

# North Carolina Retirement Systems

## Investment Cost Effectiveness Analysis - Summary of Results

For the 5 year period ending December 31, 2017



# Key takeaways

## Returns

- Your 5-year net total return was 7.6%. This was below the U.S. Public median of 9.0% and below the peer median of 9.0%.
- Your 5-year policy return was 6.8%. This was below the U.S. Public median of 8.8% and below the peer median of 8.7%.

## Value added

- Your 5-year net value added was 0.8%. This was above the U.S. Public median of 0.2% and above the peer median of 0.3%.

## Cost

- Your investment cost of 42.9 bps was below your benchmark cost of 54.2 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was low cost because you paid less than peers for similar services.

## Risk

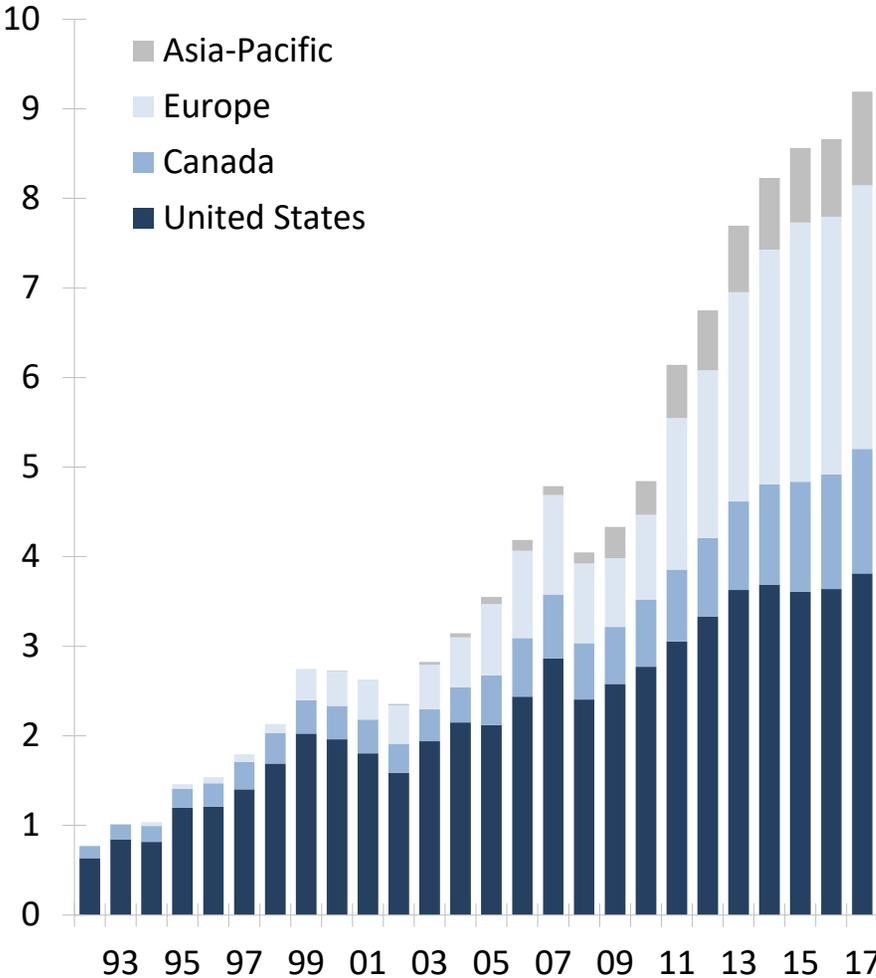
- Your asset risk of 9.5% was below the U.S. Public median of 10.5%.

# This benchmarking report compares your cost and return performance to the 294 funds in CEM's extensive pension database.

- 163 U.S. pension funds participate. The median U.S. fund had assets of \$9.4 billion and the average U.S. fund had assets of \$23.4 billion. Total participating U.S. assets were \$3.8 trillion.
- 77 Canadian funds participate with assets totaling \$1,391.1 billion.
- 43 European funds participate with aggregate assets of \$2.9 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Ireland, Denmark and the U.K.
- 11 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.

