

# CEM Investment Benchmarking Analysis for: Oregon Public Employees Retirement Fund

# Key takeaways

## Returns

- Your 5-year net total return was 9.3%. This was above the U.S. Public median of 9.0% and above the peer median of 9.0%.
- Your 5-year policy return was 9.5%. This was above the U.S. Public median of 8.7% and above the peer median of 8.6%.

## Value added

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

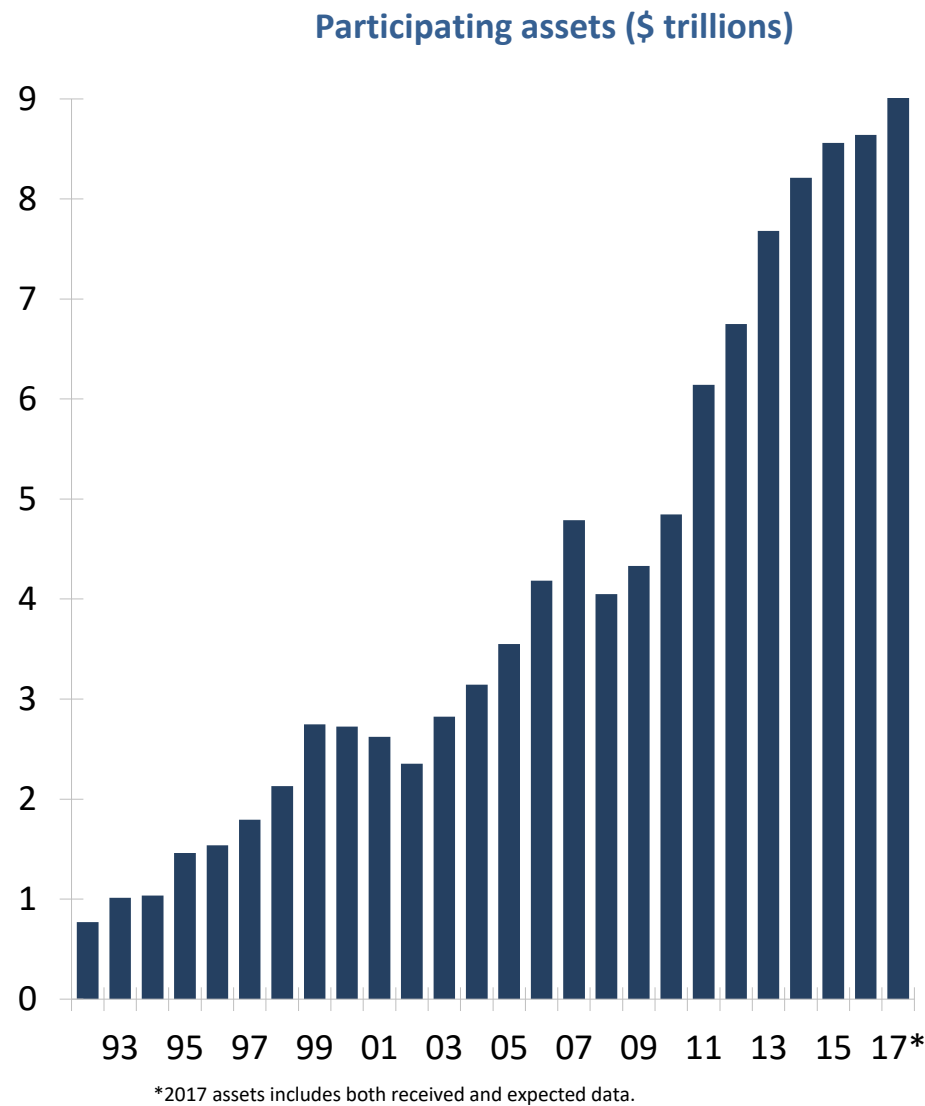
## Cost

- Your investment cost of 72.4 bps was below your benchmark cost of 76.3 bps. This suggests that your fund was slightly low cost compared to your peers. Your fund was slightly low cost because you paid less than peers for similar services.

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

- 156 U.S. pension funds participate. The median U.S. fund had assets of \$10.7 billion and the average U.S. fund had assets of \$22.6 billion. Total participating U.S. assets were \$3.5 trillion.
- 74 Canadian funds participate with assets totaling \$1,358.7 billion.
- 37 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.
- 8 Asia-Pacific funds participate with aggregate assets of \$1,043.8 billion. Included are funds from Australia, New Zealand, China and South Korea.

