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Oregon Investment Council

June 5, 2019

Rukaiyah Adams
Chair

John Skjervem
Chief Investment Officer

Tobias Read
State Treasurer



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OREGON INVESTMENT COUNCIL



Agenda

June 5, 2019
9:00 AM

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

| <u>Time</u> | <u>A. Action Items</u> | <u>Presenter</u> | <u>Tab</u> |
|-----------------------------|---|--|------------|
| 9:00-9:05 | 1. Review & Approval of Minutes April 24, 2019 | Rukaiyah Adams <i>OIC Chair</i> | 1 |
| 9:05-9:15 | 2. Committee Reports and CIO Remarks | John Skjervem <i>Chief Investment Officer</i> | 2 |
| <u>B. Information Items</u> | | | |
| 9:15-10:10 | 3. Alternatives Portfolio Review <i>OPERF Alternatives Portfolio</i> | Ben Mahon <i>Senior Investment Officer, Alternatives</i> Tom Martin <i>Managing Director, TorreyCove</i> Jim Callahan <i>President, Callan LLC</i> | 3 |
| 10:10-10:30 | 4. Overlay Review <i>OPERF</i> | Karl Cheng <i>Senior Investment Officer, Portfolio Risk & Research</i> Greg Nordquist <i>Director, Overlay Strategies, Russell Investments</i> Philip Saucier <i>Portfolio Manager, Overlay Strategies, Russell Investments</i> | 4 |
| 10:30-10:45 | ----- BREAK ----- | | |
| 10:45-11:05 | 5. Q1 2019 Performance & Risk Report <i>OPERF</i> | Karl Cheng Janet Becker-Wold <i>Senior Vice President, Callan LLC</i> | 5 |

TAB 1 – REVIEW & APPROVAL OF MINUTES

April 24, 2019 Regular Meeting



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State of Oregon

Office of the State Treasurer

16290 SW Upper Boones Ferry Road
Tigard, Oregon 97224

OREGON INVESTMENT COUNCIL

April 24, 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, Lisa Pettinati, Anna Totdahl, Steve Kruth, Roy Jackson, Austin Carmichael, Paul Koch, David Elott, May Fanning, Tony Breault, Jen Plett, Ricardo Lopez, Dana Millican, Ben Mahon, Jo Recht, Tom Lofton, Amanda Kingsbury, Aliese Jacobsen, Eric Messer, Geoff Nolan, Michael Langdon, Joe Hutchinson, Michael Viteri, Jennifer Peet, William Hiles, Michael Mueller, Kristel Flores, Andy Coutu, Garrett Cudahey, Tiffany Zhuge, Angela Schaffers, James Sinks, Dmitri Palmateer, Amy Wojcicki, Ahman Dirks, Robin Kaukonen, Chris Ebersole, Faith Sedberry, Sam Spencer, Kristi Jenkins, Ryan Auclair, Tyler Bernstein, Krystal Melean, Sommer May and Andrey Voloshinov

Consultants Present: Tom Martin (TorreyCove Capital Partners); Allan Emkin and Brandon Ross (Meketa Investment Group, Inc.); Jason Ellement, Janet Becker-Wold, Jim Callahan and Uvan Tseng (Callan LLC)

Legal Counsel Present: Steven Marlowe, Department of Justice

The April 24th, 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 March 13, 2019 OIC regular meeting minutes. Member Russell moved the motion at 9:00 am, and Mr. Kim seconded the motion which then passed by a 5/0 vote.

II. 9:01 am Committee Reports and CIO Update

Committee Reports: Mr. Skjervem gave an update on the following committee actions taken since the March 13th, 2019 OIC meeting including a February 13th Alternatives Portfolio commitment that wasn't previously reported:

Alternatives Portfolio Committee

February 13, 2019

Bolt Energy LLC

\$50M



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Real Estate Committee

March 27, 2019 Prologis Targeted U.S. Logistics Fund \$250M

Private Equity Committee:

April 2, 2019 Cinven Fund VII €200M
Advent International Global Private Equity Fund IX \$150M
Aquiline Financial Services Fund IV \$250M

Opportunity Portfolio Committee

None

Mr. Skjervem then provided opening remarks which included a summary of the Strategic Asset Allocation & CMAs Update, remarks on the Securities Lending Update and Private Equity Benchmarking project, and an overview of the annual State Accident Insurance Fund report. Mr. Skjervem also introduced new OST staff members including Tyler Bernstein, Operations Analyst, Scott Robertson, Investment Analyst, Krisi Jenkins, Operations Manager, Sommer May, Senior Compliance Analyst and Andrey Voloshinov, Senior Compliance Analyst. Finally, Mr. Skjervem also informed the Council of the departure of Tim Baumert, Investment Officer, Public Equity.

III. 9:06 am Strategic Asset Allocation & Capital Markets Assumption Update – OPERF

Karl Cheng, Senior Investment Officer, Portfolio Risk & Research, Janet Becker-Wold, Senior Vice President, Callan LLC, Jason Ellement, Senior Vice President, Callan LLC and Allan Emkin, Managing Principal, Meketa Investment Group, Inc. presented a thorough summary of updated capital market assumptions and related considerations and concluded with the following recommended changes to OPERF's strategic asset allocation targets:

- a) Reduce the target weight to Public Equity by 5.0%;
- b) Increase the target weight to Diversifying Strategies by 2.5%; and
- c) Within Capital Markets, initiate a new allocation to Risk Parity with a target weight of 2.5%.

In addition to the above listed asset allocation changes, Staff also recommended eliminating **Policy INV 215 OPERF Asset Allocation and Rebalancing Policy** and consolidating its germane sections with a now revised **Policy INV 1203 Statement of Investment Objectives and Policy Framework for the Oregon Public Employees Retirement Fund**.

MOTION: Treasurer Read moved approval of the proposed changes at 10:36 am, and Mr. Kim seconded the motion which then passed by a 5/0 vote.

IV. 10: 51 am Securities Lending Update – OPERF/SAIF/CSF/OSTF/Agency Accounts

Perrin Lim, Director of Capital Markets, provided the Council with an update on and review of the securities lending program which includes OPERF, OSTF and other state agency funds.

Mr. Lim, then presented Mr. Tom Connelley, Vice President, Senior Portfolio Manager, State Street Global Advisors and Mr. Johnson Shum, Vice President, Securities Finance, State Street Global Markets who provided State Street's annual update on its securities lending activities on behalf of OPERF and other OST-managed accounts.



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V. **11:14 am Private Equity Benchmark Discussion – OPERF Private Equity Portfolio**
Michael Langdon, Senior Investment Officer, Private Equity and Tom Martin, Managing Director, TorreyCove Capital Partners, engaged the Council in a detailed discussion on the background, objectives and recent trends in benchmarking for private equity investments.

VI. **11:53 am State Accident Insurance Fund – Annual Review**
Perrin Lim, presented the SAIF Annual Update and presenters Kerry Barnett, President & CEO and Gina Manley, Vice President, Finance & CFO of the State Accident Insurance Fund (SAIF). This presentation covered annual investment performance as well as an update on SAIF's business activity and operating trends.

VII. **12:17 pm State Accident Insurance Fund – Asset Allocation Analysis**
Garrett Cudahey, Investment Officer, Fixed Income, introduced, Jim Voytko, President, Senior Consultant, Director of Research, RVK, Inc., Beau Burggraff, Senior Consultant, RVK, Inc. and Greg Kantor, Consultant, RVK, Inc., who provided the OIC with a summary of their firm's work on behalf of SAIF which included an asset allocation study, a peer group comparison, and a review of all relevant investment guidelines and benchmarks.

At its March 6, 2019 meeting, the SAIF Board approved moving the following proposed changes to the OIC.

Staff recommends approving the proposed asset allocation changes, policy modifications and real estate manager selections. Summary below:

- INV 1002 – State Accident Insurance Fund: Asset Classes and Allocation
 - Modify to include bank loan and private credit asset classes including benchmarks, strategic allocation targets and allowable ranges
 - Reduce allocation to U.S. Fixed Income to fund bank loan and private credit allocations
- INV 1003 – State Accident Insurance Fund: Fixed Income Investments
 - Reduce target manager weightings and ranges to reflect overall reduction in fixed income
- INV 1004 – State Accident Insurance Fund: Real Estate Investments
 - Refine strategy and investment criteria
 - Add target allocations and ranges for two core real estate investment managers
- (New Policy) INV 1007 – State Accident Insurance Fund: Bank Loans
 - New policy crafted to add bank loans as an asset class to SAIF's program
- (New Policy) INV 1008 – State Accident Insurance Fund: Private Credit
 - New policy crafted to add select private credit investments as an asset class to SAIF's program

MOTION: Mr. Kim moved approval at 12:53 pm, and Mr. Russell seconded the motion which then passed by a 5/0 vote.

VIII. **12:53 pm Asset Allocation & NAV Updates**
Mr. Skjervem reviewed asset allocations and NAVs across OST-managed accounts for the period ended March 31, 2019.

IX. **12:53 pm Calendar – Future Agenda Items**
A calendar listing of future OIC meetings and scheduled agenda topics was included in the Council's meeting material.



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X. 12:55 pm Open Discussion

Mr. Skjervem stated that today's OIC meeting coincides with the National Administrative Professionals Day, and took the opportunity to recognize the OST Investment and Legal and Compliance administrative support staff for all their efforts.

Ms. Adams then acknowledged and thanked Council members for all their effort in support of today's important Council meeting.

12:57 pm Public Comments

Bill Parish, Independent Investment Consultant, addressed the Council and suggested changes to Treasury's website, made comments about select large-cap stocks that currently do not pay dividends and warned the Council about investment risks associated with strong economic growth and rising interest rates.

Ms. Adams adjourned the meeting at 1:01 pm.

Respectfully submitted,

May Fanning

May Fanning

Executive Support Specialist

TAB 2 – Committee Reports and CIO Remarks

June 5, 2019

Oregon Investment Council

Opening Remarks

John D. Skjervem, Chief Investment Officer



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Annual Alternatives Review

- Ben and (expanded) team on keyboard, sax, harmonica and cowbell.
- Was approaching the seventh inning stretch, but now going to extra innings.
- WAL of portfolio investments still < 3 years.
- Lots of activity, lots of deal flow.

Annual Overlay Review

Stealthy and effective.

Q1 2019 Performance & Risk Report

Good results, expanded analysis.

Annual Operations Update

The beat goes on: better data quality; much improved reporting; and enhanced trade and settlement support for internal management efforts.

New Hires

- Ian Huculak, Investment Analyst, Operations

Transfers

- Ricardo Lopez, from Investment Analyst, Operations to Investment Analyst, Real Estate

Departures

- Adios and straight shooting, Mr. Deputy.

TAB 3 – Alternatives Portfolio Review

OPERF Alternatives Portfolio

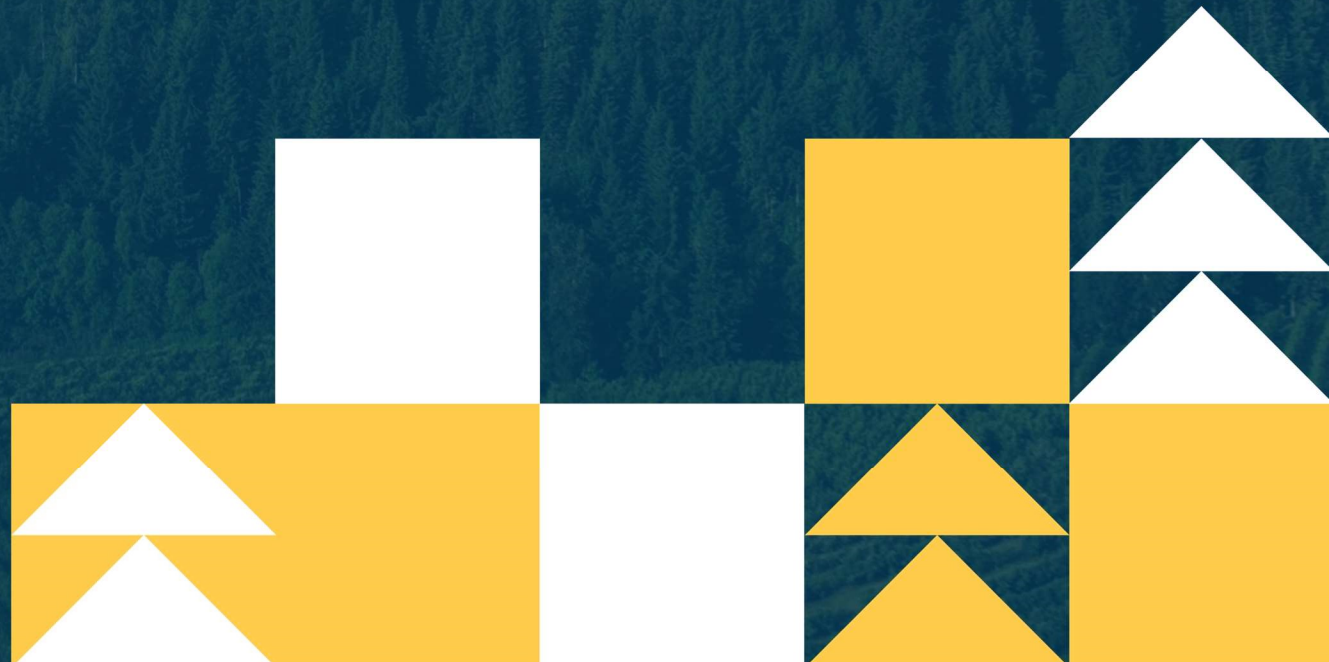
June 5, 2019

OPERF Alternatives Portfolio

Annual Review and 2019 Plan



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Executive Summary

- Primary role of the Alternatives Portfolio = diversification
 - The “keyboard” in ‘70s rock band analogy
 - Seeking less correlated and diversifying sources of returns as well as inflation hedges or inflation-sensitive returns
- Pacing on target; Portfolio still young and early in its build-out
 - Market value as of December 31, 2018 = \$7 billion (vs. \$5 billion at year-end 2017)
 - Market value as a % of OPERF as of December 31, 2018 = 9.3% (vs. 15.0% target)
 - 53% of total commitments authorized and 64% capital contributed in past 3 years; weighted-average age of 2.7 years
 - “Sixth inning” of portfolio development
- Additional resources
 - Addition of fourth Alts Portfolio investment officer (Faith) and first analyst (Amanda)
 - Continued expansion (and utilization) of broader OST resources
- Dynamic market and evolving investment opportunity set
 - Steady flow of new managers, strategies, and structures
 - Strong set of existing managers, offering opportunities to expand relationships
- Portfolio development on track



Topics

- 1. Background/Objectives**
2. 2018 Review
3. Looking Forward
4. Appendix

Background/Objectives

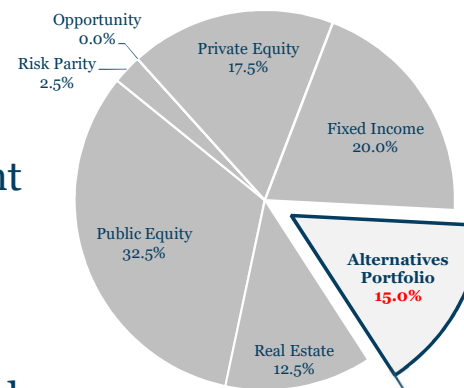
➤ Alternatives Portfolio background

- Alternatives Portfolio approved at January 2011 OIC meeting; seeded July 2011 with 3 investments from the Opportunity Portfolio
- Target allocation for the Portfolio has increased **3** times since its inception:
 - From 5% to 10% in June 2013, from 10% to 12.5% in June 2015, and from **12.5% to 15.0% in April 2019**
 - Actual allocation at December 31, 2018 was 9.3%

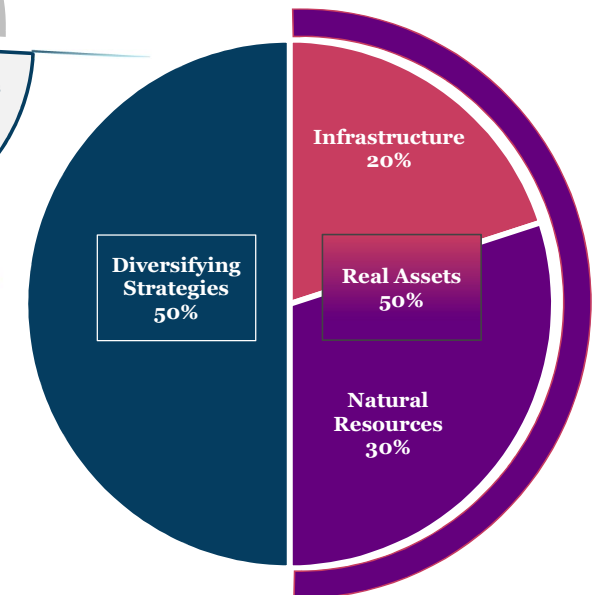
➤ Alternatives Portfolio objectives

- Participate in attractive long-term investment opportunities
- Diversify the overall OPERF investment portfolio
- Seek non-real estate *real assets* and *diversifying strategies* exposures
- Less correlated returns, diversifying risk premia
- Includes inflation hedging objective
- Performance objective: CPI + 4%

**OPERF
Target Allocation**



**Alternatives Portfolio
Target Allocation**



Topics

1. Background/Objectives
- 2. 2018 Review**
3. Looking Forward
4. Appendix

2018 Year in Review

➤ Portfolio build-out continued on track

- During 2018, OIC/OST authorized \$1.52 billion in commitments across 6 investments
 - 3 of the commitments were new relationships; 3 were “re-ups”
 - Pacing was slightly lower than budgeted, but with rolling average on target
- Portfolio exposures remain balanced and within target ranges
- Continue to refine strategy and develop anchor positions complemented by specialist/next generation relationships. No shortage of deal flow!
- 2018/**YTD 2019** commitments comprised a diverse set of investment strategies:

| INVESTMENT NAME | AUTHORIZED DATE | FIRST OPERF DRAWDOWN | COMMITMENT AMOUNT |
|--|----------------------|----------------------|-------------------|
| AQR Managed Futures | January 2018 | April 2018 | \$250.0 |
| Blackstone Energy Partners III, L.P. | May 2018 | N/A | \$200.0 |
| Digital Colony Partners, L.P. | August 2018 | October 2018 | \$150.0 |
| Westbourne Infra Debt SMA | October 2018 | May 2019 | \$230.0 |
| EQT Infrastructure IV (No.2) USD SCSp | November 2018 | N/A | \$290.0 |
| Global Infrastructure Partners IV-A, L.P. | December 2018 | May 2019 | \$400.0 |
| 2018 TOTAL | | | \$1,520.0 |
| Bolt Energy LLC | January 2019 | February 2019 | \$36.0 |
| Brookfield Infrastructure Fund IV, L.P. | January 2019 | N/A | \$400.0 |
| Bridgewater Optimal Portfolio, LLC | February 2019 | May 2019 | \$250.0 |
| GMO Systematic Global Macro | February 2019 | April 2019 | \$250.0 |
| Northern Shipping Fund IV, L.P. | February 2019 | N/A | \$150.0 |
| Silver Creek Aggregate Reserves Fund I, LLC | May 2019 | N/A | \$150.0 |
| Taurus Mining Finance Fund No. 2, L.P. | May 2019 | N/A | \$150.0 |
| YTD 2019 TOTAL | | | \$1,386.0 |

\$ in millions.



2018 Year in Review, cont.

➤ Diversifying Strategies

- Approvals from 2017 funded over the course of 2018
 - Total of \$1.55 billion invested in four strategies (AQR managed futures, Aspect, Blackrock, and JP Morgan) across 14 discrete subscription transactions
 - At year end 2018, both Alternative Risk Premia and Managed Futures sub-sectors were at respective target allocations
- Absolute Return/Global Macro sub-sector managers approved February 2019: Bridgewater Optimal Portfolio and GMO Systematic Global Macro
 - Newly authorized mandates will fund over the course of 2019

➤ Additional resources

- Addition of Alts investment officer: Faith Sedberry (October 2018 start)
- Addition of senior analyst “majoring” in Alternatives Portfolio: Amanda Kingsbury
- Continued expansion of legal/compliance/operations/risk teams

➤ Consultant search

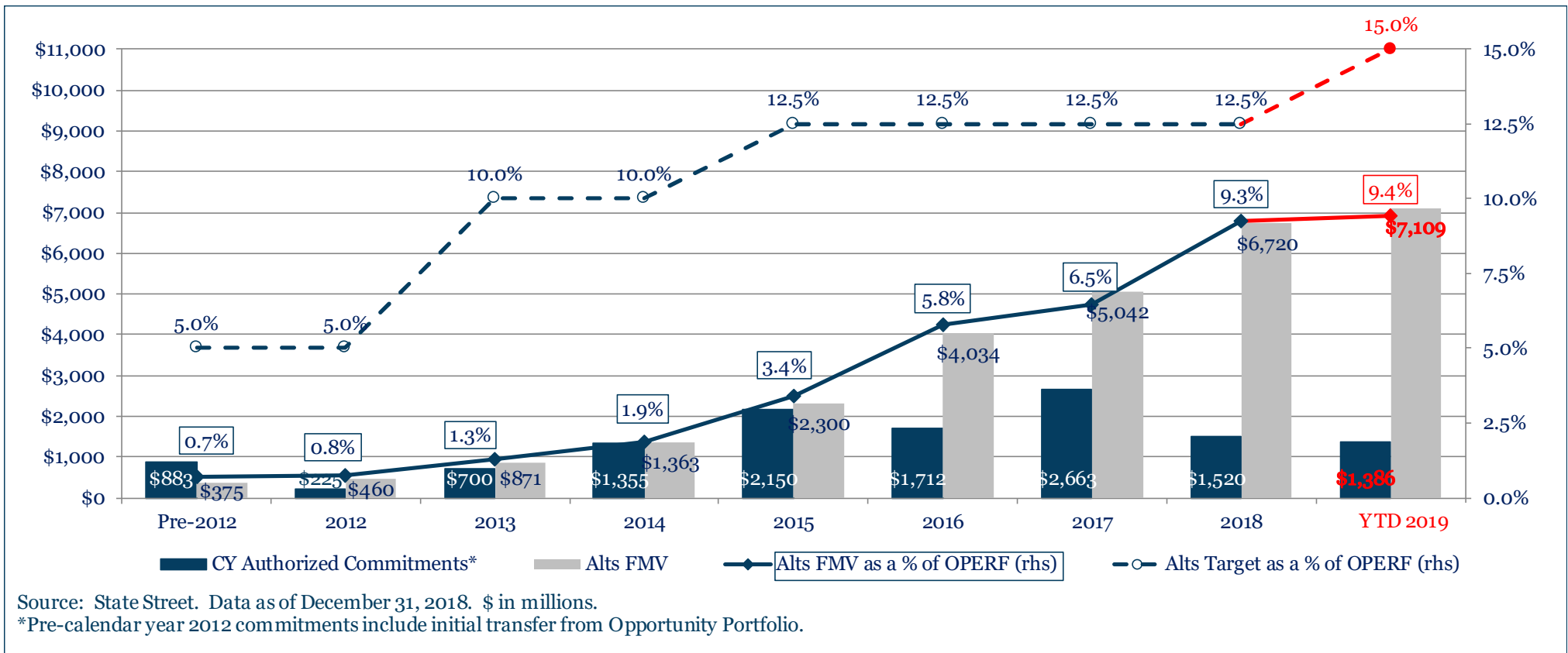
- TorreyCove re-hired as Alternatives Portfolio real asset consultant

➤ Monitoring and risk management

- Several enhancements to monitoring and risk management efforts, including improvements to Aladdin, risk score, and stress test simulations

Commitments and Market Values

- Alternatives Portfolio weight increasing as a percentage of OPERF; equal to 9.3% at year-end 2018
- Since inception, \$11.1 billion of commitments have been authorized, with the majority (\$5.9 billion or 53%) over the past 3 years



Cash Flow Activity Since Inception

- As anticipated, Portfolio cash outflows have exceeded cash inflows by a meaningful amount with pace of contributions increasing as capital commitments are made
- As of December 31, 2018, OPERF had contributed \$8.2 billion in capital, funding approximately 73% of aggregate capital commitments. Approximately \$3.3 billion of capital commitments remain outstanding
- Since inception, a total of \$1.8 billion has been distributed to OPERF
- As new commitments continue to be made, the weighted-average age of commitments has remained consistent through time, averaging approximately 2 years (representing the early stage of the portfolio)
- Since inception, 46 commitments have been made to closed-end vehicles:
 - 14 have reached end of investment period
 - 0 have reached end of term
 - 0 have been fully realized

| | Pre-2012 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|--|----------|----------|----------|-----------|------------|------------|------------|------------|
| Authorized Commitments* | \$882.5 | \$225.0 | \$700.0 | \$1,355.0 | \$2,150.0 | \$1,712.0 | \$2,663.0 | \$1,520.0 |
| Contributions | -\$395.6 | -\$136.3 | -\$429.3 | -\$561.7 | -\$1,450.1 | -\$1,727.2 | -\$1,163.2 | -\$2,356.4 |
| Distributions | \$8.3 | \$47.7 | \$51.5 | \$112.1 | \$443.5 | \$204.1 | \$487.9 | \$480.1 |
| Net Cash Flow | -\$387.4 | -\$88.6 | -\$377.8 | -\$449.6 | -\$1,006.6 | -\$1,523.2 | -\$675.3 | -\$1,876.3 |
| Unfunded Commitments | \$282.5 | \$534.4 | \$574.3 | \$1,643.1 | \$2,353.6 | \$2,871.5 | \$4,399.4 | \$3,347.0 |
| Weighted Avg. Age of Commitments (yrs) | 2.0 | 2.1 | 2.1 | 1.9 | 2.1 | 2.3 | 2.3 | 2.7 |

Source: TorreyCove. \$ in millions.

*Pre-calendar year 2012 commitments include initial transfer from Opportunity Portfolio.



Portfolio Snapshot

- Sector exposures are generally within targeted allocation ranges
 - Diversifying Strategies are liquid and can be deployed more quickly than illiquid investments in infrastructure and natural resources...
 - ... while cognizant of allocation ranges, anticipate deviations to occur as the program scales

| SECTOR | TARGET (\$) | TARGET (%) | TARGET RANGE (%) | MARKET VALUE (\$) | MARKET VALUE (%) | APRIL 2019 TARGET (\$) | APRIL 2019 TARGET (%) |
|-------------------------|------------------|-------------|------------------|-------------------|------------------|------------------------|-----------------------|
| Infrastructure | \$2,264.3 | 25% | 20-30% | \$1,830.8 | 27% | \$2,173.7 | 20% |
| Natural Resources | \$3,170.0 | 35% | 30-40% | \$1,945.8 | 29% | \$3,260.6 | 30% |
| Diversifying Strategies | \$3,622.8 | 40% | 35-45% | \$2,943.8 | 44% | \$5,434.3 | 50% |
| TOTAL | \$9,057.1 | 100% | | \$6,720.3 | 100% | \$10,868.5 | 100% |

Source: State State. Data as of December 31, 2018. \$ in millions.



Investment Performance

- As noted, Alternatives Portfolio is early in its build-out, and nearly all returns are unrealized
 - 64% of total contributions made in the past 3 years
 - Weighted-average age of 2.7 years
- Given the long-term nature of alternative investments, as well as the J-curve effect, performance to-date is not meaningful

| IRR | 1 Year | 2 Year | 3 Year | 5 Year | 7 Year | Inception |
|-------------------------|---------------|---------------|---------------|---------------|---------------|------------------|
| Alternatives Portfolio | -7.4% | -1.1% | 2.2% | 1.3% | 1.4% | 1.3% |
| CPI + 4% | 5.7% | 5.9% | 5.9% | 5.6% | 5.6% | 5.6% |
| <i>Difference</i> | <i>-13.1%</i> | <i>-7.0%</i> | <i>-3.7%</i> | <i>-4.3%</i> | <i>-4.3%</i> | <i>-4.3%</i> |
| SECTOR | | | | | | |
| Infrastructure | 6.3% | 7.7% | 8.8% | 9.6% | 9.2% | 9.0% |
| Natural Resources | -10.7% | -2.8% | 4.5% | -0.8% | -1.1% | -1.2% |
| Diversifying Strategies | -13.3% | -5.9% | -4.5% | -2.9% | -2.5% | -2.5% |

Source: TorreyCove. Data as of December 31, 2018. Net of fees.



Topics

1. Background/Objectives
2. Background
- 3. Looking Forward**
4. Appendix

Portfolio Structure/Relationships

Total OPERF Alternatives Portfolio

\$7.1 billion NAV

Infrastructure

Natural Resources

Diversifying Strategies

\$2.1 billion NAV

\$1.7 billion NAV

\$3.3 billion NAV

Number of Ongoing Relationships / Managers

Brookfield
Digital Colony
 EnCap Flatrock
 EQT
 GIP
 LS Power
 Northern Shipping
 Starwood Energy
 Stonepeak
Westbourne

10

Appian
Blackstone Energy
 EMR
 Homestead
 NGP
 Sheridan
 Taurus
 Teays River
 Tillridge
 Twin Creeks
 Warwick

11

AQR
 Aspect
 Blackrock
Bridgewater
GMO
 JP Morgan

6

Source: State Street. Market values as of April 30, 2019. New relationships shown in italics.



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Portfolio Structure/Relationships **Vision**

Goals:

- Target ~30 active relationships
- Use for priority setting
- Assess current targets – are they reasonable?

Total OPERF Alternatives Portfolio

\$7.1 billion NAV
 \$11.3 billion target
 \$3.3 billion unfunded

Infrastructure

Natural Resources

Diversifying Strategies

\$2.1 billion NAV
 \$2.3 billion target
 \$2.3 billion unfunded

\$1.7 billion NAV
 \$3.4 billion target
 \$1.0 billion unfunded

\$3.3 billion NAV
 \$5.7 billion target
 \$300 million unfunded

Number of Ongoing Relationships / Managers

Brookfield
 Digital Colony
 EnCap Flatrock
 EQT
 GIP
 LS Power
 Northern Shipping
 Starwood Energy
 Stonepeak
 Westbourne

10

- Envision 10-12 relationships
- Larger fund sizes and manager universe, so average commitment larger

Appian
 Blackstone Energy
 EMR
 Homestead
 NGP
 Sheridan
 Taurus
 Teays River
 Tillridge
 Twin Creeks
 Warwick

11

- Envision 14-16 relationships
- Smaller fund sizes and manager universe, so average commitment smaller

AQR
 Aspect
 Blackrock
 Bridgewater
 GMO
 JP Morgan

6

- Envision 8-10 relationships
- Maintain style and strategy premia bias

Source: State Street. Market values as of April 30, 2019. New relationships shown in italics.



Portfolio Pacing

➤ 2019 plan

- \$1.5 - \$2.5 billion in commitments
- Based on balanced portfolio allocation, not driven by a need to fill an exposure

➤ Longer-term pacing

- Staff has been measured, given entry point risk, research requirements, and resource constraints
- At current pace, anticipate reaching target allocation in ≈ 4 years
- Can deploy liquid strategies (e.g., diversifying strategies and listed commodities funds) more quickly than illiquid strategies (e.g., infrastructure, timber, agriculture, metals & mining, etc.)
- Remain cognizant of exposures while aiming for vintage year diversification



2019 Portfolio Priorities

1. Diversifying Strategies

- Develop plan for increased Diversifying Strategies allocation
- 1-2 recommendations possible in second half of 2019

2. Real Assets

- 5-10 commitments with an average commitment size of \$150-\$200 million

3. Co-investment

- Continue to evaluate co-investment opportunities and refine program model
 - Includes evaluation of separate accounts/strategic relationships
 - Objective function is to reduce fee drag

4. Monitoring and risk management

- Continue to pursue enhancements to monitoring and risk management efforts

5. Conduct research reviews of areas of interest

- Renewable energy
- Metals and mining
- Farmland/timberland



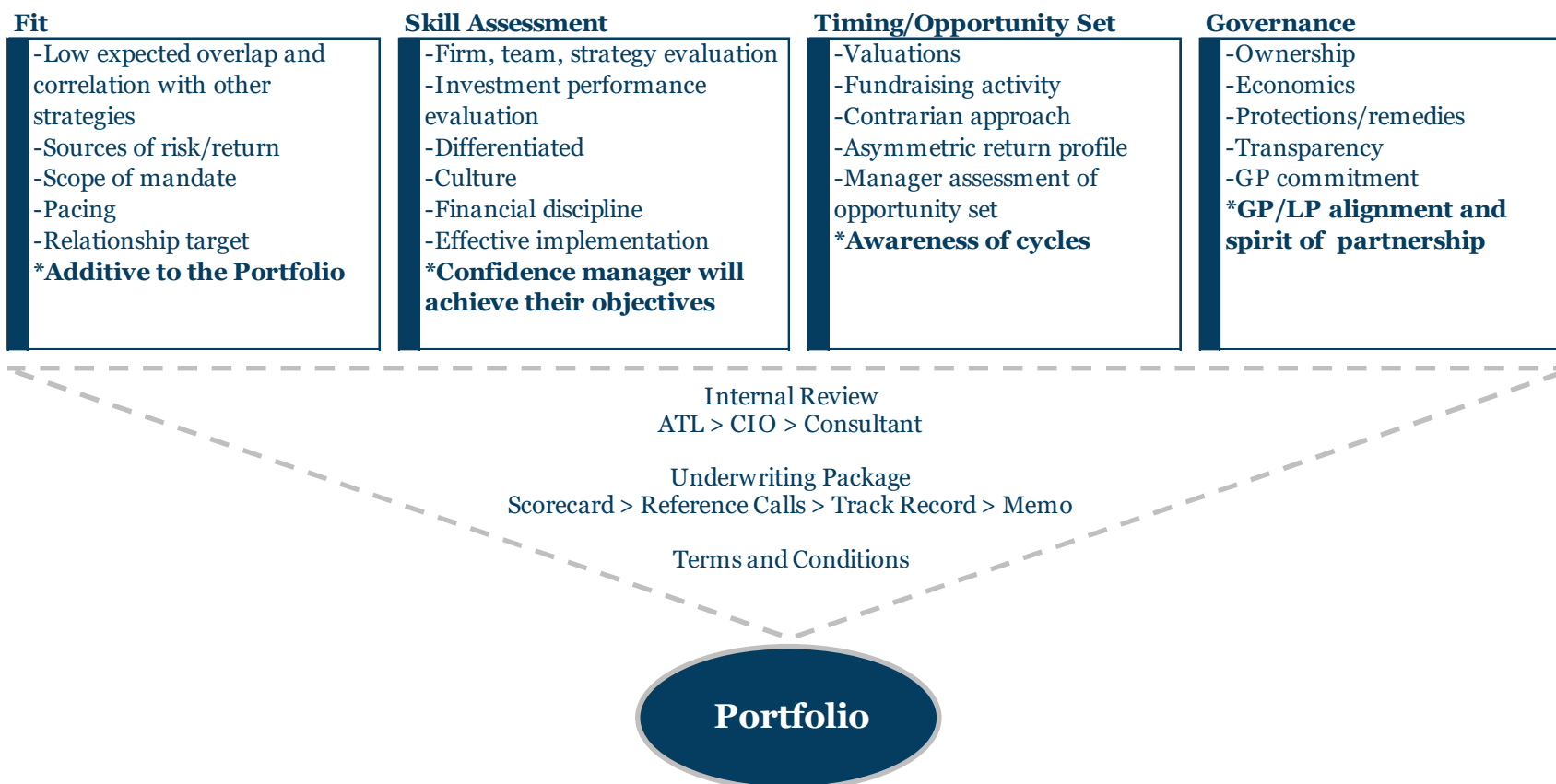
Topics

1. Background/Objectives
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Appendix: Investment Process

➤ Evaluation framework

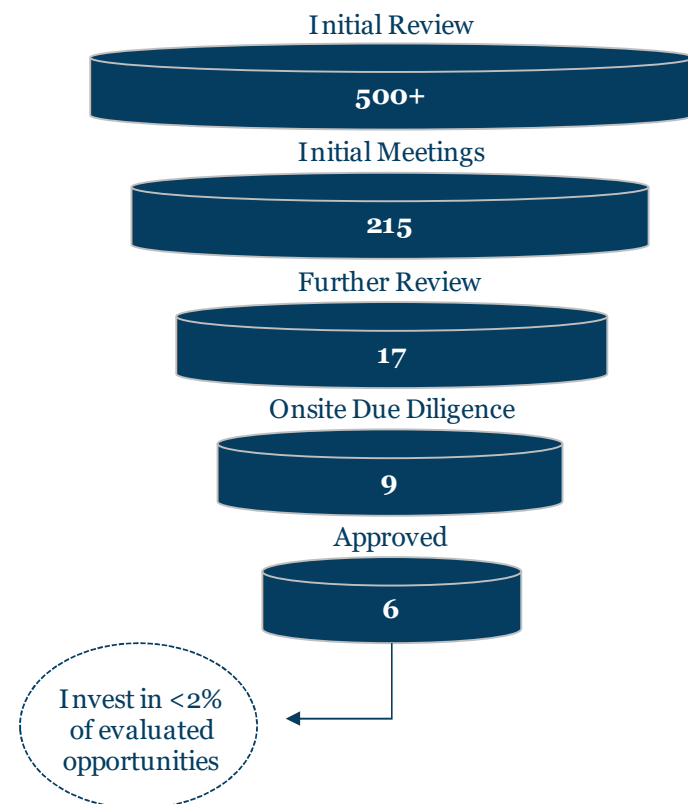
- Very high-level summary of Alternatives Portfolio investment evaluation framework below
- In practice, many more variables, non-linear, and with numerous feedback channels



Appendix: Investment Process, cont.

➤ Example: 2018 Alts Portfolio meeting count

- Began formally tracking meeting count in 2016
- Scale, brand, and open door policy leveraged to foster deal flow; broad opportunity set has helped meeting count remain consistent over time
 - E.g., among U.S. defined benefit plans, OPERF ranks (by assets) in the top 3 in infrastructure, the top 10 in energy and commodities, and the top 20 in hedge funds*
- After screening approximately 500 opportunities, held initial meetings (in-person or telephonic) with 215 distinct prospective managers/investments
 - In total, held 563 manager meetings in 2018, 369 of which were with prospects
- “Deep dives” on 17 opportunities
- Ultimately sought approval for 6 investments



* Source: P&I. Market values as of September 30, 2018.



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Tobias Read
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TAB 4 – Overlay Review

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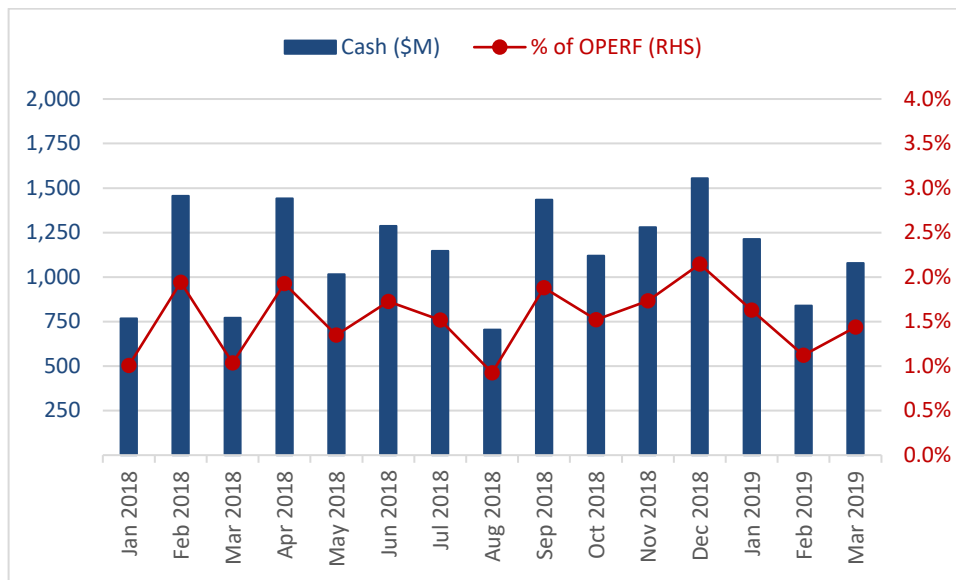
OPERF Policy Implementation Overlay Manager Annual Update

Purpose

To provide the OIC an update on the OPERF overlay program, currently managed by Russell Investments.

