

Oregon Public Employees Retirement Fund Investment Benchmarking Results

For the 5 year period ending December 2015

Bruce Hopkins
CEM Benchmarking Inc
October 26, 2016



Key takeaways

Returns

- Your 5-year net total return was 8.1%. This was above the U.S. Public median of 7.2% and above the peer median of 7.5%.
- Your 5-year policy return was 8.4%. This was above the U.S. Public median of 7.2% and above the peer median of 7.3%.

Value added

- Your 5-year net value added was -0.2%. This was slightly below the U.S. Public median of 0.0% and slightly below the peer median of 0.0%.

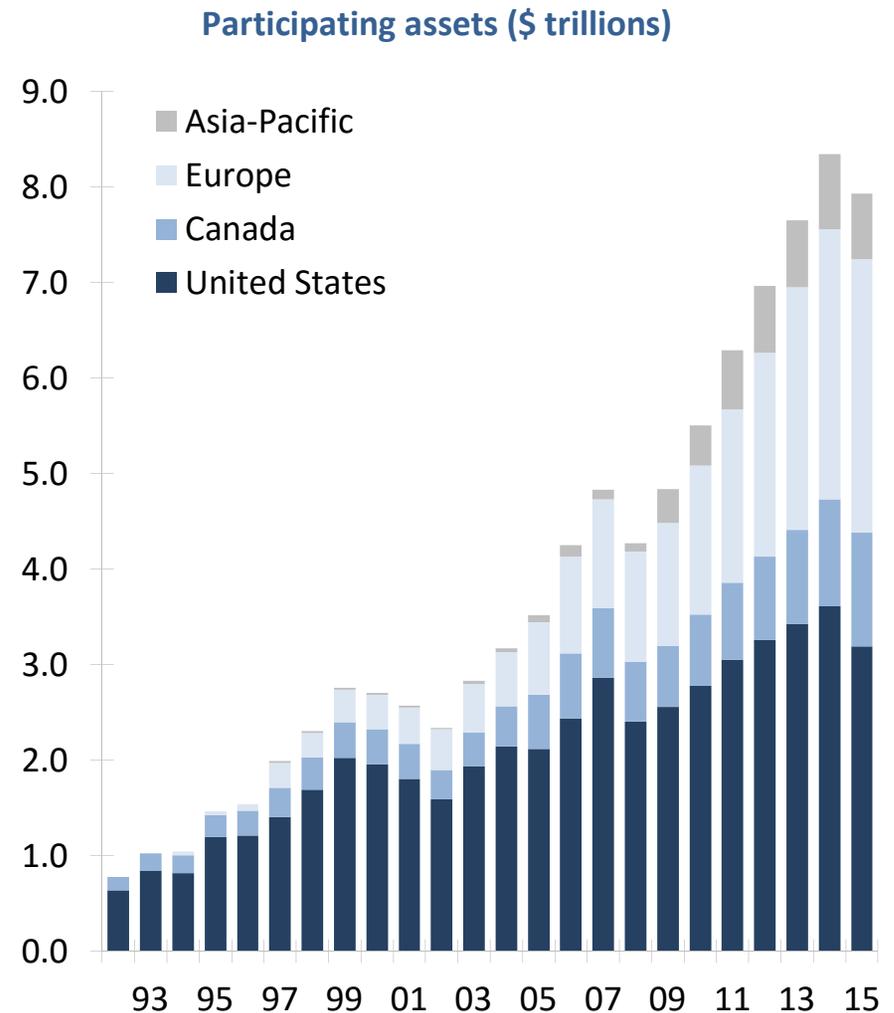
Cost

- Your investment cost of 73.5 bps was above the peer median cost of 50.5 bps. You were higher cost because your investments were more heavily weighted in higher cost private asset classes. However, your cost was close to your benchmark cost of 71.8 bps. This suggests that your fund was normal cost compared to your peers, given your assets.
- Your fund was normal cost because you had a higher cost implementation style. This added cost was partly offset because you paid less than peers for similar services.

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

- 162 U.S. pension funds participate with total participating assets of \$3.2 trillion.
- 70 Canadian funds participate with assets totaling \$1,189 billion.
- 51 European funds participate with aggregate assets of \$2.7 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Ireland, Denmark and the U.K.
- 6 Asia-Pacific funds participate with aggregate assets of \$685 billion. Included are funds from Australia, New Zealand, China and South Korea.

