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Oregon Investment Council

December 11, 2019

Rukaiyah Adams
Chair

John Skjervem
Chief Investment Officer

Tobias Read
State Treasurer

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OREGON INVESTMENT COUNCIL

Agenda

December 11, 2019
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** October 30, 2019	**Rukaiyah Adams** *OIC Chair*	**1**
9:02-9:05	**2. Committee Reports and CIO Remarks**	**John Skjervem** *Chief Investment Officer*	**2**
9:05-9:55	**3. Private Equity Monitoring & Liquidity Solutions** *OPERF Private Equity Portfolio*	**Michael Langdon** *Senior Investment Officer, Private Equity* **Tom Martin** *Managing Director, TorreyCove Capital Partners* **Karen J. Jakobi** *Senior Managing Director & CIO, Pathway Capital Management* **Derrek I. Ransford** *Managing Director, Pathway Capital Management* **Pete Veravanich** *Managing Director, Pathway Capital Management*	**3**
9:55-10:00	**4. Private Equity Consulting Contract Extension** *OPERF Private Equity Portfolio*	**Michael Langdon**	**4**

10:00-10:55	**5.**	**Risk Parity Manager Recommendations** *OPERF Risk Parity Portfolio*	**Michael Viteri** *Senior Investment Officer, Public Equity* **Geoff Nolan** *Senior Investment Officer, Fixed Income* **Karl Cheng** *Senior Investment Officer, Portfolio Risk & Research* **Jim Callahan** *President, Callan LLC* **Edward Qian** *CIO & Head of Research, Multi Asset, PanAgora Asset Management, Inc.* **Bryan Belton** *Director, Multi Asset, PanAgora Asset Management, Inc.* **Russell Korgaonkar** *Director of Investment Strategies, AHL Partners LLP*	**5**
10:55-11:05		**-------------------- BREAK --------------------**		
11:05-12:00	**6.**	**Fixed Income Review** *OPERF and other OST-managed funds*	**Geoff Nolan** **Tom Lofton** *Investment Officer, Fixed Income* **Garrett Cudahey** *Investment Officer, Fixed Income* **Janet Becker-Wold** *Senior Vice President, Callan LLC*	**6**

B. Information Items

12:05-12:20	**7.**	**Q3 2019 Performance & Risk Report** *OPERF*	**Karl Cheng** **Janet Becker-Wold**	**7**
12:20-12:25	**8.**	**Asset Allocations & NAV Updates** a. Oregon Public Employees Retirement Fund b. SAIF Corporation c. Common School Fund d. Southern Oregon University Endowment Fund	**John Skjervem**	**8**
	9.	**Calendar — Future Agenda Items**	**John Skjervem**	**9**

12:25 **10. Open Discussion** **Council Members**
Staff
Consultants

C. Public Comment Invited
10 Minutes

TAB 1 – REVIEW & APPROVAL OF MINUTES

October 30, 2019 Regular Meeting

State of Oregon
Office of the State Treasurer
16290 SW Upper Boones Ferry Road
Tigard, Oregon 97224
OREGON INVESTMENT COUNCIL
October 30, 2019
Meeting Minutes

Members Present:	Rukaiyah Adams, John Russell, Tobias Read, Rex Kim, Patricia Moss (via phone) and Kevin Olineck
Staff Present:	John Skjervem, Michael Kaplan, David Randall, John Hershey, Deena Bothello, Karl Cheng, David Elott, May Fanning, Roy Jackson, Andy Coutu, Wil Hiles, Tony Breault, Jen Plett, Ben Mahon, Jo Recht, Faith Sedberry, Sam Spencer, Paul Koch, Kristi Jenkins, Ahman Dirks, Tom Lofton, Lisa Pettinati, Mark Selfridge, Joe Hutchinson, Amanda Kingsbury, Michael Mueller, Aliese Jacobsen, Angela Schaffers, Dana Millican, Jen Peet, Eric Messer, Kristel Flores, Michael Viteri, Mohammed Quraishi, Anna Totdahl, Ricardo Lopez, Jeremy Knowles, Tiffany ZhuGe, Dmitri Palmateer, Amy Wojcicki, Rachel Wray, Meredith Coba, Robin Kaukonen, Sommer May, Andrey Voloshinov, Austin Carmichael, Chris Ebersole, and Scott Robertson
Consultants Present:	Tom Martin (TorreyCove); Allan Emkin, David Glickman and Brandon Ross (Meketa Investment Group, Inc.); Janet Becker-Wold and Uvan Tseng (Callan LLC)
Legal Counsel Present:	Steven Marlowe, Department of Justice

The October 30th, 2019 OIC meeting was called to order at 9:00 am by Rukaiyah Adams, OIC Chair.

I. 9:00 am Review and Approval of Minutes

MOTION: Chair Adams asked for approval of the September 18, 2019 OIC regular meeting minutes. Treasurer Read moved approval at 9:01 am, and Mr. Russell seconded the motion which then passed by a 5/0 vote.

II. 9:02 am Committee Reports and CIO Remarks

Committee Reports: John Skjervem, Chief Investment Officer, gave an update on the following recent committee actions:

Alternatives Portfolio Committee

August 14, 2019	Westbourne (Compartment C - co-invest)	$50M

Private Equity Committee

September 9, 2019	KPS Special Situations Fund V & Mid-Cap Fund	$150M

Real Estate Committee
None

Opportunity Portfolio Committee
None

Mr. Skjervem then provided opening remarks which included brief comments on the Annual Currency Overlay Review, Annual Public Equity Review, Annual Opportunity Portfolio Review and initial report on the division's ESG activities.

III. 9:05 am Currency Overlay Review and Manager Recommendations – *OPERF*

Jen Plett, Investment Officer, Portfolio Risk & Research, provided the Oregon Investment Council with a review of and update on the Oregon Public Employees Retirement Fund (OPERF) Currency Overlay Program, which was launched on January 2, 2018. Then, she presented Dr. Anoosh Lachin, Co-Portfolio Manager, Aspect Capital who provided the Council with a presentation on Aspect Capital's program structure, currency trading experience, and investment performance.

Ms. Plett then introduced Mr. Warren Naphtal, Co-Founder & Chief Investment Officer, P/E Global, and Mr. David Souza Jr., Co-Portfolio Manager, P/E Global who provided an introductory presentation on the Firm's functions, methods for managing currency risk, and overall investment strategy.

Staff and Callan recommend adding Aspect Capital Limited and P/E Global LLC to the OPERF Currency Overlay Program. Furthermore, Staff recommended allocating $2 billion notional exposure to each manager (an initial investment of $1 billion with another $1 billion exposure subsequently added at Staff discretion), subject to Oregon Investment Council approval and satisfactory legal negotiation of all related terms and conditions.

MOTION: Mr. Russell moved approval at 10:06 am to add Aspect Capital Limited and P/E Global LLC to the OPERF Currency Overlay Program and allocate $2 billion notional exposure to each manager. Mr. Kim seconded the motion which then passed by a 5/0 vote.

IV. 10:07 am Public Equity Review – *OPERF*

Michael Viteri, Senior Investment Officer, Public Equity, Robin Kaukonen, Investment Officer, Public Equity, Wil Hiles, Investment Officer, Public Equity and Janet Becker-Wold, Senior Vice President, Callan LLC delivered an annual review of the OPERF public equity portfolio. Their presentation included the following recommendations:

1. Fund a $500 million internally-managed Emerging Markets Risk Premia ESG strategy within the OPERF Public Equity Portfolio, a recommendation consistent with OIC INV 1201; and
2. Amend Policy INV 603 (Internal Equity – Portfolio Objectives & Strategies) accordingly.

MOTION: Treasurer Read moved approval at 10:54 am of both requests. Mr. Russell seconded the motion which then passed by a 4/1 vote. Member Kim cast the dissenting vote.

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11:07 am Opportunity Portfolio Review – *OPERF*

Mike Mueller, Investment Officer, Alternatives, provided the OPERF Opportunity Portfolio 2018/2019 Annual Review which included a portfolio overview and history, review of recent activity, and update on investment performance.

11:25 am ESG Update – *OPERF*

Anna Totdahl, Investment Officer, Portfolio Risk & Research, provided the Council with a presentation on the scope of ESG activities at Oregon State Treasury and progress to date by asset class. She also described staff's work on a physical property risk assessment as well as her future endeavors in this space.

V. 12:00 pm Asset Allocation & NAV Updates

Mr. Skjervem reviewed asset allocations and NAVs across OST-managed accounts for the period ended September 30, 2019.

VI. 12:00 pm Calendar – Future Agenda Items

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

VII. 12:01 pm Open Discussion

Chair Adams mentioned that Member Kim would like to further discuss the idea of a more flexible allocation for the Opportunity Portfolio, an idea staff agreed to research and report back on. Additionally, Mr. Olineck mentioned the continued work PERS is doing in preparation for SB 1049 which he said will result in a lot of changes for employers and members.

12:01 pm Public Comments

None

Ms. Adams adjourned the meeting at 12:01 pm.

Respectfully submitted,
May Fanning
May Fanning
Executive Support Specialist

TAB 2 – Committee Reports and CIO Remarks

December 11, 2019 **Oregon Investment Council**

Opening Remarks

John D. Skjervem, Chief Investment Officer

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Private Equity Monitoring and Liquidity Solutions

- The final piece of the puzzle
- Another innovative approach

Risk Parity Manager Recommendations

- First implementation step in new OPERF allocation
- True cross-discipline effort

Annual Fixed Income Review

- Most thorough, substantive review since introduction of rock band analogy
- Introducing explicit portfolio-level leverage
- New credit mandate/manager for SAIF

New Hires

- Will Hampson, Investment Officer, Fixed Income

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TAB 3 – Private Equity Monitoring & Liquidity Solutions

OPERF Private Equity Portfolio

December 2019

OPERF Private Equity

Monitoring & Liquidity Solutions

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OPERF PE Portfolio Repositioning

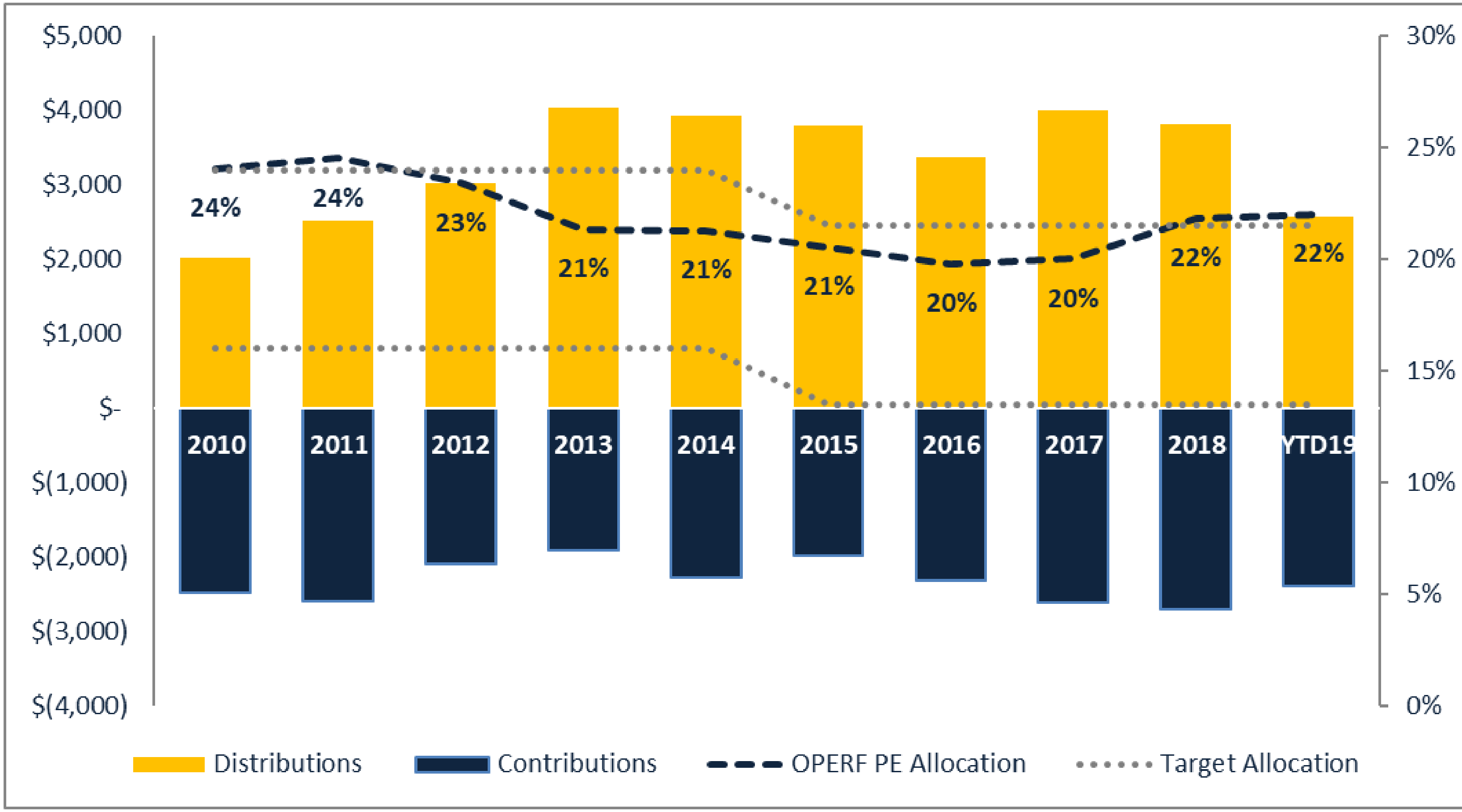
In the past four years, OPERF's private equity implementation has evolved to emphasize three primary objectives:

1. **REFOCUSED PRIMARY PROGRAM – In place**

2. **FEE MITIGATION – In place**

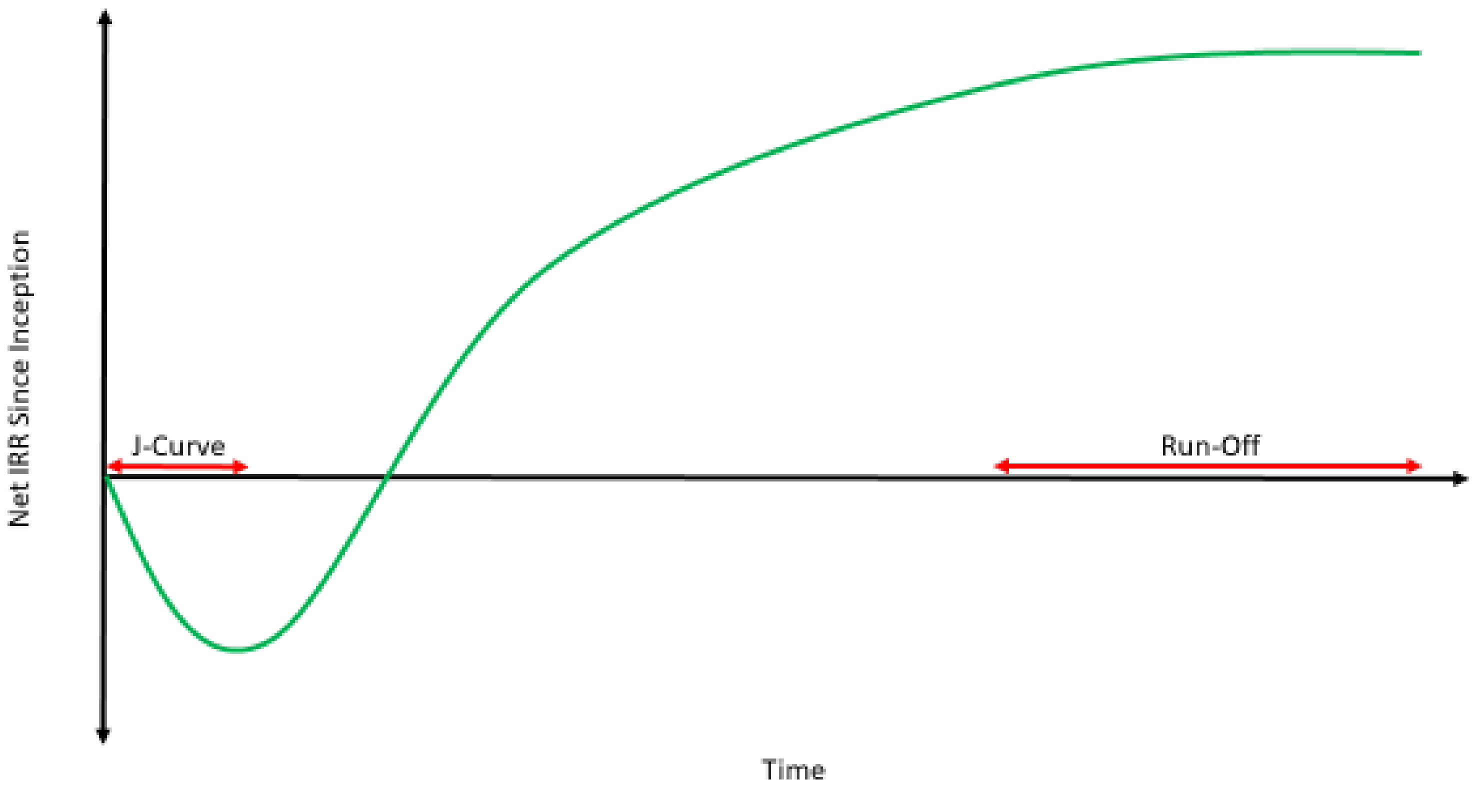
3. **SMOOTH PACING – In process**

OPERF PE Cash Flows & Allocation



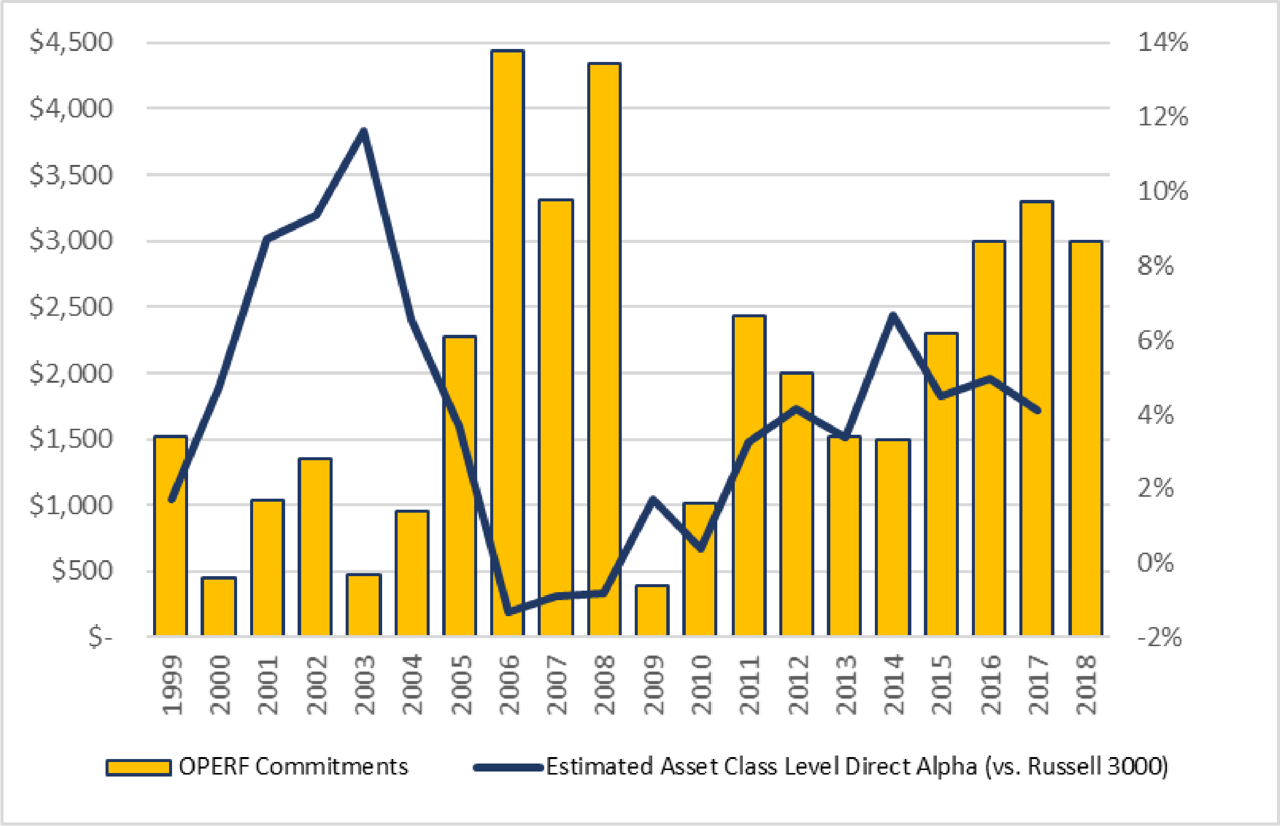
Source: OST, TorreyCove, State Street

PE Pacing Management



Source: OST

PE Pacing Management



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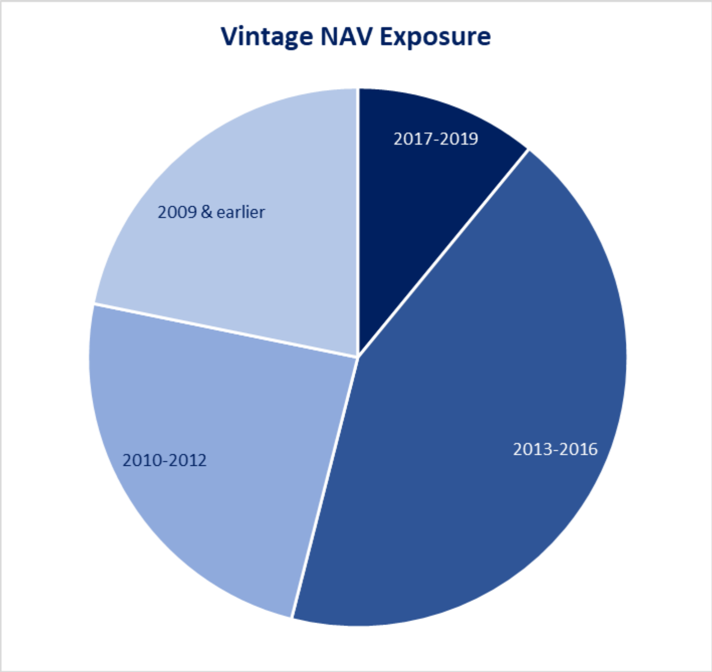
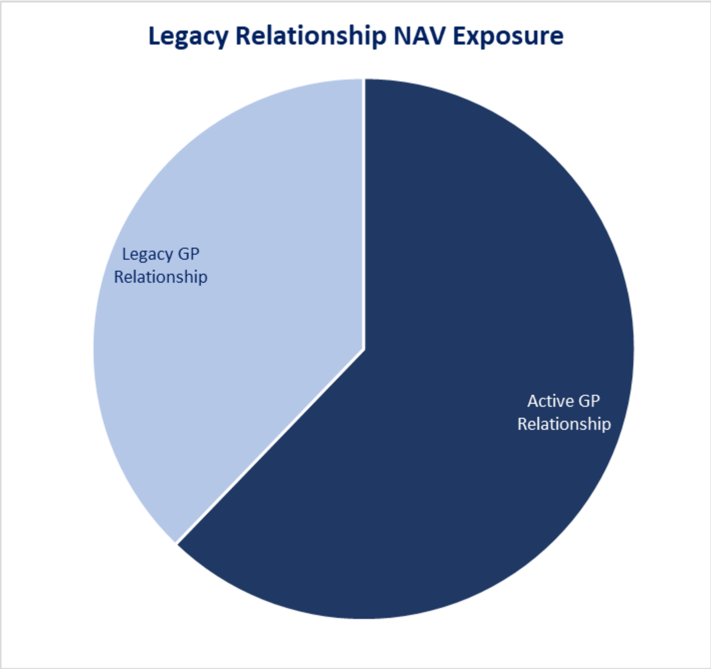
Source: OST, TorreyCove. Burgiss

Legacy Private Equity Portfolio





Vintage Cohort	IRR 1 Year	IRR 3 Year	IRR 5 Year	IRR 7 Year	IRR 10 Year	DPI	TVPI	IRR ITD
All Vintages	13.0%	15.3%	10.6%	13.4%	14.4%	1.22x	1.68x	15.4%
1981 - 2009	5.5%	10.6%	6.0%	11.8%	14.0%	1.60x	1.75x	15.4%
2010 - 2019	15.7%	18.1%	15.5%	16.1%	15.6%	0.45x	1.53x	15.6%

Source: OST, TorreyCove

Monitoring & Liquidity Management Solutions

In collaboration with TorreyCove and Pathway, OST Staff has developed a new program that will provide important new capabilities in support of OPERF's revised PE implementation plan:

- **Enhanced monitoring of legacy investments**
- **Opportunistic accelerated liquidity as a portfolio & pacing management tool**

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Oregon State Treasurer

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Pathway Private Equity Monitoring & Liquidity Management Solutions

Purpose

Subject to the satisfactory negotiation of all terms and conditions with Staff working in concert with legal counsel, Staff will establish a new monitoring and liquidity management program (the "Program") with Pathway Capital Management ("Pathway" or the "Firm") for the OPERF private equity portfolio. The Program will consist of an initial portfolio of existing OPERF private equity investments with a value of up to $2 billion selected by Staff in close collaboration with Pathway and TorreyCove. Staff recommends approval to recycle half of any accelerated liquidity proceeds generated by the Program for an initial period of five years and up to a maximum of $1 billion into new commitments to OPERF's co-investment program (Pathway Private Equity Fund C-III, L.P., the "Co-Invest Vehicle"). Approval of this proposal would represent the continuation and extension of the OIC's existing relationship with Pathway dating back to 2001 and spanning $1.15 billion of total commitments across two investment mandates.

Background

Pathway was established in 1991 as a spin-out of Wilshire Associates private markets investment team. The Firm currently oversees more than $55 billion of discretionary assets under management across private equity, private credit, and infrastructure deploying roughly $7 billion per annum in primary fund investments, co-investments, and secondary transactions. Led by Senior Managing Director & CIO Karen Jakobi, Pathway is owned by 18 Partners who oversee a team of more than 150 professionals based in Irvine, Providence, Hong Kong, and Tokyo. The team is highly cohesive with an average tenure among the 16 investing Partners of 22 years. Pathway's middle and back office capabilities include 45 finance/tax professionals and 7 in-house attorneys that focus on investment administration and monitoring; moreover, Pathway's Secondaries team is led by Pete Veranavich who has been with the Firm for 19 years.

Program Overview

Since 2015, the OIC has overseen the staged repositioning of OPERF's private equity portfolio emphasizing more focused primary investments, fee mitigation, and better calibrated pacing. The proposed Program will augment Staff's existing monitoring protocols creating much needed leverage given the extensive restructuring of the manager roster that has taken place in recent years. Secondly, and at Pathway's discretion, the Program will be used to opportunistically pursue accelerated liquidity within the OPERF private equity portfolio as a pacing and portfolio management tool. Finally, the Program represents an acceleration of Staff's pivot to its new private equity implementation plan as approved by the OIC in 2015.

Issues to Consider

<u>Attributes</u>:

- *Better Deployed Staff Resources* – Due to material trimming of OPERF's private equity manager roster in recent years, Staff is currently monitoring a run-off portfolio that is as large by manager count as the current active General Partner roster. Reducing the monitoring burden associated with these legacy relationships will increase Staff's effectiveness with respect to executing its go-forward plan. Specifically, the Program creates leverage for OST's limited Staff resources against the team's highest and best use.
- *PE Portfolio Repositioning* – As an effective pacing management tool, the Program puts in place the final pillar of the revised private equity implementation plan that the OIC and Staff have been working toward since 2015. Staff believes that emphasizing a refocused primary fund effort, fee mitigation, and controlled pacing best positions OPERF's private equity portfolio to deliver on its risk/return objectives in an increasingly complex and competitive industry.

- *Total Portfolio Management* – Over the medium-term, the Program's enhanced pacing and portfolio management features create another lever that can be used to rebalance the total OPERF portfolio maintaining closer alignment with asset allocation policy and the total fund's target risk/return profile.

Concerns:

- *Cost* – As this recommendation involves the engagement of a third party solutions provider, it introduces incremental fees. [Mitigant: The potential incremental costs of the Program are extremely modest particularly relative to the opportunity cost associated with not introducing this capability from an execution standpoint. As the past decade has shown, at OPERF's scale the opportunity cost associated with uneven pacing can be significant. Finally, introducing this solution would facilitate an acceleration of OPERF's "fee mitigation" initiative generating fee savings massively in excess of the Program's additional costs.]
- *Alignment* – Due to the need to provide Pathway with discretion to execute accelerated liquidity transactions, alignment of interests can be complex to maintain. [Mitigant: The compensation structure of the Program creates a baseline level of alignment, and the ability to episodically modify incentives in periods where accelerated liquidity is more desirable maintains alignment as objectives evolve.]
- *Execution* – The proposed monitoring and liquidity management solution is the product of multiple years of iterative discussions in pursuit of a tailored solution for a complex segment of the portfolio and the market. [Mitigant: The proposed solution is the result of a comprehensive examination of OPERF's execution challenges, and, in Staff's view, this model positions OPERF for the highest probability of successfully delivering on portfolio objectives. Further, this solution has been designed and will be implemented in close collaboration with a long-term partner, and the success that we have had working closely with Pathway on an innovative solution in the co-investment area gives us confidence that we can succeed here too.]

Terms

The legal agreement for this Program remains subject to further negotiation, but Staff views the proposed terms as attractive. Further information on the terms can be found in the TorreyCove materials. Please note that Staff has not interacted with a placement agent in connection with this process.

Conclusion

Subject to the satisfactory negotiation of all terms and conditions with Staff working in concert with legal counsel, Staff will establish the Program with Pathway for the OPERF private equity portfolio. The Program will consist of an initial portfolio of existing OPERF private equity investments with a value of up to $2 billion. Staff further recommends recycling half of any accelerated liquidity proceeds generated by the Program for an initial period of five years and up to a maximum of $1 billion into new commitments to the Co-Invest Vehicle.

TORREYCOVE
CAPITAL PARTNERS

MEMORANDUM

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

FROM: TorreyCove Capital Partners ("TorreyCove")

DATE: December 4, 2019

RE: Pathway Private Equity Monitoring & Liquidity Management Program (the "Program")

Strategy:

The Pathway Monitoring and Liquidity Management Program (the "Program") represents an expansion of an existing, long-term, relationship between OPERF and Pathway to provide a new, customized, liquidity management solution to the OPERF private equity portfolio. The Program will consist of an initial portfolio of existing OPERF private equity holdings with an estimated value of up to approximately $2.0 billion. The initial portfolio will be determined jointly by Staff, Pathway and TorreyCove, with CIO oversight. As liquidity is generated in the secondary market, it is contemplated that for an initial period of five years, half of the liquidity proceeds (up to $1.0 billion) will be recycled into the Pathway Private Equity Fund C – III, L.P. (the existing OPERF "Co-Invest Vehicle").

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

Conclusion:

The Program offers OPERF an opportunity to achieve several strategic objectives with respect to the private equity portfolio with relatively attractive overall terms. TorreyCove's review of the Program indicates that the potential strategic benefits available justify the risks associated with the Program. TorreyCove recommends that OPERF establish the Program with an initial portfolio of up to $2.0 billion in value. TorreyCove recommends further that up to 50.0% of the liquidity proceeds from the Program for a period of five years (up to $1.0 billion) be recycled into the Co-Invest Vehicle.

TorreyCove's recommendation is contingent upon the following:

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

(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 Program until such time as all the preceding conditions are met.

TAB 4 – Private Equity Monitoring & Liquidity Solutions

OPERF Private Equity Portfolio

(This agenda item contains no documents)

TAB 5 – Risk Parity Manager Recommendations

OPERF Risk Parity Portfolio

OPERF Risk Parity Manager Recommendation

PanAgora Asset Management, Inc. Risk Parity Multi Asset

AHL Partners LLP Multi-Asset TargetRisk

Purpose

Subject to the satisfactory negotiation of all terms and conditions, staff recommends approval of an up to $900 million investment to both PanAgora Asset Management, Inc. Risk Parity Multi Asset and AHL Partners LLP Multi-Asset TargetRisk. Approval of these recommended investments would initiate the formation of the OPERF Risk Parity Portfolio.

Background

At its April 2019 meeting, the Oregon Investment Council approved a staff recommendation for a 2.5% allocation to Risk Parity during the Strategic Asset Allocation & Capital Markets Assumptions Update. Although Public and Private Equity make up 55% of OPERF by net asset value as of September 30, 2019, these allocations together contribute 90% of OPERF's risk per Aladdin. OPERF's 20% allocation to Fixed Income provides some diversification, but overall OPERF risk (as measured by the standard deviation of expected returns) is almost entirely driven by the combined equity allocations.

The traditional "60/40" portfolio provides some intuition for why OPERF's risk stems almost exclusively from its equity allocations. Comprised of 60% public equity and 40% fixed income, the traditional 60/40 allocation is a widely-used reference or benchmark for a "balanced" portfolio. Although the nominal allocation in this 60/40 portfolio is 3:2 public equity to fixed income, the Expected Volatility of public equity is a multiple of fixed income. Callan's Capital Market Assumptions, reviewed at the same April 2019 meeting, included expected volatilities of approximately 18.8%[1] and 3.8%, respectively for public equity and fixed income. In other words, the risk of stocks to bonds is roughly 5:1. Thus, while the traditional 60/40 has an asset weighting of stocks to bonds of 3:2, given stocks' much higher volatility, the risk weighting is closer to 15:2.

As inferred from its name, "Risk Parity" balances the risk contributions in a portfolio equally among the portfolio's component asset classes, which typically includes public equity, fixed income and commodities. Moreover, in order to provide a level of return commensurate with that of the 60/40 portfolio, risk parity strategies are levered using exchange-traded futures contracts. Comprising a collection of long-only beta exposures, Risk Parity is positively correlated to public equity and fixed income. Nevertheless, and due primarily to its levered fixed income exposures (as expressed through U.S. Treasury and other sovereign bond futures), Risk Parity can still serve as an effective diversifier within an otherwise broad asset allocation strategy.

Discussion/Investment Considerations

PanAgora Asset Management, Inc. Risk Parity Multi Asset ("PanAgora Risk Parity")

Created as an investment group within The Boston Company in 1985 before a series of restructurings and corporate activities, PanAgora Asset Management, Inc. ("PanAgora") is a Boston-based asset manager with $45.6 billion assets under management (AUM) of which $12.8 billion is managed with the Firm's Multi Asset Risk Parity strategy while the balance is managed across quantitative equity and systematic strategies. PanAgora is majority owned by the publicly-traded Power Financial Corporation with the balance held through an employee equity plan. The firm has 54 investment professionals, with 15 on the Multi Asset Investment Team. The team is led by Dr. Edward Qian, Chief Investment Officer of Multi Asset Investments, and Bryan Belton, Managing Director of Multi Asset Investments.

[1] Calculated based on a 50/50 construct of Callan's U.S. Equity and Global Non-U.S. Equity estimates.

Launched in January 2006, PanAgora Risk Parity allocates 40%/40%/20% of the risk respectively to Equities, Nominal Fixed Income, and Inflation Protected Assets. PanAgora's philosophy towards a lower allocation to commodities and inflation-linked bonds is that asset owners are generally less sensitive to inflation. Furthermore, another differentiator in PanAgora Risk Parity is a "bottom-up risk parity" approach. Instead of holding exchange-traded futures for developed market equity exposures, PanAgora holds common stocks to provide risk parity by sector and country. The team also applies a similar approach with nominal bonds. Finally, PanAgora Risk Parity has a small tactical component, Dynamic Risk Allocation (DRA), which uses a combination of value and momentum signals to make small adjustments to risk allocations within and between asset classes. The return characteristics of DRA are roughly uncorrelated with those of PanAgora Risk Parity and major market indices.

Attributes:

- *Experienced portfolio management team*. Dr. Qian and Mr. Belton both have over 20 years of industry experience. Dr. Qian's earlier papers are part of the foundation of the risk parity allocation approach; in fact, he is credited with coining the phrase "risk parity". In addition to a 15-person investment team of researchers and developers, PanAgora Risk Parity is also supported by the firm's 11-person trading desk.
- *Differentiated investment approach*. Given that most risk parity managers hold a portfolio of widely-used asset class exposures, the total returns of risk parity managers are highly correlated to one another. However, PanAgora's bottom-up risk parity implementation is unique and provides some return differentiation from the standard capitalization-/GDP-weighted approaches for public equity and fixed income.
- *Delivery of desired beta exposures*. Scaling the 5-year monthly performance through June 2019 for volatility, staff estimates a beta of +0.5 to MSCI World Index (developed market public equity) and a beta of +1.4 to Bloomberg Barclays Global Aggregate (fixed income) for PanAgora Risk Parity.

Concerns:

- *Additional complexity of bottom-up risk parity*. Instead of dozens of investment instruments, PanAgora Risk Parity holds thousands of stocks, bonds, futures, and other derivative instruments. [Mitigant: PanAgora has managed public equity portfolios via a quantitative approach since 1985 when the Firm was part of The Boston Company. PanAgora has a sizeable equity investment team that can provide additional support as needed.]
- *Leverage*. While "leverage" is an integral part of the risk parity value proposition, leverage within the PanAgora Risk Parity strategy can reach three times or more the strategy's net asset value. [Mitigant: Equity exposure, generally the most volatile asset class, is on average only about 20% of the total strategy exposure while Nominal Fixed Income averages 66%.]

AHL Partners LLP Multi-Asset TargetRisk ("AHL TargetRisk")

Established in 1987 and acquired completely by the publicly-traded Man Group in 1994, AHL Partners LLP ("Man AHL") has $31.6 billion AUM as of September 30, 2019 across systematic investment strategies, including managed futures, alternative risk premia and risk parity. London-based Man AHL has over 120 investment professionals, with over 90 investment and technology researchers working on a shared technology platform developed since the firm's founding. Man AHL also shares resources with the parent company and the other investment divisions. AHL TargetRisk, the risk parity strategy with $3.1 billion AUM, is managed by a team led by Russell Korgaonkar, Director of Investment Strategies.

AHL TargetRisk starts with a balanced risk allocation to four asset classes – Equities, Credit (investment grade and high yield credit spread), Bonds (sovereign debt) and Inflation (commodities and inflation-linked bonds) – with some of the Credit portion reallocated to Equity for liquidity purposes. The strategy holds approximately 50 investments, mainly exchange-traded futures contracts and other derivatives. As suggested by its name, the strategy seeks to maintain a specific volatility target of 12%, increasing and decreasing notional exposures to achieve the desired volatility level. With over 30 years' experience trading futures, Man AHL also applies other elements of its systematic pedigree to AHL TargetRisk, such as a momentum overlay.

<u>Attributes</u>:

- *Experienced investment team*. Mr. Korgaonkar's 18-year tenure with the firm notwithstanding, this strategy is a highly systematic approach and thus less dependent on a "star manager." Instead, an element of the investment thesis is Man AHL's 30-year history of implementing investment strategies in a risk-controlled fashion. The Firm devotes significant resources to incrementally improving all elements of the investment process.
- *Sophisticated risk management*. As earlier stated, Man AHL targets a return volatility of 12%. To achieve this target, AHL monitors short and longer-term covariance measures, aiming to deliver the target volatility while minimizing unnecessary turnover. The Firm can quickly change the strategy's notional exposures in response to market dynamics. For example, in a sharp market sell-off with rising equity volatility, the Firm would likely reduce strategy exposures. When markets stabilize, the AHL TargetRisk team would increase the strategy's equity exposure. The Firm's approach also allows for evolving asset class correlations, which are a big volatility determinant within multi-asset class portfolios. Finally, Man AHL's systems monitor bond market behavior particularly closely as an additional means of managing strategy risk.
- *Delivery of desired beta exposures*. Since AHL TargRisk's inception date of December 2014, and scaling the strategy's monthly performance for volatility, staff estimates a beta of +0.5 to MSCI World Index and a beta of +0.7 to Bloomberg Barclays Global Aggregate.