Background

Although OPERF does not have a strategic allocation to cash, it maintains a cash balance that is primarily invested in the Oregon Short Term Fund (OSTF). This cash balance is used to make regularly-scheduled PERS benefit payments as well handle episodic capital calls and distributions associated with OPERF's Alternative Investments Program. The chart below shows OPERF's monthly cash balance invested in OSTF and subject to the overlay program.



Since it does not have a strategic allocation target, the OPERF cash balance may be the source of “cash drag” in that it is not invested in investments with greater potential return. To minimize cash drag, the OIC retained Russell Investments to implement an overlay program that equitizes OPERF's cash balances. Specifically, Russell monitors and, if necessary, equitizes both excess cash held by public equity and REIT managers and any other idle OPERF cash. In its equitizing process, Russell uses highly-liquid futures contracts with margin requirements much smaller than the contracts' “face” or “notional” values. As part of its process, Russell also a) monitors OPERF's asset allocation relative to its OIC-established strategic targets (see the “Rebalancing” section in the attached OIC Policy INV 1203: Statement of Investment Objectives and Policy Framework for OPERF) and b) trades equity and fixed income futures contracts as necessary to align the Fund's overall asset allocation with these OIC-established targets. For perspective on the overlay program, OIC members receive a monthly update on the program's overlay exposures in the asset allocation section of the regular OIC meeting materials.

As of March 31, 2019, the OPERF overlay program was long \$1.20 billion in fixed income contracts and long \$270 million in global equity contracts for a total gross notional exposure of \$1.47 billion.

Staff Recommendation

None, information only.



**OREGON
STATE
TREASURY**

Origination: 02/2002
Last Approved: N/A
Last Revised: 05/2019
Next Review: 1 year after approval
Owner: John Skjervem: Chief Investment Officer
Policy Area: Investments
References:

INV 1203: Statement of Investment Objectives and Policy Framework for the Oregon Public Employees Retirement Fund

INTRODUCTION & OVERVIEW

Summary Policy Statement

This Statement of Investment Objectives and Policy Framework (the "Statement") summarizes the philosophy, objectives and policies approved by the *Oregon Investment Council* (the "OIC" or the "Council") for the investment of *Oregon Public Employees Retirement Fund* ("OPERF" or the "Fund") assets.

1. The Statement has been prepared with six audiences in mind: 1) incumbent, new and prospective Council members; 2) *Oregon State Treasury* ("OST") staff; 3) the Public Employees Retirement Board ("PERB"); 4) active and retired Oregon Public Employees Retirement System (PERS) members; 5) the Oregon State Legislature and Governor; and 6) agents engaged by the Council to manage and administer Fund assets.
2. The Council approved these objectives and framework after careful consideration of PERS benefit provisions, and the implications of alternative objectives and policies.
3. The Statement summarizes more detailed policy and procedure documents prepared and maintained by staff, and numerous other documents that govern the day-to-day management of OPERF assets including agent agreements, individual investment manager mandates and limited partnership documents.
4. The Council regularly assesses the continued suitability of its approved investment objectives and policies, initiates change as necessary and updates these documents accordingly.

Applicability

Classified represented, management service, unclassified executive service.

Authority

ORS Chapter 293.

POLICY PROVISIONS

Definitions

Actuarial Discount Rate ("ADR"): The interest rate used to calculate the present value of a defined benefit plan's future obligations and determine the size of the plan sponsor's annual contribution. The ADR currently approved by the PERB is 7.2%.

Alternatives: Investments that are considered non-traditional or emerging in nature. Presently, the following investment types are included within the OPERF alternatives allocation: hedge funds; infrastructure; natural resources; and commodities.

Asset Class: A collection of securities that have conceptually similar claims on income streams and have returns that are highly correlated with each other. The most frequently referenced asset classes include equities, fixed income, real estate and cash.

Bank of America Merrill Lynch U.S. High Yield Master II Index: This index tracks the performance of publicly-issued, U.S. dollar-denominated, below investment-grade corporate debt. Its constituents are capitalization-weighted based on their current amount outstanding times the market price plus accrued interest that conform to specific parameters.

Bloomberg Barclays U.S. Aggregate Index: This index covers the U.S. investment-grade fixed rate bond market, and includes government, corporate, mortgage pass-through and asset-backed securities. These major sectors are subdivided into more specific indices that are calculated and reported on a regular basis. Its constituents are SEC-registered, taxable, dollar-denominated securities that conform to specific parameters.

Bloomberg Barclays U.S. Treasury Index: This index is a sub-component of the Bloomberg Barclays Aggregate Index and includes public obligations of the U.S. Treasury with remaining maturities of more than one year that conform to specific parameters.

Basis Point: This refers to a common unit of financial measurement. One basis point equals 0.01%. One hundred basis points equal 1% or one percentage point.

Benchmark: A standard by which investment performance can be measured and evaluated. For example, the performance of U.S. equity managers is often measured and evaluated relative to the Russell 3000 Index. In this case, the Russell 3000 Index serves as or represents the U.S. equity benchmark.

Benchmark Exposure: The proportion that a given stock represents within a benchmark, such as the Russell 3000 Index of U.S. equity securities. Allows investors to measure the extent to which a portfolio or specific investment strategy is over- or under-exposed to a particular stock or investment characteristic (e.g., market capitalization) relative to a benchmark.

Co-investment: Although used loosely to describe any two parties that invest alongside one another in the same company, this term has a special meaning in the context of an investment fund's limited partners. By having co-investment rights, a limited partner can invest directly in a company that is simultaneously backed by the fund's general partner. In this way, the limited partner has two separate stakes in the company: the first, an indirect investment through its participation in the general partner's fund; the second, a direct investment alongside the general partner. While the direct, co-investment opportunity is usually offered at terms and conditions more favorable than the fund investment, the direct, concentrated nature of the co-investment opportunity implies higher risk for the limited partner.

Core: Real estate investment strategies which exhibit "institutional" qualities, such as superior location, high

occupancy and premium design and construction quality.

Credit: Used most often in a fixed income context, the measure of an organization's ability to re-pay borrowed money. Organizations with the highest credit rating (i.e., those most likely to re-pay borrowed money) are assigned a AAA credit rating.

Distressed Debt: A private equity investment strategy that involves purchasing discounted bonds of a financially-distressed firm. Distressed debt investors frequently convert their holdings into equity and become actively involved in the management of the distressed firm.

Diversifying Strategies: Investment strategies that attempt to systematically capture certain risk premia beyond traditional equity and fixed income market exposures using alternative investment techniques.

Diversification: Reducing risk without a commensurate reduction in expected return by combining assets and/or investment strategies with low or uncorrelated return and volatility profiles. For example, a decline in the price of one asset (e.g., oil stocks) is offset by an increase in the price of another asset (e.g., airline stocks). In lay terms, this principal is often described as "putting your eggs in more than one basket".

Duration: A financial measure used by investors to estimate the price sensitivity of a fixed income security relative to changes in interest rates. For example, if interest rates increase by 1 percentage point, a 5-year duration bond will decline in price by approximately 5 percent.

Efficient Market: A market in which security prices rapidly reflect all information germane to the price discovery process. A primary implication of an efficient market is that active management efforts often fail to produce results that consistently beat the performance of an index fund or other passive strategy net of fees, transactions costs and other expenses.

Equities: Investments that represent ownership in a company and therefore a proportional share of company profits.

Fixed Income: Debt obligations that specify the precise repayment of previously borrowed money. Typically, repayment takes the form of a series of fixed-amount, semi-annual interest payments and a single, final repayment of principal.

Funded Status: A comparison of a pension plan's assets and liabilities where the latter are often referred to as the plan's projected benefit obligation ("PBO"). When a plan's assets exceed its PBO, the plan is considered overfunded. Conversely, if a plan's assets are less than its PBO, the plan is considered underfunded and the plan sponsor has a net liability position with respect to its pension plan.

Fund-of-funds: Often organized by an investment advisor or investment bank, a fund that invests in other funds rather than directly in securities, operating firms or other assets.

Growth Stock: Stocks exhibiting faster-than-average earnings growth with expectations that such growth will continue. Growth stocks usually have high price-to-earnings ratios, high price-to-book ratios and low to no dividend yields.

Hedged: A term applied to one, more or an entire portfolio of assets indicating that the base country value of such assets is partially or wholly protected from foreign currency fluctuations. Forward currency contracts are typically used to hedge or offset the effects of these fluctuations.

Index Fund: A portfolio management strategy that seeks to match the composition and performance of a select index such as the Russell 3000 or S&P 500.

Leverage Buyout (LBO): A strategy in which debt financing is used to acquire a firm or business unit, typically in

a mature industry. LBO debt is usually repaid according to a strict schedule that absorbs most of the acquired firm's cash flow.

Liability: A claim on assets by individuals or companies. In a pension context, liabilities represent the claim on fund assets by active and retired plan beneficiaries.

MSCI All Country World Investable Market Index (ACWI-IMI): A capitalization-weighted index that includes approximately 9,000 publically-traded equity securities and is designed to measure equity market performance across developed and emerging markets. This index consists of over 40 separate developed and emerging market country indices.

MSCI World Ex-U.S. Index: A subset of the MSCI All Country World Index that contains only securities from developed market countries, excluding those from the U.S.

Market Capitalization: The value of a corporation as determined by multiplying the price of its shares by the number of shares outstanding. In general, the share prices of smaller capitalized companies are more volatile than those of larger capitalized companies.

Mezzanine: Either a private equity financing undertaken shortly before an initial public offering, or an investment strategy that employs subordinated debt (which has fewer privileges than bank debt but more standing than equity) and often is issued with attached equity warrants.

NCREIF Fund Index – Open End Diversified Core Equity (NFI-ODCE): The NFI-ODCE is an investment performance composite published quarterly by the National Council of Real Estate Investment Fiduciaries (NCREIF). This index is a capitalization-weighted index of approximately 30 open-ended, commingled funds pursuing a "core" investment strategy and conform to specific parameters.

Oregon State Treasury: Headed by the State Treasurer, the Oregon State Treasury is responsible for managing the day to day investment operations of the state pension fund (and other funds), issuing all state debt, and serving as the central bank for state agencies. Within the Oregon State Treasury, the Investment Division also manages investment programs for the state's deferred compensation and college savings plans, and serves as staff to the Oregon Investment Council.

Opportunistic: Higher risk but higher expected return real estate investments that are usually illiquid, produce little or no current income and are often focused on distressed and/or highly leveraged properties.

Opportunity Portfolio: Includes non-traditional and/or concentrated investment strategies that may provide enhanced diversification and/or unique sources of return relative to the other asset classes included in the OIC's approved policy mix. The Opportunity Portfolio's objectives are pursued by investing in strategies that fall outside the boundaries of "strategic" or approved policy mix allocations including new or innovative strategies across a wide range of potential investment opportunities and with few limitations or constraints.

Oregon Investment Council: Oregon Revised Statutes ("ORS") 293.706 establishes the OIC, which consists of five voting members, four of whom are appointed by the Governor and subject to Senate confirmation (the Treasurer serves as an ex-officio member, and is therefore not subject to confirmation). The members appointed by the Governor must be qualified by training and experience in the field of investment or finance. In addition, the Director of the Oregon Public Employees Retirement System is a non-voting ex-officio member of the OIC. ORS 293.721 and 293.726 establish the OIC's investment objectives and standards of judgment and care. .

Oregon Public Employees Retirement Fund: Holds the assets of beneficiaries of PERS, which is a state-wide, defined benefit retirement plan for units of state government, political subdivisions, community colleges and

school districts. PERS is administered under ORS chapters 237, 238, 238A, and applicable provisions of the Internal Revenue Code by the PERB. Participation by state government units, school districts, and community colleges is mandatory. Participation by most political subdivisions is optional, but irrevocable if elected. All system assets accumulated for the payment of benefits may legally be used to pay benefits to any of the plan members or beneficiaries of the system. PERS is responsible for administering the management of the plan's liability and participant benefits.

Oregon Short Term Fund (OSTF): The state's commingled cash investment pool managed internally by Treasury staff. The OSTF includes all excess state agency cash, as required by law, as well as cash invested by local governments on a discretionary basis. The OSTF is invested in accordance with investment guidelines recommended by the state's Oregon Short Term Fund Board and approved by the OIC.

Overlay Manager: An investment advisor retained by the OIC to monitor daily cash balances in OPERF and execute trades in the equity and fixed income futures markets to adjust OPERF's overall asset allocation closer to its OIC-approved targets.

Overweight: A stock, sector or capitalization exposure that is higher than the corresponding exposure in a given asset class benchmark, such as the Russell 3000 Index.

Private Equity: Venture Economics ("VE") uses the term to describe the universe of all venture investing, buyout investing and mezzanine investing. Fund-of-funds investing and secondaries are also included in this term's broadest interpretation. VE is not using the term to include angel investors or business angels, real estate investments or other investing scenarios outside of the public market. See also *Alternatives*.

Real Estate Investments: Investments in land, buildings or other real property.

Real Estate Investment Trusts ("REITs"): A real estate portfolio managed by an investment company for the benefit of the trust unit holders. The units of most REITs are publically traded.

Regular Account: That portion of OPERF that excludes the Variable Account (defined below). A diversified investment portfolio for which the asset allocation and general investment policies are established and approved by the OIC. Tier One participants are guaranteed a minimum rate of return based on the long-term interest rate used by the actuary. Tier Two participants have no guaranteed rate of return and receive benefits that reflect the Regular Account's actual or realized investment return.

Return: The gain or loss in value of an investment over a given period of time expressed as a percentage of the original amount invested. For example, an initial investment of \$100 that grows to \$105 over one year has produced a 5% return.

Risk: The probability of losing money or not achieving the expected investment outcome.

Russell 3000 Index: Measures the investment performance of a composite comprised of stocks issued by the approximately 3,000 largest U.S. companies. Based on total market capitalization, this index represents approximately 98% of the investable U.S. equity market.

S&P/LSTA Leveraged Loan Index: This index is designed to mirror the market-weighted performance of the largest institutional leveraged loan portfolios based on market weightings, spreads and interest payments. Facilities are eligible for inclusion in the index if they are senior secured institutional term loans with a minimum initial spread of 125 basis points and minimum one-year term. Facilities are retired from the index when there is no bid posted on the facility for at least 12 successive weeks or when the loan is repaid.

Secondaries: The purchase and sale of existing limited partnership commitments to other limited partners and/or fund sponsors.

Sector: A particular group of stocks or bonds that usually characterize a given industry or economic activity. For example, "pharmaceuticals" is the name given to stocks issued by companies researching, manufacturing and selling over-the-counter and prescription medicines. "Corporates" is the name given to fixed income instruments issued by private and public companies.

Sector Funds: A pooled investment product that focuses on a particular industry or economic activity. For example, pooled funds that invest principally in technology stocks would be termed a technology sector fund.

Tracking Error: The amount by which an investor's investment performance differed from a corresponding or assigned benchmark. Usually measured and expressed as the standard deviation of returns relative to a pre-specified benchmark.

Unhedged: A term indicating that the value of one, more or an entire portfolio of assets may be affected by foreign currency fluctuations and that no deliberate attempt has been made to protect against such fluctuations.

Value Added: As used in real estate, may include office, retail, industrial and apartment properties, but may target structured investments in alternative property types such as hotels, student housing, senior housing and specialized retail uses. Portfolios or strategies that are positioned as Value Added are expected to produce returns between Core and Opportunistic portfolios/strategies. For example, a Value Added property may exhibit some "institutional" qualities such as good location and high design and construction quality, but may need significant leasing improvements to stabilize and enhance its value. Value Added investments may also include development opportunities with balanced risk/return profiles.

Value Stock: Stocks that appear to be undervalued for reasons other than low potential earnings growth. Value stocks usually have low price-to-earnings ratios, low price-to-book ratios and a high dividend yield.

Variable Account: An account established for a PERS member who participated in the VAP (defined below).

Variable Annuity Program ("VAP"): a program that allowed active PERS members to allocate a portion of their yearly, employee retirement contributions to a domestic equity portfolio. No such contributions were allowed after December 31, 2003. Active members who participated in the VAP had part of their balance invested in the Regular Account and part invested in the Variable Account. Unless a member explicitly elected to participate in the VAP, all of that member's employee contributions were invested in the Regular Account. This "primary" election allowed members to place 25 percent, 50 percent or 75 percent of their employee contributions in the Variable Account. Variable Account balances increase or decrease depending on the investment performance of the variable fund, and individual participant accounts are credited for any amount (gain or loss) available for distribution. The OIC's asset allocation policy purview only applies to the Regular Account since the OIC cannot control the investment option elections of VAP participants.

Venture Capital: Independently managed, dedicated pools of capital that focus on equity or equity-linked investments in privately held, high growth companies. Outside of the United States, the term venture capital is used as a synonym for all types of alternative or private equity.

Vintage Year: The calendar year in which an investment fund's first closing occurs. For example, the 1995 vintage year for venture capital includes all venture capital funds that held a first closing in 1995.

POLICY STATEMENTS

Introduction

1. Subject to ORS 293.721 and 293.726, 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.

2. This objective further contemplates a consecutive ten-year forecast horizon, and the Council also understands that estimates of forward-looking OPERF returns are a primary consideration during PERB's biennial determination of its ADR.
3. Historically, PERS members were allowed to direct up to 75% of their annual, employee retirement contributions to the *Variable Account*. While no longer receiving new contributions, the Variable Account's objective remains investment performance consistent with the *MSCI All Country World Investable Market Index*.
4. The Council has established investment objectives for individual asset classes that are also summarized in this Statement.

A. Policy Asset Mix, Diversification, and Return Expectations

1. The OIC undertakes a rigorous study of OPERF's assets and liabilities every three to five years (or more frequently, if desired). These asset-liability studies include the following elements for OIC consideration: 1) capital market assumptions by asset class, which include expected returns, volatilities and correlations; 2) proposed asset mixes using various portfolio modeling/construction techniques; 3) OPERF's *liability* structure, *funded status* and liquidity needs; and 4) recommended strategic asset allocation targets and a rebalancing framework. The Council's approved asset mix policy for the Regular Account is summarized in Exhibit 1, and its active management return expectations are summarized in Exhibit 2.
2. Of total Fund assets, 55 percent of OPERF is targeted for investment in *equities*, inclusive of *private equity*. Equity investments have generated the highest returns over long time periods, but can also produce low and even negative returns over shorter time periods. The risk of low returns over shorter time periods makes 100% equity policies unsuitable for most pension funds, including OPERF. By investing across multiple equity asset classes, and in lower return but less risky *fixed income*, *real estate* and *alternatives* asset classes, the Council manages and diversifies the Fund's overall risk.
3. Specific asset class exposures are maintained within the ranges outlined in Exhibit 1.

Exhibit 1: Policy Mix and Return Expectations for the OPERF Regular Account

| Asset Class | Target Allocation (%) | Re-balancing Range (0%) | Expected Annual Policy Return ¹ (%) |
|----------------|-----------------------|-------------------------|--|
| Public Equity | 32.5 | 27.5-37.5 | 7.3 |
| Private Equity | 17.5 | 14.0-21.0 | 9.2 |
| Total Equity | 50.0 | 50.0-60.0 | |
| Fixed Income | 20.0 | 15.0-25.0 | 3.8 |
| Risk Parity | 2.5 | 0.0-2.5 | 6.5 |
| Real Estate | 12.5 | 9.5-15.5 | 7.0 |

| | | | |
|-------------------------------|--------------|----------|------------|
| Alternatives | 15.0 | 7.5-17.5 | 6.9 |
| Total Fund² | 100.0 | | 7.3 |

1. Based on capital market forecasts developed by the Council's investment consultant, Callan Inc.
2. Total Fund expected returns are calculated *geometrically* using the investment consultant's forecasts for the *arithmetic* returns and co-variances of the asset classes. Accordingly, the Total Fund's expected returns are not equivalent to the weighted average of individual asset class returns listed in Exhibit 1.
4. The policy mix's 7.3% average annual return expectation was developed with reference to observed long-term relationships among major asset classes, adjusted to account for current market conditions. The Council believes this return expectation is reasonable, but recognizes that *realized* returns can deviate significantly from expectations – both positively and negatively.
5. The OIC has allocated up to 3.0% of total Fund assets for investment in an *Opportunity Portfolio*, the objective of which is to enhance OPERF returns and/or diversification. Investments in the Opportunity Portfolio are expected to comprise a combination of both shorter-term (1-3 year) and longer-term holdings. The Opportunity Portfolio has no strategic target since, by definition, eligible investments are only pursued on an opportunistic or episodic basis; moreover, the Opportunity Portfolio allocation shall not result in an allocation range breach for any of the other five, primary asset class allocations.
6. OPERF cash balances are invested in the *Oregon Short Term Fund* and managed to levels that are deliberately minimized but still sufficient to cover OPERF's short-term cash flow needs.
7. In an effort to minimize cash balances at both the Fund and manager level, the OIC has retained an overlay manager to more closely align the actual Fund portfolio with the approved policy mix, generally through the purchase and sale of futures contracts to increase or decrease specific asset class exposures, as necessary.
8. The Council shall review, at least biennially, its expectations for asset class and active management performance, and assess how the updated expectations affect the probability that the Regular Account will achieve its investment objective.

B. Rebalancing

1. In the absence of any other considerations, the optimal rebalancing strategy would suggest continually rebalancing back to OPERF's strategic asset allocation targets. Rebalancing ensures that the return objectives and risk tolerance parameters approved by the OIC are consistently and effectively reflected in the Fund. However, rebalancing involves transactions costs such as brokerage fees and market impact. As a result of these costs, ranges are established around the strategic asset allocation targets in order to balance the desirability of achieving precise target allocations with the various and often material transactions costs associated with these same rebalancing activities. In addition, the overlay manager is expected to minimize cash exposures at both the Fund and individual manager level.
2. With OIC oversight, OST staff implements the approved rebalancing framework, although the illiquid nature of many private market assets may exempt those assets from staff's short-term rebalancing activities. Rebalancing should be implemented by the most cost-effective means available. For example, cash flows into and out of OPERF will first be used to rebalance back toward asset class targets, whenever possible.
3. A breach of any of the established asset allocation ranges triggers a review and possible rebalancing

back to established targets with due consideration given to the liquidity of the affected investments, all anticipated transaction costs and the current portfolio structure within each asset class.

C. Passive and Active Management

1. Passive management uses lower cost *index funds* to access the return streams available from the world's capital markets. Active management tries to earn higher returns than those available from index funds through the application of manager skill in the form of sector and security selection as well as market and/or asset mix timing decisions.
2. The Council uses passive management to control costs, evaluate active management strategies, capture exposure to *efficient market* segments, manage *tracking error* and facilitate policy mix re-balancing activities.
3. The Council approves active management of Fund assets when proposed active strategies offer sufficiently high expected incremental returns, net of fees, and when the magnitude of potential under-performance can be estimated, monitored and managed.
4. Public equity and fixed income asset classes are managed using both passive and active management strategies. Active management of the Fund's public market equity and fixed income allocations is expected to earn annual return premiums of 0.50% and 0.25%, respectively, over rolling, consecutive five-year periods (and relative to those allocation's respective benchmarks). The Council recognizes that unsuccessful active management can reduce total Fund returns.
5. The Council must accept active management in those asset classes for which there are no passive management alternatives; in particular, private real estate, private equity and other alternative and opportunistic investment strategies.
6. At the aggregate, Regular Account level, and as outlined in Exhibit 2, active management strategies authorized by the Council are expected to **add 0.3% of annualized excess return**, net of fees, over rolling, consecutive five-year periods.

Exhibit 2: Active Return Expectations for the OPERF Regular Account by Asset Class

| Asset Class | Target Allocation (%) | Target Active Return (%) | Target Active Contribution (%) |
|-------------------|-----------------------|--------------------------|--------------------------------|
| Public Equity | 32.5 | 0.50 | 0.19 |
| Fixed Income | 20.0 | 0.25 | 0.05 |
| Real Estate | 12.5 | 0.50 | 0.06 |
| Total Fund | | | 0.28 |

D. Public Equity Strategy

1. OPERF's public equity allocation is managed with the objective of earning at least **50 basis points** in annualized net excess return relative to the *MSCI All Country World Investable Market Index (ACWI IMI – net)* (unhedged) over rolling, consecutive five-year periods. **Relative to that same benchmark, active risk shall be managed to a 0.75 to 2.0 percent annualized tracking error target.**
2. Key elements of the strategy include the following:
 - a. In an effort to enhance return, strategy will include maintaining an over-weight to small capitalization stocks and other well supported sources of return premia. These strategic overweights or "tilts" are based on and supported by robust empirical research that historically links persistent and pervasive

evidence of excess returns to systematic "factor exposures" such as size (i.e., small cap), value and momentum. Implementation of other factor tilts may be considered at the manager, strategy or mandate level upon approval of both the Chief Investment Officer (CIO) and OIC.

- b. Multiple, specialist active managers with complementary investment styles are employed. For example, some OPERF managers focus on growth stocks, some on value stocks, some on large capitalization stocks and others on small capitalization stocks. This diversified approach produces more excess return opportunities and minimizes the Fund's exposure to any single investment organization.
- c. Aggregate exposures to countries, economic sectors, investment styles and market capitalization tiers are monitored and managed relative to corresponding benchmark exposures.

E. Fixed Income Strategy

1. OPERF's fixed income allocation is managed with the objective of earning **25 basis points** in annualized, net excess returns relative to a blended benchmark comprised of 46% *Bloomberg Barclays U.S. Aggregate Index*, 37% *Bloomberg Barclays U.S. Treasury Index*, 13% *S&P/LSTA Leveraged Loan Index* and 4% *Bank of America Merrill Lynch High Yield Master II Index* over rolling, consecutive five-year periods. **Relative to the above-described benchmark, active risk within the OPERF fixed income allocation is managed to a 0.5 to 1.0 percent annualized tracking error target.**
2. Key elements of the strategy include the following:
 - a. A significant proportion of the OPERF fixed income allocation is actively managed due to performance and cost considerations. Specifically, excess returns from active fixed income management are likely as many investors hold fixed income securities to meet regulatory and liability matching objectives, and hence are not total return oriented. This market dynamic produces systematic opportunities in fixed income securities that skilled investment managers can exploit. Active fixed income management fees are also much lower than active equity management fees.
 - b. Aggregate exposures to duration, credit and sectors are monitored and managed relative to corresponding exposures in the fixed income allocation benchmark.

F. Risk Parity Strategy

1. OPERF's risk parity allocation will be managed with the objective of earning a net total return comparable to an equal risk weighting of traditional asset class indices such as *Bloomberg Barclays U.S. Treasury Index* and the *MSCI ACWI IMI*.

G. Real Estate Strategy

1. OPERF's real estate allocation is managed with the objective of earning at least **50 basis points** in annualized, net excess returns relative to the *NCREIF Fund Index – Open End Diversified Core Equity (NFI-ODCE)*, net of management fees, over rolling, consecutive five-year periods.
2. Key elements of the strategy include the following:
 - a. Real Estate is 100% actively managed because a passive replication of the full breadth and depth of the real estate asset class is not viable.
 - b. Core property investments represent 55% of the Fund's real estate allocation, with a range of 45% to 65%. Risk is diversified by investing across the following major property types: office; apartments;

retail; and industrial. The OPERF real estate allocation may also include structured investments in alternative property types with Core-like risk and return attributes.

- c. Exchange-traded real estate investment trusts (REITs) represent 5% of the Fund's real estate allocation, with a range of 0% to 10%. Up to 50% of the REIT exposure may be invested in markets outside the United States.
- d. *Value Added* property investments represent 20% of the OPERF real estate allocation, with a range of 10% to 30%, and may include direct investments in each of the property types listed above, as well as structured investments in alternative property types. Risk is diversified by property type and geography.
- e. *Opportunistic* property investments represent 20% of the OPERF real estate allocation, with a range of 10% to 30%. Relative to Core and Value Added strategies, real estate investments will be characterized as "opportunistic" based on higher risk/return expectations and other prevailing market conditions.
- f. Within its real estate allocation, the Fund may participate in *co-investment* opportunities.

H. Private Equity Strategy

1. OPERF's private equity allocation is managed with the objective of earning at least **300 basis points** in annualized, net excess returns relative to the Russell 3000 Index over very long time horizons, typically rolling, consecutive 10-year periods.
2. Key elements of the strategy include the following:
 - a. Private Equity is 100% actively managed because private equity index funds are not available.
 - b. Risk within OPERF's private equity allocation is diversified by investing across different fund types and strategies including *venture capital, leverage buyout, mezzanine debt, distressed debt, sector funds, secondaries* and *fund-of-funds*.
 - c. OPERF's private equity allocation is further diversified by investing across *vintage year*, industry sectors, investment size, development stage and geography.
 - d. OPERF's private equity investments are managed by external managers operating as general partners. Considerations for private equity manager selection include access to transactions (i.e., "deal flow"), specialized areas of operating expertise, established or promising net of fees performance track records, unique or differentiated investment methodologies and transparent/verifiable reporting processes.
 - e. Within its private equity allocation, the Fund may participate in co-investment opportunities.

I. Alternatives Strategy

1. OPERF's allocation to Alternatives is managed with the objective of earning at least **400 basis points** in annualized, net excess returns relative to *CPI* over rolling, consecutive ten-year periods.
2. Key elements of the strategy include the following:
 - a. Alternatives are 100% actively managed because index funds replicating the broad alternatives market are not available.
 - b. *Infrastructure* investments represent 20% of the Fund's alternatives allocation, with a range of 15% to 25%. Risk is diversified by investment type, size and geography. Specific infrastructure sector

exposures will likely include energy, transportation, ports and water in both domestic and international markets and comprising both mid-size and large capitalization enterprises.

- c. *Natural Resource* investments represent 30% of the Fund's alternatives allocation, with a range of 25% to 35%. Risk is diversified by investing across multiple industry sectors including oil and gas, agriculture, timberland, mining and commodities.
- d. *Diversifying Strategies* represent 50% of the Fund's alternatives allocation, with a range of 45% to 55%. Diversifying Strategies investments may include relative value, macro, arbitrage and long/short equity strategies. The objective of this sleeve is to invest in strategies with returns uncorrelated with those of the broader Fund. Risk is diversified by investing in multiple managers and across several strategies.
- e. *Other* investments may represent 5% of the Fund's alternatives allocation, with a range of 0% to 10%. Investment strategies will be characterized as "other" based on prevailing market conditions as well as a specific strategy's unique "value proposition" or investment thesis.
- f. Within its alternatives allocation, the Fund may also participate in *co-investment* opportunities.

J. Performance Monitoring and Evaluation

1. The Council and OST staff use a variety of verification and performance measurement tools to monitor, measure and evaluate the management of OPERF assets. Monitoring, reporting and evaluation frequencies range from daily to annually, although quarterly is the most commonly used reporting frequency.
2. The Council directs staff to develop a performance monitoring and evaluation system that validates whether the assets are prudently managed. More specifically, whether Fund investment performance improved benefit security, and capital market risk in general and active management in particular have been sufficiently rewarded.
3. One of many reports used by the Council to satisfy the above requirements is a simple comparison of Regular Account investment performance relative to the Council's assigned total Fund benchmark over rolling, consecutive multi-year periods. Other reports help the Council assess whether or not the Fund was rewarded for its allocations to higher return, higher risk equity investments and whether or not the active management strategies utilized added or subtracted from policy returns on a net of fees basis.
4. The reporting described in this section gives the Council a consolidated or "big picture" view of Regular Account investment performance. Regular Account investment performance across primary asset allocation categories will also be reported to the OIC. Upon request and if available, staff will also provide the Council more granular performance reporting, e.g., at the individual manager level.
5. 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.

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.

Attachments:

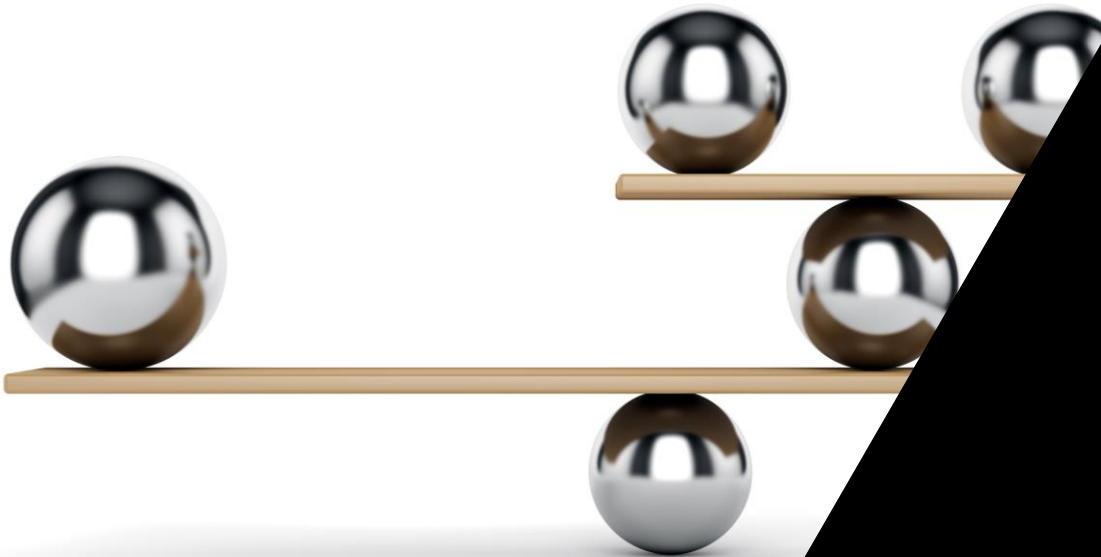
No Attachments

Approval Signatures

| Step Description | Approver | Date |
|------------------|---|---------|
| | John Skjervem: Chief Investment Officer | pending |

Total Fund Overlay Platform

State of Oregon
2018 Year in Review



GREG NORDQUIST, CFA
Director, Overlay Strategies

PHILIP SAUCIER, CFA
Portfolio Manager

June 05, 2019

Discussion topics

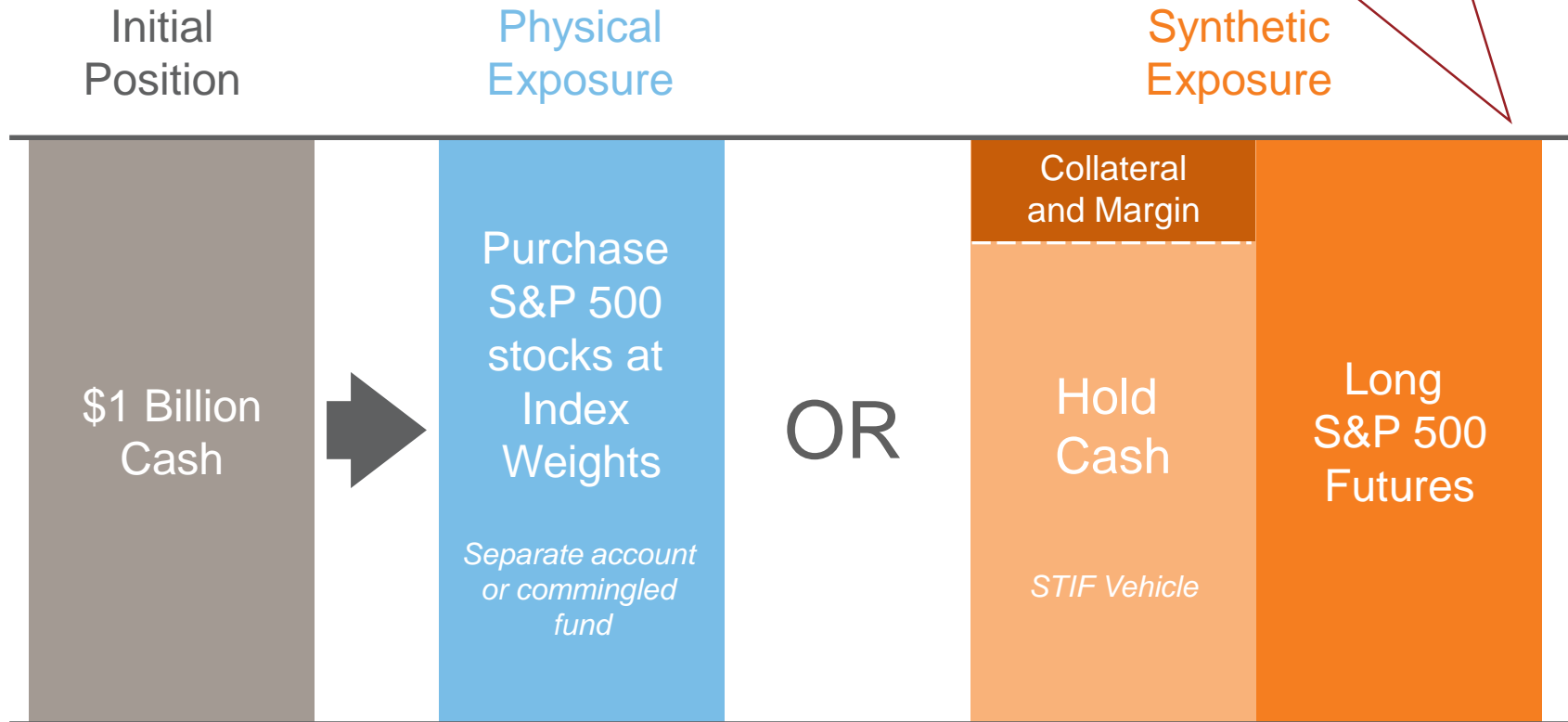
- > Futures overlay explained
 - > Review of the basic mechanics of an overlay program
- > Why use an overlay?
 - > Review of results and the benefits that the overlay provides
 - > Reduction in cash drag . . . *-\$31 MM*
 - > *-\$186 MM* in 2018 (sharp downturn in markets Q4 2018)
 - > *+\$155 MM* in Q1 2019 (rapid rebound in Q1 2019)
 - > Reduction in risk (70% lower tracking error . . . *+\$96 MM from risk control*)
 - > *+\$162 MM* in 2018 (helped offset losses from Cash Equitization)
 - > *-\$78 MM* in Q1 2019
 - > Reduction in transaction costs (*+\$26 MM* in estimated savings)
- > Appendix

Futures overlay explained

Example

Physicals vs Futures – Day 1

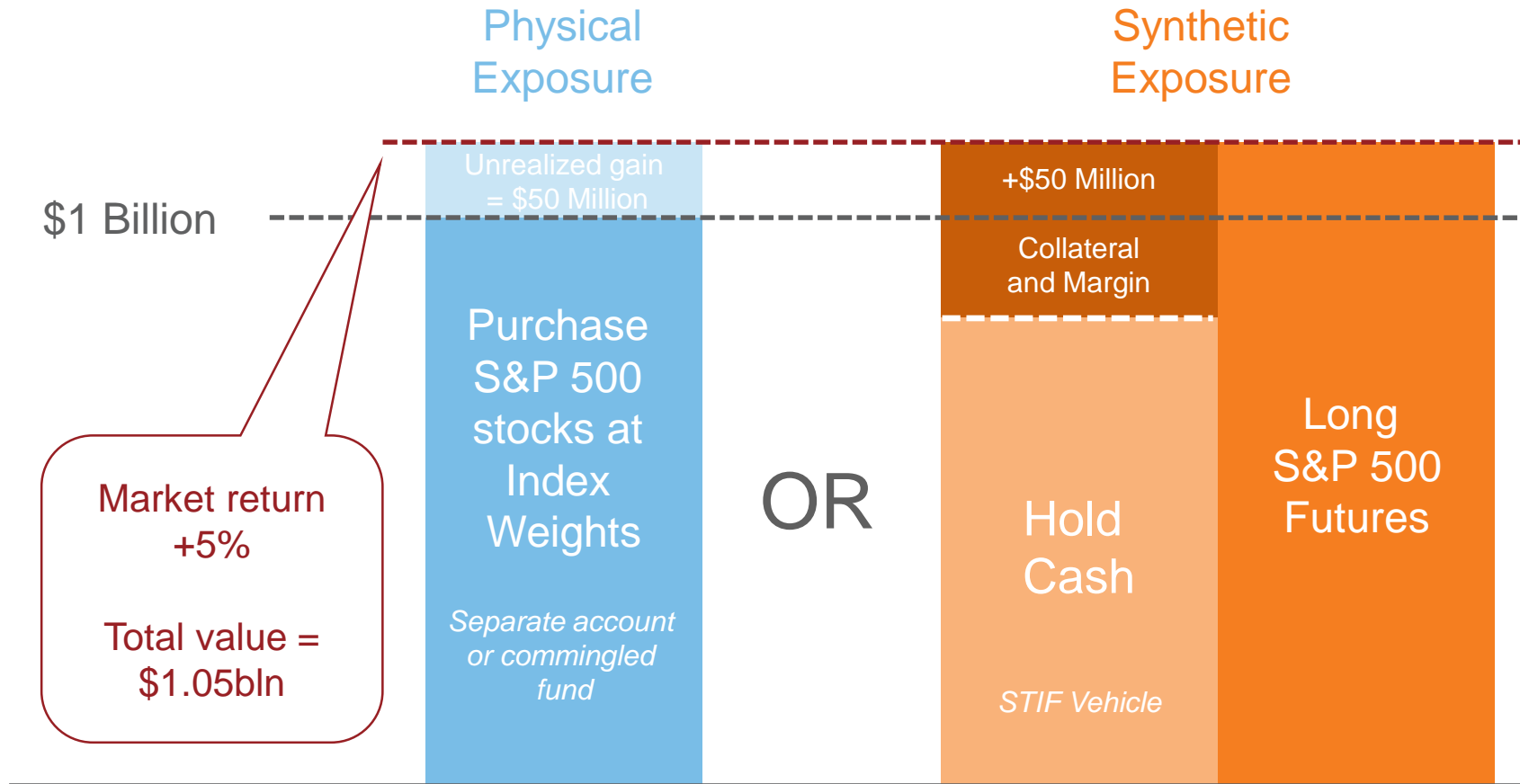
Note: Futures = Liquid Exposure
(NOT Leverage)



For illustrative purposes only.
Indexes are unmanaged and cannot be invested in directly.