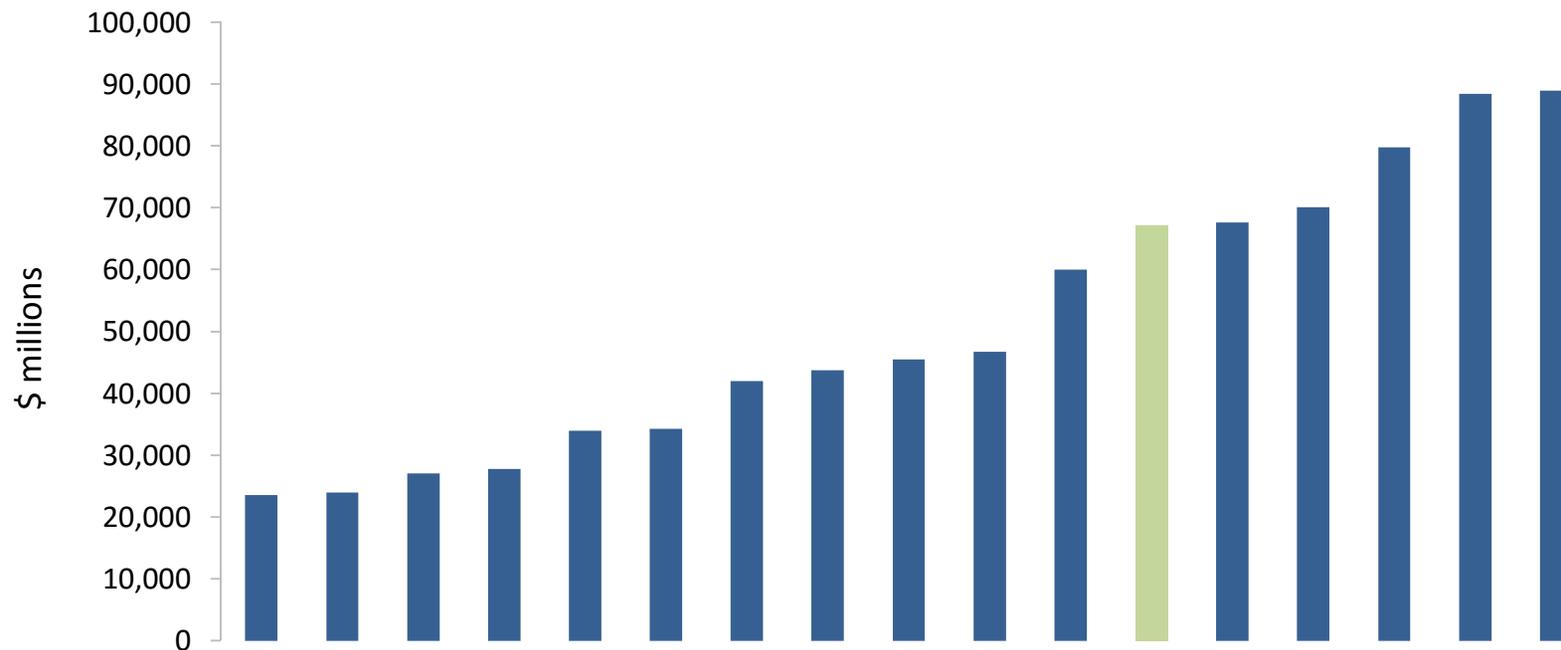
The most meaningful comparisons for your returns and value added are to the U.S. Public universe which consists of 55 funds.



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

Peer group for Oregon Public Employees Retirement Fund

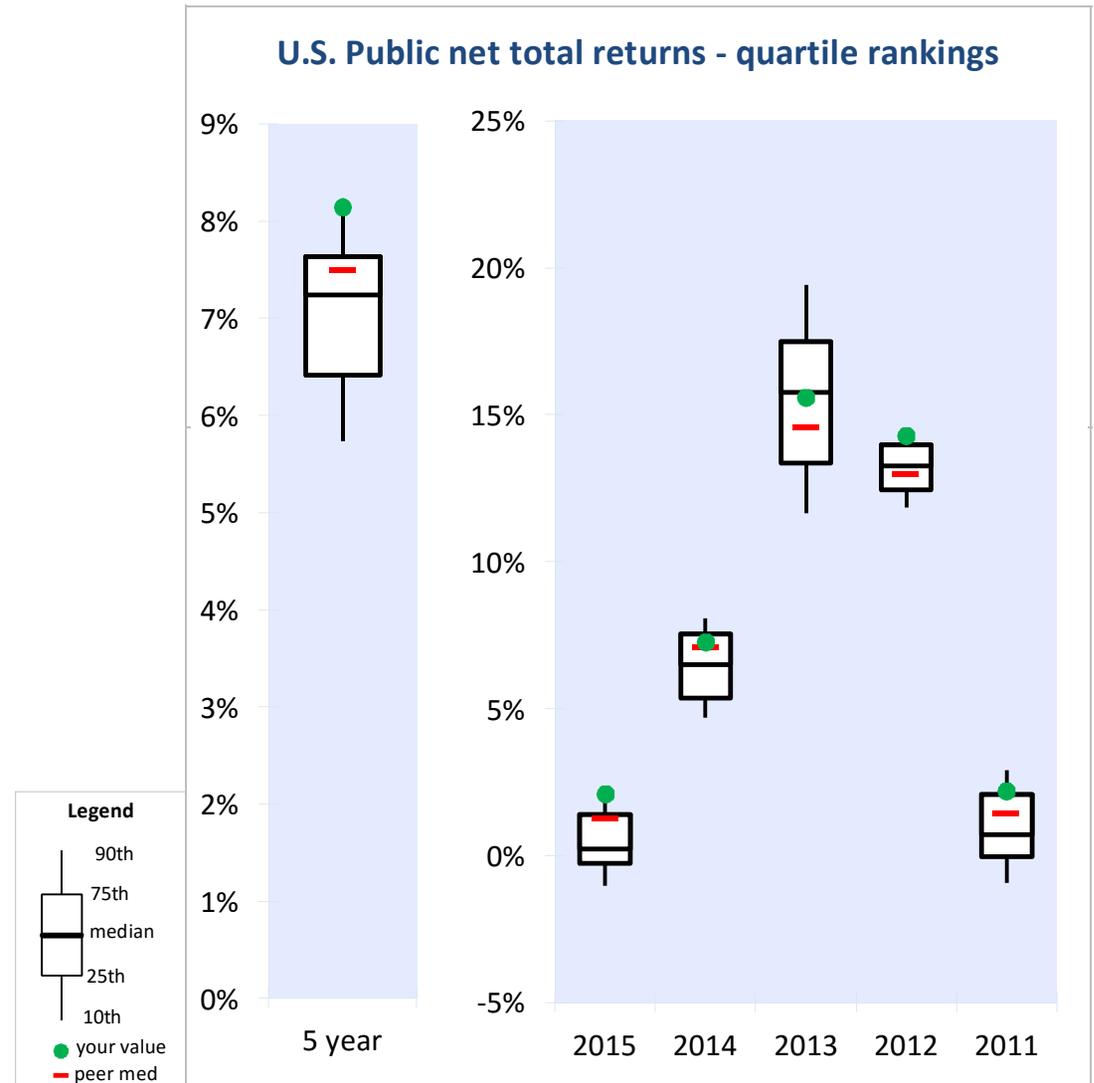
- 17 U.S. public sponsors from \$24 billion to \$89 billion
- Median size of \$46 billion versus your \$67 billion