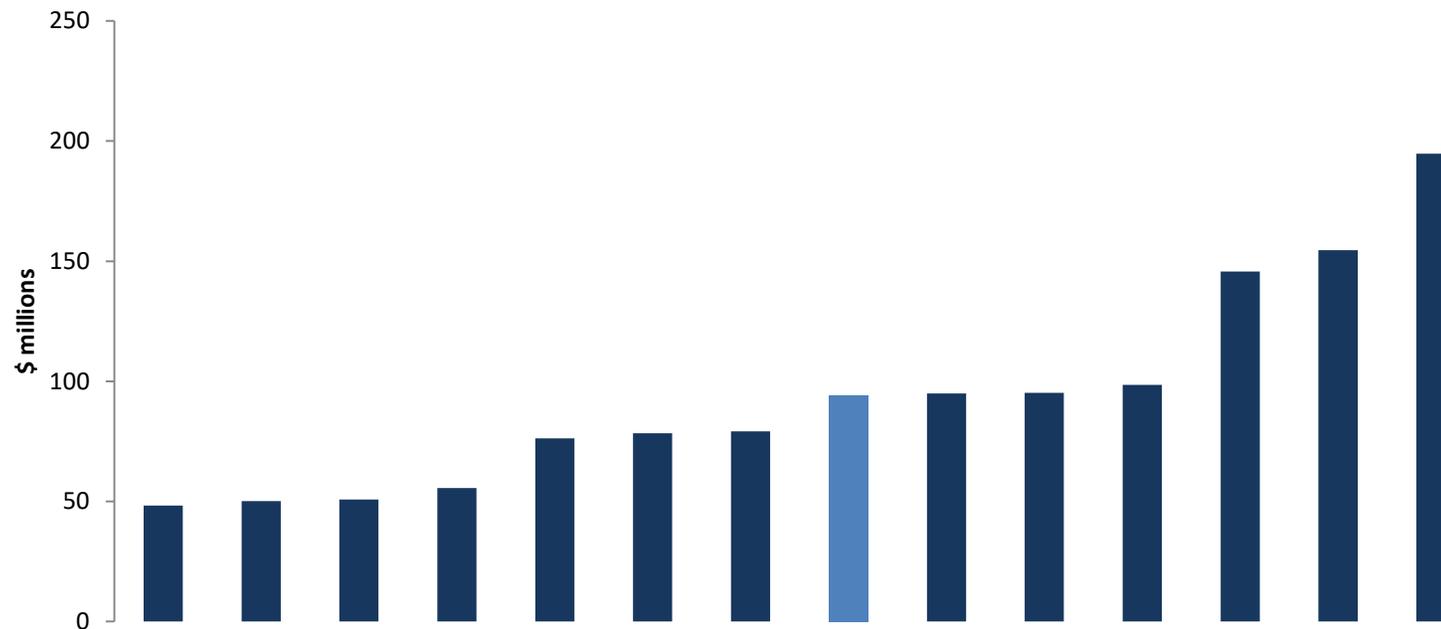
Participating assets (\$ trillions)



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

## Peer group for North Carolina Retirement Systems

- 14 U.S. Public public sponsors from \$48 billion to \$195 billion
- Median size of \$87 billion versus your \$94 billion



