29,930	29,954	31,079	32,029	33,053	34,406	35,042	35,964
AK Target Date 2050 Trust	41,678	41,573	41,947	41,778	43,227	44,715	46,235	48,038	48,986	50,309
AK Target Date 2055 Trust	13,833	13,836	14,050	14,334	15,009	15,838	16,634	17,586	18,203	18,982
AK Target Date 2060 Trust	9	5	6	6	6	6	51	52	53	64
State Street Global Advisors										
Money Market	219	222	223	227	281	249	237	291	353	358
S&P 500 Stock Index Fund Series A	21,625	23,391	24,718	24,988	27,064	28,461	29,389	30,719	31,408	32,362
Russell 3000 Index	15,824	13,628	11,964	10,960	10,335	9,196	8,734	8,597	7,388	6,296
US Real Estate Investment Trust Index	6,520	6,197	6,065	5,741	5,975	6,394	6,310	6,427	6,034	5,890
World Equity Ex-US Index	15,330	14,046	13,199	13,143	13,270	14,016	14,611	15,199	16,085	17,015
Long US Treasury Bond Index	238	277	284	278	278	276	281	240	237	244
US Treasury Inflation Protected Securities Index	3,889	3,999	4,173	4,195	4,137	4,244	4,437	4,512	4,594	4,701
World Government Bond Ex-US Index	2,575	2,808	3,050	2,937	2,757	2,893	3,068	2,869	2,258	1,659
Global Balanced Fund	3,975	4,302	4,593	4,689	4,910	5,329	5,695	6,306	7,395	8,422
Investments with BlackRock										
Government/Credit Bond Fund	14,047	13,662	13,465	13,359	12,975	13,270	13,607	13,887	14,174	14,588
Intermediate Bond Fund	4,774	5,278	5,692	5,885	6,018	6,435	6,807	7,216	7,986	8,523
Investments with Brandes/Allianz										
AK International Equity Fund	12,625	14,495	15,825	15,793	15,733	16,352	16,814	16,830	17,145	17,331
Investments with RCM										
Sustainable Core Opportunities Fund	1,263	1,240	1,244	1,221	1,259	1,292	1,366	1,423	1,441	1,456
Total Invested Assets	**$ 297,096**	**$ 296,728**	**$ 298,649**	**$ 296,732**	**$ 305,705**	**$ 314,874**	**$ 323,595**	**$ 334,310**	**$ 339,949**	**$ 347,769**
Change in Invested Assets										
Beginning Assets	$ 286,112	$ 297,096	$ 296,728	$ 298,649	$ 296,732	$ 305,705	$ 314,874	$ 323,595	$ 334,310	$ 339,949
Investment Earnings	9,751	1,009	715	(5,446)	5,578	5,113	5,968	7,683	2,071	4,174
Net Contributions (Withdrawals)	1,232	(1,376)	1,206	3,529	3,394	4,057	2,753	3,032	3,568	3,646
Ending Invested Assets	**$ 297,096**	**$ 296,728**	**$ 298,649**	**$ 296,732**	**$ 305,705**	**$ 314,874**	**$ 323,595**	**$ 334,310**	**$ 339,949**	**$ 347,769**

Source data provided by the record keeper, Empower Retirement.

ALASKA RETIREMENT MANAGEMENT BOARD

FINANCIAL REPORT
(Supplement to the Treasury Division Report)

As of April 30, 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 Ten Months Ending April 30, 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	$ 294,397,701	$ 99,166,762	$ 25,933	$ 393,590,396	$ (640,052,120)	$ (8,768,205)	$ (10,652,093)	$ (659,472,418)	$ (265,882,022)
Retirement Health Care Trust	107,350,891	(186)	29,816,275	137,166,980	(343,928,464)	-	(18,412,774)	(362,341,238)	(225,174,258)
Total Defined Benefit Plans	401,748,592	99,166,576	29,842,208	530,757,376	(983,980,584)	(8,768,205)	(29,064,867)	(1,021,813,656)	(491,056,280)
Defined Contribution Plans:									
Participant Directed Retirement	111,522,450	-	-	111,522,450	-	(33,627,038)	(2,599,698)	(36,226,736)	75,295,714
Health Reimbursement Arrangement [(a)]	29,612,540	-	-	29,612,540	(34)	-	(40,802)	(40,836)	29,571,704
Retiree Medical Plan [(a)]	10,425,095	-	-	10,425,095	(101)	-	(37,416)	(37,517)	10,387,578
Occupational Death and Disability: [(a)]									
Public Employees	1,304,338	-	-	1,304,338	(95,850)	-	(11,791)	(107,641)	1,196,697
Police and Firefighters	594,629	-	-	594,629	(175,888)	-	(10,542)	(186,430)	408,199
Total Defined Contribution Plans	153,459,052	-	-	153,459,052	(271,873)	(33,627,038)	(2,700,249)	(36,599,160)	116,859,892
Total PERS	**555,207,644**	**99,166,576**	**29,842,208**	**684,216,428**	**(984,252,457)**	**(42,395,243)**	**(31,765,116)**	**(1,058,412,816)**	**(374,196,388)**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Trust	54,928,487	116,699,959	7,597	171,636,043	(372,385,690)	(2,181,629)	(5,606,820)	(380,174,139)	(208,538,096)
Retirement Health Care Trust	17,769,670	-	9,634,921	27,404,591	(101,503,422)	-	(6,870,219)	(108,373,641)	(80,969,050)
Total Defined Benefit Plans	72,698,157	116,699,959	9,642,518	199,040,634	(473,889,112)	(2,181,629)	(12,477,039)	(488,547,780)	(289,507,146)
Defined Contribution Plans:									
Participant Directed Retirement	35,916,892	-	-	35,916,892	-	(9,931,110)	(944,800)	(10,875,910)	25,040,982
Health Reimbursement Arrangement [(a)]	7,287,186	-	-	7,287,186	(7,051)	-	(12,364)	(19,415)	7,267,771
Retiree Medical Plan [(a)]	2,740,930	-	-	2,740,930	(7,044)	-	(28,783)	(35,827)	2,705,103
Occupational Death and Disability [(a)]	-	-	-	-	-	-	(12,328)	(12,328)	(12,328)
Total Defined Contribution Plans	45,945,008	-	-	45,945,008	(14,095)	(9,931,110)	(998,275)	(10,943,480)	35,001,528
Total TRS	**118,643,165**	**116,699,959**	**9,642,518**	**244,985,642**	**(473,903,207)**	**(12,112,739)**	**(13,475,314)**	**(499,491,260)**	**(254,505,618)**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	5,635,293	5,412,366	-	11,047,659	(9,652,078)	-	(156,936)	(9,809,014)	1,238,645
Defined Benefit Retirement Health Care Trust	485,207	-	90,742	575,949	(674,781)	-	(69,092)	(743,873)	(167,924)
Total JRS	**6,120,500**	**5,412,366**	**90,742**	**11,623,608**	**(10,326,859)**	**-**	**(226,028)**	**(10,552,887)**	**1,070,721**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust [(a)]	866,905	-	-	866,905	(1,261,515)	-	(168,542)	(1,430,057)	(563,152)
Other Participant Directed Plans									
Supplemental Annuity Plan	137,425,316	-	96	137,425,412	-	(167,968,983)	(5,007,947)	(172,976,930)	(35,551,518)
Deferred Compensation Plan	36,045,433	-	-	36,045,433	-	(46,731,547)	(1,283,951)	(48,015,498)	(11,970,065)
Total All Funds	**854,308,963**	**221,278,901**	**39,575,564**	**1,115,163,428**	**(1,469,744,038)**	**(269,208,512)**	**(51,926,898)**	**(1,790,879,448)**	**(675,716,020)**
Total Non-Participant Directed	533,398,872	221,278,901	39,575,468	794,253,241	(1,469,744,038)	(10,949,834)	(42,090,502)	(1,522,784,374)	(728,531,133)
Total Participant Directed	320,910,091	-	96	320,910,187	-	(258,258,678)	(9,836,396)	(268,095,074)	52,815,113
Total All Funds	**$ 854,308,963**	**$ 221,278,901**	**$ 39,575,564**	**$ 1,115,163,428**	**$ (1,469,744,038)**	**$ (269,208,512)**	**$ (51,926,898)**	**$ (1,790,879,448)**	**$ (675,716,020)**

(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 April 30, 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	$ 27,907,869	$ -	$ 714	$ 27,908,583	$ (65,611,541)	$ (1,475,109)	$ (379,534)	$ (67,466,184)	$ (39,557,601)
Retirement Health Care Trust	9,684,714	-	8,650	9,693,364	(33,183,374)	-	(1,148,909)	(34,332,283)	(24,638,919)
Total Defined Benefit Plans	37,592,583	-	9,364	37,601,947	(98,794,915)	(1,475,109)	(1,528,443)	(101,798,467)	(64,196,520)
Defined Contribution Plans:									
Participant Directed Retirement	11,070,136	-	-	11,070,136	-	(3,383,659)	(398,354)	(3,782,013)	7,288,123
Health Reimbursement Arrangement [(a)]	2,979,011	-	-	2,979,011	-	-	(4,226)	(4,226)	2,974,785
Retiree Medical Plan [(a)]	991,843	-	-	991,843	-	-	(1,135)	(1,135)	990,708
Occupational Death and Disability: [(a)]									
Public Employees	125,654	-	-	125,654	(9,585)	-	(263)	(9,848)	115,806
Police and Firefighters	51,329	-	-	51,329	(17,974)	-	(158)	(18,132)	33,197
Total Defined Contribution Plans	15,217,973	-	-	15,217,973	(27,559)	(3,383,659)	(404,136)	(3,815,354)	11,402,619
Total PERS	**52,810,556**	**-**	**9,364**	**52,819,920**	**(98,822,474)**	**(4,858,768)**	**(1,932,579)**	**(105,613,821)**	**(52,793,901)**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Trust	6,334,986	-	41	6,335,027	(37,183,457)	(121,971)	(182,223)	(37,487,651)	(31,152,624)
Retirement Health Care Trust	2,054,402	-	386	2,054,788	(9,718,891)	-	(434,257)	(10,153,148)	(8,098,360)
Total Defined Benefit Plans	8,389,388	-	427	8,389,815	(46,902,348)	(121,971)	(616,480)	(47,640,799)	(39,250,984)
Defined Contribution Plans:									
Participant Directed Retirement	4,273,375	-	-	4,273,375	-	(455,689)	(172,149)	(627,838)	3,645,537
Health Reimbursement Arrangement [(a)]	877,282	-	-	877,282	-	-	(1,276)	(1,276)	876,006
Retiree Medical Plan [(a)]	298,522	-	-	298,522	-	-	(481)	(481)	298,041
Occupational Death and Disability [(a)]	-	-	-	-	-	-	(52)	(52)	(52)
Total Defined Contribution Plans	5,449,179	-	-	5,449,179	-	(455,689)	(173,958)	(629,647)	4,819,532
Total TRS	**13,838,567**	**-**	**427**	**13,838,994**	**(46,902,348)**	**(577,660)**	**(790,438)**	**(48,270,446)**	**(34,431,452)**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	481,368	-	-	481,368	(1,016,463)	-	(7,513)	(1,023,976)	(542,608)
Defined Benefit Retirement Health Care Trust	49,168	-	-	49,168	(81,893)	-	(3,621)	(85,514)	(36,346)
Total JRS	**530,536**	**-**	**-**	**530,536**	**(1,098,356)**	**-**	**(11,134)**	**(1,109,490)**	**(578,954)**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust [(a)]	-	-	-	-	(123,532)	-	(11,483)	(135,015)	(135,015)
Other Participant Directed Plans									
Supplemental Annuity Plan	14,158,921	-	-	14,158,921	-	(17,963,869)	(476,490)	(18,440,359)	(4,281,438)
Deferred Compensation Plan	3,576,498	-	-	3,576,498	-	(4,806,604)	(156,521)	(4,963,125)	(1,386,627)
Total All Funds	**84,915,078**	**-**	**9,791**	**84,924,869**	**(146,946,710)**	**(28,206,901)**	**-**	**(178,532,256)**	**(93,607,387)**
Total Non-Participant Directed	51,836,148	-	9,791	51,845,939	(146,946,710)	(1,597,080)	(2,175,131)	(150,718,921)	(98,872,982)
Total Participant Directed	33,078,930	-	-	33,078,930	-	(26,609,821)	(1,203,514)	(27,813,335)	5,265,595
Total All Funds	**$ 84,915,078**	**$ -**	**$ 9,791**	**$ 84,924,869**	**$ (146,946,710)**	**$ (28,206,901)**	**$ (3,378,645)**	**$ (178,532,256)**	**$ (93,607,387)**

(a) Employer only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Ten Months Ending April 30, 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	-	138,400	129,689	271,938	0.1%
Death Benefit	1,112,296	63,673	7,300,111	1,159,053	9,635,133	3.7%
Disability / Hardship	123,049	-	429,881	169,492	722,422	0.3%
Minimum Required Distribution	37,117	19,128	5,064,621	1,957,398	7,078,264	2.7%
Qualified Domestic Relations Order	374,065	20,678	4,955,095	936,394	6,286,232	2.4%
Separation from Service / Retirement	31,976,662	9,827,631	148,959,359	42,223,532	232,987,184	90.2%
Purchase of Service Credit	-	-	1,121,516	155,989	1,277,505	0.5%
Transfer to a Qualifying Plan	-	-	-	-	-	0.0%
TOTAL	33,627,038	9,931,110	167,968,983	46,731,547	258,258,678	100.0%

Notes for the DRB Supplement to the Treasury Report
April 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 ten months of Fiscal Year 2017, while page two shows only the month of April 2017.

Highlights – On page one, for the **ten months** ending April 30, 2017:

- PERS DB Pension – Average employer and employee contributions of $29.4 million per month; benefit payments of approximately $64 million per month; refunds average $877 thousand with a HIGH of $1.5 million in April 2017 and a LOW of $433 thousand in December 2016; and Administrative and Investment expenditures of $1.1 million per month (DOR and DRB).

- PERS DB Healthcare – Average employer contributions of $10.7 million per month; other income of $18.5 million Rx rebates and $11.3 million Medicare drug subsidy; benefit payments of approximately $34.4 million per month; and average Administrative and Investment expenditures of $1.8 million per month (DOR and DRB).

- PERS DC Pension – Average employer and employee contributions of $11.2 million per month; participant disbursements average $3.4 million per month; and average Administrative and Investment expenditures of $260 thousand per month (DOR and DRB).

- PERS DC Health – For HRA, RMP, and OD&D, there are only employer contributions on behalf of participating employees. For RMP, retiree premiums are received from participating retirees. Currently 11 benefits are being paid from the Occupational Death & Disability plans - 5 are for Public Employees and 6 are for Police and Firefighters, 9 due to disability and 2 due to death. Currently 2 retirees are participating in RMP and 4 are participating in HRA.

- TRS DB Pension - Average employer and employee contributions of $5.5 million per month; benefit payments of approximately $37.2 million per month; refunds average $218 thousand with a HIGH of $309 thousand in August 2016 and a LOW of $122 thousand in April 2017; and average Administrative and Investment expenditures of $561 thousand per month (DOR and DRB).

- TRS DB Healthcare – Average employer contributions of $1.8 million per month; other income of $5.9 million Rx rebates and $3.7 million Medicare drug subsidy; benefit payments of approximately $10.2 million per month; and average Administrative and Investment expenditures of $687 thousand per month (DOR and DRB).

- TRS DC Pension – Average employer and employee contributions of $3.6 million per month; participant disbursements average $993 thousand per month; and average Administrative and investment expenditures of $94 thousand per month (DOR and DRB).

- TRS DC Health – For HRA, RMP, and OD&D, there are only employer contributions on behalf of participating employees. For RMP, retiree premiums are received from participating retirees. Currently 4 retirees are participating in RMP and 3 are participating in HRA.

- JRS Pension – Average employer and employee contributions of $564 thousand per month; benefit payments of approximately $965 thousand per month; and average Administrative and Investment expenditures of $16 thousand per month (DOR and DRB).

- JRS Healthcare – Average employer contributions of $49 thousand per month; other income of $50 thousand Rx rebates and $41 thousand Medicare drug subsidy; benefit payments of approximately $67 thousand per month; and average Administrative and Investment expenditures of $7 thousand 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 $126 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 $17 thousand per month (DOR and DRB).

- SBS – Average employer and employee contributions and transfers in of $13.7 million per month. Participant disbursements average of $16.8 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 $501 thousand per month (DOR and DRB).

- Deferred Compensation – Average member-only contributions and transfers in of $3.6 million per month; participant disbursements average of $4.7 million per month; and average Administrative and Investment expenditures of $128 thousand per month (DOR and DRB).

Highlights – On page two, activity for the **one month** ending April 30, 2017 only: Nothing significant to report.

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

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Division of Retirement & Benefits
Cyber Security Report
June 22, 2017

In recognition of the responsibility entrusted to us, the Division of Retirement and Benefits (DRB) is fully committed to provide the best protection available to the Personal Identifiable Information (PII) and the protected health information (HIPAA) held in our information technology systems. At the DRB we take the integrity, security and privacy of our members' data very seriously. We have implemented various layers of security measures to protect against the loss, misuse or alteration of our members' information. In addition, due to the ever-changing nature of cyber threats we continuously evaluate and improve our cyber defenses and detection systems.

The synopsis below outlines some of the security layers DRB currently has in place.

- Oracle's Transparent Data Encryption on all Oracle databases
- Oracle's Data Masking
- Current with all Operating System, security, and database patches
- We practice and enforce the principle of least privilege
    - Computer accounts are restricted to provide access to only to applications, data, and operating system permissions which are pertinent to their user rights, duties and data clearance.
- Lock and expire default user accounts
    - Generic and 'Default' accounts built into an application's initial installation are deactivated and/or locked
- Minimum requirements for passwords
    - DRB complies with State active directory policies and enforces information security standards for password management, including strength, expiration, and re-use.
- Root accounts are denied remote access to all to DRB systems.
    - In Oracle environments, a 'Root' account has the highest access level of any user account. In DRB's Oracle platform, root accounts are restricted from making connection to the system from outside the State firewall.

Internal Policies and Safeguards

Database Security

We have implemented encryption technology on software and hardware to secure our data. Accessing DRB information requires passing through multiple highly secured firewalls and authentication mechanisms. This environment protects our data from external security risks.

Physical Security

All DRB offices and computer workstations are located within secure areas accessible only with the use of a DRB-issued security badge and keycard. All DRB personnel are required to acknowledge the strict enforcement of policies and procedures regarding the use of data and badge access areas. All DRB staff are required to always visibly wear their badge. All DRB personnel are required to lock their computer each time they leave their workstation.

Privacy

The privacy of our members is important to the Division of Retirement and Benefits. We do not share any of the member's personal information with any other State of Alaska agency.

Training and Awareness

All DRB staff are required to pass a HIPAA data safe handling certification course before they are authorized to view DRB data. DRB's staff's cyber security awareness is continuously reinforced with monthly newsletters, instructor-led user training by Learn Alaska, Administrator Training, Wombat Security Training, and Phish Guru, an active, email phishing simulation campaign. Additionally, all DRB personnel are trained on Alaska Statute 40.25.151, *Confidentiality of Retirement Records*, which states member and participant information will remain confidential and are not subject to inspection or copying under AS 40.25.110 – 40.25.120.

External Security

Access

Members accessing our website must pass through multiple firewall and authentication points before being granted access to DRB information. Certain network segments, separated by a firewall-enabled Demilitarized Zone, or DMZ, are reserved and restricts the ingress and egress of specified data to and from the network. By using a DMZ, DRB is able to partition designated other network segments to allow limited access to the public.

Data Transmissions

Member data received by e-mail is encrypted using Secure Sockets Layer (SSL) technology. This technology encrypts the information before transmitting, so that it can only be viewed by the person requesting it thereby protecting any Personally Identifiable Information (PII). For example, an incoming e-mail containing a Social Security Number (SSN) would be scanned and the SSN removed before the e-mail reaches its destination.

External Entity

By law, the HIPAA Privacy Rule applies to covered entities such as DRB due to its administration of health plans. The Privacy Rule requires that a covered entity obtain satisfactory assurances from its Business Associate (BA), and that the BA will appropriately safeguard the protected health information it receives or creates on behalf of the covered entity. The satisfactory assurances must be in writing, whether in the form of a contract or other agreement between the covered entity and the BA.

> *(A BA may use or disclose protected health information only as permitted or required by its BA contract or as required by law. A BA is directly liable under the HIPAA Rules and subject to civil and, in some cases, criminal penalties for making uses and disclosures of protected health information that are not authorized by its contract or required by law. A BA also is directly liable and subject to civil penalties for failing to safeguard electronic protected health information in accordance with the HIPAA Security Rule.)*

Enterprise Technology Services (ETS)

Alaska Statute 44.21 designates the Commissioner of the Department of Administration (DOA) with the responsibility for oversight of all SOA executive branch information technology, fulfilling the role of the Chief Information Officer (CIO) for the State. The roles and responsibilities for statewide information security have been delegated to the Chief Security Officer (CSO) through the Enterprise Technology Services Division (ETS) Director, by the CIO.

The Division of Enterprise Technology Services (ETS), provides core information technology services to all state agencies. It provides the underlying hardware, software, network infrastructure, and enterprise services in support of Executive Branch departments and their corresponding missions. Since its creation, the Alaska State Security Office (SSO) has sought to address cybersecurity concerns through the implementation of capabilities for detecting and managing threats to enterprise systems and networks. The following network capabilities are in use by DRB:

	Current Toolset	**Status**	**Responsibility**
End-Point Security			
Anti-Virus	McAfee Endpoint	Deployed	ETS (SSO) & Agency
Host Based Intrusion	McAfee Endpoint, Cisco Security Agent	Deployed	ETS (SSO) & Agency
Host Firewalls	McAfee Endpoint	Deployed	ETS (SSO) & Agency
Anti-Malware Gateway	McAfee Web Gateway	Deployed	ETS (SSO)
Network Security			
Intrusion Detection System	Cisco, SNORT, SourceFire	Deployed	ETS (SSO)
Intrusion Prevention System	McAfee Network IPS	Deployed	ETS (SSO)
Firewalls	Cisco ASA	Deployed	ETS (SSO) & Core Contract Vendor (ACS)
Threat Intelligence / Advanced Threat Detection	McAfee ATD/NMS sensors	Deployed	ETS (SSO)
DMZ	Co-managed with Core Contract Vendor	Active	ETS (SSO) & Core Contract Vendor (ACS)
Data Protection			
SPAM	McAfee SAAS	Deployed	ETS (SSO)
Data Loss Prevention - Email	McAfee Email Gateway	Deployed	ETS (SSO)

Data at Rest (encryption)	McAfee Encryption (Drive, File, Folder)	Limited Deployment	ETS (SSO) & Agency
Monitoring			
Logging	Syslog A & J	Deployed	ETS (SSO)
Compliance Reporting	Splunk	Deployed	ETS (SSO)
24/7 Security Operations Center	MS-ISAC/CIS	Implemented	ETS (SSO)
Albert Network Malware Sensors	MS-ISAC/CIS	Deployed	ETS (SSO)
Awareness & Training			
Newsletters	Monthly Awareness, OUCH!	Active	ETS (SSO)
User Training	Learn Alaska,	Active	ETS (SSO)
	Instructor Led		
Administrator Training	SANS Computer Based Training	Active	ETS (SSO)
Wombat User Training	Security training modules for all SOA employees	Active	ETS (SSO)
Phish Guru	Active real-life email phishing campaigns	Active	ETS (SSO)

Risk Management Policy:

In collaboration with the State Security Office (SSO) and the Division of Risk Management (DRM), business owners must implement a formal risk assessment and management process. This risk management process identifies and addresses potential threats that may expose the state's network, resources, assets, information systems and information to unauthorized disclosure, service disruption, or any other adverse condition. Department Information Security Officers must ensure that risk assessment requirements are met annually and whenever significant changes are made to the administrative, technical or physical environment.

SSO personnel tasked with assessing risk within the enterprise must identify potential vulnerabilities for the department during the risk assessment process. Vulnerability identification in support of risk assessment include activities such as technical vulnerability assessment and scanning, system configuration review, operating system evaluations, application patching levels, and other non-technical analysis.

This table defines the minimum assessment criteria in identifying an IT system's vulnerabilities in each security area.

Security Area	**Security Criteria**
Management Security	• Assignment of responsibilities • Continuity of support • Incident response capability • Periodic review of security controls • Personnel clearance and background investigation • Risk assessment • Security and technical training • Separation of duties • System authorization and reauthorization • System or application security plan • Statute, regulatory, policy and industry standards compliance
Operational Security	• Control of air-borne contaminants (smoke, dust, chemicals) • Controls to ensure the quality of the electrical power supply • Information, media access and disposal • External data distribution and labeling • Facility protection (e.g., computer room, data center, office space, filing cabinets) • Humidity control • Temperature control • Workstations, laptops and stand-alone personal computers and work areas
Technical Security	• Communications (e.g., dial-in, system interconnection, routers) • Cryptography • Access control (electronic and physical) • Identification and authentication • Threat detection • Object reuse • System and Application Hardening • Audit • Logging (operational, and technical) • Monitoring and reporting (operational and technical)

Information Security

June 2017

Information Security

What is Information Security?

Information Security is the practice of preventing unauthorized access, use, disclosure, disruption, modification, inspection, recording or destruction of information. It can be generally broken down into 2 components:

1. **Physical Security**
2. **Cyber Security**

Physical Security

Physical Security

Physical Access to State Street Infrastructure

- State Street Photo Identification Badges are issued to all personnel who have been approved for physical access. The ID badge is used for identification purposes as well as for physical access to facilities and other approved uses.

- All visitors to State Street must be preregistered at specific buildings by a State Street employee. Visitors are given badges which must be shown to security staff at entrances. After 24 hours a red "**V**" appears on the badges and visitors returning must check in with security again and receive new badges.

Physical Security

State Street Data Centers

- State Street has 3 data centers. Their primary data center has an ‘Embassy-class’ security designation and their other two have ‘N-Class’ security designations.

- State Street practices failover between the datacenters regularly.

- Physical security of State Street’s premises is audited regularly during reviews done by multiple State and Federal entities (Department of Labor, SEC, Federal Reserve Bank of Boston, and the Massachusetts Commissioner of Banks for example)

Cyber Security

Cyber Security

Penetration Testing at State Street

Constant Red and Blue team vulnerability testing. These are teams of individuals who have been hired to try and break into SSB's systems. Their penetration testing takes place both onsite at SSB properties and from offsite

Red Team: External entities (White Hats) brought in to test the effectiveness State Street's security program. This is accomplished by emulating the behaviors and techniques of likely attackers in the most realistic way possible. Their penetration testing takes place both onsite at SSB properties and from offsite locations.

Blue Team: Internal security team that defends against both real attackers and Red Team. The Blue Team is distinguished from standard security teams in the organization and have a mentality of constant vigilance against attack.

Other safeguarding controls in place at State Street

- FTTOP (Funds Transfer and Transaction Origination Procedures)
  - Defines permissible means for transmitting cash transfers
  - Defines who can initiate and verify (authorize) cash transfers
  - Each individual on the FTTOP provides a specimen signature; these signatures are used as a baseline for electronic review of all signed direction letters sent by Alaska to help ensure authenticity.
- Delegation of Authority
  - Alaska provides delegations of authority to State Street for each group as necessary identifying individuals who are allowed to provide direction to State Street for issues not related to cash.
- Callback procedures
  - Callback procedures are used for wires being sent out of State Street. Callbacks can not be made to the individual who signed the direction letter and must be listed in the FTTOP 'Verifiers' section.
  - Callback thresholds vary based on if wires are repetitive or not as well as the size of the wires.

Subcustodian Monitoring

State Street has dedicated teams who's responsibility is to assess risk and test and monitor for risk at their subcustodians and subvendors.

- State Street completes reviews of all subcustodians yearly.
- Security requirements of subcustodians vary slightly from country to country.
- Dedicated groups within State Street continually conducting onsite visits and audits of subcustodians and monitor their financial condition.
- Subvendors and Subcustodians are reviewed under scope of the AT Section 801 report.

Treasury Division Review of State Street

- State Street completes an AICPA AT Section 801 (formerly known as SSAE16 or SOC1) report twice yearly which reviews both the controls in place and the effectiveness of those controls over State Street's Information Technology General Controls (ITGC) System.

- The Treasury Division reviews each of these reports when received and discusses any applicable findings with State Street staff.

- On a yearly basis, the Treasury Division reports on the AT Section 801 to the Audit Committee of the ARMB.

- Yearly the Treasury Division conducts an onsite review of State Street controls.

Thank You

QUESTIONS?

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Acceptance of Actuarial Reports ACTION: X

DATE: June 22, 2017 INFORMATION:

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

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

STATUS:
Conduent HR Services, the Department of Administration's and Plans' actuary, has completed and reviewed the following reports with the Board's Actuarial Committee on March 1, April 19, and June 21, 2017:

1) an actuarial valuation of the Public Employees' Retirement System as of June 30, 2016
2) an actuarial valuation of the Teachers' Retirement System as of June 30, 2016
3) an actuarial valuation of the Public Employees' Retirement System – Defined Contribution Retirement Plan (for Occupational Death and Disability and Retiree Medical Benefits) as of June 30, 2016
4) an actuarial valuation of the Teachers' Retirement System – Defined Contribution Retirement Plan (for Occupational Death and Disability and Retiree Medical Benefits) as of June 30, 2016
5) an actuarial valuation of the Judicial Retirement System (JRS) as of June 30, 2016
6) an actuarial valuation of the National Guard and Naval Militia Retirement System (NGNMRS) as of June 30, 2016

There are two assumption changes recommended and presented in the final reports:
1) A rehire assumption to account for anticipated rehires developed based on 5-years of rehire loss experience through June 30, 2015 for both the PERS and TRS DB actuarial valuation reports
2) Healthcare claim costs are updated annually and described in Section 6.2 for the PERS and TRS DB and Section 5.2 for the PERS DCR, TRS DCR, and JRS actuarial valuation reports

Gabriel Roeder Smith & Company (GRS), the Board's actuary, has reviewed the above actuarial valuations and provided their reports and audit findings to the Actuarial Committee.

RECOMMENDATION:

The Alaska Retirement Management Board accept the actuarial valuation reports prepared by Conduent HR Services for the Public Employees', Teachers', Public Employees' Defined Contribution (for Occupational Death and Disability and Retiree Medical Benefits), Teachers' Defined Contribution (for Occupational Death and Disability and Retiree Medical Benefits), Judicial, and National Guard and Naval Militia retirement systems as of June 30, 2016.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Acceptance of Actuarial Reports	ACTION:	X
DATE:	June 22, 2017	INFORMATION:	

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

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

STATUS:
Conduent Human Resource Services (Conduent) has completed and reviewed the following reports with the Board's Actuarial Committee on March 1, April 19, and June 21, 2017:

1) an actuarial valuation of the Public Employees' Retirement System as of June 30, 2016
2) an actuarial valuation of the Teachers' Retirement System as of June 30, 2016
3) an actuarial valuation of the Public Employees' Retirement System – Defined Contribution Retirement Plan (for Occupational Death and Disability and Retiree Medical Benefits) as of June 30, 2016
4) an actuarial valuation of the Teachers' Retirement System – Defined Contribution Retirement Plan (for Occupational Death and Disability and Retiree Medical Benefits) as of June 30, 2016
5) an actuarial valuation of the Judicial Retirement System (JRS) as of June 30, 2016
6) an actuarial valuation of the National Guard and Naval Militia Retirement System (NGNMRS) as of June 30, 2016

There are no changes recommended to the actuarial assumptions currently in place.

Gabriel Roeder Smith & Company (GRS), the Board's actuary, has reviewed the above actuarial valuations and provided their reports and audit findings to the Actuarial Committee.

RECOMMENDATION:
That the Alaska Retirement Management Board accept the actuarial valuation reports prepared by Conduent Human Resource Services for the Public Employees', Teachers', Public Employees' Defined Contribution (for Occupational Death and Disability and Retiree Medical Benefits), Teachers' Defined Contribution (for Occupational Death and Disability and Retiree Medical Benefits), Judicial and National Guard and Naval Militia retirement systems as of June 30, 2016.

Alaska Retirement Management Board

Asset Allocation Review and Approval

Bob Mitchell, CFA
Anchorage, Alaska
June 22-23, 2017

FY 18 Asset Allocation Review and Approval

The purpose of this presentation is to:

1. Describe the FY18 asset allocation process;

2. Summarize changes to the ARMB's asset allocation structure; and,

3. Share estimated expected returns based on longer-term assumptions.

FY 18 Asset Allocation Review and Approval

Process

- Callan updates its Capital Market Assumptions - forward-looking estimates of expected return, volatility and correlation of numerous asset classes.
- Callan customizes the assumptions as necessary to reflect the ARMB asset classes.
- Callan provides a set of efficient allocations for consideration.
- Staff, Callan and the IAC review the allocations, deliberate, and recommend target asset allocations for the upcoming fiscal year.
- The ARMB considers the recommendations and approves target allocations.
- This year, the process also included a review of policy benchmarks at the ARMB's April meeting. This resulted in some changes that impacted this year's exercise.
- Return expectations are generally lower this year. This year's process also included an evaluation of longer time horizons to supplement the customary ten-year horizon.

ARMB Benchmarks and Asset Classes

Overview of Benchmark Changes

- Expanded Global Equity Ex-US benchmark to include international small cap.
- Changed Absolute Return policy benchmark to HFRI Fund-of-Funds Composite Index.
- Retasked Alternative Equity as "Opportunistic." Changed benchmark to 60% Russell 1000 / 40% Aggregate. Moved Equity Yield strategy to Domestic Large Cap. Moved large cap low volatility strategies to Opportunistic.
- Changed Fixed Income benchmark to 100% intermediate Treasury index. Moved non-Treasury strategies to Opportunistic.
- Changed Real Assets policy benchmark to match long-term benchmark mixes.

Changes to PERS Target and Asset Class Benchmarks

Asset Classes	PERS 2016	2016 Remapped
Broad Domestic Equity	26%	24%
Alternative Equities	5%	
Global ex US Equity	22%	22%
Opportunistic		10%
Fixed Income - Treasuries		10%
Fixed Income - Composite	13%	
Real Assets	17%	17%
Absolute Return	7%	7%
Private Equity	9%	9%
Cash Equivalents	1%	1%
Totals	100%	100%

2017 Capital Market Expectations—Return and Risk

Summary of Callan's Standard Long-Term Capital Market Projections (2017 – 2026)

		PROJECTED RETURN			PROJECTED RISK			2016 - 2025		
Asset Class	Index	1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation	Sharpe Ratio	Projected Yield	10-Year Geometric*	Standard Deviation	Geometric* Delta
Equities										
Broad Domestic Equity	Russell 3000	8.30%	6.85%	4.60%	18.25%	0.332	2.00%	7.35%	18.70%	-0.50%
Large Cap	S&P 500	8.05%	6.75%	4.50%	17.40%	0.333	2.10%	7.25%	17.95%	-0.50%
Small/Mid Cap	Russell 2500	9.30%	7.00%	4.75%	22.60%	0.312	1.55%	7.55%	22.75%	-0.55%
Global ex-US Equity	MSCI ACWI ex USA	8.95%	7.00%	4.75%	21.00%	0.319	3.10%	7.55%	21.30%	-0.55%
International Equity	MSCI World ex USA	8.45%	6.75%	4.50%	19.70%	0.315	3.25%	7.25%	20.05%	-0.50%
Emerging Markets Equity	MSCI Emerging Markets	10.50%	7.00%	4.75%	27.45%	0.301	2.65%	7.60%	27.85%	-0.60%
Fixed Income										
Short Duration	Bloomberg Barclays 1-3 Yr G/C	2.60%	2.60%	0.35%	2.10%	0.167	2.85%	2.60%	2.25%	0.00%
Domestic Fixed	Bloomberg Barclays Aggregate	3.05%	3.00%	0.75%	3.75%	0.213	3.50%	3.00%	3.75%	0.00%
Long Duration	Bloomberg Barclays Long G/C	3.75%	3.20%	0.95%	10.90%	0.138	4.50%	3.70%	11.40%	-0.50%
TIPS	Bloomberg Barclays TIPS	3.10%	3.00%	0.75%	5.25%	0.162	3.35%	3.00%	5.30%	0.00%
High Yield	Bloomberg Barclays High Yield	5.20%	4.75%	2.50%	10.35%	0.285	7.75%	5.00%	10.50%	-0.25%
Non-US Fixed	Bloomberg Barclays Glbl Agg xUSD	1.80%	1.40%	-0.85%	9.20%	-0.049	2.50%	1.40%	9.20%	0.00%
Emerging Market Debt	EMBI Global Diversified	4.85%	4.50%	2.25%	9.60%	0.271	5.75%	4.60%	9.90%	-0.10%
Other										
Real Estate	Callan Real Estate Database	6.90%	5.75%	3.50%	16.35%	0.284	4.75%	6.00%	16.45%	-0.25%
Private Equity	TR Post Venture Capital	12.45%	7.35%	5.10%	32.90%	0.310	0.00%	8.15%	32.80%	-0.80%
Hedge Funds	Callan Hedge FoF Database	5.35%	5.05%	2.80%	9.15%	0.339	2.25%	5.25%	9.30%	-0.20%
Commodities	Bloomberg Commodity	4.25%	2.65%	0.40%	18.30%	0.109	2.25%	2.75%	18.50%	-0.10%
Cash Equivalents	90-Day T-Bill	2.25%	2.25%	0.00%	0.90%	0.000	2.25%	2.25%	0.90%	0.00%
Inflation	CPI-U		2.25%		1.50%			2.25%	1.50%	0.00%

** Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).*

•Source: Callan Associates

PERS Asset Mix Alternatives

Asset Classes	PERS	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
Broad Domestic Equity	24%	18%	20%	22%	24%	26%
Global ex US Equity	22%	15%	17%	19%	22%	23%
Intermediate Treasurys	10%	25%	20%	15%	10%	5%
Opportunistic	10%	8%	9%	10%	10%	12%
Real Assets	17%	17%	17%	17%	17%	17%
Absolute Return	7%	7%	7%	7%	7%	7%
Private Equity	9%	9%	9%	9%	9%	9%
Cash Equivalents	1%	1%	1%	1%	1%	1%
Totals	100%	100%	100%	100%	100%	100%
Uncompounded Return	7.5%	6.7%	7.0%	7.2%	7.5%	7.8%
10-Year Compounded Return	6.6%	6.2%	6.3%	6.5%	6.6%	6.8%
Risk (Standard Deviation)	14.7%	12.0%	12.8%	13.7%	14.7%	15.4%
10-Year Real Return	4.3%	3.8%	4.0%	4.1%	4.3%	4.4%
Public Equity	46%	33%	37%	41%	46%	49%
Public Fixed	10%	25%	20%	15%	10%	5%
Alternatives	16%	16%	16%	16%	16%	16%

•Source: Callan Associates

Militia Asset Mix Alternatives

Asset Classes	Militia	Mix 1	Mix 2	Mix 3	Mix 3b	Mix 4	Mix 5
Broad Domestic Equity	25%	19%	22%	25%	25%	27%	31%
Global ex US Equity	17%	11%	13%	15%	17%	18%	19%
Intermediate Treasurys	48%	60%	55%	50%	48%	45%	40%
Opportunistic	10%	10%	10%	10%	10%	10%	10%
Cash Equivalents	0%	0%	0%	0%	0%	0%	0%
Totals	100%	100%	100%	100%	100%	100%	100%
Uncompounded Return	5.6%	4.9%	5.2%	5.4%	5.6%	5.7%	6.0%
10-Year Compounded Return	5.3%	4.8%	5.0%	5.2%	5.3%	5.4%	5.6%
Risk (Standard Deviation)	8.8%	6.6%	7.5%	8.4%	8.8%	9.3%	10.2%
10-Year Real Return	3.0%	2.4%	2.6%	2.9%	3.0%	3.1%	3.3%
Effective Public Equity*	48%	36%	41%	46%	48%	51%	56%
Effective Public Fixed*	52%	64%	59%	54%	52%	49%	44%

•Source: Callan Associates

2017 Capital Market Projections – Very Long Term (80 years)

Summary of Callan's Very Long-Term Capital Market Projections (2017-2096)

		2017 - 2026		Long-Term (80 years)		Change from 10-year to Long-Term	
Asset Class	Index	10-Year Annualized Return	10-Year Standard Deviation	Long-Term Annualized Return[1]	Long-Term Standard Deviation	Annualized Return	Standard Deviation
Equities							
Large Cap US Equity	S&P 500	6.75%	17.40%	8.25%	17.40%	1.50%	0.00%
Small/mid Cap US Equity	Russell 2500	7.00%	22.60%	9.00%	22.60%	2.00%	0.00%
Non-US Equity (Developed)	MSCI EAFE	6.75%	19.70%	8.25%	19.70%	1.50%	0.00%
Emerging Equity	MSCI EMF	7.00%	27.45%	9.50%	27.45%	2.50%	0.00%
Global ex-US Equity	MSCI ACWI ex-US	7.00%	21.00%	8.90%	21.00%	1.90%	0.00%
Int'l Small Cap Equity	MSCI ACWI ex-US Small	7.00%	24.30%	9.25%	24.30%	2.25%	0.00%
Fixed Income							
Cash Equivalents	90-Day T-Bill	2.25%	0.90%	3.25%	0.90%	1.00%	0.00%
Stable Value	n/a	2.30%	1.50%	3.80%	1.50%	1.50%	0.00%
Short Duration (Gov/Credit 1-3 year)	BC Govt/Credit 1-3 Year	2.60%	2.10%	4.00%	2.10%	1.40%	0.00%
Non-US Fixed (Hdgd)	BC Global Aggregate ex-US (Hdgd)	1.40%	3.70%	4.20%	3.70%	2.80%	0.00%
US Fixed Income	BC Aggregate	3.00%	3.75%	5.00%	3.75%	2.00%	0.00%
Non-US Fixed	BC Global Aggregate ex-US	1.40%	9.20%	4.25%	9.20%	2.85%	0.00%
Long Gov	BC Long Gov't	1.30%	12.80%	5.00%	12.80%	3.70%	0.00%
Long Credit	BC Long Credit	4.10%	10.80%	6.00%	10.80%	1.90%	0.00%
High Yield	BC High Yield	4.75%	10.35%	6.50%	10.35%	1.75%	0.00%
Bank Loans	S&P/LSTA Leveraged Loan Index	4.25%	9.00%	5.50%	9.00%	1.25%	0.00%
Emerging Markets Debt	JPM EMBI Global Diversified	4.50%	9.60%	6.25%	9.60%	1.75%	0.00%
Real Assets							
TIPS	BC US TIPS	3.00%	5.25%	4.75%	5.25%	1.75%	0.00%
Commodities (GSCI)	GSCI Total Return	2.30%	25.00%	3.75%	25.00%	1.45%	0.00%
Commodities (Blmbrg)	Bloomberg Commodity	2.65%	18.30%	3.75%	18.30%	1.10%	0.00%
US REITS	NAREIT All Equity	6.50%	20.70%	8.00%	20.70%	1.50%	0.00%
Global REITS	EPRA/NAREIT Developed	6.50%	21.60%	8.00%	21.60%	1.50%	0.00%
Natural Resources Equity	S&P500 Global Nat. Res.	6.30%	20.70%	7.85%	20.70%	1.55%	0.00%
Direct Real Estate	70% NCREIF / 25% REITS / 5% Cash	5.90%	10.00%	7.25%	10.00%	1.35%	0.00%
Inflation	CPI-U	2.25%	1.50%	2.25%	1.50%	0.00%	0.00%

1 - Long-term return forecasts for years 20 to 80. Callan 10-year forecasts (2017-2026) gradually converge to these return expectations over years 11 to 20.

•Source: Callan Associates

PERS Asset Mix Alternatives

Asset Mix Return and Risk – Thirty-Year Time Horizon

Asset Classes	PERS	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
Broad Domestic Equity	24%	18%	20%	22%	24%	26%
Global ex US Equity	22%	15%	17%	19%	22%	23%
Intermediate Treasurys	10%	25%	20%	15%	10%	5%
Opportunistic	10%	8%	9%	10%	10%	12%
Real Assets	17%	17%	17%	17%	17%	17%
Absolute Return	7%	7%	7%	7%	7%	7%
Private Equity	9%	9%	9%	9%	9%	9%
Cash Equivalents	1%	1%	1%	1%	1%	1%
Totals	100%	100%	100%	100%	100%	100%
Uncompounded Return	8.9%	8.0%	8.3%	8.6%	8.9%	9.1%
30-Year+ Compounded Return	8.1%	7.5%	7.7%	7.9%	8.1%	8.2%
Risk (Standard Deviation)	14.7%	12.0%	12.8%	13.7%	14.7%	15.4%
30-Year+ Real Return	5.7%	5.1%	5.3%	5.5%	5.7%	5.9%
Public Equity	46%	33%	37%	41%	46%	49%
Public Fixed	10%	25%	20%	15%	10%	5%
Alternatives	16%	16%	16%	16%	16%	16%

•Source: Callan Associates

Militia Asset Mix Alternatives

Asset Mix Return and Risk – Thirty-Year Time Horizon

Asset Classes	Militia	Mix 1	Mix 2	Mix 3	Mix 3b	Mix 4	Mix 5
Broad Domestic Equity	25%	19%	22%	25%	25%	27%	31%
Global ex US Equity	17%	11%	13%	15%	17%	18%	19%
Intermediate Treasurys	48%	60%	55%	50%	48%	45%	40%
Opportunistic	10%	10%	10%	10%	10%	10%	10%
Cash Equivalents	0%	0%	0%	0%	0%	0%	0%
Totals	100%	100%	100%	100%	100%	100%	100%
Uncompounded Return	6.9%	6.2%	6.5%	6.8%	6.9%	7.1%	7.4%
30-Year+ Compounded Return	6.7%	6.1%	6.4%	6.6%	6.7%	6.9%	7.1%
Risk (Standard Deviation)	8.8%	6.6%	7.5%	8.4%	8.8%	9.3%	10.2%
30-Year+ Real Return	4.4%	3.8%	4.0%	4.3%	4.4%	4.5%	4.7%
Effective Public Equity*	48%	36%	41%	46%	48%	51%	56%
Effective Public Fixed*	52%	64%	59%	54%	52%	49%	44%

•Source: Callan Associates

Conclusions

- Ten-year return expectations have fallen. Average geometric returns for PERS, et al, and for Militia are 6.6% and 5.3%, respectively.

- Longer-term expectations for existing target asset allocations are higher. Thirty-year average geometric returns for PERS, et al, and for Militia are 8.1% and 6.7%, respectively.

- Staff recommends portfolios with the same risk profile as the existing target allocations, corresponding to mixes 4 and 3b.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Asset Allocations – Resolutions 2017-03 and 2017-04	ACTION:	X
DATE:	June 22, 2017	INFORMATION:	

BACKGROUND:

The Alaska Retirement Management Board (ARMB) sets and reviews the asset allocations on behalf of all plans over which it has fiduciary responsibility.

STATUS:

At the March 2017 ARMB meeting, Paul Erlendson of Callan Associates, Inc. (Callan) presented the firm's 2017 capital market projections which are the basis for ARMB's asset allocation and optimization process. On February 24, 2017, Acting Chief Investment Officer, Bob Mitchell, conferred by phone with Paul Erlendson, Steve Center and James Van Heuit of Callan to discuss potential changes to the asset class benchmarks employed by ARMB. This discussion continued on March 30, 2017 between Bob Mitchell, State Investment Officer Zach Hanna, Paul Erlendson, Steve Center and Investment Advisory Council (IAC) members Dr. William Jennings, Dr. Jerrold Mitchell and Robert Shaw. On April 21, 2017, Bob Mitchell presented to the ARMB his recommendations for changes to existing benchmarks and for the retasking and renaming of the Alternative Equity asset class to Opportunistic. Bob Mitchell received feedback and indicated that these changes would be incorporated into the asset allocation recommendations that would come before the ARMB at its June meeting. On June 6, 2017, Bob Mitchell and Zach Hanna conferred with Paul Erlendson, Steve Center and Jay Kloepfer of Callan and the IAC regarding asset allocation options for the upcoming fiscal year.

Staff recommend the following strategic asset allocations after considering current asset allocations and a range of optimal portfolios produced by Callan:

Resolution 2017-03 –
Public Employees' Retirement System Defined Benefit and Defined Contribution Plans
Teachers' Retirement System Defined Benefit and Defined Contribution Plans
Judicial Retirement System Defined Benefit Plans

Resolution 2017-04 – Alaska National Guard and Naval Militia Retirement Systems

RECOMMENDATION:

The Alaska Retirement Management Board adopt Resolutions 2017-03 and 2017-04, approving the asset allocations for fiscal year 2018.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Asset Allocation for the Funds of the
Public Employees' Retirement System Defined Benefit and Defined Contribution Plans,
Teachers' Retirement System Defined Benefit and Defined Contribution Plans, and
Judicial Retirement System Defined Benefit Plans

Resolution 2017-03

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee of 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 policies 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 with 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 reviewed the actuarial assumptions; and

WHEREAS, the Board has reviewed the asset allocation set forth in the study prepared by the external investment consulting firm of Callan Associates, Inc.; and

WHEREAS, a prudent, diversified portfolio reduces risk and volatility and considers short term and long term earnings requirements for the Funds; and

WHEREAS, the Board shall continue to review, evaluate and make appropriate adjustments to asset allocation for the retirement plans on a periodic basis;

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD that effective July 1, 2017, the following asset allocation be established for the following funds:

(1) Public Employees' Retirement System
- Defined Benefit Plans
  - Retirement Trust
  - Retirement Health Care Trust
- Defined Contribution Plans
  - Health Reimbursement Arrangement Plan Trust Fund
  - Retiree Medical Plan
  - Defined Benefit Occupational Death and Disability

- Public Employees All Other
- Peace Officers and Firefighters

(2) Teachers' Retirement System

- Defined Benefit Plans
  - Retirement Trust
  - Retirement Health Care Trust
- Defined Contribution Plans
  - Health Reimbursement Arrangement Plan Trust Fund
  - Retiree Medical Plan
  - Defined Benefit Occupational Death and Disability

(3) Judicial Retirement System

- Retirement Trust
- Retirement Health Care Trust

Target Asset Allocation

Asset Class	Allocation	Range
Broad Domestic Equity	24%	± 6%
Global Equity Ex-US	22%	± 4%
Fixed Income	10%	± 5%
Opportunistic	10%	± 5%
Real Assets	17%	± 8%
Absolute Return	7%	± 4%
Private Equity	9%	± 5%
Cash Equivalents	1%	+3%/-1%
Total	100%	

Expected Return – 10 Year Geometric Mean	6.6%	
Expected Return – 30 Year Geometric Mean	8.1%	
Projected Standard Deviation	14.7%	

Policy Benchmarks

Asset Class	Benchmark
Broad Domestic Equity	Russell 3000
Global Equity Ex-US	MSCI ACWI Ex-US IMI Net
Fixed Income	BB Barclays Int. Treasury
Opportunistic	60% Russell 1000 40% BB Barclays Aggregate
Real Assets	31% NCREIF Total 25% NCREIF Farmland 10% NCREIF Timberland 17.5% Global Infrastructure 12.5% Alerian MLP

Real Assets (cont'd)	4% FTSE NAREIT All Equity
Absolute Return	HFRI Fund of Funds Composite
Private Equity	1/3 S&P 500 1/3 Russell 2000 1/3 MSCI EAFE Net
Cash Equivalents	3-Month Treasury Bill

This resolution repeals and replaces Resolution 2016-08.

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

____
Chair

ATTEST:

____
Secretary

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Asset Allocation
For the Alaska National Guard and Naval Militia Retirement Systems

Resolution 2017-04

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee of 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 with 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 reviewed the actuarial assumptions for the Alaska National Guard and Naval Militia Retirement Systems; and

WHEREAS, the Board has reviewed the asset allocation set forth in the study prepared by the external investment consulting firm of Callan Associates, Inc.; and

WHEREAS, a prudent, diversified portfolio reduces risk and volatility and considers short term and long term earnings requirements for the Funds; and

WHEREAS, the Board shall continue to review, evaluate and make appropriate adjustments to asset allocation for the retirement plans on a periodic basis;

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD that the following asset allocation be established for the Alaska National Guard & Naval Militia Retirement System, effective July 1, 2017:

Target Asset Allocation

Asset Class	Allocation	Range
Broad Domestic Equity	25%	± 6%
Global Equity Ex-US	17%	± 4%
Fixed Income	48%	± 10%
Opportunistic	10%	± 5%
Cash Equivalents	0%	+ 3%
Total	100%	
Expected Return – 10 Year Geometric Mean	5.3%	
Expected Return – 30 Year Geometric Mean	6.7%	
Projected Standard Deviation	8.8%	

Policy Benchmarks

Asset Class	Benchmark
Broad Domestic Equity	Russell 3000
Global Equity Ex-US	MSCI ACWI Ex-US IMI Net
Fixed Income	BB Barclays Int. Treasury
Opportunistic	60% Russell 1000 40% BB Barclays Aggregate
Cash Equivalents	3-Month Treasury Bill

This resolution repeals and replaces Resolution 2016-09.

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

____
Chair

ATTEST:

____
Secretary

Callan

June 2017

ARMB Board Meeting

Investment Performance
(Preliminary Real Assets)
Periods Ended March 31, 2017

Steve Center, CFA
Senior Vice President

Paul Erlendson
Senior Vice President

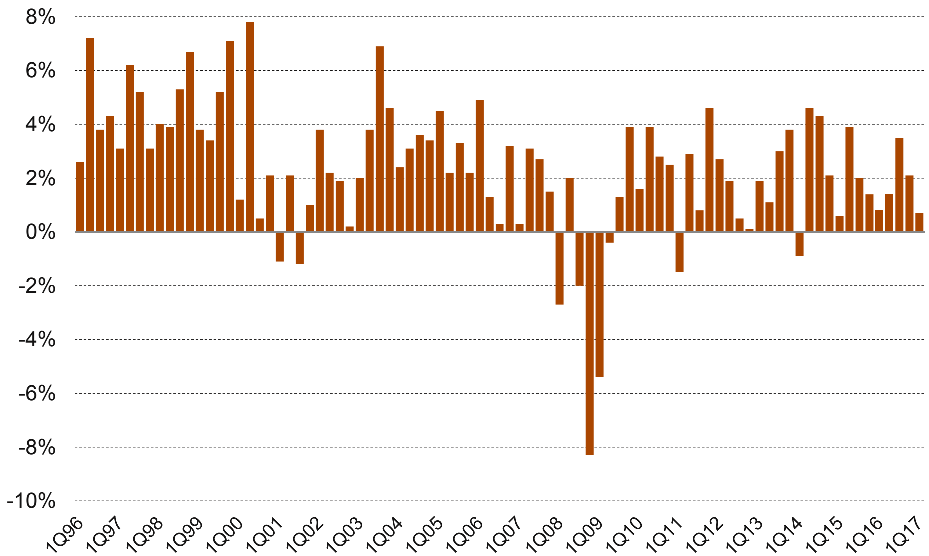
Agenda

- Market and Economic Environment
- Total Fund Performance
  - Major Asset Classes
- Review of Major Activities

U.S. Economy

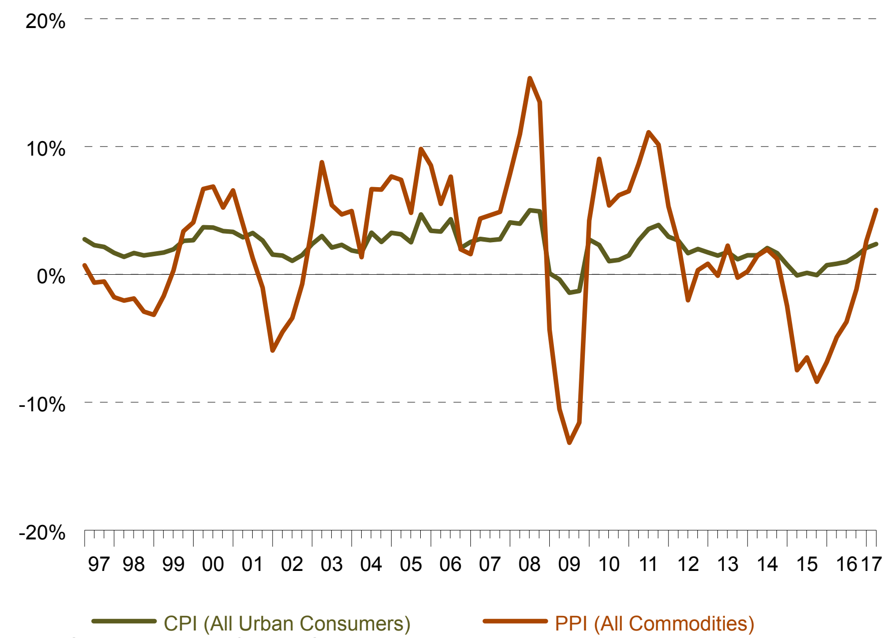
Periods Ending March 31, 2017

Quarterly Real GDP Growth (20 Years)



Source: Bureau of Economic Analysis

Inflation Year-Over-Year



Source: Bureau of Labor Statistics

- The initial estimate of 1st quarter GDP came out at 0.7%, lagging the 4th quarter, up 2.1%.
- March headline inflation rose 2.4% over the trailing twelve months. Core CPI increased 2.0%.
- March unemployment was 4.5% (down 0.2% from December) and the labor force participation rate rose to 63.0% (up 0.4%).
- The Fed increased the target overnight rate to 0.75% - 1.00% on March 15.

Asset Class Performance

- Emerging markets (MSCI EM) was the best performer last quarter, returning 11.4%.
- EM still lags over the long term but has performed well over the last year.
- Developed non-US markets (MSCI EAFE) outperformed U.S. markets in the first quarter, gaining 7.2%.
- US large cap stocks (S&P 500) rose 6.1% last quarter and is the best performer over the three, five, and ten year time frames.

	QTD (6/6/2017)	YTD (6/6/2017)
Russell 3000	3.0%	8.9%
S&P 500	3.2%	9.5%
Russell 2000	0.8%	3.3%
MSCI EAFE	7.2%	14.9%
MSCI EM	6.4%	18.6%
BC Aggregate	1.8%	2.7%

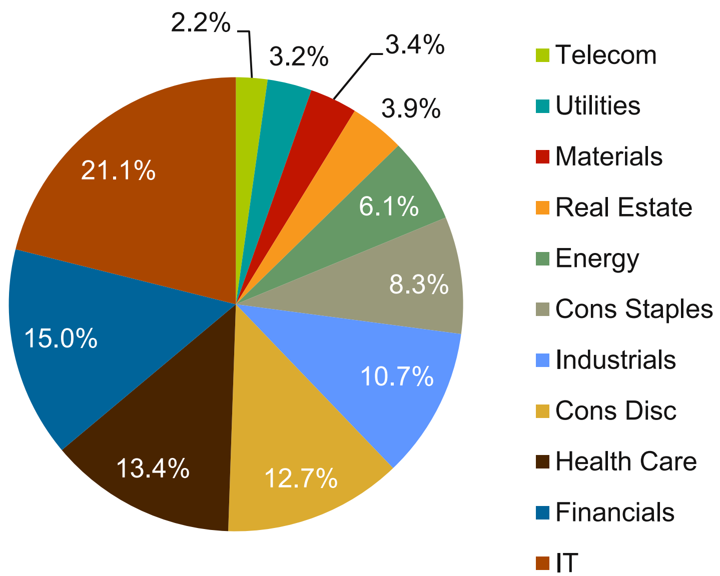
Periodic Table of Investment Returns
for Periods Ended March 31, 2017

Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
MSCI:EM 11.4%	Russell:2000 Index 26.2%	S&P:500 10.4%	S&P:500 13.3%	S&P:500 7.5%
MSCI:EAFE 7.2%	MSCI:EM 17.2%	Russell:2000 Index 7.2%	Russell:2000 Index 12.4%	Russell:2000 Index 7.1%
S&P:500 6.1%	S&P:500 17.2%	Blmbg:Aggregate 2.7%	MSCI:EAFE 5.8%	Blmbg:Aggregate 4.3%
Russell:2000 Index 2.5%	MSCI:EAFE 11.7%	MSCI:EM 1.2%	Blmbg:Aggregate 2.3%	MSCI:EM 2.7%
Blmbg:Aggregate 0.8%	Blmbg:Aggregate 0.4%	MSCI:EAFE 0.5%	MSCI:EM 0.8%	MSCI:EAFE 1.1%
3 Month T-Bill 0.1%	3 Month T-Bill 0.4%	3 Month T-Bill 0.2%	3 Month T-Bill 0.1%	3 Month T-Bill 0.7%

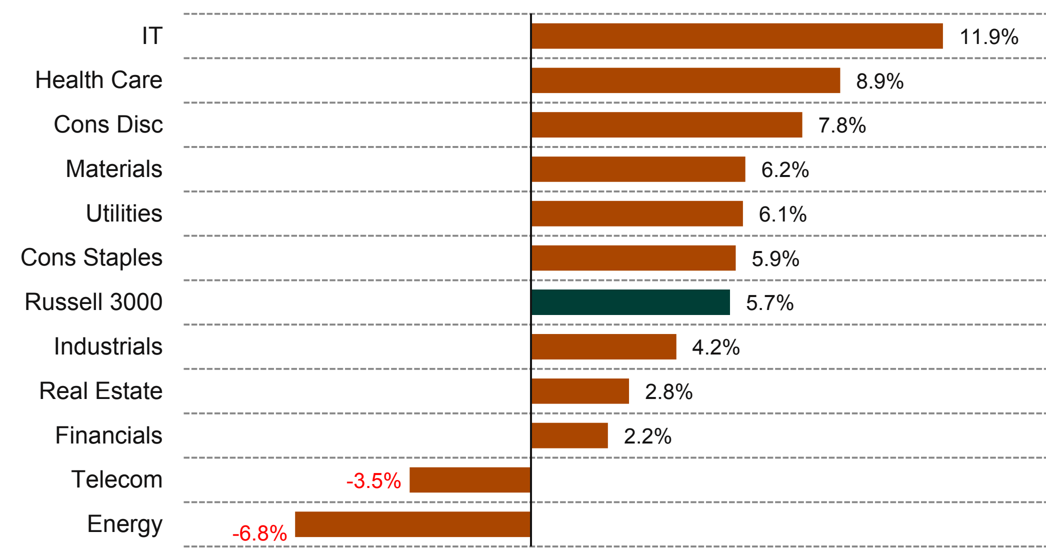
U.S. Equity Returns

Periods Ending March 31, 2017

Economic Sector Exposure (Russell 3000)



Russell 3000 Sector Returns



Source: Barrow Hanley Quarterly Benchmark Review

- The RU 1000 was up 6.0% - Information Technology (+12.3%) and Health Care (+8.6%) were the best performing sectors.
- The RU 2000 was up 2.5% - Health Care (+12.5%) and Information Technology (+6.0%) were the best performing sectors.
- Some lagging sectors through December regained traction in the first quarter - Utilities (+6.1%) and Consumer Staples (+5.9%) were strong performers.

U.S. Equity Style Returns

Periods Ending March 31, 2017

	1Q 2017		
	Value	Core	Growth
Large	3.3%	6.0%	8.9%
Mid	3.8%	5.2%	6.9%
Small	-0.1%	2.5%	5.4%

	Annualized 1 Year Returns		
	Value	Core	Growth
Large	19.2%	17.4%	15.8%
Mid	19.8%	17.0%	14.1%
Small	29.4%	26.2%	23.0%

Green	Represents 3 best performing asset classes in time period
Gold	Represents 3 middle performing asset classes in time period
Red	Represents 3 worst performing asset classes in time period

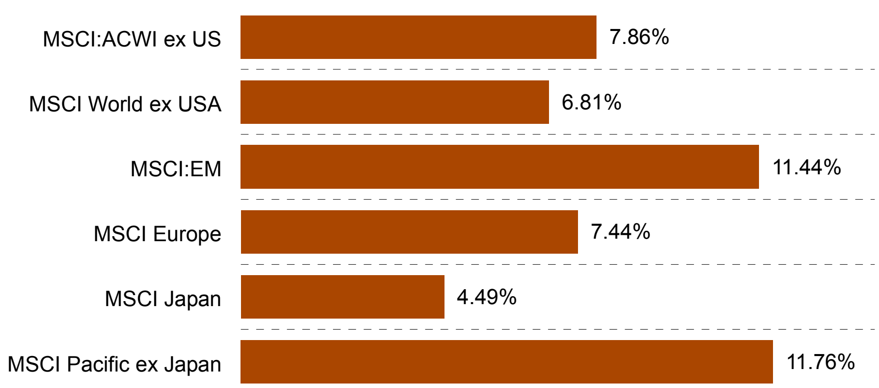
- Last Quarter: Size mixed; growth outperformed
- Last Year: Small cap outperformed; value outperformed

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

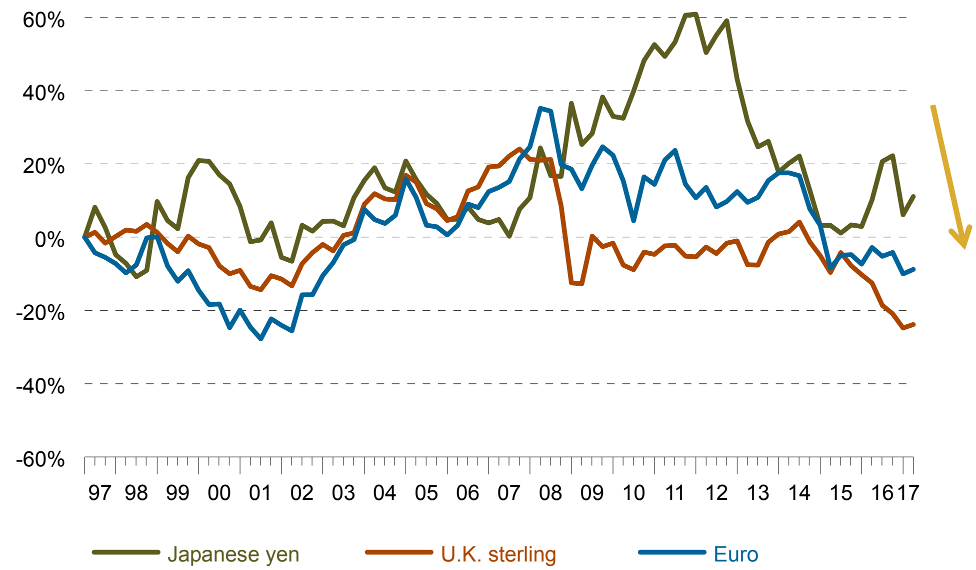
Periods Ending March 31, 2017

Regional Quarterly Performance (U.S. Dollar)



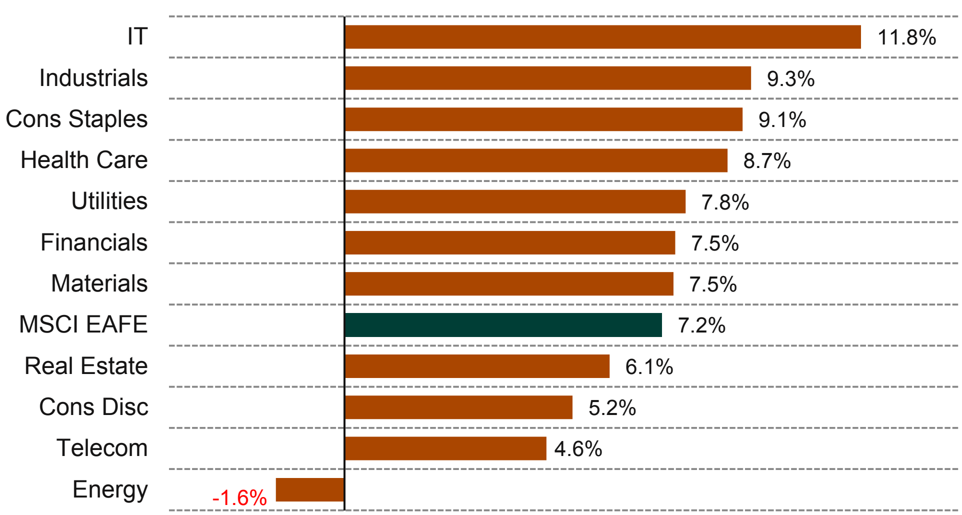
Source: MSCI

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



*Euro returns from 1Q99. German mark prior to 1Q99.
Source: MSCI

MSCI EAFE Sector Returns

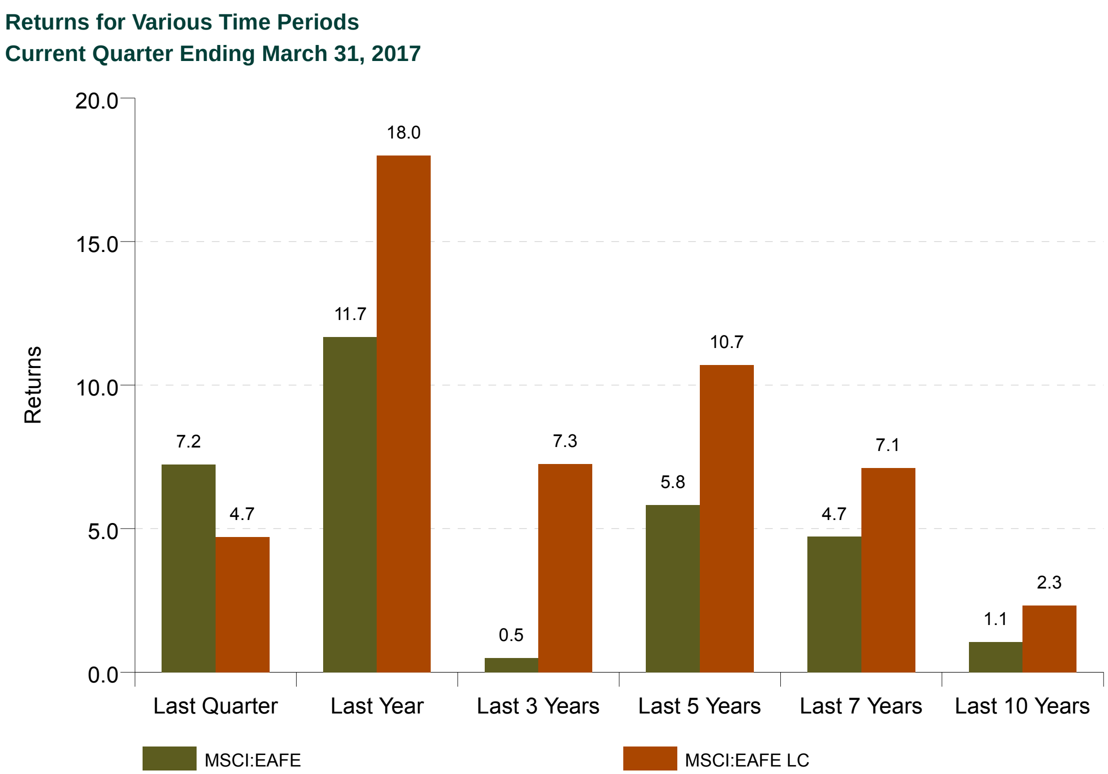


Source: Barrow Hanley Quarterly Benchmark Review

- Best performing region was Pacific ex-Japan (+11.8%).
- The yen (+4.7%), pound (1.2%), and euro (+1.4%) strengthened versus the dollar.
- Information Technology and Industrials were the top and Telecom and Energy the worst performing sectors.