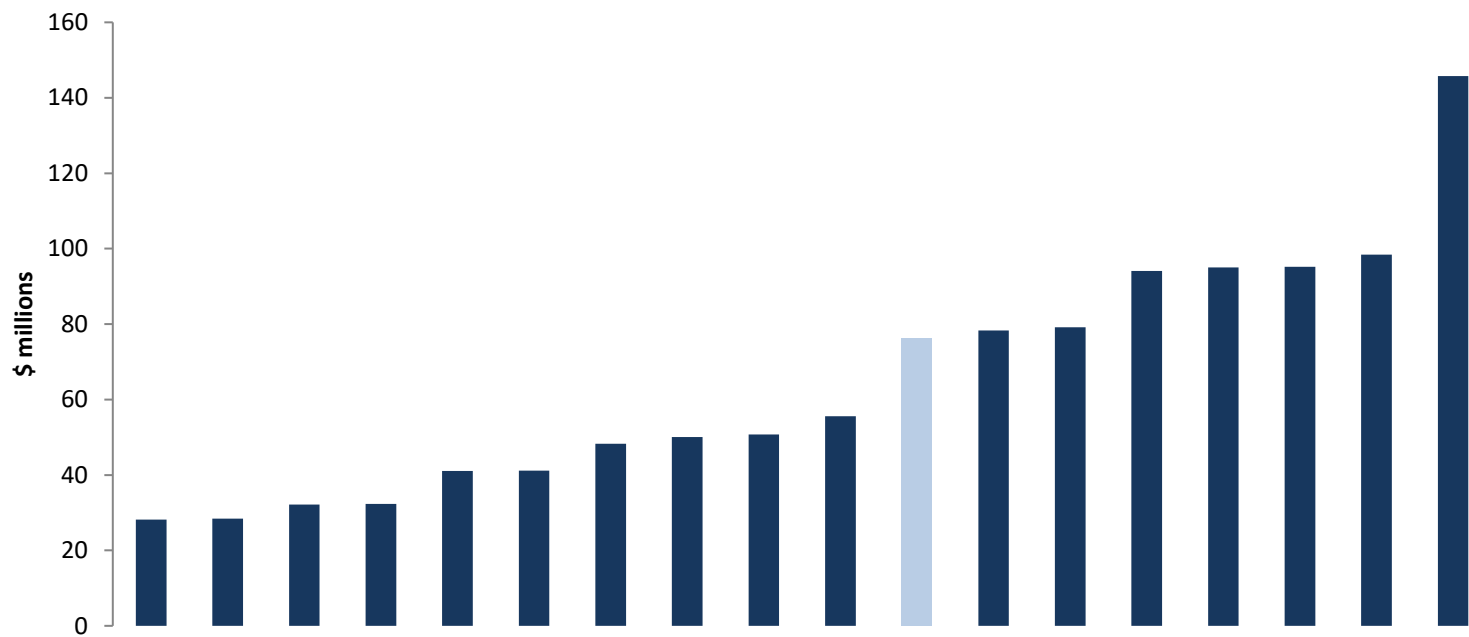
The most meaningful comparisons for your returns and value added are to the U.S. Public universe, which consists of 57 funds.



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

- 18 U.S. Public public sponsors from \$28.2 billion to \$145.7 billion
- Median size of \$53.2 billion versus your \$76.2 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.

## What gets measured gets managed, so it is critical that you measure and compare the right things:

### 1. Returns

Why do total returns differ from other funds? What was the impact of your policy mix decisions versus implementation decisions?

### 2. Net value added

Are your implementation decisions adding value (i.e., mostly the effectiveness of active management, as well as the amount of active management versus passive management)?

### 3. Costs

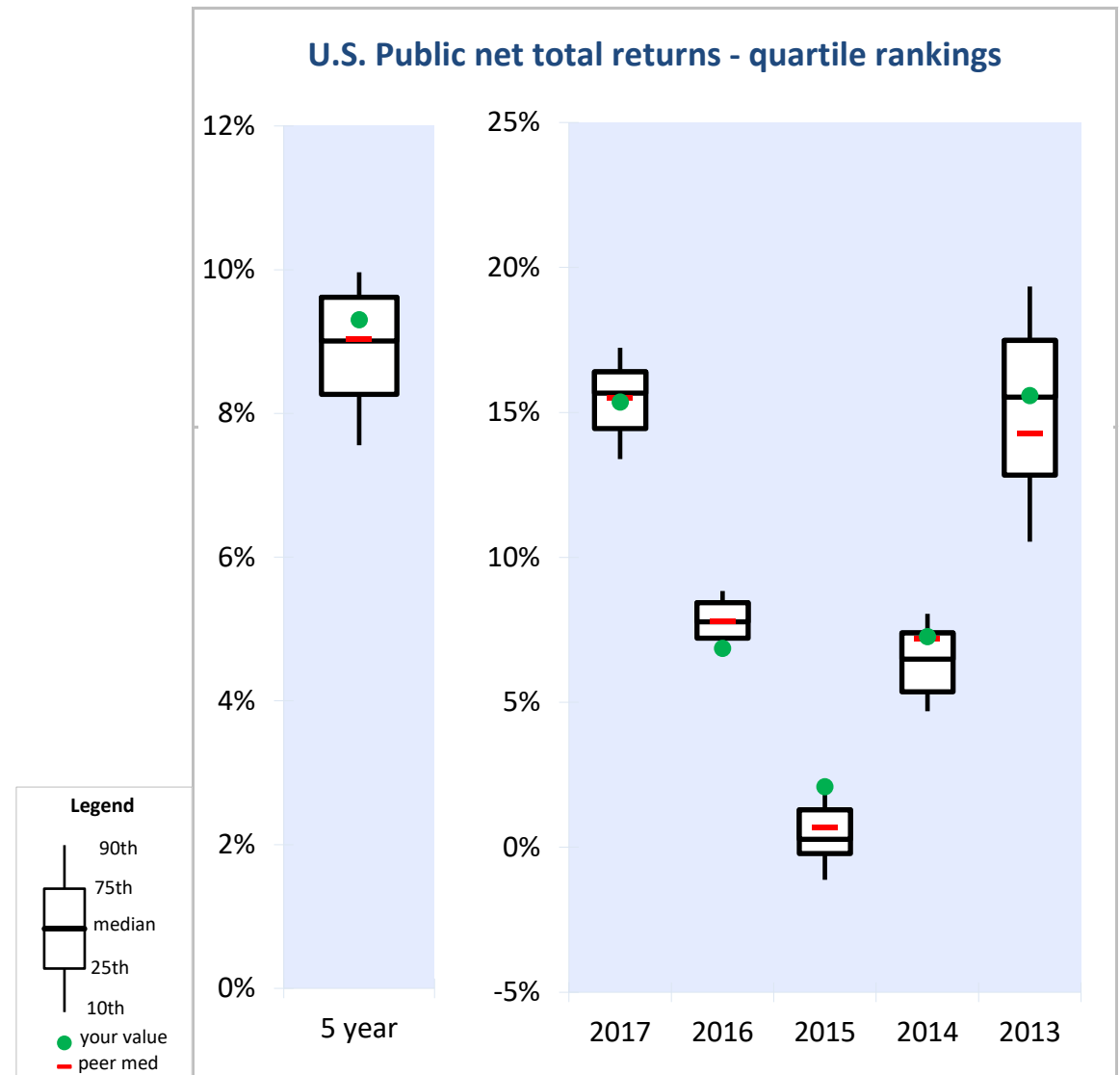
Are your costs reasonable? Costs matter and can be managed.