Example

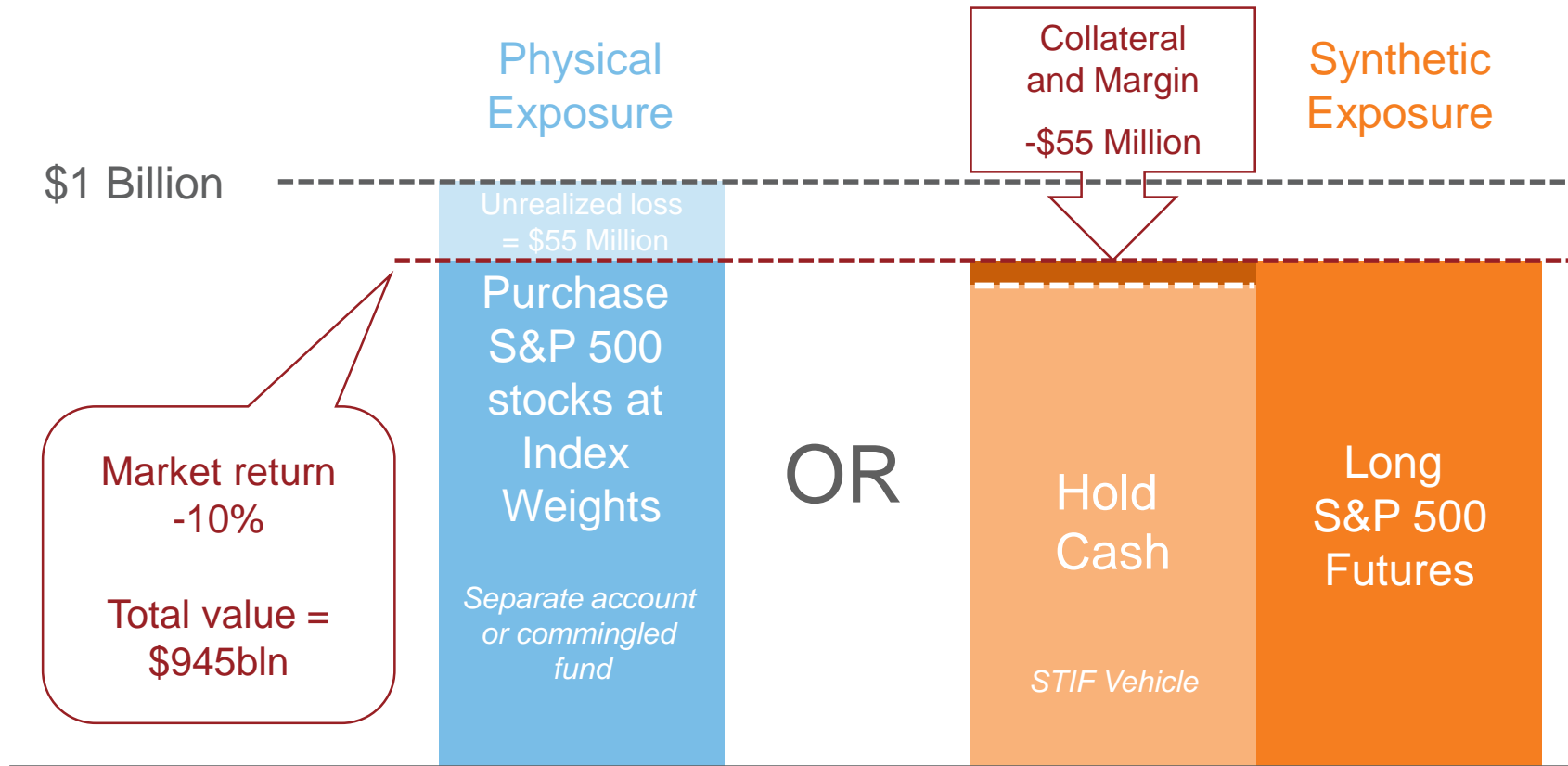
Physicals vs Futures – Day 2



For illustrative purposes only.
Indexes are unmanaged and cannot be invested in directly.

Example

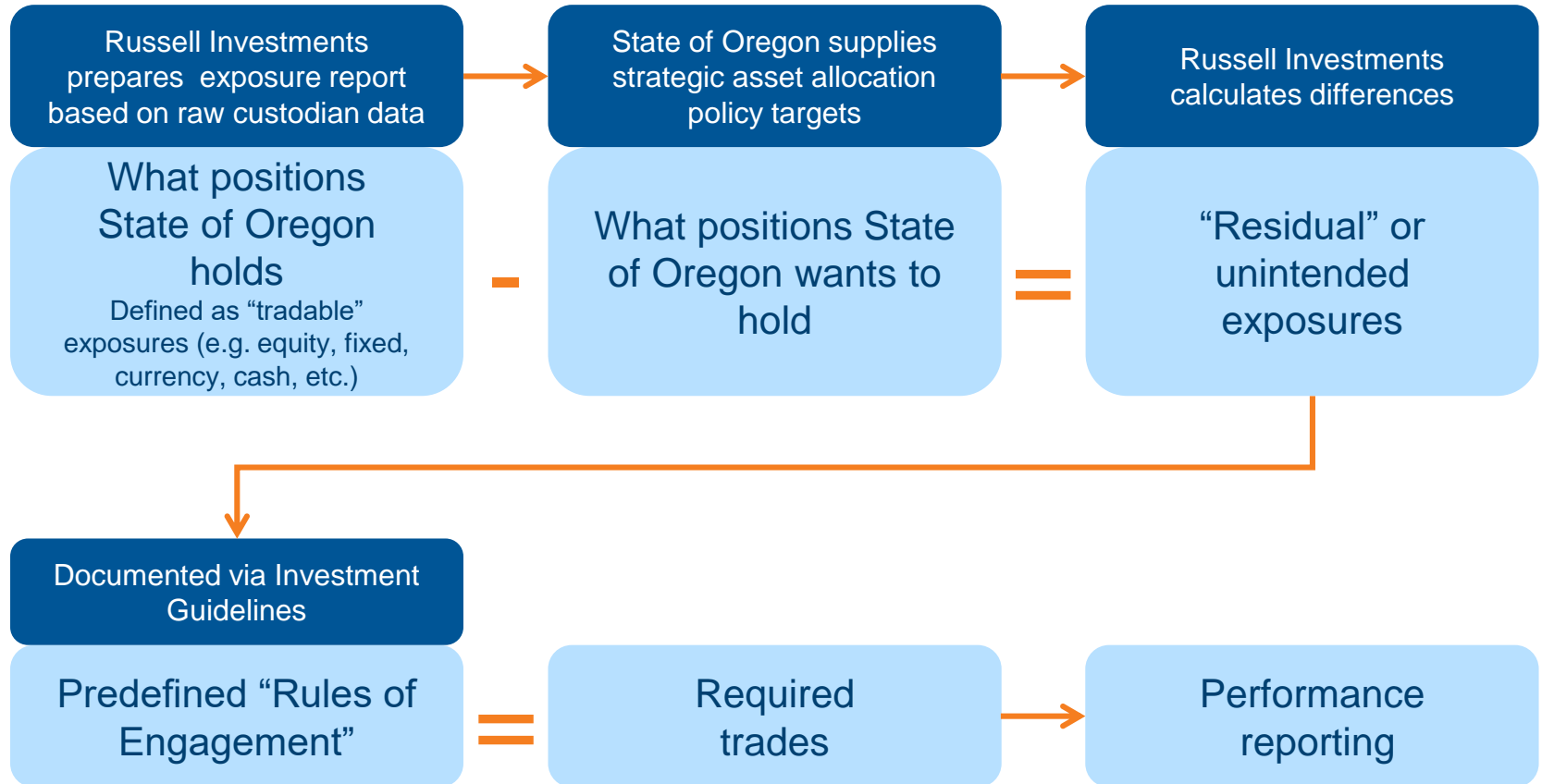
Physicals vs Futures – Day 3



For illustrative purposes only.
Indexes are unmanaged and cannot be invested in directly.

Process

Data, targets, exposures, guidelines, trades, reporting

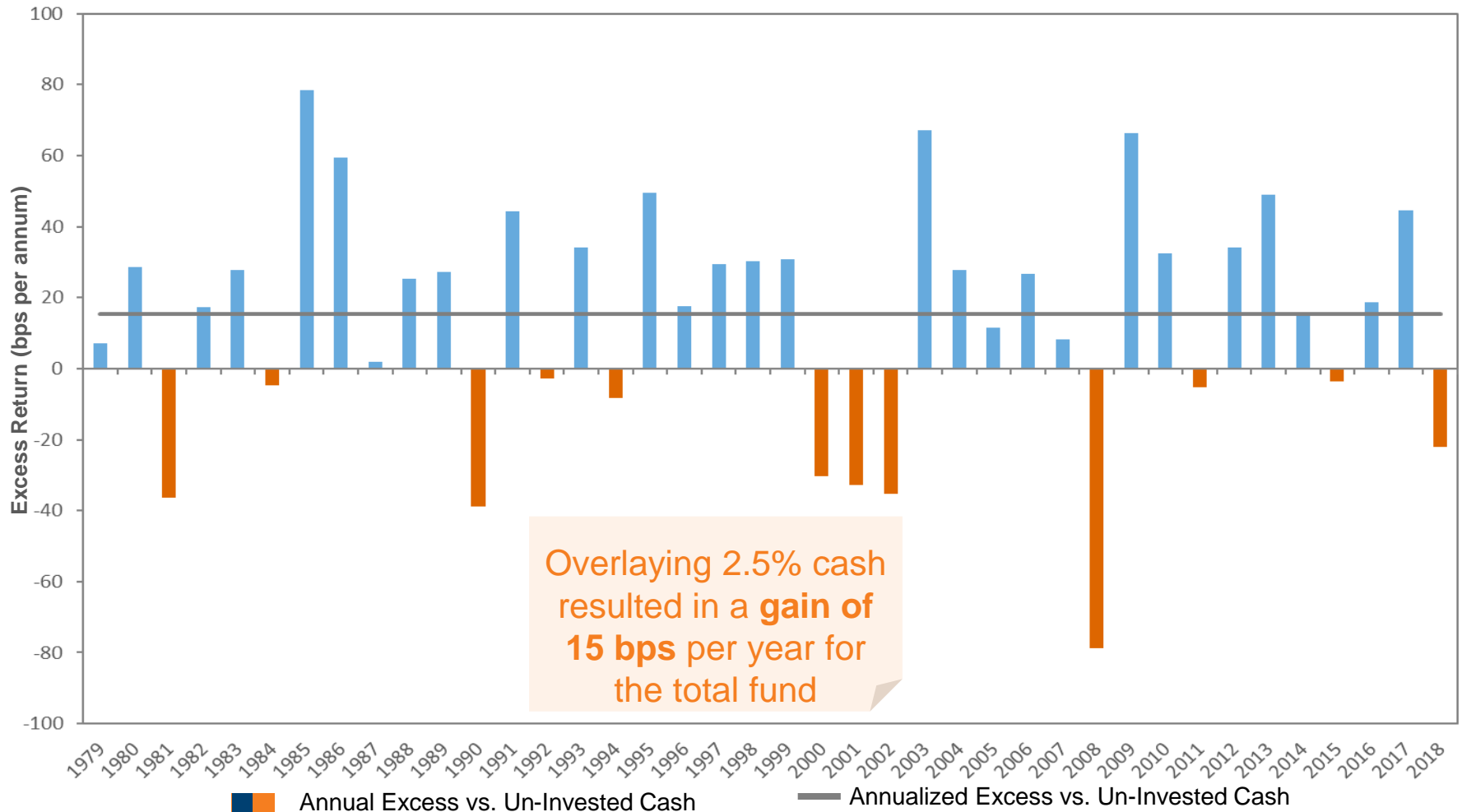


Why use an Overlay?

Reduce cash drag

Potential benefit of cash Overlay

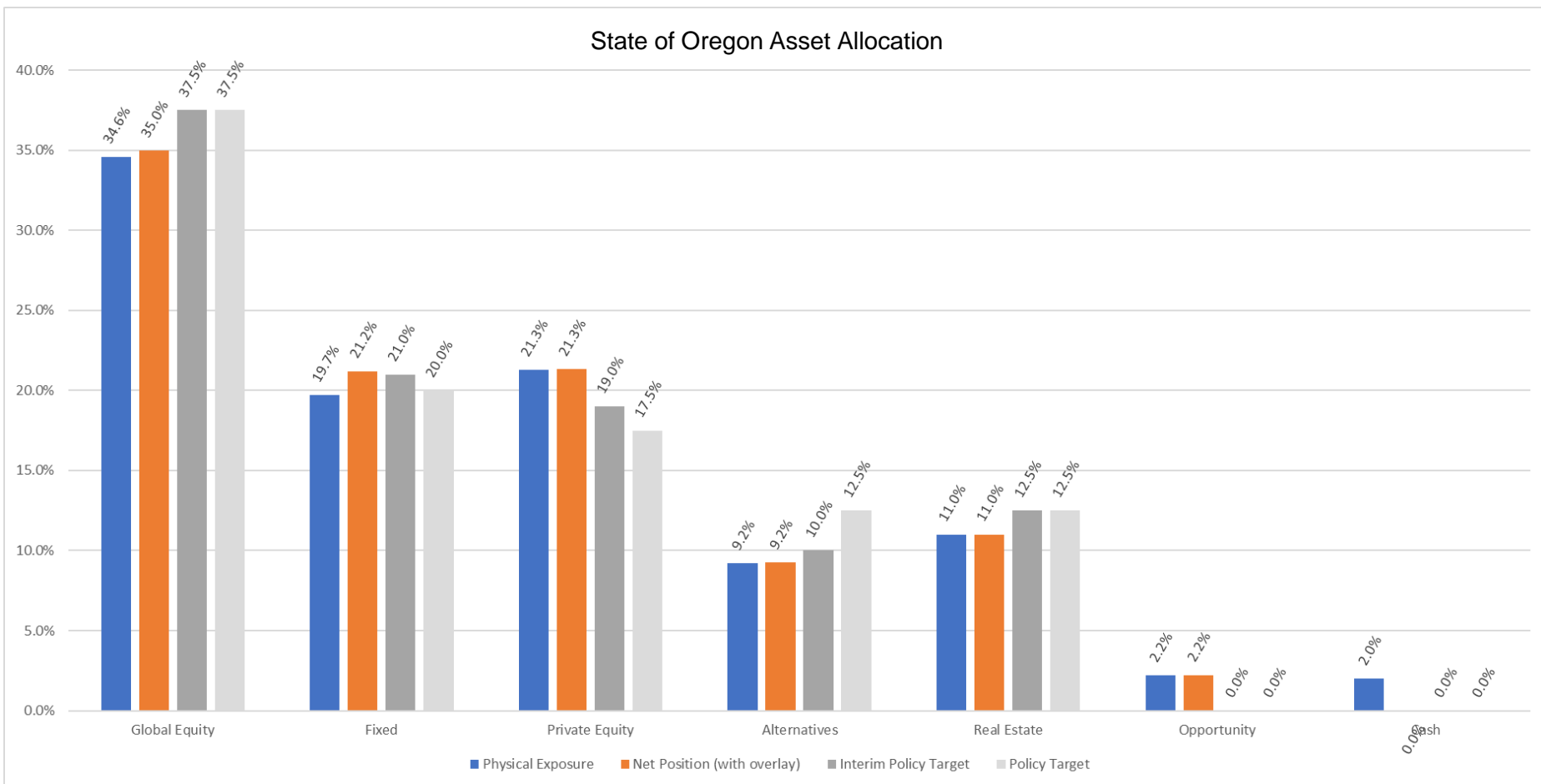
Frictional cash drag can have a significant impact on performance ¹



¹Impact from 12/31/78 to 12/31/18 of 1.5% US equity, 2.0% International equity and 1.5% fund cash (total cash ~2.5%) vs. a pro-rated target of 40.0% Russell 3000 / 20.0% MSCI ACWI ex-US / 40.0% Barclays US Aggregate. For illustrative purposes only. Does not represent any actual investment. Indexes are unmanaged and cannot be invested in directly. Data is historical and not a guarantee of future results.

Reduce cash drag

No strategic allocation to cash



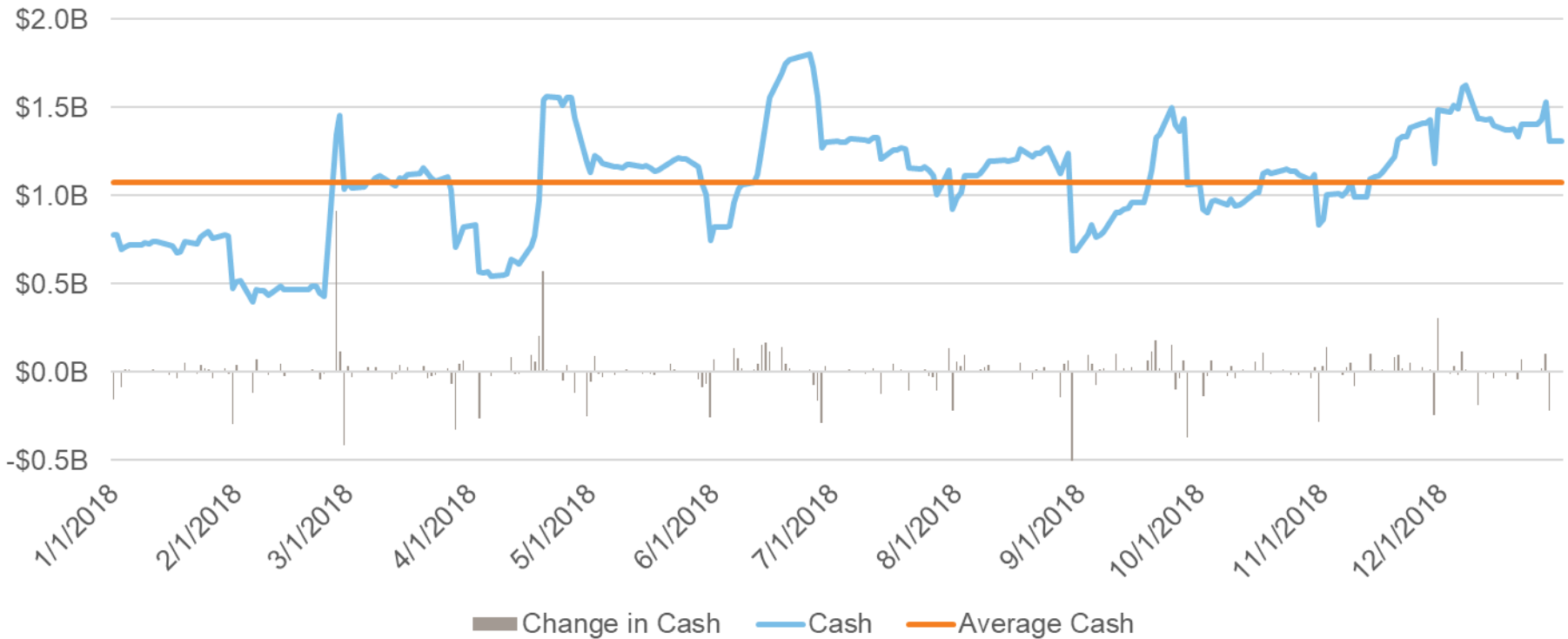
As of March 31, 2019. Past performance is not a guarantee of future results.

Reduce cash drag

Plan cash levels

The plan had almost \$15 Billion in aggregate cash flows over the course of the year (2018)

State of Oregon Plan Cash Levels

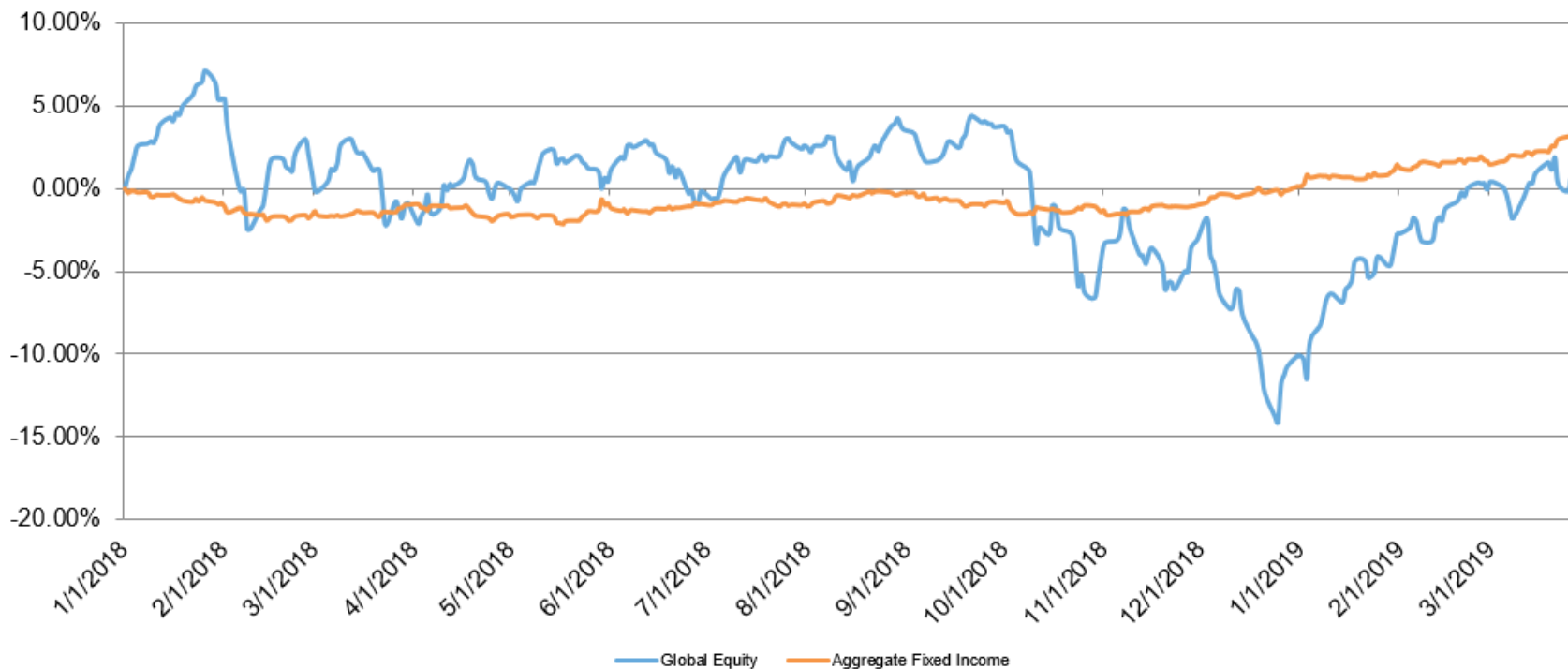


Past performance is not a guarantee of future results.

Reduce cash drag

Benchmark returns

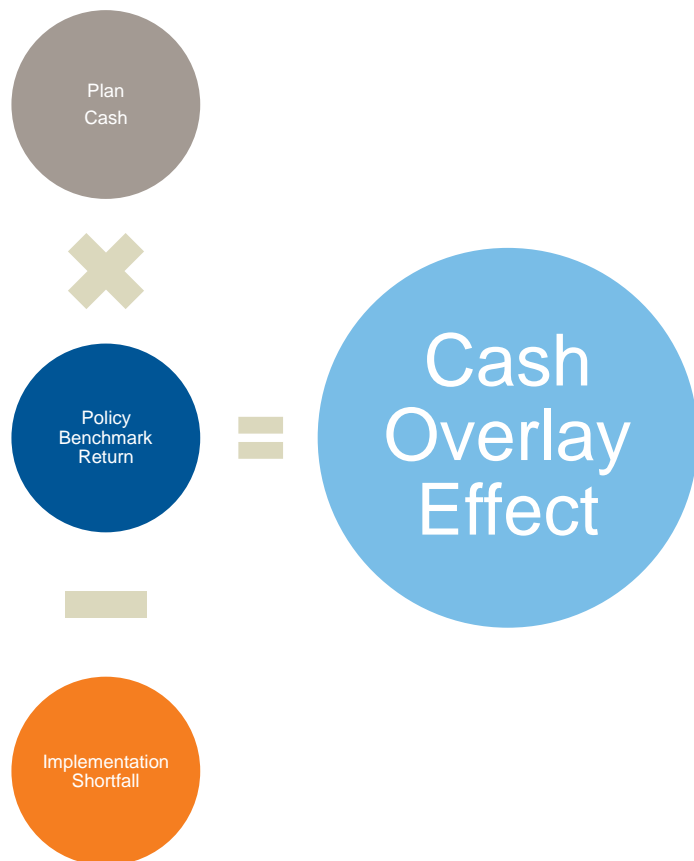
Cumulative Benchmark Return



Past performance is not a guarantee of future results.

Reduce cash drag

Cash overlay effect



- > In 2018 the cash overlay effect was about -\$186 million. This should be expected in down markets.
- > Q1 2019 the cash overlay effect was roughly +155 million. This was a result of the rebound in the markets.
- > For context, in 2017 the cash overlay effect was about +\$269 million.
- > Over the long run overlaying cash and reducing cash drag should be expected to benefit your plan.

Past performance is not a guarantee of future results.

Why use an Overlay?

Reduce risk



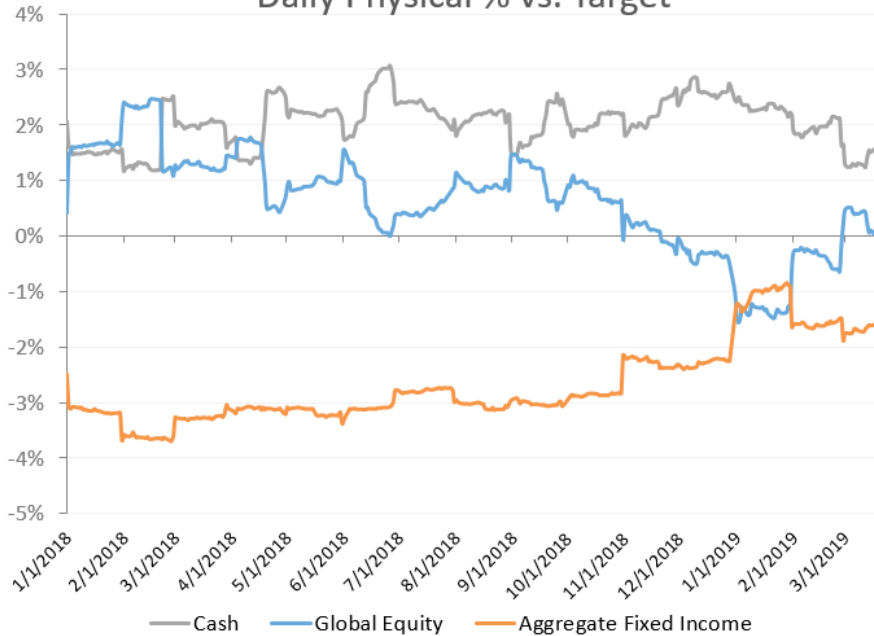
Reduce risk

Deviations from policy exposures

Without Overlay



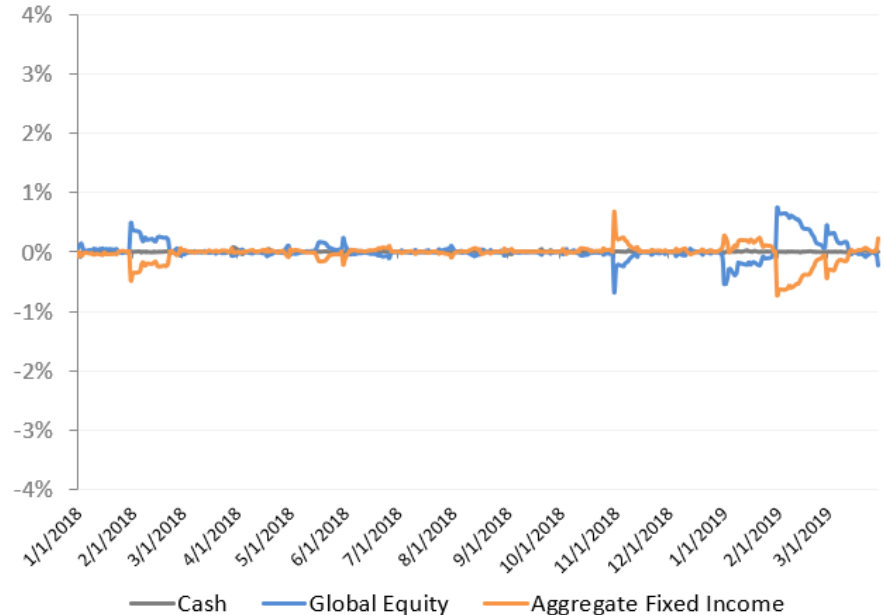
Daily Physical % vs. Target



With Overlay



Daily Net Exposure % vs. Target

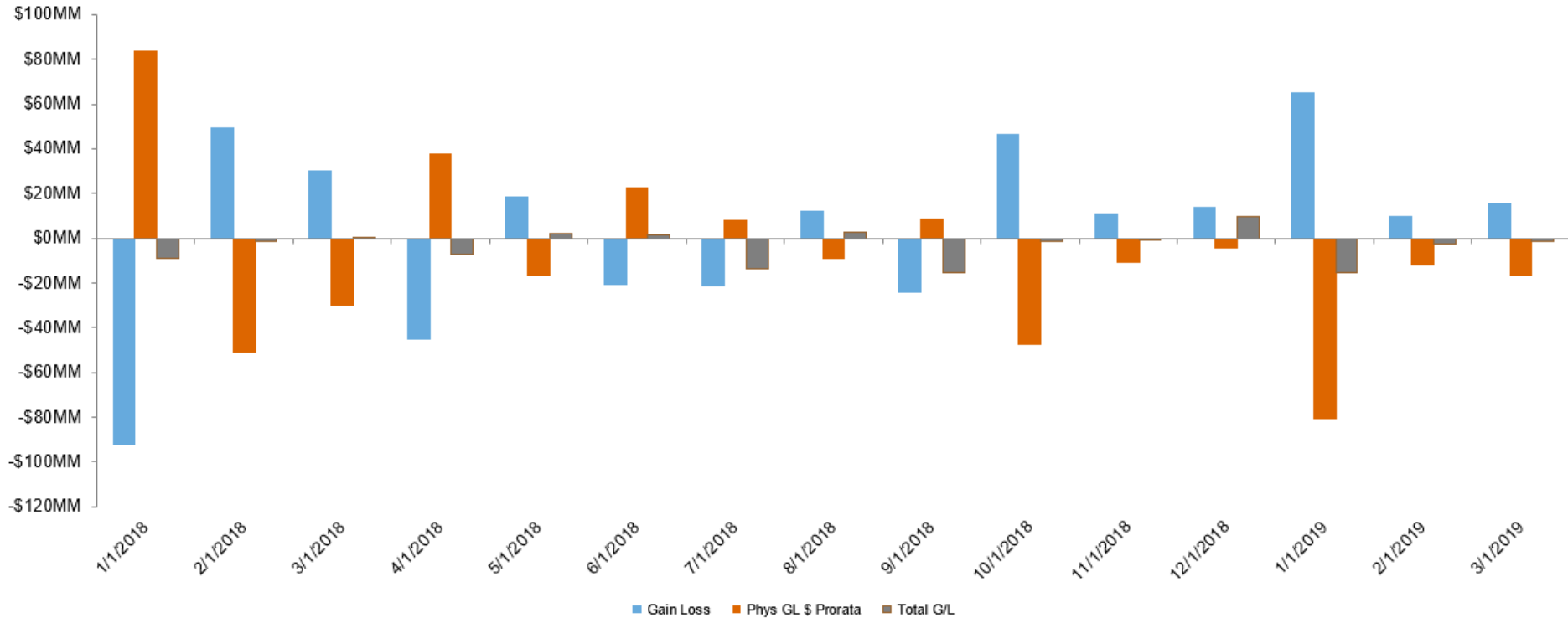


Past performance is not a guarantee of future results.

Reduce risk

Gain / Loss due to deviations

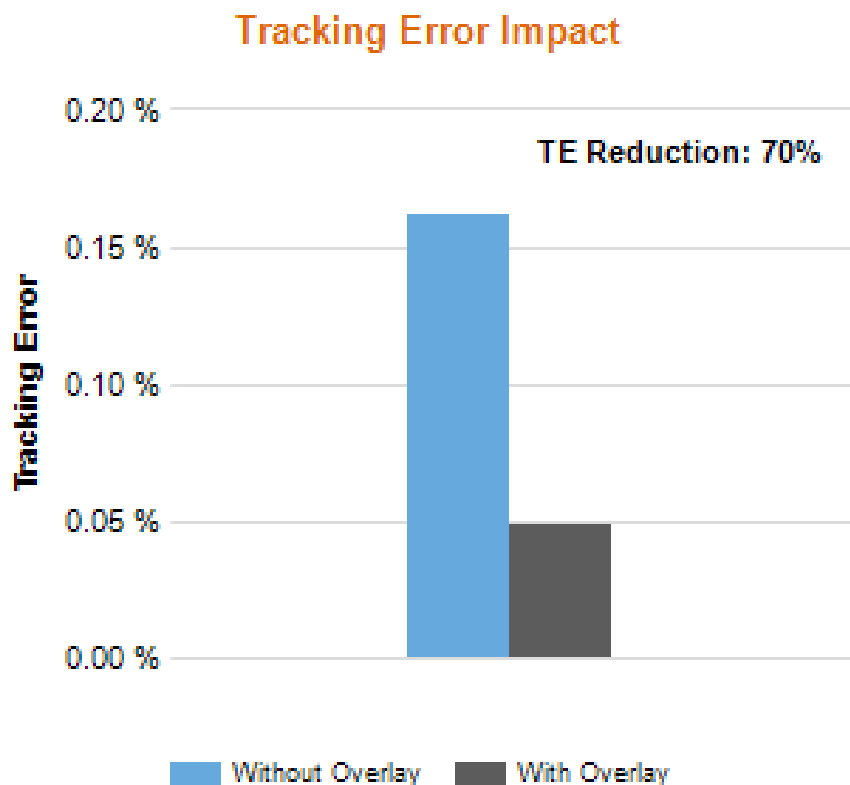
State of Oregon Monthly Gain/Loss



Past performance is not a guarantee of future results.

Reduce risk

Tracking Error Impact



- > The Overlay reduced the tracking error of the plan vs. its policy benchmark by about 70%
- > Given State of Oregon's \$73 billion average market value, this reduction in risk equates to ~ \$175 million reduction in risk*

*Dollar return variation at 2 standard deviations

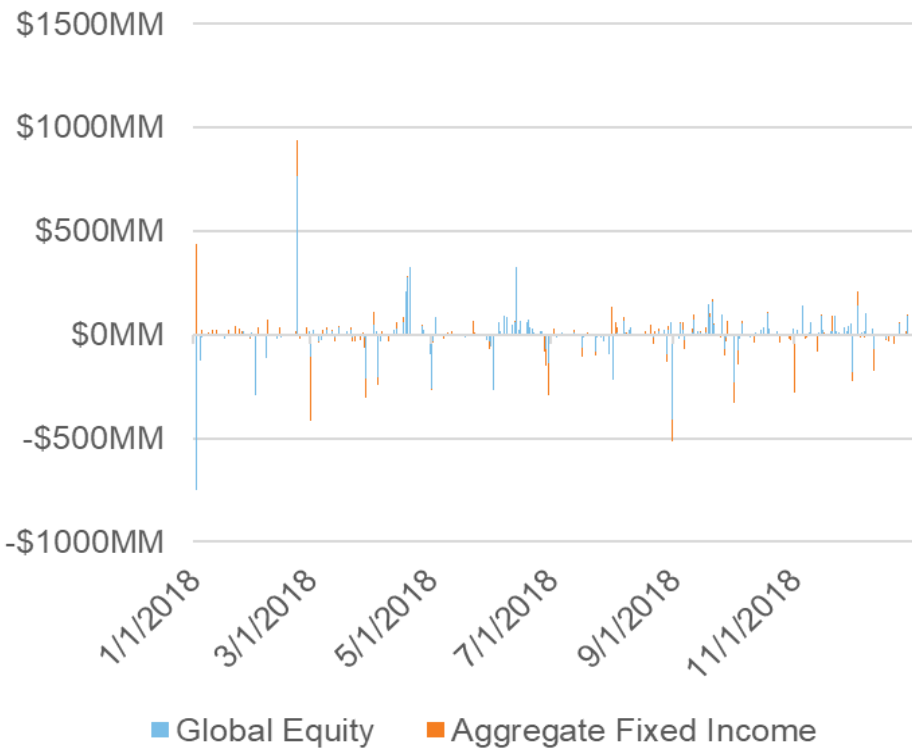
Why use an Overlay?