Domestic vs. Local Currency Returns

Currency Effect on U.S. Investors' International Equity Returns

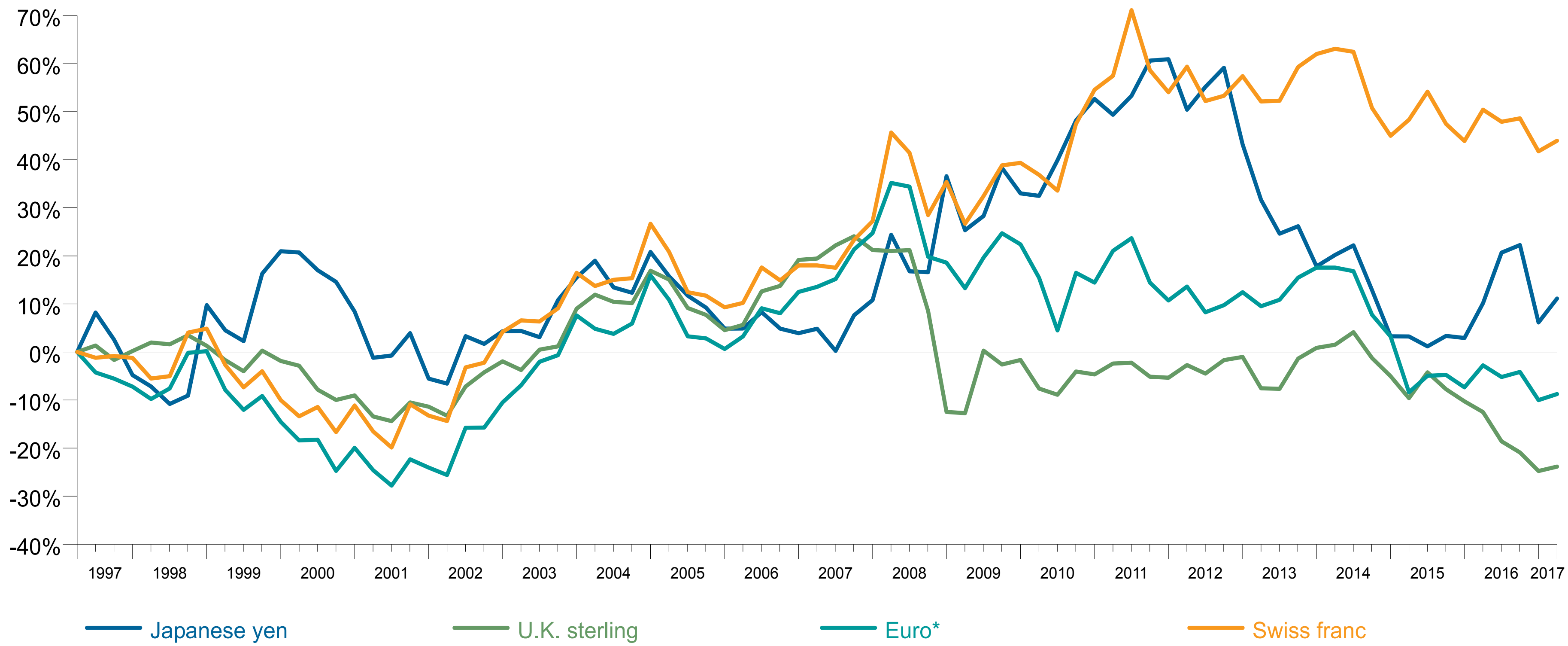


- Despite rebounding recently, U.S. investors' gains on international equities were weighed down over the last year by the amount the U.S. dollar strengthened against local market currencies.
- Over the last five years, dollar strength has cost U.S. investors 4.9% (10.7% return in local currency, but only 5.8% when returns are adjusted by local currency declines versus the dollar).

Non-U.S. Equity

Currencies

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



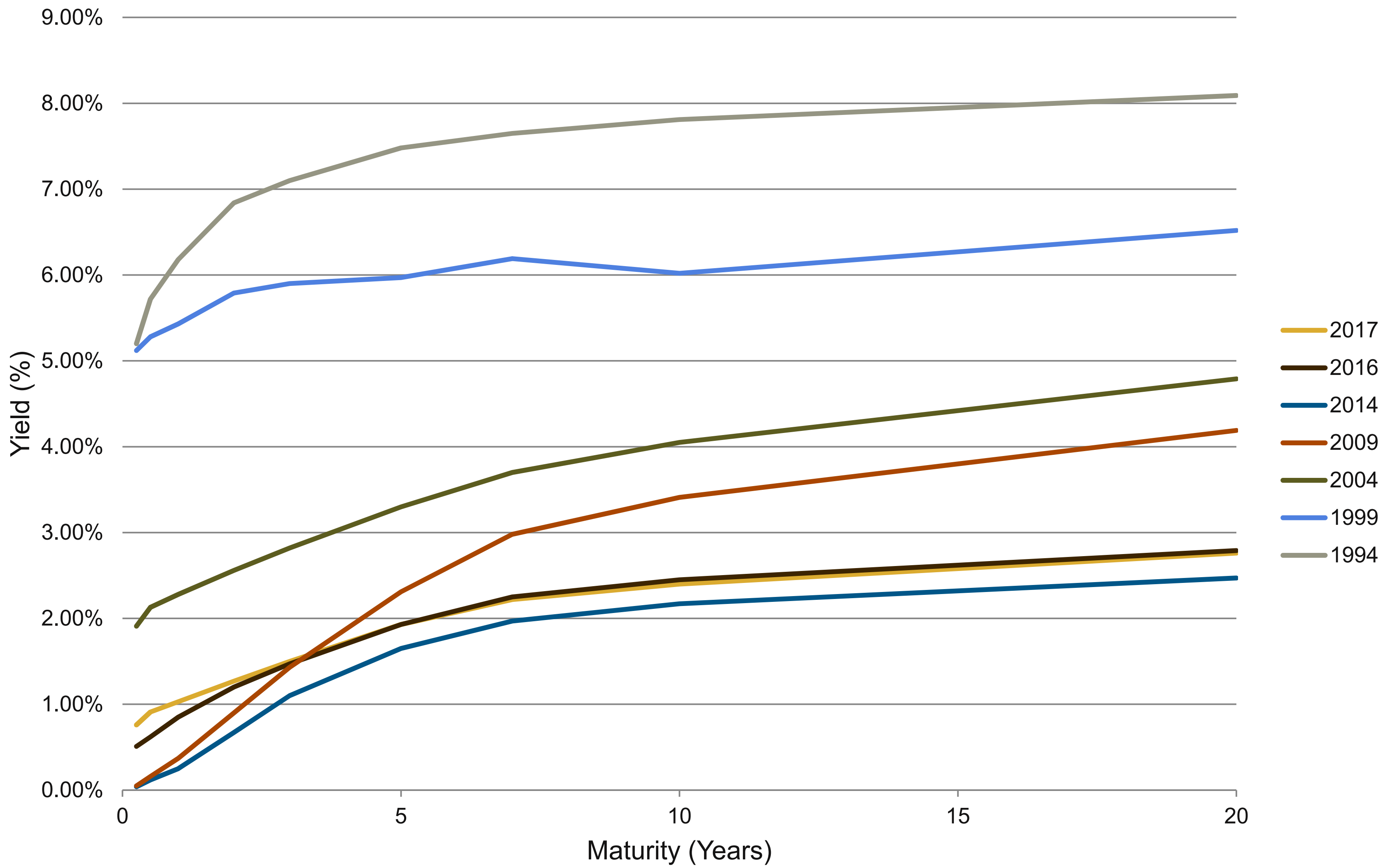
- In the most recent quarter, the dollar's weakness bolstered returns for U.S. investors.
- After hitting a multi-year high last quarter, the U.S. dollar experienced a 1.6% pullback compared to a basket of currencies.

* Euro returns from 1Q99. German mark prior to 1Q99. Source: MSCI

Historic Yield Curves

As of March 31, 2017

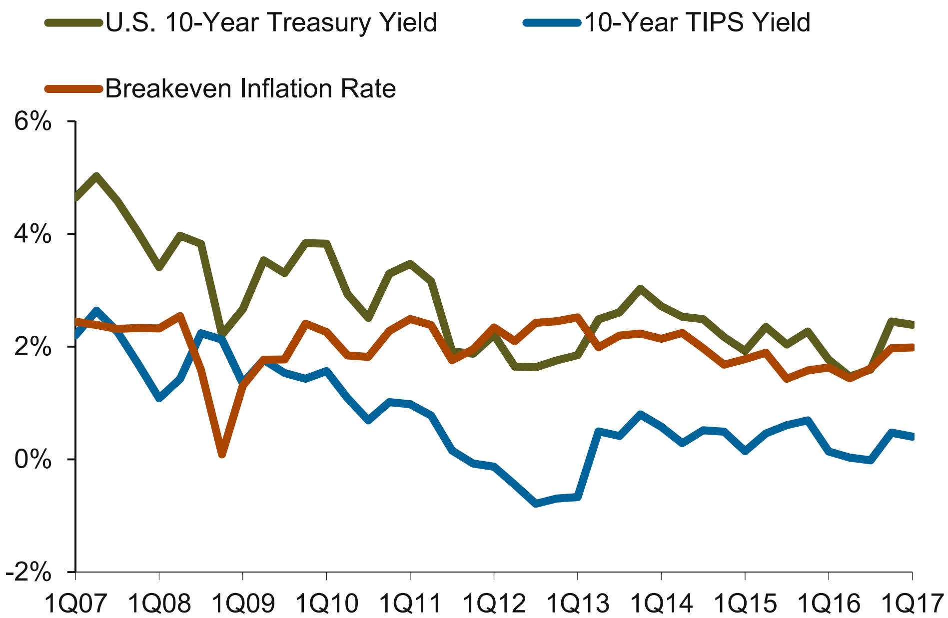
Treasury Yield Curve



Yield Curve Changes

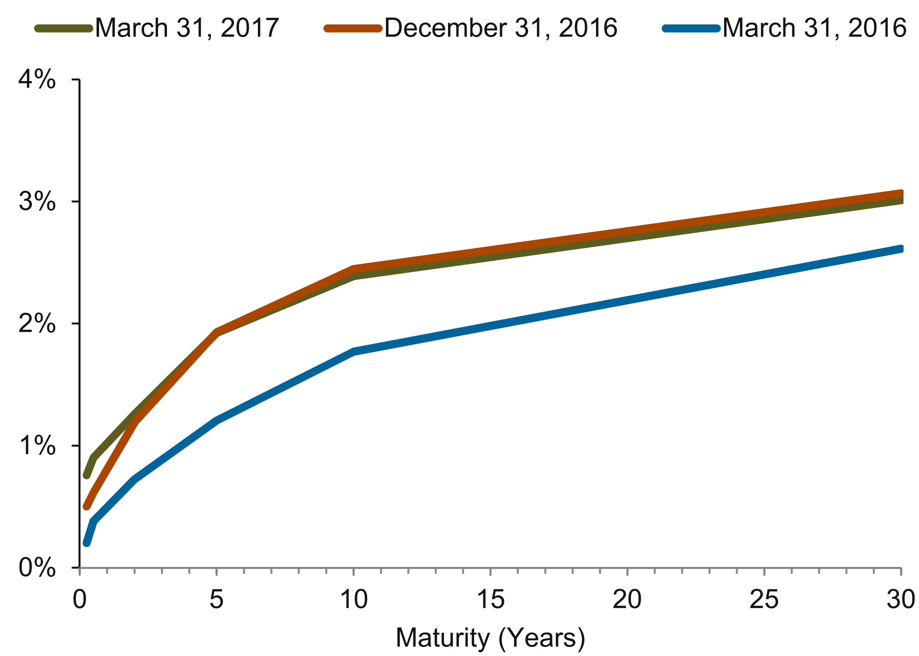
Periods Ending March 31, 2017

Historical 10-Year Yields



Source: Bloomberg

U.S. Treasury Yield Curves



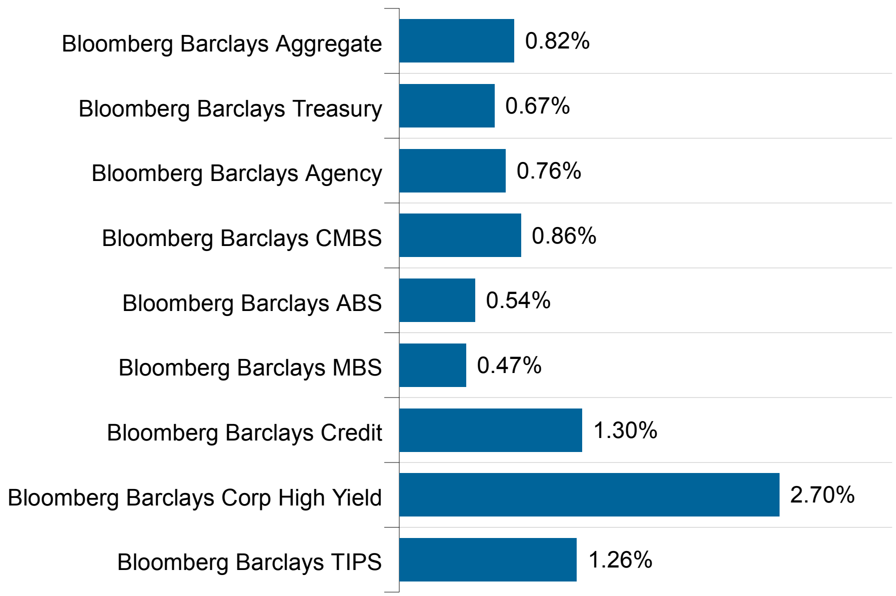
Source: U.S. Department of the Treasury

- Treasury yields increased at the short end of the curve and dipped slightly at the long end. The yield on the 10-year and 30-year dropped 5 bps and 4 bps, respectively. The 1-month rose 30 bps.
- Breakeven inflation was flat on soft March inflation figures.
- Worldwide, rates remain low.

Total Rates of Return by Bond Sector

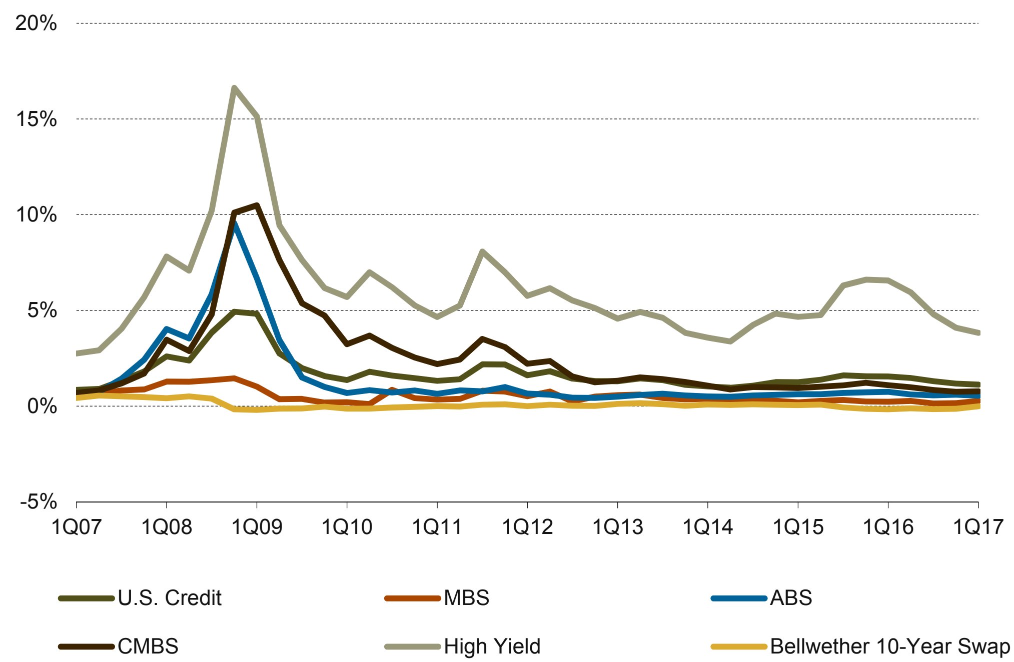
Periods Ending March 31, 2017

Total Returns



Source: Bloomberg Barclays

Effective Yield Over Treasuries



- All sectors posted positive returns. The best performing sector was high yield (+2.7%).
- Worst performing sector of the Aggregate was mortgage-backed securities (+0.5%).
- Treasury Inflation Protected Securities (TIPS) outperformed Treasuries.
- Spreads contracted across investment grade credit, high yield, and asset-backed security sectors.

Real Estate

Style medians and index returns

Style Median and Index Returns* for Periods ended March 31, 2017

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)	1.88	1.88	7.90	11.40	11.51	4.38	7.75
NCREIF Property**	1.55	1.55	7.27	10.58	10.69	6.72	9.01
NFI-ODCE (value wtd-net)	1.54	1.54	7.36	10.77	10.94	4.62	7.24
Public Real Estate							
REIT U.S. Database	1.14	1.14	3.30	10.54	10.16	5.42	11.34
FTSE NAREIT Equity	1.16	1.16	3.56	10.26	9.99	4.85	10.30
Global Real Estate							
Global REIT Database	2.19	2.19	1.18	6.54	8.61	2.44	10.22
EPRA/NAREIT Developed REITs	2.30	2.30	1.86	6.18	8.19	1.85	9.62
EPRA/NAREIT Developed REITs ex-US	4.88	4.88	1.66	2.63	6.50	-0.15	9.48

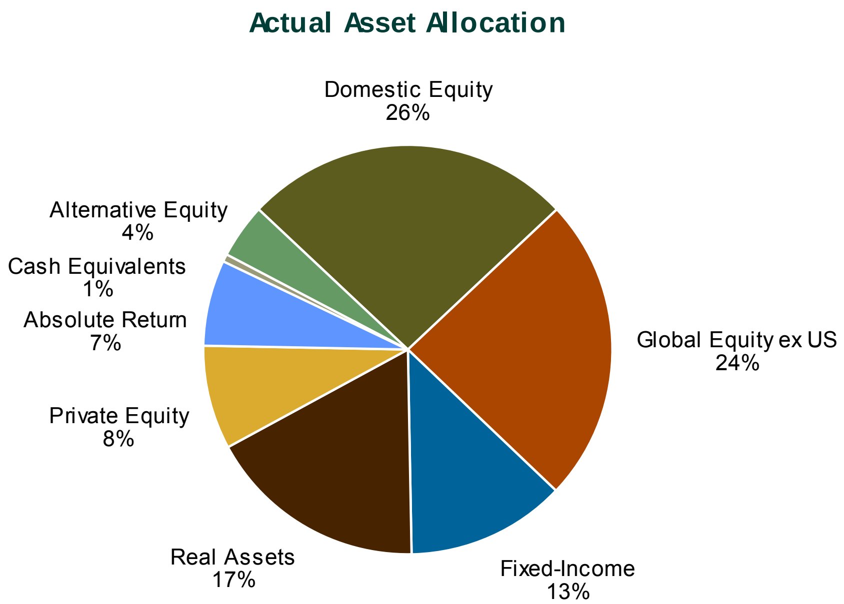
Sources: Callan, Citigroup, JPMorgan Chase & Co.

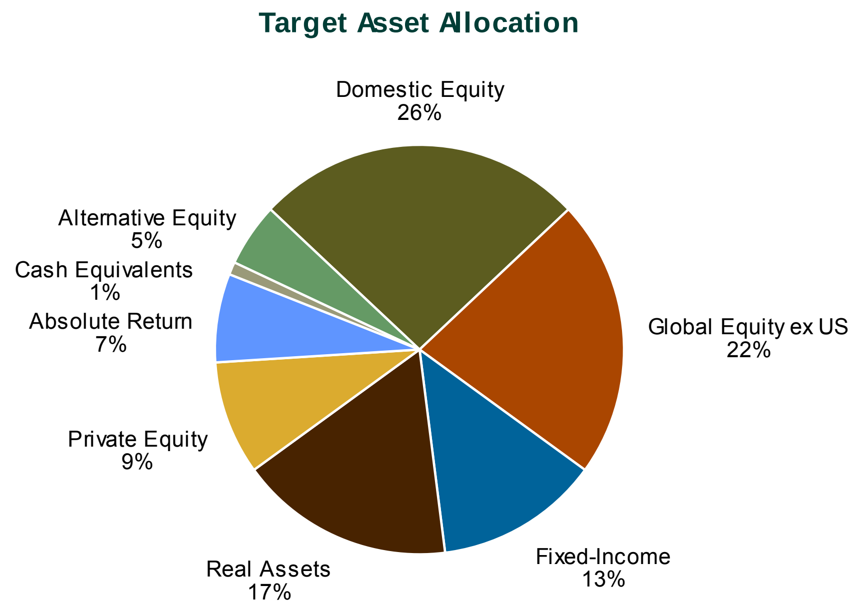
- The NCREIF Property index returned 1.55% in the first calendar quarter of 2017.
- The NFI-ODCE rose 1.54% (0.84% from income and 0.71% from appreciation).
- U.S. REITs, measured by the FTSE NAREIT Equity REITs Index, gained 1.16% for the quarter.

Pension Plan

Asset Allocation – Public Employees' Retirement System

Quarter Ending March 31, 2017





Asset Class	$000s Actual	Weight Actual	Target	Percent Difference	$000s Difference
Domestic Equity	2,281,698	26.0%	26.0%	0.0%	(272)
Global Equity ex US	2,116,310	24.1%	22.0%	2.1%	185,413
Fixed-Income	1,107,303	12.6%	13.0%	(0.4%)	(33,682)
Real Assets	1,525,022	17.4%	17.0%	0.4%	32,965
Private Equity	715,995	8.2%	9.0%	(0.8%)	(73,918)
Absolute Return	593,843	6.8%	7.0%	(0.2%)	(20,533)
Cash Equivalents	56,275	0.6%	1.0%	(0.4%)	(31,493)
Alternative Equity	380,361	4.3%	5.0%	(0.7%)	(58,480)
Total	8,776,808	100.0%	100.0%		

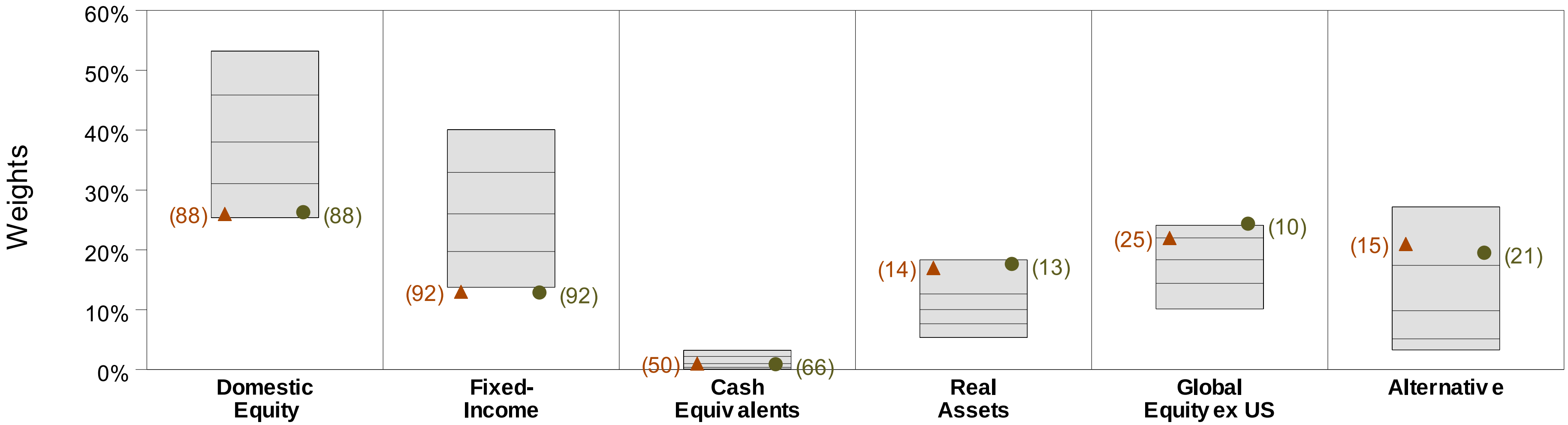
PERS is used as illustrative throughout the presentation.

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



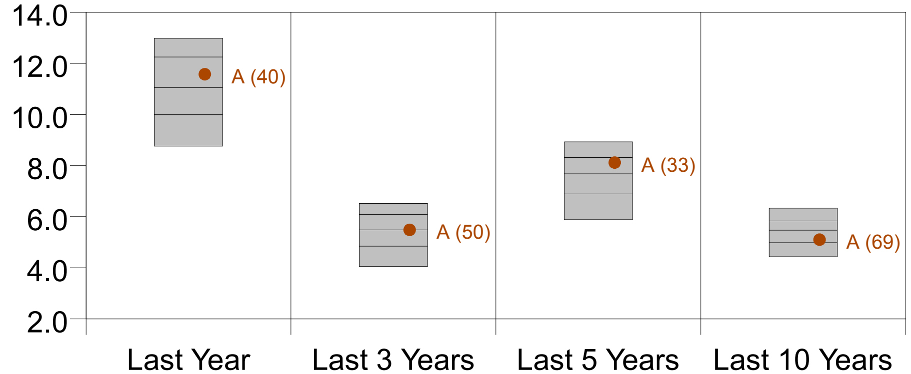
	Domestic Equity	Fixed-Income	Cash Equivalents	Real Assets	Global Equity ex US	Alternative
10th Percentile	53.22	40.08	3.21	18.33	24.12	27.19
25th Percentile	45.87	32.95	2.18	12.64	21.99	17.42
Median	38.03	25.99	1.01	10.02	18.35	9.85
75th Percentile	31.08	19.74	0.38	7.65	14.40	5.11
90th Percentile	25.37	13.75	0.10	5.35	10.13	3.27
Fund ●	26.00	12.62	0.64	17.38	24.11	19.26
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 reasonably close to their targets. Fixed income is a low allocation when compared to other public funds. Real assets are high when compared to other public funds. Policy is "growth" oriented as opposed to "income" oriented.

*Note that "Alternative" includes private equity and absolute return

Total Fund Return vs Public Funds (PERS)

Callan Public Fund Database



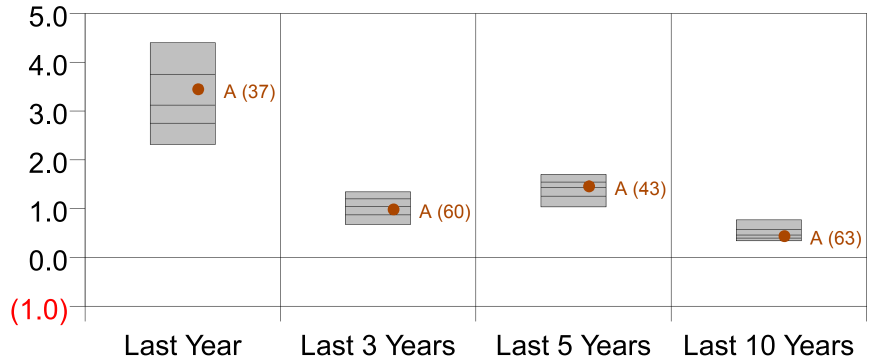
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	12.98	6.52	8.93	6.34
25th Percentile	12.26	6.09	8.32	5.84
Median	11.06	5.49	7.68	5.47
75th Percentile	9.99	4.84	6.89	4.98
90th Percentile	8.76	4.05	5.88	4.44
Member Count	214	210	200	162
ARMB - PERS - Total Fund ● A	11.58	5.49	8.12	5.10

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

Total Fund Sharpe Ratio Rankings vs Public Funds (PERS)

Callan Public Fund Database

Sharpe Ratio
for Periods Ended March 31, 2017
Group: CAI Public Fund Sponsor Database



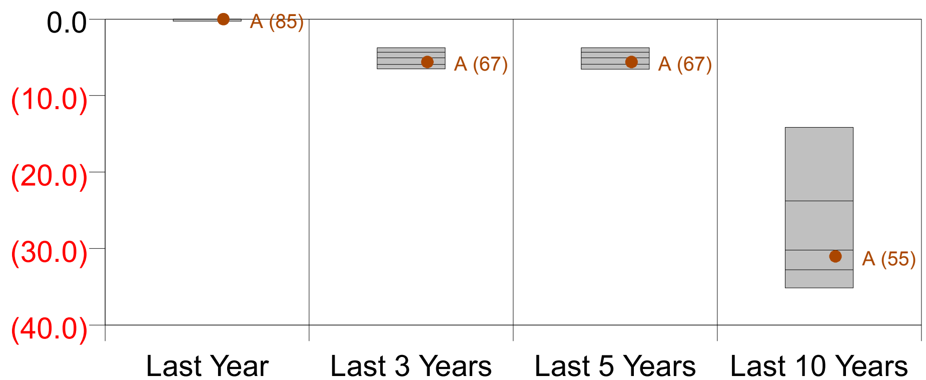
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	4.40	1.34	1.70	0.77
25th Percentile	3.75	1.20	1.54	0.57
Median	3.12	1.05	1.43	0.46
75th Percentile	2.75	0.87	1.25	0.40
90th Percentile	2.32	0.68	1.04	0.34
Member Count	214	210	200	162
ARMB - PERS - Total Fund ● A	3.45	0.98	1.46	0.44

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

Total Maximum Drawdown Rankings vs Public Funds (PERS)

Callan Public Fund Database

Maximum Drawdown
for Periods Ended March 31, 2017
Group: CAI Public Fund Sponsor Database



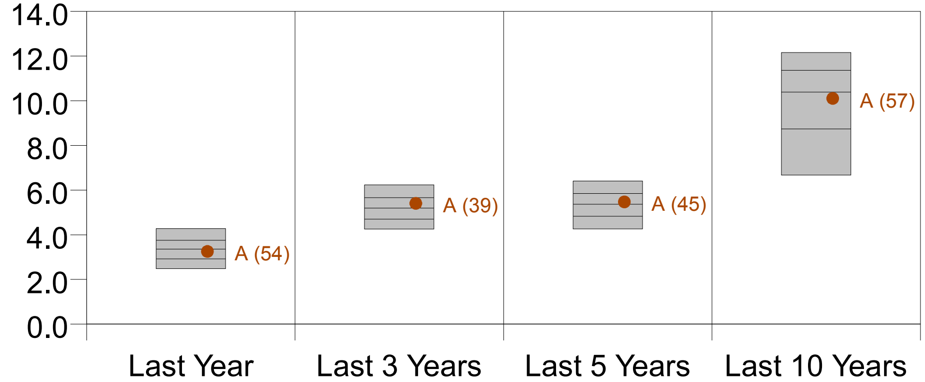
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	0.00	(3.73)	(3.73)	(14.15)
25th Percentile	0.00	(4.31)	(4.31)	(23.75)
Median	0.00	(5.05)	(5.05)	(30.18)
75th Percentile	0.00	(5.91)	(5.88)	(32.77)
90th Percentile	(0.25)	(6.49)	(6.53)	(35.13)
Member Count	214	210	200	162
ARMB - PERS - 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, three-year, and five-year time frames is due in part to the consistent bull market.

Standard Deviation Ranking vs Public Funds (PERS)

Callan Public Fund Database

Standard Deviation
for Periods Ended March 31, 2017
Group: CAI Public Fund Sponsor Database



	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	4.28	6.24	6.41	12.16
25th Percentile	3.76	5.66	5.85	11.37
Median	3.36	5.20	5.37	10.39
75th Percentile	2.92	4.70	4.83	8.74
90th Percentile	2.48	4.26	4.26	6.68
Member Count	214	210	200	162
ARMB - PERS - Total Fund ● A	3.25	5.41	5.47	10.11

- 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 – 1st Quarter 2017 & Trailing Year

Relative Attribution Effects for Quarter ended March 31, 2017

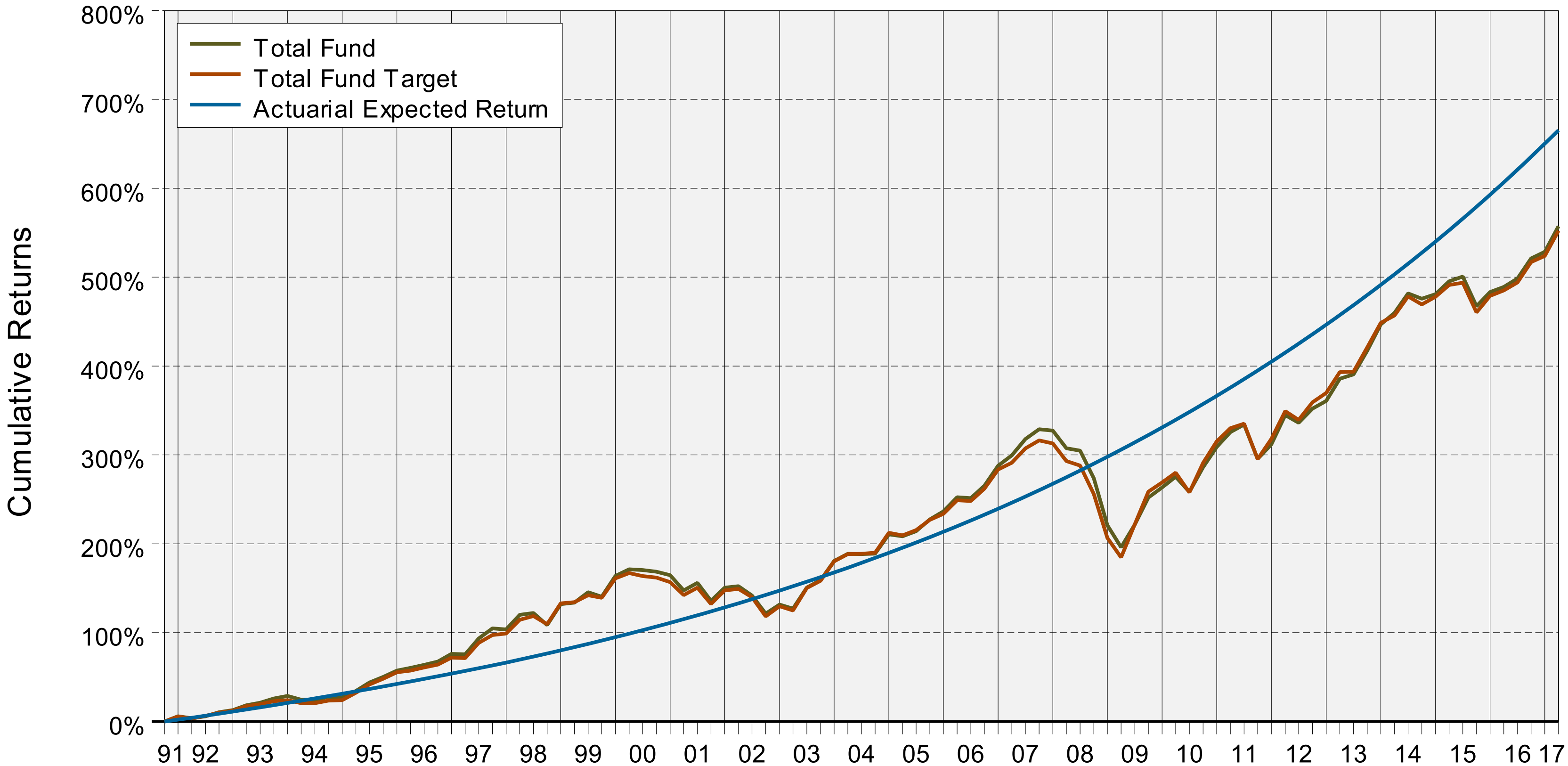
Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	27%	26%	5.31%	5.74%	(0.12%)	0.01%	(0.11%)
Fixed-Income	12%	13%	1.85%	1.04%	0.10%	0.04%	0.14%
Real Assets	18%	17%	2.69%	2.01%	0.12%	(0.01%)	0.11%
Global Equity ex US	23%	22%	8.43%	7.98%	0.10%	0.05%	0.15%
Private Equity	8%	9%	3.01%	5.26%	(0.18%)	(0.01%)	(0.19%)
Absolute Return	7%	7%	1.41%	1.33%	0.01%	0.00%	0.01%
Alternative Equity	4%	5%	3.45%	4.98%	(0.07%)	(0.00%)	(0.07%)
Cash Equivalents	1%	1%	0.23%	0.10%	0.00%	(0.00%)	(0.00%)
Total			**4.58% =**	**4.54% +**	**(0.04%) +**	**0.08%**	**0.04%**

One Year Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	26%	26%	18.15%	18.07%	0.02%	(0.01%)	0.01%
Fixed-Income	12%	13%	3.97%	0.87%	0.40%	0.10%	0.50%
Real Assets	18%	17%	9.14%	6.30%	0.52%	(0.04%)	0.48%
Global Equity ex US	24%	23%	12.59%	13.70%	(0.27%)	0.03%	(0.24%)
Private Equity	8%	9%	10.67%	18.36%	(0.61%)	(0.07%)	(0.68%)
Absolute Return	7%	6%	7.40%	5.36%	0.15%	0.01%	0.15%
Alternative Equity	4%	4%	11.42%	15.41%	(0.17%)	0.00%	(0.17%)
Cash Equivalents	1%	1%	0.79%	0.36%	0.00%	0.04%	0.04%
Total			**11.58% =**	**11.48% +**	**0.05% +**	**0.05%**	**0.10%**

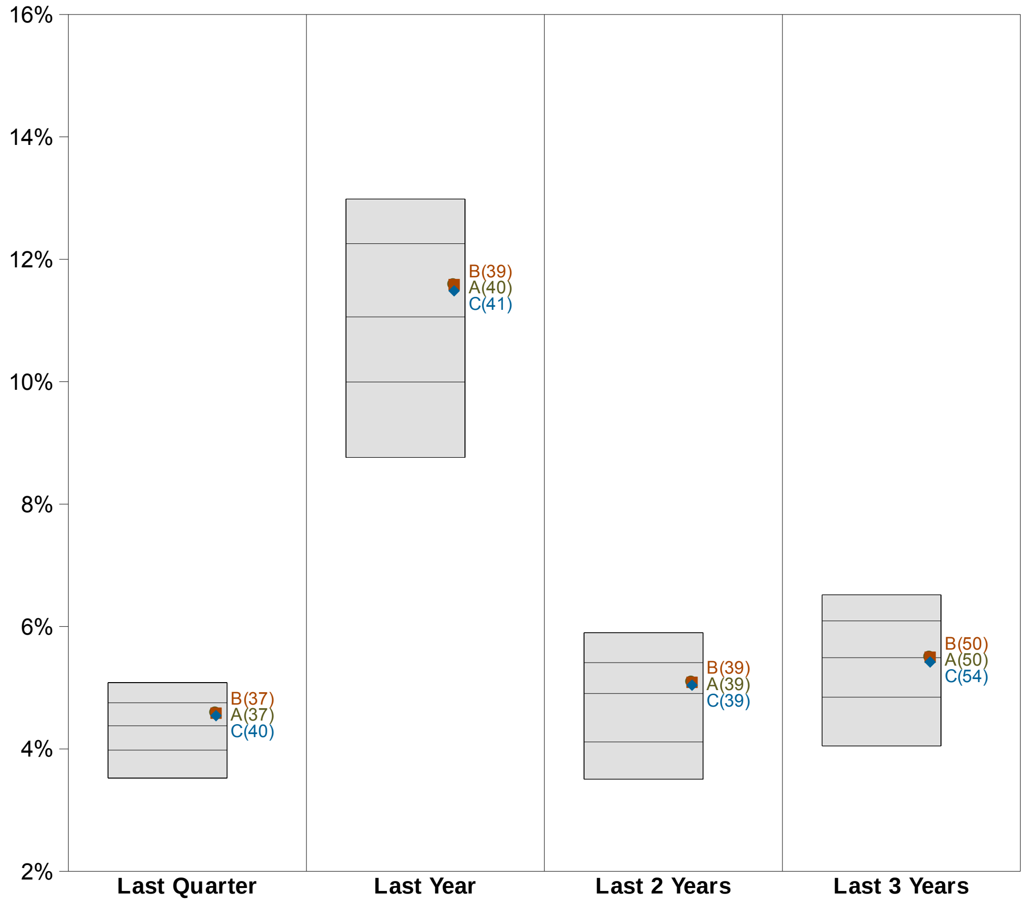
PERS Long-Term Performance as of 3/31/17

Cumulative Returns Actual vs Target



- Each Fund has two targets: the <u>asset allocation policy return</u> and the <u>actuarial return</u>.
- 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.

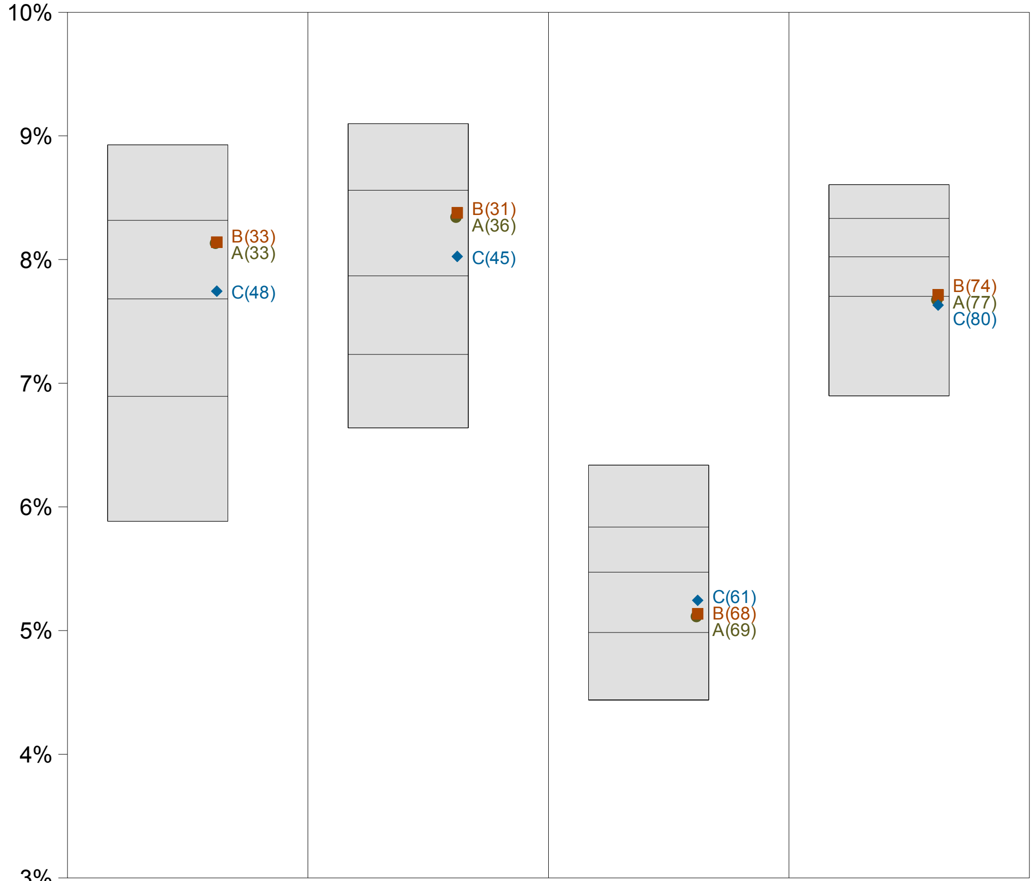
Cumulative Total Fund Returns as of 3/31/17



		Last Quarter	Last Year	Last 2 Years	Last 3 Years
10th Percentile		5.08	12.98	5.90	6.52
25th Percentile		4.75	12.26	5.41	6.09
Median		4.38	11.06	4.90	5.49
75th Percentile		3.98	9.99	4.11	4.84
90th Percentile		3.52	8.76	3.50	4.05
PERS Total Plan	● A	4.58	11.58	5.08	5.49
TRS Total Plan	■ B	4.59	11.59	5.09	5.50
Target Index	◆ C	4.54	11.48	5.04	5.42

- PERS and TRS have outperformed their target for the last quarter, year, two-year and three-year time frames.
- PERS 1st quarter performance beat the target by four basis points.

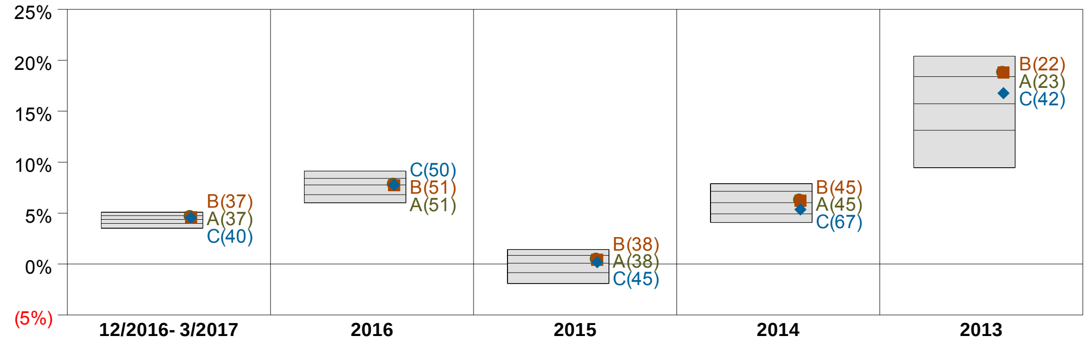
Longer-Term Returns as of 3/31/17



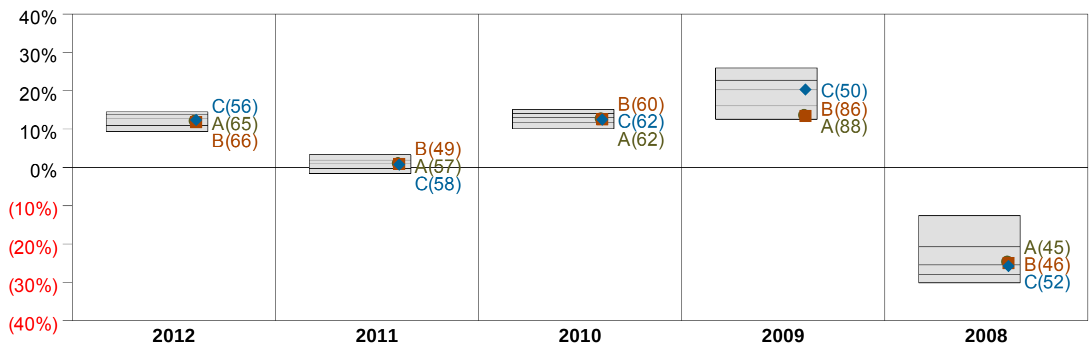
		Last 5 Years	Last 7 Years	Last 10 Years	Last 25-1/2 Years
10th Percentile		8.93	9.10	6.34	8.61
25th Percentile		8.32	8.56	5.84	8.33
Median		7.68	7.87	5.47	8.02
75th Percentile		6.89	7.23	4.98	7.70
90th Percentile		5.88	6.64	4.44	6.90
PERS Total Plan	● A	8.12	8.33	5.10	7.66
TRS Total Plan	■ B	8.14	8.38	5.14	7.71
Target Index	◆ C	7.75	8.03	5.24	7.63

- 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 14 basis points.
- 25 and ½-year return beats the target.

Calendar Period Performance



	12/2016- 3/2017	2016	2015	2014	2013
10th Percentile	5.08	9.12	1.43	7.89	20.41
25th Percentile	4.75	8.41	0.84	7.14	18.40
Median	4.38	7.77	0.07	6.03	15.73
75th Percentile	3.98	6.81	(0.84)	4.93	13.13
90th Percentile	3.52	6.01	(1.91)	4.08	9.45
PERS Total Plan ● A	4.58	7.74	0.40	6.22	18.74
TRS Total Plan ■ B	4.59	7.74	0.41	6.22	18.79
Target Index ◆ C	4.54	7.77	0.18	5.35	16.78

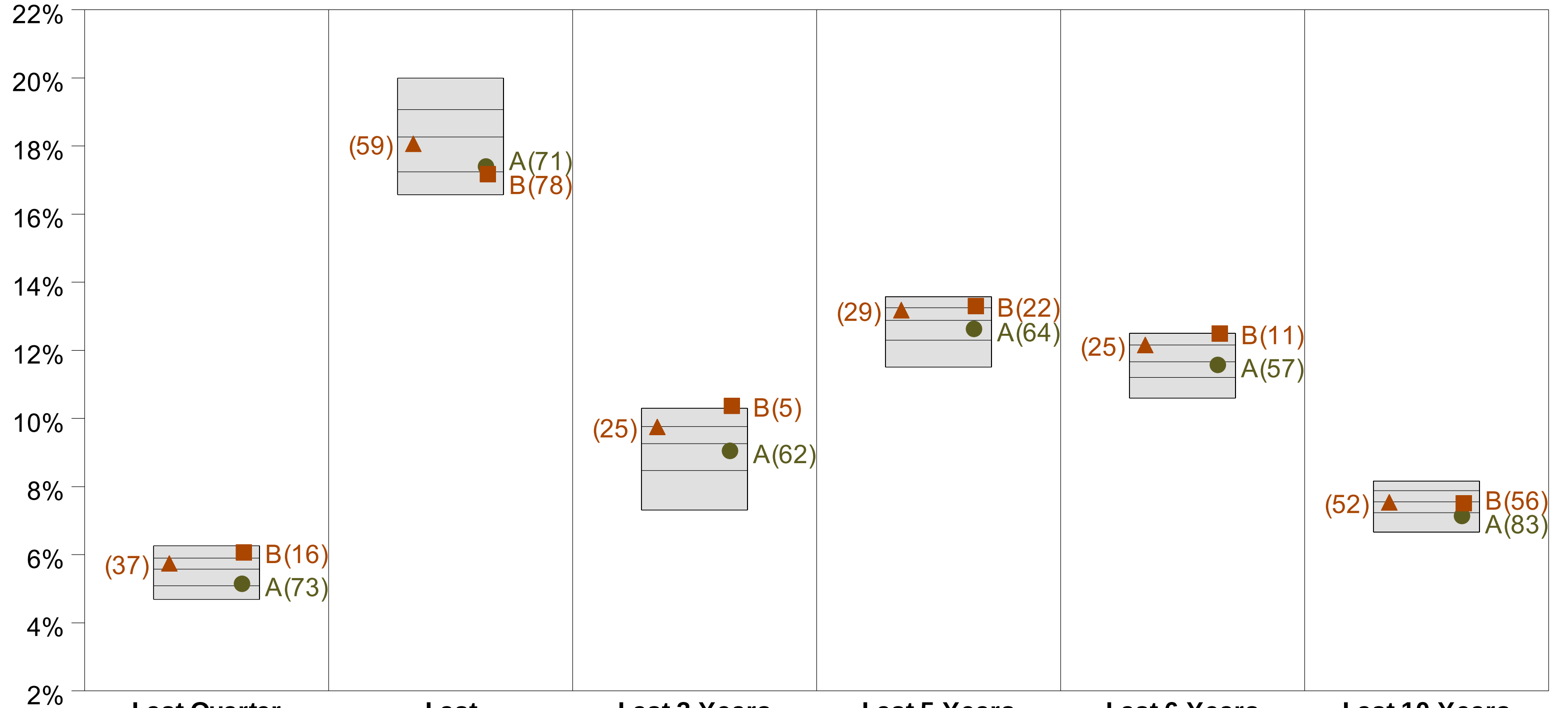


	2012	2011	2010	2009	2008
10th Percentile	14.49	3.31	15.10	25.93	(12.58)
25th Percentile	13.73	1.92	14.11	22.73	(20.71)
Median	12.66	0.91	13.00	20.23	(25.43)
75th Percentile	10.92	(0.30)	11.68	16.02	(27.97)
90th Percentile	9.34	(1.58)	10.06	12.57	(30.14)
PERS Total Plan ● A	11.81	0.77	12.45	13.31	(24.91)
TRS Total Plan ■ B	11.79	0.95	12.55	13.40	(24.98)
Target Index ◆ C	12.38	0.72	12.49	20.33	(25.74)

- PERS and TRS had the same return during 2016 and 2014.
- Peer group range of returns during 2016, 2015, and 2014 were very tight.
- Wide range of peer group returns during calendar 2013 due to varying fixed-income allocations within the Public Fund universe.
- PERS ranks above median in five and TRS ranks above median in six of the ten periods shown.

Total Domestic Equity through 3/31/17

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		6.26	19.99	10.30	13.57	12.50	8.16
25th Percentile		5.90	19.07	9.77	13.25	12.15	7.88
Median		5.58	18.26	9.26	12.88	11.66	7.55
75th Percentile		5.08	17.24	8.47	12.30	11.20	7.23
90th Percentile		4.69	16.57	7.31	11.51	10.60	6.67
Domestic Equity Pool	● A	5.10	17.35	9.00	12.58	11.52	7.08
Standard & Poor's 500	■ B	6.07	17.17	10.37	13.30	12.49	7.51
Russell 3000 Index	▲	5.74	18.07	9.76	13.18	12.16	7.54

Domestic Equity Component Returns

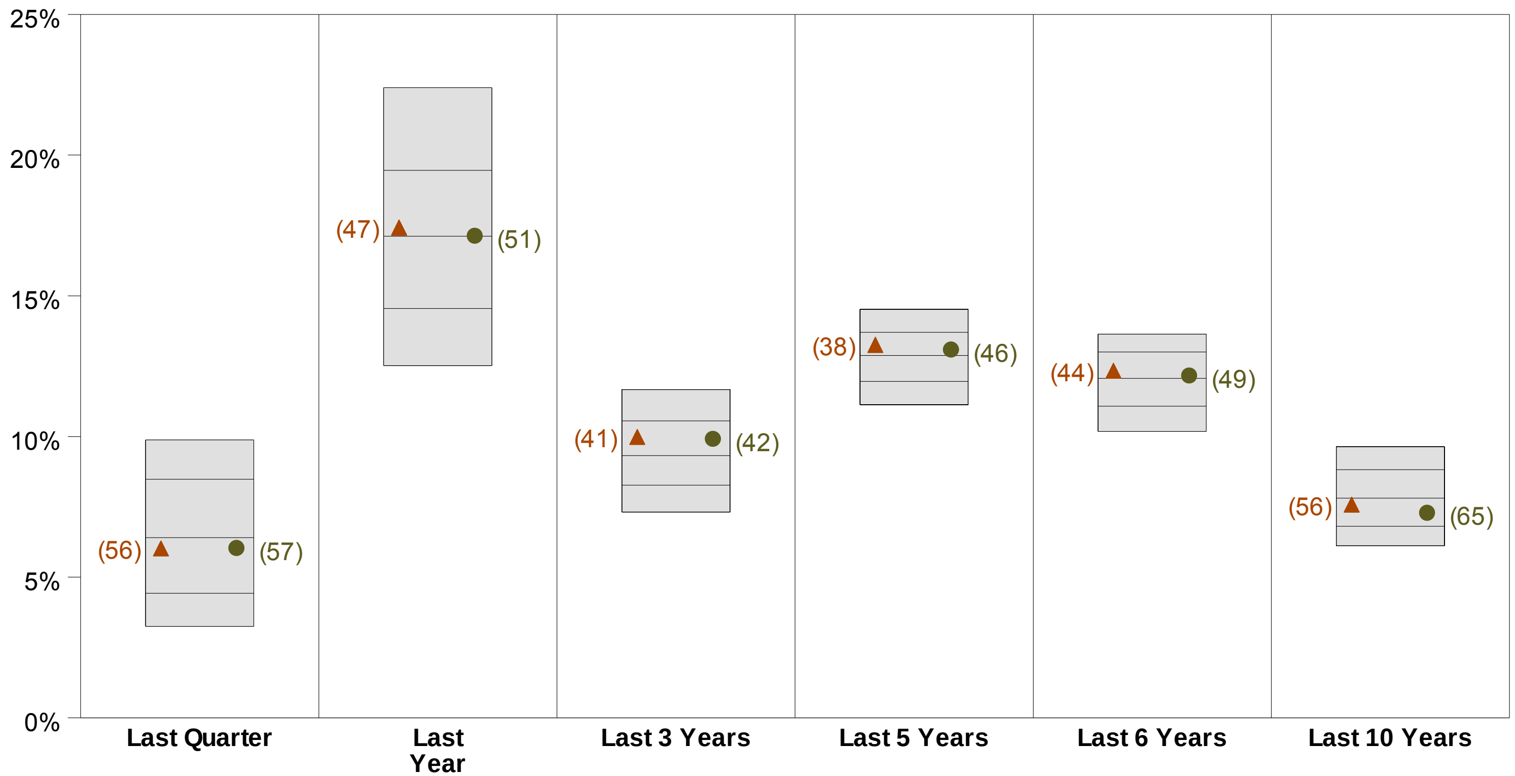
Returns for Periods Ended March 31, 2017

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years
Total Dom Equity Pool	5.10%	17.35%	9.00%	12.58%	11.52%
Russell 3000 Index	5.74%	18.07%	9.76%	13.18%	12.16%
Large Cap Managers	5.98%	17.07%	9.86%	13.02%	12.10%
Large Cap Active	5.93%	19.16%	10.00%	12.96%	11.96%
Large Cap Passive	6.22%	17.18%	10.10%	13.32%	12.40%
Russell 1000 Index	6.03%	17.43%	9.99%	13.26%	12.34%
Small Cap Managers	2.15%	24.51%	6.56%	12.29%	10.56%
Small Cap Active	2.32%	25.20%	6.53%	12.33%	10.80%
Small Cap Passive	0.83%	20.42%	7.00%	12.04%	9.46%
Russell 2000 Index	2.47%	26.22%	7.22%	12.35%	10.16%
Alternative Equity	3.45%	11.37%	5.99%	8.29%	7.57%

- 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.

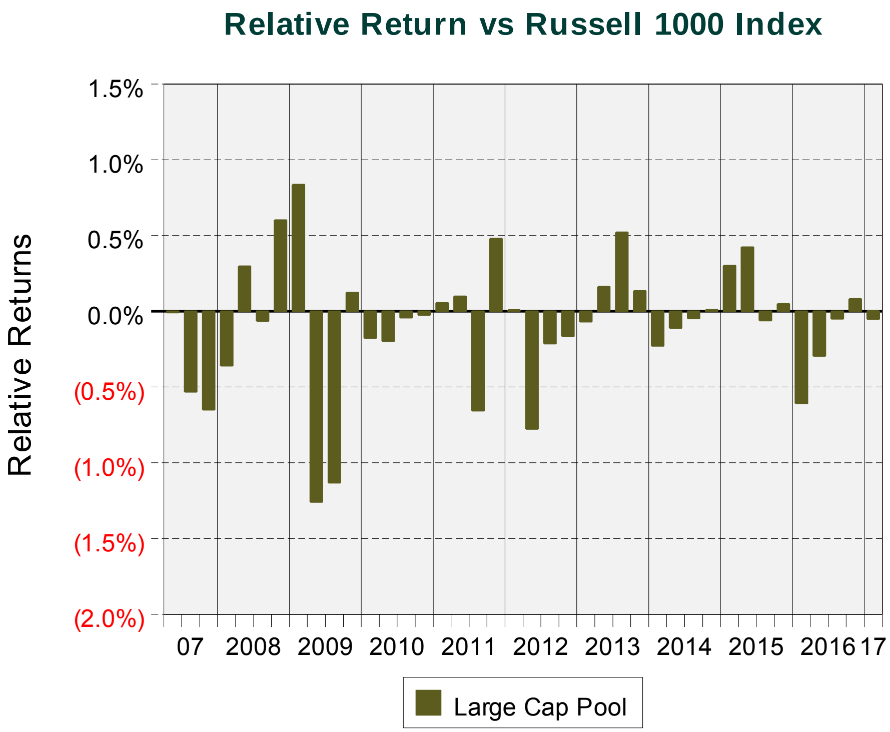
Large Cap Domestic Equity Pool through 3/31/17

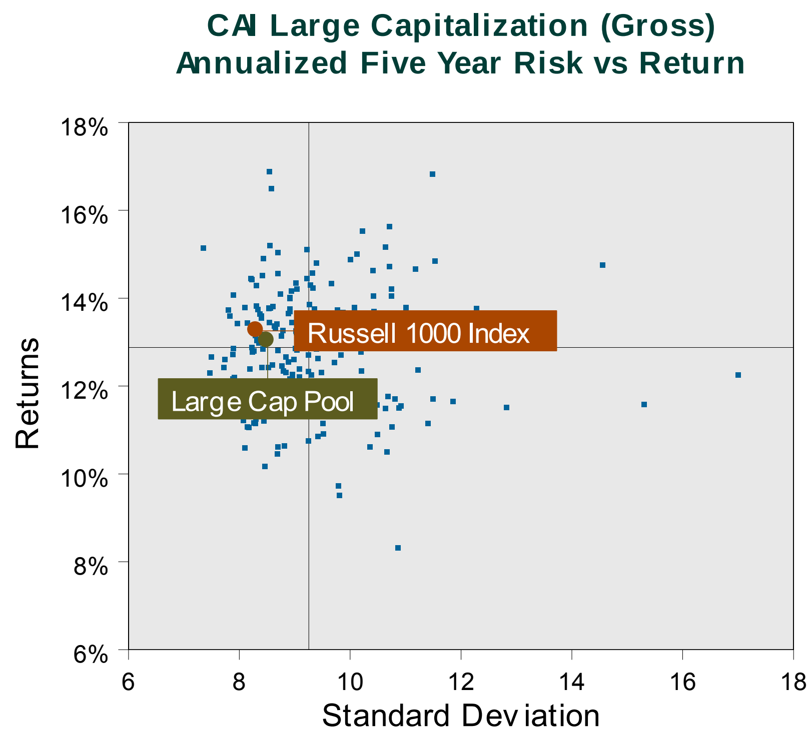
Performance vs CAI Large Capitalization (Gross)



	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	9.88	22.39	11.66	14.52	13.64	9.64
25th Percentile	8.48	19.46	10.55	13.70	13.00	8.82
Median	6.40	17.12	9.32	12.88	12.07	7.81
75th Percentile	4.43	14.55	8.27	11.96	11.08	6.81
90th Percentile	3.25	12.52	7.32	11.12	10.18	6.12
Large Cap Pool ●	5.98	17.07	9.86	13.02	12.10	7.23
Russell 1000 Index ▲	6.03	17.43	9.99	13.26	12.34	7.58

Large Cap Domestic Equity Pool as of 3/31/17

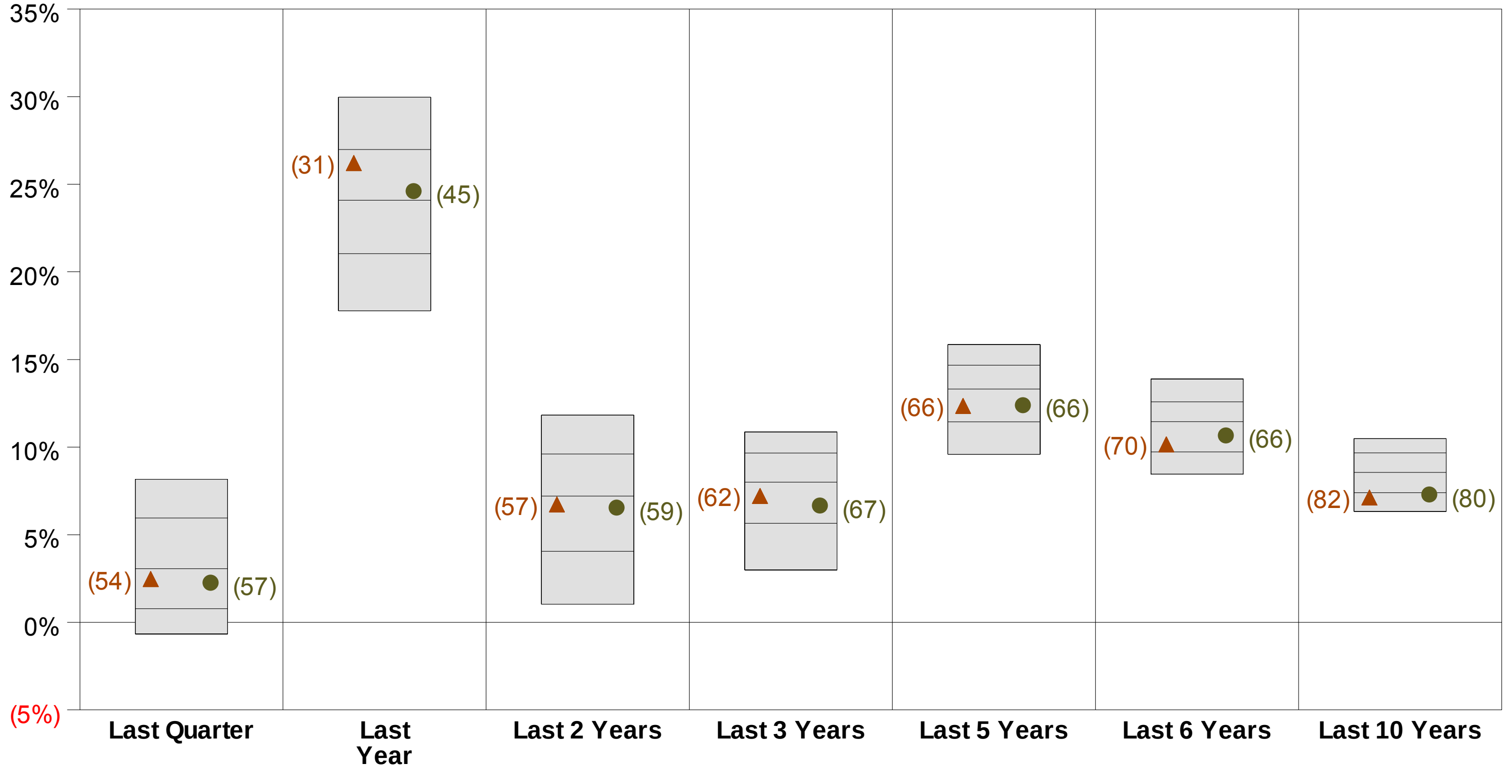




- Nearly 3/5 of large cap allocation is passively managed.
- Long-term performance exhibits market-like returns with similar risk.

Small Cap Domestic Equity Pool through 3/31/17

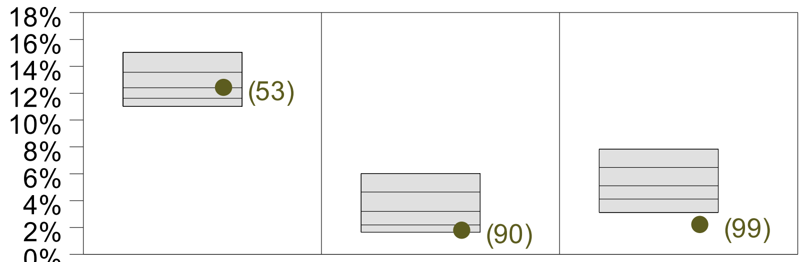
Performance vs CAI Small Capitalization (Gross)



	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	8.16	29.98	11.82	10.87	15.85	13.89	10.48
25th Percentile	5.95	26.99	9.61	9.66	14.67	12.59	9.67
Median	3.05	24.10	7.20	8.00	13.31	11.45	8.55
75th Percentile	0.77	21.04	4.05	5.65	11.44	9.73	7.40
90th Percentile	(0.67)	17.78	1.03	2.98	9.58	8.46	6.33
Small Cap Pool ●	2.15	24.51	6.45	6.56	12.29	10.56	7.19
Russell 2000 Index ▲	2.47	26.22	6.72	7.22	12.35	10.16	7.12

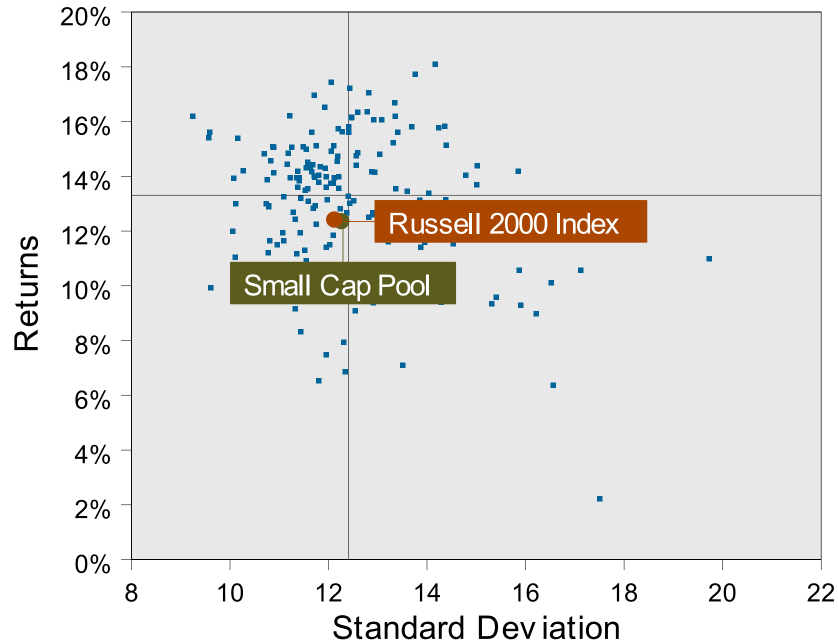
- Returns have lagged the index in recent periods but compare favorably across the six, and 10 year time frames.

