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Oregon Investment Council

March 13, 2019

Rukaiyah Adams
Chair

John Skjervem
Chief Investment Officer

Tobias Read
State Treasurer

Investment Division
16290 SW Upper Boones Ferry Road
Tigard, OR 97224
503.431.7900

Main Office
350 Winter Street, Suite 100
Salem, OR 97301-3896
503.378.4000

oregon.gov/treasury
oregon.treasurer@state.or.us

OREGON INVESTMENT COUNCIL

Agenda

March 13, 2019
9:00 AM

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

Time	A. Action Items	Presenter	Tab
9:00-9:05	**1. Review & Approval of Minutes** January 31, 2019	**Rukaiyah Adams** *OIC Chair*	**1**
9:05-9:15	**2. Committee Reports and Opening Remarks**	**John Skjervem** *Chief Investment Officer*	**2**
9:15-9:45	**3. Common School Fund Annual Review** *Common School Fund*	**Michael Viteri** *Senior Investment Officer, Public Equity* **Jennifer J. Peet** *Corporate Governance Director* **Bill Ryan** *Deputy Director, Operations, Oregon Department of State Lands*	**3**
	B. Information Items		
9:45-10:15	**4. IAP Update** *OPERF*	**Jennifer J. Peet** **Christopher Nikolich** *Head of Glide Path Strategies (U.S.), AllianceBernstein*	**4**
10:15-10:35	**5. Q4 2018 Performance & Risk Report** *OPERF*	**Karl Cheng** *Senior Investment Officer, Portfolio Risk & Research* **Janet Becker-Wold** *Senior Vice President, Callan*	**5**
10:35-10:45	**-------------------- BREAK --------------------**		

10:45-11:40	**6.**	**Real Estate Portfolio Review** *OPERF*	**Tony Breault** *Senior Investment Officer, Real Estate* **Christy Fields** *Managing Director, Pension Consulting Alliance* **David Glickman** *Managing Director, Pension Consulting Alliance* **Mary Ludgin** *Managing Director, Head of Global Research, Heitman*	**6**
11:40-12:20	**7.**	**Liquidity Update & Analysis** *OPERF*	**Jiangning (Jen) Plett** *Senior Investment Analyst* **Karl Cheng**	**7**
12:20-12:25	**8.**	**Asset Allocation & NAV Updates** a. Oregon Public Employees Retirement Fund b. SAIF Corporation c. Common School Fund d. Southern Oregon University Endowment Fund	**John Skjervem**	**8**
	9.	**Calendar — Future Agenda Items**	**John Skjervem**	**9**
12:25	**10.**	**Open Discussion**	**OIC Members** **Staff** **Consultants**	

C. Public Comment

TAB 1 – REVIEW & APPROVAL OF MINUTES

January 31, 2019 Regular Meeting

State of Oregon
Office of the State Treasurer

16290 SW Upper Boones Ferry Road

Tigard, Oregon 97224

OREGON INVESTMENT COUNCIL

JANUARY 31, 2019

Meeting Minutes

Members Present:	Rukaiyah Adams, John Russell, Tobias Read, Rex Kim, Patricia Moss and Kevin Olineck
Staff Present:	John Skjervem, Darren Bond, Perrin Lim, David Randall, John Hershey, Deena Bothello, Karl Cheng, Anna Totdahl, Roy Jackson, Austin Carmichael, Tim Baumert, Paul Koch, David Elott, May Fanning, Tony Breault, Jen Plett, Debra Day, Dana Millican, Caitlyn Wang, Ben Mahon, Jo Recht, Tom Lofton, Lisa Pettinati, Geoff Nolan, Garrett Cudahey, Amanda Kingsbury, Aliese Jacobsen, Eric Messer, Kristel Flores, Michael Langdon, Joe Hutchinson, Michael Viteri, Jennifer Peet, William Hiles, Michael Mueller, Kristel Flores, Tiffany ZhuGe, Andy Coutu, James Sinks, Jenny Dalto, Dmitri Palmateer, Amy Wojcicki, Ahman Dirks, Robin Kaukonen, Chris Ebersole and Faith Sedberry
Consultants Present:	Tom Martin (TorreyCove); Allan Emkin, David Glickman and Brandon Ross (PCA); Janet Becker-Wold and Uvan Tseng (Callan)
Legal Counsel Present:	Steven Marlowe, Department of Justice

The January 31st, 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 December 12, 2018 OIC regular meeting minutes. Member Russell moved the motion at 9:01 am, and Mr. Kim seconded the motion which then passed by a 4/0 vote.

As Ms. Moss was appointed to the Council after the December OIC meeting, she abstained from voting.

Treasurer Read along with the rest of the Council, welcomed Ms. Moss to the OIC.

Mr. Olineck, Director of PERS, introduced the new PERS Board Chair, Ms. Sadhana Shenoy, who joined the PERS Board effective October 2018.

II. 9:01 am Proposed 2020 OIC Meeting Dates

Mr. Skjervem requested Council approval for a proposed list of 2020 OIC meeting dates.

MOTION: Treasurer Read moved approval at 9:03 am, and Mr. Kim seconded the motion which then passed by a 5/0 vote.

III. **9:03 am Committee Reports and CIO Update**

Committee Reports: Mr. Skjervem gave an update on the following committee actions taken since the December 12th, 2018 OIC meeting:

Private Equity Committee

December 14, 2018	Pathway Private Equity Fund C-III	$250M

Alternatives Portfolio Committee

None

Opportunity Portfolio Committee

None

Real Estate Committee

None

Mr. Skjervem then provided opening remarks which included context for the agenda's Private Equity and Alternatives Portfolio investment recommendations as well as an explanation for staff's proposed Policy Updates. He also previewed staff's annual Private Equity review and 2019 plan presentation.

IV. **9:09 am Blackstone Capital Partners VIII, L.P. –** ***OPERF Private Equity Portfolio***

Michael Langdon, Senior Investment Officer, Private Equity, recommended an up to $500 million commitment to Blackstone Capital Partners VIII, L.P. for the OPERF Private Equity Portfolio. This proposed commitment represents the continuation of a relationship on behalf of OPERF with The Blackstone Group L.P. which includes previous private equity commitments totaling $850 million across three partnerships since 2011.

Mr. Langdon then introduced Mr. Joseph Baratta, Blackstone's Global Head of Private Equity, who provided the Council with an update on his firm and described the investment opportunity represented by Blackstone Capital Partners VIII, L.P.

MOTION: Mr. Russell moved approval of the recommendation at 9:55 am, and Mr. Kim seconded the motion which then passed by a 5/0 vote.

V. **9:55 am Annual Placement Agent Report**

John Hershey, Director of Alternative Investments, provided the Council with the Annual Placement Agent Disclosure report. This report was made in accordance with Policy COM 201: Conflict of Interest and Code of Conduct, which stipulates that OST shall disclose, in all investment recommendations to the Oregon Investment Council, any Placement Agent used by the investment firm that has had any contact with Treasury investment staff. This policy further stipulates that staff shall present to the OIC an annual summary of any and all placement agent contacts, and make such summary available to the public on the Treasury website.

VI. **9:57 am Investment Policy Updates –** ***Oregon Public Universities***

Jennifer Peet, Corporate Governance Director, and Tom Lofton, Fixed Income Investment Officer, Capital Markets, sought approval to revise and expand the Council's existing policy framework for the investment of Oregon public university moneys.

MOTION: Treasurer Read moved approval of the recommendation at 10:10 am, and Mr. Kim seconded the motion which then passed by a 5/0 vote.

VII. 10:10 am Investment Beliefs Update and Discussion – *OPERF*

Allan Emkin, Managing Director, Pension Consulting Alliance, provided the Council with a revised draft of the OIC's Statement of Investment and Management Beliefs. This Statement of Investment and Management Beliefs enumerates fundamental investment and management principles that guide the Oregon Investment Council in performing its fiduciary and statutory obligations.

Staff's recommendation to the Council is to revise the OIC's Investment Beliefs by adding specific language describing the Council's diversity and inclusion objectives.

MOTION: Treasurer Read moved approval of the recommendation at 10:20 am, and Mr. Russell seconded the motion which then passed by a 5/0 vote.

VIII. 10:34 am Brookfield Infrastructure Fund IV, L.P. – *OPERF Alternatives Portfolio*

Paul Koch, Alternatives Investment Officer, recommend a $400 million commitment to Brookfield Infrastructure Fund IV, L.P. for the OPERF Alternatives Portfolio, subject to the satisfactory negotiation of terms and conditions with staff working in concert with legal counsel. This proposed commitment represents the continuation of a relationship on behalf of the OPERF Alternatives Portfolio.

Mr. Koch then introduced Mr. Sam Pollock, Senior Managing Partner, Brookfield Asset Management, who provided the Council with an update on his firm, its investment strategy and performance record. He also described in detail the investment opportunity represented by Brookfield Infrastructure Fund IV, L.P.

MOTION: Treasurer Read moved approval of the recommendation at 11:22 am, and Mr. Russell seconded the motion which then passed by a 5/0 vote.

IX. 11:22 am Private Equity Annual Review and 2019 Plan – *OPERF Private Equity Portfolio*

Michael Langdon, Ahman Dirks, Investment Officer, Private Equity, Tiffany ZhuGe, Investment Officer, Private Equity, along with Tom Martin of TorreyCove presented the annual Private Equity Review and 2019 Plan. This presentation included a review of OPERF private equity activity in 2018, updated portfolio performance and a summary of staff's 2019 private equity pacing goals.

X. 12:31 pm Asset Allocation & NAV Updates

Mr. Skjervem reviewed asset allocations and NAVs across OST-managed accounts for the period ended December 31, 2018.

XI. 12:33 pm Calendar – Future Agenda Items

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

XII. 12:33 pm Open Discussion

None.

12:33 pm Public Comments

None.

Ms. Adams adjourned the meeting at 12:33 pm.

Respectfully submitted,

May Fanning

May Fanning
Executive Support Specialist

TAB 2 – Committee Reports and Opening Remarks

March 13, 2019

Oregon Investment Council

Opening Remarks

John D. Skjervem, Chief Investment Officer

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2018 & Cumulative OPERF Investment Performance

Lots of good news here!

CSF Annual Review

Update on asset allocation & performance; policy revisions, too.

IAP Update

Outstanding first year results.

Q4 2018 Performance & Risk Report

Gory details from Karl and Janet.

Real Estate Annual Review

Well done, Captain.

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Liquidity Update & Analysis

Setting the stage for gradual changes ahead.

More New Faces

- Krystal Mclean, Legal Assistant, Legal & Compliance
- Sam Spencer, Investment Officer, Real Estate

Promotions

- Andy Coutu, Investment Analyst 3, Fixed Income
- Angela Schaffers, Investment Analyst 3, Fixed Income
- Roy Jackson, Investment Analyst 3, Financial Accounting
- Aliese Jacobsen, Investment Analyst 1, Operations
- Dana Millican, Investment Analyst 1, Alternatives

Transfers

- Ricardo Lopez, Operations to Real Estate

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OPERF Investment Performance
(as of December 31, 2018)

Annualized Return	1-Year	3-Year	5-Year	7-Year	10-Year	20-Year
Russell 3000	-5.24%	8.97%	7.91%	12.46%	13.18%	5.96%
S&P 500	-4.38%	9.26%	8.49%	12.70%	13.12%	5.62%
Russell 2000	-11.01%	7.36%	4.41%	10.44%	11.97%	7.40%
MSCI ACWI ex-US IMI	-14.76%	4.39%	0.84%	5.07%	6.97%	4.59%
MSCI Emerging Markets	-14.58%	9.25%	1.65%	3.23%	8.02%	8.52%
Bloomberg Barclays U.S. Aggregate	0.01%	2.06%	2.52%	2.10%	3.48%	4.55%
Fund Performance (Net of Fees)	**1-Year**	**3-Year**	**5-Year**	**7-Year**	**10-Year**	**20-Year**
OPERF (Ranking[1])	**0.48% (9)**	**7.49% (9)**	**6.33% (5)**	**8.72% (1)**	**9.46% (1)**	**7.08% (1)**
Domestic Equity	-7.87%	8.38%	6.75%	11.80%	13.10%	6.41%
International Equity	-14.88%	5.09%	1.89%	6.45%	8.00%	5.86%
Fixed Income	0.25%	2.34%	2.21%	3.16%	6.28%	5.36%
Private Equity	18.15%	13.78%	12.87%	13.56%	11.66%	12.00%
Real Estate	8.03%	8.65%	9.98%	10.90%	7.70%	10.30%

[1] Relative to Wilshire Trust Universe Comparison Service (TUCS) Public Funds > $10 Billion peer group. Percentile rankings based on estimated gross returns for Fund and peer group.

OPERF Performance Impact in $$$s
(as of December 31, 2018)

<u>Notes</u>:
OPERF vs Median reflects gross performance compared to TUCS Universe Median > $10 Billion. OPERF vs Balanced Portfolios reflects net performance.
The 60/40 Balanced Portfolio consists of 60% MSCI IMA, 40% Bloomberg Barclays Aggregate.
The 70/30 Balanced Portfolio consists of 70% MSCI IMA, 30% Bloomberg Barclays Aggregate.

IAP Target Date Funds
Performance Summary as of 12/31/2018

2018 IAP TDF PERFORMANCE*			
Fund	**Jan-Sept 2018**	**4Q 2018**	**2018**
TDF RETIREMENT FUND	1.89	-1.48	0.38
TDF 2020	2.42	-2.17	0.20
TDF 2025	3.51	-4.06	-0.69
TDF 2030	4.22	-4.82	-0.80
TDF 2035	4.46	-4.47	-0.21
TDF 2040	4.53	-4.71	-0.40
TDF 2045	4.63	-6.37	-2.03
TDF 2050	4.65	-6.37	-2.02
TDF 2055	4.70	-6.40	-2.01
TDF 2060	4.78	-6.42	-1.95

* Preliminary

Source: State Street.

TAB 3 – Common School Fund Annual Review

Common School Fund

Common School Fund
Annual Review

Purpose
Provide the Oregon Investment Council with an update on the Common School Fund (CSF) for the period ended December 31, 2018, and seek approval for changes to OIC Common School Fund Policies and Procedures.

Background
The act of Congress admitting Oregon to the Union in 1859 granted sections 16 and 36 in every township "for the use of schools." The provision of land for educational purposes was a practical solution for the developing nation that was "land rich, but cash poor."

In Oregon, Congress granted roughly six percent of the new state´s land -- nearly 3.4 million acres -- for the support of schools. Due to various circumstances, about 700,000 acres remain in state ownership today. These lands and their mineral and timber resources, as well as other resources under the State Land Board´s jurisdiction (including the submerged and submersible lands underlying the state´s tidal and navigable waterways) are managed "with the object of obtaining the greatest benefit for the people of this state, consistent with the conservation of this resource under sound techniques of land management."

- **Rangelands** are leased to ranchers for grazing sheep and cattle.
- **Forestlands** are managed for timber production.
- **Industrial, commercial, residential** properties are managed to generate rents and to maximize value for future sale.
- **Waterways** are leased for uses such as sand and gravel extraction, houseboats, marinas and log rafts. The rents and royalties received from these activities are deposited in the Common School Fund, a trust fund for the benefit of Oregon´s K-12 public schools.

Other sources of money contributing to the Common School Fund include the following:

- **Escheats** -- property reverting to the state on an individual´s death because no heir or will exists or can be found;
- **Unclaimed property**, while the agency searches for the rightful owner;
- **Gifts** to the state not designated for some other purpose;
- **Tax revenues** from the production, storage, use, sale or distribution of oil and natural gas; and
- **5% of the proceeds** from the sale of federal lands.

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

At the September 20, 2017 Board meeting, the Oregon Investment Council (OIC or the Council) approved the following asset allocation targets, benchmarks, and ranges (Exhibit 1) for the CSF. This OIC-approved asset allocation resulted in a 10 percent target allocation to both Real Assets and Alternatives, which produced an improvement in ex ante returns while simultaneously decreasing expected risk.

The OIC-approved asset allocation was informed by Callan Associates' CSF Distribution Study, which was presented to the Department of State Lands Board in April 2017. That study concluded that a 4% annual distribution was the maximum rate compatible with future CSF value stability in real (i.e., inflation-adjusted) terms. Important elements of the CSF asset allocation policy are its expected return and risk statistics. Specifically, minimum return and maximum risk boundaries are necessary to maintain the long-run feasibility of the CSF distribution policy.

Exhibit 1 – Asset Allocation Policy

Common School Fund	Benchmark	Prior Allocation	Approved Allocation	Approved Range
Global Equity	MSCI ACWI IMI Net	60%	45%	40% - 50%
Private Equity	Russell 3000 + 300 bps	10%	10%	8% - 12%
Fixed Income	Bloomberg U.S. Aggregate Bond Index	30%	25%	20% - 30%
Real Assets	NCREIF ODCE QTR LAG (net)	0%	10%	8% - 12%
Alternatives	CPI + 4%	0%	10%	8% - 12%
Cash	Cash	0%	0%	0% - 3%

	Prior Allocation	Approved Allocation
10-Year Expected Return (Geometric Mean)	**6.5%**	**6.6%**
Projected Standard Deviation	**14.5%**	**13.2%**

Source: Updated using Callan 2018 Capital Market Assumptions.

CSF Performance

For the year ended December 31, 2018, the CSF posted a -3.89 percent return, underperforming its policy benchmark by 2.45 percent (Exhibit 2). For the three-, five-, and ten- year periods ended December 31, 2018, CSF returns fell short of the policy benchmark by 1.61 percent, 0.59 percent and 0.22 percent, respectively.

Exhibit 2 – Total Fund Performance

Period Ending 12/31/18	Market Value	3 Months	1 Year	3 Years	5 Years	10 Years
Common School Fund Returns	$ 1,571,792,000	-5.87%	-3.89%	6.13%	5.07%	8.27%
CSF Policy Benchmark		-4.66%	-1.44%	7.74%	5.66%	8.49%
Excess Return		**-1.21%**	**-2.45%**	**-1.61%**	**-0.59%**	**-0.22%**

Source: State Street

All asset classes realized underperformance (Exhibit 3) during CY2018. According to Antti Ilmanen, a principal at AQR, 2018 "was one of only three years in the U.S. since 1926 where stocks, government bonds, corporate bonds, and commodities all did worse than cash (the others were 1981 and 1931)[1]."

[1] Mackintosh, James, "Thank the Fed for a Retro January Surge", Wall Street Journal, January 31, 2019.

Exhibit 3

Period Ending 12/31/18	Market Value	3 Months	1 Year	3 Years	5 Years	10 Years
Common School Fund Public Equity Returns	$ 672,619,000	-13.93%	-11.35%	5.72%	4.24%	10.60%
MSCI ACWI IMI Net		-13.28%	-10.08%	6.49%	4.17%	9.74%
Excess Return		**-0.65%**	**-1.27%**	**-0.77%**	**0.07%**	**0.86%**

Period Ending 12/31/18	Market Value	3 Months	1 Year	3 Years	5 Years	10 Years
Common School Fund Fixed Income Returns	$ 440,001,000	0.66%	-0.71%	2.74%	2.85%	5.77%
Bloomberg Barclays US Aggregate		1.64%	0.01%	2.17%	2.49%	3.94%
Excess Return		**-0.98%**	**-0.72%**	**0.57%**	**0.36%**	**1.83%**

Period Ending 9/30/18	Market Value	3 Months	1 Year	3 Years	5 Years	10 Years
Common School Fund Private Equity Returns	$ 214,537,000	3.27%	15.15%	12.76%	13.25%	11.98%
Russell 3000 + 300 Bps Qtr Lag		7.90%	21.06%	20.54%	16.83%	15.66%
Excess Return		**-4.63%**	**-5.91%**	**-7.78%**	**-3.58%**	**-3.68%**

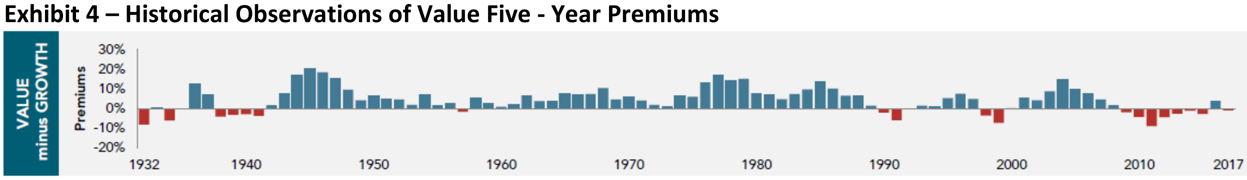
Period Ending 12/31/18	Market Value	3 Months	1 Year	3 Years	5 Years	10 Years
Common School Fund Alternatives Returns	$ 89,446,000	0.18%	-10.55%	N/A	N/A	N/A
CPI + 400 Bps		0.50%	5.98%	N/A	N/A	N/A
Excess Return		**-0.32%**	**-16.53%**	**N/A**	**N/A**	**N/A**

Period Ending 9/30/18	Market Value	3 Months	1 Year	3 Years	5 Years	10 Years
Common School Fund Real Estate Returns	$ 105,759,000	0.56%	N/A	N/A	N/A	N/A
NCREIF ODCE (Custom Adj)		1.87%	N/A	N/A	N/A	N/A
Excess Return		**-1.31%**	**N/A**	**N/A**	**N/A**	**N/A**

In dollar terms, CSF lost approximately $39MM relative to its benchmark. On a dollar-weighted basis, 30 percent of the fund's underperformance last year is attributed to public markets ($8.5mm to Public Equity and $3mm to Fixed Income). The residual 70 percent of the relative, dollar-weighted underperformance is attributed to Private Markets ($12.7mm to Private Equity and $14.8mm to Alternatives).

Within public equity, the majority of the relative underperformance is attributable to one mandate, Dimensional Fund Advisors U.S. Large Cap Core Strategy. This mandate's methodology includes deliberate factor tilts (Value, Size, and Profitability) that are supported by robust empirical evidence as persistent and pervasive sources of excess returns. Funded in November 2017, this mandate underperformed its benchmark (the Russell 1000 Index) by 390 basis points over calendar year 2018. Although unfortunate, this underperformance is consistent with expectations given the large performance differentials between value and growth stocks last year. In fact, the CY2018 performance spread between the Russell 1000 Value index (-8.27 percent) and Russell 1000 growth index (-1.51 percent) was 6.76 percent. This deviation between value and growth was even more pronounced in calendar year 2017 (when the DFA mandate was initially funded), when the differences between the Russell 1000 Value index (13.66 percent) and the Russell 1000 Growth index (30.21 percent) was 16.55 percent. From a historical perspective, a U.S. growth/value performance gap is the largest and most sustained since the 1930's (Exhibit 4).

Exhibit 4 – Historical Observations of Value Five - Year Premiums



Source: Dimensional Fund Advisors

Underperformance among CSF's alternative investments (e.g., the JP Morgan Systematic fund and BlackRock Style Advantage fund, both funded in January 2018) is also attributed to common factor tilts. Although differentiated from the DFA public equity strategy by investments in event-driven and managed futures, both of these alternative strategies underperformed due to their long/short value exposures which reached relative value nadirs comparable in magnitude to levels plumbed during the early 2000 tech stock bubble.

An allocation to private equity was first added to the CSF in 2007. Last year, CSF's private equity portfolio underperformed as a result of the following: 1) poor manager selection; and 2) adverse vintage year concentrations (see Exhibit 5). Regarding the latter, approximately 45 percent of CSF's total private equity fund commitments were made in 2007 and 2008. Accordingly, CSF private equity performance has been dominated by adverse vintage year concentrations and poor (e.g., 3rd quartile) manager selection. A second wave of fund commitments occurred between 2013 and 2015, now accounting for 48 percent of CSF's total private equity allocation.

Today, more than 90 percent of all CSF fund commitments are concentrated in 5 of the last 12 vintage years, with half of these investments in 3rd quartile funds. Going forward, staff is applying a more systematic vintage year pacing discipline, which should result in improved private equity performance for CSF going forward.

Exhibit 5

Vintage	Fund	Commitment	Unfunded Commit	Contributions	Distributions	TVPI	Net IRR	Cambridge Assoc. Rank
2007	Warburg Pincus PE X	$ 25,000,000	$ -	$ 25,214,323	$ 28,856,311	1.61X	8.6%	3rd
2007	Oak Hill Capital Part III	$ 25,000,000	$ -	$ 30,189,059	$ 41,715,827	1.5X	8.9%	3rd
2008	Apollo Invest Fund VII	$ 25,000,000	$ 3,565,948	$ 30,092,816	$ 46,945,151	2.05X	23.1%	1st
2008	TPG Partners VI	$ 25,000,000	$ 1,090,536	$ 27,095,272	$ 31,317,640	1.64X	11.2%	3rd
2008	PEG Venture Cap IV	$ 20,000,000	$ 274,676	$ 24,434,184	$ 18,738,925	1.79X	14.1%	3rd
2009	Oaktree Opp Fund VIII	$ 12,500,000	$ -	$ 12,500,000	$ 17,178,520	1.46X	9.2%	N/A
2011	Oaktree Opp Fund VIIIb	$ 12,500,000	$ -	$ 12,500,000	$ 9,480,383	1.33X	20.8%	2nd
2013	Oaktree Opp Fund IX	$ 20,000,000	$ -	$ 20,000,000	$ 6,579,086	1.14X	3.2%	N/A
2013	KKR Asian Fund II	$ 25,000,000	$ 2,309,953	$ 27,186,631	$ 20,340,392	1.41X	13.7%	3rd
2013	Apollo Invest Fund VIII	$ 25,000,000	$ 5,580,815	$ 21,690,865	$ 6,525,855	1.37X	14.6%	3rd
2014	PEG Venture Cap V	$ 25,000,000	$ 4,104,290	$ 21,385,953	$ 1,062,332	1.22X	NM	NM
2015	Francisco Partners IV	$ 15,000,000	$ 382,500	$ 14,617,500	$ 1,552,500	1.58X	26.0%	1st
2015	Oaktree Opp Fund X	$ 25,000,000	$ 7,500,000	$ 20,000,000	$ 2,809,830	1.33X	20.8%	NM

Source: Torrey Cove

Although positive relative returns relative to the CSF private equity benchmark (Russell 3000 + 300 bps) have not been achieved, CSF's private equity allocation has generated the Fund's highest, relative returns over all trailing time periods, thereby contributing to the Fund's primary objectives of optimizing long-term investment returns and distributions while enabling CSF corpus growth in real terms.

Rebalancing Activity

At the April 2017 OIC meeting, staff recommended, and the OIC approved, updated CSF policies for Public Equity, Fixed Income and Private Equity that align with the asset class policies used for the Oregon Public Employees Retirement Fund (OPERF). In addition to harmonizing CSF's asset class policies with those governing OPERF, the Council also approved staff's ability to exercise retention, termination and rebalancing discretion as part of its daily CSF management activities. These updated policies also endowed staff with the ability to implement in CSF any private equity manager/strategy previously approved by the Council on behalf of OPERF.

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

Using this authority, the following rebalance actions (Exhibit 6) were implemented: **Exhibit 6 - Rebalancing Activity**

Date(s)	Manager	Sub-Asset Class	Market Value	Purpose
Jan-18	JP Morgan Systematic	Alternatives	$ 50,000,000	Initial Funding
Jan-18	BlackRock ACWI IMI	Global Equity	$ (50,000,000)	Rebalance - Cash Raise
Feb-18	BlackRock Style Advantage	Alternatives	$ 50,000,000	Initial Funding
Apr-18	Blackrock	Global Equity	$ (16,103,682)	Termination/Cash Raise
Apr-18	RREEF	Real Estate	$ 9,000,000	Initial Funding
Jun-18	Clearbridge	US Mid Cap	$ (34,882,281)	Termination/Cash Raise
Jun-18	Arrowstreet	Global X-US Equity	$ (10,000,000)	Cash Raise
Jun-18	Fidelity	Developed X-US Equity	$ (8,000,000)	Cash Raise
Jun-18	Western Asset Management	Core Fixed Income	$ (15,000,000)	Cash Raise
Jun-18	BlackRock	US Large Cap	$ (30,000,000)	Cash Raise
Jun-18	N/A	N/A	$ 30,000,000	DSL Distribution
Jun-18	RREEF	Real Estate	$ 21,000,000	Additional Funding
Jun-18	Morgan Stanley Prime Fund	Real Estate	$ 30,000,000	Initial Funding
Sep-18	Morgan Stanley Prime Fund	Real Estate	$ 30,000,000	Additional Funding
Oct-18	RREEF	Real Estate	$ 15,000,000	Additional Funding
Jan-19	RREEF	Real Estate	$ 15,000,000	Additional Funding

Source: State Street

Portfolio Construction Update

As of December 31, 2018, the CSF's actual asset allocation relative to recently established policy targets is near completion (Exhibit 7). As shown in Exhibit 5, staff allocated $100MM to two separate Alternatives mandates in Q1 2018, while new Real Estate investments were executed in last year's second half. Staff is currently working on two new alternative investments, one new real estate investment, and two new private equity commitments all of which should fund this year. Accordingly, staff expects to reach the OIC-approved target allocations for CSF by mid- to late-2019.

Exhibit 7 - Portfolio Construction as of December 31, 2018

Common School Fund	Benchmark	Market Value	Current Allocation	Target Allocation	Approved Range
Global Equity	MSCI ACWI IMI Net	$ 672,619,000.00	42.8%	45%	40% - 50%
Private Equity	Russell 3000 + 300 bps	$ 214,537,000.00	13.6%	10%	8% - 12%
Fixed Income	Bloomberg U.S. Aggregate Bond Index	$ 440,001,000.00	28.0%	25%	20% - 30%
Real Assets	NCREIF ODCE QTR LAG (net)	$ 105,759,000.00	6.7%	10%	8% - 12%
Alternatives	CPI + 4%	$ 89,446,000.00	5.7%	10%	8% - 12%
Cash	Cash	$ 49,433,000.00	3.1%	0%	0% - 3%
		$ 1,571,795,000.00			

March 13, 2019

Common School Fund Annual Review

Michael Viteri

Senior Investment Officer

OREGON STATE TREASURY

Common School Fund
Asset Allocation Policy

- Approved by the Oregon Investment Council on September 20, 2017.
- Resulted in a 10 percent target allocation to Real Assets and Alternatives.
- Improvement in expected returns while decreasing expected risk.

Common School Fund	Benchmark	Prior Allocation	Approved Allocation	Approved Range
Global Equity	MSCI ACWI IMI Net	60%	45%	40% - 50%
Private Equity	Russell 3000 + 300 bps	10%	10%	8% - 12%
Fixed Income	Bloomberg U.S. Aggregate Bond Index	30%	25%	20% - 30%
Real Assets	NCREIF ODCE QTR LAG (net)	0%	10%	8% - 12%
Alternatives	CPI + 4%	0%	10%	8% - 12%
Cash	Cash	0%	0%	0% - 3%

10-Year Expected Return (Geometric Mean)		**6.5%**	**6.6%**
Projected Standard Deviation		**14.5%**	**13.2%**

Source: Updated using Callan 2018 Capital Market Assumptions.

OREGON STATE TREASURY

Common School Fund Performance
(Period ending December 2018)

– Negative fund performance across all trailing time periods driven by near term Public Equity and longer term Private Equity performance.

Period Ending 12/31/18	Market Value	3 Months	1 Year	3 Years	5 Years	10 Years
Common School Fund Returns	$ 1,571,792,000	-5.87%	-3.89%	6.13%	5.07%	8.27%
CSF Policy Benchmark		-4.66%	-1.44%	7.74%	5.66%	8.49%
Excess Return		**-1.21%**	**-2.45%**	**-1.61%**	**-0.59%**	**-0.22%**

OREGON STATE TREASURY

Common School Fund Performance
(Periods ended December 31, 2018)

- Extraordinary, although not unprecedented investment environment.
- In the U.S., 2018 was one of only three years since 1926 during which stocks, government bonds, corporate bonds, and commodities performed worse than cash (the other years were 1931 and 1981).
- In dollar terms, 30 percent of the relative under-performance for the year can be attributed to Public Equity and Fixed Income. The residual 70 percent of the relative, dollar weighted under-performance is attributed to Private Equity and Alternatives.

Period Ending 12/31/18	Market Value	3 Months	1 Year	3 Years	5 Years	10 Years
Common School Fund Public Equity Returns	$ 672,619,000	-13.93%	-11.35%	5.72%	4.24%	10.60%
MSCI ACWI IMI Net		-13.28%	-10.08%	6.49%	4.17%	9.74%
Excess Return		**-0.65%**	**-1.27%**	**-0.77%**	**0.07%**	**0.86%**

Period Ending 12/31/18	Market Value	3 Months	1 Year	3 Years	5 Years	10 Years
Common School Fund Fixed Income Returns	$ 440,001,000	0.66%	-0.71%	2.74%	2.85%	5.77%
Bloomberg Barclays US Aggregate		1.64%	0.01%	2.17%	2.49%	3.94%
Excess Return		**-0.98%**	**-0.72%**	**0.57%**	**0.36%**	**1.83%**

Period Ending 9/30/18	Market Value	3 Months	1 Year	3 Years	5 Years	10 Years
Common School Fund Private Equity Returns	$ 214,537,000	3.27%	15.15%	12.76%	13.25%	11.98%
Russell 3000 + 300 Bps Qtr Lag		7.90%	21.06%	20.54%	16.83%	15.66%
Excess Return		**-4.63%**	**-5.91%**	**-7.78%**	**-3.58%**	**-3.68%**

Period Ending 12/31/18	Market Value	3 Months	1 Year	3 Years	5 Years	10 Years
Common School Fund Alternatives Returns	$ 89,446,000	0.18%	-10.55%	N/A	N/A	N/A
CPI + 400 Bps		0.50%	5.98%	N/A	N/A	N/A
Excess Return		**-0.32%**	**-16.53%**	**N/A**	**N/A**	**N/A**

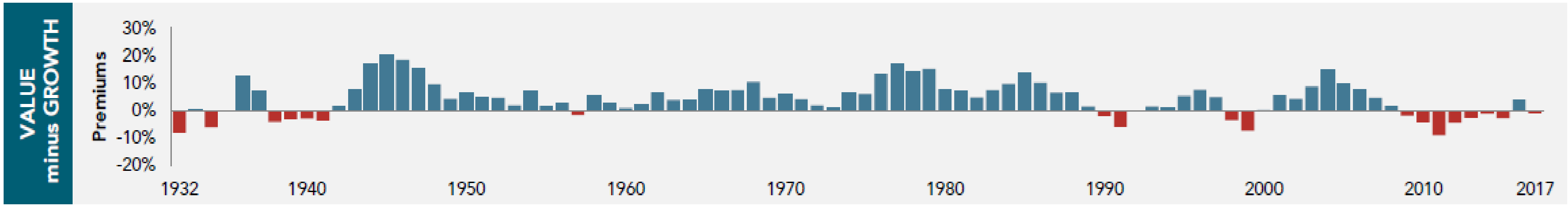
Period Ending 9/30/18	Market Value	3 Months	1 Year	3 Years	5 Years	10 Years
Common School Fund Real Estate Returns	$ 105,759,000	0.56%	N/A	N/A	N/A	N/A
NCREIF ODCE (Custom Adj)		1.87%	N/A	N/A	N/A	N/A
Excess Return		**-1.31%**	**N/A**	**N/A**	**N/A**	**N/A**

OREGON STATE TREASURY

Common School Fund Performance
(Periods ended December 31, 2018)

Public Equity

- Within Public Equity, the majority of the relative under-performance can be attributed to one mandate (Dimensional Fund Advisors U.S. Large Cap Core).
- This strategy includes deliberate tilts towards Value, Size, and Profitability which are supported by robust empirical evidence as persistent and pervasive sources of excess return relative to the market.
- Calendar year performance differentials between Growth and Value stocks (as defined by the Russell 1000 Growth and Russell 1000 Value index) over the last two calendar years were significant. In 2018, growth outperformed value by 6.76 percent. In 2017, growth outperformed value by a whopping 16.55 percent.
- From a historical perspective, the current U.S. growth/value performance gap is the largest and most sustained since the 1930s.



Source: Dimensional Fund Advisors

OREGON STATE TREASURY

Common School Fund Performance
(Periods ended December 31, 2018)

Alternatives

– Although differentiated from public equity factor tilts by investments in event-driven and managed futures, under-performance within Alternatives can also be attributed to pronounced long/short value exposures which reached relative value drawdowns not seen since the early 2000 tech stock bubble.

Private Equity

– The CSF's private equity portfolio underperformed as a result of 1) poor manager selection and 2) adverse vintage year concentrations.

– Approximately 45 percent of the CSF's total private equity commitments were made in 2007 and 2008.

– A second wave of fund commitments (45 percent of total commitments) occurred between 2013 and 2015.

– In total, more than 90 percent of all CSF private equity commitments are concentrated in 5 of the last 12 vintage years, with half of these investments in 3rd quartile funds.

Vintage	Fund	Commitment	Unfunded Commit	Contributions	Distributions	TVPI	Net IRR	Cambridge Assoc. Rank
2007	Warburg Pincus PE X	$ 25,000,000	$ -	$ 25,214,323	$ 28,856,311	1.61X	8.6%	3rd
2007	Oak Hill Capital Part III	$ 25,000,000	$ -	$ 30,189,059	$ 41,715,827	1.5X	8.9%	3rd
2008	Apollo Invest Fund VII	$ 25,000,000	$ 3,565,948	$ 30,092,816	$ 46,945,151	2.05X	23.1%	1st
2008	TPG Partners VI	$ 25,000,000	$ 1,090,536	$ 27,095,272	$ 31,317,640	1.64X	11.2%	3rd
2008	PEG Venture Cap IV	$ 20,000,000	$ 274,676	$ 24,434,184	$ 18,738,925	1.79X	14.1%	3rd
2009	Oaktree Opp Fund VIII	$ 12,500,000	$ -	$ 12,500,000	$ 17,178,520	1.46X	9.2%	N/A
2011	Oaktree Opp Fund VIIIb	$ 12,500,000	$ -	$ 12,500,000	$ 9,480,383	1.33X	20.8%	2nd
2013	Oaktree Opp Fund IX	$ 20,000,000	$ -	$ 20,000,000	$ 6,579,086	1.14X	3.2%	N/A
2013	KKR Asian Fund II	$ 25,000,000	$ 2,309,953	$ 27,186,631	$ 20,340,392	1.41X	13.7%	3rd
2013	Apollo Invest Fund VIII	$ 25,000,000	$ 5,580,815	$ 21,690,865	$ 6,525,855	1.37X	14.6%	3rd
2014	PEG Venture Cap V	$ 25,000,000	$ 4,104,290	$ 21,385,953	$ 1,062,332	1.22X	NM	NM
2015	Francisco Partners IV	$ 15,000,000	$ 382,500	$ 14,617,500	$ 1,552,500	1.58X	26.0%	1st
2015	Oaktree Opp Fund X	$ 25,000,000	$ 7,500,000	$ 20,000,000	$ 2,809,830	1.33X	20.8%	NM

Source: Torrey Cove

OREGON STATE TREASURY

CSF Portfolio Construction Update
(Periods ended December 31, 2018)

– Two Alternative mandates (JPM Systematic Fund and BlackRock Style Advantage) funded early in 2018.

– Two Real Estate mandates (DWS RREEF and Morgan Stanley Prime Fund) funded in the second half of 2018.

– Staff is currently working on two new alternative investments, one real estate investment, and two new private equity commitments, all of which should fund this year.

– Staff expects to reach the OIC-approved target allocation for CSF by mid-to-late-2019.

Common School Fund	Benchmark	Market Value	Current Allocation	Target Allocation	Approved Range
Global Equity	MSCI ACWI IMI Net	$ 672,619,000.00	42.8%	45%	40% - 50%
Private Equity	Russell 3000 + 300 bps	$ 214,537,000.00	13.6%	10%	8% - 12%
Fixed Income	Bloomberg U.S. Aggregate Bond Index	$ 440,001,000.00	28.0%	25%	20% - 30%
Real Assets	NCREIF ODCE QTR LAG (net)	$ 105,759,000.00	6.7%	10%	8% - 12%
Alternatives	CPI + 4%	$ 89,446,000.00	5.7%	10%	8% - 12%
Cash	Cash	$ 49,433,000.00	3.1%	0%	0% - 3%
		$ 1,571,795,000.00			

Source: State Street

OREGON STATE TREASURY

OREGON
STATE
TREASURY

Tobias Read
Oregon State Treasurer

350 Winter St NE, Suite 100
Salem, OR 97301-3896

oregon.gov/treasury

Common School Fund
Policy Updates
March 13, 2019

Purpose
Update and consolidate policies governing the Oregon Common School Fund.

Discussion
The Common School Fund is currently governed by a series of six policies. Staff is now recommending an extensive policy consolidation that would reduce that number to one, including specific investment guidelines for any assets managed internally. Staff recommends policy changes consistent with the matrix below.

INV 901: Common School Fund: Asset Classes, Asset Allocation, and Reporting Requirements	Revise and retain
INV 903: Common School Fund: Public Equity Investments	Retire
INV 904: Common School Fund: Fixed Income Investments	Retire
INV 905: Common School Fund: Private Equity Investments	Retire
INV 906: Common School Fund: Real Estate	Retire
INV 907: Common School Fund: Alternative Investments	Retire

Recommendation: Approve proposed policy consolidation and updated policy language as presented in the attached documents.

INTRODUCTION & OVERVIEW

Summary Policy Statement

The Oregon Investment Council (“OIC”) formulates policies for the investment and reinvestment of funds under the control and administration of the Department of State Lands ("DSL"), known as the Common School Fund (the "Fund"). This policy provides guidance to Oregon State Treasury ("OST") staff and advisors regarding approved asset classes, asset allocation, and reporting requirements for the Fund.

Purpose and Goals

The investment objective for the Fund is to maximize risk-adjusted return, while remaining consistent with Fund goals as established by DSL’s board (the “State Land Board”). The OIC has approved the following asset classes to meet the Fund’s investment objective: 1) Global Equity; 2) Private Equity; 3) Fixed Income; 4) Real Estate; 5) Alternatives; and 6) Cash (each as defined below). This policy will outline the strategic role of each asset class and provide further guidance to OST staff on the investment program.

Applicability

Classified represented, management service, and unclassified executive service staff.

