



**OREGON
STATE
TREASURY**

Oregon Investment Council

June 2, 2021

John Russell
Chair

Rex Kim
Chief Investment Officer

Tobias Read
State Treasurer



Investment Division
16290 SW Upper Boones Ferry Road
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OREGON INVESTMENT COUNCIL

Agenda

June 2, 2021
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>
9:00-9:10	1. Review & Approval of Minutes April 21, 2021	John Russell <i>OIC Chair</i>	1
	2. Committee Reports	Rex Kim <i>Chief Investment Officer</i>	2
9:10-9:40	3. Q1 OPERF Performance	Allan Emkin <i>Managing Principal, Meketa Investment Group</i> Mika Malone <i>Managing Principal/Consultant, Meketa Investment Group</i>	3
9:40-10:30	4. OIC, PERS Joint Session	Sadhana Shenoy <i>Chair, PERS Board</i> Lawrence Furnstahl <i>Vice-Chair, PERS Board</i> Stephen Buckley <i>Member, PERS Board</i> Jardon Jaramillo <i>Member, PERS Board</i> John Scanlan <i>Member, PERS Board</i> Matt Larrabee, FSA, EA, MAAA <i>Principal, Milliman</i> Scott Preppernau, FSA, EA, MAAA <i>Principal & Consulting Actuary, Milliman</i>	4

John Russell
Chair

Cara M. Samples
Vice-Chair

Monica Enand
Member

Charles Wilhoite
Member

Tobias Read
State Treasurer

Kevin Olineck
PERS Director

10:30-11:30	5. OPERF Asset Allocation	<p>Karl Cheng <i>Senior Investment Officer, Portfolio Risk & Research</i></p> <p>Ben Mahon <i>Senior Investment Officer, Alternatives</i></p> <p>Stephen Kennedy <i>Partner, Portfolio Analyst, Albourne</i></p> <p>Colin Bebee <i>Managing Principal, Consultant, Meketa Investment Group</i></p> <p>Allan Emkin</p> <p>Mika Malone</p> <p>Kristen Doyle <i>Partner, Aon Investments</i></p> <p>Raneen Jalajel <i>Associate Partner, Aon Investments</i></p>	5
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B. Information Items

11:40-12:10	6. IAP Program Review	<p>Karl Cheng</p> <p>Chris Nikolich <i>Head of Glide Path Strategies (US) Multi Asset Solutions, AllianceBernstein, L.P.</i></p> <p>Elena Wang <i>Research Analyst Multi Asset Solutions, AllianceBernstein, L.P.</i></p>	6
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12:10-12:40	7. Operational Annual Review	<p>David Randall <i>Chief Investment Operating Officer</i></p> <p>Debra Day <i>Investment Reporting Manager, Operations</i></p> <p>Kristi Jenkins <i>Investment Operations Manager, Operations</i></p>	7
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12:40	8. Asset Allocation & NAV Updates	<p>Rex Kim</p> <p>a. Oregon Public Employees Retirement Fund</p> <p>b. SAIF Corporation</p> <p>c. Common School Fund</p>	8
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9. Calendar — Future Agenda Items	Rex Kim	9
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12:45 **10. Open Discussion**

**OIC Member
Staff
Consultants**

C. Public Comment

TAB 1 – REVIEW & APPROVAL OF MINUTES

April 2, 2021 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 21, 2021

Meeting Minutes

- Members Present: John Russell, Cara Samples, Monica Enand, Charles Wilhoite, Tobias Read and Kevin Olineck.
- Staff Present: Rex Kim, John Hershey, Michael Langdon, David Randall, Karl Cheng, Ben Mahon, Geoff Nolan, Tony Breault, Michael Viteri, Jen Plett Rachel Wray and May Fanning
- Staff Participating virtually: Anna Totdahl, John Lutkehaus, Perrin Lim, Mohammed Quraishi, Andrew Robertson, Jo Recht, Roy Jackson, Robin Kaukonen, Tim Miller, Krystal Korthals, Ian Huculak, Faith Sedberry, Taylor Bowman, Paul Koch, Mark Selfridge, Claire Illo, Jeremy Knowles, Amanda Kingsbury, Tiffany Zahas, Christopher Ebersole, Andrew Coutu, Lisa Pettinati, Scott Robertson, Andrey Voloshinov, Mike Mueller, Debra Day, Tan Cao, Sam Spencer, Tyler Bernstein, Kristi Jenkins, Eric Messer, Angela Schaffers, Aliese Jacobsen, Kenny Bao, Sommer May, Andrew Hillis, Dmitri Palmateer, Ahman Dirks, Dana Millican and Amy Bates
- Consultants Present: Allan Emkin, Christy Fields, Mika Malone, David Glickman, Paola Nealon and Colin Bebee (Meketa Investment Group, Inc.); Stephen Cummings, Kristen Doyle, Raneen Jalajel and Phil Kivarkis (Aon Investments); Tom Martin (Aksia/TorreyCove Capital Partners LLC), Steve Kennedy, Albourne
- Legal Counsel Present: Steven Marlowe, Department of Justice
- Before proceeding with the OIC meeting, Chief Investment Officer, Rex Kim provided a disclosure pertaining to the virtual set-up of this OIC meeting, informing those in attendance (virtual and in person) of the guidelines in which this meeting will proceed.
- The April 21st, 2021 OIC meeting was called to order at 9:00 am by John Russell, OIC Chair. Chair Russell opened the meeting by introducing and welcoming, newly appointment Council member, Charles Wilhoite.

I. **9:01 am Review and Approval of Minutes**

MOTION: Chair Russell asked for approval of the March 10th, 2021 OIC regular meeting minutes. Treasurer Read moved approval at 9:01 am, and Ms. Enand seconded the motion which then passed by a 4/0 vote. Since member Wilhoite's appointment to the Council was made post the March OIC meeting, he abstained from voting.



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II. 9:03 am Committee Reports

Mr. Kim, gave an update on the following committee actions taken since the March 10th, 2021 OIC meeting:

Private Equity Committee:

March 16, 2021	Genstar Capital Partners X, L.P.	\$250M
	KKR North America Fund XIII, SCSp	\$350M
April 16, 2021	TA XIV, L.P.	\$150M

Real Estate Committee:

March 25, 2021	AEW Core Property Trust - 108k shares	est.
\$110M	Ascentris-OR Cherry Creek West, LLC	\$350M

Opportunity Committee:

March 25, 2021	Blue Torch Credit Opportunities Fund II, L.P.	\$100M
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Alternatives Portfolio Committee:

None

Mr. Kim also wanted to acknowledge and thank, Michael Viteri, Senior Investment Officer, Public Equity and May Fanning, Executive Support Specialist who have served at Treasury under the Investment Division and wanted to wish them well in their upcoming endeavors.

III. 9:05 am OPERF Risk Survey

Allan Emkin, Managing Principle, Meketa Investment, Mika Malone, Managing Principal/Consultant, Meketa Investment Group and Paola Nealon, Principal/Consultant, Meketa provided the OPERF Risk Survey.

This presentation is the initial step in the 2022, study of OPERF's assets and liabilities. The comprehensive 2022 asset/liability study will address, in depth, the following elements:

- 1) Capital market assumptions by asset class, which include expected returns, volatilities and correlations; Along with the selection of which asset classes/strategies (ie. leverage) to model.
- 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.

Over the course of 2021, the Council - with input from Staff and Consultant(s) - will review several topics relevant to these elements ahead of the 2022 A/L study timeline. The 2021 asset allocation review is intended to be a "fine tuning" of the current asset allocation and a vehicle to initiate discussion and debate on issues that will be comprehensively addressed next year.

This Risk Survey seeks to understand the Council's key concerns, risk tolerance levels and portfolio attributes. There is no "right" answer as risk may mean different things to different people. Importantly, this is intended to solicit the types and the levels of risk the Board deems appropriate, commensurate with the return target to be achieved.

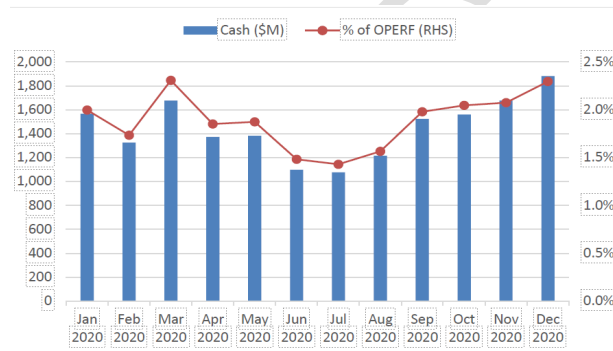


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IV. 9:12 am OPERF Synthetic Overlay Review

Karl Cheng, Senior Investment Officer, Portfolio Risk & Research, along with Greg Nordquist, CFA, Director Overly Strategies, Russell Investments and Doug Miller, Director Relationship Management, Russell Investments provided the Council an update on the OPERF overlay program that is managed by Russell Investments. This presentation included an introduction to Overly and the year 2020 in review.

Although OPERF does not have a strategic allocation to cash, it has 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 private market investments. The chart below shows OPERF’s monthly cash balance invested in OSTF, as well as the cash in 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. The OIC retained Russell Investments to implement an overlay program to minimize cash drag. Specifically, Russell Investments monitors and, if necessary, equitizes and/or bondizes excess cash held by public equity & REIT managers and any other idle OPERF cash. The firm uses highly-liquid futures contracts with margin requirements much smaller than the contracts’ “face” or “notional” values. As part of its process, Russell Investments also a) monitors OPERF’s asset allocation relative to its OIC-established strategic targets, and b) trades equity and fixed income futures contracts as necessary to align the Fund’s overall asset allocation with these OIC-established targets.

As December 31, 2020, the OPERF overlay program was long \$2.87 billion in fixed income contracts and short \$1.07 billion in global equity contracts for a total gross notional exposure of \$1.80 billion.

V. 9:59 am OPERF Public Equity Currency Hedge Program

Karl Cheng and Jen Plett, Investment Officer, Portfolio Risk & Research, presented the OPERF Public Equity Currency Hedge Program. The presentation included an executive summary, timeline, rationales, goal, program profile, performance, and results since inception.

VI. 10:18 am Use of Leverage for Asset Allocation

Kristen Doyle, Partner, Aon Investments, Raneen Jalajel, Associate Partner, Aon Investments and Phil Kivarkis, North America Head of Investment Policy Services, Aon Investments provided a presentation on the use of leverage for asset allocation. The presentation explored in detail the background, leverage overview and key takeaways. Karl



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Cheng and Geoff Nolan, Senior Investment Officer, Fixed Income, continued on the same lines, with a thorough presentation relating to OPERF leverage.

VII. 11:13 am OPERF Liquidity

Karl Cheng, Allan Emkin and Mika Malone, delivered a presentation on OPERF liquidity that covered an introduction, OPERF maturity, allocation over time, cash sources & uses, state of the pension fund, and takeaways.

VIII. 11:37 am Low Interest Rates, Risk Mitigation

Colin Bebee, Managing Principle/Consultant, Meketa Investment Group, delivered a presentation on low interest rates, risk mitigation. The presentation included an introduction, historical context, and considerations for the OPERF portfolio.

IX. 12:10 pm Asset Allocation & NAV Updates

Mr. Kim reviewed asset allocations and NAVs across OST-managed accounts for periods ended February 28, 2021.

X. 12:11 pm Calendar – Future Agenda Items

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

XI. 12:13 pm Open Discussion

Treasurer Read expressed his appreciation to the Staff and Consultants for the context in which the topics were brought forward. He also went on to welcome newly appointed Council member, Mr. Wilhoite. Member Enand, echoed Treasurer Read's sentiment.

XII. 12:15 pm Public Comments

Chair Russell read three written statements provided by, Ms. Alyssa Giachino, Ms. Nyresse Cole and Ms. Zella Roberts. All comments pertained to Roark Capital, who owns some of the largest fast-food chains, including Arby's and Sonic. Comments were about the current level of minimum wages. Before the Oregon Investment Council makes any additional commitments to Roark, they would ask that the Council evaluate previous investment with them and the human capital risks of Roark's investments.

Mr. Russell adjourned the meeting at 12:28 pm.

Respectfully submitted,

May Fanning
May Fanning
Executive Support Specialist

TAB 2 – Committee Reports

June 2, 2021

Oregon Investment Council

Committee Reports

Rex T. Kim, Chief Investment Officer



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TAB 3 – Q1 OPERF Performance

Oregon Investment Council

June 2, 2021

Executive Summary

OPERF Performance Summary – Commentary

- OPERF posted a return of 5.4% for the first quarter, relative to a benchmark return of 4.5% and peer median return of 3.2%. This ranks in the top decile of the InvestMetrics public plan peer universe for the quarter.
- The last year was marked by extraordinary equity returns. Within Domestic Equity, the OPERF portfolio benefited from value and small cap exposure tilts in the last two quarters, but was penalized over all other trailing periods. Consideration should be given towards determining and re-assessing the magnitude and conviction of these exposures within the portfolio.
- OPERF saw strong benchmark-relative performance across all time periods within International Equity.
- The Global Equity Low Volatility sleeve comprises nearly 90% of the total allocation to Global Equity. Due to the emphasis on downside protection, these strategies have struggled to keep up with the MSCI ACWI IMI Index given the strong equity market experienced since implementation.
- The performance of the Private Equity portfolio, although strong on an absolute basis, detracted on a relative basis. The OPERF Portfolio maintains a significant overweight relative to the target - actual allocation of 24% versus a target allocation of 19%. Additionally, the portfolio underperformed its public market benchmark over most trailing periods, due to the extraordinary performance of public equity markets over the last year. OPERF is actively looking to reduce private equity exposure, though it will take some time given the illiquid nature of the asset class.

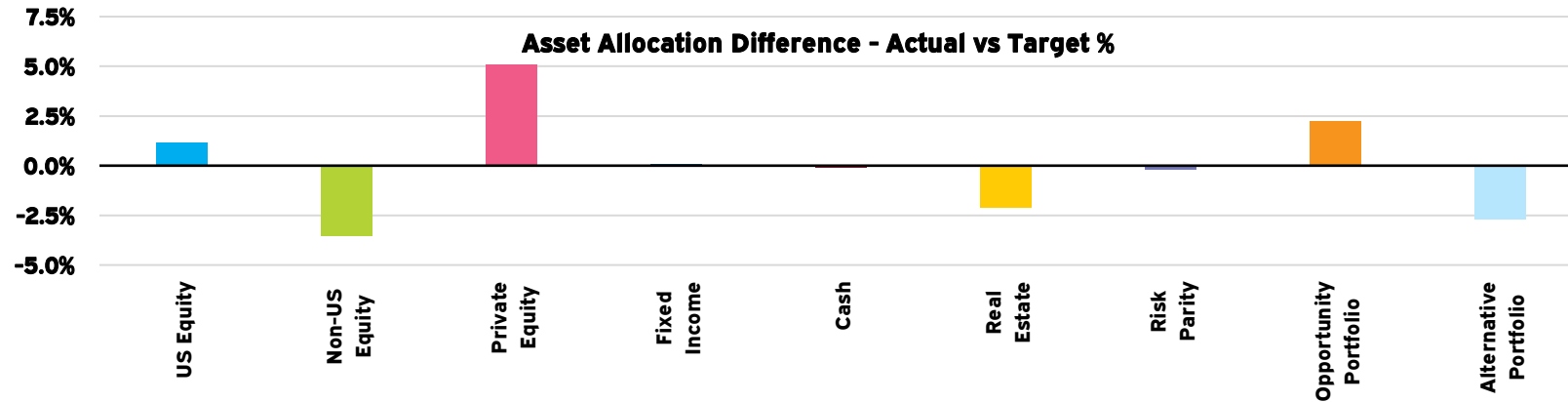
OPERF Performance Summary – Commentary (continued)

- Diversifying Strategies performed relatively well for the latest quarter. The segment outperformed the CPI +4%¹ benchmark by 2.9%. Longer period returns remain challenged on an absolute and relative basis; Meketa believes some of the underperformance can be attributable to implementation.

¹ Meketa will work with Staff to identify a benchmark for the Diversifying Strategies sub-asset class. Currently, it is being benchmarked by the CPI +4% Index, which is the index utilized at the top asset class level (Alternative Portfolio).

OPERF Asset Allocation as of March 31, 2021

Asset Class	Actual (\$ 000)	Actual Weight	Target Weight ¹	Difference (%)	Difference (\$ 000)
Fixed Income	17,178,205	20.08%	20.00%	0.08%	71,563
US Equity	15,309,073	17.90%	16.75%	1.15%	982,261
Non-US Equity	11,328,729	13.24%	16.75%	-3.51%	-2,998,084
Real Estate	8,896,570	10.40%	12.50%	-2.10%	-1,795,082
Risk Parity	1,990,768	2.33%	2.50%	-0.17%	-147,562
Opportunity Portfolio	1,890,591	2.21%	0.00%	2.21%	1,890,591
Alternative Portfolio	8,385,004	9.80%	12.50%	-2.70%	-2,306,647
Private Equity	20,613,752	24.10%	19.00%	5.10%	4,362,442
Cash	-59,482	-0.07%	0.00%	-0.07%	-59,482
Total	85,533,211	100.0%	100.0%		
YTD Net Cash Flow	(786,391)				
Gain/Loss	4,355,584				



- A significant majority of OPERF's assets are allocated to risk-oriented assets in the public and private equity markets.
- Efforts are underway/ liquidity programs in place to reduce the overweight to Private Equity. It is important to note that reducing exposure to PE is challenging given the nature of the asset class, and a work in progress.

¹ Reflects interim policy target adopted July 1, 2020. Strategic policy target not shown.

OPERF Q1 2021 Performance Attribution¹

	QTD	1 Yr	3 Yr	5 Yr	10 Yr	Target	Overweight / Underweight	Contributors / Detractors to excess return
Total OPERF	5.36	22.28	8.75	9.62	8.48			
Total OPERF ex Overlay	5.41	22.66	8.83	9.68	8.46			
OPERF Benchmark	4.49	25.36	10.21	10.76	9.30			
excess	0.87	-3.08	-1.46	-1.14	-0.82			
IM All DB > \$5B Net Median	3.19	28.86	9.37	9.92	8.30			
Peer Quartile Rank	2	90	68	66	43			
Fixed Income	-2.87	3.40	4.80	3.72	3.95			
Custom Benchmark	-2.87	2.00	4.54	3.31	3.49			
excess	0.00	1.40	0.26	0.41	0.59			
US Equity	10.44	66.14	14.66	15.34	12.66			
Russell 3000	6.35	62.54	17.12	16.64	13.79			
excess	4.09	3.60	-2.46	-1.30	-1.13			
Non-US Equity	5.40	58.38	7.63	11.29	6.69			
MSCI ACWI x US IMI	3.77	51.94	6.51	9.84	5.11			
excess	1.63	6.44	1.12	1.45	1.58			
Real Estate	1.46	1.82	5.80	6.58	9.29			
NCREIF ODCE (Qtr Lag)	1.08	0.32	3.98	5.27	8.67			
excess	0.38	1.50	1.82	1.31	0.62			
Risk Parity	-0.53							
S&P Risk Parity - 12% Vol	1.41							
excess	-1.94							
Opportunity Portfolio	7.17	17.36	9.78	9.50	8.26			
CPI +5%	2.93	7.73	7.09	7.28	6.81			
excess	4.24	9.63	2.69	2.22	1.45			
Alternative Portfolio	5.51	1.69	-2.24	2.19	--			
CPI +4%	2.68	6.71	6.07	6.23	5.78			
excess	2.83							
Private Equity	10.81	20.66	16.49	15.24	13.44			
Russell 3000 + 3% (Qtr Lag)	15.50	24.49	17.89	18.86	17.17			
excess	-4.69	-3.83	-1.40	-3.62	-3.73			
CASH in OSTF	0.04	1.87	2.22	1.81	1.26			
91 Day Treasury Bill	0.03	0.12	1.49	1.19	0.63			
excess	0.01	1.75	0.73	0.62	0.63			
Policy							As of 3/31/021	QTD
20.00%							+0.08%	neutral
16.75%							+1.15%	contributor
16.75%							-3.51%	contributor
12.50%							-2.10%	contributor
2.50%							-0.17%	neutral
0.00%							+2.21%	contributor
12.50%							-2.70%	contributor
19.00%							+5.10%	detractor
0.00%							-0.07%	neutral

¹ Performance figures may differ versus State Street reporting due to calculation methodology differences.

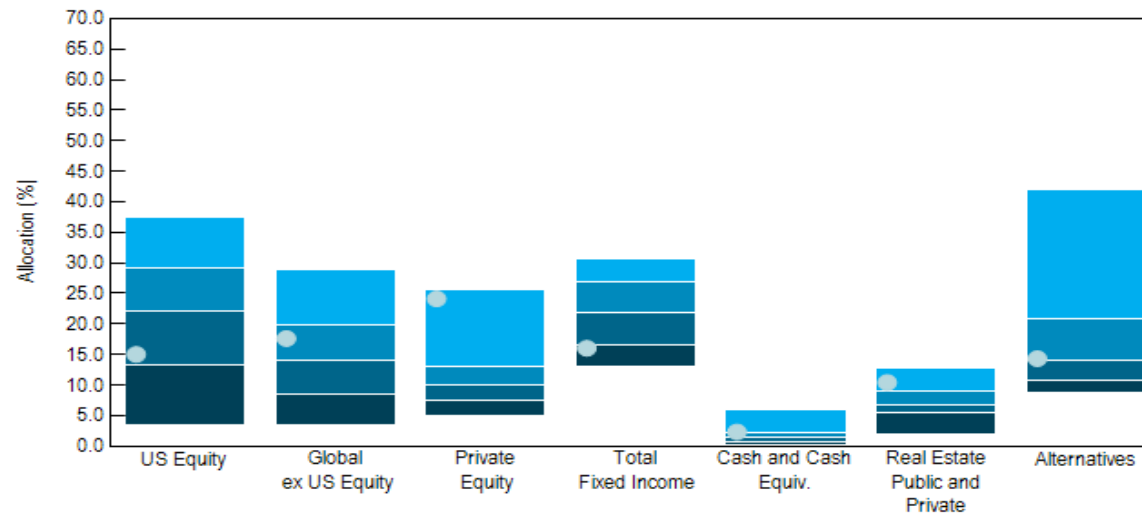
Action Items / General Updates

- The OPERF portfolio had a strong first quarter in terms of absolute and relative returns, and outperformed the Policy Index.
 - Public Equity's relative outperformance contributed to positive returns as value and core managers exhibited strong performance in the wake of a growth reversion
- The Asset Allocation conversation today will highlight Staff and Consultant expectations for various asset classes and portfolios going forward, leading into the more in depth asset liability study in 2022.

Appendix

OPERF – Asset Allocation Peer Comparison¹

Total Plan Allocation vs. InvMetrics All DB > \$5B Net
As of March 31, 2021



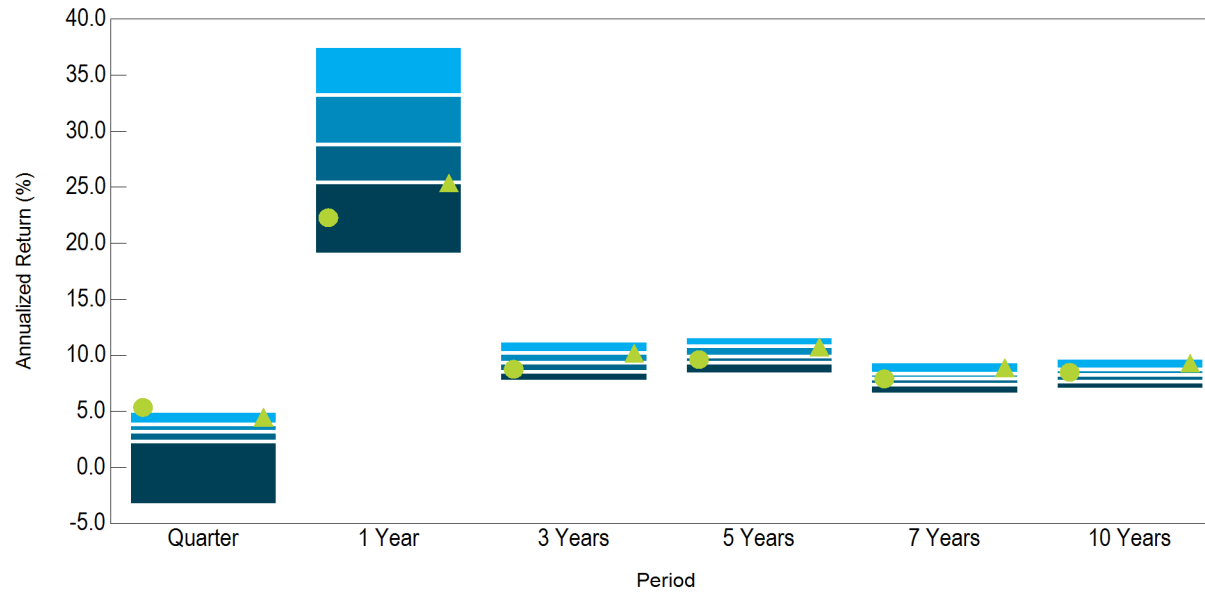
	Allocation (Rank)													
	US Equity		Global ex US Equity		Private Equity		Total Fixed Income		Cash and Cash Equiv.		Real Estate Public and Private		Alternatives	
5th Percentile	37.4	28.9	25.6	30.6	6.1	12.7	42.0							
25th Percentile	29.1	19.8	12.9	27.0	2.2	9.1	20.9							
Median	22.1	14.0	9.9	21.7	1.4	6.7	14.1							
75th Percentile	13.2	8.4	7.4	16.5	0.7	5.5	10.8							
95th Percentile	3.4	3.4	4.8	12.9	0.1	1.9	8.8							
# of Portfolios	28		32		29		32		32		31		30	
OIC	15.0	(70)	17.6	(38)	24.1	(7)	16.0	(79)	2.3	(25)	10.4	(12)	14.3	(48)

- Relative to peers, OPERF has significantly more private equity and real estate exposure than the peer median, while traditional US Equity and fixed income exposure is somewhat lower than peer averages.

¹ Alternatives asset class as shown in the chart above reflects the sum of Risk Parity, Opportunity Portfolio, and Alternative Portfolio for OPERF.

OPERF – Universe Performance Comparison

InvMetrics All DB > \$5B Net Return Comparison
Ending March 31, 2021



	Return (Rank)					
	Quarter	1 Year	3 Years	5 Years	7 Years	10 Years
5th Percentile	5.0	37.6	11.3	11.6	9.4	9.7
25th Percentile	3.9	33.3	10.3	10.8	8.4	8.8
Median	3.2	28.9	9.4	9.9	7.9	8.3
75th Percentile	2.4	25.4	8.6	9.4	7.4	7.7
95th Percentile	-3.3	19.0	7.7	8.3	6.6	7.0
# of Portfolios	47	46	45	45	43	38
● Total Fund	5.4 (2)	22.3 (90)	8.8 (68)	9.6 (66)	7.9 (53)	8.5 (43)
▲ OPERF Policy Benchmark	4.5 (13)	25.4 (76)	10.2 (26)	10.8 (30)	8.9 (11)	9.3 (12)

WE HAVE PREPARED THIS REPORT (THIS "REPORT") FOR THE SOLE BENEFIT OF THE INTENDED RECIPIENT (THE "RECIPIENT").

SIGNIFICANT EVENTS MAY OCCUR (OR HAVE OCCURRED) AFTER THE DATE OF THIS REPORT AND THAT IT IS NOT OUR FUNCTION OR RESPONSIBILITY TO UPDATE THIS REPORT. ANY OPINIONS OR RECOMMENDATIONS PRESENTED HEREIN REPRESENT OUR GOOD FAITH VIEWS AS OF THE DATE OF THIS REPORT AND ARE SUBJECT TO CHANGE AT ANY TIME. ALL INVESTMENTS INVOLVE RISK. THERE CAN BE NO GUARANTEE THAT THE STRATEGIES, TACTICS, AND METHODS DISCUSSED HERE WILL BE SUCCESSFUL.

INFORMATION USED TO PREPARE THIS REPORT WAS OBTAINED FROM INVESTMENT MANAGERS, CUSTODIANS, AND OTHER EXTERNAL SOURCES. WHILE WE HAVE EXERCISED REASONABLE CARE IN PREPARING THIS REPORT, WE CANNOT GUARANTEE THE ACCURACY OF ALL SOURCE INFORMATION CONTAINED HEREIN.

CERTAIN INFORMATION CONTAINED IN THIS REPORT MAY CONSTITUTE "FORWARD - LOOKING STATEMENTS," WHICH CAN BE IDENTIFIED BY THE USE OF TERMINOLOGY SUCH AS "MAY," "WILL," "SHOULD," "EXPECT," "AIM", "ANTICIPATE," "TARGET," "PROJECT," "ESTIMATE," "INTEND," "CONTINUE" OR "BELIEVE," OR THE NEGATIVES THEREOF OR OTHER VARIATIONS THEREON OR COMPARABLE TERMINOLOGY. ANY FORWARD-LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION ARE BASED UPON CURRENT ASSUMPTIONS. CHANGES TO ANY ASSUMPTIONS MAY HAVE A MATERIAL IMPACT ON FORWARD - LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS. ACTUAL RESULTS MAY THEREFORE BE MATERIALLY DIFFERENT FROM ANY FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION.

PERFORMANCE DATA CONTAINED HEREIN REPRESENT PAST PERFORMANCE. PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS.

TAB 4 – OIC, PERS Joint Session



Joint Meeting of OIC and PERS Board

OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM

Presented by:

Matt Larrabee, FSA, EA
Scott Preppernau, FSA, EA

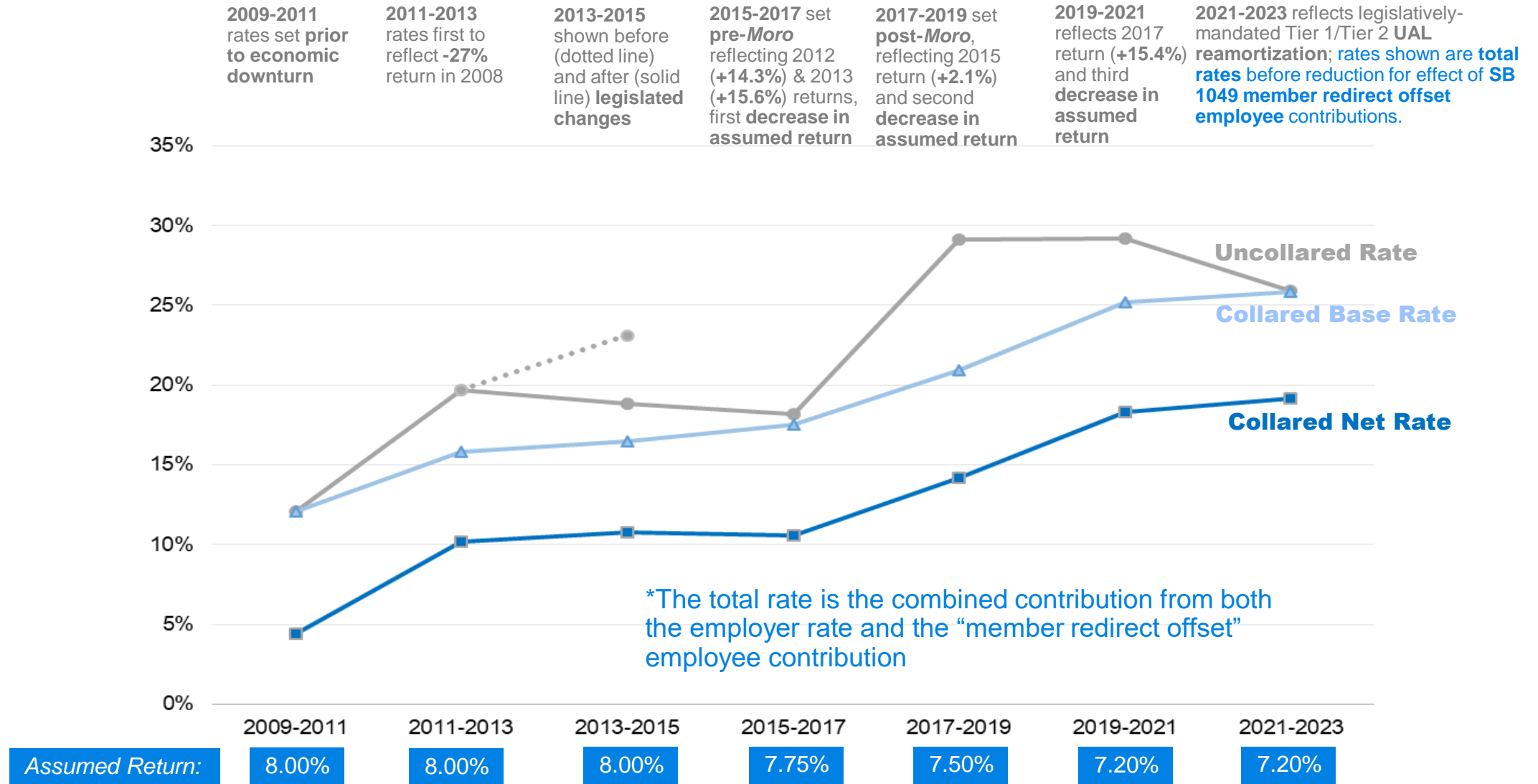
June 2, 2021

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Background Regarding Today's Slides

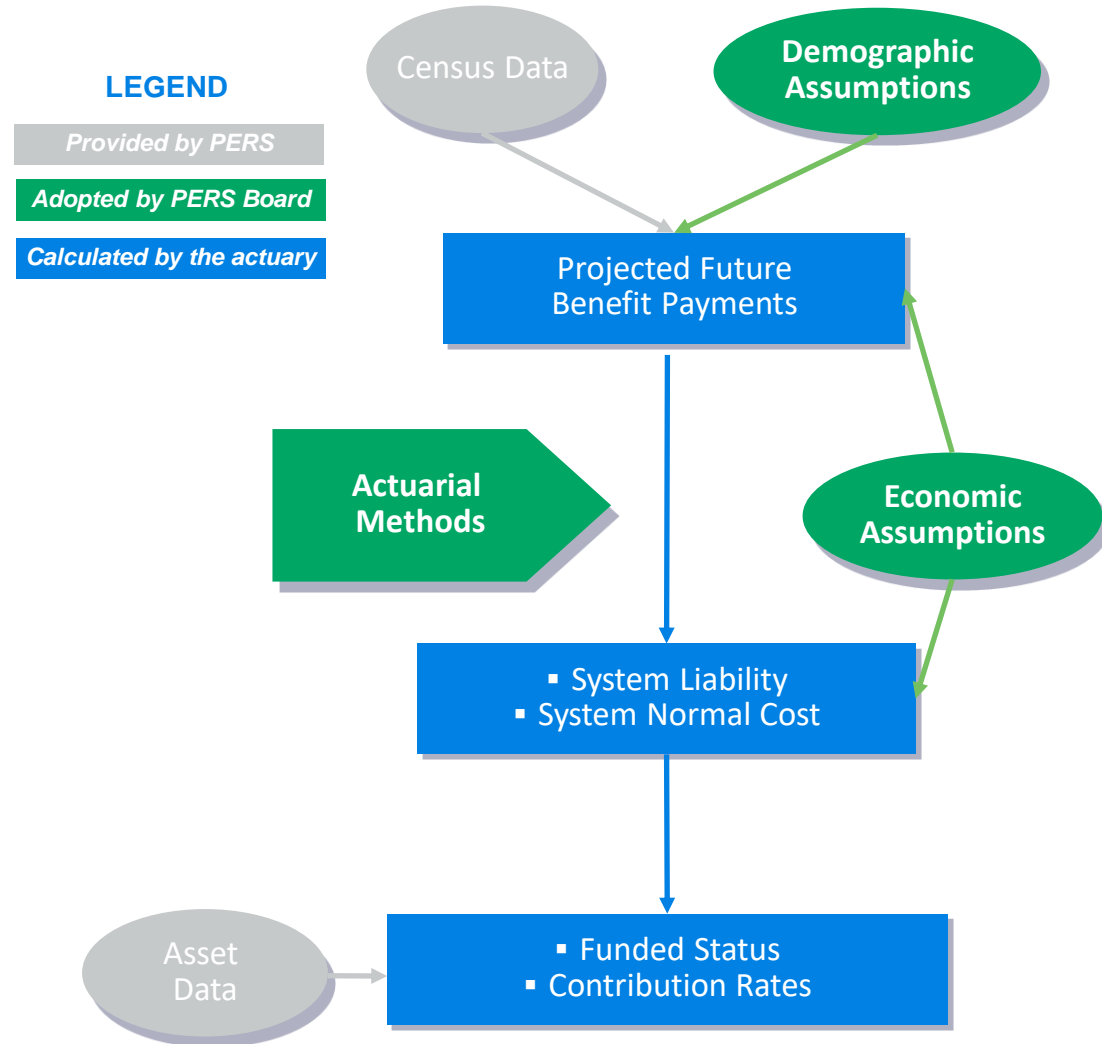
- The following slides have either been presented at prior PERS Board meetings or will be presented at the June 4, 2021 PERS Board meeting
- Information on the data, assumptions, methods, and provisions used in developing the slides from prior presentations, including the limitations of use of the material, is incorporated into this material by reference

System-Average Weighted Total* Pension-Only Rates



Two-Year Rate-Setting Cycle

- **July 2021: Assumptions & methods adopted by Board in consultation with the actuary**
- October 2021: System-wide 12/31/20 actuarial valuation results
- December 2021: Advisory 2023-2025 employer-specific contribution rates
- July 2022: System-wide 12/31/21 actuarial valuation results
- September 2022: Disclosure & adoption of employer-specific **2023-2025 contribution rates**



Valuation Process and Timeline

- Actuarial valuations are conducted annually
 - Alternate between “rate-setting” and “advisory” valuations
 - This valuation as of 12/31/2020 is advisory
- Board adopts contribution rates developed in rate-setting valuations, and those rates go into effect 18 months after the valuation date

Valuation Date	Employer Contribution Rates
12/31/2017	July 2019 – June 2021
12/31/2019	July 2021 – June 2023
12/31/2021	July 2023 – June 2025

Board Objectives - Methods & Assumptions

- Transparent
- Predictable and stable rates
- Protect funded status
- Equitable across generations
- Actuarially sound
- GASB compliant

Some of the objectives can conflict, particularly in periods with significant volatility in investment return or projected benefit levels. Overall system funding policies should seek an appropriate balance between conflicting objectives.

The Fundamental Cost Equation

- Long-term program costs are the contributions, which are governed by the “fundamental cost equation”:

$$\mathbf{BENEFITS = CONTRIBUTIONS + EARNINGS}$$

Governance Structure

- Benefits:
 - Plan design set by Oregon Legislature
 - Subject to judicial review
- Earnings:
 - Asset allocation set by OIC
 - Actual returns determined by market
- Contributions:
 - Funding, including methods & assumptions, set by PERS Board
 - Since contributions are the balancing item in the fundamental cost equation, PERS Board policies primarily affect the **timing** of contributions
 - Different actuarial methods and assumptions produce different projected future contribution patterns



Assumptions To Be Reviewed

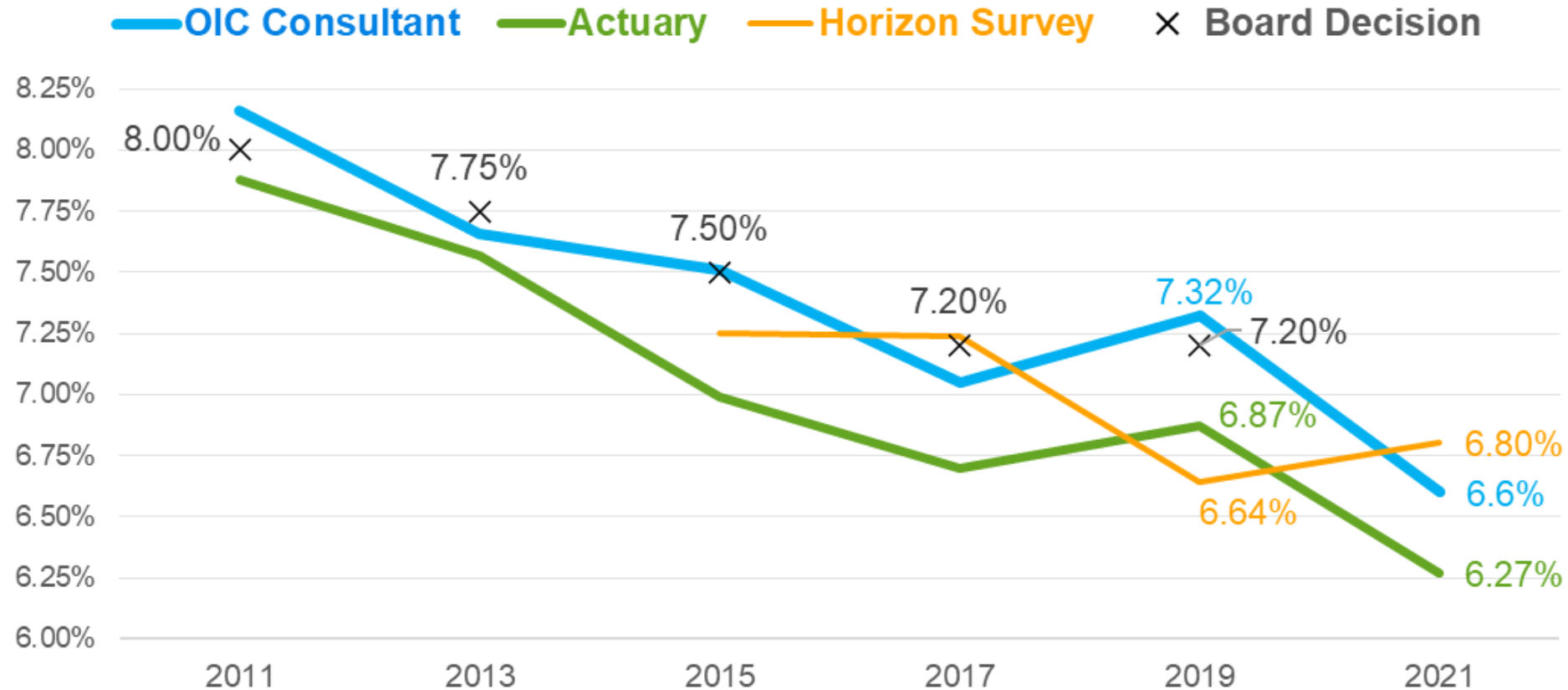
	12/31/2019 Valuation Assumptions	12/31/2020 Valuation Proposed* Assumptions
Inflation	2.5%	2.4% or lower
Real Wage Growth	<u>1.0%</u>	<u>1.0%</u>
System Payroll Growth	3.5%	3.4% or lower

No explicit assumption is made for investment-related expenses, which are accounted for implicitly in the analysis of the long-term investment return assumption.