Reduce transaction cost

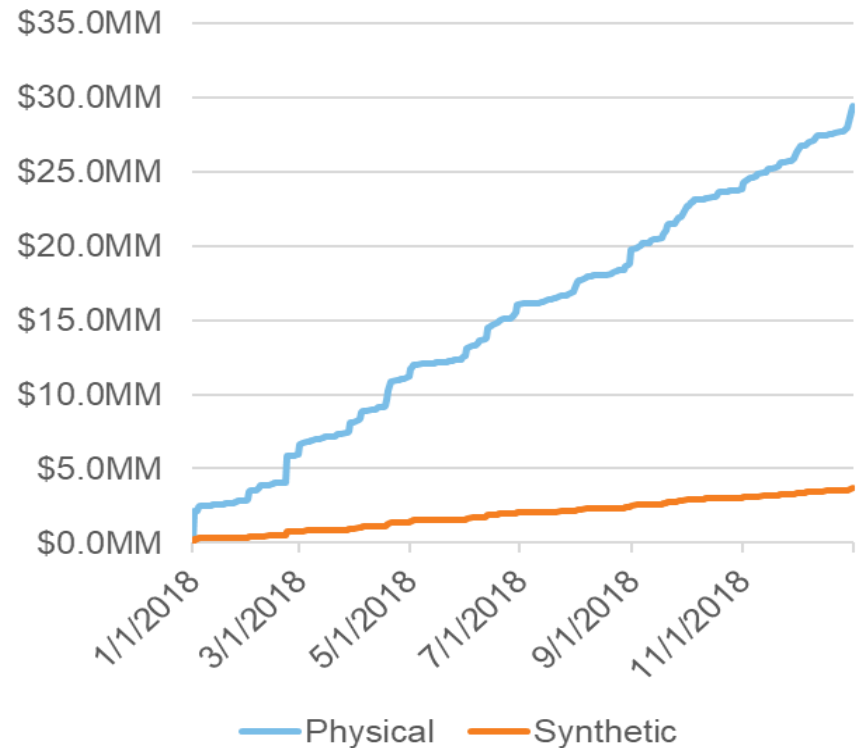
Reduce transaction cost

Daily traded flows & estimated transaction costs (2018)

Daily Traded Flows



Estimated Transaction Cost

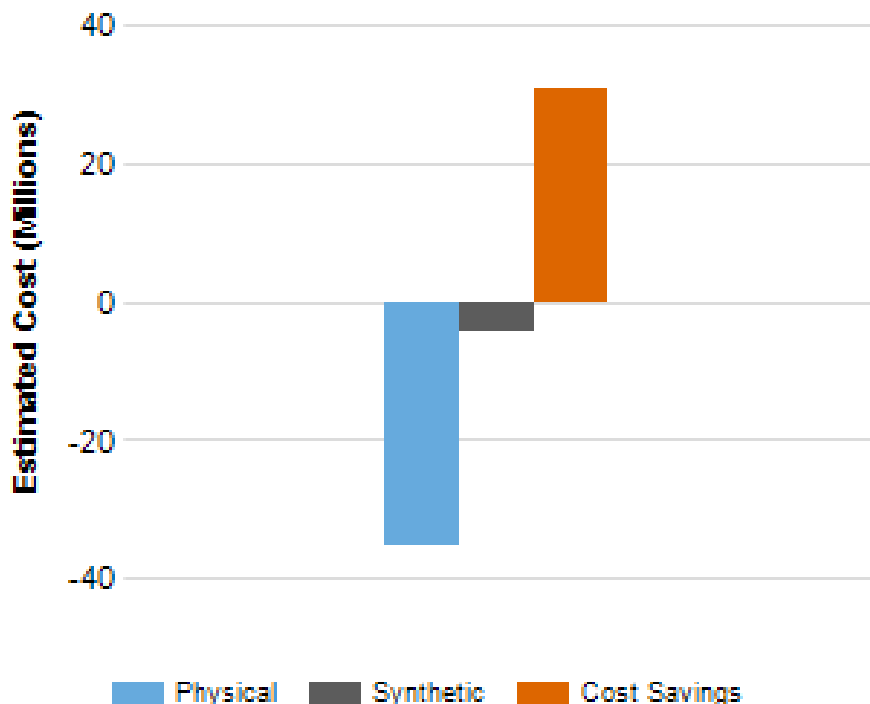


Past performance is not a guarantee of future results.

Reduce transaction cost

Daily traded flows & estimated transaction costs (2018 and Q1 2019)

Transaction Cost Savings



> Compared to rebalancing physicals, we estimate that rebalancing with derivatives in the overlay saved about \$30.7 million in transaction costs

Past performance is not a guarantee of future results.

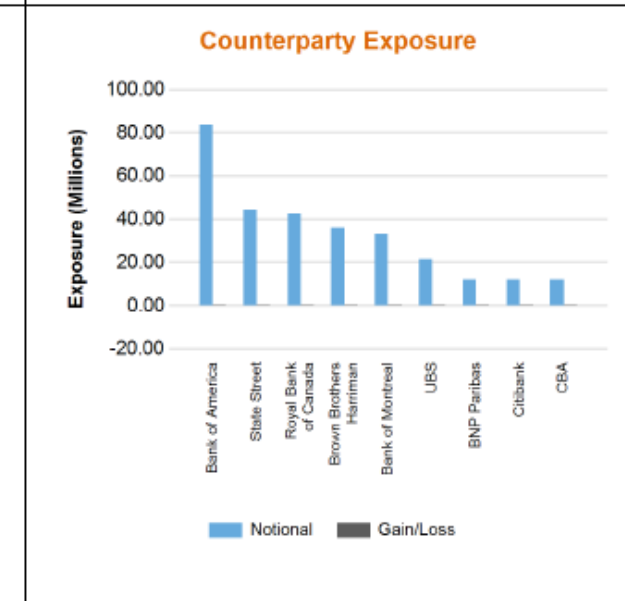
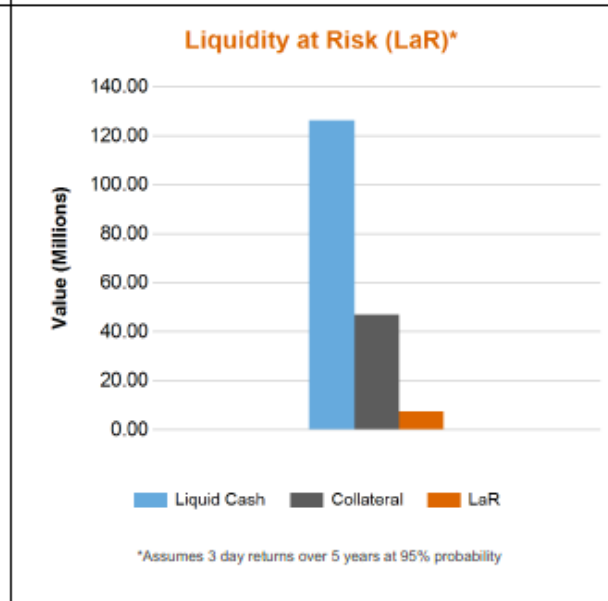
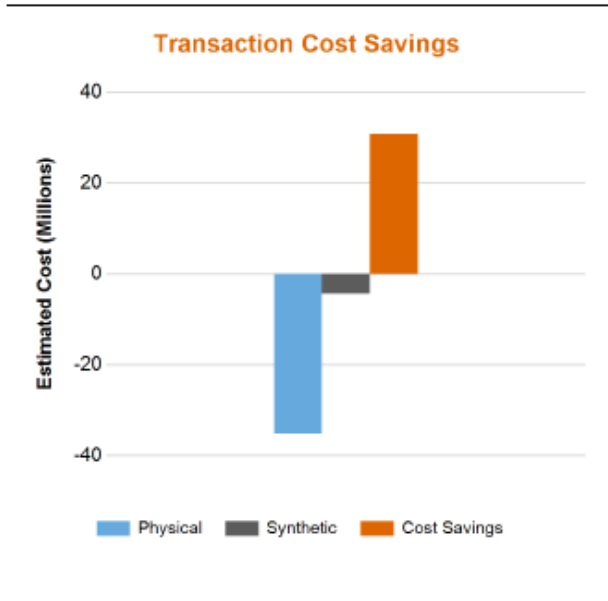
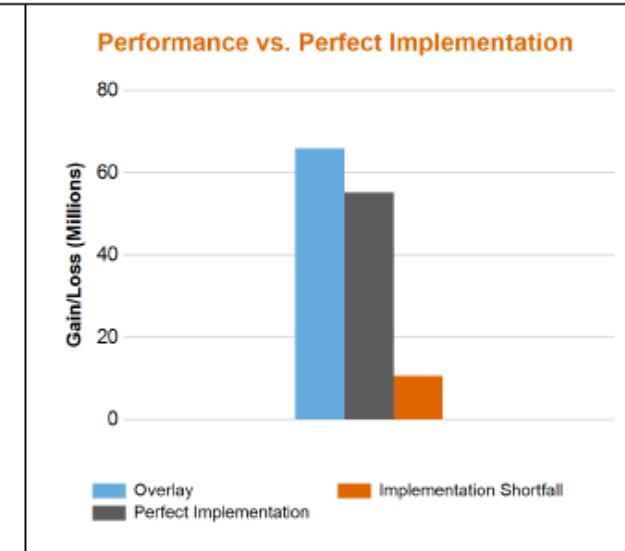
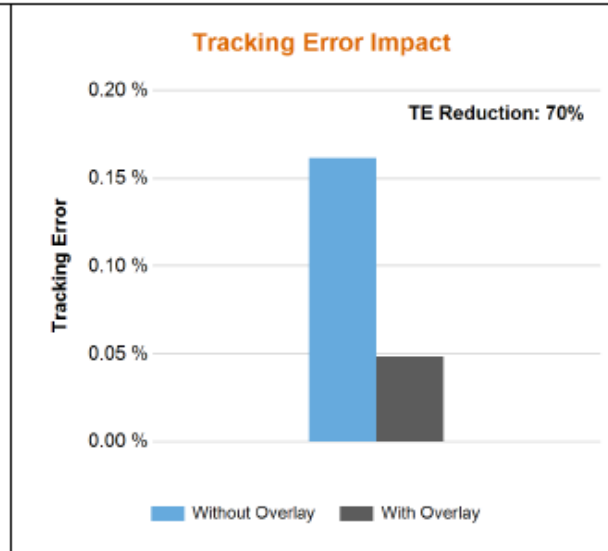
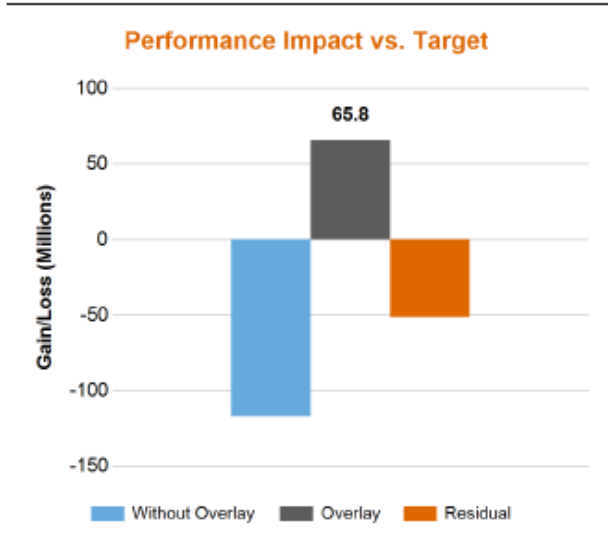
Bringing it all together

Overlay highlights

Overlay Highlights

Oregon - Oregon

01-Jan-2018 to 29-Mar-2019



Perfect Implementation assumes all trades at the prior day close, no transaction costs, and returns equal to physical benchmark(s). In addition, 3-month LIBOR (daily calculated) is subtracted from the total return benchmark in the calculation of the perfect implementation benchmark.

Appendix

Client Performance

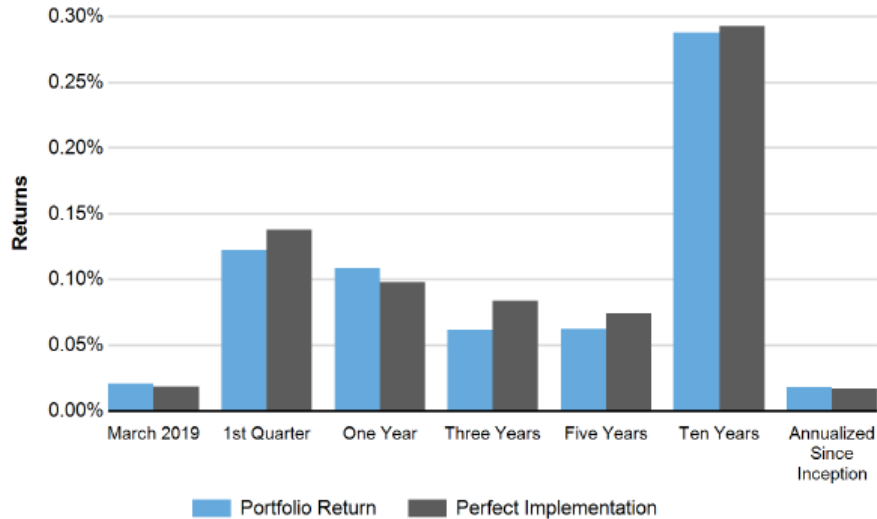
Oregon - Oregon



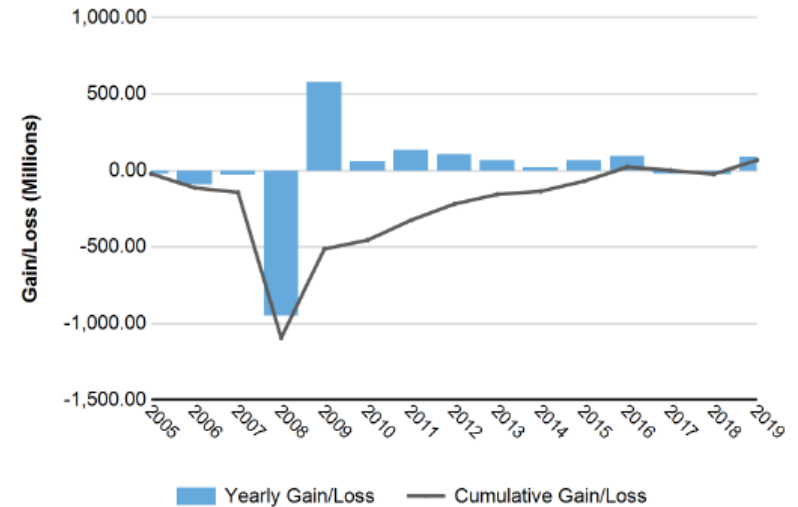
As of 29-Mar-2019

| Time Period | Gain/Loss | Portfolio Return* | Perfect Implementation* |
|----------------------------|------------------|-------------------|-------------------------|
| March 2019 | 15,362,070.43 | 0.02 % | 0.02 % |
| 1st Quarter | 89,745,106.66 | 0.12 % | 0.14 % |
| One Year | 79,167,120.10 | 0.11 % | 0.10 % |
| Three Years | 124,412,797.86 | 0.06 % | 0.08 % |
| Five Years | 208,295,966.33 | 0.06 % | 0.07 % |
| Ten Years | 1,422,588,871.92 | 0.29 % | 0.29 % |
| Annualized Since Inception | 4,969,543.95 | 0.02 % | 0.02 % |
| Cumulative Since Inception | 66,932,268.65 | 0.24 % | 0.23 % |

Portfolio Return vs Perfect Implementation



Yearly Gain/Loss vs Cumulative

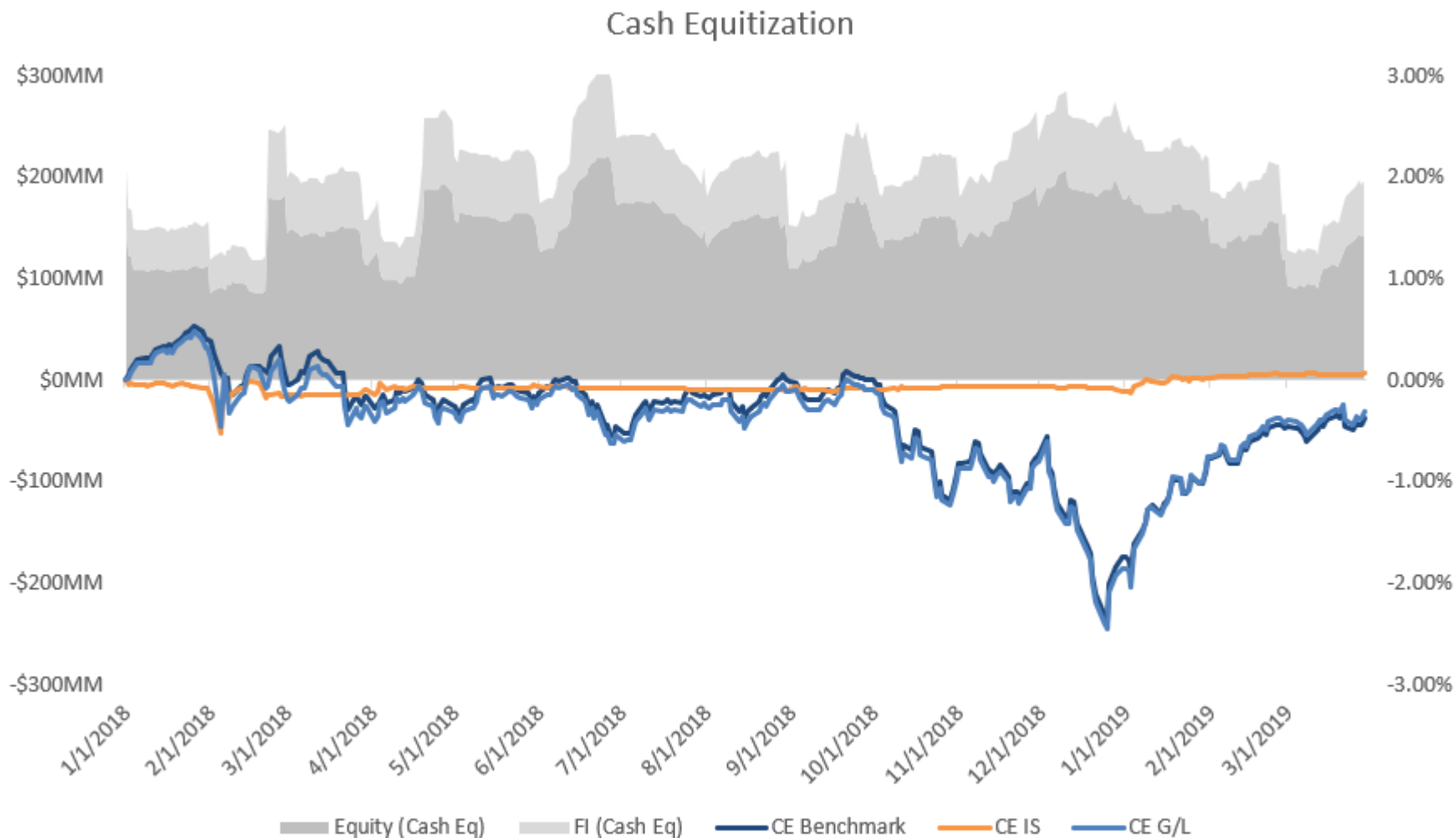


Inception Date: 11-Oct-2005

Past performance is not a guarantee of future results.

Reduce cash drag

Cash overlay effect

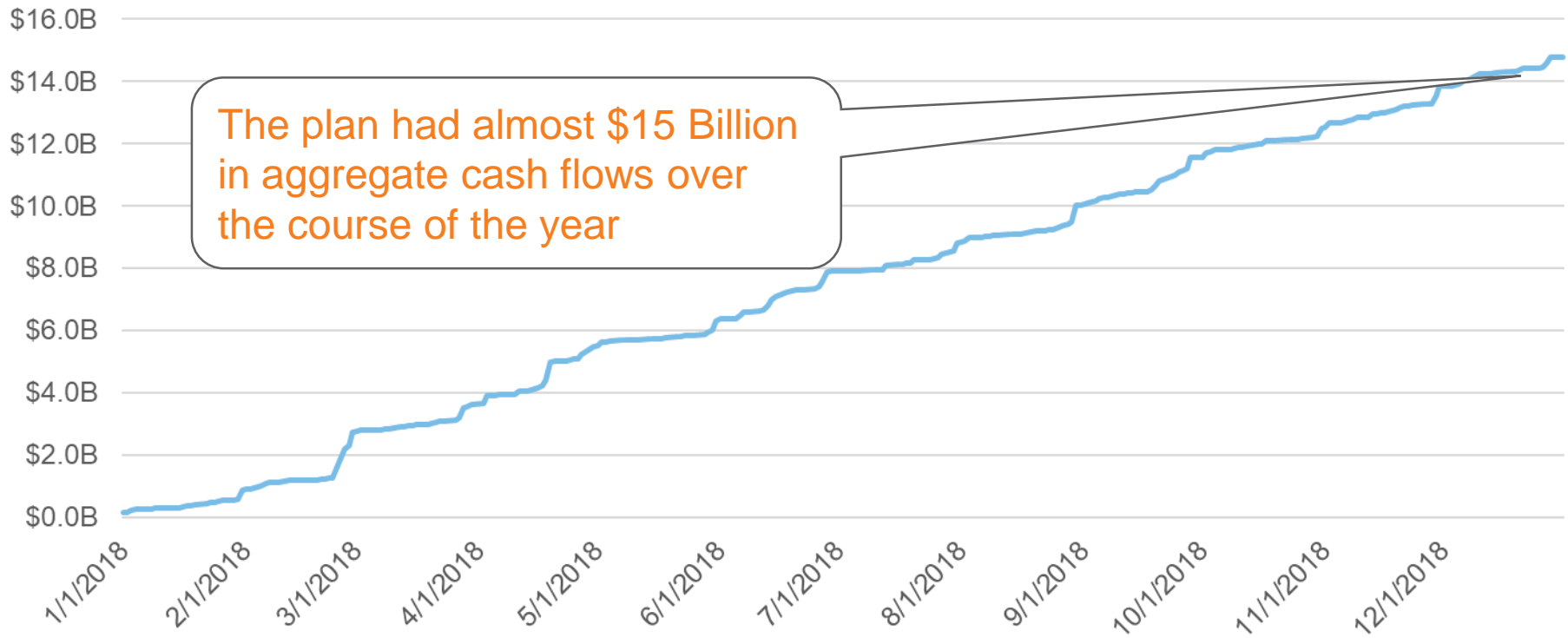


Past performance is not a guarantee of future results.

Reduce cash drag

Plan cash flows (2018)

State of Oregon Cumulative Cash Flows



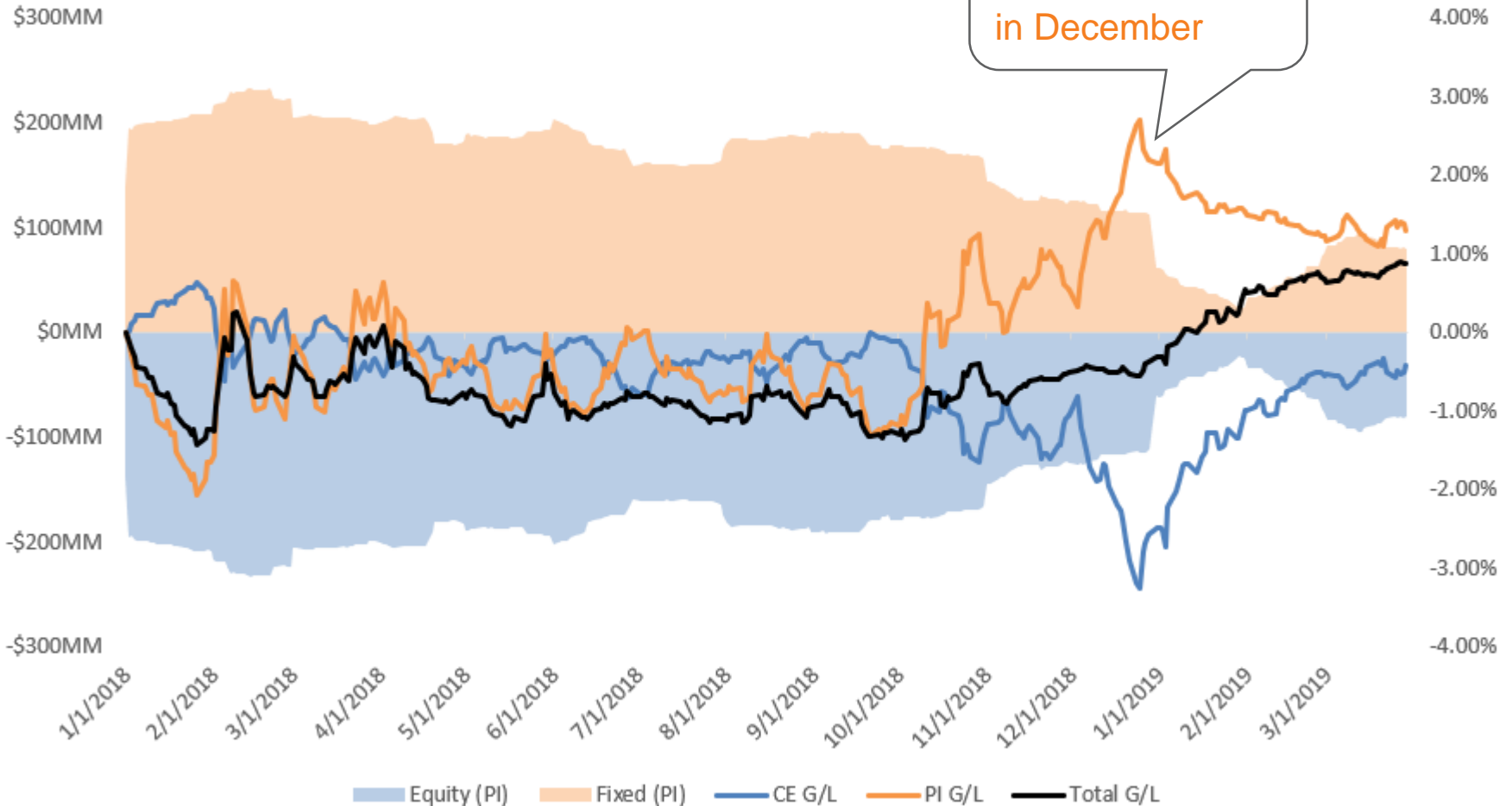
Past performance is not a guarantee of future results.

Reduce risk

Decomposing cash equitization and policy implementation effects

Policy Implementation

PI helped a lot as markets declined in December



Past performance is not a guarantee of future results.

Biography



Gregory S. Nordquist, CFA

Director, Overlay Strategies

Russell Investments Implementation Services, LLC

Greg Nordquist is a director, overlay strategies on the overlay services team for Russell Investments. This team manages custom overlays for large institutional investors. Assignments include equitization, policy implementation, portable alpha, and liability based solutions as well as client-directed hedges. Through these assignments, Russell Investments strives to improve the implementation of existing investment strategies by reducing slippage inherent in most portfolios and provide an efficient platform for implementing newer strategies such as portable alpha and interest rate hedging. From 1996 to 2006 Greg was with Russell Investments' U.S. consulting group, the final eight years as a consultant. In that role Greg provided advice to large institutional fund clients on all aspects of their investment programs including governance, asset allocation, investment structure, manager selection and performance monitoring. Greg was also involved in researching global tactical asset allocation strategies, a team leader on U.S. and international equity strategy and served on Russell's index content committee.

Greg joined Russell Investments' trust operations in 1990 as a technical assistant. In 1993 Greg moved to the firms investment management group as a portfolio specialist, where his responsibilities included executing trades for money market funds, short-term investment funds and various custom assignment fixed income funds.

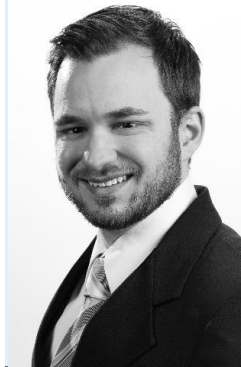
Greg served as a member of FTSE America's Regional Index Committee from 2002 to 2006.

Greg is a director, overlay strategies for overlay services of Russell Investments Implementation Services, LLC, Russell Investments' global trading firm. Russell Investments Implementation Services, LLC is an SEC registered investment adviser and FINRA member firm.

BB.A., Finance and Accounting, University of Puget Sound

CFA Charterholder, CFA Institute, 1997

Biography



Philip Saucier, CFA

Portfolio Manager, Overlay Services

Russell Investments Implementation Services, LLC

Phil Saucier is a portfolio manager on the Overlay Services team for Russell Investments. His primary responsibilities are to design, implement, and manage portfolios for large institutional investors. Strategies include cash securitization, synthetic rebalancing, liquidity management, currency overlays, liability-based solutions, portable alpha, downside protection, non-delta one options, and client-directed hedges. Some of his key areas of focus include the use of OTC derivatives in portfolios, and the implementation of downside protection strategies.

Phil joined Russell full-time in 2009 after graduating with his Bachelors in Finance from Pacific Lutheran University. Prior to becoming a portfolio manager Phil was a portfolio analyst in Russell's Overlay Services group. In this role, his primary responsibilities were supporting the portfolio management team in the daily trading and operational processes.

Phil is a portfolio manager for Russell Investments Implementation Services, LLC Russell Investments' global trading firm. Russell Investments Implementation Services, LLC is an SEC registered investment adviser and FINRA member firm.

BA, Finance, Pacific Lutheran University
Licensed Registered Representative, FINRA Series Series 3
CFA Charterholder, CFA Institute

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Date of first use: June 2019
RIIS RC: 03676



Thank you

Any questions?

TAB 5 – Q1 2019 Performance & Risk Report

OPERF

Callan



June 5, 2019

Oregon Investment Council

First Quarter 2019
Performance Review

Rebound in Q1 After a Severe Downtraft in Q4 2018

Was Q4 2018 the anomaly, or Q1 2019?

Three sharp declines during 2018

First quarter snapback

Dovish Fed comments, solid corporate fundamentals and low employment propelled equity markets in first quarter:

- low quality stocks outperform
- growth over value
- small cap over large cap
- Global equities rebound

China drives emerging markets

Fixed Income markets participate, too

- High yield is the strongest performer in the U.S.
- Credit spreads rally
- Yield curve shifts lower across maturities

Returns for Periods ended March 31, 2019

| | 1 Quarter | 1 Year | 5 Years | 10 Years | 25 Years |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|
| U.S. Equity | | | | | |
| Russell 3000 | 14.04 | 8.77 | 10.36 | 16.00 | 9.78 |
| S&P 500 | 13.65 | 9.50 | 10.91 | 15.92 | 9.80 |
| Russell 2000 | 14.58 | 2.05 | 7.05 | 15.36 | 8.99 |
| Non-U.S. Equity | | | | | |
| MSCI World ex USA | 10.45 | -3.14 | 2.20 | 8.82 | 5.04 |
| MSCI Emerging Markets | 9.93 | -7.40 | 3.68 | 8.95 | -- |
| MSCI ACWI ex USA Small Cap | 10.26 | -9.48 | 3.26 | 11.86 | -- |
| Fixed Income | | | | | |
| Bloomberg Barclays Aggregate | 2.94 | 4.48 | 2.74 | 3.77 | 5.33 |
| 3-Month T-Bill | 0.60 | 2.12 | 0.74 | 0.43 | 2.54 |
| Bloomberg Barclays Long Gov/Credit | 6.45 | 5.24 | 5.35 | 7.23 | 7.34 |
| Bloomberg Barclays Global Agg ex-US | 1.52 | -4.13 | -0.26 | 2.46 | 4.40 |
| Real Estate | | | | | |
| NCREIF Property | 1.80 | 6.83 | 9.13 | 8.50 | 9.36 |
| FTSE NAREIT Equity | 16.33 | 20.86 | 9.12 | 18.28 | 10.27 |
| Alternatives | | | | | |
| CS Hedge Fund | 3.99 | 0.20 | 2.26 | 5.42 | 7.72 |
| Cambridge Private Equity* | -0.53 | 10.61 | 11.94 | 13.76 | 15.20 |
| Bloomberg Commodity | 6.32 | -5.25 | -8.92 | -2.56 | 2.15 |
| Gold Spot Price | 1.34 | -2.17 | 0.23 | 3.45 | 4.88 |
| Inflation - CPI-U | 1.18 | 1.86 | 1.47 | 1.80 | 2.21 |

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

Source: Callan

Global Economic Update 2019

The Big Picture

Global interest rate policies have yet to converge

- The Fed is largely alone on a path to normalize interest rates, but has paused after 9 rate hikes.
- Euro zone may skip this round of tightening entirely, leaving super low rates where they are.

U.S. economy remains strong, labor market very tight, reaching the limits of full employment

- Q1 increase in GDP (3.2%) a sign of resilience after Q4 market swoon and government shutdown in January.
- Consumer spending slowed in Q1, but it may be a blip, reflecting the impact of the shutdown.
- Signal from Fed that further rate hikes are on hold have boosted consumer and business confidence.
- Full impact of 9 rate hikes to date still working through the economy – borrowing costs are substantially higher than two years ago.

The U.S. and euro zone economies diverging again

- Eurozone unemployment has dropped, but economic growth stalled (GDP below 1.5%).
- Geopolitical turmoil across the zone, from Italy to Brexit.

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

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

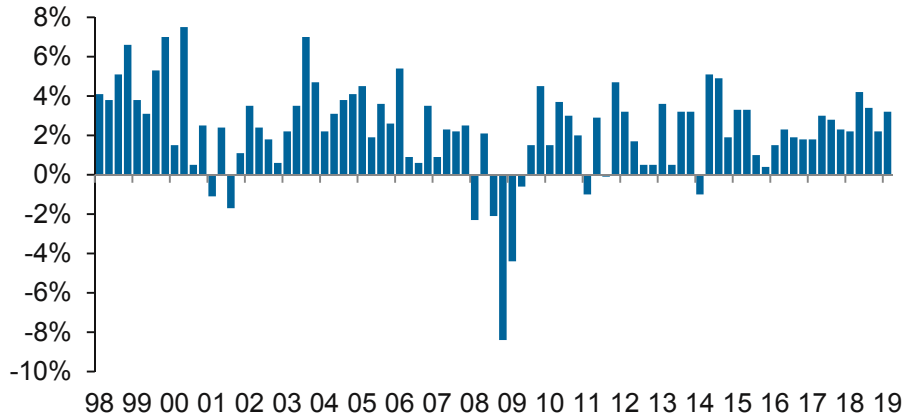
Oil prices may (or may not) radically alter inflation outlook

- Wage pressures building in U.S. had yet to translate into headline inflation.
- Crude oil prices collapsed in the fourth quarter, but recovered somewhat in Q1, spurred risks posed from the supply side (Russia, Iran).

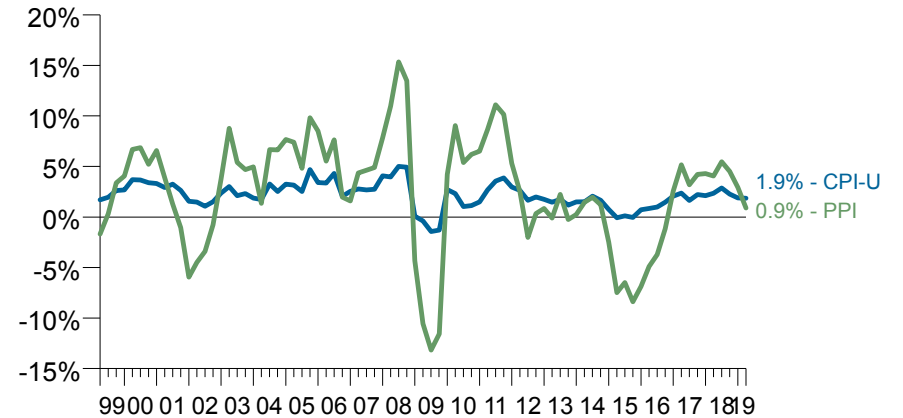
U.S. Economy – Summary

For periods ended March 31, 2019

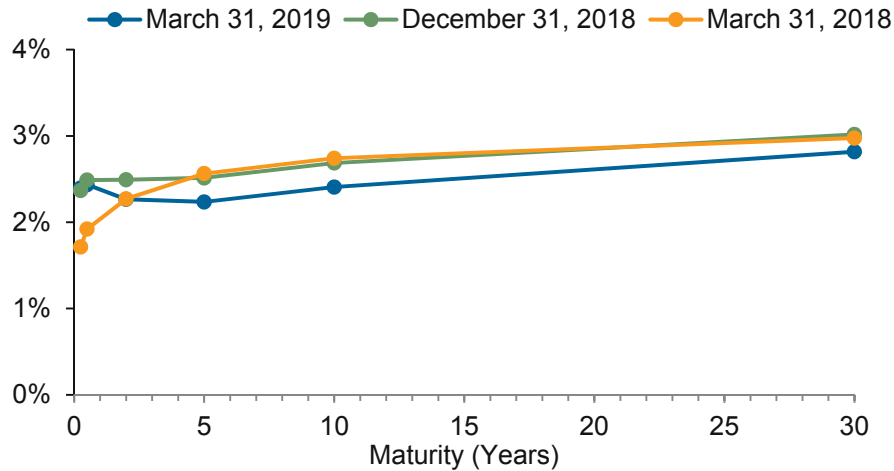
Quarterly Real GDP Growth*



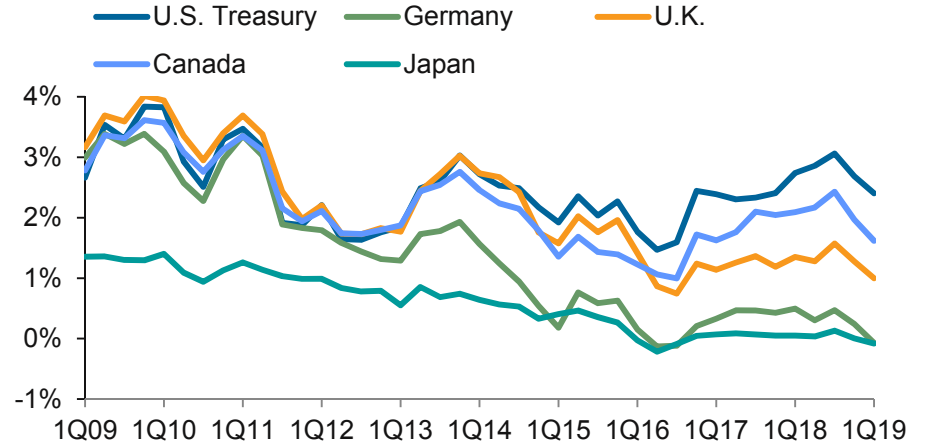
Inflation Year-Over-Year



U.S. Treasury Yield Curves



10-Year Global Government Bond Yields



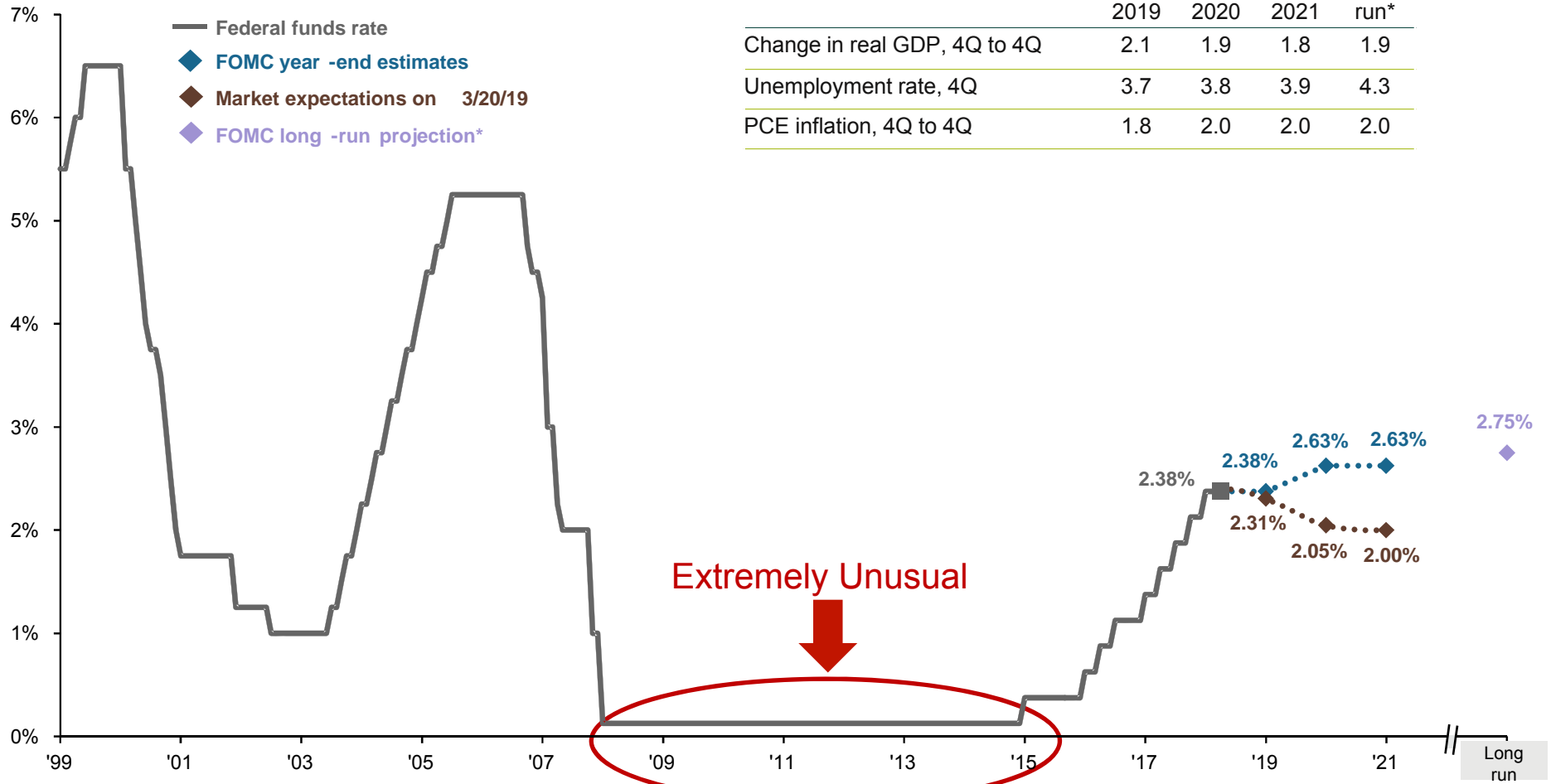
Sources: Bureau of Labor Statistics, Bloomberg, Callan

Is Interest Rate Normalization Complete?