POLICY PROVISIONS

Policy Statements

A. Asset Allocation

Recognizing the general objectives and operating philosophy of the Fund, the OIC has approved the following asset classes and target ranges:

1. **Global Equity.** Domestic and international investments that represent a direct ownership of, or interest in, a corporation, and the shares of which are traded in public securities markets.
2. **Fixed Income.** Investments in loans and other debt. This asset class may include mortgage-backed, asset-backed and structured securities.
3. **Private Equity.** Investments in privately-held companies or corporations including buyouts and venture capital. Fund of funds investing and purchases of secondary interests may also be included in this category.
4. **Alternatives.** Investments will be diversified through exposure to a variety of alternative investment assets and strategies, including infrastructure, natural resources, and other diversifying strategies.
5. **Real Estate.** Investments will be diversified through exposure to a variety of real estate investment strategies, including core, value add, and opportunistic.
6. **Cash.** Cash and cash equivalents are defined as cash held in OST's Oregon Short Term Fund.

Asset Class	Benchmark	Target Allocation	Range
Global Equity	MSCI ACWI IMI Net	45%	40% - 50%
Private Equity	Russell 3000 + 300 bps	10%	8% - 12%
Fixed Income	Bloomberg Barclays U.S. Aggregate Bond Index	25%	20% - 30%
Real Estate	NCREIF-ODCE	10%	0% - 12%
Alternatives	CPI+ 4%	10%	0% - 12%
Cash	Cash	0%	0% - 3%

7. OST staff shall monitor the Fund's actual asset allocations relative to OIC-established targets on a monthly basis. A sustained and material deviation outside of the approved ranges shall trigger a rebalancing back towards established targets with due consideration given to any liquidity constraints and/or potential transactions costs. Whenever possible, the Fund's cash flows will be used to rebalance between asset classes. Alternative investments will receive special consideration and staff will receive additional flexibility in building out this asset class given its still-nascent status.
8. OST will work with the State Land Board and DSL staff to ensure the Fund's asset allocation policy comports with the State Land Board's goals for the Fund. Moreover, the OIC shall not make asset allocation changes without considering input from the State Land Board or DSL staff.
9. Formal asset allocation reviews will be performed at least every 3 years to ensure that the Fund is positioned properly. These reviews will be performed by OST staff in conjunction with the OIC's general consultant.

B. Global Equity Investments

The strategic role of publicly-traded equity securities is to provide one of the highest expected returns among approved asset classes for the Fund. The Fund's Global Equity portfolio also provides liquidity necessary to meet its cash distribution obligations.

1. The Fund's Global Equity portfolio is structured on a global basis, seeking to loosely replicate the country and market capitalization characteristics of the MSCI ACWI Investable Market Index (MSCI ACWI IMI Net).
2. OST staff will seek to enhance returns through selective active management, provided such actively- managed strategies demonstrate empirical efficacy relative to factor exposures and net of all fees and transactions costs.
3. Benchmarks assigned to all non-U.S. strategies should be unhedged. Managers may be permitted to hedge currency exposures, and in cases where currency represents an explicit element of a manager's stated investment approach, may take active currency positions.
4. Proxies associated with separately managed accounts will be voted by OST's third-party proxy voting agent.

C. Fixed Income Investments

The strategic role of fixed income securities is to diversify the Fund in general and its allocation to equity securities in particular. The Fixed Income portfolio provides liquidity necessary to meet its cash distribution obligations.

1. The Fund's Fixed Income portfolio is structured as a well-diversified bond portfolio.
2. The benchmark is the Bloomberg Barclays U.S. Aggregate Bond Index (the "Benchmark").
3. Actively-managed strategies are expected to outperform stated benchmarks on an after-fee and risk- adjusted basis, over a 3-5 year market cycle while remaining within reasonable risk parameters.

D. Private Equity Investments

The strategic role of private equity investments is to enhance return and diversification opportunities for the Fund. While potentially more volatile than public equity, private equity provides a diversification benefit and the opportunity to achieve higher returns.

1. The Fund's Private Equity portfolio will include investments with a select group of large, established and historically successful private equity partners and will generally be accessed through limited partnership interests.
2. Diversification in the Fund's Private Equity portfolio may be accomplished through any of the following: investment style or strategy; geographic focus; sector allocation; and capitalization.
3. Partnership agreements shall conform to current industry standards and shall be subject to legal sufficiency approval by and through OST legal counsel.
4. The Fund's Private Equity portfolio is expected to achieve total returns greater than the Russell 3000 + 300 basis points, net of fees, over a three- to five-year investment cycle.

E. Real Estate Investments

The strategic role of real estate investments is to enhance return and diversification opportunities for the Fund.

1. Diversification in real estate may be accomplished through exposure to a variety of real estate debt and equity investment strategies, property types (i.e., office, industrial, retail, multifamily, hospitality, etc.), geographic location, and various stages of a property life-cycle from development to stabilized.
2. The Fund's Real Estate portfolio is expected to achieve total returns greater than the NCREIF Fund Index - Open-End Diversified Core Equity (NFI-ODCE), net of fees.

F. Alternative Investments

The strategic role of alternative investments is to enhance long-term return and diversification opportunities for the Fund. A lower correlation between the returns of alternative investments and other Fund assets is expected, and alternative investments are therefore expected to provide an added measure of diversification to overall Fund returns.

1. Diversification in alternative investments may be achieved through exposure to a variety of possible alternative investment assets and strategies, including, but not limited to, infrastructure, natural resources, and other diversifying strategies.
2. The Fund's Alternatives portfolio is expected to achieve total returns greater than the Consumer Price Index for All Urban Consumers ("CPI") plus 400 basis points, net of fees.

G. OST Staff Authority

With approval from the Chief Investment Officer (“CIO”) and quarterly notification to the OIC, OST staff may:

1. Terminate "at will" any public equity or fixed income manager or mandate according to the terms of its contract with, and on behalf of, the OIC;
2. Rebalance between and among managers within the Fund’s Global Equity or Fixed Income portfolios. The aggregate, structural characteristics of the portfolio will be considered during such rebalancings.
3. Rebalance between and among open-end core real estate funds within the Real Estate Portfolio. The aggregate, structural characteristics of the portfolio will be considered during such rebalancings.
4. Convert any public equity long-only implementation to a 130/30 strategy, provided such implementation does not change the mandate's role within the Fund’s Global Equity Portfolio; and
5. Retain an external manager in any of the five asset classes that has been approved by the OIC on behalf of the Oregon Public Employees Retirement Fund (“OPERF”).

H. 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 Fund, as appropriate; and d) when applicable, verify resolution by the appropriate individual or manager within the appropriate time frame.

I. Review and Reporting

1. **OST/OIC Reviews.** OST staff will continuously review asset allocations and investment performance, and present their review and conclusions to the OIC on no less than an annual basis. These reviews will focus on the continued appropriateness of existing policy, compliance with guidelines and performance relative to Fund objectives. A formal process shall be established allowing DSL staff to meet with OIC's general consultant on an annual basis to discuss investment management and asset allocation issues. In addition, DSL staff will have the opportunity to address the OIC annually to discuss the State Land Board's particular views regarding Fund performance and related management issues.
2. **Presentation to State Land Board.** OST staff will arrange for and lead a formal review of the Fund at a meeting of the State Land Board on at least an annual basis. OST and DSL staff will coordinate in advance of each meeting to develop an agenda.

Exceptions

None.

Failure to Comply

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

INTRODUCTION & OVERVIEW

Summary Policy Statement

The Oregon Investment Council ~~(~~(“OIC~~) approves asset classes~~”) formulates policies for the investment and ~~the asset allocation~~reinvestment of funds under the control and administration of the Department of State Lands ("DSL"), known as the Common School Fund ~~("CSF" or~~ (the "Fund"). This policy provides guidance to Oregon State Treasury ("OST") staff and advisors regarding approved asset classes, asset allocation, and reporting requirements for the Fund.

Purpose and Goals

~~The goal of this policy is to provide guidance to Oregon State Treasury (OST) staff and advisors regarding the asset allocation, asset classes and reporting requirements for the Fund.~~

The investment objective for the Fund is to maximize risk-adjusted return, while remaining consistent with Fund goals as established by DSL’s board (the “State Land Board”). The OIC has approved the following asset classes to meet the Fund’s investment objective: 1) Global Equity; 2) Private Equity; 3) Fixed Income; 4) Real Estate; 5) Alternatives; and 6) Cash (each as defined below). This policy will outline the strategic role of each asset class and provide further guidance to OST staff on the investment program.

Applicability

~~All Investment Division staff.~~

Classified represented, management service, and unclassified executive service staff.

POLICY PROVISIONS

Policy Statements

~~1. OST shall adopt an asset allocation policy defining appropriate guidelines for the CSF portfolio, the objective of which is to optimize the Fund's long-term investment return and distributions, while enabling the CSF asset base to grow in real terms.~~

A. ~~The OIC shall establish asset allocation ranges and targets for the CSF, while~~ Asset Allocation

~~2. OST staff shall monitor the Fund's actual asset allocations relative to OIC-established targets on a monthly basis.~~

~~3. The purpose of OST staff's monitoring efforts is to ensure that CSF allocations do not drift significantly from the strategic targets approved by the OIC. A sustained and material deviation outside of the approved ranges shall trigger a review and rebalancing back towards established targets with due consideration given to any liquidity constraints and/or potential transactions costs. Whenever possible, cash flows into and out of the fund will be used to rebalance between asset classes.~~

~~4. The CSF's asset allocation shall be managed as detailed below:~~

~~**Common School Fund**~~	~~**Benchmark**~~	~~**Target Allocation**~~	~~**Range**~~
~~Global Equity~~	~~MSCI ACWI IMI Net~~	~~45%~~	~~40% - 50%~~
~~Private Equity~~	~~Russell 3000 + 300 bps~~	~~10%~~	~~8% - 12%~~
~~Fixed Income~~	~~Bloomberg U.S. Aggregate Bond Index~~	~~25%~~	~~20% - 30%~~
~~Real Assets~~	~~NCREIF ODCE QTR LAG (net)~~	~~10%~~	~~8% - 12%~~

~~Alternatives~~	~~CPI + 4%~~	~~10%~~	~~8% - 12%~~
~~Cash~~	~~Cash~~	~~0%~~	~~0% - 3%~~

~~5. OST will work with the State Land Board and Department of State Lands (DSL) staff to ensure the implementation of the Fund's asset allocation policy comports with DSL business needs. Moreover, the OIC shall not make asset allocation changes without considering input from the State Land Board.~~

~~6. Formal asset allocation reviews will be performed at least every 3 years to ensure that CSF capital is positioned properly. These reviews will be performed by OST staff in conjunction with the OIC's general consultant, and any asset classes not specifically addressed in the policy below will be reviewed by OST and State Land Board staff for approval by the OIC.~~

~~7.~~ Recognizing the general objectives and operating philosophy of the Fund, the OIC has approved the following asset classes~~:~~ and target ranges:

~~a.~~1. **Global Equity.** Domestic and international investments that represent a direct ownership of, or interest in, a corporation, and the shares of which are traded in public securities markets.

~~b.~~2. **Fixed Income.** Investments in loans and other debt ~~obligations that have pre-defined interest and principal repayment schedules.~~. This asset class may include mortgage ~~obligations.~~ -backed, asset-backed and structured securities.

~~c.~~3. **Private Equity.** Investments in privately-held companies or corporations including buyouts~~,~~ and venture capital ~~and mezzanine finance techniques~~. Fund of funds investing and purchases of secondary interests may also be included in this category.

~~d.~~4. **Alternatives.** Investments will be diversified through exposure to a variety of alternative investment assets and strategies, including infrastructure, natural resources ~~(including commodities)~~, and other diversifying ~~asset~~ strategies.

~~e.~~5. **Real ~~Assets~~Estate.** Investments will be diversified through exposure to a variety of real estate investment strategies, including core, value add, and opportunistic.

~~f.~~6. **Cash.** Cash and cash equivalents are defined as cash held in OST's Oregon Short Term Fund.

Asset Class	Benchmark	Target Allocation	Range
Global Equity	MSCI ACWI IMI Net	45%	40% - 50%
Private Equity	Russell 3000 + 300 bps	10%	8% - 12%
Fixed Income	Bloomberg Barclays U.S. Aggregate Bond Index	25%	20% - 30%
Real Estate	NCREIF-ODCE	10%	0% - 12%
Alternatives	CPI+ 4%	10%	0% - 12%
Cash	Cash	0%	0% - 3%

7. OST staff shall monitor the Fund's actual asset allocations relative to OIC-established targets on a monthly basis. ~~**Reporting Requirements.** Formal review~~ A sustained and material deviation outside of the approved ranges shall trigger a rebalancing back towards established targets with due consideration given to any liquidity constraints and/or potential transactions costs. Whenever possible, the Fund's cash flows will be used to rebalance between asset classes. Alternative investments will receive special consideration and staff will receive additional flexibility in building out this asset class given its still-nascent status.

~~8.~~ OST will work with the State Land Board ~~shall be undertaken at least annually.~~

~~9. **Reporting Package to Department of State Lands (DSL).** The material covered during each meeting should be summarized and available in advance, and unless otherwise indicated, the material distributed should include the following information:~~

~~a. Economic and market outlook;~~

~~b. Portfolio structure~~ and ~~asset allocation summary;~~

~~c. Current investment strategy;~~

~~d. Recent portfolio performance including an attribution analysis; and~~

~~e. Other items of importance, such as changes in personnel, legislative impacts or any changes in investment philosophy and approach.~~

8. DSL staff to ensure ~~**OST/OIC Reviews.** Review of~~ the Fund's asset allocation policy ~~and investment performance will occur at least annually with~~ comports with the State Land Board's goals for the Fund. Moreover, the OIC shall not make asset allocation changes without considering input from the State Land Board or DSL staff.

9. Formal asset allocation reviews will be performed at least every 3 years to ensure that the Fund is positioned properly. These reviews will be performed by OST staff in conjunction with the OIC's general consultant.

B. Global Equity Investments

The strategic role of publicly-traded equity securities is to provide one of the highest expected returns among approved asset classes for the Fund. The Fund's Global Equity portfolio also provides liquidity necessary to meet its cash distribution obligations.

1. The Fund's Global Equity portfolio is structured on a global basis, seeking to loosely replicate the country and market capitalization characteristics of the MSCI ACWI Investable Market Index (MSCI ACWI IMI Net).

2. OST staff will seek to enhance returns through selective active management, provided such actively- managed strategies demonstrate empirical efficacy relative to factor exposures and net of all fees and transactions costs.

3. Benchmarks assigned to all non-U.S. strategies should be unhedged. Managers may be permitted to hedge currency exposures, and in cases where currency represents an explicit element of a manager's stated investment approach, may take active currency positions.

4. Proxies associated with separately managed accounts will be voted by OST's third-party proxy voting agent.

C. Fixed Income Investments

The strategic role of fixed income securities is to diversify the Fund in general and its allocation to equity securities in particular. The Fixed Income portfolio provides liquidity necessary to meet its cash distribution obligations.

1. The Fund's Fixed Income portfolio is structured as a well-diversified bond portfolio.
2. The benchmark is the Bloomberg Barclays U.S. Aggregate Bond Index (the "Benchmark").
3. Actively-managed strategies are expected to outperform stated benchmarks on an after-fee and risk- adjusted basis, over a 3-5 year market cycle while remaining within reasonable risk parameters.

D. Private Equity Investments

The strategic role of private equity investments is to enhance return and diversification opportunities for the Fund. While potentially more volatile than public equity, private equity provides a diversification benefit and the opportunity to achieve higher returns.

1. The Fund's Private Equity portfolio will include investments with a select group of large, established and historically successful private equity partners and will generally be accessed through limited partnership interests.
2. Diversification in the Fund's Private Equity portfolio may be accomplished through any of the following: investment style or strategy; geographic focus; sector allocation; and capitalization.
3. Partnership agreements shall conform to current industry standards and shall be subject to legal sufficiency approval by and through OST legal counsel.
4. The Fund's Private Equity portfolio is expected to achieve total returns greater than the Russell 3000 + 300 basis points, net of fees, over a three- to five-year investment cycle.

E. Real Estate Investments

The strategic role of real estate investments is to enhance return and diversification opportunities for the Fund.

1. Diversification in real estate may be accomplished through exposure to a variety of real estate debt and equity investment strategies, property types (i.e., office, industrial, retail, multifamily, hospitality, etc.), geographic location, and various stages of a property life-cycle from development to stabilized.
2. The Fund's Real Estate portfolio is expected to achieve total returns greater than the NCREIF Fund Index - Open-End Diversified Core Equity (NFI-ODCE), net of fees.

F. Alternative Investments

The strategic role of alternative investments is to enhance long-term return and diversification opportunities for the Fund. A lower correlation between the returns of alternative investments and other Fund assets is expected, and alternative investments are therefore expected to provide an added measure of diversification to overall Fund returns.

1. Diversification in alternative investments may be achieved through exposure to a variety of possible alternative investment assets and strategies, including, but not limited to, infrastructure, natural resources, and other diversifying strategies.

2. The Fund's Alternatives portfolio is expected to achieve total returns greater than the Consumer Price Index for All Urban Consumers ("CPI") plus 400 basis points, net of fees.

G. OST Staff Authority

With approval from the Chief Investment Officer ("CIO") and quarterly notification to the OIC, OST staff may:

1. Terminate "at will" any public equity or fixed income manager or mandate according to the terms of its contract with, and on behalf of, the OIC;
2. Rebalance between and among managers within the Fund's Global Equity or Fixed Income portfolios. The aggregate, structural characteristics of the portfolio will be considered during such rebalancings.
3. Rebalance between and among open-end core real estate funds within the Real Estate Portfolio. The aggregate, structural characteristics of the portfolio will be considered during such rebalancings.
4. Convert any public equity long-only implementation to a 130/30 strategy, provided such implementation does not change the mandate's role within the Fund's Global Equity Portfolio; and
5. Retain an external manager in any of the five asset classes that has been approved by the OIC on behalf of the Oregon Public Employees Retirement Fund ("OPERF").

H. 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 Fund, as appropriate; and d) when applicable, verify resolution by the appropriate individual or manager within the appropriate time frame.

I. Review and Reporting

~~10.~~1. **OST/OIC Reviews.** ~~and more frequently by OST staff.~~OST staff will continuously review asset allocations and investment performance, and present their review and conclusions to the OIC on no less than an annual basis. These reviews will focus on the continued appropriateness of existing policy, compliance with guidelines and performance relative to Fund objectives. A formal process shall be established allowing DSL staff to meet with OIC's ~~consultants~~general consultant on an annual basis to discuss investment management and asset allocation issues. In addition, DSL staff will have the opportunity to address the OIC annually to discuss the State Land Board's particular views regarding Fund performance and related management issues.

2. **Presentation to State Land Board.** OST staff will arrange for and lead a formal review of the Fund at a meeting of the State Land Board on at least an annual basis. OST and DSL staff will coordinate in advance of each meeting to develop an agenda.

Exceptions

None.

Failure to Comply

~~*In general, this statement will suffice:* "~~Failure to comply with this policy may be cause for disciplinary action up to and including dismissal~~."~~.

~~PROCEDURES and FORMS~~

~~ADMINISTRATION~~

~~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.~~

Appendix A

**Portfolio Rules for the
Common School Fund's
Fixed Income Portfolio**

Revised March, 2019

A. Scope

The strategic role of fixed income securities is to diversify the Common School Fund ("CSF") asset base in general, and its allocation to equity securities in particular. The fixed income securities portfolio within CSF is also designed to provide liquidity in connection with CSF's regular cash distribution obligations. Fixed income securities are subject to the specific, strategic allocation targets established in Oregon Investment Council ("OIC") Policy.

B. Strategy

1. Maintain a minimum-weighted, average credit quality of one rating category below that of the Benchmark. For example, if the Benchmark's average credit quality is Aa2, the minimum-weighted, average credit quality should be A2.
2. Maintain a target duration band of +/-20% relative to the effective duration of the Benchmark.

C. Permitted Holdings

1. Any security eligible for the designated Benchmark.
2. Debt obligations issued or guaranteed by the U.S. Federal Government, U.S. Federal agencies or U.S. government-sponsored corporations and agencies.
3. Debt obligations of U.S. and non-U.S. corporations including common stock received in connection with the restructuring of corporate debt.
4. Mortgage-backed, asset-backed and structured securities.
5. Securities eligible for the Oregon Short-Term Fund (OSTF).
6. Yankee Bonds (dollar denominated sovereign and corporate debt).
7. Debt obligations, including the securities of emerging market issuers, denominated in U.S. dollars or foreign currencies of international agencies, supranational entities and foreign governments (or their subdivisions or agencies).
8. Rule 144A securities.
9. Credit Rating Criteria: In addition to the eligibility requirements described above, securities considered for purchase must be rated investment grade at the time of purchase. If no ratings are available for a particular security, then an equivalent investment grade credit rating, as determined by the Manager, may be used.
10. For certain securities or instruments, such as newly-issued bonds, expected ratings may be used until actual ratings are issued and assigned by the rating agencies.

D. Diversification

The portfolio should be adequately diversified to minimize various risks. The following specific limitations reflect, in part, the OIC's current investment philosophy regarding diversification:

1. Obligations of non-US governments are limited to 10% per issuer;

2. Not more than 10% of the CSF fixed income portfolio may be invested in non-dollar denominated securities; and
3. Currency hedging is at the Manager's discretion.

E. Portfolio Restrictions

1. No more than 10% of the total CSF fixed income portfolio, at market value, may be maintained in securities rated less than Baa3.
2. No more than +/- 10% of any sector should be overweight or underweight versus the benchmark.
3. Leverage in any fixed income securities holding (excluding use of securities in a securities lending program) is not permitted.

F. Performance Expectations/Reviews

Over a market cycle of 3-5 years, the CSF fixed income portfolio is expected to outperform its benchmark by at least 35 basis points, net-of-fees. Quarterly investment portfolio reviews will focus on performance relative to objectives and adherence to guidelines.

TAB 4 – IAP Update

OPERF

Oregon Investment Council
Individual Account Program
Annual Review and Policy Updates
March 13, 2019

Purpose
Staff will provide a status report for the Individual Account Program, and recommend policy updates in connection therewith.

Recommendation
Staff recommends approval of proposed policy changes as outlined in attached, supporting materials.

March 13, 2019

Oregon Public Employees Retirement Fund Individual Account Program

Annual Review

Jennifer J. Peet

Corporate Governance Director

OREGON STATE TREASURY

Agenda

1. Review of IAP program, Implementation and Ongoing Services
2. Demographic Analysis and Glide Path Design Refresher
3. Performance and Benchmark Review
4. Questions

IAP Review
2018 Implementation Summary

In collaboration with AllianceBernstein, PERS, Russell Investments, SSGA, and State Street Bank, OST staff facilitated the transition of IAP assets from OPERF to a Target Date Fund structure effective January 2nd, 2018.

- Russell Investments transitioned approximately $1.8 billion of OPERF securities to five SSGA index funds for IAP; and
- An additional $400 million of the same index funds were purchased for IAP using cash from OPERF.

At the conclusion of the transition, IAP had approximately $2.2 billion in the SSGA index funds and $6.7 billion remaining in OPERF.

Summary: AB's Implementation and Ongoing Services

Seamless Implementation

- Served as the overall project manager for investment, operational and communications work streams.
- Developed project plan and implementation timeline in concert with both PERS and OST staff as well as representatives from other service providers.

Ongoing Operational Oversight

- Worked with PERS/OST teams and other service providers to determine trading processes and timing.
- Provided initial and ongoing operational support inclusive of cash flow management, rebalancing and glide path progression.

Participant Communications

- Provided participant communications assistance and expertise.
- Created custom content for participant communications inclusive of fund fact sheets, train-the-trainer presentations, Call Center Q&As, website and participant newsletters.

Agenda

1. Review of IAP program, Implementation and Ongoing Services
2. Demographic Analysis and Glide Path Design Refresher
3. Performance and Benchmark Review
4. Questions

OREGON STATE TREASURY

Summary: Demographic Research and Glide Path Design

Benefits of Transition to Glide Path

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

Key Demographic Inputs & Assumptions

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

IAP Target-Date Funds' Glide Path

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

Summary: Oregon Demographics

Standard Goals & Risk Tolerance

- Provides long-term real asset growth while working
- Prolongs savings in retirement
- Mitigates participant risk especially when approaching and entering retirement

Demographic Summary

- Average retirement age: 63*
- Average account balance increases with age and reaches its peak at 0.8x final salary near retirement
- Average salary level and DC deferrals are around population average with additional benefits from DB
- Low employment risk or frequency of job-changing

Target total replacement rate

- Target average total replacement rate of 90%
- Average DB replacement rate of 45% + Social Security replacement rate of 35%

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

Key Inputs and Highlights of Glide Path Design

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

Participant Demographics

Oregon Public Employees Retirement Fund (OPERF)

Current Capital Market Environment

Glide Path Design

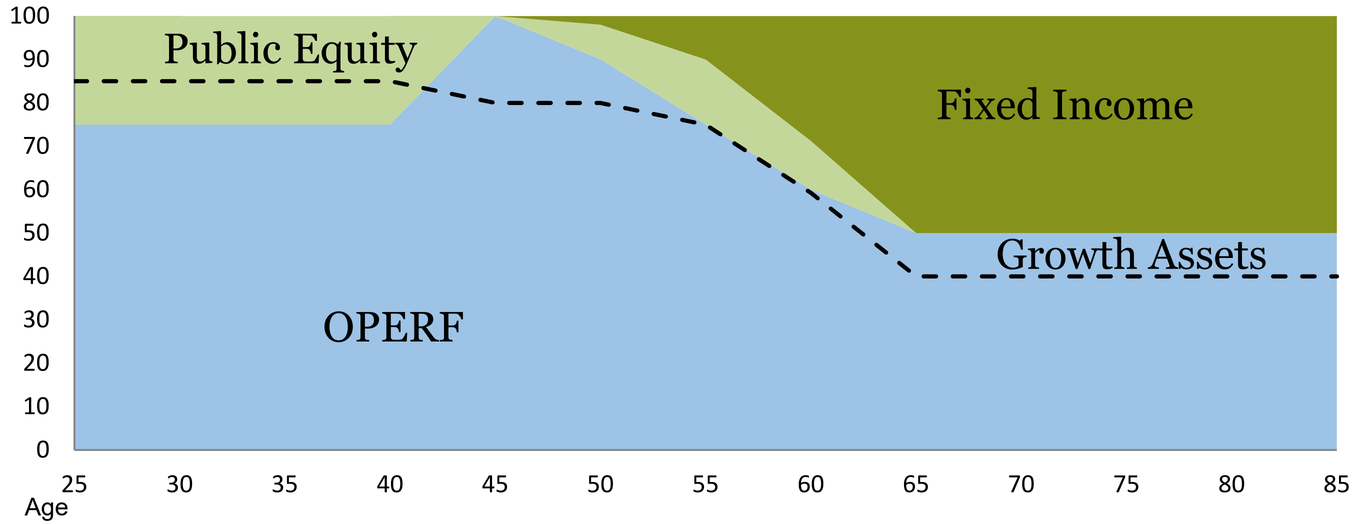
- Designed a customized glide path landing at age 65
- Allocation to OPERF is determined by OST and incorporated into the design
- OPERF portfolio is assessed and non-OPERF allocations are designed by AB accordingly
- Modeled passive implementation for all non-OPERF allocations

OREGON STATE TREASURY

State of Oregon: Custom Target-Date Funds

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

State of Oregon Glide Path



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

* 80% of OPERF allocation is counted as growth assets.

OREGON STATE TREASURY

Comparison of Asset Allocation & Performance

Asset Allocation vs. Peer Universe

- While IAP has in general a higher growth allocation than the mutual fund TDF universe average, it is in-line with the custom TDF universe average.
- Unlike its peer average, IAP includes a significant allocation to diversifiers, making its growth exposure less volatile.

Performance vs Peers

- Compared with the mutual fund peer universe, IAP outperformed during calendar year 2018, outperforming during both the first 3 quarters and in Q4.

Performance vs OPERF

<u>Young Participants</u>

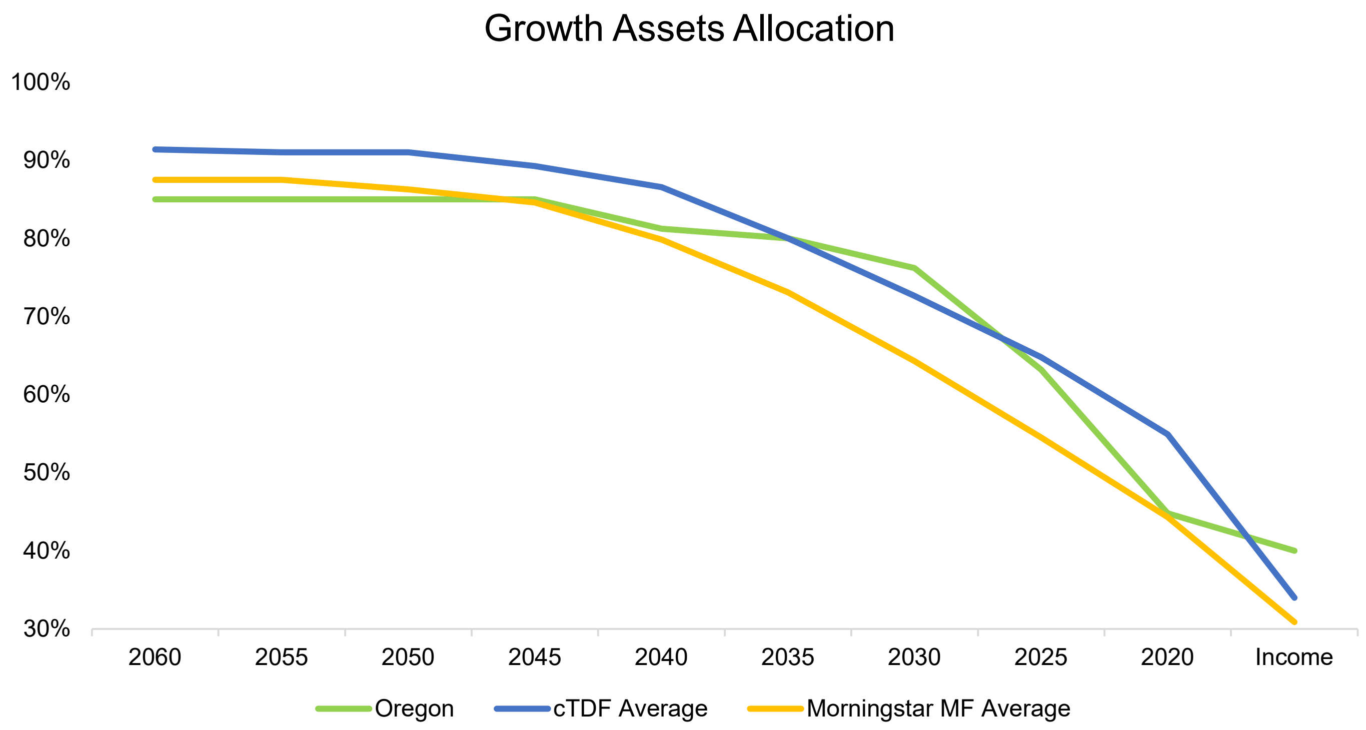
- Outperformed OPERF during the first 3 quarters of 2018 but underperformed during the 4th quarter.

<u>Senior Participants</u>

- Outperformed OPERF during the 4th quarter's sharp equity sell-off, and underperformed OPERF during the first 3 quarters of 2018.

Conclusion: Mission Accomplished!

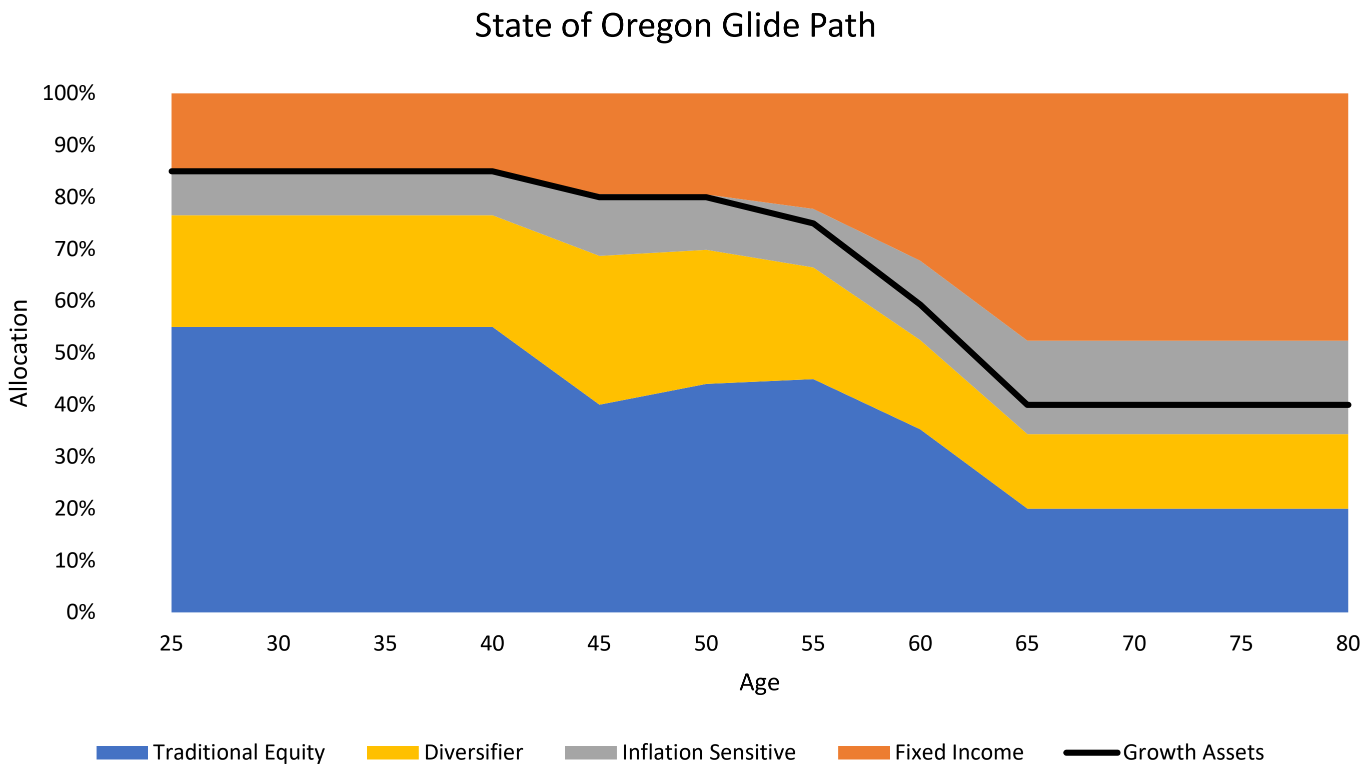
Growth Allocation Higher than Mutual Fund Average, In-Line with Custom TDF Average



Source: AB; DCIIA; Morningstar.

OREGON STATE TREASURY

A Significant Portion of IAP Growth Allocation is from Diversifiers

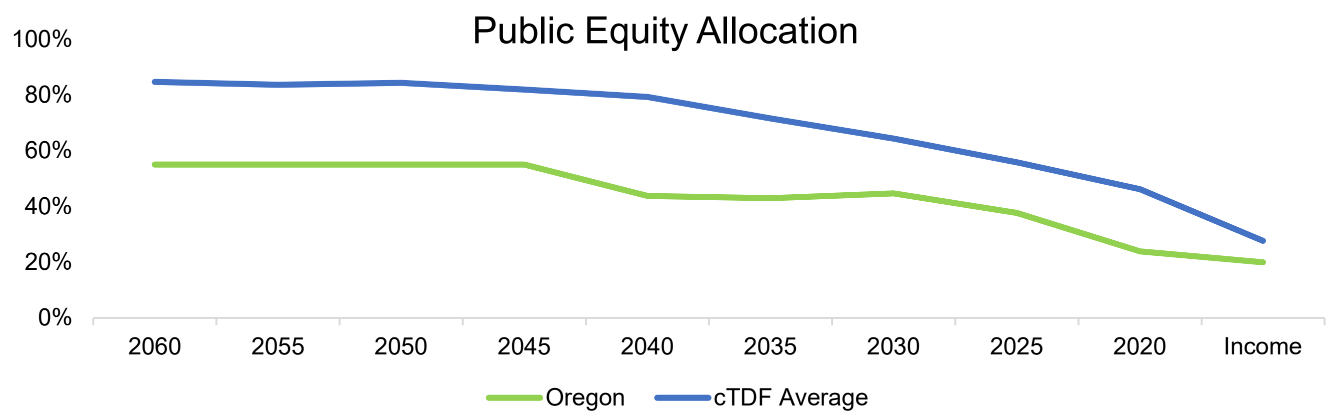


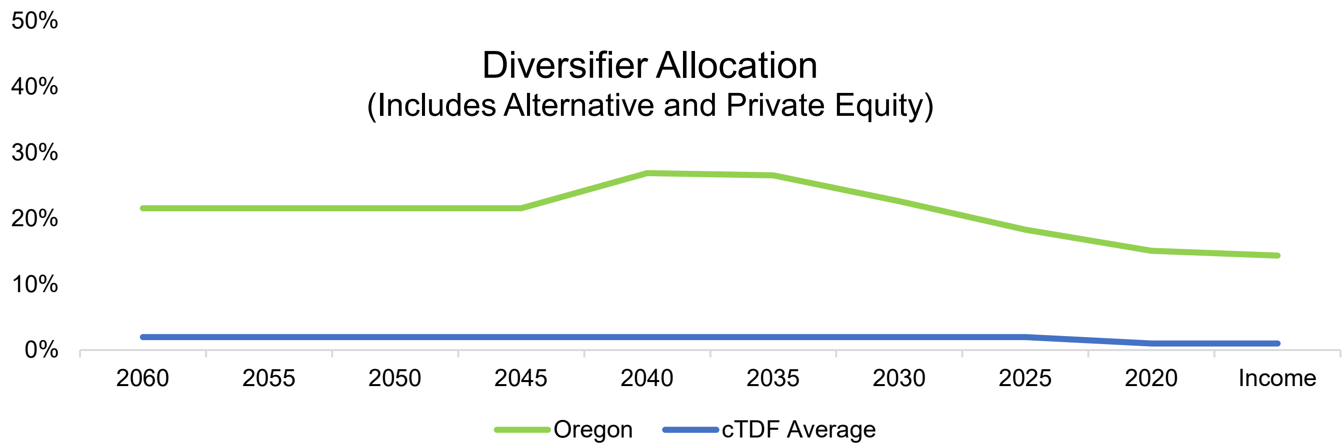
Source: AB

Diversifiers include Alternative and Private Equity portion within OPERF allocation.

OREGON STATE TREASURY

Relative to Custom TDF Average, Lower Allocation to Public Equity and Higher Allocation to Diversifiers





Source: AB; DCIIA.

Agenda

1. Review of IAP program, Implementation and Ongoing Services
2. Demographic Analysis and Glide Path Design Refresher
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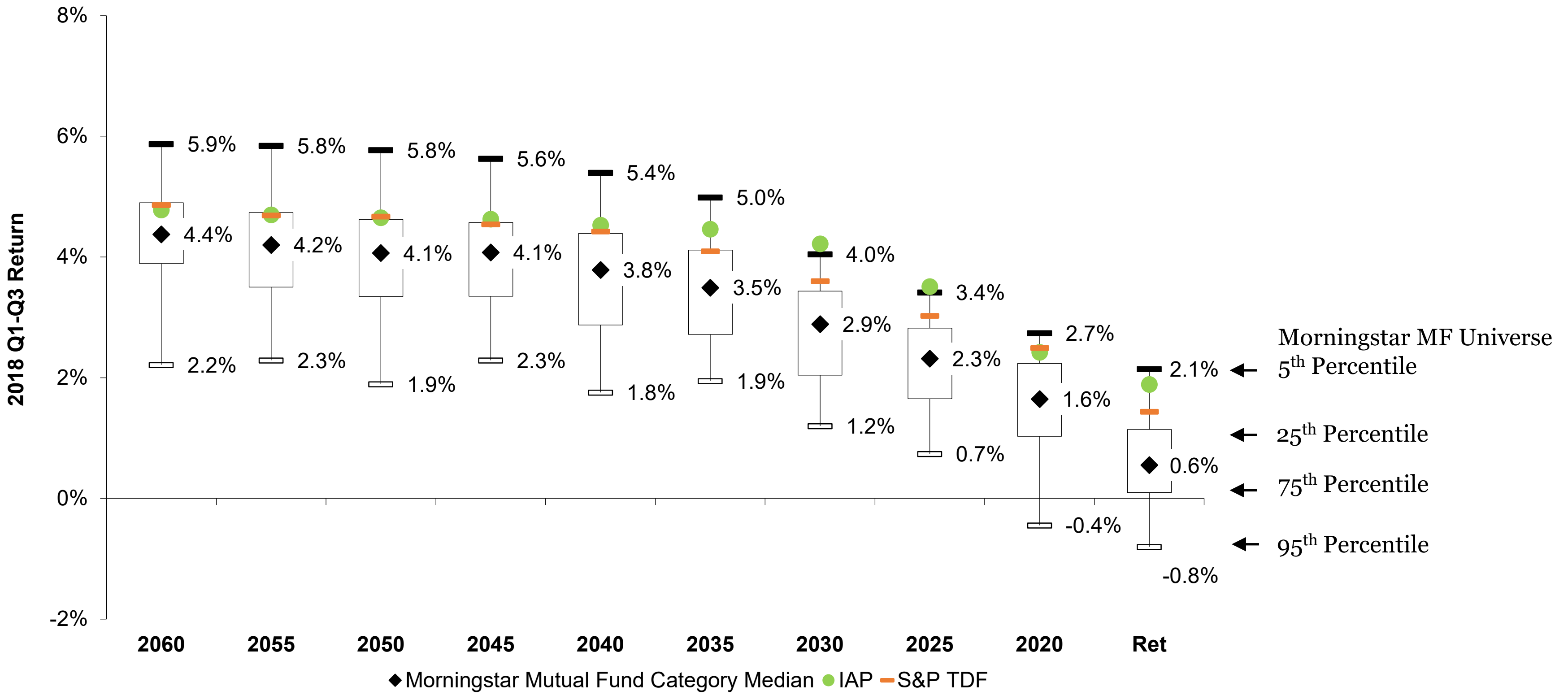
4. Questions

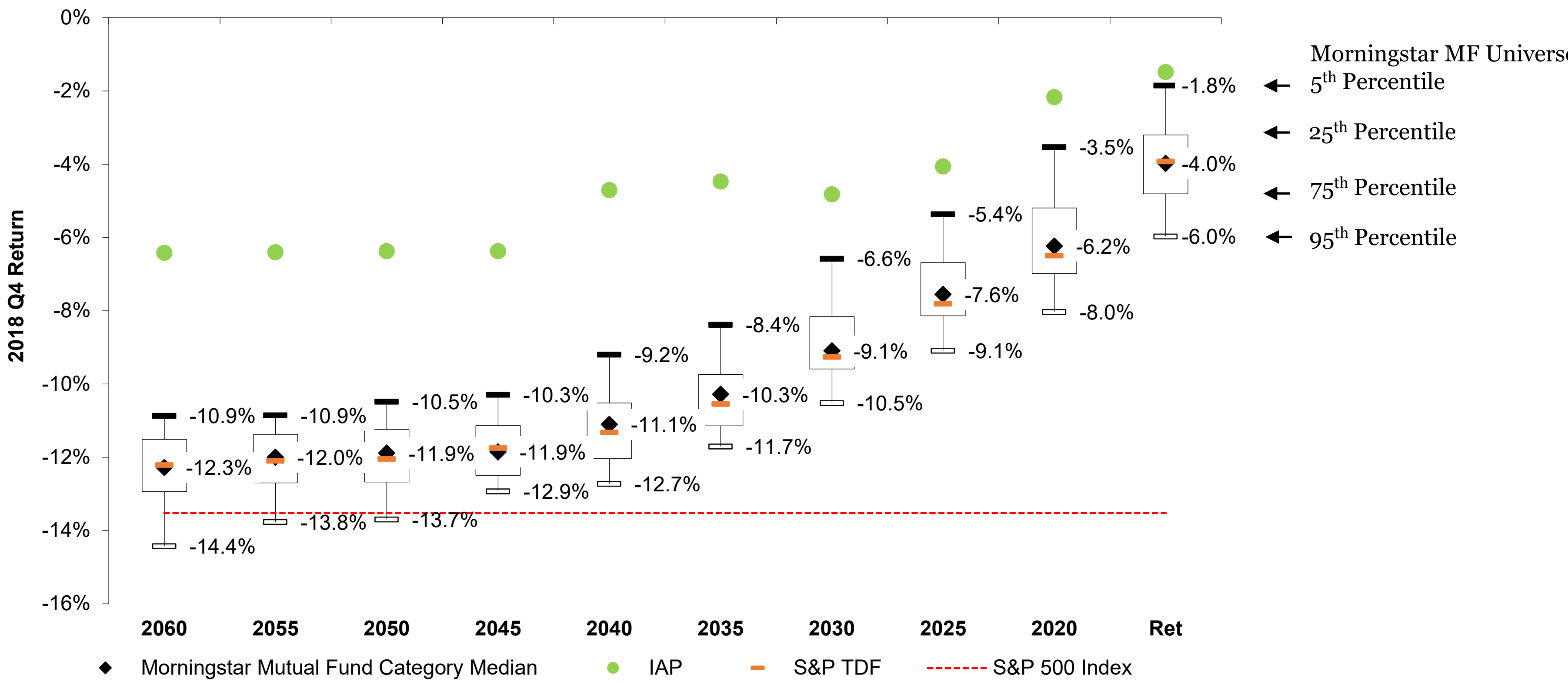
IAP Delivered Top Quartile Performance During the First Three Quarters Among Mutual Fund Universe



As of December 31, 2018
Source: State Street; Morningstar; S&P.