Small Cap Pool through 3/31/17



	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	15.05	6.01	7.83
25th Percentile	13.56	4.63	6.47
Median	12.41	3.21	5.11
75th Percentile	11.63	2.20	4.11
90th Percentile	11.01	1.64	3.11
Small Cap Equity Pool ●	12.29	1.65	2.08

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 3/31/17

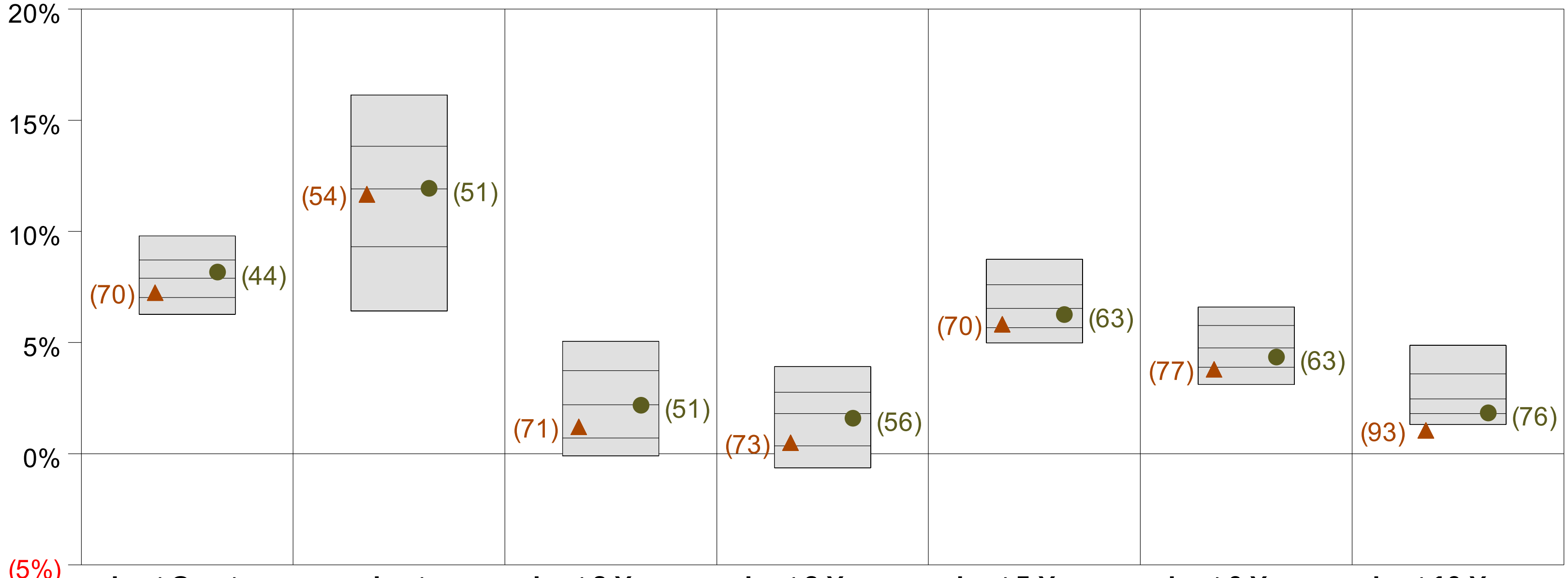
Performance vs Pub Pln- International Equity (Gross)

		Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile		11.49	18.31	3.87	3.29	7.14	5.52	3.39
25th Percentile		9.19	13.93	3.10	2.14	6.33	4.74	2.97
Median		8.05	12.55	2.35	1.38	5.69	4.04	2.21
75th Percentile		7.67	11.41	0.82	0.63	4.64	3.09	1.78
90th Percentile		7.13	7.97	(0.43)	(0.45)	2.71	1.24	1.33
Employees' Total Int'l Equity	● A	8.43	12.60	2.48	1.40	5.49	3.55	2.18
MSCI EAFE Index	■ B	7.25	11.67	1.21	0.50	5.83	3.80	1.05
MSCI ACWIxUS Gross	▲	7.98	13.70	1.84	1.03	4.84	2.81	1.82

- In contrast to last quarter, performance figures for 1Q17 were bolstered by strong emerging markets performance.

International Equity ex Emerging Markets through 3/31/17

Performance vs CAI Non-US Equity (Gross)



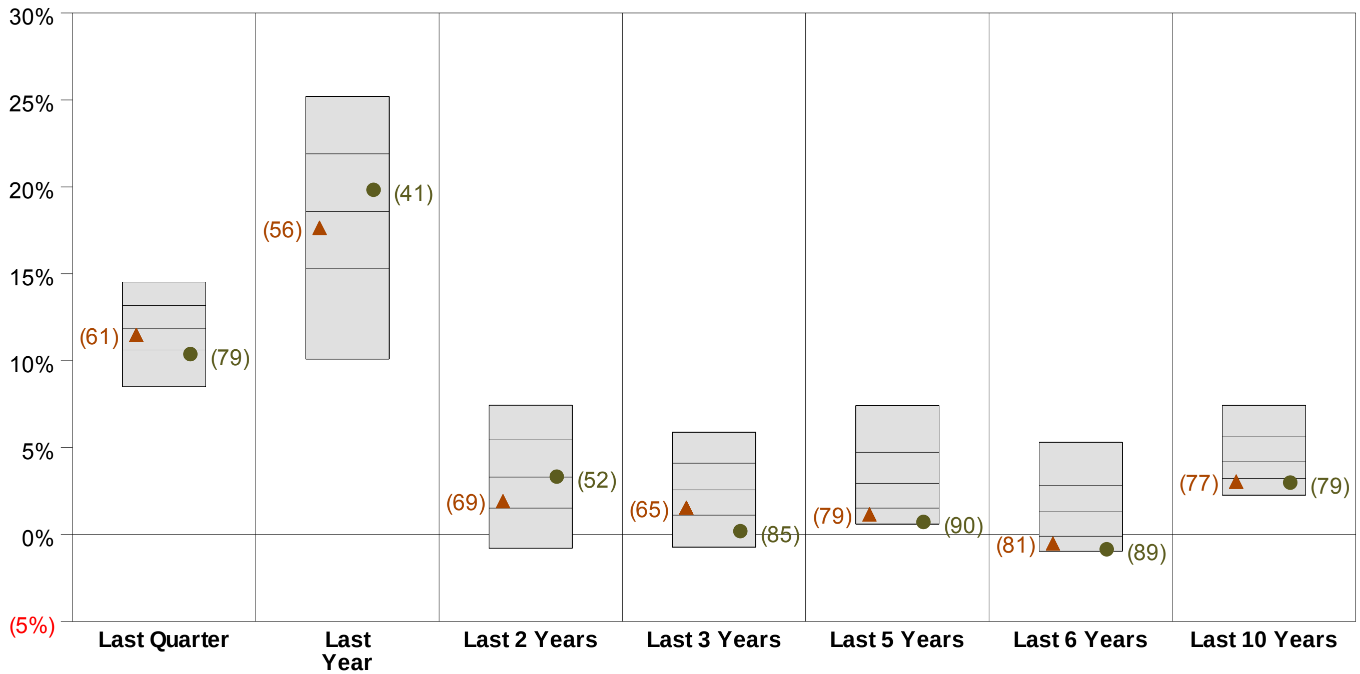
	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	9.80	16.13	5.06	3.91	8.75	6.60	4.87
25th Percentile	8.72	13.83	3.74	2.77	7.61	5.77	3.60
Median	7.90	11.91	2.20	1.80	6.54	4.76	2.46
75th Percentile	7.03	9.31	0.71	0.36	5.67	3.89	1.81
90th Percentile	6.27	6.42	(0.10)	(0.63)	4.99	3.12	1.32
Int'l Equity Pool (ex Emerging. Mkt) ●	8.08	11.85	2.10	1.51	6.17	4.26	1.76
MSCI EAFE ▲	7.25	11.67	1.21	0.50	5.83	3.80	1.05

International Equity ex Emerging Markets through 3/31/17

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Int'l Equity Pool (ex Emerging Market)	**8.08%**	**11.85%**	**1.51%**	**6.17%**	**1.76%**
Allianz Global Investors	6.81%	5.58%	-	-	-
Arrowstreet ACWI ex -US	8.51%	14.95%	-	-	-
Baillie Gifford ACWI ex US	10.18%	10.59%	-	-	-
Blackrock ACWI ex US IMI	8.06%	13.32%	1.05%	-	-
Brandes Investment	5.48%	10.90%	1.82%	7.22%	2.14%
Capital Guardian	9.80%	14.19%	1.43%	6.75%	2.41%
Lazard Asset Intl	6.40%	6.93%	1.04%	5.79%	2.89%
McKinley Capital	9.36%	10.09%	3.93%	7.36%	1.10%
SSgA Int'l	8.07%	13.17%	1.07%	4.97%	-
Schroder Inv Mgmt	8.96%	9.93%	3.88%	9.61%	-
Mondrian Intl Sm Cap	9.87%	7.99%	2.54%	7.64%	-
MSCI EAFE Index	7.25%	11.67%	0.50%	5.83%	1.05%
MSCI ACWI ex-US IMI Index	7.99%	13.01%	0.82%	4.66%	1.59%

Emerging Markets Pool through 3/31/17

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	14.52	25.20	7.44	5.89	7.41	5.31	7.44
25th Percentile	13.18	21.91	5.44	4.11	4.74	2.81	5.63
Median	11.84	18.58	3.31	2.57	2.95	1.31	4.19
75th Percentile	10.61	15.31	1.52	1.11	1.52	(0.10)	3.23
90th Percentile	8.50	10.09	(0.79)	(0.73)	0.60	(0.96)	2.27
Emerging Markets Pool ●	10.28	19.74	3.23	0.11	0.64	(0.94)	2.89
MSCI EM Gross ▲	11.49	17.65	1.93	1.55	1.17	(0.52)	3.05

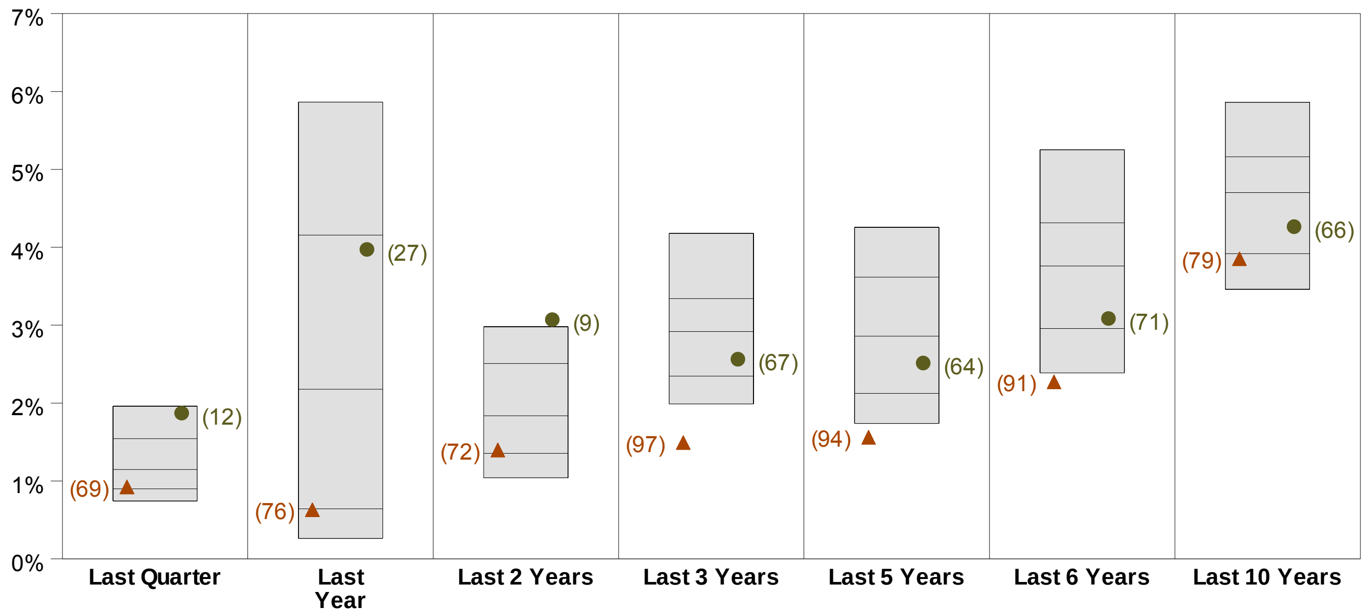
- The Emerging Markets Pool outperformed over the last year and two-year time frames.

Emerging Markets Pool through 3/31/17

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Emerging Markets Pool	**10.28%**	**19.74%**	**0.11%**	**0.64%**	**2.89%**
Lazard Emerging	10.40%	22.40%	0.74%	1.05%	-
Eaton Vance Emerging(net)	10.06%	14.61%	(0.52%)	0.87%	-
MSCI Emerging Mkts Idx	11.49%	17.65%	1.55%	1.17%	3.05%

Total Bond as of 3/31/17

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	1.96	5.86	2.98	4.18	4.26	5.25	5.86
25th Percentile	1.55	4.16	2.51	3.34	3.62	4.32	5.16
Median	1.15	2.18	1.84	2.92	2.86	3.76	4.70
75th Percentile	0.90	0.64	1.36	2.35	2.12	2.96	3.92
90th Percentile	0.74	0.26	1.04	1.99	1.74	2.39	3.46
Total Fixed-Income Pool ●	1.85	3.95	3.05	2.54	2.49	3.06	4.25
Fixed-Income Target ▲	0.93	0.63	1.40	1.50	1.56	2.27	3.85

- 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

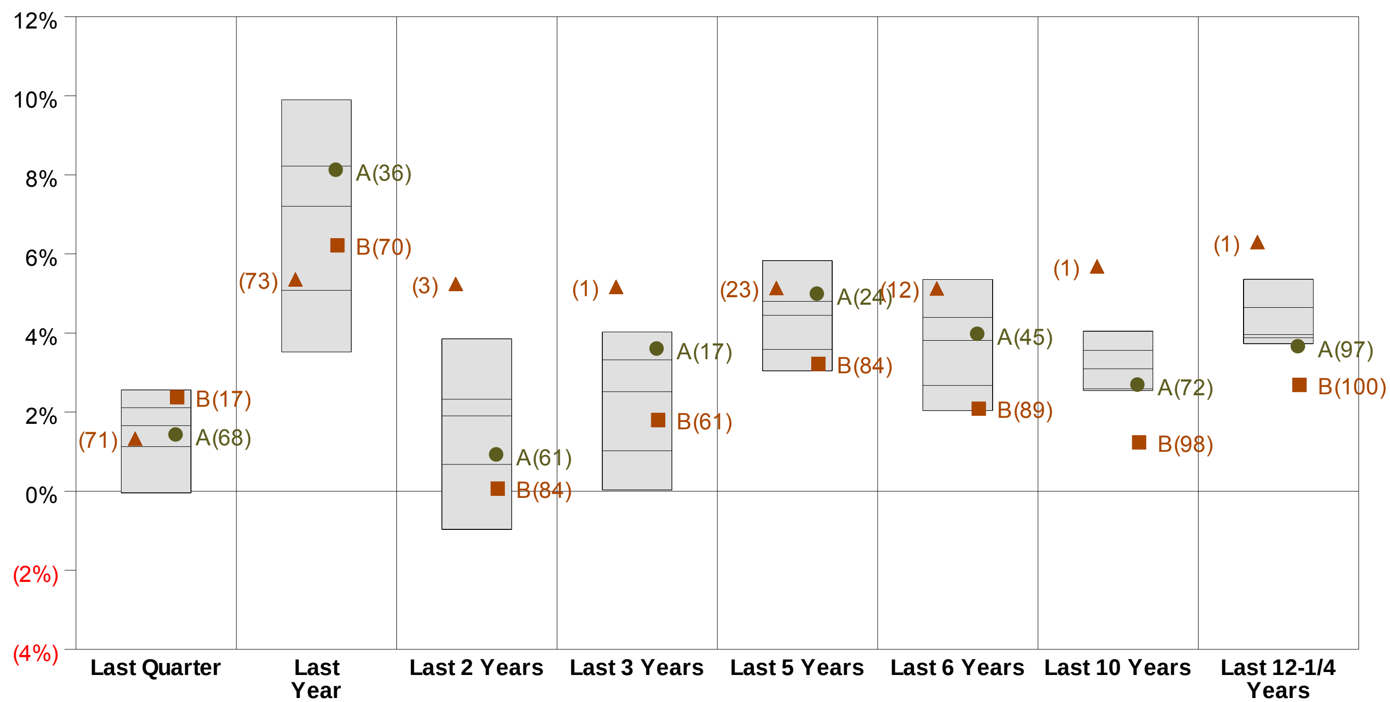
Real Assets through 3/31/17

	Last Quarter	Fiscal YTD	Last Year	Last 3 Years	Last 5 Years
Real Assets	**2.69%**	**5.13%**	**9.10%**	**6.06%**	**7.70%**
Real Assets Target (1)	2.01%	3.84%	6.30%	8.11%	8.52%
Real Estate Pool	2.28%	4.15%	6.93%	10.79%	10.42%
Real Estate Target (2)	1.65%	4.41%	7.09%	10.64%	10.70%
Private Real Estate	2.18%	5.60%	7.19%	10.79%	10.44%
NCREIF Total Index	1.55%	5.13%	7.27%	10.58%	10.69%
REIT Internal Portfolio	2.69%	(2.01%)	5.04%	10.64%	10.21%
NAREIT Equity Index	2.55%	(2.01%)	5.25%	10.56%	10.32%
Total Farmland	1.21%	3.17%	4.02%	5.29%	7.87%
UBS Farmland	1.73%	3.83%	4.92%	5.89%	9.08%
Hancock Agricultural	0.12%	1.81%	2.16%	3.97%	5.66%
ARMB Farmland Target (3)	0.93%	3.31%	4.74%	5.96%	9.47%
Total Timber	(1.11%)	(1.00%)	1.01%	3.25%	4.88%
Timberland Investment Resources	(0.93%)	(0.69%)	2.06%	4.28%	4.59%
Hancock Timber	(1.61%)	(1.89%)	(1.92%)	0.65%	5.14%
NCREIF Timberland Index	0.76%	2.63%	3.64%	5.67%	7.14%
TIPS Internal Portfolio	1.20%	(0.22%)	1.48%	2.03%	1.05%
BC US TIPS Index	1.26%	(0.22%)	1.48%	2.03%	0.97%
Total Energy Funds *	11.39%	20.39%	6.40%	(13.56%)	(8.33%)
CPI + 5%	2.16%	4.72%	7.35%	5.73%	5.99%
MLP Composite	4.22%	10.99%	32.62%	(2.07%)	-
Advisory Research (FKA FAMCO) MLP	3.09%	10.97%	35.74%	(3.16%)	-
Tortoise Capital Adv MLP	5.23%	11.00%	30.05%	(1.07%)	-
Alerian MLP Index	3.95%	7.21%	28.32%	(5.17%)	2.64%
Total Infrastructure	5.13%	6.20%	11.60%	5.34%	-
Brookfield	7.70%	4.27%	13.98%	2.91%	-
Lazard	12.80%	17.31%	12.79%	8.92%	-
JPM Infrastructure	(1.63%)	(1.09%)	1.28%	-	-
IFM Infrastructure (funded May 2015)	3.41%	5.07%	15.17%	-	-
Global Infrastructure Idx	7.95%	6.38%	11.68%	4.30%	7.89%

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

Absolute Return Composite through 3/31/17

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 12-1/4 Years
10th Percentile		2.56	9.90	3.85	4.03	5.83	5.36	4.05	5.36
25th Percentile		2.11	8.22	2.33	3.33	4.80	4.39	3.56	4.64
Median		1.66	7.21	1.90	2.52	4.45	3.81	3.10	3.96
75th Percentile		1.12	5.08	0.68	1.02	3.59	2.67	2.59	3.88
90th Percentile		(0.04)	3.52	(0.96)	0.03	3.04	2.04	2.55	3.73
Absolute Return Composite	● A	1.40	8.09	0.90	3.57	4.95	3.94	2.66	3.62
HFRI Fund of Funds Compos	■ B	2.38	6.22	0.06	1.80	3.22	2.09	1.24	2.69
T-Bills + 5%	▲	1.33	5.36	5.24	5.17	5.14	5.13	5.68	6.30

- Excluding the most recent quarter, the absolute return allocation has exceeded the HFRI FoF Index over each trailing time period shown.

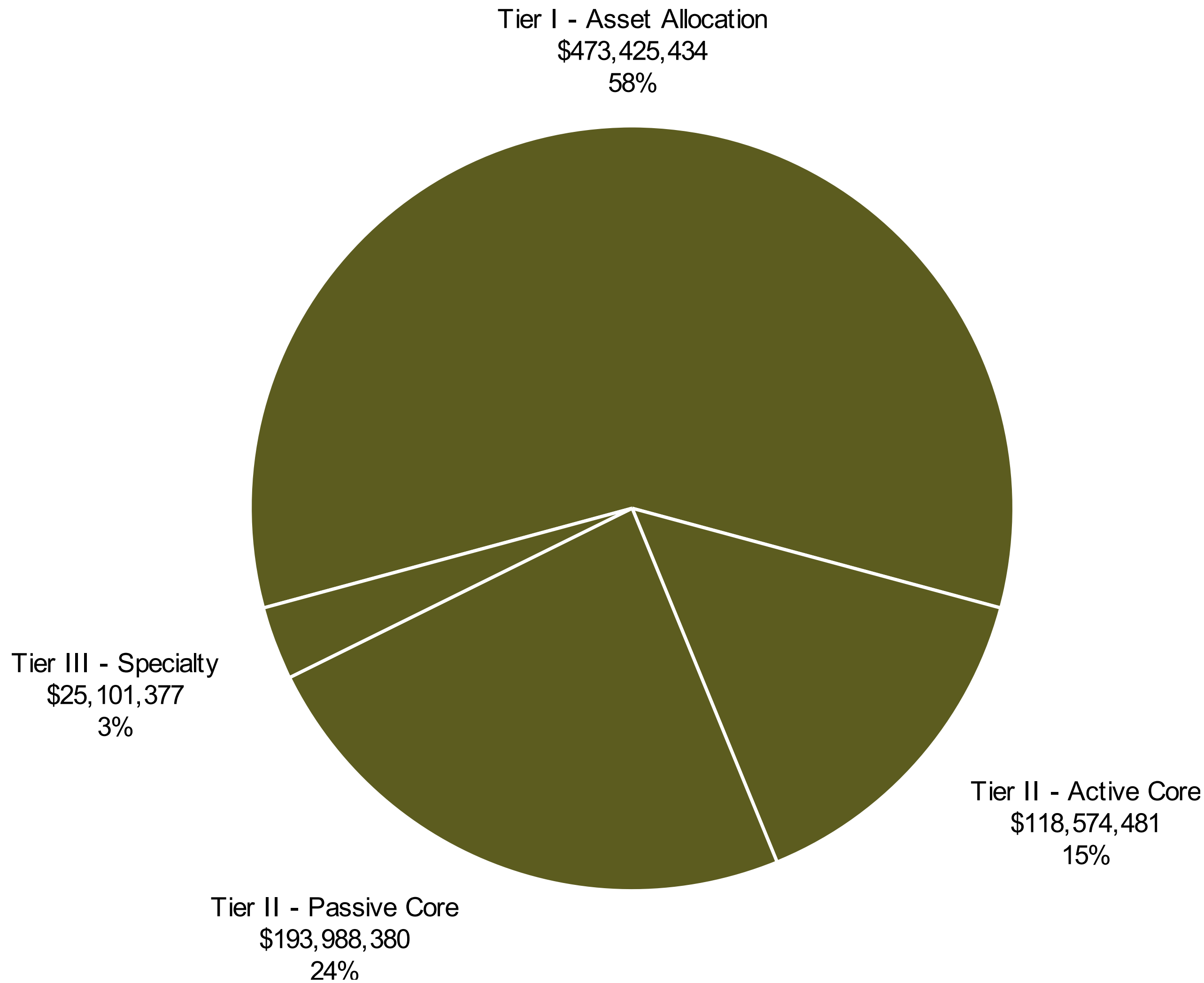
Absolute Return Composite through 3/31/17

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Absolute Return	**1.41%**	**7.40%**	**3.62%**	**5.08%**	**2.73%**
Crestline ABS	1.10%	13.78%	9.25%	8.01%	3.99%
Glob Asset Mgt	1.39%	4.04%	1.45%	3.78%	-
Prisma ABS	1.72%	5.35%	1.20%	4.14%	-
Allianz Stuctured Alpha 1000+	2.03%	10.76%	-	-	-
KKR Apex Equity Fund	0.56%	2.10%	-	-	-
Crestline Specialty Lending Fund	3.12%	13.98%	-	-	-
Zebra Global Equity	(0.36%)	-	-	-	-
Zebra Global Advantage	(2.00%)	-	-	-	-
HFRI Fund of Funds Index	2.39%	6.23%	1.80%	3.22%	1.24%

Defined Contribution Plan

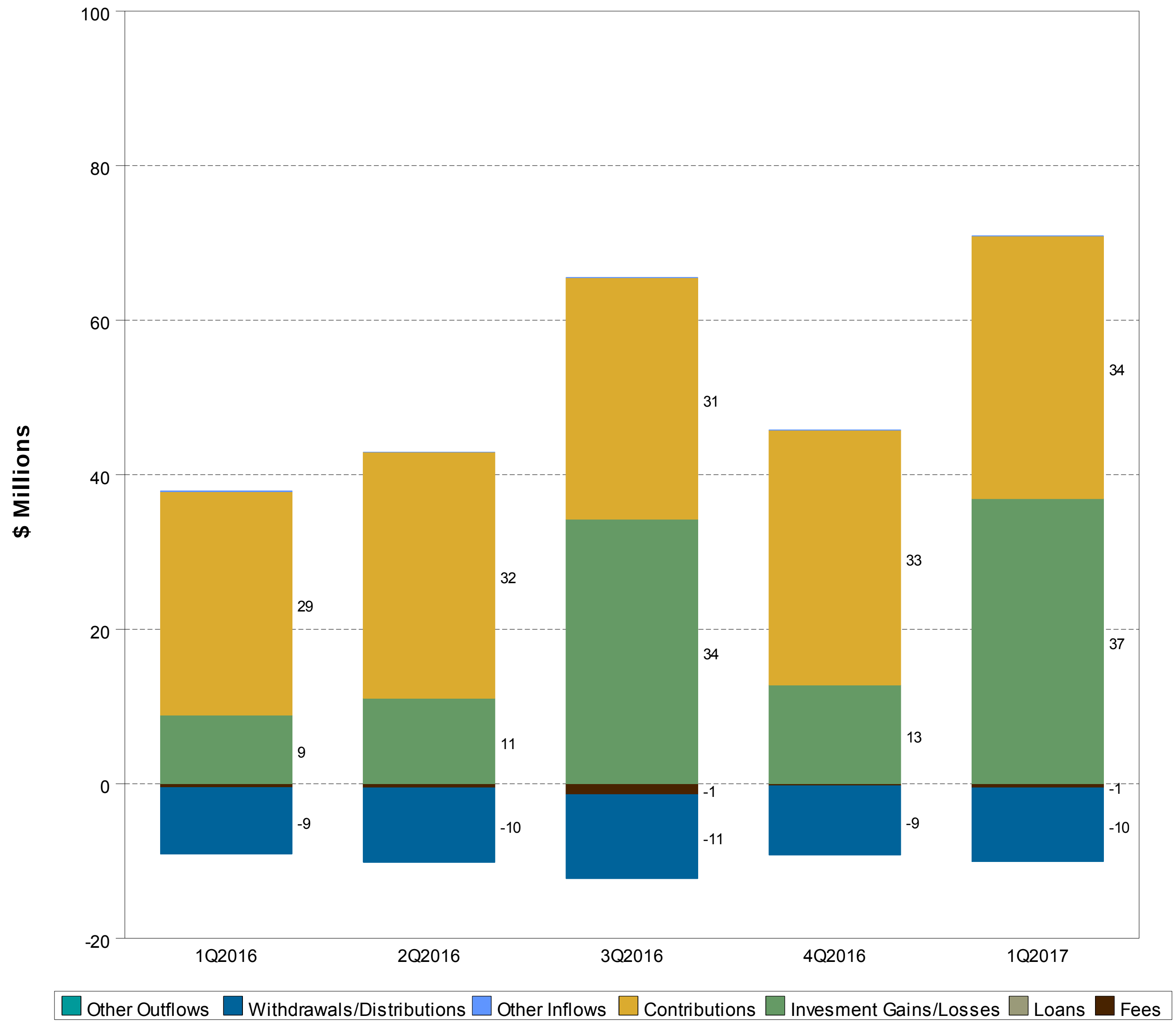
PERS DC Plan

March 31, 2017



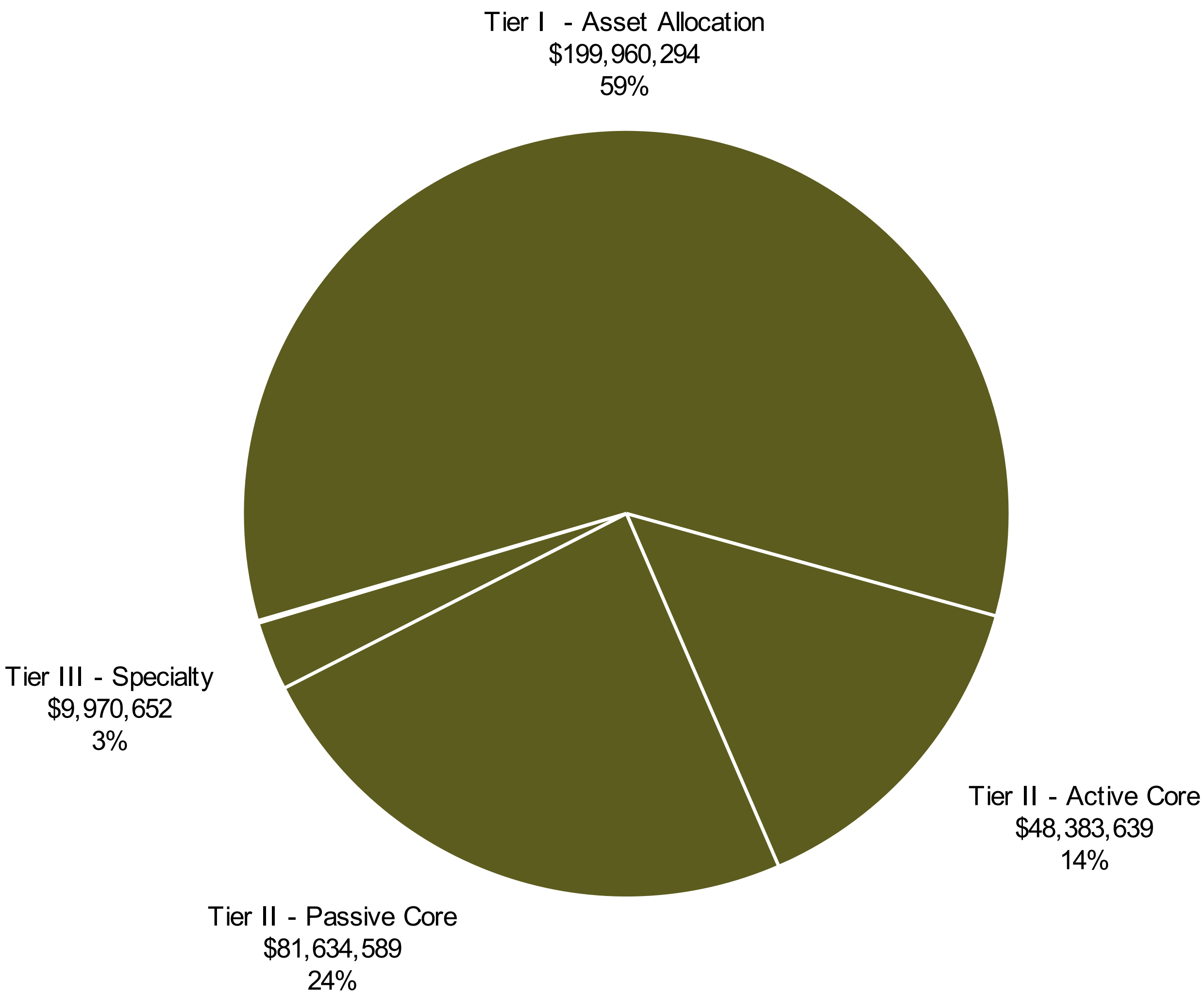
PERS DC Plan: Asset Changes

March 31, 2017



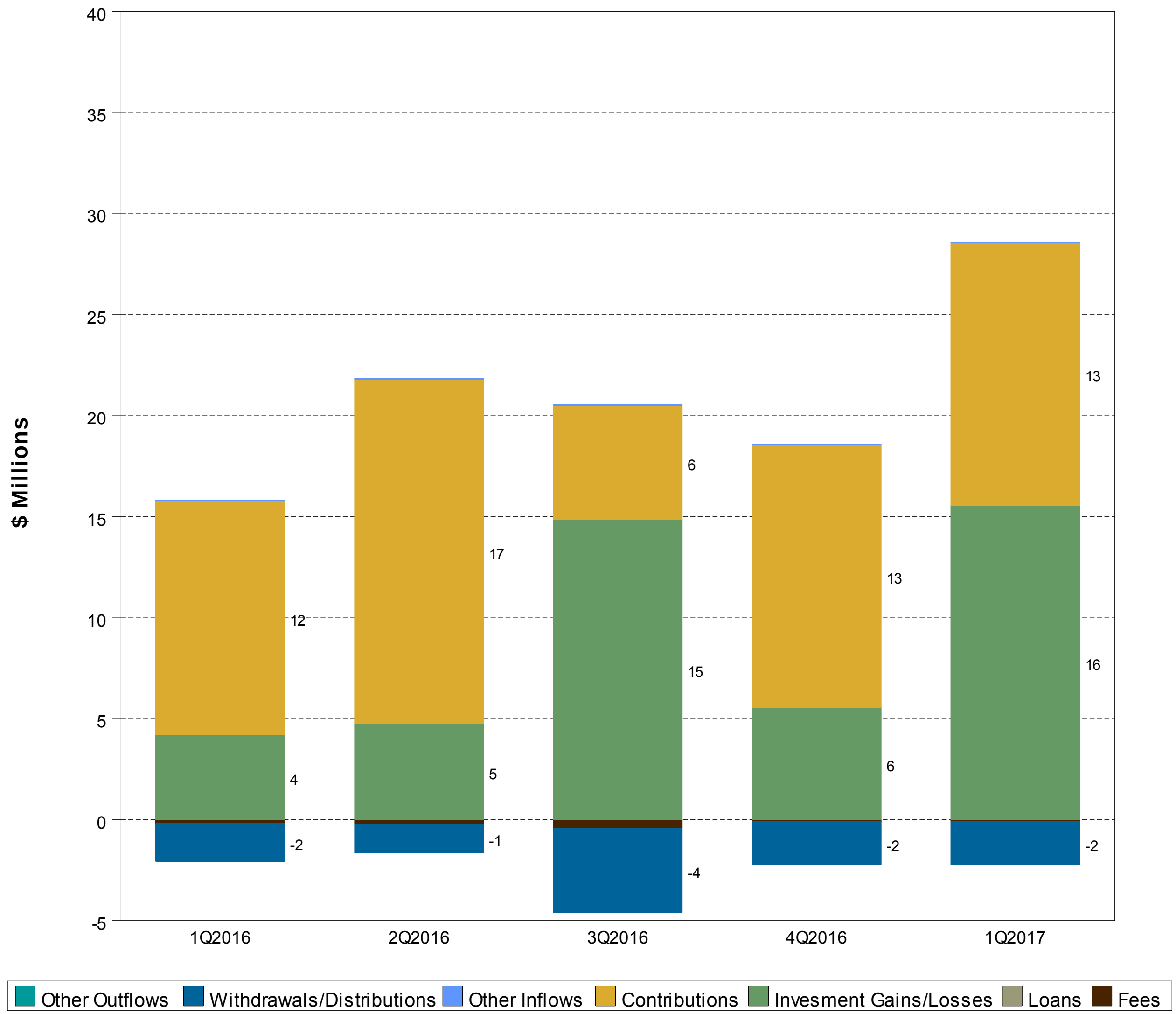
TRS DC Plan

March 31, 2017



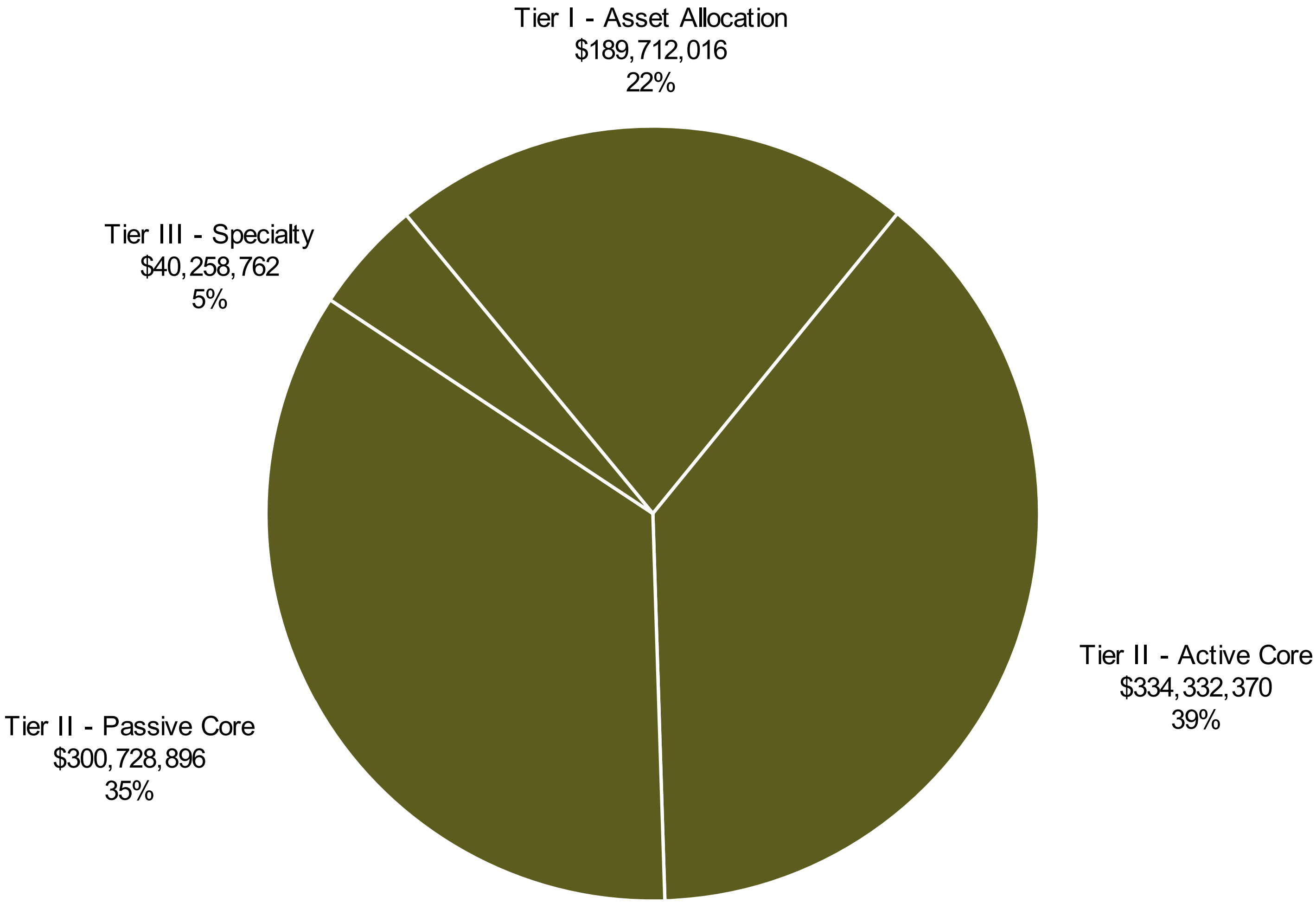
TRS DC Plan: Asset Growth Changes

March 31, 2017



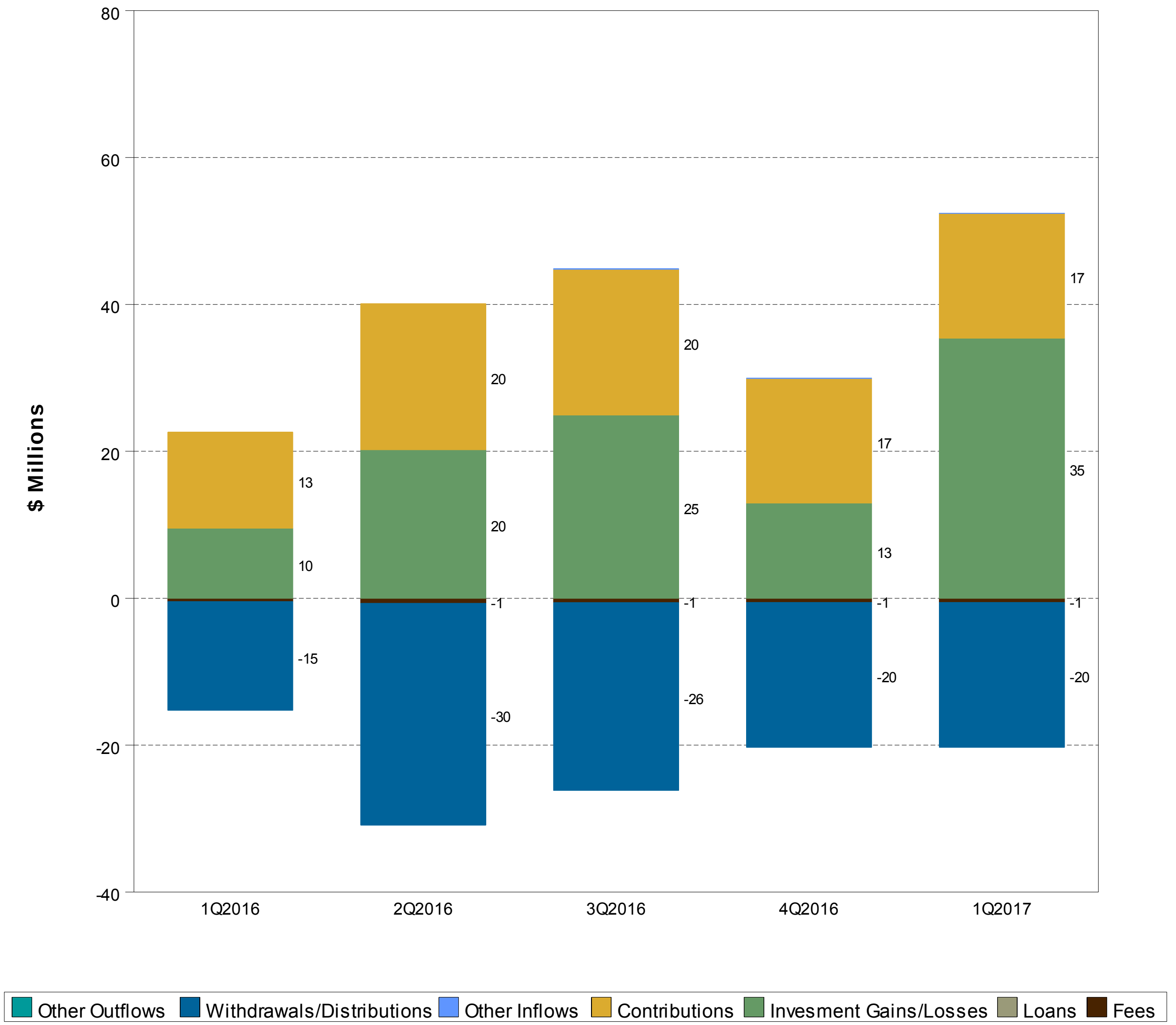
Deferred Comp Plan

March 31, 2017



Deferred Comp Plan: Quarterly Asset Changes

March 31, 2017



Individual Account Option Performance: 3/31/17

Balanced & Target Date Funds

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Tier I - Asset Allocation										
Alaska Balanced Trust	**2.7** 57	**6.0** 80	**4.0** 57	**5.4** 61	**6.2** 60	**3.3** 79		**0.5** 41	**0.2** 100	**1.6** 29
CAI MA Tgt Alloc Cons MFs										
Passive Target	2.7 59	6.0 80	4.0 55	5.3 64	6.1 63	3.2 80				1.6 31
Alaska Long-Term Balanced	**4.1** 40	**10.0** 64	**5.2** 54	**7.7** 44	**8.1** 46	**5.2** 64		**0.2** 37	**0.2** 100	**1.5** 37
CAI MA Tgt Alloc Mod MFs										
Passive Target	4.1 40	10.1 63	5.3 50	7.6 44	8.1 46	5.2 63				1.4 37
SSgA Global Balanced (i)	**4.6** 11	**8.8** 13	**4.0** 11	**5.9** 2	**6.3** 4	**5.6** 50		**0.9** 1	**0.3** 100	**1.0** 13
CAI Global FI MFs										
Global Balanced Custom Benchmark	4.6 11	8.5 14	3.7 13	5.7 3	6.1 6	5.7 41				1.0 14
Target 2010 Trust	**3.1** 54	**7.5** 55	**4.2** 39	**6.3** 24	**6.8** 26	**4.1** 68		**0.1** 7	**0.2** 100	**1.5** 10
CAI Tgt Date 2010										
Custom Index	3.1 55	7.5 55	4.2 39	6.3 25	6.8 26	4.2 67				1.5 11
Target 2015 Trust	**3.7** 31	**9.0** 34	**4.8** 28	**7.3** 17	**7.7** 13	**4.9** 44		**0.3** 3	**0.2** 100	**1.5** 13
CAI Tgt Date 2015										
Custom Index	3.6 36	8.9 36	4.7 31	7.3 17	7.7 14	5.0 38				1.4 15
Target 2020 Trust	**4.2** 22	**10.5** 21	**5.4** 15	**8.2** 8	**8.5** 10	**5.6** 31		**0.2** 2	**0.2** 100	**1.4** 8
CAI Tgt Date 2020										
Custom Index	4.2 25	10.5 22	5.3 16	8.1 10	8.4 10	5.8 21				1.4 11
Target 2025 Trust	**4.8** 22	**11.9** 22	**5.8** 10	**8.9** 9	**9.1** 12	**6.3** 34		**0.2** 3	**0.3** 100	**1.4** 6
CAI Tgt Date 2025										
Custom Index	4.7 27	11.8 24	5.7 13	8.9 11	9.1 11	6.5 24				1.4 13
Target 2030 Trust	**5.2** 31	**13.1** 21	**6.1** 12	**9.6** 6	**9.6** 6	**6.9** 40		**0.1** 3	**0.3** 100	**1.4** 3
CAI Tgt Date 2030										
Custom Index	5.1 32	13.1 21	6.1 15	9.5 8	9.6 6	7.1 31				1.3 8
Target 2035 Trust	**5.5** 39	**14.1** 25	**6.4** 9	**10.1** 6	**10.0** 3	**7.3** 44		**0.1** 3	**0.3** 100	**1.4** 3
CAI Tgt Date 2035										
Custom Index	5.5 42	14.1 26	6.4 12	10.0 7	10.0 3	7.5 36				1.3 7

Returns: above median, third quartile, fourth quartile
Risk: below median, second quartile, first quartile
Risk Quadrant:
Excess Return Ratio: above median, third quartile, fourth quartile
Tracking Error: below median, second quartile, first quartile
Sharpe Ratio: above median, third quartile, fourth quartile

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	**5.8** 45	**15.0** 21	**6.7** 8	**10.4** 4	**10.2** 1	**7.6** 57		**0.1** 1	**0.3** 100	**1.3** 3
CAI Tgt Date 2040										
Custom Index	5.8 48	14.9 21	6.6 9	10.3 4	10.3 1	7.9 35				1.3 5
Target 2045 Trust	**5.9** 57	**15.1** 28	**6.7** 7	**10.4** 4	**10.3** 1	**7.6** 63		**0.2** 2	**0.3** 100	**1.3** 3
CAI Tgt Date 2045										
Custom Index	5.9 57	15.1 28	6.6 8	10.4 5	10.3 1	7.9 50				1.3 4
Target 2050 Trust	**5.9** 54	**15.1** 32	**6.7** 11	**10.4** 4	**10.3** 1	**7.7** 78		**0.2** 2	**0.3** 100	**1.3** 3
CAI Tgt Date 2050										
Custom Index	5.9 57	15.1 32	6.6 14	10.4 4	10.3 1	7.9 53				1.3 4
Target 2055 Trust	**5.9** 56	**15.2** 31	**6.7** 11	**10.4** 6	**10.3** 1	**7.7** 77		**0.2** 3	**0.3** 100	**1.3** 4
CAI Tgt Date 2055										
Custom Index	5.9 62	15.1 32	6.6 13	10.4 6	10.3 1	7.9 58				1.3 6
Target 2060 Trust	**5.9** 63	**15.1** 47								
CAI Tgt Date 2060										
Custom Index	5.9 68	15.1 46								

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: 3/31/17

Active Equity, Stable Value, and Interest Income

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Active and Other Funds										
International Equity Fund	**6.4** 88	**8.1** 78								
CAI Mut Fd: Non-U.S. Equity Style										
MSCI ACWI ex US Index	8.0 57	13.7 33	1.0 64	4.8 94	4.3 90	11.3 56				0.4 91
Allianz/RCM Socially Responsible	**6.1** 53	**13.6** 84	**7.9** 86	**10.6** 95	**10.5** 88	**8.9** 48		**-0.5** 97	**2.0** 84	**1.2** 90
CAI Mut Fd: Core Equity Style										
Custom Benchmark	5.3 75	15.4 73	8.6 67	12.1 70	12.1 71	8.0 92				1.5 37
T. Rowe Price Small Cap	**3.6** 56	**23.5** 54	**8.0** 38	**13.3** 34	**14.4** 21	**11.1** 85		**0.5** 12	**2.7** 100	**1.2** 19
CAI Mut Fd: Sm Cap Broad Style										
Russell 2000 Index	2.5 63	26.2 22	7.2 50	12.4 59	12.3 70	12.1 66				1.0 48
T. Rowe Price Stable Value	**0.6** 4	**2.3** 3	**2.4** 2	**2.5** 1	**2.8** 2	**0.1** 43		**15.0** 16	**0.0** 99	**22.8** 21
CAI Stable Value Database										
5 Yr U.S. Treas Rolling	0.3 93	1.3 93	1.3 93	1.5 91	1.9 76	0.1 18				9.9 88
Def Comp Interest Income Fund	**0.6** 2	**2.7** 1	**2.8** 1	**2.9** 1	**3.2** 1	**0.1** 21		**29.6** 1	**0.0** 81	**21.4** 23
CAI Stable Value Database										
5 Yr U.S. Treas Rolling	0.3 93	1.3 93	1.3 93	1.5 91	1.9 76	0.1 18				9.9 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: 3/31/17

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Index Funds										
SSgA S&P 500 Index Fund (i)	**6.1** 61	**17.2** 44	**10.4** 35	**13.3** 34	**12.9** 43	**8.2** 91		**-0.3** 74	**0.0** 100	**1.6** 9
CAI Large Cap Broad MFs										
S&P 500 Index	6.1 61	17.2 44	10.4 35	13.3 34	12.9 43	8.2 91				1.6 9
BlackRock S&P 500 Index Fund (i)	**6.1** 55	**17.2** 50	**10.3** 28	**13.3** 36	**13.0** 39	**8.2** 81		**-0.3** 63	**0.0** 99	**1.6** 15
CAI Mut Fd: Core Equity Style (Gross)										
S&P 500 Index	6.1 54	17.2 49	10.4 28	13.3 36	12.9 41	8.2 82				1.6 14
SSgA Russell 3000 Index Fund (i)	**5.7** 65	**18.0** 35	**9.8** 46	**13.2** 36	**12.9** 45	**8.4** 83		**0.2** 24	**0.1** 100	**1.5** 16
CAI Mut Fd: Large Cap Broad Style (Net)										
Russell 3000 Index	5.7 65	18.1 34	9.8 46	13.2 36	12.9 46	8.5 83				1.5 16
SSgA World Equity ex-US Index Fund (i)	**7.9** 62	**13.3** 37	**0.6** 72	**4.5** 96	**3.9** 94	**11.2** 59		**0.1** 95	**0.9** 100	**0.4** 95
CAI MF: Non-U.S. Equity Style										
MSCI ACWI x U.S. Index (Net)	7.9 64	13.1 38	0.6 73	4.4 96	3.8 96	11.4 55				0.4 96
SSgA Long US Treasury Bond (i)	**1.4** 85	**-5.1** 80	**5.9** 65	**4.0** 78	**7.1** 84	**11.8** 40		**0.1** 76	**0.1** 100	**0.3** 61
CAI Mut Fd: Extended Mat Fixed Income										
Blmbg Long Treasury Index	1.4 86	-5.0 79	5.8 65	4.0 78	7.1 83	11.7 42				0.3 60
SSgA US TIPS (i)	**1.2** 67	**1.3** 95	**1.9** 54	**0.9** 84	**3.3** 77	**5.2** 40		**-5.1** 100	**0.0** 100	**0.1** 90
CAI TIPS MFs										
Blmbg U.S. TIPS Index	1.3 64	1.5 90	2.0 41	1.0 71	3.5 58	5.2 40				0.2 75
SSgA World Gov't Bond ex-US (i)	**2.1** 70	**-4.8** 99	**-2.6** 97	**-1.5** 98	**0.6** 97	**8.8** 1		**-0.4** 98	**0.1** 100	**-0.2** 97
CAI Mut Fd: Global Fixed Income Style										
Citi WGBI Non-U.S. Index	2.0 74	-4.8 99	-2.6 97	-1.5 98	0.6 97	8.8 1				-0.2 96
SSgA US REIT Index Fund (i)	**-0.3** 85	**1.0** 76	**9.7** 36	**9.2** 49	**11.8** 47	**11.3** 22		**-3.6** 100	**0.1** 100	**0.8** 64
CAI Mut Fd: Real Estate Database										
DJ US Select REIT Index	-0.3 81	1.2 72	10.0 29	9.4 37	12.1 26	11.3 20				0.8 54
BlackRock Govt/Credit (i)	**1.0** 85	**0.5** 95	**2.6** 84	**2.4** 98	**3.6** 93	**3.6** 1		**-1.6** 100	**0.1** 99	**0.6** 98
CAI Mut Fd: Core Bond Style										
Blmbg Gov t/Credit Bd	1.0 84	0.5 95	2.7 82	2.5 92	3.7 89	3.6 1				0.7 97

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)	**0.5** 88	**-0.7** 99	**1.4** 91	**1.1** 92	**2.1** 92	**2.1** 61		**-3.3** 100	**0.0** 98	**0.5** 95
CAI MF: Intermediate Fixed Income Style										
Blmbg Gov Inter	0.5 86	-0.7 99	1.6 90	1.2 92	2.2 91	2.1 61				0.5 94

Returns: above median; third quartile; fourth quartile
Risk: below median; second quartile; first quartile
Risk Quadrant:
Excess Return Ratio: above median; third quartile; fourth quartile
Tracking Error: below median; second quartile; first quartile
Sharpe Ratio: above median; third quartile; fourth quartile

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

Callan

June 22, 2017

Alaska Retirement Management Board

Alternative Beta Multi-Asset Class Strategies

Paul Erlendson
Senior Vice President

Eugene Podkaminer, CFA
Senior Vice President

Steve Center, CFA
Senior Vice President

Agenda and Objectives

- Introduce the multi-asset class (MAC) universe generally, and alternative beta / risk premia strategies specifically
- Discuss alternative beta / risk premia investment approaches
  - Focus on portfolio construction, risk management, and both asset class and factor exposures
- Explore typical risk and return characteristics

Strategic Asset Allocation – Where MACs Fit

Economic Growth

Equities
- Global equity
- Private equity
- Smart beta
- Opportunistic real estate

Credit Sensitive
- IG Credit
- High yield
- Emerging debt
- Bank loans
- Private debt

Risk Mitigation

Income Producing
- Short duration
- US fixed income
- Non-US fixed income

Rising Rate Protection
- Cash equivalents
- Short duration
- Floating rate securities

Flight to Quality
- Long Treasury

Liability Hedging
- Long Treasury
- Long Credit
- Strips
- Swaps

Real Assets

Short/Intermediate Hedge
- Inflation-linked debt
- Commodities

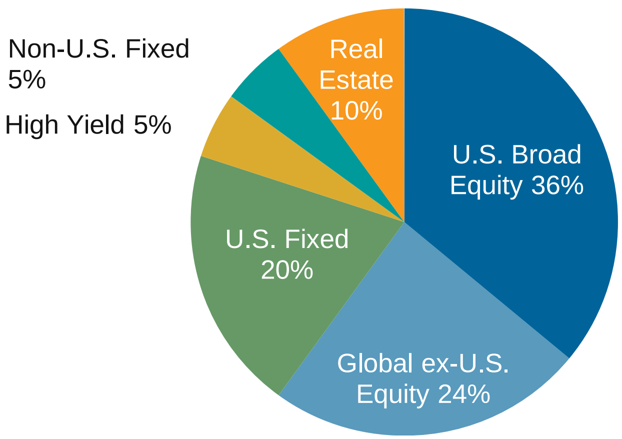
Growth-Oriented
- Core real estate
- Value-add real estate
- Timber
- Agriculture
- REITs
- MLPs
- Natural resources
- Infrastructure

Absolute Return

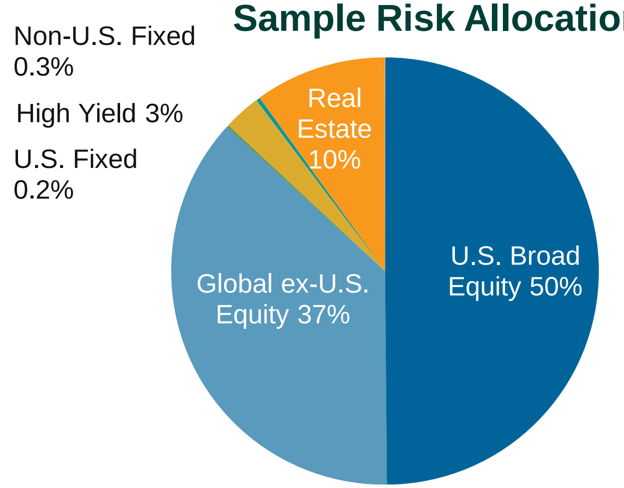
- **Multi-asset class strategies**
- Hedge Funds
- Managed Futures
- Volatility Capture

Equity Risk Concentration

Sample Asset Allocation

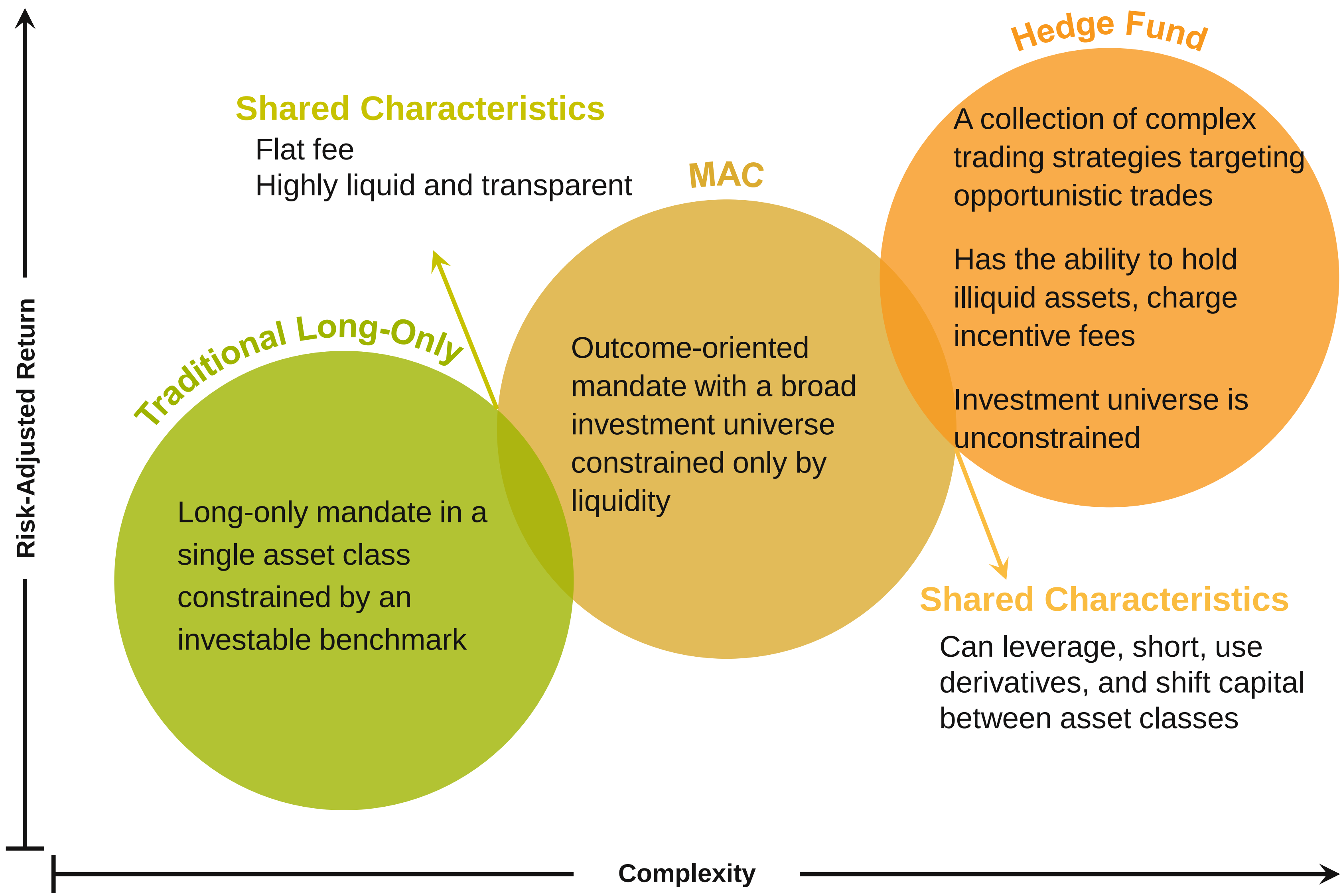


Sample Risk Allocation



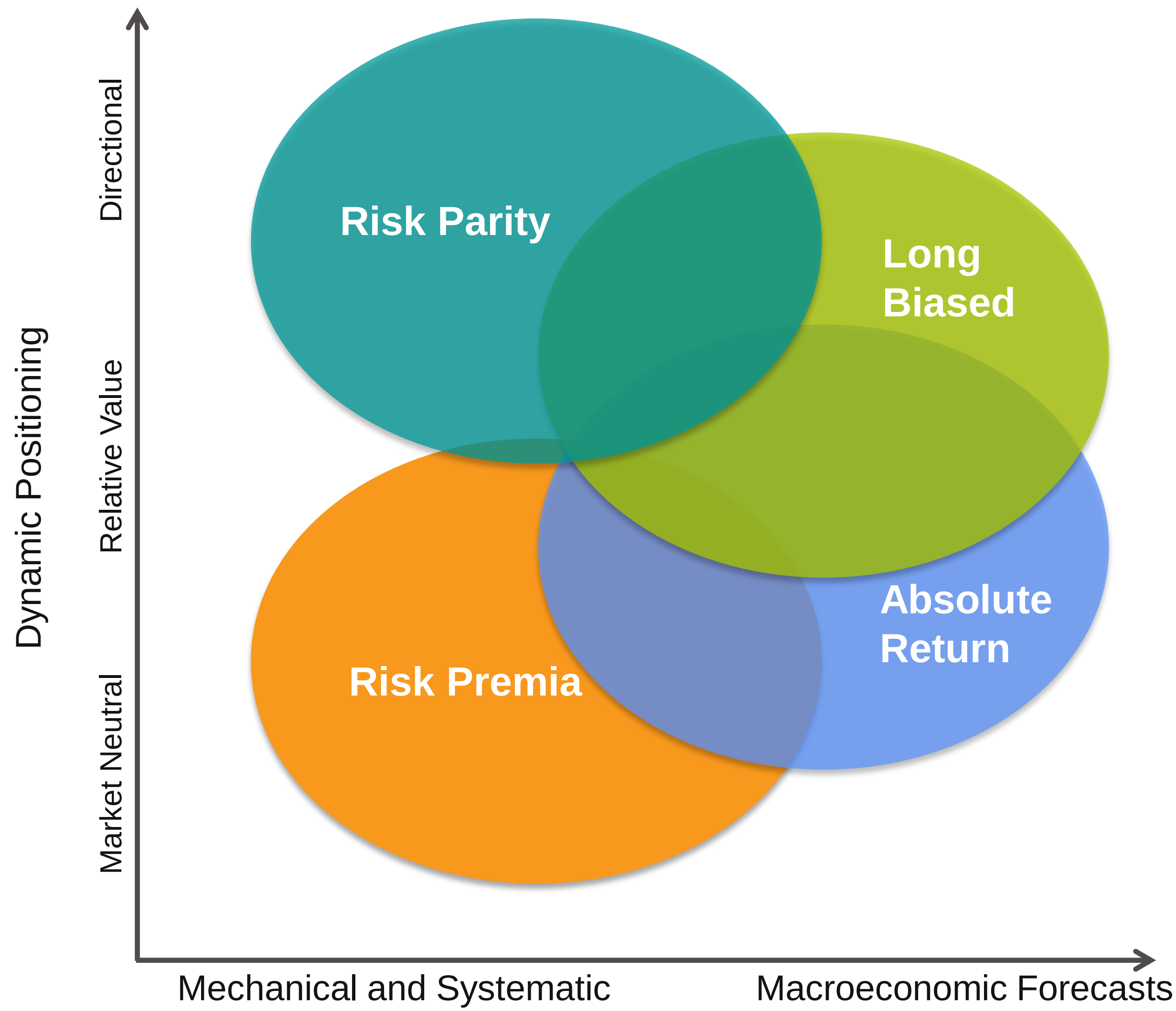
- Most "diversified" portfolios are dominated by equity risk
- Multi-asset class strategies can mitigate equity risk concentration via the "Three Ds":
  - Diversification
  - Dynamic risk management
  - Drawdown protection
- The MAC framework includes a large opportunity set across asset classes, using leverage and derivatives, combined with the ability to short

Bridging the Gap



Categorizing the MAC Universe

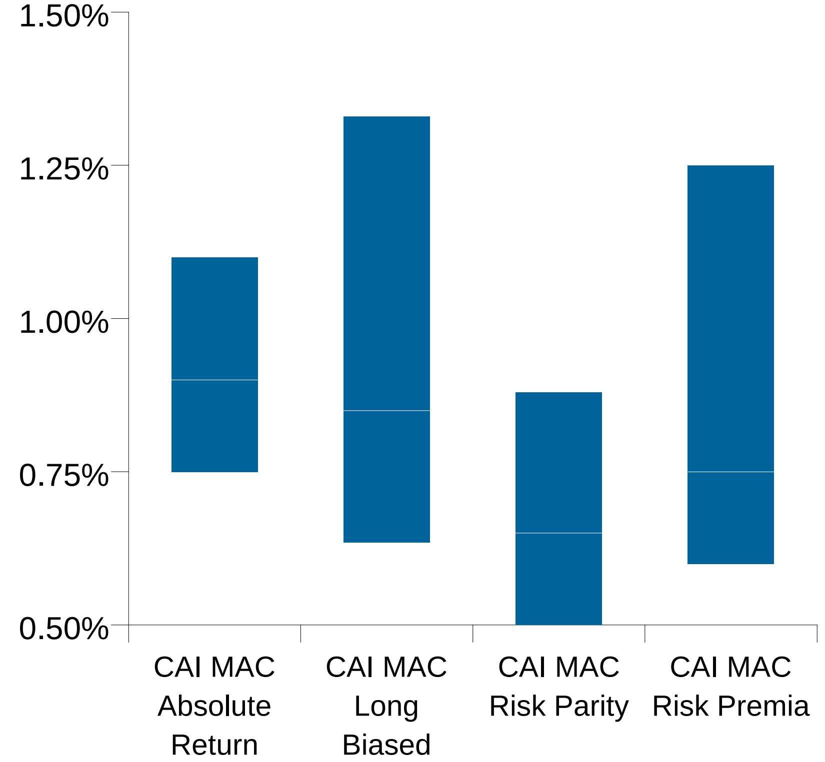
- MAC portfolio structure
  - Market Neutral
  - Relative Value
  - Directional
  - Long Only
- MAC investment structure
  - Mechanical
  - Macroeconomic
- Risk Premia detail
  - Exposure to academic and behavioral risk factors
  - Often with risk balancing between factors
  - Implemented through market neutral positions with leverage applied to reach volatility target between 5-15%
  - Common benchmarks: T-bills + 3-8%, Global 60/40, various alternative risk premia Indices
    - *Targeted volatility must be considered in benchmarking*



Product Attributes

- Fees and complexity
  - Higher than traditional assets
  - Lower than alternative assets
- Capacity
  - Generally capacities are large unless implementation employs meaningful exposure to security selection or less liquid market segments
- Vehicles
  - Generally commingled solutions (CTs, MFs, LPs) due to complexity
  - Some strategies will run separate accounts for very large mandates
- Liquidity
  - Daily for MFs and some CTs
  - Monthly for some CTs and LPs
- Transparency
  - Excellent for most strategies

Management Fees*



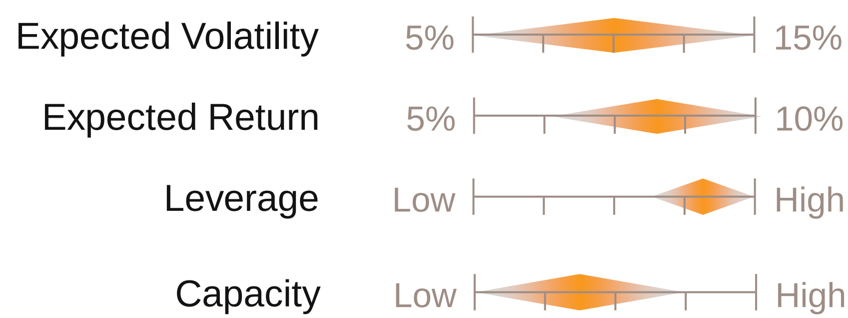
	CAI MAC Absolute Return	CAI MAC Long Biased	CAI MAC Risk Parity	CAI MAC Risk Premia
25th Percentile	1.10	1.33	0.88	1.25
Median	0.90	0.85	0.65	0.75
75th Percentile	0.75	0.64	0.50	0.60

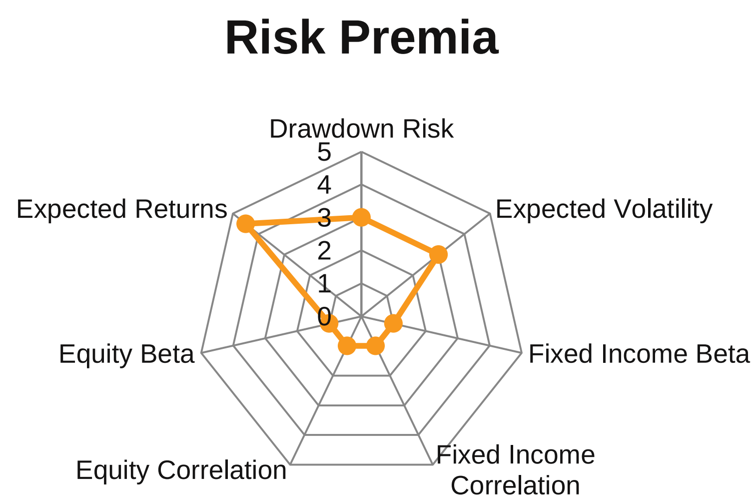
*Vehicle costs and administrative costs can add substantially

