Oregon Investment Council

September 20, 2017
9:00 AM

Oregon State Treasury
16290 SW Upper Boones Ferry Road
Tigard, OR 97224

Rukaiyah Adams
Chair

John Skjervem
Chief Investment Officer

Tobias Read
State Treasurer

OREGON INVESTMENT COUNCIL

Agenda

September 20, 2017
9:00 AM

Oregon State Treasury
Investment Division
16290 SW Upper Boones Ferry Road
Tigard, OR 97224

Time	**A. Action Items**	**Presenter**	**Tab**
9:00-9:02	**1. Review & Approval of Minutes** August 9, 2017	**Rukaiyah Adams** *OIC Chair*	**1**
9:02-9:10	**2. Committee Reports and CIO Remarks**	**John Skjervem** *Chief Investment Officer*	**2**
9:10-9:50	**3. Stonepeak Infrastructure Partners III, L.P.** *OPERF Alternatives Portfolio*	**Ben Mahon** *Senior Investment Officer, Alternatives* **Michael Dorrell and Trent Vichie** *Senior Managing Directors & Co-Founders* **Tom Martin** *TorreyCove Partners*	**3**
9:50-10:30	**4. J.P. Morgan Systematic Alpha** *OPERF Alternatives Portfolio*	**Mike Mueller** *Investment Officer, Alternatives* **Yazann "Yaz" Romahi** *CIO, Quantitative Strategies* **Darren Smith** *Managing Director* **Jim Callahan** *Callan Associates*	**4**
10:30-10:40	**-------------------- BREAK --------------------**		
10:40-11:10	**5. AB Individual Account Program (IAP) Presentation** *OPERF*	**Karl Cheng** *Senior Investment Officer, Portfolio Risk & Research* **Dave Randall** *Director of Investment Operations* **Chris Nikolich** *Head of Glidepath Strategies (U.S.)* **Ray Decker** *Head of Client Service – Defined Contribution* **Liz Smith** *Senior Managing Director – Public Funds*	**5**

11:10-11:25	**6. Common School Fund** *Asset Allocation Recommendation*	**Michael Viteri** *Senior Investment Officer, Public Equity* **Janet Becker-Wold** *Callan Associates*	**6**
11:25-11:40	**7. LaSalle REIT Mandate Revision** *OPERF Real Estate Portfolio*	**Austin Carmichael** *Investment Officer, Real Estate* **Amanda Kingsbury** *Senior Investment Analyst*	**7**
11:40-11:50	**8. Fixed Income Policy Update** *OITP*	**Tom Lofton** *Investment Officer, Fixed Income*	**8**
	<u>B. Information Items</u>		
11:50-12:10	**9. CEM Benchmarking Annual Report** *OPERF*	**Karl Cheng** **Mike Heale** *Principal*	**9**
12:10-12:20	**10. Q2 2017 Performance & Risk Report** *OPERF*	**Karl Cheng** **Janet Becker-Wold**	**10**
12:20-12:25	**11 Asset Allocation & NAV Updates** a. Oregon Public Employees Retirement Fund b. SAIF Corporation c. Common School Fund d. Southern Oregon University Endowment Fund	**John Skjervem**	**11**
	12. Calendar — Future Agenda Items	**John Skjervem**	**12**
12:25	**13. Open Discussion**	**OIC Members** **Staff** **Consultants**	
	<u>C. Public Comment Invited</u> 5 Minutes		

TAB 1 – REVIEW & APPROVAL OF MINUTES

August 9, 2017 Regular Meeting

JOHN D. SKJERVEM
CHIEF INVESTMENT OFFICER
INVESTMENT DIVISION

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STATE OF OREGON
OFFICE OF THE STATE TREASURER
16290 SW UPPER BOONES FERRY ROAD
TIGARD, OREGON 97224

OREGON INVESTMENT COUNCIL
AUGUST 9, 2017
MEETING MINUTES

Members Present:	Rukaiyah Adams, Tobias Read, John Russell, Rex Kim, Rick Miller and Steve Rodeman
Staff Present:	John Skjervem, John Hershey, Perrin Lim, Deena Bothello, Karl Cheng, May Fanning, Michael Langdon, Jen Plett, Jen Peet, James Sinks, Michael Viteri, Tony Breault, Amanda Kingsbury, Austin Carmichael, Dana Millican, Ricardo Lopez, Jo Recht, Mark Selfridge, Ben Mahon, Debra Day, Tom Lofton, Angela Schaffers, Eric Messer, Paola Nealon, Priyanka Shukla, Roy Jackson, Garrett Cudahey, Mike Mueller, Lisa Massena, Steven Chang, Andy Coutu, Cassie Lallack, Connie Lelack, Chelsea Brossard
Consultants Present:	Jeff Goldberger, (TorreyCove); Allan Emkin, David Glickman (PCA); Uvan Tseng (Callan)
Legal Counsel Present:	Dee Carlson, Oregon Department of Justice

The August 9th, 2017 OIC meeting was called to order at 9:00 am by Rukaiyah Adams, OIC Chair.

I. 9: 01am Review and Approval of Minutes

MOTION: Mr. Russell moved approval of the June 7th, 2017 OIC meeting minutes, and Treasurer Read seconded the motion which then passed by a 5/0 vote.

II. 9:06 am Committee Reports and CIO Update

Committee Reports: John Skjervem, OST Chief Investment Officer gave an update on the following committee actions taken since the June 7, 2017 OIC meeting:

Private Equity Committee

June 27, 2017	Palladium Equity Partners V	$250 million

Alternatives Portfolio Committee

None

Opportunity Portfolio Committee

None

Real Estate Committee

Pursuant to INV 501: Acquiring and Managing Equity Real Estate, the following managers, both with ex-U.S. mandates, were terminated from the real estate portfolio as part of staff's efforts to bring public REIT allocations within the portfolio's established policy range:

- EII Capital Management; and
- Morgan Stanley.

In accordance with the above referenced policy, staff is required to report all terminations at the next, most feasible OIC meeting.

Mr. Skjervem then gave opening remarks which included updates on the Individual Account Program (IAP), Foreign Currency Policy Recommendation and forthcoming presentation on alternative risk premia.

III. 09:39 am Individual Account Program Policy Recommendation - ***OPERF***

As of 2016, there were over 200,000 individual participants of varying ages in the Individual Account Program (IAP or the Program), a defined contribution retirement plan. To adapt the Program to these participants, the Council directs staff to establish a set of Target-Date Funds available for PERS to assign to each Program participant. These funds are collectively called the Individual Account Program Funds (the "IAP Funds"). Program participants approaching retirement would be assigned to less-risky IAP Funds while younger Program participants would be directed to IAP Funds with greater return potential (and higher volatility).

Karl Cheng, Investment Officer, Portfolio Risk & Research, asked the Council to approve a new policy governing IAP investment activities. Specifically, the proposed policy stipulates that the OIC will maintain a program for the investment of moneys in the IAP that will provide an array of investment funds with varying levels of risk and return for eligible participating employees.

MOTION: Treasurer Read moved approval of staff's recommendation, and Mr. Russell seconded the motion which then passed by a 5/0 vote.

IV. 9:52 am Foreign Currency Policy Recommendation – ***OPERF***

Staff presented a proposed policy to a) summarize OIC philosophy relative to OPERF's foreign currency exposures and b) establish a Currency Overlay Program to manage the risk of such exposures. The goal of the Currency Overlay Program was then described as strategically managing foreign currency risk to reduce volatility in U.S. dollar-denominated value as a result of adverse movements in foreign exchange rates while preserving the diversification benefits of OPERF's foreign-denominated investments.

Karl Cheng and Jen Plett, Senior Internal Investment Auditor, requested Council approval for the newly proposed OIC policy INV217: OPERF Foreign Currency Risk Policy.

MOTION: Mr. Russell moved approval of staff's recommendation pending elimination of the word "adverse" from the policy. Mr. Kim seconded the motion which then passed by a 5/0 vote.

V. **<u>9:56 am Oregon Savings Growth Plan –</u>** *<u>Consultant Recommendation</u>*

In accordance with OIC Policy INV 210: Consulting Contracts, Paola Nealon, Investment Officer, Public Equity recommended that the OIC select Callan Associates to provide investment consultant services for OSGP. She further indicated that OST staff recommended an initial three-year engagement, with two optional 24-month extensions available at OIC discretion.

MOTION: Treasurer Read moved approval of staff's recommendation, and Mr. Russell seconded the motion which then passed by a 5/0 vote.

VI. **<u>11:33 am Alternative Risk Premia Overview –</u>** *<u>OPERF Alternatives Portfolio</u>*

Ben Mahon, Senior Investment Officer, Alternatives, provided the OIC with an overview of Alternative Risk Premia and introduced Clifford Asness, Ph.D, Founder, Managing Principal & Chief Investment Officer of AQR Capital Management, one of the Council's largest and long-standing managers. Dr. Asness then lead a comprehensive discussion of the origin, evolution and application of Alternative Risk Premia in institutional investment portfolios.

VII. **<u>11:34 am Asset Allocation & NAV Updates</u>**

Mr. Skjervem reviewed asset allocations and NAVs across OST-managed accounts for the period ended June 30, 2017.

VIII. **<u>11:34 am Calendar — Future Agenda Items</u>**

A calendar listing of future OIC meetings and scheduled agenda topics was included in the Council's meeting material.

IX. **<u>11:39 am Open Discussion</u>**

Treasurer Read provided an update on the recently-concluded legislative session, and announced that OST successfully achieved most of its budget objectives including approval for over two dozen more positions in the investment division. The Treasurer also mentioned that House Bill 2779 passed which mandates fiduciary training and continuing education requirements for all OIC members. Treasurer Read indicated that he, Chair Adams and CIO John Skjervem would meet, per the new law's direction, to identify the best and most efficient means of helping OIC members satisfy these new requirements. Finally, Chair Adams reminded Council members that the upcoming November 1 OIC meeting would include a strategic discussion agenda item and that members should share with her any suggestions for that discussion at their earliest convenience.

<u>11:39 am Public Comments</u>

None

Ms. Adams adjourned the meeting at 11:39 am.

Respectfully submitted,

May Fanning

May Fanning
Executive Support Specialist

TAB 2 – Committee Reports and CIO Remarks

Opening Remarks

John D. Skjervem, Chief Investment Officer

September 20, 2017

Oregon State Treasury

September 20, 2017 OIC Meeting

Alternatives Manager Presentations

- Application/implementation of risk premia concepts discussed during last month's OIC meeting
- Proposing a manager/strategy in both sleeves: Real Assets and Diversifying Strategies

Individual Account Program (IAP)

- Last month, and consistent with ORS 238A.050(3), OIC adopted a policy to enable a separate and differentiated approach to IAP investment management
- This policy recognizes and affirmatively responds to IAP participants' individual, heterogeneous risk profiles
- Today staff is proposing a specific investment solution to achieve this differentiated approach, namely a suite of customized Target Date Funds (TDFs) organized by participant age cohort
- Our solution is relatively simple as it a) comprises OPERF as its primary asset and b) uses incremental allocations to stock and bond index funds to effect cohort customization
- This simplicity results in a solution that is both low cost to participants and low impact to OPERF

Follow-up Items

- Common School Fund, Real Estate and Fixed Income

Annual CEM Benchmarking Report

- Costs slightly higher than last year
- Comparison to similarly-sized and -constructed public funds still positive
- Costs poised to fall modestly due to increased insourcing activities earlier this year

TAB 3 – Stonepeak Infrastructure Partners III, L.P.

OPERF Alternatives Portfolio

Stonepeak Infrastructure Fund III, L.P.

Purpose
Staff and TorreyCove recommend a $400 million commitment to Stonepeak Infrastructure Fund III, L.P. ("Stonepeak III" or the "Fund") for the OPERF Alternatives Portfolio, subject to the satisfactory negotiation of terms and conditions with Staff working in concert with legal counsel.

Background
Stonepeak Infrastructure Partners ("Stonepeak" or the "Firm") is an independently-owned investment firm formed in 2011 by Mike Dorrell and Trent Vichie, formerly of The Blackstone Group and Macquarie. Oregon's relationship with Stonepeak dates back to 2012, when the OIC committed $100 million to Stonepeak Infrastructure Fund I, L.P. ("Stonepeak I"). A subsequent $400 million commitment was made to Stonepeak Infrastructure Fund II, L.P. ("Stonepeak II") in 2015. Thus, this proposed investment would represent the OIC's third Stonepeak fund commitment.

Stonepeak is seeking $5.0 billion in aggregate L.P. capital commitments for the Fund with a $7.0 billion hard cap. The Firm plans to hold a first close on or about September 30, 2017. The Fund is targeting a net internal rate of return of 12%, inclusive of a 4% cash yield.

Discussion/Investment Considerations
Consistent with its history, Stonepeak will focus Fund capital on U.S. and Canadian lower-to-upper middle-market infrastructure investments, primarily in the power, water, energy, communications, renewables, and transportation sectors. Target returns will include a balance of income and capital appreciation, and the Firm expects to make individual equity investments of between $100 million and $1 billion and generally aims to secure a controlling stake. An important feature of Stonepeak III strategy is the Firm's focus on North American middle-market investments, which it believes provide greater "off-the-run" and exclusive deal sourcing opportunities. Seeking to create additional value through its active management strategy, Stonepeak will work with its operating partners to intensively manage Fund portfolio companies and identify both operational improvements and growth opportunities.

<u>Attributes</u>:

- *Experienced team*. Stonepeak is led by Mike Dorrell and Trent Vichie, who collectively have over 37 years of infrastructure investing experience (including 18 years working together). The pair has been responsible for day-to-day sourcing and execution of prospective investment opportunities and portfolio management for existing portfolio investments across a wide variety of assets and businesses. In total, the investment team consists of 24 members with an additional 10 non-employee operating partners/senior advisors. This breadth of experience provides Stonepeak with the capabilities to evaluate a wide set of opportunities on behalf of the Fund.
- *Supply/demand gap*. North American infrastructure represents a compelling investment opportunity given the current and substantial gap between capital demand and supply. U.S. infrastructure is severely aging due to historical underinvestment and is in critical need of upgrade and replacement. At the same time, traditional suppliers of infrastructure capital, such as governments and utilities, continue to face capital constraints. According to recent estimates, the U.S. infrastructure market faces a $2 trillion funding gap over the next ten years.
- *Independent and focused platform*. In addition to being employee owned and controlled, Stonepeak also has a single sector focus. As such, conflicts typically associated with sponsored entities or competing products do not exist.

- *Middle-market focus.* The Firm's focus with Stonepeak III will be on middle-market, value-add infrastructure investments, a strategy that complements OPERF's existing infrastructure portfolio, which is currently tilted toward larger infrastructure assets or more opportunistic strategies.
- *Strong interim results*. While both Stonepeak I and Stonepeak II are still early in their lifespans, interim investment returns have been solid, with the Firm generating an overall net IRR of 19% and a 1.3x multiple.

<u>Concerns</u>:

- *Dependence on key personnel*. The success or failure of the Fund will be highly dependent on Messrs. Dorrell and Vichie's investment experience, management relationships and industry network. [Mitigant: Staff assesses their departure odds as low, and both have a significant portion of their liquid net worth invested in Stonepeak funds. Moreover, the Firm has continued to build an experienced team around the founders, adding depth and new insight to the organization.]
- *Competitive market for investment opportunities*. Interest from institutional investors in real assets, including infrastructure strategies, remains high. As more capital enters the market for private infrastructure, expected returns may be driven down. [Mitigant: Staff has confidence in Stonepeak's financial discipline and expertise in originating, structuring, and executing infrastructure transactions. Overall, the market for North American middle-market infrastructure capital is viewed as less crowded and the Firm will likely face limited pure-play competitors.]
- *Fund III increase.* Fund III represents a substantial increase in capital commitments relative to Fund II. Such increases in assets under management may result in a deviation from stated objectives, i.e., "style drift," as well as create strains on organizational infrastructure. [Mitigant: The Fund is subject to restrictions on the size and type of investments, limiting the potential impacts on investment approach. Furthermore, the firm has been steadily hiring ahead of the Fund III launch, growing to a team of 38 individuals, including 8 operations/IR professionals.]
- *Limited realized performance*. The Firm has a limited historical track record, with only two investments fully realized to-date. [Mitigant: While both Fund I and Fund II are relatively young, key Stonepeak team members have worked together as colleagues and industry peers for several years, and Stonepeak has provided representations about the their track records from prior firms, allowing for a greater degree of analysis.]

Terms

Fund terms include a management fee on committed capital with a standard carry and preferred return. Note: investors participating in the first close will receive a carried interest discount. The Fund will have a five-year investment period, and a 12-year duration with three, one-year extensions subject to LPAC consent. The GP will make a capital commitment of at least one percent of the aggregate capital commitments to the Fund. During fundraising efforts, no placement agent had contact with Treasury staff.

Conclusion

The Alternatives Portfolio target allocation to infrastructure is 20% to 30% (or approximately $1.8 billion to $2.7 billion at current OPERF NAV), with $1.3 billion in current NAV. Staff considers Stonepeak III an anchor commitment within the OPERF infrastructure portfolio.

Staff also believes Stonepeak III represents an opportunity to invest with an experienced manager in an attractive sector. Stonepeak is a focused investor with expertise across the spectrum of infrastructure investments and has a deep network of industry relationships. Moreover, Stonepeak is differentiated by their value-add strategy and middle-market focus. At a macro level, requirements for infrastructure investment are massive, underpinning positive demand dynamics for capital, and Staff believes Stonepeak is well positioned to capitalize on the Fund's target opportunity set.

MEMORANDUM

TO: Oregon Public Employees Retirement Fund ("OPERF")

FROM: TorreyCove Capital Partners ("TorreyCove")

DATE: September 5, 2017

RE: Stonepeak Infrastructure Fund III, L.P. (the "Fund", "Fund III")

Strategy:

Fund III will largely be a continuation of the strategy set forth in the prior two funds focusing on brownfield and greenfield infrastructure assets in the U.S. and Canadian lower-to-upper middle market requiring $100.0 million to $1.0 billion of equity. Stonepeak is targeting a five to ten year hold period. Stonepeak expects to deploy the capital over a three to four year period and will take an opportunistic approach to originating investment opportunities, looking to exploit changes in relative value across the targeted sub-sectors of power, renewables, and utilities; midstream; communications; water; and transportation.

Targeted assets will have high barriers to entry, stable and predictable cash flows, operational improvement opportunities, strong contractual protections, and platform capabilities that can be scaled over time. Core to the strategy is the focus on downside protection and assets should be inflation-linked, long-lived real assets that provide an essential service with inelastic demand and low operational risk in sectors or businesses that have strong underlying or secular growth characteristics. Transactions should also be structured in a manner that provides a preferred position in the capital structure or significantly transfers risk through counterparty contracts. Potential investment opportunities should also provide the opportunity for operational improvement and expansion.

Please see attached investment memorandum for further detail on the investment opportunity.

Conclusion:

The Fund offers OPERF an opportunity to participate in a differentiated portfolio of private investments with relatively attractive overall terms. TorreyCove's review of the General Partner and the proposed Fund indicates that the potential returns available justify the risks associated with an investment in the Fund. TorreyCove recommends that OPERF consider a commitment of $400.0 million to the Fund. TorreyCove's recommendation is contingent upon the following:

(1) Satisfactory negotiation or clarification of certain terms of the investment;

(2) Satisfactory completion of legal documents;

(3) Satisfactory continuation and finalization of due diligence;

(4) No material changes to the investment opportunity as presented; and

(5) Confidentiality maintained regarding the commitment of OPERF to the Partnership until such time as all the preceding conditions are met.

TAB 4 – J.P. Morgan Systematic Alpha

OPERF Alternatives Portfolio

JP Morgan Asset Management
Systematic Alpha Strategy

Purpose

Staff and Callan recommend a $500 million commitment (an initial investment of $250 million with additional funding at Staff discretion) to the JP Morgan Asset Management ("JPMAM") Systematic Alpha ("SA") strategy for the Diversifying Strategies sleeve of the OPERF Alternatives Portfolio, subject to the satisfactory negotiation of terms and conditions with Staff working in concert with legal counsel. This proposed commitment represents a new investment manager relationship on behalf of the OPERF Alternatives Portfolio.

Background

In January 2011, the OIC approved the creation of the Alternatives Portfolio, with a target allocation of 5% of total OPERF assets and a portfolio mix of approximately 75% Real Assets[1] and 25% Diversifying Strategies[2]. Consistent with the expansion potential outlined in the original proposal, the target allocation for the Alternatives Portfolio has increased twice since its inception: first, in June 2013, when the overall target allocation was doubled to 10% of total OPERF assets, and second, in June 2015, when the Diversifying Strategies sleeve was increased to 5% of total OPERF assets (resulting in an overall 12.5% target allocation for the Alternatives Portfolio and a 60% Real Assets/40% Diversifying Strategies mix).

As referenced during the Alternatives Portfolio "2017 Plan and Review," Staff is in the second year of a three-year plan to build out the Diversifying Strategies allocation. That plan includes funding two additional Alternative Risk Premia managers and one additional Managed Futures manager, prior to year-end 2017. JPMAM is the first of the two Alternative Risk Premia managers staff is recommending to the OIC for approval.

Discussion/Investment Considerations

JP Morgan Chase & Co. ("JPMC") is among the leaders in asset management, commercial and retail banking and lending, credit cards, investment banking, private banking, treasury and securities services, middle market and private equity. JPMAM, with $1.5 trillion in assets under management (AUM), is the global multi-asset investment management business of JPMC. JPMAM has managed dedicated alternative risk premia strategies since 2009, with nearly $4 billion in assets under management (AUM) today.

The portfolio managers of SA allocate to specific investment styles ("factors") which historically have been the source of excess returns, while also exhibiting strong portfolio diversification characteristics (i.e., low to negative correlations to traditional market betas). These factors and corresponding excess returns have also been both persistent and pervasive (i.e., they manifest across multiple asset classes, sectors and geographies). Based on empirical research, stringent back testing and insights from behavioral finance, SA is designed to "harvest" excess returns from four style risk premia (which are broadly categorized as an equity market neutral implementation of value, momentum, quality, and size), as well as accessing a broader set of risk premia typically captured by traditional hedge fund styles: event-driven, global macro, and convertible bond arbitrage.

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[1] Using current OIC/OST nomenclature, *Real Assets* is synonymous with the illiquid elements of the Alternatives Portfolio (e.g., infrastructure, natural resources, etc.).

[2] Using current OIC/OST nomenclature, *Diversifying Strategies* is synonymous with the liquid elements of the Alternatives Portfolio.

By combining a diverse set of strategies (similar to, but different from AQR's Style Premia and DELTA strategies), JPMAM builds a portfolio that is largely uncorrelated to public stock and bond markets. The result is a composite portfolio with a higher, risk-adjusted return (as measured by and reflected in a favorable Sharpe ratio) which makes SA a valuable diversifier to a portfolio such as OPERF's with otherwise large, long-only public market allocations.

Attributes:

- *Established track record and experienced portfolio manager*. Along with AQR, JPMAM has one of the longer, live track records in alternative risk premia investing. The SA live track record goes back to July 2009. Yazann "Yaz" Romahi serves as CIO of Quantitative Beta Strategies for JPMAM, as well as the lead portfolio manager for the SA strategy. Mr. Romahi holds a PhD in Applied Mathematics from the University of Cambridge, and has been with JPMAM in various capacities since 2003. Mr. Romahi is supported by a team of 12 quantitative researchers/portfolio managers who are jointly responsible for conducting research, three of whom also hold a PhD.
- *Uncorrelated returns*. While difficult to find, truly uncorrelated returns (i.e., uncorrelated relative to the existing portfolio's other, conventional asset class allocations) provide valuable diversification benefits. Accordingly, a commitment to the SA strategy is intended to improve, on the margin, the risk-adjusted return of the total OPERF portfolio while adding diversification and incremental improvements to downside risk. For example, the expected correlation of SA to OPERF and its equity market beta are both approximately 0.18. Moreover, based on staff analysis, the historical correlation of SA to the existing AQR strategies is less than 0.50, thus adding a complementary strategy to the Alternatives Portfolio's Diversifying Strategies sleeve.
- *Excellent transparency, liquidity and cost effectiveness.* JPMAM provides OPERF and its other investors complete position-level transparency into the SA portfolio. In addition, the SA strategy provides excellent liquidity as OPERF can redeem its investment monthly, upon 30 days prior notice. Before SA portfolio positions are traded, these positions are aggregated within the SA portfolio, with offsetting positions netted out, resulting in lower trading costs and improved capacity utilization.
- *Risk management and compliance processes.* Given the scale of JPMAM, there is a significant commitment of resources to compliance and risk management. Within the firm, over 335 employees are dedicated to compliance, including over 150 employees dedicated to the Global Investment Management line of business. The Compliance Group is responsible for advising, educating and promoting compliance within the framework of securities and banking laws, regulations, and policies governing the asset management business. Risk management is integrated throughout the investment process beginning with the portfolio manager. Importantly, JPMAM embeds an independent Investment Director in the investment process to serve as the "eyes and ears of the client," providing ongoing statistical analysis and monitoring adherence to guidelines.

Concerns:

- *Continued efficacy of style/factor premia.* The academic merit behind factor investing has been well established, going back over a quarter century. However, the practical implementation of these concepts to portfolio management, beyond public equities, is just now gaining significant attention. Popularity of investment approaches increases the chances of "crowded trades" (e.g., the "Quant Meltdown" in August 2007). Barclays estimates that quantitative strategies now comprise approximately $500 billion in AUM, roughly double from 2007. [Mitigant: Broader implementation of this investment approach is still in its early days, and the data sets and algorithms are becoming more varied. "Quantitative investing" is a very general category, encompassing various strategies that are far from homogenous. Additionally, each style/factor is not simply an observable pattern, but rather has a well-documented, fundamental and behavioral bases (i.e., it is expected to persist). Lastly, by pursuing strategies across asset classes and across multiple risk premia, the likelihood of broad drawdowns, should be reduced.]

- *Significant use of leverage and shorting.* To achieve the strategy's target volatility and factor exposures, JPMAM does apply leverage and shorting. Without the use of leverage, and due to the diversifying nature of the underlying strategies, the volatility of the portfolio would be insufficient to meet its return objectives. [Mitigant: JPMAM invests only in highly liquid instruments and markets and maintains meaningful levels of cash. For example, cash levels within SA have been approximately 25-30 percent since inception. Lastly, by way of comparison, the total notional exposure of the SA strategy is less than that employed by AQR in their strategies.]
- *Global banking institution.* All else equal, staff has a demonstrated a preference for non-bank, "boutique" firms within the Alternatives Portfolio. The short-term, quarterly earnings pressure of large, publicly-traded financial institutions can sometimes be at odds with institutional investors' longer term investment horizon which can lead to a lack of focus and product proliferation, driven by a desire to grow assets under management. Additionally, potential conflicts, such as the use of affiliated brokers, must be managed. [Mitigant: The SA team within JPMAM has been allowed to function as a relatively independent research and portfolio management group, since 2009. JPMAM has established AUM limits for the SA strategy, reducing the likelihood that the fund will be allowed to grow to the point of diminishing returns. Finally, as mentioned previously, a large financial institution has significant regulatory oversight and a necessary commitment to compliance and risk management that smaller firms are challenged to afford/implement.]
- *Recent lackluster performance.* The SA strategy has a *net* annual return of 3.2% for the three years ended June 30, 2017, albeit at 6.2% risk (as measured by the monthly standard deviation of returns). [Mitigant: Short-term performance is never a particularly good measure of the efficacy of a strategy. Even so, the performance was realized with a -0.09 correlation to the broad MSCI ACWI IMI equity index, achieving the sought after diversification benefits. If the return period is extended to include an additional two years (inclusive of 18 months of back tested data), the return is 7.2% with a risk level of 6.3%, resulting in an attractive Sharpe Ratio for the strategy.]

Conclusion

The Alternatives Portfolio target allocation to Diversifying Strategies is 40%, or approximately $3.6 billion at current OPERF NAV. To date, OPERF has a total of $1.4 billion invested in this category, almost exclusively with AQR. As recently discussed with members of the OIC, risk premia strategies can offer an excellent source of diversification to an otherwise heavily-weighted, long-only equity and bond portfolio. A $250 million initial commitment to JPMAM's Systematic Alpha strategy will not only provide OPERF with necessary manager diversification in this space, but more importantly, continue to build out the OIC's target allocation to Diversifying Strategies.

TAB 5 – AB Individual Account Program (IAP) Presentation

OPERF

Individual Account Program Proposals

Purpose
Staff is submitting the following recommendations for the Individual Account Program:

1. Retain AB for glide path design and management;
2. Approve AB's proposed glide path and corresponding creation of ten specific Target-Date Funds;
3. Retain State Street Global Advisors to manage certain index strategies for inclusion in the proposed Target-Date Fund series;
4. Create a new Individual Account Program fund that invests solely in the Oregon Short Term Fund; and
5. Update the recently-approved Individual Account Program policy.

Background
The Individual Account Program ("IAP" or the "Program") is a member-funded Defined Contribution Retirement Plan created by the Oregon Legislature in 2003. Since inception, IAP assets have been invested alongside of defined benefit pension assets and represent a growing fraction of the Oregon Public Employees Retirement Fund (OPERF). As of June 2017, IAP comprised $8.2 billion or 11.3% of total OPERF net asset value.

Oregon State Treasury (OST) and the Public Employees Retirement System (PERS) staff have collaborated for the past two years to improve IAP so its investments would better match the risk-return profile of the approximately 250,000 individual participants. To that end, the Council approved at the August 2017 OIC meeting a policy directing staff to establish a set of Target-Date Funds (TDFs) available for PERS to assign to each Program participant.

AB, also known as AllianceBernstein, traces its history to 1967, when Sanford C. Bernstein & Co. was founded. Alliance Capital was separately founded in 1971 and the two firms merged in 2000 when Alliance Capital purchased Sanford C. Bernstein & Co. AB is publicly-listed and majority owned by AXA SA, a French insurance company. The firm manages over $500 billion across a variety of asset classes and a diverse set of investment approaches which include $55 billion in defined contribution assets. The OIC's relationship with AB dates back over two decades ago, beginning with a U.S. Large Cap Value mandate initiated in 1994 with Sanford C. Bernstein & Co. AB currently manages two mandates for OPERF: a $1.0 billion Global Equity portfolio and a $1.6 billion Core Fixed Income portfolio.

Discussion
Staff is recommending OIC approval of the following proposals:

1. Retain AB for glide path design and management
AB has substantial experience in target-date solutions, launching its first target-date fund series in 2005 and its first custom target-date fund solution in 2006. As of June 2017, the firm has 22 U.S.-based clients and $38 billion in custom target-date assets under management. AB offers extensive resources on the implementation of a custom TDF solution for IAP. While AB's Multi-Asset Solutions team has substantial expertise in the investment design and analysis for IAP, equally important, AB has significant experience with the operational and participant education components of implementing a TDF approach. Such experience will likely prove very valuable to PERS. Furthermore, AB is a long-trusted partner of OST/OIC with an in-depth understanding of OPERF, its asset allocation and various investment strategies.

2. Approve AB's proposed glide path and corresponding creation of ten specific Target-Date Funds
Using actuarial reports and additional data provided by PERS, AB conducted a demographic analysis of Program participants. Based on this analysis and projecting the other components of a typical IAP

participant's retirement benefits – e.g., pension benefits and Social Security – as well as OPERF's current asset allocation, AB constructed a custom glide path allocation strategy for IAP. Please see AB's presentation materials for details.

3. Retain State Street Global Advisors to manage certain index strategies for inclusion in the proposed Target-Date Fund series

AB's proposed investment allocation for the ten TDFs is summarized below:

TDF	**2060**	**2055**	**2050**	**2045**	**2040**	**2035**	**2030**	**2025**	**2020**	**Retire**	**Total**
% of IAP	0%	1%	5%	10%	14%	18%	18%	17%	12%	4%	100%
Investment	**Approximate Allocation by Fund**										
U.S. All Market Equity	15%	15%	15%	15%	0%	5%	10%	8%	0%	0%	7%
ACWI ex-U.S. Equity	10%	10%	10%	10%	0%	3%	5%	4%	0%	0%	4%
Core Bond	0%	0%	0%	0%	0%	2%	8%	16%	19%	19%	8%
TIPS	0%	0%	0%	0%	0%	0%	2%	8%	12%	12%	4%
Short Duration Bond	0%	0%	0%	0%	0%	0%	0%	4%	19%	19%	4%
OPERF	75%	75%	75%	75%	100%	90%	75%	60%	50%	50%	75%
Investment Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Applying the allocation strategy outlined above to the approximately $8.2 billion of IAP assets, staff recommends retaining State Street Global Advisors to manage the following (with approximate values):

- $670 million in a Russell 3000 Index Fund ("U.S. All Market Equity");
- $410 million in a MSCI All Country World Index (ACWI) ex-U.S. IMI Index Fund;
- $360 million in a Bloomberg Barclays Aggregate Index Fund ("Core Bond");
- $150 million in a 1-10 Year U.S. TIPS Fund; and
- $110 million in a Bloomberg Barclays 1-3 Year Government/Credit Index Fund ("Short Duration Bond").

State Street Global Advisors (SSGA) was founded in 1978 as the Asset Management Division of State Street Bank and Trust Company ("State Street"). It is one of the world's largest asset management firms, with over $2.5 trillion assets under management. Oregon has extensive relationship with SSGA and State Street, including asset management and custody.

4. Create a new IAP fund that invests solely in the Oregon Short Term Fund

For participants planning to withdraw from the Program at or soon after retirement, staff recommends the creation of a new, low-risk IAP fund option that invests solely in the Oregon Short Term Fund. This fund would stand and operate independent of the other multi-asset TDFs recommended above (i.e., it would not be managed by AB).

5. Update the recently-approved Individual Account Program policy

If the Council approves Recommendation #4 immediately above, staff recommends updating the IAP policy previously approved at the August 2017 meeting to reflect the creation of this new IAP fund. Please see the redlined policy for details.

INTRODUCTION & OVERVIEW

Summary Policy Statement

The Oregon Investment Council (the "OIC" or the "Council") will maintain a program for the investment of moneys in the Individual Account Program ("IAP" or the "Program") that will provide an array of investment funds with varying levels of risk and return for eligible participating employees.

Purpose and Goals

To describe policy provisions for identifying and meeting the need for varying levels of investment risk across the heterogeneous universe of IAP participants.

Applicability

Classified represented, management service, unclassified executive service

Authority

ORS 238A.025 established IAP as a separate account from the pension program. ORS 238A.050(3) provides discretion to the Council to invest IAP assets differently than the other assets of the Public Employees Retirement System (PERS).

POLICY PROVISIONS

Definitions

Defined Benefit Retirement Plan: A retirement plan in which an employer or sponsor provides a specified pension payment upon retirement based on a predefined formula. As of 2016, the vast majority of IAP participants were also eligible for a defined benefit plan through the PERS.

Defined Contribution Retirement Plan: A retirement plan in which regular periodic contributions are made into an investment account, which can be distributed upon retirement. The value of such an investment account depends on the contributions and their timing, as well as the performances of the account's investments. Defined contribution plans include retirement plans offered by private companies such as 401(k) plans. Defined contribution plans also include 457 plans and 401(a) plans, such as IAP.

Target-Date Funds: A suite of funds, each with a specific target date, that systematically rebalances to a time-varying asset allocation. In the context of IAP, these target dates are the approximate calendar year a participant expects to retire. For example, a participant planning to retire in 2050 would invest in the 2050 target-date fund.

Glide Path: A predefined asset allocation for a Target-Date Fund that varies based on the number of years to the target date, as proxied by the level of equity (public or private) exposure. Typically, the further away from the target date, the more of the Target-Date Fund's asset allocation will be comprised of more equity risk on the expectation that prudent equity risk is rewarded over the long-term.

Policy Statements

As of 2016, there are over 200,000 individual participants of varying ages in IAP, a Defined Contribution Retirement Plan. To adapt the Program to these participants, the Council directs staff to establish a set of Target-Date Funds (TDFs) available for PERS to assign to each Program participant. These funds are collectively called the *Individual Account Program Funds* (the "IAP Funds"). IAP participants approaching retirement would be assigned to less-risky IAP Funds while younger IAP participants would be assigned to riskier IAP Funds with potentially greater return potential. Although each participant likely has a unique combination of "life circumstance" and risk appetite, the objective is to make IAP Funds appropriate for the broad and diverse population of IAP participants. Participants seeking further retirement planning customization are expected to make arrangements outside of the Program, such as utilization of the Oregon Savings Growth Plan which is accessible to some participants.

1. **Selection of Target-Date Fund Manager.** The selection of a Target-Date Fund Manager (the "Manager") is the decision of the OIC, and is made subject to the research and recommendations of staff. Consultants may be used to assist in evaluating prospective managers, but the OIC will retain authority over the decision. The OIC may delegate authority for policy implementation to the State Treasurer and OST's Chief Investment Officer.

2. **Asset Allocation for the IAP Funds.** Working with staff, the Manager will recommend to the Council a glide path for the IAP Funds which would include the Oregon Public Employees Retirement Fund (OPERF), capital market investment vehicles, or a combination thereof. To the extent that PERS could provide readily available data, the glide path will be customized to the demographic profile and circumstances of the pool of IAP participants, such as access to a Defined Benefit Retirement Plan or Social Security.

3. **General Oversight of Target-Date Fund Manager and the IAP Funds.** All performance calculations shall be provided by an independent third party, such as the custodian or recordkeeper. Staff shall review the Manager, the IAP Funds, and IAP and report to the Council no less frequently than every other year.

4. **Termination of Target-Date Fund Manager.** Termination is the decision of the OIC and the Council may terminate "at will" according to the terms of the contractual relationship. Staff shall evaluate the Manager on several attributes, including contract compliance, adherence to Program objectives and fund volatility and performance. If staff believes after diligent analysis that the Manager has not met Program standards on one or more attributes, staff may recommend to the Council termination of the existing manager and the concurrent selection of a new manager.

5. **Establishment of an IAP Fund that invests solely in the Oregon Short Term Fund.** The Council directs staff to establish a fund that invests only in the Oregon Short Term Fund (OSTF). The purpose of this option is to offer a low-risk investment vehicle available for IAP participants.

Exceptions

List any exceptions to the policy statements.

Failure to Comply

Failure to comply with this policy may be cause for disciplinary action up to and including dismissal.

PROCEDURES and FORMS

None.

ADMINISTRATION

Review

Annually.

Feedback

Your comments are extremely important to improving the effectiveness of this policy. If you would like to comment on the provisions of this policy, you may do so by e-mailing the Policy Analyst. To ensure your comments are received without delay, *please list the policy number and name in your e-mail's subject*. Your comments will be reviewed during the policy revisions process and may result in changes to the policy.

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September 20, 2017

AB CUSTOM TARGET-DATE SOLUTIONS

STATE OF OREGON

Chris Nikolich Head of Glide Path Strategies—Multi-Asset Solutions

Ray Decker Managing Director, Head of Client Service—Defined Contribution

Liz Smith Senior Managing Director—Public Funds

Agenda

- Introduction of AB
- Demographic Analysis
- Glide Path Design
- Implementation and Ongoing Services

AB: A Unique Combination of Expertise, Innovative Solutions and Global Reach

OUR GOAL

TO KEEP CLIENTS AHEAD OF TOMORROW

We work every day to earn our clients' trust, create innovative solutions tailored to their unique needs and deliver the performance they expect.