*All assumptions and methods to be adopted at the July 2021 Board meeting

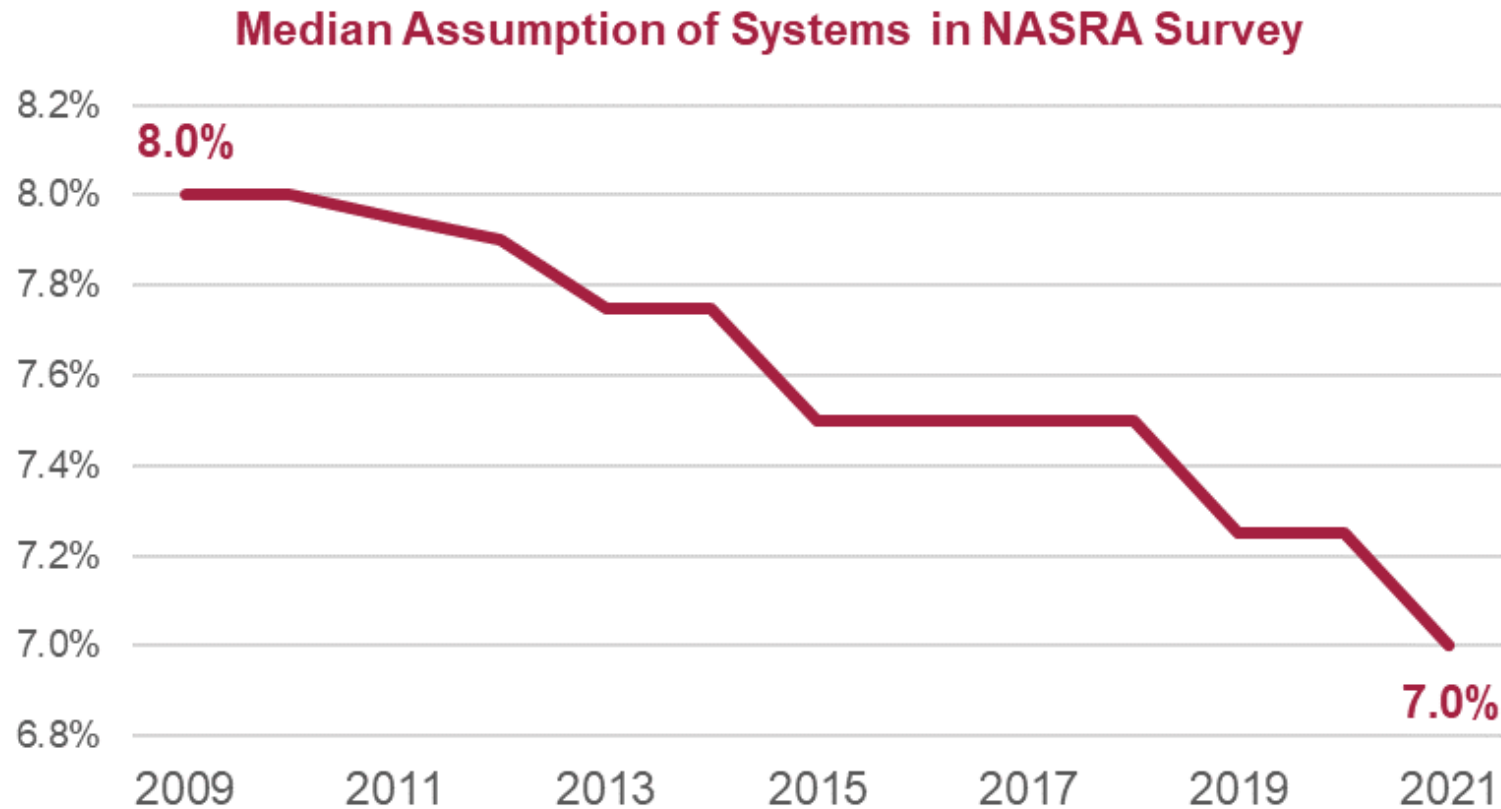
Investment Return 50th Percentile Outlooks

Geometric Returns from Outlook Models in Current and Prior Five Reviews



Comparison to Peer Systems

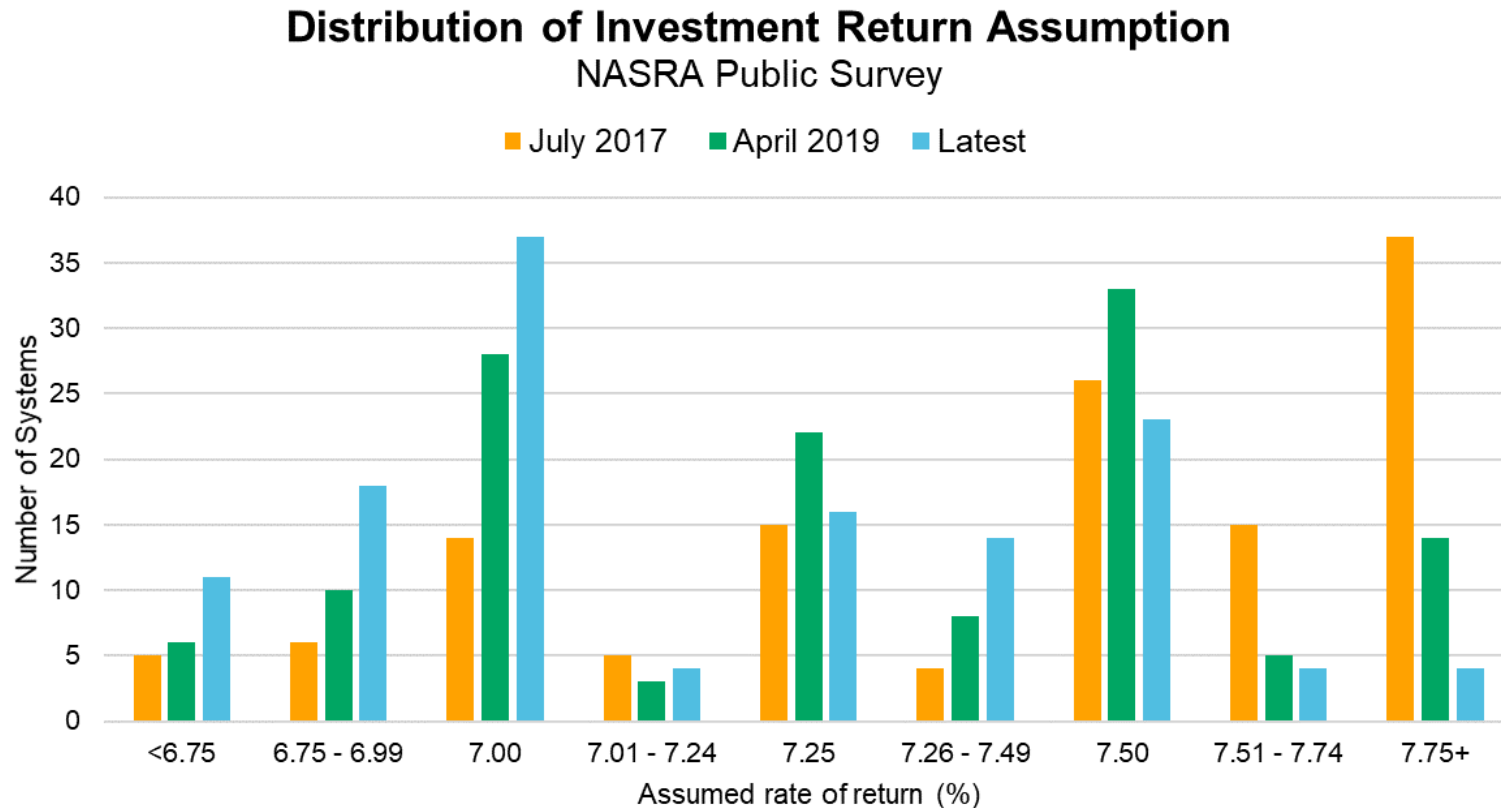
- There is a downward trend in public plan return assumptions, with a current median assumption for large public systems of 7.0%



Source: NASRA (May 2021)

Comparison to Peer Systems

- The distribution of about 130 systems tracked by the NASRA Public Fund Survey is shown below
- Two years ago, the most common assumption was 7.50%; now the most common assumption is 7.00% and over half of all plans have an assumption of 7.00% or lower

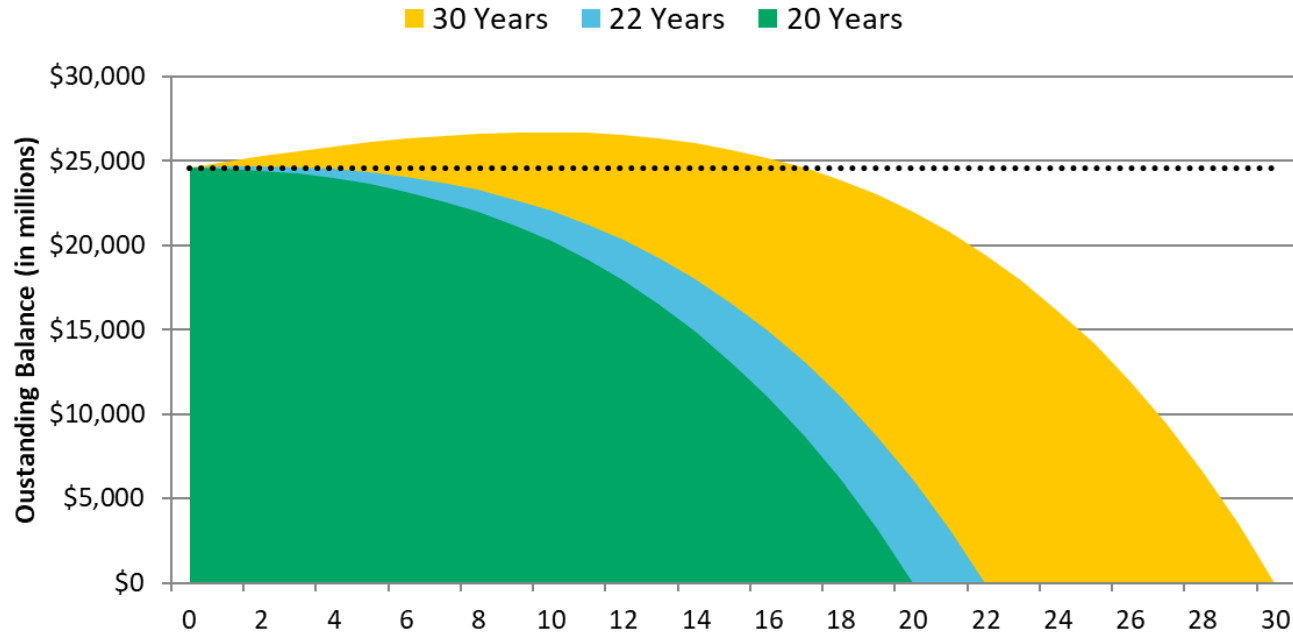


Source: NASRA (May 2021)

Remaining Balances for 20-, 22-, & 30-Year Amortizations

UAL Balance Over Time by Selected Amortization Period

Level % of pay amortization, 7.20% interest, 3.40% payroll growth



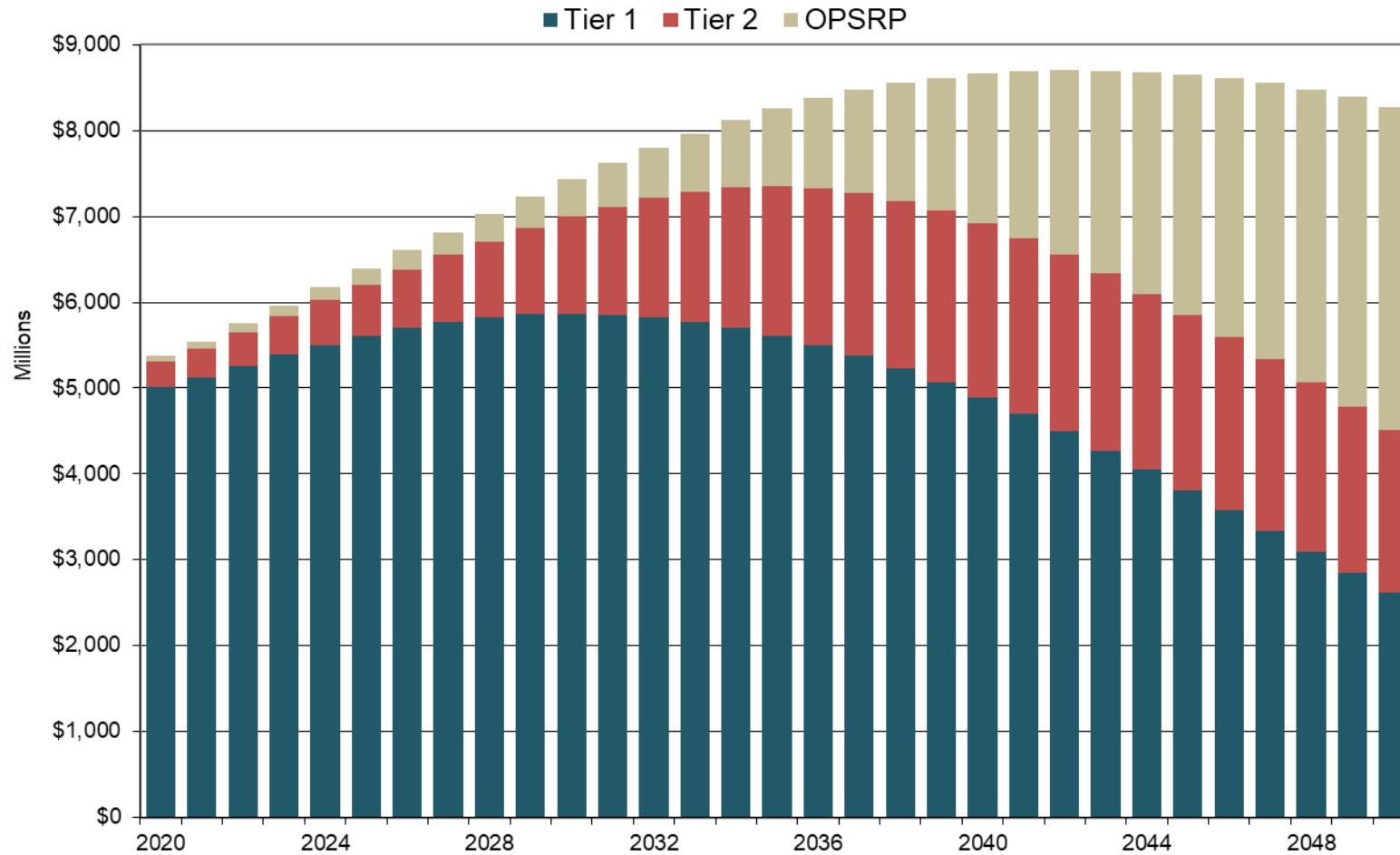
Current ongoing policy

- Tier 1 / Tier 2: **20 years**
- OPSRP: **16 years**

- **Why 20 years or less?** If actual experience matches the assumption...
 - with 22 years zero progress is made in decreasing the initial UAL until year 4
 - with 30 years the UAL has increased by about 9% after the first decade, and zero progress is made in decreasing the initial UAL until year 17

Projected Benefit Payments by Tier

Tier 1/Tier 2 & OPSRP Expected Benefit Payments
by Tier as of 12/31/2019

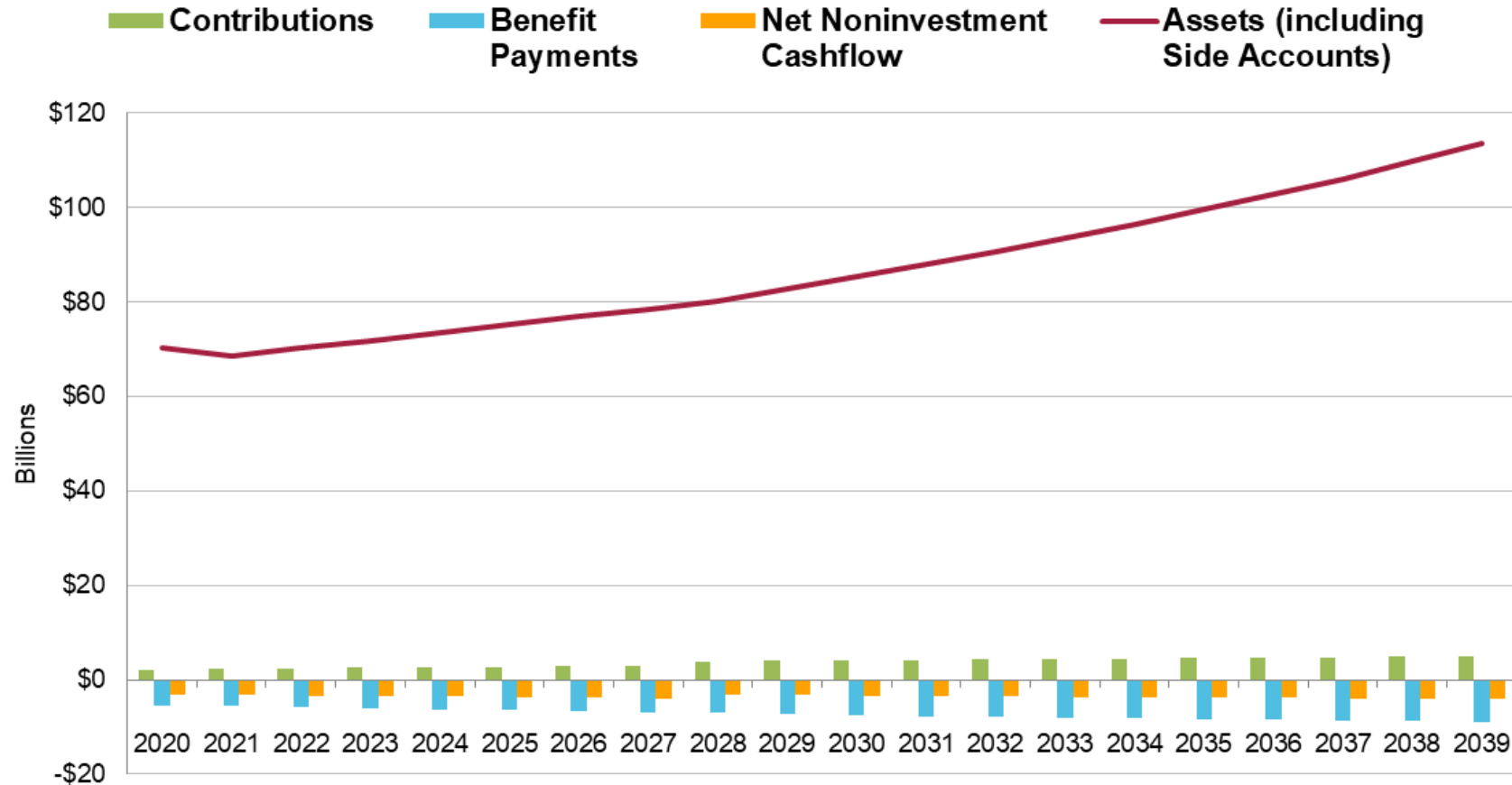


Reflects system membership at 12/31/2019 actuarial valuation date. Estimated benefit payments for future hires are not shown.

Amounts shown are in non-inflation-adjusted dollars

Cash Flow and Asset Balance at +7.20% Actual Future Return

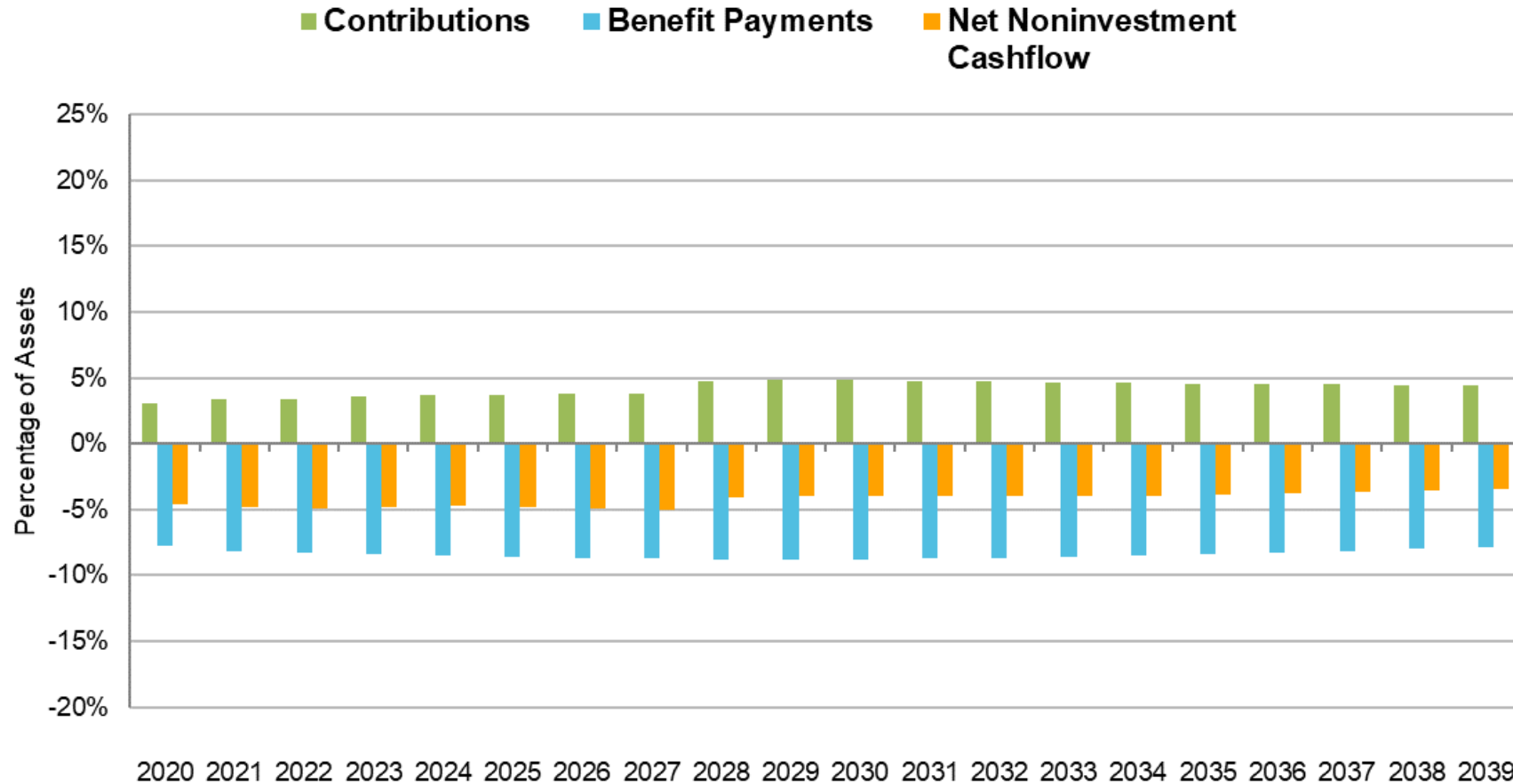
Current Rate Setting Structure and Assumptions



$$\text{Net Noninvestment Cashflow} = \text{Contributions} - \text{Benefit Payments}$$

Cash Flows as % of Assets at +7.20% Actual Future Return

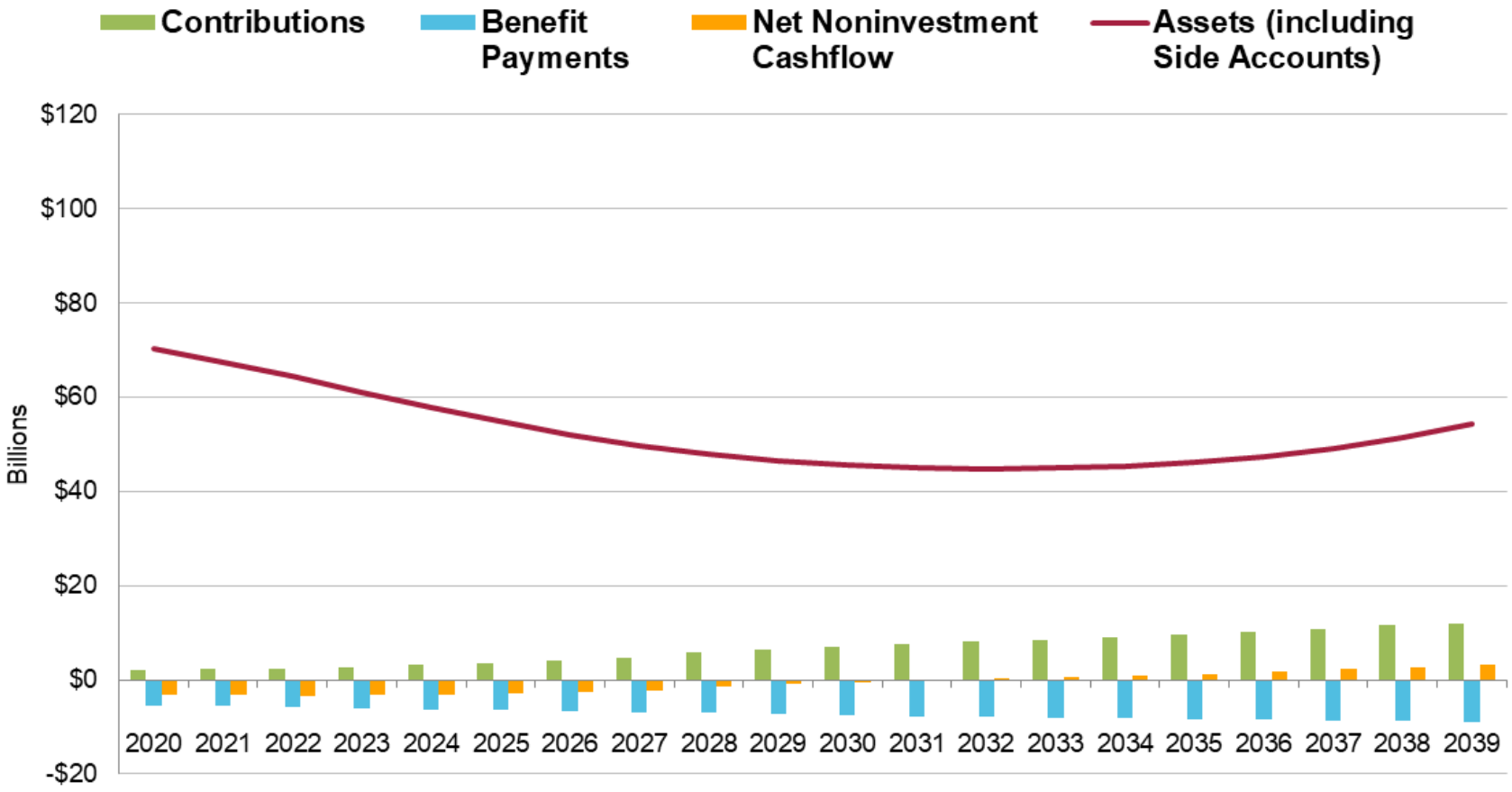
Current Rate Setting Structure and Assumptions



$$\text{Net Noninvestment Cashflow} = \text{Contributions} - \text{Benefit Payments}$$

Cash Flow and Asset Balance at +0.00% Actual Future Return

Current Rate Setting Structure and Assumptions



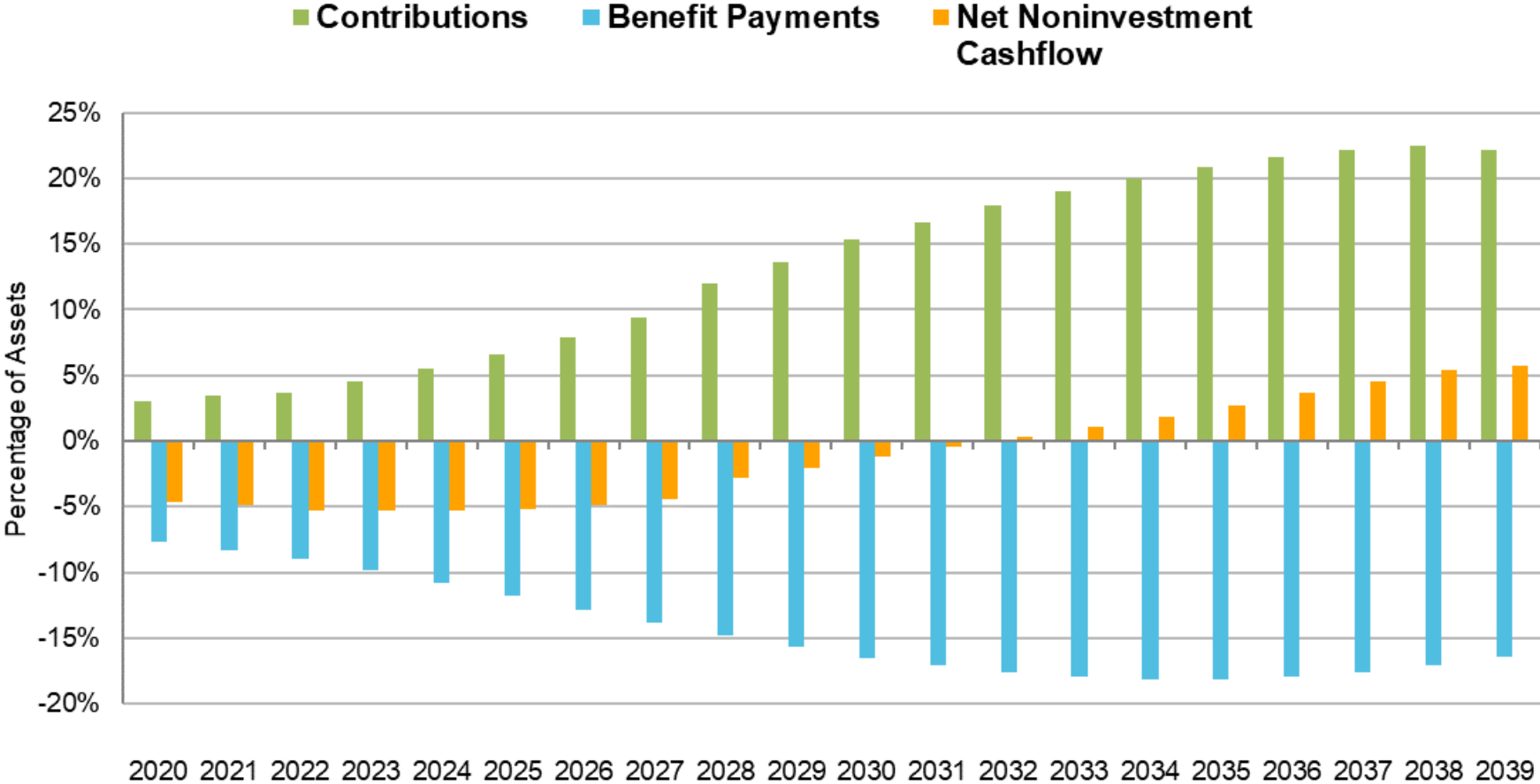
Net Noninvestment Cashflow = Contributions – Benefit Payments



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Cash Flows as % of Assets at +0.00% Actual Future Return

Current Rate Setting Structure and Assumptions



$$\text{Net Noninvestment Cashflow} = \text{Contributions} - \text{Benefit Payments}$$



Appendix

Certification

This presentation discusses actuarial methods and assumptions for use in the valuation of the Oregon Public Employees Retirement System (“PERS” or “the System”). For the most recent complete actuarial valuation results, including cautions regarding the limitations of use of valuation calculations, please refer to our formal Actuarial Valuation Report as of December 31, 2019 (“the Valuation Report”) published on September 17, 2020. The Valuation Report, including all supporting information regarding data, assumptions, methods, and provisions, is incorporated by reference into this presentation. The statements of reliance and limitations on the use of this material is reflected in the actuarial report and still apply to this presentation. The Valuation Report, along with prior presentations to the PERS Board, including the December 2020, February 2021, and March 2021 presentations to the PERS Board should be referenced for additional detail on the assumptions, methods, and plan provisions underlying this presentation.

In preparing this presentation, we relied, without audit, on information (some oral and some in writing) supplied by the System’s staff as well as OIC capital market expectations as provided to us by Meketa, capital market outlook information published in 2020 by Horizon Actuarial Services, and information presented to the Oregon Investment Council. This information includes, but is not limited to, statutory provisions, employee data, and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The results depend on the integrity of this information. If any of this information is inaccurate or incomplete our results may be different and our calculations may need to be revised.

In assessing the Milliman capital market expectations presented in this report, per Actuarial Standards of Practice we disclose reliance upon a model developed by Milliman colleagues who are credentialed investment professionals with expertise in capital outlook modeling.

All costs, liabilities, rates of interest, and other factors for the System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer a reasonable estimate of anticipated experience affecting the System. The valuation results were developed using models intended for valuations that use standard actuarial techniques.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. Our annual financial modeling presentation to the PERS Board should be referenced for additional analysis of the potential variation in future measurements. The PERS Board has the final decision regarding the appropriateness of the assumptions.

Certification

The calculations in this report have been made on a basis consistent with our understanding of the plan provisions described in the appendix of the Valuation Report. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

Milliman's work is prepared solely for the internal business use of the Oregon Public Employees Retirement System. Milliman does not intend to benefit or create a legal duty to any third-party recipient of its work product.

No third-party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

The consultants who worked on this assignment are retirement actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

The signing actuaries are independent of the System. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board and the *Code of Professional Conduct and Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States* published by the American Academy of Actuaries. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

Appendix

Actuarial Basis

Capital Market Assumptions – Milliman

For assessing the expected portfolio return under Milliman’s capital market assumptions (adjusted for inflation assumption shown below), we considered the Oregon PERS Fund to be allocated among the model’s asset classes as shown below. This allocation is based on input provided by Meketa and reflects proposed changes to the Oregon Investment Council’s target allocation for the Oregon PERS Fund that are expected to be adopted in June 2021.

	Annual Arithmetic Mean	20-Year Annualized Geometric Mean	Annual Standard Deviation	Policy Allocation
Global Equity	7.11%	5.85%	17.05%	30.62%
Private Equity	11.35%	7.71%	30.00%	25.50%
US Core Fixed Income	2.80%	2.73%	3.85%	23.75%
Real Estate	6.29%	5.66%	12.00%	12.25%
Master Limited Partnerships	7.65%	5.71%	21.30%	0.75%
Infrastructure	7.24%	6.26%	15.00%	1.50%
Commodities	4.68%	3.10%	18.85%	0.63%
Hedge Fund of Funds – MultiStrategy	5.42%	5.11%	8.45%	1.25%
Hedge Fund Equity-Hedge	5.85%	5.31%	11.05%	0.63%
Hedge Fund – Macro	5.33%	5.06%	7.90%	5.62%
US Cash	1.77%	1.76%	1.20%	(2.50%)
US Inflation (CPI-U)		2.40%	1.65%	N/A
Fund Total (reflecting asset class correlations)	7.06%	6.31%*	13.08%	100.00%

* Reflects 0.09% average reduction to model passive investment expenses. The model does not try to assess the actual investment expenses for active management. The model’s **20-year annualized geometric median** is **6.27%**.

Appendix

Actuarial Basis

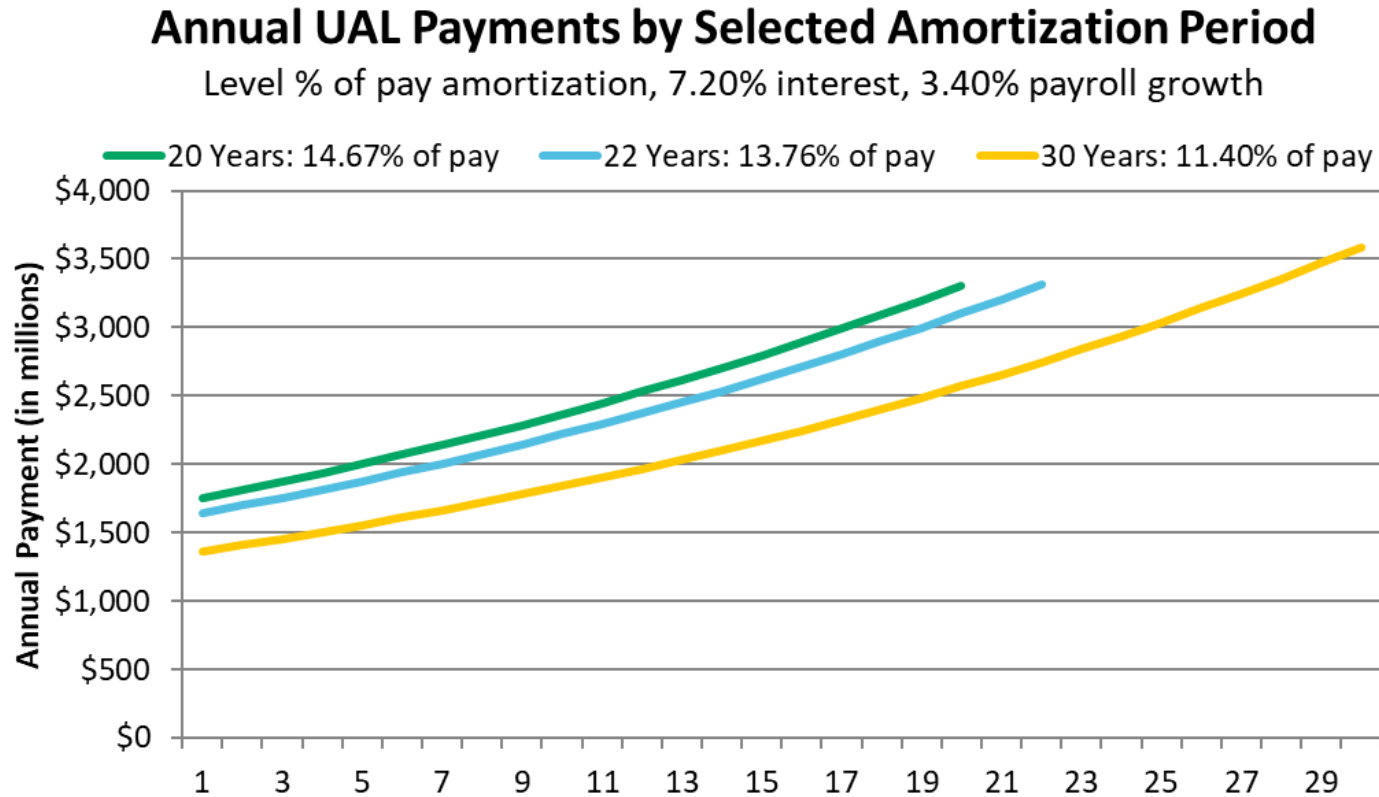
Capital Market Assumptions – Horizon Survey

For assessing the expected portfolio return under an additional set of capital market assumptions, we applied the assumptions from the 2020 Survey of Capital Market Assumptions published by Horizon Actuarial Services, LLC. According to the survey report, the 10-year return assumptions shown below represent an average of the expectations for 39 investment advisors responding to the survey.

	10-Year Annualized Geometric Mean	Annual Standard Deviation	Policy Allocation
US Equity – Large Cap	6.16%	16.22%	13.78%
Non-US Equity – Developed	6.80%	18.05%	13.78%
Non-US Equity – Emerging	7.85%	24.23%	3.06%
US Corporate Bonds – Core	2.60%	5.47%	23.75%
US Treasuries (Cash Equivalents)	1.56%	1.78%	(2.50%)
Real Estate	5.75%	16.84%	12.25%
Hedge Funds	4.74%	8.00%	7.50%
Commodities	3.19%	17.60%	0.63%
Infrastructure	6.94%	14.58%	2.25%
Private Equity	9.08%	21.99%	25.50%
Inflation	1.98%		N/A
Fund Total (reflecting asset class correlations)	6.87%*		100.00%

* 10-year annualized geometric median is **6.80%**.

Illustration of UAL Amortization Periods



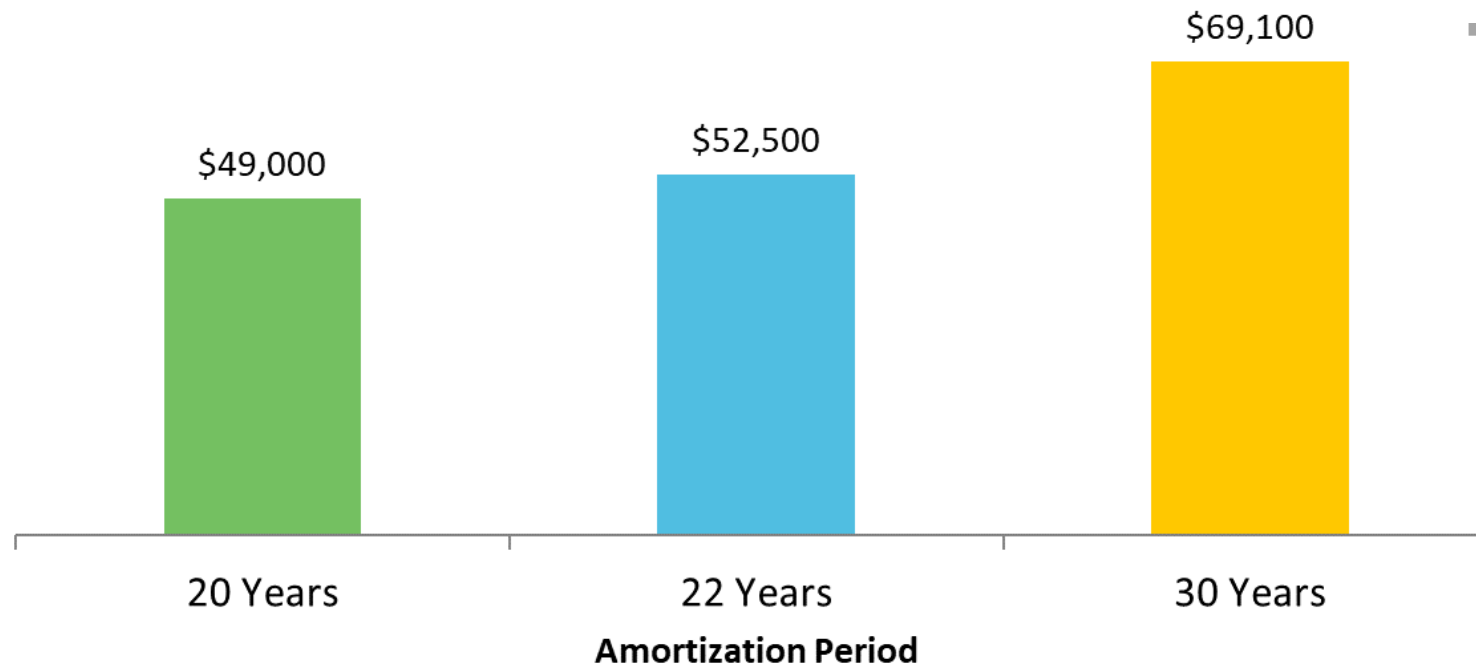
Current policy

- Tier 1 / Tier 2:
20 years
- OPSRP:
16 years

Illustration of UAL Amortization Periods

Total Repayment (\$M) by Selected Amortization Period

Level % of pay amortization, 7.20% assumed return, 3.40% payroll growth



Current policy

- Tier 1 / Tier 2:
20 years
- OPSRP:
16 years

TAB 5 – OPERF Asset Allocation

OPERF Asset Allocation Update

Purpose

Staff recommends two changes to OPERF's strategic asset allocation and associated policy revisions: a) bifurcation of the Alternatives Portfolio into the Real Assets and Diversifying Strategies Portfolios; and b) minor adjustments to OPERF's target asset allocation, including an increase to Private Equity's allocation by 2.5% and a decrease to Public Equity's allocation by 2.5%.

Background

OPERF is invested to meet long horizon obligations, mainly retirement benefit payments for eligible beneficiaries. To manage the Fund, the OIC periodically sets strategic asset allocation (SAA) targets for the asset class portfolios, sub-divisions of the investment universe organized by security types, underlying assets, implementation approaches, or combinations thereof. The Council considers expected returns & volatilities of the asset class portfolios and reviews proposed SAA targets. The target allocations approved by the OIC are then codified into policy under *INV 1203: Statement of Investment Objectives and Policy Framework for OPERF*.

Setting OPERF's asset allocation is one of the Council's most important investment decisions since the target weights to the broad asset classes will largely determine OPERF's performance. The asset allocation process attempts both to balance risk & return as well as maximize return per unit of risk, subject to implementation constraints such as the Fund's liquidity needs and available staff resources & investment opportunities.

The Council last revised OPERF's SAA targets at the April 2019 meeting when it approved:

- increased target allocation from 5.0% to 7.5% for Diversifying Strategies, a sleeve within the Alternatives Portfolio;
- initiated allocation for the newly-created Risk Parity Portfolio at 2.5%; and
- decreased target allocation for the Public Equity Portfolio from 37.5% to 32.5%.

Bifurcation of the Alternatives Portfolio

The OIC approved the creation of the Alternatives Portfolio with a target allocation of 5.0% at the January 2011 meeting. Since inception, the objective of the Alternatives Portfolio has been to deliver investment returns that diversifies OPERF's performance, specifically returns that have low to no correlation to equity or "economic growth" exposure that dominates the Fund's risk. In implementation for the Alternatives Portfolio, staff allocates into two sleeves:

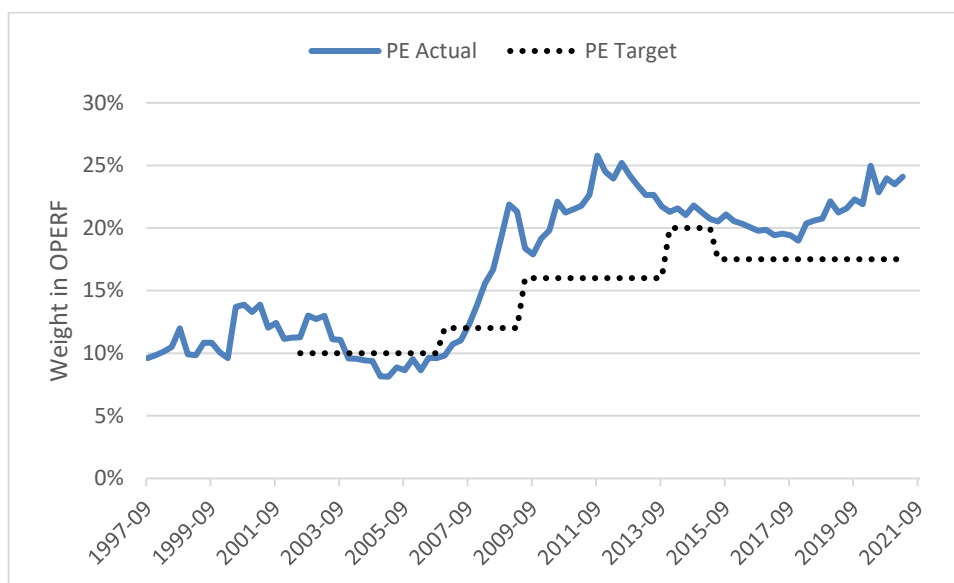
- infrastructure & natural resources assets ("Real Assets"), mainly private market investment vehicles; and
- liquid funds with low equity market correlations ("Diversifying Strategies"), mainly long-short, levered strategies trading public market securities.