MAC Risk Premia

Strategy characteristics

- Observed Characteristics:
  - High volatility*
  - High drawdown risk
  - Low equity and fixed income beta
  - Low equity and fixed income correlation
  - Low to modest capacity
  - High expected return*
  - High drawdown Risk*





*Funded vs. overlay

MAC Risk Premia

Common factor exposures

- Classic finance and behavioral risk premia
  - Observable
  - Persistent
  - Investable
  - Transparent
- Accessed via:
  - Cash securities
  - Futures, forwards, options
  - Total return swaps
- Factor construction
  - Off the shelf
  - Customized / tailored
  - Bottom-up design
- Portfolio Construction
  - Equal risk contribution
  - Optimized risk / return
  - Targeted market diversification

	Value	Momentum	Volatility	Carry	Curve	Quality	Liquidity
Equities	✓	✓	✓	✓		✓	✓
Fixed Income	✓	✓	✓	✓	✓		✓
Commodities		✓	✓	✓	✓		
Currencies	✓	✓	✓	✓			✓

MAC Risk Premia

Factor diversification

- Risk premia portfolios can have significant diversification benefits
- Multi-asset and multi-style implementation is important to capture low pairwise correlations
- Individual factor expressions can vary widely in implementation
  - For instance – many flavors of equity value

Average Pairwise Correlations 2000-2016

	EQ Value	EQ Mom	EQ Carry	FI Value	FI Mom	FI Carry	Cmdty Mom	Cmdty Carry	FX Value	FX Carry
EQ Value	1.00									
EQ Mom	0.09	1.00								
EQ Carry	0.63	0.07	1.00							
FI Value	-0.04	0.26	0.14	1.00						
FI Mom	0.06	0.12	0.20	0.39	1.00					
FI Carry	0.01	-0.02	0.16	0.33	0.66	1.00				
Cmdty Mom	-0.03	-0.01	0.09	-0.02	0.17	0.18	1.00			
Cmdty Carry	-0.15	0.02	-0.06	-0.02	0.12	0.10	0.51	1.00		
FX Value	-0.04	-0.07	0.05	-0.05	-0.05	-0.05	0.10	-0.05	1.00	
FX Carry	0.01	-0.22	0.02	-0.23	-0.20	-0.08	0.01	-0.05	0.17	1.00

Source: Credit Suisse / Neuberger Berman

Average Broad Market Correlations 2005-2016

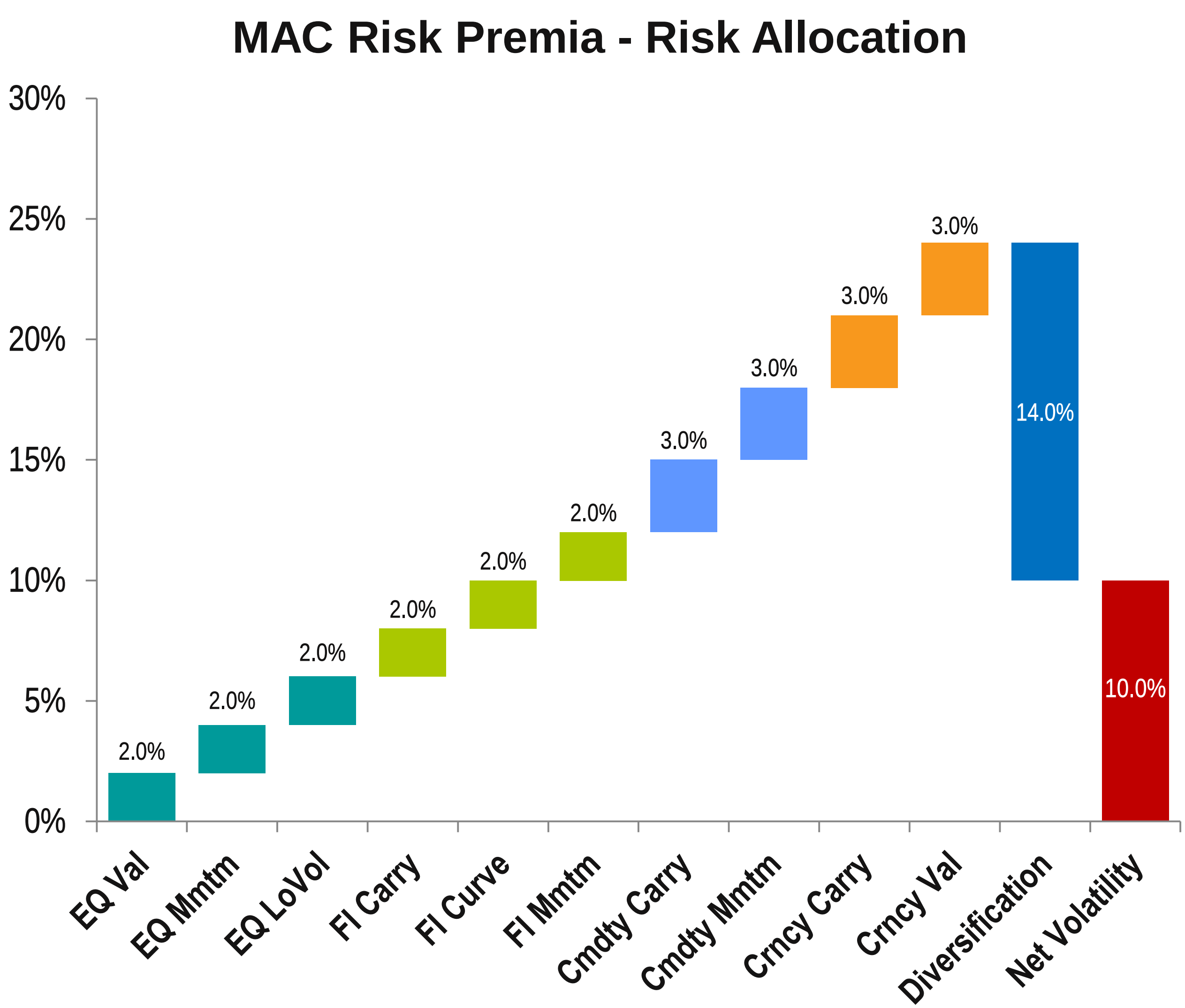
	Index*	Manager**	MSCI ACWI	BB Agg
Index*	1.00			
Manager**	0.20	1.00		
MSCI ACWI	-0.17	0.05	1.00	
BB Agg	0.39	-0.13	0.08	1.00

*Backtest before January 2016
**Backtest before August 2012

MAC Risk Premia

Contribution to risk

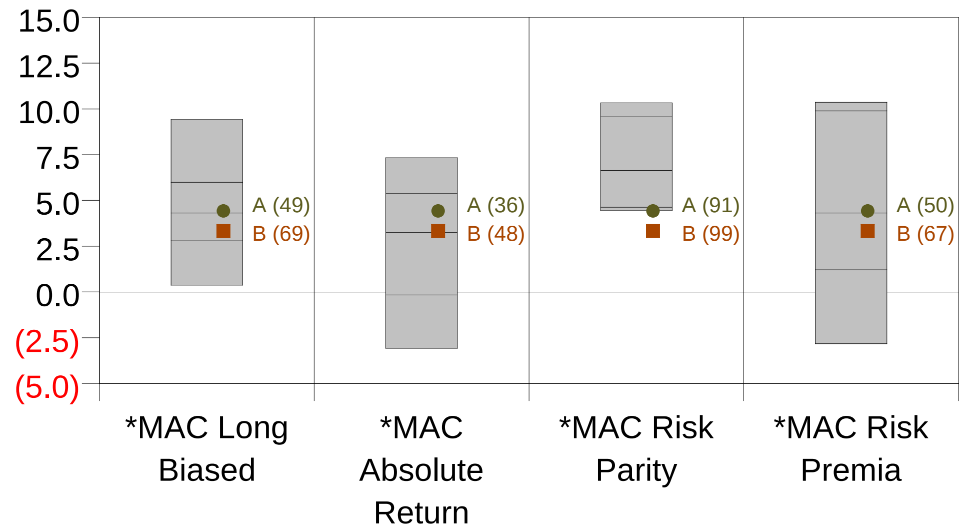
- Example of capturing 10 risk premia
- Equal risk contribution by asset class
- Individual premia levered to generate targeted standalone volatility
  - "Naive equity value" factor may require 2x – 2.5x leverage to contribute equally with other factors to overall portfolio risk



Peer Groups

- Callan has constructed multi-asset peer groups that can be used as a supplementary source of information
  - Number of constituents is 5 – 20 per peer group over a 3 year period
  - Track records are still relatively short

Gross of Fee Returns for 3 Years Ended September 30, 2016



		*MAC Long Biased	*MAC Absolute Return	*MAC Risk Parity	*MAC Risk Premia
10th Percentile		9.43	7.33	10.34	10.37
25th Percentile		5.99	5.37	9.58	9.90
Median		4.32	3.25	6.65	4.32
75th Percentile		2.80	(0.16)	4.64	1.21
90th Percentile		0.37	(3.07)	4.44	(2.83)
60% ACWI / 40% Global Agg	● A	4.43	4.43	4.43	4.43
30% ACWI / 70% Global Agg	■ B	3.33	3.33	3.33	3.33

MAC Strategy Diversification – Asset Classes vs. Risk Factors

Correlation matrix

10-Year Ending 9/30/2016	1*	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 S&P:500	1.0	0.9	0.3	-0.3	0.7	0.2	0.5	0.7	0.1	0.1	0.0	-0.4	0.1	-0.2	-0.3	-0.3	0.7	-0.4	-0.2
2 MSCI:ACWIxUS Gross	0.9	1.0	0.4	-0.3	0.8	0.3	0.6	0.8	0.1	0.0	-0.1	-0.3	0.0	-0.2	-0.2	-0.3	0.7	-0.4	-0.2
3 BB Barclays:Long Credit	0.3	0.4	1.0	0.6	0.5	0.6	0.2	0.2	0.2	0.1	0.1	-0.2	0.0	0.5	0.4	0.1	0.2	-0.3	-0.3
4 BB Barclays:Gov Long	-0.3	-0.3	0.6	1.0	-0.2	0.5	-0.2	-0.3	0.2	0.2	0.4	0.0	0.0	0.8	0.8	0.4	-0.3	0.0	0.0
5 BB Barclays:Corp High Yld	0.7	0.8	0.5	-0.2	1.0	0.4	0.5	0.6	0.1	0.0	-0.1	-0.4	0.0	-0.1	-0.3	-0.3	0.5	-0.4	-0.2
6 BB Barclays:US TIPS Index	0.2	0.3	0.6	0.5	0.4	1.0	0.4	0.2	0.1	0.0	0.0	-0.2	-0.2	0.5	0.4	0.2	0.2	-0.2	-0.2
7 BLMBRG:Commdty Idx	0.5	0.6	0.2	-0.2	0.5	0.4	1.0	0.6	0.0	-0.1	0.0	-0.1	0.0	-0.1	-0.1	-0.3	0.6	-0.2	-0.2
8 HFRI FOF Diversified	0.6	0.6	0.2	-0.3	0.6	0.2	0.5	1.0	0.0	0.0	-0.3	-0.1	-0.2	-0.2	-0.3	-0.4	0.6	-0.1	-0.2
9 CS NB CM Carry	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.0	1.0	0.6	0.0	0.0	-0.2	0.2	0.2	0.0	0.0	0.0	-0.1
10 CS NB CM Mom	0.1	0.0	0.1	0.2	0.0	0.0	-0.1	0.1	0.6	1.0	0.1	-0.1	-0.1	0.2	0.0	-0.2	-0.1	0.1	0.0
11 CS NB EQ Carry	0.0	-0.1	0.1	0.4	-0.1	0.0	0.0	-0.3	0.0	0.1	1.0	0.1	0.4	0.3	0.3	0.1	0.0	0.0	0.3
12 CS NB EQ Mom	-0.4	-0.3	-0.2	0.0	-0.4	-0.2	-0.1	-0.2	0.0	-0.1	0.1	1.0	0.0	-0.1	0.0	0.2	-0.2	0.5	0.1
13 CS NB EQ Value	0.1	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2	-0.2	-0.1	0.4	0.0	1.0	0.0	0.1	0.2	-0.1	0.0	0.2
14 CS NB FI Carry	-0.2	-0.2	0.5	0.8	-0.1	0.5	-0.1	-0.2	0.2	0.2	0.3	-0.1	0.0	1.0	0.7	0.3	-0.1	0.0	0.0
15 CS NB FI Mom	-0.3	-0.2	0.4	0.8	-0.3	0.4	-0.1	-0.3	0.2	0.0	0.3	0.0	0.1	0.7	1.0	0.4	-0.2	0.1	0.0
16 CS NB FI Value	-0.3	-0.3	0.1	0.4	-0.3	0.2	-0.3	-0.5	0.0	-0.2	0.1	0.2	0.2	0.3	0.4	1.0	-0.3	0.2	0.0
17 CS NB FX Carry	0.7	0.7	0.2	-0.3	0.5	0.2	0.6	0.6	0.0	-0.1	0.0	-0.2	-0.1	-0.1	-0.2	-0.3	1.0	-0.3	-0.1
18 CS NB FX Mom	-0.4	-0.4	-0.3	0.0	-0.4	-0.2	-0.2	-0.1	0.0	0.1	0.0	0.5	0.0	0.0	0.1	0.2	-0.3	1.0	-0.1
19 CS NB FX Value	-0.2	-0.2	-0.3	0.0	-0.2	-0.2	-0.2	-0.3	-0.1	0.0	0.3	0.1	0.2	0.0	0.0	0.0	-0.1	-0.1	1.0

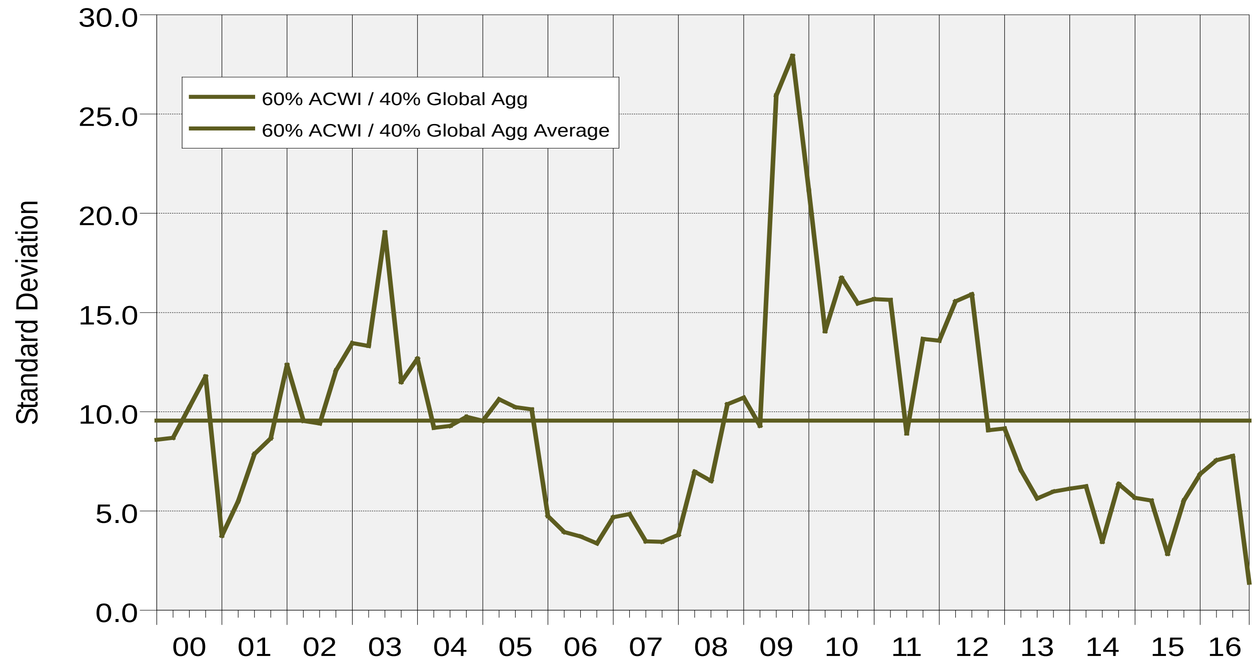
- Asset classes (in **red**, #1 – 8) generally exhibit high levels of correlations, and can become especially highly correlated during periods of economic distress
- Risk factors (in **black**, #9 – 19) exhibited lower correlation and thus more powerful diversification
- In times of market stress, asset classes (top left quadrant) become even more correlated whereas factor correlations (bottom right quadrant) remain moderately low

** Numbers above correlation matrix reference the categories of asset classes and risk factors enumerated on the left-hand margin.*

MAC Dynamic Risk Management

- A static 60/40 portfolio can have much higher, and variable, volatility than expected
- Most multi-asset class strategies put risk management front and center
- Some MAC strategies will “risk off” when volatility spikes and “risk on” when volatility is low; thus volatility may be managed to a certain range
- The table illustrates the monthly average S&P500 returns for high, normal and low volatility months

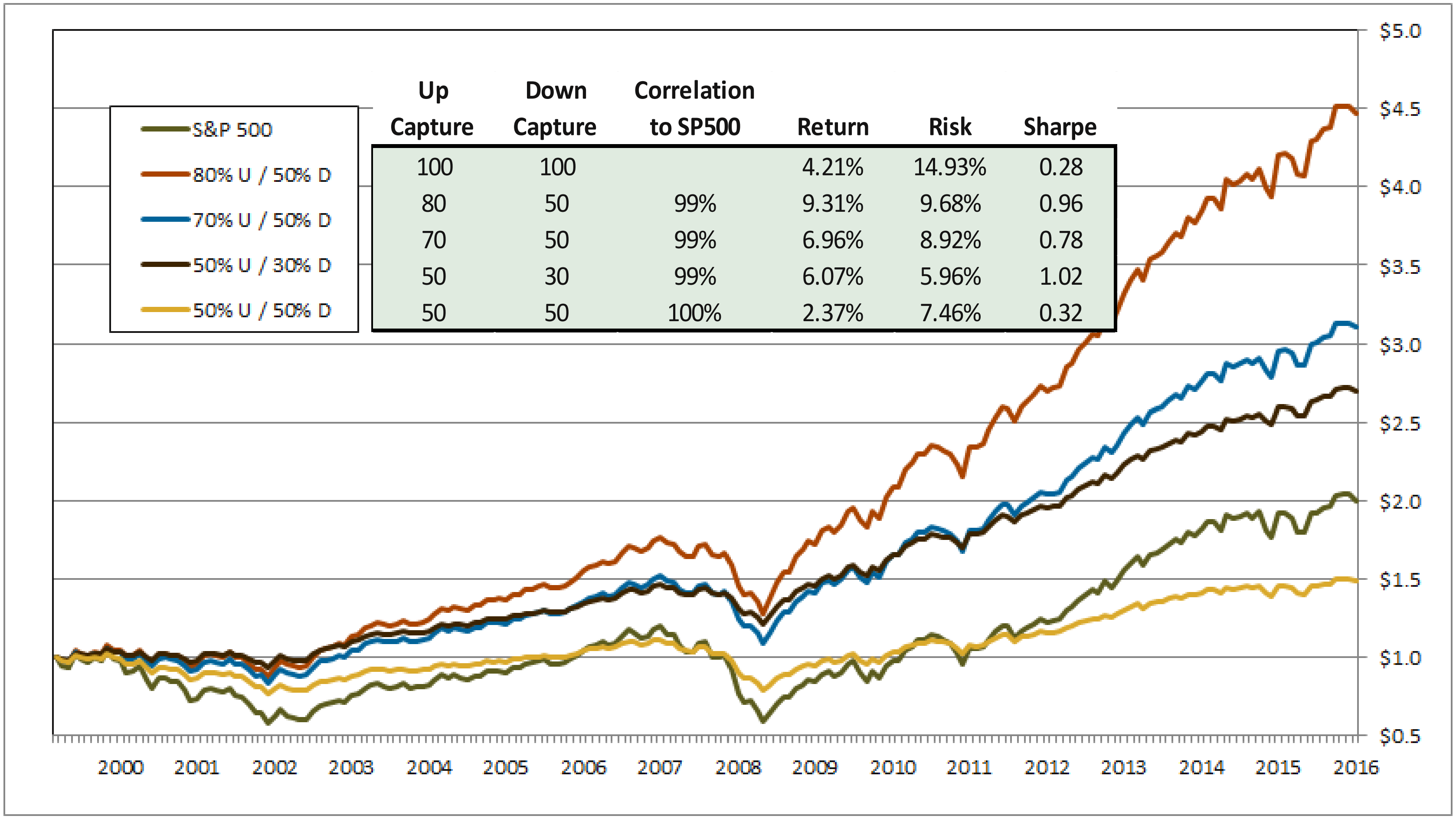
Rolling 4 Quarter Standard Deviation
for 16 3/4 Years Ended September 30, 2016



	High Volatility	Normal Volatility	Low Volatility
# Months	47	90	52
S&P 500 return	-13.0%	7.8%	14.5%
Std. Deviation	23.5%	12.9%	7.0%
Return/Risk	-0.6	0.6	2.1

Based on monthly data from Dec 1999 to Nov 2015. High (low) volatility defined as months where average VIX exceeds 25 (falls below 15)

Asymmetric Risk / Return Profile



Up Capture	Down Capture	Correlation to SP500	Return	Risk	Sharpe
100	100		4.21%	14.93%	0.28
80	50	99%	9.31%	9.68%	0.96
70	50	99%	6.96%	8.92%	0.78
50	30	99%	6.07%	5.96%	1.02
50	50	100%	2.37%	7.46%	0.32

- Multi-asset class strategies that protect on the downside via the “three D’s” must give up something on the upside
- Of course, the goal is an asymmetric profile where the upside capture outweighs the downside

Summary Observations

- Alternative beta / risk premia strategies provide exposure to classic finance and behavioral risk factors, often coupled with relative value, event-driven, or other hedge fund-like sources of return
- Portfolio construction is transparent and rules-based, resulting in low correlations to global public equity and fixed income which leads to diversification benefits
  - Strategies use derivatives and employ leverage and shorting
- While risk / return characteristics vary for individual strategies, in aggregate they are similar to hedge funds, and feature increased transparency, liquidity, and lower fees
- Alternative beta / risk premia strategies are an appropriate complement to the existing hedge fund portfolio

Disclaimers

This report is for informational purposes only and should not be construed as legal or tax advice on any matter. Any decision you make on the basis of this content is your sole responsibility. You should consult with legal and tax advisers before applying any of this information to your particular situation.

This report may consist of statements of opinion, which are made as of the date they are expressed and are not statements of fact.

Reference to or inclusion in this report of any product, service or entity should not be construed as a recommendation, approval, affiliation or endorsement of such product, service or entity by Callan.

Past performance is no guarantee of future results.

The statements made herein may include forward-looking statements regarding future results. The forward-looking statements herein: (i) are best estimations consistent with the information available as of the date hereof and (ii) involve known and unknown risks and uncertainties such that actual results may differ materially from these statements. There is no obligation to update or alter any forward-looking statement, whether as a result of new information, future events or otherwise. Undue reliance should not be placed on forward-looking statements.

0903c02a818403ca

J.P. Morgan Systematic Alpha

June 22, 2017

Presented to: Alaska Retirement Management Board

Agenda

Quantitative Beta Strategies Platform and Evolution of Alpha into Beta

Providing broad access to factor solutions

Standalone and multi-strategy approaches

STRATEGIC BETA

MULTI-FACTOR EQUITY

EQUITY VALUE

Long only exposure to compensated equity factors:

- Value
- Quality
- Momentum
- Size

FACTOR RISK PARITY

DIVERSIFIED RISK PREMIA

Diversified portfolio using factors as building blocks and a risk parity approach to portfolio construction:

- Value
- Momentum
- Carry

HEDGE FUND BETA

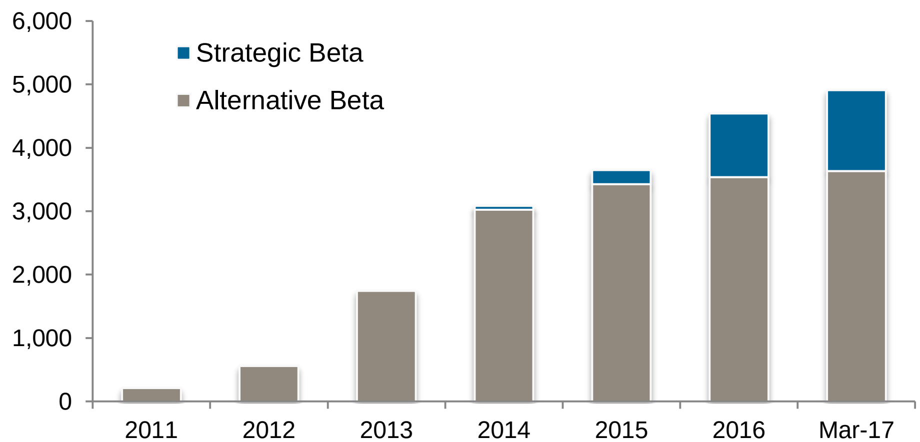
DIVERSIFIED HEDGE FUND BETA

MERGER ARBITRAGE

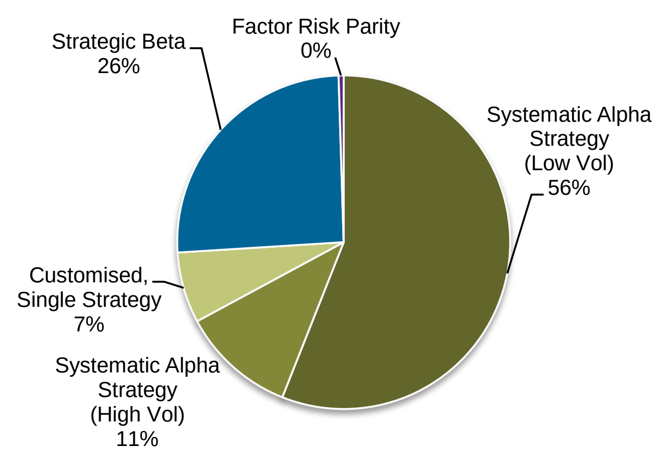
Systematic capture of hedge funds return sources:

- Merger Arbitrage
- Event Driven
- Equity Long/short
- Global Macro

Growth of assets over time (USD mm):

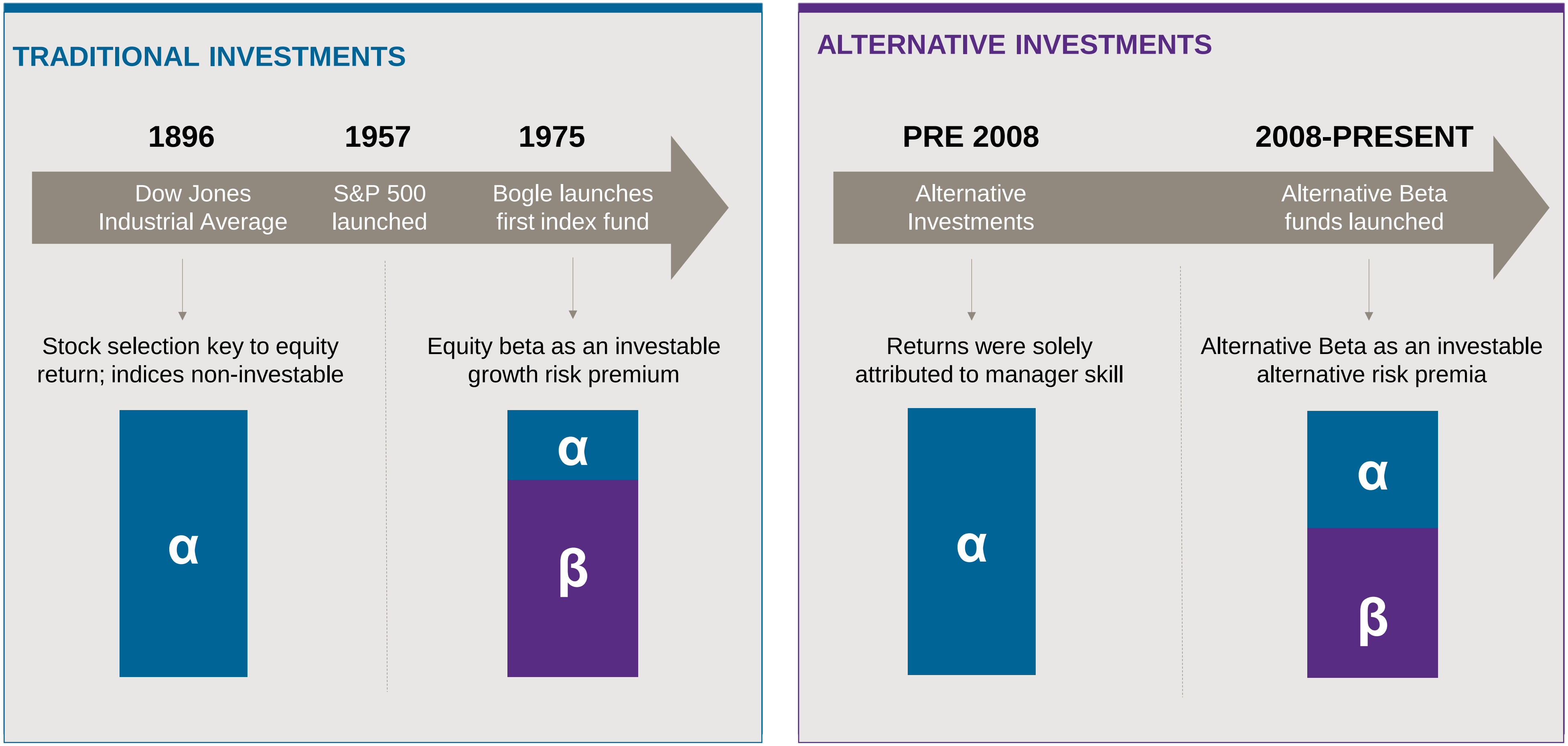


Current AUM breakdown:



Source: J.P. Morgan Asset Management. As of 31 March 2017. For illustrative purposes only.

Evolution of alpha into beta



For illustrative purposes only.

J.P.Morgan Asset Management

Alternative beta transforms the way hedge fund returns are accessed

Liquidity	Daily/monthly liquidity provides ability to dynamically allocate capital
Transparency	Full look-through to individual positions allows insight into risk exposures/contributions
Capacity	Higher capacity allows for meaningful role in portfolio
Cost	Reduction of fees in overall portfolio

For illustrative and discussion purposes only. The Fund is an actively managed portfolio; holdings, sector weights, allocations and leverage as applicable, are subject to change and the Fund is managed to internal guidelines which are not absolute and can change over time. The targets and aims provided above are the Investment Manager's targets and aims only and are not part of the Strategy investment objective. There is no guarantee that these targets and aims will be achieved. This information reflects JPMAMs opinion and goals and is subject to change.

J.P. Morgan Systematic Alpha Strategy

J.P. Morgan Systematic Alpha: summary

Providing access to core hedge fund return sources

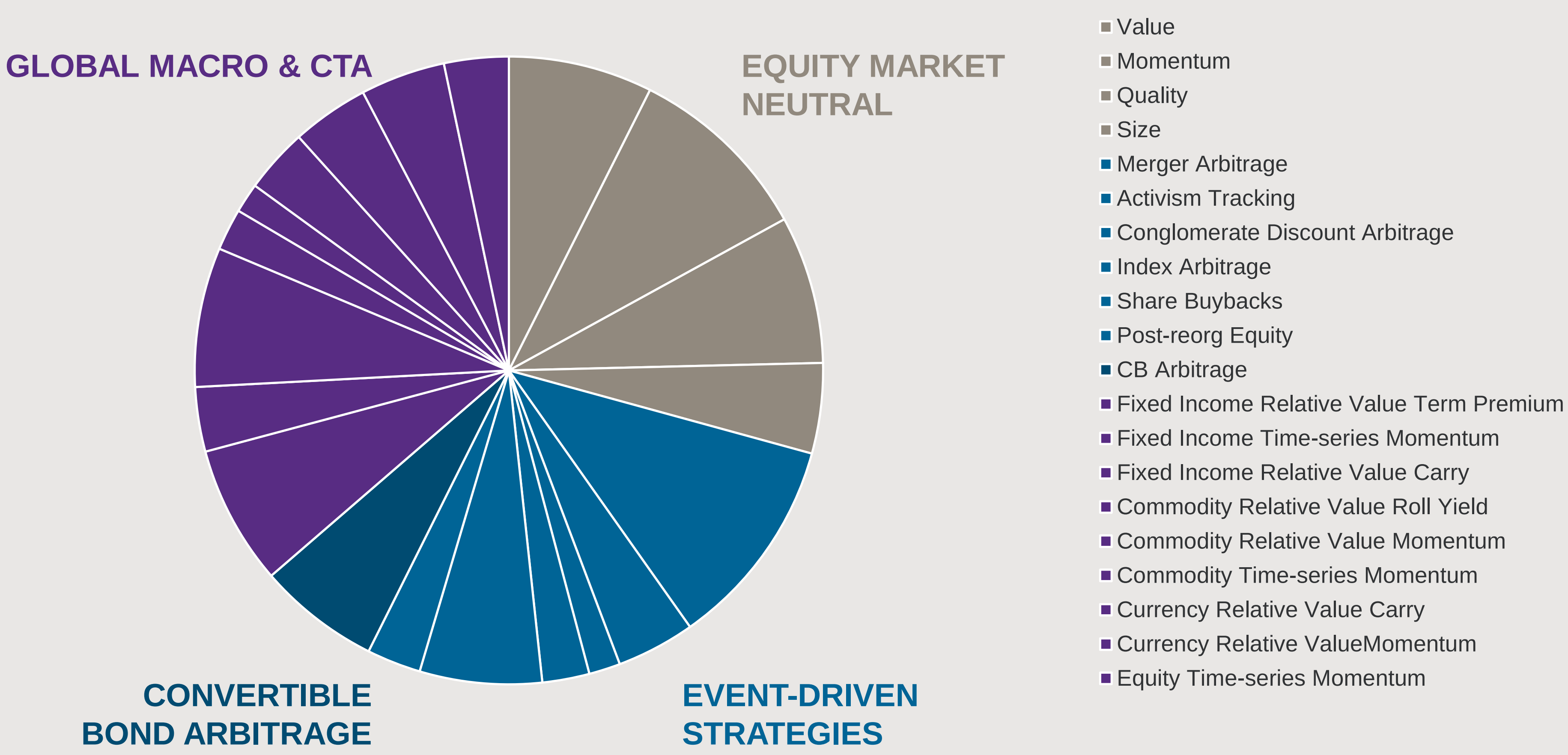
STRATEGY HIGHLIGHTS	■ ~$3.5 bn in AUM as at 31 March 2017 ■ Global investor base across with investors in North America, Europe and Asia ■ 7 year track record one of the longest track records in the alternative beta space
STRATEGY STATISTICS	■ Approximately 1,100 positions - limited idiosyncratic risk ■ Strong performance since inception in 2009, with an IR* of 0.9 net of fees
KEY FEATURES	■ Diversification of strategies: Equity Market Neutral, Event-driven, Convertible Arbitrage and Global Macro ■ Low correlation to traditional asset classes; targets low beta to equity markets and low sensitivity to fixed income markets ■ Seeks to address the need for absolute return alternative investments in a liquid, low-cost and transparent manner

Source: J.P. Morgan Asset Management. The Investment Manager (Portfolio Manager) seeks to achieve the stated targets/objectives. There can be no guarantee the objectives/targets will be met.

*Sharpe ratio based on the JPMorgan Funds – Systematic Alpha Fund EUR C (acc) performance over 5 years, as of 31 March 2017. Fund inception 01 September 2009. Past performance is not necessarily a reliable indicator for current and future performance.

J.P. Morgan Systematic Alpha: diversification across alternative strategies

Alternative strategies accessed



Source: J.P. Morgan Asset Management. For illustrative proposes only.

A brief guide to common rationales for selected risk premia

Based on our internal research and what we include within vehicles the team manages

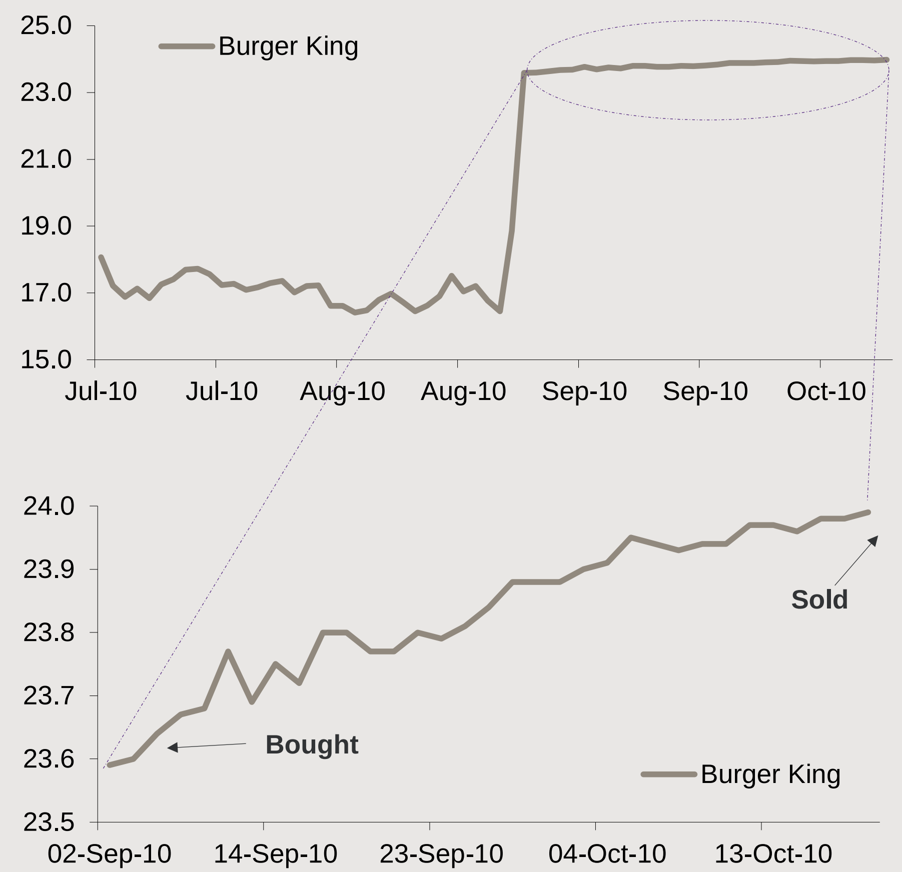
Style	Risk-based Argument	Behavioural Argument
Value	▪ Greater default risk in value stocks ▪ Dynamic betas	▪ Initial underreaction, delayed overreaction to information ▪ Over-extrapolation of growth trends
Momentum and Trend	▪ Greater macroeconomic risk* ▪ Higher discount rates for “riskier” companies*	▪ Anchoring and confirmation bias, along with delayed information processing ▪ Disposition effect
Carry	▪ In FX, high-yielding currencies are more sensitive to volatility innovations ▪ Crash, economic, and liquidity risk	▪ Aversion to negative skew ▪ Flows seek higher yield ▪ Status quo bias
Low Volatility/Quality	▪ Leverage and short selling constraints	▪ Glamour stocks
Size/Rebalancing	▪ Smaller companies are riskier in economic downturns ▪ Compensation for bearing illiquidity	
Event	▪ Compensation for deal failure risk (merger arbitrage)	▪ Aversion to negative skew ▪ Delayed information processing

*Risk-based arguments for momentum tend to be weaker, due to low statistical power

An example of merger arbitrage

Premia are selected based on expectations of positive returns, in this case driven by risk of deal failure

Merger Arbitrage Example – 3G/Burger King



Source: Bloomberg October 2010

Background and Implementation

Justification of persistence:

- **Economic:** compensation for the risk of deal break
- **Behavioral:** negative skew aversion

Basic construction:

- **Universe:** Developed equities (filtered for liquidity)
- **Implementation:** Long target if cash deal, long target/short acquirer if stock deal
- **Construction:** Equal notional weight every deal (adjustment for hostile deals)

Trade example:

- 3G Capital made an offer to acquire Burger King on 2 September 2010.
- Given that this was a friendly deal with a high likelihood of success, the premium available was limited. We bought the stock at USD 23.59, selling it to 3G Capital for USD 24.
- The deal completed on 20 October 2010 and thus earned 1.7%.
- While this may initially sound low, this was over a two- month period, roughly equating to an annualized figure of over 10%.

The example above is shown for illustrative purposes only. In should not be assume that all past recommendation experienced a similar results. The inclusion of the securities mentioned above is not to be interpreted as recommendations to buy or sell. A complete list of portfolio holdings for the past year are available upon request. Past performance is not indicative of future returns.

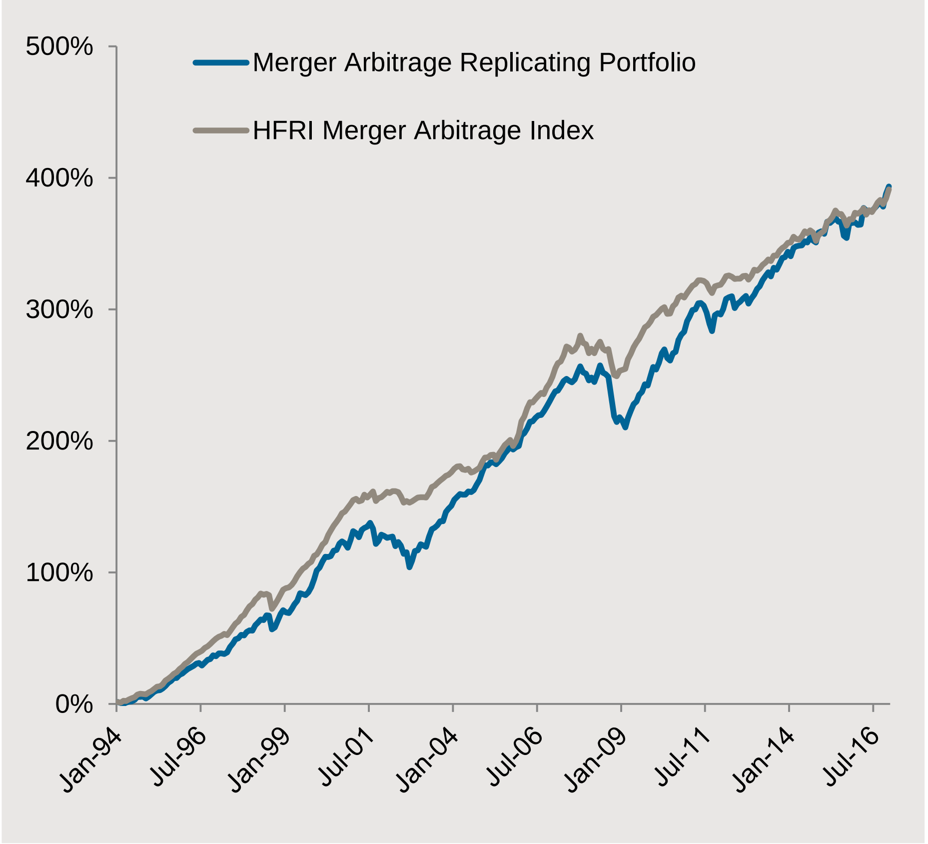
Lower cost access to hedge fund returns

Alternative beta strategies can explain the returns of hedge fund indices

- The beta of merger arbitrage can be created by simply holding all stocks subject to takeover activity (and hedging appropriately)
- Increasingly, hedge funds defining themselves as event driven or merger arbitrage will only be able to justify their 2/20 fee structure by charging fees above the 'merger arbitrage risk premium' rather than cash

Jan 1994 – Dec 2016	HFRI Merger Arbitrage Index	Merger Arbitrage Replicating Portfolio
Return	7.3%	7.2%
Risk	3.5%	4.9%
IR	1.3	0.9
Drawdown	8.1%	14.2%

Performance Comparison



Source: J.P. Morgan Asset Management, Bloomberg. Portfolio performance is calculated using a static weight of the asset illustrated above, monthly rebalancing gross of fees. Analysis period January 1, 1994 to December 31, 2016.

Past performance is not indicative of future results.

J.P. Morgan Systematic Alpha: equal risk principles with tactical sizing

Tactical sizing component based on opportunities within each strategy:

Global Macro

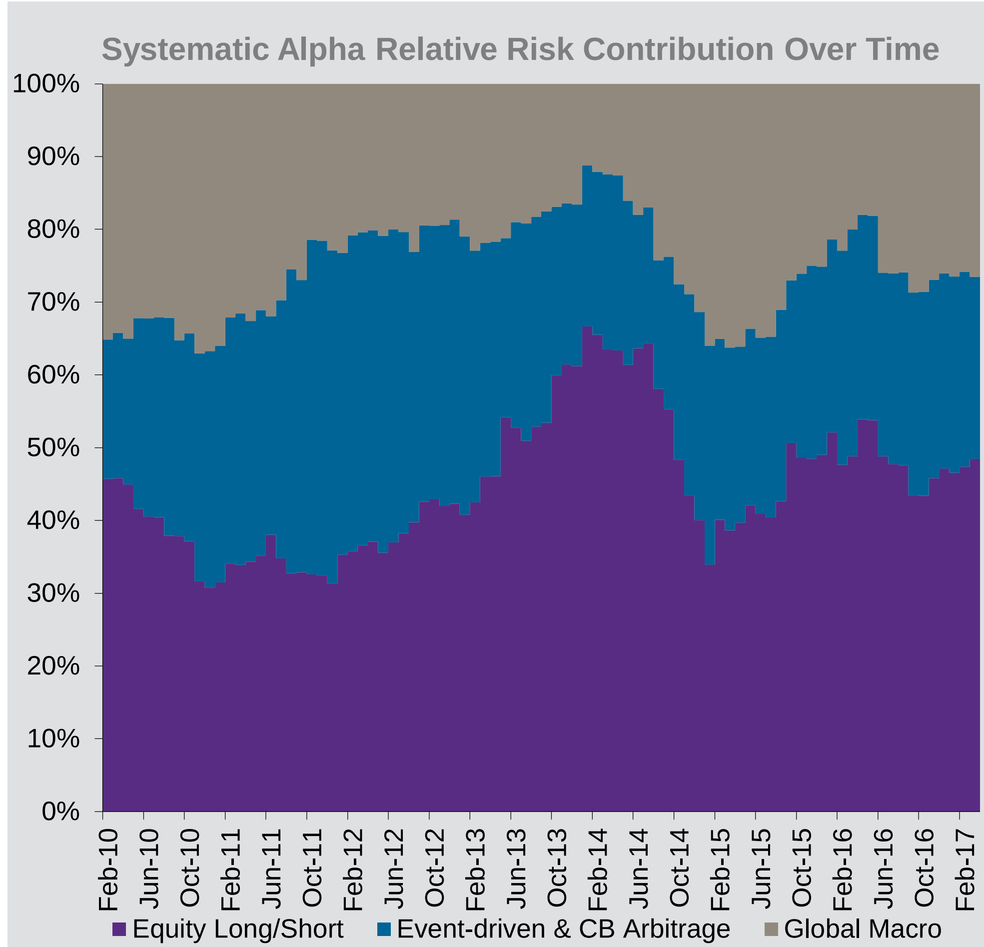
- Asset class risk will fluctuate depending on whether the factors confirm or offset each other

Event Driven

- As the number of events increases and diversification improves, the strategy allocation will rise

Equity Market Neutral

- Risk in the short-term is driven by equity market dispersion



Source: J.P. Morgan Asset Management. *As of March 31, 2017. Restated to be fully invested. For illustrative purposes only.

J.P.Morgan Asset Management

J.P. Morgan Systematic Alpha: benefits of a diversified approach

- Individual hedge fund strategies have each had years where they have been out of favour
  - Merger arbitrage was weak in 2008 and 2011
  - Equity long/short was weak in 2009 and 2016
  - Macro was weak in 2010 and 2015

- Combining the strategies into one portfolio may diversify the return profile and reduce risk
  - Diversification of style and approach gives lower volatility and attractive correlation to other asset classes

Beta of Systematic Alpha to:	Backtest and live period*	Since inception
MSCI World	0.10	-0.02
Barclays Global Aggregate Bond Index	0.22	-0.22
Barclays US Corporate High Yield Index	0.14	-0.21
S&P GSCI Commodities Index	0.05	-0.13

Source; J.P. Morgan Asset Management, Bloomberg.*Period: January 1998 – 31 March 2017. Inception 12/31/2013. Opinions and analysis offered constitute J.P. Morgan Asset Management's judgment and are subject to change without notice. Indices do not include fees or operating expenses and are not available for actual investment. Past performance is not an indication of future performance.

Product Offerings and Performance

J.P. Morgan Systematic Alpha: offerings

	Higher Volatility (10% Target)	Low Volatility (5% Target)
Sub-strategies	Equity Market Neutral, Event Driven, Convertible Bond Arbitrage, and Global Macro	
Individual Factors	20	20
Target Return (Excess)[1]	6-8%	3-5%
Target Volatility[2]	8-10%	3-5%
Target Equity Beta	Neutral	Neutral
Target Duration	Neutral	Neutral
Expected Leverage (Gross Notional Exposure)	500% - 600%	250% - 300%
Liquidity	Monthly	Daily

Source: J.P. Morgan Asset Management as of 31 March 2017

[1] The target returns are for illustrative purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns similar to the target returns shown above. Because of the inherent limitations of the target returns, potential investors should not rely on them when making a decision on whether or not to invest in the strategy. Please see the complete Target Return disclosure at the conclusion of the presentation for more information on the risks and limitation of target returns.

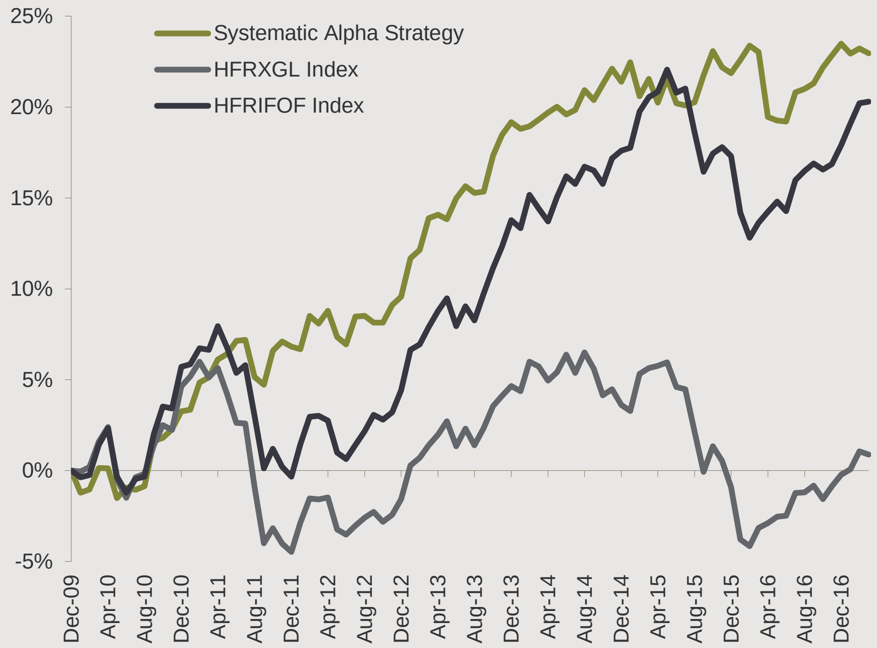
[2] *Target volatility has been established by J.P. Morgan Investment Management Inc. "JPMorgan" based on its assumptions and calculations using data available to it and in light of current market conditions and available investment opportunities. The target volatility is for illustrative purposes only and is subject to significant limitations. The manager seeks to achieve the stated objectives. There can be no guarantee the objectives will be met.*

J.P.Morgan Asset Management

Systematic Alpha (5% volatility target): performance (net of fees)

Systematic Alpha Strategy

Systematic Alpha Strategy	**+23.0% (net of fees)**
HFRX Global Hedge Fund (EUR)	+0.9%
HFRI Fund of Fund	+20.3%



- Outperformed competitive universe with a lower equity market beta
- The strategy's 5-year volatility is lower than that of hedge fund indices

Systematic Alpha Strategy: Historical Risk/Return Statistics

Annualized Return	2.96%
Risk	3.10%
Return/Risk Ratio	0.96
Max Drawdown	-3.41%

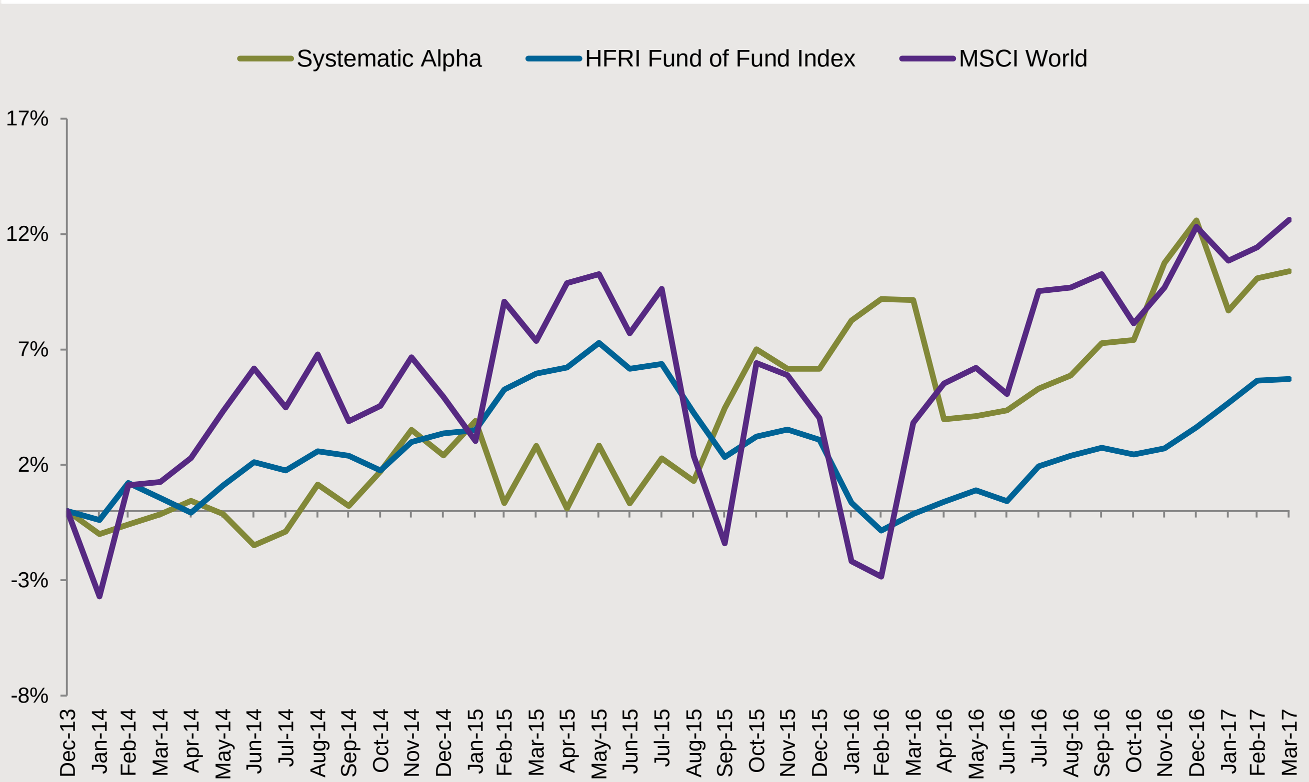
Source: J.P. Morgan Asset Management, Bloomberg. Period: January 2010 – 31 March 2017

Performance is cumulative. C-share class inception 04/04/2011. Performance is shown based on the NAV of the share class C in EUR with income reinvested including actual ongoing charges excluding any entry and exit fees. Past performance is not an indication of current and future performance. C share class inception date on 04 April 2011. The benchmark of the Fund is ICE one-month EUR LIBOR and the use of HFRX and HFRI indices is merely for comparative purposes of similar strategies. Please note that performance is shown from January 2010 as this is the date from which all strategies included at launch were running at full weight.

Systematic Alpha (10% volatility target): composite - performance (gross of fees)

Annualized Performance as of 3/31/2017	3 Months	6 Months	YTD	1 year	Since inception*
Systematic Alpha (higher vol) Composite	**-0.58%**	**4.35%**	**-0.58%**	**2.57%**	**3.51%**
B of A Merrill 3 month Treasury Bill	0.10%	0.19%	0.10%	0.35%	0.16%
Excess Return	-0.68%	4.16%	-0.68%	2.22%	3.35%

Historical Monthly Cumulative Returns



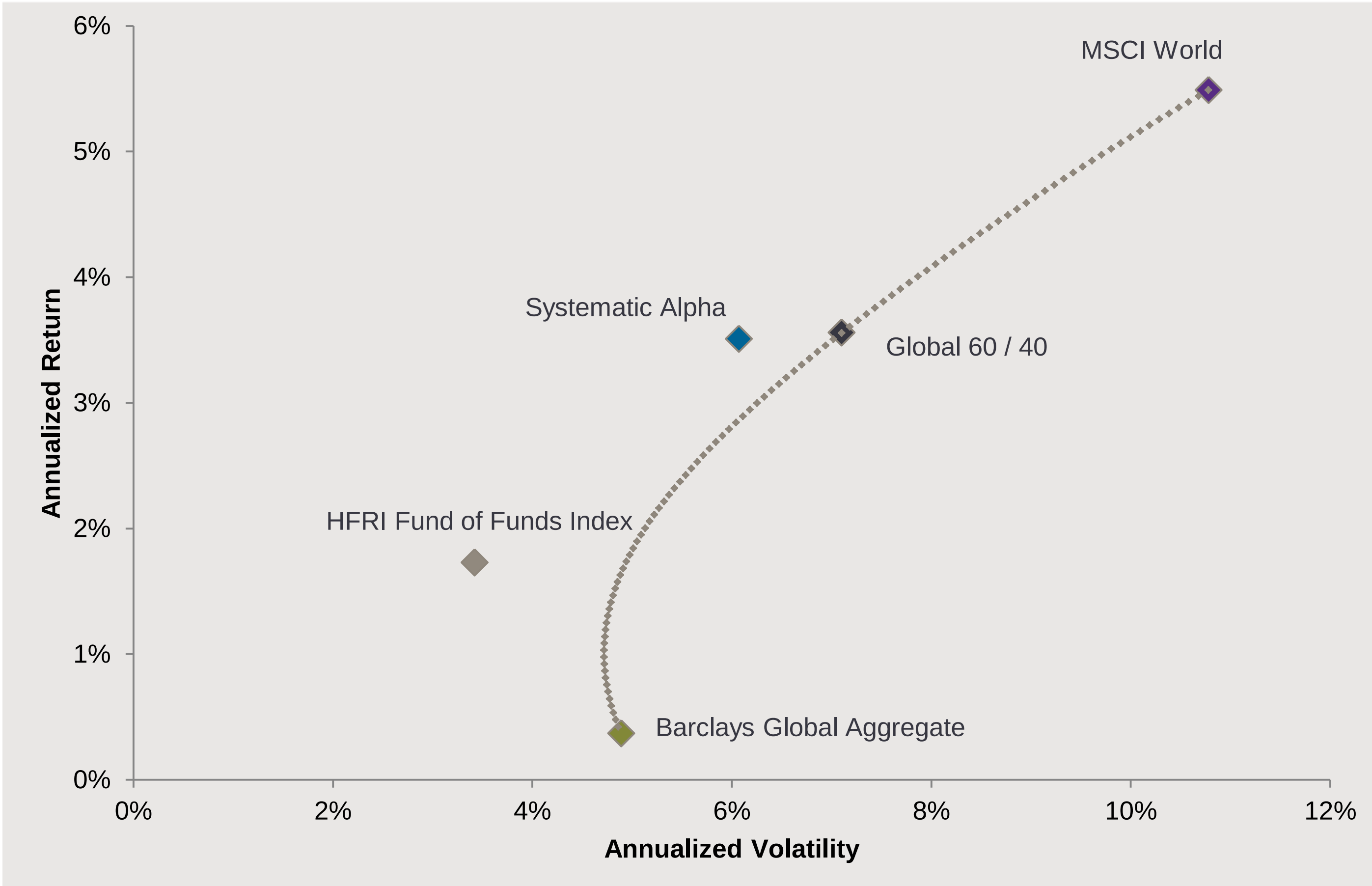
Historical Risk/Return Statistics

Annualized Return	3.51%
Risk	6.07%
Sharpe Ratio	0.58
Max Drawdown	-4.78%

All performance in USD, gross of fees. * Inception date is December 31, 2013, performance over 12 months is annualized. Excess return is calculated geometrically. All funds in the composite seek a volatility target of 10%. Past performance is not indicate of future performance. Total return assumes the reinvestment of income. Performance results are gross of investment management fees. The deduction of an advisory fee reduces an investor's return. Actual account performance will vary depending on individual portfolio security selection and the applicable fee schedule. Fees are described in Part II of the Advisor's ADV which is available upon request . Please see back page for additional disclosure

Systematic Alpha (10% volatility target): composite - performance (gross of fees)

Risk vs. Return



All performance in USD, gross of fees. * Inception date is December 31, 2013. All funds in the composite seek a volatility target of 10%. Past performance is not indicate of future performance. Total return assumes the reinvestment of income. Performance results are gross of investment management fees. The deduction of an advisory fee reduces an investor's return. Actual account performance will vary depending on individual portfolio security selection and the applicable fee schedule. Fees are described in Part II of the Advisor's ADV which is available upon request . Please see back page for additional disclosure

J.P.Morgan Asset Management

Alaska Retirement Management Board: Conclusion

- Systematic Alpha offers liquid, low cost, transparent access to a diversified set of return sources that are uncorrelated to traditional equity and fixed income markets
  - 20 alternative beta strategies across 4 hedge fund styles
- Our integrated research, portfolio management and technology functions ensures the portfolio implementation meets the risk/return expectations of our investors
- Risk management is integrated throughout the entire investment process:
  - Strategic design
  - Daily risk analysis
  - Operational oversight
- The J.P. Morgan Beta Strategies Team is one of the growth engines within J.P. Morgan Asset Management and has a strong commitment from senior management for resources, personnel, and technology spend

Appendix I: Systematic Alpha Component Strategies

- Equity Market Neutral
- Event Driven
- Global Macro
- Convertible Bond Arbitrage

The fund invests across the Merger Arbitrage, Equity Market Neutral, Convertible Bond Arbitrage and Macro based strategies. Generally uncorrelated behavioral patterns are likely to change over time. Under certain market conditions, these patterns could become correlated, exposing the fund to additional risks.

Equity market neutral: diversified, systematic capture of risk premia

Value premium	■ Risk premium ■ Strategy: Long “cheap” stocks, short “expensive” stocks (as measured by P/E, Div Yld etc) ■ These factors form the backbone of many quantitative and qualitative equity products and drive most equity investment philosophies
Momentum	■ Return chasing and market bias ■ Strategy: (1) Long positive earnings revision stocks, short negative revision stocks (2) Buy stocks whose momentum is in the top decile while shorting those in the bottom decile
Quality	■ Behavioral bias ■ Strategy: Buy high quality stocks, as measured on a number of metrics including profitability, financial risk and earnings quality, while shorting lower ranked stocks on these metrics.
Size	■ Risk premium ■ Strategy: Buy small cap stocks, short large cap stocks

Capturing the risk premia in our equity market neutral strategy

Beta neutral, unlike most Equity Long/Short strategies – very low correlation to equity markets

- Portfolio constructed neutrally by country and sector

8,500 companies in universe (S&P Broad Market Index), around 300-350 long and short companies in portfolio

- Diversify idiosyncratic risk, includes mid and small cap exposure;
- Equally weighted subject to minimum market cap and average daily traded volume

Capital efficient investment, low turnover

Source: J.P. Morgan Asset Management. For illustrative purposes only.

J.P.Morgan Asset Management

Event-driven investing: systematic capture of underlying strategies

MERGER ARBITRAGE	■ Captures the deal risk premium inherent in merger transactions ■ Invests in the target company of all merger deals globally, subject to a number of size and liquidity filters, while shorting the acquirer
CONGLOMERATE DISCOUNT ARBITRAGE	■ Captures positive performance of parent company as value is unlocked through spinoff announcement. The source of the premium is the additional information released to the markets, which typically leads to a revaluation of the company ■ Long positions in all parent companies post-announcement to capture post-announcement price drift, closing just prior to record date
SHARE REPURCHASES	■ Exploits outperformance of a company engaged in a share buyback program, which is driven by market under-reaction in the reduction in the cost of capital ■ Long positions in stocks whose outstanding shares have been declining while hedging the beta
SHAREHOLDER ACTIVISM	■ Approximately 15% of all activist targets turn into merger transactions ■ Uses 13-D filings to track activist campaigns allowing the capture of positive abnormal returns unrelated to classical equity risk premia
EQUITY INDEX ARBITRAGE	■ Index changes typically pre-announced to avoid market dislocation on effective date due to price pressure from beta trackers ■ Buy index additions at announcement and sell on effective date; compensation for liquidity provision to the market
POST-REORGANISATION EQUITY	■ Companies emerging from bankruptcy exhibit binary risk, low analyst coverage, unusual shareholder composition, and have the stigma of the former bankrupt entity despite often being restructured into a different company ■ Buy companies that have emerged from the Chapter 11 bankruptcy process to capture this set of unique risks

Source: J.P. Morgan Asset Management. For illustrative purposes only.

Global macro: capturing macro risk premia

Fixed income	■ Fixed income carry trades across 6 developed bond market indices ■ Long the long end of steepest curves and short the long end of the flattest curves ■ Long the highest carry bond markets and short the lowest carry bond markets ■ Time series momentum trades across 6 developed bond market indices using 3, 6, and 12 months momentum
Currency	■ FX carry trades ■ Forward rate bias across 10 developed market currencies: Long the highest yielding currencies with rising rates and short the lowest yielding currencies with decreasing rates ■ Forward Rate Bias across 20 Emerging Market Currencies (no positions taken in currencies of countries where the CDS prices are implying an implied probability of default greater than 15%) ■ Relative momentum strategy across developed markets
Commodity	■ Relative Roll Yield – long backwardated commodities and short those in contango across 17 commodities ■ Time series momentum using 3, 6, and 12 months momentum ■ RV commodity momentum over 17 commodities using 12 month momentum
Equities	■ Time series momentum across a universe of 10 developed market equity indices using 3, 6, and 12 months momentum

Capturing the macro risk premia in our global macro strategy

Carry and momentum strategies across asset classes are uncorrelated

Within carry and within momentum, the strategies are also generally uncorrelated

- The two fixed income carry strategies are negatively correlated
- FX strategies exhibit the highest correlation within an asset class but are still diversifying to one another
- Use both time series momentum (trend following/CTA) and relative value momentum

Source: J.P. Morgan Asset Management. For illustrative purposes only.

Convertible bond arb: systematic capture of strategy

Straight Bond	■ A convertible bond trades at a discount to the sum of its parts – straight bond plus a call option on the underlying. ■ The premium is essentially an illiquidity and small cap premium.
Equity Call Option	■ To eliminate this, the arbitrageur will typically go long the convertible bond and look to hedge the equity and duration sensitivity.

Capturing the convertible arb

Ensuring a liquid universe is crucial

- CB's selected from the Thomson Reuters US index. Must have an outstanding issuance of USD 300m+ and generally debt maturing within 3 months is excluded

Limiting the impact of idiosyncratic risk

- Idiosyncratic risk is limited by diversifying across the index which typically includes 100-150 holdings
  - For each CB, we utilize their respective stock ranking from the Equity Market Neutral sleeve portfolio to determine those companies in the bottom decile and remove them from the Convertible Bond Arbitrage sleeve portfolio
- Equal notional exposure is targeted in each CB in the universe in order to limit idiosyncratic risk and to avoid the problems of recidivism
- To isolate and capture the small cap illiquidity premium, we use S&P futures rather than specific stock shorts:
  - Small Cap stock shorts may be too expensive or unavailable

Source: J.P. Morgan Asset Management. For illustrative purposes only.