OUR FIRM

3,454 EMPLOYEES + 21 COUNTRIES + 47 CITIES

$517 BILLION AUM

201 BUY-SIDE ANALYSTS
Avg. 16 years' experience and 7 years with AB

141 PORTFOLIO MANAGERS
Avg. 22 years' experience and 12 years with AB

WHAT SETS US APART

People & Culture

We attract the industry's best—people with relentless drive and ingenuity who prize delivering for clients above all else.

Global Structure

We've built an extensive and integrated global research and investing footprint over four decades, which gives us the broadest possible perspective.

How We Collaborate

Our experts share ideas across geographies, asset classes and sectors—their collective insights drive innovation and lead to better client outcomes.

Client Focus

We work with all types of clients; as markets and needs evolve, we do, too—focusing our firm's full resources on achieving their objectives.

Historical analysis does not guarantee future results.
In US dollars. As of June 30, 2017. Source: AB

Expertise in Defined Contribution

AB's Goal: Shape Better Experiences and Outcomes for Our Clients

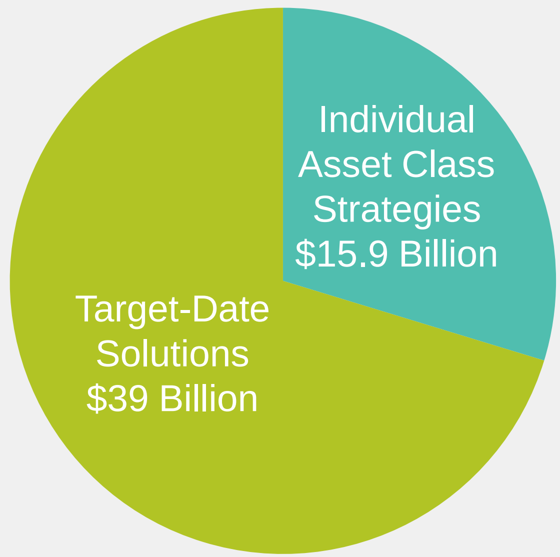
We get there with:

+ **Global market expertise**—to help clients navigate evolving regulatory challenges and market opportunities with a broad spectrum of investments

+ **Visionary research**—we transform insights and expertise into progressive market solutions

+ **Collaborative**—AB's more than 70 DC experts collaborate across our firm and industry to address our clients' needs and deliver unique solutions for their portfolios

AB Defined Contribution Global AUM: $54.9 Billion



As of June 30, 2017. Data includes pending implementations.
Source: AB

Experience Counts

Leveraging more than a Decade of Glide Path Design for Large DC Plans

Unmatched Client List

Largest, Most Sophisticated DC Plans

+ Three of the top 10* and six of the top 30 in US*
+ 22 US clients†
+ $38 billion in custom target-date assets under management globally†

Experienced Default Provider

Helping Participants Achieve Better Retirement Outcomes

+ Available to over 1.5 million plan participants
+ Aggregate plan assets of $150 billion
+ Automatically incorporate lifetime income for 2 DC plans

State-of-the-Art Technology Platform

Unparalleled Expertise

+ Worked with 11 different record-keepers
+ Incorporating 38 third-party managers
+ Trading over $6 billion of cash flows, rebalancing and manager changes annually

Global Experience: US, UK and Japan

*P&I September 2015
†June 30, 2017

Extensive Track Record of CRS/LIS* Implementations

Industry	Plan Assets ($ in Millions)	CRS/LIS Assets ($ in Millions)	Participants	Underlying Components	Record-Keeper
Aerospace/Defense Products & Services	$32,706	$3,058	135,527	Active/Passive	Voya
Conglomerate	$28,582	$5,006	123,410	All Passive	Fidelity
Conglomerate	$21,563	$3,032	69,998	All Passive	Alight
State Government	$15,588	$4,236	213,000	Active/Passive	Empower
Manufacturing and Technology	$14,554	$6,295	88,220	Active/Passive	Fidelity
Drug Manufacturers	$8,182	$3,856	24,711	Active/Passive	Fidelity
State Government	$7,400	$1,351	268,000	Active/Passive	Empower
Communications Equipment	$6,913	$1,377	9,991	Active/Passive	Alight
Airlines	$6,725	$1,220	12,047	Active/Passive	Charles Schwab
Electric Utility	$3,886	$830	13,238	Active/Passive	Xerox
Grocery Stores	$2,085	$1,866	113,558	Active/Passive	Fidelity
State Government	$1,900	$815	66,205	Active/Passive	ICMA
Life Insurance	$1,844	$704	9,242	Active/Passive	Alight
State Municipal Employee System	$1,174	$394	16,041	All Passive	Alerus
Diversified Computer Systems	$931	$469	4,096	Active/Passive	Fidelity
Asset Management	$842	$451	2,791	All Active	Voya
Restaurants	$594	$126	37,251	All Passive	Voya
Manufacturing and Technology	$436	$221	3,999	All Passive	Alight
Food - Major Diversified	$234	$27	1,907	Active/Passive	Alight
Trucks & Other Vehicles	$217	$217	3,786	Active/Passive	Kravitz
Legal	$207	$81	1,088	All Active	Fidelity
Variety Stores	$183	$243	8,843	Active/Passive	Empower
	$156,746	**$35,875**	**1,226,949**		

*CRS/LIS denotes AB's Customized Retirement Strategies and Lifetime Income Strategy services.
The above clients and target-date/LIS assets are US-based as of June 30, 2017. DC Plan Asset and Participant Data measurement dates vary based on the information available in BrightScope, Money Market Directory and EFAST2 as of March 2017. Plan Assets represent DC or hybrid plans with a DC component.
Source: AB, BrightScope, Money Market Directory and EFAST2 (for DC Plan Asset and Participant Data).

AB's Roles and Responsibilities

Making the Custom Target-Date Fund Implementation Seamless for the State of Oregon

Investments → **Design Glide Path**

- Glide path
- Asset classes
- Components

Operations → **Ongoing Operational Support**

- Develop operational structure
- Interface with:
  - Plan Sponsor (PERS)
  - Managers
  - Custodian (State Street)

Communications → **Advise and Consult on Participant Communications Strategy**

- Introduction
- Ongoing

Summary: Demographic Research and Glide Path Design

- Benefits of Transition to Glide Path
  - Improve Risk Control for Participants Approaching Retirement
  - Maintain Growth Oriented Focus for Younger Participants
  - Retain Contribution to Diversification and Growth from OPERF

- Key Demographic Inputs
  - Target 90% Total Replacement Rate From all Sources
  - Oregon Participant Salaries, Savings and Tenure
  - Age 65 Retirement

- Proposed Glide Path
  - Modest Increase to Growth Allocation for Young Savers
  - Significant Increase to Fixed Income for Near Retirees
  - Expect Improved Consistency, Lower Downside Risk and Lower Median Growth

Demographic Analysis

State of Oregon Demographics Summary

- Standard Goals & Risk Tolerance
  - Providing long-term real asset growth while working
  - Prolonging savings in retirement
  - Mitigating participant risk especially when approaching and while in retirement
- Demographic Summary
  - Average retirement age: 63*
  - Average account balance increases with age and reaches its peak at 0.8x final salary near retirement
  - Average salary level and DC deferrals are around population average with additional benefits from DB
  - Low employment risk or frequency of job-changing
- Target total replacement rate
  - Target average total replacement rate of 90%
  - Average DB replacement rate of 45% + Social Security replacement rate of 35%

* Used average retirement age of 65 in glide path modeling and analysis.

Experienced Real Salary Increase by Age

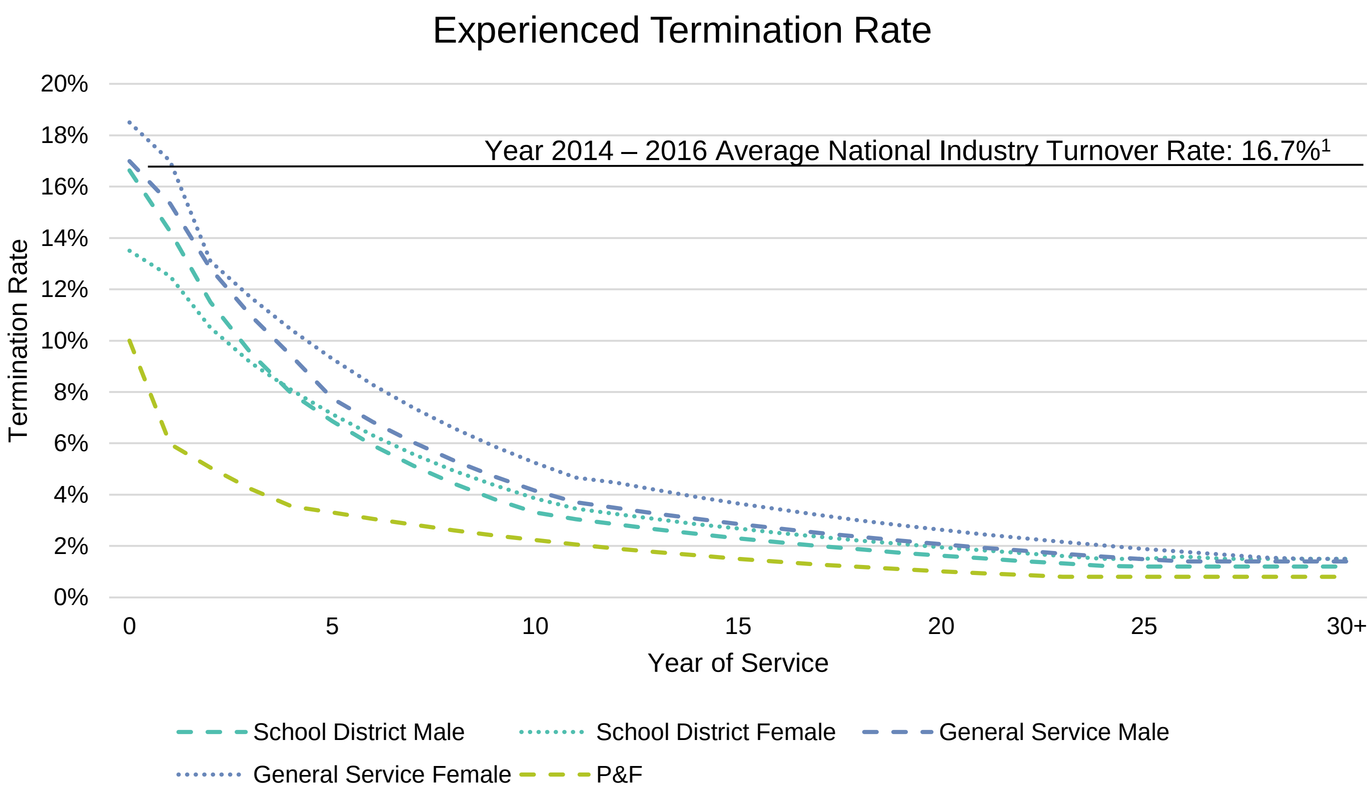
Data source: Oregon Public Employees Retirement System 2016 Experience Study
Weighted average is calculated based on number of active members within each category sourced from Oregon Public Employees Retirement System December 31, 2015 Actuarial Valuation Report

Estimated Average Salary Progression by Age

Age 25 salary is based on 2015 payroll information sourced from Oregon Public Employees Retirement System December 31, 2015 Actuarial Valuation Report.
Real salary progression is based on weighted average Milliman real salary increase assumption sourced from Oregon Public Employees Retirement System 2016 experience study. It is the sum of merit salary increase assumption and 1% real wage growth assumption for the entire population.

Low Employment Risk / Job Turnover

+ Termination rate substantially decreases as year of service increases



Data source: Oregon Public Employees Retirement System 2016 Experience Study

[1] Year 2014 – 2016 average national industry turnover rate is sourced from Compdata Surveys, BenchmarkPro 2016 Report

Average Retirement Age

- Based on Oregon PERS 2016 experience study, differences in retirement patterns were observed across length of services, job classes, and eligibility for unreduced benefits (details in appendix)
- Age 63 is the weighted average retirement age across tiers and job classes based on both plan normal retirement age and observed average age at effective retirement date
- Average retirement age of 65 is used in State of Oregon glide path design and analysis

	Plan Avg Normal Retirement Age[1]	PERS Observed Avg Age at Effective Retirement Date[2]	Active Participants Weights[3]
Tier 1	58	61	18%
Tier 2	60	63	24%
OPSRP	65	64	58%
Weighted Avg	**63**	**63**	

[1] Sourced from Tier 1, Tier 2, OPSRP Plan Information. Weighted average of general service normal retirement age and Police & Fire normal retirement age.
[2] Data as of December 31, 2017 provided by PERS
[3] Sourced from Oregon Public Employees Retirement System December 31, 2015 Actuarial Valuation Report. Police & Fire is included.

Glide Path Design

AB Target-Date Investment Philosophy

- Glide paths must **balance the four major risks** facing plan participants: growth risk, inflation risk, market risk and longevity risk
- Capital market forecasts must **capture the importance of current conditions** and the sequencing of returns to guard against the long-run risks participants face
- **Customization enhances outcomes** by incorporating participant demographics and plan sponsor philosophy relating to investment alternatives and risk
- Diversifying asset class exposures utilized **should vary by age** in order to best reduce risks specific to that age cohort

State of Oregon Glide Path Construction

Process Overview

Risk Budgets	Portfolio Building Blocks	Glide Path
Determine Plan Sponsor Objectives	Define Strategy Universe	Align Risk Budgets and Building Blocks
Perform Demographic Analysis	Assess Implementation Vehicles	Integrate, Optimize and Refine
Determine Participant Risk Budgets	Generate Portfolio Building Blocks	Finalize Glide Path

Assess Expected and Ongoing Value-Add

Key Inputs and Highlights of Glide Path Design

+ Increase growth potential for young savers, improve risk control as approaching retirement and enhance retirement income potential above DB (45%) and Social Security (35%)

Participant Demographics

Oregon Public Employees Retirement Fund (OPERF)

Current Capital Market Environment

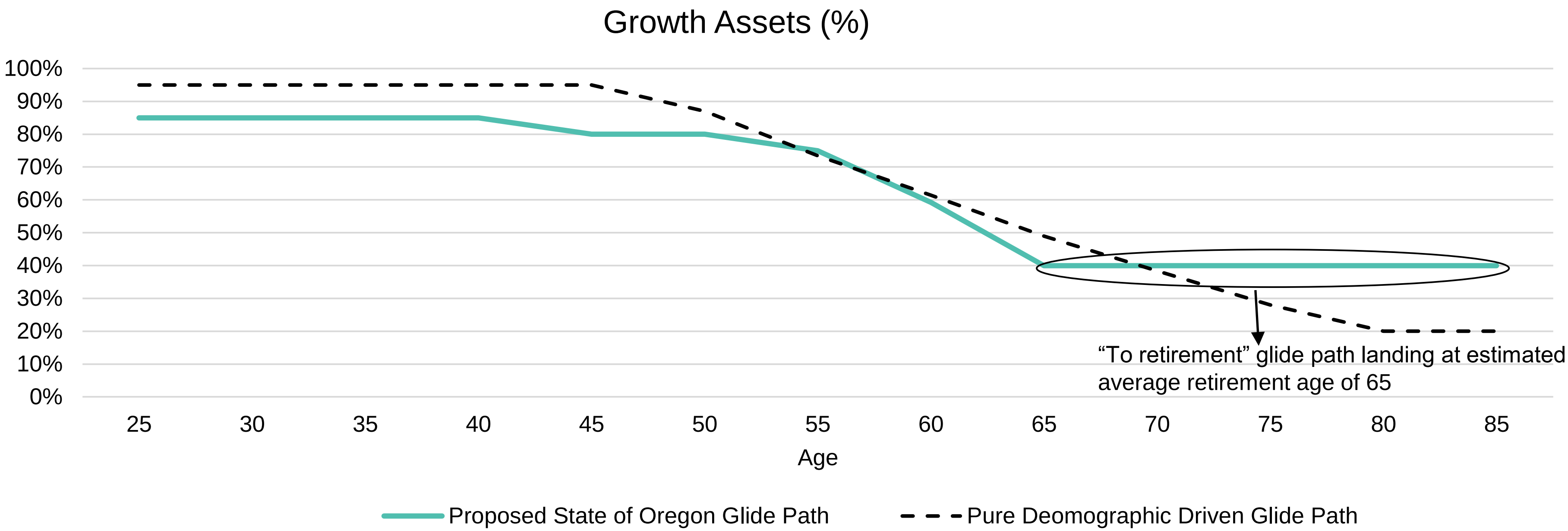
Glide Path Design

- Designed a customized glide path landing at age 65
- Allocation to OPERF is determined by OST and incorporated into the design
- OPERF portfolio is assessed and non-OPERF allocations are designed by AB accordingly
- Modeled passive implementation for all non-OPERF allocations

Proposed State of Oregon Glide Path Summary

+ A customized glide path landing at age 65 is designed, with total 10 vintages (2060-2020 plus Retirement Allocation Fund)

+ OPERF allocation is determined by OST, AB assessed OPERF portfolio and designed the remaining allocations assuming passive implementation

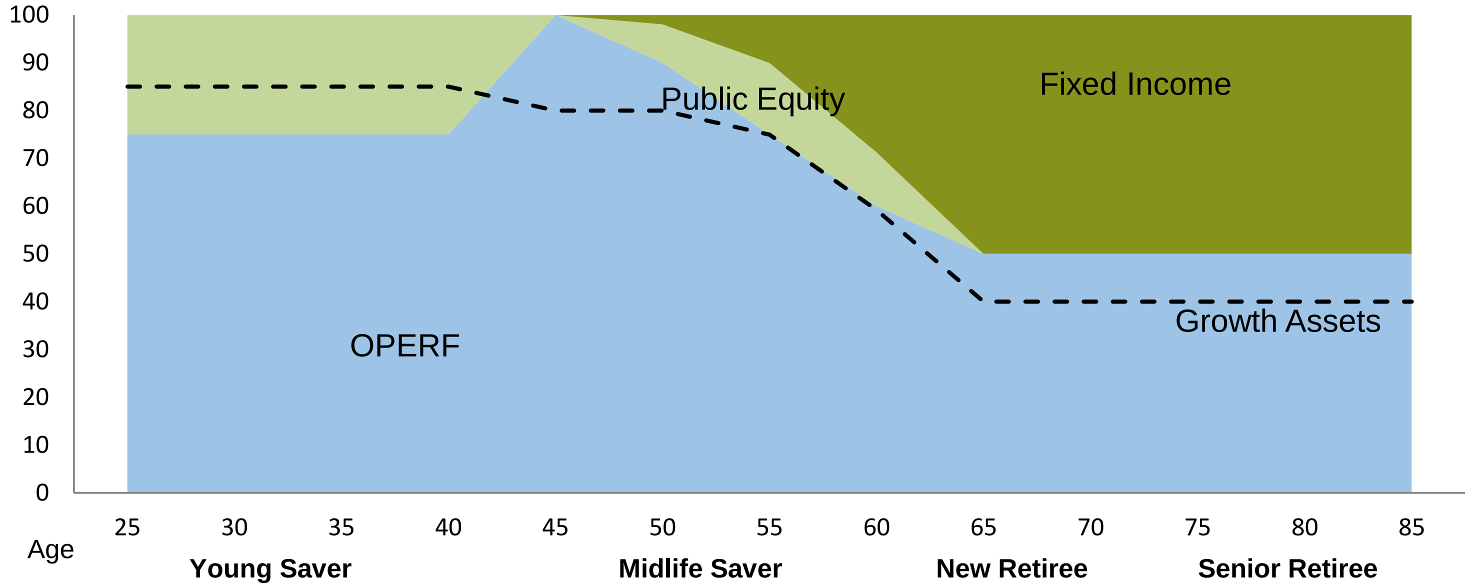


	25	30	35	40	45	50	55	60	65	70	75	80	85
OPERF	75.00	75.00	75.00	75.00	100.00	90.00	75.00	60.00	50.00	50.00	50.00	50.00	50.00

80% of OPERF allocation is counted as growth assets

Proposed State of Oregon Glide Path

State of Oregon

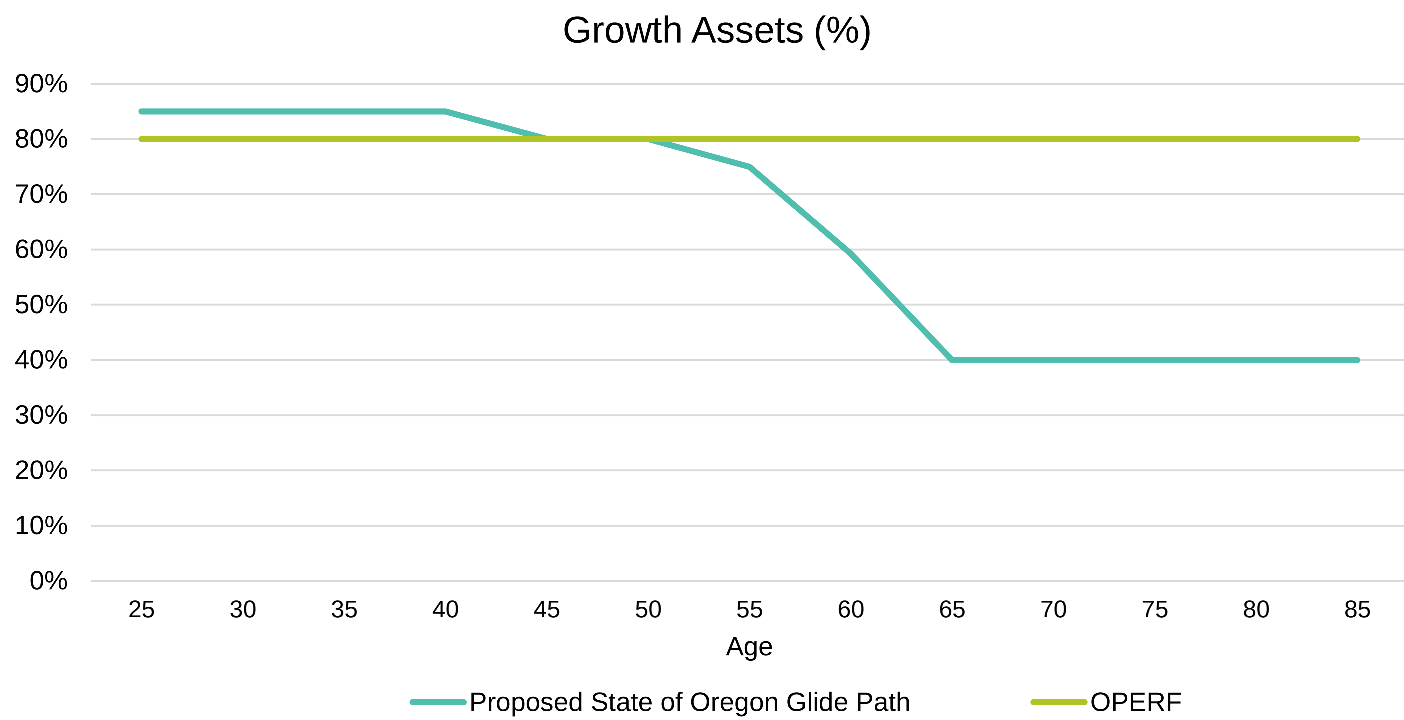


Proposed State of Oregon Glide Path	25	30	35	40	45	50	55	60	65	70	75	80	85
US All Market Equity	15.00	15.00	15.00	15.00	-	5.10	9.85	7.65	-	-	-	-	-
ACWI ex US Equity	10.00	10.00	10.00	10.00	-	2.90	5.10	3.60	-	-	-	-	-
Core Bond	-	-	-	-	-	2.00	7.70	16.30	18.65	18.65	18.65	18.65	18.65
TIPS	-	-	-	-	-	-	2.35	8.15	12.05	12.05	12.05	12.05	12.05
Short Duration Bond	-	-	-	-	-	-	-	4.30	19.30	19.30	19.30	19.30	19.30
OPERF	75.00	75.00	75.00	75.00	100.00	90.00	75.00	60.00	50.00	50.00	50.00	50.00	50.00
Public Equity	25.00	25.00	25.00	25.00	-	8.00	14.95	11.25	-	-	-	-	-
Fixed Income	-	-	-	-	-	2.00	10.05	28.75	50.00	50.00	50.00	50.00	50.00
OPERF	75.00	75.00	75.00	75.00	100.00	90.00	75.00	60.00	50.00	50.00	50.00	50.00	50.00
Total Growth Assets*	85.00	85.00	85.00	85.00	80.00	80.00	74.95	59.25	40.00	40.00	40.00	40.00	40.00

* 80% of OPERF allocation is counted as growth assets

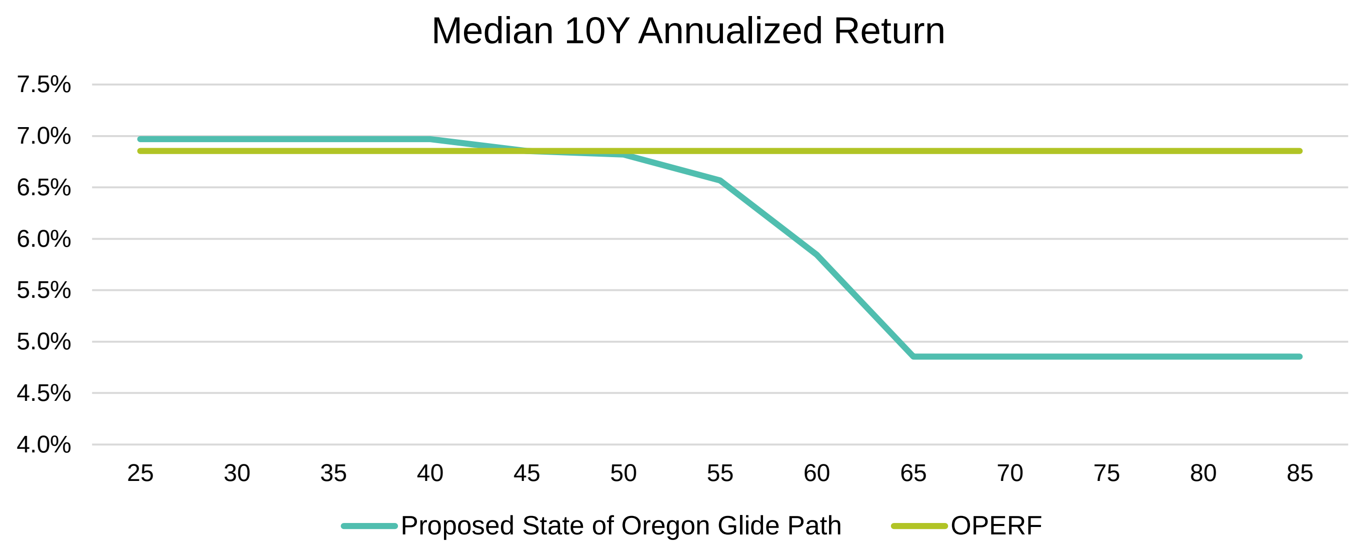
Return vs. Risk Trade-Off

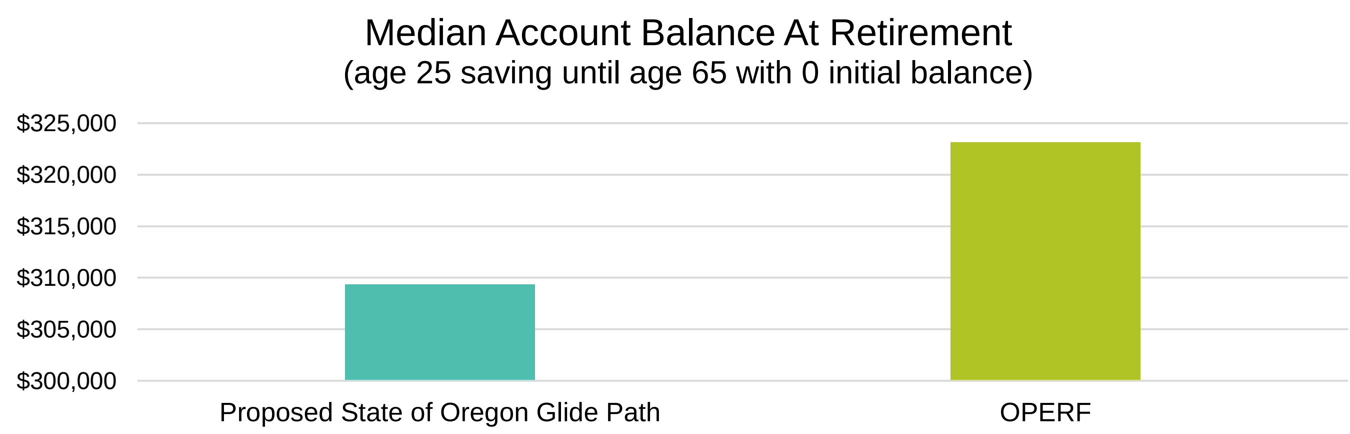
+ Proposed glide path increases growth allocation for younger participants vs. OPERF to enhance wealth accumulation and reduces growth allocation as participants approaching retirement to protect them from downside market risk



80% of OPERF allocation is counted as growth assets

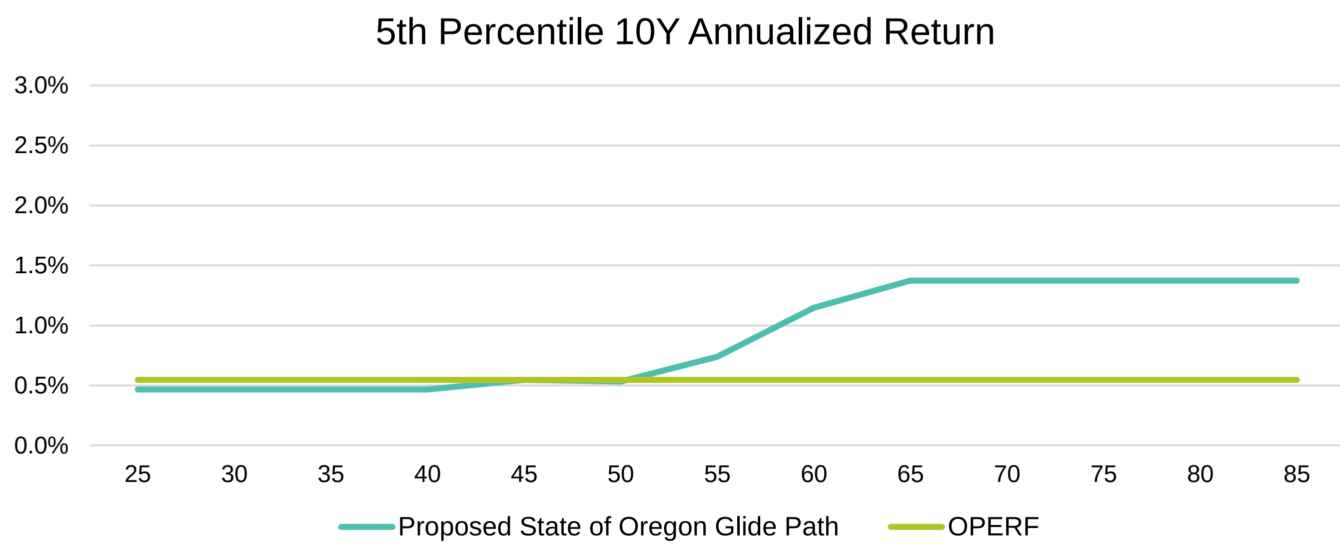
Lower Growth Allocation Approaching Retirement Leads to Lower Long Term Median Return But Provides Better Long Term Downside Protection

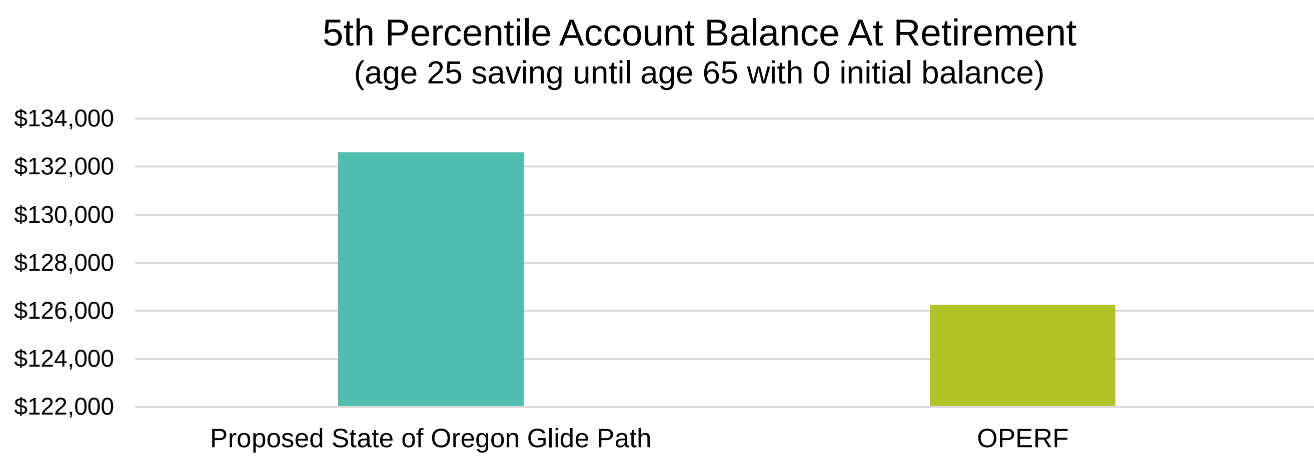




Based on 10K trial of Monte Carlo Simulation with CME initial market condition as of 2016Q4

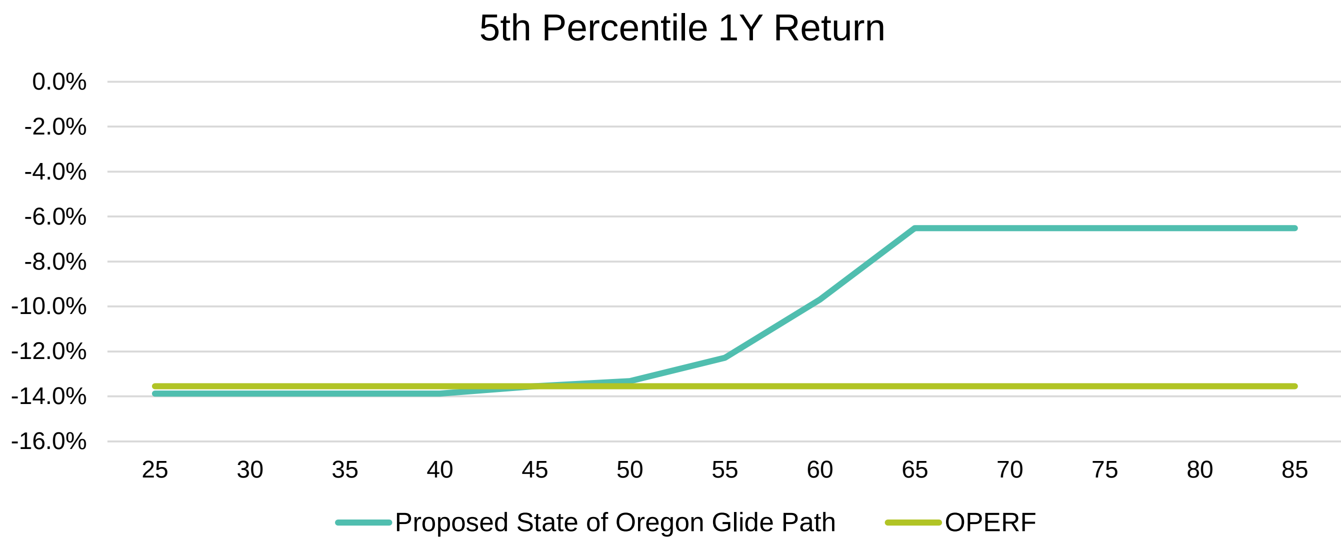
Lower Growth Allocation Approaching Retirement Leads to Lower Long Term Median Return But Provides Better Long Term Downside Protection

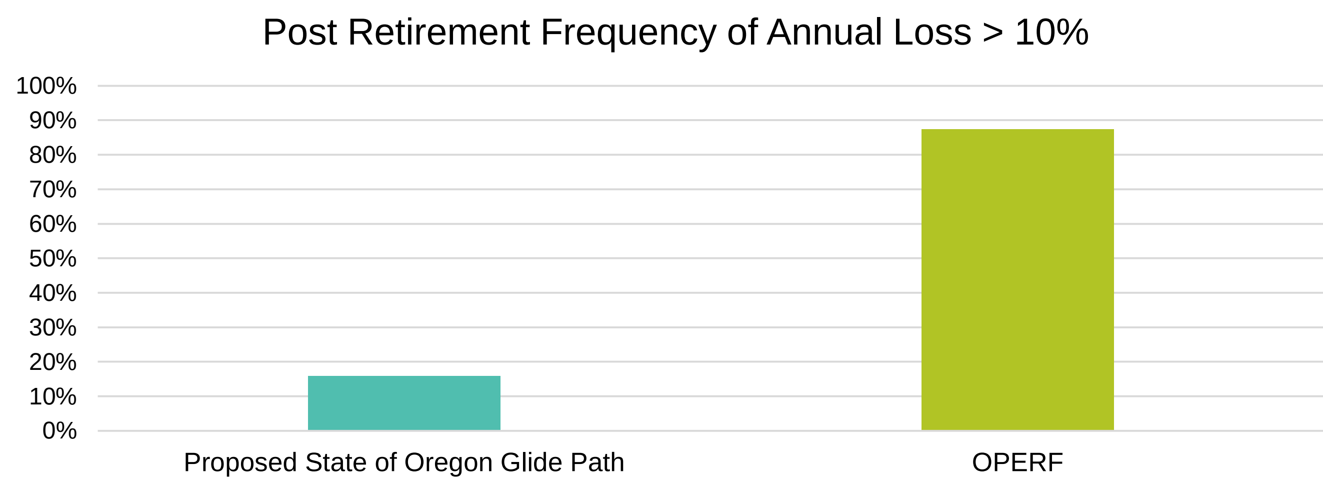




Based on 10K trial of Monte Carlo Simulation with CME initial market condition as of 2016Q4

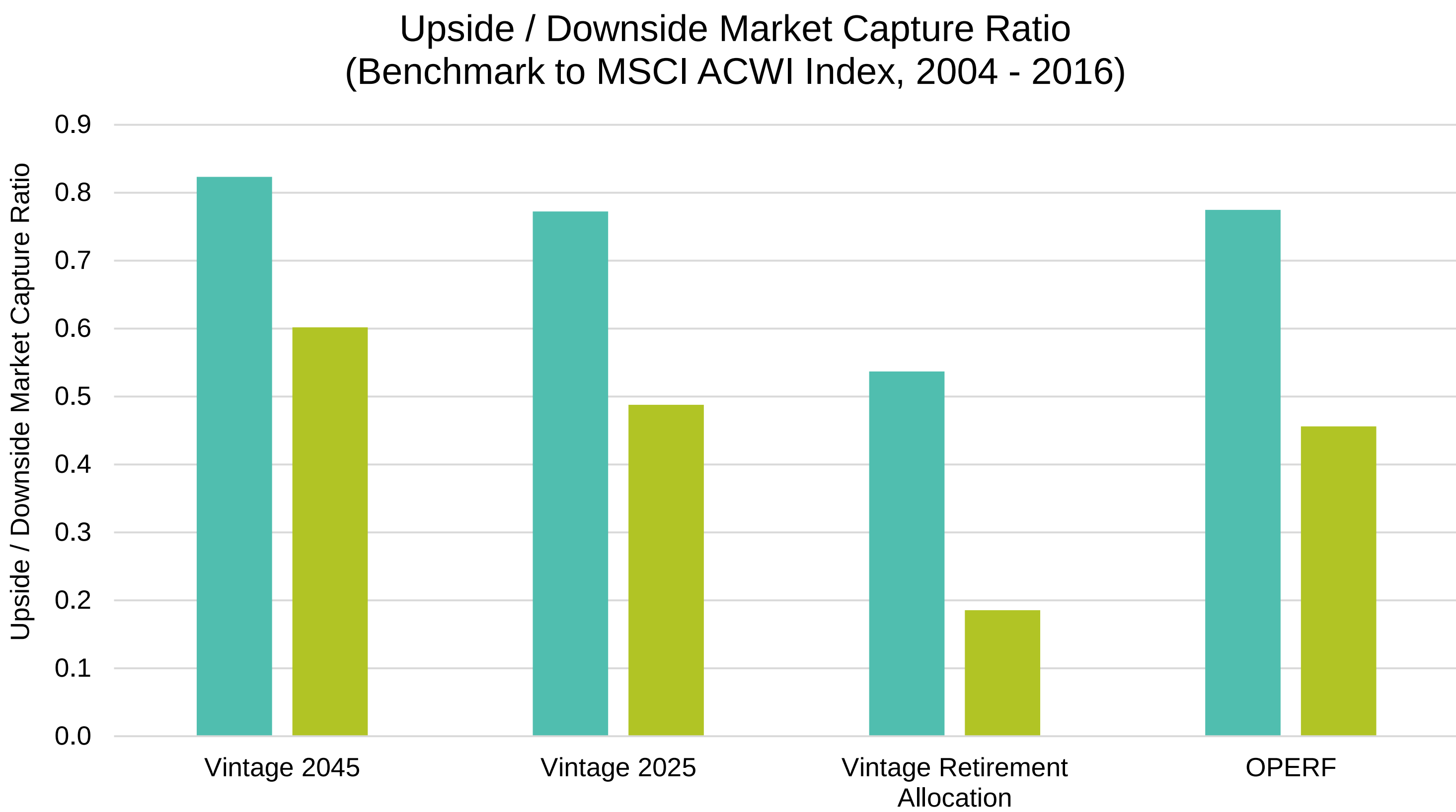
Lower Growth Allocation Approaching Retirement Reduces Short Term Downside Risk and Provides Additional Downside Protection Post Retirement if Participants Don't Roll Out





Based on 10K trial of Monte Carlo Simulation with CME initial market condition as of 2016Q4

Historical Simulated Upside / Downside Market Capture Ratio



Historical simulation based on annual return within period 2004 – 2016. These returns are derived through back-testing, and are presented for illustrative purposes only and do not reflect the performance of any AllianceBernstein product. Back-testing is designed to allow one to understand and evaluate certain strategies by seeing how they would have performed, hypothetically, during certain time periods. Back-tested results have important limitations, may represent only a small sample of possible scenarios and should not be considered indicative of future results. In particular, they do not reflect actual trading in an account, so there is no guarantee that, in fact, an actual account would have achieved the results shown. Back-tested results also assume that investment decisions would not have changed over time and in response to market conditions, which might have occurred in an actual account. Up / Down market is determined by MSCI ACWI Index annual performance. Down market within the period were year 2008, 2011 and 2015.
Actual % return is actual OPERF annual return provided by PERS. TDF % return is historical simulated return based on proposed glide path and the following historical index return with a 10bps passive mandate fee applied: Russell 3000 Index, MSCI ACWI ex US (NET UH USD), Bloomberg Barclays US Aggregate Index, Bloomberg Barclays US Govt Inflation-Linked 1-10 Y, Bloomberg Barclays US Govt/Credit 1-3 Y.