## Your 5-year net total return of 9.3% was above both the U.S. Public median of 9.0% and the peer median of 9.0%.

Total returns, by themselves, provide little insight into the reasons behind relative performance. Therefore, we separate total return into its more meaningful components: policy return and value added.

	Your 5-year
Net total fund return	9.3%
- Policy return	9.5%
= Net value added	-0.2%

This approach enables you to understand the contribution from both policy mix decisions (which tend to be the board's responsibility) and implementation decisions (which tend to be management's responsibility).



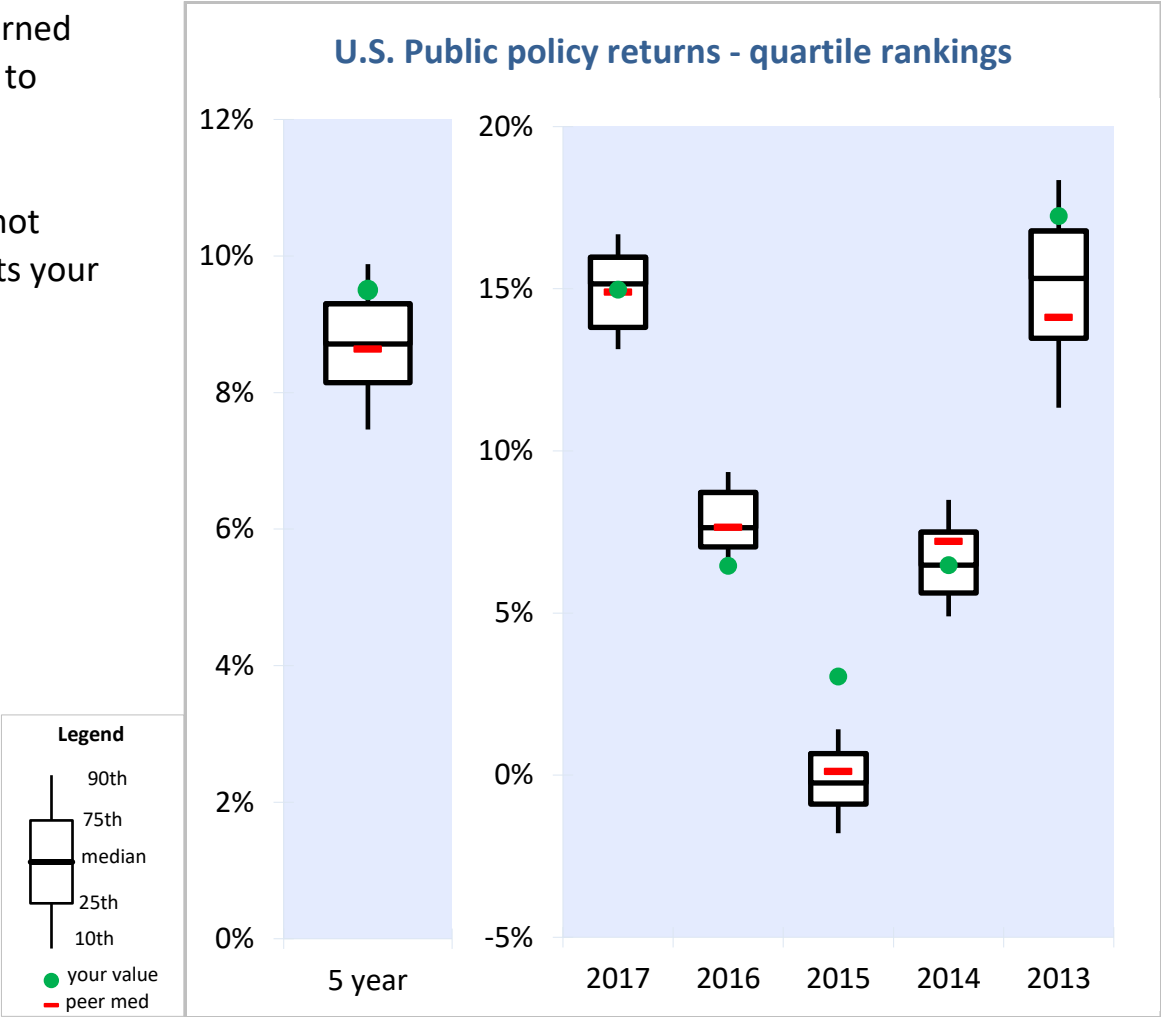
**Your 5-year policy return of 9.5% was above both the U.S. Public median of 8.7% and the peer median of 8.6%.**

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, including your fund, were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. Prior to this adjustment, your 5-year policy return was 9.9%, 0.4% higher than your adjusted 5-year policy return of 9.5%. Mirroring this, your 5-year total fund net value added would be 0.4% lower.