OREGON STATE TREASURY

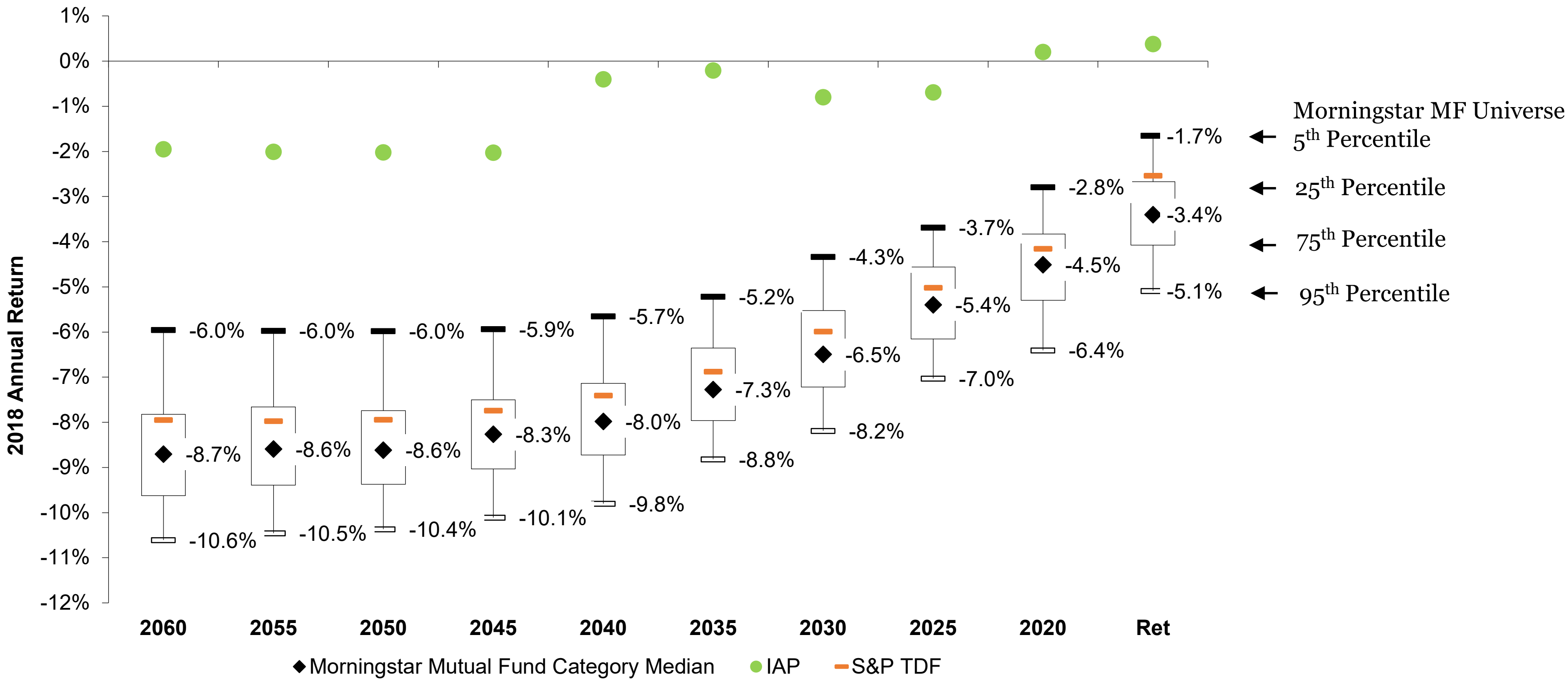
IAP Outperformed Peer Mutual Fund Universe During 4th Quarter Sharp Equity Sell-Off



As of December 31, 2018
Source: State Street; Morningstar; S&P.

OREGON STATE TREASURY

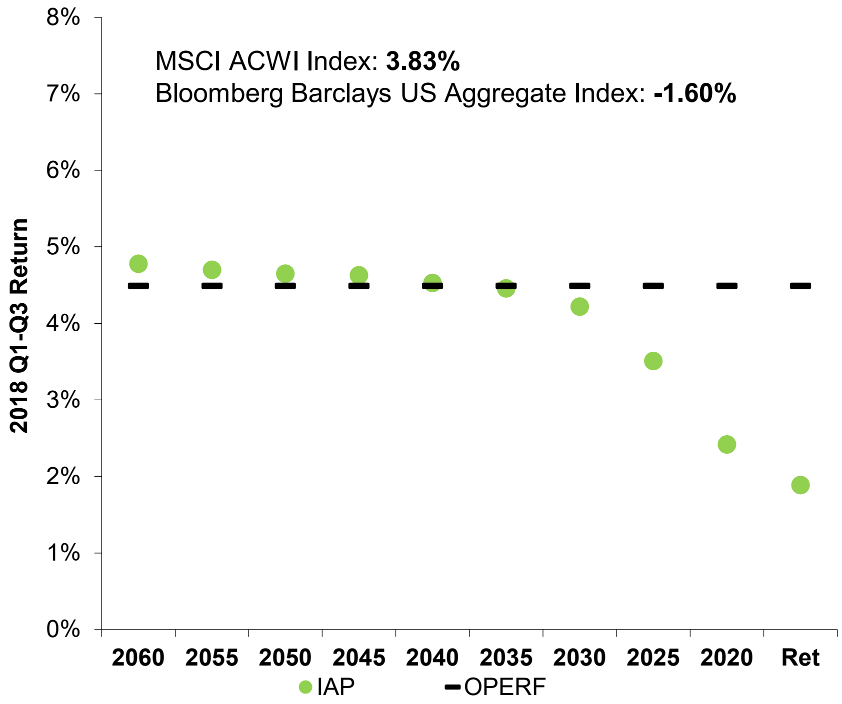
IAP Outperformed Peer Mutual Fund TDF Universe During Calendar Year 2018

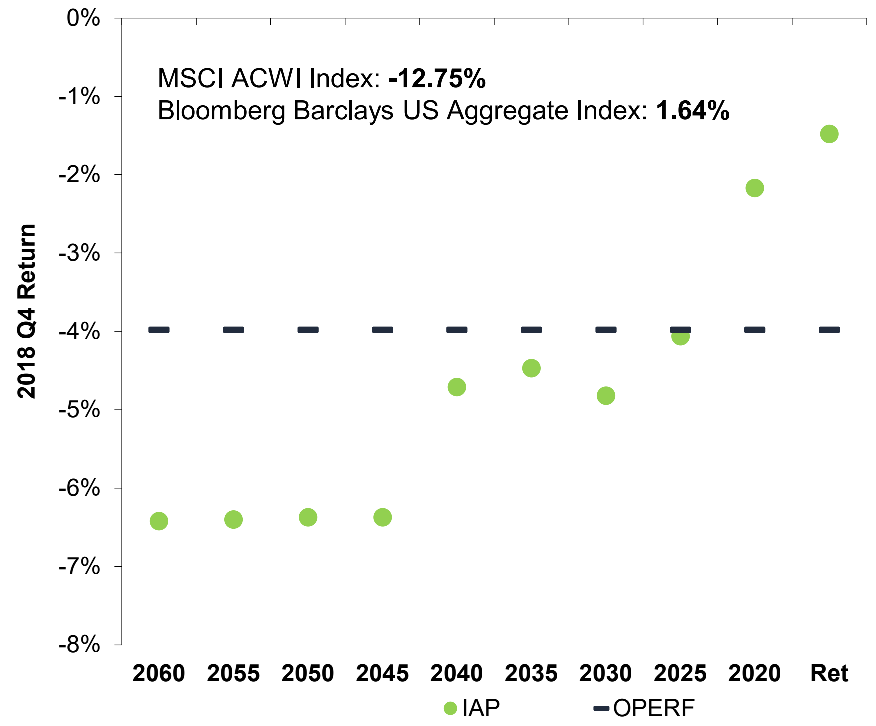


As of December 31, 2018
Source: State Street; Morningstar; S&P.

IAP Performed as Expected Versus OPERF

Higher Return/Risk Profile for Younger Participants
Lower Risk/Return Exposure for Older Participants





Source: State Street.

OREGON STATE TREASURY

IAP Performance Review

Fund	Assets (in $millions)	YTD Return	YTD Custom Benchmark Return	Relative Return
Retirement Fund	693	0.38%	0.90%	(0.52)%
2020 Fund	967	0.20%	0.72%	(0.52)%
2025 Fund	1,447	(0.69)%	(0.12)%	(0.57)%
2030 Fund	1,533	(0.80)%	(0.16)%	(0.64)%
2035 Fund	1,579	(0.21)%	0.57%	(0.78)%
2040 Fund	1,277	(0.40)%	0.48%	(0.88)%
2045 Fund	877	(2.03)%	(1.42)%	(0.61)%
2050 Fund	416	(2.02)%	(1.42)%	(0.60)%
2055 Fund	124	(2.01)%	(1.42)%	(0.59)%
2060 Fund	16	(1.95)%	(1.42)%	(0.53)%
OPERF	**6,759**	**0.33%**	**1.21%**	**(0.88)%**

OREGON STATE TREASURY

As of December 31, 2018
Source: State Street; AB.

IAP TDF Custom Benchmark Definition

The benchmark for each Fund is a customized benchmark that has the same asset allocation as the Fund's target asset allocation and uses index returns to represent performance of the underlying asset classes/components. The benchmark returns were calculated by weighting the monthly index returns of each asset class/component by the Portfolio's monthly target allocation for each asset class/component. Target allocations adjust quarterly in accordance with the Fund's standard glide path.

The Russell 3000® Index is used to represent Domestic Equities, the MSCI ACWI ex USA IMI Index is used to represent International Equities, the Bloomberg Barclays US Aggregate Bond Index is used to represent Core Bonds, the Bloomberg Barclays 1-10 Year Government Inflation-Linked Bond Index is used to represent Treasury Inflation-Protected Securities (TIPS), the Bloomberg Barclays US 1-3 Year Government/Credit Bond Index is used to represent Short-Duration Bonds, and the OPERF Policy Benchmark is used to represent OPERF, which is a fund managed by the Oregon State Treasury and is comprised of public and private equity, fixed income, alternatives and real estate.

The current OPERF Policy Benchmark is comprised of 20% of the Russell 3000® Index + 3%, one quarter lagged, 22.5% of the Oregon Custom Fixed Income Benchmark (comprised of 46% of the Bloomberg Barclays Aggregate Bond Index, 37% of the Bloomberg Barclays Treasury Index, 4% of the ICE BofA ML High Yield Master II Index and 13% of the S&P/LSTA Index), 12.5% of the Oregon Custom Real Estate Benchmark (comprised of NFIODCE Index, one quarter lagged (net of fees)), 40% of the MSCI ACWI IMI Net Index and 5% of the CPI + 4%.

IAP Target-Date Funds Summary

	Year to Date
Beginning Market Value	0
Inflows	$9,180,471,241
Outflows	192,147,359
Gain/Loss	(59,818,919)
Income	0
Ending Market Value	$8,928,504,963

As of December 31, 2018
Source: State Street.

OREGON STATE TREASURY

Agenda

1. Review of IAP program, Implementation and Ongoing Services
2. Demographic Analysis and Glide Path Design Refresher
3. Performance and Benchmark Review
4. Questions

OREGON STATE TREASURY

OREGON
STATE
TREASURY

Tobias Read
Oregon State Treasurer

16290 SW Upper Boones Ferry Road
Tigard, OR 97224

oregon.gov/treasury

INTRODUCTION & OVERVIEW

Summary Policy Statement

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

Purpose and Goals

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

Applicability

Classified represented, management service, unclassified executive service

Authority

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

POLICY PROVISIONS

Definitions

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

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

Glide Path: The asset allocation for a Target-Date Fund that varies based on the number of years to the target retirement date, as proxied by the level of equity (public or private) exposure. Typically, the further away from the target date, the more of the Target-Date Fund's asset allocation will be comprised of more equity risk on the expectation that prudent equity risk is rewarded over the long-term. Conversely, the closer to retirement date, the more the Target-Date Fund's asset allocation will consist of fixed income and/or capital preservation type investments.

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

Policy Statements

The IAP participant pool is comprised of employees at all phases of their working lives. To adapt the IAP to these varied participants, OST staff and the OIC established a set of TDFs available for PERS to assign to each IAP participant (collectively, such TDFs are referred to as the "IAP Funds"). IAP participants approaching retirement are assigned to less-risky IAP Funds, while younger IAP participants are assigned to riskier IAP Funds with a longer time horizon and greater return potential. The objective is to make IAP Funds appropriate for the broad and diverse population of IAP participants. Participants seeking further retirement planning customization are expected to make arrangements outside of the IAP, such as utilization of the Oregon Savings Growth Plan which is accessible to many participants.

1. **Target-Date Fund Manager.** The Target-Date Fund Manager (the "Manager") works under a contract with the OIC (the "Management Agreement"), and assists OST staff ("Staff") in implementing and monitoring the IAP. The OIC may delegate authority for policy implementation to the State Treasurer and OST's Chief Investment Officer.
2. **Asset Allocation for the IAP Funds.** Working with Staff, the Manager developed a Glide Path for the IAP Funds, which includes the Oregon Public Employees Retirement Fund and capital market investment vehicles. To the extent that PERS can provide readily available data, the Glide Path is customized, and will be adjusted over time, to the demographic profile and circumstances of the IAP participant pool. Factors that influence this customization process include access to a defined benefit retirement plan or social security.
3. **General Oversight of Target-Date Fund Manager and the IAP Funds.** All performance calculations shall be provided by an independent third party, such as the custodian or recordkeeper. Staff shall review each Manager, IAP Funds, and IAP and report to the OIC every two years, or more frequently as needed.
4. **Termination of Target-Date Fund Manager.** The OIC, in its discretion, may terminate "at will" according to the terms of the Management Agreement. Staff shall evaluate the Manager on several attributes, including contract compliance, adherence to IAP objectives and fund volatility and performance. If Staff believes after diligent analysis that the Manager has not met IAP standards on one or more attributes, Staff may recommend to the OIC termination of such Manager and the concurrent selection of a new manager.
5. **IAP fund that invests solely in the Oregon Short Term Fund**. The OIC directs Staff to maintain a fund that invests only in the Oregon Short Term Fund. The purpose of this option is to offer a low-risk investment vehicle available for IAP participants.

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

None

ADMINISTRATION

Review

Annually

Feedback

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

INV 218: IAP

INTRODUCTION & OVERVIEW

Summary Policy Statement

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

Purpose and Goals

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

Applicability

Classified represented, management service, unclassified executive service

Authority

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

POLICY PROVISIONS

Definitions

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

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

Glide Path: ~~A predefined~~The asset allocation for a Target-Date Fund that varies based on the number of years to the target retirement date, as proxied by the level of equity (public or private) exposure. Typically, the further away from the target date, the more of the Target-Date Fund's asset allocation will be comprised of more equity risk on the expectation that prudent equity risk is rewarded over the long-term. Conversely, the closer to retirement date, the more the Target-Date Fund’s asset allocation will consist of fixed income and/or capital preservation type investments.

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

Policy Statements

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

1. ~~**Selection of**~~ **Target-Date Fund Manager.** The~~ selection of a~~ Target-Date Fund Manager (the "Manager") ~~is the decision of~~works under a contract with the OIC~~,~~ (the “Management Agreement”), and ~~is made subject to the research and recommendations of~~assists OST staff~~. Consultants may be used to assist~~ ("Staff") in ~~evaluating prospective managers, but the OIC will retain authority over the decision~~implementing and monitoring the IAP. The OIC may delegate authority for policy implementation to the State Treasurer and OST's Chief Investment Officer.
2. **Asset Allocation for the IAP Funds.** Working with ~~staff~~Staff, the Manager ~~will recommend to the Council~~developed a ~~glide path~~Glide Path for the IAP Funds, which ~~would include~~ includes the Oregon Public Employees Retirement Fund ~~(OPERF),~~and capital market investment vehicles~~, or a combination thereof.~~. To the extent that PERS ~~could~~can provide readily available data, the ~~glide path will be~~ Glide Path is customized, and will be adjusted over time, to the demographic profile and circumstances of the ~~pool of IAP participants, such as~~ IAP participant pool. Factors that influence this customization process include access to a ~~Defined Benefit Retirement Plan or Social Security~~defined benefit retirement plan or social security.
3. **General Oversight of Target-Date Fund Manager and the IAP Funds.** All performance calculations shall be provided by an independent third party, such as the custodian or recordkeeper. Staff shall review ~~the~~each Manager, ~~the~~ IAP Funds, and IAP and report to the ~~Council no less~~OIC every two years, or more frequently ~~than every other year~~as needed.
4. **Termination of Target-Date Fund Manager.** ~~Termination is the decision of the~~ The OIC~~ and the Council~~, in its discretion, may terminate "at will" according to the terms of the ~~contractual relationship~~Management Agreement. Staff shall evaluate the Manager on several attributes, including contract compliance, adherence to ~~Program~~IAP objectives and fund volatility and performance. If ~~staff~~Staff believes after diligent analysis that the Manager has not met ~~Program~~IAP standards on one or more attributes, ~~staff~~Staff may recommend to the ~~Council~~OIC termination of ~~the existing manager~~such Manager and the concurrent selection of a new manager.
5. ~~**Establishment of an**~~ **IAP ~~Fund~~fund that invests solely in the Oregon Short Term Fund**. The ~~Council~~OIC directs ~~staff~~Staff to ~~establish~~maintain a fund that invests only in the Oregon Short Term Fund~~ (OSTF).~~. The purpose of this option is to offer a low-risk investment vehicle available for IAP participants.

Exceptions

None

Failure to Comply

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

PROCEDURES and FORMS

None

ADMINISTRATION

Review

Annually

Feedback

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

TAB 5 – Q4 2018 Performance & Risk Report

OPERF

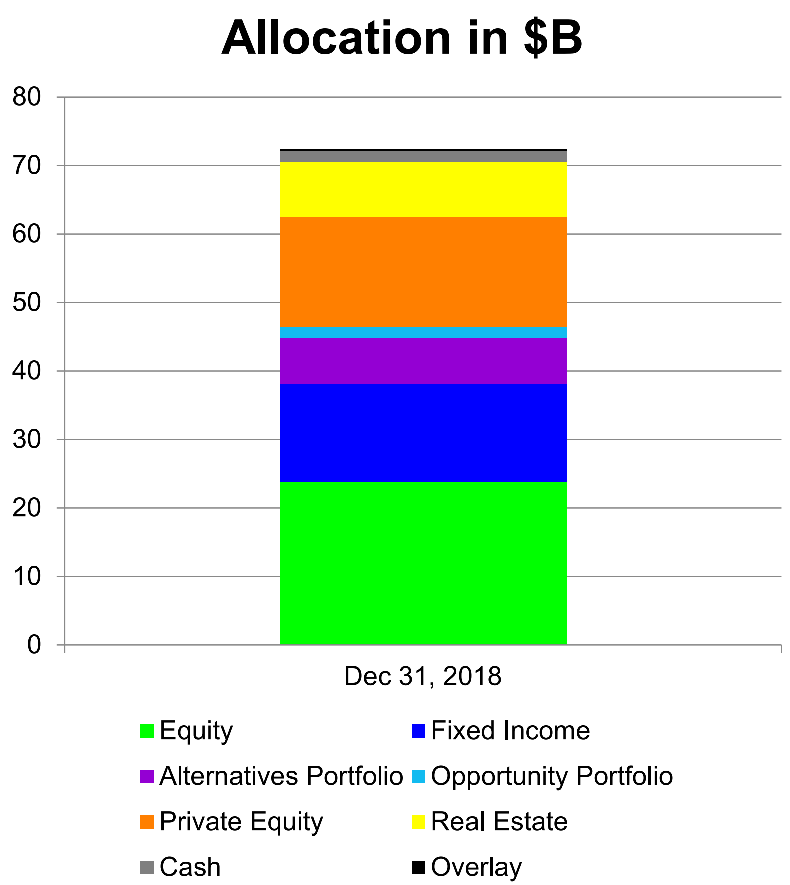
March 13, 2019

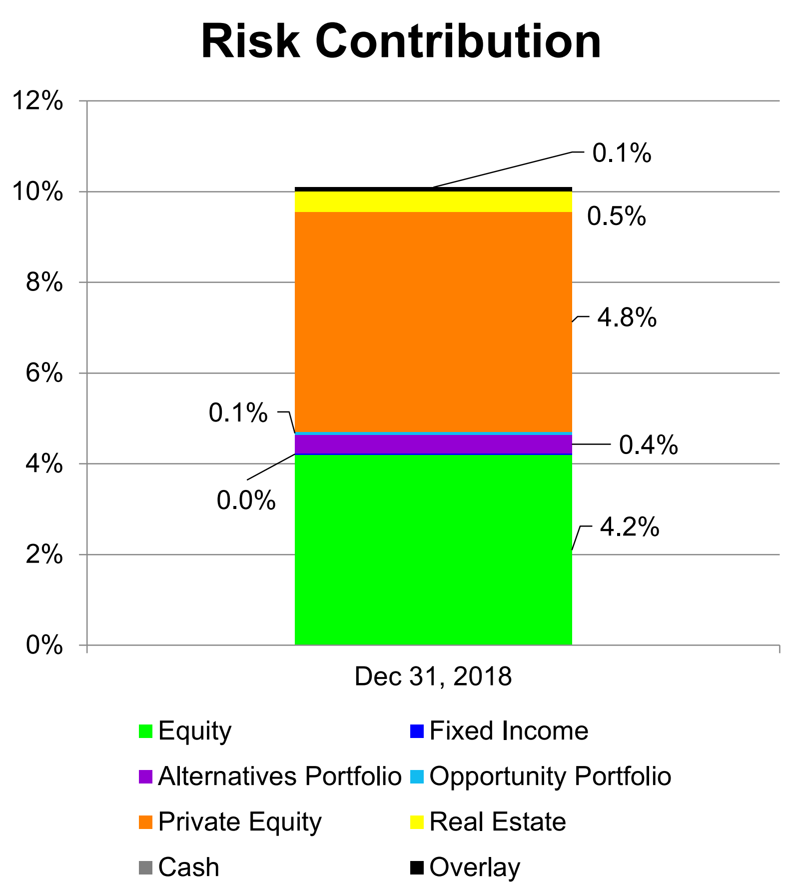
OPERF Risk Dashboard

2018 Q4

OREGON
STATE
TREASURY

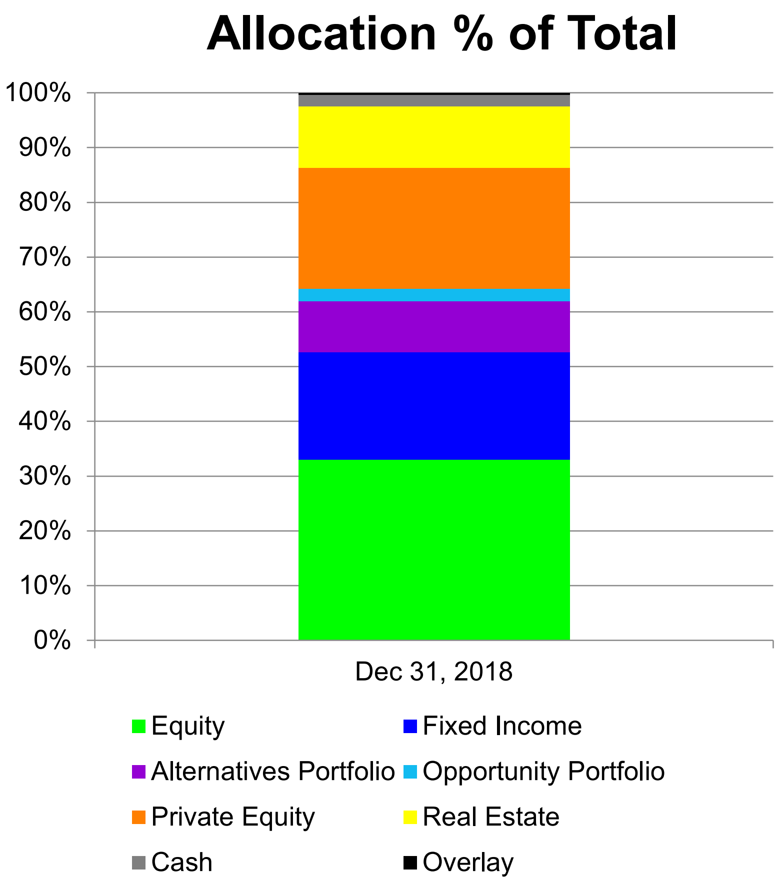
Allocation & Risk Contribution by Asset Class

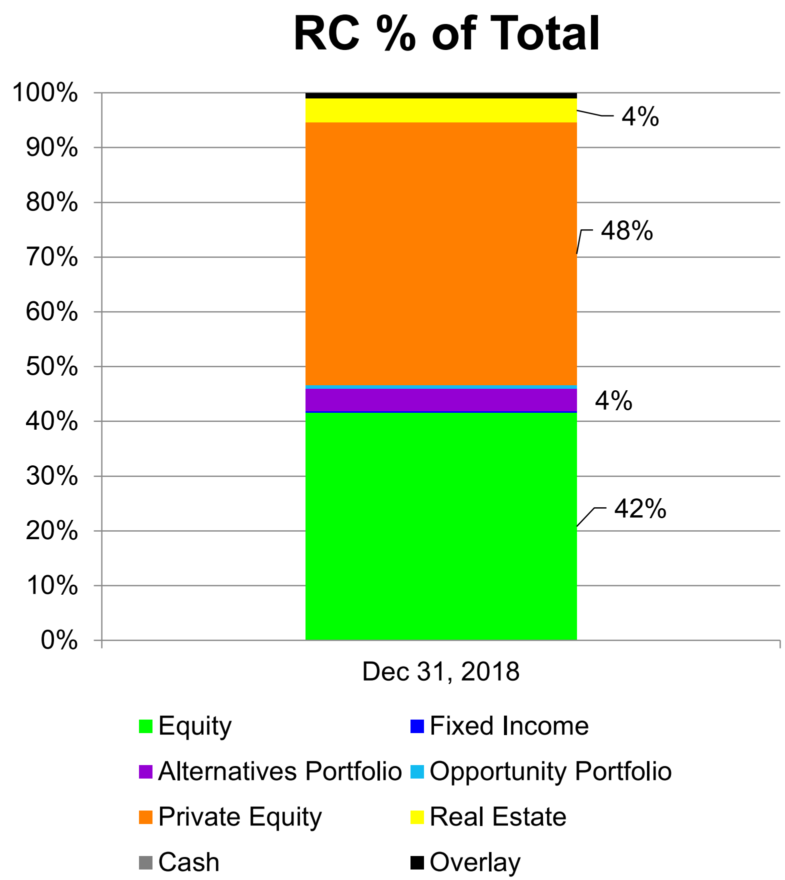




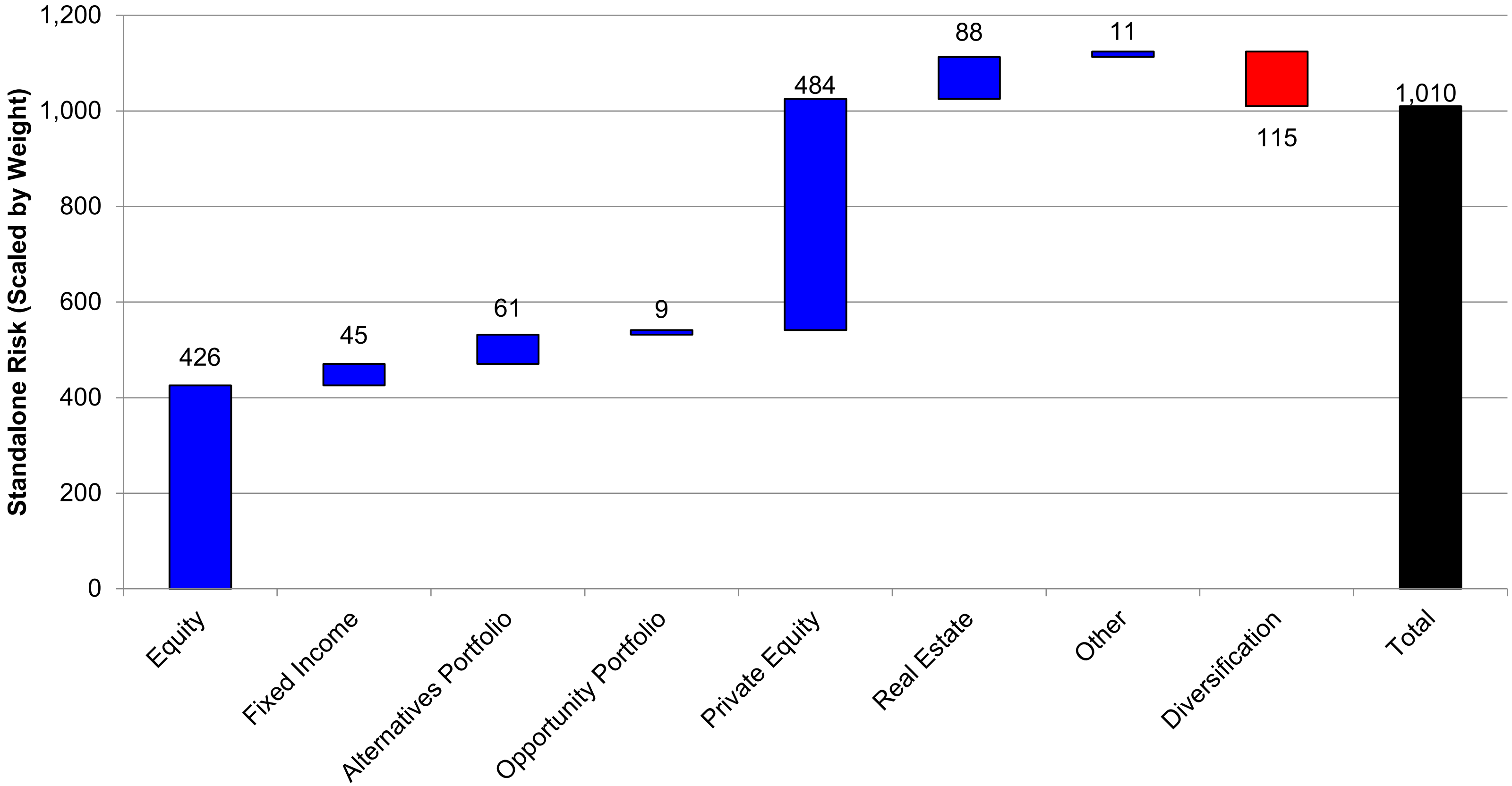
OREGON STATE TREASURY

Allocation & Risk Contribution by Asset Class



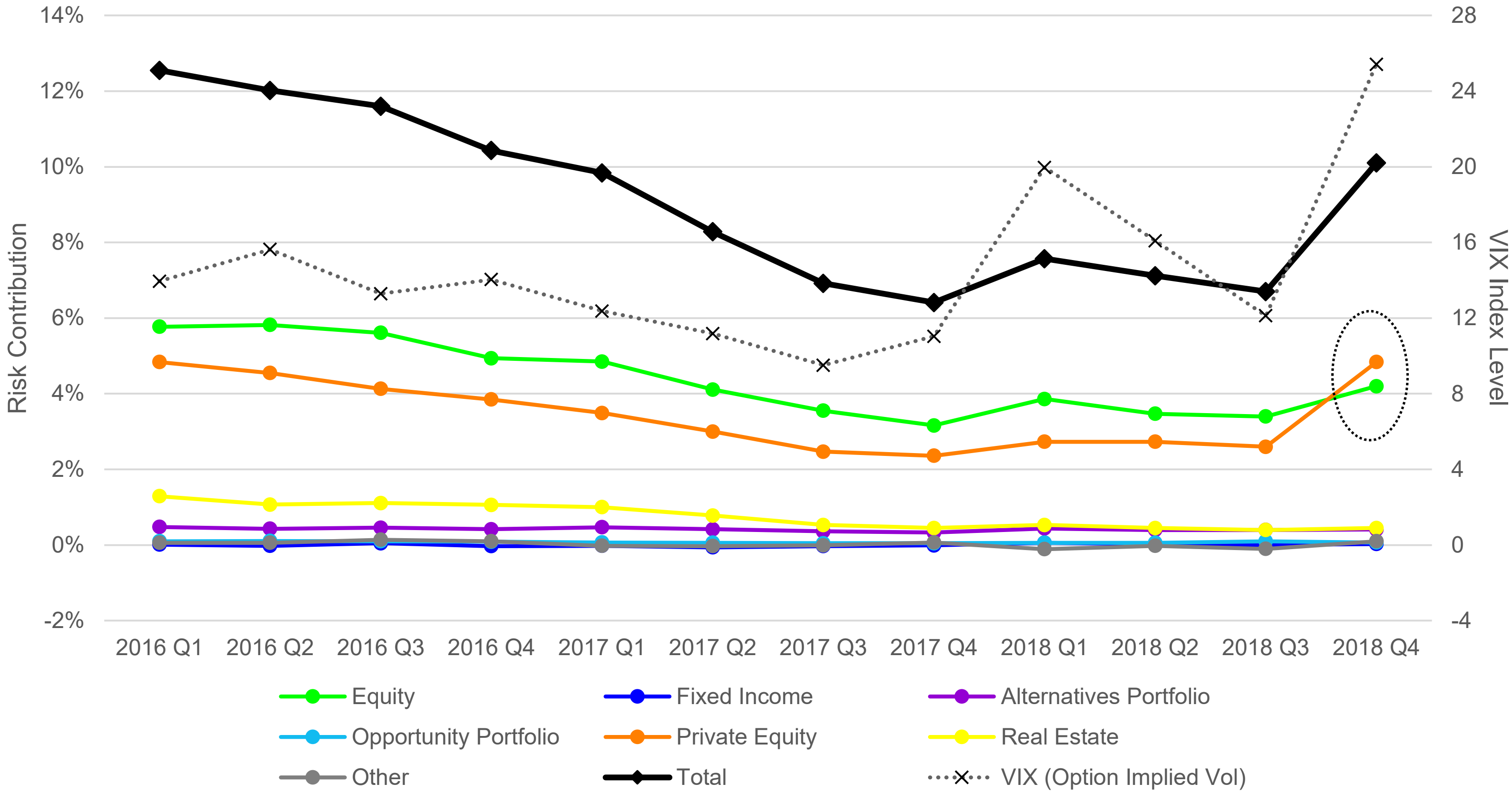


Stand-alone Risk by Asset Class



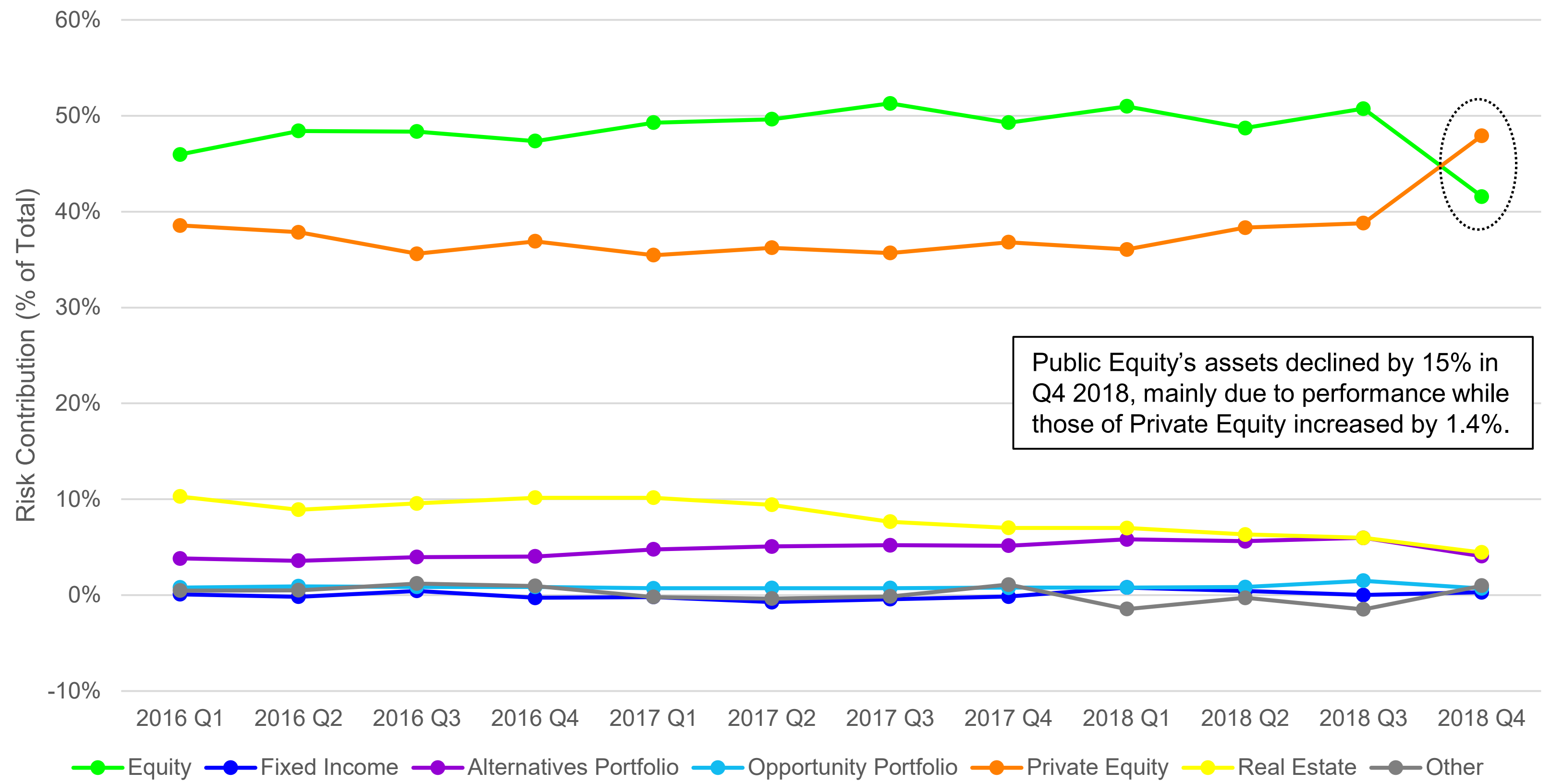
OREGON STATE TREASURY

12-Quarter Risk Contribution Time Series



OREGON STATE TREASURY

12-Quarter Risk Contribution Time Series



OREGON STATE TREASURY

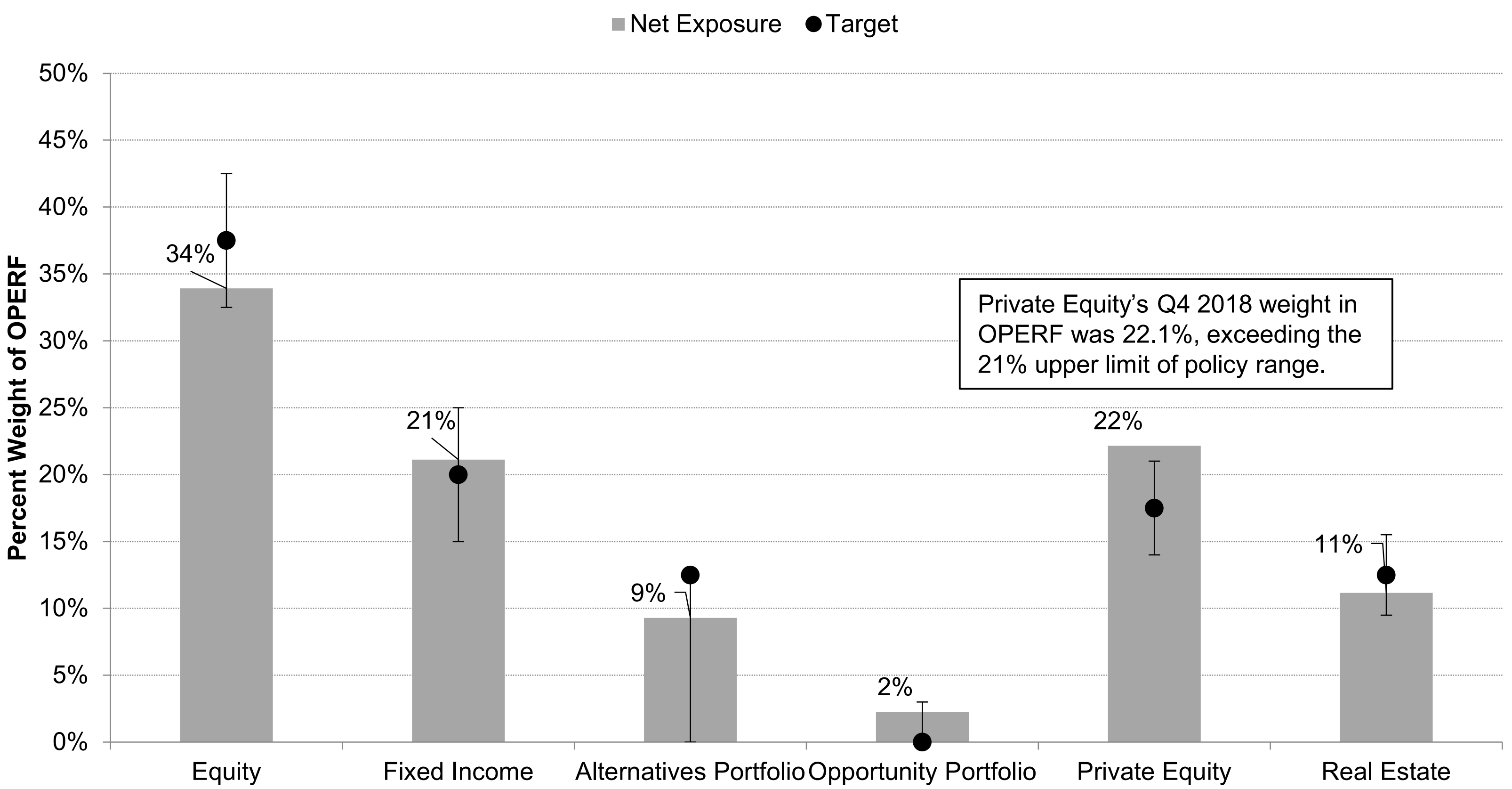
Correlation Matrix by Asset Class

Expected Return	Expected Risk	Predicted Risk[1]	Dec 31, 2018	Equity	Fixed Income	Alternatives Portfolio	Opportunity Portfolio	Private Equity	Real Estate	**OPERF**
7.1%	19.5%	13.0%	Equity	1.00	-0.02	0.59	0.68	0.96	0.40	**0.98**
3.0%	3.8%	2.2%	Fixed Income		1.00	0.20	0.05	-0.01	0.26	**0.07**
6.8%	10.6%	6.4%	Alternatives Portfolio			1.00	0.65	0.58	0.41	**0.65**
		4.1%	Opportunity Portfolio				1.00	0.69	0.30	**0.71**
9.5%	26.3%	22.2%	Private Equity					1.00	0.41	**0.98**
6.6%	15.0%	8.0%	Real Estate						1.00	**0.50**
7.1%	**14.1%**	**10.1%**	**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	1,812					
Public Equity	21,081	*1,733*	*537*	*537*		
Fixed Income	11,813	*2,415*				
Private Equity				16,038	-10,999	
Real Estate	*569*			7,564	-2,239	
Alternatives	1,056	916	1,019	3,690	-3,379	
Opportunity	361		227	1,049	-597	
Proj PERS Cash Flow						-3,600
Total	36,692	5,063	1,784	28,877	-17,213	-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	12,807	17.2%	Cash, Fixed Income, Public Equity
2	Dimensional Fund Advisors	4,060	5.5%	Public Equity
3	AQR	3,212	4.3%	Alternatives, Public Equity
4	KKR	3,037	4.1%	Fixed Income, Private Equity
5	Arrowstreet Capital	2,663	3.6%	Public Equity
6	AllianceBernstein	2,334	3.1%	Fixed Income, Public Equity
7	BlackRock	2,109	2.8%	Alternatives, Fixed Income
8	Lazard	1,876	2.5%	Public Equity
9	Western Asset Management Co	1,689	2.3%	Fixed Income
10	Wellington	1,672	2.2%	Fixed Income

OREGON
STATE
TREASURY

Tobias Read
Oregon State Treasurer

350 Winter St NE, Suite 100
Salem, OR 97301-3896

oregon.gov/treasury

Callan

March 13, 2019

Oregon Investment Council

Fourth Quarter 2018
Performance Review

Volatility Spikes Returns in 2018

Is this our return to normal?