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

Your 5-year net total return of 8.1% was above both the U.S. Public median of 7.2% and the peer median of 7.5%.

	Your 5-year
Net total fund return	8.1%
- Policy return	8.4%
= Net value added	-0.2%



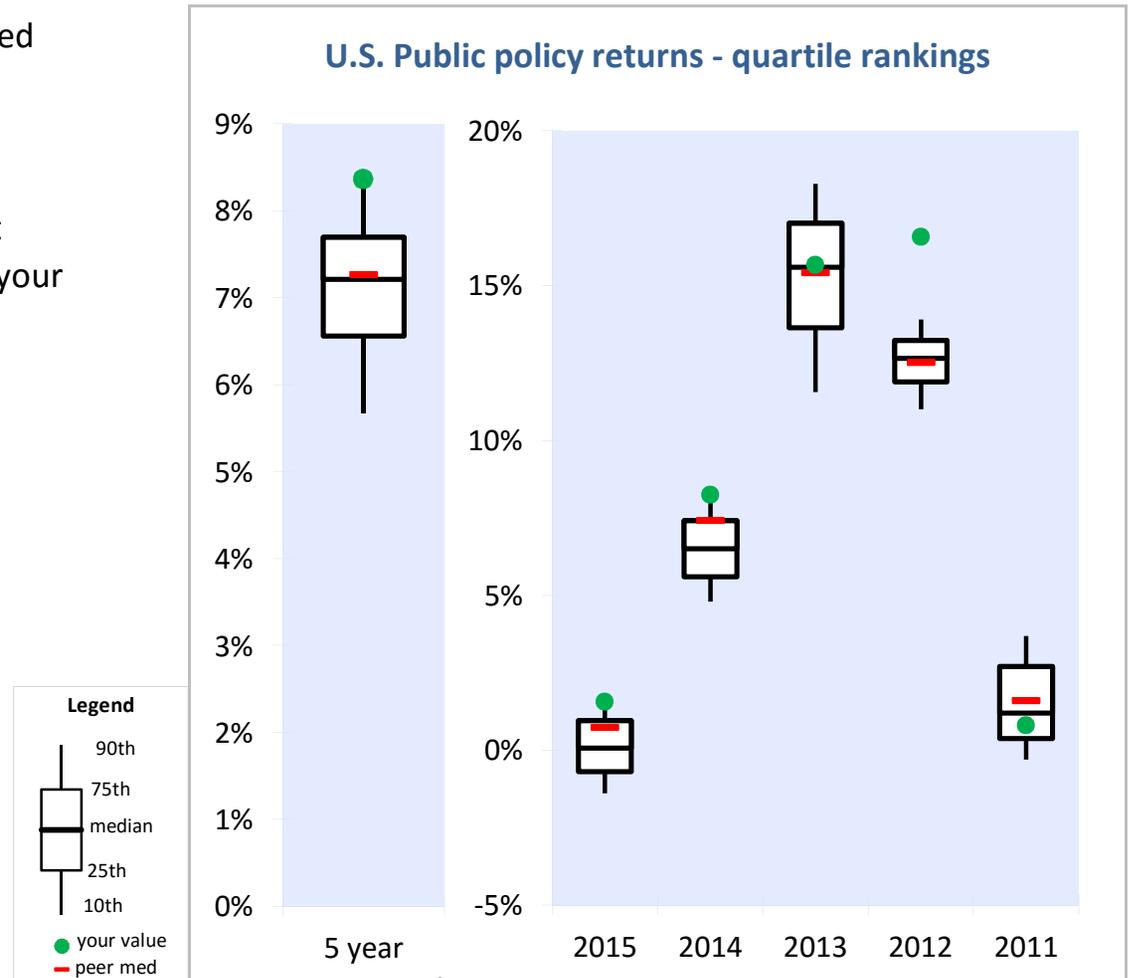
Your 5-year policy return of 8.4% was above both the U.S. Public median of 7.2% and the peer median of 7.3%.