Fed executed nine rate hikes since 2015, but current rates still historically low

Federal funds rate expectations

FOMC and market expectations for the fed funds rate



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 March 2019 FOMC meeting and are through December 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 March 31, 2019.

Q1 Rebound Reverses Fourth Quarter Loss in U.S. Stock Market

Strongest first quarter since 2009 lifted S&P 500 close to the record level set last October

- Strong 3rd quarter put S&P up over 10% by September; obliterating TWO corrections in February and March

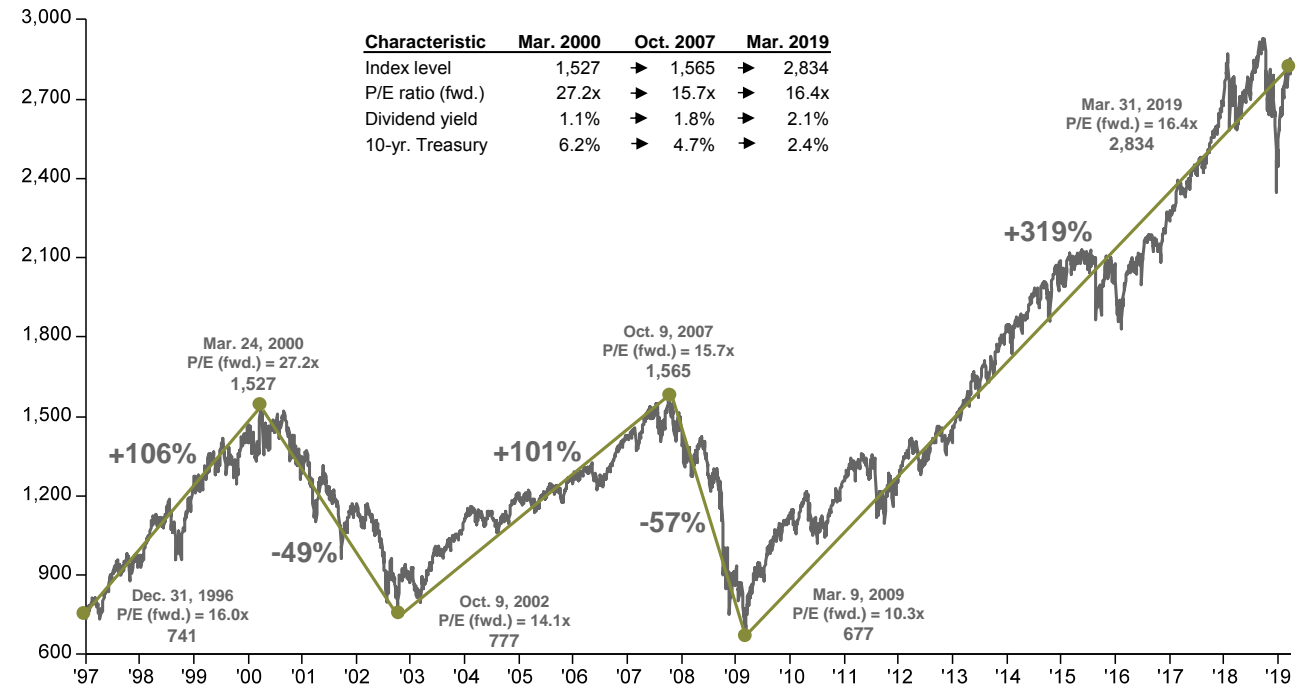
Forward valuation rose back to 16.4 in Q1, just above its 25-year average

- Still nowhere near the peak set in 2000

Dividend yield on stocks has been comparable to that of a 10-year Treasury for an extended period. Gap began to widen in 2018, but narrowed again in Q1

- vastly different relationship between stock and bond yields in 2000 and 2007

S&P 500 Price Index



Source: Compustat, FactSet, Federal Reserve, Standard & Poor's, J.P. Morgan Asset Management. Dividend yield is calculated as consensus estimates of dividends for the next 12 months, divided by most recent price, as provided by Compustat. Forward price to earnings ratio is a bottom-up calculation based on the most recent S&P 500 Index price, divided by consensus estimates for earnings in the next 12 months (NTM), and is provided by FactSet Market Aggregates. Returns are cumulative and based on S&P 500 Index price movement only, and do not include the reinvestment of dividends. Past performance is not indicative of future returns. *Guide to the Markets* – U.S. Data are as of March 31, 2019.

Source: J.P. Morgan Asset Management.

Callan Periodic Table of Investment Returns

Returns for Key Indices

| 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 1 Qtr. 2019 |
|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|----------------------------------|----------------------------------|-----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|----------------------------------|----------------------------------|-----------------------------------|---------------------------------|
| Emerging Market Equity 34.00% | Real Estate 42.12% | Emerging Market Equity 39.38% | U.S. Fixed Income 5.24% | Emerging Market Equity 78.51% | Small Cap Equity 26.85% | U.S. Fixed Income 7.84% | Real Estate 27.73% | Small Cap Equity 38.82% | Real Estate 15.02% | Large Cap Equity 1.38% | Small Cap Equity 21.31% | Emerging Market Equity 37.28% | Cash Equivalent 1.87% | Real Estate 14.59% |
| Real Estate 15.35% | Emerging Market Equity 32.17% | Non-U.S. Equity 12.44% | Non-U.S. Fixed Income 4.39% | High Yield 58.21% | Real Estate 19.63% | High Yield 4.98% | Emerging Market Equity 18.23% | Large Cap Equity 32.39% | Large Cap Equity 13.69% | U.S. Fixed Income 0.55% | High Yield 17.13% | Non-U.S. Equity 24.21% | U.S. Fixed Income 0.01% | Small Cap Equity 14.58% |
| Non-U.S. Equity 14.47% | Non-U.S. Equity 25.71% | Non-U.S. Fixed Income 11.03% | Cash Equivalent 2.06% | Real Estate 37.13% | Emerging Market Equity 18.88% | Non-U.S. Fixed Income 4.36% | Non-U.S. Equity 16.41% | Non-U.S. Equity 21.02% | U.S. Fixed Income 5.97% | Cash Equivalent 0.05% | Large Cap Equity 11.96% | Large Cap Equity 21.83% | High Yield -2.08% | Large Cap Equity 13.65% |
| Large Cap Equity 4.91% | Small Cap Equity 18.37% | U.S. Fixed Income 6.97% | High Yield -26.16% | Non-U.S. Equity 33.67% | High Yield 15.12% | Large Cap Equity 2.11% | Small Cap Equity 16.35% | High Yield 7.44% | Small Cap Equity 4.89% | Real Estate -0.79% | Emerging Market Equity 11.19% | Small Cap Equity 14.65% | Non-U.S. Fixed Income -2.15% | Non-U.S. Equity 10.45% |
| Small Cap Equity 4.55% | Large Cap Equity 15.79% | Large Cap Equity 5.49% | Small Cap Equity -33.79% | Small Cap Equity 27.17% | Large Cap Equity 15.06% | Cash Equivalent 0.10% | Large Cap Equity 16.00% | Real Estate 3.67% | High Yield 2.45% | Non-U.S. Equity -3.04% | Real Estate 4.06% | Non-U.S. Fixed Income 10.51% | Large Cap Equity -4.38% | Emerging Market Equity 9.93% |
| Cash Equivalent 3.07% | High Yield 11.85% | Cash Equivalent 5.00% | Large Cap Equity -37.00% | Large Cap Equity 26.47% | Non-U.S. Equity 8.95% | Small Cap Equity -4.18% | High Yield 15.81% | Cash Equivalent 0.07% | Cash Equivalent 0.03% | Small Cap Equity -4.41% | Non-U.S. Equity 2.75% | Real Estate 10.36% | Real Estate -5.63% | High Yield 7.26% |
| High Yield 2.74% | Non-U.S. Fixed Income 8.16% | High Yield 1.87% | Non-U.S. Equity -43.56% | Non-U.S. Fixed Income 7.53% | U.S. Fixed Income 6.54% | Real Estate -6.46% | U.S. Fixed Income 4.21% | U.S. Fixed Income -2.02% | Emerging Market Equity -2.19% | High Yield -4.47% | U.S. Fixed Income 2.65% | High Yield 7.50% | Small Cap Equity -11.01% | U.S. Fixed Income 2.94% |
| U.S. Fixed Income 2.43% | Cash Equivalent 4.85% | Small Cap Equity -1.57% | Real Estate -48.21% | U.S. Fixed Income 5.93% | Non-U.S. Fixed Income 4.95% | Non-U.S. Equity -12.21% | Non-U.S. Fixed Income 4.09% | Emerging Market Equity -2.60% | Non-U.S. Fixed Income -3.09% | Non-U.S. Fixed Income -6.02% | Non-U.S. Fixed Income 1.49% | U.S. Fixed Income 3.54% | Non-U.S. Equity -14.09% | Non-U.S. Fixed Income 1.52% |
| Non-U.S. Fixed Income -8.65% | U.S. Fixed Income 4.33% | Real Estate -7.39% | Emerging Market Equity -53.33% | Cash Equivalent 0.21% | Cash Equivalent 0.13% | Emerging Market Equity -18.42% | Cash Equivalent 0.11% | Non-U.S. Fixed Income -3.08% | Non-U.S. Equity -4.32% | Emerging Market Equity -14.92% | Cash Equivalent 0.33% | Cash Equivalent 0.86% | Emerging Market Equity -14.57% | Cash Equivalent 0.60% |

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

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

OPERF Total Regular Account

Performance Summary for the First Quarter 2019

Total Fund:

For the quarter ended March 31, 2019, the Total Regular Account rose 4.70% (4.58% net of fees), beating the 2.79% return of the Policy Benchmark, and ranked in the 4th quartile of Callan's \$10B+ public fund peer group. For the twelve months ended March, the Total Regular Account gained 4.88% (+4.44% net of fees), ahead of the 2.78% return for the Policy Target, and ranked top third in Callan's \$10B+ public fund peer group. Longer term results exceed the Policy Target and ranked in the top quartile.

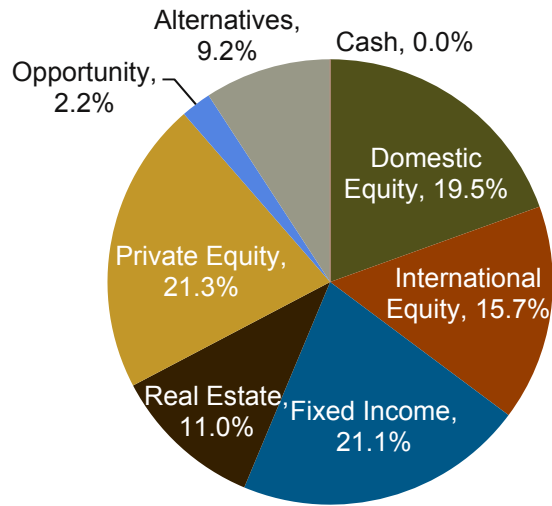
Asset Classes:

- **Total Fixed Income:** The Fixed Income Portfolio added 3.13% (+3.09% net of fees) for the quarter versus a gain of 2.95% for the Custom Fixed Income Benchmark, and ranked in the 86th percentile of Callan's Public Funds \$10B+ US Fixed income (Gross) peer group. For the trailing year, the Portfolio rose 4.39% (4.25% net of fees), ahead of the 4.27% return of the benchmark, and ranked in the 34th percentile of the peer group. 10 year results were ahead of the benchmark and ranked in the top quartile of the peer group.
- **Total Public Equity:** Total Public Equity portfolio returned 11.79% (+11.73% net of fees) for the quarter versus 12.29% increase in the MSCI ACWI IMI Net benchmark, and ranked in the 63rd percentile of its peer group. For the trailing year, the portfolio rose 0.81% (0.56% net of fees), behind the 1.89% return of the benchmark and ranked in the 65th percentile of peer group.
 - **U.S. Equity:** The U.S. Equity Portfolio increased 13.04% (+13.02% net of fees) for the quarter, lagging the Russell 3000 Index return of 14.04%, and ranked in the 89th percentile of Callan's Public Fund: \$10B+ Domestic Equity (gross) peer group. On a trailing 12 month basis, the Portfolio rose 5.33% (+5.25% net of fees) versus a return of 8.77% for the benchmark and ranked in the 79th percentile of the peer group. 10 year results of 15.81% (+15.59% net of fees) lagged the benchmark return of 16.00% and ranked in the 68th percentile of the peer group.
 - **International Equity:** The International Equity Portfolio registered returns of 10.98% (+10.88% net of fees) for the quarter, behind the +10.31% return of the MSCI ACWI ex-U.S. IMI Index, and ranked in the 22th percentile of Callan's Public Fund: \$10B+ International Equity (gross) peer group. For the trailing year, the Portfolio returned -5.34% (-5.72% net of fees) underperforming the benchmark return of -4.96%, and ranked in the 75th percentile in the peer group. 10 year results remained comfortably ahead of the benchmark (+10.36% net of fees versus +9.20%) and continued to rank in the top quartile of the peer group.
- **Total Real Estate:** The Real Estate Portfolio continued to show competitive absolute results over the last decade with an annualized return of 10.15% net of fees.
- **Opportunity Portfolio:** The Opportunity Portfolio's results over the last ten years continued to be favorable with an annualized return of 11.57% net of fees.
- **Alternative Portfolio:** The Alternative Portfolio returned 2.68% per annum net of fees over the last five years.
- **Total Private Equity:** The Private Equity Portfolio's returns remained strong with an annualized return of 13.50% net of fees over the last ten years.

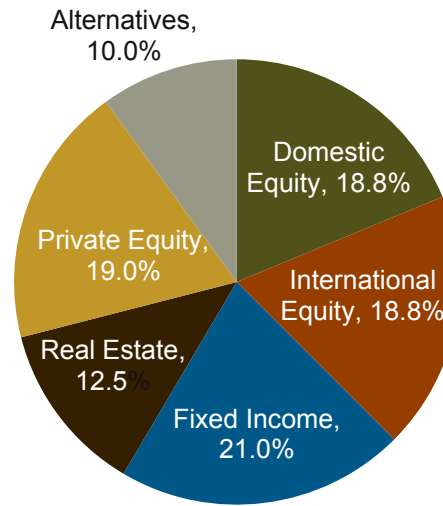
OPERF Total Regular Account

Asset Allocation

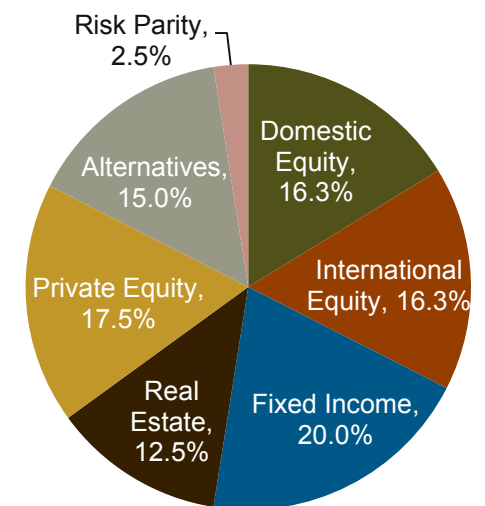
Actual Allocation as of 03/31/2019



Interim Policy Target*



Strategic Policy Target**



| Asset Class | \$000s Actual | Weight*** Actual | Target | Percent Difference | \$000s Difference |
|---------------------------|---------------|------------------|--------|--------------------|-------------------|
| Total Fixed Income | 15,865,230 | 21.1% | 21.0% | 0.1% | 106,863 |
| U.S. Equity Portfolio | 14,630,589 | 19.5% | 18.8% | 0.7% | 560,618 |
| Non-U.S. Equity Portfolio | 11,766,579 | 15.7% | 18.8% | (3.1%) | (2,303,392) |
| Total Real Estate | 8,245,048 | 11.0% | 12.5% | (1.5%) | (1,134,933) |
| Opportunity Portfolio | 1,671,351 | 2.2% | 0.0% | 2.2% | 1,671,351 |
| Alternative Portfolio | 6,905,357 | 9.2% | 10.0% | (0.8%) | (598,628) |
| Total Private Equity | 15,946,221 | 21.3% | 19.0% | 2.3% | 1,688,650 |
| Cash | 9,472 | 0.0% | 0.0% | 0.0% | 9,472 |
| Total | 75,039,846 | 100.0% | 100.0% | | |

*Interim policy target adopted January 1, 2019

**Strategic policy target adopted April 24, 2019

***Totals provided by OST Staff

OPERF Total Regular Account

Net Cumulative Performance by Asset Class as of March 31, 2019

| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 7 Years | Last 10 Years |
|---|-----------------|--------------|-----------------|-----------------|-----------------|------------------|
| Total Regular Account | 4.58 | 4.44 | 8.73 | 6.69 | 8.40 | 11.00 |
| Total Regular Account ex-Overlay | 4.45 | 4.21 | 8.56 | 6.58 | 8.29 | 10.73 |
| OPERF Policy Benchmark* | 2.79 | 2.78 | 8.57 | 6.88 | 8.67 | 10.65 |
| Total Fixed Income | 3.09 | 4.25 | 2.80 | 2.49 | 3.15 | 6.37 |
| OPERF Total Custom FI Benchmark | 2.95 | 4.27 | 2.40 | 2.22 | 2.67 | 4.04 |
| Callan Public Fund \$10bn+ U.S. Fixed | 3.83 | 4.07 | 3.25 | 3.25 | 3.16 | 5.15 |
| Total Public Equity | 11.73 | 0.56 | 10.88 | 6.51 | 9.00 | 12.80 |
| MSCI ACWI IMI Net | 12.29 | 1.89 | 10.58 | 6.33 | 8.47 | 12.27 |
| U. S. Equity | 13.02 | 5.25 | 12.59 | 9.10 | 11.74 | 15.59 |
| Russell 3000 Index | 14.04 | 8.77 | 13.48 | 10.36 | 12.63 | 16.00 |
| Callan Large Public > \$10bn U.S. Equity | 14.07 | 7.93 | 13.44 | 10.07 | 12.40 | 16.27 |
| Non-U.S. Equity | 10.88 | -5.72 | 8.87 | 3.82 | 6.22 | 10.36 |
| MSCI ACWI ex USA IMI** | 10.31 | -4.96 | 7.94 | 2.67 | 4.90 | 9.20 |
| Callan Large Public >\$10bn Non-U.S. Equity | 10.50 | -4.60 | 8.88 | 3.74 | 5.90 | 10.04 |
| Total Real Estate | 1.86 | 7.95 | 7.81 | 9.55 | 10.58 | 10.15 |
| Total Real Estate ex REITs | 1.12 | 7.18 | 8.92 | 10.41 | 11.46 | 8.86 |
| OPERF Custom Real Estate Benchmark | 1.52 | 7.36 | 7.27 | 9.36 | 9.76 | 7.51 |
| Callan Public Plan - Real Estate | 2.43 | 9.07 | 7.87 | 9.50 | 9.99 | 9.10 |
| Opportunity Portfolio | 0.98 | 6.61 | 8.26 | 6.24 | 8.56 | 11.57 |
| Russell 3000 Index | 14.04 | 8.77 | 13.48 | 10.36 | 12.63 | 16.00 |
| CPI + 5% | 2.40 | 6.77 | 7.19 | 6.28 | 6.31 | 6.81 |
| Total Alternative | -0.42 | -4.27 | 4.52 | 2.68 | 2.34 | -- |
| CPI + 4% | 2.17 | 5.93 | 6.28 | 5.53 | 5.53 | -- |
| Total Private Equity | -1.19 | 12.54 | 13.11 | 11.16 | 12.91 | 13.50 |
| OIC - Russell 3000 + 300 BPS Qtr Lag | -13.63 | -2.38 | 12.22 | 11.13 | 15.80 | 16.60 |

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

OPERF Total Regular Account

Net Calendar Year Performance by Asset Class

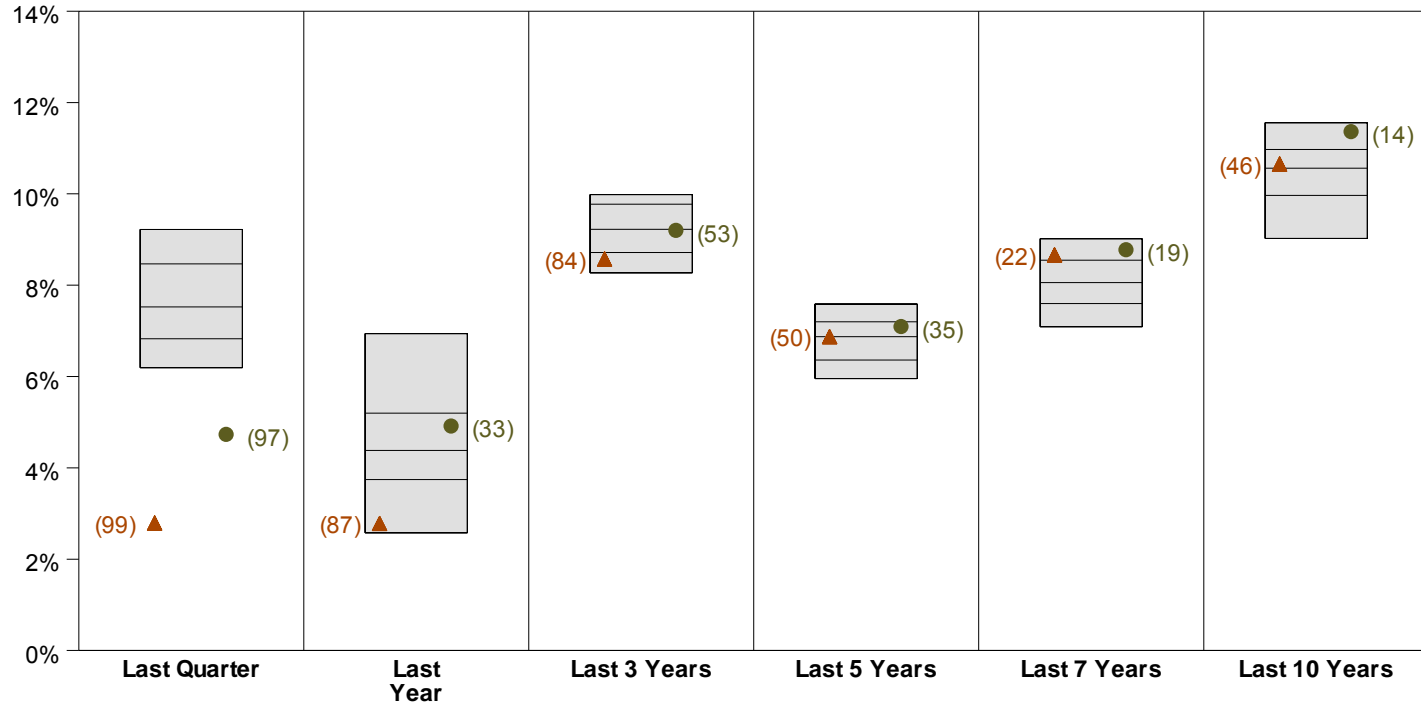
| | 2018 | 2017 | 2016 | 2015 | 2014 |
|---|---------------|--------------|--------------|--------------|--------------|
| Total Regular Account | 0.48 | 15.39 | 7.11 | 2.01 | 7.29 |
| Total Regular Account ex-Overlay | 0.45 | 15.38 | 6.73 | 2.02 | 7.28 |
| OPERF Policy Benchmark* | 1.22 | 15.64 | 8.95 | 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 |
| Russell 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 |

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

OPERF Total Regular Account

Gross Performance and Peer Group Rankings* as of March 31, 2019

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

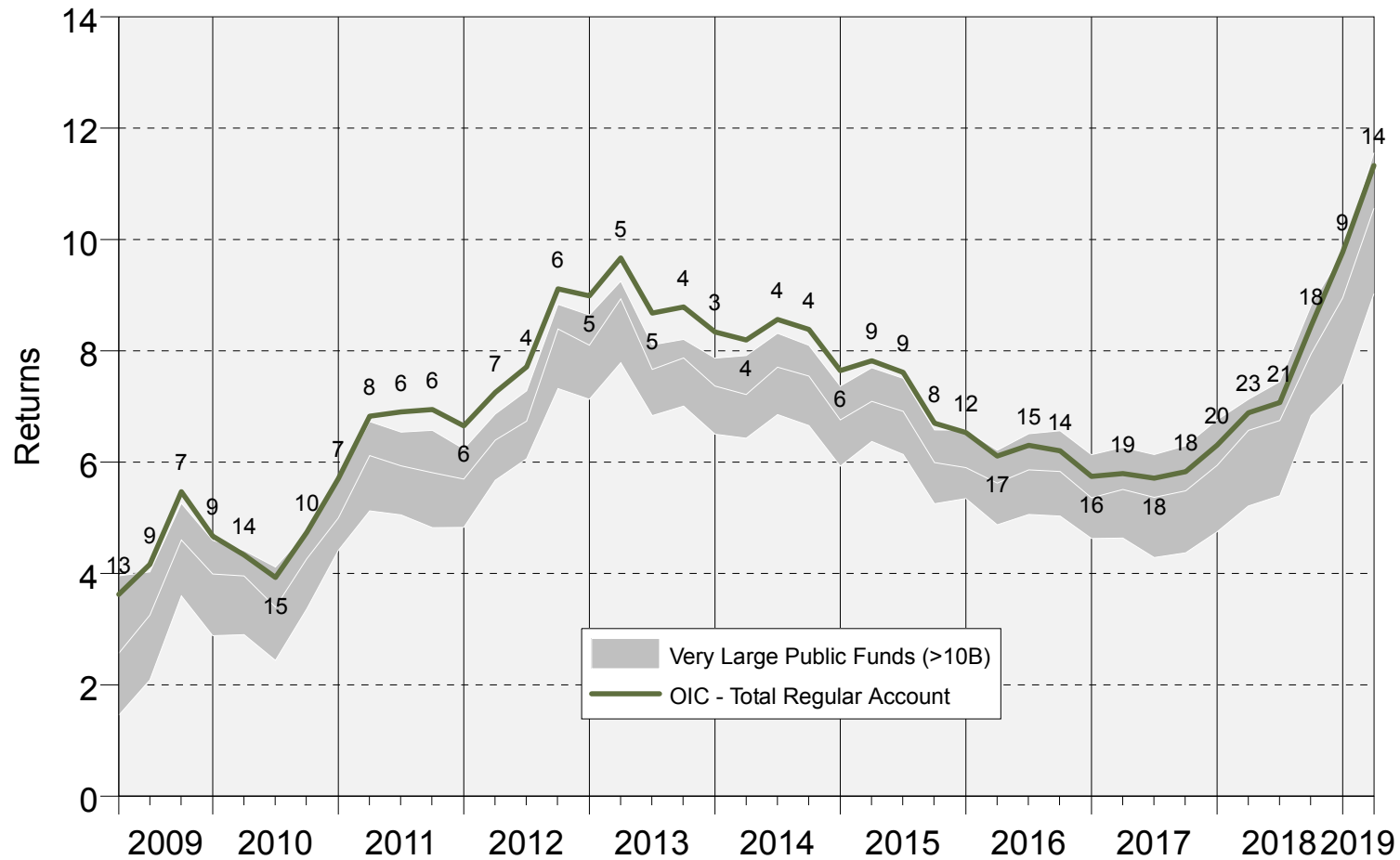


| | | | | | | |
|--------------------------------|------|------|------|------|------|-------|
| 10th Percentile | 9.22 | 6.94 | 9.99 | 7.59 | 9.02 | 11.56 |
| 25th Percentile | 8.47 | 5.20 | 9.78 | 7.20 | 8.55 | 10.97 |
| Median | 7.52 | 4.38 | 9.22 | 6.87 | 8.06 | 10.56 |
| 75th Percentile | 6.83 | 3.75 | 8.72 | 6.36 | 7.60 | 9.97 |
| 90th Percentile | 6.19 | 2.58 | 8.27 | 5.96 | 7.09 | 9.03 |
| Total Regular Account ● | 4.70 | 4.88 | 9.16 | 7.06 | 8.74 | 11.33 |
| Total Policy Target ▲ | 2.79 | 2.78 | 8.57 | 6.88 | 8.67 | 10.65 |

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

OPERF Rolling 10 Year Returns and Rankings

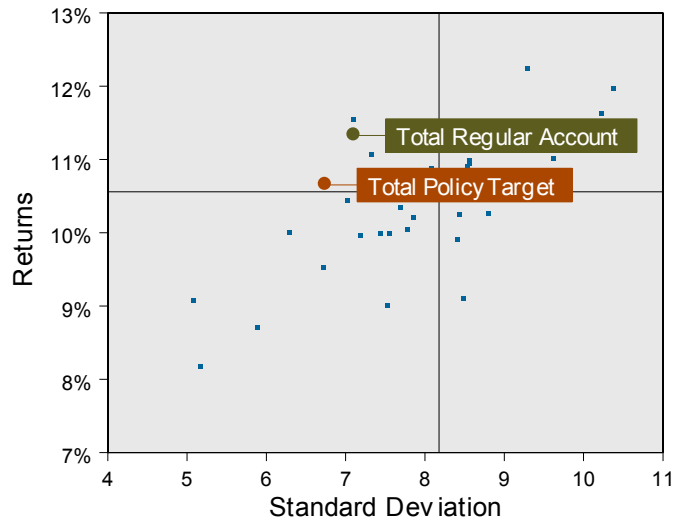
Rolling 40 Quarter Gross of Fee Returns
for 10 Years Ended March 31, 2019



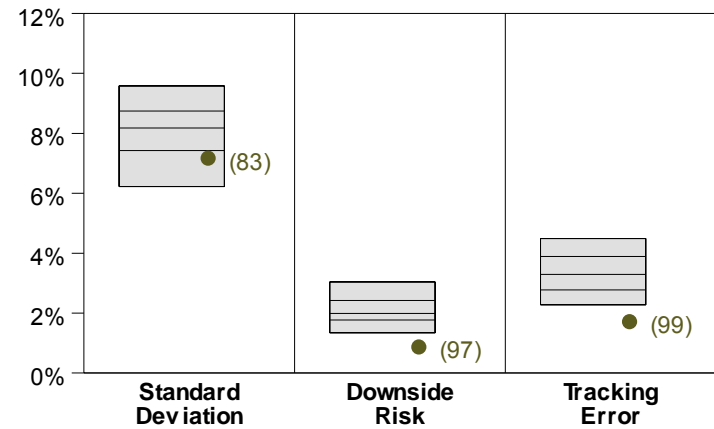
OPERF Total Regular Account

Risk vs Return

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



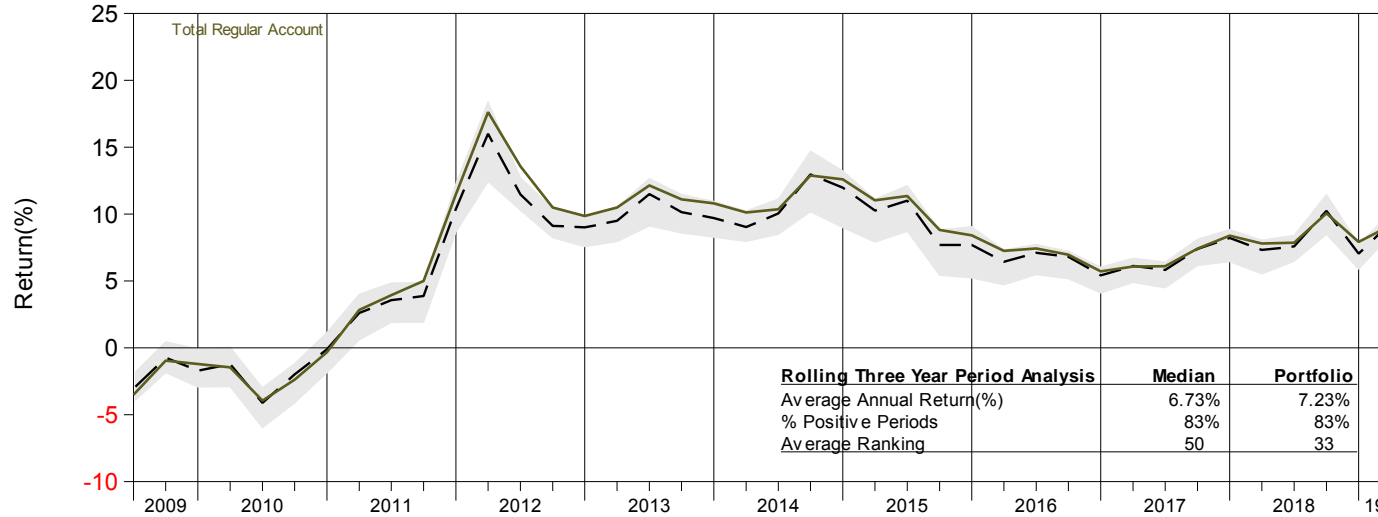
Risk Statistics Rankings vs Policy Target
Rankings Against Large Public Funds (>10B) (Gross)
Ten Years Ended March 31, 2019



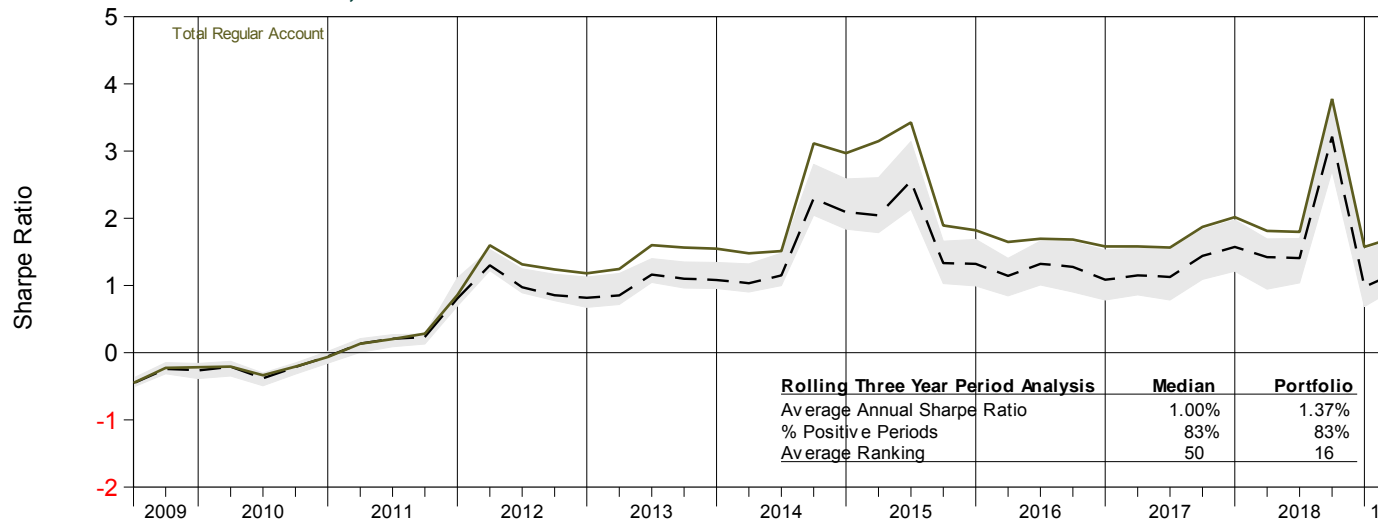
| | Standard Deviation | Downside Risk | Tracking Error |
|------------------------------|--------------------|---------------|----------------|
| 10th Percentile | 9.59 | 3.04 | 4.49 |
| 25th Percentile | 8.75 | 2.42 | 3.89 |
| Median | 8.18 | 1.99 | 3.29 |
| 75th Percentile | 7.43 | 1.77 | 2.77 |
| 90th Percentile | 6.23 | 1.34 | 2.28 |
| Total Regular Account | 7.11 | 0.81 | 1.66 |

Total Fund Consistency

**Rolling Three Year Return(%) Relative to Policy Target
Ten Years Ended March 31, 2019**



**Rolling Three Year Sharpe Ratio Relative to Policy Target
Ten Years Ended March 31, 2019**



Callan



Appendix

U.S. Equity Performance: Solid Recovery

First quarter snapback

- Dovish Fed comments, solid corporate fundamentals and low employment propelled equity markets in first quarter.
- Risk-on market highlighted by low quality outperforming high quality by 440 basis points.
- Surprisingly, utilities and REITs produced solid returns as investors sought yield in face of flattening yield curve and end to rate hikes.

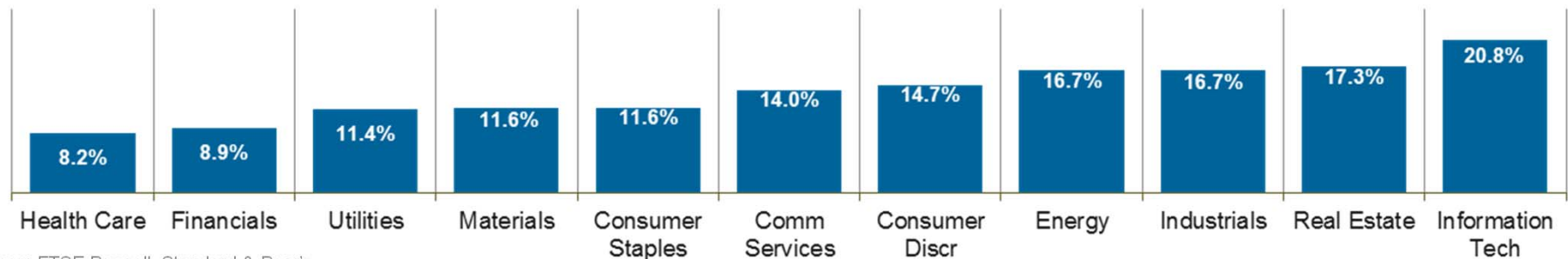
Growth outpaced value

- Sharp change in Fed rhetoric influenced stronger growth performance.
- Investors favored companies with stronger earnings prospects to counter softer economic environment.