## Your 5-year policy return of 9.5% was above the U.S. Public median of 8.7% primarily because of:

- The positive impact of a higher allocation towards Real Estate (your 11% 5-year average weight versus a U.S. Public average of 8%) and Private Equity (your 20% 5-year average weight versus a U.S. Public average of 9%). Both these asset classes performed well over the last 5 years.
- The positive impact of your lower weight in one of the worst performing asset classes of the past 5 years: Hedge Funds. U.S. Public funds invested an average of 5% of their assets in Hedge Funds, you did not invest in Hedge Funds at all.
- The above was partly offset by your lower weight in Total Stock (your 41% 5-year average weight versus a U.S. Public average of 49%).

	5-Year average policy mix <sup>1</sup>			5-year policy return	
	Your Fund	U.S. Public Avg.	More/Less	Your Fund	U.S. Public Avg.
U.S. Stock	0%	21%	-21%	15.5%	15.5%
EAFE Stock	0%	5%	-5%	n/a <sup>3</sup>	8.1%
ACWIxUS Stock	0%	9%	-9%	7.0%	7.3%
Global Stock	41%	10%	31%	11.0%	10.9%
Other Stock	0%	5%	-5%	n/a <sup>3</sup>	n/a <sup>3</sup>
Total Stock	41%	49%	-8%	11.0%	11.8%
U.S. Bonds	22%	17%	4%	1.9%	2.2%
Other Fixed Income <sup>2</sup>	1%	9%	-7%	n/a <sup>3</sup>	n/a <sup>3</sup>
Total Fixed Income	23%	26%	-3%	2.2%	2.8%
Hedge Funds	0%	5%	-5%	n/a <sup>3</sup>	4.8%
Real Estate ex-REITs	11%	8%	4%	10.2%	10.7%
Other Real Assets <sup>2</sup>	5%	4%	1%	n/a <sup>3</sup>	n/a <sup>3</sup>
Private Equity	20%	9%	11%	15.6%	15.1%
Total	100%	100%	0%		

1. 5-year weights are based only on plans with 5 years of continuous data.

2. Other fixed income includes Inflation Indexed and Global bonds.

Other real assets includes commodities, natural resources, infrastructure and REITS.

3. A value of 'n/a' is shown if asset class return are not available for the full 5 years or if they are broad and incomparable.



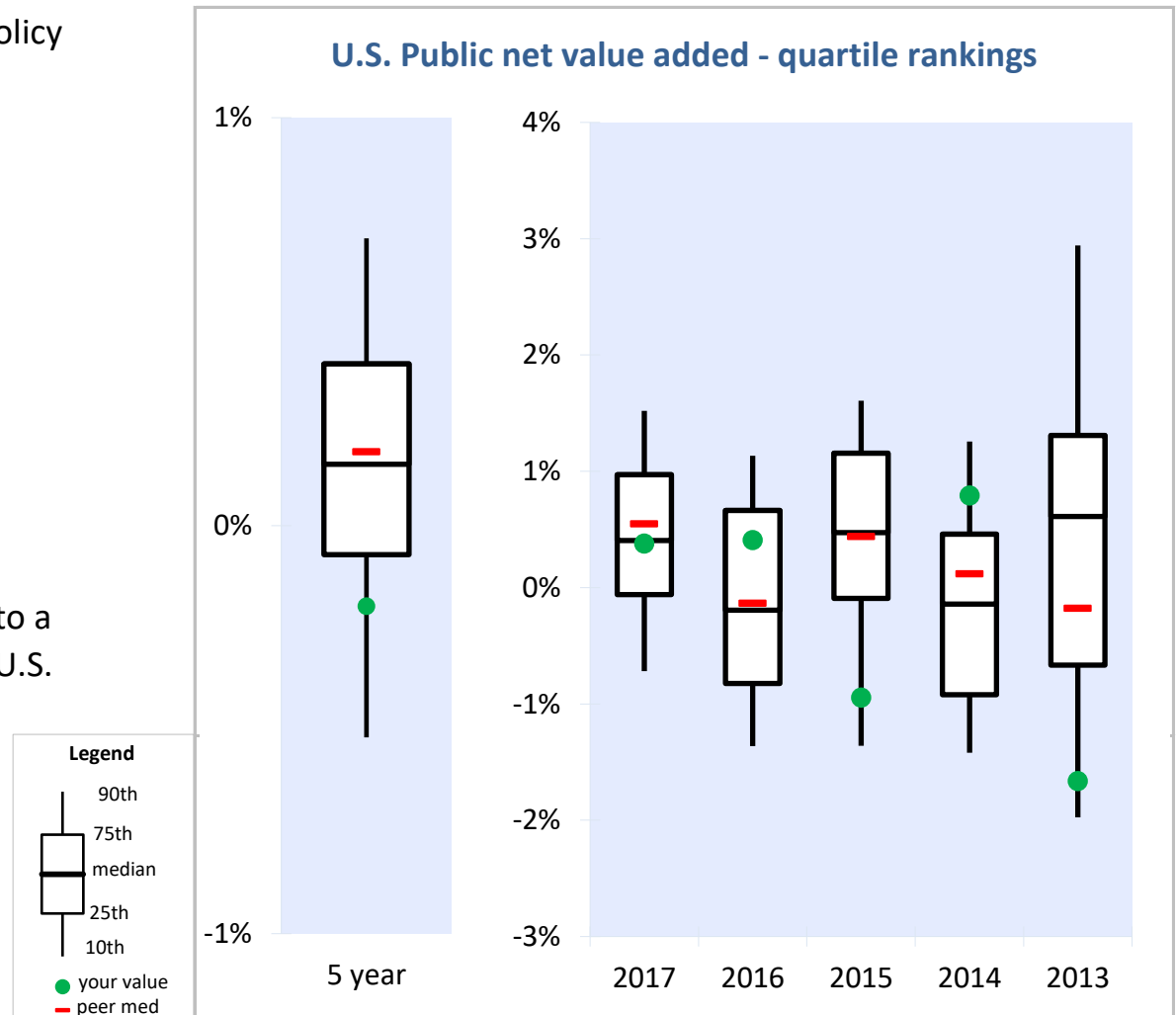
## Net value added is the component of total return from active management. Your 5-year net value added was -0.2%.