Three sharp declines during 2018

– Full corrections (10% decline) in February and December

– Near-correction (8% drop) in March

U.S. equity market suffered 5% loss for the year

– Developed markets fell 14%

– Emerging dropped over 18%.

The Fed raised rates four times in 2018, and signaled two more hikes in 2019

Wage pressures are building as the unemployment rate stays below 4%

However, CPI fell back below 2% year-over-year in December

– Higher rates threatened earlier in the year

– Falling oil prices alters the outlook for inflation

Returns for Periods ended December 31, 2018

	1 Quarter	1 Year	5 Years	10 Years	25 Years
U.S. Equity					
Russell 3000	-14.30	-5.24	7.91	13.18	9.04
S&P 500	-13.52	-4.38	8.49	13.12	9.07
Russell 2000	-20.20	-11.01	4.41	11.97	8.28
Non-U.S. Equity					
MSCI World ex USA	-12.78	-14.09	0.34	6.24	4.76
MSCI Emerging Markets	-7.46	-14.57	1.65	8.02	--
MSCI ACWI ex USA Small Cap	-14.43	-18.20	1.96	10.02	--
Fixed Income					
Bloomberg Barclays Aggregate	1.64	0.01	2.52	3.48	5.09
3-Month T-Bill	0.56	1.87	0.63	0.37	2.55
Bloomberg Barclays Long Gov/Credit	0.78	-4.68	5.37	5.88	6.82
Bloomberg Barclays Global Agg ex-US	0.91	-2.15	-0.01	1.73	4.39
Real Estate					
NCREIF Property	1.37	6.72	9.33	7.49	9.34
FTSE NAREIT Equity	-6.32	-4.62	7.90	12.12	9.76
Alternatives					
CS Hedge Fund	-4.30	-3.19	1.66	5.10	7.27
Cambridge Private Equity*	3.37	16.77	13.77	11.62	15.46
Bloomberg Commodity	-9.41	-11.25	-8.80	-3.78	2.03
Gold Spot Price	7.11	-2.14	1.28	3.78	4.85
Inflation - CPI-U	-0.48	1.91	1.51	1.80	2.20

*Cambridge PE data are available through September 30, 2018.

Source: Callan LLC

Risk Themes As We Start 2019

Climbing a Wall of Worry

Current expansion is growing long in the tooth; has a downturn begun, should something be done about it?

Urge to engage in market timing is very great: long-term benefit to higher equity but investors (and Callan) are nervous about ramping up right now.

- Competing fears: equity market downturn vs. fear of missing out (FOMO!)
- Refine definition of growth to include high yield, convertibles, low volatility equity, hedge funds, MACs, and option based strategies – tamp down risk within the growth allocation
- Diversify cap-weighted equity with factor strategies
- Conservative equity
- Reduce equity allocation
- Examine explicit risk mitigation strategies – hedges or diversifiers?

Litany of macro investing concerns raising anxiety:

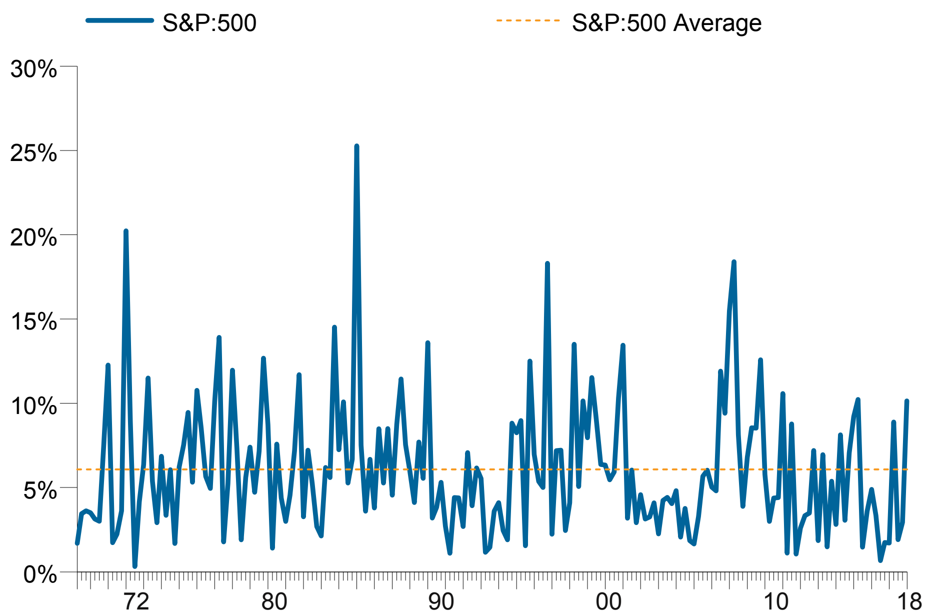
- Trade wars
- Oil price collapse
- Weaker GDP cycle going forward
- Inverted yield curve
- Emerging markets underperformance
- Value underperformance
- Equity concentration risk
- When does China become an asset class?

Preparing for return to “normal” market volatility?

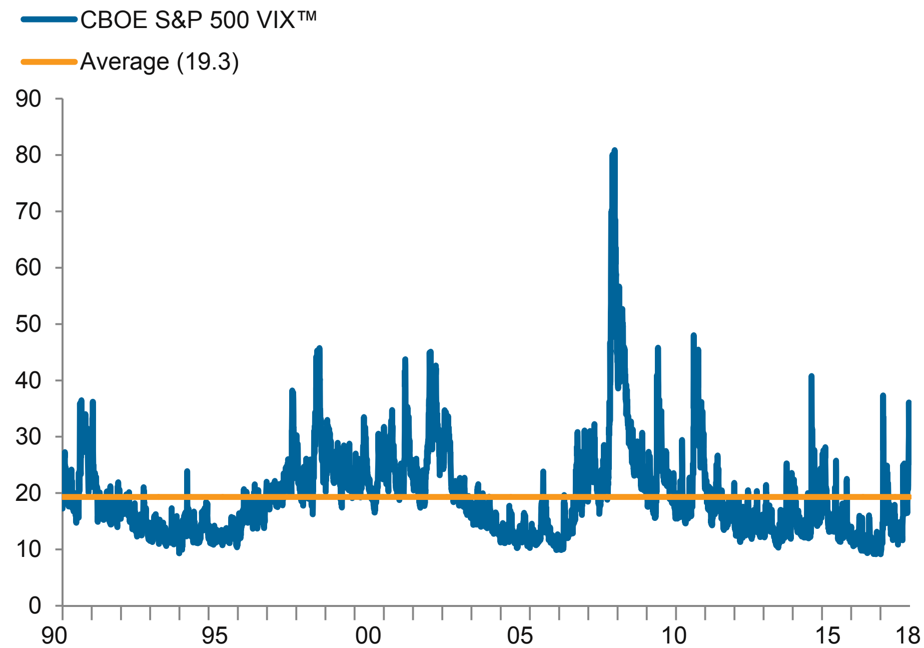
Market Volatility—Realized and Implied

S&P 500 Index

Standard Deviation for S&P 500



CBOE VIX™



The VIX, measuring the implied volatility of S&P 500 Index options, spiked 116% on Feb 5 when the market sank 4%, marking the biggest jump ever recorded—albeit from historically low levels.

– Volatility remained elevated through March and April, then fell below the long-term average of 19.3 until October, when fear returned

Fourth quarter 2018 volatility was exacerbated by concerns about trade, slowing global growth, earnings after a peak, and generalized anxiety.

– US economic data continued to come in strong in spite of concerns

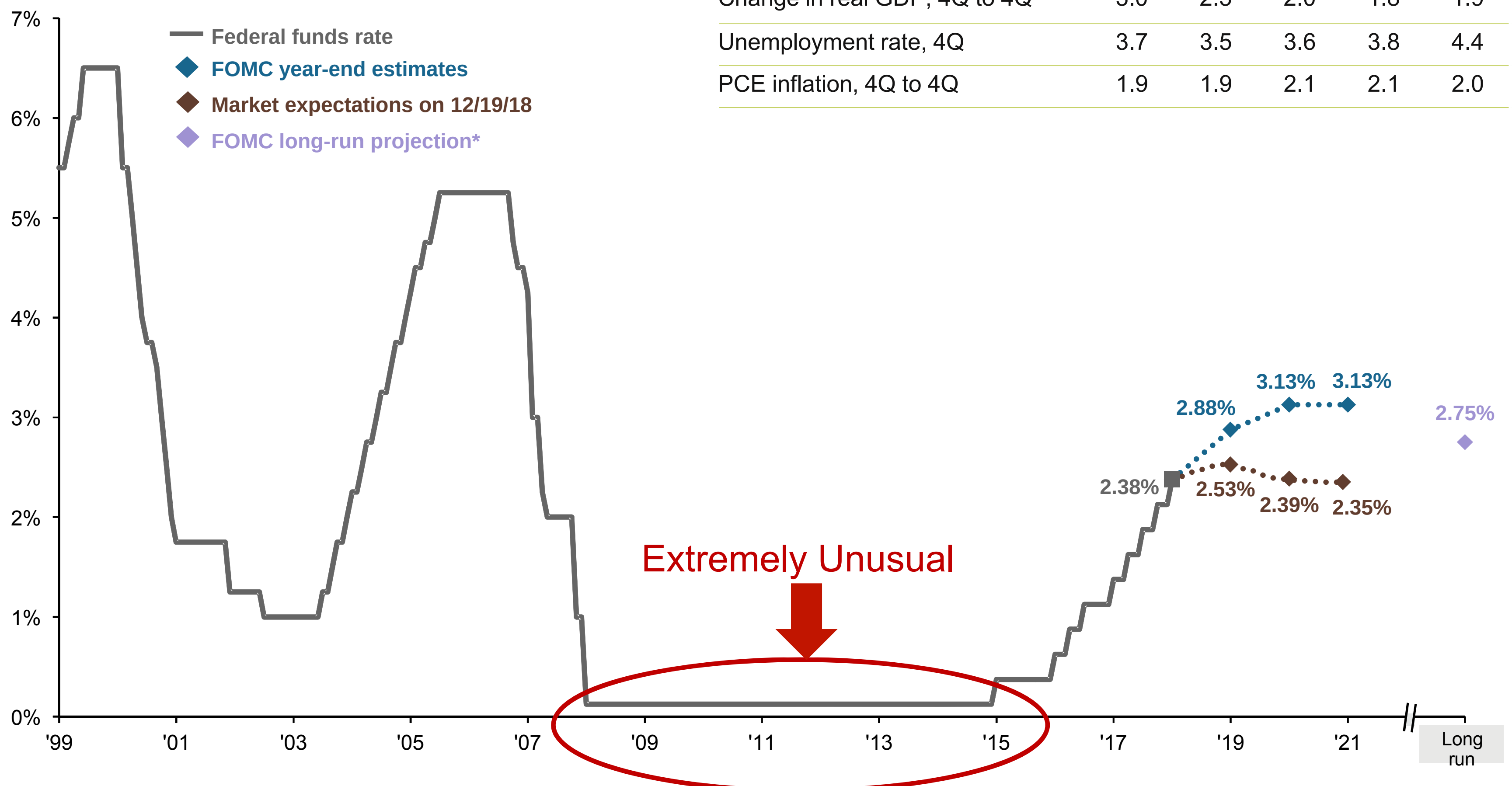
Source: Standard & Poor's, CBOE, Callan LLC

Unprecedented Policy Response Is Finally Over

Fed moved toward normalization with four rate hikes in 2018; two more still projected for 2019

Federal funds rate expectations

FOMC and market expectations for the fed funds rate



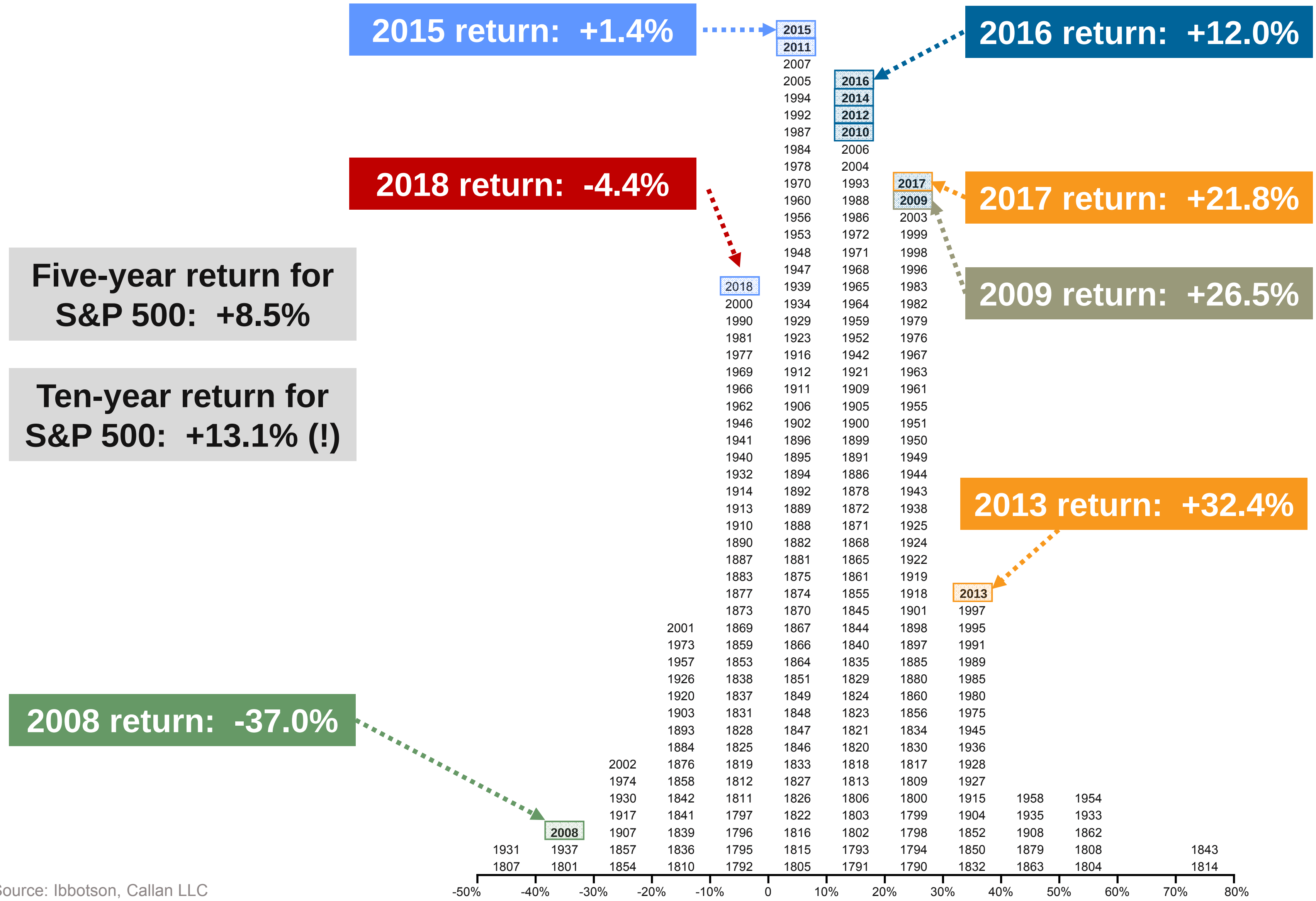
FOMC December 2018 forecasts (percent)

	2018	2019	2020	2021	Long run
Change in real GDP, 4Q to 4Q	3.0	2.3	2.0	1.8	1.9
Unemployment rate, 4Q	3.7	3.5	3.6	3.8	4.4
PCE inflation, 4Q to 4Q	1.9	1.9	2.1	2.1	2.0

Source: Bloomberg, FactSet, Federal Reserve, J.P. Morgan Asset Management.
Market expectations are the federal funds rates priced into the fed futures market as of the date of the December 2018 FOMC meeting and are through November 2021. *Long-run projections are the rates of growth, unemployment and inflation to which a policymaker expects the economy to converge over the next five to six years in absence of further shocks and under appropriate monetary policy.
Guide to the Markets – U.S. Data are as of December 31, 2018.

Stock Market Returns by Calendar Year

2018 Performance in Perspective: History of the U.S. Stock Market (230 Years of Returns)



Source: Ibbotson, Callan LLC

Diversification Remains Key Risk Control Over The Long Run

Periodic Table of Investment Returns 1999-2018

1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Non-U.S. Equity 27.92%	Real Estate 13.84%	U.S. Fixed Income 8.43%	Non-U.S. Fixed Income 22.37%	Emerging Market Equity 55.82%	Real Estate 37.96%	Emerging Market Equity 34.00%	Real Estate 42.12%	Emerging Market Equity 39.38%	U.S. Fixed Income 5.24%
Small Cap Equity 21.26%	U.S. Fixed Income 11.63%	High Yield 5.28%	U.S. Fixed Income 10.26%	Small Cap Equity 47.25%	Emerging Market Equity 25.55%	Real Estate 15.35%	Emerging Market Equity 32.17%	Non-U.S. Equity 12.44%	Non-U.S. Fixed Income 4.39%
Large Cap Equity 21.04%	Cash Equivalent 6.18%	Cash Equivalent 4.42%	Real Estate 2.82%	Real Estate 40.69%	Non-U.S. Equity 20.38%	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 8.87%	Small Cap Equity -3.02%	Small Cap Equity 2.49%	Cash Equivalent 1.78%	Non-U.S. Equity 39.42%	Small Cap Equity 18.33%	Large Cap Equity 4.91%	Small Cap Equity 18.37%	U.S. Fixed Income 6.97%	High Yield -26.16%
Cash Equivalent 4.85%	Non-U.S. Fixed Income -3.91%	Emerging Market Equity -2.61%	High Yield -1.37%	High Yield 28.97%	Non-U.S. Fixed Income 12.54%	Small Cap Equity 4.55%	Large Cap Equity 15.79%	Large Cap Equity 5.49%	Small Cap Equity -33.79%
High Yield 2.39%	High Yield -5.86%	Non-U.S. Fixed Income -3.75%	Emerging Market Equity -6.16%	Large Cap Equity 28.68%	High Yield 11.13%	Cash Equivalent 3.07%	High Yield 11.85%	Cash Equivalent 5.00%	Large Cap Equity -37.00%
U.S. Fixed Income -0.83%	Large Cap Equity -9.11%	Real Estate -3.81%	Non-U.S. Equity -15.80%	Non-U.S. Fixed Income 19.36%	Large Cap Equity 10.88%	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 -8.83%	Non-U.S. Equity -13.37%	Large Cap Equity -11.89%	Small Cap Equity -20.48%	U.S. Fixed Income 4.10%	U.S. Fixed Income 4.34%	U.S. Fixed Income 2.43%	Cash Equivalent 4.85%	Small Cap Equity -1.57%	Real Estate -48.21%
		Non-U.S. Equity -21.40%	Large Cap Equity -22.10%	Cash Equivalent 1.15%	Cash Equivalent 1.33%	Non-U.S. Fixed Income -8.65%	U.S. Fixed Income 4.33%	Real Estate -7.39%	Emerging Market Equity -53.33%

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
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%
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 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%
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%
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%
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%
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%
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%
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 -14.58%

- 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

Source: Callan LLC, Bloomberg Barclays, FTSE Russell, MSCI, Standard & Poor's

OPERF Total Regular Account

Performance Summary for the Fourth Quarter 2018

Total Fund:

For the quarter ended December 31, 2018, the Total Regular Account fell 3.84% (-3.95% net of fees), lagging the -3.36% return of the Policy Benchmark, and ranked in the 4th percentile of Callan's $10B+ public fund peer group. For the year ended December, the Total Regular Account gained 0.95% (+0.48% net of fees), behind the 1.22% return for the Policy Target, and ranked 1st percentile in Callan's $10B+ public fund peer group. Longer term results exceed the Policy Target and rank in the top decile.

Asset Classes:

- **Total Fixed Income:** The Fixed Income Portfolio added 0.87% (+0.83% net of fees) for the quarter versus a gain of 1.06% for the Custom Fixed Income Benchmark, and ranked in the 29th percentile of Callan's Public Funds $10B+ US Fixed income (Gross) peer group. For the trailing year, the Portfolio rose 0.41% (0.25% net of fees), ahead of the 0.31% return of the benchmark, and ranked in the 7th percentile of the peer group. 10 year results remain well ahead of the benchmark and rank in the top quartile of the peer group.

- **Total Public Equity:** Total Public Equity portfolio slid 13.36% (-13.41% net of fees) for the quarter versus a loss of 13.28% for the MSCI ACWI IMI Net benchmark, and ranked in the 49th percentile of its peer group. For the trailing year, the portfolio dropped 10.17% (-10.47% net of fees), behind the -10.08% return of the benchmark and ranked near the median of the peer group.

  - **U.S. Equity:** The U.S. Equity Portfolio fell 15.44% (-15.45% net of fees) for the quarter, lagging the Russell 3000 Index return of -14.30%, and ranked in the 81st percentile of Callan's Public Fund: $10B+ Domestic Equity (gross) peer group. On a trailing 12 month basis, the Portfolio dropped -7.76% (-7.87% net of fees) versus a return of -5.24% for the benchmark and ranked in the 87th percentile of the peer group. 10 year results slightly lag the benchmark (net) and rank in the 38th percentile of the peer group.

  - **International Equity:** The International Equity Portfolio fell 11.95% (-12.04% net of fees) for the quarter, behind the -11.87% return of the MSCI ACWI ex-U.S. IMI Index, and ranked in the 74th percentile of Callan's Public Fund: $10B+ International Equity (gross) peer group. For the trailing year, the Portfolio returned -14.42% (-14.88% net of fees) on top of the benchmark return of -14.76%, and ranked in the 74th percentile in the peer group. 10 year results remain comfortably ahead of the benchmark (+8.00% net of fees versus +6.97%) and continue to rank in the top quartile of the peer group.

- **Total Real Estate:** The Real Estate Portfolio continues to show competitive absolute results over the last decade with an annualized return of 7.69% net of fees.

- **Opportunity Portfolio:** The Opportunity Portfolio's results over the last ten years continue to be favorable with an annualized return of 11.41% net of fees.

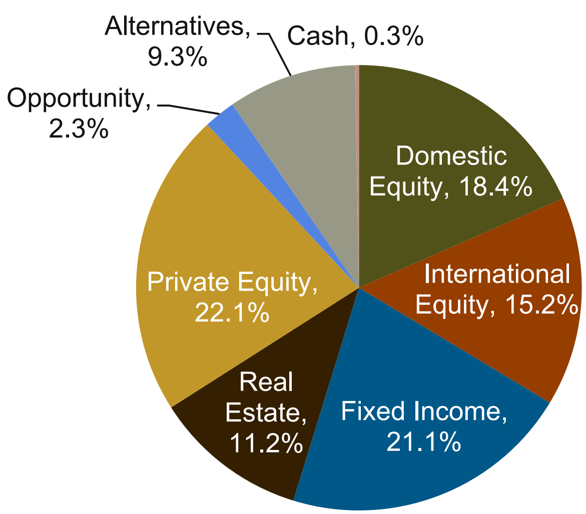
- **Alternative Portfolio:** The Alternative Portfolio has returned 2.40% per annum net of fees over the last five years.

- **Total Private Equity:** The Private Equity Portfolio's returns remain strong with an annualized return of 11.71% net of fees over the last ten years.

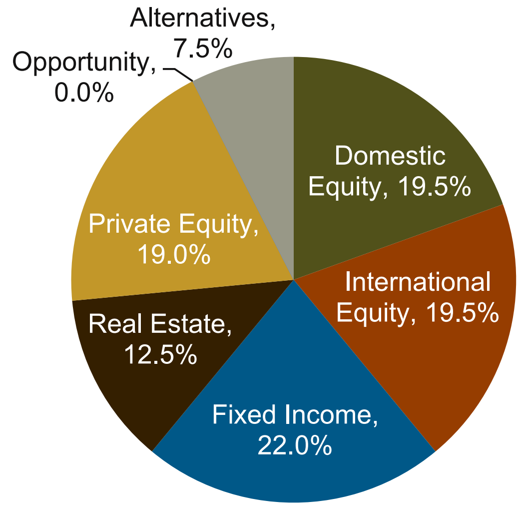
OPERF Total Regular Account

Asset Allocation

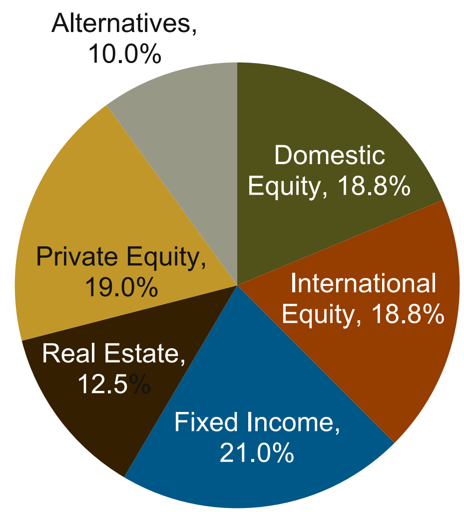
Actual Allocation as of 12/31/2018



Interim Policy Target as of 12/31/2018



Interim Policy Target as of 01/01/219*



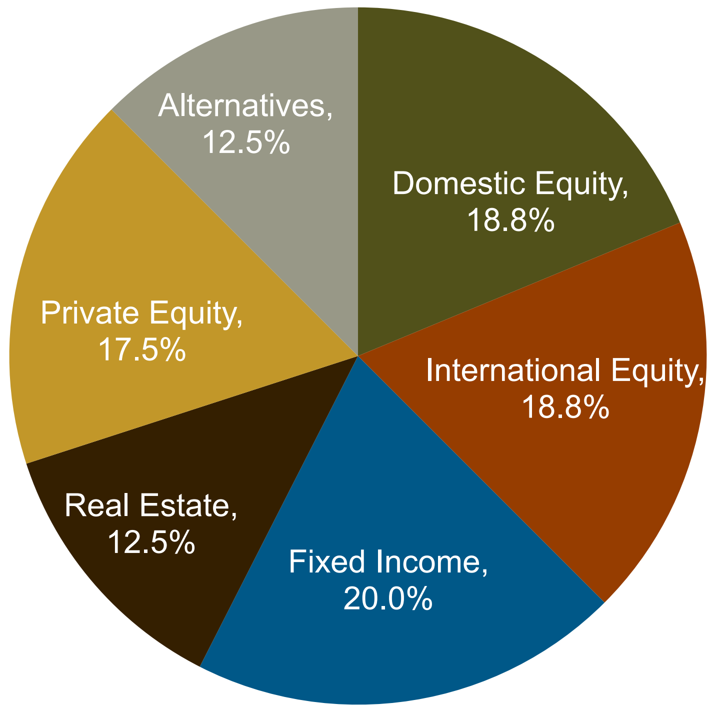
Asset Class	$000s** Actual	Weight Actual	Target	Percent Difference	$000s Difference
Total Fixed Income	15,293,214	21.1%	22.0%	(0.9%)	(647,320)
U.S. Equity Portfolio	13,347,747	18.4%	19.5%	(1.1%)	(781,363)
Non-U.S. Equity Portfolio	11,047,069	15.2%	19.5%	(4.3%)	(3,082,041)
Total Real Estate	8,124,547	11.2%	12.5%	(1.3%)	(932,575)
Opportunity Portfolio	1,637,031	2.3%	0.0%	2.3%	1,637,031
Alternative Portfolio	6,720,344	9.3%	7.5%	1.8%	1,286,071
Total Private Equity	16,037,715	22.1%	19.0%	3.1%	2,270,890
Cash	249,308	0.3%	0.0%	0.3%	249,308
Total	72,456,975	100.0%	100.0%		

*As of January 1, 2019, the Interim Policy Target was changed to 19% Russell 3000+300 Bps quarter lag, 21% Oregon Custom FI Benchmark, 12.5% Oregon Custom Real Estate Benchmark, 37.5% MSCI ACWI IMI Net and 10% CPI+4%.

**Totals provided by OST Staff

OPERF Total Regular Account

Long Term Strategic Policy Target*



*Long term strategic policy target under review as part of April 2019 Asset/Liability Study

OPERF Total Regular Account

Net Cumulative Performance by Asset Class as of December 31, 2018

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years	Last 10 Years
Total Regular Account	**-3.95**	**0.48**	**7.49**	**6.33**	**8.72**	**9.45**
Total Regular Account ex-Overlay	-4.06	0.45	7.34	6.25	8.64	9.25
OPERF Policy Benchmark*	-3.36	1.22	8.44	6.99	9.51	9.37
Total Fixed Income	**0.83**	**0.25**	**2.33**	**2.20**	**3.16**	**6.27**
OPERF Total Custom FI Benchmark	1.06	0.31	2.04	1.86	2.57	3.78
Callan Public Fund $10bn+ U.S. Fixed	0.16	-0.99	3.05	2.97	2.82	4.85
Total Public Equity	**-13.41**	**-10.47**	**6.97**	**4.44**	**9.18**	**10.39**
MSCI ACWI IMI Net	-13.28	-10.08	6.49	4.17	8.44	9.75
U.S. Equity	**-15.45**	**-7.87**	**8.42**	**6.77**	**11.82**	**13.11**
Rusell 3000 Index	-14.30	-5.24	8.97	7.91	12.46	13.18
Callan Large Public > $10bn U.S. Equity	-14.40	-5.71	8.99	7.68	12.14	13.36
Non-U.S. Equity	**-12.04**	**-14.88**	**5.08**	**1.88**	**6.45**	**8.00**
MSCI ACWI ex USA IMI**	-11.87	-14.76	4.39	0.85	5.07	6.97
Callan Large Public >$10bn Non-U.S. Equity	-11.10	-13.29	5.60	1.99	6.13	7.81
Total Real Estate	**0.63**	**8.03**	**8.65**	**9.98**	**10.90**	**7.69**
Total Real Estate ex REITs	1.07	8.87	10.02	10.94	11.59	6.63
OPERF Custom Real Estate Benchmark	1.67	7.50	7.69	9.54	9.95	6.40
Callan Public Plan - Real Estate	1.14	7.23	7.74	9.52	10.10	7.06
Opportunity Portfolio	**-1.34**	**5.85**	**7.46**	**6.64**	**9.42**	**11.41**
Russell 3000 Index	-14.30	-5.24	8.97	7.91	12.46	13.18
CPI + 5%	0.53	6.77	6.98	6.33	6.40	6.80
Total Alternative	**-2.34**	**-2.44**	**4.05**	**2.40**	**2.43**	**--**
CPI + 4%	0.50	5.98	6.11	5.57	5.60	--
Total Private Equity	**4.39**	**18.15**	**13.78**	**12.97**	**13.63**	**11.71**
OIC - Russell 3000 + 300 BPS Qtr Lag	7.90	21.06	20.54	16.83	20.33	15.66

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

OPERF Total Regular Account

Net Calendar Year Performance by Asset Class

	2018	2017	2016	2015	2014
Total Regular Account	**0.48**	**15.39**	**7.11**	**2.01**	**7.29**
Total Regular Account ex-Overlay	0.45	15.38	6.73	2.02	7.28
OPERF Policy Benchmark*	1.22	15.64	8.95	1.57	8.24
Total Fixed Income	**0.25**	**3.70**	**3.06**	**0.54**	**3.52**
OPERF Total Custom FI Benchmark	0.31	3.32	2.52	0.16	3.04
Callan Public Fund $10bn+ U.S. Fixed	-0.99	4.99	5.25	-0.50	6.31
Total Public Equity	**-10.47**	**24.41**	**9.89**	**-1.75**	**3.31**
MSCI ACWI IMI Net	-10.08	23.95	8.36	-2.19	3.84
U.S. Equity	**-7.87**	**20.40**	**14.90**	**-0.87**	**9.85**
Rusell 3000 Index	-5.24	21.13	12.74	0.48	12.56
Callan Large Public > $10bn U.S. Equity	-5.71	20.79	13.66	0.06	11.78
Non-U.S. Equity	**-14.88**	**30.23**	**4.67**	**-2.59**	**-2.88**
MSCI ACWI ex USA IMI**	-14.76	27.81	4.41	-4.60	-3.89
Callan Large Public >$10bn Non-U.S. Equity	-13.29	29.16	5.14	-3.58	-2.81
Total Real Estate	**8.03**	**10.05**	**7.88**	**9.89**	**14.16**
Total Real Estate ex REITs	8.87	11.19	10.01	12.67	12.01
OPERF Custom Real Estate Benchmark	7.50	6.70	8.88	13.48	11.26
Callan Public Plan - Real Estate	7.23	7.75	8.24	11.05	13.46
Opportunity Portfolio	**5.85**	**10.47**	**6.12**	**2.14**	**8.81**
Russell 3000 Index	-5.24	21.13	12.74	0.48	12.56
CPI + 5%	6.77	7.18	6.99	5.39	5.33
Total Alternative	**-2.44**	**8.30**	**6.61**	**-4.32**	**4.44**
CPI + 4%	5.98	6.19	6.16	4.76	4.78
Total Private Equity	**18.15**	**17.32**	**6.26**	**7.79**	**15.90**
OIC - Russell 3000 + 300 BPS Qtr Lag	21.06	22.22	18.37	2.49	21.24

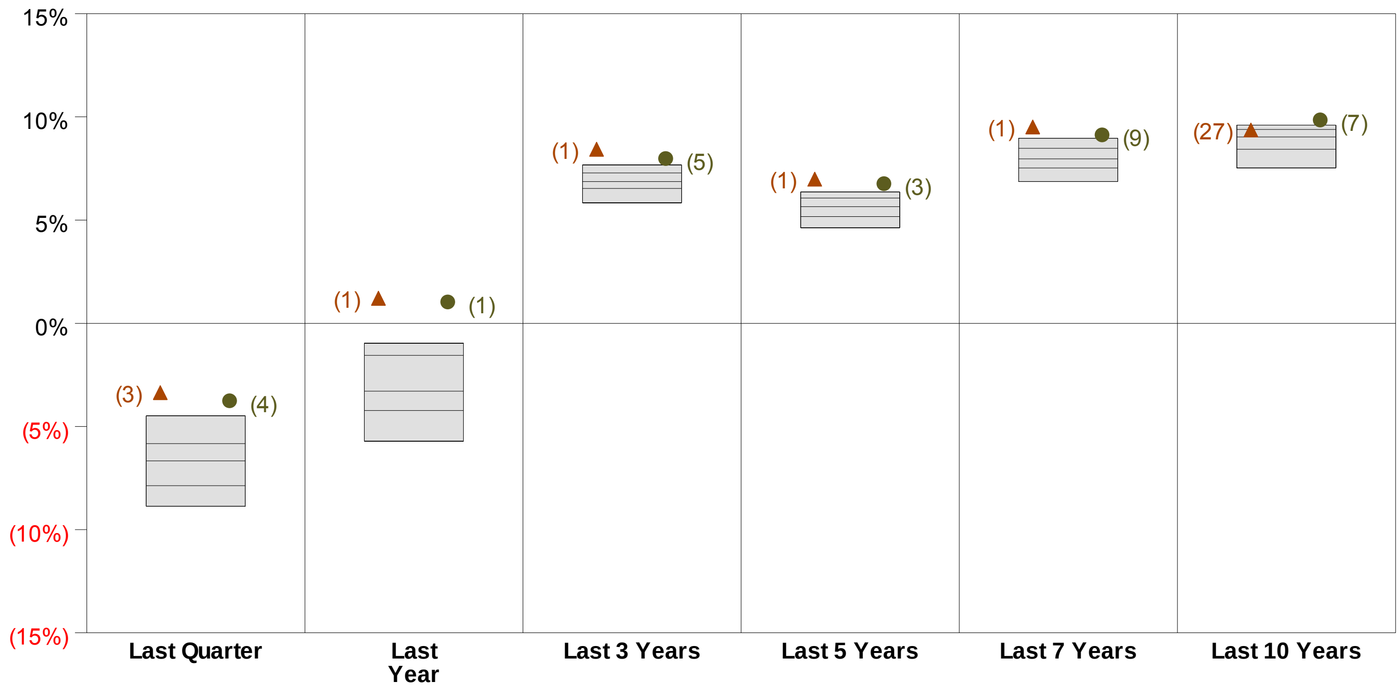
*Policy Benchmark = 22.5% OPERF Total Custom FI Benchmark, 20.0% Russell 3000 Index, 20.0% MSCI ACWI ex US IMI, 20.0% Russell 3000 + 300 bps Qtr Lag, 12.5% Oregon Custom Real Estate Benchmark and 5.0% CPI + 400 bps.

**Non-US Equity Benchmark performance through May 31, 2008, is MSCI ACWI ex US Gross and is linked thereafter with the MSCI ACWI ex-US IMI Net Index.