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

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

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

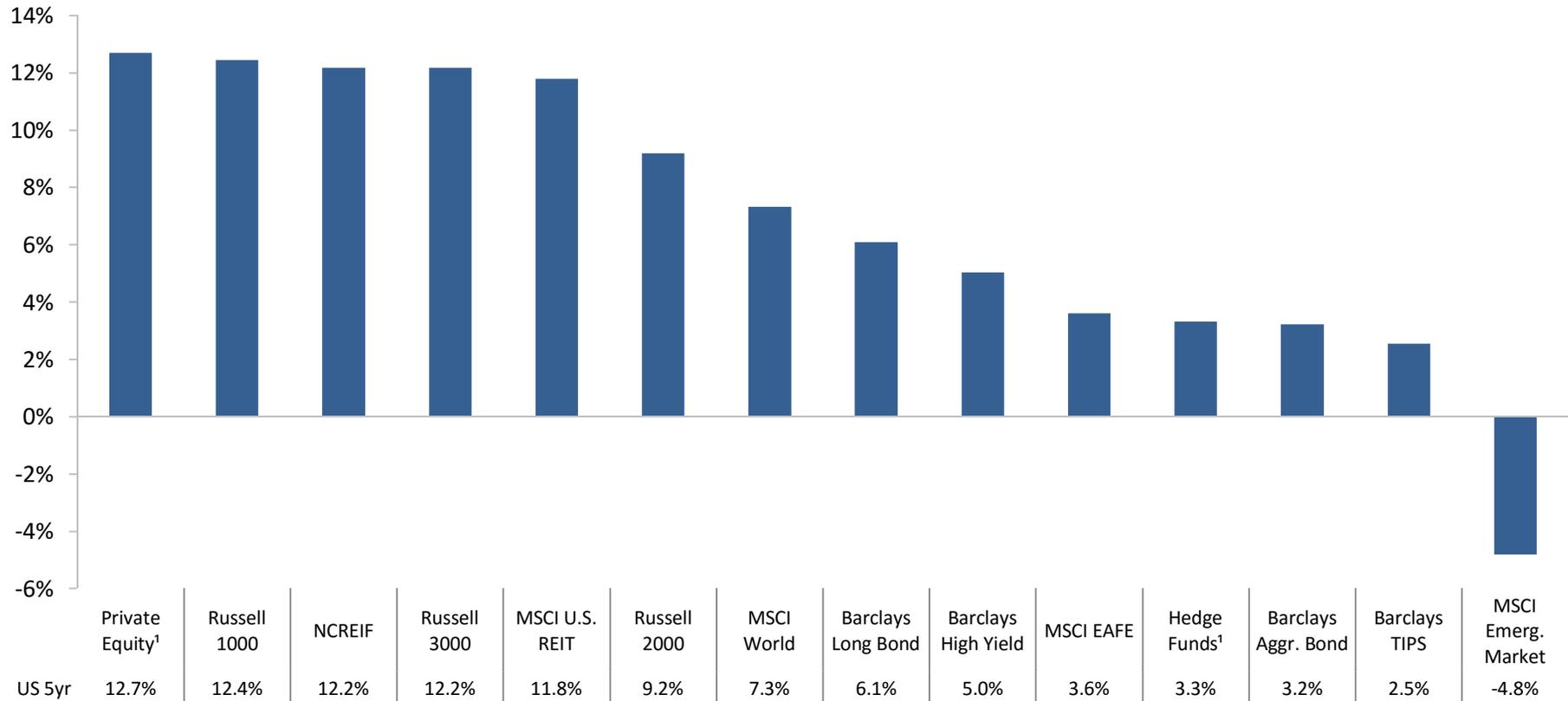
Each of these three factors is different across funds. Therefore, it is not surprising that policy returns often vary widely between funds.



To enable fairer comparisons, the policy returns of all participants except your fund were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. If CEM used this same adjustment for your fund, your 5-year policy return would be 8.2%, 0.2% lower than your actual 5-year policy return of 8.4%. Mirroring this, your 5-year total fund net value added would be 0.2% higher. Refer to the Research section pages 6-7 for details.

Differences in policy returns are caused by differences in benchmarks and policy mix. The two best performing asset classes for the 5 years ending 2015 were private equity¹ and large cap stock (Russell 1000).

5-Year returns for frequently used benchmark indices



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

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

- The positive impact of your higher weight in two of the better performing asset classes of the past 5 years: Private Equity and Real Estate.

5-year average policy mix

	Your Fund	Peer Avg.	U.S. Public Avg.
U.S. Stock	0%	22%	24%
EAFE Stock	0%	7%	6%
ACWIxUS Stock	0%	8%	9%
Global Stock	42%	9%	8%
Other Stock	0%	2%	4%
Total Stock	42%	48%	51%
U.S. Bonds	20%	19%	18%
High Yield Bonds	0%	2%	2%
Other Fixed Income ¹	4%	7%	7%
Total Fixed Income	24%	28%	27%
Hedge Funds	0%	3%	4%
Real Estate incl. REITS	12%	9%	7%
Other Real Assets ¹	3%	1%	3%
Private Equity	19%	10%	8%
Total	100%	100%	100%

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

Your policy asset mix has changed over the past 5 years. At the end of 2015 your policy mix compared to your peers and the U.S. universe as follows:

Policy asset mix

Asset class	Your fund					Peer avg.	U.S. Public avg.
	2011	2012	2013	2014	2015	2015	2015
U.S. Stock	0%	0%	0%	0%	0%	21%	23%
EAFE Stock	0%	0%	0%	0%	0%	6%	5%
ACWIXUS Stock	0%	0%	0%	0%	0%	7%	10%
Global Stock	43%	43%	42%	42%	42%	11%	9%
Other Stock	0%	0%	0%	0%	0%	2%	4%
Total Stock	43%	43%	42%	42%	42%	48%	50%
U.S. Bonds	19%	19%	17%	24%	24%	19%	18%
Cash	0%	0%	0%	0%	0%	0%	-1%
Other Fixed Income ¹	6%	6%	7%	0%	0%	7%	9%
Total Fixed Income	25%	25%	24%	24%	24%	27%	26%
Hedge Funds	0%	0%	0%	0%	0%	4%	5%
Real Estate incl. REITS	11%	11%	13%	13%	13%	9%	8%
Other Real Assets ¹	0%	5%	3%	3%	3%	2%	3%
Private Equity	21%	16%	20%	20%	20%	10%	9%
Total	100%						