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
2017	15.4%	15.0%	0.4%
2016	6.9%	6.5%	0.4%
2015	2.1%	3.0%	-0.9%
2014	7.3%	6.5%	0.8%
2013	15.6%	17.2%	-1.7%
5-Year	9.3%	9.5%	-0.2%

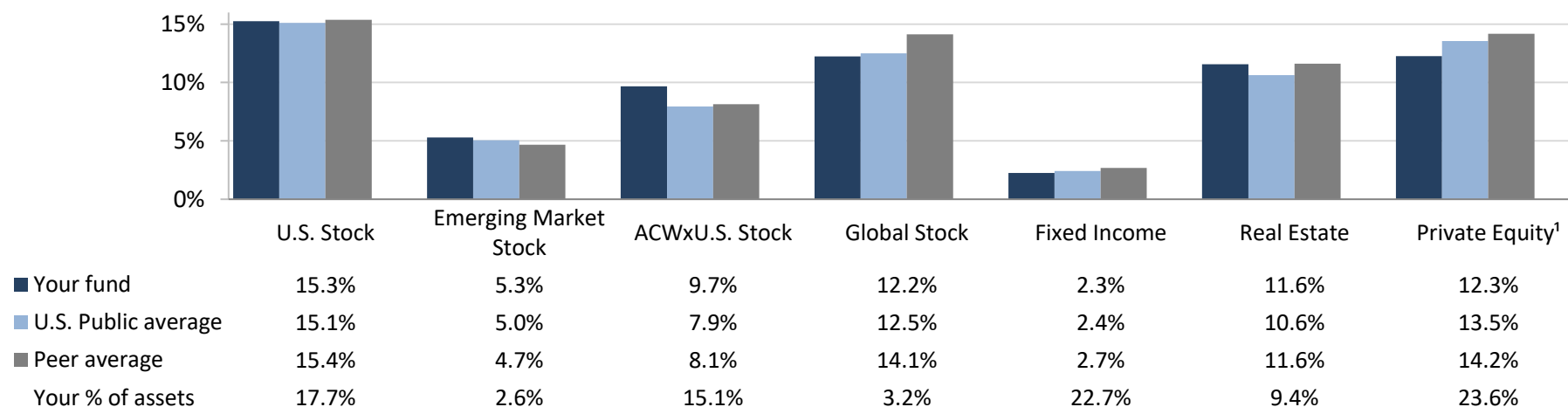
Your 5-year net value added of -0.2% compares to a median of 0.2% for your peers and 0.2% for the U.S. Public universe.



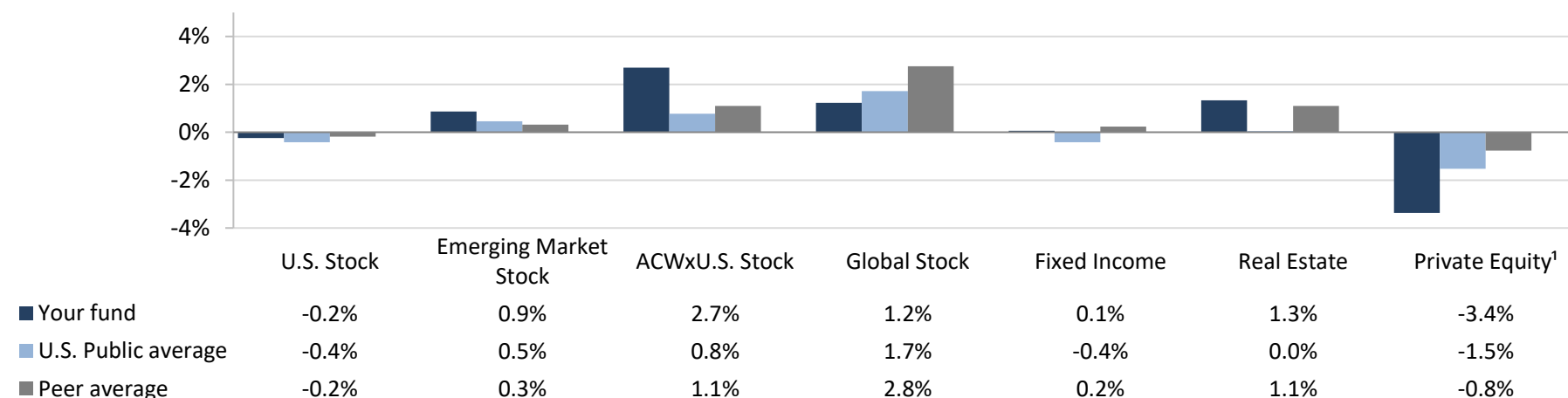
To enable fairer comparisons, the value added for each participant including your fund was adjusted to reflect private equity benchmarks based on investable public market indices. Prior to this adjustment, your fund's 5-year total fund net value added was -0.6%.