<u>Concerns</u>:

- *Short track record*. Of the risk parity strategies staff considered, AHL TargetRisk has the shortest track record with an inception date of January 2015. [Mitigant: "Risk parity" as a multi-asset allocation approach is relatively well established within both academic and commercial ranks. Man AHL is able to apply their core competencies in managing futures and risk to this particular allocation.]
- *Leverage*. While "leverage" is part of the risk parity value proposition, the strategy's leverage can reach three times or more its net asset value. [Mitigant: Equity exposure, generally the most volatile asset class, remains relatively low. Bonds and Inflation contribute most of the strategy's notional exposures, which generally diversify Equity].

Conclusion

The recently-approved allocation to Risk Parity has a 2.5% target at the total fund level. To fulfill that allocation, Staff is recommending an up to $900 million commitment to both PanAgora Risk Parity and AHL TargetRisk. Both managers would be initially funded with $650 million while staff continues to evaluate other managers. To bring the Risk Parity Portfolio up to its 2.5% target, and based on manager attributes and other portfolio construction criteria, staff may bring an additional Risk Parity manager for the OIC consideration or instead increase the allocation to PanAgora Risk Parity and AHL TargetRisk, respectively to the $900 million initial funding limit.

A portfolio comprised of PanAgora Risk Parity and AHL TargetRisk would have beneficial diversification characteristics given the sponsoring firm's different approaches to risk parity. PanAgora Risk Parity is expected to reflect a definite tilt towards public equity and fixed income in combination with bottom-up risk parity and a tactical component, while AHL TargetRisk is expected to benefit from its sponsor's trading prowess and unique risk management techniques. Staff believes the combination of both managers would be a good fit for OPERF.

Callan

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Memorandum

To: Oregon Investment Council
From: Callan LLC (”Callan”)
Date: November 26, 2019
Subject: PanAgora Risk Parity Multi Asset strategy (“RPMA,” or “the Strategy”)

Callan conducted an evaluation of PanAgora (“the Firm”) Risk Parity Multi Asset strategy, which is being considered for an investment by the Oregon State Treasury (“OST”). OST is considering a customized separate account investment with a volatility target of 12%, which contrasts with the 10% volatility target of the Strategy’s established track record. The customized separate account is expected to utilize proportionally higher leverage in order to pursue proportionally higher return and risk with other aspects of the Strategy materially similar. As a result, this evaluation will focus on the established track record with a 10% volatility target and comment on any differences expected from the customized separate account.

PanAgora has total assets under management of approximately $43 billion as of September 30, 2019. This includes roughly $12.5 billion in its Risk Parity Multi Asset strategy as of September 30, 2019. PanAgora estimates its capacity run the Strategy in its current form to be about $20 billion, given RPMA by design trades in highly liquid markets. PanAgora was one of the original entrants into risk parity space and given roughly one-quarter of the firm’s assets are in Risk Parity, Callan is confident PanAgora will continue to devote ample resources to the RPMA strategy going forward.

The Risk Parity Multi Asset Fund invests in equity indices, individual stocks, fixed-income and commodity-linked instruments with a long-only approach. The portfolio is constructed in a manner that is, over the long term, targeted to have greater diversification and a more consistent volatility than a 60/40 equity/fixed income portfolio. Using a systematic, quantitative investment process, the Strategy seeks to capture sources of return typically associated with traditional asset classes while actively managing risk to target a stable level of volatility through a full market cycle.

In summary, Callan believes that the PanAgora Risk Parity Multi Asset strategy is an attractive investment opportunity, notwithstanding potential investment risks inherent to the Strategy that require ongoing monitoring. Based upon our evaluation of the Firm, investment process, and proposed strategy, Callan believes the following:

- PanAgora is a well-established investment firm with substantial resources committed to research, portfolio construction, execution, and risk management.

- The RPMA team has sufficient resources to deliver liquid, transparent investment solutions that are competitive with those of peers. Furthermore, the Team follows a relatively transparent and thoughtful investment process in managing risk parity multi asset portfolios.
- Risk Parity Multi Asset is a compelling fit for OST's proposed risk parity mandate as it focused exclusively on sources of return associated with traditional asset classes.
- Based upon our evaluation of PanAgora and the proposed investment, Callan recommends that OST consider an investment as part of the Risk Parity portfolio. Callan's recommendation is subject to review and approval by OST's legal counsel.
- While PanAgora's Risk Parity Multi Asset's strategy design differs from other risk parity strategies, such as Man AHL TargetRisk, there is significant overlap in the types of asset class risks sought by each. Both strategies seek exposure to equities, sovereign bonds, corporate credit, inflation linked bonds, and commodities. Investors in Man AHL TargetRisk who are considering an allocation to PanAgora Risk Parity Multi Asset should consider this potential overlap.

Please refer to the full report for further information.

Callan

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www.callan.com

Memorandum

To: Oregon Investment Council
From: Callan LLC (”Callan”)
Date: November 26, 2019
Subject: Man AHL TargetRisk (“the Strategy”” or “the Fund”)

Callan conducted an evaluation of Man AHL TargetRisk as a customized separate account investment with a volatility target of 12% (which contrasts with the 10% volatility target of the Strategy’s established track record). The customized separate account is expected to utilize proportionally higher leverage in order to pursue proportionally higher return and risk with other aspects of the Strategy materially similar. As a result, the full evaluation is focused on the established track record with a 10% volatility target and comment on any differences expected from the customized separate account.

Man Group is a well-diversified investment management organization and has total assets under management of approximately $113 billion, including over $31 billion managed by Man AHL, as of September 30, 2019. This includes $2.4 billion in Man AHL TargetRisk. Man AHL estimates capacity for the Strategy to be about $10 billion.

The Strategy invests in equity indices, fixed-income and commodity-linked instruments with a long-only approach. The portfolio is constructed in a manner that is, over the long term, targeted to have greater diversification and a more consistent maximum expected volatility relative to a 60/40 equity/fixed income portfolio. Using a systematic, quantitative investment process, the Strategy seeks to capture sources of return typically associated with traditional asset classes while actively managing risk.

In summary, Callan believes that Man AHL TargetRisk is an attractive investment opportunity, notwithstanding potential investment risks inherent to the Strategy that require ongoing monitoring. Based upon our evaluation of the Firm, investment process, and proposed strategy, Callan believes the following:

- Man Group is a well-established investment firm with substantial resources committed to research, portfolio construction, execution, and risk management.
- Man AHL has sufficient resources to deliver liquid, transparent investment solutions that are competitive with those of peers. Furthermore, the Team follows an institutional-quality process in managing risk parity portfolios.

- TargetRisk is a compelling fit for OST's proposed risk parity mandate as it is focused exclusively on sources of return associated with traditional asset classes.
- Based upon our evaluation of Man AHL and the proposed investment, Callan recommends that OST consider an investment as part of the Risk Parity portfolio. Callan's recommendation is subject to review and approval by OST's legal counsel.
- While Man AHL TargetRisk's strategy design differs from other risk parity strategies, such as the PanAgora Risk Parity Multi-Asset strategy, there is significant overlap in the types of asset class risks sought by each. Both strategies seek exposure to equities, sovereign bonds, corporate credit, inflation linked bonds, and commodities. Investors in PanAgora Risk Parity Multi-Asset who are considering an allocation to Man AHL TargetRisk should consider this potential overlap.

Please refer to the full report for further information.

TAB 6 – Fixed Income Review

OPERF and other OST-managed funds

December 11, 2019

Fixed Income Portfolio 2019 Strategic Review

Geoff Nolan, Senior Investment Officer

OREGON STATE TREASURY

Agenda

Background / Objectives

Putting Fixed Income in Context

- Oregon Investment Council (OIC) Oversight
  - The OIC sets policy and is ultimately responsible for the Investment Program
    - The OIC is a policy-setting council that largely delegates investment management activities to the Oregon State Treasury (OST) and qualified external fiduciaries.
    - The OIC has authority to set and monitor portfolio risk. Both short term and long term risks are critical.

- Role of Fixed Income in Oregon Public Employees Retirement Fund (OPERF) = Diversification & Liquidity
  - The role of fixed income investments, pursuant to policy INV 401, is to:
    - provide diversification to the OPERF portfolio in general and to equity securities in particular; and
    - provide liquidity to help meet OPERF's cash flow needs.

- Fixed Income Strategic Review Objective = Enhance Diversification & Liquidity
  - Objective: determine whether the fixed income portfolio asset allocation can be enhanced to improve upon current diversification & liquidity benefits.

- OST staff worked with BlackRock on the Strategic Review
  - OST provided inputs, feedback & guidance on preferred model portfolios.
  - BlackRock ran the asset allocation analytics given OST's guidance.
  - Callan and Guggenheim Partners also undertook an independent analysis.

Fixed Income's Role: Providing Diversification and Liquidity for OPERF

Agenda

Executive Summary

- Further De-Risk Fixed Income Portfolio To Enhance Diversification & Liquidity
  - Diversification & liquidity benefits can be enhanced by de-risking. De-risking entails:
    - Lowering non-investment & investment grade credit exposure;
    - Increasing US Treasury exposure;
    - Increasing Global Sovereign exposure (ex-US; hedged back to USD); and
    - Adding an OPERF Liquidity Fund "OLF" (high quality portfolio, internally managed)
  - Additional benefit of de-risking: reduced drawdown & improved credit loss stress scenarios.

- Further De-Risking Comes with Trade-Offs
  - While de-risking improves fixed income's role within the OPERF portfolio, it comes with trade-offs:
    - Increased expected long term volatility (➔ higher rate risk); and
    - Lower expected long term returns & carry (➔ up in quality, shifting away from higher yielding assets).

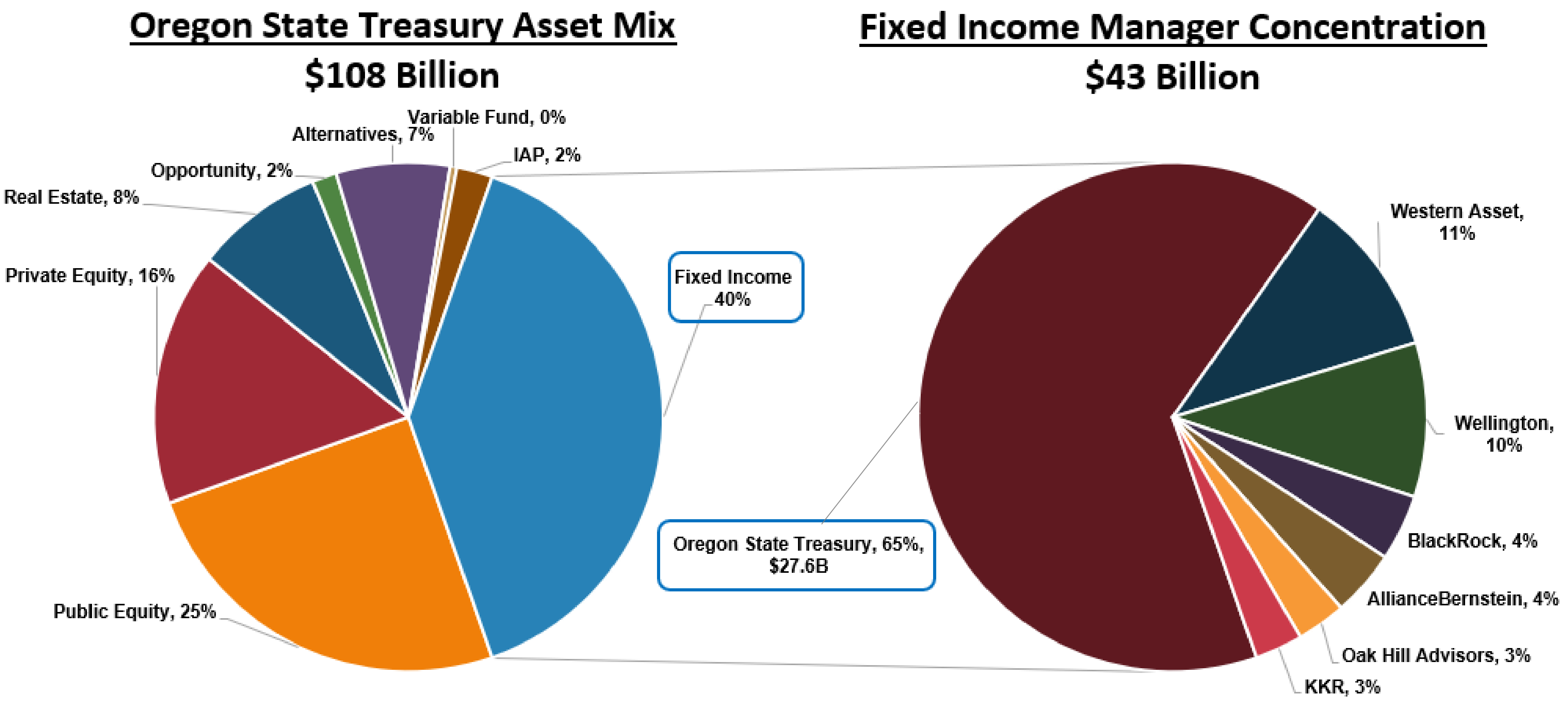
- Leverage Helps Mitigate Some of the Trade-Offs of De-Risking & Provides a Safety Buffer in Down Markets
  - Addition of leverage (~12.5% at asset level) improves return potential & Sharpe ratio
  - Additional leverage (~12.5% at asset level) can act as a safety buffer for scenarios such as the following:
    - extended down market timeframes; and
    - capital calls associated with OST Private Market activities.

Further De-Risk Fixed Income Portfolio To Enhance Diversification & Liquidity

Add Leverage to Help Mitigate Some Trade-Offs & Provide a Safety Buffer

Strategic Review: OST Fixed Income Program Overview

Putting Fixed Income in Context – Current Portfolio Composition



As of October 31, 2019 Source: State Street, OST

Fixed Income & OST-Managed Funds Represent a Significant Portion of OST Assets

Agenda

Strategic Review: Model Input Overview

- OST Provided Key Model Inputs to BlackRock for Fixed Income Asset Allocation Modeling Purposes

Fixed Income Goals (Priority Order)	Metric to Measure
1. Provide diversification to public equities	Correlation to S&P 500, MSCI ACWI
2. Provide diversification to overall OPERF portfolio	
3. Provide liquidity in down markets / preserve capital	Minimum funding amount over 2 years
4. Maximize total return for a given level of risk	Balance Yield / LT Expected Return against Drawdown / Credit Loss
5. Earn adequate return for a given level of risk	Sharpe Ratio

- Key Guidelines
  - Minimum funding amount over 2 years: $3BN / year
  - Max drawdown stress scenarios: 4% of fixed income AUM
  - Max credit loss scenario: 1% of fixed income AUM

- Return Horizon
  - 10 years

- Return / Volatility / Duration / Correlation Assumptions
  - BlackRock Investment Institute Capital Markets assumptions as of June 30, 2019
    - Please see appendix for details.
  - Adjustments to OPERF Liquidity Fund (OLF) assumptions provided by OST

Agenda

Strategic Review: Asset Allocation Portfolios

Fixed Income Asset Classes	Policy Benchmark	Actual Portfolio	Unlevered 1	Leveraged 12.5% 2	Leveraged 25% 3
Cash / OPERF Liquidity Fund (OLF)	0.0%	4.9%	18.9%	24.1%	28.8%
ABS (Credit cards, Autos, Student Loans)	0.2%	4.4%	1.9%	1.6%	1.8%
Agency MBS	12.8%	13.7%	3.7%	5.5%	6.2%
CMBS	1.0%	2.4%	5.7%	5.6%	5.7%
Subtotal Securitized	*14.0%*	*20.5%*	*11.3%*	*12.8%*	*13.7%*
IG Corporate 1-5	5.5%	5.6%	0.6%	1.3%	1.5%
IG Corporate 5-10	3.8%	5.9%	1.3%	1.7%	1.6%
IG Corporate 10+	4.3%	2.8%	0.0%	0.0%	0.0%
Subtotal IG Corporate	*13.5%*	*14.2%*	*2.0%*	*3.0%*	*3.1%*
US Treasuries 1-10	45.7%	32.4%	35.9%	38.6%	43.8%
US Treasuries 10+	9.6%	10.2%	15.0%	14.3%	14.0%
Subtotal US Treasuries	*55.3%*	*42.6%*	*50.9%*	*52.9%*	*57.8%*
TIPS	0.0%	1.3%	1.4%	1.6%	1.6%
Global Sovereign (ex-US) (USD Hedged)	0.0%	1.0%	5.7%	8.1%	9.3%
High Yield	4.0%	3.9%	5.2%	4.8%	5.1%
Bank Loans	13.0%	11.2%	2.1%	2.5%	2.7%
Subtotal Non Investment Grade	*17.0%*	*15.2%*	*7.4%*	*7.3%*	*7.8%*
EM Debt (Hard Dollar)	0.0%	0.4%	2.6%	2.7%	2.8%
Total	**100%**	**100%**	**100.0%**	**112.5%**	**125.0%**

Note: Policy Benchmark refers to the Portfolio's disaggregated benchmark per OIC policies.

Exposure movements refer to changes from Actual Portfolio to Unlevered and Leveraged 12.5% allocations, respectively.

Add OPERF Liquidity Fund exposure of ~14% to ~19%.

Reduce IG exposure from ~14% to ~2-3%.

Increase US Treasury exposure from ~43% to ~51-53%.

Increase Global Sovereign exposure from ~1% to ~6-8%.

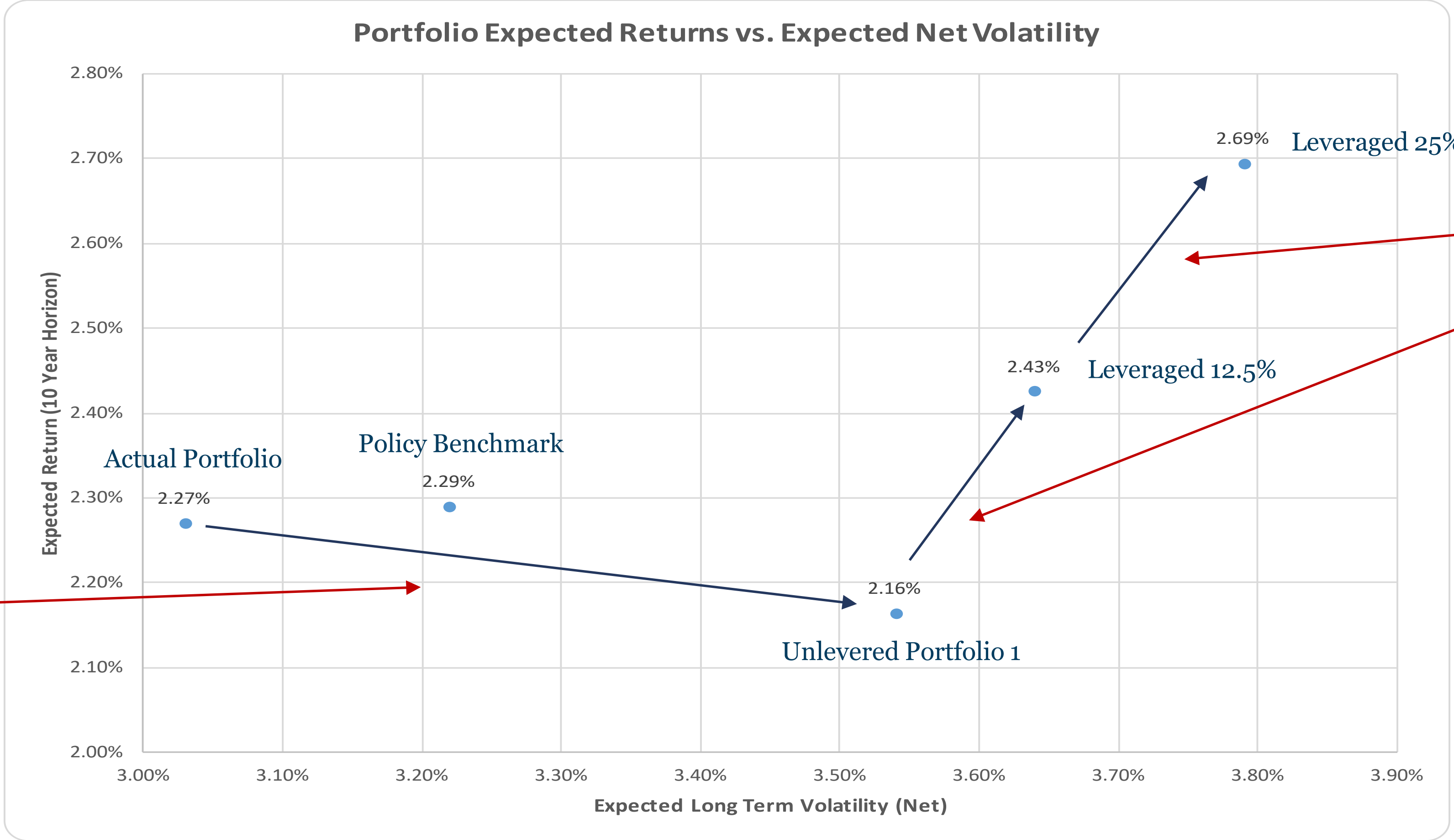
Reduce Non-IG exposure from ~15% to ~7%.

10

Further De-Risking the Fixed Income Portfolio

OREGON STATE TREASURY

Strategic Review: Portfolio Characteristics



"Costs" of De-Risking

There are trade-offs from de-risking without adding leverage.

Benefits of De-Risking & Leverage

Adding leverage improves expected returns, Sharpe ratio and provides additional liquidity buffer.

Further De-Risking Enhances Diversification & Liquidity

Adding Leverage Helps Mitigate Some Trade-Offs & Provides Future Safety Buffer

Strategic Review: Portfolio Characteristics

"Costs" of De-Risking

There are trade-offs from de-risking without adding leverage.

Benefits of De-Risking & Leverage

Portfolio Characteristics	Policy Benchmark	Actual Portfolio	Unlevered 1	Leveraged 12.5% 2	Leveraged 25% 3
Active Risk (to current benchmark)	--	0.46%	0.55%	0.58%	0.69%
Expected LT Volatility (net)	3.22%	3.03%	3.54%	3.64%	3.79%
Expected Return (%)	2.29%	2.27%	2.16%	2.43%	2.69%
Sharpe Ratio	0.07	0.06	0.02	0.10	0.16
Current Carry (%) (Nominal Yield)	2.95%	2.93%	2.46%	2.72%	2.99%
Expected Liquidity (2 Yrs) [1]	55%	48%	70%	72%	82%
Correlation to S&P500	(0.11)	(0.02)	(0.15)	(0.15)	(0.15)
Correlation to MSCI ACWI	(0.08)	0.01	(0.13)	(0.12)	(0.12)
Duration (Yrs)	4.89	4.82	5.57	5.87	6.19
Spread Duration (Yrs)	2.03	2.21	1.30	1.51	1.62
Spread (bps)	88	87	53	57	62
DxS [2]	3.41	3.25	1.92	2.03	2.13
Convexity	0.43	0.45	0.79	0.79	0.79

Adding leverage improves expected returns, Sharpe ratio and provides additional liquidity buffer.

Improved liquidity from de-risking.

Improved correlation metrics from de-risking.

Improved spread duration metrics from de-risking.

Note: Policy Benchmark refers to the Portfolio's disaggregated benchmark per OIC policies.

1 Liquidity = Cash/OPERF Liquidity Fund + US Treasuries

2 Duration x Spread: measures the sensitivity to a relative change in credit spreads.

Further De-Risking Enhances Diversification & Liquidity

Adding Leverage Helps Mitigate Some Trade-Offs & Provides Future Safety Buffer

OREGON STATE TREASURY

Strategic Review: Stress Scenarios

Stress Scenarios		Policy Benchmark	Actual Portfolio	Unlevered 1	Leveraged 12.5% 2	Leveraged 25% 3
Crash '08	Crash08	-5.46%	-7.65%	-4.03%	-4.19%	-4.36%
Credit '07	C07_ABS	1.40%	-0.11%	2.61%	2.65%	2.85%
Recession '07-'09	REC_ABS	-4.26%	-7.80%	-1.75%	-1.84%	-1.87%
Taper Tantrum '13	FED13_AB	-2.97%	-2.94%	-3.15%	-3.29%	-3.45%
Slow Deflation	SLOW_DF	3.30%	2.77%	4.25%	4.17%	4.20%
Rising Inflation	MS_USCPIUP	-0.75%	-0.60%	-0.91%	-0.91%	-0.94%
Weighted Scenario [1]		-1.6%	-3.1%	-0.42%	-0.50%	-0.53%

Credit Loss Stress Scenarios	Policy Benchmark	Actual Portfolio	Unlevered 1	Leveraged 12.5% 2	Leveraged 25% 3
Avg All Years	-0.38%	-0.35%	-0.21%	-0.22%	-0.24%
Avg Worst 10 years	-0.81%	-0.73%	-0.46%	-0.47%	-0.51%

1 Average of 6 stress scenarios.

Note: Policy Benchmark refers to the Portfolio's disaggregated benchmark per OIC policies.

Additional Benefits of Further De-Risking: Reduced Drawdown & Improved Credit Loss Stress Testing Results

Strategic Review: Credit Quality

Credit Quality Stats	**Policy Benchmark**	**Actual Portfolio**	**Unlevered 1**	**Leveraged 12.5% 2**	**Leveraged 25% 3**
AAA	69.8%	69.2%	63.8%	67.8%	74.0%
AA	1.4%	~85% 2.0%	~91% 6.3%	~104% 8.1%	9.4%
A	5.4%	6.3%	13.3%	17.6%	20.5%
BBB	7.3%	7.8%	8.1%	10.4%	11.9%
BB	5.3%	4.9%	~9% 3.4%	~9% 3.3%	3.5%
B	9.3%	~15% 8.3%	4.1%	4.2%	4.5%
CCC or less	1.6%	1.4%	1.1%	1.1%	1.2%
Total	**100.0%**	**100.0%**	**100.0%**	**112.5%**	**125.0%**

Note: Policy Benchmark refers to the Portfolio's disaggregated benchmark per OIC policies.

Further De-Risking Leads to Improvement in Portfolio Credit Quality

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Strategic Review: Additional Risk Metrics

Risk Contribution by Asset Class Long Term Volatility (net)	Policy Benchmark	Actual Portfolio	Unlevered 1	Leveraged 12.5% 2	Leveraged 25% 3
Cash / OPERF Liquidity Fund (OLF)	0%	0%	1%	1%	1%
ABS (Credit cards, Autos, Student Loans)	0%	1%	1%	0%	0%
Agency MBS	4%	4%	1%	1%	2%
CMBS	1%	3%	5%	5%	5%
IG Corporate 1-5	2%	3%	0%	1%	1%
IG Corporate 5-10	6%	9%	2%	2%	2%
IG Corporate 10+	12%	8%	0%	0%	0%
US Treasuries 1-10	36%	26%	26%	28%	30%
US Treasuries 10+	38%	41%	56%	52%	48%
TIPS	0%	2%	2%	2%	2%
Global Sovereign (ex-US) (USD Hedged)	0%	1%	4%	6%	7%
High Yield	2%	2%	1%	1%	1%
Bank Loans	-1%	0%	-1%	-1%	-1%
EM Debt (Hard Dollar)	0%	1%	3%	3%	3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Note: Policy Benchmark refers to the Portfolio's disaggregated benchmark per OIC policies.

Risk Contribution Skewed towards US Treasuries

Agenda

Strategic Review: Benchmarks

- OST's current custom Policy Benchmark aligns with our current manager structure.

- OST staff proposes updating the Policy Benchmark to the Bloomberg Barclays US Aggregate Bond Index with a return expectation of 15 basis points above the Policy Benchmark over a market cycle.

- Benchmark Update Rationale:
  - Current benchmark is somewhat restrictive and limits the ability of OST staff to adjust asset allocation.
  - Subject to the risk, governance & controls set out in policy, allows for adjusting the asset allocation and external managers as markets & OPERF needs evolve.

- Return Hurdle Update Rationale:
  - Given the significant de-risking, a reduction in the market cycle return target is warranted.

- INV 401: Strategic Role of Fixed Income for OPERF would be updated for proposed benchmark and return target.

Realigning Policy Benchmark & Target Return with Strategic Review

Agenda

Strategic Review: Risk Limits

- Per INV 401, OST Fixed Income currently manages the OPERF Fixed Income portfolio within tracking error guidelines.
  - To limit portfolio risk, the portfolio is limited to an annualized tracking error target of plus 0.5 to 1.0 percent.

- Tracking Error
  - Can be defined as the amount of quantifiable risk a portfolio has relative to a benchmark.
  - Generally, realized tracking error may deviate from the benchmark for a variety of reasons including:
    - Manager's sector, security, geographic, duration or weighting selection differ from the policy benchmark;
    - Asset allocation impacts from contributions, distributions or other short-term cash needs;
    - Asset allocation decisions by OST staff; and
    - Forward looking tracking error calculations are model based and may not fully capture risk.

- OST staff would recommend:
  - adjusting the annualized tracking error to "up to 1.0 percent" from "plus 0.5-1.0 percent".

- Rationale:
  - clarifies the current tracking error limit by eliminating the lower bound and just having a cap.

Clarifying Fixed Income Risk Limits

Agenda

Strategic Review: Implementation Guidelines

- Given the complexity of and amount of fund movements involved in the portfolio realignment, implementation of changes from the Strategic Review would take place at a measured pace over the next 3-6 quarters.

- Internally-managed mandates:
  - US treasuries; US treasury futures; and US TIPS and OPERF Liquidity Fund.

- Step 1 – Manager Searches
  - Initiate searches for new mandates: Global Sovereign /EMD (Hard Currency); Securitized (ABS, Agency MBS, CMBS); and High yield / bank loan. Incumbent managers may be included in searches.
- Step 2 - Funding New Mandates (without using leverage)
  - Depending on timing of onboarding of new managers, funding of mandates may be run in parallel.
    - Global Sovereign / EMD expected to be largely funded with proceeds from reduction in high yield / bank loan mandates.
    - Securitized, OPERF Liquidity Fund, US Treasuries & TIPS expected to be funded with proceeds from a combination of a reduction in investment grade core mandates.
- Step 3 – Leverage
  - Leverage to be added through use of US treasury futures.
  - Given current cash allocation to US treasuries (internally managed and embedded within external core manager portfolios), sales of US treasuries to reach the asset allocation target may be modest.
  - Leverage would be added upon completion of ramp in of US treasury cash portfolio.

- Other
  - To minimize the costs of the realignment, in-kind transfers (to internal or new external managers) and arms-length crossing trades within managers may be considered.

Portfolio Realignment to Occur Over the Next 3-6 Quarters

Agenda

Strategic Review: Additional Leverage Guidelines

- Utilization of Additional Leverage beyond 12.5%
  - Remaining leverage of ~12.5% to be reserved for scenarios such as the following:
    - extended down market timeframes; and
    - capital calls associated with OST Private Markets activities.
  - For governance and control purposes, use of leverage above 12.5% would require the approval of:
    - Chief Investment Officer; and
    - Director of Capital Markets.

- Leveraging Sequencing Guidelines
  - Given the uncertainty surrounding forecasting down markets (e.g., timing, depth, duration, etc.), OPERF plan needs at the time as well as future fixed income and OPERF portfolio composition, a pre-set proscribed leveraging sequence is not advisable.

  - However, in an extended down market scenario, the following factors would need to be considered:
    - Expected length and/or severity of the downturn;
    - Amount of US treasuries (most liquid, easily sold assets) as well as leverage to hold in reserve in case market downturn extends and/or becomes more severe;
    - Ease and practicality of selling cash securities vs. leveraging via US treasury futures; and
    - Maintaining a reasonable risk level at the asset class and total plan level.

Additional Use of Leverage Warrants Appropriate Controls by Senior Management

Agenda

Recommendation

Portfolio Asset Allocation

- Target Portfolio 2
- Additional Leverage of 12.5% (total 25% at asset class level)
  - Remaining leverage (~12.5%) to be reserved for scenarios such as the following:
    - extended down market timeframes; and
    - capital calls associated with OST Private Markets activities.
  - Use of leverage above 12.5% would require the approval of:
    - Chief Investment Officer; and
    - Director of Capital Markets.

Policy Benchmark

- Per page 17, Policy Benchmark for Portfolio 2 (Leveraged 12.5%) with a return target expectation of 15 basis points above the Policy Benchmark over a market cycle.

OST Policy INV 401

- Amend "Section A, Policy Statement" return target expectation to 15 from 25 basis points over a market cycle.
- Amend "Section A, Policy Statement" Policy Benchmark per the above.
- Amend "Section B, (1)" limiting portfolio risk, as measured by tracking error, to "up to 1.0 percent" from "0.5-1.0 percent".

Agenda

Appendix: BlackRock Investment Institute Capital Markets Assumptions

BlackRock Investment Institute Capital Markets Assumptions As of June 30, 2019									
Asset Classes	Benchmark Proxy	Expected Return				Expected	Correlation to	
		10 Yr	20 Yr	30 Yr	Duration	Volatility	S&P 500	MSCI ACWI
Cash	Citi 3 mth T bill Index	2.08%	2.42%	2.56%		0.00%		
OPERF Liquidity Fund (OLF)	iShares Ultra Short Bond ETF (for risk output proxy)	2.38%				0.25%		
ABS (Credit cards, Autos, Student Loans)	BBG Barc ABS Index	1.40%	2.32%	2.72%	2.18	3.70%	-0.15	-0.07
Agency MBS	BBG Barc MBS Index	1.96%	2.41%	2.59%	1.96	2.13%	-0.11	-0.09
CMBS	BBG Barc CMBS, Eligible for U.S. Aggregate	2.48%	3.12%	3.39%	5.05	8.28%	0.04	0.06
IG Corporate 1-5	BBG Barc US Corporate 1-5 years Index	2.20%	2.73%	2.95%	2.69	2.23%	-0.10	-0.04
IG Corporate 5-10	BBG Barc U.S. Credit Index	2.30%	3.39%	3.87%	7.31	5.77%	0.08	0.14
IG Corporate 10+	ICE BofAML Corporate Investment Grade 10+	1.94%	4.08%	5.07%	13.75	12.07%	0.13	0.18
US Treasuries 1-5	BBG Barc Treasury 1-5 Yr Index	1.89%				2.28%		
US Treasuries 1-10	BBG Barc Treasury 1-10 Yr Index	1.91%	2.34%	2.51%	3.82	3.29%	-0.30	-0.27
US Treasuries 10+	BBG Barc Treasury 10+ Yr Index	0.23%	1.34%	1.84%	17.34	14.38%	-0.27	-0.27
TIPS	BBG Barc US Government Inflation-Linked	1.70%	2.37%	2.66%	7.92	5.71%	0.14	0.20
Global Sovereign (ex-US)	BBG Global Agg Treasury Index ex US	1.57%	2.29%	2.60%	9.03	3.33%	-0.11	-0.12
High Yield	BBG Barc US Corp High Yield 2% Issuer Cap	4.71%	5.06%	5.20%	3.52	7.78%	0.68	0.73
Bank Loans	Bank Loans (BLK Proxy)	3.50%	4.08%	4.33%	0.21	8.01%	0.63	0.64
EM Debt (Hard Dollar)	JPM Morgan EMBI Global Diversified Index	3.54%	4.51%	4.95%	7.65	9.12%	0.45	0.53
US Aggregate Bond Index	Barclays US Aggregate Bond Index	2.87%	2.70%	2.99%		3.98%		

Notes:
1. Equity correlations calculated using 180 months of data
2. OPERF Liquidity Fund (OLF) return assumption of 30 bps over Cash

Strategic Review: Additional Risk Metrics

Total Risk (Contribution)	Policy Benchmark	Actual Portfolio	Unlevered 1	Leveraged 12.5% 2	Leveraged 25% 3
Equity	0.00%	0.00%	0.00%	0.00%	0.00%
Rates	3.48%	3.18%	3.80%	3.90%	4.06%
Spreads	-0.27%	-0.15%	-0.23%	-0.24%	-0.25%
Foreign Exchange	0.00%	0.00%	0.00%	0.00%	0.00%
Alternative	0.00%	0.00%	0.00%	0.00%	0.00%
Inflation	0.00%	-0.02%	-0.03%	-0.03%	-0.03%
Volatility	0.01%	0.02%	0.00%	0.01%	0.01%
Other	0.00%	0.00%	0.00%	0.00%	0.00%
Total	**3.22%**	**3.03%**	**3.54%**	**3.64%**	**3.79%**

Total Risk (Stand Alone)	Policy Benchmark	Actual Portfolio	Unlevered 1	Leveraged 12.5% 2	Leveraged 25% 3
Equity	0.00%	0.00%	0.00%	0.00%	0.00%
Rates	3.63%	3.48%	3.88%	3.98%	4.15%
Spreads	1.06%	1.37%	0.76%	0.80%	0.84%
Foreign Exchange	0.00%	0.00%	0.00%	0.00%	0.00%
Alternative	0.00%	0.00%	0.00%	0.00%	0.00%
Inflation	0.00%	0.07%	0.07%	0.08%	0.08%
Volatility	0.07%	0.08%	0.03%	0.04%	0.04%
Other	0.00%	0.00%	0.00%	0.00%	0.00%
Total	**4.76%**	**5.00%**	**4.74%**	**4.90%**	**5.11%**

Note: Policy Benchmark refers to the Portfolio's disaggregated benchmark per OIC policies.

Rate Risk is Primary Factor Risk

Strategic Review: Additional Risk Metrics

Macro Factors - Total Risk Contribution (Fixed Income)	Policy Benchmark	Actual Portfolio	Unlevered 1	Leveraged 12.5% 2	Leveraged 25% 3
Economic Growth	0.00%	0.00%	0.00%	0.00%	0.00%
Credit	-0.17%	-0.07%	-0.17%	-0.18%	-0.19%
Real Rates	2.34%	2.32%	2.48%	2.59%	2.72%
Inflation	0.64%	0.47%	0.83%	0.84%	0.86%
EM	0.00%	0.00%	0.00%	0.00%	0.00%
Commodity	0.00%	0.00%	0.00%	0.00%	0.00%
Foreign Exchange	0.00%	0.00%	0.00%	0.00%	0.00%
Other	0.41%	0.31%	0.41%	0.38%	0.39%
Total	**3.22%**	**3.03%**	**3.55%**	**3.63%**	**3.78%**

Macro Factors - Total Risk Contribution (Total Portfolio)	Policy Benchmark	Actual Portfolio	Unlevered 1	Leveraged 12.5% 2	Leveraged 25% 3
Economic Growth	8.62%	8.62%	8.68%	8.68%	8.68%
Credit	0.42%	0.48%	0.33%	0.34%	0.35%
Real Rates	0.34%	0.34%	0.36%	0.37%	0.38%
Inflation	-0.56%	-0.55%	-0.52%	-0.53%	-0.53%
EM	-0.20%	-0.19%	-0.12%	-0.12%	-0.12%
Commodity	0.67%	0.67%	0.67%	0.67%	0.67%
Foreign Exchange	0.65%	0.64%	0.63%	0.63%	0.63%
Other	2.34%	2.34%	2.21%	2.20%	2.18%
Total	**12.28%**	**12.35%**	**12.24%**	**12.24%**	**12.24%**

Note: Policy Benchmark refers to the Portfolio's disaggregated benchmark per OIC policies.

Rate Risk is Primary Macro Risk for Fixed Income

Further De-Risking Lowers Credit Risk for OPERF

OREGON STATE TREASURY

Tobias Read
Oregon State Treasurer

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Salem, OR 97301-3896

oregon.gov/treasury

Callan

December 2019

Oregon Investment Council

OPERF Fixed Income Review

Fixed Income Portfolio

Summary Observations

- The Total Fixed Income portfolio continues to perform well and has exceeded the Custom Target Index over both near and longer term periods.
- As of September 30, 2019, the Fixed Income portfolio employed 7 strategies and accounted for 20% of OPERF.
  - The Portfolio is roughly 47% Core, 37% Treasuries and 17% Below Investment Grade
  - The Core portion is managed by four managers – AllianceBernstein, BlackRock, Wellington and Western
  - The Treasury portion is managed by OST Staff
  - Non-Core is managed by Oak Hill and KKR
  - The Portfolio is diversified across all sectors of the fixed income market
- With the dedicated Treasury and core Aggregate exposures, the portfolio is positioned to perform well in a down equity market consistent with its stated role in the OPERF portfolio.