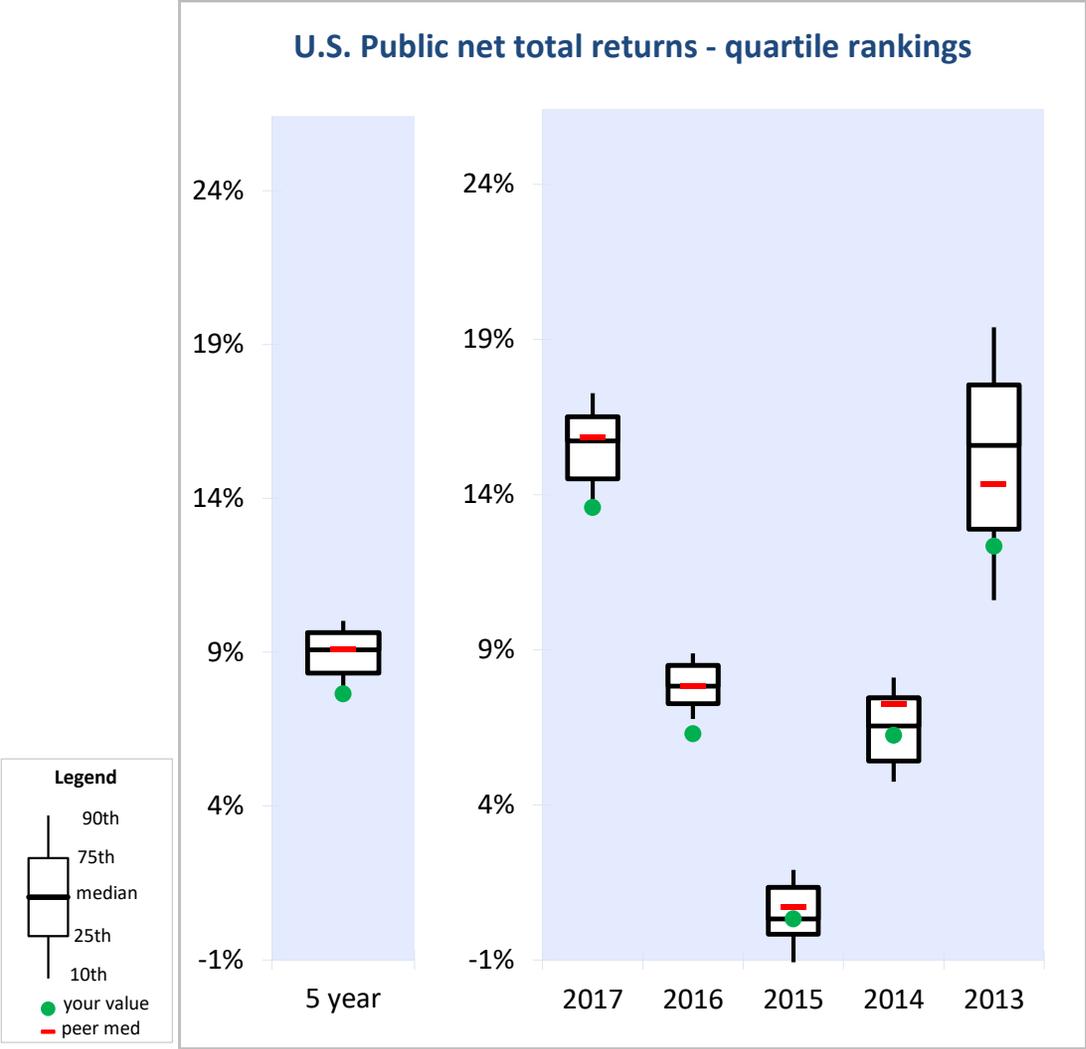
To preserve client confidentiality, given potential access to documents as permitted by the Freedom of Information Act, we do not disclose your peers' names in this document.

# Your 5-year net total return of 7.6% was below 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	7.6%
- Policy return	6.8%
= Net value added	0.8%

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).