OPERF Total Regular Account

Gross Performance and Peer Group Rankings* as of December 31, 2018

Performance vs Large Public Funds (>10B) (Gross)



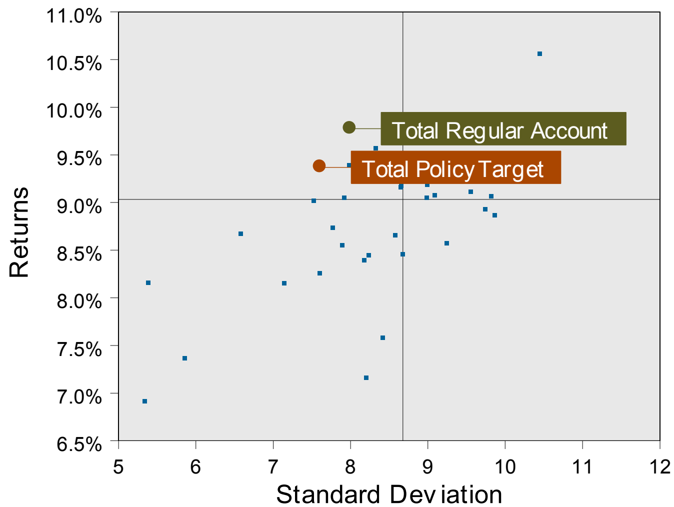
	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years	Last 10 Years
10th Percentile	(4.49)	(0.96)	7.68	6.36	8.97	9.60
25th Percentile	(5.83)	(1.55)	7.29	6.07	8.48	9.40
Median	(6.66)	(3.29)	6.87	5.65	7.97	9.03
75th Percentile	(7.87)	(4.22)	6.53	5.18	7.53	8.44
90th Percentile	(8.86)	(5.72)	5.83	4.62	6.86	7.52
Total Regular Account ●	(3.84)	0.95	7.90	6.68	9.05	9.77
Total Policy Target ▲	(3.36)	1.22	8.44	6.99	9.51	9.37

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

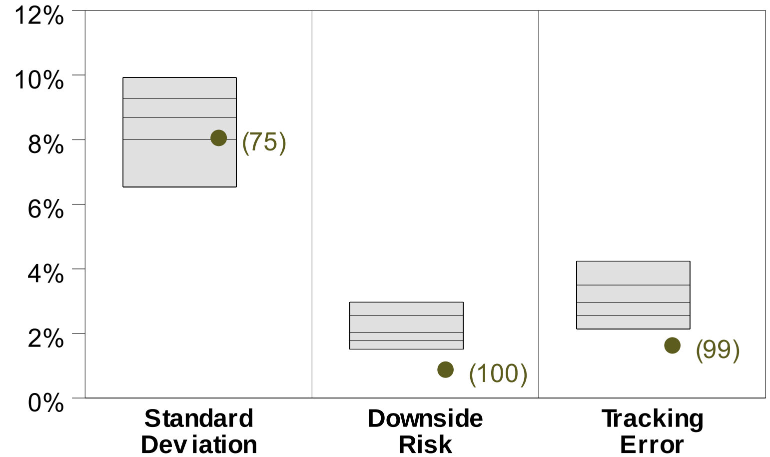
OPERF Total Regular Account

Risk vs Return

Large Public Funds (>10B) (Gross)
Annualized Ten Year Risk vs Return



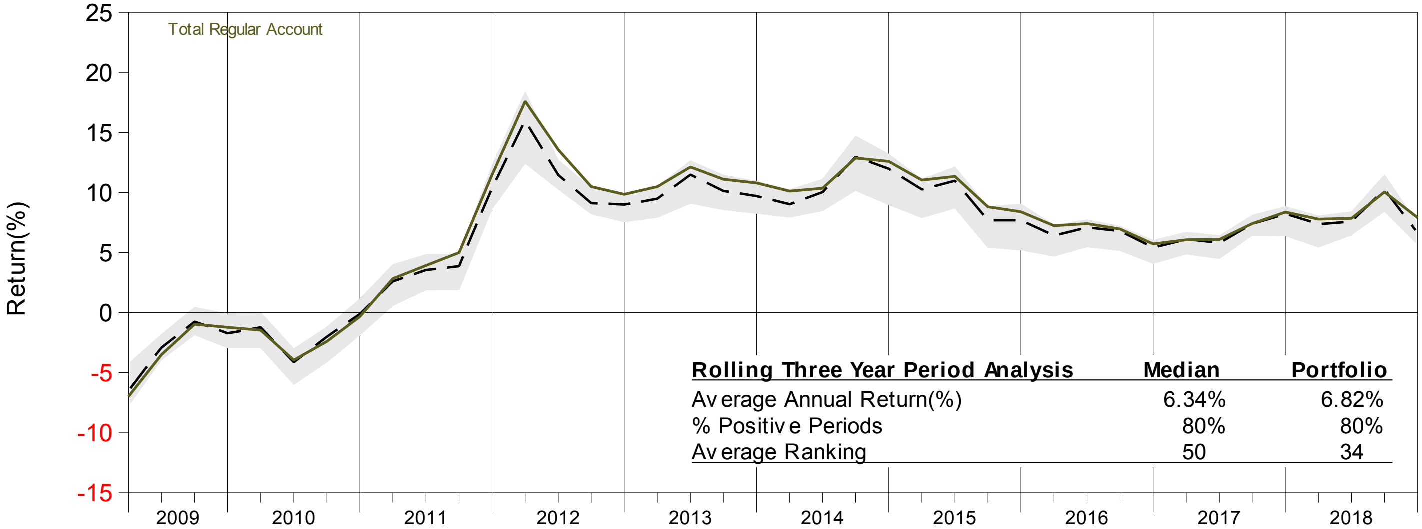
Risk Statistics Rankings vs Policy Target
Rankings Against Large Public Funds (>10B) (Gross)
Ten Years Ended December 31, 2018



	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	9.93	2.97	4.23
25th Percentile	9.27	2.57	3.50
Median	8.68	2.03	2.96
75th Percentile	8.00	1.78	2.57
90th Percentile	6.53	1.51	2.14
Total Regular Account ●	8.00	0.83	1.57

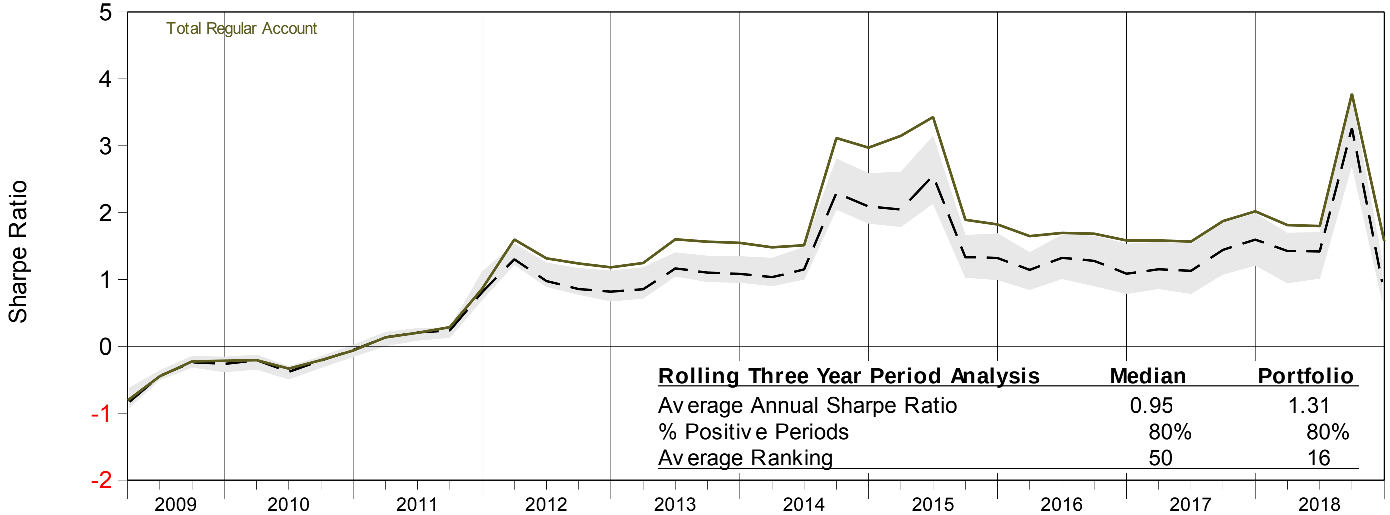
Total Fund Consistency

Rolling Three Year Return(%) Relative to Policy Target
Ten Years Ended December 31, 2018



Rolling Three Year Period Analysis	Median	Portfolio
Average Annual Return(%)	6.34%	6.82%
% Positive Periods	80%	80%
Average Ranking	50	34

Rolling Three Year Sharpe Ratio Relative to Policy Target
Ten Years Ended December 31, 2018



Rolling Three Year Period Analysis	Median	Portfolio
Average Annual Sharpe Ratio	0.95	1.31
% Positive Periods	80%	80%
Average Ranking	50	16

Callan

Appendix

U.S. Equity Performance: Broad-Based Losses

U.S. Equity Fell Drastically in 4Q18

– Decline driven by broad-based de-risking

– Trade tension, rising rates, concern over slowing growth, low oil prices, and government shutdown remain concerns

– Defensive “safe haven” sectors fared best; Cyclical sectors fared worst on end-of-cycle fears

Growth Trailed Value for the Quarter

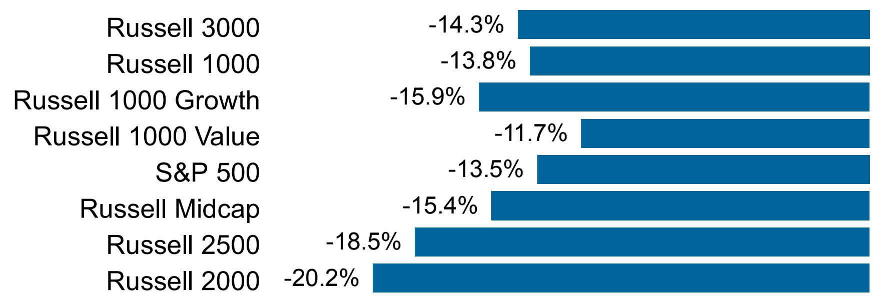
– Growth fell further than Value within both large and small cap due to larger weightings in poor performing Tech, Discretionary and Industrial sectors

Small Caps Hardest Hit

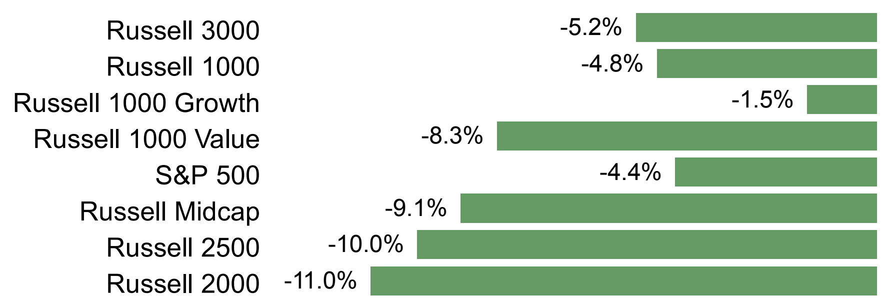
– Margin pressure, excess leverage, slowing growth and earnings expectations worried investors

– Russell 2000 fell over 22% from August peak

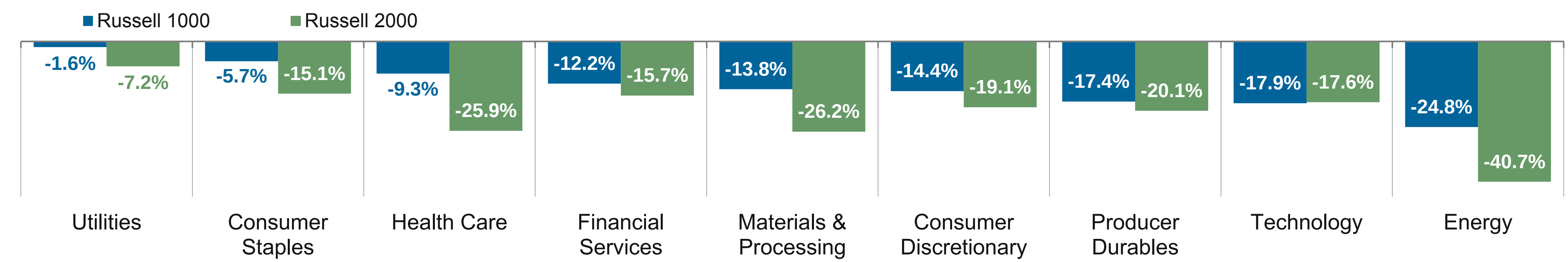
U.S. Equity: Quarterly Returns



U.S. Equity: One-Year Returns



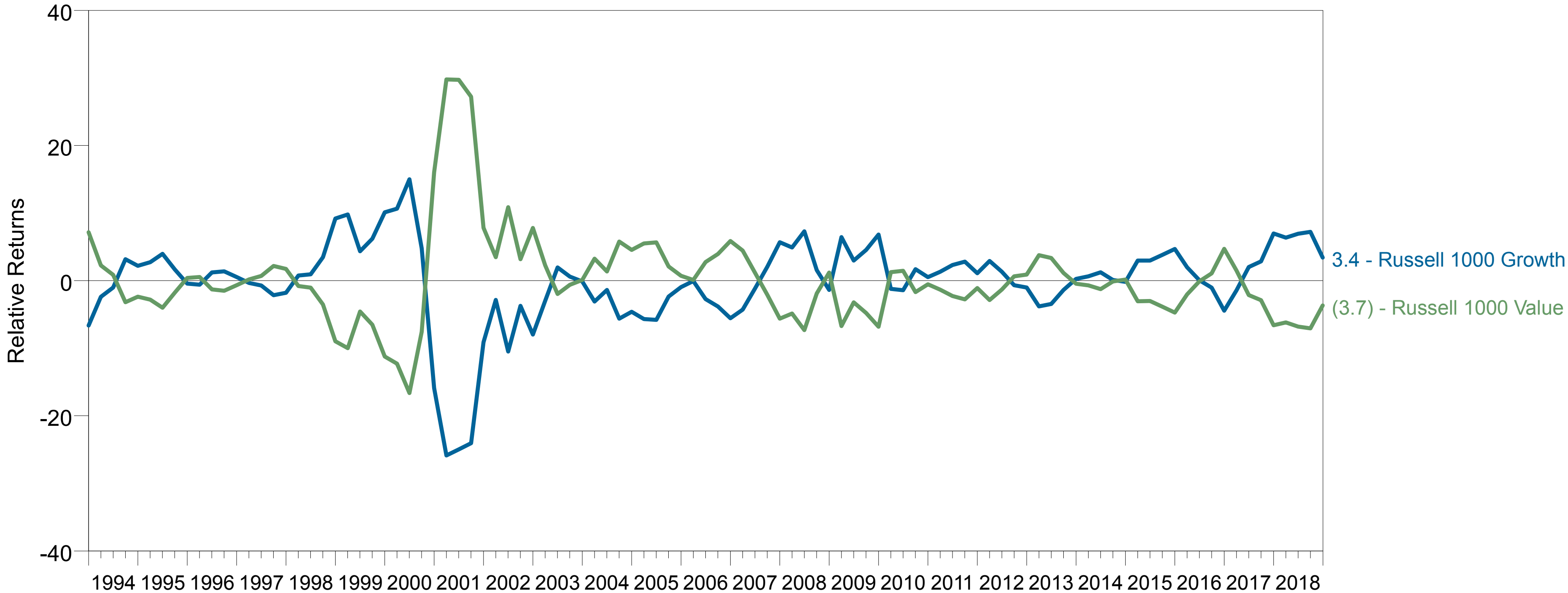
Economic Sector Quarterly Performance



Sources: FTSE Russell, Standard & Poor’s

Value Outpaced Growth for Quarter, Trails for Year

Relative Returns relative to Russell 1000 for 25 Years ended December 31, 2018



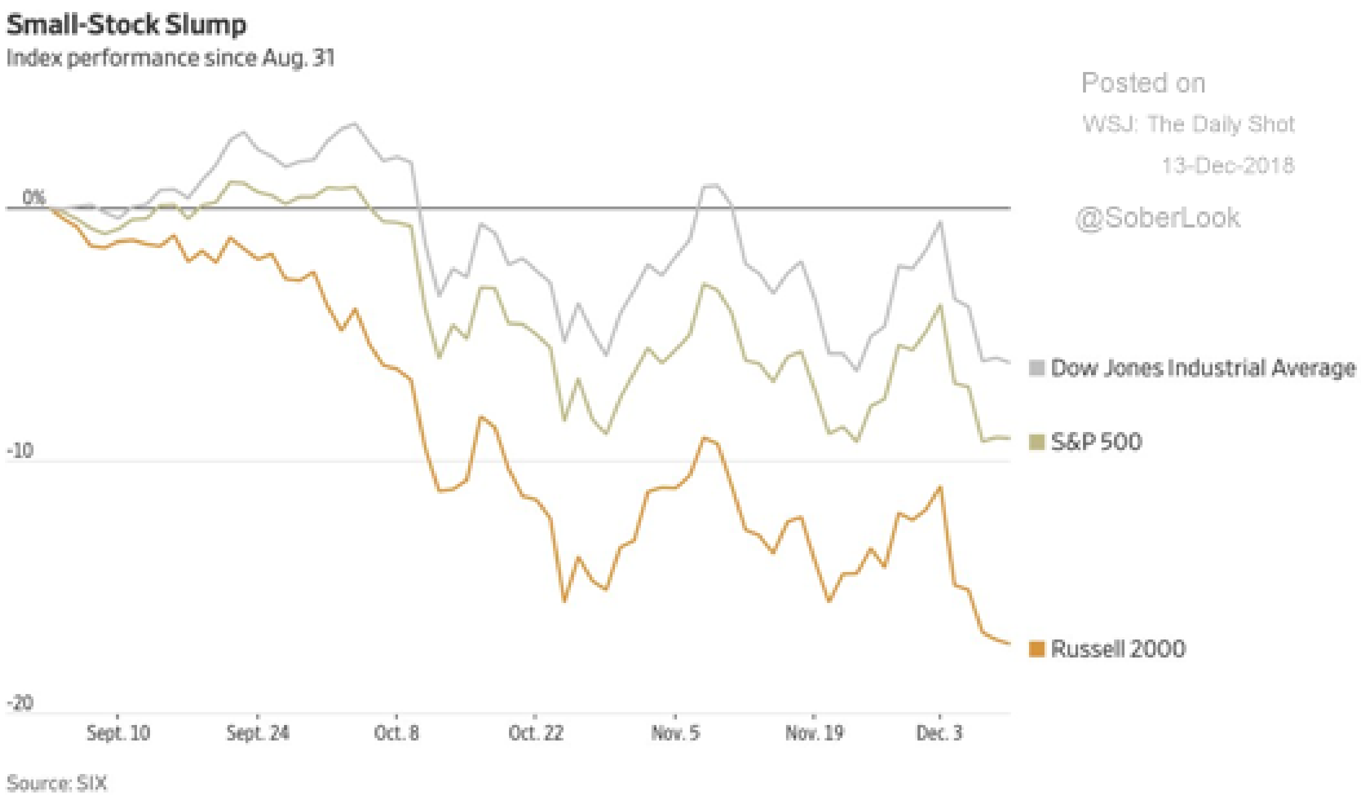
Value Beats Growth in Fourth Quarter

– Defensive sectors (typically associated with the value style) outperformed cyclicals in the fourth quarter

– Mega cap Technology stocks, in particular, came under pressure to end the year

– Growth stocks still outperformed Value stocks for the year

Small Cap Underperformed



– Russell 2000 fell 27% from peak (end of August) to trough (December 24) during 2018

– Russell 2000 decline of 11% in 2018 was 4th worst annual return since the index formation in 1984

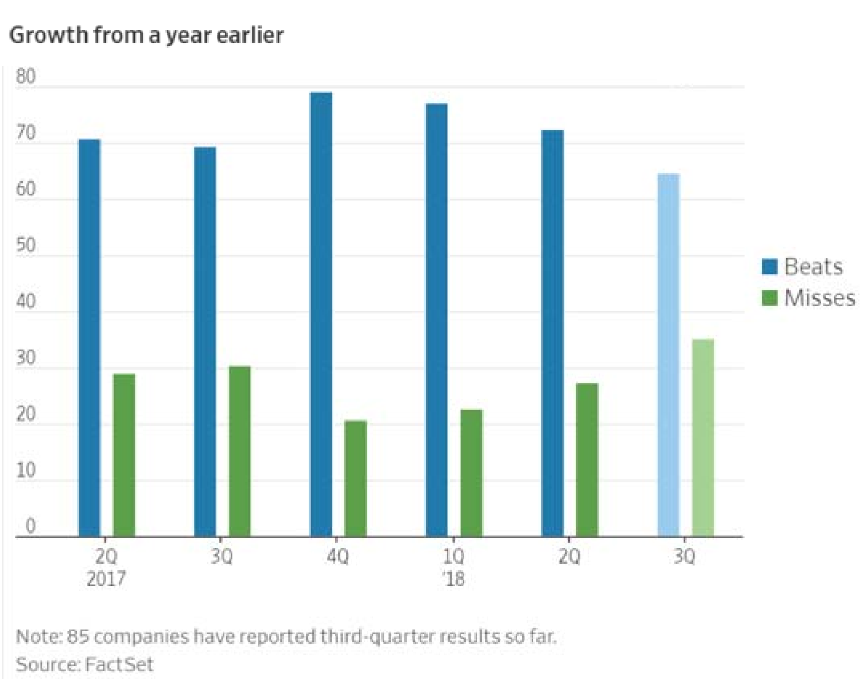
– Small Cap seeing pressure from squeezed margins, increased costs of borrowing, and trade tensions

– Rising interest rates could pose a problem with the Russell Debt/EBITDA level standing around 3.5x

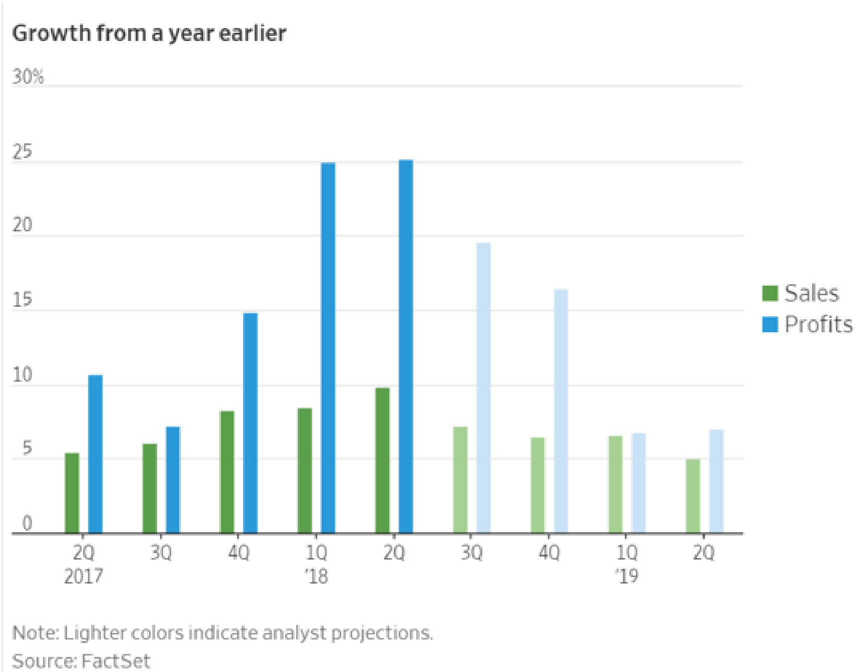
Source: Callan, FTSE Russell, Bloomberg

U.S. Equities: Fundamentals

The percentage of S&P 500 companies reporting lackluster quarterly sales results has been increasing.



The strong sales and earnings that powered the S&P 500 higher this year are fading into 2019.



Negative Sentiment a Concern in Light of Earnings

– Companies have increasingly reported slower than expected earnings growth

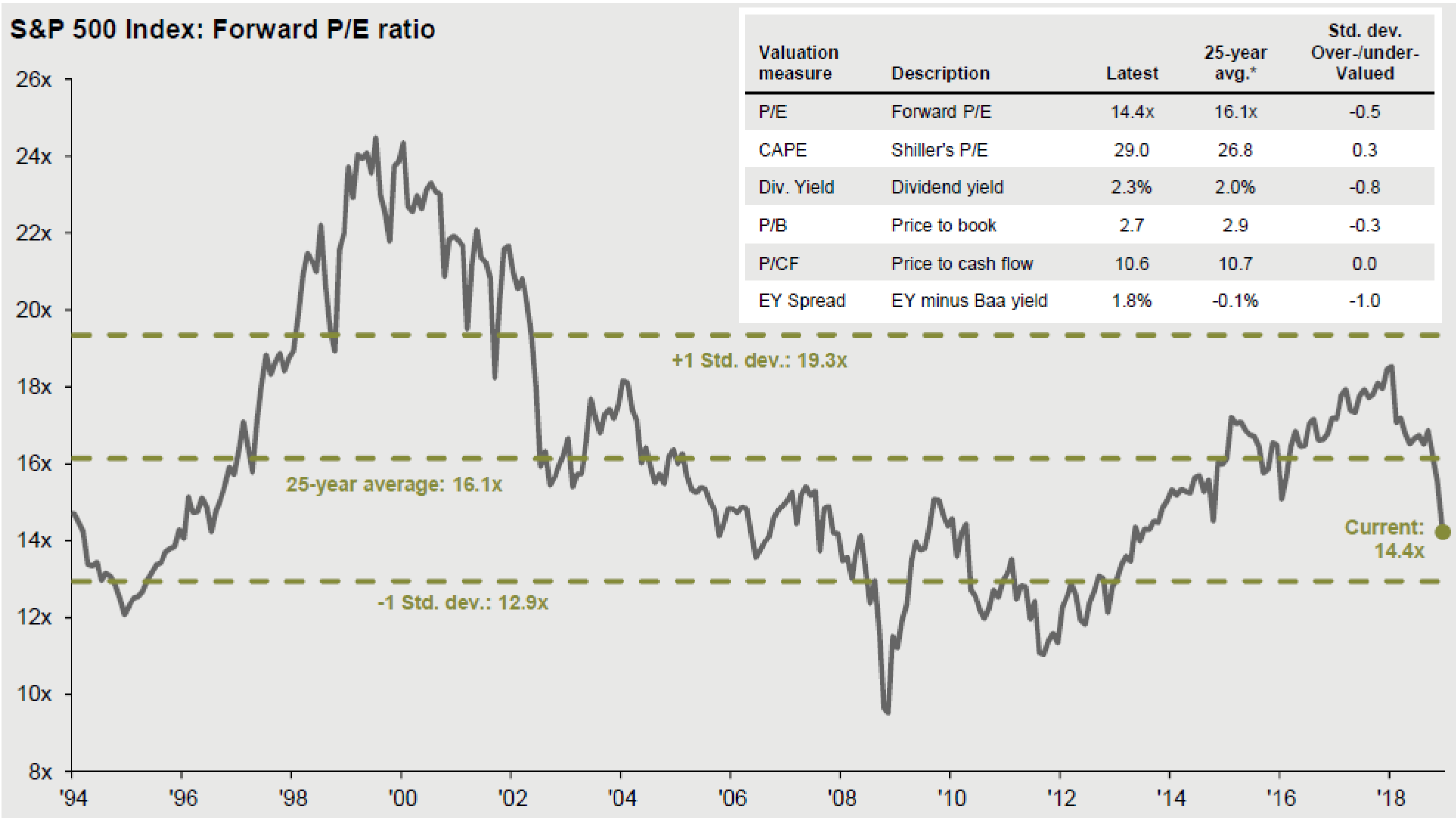
– The market has been more reactive to both positive and negative earnings surprises

– Companies continue to struggle with debt service

– U.S. corporate profits coming from foreign markets are in excess of 21%, underscoring the market's concerns regarding tariff/trade uncertainty

Source: Factset

S&P 500 – Historical Valuations



Valuation measure	Description	Latest	25-year avg.*	Std. dev. Over-/under-Valued
P/E	Forward P/E	14.4x	16.1x	-0.5
CAPE	Shiller's P/E	29.0	26.8	0.3
Div. Yield	Dividend yield	2.3%	2.0%	-0.8
P/B	Price to book	2.7	2.9	-0.3
P/CF	Price to cash flow	10.6	10.7	0.0
EY Spread	EY minus Baa yield	1.8%	-0.1%	-1.0

– The S&P 500 forward P/E ratio fell dramatically during 2018 to its current level of 14.4, which is below the 25-year average.

– Valuation measures Forward P/E, Dividend Yield, and P/B ratio trail historic levels.

Source: J.P. Morgan Asset Management

Non-U.S. Equity Performance

Markets Driven Down by Global Trade Dispute and Brexit impasse

– Dollar rallied against euro on fears of euro zone contraction; Yen gained against dollar as investors sought safe haven
– Defensive sectors fared better than cyclicals across all markets given risk-off environment
– Global growth concerns and falling oil prices challenged economically sensitive sectors
– Value outpaced growth (and quality outpaced volatility factors) across all markets as visible earners and stable businesses prevailed

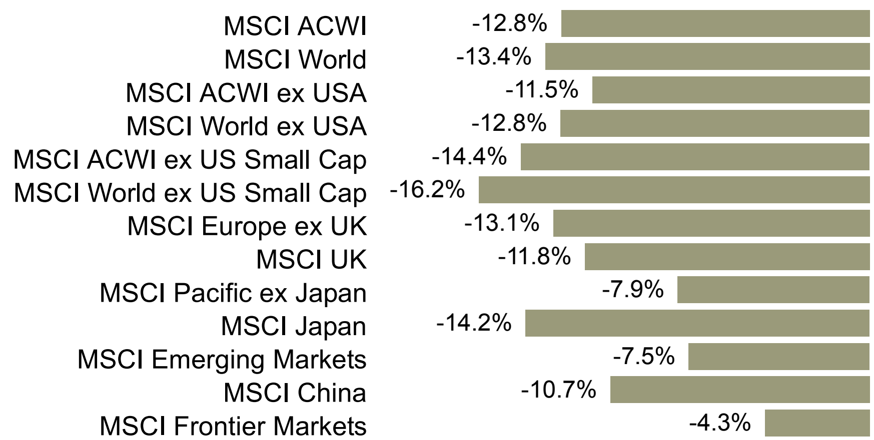
Emerging Markets Faltered

– China down double digits on rising dollar, trade tension and slowing economy
– Brazil up double digits on shifting growth and pension reform sentiment with presidential election
– Asian Tech companies down on soft demand, heightened regulation and consumption slowdown

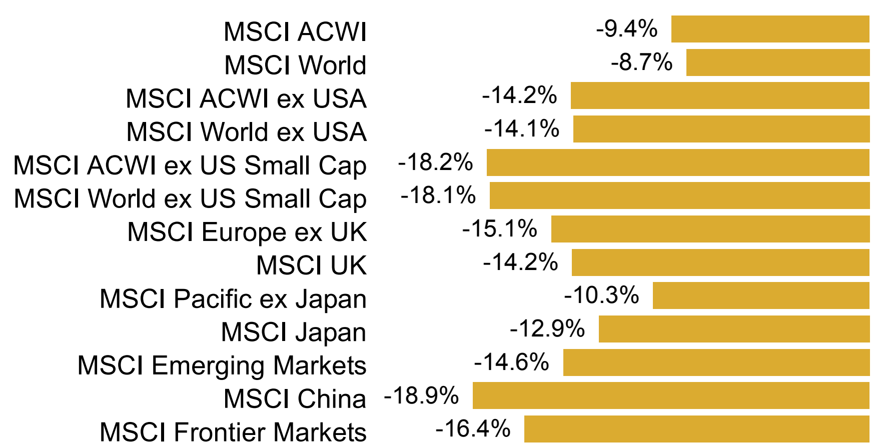
Non-U.S. Small Cap Trailed Large Cap

– Non-U.S. small cap also negatively impacted by U.S.-China trade tension and global growth fears

Global Equity: Quarterly Returns



Global Equity: Annual Returns



Source: MSCI

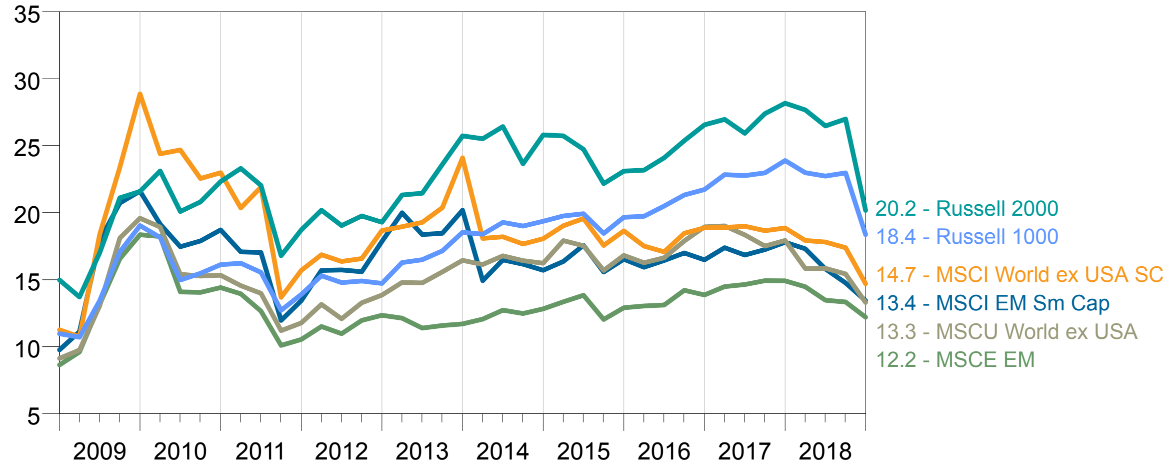
Emerging Markets are Cheap

– Emerging markets are trading at lower valuation multiples than the U.S. market.

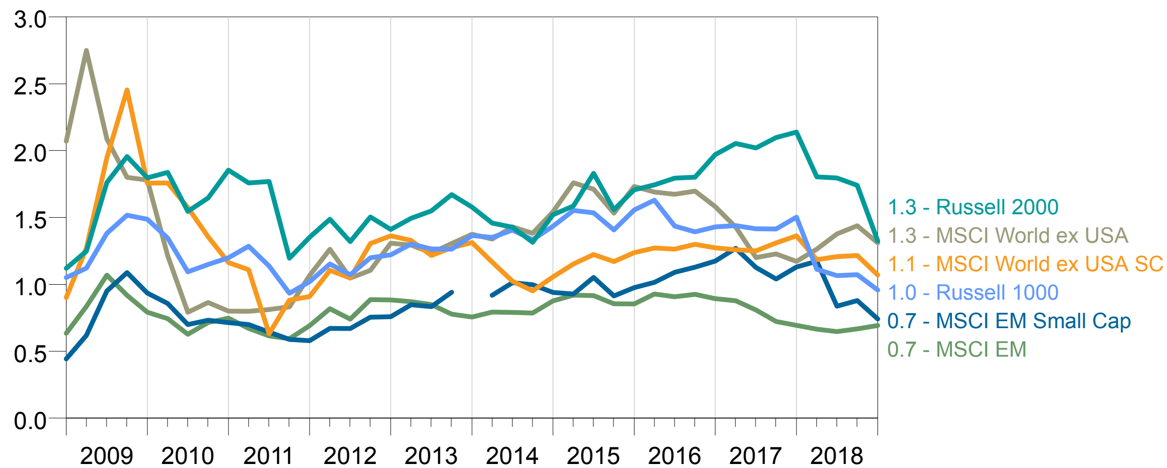
– Emerging markets are trading at valuation multiples similar to non-U.S. developed markets.

– The price for growth is approaching the GFC level in 2008 for emerging markets.

Price/Earnings Ratio (exc neg)



P/E to Growth



Sources: FTSE Russell, MSCI

U.S. Fixed Income Performance

Investors Rotated into Safe Haven Securities

– U.S. Treasuries returned 2.57% as the 10-year Treasury yield closed the quarter at 2.69%
– Yield curve continued to flatten with long-term rates declining faster than short-term rates
– IG corporates sank amid elevated leverage concerns
– Investment grade spreads widened to levels (+153 bps) not seen since July 2016
– Greater than 50% of new issuance came from BBB-rated issuers in 2018

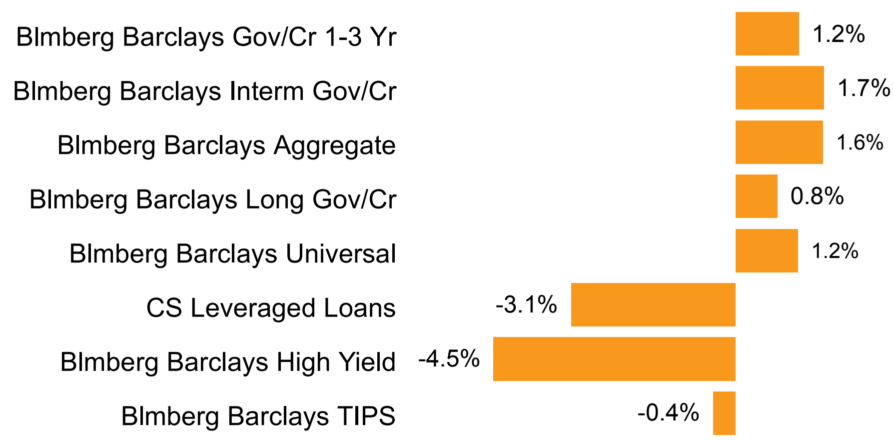
High Yield Spreads Widened as Yield-to-Worst Approached 8%

– High Yield funds saw $20bn in outflows as sector dealt with flight to quality
– Energy sector led selloff amid volatile oil prices

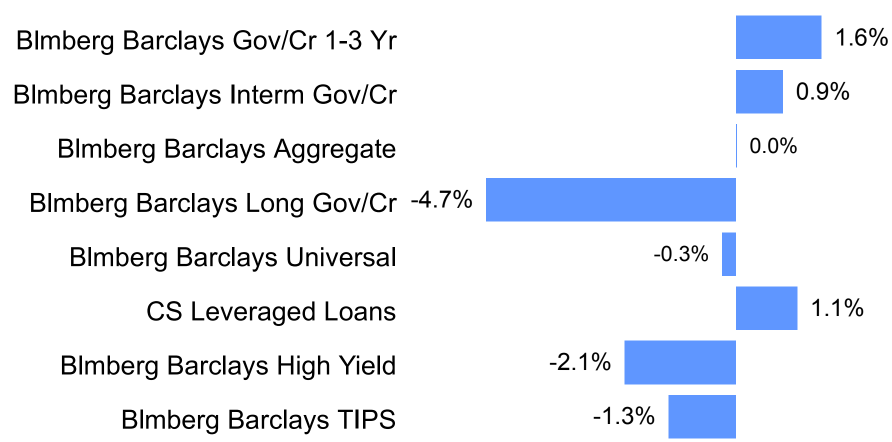
Leveraged Loans Experienced $17 bn in Outflows

– Changing interest rate projections sparked additional volatility
– CLO formation decreased in December, pulling back from technical demand in 4Q

U.S. Fixed Income: Quarterly Returns



U.S. Fixed Income: Annual Returns



Sources: Bloomberg Barclays, Credit Suisse

Rising Risks In Corporate Credit Market

Corporate Leverage Increased

– Corporations have taken advantage of low rate environment; overall credit quality has declined

BBBs have Steadily Grown

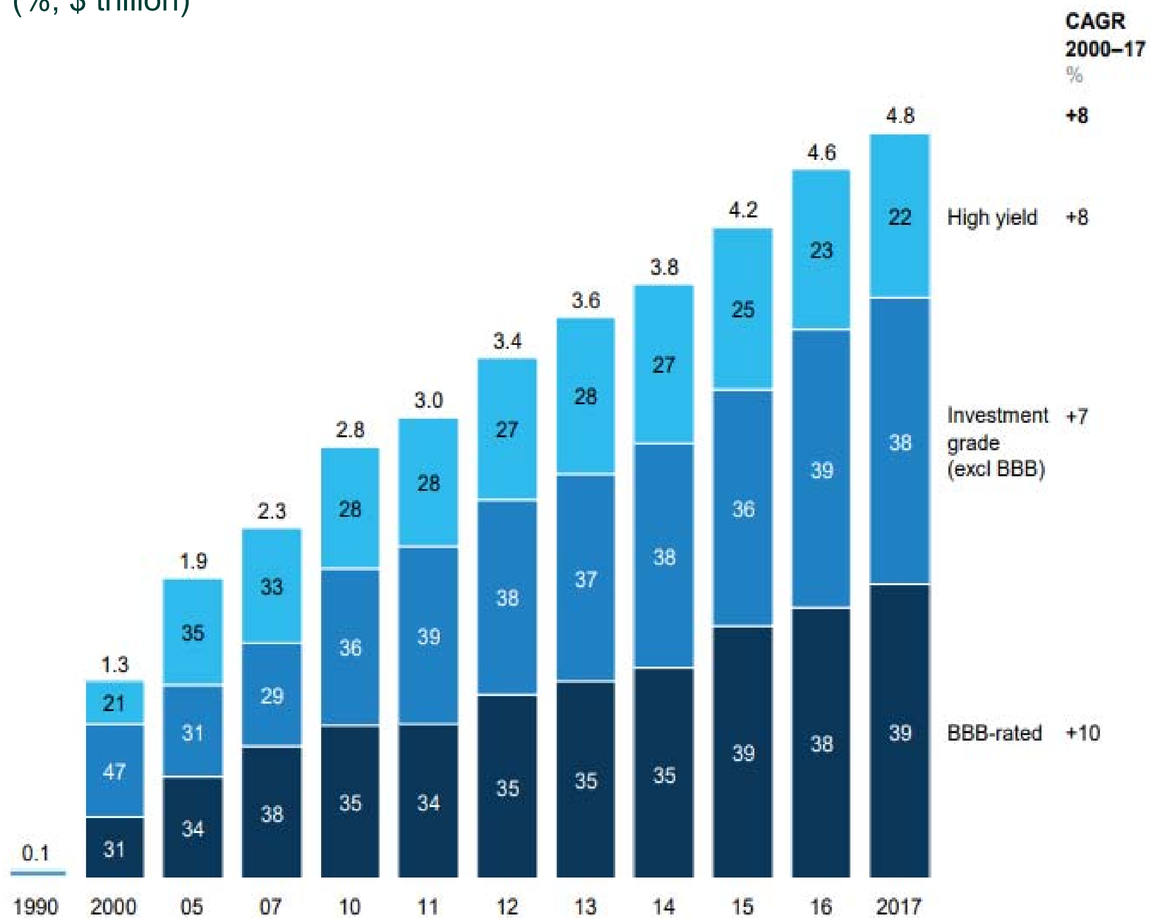
– BBBs have grown to half of IG corporate debt (up from 20% in 1990), and nearly double HY market