Strategic Role and Policy Objectives of Fixed Income

Strategic Role

- Provide income, diversification and liquidity.
- Target allocation is 21% of the Total Fund.
- The investable universe can be described as investment grade securities as defined by the Bloomberg Barclays Aggregate index and below investment grade debt (leveraged loans and high yield).

Policy Objectives

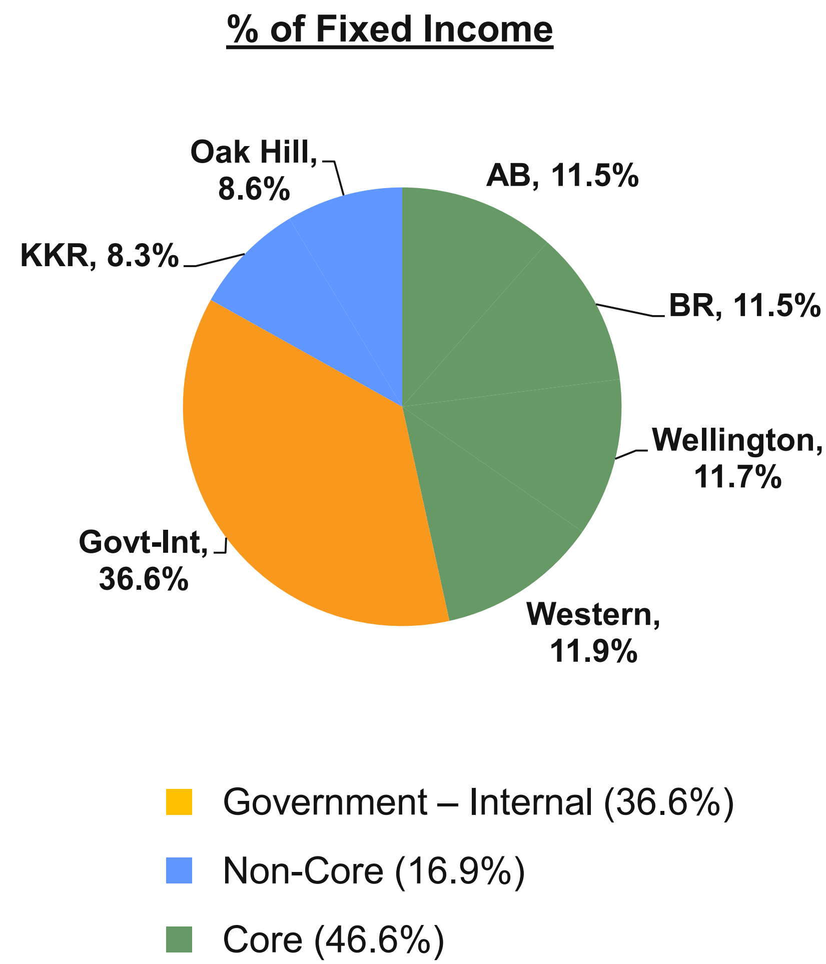
- Over a market cycle, achieve a rate of return at least 25 bps over the custom policy benchmark net of fees at a tracking error between 0.5-1.0%.
  - Portfolio return of 5.0% over trailing 10 years ended September 30, 2019 exceeds the Custom Benchmark by 1.15% net of fees
  - Custom Benchmark = 46% Bloomberg U.S. Aggregate; 37% Bloomberg U.S. Treasury; 13% S&P/LSTA Leveraged Loan Index; 4% ICE BofA ML High Yield Master II

Returns
for Periods Ended September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
OIC - PERS Fixed Income	2.18	9.40	3.31	3.27	5.00
OPERF Total Custom FI Benchmark	2.12	9.28	3.02	2.98	3.85
Public Fund 10+ B US FI	2.22	9.37	3.47	3.81	4.65

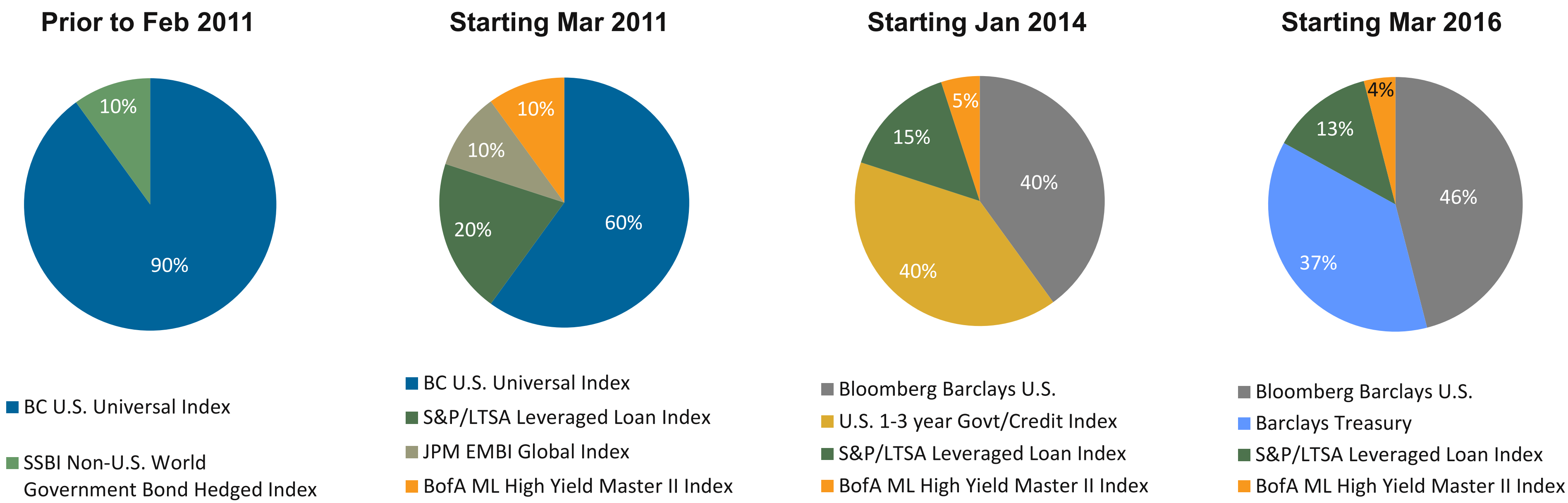
Fixed Income Managers

	September 30, 2019 Market Value	% of Total Fund
Total Fixed Income	**$15,437,500,098**	**20.01%**
Core Fixed Income	**$7,187,155,826**	**9.31%**
AllianceBernstein	1,778,303,928	2.30%
BlackRock	1,772,582,492	2.30%
Wellington	1,800,805,743	2.33%
Western Asset	1,835,463,664	2.38%
US Government	**$5,637,974,526**	**7.31%**
Government Portfolio	5,637,974,526	7.31%
Non-Core Fixed Income	**$2,612,368,309**	**3.39%**
KKR Credit Advisors	1,283,706,492	1.66%
Oak Hill	1,328,661,816	1.72%



Fixed Income Portfolio Evolution

Changes in the Custom Fixed Income Index



Significant Changes:

- Eliminated developed government non-U.S. fixed income (hedged) in March 2011
- Added emerging market debt, leveraged loans and high yield (total of 40%) in March 2011
- Added 40% high quality short duration in January 2014 and changed from the U.S. Universal to the Aggregate
- In March 2016, replaced short duration with full treasury curve (Bloomberg Barclays Treasury Index)

Performance

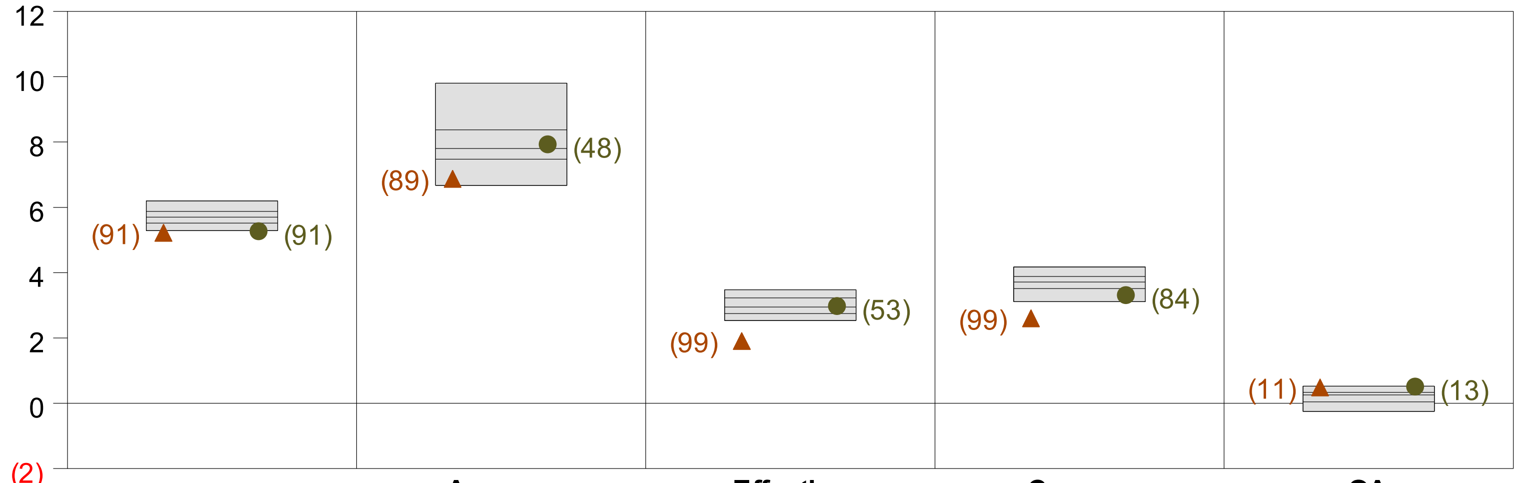
Net of Fees, Period Ending September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Total Fixed Income	**2.18%**	**9.40%**	**3.31%**	**3.27%**	**5.00%**
Oregon Custom FI Benchmark (15)	2.12%	9.28%	3.02%	2.98%	3.85%
Lg Public >10 B DF	2.22%	9.37%	3.47%	3.81%	4.65%
Core Fixed Income	**2.32%**	**10.48%**	**3.41%**	**3.83%**	**5.03%**
AllianceBernstein	2.09%	9.97%	3.10%	3.62%	4.70%
BlackRock	2.16%	10.12%	3.00%	3.50%	4.55%
Wellington	2.40%	10.23%	3.56%	4.04%	5.21%
Western Asset	2.62%	11.57%	3.98%	4.14%	5.70%
Oregon Custom FI Benchmark (16)	2.27%	10.30%	2.92%	3.38%	4.02%
CAI Core Bond Style	2.36%	10.51%	3.35%	3.75%	4.44%
US Government*	**2.41%**	**10.51%**	**2.27%**	**-**	**-**
Blmbg Treasury	2.40%	10.48%	2.24%	2.91%	3.08%
Callan Core Bond FI	2.36%	10.51%	3.35%	3.75%	4.44%
Non-Core Fixed Income	**1.32%**	**4.35%**	**4.96%**	**4.46%**	**6.74%**
Leveraged Loans & Bond Idx (23)	1.05%	3.91%	4.92%	4.34%	5.87%
KKR Credit Advisors	1.19%	3.76%	4.15%	3.80%	6.86%
Leveraged Loans & Bond Idx (17)	1.07%	4.23%	5.07%	4.48%	6.14%
Oak Hill	1.45%	4.93%	5.76%	5.22%	6.28%
Leveraged Loans & Bond Idx (18)	1.03%	3.58%	4.76%	4.19%	5.61%
Leveraged Bank Loans	1.10%	3.24%	4.61%	4.25%	5.52%

* Benchmark definitions in the Appendix

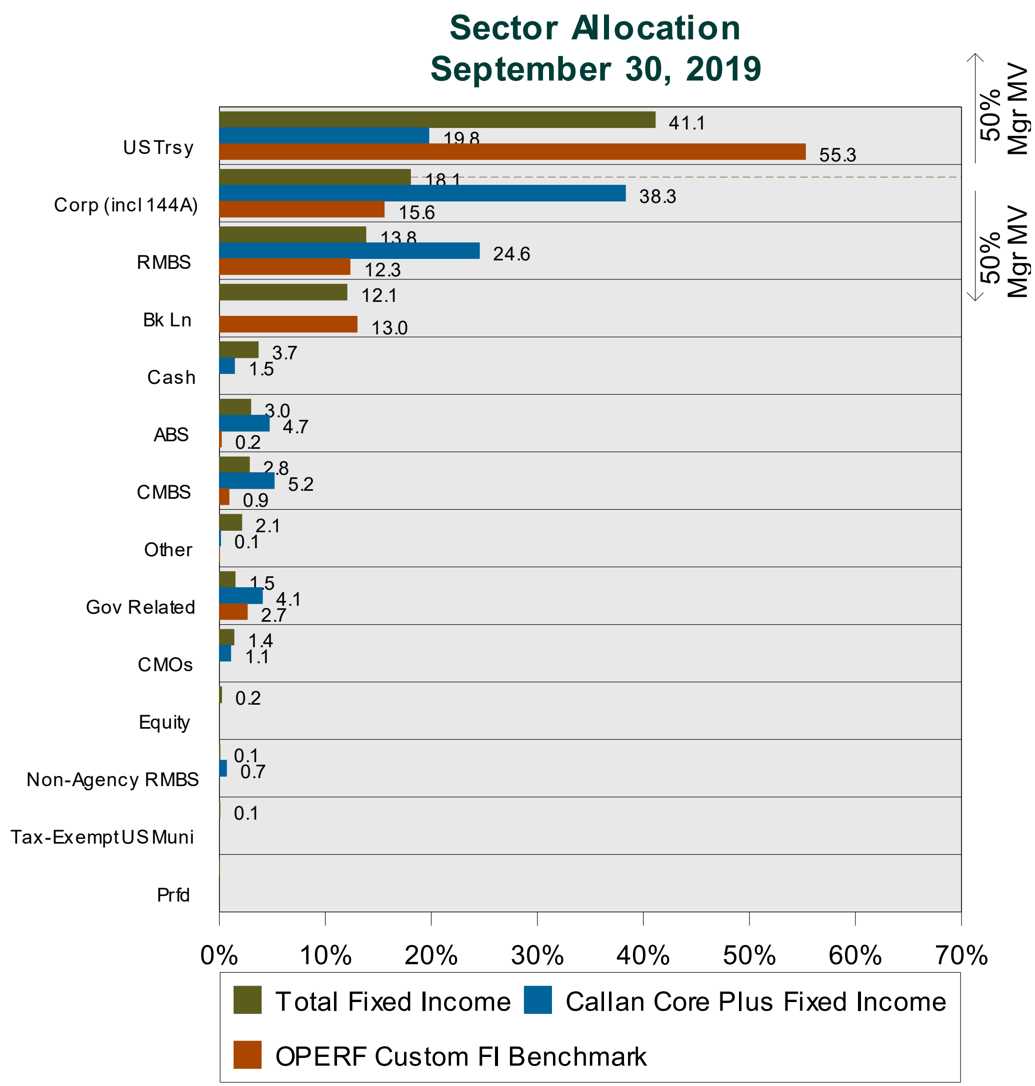
Fixed Income Portfolio Characteristics

Fixed Income Portfolio Characteristics
Rankings Against Callan Core Plus Fixed Income
as of September 30, 2019



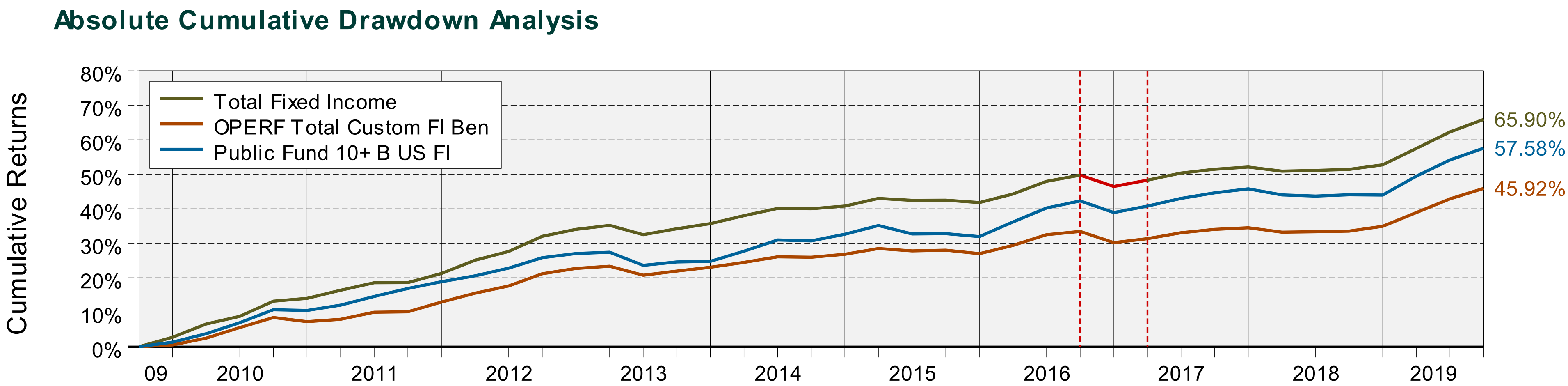
	Duration	Average Life	Effective Yield	Coupon Rate	OA Convexity
10th Percentile	6.20	9.80	3.48	4.17	0.52
25th Percentile	5.88	8.38	3.23	3.88	0.34
Median	5.70	7.80	2.95	3.71	0.25
75th Percentile	5.52	7.47	2.75	3.51	0.04
90th Percentile	5.29	6.67	2.54	3.11	(0.25)
Total Fixed Income ●	5.20	7.87	2.91	3.25	0.45
OPERF Custom FI Benchmark ▲	5.22	6.88	1.91	2.60	0.49

Fixed Income Sector Allocation



Absolute Cumulative Drawdown Analysis

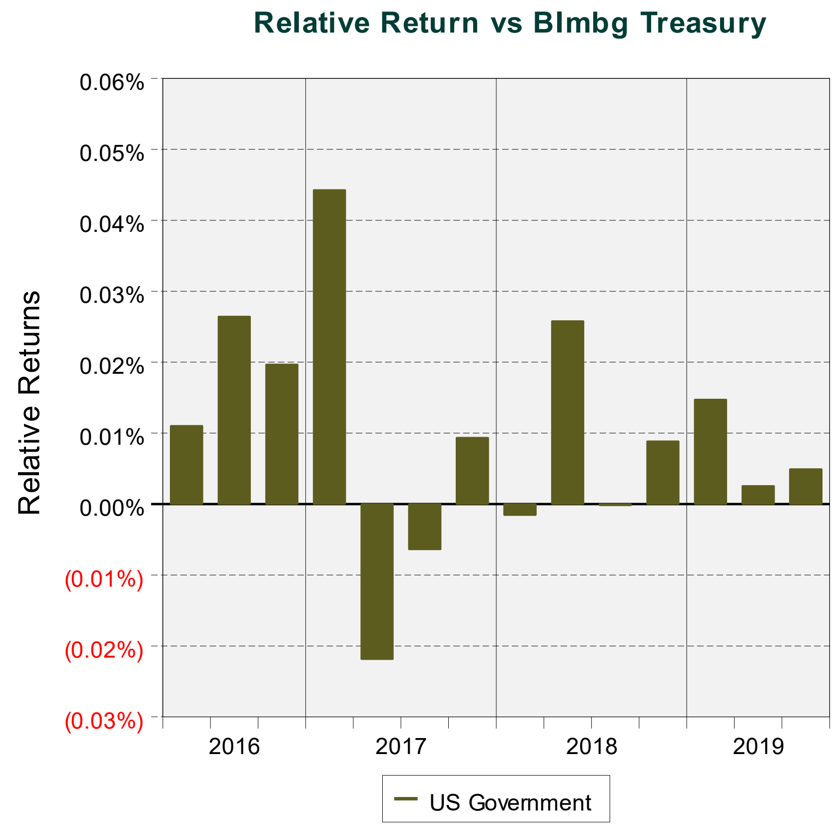
10 Years Ended September 30, 2019



	Worst Absolute Drawdown				
	Return	**Years**	**Period**	**Index**	**Peers**
Total Fixed Income	(0.98)%	0.50	2016/09-2017/03	(1.57)%	(1.02)%
Recovery from Trough	1.38%	0.25	2017/03-2017/06	1.29%	1.55%
OPERF Total Custom FI Ben	(1.57)%	0.50	2016/09-2017/03		
Public Fund 10+ B US FI	(2.37)%	0.75	2015/03-2015/12		

Internally Managed Treasury Portfolio

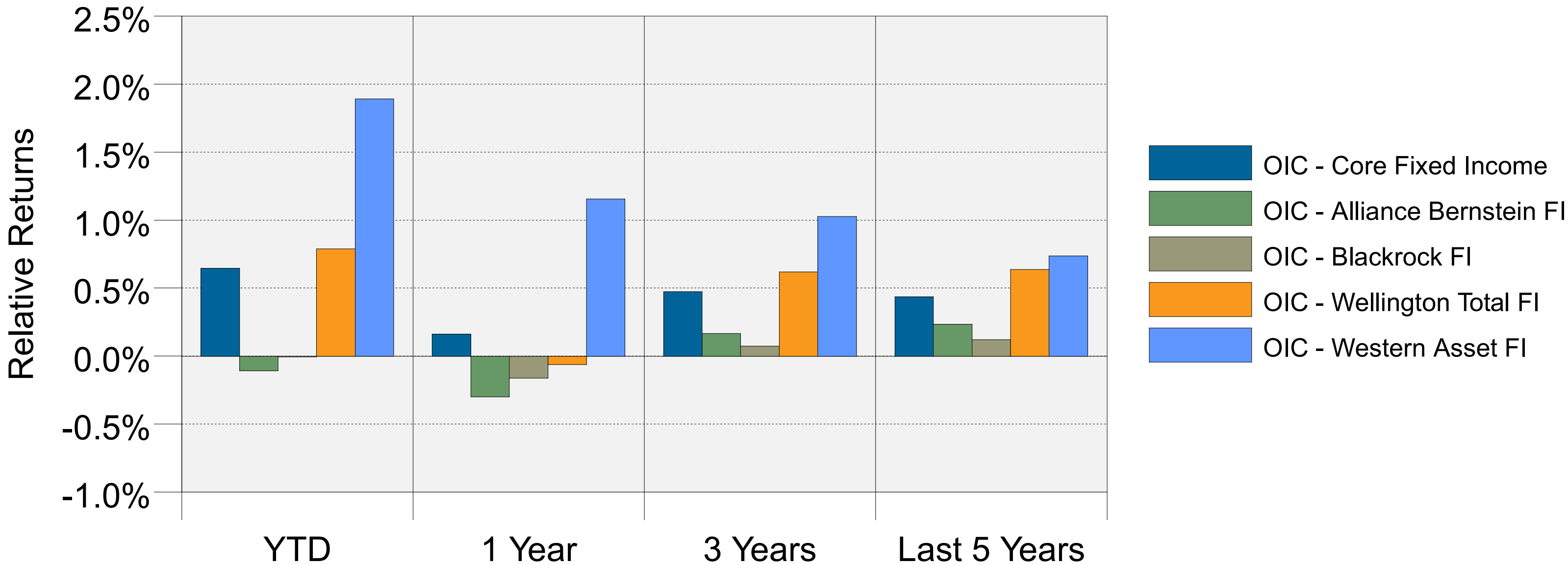
14 Quarters ended September 30, 2019



	Returns	Standard Deviation	Sharpe Ratio	Excess Return	Tracking Error	Information Ratio
OIC - Short Term Fixed Income	2.46%	3.84%	0.29%	0.02	0.04%	0.44%
Blmbg:Treasury	*2.44%*	*3.82%*	*0.28%*	*0.00*	*0.00%*	*0.00%*

Core Bond Manager Performance

Relative Returns vs Blmbg:Aggregate
Ending September 30, 2019



Below Investment Grade Returns and Selected Metrics

5 Years Ended September 30, 2019

	Returns	Standard Deviation	Sharpe Ratio	Maximum Drawdown	Excess Return	Tracking Error	Information Ratio
OIC - Big Fixed Income	4.46%	3.06%	1.13%	-4.39	0.12%	0.95%	0.71%
Leveraged Loans & Bond Idx (23)	*4.34%*	*3.45%*	*0.97%*	*-6.07*	*0.00%*	*0.00%*	*0.00%*
OIC - KKR Asset Management FI	3.80%	3.19%	0.88%	-4.57	-0.68%	1.55%	0.05%
Leveraged Loans & Bond Idx (17)	*4.48%*	*3.67%*	*0.95%*	*-6.52*	*0.00%*	*0.00%*	*0.00%*
OIC - Oak Hill FI	5.22%	3.14%	1.35%	-4.11	1.02%	0.72%	1.67%
Leveraged Loans & Bond Idx (18)	*4.19%*	*3.25%*	*0.99%*	*-5.62*	*0.00%*	*0.00%*	*0.00%*

Fixed Income as Equity Hedge

Correlation to MSCI ACWI IMI (OPERF Total Equity Benchmark)

Correlation
for Periods Ended September 30, 2019

	Last 5 Years	Last 10 Years	Last 20 Years
OST-Passive Target	0.11	(0.17)	(0.16)
Blmbg:Aggregate	0.04	(0.24)	(0.31)
Blmbg:Treasury	(0.18)	(0.50)	(0.56)
ML:HY Corp Mastr II	0.75	0.79	0.74
S&P:LSTA Lev Loan	0.69	0.78	0.61

- OST Passive Target = 46% Bloomberg U.S. Aggregate; 37% Bloomberg U.S. Treasury; 13% S&P/LSTA Leveraged Loan Index; 4% ICE BofA ML High Yield Master II

Benchmark References

- (15) Prior to February 28, 2011, index is Oregon Custom FI 90/10 Benchmark (90% BC US Universal Index and 10% SSBI Non-US World Gov't Bond Hedged Index). From March 1, 2011 to December 31, 2013, index is Oregon Custom FI Benchmark 60% BC US Universal Index, 20% S&P/LSTA Leveraged Loan Index, 10% JMP EMBI Global Index, and 10% BofA ML High Yield Master II Index). From January 1, 2014 to February 29, 2016, index is Oregon Custom FI Benchmark (40% Barclays Capital U.S. Aggregate Bond, 40% Barclays Capital U.S. 1-3 Govt/Credit Bond Index, 15% S&P/LSTA Leveraged Loan Index, and 5% BofA ML High Yield Master II Index). From March 1, 2016 to Present, index is 46% Barclays Aggregate Bond, 37% Barclays Treasury, 4% BofA ML High Yield Master II and 13% S&P/LSTA.
- (16) Prior to February 28, 2011, index is Oregon Custom External FI 90/10 Benchmark (90% BC US Universal and 10% SSBI Non-US World Gov't Bond Hedged Index). From March 1, 2011 to December 31, 2013, index is Oregon Custom External FI Benchmark (90% BC US Universal Index and 10% JMP EMBI Global Index). From January 1, 2014 to Current, index is Oregon Custom External FI Benchmark (100% Barclays Capital U.S. Aggregate Bond).
- (17) 65% S&P-LSTA/35% Merrill HY Master II.
- (18) 85% S&P-LSTA/15% Merrill HY Master II.
- (23) 75% S&P-LSTA/25% Merrill HY Master II.

Index Descriptions

- ***Bloomberg Barclays Aggregate:*** The Bloomberg Barclays US Aggregate Bond Index is a broad-based flagship benchmark that measures the investment grade, US dollar-denominated, fixed-rate taxable bond market. The index includes Treasuries, government-related and corporate securities, MBS (agency fixed-rate and hybrid ARM pass-throughs), ABS and CMBS (agency and non-agency).

- ***Bloomberg Barclays Treasury Index*****:** The Bloomberg Barclays US Treasury Index measures US dollar-denominated, fixed-rate, nominal debt issued by the US Treasury with at least one year to maturity.

- ***ICE BofA ML US High Yield Master II Index:*** tracks the performance of US dollar denominated below investment grade rated corporate debt publically issued in the US domestic market. To qualify for inclusion in the index, securities must have a below investment grade rating (based on an average of Moody's, S&P, and Fitch) and an investment grade rated country of risk (based on an average of Moody's, S&P, and Fitch foreign currency long term sovereign debt ratings). Each security must have greater than 1 year of remaining maturity, a fixed coupon schedule, and a minimum amount outstanding of $100 m.

- ***S&P/LSTA (Loan Syndications and Trading Association) U.S. Leveraged Loan Index (LLI)***: The index is a fixed-weighted index that tracks the performance of the U.S. senior loan market. Term loans from syndicated credits must meet the following criteria at issuance in order to be eligible for inclusion in the LLI: Senior secured; U.S. dollar denominated; minimum initial term of one year; minimum initial spread of *LIBOR* + 125 basis points; US$ 50 million initially funded loans. The loan must have been bought by an institutional investor, and must currently be in their portfolio.

Definition of Terms

- Alpha represents the historical return from an asset, based on factors unrelated to the underlying factors affecting the market. As such, Alpha is a measure of the return for asset specific (or residual) risk. Alpha is used as a measure of a manager’s contribution to performance due to security or sector selection. A positive (negative) Alpha indicates that a portfolio was positively (negatively) rewarded for the residual risk taken for a given level of market exposure. If the market excess return is 2% and the portfolio Beta is 1.1, then the manager would have to have an excess return greater than 2.2% for the manager to have contributed to performance above and beyond the performance of the market.

- Beta is a measure of the systematic risk of a security or portfolio. Beta measures the historical sensitivity of portfolio or security excess returns to movements in the excess return of the market index. The value for Beta is expressed as a percentage of the market where the market Beta is 1.00. A security or portfolio with a Beta above the market has volatility greater than the market. If the Beta of a security was 1.3, a 1 percent increase in the market return resulted, on average, in a 1.3 percent increase in the security’s return. A security or portfolio with Beta below the market has lower volatility than the market and the return on the security will move less than the market return. If the Beta of the security was .9, a 1 percent decrease in the market resulted in only a .9 percent decrease in the security’s return.

- Down Market Capture is determined by the index which has a Down-Capture ratio of 100% when the index is performing negatively. If a manager captures less than 100% of the declining market it is said to be "defensive".

- Excess Return is a portfolio return minus the benchmark.

- Information Ratio is a risk statistic that measures the excess return per unit of residual “non-market” risk in a portfolio. The ratio is equal to the Alpha divided by the Residual Risk. Because the Information Ratio represents a residual-risk adjusted measure of the excess returns of a portfolio, the resulting value can be looked at as the excess return per unit of risk that is due solely to the specific risks associated with the securities in the portfolio and by definition could be diversified away.

- Maximum Drawdown is the maximum loss from a peak to a trough of a portfolio, before a new peak is attained.

Definition of Terms

- R-Squared indicates the extent to which the variability of the portfolio returns are explained by market action. It can also be thought of as measuring the diversification relative to the appropriate benchmark. An r-squared value of .75 indicates that 75% of the fluctuation in a portfolio return is explained by market action. An r-squared of 1.0 indicates that a portfolio's returns are entirely related to the market and it is not influenced by other factors. An r-squared of zero indicates that no relationship exists between the portfolio's return and the market.
- Sharpe Ratio is a commonly used measure of risk-adjusted return. It is calculated by subtracting the "risk-free" return (usually 3 Month Treasury Bill) from the portfolio return and dividing the resulting "excess return" by the portfolio's risk level (standard deviation). The result is a measure of return gained per unit of risk taken.
- Sortino Ratio measures excess return over a benchmark divided by downside risk. The natural appeal is that it identifies value-added per unit of truly bad risk. The danger of interpretation, however, lies in the two areas: (1) the statistical significance of the denominator, and (2) its reliance on the persistence of skewness in return distributions.
- Standard Deviation is a statistical measure of portfolio risk. It reflects the average deviation of the observations from their
- Sample mean. Standard deviation is used as an estimate of risk since it measures how wide the range of returns typically is. The wider the typical range of returns, the higher the standard deviation of returns, and the higher the portfolio risk. If returns are normally distributed (e.g., has a bell shaped curve distribution) then approximately 2/3 of the returns would occur within plus or minus one standard deviation from the sample mean.
- Tracking Error is a statistical measure of a portfolio's risk relative to an index. It reflects the standard deviation of a portfolio's individual quarterly or monthly returns from the index's returns. Typically, the lower the Tracking Error, the more "index-like" the portfolio.
- Up Market Capture is determined by the index which has an Up-Capture ratio of 100% when the index is performing positively. If a manager captures more than 100% of the rising market it is said to be "offensive".

December 11, 2019 Oregon Investment Council

Fixed Income Portfolio 2019 Review and 2020 Plan

Geoff Nolan, Senior Investment Officer

Garrett Cudahey, Investment Officer

Tom Lofton, Investment Officer

OREGON STATE TREASURY

Agenda

1. Background/Objectives
2. Looking Back and Looking Ahead
3. Fixed Income Program Overview
4. Discussion on Select Accounts
5. Appendix

Background / Objectives

Putting Fixed Income in Context

- Oregon Investment Council (OIC) Oversight
  - The OIC sets policy and is ultimately responsible for the Investment Program
    - The OIC is a policy-setting council that largely delegates investment management activities to the Oregon State Treasury (OST) and qualified external fiduciaries.
    - The OIC has authority to set and monitor portfolio risk. Both short term and long term risks are critical.
    - To exploit market inefficiencies, the OIC must be contrarian, innovative and opportunistic in its investment approach.
    - Internal incentive structures should be carefully evaluated to ensure proper alignment with specific investment objectives.
    - Adequate resources are required to successfully compete in global capital markets.

- Role of Fixed Income in Oregon Public Employees Retirement Fund (OPERF) = Diversification & Liquidity
  - The role of fixed income investments, pursuant to policy INV 401, is to:
    - provide diversification to the OPERF portfolio in general and to equity securities in particular, and
    - provide liquidity to help meet OPERF's cash flow needs.
  - Realized Fixed Income Benefits:
    - ✓ Adding Diversification: Correlation to OPERF portfolio of -0.15 and Public Equities of -0.25. (9/30/19)
    - ✓ Adding Liquidity: (a) ~$13BN available within 7 days

Fixed Income's Role: Providing Diversification and Liquidity for OPERF

Agenda

1. Background/Objectives
2. Looking Back and Looking Ahead
3. Fixed Income Program Overview
4. Discussion on Select Accounts
5. Appendix

Looking Back and Looking Ahead

- 2019 Market Update
  - Compared to 2018 in which headwinds led to a dispersion of investment returns, in 2019 fixed income markets staged a strong comeback supported by dovish central banks, a US economy that is holding up and continued global demand for US fixed income assets. These trends persisted despite ongoing trade war tensions and concerns about what a yield curve inversion may portend.
    - Investment Grade: +13.5%, High Yield: +11.9%, U.S. Government: +7.7%, Leveraged Loans: +6.2%, Mortgages: 6.1%(1)
    - EM Sovereigns: +12.1%, S&P 500: +24.4%(1)
- 2019 Highlights
  - Local Government Investor Day Conference
  - Team Build Out Completed – 3 Investment Analysts & 1 Investment Officer Hired
  - Fixed Income Strategic Review Completed
  - Enhanced Internal / External Client Reporting, External Manager Monitoring
  - Team Cross-Training
- 2020 Goals
  - Continue Team Development ➔ People Are An Organization's Most Valuable Asset
    - Continue to Develop Bench Strength: new analyst training / intra-desk rotations; team cross-training
  - Strategic Fixed Income Strategic Review Implementation (if approved)
  - Client Outreach Initiatives ➔ Goals = Educate / Enhance Communication & Transparency
    - Client Portfolio Meetings

2019 Review: Team & Platform Buildout. 2020 Goals: Team & Platform Initiatives.

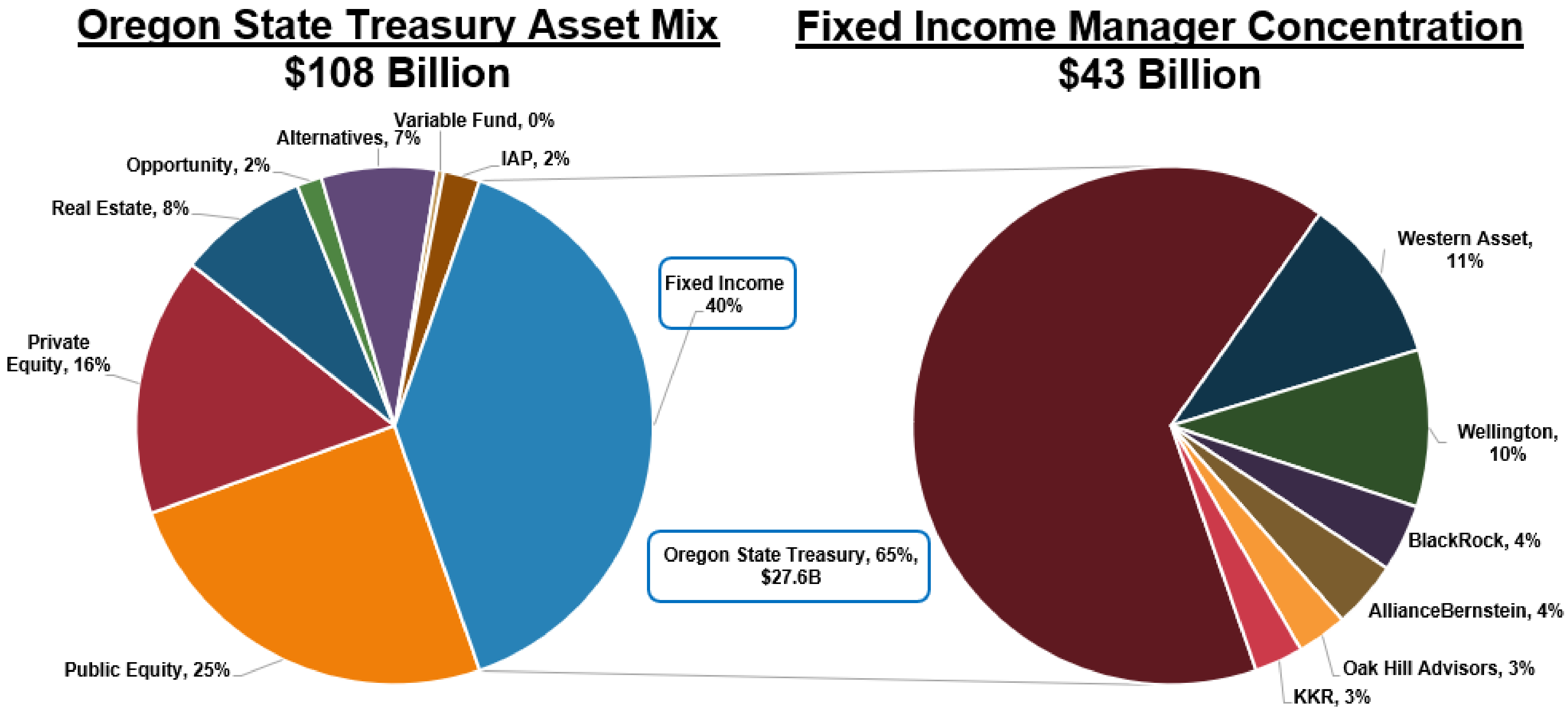
OREGON STATE TREASURY

(1) returns as of 11/01/19; Source: CreditSights

Agenda

OST Fixed Income Program Overview

Putting Fixed Income in Context



As of October 31, 2019

Fixed Income & OST-Managed Funds Represent a Significant Portion of OST Assets

OST Fixed Income Program Overview

Putting Fixed Income in Context

- 1. Oregon Public Employees Retirement Fund $15.47 Billion
  - 1(A) Government Portfolio $5.64 Billion
    - Oregon State Treasury $5.64 Billion
  - 1(B) Core Fixed Income $7.22 Billion
    - AllianceBernstein $1.78 Billion
    - BlackRock $1.78 Billion
    - Wellington $1.81 Billion
    - Western Asset $1.85 Billion
  - 1(C) Non-Core Fixed Income $2.61 Billion
    - KKR $1.28 Billion
    - Oak Hill $1.33 Billion
- 2. State Agency & Local Government $23.67 Billion
  - 2(A) Oregon Short Term Fund $21.50 Billion
  - 2(B) Oregon Intermediate Term Pool Oregon State Treasury $137 Million
  - 2(C) Oregon Local Government Investment Fund – Western $238 Million
  - 2(D) Oregon Public University Fund Oregon State Treasury $311 Million
  - 2(E) Oregon Agency Separate Accounts Oregon State Treasury $1.48 Billion
    - Dept of Admin Svcs $147 Million
    - Dept of Consumer & Business Svcs $286 Million
    - Dept of Veteran Affairs $100 Million
    - Oregon Dept of Transportation $803 Million
    - Lottery $125 Million
    - Dept of Housing & Comm Svcs $16 Million
- 3. State Accident Insurance Fund (SAIF) $4.22 Billion
  - Core Fixed Income $4.22 Billion
    - Wellington $2.11 Billion
    - Western Asset $2.12 Billion
- 4. Common School Fund (CSF) $487 Million
  - Core Fixed Income $487 Million
    - Wellington $242 Million
    - Western Asset $245 Million

Internally Managed $29.3 Billion

Externally Managed $14.5 Billion

As of October 31, 2019

OST Oversees A Variety of Strategies That Serve A Diverse Oregonian Client Base

Agenda

1. Background/Objectives
2. Looking Back and Looking Ahead
3. Fixed Income Program Overview
4. Discussion on Select Accounts
5. Appendix

OREGON STATE TREASURY

Select Accounts Discussion

- Oregon Public Employees Retirement Fund (OPERF) – Fixed Income
  - Geoff Nolan, Senior Investment Officer

- Oregon Short Term Fund (OSTF)
  - Garrett Cudahey, Investment Officer

- Oregon Intermediate Term Pool (OITP)
  - Tom Lofton, Investment Officer

Meeting OPERF, OSTF & OITP Portfolio Objectives

Oregon Public Employees Retirement Fund (OPERF): Fixed Income

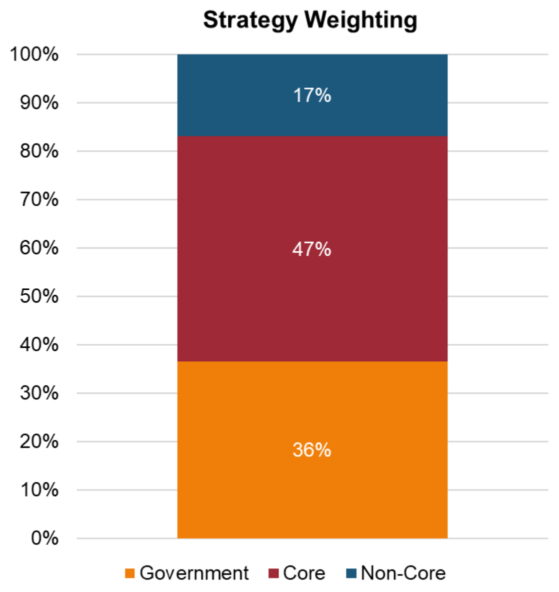
Objective – To provide diversification to the OPERF portfolio in general and to equity exposures in particular. Additionally, the fixed income portfolio is designed to provide liquidity and income to help meet cash flow needs. Over a market cycle of three to five years, and on a net-of-fee basis, the performance objective is to achieve a total return of at least 25 basis points above the custom policy benchmark while maintaining an annualized targeted tracking error between 0.5 to 1.0 percent.