Small cap over large cap

Risk-on appetite fed small cap.

Economic Sector Quarterly Performance (Russell 3000)

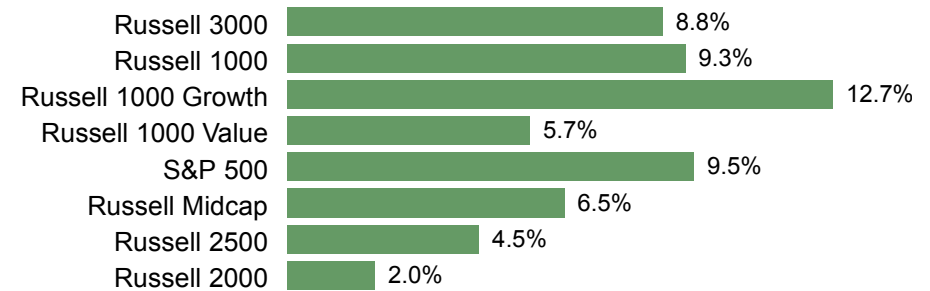


Sources: FTSE Russell, Standard & Poor's

U.S. Equity: Quarterly Returns



U.S. Equity: One-Year Returns

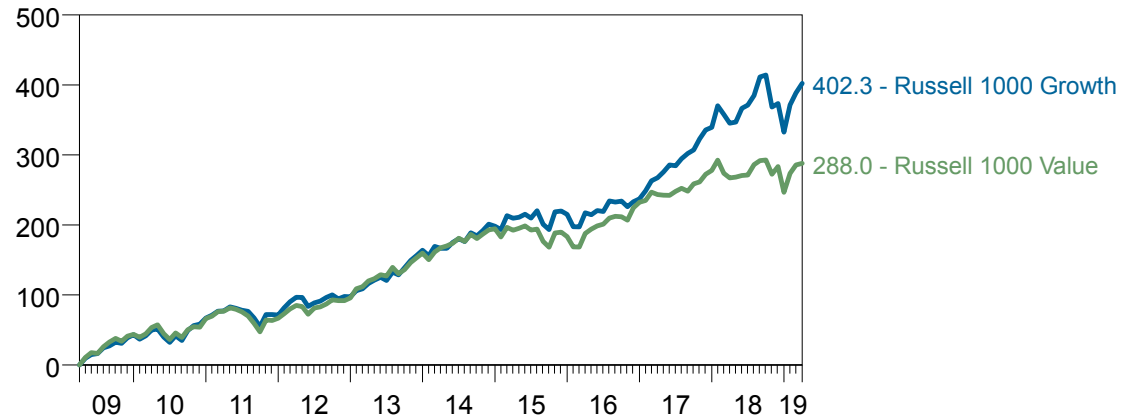


Growth Outpaced Value for Quarter, Trails Longer Term

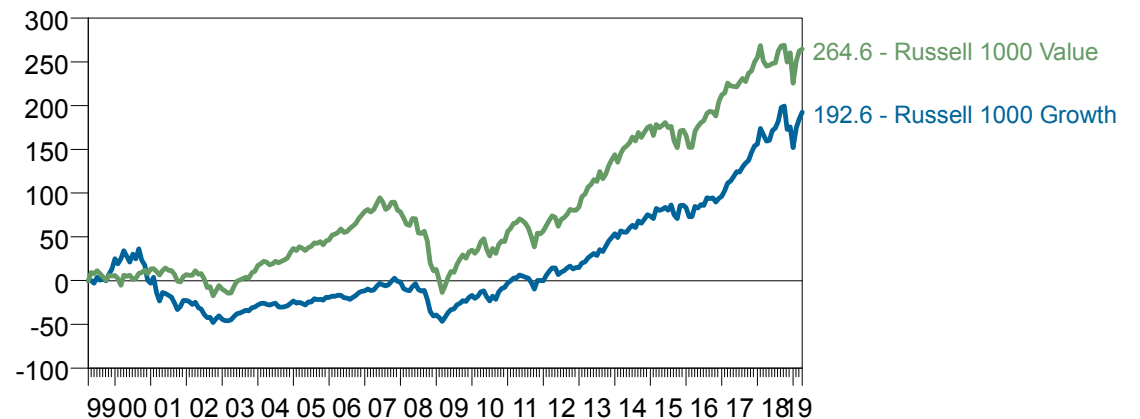
Growth beats value in first quarter

- Cyclical sector outperformed in first quarter following risk-on trade.
- Large cap technology stocks, under pressure to end the year in 2018, rebounded.
- Growth outperformed value for year and trailing 10-year period; value beats growth over 20-year period.

Cumulative Returns for Russell 1000 Style Indices 10 Years



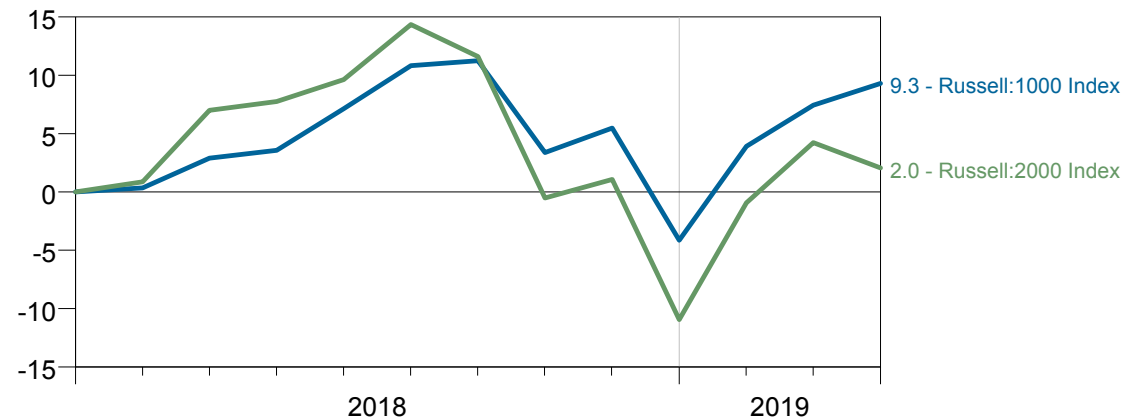
Cumulative Returns for Russell 1000 Style Indices 20 Years



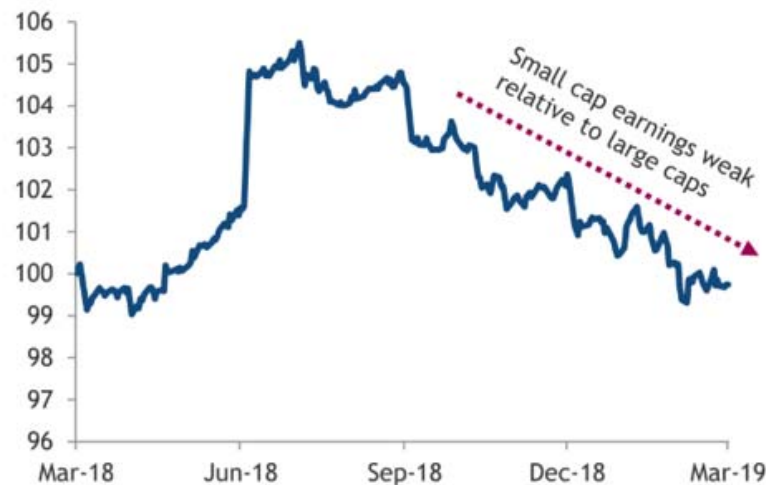
Small Caps Outpace Large Cap

- Small cap outpaced large cap in first quarter recovery following fourth quarter lag.
- Outperformance driven by risk-on appetite following dovish Fed comments regarding interest rates.
- Multiple expansion was primary source of attribution as small cap earnings continue to lag large cap.

Monthly Cumulative Returns for 1 Year



Small Cap Earnings Trends Relative to Large Caps



Source: Callan, JPMorgan, SunTrust Bank

Non-U.S. Equity Performance

Global equity rebound

- Investors resumed a risk-on outlook as central banks telegraphed more accommodative positioning.
- Market stabilized under delayed U.S./China trade talks and Brexit, although uncertain outcomes remain a future risk.
- Currency effect was mixed:
 - US\$ rose against euro and yen given soft economic data
 - Fell against British pound as possibility of “no-deal” Brexit diminished
- Factor performance favored growth (historical and projected) as investors believed accommodative Fed will extend growth cycle.

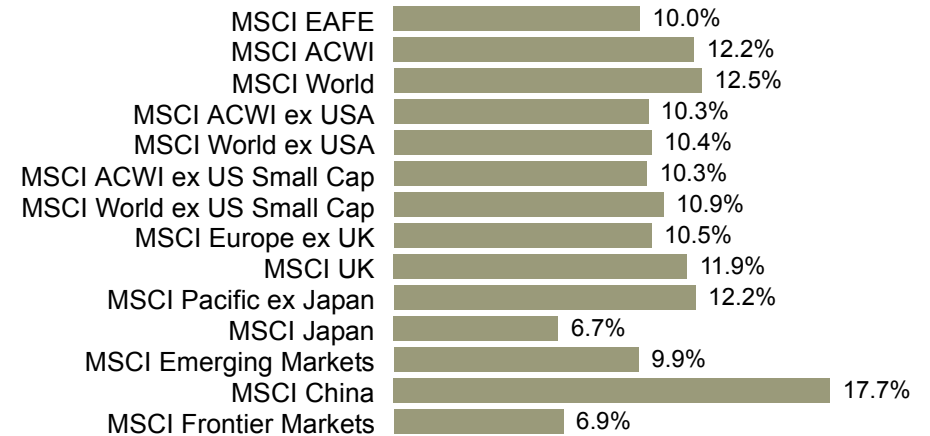
China drove emerging markets

- EM surged on stimulus measures in China which spurred optimism and diminished growth worries.
- Improving outlook for Chinese consumption and rebound in Asian Tech also contributed.

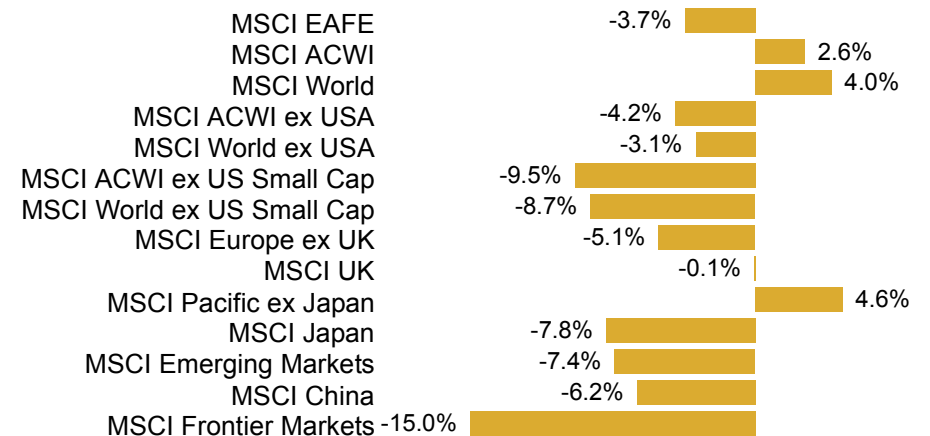
Non-U.S. small cap in line with large cap

- Cyclical sectors led with tech and energy up double digits.

Global Equity: Quarterly Returns



Global Equity: Annual Returns



Source: MSCI

U.S. Fixed Income Performance

Sharp reversal

- High Yield strongest performer as risk markets reacted to Fed’s dovish comments, solid economic data and tempered concern over slowing China.
- U.S. Treasuries +2.1% as yield curve shifted lower across maturities on lower growth/inflation expectations.
- Shape of yield curve did not materially change during quarter

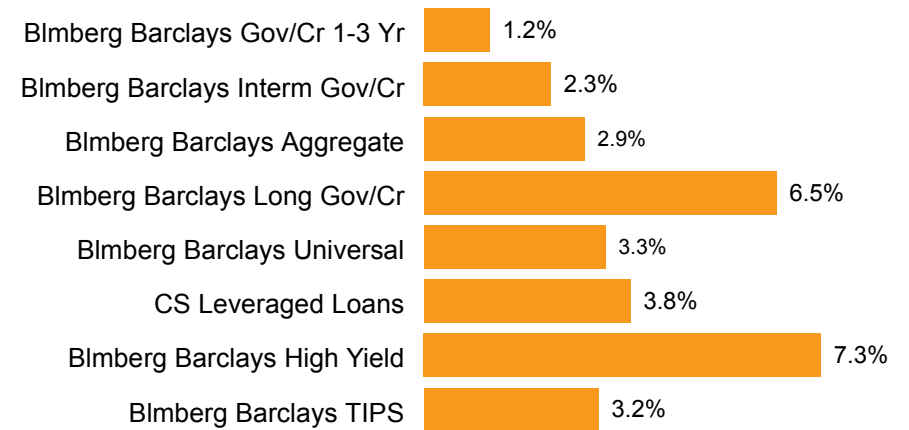
Higher inflation expectation

- TIPS outperformed Treasuries as Fed’s balanced stance and unexpected wage pressures stoked higher inflation expectation.

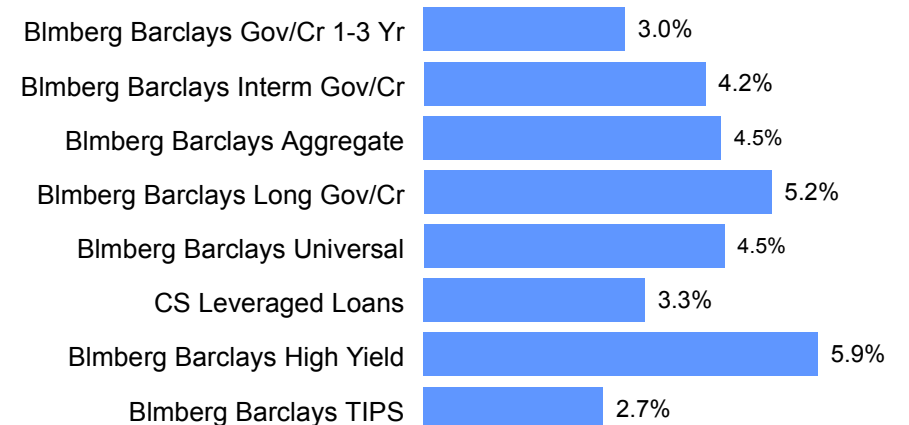
Credit spreads rallied

- Softer Fed stance, positive economic news, and better than expected corporate earnings contributed.
- Net new corporate issuance on par with a year ago.

U.S. Fixed Income: Quarterly Returns



U.S. Fixed Income: Annual Returns



Sources: Bloomberg Barclays, Credit Suisse

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June 5, 2019

OPERF Risk Dashboard

2019 Q1

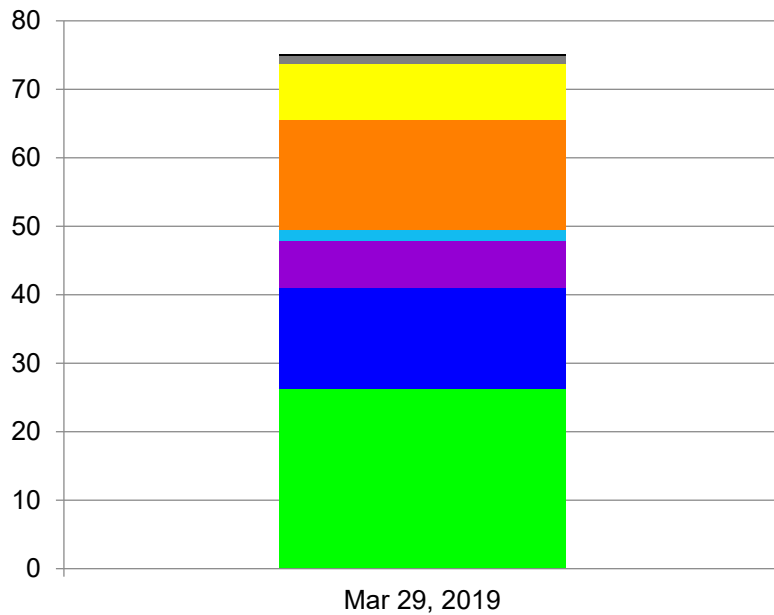


OREGON
STATE
TREASURY



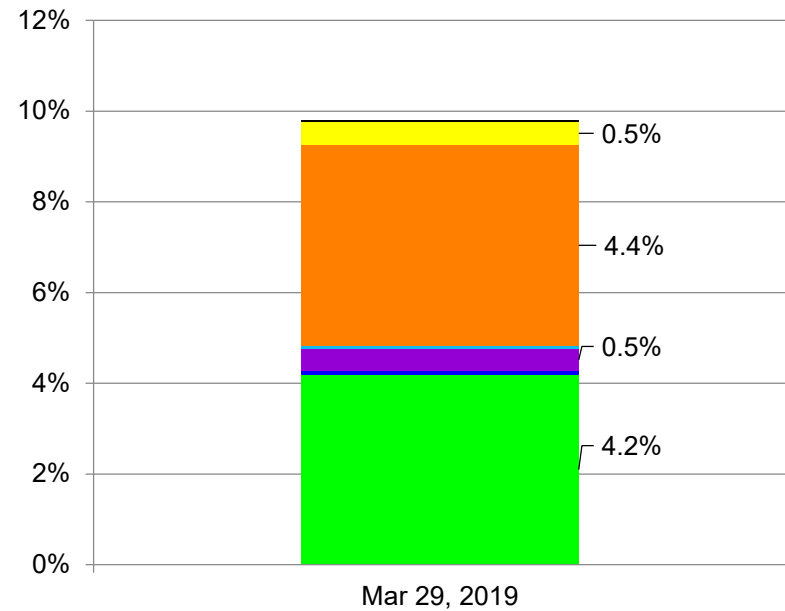
Allocation & Risk Contribution by Asset Class

Allocation in \$B



- Equity
- Fixed Income
- Alternatives Portfolio
- Opportunity Portfolio
- Private Equity
- Real Estate
- Cash
- Overlay

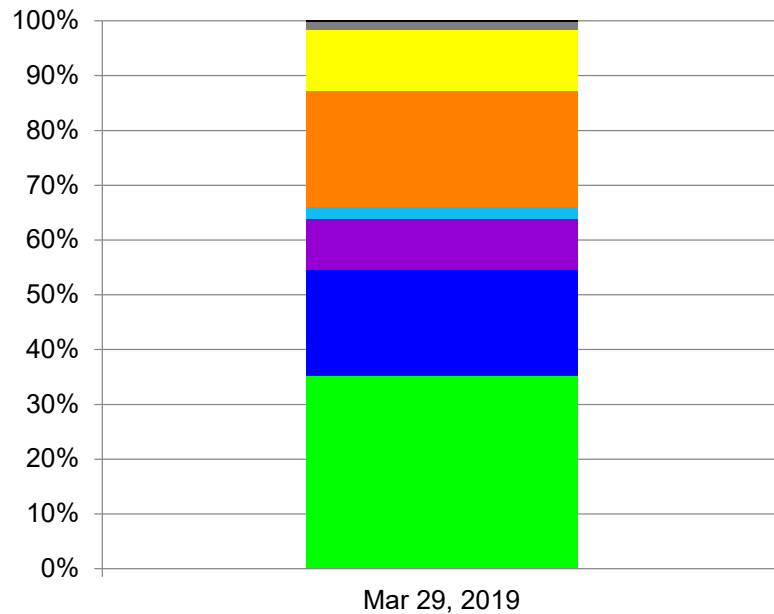
Risk Contribution



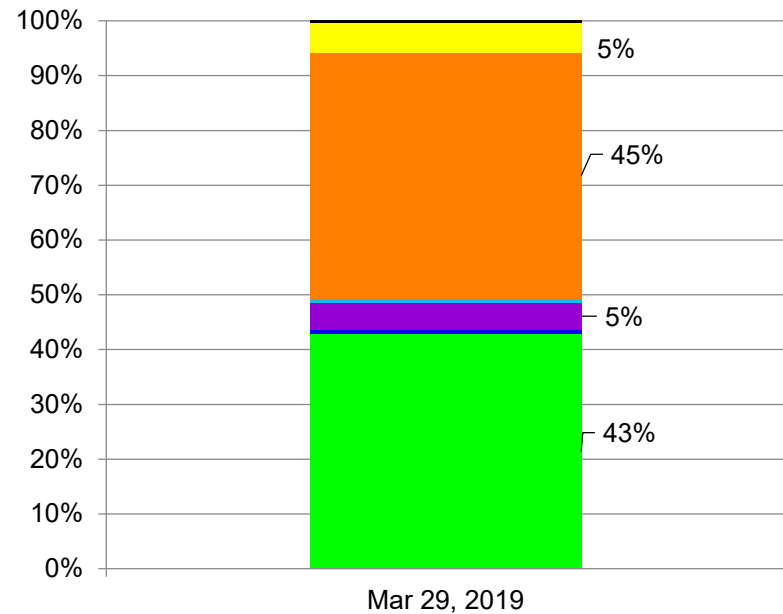
- Equity
- Fixed Income
- Alternatives Portfolio
- Opportunity Portfolio
- Private Equity
- Real Estate
- Cash
- Overlay

Allocation & Risk Contribution by Asset Class

Allocation % of Total



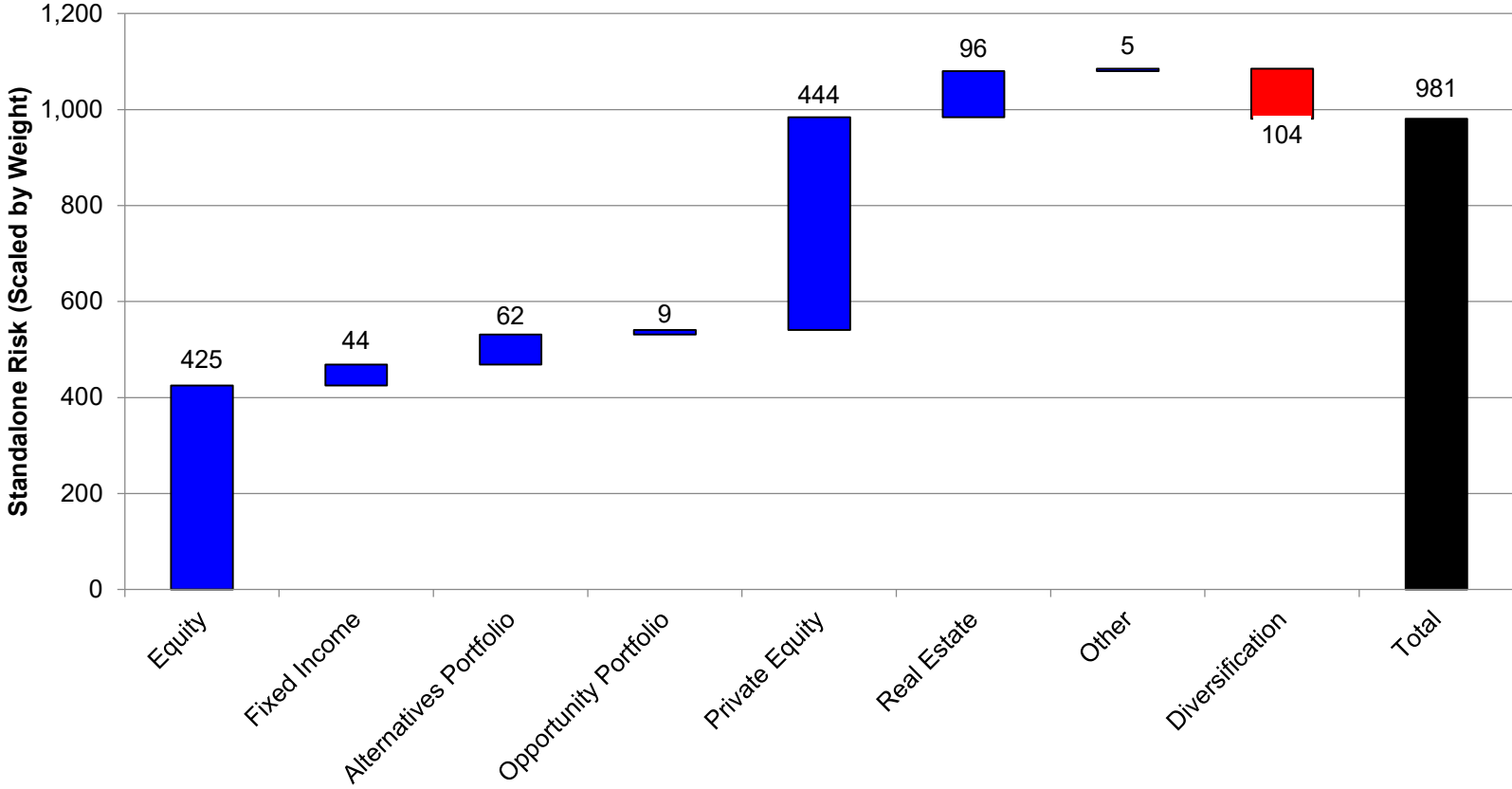
RC % of Total



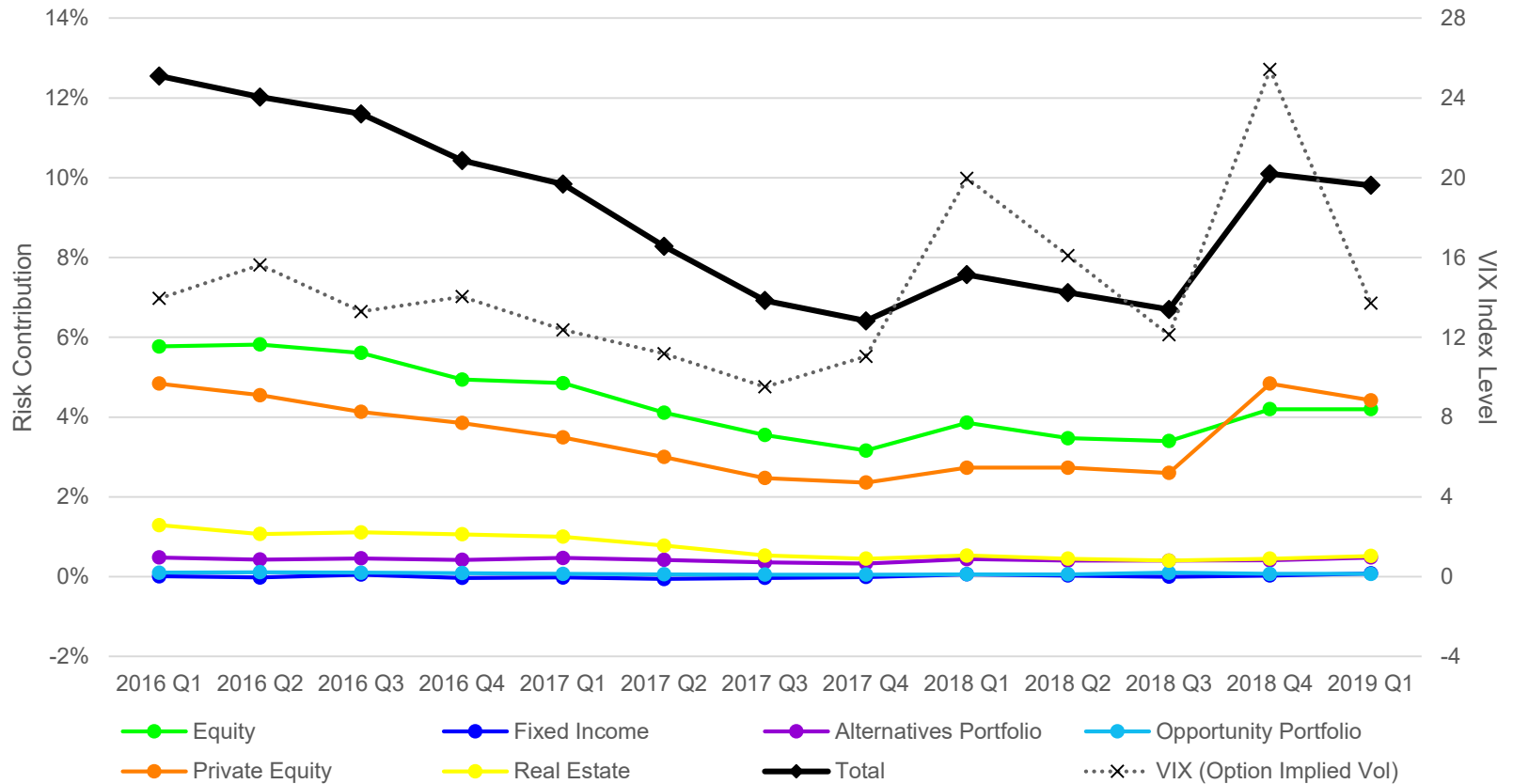
- Equity
- Fixed Income
- Alternatives Portfolio
- Opportunity Portfolio
- Private Equity
- Real Estate
- Cash
- Overlay

- Equity
- Fixed Income
- Alternatives Portfolio
- Opportunity Portfolio
- Private Equity
- Real Estate
- Cash
- Overlay

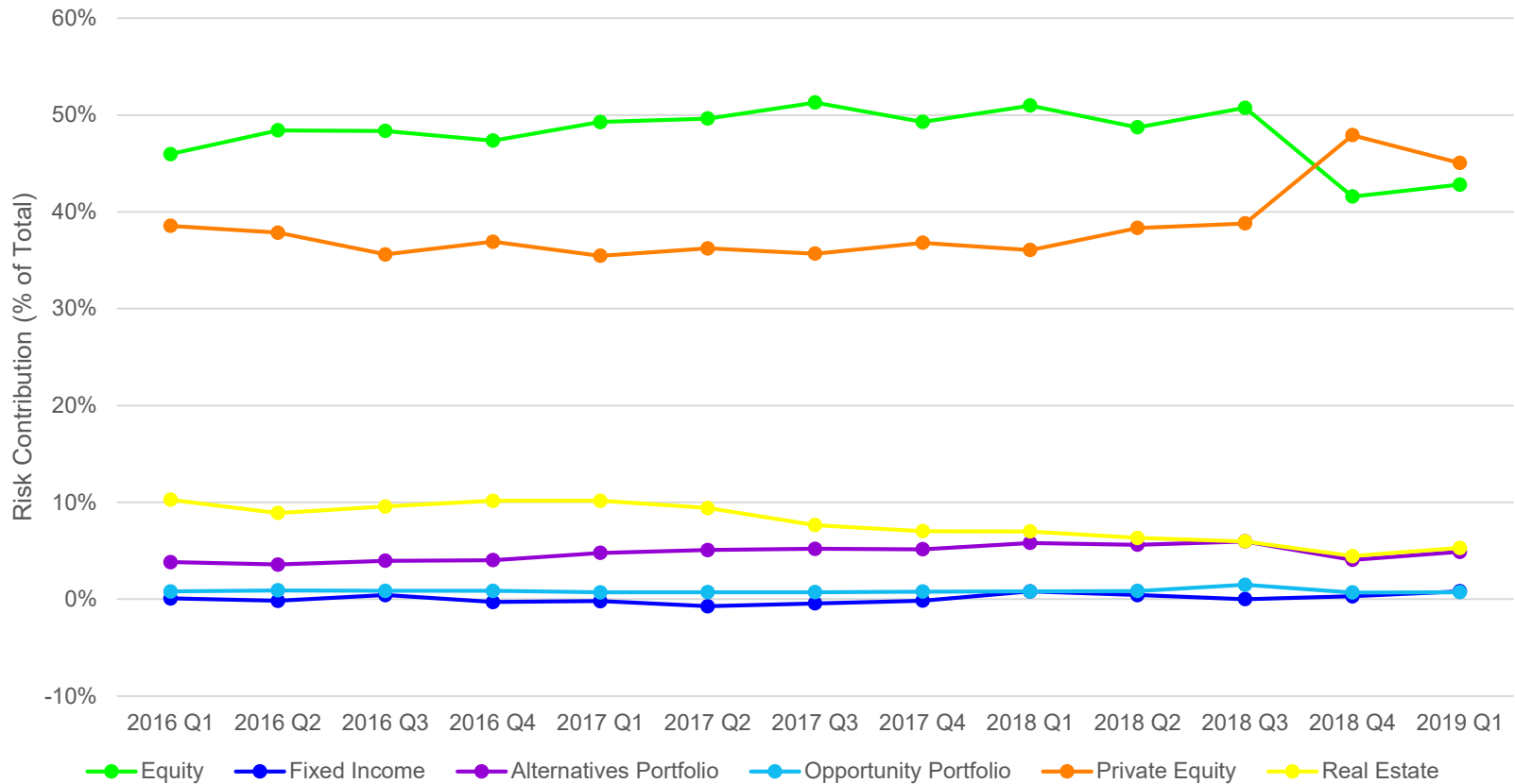
Stand-alone Risk by Asset Class



13-Quarter Risk Contribution Time Series



13-Quarter Risk Contribution Time Series



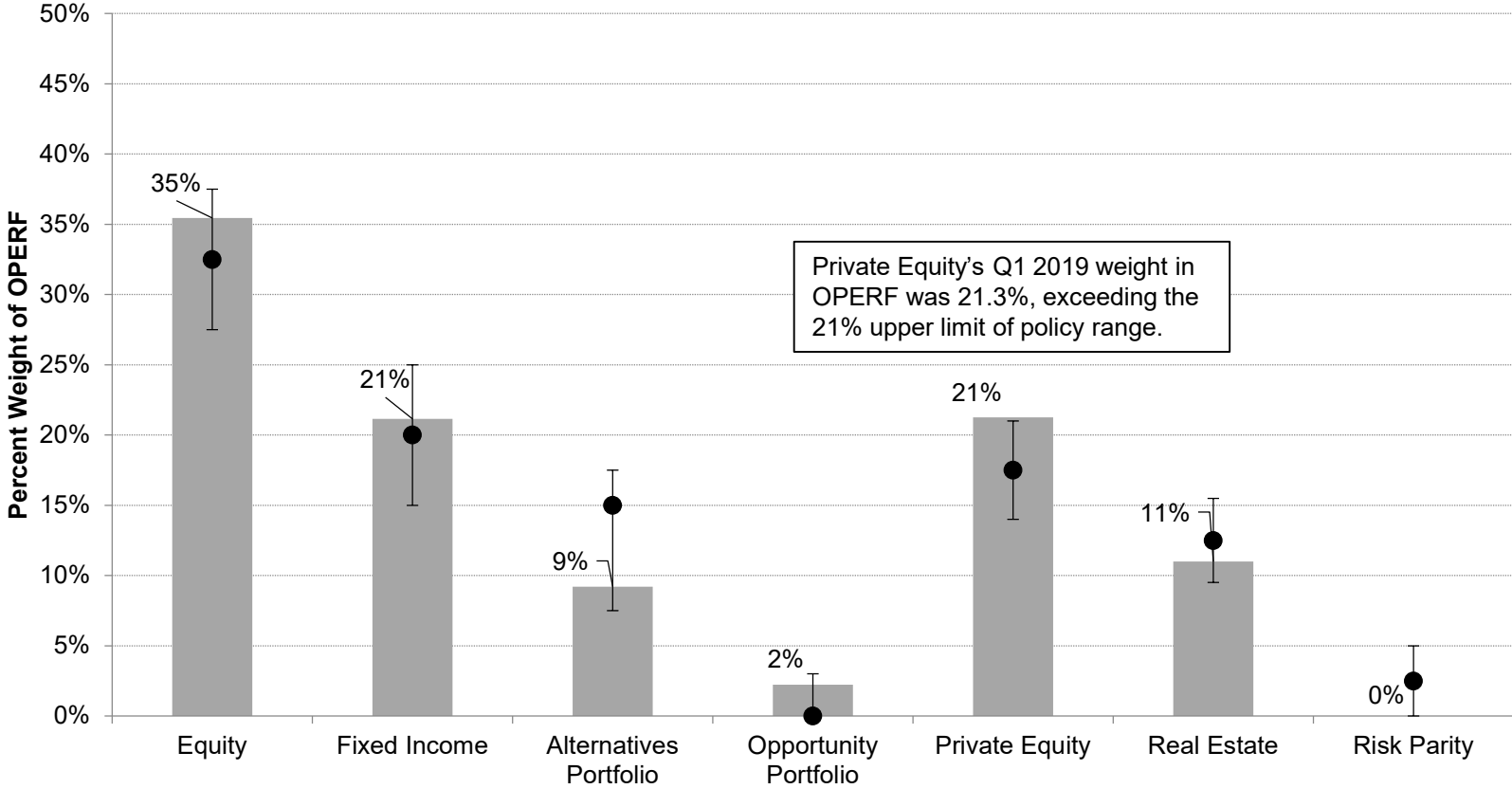
Correlation Matrix by Asset Class

| Expected Return | Expected Risk | Predicted Risk ¹ | Mar 29, 2019 | Equity | Fixed Income | Alternatives Portfolio | Opportunity Portfolio | Private Equity | Real Estate | OPERF |
|-----------------|---------------|-----------------------------|------------------------|--------|--------------|------------------------|-----------------------|----------------|-------------|-------------|
| 7.3% | 18.8% | 12.2% | Equity | 1.00 | 0.09 | 0.72 | 0.75 | 0.96 | 0.44 | 0.98 |
| 3.8% | 3.8% | 2.2% | Fixed Income | | 1.00 | 0.31 | 0.16 | 0.11 | 0.29 | 0.19 |
| 7.0% | 9.1% | 6.5% | Alternatives Portfolio | | | 1.00 | 0.73 | 0.69 | 0.51 | 0.77 |
| | | 4.2% | Opportunity Portfolio | | | | 1.00 | 0.75 | 0.38 | 0.77 |
| 9.2% | 26.3% | 21.3% | Private Equity | | | | | 1.00 | 0.43 | 0.98 |
| 7.0% | 12.2% | 8.8% | Real Estate | | | | | | 1.00 | 0.54 |
| 7.3% | 12.5% | 9.8% | OPERF | | | | | | | 1.00 |

Capital Market Assumptions from Callan

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

OPERF Allocations



Liquidity Report

| Asset Class | Liquidity (\$M) | | | | ∞ | Uncalled Commitment | Next 12 Months |
|---------------------|-----------------|--------------|--------------|---------------|--------|---------------------|----------------|
| | 1 Week | 1 Month | 1 Quarter | | | | |
| Cash & Overlay | 1,252 | | | | | | |
| Public Equity | 23,307 | 1,909 | 561 | 561 | | | |
| Fixed Income | 12,152 | 2,516 | | | | | |
| Private Equity | | | | | 15,946 | -9,920 | |
| Real Estate | 637 | | | | 7,616 | -1,831 | |
| Alternatives | 1,088 | 1,072 | 1,014 | 3,732 | | -3,402 | |
| Opportunity | 371 | | 230 | 1,070 | | -561 | |
| Proj PERS Cash Flow | | | | | | | -3,600 |
| Total | 38,806 | 5,497 | 1,805 | 28,925 | | -15,713 | -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.