OPERF

OPERF: Analysis Summary

Estimated Growth Allocation = 80% Based on Total Volatility vs. Equity Volatility

	Allocation	Equity Beta	Liquid Proxy	Comment
Public Equity	40.0%	1.02	100% Equity	
Fixed Income	19.4%	-0.01	46% Diversified Bonds + 37% US Treasury + 13% Leveraged Loans + 4% High Yield	
Alternatives	8.9%	0.62	25% Infrastructure Equity + 35% Natural Resource Equity + 40% Hedge Fund of Funds	
Real Estate	11.9%	1.04	80% REITs + Residual	Opportunistic/REIT transitioning to Core
Private Equity	19.8%	0.84	85% US Equity + Residual	Large Buyout with little Venture Capital
OPERF Proxy		**0.75**	**75% Equity + 15% (REIT-Equity) + 10% Diversified Bonds + Residual**	**Residual Volatility = 6% Information Ratio = 0.2**

+ OPERF Proxy 10-Year Forward Looking Risk/Return: 13.5% Volatility = 79% of Global Equity Volatility, 6.9% Geometric Return, 0.44 Sharpe Ratio

Actual Allocation sourced from State Street Report as of 6/30/17. Allocation in Opportunity and Cash & Misc are merged with Alternatives allocation; Equity Betas calculated by regressing Liquid Proxies on Equity, Equity – REIT, Bonds; Equity = MSCI ACWI, US Equity = Russell 3000, REITs = US NAREIT, Diversified Bonds = Barclay US Aggregate; US Treasury = Barclay US Treasury, Leveraged Loans = S&P LSTA Index, High Yield = BOA/ML High Yield Index, Infrastructure Equity = DJ/Brookfield Infrastructure Index, Natural Resource Equity = HSBC Energy/Mining, Hedge Fund of Funds = HFRI FOF Index; Real Estate Liquid Proxy derived by regressing Cambridge Associates Private Real Estate Index on NAREIT Index lagged 0-8 quarters and summing the betas; Private Equity Liquid Proxy derived by regressing 50% actual Oregon Private Equity NAV / 50% Cambridge Associated Private Equity Index on Russell 3000 lagged 0-8 quarters and summing the betas; all historical calculations based on 3Q97-4Q16; OPERF forward looking return estimation is based on 10K trial of Monte Carlo Simulation with CME initial market condition as of 2016Q4.
Source: Bloomberg, Cambridge Associates, State Street, OIC, AB

Implementation & Ongoing Services

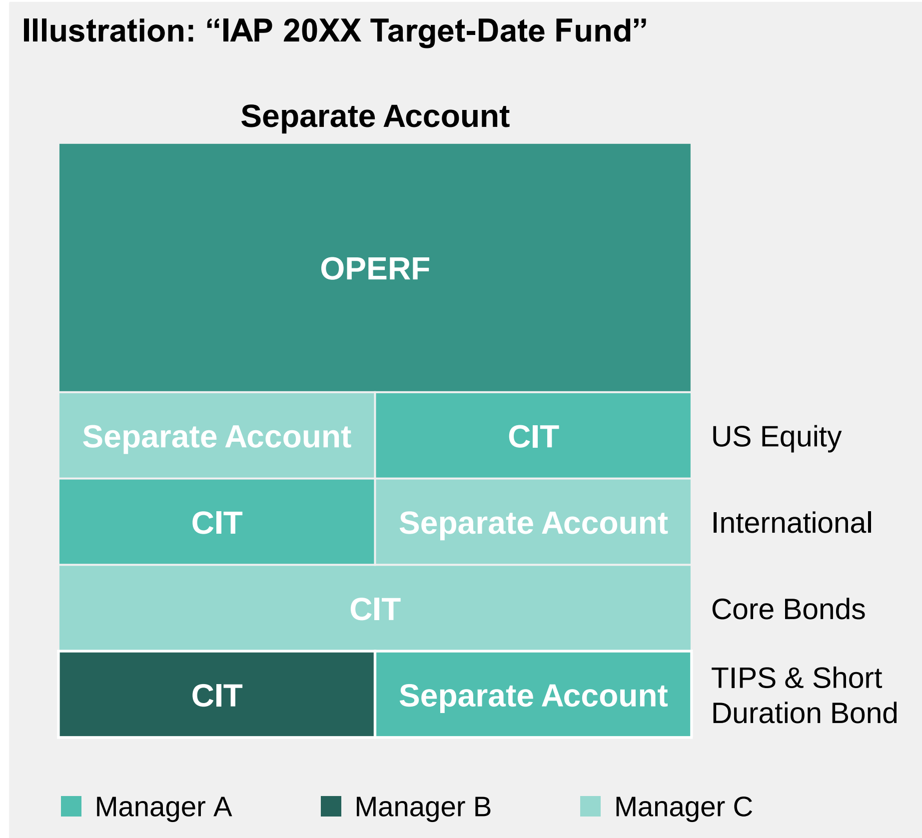
Summary: AB's Implementation and Ongoing Services

- Seamless Implementation
  - Serves as the overall project manager for the investment, operational and communications implementation
  - Develop implementation project plan and timeline with plan representatives and service providers
  - Lead weekly/bi-weekly project calls and report progress to the working teams
- Ongoing Operational Oversight
  - Work with Oregon and their service providers to determine trading processes and timing
  - Provide initial and ongoing operational support inclusive of cash flow management, rebalancing and glide path progression
- Participant Communications
  - Provide participant communications assistance and expertise
  - Provide custom content for participant communications inclusive of fund fact sheets, train-the-trainer presentations, Call Center Q&As, website and participant newsletters

Custom Target-Date Funds

Operational Roles and Responsibilities

Glide Path Design	**State of Oregon ("OPERF")** **AB ("Non-OPERF")** Investment Fiduciaries
Cash Flow, Glide Path Progression & Rebalancing	**AB**
Record-Keeper (Voya) Interface	**PERS**
Valuation and Custody	**State Street**
Manager Selection	**OST**
Control	**State of Oregon**



Appendix

State of Oregon: Custom Target-Date Fund Vintage Recommendation

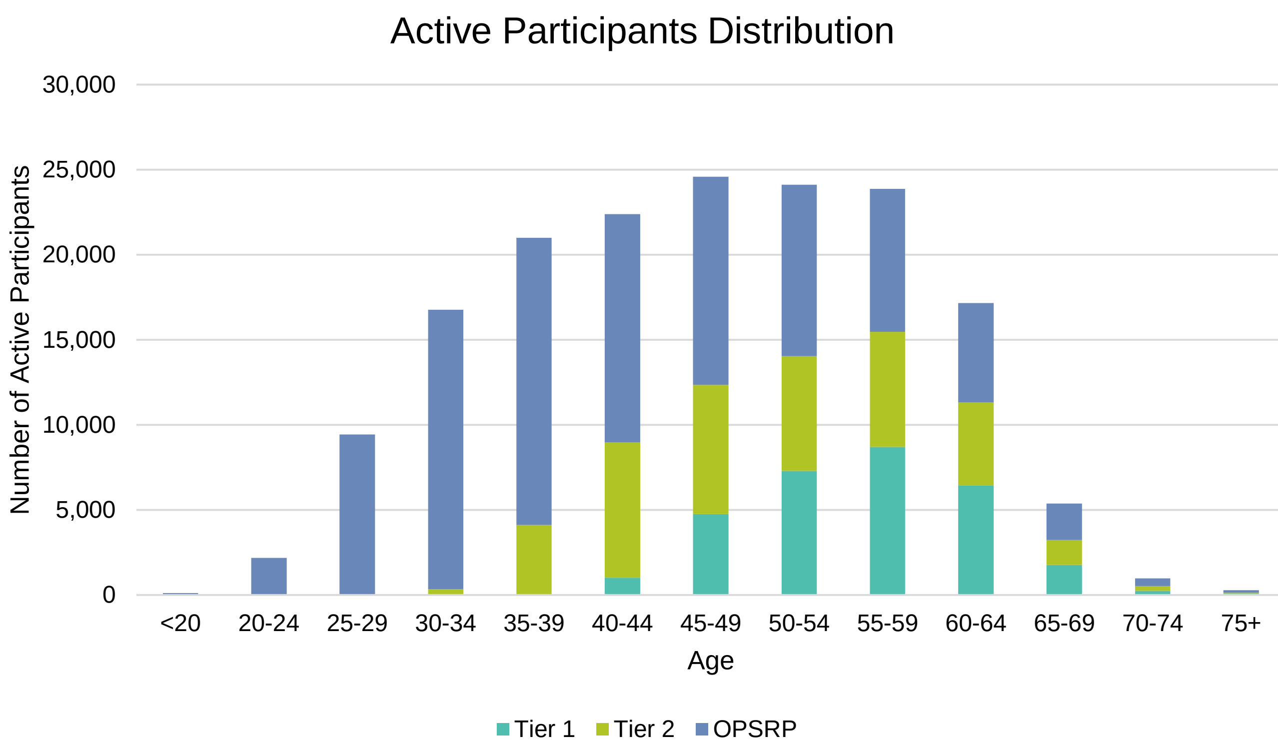
If the Employee was born…	Vintage
In 1993 or after	2060
Between 1988 and 1992	2055
Between 1983 and 1987	2050
Between 1978 and 1982	2045
Between 1973 and 1977	2040
Between 1968 and 1972	2035
Between 1963 and 1967	2030
Between 1958 and 1962	2025
Between 1953 and 1957	2020
In 1952 or before	Retirement Allocation Fund

Vintage Addition and Potential Consolidation every Five Years

+ In 2020, we would recommend the addition of a 2065 vintage designed for younger employees
+ These employees would be age 22 or younger in 2020 (born in 1998 or after)
+ Many plan sponsors prefer to limit the growth of the number of target-date fund vintages by consolidating vintages that have reached their final asset allocation (age 65 for the Oregon funds)
+ As an example, the 2020 Target-Date Fund will reach it's final asset allocation in 2020
+ At this point, it could be merged into the Retirement Allocation Fund since both funds will have the identical asset allocation going forward
+ Impacted participants would be notified in advance and the record-keeper would transfer their balances to the Retirement Allocation Fund
+ This approach of adding/consolidating a target-date fund vintage every five years will maintain the total number of the vintages to 10

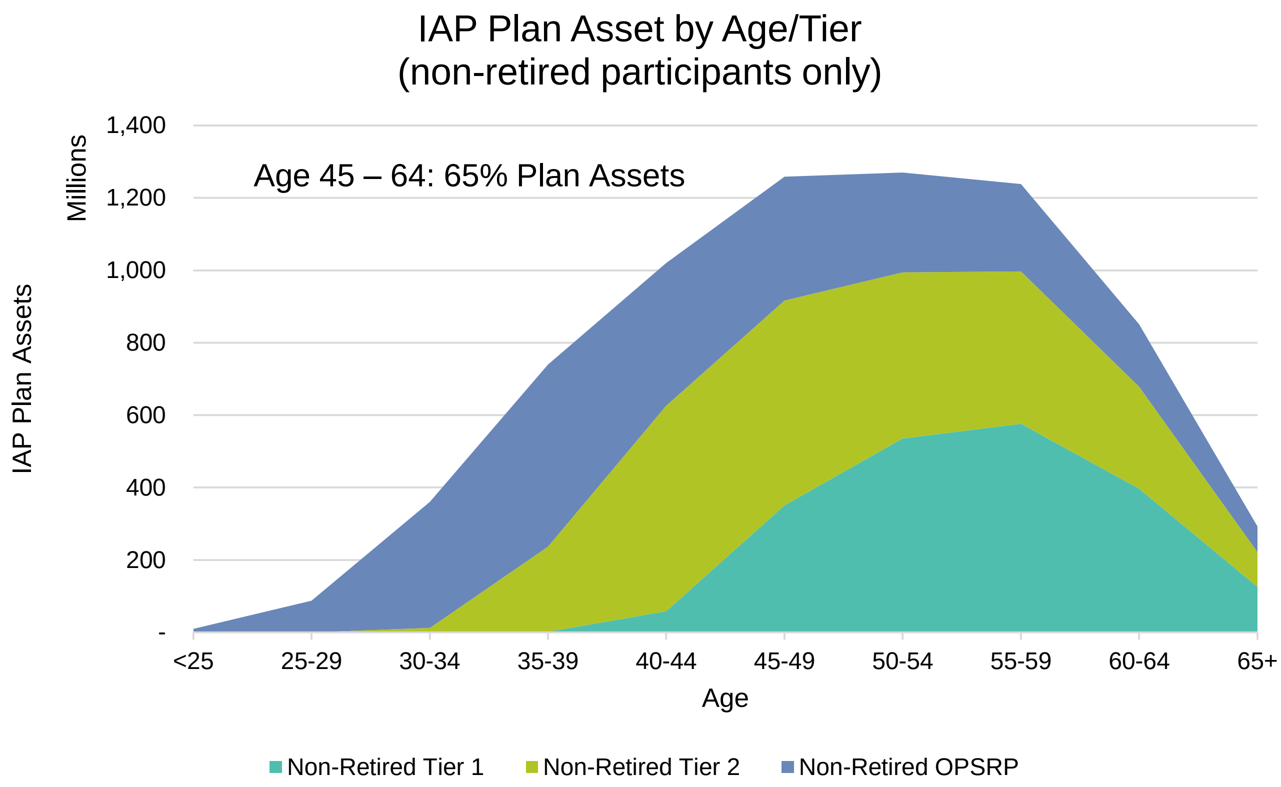
OPSRP Members Dominate Active Participants

- More than half of active participants are OPSRP members
- Young and midlife participants are especially dominated by OPSRP members



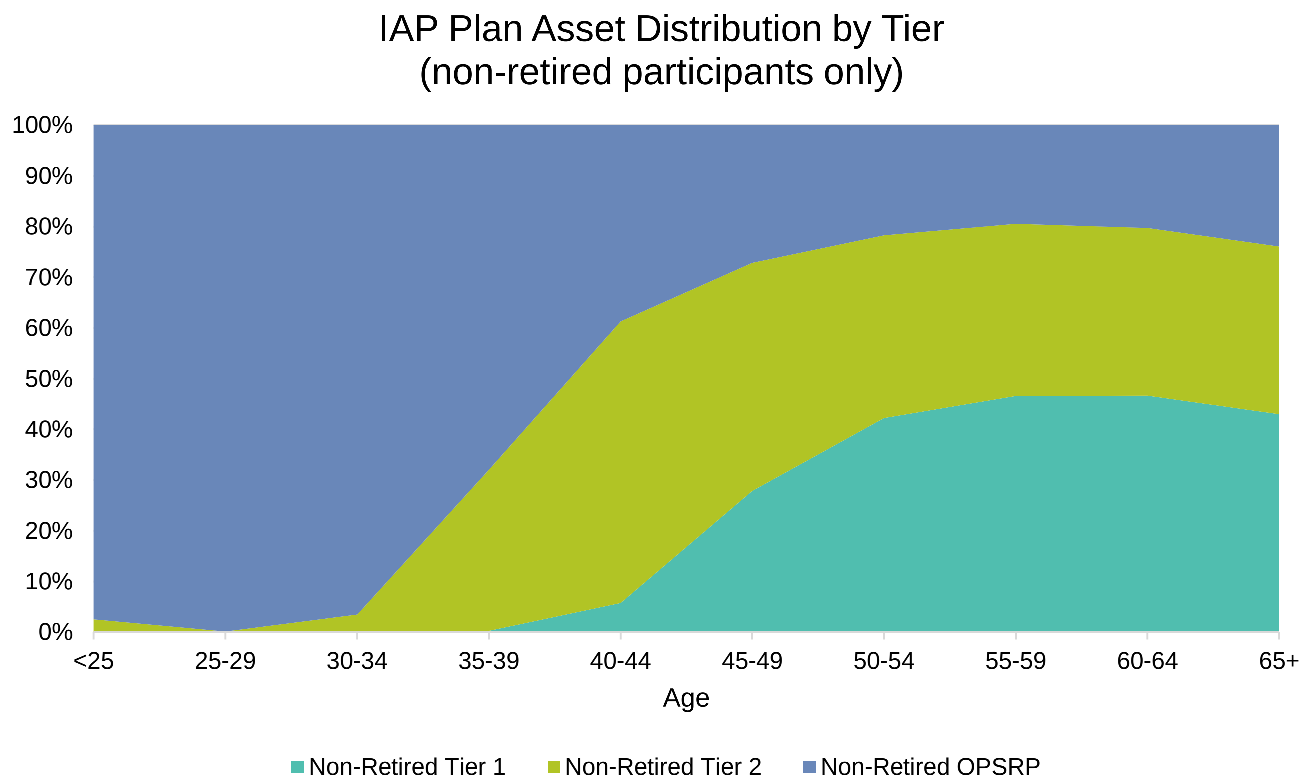
Data source: Oregon Public Employees Retirement System December 31, 2015 Actuarial Valuation Report

Majority of Plan Assets Are In Age 45 – 64



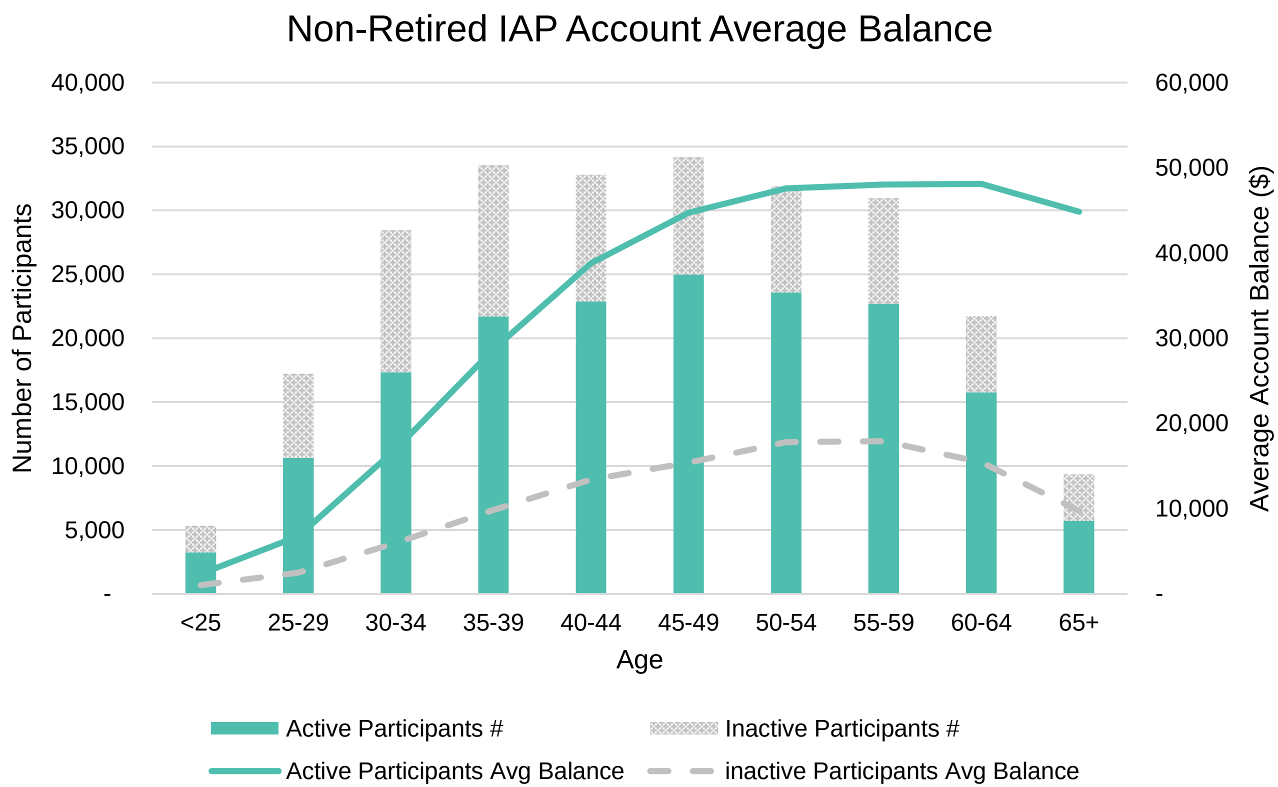
Data as of December 31, 2016 provided by PERS

Most of the Assets Held by Younger Participants Are From OPSRP Members Assets Held by Senior Participants Are More Split Among Tiers



Data as of December 31, 2016 provided by PERS

Average Account Balances Are Highest Near Retirement



Data as of December 31, 2016 provided by PERS

Retirement Benefit Summary

- Estimated average replacement ratio from DB & Social Security is 80%.
- Tier 1 / Tier 2 members have higher replacement ratio from DB compared with OPSRP members, given longer estimated service year at retirement and higher full formula factor, which partially offset by lower Social Security replacement ratio given earlier average retirement age.

	Tier 1	Tier 2	OPSRP	Weighted Average Across Tiers
Average Age at Retirement[1]	61	63	64	63
Average Non-Retired Members Age[1]	55	50	42	46
Average Active Members Service Year[2]	24	15	6	11
Estimated Total Service Year at Retirement	30	28	28	28
Estimated Average DB Replacement Ratio[3] (based on full formula)	51%	48%	42%	45%
IAP Contribution (made on the after Jan 1, 2004)	6% of covered salary			6%
Estimated Work Life Social Security Replacement Ratio (if eligible)[4]	33%	35%	37%	36%
Estimated Replacement Ratio from DB and Social Security	84%	83%	79%	81%

1 Average age at retirement and average non-retired members age are provided by PERS as of December 31, 2016
2 Average active members service data is sourced from Oregon Public Employees Retirement System December 31, 2015 Actuarial Valuation Report.
3 DB replacement ratio is estimated based on estimated total service year at retirement and benefit full formula, weighted averaged across job classes.
4 Social Security replacement ratio is estimated for the entire work life of a participant. Estimation is based on estimated salary progression, assuming participants start work at age 25, retire at average retirement age, and start withdrawing benefit at either retirement or at age 62 (if retire before age 62). A very small percentage of participants may not be eligible for Social Security.

AB's Proprietary Individual Participant Glide Path Design Tool (CyRIL)

The Outcome Objective: How the Participant Will Spend Their Savings

AB's Four Drawdown Profiles

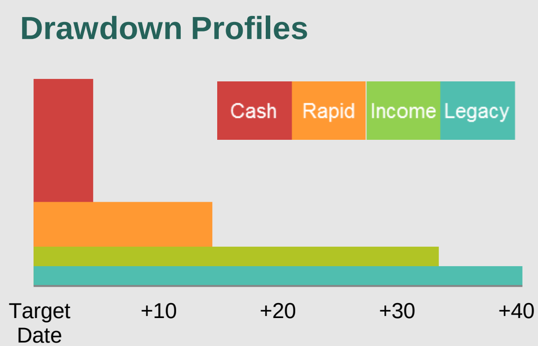
Will determine average investment horizon

Cash: Over first 5 yrs

Rapid Drawdown: Over first 15 yrs

Income for Life: Over expected retirement period (with 75% success)

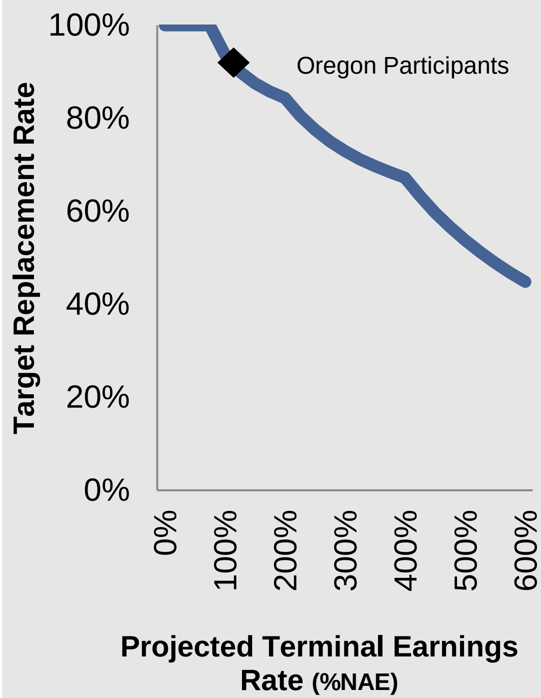
Legacy: No drawdown interest only



All assumed to be inflation linked

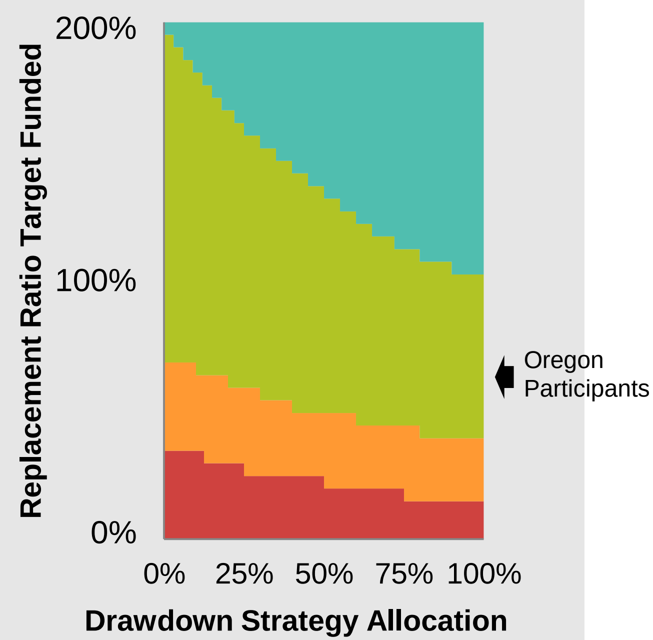
Target Replacement Ratio

Varies by expected earnings at retirement level



AB CyRIL Analysis

Based on expected funding of target replacement ratio, an allocation is made to the drawdown strategies



Historical High Ratio of Lump Sum Withdrawal At Retirement
Ratio Is Trending Down Through Time

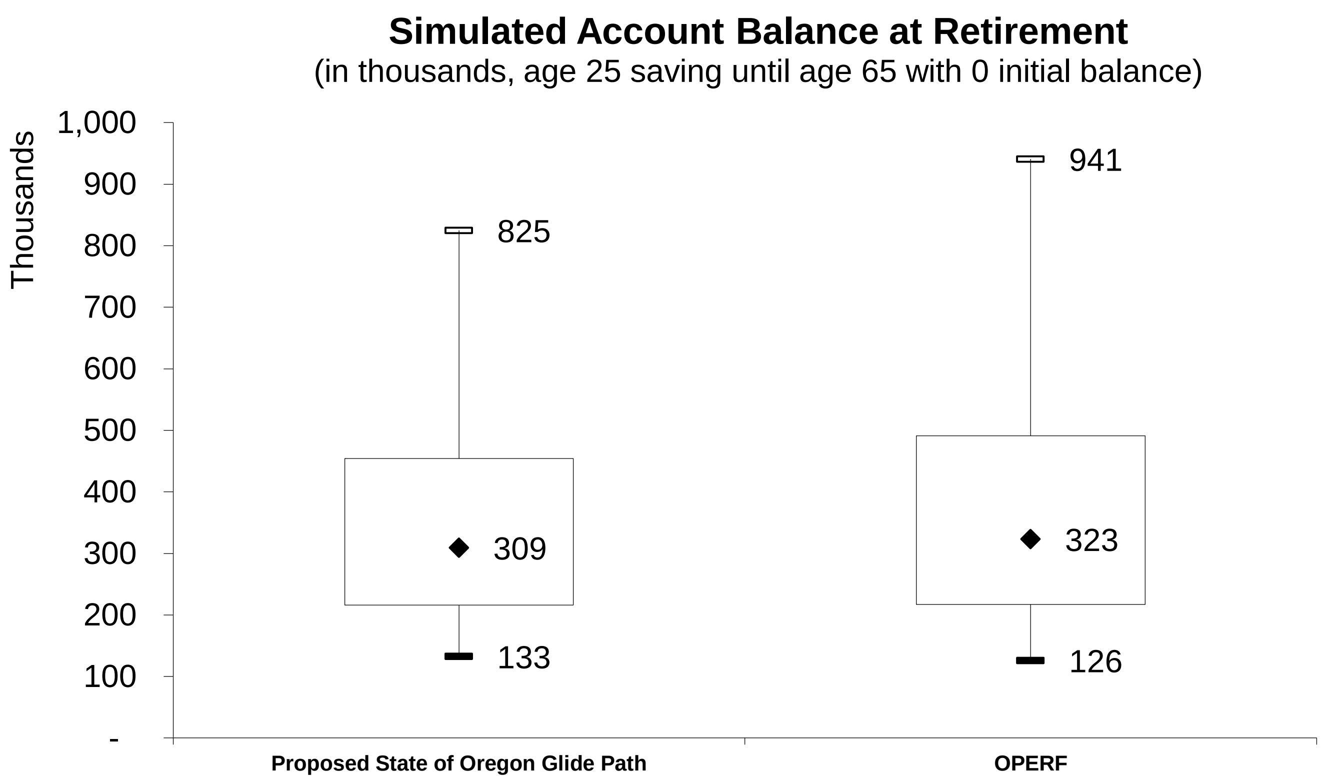
Year of Retirement	Accounts Receiving Installments	Accounts Receiving Lump Sum	Ratio (Lump Sum vs. All Retirements)
2004	12	2,841	99.58%
2005	56	2,407	97.73%
2006	203	2,722	93.06%
2007	387	2,758	87.69%
2008	383	2,566	87.01%
2009	267	2,256	89.42%
2010	367	3,882	91.36%
2011	1,432	7,259	83.52%
2012	1,123	5,882	83.97%
2013	1,524	7,971	83.95%
2014	1,323	5,367	80.22%
2015	1,551	6,062	79.63%
2016	1,311	5,500	80.75%
2017	549	2,352	81.08%

For reference only. No impact on glide path design.

NOTE: The source for the above table is all applicable completed retirements from internal IAP Disbursements tracking database. This includes accounts for which **IAP balance** at retirement was not immediately available; these accounts are not included in the above charts.

Data as of December 31, 2016 provided by PERS

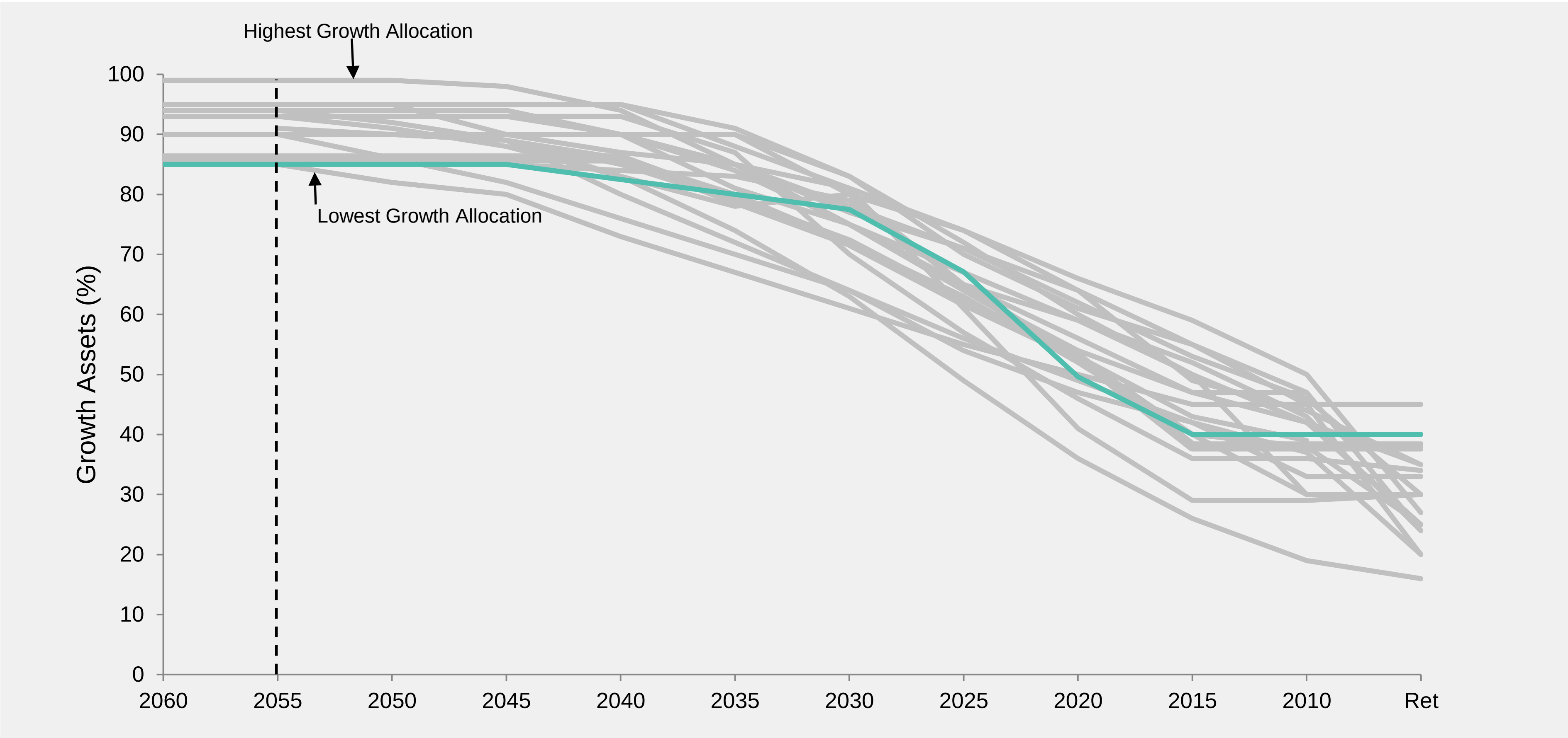
Lower Growth Allocation Approaching Retirement Leads to Lower Long Term Median Return But Provides Better Long Term Downside Protection



Based on 10K trial of Monte Carlo Simulation with CME initial market condition as of 2016Q4

Proposed State of Oregon Glide Path vs. Off-the-Shelf TDF Products

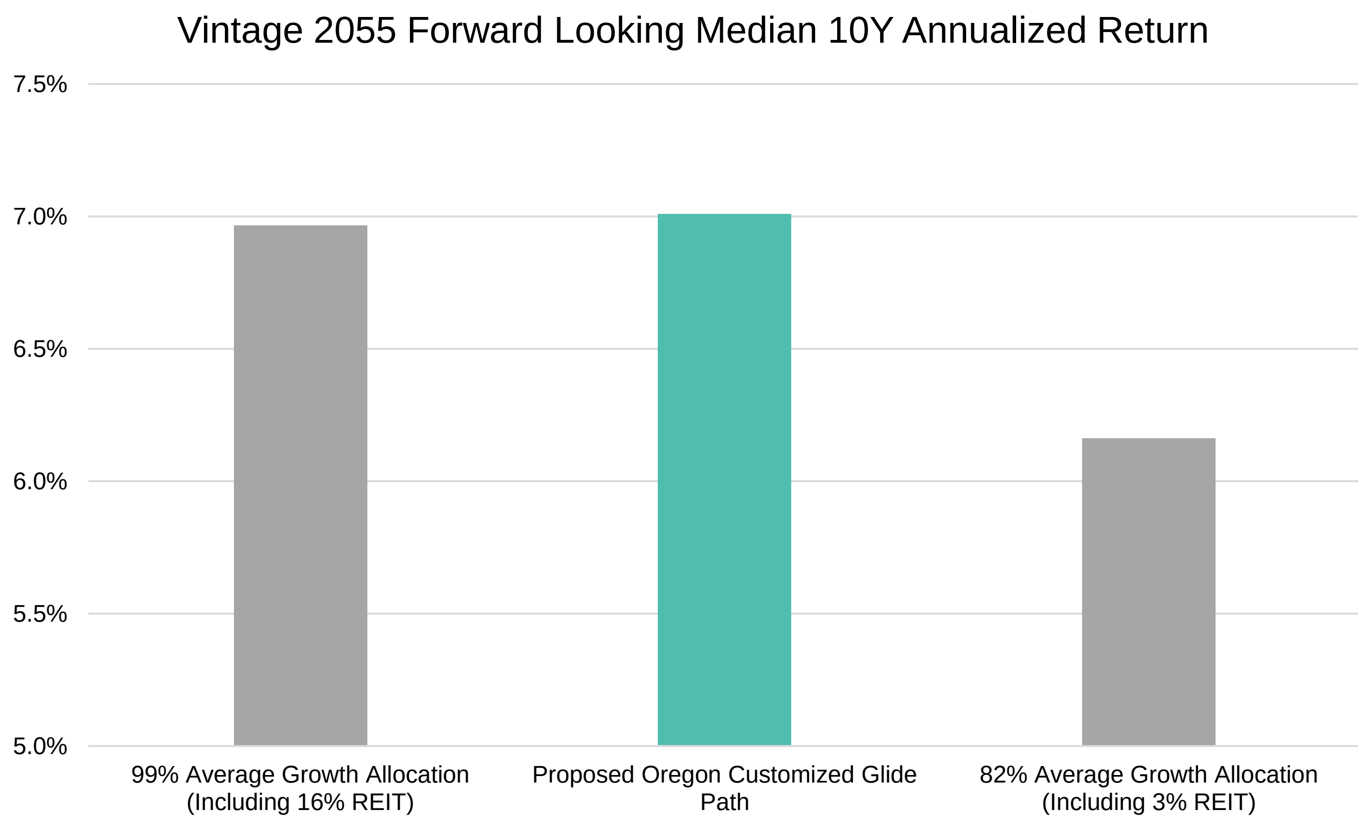
Glide Path Growth Asset Allocation Comparison



Source: Morningstar, Morningstar TDF Reports and Prospectus. Data as of December 31, 2016. Equity Allocation(%) includes real assets such as commodities, real estate, natural resources and other equity-like alternatives.