# Comparisons of your 5-year net return and net value added by major asset class.

## 5-year average net return by major asset class



## 5-year average net value added by major asset class



1. To enable fairer comparisons, the private equity benchmarks of all participants, including your fund were adjusted to reflect lagged, investable, public-market indices.

Prior to this adjustment, your fund's 5-year private equity net value added was -5.3%.

## Your investment costs were \$551.7 million or 72.4 basis points in 2017.

Asset management costs by asset class and style (\$000s)	Internal Management			External Mgmt		Total <sup>3</sup>
	Passive	Active	Overseeing of external	Passive fees	Active base fees	
Stock - U.S. Broad/All	1,754					1,754
Stock - U.S. Large Cap			527		5,501	6,028
Stock - U.S. Small Cap			158		10,676	10,834
Stock - Emerging			377		13,278	13,655
Stock - Global			863		11,873	12,736
Stock - ACWI x U.S.			846		36,437	37,283
Fixed Income - U.S.			885		6,374	7,259
Fixed Income - U.S. Gov't		946	113		945	2,003
Fixed Income - Other			650		11,963	12,613
Cash		452				452
REITs			136		6,029	6,165
Real Estate ex-REITs <sup>3</sup>			2,029		27,832	29,861
Real Estate - LPs <sup>3</sup>			1,898		33,745	35,643
Other Real Assets <sup>3</sup>			1,827		52,348	54,175
Diversified Private Equity - LPs <sup>1 3</sup>			6,828		256,670	263,498
Diversified Private Equity - Co-Invest. <sup>3</sup>			165			165
Diversified Private Equity - FoFs <sup>2 3</sup>			394		22,826	23,220
Other Private Equity - LPs <sup>1 3</sup>			1,302		28,418	29,720
Derivatives/Overlays			514	674		1,188
Total excluding private asset performance fees						548,255 72.0bp
<b>Oversight, custodial and other costs</b>						
Oversight & consulting						2,750
Trustee & custodial						225
Audit						53
Other						424
Total oversight, custodial & other costs						3,452 0.5bp
Total investment costs (excl. transaction costs & private asset performance fees)						551,707 72.4bp

### Footnotes

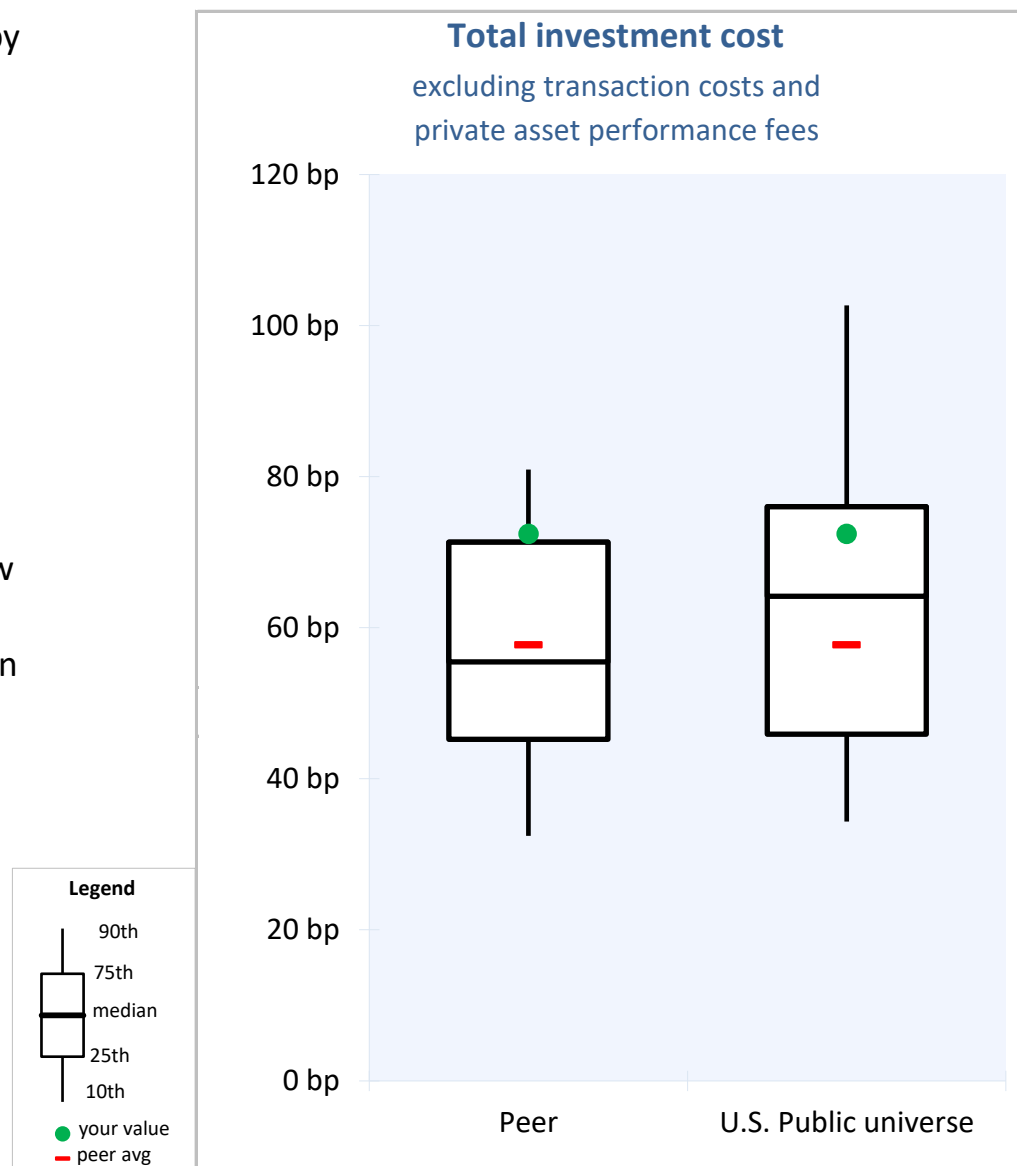
1. Fees are the weighted average management cost calculated using the detailed limited partnership survey provided.
2. Default underlying costs were added: Diversified Private Equity - FoFs 157 bp. Refer to Appendix A for full details regarding defaults.
3. Total cost excludes carry/performance fees.