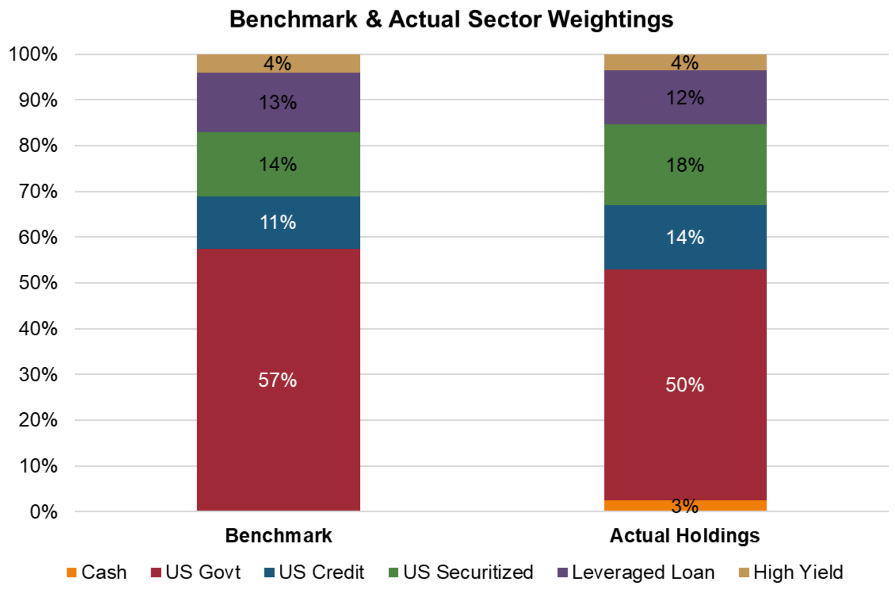
Strategy – OPERF's fixed income portfolio is deployed into three actively managed strategies: a U.S. government allocation; a core bond allocation; and an allocation to bank loan and high yield securities.

Benchmark – The benchmark is a custom blend comprised of:

- 37% Bloomberg Barclays U.S. Treasury Index;
- 46% Bloomberg Barclays U.S. Aggregate Index;
- 13% S&P/LSTA Leveraged Loan Index; and
- 4% Bank of America Merrill Lynch High Yield Master II Index.

		Yield to Maturity		Duration		Effective Rating	
Portfolio	NAV ($Ms)	Portfolio	Benchmark	Portfolio	Benchmark	Portfolio	Benchmark
OPERF FI	15,468,796	2.78	2.72	4.96	5.06	AA-	AA-
CORE FI	7,216,650	2.30	2.23	5.29	5.63	AA	AA
NON-CORE	2,610,196	6.49	6.35	0.69	0.51	B	B+
GOVT	5,641,948	1.68	1.67	6.52	6.45	AAA	AAA





	Market Value ($Ms)	1 Mth	3 Mth	YTD	1 Year	2 Year	3 Year	4 Year	5 Year	7 Year	10 Year
OPERF Total Fixed Income	**15,468,796**	**0.20**	**2.17**	**8.72**	**10.36**	**4.56**	**3.57**	**3.66**	**3.20**	**3.08**	**4.91**
OPERF Custom Fixed Income Benchmark		0.11	2.05	8.26	10.08	4.36	3.28	3.33	2.88	2.65	3.81
Excess Return		0.09	0.12	0.46	0.28	0.20	0.29	0.33	0.32	0.43	1.10

As of October 31, 2019

OPERF Core Fixed Income Portfolio

Objective – The OPERF Core Fixed Income Portfolio is designed to provide exposure to the broad, liquid U.S. investment grade bond universe in order to provide a diversifying return stream to OPERF that seeks to complement OPERF's risk-asset exposures while providing liquidity and income to help fund both the plan's beneficiary payment obligations and other investment opportunities. The performance goal is a higher, after-fee and risk-adjusted return relative to the broad U.S. investment grade bond market.

Strategy – To achieve its objective, the core allocation is actively invested against the Bloomberg Barclays U.S. Aggregate index which encompasses the liquid, investment grade government, corporate and securitized bond markets in the United States. Staff seeks to allocate the core mandate amongst high-conviction firms that are complementary to each other in the way they view markets and structure portfolios.

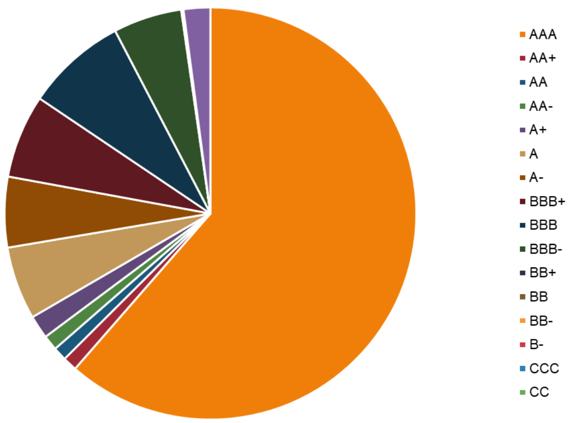
Managers – The portfolio is currently allocated to the following four external firms:

- AllianceBernstein
- BlackRock
- Wellington Management
- Western Asset

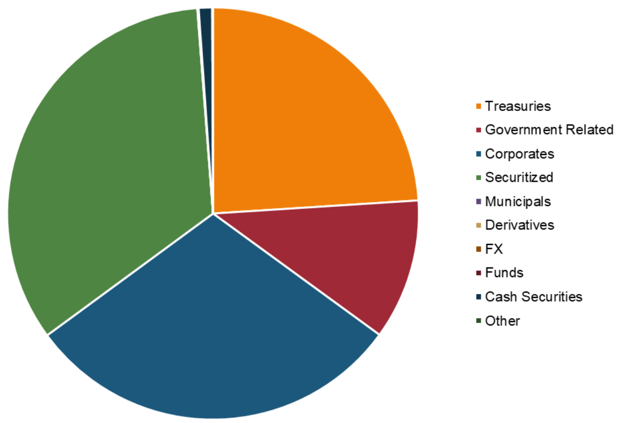
Benchmark – Bloomberg Barclays U.S. Aggregate Bond Index

		Yield to Maturity		Duration		Effective Rating	
Portfolio	NAV ($Ms)	Portfolio	Benchmark	Portfolio	Benchmark	Portfolio	Benchmark
CORE FI	7,216,650	2.30	2.23	5.29	5.63	AA	AA
Western Asset	1,846,966	2.88	2.23	6.18	5.63	AA-	AA
Wellington	1,806,692	1.60	2.23	4.72	5.63	AA	AA
BlackRock	1,779,841	2.27	2.23	5.33	5.63	AA	AA
AllianceBernstein	1,783,151	2.43	2.23	4.92	5.63	AA	AA

Rating Exposures



Sector Exposures



	Market Value ($Ms)	1 Mth	3 Mth	YTD	1 Year	2 Year	3 Year	4 Year	5 Year	7 Year	10 Year
Core Fixed Income	**7,216,650**	**0.41**	**2.45**	**9.67**	**11.99**	**4.86**	**3.78**	**4.12**	**3.74**	**3.38**	**4.96**
AllianceBernstein	1,783,151	0.27	2.21	8.70	11.07	4.55	3.39	3.78	3.49	3.14	4.61
BlackRock	1,779,841	0.41	2.30	8.96	11.48	4.59	3.39	3.68	3.40	3.10	4.51
Wellington	1,806,692	0.33	2.42	9.73	11.65	4.78	3.90	4.28	3.97	3.51	5.06
Western Asset	1,846,966	0.63	2.85	11.27	13.74	5.51	4.45	4.71	4.08	3.77	5.63
OPERF Custom Core Fixed Income Benchmark		0.30	2.35	8.85	11.51	4.51	3.29	3.56	3.24	2.83	4.01
Excess Return		0.11	0.10	0.82	0.48	0.35	0.49	0.56	0.50	0.55	0.95

As of October 31, 2019

OPERF Non-Core Fixed Income Portfolio

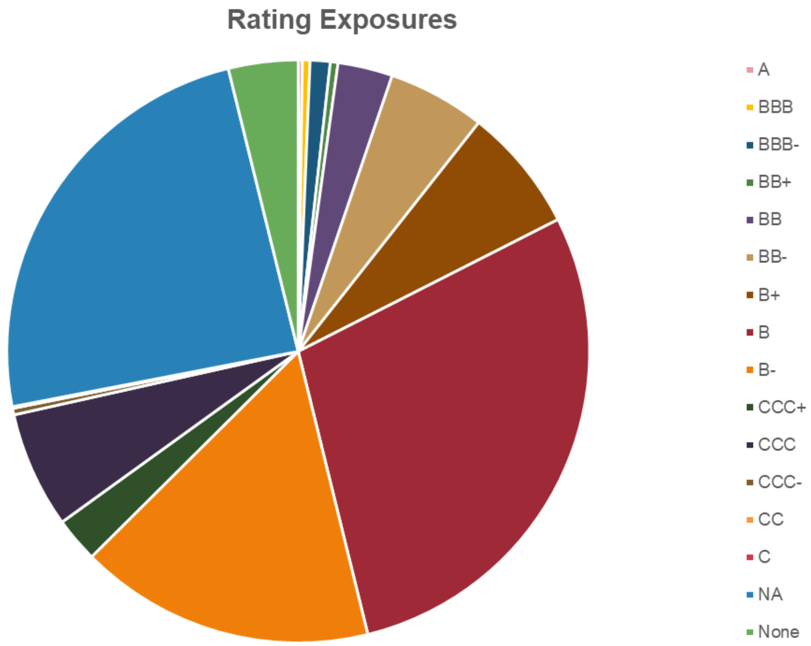
Objective – The non-core allocation is designed to provide enhanced expected return opportunities and diversification from the government and core fixed income allocations by accessing risk and return sources different from those traditionally available in the core and government portions of the OPERF fixed income portfolio.

Strategy – To achieve the objective, the non-core allocation is actively invested in a mix of bank loans and high yield bonds that offer exposure to corporate credit spreads with limited interest rate risk given the floating rate nature of bank loans. A significant portion of the bank loan allocation is in secured positions that are higher in the capital structure than traditional high-yield bonds and thus offer better protection through higher recovery rates in the event of a default or credit event.

Managers – The portfolio is allocated to two external firms:
- KKR
- Oak Hill Advisors

Benchmark – Each manager has a unique benchmark:
- KKR - 65% S&P LSTA Leveraged Loan Index; 35% BAML High Yield Master II
- Oak Hill - 85% S&P LSTA Leveraged Loan Index; 15% BAML High Yield Master II

		Yield to Maturity		Duration		Effective Rating		Option Adjusted Spread	
Portfolio	NAV ($Ms)	Portfolio	Benchmark	Portfolio	Benchmark	Portfolio	Benchmark	Portfolio	Benchmark
NON-CORE	2,610,196	6.49	6.35	0.69	0.51	B	B+	437.33	421.40
Oak Hill Advisors	1,327,592	6.35	6.35	0.52	0.31	B	B+	428.46	423.79
KKR	1,282,604	6.63	6.36	0.87	0.72	B	B+	446.52	419.93



	Market Value ($Ms)	1 Mth	3 Mth	YTD	1 Year	2 Year	3 Year	4 Year	5 Year	7 Year	10 Year
Non-Core Fixed Income	**2,610,196**	**-0.08**	**0.48**	**8.09**	**4.63**	**4.10**	**4.70**	**5.18**	**4.33**	**4.97**	**6.65**
KKR	1,282,604	-0.09	0.36	8.11	4.25	3.65	3.91	4.51	3.71	4.66	6.74
KKR Custom Leveraged Loans/Bond Index		-0.21	0.16	8.20	4.63	3.93	4.77	5.52	4.31	4.63	6.02
Excess Return		0.12	0.20	-0.09	-0.38	-0.28	-0.86	-1.01	-0.60	0.03	0.72
Oak Hill Advisors	1,327,592	-0.08	0.60	8.08	5.00	4.53	5.49	5.88	5.03	5.23	6.27
Oak Hill Custom Leveraged Loans/Bond Index		-0.35	-0.08	7.12	3.51	3.74	4.38	5.05	4.04	4.27	5.51
Excess Return		0.27	0.68	0.96	1.49	0.79	1.11	0.83	0.99	0.96	0.76

As of October 31, 2019

OPERF Government Portfolio

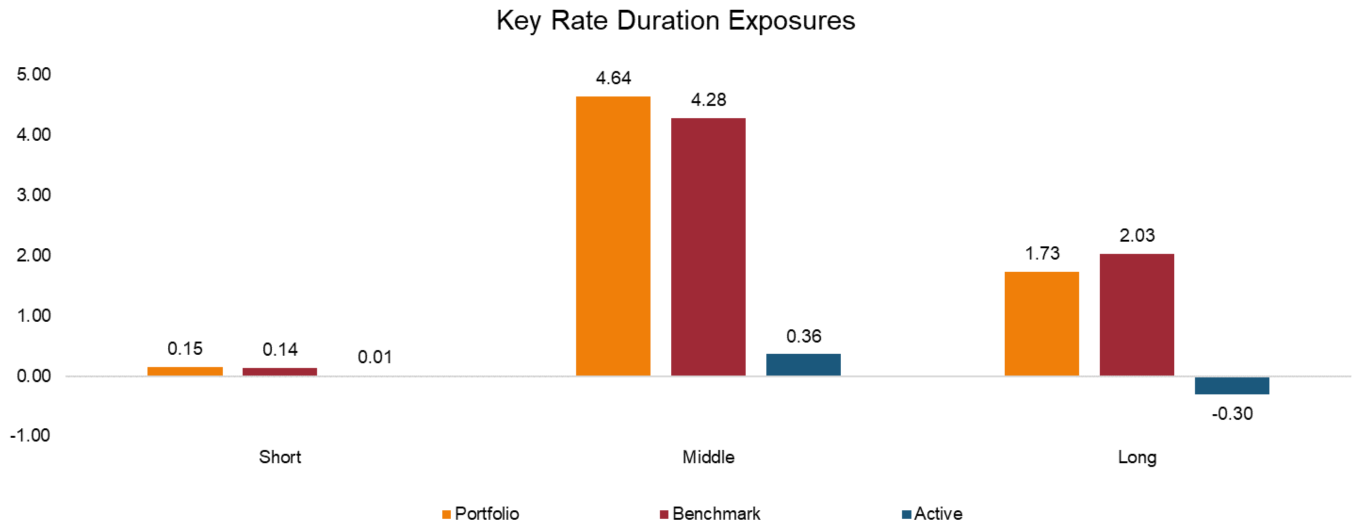
Objective – The Government Portfolio's objective is to enhance the diversification benefit of the OPERF fixed income portfolio versus OPERF's otherwise large allocation to risk assets (e.g., Public Equity, Private Equity, Real Estate and Alternatives) and to provide a reliable source of liquidity. Over a market cycle of three to five years, and on a net-of-fee basis, the objective is to achieve a return of 0.00 basis points above the policy benchmark while maintaining an annualized targeted tracking error between 0.5 to 1.0 percent.

Strategy – The Government Portfolio is managed to closely match the benchmark with minimal active risk. To achieve this goal, staff seeks to maintain a key rate duration profile similar to the benchmark while holding fewer positions than the benchmark in order to reduce trading costs.

Manager – Oregon State Treasury

Benchmark – Bloomberg Barclays U.S. Treasury Index

		Yield to Maturity		Duration		Effective Rating	
Portfolio	NAV ($Ms)	Portfolio	Benchmark	Portfolio	Benchmark	Portfolio	Benchmark
GOVT Portfolio	5,641,948	1.68	1.67	6.52	6.45	AAA	AAA



	Market Value ($Ms)	1 Mth	3 Mth	YTD	1 Year	2 Year	3 Year	4 Year	5 Year
OPERF Government Fixed Income	**5,641,948**	**0.07**	**2.60**	**7.81**	**11.11**	**4.38**	**2.67**	**2.23**	**1.99**
OPERF Government Fixed Income Benchmark		0.07	2.59	7.78	11.08	4.35	2.64	2.26	1.98
Excess Return		0.00	0.01	0.03	0.03	0.03	0.03	-0.03	0.01

As of October 31, 2019

Oregon Short Term Fund (OSTF)

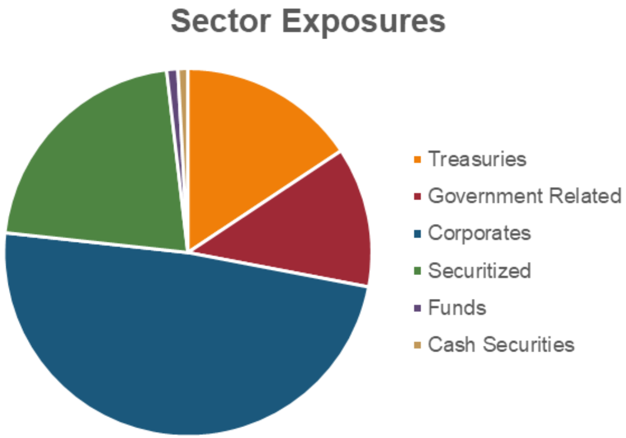
Objective – The investment objectives of the Oregon Short Term Fund ("OSTF") are, in priority order, preservation of principal, maintenance of a sufficient level of liquidity to meet all state agency and local government operating requirements and attainment of a yield greater than money market and other short-term alternatives through investments in high-quality, U.S. dollar-denominated fixed income securities. The fund serves as a short-term cash investment vehicle for agencies and local government entities in the State of Oregon, including OPERF.

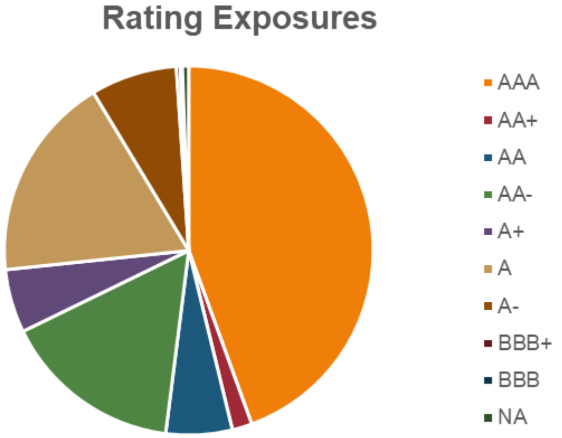
Strategy – OSTF is invested consistent with the fund's objectives by creating a diversified portfolio comprised of a broad range of fixed income investments. Securities may include the following: U.S. government securities, including U.S. Treasury obligations and securities issued by U.S. Agencies and instrumentalities; securities issued by foreign governments and instrumentalities; certificates of deposit and time deposits in certain qualified depositories; commercial paper; corporate bonds; asset-backed securities; municipal securities; bankers' acceptances; repurchase agreements; and investments in the Oregon Local Government Intermediate Fund. Investments may be made in securities that are issued at a discount or pay interest based on a fixed or floating rate coupon. All securities are denominated in U.S. dollars.

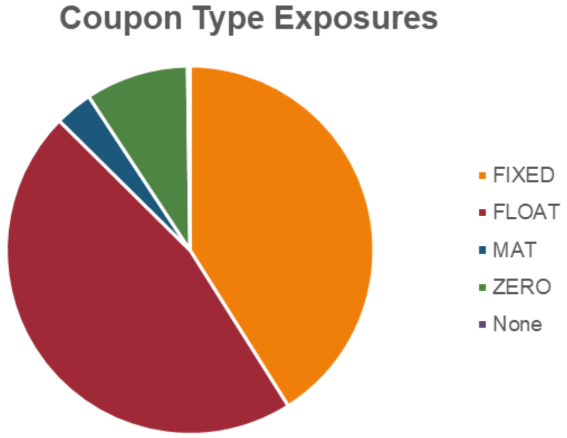
Manager – Oregon State Treasury

Benchmark – 3-Month U.S. T-Bill Index

Fund Characteristics	
Net Assets	$ 21,498,574,108.00
Fund NAV/OSTF Balances (9/30/2019)	$1.0090
Wtd. Avg. Credit Quality	AA/Aa2/AA-
Book Yield	2.36%
Wtd. Avg. Maturity (days)	221
Duration (years)	0.54
Spread Duration (years)	0.97
Rate Paid	2.45%







	Market Value ($Ms)	1 Mth	3 Mth	YTD	1 Year	2 Year	3 Year	4 Year	5 Year	7 Year	10 Year
Oregon Short Term Fund*	21,498,574	0.25	0.76	2.96	3.38	2.57	2.14	1.87	1.60	1.33	1.19
91 Day Treasury Bill		0.19	0.57	2.01	2.40	2.04	1.60	1.27	1.02	0.75	0.56
Excess Return		0.06	0.19	0.95	0.98	0.53	0.54	0.60	0.58	0.58	0.63

As of October 31, 2019

*Includes investments in the Oregon Short Term Fund

Oregon Intermediate Term Pool (OITP)

Objective – The Oregon Intermediate Term Pool ("OITP") is a high-quality, intermediate-duration investment pool that is offered to Oregon State Agencies. The OITP investment objective is to maximize total return (i.e., principal and income) within stipulated risk parameters. OITP is not appropriate for funds needed to cover short-term (i.e., less than 1 year) needs. The OITP performance goal portfolio is to meet or outperform the total return of the Bloomberg Barclays 3-5 Year U.S. Aggregate Index.

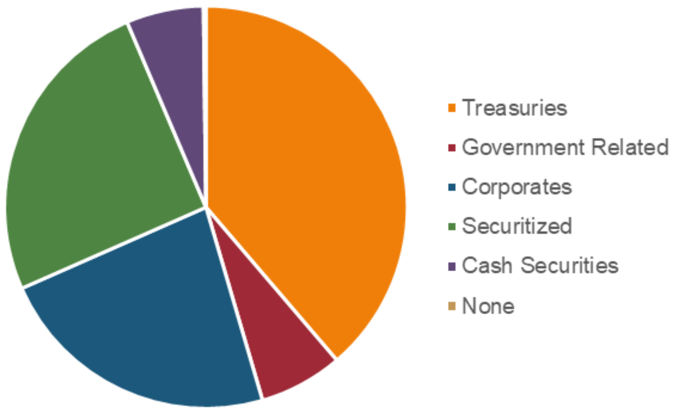
Strategy – OITP is actively managed and comprises a diversified portfolio of investment grade fixed income investments as prescribed in the portfolio guidelines. OITP may have exposures, subject to diversification requirements, to several types of investment grade public debt market instruments denominated in U.S. dollars.

Manager – Oregon State Treasury

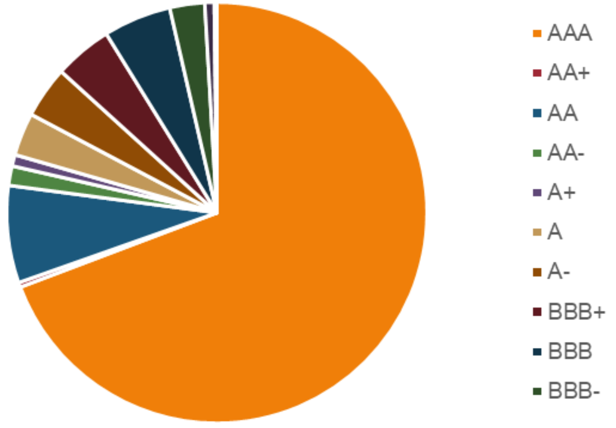
Benchmark – Bloomberg Barclays 3-5 Year Aggregate Index

		Yield to Maturity		Duration		Effective Rating	
Portfolio	NAV ($Ms)	Portfolio	Benchmark	Portfolio	Benchmark	Portfolio	Benchmark
OITP	137,484	1.94	2.11	2.90	2.99	AA	AA+

Sector Exposures



Ratings Exposures



	Market Value ($Ms)	1 Mth	3 Mth	YTD	1 Year	2 Year	3 Year	4 Year	5 Year	7 Year
Oregon Intermediate Term Pool*	137,484	0.36	1.47	6.03	7.58	3.33	2.63	2.70	2.46	2.21
Oregon Intermediate Pool Custom Benchmark		0.35	1.55	6.14	8.14	3.44	2.49	2.61	2.40	2.04
Excess Return		0.01	-0.08	-0.11	-0.56	-0.11	0.14	0.09	0.06	0.17

As of October 31, 2019

*Includes investments in the Oregon Short Term Fund

OREGON STATE TREASURY

Oregon Local Government Fund (OLGIF)

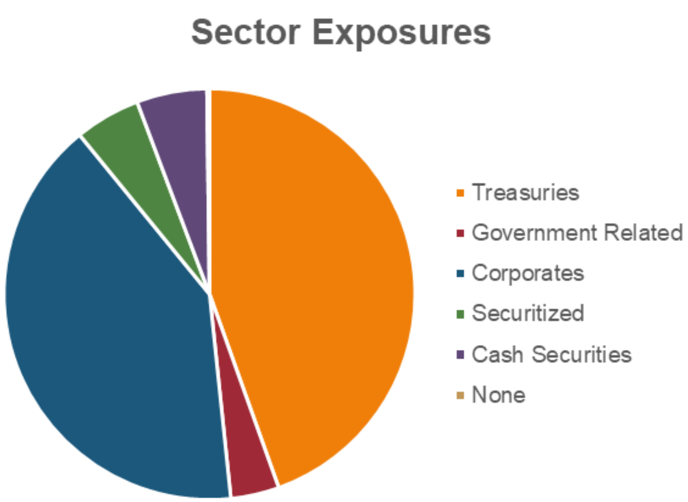
Objective – The Oregon Local Government Intermediate Fund ("OLGIF") is a commingled investment pool for local governments offered by Oregon State Treasury. The OLGIF investment objective is to achieve a total return (i.e., principal and income) greater than its benchmark over a full market cycle. OLGIF is expected to provide a risk and return profile consistent with a diversified investment-grade and intermediate-duration fixed income portfolio.

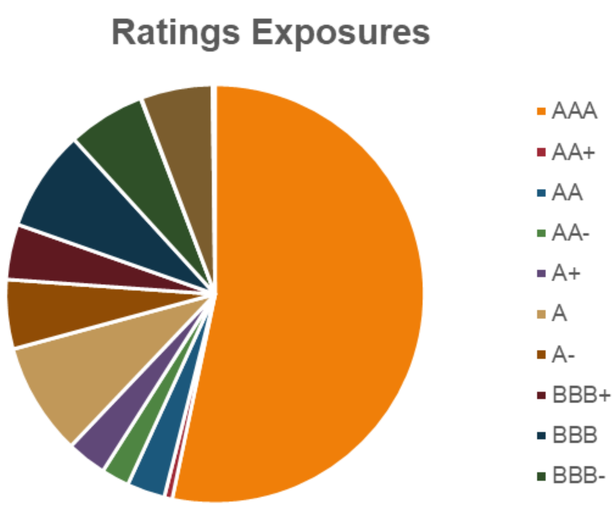
Strategy – OLGIF is actively managed to achieve a total return greater than the benchmark by investing in U.S. dollar-denominated investment grade fixed income securities as prescribed in the portfolio guidelines and consistent with the fund's benchmark.

Manager – Western Asset

Benchmark – Bloomberg Barclays 1-5 Year U.S. Government/Credit Index

		Yield to Maturity		Duration		Effective Rating	
Portfolio	NAV ($Ms)	Portfolio	Benchmark	Portfolio	Benchmark	Portfolio	Benchmark
Western Assets	238,397	1.86	1.74	2.78	2.65	AA-	AA





	Market Value ($Ms)	1 Mth	3 Mth	YTD	1 Year	2 Year	3 Year
Oregon Local Government Investment Fund	238,397	0.32	1.39	5.45	6.76	3.20	2.34
Bloomberg Barclays 1-5 Year Government/Credit Index		0.36	1.35	4.86	6.33	2.97	2.18
Excess Return		-0.04	0.04	0.59	0.43	0.23	0.16

As of October 31, 2019

Oregon Public University Fund (PUF)

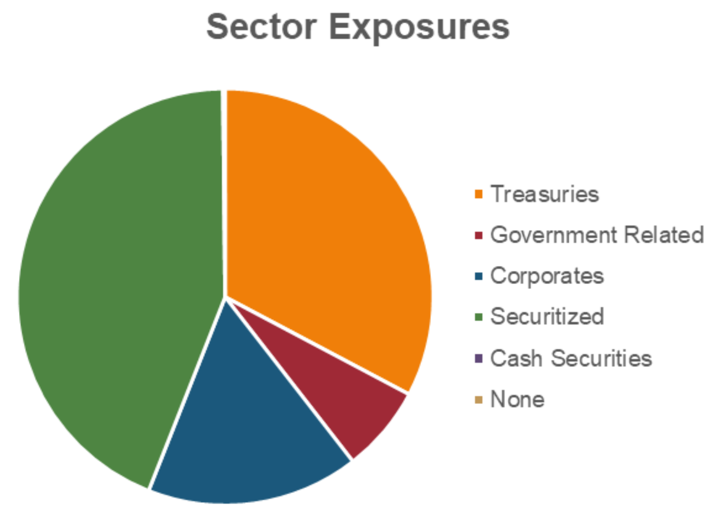
Objective – The objective for the Public University Fund ("PUF") is a high-quality fixed income portfolio that maximizes total return over a long-term horizon within stipulated risk parameters while providing adequate liquidity to meet participant cash flow needs. Based on historical market performance, total returns generated over extended periods are anticipated to be greater than returns realized in shorter-maturity strategies.

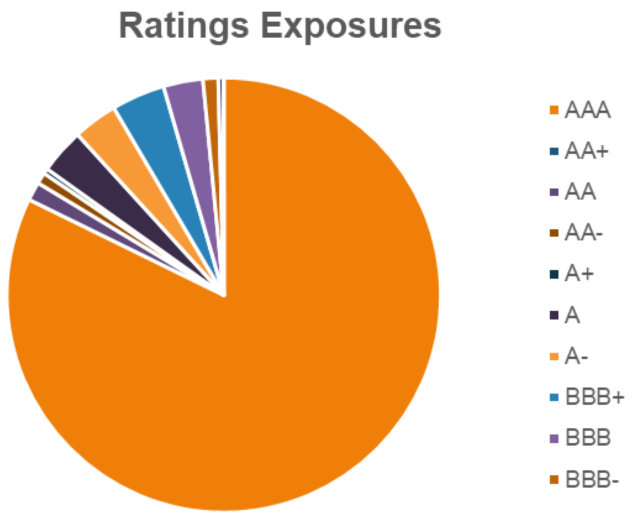
Strategy – PUF is actively managed to create a diversified portfolio of investment grade bonds invested over longer horizons than permitted in OSTF.

Manager – Oregon State Treasury

Benchmark – Custom benchmark comprised of:
- 75% Bloomberg Barclays Aggregate 3 - 5 Years
- 25% Bloomberg Barclays Aggregate 5 - 7 Years

		Yield to Maturity		Duration		Effective Rating	
Portfolio	NAV ($Ms)	Portfolio	Benchmark	Portfolio	Benchmark	Portfolio	Benchmark
PUF	310,980	2.00	2.14	3.20	3.31	AA+	AA+





	Market Value ($Ms)	1 Mth	3 Mth	YTD	1 Year	2 Year
Public University Fund*	310,980	0.37	1.54	6.08	8.01	3.44
Public University Fund Custom Benchmark		0.37	1.58	6.41	8.52	3.58
Excess Return		0.00	-0.04	-0.33	-0.51	-0.14

As of October 31, 2019

*Includes investments in the Oregon Short Term Fund

State Agency Separate Accounts

Objective – The investment objectives, constraints and requirements for individual agency accounts are bespoke. The over-arching Fixed Income Investment Policy that covers these separate agency accounts contains the following objectives: (1) determine what funds are eligible for discreet investment management; (2) define the role of fixed income within the OIC's general investment policies for internally-managed funds; 3) establish specific short- and long-term policy objectives for these funds; and 4) outline strategies for implementing the OIC's fixed income investment policies.

Strategy – Specific risk tolerances of state agency separate accounts vary, but all have the primary goal of achieving a maximum yield while preserving principal. The management strategy for state agency separate accounts eschews trading and adheres to a buy and hold discipline. Separate accounts are constructed to provide sufficient liquidity and be well-diversified amongst sectors and issuers with a weighted-average, minimum credit rating of single A. Staff conducts periodic meetings with agencies to review each agency's specific portfolio objectives and liquidity needs to ensure individual strategies are still relevant.

Constraints – All state agency accounts overseen by OST are governed by OIC Policy INV 402: Internal Fixed Income Portfolio Investments. INV 402 limits investment exposures by product, concentration and rating. Additionally, each agency portfolio has bespoke guidelines which further restrict exposures and define investment goals.

	Market Value ($Ms)	1 Mth	3 Mth	YTD	1 Year	2 Year	3 Year	4 Year	5 Year	7 Year	10 Year
DAS Insurance*	146,835	0.29	0.96	3.75	4.29	2.75	2.24	2.10	1.97	1.54	1.62
DCBS Insurance**	129,223	0.27	0.91	3.51	4.10	2.61	2.11	2.10	2.00	1.77	1.58
DCBS Workers Benefit**	156,996	0.25	0.92	3.75	4.33	2.75	2.34	2.31	2.15	1.88	2.23
DHCS Elderley Housing	1,781	-0.37	4.69	14.85	21.29	8.58	5.30	5.71	5.42	4.31	6.24
DHCS Housing	16,033	0.20	3.47	11.63	15.43	6.26	3.85	3.10	2.77	2.21	2.17
Lottery	124,671	-0.08	3.05	9.49	13.69	5.19	3.12	3.62	3.66	2.90	4.35
Veterans Affairs**	99,533	0.23	0.74	2.64	3.19	2.45	2.07	1.80	1.54	1.13	1.11
Oregon Department of Transportation*	802,578	0.22	0.70	2.46	2.90	2.45	2.05	1.76	1.66	1.51	2.00

As of October 31, 2019

* Includes Investments in the Oregon Short Term Fund

** Includes investments in both the Oregon Short Term Fund and the Oregon Intermediate Term Pool

State Accident Insurance Fund (SAIF)

Objective – The SAIF portfolio is largely designed to be comprised of fixed income holdings that provide positive cash flow, dampen overall portfolio volatility, provide a real rate of return, and are positively linked to the entity's insurance liabilities. Maintaining the flexibility to seek out total return and a focus on realized loss minimization are additional, important criteria.

Strategy – SAIF funds are invested to maintain an overall portfolio quality of single A or higher with an average duration of +/-20% of the custom fixed income benchmark. In addition, maturities are structured to provide reinvestment opportunities that consider SAIF's operating cash flow projections. SAIF hires independent consultants to develop an appropriate strategy and benchmark. OST staff assists in this process and helps select firms that can best achieve the desired objective given all relevant constraints.