Top 10 Exposures by Investment Firm

| Rank | Asset Manager | Mkt Val (\$mm) | Mkt Val Weight | Asset Class |
|------|-----------------------------|----------------|----------------|-----------------------------------|
| 1 | Internally-Managed | 13,776 | 18.4% | Cash, Fixed Income, Public Equity |
| 2 | Dimensional Fund Advisors | 4,957 | 6.6% | Public Equity |
| 3 | AQR | 3,325 | 4.4% | Alternatives, Public Equity |
| 4 | Arrowstreet Capital | 2,901 | 3.9% | Public Equity |
| 5 | KKR | 2,757 | 3.7% | Fixed Income, Private Equity |
| 6 | AllianceBernstein | 2,317 | 3.1% | Fixed Income, Public Equity |
| 7 | BlackRock | 2,166 | 2.9% | Alternatives, Fixed Income |
| 8 | Lazard | 1,929 | 2.6% | Public Equity |
| 9 | Western Asset Management Co | 1,727 | 2.3% | Fixed Income |
| 10 | Wellington | 1,705 | 2.3% | Fixed Income |

Public Equity Portfolio's Predicted Risk per Aladdin

| | Risk Contribution (bps) | | | Meta Category |
|--------------------|-------------------------|--------------|------------|---------------|
| | Port | Bench | Active | |
| Equity | 1,133 | 1,217 | 111 | |
| WRLD Style | 1,020 | 1,076 | 64 | |
| Market | 1,063 | 1,092 | 22 | |
| Size | 17 | 29 | 19 | Size |
| Volatility | -87 | -73 | 12 | Volatility |
| Momentum | 1 | 2 | 0 | Momentum |
| Reversal | -1 | -11 | -4 | |
| Liquidity | 29 | 37 | 4 | |
| SmallCap | 8 | 10 | 2 | |
| Value | -2 | -6 | -1 | Value |
| Profitability | -5 | -5 | 1 | |
| Earnings Yield | 1 | 0 | 1 | Value |
| Dividend Yield | 1 | 1 | 0 | Value |
| Growth | -4 | 0 | 6 | Value |
| Leverage | 0 | -1 | -2 | |
| Sentiment | 0 | 0 | 1 | |
| Emerging | 1 | 3 | 3 | |
| Oil | -1 | -1 | 0 | |
| WRLD Country | 119 | 128 | 10 | |
| WRLD Sector | -13 | 9 | 24 | |
| Stock Return Based | 4 | | -3 | |
| Equity Specific | 3 | 4 | 16 | |
| Foreign Exchange | 86 | 87 | 7 | |
| Rates | 0 | | 0 | |
| Total | 1,219 | 1,304 | 118 | |

Consolidate into "Value" exposure

By design, the Public Equity Portfolio has a lower predicted risk than that of the benchmark (MSCI ACWI IMI).

The Public Equity Portfolio has an "active" risk of 118 bps. This is the estimated volatility of performance relative to the benchmark.

Framework to Calculating Active Beta

- Take the estimated Active Factor Exposures and Factor Volatilities from Aladdin, e.g., an Active Exposure of -0.29 to Size and a Factor Volatility of 161 bps; and
- Scale by the Market Volatility of 1,129 bps to produce a “Beta”.

As an example, applying the above approach to a portfolio of Russell 2000 U.S. Small Cap Index against a benchmark of Russell 3000 U.S. All Cap Index result in active exposures of:

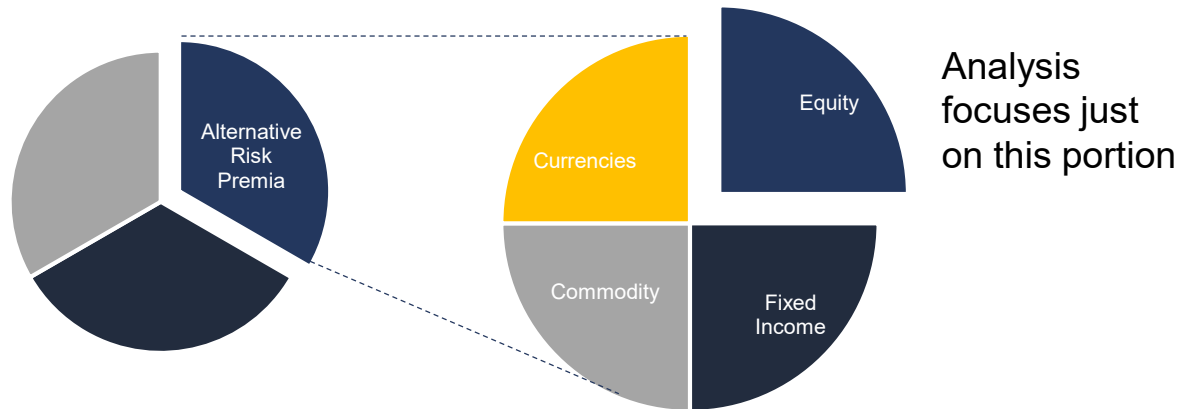
- Beta to Value of +0.050,
- Beta to Momentum of -0.025, and
- Beta to Size of -0.276.

“What Are The Active Factor Betas in the Public Equity Portfolio?”

- Beta to Value of +0.025 due to allocations to systematic managers such as DFA and internally-managed strategies,
- Beta to Momentum of +0.001,
- Beta to Size of -0.042 due to long-term Small Cap tilt, and
- Beta to Volatility of -0.015 due to allocations to global low-volatility managers.

“What Are The Active Factor Betas in the Diversifying Strategies Sleeve?”

Apply the same framework to a portion of the Diversifying Strategies Sleeve of the Alternatives Portfolio.



Aladdin does not estimate “style” factors for non-equity asset classes as used by Alternative Risk Premia managers.

Pie charts for illustrative purpose only and not indicative of actual allocations

“What Are The Active Factor Betas in the Diversifying Strategies Sleeve?”

- Beta to Value of +0.132,
- Beta to Momentum of +0.116, and
- Beta to Volatility of -0.197.

Betas to the above factors in the Diversifying Strategies Sleeve are greater than those in the Public Equity Portfolio. That is due to different implementation (long-short levered mandates) and objective (delivering alternative risk premia returns as opposed to market returns with factor tilts).

“What Are The Active Factor Betas in OPERF?”

Scale the Betas by the ratio of Alternative Risk Premia net asset value to Public Equity Portfolio net asset value.

| | Public Equity | Div Strategies | Total |
|------------|---------------|----------------|--------|
| Value | +0.025 | +0.009 | +0.034 |
| Momentum | +0.001 | +0.008 | +0.009 |
| Size | -0.042 | +0.004 | -0.038 |
| Volatility | -0.015 | -0.014 | -0.029 |

The takeaway is that the aggregate tilts to equity factors such as Value, Momentum, and Volatility remain small and do not meaningfully add to OPERF’s total risk.



OREGON STATE TREASURY

Tobias Read
Oregon State Treasurer

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

oregon.gov/treasury

TAB 6 – OST Investment Operations Update

OPERF & Other OST-managed Accounts

June 5, 2019

Investment Operations

Dave Randall

Director of Investment Operations

Debra Day

Investment Reporting Manager

Kristi Jenkins

Investment Operations Manager



**OREGON
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TREASURY**



Executive Summary

Data accuracy, reporting, analytics, and business intelligence are critical to investment decision-making.

Continued utilization of Blackrock's Aladdin platform and the maturation of dedicated OST operational staff have enabled Investment Officers to focus on informed decision-making and produced the following, positive bottom line results:

- Cost Savings
- Value Added Returns
- Data Integrity
- Expanded Capabilities

Background - Audit and Peer Reviews

Common theme of findings

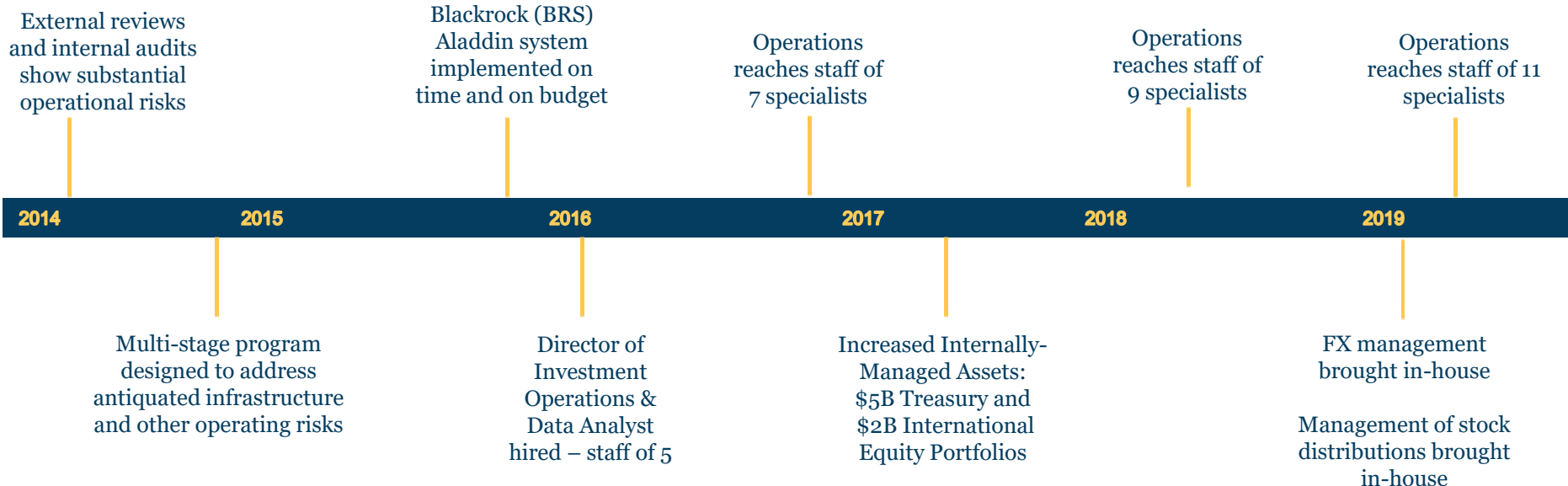
- The investment division was significantly under-resourced relative to the size and complexity of its asset management responsibilities.
- This gap created substantial and avoidable risks.
- Given its fiduciary obligations, the Council determined that the status quo was untenable.

ANALYSES

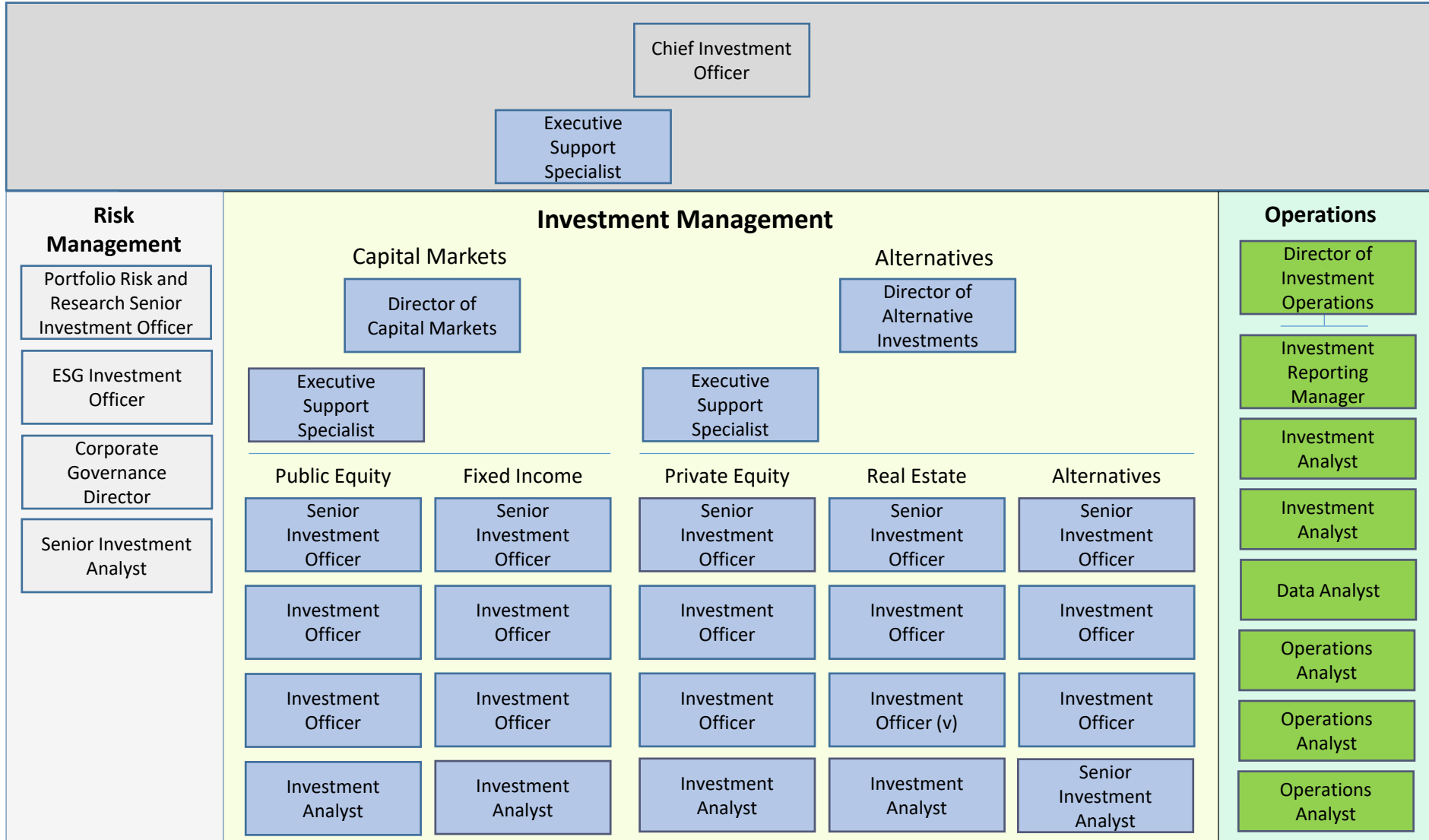
CUTTER (2011-14)
FUNSTON ADVISORY SERVICES
(2012)
HEWITT ENNIS KNUPP (2012)
CORTEX (2012)
OST INTERNAL AUDIT (2013)
CEM BENCHMARKING (ANNUAL)
WILSHIRE/TRUST UNIVERSE
COMPARISON SERVICE (ANNUAL)

Background - Timeline

OST undertook a multi-year business transformation project that included the addition and assimilation of dedicated operational resources as well as the acquisition and integration of the BlackRock Solutions (BRS) Aladdin platform. Today, OST's Aladdin utilization rates are top among peers, and the Investment Operations Unit is now comprised of 11 FTEs across Investment Accounting, Performance, Reporting, Reconciliation, Trade Operations and Data Management.



OST Investment Division Org Chart – 2018



(v) = vacant

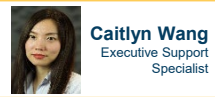
Investment Division Organizational Chart - Today



Capital Markets



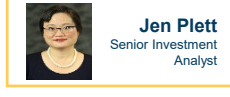
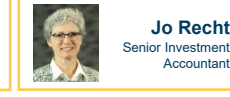
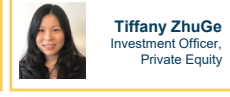
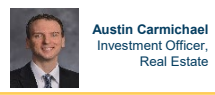
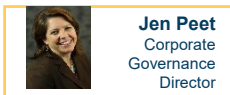
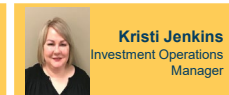
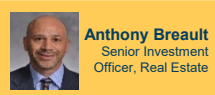
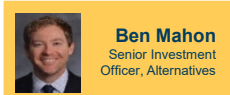
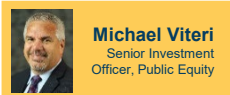
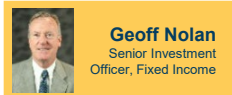
Alternatives



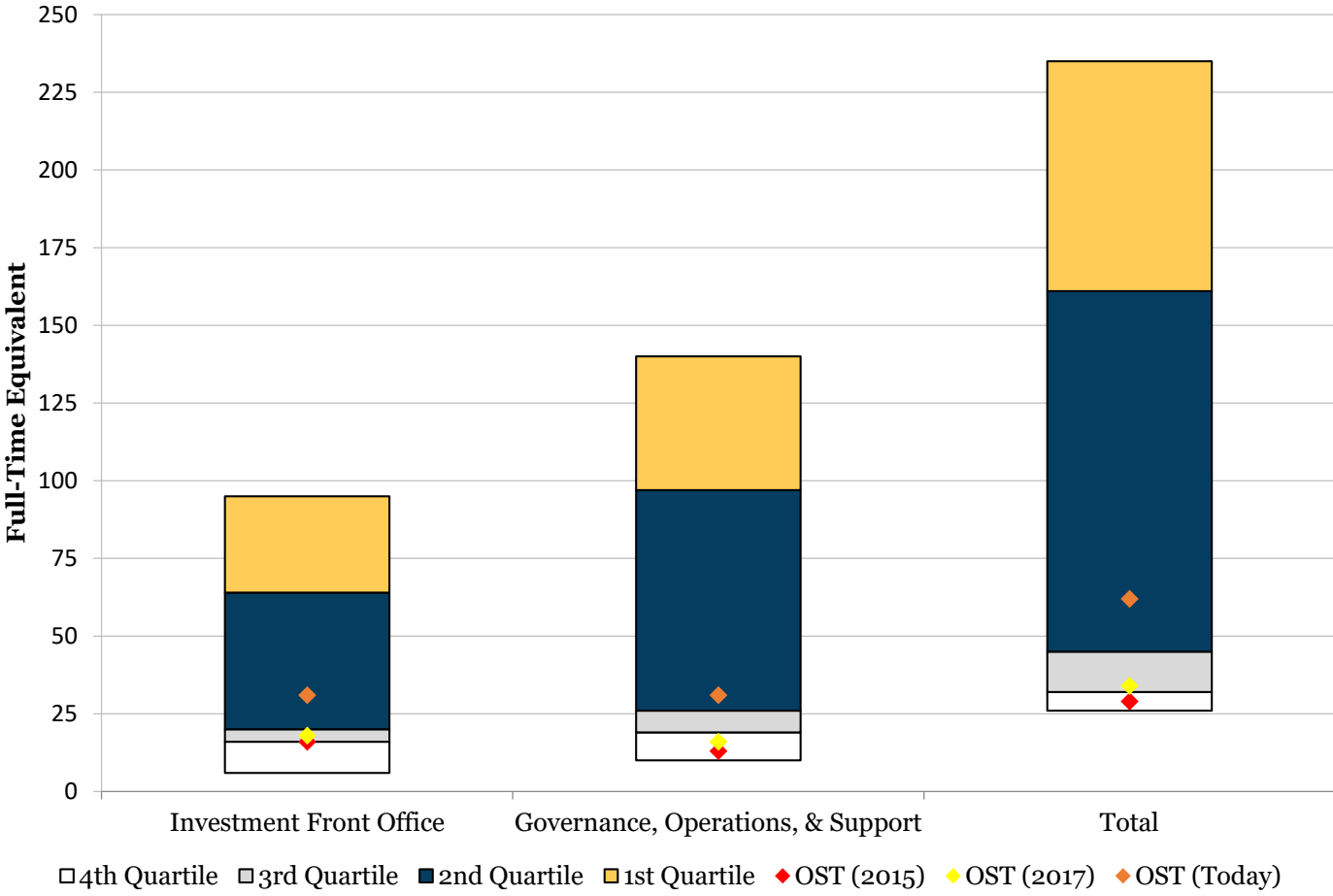
Operations



Risk



OST Staffing Compared to Peers



Investment Operations Organizational Chart



Investment Accounting

- Cash Management
- Portfolio Administration
- Financial Reporting
- Expense Tracking

Reconciliation

- Investment Book of Record
- Accounting Book of Record
- Investment Manager Data
- Consultant Data
- Custodial Data

Performance

- Oregon Investment Council Reporting
- Public Reporting
- Web Updates
- PERS Reporting
- Internal Reporting

Trade Operations

- Daily Report Monitoring
- Counterparty Maintenance
- Cash Process
- Cash Exceptions
- SM Pending

Data Mgmt./Analysis

- Data Integrity
- Security Master
- Security Characteristics
- Analytics

Building Capacity – Internal Management

Through benchmarking an aggregation of pension funds across the globe, research shows that internally-managed assets, over the long term, produce cost savings and improved investment returns. Overall staffing levels tend to increase, but the investment management costs are reduced.

-CEM



Managing Billions Internally



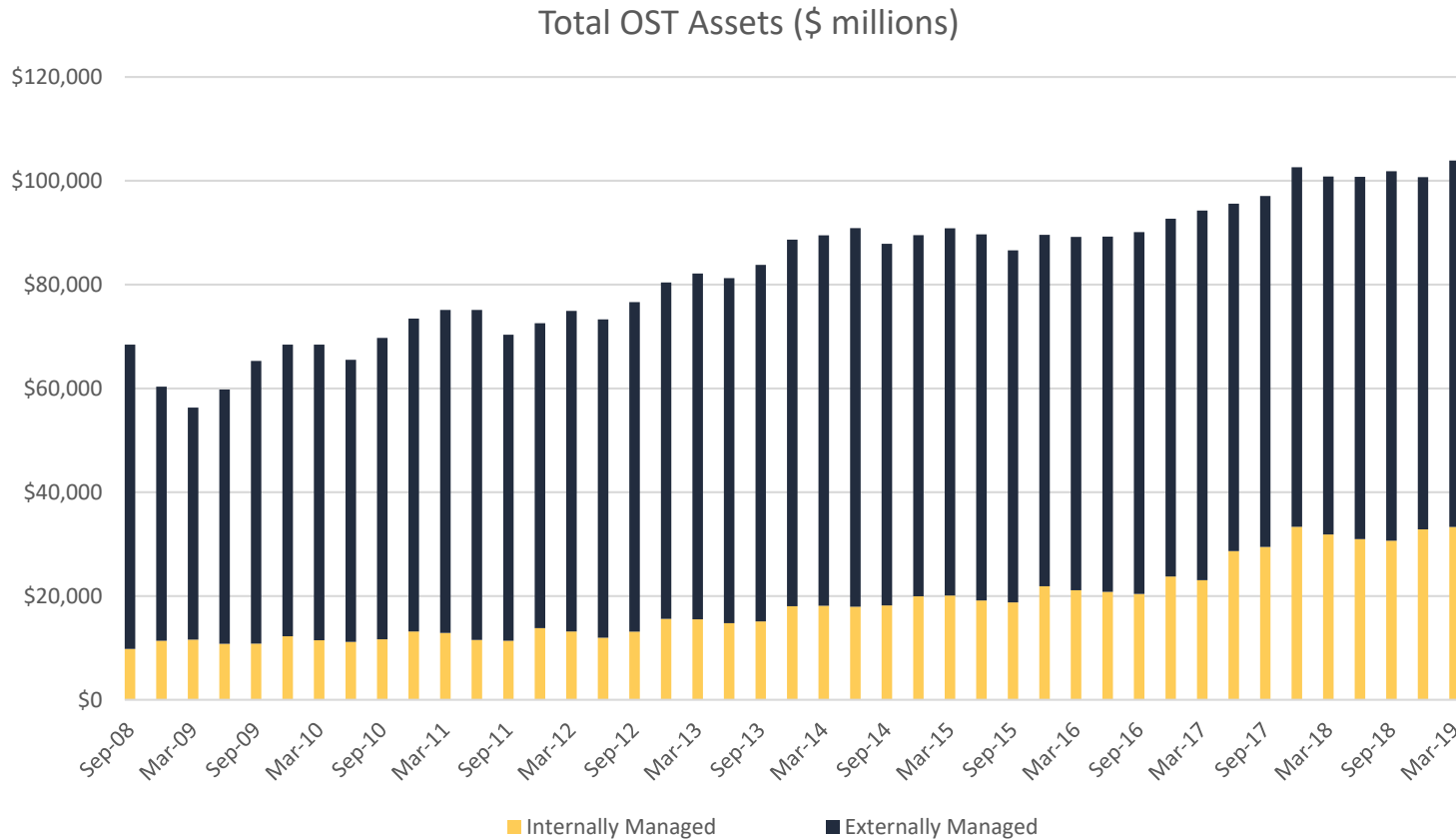
PUBLIC EQUITY
INTERNAL 25.2%
EXTERNAL 74.8%



FIXED INCOME
INTERNAL 62.8%
EXTERNAL 37.2%

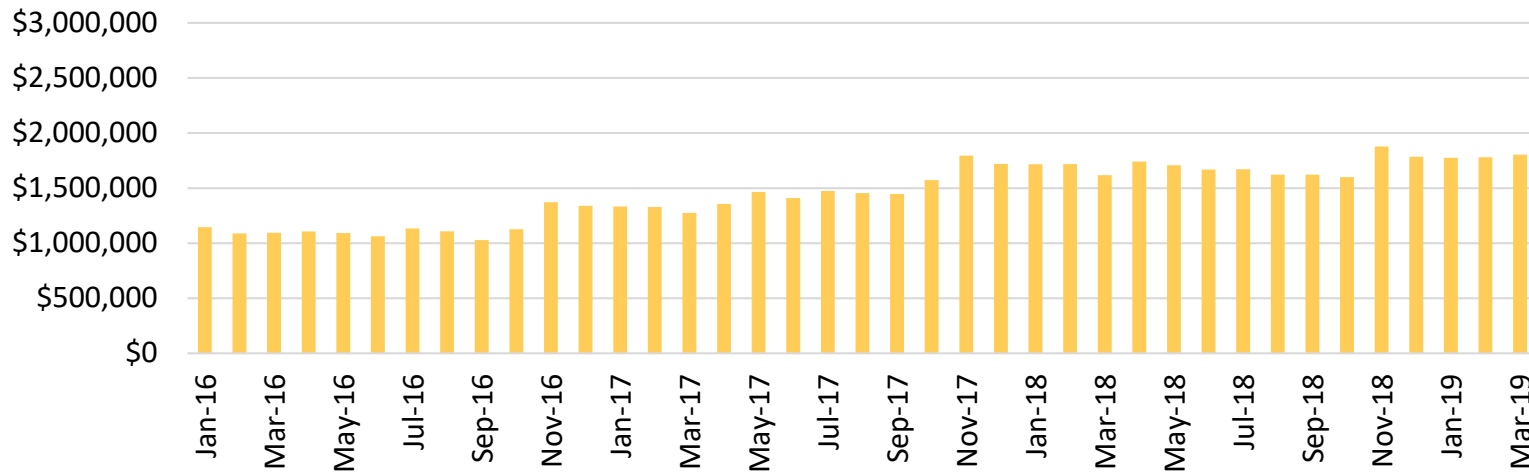


Internally-Managed Assets



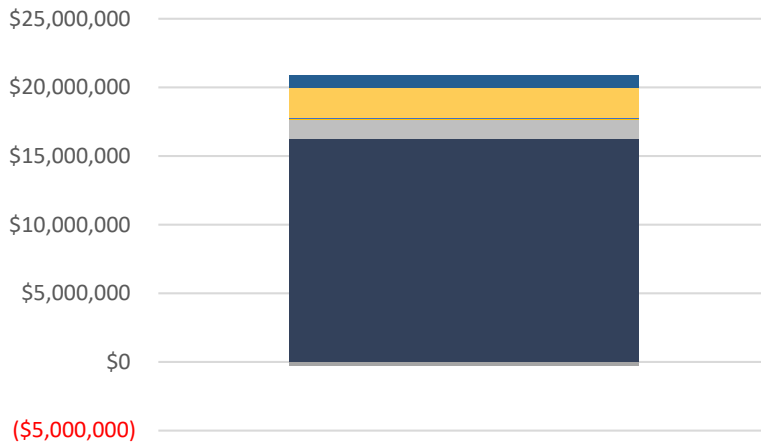
Estimated Cost Savings

Monthly Internal Management Fee Savings
Since January 2016



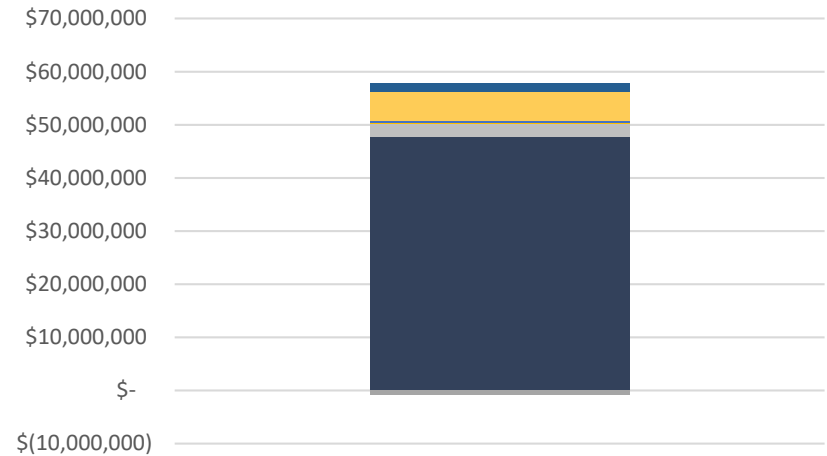
Estimated Cost Savings

Estimated Trailing Year Fee Savings from Internal Management as of March 31, 2019



- Oregon Short Term Fund
- Government Portfolio - OST
- S&P 500 Index - OST
- S&P 400 Index - OST
- S&P 600 Index - OST
- US Risk Premia - OST
- International Risk Premia - OST

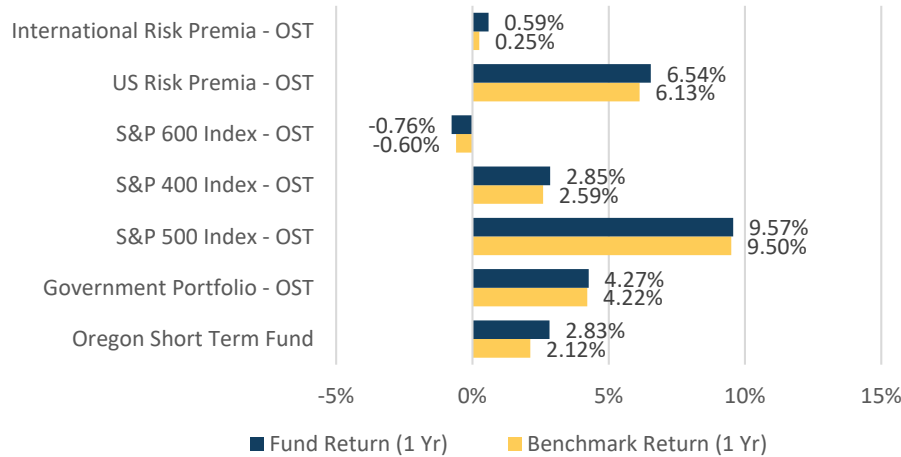
Estimated Fee Savings from Internal Management Activities January 1, 2016 to March 31, 2019



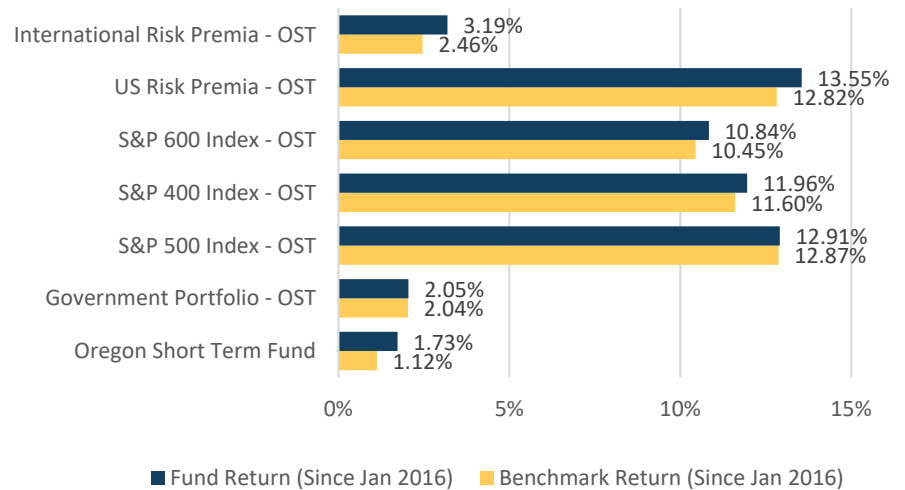
- Oregon Short Term Fund
- Government Portfolio - OST
- S&P 500 Index - OST
- S&P 400 Index - OST
- S&P 600 Index - OST
- US Risk Premia - OST
- International Risk Premia - OST

Value Added Performance

Performance as of March 31, 2019

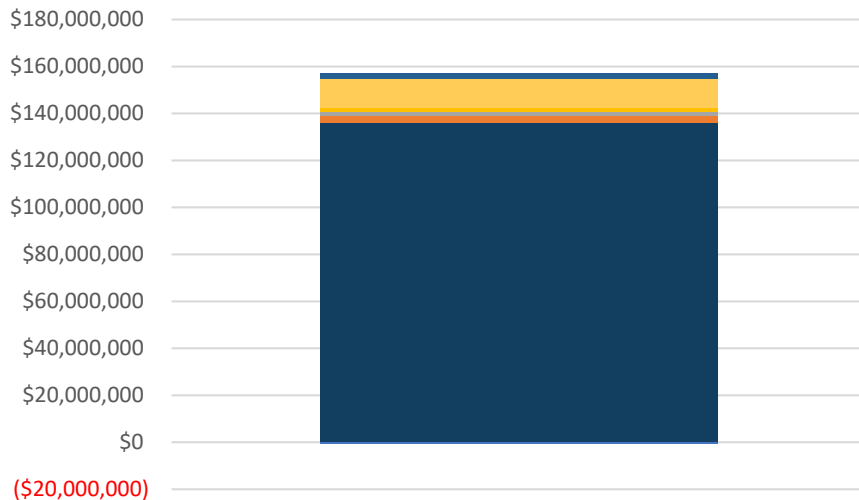


Performance as of March 31, 2019



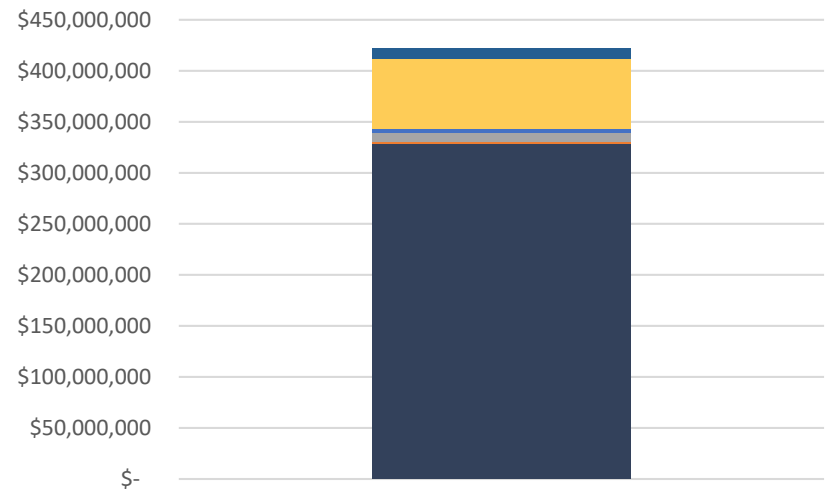
Investment Performance Value Add (Estimated \$\$\$s)

Trailing Year Estimated Dollar Performance Contribution Versus Benchmark as of March 31, 2019



- Oregon Short Term Fund
- Government Portfolio - OST
- S&P 500 Index - OST
- S&P 400 Index - OST
- S&P 600 Index - OST
- US Risk Premia - OST
- International Risk Premia - OST

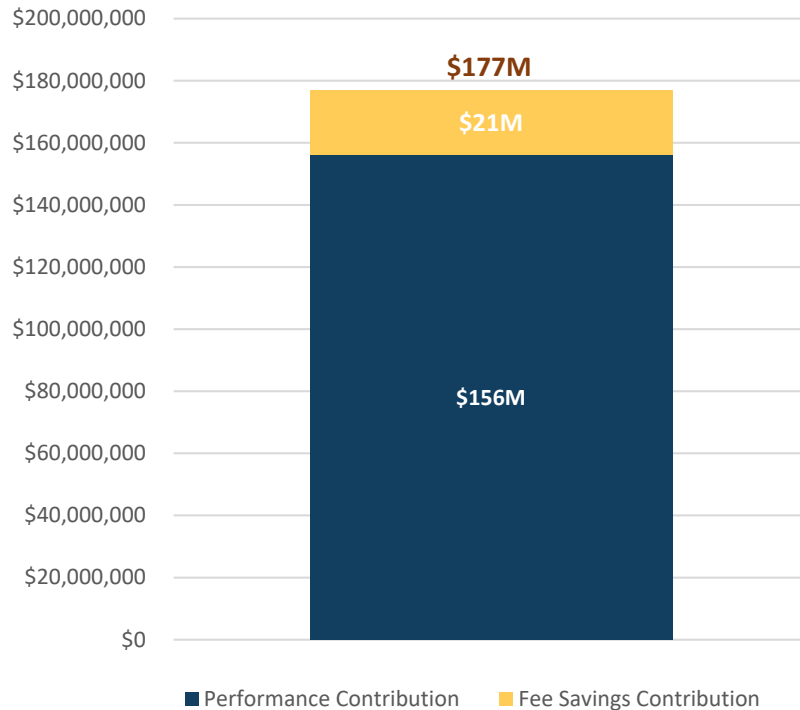
Estimated Dollar Contribution Versus Benchmark January 1, 2016 to March 31, 2019



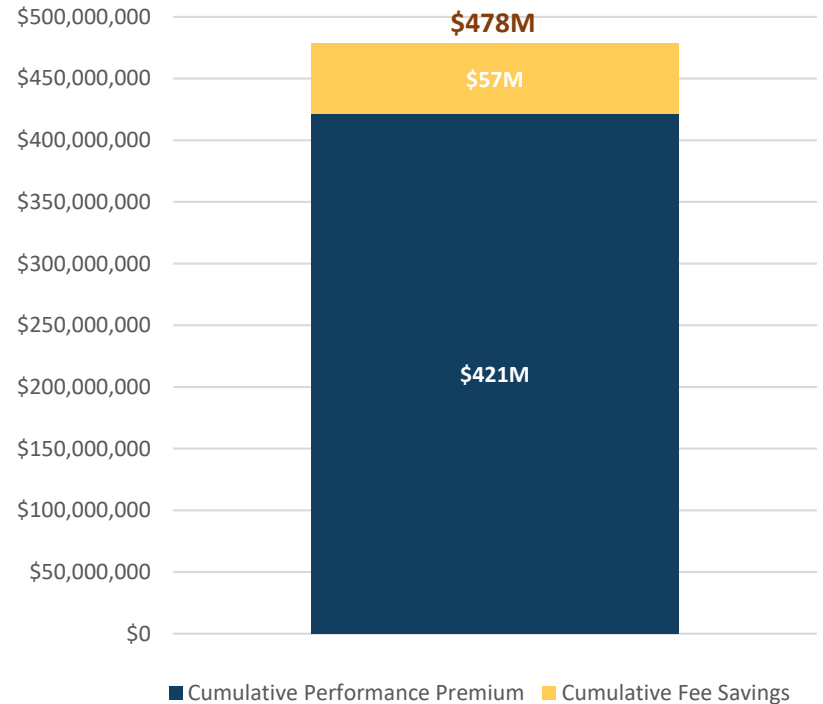
- Oregon Short Term Fund
- Government Portfolio - OST
- S&P 500 Index - OST
- S&P 400 Index - OST
- S&P 600 Index - OST
- US Risk Premia - OST
- International Risk Premia - OST

Combined Value Add Estimated

Estimated Internal Management Value Add
April 1, 2018 - March 31, 2019



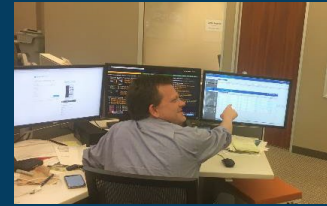
Estimated Internal Management Value Add
January 1, 2016 – March 31, 2019



Data Integrity

Given the size, scale and complexity of the OST investment program, even slight discrepancies in data accuracy can magnify performance distortions which may result in unintended investment consequences and fund valuation mistakes.

Every basis point counts!