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

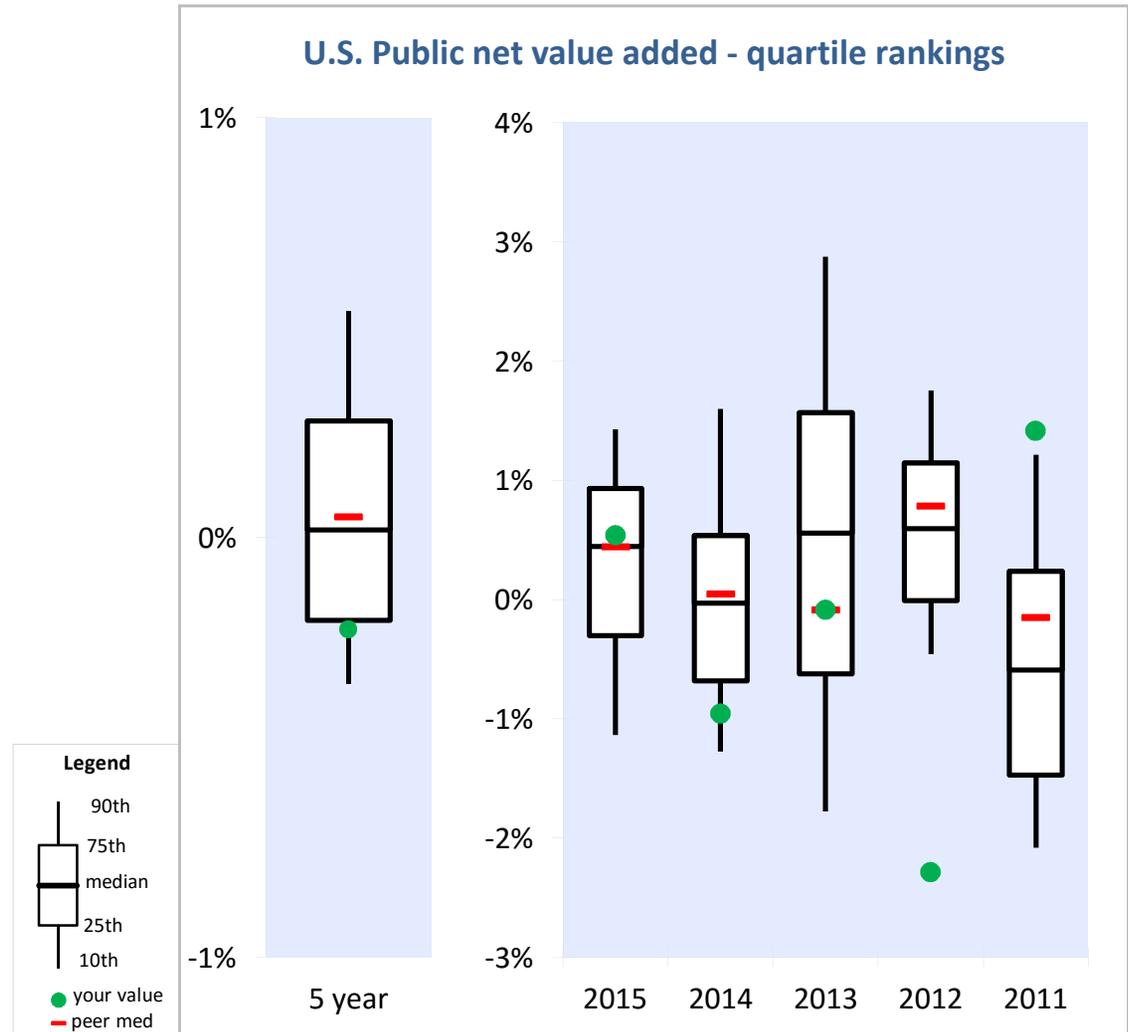
Net value added is the component of total return from active management. Your 5-year net value added was -0.2%.

Net value added equals total net return minus policy return.

Value added for Oregon Public Employees Retirement Fund

Year	Net Return	Policy Return	Net value Added
2015	2.1%	1.6%	0.5%
2014	7.3%	8.2%	(1.0%)
2013	15.6%	15.7%	(0.1%)
2012	14.3%	16.6%	(2.3%)
2011	2.2%	0.8%	1.4%
5-year	8.1%	8.4%	(0.2%)

Your 5-year net value added of -0.2% compares to a median of 0.0% for your peers and 0.0% for the U.S. Public universe.



Your value added was impacted by your choice of benchmarks for private equity. CEM suggests using lagged, investable benchmarks for private equity (see Research section, pages 6-7, for reasons why). If your fund used the private equity benchmark suggested by CEM, your 5-year total fund value added would have been 0.2% higher.

Your investment costs were \$493.2 million or 73.5 basis points in 2015.

Asset management costs by asset class and style (\$000s)	Internal Management			External Management			Total	
	Passive	Active	Overseeing of external	Passive fees	Active base fees	Perform. fees ³		
U.S. Stock - Broad/All			264		4,471	819	5,553	
U.S. Stock - Large Cap	93		340	170	6,872		7,475	
U.S. Stock - Small Cap	99		154		8,911		9,164	
Stock - Emerging		187	424		11,154		11,765	
Stock - ACWIxU.S.			701	522	40,901		42,124	
Stock - Global			286	363	3,699		4,348	
Fixed Income - U.S.			1,072		5,309		6,381	
Fixed Income - U.S. Gov't			186		4,515		4,701	
Fixed Income - Other			486		22,795		23,281	
Cash		284					284	
REITs			50		6,117		6,168	
Real Estate			480		18,005		18,484	
Real Estate - LPs			1,056		49,990		51,046	
Other Real Assets			1,491		23,249		24,740	
Diversified Private Equity			2,414		208,309 ¹		210,723	
Diversified Priv.Eq. - Fund of Funds			240		42,424 ²		42,664	
Other Private Equity			198		20,959 ¹		21,157	
Overlay Programs			944		579		1,523	
Total excluding private asset performance fees							491,582	73.2bp
Oversight, custodial and other costs ⁴								
Oversight & consulting							1,304	
Trustee & custodial								
Audit							47	
Other							277	
Total oversight, custodial & other costs							1,628	0.2bp
Total investment costs (excl. transaction costs & private asset performance fees)							493,210	73.5bp