Appendix II: Team and Research Process

Beta Strategies – Investment team

Chris Willcox, *CEO, J. P. Morgan Asset Management*

Mike Camacho, *Global Head of Beta Strategies*

Quantitative Beta Strategies

Yazann Romahi, *Chief Investment Officer*

Victor Li, *Head of Equity/Alternative Beta Research*
Niels Schuehle, *Head of Fixed Income Research*
Eric Isenberg, *Head of Fixed Income Portfolio Management*

Kartik Aiyar
Albert Chuang
Aijaz Hussain
Naveen Kumar
Jonathan Msika
Charles Su
Joe Staines
Steven Wu

Global Research Technology

Kent Zheng, *Head of Team*

Ilias Belaidi
Jakub Hulewicz
Phillip Lin
Alan Loi
Oleg Mihailik
Kai Shen
Jefferson Song
Ramesh Vagadiya
Chris Wong

Beta Specialist Team

Sherene Ban
Global Head of Beta Specialists

Yasmin Dahya
Head of US Beta Specialists

Gareth Turner
Garrett Norman
Katie Magee

Market Cap Equity Beta Strategies

Ove Fladberg
Chief Investment Officer

Nick D'Eramo
Oliver Furby
Alex Hamilton
Mike Loeffler
Anshul Mohan

Related functions

Global Multi-Asset Research

Katherine Santiago,
Head of Global Multi-Asset Research
+6 Quantitative Analysts

Middle Office

Chris Maizys,
Head of team
+17 team members

Investment Director & Embedded Risk

Ed Berman,
Head of team
+6 team members

JPMAM Trading

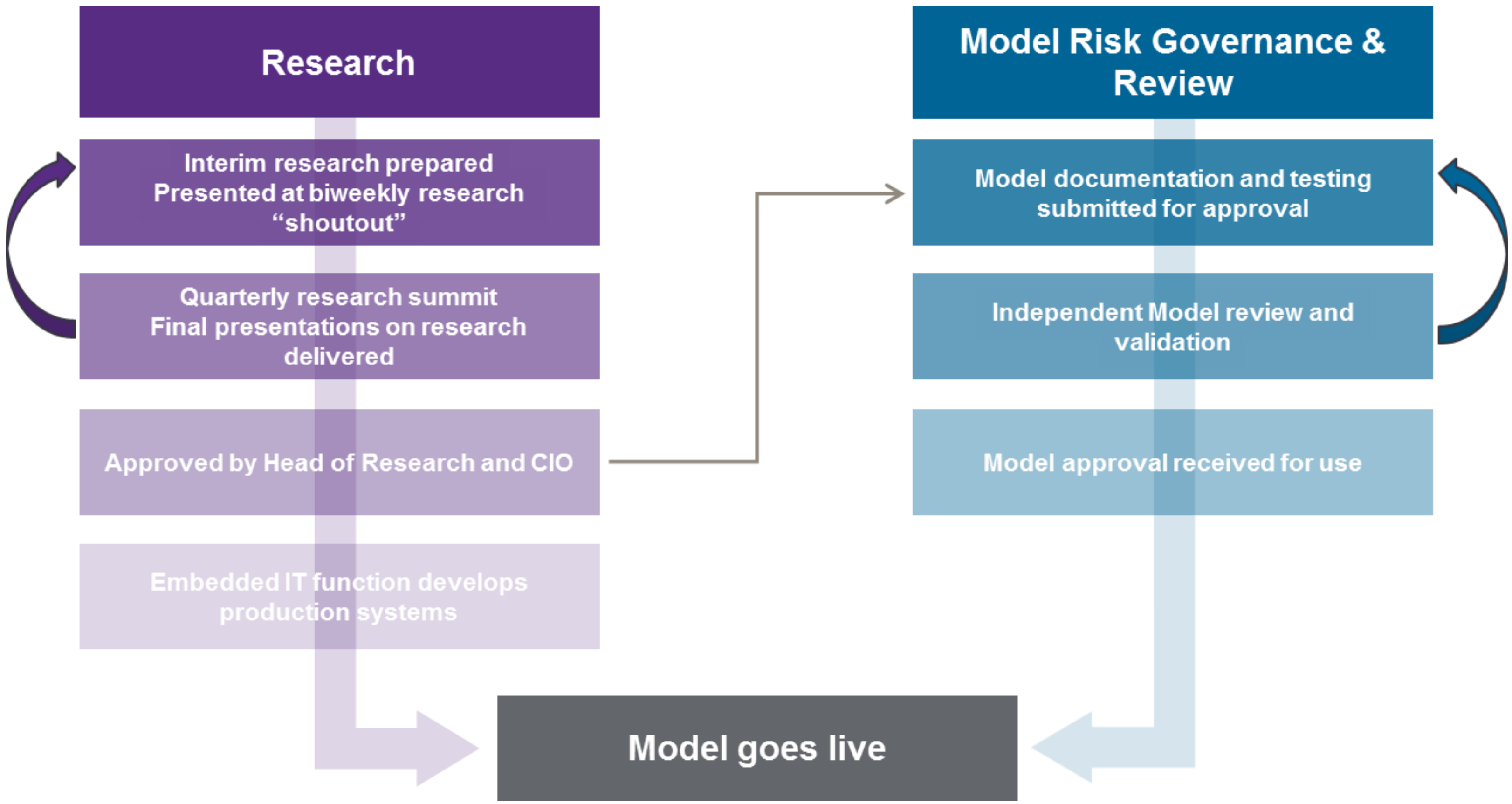
Equity **-** 40+ traders and analysts
Fixed income **-** 20+ traders
Currency **-** 15+ currency managers

Independent functions

JPMAM Risk Management, including:
AM Counterparty Risk Group
Investment risk oversight
Model Risk Governance and Review
Soma Rao, *AM Model Risk Officer*

Source: J.P. Morgan Asset Management. As of May 2017. There can be no assurance that the professionals currently employed by J.P. Morgan Asset Management will continue to be employed by J.P. Morgan Asset Management or that the past performance or success of any such professional serves as an indicator of such professional's future performance or success.

Robust research & development process



Source: J.P. Morgan Asset Management, as of 31 December 2016

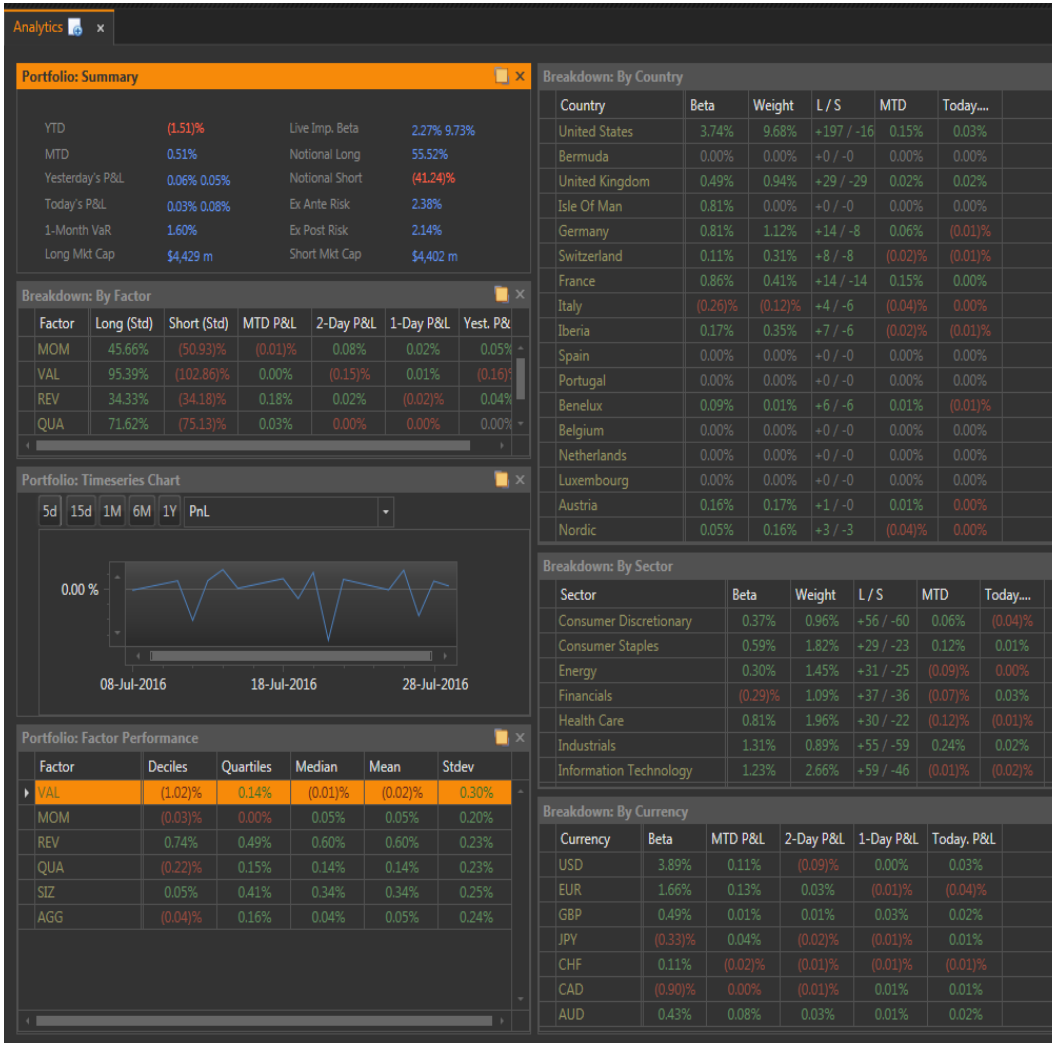
Advanced risk management capabilities

RISK MANAGEMENT

- Risk report includes factor by factor ex ante risk breakdown
- Highlights exposures to idiosyncratic risk
- Monitors Sector, Country and Beta deviation from neutrality
- Broad range of ex-ante risks are monitored
- Additional stress testing and analysis is performed
- Reports generated in real time

ACCOUNT MONITORING

- Attribution monitoring by hedge fund style and factor level
- Automated portfolio reconciliation between desk trading systems and back-office systems
- Automated integration with broker systems for the arrangement of stock borrow
- News Alert for Event Driven strategies (in house software)



Source: J.P. Morgan Asset Management.

J.P.Morgan Asset Management

Glossary of terms

- Normal backwardation is when the futures price is below the expected future spot price. This is desirable for speculators who are net long in their positions; they want the futures price to increase. Thus, normal backwardation is when the futures price is increasing
- Contango is when the futures price is above the expected future spot price. Because the futures price must converge on the expected future spot price, contango implies that future prices are falling over time as new information brings them into line with the expected future spot price
- Spot price is the current price at which a particular commodity, security or currency can be bought or sold at a specified time and place
- The maximum drawdown is the largest percentage drawdown that has occurred in any investment data record from peak to trough
- Beta is a measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the market as a whole. Beta is calculated using regression. A beta of one indicates that the security's price will move in line with the market. A beta less than one means that the security will be less volatile than the market. A beta greater than one indicates that the security's price will be more volatile than the market
- Alpha is the portion of an investment return arising from a specific (non-market) risk. It is an estimate of the amount of return expected from an investment's inherent values and is distinct from the amount of return caused by volatility, which is measured by beta
- Volatility is the characteristic of a security, commodity or market to rise or fall sharply in price within a short-term period. A measure of the relative volatility of a stock to the overall market is its beta
- Carry refers to return obtained from an asset (if positive) or cost of holding an asset (if negative). Carry is usually associated with a currency carry trade where an investor sells a certain low-yielding currency and uses the funds to buy a different currency yielding a higher interest rate. The strategy attempts to capture the difference between the rates

For illustrative and discussion purposes only.

Data source disclosure

Ref.	Asset/Factor	Data Source	Time Period of Use
1	US Equity/Equity	S&P500 Index (data prior to 1957 from CRSP database/Ibbotson)	January 1927 – March 2016
2	MSCI World/Equity Risk Premium	MSCI World Index (USD net)	January 1975 - March 2016
3	MSCI EM	MSCI Emerging Market Free Index (USD)	January 1991 - March 2016
4	Treasuries	Citigroup U.S 10 year Treasuries Index (data prior to 1980 from Ibbotson)	January 1927 - March 2016
5	WGBI/Bonds	Citigroup WGBI 7-10 year Index (USD)	January 1975 - March 2016
6	Credit/High Yield	Barclay Capital US High Yield Index (data prior to 1983 -Barclay Capital Intermediate Credit Index)	January 1975 - March 2016
7	EMBI	JPMorgan EMBI Global Index	January 1991 - March 2016
8	Commodities/GSCI	Goldman Sachs Commodity Index	January 1975 - March 2016
9	REITs	NAREIT Index	January 1991 - March 2016
10	Value	Kenneth French (1927-1990) , J. P. Morgan Asset Management GMAG (1990-2015)	January 1927 - March 2016
11	Momentum	Kenneth French (1927-1990) , J. P. Morgan Asset Management GMAG (1990-2015)	January 1927 - March 2016
12	Size/Small Cap	Kenneth French (1927-1990) , J. P. Morgan Asset Management GMAG (1990-2015)	January 1927 - March 2016
13	Low beta/minimum volatility	MSCI Minimum Volatility Index, J. P. Morgan Asset Management Global Multi-Asset Group	January 1991 - March 2016
14	Convertible bond arbitrage	UBS Global Focus Convertible Bond Index, J. P. Morgan Asset Management	January 1991 - March 2016
15	Systematic merger arbitrage	MergerStat, Bloomberg, J. P. Morgan Asset Management	January 1991 - March 2016
16	Long/Short G7 Term Premium	Citigroup WGBI Index for US, UK, EU, JP, J. P. Morgan Asset Management	January 1975 - March 2016
17	Carry/FI Carry	Citigroup WGBI Index for US, UK, EU, JP, J. P. Morgan Asset Management	January 1975 - March 2016
18	FX Forward Rate Bias	J. P. Morgan Asset Management Global Multi-Asset Group	January 1998 - March 2016
19	FX Momentum	J. P. Morgan Asset Management Global Multi-Asset Group	January 1998 - March 2016
20	Commodities Roll Yield	J. P. Morgan Asset Management Global Multi-Asset Group	January 1998 - March 2016
21	Commodities Momentum	J. P. Morgan Asset Management Global Multi-Asset Group	January 1998 - March 2016

Composite disclosures

Composite: Diversified Alternative Beta, as of 31st of August

JPMorgan Asset Management claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. JPMorgan Asset Management has been independently verified for the periods 1st January 1996 to 31st December 2010. 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. Additional information regarding policies for valuing portfolios, calculating performance and preparing compliant presentations are available upon request. HSBC Securities Services has verified JPMorgan Asset Management's claim of compliance with GIPS since 1st January 2001.

For the purposes of GIPS® compliance, the Firm is defined as the London JPMorgan, JPMorgan Japan and the JF (Hong Kong and Singapore) investment processes of JPMorgan Asset Management. Robert Fleming Holdings was acquired by the Chase Manhattan Corporation on 1st August 2000. The Chase Manhattan Corporation and JP Morgan and Co Incorporated merged with effect from 1st January 2001. A list of business entities represented by the above investment processes, and also full details of the acquisition and merger and their impact on the investment processes, are available upon request. The firm name was changed from JPMorgan Fleming Asset Management to JPMorgan Asset Management with effect from July 2005.

This composite consists of all diversified alternative beta portfolios that are managed according to the following rules. The portfolios are managed by Multi-Asset Solutions; they must include each of the following sub-strategies: equity long-short, merger arbitrage and macro based strategies; they have a volatility target around 5%; they should not explicitly seek to capture traditional beta exposure. It does not contain any returns that have been carved out of other multi asset class portfolios.

Name changed from Systematic Alpha on 24/06/13

The Benchmark of the composite is EUR 1 Month Libor. A complete list and description of all the firm's composites is available on request. The composite was constructed during December 2009. The composite inception date is July 2009.

Valuation and Calculation

The returns shown for this composite are the asset-weighted averages of the performance of all of the individual portfolios in the composite using beginning of period weightings. The performance results are time-weighted rates of return net of commissions, transaction costs and non-reclaimable withholding taxes. They have been presented gross of investment management fees (unless otherwise stated). All portfolios in this composite have been valued at least monthly to June 2005 and daily thereafter (excluding Hong Kong accounts which continue to be valued monthly), on a trade date basis using accrual accounting.

The dispersion is measured by the asset-weighted standard deviation of annual returns of those portfolios that are included in the composite for the full year. The dispersion of results are not shown where the number of accounts held during the period is less than five. Furthermore, there are no non-fee paying portfolios included within the composites and no known inconsistencies between the source of exchange rates used to calculate composite returns and those used to calculate the benchmark.

There are no known local laws and regulations which conflict with GIPS®.

JPMorgan Asset Management's (JPMAM) schedule of management fees payable in USD for systematic alpha clients is: 0.75% per annum.

Illustration showing impact of investment management fees:-

An investment of USD 1,000,000 under the management of JPMAM achieves a 10% compounded gross annual return for 10 years. If a management fee of 0.75% of average assets under management were charged per year for the 10 year period, the annual return would be 9.25% and the value of assets would be USD 2,422,225 net of fees and compared with USD 2,593,742 gross of fees. Therefore the investment management fee, and any other expenses incurred in the management of the portfolio, will reduce the client's return. Investment advisory fees are described in Part II of the advisor's Form ADV.

Footnotes

Back-tested Performance Limitation

Back tested performance results are shown for illustrative purposes only. Back tested performance results have many inherent limitations, some of which are described below. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between back-tested performance results and the actual results subsequently achieved by any particular trading program.

One of the limitations of back-tested performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. Also, since the trades have not actually been executed, the results may have over or under-compensated for the impact, if any, of certain market factors such as liquidity constraints. For example, the ability to withstand losses or to adhere to a particular trading program in spite of trading losses are material points which can also adversely affect actual trading results. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the preparation of back-tested performance results and all of which can adversely affect actual trading results.

The back-tested results are not meant to be representative of actual results achieved by the manager while investing in the respective strategies over the time periods shown. The back-tested performance calculations for the respective strategies are shown gross of fees. If fees were included returns would be lower. Unlike an actual performance record, they do not reflect actual trading, liquidity constraints, fees and other costs. Also, since the trades have not actually been executed, the results may have under-or-over compensated for the impact of certain market factors such as lack of liquidity. Simulated trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. These back-tested performance results do not take into consideration the ongoing implementation of the manager's proprietary investment strategies. When making investment decisions an investor should not rely on the back-tested performance.

The Target Return has been established by J.P. Morgan Investment Management Inc. "J.P. Morgan" based on its assumptions and calculations using data available to it and in light of current market conditions and available investment opportunities and is subject to the risks set forth herein and to be set forth more fully in the Memorandum. The target returns are for illustrative purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns similar to the target returns shown above. Because of the inherent limitations of the target returns, potential investors should not rely on them when making a decision on whether or not to invest in the strategy. The target returns cannot account for the impact that economic, market, and other factors may have on the implementation of an actual investment program. Unlike actual performance, the target returns do not reflect actual trading, liquidity constraints, fees, expenses, and other factors that could impact the future returns of the strategy. The manager's ability to achieve the target returns is subject to risk factors over which the manager may have no or limited control. There can be no assurance that the Fund will achieve its investment objective, the Target Return or any other objectives. The return achieved may be more or less than the Target Return. The data supporting the Target Return is on file with J.P. Morgan and is available for inspection upon request.

.

J.P. Morgan Asset Management

RISKS ASSOCIATED WITH INVESTING

Equity: The price of equity securities may rise or fall because of changes in the broad market or changes in a company's financial condition, sometimes rapidly or unpredictably. These price movements may result from factors affecting individual companies, sectors or industries selected for the portfolio or the securities market as a whole, such as changes in economic or political conditions. Equity securities are subject to "stock market risk" meaning that stock prices in general (or in particular, the prices of the types of securities in which a portfolio invests) may decline over short or extended periods of time. When the value of a portfolio's securities goes down, an investment in a fund decreases in value. There is no guarantee that the use of long and short positions will succeed in limiting the Fund's exposure to domestic stock market movements, capitalization, sector-swings or other risk factors. Investment in a portfolio involved in long and short selling may have higher portfolio turnover rates. This will likely result in additional tax consequences. Short selling involves certain risks, including additional costs associated with covering short positions and a possibility of unlimited loss on certain short sale positions. **Fixed Income:** Investments in bonds and other debt securities will change in value based on changes in interest rates. If rates rise, the value of these investments generally drops. Securities with greater interest rate sensitivity and longer maturities tend to produce higher yields, but are subject to greater fluctuations in value. Usually, the changes in the value of fixed income securities will not affect cash income generated, but may affect the value of your investment. Credit risk is the risk of loss of principal or loss of a financial reward stemming from a borrower's failure to repay a loan or otherwise meet a contractual obligation. Credit risk arises whenever a borrower is expecting to use future cash flows to pay a current debt. Such default could result in losses to an investment in your portfolio. **International/Emerging Markets :** International investing involves a greater degree of risk and increased volatility. Changes in currency exchange rates and differences in accounting and taxation policies outside the U.S. can raise or lower returns. Also, some overseas markets may not be as politically and economically stable as the United States and other nations. Investments that are concentrated in a single country or region are subject to the additional risk associated with a smaller number of issuers. International investing bears greater risk due to social, economic, regulatory and political instability in countries in "emerging markets." This makes emerging market securities more volatile and less liquid developed market securities. Changes in exchange rates and differences in accounting and taxation policies outside the U.S. can also affect returns. **Alternatives:** Investing in alternative assets involves higher risks than traditional investments and is suitable only for sophisticated investors. Alternative investments involve greater risks than traditional investments and should not be deemed a complete investment program. They are not tax efficient and an investor should consult with his/her tax advisor prior to investing. Alternative investments have higher fees than traditional investments and they may also be highly leveraged and engage in speculative investment techniques, which can magnify the potential for investment loss or gain. The value of the investment may fall as well as rise and investors may get back less than they invested. **Hedge Funds:** Hedge funds often engage in leverage, short-selling, arbitrage, hedging, derivatives, and other speculative investment practices that may increase investment loss. Hedge funds may be highly illiquid, are not required to provide periodic pricing or valuation information, and often charge high fees that may negatively impact performance. Additionally, hedge funds may involve complex tax structures that may delay the distribution of tax information.

J.P. Morgan Asset Management

Opinions, estimates, forecasts, and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. We believe the information provided here is reliable. These views and strategies described may not be suitable for all investors. References to specific securities, asset classes and financial markets are for illustrative purposes only and are not intended to be, and should not be interpreted as, recommendations. Past performance is no guarantee of future results.

There can be no assurance that the professionals currently employed by JPMAM will continue to be employed by JPMAM or that the past performance or success of any such professional serves as an indicator of such professional's future performance or success.

Any securities/portfolio holdings mentioned throughout the presentation are shown for illustrative purposes only and should not be interpreted as recommendations to buy or sell. A full list of firm recommendations for the past year are available upon request.

Past performance does not guarantee future results. Total returns assumes reinvestment of any income. The deduction of an advisory fee reduces an investor's return. Actual account performance will vary on individual portfolio security selection and the applicable fee schedule. Fees are available upon request.

The following is an example of the effect of compounded advisory fees over a period of time on the value of a client's portfolio: A portfolio with a beginning value of $100 million, gaining an annual return of 10% per annum would grow to $259 million after 10 years, assuming no fees have been paid out. Conversely, a portfolio with a beginning value of $100 million, gaining an annual return of 10% per annum, but paying a fee of 1% per annum, would only grow to $235 million after 10 years. The annualized returns over the 10 year time period are 10.00% (gross of fees) and 8.91% (net of fees). If the fee in the above example was 0.25% per annum, the portfolio would grow to $253 million after 10 years and return 9.73% net of fees. The fees were calculated on a monthly basis, which shows the maximum effect of compounding.

Securities may be sold through J.P. Morgan Institutional Investments Inc., member FINRA/SIPC.

J.P. Morgan Asset Management is the marketing name for the asset management businesses of JPMorgan Chase & Co. Those businesses include, but are not limited to, JPMorgan Chase Bank N.A., J.P. Morgan Investment Management Inc., Security Capital Research & Management Incorporated , J.P. Morgan Alternative Asset Management, Inc., and J.P. Morgan Asset Management (Canada), Inc.

Man

Man Alternative Risk Premia

Presentation to Alaska Retirement Management Board

www.man.com

Keith Haydon, Chief Investment Officer for Man Solutions Limited
Shanta Puchtler, Chief Executive Officer for Man Numeric
Christopher Gorgone, Managing Director US Institutional Sales, Man Group

May 2017

Important information

The value of an investment and any income derived from it can go down as well as up and investors may not get back their original amount invested. Alternative investments can involve significant additional risks.

This material is for information purposes only and does not constitute an offer or invitation to invest in any product for which any Man Group plc affiliate provides investment advisory or any other services. The content is not intended to constitute advice of any nature nor an investment recommendation or opinion regarding the appropriateness or suitability of any investment or strategy and does not consider the particular circumstances specific to any individual recipient to whom this material has been sent. Prior to making any investment decisions, investors should read and consider the fund's offering documents.

Opinions expressed are those of the author as of the date of their publication, and are subject to change.

Some statements contained in these materials concerning goals, strategies, outlook or other non-historical matters may be "forward-looking statements" and are based on current indicators and expectations at the date of their publication. We undertake no obligation to update or revise them. Forward-looking statements are subject to risks and uncertainties that may cause actual results to differ materially from those implied in the statements.

Distribution of this material and the offer of shares may be restricted and the minimum subscription amount may be higher in certain jurisdictions. The product(s) mentioned within this material (i) may not be registered for distribution in your jurisdiction, and (ii) may only be available to professional or otherwise qualified investors or entities. It is important that distributors and/or potential investors are able to ensure compliance with local regulations prior to making a subscription. Please refer to the offering documentation for additional information.

Unless stated otherwise the source of all information is Man Group plc and its affiliates as of the date on the first page of this material.

This material was prepared by Man Solutions Limited (company number 3385362) which is registered in England and Wales at One Curzon Street, London W1J 5HB. Authorized and regulated in the United Kingdom by the Financial Conduct Authority. This material is distributed pursuant to global distribution and advisory agreements by subsidiaries of Man Group plc. Specifically, in the following jurisdictions:

United States: To the extent this material is distributed in the United States it is communicated by Man Solutions Limited ("the Investment Manager"). The Investment Manager is registered as an investment advisor with the US Securities and Exchange Commission ("SEC"). The Investment Manager utilizes its affiliate, Man Investments Inc. ("Man Investments") to assist in the marketing of its investment services. To that end, in the US this material is presented by Man Investments. Man Investments is registered as a broker-dealer with the U.S. Securities and Exchange Commission ("SEC") and is a member of the Financial Industry Regulatory Authority ("FINRA") and the Securities Investor Protection Corporation ("SIPC"). The registrations and memberships above in no way imply a certain level of skill or expertise or that the SEC, FINRA or SIPC have endorsed the entities, products or services discussed herein.

Man Investments Inc., 452 Fifth Avenue, 26th floor, New York, NY 10018. Tel: (212) 649-6600. Member FINRA and SIPC.

Recipients of this material are deemed by the respective Marketing Entity to be investment professionals and/or qualified investors that have employed appropriately qualified individuals to manage their financial assets and/or are a financial services entity appointed by an investor to provide fiduciary advisory and/or portfolio management services in respect of their financial assets. Marketing Entities will provide prospective and existing investors with product and strategy information prepared by the Investment Manager and assist with queries regarding investment strategies and products managed by the Investment Manager but will not provide investment advice or personal investment recommendations, assess the suitability or appropriateness of any investment products and does not consider the particular circumstances specific to any individual recipient to whom this material has been sent nor engage in any activity which may be deemed to be "receipt and transmission of client orders" or "arranging deals" in investments.

Unless otherwise indicated, any performance shown is unaudited, net of applicable management, performance and other fees, and expenses, presumes reinvestment of earnings and excludes investor specific sales and other charges. Fees may be modified or waived for certain investors. Please refer to each Investment Product's individual Investment Documents for more information regarding an Investment Product's fees, charges and expenses, which will offset an Investment Product's gains. Performance may vary substantially from year to year or even from month to month. An investor's actual performance and actual fees may differ from the performance information shown due to, among other factors, capital contributions and withdrawals/redemptions, different share classes and eligibility to participate in "new issues." The value of investments can go down as well as up.

This information is qualified in its entirety by the information that would be contained in any or all Investment Products' governing investment documents or confidential offering documents, including an offering memoranda or managed account agreements, as the case may be (collectively, the "Investment Documents"). Any offer or solicitation of an investment in an Investment Product may be made only by delivery of an Investment Product's Investment Documents to qualified investors. Prospective investors should rely solely on the Investment Documents in making any investment decision. The Investment Documents contain important information and should be read carefully before any investment decision is made. This material does not take into account the particular investment objectives, restrictions, or financial, legal or tax situation of any specific investor. An investment in an Investment Product is not suitable for all investors.

Introduction to Man Alternative Risk Premia

Portfolio Construction and Risk Management

Appendix

Biographies

Keith Haydon is Chief Investment Officer of Man Solutions Limited ('MSL'), based in London, and a member of Man Group's Executive Committee. He also heads up FRM's Investment Committee. Keith is responsible for investment policy and oversight of FRM portfolios. Prior to this he spent seven years as Deputy CIO managing segregated portfolios, working with large institutional clients. Before joining FRM in 2004, Keith held positions as a multi-asset macro proprietary trader at Morgan Stanley, HSBC and Deutsche Bank. Keith holds a BA in History from the University of Cambridge.

Shanta Puchtler is President and CEO of Man Numeric ('Numeric'). He was named CEO in January 2017 and President in January 2016. He is also a member of the Man Group Executive Committee. Formerly, he was Chief Investment Officer and Head of Research at Numeric, directing research efforts focused on new alpha sources, product design, and risk modeling. He joined Numeric in 1999 as a research analyst. Prior to joining Numeric, Shanta was an electronic commerce technology analyst at Forrester Research, a Cambridge-based market research firm. He also co-founded an electronic commerce company which focused on the analysis of on-line buying behavior. Prior to that, Shanta worked as a management consultant and taught at private schools in the US and Asia. Shanta received a B.A. in Computer Science from Dartmouth College, graduating Summa Cum Laude, and is a CFA charterholder.

Christopher Gorgone is Managing Director on the US Institutional Sales team. He joined Man Group in 2014 and is responsible for the formation and growth of the firm's US institutional investor base. Prior to Man Group, he was a Senior Vice President at Trian Partners, a $10 billion activist equity fund managed by Nelson Peltz. He previously served as a Vice President at Balestra Capital in their business development group, where he was responsible for development the firm's global institutional investor base. In 2009, Mr. Gorgone worked for the U.S Department of the Treasury in Washington DC under the direction of Secretary Timothy F. Geithner on all mortgage finance and TARP related initiatives. Prior to the Treasury, he worked as an Analyst at Lehman Brothers in its Securitization and Global Real Estate Group. Mr. Gorgone attended Providence College where he received a Bachelor of Arts degree and holds his FINRA Series 7, 63, and NFA Series 3 licenses.

An overview of Man Group[1]

Entrepreneurial fund management within an institutional framework

- A technology-empowered active investment management firm focused on delivering superior performance and client solutions
- Individual performance-driven investment businesses with centralised operations and services, providing a diverse range of strategies across investment approaches, styles and assets classes, managing around USD 88.7 billion[1]
- Large institutional client base, including endowments, insurance companies and pension funds
- Headquarters in London, with offices in every major region
- Actively engaged industry leader and founding member of the Hedge Fund Standards Board

Man AHL

- Systematic investment manager
- Offering absolute return and long only quantitative funds
- Pioneer in systematic trading for over 30 years
- AUM USD 18.8 billion
- Founded in 1987
- 120 researchers
- 153 investment professionals

Man numeric investors

- Fundamentally driven quantitative asset manager
- Offering long-only, active extension, and hedged equity strategies across regions, styles, and capitalisations
- Focus on risk adjusted alpha
- AUM USD 24.7 billion[2]
- Founded in 1989
- 33 investment professionals

Man glg

- Discretionary investment manager
- Offering absolute return and long only funds across asset classes, sectors and geographies
- Investment teams benefit from a collaborative environment and are unconstrained by a house view
- AUM USD 28.8 billion
- Founded in 1995
- 129 investment professionals

Man FRM

- Global alternative investment specialist
- Offering customised/advisory solutions, a leading managed account platform and commingled strategies
- Open architecture, full service hedge fund platform
- AUM USD 14.5 billion
- Founded in 1991
- 41 investment professionals

Man Global Private Markets

- Private markets investment unit with teams specialising in unlisted real estate debt, equity investment strategies, corporate credit, direct real estate investing and private lending
- Differentiated risk and return characteristics to public market investments
- AUM USD 1.9 billion[3]
- Man GPM Aalto specialises in real assets while Man GPM Bridge Lane engages in middle market private lending
- 17 investment professionals

1. As of March 31, 2017. Throughout this presentation reference to “Man” refers to all Man Group plc and its subsidiaries. Combined AUM of all affiliated Man investment managers. All investment management services are offered through Man affiliated investment managers. 2. Man Numeric firm total AUM is USD 25.2 billion, including approximately USD 530 million allocation from internal Man clients. 3. The assets under management total contains certain assets for which Aalto is compensated for supervisory services but not investment advice. Additionally, the assets under management total includes approximately USD 95 million in assets of two value equity strategy funds that were ”disposed of” subsequent to 31 March 2017.

Man Alternative Risk Premia*

Overview

Aims to offer access to a diversifying return stream in a highly transparent, liquid and cost-effective manner

Investment Approach

- **Multi-premia, multi-strategy, multi-asset approach**
- Allocates across four alternative risk premia: Momentum, Carry, Value and Defensive
- Systematic trading strategies with **multi-level risk management** and controls

Value Proposition

- Targets **8% volatility and net returns of 6-7%** [1]
- Multi-strategy approach seeks to allow for **performance across varied market conditions**
- Aims to be **uncorrelated** to traditional assets; potential diversifier for other style investments
- Management fee only and continuous **fiduciary oversight**

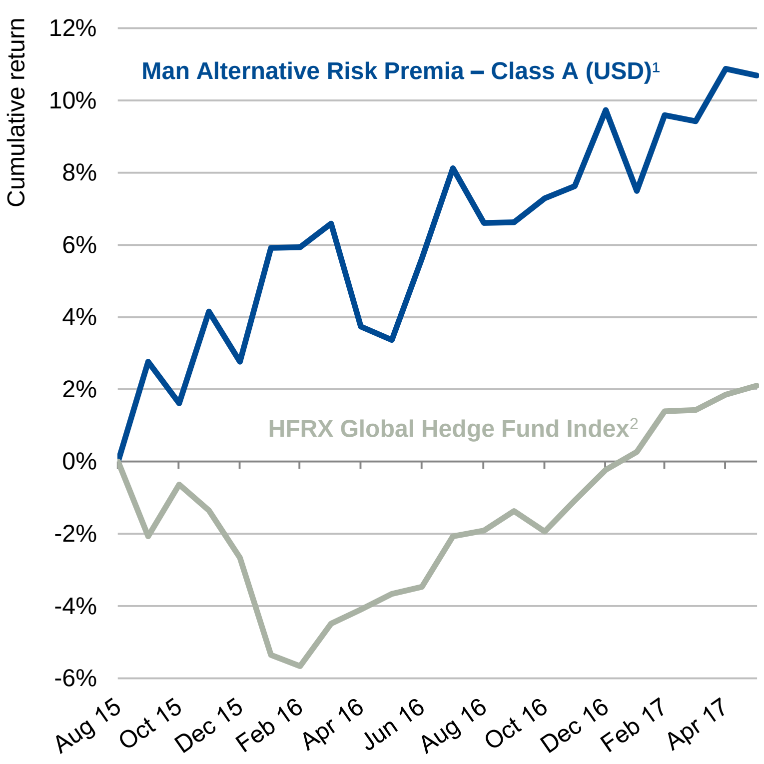
Why Man?

- **Long history** of researching, implementing and executing alternative risk premia
- Leverages one of the world's largest quantitative R&D groups into alternative risk premia investing
- Seeks **trading cost containment** via in-house systematic execution platform

1. The limits and/or targets illustrate the Investment Manager's current intentions, and are subject to change without notice. Target volatility will vary across solutions – please refer to slide 20 for more details. Any descriptions involving investment process, portfolio characteristics, investment strategies, goals or risk management are provided for illustration purposes only, are not complete, will not apply in all situations, may not be fully indicative of any present or future investments and may be changed in the discretion of the Investment Manager. No representation is made that the Investment Manager's or the Fund's investment process, investment strategies, goals or risk management techniques will or are likely to be achieved or successful. See Important Information at the beginning and end of this document. ***The investment manager for Alternative Risk Premia is Man Solutions Limited.**

Track record

Inception (September 11, 2015) to May 31, 2017



	Man Alternative Risk Premia – Class A (USD)[1]	HFRX Global Hedge Fund Index[2]
Annualized return	**6.1%**	1.2%
Annualized volatility	**5.8%**	3.8%
Sharpe Ratio[3]	**0.92**	0.11
Beta to MSCI World[2]	**-0.14**	0.33
Beta to Barclays Capital Global Agg. Bond Index[2]	**-0.01**	0.01
Maximum drawdown	**-3.0%**	-5.7%

Monthly Returns (%)[1]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
2017	-2.05	1.96	-0.15	1.33	-0.17								**0.87**[4]
2016	3.07	0.02	0.62	-2.68	-0.36	2.18	2.36	-1.40	0.01	0.63	0.31	1.96	**6.78**
2015									2.76	-1.12	2.51	-1.34	**2.77**[4]

1. Past performance is not indicative of future results. Returns may increase or decrease as a result of currency fluctuations. Man Alternative Risk Premia SP – Class A USD. Performance data is shown net of the maximum 1% management fee with income reinvested, and does not take into account sales and redemption charges where such costs are applicable. 2. The indices shown are not benchmarks and are not representative of the Fund's investment strategy. The information is shown for comparison purposes only. 3. Sharpe ratio is a measure of risk-adjusted performance that indicates the level of excess return per unit of risk. It is calculated using the risk-free rate in the appropriate currency over the period analysed. Where an investment has underperformed the risk-free rate, the Sharpe ratio will be negative. As the Sharpe ratio is an absolute measure of risk-adjusted return, negative Sharpe ratios can be misleading and are therefore shown as n/a. 4. Part year.
Source: Man Database and Bloomberg.

Introduction to Man Alternative Risk Premia

Portfolio Construction and Risk Management

Appendix

Multi-Asset Approach

Diversification and Low correlation

Investment Strategies

	Strategy[1]	Investment Aim	Strategy Experience
MOMENTUM	Momentum	Seeking to capture trend following momentum across multiple markets	1987
CARRY	FX Carry	Seeking to capture FX carry risk premium across developed markets	1992
	EM FX Carry	Seeking to capture risk premium from FX carry in emerging market currencies	1992
	Fixed Income	Seeking to capture risk premium associated with yield curve carry	2007
	Volatility	Seeking to capture risk premium associated with volatility surfaces	2006
VALUE	Equity Value	Seeking to capture equity risk premium arising from valuation inefficiencies	1989
	Equity Size	Seeking to capture small cap and quality premia across developed markets	2010
DEFENSIVE	Low Beta	Seeking to capture risk premium associated with low beta stocks	2014

Low Inter-Strategy Correlation (Simulation)[1]

	Moment.	FX Carry	EM FX Carry	Volatility	Fixed Income	Equity Value	Equity Size	Low Beta
Moment.	1.00	(0.05)	(0.09)	(0.19)	0.24	0.14	0.15	0.18
FX Carry	(0.05)	1.00	0.75	0.57	0.12	0.15	(0.22)	0.10
EM FX Carry	(0.09)	0.75	1.00	0.64	0.11	0.12	(0.15)	0.10
Volatility	(0.19)	0.57	0.64	1.00	(0.03)	0.22	(0.31)	0.21
Fixed Income	0.24	0.12	0.11	(0.03)	1.00	0.04	(0.14)	0.27
Equity Value	0.14	0.15	0.12	0.22	0.04	1.00	0.02	0.03
Equity Size	0.15	(0.22)	(0.15)	(0.31)	(0.14)	0.02	1.00	(0.06)
Low Beta	0.18	0.10	0.10	0.21	0.27	0.03	(0.06)	1.00

1. July 1, 2006, to March 31, 2017. See slide 11 for full strategy names. The simulated track record has been created by 'back testing' a systematic trading models to historic data. The simulated track record is subject to change without notice as models develop over time. It does not represent actual performance of the Fund/Strategy and it should not be used as a guide to the future. It is shown for comparison purposes only. Returns are calculated gross of fees. This approach has inherent limitations, including that results will not reflect the impact material economic and market factors might have had on the investment manager's decision-making and/or the application of any trading models had the strategy been managed throughout the period over which the synthetic performance is illustrated. It has been designed with the benefit of hindsight and since the trades have not been executed, the published results may have under-or-over compensated for the impact, if any, of certain market factors, such as lack of liquidity.
Any descriptions or information involving investment process or strategies are provided for illustration purposes only, may not be fully indicative of any present or future investments, may be changed at the discretion of the investment manager and are not intended to reflect performance. There is no guarantee of trading performance and past performance is no indication of current or future performance/results. See Important Information at the beginning and end of this document.

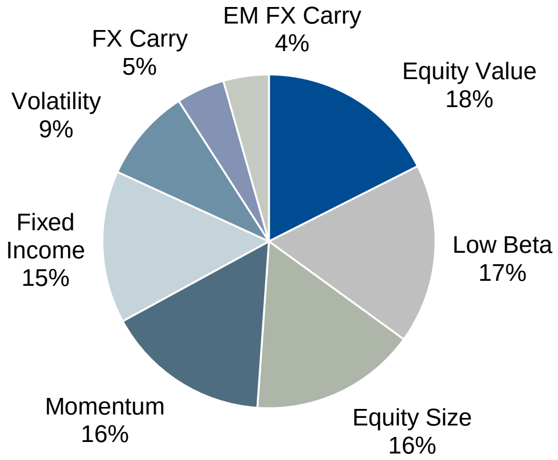
Source: Man Database.

Portfolio allocations

Risk budget equally distributed

Risk Allocations

- **Proportional allocations for risk parity**
- **Highly correlated strategies are grouped together, e.g. FX Carry, EM FX Carry and Volatility**



Portfolio Allocation

1 Model Portfolio Weights

- Strategy allocations are calculated to add equal amounts of risk (rather than capital)
- Make adjustment for highly correlated strategies

2 Review and rebalance

- Continuous review of performance, risks and exposures
- Weekly rebalancing to target strategy allocations

As of March 31, 2017.
Any descriptions or information involving investment process or strategies is provided for illustration purposes only, may not be fully indicative of any present or future investments, may be changed in the discretion of the investment manager and are not intended to reflect performance. Portfolio allocations are selected by, and will vary in the sole discretion of, the Fund's investment manager and are subject to availability and market conditions, among other things. Operational cash not shown. See Important Information at the beginning of this document.
Source: Man Group Database.

Aims to capture equity risk premium arising from valuation inefficiencies

Explanations for Style Premium

- Mispricing of equities can arise from market inefficiencies, such as:
  - Stocks prices fluctuate more than the underlying information set
  - New significant information may not be perfectly priced

Investment Characteristics

- Positive historical performance in crises
- Aims to provide returns that are uncorrelated to traditional asset classes

Investment Approach

- Seeks to harvest returns investing across the 500 most liquid global large cap stocks
- For each stock, a signal is created which comprises five complementary fundamental models (see chart)
- Model weights vary by stock and are determined by proprietary algorithms
- Combined, normalized score for each stock is generated; stocks are then ranked and traded accordingly

Fundamental Analysis of Equities

VALUATION

Aims to identify stocks that are attractively valued relative to peers

Model Components

- **Fair Value**
  Forward-looking model analyzing future earnings of a company
- **Alternative Value**
  Focus on capital structure and company life cycle

INFORMATION FLOW

Aims to systematically capture the behavior and sentiment that surrounds a company

Model Components

- **Quality of Earnings**
  Studies management actions
- **Momentum**
  Analyzes investor sentiment that surrounds industry peers and competitors
- **Informed Investor**
  Incorporates actions of other, informed investors

Combined Signal

Schematic illustration. Any descriptions or information involving investment process or strategies are provided for illustration purposes only, may not be fully indicative of any present or future investments, may be changed at the discretion of the investment manager and are not intended to reflect performance. There is no guarantee of trading performance and past performance is no indication of current or future performance/results. See Important Information at the beginning and end of this document.

Source: Man Database.

Man Alternative Risk Premia

Momentum Strategy

Aims to capture alternative risk premium associated with simple trend following models

MOMENTUM

CARRY

VALUE

DEFENSIVE

Explanations for Momentum Premium

- Slow dissemination and under-reaction to information
- Long-term macro cycles (policy and business cycle)
- Behavioral biases – investors look for confirmation of an investment thesis from others before investing

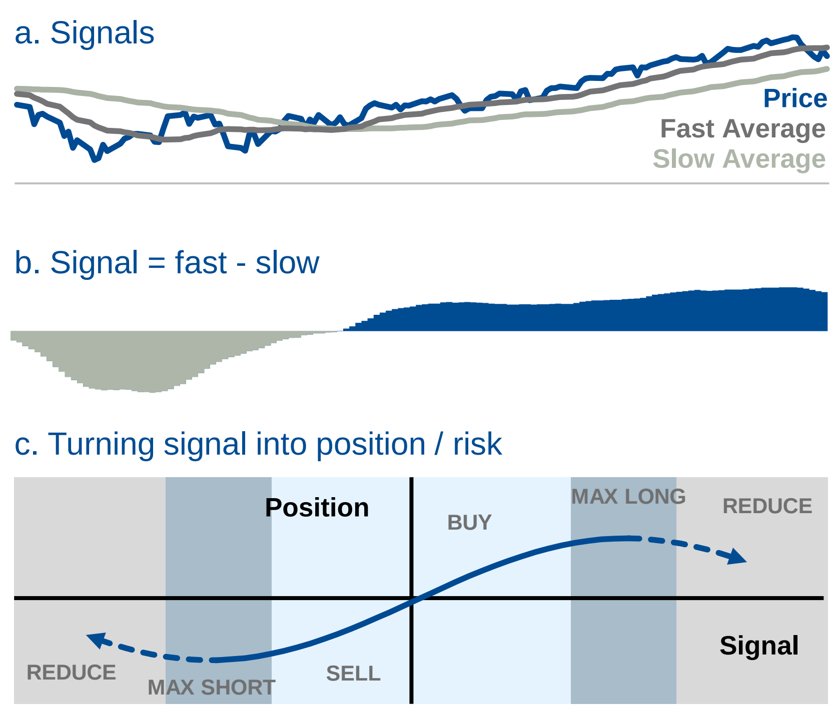
Investment Characteristics

- Positive historical performance in crises
- Potential to provide diversification benefits to portfolios in rising and falling equity markets

Investment Approach

- Aims to capture trends across multiple sectors, markets and timeframes – seeks to benefit from both up and down trends
- Trends are calculated using moving averages and breakout signals
- Market positions take into account signal strength, short term market volatility, liquidity and correlations

Illustration of Signal Generation



Schematic illustration. Any descriptions or information involving investment process or strategies are provided for illustration purposes only, may not be fully indicative of any present or future investments, may be changed at the discretion of the investment manager and are not intended to reflect performance. There is no guarantee of trading performance and past performance is no indication of current or future performance/results. See Important Information at the beginning and end of this document.

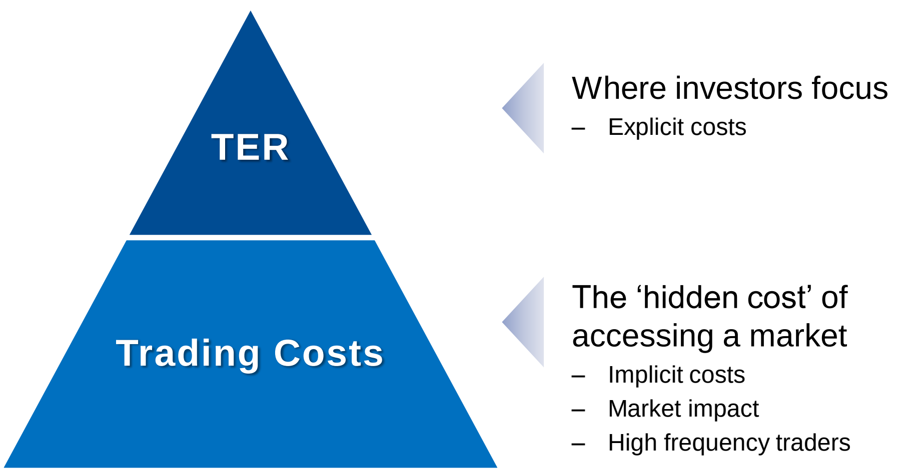
Source: Man Database.

Trading execution

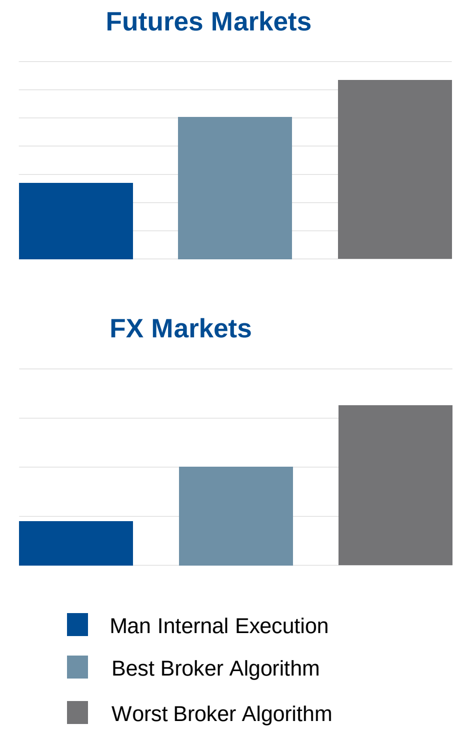
In-house trading platform seeks to protect clients' returns from hidden costs

- Man has almost **three decades of experience** in developing systematic trading methodologies
- Institutional scale helps sustain investment in robust **in-house developed global execution systems**
- Continuous R&D to help improve platform and rigorous **benchmarking** with external brokers

Why Execution Matters: Total Cost of Accessing a Market



Man's Execution Costs[1]



1. Represents slippage based on one of Man AHL's Flagship Programs using Momentum. Man AHL executes futures and FX flow using algorithms developed internally since 2002. External broker algorithms largely used for benchmarking Man AHL's Alpha Program's futures slippage yield is the realized annual cost during 2014 since inception on 3/3/2014, executed as part of strategies with AUM of USD 4.2bn. Man AHL executes a random portion of its trades using four broker algorithms for benchmarking purposes. The algorithmic slippage is the realized slippage of broker algorithms for Equities, FX and Fixed Income and reported broker realised slippage for Fixed Income and Commodities. Any descriptions or information involving investment process or strategies is provided for illustration purposes only, may not be fully indicative of any present or future investments, may be changed in the discretion of the investment manager and are not intended to reflect performance. See Important Information at the beginning and end of this document.

Source: Man Database.

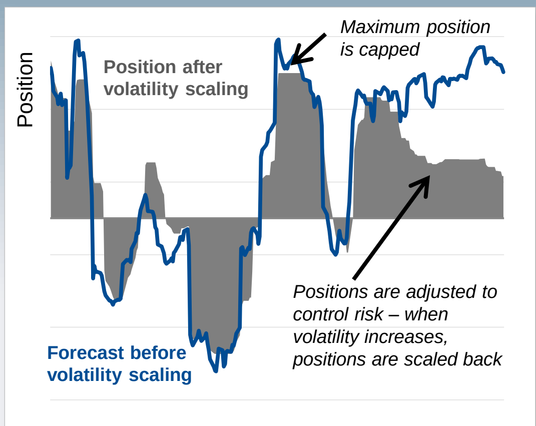
Multi-layered risk management

From strategy design to portfolio oversight

Man

Strategy Construction

Example risk control: volatility scaling



- Risk management is built into the core design of all strategies
- Daily reconciliation of system responses
- Strategy specific overrides aim to adjust appropriately for foreseen events

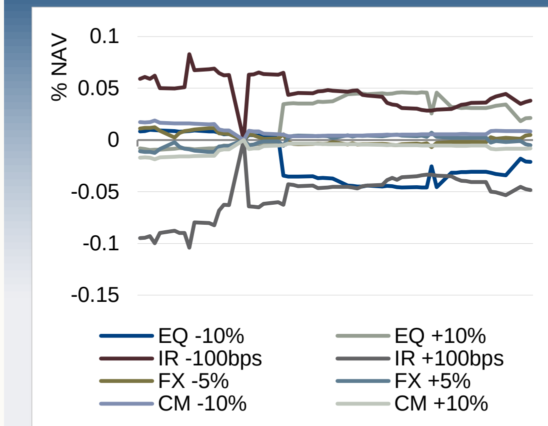
Strategy Oversight

Example risk reports for each strategy

- Daily risk monitoring of each strategy by independent Risk teams embedded within Man's investment businesses
- Margin-to-equity, gross exposure, liquidity and implied volatility monitored
- Realized return compared to tolerances and expectations

Portfolio Oversight

Portfolio stress test



- Portfolio is monitored for known extreme environments resulting in rare intervention
- Check that factor analysis, stress testing and VaR estimates are in line with expectations
- Independent oversight by the Man Risk Committee

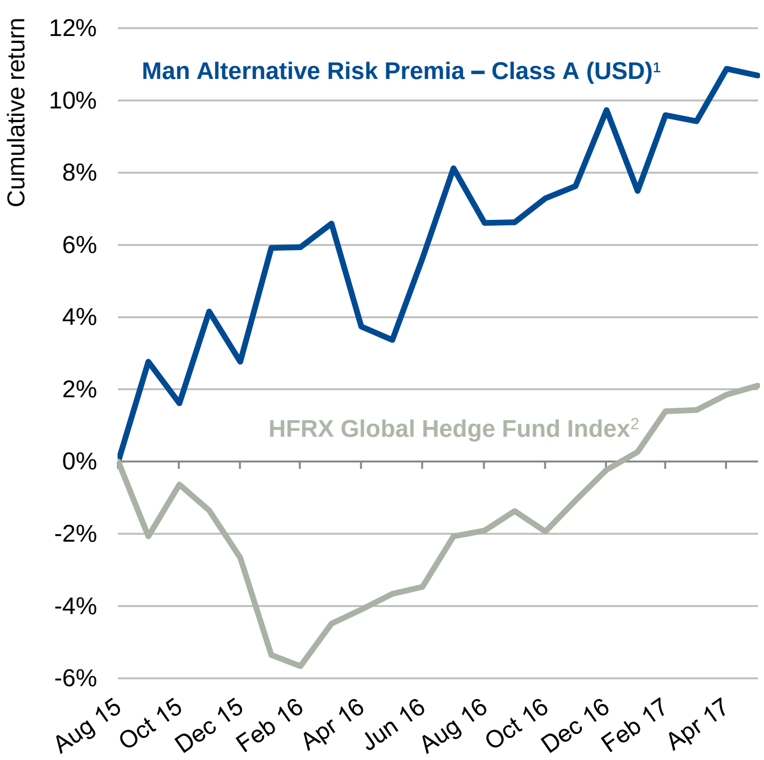
Illustrative examples – for information only. Any descriptions or information involving investment process or strategies is provided for illustration purposes only, may not be fully indicative of any present or future investments, may be changed in the discretion of the investment manager and are not intended to reflect performance. See Important Information at the beginning and end of this document.

Source: Man Database.

Man Alternative Risk Premia

Summary

Inception (September 11, 2015) to May 31, 2017



Why Man Alternative Risk Premia?

- **Multi-premia, multi-strategy, multi-asset approach**
- Targets **8% return volatility and net returns of 6-7%**[1]
- Aims to be **uncorrelated** to traditional assets; potential diversifier for other style investments
- **Liquid** and **low cost access**

	Man Alternative Risk Premia – Class A (USD)[1]	HFRX Global Hedge Fund Index[2]
Annualized return	**6.1%**	1.2%
Annualized volatility	**5.8%**	3.8%
Sharpe Ratio[3]	**0.92**	0.11
Beta to MSCI World[2]	**-0.14**	0.33
Beta to Barclays Capital Global Agg. Bond Index[2]	**-0.01**	0.01
Maximum drawdown	**-3.0%**	-5.7%

1. Past performance is not indicative of future results. Returns may increase or decrease as a result of currency fluctuations. Man Alternative Risk Premia SP – Class A USD. Performance data is shown net of the maximum 1% management fee with income reinvested, and does not take into account sales and redemption charges where such costs are applicable. 2. The indices shown are not benchmarks and are not representative of the Fund's investment strategy. The information is shown for comparison purposes only. 3. Sharpe ratio is a measure of risk-adjusted performance that indicates the level of excess return per unit of risk. It is calculated using the risk-free rate in the appropriate currency over the period analysed. Where an investment has underperformed the risk-free rate, the Sharpe ratio will be negative. As the Sharpe ratio is an absolute measure of risk-adjusted return, negative Sharpe ratios can be misleading and are therefore shown as n/a. 4. Part year.
Source: Man Database and Bloomberg.

Introduction to Man Alternative Risk Premia

Portfolio Construction and Risk Management

Appendix

Aims to capture risk premium associated with yield curve carry

MOMENTUM | CARRY | VALUE | DEFENSIVE

Explanations for Yield Curve Carry Premium

- Directional carry: Investors require compensation for locking up their capital for longer periods of time to compensate for the risk of inflation surprises (for example)
- Cross country carry: different yield levels between countries reflect varying degrees of risk premium to compensate for differentials in sovereign credit risk and inflation risk

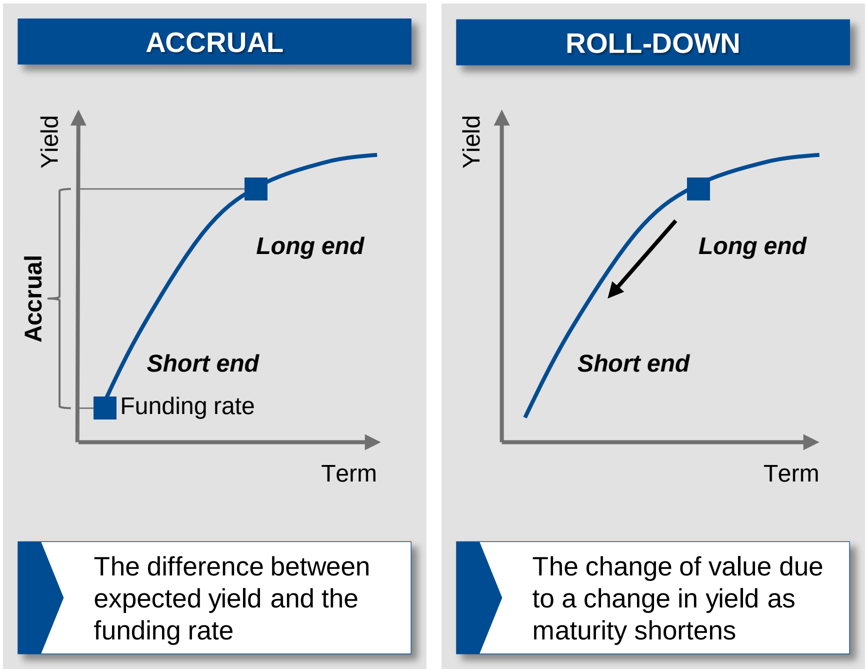
Investment Characteristics

- Effective tool for targeting specific market exposures in balanced manner
- Complementary to other alternative risk premia strategies such as FX carry, momentum and equity factor strategies

Investment Approach

- Trades two separate sub-strategies – directional carry and cross country carry
- Binary signal is calculated ensuring that strategy is either long or short in each market
- All bond markets are accessed via long/short futures contracts

Illustration of Carry



Schematic illustration. Any descriptions or information involving investment process or strategies are provided for illustration purposes only, may not be fully indicative of any present or future investments, may be changed at the discretion of the investment manager and are not intended to reflect performance. There is no guarantee of trading performance and past performance is no indication of current or future performance/results. See Important Information at the beginning and end of this document.
Source: Man Database.

Man Alternative Risk Premia

FX Carry Strategy

Aims to capture FX carry risk premium across liquid developed market currencies

MOMENTUM | CARRY | VALUE | DEFENSIVE

Explanations for Developed Market FX Carry Premium

- Seeks to exploit well-known "forward premium anomaly" in foreign exchange markets
- Currencies paying high interest rates tend to appreciate relative to currencies paying low interest
- Historically some currencies have higher yields to reflect a risk premium on the stability of the underlying economy

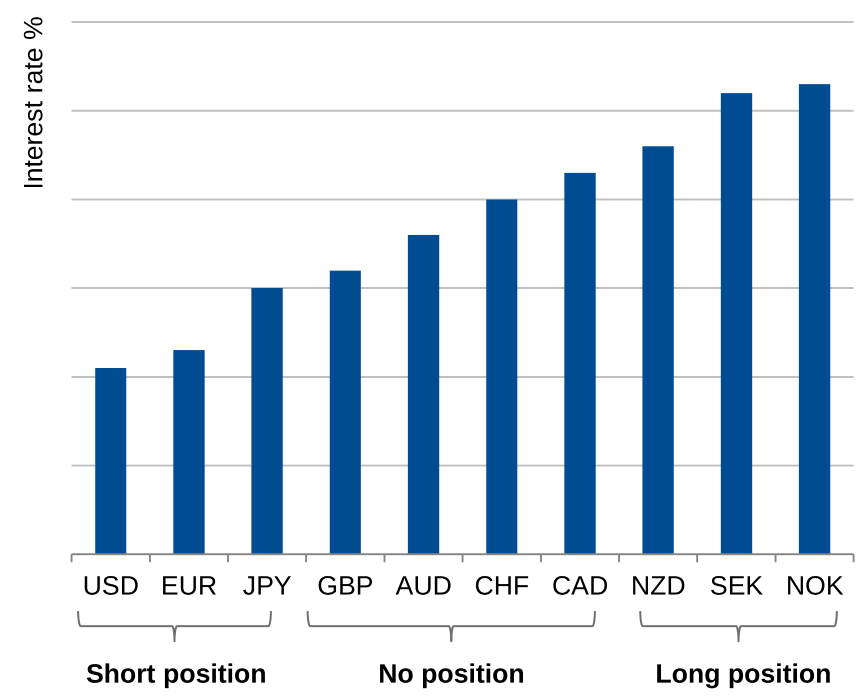
Investment Characteristics

- Over the long term, FX carry as a source of return is well established
- Complementary to other alternative risk premia strategies such as momentum and commodity carry

Investment Approach

- Strategy ranks world's 10 most liquid currencies in order of their interest rates
- Long exposures are taken in 3 high yielding currencies, funded by shorting 3 low yielding currencies
- The 9 resulting cross rates are accessed via forwards contracts

Illustration of Currency Exposures



Schematic illustration. Any descriptions or information involving investment process or strategies are provided for illustration purposes only, may not be fully indicative of any present or future investments, may be changed at the discretion of the investment manager and are not intended to reflect performance. There is no guarantee of trading performance and past performance is no indication of current or future performance/results. See Important Information at the beginning and end of this document.

Source: Man Database.

Aims to capture risk premium from FX carry in emerging market ('EM') currencies

MOMENTUM | **CARRY** | VALUE | DEFENSIVE

Explanations for EM FX Carry Premium

- EM economies exhibit more GDP growth over the long term than the largest developed economies
- Given the strong tie between growth and the demand for domestic currency, EM currencies appreciate on a relative basis against developed market ('DM') currencies
- Typically the yield in EM currencies reflects a risk premium for uncertainty about the structures of markets in EM countries

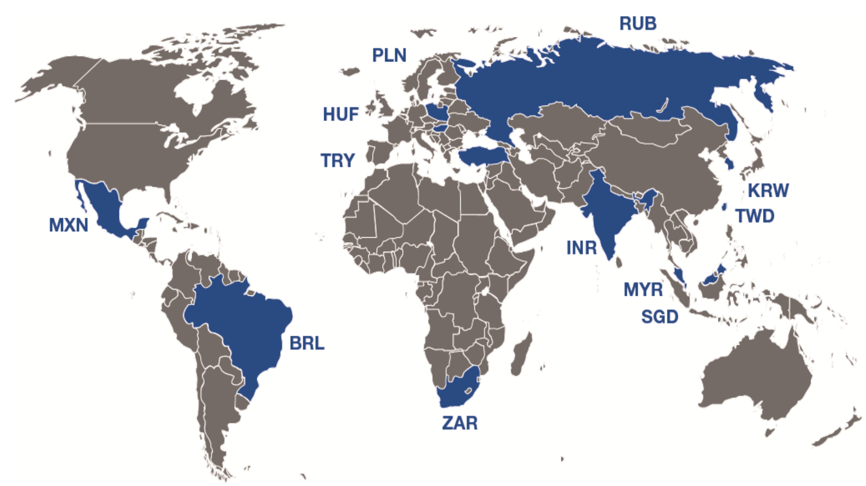
Investment Characteristics

- Over the long term, FX carry as a source of return is well established
- Complementary to other alternative risk premia strategies such as momentum and commodity carry

Investment Approach

- Emerging market currencies ranked by turnover; any tightly controlled low volatility regimes are removed
- Long position is taken in 12 most liquid emerging market currencies, funded by shorting the USD, EUR and JPY
- Combination of 12 EM currencies and 3 EM currencies creates 36 cross rates, accessed via forward contracts

EM Currencies Traded[1]



Schematic illustration. Any descriptions or information involving investment process or strategies are provided for illustration purposes only, may not be fully indicative of any present or future investments, may be changed at the discretion of the investment manager and are not intended to reflect performance. There is no guarantee of trading performance and past performance is no indication of current or future performance/results. See Important Information at the beginning and end of this document.

1. As of September 1, 2015. The list of currencies traded is reviewed periodically.

Source: Man Database.

Man Alternative Risk Premia

Equity Size Strategy

Aims to capture alternative risk premium associated with size and quality equity styles

MOMENTUM | CARRY | **VALUE** | DEFENSIVE

Explanations for Size and Quality Premia

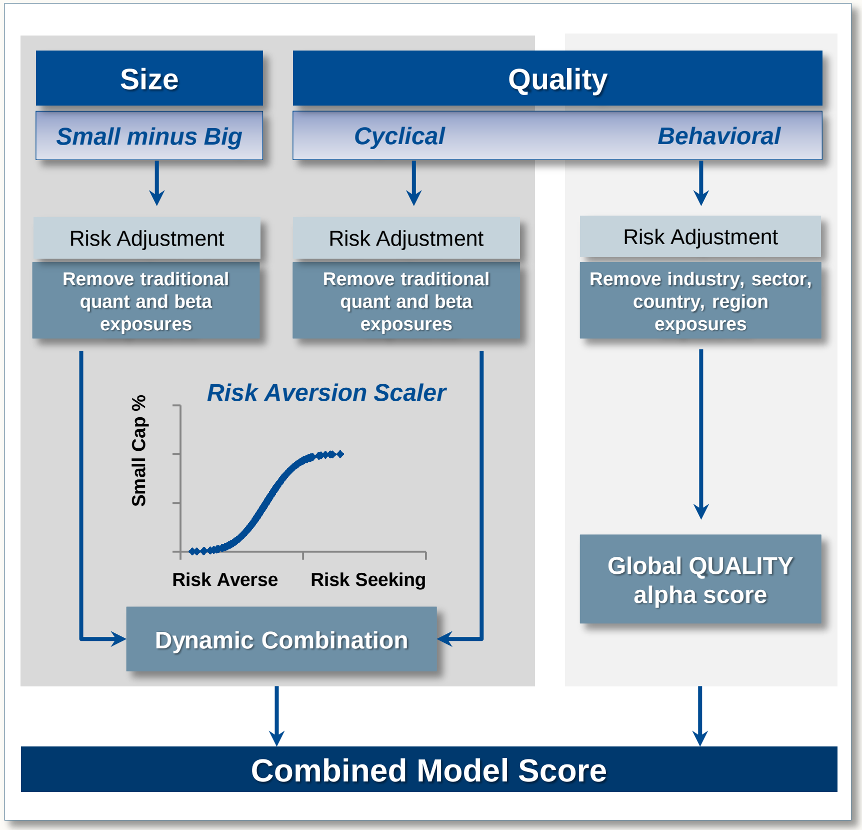
- Small cap historically carries a higher risk premium than large cap and can potentially benefit in risk-seeking markets
- 'Cyclical' quality historically performs better when markets are risk averse
- 'Behavioral' quality historically performs well across market cycles

Investment Characteristics

- Positive historical performance in crises
- Complementary to traditional value/momentum driven strategies

Investment Approach

- Aims to capture a 'safe' size premium, leveraging the complementary nature of size and quality
- Quality is defined to include both 'cyclical' and 'behavioral' components
- Risk adjustments aim to minimize undesired exposures, and remove any 'traditional' quant overlap
- Time-varying risk aversion is used for dynamic weighting between 'small' and 'quality'



Schematic illustration. Any descriptions or information involving investment process or strategies are provided for illustration purposes only, may not be fully indicative of any present or future investments, may be changed at the discretion of the investment manager and are not intended to reflect performance. There is no guarantee of trading performance and past performance is no indication of current or future performance/results. See Important Information at the beginning and end of this document.

Source: Man Database.

Man Alternative Risk Premia

Volatility Strategy

Aims to capture risk premium associated with volatility surfaces

MOMENTUM
CARRY
VALUE
DEFENSIVE

Explanations for Volatility Premium

- "Forward Variance Risk Premium": Tendency for the VIX futures forward curve to maintain a natural contango shape
- Reflects heightened uncertainty associated with distant delivery dates

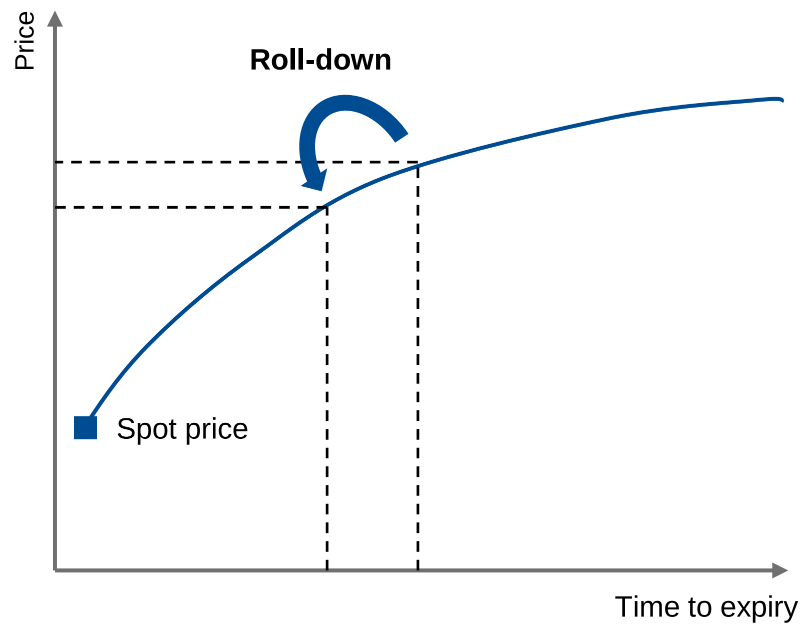
Investment Characteristics

- Premium has existed over time and is well documented in academic literature
- Liquid strategy; not heavily constrained by capacity
- Complementary to traditional value/momentum driven strategies

Investment Approach

- Strategy takes short positions in VIX futures seeking to capture roll-down from the VIX futures curve
- Focus on part of futures curve that is steep and most liquid
- Targets a constant exposure to volatility and a stable risk profile over time

Illustration of Futures Curve in Contango



Schematic illustration. Any descriptions or information involving investment process or strategies are provided for illustration purposes only, may not be fully indicative of any present or future investments, may be changed at the discretion of the investment manager and are not intended to reflect performance. There is no guarantee of trading performance and past performance is no indication of current or future performance/results. See Important Information at the beginning and end of this document.

Source: Man Database.