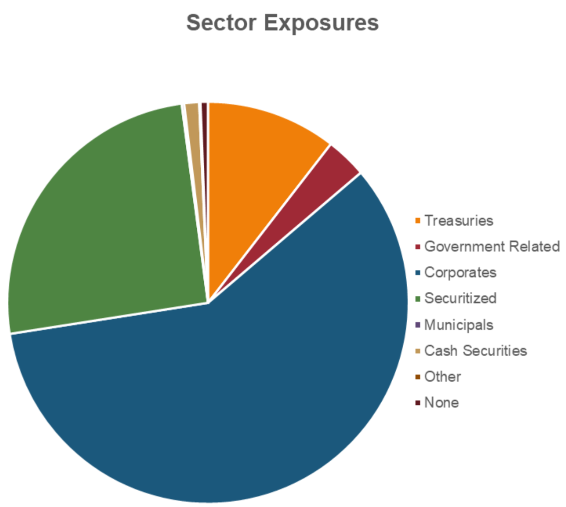
Managers – The SAIF portfolio is allocated to two external firms:

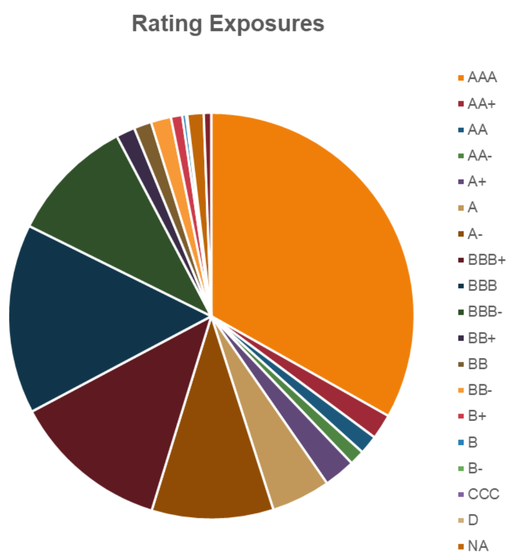
- Western Asset
- Wellington Management

Benchmark – SAIF's investment objective and liability structure give rise to a uniquely created custom benchmark that is comprised of the following components:

- 50% Bloomberg Barclays U.S. Corporate Index
- 20% Bloomberg Barclays Mortgage Backed Fixed Rate Security Index
- 15% Bloomberg Barclays U.S. Government Index
- 10% Bloomberg Barclays Corporate Intermediate Index
- 5% Bloomberg Barclays Ba to B U.S. High Yield 2% Issuer Cap

		Yield to Maturity		Duration		Effective Rating	
Portfolio	NAV ($Ms)	Portfolio	Benchmark	Portfolio	Benchmark	Portfolio	Benchmark
SAIF FI	4,265,983	2.84	2.7	5.83	5.87	A	A+
Wellington	2,106,221	2.93	2.7	5.84	5.87	A+	A+
Western Asset	2,118,159	2.78	2.7	5.89	5.87	A	A+
Pledged Securities	41,603	1.56		1.86		AAA	





	Market Value ($Ms)	1 Mth	3 Mth	YTD	1 Year	2 Year	3 Year	4 Year	5 Year	7 Year	10 Year
State Accident Insurance Fund	**4,224,380**	**0.48**	**2.48**	**11.71**	**13.29**	**5.40**	**4.78**	**5.29**	**4.53**	**4.12**	**5.35**
Wellington	2,106,221	0.44	2.44	11.34	13.01	5.38	4.76	5.20	4.56	4.11	5.42
Western Asset	2,118,159	0.52	2.52	12.09	13.57	5.43	4.80	5.39	4.50	4.13	5.29
State Accident Insurance Fund Custom Benchmark		0.47	2.50	10.87	12.69	4.97	4.09	4.49	3.90	3.42	4.67
Excess Return		0.01	-0.02	0.84	0.60	0.43	0.69	0.80	0.63	0.70	0.68

As of October 31, 2019

Common School Fund (CSF)

Objective – The objective for the Common School Fund (CSF) fixed income allocation is to provide portfolio diversification while achieving a total return representative of the broad, investment grade U.S. bond universe.

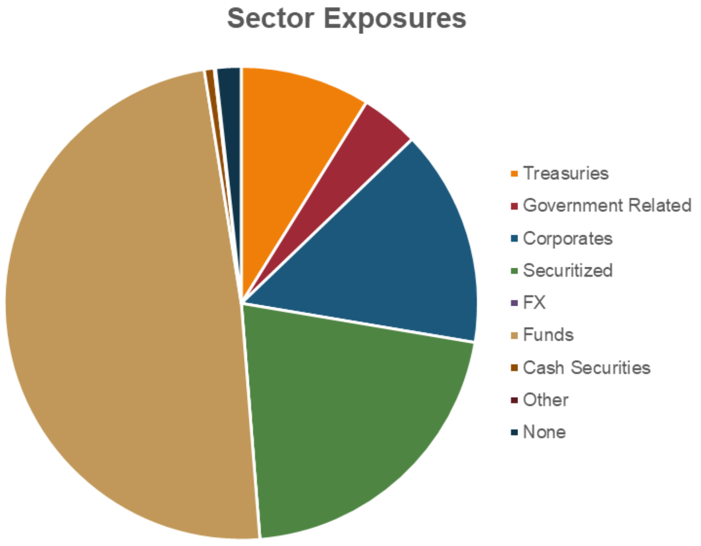
Strategy – To meet this objective, the CSF fixed income allocation is actively managed and invested in core U.S. fixed income holdings.

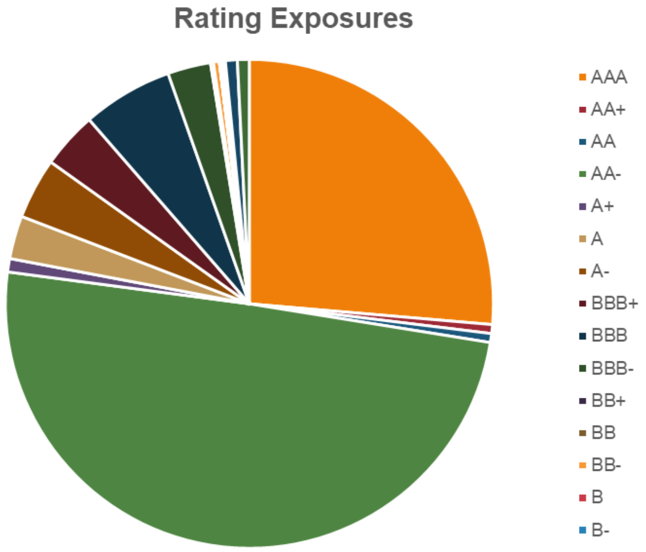
Managers – The CSF fixed income allocation is split between two external firms:

- Western Asset
- Wellington Management

Benchmark – Bloomberg Barclays U.S. Aggregate Bond Index

		Yield to Maturity		Duration		Effective Rating	
Portfolio	NAV ($Ms)	Portfolio	Benchmark	Portfolio	Benchmark	Portfolio	Benchmark
CSF FI	486,715	2.19	2.23	5.16	5.63	AA-	AA
Western Asset	245,166	2.87	2.23	5.91	5.63	AA-	AA
Wellington	241,549	1.49	2.23	4.4	5.63	AA-	AA



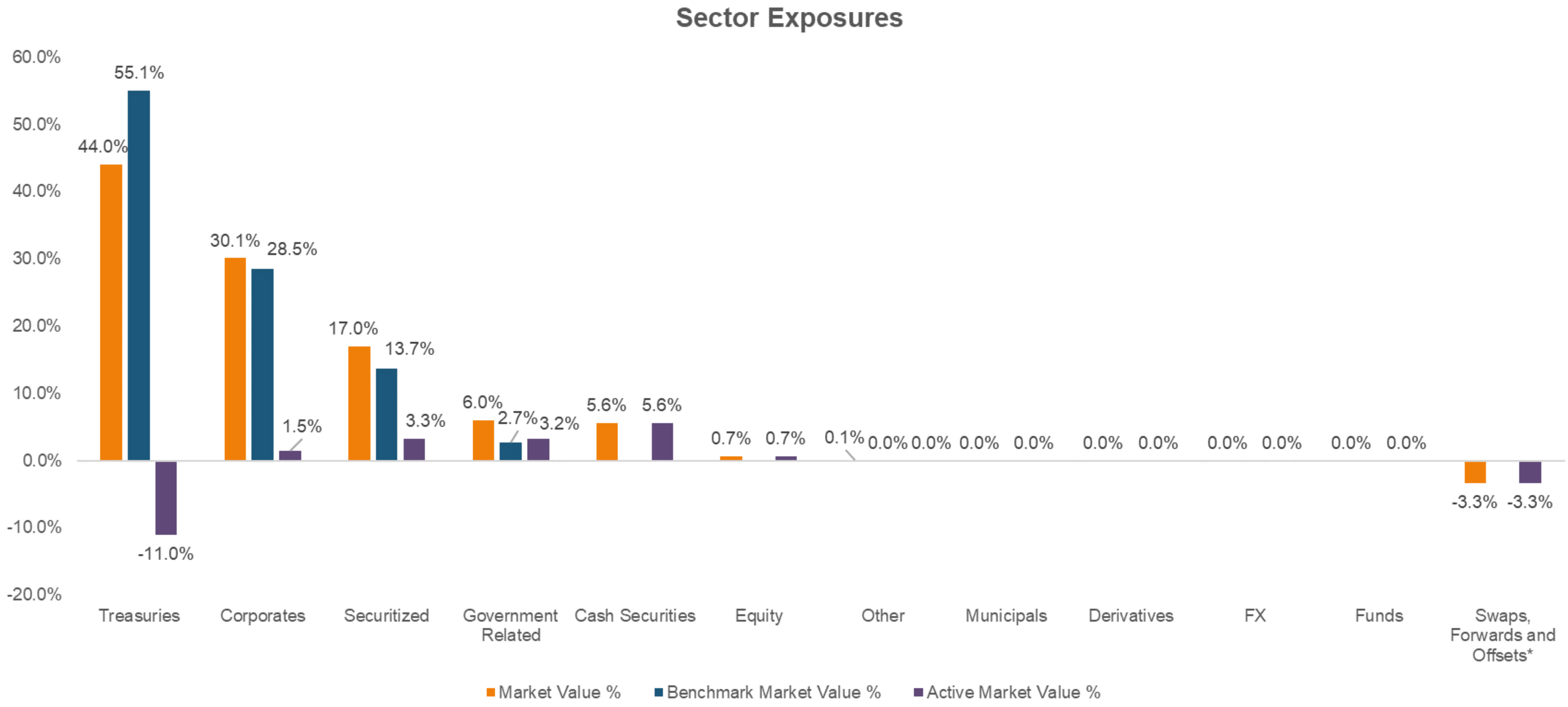


	Market Value ($Ms)	1 Mth	3 Mth	YTD	1 Year	2 Year	3 Year	4 Year	5 Year	7 Year	10 Year
Common School Fund	**486,715**	**0.37**	**2.39**	**10.30**	**12.32**	**4.87**	**4.04**	**4.35**	**3.71**	**3.43**	**4.96**
Wellington	241,549	0.22	2.31	9.48	11.43	4.59	3.68	3.96	3.37	3.06	4.61
Western Asset	245,166	0.51	2.47	11.11	13.20	5.15	4.40	4.74	4.04	3.80	5.40
Bloomberg Barclays U.S. Aggregate Index		0.30	2.35	8.85	11.51	4.51	3.29	3.58	3.19	2.85	3.96
Excess Return		0.07	0.04	1.45	0.81	0.36	0.75	0.77	0.52	0.58	1.00

As of October 31, 2019

Agenda

OPERF Fixed Income Sector Exposure



*Includes interest rate swaps, currency forwards and other fixed income derivatives as well as related cash offsets associated with forwards, derivatives and certain positions in the "Cash Securities" category above.

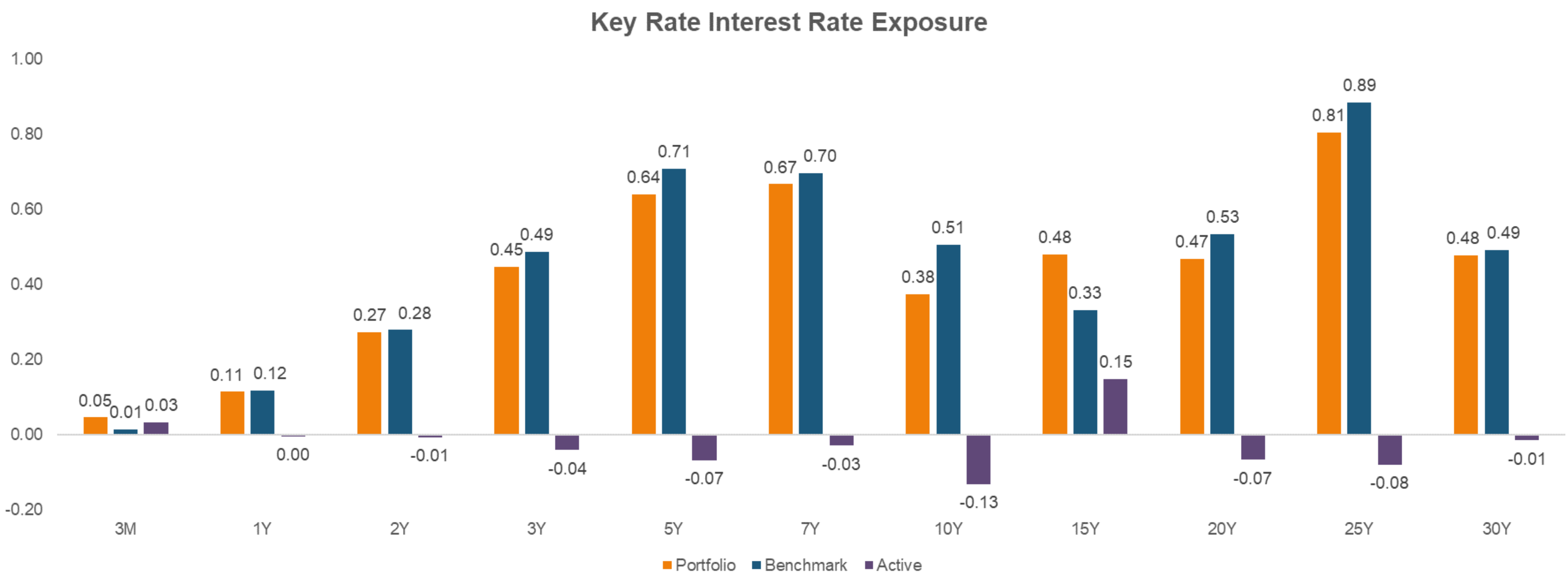
Data as of October 31, 2019

OPERF Fixed Income Issuer Exposure

Issuer Exposures									
Security Description	Market Value (m)	Market Value %	Duration	Duration Contribution	Spread Duration	Spread Duration Contribution	Yield to Worst	OAS	Effective Rating
FI	15,468,796	100.00%	4.96	4.96	2.34	2.34	2.68	104	AA-
UNITED STATES TREASURY	6,637,970	42.90%	7.46	3.2	0	0	1.67	0	AAA
FEDERAL NATIONAL MORTGAGE ASSOCIATION	1,412,470	9.10%	1.46	0.13	2.62	0.24	1.35	21	AAA
OREGON STATE TREASURY	574,598	3.70%	0.52	0.02	0.96	0.04	1.96	28	AA
GOVERNMENT NATIONAL MORTGAGE ASSOCIATION II	344,010	2.20%	2.06	0.05	3.67	0.08	2.06	22	AAA
STATE STREET	264,791	1.70%	0	0	0	0	1.78	0	
FEDERAL HOME LOAN MORTGAGE CORPORATION - GOLD	169,509	1.10%	2.3	0.03	4.29	0.05	2.42	45	AAA
FEDERAL HOME LOAN MORTGAGE CORPORATION	156,309	1.00%	3.59	0.04	5.23	0.05	2.42	30	AAA
BANK OF AMERICA CORP	92,529	0.60%	5.1	0.03	5.47	0.03	2.5	88	A
JPMORGAN CHASE & CO	77,143	0.50%	4.77	0.02	5.18	0.03	2.53	88	A
JAPAN (GOVERNMENT OF)	70,420	0.50%	1.76	0.01	0	0	-0.18	3	A
GOLDMAN SACHS GROUP INC/THE	65,860	0.40%	5.41	0.02	5.57	0.02	2.63	95	A-
UNITED STATES OF AMERICA	57,294	0.40%	3.86	0.01	0	0	1.52	0	AAA
AT&T INC	50,096	0.30%	7.33	0.02	7.4	0.02	2.9	119	BBB
CITIGROUP INC	49,877	0.30%	6.88	0.02	7.2	0.02	2.76	108	BBB+
WELLS FARGO & COMPANY	48,319	0.30%	6.7	0.02	6.8	0.02	2.62	97	A
MEXICO (UNITED MEXICAN STATES) (GOVERNMENT)	47,048	0.30%	11.12	0.03	7.46	0.02	4.94	117	BBB+
MORGAN STANLEY	37,554	0.20%	4.83	0.01	4.98	0.01	2.55	94	BBB+
SELECTA GROUP BV (Equity in Private Company)	37,282	0.20%	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CANADA (GOVERNMENT OF)	35,945	0.20%	2.37	0.01	2.39	0.01	1.6	7	AAA
CVS HEALTH CORP	35,390	0.20%	6.85	0.02	6.9	0.02	2.93	125	BBB
RESIDUAL FUNDING CORP PRINCIPAL STRIP	35,285	0.20%	0.7	0	0.71	0	1.7	10	AAA
VERIZON COMMUNICATIONS INC	34,152	0.20%	10.88	0.02	10.98	0.02	2.93	109	BBB+
FORD MOTOR CREDIT COMPANY LLC	33,247	0.20%	1.36	0	1.38	0	3.24	162	BBB-
ALMONDE INC	32,039	0.20%	0.09	0	4.21	0.01	8.23	608	B-
HSBC HOLDINGS PLC	30,333	0.20%	4.29	0.01	4.43	0.01	2.59	100	A

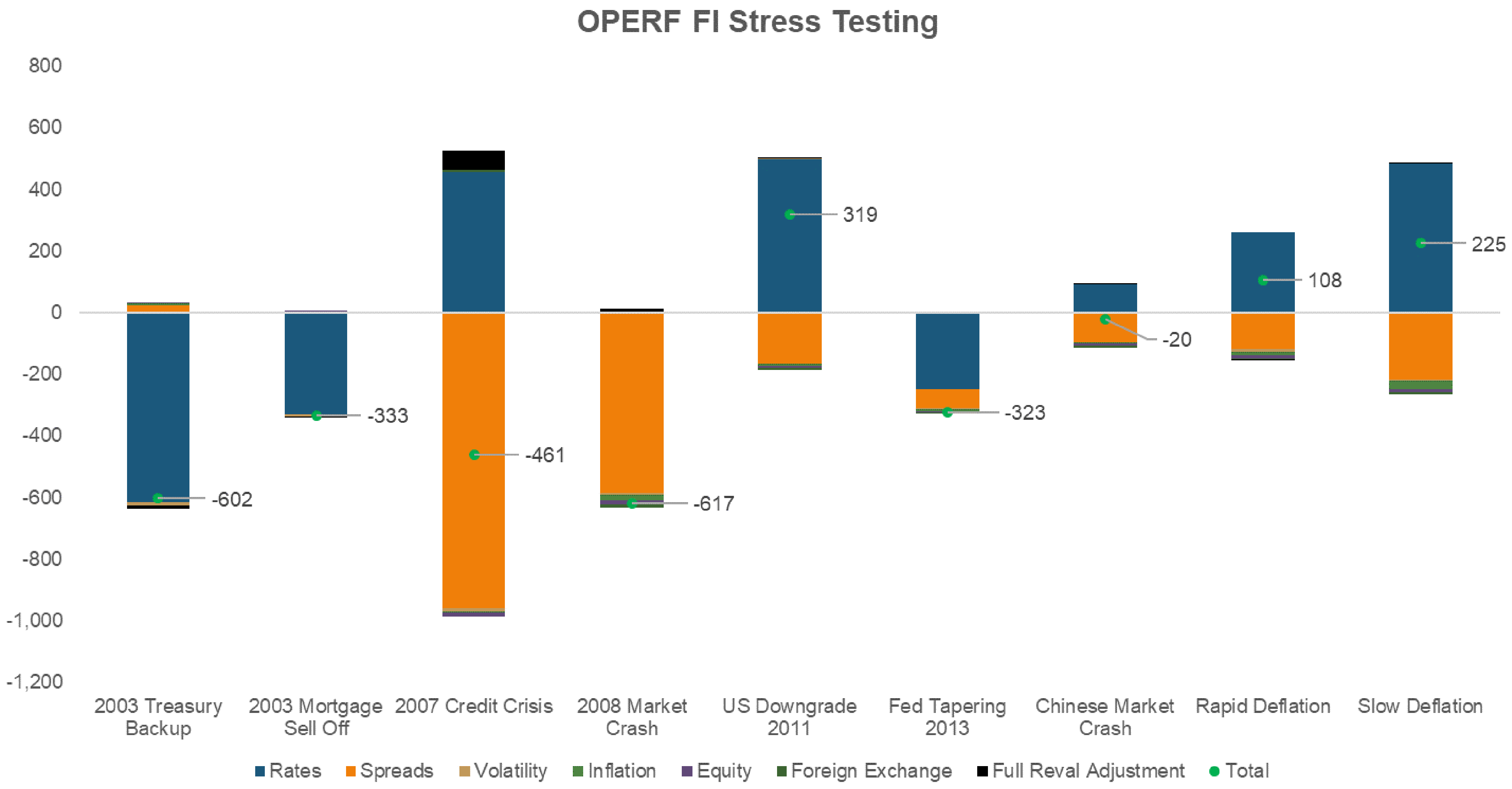
Data as of October 31, 2019

OPERF Fixed Income Interest Rate Exposure



Data as of October 31, 2019

OPERF Fixed Income Stress Testing



Data as of October 31, 2019

OPERF Non-Core Stress Testing

Scenario Definitions

1. 2003 Treasury Backup
Treasuries sell-off resulting in a loss on interest rate returns. Equities and alternatives benefit as investors seek returns in other investments.

2. 2003 Mortgage Sell Off
An unexpected rise in Treasury yields engendered a massive sell-off of mortgage backed securities (MBS), resulting in increased MBS spreads and decreased credit spreads. Convexity selling as mortgage durations lengthen.

3. 2007 Credit Crisis
The Credit Crisis of 2007 resulted from the bursting of the housing bubble, a consequence of an unprecedented expansion of credit that helped feed a boom in the housing market. The bursting of the bubble forced banks to write down bad loans caused by mortgage delinquencies. The crisis saw a massive decrease in Treasury yields and a widening of both MBS and credit spreads.

4. 2008 Market Crash
Credit & liquidity crisis and equity market crash set off by Lehman Brothers bankruptcy. Significant credit spreads widening caused by massive deleveraging.

5. 2011 US Downgrade
The period begins with an indication of a 50% chance of a US downgrade from S&P and ends with the Fed's Operation Twist announcement. The stock market incurred losses while bond markets saw gains due to flight to quality.

6. 2013 Fed Tapering Scare
The timing and magnitude of Bernanke's testimony in front of Congress surprised the market, causing market volatility and both equity and bonds to sell off. Emerging Markets suffered badly due to a flight of money to the US.

7. Chinese Market Crash
Chinese stock market crash beginning with the popping of the stock market bubble on June 12, 2015.

8. Rapid Deflation
Oil price drops which causes short-end of the inflation curve to drop. The short end of the nominal curve is held unchanged since nominal rates in the short end are already very low. Due to the new round of quantitative easing agency mortgage rate spreads widen.

9. Slow Deflation
Oil price is kept unchanged. The 10yr inflation rate drops 200 bps. The 10yr nominal rate drops to historical lows while short-term nominal rates are held constant. Agency mortgage rate spreads tighten.

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Legal Disclaimer Information

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Updated Jan 2016

OREGON
STATE
TREASURY

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Oregon State Treasurer

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Salem, OR 97301-3896

oregon.gov/treasury

OIC Policy Update
December 11, 2019

Purpose

To update OIC Policy 401.

Discussion

The following is a brief summary of the attached Policies and staff's proposed updates thereto.

1. **INV 401: Strategic Role of Fixed Income for OPERF**

Changes: Staff recommends updating this policy to:

- Update the expected return target to 15 basis points from 25 basis points;
- Update the fixed income policy benchmark to the Bloomberg Barclays U.S. Aggregate Bond Index; and
- Update the tracking error to an annualized target of "up to 1.0 percent" from "0.5 to 1.0 percent".

Recommendation: Approve policy updates as presented in attached documents.

OREGON INVESTMENT COUNCIL POLICY

INTRODUCTION & OVERVIEW

Summary Policy Statement Blackline 11-25-19

The strategic role of fixed income investments is delineated in the Oregon Investment Council ("OIC") Statement of Investment Objectives and Policy Framework (INV 1203, the "Statement") for the Oregon Public Employees Retirement Fund ("OPERF" or the "Fund"). The OPERF Fixed Income Portfolio (the "Portfolio") is expected to provide diversification opportunities, as well as liquidity to help meet OPERF's cash flow requirements. Oregon State Treasury staff (~~"OST" and~~ "Staff"), with approval from the Director of Capital Markets and the Chief Investment Officer ("CIO"), and subsequent notification to the OIC, ~~will have~~has the discretion to rebalance between and among managers within the ~~Fixed Income~~ Portfolio. Fixed income investments are subject to specific, strategic asset allocation targets described herein.

Purpose and Goals

The purpose of these Fixed Income Investment Policies & Strategies is to a) define the objectives of fixed income as an asset class within the general investment policies established by the OIC, and b) outline appropriate strategies for implementing the OIC's fixed income investment policies.

Applicability

Classified represented, management service, unclassified executive service

Authority

ORS Chapter 293

POLICY PROVISIONS

A. **POLICY STATEMENTS**
The Portfolio is expected to achieve a return of at least ~~25~~15 basis points above the ~~custom~~ policy benchmark~~,~~ which is: ~~currently comprised as follows: 37% Bloomberg Barclays U.S. Treasury Index; 46%~~ 100% Bloomberg Barclays U.S. Aggregate Bond Index~~; 13% S&P/LSTA Leveraged Loan Index; and 4% Bank of America Merrill Lynch High Yield Master II Index~~. Any changes to the policy benchmark will be approved by the OIC.

B. **OBJECTIVES**
1. Limit portfolio risk, as measured by tracking error, to an annualized target of ~~.5~~ up to 1.0 percent.
2. Build and maintain a well-diversified portfolio managed to maximize total return subject to the risk limitations described herein.
3. Maintain portfolio duration within parameters as defined by staff, with CIO approval, for each specific fixed income mandate.
4. Invest opportunistically using innovative investment approaches within a controlled and defined portfolio allocation.
5. Outperform stated benchmarks on an after-fee, risk-adjusted basis over a market cycle of three to five years.
6. Select active managers based upon demonstrated expertise and ability to add value over a passive management alternative and within reasonable risk parameters.

C. **OST STAFF AUTHORITY & REPORTING**
1. Staff will have discretion, with advance approval of the Director of Capital Markets and

the CIO and subsequent notice to the OIC, to rebalance between and among managers. The total fixed income portfolio's structural characteristics will be considered at the time of any rebalancing.

2. Re-allocations between asset classes shall adhere to ~~Policy INV 1203:~~the Statement~~ of Investment Objectives and Policy Framework for the Oregon Public Employees Retirement Fund~~.
3. The following guidelines may be modified as considered necessary by the Director of Capital Markets, with notification to the CIO:
    a. The investment mandate to which a manager is assigned;
    b. A manager's investment objectives;
    c. A manager's benchmark;
    d. A manager's performance objective(s), expressed on a relative basis in comparison to a defined benchmark, as that manager's required excess return; and
    e. Permissible fixed income investments in which a manager may invest, as listed in the “Permitted Holdings” section below.
4. ~~OST~~ Staff, with approval from the CIO and notification to the OIC, may terminate “at will” any manager according to the terms of its contract with ~~and on behalf of~~ the OIC.
5. ~~OST~~ Staff, with approval from the CIO and notification to the OIC, is authorized to engage and fund any mandate considered necessary to allocate assets from terminated or defunded managers or to fill gaps identified in, or reduce risk in, the Portfolio.

D. **PERMITTED HOLDINGS**

The following fixed income securities, individually or in commingled vehicles, may be held outright and under resale agreement:

1. Obligations issued or guaranteed by the U.S. Federal Government, U.S. Federal agencies or U.S. government-sponsored corporations and agencies;
2. Obligations of U.S. and non-U.S. corporations;
3. Obligations of international agencies, supranational entities and foreign governments (or their subdivisions or agencies), as well as foreign currency exchange-related securities, warrants and forward contracts;
4. Obligations issued or guaranteed by U.S. local, city and state governments and agencies;
5. Securities defined under Rule 144A and Commercial Paper defined under Section 4(2) of the Securities Act of 1933;
6. Yankee Bonds (dollar denominated sovereign and corporate debt);
7. Derivatives of fixed income and currency market instruments; and
8. Securities eligible for the Short-Term Investment Fund (OSTF).

Exceptions

None.

Failure to Comply

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

PROCEDURES and FORMS

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.

OREGON INVESTMENT COUNCIL POLICY

INTRODUCTION & OVERVIEW

Summary Policy Statement

The strategic role of fixed income investments is delineated in the Oregon Investment Council ("OIC") Statement of Investment Objectives and Policy Framework (INV 1203, the "Statement") for the Oregon Public Employees Retirement Fund ("OPERF" or the "Fund"). The OPERF Fixed Income Portfolio (the "Portfolio") is expected to provide diversification opportunities, as well as liquidity to help meet OPERF's cash flow requirements. Oregon State Treasury staff ("Staff"), with approval from the Director of Capital Markets and the Chief Investment Officer ("CIO"), and subsequent notification to the OIC, has the discretion to rebalance between and among managers within the Portfolio. Fixed income investments are subject to specific, strategic asset allocation targets described herein.

Purpose and Goals

The purpose of these Fixed Income Investment Policies & Strategies is to a) define the objectives of fixed income as an asset class within the general investment policies established by the OIC, and b) outline appropriate strategies for implementing the OIC's fixed income investment policies.

Applicability

Classified represented, management service, unclassified executive service

Authority

ORS Chapter 293

POLICY PROVISIONS

A. **POLICY STATEMENTS**
   The Portfolio is expected to achieve a return of at least 15 basis points above the policy benchmark which is: 100% Bloomberg Barclays U.S. Aggregate Bond Index. Any changes to the policy benchmark will be approved by the OIC.

B. **OBJECTIVES**
   1. Limit portfolio risk, as measured by tracking error, to an annualized target of up to 1.0 percent.
   2. Build and maintain a well-diversified portfolio managed to maximize total return subject to the risk limitations described herein.
   3. Maintain portfolio duration within parameters as defined by staff, with CIO approval, for each specific fixed income mandate.
   4. Invest opportunistically using innovative investment approaches within a controlled and defined portfolio allocation.
   5. Outperform stated benchmarks on an after-fee, risk-adjusted basis over a market cycle of three to five years.
   6. Select active managers based upon demonstrated expertise and ability to add value over a passive management alternative and within reasonable risk parameters.

C. **OST STAFF AUTHORITY & REPORTING**
   1. Staff will have discretion, with advance approval of the Director of Capital Markets and the CIO and subsequent notice to the OIC, to rebalance between and among managers. The total fixed income portfolio's structural characteristics will be considered at the time of any rebalancing.

2. Re-allocations between asset classes shall adhere to the Statement.
3. The following guidelines may be modified as considered necessary by the Director of Capital Markets, with notification to the CIO:
    a. The investment mandate to which a manager is assigned;
    b. A manager's investment objectives;
    c. A manager's benchmark;
    d. A manager's performance objective(s), expressed on a relative basis in comparison to a defined benchmark, as that manager's required excess return; and
    e. Permissible fixed income investments in which a manager may invest, as listed in the “Permitted Holdings” section below.
4. Staff, with approval from the CIO and notification to the OIC, may terminate “at will” any manager according to the terms of its contract with the OIC.
5. Staff, with approval from the CIO and notification to the OIC, is authorized to engage and fund any mandate considered necessary to allocate assets from terminated or defunded managers or to fill gaps identified in, or reduce risk in, the Portfolio.

D. **PERMITTED HOLDINGS**
The following fixed income securities, individually or in commingled vehicles, may be held outright and under resale agreement:
1. Obligations issued or guaranteed by the U.S. Federal Government, U.S. Federal agencies or U.S. government-sponsored corporations and agencies;
2. Obligations of U.S. and non-U.S. corporations;
3. Obligations of international agencies, supranational entities and foreign governments (or their subdivisions or agencies), as well as foreign currency exchange-related securities, warrants and forward contracts;
4. Obligations issued or guaranteed by U.S. local, city and state governments and agencies;
5. Securities defined under Rule 144A and Commercial Paper defined under Section 4(2) of the Securities Act of 1933;
6. Yankee Bonds (dollar denominated sovereign and corporate debt);
7. Derivatives of fixed income and currency market instruments; and
8. Securities eligible for the Short-Term Investment Fund (OSTF).

Exceptions

None.

Failure to Comply

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

PROCEDURES and FORMS

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.

OIC Policy Updates

December 11, 2019

Purpose

To Update Several OIC Policies

Discussion

The following is a brief summary Staff's proposed updates to the attached Policies:

1. **INV 404: Intermediate Term Pool Investments**

   Changes: Staff recommends updating this policy to clarify that public universities are allowed to invest in the Oregon Intermediate Term Pool

2. **INV 407: Public Universities Common Policy**

   Changes: Staff recommends updating this policy to clarify that public universities are allowed to invest in the Public University Core Bond Fund (Appendix A) and the Oregon Intermediate Term Pool (INV 404).

Recommendation: Approve policy updates as presented in the attached documents.

INTRODUCTION & OVERVIEW

Summary Policy Statement (Blackline 11-25-19)

The Oregon Intermediate Term Pool ("OITP") is a pooled investment vehicle for state agency funds~~.~~ and public universities. Eligibility of state agency and public university funds for discreet (i.e., separate account) investment management in pooled vehicles is subject to the discretion of Oregon State Treasury ("OST"). Public universities that invest in OITP are also subject to compliance with INV 407: Public Universities Common Policy. Internally managed fixed income investments are subject to the policies approved by the Oregon Investment Council ("OIC") and the applicable guidelines established by OST.

Purpose and Goals

The purpose of this policy is to define the investment objectives and compliance procedures for OITP.

Applicability

Classified represented, management service, unclassified executive service.

Authority

ORS Chapters 293 and 294.

POLICY PROVISIONS

Policy Statements

A. **POLICY.** OITP is expected to provide a total return consistent with an investment grade quality, intermediate duration diversified fixed income portfolio.
   1. While not guaranteed, based upon historical market performance, expected returns in the OITP are anticipated to be greater over time than the returns provided by shorter maturity alternatives such as the OSTF portfolio.
   2. OITP is not structured to provide 100% net asset value (NAV) on each participants' initial investments therein. Accordingly, OITP participants may experience gains or losses on their OITP investments due to changes in market conditions. For consistency with the OITP's total return objective, the value of each participant's individual investment will be determined proportional to the NAV of the entire OITP portfolio.

B. **OBJECTIVE.** The 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 the OITP investment guidelines.

C. **COMPLIANCE.** OST's Compliance program will facilitate the following: 1) monitor and evaluate portfolios, asset classes, and other investment funds to determine compliance with OST policies, guidelines, and contractual obligations; 2) identify instances of non-compliance and develop appropriate resolution strategies; 3) provide relevant compliance information and reports to OST management and the OIC, as appropriate; and 4) verify resolution by the appropriate individual or manager within the appropriate time frame.

D. **CORRECTION OF NON-COMPLIANCE.** If OITP is found to be out of compliance with any of the adopted investment guidelines or is being managed inconsistently with its policy and objectives, investment staff shall bring the OITP portfolio into compliance as soon as is prudently feasible. Actions to bring the portfolio back into compliance and justification for such actions, including documentation of proposed and actual resolution strategies, will be coordinated under the OST investment Compliance program with OST Compliance staff.

Exceptions

None.

Failure to Comply

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

PROCEDURES and FORMS

A. Portfolio Guidelines for the Oregon Intermediate Term Pool

ADMINISTRATION

Review

Annually.

Feedback

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INTRODUCTION & OVERVIEW

Summary Policy Statement

The Oregon Intermediate Term Pool ("OITP") is a pooled investment vehicle for state agency funds and public universities. Eligibility of state agency and public university funds for discreet (i.e., separate account) investment management in pooled vehicles is subject to the discretion of Oregon State Treasury ("OST"). Public universities that invest in OITP are also subject to compliance with INV 407: Public Universities Common Policy. Internally managed fixed income investments are subject to the policies approved by the Oregon Investment Council ("OIC") and the applicable guidelines established by OST.

Purpose and Goals

The purpose of this policy is to define the investment objectives and compliance procedures for OITP.

Applicability

Classified represented, management service, unclassified executive service.

Authority

ORS Chapters 293 and 294.

POLICY PROVISIONS

Policy Statements

A. **POLICY.** OITP is expected to provide a total return consistent with an investment grade quality, intermediate duration diversified fixed income portfolio.
   1. While not guaranteed, based upon historical market performance, expected returns in the OITP are anticipated to be greater over time than the returns provided by shorter maturity alternatives such as the OSTF portfolio.
   2. OITP is not structured to provide 100% net asset value (NAV) on each participants' initial investments therein. Accordingly, OITP participants may experience gains or losses on their OITP investments due to changes in market conditions. For consistency with the OITP's total return objective, the value of each participant's individual investment will be determined proportional to the NAV of the entire OITP portfolio.

B. **OBJECTIVE.** The 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 the OITP investment guidelines.

C. **COMPLIANCE.** OST's Compliance program will facilitate the following: 1) monitor and evaluate portfolios, asset classes, and other investment funds to determine compliance with OST policies, guidelines, and contractual obligations; 2) identify instances of non-compliance and develop appropriate resolution strategies; 3) provide relevant compliance information and reports to OST management and the OIC, as appropriate; and 4) verify resolution by the appropriate individual or manager within the appropriate time frame.

D. **CORRECTION OF NON-COMPLIANCE.** If OITP is found to be out of compliance with any of the adopted investment guidelines or is being managed inconsistently with its policy and objectives, investment staff shall bring the OITP portfolio into compliance as soon as is prudently feasible. Actions to bring the portfolio back into compliance and justification for such actions, including documentation of proposed and actual resolution strategies, will be coordinated under the OST investment Compliance program with OST Compliance staff.

Exceptions

None.

Failure to Comply

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

PROCEDURES and FORMS

A. Portfolio Guidelines for the Oregon Intermediate Term Pool

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.

PUBLIC UNIVERSITIES COMMON POLICY

INTRODUCTION & OVERVIEW

Summary Policy Statement (Blackline 11-25-19)

Oregon law allows "public universities" as defined in ORS Chapter 352 (each, a "University"), to enter into agreements with the Oregon State Treasury ("OST") to establish a separate or commingled fund (each, "University Invested Moneys" or "Invested Moneys") in order for OST to receive, hold, keep, manage and invest moneys of such University. OST offers internal investment management services, as well as a limited selection of external investment management options, for the University Invested Moneys.

Invested Moneys invested pursuant to this policy are expected to follow a long-term investment strategy. This policy establishes a coordinated program for investing and spending to minimize the risk to the principal of any Invested Moneys, and to produce a reasonable total return.

Purpose and Goals

The purpose of this policy is to provide guidance to OST investment staff regarding the investment, exchange, liquidation and reinvestment of Invested Moneys per the request of any University that has also entered into an agreement with OST pursuant to ORS 352.410(10)(a) and ORS 352.135. These rules are established under the authority of, and do not supersede, ORS Chapter 293 and ORS Chapter 352. All modifications to this policy will be made in writing and approved by the OIC.

Applicability

Classified represented, management service, unclassified executive service.

Authority

ORS Chapter 293.

ORS Chapter 352.

POLICY PROVISIONS

Definitions

None.

Policy Statements and Strategies

A. OBJECTIVES

The investment objective of each participating University is to seek consistency of investment ~~return~~returns with emphasis on capital appreciation, while meeting liquidity needs, over long periods of time. Universities may work with OST to develop custom investment guidelines provided that such guidelines are no less restrictive than this policy. OST may limit investment programs or options in its discretion.

B. ASSET ALLOCATION

1. OST may invest University Invested Moneys within the following exposure ranges:

Asset Class	Minimum	Maximum
Public Equity	**0%**	**65%**
U.S. Public Equity	0%	65%
International Public Equity – Developed	0%	40%
Emerging Markets Public Equity	0%	20%
Fixed Income	**35%**	**100%**
Investment Grade	35%	100%
Below Investment Grade	0%	20%

OST, in conjunction with the University, will establish target asset allocations within the ranges noted above to achieve the investment goals of the Invested Moneys, taking into consideration the appropriate level of portfolio risk. The University is expected to provide broad investment goals to OST staff, including spending rate information and other information necessary to provide input into the asset allocation process.

2. Limitations: Not more than sixty-five percent (65%) of the moneys contributed to endowment funds managed by OST may be invested in common stock and mutual funds, in the aggregate.