Fear of Increased Defaults Given Rising Interest Costs on Increasing Debt

– Headline risk increased on growing size of BBB market and potential implications from ratings downgrades should economic growth slow

Leveraged Loan Market Exceeds HY Market Amid Heavy Issuance

U.S. nonfinancial corporate bonds outstanding based on S&P ratings[1]
(%, $ trillion)



1 Shares from Morgan Stanley applied to Dealogic numbers.
NOTE: Figures may not sum to 100%, because of rounding.

Source: Morgan Stanley; Dealogic; McKinsey Global Institute analysis

Unsynchronized Growth and Policy Paths

U.S. Takes Lead on Rate Normalization

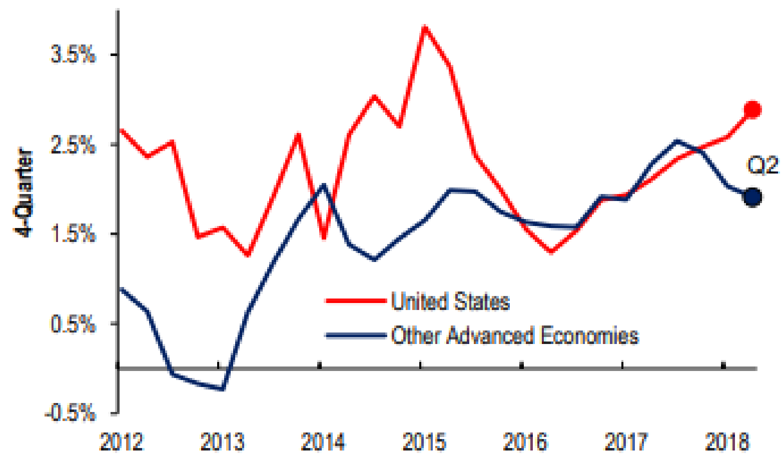
– Rates in Europe and Japan remain low, but asset purchases slowing and hikes may follow

– U.S. farther ahead in its tightening cycle, which may lead to decoupling in interest rate regimes

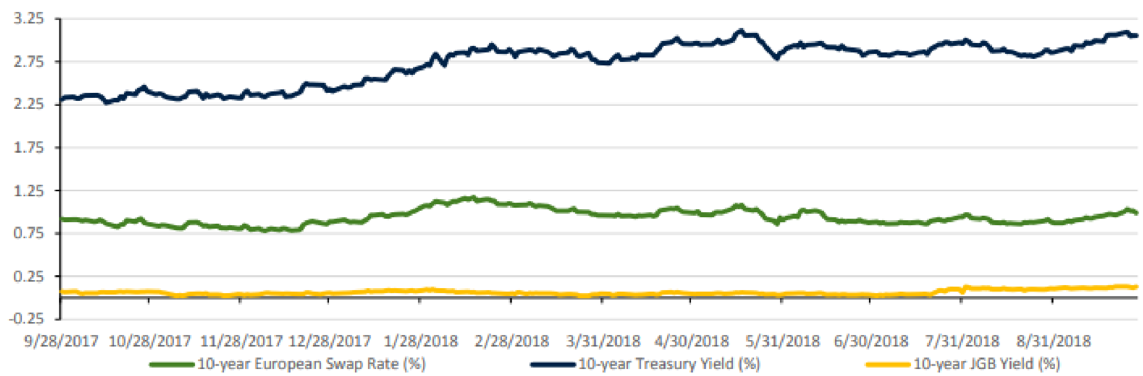
China Growth Slowed; Efforts Underway to Reduce Credit & Leverage in System

– Trade war effects will start to take hold

Real GDP Growth



U.S. Rates moving off lows while Japanese and European rates remain anchored



Sources: Bloomberg as of September 2018, Haver Analytics as of October 2018

Implications of Stimulative U.S. Fiscal Policy

Given U.S. Tax Reform, Treasury Issuance Likely Rise to Fund Deficit

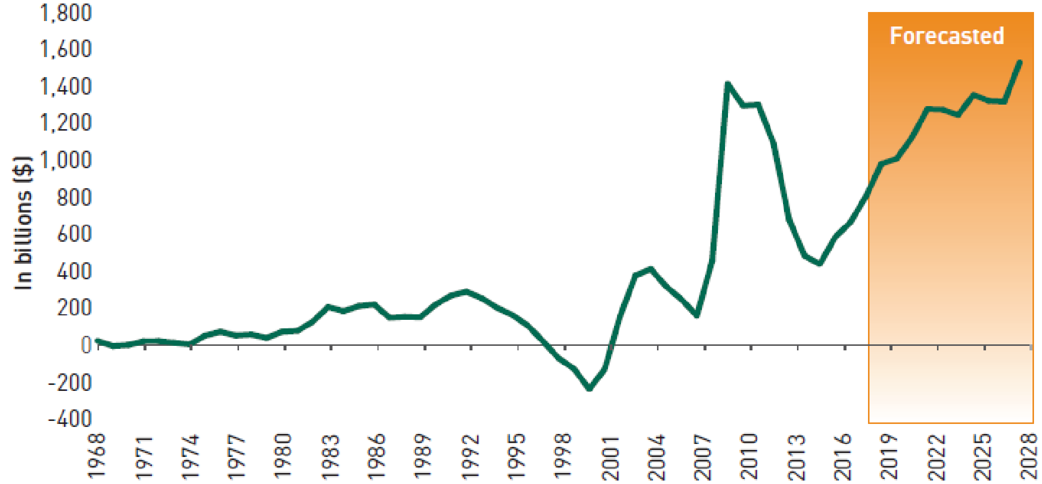
– Technical pressures from increase in supply and slower demand may change dynamic for U.S. Treasuries as a risk diversifier

Japan and Others May Embark on Rate Hikes as Soon as 2019

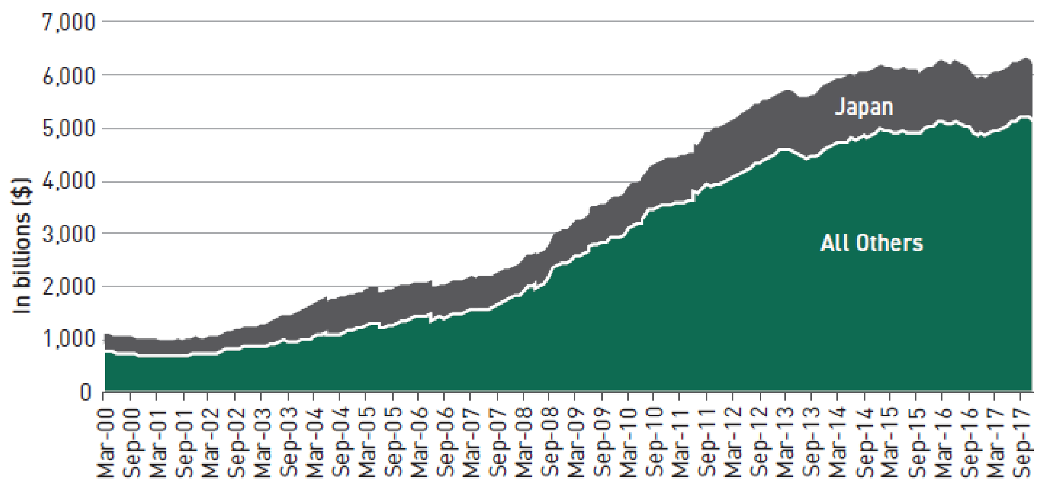
– Rising yields for investors in their home markets may be more appealing for foreign investors than purchasing and holding U.S. Treasuries

U.S. Treasury Volatility May Increase Given Impact of These Potential Developments

U.S. Federal Budget Deficit



Foreign Holders of U.S. Treasuries



Sources: CBO, Department of the Treasury/Federal Reserve Board

Real Estate Market Trends

REITs Traded Off, Outperformed Global Equities

– Global REITs lost 5.5% in 4Q18 compared to -13.3% for global equities (MSCI ACWI IMI)

– Both domestic and international REITs are trading at discounts to NAV

– Large cap stocks, especially those with lower debt levels, outperformed

Non-U.S. Markets Seeing Increased Capital Flows

– European real estate markets (ex-U.K.) gaining momentum due to strong fundamentals in major European cities

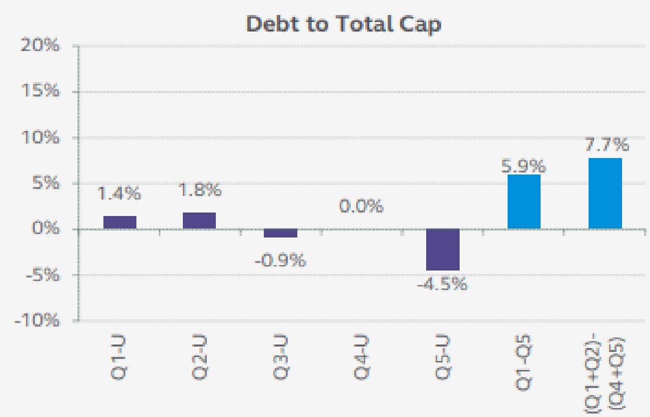
– Asian real estate products seeing strong fundraising momentum, with an increase in Asia-focused open-end funds

Global Real Estate Securities Price to NAV

Source: Principal Global Investors, UBS, FactSet, IBESS.

Total Return by Debt to Total Capital

Lower levered stocks outperformed.



Note: Q1 = Lowest leverage, Q5 = Highest leverage; U=Universe mean

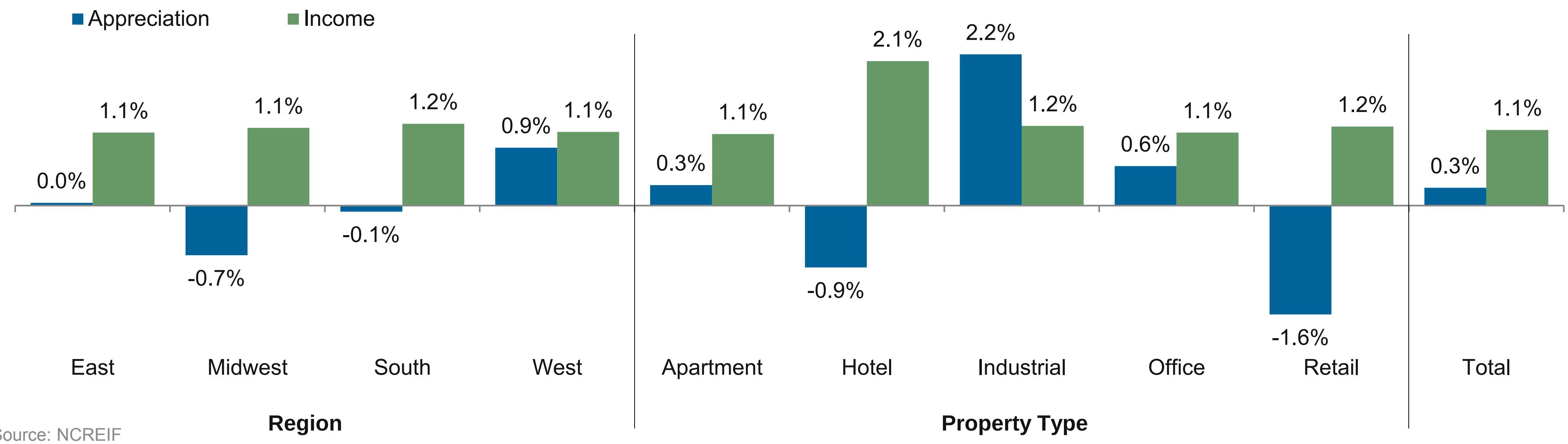
U.S. Real Estate

Returns Continue to Moderate

- U.S. Core real estate returns continue to shift toward income with limited appreciation
- Appreciation coming from NOI growth rather than further cap rate compression
- Industrial real estate remains best performer

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
NCREIF ODCE	1.5%	7.4%	7.8%	9.7%	10.0%
Appreciation	0.7%	4.0%	3.8%	5.6%	6.0%
Income	0.8%	3.3%	3.4%	3.6%	3.8%
NCREIF Property Index	1.4%	6.7%	7.2%	9.3%	9.7%
Appreciation	0.3%	2.1%	2.5%	4.3%	4.4%
Income	1.1%	4.6%	4.7%	4.9%	5.1%

NCREIF Property Index Returns by Region and Property Type



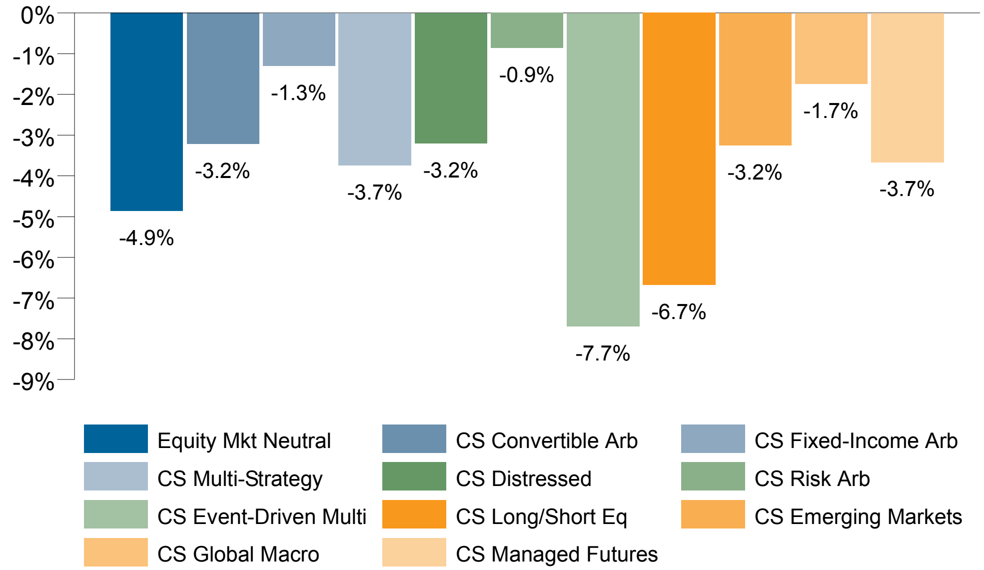
Source: NCREIF

Hedge Fund Performance

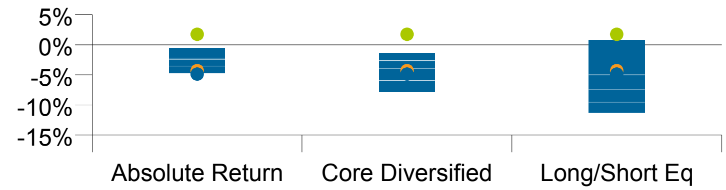
Hot Stuffing Meets Cold Turkey

- As the global capital markets reacted to the sharp risk-off sentiment driven by the mounting trade war and slumping China growth, volatile prices and tightening liquidity inside these markets became a heated mess for hedge funds.
- With U.S. small caps and commodities leading markets down, most hedge funds long on risk lost ground, as the *Credit Suisse Hedge Fund Index* melted down 4.3%. For the year, the index finished with a 3.2% loss.
- Heavily exposed to equity beta, *Long/Short Equity* (-6.7%) and *Event-Driven Multi* (*-7.7%)* lost the most among CS hedge fund strategies.
- After suffering more-than-expected damage in the prior quarter, *Emerging Markets* (-3.2%) fare better with alpha.
- Relative value trades, particularly those further away from liquid stocks, like *Fixed-Income Arb* (-1.3%), were less impacted.
- Also, more process-driven or hard-catalyst strategies, like *Risk Arb* and even *Distressed* (-3.2%), held ground better.
- Reflecting live hedge fund portfolios, the *HFRI FoF Composite Index* (-4.8%) fell marginally more than its unmanaged CS HFI proxy. For the year, it lost 3.9%.
- Hedge fund portfolios with a long bias to U.S. equities and related risks suffered the most, while those with illiquid credits, conservative event-driven, or discretionary macro strategies performed relatively well.

CS Hedge Fund Strategy Returns (quarter ended December 31, 2018)



Callan Hedge FOFs Style Group Returns (quarter ended December 31, 2018)



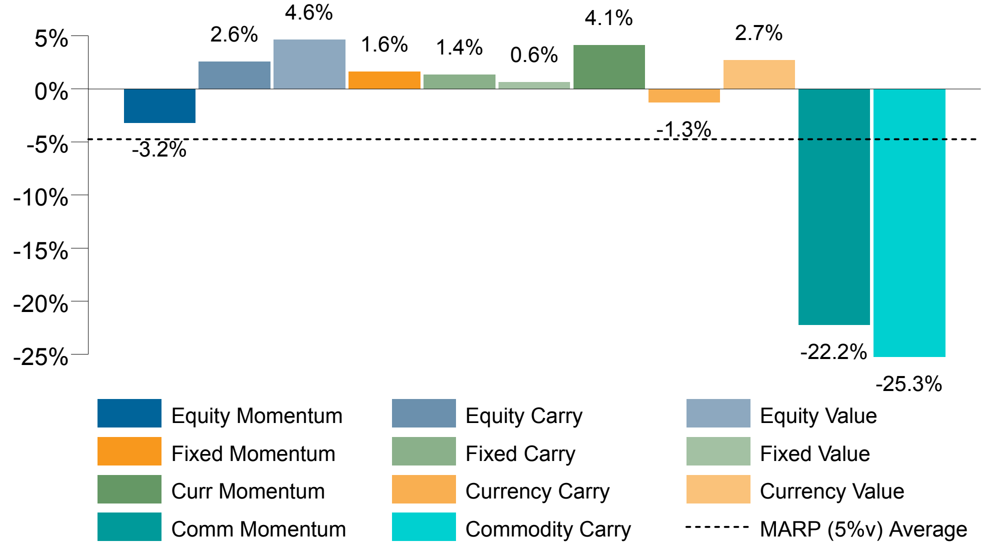
	Absolute Return	Core Diversified	Long/Short Eq
10th Percentile	-0.5	-1.4	0.8
25th Percentile	-2.2	-2.6	-5.0
Median	-2.4	-3.9	-7.4
75th Percentile	-3.5	-5.9	-9.5
90th Percentile	-4.7	-7.8	-11.3
CS Hedge Fund Index	-4.3	-4.3	-4.3
HFRI Fund of Funds	-4.8	-4.8	-4.8
T-Bills + 5%	1.8	1.8	1.8

MAC Performance

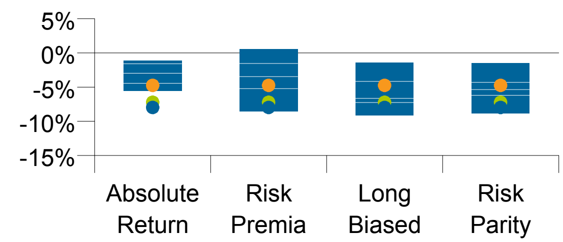
Top-Down Multi-Asset Class Strategies Slump Together in Fourth Quarter

- Liquid alternatives to hedge funds have become popular among investors for their attractive risk-adjusted returns that are similarly uncorrelated with traditional stock and bond investments but constructed at a lower cost.
- Callan's Multi-Asset Class (MAC) style groups tripped again in the fourth quarter's risk-off mode, but different factors were to blame than in prior quarters. As value-oriented trades gain ground, particularly in equities, commodity momentum lost traction, particularly with heated oil markets suddenly cooling off. The commodity carry trade was also difficult, especially in November for natural gas.
- *HFR Risk Parity Index* targeting 12% volatility slipped 8.0%, hurt by both commodity and equity exposures. Reflecting a material U.S. equity influence, a global balanced index of 60% stocks and 40% bonds fell 7.2%.
- *CS NB Multi Asset Risk Premia Index* (-4.7%) is an equal risk-weighted index of alternative risk factors (value, carry, momentum, and liquidity) across 4 capital markets (equity, fixed income, currency, and commodities) targeting 5% volatility.
- Within CS NB MARP, *Equity Value* (+4.6%) finally earned positive marks, but such gains were notably offset by both *Commodity Momentum* (-22.2%) and *Commodity Carry* (-25.3%) suffering massive reversals to end the year down deeply in red.

Alternative Risk Factor Breakdown (quarter ended December 31, 2018)



Callan Multi-Asset Class Style Group Returns (quarter ended 12/31/18)



	Absolute Return	Risk Premia	Long Biased	Risk Parity
10th Percentile	-1.1	0.6	-1.4	-1.5
25th Percentile	-1.6	-1.5	-4.2	-4.3
Median	-3.0	-3.4	-6.6	-5.4
75th Percentile	-4.4	-5.2	-7.2	-6.2
90th Percentile	-5.5	-8.5	-9.1	-8.9
CS NB MARP Index (5%v) ●	-4.7	-4.7	-4.7	-4.7
HFR Risk Parity Vol 12 In ●	-8.0	-8.0	-8.0	-8.0
60% MSCI ACWI/40% BB Global Agg ●	-7.2	-7.2	-7.2	-7.2

Hedge Fund and MAC Industry Trends

Rising cash yields help most hedge funds

– Although rising short-term rates are providing a better tailwind to hedge fund performance with growing returns on cash and short interest rebates, the outlook for further rate increases by the Fed dimmed by year end.

– The Fed's continuing commitment to unwinding its balance sheet will continue to tighten market liquidity and create market volatility, which will likely lead to more sustained trading opportunities for active managers like hedge funds.

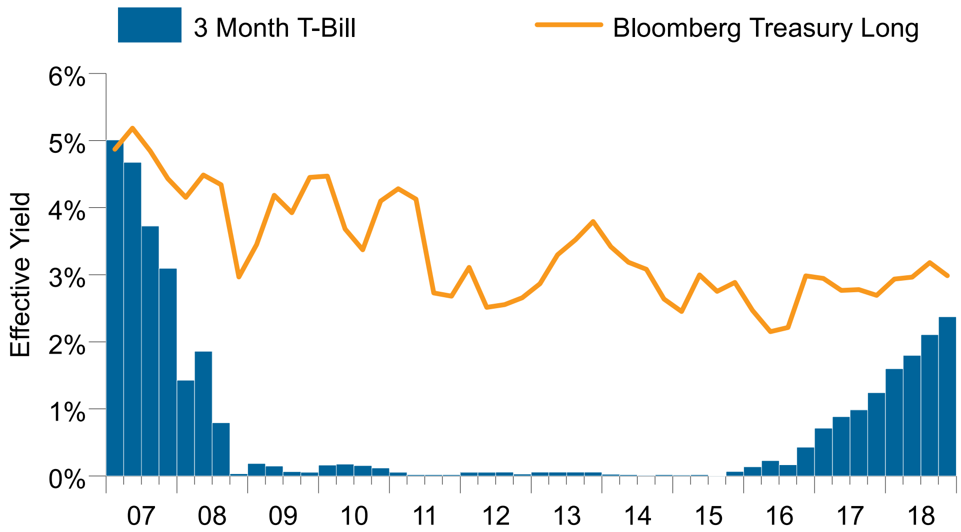
Volatility is back after a brief respite

- While the spike in volatility last year in February was more technical in nature, the recent bout of market volatility, as reflected in the VIX measure, has a more fundamental underpinning with actual slowing economic growth.
- This slowing global economic growth with tightening market liquidity, fading U.S. stimulus and slowing China growth suggests more sustained spikes in vol ahead.

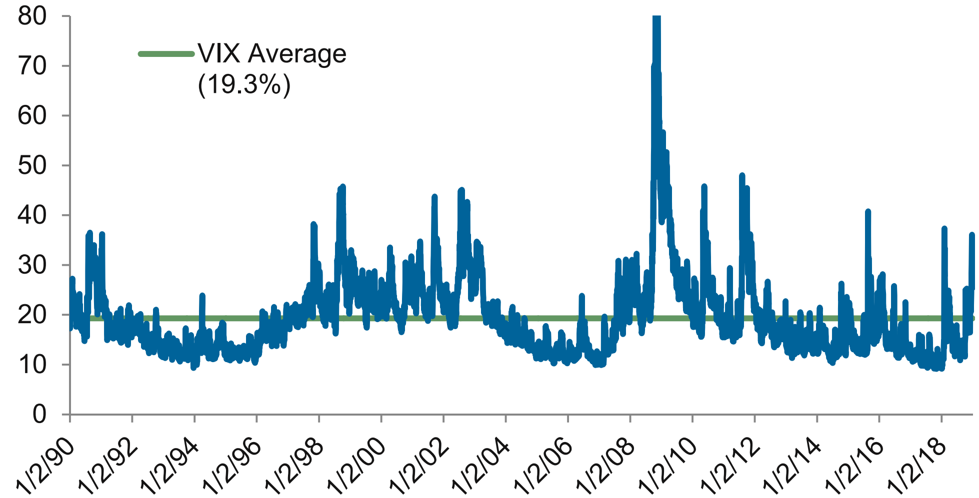
Global tensions create divergent forces

- Mounting stress from trade war and slowing China growth coupled with a fading U.S. stimulus will likely test market valuations ahead. Such major economic shifts will create trade opportunities for active management as these structural imbalances reconcile themselves.

Effective Yields for 3 Month T-Bill versus Bloomberg Long Treasury



VIX Index (30-Day Implied Volatility) – 1Q90 to 4Q18



TAB 6 – Real Estate Portfolio Review

OPERF

March 13, 2019

OPERF Real Estate Annual Review & 2019 Plan

Anthony Breault
Senior Investment Officer, Real Estate

OREGON STATE TREASURY

Agenda

- **Preface**
- **Executive Summary**
- **Investment Environment**
- **OPERF 2018 Real Estate Year In Review**
- **OPERF Real Estate Performance Review**
- **OPERF Real Estate Portfolio Update**
- **2019 Real Estate Plan**
- **Conclusion**

Preface

- **OPERF's role for real estate is to provide:**

  - Diversification of equity risk
  - Stable and predictable cash yield
  - Inflation protection

  Bass guitar

- **Benchmark:**

  National Council of Real Estate Investment Fiduciaries – Open End Diversified Core Equity Index (NFI-ODCE) + 50 bps (net)

Executive Summary

Key Takeaways…

1. The "shift to core," started in 2015, is largely complete.

2. Primary focus for foreseeable future is continuing to structure and manage a balanced portfolio that is capable of weathering cycles through its broad diversification across sectors, markets and strategies.

3. Majority of portfolio is constructed around high quality, cash-flowing assets designed to preserve capital in a downturn and diversify OPERF equity risk, complemented by value-creation strategies for consistent outperformance relative to the benchmark.

4. The portfolio has exhibited sustained, strong net performance over its benchmark.

5. Compared to the time period prior to adoption of current OIC-approved policy (i.e., pre-2015), staff has reduced the portfolio's complexity and increased its transparency.

Investment Environment

- **Capital Markets**
  - Capital flows into real estate, both debt and equity, remain strong, commensurate with the continued trend of larger, permanent allocations to the asset class from institutional investors.
  - The extended period of outsized appreciation returns via capitalization rate compression has moderated, although real estate fundamentals (economic growth, supply/demand balance) remain primarily favorable.
- **Residential**
  - Nearly 10 years post-recession, supply has largely caught up to demand in the higher-end (luxury) rental apartment market.
  - Conversely, single-family for-sale housing has become increasingly unaffordable to greater segments of the population, both in the U.S. and abroad, as home prices continue to escalate and mortgage rates increase.
  - The above cycle trends have created increased demand in the affordable housing ("renters by necessity") segment of the market, which remains undersupplied.
- **Office**
  - The trend from denser workspaces has shifted to one of flexible usage, highly amentized space, designed to attract talent and create optimized work environments blending open space for collaboration and private spaces for concentration.
  - The time-tested, enduring fundamentals of functionality and location have become critical for long-term investors. Properties must be well-located, with proximity to amenities and live/work/play environments coupled with functional designs capable of adapting to flexible space needs.
- **Industrial**
  - The growth of e-commerce, globally, has primarily benefited the industrial asset class, with logistic fulfillment centers experiencing rapid growth requirements to meet consumer demand (often at the expense of traditional retail).
  - Increasing tenant demand and strong near- to mid-term projected growth for this sector, coupled with high institutional demand amongst global institutional investors, this traditionally higher-yielding asset class is now trading at yields largely on-par with the other property sectors.
- **Retail**
  - The rapid growth of e-commerce, combined with overbuilding in certain markets and shopping venues without differentiated products or experiences, has led to the retail asset class undergoing a period of significant transformation.
  - Although consumer activity (sales) remains strong, investment opportunities in retail have been limited to properties offering consumer convenience and experiential offerings as well as well-located, grocery-anchored neighborhood centers.

With fundamentals intact and returns moderating, it is critical to keep an eye on late-cycle risk taking

Real Estate 2018 Year In Review – Priorities

Staff accomplished primary objectives previously identified for 2018, with ongoing efforts dedicated to longer-duration projects:

- Situs-RERC
  - Finalized onboarding of third-party valuation service for separate account performance and attribution reporting.
- Conduct non-ODCE Core+ open-end fund review.
- Conduct competitive search process, source and underwrite a Core+ separate account.
- Staffing
  - Recruit and onboard one IO; commence search process for second IO in 2H 2018.
- MSCI
  - Incorporated "dashboard" analytics into separate account reviews (manager & asset attribution).
  - Continue crafting customized core benchmarks for separate account hurdles/gates.
- Review industrial/logistics competitive landscape and potential separate account mandates.
- Continue to pursue enhancements to due diligence and monitoring processes:
  - Build on the Alternatives Program due diligence process enhancements achieved to-date; and
  - Continued integration of Investment Analyst pool in due diligence activities.

OREGON STATE TREASURY

Real Estate 2018 Year In Review – Approvals

Over the course of 2018, the OIC approved 4 real estate commitments totaling $750 million

Pacing

- The $750 million in commitments was on target for portfolio underwriting goals and objectives established at start of the year.
- With the shift to evergreen investment structures and long-term property holds, vintage year pacing is less of a concern as cyclical investment risks and repatriation of capital inherent in closed-end fund structures have been considerably reduced.
- Underwriting needs entail lengthier diligence efforts in order to capture wider investment "landscapes" of comparable alternative investments/partners.

Geography – 90% Domestic, 10% Global

Strategy – 2018 commitment approvals included three long-term strategic partnerships, with strong GP-LP alignment designed for investing through market cycles, and one opportunistic approval with an existing partner with a demonstrated track record of sustained outperformance.

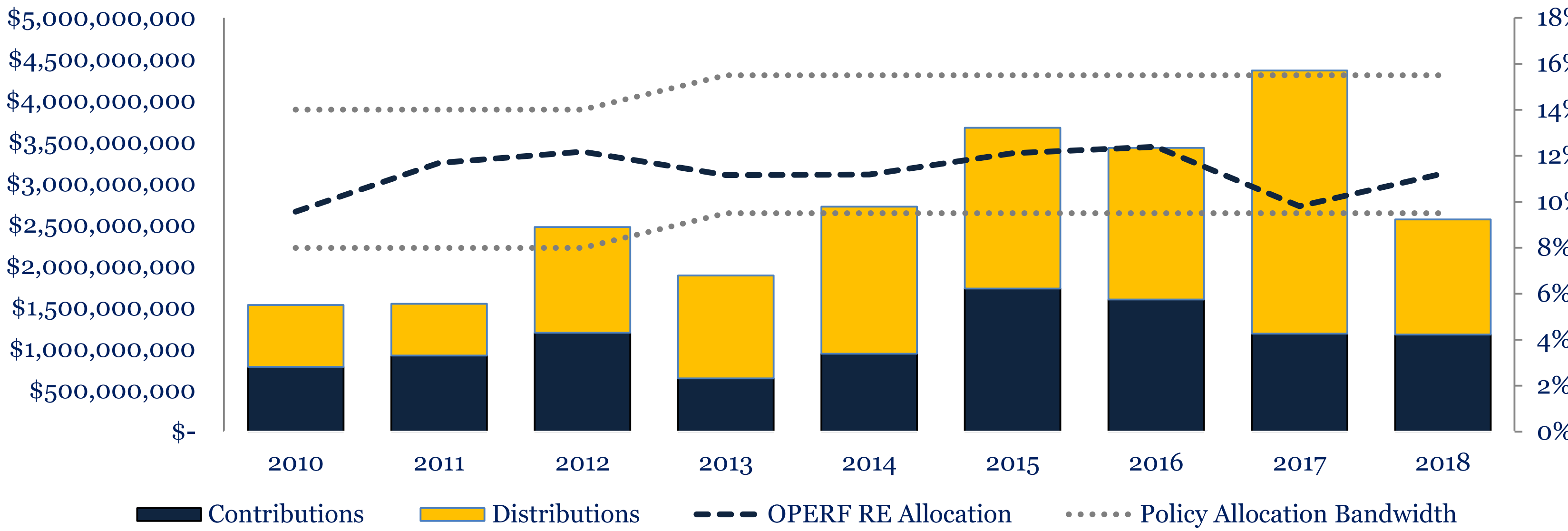
Fees – Continued trend towards lower fees through tailored partnership structures.

FUND NAME	STRATEGY	SUB-PORTFOLIO	GEOGRAPHY	COMMITMENT ($ MM)	Funding Status
Harrison Street Core Real Estate Fund	Diversified / Niche	Core	Domestic	150	Funded
Lionstone-Oregon One (Separate Account)	Recap	Core	Domestic	50	Funded
Blackstone Real Estate Partners IX	Diversified	Opportunistic	Global	300	Unfunded
DivcoWest (Separate Account)	Diversified	Core	Domestic	250	Unfunded
NEW COMMITMENTS SUB-TOTAL				**750**	

Real Estate 2018 Year In Review – Allocations

OPERF real estate portfolio allocation consistently within policy range

- The majority of contributions indicated below, particularly since 2015, represent commitments to evergreen partnerships (separate accounts and open-end funds) approved in 2017 and 2018. As the real estate portfolio matures, and these Core partnerships comprise a greater portion of portfolio NAV, distributions will become an increasingly larger component of annual portfolio cash flows.
- With a lower allocation to closed-end funds (projected to be <30% of portfolio), and a corresponding decrease in capital repatriation inherent in such structures, portfolio yield will comprise a larger component of the portfolio's overall total returns.



Strategic allocation to Core = permanent positive cash flow & yield generation

Source: OST; Private Edge

Performance Review – Relative Performance

For the year ending 9/30/18, the portfolio outperformed its policy benchmark, on a net basis and over every time period

- OPERF's Core allocation has demonstrated strong, long-term results, having outperformed its revised policy benchmark by 320, 480, 260, and 200 bps over the respective 1-, 3-, 5- and 10-year periods.
- The Value-Add allocation outperformed the policy benchmark by 30, 290 and 440 bps over the 1-, 3- and 5-year periods, and underperformed the trailing 10-year period by 75 bps, reflecting the challenges higher risk assets and strategies suffered during and immediately following the 2008-09 GFC.
- The portfolio's Opportunistic allocation underperformed the benchmark across every time period, indicative of the difficult conditions for high risk and emerging market strategies in the post-GFC era.

9/30/2018	*1 YR.*	*3 YR.*	*5 YR.*	*10 YR.*	*SINCE INCEPTION*
Private Real Estate					
Income	4.4%	4.1%	4.3%	3.7%	4.1%
Appreciation	5.1%	5.9%	6.8%	3.0%	6.6%
Total OPERF Private Real Estate	9.6%	10.0%	11.1%	6.7%	10.7%
NFI-ODCE Index[1]	7.7%	7.8%	9.7%	4.6%	
Excess (bps)	*190*	*220*	*140*	*210*	
OPERF Public Real Estate	7.9%	5.7%	8.9%	7.7%	10.7%
NAREIT Index[1]	4.3%	9.0%	9.6%	7.8%	
Excess (bps)	*360*	*(330)*	*(70)*	*(10)*	
Total OPERF Real Estate	9.5%	9.4%	10.2%	7.1%	10.7%
NCREIF Property Index (NPI)[1, 2]	7.2%	7.8%	9.6%	6.4%	
Excess (bps)	*234*	*165*	*63*	*68*	
NFI-ODCE + 50 bps[1,3]	8.2%	8.3%	10.2%	5.1%	
Excess (bps)	*130*	*110*	*0*	*200*	
Policy Benchmark - NPI / ODCE + 50 bps (Custom)[4]	7.7%	7.8%	9.6%	6.4%	
Excess (bps)	*179*	*164*	*62*	*68*	

[1] Since Inception benchmark data not available due to cash flows not-verifiable for period prior to Private Edge contract commencement Q1 2006

[2] Policy benchmark through March 31, 2016 was NPI; gross of fees, unlevered

[3] NFIC-ODCE +50bps was adopted as Policy benchmark commencing April 1, 2016; net of fees, levered

[4] Policy benchmark represents NPI through March 31, 2016 and ODCE + 50bps commencing April 1, 2016

Source: OST; Private Edge

Performance Review – Relative Performance

Vintage Exposure

Given the robust seller's market during the past 7+ years, coupled with relatively moderate capital pacing from 2006-2008, the "legacy" holdings (i.e., all funds with a 2008 vintage or older) now have a smaller impact on portfolio performance. In aggregate, legacy holdings represent the following:

- NAV of $744 million across 29 funds and comprising 9.2% of total portfolio value. This exposure is down considerably from 2017, when legacy holdings represented $1.1 billion or 13.7% of total portfolio value. Although many of the 2005-2007 funds still contain distressed assets, not all 2008 and prior funds are underperforming.

Separate Accounts & Open-end Allocations

Separate accounts and open-end fund commitments have been a positive driver of returns, outperforming the benchmark over all time periods:

	OPERF Separate Accts	OPERF Open-end Funds	OPERF Total**	ODCE + 50 bps	Excess
10-Year Total Return	7.49%	3.35%	7.10%	5.12%	1.98%
5-Year Total Return	13.21%	8.31%	12.82%	10.21%	2.61%
3-Year Total Return	13.49%	8.73%	13.13%	8.33%	4.80%
1-Year Total Return	11.85%	9.14%	11.43%	8.21%	3.22%

* Returns are net of fees, as of 3Q2018.

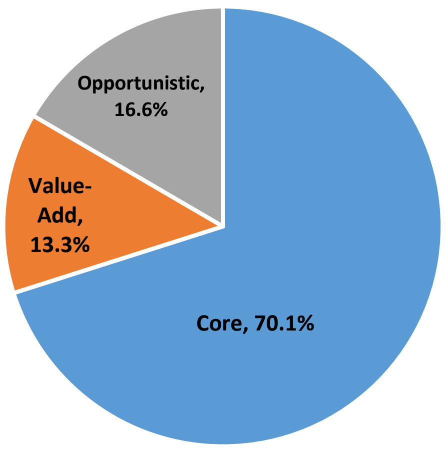
** OPERF Total represents all Separate Accounts and open-end funds as of 3Q2018.

Source: OST; Private Edge; RERC.

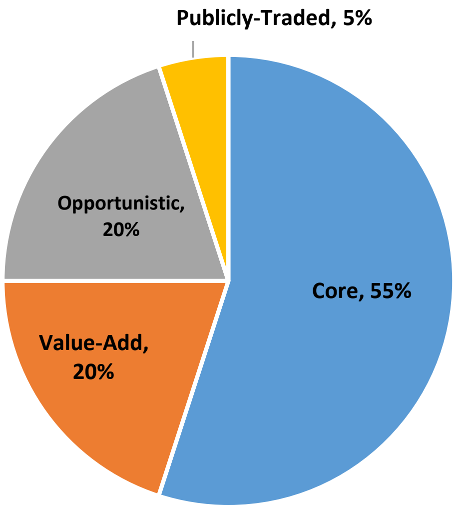
Portfolio Update – Policy Comparison

Risk Allocations

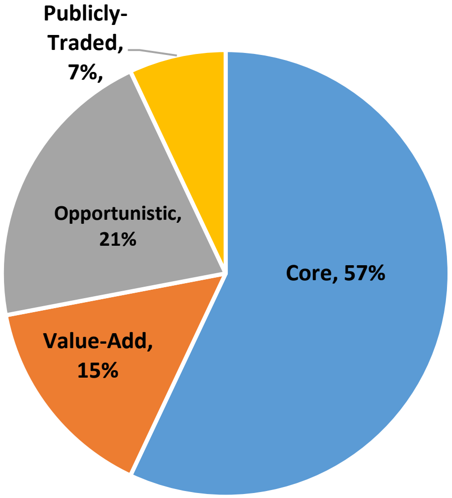
OPERF's portfolio as currently comprised is slightly riskier than the majority of institutional investors surveyed by Pension Real Estate Association:



Peer Group



OPERF Target (Policy)



OPERF (9/30/2018)

- While publicly-traded REITs were not represented in the Peer Group survey, many plans have a blend of private and public exposures. (REITs play a diversifying role in the OPERF real estate portfolio, providing exposure to product types not easily replicated in allocations to private real estate structures.)
- OPERF policy allocations include ranges of +/- 10% from target.
- Current Staff objectives include overweight to Core with commensurate underweights to the Value Add and Opportunistic categories.

Source: 2018 PREA Intentions Survey Investment.

Portfolio Update – Manager Concentration

The Real Estate "Top 10"

Significant portfolio reshaping occurred over the 5-year period (2013-2018), primarily:

- Consistent with the objective of reducing portfolio complexity while also leveraging OPERF's scale to achieve preferred economics and improved alignment, the Top 10 managers now represent 69% of the portfolio, up from 62% in 2013; and
- As part of Staff's objectives to a) de-risk the real estate portfolio through lower volatility investments and b) reduce cyclical risks inherent in closed-end opportunistic funds, Core now represents 81% of the Top 10 manager NAV, up from 33% in 2013.