Since initiating the Alternatives Portfolio, the Council approved multiple increases to the target allocation, most recently a target of 15.0%, with 7.5% in Real Assets and 7.5% in Diversifying Strategies. While the objective for the Alternatives Portfolio remains the same: 1) the implementations of the sleeves are approaching maturity and scale; and 2) although the investments are internally coherent within the sleeves, the sleeves themselves are dissimilar to each other.

In order to improve administrative oversight and recognize the distinction between the two types of assets, staff recommends bifurcating the Alternatives Portfolio into the Real Assets and the Diversifying Strategies Portfolios.

Changes to OPERF's SAA

The Council last changed the target allocation to the Private Equity Portfolio at the June 2015 meeting when it lowered the target from 20% to 17.5%. However, the Private Equity Portfolio's actual weight in OPERF have generally been above 20% for the past 11 years.



Besides the expected effort of managing illiquid assets and its associated cash flows, there were two OPERF-specific issues that contributed to the sustain overweight to the Private Equity Portfolio:

- The considerable commitments to the “legacy” 2005-2008 vintage years and the tempo of their distributions. Staff discussed this at the recent Private Equity Annual Review and have implemented a plan to manage these assets; and
- The favorable appraisal values of OPERF's private equity investments have sustained through both the market drawdown and drawup of 2020. That is partly represented by a 10-year annualized return of +13.4% compared to that of the MSCI All-Country World Index IMI (public equity benchmark) of +9.2%.

Therefore, staff recommends:

1. Increase the Private Equity Portfolio's target allocation by 2.5% and decrease the Public Equity Portfolio's target allocation by 2.5%. That would keep constant OPERF's exposure to equity or “economic growth”; and
2. Expand the rebalancing range around the target allocations for illiquid private market asset classes, i.e., Private Equity, Real Estate, and Real Assets. Per *INV 1203: Statement of Investment Objectives and Policy Framework for OPERF*, the upper end of range for Private Equity is 21%. The Private Equity Portfolio has exceeded this value since Q4 2018. The purpose of expanding the range is to recognize the difficulty of rebalancing illiquid assets, particularly through volatile market environments, and reduce the number of “false positive” breaches of range.

The table below captures staff recommendation.

Asset Class	Current Target Allocation (%)	Current Rebalancing Range (%)	Recommended Target Allocation (%)	Recommended Rebalancing Range (%)
Public Equity	32.5	27.5 – 37.5	30.0	25.0 – 35.0
Private Equity	17.5	14.0 – 21.0	20.0	15.0 – 27.5
Fixed Income	20.0	15.0 – 25.0	20.0	15.0 – 25.0
Real Estate	12.5	9.5 – 15.5	12.5	9.0 – 16.5
Real Assets	7.5		7.5	5.0 – 10.0
Diversifying Strategies	7.5		7.5	5.0 – 10.0
Risk Parity	2.5	0.0 – 2.5	2.5	0.0 – 5.0
Total Fund	100.0		100.0	

Staff Recommendation

Approve the bifurcation of the Alternatives Portfolio into the Real Assets and Diversifying Strategies Portfolios and the new asset allocation targets. These recommendations are reflected in the following proposed policies:

- Revision to *INV 1203: Statement of Investment Objectives and Policy Framework for OPERF*;
- New policies *INV 710: Real Assets Portfolio Standards & Procedures* and *INV 711: Diversifying Strategies Portfolio Standards & Procedures*; and
- Retirement of *INV 702: Alternative Investments Portfolio Standards & Procedures*.

MEKETA

INVESTMENT GROUP

Oregon Investment Council

June 2, 2021

Asset Allocation Review



Table of Contents

1. Introduction
2. Portfolio Analysis
3. Appendix

Introduction



Introduction

- Asset Allocation has been a central theme for the OIC in 2021:
 - Long-term Capital Market Assumptions
 - Risk Survey
 - Total Portfolio Liquidity
 - Diversification in a Low Interest Rate Environment
- The goal was for the OIC to review the current OPERF asset allocation under the prevailing market conditions.
- The 2021 Asset Allocation Review represents an abridged exercise for modifying the policy portfolio allocation.
- The 2022 Asset-Liability Study will represent a comprehensive review that incorporates all the system's complex considerations.
 - Modifications to the policy portfolio allocation may be more material during this process.

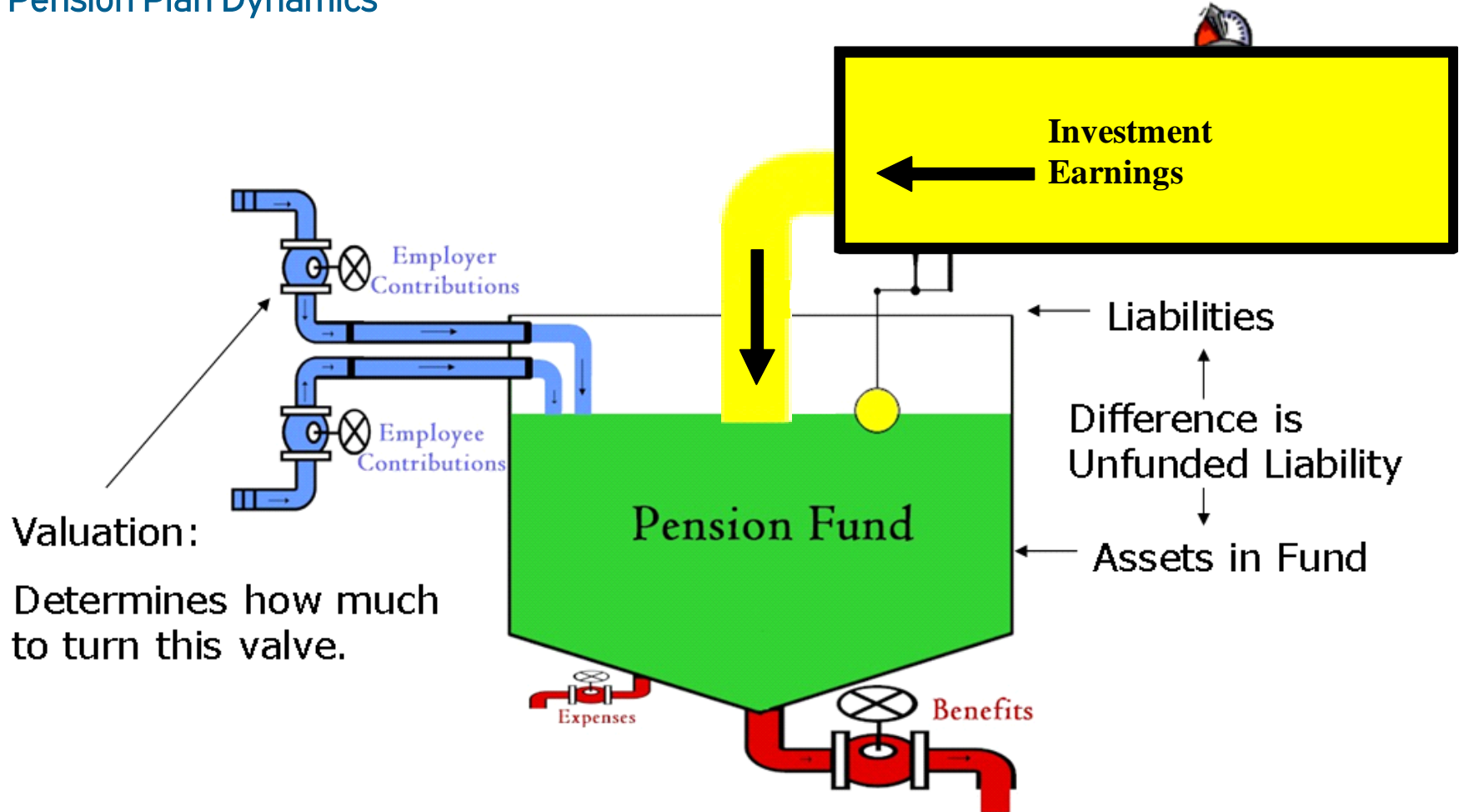
Asset Allocation Overview

Goal:

To review and possibly modify the OPERF Strategic Allocation Policy, reflecting the OIC's unique definition, tolerance for, and beliefs about investment risk.

- At the most basic level, asset allocation seeks to examine the risk/return tradeoff.
- For mature pension systems, the measure of “risk” is multifaceted.
- While all investment portfolios will experience volatility, these are asymmetric events.
- Most of the metrics in this presentation focus on downside risks, and in particular, short-term drawdowns.
 - As a portfolio draws down, the required benefit payments become a larger and larger percent of the asset base, potentially impeding long-term success (i.e., a spiral).
- Key decision = balancing long-term success with short-term drawdown/funding risks.
 - 2022 Asset-Liability Study will examine these tradeoffs over multiple meetings.

Pension Plan Dynamics



Valuation:

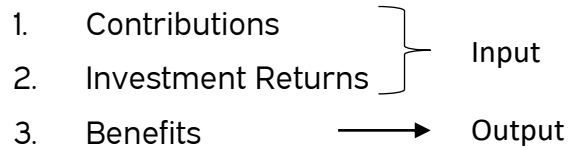
Determines how much to turn this valve.

Source: Cheiron.



Pension Plan Dynamics

- There are three primary levers that determine a pension system's current and future health:



- OIC can only impact #2 (Investment Returns).
 - Due to variability and risks within the capital markets, this impact is imperfect.
- Constructing an investment portfolio that is cognizant of the other levers is best-practices.
- OPERF's liability structure (i.e., contributions and benefits) is highly complex.



Risk Survey

- A key element of selecting an asset allocation is aligning the portfolio with the council members' stated risk preferences.
- Key preferences/viewpoints:
 - Pursue a similar amount of investment risk as the current portfolio.
 - Maintain consistent progress on the funding path.
 - Minimize portfolio drawdowns.
 - Utilize specific “diversifying strategies” in the portfolio.
 - A focus on the cash-flow position of the system.
 - Illiquid strategies are additive to the portfolio.
- Each of these considerations were kept in mind as Staff, Meketa, and Aon reviewed the current portfolio and analyzed potential modifications.



Investment Beliefs

- In addition to the Risk Survey, the *Statement of OIC Investment and Management Beliefs* served as a foundational document for analyzing the current portfolio and any modifications thereof.
- The primary investment beliefs that relate to this asset allocation process are:
 - Investment management is dichotomous – part art and part science.
 - The OIC is vested with the authority to set and monitor portfolio risk. Both short-term and long-term risks are critical.
 - Asset allocation drives risk and return.
 - The equity risk premium will be rewarded.
 - Private market investments can add significant value and represent a core OIC/OST competency.
 - Capital markets have inefficiencies that can be exploited.
- All the portfolios that are detailed in this presentation align with these beliefs.

Primary OPERF Considerations

1. Negative net cash-flow
 - Potential to magnify negative capital market events.
 2. Challenging global capital market environment
 - Significant headwinds to obtaining current actuarial target rate of return.
 3. Complex liability structure
 - Likely necessitates a full asset-liability study in order to materially alter the portfolio.
 4. Significant private markets exposures
 - Presents implications for rebalancing activities and liquidity.
- While #1 and #2 are common amongst peers, #3 and #4 are more OPERF-specific.

Liquidity and Private Markets

- A significant consideration for OPERF is liquidity management.
- With a large private markets allocation and material negative net cash-flow, liquidity must be continually sourced from the liquid markets portfolio.
 - Moreover, sustained drawdowns can severely impact the actual allocations of OPERF (i.e., it can be impossible to rebalance private markets allocations).

Liquidity: Role vs. Attribute

Role:

A class's assignment or purpose within a portfolio.

Attribute:

A description or characteristic that may help or could impede the role of a class.

Example: Liquidity (tradability)

Public Equity happens to be liquid, but such liquidity is not always beneficial (e.g., selling equity during a bear market); *Liquidity is an attribute.*

U.S. Treasuries exhibit significant liquidity during all market environments and are much more consistent than Public Equity; *Liquidity is a role.*

Strategic Allocation: The foundation for long-term portfolio structure

Key aspect:

Define risk & determine Council's tolerance for that risk

Tolerance for risk:

Heavily influences policy selection

Plan Assets

Heavily influence overall plan risk

90%

% of portfolio volatility explained by asset allocation policy

A comprehensive Asset-Liability Study will occur in 2022



Strategic Classes

- In March 2021, Staff, Meketa, and Aon presented long-term capital markets assumptions (i.e., forecasted returns, volatilities, and correlations) for a variety of asset classes.
- Asset classes can be grouped into higher-level, strategic classes that offer more transparency into their categorization or objectives.

Asset Class/Strategy	Strategic Class
Global Equity	Public Equity
Private Equity	Private Equity
Core RE	Real Estate
Value Add RE	
Opportunistic RE	
Global Macro	Diversifying Strategies
Trend Following	
Alternative Risk Premia	
Core Infrastructure	Real Assets
Non-Core Infrastructure	
Natural Resources	
Core Fixed Income	Fixed Income
Intermediate Govt	
Long Govt	
Foreign Sovereign	
High Yield	
Bank Loans	
EMD Major	
EMD Local	
Risk Parity	
Risk Parity	Risk Parity



- Strategic Classes combine asset classes/strategies with common characteristics or portfolio functions.
- At the policy level, best practices is to focus on allocations to the major strategic classes.



Strategic Classes

- After the March 2021 meeting, Staff, Meketa, and Aon continued to discuss the CMAs.
- Staff combined these CMAs with those from other market participants to arrive at a proposed set of “final” return expectations (volatility and correlation assumptions did not change).

Long-term Annualized Return Expectations

	Meketa	Aon	Staff “Final”
Risk Mitigating Strategies			
Fixed Income	1.8%	2.0%	1.7%
Diversifying Strategies	4.6%	5.4%	4.4%
Return Seeking Strategies			
Public Equity	7.1%	7.2%	6.5%
Private Equity	9.1%	9.0%	8.5%
Real Estate	6.3%	6.0%	6.2%
Real Assets	8.8%	8.8%	7.5%
Risk Parity	4.2%	5.4%	5.2%

- Meketa believes that these “final” return expectations are reasonable.



Reference Portfolio

- Reference portfolios are portfolios that consist of passively managed, publicly traded asset classes that have similar risk levels as a specific investor's portfolio.
 - They are commonly used for comparison and/or benchmarking purposes.
- A 60% Public Equity / 40% Fixed Income portfolio has historically been a common example.
- Most institutional investors, including OPERF, now more closely mirror a 70/30 portfolio due to the decline in interest rates and expected returns over the last ten years.

	Current (%)	70/30 (%)
Fixed Income	20.0%	30.0%
Diversifying Strategies	7.5%	---
Total Risk Mitigating	27.5%	30.0%
Public Equity	32.5%	70.0%
Private Equity	17.5%	---
Real Estate	12.5%	---
Real Assets	7.5%	---
Risk Parity	2.5%	---
Total Return Seeking	72.5%	70.0%

Portfolio Analysis



Portfolio Analysis

- The remainder of this presentation contains various analytics for three portfolios:
 - Current OPERF Policy Portfolio
 - Proposed OPERF Policy Portfolio
 - 70/30 Reference Portfolio
- The Proposed Portfolio contains subtle changes when compared to the Current Portfolio:
 - Better alignment of private markets target allocations with actual invested amounts.
 - Increase Private Equity's target from 17.5% to 20.0%
 - Improved transparency into the Alternatives portfolio.
 - Separate Real Assets and Diversifying Strategies into dedicated allocations.
- When considering the current capital market environment, OPERF's large private markets allocations, and the impending 2022 asset-liability study, Meketa believes that the Proposed Portfolio is appropriate for the OIC to adopt at this time.



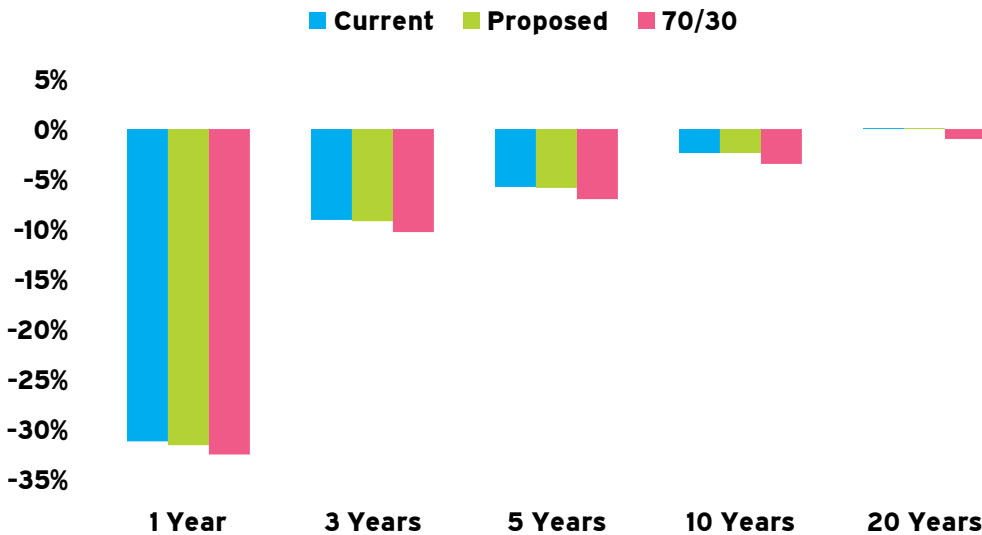
Portfolios for Consideration

	Current (%)	Proposed (%)	70/30 (%)
Fixed Income	20.0%	20.0%	30.0%
Diversifying Strategies	7.5%	7.5%	---
Total Risk Mitigating	27.5%	27.5%	30.0%
Public Equity	32.5%	↓ 30.0%	70.0%
Private Equity	17.5%	↑ 20.0%	---
Real Estate	12.5%	12.5%	---
Real Assets	7.5%	7.5%	---
Risk Parity	2.5%	2.5%	---
Total Return Seeking	72.5%	72.5%	70.0%
<i>Expected Return (20 years)</i>	6.5	6.6	5.4
<i>Standard Deviation</i>	12.6	12.8	12.8
<i>Probability of Achieving 7.2% over 20 Years</i>	39.2	40.4	25.9

- All three portfolios exhibit expected returns less than the 7.2% actuarial rate.
 - Proposed Portfolio has greatest probability (40.4%) of achieving a long-term return of 7.2% or higher.



Scenario Analysis – “Worst Case” Projections

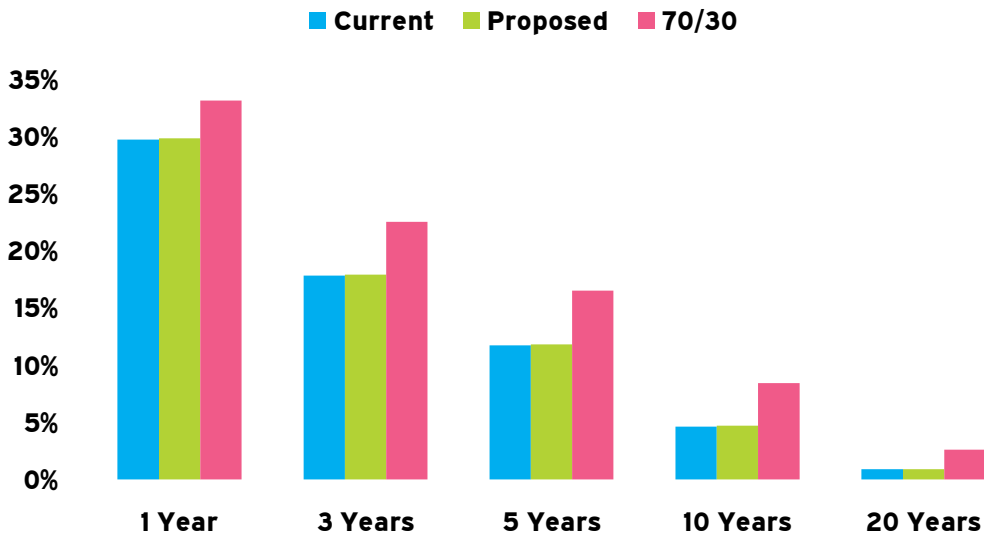


Scenario	Current (%)	Proposed (%)	70/30 (%)
Worst Case Returns			
One Year (0.01 percentile)	-31.2	-31.6	-32.5
Three Years (annualized) (1 st percentile)	-9.1	-9.2	-10.3
Five Years (annualized) (1 st percentile)	-5.8	-5.9	-7.0
Ten Years (annualized) (1 st percentile)	-2.4	-2.4	-3.5
Twenty Years (annualized) (1 st percentile)	0.1	0.1	-1.0

- The Current and Proposed portfolios have nearly identical “worst case” projections.
- Both appear to offer better downside protection compared to the 70/30 portfolio.



Scenario Analysis – Probability of Negative Returns

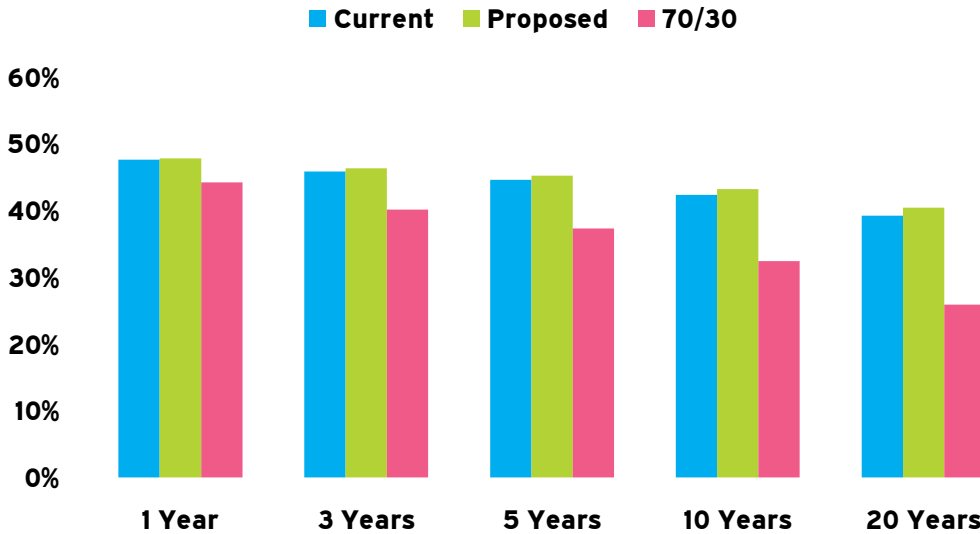


Scenario	Current (%)	Proposed (%)	70/30 (%)
Probability of Experiencing Negative Ret.			
One Year	29.7	29.8	33.1
Three Years	17.8	17.9	22.5
Five Years	11.7	11.8	16.5
Ten Years	4.6	4.7	8.4
Twenty Years	0.9	0.9	2.6

- Both the Current and Proposed portfolios exhibit lower probabilities of negative returns over all horizons when compared to the 70/30 portfolio.



Scenario Analysis – Probability of Achieving 7.2% Return



Scenario	Current (%)	Proposed (%)	70/30 (%)
Probability of Achieving at least a 7.2% Ret.			
One Year	47.6	47.8	44.2
Three Years	45.8	46.3	40.1
Five Years	44.6	45.2	37.3
Ten Years	42.3	43.2	32.4
Twenty Years	39.2	40.4	25.9

- Due to the “volatility penalty” associated with compounding returns, the probability of achieving an annualized 7.2% return declines over longer horizons.
- The Proposed Portfolio exhibits the highest probability of achieving a 7.2% return or greater.



Historical Scenario Analysis (Negative Periods - Cumulative Return)

Scenario	Current (%)	Proposed (%)	70/30 (%)
COVID-19 Market Shock (Feb 2020-Mar 2020)	-14.0	-13.4	-23.8
Taper Tantrum (May - Aug 2013)	0.3	0.5	-1.6
Global Financial Crisis (Oct 2007 - Mar 2009)	-21.6	-21.1	-32.0
Popping of the TMT Bubble (Apr 2000 - Sep 2002)	-8.0	-7.5	-24.2
LTCM (Jul - Aug 1998)	-5.9	-5.7	-9.2
Rate spike (1994 Calendar Year)	2.3	2.5	2.6
Crash of 1987 (Sep - Nov 1987)	-6.9	-6.3	-14.4
Strong dollar (Jan 1981 - Sep 1982)	6.9	7.1	1.1
Volcker Recession (Jan - Mar 1980)	-3.2	-3.2	-6.7
Stagflation (Jan 1973 - Sep 1974)	-13.5	-13.0	-25.1

- When examining the three portfolios over history, the Proposed Portfolio has exhibited the greatest resilience to negative events.
 - Since most drawdowns are relatively short-lived, a portfolio with material private markets exposure may exhibit better protection. This protection, however, may be illusory.



Historical Scenario Analysis (Positive Periods - Cumulative Return)

Scenario	Current (%)	Proposed (%)	70/30 (%)
Global Financial Crisis Recovery (Mar 2009 - Nov 2009)	25.2	24.1	44.6
Best of Great Moderation (Apr 2003 - Feb 2004)	25.5	24.9	33.7
Peak of the TMT Bubble (Oct 1998 - Mar 2000)	38.8	39.7	38.9
Plummeting Dollar (Jan 1986 - Aug 1987)	51.7	49.5	80.2
Volcker Recovery (Aug 1982 - Apr 1983)	27.1	26.4	38.0
Bretton Wood Recovery (Oct 1974 - Jun 1975)	22.8	22.2	34.0

- Conversely, a portfolio with material private markets exposure can face headwinds during shorter duration bull markets.
- Except for the late 1990s (where classes such as Private Equity generated strong positive returns), the Current and Proposed portfolios trailed the 70/30 portfolio over the examined positive historical periods.



Stress Tests (Expected Return under Negative Conditions)

Scenario	Current (%)	Proposed (%)	70/30 (%)
10-year Treasury Bond rates rise 100 bps	3.0	3.0	3.4
10-year Treasury Bond rates rise 200 bps	-1.2	-1.2	-1.5
10-year Treasury Bond rates rise 300 bps	-4.3	-4.4	-5.2
Baa Spreads widen by 50 bps, High Yield by 200 bps	1.1	1.1	0.7
Baa Spreads widen by 300 bps, High Yield by 1000 bps	-17.1	-16.9	-23.4
Trade Weighted Dollar gains 10%	-3.3	-3.2	-5.2
Trade Weighted Dollar gains 20%	-1.8	-1.8	-2.7
U.S. Equities decline 10%	-4.7	-4.8	-5.9
U.S. Equities decline 25%	-14.4	-14.3	-17.0
U.S. Equities decline 40%	-21.8	-21.4	-28.5

- In addition to historical events, we can examine estimated behavior of portfolios during hypothetical stress events. These estimates are based on historical behavior and our forward-looking CMAs.
- The Proposed Portfolio generally exhibits the best responses to these stress tests.



Stress Tests (Expected Return under Positive Conditions)

Scenario	Current (%)	Proposed (%)	70/30 (%)
10-year Treasury Bond rates drop 100 bps	2.8	2.8	3.1
10-year Treasury Bond rates drop 200 bps	9.9	9.7	15.0
Baa Spreads narrow by 30bps, High Yield by 100 bps	6.4	6.4	6.9
Baa Spreads narrow by 100bps, High Yield by 300 bps	9.8	9.6	14.9
Trade Weighted Dollar drops 10%	6.6	6.5	8.3
Trade Weighted Dollar drops 20%	20.0	19.5	27.7
U.S. Equities rise 10%	6.2	6.3	6.4
U.S. Equities rise 30%	12.9	12.6	18.7

- Similar to the historical scenarios, the Current and Proposed portfolios are not expected to experience the same reactivity as the 70/30 Portfolio during most positive stress tests.

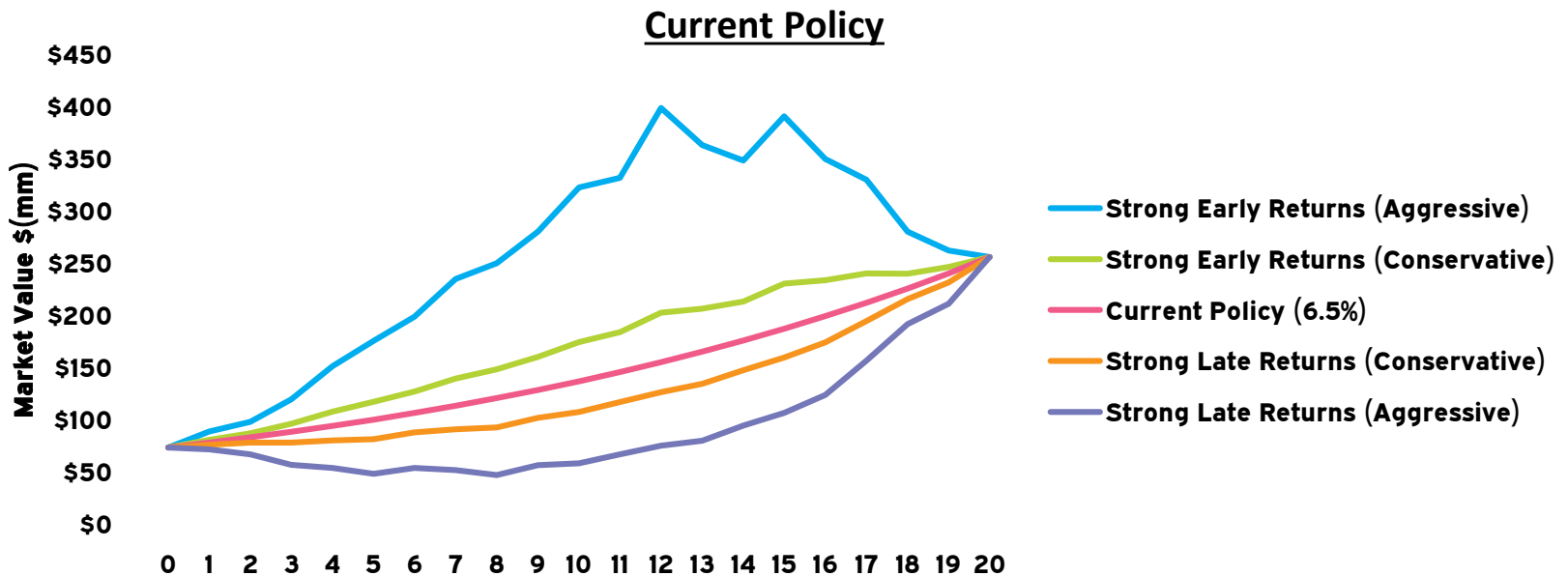
Sequence of Returns

- The following slides highlight the importance of examining the cash-flow position of a portfolio when determining its ability to withstand drawdowns.
- When there are no cash-flows, the sequence of returns does not matter so long as the average return among the various sequences is the same.
 - For \$1 invested in a portfolio at the start, the final dollar amount will be the same regardless of how the average return (e.g., 6.5%) is achieved.
- When there are cash-flows, and in particular negative cash-flows, the sequence of returns does matter.
- For this exercise, we utilized stable contribution and benefit data from Milliman. This data makes two key assumptions for the contribution and benefit calculations:
 - 1) Portfolio achieves a 7.2% return every year.
 - 2) Liabilities are discounted at 7.2%.
- This analysis is generally for illustration purposes only.
 - In reality, if OPERF experiences a poor investment period, the contributions will be increased to counterbalance this issue. This will be explored in the 2022 asset-liability study.



Sequence of Returns – Does Not Matter with No Cash Flows

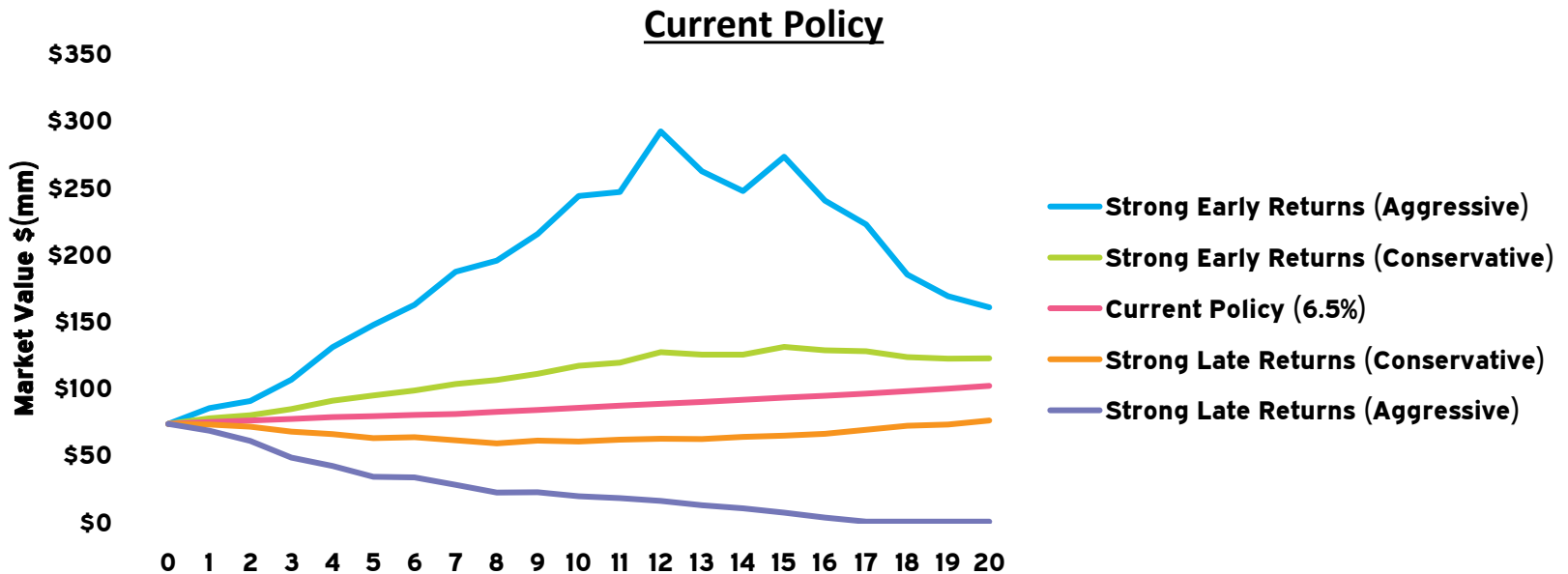
- This analysis reviews three scenarios that achieve the same twenty-year annualized return of 6.5% but that take very different paths to arrive at this destination.
- The “Strong Early Returns” and “Strong Late Returns” scenarios produce the same returns but the order in which the returns are generated is reversed. The third scenario assumes 6.5% is earned every year.
- If net cash flow is \$0, the ending value is the same for all three scenarios.





Sequence of Returns – Significant Impact with Negative Cash Flows

- Negative cash flows make it much harder for a system to recover after a market downturn; the larger the cash outflows are, the more severe the impact.
- Contribution schedules and plan demographics can make cash flow more variable over time.
- As a % of plan assets, OPERF is projected to have a stable/improving net cash flow position.





Sequence of Returns – Significant Impact with Negative Cash Flows

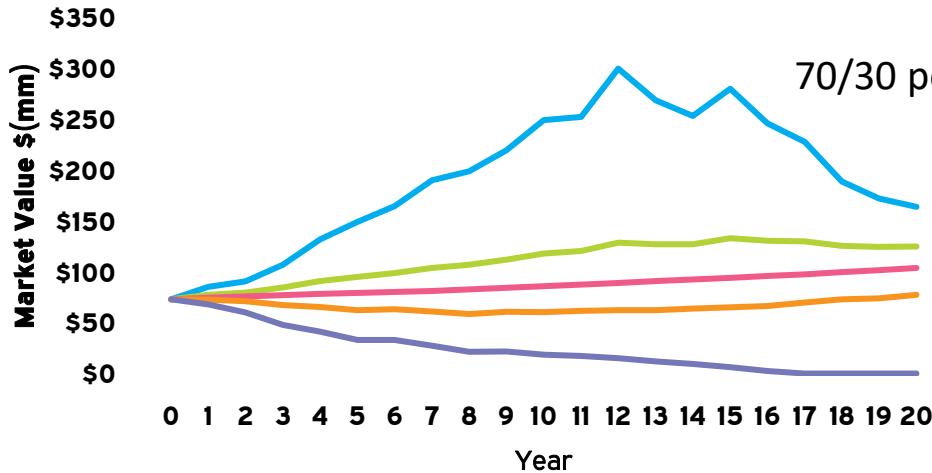
- The 70/30 Reference Portfolio has a similar risk posture (i.e., volatility and drawdown) as the proposed portfolio – with a lower expected return negative cash flow is a stronger headwind.

Proposed

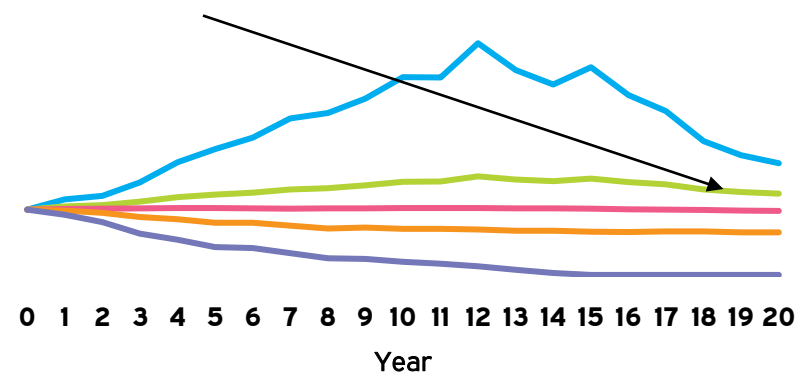
- Strong Early Returns (Aggressive)
- Strong Early Returns (Conservative)
- Proposed (6.6%)
- Strong Late Returns (Conservative)
- Strong Late Returns (Aggressive)

70/30 Portfolio

- Strong Early Returns (Aggressive)
- Strong Early Returns (Conservative)
- 70-30 (5.4%)
- Strong Late Returns (Conservative)
- Strong Late Returns (Aggressive)



70/30 portfolio is worse-off in all situations

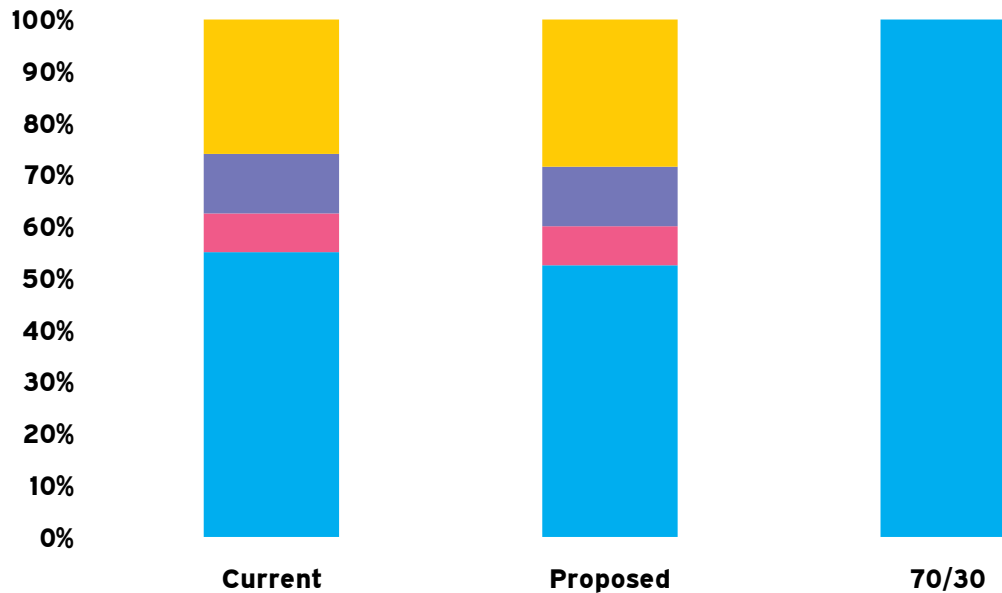




Liquidity Management and Rebalancing

Liquidity Profile

■ Daily ■ Monthly ■ Annually ■ Illiquid



- As discussed earlier, liquidity management is a crucial element of managing the OPERF.
- This is most critical during times of stress. As such, utilizing liquidity stress tests can prove informative.
- The graphics on this page dissect the three portfolios based on the liquidity profiles of their components.

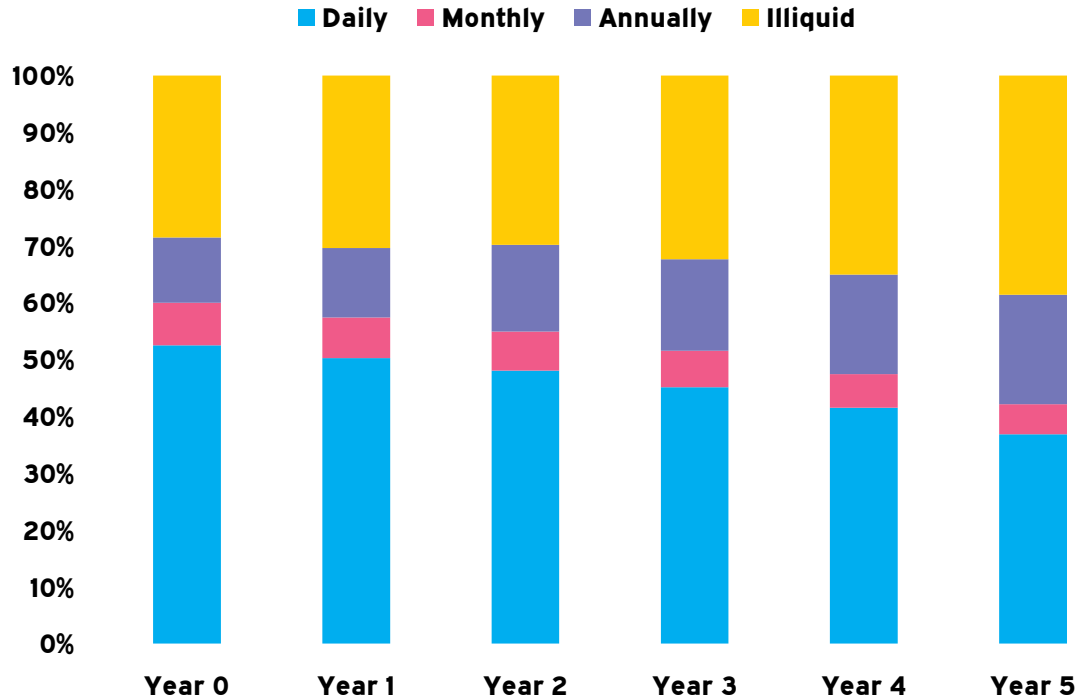
Daily	Monthly	Annual	Illiquid
Fixed Income Public Equity Risk Parity	Diversifying Strategies	Core Real Estate Core Real Assets	Private Equity Non-Core Real Estate Non-Core Real Assets

Liquidity Stress Test

- We conducted an extreme stress test to analyze the portfolio's liquidity. Specifically, we evaluated whether the portfolio could:
 - Continue to meet its cash flow requirements,
 - While staying within its target allocation ranges,
 - And at what cost (i.e., to what extent would it be forced to sell stressed or distressed assets)?
- The scenario is designed to be extreme.
 - In Years 1–3, we use the returns produced by each asset class in 4Q07, 2008, and 1Q09, respectively.
 - In Years 4–5, we assume flat (0%) returns for each asset class (i.e., no rebound).
 - We assume net outflows per Milliman's data (i.e., deterministic contributions).
 - We assume illiquid vehicles offer no liquidity in years 1–4 and very limited liquidity in year 5.
 - We assume annual liquidity vehicles offer no liquidity in years 1–3 and limited liquidity in years 4-5.
 - We assume the portfolio would rebalance toward its policy targets each year.