## Your total investment cost of 72.4 bps was above the peer median of 55.5 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 assets at the end of 2017 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 slightly low cost by 3.9 basis points in 2017.

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 72.4 bp was slightly below your benchmark cost of 76.3 bp. Thus, your cost savings was 3.9 bp.

### Your cost versus benchmark

	\$000s	basis points
Your total investment cost	551,707	72.4 bp
Your benchmark cost	581,183	76.3 bp
Your excess cost	-29,477	(3.9) bp

## Your fund was slightly low cost because you paid less than peers for similar services.

### Reasons for your low cost status

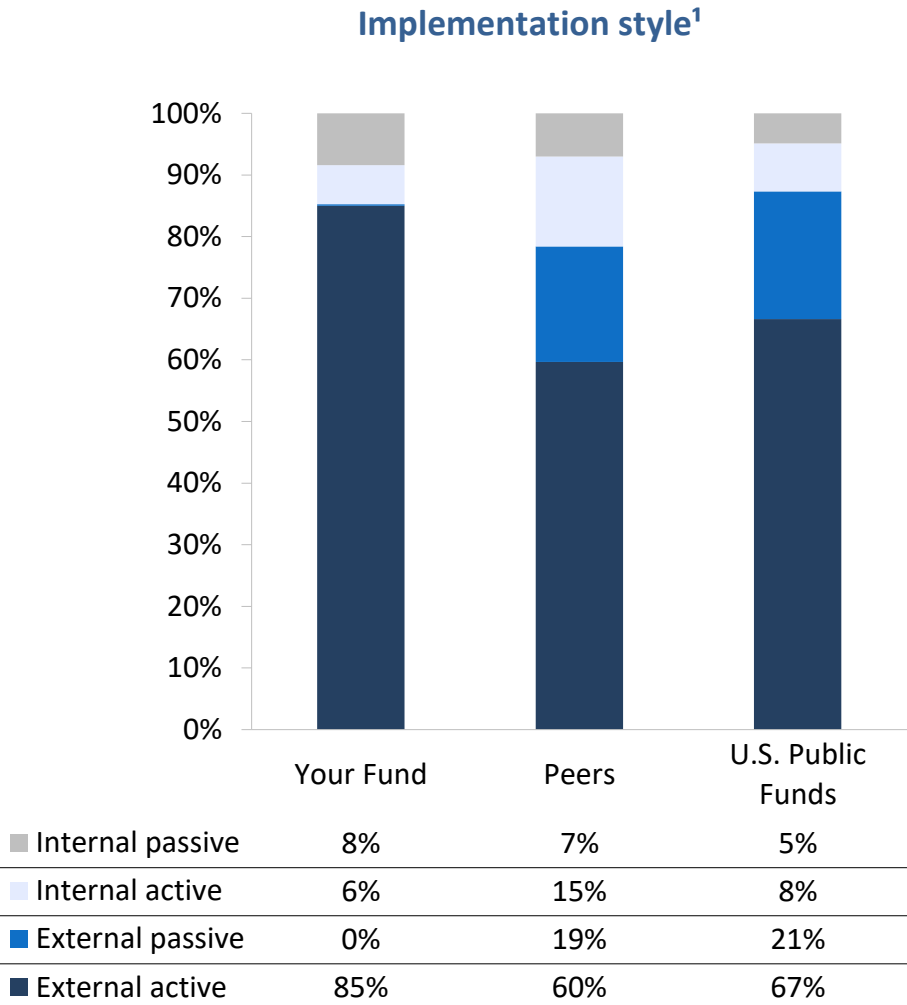
	Excess Cost/ (Savings)	
	\$000s	bps
1. Higher cost implementation style		
• More external active management (less lower cost passive and internal)	39,018	5.1
• Less fund of funds	-15,178	(2.0)
• Less overlays	-126	(0.0)
• Other style differences	-226	(0.0)
	23,489	3.1
2. Paying less than peers for similar services		
• External investment management costs	-49,308	(6.5)
• Oversight, custodial & other costs	-3,657	(0.5)
	-52,966	(7.0)
Total savings	-29,477	(3.9)

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

Implementation style is defined as the way in which your fund implements asset allocation. It includes internal, external, active, passive and fund of funds styles.

The greatest cost impact is usually caused by differences in the use of:

- External active management because it tends to be much more expensive than internal or passive management. You used more external active management than your peers (your 85% versus 60% for your peers).
- Within external active holdings, fund of funds usage because it is more expensive than direct fund investment. You had less in fund of funds. Your 3% of hedge funds, real estate and private equity in fund of funds compared to 10% for your peers.