Q3 2013 → **Q3 2018**

Q3 2013

Partner	Risk	Structure	Strategy	NAV ($M)
LaSalle	REIT (Domestic)	SMA	Diversified	716
Lone Star	Opportunistic	Closed End	Diversified	683
Clarion	Core	SMA	Office	576
Talmage	CMBS/Debt	SMA/Closed End	Diversified	532
Fortress	Opportunistic	Closed End	Diversified	491
Morgan Stanley	REIT (Domestic)	SMA	International	422
Regency	Core	SMA	Retail	355
Lincoln	Core	SMA	Industrial	332
Blackstone	Opportunistic	Closed End	Diversified	326
GID	Core	SMA	Multifamily	320

Q3 2018

Partner	Risk	Structure	Strategy	NAV ($M)
Clarion	Core	SMA	Office	894
GID	Core	SMA	Multifamily	850
Lionstone	Core/Value Add	SMA	Diversified	761
Lincoln	Core	SMA	Industrial	672
Lone Star	Opportunistic	Closed End	Diversified	616
Regency	Core	SMA	Retail	551
Waterton	Core/Value Add	JV/Closed End	Multifamily	338
Cohen & Steers	REIT	SMA	Retail	300
Rockpoint	Core/Opportunistic	Closed End	Diversified	291
JP Morgan	Core	Open End	Diversified	275

Core | CRE Debt and High Volatility Core | Opportunistic/High Risk

Portfolio Update – Current Exposures

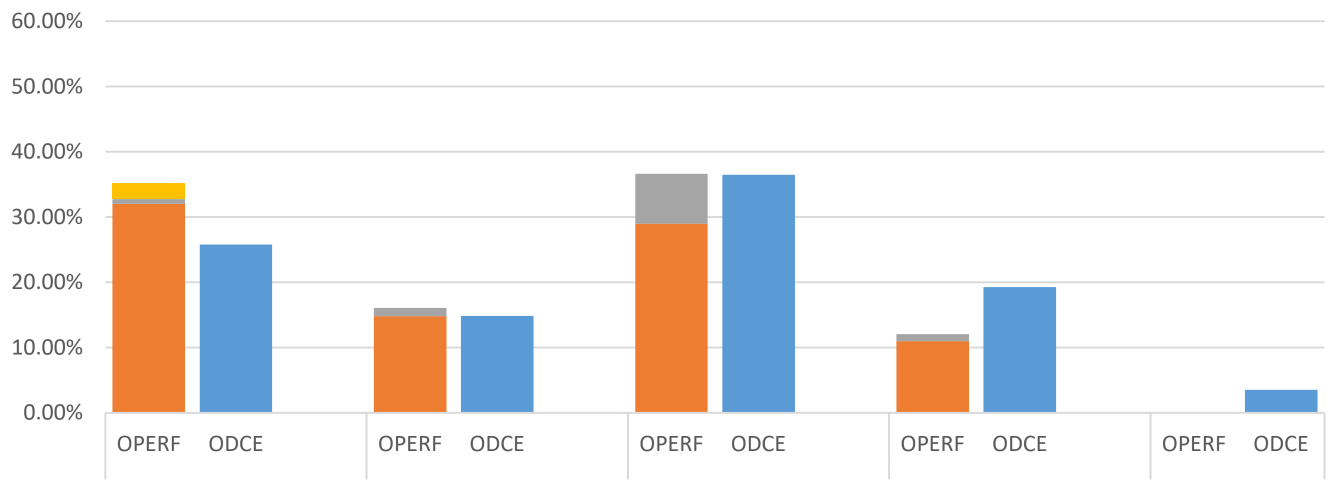
Portfolio Weightings

Staff is actively managing sector weightings (i.e., over/under) relative to the benchmark.

The below chart captures nearly 70% of the real estate portfolio, and includes all separate account exposures and open-end fund commitments, the combination of which represents the "controllable" part of the portfolio. Staff can now actively allocate capital based on long-term asset type diversification targets and short-term tactical considerations (the latter of which are predicated on prevailing market conditions and opportunities).

Current over/under weightings are primarily short-term in nature and reflect transitions associated with the strategy shift commenced in 2015. As Staff continues ongoing separate account and open-end fund due diligence efforts, asset type exposures will converge on strategic targets.

- The chart below does not take into account the portfolio's public REIT mandates with LaSalle (for niche/other RE securities exposures) and Cohen & Steers (for regional mall exposure). These exposures, together with a recent commitment to Harrison Street's Core Fund (which includes student and senior housing, self storage and medical office exposures) move the portfolio's sector allocations closer to its strategic targets.



Source: OST; RERC.

Portfolio Update – Implementation

Strategy Diversification

- Continue building out a well-balanced portfolio to optimize the long-term role of real estate within OPERF.

Partnership Strategy	Objective
Strategic Partnerships: Investment mandates based upon long-term fundamentals and cycle-tested strategies (i.e., Core/Core+/Value Add).	• Lower the beta of real estate, relative to a securities portfolio.
Value enhancers: Partnerships and investment strategies enabling faster response to prevailing, and changing, market conditions.	• Alpha creation to achieve outperformance relative to the NFI-ODCE benchmark.

Asset Type Diversification

- The shift to long-term structures allows Staff to actively control asset class weightings and optimize sector exposures. Further, the relative performance of the different property types can vary considerably over time, hence the need for asset type diversification in portfolio construction.
- Staff will continue to pursue strategic partnerships and implement asset type diversification while taking into account sector weights (i.e., over/under) relative to the benchmark.

CY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Best	Ret	Ret	Apt	Off	Off	Ret	Ret	Apt	Apt	Ret	Ret	Ind	Ret	Ind	Ind
	Apt	Apt	Ind	Ind	Ind	Ind	Apt	Ret	Ind	Apt	Ind	Ret	Ind	Ret	Apt
	Ind	Ind	Ret	Apt	Ret	Off	Ind	Off	Ret	Ind	Apt	Off	Off	Apt	Off
Worst	Off	Off	Off	Ret	Apt	Apt	Off	Ind	Off	Off	Off	Apt	Apt	Off	Ret

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Source: PREA Research based on NCREIF study.

Portfolio Update – Implementation

Structure Comparison

Advantages	Challenges	OPERF Portfolio
Open-end funds		
• Liquidity • Access to professionally-managed and diversified portfolio • Relatively low fees • Existing pool of assets to underwrite	• Limited control • Liquidity may not be available when desired (entry queues in up markets, exit queues in down markets) • Primarily limited to lower-risk strategies	• 10-20% of portfolio
Closed-end funds		
• Managerial expertise and specialized areas • LP can choose fund with a specific strategy • Wide range of available strategies to choose from • Managers have discretion to pursue opportunities	• Higher fees, particularly carried interest • Limited control • Lack of liquidity • Blind pool • J-curve • Fixed term may not coincide with real estate cycle	• Limited to Value Add and Opportunistic • 20-40% of portfolio
Separate Accounts		
• Access to expert managers • Control and flexibility, set parameters and varying levels of manager discretion • Limited liquidity (same as property) • Lower costs (generally as scale is obtained)	• Need substantial capital to obtain a diversified portfolio	• Core through Value Add strategies • 60-70% of portfolio
Direct investment		
• Greatest control • Overall costs low	• Need in-house expertise • Need substantial capital to obtain a diversified portfolio	N/A

- Historically, the OPERF real estate portfolio was heavily reliant on closed-end fund investments. That approach pursued high total returns, but in turn incurred higher expenses and elevated levels of risk and volatility. That approach also produced limited diversification benefits for OPERF.
- Direct investments would require a substantial increase in internal resources and a new governance structure.
- Given OPERF's scale and Staff's access, current portfolio objectives include a) strategic partnerships using separate account structures to enhance control and improve GP-LP alignment, and b) high quality open-end fund commitments to minimize fees and improve transparency. These primary objectives will be balanced with tactical investments designed to respond to market conditions and provide sustained outperformance relative to the benchmark.

Source: PREA Research; OST.

Portfolio Update – Manager Diligence

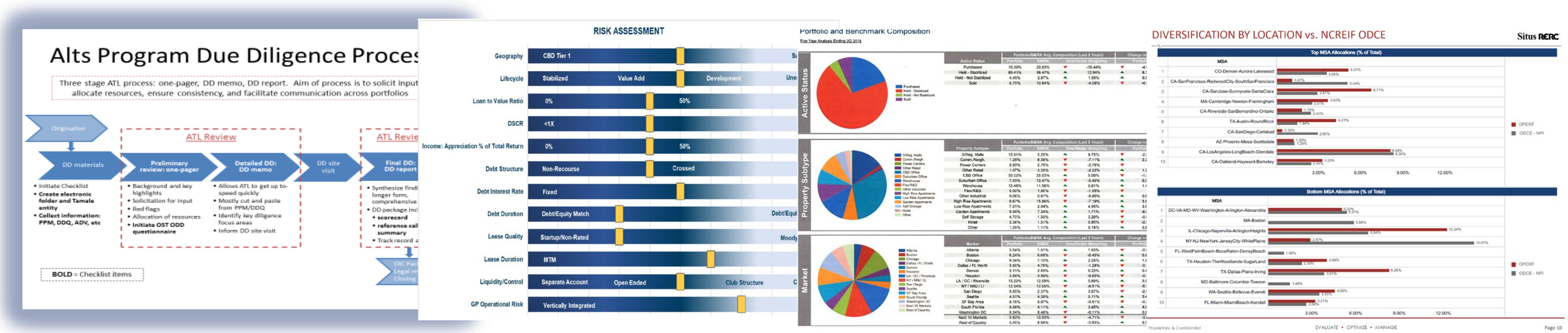
Portfolio analytics

The shift to open-end fund commitments and separate accounts improves Staff’s ability to capture portfolio analytics and performance attribution.

- RERC: Provides valuation oversight services, with annualized appraisals and quarterly “desktop” reviews, allowing for improved mark-to-market periodicity and performance attribution relative to the portfolio benchmark.
- MSCI: Provides customized benchmarks, thereby enabling Staff to structure tailored performance hurdles aligned with OPERF’s portfolio objectives.

Diligence of prospective core and strategic partnerships requires higher levels of portfolio analytics than previously possible to ensure market and property type exposures meet long-term portfolio construction targets.

With continued emphasis on evergreen partnerships, frequency of new partnership underwriting will fall, albeit with a corresponding increase in portfolio monitoring, performance attribution and capital allocation assessments to maintain desired target exposures relative to the benchmark.



Source: OST; RERC; MSCI.

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2019 Plan – Pacing

Investment strategies Staff will be seeking, for both short- and long-term portfolio diversification, include the following:

CORE

- **Multifamily** – Currently reviewing separate account managers and open-ended funds within the mid-market and workforce housing sectors to complement current portfolio holdings.
- **Industrial** – Continued overweight to the industrial sector given its long-term growth potential, historic lower volatility and efficient cash flow characteristics.
- **Retail** – Similar to multifamily above, researching SMAs and open-end structures with long-term hold strategies in subsectors complementary to current holdings. Longer diligence efforts are required to identify a) viable long-term investment strategies and b) partners with proven operational expertise given this property type's current challenges and transformation potential.
- **Core+ open-end fund** – seeking an open-end fund commitment capable of delivering sustained outperformance relative to the NFI-ODCE benchmark. Potential anchor/seed investor role for enhanced LP economics and tailored terms.

VALUE ADD

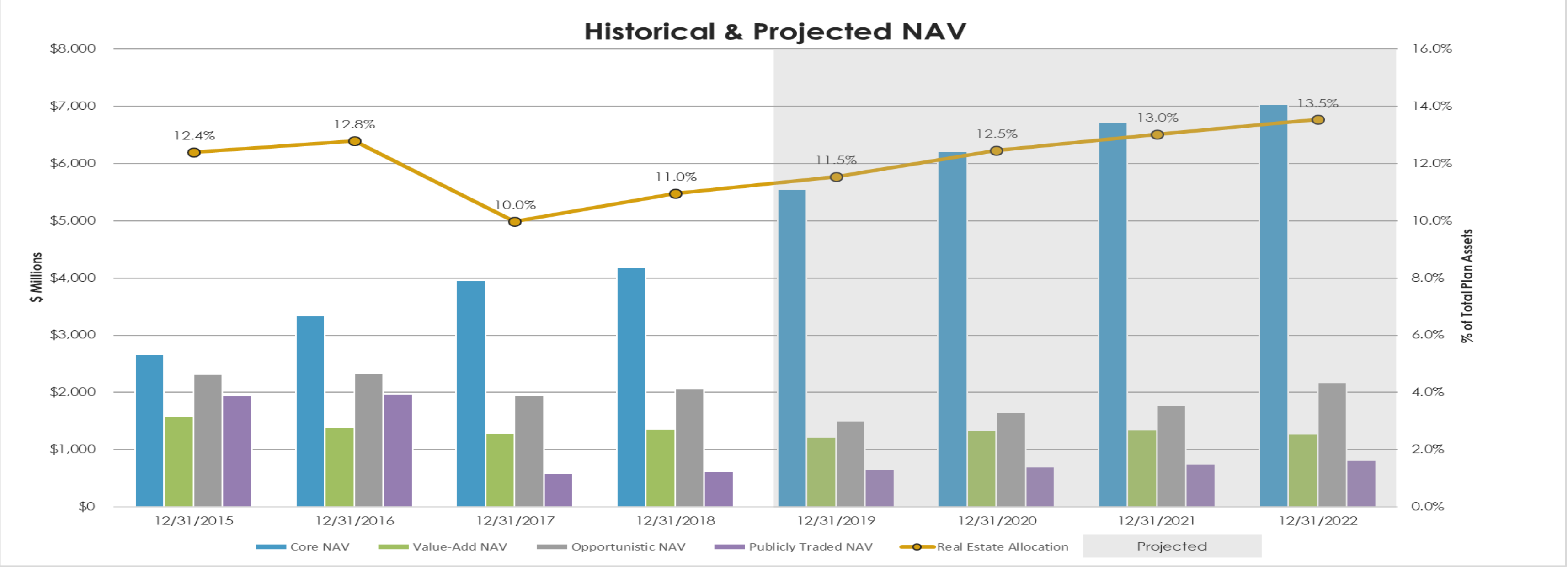
- Given the current 15% weighting to Value Add (and 20% strategic target) and Staff's ongoing efforts to reduce manager count, new investments will be primarily limited to select re-ups with existing partnerships.

OPPORTUNISTIC

- With a 20% target and 21% current allocation, Staff does not anticipate seeking new opportunistic commitments in the near term.
- Continue underweighting this sector, and allow existing and legacy opportunistic funds to liquidate….thereby providing "dry powder" for future commitments should an opportunistic-rich environment emerge.

2019 Plan – Pacing

- **Future real estate target exposures will have less reliance on pacing and greater emphasis on strategic partnership allocation management**
  - With 60-70% of the portfolio shifting to evergreen structures, Staff will be able to manage the real estate portfolio within its allocation range by controlling capital recycling and dividend reinvestments.
  - In the case of separate accounts and REITs, Staff will maintain control over capital deployment (acquisition pacing) or asset liquidation, if needed.
  - At 20-30% of the portfolio, closed-end funds will have a reduced impact on capital pacing considerations and be limited to opportunistic and some value add strategies.



Source: PCA; OST.

2019 Plan – Initiatives

Staff Priorities

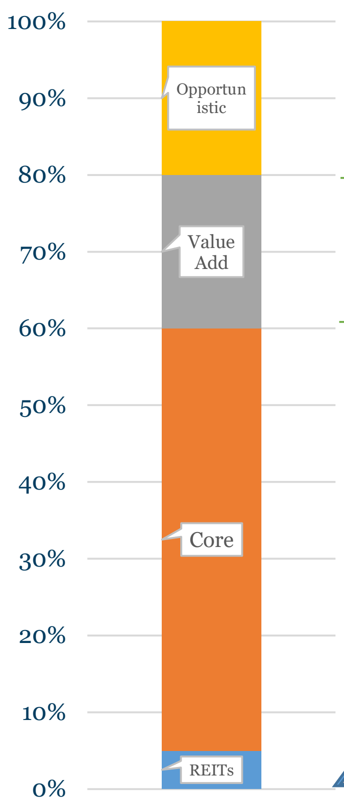
1. **$800 million - 1.3 billion in new commitments.**
   - 4-6 commitments of $150–300 million
2. **Research diversification attributes of international Core real estate exposures.**
3. **Research creation of a debt facility for separate account portfolio.**
   - Would allow OPERF to reduce risk through greater control of portfolio leverage, optimize asset-level flexibility, and enhance performance attribution through unlevered GP return analytics.
4. **Amend existing separate account agreements to reflect updated terms and improved LP economics, particularly when scale has been obtained.**
5. **Commence mandatory OIC Real Estate Consultant search.**
   - Current 7-year contract expires on June 30, 2020.
6. **Continue enhancements to due diligence and monitoring capabilities.**
   - Enhanced data capture and improved monitoring remain focus areas for 2019.
7. **Onboard two new real estate professionals, an Investment Officer and an Analyst.**
8. **Initiate training program ("Bootcamp") for RE Staff and analysts.**
   - 60-hour program, over three phases; leveraging GP platforms; skillsets; and training.

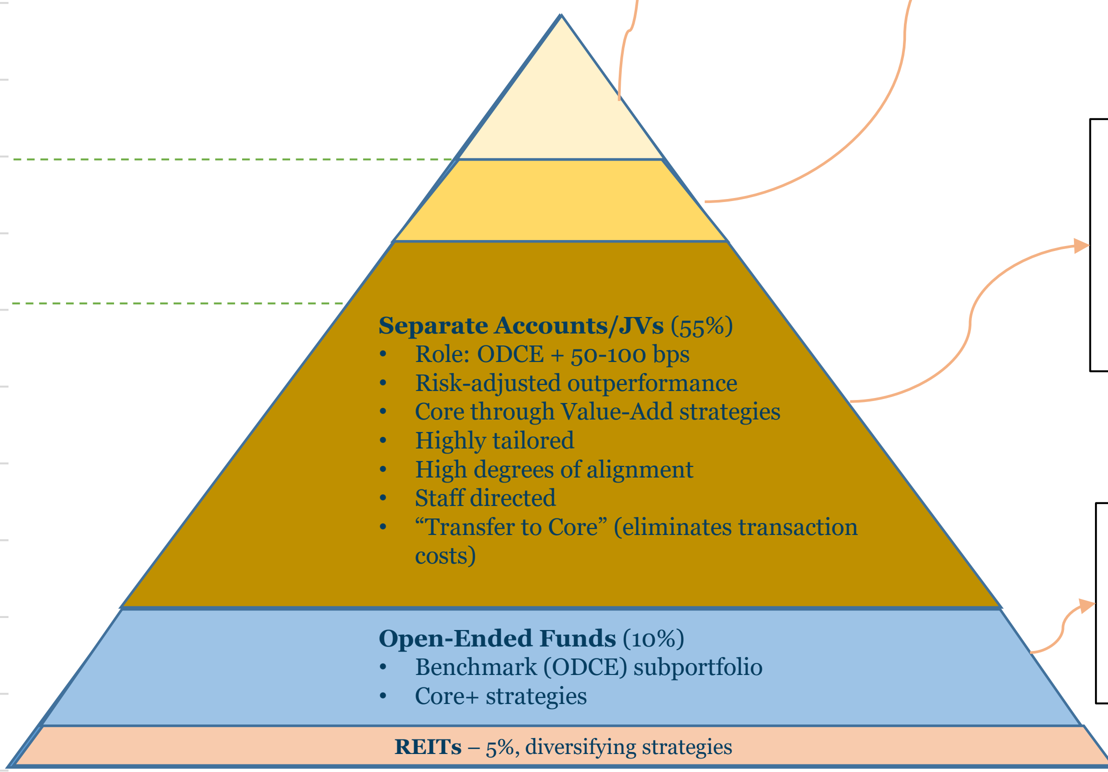
2019 Plan – Long Term Construction Plan

Opportunistic (Closed-End Funds)
- Allocation Range: 10-30%
- Objective: Tactical/ODCE + 300 bps
- Optimized portfolio:
  - 8-10 relationships
  - $200MM min / fund
- 2019 focus: None

Value-Add (Closed-End Funds)
- Allocation Target: 10-30%
- Objective: ODCE + 100 bps
- Optimized portfolio:
  - 4-6 relationships
  - $200MM min / fund
- 2020 Focus

Policy Allocations





Separate Accounts
- Objective: ODCE + 50 bps
  ODCE + 100 bps (VA)
- Optimized portfolio
  - 4-6 relationships (Core)
  - 2-4 relationships (VA)
- +$400M / SMA
- 2019 focus: Active

Open-End Allocation (Core)
- Allocation Target: 10%
- Optimized portfolio
  - 7-9 funds
  - $200+MM / SMA
- Benchmark: ODCE
- 2019 focus: Active

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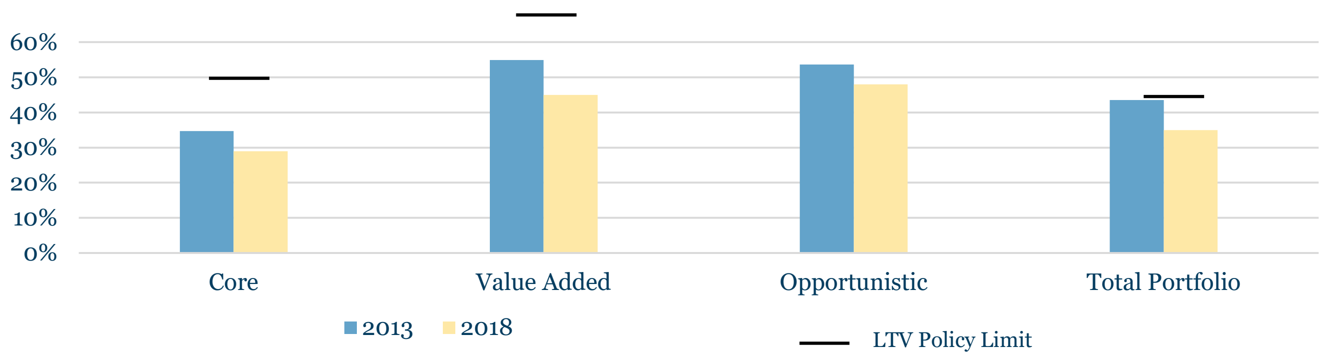
2019 Plan – Housekeeping / Policy Reporting

Leverage

- Leverage significantly decreased over the past five years.
- Staff has been actively negotiating lower leverage mandates within separate account universe.
- Addition of open-end funds to portfolio, with an average LTV of 23%, has reduced overall portfolio leverage.
- With minimal new commitments to Value Add and Opportunistic, the LTV ratio has been trending down as assets in these two categories mature and/or are liquidated.
  - As of 9/30/2018, leverage for the Total, Core and Value Add allocations was approximately 35%, 29% and 45%, respectively, compared to the 50%, 45% and 65% respective policy leverage limits. Leverage in the Opportunistic allocation was 48% with no stated policy leverage limit.



2018 Non-Mandate Activity

Partner	Partnership	Acquisition Type	Acquisition Price ($M)	Location	Strategy
Lincoln	Columbia Industrial Properties (CIP)	Office	$58	Seattle, WA	Core

Sources: OST; Private Edge.

Conclusion

Key takeaways…

1. Performance has been strong through all time periods, both on an absolute and benchmark-relative basis.
2. Portfolio is within the revised policy allocations implemented in 2015.
3. As a result of REIT liquidations in late 2017 and slower, private structure capital pacing, the Portfolio remains at lower end of its target allocation range. Consistent with the pacing plan established in 2015, Staff and Consultant are projecting the portfolio to hit its target midpoint by year-end 2020.
4. With the shift to core and evergreen structures, the portfolio should remain cash flow positive.
5. Significant enhancements to staffing, the internal underwriting process, and monitoring efforts enable improved portfolio oversight and long-term program success.

Looking forward…

1. Continue seeking strongly aligned strategic partnerships and leveraging OPERF's scale to drive down fees.
2. With scalable strategic partnerships, complemented by select, tactical investments, the portfolio is well-positioned to deliver on its role of improving overall OPERF diversification and delivering modest, excess returns relative to its policy benchmark.

PCA SWOT Analysis

Strengths

- Clear role within OPERF
- OIC / governance framework
- Portfolio construction (separate accounts and funds)
  - Increased use of separate accounts and open-end funds creates better alignment
  - Substantially more capital in evergreen vehicles
  - Fee efficient
- Strong historical performance of strategic core investments
- Staff experience with portfolio

Potential Weaknesses

- Early stages of exploring and integrating third-party data providers to better understand portfolio performance
- More management responsibility for Senior Investment Officer with increased head count
- Transition from "silo" approach to a more integrated investment function may require cultural shifts within the organization

Opportunities

- Lean into long-term themes
- Further reduce number of partnerships and restructure strategic relationships; potentially increase co-investments
- Further refine attribution analysis and portfolio management discipline
- ESG integration into property portfolio
- Consider secondary sale of legacy holdings

Threats

- Market cycle
- Rising cost of debt capital
- Abundant capital in the market
- Technology changes the manner in which space is consumed by tenants
- Uncertain regulatory environment could lead to bursts of new speculative construction

Source: PCA

PCA Conclusion

Five Years Into New Asset Class Role

THEN	NOW
Total Return Seeking	Income-focused, diversifying role
Large number of managers	Shorter manager roster
More complexity	Less complexity
More market timing	Less vintage year risk
Team of one	Larger team
Fully outsourced due diligence	Enhanced internal processes
Higher fee structures	Greater fee efficiency
Lower alignment	Higher alignment
Higher volatility	Lower volatility

Source: PCA

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Tobias Read
Oregon State Treasurer

350 Winter St NE, Suite 100
Salem, OR 97301-3896

oregon.gov/treasury

TAB 7 – Liquidity Update & Analysis

OPERF

OPERF Cash Flow/Liquidity Analysis

Purpose

Provide the OIC with an introduction to the OPERF ("Fund") cash flow and liquidity project, and restate the collective understanding of OPERF's short- and long-term investment objectives. To simultaneously pursue these at times conflicting objectives, the OIC needs to balance its consideration of three Fund attributes during the strategic asset allocation process: long-term returns; short-term volatility; and liquidity.

Background

OIC's Investment Belief 2-A states: "The timing and magnitude of projected employer contributions and future benefit payments have significant cash flow implications and thus will receive explicit consideration during the OIC's asset allocation decision-making process." Furthermore, OIC's INV 1203: Statement of Investment Objectives and Policy Framework for the Oregon Public Employees Retirement Fund, under the investment objective section, states: "The Council believes, …, the investment policies summarized in this document will provide the highest possible *return* at a level of risk that is appropriate for active and retired PERS members. The Council evaluates risk in terms of both short-term asset price volatility and long-term plan viability."

Like many of its public pension fund peers, OPERF is a mature, "cash flow negative" fund -- i.e., it pays out more in benefits than it receives in contributions. As the Fund continues along its maturation trajectory, investment earnings play an increasingly critical role in meeting the Fund's annual benefit payment obligations. As a result, OPERF's short-term goal is increasingly defined by its ability to meet its annual cash flow and liquidity demands.

- Total Benefits + Expenses = Total Contribution + Investment Earnings
- Total Benefits – Total Contribution = Investment Earnings – Expenses
- Net Benefit Payments = Investment Earnings - Expenses

OPERF's liquidity profile warrants analysis and attention because 1) total benefit payments continue to rise at an annualized rate of 2.6%, and are projected by PERS actuary Milliman to peak at $8.3 billion in 2040, a 75% increase from the $4.7 billion in total benefits paid in 2018; and 2) most of OPERF's 42.5% strategic asset allocation to Alternatives is illiquid, and therefore does not provide a primary source of short-term liquidity. Finally, OPERF's cash flow needs have historically been met through sales of public equity securities, an approach that makes the Fund increasingly vulnerable to future downturns in global equity markets.

In order to deliver the highest possible return at an appropriate risk level, OPERF needs abundant exposure to equity beta (i.e., risk assets), in both public and private structures. Empirical research performed by Wang and Spinney[1] found: "As expected, greater allocation to risk assets results in a lower long-term risk of the endowment falling below its initial value because of the higher expected returns from those risk assets. However, risk assets, while offering higher risk premiums over the long-term, come with greater downside risks in the short term." Indeed, the realization of a material drawdown event may impact (or even impair) a fund's capacity to sustainably meet its benefit payment obligations.

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[1] Wang, P., and J. Spinney. 2017. "Strategic Asset Allocation: Combining Science and Judgement to Balance Short-Term and Long-Term Goals." *Journal of Portfolio Management* 44(1): 69-82.

Accordingly, cash flow-negative funds such as OPERF are highly sensitive to drawdown risk, even when associated spending rate increases (i.e., increases in the fund’s pay-out ratio) are modest.

Staff Recommendation
None, information only.

March 13, 2019 Oregon Investment Council

OPERF Cash Flow/Liquidity Analysis

Jiangning (Jen) Plett
Karl Cheng
Portfolio Risk and Research

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Agenda

- Introduction
- Investment Beliefs and Policy
- OPERF's Long-term Plan Viability
- Payout Ratio
- Cash Sources and Uses
- Asset Allocation and Liquidity
- Stress-Test Simulations
- Key Takeaways

Appendix

- Legislative Fiscal Office (LFO) Budget Information Brief on PERS Liquidity and Insolvency Risk
- Staff Observations

Introduction

- OPERF is a mature, “cash flow negative” pension fund -- i.e., it pays out more in benefits than it receives in contributions.
- OPERF’s liquidity profile warrants analysis and attention because:
    1. PERS’ total annual benefit payments continue increasing and are projected to peak in 2040 for existing member populations; and
    2. Most of OPERF’s 42.5% strategic asset allocation to Alternatives is illiquid.
- Based on its system-wide actuarial valuation results as of 12/31/2017, Milliman, the PERS actuary, projects total pension benefit payments will grow at an annualized rate of 2.6% to $8.3 billion by 2040, a 75% increase from the $4.7 billion in total benefits paid in 2018.
- OPERF’s cash flow needs have been mainly met through liquidations of public equity securities, making the Fund vulnerable to market downturns.
- The Global Financial Crisis (GFC) highlighted the importance of liquidity management. To meet liquidity requirements, many asset owners were forced to liquidate publicly-traded assets at depressed prices; some, such as Harvard University’s endowment, had to sell private assets on the secondary market at significant discounts to intrinsic value.
- As of 12/31/2018, $5.2 billion or 7% of OPERF is invested in an allocation to U.S. Government bonds. This portfolio replicates the Bloomberg Barclays Treasury index, and hence should help mitigate equity market volatility and provide liquidity at the total Fund level.

Investment Beliefs and Policy

Investment Beliefs – INV 1201

2.) ASSET ALLOCATION DRIVES RISK AND RETURN

A. Asset allocation is the OIC's primary policy tool for managing the investment program's long-term risk/return profile.

- The timing and magnitude of projected employer contributions and future benefit payments have significant cash flow implications and thus will receive explicit consideration during the OIC's asset allocation decision-making process.

Investment Policy 1203: Statement of Investment Objectives and Policy Framework for OPERF

INVESTMENT OBJECTIVE

1. The Council believes, based on the assumptions outlined herein, that the investment policies summarized in this document will provide the highest possible *return* at a level of *risk* that is appropriate for active and retired OPERF members. The Council evaluates risk in terms of both short-term asset price volatility and long-term plan viability.

Short-term Risk vs. Long-term Risk

In a paper published by Wang and Spinney[1], the authors define short-term risk as a portfolio drawdown event in any one year and long-term risk as the probability of a portfolio's long-term real (i.e., inflation-adjusted) value falling below its initial value at some future point in the investment horizon.

They found that "As expected, greater allocation to risk assets results in a lower long-term risk of the endowment falling below its initial value because of the higher expected returns from those risk assets. However, risk assets, while offering higher risk premiums over the long-term, come with greater downside risks in the short term."

The realization of a material drawdown event (e.g., 2008-09) may impact (or even impair) a portfolio's sustainable distribution (i.e., pay-out) rate. In addition, the authors suggest that "even small spending rate increases have significant consequences for the portfolio's risk profile, and may leave cash-flow-negative institutions highly sensitive to drawdown risk."

1 Wang, P., and J. Spinney. 2017. "Strategic Asset Allocation: Combining Science and Judgement to Balance Short-Term and Long-Term Goals." *Journal of Portfolio Management* 44(1): 69-82.

OPERF's Long-term Viability

Calendar Year	OPERF ex-IAP in $ Billions A	Asset Growth Rate B	Actuarial Accrued Liability (AAL) C	Liability Growth Rate D	Asset Liability Gap = A - C E
2004	46.7		47.4		(0.7)
2005	51.6	10.4%	49.3	4.0%	2.3
2006	57.5	11.5%	51.3	4.0%	6.3
2007	61.2	6.4%	52.9	3.2%	8.4
2008	43.1	-29.5%	54.3	2.6%	(11.1)
2009	48.8	13.2%	56.8	4.7%	(8.0)
2010	52.2	7.0%	59.3	4.4%	(7.1)
2011	50.8	-2.7%	61.2	3.2%	(10.4)
2012	55.5	9.1%	60.4	-1.3%	(4.9)
2013	61.3	10.4%	62.6	3.6%	(1.3)
2014	62.8	2.5%	73.5	17.4%	(10.7)
2015	61.2	-2.5%	76.2	3.7%	(15.0)
2016	62.4	1.9%	81.0	6.3%	(18.6)
2017	68.5	9.8%	84.1	3.8%	(15.6)
2018	65.7	-4.0%			
Average		**3.1%**		**4.6%**	
Annualized		**2.5%**		**4.5%**	

Source: State Street; PERS; and OST.

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OPERF's Long-term Viability

Calendar Year	OPERF ex-IAP in $Billions A	Asset Growth Rate B	Net Pension Payment (NPP) C	NPP Growth Rate D	Payout Ratio = - C_t / A_{t-1} E	Annual Return F	Payout Ratio and Annual Return = E + F G
2004	46.7		1.5				
2005	51.6	10.4%	1.2	-21.6%	-2.5%	13.2%	10.7%
2006	57.5	11.5%	1.9	68.1%	-3.8%	16.0%	12.2%
2007	61.2	6.4%	1.9	-5.0%	-3.2%	10.0%	6.7%
2008*	43.1	-29.5%	2.1	13.1%	-3.4%	-26.9%	-30.3%
2009	48.8	13.2%	2.2	3.3%	-5.0%	19.4%	14.4%
2010	52.2	7.0%	2.5	17.9%	-5.2%	12.6%	7.4%
2011*	50.8	-2.7%	2.7	4.8%	-5.1%	2.2%	-2.9%
2012	55.5	9.1%	2.4	-11.1%	-4.7%	14.3%	9.6%
2013	61.3	10.4%	2.7	15.0%	-4.9%	15.6%	10.7%
2014	62.8	2.5%	2.8	4.3%	-4.6%	7.3%	2.6%
2015*	61.2	-2.5%	2.8	-0.7%	-4.5%	2.0%	-2.5%
2016	62.4	1.9%	3.2	12.7%	-5.2%	7.1%	1.9%
2017	68.5	9.8%	3.3	2.8%	-5.3%	15.4%	10.1%
2018**	65.7	-4.0%	2.9	-10.1%	-4.3%	0.5%	-3.8%
Average		**3.1%**	2.4	**6.7%**	**-4.4%**	**7.8%**	3.3%
Annualized		**2.5%**		**5.0%**	**-4.4%**	**7.1%**	2.7%

* Highlighted rows indicate years during which fund balance declines were realized.

** The ratio in Column E declined due to higher pension contributions in 2018 which resulted in a lower, net PERS benefit payment obligation.

Source: State Street; PERS; and OST.

Return and Payout Ratio Impact Fund Asset Growth

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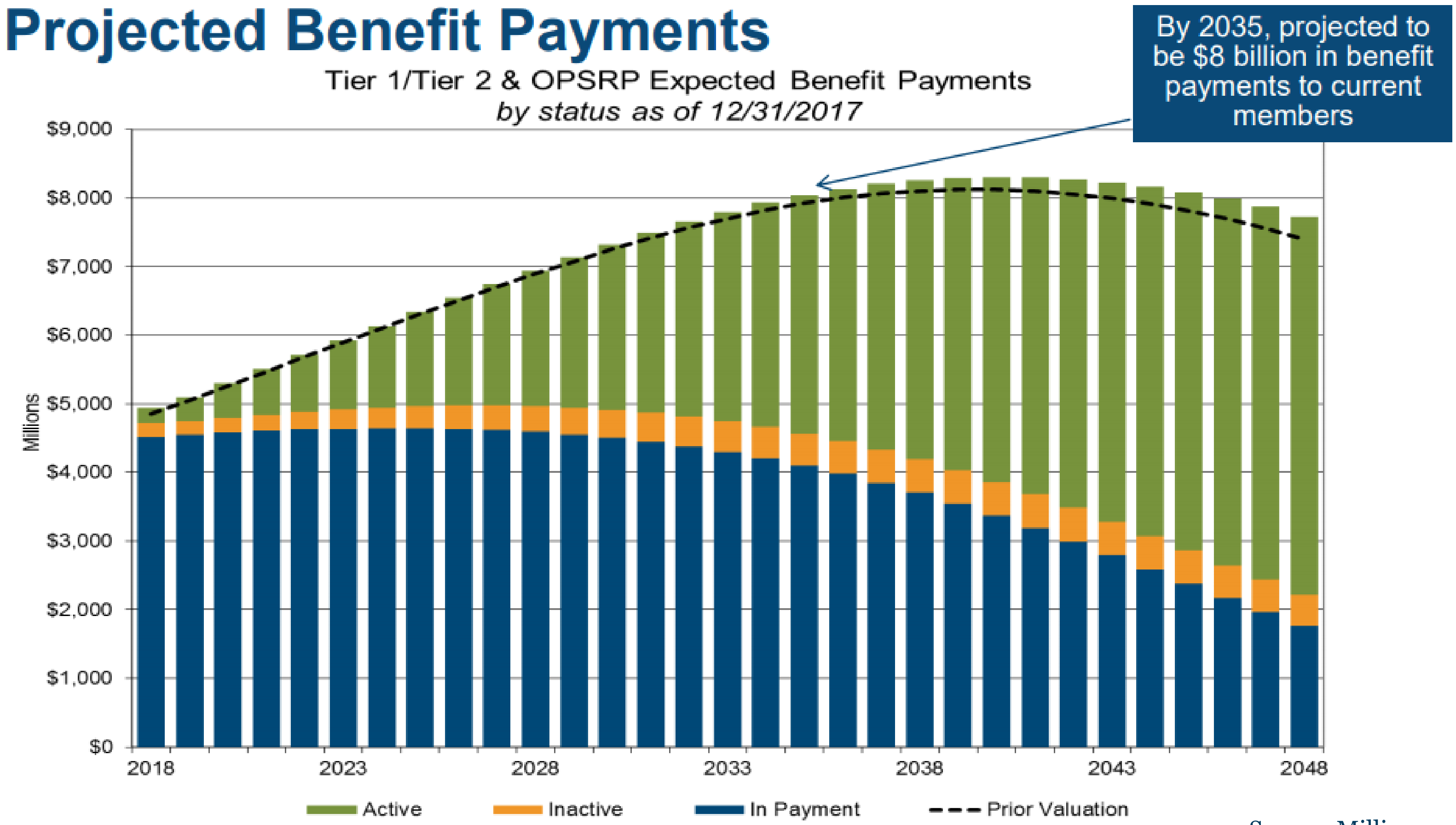
PERS Projected Benefit Payments



Source: Milliman.

Based on Milliman's system-wide actuarial valuation results as of 12/31/2017 on existing member populations, PERS' annual benefit payments are projected to peak at $8.3 billion in 2040. That level will represent an annualized growth rate of 2.6% or a 75% increase from 2018's $4.7 billion benefit payments.

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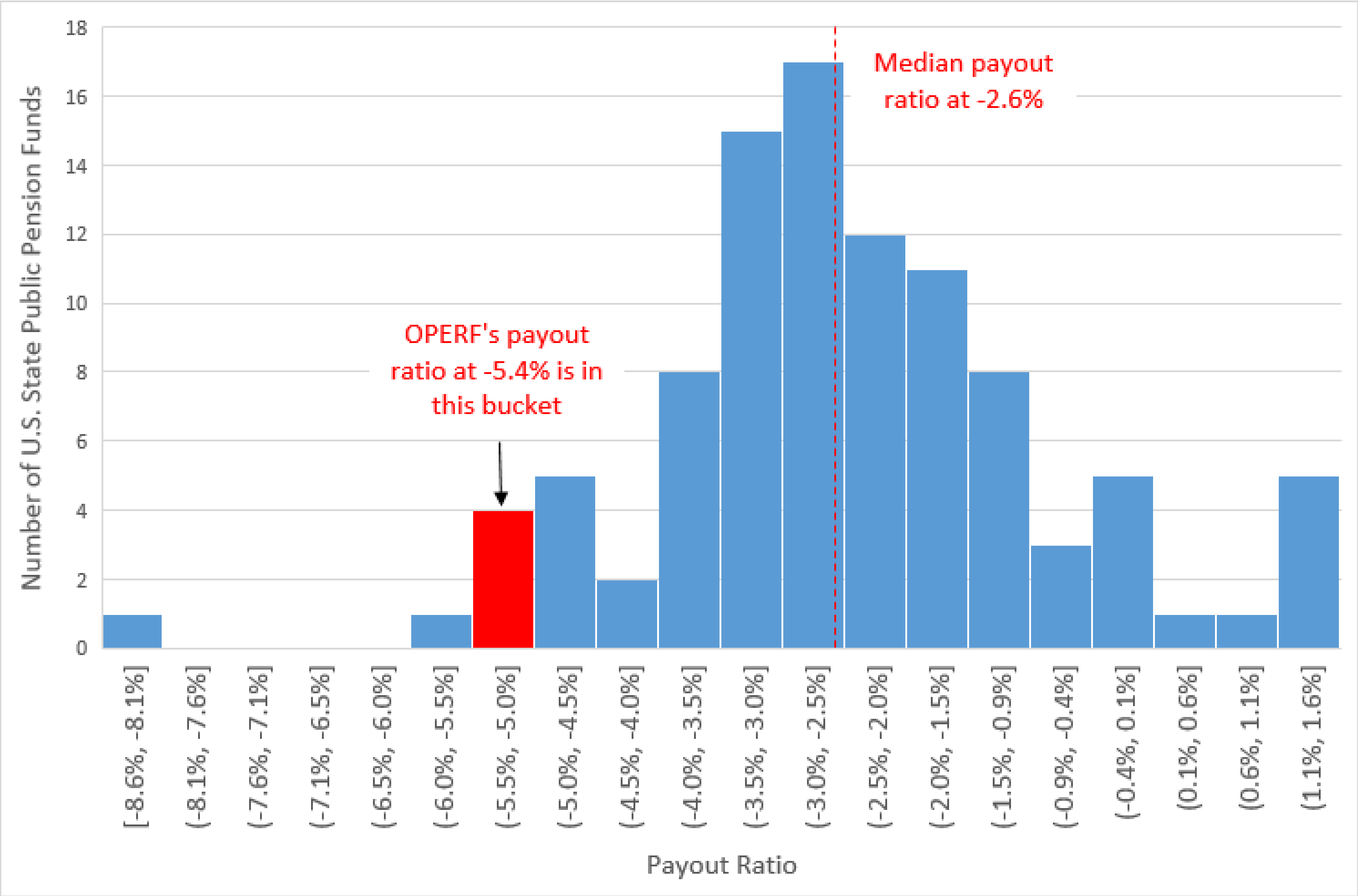
Payout Ratio by State, 2017



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Source: Public Plans Data.