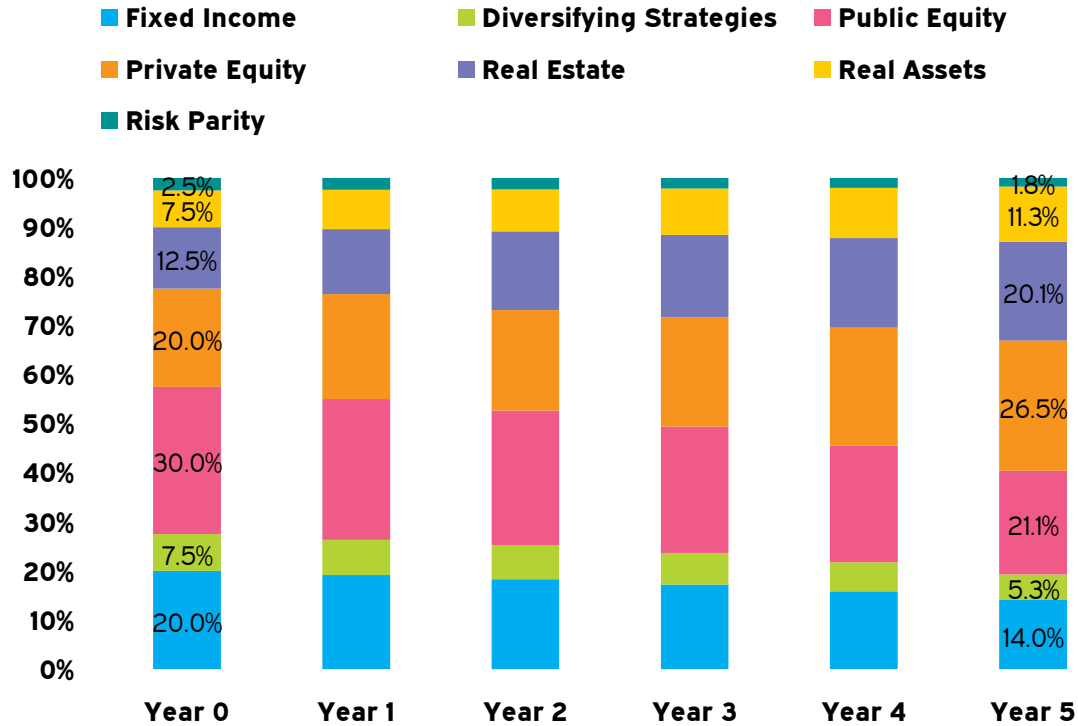
Liquidity Stress Test – Change in Liquidity Over Time



- This analysis is for the Proposed Portfolio. Current Portfolio would exhibit similar takeaways.
- In this extreme stress test, the overall allocation to illiquid strategies grows over time due to the inability to rebalance. OPERF would have sufficient liquidity to manage through this event, however, it may require selling distressed assets and the portfolio’s risk posture would change.



Liquidity Stress Test – Change in Allocations Over Time



- During such an event, the OPERF portfolio would become more illiquid.



Liquidity Stress Test

Metric	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Ending Market Value (\$bn)	73.0	71.2	53.8	47.2	43.5	39.5
Net flows (\$bn)	0.0	-3.2	-3.4	-3.6	-3.7	-4.0
Flows as percentage of Market Value	0%	-4%	-5%	-7%	-8%	-9%
Assets Sold in Duress (\$bn)	0.0	0.0	-1.4	-1.9	-2.0	-2.2
Percentage of Outflows sold in duress	0%	0%	40%	52%	54%	54%
Percentage of Assets sold in duress	0%	0%	2%	3%	4%	5%
Remaining liquid Market Value	52.2	49.6	37.8	32.0	28.3	24.3
Total Illiquid Assets (\$bn)	20.8	21.6	16.0	15.3	15.3	15.3
Percentage of Illiquid Assets	29%	30%	30%	32%	35%	39%
Portfolio Return	0.0%	1.9%	-19.7%	-5.4%	0.0%	0.0%

- Stress Test Takeaways:

- If OPERF sought to maintain a balance among liquid markets strategies, some would have to be sold under duress (e.g., Public Equity).
- Material increase of negative net-cash flow from approximately -4% to -9% of total NAV.
- OPERF could withstand this event from a liquidity standpoint, however, without commensurate increases in contributions, the system's solvency would be at risk.



Conclusion

- The 2021 Asset Allocation Review was meant to serve as a “steppingstone” exercise before the 2022 Asset-Liability Study.
- Staff, Meketa, and Aon believe that there are slight modifications that can be made to improve the portfolio’s posture and to better align the actual and policy portfolios in the near-term.

	Current (%)	Proposed (%)
Fixed Income	20.0%	20.0%
Diversifying Strategies	7.5%	7.5%
Total Risk Mitigating	27.5%	27.5%
Public Equity	32.5%	↓ 30.0%
Private Equity	17.5%	↑ 20.0%
Real Estate	12.5%	12.5%
Real Assets	7.5%	7.5%
Risk Parity	2.5%	2.5%
Total Return Seeking	72.5%	72.5%
<i>Expected Return (20 years)</i>	6.5	6.6
<i>Standard Deviation</i>	12.6	12.8

Appendix

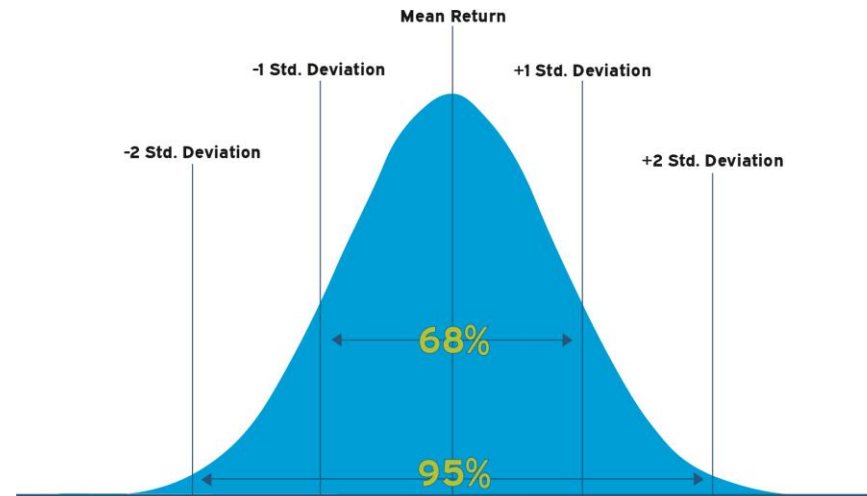


Correlation and Volatility Assumptions

	Volatility	Global Equity	Fixed Income	Risk Parity	Private Equity	Real Estate	Real Assets	Diversifying Strategies
Global Equity	18.0%	1.00						
Fixed Income	4.0%	0.08	1.00					
Risk Parity	12.0%	0.73	0.49	1.00				
Private Equity	28.0%	0.80	0.00	0.20	1.00			
Real Estate	13.8%	0.41	0.23	0.29	0.44	1.00		
Real Assets	18.8%	0.72	0.23	0.37	0.64	0.62	1.00	
Diversifying Strategies	9.9%	0.19	0.25	0.32	0.07	0.04	0.19	1.00

Volatility

- Volatility is a measure of risk. It measures the variability of returns around an average.
- Higher-returning investments almost always have higher volatility, and are thus considered riskier by this metric.

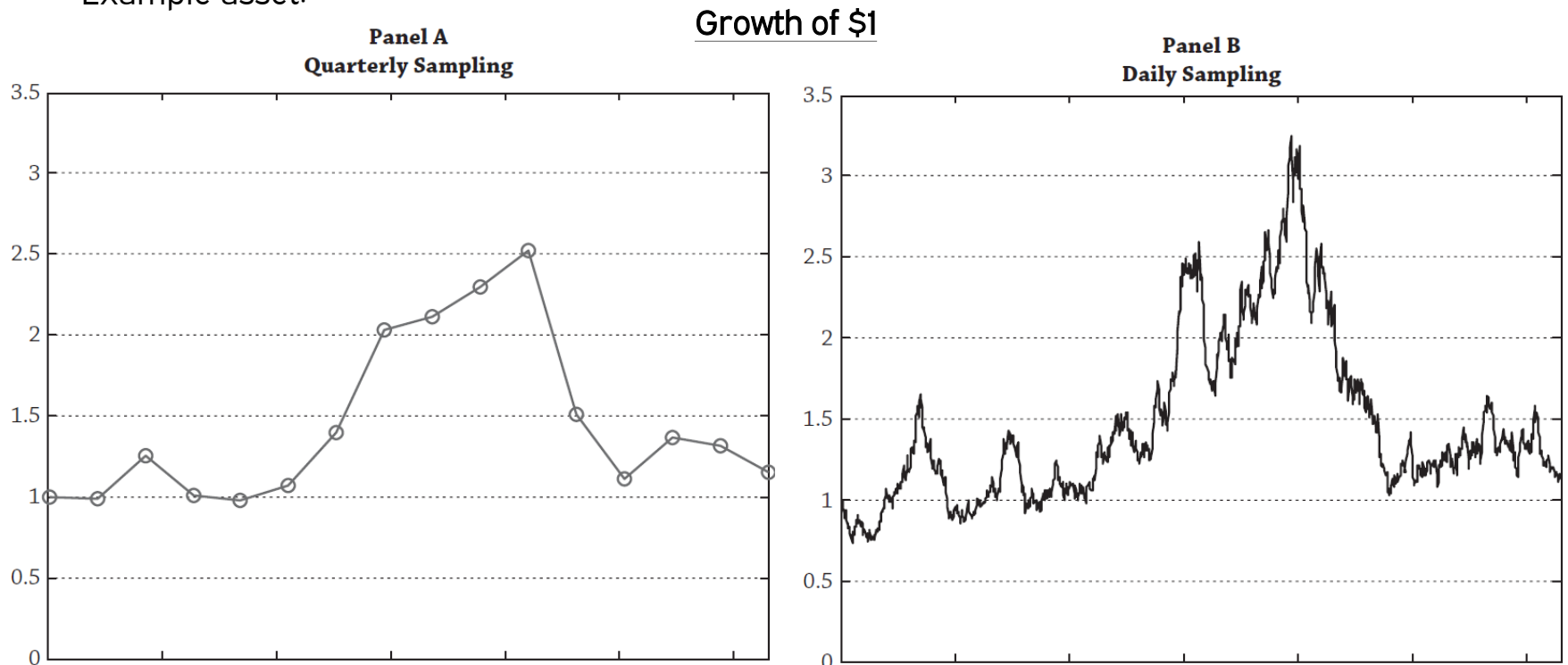


- Volatility includes above-average returns as well as below-average; it measures dispersion (usually via a metric known as standard deviation).
- Returns are commonly assumed to follow a “normal distribution” as shown by the “bell curve.”
 - About 2/3rds of returns fall within one standard deviation above or below the average.



Volatility

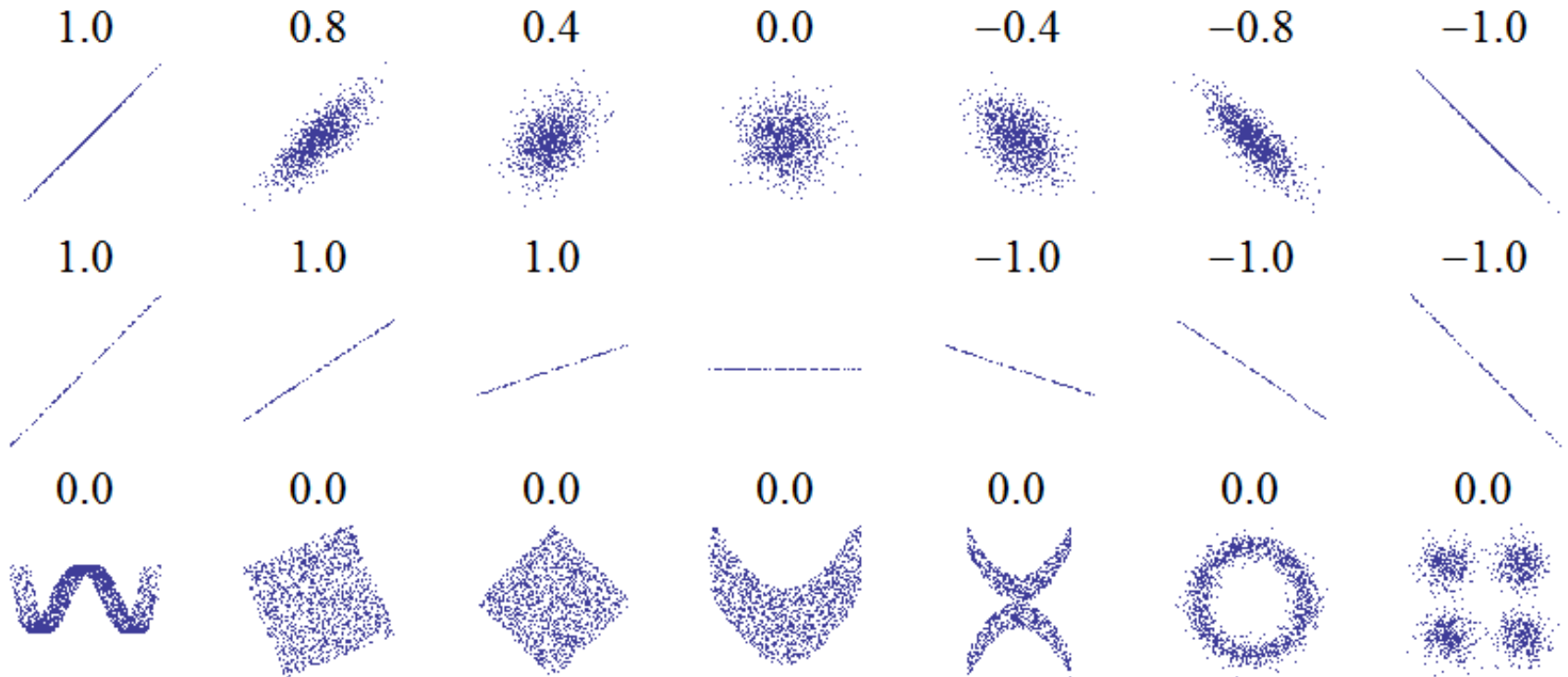
- With infrequent trading, estimates of risk (volatility, correlation, beta, etc.) are too low when using reported returns (i.e., quarterly appraisal/marked returns).
- Example asset:



Source: Asset Management: A Systematic Approach to Factor Investing, Andrew Ang, PhD



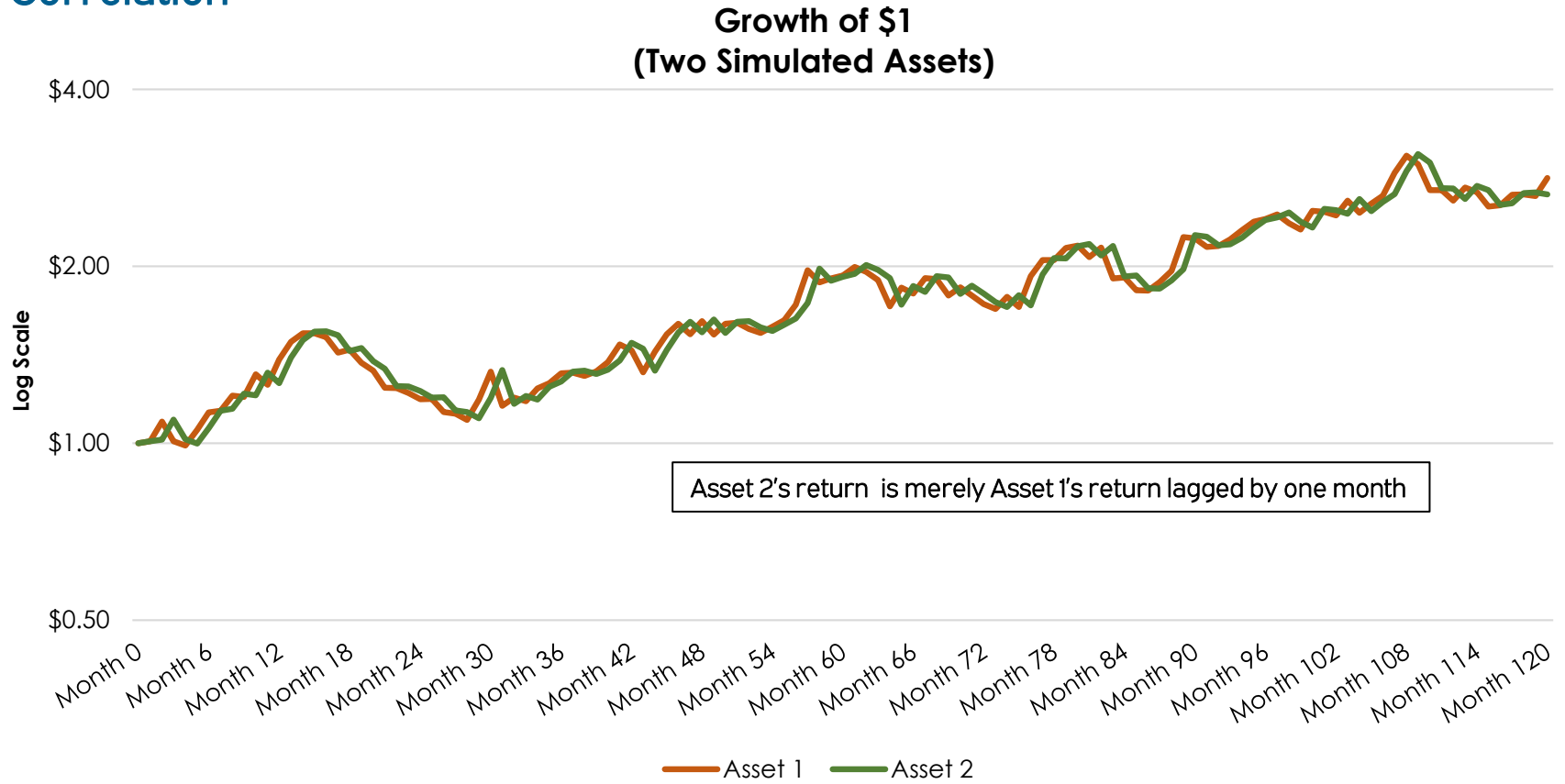
Correlation



Having a zero correlation does not mean two assets are unrelated



Correlation



- Monthly correlation of Asset 1 and Asset 2? -0.05
- Assets with low-to-negative correlations over one period can, in fact, be related over different lengths of periods.



Disclaimers

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INTRODUCTION & OVERVIEW

Summary Policy Statement

To accomplish the prudent and efficient implementation of investment policies established by the Oregon Investment Council ("OIC" or "Council"), Oregon State Treasury ("OST") created the Alternatives Portfolio (the "Portfolio") as an investment strategy within the Oregon Public Employees Retirement Fund ("OPERF" or the "Fund") to participate in attractive long-term investment opportunities and diversify the overall OPERF investment portfolio. To date, Portfolio investments have included participation in diversifying assets and strategies in areas such as infrastructure, oil and gas, agriculture, timberland, hedge funds and other special situations. After its initial build-out period, the Portfolio's current allocation target is 15.0 percent of total OPERF asset value, with an expected duration of three to ten years. As opportunities become available, OST investment staff ("Staff") prudently and productively invests Portfolio assets in a manner consistent with the Portfolio's objectives, OIC and OST policies and applicable law. The Portfolio is subject to the specific strategic target allocations established in Policy INV 1203.

Purpose and Goals

The goal of this policy is to provide guidance to Staff and advisors regarding the Portfolio and its investment objectives.

Applicability

Classified represented, management service, unclassified executive service

Authority

ORS 293.726

ORS 293.731

ORS 293.736

POLICY PROVISIONS

Definitions

Advisor: One or more independent, third party (consultant) firms retained by the OIC and working in concert with OST staff to provide expert investment counsel, due diligence, and ongoing portfolio monitoring.

Benchmark: The Consumer Price Index plus a premium defined as 400 basis points.

Policy Statements

- I. Portfolio investments provide an appropriate complement to OPERF's investment portfolio, and are consistent with OPERF's general objectives, including:
 - A. Providing a means to pay benefits to OPERF participants and their beneficiaries;
 - B. Investing to produce a return based on prudent and reasonable levels of liquidity and investment risk;
 - C. Attaining an adequate real return over the expected rate of inflation; and
 - D. Complying with all applicable laws and regulations concerning the investment of pension assets.

Portfolio investments should exhibit differentiated (i.e., less correlated) returns relative to other Fund assets and therefore the Portfolio is expected to provide diversification benefits to the Fund.

Staff and the Advisor will furnish the OST and OIC with an annual Portfolio investment review and strategy plan.

II. OBJECTIVES

A. Portfolio Investment Performance Objectives

The Portfolio's investment performance objective is to generate long-term net returns to OPERF (i.e., after management fees and general partners' carried interest) above a benchmark comprised of the Consumer Price Index ("CPI") plus the Benchmark. The premium portion of the Benchmark compensates for illiquidity, principal risk and related investment costs and expenses. Staff will periodically evaluate the Portfolio's performance objective and the Benchmark.

B. Diversification

Diversification reduces risk among the Portfolio's investments, and Staff should consider the following types of diversification, including, but not limited to:

1. Strategy. The Portfolio will include a variety of alternative investment strategies, including real assets (i.e., infrastructure, natural resources, commodities, etc.) and other diversifying strategies. The allocation ranges and targets for various types of investments are as follows:

Investment Type	Target Allocation
------------------------	--------------------------

Real Assets	45-55%
--------------------	---------------

Diversifying Strategies	45-55%
--------------------------------	---------------

2. Industry Sectors. Investments will be diversified among various industry groups.

3. Investment Size. Investments will be diversified among a range of commitment sizes, generally with a minimum commitment size of \$75 million. Such commitments may comprise as much as 25% of a particular co-mingled partnership, when appropriate. Staff will document and report any deviations from these guidelines to the OIC.

4. Geography. Staff should consider geographical diversification in investment selection. To the extent appropriate, commitments may be considered that benefit the overall economic health of Oregon so long as and only if such commitments otherwise meet the investment criteria, quality of the Portfolio and are consistent with Staff's fiduciary obligations.

5. Time. Staff will endeavor to invest OPERF assets in a consistent manner over time, unless market conditions appear uniquely favorable or unfavorable.

C. Total Portfolio Diversification. A lower correlation between Program investment returns and other Fund assets is expected, and the Program is therefore expected to provide an added measure of diversification to overall Fund returns.

III. ALTERNATIVES PORTFOLIO COMMITTEE

A. The Alternatives Portfolio Committee ("Committee") acts on behalf of, and subject to the review of, OST. The Committee is comprised of the following individuals: the Deputy State Treasurer; the Chief Investment Officer ("CIO"); and an OIC member invited by the OST to participate as a voting member on the Committee. OST will consider input from the OIC in extending such invitations.

B. OST, through the Committee, may invest OPERF amounts up to and including \$250 million per investment for new general partner, fund sponsor or manager relationships, and an amount up to and including \$350 million for existing relationships, consistent with OIC policies (see Appendix A). If consideration of a particular investment opportunity is deemed urgent or otherwise less suited for presentation to the OIC, the CIO may seek OIC approval for Committee consideration of that particular investment opportunity.

- C. The Committee will only exercise its investment authority by unanimous vote and acting upon a favorable due diligence determination by the Advisor. The Committee may only consider proposed investments or partnership commitments if agreement exists between the Advisor and Staff that the proposed investment or partnership commitment is consistent with Portfolio standards including, but not limited to, the applicable sector plan and strategy. Proposed investments or partnership commitments presented to the Committee are subject to review by OST, which may choose to cancel or refer such proposed commitments to the OIC for broader review and consideration.
 - D. In connection with a proposed investment or partnership commitment, Staff shall furnish any favorable due diligence determination, including the underlying rationale, market conditions and portfolio impact, to the OIC as soon as practical and at least one week prior to a Committee meeting called for purposes of considering the proposed investment or partnership commitment. If OST objects to the proposed investment or partnership commitment or is advised by any OIC member that he or she objects to the proposed investment or partnership commitment, OST will cancel the proposed investment or partnership commitment and determine whether or not Staff will bring same as a separate agenda item at a subsequent OIC meeting.
 - E. Staff shall report any investment or partnership commitment made by the Committee at the next, most feasible OIC meeting.
- IV. OST STAFF AUTHORITY. The CIO, upon a favorable recommendation from both the Director of Alternative Investments and the Advisor, has authority to accomplish the following:
- A. Approve OST administrative activities and guideline exceptions if a plan is established to conform the investment exceptions to applicable guidelines within a reasonable period of time;
 - B. Acquire, retain, manage and dispose of investment or partnership interests consistent with the authority granted to the Office of the State Treasurer pursuant to ORS 293.736. Review and approve other activities as necessary to further the interests of the Portfolio consistent with its standards; and
 - C. Approve up to an additional \$50 million, per action, to an existing investment or partnership commitment for the following purposes: (1) recapitalize the investment or partnership with additional equity; (2) acquire all or part of another manager's or limited partner's interest in an investment or partnership; (3) re-balance between or among investments or partnership commitments; or (4) co-invest alongside a partnership in an individual investment.
Any such additional investments or partnership commitments shall be on terms equal to or better than the existing terms.
- D. Staff shall report any of the foregoing activities at the next, most feasible OIC meeting.
- V. ADVISOR AND OST REQUIREMENTS
- Staff manages the Portfolio in collaboration with the Advisor. Subject to budget limitations, OST will assign an appropriate number of Staff to manage Portfolio design and portfolio construction, the Portfolio's investment decision-making schedule and process, and the Advisor's contract. The OIC will retain a qualified, independent Advisor and will delegate to that Advisor substantial duties such as performing due diligence on investment opportunities, monitoring Portfolio investments, performing Portfolio analytics and valuation analyses and preparing performance reports.
- Staff retains the primary responsibility to ensure that Portfolio investments and prospective investments receive appropriate due diligence, monitoring, and valuation analyses.
- VI. MONITORING
- A. Reports
The Advisor will furnish Portfolio activity and performance reports to Staff on both a quarterly and annual basis.
 - B. Adherence to Strategy
Staff and the Advisor will evaluate the actual strategy employed by investment managers and general partners relative to stated objectives, strategies and other industry standards. The Advisor will interact with the investment managers and general partners periodically and as necessary to verify adherence to such objectives, strategies and standards.

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

Appendix A: OIC/OST Alternative Investments Authority

Appendix B: OST Procedure for INV 702

ADMINISTRATION

Feedback

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

INTRODUCTION & OVERVIEW

Summary Policy Statement

To accomplish the prudent and efficient implementation of investment policies established by the Oregon Investment Council ("OIC" or "Council"), Oregon State Treasury ("OST") created the ~~Alternatives-Real Assets~~ Portfolio (the "Portfolio") as an investment strategy within the Oregon Public Employees Retirement Fund ("OPERF" or the "Fund") to participate in attractive long-term investment opportunities and diversify the overall OPERF investment portfolio. To date, Portfolio investments have included participation in diversifying assets ~~and strategies~~ in areas such as infrastructure, oil and gas, agriculture, timberland, ~~hedge funds~~ and other special situations. After its initial build-out period, the Portfolio's current allocation target is ~~15.07.5~~ percent of total OPERF asset value, with an expected duration of three to ten years. As opportunities become available, OST investment staff ("Staff") prudently and productively invests Portfolio assets in a manner consistent with the Portfolio's objectives, OIC and OST policies and applicable law. The Portfolio is subject to the specific strategic target allocations established in Policy INV 1203.

Purpose and Goals

The goal of this policy is to provide guidance to Staff and advisors regarding the Portfolio and its investment objectives.

Applicability

Classified represented, management service, unclassified executive service

Authority

ORS 293.726

ORS 293.731

ORS 293.736

POLICY PROVISIONS

Definitions

Advisor: One or more independent, third party (consultant) firms retained by the OIC and working in concert with OST staff to provide expert investment counsel, due diligence, and ongoing portfolio monitoring.

Benchmark: The Consumer Price Index plus a premium defined as 400 basis points.

Policy Statements

- I. Portfolio investments provide an appropriate complement to OPERF's investment portfolio, and are consistent with OPERF's general objectives, including:
 - A. Providing a means to pay benefits to OPERF participants and their beneficiaries;
 - B. Investing to produce a return based on prudent and reasonable levels of liquidity and investment risk;
 - C. Attaining an adequate real return over the expected rate of inflation; and
 - D. Complying with all applicable laws and regulations concerning the investment of pension

assets.

Portfolio investments should exhibit differentiated (i.e., less correlated) returns relative to other Fund assets and therefore the Portfolio is expected to provide diversification benefits to the Fund.

Staff and the Advisor will furnish the OST and OIC with an annual Portfolio investment review and strategy plan.

II. OBJECTIVES

A. Portfolio Investment Performance Objectives

The Portfolio's investment performance objective is to generate long-term net returns to OPERF (i.e., after management fees and general partners' carried interest) above a benchmark comprised of the Consumer Price Index ("CPI") plus the Benchmark. The premium portion of the Benchmark compensates for illiquidity, principal risk and related investment costs and expenses. Staff will periodically evaluate the Portfolio's performance objective and the Benchmark.

B. Diversification

Diversification reduces risk among the Portfolio's investments, and Staff should consider the following types of diversification, including, but not limited to:

1. Strategy. The Portfolio will include a variety of alternative investment strategies, including real assets (i.e., infrastructure, natural resources, commodities, etc.) and other diversifying ~~strategies~~ ~~assets~~. ~~The allocation ranges and targets for various types of investments are as follows:~~

Investment Type	Target Allocation
Real Assets	45-55%
Diversifying Strategies	45-55%

2. Industry Sectors. Investments will be diversified among various industry groups.

3. Investment Size. Investments will be diversified among a range of commitment sizes, generally with a minimum commitment size of \$75 million. Such commitments may comprise as much as 25% of a particular co-mingled partnership, when appropriate. Staff will document and report any deviations from these guidelines to the OIC.

4. Geography. Staff should consider geographical diversification in investment selection. To the extent appropriate, commitments may be considered that benefit the overall economic health of Oregon so long as and only if such commitments otherwise meet the investment criteria, quality of the Portfolio and are consistent with Staff's fiduciary obligations.

5. Time. Staff will endeavor to invest OPERF assets in a consistent manner over time, unless market conditions appear uniquely favorable or unfavorable.

C. Total Portfolio Diversification. A lower correlation between ~~Program Portfolio~~ investment returns and other Fund assets is expected, and the ~~Program Portfolio~~ is therefore expected to provide an added measure of diversification to overall Fund returns.

III. ALTERNATIVES PORTFOLIO COMMITTEE

A. The Alternatives Portfolio Committee ("Committee") acts on behalf of, and subject to the review of, OST. The Committee is comprised of the following individuals: the Deputy State Treasurer; the Chief Investment Officer ("CIO"); and an OIC member invited by the OST to participate as a voting member on the Committee. OST will consider input from the OIC in extending such invitations.

B. OST, through the Committee, may invest OPERF amounts up to and including \$250 million per investment for new general partner, fund sponsor or manager relationships, and an amount up to and including \$350 million for existing relationships, consistent with OIC policies (see Appendix A). If consideration of a particular investment opportunity is deemed urgent or otherwise less suited for presentation to the OIC, the CIO may seek OIC

approval for Committee consideration of that particular investment opportunity.

- C. The Committee will only exercise its investment authority by unanimous vote and acting upon a favorable due diligence determination by the Advisor. The Committee may only consider proposed investments or partnership commitments if agreement exists between the Advisor and Staff that the proposed investment or partnership commitment is consistent with Portfolio standards including, but not limited to, the applicable sector plan and strategy. Proposed investments or partnership commitments presented to the Committee are subject to review by OST, which may choose to cancel or refer such proposed commitments to the OIC for broader review and consideration.
- D. In connection with a proposed investment or partnership commitment, Staff shall furnish any favorable due diligence determination, including the underlying rationale, market conditions and portfolio impact, to the OIC as soon as practical and at least one week prior to a Committee meeting called for purposes of considering the proposed investment or partnership commitment. If OST objects to the proposed investment or partnership commitment or is advised by any OIC member that he or she objects to the proposed investment or partnership commitment, OST will cancel the proposed investment or partnership commitment and determine whether or not Staff will bring same as a separate agenda item at a subsequent OIC meeting.
- E. Staff shall report any investment or partnership commitment made by the Committee at the next, most feasible OIC meeting.

IV. **OST STAFF AUTHORITY.** The CIO, upon a favorable recommendation from both the Director of ~~Alternative Investments~~Private Markets and the Advisor, has authority to accomplish the following:

- A. Approve OST administrative activities and guideline exceptions if a plan is established to conform the investment exceptions to applicable guidelines within a reasonable period of time;
- B. Acquire, retain, manage and dispose of investment or partnership interests consistent with the authority granted to the Office of the State Treasurer pursuant to ORS 293.736. Review and approve other activities as necessary to further the interests of the Portfolio consistent with its standards; and
- C. Approve up to an additional \$50 million, per action, to an existing investment or partnership commitment for the following purposes: (1) recapitalize the investment or partnership with additional equity; (2) acquire all or part of another manager's or limited partner's interest in an investment or partnership; (3) re-balance between or among investments or partnership commitments; or (4) co-invest alongside a partnership in an individual investment.
Any such additional investments or partnership commitments shall be on terms equal to or better than the existing terms.
- D. Staff shall report any of the foregoing activities at the next, most feasible OIC meeting.

V. **ADVISOR AND OST REQUIREMENTS**

Staff manages the Portfolio in collaboration with the Advisor. Subject to budget limitations, OST will assign an appropriate number of Staff to manage Portfolio design and portfolio construction, the Portfolio's investment decision-making schedule and process, and the Advisor's contract. The OIC will retain a qualified, independent Advisor and will delegate to that Advisor substantial duties such as performing due diligence on investment opportunities, monitoring Portfolio investments, performing Portfolio analytics and valuation analyses and preparing performance reports.

Staff retains the primary responsibility to ensure that Portfolio investments and prospective investments receive appropriate due diligence, monitoring, and valuation analyses.

VI. **MONITORING**

A. **Reports**

The Advisor will furnish Portfolio activity and performance reports to Staff on both a quarterly and annual basis.

B. **Adherence to Strategy**

Staff and the Advisor will evaluate the actual strategy employed by investment managers and general partners relative to stated objectives, strategies and other industry standards. The Advisor will interact with the investment managers and general partners periodically and as necessary to verify adherence to such objectives, strategies and standards.

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

Appendix A: OIC/OST Alternative Investments Authority

Appendix B: OST Procedure for INV ~~7102~~

ADMINISTRATION

Feedback

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

INTRODUCTION & OVERVIEW

Summary Policy Statement

To accomplish the prudent and efficient implementation of investment policies established by the Oregon Investment Council ("OIC" or "Council"), Oregon State Treasury ("OST") created the ~~Alternatives Diversifying Strategies~~ Portfolio (the "Portfolio") as an investment strategy within the Oregon Public Employees Retirement Fund ("OPERF" or the "Fund") to participate in attractive long-term investment opportunities and diversify the overall OPERF investment portfolio. To date, Portfolio investments have included participation in diversifying ~~assets and~~ strategies in areas such as ~~infrastructure, oil and gas, agriculture, timberland,~~ hedge funds and other special situations. After its initial build-out period, the Portfolio's current allocation target is ~~15.07.5~~ percent of total OPERF asset value, with an expected duration of three to ten years. As opportunities become available, OST investment staff ("Staff") prudently and productively invests Portfolio assets in a manner consistent with the Portfolio's objectives, OIC and OST policies and applicable law. The Portfolio is subject to the specific strategic target allocations established in Policy INV 1203.

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The goal of this policy is to provide guidance to Staff and advisors regarding the Portfolio and its investment objectives.

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Advisor: One or more independent, third party (consultant) firms retained by the OIC and working in concert with OST staff to provide expert investment counsel, due diligence, and ongoing portfolio monitoring.

Benchmark: ~~The Consumer Price Index plus a premium defined as 400 basis points~~ HFRI Fund of Funds Conservative Index.

Policy Statements

- I. Portfolio investments provide an appropriate complement to OPERF's investment portfolio, and are consistent with OPERF's general objectives, including:
 - A. Providing a means to pay benefits to OPERF participants and their beneficiaries;
 - B. Investing to produce a return based on prudent and reasonable levels of liquidity and investment risk;
 - C. Attaining an adequate real return over the expected rate of inflation; and

D. Complying with all applicable laws and regulations concerning the investment of pension assets.

Portfolio investments should exhibit differentiated (i.e., less correlated) returns relative to other Fund assets and therefore the Portfolio is expected to provide diversification benefits to the Fund.

Staff and the Advisor will furnish the OST and OIC with an annual Portfolio investment review and strategy plan.

II. OBJECTIVES

A. Portfolio Investment Performance Objectives

The Portfolio's investment performance objective is to generate long-term net returns to OPERF ~~(i.e., after management fees and general partners' carried interest) above a benchmark comprised of the Consumer Price Index ("CPI") plus the Benchmark. The premium portion of the Benchmark compensates for illiquidity, principal risk and related investment costs and expenses that are independent of asset class returns. In order to achieve this objective, the Portfolio is expected to hold a diversified exposure to managers and strategies, as outlined below.~~ Staff will periodically evaluate the Portfolio's performance objective and the Benchmark.

B. Diversification

Diversification reduces risk among the Portfolio's investments, and Staff should consider the following types of diversification, including, but not limited to:

1. Strategy. The Portfolio will ~~be broadly diversified, global and will include a variety of hedge fund managers and strategies, include a variety of alternative investment strategies, including real assets (i.e., infrastructure, natural resources, commodities, etc.) and other diversifying strategies. The allocation ranges and targets for various types of investments are as follows:~~

Investment Type	Target Allocation
Real Assets	45-55%
Diversifying Strategies	45-55%

2. Industry Sectors. Investments will be diversified among various industry groups.

3. Investment Size. Investments will be diversified among a range of commitment sizes, generally with a minimum commitment size of \$75 million. Such commitments may comprise as much as 25% of a particular co-mingled partnership, when appropriate. Staff will document and report any deviations from these guidelines to the OIC.

4. Geography. Staff should consider geographical diversification in investment selection. To the extent appropriate, commitments may be considered that benefit the overall economic health of Oregon so long as and only if such commitments otherwise meet the investment criteria, quality of the Portfolio and are consistent with Staff's fiduciary obligations.

5. Time. Staff will endeavor to invest OPERF assets in a consistent manner over time, unless market conditions appear uniquely favorable or unfavorable.

C. Total Portfolio Diversification. A lower correlation between ~~Program Portfolio~~ investment returns and other Fund assets is expected, and the ~~Program Portfolio~~ is therefore expected to provide an added measure of diversification to overall Fund returns.

III. ALTERNATIVES PORTFOLIO COMMITTEE

A. The Alternatives Portfolio Committee ("Committee") acts on behalf of, and subject to the review of, OST. The Committee is comprised of the following individuals: the Deputy State Treasurer; the Chief Investment Officer ("CIO"); and an OIC member invited by the OST to participate as a voting member on the Committee. OST will consider input from the OIC in extending such invitations.

B. OST, through the Committee, may invest OPERF amounts up to and including \$250

million per investment for new general partner, fund sponsor or manager relationships, and an amount up to and including \$350 million for existing relationships, consistent with OIC policies (see Appendix A). If consideration of a particular investment opportunity is deemed urgent or otherwise less suited for presentation to the OIC, the CIO may seek OIC approval for Committee consideration of that particular investment opportunity.

- C. The Committee will only exercise its investment authority by unanimous vote and acting upon a favorable due diligence determination by the Advisor. The Committee may only consider proposed investments or partnership commitments if agreement exists between the Advisor and Staff that the proposed investment or partnership commitment is consistent with Portfolio standards including, but not limited to, the applicable sector plan and strategy. Proposed investments or partnership commitments presented to the Committee are subject to review by OST, which may choose to cancel or refer such proposed commitments to the OIC for broader review and consideration.
- D. In connection with a proposed investment or partnership commitment, Staff shall furnish any favorable due diligence determination, including the underlying rationale, market conditions and portfolio impact, to the OIC as soon as practical and at least one week prior to a Committee meeting called for purposes of considering the proposed investment or partnership commitment. If OST objects to the proposed investment or partnership commitment or is advised by any OIC member that he or she objects to the proposed investment or partnership commitment, OST will cancel the proposed investment or partnership commitment and determine whether or not Staff will bring same as a separate agenda item at a subsequent OIC meeting.
- E. Staff shall report any investment or partnership commitment made by the Committee at the next, most feasible OIC meeting.

IV. **OST STAFF AUTHORITY.** The CIO, upon a favorable recommendation from both the Director of Alternative Investments Private Markets and the Advisor, has authority to accomplish the following:

A. Rebalance between and among managers.

B. Re-allocate between asset classes, adhering to Policy INV 1203.

C. Terminate "at will" any manager according to the terms of its contract with and on behalf of the OIC.

A-D. Approve OST administrative activities and guideline exceptions if a plan is established to conform the investment exceptions to applicable guidelines within a reasonable period of time;

B-E. Acquire, retain, manage and dispose of investment or partnership interests consistent with the authority granted to the Office of the State Treasurer pursuant to ORS 293.736. Review and approve other activities as necessary to further the interests of the Portfolio consistent with its standards; and

F. Approve up to an additional \$50 million, per action, to an existing investment or partnership commitment for the following purposes: (1) recapitalize the investment or partnership with additional equity; (2) acquire all or part of another manager's or limited partner's interest in an investment or partnership; (3) re-balance between or among investments or partnership commitments; or (4) co-invest alongside a partnership in an individual investment. Any such additional investments or partnership commitments shall be on terms equal to or better than the existing terms.

C-G. Staff shall report any of the foregoing activities at the next, most feasible OIC meeting.

V. ADVISOR AND OST REQUIREMENTS

Staff manages the Portfolio in collaboration with the Advisor. Subject to budget limitations, OST will assign an appropriate number of Staff to manage Portfolio design and portfolio construction, the Portfolio's investment decision-making schedule and process, and the Advisor's contract. The OIC will retain a qualified, independent Advisor and will delegate to that Advisor substantial duties such as performing due diligence on investment opportunities, monitoring Portfolio investments, performing Portfolio analytics and valuation analyses and preparing performance

reports.

Staff retains the primary responsibility to ensure that Portfolio investments and prospective investments receive appropriate due diligence, monitoring, and valuation analyses.

VI. MONITORING

A. Reports

The Advisor will furnish Portfolio activity and performance reports to Staff on both a quarterly and annual basis.

B. Adherence to Strategy

Staff and the Advisor will evaluate the actual strategy employed by investment managers and general partners relative to stated objectives, strategies and other industry standards. The Advisor will interact with the investment managers and general partners periodically and as necessary to verify adherence to such objectives, strategies and standards.

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

Appendix A: OIC/OST Alternative Investments Authority

Appendix B: OST Procedure for INV [71102](#)

ADMINISTRATION

Feedback

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

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 discount~~ rate ~~used~~ set by the PERB 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.

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.

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.

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.

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".

Diversifying Strategies: Investment strategies that attempt to generate returns that are independent of asset class returns, and may include systematically capture capturing certain risk premia beyond traditional equity and fixed income market exposures ~~using alternative investment techniques~~.

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 (FOFs): 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.

Hedge Fund Research Inc. Fund of Funds Conservative Index (HFRI FOF Conservative Index): The HFRI FOF Conservative Index is an investment performance composite published monthly by Hedge Fund Research, Inc. (HFRI). This index is a capitalization-weighted index of FOFs pursuing a "conservative" investment strategy and conforming to specific parameters. A fund in the HFRI FOF Conservative Index shows generally consistent performance regardless of market conditions.

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 publicly-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 Asset Investments: "Real assets" are broadly defined as long-lived, capital intensive, physical or "hard" assets that provide essential products and services to the global economy and/or generally serve as the inputs to economic production.

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 publicly-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 Risk Parity Index – 12% Target Volatility: An index designed to proxy the performance of a generic risk parity strategy using public equity, fixed income, and commodity exchange-traded futures, levered to target a 12% return volatility. Because there is no widely-accepted approach to risk parity, this index is not representative of the “market” but can still serve as a benchmark.

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.

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.
2. Of total Fund assets, 50 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 <u>30.0</u>	27.5-37.5 <u>25.0-35.0</u>	7.3
Private Equity	17.5 <u>20.0</u>	14.0-21.0 <u>15.0-27.5</u>	9.2
Total Equity	50.0	45.0-55.0	-
Fixed Income	20.0	15.0-25.0	2.8
Risk Parity	2.5	0.0- 2 <u>3.5</u>	6.3
Real Estate	12.5	9.5-15 <u>7.5-17.5</u>	7.0
<u>Alternatives Real Assets</u>	15.0 <u>7.5</u>	7.5-17.5 <u>10.0</u>	7.0
<u>Diversifying Strategies</u>	<u>7.5</u>	<u>2.5-10.0</u>	
Total Fund² Fund	100.0		7.1

~~1. Based on capital market forecasts developed by the Council's investment consultant, Callan LLC.~~

~~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.~~

~~The policy mix's 7.1% 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.~~

4. The OIC has allocated up to 5.0% 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.
5. 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.
 6. 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.
 7. 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.