Proposed State of Oregon Glide Path vs. Off-the-Shelf TDF Products

Vintage 2055 Forward Looking 10Y Return Comparison



Based on 10K trial of Monte Carlo Simulation with CME initial market condition as of 2016Q4

The Capital-Markets Engine

The Bernstein Capital-Markets Engine is a proprietary model that uses our research and historical data to create a vast range of market returns, which takes into account the linkages within and among the capital markets, as well as their unpredictability; and finally (4) A Probability Distribution of Outcomes: based on the assets invested pursuant to the stated asset allocation, 90% of the estimated ranges of returns and asset values the client could expect to experience are represented within the range established by the 5th and 95th percentiles on “box-and-whiskers” graphs. However, outcomes outside this range are expected to occur 10% of the time; thus, the range does not establish the boundaries for all outcomes. Expected market returns on bonds are derived taking into account yield and other criteria. An important assumption is that stocks will, over time, outperform long bonds by a reasonable amount, although this is in no way a certainty. Moreover, actual future results may not meet Bernstein’s estimates of the range of market returns, as these results are subject to a variety of economic, market and other variables. Accordingly, the analysis should not be construed as a promise of actual future results, the actual range of future results or the actual probability that these results will be realized. The information provided here is not intended for public use or distribution beyond our private meeting.

TAB 6 – Common School Fund

Asset Allocation Recommendation

Oregon Investment Council
Common School Fund – Asset Allocation
STAFF RECOMMENDATION
September 20, 2017

Purpose
Staff recommends approval of the following proposed asset allocation target and ranges (Exhibit 1) for the Common School Fund (CSF):

Exhibit 1

Common School Fund	Current Target	Current Ranges	Proposed Target	Proposed Ranges
Global Equity	60%	50% - 70%	45%	40% - 50%
Private Equity	10%	0% - 12%	10%	8% - 12%
Fixed Income	30%	25% - 35%	25%	20% - 30%
Real Assets	0%	N/A	10%	8% - 12%
Diversifying Strategies	0%	N/A	10%	8% - 12%
Cash	0%	0% - 3%	0%	0% - 3%
10 Yr Expected Return (Geo Mean)	**6.5%**		**6.6%**	
Projected Standard Deviation	**14.5%**		**13.2%**	

Source: Callan 2017 Capital Market Assumptions

Executive Summary
Staff requests OIC approval of asset allocation targets for the CSF that improve its diversification and reduce both portfolio and distribution volatility through the introduction of explicit allocations to Real Assets and Diversifying Strategies. This recommendation is informed by the Callan Associates (Callan) CSF Distribution Study, which was presented to the Department of State Lands Board (DSL Board) in April 2017. That study concluded that a 4% annual distribution was the maximum rate compatible with future CSF value stability in real (i.e., inflation-adjusted) terms. The study also considered asset allocation mixes that improve ex ante portfolio returns without increasing portfolio risk, and conversely, reduce portfolio risk without decreasing portfolio returns.

Background
The objective of the CSF, outlined in **OIC INV 901** - ***Common School Fund: Asset Classes, Asset Allocation, and Reporting Requirements,*** is to, on behalf of the Department of State Lands, optimize long-term investment returns and distributions, while enabling the CSF asset base to grow in real terms.

In 2009, the DSL Board adopted a 4% annual distribution policy based on the fund's preceding 3-year rolling average balance. If in any one year the fund balance increases by 11% or more, "the distribution shall be 5% of the preceding 3-year average balance". The DSL Board must also consider the issue of "intergenerational equity" in its policies; accordingly, fund distributions cannot benefit current students at the disadvantage of future students, or vice-versa.

Earlier this year, OST staff, at the request of the DSL Board, engaged Callan to review the CSF distribution policy and identify a rate consistent with this intergenerational equity objective. Callan's study included the following assumptions in projecting the variability of future CSF returns: 1) Callan's 2017 Capital Market Assumptions; and 2) the current CSF asset allocation policy, which limits fund investments to Public Equity, Fixed Income and Private Equity. Callan's study concluded that a 4% annual distribution was the maximum rate compatible with future CSF value stability in real terms.

CSF Asset Allocation

The CSF asset allocation is currently managed relative to a 70/30 equity-to-fixed income target (Exhibit 2), which includes a 60 percent allocation to global (public) equity, a 10 percent allocation to private equity, and a 30 percent allocation to fixed income.

Exhibit 2

Common School Fund	Current Target	Current Ranges	Market Value	Actual
Global Equity	60%	50% - 70%	$ 799,182,000	55%
Private Equity	10%	0% - 12%	$ 190,824,000	13%
Fixed Income	30%	25% - 35%	$ 441,098,000	31%
Real Assets	0%	N/A	$ -	0%
Diversifying Strategies	0%	N/A	$ -	0%
Cash	0%	0% - 3%	$ 11,666,000	1%
Source: State Street			**$ 1,442,770,000**	

At the April 2017 OIC meeting, staff recommended, and the OIC approved, updated CSF policies which align with the asset class policies used for the Oregon Public Employees Retirement Fund (OPERF). In addition to the alignment of asset class policies, staff's ability to exercise retention/termination discretion with any public equity, fixed income, or private equity manager was approved, allowing for similar treatment in the implementation of managers/strategies between CSF and OPERF.

Subsequently, at the June 2017 OIC meeting, staff recommended, and the OIC approved, new policies for the CSF, including *INV 906: Real Estate* and *INV 907: Alternatives*. These new policies also better align CSF and OPERF by granting staff discretion to retain any real estate manager/strategy or alternatives manager/strategy for CSF that has been previously approved by the Council on behalf of OPERF.

Recently, and consistent with CSF investment policy, staff initiated a formal CSF asset allocation study. Conducted by Callan, the study's intent was to improve fund diversification, reduce portfolio volatility and limit drawdowns inherent in an otherwise equity-oriented investment approach. Following the June OIC meeting, Callan analyzed several different asset allocation scenarios for the CSF portfolio, and considered a broad range of asset allocation mixes consistent with the CSF distribution policy.

Important elements of an updated CSF asset allocation policy are the baseline expected return and risk statistics established in the distribution study (and presented previously to the DSL Board). Specifically, the forecasted return for a new asset allocation mix cannot be lower than that established in the distribution study (6.5% expected return). Correspondingly, the expected risk of a new asset mix cannot be higher than that established in the distribution study (14.5% standard deviation). These minimum return and maximum risk boundaries are necessary so that the CSF distribution policy remains feasible.

Relative to current CSF target allocations, the new asset mix staff is recommending (see Exhibit 1) increases CSF's expected return from 6.5% to 6.6%, and reduces its expected volatility (i.e., risk) from 14.5% to 13.2% while maintaining CSF distribution policy viability. Moreover, proceeds for the new asset classes (Real Assets and Diversifying Strategies) are sourced by a 15% reduction in global equities and a 5% reduction in fixed income.

Recommendation

1. Approve asset allocation change per staff and Callan's recommendation, and amend INV 901 accordingly.

This recommendation is consistent with existing policy and practice in OPERF as well as the following excerpts from INV 1201: Statement of OIC Investment Management and Beliefs:

A. Asset allocation is the OIC's primary policy tool for managing the investment program's long-term risk/return profile, and
B. Portfolio construction, including diversification and correlation considerations, is essential to maximizing risk-adjusted returns.

Callan

September 20, 2017

Oregon Common School Fund

Asset Allocation Study Update

Julia Moriarty, CFA
Capital Markets Research

Janet Becker-Wold, CFA
Fund Sponsor Consulting

James Callahan, CFA
Fund Sponsor Consulting

Uvan Tseng, CFA
Fund Sponsor Consulting

Observations and Recommendations

- The current Common School Fund (CSF) investment policy includes efficient allocations to Public Equity (both domestic and international), Private Equity, and Fixed Income.
  - Keeping current asset class targets constant, CSF is expected to earn 6.5% with a minimum volatility (i.e., risk) level of 14.5%.
- CSF has larger allocations to Public Equity and Fixed Income and a much lower allocation to Alternative Investments relative to peers in Callan's large endowment/foundation database, the *2016 NACUBO-Commonfund Study of Endowments*, and a sampling of western state land trusts.
- While the current CSF investment policy is reasonable and could be maintained going forward, Callan recommends the introduction of new allocations to Real Assets and Diversifying Strategies to improve diversification, reduce distribution volatility, and limit the potential drawdown risk associated with an otherwise public equity biased portfolio.

Observations and Recommendations

- Real Assets provide competitive returns with a strong income component, diversification, and inflation protection (both short and long-term).
- Within Real Assets, private real estate is typically the largest, if not the sole, real return asset class in most institutional portfolios.
  - While CSF has sizeable real estate holdings in Oregon, we believe that a broader real estate allocation sourced from an expanded opportunity set represents a prudent and cost-effective means of improving the CSF diversification profile.
- Diversifying Strategies are liquid, transparent strategies that can mitigate equity risk concentration via diversification, dynamic risk management, and drawdown protection.
- Callan recommends new allocations to Real Assets and Diversifying Strategies consistent with the following objectives:
  - Improve diversification;
  - Reduce distribution volatility (distributions calculated at 4% on rolling 3-year market value basis); and
  - Limit the potential drawdown risk associated with a public equity biased portfolio.

Observations and Recommendations

Current Target and Alternative Asset Mixes (Real Assets and 10% Diversifying Strategies)

	Assumption Used	Current	Target	Mix 1	Mix2	Mix 3	Mix 4	Mix 5
Global Equity	Callan Global Equity	57%	60%	37%	42%	48%	54%	60%
Private Equity	Callan Private Equity	12%	10%	10%	10%	10%	10%	10%
Domestic Fixed Income	Callan Fixed Income	29%	30%	35%	30%	23%	16%	9%
Real Assets	OIC Custom	0%	0%	8%	8%	9%	10%	11%
Diversifying Strategies	OIC Custom*	0%	0%	10%	10%	10%	10%	10%
Cash Equivalents	Callan Cash	2%	0%	0%	0%	0%	0%	0%
		100%	100%	100%	100%	100%	100%	100%
10-Year Geometric Mean Return		6.5%	6.5%	6.3%	6.5%	6.7%	6.9%	7.1%
Projected Standard Deviation		14.5%	14.5%	11.5%	12.5%	13.7%	15.0%	16.2%
Total Equity Allocation		**69%**	**70%**	**47%**	**52%**	**58%**	**64%**	**70%**

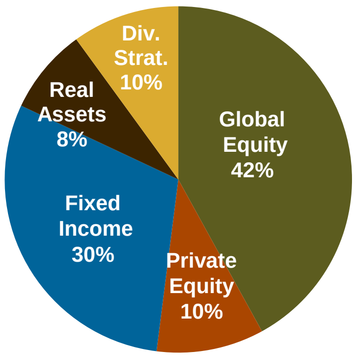
* Constraints: Global Equity is 50% U.S. / 50% Non-U.S.; Private Equity minimum is 10%; Diversified Strategies maximum is 10%.

- Mixes range in projected volatility (i.e., risk) from 11.5% to 16.2%; Current and Target Mix risk is 14.5%.
- Mixes with risk similar to Target offer higher return; conversely, mixes with return similar to Target have lower risk.

Observations

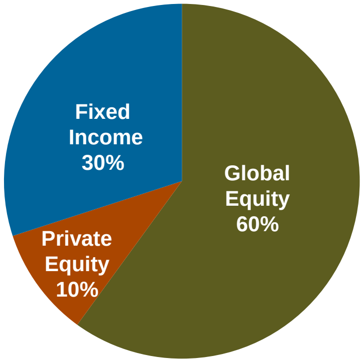
Current Target and Two Alternative Asset Mixes

Same Return (Mix 2)
(12.5% Risk)

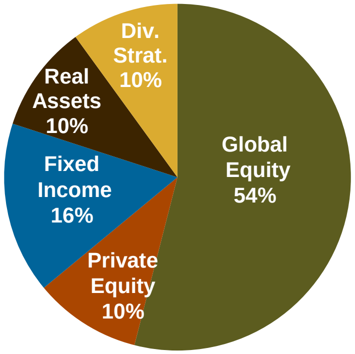


10% Diversifying Strategies,
8% Real Assets
& 30% Fixed Income
(6.5% Return; 14.1% Risk)

Current Target Allocation
(6.5% Return; 14.5% Risk)



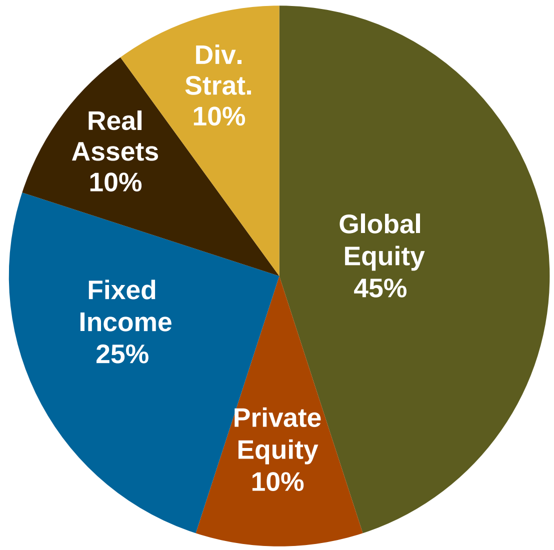
Same Risk (Mix 4)
(6.9% Return)



10% Diversifying Strategies,
10% Real Assets
& 16% Fixed Income
(6.9% Return; 15.0% Risk)

- While there are a range of asset mixes that could be considered, two particular mixes are shown above, one with risk similar to Target and one with return similar to Target.
- These alternative mixes illustrate that the current mix can be improved upon by adding asset classes that provide diversification away from public equities (specifically, Real Assets and Diversifying Strategies).

Recommended Mix

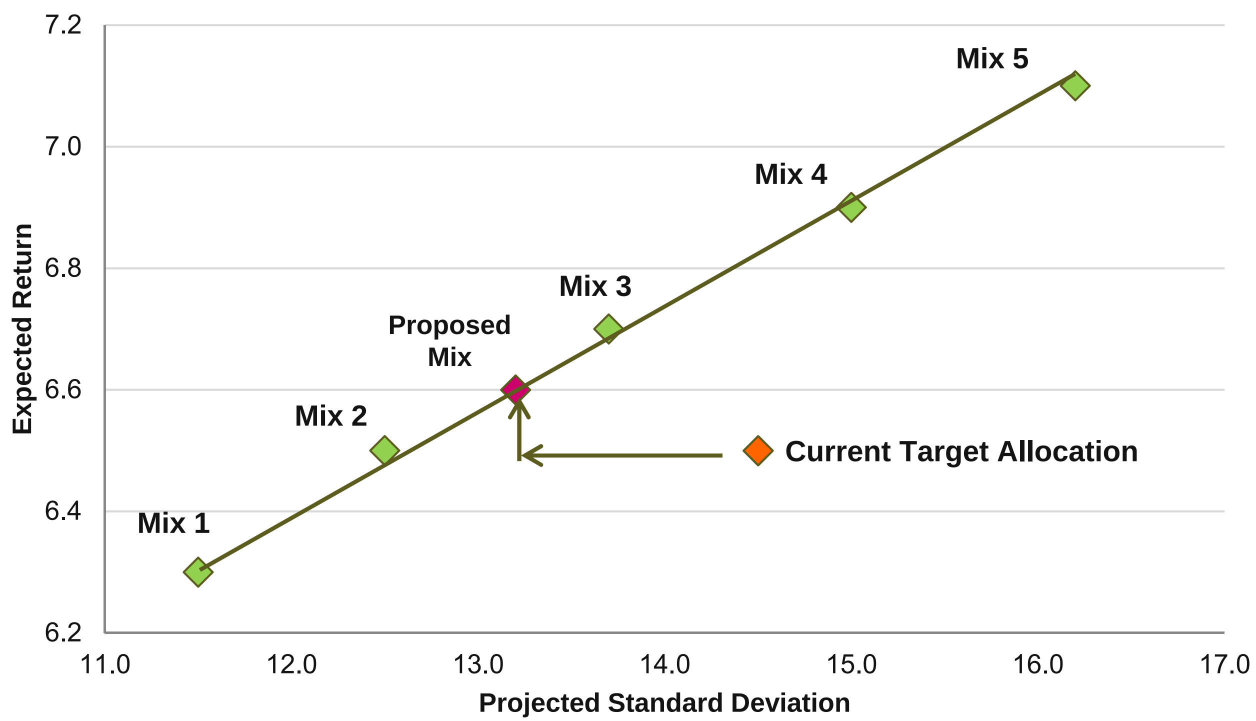


10% Diversifying Strategies,
10% Real Assets
& 25% Fixed Income
(6.6% Return; 13.2% Risk)

- Relative to the current Target allocation, the proposed asset allocation mix increases expected return from 6.5% to 6.6% and reduces expected risk from 14.5% to 13.2%.
- Addition of Real Assets and Diversifying Strategies dampens expected volatility (i.e., risk) associated with the Target allocation’s otherwise large Public Equity bias.
- Fixed Income allocation remains sufficiently large to provide explicit risk mitigation.

Risk Reward Chart

Target and Alternative Mixes



- Moving from the Current Target Allocation to the Proposed Mix reduces CSF's expected risk and increases its expected return.

OPERF and CSF Capital Market Assumption Comparison

	Assumption Used	Return	Risk	OPERF Target*	CSF Target	Rec. Mix
Global Equity	Callan Global Equity	6.93%	19.63%	38%	60%	45%
Private Equity	Callan Private Equity	7.35%	32.90%		10%	10%
Private Equity	OIC Custom	9.50%	26.30%	18%		
Domestic Fixed Income	Callan Fixed Income	3.00%	3.75%	20%	30%	25%
Real Assets	OIC Custom	6.60%	15.00%	20%		10%
Diversifying Strategies	OIC Custom	6.20%	11.00%	5%		10%
				100%	100%	100%
10-Year Geometric Mean Return				7.1%	6.5%	6.6%
Projected Standard Deviation				14.1%	14.5%	13.2%
Total Equity Allocation				**55%**	**70%**	**55%**

* New target with 5% Diversifying Assets. Current Target is 37.5% Global Equity; 20% Private Equity; 20% Fixed Income; 20% Real Assets and 2.5% Diversifying Strategies.

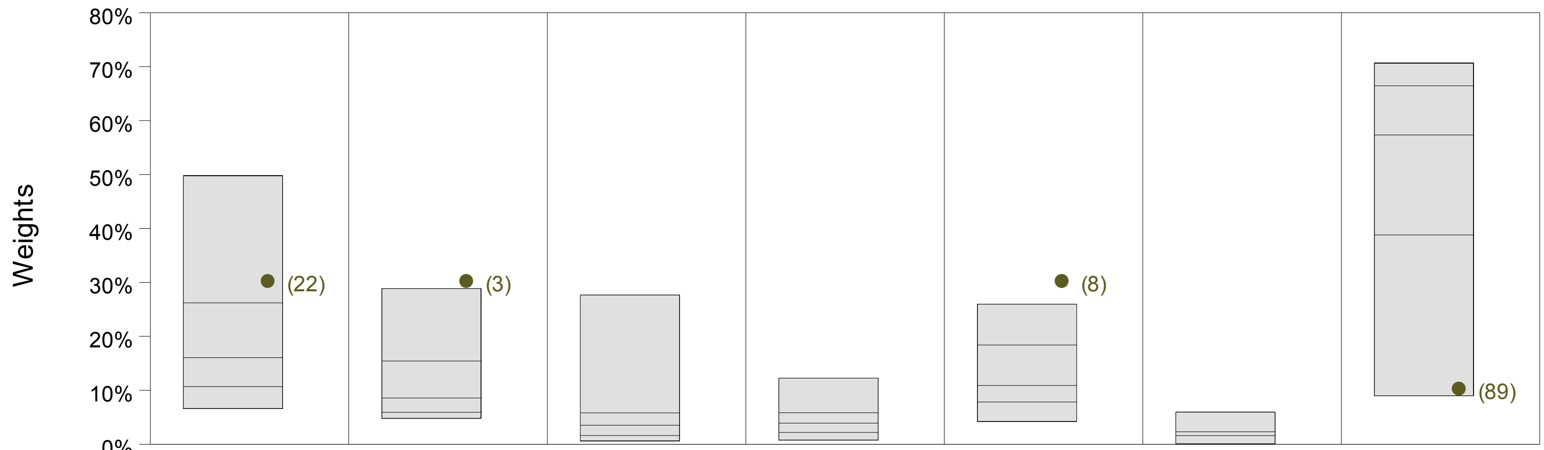
- Real Assets: OIC custom assumptions used for both the OPERF and CSF portfolio.
  - Assumes that the CSF implementation will mirror that of OPERF with a mix of real estate, infrastructure, and other types of real asset investments.
  - Phase 1 implementation is expected to comprise investments in core, open-end real estate funds.
- Private Equity: assumptions used for CSF are different from those used for OPERF.
  - Significant size, scale and history differences warrant using different risk and return assumptions.

APPENDIX

Peer Comparison

Callan Endowment & Foundation Database (Assets > $1 Billion)

Asset Class Weights vs CAI Endowment/Foundation - Large (>1B)



	Domestic Equity	Fixed Income	Cash Equiv	Real Estate	International Equity	Intl Fixed-Inc	Other Alternatives
10th Percentile	49.77	28.86	27.68	12.25	26.00	5.97	70.67
25th Percentile	26.22	15.45	5.81	5.86	18.39	2.31	66.45
Median	16.06	8.58	3.53	3.89	10.89	1.62	57.33
75th Percentile	10.69	5.95	1.66	2.18	7.82	0.12	38.82
90th Percentile	6.63	4.80	0.61	0.79	4.23	0.02	9.01
Fund ●	30.00	30.00	-	-	30.00	-	10.00
% Group Invested	92.86%	92.86%	75.00%	64.29%	96.43%	39.29%	89.29%

Percent of funds with an allocation to each asset class is noted here.

- CSF has greater allocations to Public Equity and Fixed Income and a much lower allocation to Alternative Investments compared to a majority of the similar-sized endowments and foundations in Callan's database.
- Peer group comparisons include only those funds with an allocation to any one asset class (i.e., zero allocations to an asset class are dropped from percentile calculations).

Peer Comparison

2016 NACUBO-Commonfund Study of Endowments

Asset Allocations for Fiscal Year 2016

Endowment Assets (Number of Respondents)	Domestic equities	Fixed income	International equities	Alternative strategies[1]	Short-term securities/cash /other
Over $1 Billion (91)	13	7	19	58	3
Oregon CSF Target	30	30	30	10	0
$501 Million-$1 Billion (75)	20	9	18	45	8
$101-$500 Million (264)	26	13	20	35	6
$51-$100 Million (163)	33	17	19	24	7
$25-$50 Million (121)	38	20	17	17	8
Under $25 Million (91)	44	24	15	10	7
Total Institutions (805)	16	8	19	53	4

Table data are dollar-weighted; numbers in percent.
[1]Includes private equity, marketable alternative strategies, venture capital, private equity real estate, energy and natural resources, and distressed debt.
Source: NACUBO-Commonfund Study of Endowments 2016.

- CSF has greater allocations to Public Equity and Fixed Income and a much lower allocation to Alternative Investments relative to similar-sized endowments in the *2016 NACUBO-Commonfund Study of Endowments.*
- Important caveat: the majority of these funds likely have money coming into their endowments through fundraising efforts and can therefore afford to take on greater risk and illiquidity with their investment policies.

Peer Comparison

2016 NACUBO-Commonfund Study of Endowments

Alternative Allocations for Fiscal Year 2016

Endowment Assets (Number of Respondents)	Private equity[1]	Marketable alternative strategies[2]	Venture capital	Private equity real estate[3]	Energy and natural resources[4]	Distressed debt
Over $1 Billion (84)	13	21	7	8	8	2
Oregon CSF Target	10	0	0	0	0	0
$501 Million-$1 Billion (66)	9	22	3	4	6	1
$101-$500 Million (233)	6	18	2	3	5	1
$51-$100 Million (134)	3	13	1	3	3	0
$25-$50 Million (85)	3	9	1	2	2	0
Under $25 Million (57)	1	7	0	1	2	0
Total Institutions (659)	11	21	6	6	7	2

Table data are dollar-weighted; numbers in percent.
[1] LBOs, mezzanine, M&A funds and non-U.S. private equity.
[2] Hedge funds, absolute return, market neutral, long/short, 130/30, event-driven and derivatives.
[3] Non-campus.
[4] Oil, gas, timber, commodities and managed futures.
Source: NACUBO-Commonfund Study of Endowments 2016.

- CSF has a similar allocation to Private Equity relative to similar-sized endowments in the *2016 NACUBO-Commonfund Study of Endowments* but lacks investments in other Alternative Investments strategies.
- Important caveat: the majority of these funds likely have money coming into their endowments through fundraising efforts and can therefore afford to take on greater risk and illiquidity with their investment policies.

Peer Comparison

Western State Land Trusts

Asset Class (# Invested)	Western State Land Trusts*	Oregon CSF Target
US Equities (9/9)	25	30
NUS Equities (7/9)	18	30
Fixed Income (9/9)	25	30
Real Estate (7/9)	10	0
Private Equity (4/9)	5	10
Absolute Return/Other (4/9)	18	0
Cash (5/9)	5	0

*Median allocation of those with investments in the asset class. Mix of actual and target allocations from 2016.

- The table above illustrates the median allocations to the major asset classes for nine western state land trusts (WSLTs).
- The nine land trusts have a median asset value of $3.4 billion and total assets of over $71 billion.
- CSF has a greater allocation to Public Equity and Fixed Income and a lower allocation to Alternative Investments relative to its WSLT peer group median.

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.

TAB 7 – LaSalle REIT Mandate Revision

OPERF Real Estate Portfolio

LaSalle Investment Management

Purpose
Staff recommends amending OPERF's investment mandate with LaSalle Investment Management ("LaSalle") to a more narrowly defined universe of niche publicly traded real estate securities ("REITs") in order to meet the revised role for REITs within the real estate portfolio. A customized benchmark consisting of diversifying real estate asset types is proposed for this sub-portfolio.

Background
In April 2016, OIC Policy "INV 501: Acquiring and Managing Equity Real Estate" was revised, and subsequently approved, by the OIC. In order to meet the new real estate investment objectives, 1) provide improved diversification for the total plan by lowering the real estate portfolio's correlation to OPERF's public and private equity allocations, 2) reduce the real estate portfolio's volatility, and 3) improve the inflation-hedging potential, the sub-portfolio target allocations were revised to a) provide greater emphasis on current income generation and b) reduce exposure to publicly-listed securities already captured in OPERF's public equity holdings. Accordingly, the real estate portfolio's publicly-traded REIT allocation was lowered to a 0-10% target range, down from the 15-25% previous target. Commensurately, the REIT allocation objective was revised to play a more explicit diversifying role within the real estate portfolio by capturing exposures to real estate asset types and strategies not otherwise found in the private real estate program.

The current mandate with LaSalle has been the longest active relationship within the real estate portfolio, dating back to February 1, 1985. Presently, LaSalle actively manages a domestic-only equity REIT mandate using the FTSE NAREIT All Equity REIT Index as a benchmark. Following the adoption of the revised real estate policy objectives, staff commenced researching investment options for employing REITs as a more explicit diversifying strategy within the broader real estate portfolio. As the only remaining domestic REIT manager in the portfolio, coupled with its investment history and long-standing tenure with OPERF, LaSalle is recommended by staff for a revised mandate using a customized benchmark comprised of publicly-listed REIT securities not easily replicated within the private market elements of OPERF's real estate portfolio.

While OPERF has a mature, private real estate portfolio and is able to effectively achieve, via private market partnerships, efficient exposures to the traditional property types such as office, industrial, and multi-family, similarly efficient exposures to niche property types such as senior housing, self-storage, medical office, and student housing are more difficult to achieve through private market structures. Accordingly, staff recommends narrowing LaSalle's mandate to invest in these niche, or "gap filling," property types. The proposed mandate and custom benchmark would comprise a 54 security universe with a market capitalization of approximately $351 billion.

About LaSalle
LaSalle Investment Management (LIM) is a subsidiary of JLL (NYSE: JLL). JLL is among the world's largest property services and investment management organizations with more than 78,000 employees worldwide in 80 countries. LIM, as the asset management and investment services arm of JLL, manages approximately $59 billion of assets with more than 700 employees in 24 offices located in 17 countries. LaSalle Securities is a division of LIM with approximately $12 billion in AUM and was founded in 1985.

Recommendation
Revise the current mandate with LaSalle to include a customized benchmark for niche, publicly-traded domestic REIT securities.

TAB 8 – Fixed Income Policy Update

OITP

Oregon Intermediate Term Pool

Purpose
To recommend guideline changes for the Oregon Intermediate Term Pool (OITP) that enable more efficient management of OITP's risk and return attributes.

Background and Objective
The OIC approved creation of the Oregon Intermediate Term Pool in April 2010. OITP was created with the purpose of providing a fixed income investment vehicle for state agencies and sponsored entities seeking a higher return (by applying a longer term investment horizon) relative to the Oregon Short Term Fund (OSTF). As of July 31, 2017, OITP's market value was $114.09 million, and its benchmark is the Bloomberg Barclays 3-5 year U.S. Aggregate index. Staff now seeks guideline changes to more efficiently manage OITP's risk and return profile relative to its benchmark.

Specifically, staff recommends the following OITP guideline revision:

- Revise duration guideline to +/- 20% of the benchmark's duration from current static maximum of 3.0 years. Duration is the weighted average time to maturity of a bond's discounted cash flows (interest and principal), and approximates the change in a bond's value for an instantaneous 1.0% change in the level of all interest rates.
- Remove weighted average life (WAL) maximum of 5.0 years on allowed structured finance investments. The WAL of an amortizing loan or amortizing bond, also called average life, is the average time until a dollar of principal is repaid. This revision would affect the following security types:
  - U.S. agency mortgage-backed securities (MBS) including U.S. agency collateralized mortgage obligations (CMOs);
  - Asset-backed securities (ABS); and
  - Commercial mortgage-backed securities (CMBS).

Recommendation
Staff recommends the OIC approve OITP guideline revisions as proposed and highlighted in Appendix A.

Appendix A:

Portfolio Rules
For The
Oregon Intermediate Term Pool

Revised ~~March 15, 2016~~September 20, 2017

I. Scope

These rules apply to the investment of cash from all eligible and approved participants of the Oregon Intermediate Term Pool (~~"~~OITP~~"~~). These rules are established under the authority of, and shall not supersede, the requirements established under ORS Chapter 293.

II. Investment Objective

A. The investment objective of OITP is to maximize total return (i.e., principal *and* income) within the stipulated risk parameters and subject to the approved securities holdings prescribed in Section V. below.

III. Standards of Care

A. Prudence: The standard of prudence to be used by Fixed Income Investment Staff (~~"investment~~ staff~~"~~) shall be the "prudent investor" standard and shall be applied in the context of managing the aggregate OITP portfolio. Pursuant to ORS Chapter 293.726:

(1) The investment funds shall be invested and the investments of those funds managed as a prudent investor would do, under the circumstances then prevailing and in light of the purposes, terms, distribution requirements and laws governing OITP~~the Pool~~; and~~.~~

(2) The standard stated in subsection (1) of this section requires the exercise of reasonable care, skill and caution, and is to be applied to investments not in isolation but in the context of the OITP~~investment Pool~~'s investment portfolio and as a part of an overall investment strategy, which should incorporate risk and return objectives reasonably suitable to OITP~~the investment Pool~~.

B. Ethics and Conflicts of Interest: Staff involved in the investment process shall refrain from personal business activity that could conflict with the proper execution and management of the investment program, or that could impair their ability to make impartial decisions. Investment staff shall, at all times, comply with the State of Oregon Government Standards and Practices code of ethics set forth in ORS 244, as well as all policies of the OST.

C. Delegation of Authority: Investment staff shall act in accordance with established written procedures and internal controls for the operation of the investment program consistent with these Portfolio Rules. No person may engage in an investment transaction except as provided under the terms of these Portfolio Rules and the procedures established by OST staff. Senior Fixed Income Investment Officers are jointly responsible for all transactions undertaken, and shall establish a reasonable system of controls to regulate the activities of subordinate employees.

IV. Safekeeping and Custody

A. Authorized Financial Dealers and Institutions: All financial institutions and broker/dealers who desire to become qualified for investment transactions must supply, as appropriate:

(1) Audited financial statements;
(2) Licensing Representation form provided by OST; and
(3) Understanding and acknowledgement of OITP Portfolio Rules located on the Oregon State Treasury's website.

B. Internal Controls: Fixed Income Investment Officer(s) and designated Fixed Income Investment staff should jointly collaborate to establish and maintain an adequate internal control structure designed to reasonably protect the assets of the OITP from loss, theft or misuse.

C. Delivery vs. Payment: All trades where applicable will be executed by delivery vs. payment (DVP) to ensure that securities are deposited in an eligible financial institution prior to the release of funds.

D. Safekeeping: Securities will be held by a third-party custodian as evidenced by safekeeping receipts.

V. Investment Guidelines

1. Eligible Investments
Investments shall be limited to the following:
(1) The Oregon Short Term Fund (~~the “~~OSTF~~”~~);
(2) Obligations issued or guaranteed by the United States (U.S.) Treasury or by U.S. federal agencies and instrumentalities, including inflation-indexed obligations;
(3) Non-U.S. Government Securities and their Instrumentalities;
~~1.~~i. Non-U.S. government securities and Instrumentalities must have minimum long-term ratings of AA-, Aa3 or better at the time of

purchase and must be rated by at least two Nationally Recognized Statistical Rating Organizations (NRSROs).

(4) Certificates of deposit;

(5) Bankers acceptances that are eligible for discount at a U.S. Federal Reserve Bank;

(6) Corporate debt obligations (e.g., commercial paper, term debt, etc.);

(7) Taxable and non-taxable municipal debt securities issued by U.S. states or local governments and their agencies, authorities and sponsored enterprises;

(8) U.S. Agency Mortgage-backed Securities (MBS) which include both pass-through securities and Collateralized Mortgage Obligations (CMOs)~~. The weighted average life at purchase shall be 5 years or less~~;

(9) Commercial Mortgage-backed Securities (CMBS) which must be rated triple-A at the time of purchase~~ and have a weighted average life of 5 years or less~~;

(10) Asset-backed securities (ABS) which must be rated triple-A at the time of purchase~~ and have a weighted average life of 5 years or less~~;

(11) Repurchase Agreements;

i. Maximum maturity will be 180 days.

ii. Counterparties must have a minimum Standard & Poor's or Moody's Investor Services credit rating of "AA" or "Aa2" for maturities one year or longer or "A-1" or "P-1" for maturities less than one year.

iii. Repurchase Agreements must equal no more than 5% of liabilities of the counterparty.

iv. No more than 10% of OITP assets shall be placed with the same counterparty for repurchases.

v. Counterparty must be either a Primary Dealer as recognized by the Federal Reserve Bank or the Oregon State Treasury's custodial agent as non-primary dealer counterparty.

vi. The counterparty must have a signed repurchase agreement.

vii. Collateral must be delivered to the Oregon State Treasury's account at its custodian or to an account established for the Oregon State Treasury pursuant to the terms of the specific Repurchase Agreement in the name of the Oregon State Treasury.

viii. Collateral for repurchase agreements may be U.S. Treasury or U.S. Agency Senior Unsubordinated securities only.

ix. The market value of the delivered collateral must be maintained at not less than 102% of the cash invested.

(12) Reverse Repurchase Agreements;

i. Maximum maturity will be 180 days.

ii. Counterparties must have a minimum Standard & Poor's or Moody's Investor Services credit rating at least equivalent to "AA" or "Aa2" for maturities one year or longer or "A-1" or "P-1" for maturities less than one year.

iii. Reverse Repurchase Agreements must equal no more than 5% of liabilities of the counterparty.

iv. No more than 10% of OITP assets shall be placed with the same counterparty for reverse repurchase agreements.

v. Counterparty must be a Primary Dealer as recognized by the Federal Reserve Bank.

vi. The counterparty must have a signed reverse repurchase agreement.

vii. Acceptable reinvestment vehicles include securities that may otherwise be purchased outright.

viii. Securities will be reversed on a fully collateralized basis.

ix. Reverse repurchase investments for interest rate arbitrage shall only be done on a matched book basis.

2. Denomination: All securities will be denominated in U.S. dollars only.

3. Form: All securities will be non-convertible to equity.

4. Benchmark: The benchmark for the OITP ~~portfolio~~ is the Bloomberg Barclays U.S. Aggregate 3-5 Year index.

5. Risk Parameters

(1) Credit Risk

i. Investment Rating
Unless noted otherwise, securities must be rated investment grade or higher by a NRSRO at the time of purchase. If a security is rated by more than one NRSRO, the lowest rating is used to determine eligibility.

ii. For newly issued securities, and absent assigned ratings, "expected ratings" may be used as a proxy for actual ratings for not more than 30 business days after the anticipated settlement date.