Payout Ratio vs. Spending Rate

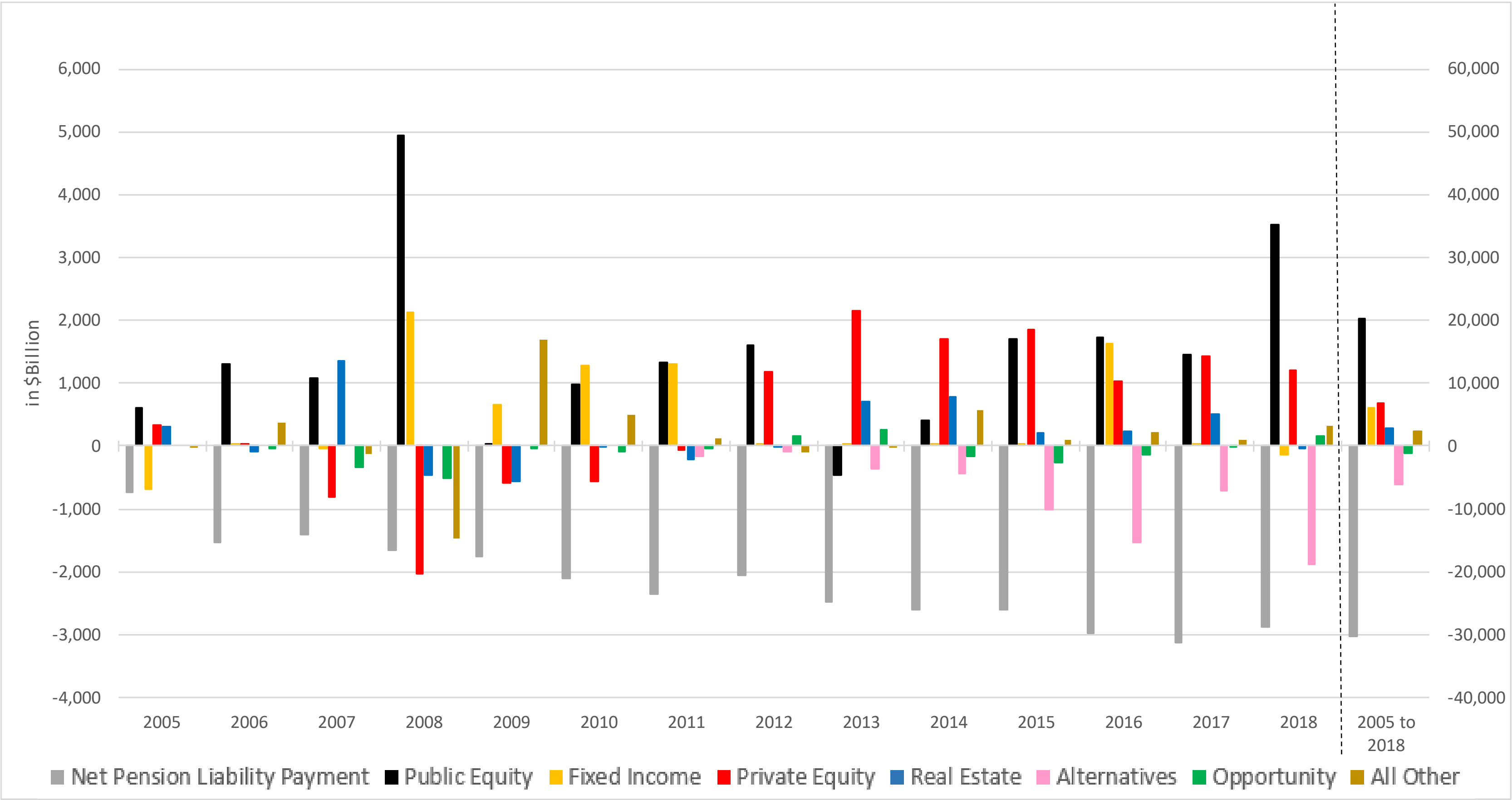
Average Annual Effective Spending Rates for Fiscal Years

OPERF Payout Ratio	Spending Rate	Total participating Endowments	Over $1 Billion Endowments
-5.2%	FY 2016	-4.3%	-4.4%
-5.3%	FY 2017	-4.4%	-4.8%

Source: NACUBO-Commonfund Study of Endowments for fiscal years ended June 30, 2016 and 2017, respectively.
Note: OPERF data as of December 31, 2016 and 2017, respectively.

Effective Spending Rate Definition:
The distribution available for spending divided by the beginning market value of the endowment, net of all management and administrative fees and expenses.

Cash Sources and Uses



- Prior to 2011, Private Equity was a net cash user. In 2008, Private Equity consumed $2 billion of cash due to large commitments which averaged $4 billion annually for three consecutive years. Since 2011, capital calls have been largely self-funded through GP distributions, and in the absence of another major market dislocation (e.g., GFC), OPERF's Private Equity portfolio is projected to remain cash flow positive.
- Public Equity and Fixed Income security sales have generated liquidity, except in 2013 when Private Equity was meaningfully cash flow positive, providing average monthly net inflows of $180 million.
- "All Other" includes the Russell overlay program (account 59AH) and other miscellaneous items.

OREGON STATE TREASURY

Asset Allocation and Liquidity

Asset Class	Target	Actual	1 Week	1 Month	1 Quarter	Illiquid
Cash & Overlay	0.0%	2.5%	2.5%			
Public Equity	37.5%	33.0%	29.1%	2.4%	0.7%	0.7%
Fixed Income	20.0%	19.6%	16.3%	3.3%		
Private Equity	17.5%	22.1%				22.1%
Real Estate	12.5%	11.2%	0.8%			10.4%
Alternatives	12.5%	9.2%	1.5%	1.3%	1.4%	5.1%
Opportunity	0.0%	2.3%	0.5%		0.3%	1.4%
Total	100.0%	100.0%	50.7%	7.0%	2.5%	39.9%

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 illiquid = 50% Lazard Closed-End Fund portfolio.

Fixed Income 1 Month = Below Investment Grade.

Real Estate 1 Week = REIT composite.

Source: OPERF 2018 Q4 Risk Dashboard.

Liquidity Through the Global Financial Crisis (GFC)

OPERF in $Billions	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Public Equity (EQ)	33,561	33,112	15,153	20,759	22,992	18.9%	8.9%	-42.6%	36.9%	15.7%
Fixed Income (FI)	14,914	15,635	11,884	13,174	13,334	5.8%	4.8%	-9.9%	25.7%	10.8%
Private Equity	5,793	8,770	9,845	9,847	11,973	23.1%	28.1%	-8.4%	-4.4%	16.4%
Real Estate	4,011	4,702	5,275	5,387	5,330	27.3%	10.2%	-13.6%	-9.4%	-1.9%
Opportunity	30	443	734	1,036	1,053	-	3.0%	-24.8%	37.5%	12.4%
Alternatives*	-	-	-	-	-	-	-	-	-	-
Cash & Cash Overlay	654	603	2,086	1,269	1,014	-	-	-	-	-
Total Fund	58,962	63,266	44,977	51,472	55,697	16.0%	9.9%	-26.9%	19.4%	12.6%
Total Cash, EQ and FI (TCEF)**	49,128	49,351	29,124	35,202	37,341	14.6%	7.6%	-30.8%	31.3%	13.9%
TCEF % of Total Fund	83.3%	78.0%	64.8%	68.4%	67.0%					
Net Pension Payment (NPP)	(1,949)	(1,851)	(2,093)	(2,162)	(2,549)					
Payout Ratio		-3.1%	-3.3%	-4.8%	-5.0%					
NPP % of Beginning Year TCEF		-3.8%	-4.2%	-7.4%	-7.2%					

* OPERF's Alternatives Portfolio was approved at the 1/26/2011 OIC meeting and seeded in mid-2011.

** Annual returns from 2006 to 2010 are for the Public Equity and Fixed Income portfolios.

Source: State Street; OST.

OREGON STATE TREASURY

GFC Stress-Test Simulation

Apply historical returns to simulation

OPERF ex-IAP in $Billions	2018	2019E	2020E	2008	2009
Public Equity (EQ)	21,659	11,935	14,068	-42.6%	36.9%
Fixed Income (FI)	12,901	10,838	11,540	-9.9%	25.7%
Private Equity	14,542	13,316	12,735	-8.4%	-4.4%
Real Estate	7,375	6,372	5,773	-13.6%	-9.4%
Opportunity	1,484	1,116	1,533	-24.8%	37.5%
Alternatives*	6,093	6,093	6,093	-	-
Cash & Cash Overlay	1,643	-	-	-	-
Total Fund	65,698	49,670	51,742	-26.9%	19.4%
Total Cash, EQ and FI (TCEF)	36,204	22,773	25,607	-30.8%	31.3%
TCEF % of Beginning Yr Total Fund	52.9%	34.7%	51.6%		
Net Pension Payment (NPP)**	(2,945)	(3,399)	(3,320)		
Payout Ratio	-4.3%	-5.2%	-6.7%		
NPP % of Beginning Year TCEF		-9.4%	-14.6%		

Assume a flat return for the Alternatives portfolio

* OPERF's Alternatives Portfolio was approved at the 1/26/2011 OIC meeting and seeded in mid-2011.

** Assume projected NPP for 2019 and 2020 based on Milliman's estimates of 50th percentile employer contribution rates.

Source: State Street; OST; and Milliman.

OREGON STATE TREASURY

Early 2000s Stress-Test Simulation

Apply historical returns to simulation

OPERF ex-IAP in $Billions	2018	2019E	2020E	2021E	2000	2001	2002
Public Equity (EQ)	21,659	19,267	15,223	11,033	-7.3%	-13.5%	-19.3%
Fixed Income (FI)	12,901	13,228	12,506	11,931	10.0%	8.1%	8.9%
Private Equity	14,542	18,394	15,148	14,213	26.5%	-17.6%	-6.2%
Real Estate	7,375	8,650	9,343	10,075	17.3%	8.0%	7.8%
Opportunity*	1,484	1,484	1,484	1,484	-	-	-
Alternatives*	6,093	6,093	6,093	6,093	-	-	-
Cash & Cash Overlay	1,643	-	-	-	-	-	-
Total Fund	65,698	67,116	59,798	54,830	2.1%	-6.5%	-7.9%
Total Cash, EQ and FI (TCEF)	36,204	32,495	27,729	22,964	-2.0%	-5.9%	-9.5%
TCEF % of Beginning Yr Total Fund	52.9%	49.5%	41.3%	38.4%			
Net Pension Payment (NPP)**	(2,945)	(3,399)	(3,320)	(3,107)			
Payout Ratio	-4.3%	-5.2%	-4.9%	-5.2%			
NPP % of Beginning Year TCEF		-9.4%	-10.2%	-11.2%			

Assume a flat return for the Opportunity and Alternatives portfolios

* OPERF's Opportunity and Alternatives Portfolios were not created prior to 2007.

** Assume projected NPP for 2019 to 2021 based on Milliman's estimates of 50th percentile employer contribution rates.

Source: State Street; OST; and Milliman.

OREGON STATE TREASURY

Key Takeaways

- As a mature, "cash-flow negative" pension fund, OPERF's liquidity profile warrants regular analysis and careful attention:

  - Based on its recent actuarial valuation results for current member populations, Milliman projects OPERF's total annual benefit payments will grow at an annualized rate of 2.6% or increase by 75% from $4.7 billion in 2018 to $8.3 billion in 2040.

  - OPERF's operating cash flow payout ratio was -5.3% in 2017, more than double the U.S. public pension fund average (-2.5%).

- Empirical research shows even small spending rate increases can have significant consequences for a portfolio's long-term risk profile, and may leave cash-flow-negative funds highly sensitive (i.e., vulnerable) to short-term drawdown risks.

- In summary, the OIC must balance the following three portfolio attributes in its OPERF asset allocation deliberations: Long-Term Return; Short-Term Risk; and Liquidity. The first two attributes affect OPERF's funded ratio and employer contribution rates, while Liquidity influences OPERF's capacity to meet pension obligations and capital calls without negatively impacting Return and Risk.

Appendix: Legislative Fiscal Office (LFO) Budget Information Brief

In December 2018, LFO issued a budget information brief on PERS Liquidity and Insolvency Risk. In the brief, LFO pointed out that

1. Page 3, "The absolute value of Oregon's operating cashflow-to-asset ratio has remained below the assumed rate of return and faces low insolvency risk."
2. Page 4, "…; however, since the operating cashflow-to-asset ratio is based on the beginning market value, rather than the end-of-year market value, the ratio fails to take into account the fact that market returns for calendar year 2017 were +15.15%, or over twice the assumed earnings rate of 7.2%. In dollar terms, market earnings in 2017 were $10.1 billion, or the single largest amount of calendar year earnings credited in PERS history and estimated to be $4.3 billion above assumed earnings. In other words, the operating cashflow-to-asset ratio will not account for these additional assets until the 2018 calculation is done, as that is when the earnings will be incorporated in the beginning market value of assets. This should reduce the operating cashflow-to-asset ratio, resulting in improved system liquidity. The ratio should see further improvement as contributions are slated to continue increasing for the next several biennia."
3. Page 4, "Over the long-term, the liquidity position of PERS should improve as benefit payments for Tier 1 and Tier 2 retirees and beneficiaries decline as the system transition to lower benefit payment for Oregon Public Service Retirement Plan members."

Appendix: Staff Observations

Point 1: OPERF's liquidity profile is a function of the difference between the payout ratio and the actual or realized investment return, not the difference between the payout ratio and the fund's assumed rate of return. Like all investment funds, OPERF's realized returns are far more volatile on a year-to-year basis than its assumed rate as set biennially by the PERS board.

From Oregon PERS FAQs: "The PERS Board decided on the assumed rate based on: 1) the long-term projection of investment returns based on the asset allocations of the Oregon Investment Council and the related capital market expectations, and 2) independent analysis by PERS' actuary, Milliman, of the projected returns from the asset allocation, over a long-term investment horizon."

Point 2: OPERF's realized return in CY2017 was +15.4%, the sixth highest annual return during the last 20 years. Focusing on the outsized return realized in any one single year obfuscates OPERF's otherwise high and persistent payout ratio (and the related investment and governance challenges associated with a persistently high payout ratio).

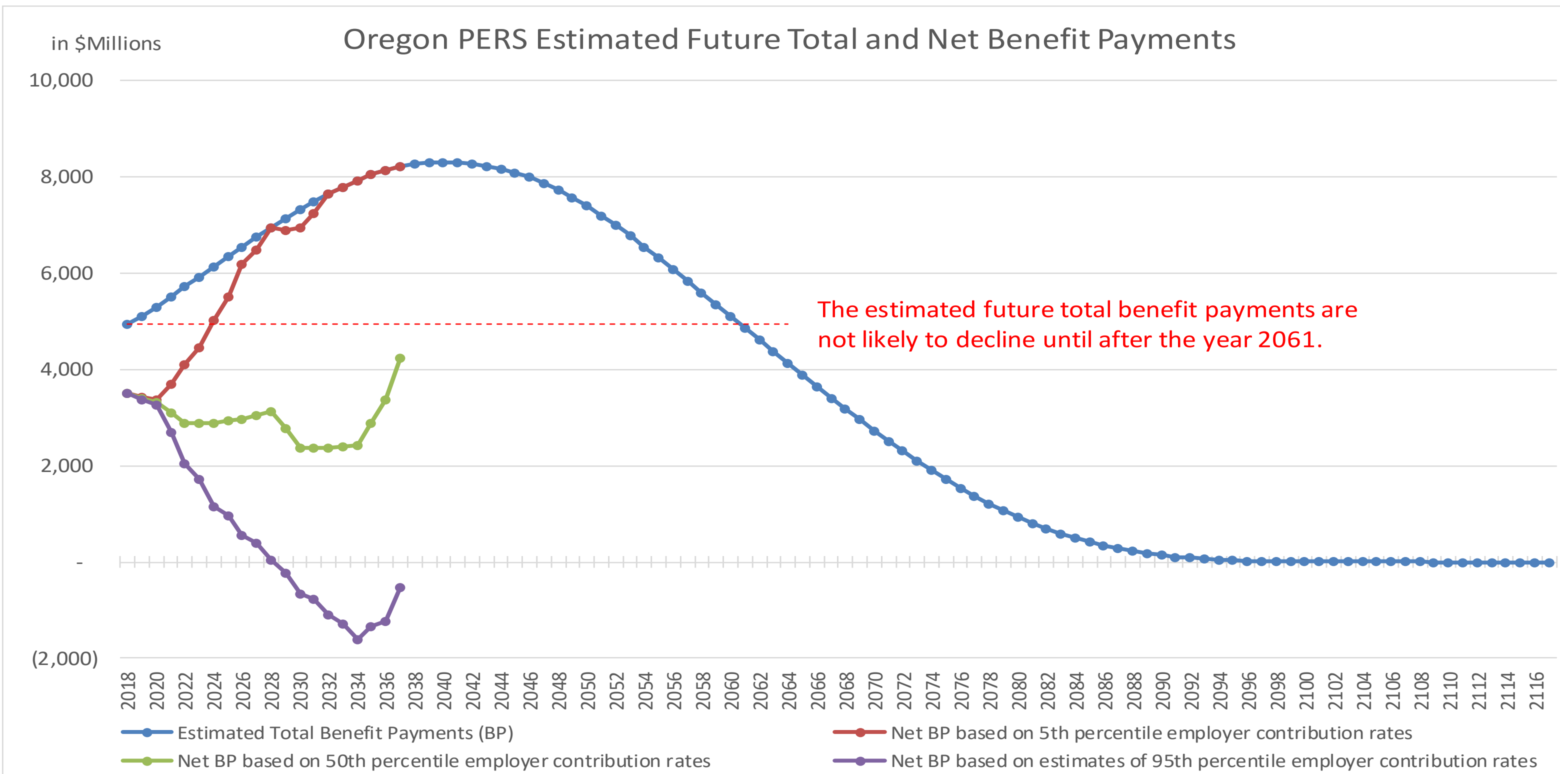
	Set By PERS Board	Actual or Realized		LFO Approach	Staff Approach
Calendar Year	**Assumed Return A**	**Annual Return B**	**Payout Ratio C**	**Gap = A + C D**	**Gap = B + C E**
2005	8.0%	13.2%	-2.5%	5.5%	10.7%
2006	8.0%	16.0%	-3.8%	4.2%	12.2%
2007	8.0%	10.0%	-3.2%	4.8%	6.7%
2008	8.0%	-26.9%	-3.4%	4.6%	-30.3%
2009	8.0%	19.4%	-5.0%	3.0%	14.4%
2010	8.0%	12.6%	-5.2%	2.8%	7.4%
2011	8.0%	2.2%	-5.1%	2.9%	-2.9%
2012	8.0%	14.3%	-4.7%	3.3%	9.6%
2013	8.0%	15.6%	-4.9%	3.1%	10.7%
2014	7.8%	7.3%	-4.6%	3.1%	2.6%
2015	7.5%	2.0%	-4.5%	3.0%	-2.5%
2016	7.5%	7.1%	-5.2%	2.3%	1.9%
2017	7.2%	15.4%	-5.3%	1.9%	10.1%
2018	7.2%	0.5%	-4.3%	2.9%	-3.8%
Average	7.8%	7.8%	-4.4%	3.4%	3.3%
Annualized	7.8%	7.1%	-4.4%		

Source: State Street; PERS; and OST.

OREGON STATE TREASURY

Appendix: Staff Observations

Point 3: Based on Milliman projections, and relative to the plan's 2018 payment obligation, PERS' total benefit payments are not likely to decline until the year 2061. Accordingly, the LFO statement that "system liquidity" should improve is somewhat speculative as such improvement may not manifest in the near term. On the other hand, if employer contributions rise at a rate matching the projected increases in total benefit payments, the system's net benefit payment obligation may hold steady (or even decline) which would reduce negative cash flow pressure on OPERF.



OREGON STATE TREASURY

Source: Milliman.

OREGON
STATE
TREASURY

Tobias Read
Oregon State Treasurer

16290 SW Upper Boones Ferry Road
Tigard, OR 97224

oregon.gov/treasury

TAB 8 – Asset Allocation & NAV Updates.

Asset Allocations at January 31, 2019

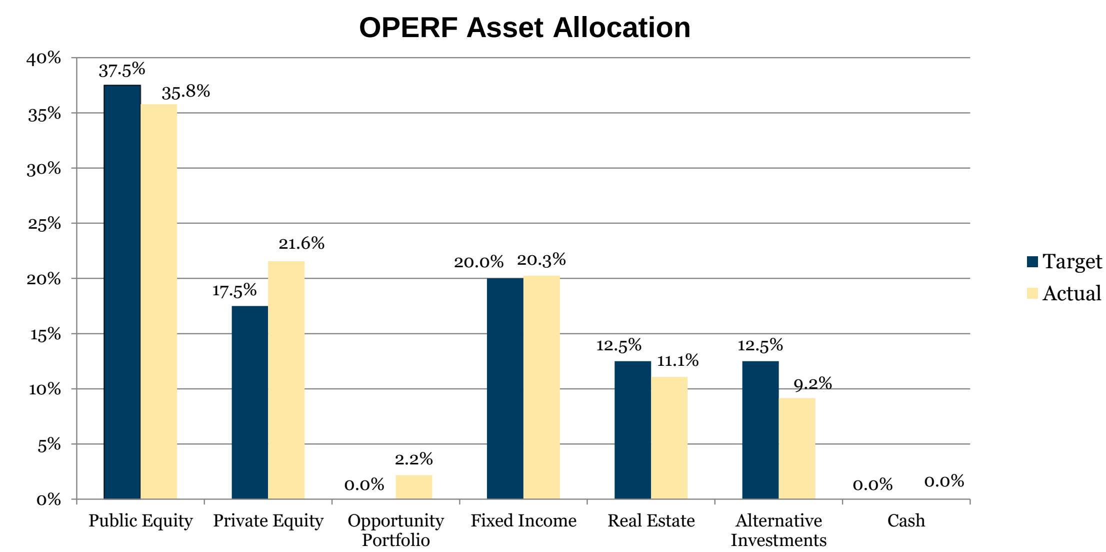
OPERF	Policy	Target[1]	Regular Account: $ Thousands	Regular Account: Pre-Overlay	Regular Account: Overlay	Regular Account: Net Position	Regular Account: Actual	Target Date Funds: $ Thousands	Variable Fund: $ Thousands	Total Fund: $ Thousands
Public Equity	32.5-42.5%	37.5%	25,908,346	34.8%	745,009	26,653,355	35.8%	992,721	488,776	28,134,852
Private Equity	13.5-21.5%	17.5%	16,056,476	21.6%		16,056,476	21.6%			16,056,476
Total Equity	**50.0-60.0%**	**55.0%**	**41,964,823**	**56.3%**	**745,009**	**42,709,831**	**57.3%**			**44,191,328**
Opportunity Portfolio	0-3%	0.0%	1,616,770	2.2%		1,616,770	2.2%			1,616,770
Fixed Income	**15-25%**	**20.0%**	**14,406,403**	**19.3%**	**683,953**	**15,090,356**	20.3%	1,289,655		**16,380,011**
Real Estate	**9.5-15.5%**	**12.5%**	**8,250,037**	**11.1%**	**(2,900)**	**8,247,137**	11.1%			**8,247,137**
Alternative Investments	**0-12.5%**	**12.5%**	**6,820,415**	**9.2%**		**6,820,415**	9.2%			**6,820,415**
Cash[2]	**0-3%**	**0.0%**	**1,428,892**	**1.9%**	**(1,426,062)**	**2,830**	0.0%		8,979	**11,809**
TOTAL OPERF		**100%**	**$ 74,487,339**	**100.0%**	**$ -**	**$ 74,487,339**	**100.0%**	**$ 2,282,376**	**$ 497,755**	**$ 77,267,470**

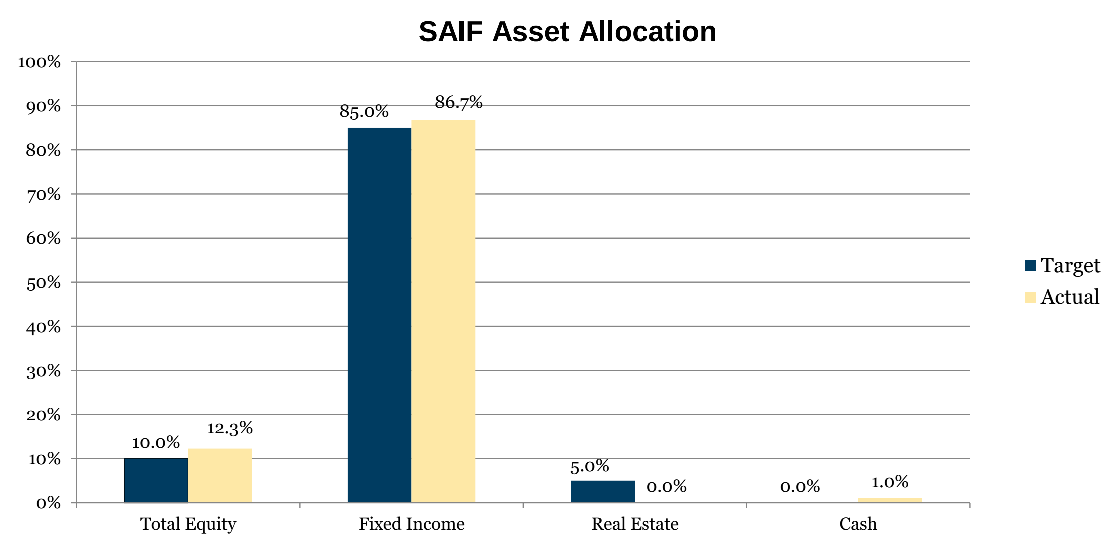
[1] Targets established in June 2015. Interim policy benchmark consists of: 40% MSCI ACWI IMI Net, 22.5% Custom FI Benchmark, 20% Russell 3000+300bps (1 quarter lagged), 12.5% NCREIF ODCE net (1 quarter lagged), & 5% CPI+400bps.

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

SAIF	Policy	Target	$ Thousands	Actual
Total Equity	**7-13%**	**10.0%**	**574,792**	**12.3%**
Fixed Income	**80-90%**	**85.0%**	**4,064,849**	**86.7%**
Real Estate	**0-7%**	**5.0%**	**-**	**0.0%**
Cash	**0-3%**	**0.0%**	**48,463**	**1.0%**
TOTAL SAIF			**$ 4,688,104**	**100.0%**

CSF	Policy	Target	$ Thousands	Actual
Global Equities	40-50%	45.0%	729,151	44.6%
Private Equity	8-12%	10.0%	210,588	12.9%
Total Equity	**58-62%**	**55.0%**	**939,739**	**57.5%**
Fixed Income	**25-35%**	**25.0%**	**447,777**	**27.4%**
Real Estate	**8-12%**	**10.0%**	**121,858**	**7.5%**
Diversifying Strategies	**8-12%**	**10.0%**	**89,819**	**5.5%**
Cash	**0-3%**	**0.0%**	**34,036**	**2.1%**
TOTAL CSF			**$ 1,633,230**	**100.0%**


OPERF Asset Allocation
40%
35%
30%
25%
20%
15%
10%
5%
0%
37.5%
35.8%
17.5%
21.6%
0.0%
2.2%
20.0%
20.3%
12.5%
11.1%
12.5%
9.2%
0.0%
0.0%
Public Equity
Private Equity
Opportunity Portfolio
Fixed Income
Real Estate
Alternative Investments
Cash
Target
Actual


SAIF Asset Allocation
100%
90%
80%
70%
60%
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20%
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12.3%
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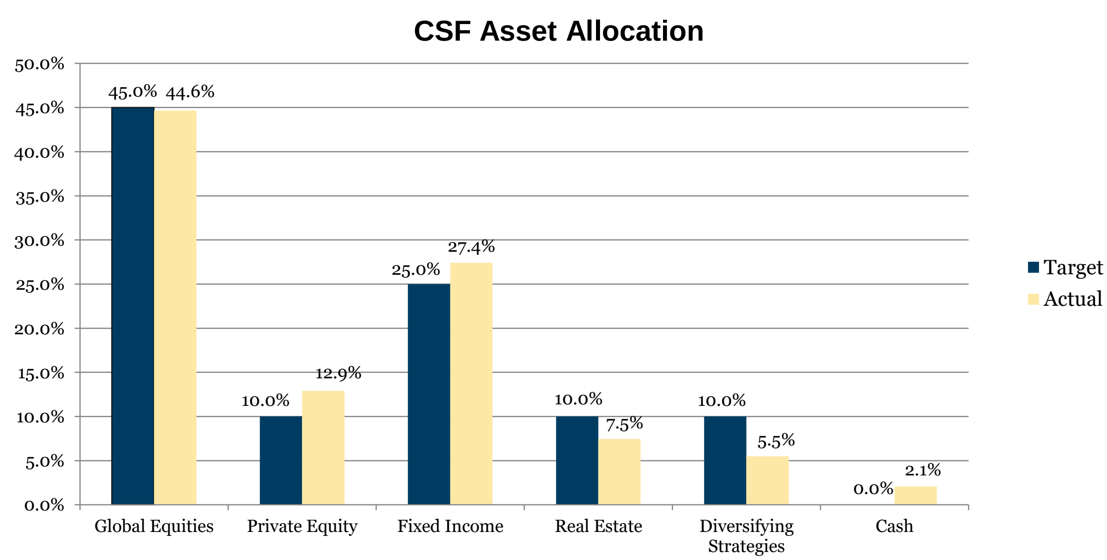
Total Equity
Fixed Income
Real Estate
Cash
Target
Actual


CSF Asset Allocation
50.0%
45.0%
40.0%
35.0%
30.0%
25.0%
20.0%
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5.0%
0.0%
45.0%
44.6%
10.0%
12.9%
25.0%
27.4%
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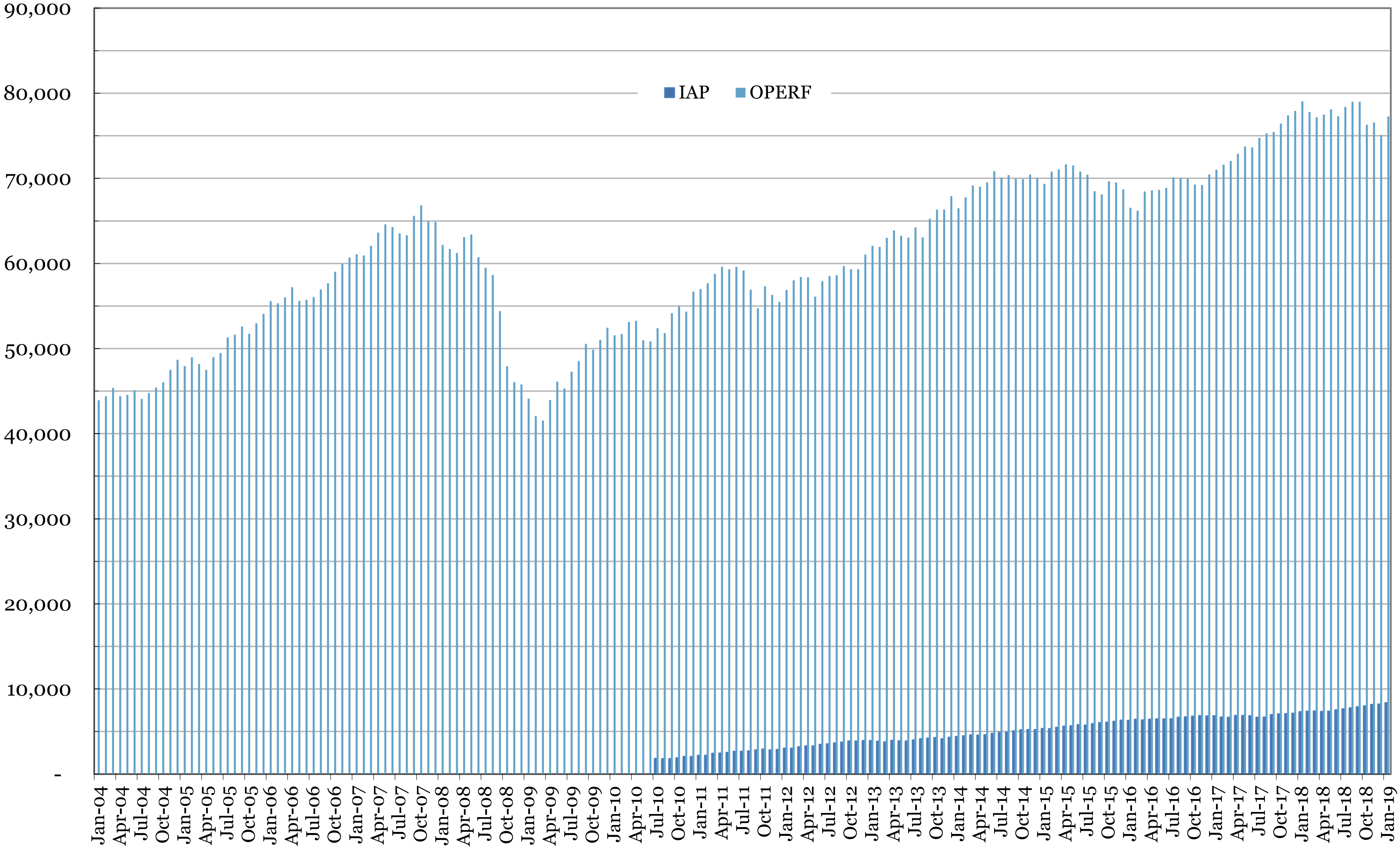
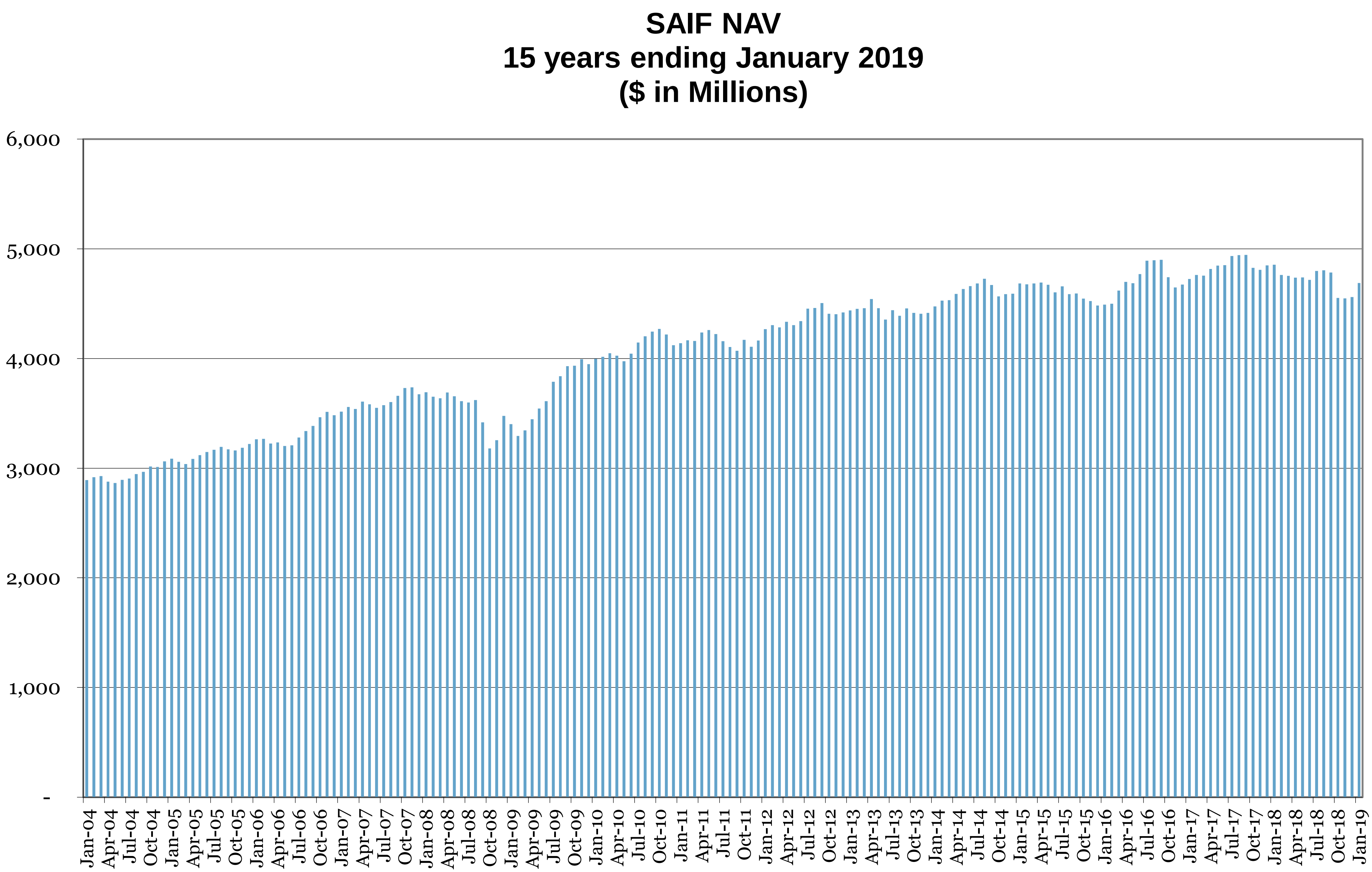
7.5%
10.0%
5.5%
0.0%
2.1%
Global Equities
Private Equity
Fixed Income
Real Estate
Diversifying Strategies
Cash
Target
Actual

OPERF NAV
15 years ending January 2019
($ in Millions)




SAIF NAV
15 years ending January 2019
($ in Millions)
6,000
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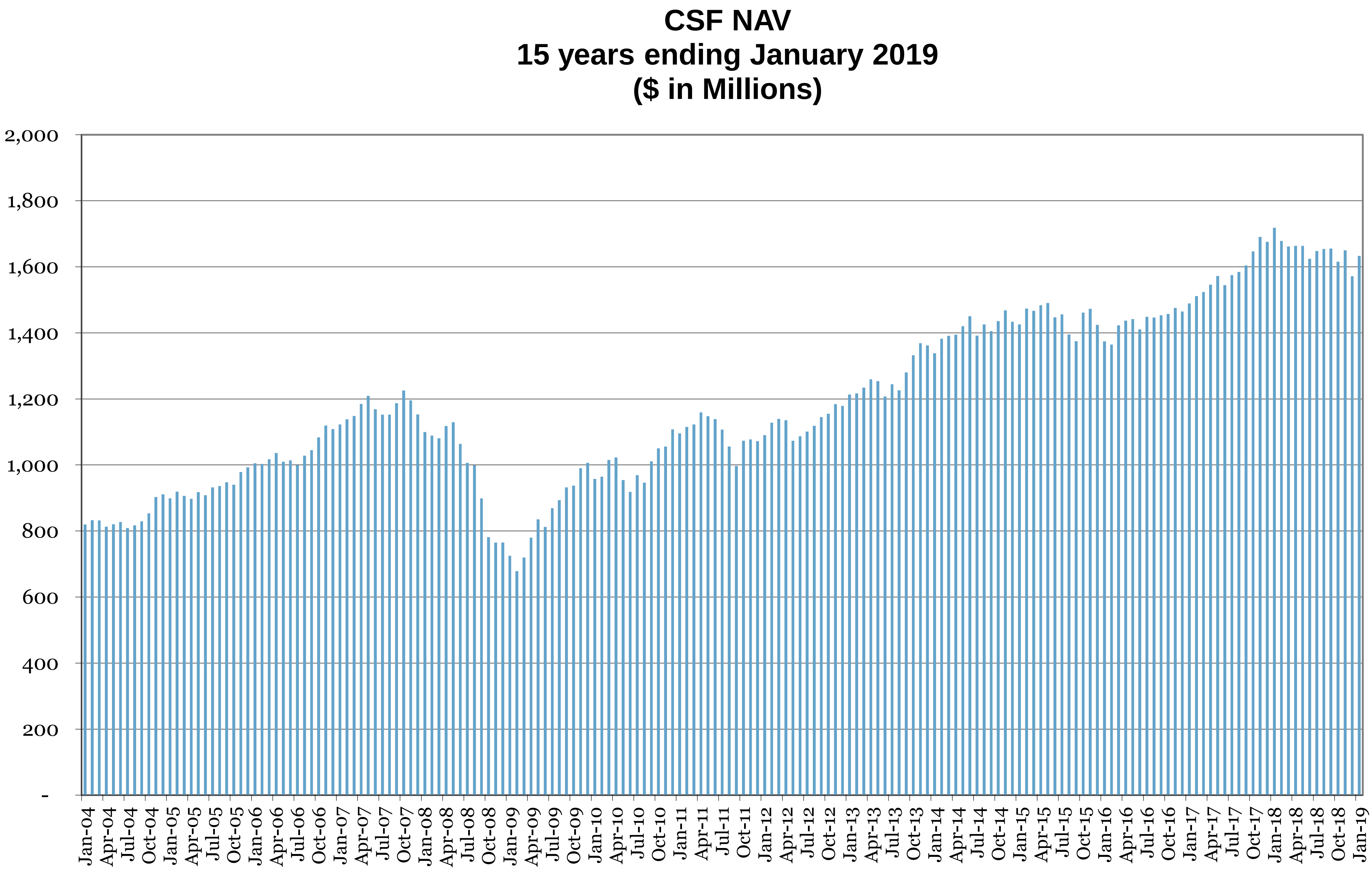
CSF NAV
15 years ending January 2019
($ in Millions)
2,000
1,800
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1,000
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Jan-19

TAB 9 – Calendar — Future Agenda Items

2019/20 OIC Forward Calendar and Planned Agenda Topics

April 24, 2019:	Private Equity Benchmark Discussion Asset Allocation & Capital Market Assumptions Update Securities Lending Update Strategic Asset Allocation Overlay Review SAIF Annual Review[1]
June 5, 2019	Alternatives Portfolio Review Q1 Performance & Risk Report Operations Update Joint PERS/OIC Board Discussion
August 7, 2019	Opportunity Portfolio Review OSGP Annual Review Corporate Governance Update
September 18, 2019	CEM Benchmarking Report Q2 Performance & Risk Report
October 30, 2019	General Consultant Recommendation Currency Overlay Review Public Equity Program Review
December 11, 2019	Fixed Income Program Review Q3 Performance & Risk Report
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

[1] Includes Asset/Liability study presentation.