C. STRATEGIES

1. **INTERNALLY-MANAGED PROGRAMS**
   a. Deposits and Distributions. The University will adopt and communicate to OST a policy on investment inflows and amounts necessary for distribution from the University Invested Moneys for spending purposes.
   b. Custodian Bank. OST will determine custodial responsibility and the selection of a securities lending agent for all securities.
   c. Asset Class Mandates.
      i. Equity: None
      ii. Fixed Income: Actively managed intermediate term core bond fund-, such as the Public University Core Bond Fund (see Appendix A) and the Oregon Intermediate Term Pool (Policy Inv 404).
2. **EXTERNALLY MANAGED PROGRAMS.** Universities will have access to investment products offered by external investment managers who have previously entered into an investment management agreement with the OIC ("IMA").
   a. External investment managers will have discretionary authority to direct investments of

University Invested Moneys.

b. OST will have full discretion over external investment managers, including their selection, and asset class strategies. Manager selection and asset class strategies are subject to OST fiscal and staffing constraints and OST staff fiduciary obligations.
c. Once the manager is selected, the investment guidelines attached to its IMA will be applied as the investment strategy for the University Invested Moneys.
d. Asset Class Mandates.
    i. Equity: Passive ACWI IMI index
    ii. Fixed Income: Actively managed Core+ bond fund

D. COMPLIANCE

The OST Compliance program will a) monitor and evaluate portfolios and asset classes and determine compliance with OST policies and contractual obligations; b) identify instances of non-compliance and develop and execute appropriate resolution strategies; c) provide relevant compliance information and reports to OST management and the University, as appropriate; and d) when applicable, verify resolution by the appropriate individual or manager within the appropriate time frame.

E. REPORTING REQUIREMENTS

1. OST investment staff will monitor investment results on a quarterly basis. Such review will include, but is not limited to: a) performance relative to objectives; b) compliance with policy and guidelines; and c) trading activity. OST staff will report investment results, or other information to the University upon request.
2. For any University in an externally managed investment program, a representative of OST will meet with the University at least annually, to review the following with respect to each external manager: (i) past performance; (ii) asset allocation and returns; and (iii) risk profile.

Exceptions

None.

Failure to Comply

Implementation of this Policy, including investment manager selection, shall be the responsibility of OST staff subject to the necessary approvals from the OIC. Failure to comply with this policy may be cause for disciplinary action up to and including dismissal.

PROCEDURES AND FORMS

Appendix A: Public University Core Bond Fund Investment Program Guidelines

Appendix B: Southern Oregon University Investment Program Guidelines

Appendix C: Western Oregon University Investment Program Guidelines

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OST staff will review this policy at least every two years, and will bring any modifications to the OIC. OST staff will notify the OIC of any new appendices.

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TAB 7 – Q3 2019 Performance & Risk Report

OPERF

Callan

December 11, 2019

Oregon Investment Council

Third Quarter 2019
Performance Review

Does Strong 2019 Spell Problems for 2020 and Beyond?

Did we just “steal” the expected return for the next 18 months?

U.S. equity market expanded modestly in Q3, while non-U.S. markets suffered losses

– S&P up 1.7%, World ex USA down 0.9%, Emerging Markets lost 4.3%. One-year results look weak, thanks to Q4 2018, but all regions are still up sharply y-t-d.

Fed rate cuts, solid corporate fundamentals, and even lower unemployment propel U.S. equity markets in Q3:

– Value caught up to growth in September.

– Small cap declined and lags large cap again.

– Economic weakness, trade concerns hit developed non-U.S. and EM equities in Q3.

Fixed income markets are having an “outlier” year

– Investment grade is strongest performer in the U.S.

– Credit spreads continued rally in Q3.

– Yield curve shifts lower across maturities; inverted from 3 month – 10 year in April, then from 2- to 10-year in August.

Returns for Periods ended September 30, 2019

	1 Quarter	1 Year	5 Years	10 Years	25 Years
U.S. Equity					
Russell 3000	1.16	2.92	10.44	13.08	9.81
S&P 500	1.70	4.25	10.84	13.24	9.83
Russell 2000	-2.40	-8.89	8.19	11.19	8.86
Non-U.S. Equity					
MSCI World ex USA	-0.93	-0.95	3.06	4.78	4.94
MSCI Emerging Markets	-4.25	-2.01	2.33	3.37	--
MSCI ACWI ex USA Small Cap	-1.19	-5.63	3.98	6.13	5.30
Fixed Income					
Bloomberg Barclays Aggregate	2.27	10.30	3.38	3.75	5.57
90-day T-Bill	0.56	2.39	0.98	0.54	2.50
Bloomberg Barclays Long Gov/Credit	6.58	21.88	6.81	7.42	8.02
Bloomberg Barclays Global Agg ex-US	-0.58	5.34	0.87	1.27	4.38
Real Estate					
NCREIF Property	1.41	6.24	8.57	9.77	9.36
FTSE Nareit Equity	7.80	18.42	10.26	13.04	10.67
Alternatives					
CS Hedge Fund	0.26	2.13	2.30	4.32	7.69
Cambridge Private Equity*	4.31	12.23	12.22	14.51	15.42
Bloomberg Commodity	-1.84	-6.57	-7.18	-4.32	1.66
Gold Spot Price	4.19	23.13	3.98	3.85	5.38
Inflation - CPI-U	0.24	1.71	1.53	1.75	2.19

*Cambridge PE data are available through December 31, 2018.

Source: Callan

Global Economic Update 2019

The big picture

Central bank policy front and center

– The Fed was alone on a path to normalize interest rates, with nine rate hikes in two years; euro zone sat out. U.S. rates have been substantially higher than developed markets globally for an extended period.

– Fed reversed course and adopted dovish tone in January. Rates held constant through Q2; cut rates twice in Q3, but signaled no more rate cuts in Q4 2019 or 2020. Bond market believes rates will come down another 100 bps.

Rest of the global economy is slowing, but U.S. remains strong, labor market very tight, reaching the limits of full employment

– Solid Q1 GDP growth (3.2%) moderated in Q2 (2.0%), but held up surprisingly well in Q3 (1.9%), despite slowing global growth and trade uncertainty.

– Slower growth is inevitable after impact of 2018 fiscal stimulus fades and full impact of nine rate hikes feeds through the economy.

– Switch to dovish Fed policy boosted consumer and business confidence, and juiced stock market; drop in borrowing costs expected to sustain consumption growth and soften slowdown.

– Policy reversal simultaneously stoked fears of coming slowdown and fed a rally in bonds, which are having an “outlier” year.

– Any recession will be the most anticipated in recent history.

Slowdown in Europe and China weighing on global growth

– Euro zone unemployment has dropped, but economic growth stalled (GDP below 1.5%).

– China suffering dramatic slowdown in growth: industrial output, retail sales, implied GDP

– Resolution of trade uncertainty crucial to resumption of growth—far more important to China than the U.S.

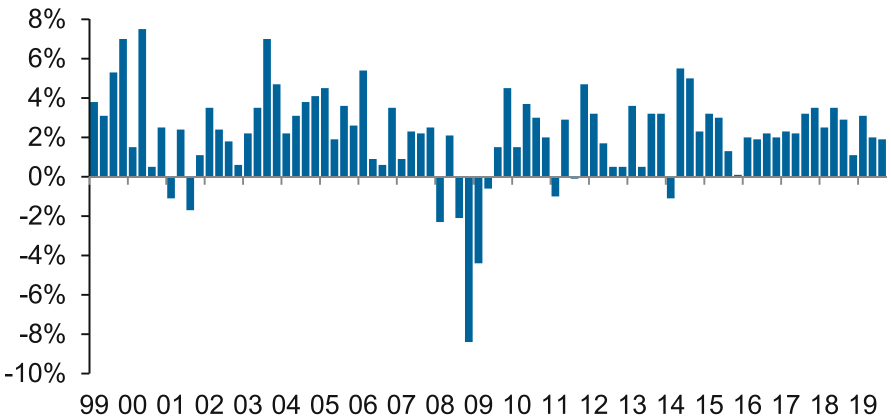
Inflation remains stuck below 2% in U.S., weaker overseas

– Wage pressures in U.S. have yet to translate into headline inflation; low inflation gives Fed cover to cut rates.

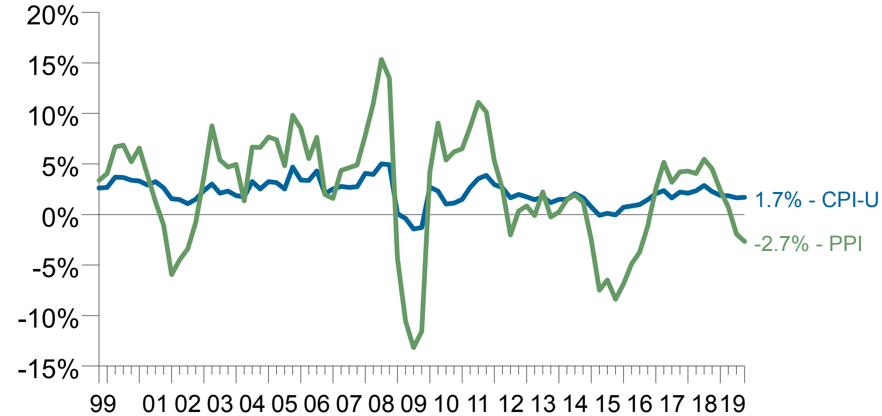
U.S. Economy—Summary

For periods ended September 30, 2019

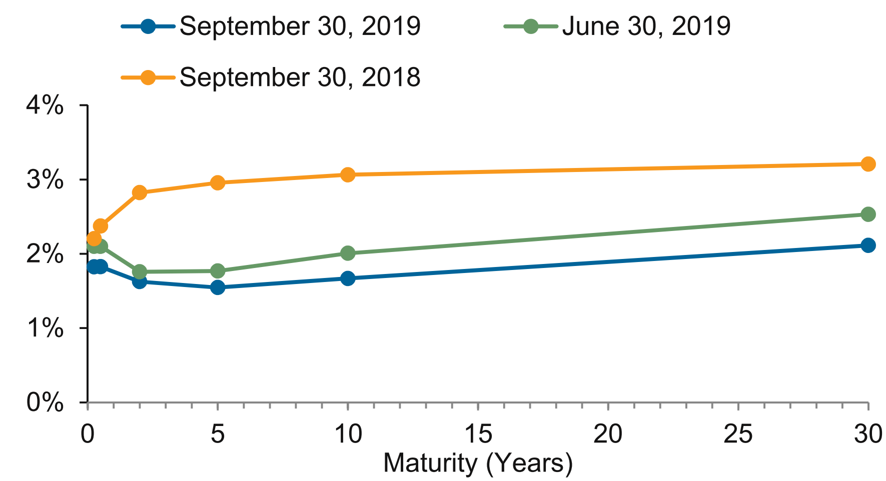
Quarterly Real GDP Growth



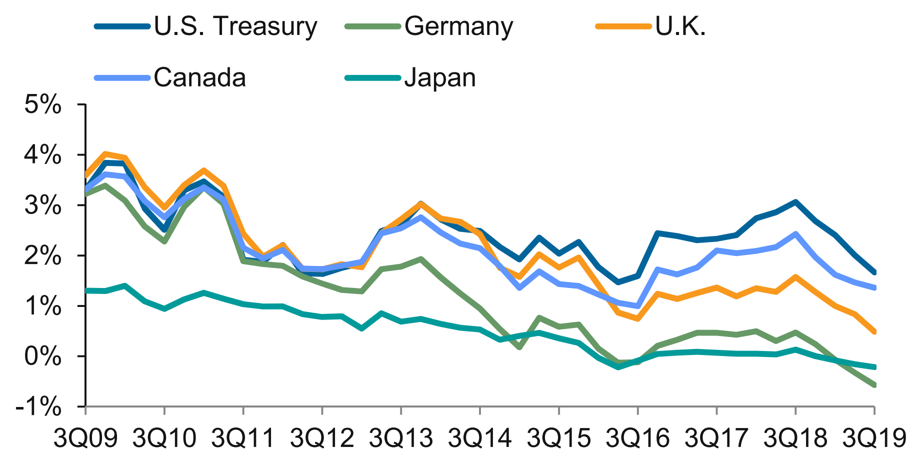
Inflation Year-Over-Year



U.S. Treasury Yield Curves



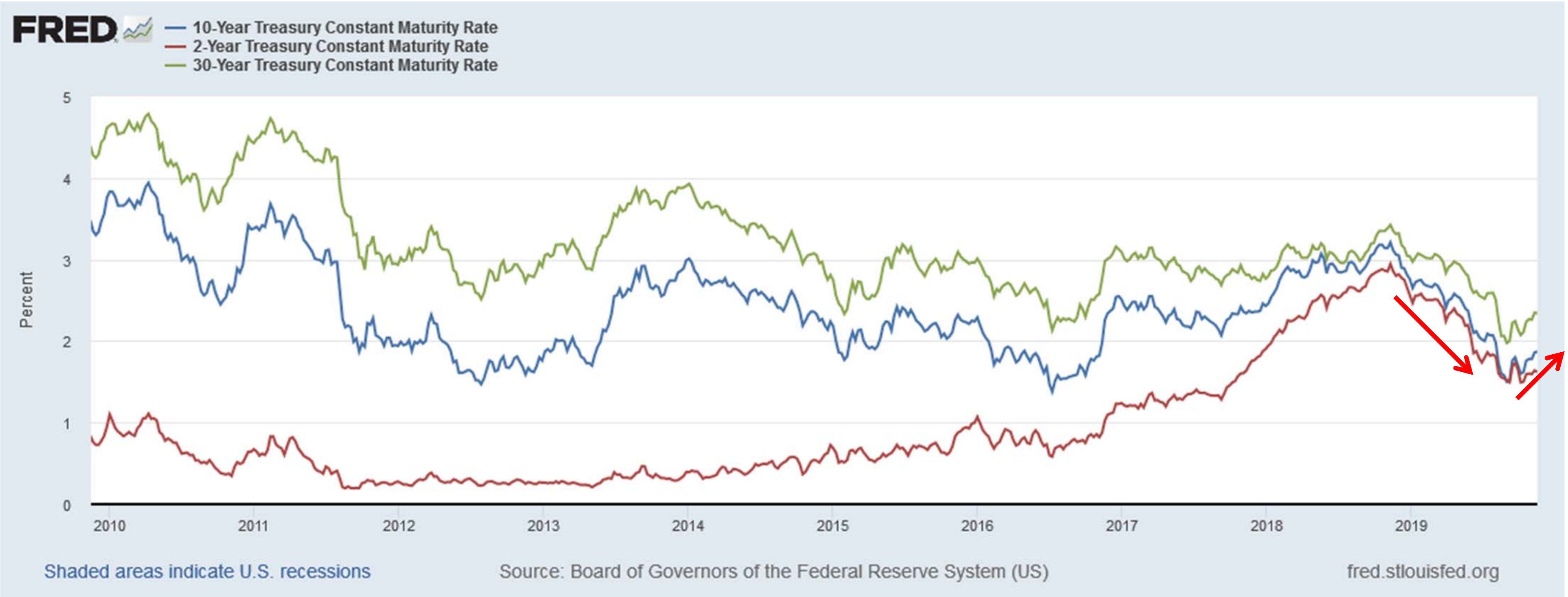
10-Year Global Government Bond Yields



Sources: Bureau of Labor Statistics, Bloomberg, Callan

Treasury Yield Curve

November 15, 2009 – November 15, 2019

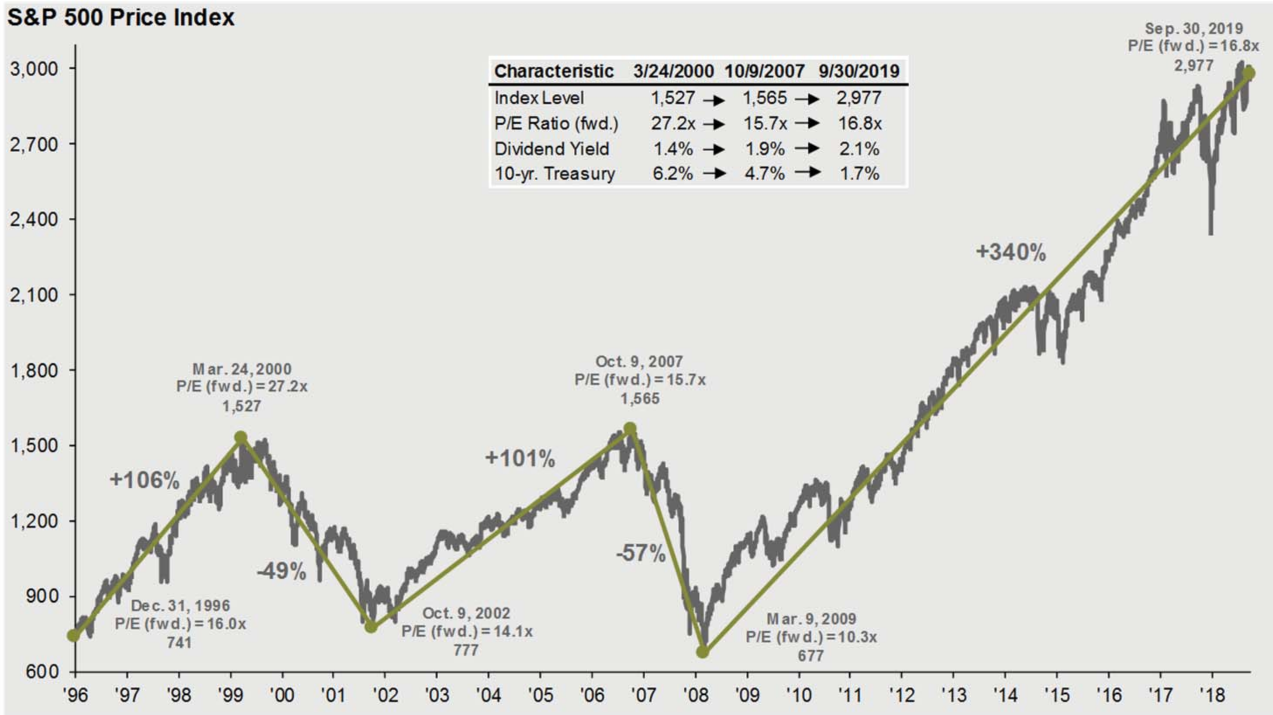


Q3 Rebound Continues, U.S. Stock Markets Surge Through Three Quarters of 2019

New record for the S&P 500 reached in Q3 2019
- 1.7% gain in Q3, after 4.3% in Q2 and the strongest first quarter (13.7%) since 2009.

Forward valuation slipped back to 16.8 in Q3, but above its 25-year average (16.2)
- Still nowhere near the peak set in 2000

Yield on 10-year Treasury fell back below the level of the dividend yield on stocks
- Prior to GFC, Treasury yield typically exceeded that of the stock dividend; two yields were very close for eight years following GFC.
- Gap began to widen with Fed tightening in 2017, but narrowed again in Q2 with reversal of Fed policy.
- Vastly different relationship between stock and bond yields in 2000 and 2007



Characteristic	3/24/2000	10/9/2007	9/30/2019
Index Level	1,527 →	1,565 →	2,977
P/E Ratio (fwd.)	27.2x →	15.7x →	16.8x
Dividend Yield	1.4% →	1.9% →	2.1%
10-yr. Treasury	6.2% →	4.7% →	1.7%

Source: Compustat, FactSet, Federal Reserve, Standard & Poor's, J.P. Morgan Asset Management.
Dividend yield is calculated as consensus estimates of dividends for the next 12 months, divided by most recent price, as provided by Compustat. Forward price to earnings ratio is a bottom-up calculation based on the most recent S&P 500 Index price, divided by consensus estimates for earnings in the next 12 months (NTM), and is provided by FactSet Market Aggregates. Returns are cumulative and based on S&P 500 Index price movement only, and do not include the reinvestment of dividends. Past performance is not indicative of future returns.
Guide to the Markets – U.S. Data are as of September 30, 2019.

Source: J.P. Morgan Asset Management

Callan Periodic Table of Investment Returns

Returns for Key Indices

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	3 Qtrs. 2019
Emerging Market Equity 34.00%	Real Estate 42.12%	Emerging Market Equity 39.38%	U.S. Fixed Income 5.24%	Emerging Market Equity 78.51%	Small Cap Equity 26.85%	U.S. Fixed Income 7.84%	Real Estate 27.73%	Small Cap Equity 38.82%	Real Estate 15.02%	Large Cap Equity 1.38%	Small Cap Equity 21.31%	Emerging Market Equity 37.28%	Cash Equivalent 1.87%	Large Cap Equity 20.55%
Real Estate 15.35%	Emerging Market Equity 32.17%	Non-U.S. Equity 12.44%	Non-U.S. Fixed Income 4.39%	High Yield 58.21%	Real Estate 19.63%	High Yield 4.98%	Emerging Market Equity 18.23%	Large Cap Equity 32.39%	Large Cap Equity 13.69%	U.S. Fixed Income 0.55%	High Yield 17.13%	Non-U.S. Equity 24.21%	U.S. Fixed Income 0.01%	Real Estate 19.82%
Non-U.S. Equity 14.47%	Non-U.S. Equity 25.71%	Non-U.S. Fixed Income 11.03%	Cash Equivalent 2.06%	Real Estate 37.13%	Emerging Market Equity 18.88%	Non-U.S. Fixed Income 4.36%	Non-U.S. Equity 16.41%	Non-U.S. Equity 21.02%	U.S. Fixed Income 5.97%	Cash Equivalent 0.05%	Large Cap Equity 11.96%	Large Cap Equity 21.83%	High Yield -2.08%	Small Cap Equity 14.18%
Large Cap Equity 4.91%	Small Cap Equity 18.37%	U.S. Fixed Income 6.97%	High Yield -26.16%	Non-U.S. Equity 33.67%	High Yield 15.12%	Large Cap Equity 2.11%	Small Cap Equity 16.35%	High Yield 7.44%	Small Cap Equity 4.89%	Real Estate -0.79%	Emerging Market Equity 11.19%	Small Cap Equity 14.65%	Non-U.S. Fixed Income -2.15%	Non-U.S. Equity 13.57%
Small Cap Equity 4.55%	Large Cap Equity 15.79%	Large Cap Equity 5.49%	Small Cap Equity -33.79%	Small Cap Equity 27.17%	Large Cap Equity 15.06%	Cash Equivalent 0.10%	Large Cap Equity 16.00%	Real Estate 3.67%	High Yield 2.45%	Non-U.S. Equity -3.04%	Real Estate 4.06%	Non-U.S. Fixed Income 10.51%	Large Cap Equity -4.38%	High Yield 11.41%
Cash Equivalent 3.07%	High Yield 11.85%	Cash Equivalent 5.00%	Large Cap Equity -37.00%	Large Cap Equity 26.47%	Non-U.S. Equity 8.95%	Small Cap Equity -4.18%	High Yield 15.81%	Cash Equivalent 0.07%	Cash Equivalent 0.03%	Small Cap Equity -4.41%	Non-U.S. Equity 2.75%	Real Estate 10.36%	Real Estate -5.63%	U.S. Fixed Income 8.52%
High Yield 2.74%	Non-U.S. Fixed Income 8.16%	High Yield 1.87%	Non-U.S. Equity -43.56%	Non-U.S. Fixed Income 7.53%	U.S. Fixed Income 6.54%	Real Estate -6.46%	U.S. Fixed Income 4.21%	U.S. Fixed Income -2.02%	Emerging Market Equity -2.19%	High Yield -4.47%	U.S. Fixed Income 2.65%	High Yield 7.50%	Small Cap Equity -11.01%	Emerging Market Equity 5.90%
U.S. Fixed Income 2.43%	Cash Equivalent 4.85%	Small Cap Equity -1.57%	Real Estate -48.21%	U.S. Fixed Income 5.93%	Non-U.S. Fixed Income 4.95%	Non-U.S. Equity -12.21%	Non-U.S. Fixed Income 4.09%	Emerging Market Equity -2.60%	Non-U.S. Fixed Income -3.09%	Non-U.S. Fixed Income -6.02%	Non-U.S. Fixed Income 1.49%	U.S. Fixed Income 3.54%	Non-U.S. Equity -14.09%	Non-U.S. Fixed Income 4.38%
Non-U.S. Fixed Income -8.65%	U.S. Fixed Income 4.33%	Real Estate -7.39%	Emerging Market Equity -53.33%	Cash Equivalent 0.21%	Cash Equivalent 0.13%	Emerging Market Equity -18.42%	Cash Equivalent 0.11%	Non-U.S. Fixed Income -3.08%	Non-U.S. Equity -4.32%	Emerging Market Equity -14.92%	Cash Equivalent 0.33%	Cash Equivalent 0.86%	Emerging Market Equity -14.57%	Cash Equivalent 1.81%

- S&P 500 Index
- Russell 2000 Index
- MSCI World ex USA
- MSCI Emerging Markets
- Bloomberg Barclays US Aggregate Bond
- Bloomberg Barclays High Yield Bond Index
- Bloomberg Barclays Global Aggregate ex US Bond Index
- FTSE EPRA/NAREIT Developed REIT Index
- 3-month Treasury Bill

Sources: Bloomberg Barclays, FTSE Russell, MSCI, Standard & Poor's

OPERF Total Regular Account

Performance Summary for the Third Quarter 2019

Total Fund:

For the quarter ended September 30, 2019, the Total Regular Account rose 1.86% (+1.73% net of fees), exceeding the 1.53% return of the Policy Benchmark, and ranked in the top decile of Callan's $10B+ public fund peer group. For the twelve months ended September30, 2019, the Total Regular Account gained 5.90% (+5.42% net of fees), just short of the return for the Policy Target (+5.95%), and ranked in the 21st percentile in Callan's $10B+ public fund peer group. Longer term results against the Policy Target were mixed; however, peer group rankings consisntely placed the Total Regular Account in the top quartile.

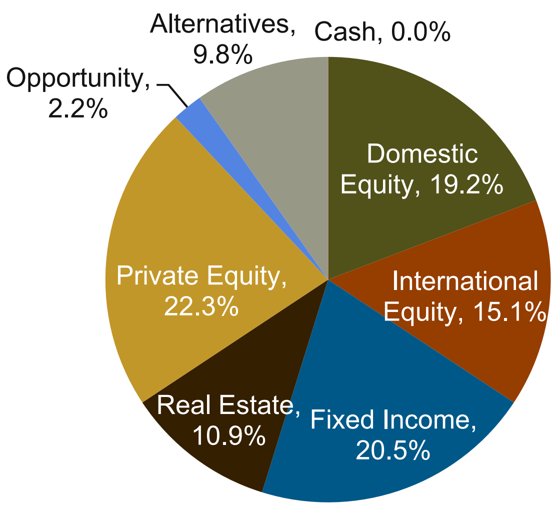
Asset Classes:

- **Total Fixed Income:** The Fixed Income Portfolio added 2.22% (+2.18% net of fees) for the quarter versus a gain of 2.12% for the Custom Fixed Income Benchmark, and ranked in the 35th percentile of Callan's Public Funds $10B+ US Fixed Income (Gross) peer group. For the trailing year, the Portfolio rose 9.55% (+9.40% net of fees), ahead of the 9.28% return of the benchmark, and ranked in the 47th percentile of the peer group. 10 year results were ahead of the benchmark and ranked in the top quartile of the peer group.
- **Total Public Equity:** Total Public Equity portfolio returned 0.08% (+0.02% net of fees) for the quarter versus a 0.18% decrease in the MSCI ACWI IMI Net benchmark, and ranked in the 43rd percentile of its peer group. For the trailing year, the portfolio rose 0.16% (-0.07% net of fees), trailing the 0.48% return of the benchmark and ranked in the 61st percentile of peer group.
  - **U.S. Equity:** The U.S. Equity Portfolio increased 0.94% (+0.92% net of fees) for the quarter, lagging the Russell 3000 Index return of 1.16%, and ranked in the 49th percentile of Callan's Public Fund: $10B+ Domestic Equity (gross) peer group. On a trailing 12 month basis, the Portfolio added 0.12% (+0.05% net of fees) versus a return of 2.92% for the benchmark and ranked in the 82nd percentile of the peer group. 10 year results of 12.69% (+12.48% net of fees) lagged the benchmark return of 13.08% and ranked in the 69th percentile of the peer group.
  - **International Equity:** The International Equity Portfolio registered a return of -1.42% (-1.53% net of fees) for the quarter, ahead of the -1.72% return of the MSCI ACWI ex-U.S. IMI Index, and ranked in the 36th percentile of Callan's Public Fund: $10B+ International Equity (gross) peer group. For the trailing year, the Portfolio returned -1.05% (-1.46% net of fees) outperforming the benchmark return of -1.84%, and ranked in the 52nd percentile in the peer group. 10 year results remained comfortably ahead of the benchmark (+5.88% net of fees versus +4.66%) and continued to rank in the top quartile of the peer group.
- **Total Real Estate:** The Real Estate Portfolio continued to show competitive absolute results over the last decade with an annualized return of 9.68% net of fees.
- **Opportunity Portfolio:** The Opportunity Portfolio's results over the last ten years continued to be favorable with an annualized return of 9.18% net of fees.
- **Alternative Portfolio:** The Alternative Portfolio returned 1.01% per annum net of fees over the last five years.
- **Total Private Equity:** The Private Equity Portfolio's returns remained strong with an annualized return of 14.23% net of fees over the last ten years.

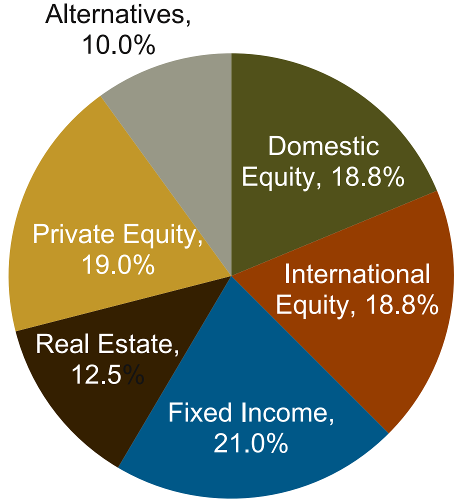
OPERF Total Regular Account

Asset Allocation

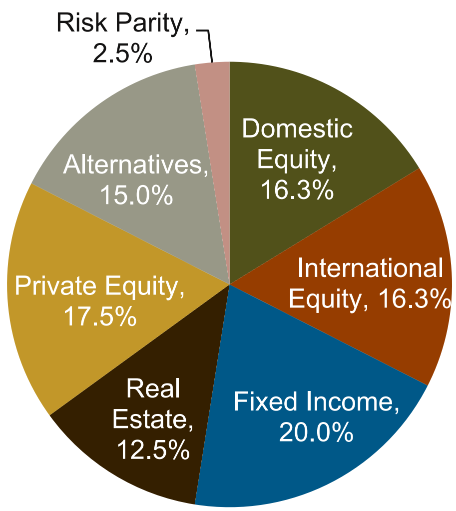
Actual Allocation as of 09/30/2019



Interim Policy Target*



Strategic Policy Target**



Asset Class	$000s Actual	Weight*** Actual	Target	Percent Difference	$000s Difference
Total Fixed Income	15,827,308	20.5%	21.0%	(0.5%)	(375,681)
U.S. Equity Portfolio	14,797,637	19.2%	18.8%	0.4%	330,682
Non-U.S. Equity Portfolio	11,644,588	15.1%	18.8%	(3.7%)	(2,822,367)
Total Real Estate	8,405,853	10.9%	12.5%	(1.6%)	(1,238,784)
Opportunity Portfolio	1,678,094	2.2%	0.0%	2.2%	1,678,094
Alternative Portfolio	7,598,481	9.8%	10.0%	(0.2%)	(117,228)
Total Private Equity	17,188,196	22.3%	19.0%	3.3%	2,528,348
Cash	16,937	0.0%	0.0%	0.0%	16,937
Total	77,157,095	100.0%	100.0%		

*Interim policy target adopted January 1, 2019 **Strategic policy target adopted April 24, 2019 ***Totals provided by OST Staff

OPERF Total Regular Account

Net Cumulative Performance by Asset Class as of September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Total Regular Account	**1.73%**	**5.42%**	**8.80%**	**7.05%**	**9.06%**
Total Regular Account ex-Overlay	1.61%	5.00%	8.64%	6.90%	8.93%
OPERF Policy Benchmark*	1.53%	5.95%	9.12%	7.44%	9.30%
Total Fixed Income	**2.18%**	**9.40%**	**3.31%**	**3.27%**	**5.00%**
Custom FI Benchmark	2.12%	9.28%	3.02%	2.98%	3.84%
Callan Public Fund > $10bn U.S. Fixed	2.04%	9.42%	3.57%	3.78%	4.71%
Total Public Equity	**0.02%**	**-0.07%**	**9.59%**	**7.02%**	**9.00%**
MSCI ACWI IMI Net	-0.18%	0.48%	9.36%	6.61%	8.45%
U.S. Equity Portfolio	**0.92%**	**0.05%**	**11.73%**	**9.51%**	**12.48%**
Russell 3000 Index	1.16%	2.92%	12.83%	10.44%	13.08%
Callan Large Public > $10bn U.S. Equity	0.90%	2.00%	12.52%	10.15%	12.98%
Non-U.S. Equity Portfolio	**-1.53%**	**-1.46%**	**6.83%**	**4.20%**	**5.88%**
MSCI ACWI ex-US IMI Index**	-1.72%	-1.84%	6.10%	3.05%	4.66%
Callan Large Public > $10bn Non-U.S. Equity	-1.58%	-0.92%	6.81%	4.06%	5.82%
Total Real Estate	**2.67%**	**6.34%**	**8.13%**	**9.18%**	**9.68%**
Total Real Estate ex REITs	2.57%	6.43%	9.45%	10.14%	9.39%
Oregon Custom Real Estate Benchmark	0.77%	5.46%	6.61%	8.57%	9.12%
Callan Public Plan - Real Estate	1.71%	6.61%	7.59%	9.47%	10.01%
Opportunity Portfolio	**1.11%**	**1.28%**	**6.31%**	**5.75%**	**9.18%**
CPI + 5%	1.42%	6.50%	7.05%	6.34%	6.71%
Alternative Portfolio	**-0.17%**	**-2.98%**	**2.70%**	**1.01%**	**-**
CPI + 4%	1.23%	5.77%	6.15%	5.58%	-
Total Private Equity	**4.22%**	**13.83%**	**16.02%**	**11.71%**	**14.23%**
OIC - Russell 3000 + 300 BPS Qtr Lag	4.86%	12.23%	17.41%	13.47%	18.05%

*Current Policy Benchmark = 37.5%, MSCI ACWI IMI, 21.0% OPERF Custom Total FI Benchmark, 19.0% Russell 3000 + 300 bps Qtr Lag, 12.5% Oregon Custom Real Estate Benchmark and 10.0% CPI + 400 bps
Target 12/18= 39.0%, MSCI ACWI IMI, 22.0% OPERF Custom Total FI Benchmark, 19.0% Russell 3000 + 300 bps Qtr Lag, 12.5% Oregon Custom Real Estate Benchmark and 7.5% CPI + 400 bps

OPERF Total Regular Account

Net Calendar Year Performance by Asset Class

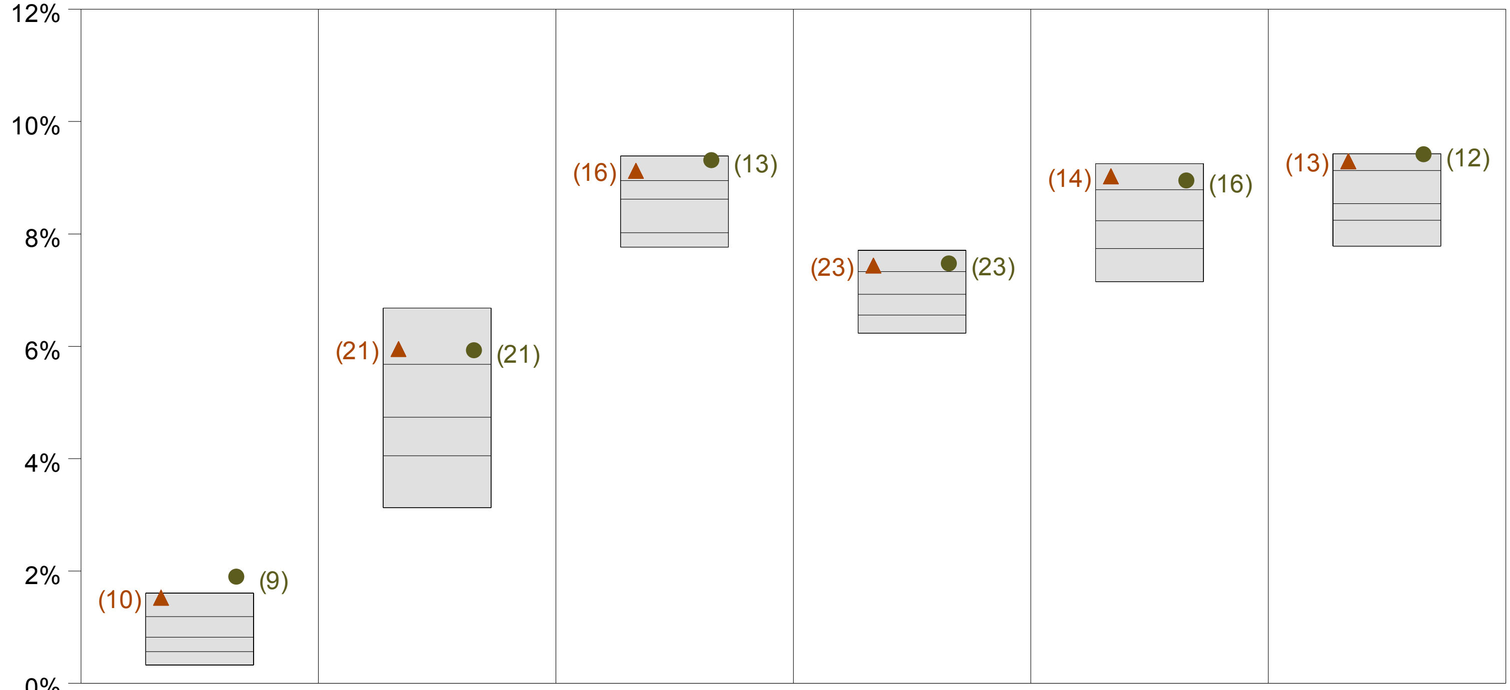
	3 Qtrs. 2019	2018	2017	2016	2015
Total Regular Account	**9.75%**	**0.48%**	**15.39%**	**7.11%**	**2.01%**
Total Regular Account ex-Overlay	9.44%	0.45%	15.38%	6.73%	2.02%
OPERF Policy Benchmark*	9.63%	1.22%	15.64%	8.95%	1.57%
Total Fixed Income	**8.50%**	**0.25%**	**3.70%**	**3.06%**	**0.54%**
Custom FI Benchmark	8.14%	0.31%	3.32%	2.52%	0.16%
Callan Public Fund > $10bn U.S. Fixed	9.06%	-0.58%	4.61%	4.82%	-0.06%
Total Public Equity	**15.41%**	**-10.47%**	**24.41%**	**9.89%**	**-1.75%**
MSCI ACWI IMI Net	15.87%	-10.08%	23.95%	8.36%	-2.19%
U.S. Equity Portfolio	**18.33%**	**-7.87%**	**20.40%**	**14.90%**	**-0.87%**
Russell 3000 Index	20.09%	-5.24%	21.13%	12.74%	0.48%
Callan Large Public > $10bn U.S. Equity	19.41%	-5.76%	21.28%	12.60%	0.40%
Non-U.S. Equity Portfolio	**12.03%**	**-14.88%**	**30.23%**	**4.67%**	**-2.59%**
MSCI ACWI ex-US IMI Index**	11.39%	-14.76%	27.81%	4.41%	-4.60%
Callan Large Public > $10bn Non-U.S. Equity	12.52%	-14.03%	29.70%	5.16%	-3.22%
Total Real Estate	**5.67%**	**8.03%**	**10.05%**	**7.88%**	**9.90%**
Total Real Estate ex REITs	5.30%	8.87%	11.19%	10.01%	12.67%
Oregon Custom Real Estate Benchmark	3.53%	7.71%	6.70%	8.88%	13.48%
Callan Public Plan - Real Estate	5.24%	7.98%	7.70%	8.50%	12.31%
Opportunity Portfolio	**2.66%**	**5.85%**	**10.47%**	**6.12%**	**2.14%**
CPI + 5%	5.93%	6.77%	7.18%	6.99%	5.39%
Alternative Portfolio	**-0.67%**	**-2.44%**	**8.30%**	**6.61%**	**-4.32%**
CPI + 4%	5.24%	5.98%	6.19%	6.16%	4.76%
Total Private Equity	**9.04%**	**18.15%**	**17.32%**	**6.26%**	**7.79%**
OIC - Russell 3000 + 300 BPS Qtr Lag	4.02%	21.06%	22.22%	18.37%	2.49%