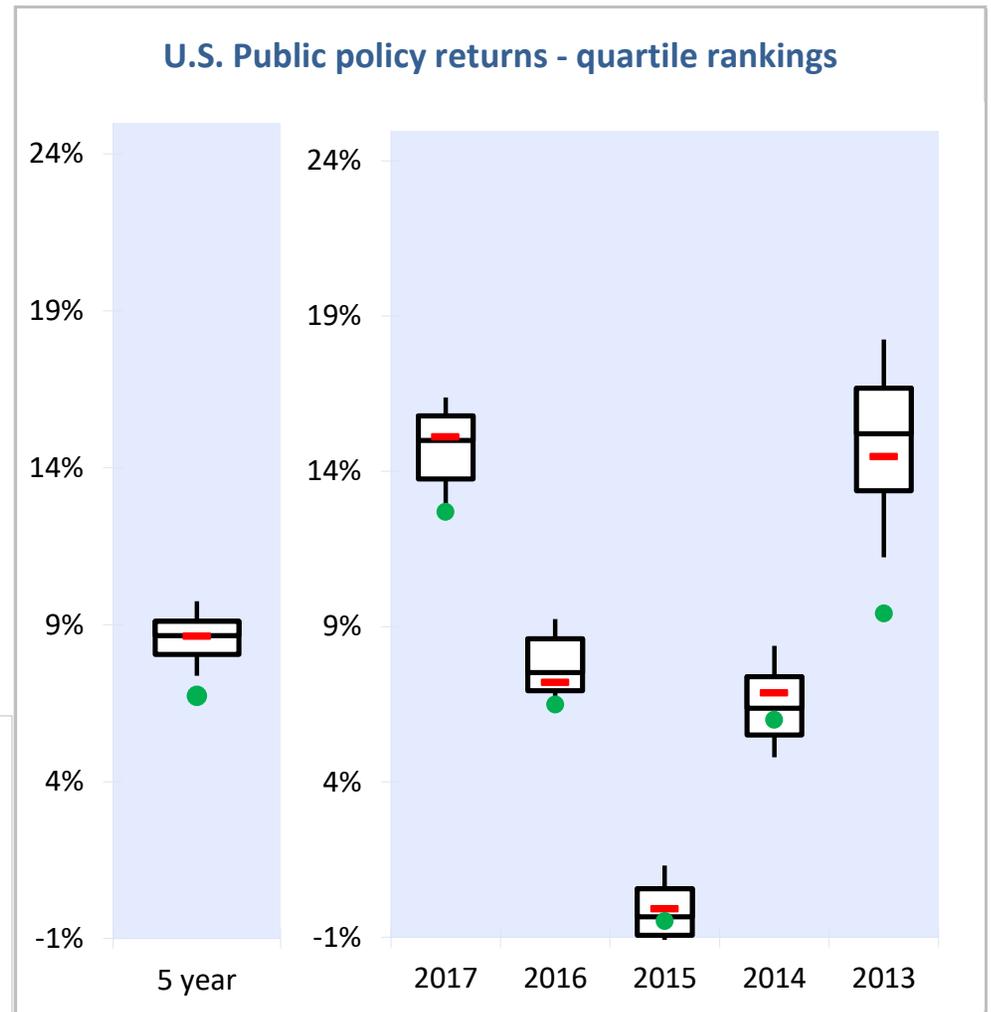
# Your 5-year policy return of 6.8% was below both the U.S. Public median of 8.8% and the peer median of 8.7%.

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 7.1%, 0.2% higher than your actual 5-year policy return of 6.8%. Mirroring this, your 5-year total fund net value added would be 0.2% lower.

## Your 5-year policy return of 6.8% was below the U.S. Public median of 8.8% primarily because of:

- The negative impact of your higher weight in two of the poorer performing asset classes of the past 5 years: U.S. Bonds (your 27% 5-year average weight versus a U.S. Public average of 17%) and cash (your 3% vs. a U.S. public fund average of 0%).
- Also having a negative impact was your lower relative weight in Stocks which was the best performing category over the past 5 years (your 42% versus a U.S. public fund average of 47%).