(2) Diversification

i. Assets in the account shall be sufficiently diversified by type and maturity to allow for anticipated withdrawals.

ii. No more than 3% of the par value of portfolio shall be invested in one security. This restriction does not apply to obligations issued or guaranteed by the U.S. Treasury or by U.S. federal agencies and instrumentalities.

iii. No more than 3% of the par value of portfolio shall be invested in the securities of one issuer. This restriction does not apply to obligations issued or guaranteed by the U.S. Treasury or by U.S. federal agencies and instrumentalities.

iv. No more than 25% of the portfolio shall be invested in the securities of one sector as defined by the Bloomberg Industry Sector Classification. This restriction does not apply to obligations issued or guaranteed by the U.S. Treasury or by U.S. federal agencies and instrumentalities or to MBS, ABS and CMBS.

v. No more than 25% of the portfolio may be invested in MBS.

vi. No more than 25% of the portfolio may be invested in ABS.

vii. No more than 25% of the portfolio may be invested in CMBS.

(3) Interest-rate Risk

i. The portfolio duration shall not exceed ~~3.0 years~~+/- 20% of the benchmark index; and

ii. The maximum maturity on any allowed investment is constrained as follows:

~~1.~~a. The maximum stated maturity should not be greater than 10.25 years from the date of settlement unless otherwise noted.

~~2.~~b. For ABS, MBS and CMBS, weighted average life will be used to measure maturity limitations.

(4) Liquidity

i. To insure the flexibility necessary to take defensive action when appropriate, positions should be in issues with sufficient float to facilitate, under most market conditions, prompt sale without severe market effect.

(5) Prohibited Investments~~:~~

i. Alt-A, non-agency, sub-prime, limited documentation or other “sub-prime” residential mortgage pools or related securities;

ii. Collateralized Debt Obligations (CDO); and

iii. Collateralized Loan Obligations (CLO).

VI. Securities Lending for Reinvestment of Cash Collateral

A. Securities eligible for investment by the Oregon Short Term Fund (“OSTF”) as determined by the OSTF Portfolio Rules may be purchased outright for reinvestment. In addition, within the securities lending program only, cash collateral may also be reinvested as follows:

(1) Maximum of 15% in ABS rated AAA/Aaa, limited to auto loan and credit card issues with an average life of three years or less;

(2) Repurchase agreements collateralized by U.S. Treasury or U.S. Government Agency securities with a maximum original maturity of 30 years. No more than 25% of assets shall be placed with the same counterparty. Repurchase agreements may also be placed with the Federal Reserve Bank's Repo facility

B. Net capital of lending counterparty must be over $100 million.

C. Securities will only be loaned on a fully collateralized basis.

D. Lending counterparty must be a Primary Dealer as recognized by the Federal Reserve Bank, and have a signed master securities lending agreement.

E. The market value of the delivered collateral must be maintained at not less than 102% of the market value of the securities loaned.

F. Notwithstanding Section V.1.12 hereof, Reverse Repurchase Agreements are prohibited within the securities lending program.

TAB 9 – CEM Annual Benchmarking Report

OPERF

2016 OPERF Cost Study

Purpose

To present the OPERF investment cost analysis performed by CEM Benchmarking Inc. ("CEM") for both the calendar and five-year period ended December 31, 2016.

Background

Beginning in 2003, Treasury staff provided the OIC an independent assessment of the various costs incurred for OPERF management (e.g., asset management, custody and consulting fees), and how those costs and resultant net OPERF performance compare with other institutional investors.

CEM is recognized as the foremost, independent, third-party provider of cost analysis to defined benefit and defined contribution plans. Using the firm's unique database, CEM has provided defined benefit fund sponsors with net return and cost insights since 1990. That database includes 154 U.S. pension funds (including 56 public funds), valued at approximately $3.3 trillion.

Similar to previous years' analyses, staff provided CEM with updated OPERF cost and operating data. For the calendar year ended December 31, 2016, OPERF's total investment costs (including asset management, custody, consulting and other fees) were approximately 77 basis points, consistent with the 74 bps reported for calendar year 2015.

OPERF's custom peer group for benchmarking purposes is comprised of 17 U.S. public funds ranging in asset size from $25 billion to $88 billion. In terms of asset size, the peer group's median fund was $47 billion, and within the peer group, OPERF was the 5th largest fund. Based on CEM's analysis, OPERF's total costs given its implementation style and asset mix were slightly higher than "expected" by approximately $947 thousand or 0.1 basis points.

Staff Recommendation

None, information only. Report findings will be presented by CEM.

CEM Investment Benchmarking Analysis for: Oregon Public Employees Retirement Fund

CEM Benchmarking

September 20, 2017

Mike Heale

This benchmarking report compares your cost and return performance to CEM's extensive pension database.

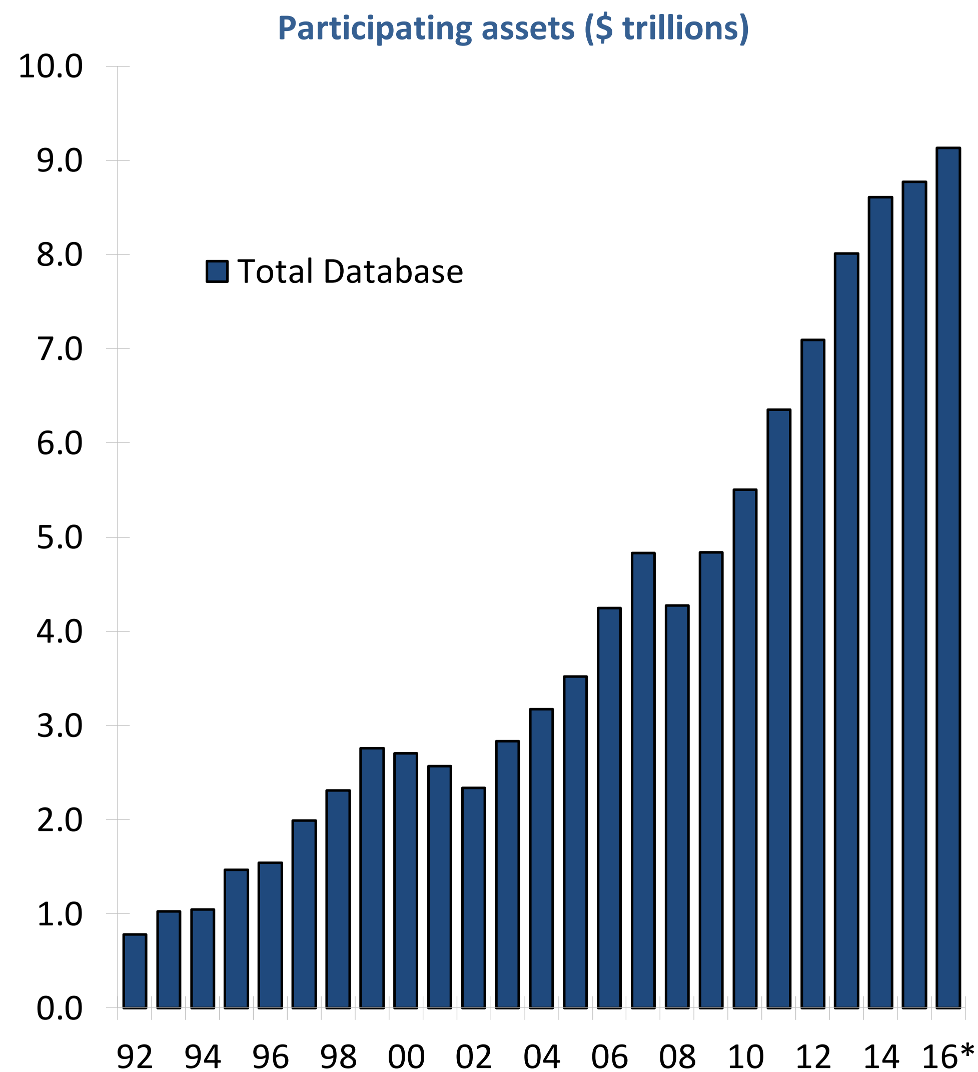
• 154 U.S. pension funds participate. The median U.S. fund had assets of $9.6 billion and the average U.S. fund had assets of $21.3 billion. Total participating U.S. assets were $3.3 trillion.

• 72 Canadian funds participate with assets totaling $1,147 billion.

• 33 European funds participate with aggregate assets of $2.5 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Denmark, Switzerland and the U.K.

• 6 Asia-Pacific funds participate with aggregate assets of $188 billion. Included are funds from Australia, New Zealand, China and South Korea.

The most meaningful comparisons for your returns and value added are to the U.S. Public universe which consists of 56 funds.

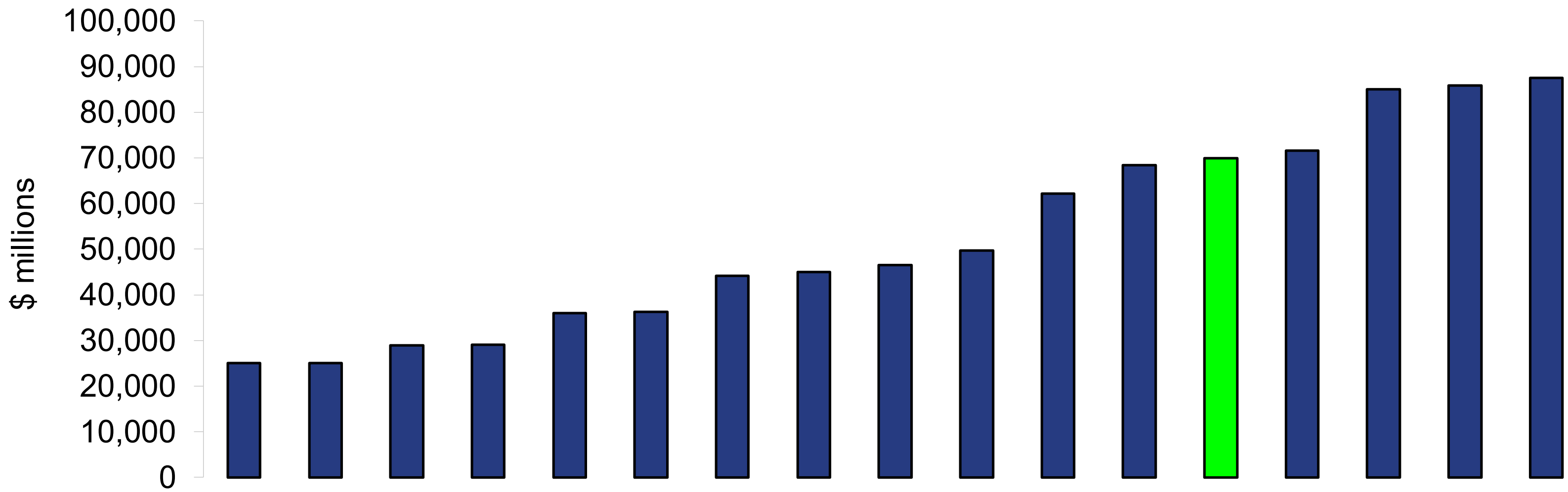


* 2016 reflects both received and expected data.

The most valuable comparisons for cost performance are to your custom peer group because size impacts costs.

Peer group for Oregon Public Employees Retirement Fund

• 17 U.S. public sponsors from $25 billion to $88 billion
• Median size of $47 billion versus your $70 billion



To preserve client confidentiality, given potential access to documents as permitted by the Freedom of Information Act, we do not disclose your peers' names in this document.

What gets measured gets managed, so it is critical that you measure and compare the right things:

1. Returns

Why do total returns differ from other funds? What was the impact of your policy mix decisions versus implementation decisions?

2. Net value added

Are your implementation decisions adding value (i.e., mostly the effectiveness of active management, as well as the amount of active management versus passive management)?

3. Costs

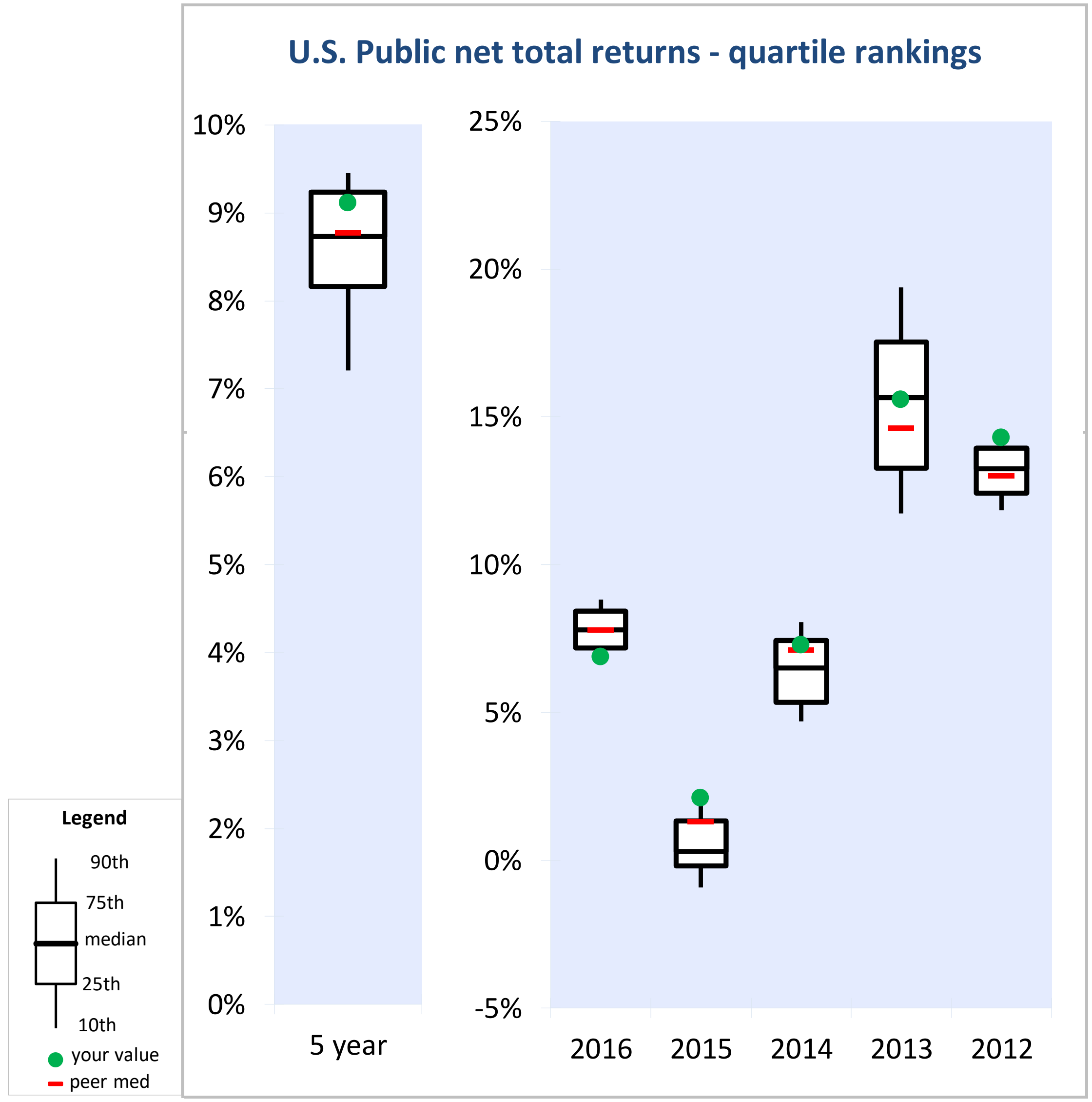
Are your costs reasonable? Costs matter and can be managed.

Your 5-year net total return of 9.1% was above both the U.S. Public median of 8.7% and the peer median of 8.8%.

Total returns, by themselves, provide little insight into the reasons behind relative performance. Therefore, we separate total return into its more meaningful components: policy return and value added.

	Your 5-year
Net total fund return	9.1%
- Policy return	9.2%
= Net value added	-0.1%

This approach enables you to understand the contribution from both policy mix decisions (which tend to be the board's responsibility) and implementation decisions (which tend to be management's responsibility).



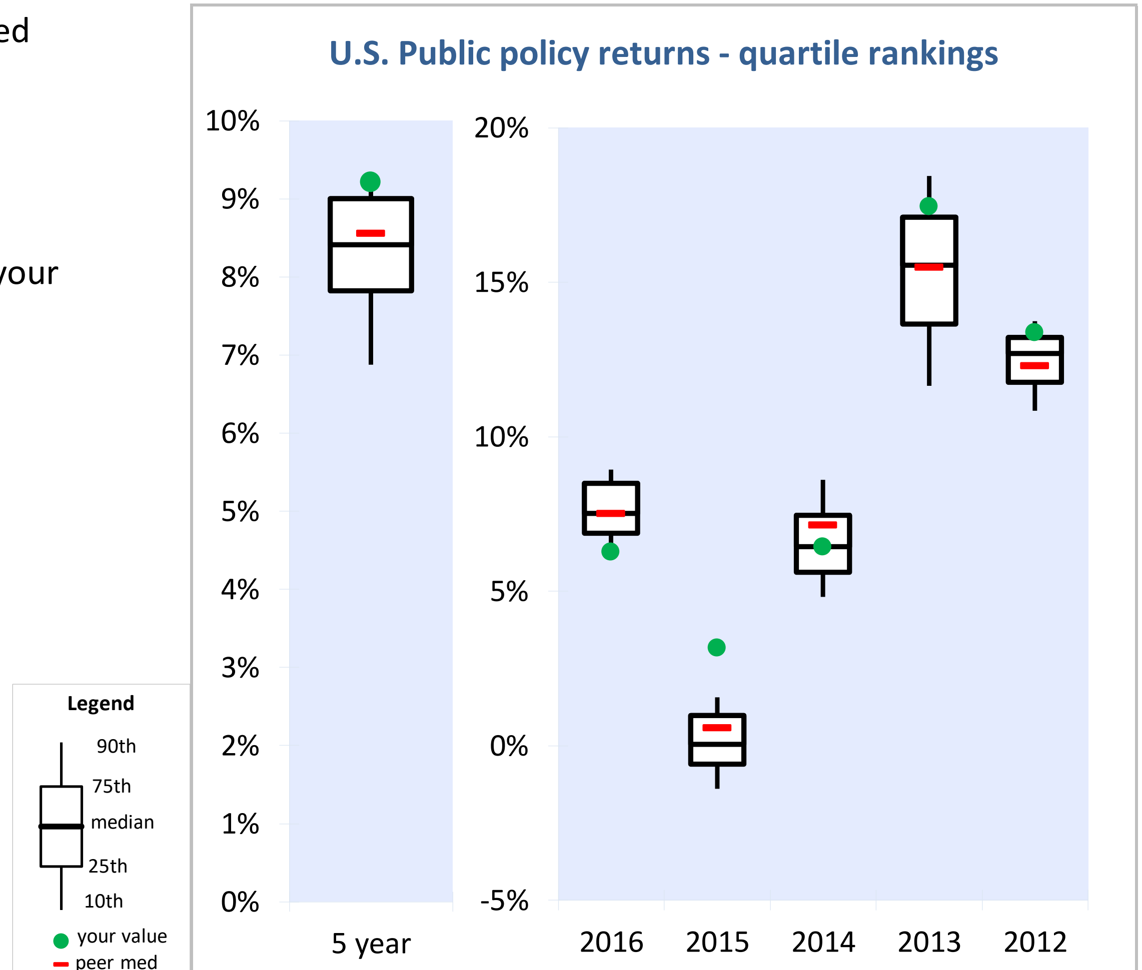
Your 5-year policy return of 9.2% was above both the U.S. Public median of 8.4% and the peer median of 8.6%.

Your policy return is the return you could have earned passively by indexing your investments according to your policy mix.

Having a higher or lower relative policy return is not necessarily good or bad. Your policy return reflects your investment policy, which should reflect your:

- Long term capital market expectations
- Liabilities
- Appetite for risk

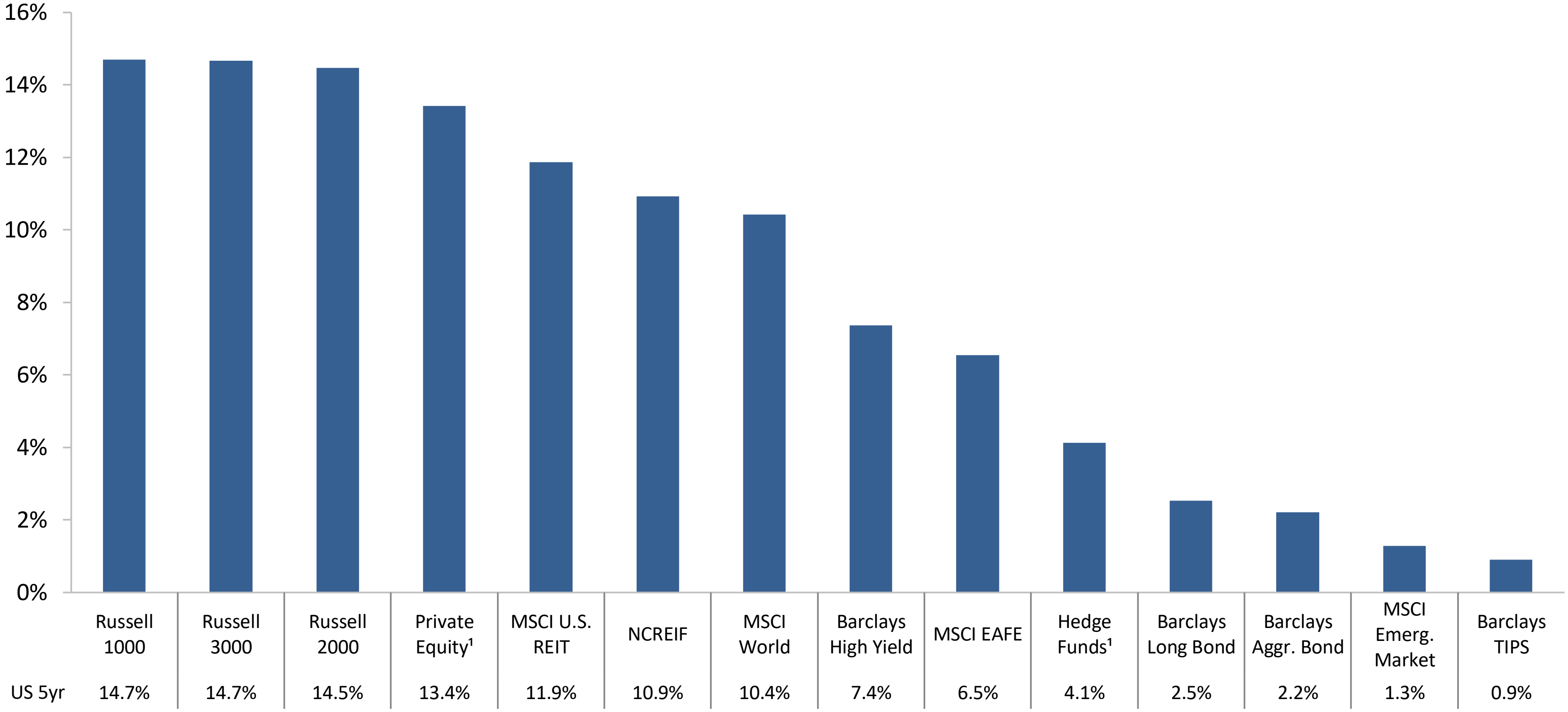
Each of these three factors is different across funds. Therefore, it is not surprising that policy returns often vary widely between funds.



To enable fairer comparisons, the policy returns of all participants including your fund were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. Your custom benchmark is composed of 20% Europe ex-UK, 10% Global, 70% U.S. small cap equity with a lag of 103 days. Prior to this adjustment, your 5-year policy return was 10.1%, 0.9% higher than your adjusted 5-year policy return of 9.2%. Mirroring this, without adjustment your 5-year total fund net value added would be 0.9% lower. Refer to the Research section pages 6-7 for details.

Differences in policy returns are caused by differences in benchmarks and policy mix.

5-Year returns for frequently used benchmark indices



1. The private equity benchmark is the average of the default private equity benchmark returns applied to U.S. participants. The hedge fund benchmark is the average of benchmark returns reported by U.S. participants.

Your 5-year policy return was above the U.S. Public median primarily because of:

- The positive impact of your higher weight in two of the better performing asset classes of the past 5 years: Private Equity (your 19% 5-year average weight versus a U.S. public fund average of 9%) and Real Estate (your 12% versus a U.S. public fund average of 8%).

- The positive impact of your lower weight in one of the poorer performing asset classes of the past 5 years: Hedge Funds (your 0% 5-year average weight versus a U.S. average of 5%).

- Partially offsetting the above was the negative impact of your lower weight in one of the better performing asset classes of the past 5 years: Stocks (your 42% 5-year average weight versus a U.S. average of 50%).

5-year average policy mix

	Your Fund	Peer Avg.	U.S. Public Avg.
U.S. Stock	0%	22%	23%
EAFE Stock	0%	7%	6%
ACWIxUS Stock	0%	7%	9%
Global Stock	42%	10%	8%
Other Stock	0%	2%	4%
Total Stock	42%	48%	50%
U.S. Bonds	21%	19%	17%
Cash	0%	0%	0%
Other Fixed Income[1]	3%	8%	9%
Total Fixed Income	24%	27%	26%
Hedge Funds	0%	4%	5%
Real Estate incl. REITS	12%	9%	8%
Other Real Assets[1]	4%	2%	3%
Private Equity	19%	10%	9%
Total	100%	100%	100%

1. Other fixed income includes Inflation Indexed, High Yield and Global bonds. Other real assets includes commodities, natural resources and infrastructure.

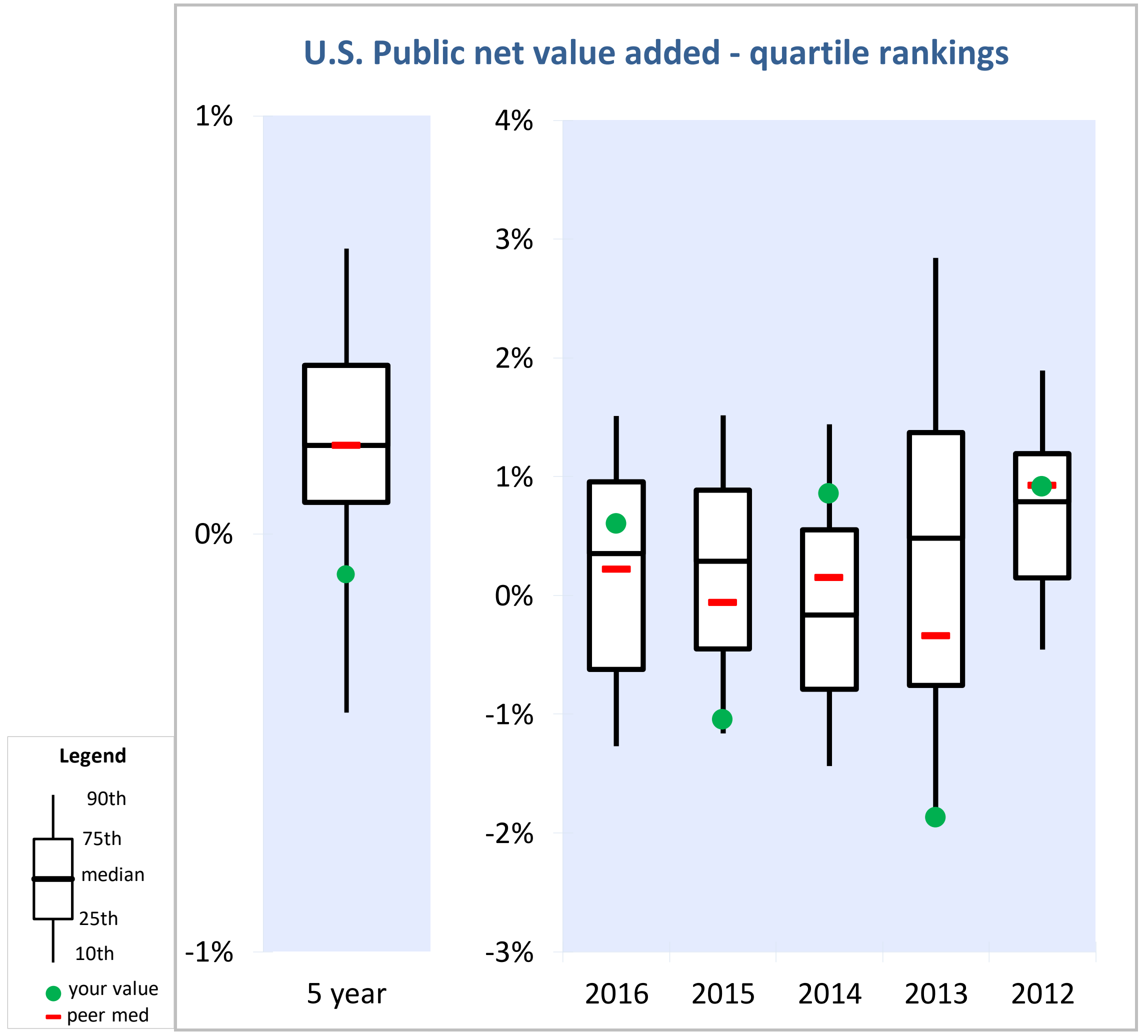
Net value added is the component of total return from active management. Your 5-year net value added was -0.1%.

Net value added equals total net return minus policy return.

Value added for Oregon Public Employees Retirement Fund

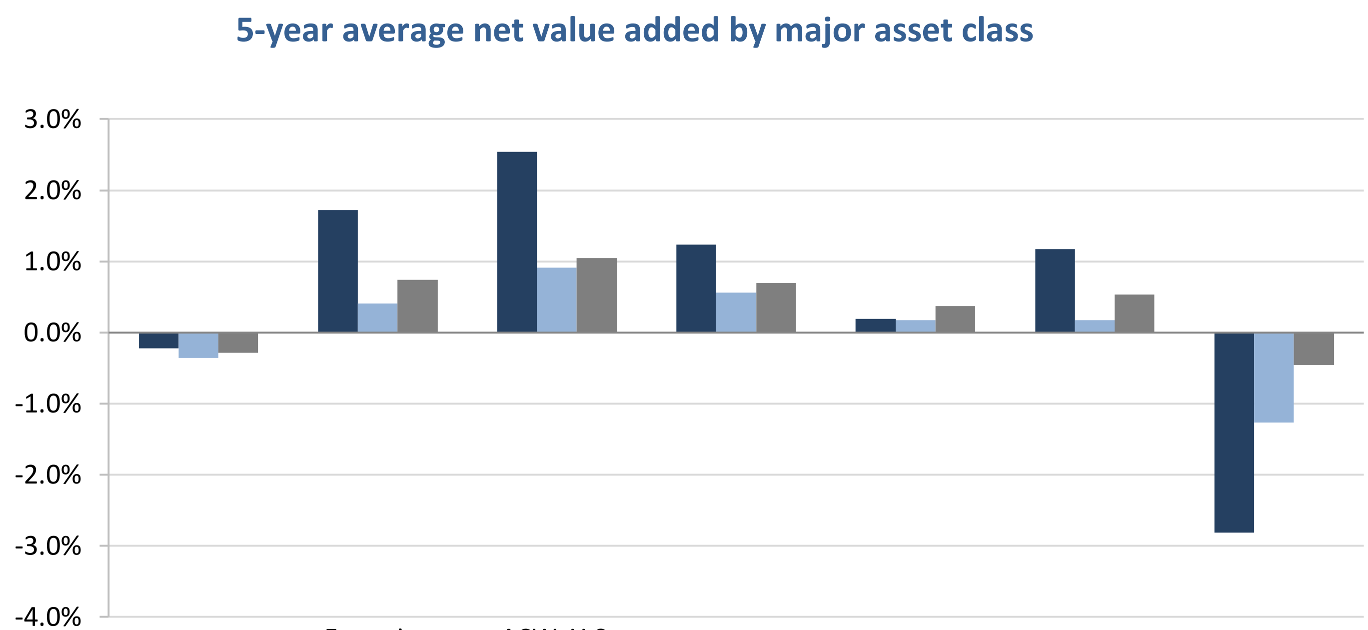
Year	Net Return	Policy Return	Net value Added
2016	6.9%	6.3%	0.6%
2015	2.1%	3.2%	(1.0%)
2014	7.3%	6.4%	0.9%
2013	15.6%	17.5%	(1.9%)
2012	14.3%	13.4%	0.9%
5-year	9.1%	9.2%	(0.1%)

Your 5-year net value added of -0.1% compares to a median of 0.2% for your peers and 0.2% for the U.S. Public universe.



To enable fairer comparisons, the value added for each participant including your fund was adjusted to reflect private equity benchmarks based on investable public market indices. Your custom benchmark is composed of 20% Europe ex-UK, 10% Global, 70% U.S. small cap equity with a lag of 103 days. Prior to this adjustment, your fund's 5-year total fund net value added was -1.0%. Refer to the Research section, pages 6-7 for details as to why this adjustment may improve comparisons.

You had positive 5-year net value added in Emerging Market Stock, ACWxU.S. Stock, Global Stock, Fixed Income and Real Estate.

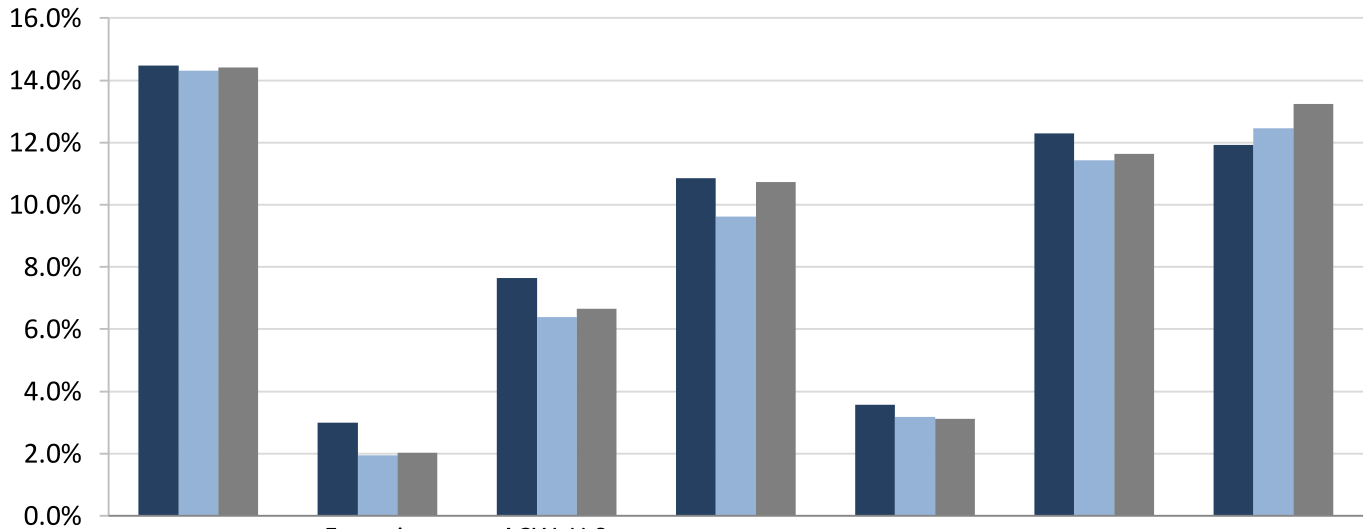


	U.S. Stock	Emerging Market Stock	ACWxU.S. Stock	Global Stock	Fixed Income	Real Estate	Private Equity[1]
Your fund	-0.2%	1.7%	2.5%	1.2%	0.2%	1.2%	-2.8%
U.S. Public average	-0.4%	0.4%	0.9%	0.6%	0.2%	0.2%	-1.3%
Peer average	-0.3%	0.7%	1.0%	0.7%	0.4%	0.5%	-0.5%

1. To enable fairer comparisons, the private equity benchmarks of all participants, including your fund were adjusted to reflect lagged, investable, public-market indices. Your custom benchmark is composed of 20% Europe ex-UK, 10% Global, 70% U.S. small cap equity with a lag of 103 days. Prior to this adjustment, your fund's 5-year private equity net value added was -7.9%. It is also useful to compare total returns. Your 5-year total return of 11.9% for private equity was below the U.S. average of 12.5%.

You had higher 5-year net returns in U.S. Stock, Emerging Market Stock, ACWxU.S. Stock, Global Stock, Fixed Income and Real Estate relative to the U.S. Public average.

5-year average net returns by major asset class



	U.S. Stock	Emerging Market Stock	ACWxU.S. Stock	Global Stock	Fixed Income	Real Estate	Private Equity
Your fund	14.5%	3.0%	7.7%	10.9%	3.6%	12.3%	11.9%
U.S. Public average	14.3%	2.0%	6.4%	9.6%	3.2%	11.4%	12.5%
Peer average	14.4%	2.0%	6.7%	10.7%	3.1%	11.6%	13.2%

Your investment costs were $537.7 million or 76.8 basis points in 2016.

Asset management costs by asset class and style ($000s)	Internal Management			External Management			Total	
	Passive	Active	Overseeing of external	Passive fees	Active base fees	Perform. fees [3]	Total	
U.S. Stock - Broad/All			58		1,346	273	1,676	
U.S. Stock - Large Cap	93	1,412	405	122	5,281		7,313	
U.S. Stock - Small Cap	103		186		8,831		9,121	
Stock - Emerging			175		11,254		11,429	
Stock - ACWIxU.S.			204	355	39,728		40,288	
Stock - Global			46	308	3,156		3,510	
Fixed Income - U.S.			843		5,843		6,686	
Fixed Income - U.S. Gov't			150		2,940		3,090	
Fixed Income - Other			364		17,579		17,943	
Cash		179					179	
REITs			191		5,708		5,899	
Real Estate			566		21,840		22,406	
Real Estate - LPs			1,264		40,216		41,479	
Other Real Assets			1,550		38,558		40,108	
Diversified Private Equity			3,734		256,496 [1]		260,230	
Diversified Priv.Eq. - Fund of Funds			421		34,873 [2]		35,294	
Diversified Priv. Eq. - Co-investments			9		3,677		3,686	
Other Private Equity			163		24,855 [1]		25,018	
Overlay Programs					584		584	
Total excluding private asset performance fees							535,939	76.6bp
Oversight, custodial and other costs [4]								
Oversight & consulting							1,297	
Trustee & custodial							80	
Other							414	
Total oversight, custodial & other costs							1,792	0.3bp
Total investment costs (excl. transaction costs & private asset performance fees)							537,731	76.8bp

Footnotes

[1] Cost derived from the partnership level detail you provided. Costs are based on partnership contract terms.

[2] Default underlying costs were added to fund of funds. The defaults added were: Diversified Priv.Eq. 158 bps base fees; refer to Appendix A for full details.

[3] Total cost excludes carry/performance fees for real estate, infrastructure, natural resources and private equity. Performance fees are included for the public market asset classes and hedge funds.