*Current Policy Benchmark = 37.5%, MSCI ACWI IMI, 21.0% OPERF Custom Total FI Benchmark, 19.0% Russell 3000 + 300 bps Qtr Lag, 12.5% Oregon Custom Real Estate Benchmark and 10.0% CPI + 400 bps
Target 12/18= 39.0%, MSCI ACWI IMI, 22.0% OPERF Custom Total FI Benchmark, 19.0% Russell 3000 + 300 bps Qtr Lag, 12.5% Oregon Custom Real Estate Benchmark and 7.5% CPI + 400 bps

OPERF Total Regular Account

Gross Performance and Peer Group Rankings* as of September 30, 2019

Performance vs Callan Public Fund Spons- V Lg DB (>10B) (Gross)

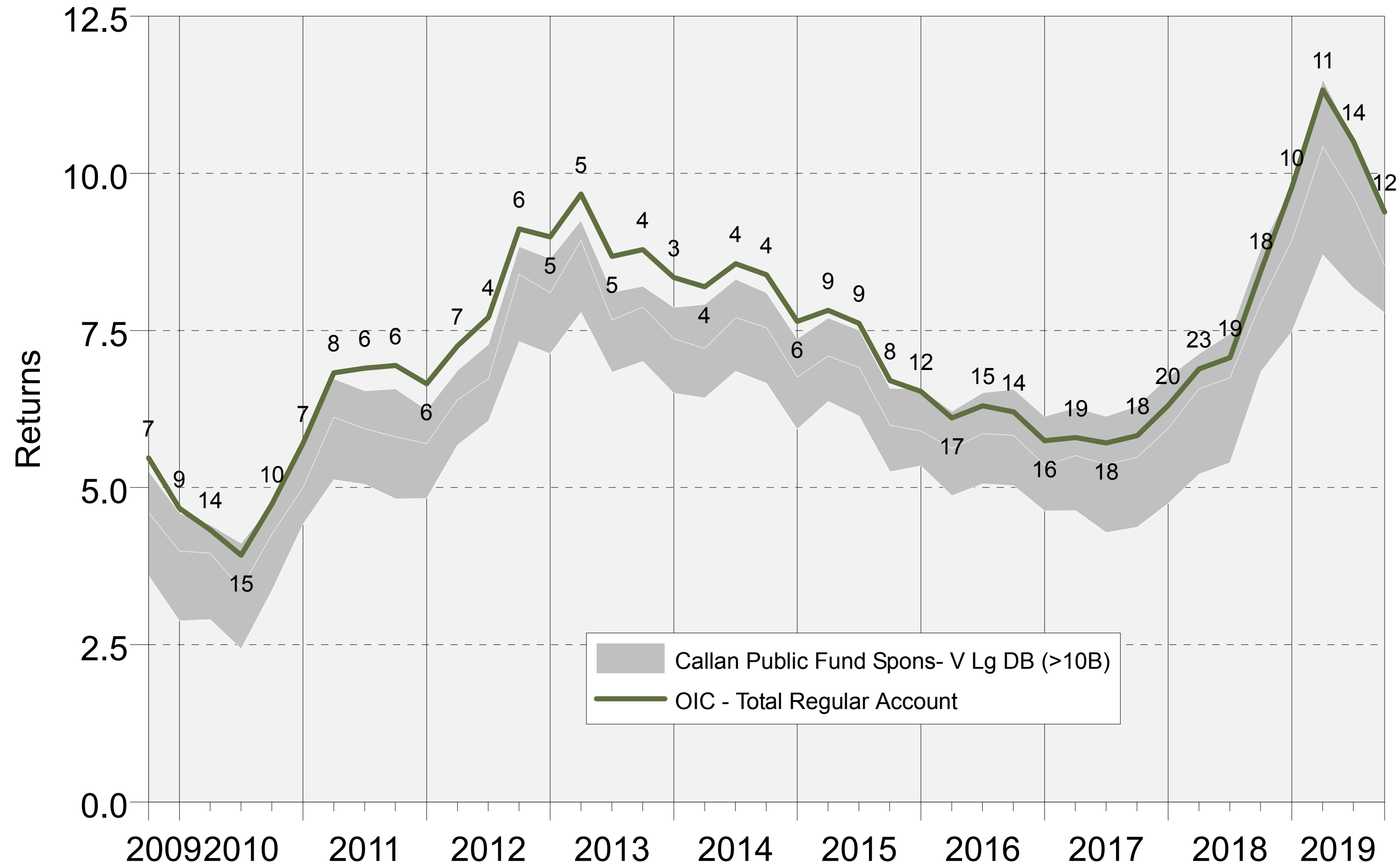


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years	Last 10 Years
10th Percentile	1.61	6.68	9.39	7.71	9.25	9.43
25th Percentile	1.19	5.68	8.95	7.33	8.79	9.13
Median	0.82	4.74	8.62	6.92	8.24	8.54
75th Percentile	0.57	4.05	8.02	6.56	7.74	8.24
90th Percentile	0.33	3.13	7.76	6.23	7.15	7.78
Total Regular Account ●	1.86	5.90	9.28	7.44	8.92	9.39
Policy Target ▲	1.53	5.95	9.12	7.44	9.03	9.30

*Versus Callan's Very Large Public Funds (> $10 billion) Peer Group (35 funds)

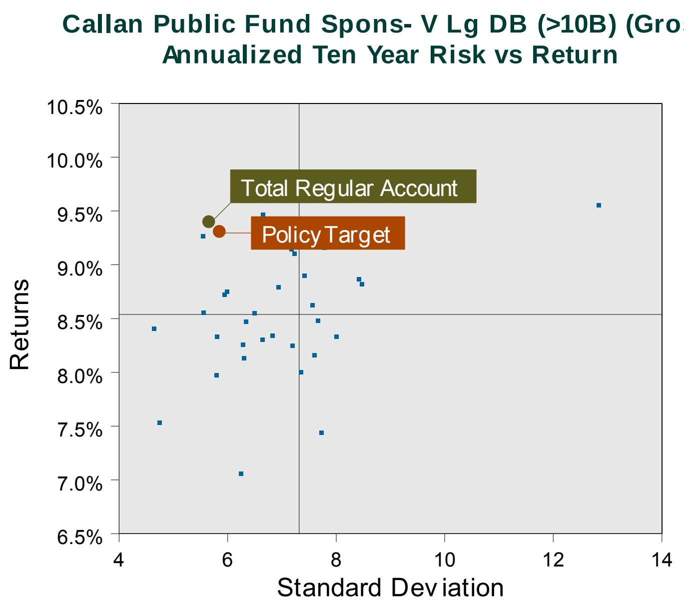
OPERF Rolling 10 Year Returns and Rankings

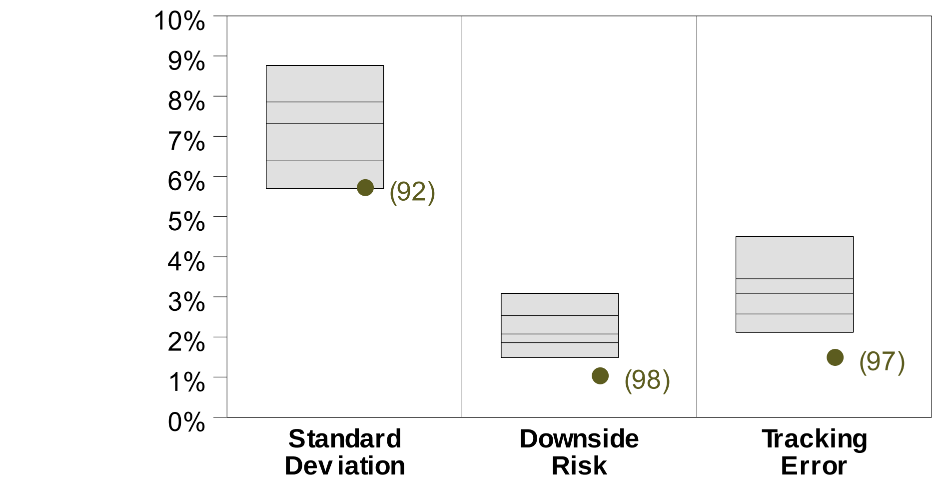
Rolling 40 Quarter Gross of Fee Returns
for 10 Years Ended September 30, 2019



OPERF Total Regular Account

Risk vs Return

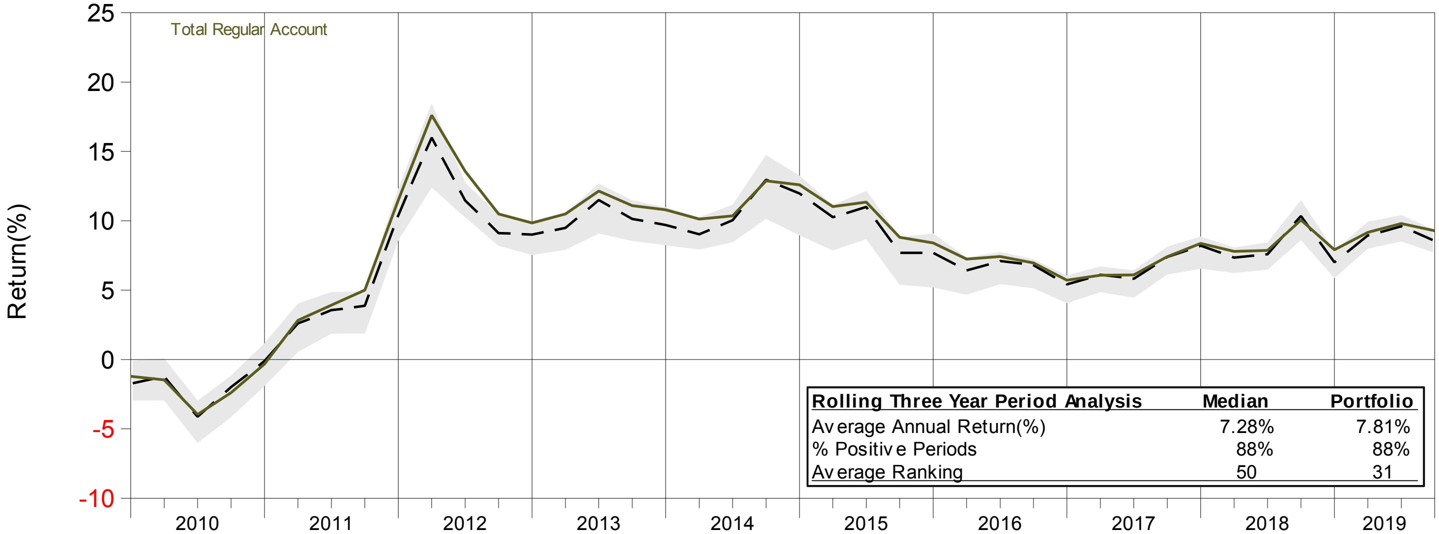




	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	8.76	3.09	4.51
25th Percentile	7.86	2.53	3.45
Median	7.32	2.07	3.09
75th Percentile	6.39	1.86	2.57
90th Percentile	5.70	1.49	2.12
Total Regular Account ●	5.67	0.99	1.45

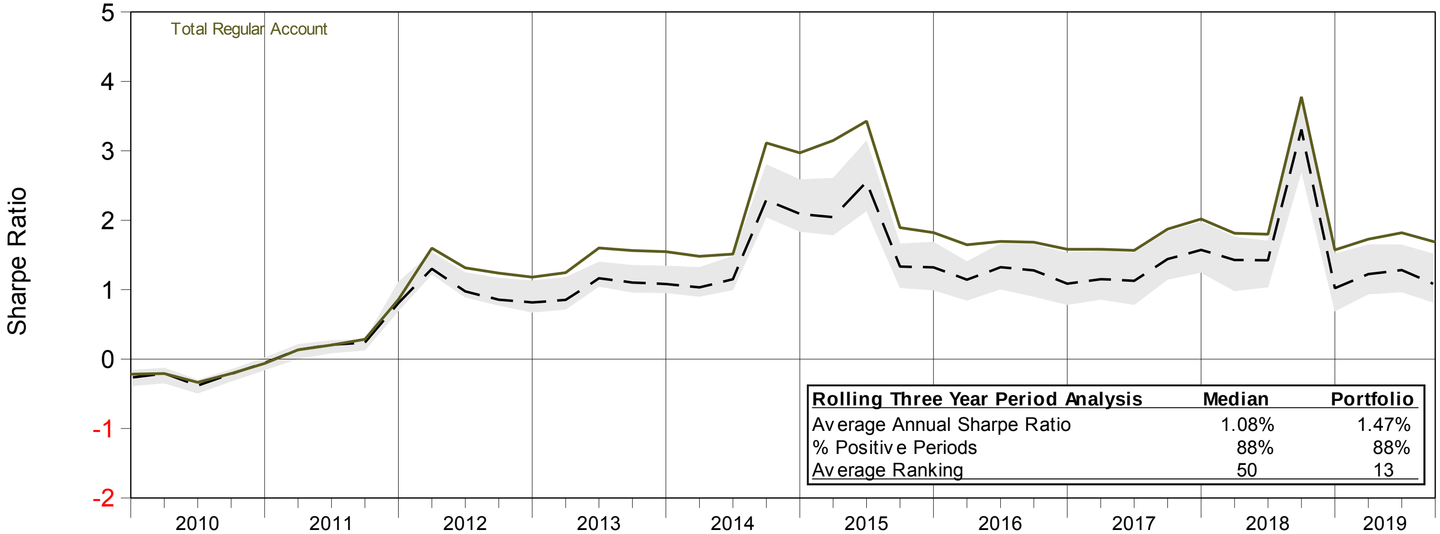
Total Fund Consistency

Rolling Three Year Return(%) Relative to Policy Target
Ten Years Ended September 30, 2019



Rolling Three Year Period Analysis	Median	Portfolio
Average Annual Return(%)	7.28%	7.81%
% Positive Periods	88%	88%
Average Ranking	50	31

Rolling Three Year Sharpe Ratio Relative to Policy Target
Ten Years Ended September 30, 2019



Rolling Three Year Period Analysis	Median	Portfolio
Average Annual Sharpe Ratio	1.08%	1.47%
% Positive Periods	88%	88%
Average Ranking	50	13

Callan

Appendix

U.S. Equity: Low Volatility Outperformance

Defensive sectors prevailed

– Ongoing trade tension, earnings and interest rate uncertainty, and the global political landscape continued to drive investor unease.
– Utilities, Real Estate, and Consumer Staples top performers in response to continued flight to quality

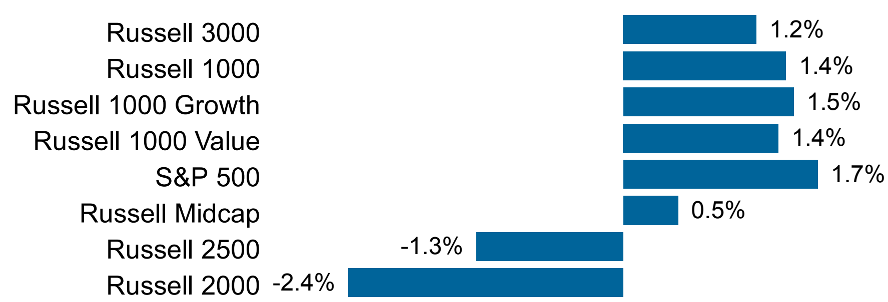
Large caps posted modest gains

– Leading up to September, low-vol and momentum stocks had outperformed as investors shunned the cheapest quintile, more volatile stocks.
– Trend sharply reversed in early September as the 10-year Treasury yield rose from 1.46% to 1.73%; defensive stocks can be dependent upon yields falling.

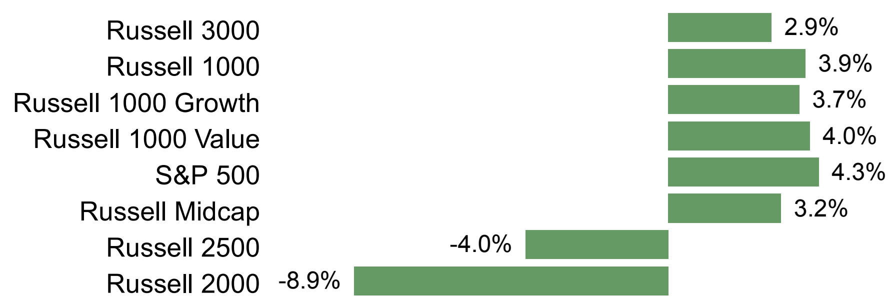
Value and Growth mixed across capitalizations

– While value continues to trail growth year-to-date, it gained ground during September's factor reversal, finishing the quarter essentially in line with growth within large caps.

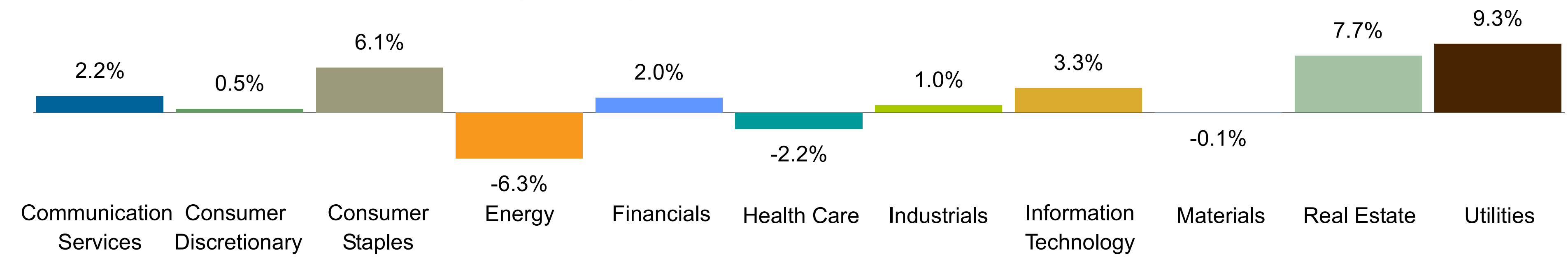
U.S. Equity: Quarterly Returns



U.S. Equity: One-Year Returns



Economic Sector Quarterly Performance (S&P 500)



Sources: FTSE Russell, Standard & Poor's

Non-U.S. Equity Performance

Trade war and no-deal Brexit fears turned non-U.S. markets negative

– U.K. declined on attempted suspension of Parliament and no-deal Brexit proclamations.

– Germany's recession fears drove country to biggest annual decline in nine years.

– Hong Kong fell 11.9% as protests continued; Japan was bright spot as low rates remained unchanged and resolution to Japan/South Korea trade war looked more promising.

Defensive sectors prevailed

– Cyclical sectors trailed as investors were positioned defensively; Energy (-6.5%) was biggest laggard on oil price decline.

– Factor performance favored quality and low vol, reflecting cautious investor behavior.

Currencies declined vs. U.S. dollar

– Major developed market currencies declined vs. the dollar despite lowering of Fed funds rate; U.S. remains dominant provider of safe assets.

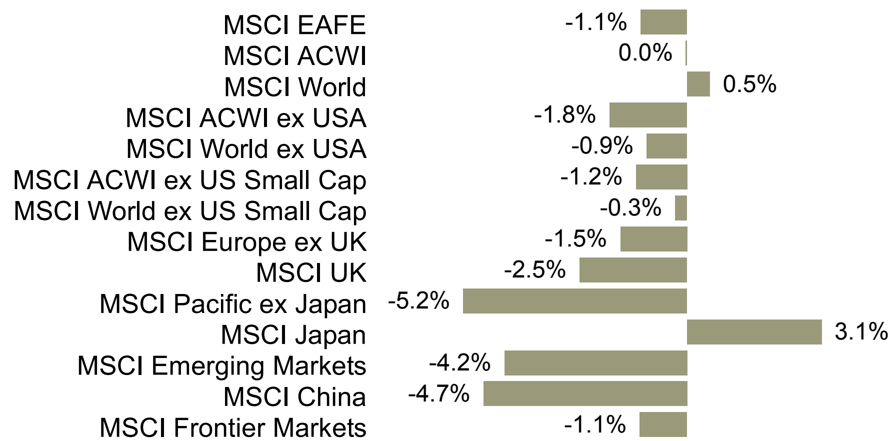
EM worst-performing region

– Global uncertainty weighed heavily on EM countries.

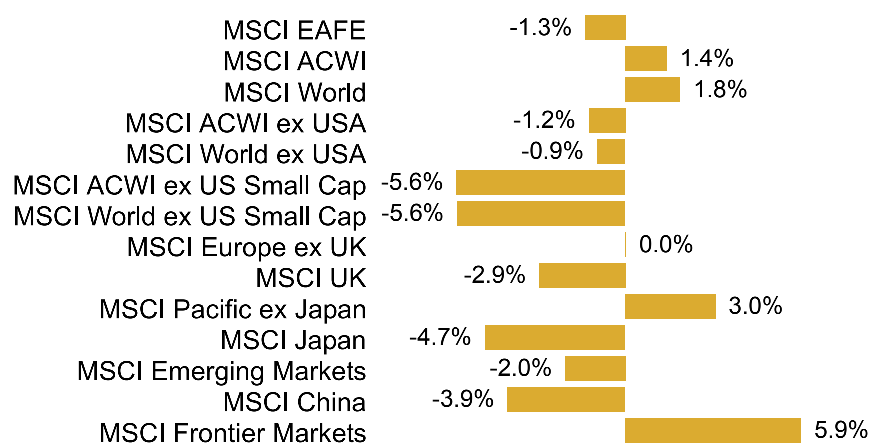
– EM currencies suffered from strong dollar.

– EM growth (-2.04%) outpaced EM value (-6.48%) given Tech sector spike (+5.63%).

Global Equity: Quarterly Returns



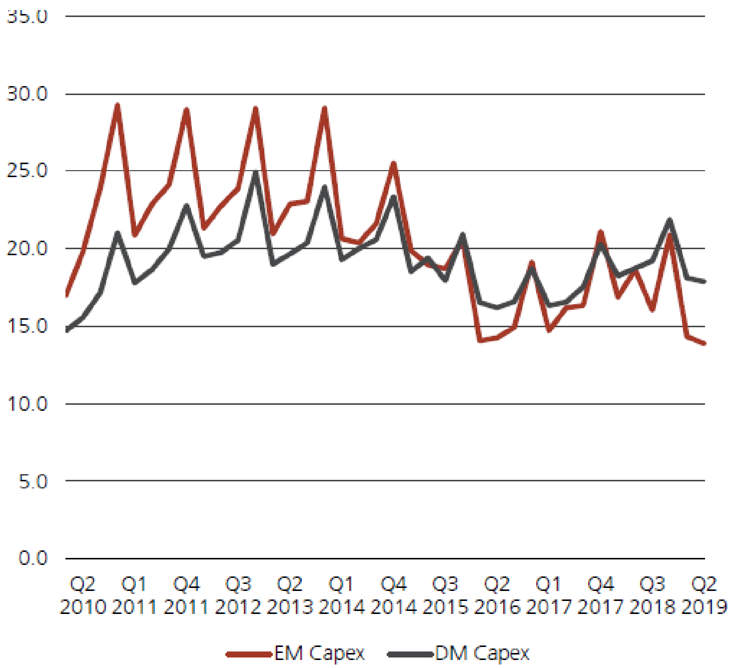
Global Equity: Annual Returns



Source: MSCI

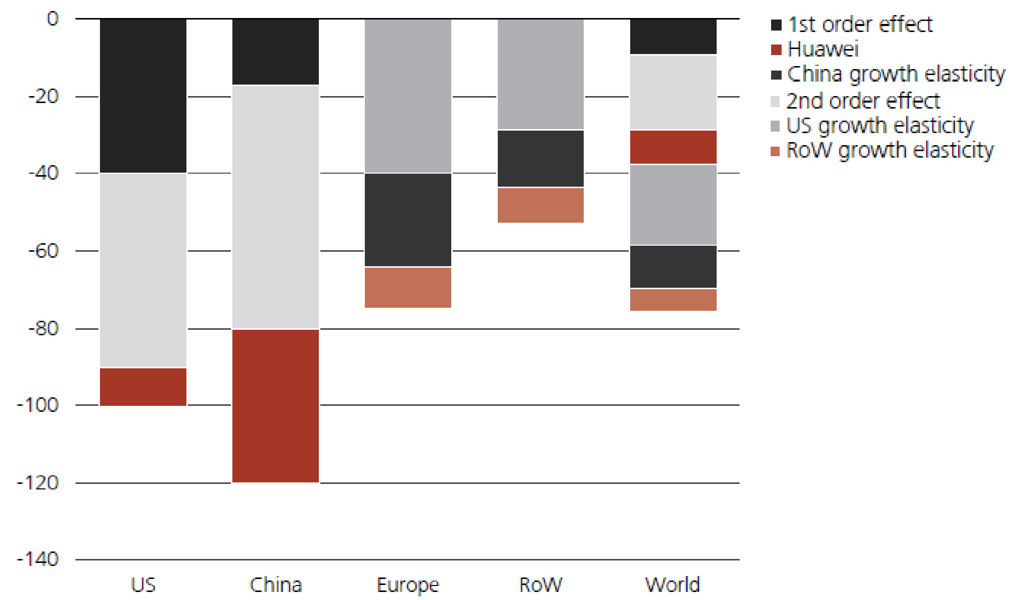
Who's Winning the Trade War?

Quarterly capex (USDm)



Source: UBS Asset Management, Bloomberg, IMF, as of June 2019

Growth impact of US/China tariffs by region 2Q19–4Q20 (bps)



Source:.UBS IB, Haver, projections as of July 2019
Note for RHS chart: this compares the index level of GDP at end 2020 with and without tariffs

- Trade war resolution is uncertain; however, its protracted negotiation is permeating into the global economy.
- Capex is decelerating, especially within emerging markets, given the uncertainty.
- Trade volumes have diminished and incrementally veered away from China.
  - Trade tension has compromised Chinese economy by moderating business sentiment within manufacturing, consumption, and property.
- Market may be plagued by recession from late 2019 to late 2020 if worst-case scenario plays out.
- Recession may be avoided in the event of no trade escalation coupled with capex normalization and government stimulus measures.

U.S. Fixed Income Performance

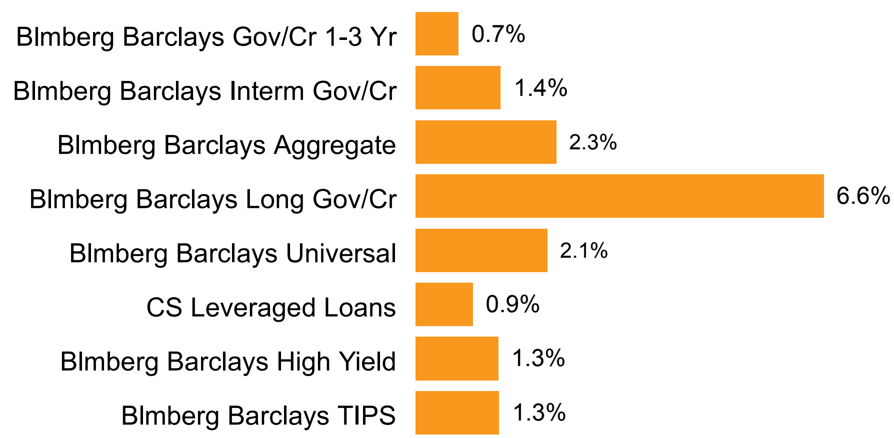
Rates rallied on trade tensions and geopolitical uncertainty

– Treasuries returned 2.4% as rates fell across the yield curve.
– While 2- and 10-year key rates remained positive, spread between the 90-day and 10-year key rates remained inverted.
– Long Treasuries soared (+7.9%) as 30-year yields fell roughly 40 bps.
– Nominal Treasuries outperformed TIPS as inflation expectations continued to fall; 10-year breakeven spreads were 1.53% as of quarter-end, down from 1.69% as of June 30.

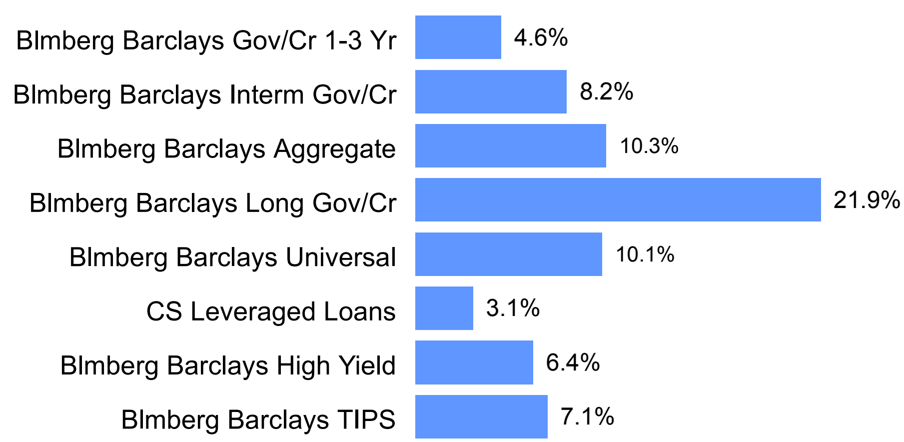
IG Corporate was quiet, but HY told two stories

– Investment grade corporate credit spreads were range-bound, but their yield advantage was enough to generate positive excess returns versus like-duration Treasuries.
– BB-rated corporates (+2.0%) outperformed CCC-rated corporates (-1.8%).
– BB and B-rated spreads narrowed slightly, but the rally in rates helped drive outperformance as a result of higher-quality bonds' greater sensitivity to interest rate movements.
– CCC-rated bond spreads widened significantly, representing some concern about deteriorating quality at the lower-end of the spectrum.

U.S. Fixed Income: Quarterly Returns



U.S. Fixed Income: Annual Returns



Sources: Bloomberg Barclays, Credit Suisse

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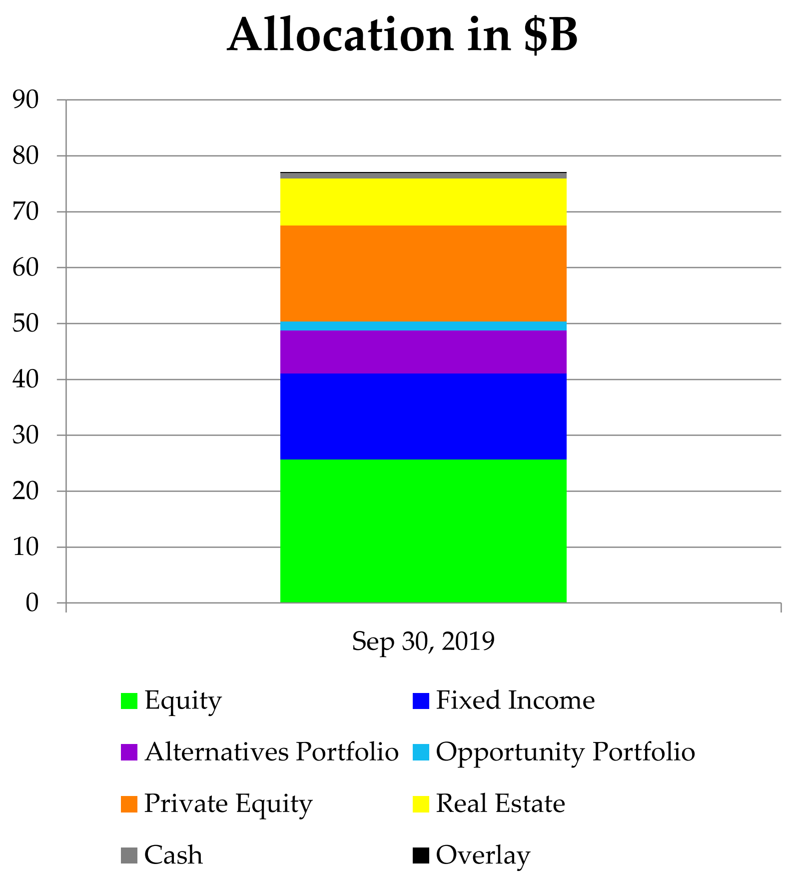
December 11, 2019

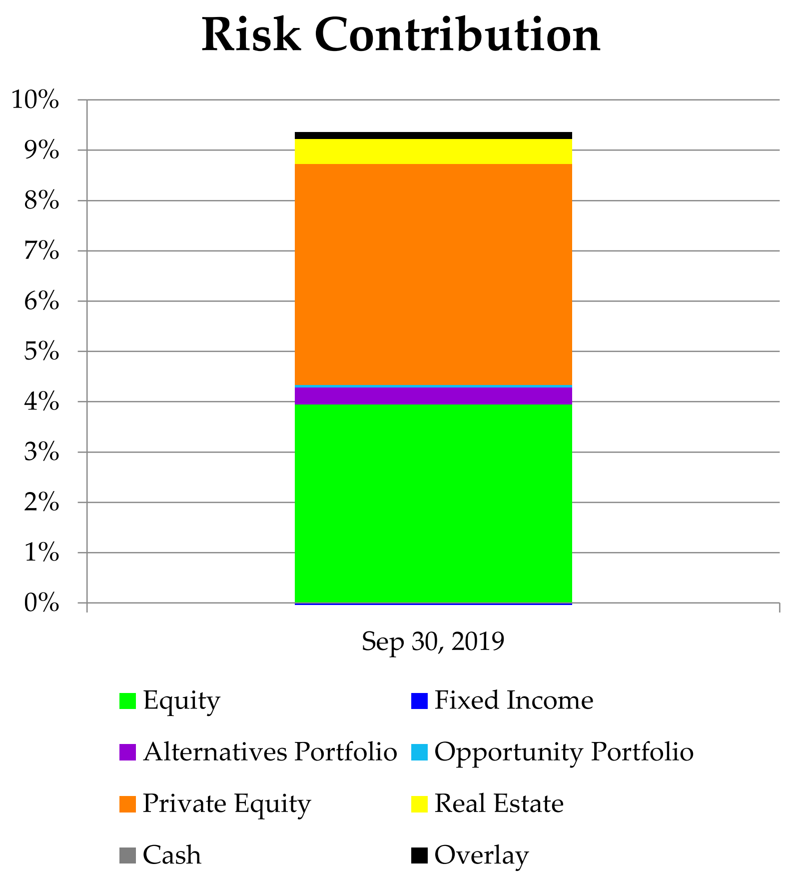
OPERF Risk Dashboard

2019 Q3

OREGON STATE TREASURY

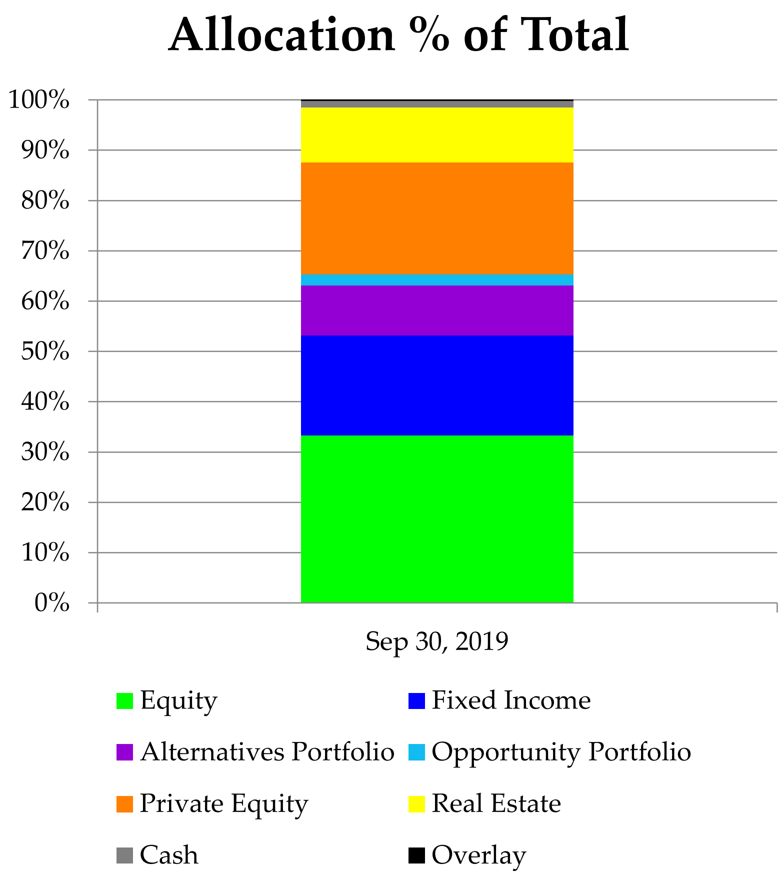
Allocation & Risk Contribution by Asset Class

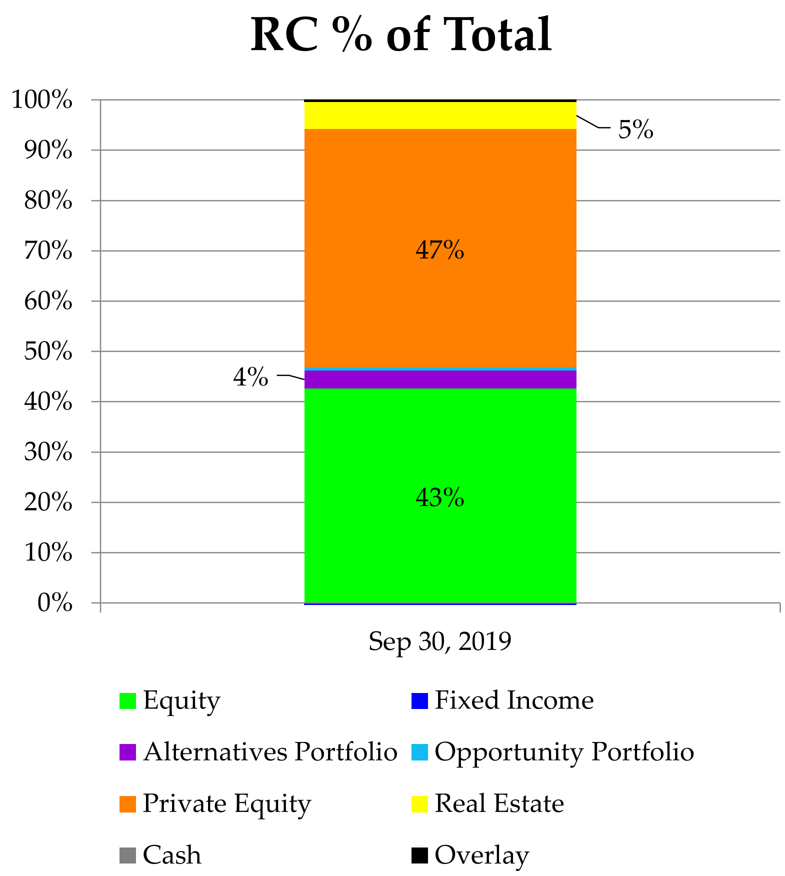




OREGON STATE TREASURY

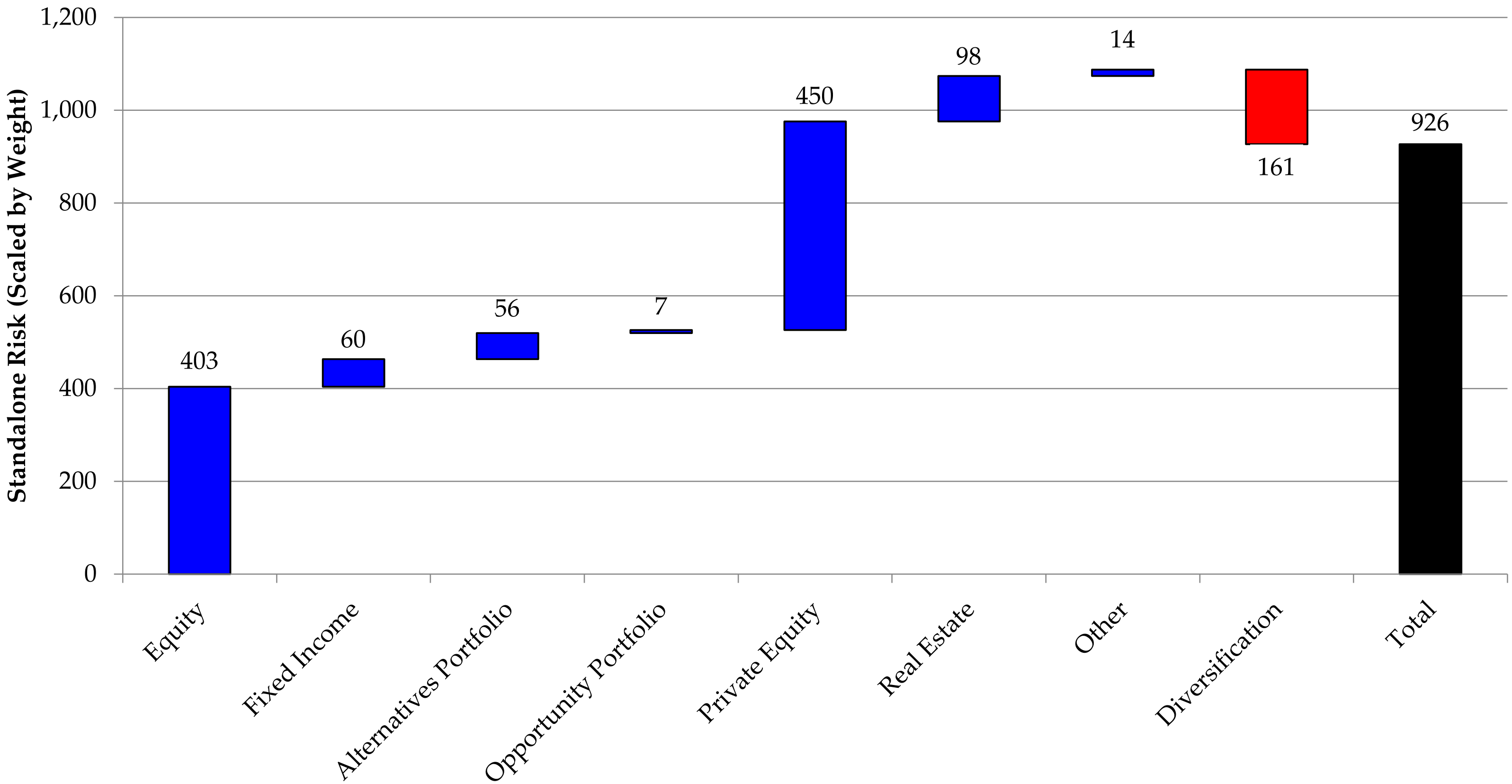
Allocation & Risk Contribution by Asset Class