Footnotes

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

² Default underlying costs were added to fund of funds. The defaults added were: Diversified Priv.Eq. 157 bps base fees refer to Appendix A for full details.

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

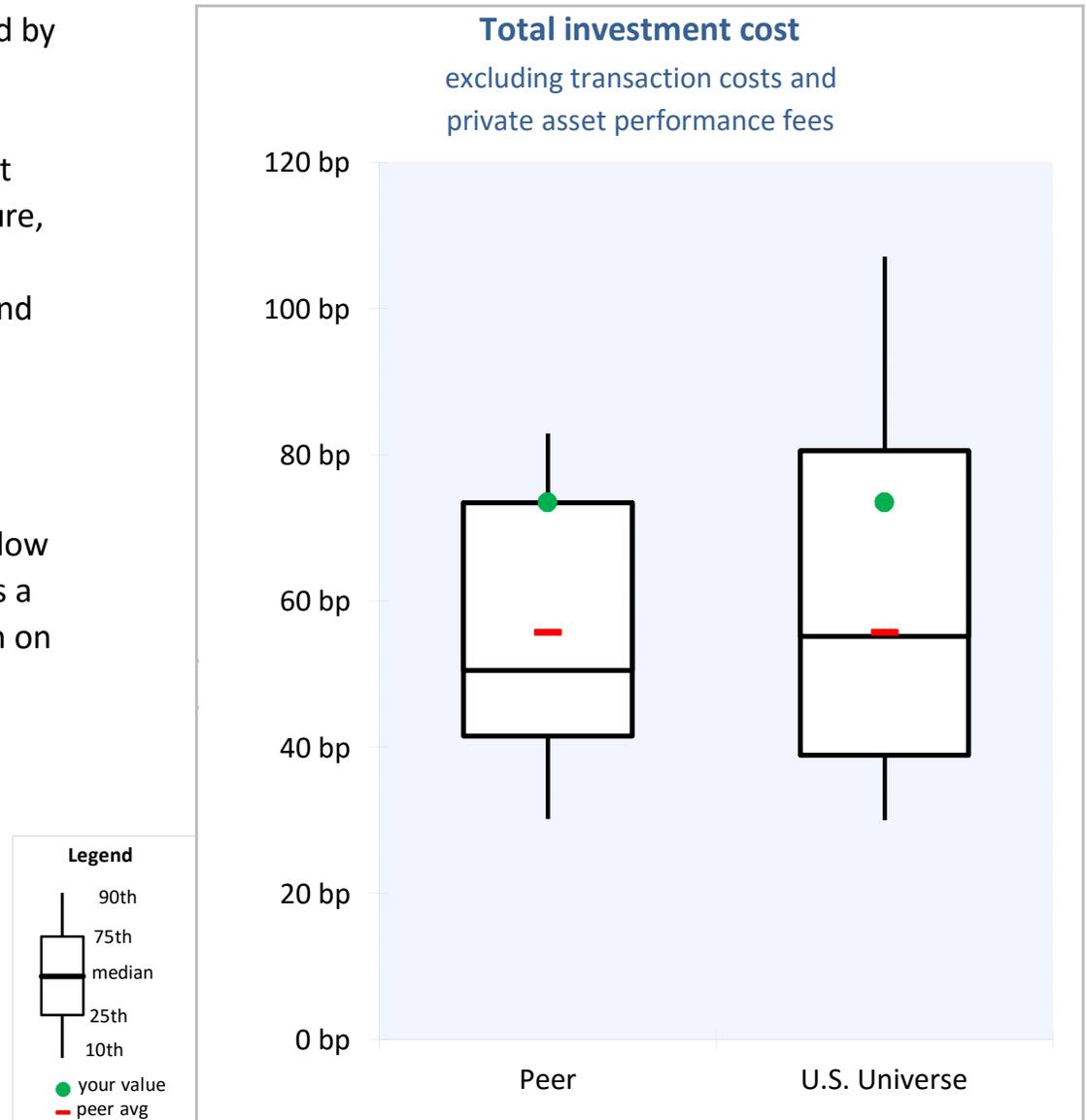
⁴ Excludes non-investment costs, such as PBGC premiums and preparing checks for retirees.

Your total investment cost of 73.5 bps was above the peer median of 50.5 bps.

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

- Asset mix, particularly holdings of the highest cost asset classes: real estate (excl REITS), infrastructure, hedge funds and private equity. These high cost assets equaled 33% of your fund's assets at the end of 2015 versus a peer average of 25%.
- Fund size. Bigger funds have advantages of scale.

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



Benchmark cost analysis suggests that, after adjusting for fund size and asset mix, your fund was normal cost in 2015.

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

Your total cost of 73.5 bp was close to your benchmark cost of 71.8 bp. Thus, your excess cost was 1.6 bp.