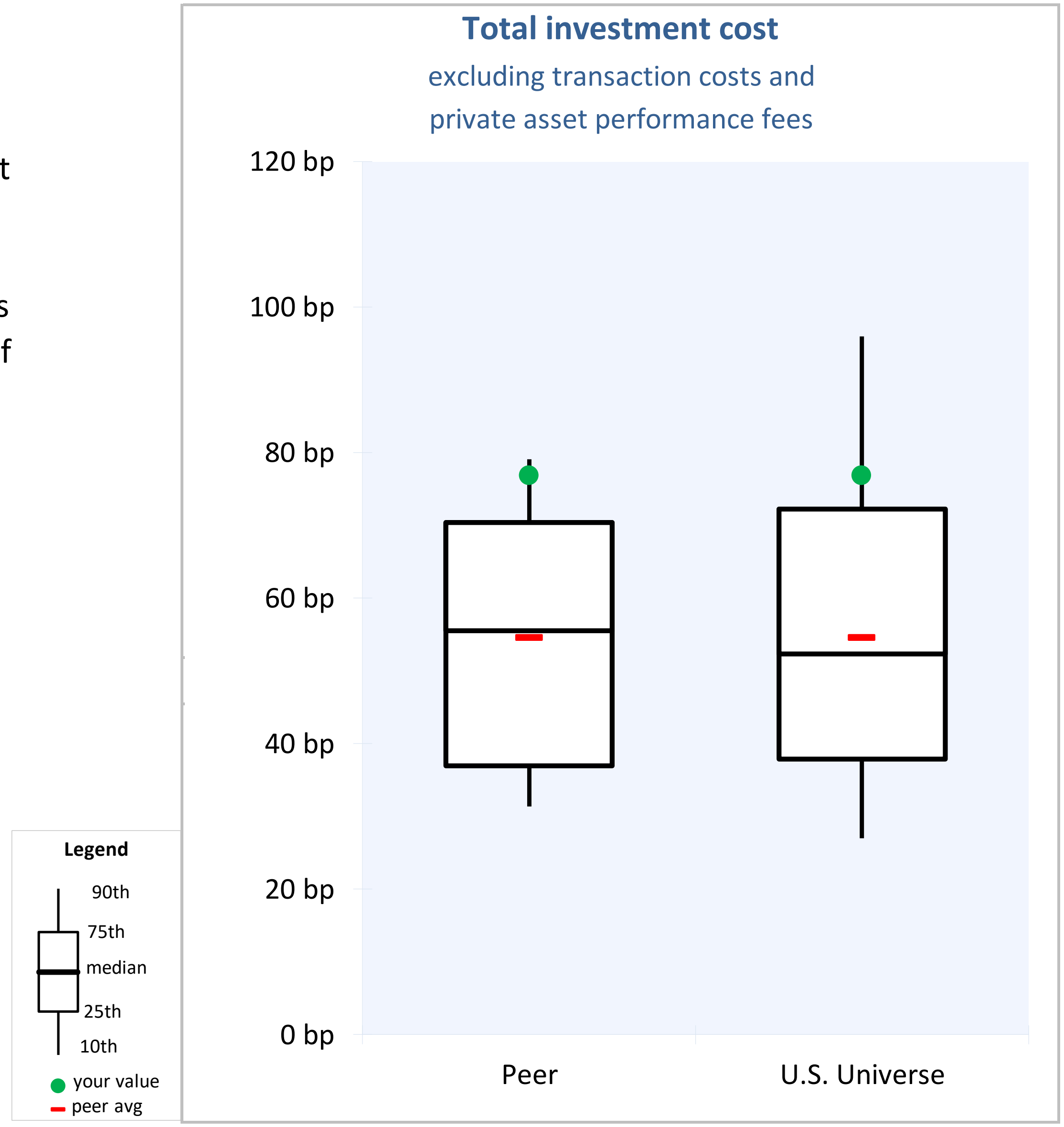
[4] Excludes non-investment costs, such as PBGC premiums and preparing checks for retirees.

Your total investment cost of 76.8 bps was above the peer median of 55.6 bps.

Differences in total investment cost are often caused by two factors that are often outside of management's control:

- Asset mix, particularly holdings of the highest cost asset classes: real estate (excl REITS), infrastructure, hedge funds and private equity. These high cost assets equaled 34% of your fund's assets at the end of 2016 versus a peer average of 25%.
- Fund size. Bigger funds have advantages of scale.

Therefore, to assess whether your costs are high or low given your unique asset mix and size, CEM calculates a benchmark cost for your fund. This analysis is shown on the following page.



Benchmark cost analysis suggests that, after adjusting for fund size and asset mix, your fund was normal cost in 2016.

Your benchmark cost is an estimate of what your cost would be given your actual asset mix and the median costs that your peers pay for similar services. It represents the cost your peers would incur if they had your actual asset mix.

Your total cost of 76.8 bp was equal to your benchmark cost of 76.7 bp. Thus, your excess cost was 0.1 bp.

Your cost versus benchmark

	$000s	basis points
Your total investment cost	537,731	76.8 bp
Your benchmark cost	536,783	76.7 bp
Your excess cost	947	0.1 bp

Your fund was normal cost because of two offsetting factors: you had a higher cost implementation style but you paid less than peers for similar services.

Explanation of your cost status

	Excess Cost/ (Savings) $000s	bps
1. Higher cost implementation style		
• Less fund of funds	(790)	(0.1)
• More external active management (less lower cost passive and internal)	24,200	3.5
• More overlays	184	0.0
• Other style differences	112	0.0
	23,707	3.4
2. Paying less than peers for similar services		
• External investment management costs	(14,127)	(2.0)
• Internal investment management costs	(10)	(0.0)
• Oversight, custodial & other costs	(8,623)	(1.2)
	(22,760)	(3.3)
Total excess cost	947	0.1

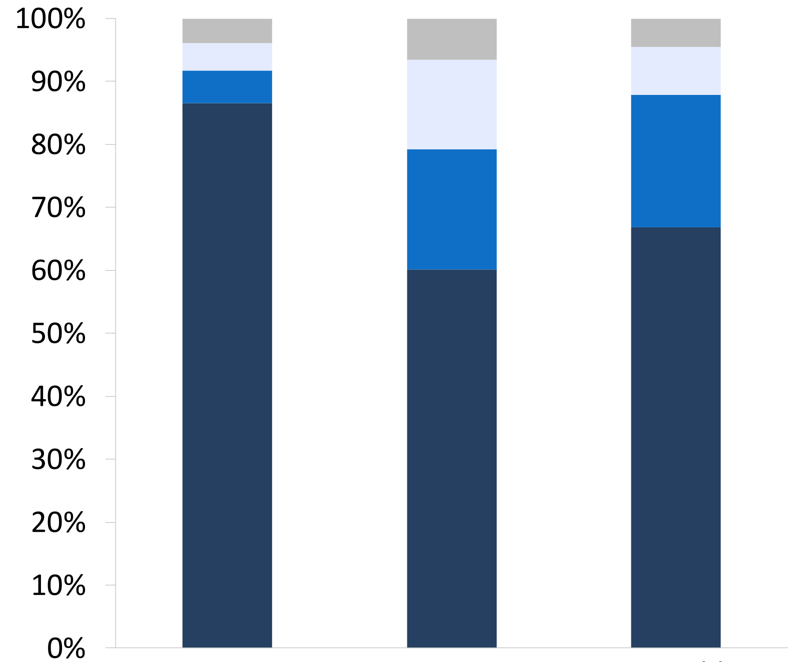
Differences in cost performance are often caused by differences in implementation style.

Implementation style is defined as the way in which your fund implements asset allocation. It includes internal, external, active, passive and fund of funds styles.

The greatest cost impact is usually caused by differences in the use of:

- External active management because it tends to be much more expensive than internal or passive management. You used more external active management than your peers (your 87% versus 60% for your peers).
- Within external active holdings, fund of funds usage because it is more expensive than direct fund investment. You had less in fund of funds. Your 6% of hedge funds, real estate and private equity in fund of funds compared to 12% for your peers.

Implementation style[1]



	Your Fund	Peers	U.S. Public Funds
Internal passive	4%	7%	5%
Internal active	4%	14%	8%
External passive	5%	19%	21%
External active	87%	60%	67%

1. The graph above does not take into consideration the impact of derivatives. The values in the graph are calculated using average holdings.

Differences in implementation style cost you 3.4 bp relative to your peers.

Calculation of the cost impact of differences in implementation style

Asset class	Your avg holdings in $mils	% External active: You	% External active: Peer average	% External active: More/ (less)	Premium vs passive & internal[1]	Cost/ (savings) $000s	Cost/ (savings) bps
	(A)			(B)	(C)	(A X B X C)	
U.S. Stock - Broad/All	384	100.0%	18.4%	81.6%	37.4 bp	1,171	
U.S. Stock - Large Cap	9,051	39.3%	22.8%	16.6%	22.7 bp	3,398	
U.S. Stock - Small Cap	3,223	73.3%	76.8%	(3.5%)	60.5 bp	(675)	
Stock - Emerging	1,540	100.0%	65.7%	34.3%	52.4 bp	2,765	
Stock - ACWIxU.S.	10,267	88.5%	64.1%	24.4%	41.0 bp	10,282	
Stock - Global	1,405	57.0%	62.9%	(5.9%)	34.6 bp	(285)	
Fixed Income - U.S.	6,066	100.0%	57.6%	42.4%	12.2 bp	3,129	
Fixed Income - U.S. Gov't	4,796	100.0%	18.8%	81.2%	N/A[2]	0	
Fixed Income - Other	3,615	100.0%	93.0%	7.0%	-9.3 bp	(234)	
REITs	2,006	100.0%	67.5%	32.5%	46.8 bp	3,049	
Real Estate ex-REITs	7,045	100.0%	94.9%	5.1%	N/A[2]	0	
Partnerships, as a proportion of external:	7,045	49.0%	41.8%	7.1%	31.9 bp	1,600	
Other Real Assets	2,687	100.0%	100.0%	0.0%		0	
Diversified Private Equity	19,896	100.0%	100.0%	0.0%		0	
Other private equity	1,377	100.0%	Excluded			0	
Impact of less/more external active vs. lower cost styles						24,200	3.5 bp
		Fund of funds % of LPs			vs. direct LP[1]		
Real Estate ex-REITs - LPs	3,449	0.0%	1.6%	(1.6%)	N/A[2]	0	
Diversified Private Equity - LPs	19,896	7.8%	8.5%	(0.7%)	57.0 bp	(790)	
Impact of less/more fund of funds vs. direct LPs						(790)	(0.1) bp
		Overlays and other					
Impact of higher use of portfolio level overlays						184	0.0 bp
Impact of mix of internal passive, internal active, and external passive[3]						112	0.0 bp
Total impact of differences in implementation style						23,707	3.4 bp

Footnotes
1. The cost premium is the additional cost of external active management relative to the average of other lower cost implementation styles - internal passive, internal active and external passive.
2. A cost premium listed as 'N/A' indicates that there was not enough peer data in one or both styles to calculate the premium.
3. The 'Impact of mix of internal passive, internal active and external passive' quantifies the net cost impact of differences in cost between, and your relative use of, these 'low-cost' styles.

The net impact of paying more/less for external asset management saved 2.0 bps.

Cost impact of paying more/(less) for external asset management

	Your avg holdings in $mils	Cost in bps			Cost/ (savings) in $000s
		Your Fund	Peer median	More/ (less)	
	(A)			(B)	(A X B)
U.S. Stock - Broad/All - Active	384	43.7[1]	39.3	4.4	168
U.S. Stock - Large Cap - Passive	1,542	1.3	1.0	0.3	42
U.S. Stock - Large Cap - Active	3,559	15.8	25.3	(9.5)	(3,389)
U.S. Stock - Small Cap - Active	2,363	38.2	63.0	(24.9)	(5,878)
Stock - Emerging - Active	1,540	74.2	57.6	16.6	2,554
Stock - ACWIxU.S. - Passive	1,181	3.3	3.3	0.0	0
Stock - ACWIxU.S. - Active	9,086	43.9	44.3	(0.4)	(332)
Stock - Global - Passive	604	5.1	5.3*	(0.2)	(14)
Stock - Global - Active	801	40.0	40.0	0.0	0
Fixed Income - U.S. - Active	6,066	11.0	14.7	(3.7)	(2,255)
Fixed Income - U.S. Gov't - Active	4,796	6.4	12.0*	(5.6)	(2,689)
Fixed Income - Other - Active	3,615	49.6	23.0	26.7	9,643
REITs - Active	2,006	29.4	50.5	(21.1)	(4,229)
Real Estate ex-REITs - Active	3,596	62.3	56.1	6.2	2,236
Real Estate ex-REITs - Limited Partnership	3,449	120.3	88.0	32.3	11,132
Other Real Assets - Active	2,687	149.3	133.6	15.7	4,216
Diversified Private Equity - Active	18,334	143.9	158.5	(14.6)	(26,713)
Diversified Private Equity - Fund of Fund	1,561	226.1	215.5	10.6	1,652
Other Private Equity - Active	1,377	181.7	Excluded		
	Notional				
Derivatives/Overlays - Passive Beta	1,470	4.0	5.8*	(1.9)	(273)
Total impact of paying more/less for external management					(14,127)
Total in bps					(2.0) bp

'Excluded' indicates that the asset class was excluded from this analysis due to comparability concerns with peers.

*Universe median used as peer data was insufficient.

[1] You paid performance fees in these asset classes.

The net impact of paying more/less for internal asset management costs rounds to 0.0 bps.

Cost impact of paying more/(less) for internal asset management

	Your avg holdings in $mils	Cost in bps			Cost/ (savings) in $000s
		Your Fund	Peer median	More/ (less)	
	(A)			(B)	(A X B)
U.S. Stock - Large Cap - Passive	1,871	0.5	0.4	0.1	18
U.S. Stock - Large Cap - Active	2,079	6.8	6.8	0.0	0
U.S. Stock - Small Cap - Passive	860	1.2	1.5	(0.3)	(28)
Total impact of paying more/less for internal management					(10)
Total in bps					(0.0) bp

'Excluded' indicates that the asset class was excluded from this analysis due to comparability concerns with peers.

The net impact of differences in oversight, custodial & other costs saved 1.2 bps.

Cost impact of differences in oversight, custodial & other costs

	Your avg holdings in $mils	Cost in bps			Cost/ (savings) in $000s
		Your fund	Peer median	More/ (less)	
	(A)			(B)	(A X B)
Oversight & consulting	69,980	0.2	1.1	(0.9)	(6,227)
Custodial	69,980	0.0	0.3	(0.2)	(1,743)
Audit	69,980	0.0	0.0	(0.0)	(319)
Other	69,980	0.1	0.1	(0.0)	(334)
Total					(8,623)
Total in bps					(1.2) bp

The table below provides a summary of why you are high/low cost relative to the peer-median for each asset class.

Why are you high/(low) cost by asset class?

Asset class/category	Due to impl. style $000s	Due to paying more/ (less)	Total $000s	Total bps
U.S. Stock - Broad/All	1,171	168	1,339	
U.S. Stock - Large Cap	3,597	(3,329)	268	
U.S. Stock - Small Cap	(761)	(5,906)	(6,667)	
Stock - Emerging	2,765	2,554	5,319	
Stock - ACWIxU.S.	10,282	(332)	9,950	
Stock - Global	(285)	(14)	(299)	
Fixed Income - U.S.	3,129	(2,255)	874	
Fixed Income - U.S. Gov't	0	(2,689)	(2,689)	
Fixed Income - Other	(234)	9,643	9,409	
Cash	0	0	0	
REITs	3,049	(4,229)	(1,179)	
Real Estate ex-REITs	1,600	13,367	14,967	
Other Real Assets	0	4,216	4,216	
Diversified Private Equity	(790)	(25,060)	(25,850)	
Other private equity	0	0	0	
Overlays	184	(273)	(89)	
Oversight, Custodial & Other		(8,623)	(8,623)	
Total	23,707	(22,760)	947	0.1 bp

Key takeaways

Returns

- Your 5-year net total return was 9.1%. This was above the U.S. Public median of 8.7% and above the peer median of 8.8%.
- Your 5-year policy return was 9.2%. This was above the U.S. Public median of 8.4% and above the peer median of 8.6%.

Value added

- Your 5-year net value added was -0.1%. This was below the U.S. Public median of 0.2% and below the peer median of 0.2%.

Cost and cost effectiveness

- Your investment cost of 76.8 bps was above the peer median cost of 55.6 bps. You were higher cost because your investments were more heavily weighted to the higher cost private market asset classes. However, your cost was close to your benchmark cost of 76.7 bps. This suggests that your fund was normal cost compared to your peers.

- Your fund was normal cost because of two offsetting factors: you had a higher cost implementation style but you paid less than peers for similar services.

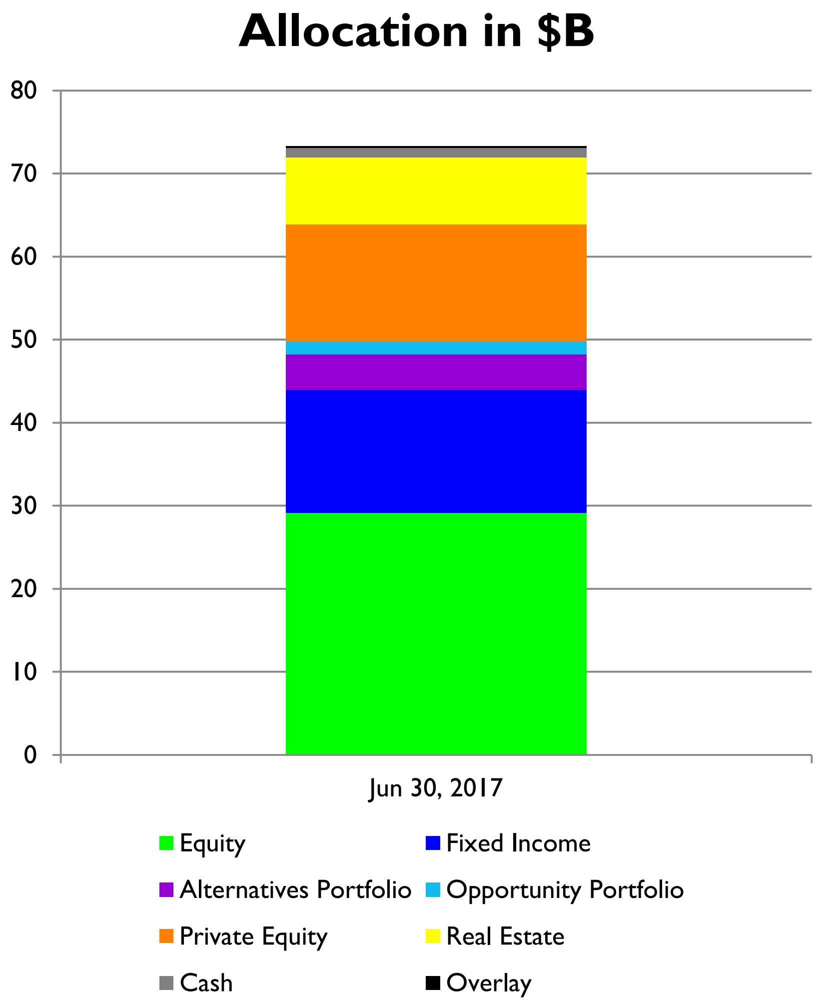
TAB 10 – Q2 2017 Performance & Risk Report

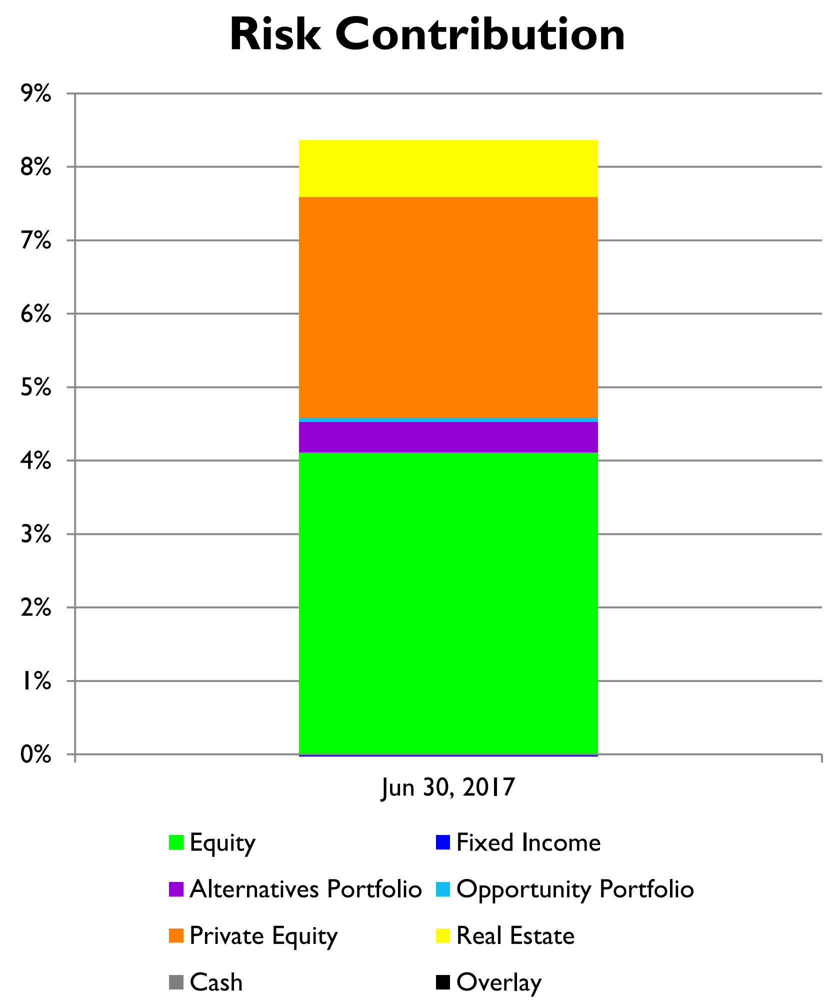
OPERF

2017 Q2 OPERF Risk Dashboard

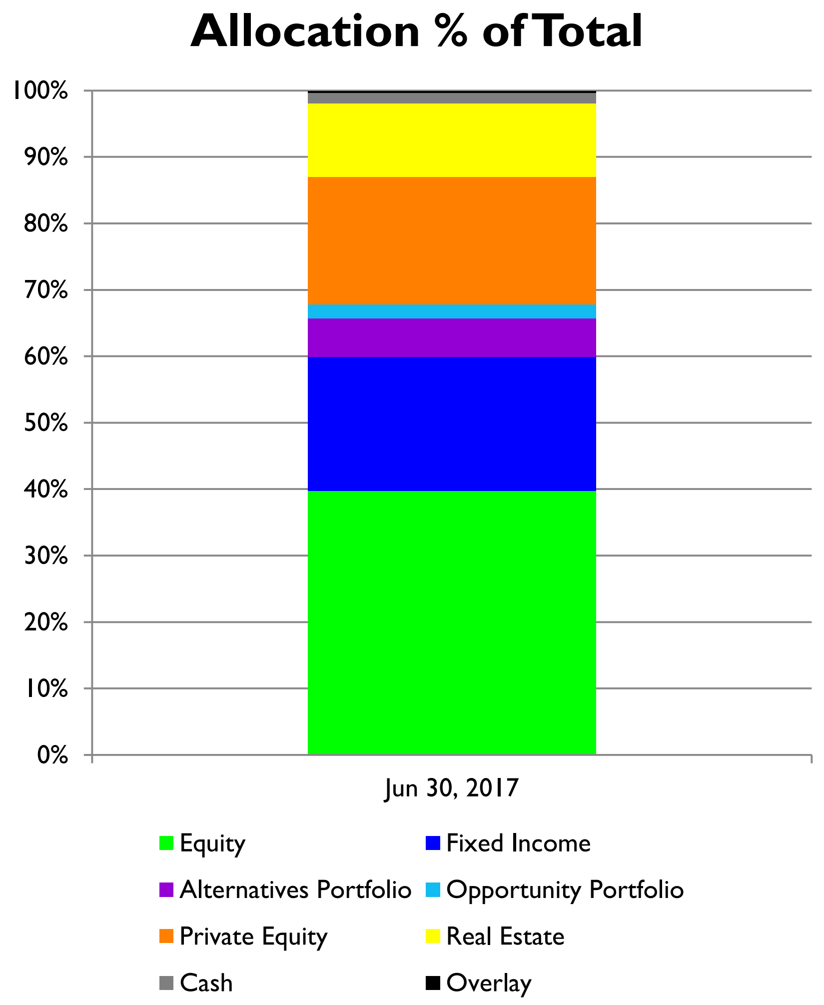
September 20, 2017

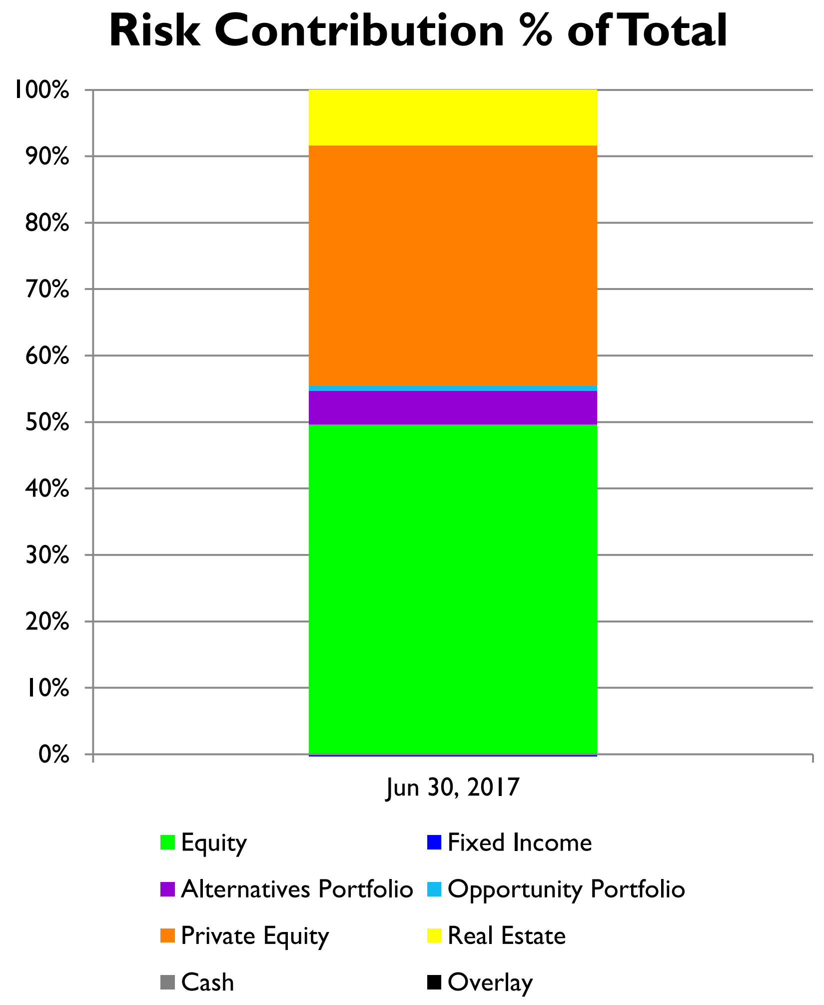
Capital Allocation & Risk Contribution by Asset Class



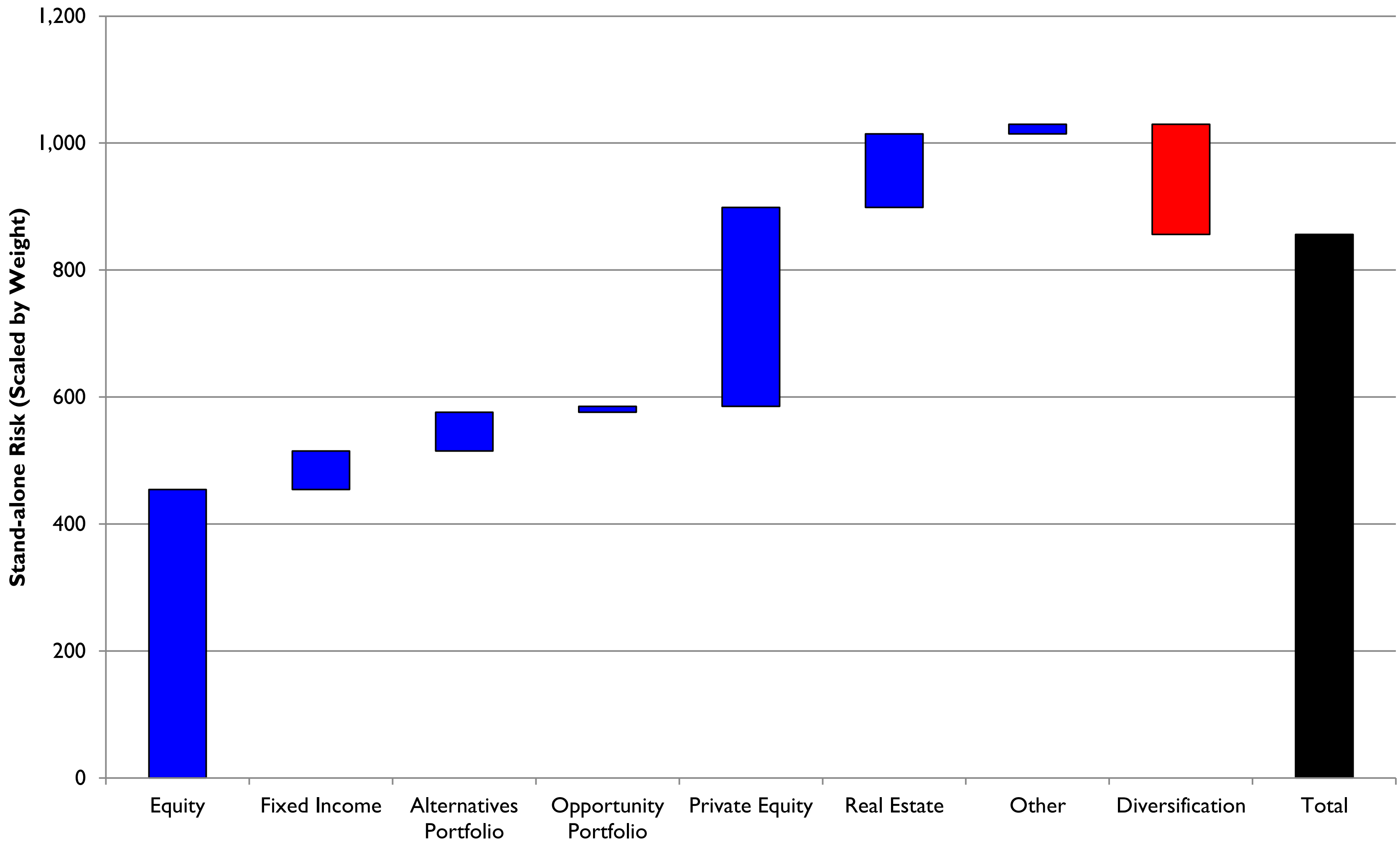


Scaled Capital Allocation & Risk Contribution by Asset Class

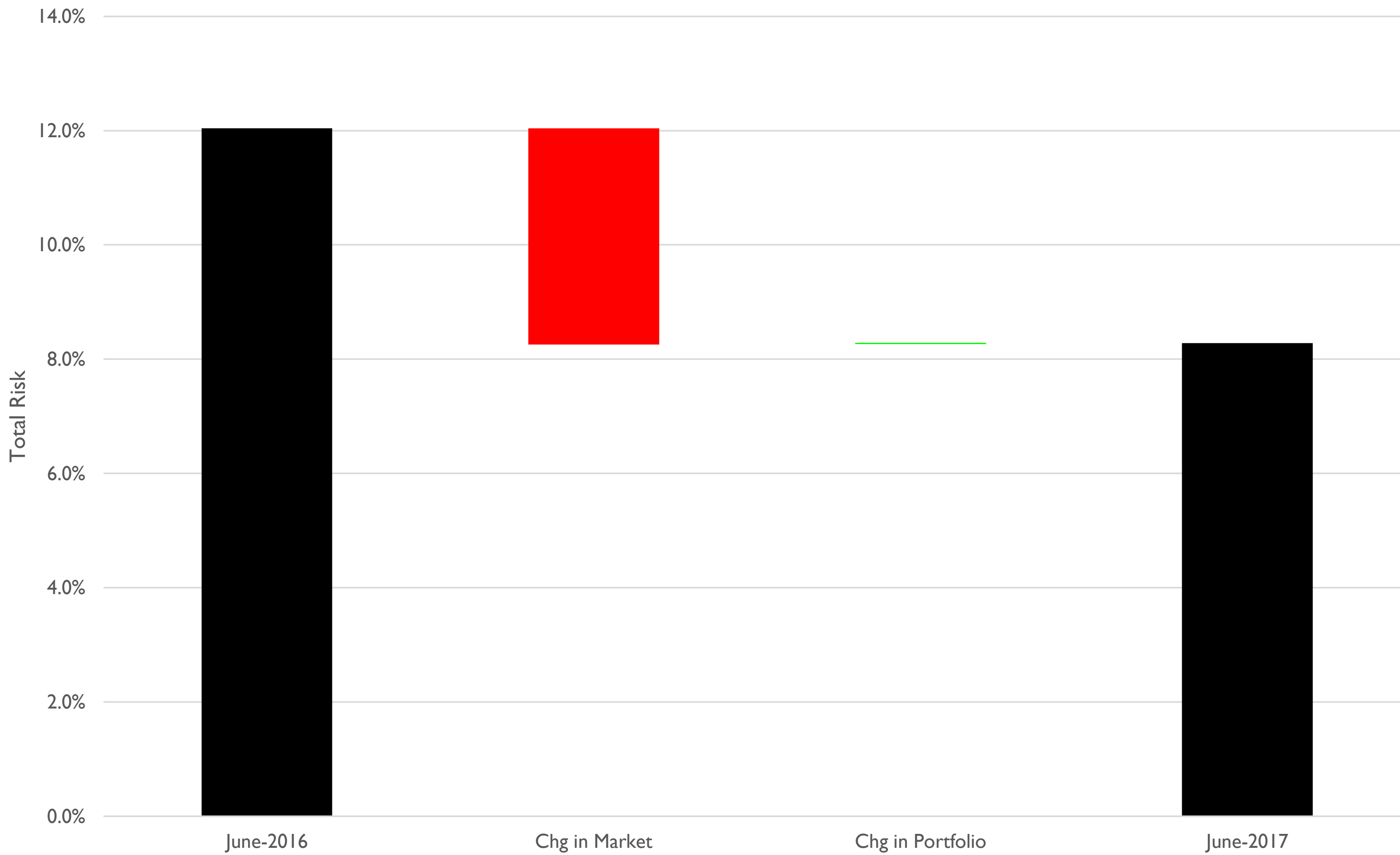




Stand-alone Risk by Asset Class



Change in Predicted OPERF Risk



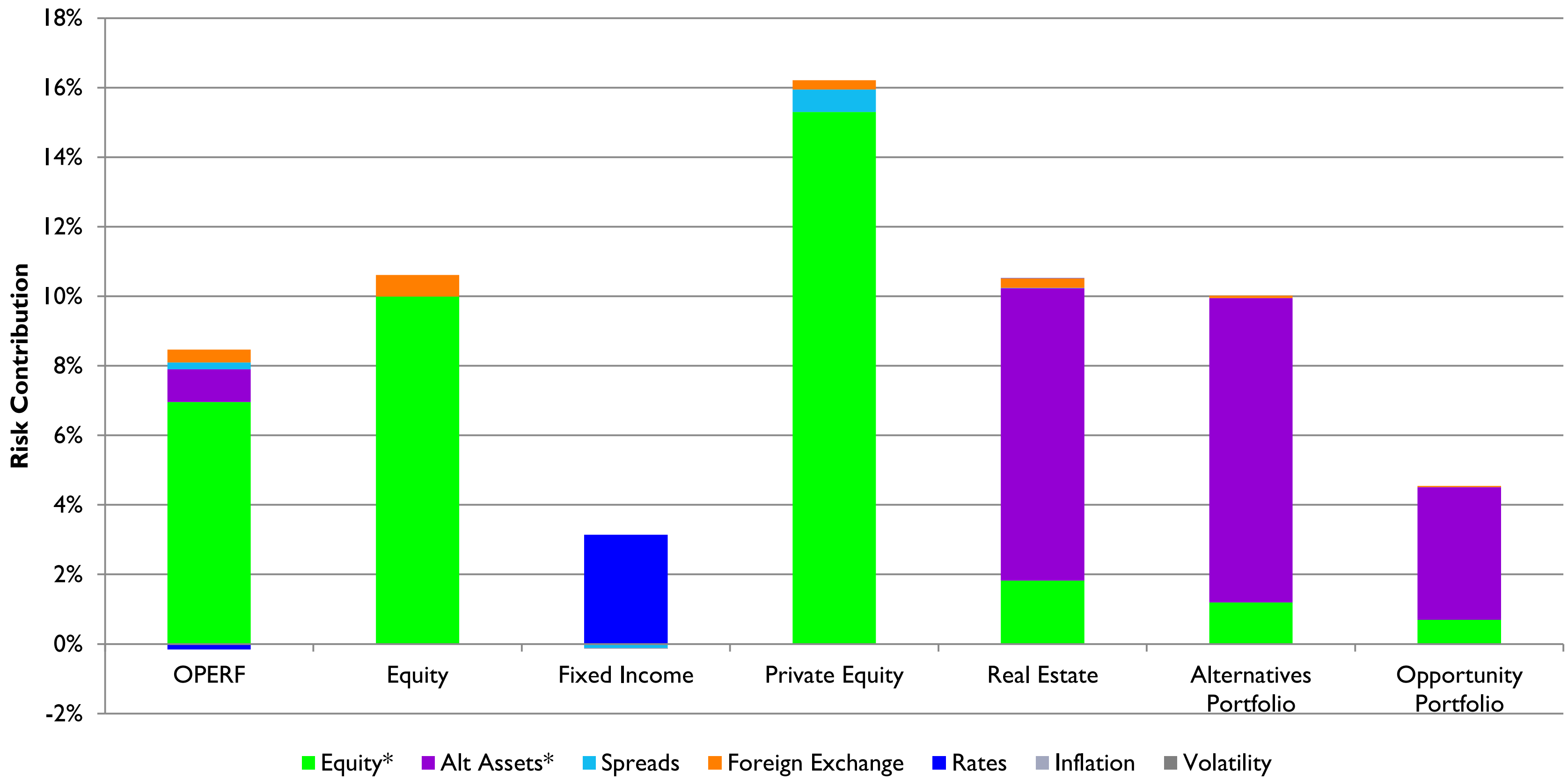
Correlation Matrix by Asset Class

Expected Return	Expected Risk	Predicted Risk [1]	Jun 30, 2017	Equity	Fixed Income	Alternatives Portfolio	Opportunity Portfolio	Private Equity	Real Estate	**OPERF**
7.1%	19.5%	10.6%	Equity	1.00	-0.18	0.61	0.61	0.91	0.53	**0.97**
3.0%	3.8%	3.0%	Fixed Income		1.00	-0.07	-0.12	-0.30	0.20	**-0.10**
6.3%	10.6%	10.5%	Alternatives Portfolio			1.00	0.50	0.62	0.43	**0.68**
		4.5%	Opportunity Portfolio				1.00	0.63	0.34	**0.64**
9.5%	26.3%	16.3%	Private Equity					1.00	0.50	**0.95**
6.7%	15.0%	10.5%	Real Estate						1.00	**0.66**
7.1%	**14.1%**	**8.3%**	**OPERF**							**1.00**

Capital Market Assumptions from Callan

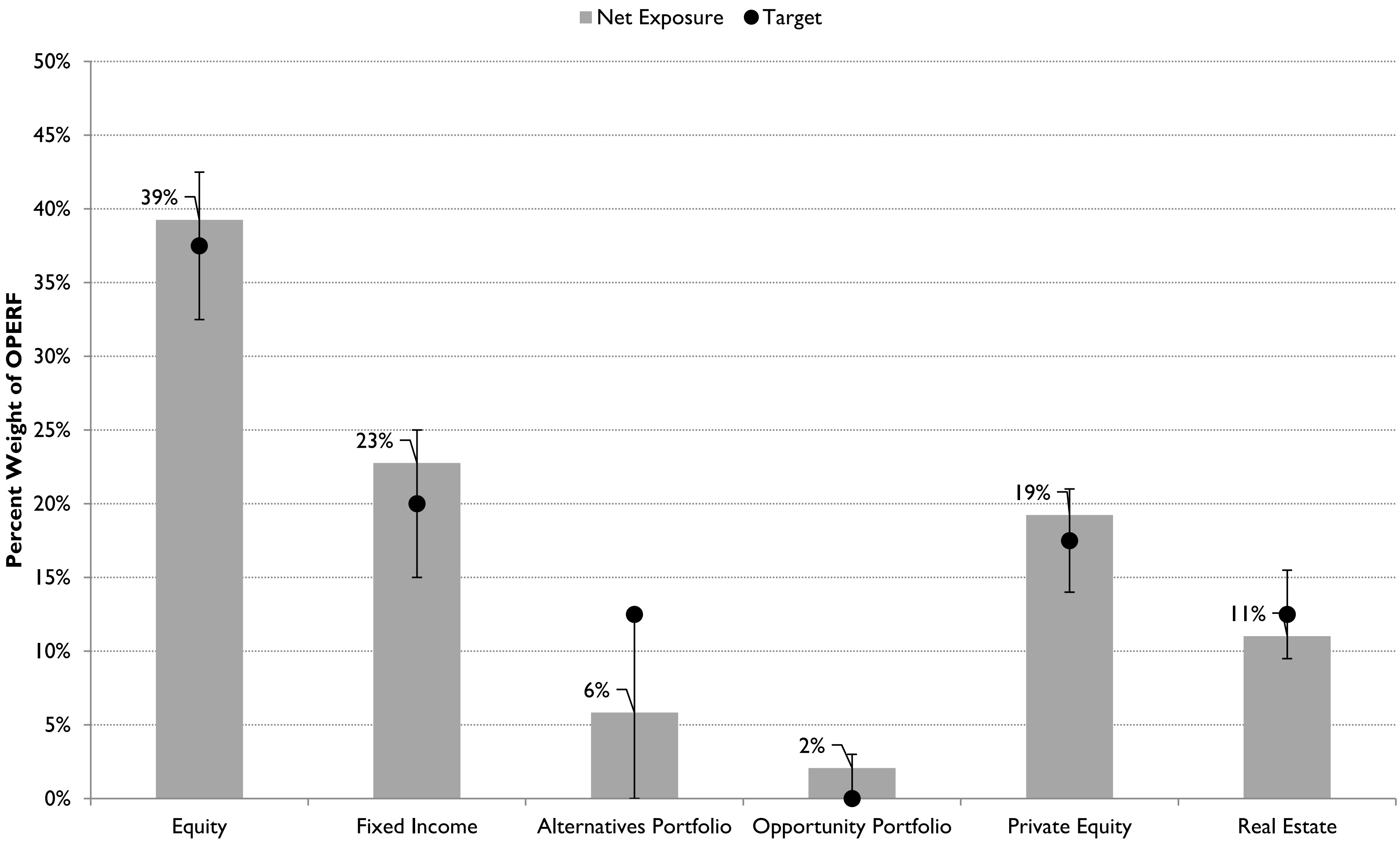
[1] Ex-Ante, holdings-based correlations between asset classes as estimated by Aladdin.