Aims to capture risk premium associated with low beta stocks

MOMENTUM

CARRY

VALUE

DEFENSIVE

Explanations for Low Beta Premium

- Leverage restrictions: High return seekers prefer high beta; low beta cannot be levered up freely
- Benchmarking: Traditional active hedge fund managers may overpay as they take on more risk in the pursuit of benchmark outperformance
- Behavioral: Investors may overpay for growth or "home run" option

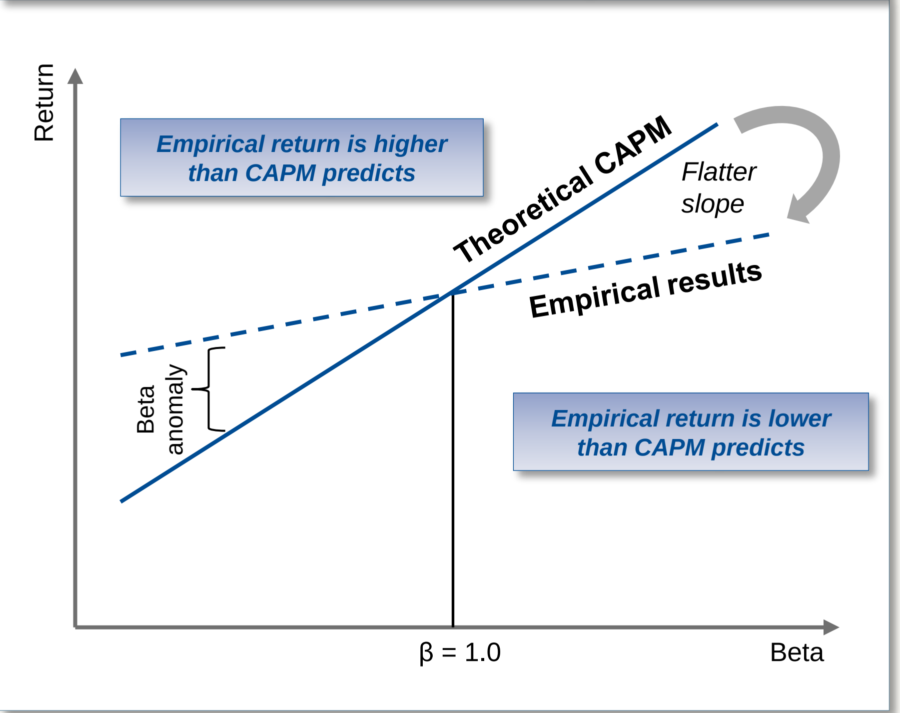
Investment Characteristics

- Low historical correlation to traditional equity markets
- Liquid strategy; not heavily constrained by capacity
- Complementary to traditional value/momentum driven strategies

Investment Approach

- Strategy utilizes proprietary statistical models to estimate the beta of stocks
- Shorts high beta stocks and buys low beta stocks, applying leverage in seeking to increase the expected return

Illustration of Flattened Security Market Line



Schematic illustration. Any descriptions or information involving investment process or strategies are provided for illustration purposes only, may not be fully indicative of any present or future investments, may be changed at the discretion of the investment manager and are not intended to reflect performance. There is no guarantee of trading performance and past performance is no indication of current or future performance/results. See Important Information at the beginning and end of this document.

Source: Man Database.

Important disclosures

General

Opinions, estimates and projections in this presentation constitute the current judgment of the authors as of the date of this report and are subject to change without notice. Man Solutions Limited or its affiliates ("Man") has no obligation to update, modify or amend this report or otherwise notify the recipient thereof in the event that any matter stated herein, or any opinion, projection, forecast or estimate set forth herein, changes or subsequently becomes inaccurate. You are not authorized to, and must not disclose, copy or distribute this report or any part of it. It should be noted that this report should not be construed as an offer or a solicitation of an offer to buy interests/shares in any investment fund managed by Man (the "Funds"). Any such offer will be made only to qualified investors by means of an offering memorandum and other operative documents, and only in those jurisdictions where permitted by law. This report should not be considered a recommendation to purchase or sell any particular security nor should its contents be construed as legal, tax, investment or other advice. Individuals are urged to consult with their own tax or legal advisors before entering into any advisory contract.

Performance Disclosures

There can be no assurance that the Funds' investment objectives will be achieved, or that their historical performance is indicative of the performance they will achieve in the future. Performance for 2014 and 2015 is not yet audited and subject to change upon audit. Monthly performance numbers are not individually audited – just annual performance. Performance may differ based upon differences in contribution dates, fee structures and new issue eligibility. It should be noted that all performance reflects reinvestment of dividends and all other income and all performance is net of applicable fees and expenses. Net strategy attribution is calculated by allocating fees and expenses to each strategy on a pro rata basis according to the respective strategy's relative allocation size. Past performance is not indicative of future returns.

Risk Summary

All investments involve risks including the potential for loss of principal. Past performance does not guarantee similar future results. The Funds' investment objectives are not projections of expected performance or guarantees of anticipated investment results. Actual performance and results may vary substantially from the stated objectives with respect to risks. Investments in the Funds are speculative and are meant for sophisticated investors. Investors may lose all or a substantial part of their investment. There are no secondary markets for interests/shares in the Funds and none are expected to develop. There are also substantial restrictions on liquidity and transfers, so an investor may not have access to capital when it is needed. Certain of the Funds' managers may employ leverage or short selling, may purchase or sell options or derivatives and may invest in speculative or illiquid securities. It should be noted that fund of funds have multiple layers of fees and expenses that may offset profits.

Any projections, market outlooks or estimates made during this presentation are forward looking statements, are based upon the assumptions, views and analytical methods of Man, and should not be construed to be indicative of the actual events that will occur. Other events that were not taken into account may occur and may significantly affect the returns or performance of any Man fund. While all the materials prepared in connection with this presentation are believed to be accurate, and all data used in the preparation of such materials was obtained from sources that Man believes to be reliable, Man makes no express warranty as to the completeness or accuracy, nor can it accept responsibility for any errors, appearing in any of the materials used or otherwise discussed during this presentation. Any information regarding portfolio composition, investment restrictions or parameters discussed during this presentation can be changed at any time by Man in its sole discretion without notice to investors.

Any indices and other financial benchmarks shown are provided for illustrative purposes only, are unmanaged, reflect reinvestment of income and dividends and do not reflect the impact of advisory fees. Investors cannot invest directly in an index. Any index information contained in this presentation is included merely to show general trends in the markets in the periods indicated and is not intended to imply that the portfolio was similar to the index either in composition or element of risk. There is no guarantee that any Man fund will meet or exceed any index. Any specific investments described herein were selected for inclusion in this report based on their ability to help you better understand our investing model/strategy. They do not represent all of the investments purchased or sold or recommended for the Fund during the quarter, and it should not be assumed that investments in such securities were or will be profitable. Finally, it should be noted that this is a brief summary of the investment risks. Prospective investors should carefully review the risk disclosure contained in the Funds' offering memoranda.

Alternative investment risks and other disclosures

The investment products described herein are private investment funds and/or managed accounts sometimes referred to as “Alternative Investments”. Alternative investments, depending upon their investment objectives and strategies, may invest and trade in many different markets, strategies and instruments (including securities, non-securities and derivatives) and are NOT subject to the same regulatory requirements as mutual funds, including mutual fund requirements to provide certain periodic and standardized pricing and valuation information to investors. There are substantial risks in investing in an Alternative Investment. You should note carefully the following:

- An Alternative Investment represents a speculative investment and involves a high degree of risk. Investors must have the financial ability, sophistication/experience and willingness to bear the risks of an investment in an Alternative Investment. An investor could lose all or a substantial portion of his/her/its investment.
- An investment in an Alternative Investment should be discretionary capital set aside strictly for speculative purposes.
- An investment in an Alternative Investment is not suitable for all investors. Only qualified eligible investors may invest in an Alternative Investment.
- An Alternative Investment’s offering documents are not reviewed or approved by federal or state regulators and its privately placed interests are not federally or state registered.
- An investment in an Alternative Investment may be illiquid and there are significant restrictions on transferring or redeeming interests in an Alternative Investment. There is no secondary market for an investor’s investment in an Alternative Investment and none is expected to develop. Substantial redemptions by shareholders within a limited period of time could compel an Alternative Investment to liquidate its positions more rapidly than otherwise would be desirable, which could adversely affect the value of the distribution proceeds and the value of the remaining interests in an Alternative Investment.
- The net asset value of an Alternative Investment may be determined by its administrator in consultation with its manager or advisor in certain cases. Certain portfolio assets may be illiquid and without a readily ascertainable market value. Since the value assigned to portfolio investments affects a manager’s or advisor’s compensation, the manager’s or advisor’s involvement in the valuation process creates a potential conflict of interest. The value assigned to such portfolio investments may differ from the value an Alternative Investment is able to realize.
- An Alternative Investment may have little or no operating history or performance and may use performance which may not reflect actual trading of the Alternative Investment and should be reviewed carefully. Investors should not place undue reliance on hypothetical, pro forma or predecessor performance.
- An Alternative Investment’s manager or advisor has total trading authority over an Alternative Investment. The death or disability of the manager or advisor, or their departure, may have a material adverse effect on an Alternative Investment.
- An Alternative Investment may use a single advisor or employ a single strategy, which could mean a lack of diversification and higher risk. An Alternative Investment’s performance may be volatile.
- An Alternative Investment may involve a complex tax structure, which should be reviewed carefully, and may involve structures or strategies that may cause delays in important tax information being sent to investors.
- An Alternative Investment’s fees and expenses which may be substantial regardless of any positive return will offset such Alternative Investment’s trading profits. If an Alternative Investment’s investments are not successful, these payments and expenses may, over a period of time, deplete the net asset value of an Alternative Investment.
- An Alternative Investment and its managers/advisors may be subject to various conflicts of interest.

The above summary is not a complete list of the risks and other important disclosures involved in investing in an Alternative Investment and is subject to the more complete disclosures contained in such Alternative Investment’s confidential offering documents, which must be reviewed carefully. This information is not intended to be or construed as an offer to sell, or a solicitation of an offer to buy, an interest in any Alternative Investment which may be made only by delivery of such Alternative Investment’s confidential offering documents to qualified investors. Before making any investment, an investor should thoroughly review an Alternative Investment’s confidential offering documents with their professional advisor(s) to determine whether an investment is suitable for them.

Each Fund’s Offering Documents contain important information concerning risk factors, including a more comprehensive description of the risks and other material aspects of the investment (including a Fund’s investment program and applicable fees and expenses), and should be read carefully before any decision to invest is made. You should not rely in any way on this summary.

Alaska Retirement Management Board

Legal Framework for Trustees

Overview

- Fiduciary Duty
- Open Meetings
- Public Records
- Role of Counsel
- Privilege
- Confidentiality
- Executive Branch Ethics Act
- Securities Laws

Objectives

- New insight
- Inquiry notice

Fiduciary Duty

- Sources
  - Statutory
  - Common Law
  - ARMB not subject to ERISA, but will likely be used by analogy

Fiduciary Duty

- AS 37.10.071(c): "the fiduciary of a state fund shall apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the fund entrusted to the fiduciary. Among beneficiaries of a fund, the fiduciaries shall treat beneficiaries with impartiality."

Fiduciary Duty

- AS 37.10.210(a): "Consistent with standards of prudence, the board has the fiduciary obligation to manage and invest these assets in a manner that is sufficient to meet the liabilities and pension obligations of the systems, plan, program, and trusts."

Fiduciary Duty

- Objective and subjective components
- Can rely on expert advisors or delegate
- Applies to all funds, even self-directed defined contribution plans
- Isn’t fire-and-forget
- “Sole financial best interest” means investment decisions based on economics

Fiduciary Duty

- How should Trustees reconcile loyalty to constituents with duty to funds as a whole?
- Courts recognize decision makers have diverse life experience
- Interests are often aligned, but statute controls in event of conflict

Fiduciary Duty

- Safe Harbor for delegated duties
  - Statutory delegations (e.g., staff)
  - Prudent delegations
- Exceptions
  - Participates in or conceals a breach
  - Enables a breach
  - Knows about a breach and does not attempt to remedy

Open Meetings

- Three trustees = a public meeting
- Government business presumed public business
- Exceptions
- Executive sessions
  - Statutory purposes
  - Practical purposes

Public Records

- Records = almost anything capable of preservation
- State records presumed public
  - General exceptions
  - Special ARMB Exceptions

Role of Counsel

- Advisor to the Board as an institution
- Separate counsel for Treasury Division and Division of Retirement and Benefits

Privilege

- Attorney-client
- Attorney work product
- Executive process
- Deliberative process
- All privileges are the Board's and can only be waived by the Board
  – Not by staff
  – Not by individual trustees

Confidentiality

- ARMB may enter confidentiality agreements
- May sign non-disclosure agreements
- Consequences of violations may be more practical than legal
  – Information may be withheld
  – Counterparties may be reluctant to transact with us

Executive Branch Ethics Act

- Board members are subject to Act
- Conflicts disclosures to Board
- Resources - http://www.law.alaska.gov/doclibrary/ethics.html

Securities Laws

- Institutional Investors –
  More Opportunities/Less Protection
  - Caveat emptor
  - Use your staff and consultants
- Insider Trading
  - When in doubt, don't trade on non-public information

Conclusion

- ARMB operates in a saturated legal environment
- When in doubt, ask
- Questions?

Alaska Retirement Management Board

DRZ Emerging Markets Value

June 2017

Kelly W. Carbone – Managing Partner
Marc P. Miller – Co-Portfolio Manager

Firm Overview

- Independently owned
- Style consistency
  - 32 year execution of our Value methodology
- Small, focused firm with goal to provide superior performance and service to the institutional marketplace
- Total firm assets: $5.3 Billion as of 03/31/17
- Conservative asset caps on all strategies

➢U.S. Large Value	➢U.S. SMID Value
➢U.S. Small Value	➢International Small-Cap Value
➢U.S. Micro Value	➢Emerging Markets Value

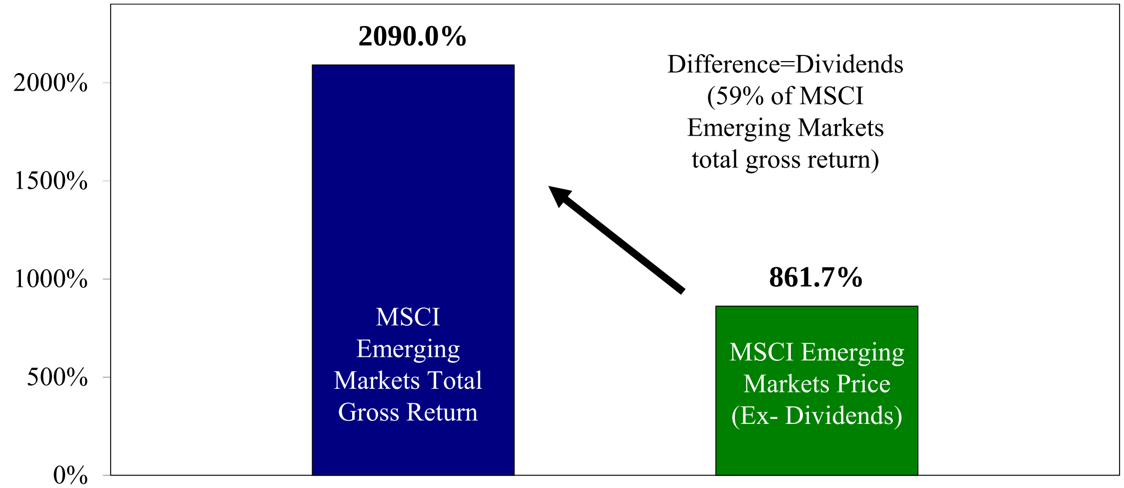
- Long-term continuity of team
  - 28 Investment Professionals
  - 13 Administrative Staff

DRZ Emerging Markets Value Strategy

- **Proven Value Methodology**
  - DRZ has consistently and successfully implemented its Value Methodology for more than 32 years.
  - Our Emerging Markets Value Strategy utilizes a similar philosophy and methodology for buying and selling stocks.
  - Activity is driven by the consistent execution of our buy/sell decision process.
  - Active share is consistently between 85-90% versus the MSCI EM Index.
- **Dividend Yield**
  - Dividends represent 59% of the MSCI EM Index's total return since inception on 12/31/87.
  - Our 1% minimum dividend yield requirement yields a robust investable universe of over 2,200 companies in Emerging and Frontier Markets, across market capitalizations.

The Importance of Dividends

Cumulative performance since inception of the Index, 12/31/1987 – 03/31/2017



- **All Cap Focus**
  - Small Cap stocks offer lower correlations with the broader market.
  - A wider range of return dispersion and less analyst coverage provides an opportunity for our bottom-up Value Methodology.
- **Uncrowded Universe**
  - According to Morningstar, only 4% of Emerging Market equity funds are defined as Value, which provides our 3-factor Value Methodology with a robust and uncrowded universe for stock selection.

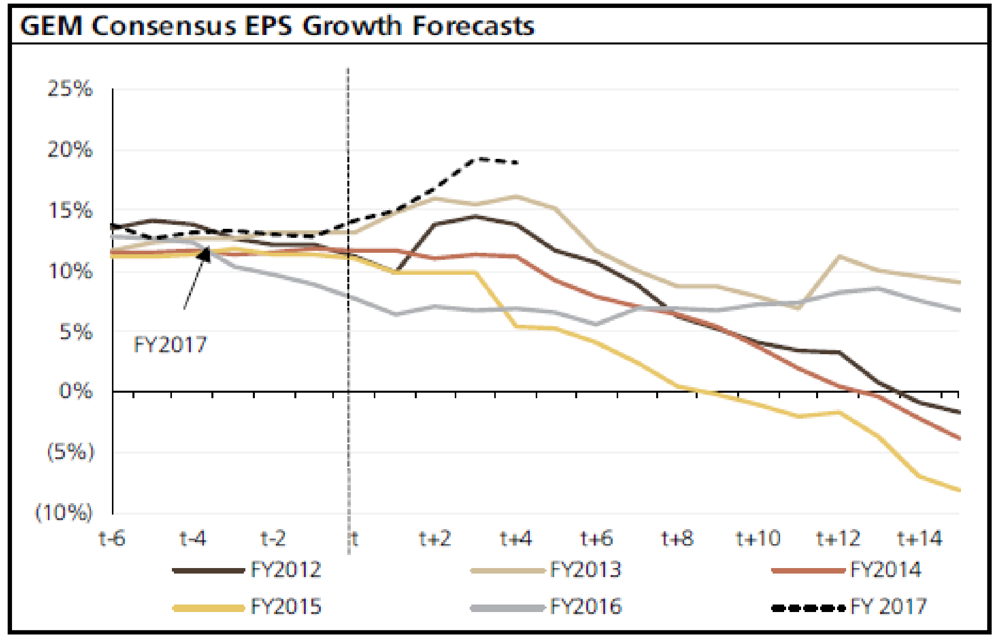
Why Emerging Markets?

GDP Growth Estimates

UBS Global/EM Growth Forecasts (2015-2018E)

		GDP Growth				CPI Inflation (%y/y)			
%y/y	Weight	2015	2016E	2017E	2018E	2015	2016E	2017E	2018E
US	0.19	2.6	1.6	2.2	2.4	0.1	1.3	2.0	1.9
Japan	0.05	1.2	1.0	1.6	1.4	0.8	-0.1	0.6	1.2
Eurozone	0.11	1.9	1.7	1.5	1.2	0.0	0.2	1.7	1.7
UK	0.03	2.2	1.8	1.4	0.7	0.0	0.7	2.8	2.8
Asia	0.42	6.2	6.0	6.0	5.9	2.4	2.5	2.8	2.8
China	0.22	6.9	6.7	6.7	6.2	1.4	2.0	2.3	2.0
India	0.09	7.9	7.1	7.2	7.8	4.9	4.5	4.1	4.9
Korea	0.02	2.8	2.8	2.4	2.5	0.7	1.0	1.8	1.7
Taiwan	0.01	0.7	1.5	2.0	1.9	-0.3	1.4	1.3	1.1
Latin America	0.09	-0.3	-1.1	1.3	2.3	4.9	6.5	4.3	4.3
Brazil	0.03	-3.8	-3.6	1.3	2.6	9.0	8.7	4.1	4.8
Mexico	0.02	2.6	2.3	1.9	2.0	2.7	2.8	5.4	3.9
Emerging EMEA	0.09	1.1	1.2	2.2	2.4	9.0	5.7	5.0	4.6
Russia	0.04	-2.8	-0.2	1.3	1.7	15.5	7.0	4.2	4.0
South Africa	0.01	1.3	0.6	1.2	1.6	4.6	6.4	6.0	5.6
Advanced	0.46	2.0	1.6	1.9	1.9	0.2	0.8	1.8	1.8
Developing	0.54	4.6	4.4	5.0	5.2	4.7	4.2	3.9	3.6
WORLD	1.00	3.5	3.1	3.6	3.7	2.6	2.6	3.0	2.8

GEM Consensus EPS Growth Forecasts



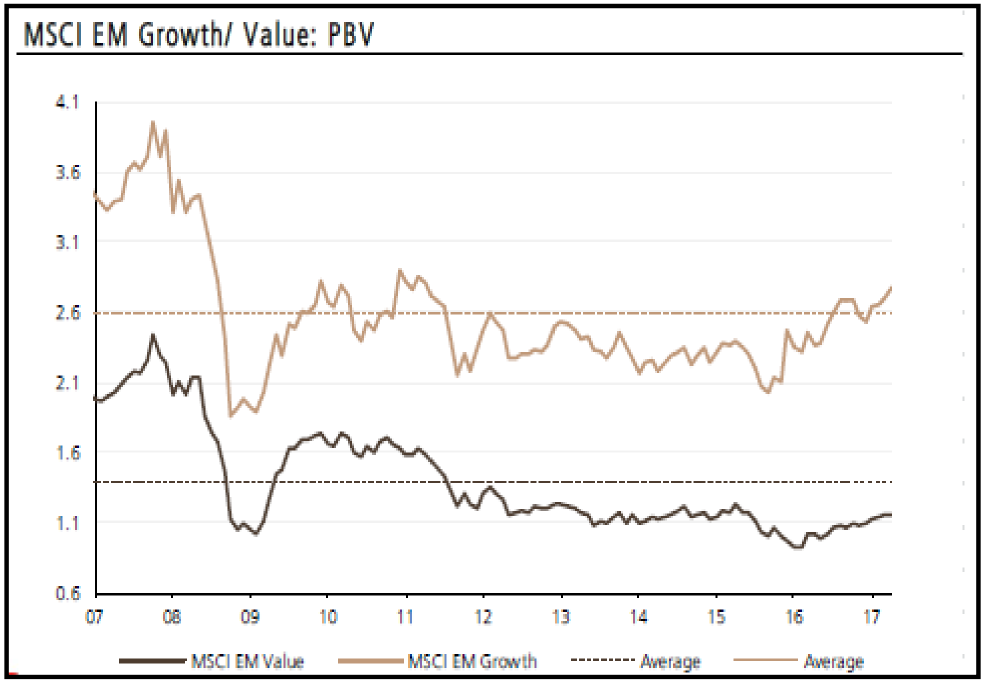
- EM GDP growth is expected to remain strong in 2017. Catalysts for positive growth include:
  - Emerging middle class to drive consumption
  - Rebounding commodity prices should support many emerging economies
  - Growth in infrastructure spending is expected to accelerate

- EM earnings growth forecasts are inflecting positively for the first time since 2010.

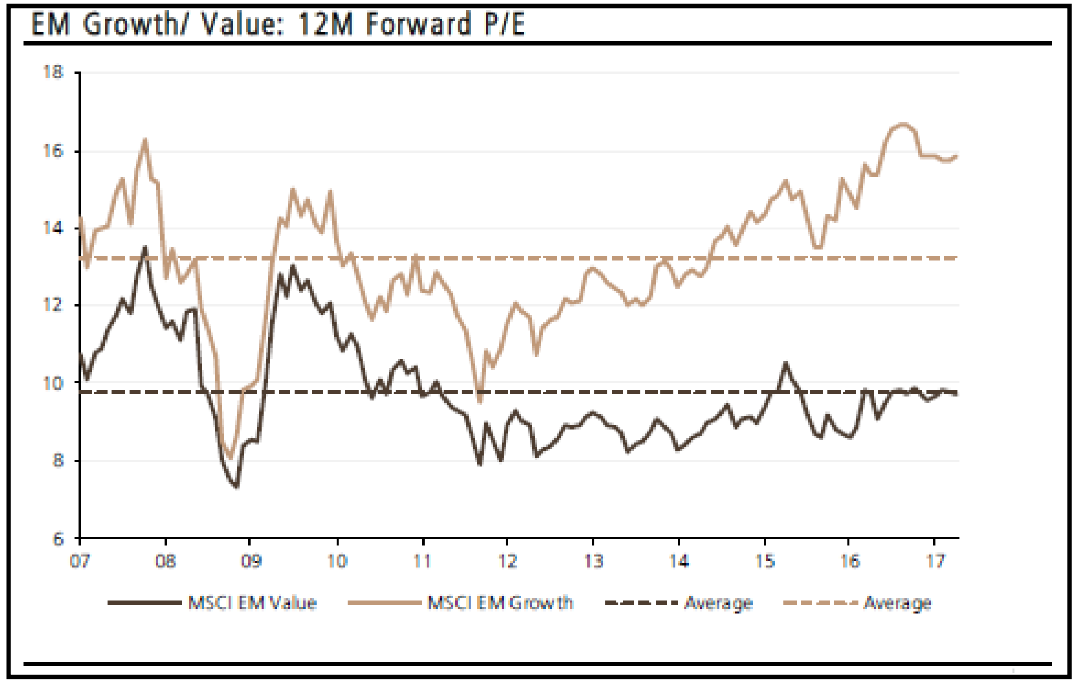
Source: UBS, IMF, MSCI

Historical P/E Valuations of Value/Growth

P/B: MSCI EM Value vs Growth



12month Forward P/E MSCI EM Value vs Growth



- EM Growth outperformed Value from 2011-2015, which has created a fertile environment for our investment methodology.
- Valuations remain over a standard deviation below the 10-year mean.

- P/BV: EM Value remains cheap (at a discount of 17%) while Growth is 8% above fair value.
- P/E (Forward): EM Value is in line with its historical average while Growth is 20% above fair value

Source: FactSet, MSCI, UBS

Value vs. Growth

Emerging Markets Value/Growth: Relative Price

- The Portfolio outperformed by 545bps in 2016 as Value rebounded from 15-year lows.
- Year to date, Value has reverted nearly to its 15-year low as the expensively valued Technology stocks have driven the Index.

Source: FactSet, MSCI, Performance through 04/30/2017

Three Equally Balanced Factors

BUY DECISION

Yield

- Identify a universe of stocks with a 1% minimum dividend yield

Relative Valuation

- Within this universe, select undervalued stocks by reviewing the following criteria:

10-year relative valuation

- Yield
- Price to Book
- Price to Earnings
- Price to Cash Flow

Fundamental Catalyst

- Fundamental analysis to identify improving prospects

Decision

- Establish relative price targets for stocks which meet all three criteria
- Buy stocks with expected upside two times the downside

SELL DECISION

Yield

- Yield on the stock falls below a 1% dividend yield

Relative Valuation

- Relative price target has been achieved:
  - Expected upside now half the downside
- There are other stocks in our buy process which have better risk/reward prospects

Fundamental Catalyst

- The company is not performing as expected
  - Review fundamentals and valuation target
- The sector or country begins to look less favorable
  - Review fundamentals and valuation target

Decision

- If one of the three criteria is violated, the stock is sold

Additional risk controls

- Position Size
- Liquidity

Three Equally Balanced Factors

Tata Global Beverages

Overview:

Tata Global Beverages is part of the Tata Group of companies and is an Indian multinational non-alcoholic beverages company with a presence in more than 40 countries. The company is the world's second largest manufacturer and distributor of tea and a major producer of coffee with the number two branded tea after Unilver.

Dividend Yield: 1.8%

Market Capitalization: **$**1.1 Billion

Relative Valuation:

We value Tata Global Beverages using a forward relative P/E range of 0.9 – 1.5 vs. the MSCI Emerging Markets Index. We determine the range by linking our historical valuation analysis with our fundamental research. The stock is a candidate for purchase when the expected upside versus downside is two to one. We purchased Tata Global Beverages in November 2015 when it was trading at the lower end of its relative P/E range.

Fundamental Catalysts:

- *Margin inflection*: The company had produced stagnant margins, but has started to benefit from lower input prices and an improvement in demand in India.

- *Improvement in India/Less disappointment ex-India:* India represented approximately a third of revenues, and the company should benefit from increased market share in tea coupled with new innovations. The company's international operations have lagged and expectations are already low. Any turnaround in these operations would be viewed positively.

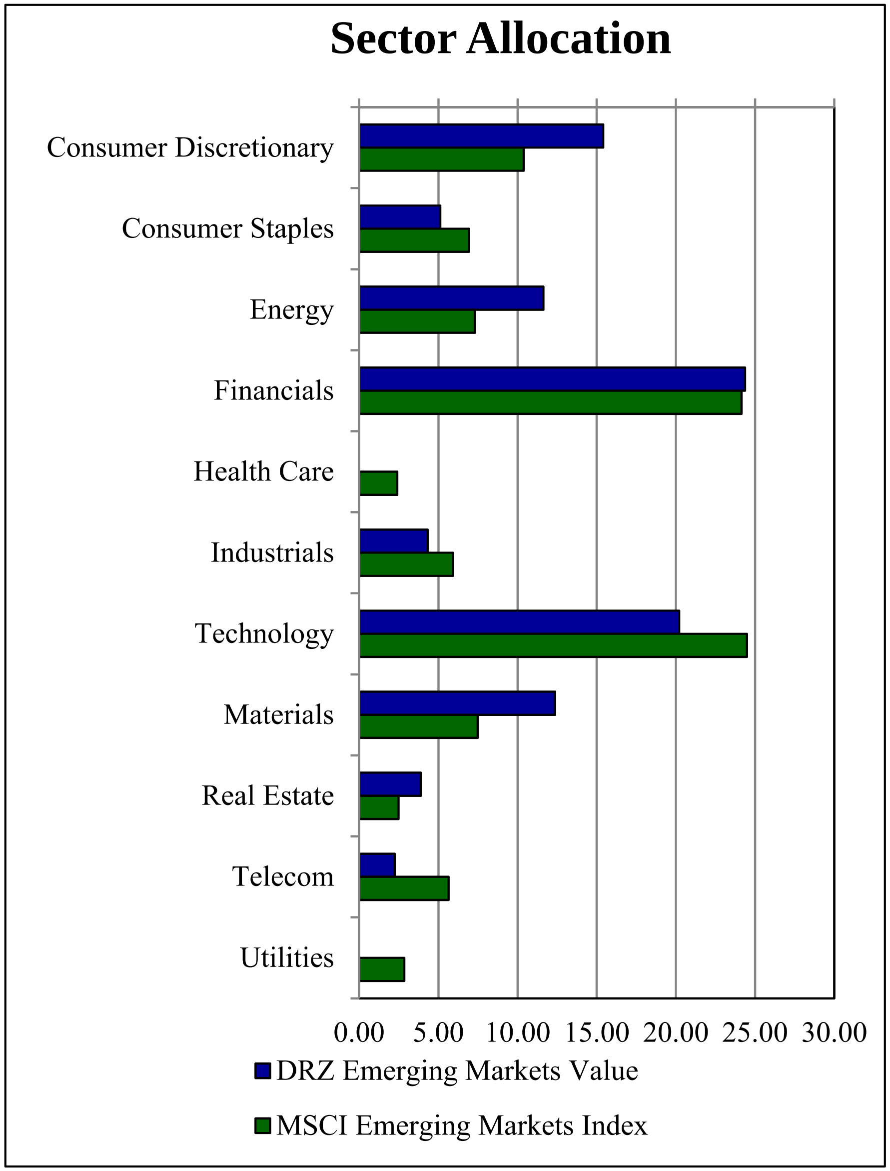
- *Starbucks JV:* Tata Global Beverages has a JV with Starbucks to launch a Starbucks platform throughout India. The business remains in a nascent stage, however, the ramp up has continued to accelerate. Starbucks is expected to breakeven in 2018.

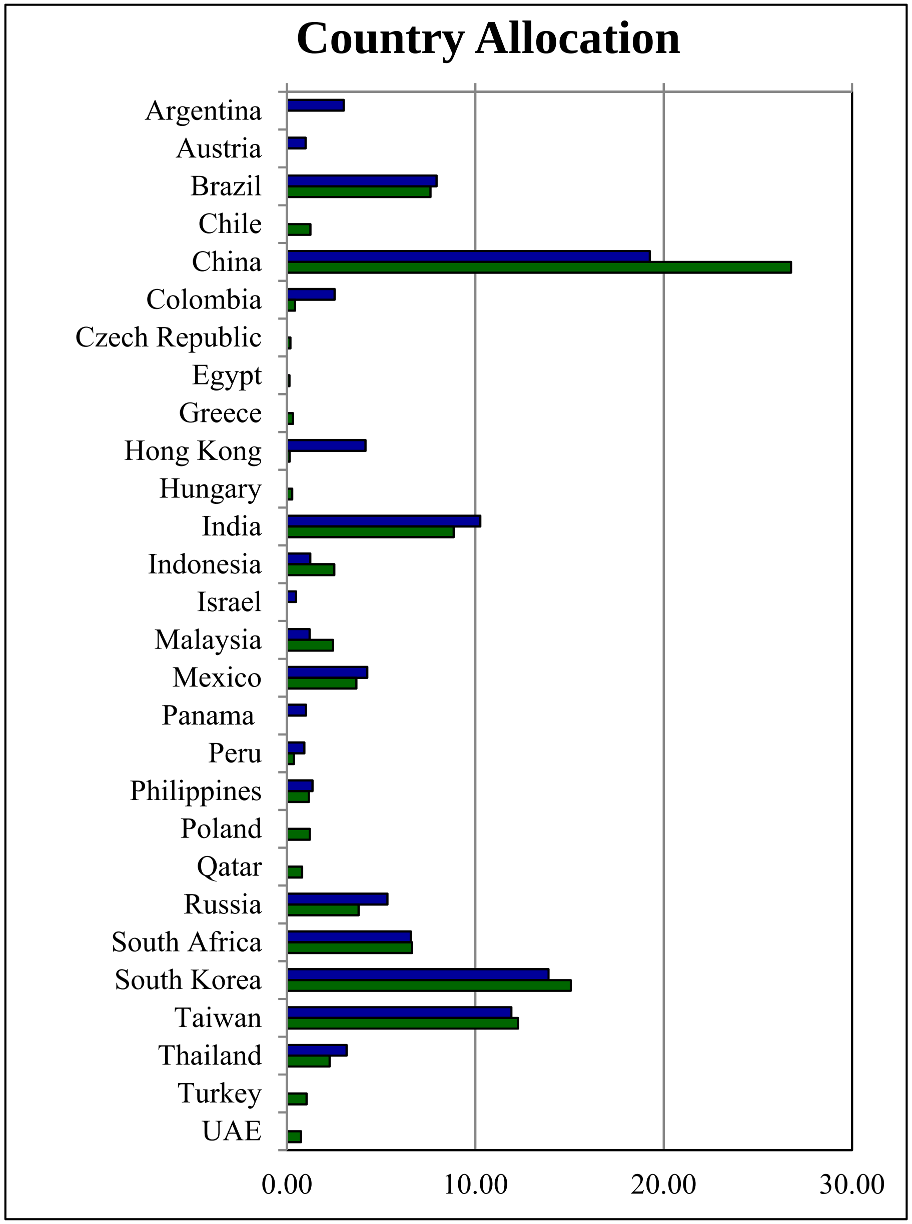
Portfolio Top 10

Company	Weight	Country	Sector
Samsung Electronics	4.67	South Korea	Information Technology
China Construction Bank Corporation	3.88	China	Financials
Taiwan Semiconductor Manufacturing Co., Ltd.	2.99	Taiwan	Information Technology
Sasol Limited	2.04	South Africa	Materials
LG Chem Ltd.	2.00	South Korea	Materials
CNOOC Limited Sponsored	1.98	China	Energy
Delta Electronics, Inc.	1.96	Taiwan	Information Technology
Ping An Insurance (Group) Company of China, Ltd.	1.90	China	Financials
LG Display Co., Ltd	1.88	South Korea	Information Technology
Larsen & Toubro Ltd.	1.84	India	Industrials

Weight as of 03/31/2017

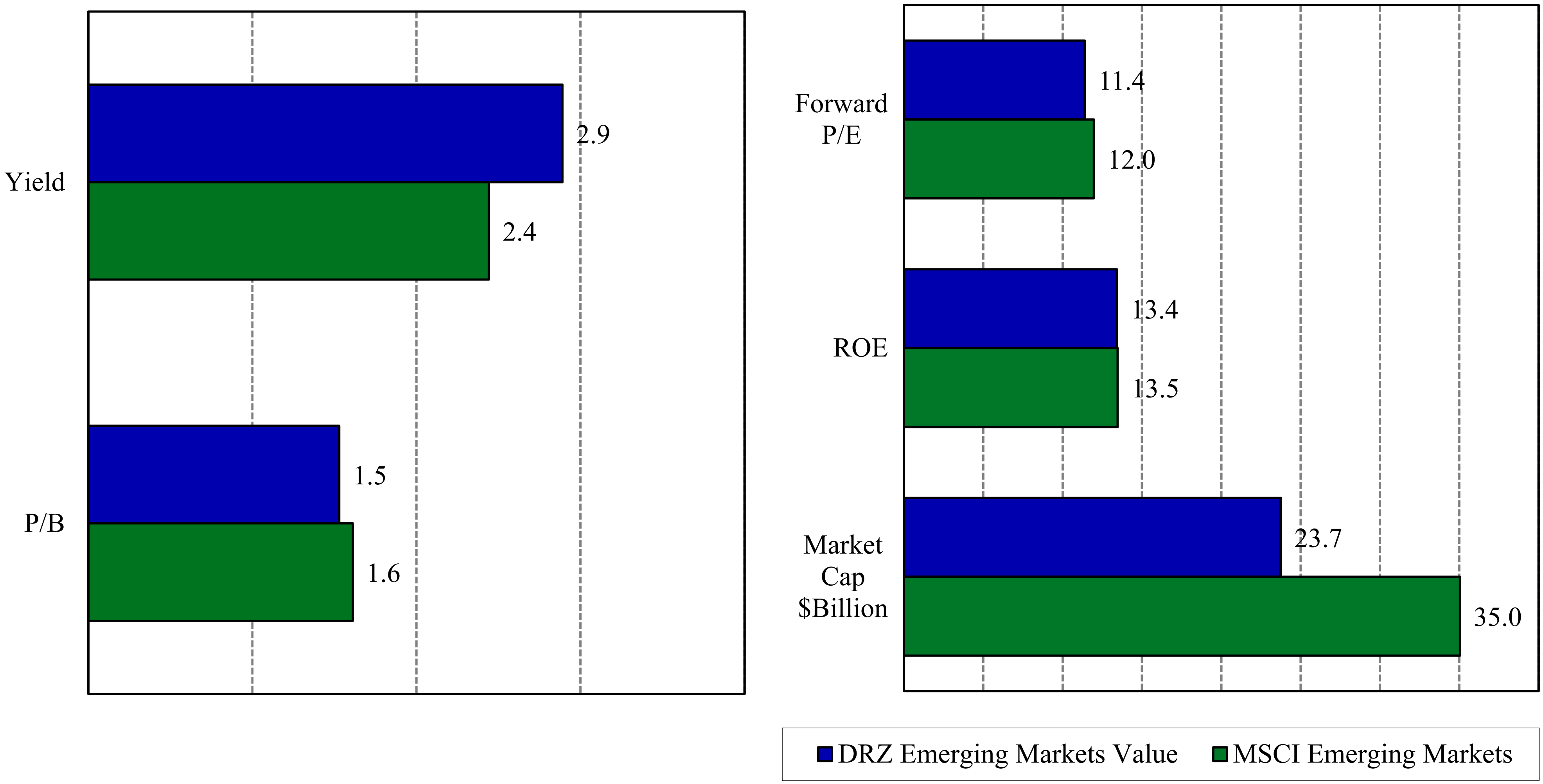
Current Positioning





Weights as of 03/31/2017, Excludes Cash Weight

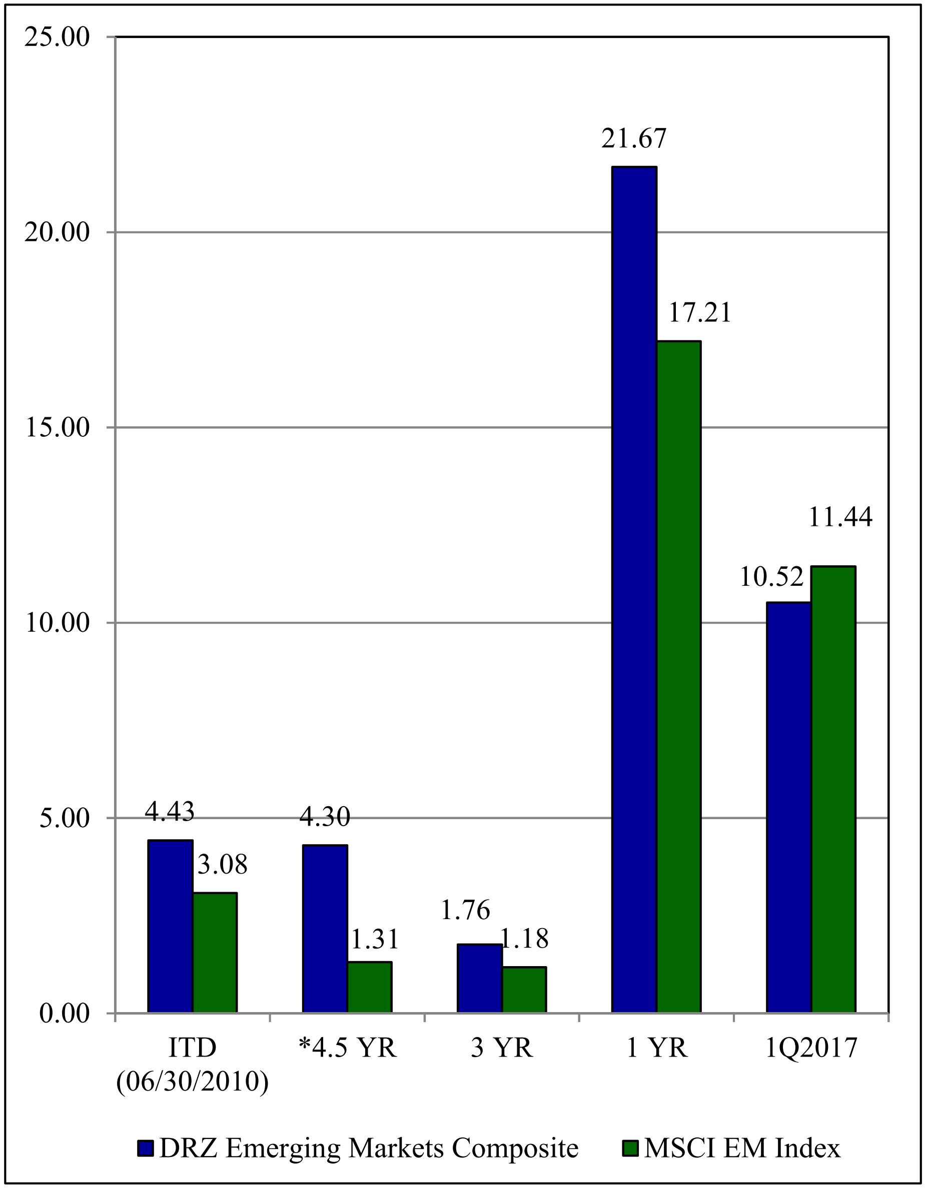
Equity Characteristics

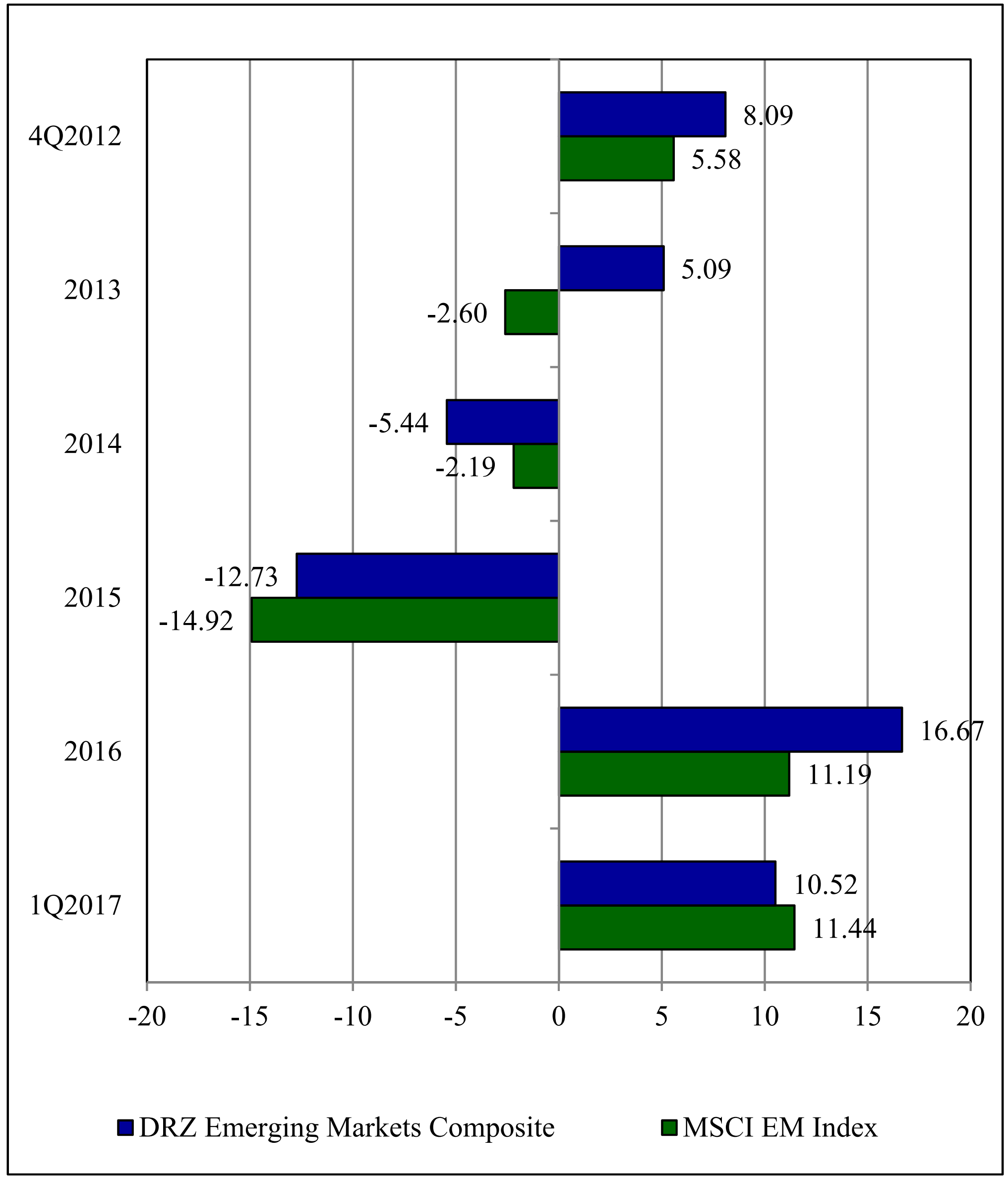


* "Yield" is based on the expected dividends for the portfolio holdings as of the date shown.

As of 03/31/2017

Emerging Markets Value Performance





**Under Marc's leadership: Since 9/30/2012*

As of March 31, 2017. Performance over 1 Year is Annualized

Emerging Markets Value Disclosure

Year	Gross Return(%)	Net Return(%)	Index Return(%)	Composite 3-Year Annualized Standard Deviation	Index 3-Year Annualized Standard Deviation	Number of Portfolios	Composite Dispersion(%)	Total Composite Assets($millions)	Percentage of Firm Assets
12/31/16-03/31/17	10.52	10.25	11.44	16.85%	15.88%	≤5	N/A	110	2.07%
2016	16.67	15.52	11.19	17.06%	16.07%	≤5	N/A	92	1.65%
2015	(12.73)	(13.61)	(14.92)	14.96%	14.06%	≤5	N/A	40	0.69%
2014	(5.63)	(6.58)	(2.19)	15.01%	15.00%	≤5	N/A	89	1.13%
2013	5.09	4.05	(2.60)	18.45%	19.04%	≤5	N/A	32	0.37%
2012	17.96	16.80	18.22			≤5	N/A	16	0.23%
2011	(21.77)	(22.56)	(18.42)			≤5	N/A	13	0.20%
06/30/10 - 12/31/10	29.85	29.23	26.69			≤5	N/A	17	0.29%

DePrince, Race & Zollo, Inc. has presented this report in compliance with the Global Investment Performance Standards (GIPS®).

1. DePrince, Race & Zollo Inc. (DRZ) is an independent investment management firm, founded in 1995, that manages equity portfolios primarily for U.S. institutional clients.
2. DRZ claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. DRZ has been independently verified for the periods March 31, 1995 through December 31, 2016 by The Spaulding Group. 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.
3. Additional information regarding the firm's policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request.
4. The composite invests in global stocks through ADRs and securities in emerging market countries that have a dividend yield greater than its respective country average yield and a market capitalization typically above $200 million.
5. Past performance is not indicative of future results. The actual return and value of an account will fluctuate and at any point could be worth more or less than the amount invested. Individual account performance will vary according to individual client investment objectives.
6. The benchmark is the MSCI Emerging Markets Index which is a free float-adjusted market capitalization index of companies in emerging markets.
7. Total time-weighted rates of return are expressed in US dollars. Computations include the reinvestment of all dividends and capital gains. For investments in ADRs and foreign domiciled companies, dividends are included net of any withholding taxes.
8. The composite was created in July 2010. DRZ's list of composite descriptions is available upon request. This composite requires a minimum asset level of $1,000,000 (one million dollars) for inclusion.
9. Net performance returns are calculated by deducting the highest investment advisory fee.
10. DRZ's standard fee schedule for Emerging Markets Value is 1.00% on all amounts.
11. Internal dispersion is calculated using the equal-weighted standard deviation of annual gross returns of those portfolios that were included in the composite for the entire year; it is not presented for periods with 5 or fewer portfolios. The three-year annualized ex-post standard deviation measures the variability of the composite and the benchmark returns over the preceding 36 months period. The composite doesn't have the three-year annualized standard deviation because 36 monthly returns are not available. The three-year ex-post standard deviation is not required for periods prior to 2011.
12. All information contained in this document is provided for informational purposes only and should not be deemed as a recommendation to buy the securities mentioned. The securities highlighted in this document, if any, represent recent holdings. Each quarter, DRZ uses the same objective, non-performance based criteria to select these securities. It should not be assumed that recommendations made in the future will be profitable or will equal the performance of the securities discussed in this report.
13. If clients are listed in this document, it is not known they approve or disapprove of DRZ or the advisory services it provides. If included, the representative clients listed in this document are a cross section of current accounts that maintain similar investment objectives as those expressed by DRZ's prospective clients. This list may include accounts that are not invested in the investment strategy described in this document.

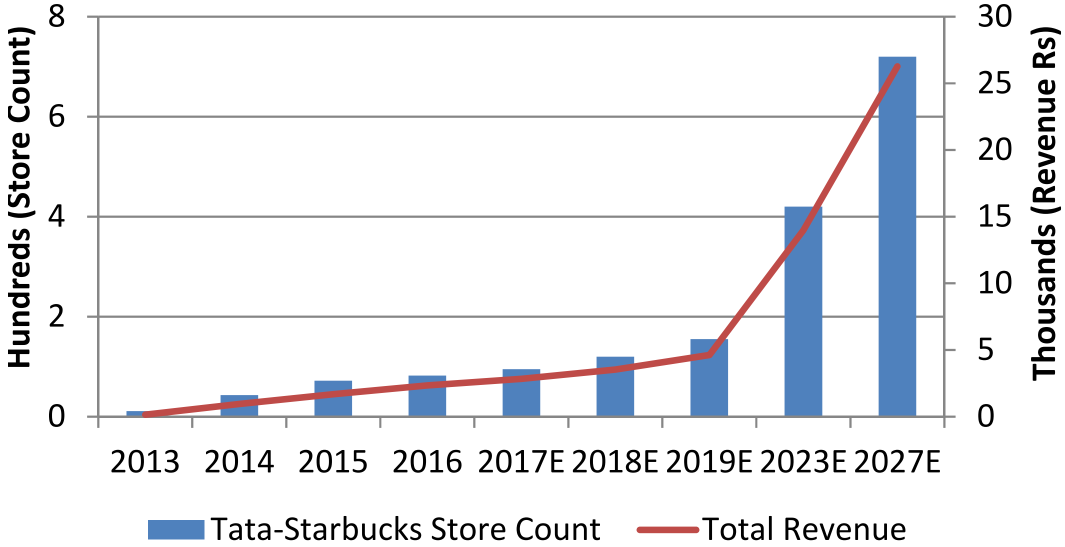
Appendix

Consumer

Tata Global Beverages – Indian multinational beverages company and world's second largest tea producer

- Optionality from JV with Starbucks as café culture penetration increases
- Category growth and increased contribution from premium products should help to drive mix and market share
- Initiatives to improve international operations gaining traction

Tata-Starbucks Store Count and Revenue Growth



India's per capita consumption of soft drinks (9.4 ltrs) lags behind the world average (91.9 ltrs)

Per capita consumption of soft drinks, December calendar year-ends, 2010-20E (ltrs per capita, %)

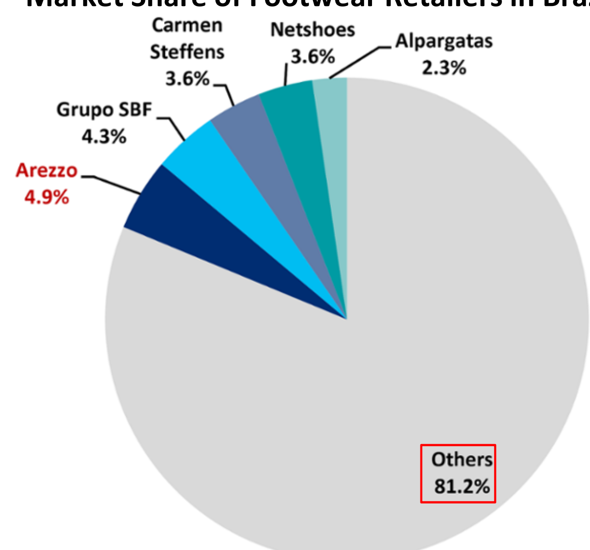
	Per capita consumption (ltrs)			CAGR (%)	
Country/Region	2010	2015	2020E	2010-15	2015-20E
World	82.5	91.9	103.0	2.2	2.3
Brazil	121.6	135.3	151.5	2.2	2.3
China	46.3	64.9	78.6	7.0	3.9
Germany	291.3	291.9	284.9	0.0	(0.5)
Mexico	342.1	367.5	398.0	1.4	1.6
USA	350.0	347.3	344.8	(0.2)	(0.1)
India	4.4	9.4	18.4	16.4	14.4

Source: VBL DRHP

Arezzo – Brazilian leader in production and sales of footwear and accessories

- Brazilian consumption should benefit as increased spending drives employment growth
- Market share gains amid highly fragmented market
- Potential from their Anacapri format which is geared toward a younger demographic
- Expansion into US and improving online platform to boost diversification and drive sales growth

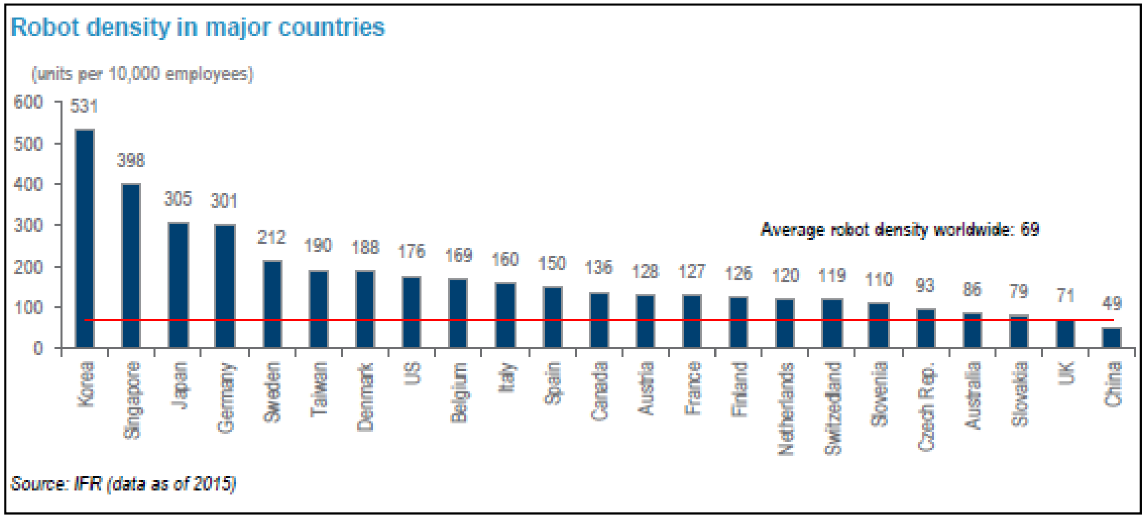
Market Share of Footwear Retailers in Brazil

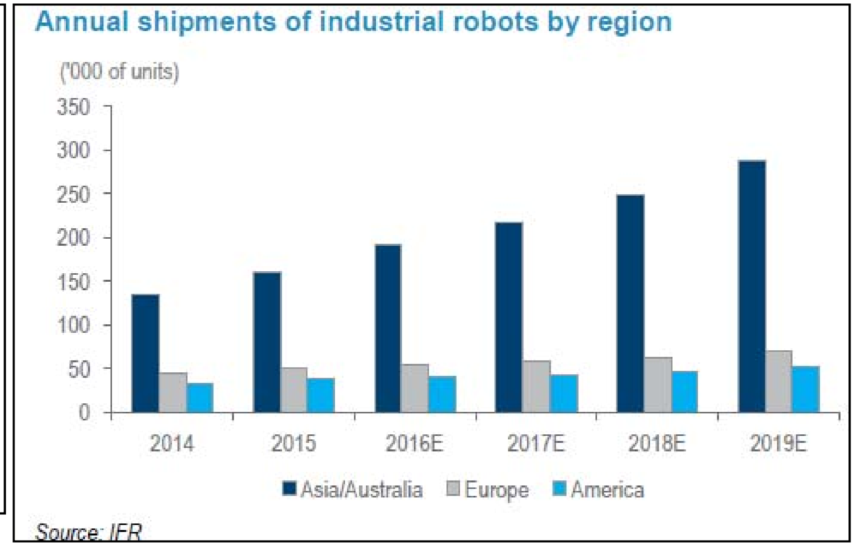


Source: Kotak Institutional Equities

Source: IBGE, SBVC, Citi Research

Technology





Airtac – Amongst the largest global vendors of pneumatic equipment to China, headquartered in Taiwan

- Beneficiary of strong pricing environment and gains in market share
- Currently has the second largest market share in China with expectations for continued gains

Delta Electronics – Taiwanese leader in switching power supply solutions

- Key beneficiary of increased industrial automation and the proliferation of data centers driving power storage demand
- Structural mix shift towards higher margin products

Advantech– Taiwanese global leader in Industrial Computing providing highly-customized IT systems for industrial automation

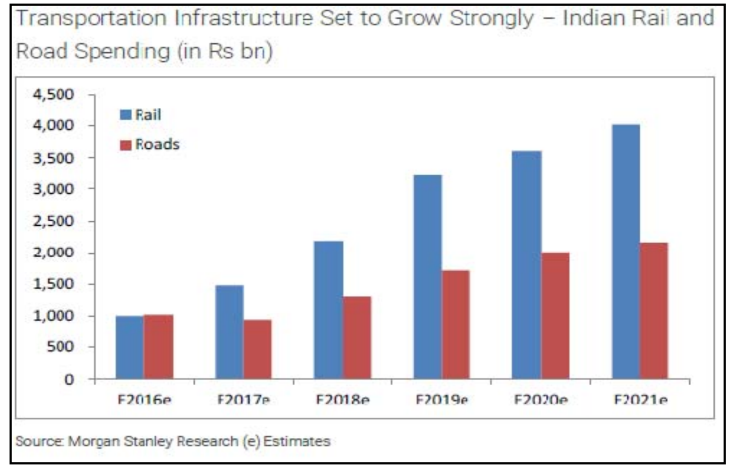
- Rising demand for industrial internet-of-things related products and greater incorporation of smart city solutions
- Company is transforming from a device manufacturer to a platform provider

Source: IFR

Infrastructure

Larsen & Toubro – Indian technology, engineering, construction, manufacturing and financial services conglomerate

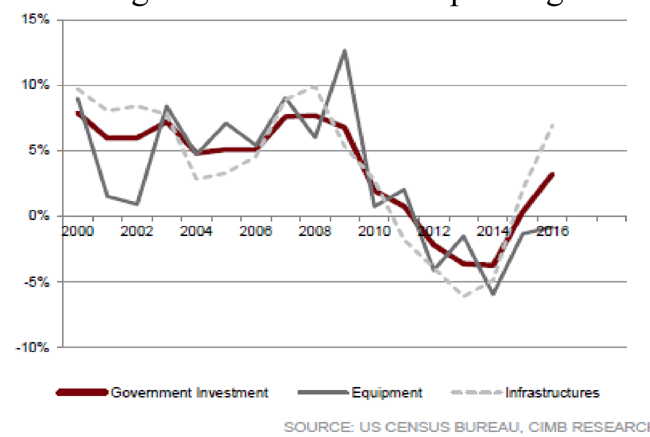
- Government of India budgeted $59 billion to build and modernize railways, airports and roads in FY 2017-2018
  - Direct beneficiary of increased infrastructure spending
  - Improved efficiencies and divestiture of non-core businesses



Doosan Bobcat – Korean construction equipment manufacturer with leading market share in the U.S. compact construction market

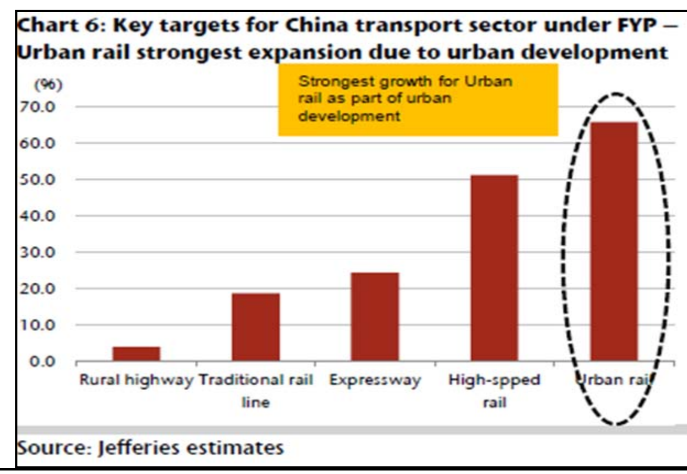
- Beneficiary of infrastructure spending and improving housing starts in the US which are rebounding from historic lows
- Product mix improvement and dealer inventory restocking

Inflecting U.S. Infrastructure Spending



China Railway Construction– One of the two largest Chinese railway infrastructure construction companies

- Beneficiary of One Belt One Road initiatives and local urban rail. CRCC held approximately 50% market share of China's railway infrastructure contracts
- China's adoption of new urban works such as subways and urban rails should provide additional revenue streams



Team Biographies

Marc P. Miller – Co-Portfolio Manager, Emerging Markets

Mr. Miller joined DePrince, Race & Zollo, Inc. in 2012 with more than 14 years of Emerging Markets equity research experience. He serves as the Co-Portfolio Manager for the firm's Emerging Markets Value Strategy and contributes to the firm's International Small-Cap Value Strategy with regards to Emerging Markets. Prior to joining DePrince, Race & Zollo, Inc., Mr. Miller was employed at BNP Paribas as a Senior Analyst in the Emerging Markets Equities Group. He received his Bachelor of Arts in Political Science and Masters in Economic Development from the University of Pittsburgh., as well as a Masters of Business Administration in Finance from Boston College. Mr. Miller is fluent in Spanish and Portuguese and conversant in German.

Regina Chi, CFA – Partner, Co-Portfolio Manager, Emerging Markets

Ms. Chi joined DePrince, Race & Zollo, Inc. in 2010. Ms. Chi is a Partner of the firm, and she serves as the Co-Portfolio Manager for the firm's Emerging Markets Value and International Small-Cap Value Strategies. Prior to joining DePrince, Race & Zollo, Inc., Ms. Chi was employed at Oppenheimer Capital as Senior Vice President in the International Equities Group. Prior to that, Ms. Chi was Senior Portfolio Manager and Vice President at Federated Investors and Vice President/Senior Research Analyst at Clay Finlay, Inc. Ms. Chi holds the Chartered Financial Analyst designation. She received her Bachelor of Arts in Economics and Philosophy from Columbia University.

Casey D. Johnson – Director of Research

Mr. Johnson joined DePrince, Race & Zollo, Inc. in 2003. Mr. Johnson is the Director of Research for the firm's International Strategies. Mr. Johnson was a summer intern at DePrince, Race & Zollo, Inc. for three years prior to joining the firm full time. Mr. Johnson received his Bachelor of Arts in Economics with a concentration in business from the University of Notre Dame and Masters of Business Administration from Rollins College in Winter Park, Florida.

Preston B. Brown, CFA – Co-Portfolio Manager, International Small-Cap Value

Mr. Brown joined DePrince, Race & Zollo, Inc. in 2008. Mr. Brown serves as the Co-Portfolio Manager for the firm's International Small-Cap Value Strategy and contributes as an analyst to the firm's Emerging Markets Value Strategy with regards to the small-cap universe. He holds the Chartered Financial Analyst designation and received his Bachelor of Science in Finance from the University of Central Florida.

E. Patrick O'Neill – Research Analyst

Mr. O'Neill joined DePrince, Race & Zollo, Inc. in 2013 as a Research Analyst for the firm's International Small-Cap Value and Emerging Markets Value Strategies. Prior to joining the firm, Mr. O'Neill served as a business and intellectual property disputes consultant at Navigant. Prior to that, he was an intern at DePrince, Race & Zollo, Inc. He completed the Chartered Financial Analyst Program. Mr. O'Neill received his Bachelor of Science in Finance and Economics from Boston College.

Crestline Investors, Inc.

Mandate: **Absolute Return** — **Hired:** **November 2004**

Firm Information

Founded in 1997, Crestline is an investment manager specializing in absolute return and hedge fund investments. Crestline is registered with the SEC and managed $8.8 billion in investments as of December 31, 2016.

Crestline has 140 employees, including 66 investment professionals and has offices in Fort Worth, TX; Toronto, Canada; and New York City. Crestline is an employee-owned firm and Doug Bratton, Caroline Cooley, Keith Williams and John Cochran are the principal owners. Crestline shares ownership via phantom equity and profit sharing participation with its employees.

Key Executives:

Doug Bratton, Founding Partner/CIO
Caroline Cooley, Partner/CIO
Keith Williams, Partner/PM
John Cochran, Vice Partner/COO

Investment Approach

Crestline's investment approach is team oriented with an Investment Committee that has ultimate decision-making authority and accountability.

Investments are evaluated using elements of the following framework:

- Investment Strategy/Opportunity Set – an emphasis on understanding the drivers of return and repeatability of the investment process.
- Portfolio/Investment Manager – assessing the manager's skill at managing assets and generating alpha with an emphasis on the team's credentials and track record. Also evaluated is the manager as a partner – investing only with managers who display high integrity.
- Fund Performance – analyzing past and future returns, as well as the quality of the returns (alpha vs. beta and performance vs. relevant peers).
- Risk Management – how is risk measured and controlled.
- Business Risk – evaluation of firm's ownership structure, organization chart, compensation structure and investor base as well as business practices.

Benchmark: T-Bills + 5%

Total ARMB Mandate & Fees

Assets Managed:

12/31/16: $ 414.9 million

Fees: Management fees differ depending on the level of active involvement and range from 0.75% and no performance fee for the legacy hedge fund-of-fund investments to 1.25% and 15% performance fee after a 6% preferred return for the opportunistic investments.

Concerns: None

Performance – Returns Through 12-31-2016, not including the Specialty Lending Fund which has a 10.4% IRR

	1-Year	2-Year Annualized	3-Year Annualized	5-Year Annualized
Crestline - Net	12.97%	4.87%	9.40%	8.25%
Benchmark	5.33%	5.19%	5.14%	5.12%

Crestline

Alaska Retirement Management Board

JUNE 2017

Table of Contents

Crestline

Crestline

Firm Overview

Organization

Crestline

Douglas Bratton Founding Partner & CIO	Keith Williams Partner/Senior PM	Caroline Cooley Partner/CIO/Diversified Funds	John Cochran Partner/COO

Opportunistic, Specialty Lending and Credit Strategies

Credit and Opportunistic Strategies

Keith Williams
Partner/Senior PM

Michael Guy, MD
CIO/Europe

Andrey Panna, MD
Sanjeev Sarkar, MD
Chris Semple, MD
Rahul Vaid, MD

Jonathan Ben-Horin, Dir
William Palmer, Dir
Alfonso Ramirez, Dir
James Delaune, Dir
Analysts - 10

Jeremiah Loeffler, COO, Credit & Opportunistic Strategies
Staff – 4

Crestline Denali

David Killion, CEO

Greg Cooper, Senior MD

John Thacker,
Senior MD, Chief Credit Officer
Staff - 22

Fund Financings and Restructuring Solutions

PE Credit and Fund Restructurings

David Philipp, MD
Group Head

Amit Mahajan, MD
Group CIO

Paul Choy[1], Sr. Advisor
GR Christon, Dir
Matt Katz, Dir
Mike Rich, Dir

David Calvert[2], Manager

1 Sr. Assoc
1 Sr. Analyst

Recovery Funds: Hedge Fund Secondaries and Side Pockets

Crestline-Kirchner: Successor GP Mandates

Hedge Fund Strategies

Equity Market Neutral and Diversified Strategies

Philip Harris, MD
Head of Equity Strategies

David Finch, MD
Senior PM

Neilson Arbour, MD
Equities
Jeff Marcinowski, Dir – Credit
Analysts – 3

Mark Walker, COO Crestline Summit
Melinda Lilly, Assoc Dir
Matt Schmitt, Assoc Dir

Beta, Hedging & Trading Strategies

Scott Henshaw, VP
Umar Malik, VP

Middle Office

Glenn Bearden, MD
Analysts - 2

Infrastructure

Operations

Roger Marcincuk, Deputy COO
Staff - 1

Risk Management/ Investment Risk

Alex Didych, MD
Staff - 1

Risk Management/ Ops Due Diligence

Rob Zell, Dir
Staff - 1

The Client Partnership Group

Frank Jordan, MD, Global Head of The Client Partnership Group

Sean Gannon, MD
Bill Braxton, MD
David Mabry, MD
Graham Officer, MD
Chris Golio, MD
Daniel Schwarz, Assoc Dir
Staff – 9

Crestline Canada

Paul Robson, Head of The Client Partnership Group Canada and President

Legal/Compliance

Jesús Payán, GC
Paula Roberts, CCO
Staff - 5

Accounting

Camille Sassman, CFO
Staff - 16

Technology

Nathan Shulman, Dir
Staff - 3

Total Firm:
66 Investment Professionals
140 Employees

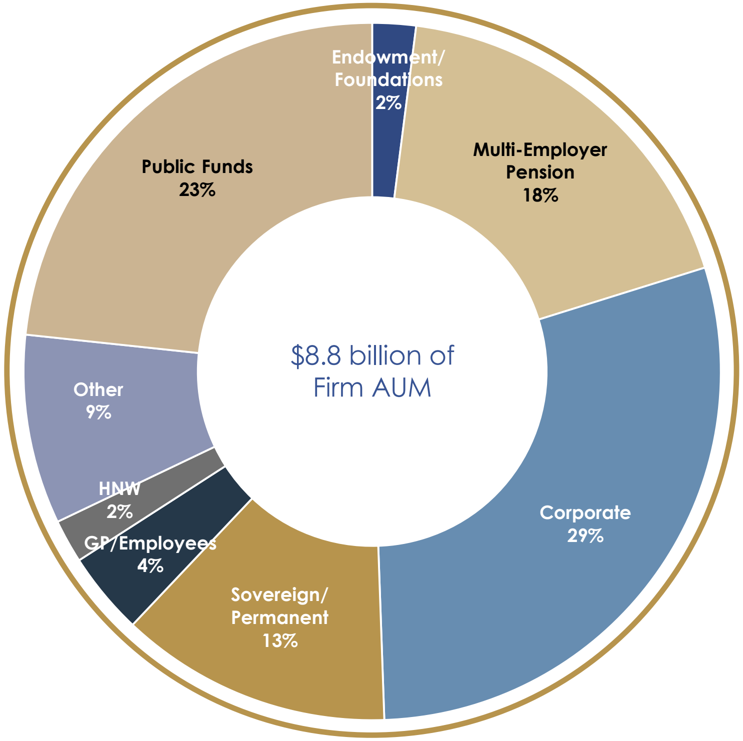
[1] Full Time Consultant
[2] Dedicated operations and middle office liaison

Client Base

The majority of our clients are institutional

94% of our total firm assets are from institutional investors

We are organized to proactively serve their needs



AUM for Crestline, its affiliates and its affiliated management team is estimated at $8.8 billion, which includes uncalled capital commitments and $1.6 billion of beta overlay notional amounts, $0.6 billion of AUM consists of previous funds managed by principals of Denali via DC Funding Partners LLC independently of Crestline. The above estimate is based on valuations as of 5/1/2017 except for certain assets managed by Crestline affiliates, which are valued as of earlier dates based on the most recently available data for such assets. Crestline Denali Capital also provides operational and administrative support services to DC Funding Partners LLC. Specialty Lending Fund AUM includes leverage.