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

# Differences in implementation style cost you 3.1 bp relative to your peers.

## Calculation of the cost impact of differences in implementation style

Asset class*	Your avg holdings in	% External active			Premium	Cost/	
	\$mils	You	Peer average	More/ (less)	vs passive & internal <sup>1</sup>	(savings) \$000s bps	
	(A)			(B)	(C)	(A X B X C)	
Stock - U.S. Broad/All	6,397	0.0%	20.3%	(20.3%)	34.9 bp	-4,528	
Stock - U.S. Large Cap	5,768	100.0%	22.1%	77.9%	27.7 bp	12,468	
Stock - U.S. Small Cap	1,728	100.0%	81.3%	18.7%	56.8 bp	1,840	
Stock - Emerging	2,060	100.0%	69.1%	30.9%	50.8 bp	3,237	
Stock - Global	4,722	100.0%	63.3%	36.7%	37.8 bp	6,554	
Stock - ACWI x U.S.	9,253	100.0%	66.3%	33.7%	36.3 bp	11,308	
Fixed Income - U.S.	6,557	100.0%	50.1%	49.9%	11.0 bp	3,615	
Fixed Income - U.S. Gov't	5,174	32.3%	5.9%	26.4%	3.1 bp	425	
Fixed Income - Other	2,410	100.0%	50.1%	49.9%	11.0 bp	1,329	
REITs	567	100.0%	72.5%	27.5%	41.1 bp	642	
Real Estate ex-REITs	7,187	100.0%	95.3%	4.7%	61.3 bp	2,054	
Diversified Private Equity	21,109	100.0%	100.0%	0.0%	127.0 bp	74	
Impact of more/less external active vs. lower cost styles						39,018	5.1 bp
					Premium vs.		
		LPs % of external active			external active <sup>1</sup>		
Real Estate ex-REITs	7,187	41.2%	43.7%	(2.4%)	42.9 bp	-748	
Impact of more/less partnerships as a percentage of external active						-748	(0.1) bp
					Premium		
		Fund of funds % of LPs			vs. direct LP <sup>1</sup>		
Real Estate ex-REITs	2,964	0.0%	1.8%	(1.8%)	49.7 bp	-259	
Diversified Private Equity	21,109	4.9%	14.2%	(9.4%)	75.4 bp	-14,919	
Impact of more/less fund of funds vs. direct LPs						-15,178	(2.0) bp
Impact of higher use of portfolio level overlays						-126	(0.0) bp
Impact of mix of internal passive, internal active, and external passive <sup>2</sup>						522	0.1 bp
Total impact of differences in implementation style						23,489	3.1 bp

Footnotes  
 \*Asset classes where you are implemented the same as peers (i.e. style impact is zero) are not shown.  
 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.



## The net impact of paying more/less for external asset management costs saved 6.5 bps.

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

	Style	Your avg holdings in \$mils	Cost in bps			Cost/ (savings) \$000s
			Your Fund	Peer median	More/ (less)	
<i>External asset management</i>		(A)	(B)			(A X B)
Stock - U.S. Large Cap	active	5,768	10.5	29.6	(19.2)	-11,054
Stock - U.S. Small Cap	active	1,728	62.7	63.8	(1.1)	-198
Stock - Emerging	active	2,060	66.3	58.7	7.5	1,552
Stock - Global	active	4,722	27.0	44.1	(17.2)	-8,099
Stock - ACWI x U.S.	active	9,253	40.3	40.3	0.0	0
Fixed Income - U.S.	active	6,557	11.1	13.9	(2.9)	-1,871
Fixed Income - U.S. Gov't	active	1,670	6.3	5.6	0.7	121
Fixed Income - Other	active	2,410	52.3	13.9	38.4	9,258
REITs	active	567	108.7	46.1	62.6	3,552
Real Estate ex-REITs	active	4,224	70.7	63.2	7.5	3,171
Real Estate ex-REITs	LP	2,964	120.3	105.3	15.0	4,447
Other Real Assets	active	4,783	113.3 <sup>1</sup>	128.5	(15.2)	-7,290
Diversified Private Equity	FoF	1,026	69.3	71.0	(1.6)	-169
Underlying base fees	FoF	1,026	157.0	157.0	0.0	0
Diversified Private Equity	LP	20,083	131.3	152.6	(21.3)	-42,731
Other Private Equity	LP	1,705	174.3 <sup>1</sup>	Excluded	--	--
Total impact of paying more/less for external management						-49,308
Total in bps						(6.5) bp

<sup>1</sup>'Excluded' indicates that the asset class was excluded from this analysis due to comparability concerns with peers.

## The net impact of differences in oversight, custodial & other costs saved 0.5 bps.

### Cost impact of differences in oversight, custodial & other costs

	Your avg holdings in \$mils (A)	Cost in bps			Cost/ (savings) \$000s (A X B)
		Your Fund	Peer median	More/ (less)	
Oversight	76,190	0.4	0.6	(0.2)	-1,516
Consulting	76,190	0.0	0.1	(0.1)	-422
Custodial	76,190	0.0	0.2	(0.2)	-1,417
Audit	76,190	0.0	0.0	(0.0)	-235
Other	76,190	0.1	0.1	(0.0)	-67
Total for oversight, custodial, other					-3,657
Total in bps					(0.5) bp

# Key takeaways

## Returns

- Your 5-year net total return was 9.3%. This was above the U.S. Public median of 9.0% and above the peer median of 9.0%.
- Your 5-year policy return was 9.5%. This was above the U.S. Public median of 8.7% and above the peer median of 8.6%.

## Value added

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

## Cost

- Your investment cost of 72.4 bps was below your benchmark cost of 76.3 bps. This suggests that your fund was slightly low cost compared to your peers. Your fund was slightly low cost because you paid less than peers for similar services.