Risk Contribution by Factor Group

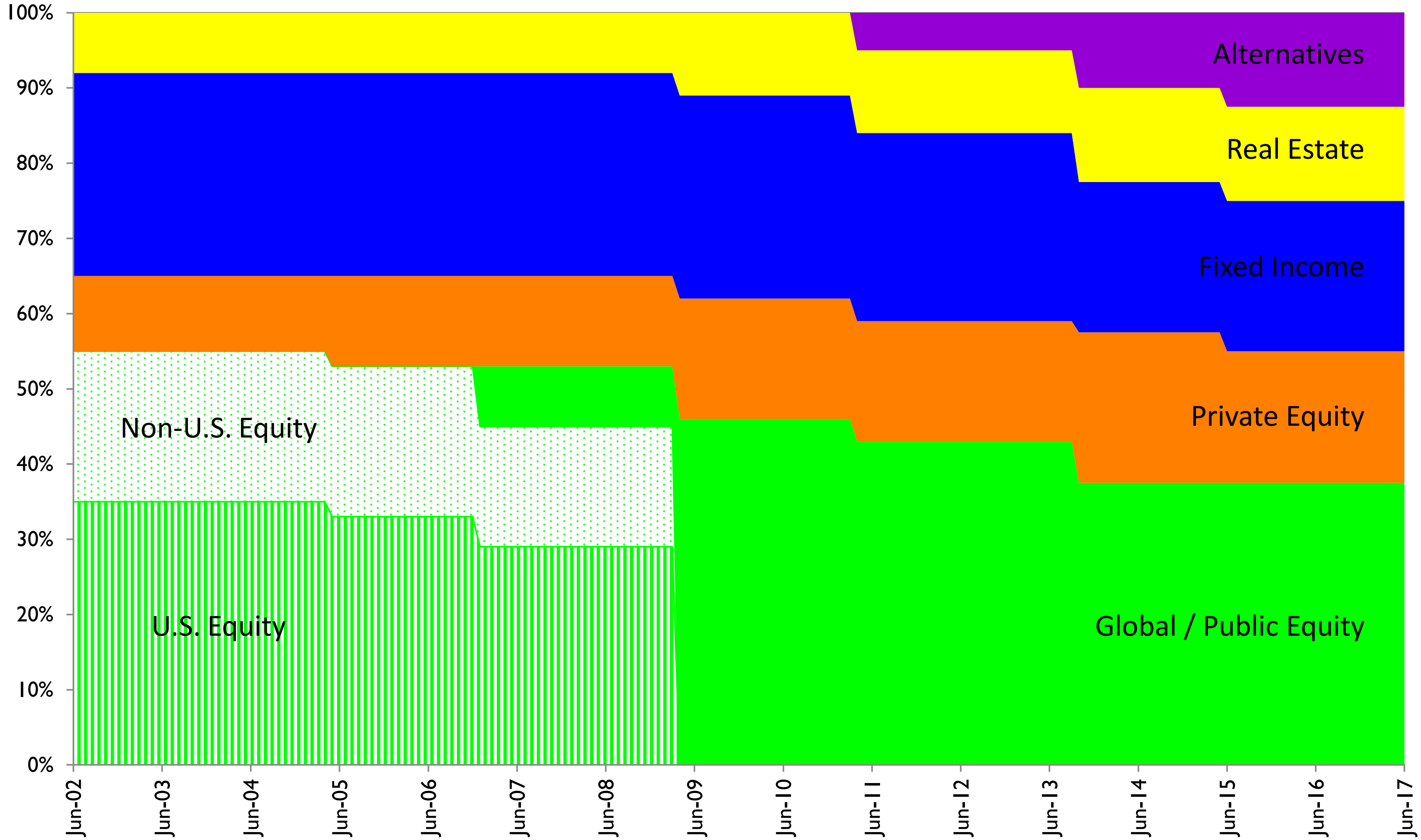


*Aladdin's Alternative risk factor group includes Private Equity, Real Estate, and Hedge Fund risk factors; however, Private Equity risk factors are highly correlated to Public Equity risk factors. In the above chart, Equity includes both Public & Private Equity while Alt Assets includes all other Alternative risk factors.

OPERF Allocations



Historical Target Asset Allocation



OPERF Five-Year Performance Attribution

	Policy Target		Actual				Policy Mix		Active Return	
Asset Class	**Allocation**	**Return**	**Allocation**	**Return**	**Contrib**	**Bench**	**Return**	**Contrib**	**Excess**	**Contrib**
Public Equity	37.5%	7.1%	39.1%	11.6%	4.5%	10.7%	10.7%	4.2%	0.9%	0.3%
Private Equity	17.5%	9.5%	21.5%	11.5%	2.4%	16.5%	11.5%	2.5%		
Equity	*55.0%*		*60.5%*		*6.9%*			*6.6%*		
Fixed Income	20.0%	3.0%	23.5%	3.1%	0.7%	2.5%	2.5%	0.6%	0.6%	0.1%
Real Estate	12.5%	6.7%	11.7%	11.4%	1.3%	10.7%	10.7%	1.3%	0.7%	0.1%
Alternatives	12.5%	6.3%	2.4%	2.5%	0.1%	5.4%	2.5%	0.1%		
Opportunity	0.0%		1.6%	8.2%	0.1%		8.2%	0.1%		
Cash	0.0%		0.1%	0.8%	0.0%		0.8%	0.0%		
OPERF		**7.1%**	**100.0%**		**9.2%**	**9.9%**		**8.7%**		**0.5%**
Excess					**-0.7%**			**-1.2%**		**+0.5%**

Public Equity, Fixed Income and Real Estate are further decomposed into Policy Mix ("Beta") and Active Return ("Alpha").

Actual Contribution = Policy Mix Contribution + Active Return Contribution

Policy Mix Contribution = Actual Allocation X Policy Mix Return

Active Return Contribution = Actual Allocation X Active Return

Liquidity Report

	Liquidity ($M)					
Asset Class	**1 Week**	**1 Month**	**1 Quarter**	**∞**	**Uncalled Commitment**	**Next 12 Months**
Cash & Overlay	695					
Public Equity	25,900	*1,866*	*1,246*			
Fixed Income	11,656	*2,382*				
Private Equity				14,306	-9,178	
Real Estate	*1,465*			7,134	-2,484	
Alternatives	*195*	226		3,868	-2,571	
Opportunity				1,529	-833	
Proj PERS Cash Flow						-3,200
Total	39,910	4,474	1,246	26,837	-15,066	-3,200

Public Equity - 1 Month = AQR 130/30, Arrowstreet 130/30, & Callan US Micro Cap Value portfolios

Public Equity - 1 Quarter = Lazard Closed-End Fund portfolio

Fixed Income - 1 Month = Below Investment Grade

Real Estate - 1 Week = REIT composite

Alternatives - 1 Week = SailingStone

- Table periods approximate the time required to liquidate different OPERF allocations.

Top 10 Exposures by Investment Firm

Rank	Asset Manager	Mkt Val ($mm)	Mkt Val Weight	Asset Class
1	Internally-Managed	12,206	16.8%	Cash, Fixed Inc, Public Equity
2	Dimensional Fund Advisors	5,376	7.4%	Public Equity
3	AQR	3,549	4.9%	Alternatives, Public Equity
4	KKR	3,231	4.4%	Fixed Income, Private Equity
5	Arrowstreet Capital	2,775	3.8%	Public Equity
6	AB (f/k/a AllianceBernstein)	2,579	3.5%	Fixed Income, Public Equity
7	Lazard	2,176	3.0%	Public Equity
8	Wellington	2,128	2.9%	Fixed Income, Public Equity
9	Acadian	1,927	2.7%	Public Equity
10	Western Asset Management	1,638	2.3%	Fixed Income

John Skjervem's Rock Band Analogy (with extra cheese)

“Rhythm” and “Lead” Guitar

Expected Return	Expected Risk	Predicted Risk	**Jun 30, 2017**	Equity	Fixed Income	Alternatives Portfolio	Opportunity Portfolio	Private Equity	Real Estate	**OPERF**
7.1%	19.5%	10.6%	Equity	1.00	-0.18	0.61	0.61	0.91	0.53	**0.97**
3.0%	3.8%	3.0%	Fixed Income		1.00	-0.07	-0.12	-0.30	0.20	**-0.10**
6.3%	10.6%	10.5%	Alternatives Portfolio			1.00	0.50	0.62	0.43	**0.68**
		4.5%	Opportunity Portfolio				1.00	0.63	0.34	**0.63**
9.5%	26.3%	16.3%	Private Equity					1.00	0.50	**0.94**
6.7%	15.0%	10.5%	Real Estate						1.00	**0.65**
7.1%	**14.1%**	**8.3%**	**OPERF**							**1.00**

These two asset classes contribute a majority of OPERF’s expected return (7.0% out of 9.2% from the Performance Attribution slide), 60% of OPERF AUM and 85% of OPERF’s predicted risk.

“Keyboard” and “Bass Guitar”

Expected Return	Expected Risk	Predicted Risk	**Jun 30, 2017**	Equity	Fixed Income	Alternatives Portfolio	Opportunity Portfolio	Private Equity	Real Estate	**OPERF**
7.1%	19.5%	10.6%	Equity	1.00	-0.18	0.61	0.61	0.91	0.53	**0.97**
3.0%	3.8%	3.0%	Fixed Income		1.00	-0.07	-0.12	-0.30	0.20	**-0.10**
6.3%	10.6%	10.5%	Alternatives Portfolio			1.00	0.50	0.62	0.43	**0.68**
		4.5%	Opportunity Portfolio				1.00	0.63	0.34	**0.63**
9.5%	26.3%	16.3%	Private Equity					1.00	0.50	**0.94**
6.7%	15.0%	10.5%	Real Estate						1.00	**0.65**
7.1%	**14.1%**	**8.3%**	**OPERF**							**1.00**

These two asset classes contribute to OPERF’s expected return (1.5% out of 9.2%) and provide some diversification away from the rhythm and lead guitar equity exposures.

“Drums”

Expected Return	Expected Risk	Predicted Risk	Jun 30, 2017	Equity	Fixed Income	Alternatives Portfolio	Opportunity Portfolio	Private Equity	Real Estate	OPERF
7.1%	19.5%	10.6%	Equity	1.00	-0.18	0.61	0.61	0.91	0.53	**0.97**
3.0%	3.8%	3.0%	Fixed Income		1.00	-0.07	-0.12	-0.30	0.20	**-0.10**
6.3%	10.6%	10.5%	Alternatives Portfolio			1.00	0.50	0.62	0.43	**0.68**
		4.5%	Opportunity Portfolio				1.00	0.63	0.34	**0.63**
9.5%	26.3%	16.3%	Private Equity					1.00	0.50	**0.94**
6.7%	15.0%	10.5%	Real Estate						1.00	**0.65**
7.1%	**14.1%**	**8.3%**	**OPERF**							**1.00**

THE diversifier for OPERF with lower risk, lower expected return (0.7% out of 9.2%), and no correlation to equities.

Callan
FORTY YEARS

September 20, 2017

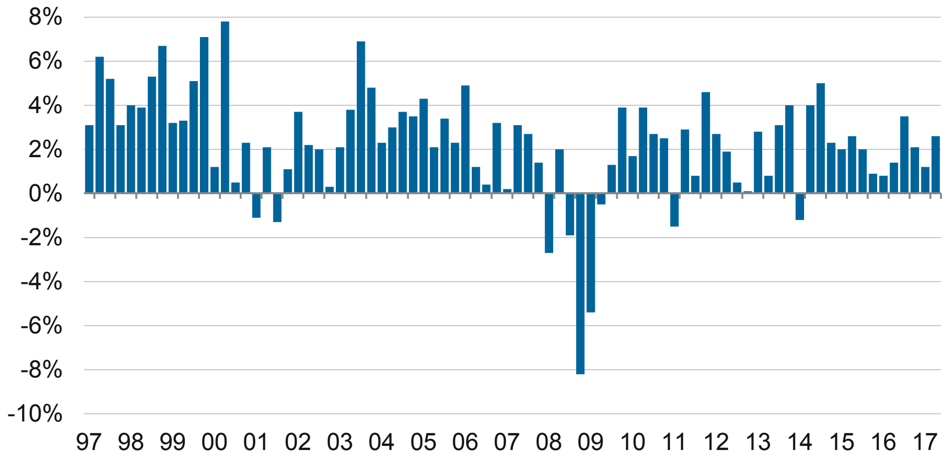
Oregon Investment Council

Second Quarter 2017
Performance Review

Economic Commentary

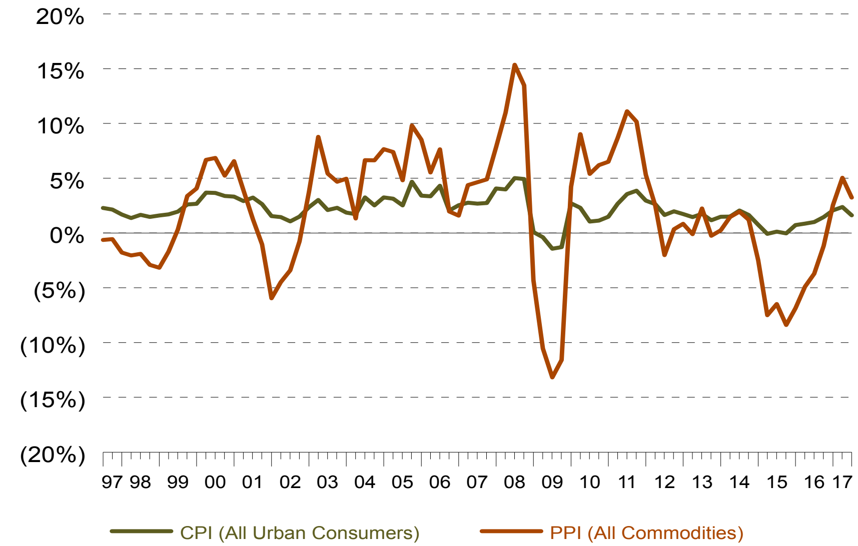
Second Quarter 2017

Quarterly Real GDP Growth (20 Years)



Source: Bureau of Economic Analysis

Inflation Year-Over-Year



Source: Bureau of Labor Statistics

- The U.S. economic picture continued to improve. The first estimate of 2nd quarter GDP came in at a solid 2.6%. Growth was supported by consumer spending and non residential expenditures. The first quarter GDP was revised from a disappointing initial read of 0.7% to 1.2%, providing a more positive view of the U.S. economy.

- Job growth averaged 194,000 in the second quarter, with two of the three months (April and June), breaking 200,000 mark. Unemployment fell to a 15-year low of 4.4%, driven by a 0.2% decline in labor force participation rate, to 62.8%. Despite low unemployment, average hourly earnings registered a meager 0.4% increase in June, while year-over-year growth remains at only 2.5%.

- Inflation remained stubbornly low. For the trailing 12 months ended June, headline CPI was +1.6%, and Core CPI (excluding food and energy) was +1.7%.

Market Summary

Second Quarter 2017

Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
MSCI:EM Gross 6.4%	Russell:2000 Index 24.6%	NCREIF:NFI-ODCE Val Wt Gr 11.4%	S&P:500 14.6%	ML:US High Yield Cash Pay 7.5%
MSCI:ACWI ex US 5.8%	MSCI:EM Gross 24.2%	S&P:500 9.6%	Russell:3000 Index 14.6%	Russell:3000 Index 7.3%
S&P:500 3.1%	MSCI:ACWI ex US 20.5%	Russell:3000 Index 9.1%	Russell:2000 Index 13.7%	S&P:500 7.2%
Russell:3000 Index 3.0%	Russell:3000 Index 18.5%	Russell:2000 Index 7.4%	NCREIF:NFI-ODCE Val Wt Gr 11.8%	Russell:2000 Index 6.9%
Russell:2000 Index 2.5%	S&P:500 17.9%	ML:US High Yield Cash Pay 4.5%	MSCI:ACWI ex US 7.2%	NCREIF:NFI-ODCE Val Wt Gr 5.3%
ML:US High Yield Cash Pay 2.2%	ML:US High Yield Cash Pay 12.8%	Blmbg:Aggregate 2.5%	ML:US High Yield Cash Pay 6.9%	Blmbg:Aggregate 4.5%
NCREIF:NFI-ODCE Val Wt Gr 1.8%	NCREIF:NFI-ODCE Val Wt Gr 8.0%	MSCI:EM Gross 1.4%	MSCI:EM Gross 4.3%	MSCI:EM Gross 2.2%
Blmbg:Aggregate 1.4%	3 Month T-Bill 0.5%	MSCI:ACWI ex US 0.8%	Blmbg:Aggregate 2.2%	MSCI:ACWI ex US 1.1%
3 Month T-Bill 0.2%	Blmbg:Aggregate (0.3%)	3 Month T-Bill 0.2%	3 Month T-Bill 0.2%	3 Month T-Bill 0.6%

OPERF Total Regular Account

Performance Summary for the Second Quarter 2017

Total Fund:

In the second quarter of 2017, the Total Regular Account rose 3.48% (+3.37% net of fees), just trailing the 3.57% return of the Policy Target, and ranked in top third of Callan's $10B+ public fund peer group. For the 12 months ended June 30, 2017, the Account gained 12.31% (+11.92% net of fees) versus 13.02% for the Policy Target, and ranked in the 74th percentile of Callan's $10B+ public fund peer group. Longer term results trail the Policy Target but rank in the top third of the peer group.

Asset Classes:

- **Total Fixed Income:** The Fixed Income Portfolio advanced 1.38% (+1.33% net of fees) for the quarter versus a gain of 1.29% for the Custom Benchmark, and ranked in the 70th percentile of Callan's Public Funds $10+B US Fixed income (Gross) peer group. For the trailing year, the Portfolio gained 1.62% (+1.44% net of fees), easily beating the benchmark return of 0.41%, and ranked in the 55th percentile of the peer group. 10 year results continue to be ahead of the benchmark and rank in the top quartile of the peer group.

- **Total Public Equity:** Total Public Equity rose 4.42% (+4.36% net of fees) for the quarter versus a gain of 4.25% for the MSCI ACWI IMI Net benchmark, and ranked in the 70th percentile of its peer group. For the trailing year, the portfolio soared 20.69% (+20.39% net of fees), beating the 19.01% return of the benchmark and ranked in the top half of the peer group.
  - **U.S. Equity:** The U.S. Equity Portfolio rose 2.59%% (+2.57% net of fees) for the quarter, lagging the 3.02% advance in the Russell 3000 Index, and ranked in the 91st percentile of Callan's Public Fund: $10B+ Domestic Equity (gross) peer group. On a trailing 12 month basis, the Portfolio surged 19.88% (+19.76% net of fees) versus an increase of 18.51% for the benchmark and ranked in the top quartile of the peer group. 10 year results remain behind those of the benchmark (+6.92% versus +7.26% net of fees) and rank just below the median of the peer group.

  - **International Equity:** The International Equity Portfolio advanced 6.57% (+6.46% net of fees) for the quarter versus 5.85% for the MSCI ACWI ex-U.S. IMI Index, and ranked in the top quartile of Callan's Public Fund: $10B+ International Equity (gross) peer group. For the trailing year, the Portfolio gained 21.59% (+21.07% net of fees) versus 20.43% for the benchmark. This one year return ranked the portfolio above the median of the peer group. 10 year results remain well ahead of the benchmark (+2.75% versus 1.52% net of fees) and continue to rank in the top quartile of the peer group.

- **Total Real Estate:** The Real Estate Portfolio continues to show favorable absolute results over the last decade with an annualized return of 4.95% net of fees.

- **Opportunity Portfolio:** The Opportunity Portfolio's results over the last ten years continue to be strong with an annualized return of 6.20% net of fees.

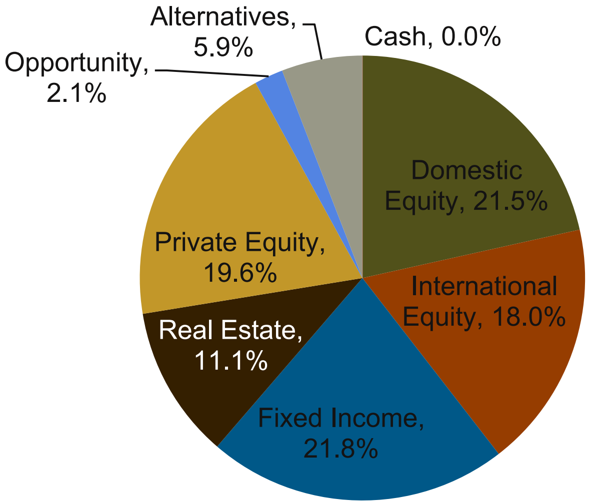
- **Alternative Portfolio:** The Alternative Portfolio has recorded an annualized return of 2.50% net of fees over the last five years.

- **Total Private Equity:** The Private Equity Portfolio's returns remain strong on an absolute basis over the last ten years with an annualized return of 8.64% net of fees

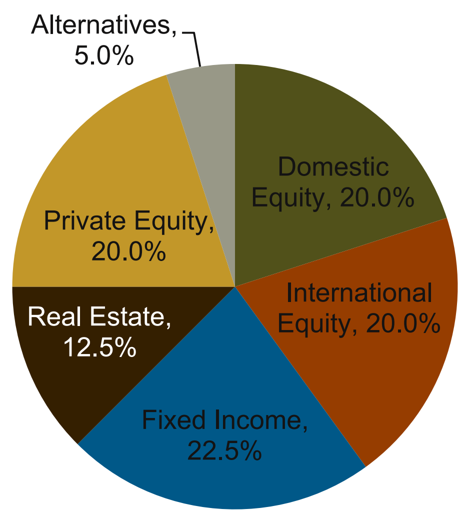
OPERF Total Regular Account

Asset Allocation as of June 30, 2017

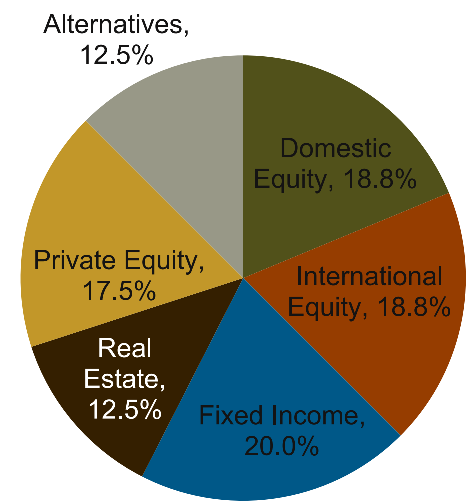
Actual Allocation



Interim Policy Target



Strategic Policy Target*



Asset Class	$000s Actual	Weight Actual	Target	Percent Difference	$000s Difference
Total Fixed Income	15,904,556	21.8%	22.5%	(0.7%)	(531,526)
U.S Equity Portfolio	15,678,309	21.5%	20.0%	1.5%	1,068,458
Non-U.S. Equity Portfolio	13,179,716	18.0%	20.0%	(2.0%)	(1,430,135)
Total Real Estate	8,133,801	11.1%	12.5%	(1.4%)	(997,356)
Opportunity Portfolio	1,529,310	2.1%	0.0%	2.1%	1,529,310
Alternative Portfolio	4,288,645	5.9%	5.0%	0.9%	636,182
Total Private Equity	14,305,685	19.6%	20.0%	(0.4%)	(304,166)
Cash	29,231	0.0%	0.0%	0.0%	29,231
Total	73,049,254	100.0%	100.0%		

*Target established in June 2015

OPERF Total Regular Account

Net Cumulative Performance by Asset Class as June 30, 2017

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years	Last 10 Years
Total Regular Account	**3.37**	**11.92**	**5.71**	**9.18**	**9.83**	**5.41**
Total Regular Account ex-Overlay	3.36	11.84	5.63	9.12	9.71	5.39
OPERF Policy Benchmark*	3.57	13.02	6.59	9.85	10.21	6.04
Total Fixed Income	**1.33**	**1.44**	**2.18**	**3.13**	**4.52**	**5.41**
OPERF Total Custom FI Benchmark	1.29	0.41	1.81	2.50	3.36	4.47
Callan Public Fund $10bn+ U.S. Fixed	1.59	2.00	2.99	3.10	4.23	5.08
Total Public Equity	**4.36**	**20.39**	**5.41**	**11.64**	**11.40**	**4.36**
MSCI ACWI IMI Net	4.25	19.01	4.87	10.74	10.65	3.95
U.S. Equity	**2.57**	**19.76**	**8.46**	**14.17**	**14.93**	**6.92**
Rusell 3000 Index	3.02	18.51	9.10	14.58	15.34	7.26
Callan Large Public > $10bn U.S. Equity	2.98	19.48	8.98	14.56	15.21	7.24
Non-U.S. Equity	**6.46**	**21.07**	**2.54**	**9.10**	**8.35**	**2.75**
MSCI ACWI ex USA IMI**	5.85	20.43	1.14	7.58	6.94	1.52
Callan Large Public >$10bn Non-U.S. Equity	6.08	21.29	2.35	8.42	7.72	2.17
Total Real Estate	**1.79**	**6.94**	**9.93**	**11.36**	**12.27**	**4.95**
Total Real Estate ex REITs	1.97	12.06	12.37	12.94	12.93	5.23
NCREIF Property Index Qtr Lag	1.55	7.36	10.52	10.65	11.80	6.70
Callan Public Plan - Real Estate	1.70	6.74	9.90	10.66	11.84	4.38
Opportunity Portfolio	**2.52**	**6.18**	**1.89**	**8.18**	**8.85**	**6.20**
Russell 3000 Index	3.02	18.51	9.10	14.58	15.34	7.26
CPI + 5%	1.70	6.50	5.59	6.11	6.60	6.60
Total Alternative	**0.51**	**11.03**	**2.58**	**2.50**	**--**	**--**
CPI + 4%	1.46	5.69	4.95	5.36	--	--
Total Private Equity	**5.67**	**12.61**	**8.84**	**11.54**	**12.18**	**8.64**
OIC - Russell 3000 + 300 BPS Qtr Lag	6.51	21.56	13.02	16.54	16.25	11.18

*Policy Benchmark = 22.5% OPERF Total Custom FI Benchmark, 20.0% Russell 3000 Index, 20.0% MSCI ACWI ex US IMI, 20.0% Russell 3000 + 300 BPS Qtr Lag, 12.5% Oregon Custom Real Estate Benchmark and 5.0% CPI + 400 bps.
**Non-US Equity Benchmark performance through May 31, 2008, is MSCI ACWI ex US Gross and is linked thereafter with the MSCI ACWI ex-US IMI Net Index.

OPERF Total Regular Account

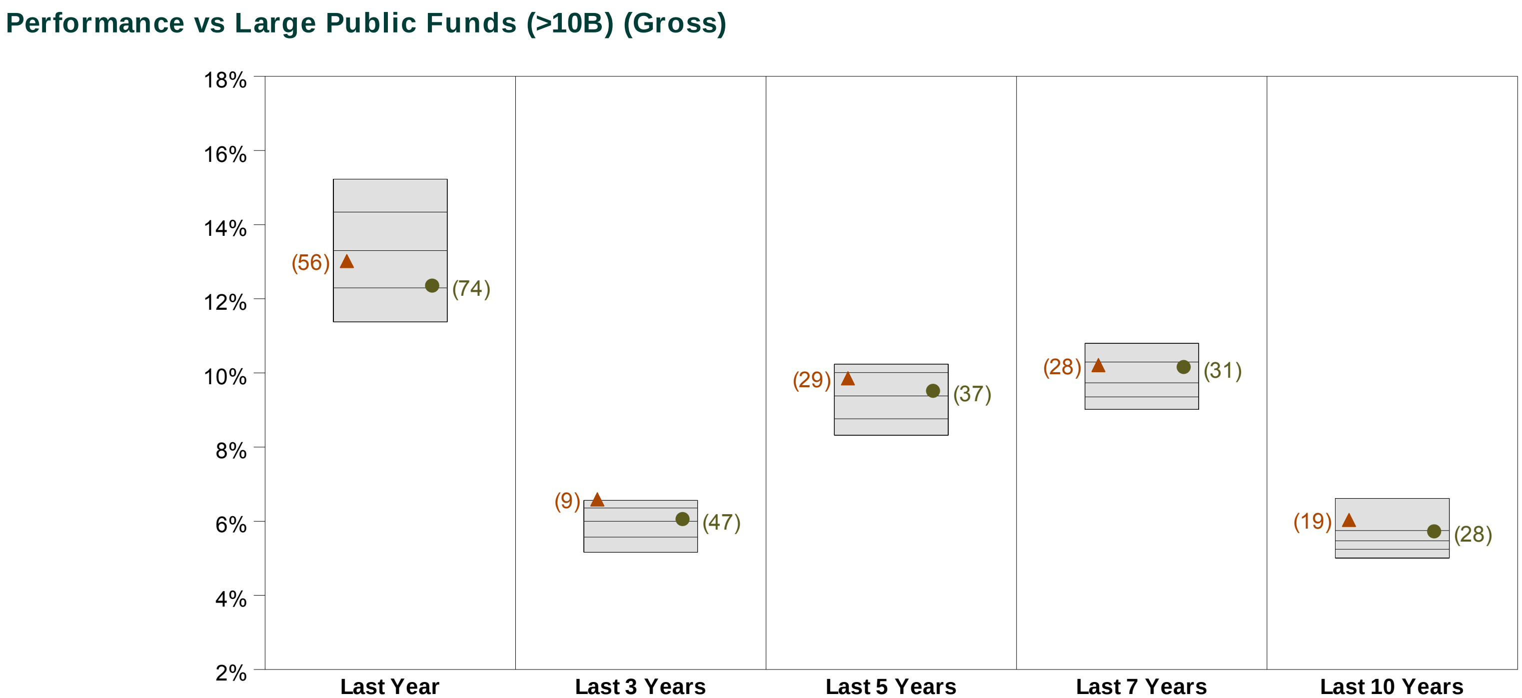
Net Calendar Year Performance by Asset Class as June 30, 2017

	2 Qtrs. 2017	2016	2015	2014	2013	2012
Total Regular Account	**7.25**	**6.84**	**2.11**	**7.29**	**15.59**	**14.29**
Total Regular Account ex-Overlay	7.22	6.73	2.02	7.28	15.57	14.15
OPERF Policy Benchmark*	7.97	8.95	1.57	8.24	15.61	16.57
Total Fixed Income	**2.57**	**3.06**	**0.54**	**3.52**	**1.04**	**10.33**
OPERF Total Custom FI Benchmark	2.18	2.52	0.16	3.04	0.29	8.60
Callan Public Fund $10bn+ U.S. Fixed	2.97	5.27	-0.50	6.31	-1.79	6.86
Total Public Equity	**11.02**	**9.89**	**-1.75**	**3.31**	**26.68**	**17.47**
MSCI ACWI IMI Net	11.32	8.36	-2.19	3.84	23.55	16.38
U.S. Equity	**7.41**	**14.90**	**-0.87**	**9.85**	**35.41**	**16.30**
Rusell 3000 Index	8.93	12.74	0.48	12.56	33.55	16.42
Callan Large Public > $10bn U.S. Equity	8.77	13.75	0.05	11.81	33.51	15.35
Non-U.S. Equity	**15.37**	**4.67**	**-2.59**	**-2.88**	**18.62**	**18.92**
MSCI ACWI ex USA IMI**	14.30	4.41	-4.60	-3.89	15.82	17.04
Callan Large Public >$10bn Non-U.S. Equity	15.38	4.71	-3.57	-2.82	16.91	17.59
Total Real Estate	**6.34**	**6.58**	**9.89**	**14.16**	**12.83**	**13.64**
Total Real Estate ex REITs	7.58	10.01	12.67	12.01	15.79	10.76
NCREIF Property Index Qtr Lag	3.46	8.88	13.48	11.26	11.00	11.00
Callan Public Plan - Real Estate	3.54	8.24	11.03	13.46	11.35	11.95
Opportunity Portfolio	**4.25**	**2.65**	**2.14**	**8.81**	**15.00**	**18.44**
Russell 3000 Index	8.93	12.74	0.48	12.56	33.55	16.42
CPI + 5%	3.89	6.99	5.39	5.33	6.46	6.68
Total Alternative	**3.38**	**6.61**	**-4.32**	**4.44**	**6.02**	**-0.84**
CPI + 4%	3.46	6.16	4.76	4.78	5.56	5.80
Total Private Equity	**7.06**	**6.26**	**7.79**	**15.90**	**16.19**	**14.41**
OIC - Russell 3000 + 300 BPS Qtr Lag	11.81	18.37	2.49	21.24	25.19	34.02

*Policy Benchmark = 22.5% OPERF Total Custom FI Benchmark, 20.0% Russell 3000 Index, 20.0% MSCI ACWI ex US IMI, 20.0% Russell 3000 + 300 BPS Qtr Lag, 12.5% Oregon Custom Real Estate Benchmark and 5.0% CPI + 400 bps.

OPERF Total Regular Account

Gross Performance and Peer Group Rankings as of June 30, 2017*



	Last Year	Last 3 Years	Last 5 Years	Last 7 Years	Last 10 Years
10th Percentile	15.22	6.56	10.24	10.80	6.61
25th Percentile	14.34	6.36	10.01	10.29	5.75
Median	13.30	6.00	9.38	9.73	5.48
75th Percentile	12.29	5.57	8.76	9.35	5.24
90th Percentile	11.38	5.16	8.32	9.02	5.01
Total Regular Account ●	12.31	6.02	9.48	10.12	5.69
Total Policy Target ▲	13.02	6.59	9.85	10.21	6.04

*Versus Callan's Very Large Public Funds (> $10 billion) Peer Group

Appendix

Global Economic Update

The Big Picture

- Populism loses some momentum outside the US with the Netherlands and France declaring centrist victories.
- Tension remain high with North Korea and escalate with Russia.
- Growth in the U.S. continues to be positive but low.
  - Real U.S. GDP accelerates to 2.6% in the second quarter, up from the (revised) 1.4% reported in Q1.
    - *Diminished hopes for near-term fiscal stimulus temper projected growth expectations for the US.*
  - Outside the U.S., Eurozone GDP revised upwards to 2.3% from 1.7%.
  - In China, annual growth exceeded expectations with a 6.9% annual growth pace in the first quarter.
- Globally, will rate policies start to converge?
  - Despite mixed economic data and low inflation, the Fed raised rates in June by 25 bps. The target rate now stands at 1.0% - 1.25%. The Fed also announced plans to reduce it's balance sheet.
  - Outside the U.S., the ECB kept rates unchanged though rates rose in anticipation of an ECB rate hike over the next twelve months and speculation that the tapering of ECB asset purchases may be on the horizon.
- Unemployment picture continues to improve
  - In the U.S., unemployment fell to a 15-year low of 4.3%.
  - Eurozone unemployment dropped to 9.3%, the lowest since 2009.
- Inflation data pulled back during the quarter to 1.4%, the lowest level in six months, and remains below the Fed's 2% target.
- The U.S. Dollar has sold off dramatically since the "Trump-induced" peak in January.
- Crude oil prices fall as supply increases and a mild winter favors the consumer.