Your cost versus benchmark

	\$000s	basis points
Your total investment cost	493,210	73.5 bp
Your benchmark cost	482,391	71.8 bp
Your excess cost	10,819	1.6 bp

Your fund was normal cost because you had a higher cost implementation style that was mostly offset by paying less than peers for similar services.

Explanation of your cost status

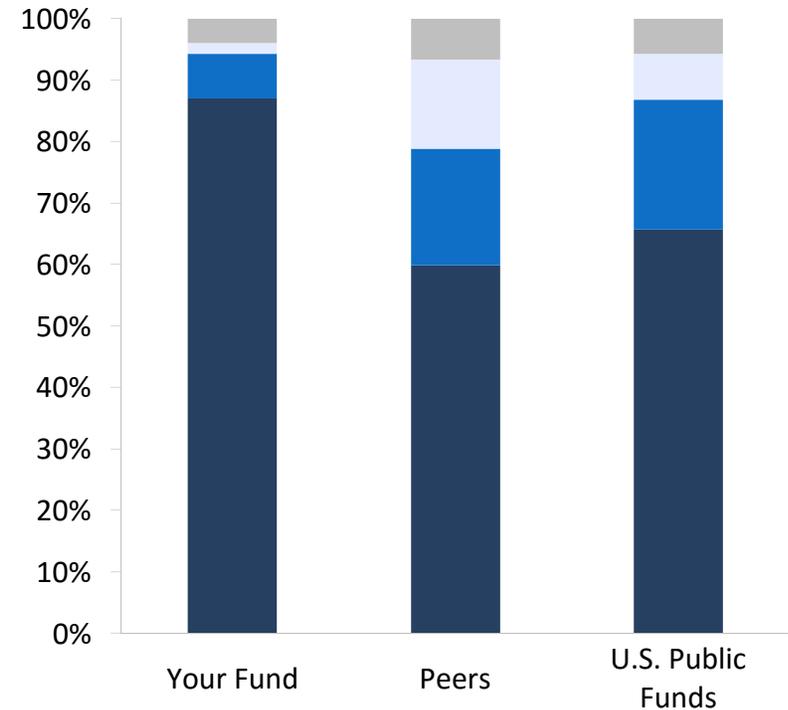
	Excess Cost/ (Savings)	
	\$000s	bps
1. Higher cost implementation style		
• More fund of funds	4,268	0.6
• More external active management (less lower cost passive and internal)	29,626	4.4
• More overlays	283	0.0
• Other style differences	(1,165)	(0.2)
	<u>33,012</u>	<u>4.9</u>
2. Paying less than peers for similar services		
• External investment management costs	(15,926)	(2.4)
• Internal investment management costs	45	0.0
• Oversight, custodial & other costs	(6,313)	(0.9)
	<u>(22,194)</u>	<u>(3.3)</u>
Total excess cost	10,819	1.6

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

The greatest cost impact of differences in implementation style is usually caused by:

- External active management because it tends to be much more expensive than internal or passive management.
- Within external active holdings, fund of funds usage because it is more expensive than direct fund investment.

Implementation style¹



■ Internal passive	4%	7%	6%
■ Internal active	2%	15%	7%
■ External passive	7%	19%	21%
■ External active	87%	60%	66%

1. The graph above does not take into consideration the impact of derivatives.

Differences in implementation style cost you 4.9 bps relative to your peers.

Calculation of the cost impact of differences in implementation style

Asset class	Your avg holdings in \$mils (A)	% External active			Premium vs passive & internal ¹ (C)	Cost/ (savings) \$000s bps (A X B X C)	
		You	Peer average	More/ (less)			
U.S. Stock - Broad/All	1,450	100.0%	19.0%	81.0%	39.4 bp	4,631	
U.S. Stock - Large Cap	6,825	41.7%	23.4%	18.3%	21.4 bp	2,676	
U.S. Stock - Small Cap	2,835	70.2%	74.8%	(4.5%)	59.6 bp	(764)	
Stock - Emerging	1,740	90.6%	67.3%	23.3%	47.1 bp	1,906	
Stock - ACWIxU.S.	10,942	84.0%	63.1%	20.9%	43.8 bp	10,018	
Stock - Global	1,711	58.1%	62.6%	(4.5%)	34.5 bp	(268)	
Fixed Income - U.S.	5,509	100.0%	57.5%	42.5%	12.4 bp	2,905	
Fixed Income - U.S. Gov't	4,966	100.0%	20.1%	79.9%	Insufficient ²	0	
Fixed Income - Other	4,500	100.0%	93.3%	6.7%	14.5 bp	434	
REITs	1,918	100.0%	70.3%	29.7%	34.1 bp	1,940	
Real Estate ex-REITs	6,575	100.0%	94.8%	5.2%	62.7 bp	2,158	
Partnerships, as a proportion of external:	6,575	54.7%	41.1%	13.5%	44.8 bp	3,989	
Other Real Assets	1,433	100.0%	100.0%	0.0%		0	
Diversified Private Equity	17,356	100.0%	99.8%	0.2%	Insufficient ²	0	
Other private equity	1,129	100.0%	93.9%	6.1%	Insufficient ²	0	
Impact of less/more external active vs. lower cost styles						29,626	4.4 bp
					<u>Fund of funds % of LPs</u>		
					<u>vs. direct LP¹</u>		
Real Estate ex-REITs - LPs	3,596	0.0%	0.0%	0.0%		0	
Diversified Private Equity - LPs	17,356	11.0%	7.6%	3.4%	72.9 bp	4,268	
Impact of less/more fund of funds vs. direct LPs						4,268	0.6 bp
					<u>Overlays and other</u>		
Impact of higher use of portfolio level overlays						283	0.0 bp
Impact of mix of internal passive, internal active, and external passive ³						(1,165)	(0.2) bp
Total impact of differences in implementation style						33,012	4.9 bp

Footnotes

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

The net impact of paying more/(less) for external asset management costs saved 2.4 bps.