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 develops and 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.

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 rebalancing 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 0.15%, 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.

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.

Fixed Income Strategy

1. OPERF's fixed income allocation is managed with the objective of earning **15 basis points** in annualized, net excess returns relative to the *Bloomberg Barclays U.S. Aggregate Index* over rolling, consecutive five-year periods. **Relative to that same benchmark, active risk within the OPERF fixed income allocation is managed to up 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.

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*, using the *S&P Risk Parity Index - 12% Target Volatility* as the policy benchmark over rolling, consecutive five-year periods.
2. Key elements of the strategy include the following:
 - a. Risk Parity is 100% actively managed because there is no widely-accepted definition of a passive implementation of risk parity.
 - b. Risk parity strategies provide long-only levered exposures to major publicly-traded asset classes, such as public equity, fixed income (sometimes separating credit from interest rate), and commodities. Since risk parity strategies typically balance asset class exposures by risk versus nominal exposures, they are levered to target some return objective comparable to a generic balanced exposures. Because each asset class in a risk parity portfolio delivers approximately the same level of risk, as opposed to equity providing the vast majority of the risk in a generic balanced portfolio, the expectation is a risk parity portfolio would deliver a higher risk-adjusted return over a full market cycle.

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.

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.

AlternativesReal Assets Strategy

1. ~~OPERF's~~OPERF's allocation to AlternativesReal Assets 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. AlternativesReal assets~~ are 100% actively managed because ~~index funds replicating the broad alternatives market are not available.~~
 - ~~a. Infrastructure investments represent 20%~~a passive replication of the full breadth and depth of the Fund's alternativesreal asset investable universe is not viable.

- ~~b. The Real Assets allocation, with a range of 15% to 25%. Risk is diversified by investment type, size and geography. is inclusive of infrastructure and natural resources investments. Specific infrastructure sector exposures will likely include energy, transportation, ports and water in both domestic digital, utilities, and international markets and comprising both mid-size and large capitalization enterprises.~~
- ~~a.b. _____ Natural Resources social 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 . Specific natural resources sector exposures will likely include oil and gas, agriculture, timberland, metals and mining, and commodities.~~
- ~~c. OPERF's real assets allocation is further diversified by investment across vintage year, investment size, development stage and geography.~~
- ~~d. Within its real assets allocation, the Fund may participate in co-investment opportunities.~~

Diversifying Strategies ~~represent 50%~~ Strategy

1. OPERF's allocation to Diversifying Strategies is managed with the objective of outperforming the HFRI FOF Conservative Index over rolling, consecutive ten-year periods.
2. Key elements of the Fund's alternatives allocation, with a range strategy include the following:
 - a. Diversifying Strategies are 100% actively managed because a passive replication of 45% to 55% the full breadth and depth of the diversifying strategy asset class is not viable.
 - ~~a.b. _____ Diversifying Strategies investments may include long/short, relative value, macro, arbitrage and long/short equity event driven, directional, and other special situations 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.~~
 - ~~c. Other investments may represent 5% of the Fund's alternatives allocation, with a range of 0% to 10%. Investment Within its diversifying strategies will be characterized as "other" based on prevailing market conditions as well as a specific strategy's unique "value proposition" or investment thesis.~~
 - ~~b.c. _____ Within its alternatives allocation, the Fund may also participate in co-investment opportunities.~~

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.

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 discount rate set by the PERB to calculate the present value of a defined benefit plan's future obligations and determine the size of the plan sponsor's annual contribution.

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.

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.

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.

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.

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".

Diversifying Strategies: Investment strategies that attempt to generate returns that are independent of asset class returns, and may include systematically capturing certain risk premia beyond traditional equity and fixed income market exposures.

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 (FOFs): 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.

Hedge Fund Research Inc. Fund of Funds Conservative Index (HFRI FOF Conservative Index): The HFRI FOF Conservative Index is an investment performance composite published monthly by Hedge Fund Research, Inc. (HFRI). This index is a capitalization-weighted index of FOFs pursuing a "conservative" investment strategy and conforming to specific parameters. A fund in the HFRI FOF Conservative Index shows generally consistent performance regardless of market conditions.

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 publicly-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.

Real Asset Investments: "Real assets" are broadly defined as long-lived, capital intensive, physical or "hard" assets that provide essential products and services to the global economy and/or generally serve as the inputs to economic production.

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 publicly-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 Risk Parity Index – 12% Target Volatility: An index designed to proxy the performance of a generic risk parity strategy using public equity, fixed income, and commodity exchange-traded futures, levered to target a 12% return volatility. Because there is no widely-accepted approach to risk parity, this index is not representative of the “market” but can still serve as a benchmark.

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.

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.
2. Of total Fund assets, 50 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 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 for the OPERF Regular Account

Asset Class	Target Allocation (%)	Re-balancing Range (0%)
Public Equity	30.0	25.0-35.0
Private Equity	20.0	15.0-27.5
Total Equity	50.0	45.0-55.0
Fixed Income	20.0	15.0-25.0
Risk Parity	2.5	0.0-3.5
Real Estate	12.5	7.5-17.5
Real Assets	7.5	2.5-10.0
Diversifying Strategies	7.5	2.5-10.0
Total Fund	100.0	

4. The OIC has allocated up to 5.0% 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.
5. 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.
6. 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.
7. 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.

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 develops and implements the 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.

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 rebalancing 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 0.15%, 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.

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.

Fixed Income Strategy

1. OPERF's fixed income allocation is managed with the objective of earning **15 basis points** in annualized, net excess returns relative to the *Bloomberg Barclays U.S. Aggregate Index* over rolling, consecutive five-year periods. **Relative to that same benchmark, active risk within the OPERF fixed income allocation is managed to up 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.

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*, using the *S&P Risk Parity Index - 12% Target Volatility* as the policy benchmark over rolling, consecutive five-year periods.
2. Key elements of the strategy include the following:
 - a. Risk Parity is 100% actively managed because there is no widely-accepted definition of a passive implementation of risk parity.
 - b. Risk parity strategies provide long-only levered exposures to major publicly-traded asset classes, such as public equity, fixed income (sometimes separating credit from interest rate), and commodities. Since risk parity strategies typically balance asset class exposures by risk versus nominal exposures, they are levered to target some return objective comparable to a generic balanced exposures. Because each asset class in a risk parity portfolio delivers approximately the same level of risk, as opposed to equity providing the vast majority of the risk in a generic balanced portfolio, the expectation is a risk parity portfolio would deliver a higher risk-adjusted return over a full market cycle.

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.

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.

Real Assets Strategy

1. OPERF's allocation to Real Assets 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. Real assets are 100% actively managed because a passive replication of the full breadth and depth of the real asset investable universe is not viable.
 - b. The Real Assets allocation is inclusive of infrastructure and natural resources investments. Specific infrastructure sector exposures will likely include energy, transportation, digital, utilities, and social investments. Specific natural resources sector exposures will likely include oil and gas, agriculture, timberland, metals and mining, and commodities.
 - c. OPERF's real assets allocation is further diversified by investment across *vintage year*, investment size, development stage and geography.
 - d. Within its real assets allocation, the Fund may participate in co-investment opportunities.

Diversifying Strategies Strategy

1. OPERF's allocation to Diversifying Strategies is managed with the objective of outperforming the HFRI FOF Conservative Index over rolling, consecutive ten-year periods.
2. Key elements of the strategy include the following:
 - a. Diversifying Strategies are 100% actively managed because a passive replication of the full breadth and depth of the diversifying strategy asset class is not viable.
 - b. Diversifying Strategies investments may include long/short, relative value, event driven, directional, and other special situations 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.
 - c. Within its diversifying strategies allocation, the Fund may also participate in co-investment opportunities.

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.

TAB 6 – IAP Program Review

June 2, 2021

Individual Account Program

Annual Review



OREGON
STATE
TREASURY

Individual Account Program (IAP)

- The Oregon Legislature created IAP in August 2003 as part of a package of PERS reforms. All contributions from Tier One, Tier Two and Oregon Public Service Retirement Plan (OPSRP) members became IAP deposits starting in January 2004.
- IAP is the Defined Contribution (DC), member-funded retirement benefit; members contribute up to 6%* of their salary and the account is credited annually with earnings or losses. At retirement, the IAP account balance is distributed (or rolled over) as directed by the member.
- From program inception until 2017, IAP solely invested in the Oregon Public Employees Retirement Fund.
- IAP participants have no discretion in either the contribution amount or the investment selection[†].

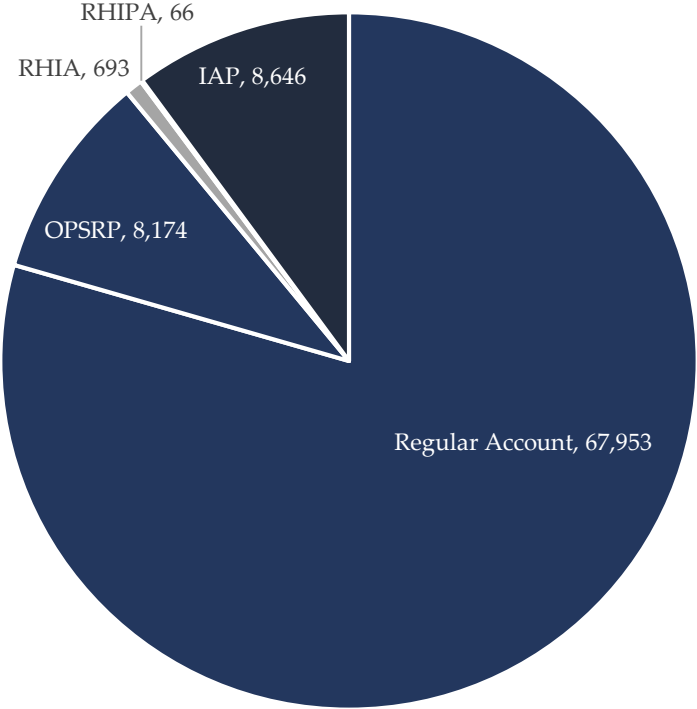
**It was fixed at 6% until the passage of Senate Bill 1049 in 2019, discussed in a subsequent slide.*

†Senate Bill 1049 also allows participants choice, discussed in a subsequent slide.

Oregon Public Employees Retirement Fund (OPERF)

- OPERF's asset allocation, set by the OIC, is designed to maximize expected long-term investment returns for PERS and its beneficiaries.
- Units of OPERF are held by various programs including: Tier One/Tier Two Regular Pension; OPSRP Pension; Retiree Health Insurance Account (RHIA); Retiree Health Insurance Premium Account (RHIPA); and IAP.
- OPERF's asset allocation, when applied to the IAP, may not align with the needs or expectations of individual members, particularly as they near retirement age.
 - Given OPERF's capital appreciation orientation, bear market episodes that result in significant losses could have an outsized impact on those members' retirement decisions.
 - Members may not be sufficiently educated on IAP investment risks and/or how to mitigate those risks with comprehensive retirement planning.
- IAP is an increasing fraction of OPERF due to the program being cash flow positive, i.e., contributions currently exceed distributions.

OPERF Assets by PERS Accounts (\$M) As of March 31, 2021



Source: Oregon State Treasury

IAP Restructuring

- In 2017, the OIC approved restructuring IAP from solely investing in OPERF to a suite of ten target-date funds (TDFs).
 - Target-date funds are common investment vehicles in DC plans that automatically reduce investment risk by decreasing equity allocation along a “glide path” as investors approach retirement age.
- In the same year, the OIC retained AllianceBernstein to manage the suite of TDFs.
- Treasury staff – in collaboration with PERS staff, State Street (custodian), Voya Financial (PERS recordkeeper), and AllianceBernstein – completed the restructuring at the end of 2017, transitioning approximately \$2B, or 25% of IAP assets, out of OPERF and into five State Street Global Advisors (SSGA) public equity and fixed income index funds.
- Members’ IAP investments were allocated to different TDFs based on member birth year.
- AllianceBernstein monitors the investments & cash flows and provides monthly trading instructions to rebalance the TDFs to target allocations.

IAP Member & Asset Distribution by Target-Date Fund As of March 31, 2021

Target-Date Fund	Birth Year	# of Accounts ('000)	Total Balance (\$M)
Retirement Funds*	1957 or before	34	1,704
2025	Between 1958 and 1962	28	1,715
2030	Between 1963 and 1967	33	2,015
2035	Between 1968 and 1972	39	2,165
2040	Between 1973 and 1977	39	1,796
2045	Between 1978 and 1982	41	1,340
2050	Between 1983 and 1987	36	686
2055	Between 1988 and 1992	27	248
2060	Born in 1993 and 1997	14	50
2065	Born in 1998 or after	2	13
Total		294	11,731

Source: # of Accounts from PERS & Total Balance from State Street.

*For administrative purposes, there are two retirement funds.

2020 Updates

- As of December 2020, IAP had \$11.3 billion in assets across the TDF suites, with \$8.3B in OPERF and \$3.0B in the SSGA index funds.
- Passed in 2019, Senate Bill 1049:
 - Redirects a portion of IAP contribution to a newly-created Employee Pension Stability Account which will pay a portion of the member's pension benefits. This "redirect" ranges from 0% for members with monthly salary below a threshold to 2.5% of salary for Tier 1 & 2 members with monthly salary above a threshold; and
 - Provides members "choice" among the available IAP TDFs. PERS implemented this feature in 2020 which allowed members the month of September to decide to reinvest their IAP balance into a different TDF.



**OREGON
STATE
TREASURY**

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Oregon State Treasurer

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June 2, 2021



ALLIANCEBERNSTEIN[®]

Oregon IAP Review

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

Elena Wang Research Analyst—Multi-Asset Solutions

Agenda

- + IAP Custom Target-Date Fund Design
- + Performance Review / Market Outlook
- + Member “Choice” Update

Executive Summary

- + IAP Custom Target-Date Fund Design
 - + Tailored to Oregon member demographics
 - + Designed to enhance growth potential for young and risk control for senior members
 - + Assessed impact from new legislation and modified design in 2020
- + Performance Review
 - + Strong absolute returns since inception
 - + Delivered smoother outcomes than typical TDFs and generally outperformed OPERF
- + Market Outlook
 - + Lower future return expectations for traditional asset classes
 - + IAP members are better positioned than peers given diversification from OPERF

IAP Custom Target Date Fund Design

- + Benefits of Transition to Target-Date Funds (TDFs)
 - + Improve Risk Control for Members Approaching Retirement
 - + Enhance Growth-Oriented Focus for Younger Members
 - + Retain Contribution to Diversification and Growth from OPERF
- + Key Demographic Inputs
 - + Target 90% Total Replacement Rate From all Sources
 - + Oregon Member Salaries, Savings and Tenure
 - + Age 65 Retirement
- + TDFs Suite vs. OPERF
 - + Modest Increase to Growth Allocation for Young Savers
 - + Significant Increase to Fixed Income for Near Retirees
 - + Expect Improved Consistency, Lower Downside Risk and Lower Median Growth

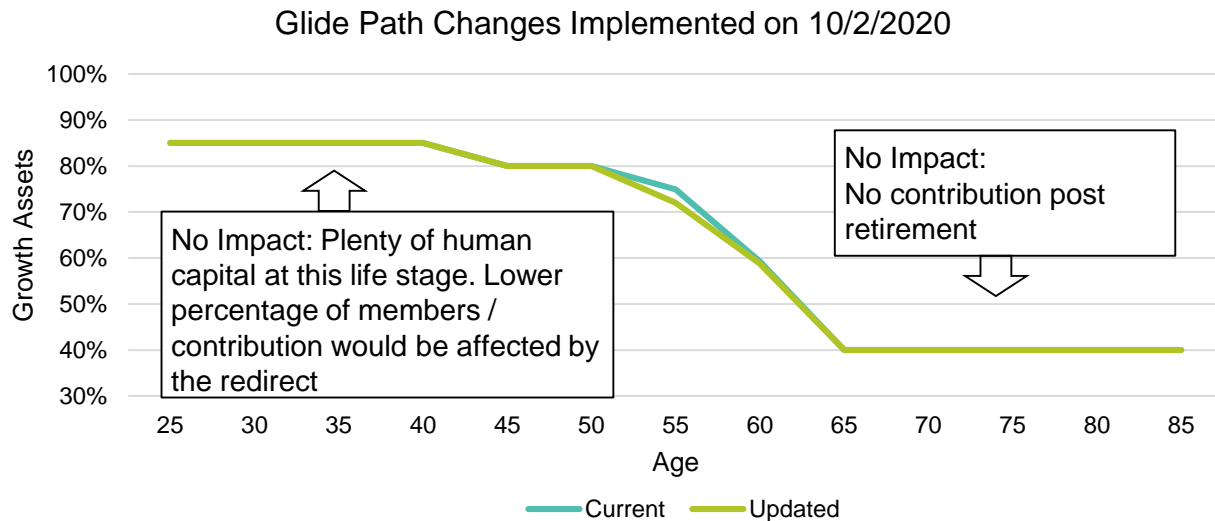
Recent Glide Path Changes: Incorporated Legislative Changes

+ New legislative changes

- + Contribution redirect: Leads to lower growth exposure for members at age 55 (-3.0%) and age 60 (-0.5%), no impact on younger or senior members
- + Final average salary limit: No impact on IAP glide path design, given limited number of members will be affected
- + Other legislative changes: Not drivers of and have no impact on IAP glide path design

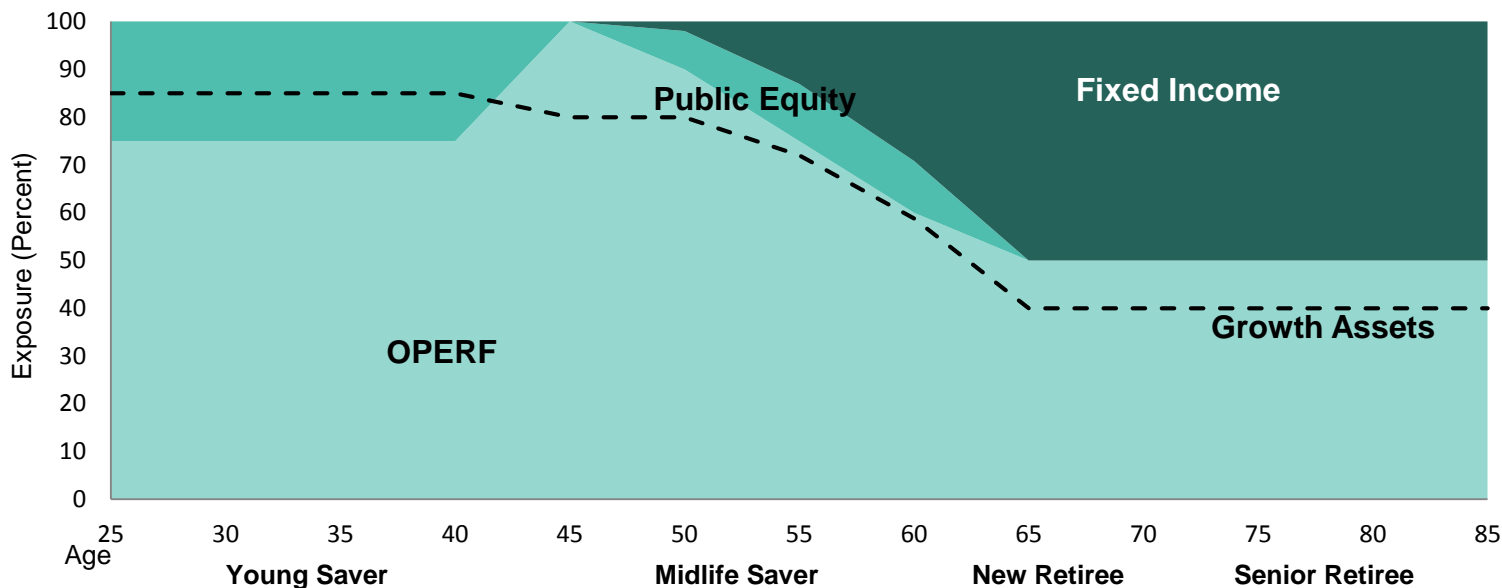
+ Other changes

- + OPERF's updated interim allocation target and AB's update capital market assumptions are both assessed, and have no significant impact on glide path design



State of Oregon Glide Path

Oregon IAP



	25	30	35	40	45	50	55	60	65	70	75	80	85
US All Market Equity	15.00	15.00	15.00	15.00	-	5.10	7.90	7.35	-	-	-	-	-
ACWI ex US Equity	10.00	10.00	10.00	10.00	-	2.90	4.10	3.45	-	-	-	-	-
Core Bond	-	-	-	-	-	2.00	9.95	16.55	18.65	18.65	18.65	18.65	18.65
TIPS	-	-	-	-	-	-	3.05	8.30	12.05	12.05	12.05	12.05	12.05
Short Duration Bond	-	-	-	-	-	-	-	4.35	19.30	19.30	19.30	19.30	19.30
OPERF*	75.00	75.00	75.00	75.00	100.00	90.00	75.00	60.00	50.00	50.00	50.00	50.00	50.00
Public Equity	25.00	25.00	25.00	25.00	-	8.00	12.00	10.80	-	-	-	-	-
Fixed Income	-	-	-	-	-	2.00	13.00	29.20	50.00	50.00	50.00	50.00	50.00
OPERF	75.00	75.00	75.00	75.00	100.00	90.00	75.00	60.00	50.00	50.00	50.00	50.00	50.00
Total Growth Assets**	85.00	85.00	85.00	85.00	80.00	80.00	72.00	58.80	40.00	40.00	40.00	40.00	40.00

*OPERF is managed by the OST under the direction of the OIC and contains a mix of the following asset classes: public and private equity, fixed income, alternatives, and real estate

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

This chart does not represent any particular target-date fund. It is meant to show how the investment mix of any target-date portfolio changes over a lifetime.

Numbers may not sum due to rounding.

Source: Oregon State Treasury and AB



Performance Summary

Year 2020

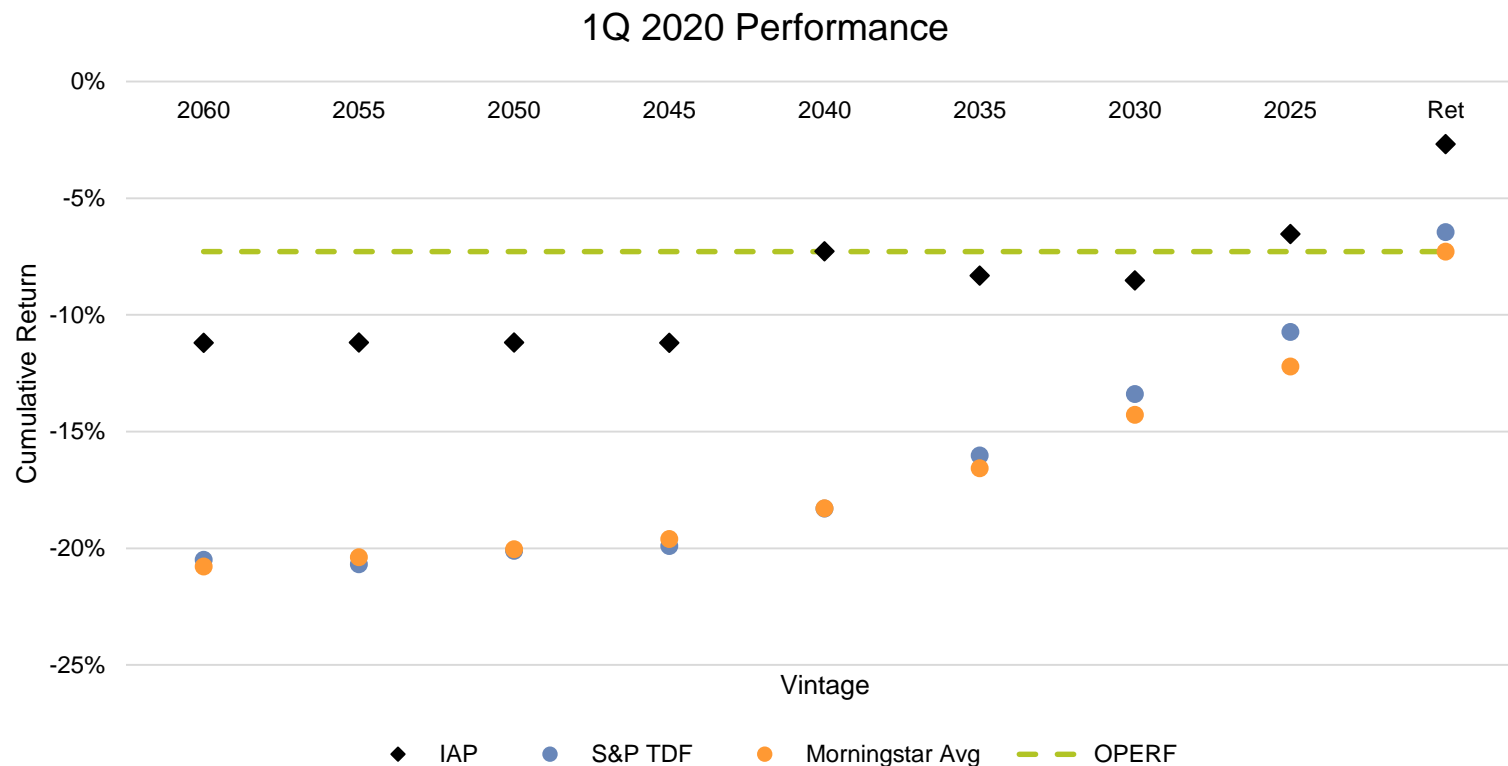
- + Strong absolute return in the year ranging from 10.51% to 6.99%
- + Underperformed peer mutual fund TDF universe during the period
 - + Outperformed during 1Q sharp equity sell-off
 - + Underperformed during the strong market recovery post 1Q
 - + Asset allocation contributed to performance when compared with S&P TDF, while manager selection detracted
- + Compared with OPERF, the glide path structure provided:
 - + Additional protection among senior members during 1Q sell-off
 - + Additional growth among young members during market recovery post 1Q

Since Inception through March 31, 2021

- + Strong absolute return. While underperformed, delivered smoother outcomes versus peers
 - + Outperformed peers during sharp equity sell-offs
 - + Underperformed peers during Bull Market periods when absolute return was strong

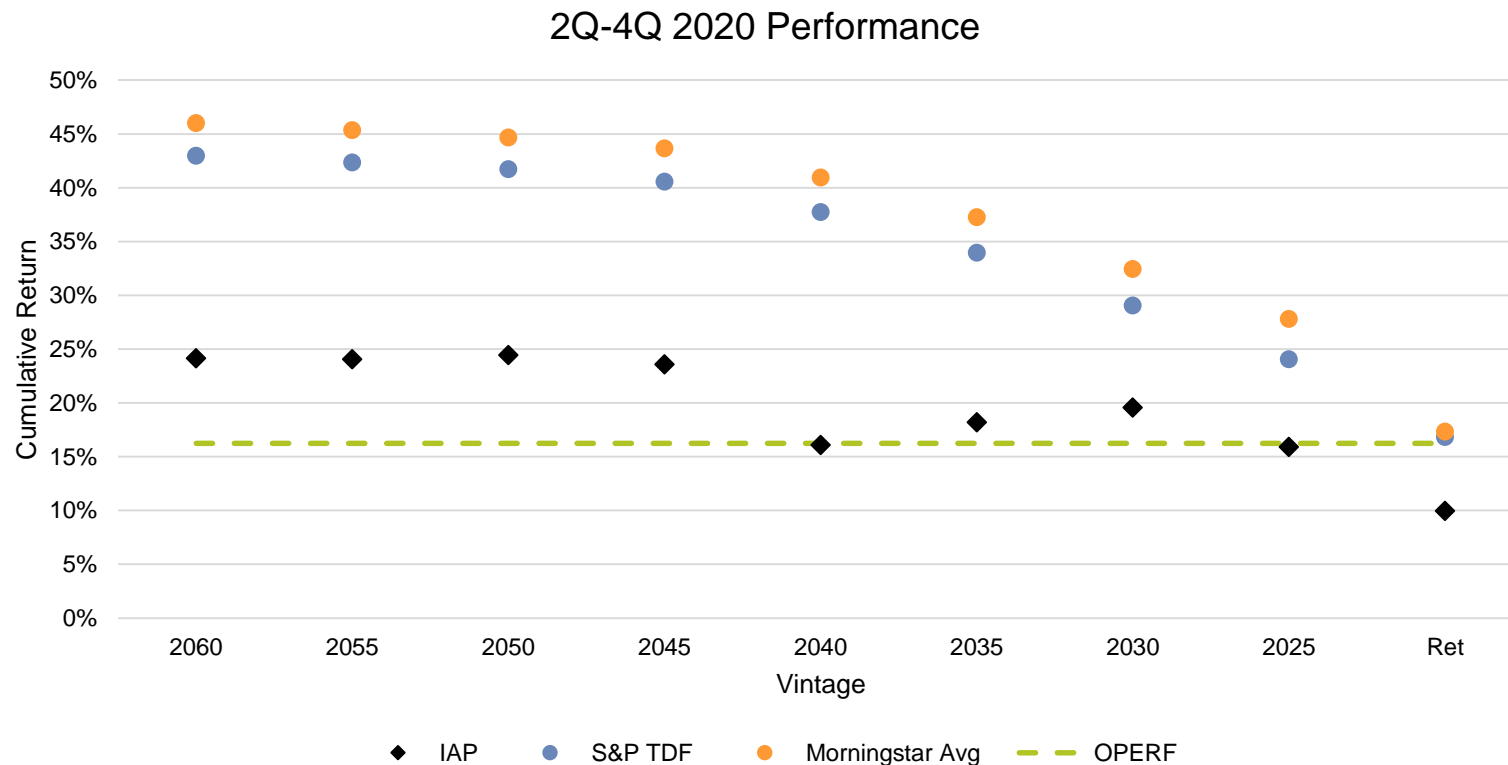
IAP Outperformed Peer Mutual Fund TDF Universe In Sharp Equity Sell-Offs

- + Diversifying OPERF exposure outperformed global equity during 4Q18 and 1Q20 sharp equity sell-offs, positively contributed to performance
- + For senior members: IAP lower return/risk profile vs. OPERF further enhances risk control



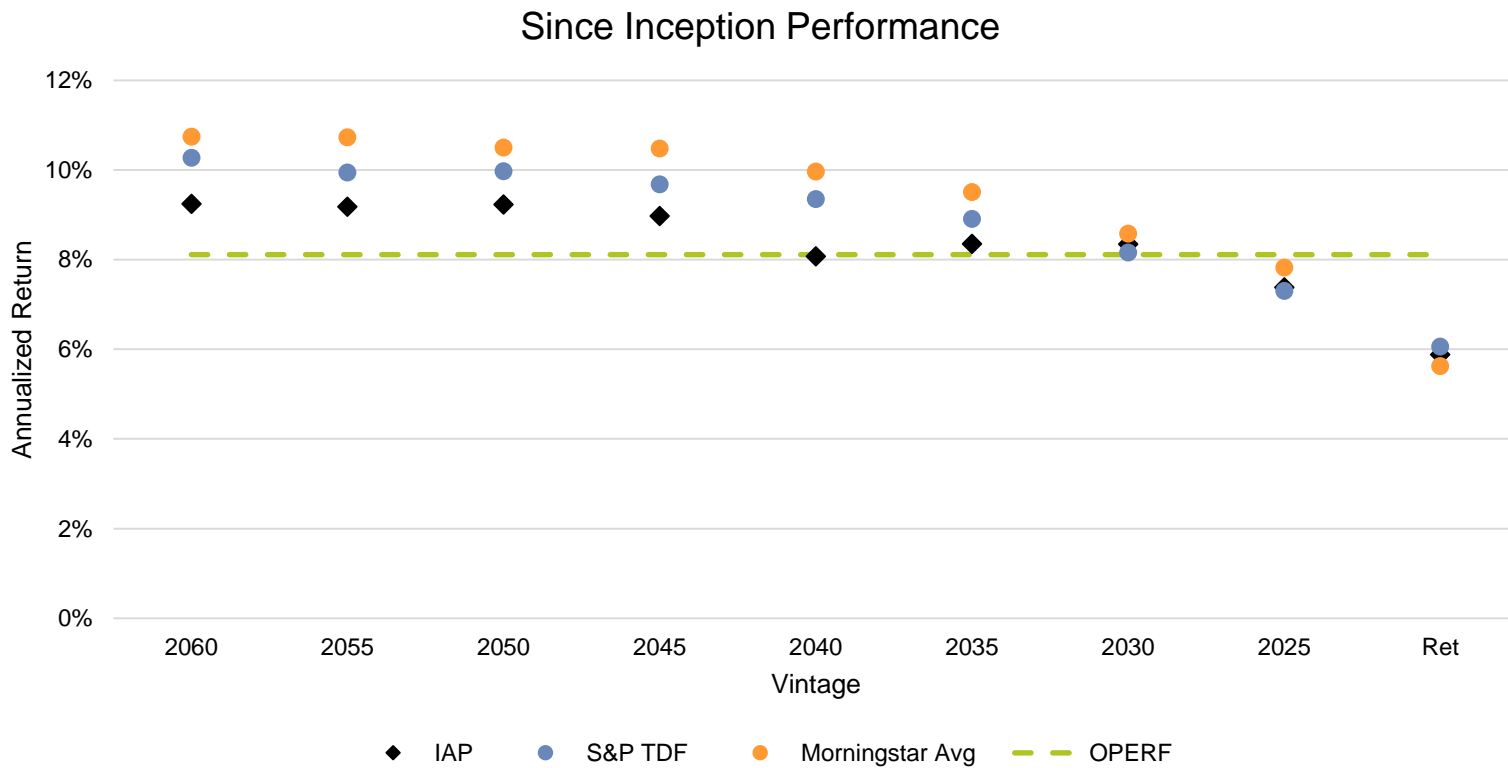
IAP Underperformed Peer Mutual Fund TDF Universe In Bull Market Periods

- + Diversifying OPERF exposure underperformed global equity during year 2019 Bull Market, and strong market recovery post 1Q20
- + For young members: IAP higher return/risk profile vs. OPERF further enhances growth potential



IAP Underperformed Peer Mutual Fund TDF Universe Since Inception

- + Asset allocation on average positively contributed to performance when compared with S&P TDF
- + Manager selection detracted as OPERF underperformed its custom benchmark over the period

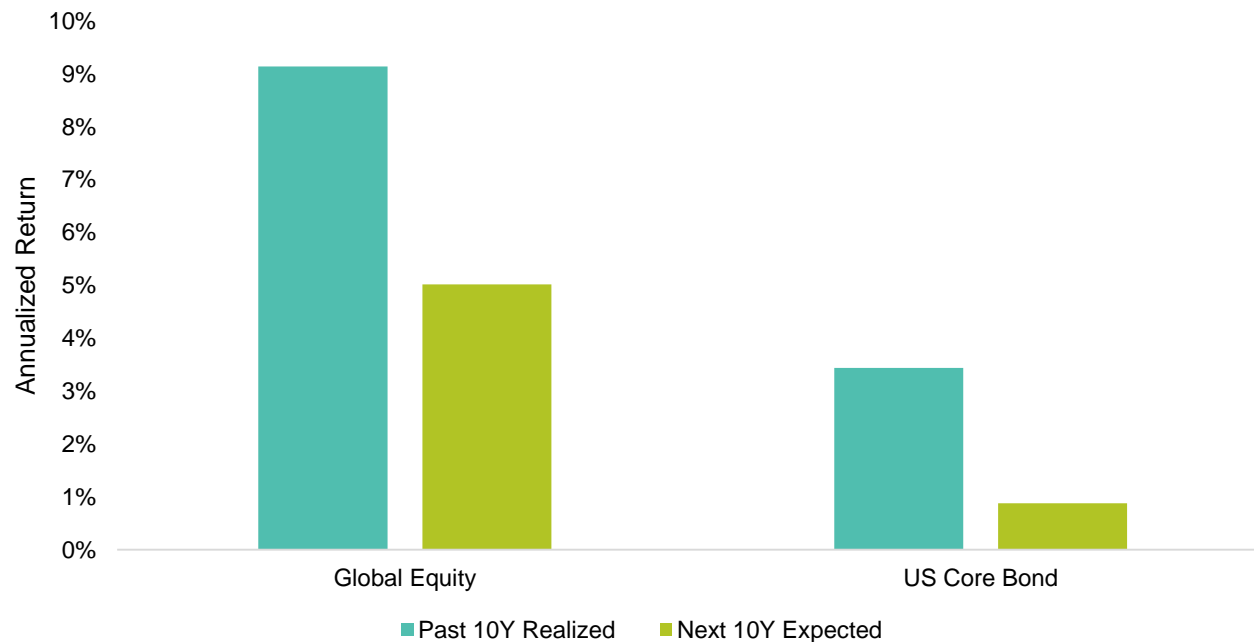


As of March 31, 2021



Diversification Is Key In The Expected Challenging Market Environment

- + Looking forward: expected lower growth, lower yield, higher inflation uncertainty
- + Less diversified stock / bond portfolio, while delivering strong performance in the past 10 years, may fail to deliver the return and risk control members need for the next 10 years
- + IAP members are better positioned versus peers going forward, given their diversifying private / alternative exposure within the glide path



Summary Of Recent Member “Choice” Activities

- + Among members who made an active “choice”:
 - + There is roughly a 50/50 split between those who moved to a more aggressive vs. more conservative vintage
 - + 44% moved to an adjacent vintage while the rest moved further way from their default vintage

	2065/ 2060	2055	2050	2045	2040	2035	2030	2025	Ret
# of Account Transfers	12	36	63	113	189	274	253	98	0
% of Total Active Members*	0.4%	0.3%	0.4%	0.5%	0.8%	1.1%	1.1%	0.4%	0.0%

* Number of active members is sourced from IAP 2016 Annual Statement

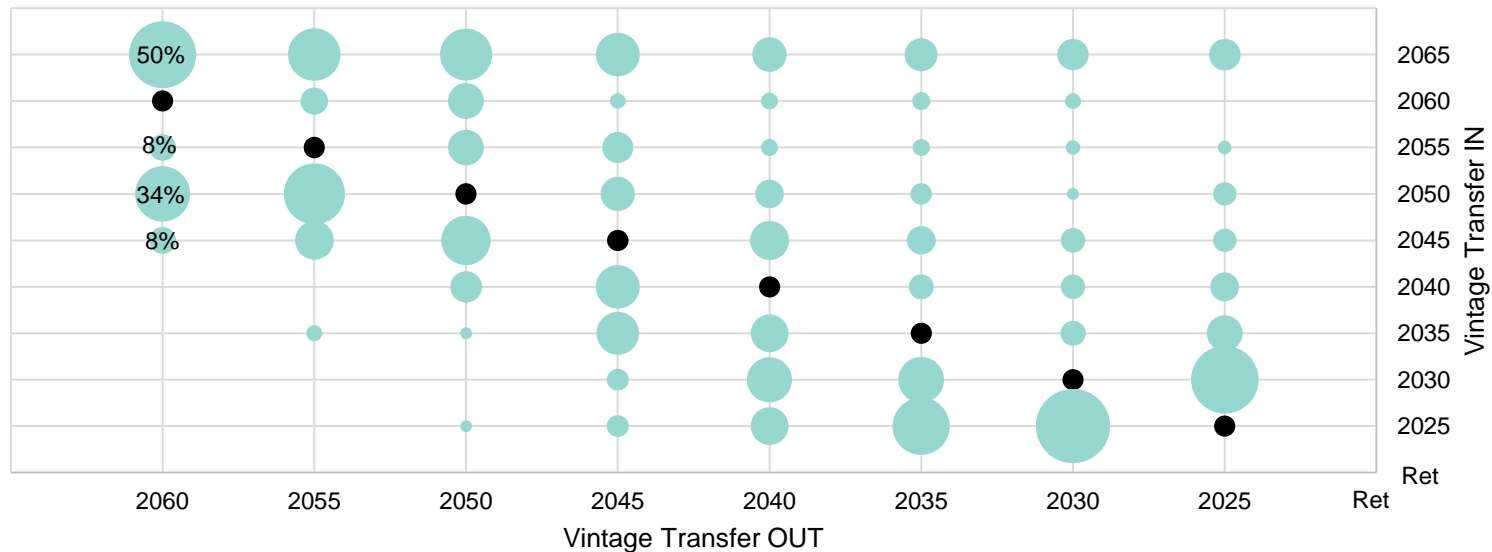


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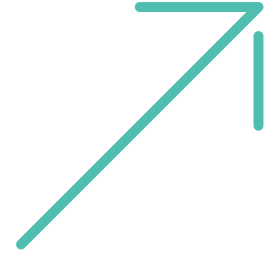
	2065/ 2060	2055	2050	2045	2040	2035	2030	2025	Ret
# of Account Transfers	12	36	63	113	189	274	253	98	0
% of Total Active Members*	0.4%	0.3%	0.4%	0.5%	0.8%	1.1%	1.1%	0.4%	0.0%

Recent Member “Choice” Activities



* Number of active members is sourced from IAP 2016 Annual Statement





Appendix

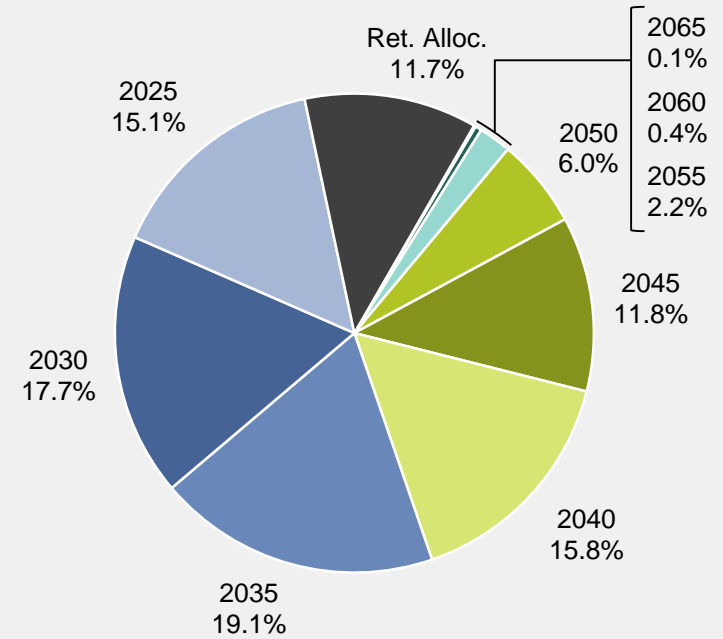
Summary

Oregon IAP

Target-Date Funds

- + Beginning Assets: \$ 10,878,975,224
- + Net Flows: \$ 550,521
- + Investment Gain (Loss): \$ 472,056,552
- + Ending Assets: \$ 11,351,582,297

Distribution by Vintage



As of March 31, 2021
Source: State Street Bank



Performance Summary

Oregon IAP

	Periods Ended March 31, 2021						Inception Date
	1Q 2021	YTD 2021	One Year	Three Year	Five Year	Since Inception	
IAP 2065 Target-Date Fund	5.31	5.31	30.72	—	—	14.22	12/31/2019
2065 Custom Benchmark	3.64	3.64	31.73	—	—	15.08	
<i>Relative Return</i>	<i>1.67</i>	<i>1.67</i>	<i>(1.01)</i>	—	—	<i>(0.86)</i>	
IAP 2060 Target-Date Fund	5.40	5.40	30.85	9.90	—	9.24	12/29/2017
2060 Custom Benchmark	3.64	3.64	31.73	10.63	—	10.00	
<i>Relative Return</i>	<i>1.76</i>	<i>1.76</i>	<i>(0.88)</i>	<i>(0.73)</i>	—	<i>(0.76)</i>	
Broad Benchmarks							12/29/2017
S&P 500 Index	6.17	6.17	56.35	16.78	—	15.10	
MSCI ACWI ex US	3.49	3.49	49.41	6.51	—	5.60	
Bloomberg Barclays US Aggregate Index	(3.37)	(3.37)	0.71	4.65	—	3.81	
OPERF Component	5.31	5.31	22.11	8.58	—	8.08	

All portfolio performance calculations are net of fees and are expressed as percentages. Periods of more than one year are annualized. Numbers may not sum due to rounding. The benchmark for a Target-Date Portfolio is a customized benchmark that has the same target asset allocation as the Portfolio's target asset allocation and uses index returns to represent performance of the asset classes. The benchmark returns were calculated by weighting the monthly index returns of each asset class by the Portfolio's monthly target allocation for each asset class. Target allocations adjust quarterly in accordance with the Portfolio's standard glide path. The Russell 3000® Index is used to represent Domestic Equities, the MSCI ACWI ex USA IMI Index is used to represent International Equities, the Bloomberg Barclays US Aggregate Bond Index is used to represent Core Bonds, the Bloomberg Barclays 1-10 Year Government Inflation-Linked Bond Index is used to represent Treasury Inflation-Protected Securities (TIPS), the Bloomberg Barclays US 1-3 Year Government/Credit Bond Index is used to represent Short-Duration Bonds, and the OPERF Policy Benchmark is used to represent OPERF, which is a fund managed by the Oregon State Treasury and is comprised of public and private equity, fixed income, alternatives and real estate. The current OPERF Policy Benchmark is comprised of 33.5% of the MSCI ACWI IMI Net Index, 19% of the Russell 3000® Index + 3%, one quarter lagged, 20% of the Oregon Custom Fixed Income Benchmark (comprised of 46% of the Bloomberg Barclays Aggregate Bond Index, 37% of the Bloomberg Barclays Treasury Index, 4% of the ICE BofA ML High Yield Master II Index and 13% of the S&P/LSTA Index), 2.5% of the S&P Risk Parity Index - 12% Target Volatility, 12.5% of the Oregon Custom Real Estate Benchmark (comprised of NFI-ODCE Index, one quarter lagged (net of fees)) and 12.5% of the CPI + 4%.