Infrastructure

- BlackRock Aladdin Platform

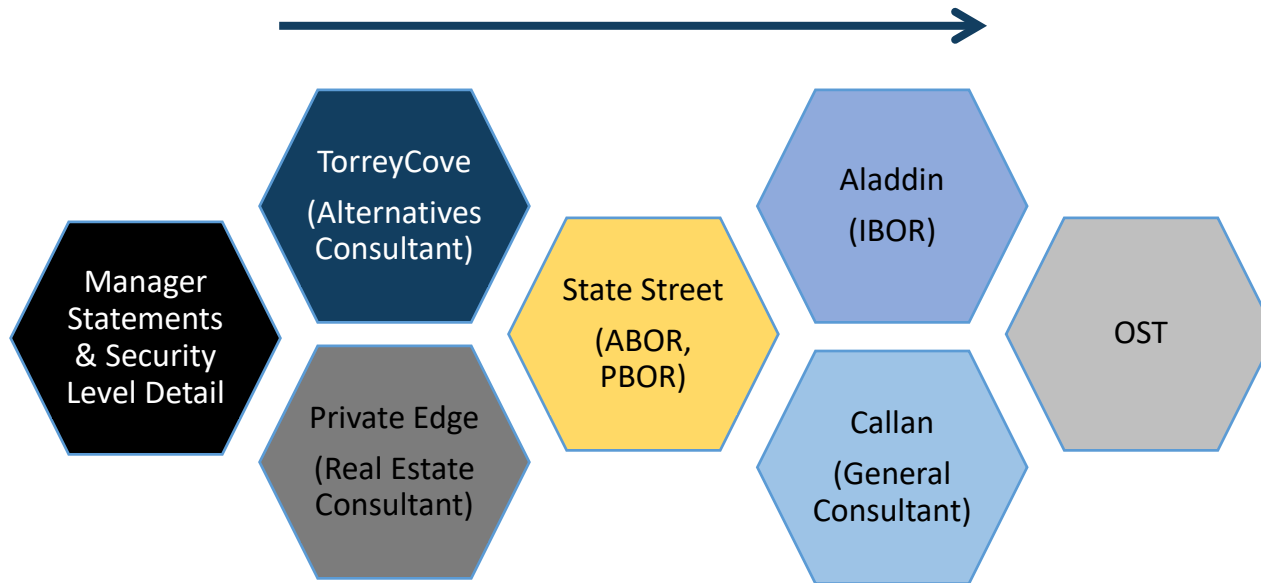
Investment Operations

- Checks and balances
- Valuation and Performance Reconciliation



Improving Data Reliability

Valuation and Performance Data Flow



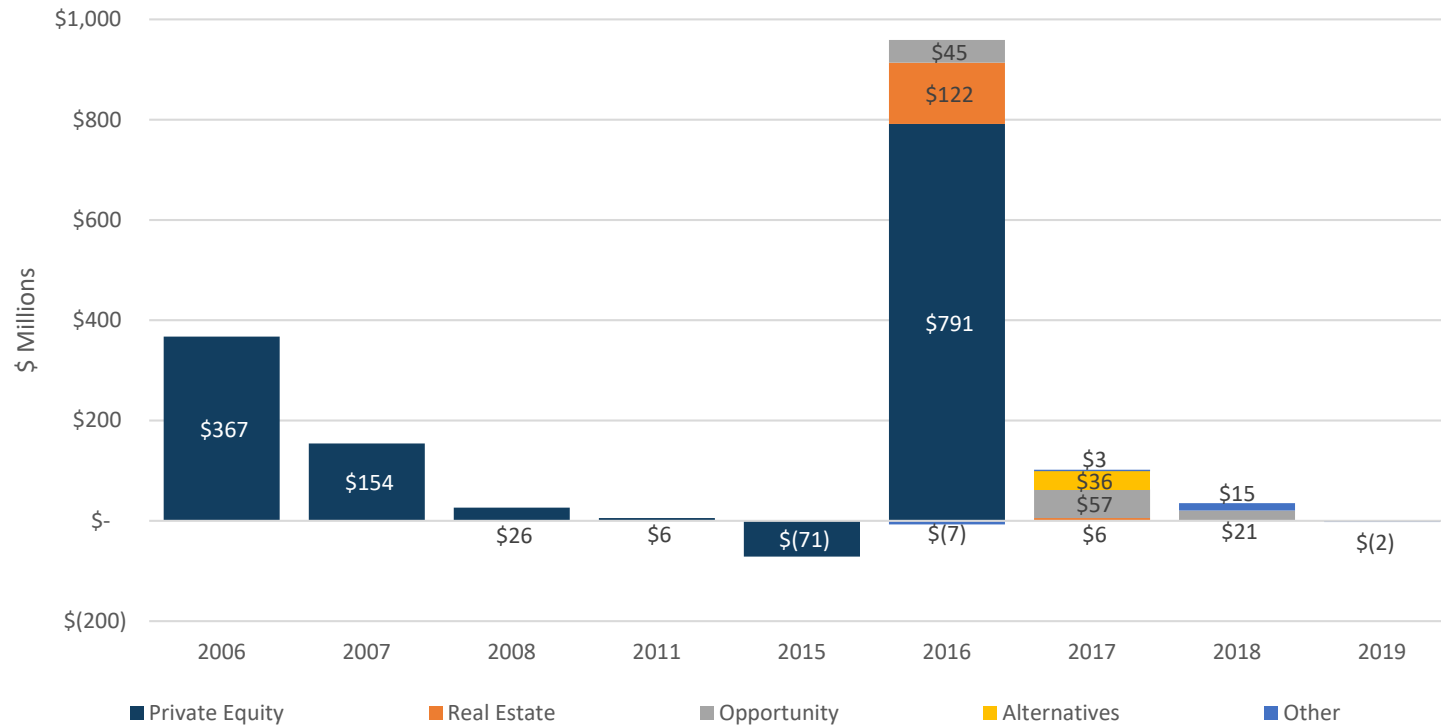
Improving Data Reliability – Issue Recon Log

| Date Discovered | Report Date | Effective Dates | Report | Account Impacted | Plan/Fund | Summary | Estimated Impact (\$) | Root Cause Means Prevalent |
|-------------------------------|-------------|--|--------------------|------------------|---------------------------|---|-----------------------|----------------------------|
| Jan-16 | Jan-16 | Jan 2016 | ART | Real Estate | OSTP | Cash manual entered from OSTP | N/A | Yes |
| 4/19/2016 | 4/18/2016 | Mar 2016 | ART | Real Estate | OPERF/Alta | Alternative Portfolio - Stop the Clock Performance not set for a liquid alternative fund | \$15,000,000 | Yes |
| 7/15/2016 | 8/5/2016 | Jan 2016 | ART | Real Estate | OITP | Re individual cash monthly performance was uncalculated | (4,15,000) | Yes |
| 8/2/2016 | 8/5/2016 | Q2 2016 | ART | Real Estate | OPERF/Private Eq | Private Equity Performance - Data Error - Wrong E entered | \$750,000,000 | Yes |
| 8/26/2016 | 8/30/2016 | Jul 2016, Oct 2016, Jan 2017 | ART | Real Estate | OPERF/Real Estate | Real Estate Portfolio - Reconciliation Value did not match performance value for one of the funds | \$7,000,000 | Yes |
| 9/7/2016 | 9/28/2016 | Dec 2015, Jan 2016 | ART | Real Estate | OPERF/Real Estate | Real Estate Portfolio - Reconciliation Value did not match performance value for one of the funds | \$7,000,000 | Yes |
| 1/18/2017 | 1/28/2017 | Dec 2016 | ART | Real Estate | OPERF/SSGAWorld Ex-MUSCOR | SSGAW - \$688M Cash Flow not annualized for. Explanation was that portfolio report was annual error | (47,000,000) | Yes |
| 1/28/2017 | 1/31/2017 | Dec 2016 | ART | Real Estate | OPERF/Alta/Warwick | Warwick Portfolio III - used 6/30 instead of 3/31 manager statement | \$17,492,600 | Yes |
| 2/12/2017 | 2/14/2017 | CV 2016 | TUCS | Real Estate | OPERF/Private Eq | Incorrect Release Used For Private-Equity 2016 TUCS prior rankings | N/A | Yes |
| 3/19/2017 | 3/15/2017 | Q2 2014, Q3 2015, Q4 2015, Q1 2016 | ART | Real Estate | OPERF/Private Eq | Reported release in spreadsheet tool did not match the source file and spreadsheet used to calculate private equity | (67,700,000) | Yes |
| 5/1/2017 | 5/25/2017 | Q3 2002 to Q3 2008 | ART | Real Estate | OPERF/Private Eq | 1) By making updates to the opening value for all 8 quarters in 2006 and 2007, the calculated release were lower than the prior period reported value were used. 2) Beginning in Q3 2002, the team changed the factor for monthly cash flow volatility | \$10,000,000 | Yes |
| 8/28/2017 | 8/28/2017 | Q3 2017 | ART | Real Estate | OPERF | Uncollected market value | \$230,340 | Yes |
| 10/23/2017 | 10/23/2017 | Jan 2017 to Apr 2017 | ART | Real Estate | OPERF/Real Estate | Woodhouse Real Estate - error | \$5,500,000 | Yes |
| 1/3/2018 | 1/11/2018 | Dec 2017 | ART | Real Estate | SAIF | Issue | \$1,300,000 | Yes |
| 1/11/2018 | 1/12/2018 | Dec 2017 | ART | Real Estate | CSF | Issue | \$1,200,000 | Yes |
| 1/12/2018 | 1/16/2018 | 12/1/2017 | ART | Real Estate | CSF | Issue - manually reported. | (4,000,000) | Yes |
| Multiple (see 1/18/2018 Memo) | 1/25/2018 | Q3 2002 to Q3 2008, Q2 2011, Q3 2015, Q4 2015, Q1 2016 | ART | Real Estate | OPERF | Private Equity and Real Estate reissues. Reported impact reflects only new Real Estate reissues; combined impact would be \$500 million. | \$100,000,000 | Yes |
| 1/30/2018 | 2/19/2018 | inception Date to Jan 2018 for all funds | Performance Report | Real Estate | OPERF | Data files containing historical performance erroneously used in performance annualized calculation with OSTP. | N/A | Yes |
| 2/6/2018 | 2/25/2018 | Mar 2016 to Dec 2017 | ART | Real Estate | OPERF | Adjusted Opportunity Investments (AOI) 3.0 value not reflected since first incremental in Q4 2015. | \$185,242,672 | Yes |
| 4/28/2018 | 4/26/2018 | Q1 2018 | ART | Real Estate | OPERF/Opportunities | SSP used wrong calculation when transitioning to RIS. | \$28,619,395 | Yes |
| 7/5/2018 | 7/24/2018 | Q2 2018 | ART | Real Estate | OPERF | 300 bps reduction in Sullivan's quarterly return, 3 day delay in performance reports | N/A | Yes |
| 7/12/2018 | 7/26/2018 | | ART | Real Estate | OPERF, SAIF, CSF | Reconciling values in official Q1 management fees were inaccurately posted. | \$210,234 | Yes |
| 9/24/2018 | 10/8/2018 | | ART | Real Estate | OITP | In performance calculation, portfolio redemption erroneously reduced as quarterly loss. | N/A | Yes |
| 9/28/2018 | 10/1/2018 | | Working Total | Real Estate | D&S, DCBS, ODOT, OITP | Reporting discrepancy of NAVs in four portfolios. | \$85,552 | Yes |
| 10/1/2018 | 10/15/2018 | | Aladdin Cash | Real Estate | OSTP | Interest payment used for a quarterly within issue | \$75,000 | Yes |
| 10/1/2018 | 10/1/2018 | 6/30/2018 to 7/31/2018 | ART | Real Estate | OPERF | Back Forward - incorrect market value as of 6/30/2018 | \$16,400,045 | Yes |
| 10/1/2018 | 1/14/2019 | 12/31/2018 | ART | Real Estate | OPERF | Performance Only Adjustment in the handling of a corporate action on 12/28/2018, in error an error in handling by Reconciliation | \$1,330,438 | Yes |
| 12/28/2018 | 1/14/2019 | 12/31/2018 | Working Total | Real Estate | SAIF | Issue held as alternative STIP position of month end | \$1,300,384 | Yes |
| 2/19/2019 | 8/8/2018 | 1/1/2019 | N/A | Real Estate | OLGIP | Yasill County application was not processed - Application was received in October, payment was in the interest for December. Was later issued on 1/1. | \$2,350 | Yes |
| 2/12/2019 | 2/14/2019 | 2/7/2019 - 2/19/2019 | N/A | Real Estate | OPERF | FX used not processed for Euros Received. Subsequent change in value were the work was not in the plans source. | \$4,476 | Yes |
| 5/5/2019 | 5/14/2019 | 12/27/2018-2/1/2019 | N/A | Real Estate | IAP | 30 bps management fee was applied as an expense and not equal amount management fee payable, leading to an overstatement of expense. This was corrected/offset with effective date of 2/1/19 | \$750,457 | Yes |
| 9/12/2019 | 4/1/2019 | 1/31/2019-2/28/2019 | ART | Real Estate | CSF | On 3/12/2019, during a month end roll of a quarterly level release of CUSIP numbers in SSPR, an error was discovered resulting in an uncalculated transfer linked of \$2.5 million. The correction was made on 3/19/2019. | (42,200,000) | Yes |

For Illustrative Purposes

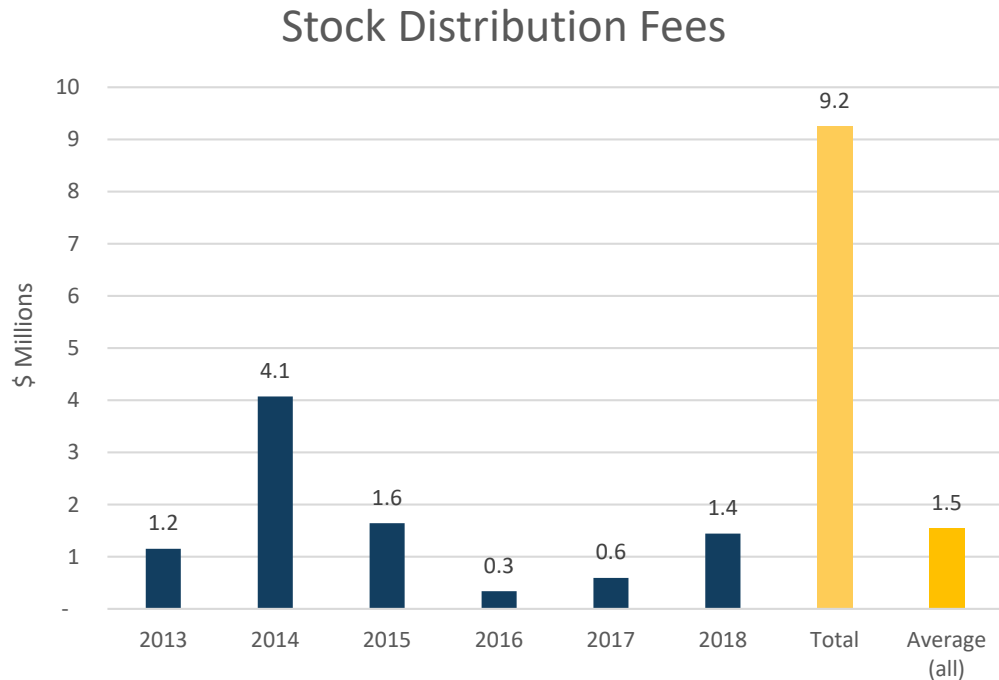
Reconciliation Impact

Estimated Historical Dollar Impact of Discrepancies



Bringing Functions In-House: Stock Distributions

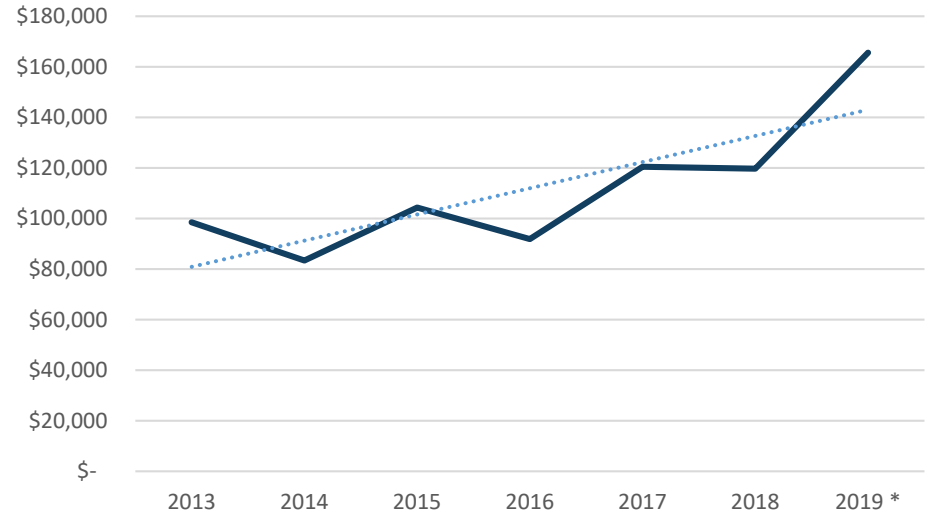
Since 2013, fees for management of stock distributions have ranged from \$0.3 million to \$4.1 million per year.



Bringing Functions In-House: Foreign Exchange

While YoY variance is significant, the 3-year rolling average shows a notable upward trend (despite 2016 being a low outlier).

3-Year Rolling Average: Foreign Exchange Fees Paid to State Street



*2019 fee level is estimated based on actual 1Q19 fees paid

A Quantifiable Improvement

Accomplishments

- Cost Savings
- Value Added Performance
- Improved Data Integrity
- Enhanced Resource Organization
- Centralized data management, reconciliation and reporting
- Improved information flow, risk mitigation and accountability

Looking Forward

Future Opportunities

- Expand Aladdin Use and Expertise – External Manger Review and Alternative Investments
- Specialization and Optimization of Operational Resource Allocation
 - Reporting
 - Reconciliation
 - Data Management & Analytics
 - Trade Operations
- Continued Fee Monitoring and Transparency
- Extend Reconciliation Efforts
- Enhance Reporting Activities







OREGON STATE TREASURY

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TAB 7 – Asset Allocations & NAV Updates

Asset Allocations at April 30, 2019

| OPERF | Regular Account | | | | | | Target Date Funds | Variable Fund | Total Fund | |
|-------------------------|-------------------|---------------------|----------------------|---------------|----------------|----------------------|-------------------|---------------------|-------------------|----------------------|
| | Policy | Target ¹ | \$ Thousands | Pre-Overlay | Overlay | Net Position | Actual | \$ Thousands | \$ Thousands | \$ Thousands |
| Public Equity | 32.5-42.5% | 37.5% | 26,663,667 | 35.1% | 310,997 | 26,974,663 | 35.6% | 1,025,515 | 493,449 | 28,493,627 |
| Private Equity | 13.5-21.5% | 17.5% | 16,174,395 | 21.3% | | 16,174,395 | 21.3% | | | 16,174,395 |
| Total Equity | 50.0-60.0% | 55.0% | 42,838,061 | 56.5% | 310,997 | 43,149,058 | 56.9% | | | 44,668,022 |
| Opportunity Portfolio | 0-3% | 0.0% | 1,694,142 | 2.2% | | 1,694,142 | 2.2% | | | 1,694,142 |
| Fixed Income | 15-25% | 20.0% | 14,704,413 | 19.4% | 980,089 | 15,684,502 | 20.7% | 1,323,231 | | 17,007,733 |
| Real Estate | 9.5-15.5% | 12.5% | 8,226,285 | 10.8% | (6,800) | 8,219,485 | 10.8% | | | 8,219,485 |
| Alternative Investments | 0-12.5% | 12.5% | 7,117,411 | 9.4% | | 7,117,411 | 9.4% | | | 7,117,411 |
| Cash ² | 0-3% | 0.0% | 1,285,050 | 1.7% | (1,284,286) | 764 | 0.0% | | 20,493 | 21,257 |
| TOTAL OPERF | | 100% | \$ 75,865,361 | 100.0% | \$ - | \$ 75,865,361 | 100.0% | \$ 2,348,746 | \$ 513,942 | \$ 78,728,049 |

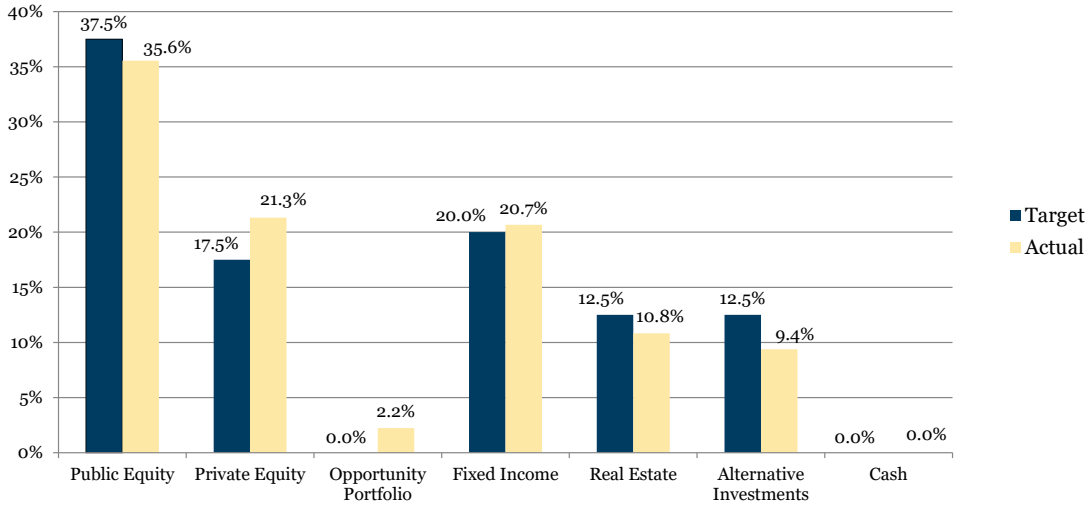
¹Targets established in June 2015. Interim policy benchmark consists of: 40% MSCI ACWI IMI Net, 22.5% Custom FI Benchmark, 20% Russell 3000+300bps (1 quarter lagged), 12.5% NCREIF ODCE net (1 quarter lagged), & 5% CPI+400bps.

²Includes cash held in the policy implementation overlay program.

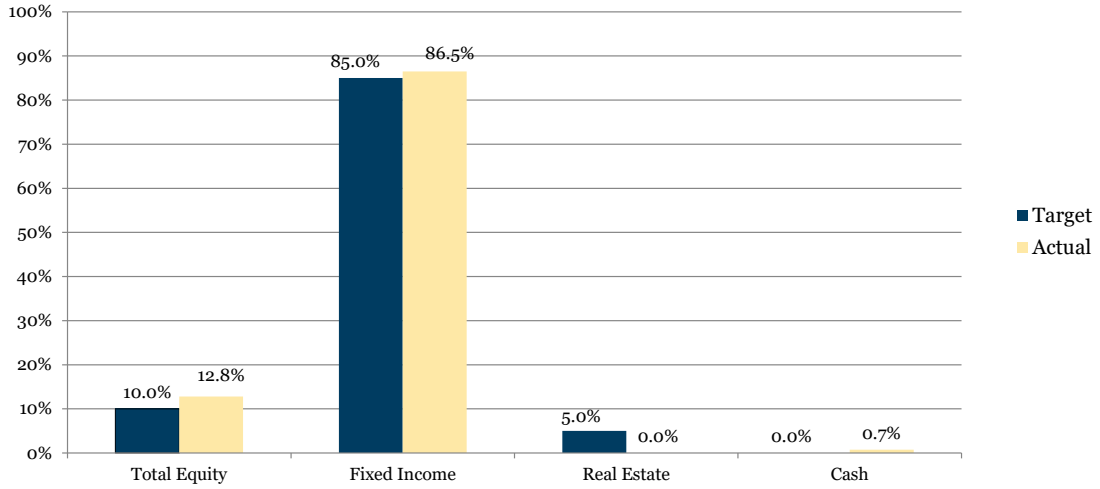
| SAIF | Policy | Target | \$ Thousands | Actual |
|---------------------|--------------|--------------|---------------------|---------------|
| Total Equity | 7-13% | 10.0% | 617,067 | 12.8% |
| Fixed Income | 80-90% | 85.0% | 4,175,626 | 86.5% |
| Real Estate | 0-7% | 5.0% | - | 0.0% |
| Cash | 0-3% | 0.0% | 35,270 | 0.7% |
| TOTAL SAIF | | | \$ 4,827,964 | 100.0% |

| CSF | Policy | Target | \$ Thousands | Actual |
|-------------------------|---------------|--------------|---------------------|---------------|
| Global Equities | 40-50% | 45.0% | 845,700 | 47.4% |
| Private Equity | 8-12% | 10.0% | 206,271 | 11.6% |
| Total Equity | 58-62% | 55.0% | 1,051,971 | 59.0% |
| Fixed Income | 25-35% | 25.0% | 493,237 | 27.6% |
| Real Estate | 8-12% | 10.0% | 123,833 | 6.9% |
| Alternative Investments | 8-12% | 10.0% | 91,906 | 5.2% |
| Cash | 0-3% | 0.0% | 23,040 | 1.3% |
| TOTAL CSF | | | \$ 1,783,987 | 100.0% |

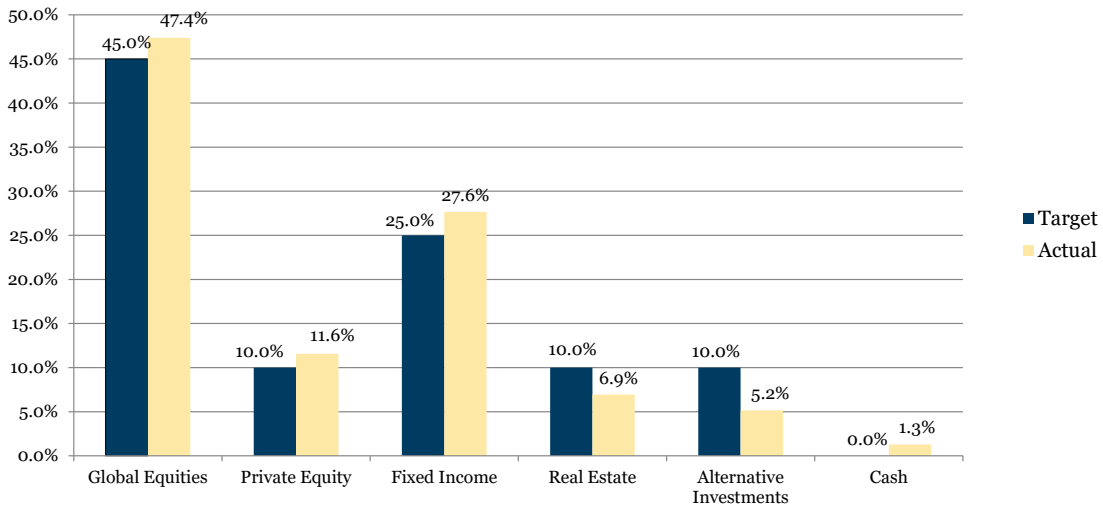
OPERF Asset Allocation



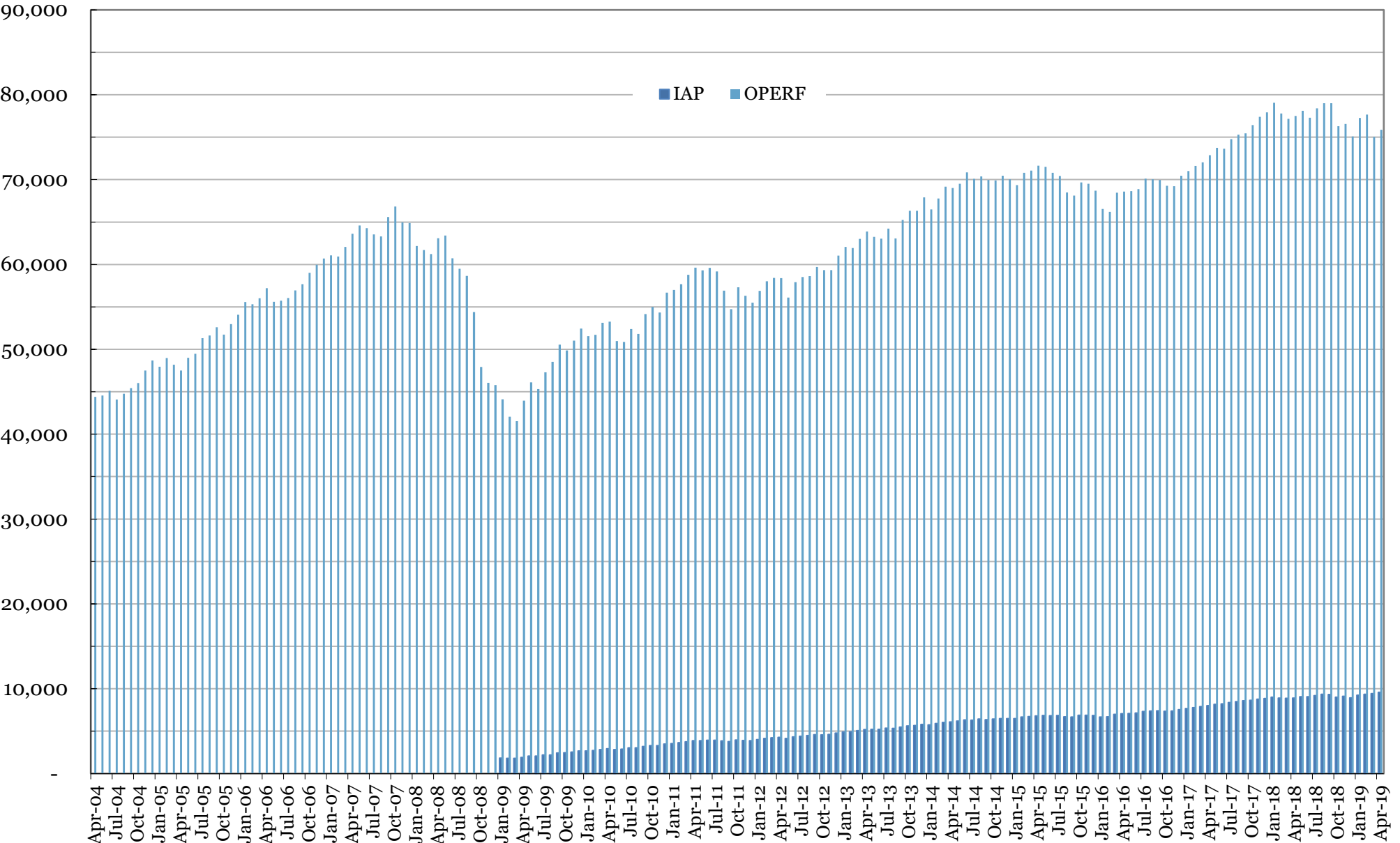
SAIF Asset Allocation



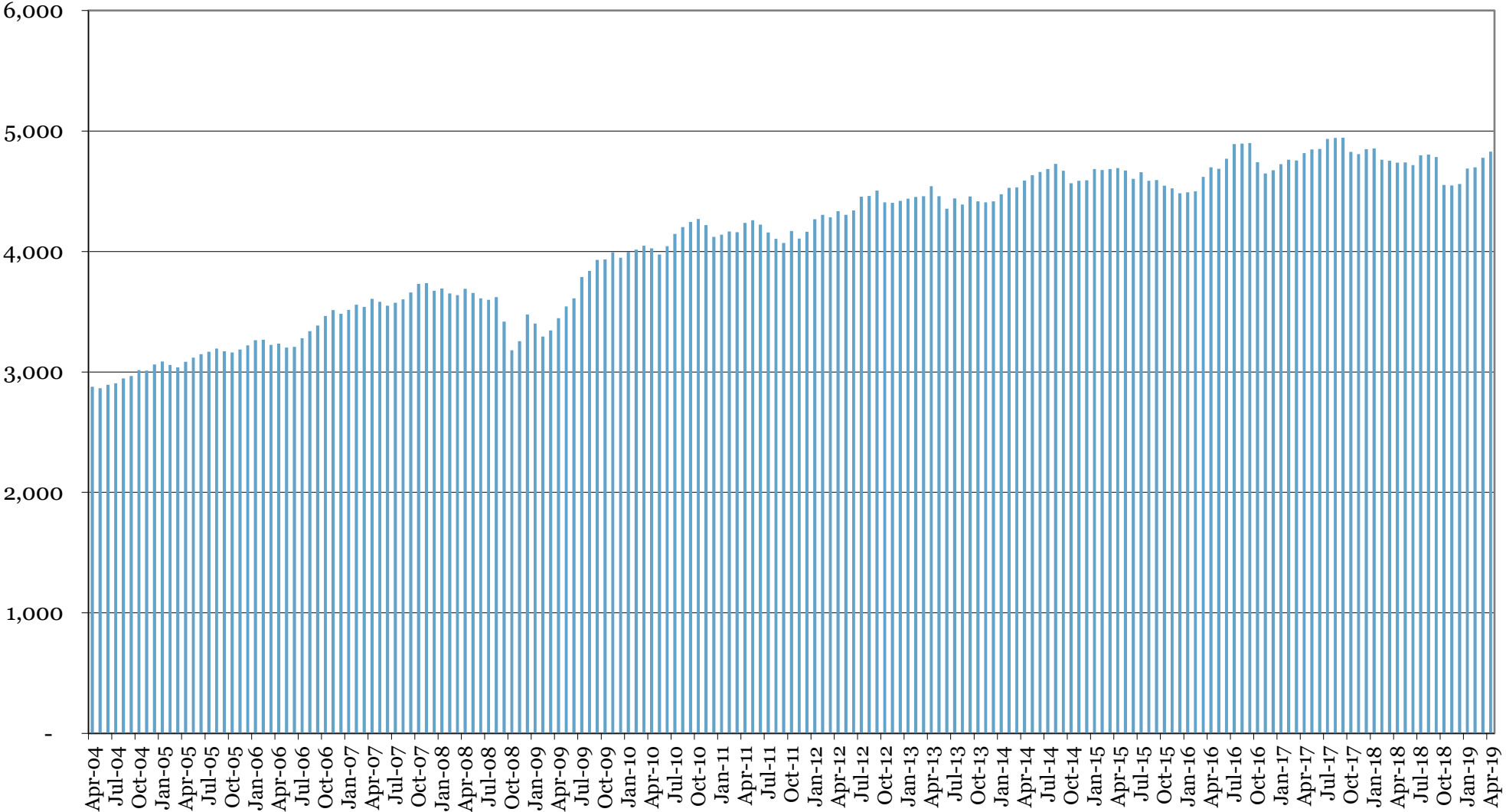
CSF Asset Allocation



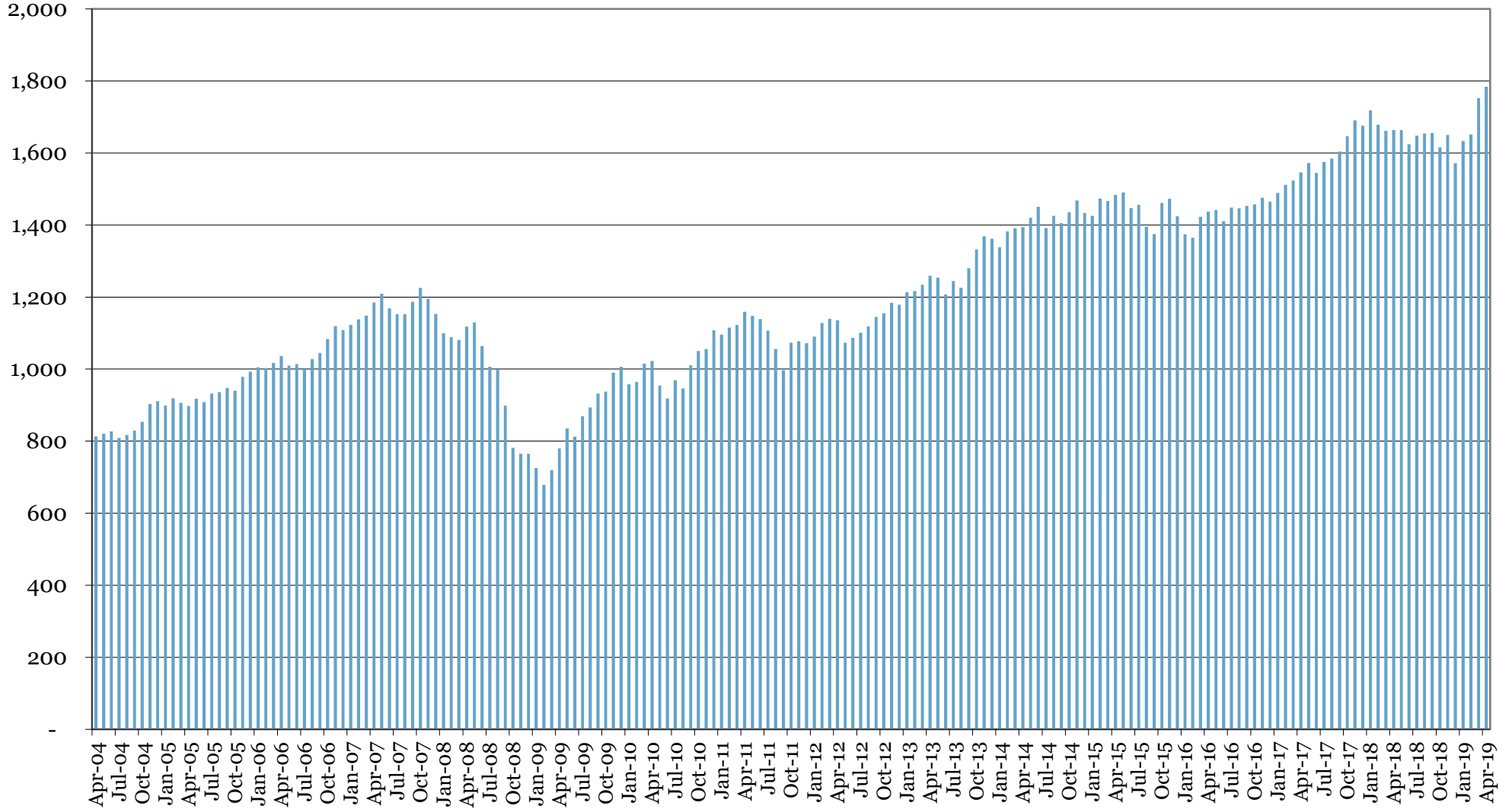
OPERF NAV
15 years ending April 2019
(\$ in Millions)



SAIF NAV
15 years ending April 2019
(\$ in Millions)



CSF NAV
15 years ending April 2019
(\$ in Millions)



TAB 8 – Calendar — Future Agenda Items

2019/20 OIC Forward Calendar and Planned Agenda Topics

| | |
|---------------------------|---|
| August 7, 2019 | Opportunity Portfolio Review OSGP Annual Review Corporate Governance Update OIC Governance Discussion |
| September 18, 2019 | CEM Benchmarking Report Q2 Performance & Risk Report OIC Governance Discussion |
| October 30, 2019 | General Consultant Recommendation Currency Overlay Review Public Equity Program Review OIC Governance Discussion |
| December 11, 2019 | Fixed Income Program Review Q3 Performance & Risk Report OIC Governance Discussion |
| January 30, 2020: | 2021 OIC Calendar Approval Private Equity Program Review Placement Agent Report IAP Update |
| March 11, 2020: | Liquidity Update & Analysis CSF Annual Review Real Estate Portfolio Review Q4 2019 Performance & Risk Report |
| April 22, 2020: | Asset Allocation & Capital Market Assumptions Update Securities Lending Update Overlay Review SAIF Annual Review |
| June 3, 2020 | Alternatives Portfolio Review Overlay Review Q1 Performance & Risk Report Operations Update Joint PERS/OIC Board Discussion |