Other Category represents Hedge Funds and Asset Management Firms.

Product Array

Crestline

Crestline has a unique 19 year experience providing innovative investment offerings across a diverse Product Array

STRATEGIES | TOTAL AUM | FOCUS | FUNDS/ OFFERINGS

Credit Strategies

TOTAL AUM: $4.7B

Opportunistic Investing

- **Fund I** 2005 launch — $390 million[1]
- **Fund II** 2012 launch — $980 million[1]
- **Fund III** $866mm raised to date. Target raise — $1–$1.25 billion

Senior Secured Credit

- **CLOs** 12 since 2001 — $2.1 billion
- **Specialty Lending** — $615 million[1]

Managed Accounts

- **Custom Private Credit Mandates** — $142 million

Fund Financings & Restructuring Solutions

TOTAL AUM: $1.3B

Private Equity/ Hedge Funds

- **Portfolio Financings and Fund Restructurings** — $354 million
- **Replacement GP, Co-IM, and Co-GP Mandates** — $354 million[3]
- **Recovery Funds** 3 since 2009 — $633 million

Hedge Funds

TOTAL AUM: $1.2B

Hedge Funds

- **Summit Equity Alpha Fund** Multi-PM equity relative value hedge fund — $452 million
- **Managed Accounts** Custom hedge fund mandates — $1.2 billion[2]

Derivative Solutions

TOTAL AUM: $1.6B

Custom Derivative Structures

- **Beta, Hedging & Trading Strategies** Portable alpha and tail-risk hedging

AUM for Crestline, its affiliates and its affiliated management team is estimated at $8.8 billion, which includes uncalled capital commitments and $1.6 billion of beta overlay notional amounts, $0.6 billion of AUM consists of previous funds managed by principals of Denali via DC Funding Partners LLC independently of Crestline. The above estimate is based on valuations as of 5/1/2017 for certain assets managed by Crestline affiliates, which are valued as of earlier dates based on the most recently available data for such assets. Crestline Denali Capital also provides operational and administrative support services to DC Funding Partners LLC. Specialty Lending Fund AUM includes leverage.

See Notes to Performance History & Comparisons for further information.

1. Represents the largest amount of capital committed and does not reflect current commitments. Opportunity Fund II includes two customized private credit mandates closed as part of the Opportunity Fund II fundraise that are shown under Custom Private Credit Mandates as well. 2. Includes commingled funds and products in wind-down as well as investments in other products. 3. Represents AUM of funds for which Crestline is a GP or Co-GP

Mandate Progression

Crestline

The mandates have continued to evolve with new opportunities over time

Blue Glacier Fund – Class B

- Inception: May 2013
- Invested in niche strategies, private credit strategies and hedge fund secondaries
- Investments currently performing as expected
- End of Investment Period: May 2015

Crestline Specialty Lending (U.S.), L.P.

- Inception: April 2015
- Commingled fund focusing on senior secured 1st lien lending to North American middle market companies with attractive risk-adjusted returns compared to the broadly syndicated market and high yield
- End of Investment Period: November 2017

Blue Glacier Fund – Class C (Opportunity)

- Inception: April 2015
- Invests in underserved or capital-constrained asset classes, out-of-favor sectors and stressed/special situations
- Targets less competitive landscape for opportunities between $15-50 million
- End of Investment Period: April 2019

Blue Glacier Fund – Class C (PE Credit)

- Inception: October 2016
- Invests in fund financings and restructuring solutions
- Crestline's credit expertise and private equity GP experience provides a unique skillset to match current market demand through value-creative portfolio financings
- End of Investment Period: April 2019

	2013	2014	2015	2016	2017
Blue Glacier Fund **Class B**	**Class B Inception:** May 2013				
Crestline Specialty Lending Fund **(U.S.)**			**SLF Inception:** April 2015		
Blue Glacier Fund **Class C**			**Class C (Opportunity) Inception:** April 2015		
				Class C (PE Credit) Inception: October 2016	

Blue Glacier Fund Class B

BGF Class B – Description

- May 2013 inception, focusing on niche strategies, private credit strategies and hedge fund secondaries
- Invested in areas where dislocations existed by primarily focusing on:
  - Purchasing assets or lending against future cash flow streams backed by assets
  - Providing loans to middle market and lower middle market companies with a focus on down-side protection
  - Purchasing fund interests and debt instruments at a discount to intrinsic value

BGF Class B Product Summary

Crestline

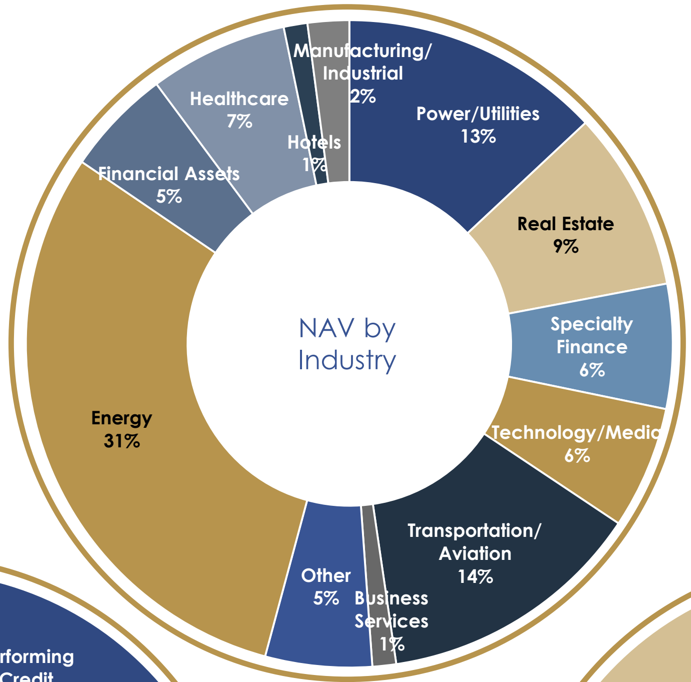
As of 2/28/2017 ($mm)

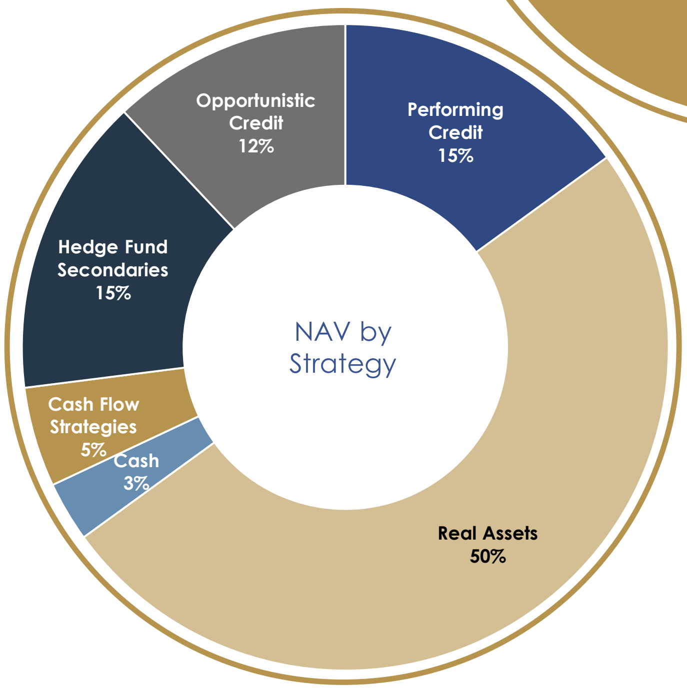
Total Investor Commitments	$264.7	NAV	$260.7
Capital Called from Investor(s)	$201.1	P&L	$74.9
Uncalled Commitments	$63.6	IRR[1]	11.9%
Capital Returned to Investor(s)	$15.3	Realized MOIC	0.1x
Number of Positions	17	Unrealized MOIC	1.3x
Committed to Investments	$274.6	Total MOIC	1.4x

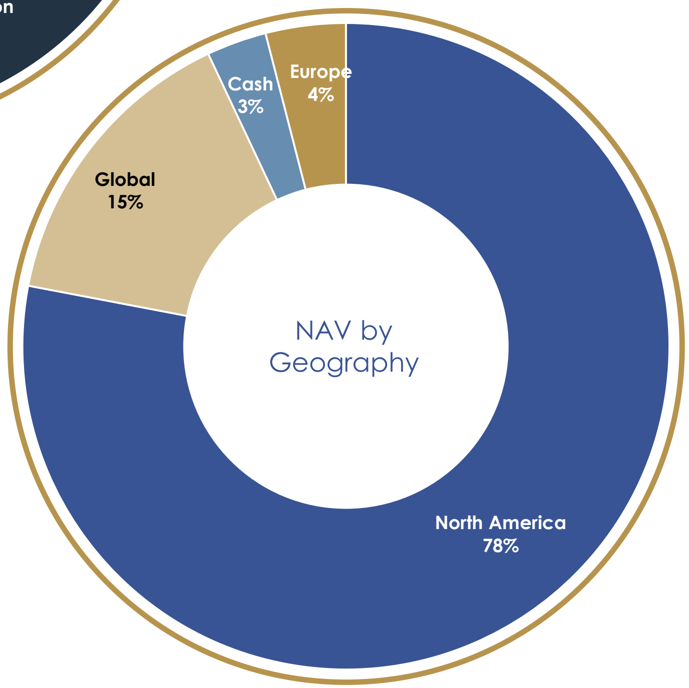
Data shown above represents both the GP and LP's interest unless otherwise noted.
Due to rounding, numbers presented may not add up precisely to the totals.
1. Based on LP's cash flows. Excludes GP.

BGF Class B Exposures

As of 2/28/2017







Classification as of most recently available info from underlying manager

Crestline

Blue Glacier Fund Class C (Opportunity)

BGF Class C (Opportunity) – Description

- April 2015 inception, focusing on under-served or capital constrained asset classes, including SMEs, out-of-favor sectors, companies in transition and stressed or special situations
- Identifies high quality opportunities in primary and secondary markets for U.S. and European small to mid-sized companies
- Targets less competitive landscape for opportunities between $15-50 million

BGF Class C (Opportunity) – Summary

Crestline

- As of May 26th, 2017
  - Currently $178.9mm committed and $144.0mm funded on $350mm of investor commitments
  - Committed to seventeen deals
    - Cash return of 8.83% and structured return of 14.19%
  - Underwritten to a 23.7% gross IRR and 1.7x MOIC[1]
  - Two deals approved and two in due diligence/documentation; pipeline is robust

- Selected Portfolio Statistics (based on deal commitments)[1]
  - 71% asset-backed deals; 29% corporate capital solutions
  - 76.5% performing assets and 23.5% special situations
  - 42.3% senior secured, 22.9% asset-based/cash flowing, 25.1% mezzanine/structured equity

[1] Excludes designated PE Capital & Restructuring

BGF Class C (Opportunity) – Product Summary

Crestline

As of 2/28/2017 ($mm)

Total Investor Commitments	$350.4	NAV	$137.4
Capital Called from Investor(s)	$165.9	P&L	$11.8
Uncalled Commitments	$220.4	IRR[1]	7.6%
Capital Returned to Investor(s)	$40.3	Realized MOIC	0.24x
Number of Positions	16	Unrealized MOIC	0.82x
Committed to Investments	$177.9	Total MOIC	1.06x

Data shown above represents both the GP and LP's interest unless otherwise noted.
Due to rounding, numbers presented may not add up precisely to the totals.
1. Based on LP's cash flows. Excludes GP.

BGF Class C (Opportunity) – Transaction Performance

Crestline

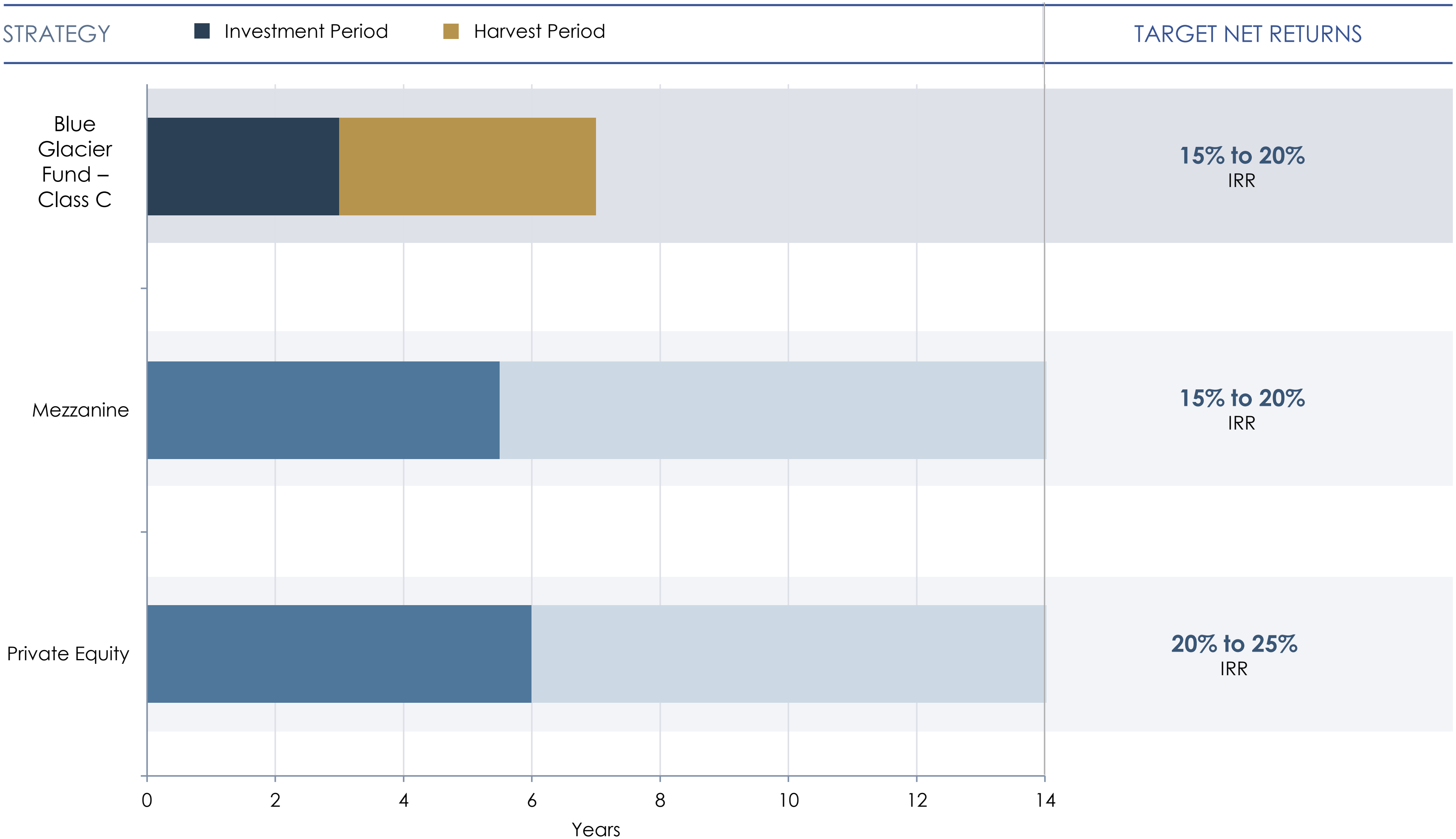
As of 2/28/2017 ($mm)

Investment Name	Investment Date	Realized MOIC	Unrealized MOIC	Total MOIC	IRR
Asset-Based/Cash Flow					
Project PCG II	Feb 2016	0.09x	0.98x	1.07x	10.4%
Project Sara	Mar 2016	0.00x	1.00x	1.00x	0.0%
Project Freedom Fin	Mar 2016	0.00x	1.10x	1.10x	10.7%
Project Blue Hawaii	May 2016	0.10x	1.13x	1.23x	31.8%
Project Cortez	May 2016	0.00x	1.09x	1.09x	11.7%
Project Ribbon	Jul 2016	0.00x	1.00x	1.00x	0.2%
Project Swiper	Aug 2016	0.00x	1.06x	1.06x	19.1%
Project Gold Rush[1]	Oct 2016	0.00x	0.93x	0.93x	-22.8%
Project Freehold	Dec 2016	0.00x	1.00x	1.00x	0.0%
Project Lion King - Debt	Feb 2017	0.00x	1.00x	1.00x	0.0%
Corporate Capital Solution					
Project Shop	Jun 2015	0.61x	0.54x	1.15x	14.9%
Project Big Blue - 2nd Lien	Nov 2015	0.12x	1.01x	1.13x	10.6%
Project Caretaker	Feb 2016	0.01x	1.12x	1.13x	13.7%
Project Lion King - Equity	Apr 2016	0.00x	1.00x	1.00x	0.0%
Project Organize	Feb 2017	0.00x	1.00x	1.00x	3.6%
Realized Positions					
Project Viv a - U	Oct 2015	1.32x	0.00x	1.32x	34.7%
Gross Totals		**0.23x**	**0.87x**	**1.10x**	**14.4%**

[1] Project Gold Rush is currently being held at cost, and therefore the negative performance is solely due to energy hedges.
Data shown above represents both the GP and LP's interest unless otherwise noted.
Due to rounding, numbers presented may not add up precisely to the totals.

Structural Advantage

Blue Glacier Fund – Class C is structured to achieve similar, if not higher, absolute unlevered returns than typical private equity or mezzanine funds, but do so with a much shorter investment time horizon, providing greater optionality for the investor.



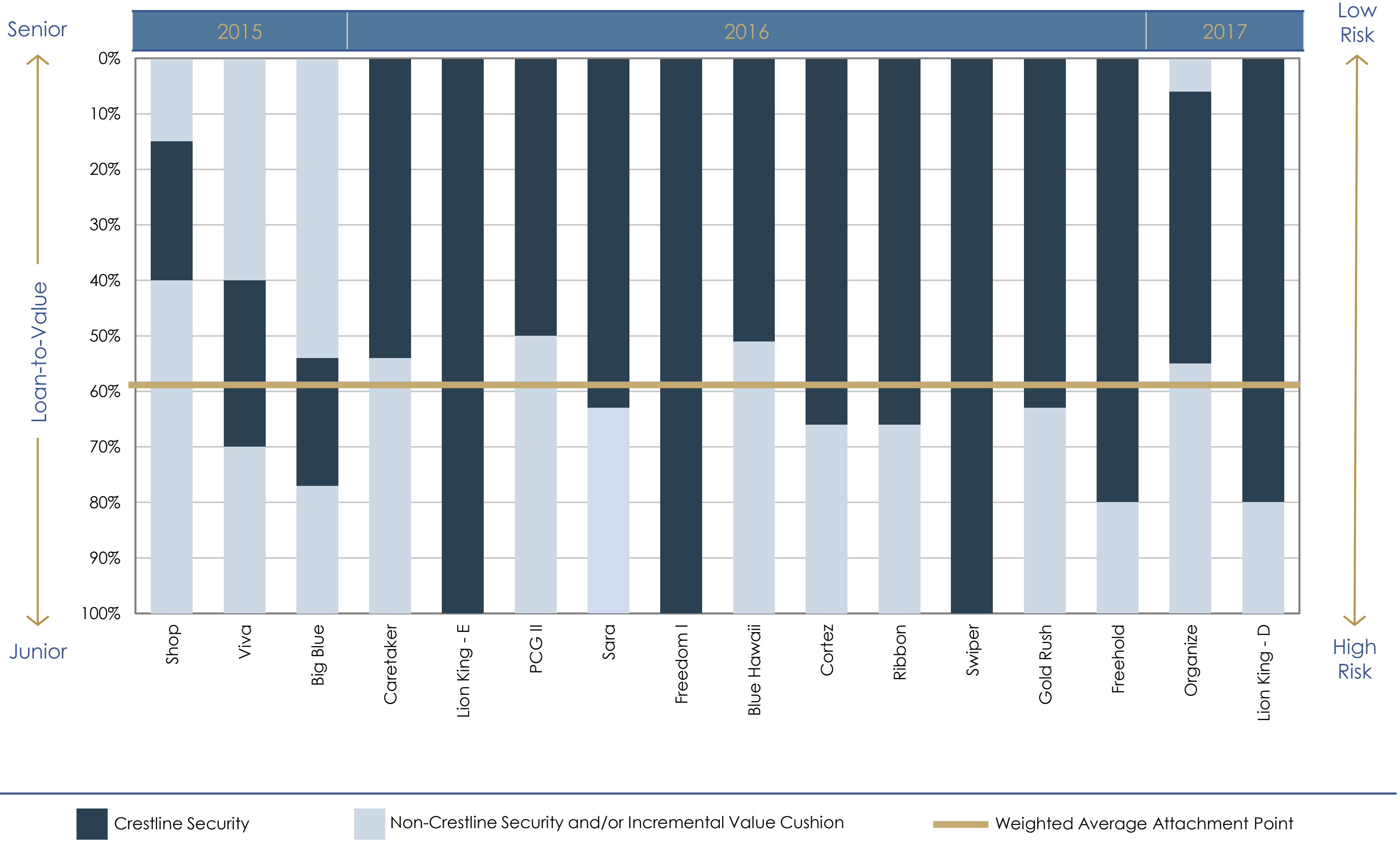
Expected/Targeted returns are forward-looking statements that are subject to uncertainty as described further in the relevant offering memorandum and should not be regarded as a representation, warranty or prediction of any particular performance. Actual performance may vary.

See Notes to Performance History & Comparisons for further information.

BGF C (Oppty) Capital Structure Attachment Points at Time of Initial Investment

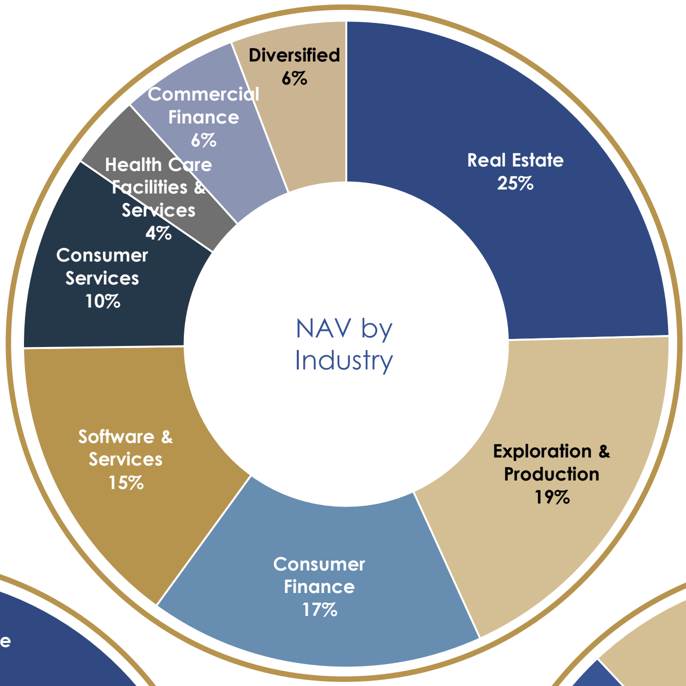
Crestline

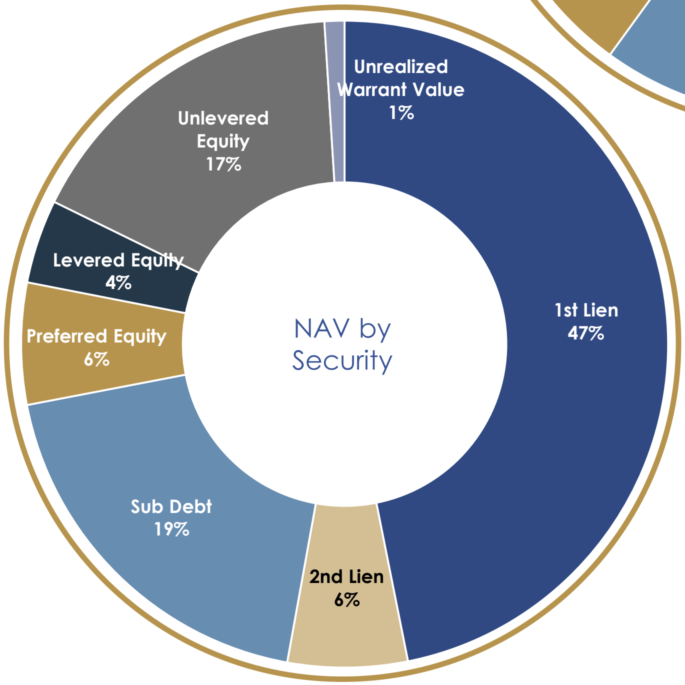
Crestline has continued its philosophy in of creating securities whereby protecting principal with multiple sources of repayment and/or avenues to control our own destiny. The first step is attractive attachment points (currently at 58%) followed by significant structural protections.

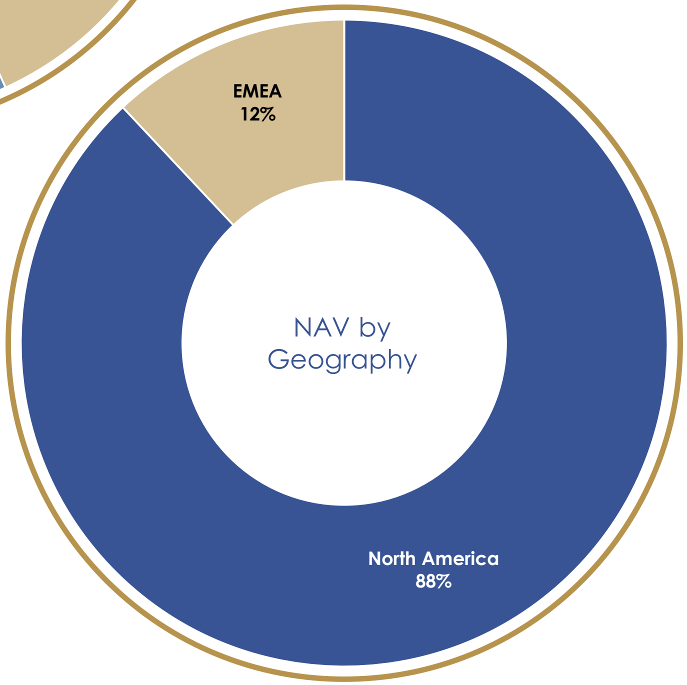


BGF Class C (Opportunity) – Exposures

As of 2/28/17







Classification as of most recently available info from underlying manager

Project Caretaker

Crestline

Crestline capitalized on a bi-lateral opportunity to partner with a leading rural-based urgent, primary and occupational care platform seeking financing to fund a robust acquisition pipeline

Investment Highlights

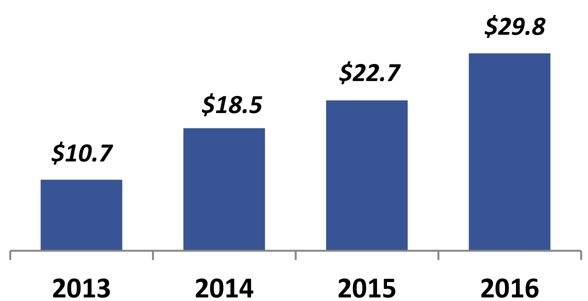
Date of Investment	February 2016
Crestline Commitment	$35.0 million
Industry	Healthcare Services
Source	Direct
Gross Base Case Return	19.0% IRR/1.9x MOIC

Security Description

Type	1st Lien, Warrants & Senior Preferred
Maturity	5 years (1^{st} & Preferred)
Total Deal Size	$43.2 million

Revenue and Office Location Ramp

($ in mm)



# of Centers			
13	19	21	29

Business Description / Investment Thesis

- Leading urgent care platform in the southeastern United States. The Company provides a continuum of services including urgent and primary care, and occupational health with a geographic focus on the underserved, rural and exurban markets
- Differentiated acquisition and joint venture growth strategy through partnerships with some of the largest hospital health systems in the southeast which promotes significant brand recognition and patient referral sources
- The 1^{st} Lien facility would only fund upon new acquisitions and joint venture contributions and maintains five financial covenants including governors that keep leverage in-line with targeted underwritten loan-to-values ("LTVs")
- All locations in operation for more than one year are profitable with significant time in their underlying rural markets where little, if any, competition exists; the size, density of locations and underlying markets in which the clinics are located make for an attractive M&A target

Sourcing / Structuring

- Sourced via Crestline relationship with existing board member, not broadly marketed
- Crestline created a highly structured transaction, **attaching from 0% to 54% LTV**, with significant covenants and minimum liquidation preferences through the Senior Preferred in addition to further equity optionality in the form of common stock and warrants (note: Crestline gave no value to the significant warrant and common stock coverage)

Current Status

- As of Q1 2017, the Company had 30 locations.
- The Company is in compliance with all covenants.
- Last dollar of risk is at 3.9x facility level EBITDA, thus creating significant cushion to value.

Expected/Target returns are forward-looking statements that are subject to uncertainties and should not be regarded as a representation, warranty, or predication of any particular performance.

Project PCG II

Crestline

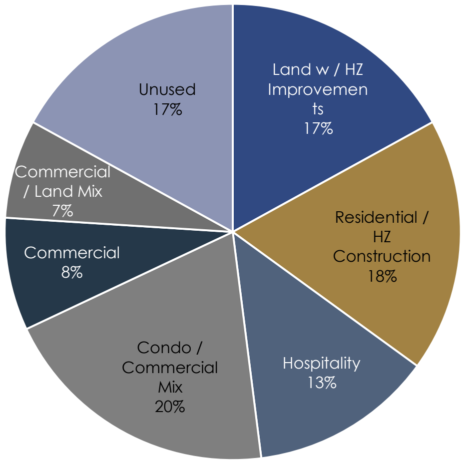
Second facility of bridge financing backed by hard assets

Investment Highlights

Date of Investment	February 2016
Crestline Commitment	$30.0 million
Industry	Real Estate
Source	Direct
Security	1st Lien Senior Secured; Revolving Credit Facility
Gross Base Case Return Targeted Returns	+17% IRR/1.3x MOIC

Collateral Summary Statistics – PCG II

Portfolio as of Q4 2016
by Asset Type



Business Description / Investment Thesis

- A 10-year old full service private lending firm that targets real estate-backed credit opportunities (e.g., hard money lending) provides a stressed situation opportunity
- Post Financial Crisis dislocation in U.S. small balance (<$15million) real estate bridge financing occurred as banks backed away from financing smaller developers
- Crestline diversifies portfolio with idiosyncratic first lien loans backed by hard assets at less than 65% LTV's across North America
- Opportunity yields high current interest in short duration assets with upside potential through extensions, workout fees and restructurings

Sourcing / Structuring

- Bi-lateral opportunity sourced off Wall Street through Crestline platform
- Unique structure allows Crestline to maintain investment discretion on deal-by-deal basis via opt-in/opt-out feature
- Company invests 10% of the capital in a deeply subordinated structure

Current Status

- Effective September 2016, Crestline closed on PCG Tranche III for a $17.5mm facility with a total of $87.5mm between the three tranches
- The Tranche II portfolio currently has six loans with a weighted average maturity of ten months and a targeted gross IRR of 24% with a LTV to Crestline of 52%

Expected/Target returns are forward-looking statements that are subject to uncertainties and should not be regarded as a representation, warranty, or predication of any particular performance.

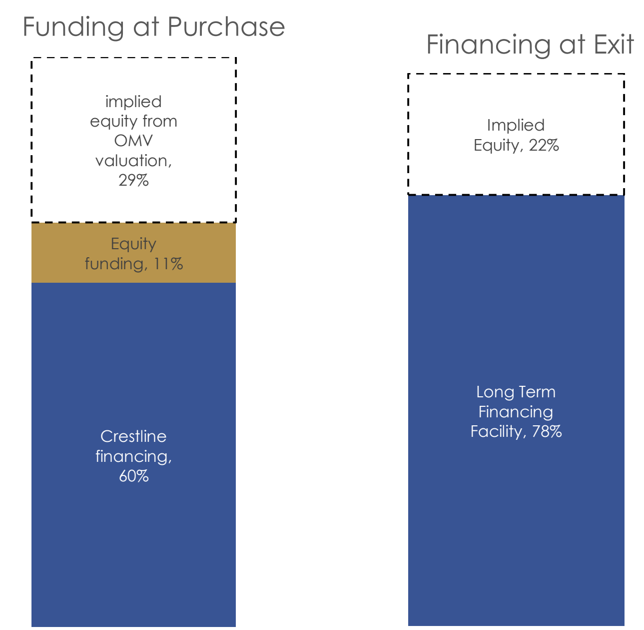
Project Ribbon

Crestline

Provision of short-term, asset-backed, finance to an innovative property development platform in the UK affordable housing segment

Investment Highlights

Date of Investment	July 2016
Crestline Commitment	£20.0 million
Industry	Real Estate
Sub category	Affordable Housing
Source	Direct
Security	1st Lien Senior Secured
Gross Base Case Return Targeted	IRR 15.0%
Returns	MOIC 1.15x



Business Description/ Investment Thesis

Ribbon is a privately owned company that is pioneering a new development and ownership model that permits private investment into the socially-oriented, long-term, UK residential property sector.

Company purchases from developers the portion of houses which the developer is required by the local council to provide (section 106). These assets are not core to the developer's offering and as a result the Company purchases them at a discount to their Open Market Value (OMV).

Crestline will provide a senior loan facility to help the Company finance the purchase and development of the houses.

The key features of the facility are as follows:

- The company purchases the houses at no more than 65% of the OMV (plus fees)
- 85% will be funded by Crestline (effectively 60% OMV) with the balance funded by cash equity
- At the time of purchase and before funding, the Company will have already pre-agreed 20-year head leases with UK Housing Associations, and
- The Company will also have pre-agreed long term financing for the ownership of the houses (at 78% of OMV)

Sourcing/Structuring

Crestline sourced this opportunity through the investment team's personal network and proximity to the industry and specialists in it.

Crestline views this asset as having many of the features of its preferred investment: well protected capital and attractive returns aligned with its project sponsors.

- There is a clear exit for Crestline with the pre-agreed long term financing in place before funding and a solid equity/valuation cushion between our 60% capital (plus an estimated 8% of accrued return over the period) and the 78% OMV take-out financing.
- There is a solid security package with financing no more than 60% of OMV
- Lastly, we like the counterparty risk of Housing Associations. They are non-for-profit private organizations that own and manage affordable housing, and benefit from an implicit UK government support. They are generally viewed as quasi-government agencies with investment grade counter-party risk.

Current Status

- As of December 2016, Project Ribbon had completed and tenanted 55 units with a further 26 units under construction. An additional 259 units are in advance stages of negotiation/documentation.

On financing and at take-out there is a solid equity cushion providing a significant margin of security for the Crestline facility.

Expected/Target returns are forward-looking statements that are subject to uncertainties and should not be regarded as a representation, warranty, or predication of any particular performance.

Select Pipeline Examples

Crestline

Opportunity Fund III continues to generate a robust pipeline by sourcing through deep industry networks, the Crestline/Bass relationships and the breadth of the platform

Project Private

Trust Services | Primary

The Company plans to operate as a trust company dedicated to providing trust services and liquidity to owners of alternative assets and illiquid investment funds.

Size of Facility	$100mm+
Returns	Est. 20%+ IRR, 1.2x MOIC
LTV	33%
Term	2 years

Transaction Highlights:

- Crestline's position would be secured by alternative asset NAV
- Experience of Crestline PE Credit team and nature in which the deal was sourced (off-market) provides a unique Crestline edge.
- Arbitrage opportunity created by regulatory environment to lend at 15%+ cost of capital against assets that typically are lent against at low single digit cost of capital.
- Experienced and high caliber management team has significant alternative asset expertise to execute the transaction.

Project Intermodal

Equipment Leasing | Primary

Opportunity to fund the initial ramp up of a tank container leasing platform through the provision of a $30m senior secured loan.

Size of Facility	$30mm
Returns	Est. 19% IRR, 1.4x MOIC
LTV	75% (peak)
Term	2 years

Transaction Highlights:

- Contractual long term lease revenues from a diversified portfolio of customers
- Asset-backing on a long life asset
- Investing at a historical low point in tank asset prices
- Clear exit mechanism in the form of bank refinance and equity put option
- Experienced management team
- Significant amount of subordinated funding being provided by investing partner

Select Pipeline Examples

Crestline

Opportunity Fund III continues to generate a robust pipeline by sourcing through deep industry networks, the Crestline/Bass relationships and the breadth of the platform

Project Silver

Healthcare | Primary

Manufacturer and developer of off-patent drugs. Crestline's investment would be in the form of senior participating preferred equity.

Deal Size	$40mm
Size of Investment	$20mm
Returns	Est. 36.7% IRR, 3.5x
Projected Investment Horizon	5 years

Transaction Highlights:

- Attractive risk-adjusted returns
- Well-structured facility with downside protection
- Knowledgeable partner with significant industry experience
- Strong, diverse pipeline of difficult to formulate products

Project Kirby

Aviation | Primary

JV with aircraft maintenance organization to pursue aviation tear down projects. Crestline's investment would be in the form of a senior secured loan with equity participation.

Size of Facility	£20mm
Returns	Est. 19% IRR, 2.1x
LTV	62%
Term	5 years

Transaction Highlights:

- Attractive returns on an asset backed basis
- Well-structured facility with high degree of control
- Downside protection
- Knowledgeable partner with differentiated sourcing
- Strong pipeline of transactions providing confidence that the facility can be invested and recycled efficiently

Blue Glacier Fund Class C (PE Credit)

- October 2016 inception, focusing on Portfolio Financings and Fund Restructuring strategies
- Portfolio financing allows managers to provide liquidity to their LPs, or provide selective follow-on growth capital to portfolio companies, thereby enhancing the future NAV
- Fund restructuring provides equity or hybrid-equity capital to existing LPs and into existing fund vehicles

BGF Class C (PE Credit) – Product Summary

As of 2/28/2017 ($mm)

Total Investor Commitments	$100.1	NAV	$5.1
Capital Called from Investor(s)	$4.8	P&L	$0.4
Uncalled Commitments	$95.3	IRR[1]	9.20%
Capital Returned to Investor(s)	$0.0	Realized MOIC	0.00x
Number of Positions	1	Unrealized MOIC	1.06x
Committed to Investments	$10.0	Total MOIC	1.06x

Data shown above represents both the GP and LP's interest unless otherwise noted.
Due to rounding, numbers presented may not add up precisely to the totals.
1. Based on LP's cash flows. Excludes GP.

Project Lighthouse

Crestline

Crestline-led syndicate to provide low LTV (~16%) portfolio financing (loan) guaranteed by a mature (10+ yrs) PE Fund yielding an attractive risk-adjusted return with significant equity cover and collateral diversity (6 companies, 3 stub positions)

Investment Highlights

Date of Investment	November 2016
Investment Opportunity	$20mm
Industry	Tech, Travel Services, Consumer & Business Services
Source	External
Security	(i) Second lien debt at three Portfolio Companies; (ii) First lien on 100% of Fund NAV (aka Fund guarantee)
Targeted Returns (gross)	
IRR	14.1%
MOIC	1.40x

Portfolio Highlights

	Legend	Figures
Portfolio NAV	A	$125,000,000
Preferred Equity Financing	B	$20,000,000
Equity Coverage	= A / B	6.3X
Priority	Second lien on Portfolio Company A. Senior lien on 100% of Fund NAV. Collateral account to be established by Fund to cash collateralize the Facility as portfolio proceeds are received.	

Business / Transaction Description

- Project Lighthouse is a Crestline-led portfolio financing, structured as a second lien loan ("Facility") to three Portfolio Companies with a first lien on Fund NAV (aka Fund guarantee)
- Provides growth capital to the three borrower Portfolio Companies.
- Fund is a 10+ year old investment vehicle diversified across six portfolio companies (and three stub positions) largely in the technology, travel services, consumer and business services industry.
- The transaction has an attractive risk-adjusted return profile from (i) ~$125.0mm of portfolio NAV which provides excellent equity cover, (ii) collateral diversification across six portfolio companies and three stub positions, (iii) one portfolio company is in a definitive agreement to be sold in late Q2 or early Q3 2017, and several other portfolio companies are in sale processes, all of which will serve to cash collateralize the loan. Note – we expect our loan to be 100% de-risked by sweeping cash from the exits of the portfolio companies by Q3 2017.

Sourcing / Structuring

- Crestline (and syndicate investors) provided a 14.5% p.a. PIK second lien loan to three portfolio companies, backstopped by a senior lien on Fund NAV, providing investors with 6.3x equity coverage. There will be a cash collateral account established by the Fund which will sweep cash from portfolio company exits/distributions.
  - All prepayments will be subject to a 15-month make-whole provision on contractual interest from closing
  - There will be a 250 bps rebate on amount of Facility which is cash collateralized and make-whole reduced from 15 months to 12 months
  - We expect the Facility to be 100% cash collateralized in Q3 2017 by sweeping cash from exits of the portfolio companies
- The Facility will mature 36 months after closing, subject to a one year extension at the lender's option.
- Protective provisions include: (i) no additional debt at Fund level, (ii) acceleration of redemption in case of bad behavior, (iii) loan maturity to be less than end of life of Fund, (iv) Lien on equity of underlying companies.

Current Status / Timeline: Closed

Expected/Targeted returns are forward-looking statements that are subject to uncertainty as described further in the relevant offering memorandum and should not be regarded as a representation, warranty or prediction of any particular performance. Actual performance may vary.

Project Horizon (On Shore)

Crestline

Crestline-led syndicate to provide low LTV (<30%) portfolio financing (preferred equity) to a mature (10+ yrs) and in-the-carry PE Fund yielding an attractive risk-adjusted return with significant equity cover and collateral diversity (six companies)

Investment Highlights

Date of Investment	March 2017
Investment Opportunity	$75mm
Industry	Electronic / VOIP Security, Industrials, Media, Financial Svc
Source	Internal
Security	Preferred Equity (100% cash sweep of all distributions)
Targeted Returns (gross)	
IRR	13.6%
MOIC	1.37x

Portfolio Highlights

	Legend	Figures
Portfolio NAV	A	$250,700,000
Preferred Equity Financing	B	$75,000,000
Equity Coverage	= A / B	3.3x
Priority	Senior to all existing equity and debt holders; sweep 100% of cash flows from distributions from portfolio companies subject to recycling provision	

Business / Transaction Description

- Project Horizon is a Crestline-led portfolio financing, structured as preferred equity, to provide follow-on capital to PE Fund to accommodate a cash distribution to the PE Fund's existing LPs.
- Fund is a 10+ year old investment vehicle with six companies across a diverse group of industries.
- Attractive risk-adjusted return profile from (i) ~$250.7mm of portfolio NAV which will be subordinate to the proposed financing, providing excellent equity cover, (ii) collateral diversification across six portfolio companies, (iii) one portfolio company is likely to be sold or refinanced by the end of 2017 while several other portfolio companies are in sale processes, and (iv) a stable, successful and experienced management team who has generated attractive returns (8.5% IRR and ~3x MOIC over 14 years) and subsequently raised two additional funds.

Sourcing / Structuring

- Crestline (and syndicate investors) will receive Preferred Notes with PIK interest at 13.5% p.a. which will be senior to all LPs and GP carry. There will be a 100% cash sweep on all distributions from the Fund.
  - The first $7.5mm of proceeds from any realization will be paid to Crestline
  - Thereafter, a maximum of the next $47.5mm of proceeds from realizations shall be recyclable to refinance debt of Interface (portfolio company)
- The Preferred Notes will be redeemed 30 months after closing. In the event the Fund cannot redeem the Preferred Notes at the end of 30 months, the Preferred Notes shall begin accruing interest at a rate of 17.5% p.a. with a mandatory redemption at year three.
- All prepayments will be subject to a 12-month make-whole provision on contractual interest from closing.
- Protective provisions include: (i) information rights, (ii) board observation rights, (iii) transferability, (iv) no further indebtedness, and (v) acceleration of redemption in case of unanticipated actions from the Borrower.

Current Status / Timeline:

- Closed

Expected/Targeted returns are forward-looking statements that are subject to uncertainty as described further in the relevant offering memorandum and should not be regarded as a representation, warranty or prediction of any particular performance. Actual performance may vary.

Senior Investment Team - Opportunistic

The team has significant experience building and executing a direct lending strategy, with four members working at Goldman Sachs Specialty Lending since 2004

Keith Williams | Partner, Senior Portfolio Manager and Investment Committee Member

20 years' experience

- Manages the US team and acts as the initial judge of deal potential based on investment criteria and themes
- Developed and executed liquid and illiquid distressed strategies in Goldman Sachs' Special Situations Group
- Brings extensive workout experience to the assessment of risk, structuring transactions and asset management

Chris Semple | Managing Director and Associate Portfolio Manager

16 years' experience

- Focuses on sourcing, due diligence and underwriting
- Worked on middle market direct lending and structured equity in Goldman Sachs' Special Situations Group
- Extensive experience in alarm monitoring, multi-site businesses and real estate

Rahul Vaid | Managing Director and Associate Portfolio Manager

20 years' experience

- Contributes to the direct deal sourcing and has extensive expertise in structuring and workouts
- Deep background in secondary credit assets, and hedge fund side-pocket assets
- Extensive experience in energy, specialty finance and telecom

Jonathan Ben-Horin | Director

14 years' experience

- Focuses on sourcing
- Worked on special situations direct lending at Elm Park Capital Management
- Extensive experience in healthcare, education and technology direct lending and private equity investing

Will Palmer | Director

12 years' experience

- Focuses on due diligence and underwriting
- Worked on middle market direct lending and structured equity in Goldman Sachs' Special Situations Group
- Extensive experience in software, data centers, the cloud and financial technology

Alfonso Ramirez | Director

16 years' experience

- Focuses on due diligence, underwriting and asset management
- Worked on middle market direct lending and structured equity in Goldman Sachs' Special Situations Group
- Experience includes workout, turnaround and restructuring of distressed or underperforming companies

Organizational Chart - Opportunistic

Crestline

Investment Committee

DOUG BRATTON
Founding Partner/CIO

CAROLINE COOLEY
Partner & CIO/
Hedge Fund Strategies

JOHN COCHRAN
Partner & COO

KEITH WILLIAMS
Partner,
Senior Portfolio Manager

MICHAEL GUY
CIO Europe

Senior Investment Team

KEITH WILLIAMS
Partner,
Senior Portfolio Manager

CHRIS SEMPLE
Managing Director,
Associate Portfolio Manager

RAHUL VAID
Managing Director,
Associate Portfolio Manager

JONATHAN BEN-HORIN
Director

WILLIAM PALMER
Director

ALFONSO RAMIREZ
Director

JAMES DELAUNE
Director

MICHAEL GUY
CIO Europe

SANJEEV SARKAR
Managing Director Europe

ANDREY PANNA
Managing Director Europe

Investment Team

CLARK WEN
Vice President

MICHAEL BULLARD
Vice President

AARON MACK
Associate

CHRIS WEBER
Associate

GRAHAM GRUNOW
Associate

ROBERT ZELL
Director,
Due Diligence

CHRIS MICHEAL
Associate

MATTHEW HUDSON
Senior Analyst

JONNY O'BRIEN
Analyst

RICKY SIMON
Analyst

Operations and Middle Office

JEREMIAH LOEFFLER
COO, Credit & Opportunistic
Strategies

JOE PIGOTT
Managing Director, COO Europe

TRAVIS KEITH
Senior Associate

MATTHEW CAVE
Senior Associate

Two Middle Office Professionals

Additional Investment Team Support

Loan Servicing
& Monitoring

Agent &
Loan Services

Middle
Office

Accounting
& Treasury

Respected
Fund Administrator

Investment Team – PE Credit

Crestline

The Portfolio Financings and Fund Restructuring team is a senior-heavy unit that has a unique combination of experience across portfolio financings, structured credit, direct secondaries, fund restructurings, fund takeovers, replacement and Co-GP engagements.

David Philipp | Group Head

23 years of experience

- Direct private investment and structuring experience across alternative investments.
- Experience includes Credit Suisse, Deutsche Bank, Merrill Lynch

Amit Mahajan | Group CIO

16 years of experience

- Direct private investment , secondary, fund restructuring and portfolio financing experience in private equity.
- Experience includes Macquarie Asset Management and PineBridge

Paul Choy[1] | Senior Advisor

21 years of experience

- Direct private investment and operational experience in both large and small companies in technology and traditional sectors
- Experience includes CIBC Capital Partners, the merchant bank operation of CIBC and TELUS Corporation.

Michael Rich | Director

25 years of experience

- Direct private investment, structured credit, and special situations lending experience across various sectors
- Experience includes LStar Capital, an affiliate of Lone Star Funds.

GR Christon | Director

19 years' experience

- Financial advisory and management experience with a focus on distressed assets, crisis management and corporate restructuring
- Experiences includes KPMG, Alvarez & Marsal, FTI and Houlihan Lokey.

S. Matthew Katz | Director

19 years' experience

- Principal investment experience, predominately involving the recapitalization of privately-owned growth companies in the middle market
- Experience includes FdG Associates and Lehman Brothers.

Daniel Gabay, CFA | Senior Associate

9 years' experience

- Financial modeling, analytical and due diligence experience across funds and direct assets.

Tim Kuhnen | Senior Analyst

2 years' experience

- Financial modeling, analytical and due diligence experience across funds and direct assets.

[1]Full time consultant

Crestline

Past performance is not a guaranty of future results. Current and prospective investors should not assume that the future performance of any Crestline fund will equal its prior performance results or the results of any previous fund with a similar strategy, and investors risk loss of their entire investment. Each fund's performance results portrayed reflect the deduction of that fund's advisory fees, brokerage commissions and other expenses. The performance results also include the reinvestment of income and dividends, in investment vehicles where such are applicable. For each Crestline fund, an individual investor's returns will vary from the historical performance due to restrictions on participation in certain types of investments and due to the timing of subscriptions, withdrawals, and redemptions; further, the general economic conditions during extreme highs and lows may have affected the returns of the funds.

Within a particular strategy, Crestline may offer a domestic fund and an offshore fund ("Funds") that are managed pari passu. In such cases the Funds managed by Crestline will have investment objectives that are identical or substantially similar. It is not anticipated, however, that the Funds managed by Crestline having identical or substantially similar investment objectives will have identical or substantially similar investment portfolios. Differing investment portfolios can be expected to result from several factors, including, without limitation, the following:

- Regulatory constraints that apply to the Funds managed by Crestline;
- Investment constraints imposed by the Investment Managers of the underlying fund that the Funds may invest in;
- The availability of underlying funds for investment at certain times but not at others; and
- The amount of cash available for investment at certain time by the Funds.

As a result of factors such as these, Funds that are managed pari passu may have a different investment portfolio (and, as a result, different performance results) even though the funds may have identical or substantially similar investment objectives.

Principal executive officers of Crestline are also associated with Bratton Capital Management, LP ("BCM") a firm that acts as the investment adviser and general partner to single family-office-related investments. Crestline and BCM are under common control.

Some information contained in this document is based on data received from third parties that we consider reliable and is accurate to the best of Crestline's knowledge. However, Crestline has not independently verified the information and does not otherwise give any warranty as to the truth, accuracy, or completeness of such third party data, and it should not be relied upon as such. The material is not intended to be a formal research report and nothing in this presentation should be interpreted to state or imply that past results are an indication of future performance.

This document is a summary, is for informational purposes only and does not constitute an offer to sell or a solicitation of any offer to buy or sell securities of any entity, investment product or investment advisory service. Any offer will be made only pursuant to a confidential offering memorandum. There can be no guarantee that the Funds will achieve their investment objective. An investment in the Funds is speculative and involves a high degree of risk, and investors risk loss of their entire investment. Past performance is not indicative of future performance.

Any opinions expressed herein are our current opinions only. There can be no assurance or guarantee that Crestline's investment strategy will achieve its stated goal. All information provided in this presentation is for informational purposes only. In addition, it should not be assumed that any of the securities and/or strategies discussed herein were or will prove to be profitable. Crestline accepts no liability for loss arising from the use of this material.

General Risks of Investing in the Crestline Funds

An investment in the Funds is speculative and involves a high degree of risk. Crestline Management, L.P., is a federally registered investment adviser and serves as the investment manager to the domestic and offshore hedge fund of funds. Crestline Canada, Inc., an affiliate, provides portfolio overlay and hedging execution capabilities to client portfolios as well as Crestline's diversified fund of hedge funds. Crestline Investors, Inc., Crestline Management, L.P. and Crestline Canada, Inc. are individually and collectively referred to herein as "Crestline" or "the Firm." Crestline's investment funds (the "Funds") utilize a fund of funds investment approach whereby Fund assets are allocated among portfolio managers. As a result, the success of the Funds is dependent on the portfolio managers' ability to develop and implement investment strategies that achieve the Funds' investment strategies. The Funds are generally not subject to regulatory restrictions or oversight. The principals of Crestline Investors, Inc. are Douglas K. Bratton, John Cochran and Caroline Cooley (the "Principals"). The success of the Funds' investment program will also depend on the expertise of the Principals in choosing portfolio managers and executing on investment transactions. If the Principals were to cease to be associated with the Funds, it is likely that the success of their investment program would be adversely affected. The Funds may employ leverage, which among other investment techniques, can make their investment performance volatile. Opportunities for redemptions and transferability of interests in the Funds are restricted so investors may not have access to their capital if and when it is needed. There is generally no secondary market for an investor's interest in the Funds and none is expected to develop. The Funds' management fees, incentive fees/allocations, and expenses, may offset their trading profits. An investor should not invest in the Funds unless it is prepared to lose all or a substantial portion of its investment.

The targeted returns are forward-looking statements that are subject to uncertainties described further in the relevant offering memorandum. The targeted returns are based on research conducted by Crestline and the conclusions are Crestline's opinions based on its own independent study. The return targets are supported by various quantitative measures including1) the actual track record of the funds, 2) back-tested returns of a pro-forma portfolio using the fund's current asset allocation and 3) a forecast return calculated using a third-party risk model. For further information on targeted returns including input data and calculation methodology please contact Client Servicing. While Crestline believes that the return targets are supportable, there is no guarantee that the funds will achieve the targeted returns. The targeted rates of return included in this presentation are hypothetical returns, and are for illustrative purposes only. Accordingly, no assumptions or comparisons should be made based upon these returns. Targeted returns are subject to inherent limitations, including but not limited to the fact that the returns do not take into account the impact that market and economic risks may have on investment decision trading. In no circumstances should the targeted returns be regarded as a representation, warranty or prediction that the fund will reflect any particular performance or that it will achieve or is likely to achieve any particular result or that investors will be able to avoid losses, including total losses of their investment.

Crestline

Specialty Lending Fund

CONFIDENTIAL AND PROPRIETARY

JUNE 2017

Table of Contents

Crestline

Crestline Investors Inc. ("Crestline") is an employee-controlled asset management firm founded in 1997 by Douglas Bratton.

The company was originally formed to manage the alternative investments of Edward P. Bass, and in 2001, was expanded to outside investors

The firm's mission is to provide attractive risk-adjusted returns for sophisticated asset owners

We pursue value creation opportunities in niche private markets. To date, Crestline has launched 9 specialized private market funds

Crestline has a 66-person investment team with broad investment experience across market cycles, geographies

Crestline is based in Fort Worth, Texas and London, UK with supporting offices in New York, Chicago, Toronto and Tokyo

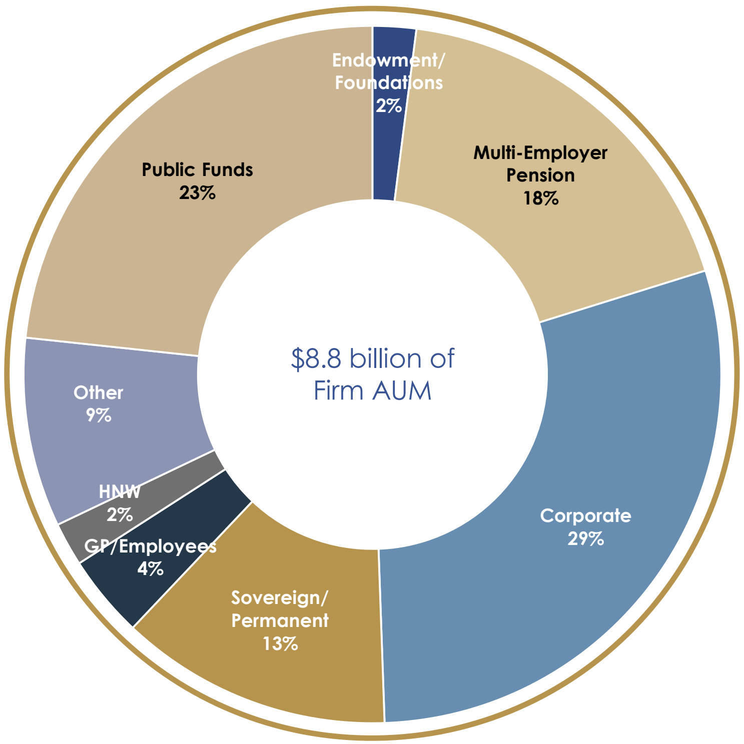
Our team of client-focused professionals provides the highest caliber of operational excellence, relationship management and governance for Crestline's clients

Client Base

The majority of our clients are institutional

94% of our total firm assets are from institutional investors

We are organized to proactively serve their needs



AUM for Crestline, its affiliates and its affiliated management team is estimated at $8.8 billion, which includes uncalled capital commitments and $1.6 billion of beta overlay notional amounts, $0.6 billion of AUM consists of previous funds managed by principals of Denali via DC Funding Partners LLC independently of Crestline. The above estimate is based on valuations as of 5/1/2017 except for certain assets managed by Crestline affiliates, which are valued as of earlier dates based on the most recently available data for such assets. Crestline Denali Capital also provides operational and administrative support services to DC Funding Partners LLC. Specialty Lending Fund AUM includes leverage.

Other Category represents Hedge Funds and Asset Management Firms.

Product Array

Crestline

Crestline has a unique 19 year experience providing innovative investment offerings across a diverse Product Array

STRATEGIES	Credit Strategies			Fund Financings & Restructuring Solutions	Hedge Funds	Derivative Solutions
TOTAL AUM	$4.7B			$1.3B	$1.2B	$1.6B
FOCUS	**Opportunistic Investing**	**Senior Secured Credit**	**Managed Accounts**	**Private Equity/ Hedge Funds**	**Hedge Funds**	**Custom Derivative Structures**
FUNDS/ OFFERINGS	**Fund I** 2005 launch $390 million[1]	**CLOs** 12 since 2001 $2.1 billion	**Custom Private Credit Mandates** $142 million	**Portfolio Financings and Fund Restructurings** $354 million	**Summit Equity Alpha Fund** Multi-PM equity relative value hedge fund $452 million	**Beta, Hedging & Trading Strategies** Portable alpha and tail-risk hedging
	Fund II 2012 launch $980 million[1]	**Specialty Lending** $615 million[1]		**Replacement GP, Co-IM, and Co-GP Mandates** $354 million[3]	**Managed Accounts** Custom hedge fund mandates $1.2 billion[2]	
	Fund III $866mm raised to date Target raise $1–$1.25 billion			**Recovery Funds** 3 since 2009 $633 million		

AUM for Crestline, its affiliates and its affiliated management team is estimated at $8.8 billion, which includes uncalled capital commitments and $1.6 billion of beta overlay notional amounts, $0.6 billion of AUM consists of previous funds managed by principals of Denali via DC Funding Partners LLC independently of Crestline. The above estimate is based on valuations as of 5/1/2017 for certain assets managed by Crestline affiliates, which are valued as of earlier dates based on the most recently available data for such assets. Crestline Denali Capital also provides operational and administrative support services to DC Funding Partners LLC. Specialty Lending Fund AUM includes leverage.

See Notes to Performance History & Comparisons for further information.

1. Represents the largest amount of capital committed and does not reflect current commitments. Opportunity Fund II includes two customized private credit mandates closed as part of the Opportunity Fund II fundraise that are shown under Custom Private Credit Mandates as well. 2. Includes commingled funds and products in wind-down as well as investments in other products. 3. Represents AUM of funds for which Crestline is a GP or Co-GP

Organization

Crestline

Douglas Bratton Founding Partner & CIO	Keith Williams Partner/Senior PM	Caroline Cooley Partner/CIO/Diversified Funds	John Cochran Partner/COO

Opportunistic, Specialty Lending and Credit Strategies

Credit and Opportunistic Strategies

Keith Williams, Partner/Senior PM
Michael Guy, MD, CIO/Europe

Andrey Panna, MD
Sanjeev Sarkar, MD
Chris Semple, MD
Rahul Vaid, MD

Jonathan Ben-Horin, Dir
William Palmer, Dir
Alfonso Ramirez, Dir
James Delaune, Dir
Analysts - 10

Jeremiah Loeffler, COO, Credit & Opportunistic Strategies
Staff – 4

Crestline Denali

David Killion, CEO

Greg Cooper, Senior MD

John Thacker, Senior MD, Chief Credit Officer
Staff - 22

Fund Financings and Restructuring Solutions

PE Credit and Fund Restructurings

David Philipp, MD, Group Head
Amit Mahajan, MD, Group CIO

Paul Choy[1], Sr. Advisor
GR Christon, Dir
Matt Katz, Dir
Mike Rich, Dir

David Calvert[2], Manager

1 Sr. Assoc
1 Sr. Analyst

Recovery Funds: Hedge Fund Secondaries and Side Pockets

Crestline-Kirchner: Successor GP Mandates

Hedge Fund Strategies

Equity Market Neutral and Diversified Strategies

Philip Harris, MD, Head of Equity Strategies
David Finch, MD, Senior PM

Neilson Arbour, MD, Equities
Jeff Marcinowski, Dir – Credit
Analysts – 3

Mark Walker, COO Crestline Summit
Melinda Lilly, Assoc Dir
Matt Schmitt, Assoc Dir

Beta, Hedging & Trading Strategies

Scott Henshaw, VP
Umar Malik, VP

Middle Office

Glenn Bearden, MD
Analysts - 2

Infrastructure

Operations

Roger Marcincuk, Deputy COO
Staff - 1

Risk Management/ Investment Risk

Alex Didych, MD
Staff - 1

Risk Management/ Ops Due Diligence

Rob Zell, Dir
Staff - 1

The Client Partnership Group

Frank Jordan, MD, Global Head of The Client Partnership Group

Sean Gannon, MD
Bill Braxton, MD
David Mabry, MD
Graham Officer, MD
Chris Golio, MD
Daniel Schwarz, Assoc Dir
Staff – 9

Crestline Canada

Paul Robson, Head of The Client Partnership Group Canada and President

Legal/Compliance

Jesús Payán, GC
Paula Roberts, CCO
Staff - 5

Accounting

Camille Sassman, CFO
Staff - 16

Technology

Nathan Shulman, Dir
Staff - 3

Total Firm:
66 Investment Professionals
140 Employees

[1] Full Time Consultant
[2] Dedicated operations and middle office liaison

Crestline Specialty Lending Fund Strategy

Overview – Firm and Opportunity

Crestline

FIRM BACKGROUND

- Crestline Investors was founded in 1997 as a manager for members of the Texas-based Bass family. We currently manage $8.8 billion in alternative investment strategies and have 66 dedicated investment professionals
- Investment teams based in Fort Worth, Texas and London, UK with supporting offices in New York, Chicago, Toronto and Tokyo
- Investment professionals have deep direct lending experience and have successfully worked together over many years and investment cycles

WHAT IS THE OPPORTUNITY?

- **Crestline Investors is launching Specialty Lending Fund II (SLFII) with a senior secured 1st lien direct lending mandate to identify high quality opportunities in the primary market for U.S. small to mid-sized companies.**
- This fund shares the same direct investment strategy as the predecessor fund, Specialty Lending Fund I (SLF I). SLF I is exceeding deployment and performance expectations with approximately 99% of existing exposure in 1st lien structure at approximately 55% loan to value ("LTV")
- Continue to capitalize on our deep expertise in specific industry verticals to differentiate from other capital providers
- Our 20 person investment team focusing on lower middle market and middle market companies in North America with capital requirements that are not easily addressed by traditional capital providers
- Achieve significant illiquidity premium over high yield and broadly syndicated bank debt markets through directly originated middle market loans

AUM for Crestline, its affiliates and its affiliated management team is estimated at $8.8 billion, which includes uncalled capital commitments and $1.6 billion of beta overlay notional amounts, $0.6 billion of AUM consists of previous funds managed by principals of Denali via DC Funding Partners LLC independently of Crestline. The above estimate is based on valuations as of 5/1/2017 for certain assets managed by Crestline affiliates, which are valued as of earlier dates based on the most recently available data for such assets. Crestline Denali Capital also provides operational and administrative support services to DC Funding Partners LLC. Specialty Lending Fund AUM includes leverage. Expected/Targeted returns are forward-looking statements that are subject to uncertainty as described further in the relevant offering memorandum and should not be regarded as a representation, warranty or prediction of any particular performance. See Notes to Performance History & Comparisons for further information.

Executive Summary – Specialty Lending Funds

Crestline

Crestline is pleased to announce the launch of Crestline Specialty Lending Fund II…

FOCUSED

- Senior secured 1st lien lending to US lower and middle market companies
- Focus on industries with recurring revenues and/or multi-site businesses for risk mitigation
- Companies with greater than $3 million of EBITDA
  - Less competition in lower-middle and middle market
- Maintenance covenants customized to key industry metrics
- Robust pipeline of sponsor (75%) and non-sponsor (25%) deals

ATTRACTIVE RETURN CHARACTERISTICS

- Targeted returns of 11% to 13% (Net of fees and including leverage)
- Floating rate loans to mitigate risk of rising interest rates
- Quarterly cash distributions (Fund I currently paying ~10% annualized dividend)
- 5 year loans with average principal repayment of approximately 3.5 years

Expected/Targeted returns are forward-looking statements that are subject to uncertainty as described further in the relevant offering memorandum and should not be regarded as a representation, warranty or prediction of any particular performance.

Crestline

What makes Crestline unique

TEAM CONTINUITY	• Core team previously worked together at Goldman Sachs ➢ Dating back to 2004 including through the financial crisis ➢ Over 100 transactions at GS and over 70 at Crestline
INDUSTRY FOCUS	• We employ specialists in industries with specific characteristics ➢ We are not generalists ➢ Multi-site Businesses (e.g. Education, Health-Care Services) ➢ Recurring Revenues (e.g. Data Centers, Alarm Monitoring, Payment Processing) ➢ Asset-Backed
RESTRUCTURING EXPERTISE	• Senior members of the team have direct restructuring experience ➢ Restructurings can be messy and complex ➢ We bring this experience to every loan
ESTABLISHED SOURCING NERTWORK	• Specialist approach leads to deep industry connections ➢ Lawyers, Accountants, Specialist Investment Bankers ➢ Private Equity Sponsors ➢ GP's, Restructuring Advisors, Broker-Dealers, Industry Conferences ➢ Bass / Crestline Network

Past performance is not indicative of future results.

Investment Characteristics / Specialty Focus

Crestline

	RECURRING REVENUE	MULTI-SITE / DISCRETE POOLS OF VALUE	ASSET PROTECTION
DESCRIPTION	• Recurring or multi-year contractual revenue • Mission critical attributes create high switching costs	• Businesses with 10+ locations, each with its own cash flow stream • Businesses with separable pools of value	• Single asset or portfolio of assets • Preferably cash yielding
WHY WE LIKE IT	• Defensible/predictable cash flow stream • High free cash flow conversion from EBITDA • Industry growth tailwinds, coupled with sticky customers, provide exit opportunities in downside	• Provides risk mitigation with multiple cash flow streams – shut down unprofitable locations • Provides risk mitigation through independent asset sales • Multiple exit options	• Provides asset coverage thus mitigating principal risk • Cash yield provides basis de-risking • Portfolio of assets creates diversity

Targeted Portfolio Attributes

Crestline

TARGET PORTFOLIO	INVESTMENT STRUCTURE		TRANSACTION
90%	1st Lien or One-Stop Unitranche Structure	Traditional 1st Lien, Single Lien Incorporating Risk from 1st Lien to Implied Mezzanine Risk or Bifurcated First Lien	Refinancing Acquisitions Leveraged Buyouts Growth Capital Dividend Recap DIP / Exit Loans Hung or Dislocated Liquid Deals
10%	2nd Lien and Minority Equity	2nd Lien Small Minority "Co-Investment"	

TYPICAL LOAN METRICS

AVERAGE SIZE: $15 – 50 million	OID: Up to 5%
COUPON RANGE: LIBOR + 650 – 1000 bps	MISCELLANEOUS FEES: Up to 2%
LIBOR FLOORS: 50 – 100 bps	EQUITY "CO-INVESTMENT": 0 – 5%

Actual portfolio composition may differ from target portfolio due to various factors.