Source: State Street Bank, Oregon State Treasury and AB"

Performance Summary

Oregon IAP

	Periods Ended March 31, 2021						Inception Date
	1Q 2021	YTD 2021	One Year	Three Year	Five Year	Since Inception	
IAP 2055 Target-Date Fund	5.36	5.36	30.72	9.85	—	9.18	12/29/2017
2055 Custom Benchmark	3.64	3.64	31.73	10.63	—	10.00	
Relative Return	1.72	1.72	(1.01)	(0.78)	—	(0.82)	
IAP 2050 Target-Date Fund	5.33	5.33	31.06	9.92	—	9.23	12/29/2017
2050 Custom Benchmark	3.64	3.64	31.73	10.63	—	10.00	
Relative Return	1.69	1.69	(0.67)	(0.71)	—	(0.77)	
Broad Benchmarks							12/29/2017
S&P 500 Index	6.17	6.17	56.35	16.78	—	15.10	
MSCI ACWI ex US	3.49	3.49	49.41	6.51	—	5.60	
Bloomberg Barclays US Aggregate Index	(3.37)	(3.37)	0.71	4.65	—	3.81	
OPERF Component	5.31	5.31	22.11	8.58	—	8.08	

All portfolio performance calculations are net of fees and are expressed as percentages. Periods of more than one year are annualized. Numbers may not sum due to rounding.

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The Russell 3000® Index is used to represent Domestic Equities, the MSCI ACWI ex USA IMI Index is used to represent International Equities, the Bloomberg Barclays US Aggregate Bond Index is used to represent Core Bonds, the Bloomberg Barclays 1-10 Year Government Inflation-Linked Bond Index is used to represent Treasury Inflation-Protected Securities (TIPS), the Bloomberg Barclays US 1-3 Year Government/Credit Bond Index is used to represent Short-Duration Bonds, and the OPERF Policy Benchmark is used to represent OPERF, which is a fund managed by the Oregon State Treasury and is comprised of public and private equity, fixed income, alternatives and real estate. The current OPERF Policy Benchmark is comprised of 33.5% of the MSCI ACWI IMI Net Index, 19% of the Russell 3000® Index + 3%, one quarter lagged, 20% of the Oregon Custom Fixed Income Benchmark (comprised of 46% of the Bloomberg Barclays Aggregate Bond Index, 37% of the Bloomberg Barclays Treasury Index, 4% of the ICE BofA ML High Yield Master II Index and 13% of the S&P/LSTA Index), 2.5% of the S&P Risk Parity Index - 12% Target Volatility, 12.5% of the Oregon Custom Real Estate Benchmark (comprised of NFI-ODCE Index, one quarter lagged (net of fees)) and 12.5% of the CPI + 4%.

Source: State Street Bank, Oregon State Treasury and AB"



Performance Summary

Oregon IAP

	Periods Ended March 31, 2021						Inception Date
	1Q 2021	YTD 2021	One Year	Three Year	Five Year	Since Inception	
IAP 2045 Target-Date Fund	5.32	5.32	30.15	9.65	—	8.97	12/29/2017
2045 Custom Benchmark	3.53	3.53	30.96	10.41	—	9.80	
<i>Relative Return</i>	1.79	1.79	(0.81)	(0.76)	—	(0.83)	
IAP 2040 Target-Date Fund	5.27	5.27	22.20	8.60	—	8.07	12/29/2017
2040 Custom Benchmark	3.10	3.10	23.81	9.72	—	9.26	
<i>Relative Return</i>	2.17	2.17	(1.61)	(1.12)	—	(1.19)	
Broad Benchmarks							12/29/2017
S&P 500 Index	6.17	6.17	56.35	16.78	—	15.10	
MSCI ACWI ex US	3.49	3.49	49.41	6.51	—	5.60	
Bloomberg Barclays US Aggregate Index	(3.37)	(3.37)	0.71	4.65	—	3.81	
OPERF Component	5.31	5.31	22.11	8.58	—	8.08	

All portfolio performance calculations are net of fees and are expressed as percentages. Periods of more than one year are annualized. Numbers may not sum due to rounding. The benchmark for a Target-Date Portfolio is a customized benchmark that has the same target asset allocation as the Portfolio's target asset allocation and uses index returns to represent performance of the asset classes. The benchmark returns were calculated by weighting the monthly index returns of each asset class by the Portfolio's monthly target allocation for each asset class. Target allocations adjust quarterly in accordance with the Portfolio's standard glide path. The Russell 3000® Index is used to represent Domestic Equities, the MSCI ACWI ex USA IMI Index is used to represent International Equities, the Bloomberg Barclays US Aggregate Bond Index is used to represent Core Bonds, the Bloomberg Barclays 1-10 Year Government Inflation-Linked Bond Index is used to represent Treasury Inflation-Protected Securities (TIPS), the Bloomberg Barclays US 1-3 Year Government/Credit Bond Index is used to represent Short-Duration Bonds, and the OPERF Policy Benchmark is used to represent OPERF, which is a fund managed by the Oregon State Treasury and is comprised of public and private equity, fixed income, alternatives and real estate. The current OPERF Policy Benchmark is comprised of 33.5% of the MSCI ACWI IMI Net Index, 19% of the Russell 3000® Index + 3%, one quarter lagged, 20% of the Oregon Custom Fixed Income Benchmark (comprised of 46% of the Bloomberg Barclays Aggregate Bond Index, 37% of the Bloomberg Barclays Treasury Index, 4% of the ICE BofA ML High Yield Master II Index and 13% of the S&P/LSTA Index), 2.5% of the S&P Risk Parity Index - 12% Target Volatility, 12.5% of the Oregon Custom Real Estate Benchmark (comprised of NFI-ODCE Index, one quarter lagged (net of fees)) and 12.5% of the CPI + 4%. Source: State Street Bank, Oregon State Treasury and AB"

Performance Summary

Oregon IAP

	Periods Ended March 31, 2021						Inception Date
	1Q 2021	YTD 2021	One Year	Three Year	Five Year	Since Inception	
IAP 2035 Target-Date Fund	5.07	5.07	24.18	8.88	—	8.35	12/29/2017
2035 Custom Benchmark	3.04	3.04	25.52	9.88	—	9.43	
Relative Return	2.03	2.03	(1.34)	(1.00)	—	(1.08)	
IAP 2030 Target-Date Fund	4.20	4.20	24.58	8.94	—	8.34	12/29/2017
2030 Custom Benchmark	2.47	2.47	24.76	9.48	—	8.98	
Relative Return	1.73	1.73	(0.18)	(0.54)	—	(0.64)	
Broad Benchmarks							12/29/2017
S&P 500 Index	6.17	6.17	56.35	16.78	—	15.10	
MSCI ACWI ex US	3.49	3.49	49.41	6.51	—	5.60	
Bloomberg Barclays US Aggregate Index	(3.37)	(3.37)	0.71	4.65	—	3.81	
OPERF Component	5.31	5.31	22.11	8.58	—	8.08	

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Source: State Street Bank, Oregon State Treasury and AB"

Performance Summary

Oregon IAP

	Periods Ended March 31, 2021						Inception Date
	1Q 2021	YTD 2021	One Year	Three Year	Five Year	Since Inception	
IAP 2025 Target-Date Fund	3.14	3.14	19.53	7.98	—	7.38	12/29/2017
2025 Custom Benchmark	1.67	1.67	19.82	8.50	—	7.97	
Relative Return	1.47	1.47	(0.29)	(0.52)	—	(0.59)	
IAP Retirement Allocation Fund	2.05	2.05	12.19	6.41	—	5.88	12/29/2017
Ret. Alloc. Custom Benchmark	0.89	0.89	12.83	6.94	—	6.47	
Relative Return	1.16	1.16	(0.64)	(0.53)	—	(0.59)	
Broad Benchmarks							12/29/2017
S&P 500 Index	6.17	6.17	56.35	16.78	—	15.10	
MSCI ACWI ex US	3.49	3.49	49.41	6.51	—	5.60	
Bloomberg Barclays US Aggregate Index	(3.37)	(3.37)	0.71	4.65	—	3.81	
OPERF Component	5.31	5.31	22.11	8.58	—	8.08	

All portfolio performance calculations are net of fees and are expressed as percentages. Periods of more than one year are annualized. Numbers may not sum due to rounding. The benchmark for a Target-Date Portfolio is a customized benchmark that has the same target asset allocation as the Portfolio's target asset allocation and uses index returns to represent performance of the asset classes. The benchmark returns were calculated by weighting the monthly index returns of each asset class by the Portfolio's monthly target allocation for each asset class. Target allocations adjust quarterly in accordance with the Portfolio's standard glide path. The Russell 3000® Index is used to represent Domestic Equities, the MSCI ACWI ex USA IMI Index is used to represent International Equities, the Bloomberg Barclays US Aggregate Bond Index is used to represent Core Bonds, the Bloomberg Barclays 1-10 Year Government Inflation-Linked Bond Index is used to represent Treasury Inflation-Protected Securities (TIPS), the Bloomberg Barclays US 1-3 Year Government/Credit Bond Index is used to represent Short-Duration Bonds, and the OPERF Policy Benchmark is used to represent OPERF, which is a fund managed by the Oregon State Treasury and is comprised of public and private equity, fixed income, alternatives and real estate. The current OPERF Policy Benchmark is comprised of 33.5% of the MSCI ACWI IMI Net Index, 19% of the Russell 3000® Index + 3%, one quarter lagged, 20% of the Oregon Custom Fixed Income Benchmark (comprised of 46% of the Bloomberg Barclays Aggregate Bond Index, 37% of the Bloomberg Barclays Treasury Index, 4% of the ICE BofA ML High Yield Master II Index and 13% of the S&P/LSTA Index), 2.5% of the S&P Risk Parity Index - 12% Target Volatility, 12.5% of the Oregon Custom Real Estate Benchmark (comprised of NFI-ODCE Index, one quarter lagged (net of fees)) and 12.5% of the CPI + 4%.

Source: State Street Bank, Oregon State Treasury and AB"



Performance vs. S&P Target Date Benchmarks

Oregon IAP

	Periods Ended March 31, 2021						Inception Date
	1Q 2021	YTD 2021	One Year	Three Year	Five Year	Since Inception	
IAP 2065 Target-Date Fund	5.31	5.31	30.72	—	—	14.22	12/31/2019
S&P Target Date To 2060+ Index	5.67	5.67	51.07	—	—	15.78	
<i>Relative Return</i>	<i>(0.36)</i>	<i>(0.36)</i>	<i>(20.35)</i>	—	—	<i>(1.56)</i>	
IAP 2060 Target-Date Fund	5.40	5.40	30.85	9.90	—	9.24	12/29/2017
S&P Target Date To 2060+ Index	5.67	5.67	51.07	11.57	—	10.27	
<i>Relative Return</i>	<i>(0.27)</i>	<i>(0.27)</i>	<i>(20.22)</i>	<i>(1.67)</i>	—	<i>(1.03)</i>	
IAP 2055 Target-Date Fund	5.36	5.36	30.72	9.85	—	9.18	12/29/2017
S&P Target Date To 2055 Index	5.62	5.62	50.35	11.17	—	9.94	
<i>Relative Return</i>	<i>(0.26)</i>	<i>(0.26)</i>	<i>(19.63)</i>	<i>(1.32)</i>	—	<i>(0.76)</i>	
IAP 2050 Target-Date Fund	5.33	5.33	31.06	9.92	—	9.23	12/29/2017
S&P Target Date To 2050 Index	5.47	5.47	49.46	11.23	—	9.97	
<i>Relative Return</i>	<i>(0.14)</i>	<i>(0.14)</i>	<i>(18.40)</i>	<i>(1.31)</i>	—	<i>(0.74)</i>	
IAP 2045 Target-Date Fund	5.32	5.32	30.15	9.65	—	8.97	12/29/2017
S&P Target Date To 2045 Index	5.18	5.18	47.85	10.89	—	9.68	
<i>Relative Return</i>	<i>0.14</i>	<i>0.14</i>	<i>(17.70)</i>	<i>(1.24)</i>	—	<i>(0.71)</i>	
IAP 2040 Target-Date Fund	5.27	5.27	22.20	8.60	—	8.07	12/29/2017
S&P Target Date To 2040 Index	4.63	4.63	44.10	10.54	—	9.35	
<i>Relative Return</i>	<i>0.64</i>	<i>0.64</i>	<i>(21.90)</i>	<i>(1.94)</i>	—	<i>(1.28)</i>	

All portfolio performance calculations are net of fees and are expressed as percentages. Periods of more than one year are annualized. Numbers may not sum due to rounding.

The S&P Target Date Benchmarks, provided by S&P Dow Jones Indices, are representative benchmarks for Target-Date Funds. The S&P Target Date To Indices offer style-specific measures of a "To" approach to glide path management. For additional information, please see the appendix section of this presentation.

Source: S&P and AB



Performance vs. S&P Target Date Benchmarks

Oregon IAP

	Periods Ended March 31, 2021						Inception Date
	1Q 2021	YTD 2021	One Year	Three Year	Five Year	Since Inception	
IAP 2035 Target-Date Fund	5.07	5.07	24.18	8.88	—	8.35	12/29/2017
S&P Target Date To 2035 Index	3.84	3.84	39.08	10.05	—	8.91	
<i>Relative Return</i>	1.23	1.23	(14.90)	(1.17)	—	(0.56)	
IAP 2030 Target-Date Fund	4.20	4.20	24.58	8.94	—	8.34	12/29/2017
S&P Target Date To 2030 Index	2.86	2.86	32.73	9.24	—	8.16	
<i>Relative Return</i>	1.34	1.34	(8.15)	(0.30)	—	0.18	
IAP 2025 Target-Date Fund	3.14	3.14	19.53	7.98	—	7.38	12/29/2017
S&P Target Date To 2025 Index	1.83	1.83	26.33	8.29	—	7.30	
<i>Relative Return</i>	1.31	1.31	(6.80)	(0.31)	—	0.08	
IAP Retirement Allocation Fund	2.05	2.05	12.19	6.41	—	5.88	12/29/2017
S&P Target Date To Retirement Income Index	0.37	0.37	17.26	6.92	—	6.06	
<i>Relative Return</i>	1.68	1.68	(5.07)	(0.51)	—	(0.18)	

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Source: S&P and AB



Performance vs. Morningstar Category Averages

Oregon IAP

	Periods Ended March 31, 2021						Inception Date
	1Q 2021	YTD 2021	One Year	Three Year	Five Year	Since Inception	
IAP 2065 Target-Date Fund	5.31	5.31	30.72	—	—	14.22	12/31/2019
Morningstar 2060+	5.30	5.30	53.30	—	—	16.80	
<i>Relative Return</i>	<i>0.01</i>	<i>0.01</i>	<i>(22.58)</i>	—	—	<i>(2.58)</i>	
IAP 2060 Target-Date Fund	5.40	5.40	30.85	9.90	—	9.24	12/29/2017
Morningstar 2060+	5.30	5.30	53.30	11.84	—	10.74	
<i>Relative Return</i>	<i>0.10</i>	<i>0.10</i>	<i>(22.45)</i>	<i>(1.94)</i>	—	<i>(1.50)</i>	
IAP 2055 Target-Date Fund	5.36	5.36	30.72	9.85	—	9.18	12/29/2017
Morningstar 2055	5.18	5.18	52.59	11.78	—	10.73	
<i>Relative Return</i>	<i>0.18</i>	<i>0.18</i>	<i>(21.87)</i>	<i>(1.93)</i>	—	<i>(1.55)</i>	
IAP 2050 Target-Date Fund	5.33	5.33	31.06	9.92	—	9.23	12/29/2017
Morningstar 2050	5.11	5.11	51.55	11.60	—	10.50	
<i>Relative Return</i>	<i>0.22</i>	<i>0.22</i>	<i>(20.49)</i>	<i>(1.68)</i>	—	<i>(1.27)</i>	
IAP 2045 Target-Date Fund	5.32	5.32	30.15	9.65	—	8.97	12/29/2017
Morningstar 2045	4.87	4.87	50.17	11.50	—	10.48	
<i>Relative Return</i>	<i>0.45</i>	<i>0.45</i>	<i>(20.02)</i>	<i>(1.85)</i>	—	<i>(1.51)</i>	
IAP 2040 Target-Date Fund	5.27	5.27	22.20	8.60	—	8.07	12/29/2017
Morningstar 2040	4.38	4.38	46.36	10.99	—	9.96	
<i>Relative Return</i>	<i>0.89</i>	<i>0.89</i>	<i>(24.16)</i>	<i>(2.39)</i>	—	<i>(1.89)</i>	

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Source: Morningstar and AB



Performance vs. Morningstar Category Averages

Oregon IAP

	Periods Ended March 31, 2021						Inception Date
	1Q 2021	YTD 2021	One Year	Three Year	Five Year	Since Inception	
IAP 2035 Target-Date Fund	5.07	5.07	24.18	8.88	—	8.35	12/29/2017
Morningstar 2035	3.55	3.55	41.55	10.45	—	9.51	
<i>Relative Return</i>	1.52	1.52	(17.37)	(1.57)	—	(1.16)	
IAP 2030 Target-Date Fund	4.20	4.20	24.58	8.94	—	8.34	12/29/2017
Morningstar 2030	2.65	2.65	35.24	9.53	—	8.58	
<i>Relative Return</i>	1.55	1.55	(10.66)	(0.59)	—	(0.24)	
IAP 2025 Target-Date Fund	3.14	3.14	19.53	7.98	—	7.38	12/29/2017
Morningstar 2025	1.86	1.86	29.63	8.66	—	7.82	
<i>Relative Return</i>	1.28	1.28	(10.10)	(0.68)	—	(0.44)	
IAP Retirement Allocation Fund	2.05	2.05	12.19	6.41	—	5.88	12/29/2017
Morningstar Retirement	0.29	0.29	17.63	6.37	—	5.62	
<i>Relative Return</i>	1.76	1.76	(5.44)	0.04	—	0.26	

All portfolio performance calculations are net of fees and are expressed as percentages. Periods of more than one year are annualized. Numbers may not sum due to rounding.

Source: Morningstar and AB



Underlying Component Performance

Oregon IAP

	Periods Ended March 31, 2021					
	1Q 2021	YTD 2021	One Year	Three Year	Five Year	Since Inception*
State Street Russell All Cap Index Securities Lending Series Fund Class I	6.39	6.39	62.57	17.12	—	15.47
Russell 3000 Index	6.35	6.35	62.53	17.12	—	15.45
<i>Relative Return</i>	<i>0.04</i>	<i>0.04</i>	<i>0.04</i>	<i>0.00</i>	<i>—</i>	<i>0.02</i>
State Street Global All Cap Equity Ex US Index Securities Lending Fund Class I	3.84	3.84	53.37	6.74	—	5.94
MSCI AC World ex USA IMI	3.77	3.77	51.94	6.51	—	5.64
<i>Relative Return</i>	<i>0.07</i>	<i>0.07</i>	<i>1.43</i>	<i>0.23</i>	<i>—</i>	<i>0.30</i>
State Street US Bond Index Securities Lending Fund Class I	(3.42)	(3.42)	0.76	4.72	—	3.87
Bloomberg Barclays US Aggregate Index	(3.37)	(3.37)	0.71	4.65	—	3.81
<i>Relative Return</i>	<i>(0.05)</i>	<i>(0.05)</i>	<i>0.05</i>	<i>0.07</i>	<i>—</i>	<i>0.06</i>
State Street 1-10 Year US TIPS Index Non-Lending Series Fund Class A	(0.02)	(0.02)	8.14	5.11	—	4.57
Bloomberg Barclays US Govt Inflation-Linked 1-10 Year	(0.01)	(0.01)	8.17	5.13	—	4.60
<i>Relative Return</i>	<i>(0.01)</i>	<i>(0.01)</i>	<i>(0.03)</i>	<i>(0.02)</i>	<i>—</i>	<i>(0.03)</i>
State Street US Short-Term Government/Credit Bond Index Fund	(0.05)	(0.05)	1.57	3.05	—	2.74
Bloomberg Barclays 1-3 Year Government/Credit	(0.04)	(0.04)	1.57	3.04	—	2.73
<i>Relative Return</i>	<i>(0.01)</i>	<i>(0.01)</i>	<i>0.00</i>	<i>0.01</i>	<i>—</i>	<i>0.01</i>

*Inception date is 12/29/2017 unless noted otherwise

Periods of more than one year are annualized. Numbers may not sum due to rounding. Returns expressed in percentages.

Performance for the underlying components was provided by the underlying fund managers. SSGA component performance calculations are presented gross of investment management fees and net of operating expenses.

Source: SSGA, State Street Bank, Oregon State Treasury and AB



Underlying Component Performance

Oregon IAP

	Periods Ended March 31, 2021					
	1Q 2021	YTD 2021	One Year	Three Year	Five Year	Since Inception*
Oregon Public Employees Retirement Fund (OPERF)	5.32	5.32	22.10	8.59	—	8.11
OPERF Policy Benchmark [†]	3.09	3.09	23.65	9.68	—	9.30
<i>Relative Return</i>	2.23	2.23	(1.55)	(1.09)	—	(1.19)

[†] Comprised of 33.5% of the MSCI ACWI IMI Net Index, 19% of the Russell 3000® Index + 3%, one quarter lagged, 20% of the Oregon Custom Fixed Income Benchmark (comprised of 46% of the Bloomberg Barclays Aggregate Bond Index, 37% of the Bloomberg Barclays Treasury Index, 4% of the ICE BofA ML High Yield Master II Index and 13% of the S&P/LSTA Index), 2.5% of the S&P Risk Parity Index - 12% Target Volatility, 12.5% of the Oregon Custom Real Estate Benchmark (comprised of NFI-ODCE Index, one quarter lagged (net of fees)) and 12.5% of the CPI + 4%

*Inception date is 12/29/2017 unless noted otherwise

Periods of more than one year are annualized. Numbers may not sum due to rounding. Returns expressed in percentages.

Performance for the underlying components was provided by the underlying fund managers. SSGA component performance calculations are presented gross of investment management fees and net of operating expenses.

Source: SSGA, State Street Bank, Oregon State Treasury and AB



Summary: Oregon Demographics

+ Standard Goals & Risk Tolerance

- + Providing long-term real asset growth while working
- + Prolonging savings in retirement
- + Mitigating member risk especially when approaching and while in retirement

+ Demographic Summary

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

+ Target total replacement rate

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



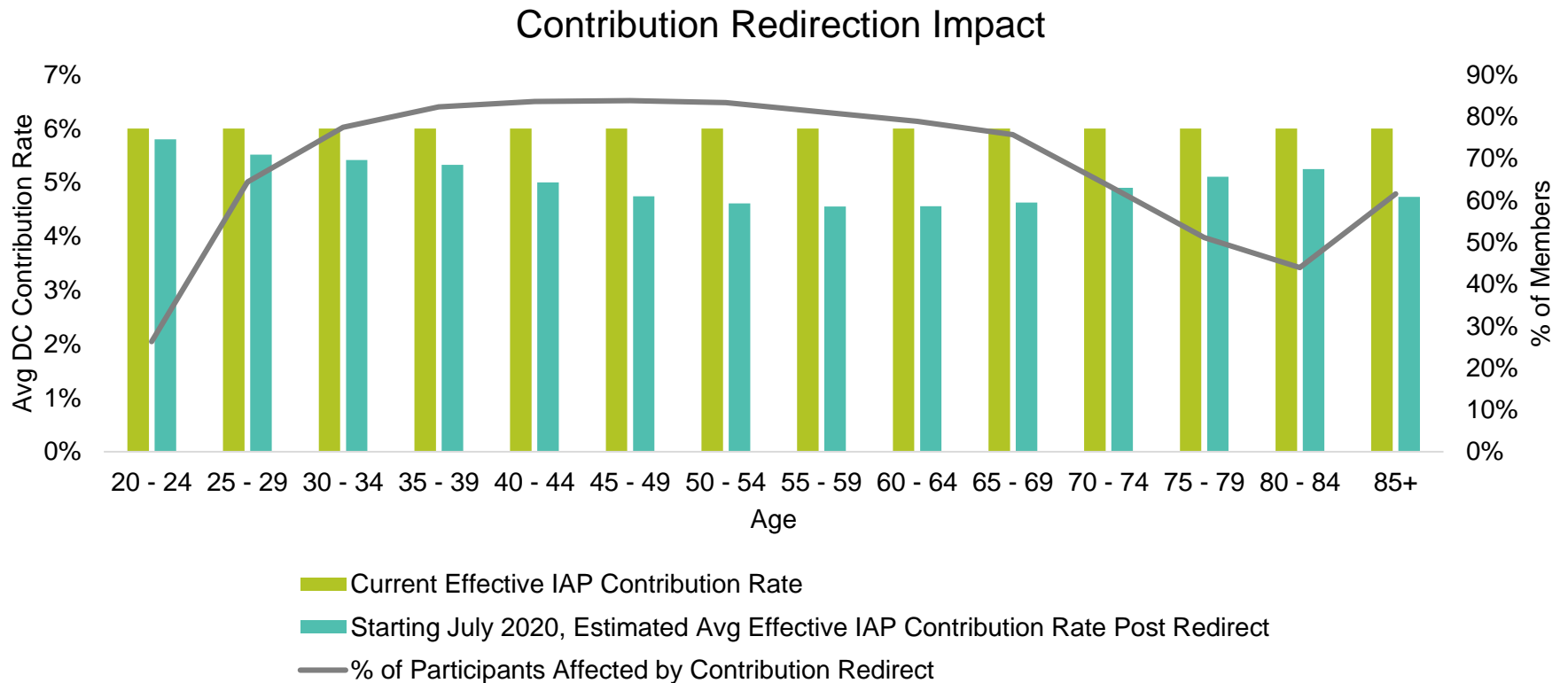
* Used average retirement age of 65 in glide path modeling and analysis

IAP Member Contribution Redirect

- + Current IAP member contribution amount is 6.0%
- + Effectively July 2020, the following IAP member contribution amounts will be redirected to Employee Pension Stability Account (EPSA):
 - + Members with annual salary \geq \$30,000
 - + Tier One / Tier Two: 2.50%
 - + OPSRP: 0.75%
 - + Members with annual salary $<$ \$30,000
 - + Tier One / Tier Two / OPSRP: 0.0%
- + Allows voluntary member contribution to IAP on an after-tax basis in amount equal to EPSA redirect contribution
 - + Not considered in the assessment as no data is available. Should assess in the future as data becomes available

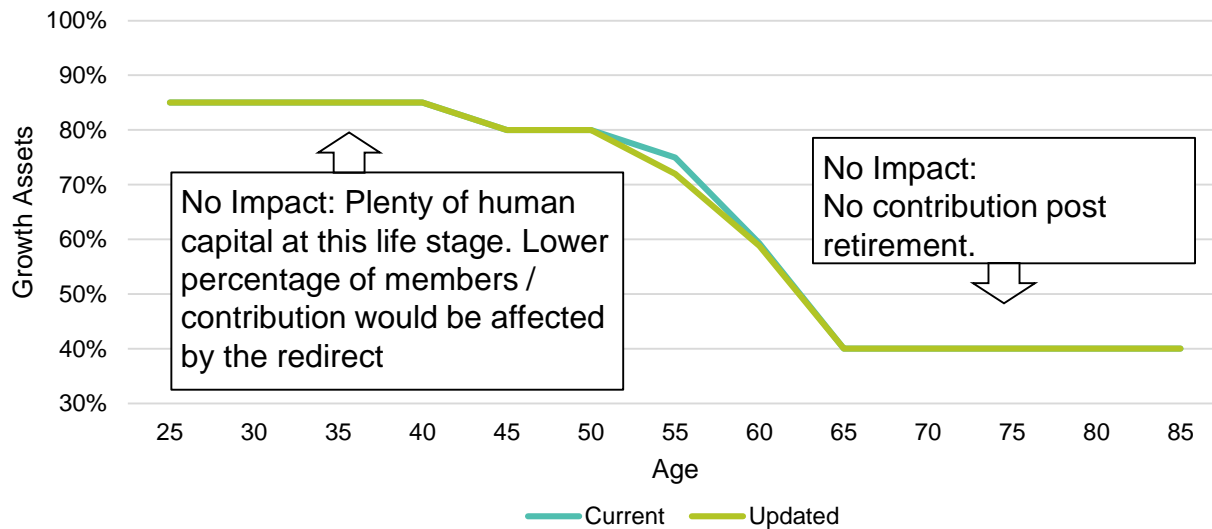
Redirect Impact on Average IAP Contribution Rate

- + On average, the redirect has the most impact for members within age bucket 50-69 (average contribution reduction of 1.4%)
- + Young members will be affected the least due to lower salary level



Redirect Impact on Glide Path Design

- + Members' total assets are comprised of low-risk human capital and high-risk financial capital. To keep overall risk budget the same, lower future contribution, i.e. human capital, reduces members' risk capacity in their financial capital at age 55 & 60, leads to lower growth exposure
- + Growth allocation at age 50 would have been reduced modestly, however, downside risk is already muted due to the existing OPERF allocation



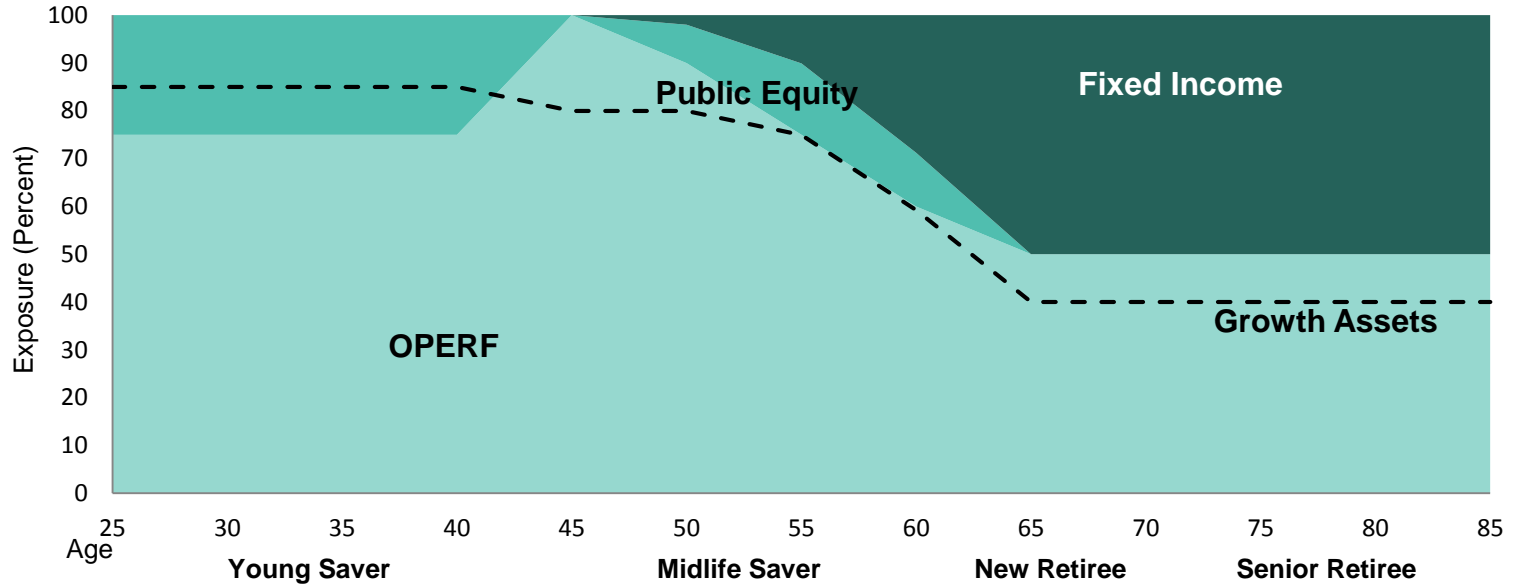
	Total Growth Assets*												
	25	30	35	40	45	50	55	60	65	70	75	80	85
Current	85.0%	85.0%	85.0%	85.0%	80.0%	80.0%	75.0%	59.3%	40.0%	40.0%	40.0%	40.0%	40.0%
Updated	85.0%	85.0%	85.0%	85.0%	80.0%	80.0%	72.0%	58.8%	40.0%	40.0%	40.0%	40.0%	40.0%
Change	-	-	-	-	-	-	-3.0%	-0.5%	-	-	-	-	-



* 80% of OPERF allocation is counted as growth assets

Glide Path Construction

Current



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

*OPERF is managed by the OST under the direction of the OIC and contains a mix of the following asset classes: public and private equity, fixed income, alternatives, and real estate

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

This chart does not represent any particular target-date fund. It is meant to show how the investment mix of any target-date portfolio changes over a lifetime.

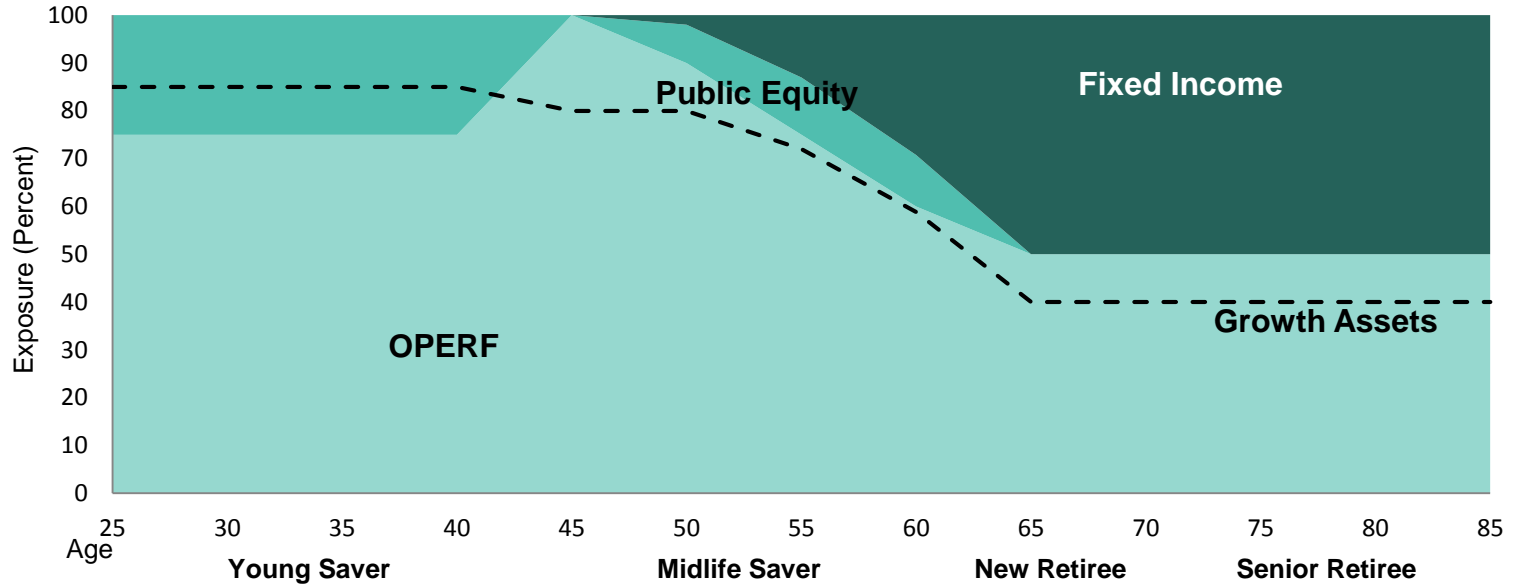
Numbers may not sum due to rounding.

Source: Oregon State Treasury and AB



Glide Path Construction

Updated



	25	30	35	40	45	50	55	60	65	70	75	80	85
US All Market Equity	15.00	15.00	15.00	15.00	-	5.10	7.90	7.35	-	-	-	-	-
ACWI ex US Equity	10.00	10.00	10.00	10.00	-	2.90	4.10	3.45	-	-	-	-	-
Core Bond	-	-	-	-	-	2.00	9.95	16.55	18.65	18.65	18.65	18.65	18.65
TIPS	-	-	-	-	-	-	3.05	8.30	12.05	12.05	12.05	12.05	12.05
Short Duration Bond	-	-	-	-	-	-	-	4.35	19.30	19.30	19.30	19.30	19.30
OPERF*	75.00	75.00	75.00	75.00	100.00	90.00	75.00	60.00	50.00	50.00	50.00	50.00	50.00
Public Equity	25.00	25.00	25.00	25.00	-	8.00	12.00	10.80	-	-	-	-	-
Fixed Income	-	-	-	-	-	2.00	13.00	29.20	50.00	50.00	50.00	50.00	50.00
OPERF	75.00	75.00	75.00	75.00	100.00	90.00	75.00	60.00	50.00	50.00	50.00	50.00	50.00
Total Growth Assets**	85.00	85.00	85.00	85.00	80.00	80.00	72.00	58.80	40.00	40.00	40.00	40.00	40.00

*OPERF is managed by the OST under the direction of the OIC and contains a mix of the following asset classes: public and private equity, fixed income, alternatives, and real estate

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

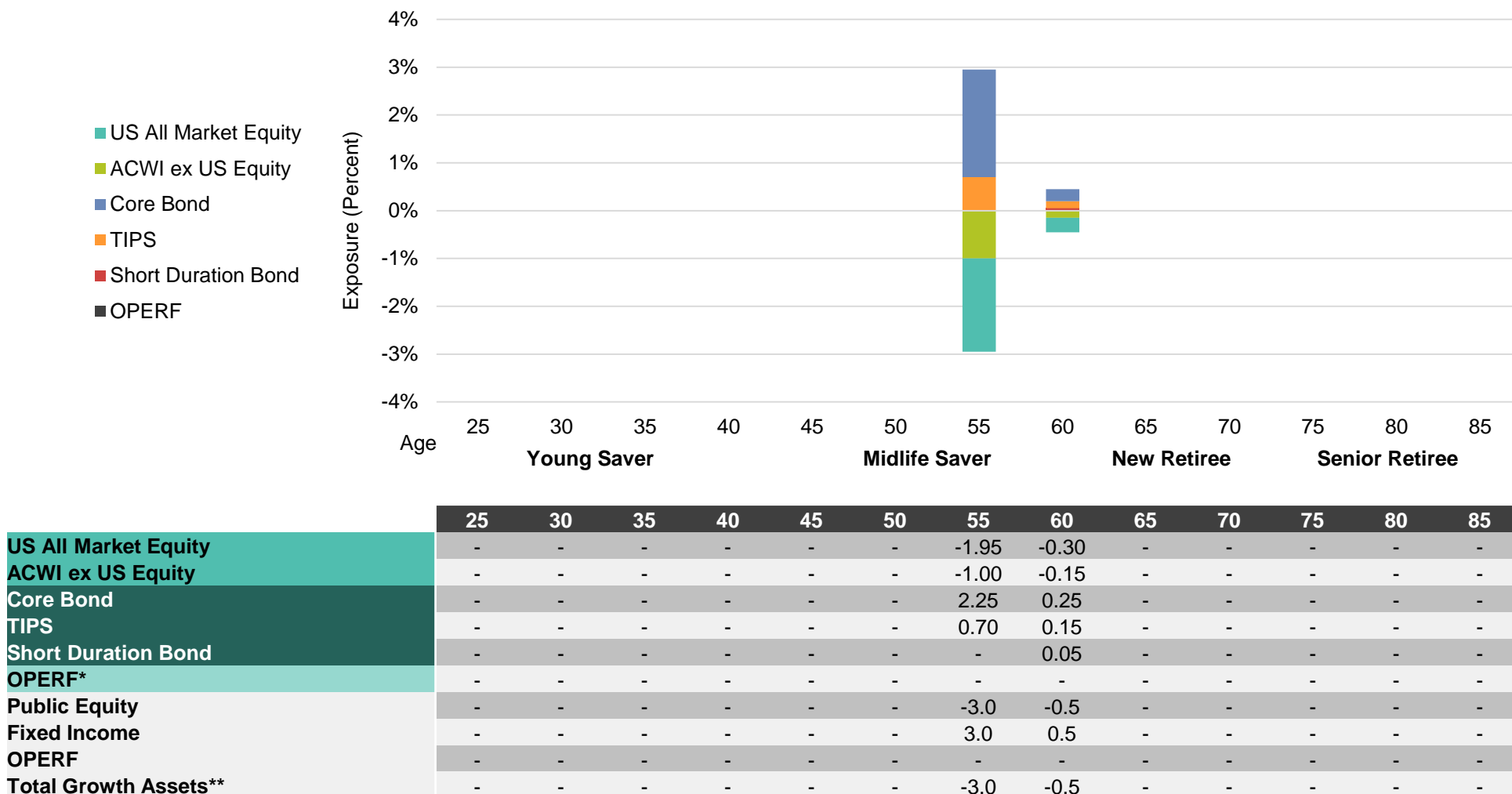
This chart does not represent any particular target-date fund. It is meant to show how the investment mix of any target-date portfolio changes over a lifetime.

Numbers may not sum due to rounding.

Source: Oregon State Treasury and AB



Updated Minus Current Glide Path



*OPERF is managed by the OST under the direction of the OIC and contains a mix of the following asset classes: public and private equity, fixed income, alternatives, and real estate

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

This chart does not represent any particular target-date fund. It is meant to show how the investment mix of any target-date portfolio changes over a lifetime.

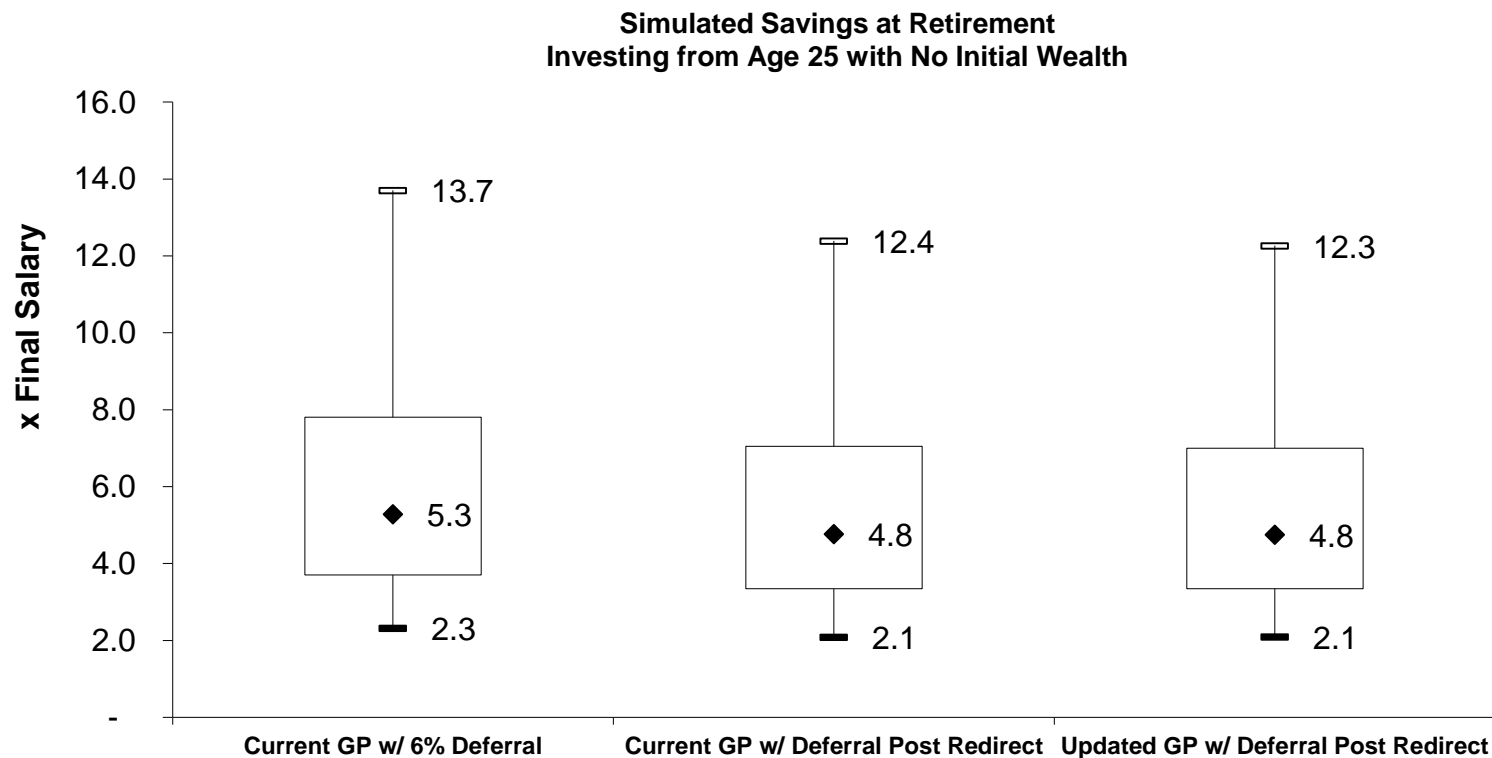
Numbers may not sum due to rounding.