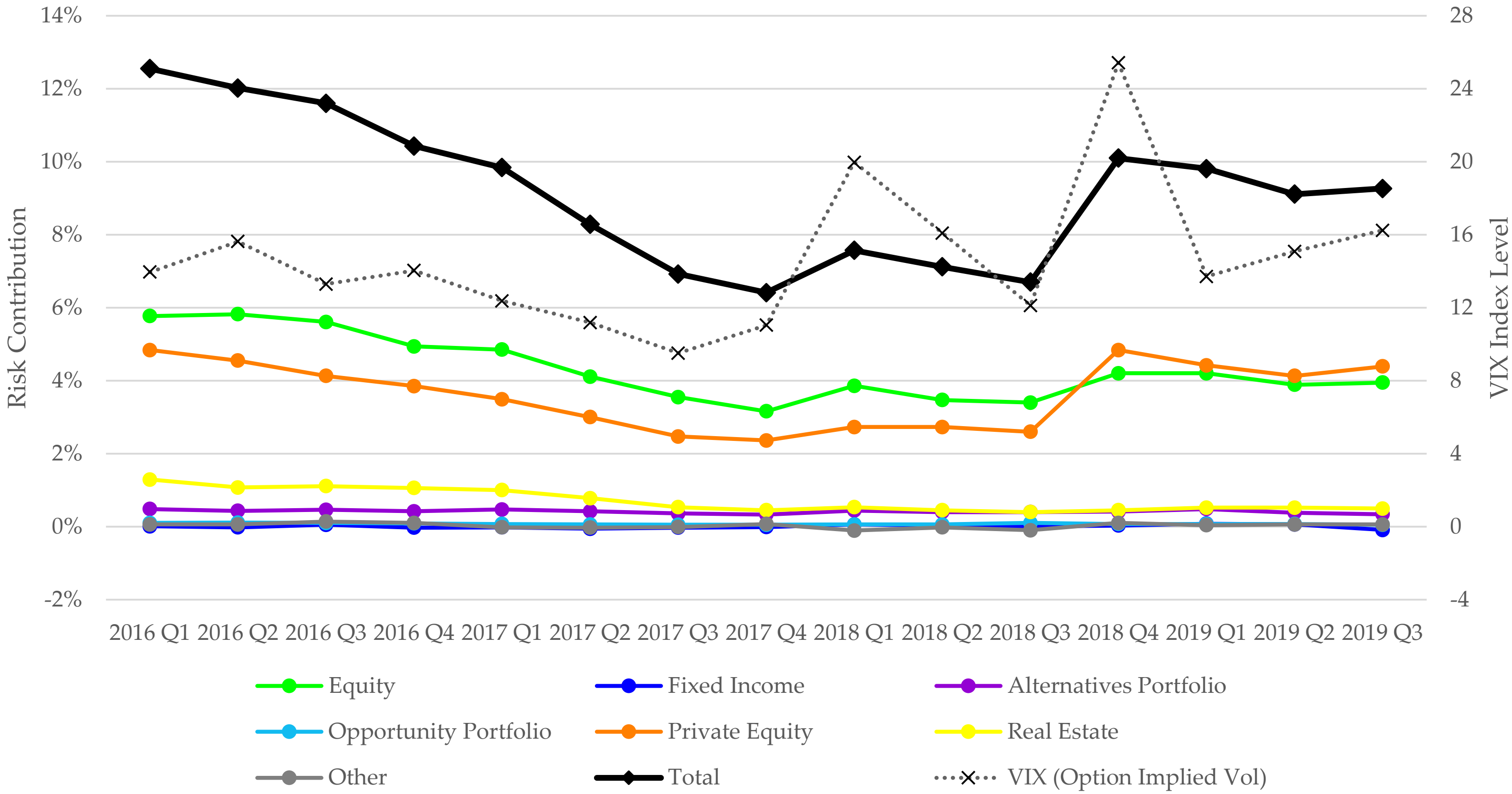
OREGON STATE TREASURY

Stand-alone Risk by Asset Class



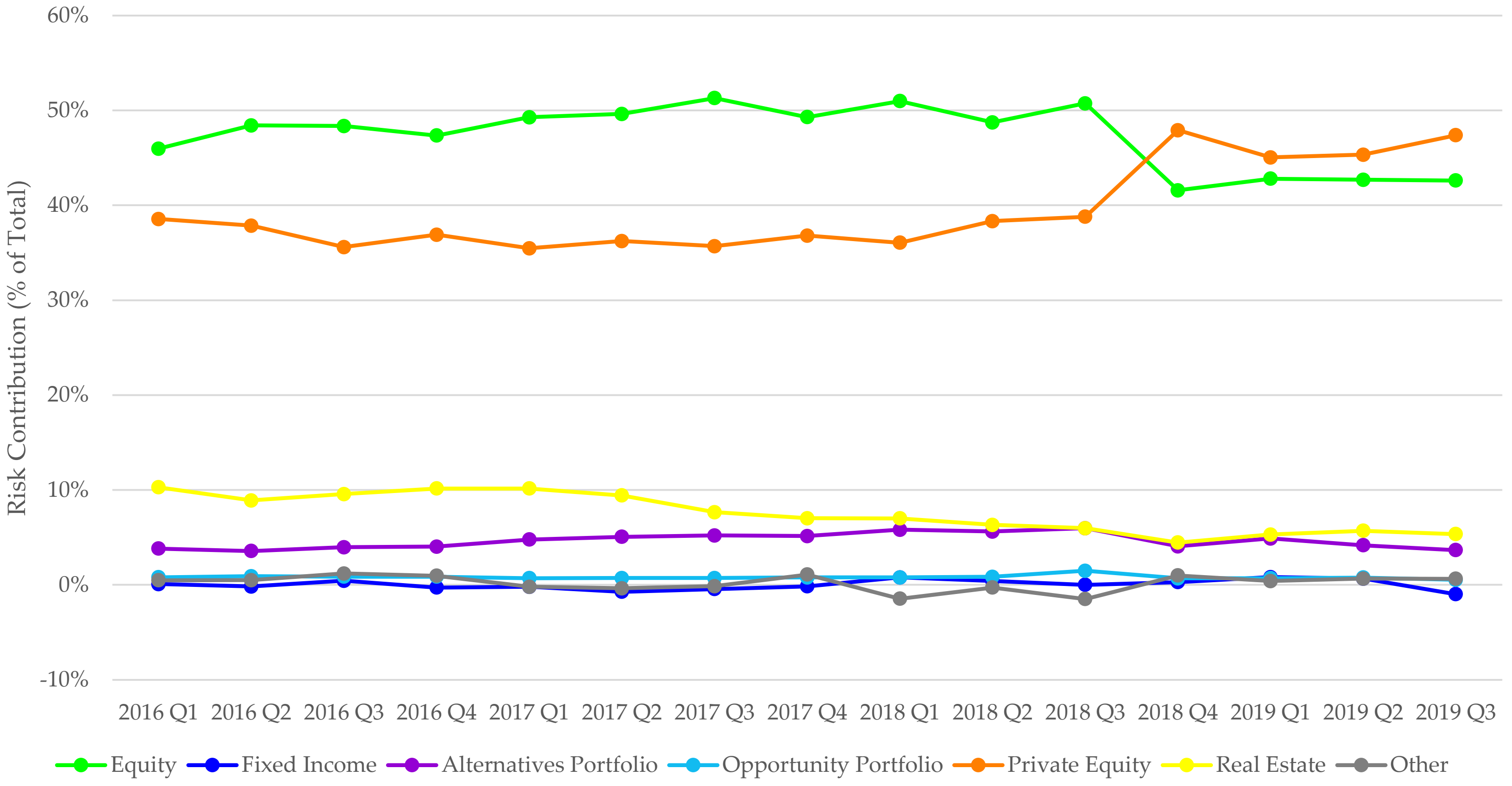
OREGON STATE TREASURY

15-Quarter Risk Contribution Time Series



OREGON STATE TREASURY

15-Quarter Risk Contribution Time Series



OREGON STATE TREASURY

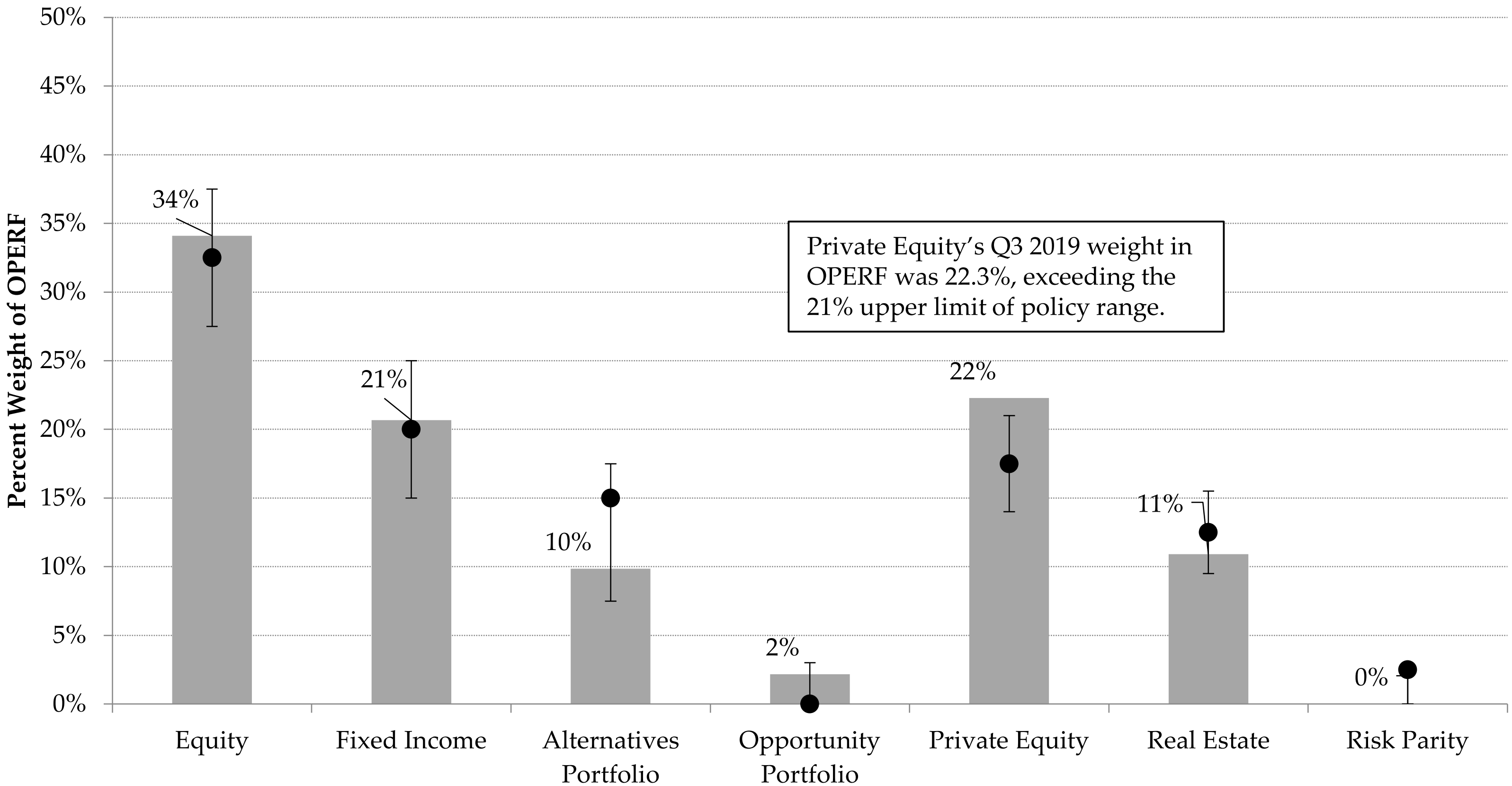
Correlation Matrix by Asset Class

Expected Return	Expected Risk	Predicted Risk1	Sep 30, 2019	Equity	Fixed Income	Alternatives Portfolio	Opportunity Portfolio	Private Equity	Real Estate	OPERF
7.3%	18.8%	12.1%	Equity	1.00	-0.25	0.55	0.75	0.96	0.39	**0.98**
3.8%	3.8%	3.0%	Fixed Income		1.00	-0.01	-0.19	-0.27	0.24	**-0.15**
7.0%	9.1%	5.7%	Alternatives Portfolio			1.00	0.49	0.54	0.36	**0.61**
		3.0%	Opportunity Portfolio				1.00	0.76	0.27	**0.76**
9.2%	26.3%	20.2%	Private Equity					1.00	0.38	**0.98**
7.0%	12.2%	9.0%	Real Estate						1.00	**0.51**
7.3%	**12.5%**	**9.3%**	**OPERF**							**1.00**

Capital Market Assumptions from Callan

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

OPERF Allocations



OREGON STATE TREASURY

Liquidity Report

	Liquidity ($M)					
Asset Class	**1 Week**	**1 Month**	**1 Quarter**	**∞**	**Uncalled Commitment**	**Next 12 Months**
Cash & Overlay	1,161					
Public Equity	22,923	*1,692*	*523*	*523*		
Fixed Income	12,825	*2,612*				
Private Equity				17,188	-9,644	
Real Estate	*631*			7,781	-1,794	
Alternatives	1,075	1,385	999	4,115	-3,935	
Opportunity	360		242	1,076	-686	
Proj PERS Cash Flow						-3,600
Total	38,975	5,689	1,763	30,684	-16,058	-3,600

Public Equity - 1 Month = AQR 130/30, Arrowstreet 130/30, & Callan US Micro Cap Value portfolios
Public Equity - 1 Quarter = 50% Lazard Closed-End Fund portfolio
Public Equity - ∞ = 50% Lazard Closed-End Fund portfolio
Fixed Income - 1 Month = Below Investment Grade
Real Estate - 1 Week = REIT composite

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

OREGON STATE TREASURY

Top 10 Exposures by Investment Firm

Rank	Asset Manager	Mkt Val ($mm)	Mkt Val Weight	Asset Class
1	Internally-Managed	14,615	18.9%	Cash, Fixed Income, Public Equity
2	Dimensional Fund Advisors	4,552	5.9%	Public Equity
3	AQR	3,162	4.1%	Alternatives, Public Equity
4	KKR	3,062	4.0%	Fixed Income, Private Equity
5	Arrowstreet Capital	2,615	3.4%	Public Equity
6	AllianceBernstein	2,361	3.1%	Fixed Income, Public Equity
7	BlackRock	2,248	2.9%	Alternatives, Fixed Income
8	Western Asset Management Co	1,835	2.4%	Fixed Income
9	Lazard	1,806	2.3%	Public Equity
10	Wellington	1,801	2.3%	Fixed Income

OREGON STATE TREASURY

OREGON
STATE
TREASURY

Tobias Read
Oregon State Treasurer

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TAB 8 – Asset Allocations & NAV Updates

Asset Allocations at October 31, 2019

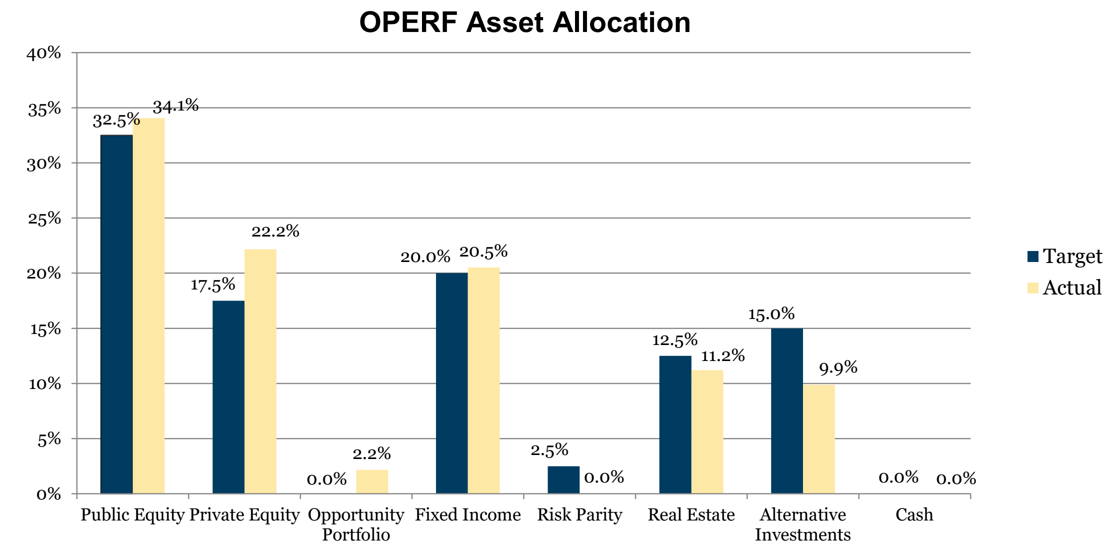
OPERF	Policy	Target[1]	Regular Account $ Thousands	Pre-Overlay	Overlay	Net Position	Actual	Target Date Funds $ Thousands	Variable Fund $ Thousands	Total Fund $ Thousands
Public Equity	27.5-37.5%	32.5%	25,296,447	32.6%	1,116,979	26,413,425	34.1%	1,024,868	466,999	27,905,292
Private Equity	13.5-21.5%	17.5%	17,184,545	22.2%		17,184,545	22.2%			17,184,545
Total Equity	**45.0-55.0%**	**50.0%**	**42,480,992**	**54.8%**	**1,116,979**	**43,597,970**	**56.2%**			**45,089,836**
Opportunity Portfolio	**0-3%**	**0.0%**	**1,680,950**	**2.2%**		**1,680,950**	2.2%			**1,680,950**
Fixed Income	**15-25%**	**20.0%**	**15,468,796**	**19.9%**	**435,678**	**15,904,473**	20.5%	1,423,296		**17,327,770**
Risk Parity	**0.0-2.5%**	**2.5%**	**-**	**0.0%**		**-**	0.0%			**-**
Real Estate	**9.5-15.5%**	**12.5%**	**8,688,841**	**11.2%**	**(5,900)**	**8,682,941**	11.2%			**8,682,941**
Alternative Investments	**7.5-17.5%**	**15.0%**	**7,650,694**	**9.9%**		**7,650,694**	9.9%			**7,650,694**
Cash[2]	**0-3%**	**0.0%**	**1,568,476**	**2.0%**	**(1,546,756)**	**21,720**	0.0%		9,025	**30,744**
TOTAL OPERF		**100%**	**$ 77,538,749**	**100.0%**	**$ -**	**$ 77,538,749**	**100.0%**	**$ 2,448,164**	**$ 476,023**	**$ 80,462,936**

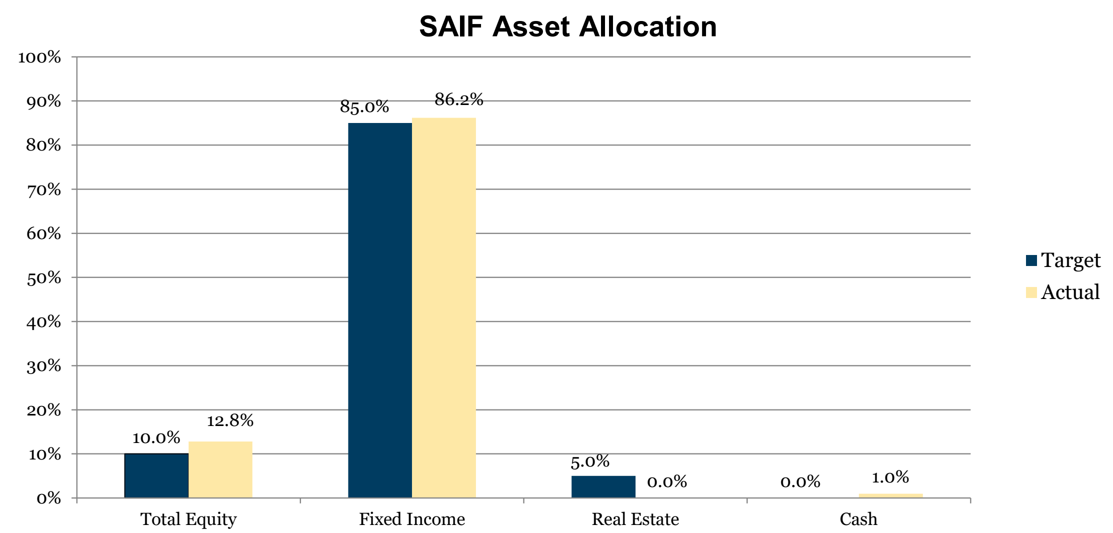
[1] Targets established in April 2019. Interim policy benchmark effective January 1, 2019, consists of: 37.5% MSCI ACWI IMI Net, 21% Custom FI Benchmark, 19% Russell 3000+300bps (1 quarter lagged), 12.5% NCREIF ODCE net (1 quarter lagged), & 10% CPI+400bps.

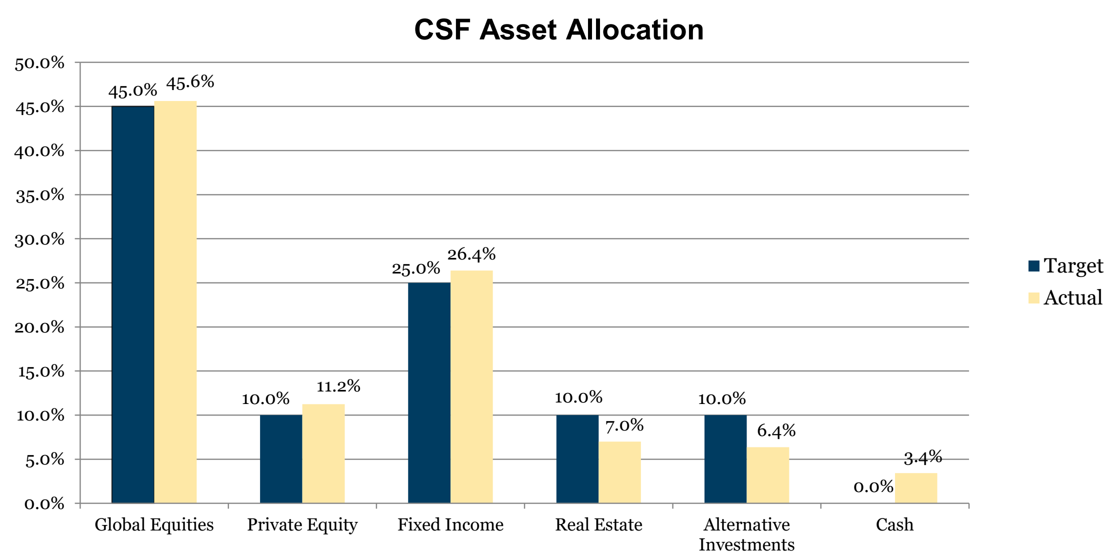
[2] Includes cash held in the policy implementation overlay program.

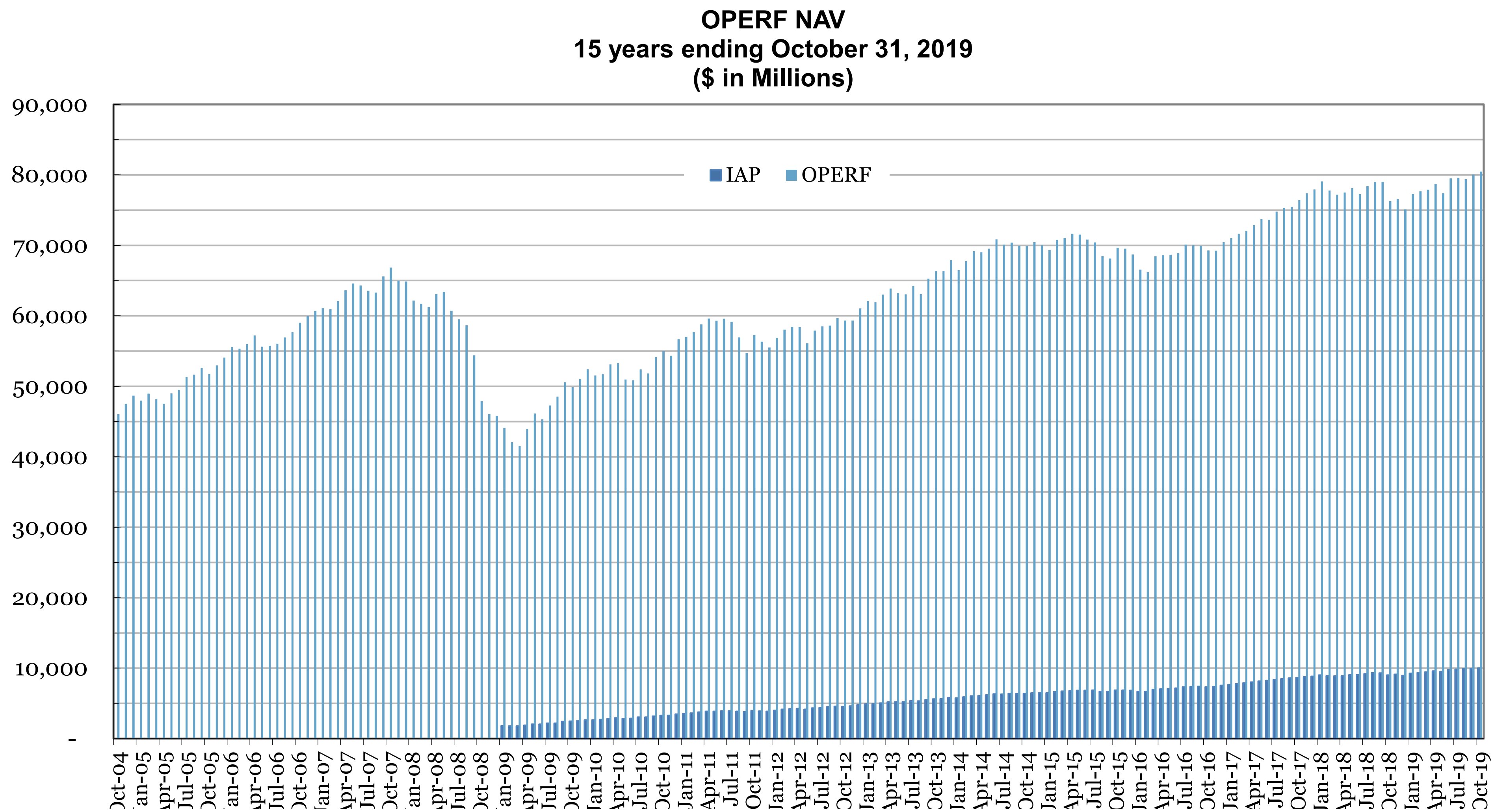
SAIF	Policy	Target	$ Thousands	Actual
Total Equity	**7-13%**	**10.0%**	**634,271**	**12.8%**
Fixed Income	**80-90%**	**85.0%**	**4,265,983**	**86.2%**
Real Estate	**0-7%**	**5.0%**	**-**	**0.0%**
Cash	**0-3%**	**0.0%**	**48,430**	**1.0%**
TOTAL SAIF			**$ 4,948,685**	**100.0%**

CSF	Policy	Target	$ Thousands	Actual
Global Equities	40-50%	45.0%	840,971	45.6%
Private Equity	8-12%	10.0%	207,224	11.2%
Total Equity	**58-62%**	**55.0%**	**1,048,195**	**56.8%**
Fixed Income	**25-35%**	**25.0%**	**486,715**	**26.4%**
Real Estate	**8-12%**	**10.0%**	**128,802**	**7.0%**
Alternative Investments	**8-12%**	**10.0%**	**117,241**	**6.4%**
Cash	**0-3%**	**0.0%**	**62,990**	**3.4%**
TOTAL CSF			**$ 1,843,943**	**100.0%**


OPERF Asset Allocation
40%
35%
30%
25%
20%
15%
10%
5%
0%
32.5%
34.1%
17.5%
22.2%
0.0%
2.2%
20.0%
20.5%
2.5%
0.0%
12.5%
11.2%
15.0%
9.9%
0.0%
0.0%
Public Equity
Private Equity
Opportunity Portfolio
Fixed Income
Risk Parity
Real Estate
Alternative Investments
Cash
Target
Actual


SAIF Asset Allocation
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
10.0%
12.8%
85.0%
86.2%
5.0%
0.0%
0.0%
1.0%
Total Equity
Fixed Income
Real Estate
Cash
Target
Actual


CSF Asset Allocation
50.0%
45.0%
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
45.0%
45.6%
10.0%
11.2%
25.0%
26.4%
10.0%
7.0%
10.0%
6.4%
0.0%
3.4%
Global Equities
Private Equity
Fixed Income
Real Estate
Alternative Investments
Cash
Target
Actual



OPERF NAV
15 years ending October 31, 2019
($ in Millions)
IAP
OPERF
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Jan-05
Apr-05
Jul-05
Jan-07
Apr-07
Jul-07
Jul-08
Apr-09
Jul-09
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Jul-16
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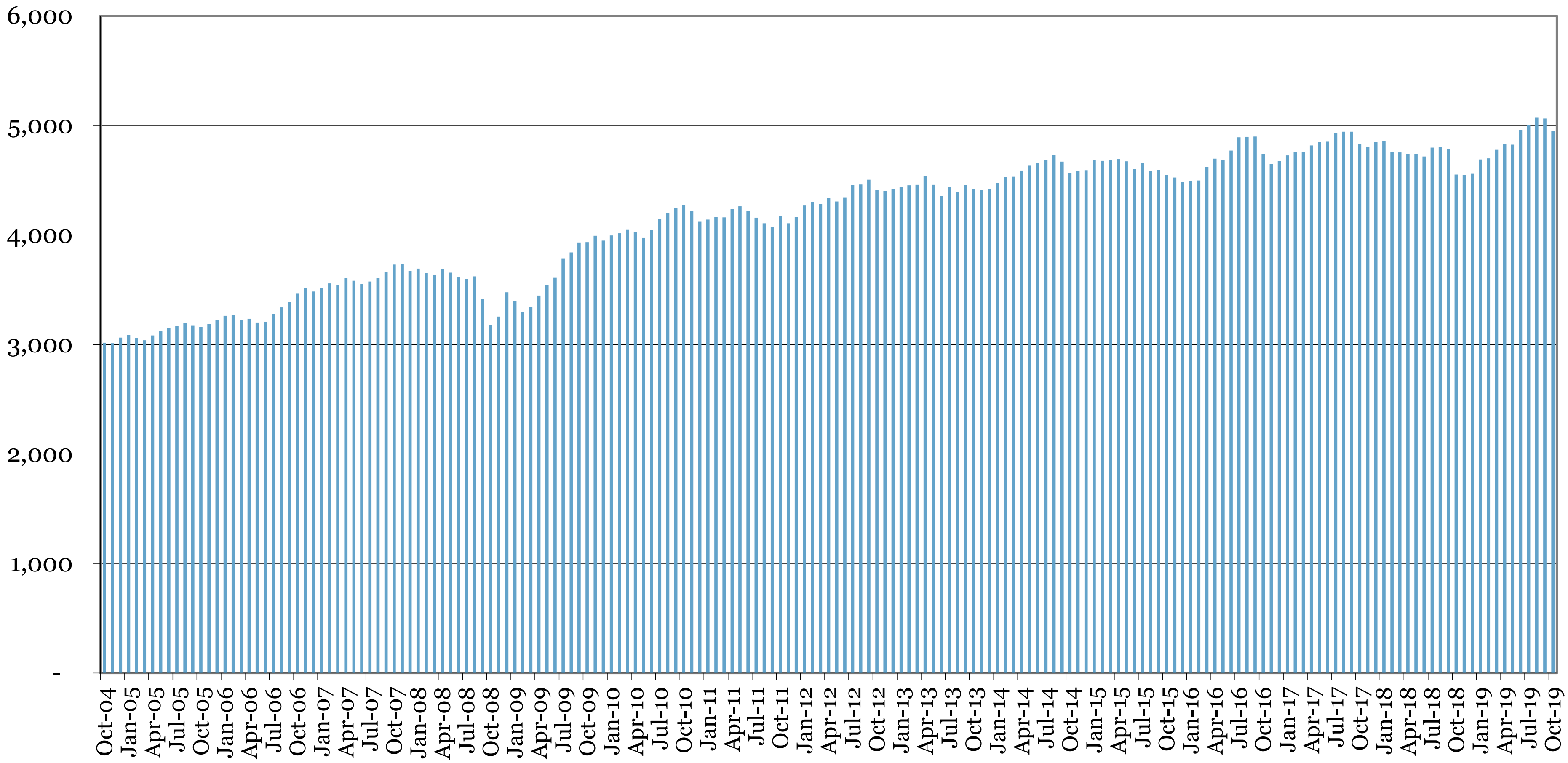
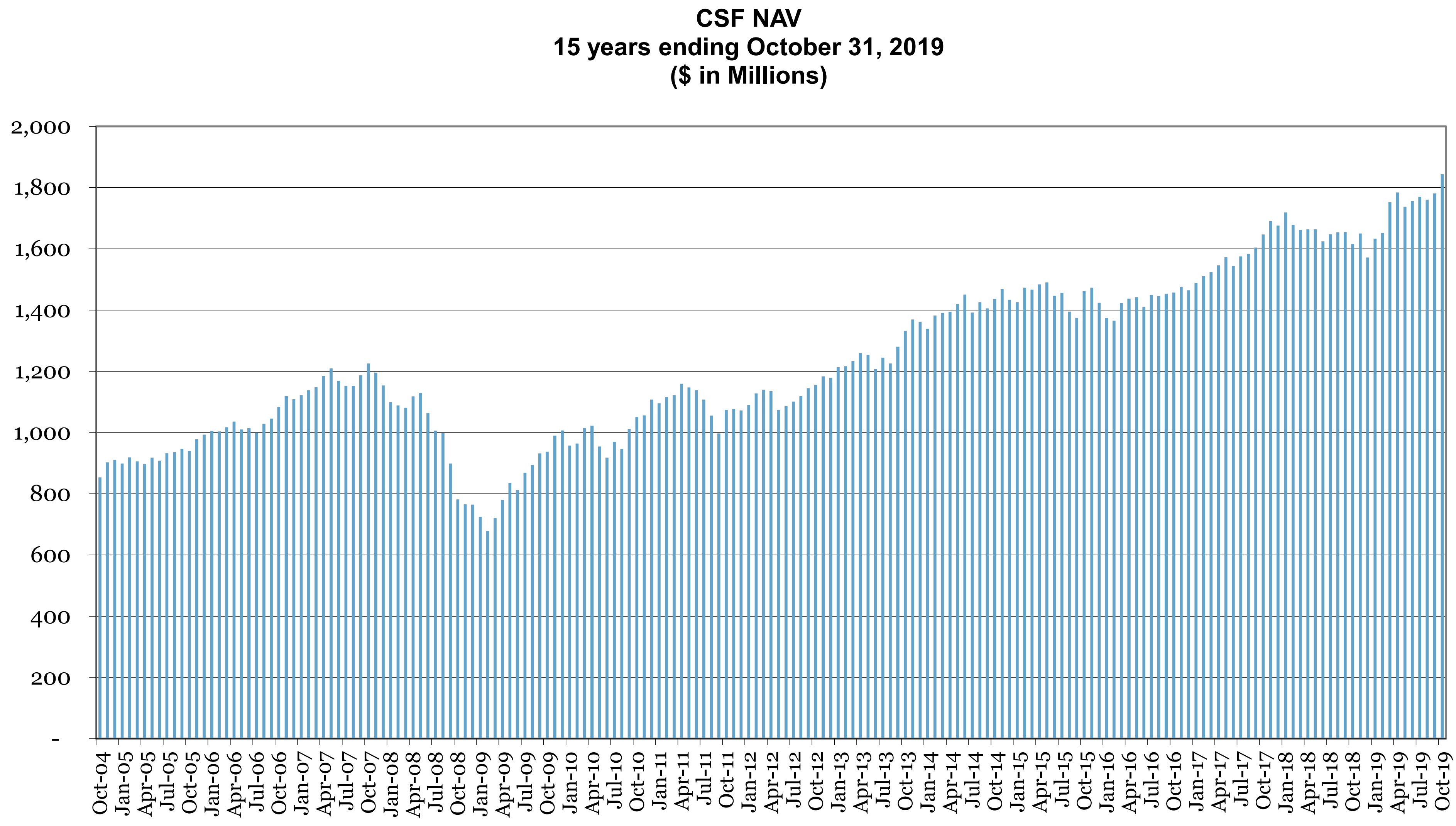
Apr-19
Jul-19

SAIF NAV
15 years ending October 31, 2019
($ in Millions)




CSF NAV
15 years ending October 31, 2019
($ in Millions)
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
-
Oct-04
Jan-05
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Jan-18
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Oct-18
Jan-19
Apr-19
Jul-19
Oct-19

TAB 8 – Calendar — Future Agenda Items

2019/20 OIC Forward Calendar and Planned Agenda Topics

January 30, 2020:	2021 OIC Calendar Approval Private Equity Program Review Placement Agent Report IAP Update
March 11, 2020:	Liquidity Update & Analysis CSF Annual Review Real Estate Portfolio Review Q4 2019 Performance & Risk Report
April 22, 2020:	Asset Allocation & Capital Market Assumptions Update SAIF Annual Review Real Estate Consultant Recommendation Overlay Review
June 3, 2020	Alternatives Portfolio Review Securities Lending Update Q1 Performance & Risk Report Operations Update
September 9, 2020	Opportunity Portfolio Review OSGP Annual Review Corporate Governance Update Q2 Performance & Risk Report
October 28, 2020	Currency Overlay Review ESG Update Public Equity Program Review
December 9, 2020	Fixed Income Program Review Q3 Performance & Risk Report Policy Updates