“Risk On” Theme Continues Unabated

What’s Driving the Rally

	Last Quarter	Last Year	5 Years	10 Years	25 Years
U.S. Equity					
Russell 3000	3.02	18.51	14.58	7.26	9.69
S&P 500	3.09	17.90	14.63	7.18	9.57
Russell 2000	2.46	24.60	13.70	6.92	9.89
Non-U.S. Equity					
MSCI World ex USA	5.63	19.49	8.15	1.00	6.05
MSCI Emerging Markets	6.27	23.75	3.96	1.92	--
MSCI ACWI ex USA Small Cap	6.24	20.32	10.02	2.91	--
Fixed Income					
Bloomberg Barclays Aggregate	1.45	-0.31	2.21	4.48	5.62
3-Month T-Bill	0.20	0.49	0.17	0.58	2.64
Bloomberg Barclays Long Gov/Credit	4.39	-1.07	4.26	7.58	7.78
Bloomberg Barclays Global Agg ex-US	3.55	-3.80	-0.36	3.05	4.79
Real Estate					
NCREIF Property	1.75	6.97	10.49	6.42	8.82
FTSE NAREIT Equity	1.52	-1.70	9.52	6.00	11.11
Alternatives					
CS Hedge Fund	0.76	5.84	4.47	3.18	--
Cambridge Private Equity*	--	--	--	--	--
Bloomberg Commodity	-3.00	-6.50	-9.25	-6.49	2.02
Gold Spot Price	-0.71	-5.93	-4.98	6.68	5.27
Inflation - CPI-U	0.47	1.63	1.31	1.63	2.25

- Despite signs that pro-growth policies have stalled in the US, the markets continue to climb higher.
- Amid a volatile macro backdrop, S&P 500 companies reported the strongest quarterly earnings in 6 years and propelled the market to an all-time high.
  - 70% of companies reported earnings above expectations.
- Large Cap stocks did best, while value stocks, energy and telecom trailed.
- Outside the U.S., improving economic conditions and centrist election results drove a rally in developed and emerging markets.
  - Non-US small cap stocks benefitted from the boost in local economic growth.
- Intermediate and long U.S. Treasury yields fell modestly in the second quarter as inflation was unexpectedly weak and economic data releases were mixed.
- Commodities registered negative returns in the second quarter, hurt mostly by falling oil prices due to concerns over stockpiles in the U.S.
- Gold was down 1% for the quarter.

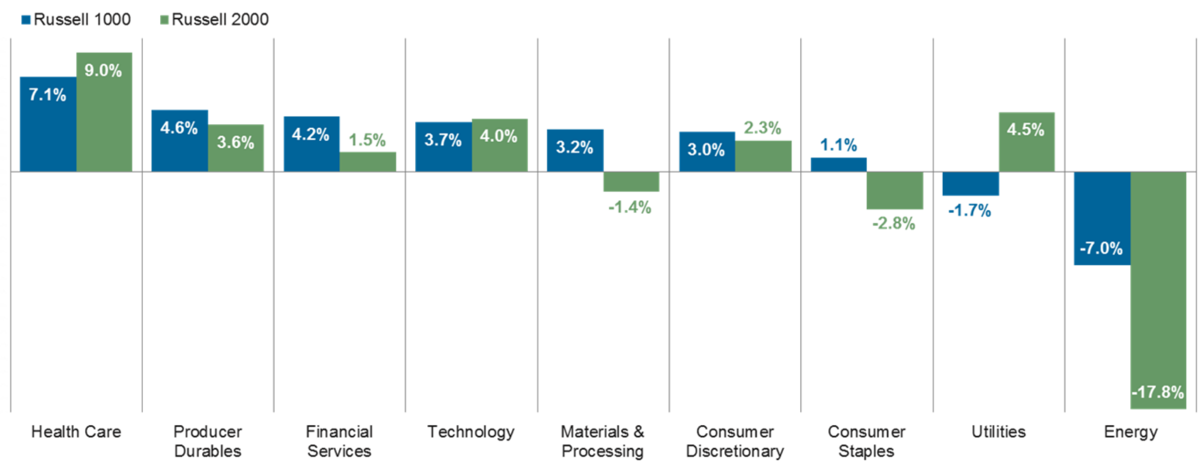
U.S. Equity Market

For Periods Ended June 30, 2017

- S&P 500 companies reported the strongest earnings growth rate in six years.
  - 70% of the companies reported earnings above expectations.
- Growth stocks continued to outperformed value across the capitalization spectrum.
- Top sectors included Health Care (+7.1%), which rallied on the Trump administration's prospect of change; Industrials (+4.6%), Financials (+4.2%), and Tech (+3.7%).
  - Energy (-7.0%) was the worst performing sector.
- From a factor perspective, Momentum (+7.9%) was the top performing factor as investors sought stocks with demonstrated earnings growth.
- Quality stocks appear to be notably expensive after valuations have increased again after a slight pull back in the second half of 2016.

Large Cap Equity	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 15 Years
Large Cap Growth Style	5.25	20.68	10.45	14.91	8.92	9.10
Large Cap Value Style	1.85	17.82	7.59	14.06	6.19	8.76
Mid Cap Equity						
Mid Cap Growth Style	5.08	17.85	7.56	13.32	8.05	10.22
Mid Cap Value Style	1.33	17.21	7.35	14.64	7.86	10.96
Small Cap Equity						
Small Cap Growth Style	5.09	24.06	7.53	14.02	8.21	10.28
Small Cap Value Style	0.62	24.03	8.07	15.17	8.00	10.78

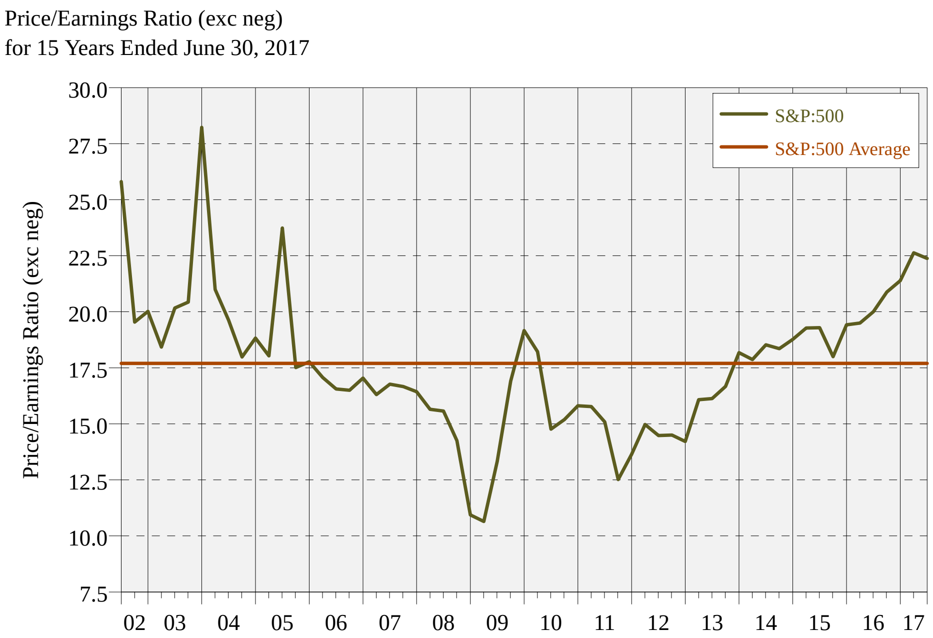
Economic Sector Quarter Performance (as of June 30, 2017)

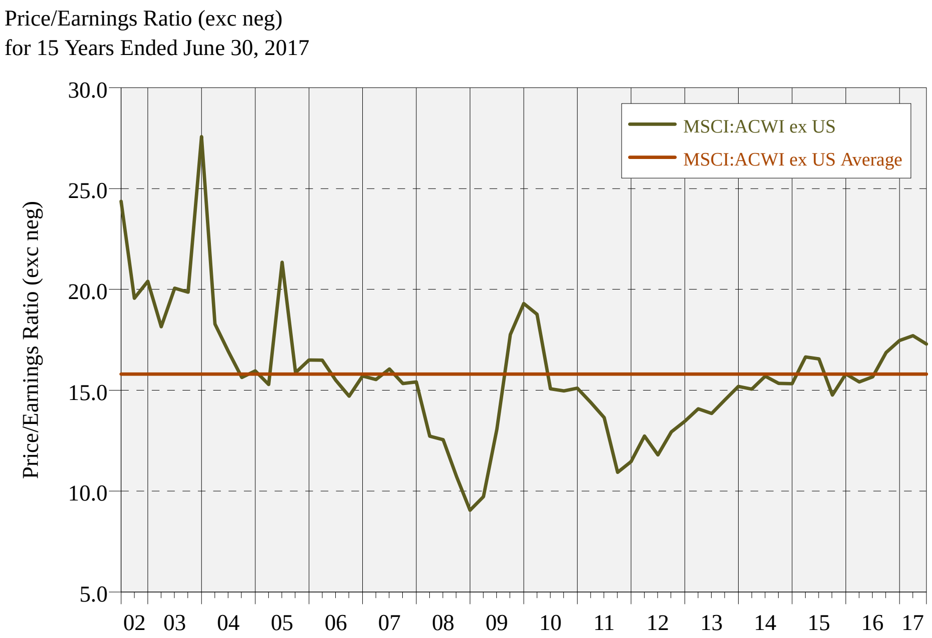


Source: Callan, Russell Investment Group

Equity Valuations

Valuations





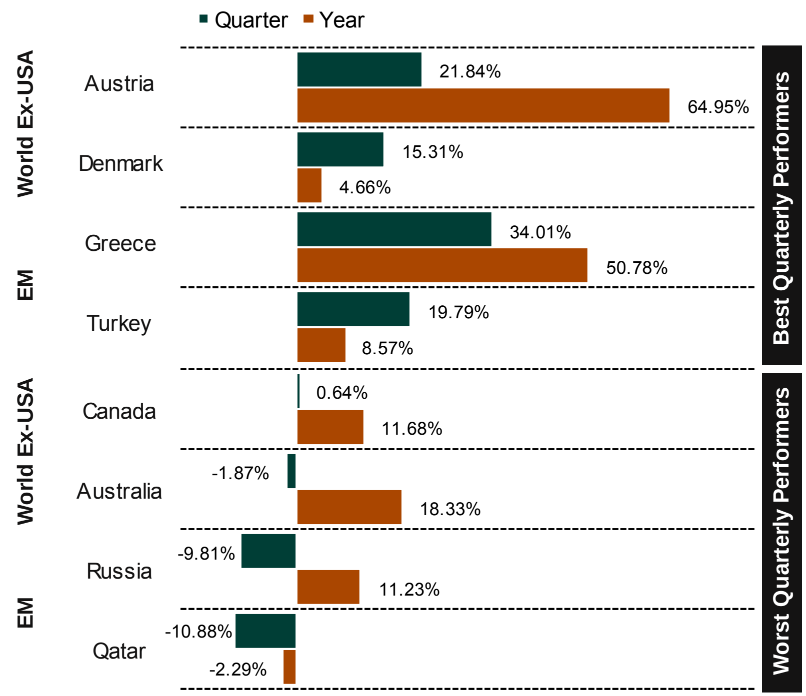
- U.S. Equity valuations are slightly higher relative to the 15-year average.
- Current valuations are well below the tech-bubble era and have recuperated steadily after the global financial crisis.
- U.S. equity valuations are higher relative to international equity.

Non-U.S. Equity Market

For Periods Ended June 30, 2017

- Non-U.S. developed equities outperformed the U.S., fueled by economic recovery in Europe and market-friendly outcomes in European elections.
- A weaker U.S. Dollar bolstered results.
- Among developed markets, only Australia lost ground (-1.9%).
- Emerging markets outperformed developed markets for the second consecutive quarter propelled by Tech companies in China, South Korea, and Taiwan.

Quarterly and Annual Country Performance Snapshot



Non-U.S. Equity	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 15 Years
MSCI ACWI ex USA	5.78	20.45	0.80	7.22	1.13	6.90
MSCI ACWI ex USA Growth	7.56	17.38	2.55	8.04	1.90	6.79
MSCI ACWI ex USA Value	4.08	23.62	-1.00	6.35	0.31	6.95
MSCI EAFE	6.12	20.27	1.15	8.69	1.03	6.31
MSCI EAFE (local)	2.71	22.10	7.02	12.54	2.01	5.47
Regional Equity						
MSCI Europe	7.37	21.11	-0.24	8.82	0.62	6.32
MSCI Europe (local)	1.79	20.22	6.59	11.57	2.65	5.73
MSCI Japan	5.19	19.18	5.54	9.56	1.21	4.80
MSCI Japan (local)	6.07	30.53	9.24	17.32	0.26	4.35
MSCI Pacific ex Japan	1.54	19.43	1.25	6.72	3.58	10.28
MSCI Pacific ex Japan (loc)	1.14	17.71	6.14	10.85	4.01	8.39
Emerging/Frontier Markets	**Last Quarter**	**Last Year**	**Last 3 Years**	**Last 5 Years**	**Last 10 Years**	**Last 15 Years**
MSCI Emerging Markets	6.27	23.75	1.07	3.96	1.92	10.60
MSCI Emerging Markets (loc)	6.56	21.77	6.09	7.58	4.33	10.94
MSCI Frontier Markets	6.13	19.22	-3.38	8.60	-1.48	8.21
Non-U.S. Small Cap Equity						
MSCI EAFE Small Cap	8.10	23.18	5.60	12.94	3.41	9.95
MSCI Em Mkts Small Cap	2.63	17.03	0.81	5.15	2.17	11.76

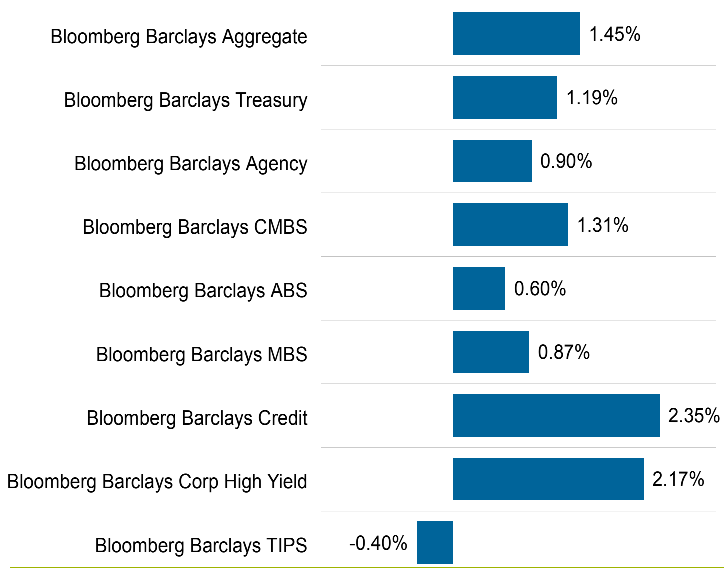
Sources: Callan, MSCI

U.S. Fixed Income Market

For Periods Ended June 30, 2017

- The yield curve flattened as the Fed raised short-term rates and Intermediate and Long U.S. Treasury yields fell modestly.
- Risky assets continued to perform well as investors continue to seek yield. Market fundamentals appear to remain intact with strong corporate balances sheets and low default expectations.
- Corporate bonds performed the best within the Bloomberg Aggregate due to strong demand.
- TIPS underperformed as inflation was unexpectedly weak in the second quarter.

Fixed Income Quarterly Returns Absolute Return



Broad Fixed Income	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 15 Years
Core Bond Style	1.54	0.37	2.90	2.70	5.04	4.97
Core Bond Plus Style	1.79	2.29	2.98	3.48	5.55	5.76
BB Barclays Aggregate	1.45	-0.31	2.48	2.21	4.48	4.48
BB Barclays Gov/Credit	1.69	-0.41	2.62	2.29	4.57	4.61
BB Barclays Government	1.17	-2.18	1.99	1.30	3.93	3.99
BB Barclays Credit	2.35	1.84	3.40	3.68	5.61	5.58
Blmbg:Corporate High Yld	2.17	12.70	4.48	6.89	7.67	9.06
Long-Term						
BB Barclays Long Gov/Credit	4.39	-1.07	5.28	4.26	7.58	7.23
BB Barclays Long Government	3.93	-6.96	5.54	2.82	7.27	6.85
BB Barclays Long Credit	4.70	2.98	5.28	5.33	7.62	7.50
Citi Pension Discount Curve	5.88	-1.13	7.23	5.48	9.77	9.23
Intermediate-Term						
BB Barclays Interm Aggregate	0.92	-0.16	2.01	1.87	4.04	4.07
BB Barclays Interm Gov/Credit	0.94	-0.21	1.92	1.77	3.87	3.96
Short-Term						
Money Market Funds (net)	0.13	0.28	0.11	0.07	0.50	1.12
ML Treasury 1-3 Year	0.17	-0.11	0.69	0.63	1.95	2.22
90-Day Treasury Bills	0.20	0.49	0.23	0.17	0.58	1.30

Source: Callan, Bloomberg

TAB 11 – Asset Allocation & NAV Updates

Asset Allocations at July 31, 2017

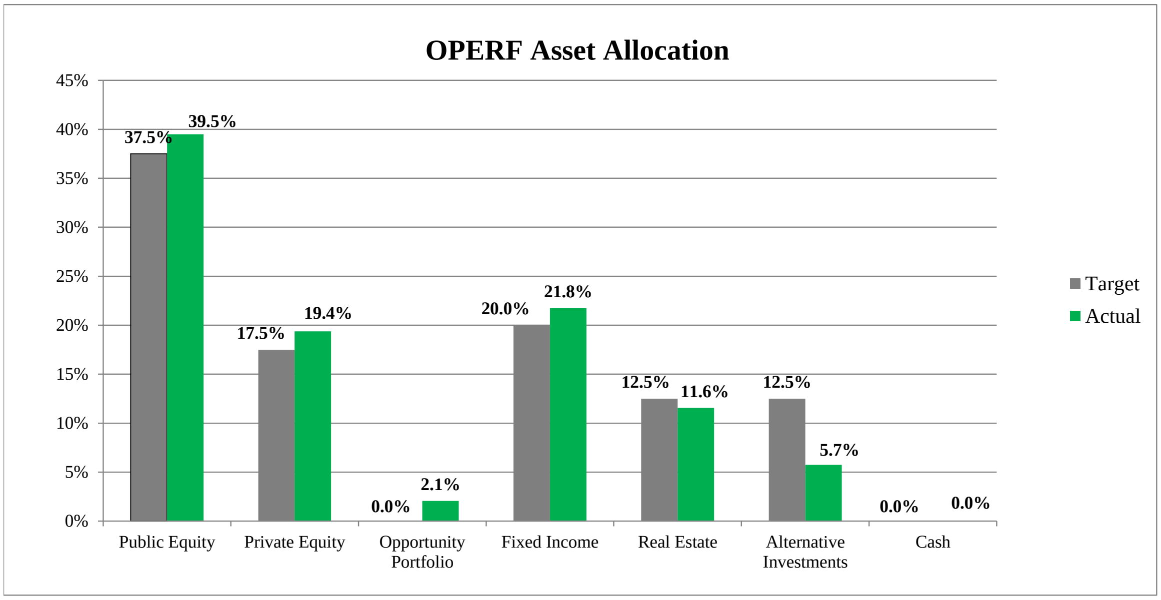
OPERF	Policy	Target[1]	Regular Account $ Thousands	Pre-Overlay	Overlay	Net Position	Actual	Variable Fund $ Thousands	Total Fund $ Thousands
Public Equity	32.5-42.5%	37.5%	29,823,818	40.2%	(529,504)	29,294,314	39.5%	600,168	29,894,481
Private Equity	13.5-21.5%	17.5%	14,366,124	19.4%		14,366,124	19.4%		14,366,124
Total Equity	**50.0-60.0%**	**55.0%**	**44,189,942**	**59.6%**	**(529,504)**	**43,660,438**	**58.9%**		**44,260,606**
Opportunity Portfolio	0-3%	0.0%	1,528,044	2.1%		1,528,044	2.1%		1,528,044
Fixed Income	**15-25%**	**20.0%**	**14,097,597**	**19.0%**	**2,045,967**	**16,143,565**	21.8%		**16,143,565**
Real Estate	**9.5-15.5%**	**12.5%**	**8,593,607**	**11.6%**	**(15,000)**	**8,578,607**	11.6%		**8,578,607**
Alternative Investments	**0-12.5%**	**12.5%**	**4,256,645**	**5.7%**		**4,256,645**	5.7%		**4,256,645**
Cash[2]	**0-3%**	**0.0%**	**1,508,979**	**2.0%**	**(1,501,463)**	**7,516**	0.0%	2,416	**9,932**
TOTAL OPERF		**100%**	**$ 74,174,814**	**100.0%**	**$ -**	**$ 74,174,814**	**100.0%**	**$ 602,584**	**$ 74,777,398**

[1]Targets established in June 2015. Interim policy benchmark consists of: 40% MSCI ACWI IMI Net, 22.5% Custom FI Benchmark, 20% Russell 3000+300bps (1 quarter lagged), 12.5% NCREIF ODCE net (1 quarter lagged), & 5% CPI+400bps.

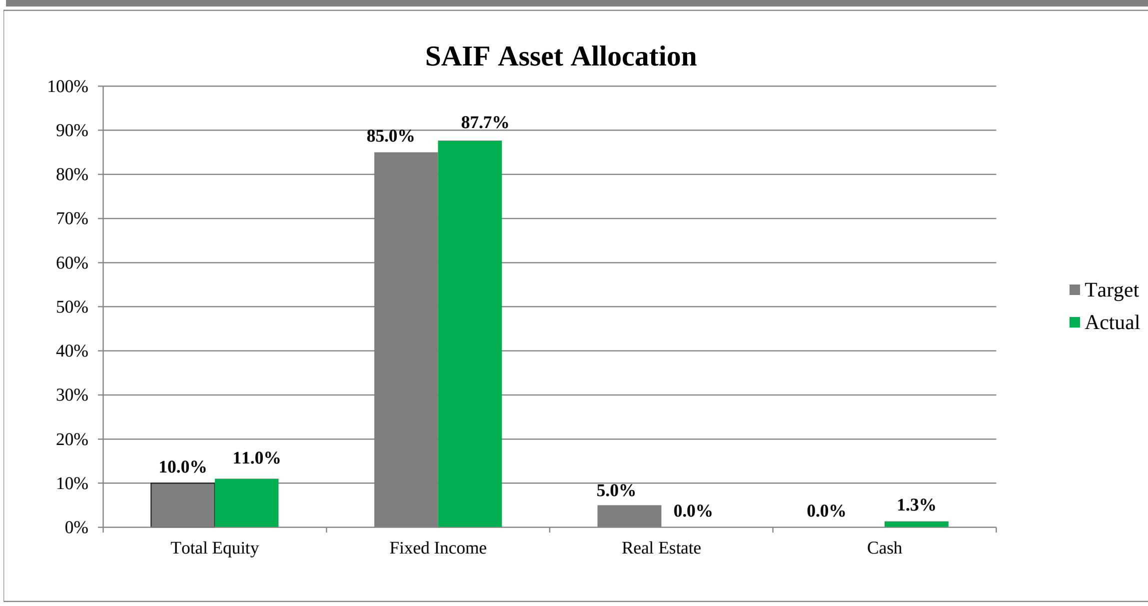
[2]Includes cash held in the policy implementation overlay program.

SAIF	Policy	Target	$ Thousands	Actual
Total Equity	**7-13%**	**10.0%**	**543,138**	**11.0%**
Fixed Income	**80-90%**	**85.0%**	**4,324,482**	**87.7%**
Real Estate	**0-7%**	**5.0%**	**0**	**0.0%**
Cash	**0-3%**	**0%**	**65,802**	**1.3%**
TOTAL SAIF			**$ 4,933,423**	**100.0%**

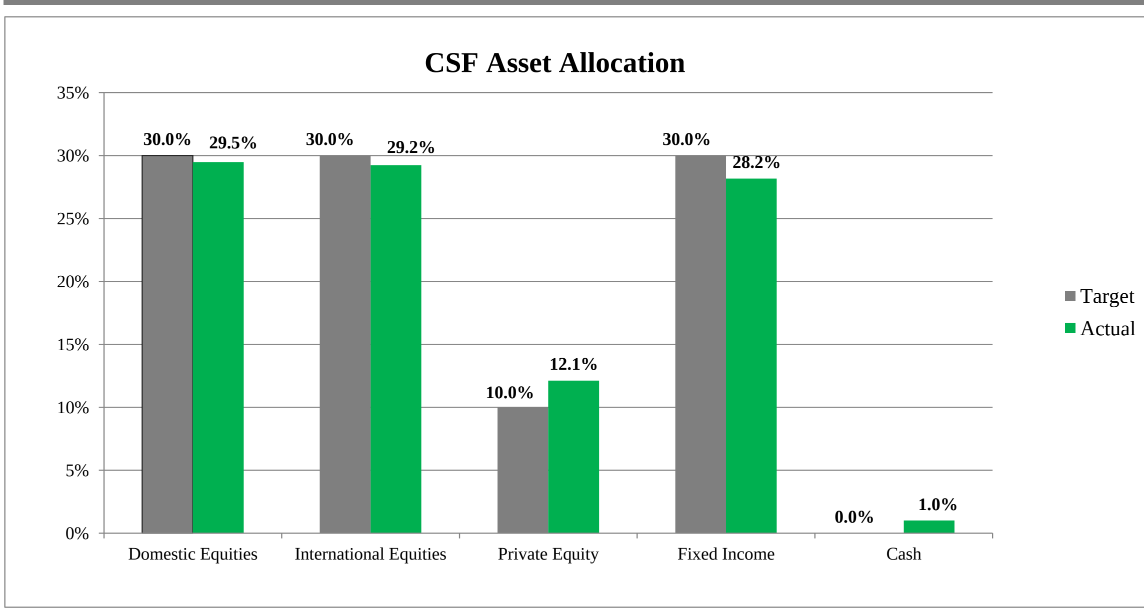
CSF	Policy	Target	$ Thousands	Actual
Domestic Equities	25-35%	30%	464,371	29.5%
International Equities	25-35%	30%	460,403	29.2%
Private Equity	0-12%	10%	190,953	12.1%
Total Equity	**65-75%**	**70%**	**1,115,728**	**70.8%**
Fixed Income	**25-35%**	**30%**	**443,545**	**28.2%**
Cash	**0-3%**	**0%**	**15,869**	**1.0%**
TOTAL CSF			**$ 1,575,142**	**100.0%**



OPERF Asset Allocation
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
37.5%
39.5%
17.5%
19.4%
0.0%
2.1%
20.0%
21.8%
12.5%
11.6%
12.5%
5.7%
0.0%
0.0%
Public Equity
Private Equity
Opportunity Portfolio
Fixed Income
Real Estate
Alternative Investments
Cash
Target
Actual



SAIF Asset Allocation
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
10.0%
11.0%
85.0%
87.7%
5.0%
0.0%
0.0%
1.3%
Total Equity
Fixed Income
Real Estate
Cash
Target
Actual



CSF Asset Allocation
35%
30%
25%
20%
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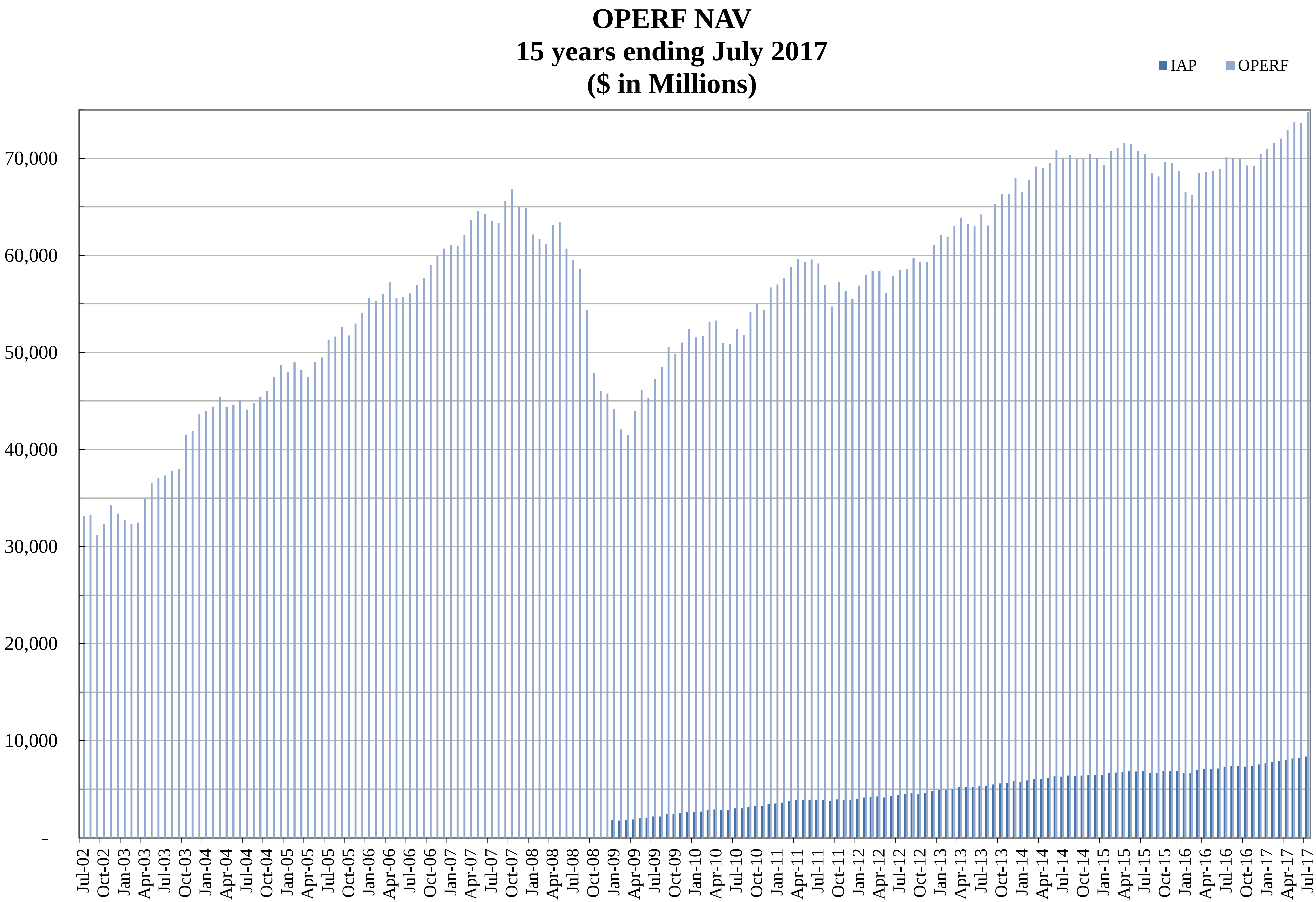
10%
5%
0%
30.0%
29.5%
30.0%
29.2%
10.0%
12.1%
30.0%
28.2%
0.0%
1.0%
Domestic Equities
International Equities
Private Equity
Fixed Income
Cash
Target
Actual


OPERF NAV
15 years ending July 2017
($ in Millions)
IAP
OPERF
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Jul-02
Oct-02
Jan-03
Apr-03
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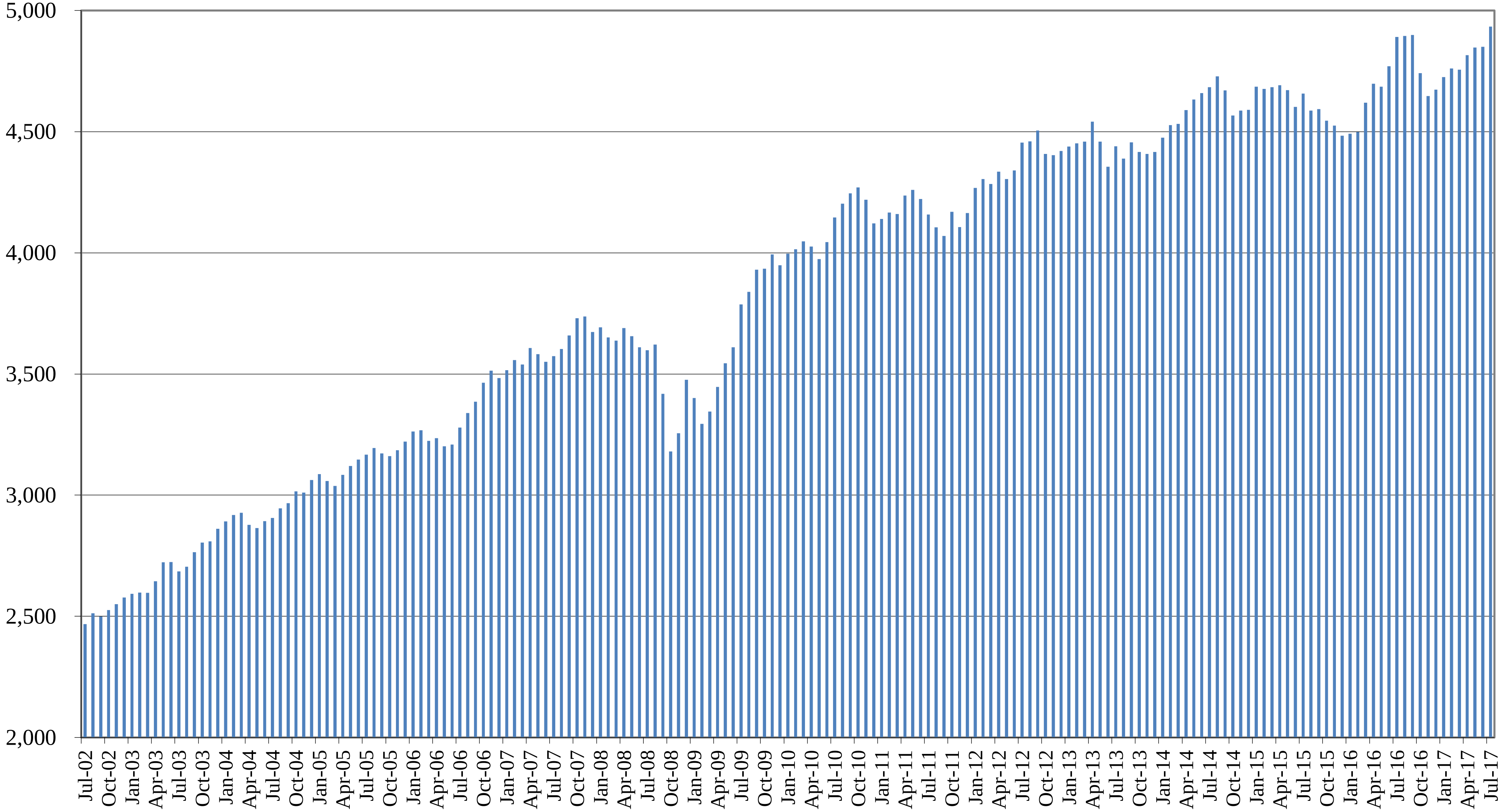
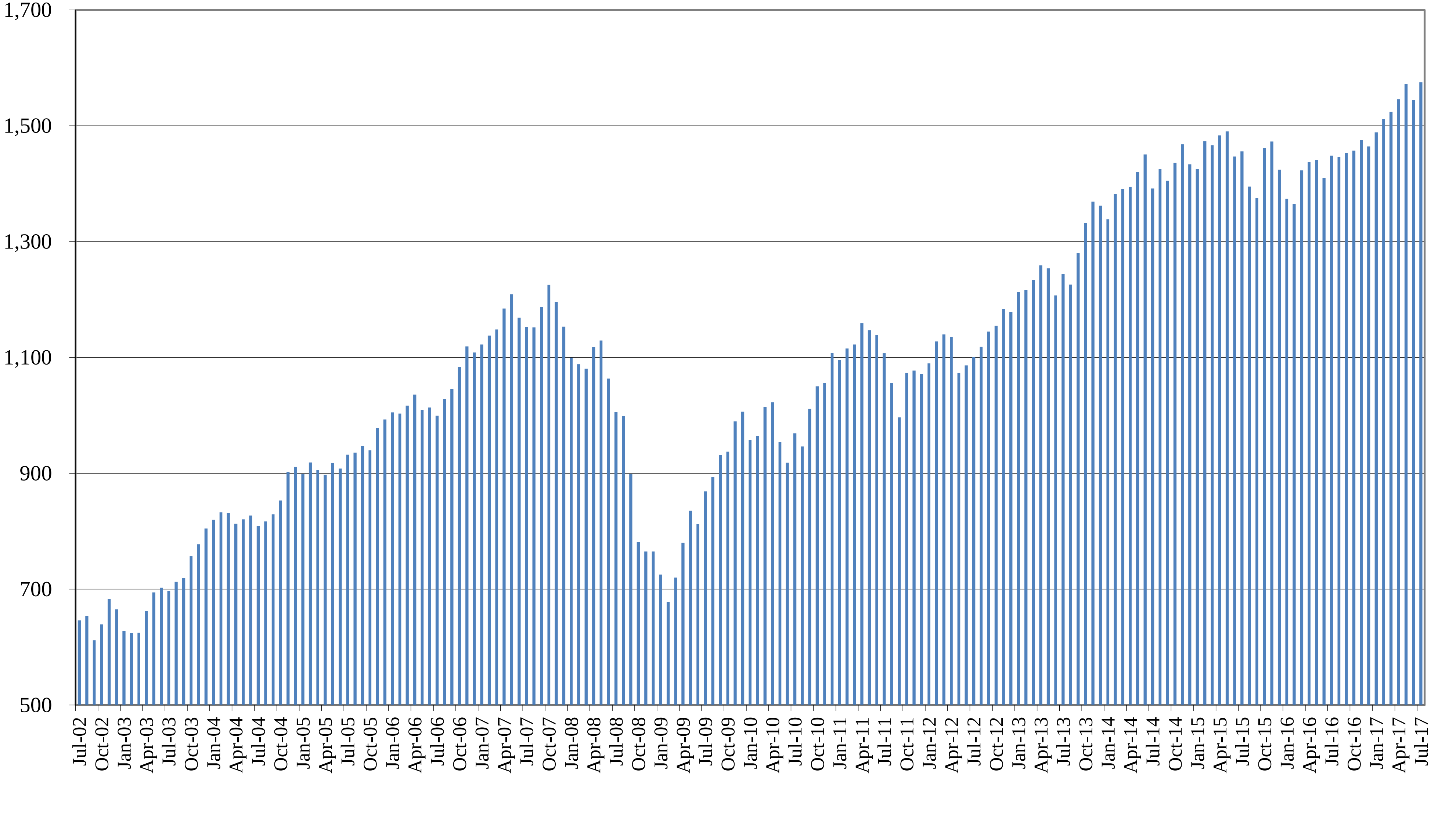
Apr-17
Jul-17

SAIF NAV
15 years ending July 2017
($ in Millions)



CSF NAV
15 years ending July 2017
($ in Millions)



TAB 11 – Calendar — Future Agenda Items

2017/18 OIC Forward Calendar and Planned Agenda Topics

November 1, 2017:	Alternatives Portfolio Manager Recommendation OPERF Currency Manager Recommendation Public Equity Program Review OIC Strategic Issues Discussion
December 13, 2017:	OIC Officer Election Alternatives Portfolio Manager Recommendation Q3 OPERF Performance & Risk Report OSTF Review OITP Review Fixed Income Program Review
February 1, 2018:	Private Equity Program Review Placement Agent Report 2019 OIC Calendar Approval Guest Speaker Presentation
March 14, 2018:	OPERF Overlay Review Securities Lending Update Real Estate Program Review Q4 2017 OPERF Performance & Risk Report
April 25, 2018:	OPERF Asset Allocation & Capital Market Assumptions Update Alternatives Portfolio Review OIC Policy Updates SAIF Annual Review
June 6, 2018	Opportunity Portfolio Review Q1 OPERF Performance & Risk Report Operations Update CSF Annual Review
August 8, 2018:	Corporate Governance Update OIC Policy Updates
September 19, 2018:	Q2 OPERF Performance & Risk Report CEM Benchmarking Report