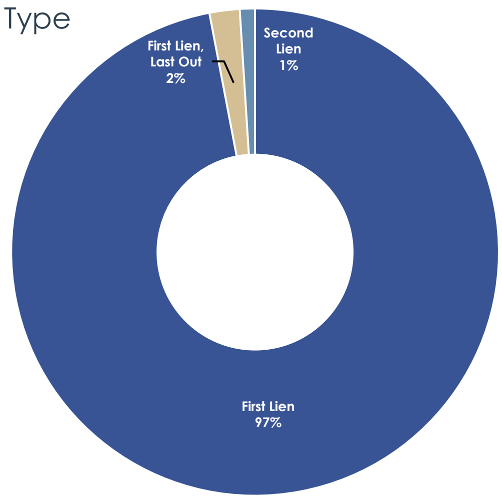
Portfolio Construction

A key Crestline advantage is its focus on the smaller or mid-sized deals, and its ability to analyze and underwrite realistic terms, covenants and expectations.

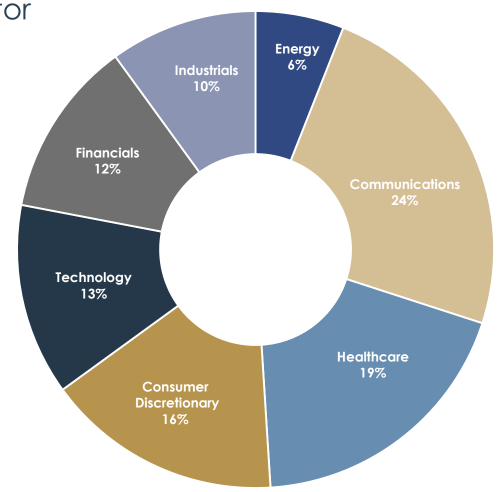
TYPICAL LOAN SIZE	$15 to $50 million
EXPOSURE	Typically 80%+ U.S. Up to 20% European 90% 1st lien senior secured
CONCENTRATION	Maximum position size at entry: 5% • 30+ Individual Loans Maximum industry concentration: 25%
TARGET RETURNS	11% to 13% net (including leverage) Quarterly cash distributions

SPECIALTY LENDING FUND I

Lien Type



Sector



Expected/Targeted returns are forward-looking statements that are subject to uncertainty as described further in the relevant offering memorandum and should not be regarded as a representation, warranty or prediction of any particular performance.

Disciplined Process

Crestline has a robust deal screening process to confirm on-going interest, appropriate use of resources, and proper risk/reward characteristics.

Target: 300 to 500

INVESTMENT PROCESS	
Continuous sourcing of opportunities via broad network of internal and external relationships	INCOMING OPPORTUNITIES
Develop initial understanding of deal dynamics, business/collateral attractiveness and core investment thesis	INITIAL SCREENING
Identify key risk factors, capital preservation drivers and core areas of diligence	PRELIMINARY INVESTMENT COMMITTEE REVIEW
Keys for risk mitigation Ability to gain control of outcome if necessary	FULL DUE DILIGENCE & STRUCTURTING
Review investment thesis, structure, risk/reward potential and portfolio fit	INVESTMENT COMMITTEE

10 to 15 loans per year

Experienced Leadership & Senior Investment Team

Crestline's Partners have significant private markets experience

Investment Committee

JOHN COCHRAN	CAROLINE COOLEY	DOUGLAS K. BRATTON	KEITH WILLIAMS	MICHAEL GUY
Chief Operating Officer	**CIO, Diversified Funds**	**Founding Partner & CEO**	**Senior Portfolio Manager**	**CIO Europe**
KPMG M&A Practice	Bass family	Bass family	Goldman Sachs' Special Situations Group	DLJ/Credit Suisse BAML
Joined 1998	Joined 1998	Founder 1997	Joined 2012	Joined 2014

20 person investment team focusing on lower middle market and middle market companies

Chris Semple | Managing Director

16 years' experience

- Goldman Sachs' Special Situations Group

James Delaune | Director

12 years' experience

- Deutsche Bank

Jonathan Ben-Horin | Director

14 years' experience

- Elm Park Capital Management

Rahul Vaid | Managing Director

20 years' experience

- Frontier Investment Holdings

Will Palmer | Director

12 years' experience

- Goldman Sachs' Special Situations Group

Alfonso Ramirez | Director

16 years' experience

- Goldman Sachs' Special Situations Group

Crestline Partners: Douglas Bratton, Caroline Cooley, John Cochran, and Keith Williams

Crestline Specialty Lending Fund II - Term Sheet

Crestline

INVESTMENT MANAGER	Crestline Management, L.P., a Delaware limited partnership, a SEC registered investment advisor
TARGET RAISE	$500 million
FINAL CLOSE DATE	No later than 12 months from Initial Close Date
TARGET RETURN	11% to 13% net
MINIMUM COMMITMENT	$5 million commingled fund, $100 million managed account
FUND STRUCTURE	Private equity format with a drawdown structure
INVESTMENT PERIOD	Three years from Final Close Date
TERM	Four years after end of Investment Period with possibility of additional one-year extensions at GP discretion
LEVERAGE	Leverage at the fund level up to 1.5x
MANAGEMENT FEE	90bps on gross assets invested
CARRIED INTEREST	15% of net profits above a 6% Preferred Return with General Partner catch-up
DISTRIBUTIONS	Distributed as received, net of proceeds required for fund expenses, liabilities or reinvestment
REPORTING	Quarterly NAV calculation with quarterly reporting; full transparency as requested

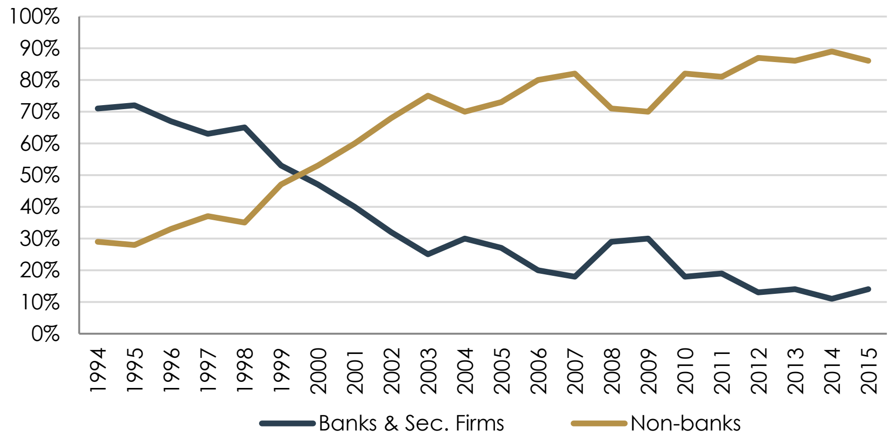
Expected/Targeted returns are forward-looking statements that are subject to uncertainty as described further in the relevant offering memorandum and should not be regarded as a representation, warranty or prediction of any particular performance.

Middle Market Overview

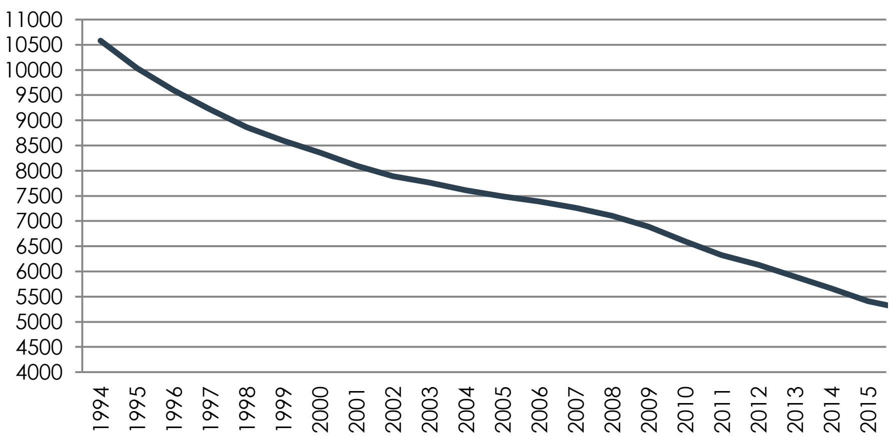
Crestline

- Due to increased regulatory pressures, the lending gap between banks and non-banks shows no signs of reversing
- Bank volume and market share continue to decrease

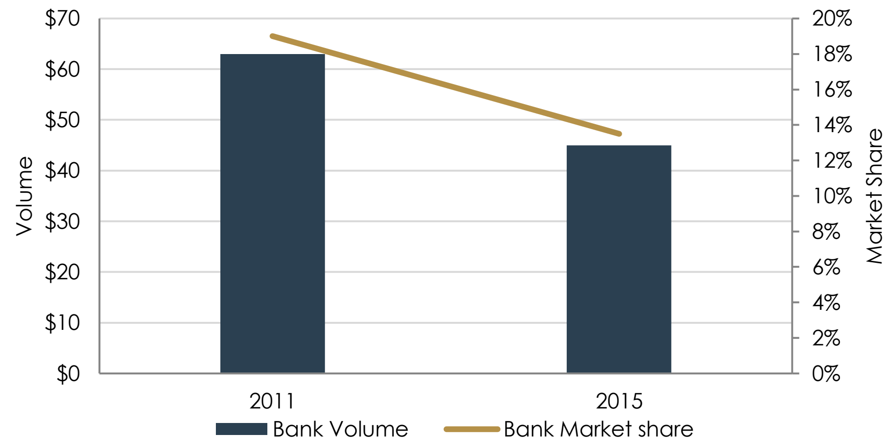
NEW ISSUANCE 20-YEAR HISTORY – LEVERED LOANS



NUMBER COMMERCIAL BANKS AND S&Ls IN THE U.S.



NEW ISSUANCE FOR LEVERED LOANS ($B)

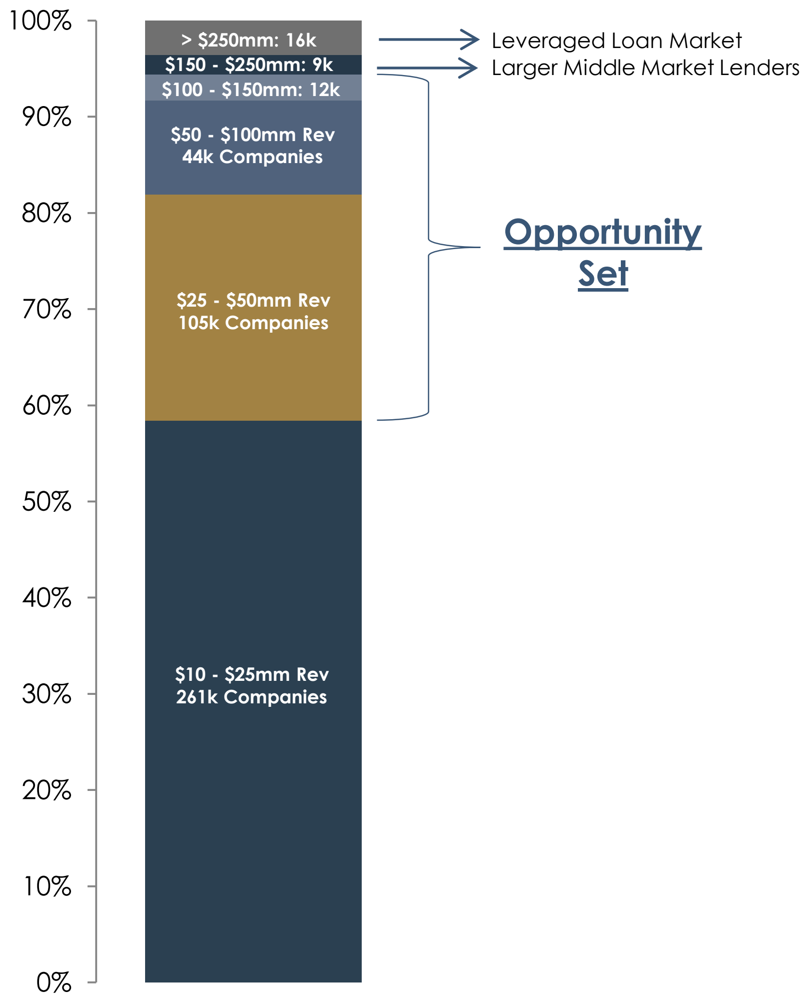


Source: Federal Reserve Bank of St. Louis Economic Research
Source: S&P Capital IQ Leveraged Commentary & Data.
See Notes to Performance History & Comparisons for further information.

Robust and Fragmented Market

Crestline

NORTH AMERICAN COMPANIES



- In total number of companies, the middle market is an immense opportunity set
- **Over 150k companies make up the core opportunity set based on revenue between $25mm and $150mm**
- 422k companies make up opportunity set based on revenue between $10mm and $150mm
- Leveraged loan and rated bond markets are realistically only accessible for companies with ~$250mm or more in revenue
- Wells Fargo Securities estimates:
  - Private credit dry powder approximately $150 billion
  - Private equity dry powder is multiples higher than private credit

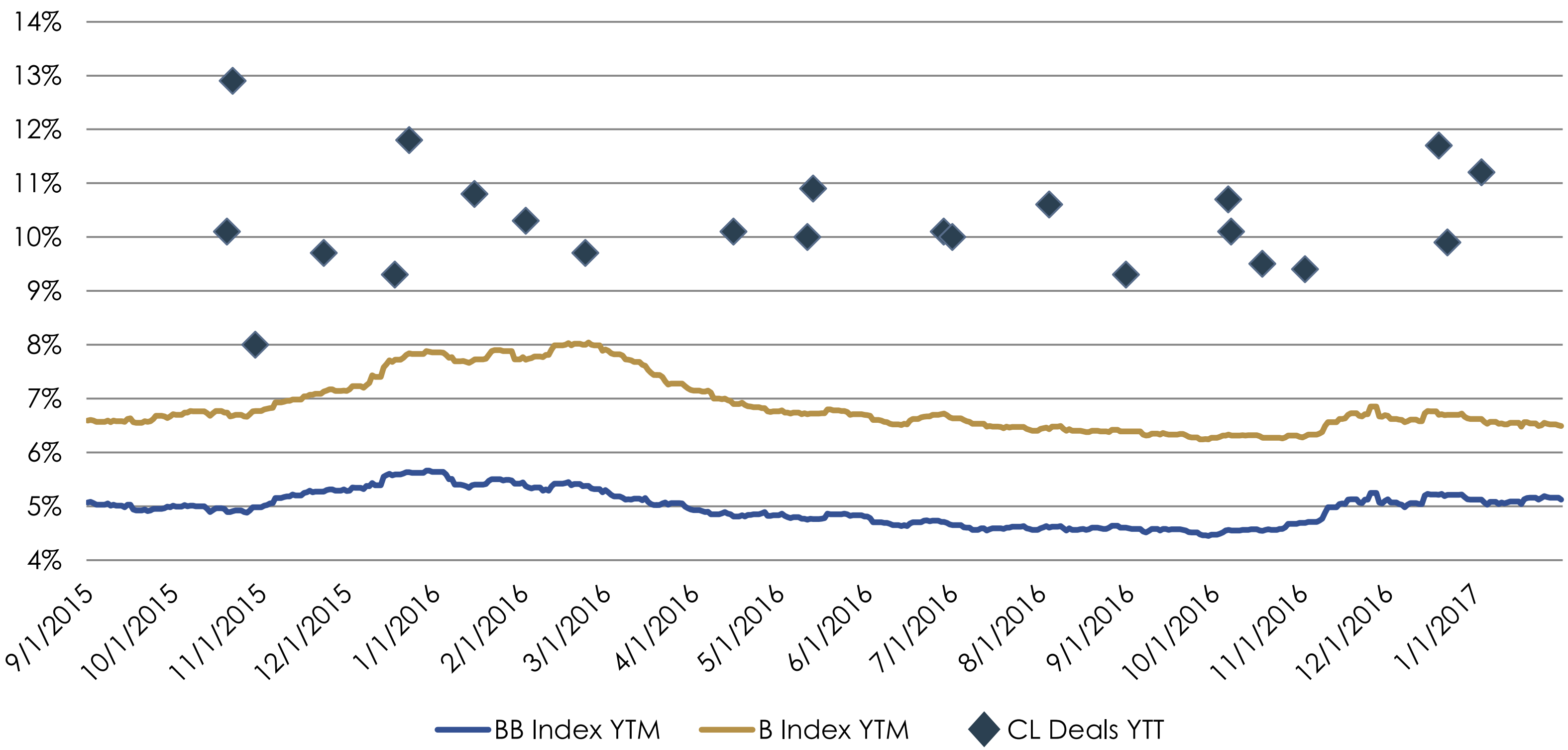
Sources: OneSource Database. Note: excludes 2.5mm companies without estimated revenue; Wells Fargo Securities, LLC – 4Q 2016 BDC Industry Trends Discussion.

Private Versus Public Illiquidity Premium

Crestline

Crestline SLF I has generated a significant premium to the broadly syndicated loan market with similar risk

- The below chart compares the base case return (yield to 3-yr take-out) for deals to date in SLF I versus the YTM (yield-to-maturity) of the JPM Leveraged Loan Index (B and BB indices)
- The illiquidity premium Crestline has been able to achieve to date is significant. The average premium for SLF I deals versus the B Index (Crestline YTT less Index YTM at underwriting) is 337bp
- The privately negotiated deals benefit from better covenants and structures, which further reduces risk in a downside

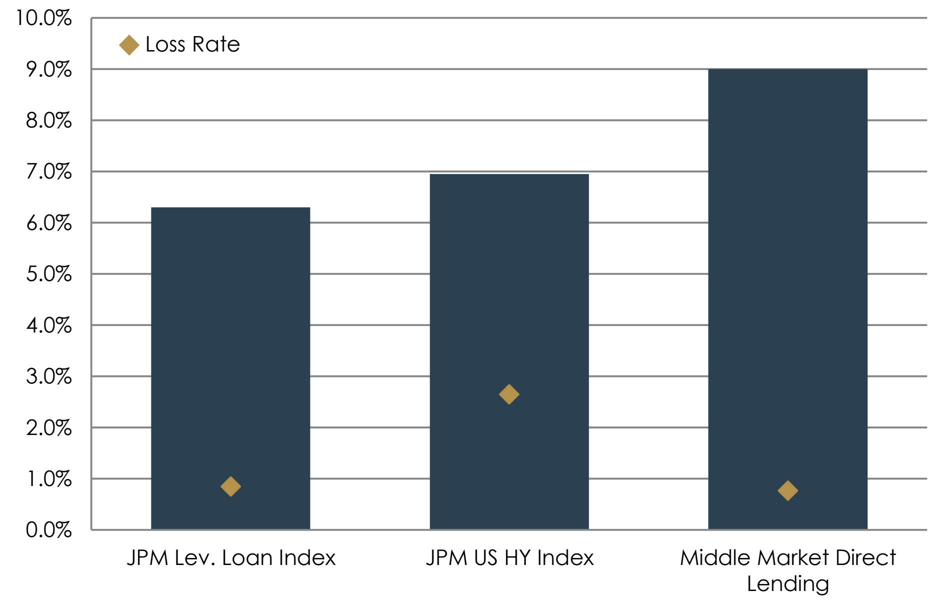


Attractive Current Market Opportunity

Attractive risk-adjusted returns vs. broadly syndicated loans / high yield securities

- Unlevered market yields of 8% to 11%, equating to 100 to 500 bps of premium relative to broadly syndicated loans and high yield securities
- Current yields ranging from 8% to 10% annually (typically paid quarterly)
- **Middle market loss rates are historically lower due to the following:**
  - **Higher equity contribution**
  - **Stronger covenant packages**
  - **Better visibility into the company and closer relationships with borrower**
  - **Less complex capital structures and inter-creditor dynamics**

MIDDLE-MARKET LOANS CAN OFFER HIGHER YIELDS THAN LARGE MARKET DEBT



Source for Lev Loan Index and JPM US HY Index return info is JPM Lev. Loan Market Monitor and JPM HY Market Monitor, respectively; Middle Market Direct Lending return is Crestline Estimate.
Loss rate data source: JPM Default Rate Monitor August 2016; calculated 15 year average default and recovery – loss rate calculation = Default Rate * (1-Recovery Rate); Private Credit Loss Rates. Loss rate data source for Middle Market Direct Lending is Cliffwater's Direct Lending Index and is used for comparison purposes only.
Past performance is not indicative of future results.
See Notes to Performance History & Comparisons for further information.

Crestline

Crestline Specialty Lending Fund I

Crestline Specialty Lending Fund I Summary

Crestline

- **Net IRR as of 3/31/17 is 11.03%**

- Target leverage: 1.00x debt/equity

- Credit Summary
  - No payment defaults since inception
  - No credits currently in non-accrual status

- **31 transactions consummated and 1 in process, as of May 25th, 2017**
  - Currently $570 million funded on $625 million of commitments[1]

- 7 deals have payed off

• Project Bulldog	April 27th, 2016	16.90% IRR / 1.11x MOIC (underwritten at 9.7% / 1.3x)[2]
• Project Ticket	October 12th, 2016	24.61% IRR / 1.11x MOIC (underwritten at 10.1% / 1.3x)[2]
• Project Skynet	October 19th, 2016	8.35% IRR / 1.04x MOIC (underwritten at 10.0% / 1.2x)[2]
• Project Cavaliers	December 15th, 2016	12.08% IRR / 1.12x MOIC (underwritten at 9.7% IRR / 1.5x)[2]
• Project Montessori	January 3rd,2017	13.28% IRR / 1.13x MOIC (underwritten at 10.7% IRR / 1.5x)[2]
• Project Atlantis	May 1st, 2017	13.0% IRR / 1.15x MOIC (underwritten at 10.8% IRR / 1.2x)[2]
• Project Yogi	May 24th, 2017	11.8% IRR, 1.14x MOIC (underwritten at 9.40% IRR / 1.4x)[2]

[1] Represents cumulative par value; does not include scheduled amortization or payoffs.
[2] Unlevered Gross IRR will differ from Net IRR due to Fund-level fees and expenses as well as returns from and costs associated with the Fund's leverage facility in addition to other factors.

Specialty Lending Fund – Current Portfolio Snapshot

Crestline

As of May 25th, 2017

Fund Statistics	
Cumulative Commitments	$624.9
As % of Total Fund Size[1]	101.6%
Current Commitments	$467.6
As % of Total Fund Size[1]	76.1%
Cumulative Transactions	31
Active Transactions	24
Commitments in Lower Middle Market (current)	$272.0
Commitments in Middle/Upper Middle Market (current)	$195.6
% Floating Rate	94.0%
% First Lien / Unitranche	99.6%
% Call Protection	94.2%

Weighted Average Portfolio Company Statistics			
Crestline Specialty Lending Fund			
As of 05/25/2017	Lower Middle Market	Upper/Middle Market	Portfolio
EBITDA (at U/W)[2]	$7.4	$44.1	$35.5
Debt / EBITDA (at U/W)[3]	3.3x	5.8x	4.4x
LTV	53.2%	56.7%	54.8%
LIBOR Spread	8.1%	7.5%	7.8%
LIBOR Floor	1.0%	0.8%	0.9%
Upfront Fees / OID	2.0%	2.4%	2.2%
Yield to 3-Year Takeout	10.2%	9.1%	9.7%

[1] $615mm of commitments (including $300mm asset based leverage commitment)
[2] Upper/Middle Market EBITDA excludes one investment outlier.
[3] Debt/EBITDA represents the debt through the security tranche Crestline holds
$ in mm

Crestline

Crestline provided capital to support the growth of one of the largest privately-owned veterinary hospital operators in the United States.

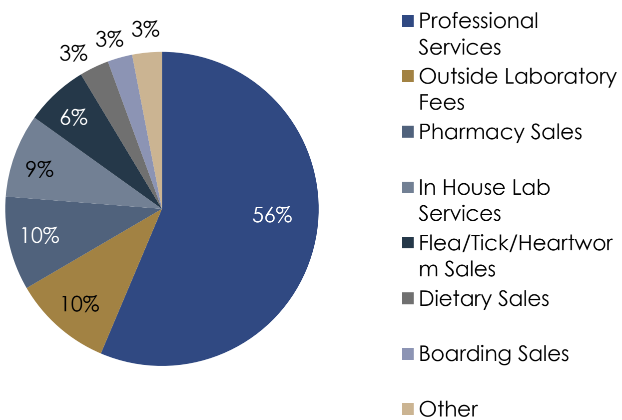
Investment Highlights

Date of Investment	June 2015
Crestline Commitment	$25.0 million
Industry	Veterinary Hospitals
Gross Base Case Return	9.6%/1.4x MOIC

Security Description

Security Type	1st Lien
Maturity	June 2019

Segment Revenue



Business Description/ Investment Thesis

- The Company owns and operates a network of full-service general practice veterinary hospitals. To date, the Company has acquired 55 veterinary hospitals since 2003, making the Company the second largest privately-owned operator in the industry.
- The veterinary care industry has grown at a 6% annual growth rate since the 1990's and has exhibited relative stability during periods of economic downturn.
- The Company has developed a reputation as a good partner to the doctors within hospitals it acquires and has a strong, proven integration and operating model that has consistently demonstrated improved operating margins post-acquisition.
- The founders worked as veterinarians prior to their experience with a private veterinary consolidation strategy backed by private equity financing.

Sourcing/Structuring

- A direct lender negotiated the opportunity to provide a senior secured loan facility to the Company.
- Crestline was approached by the Lender with the opportunity to buy down a portion of the term loan and fund incremental facility increases on a pro rata basis.

Current Status

- Realized in April 2016 at 16.9% IRR and 1.11x MOIC

Expected/Target returns are forward-looking statements that are subject to uncertainties and should not be regarded as a representation, warranty, or predication of any particular performance.

Project Cavaliers

Crestline

Crestline provided capital to a rapidly growing provider of cloud-based hosting and management services

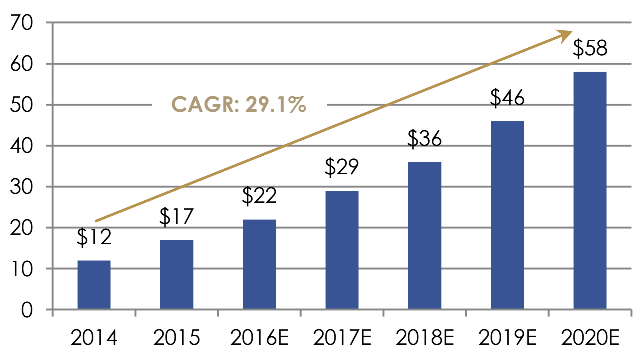
Investment Highlights

Date of Investment	November 2015
Crestline Commitment	$15.0 million
Industry	Telecom
Gross Base Case Return	9.1%+ IRR/1.3x MOIC

Facility Highlights

Structure	1st Lien Senior Secured
Maturity	5 years
Leverage	3.6x
LTV (at close)	33.8%
Total Deal Size	$15.0 million

Infrastructure-as-a-Service ("IaaS") Market Size ($bn)



Business Description/ Investment Thesis

- Growing US-based provider of enterprise cloud software and managed services. The Company offers a wide range of cloud and secure solutions to support high availability infrastructure and disaster recovery services.
- The Company is capitalizing on the significant growth in outsourcing IT infrastructure and functions, led by (i) growth in internet traffic (ii) growing complexity of applications, and (iii) necessity to support users in real-time.
- Achieves a high degree of recurring revenue and strong visibility amid multi-year contracts and high switching costs.
- Generates significant free cash flow through a combination of contractual recurring revenue, declining capital expenditures, and limited working capital requirements.

Sourcing/Structuring

- Sourced via Crestline relationship, not broadly marketed
- Highly structured transaction inclusive of a LQA leverage covenant test with significant quarterly step downs to quickly provide Crestline a seat at the table in a declining performance scenario.

Current Status

- Realized in December 2016 at 12.1% IRR and 1.12x MOIC

Expected/Target returns are forward-looking statements that are subject to uncertainties and should not be regarded as a representation, warranty, or predication of any particular performance.

Crestline

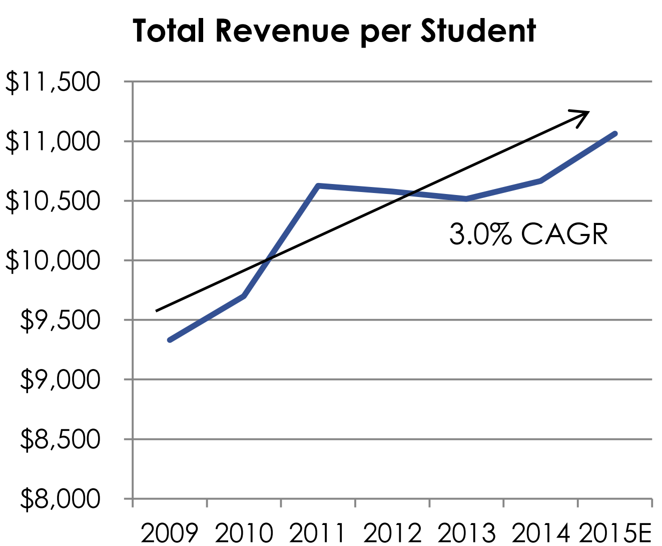
Crestline provided first lien capital to a for-profit education provider which generates highly recurring and predictable revenue streams.

Investment Highlights

Date of Investment	February 2015
Crestline Commitment	$12.5 million
Industry	Education
Gross Base Case Return	10.7%

Security Description

Security Type	1st Lien
Maturity	December 2019
Total Deal Size	$32.5 million



Business Description/ Investment Thesis

- The Company is a for-profit company that acquires and manages Pre-K to 9th grade private schools with long operating histories in top U.S. metropolitan markets.
- The Company maintains a diversified portfolio of schools. To date, the Company has acquired 17 schools located in six states, which in aggregate currently provide educational services to ~3.0k students.
- Schools typically have highly recurring and predictable revenue streams from tuition and other fees. The majority of students pay their tuition with cash or credit cards, and there is no dependence on government programs.
- The schools the Company acquires often own the real estate out of which they operate, which gives Crestline additional collateral for the Facility.

Sourcing/Structuring

- Crestline was contacted by the lender with the opportunity to participate in a first lien senior secured multi-draw term loan facility on a pari-passu basis with the lender.

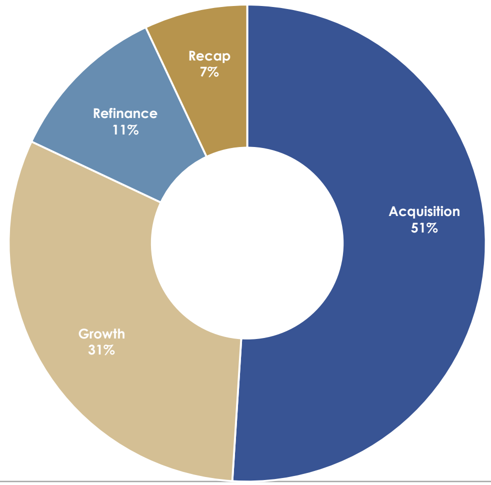
Current Status

- Realized in January 2017 at 13.3% IRR and 1.13 MOIC

Expected/Target returns are forward-looking statements that are subject to uncertainties and should not be regarded as a representation, warranty, or predication of any particular performance.

Strategy – Portfolio Diversification by Deal Type & Lien Type

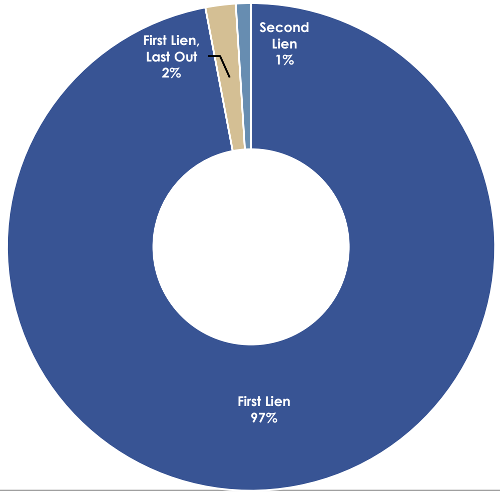
Deal Type



Deal Type Commentary

- Crestline is not dependent upon any particular type of capital transaction
- Our mix of sponsor-owned borrowers and non-sponsor backed borrowers helps diversify our portfolio by borrower capital use
- Crestline facilitates more transaction based deals, those utilizing our industry specialization to provide certainty of execution and meet timely expectations

Lien Type



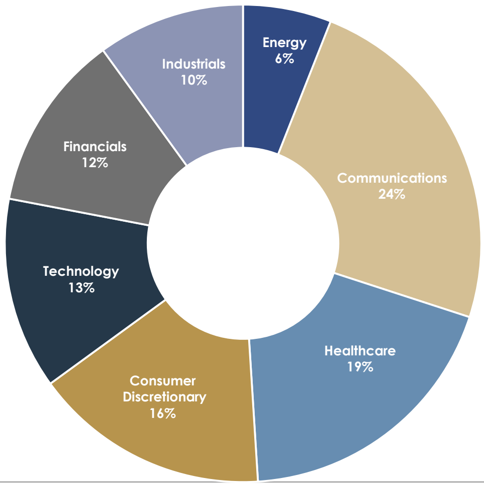
Lien Type Commentary

- Liens provide Crestline with downside protection and negotiating leverage in a restructuring
- The majority of Crestline's loans are structured with a 1st lien, providing first $ exposure on the vast majority of the portfolio

Strategy – Portfolio Diversification by Sector & Industry

Crestline

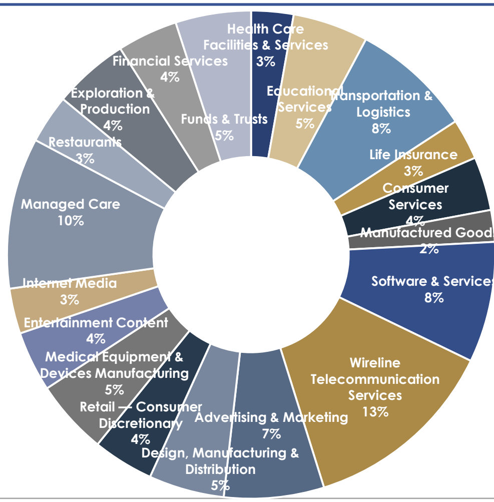
Sector



Sector Commentary

- We believe end-market diversification reduces portfolio volatility during adverse cycles in any one market
- We impose limits on sector concentration such that no sector should exceed 40% during the investment period of the fund
- Fund I reflects favorable end market weightings
- Recurring revenue and multi-site business dominate sector exposure, amounting to 88% of current commitments

Industry



Industry Commentary

- Fund I is invested in 19 industries, and has average industry exposure of 6%
- As Funds run-off post-investment period, industries will become over-weighted

Crestline Specialty Lending Fund I – Overview

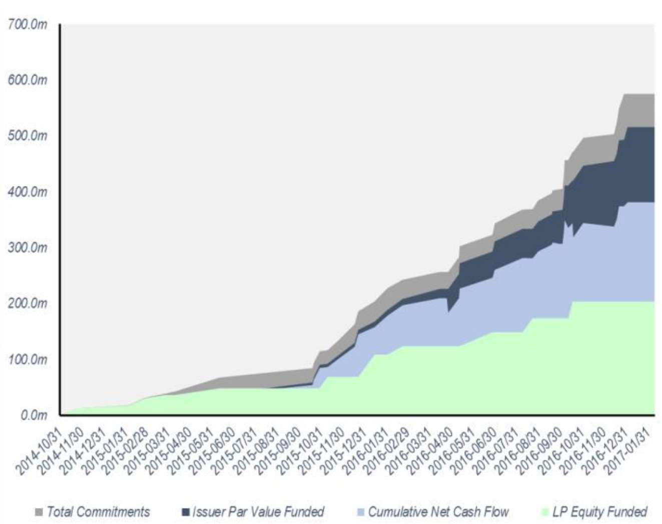
FUND STATISTICS

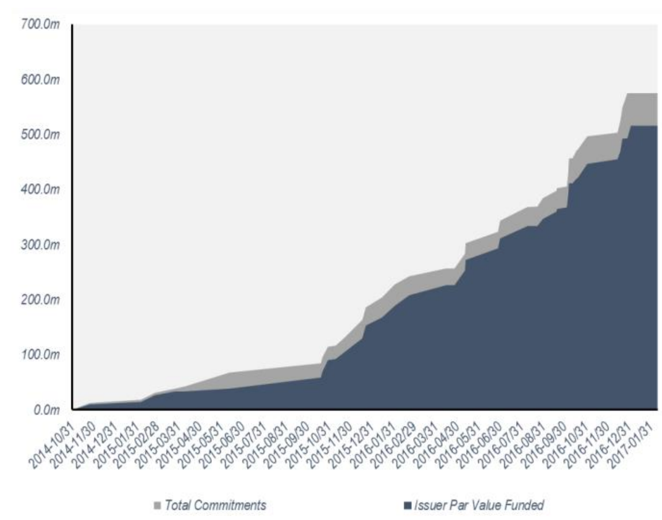
As of 5/25/17	Specialty Lending Fund I
Fund Size: Equity (mm)	$314.7mm
% of called capital – Equity + Sub-line	71.63%
Leverage Ratio	1.53x
% Floating Rate	94.0%

WEIGHTED AVERAGE PORTFOLIO COMPANY STATISTICS

As of 5/25/17	Specialty Lending Fund I Total Portfolio
Weighted Average EBITDA	$35.5mm
Debt / EBITDA (through tranche)	4.4x
LTV	54.8%
LIBOR Spread	7.8%
LIBOR Floor	0.9%
Upfront Fees / OID	2.2%
Years-to-Maturity	4.7 years
Call Protection (% of commitments)	94.2%

INVESTMENT PACE ($mm, committed capital)





Expected/Targeted returns are forward-looking statements that are subject to uncertainty as described further in the relevant offering memorandum and should not be regarded as a representation, warranty or prediction of any particular performance. Actual performance may vary.

See Notes to Performance History & Comparisons for further information.

Crestline

Appendix

Investment Process

Crestline

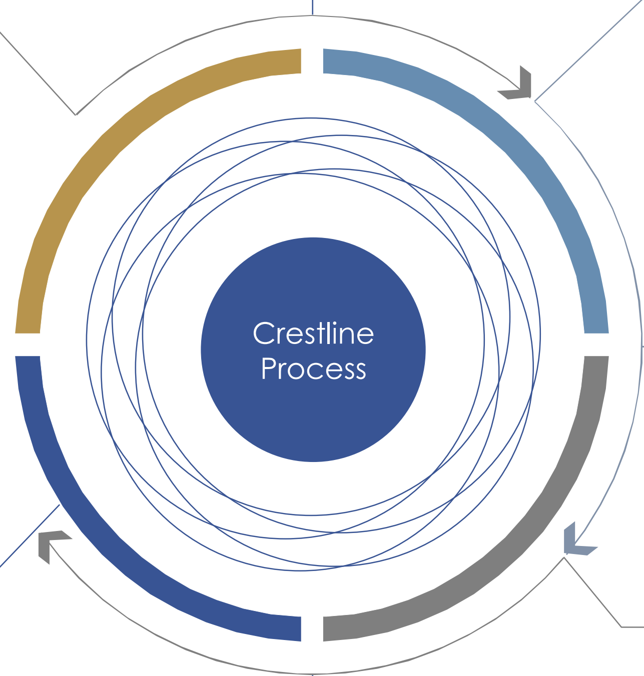
Crestline has a rigorous, repeatable process for reviewing, evaluating and executing each deal.

SOURCING AND SCREENING

Explore, identify, review and evaluate opportunities

UNDERWRITING

Comprehensive due diligence in line with risk/reward parameters



ASSET MANAGEMENT

Actively manage portfolio and build rapport with company management

STRUCTURING

Carefully construct deal framework to mitigate key risks and concerns

Process: **Sourcing and Screening**

Crestline has a robust deal screening process to confirm on-going interest, appropriate use of resources, and proper risk/reward characteristics.

Proprietary Sourcing Channels

Direct sourcing in specific industries with the investment attributes we seek

Continuous sourcing of opportunities via broad network of internal and external relationships, including restructuring advisors, banks, broker-dealer networks

Proprietary "club deal" opportunities from Crestline's General Partner relationships and platform and operating partners

Deal flow from Bass/Crestline relationships

Screening Methodology

Develop initial understanding of deal dynamics, business/collateral attractiveness and core investment thesis

Identify key risk factors, capital preservation drivers and core areas of diligence

Utilize traditional valuation methodologies to triangulate value

Prepare standard business and credit analysis

Target Attributes

Market leaders with defensible positions

Defensible niche product or service

Distinct competitive advantages or barriers to entry

Predictable cash flows

Substantial asset or enterprise value relative to investment position

Experienced and incentivized management team

Low customer/supplier concentration risk

Multiple ways to monetize exit

Objective

Singular focus on principal protection and compensation for risk

Identify only the most compelling deals

Explore key risk factors and core areas of diligences for the selected opportunities

Process: **Due Diligence**

Crestline is extremely selective and only advances the best deal opportunities for full due diligence.

Preliminary Analysis	Full Diligence	Objective
Review all investment materials, identifying key risk/reward factors	Private equity approach with in-depth review of unit level economics, cost and growth drivers, customer and supplier dynamics	Identify the most optimal portfolio investment opportunities
Triangulate value by traditional valuation methodologies	Deep dive analysis of company position and competitive dynamics, cash flow profile/drivers, balance sheet strength and site visits	Determine adequate return expectation
Arrange calls/meetings with management	3rd party due diligence across reporting and tax issues	Determine possible risk mitigation structuring
Prepare standard business and credit analysis	Identify and quantify sources of repayment with comprehensive focus on downside protection and preservation of capital tested in all scenarios	Prepare negotiation strategy
Formulate core investment thesis	Leverage industry contacts to fully vet opportunity and learn from others' mistakes	
Identify potential exit alternatives	Thoroughly scrutinize management for adequacy of financial controls, background checks, etc.	
Present finding and thesis to Investment Committee for preliminary approval or term sheet		

Crestline

Crestline thoroughly considers best, base and worst case situations when negotiating the terms, structure and exit strategy for each portfolio deal.

Structuring

Key for risk mitigation

Confirm deal structure aligns with objective

Check risk/reward parameters

Mitigate negative outcomes with verification of loan size, structure, covenants and documentation

Be aware of potential creditor/counter-party issues and risks

Ability to gain control of outcome if necessary

Where possible, include personal or cooperation guarantees

Investment Committee

Review investment thesis, structure, risk/reward potential and portfolio fit

Investment thesis presentation and review of potential risks and compensation

Structure validation

Portfolio composition

Submit a binding commitment

Completion checklist review prior to funding

Portfolio Management

Monitor current portfolio

Constant portfolio construction consideration, including correlated and uncorrelated risk accumulation

Actively manage investments through monthly/quarterly trackers, models

Maintain regular dialogue with management

Schedule reporting deadlines

Identify problems early and discuss internally and with company management

Produce detailed quarterly credit reviews

Follow Investment Committee procedures for waivers and amendments

Organizational Chart

Crestline

Investment Committee

DOUG BRATTON
Founding Partner/CIO

CAROLINE COOLEY
Partner & CIO/
Hedge Fund Strategies

JOHN COCHRAN
Partner & COO

KEITH WILLIAMS
Partner,
Senior Portfolio Manager

MICHAEL GUY
CIO Europe

Senior Investment Team

KEITH WILLIAMS
Partner,
Senior Portfolio Manager

CHRIS SEMPLE
Managing Director,
Associate Portfolio Manager

RAHUL VAID
Managing Director,
Associate Portfolio Manager

JONATHAN BEN-HORIN
Director

WILLIAM PALMER
Director

ALFONSO RAMIREZ
Director

JAMES DELAUNE
Director

MICHAEL GUY
CIO Europe

SANJEEV SARKAR
Managing Director Europe

ANDREY PANNA
Managing Director Europe

Investment Team

CLARK WEN
Vice President

MICHAEL BULLARD
Vice President

AARON MACK
Associate

CHRIS WEBER
Associate

GRAHAM GRUNOW
Associate

ROBERT ZELL
Director,
Due Diligence

CHRIS MICHEAL
Associate

MATTHEW HUDSON
Senior Analyst

JONNY O'BRIEN
Analyst

RICKY SIMON
Analyst

Operations and Middle Office

JEREMIAH LOEFFLER
COO, Credit & Opportunistic
Strategies

JOE PIGOTT
Managing Director, COO Europe

TRAVIS KEITH
Senior Associate

MATTHEW CAVE
Senior Associate

Two Middle Office Professionals

Additional Investment Team Support

Loan Servicing
& Monitoring

Agent &
Loan Services

Middle
Office

Accounting
& Treasury

Respected
Fund Administrator

Crestline

U.S. INVESTMENT TEAM

Keith Williams

Partner,
Senior Portfolio Manager

Mr. Williams joined Crestline in 2012 and is a Partner and Senior Portfolio Manager for Crestline's Opportunistic and Private Credit Strategies. Prior to joining Crestline, Mr. Williams spent the majority of his investing career at Goldman Sachs' Special Situations Group where he developed and implemented liquid and illiquid distressed investing strategies and was responsible for deal sourcing and execution for private debt strategies. In addition to his investing experience, Mr. Williams provided restructuring and turnaround services to distressed or underperforming companies while working with McKinsey & Company and a nationally recognized restructuring boutique. Mr. Williams has a BBA in Finance from Southern Methodist University and a MBA from Rice University.

Chris Semple

Managing Director, Associate Portfolio Manager

Mr. Semple joined Crestline in 2011 and is responsible for Crestline's Opportunistic and Private Credit Strategies. Prior to joining Crestline, Mr. Semple was Vice President in the Special Situations Group for Goldman Sachs where he was responsible for originating, underwriting, executing and managing middle market debt and equity investment opportunities. Prior to joining Goldman Sachs, Mr. Semple worked as a credit analyst within the Special Opportunities Group for TQA Investors, focusing on liquid credits as well as managing a long only convertible bond fund. Mr. Semple has a B.A. in Economics from the University of Texas at Austin. Mr. Semple Currently serves on the Board of Directors of Urgent Team Holdings, Inc.

Rahul Vaid

Managing Director, Associate Portfolio Manager

Mr. Vaid joined Crestline in 2015 and focuses on our Opportunistic and Private Credit Strategies. Prior to joining Crestline, Mr. Vaid was Co-Founder and Managing Director of Frontier Investment Holdings. At Frontier, Mr. Vaid was responsible for sourcing, acquiring and managing secondary credit assets, hedge fund side pocket assets and direct deal investment opportunities. Prior to Frontier, Mr. Vaid was General Partner of Pacesetter Capital Group where he sourced, led and managed investments in technology and middle-market companies across growth equity, venture capital and debt investments. He also founded a closed-end high yield debt fund and served as its President and CEO. Mr. Vaid has a Bachelor of Engineering in Electronics and Telecommunications from Government College of Engineering Pune India, and Master of Science in Electrical and Computer Engineering and Master of Engineering Management from Dartmouth College.

Jonathan Ben-Horin

Director

Mr. Ben-Horin joined Crestline in 2016 in the Opportunistic and Private Credit Strategies Group. Prior to joining the Firm, Mr. Ben-Horin was a Principal with Elm Park Capital Management. In this role, Mr. Ben-Horin was responsible for investing and managing private debt capital across multiple sectors in the business services, technology and light manufacturing industries. Prior to that, he was an investment professional with Caltius Capital Management, a lower middle-market private equity firm where he focused on buyout and growth equity opportunities. Prior to Caltius, Mr. Ben-Horin worked as an investment banker with Houlihan Lokey and Morgan Stanley. He graduated from the University of California at Berkeley with a B.A. in Political Science and received his M.B.A. from The Wharton School of the University of Pennsylvania.

U.S. INVESTMENT TEAM

William Palmer

Director

Mr. Palmer joined Crestline in 2015 in the Opportunistic and Private Credit Strategies Group. Prior to joining the Firm, Mr. Palmer was Vice President for the Special Situations Group at Goldman Sachs where he evaluated potential investments ranging from senior debt to preferred equity and warrant investments. Mr. Palmer began his career as a financial analyst with Houlihan Lokey Howard & Zukin. Mr. Palmer graduated magna cum laude with a BBA in Finance and Accounting from Texas Christian University.

Alfonso Ramirez

Director

Mr. Ramirez joined Crestline in 2015 in the Opportunistic and Private Credit Strategies Group. Prior to joining the Firm, Mr. Ramirez was a Senior Director for FTI Consulting, Inc. in the corporate restructuring practice. In this role, Mr. Ramirez spent over six years providing restructuring advisory and turnaround services to distressed or underperforming companies. Prior to joining FTI, Mr. Ramirez was a Vice President at Goldman Sachs where he spent five years within the Special Situations Group. He was responsible screening and structuring first-lien, second-lien, and subordinated debt investments, as well as minority equity investments in select transactions. Mr. Ramirez also worked at the Archon Group a real estate investment and mortgage loan company. He spent four years in underwriting and the portfolio management of investments in commercial office, industrial, and retail properties. Mr. Ramirez graduated from Harvard University with a BA in Government.

James Delaune

Director

James Delaune, Director, Mr. Delaune joined Crestline in 2015 in the Opportunistic Strategies Group. Prior to joining the Firm, Mr. Delaune was a Vice President for Deutsche Bank in the Emerging Markets Credit Group. In this role Mr. Delaune focused on special situation credit across Emerging Markets (ex-Asia) and led the loan portfolio acquisition effort in Latin America. Prior to that, he was a research analyst in the Distressed Products Group within Deutsche Bank and focused on distressed and high-yield corporate credit. Mr. Delaune graduated from Washington & Lee University with a B.S. and Special Attainments in Commerce.

Crestline

FIRM MANAGEMENT

Douglas K. Bratton

Founding Partner & Chief Investment Officer

Mr. Bratton is founder, Chief Investment Officer and majority owner of Crestline Investors, Inc., the general partner of Crestline Management, L.P., the manager of a diversified family of investment products. He is the Chair of the Investment and Executive Committees. Mr. Bratton has been an investment professional with organizations utilizing alternative asset strategies since 1983. He has extensive experience in hedge fund management, credit strategies, private equity and venture capital. Since 1989, Mr. Bratton has managed portfolios using these strategies on behalf of organizations associated with the Bass family. During this period, he also negotiated alternative asset related purchases and joint ventures for Bass and Crestline entities. These include: lift-outs of proprietary trading groups, seeding of asset managers and the acquisition of investment management organizations.

Mr. Bratton has been President of Crestline Investors, Inc. since 1997. Prior to founding Crestline Investors, he spent six years with Taylor & Company, an investment organization associated with members of the Bass family. From 1989 to 1991, Mr. Bratton was a partner of the Airlie Group, L.P. where he managed the merger arbitrage and special situation portfolio. From 1988 to 1989, Mr. Bratton was employed by Investment, L.P. as a partner in the Merger Arbitrage group. From 1984 to 1988, Mr. Bratton served as Vice President in the Merger Arbitrage group for Smith Barney Harris Upham and Company. Mr. Bratton received a B.S. from North Carolina State University in 1981 and a Masters of Business Administration with Honors from Duke University in 1984.

Caroline Cooley

Partner

Ms. Cooley is Chief Investment Officer of Crestline's Hedge Fund Strategies business and leads the Oversight Committee for Crestline Summit Equity Alpha fund. She also serves on the firm's Investment and Executive Committees. Ms. Cooley has over 33 years of experience in the alternative investment industry as a portfolio manager, risk manager and trader. Ms. Cooley has led the Hedge Fund Strategies team at Crestline, overseeing manager selection and portfolio management, since joining the firm in 1998. Before joining Crestline, Ms. Cooley was a derivatives trader and risk manager with Taylor and Company, an investment firm associated with the Bass Family of Fort Worth, TX. Ms. Cooley began her career in the investment industry at Manufacturers Hanover Trust Company (later merged into JP Morgan) in New York and Chicago after receiving her B.A. in Economics from The College of William and Mary in 1983. Ms. Cooley serves on the Advisory Board of Texas Wall Street Women and is the Vice-Chair of the Investment Advisory Committee of Texas Employee Retirement System.

Crestline

FIRM MANAGEMENT

John Cochran, CPA

Partner

Mr. Cochran serves as the Chief Operating Officer and manager of the operational due diligence efforts for Crestline. He is a member of the Executive Committee and the Investment Committee. Mr. Cochran has 28 years' experience in various segments of the investment industry including private equity, venture capital and hedge funds. Prior to joining the firm in October 1998, he spent 10 years with KPMG L.L.P. ("KPMG"). During his employment at KPMG, Mr. Cochran received extensive industry experience through his position as an auditor and focus in the Merger and Acquisition area. During his tenure at KPMG, a majority of his time was spent working with various hedge funds, investment companies, private equity firms, venture capital groups and broker dealers performing both audit and financial due diligence services. Mr. Cochran is a CPA and received a BBA in Accounting from Texas Christian University in 1987.

Keith Williams

Partner

Mr. Williams joined Crestline in 2012 and is Senior Portfolio Manager for Crestline's Opportunistic and Private Credit Strategies. Prior to joining Crestline, Mr. Williams spent the majority of his investing career at Goldman Sachs' Special Situations Group where he developed and implemented liquid and illiquid distressed investing strategies and was responsible for deal sourcing and execution for private debt strategies. In addition to his investing experience, Mr. Williams provided restructuring and turnaround services to distressed or underperforming companies while working with McKinsey & Company and a nationally recognized restructuring boutique. Mr. Williams has a BBA in Finance from Southern Methodist University and a MBA from Rice University.

Crestline

EUROPEAN INVESTMENT TEAM

Michael Guy

Chief Investment Officer, Europe and Senior Portfolio Manager

Mr. Guy joined Crestline in 2015 and is Chief Investment Officer of Crestline, Europe. Mr. Guy most recently founded and was Senior Portfolio Manager of the Tenax Credit Opportunities Fund, one of the first private credit funds of its type in Europe. Prior to this he was Managing Director and co-Head of Bank of America Merrill Lynch's Global Loans and Special Situations Group, EMEA from 2009 to 2012. He held a similar role for Donaldson, Lufkin and Jenrette/Credit Suisse, managing that firm's market-leading Distressed and Special Situations business in Europe for over 10 years. He began his professional career at JP Morgan in New York in 1989. He holds an MBA from Harvard Business School, an MA from Oxford University, was an Associate at McKinsey and Company and served as a Troop Commander in the British Army in Germany.

Andrey Panna

Managing Director

Mr. Panna joined Crestline in 2015 and is responsible for the European Opportunistic investments. Mr. Panna was previously Co-Founder and Portfolio Manager of the Tenax Credit Opportunities Fund, one of the first private credit funds of its type in Europe. Prior to this role, he was Managing Director and Co-Head of European Distressed Debt Research and Special Situations at UBS in London. Prior to UBS, he was a portfolio manager running a proprietary book of illiquid special situations and distressed debt investments at Credit Suisse in London. He has over 17 years of experience of investing in special situations and distressed debt, financial restructurings, operational turnarounds, corporate finance advisory work and equity research experience. He holds a BA from Lipscomb University, USA.

Sanjeev Sarkar

Managing Director

Mr. Sarkar joined Crestline in 2015 and is responsible for the European Opportunistic investments. Mr. Sarkar was previously Co-Founder and Portfolio Manager of the Tenax Credit Opportunities Fund, one of the first private credit funds of its type in Europe. He has more than 10 years' experience working as a principal investor including as a Venture Partner for a single LP fund investing in special situations and providing growth capital, a senior analyst at ADM Capital and an associate at Cazenove Private Equity. Mr. Sarkar has structured new facilities, been involved in workouts, invested in complex transactions (equity and debt) and managed operational turnarounds across Europe. He has a Masters in Finance from the London Business School and is a qualified accountant with more than 6 years' experience at Arthur Andersen and Ernst & Young.

Past performance is not a guaranty of future results. Current and prospective investors should not assume that the future performance of any Crestline fund will equal its prior performance results or the results of any previous fund with a similar strategy, and investors risk loss of their entire investment. Each fund's performance results portrayed reflect the deduction of that fund's advisory fees, brokerage commissions and other expenses. The performance results also include the reinvestment of income and dividends, in investment vehicles where such are applicable. For each Crestline fund, an individual investor's returns will vary from the historical performance due to restrictions on participation in certain types of investments and due to the timing of subscriptions, withdrawals, and redemptions; further, the general economic conditions during extreme highs and lows may have affected the returns of the funds.

Within a particular strategy, Crestline may offer a domestic fund and an offshore fund ("Funds") that are managed pari passu. In such cases the Funds managed by Crestline will have investment objectives that are identical or substantially similar. It is not anticipated, however, that the Funds managed by Crestline having identical or substantially similar investment objectives will have identical or substantially similar investment portfolios. Differing investment portfolios can be expected to result from several factors, including, without limitation, the following:

- Regulatory constraints that apply to the Funds managed by Crestline;
- Investment constraints imposed by the Investment Managers of the underlying fund that the Funds may invest in;
- The availability of underlying funds for investment at certain times but not at others; and
- The amount of cash available for investment at certain time by the Funds.

As a result of factors such as these, Funds that are managed pari passu may have a different investment portfolio (and, as a result, different performance results) even though the funds may have identical or substantially similar investment objectives.

Principal executive officers of Crestline are also associated with Bratton Capital Management, LP ("BCM") a firm that acts as the investment adviser and general partner to single family-office-related investments. Crestline and BCM are under common control.

Some information contained in this document is based on data received from third parties that we consider reliable and is accurate to the best of Crestline's knowledge. However, Crestline has not independently verified the information and does not otherwise give any warranty as to the truth, accuracy, or completeness of such third party data, and it should not be relied upon as such. The material is not intended to be a formal research report and nothing in this presentation should be interpreted to state or imply that past results are an indication of future performance.

This document is a summary, is for informational purposes only and does not constitute an offer to sell or a solicitation of any offer to buy or sell securities of any entity, investment product or investment advisory service. Any offer will be made only pursuant to a confidential offering memorandum. There can be no guarantee that the Funds will achieve their investment objective. An investment in the Funds is speculative and involves a high degree of risk, and investors risk loss of their entire investment. Past performance is not indicative of future performance.

Any opinions expressed herein are our current opinions only. There can be no assurance or guarantee that Crestline's investment strategy will achieve its stated goal. All information provided in this presentation is for informational purposes only. In addition, it should not be assumed that any of the securities and/or strategies discussed herein were or will prove to be profitable. Crestline accepts no liability for loss arising from the use of this material.

General Risks of Investing in the Crestline Funds

An investment in the Funds is speculative and involves a high degree of risk. Crestline Management, L.P., is a federally registered investment adviser and serves as the investment manager to the domestic and offshore hedge fund of funds. Crestline Canada, Inc., an affiliate, provides portfolio overlay and hedging execution capabilities to client portfolios as well as Crestline's diversified fund of hedge funds. Crestline Investors, Inc., Crestline Management, L.P. and Crestline Canada, Inc. are individually and collectively referred to herein as "Crestline" or "the Firm." Crestline's investment funds (the "Funds") utilize a fund of funds investment approach whereby Fund assets are allocated among portfolio managers. As a result, the success of the Funds is dependent on the portfolio managers' ability to develop and implement investment strategies that achieve the Funds' investment strategies. The Funds are generally not subject to regulatory restrictions or oversight. The principals of Crestline Investors, Inc. are Douglas K. Bratton, John Cochran and Caroline Cooley (the "Principals"). The success of the Funds' investment program will also depend on the expertise of the Principals in choosing portfolio managers and executing on investment transactions. If the Principals were to cease to be associated with the Funds, it is likely that the success of their investment program would be adversely affected. The Funds may employ leverage, which among other investment techniques, can make their investment performance volatile. Opportunities for redemptions and transferability of interests in the Funds are restricted so investors may not have access to their capital if and when it is needed. There is generally no secondary market for an investor's interest in the Funds and none is expected to develop. The Funds' management fees, incentive fees/allocations, and expenses, may offset their trading profits. An investor should not invest in the Funds unless it is prepared to lose all or a substantial portion of its investment.

The targeted returns are forward-looking statements that are subject to uncertainties described further in the relevant offering memorandum. The targeted returns are based on research conducted by Crestline and the conclusions are Crestline's opinions based on its own independent study. The return targets are supported by various quantitative measures including1) the actual track record of the funds, 2) back-tested returns of a pro-forma portfolio using the fund's current asset allocation and 3) a forecast return calculated using a third-party risk model. For further information on targeted returns including input data and calculation methodology please contact Client Servicing. While Crestline believes that the return targets are supportable, there is no guarantee that the funds will achieve the targeted returns. The targeted rates of return included in this presentation are hypothetical returns, and are for illustrative purposes only. Accordingly, no assumptions or comparisons should be made based upon these returns. Targeted returns are subject to inherent limitations, including but not limited to the fact that the returns do not take into account the impact that market and economic risks may have on investment decision trading. In no circumstances should the targeted returns be regarded as a representation, warranty or prediction that the fund will reflect any particular performance or that it will achieve or is likely to achieve any particular result or that investors will be able to avoid losses, including total losses of their investment.

European Union

In each member state of the EEA (each a "Relevant Member State") that has implemented AIFMD, the Fund may only be offered to investors in accordance with local measures implementing the AIFMD. Investors in a Relevant Member State where the Fund is not being offered pursuant to private placement rules implementing the AIFMD may invest in the Fund, but only in circumstances where they do so at their own initiative.

In relation to each member state of the EEA which, at the date of the Offering Memorandum, has not implemented the AIFMD, the Offering Memorandum may only be distributed and Shares may only be offered or placed to the extent that this Memorandum may be lawfully distributed and the Shares may lawfully be offered or placed in that member state (including at the initiative of the investor).

At the date hereof, the Investment Manager intends to register the Fund for marketing under the laws of the Netherlands, and the United Kingdom implementing Article 42 of the AIFMD. It may register the Fund in further Relevant Member States in the future.

Prospective Investors of the United Kingdom

The Fund is not a recognized collective investment scheme for the purposes of Section 264 of the Financial Services and Markets Act 2000 of the United Kingdom (the "UK Act"). The promotion of the Fund and the distribution of the Offering Memorandum in the United Kingdom are accordingly restricted by law. The Offering Memorandum is only directed at persons to whom it may lawfully be issued or directed at under the Financial Services and Markets Act 2000 (Financial Promotion) Order 2001, including persons who are authorized under the UK Act, certain persons having professional experience in matters relating to investments, high net worth companies, high net worth unincorporated associations or partnerships, trustees of high value trusts and persons who qualify as certified sophisticated investors. The Shares are only available to such persons in the United Kingdom, and this Memorandum must not be relied or acted upon by any other persons in the United Kingdom.

The Offering Memorandum is exempt from the general restriction in Section 21 of the UK Act on the communication of invitations or inducements to engage in investment activity on the grounds that it is being issued to and/or directed at only the types of persons referred to above. The content of the Offering Memorandum has not been approved by an authorized person and such approval is, save where the Offering Memorandum is directed at or issued to the types of persons referred to above, required by Section 21 of the UK Act.

Potential investors in the United Kingdom are advised that all, or most, of the protections afforded by the United Kingdom regulatory system will not apply to an investment in the Fund and that compensation will not be available under the Financial Services Compensation Scheme.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Callan Associates Inc. General Consulting Contract	ACTION:	X
DATE:	June 23, 2017	INFORMATION:	

BACKGROUND:

The Alaska Retirement Management Board (Board) has a consulting contract with Callan Associates Inc. (Callan) for general investment consulting services.

STATUS:

The current consulting contract with Callan runs from July 1, 2014 through June 30, 2017, with two optional one-year extensions. As required by AS 37.10.220, Callan provides general performance measurement, and the comparison of these returns against similar funds, portfolios, or indices. Services provided also include asset allocation, investment manager selections and general investment consulting services for the Board. Staff recommends that the Board continue the working relationship and extend the contract with Callan.

RECOMMENDATION:

That the Board direct staff to exercise the first one-year contract option, extending the consulting contract with Callan Associates Inc. until June 30, 2018.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	The Townsend Group Inc.	ACTION:	X
	Real Estate Consultant Contract		
DATE:	June 23, 2017	INFORMATION:	

BACKGROUND:

The Alaska Retirement Management Board (Board) has a contract with The Townsend Group, Inc. (Townsend) for real estate consulting services.

STATUS:

The contract period with Townsend runs from July 1, 2014, through June 30, 2017, with two optional one-year extensions. Townsend provides real estate consultant services to the Board which include: calculation of the investment returns for real estate investments; quarterly performance measurement and the comparison of these returns against similar funds, portfolios, or indices; comment on the annual budget review and strategic business plan; investment manager selection and on-going evaluation; and analysis of real estate investment policies and objectives

Staff recommends that the Board exercise the first one-year optional extension of the Townsend contract to June 30, 2018.

RECOMMENDATION:

That the Board direct staff to exercise the first one-year contract option, extending the contract with Townsend until June 30, 2018.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Crestline Specialty Lending Fund II	ACTION:	X
DATE:	June 23, 2017	INFORMATION:	

BACKGROUND:

In February 2015, the Alaska Retirement Management Board approved a commitment of $50 million to Crestline Investors' Specialty Lending Fund (SLF I). The commitment was made as a part of the ARMB's decision in 2013 to pursue a more opportunistic and less constrained approach to absolute return. Crestline's SLF Fund makes floating-rate senior secured loans to U.S. lower and middle market companies. The supply/demand dynamics are attractive for private direct lending largely due to banks exiting the market. Crestline assembled an internal team with significant private lending experience to take advantage of the opportunity. Strong downside protection allows funds like SLF I to use leverage to seek returns of 11-13% net of fees. Crestline is now close to fully invested in SLF I and has begun fundraising for a second lending fund (SLF II) with an identical strategy.

STATUS:

The portfolio construction and performance of SLF I has been in line with expectations. As of April 2017, Crestline SLF I has funded $570 million in 31 loans to middle market and lower middle market companies. The overall net IRR through 12/31/16 is 10.4%. The portfolio is 97% first lien and well diversified by deal type, sector, and industry. Unlevered yields have been 8-13% and SLF I's loans have been issued at an average liquidity premium of 337 basis points to the single B index. In addition, loss rates on the loans are expected to be lower than debt issued in the syndicated loan or high yield markets due to stronger covenant protection, lower loan-to-value, and less complex capital structures.

Staff has regularly monitored and reviewed the performance or SLF I and has evaluated the investment opportunity for SLF II. The supply and demand dynamics are still favorable for Crestline's strategy, although competition in the space has increased. Crestline has a demonstrated ability to generate diversified deal flow at attractive terms. Crestline's team has grown with the opportunity and staff has a high regard for the group. Overall, staff is comfortable with the SLF II proposal and recommends that the ARMB commit capital to the fund.

RECOMMENDATION:

That the Alaska Retirement Management Board direct staff to negotiate with Crestline Investors a commitment of up to $60 million to Crestline Specialty Lending Fund II, L.P.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	DePrince, Race & Zollo, Inc.	ACTION:	X
	Emerging Markets		
DATE:	June 23, 2017	INFORMATION:	

BACKGROUND:

The Alaska Retirement Management Board (ARMB) currently invests in two dedicated emerging markets mandates managed by Lazard Asset Management (Lazard) and Parametric Portfolio Associates LLC (Parametric). As of March 31, 2017, ARMB's investments were approximately $498 million with Lazard and $264 million with Parametric.

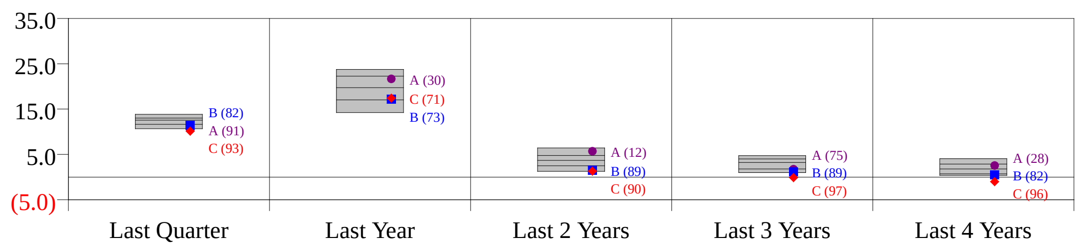
Using March 31, 2017 account values, the combined estimated annual effective fee for the two existing emerging markets managers is approximately 0.98%.

DePrince, Race & Zollo, Inc. (DRZ) is an investment manager in good standing with ARMB which also offers an emerging markets strategy. Due to the relatively short history of this strategy and to entice further investment, DRZ is offering a reduced flat fee schedule of 0.30% for all invested assets.

STATUS:

On Thursday, March 16, 2017, staff conducted on-site due diligence of the DRZ emerging markets strategy. Staff believes the strategy to be a good fit within the existing non-US portfolio of managers.

Returns
for Periods Ended March 31, 2017
Group: CAI Emerging Broad



	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 4 Years
DRZ:Emer Markets Value ● A	10.52	21.68	5.73	1.76	2.55
MSCI:EM ■ B	11.44	17.21	1.55	1.18	0.52
MSCI:EM Value ◆ C	10.16	17.43	1.33	(0.10)	(0.99)

RECOMMENDATION:

The Alaska Retirement Management Board direct staff to contract with DePrince, Race & Zollo, Inc. to manage an initial allocation of up to $200 million in an emerging markets equity strategy subject to successful contract negotiations.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Alternative Beta Manager Selection   ACTION: X

DATE: June 23, 2017   INFORMATION:

BACKGROUND:

The Alaska Retirement Management Board has an asset allocation of seven percent to absolute return strategies and $1.7 billion invested with six managers in the space. The role of absolute return in the ARMB's portfolio is to provide a source of real return diversified from exposure to traditional stock and bond market beta. Over time, the ARMB and staff have explored ways to reduce cost and increase risk-adjusted returns. Towards this end, the ARMB has added direct exposure to managers including Allianz, Zebra, and KKR Apex Equity and built a portfolio of direct opportunistic investments through Crestline and KKR Prisma.

Historically, hedge funds have offered a combination of low market beta (residual stock and bond exposure), alpha (manager skill), and what some have termed alternative beta. Alternative beta is a set of risk exposures that are largely systematic and provide a source of return for bearing risks that are uncorrelated with traditional market risks. In late 2016 and early 2017, staff met with several alternative beta managers and concluded that an investment in alternative beta could be a good complement to the other strategies in the ARMB absolute return portfolio. On March 3, 2017, the Board approved a search for alternative beta managers.

STATUS:

Staff worked with Callan to identify leading alternative beta managers for further due diligence. From this effort, a group of six managers were identified for further evaluation. The subsequent due diligence effort was comprised of on-site meetings by staff in Juneau, New York City, Greenwich, Boston and London. Managers were evaluated on a number of attributes, including the quality of the investment strategy, depth of staff, performance, suitability of fit for the ARMB's absolute return portfolio, and fees. Following on-site due diligence, staff is recommending two investment managers for the ARMB's consideration.

RECOMMENDATION:

That the Alaska Retirement Management Board direct staff to hire J.P. Morgan Asset Management and Man Group to collectively manage an initial allocation of up to $400 million subject to completion of due diligence and successful contract negotiation.