	5-Year average policy mix <sup>1</sup>			5-year bmk. return	
	Your Fund	U.S. Public Avg.	More/ Less	Your Fund	U.S. Public Avg.
U.S. Stock	21%	22%	-1%	15.6%	15.5%
EAFE Stock	3%	5%	-2%	7.9%	8.1%
Emerging Market Stock	1%	2%	-1%	4.3%	4.5%
ACWIxUS Stock	16%	9%	7%	7.8%	7.3%
Global Stock	0%	9%	-9%	10.9%	10.8%
Other Stock	2%	0%	1%	n/a <sup>3</sup>	n/a <sup>3</sup>
<b>Total Stock</b>	<b>42%</b>	<b>47%</b>	<b>-5%</b>	<b>11.6%</b>	<b>11.8%</b>
U.S. Bonds	27%	17%	10%	2.8%	2.2%
Inflation Indexed Bonds	2%	3%	-2%	n/a <sup>3</sup>	1.0%
Cash	3%	0%	3%	0.3%	0.4%
Other Fixed Income	0%	6%	-6%	n/a <sup>3</sup>	n/a <sup>3</sup>
<b>Total Fixed Income</b>	<b>32%</b>	<b>26%</b>	<b>6%</b>	<b>2.2%</b>	<b>2.8%</b>
Global TAA	2%	1%	0%	n/a <sup>3</sup>	6.9%
Hedge Funds	3%	5%	-2%	2.6%	4.7%
Risk Parity	0%	1%	-1%	n/a <sup>3</sup>	5.8%
Commodities	1%	1%	0%	-8.5%	-8.4%
Natural Resources	3%	1%	2%	3.9%	5.2%
Real Estate ex-REITs	7%	8%	0%	10.1%	10.7%
Other Real Assets <sup>2</sup>	1%	2%	-1%	n/a <sup>3</sup>	n/a <sup>3</sup>
Private Equity	9%	9%	1%	11.1%	15.0%
<b>Total</b>	<b>100%</b>	<b>100%</b>			

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

2. Other real assets includes 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.

**Differences in policy return are caused by differences in policy mix and benchmarks. At the end of 2017 your policy mix compared to your peers and the U.S. Public universe as follows:**

**Policy asset mix**

Asset class	Your fund					Peer avg.	U.S. Public avg.
	2013	2014	2015	2016	2017	2017	2017
U.S. Stock	20%	20%	20%	22%	21%	15%	20%
EAFE Stock	15%	0%	0%	0%	0%	5%	4%
Emerging Market Stock	4%	0%	0%	0%	0%	3%	2%
ACWixUS Stock	0%	19%	19%	20%	21%	6%	8%
Global Stock	0%	0%	0%	0%	0%	16%	11%
Other Stock	2%	3%	3%	0%	0%	0%	1%
<b>Total Stock</b>	<b>40%</b>	<b>42%</b>	<b>42%</b>	<b>42%</b>	<b>42%</b>	<b>44%</b>	<b>46%</b>
U.S. Bonds	36%	25%	25%	25%	25%	17%	16%
Inflation Indexed Bonds	0%	2%	2%	2%	2%	2%	3%
Cash	0%	4%	4%	4%	4%	0%	-1%
Other Fixed Income	0%	0%	0%	0%	0%	7%	8%
<b>Total Fixed Income</b>	<b>36%</b>	<b>31%</b>	<b>31%</b>	<b>31%</b>	<b>31%</b>	<b>25%</b>	<b>26%</b>
Global TAA	0%	2%	2%	2%	2%	1%	1%
Hedge Funds	3%	3%	3%	3%	3%	3%	5%
Risk Parity	0%	0%	0%	0%	0%	1%	1%
Commodities	1%	1%	1%	1%	1%	0%	1%
Natural Resources	3%	3%	3%	3%	3%	1%	1%
Real Estate ex-REITs	7%	7%	7%	7%	7%	10%	8%
Other Real Assets <sup>1</sup>	1%	1%	1%	1%	1%	2%	2%
Private Equity	8%	10%	10%	10%	10%	12%	9%
<b>Total</b>	<b>100%</b>						