Source: Oregon State Treasury and AB



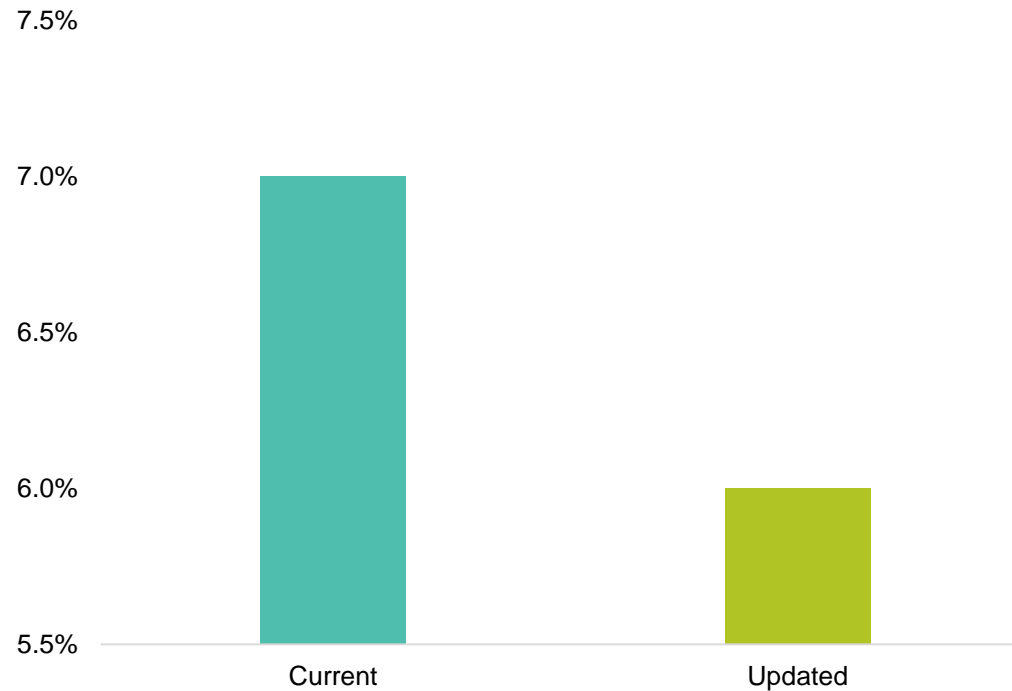
The Update Is Expected to Have Insignificant Impact on Long-Term Outcome

- + Contribution redirect will lower the outcome range; however, given defined benefit and social security are expected to have an average replacement ratio of 80%, the impact on plan members' overall retirement income is small



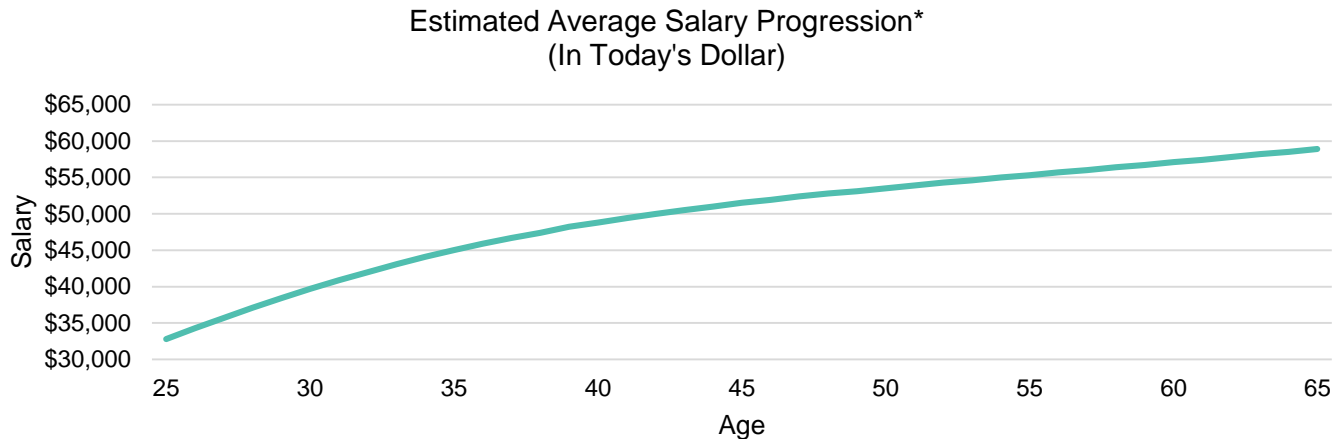
The Update Aims to Help Marginally Reduce The Probability of Experiencing Large Loss for Midlife Members

Probability of Current 50-Years-Old Suffering From Annual Loss More Than 20% Prior to Retirement



Limited Number of Members Will Be Affected by The New FAS Limit

- + Final Salary Average used to calculate benefits would be limited to \$195,000 for service on or after Jan 1, 2020
- + AB estimated average final salary level is well below the limit



- + Milliman projected less than 1% of members will be affected by the limit among Tier 1 / Tier2 / OPSRP members

	% active members with projected 2018 salary > \$195,000**
Tier 1	0.8%
Tier 2	0.3%
OPSRP	0.2%
Weighted Average	0.3%

- + Given the limited number of members that will be affected by this change, it has no impact on glide path design

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

** 2017 Milliman projection based on demographic data as of December 31, 2017.

Additional S&P Target Date Benchmarks Information

The S&P Target Date Benchmark is a product of S&P Dow Jones Indices LLC (“SPDJI”), and has been licensed for use by AB. Standard & Poor’s® and S&P® are registered trademarks of Standard & Poor’s Financial Services LLC (“S&P”); Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC (“Dow Jones”); These trademarks are trademarks of the licensor; and these trademarks have been licensed for use by SPDJI and sublicensed for certain purposes by AB. AB’s product(s) is not sponsored, endorsed, sold or promoted by SPDJI, Dow Jones, S&P, their respective affiliates and none of such parties make any representation regarding the advisability of investing in such product(s) nor do they have any liability for any errors, omissions, or interruptions of the S&P Target Date Benchmark

For more information on these indices, please visit www.SPIndices.com

Disclosure

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TAB 7 – Operational Annual Review

June 2, 2021

Investment Operations

Dave Randall

Chief Investment Operating Officer

Debra Day

Investment Reporting Manager

Kristi Jenkins

Investment Operations Manager



OREGON
STATE
TREASURY

Investment Operations

Annual Update



Investment Operations

Annual Update



Executive Summary

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

Continued utilization of Blackrock's Aladdin platform and the evolution and maturation of dedicated OST operational staff have enabled Investment Officers to focus on informed decision-making

A number of improvements to infrastructure and investment management capabilities have been made in the following areas:

- Internal Asset Management
- Trade Operations
- Financial Reporting
- Data Integrity

Background - Audit and Peer Reviews

Common theme of findings

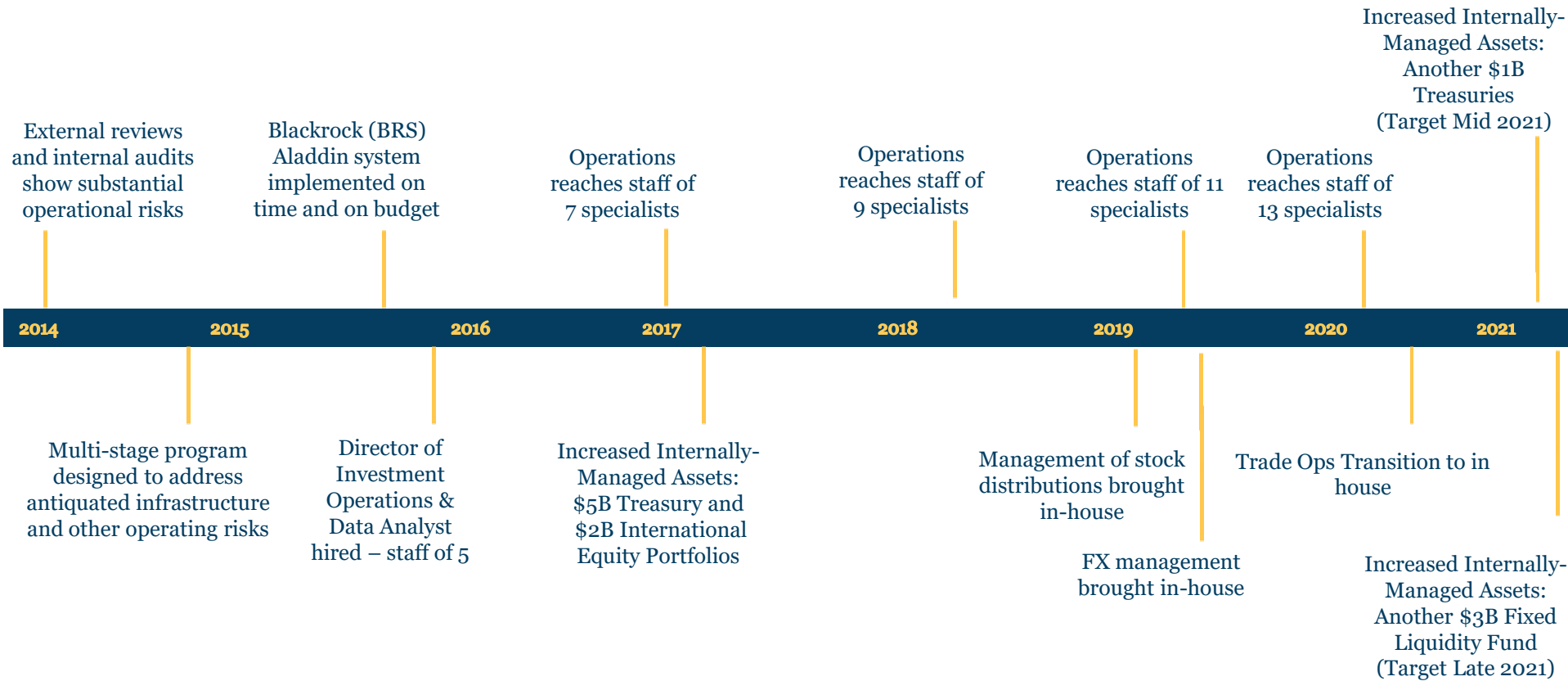
- The investment division was significantly under-resourced relative to the size and complexity of its asset management responsibilities.
- This gap created substantial and avoidable risks.
- Given its fiduciary obligations, the Council determined that the status quo was untenable.

ANALYSES

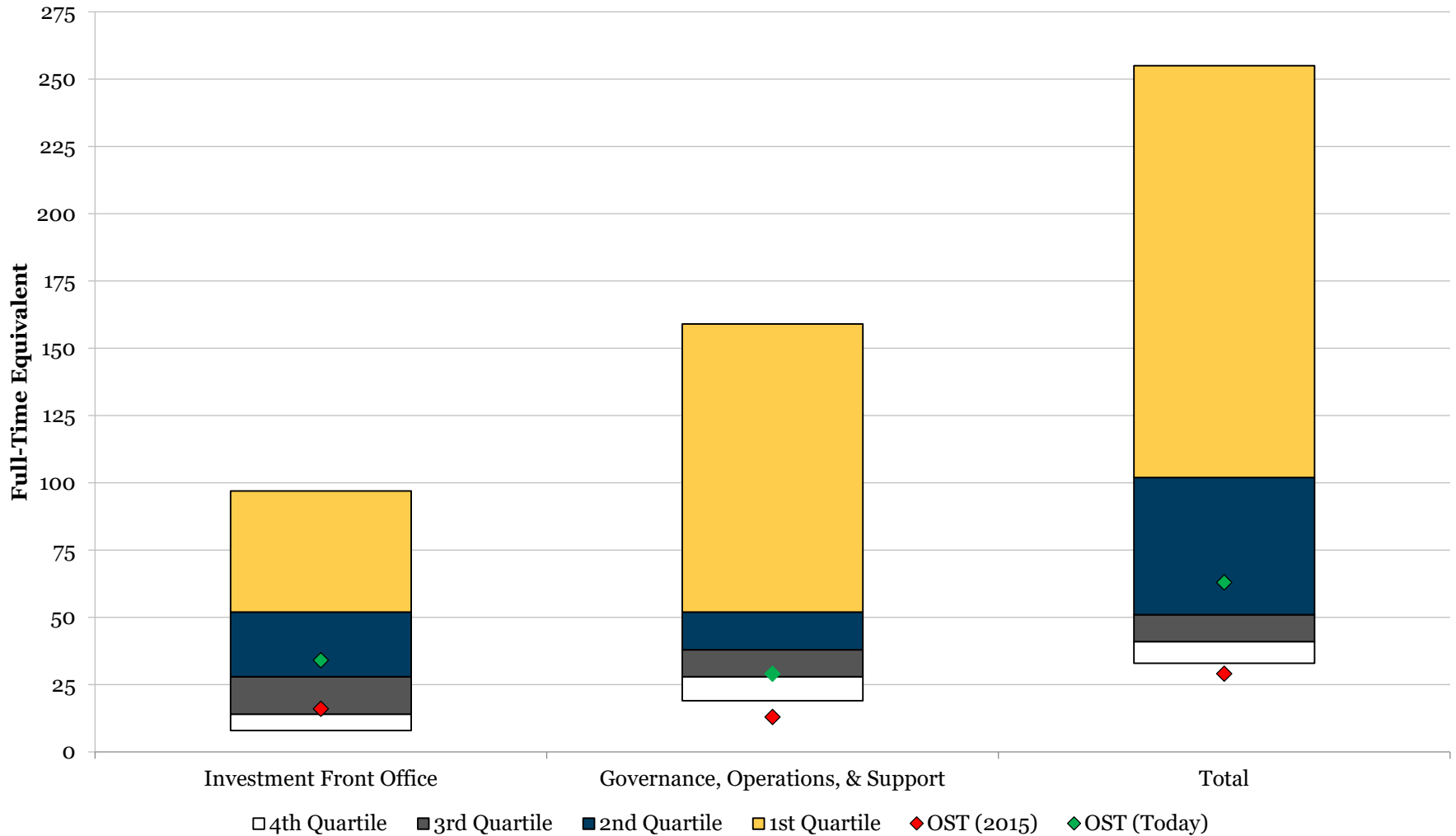
CUTTER (2011-14)
FUNSTON ADVISORY SERVICES (2012)
HEWITT ENNIS KNUPP (2012)
CORTEX (2012)
OST INTERNAL AUDIT (2013)
CEM BENCHMARKING (ANNUAL)
WILSHIRE/TRUST UNIVERSE COMPARISON
SERVICE (ANNUAL)

Background - Timeline

The Investment Division has undergone a multi-year business transformation that includes 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 15 FTEs across Investment Accounting, Performance, Reporting, Reconciliation, Trade Operations, and Data Management.



OST Staffing Compared to Peers



Rankings based on custom peer group of 9 funds of similar size and portfolio composition.

Source: CEM Benchmarking, September 2020 report.

Investment Operations Org Chart - 2015



David Randall
Director of Investment3
Operations



Debra Day
Investment Reporting
Manager



Roy Jackson
Senior Investment
Accountant



Jo Recht
Senior Investment
Accountant



Mark Selfridge
Data Investment
Analyst

Investment Accounting

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

Data Mgmt/Performance /Reconciliation

- Data Integrity
- Security Master
- Security Characteristic
- Analytics
- Custodial Review
- Reporting

Investment Operations Organizational Chart




David Randall
Chief Investment
Operating Officer

VACANT
Executive Support
Specialist



Debra Day
Investment Reporting
Manager



Kristi Jenkins
Investment Operations
Manager



Roy Jackson
Senior Investment
Accountant




Jo Recht
Senior Investment
Accountant




Mark Selfridge
Data Investment
Analyst



Tyler Bernstein
Investment Analyst



Mohammed Quraishi
Trade Support Analyst



Caitlyn Wang
Data Investment
Analyst



Monique Sadegh
Investment
Accountant




Tim Miller
Investment
Reporting Analyst




Aliese Jacobsen
Trade Support Analyst



Tiffany Zahas
Trade Support Analyst



Kenny Bao
Investment Analyst



Tan Cao
Investment Analyst

VACANT
Investment Analyst

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

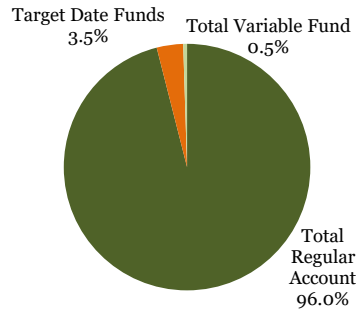
- Data Integrity
- Security Master
- Security Characteristic
- Analytics

Assets Under Management

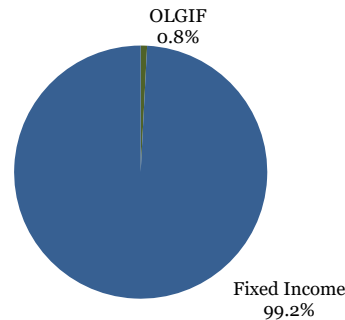
As of 3/31/2021

\$121.8
BILLION

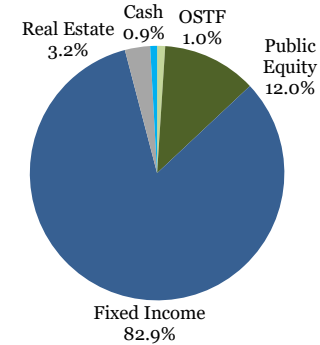
Public Employee Retirement
\$89.1 Billion



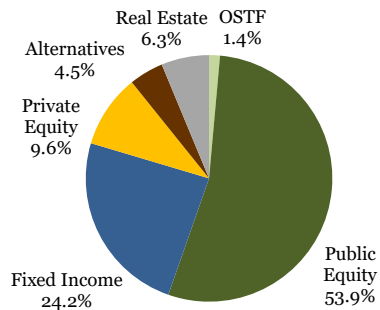
Oregon Short-Term Fund
OSTF - \$27.5 Billion



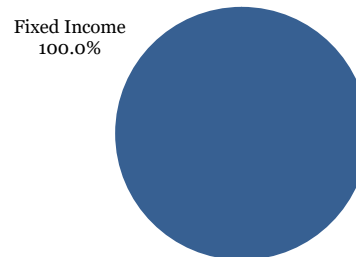
State Accident Insurance Fund
SAIF - \$5.0 Billion



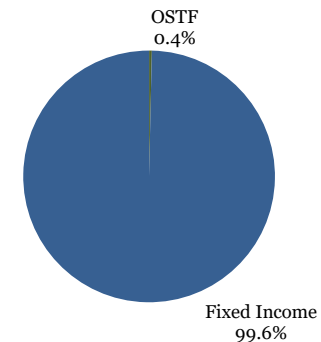
Common School Fund
CSF - \$2.1 Billion



Local Government Intermediate Fund
OLGIF - \$0.2 Billion



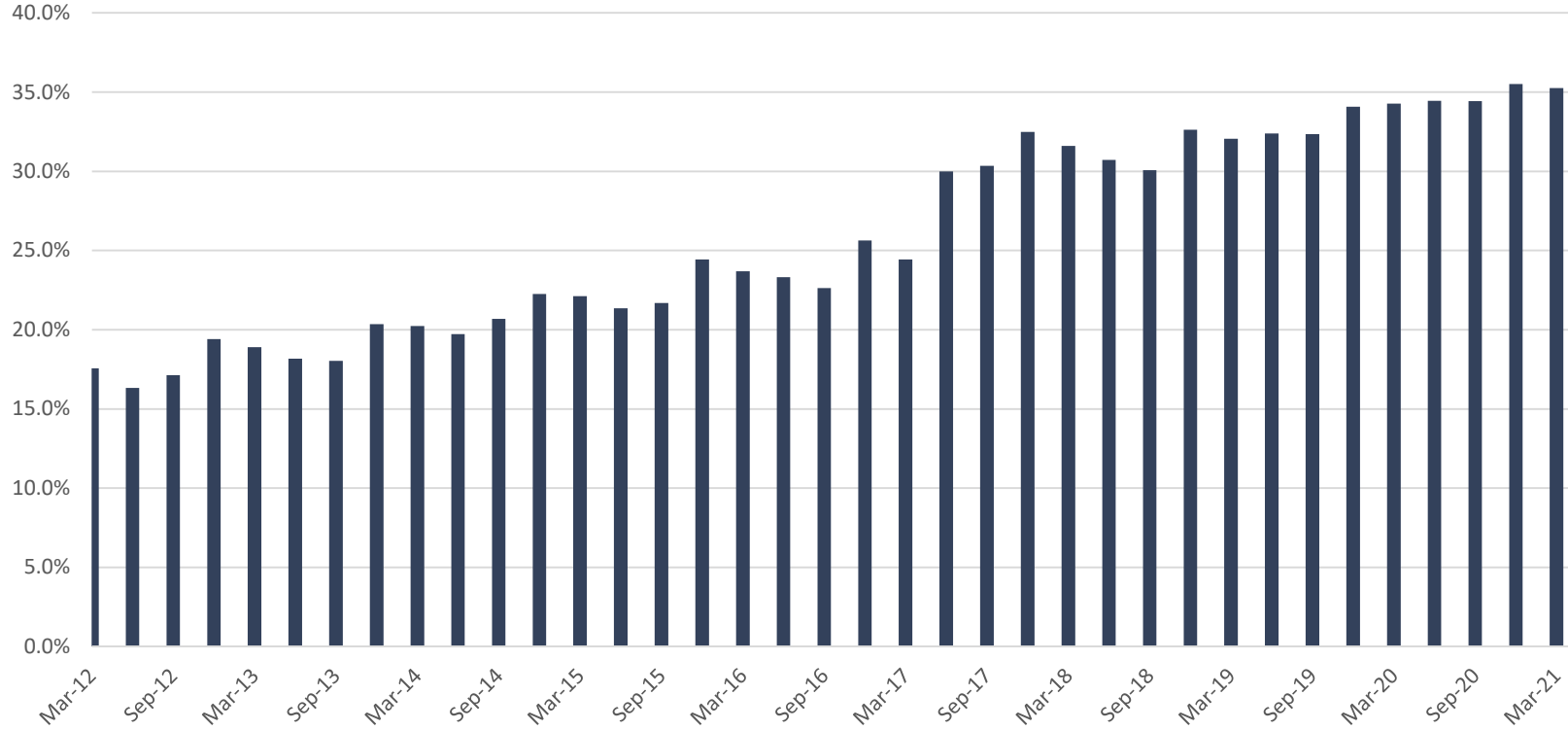
Oregon Intermediate-Term Pool
OITP - \$0.2 Billion



Sum of all individual plans will not foot to Total of State Funds due to intra-fund investing.

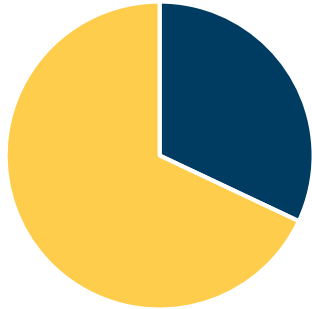
Internally-Managed Assets

Internally-Managed Percentage of Total OST Assets Over Time

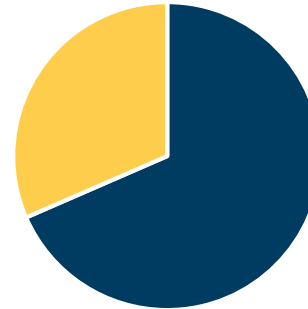


Internally-Managed Assets

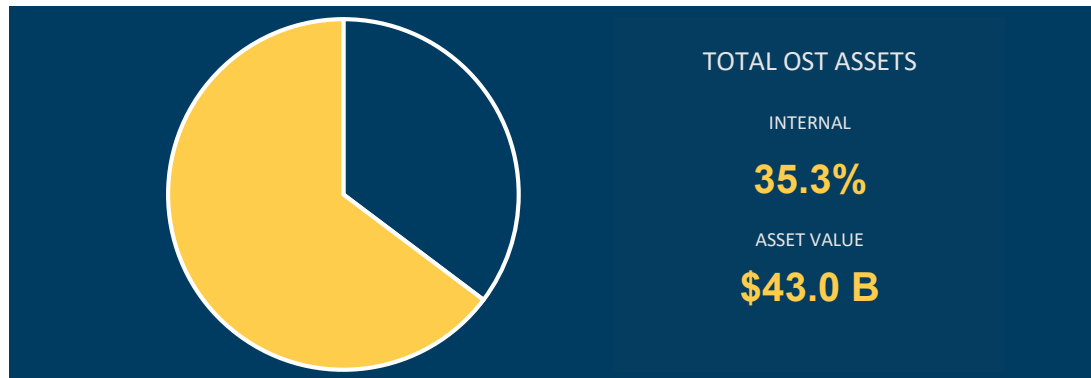
As of 3/31/2021



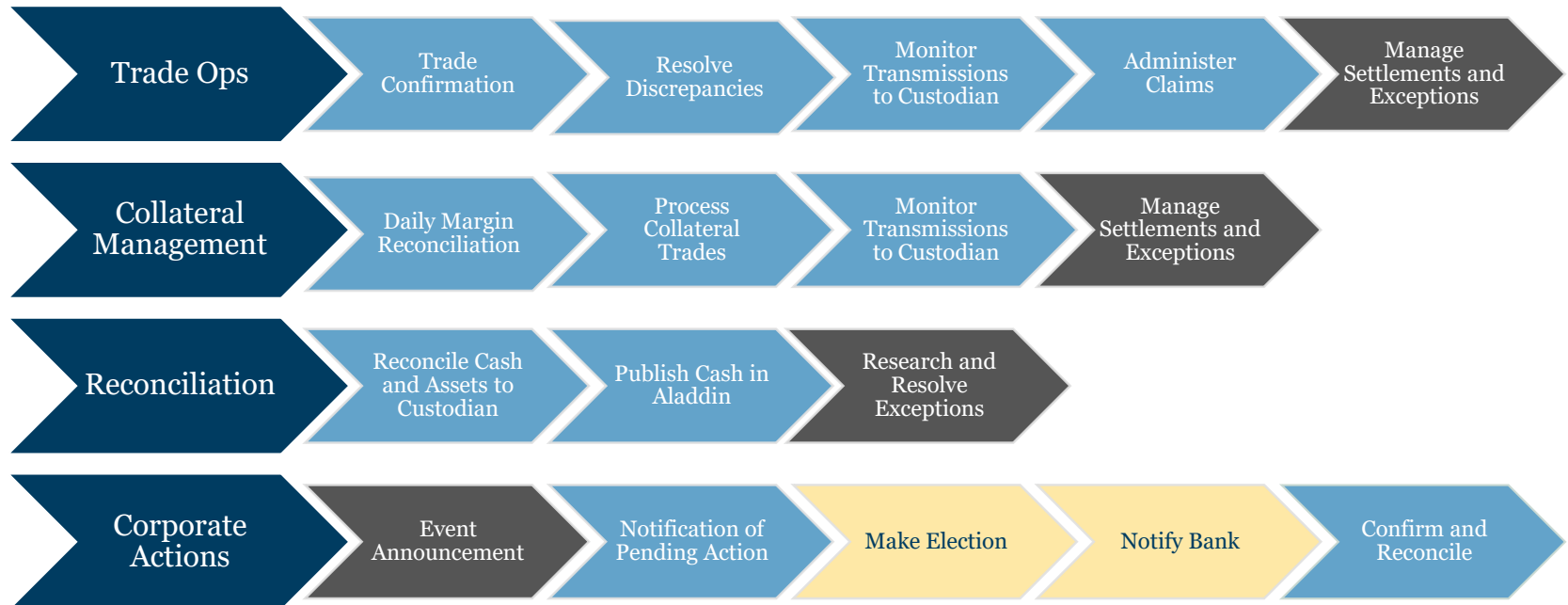
PUBLIC EQUITY
INTERNAL 32.0%
EXTERNAL 68.0%



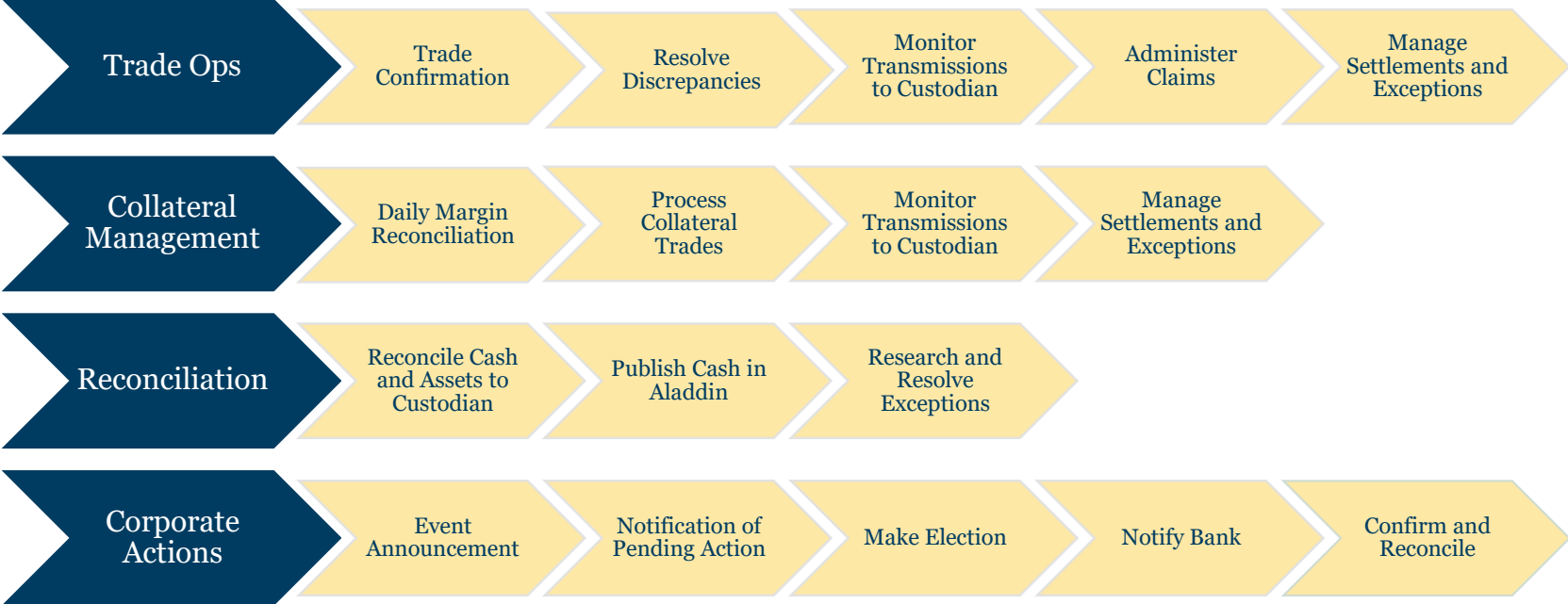
FIXED INCOME
INTERNAL 68.5%
EXTERNAL 31.5%



Trade Operations: Prior State

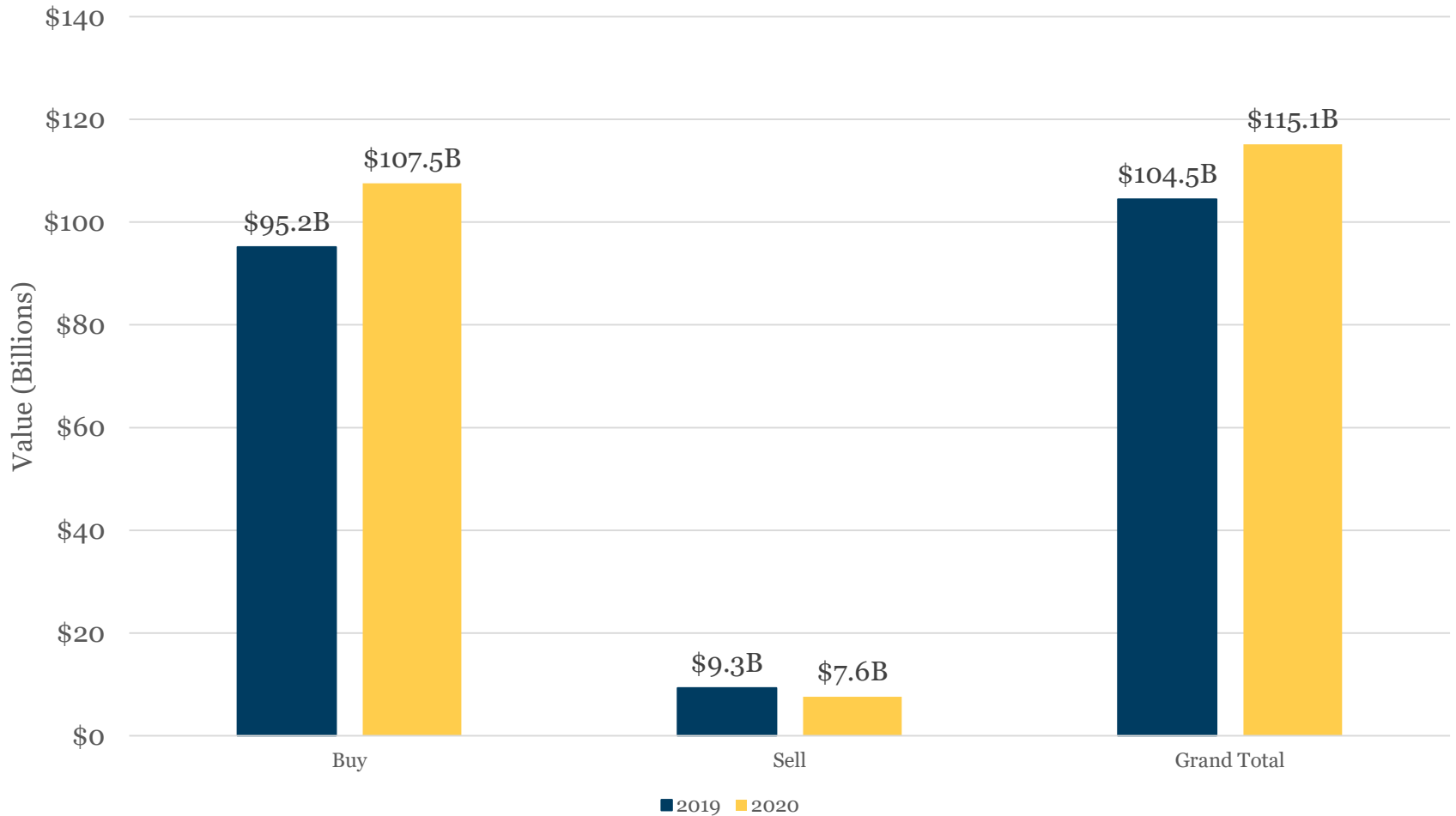


Trade Operations: Current State



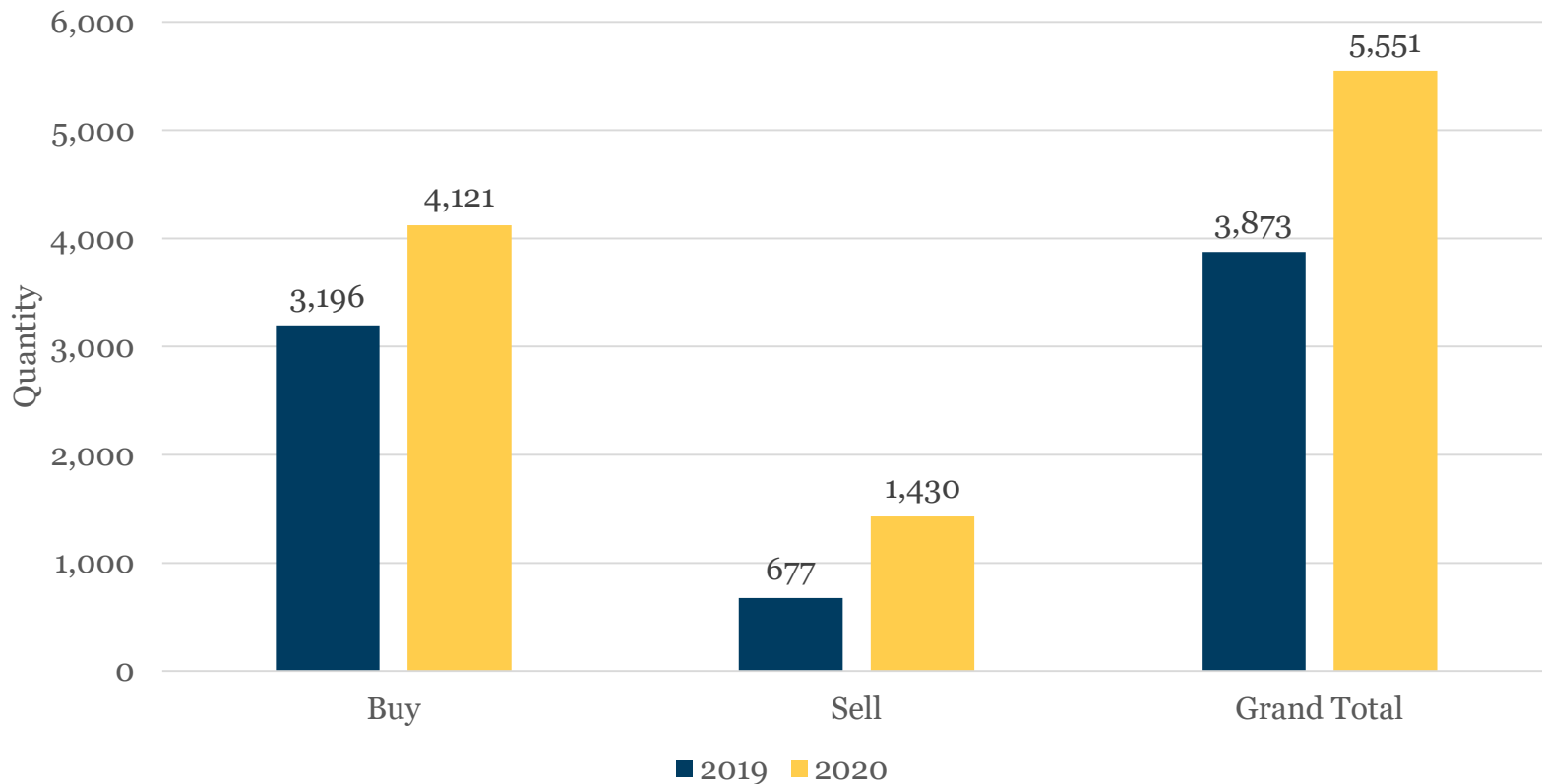
Trade Operations

2019 and 2020 Total Value of Fixed Income Trades



Trade Operations

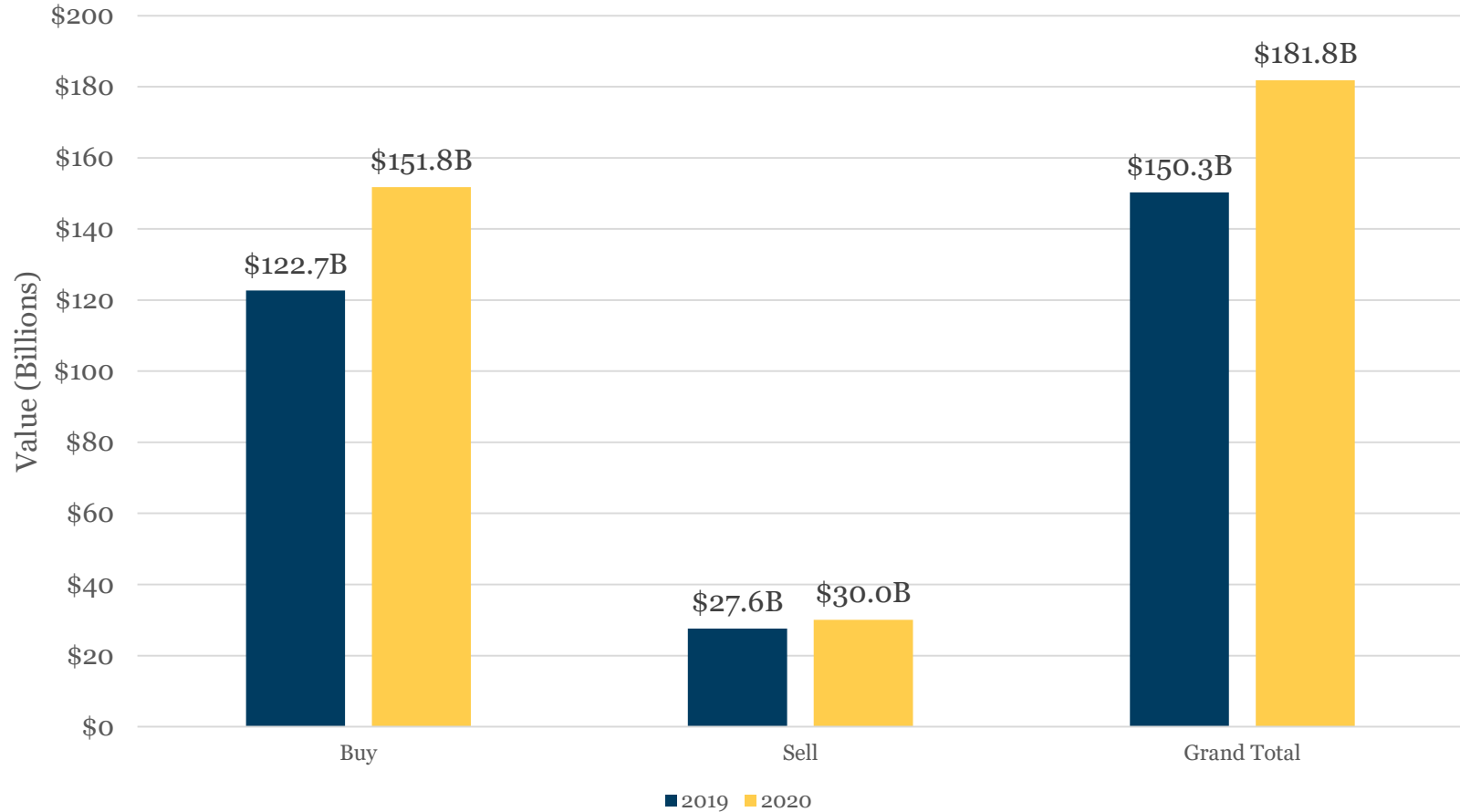
2019 and 2020 Total Quantity of Fixed Income Trades



- In 2020, fixed income trade volume increased by 43% from 2019.