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

	Your avg holdings in \$mils (A)	Cost in bps			Cost/ (savings) in \$000s (A X B)
		Your Fund	Peer median	More/ (less) (B)	
U.S. Stock - Broad/All - Active	1,450	38.3 ¹	40.6	(2.3)	(328)
U.S. Stock - Large Cap - Passive	2,179	1.2	1.0	0.2	45
U.S. Stock - Large Cap - Active	2,847	25.0	24.4	0.6	180
U.S. Stock - Small Cap - Active	1,991	45.5	64.3	(18.8)	(3,745)
Stock - Emerging - Active	1,576	73.5	56.0	17.5	2,751
Stock - ACWIxU.S. - Passive	1,750	3.4	3.4	0.0	0
Stock - ACWIxU.S. - Active	9,192	45.2	47.2	(2.0)	(1,864)
Stock - Global - Passive	717	6.7	5.3	1.3	96
Stock - Global - Active	994	38.9	39.8	(0.9)	(90)
Fixed Income - U.S. - Active	5,509	11.6	14.7	(3.1)	(1,718)
Fixed Income - U.S. Gov't - Active	4,966	9.5	9.5*	0.0	0
Fixed Income - Other - Active	4,500	51.7	43.1	8.6	3,871
REITs - Active	1,918	32.2	38.5	(6.3)	(1,211)
Real Estate ex-REITs - Active	2,979	62.0	62.0	0.0	0
Real Estate ex-REITs - Limited Partnership	3,596	142.0	106.8	35.1	12,631
Other Real Assets - Active	1,433	172.7	154.3	18.4	2,634
Diversified Private Equity - Active	15,453	136.4	156.5	(20.2)	(31,169)
Diversified Private Equity - Fund of Fund	1,903	224.2	229.4	(5.3)	(1,001)
Other Private Equity - Active	1,129	187.3	165.0	22.3	2,522
	<i>Notional</i>				
Derivatives/Overlays - Passive Beta	1,370	11.1	7.7*	3.4	470
Total impact of paying more/less for external management					(15,926)
Total in bps					(2.4) bp

*Universe median used as peer data was insufficient.

¹ You paid performance fees in this asset class.

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

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

	Your avg holdings in \$mils (A)	Cost in bps			Cost/ (savings) in \$000s (A X B)
		Your Fund	Peer median	More/ (less) (B)	
U.S. Stock - Large Cap - Passive	1,798	0.5	0.3	0.3	45
U.S. Stock - Small Cap - Passive	844	1.2	1.2	0.0	0
Stock - Emerging - Active	164	11.4	11.4	0.0	0
Total impact of paying more/less for internal management					45
Total in bps					0.0 bp

The net impact of differences in oversight, custodial & other costs saved 0.9 bps.

Cost impact of differences in oversight, custodial & other costs

	Your avg holdings in \$mils	Cost in bps			Cost/ (savings) in \$000s
		Your fund	Peer median	More/ (less)	
	(A)			(B)	(A X B)
Oversight & consulting	67,147	0.2	0.8	(0.6)	(4,249)
Custodial	67,147	0.0	0.2	(0.2)	(1,363)
Audit	67,147	0.0	0.0	(0.0)	(182)
Other	67,147	0.0	0.1	(0.1)	(520)
Total					(6,313)
Total in bps					(0.9) bp

Summary of the benchmark cost analysis which suggests that, after adjusting for fund size and asset mix, your fund was normal cost in 2015.

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

Asset class/category	Due to impl. style \$000s	Due to paying more/ (less)	Total \$000s	Total bps
U.S. Stock - Broad/All	4,631	(328)	4,303	
U.S. Stock - Large Cap	1,770	270	2,040	
U.S. Stock - Small Cap	(1,064)	(3,745)	(4,809)	
Stock - Emerging	1,946	2,751	4,697	
Stock - ACWIxU.S.	10,018	(1,864)	8,154	
Stock - Global	(268)	6	(262)	
Fixed Income - U.S.	2,905	(1,718)	1,187	
Fixed Income - U.S. Gov't	0	0	0	
Fixed Income - Other	434	3,871	4,306	
REITs	1,940	(1,211)	729	
Real Estate ex-REITs	6,148	12,631	18,778	
Other Real Assets	0	2,634	2,634	
Diversified Private Equity	4,268	(32,171)	(27,902)	
Other private equity	0	2,522	2,522	
Overlays	283	470	753	
Oversight, Custodial & Other		(6,313)	(6,313)	
Total	33,012	(22,194)	10,819	1.6 bp

Summary of key takeaways

Returns

- Your 5-year net total return was 8.1%. This was above the U.S. Public median of 7.2% and above the peer median of 7.5%.
- Your 5-year policy return was 8.4%. This was above the U.S. Public median of 7.2% and above the peer median of 7.3%.

Value added

- Your 5-year net value added was -0.2%. This was slightly below the U.S. Public median of 0.0% and slightly below the peer median of 0.0%.

Cost and cost effectiveness

- Your investment cost of 73.5 bps was above the peer median cost of 50.5 bps. You were higher cost because your investments were more heavily weighted in higher cost private asset classes. However, your cost was close to your benchmark cost of 71.8 bps. This suggests that your fund was normal cost compared to your peers, given your assets.
- Your fund was normal cost because you had a higher cost implementation style. This added cost was partly offset because you paid less than peers for similar services.