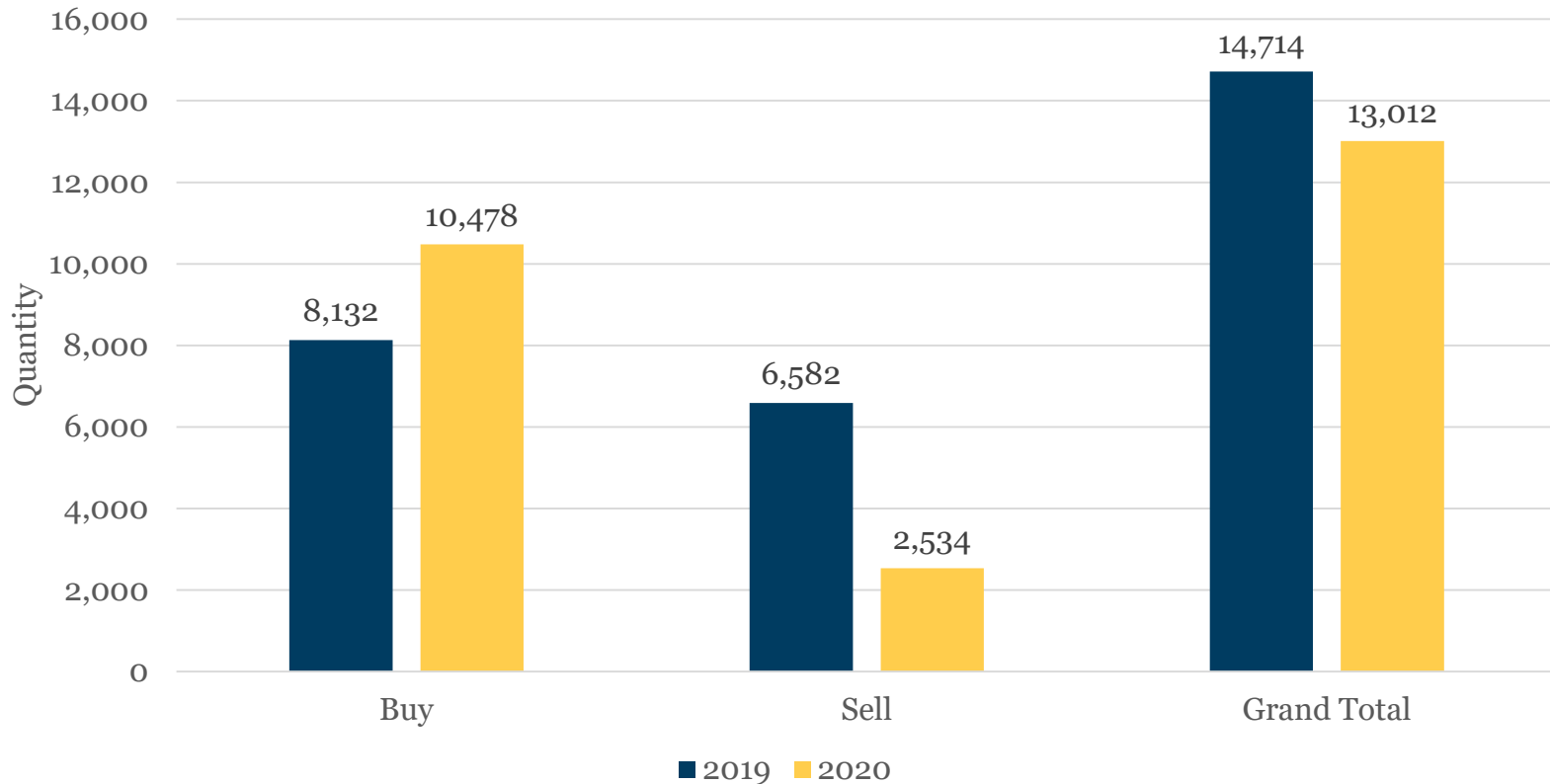
Trade Operations

2019 and 2020 Total Value of Domestic Equity Trades



Trade Operations

2019 and 2020 Total Quantity of Domestic Equity Trades



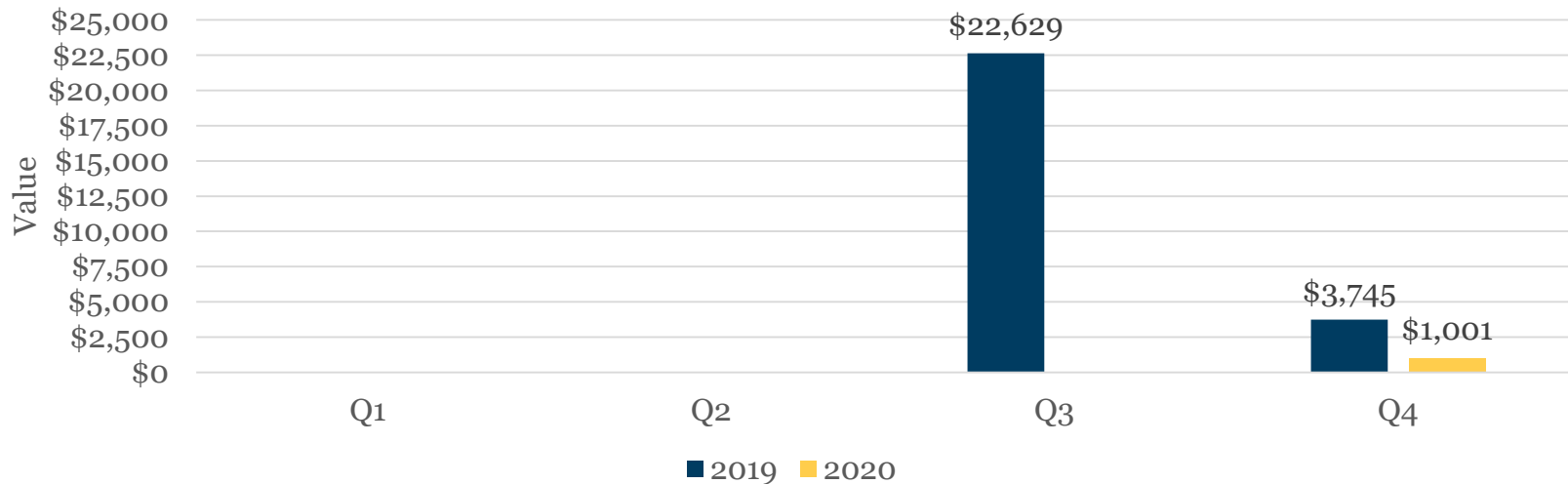
- In 2020, domestic equity trade volume decreased by 12% from 2019.



Trade Operations

Trade Fail Claims - 2019 and 2020 Fixed Income Sells

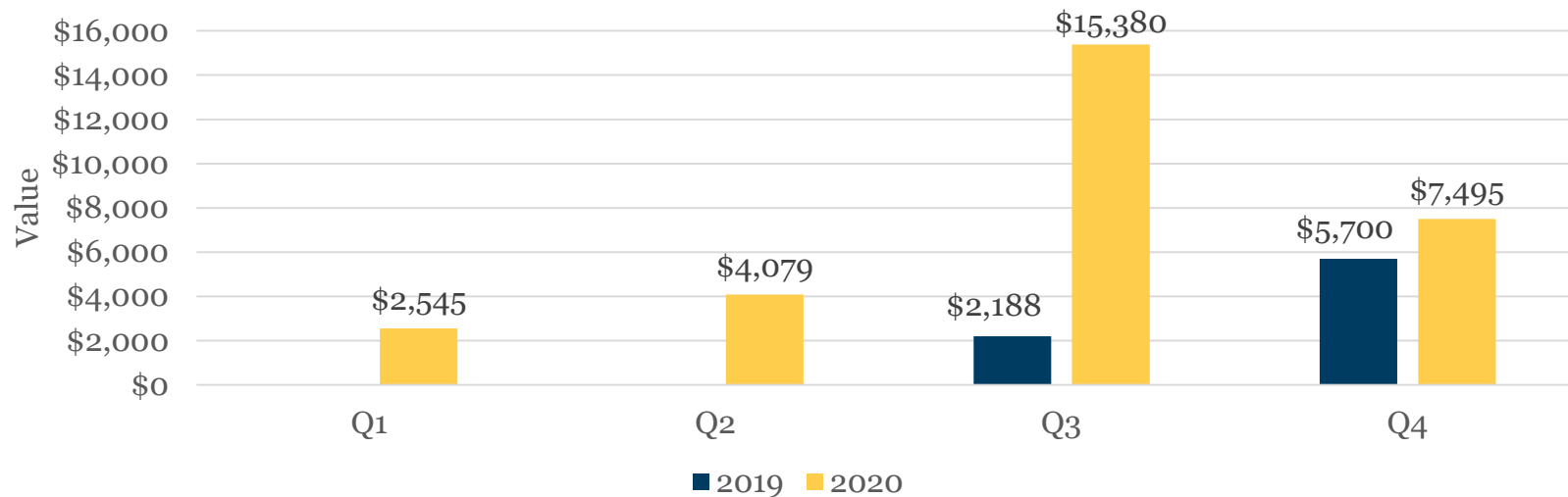
- 677 fixed income sell trades executed in 2019, 5 resulted in claims against OST
 - \$26,375 in claims against OST, only \$4,372 paid out
- 1,430 fixed income sell trades executed in 2020, 2 resulted in claims against OST
 - \$1,001 in claims against OST, full amount paid out



Trade Operations

Trade Fail Claims - 2019 and 2020 Fixed Income Buys

- 3,196 fixed income buy trades executed in 2019, 18 resulted in claims against counterparties
 - \$7,888 in claims, \$5,776 received by OST
- 4,121 fixed income buy trades executed in 2020, 12 resulted in claims against counterparties
 - \$29,500 in claims, full amount received by OST



Financial Reporting – Core Functions

Direct Reporting

Oregon Short Term Fund

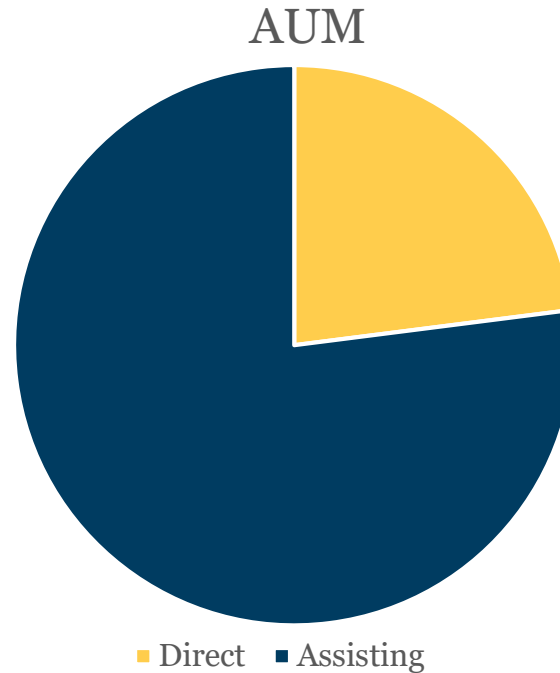
Oregon Intermediate Term Pool

Oregon Local Government Intermediate Term Fund

Assisting Others

Prepare required Comprehensive Annual Financial Report disclosures

Work with external auditors



Financial Reporting – Direct Reporting

- Annual financial statements are prepared in compliance with GAAP requirements
- Concurrently audited by Secretary of State
- Utilized by the State and local governments in their own financial statements

Oregon Short Term Fund
\$ 27.5 B

Oregon Intermediate Term Pool
\$220 M

Oregon Local Government Intermediate Fund
\$ 249 M

Financial Reporting

Supporting our Agency Partners

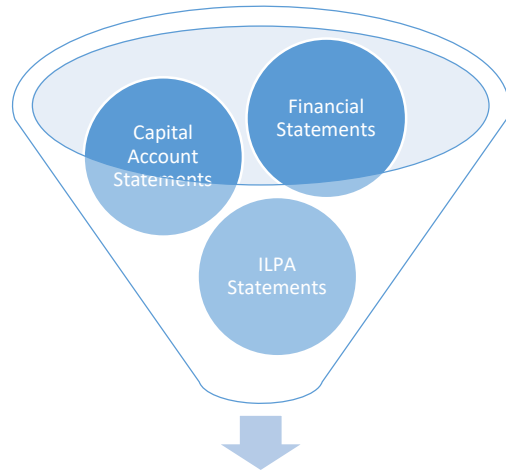
- Each agency has a unique set of holdings and reporting requirements
- Provide investment accounting and financial reporting guidance as subject matter experts
- Prepare and assist in quarterly regulatory reporting
- Prepare investment data for annual financial statements and accompanying notes
- Engage with external auditors

- **Oregon Public Employees Retirement Fund**
- **Department of State Lands (CSF)**
- **State Accident Insurance Fund**
- **Department of Administrative Services**
- **Consumer and Business Services**
- **Housing and Community Services**
- **Oregon State Lottery**
- **Department of Veterans Affairs**
- **Department of Transportation**
- **Oregon Universities**

Financial Reporting

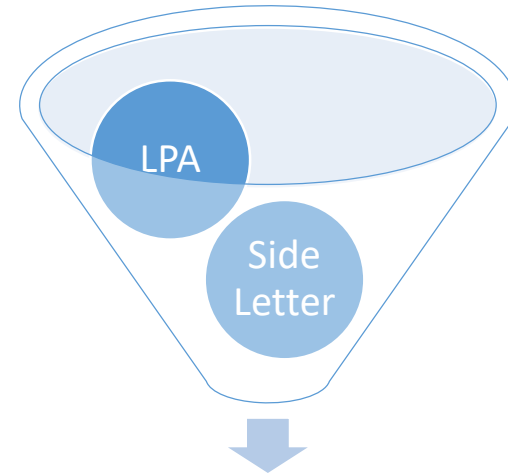
Fee Monitoring and Oversight

Alternatives Fees & Expenses: Validation Process



Reported/Charged

VS



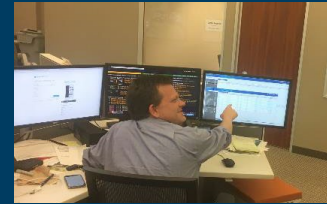
Expected

- Reported Expenses & Fees: Data extracted from capital account statements, financial statements, and ILPA statements provide us with a snapshot of expenses and fees that have been charged to the fund.
- Expected: Data extracted from LPAs and side letters provide economic terms, which allow us to calculate and model expected expenses and fees.
- The 'recipe' for validating alternatives fees and expenses is to compare what is reported against what is expected. Should a difference between the two amounts arise, further investigations will ensue.

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 errors.

Every basis point counts!



Infrastructure

- BlackRock Aladdin Platform

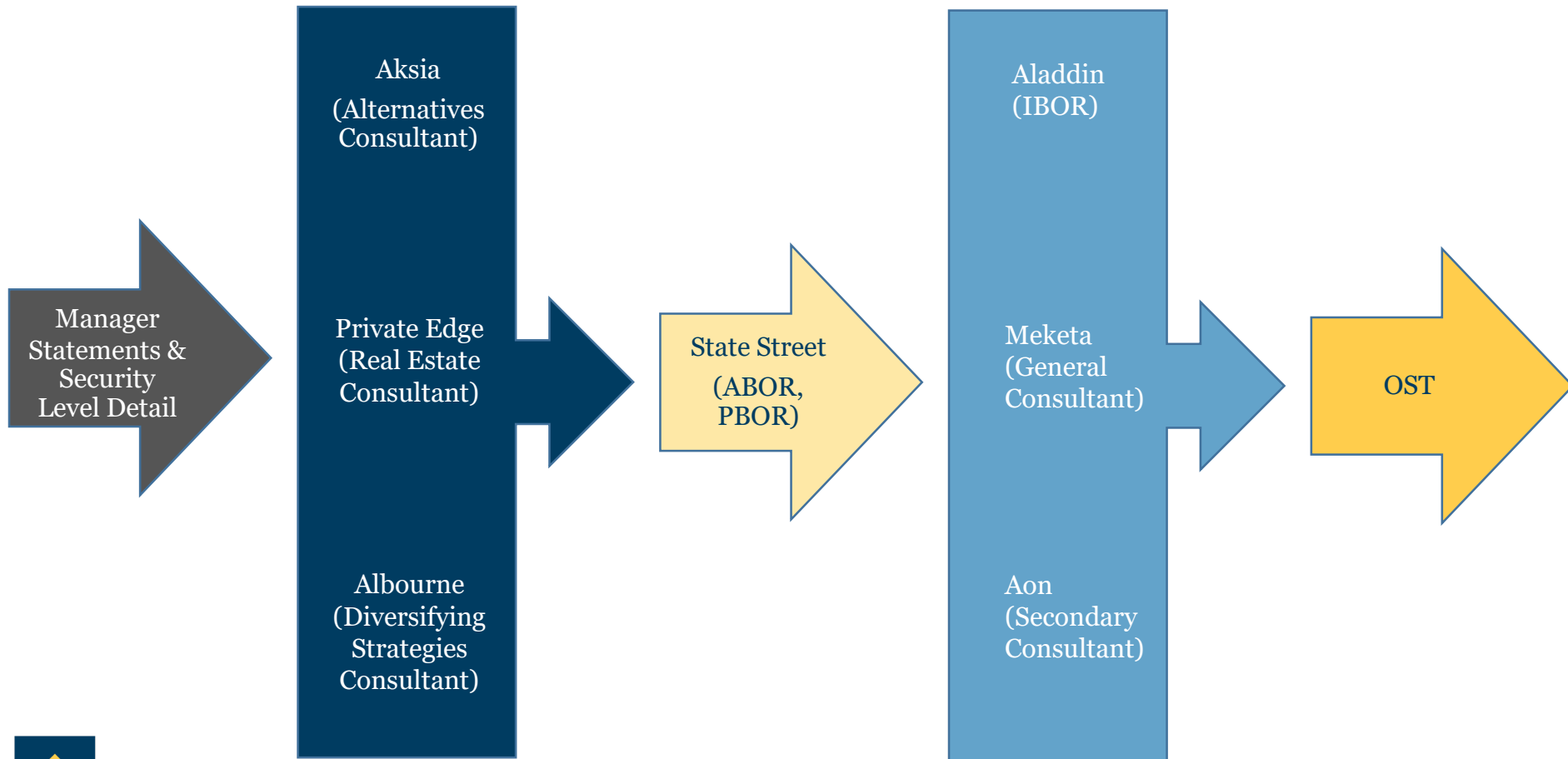
Investment Operations

- Checks and balances
- Valuation and Performance Reconciliation



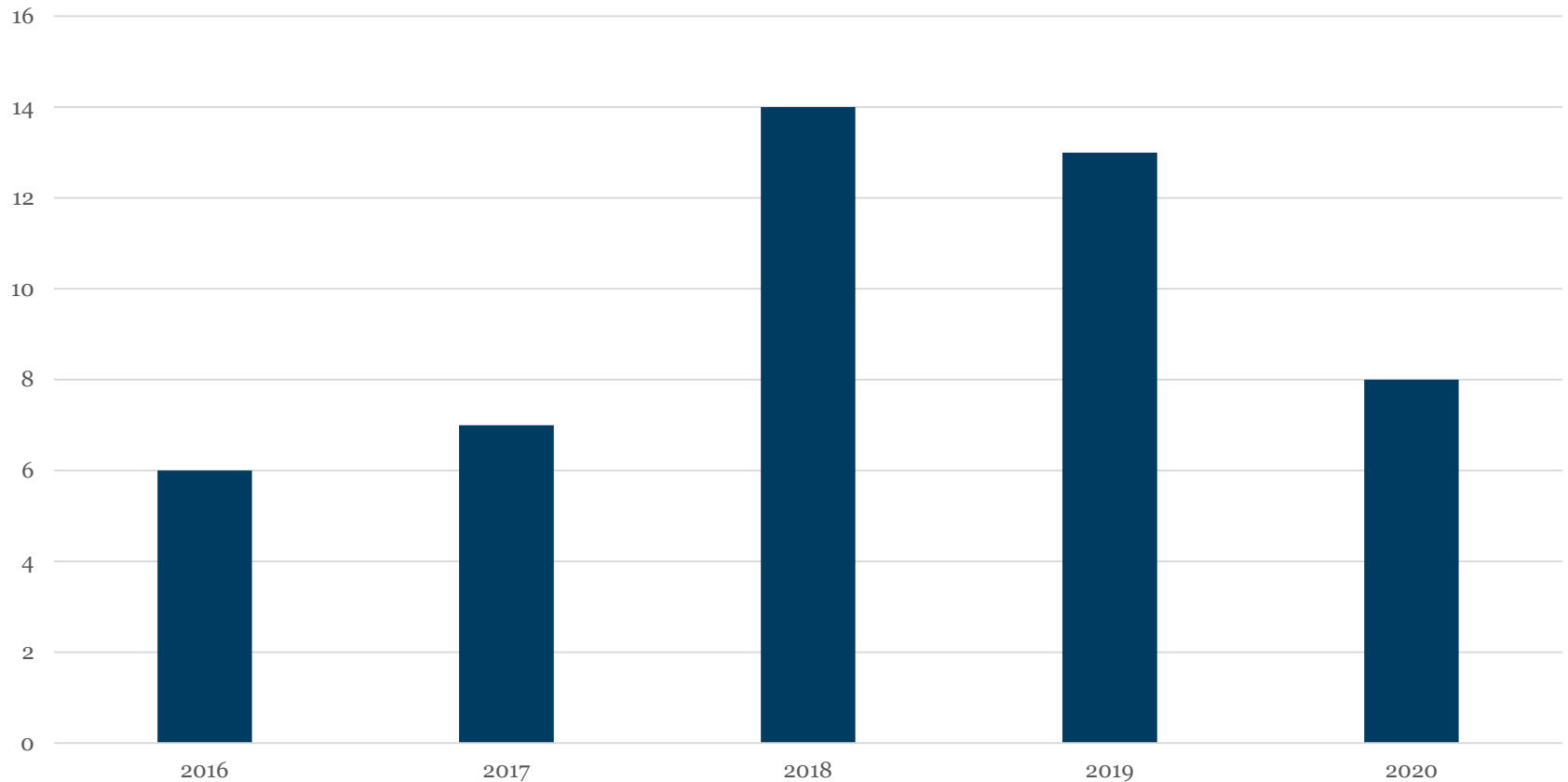
Improving Data Reliability

Valuation and Performance Data Flow



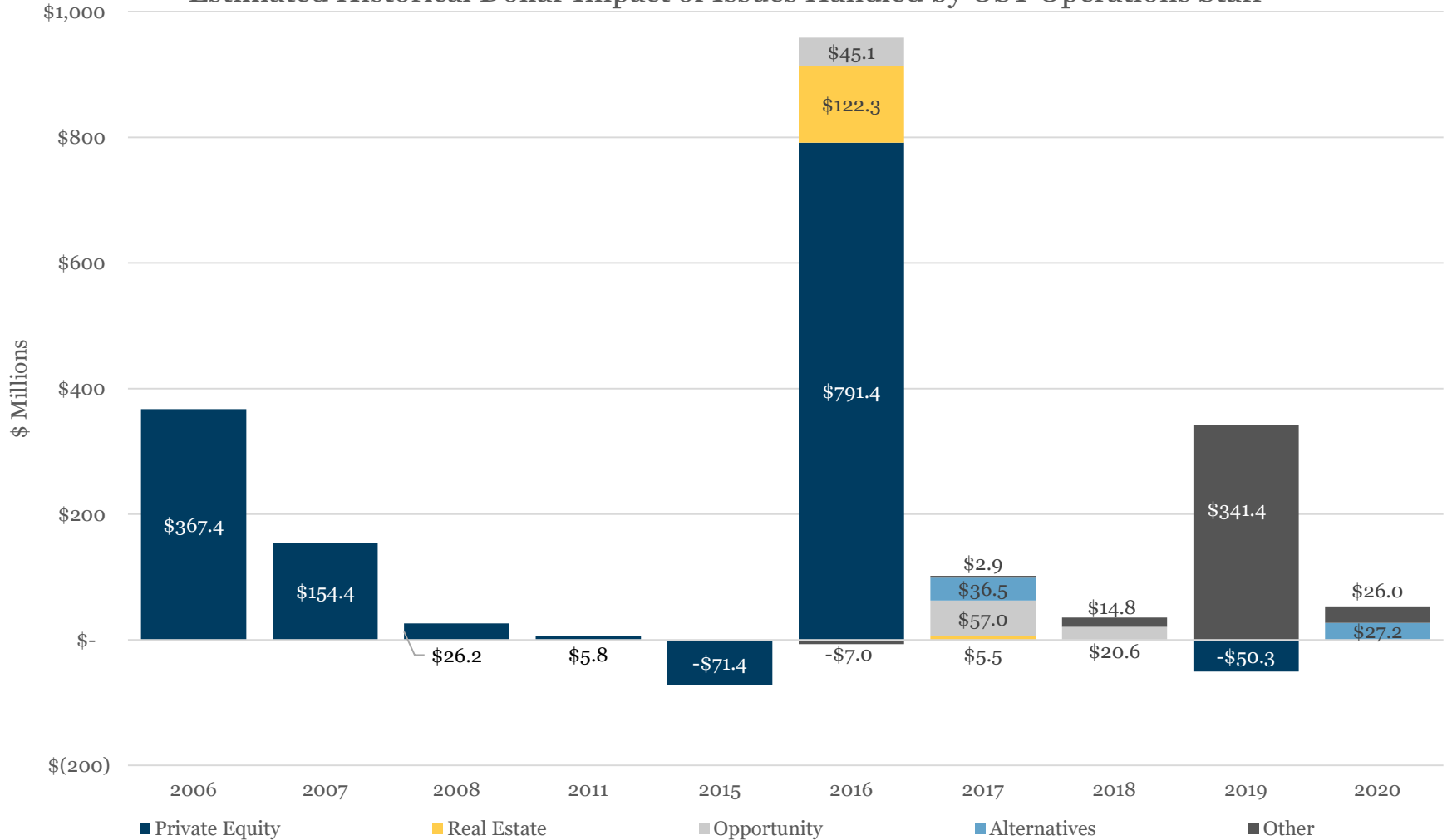
Reconciliation Impact

Count of Data Issues Identified/Handled by OST Operations Staff, by Year



Reconciliation Impact

Estimated Historical Dollar Impact of Issues Handled by OST Operations Staff



A Quantifiable Improvement

Accomplishments

- Improved Data Integrity
- Enhanced Capabilities
 - Trade Operations
 - Improved Fee Oversight
 - Centralized/Automated Reporting
 - Stock Distributions
 - FX Transactions

Looking Forward

Strategic Initiatives

- Aladdin (IBOR) Data Enrichment
- Research Management System (RMS)
- Continuous Improvement





OREGON STATE TREASURY

Tobias Read
Oregon State Treasurer

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

oregon.gov/treasury

TAB 8 – Asset Allocation & NAV Updates

Asset Allocations at March 31, 2021

OPERF	Regular Account					Target Date Funds	Variable Fund	Total Fund	
	Policy	Target ¹	\$ Thousands	Pre-Overlay	Overlay	Net Position	Actual	\$ Thousands	\$ Thousands
Public Equity	27.5-37.5%	32.5%	27,992,596	32.7%	(1,354,794)	26,637,803	31.1%		28,288,699
Private Equity	13.5-21.5%	17.5%	20,613,752	24.1%		20,613,752	24.1%		20,613,752
Total Equity	45.0-55.0%	50.0%	48,606,348	56.8%	(1,354,794)	47,251,554	55.2%	428,868	48,902,450
Opportunity Portfolio	0-5%	0.0%	1,890,591	2.2%		1,890,591	2.2%		1,890,591
Fixed Income	15-25%	20.0%	13,646,202	16.0%	3,532,003	17,178,205	20.1%	1,863,278	19,041,483
Risk Parity	0.0-2.5%	2.5%	1,990,768	2.3%		1,990,768	2.3%		1,990,768
Real Estate	9.5-15.5%	12.5%	8,899,670	10.4%	(3,100)	8,896,570	10.4%		8,896,570
Alternative Investments	7.5-17.5%	15.0%	8,385,004	9.8%		8,385,004	9.8%		8,385,004
Cash ²	0-3%	0.0%	2,114,628	2.5%	(2,174,109)	(59,482)	-0.1%	17,949	(41,532)
TOTAL OPERF		100.0%	\$ 85,533,211	100.0%	\$ -	\$ 85,533,211	100.0%	\$ 3,085,306	\$ 86,065,334

¹Targets established in April 2019. Interim policy benchmark effective July 1, 2020, consists of: 33.5% MSCI ACWI IMI Net, 20% Custom FI Benchmark, 19% Russell 3000+300bps (1 quarter lagged), 12.5% NCREIF ODCE net (1 quarter lagged), 12.5% CPI+400bps, & 2.5% S&P Risk Parity - 12% Target Volatility.
²Includes cash held in the policy implementation overlay program.

SAIF	Policy	Target	\$ Thousands	Actual
Total Equity	7-13%	10.0%	604,084	12.0%
Fixed Income	80-90%	85.0%	4,224,765	83.8%
Real Estate	0-7%	5.0%	161,529	3.2%
Cash	0-3%	0.0%	51,680	1.0%
TOTAL SAIF			\$ 5,042,058	100.0%

CSF	Policy	Target	\$ Thousands	Actual
Global Equities	40-50%	45.0%	1,138,009	53.9%
Private Equity	8-12%	10.0%	203,034	9.6%
Total Equity	58-62%	55.0%	1,341,043	63.6%
Fixed Income	25-35%	25.0%	511,513	24.2%
Real Estate	8-12%	10.0%	132,254	6.3%
Alternative Investments	8-12%	10.0%	95,013	4.5%
Cash	0-3%	0.0%	30,999	1.4%
TOTAL CSF			\$ 2,109,922	100.0%

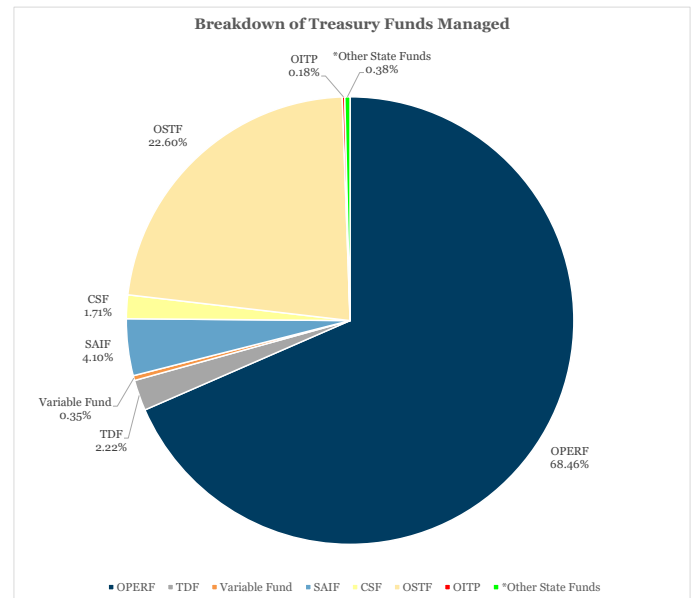
SOUF	Policy	Target	\$ Thousands	Actual
Global Equities	0-65%	N/A	2,292	76.5%
Fixed Income	35-100%	N/A	701	23.4%
Cash	0-3%	N/A	2	0.1%
TOTAL SOUF			\$ 2,995	100.0%

WOUE	Policy	Target	\$ Thousands	Actual
Global Equities	30-65%	55.0%	709	57.1%
Fixed Income	35-60%	40.0%	471	38.0%
Cash	0-25%	5.0%	61	4.9%
TOTAL WOUE			\$ 1,241	100.0%

OSTF, OITP & Other State Funds*	\$ Thousands	Actual
OSTF	27,533,372	92.4%
OITP	220,041	0.7%
DAS Insurance Fund	136,229	0.5%
DCBS Operating Fund	168,781	0.6%
DCBS Workers Benefit Fund	170,281	0.6%
DCBS - Elderly Housing Bond Sinking Fund	1,612	0.0%
DCHS - Other Fund	15,907	0.1%
Oregon Lottery Fund	122,302	0.4%
DVA Bond Sinking Fund	110,883	0.4%
ODOT Fund	872,186	2.9%
OLGIF	249,397	0.8%
OPUF	192,406	0.6%
Total OSTF & Other State Funds	\$ 29,793,397	100.0%

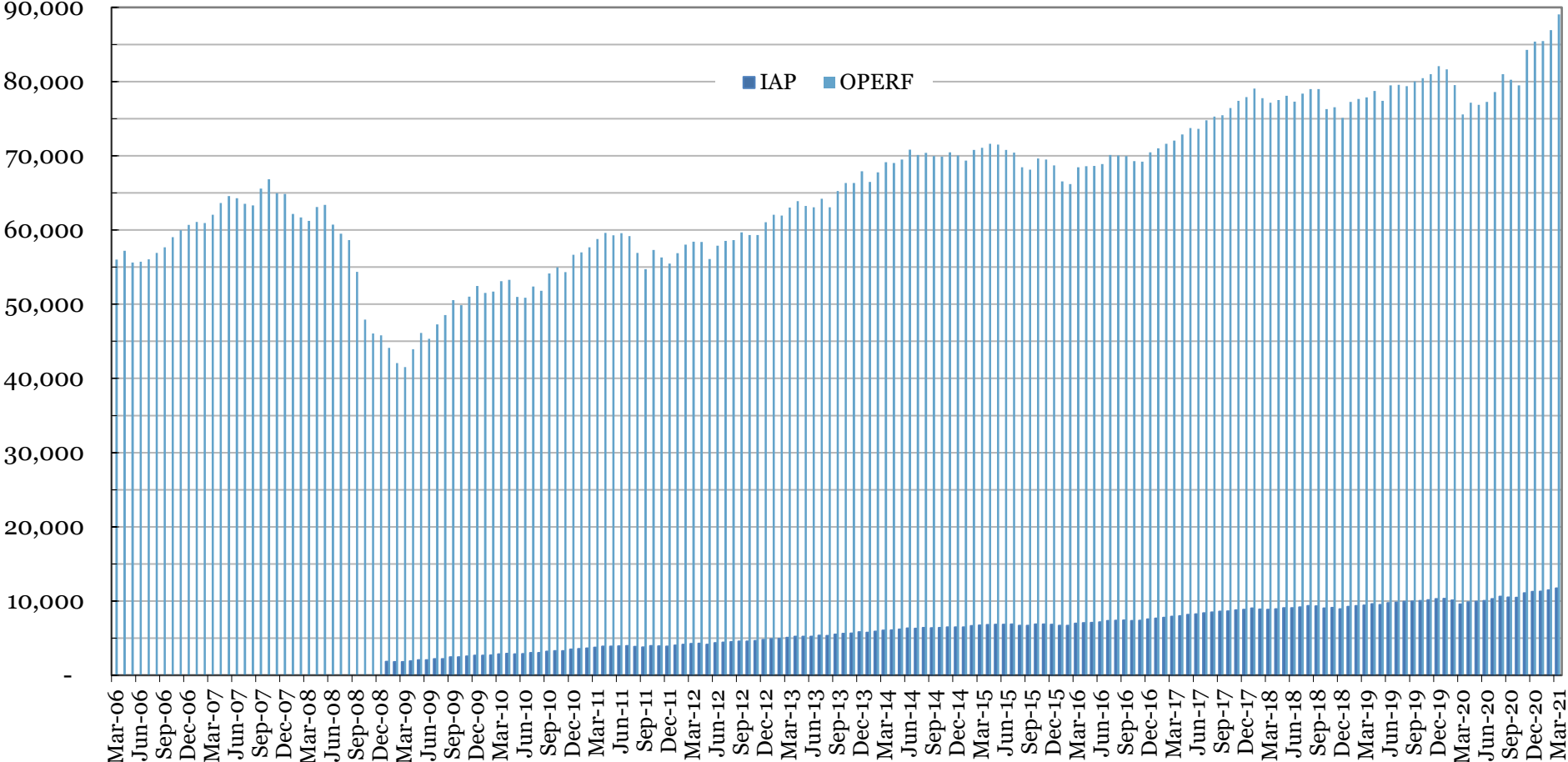
Total of All Treasury Funds** **\$ 121,826,694**

**Balances of the funds include OSTF or OITP investments, which is why total does not foot.

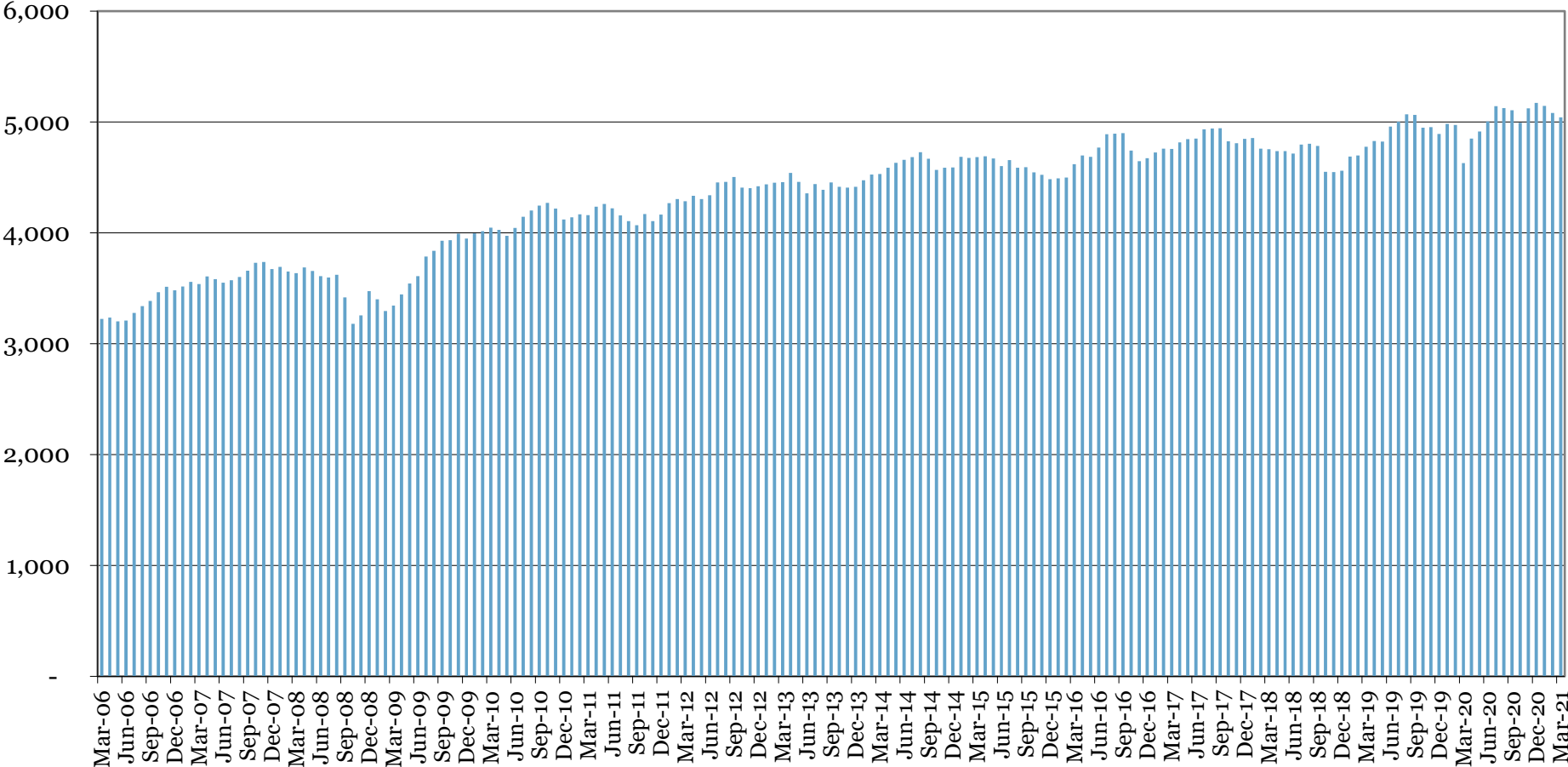


*Other State Funds include DAS Insurance Fund, DCBS Operating Fund, DCBS Workers Benefit Fund, DCBS - Elderly Housing Bond Sinking Fund, DCHS - Other Fund, Oregon Lottery Fund, DVA Bond Sinking Fund, ODOT Fund, OLGIF, & OPUF.

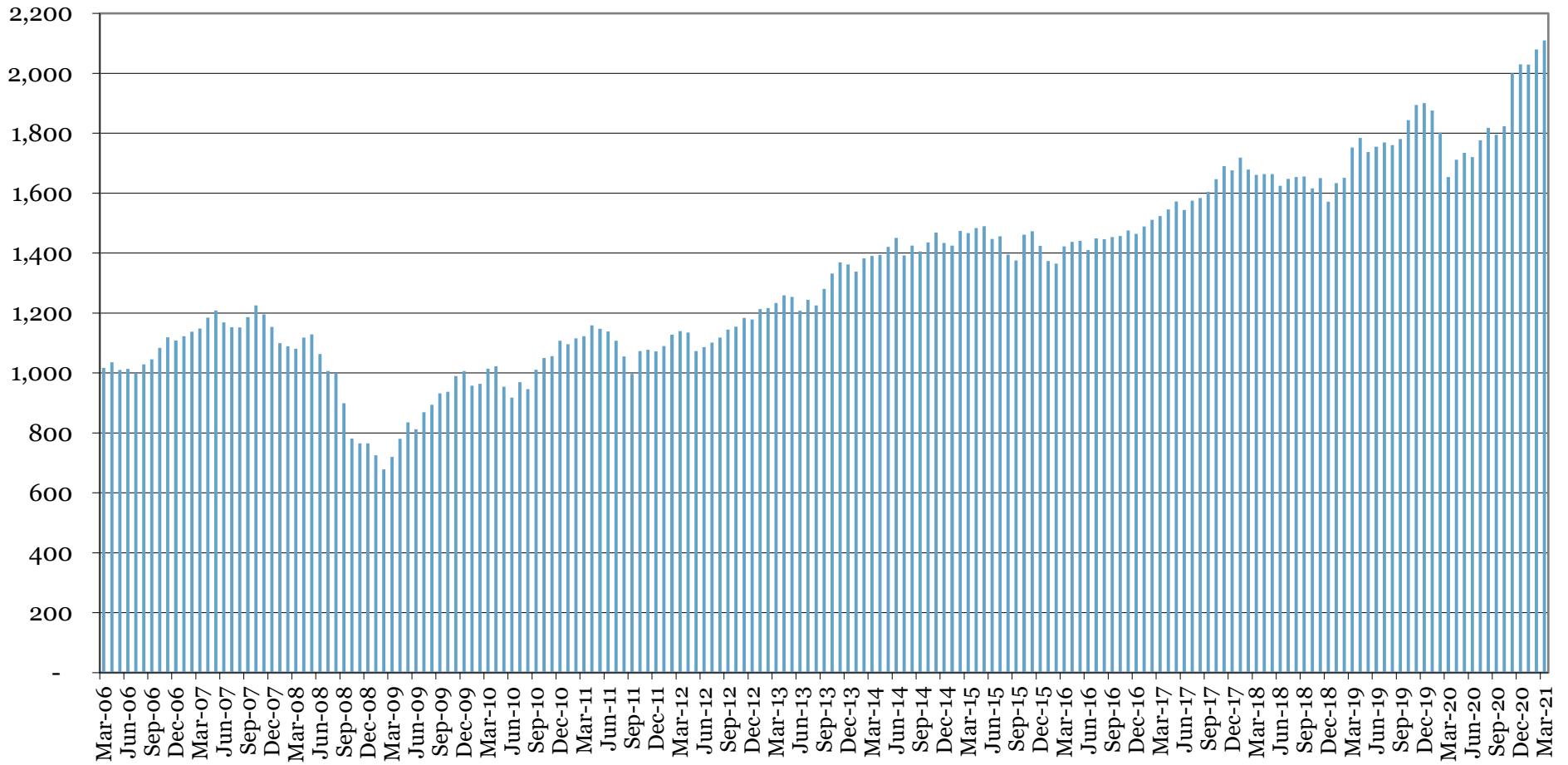
OPERF NAV
15 years ending March 31, 2021
(\$ in Millions)



SAIF NAV
15 years ending March 31, 2021
(\$ in Millions)



CSF NAV
15 years ending March 31, 2021
(\$ in Millions)



TAB 9 – Calendar — Future Agenda Items

2021/22 OIC Forward Calendar and Planned Agenda Topics

September 8, 2021	CEM Benchmarking ESG Annual Review Securities Lending Q2 OPERF Performance
October 27, 2021	SAIF Annual Review OSGP Annual Review Common School Fund Annual Review
December 8, 2021	Public Equity Program Review Fixed Income Program Review Risk Parity Program Review Q3 OPERF Performance
January 26, 2022	Private Equity Program Review Opportunity Portfolio Program Review Placement Agent Report 2023 OIC Calendar Approval
March 9, 2022	Real Estate Portfolio Review Real Assets Program Review Diversifying Strategies Program Review Q4 OPERF Performance
April 20, 2022	OPERF Asset/Liability Study
June 1, 2022	IAP Program Review Operational Annual Review Q1 OPERF Performance