1. Other real assets includes infrastructure and REITs.

# Net value added is the component of total return from active management. Your 5-year net value added was 0.8%.

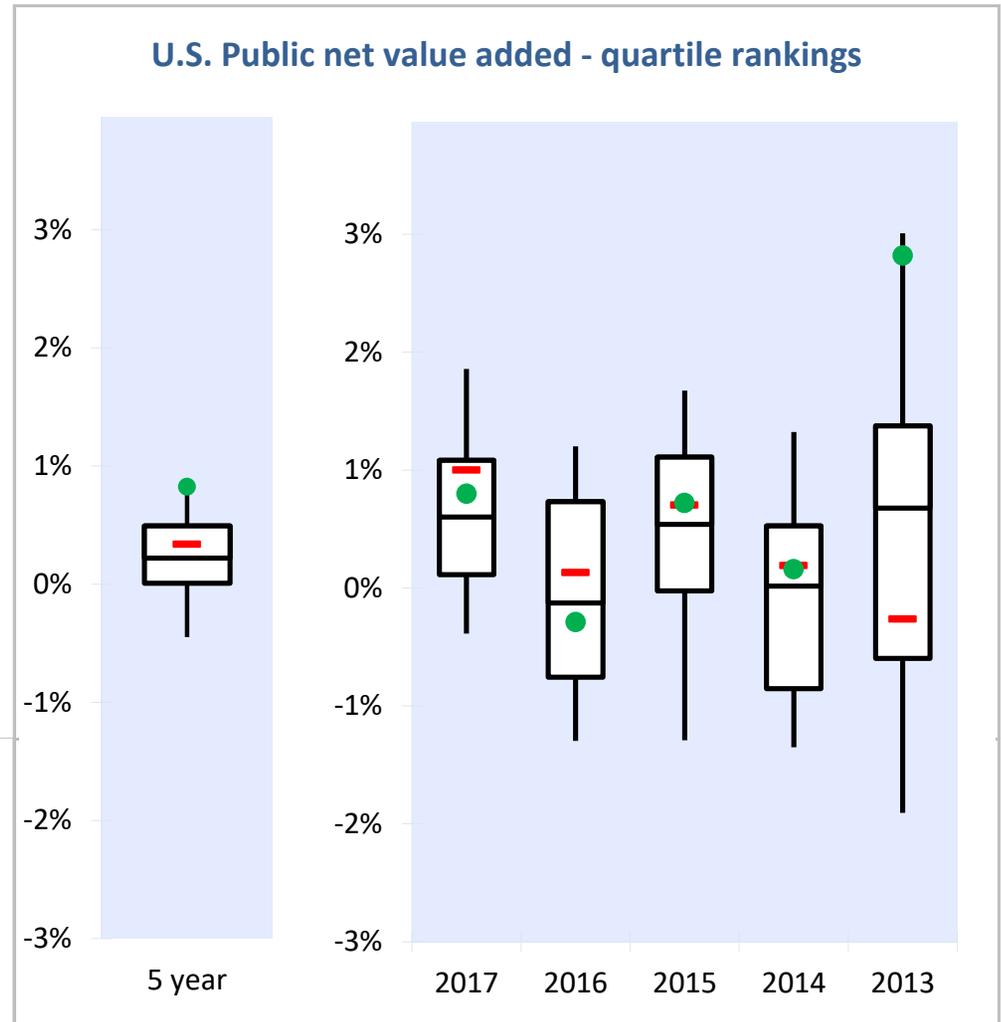
Net value added equals total net return minus policy return.

## Value added for North Carolina Retirement Systems

Year	Net Return	Policy Return	Net value Added
2017	13.5%	12.8%	0.7%
2016	6.2%	6.6%	-0.4%
2015	0.3%	-0.4%	0.7%
2014	6.2%	6.1%	0.1%
2013	12.3%	9.5%	2.8%
5-Year	7.6%	6.8%	0.8%

Your 5-year net value added of 0.8% compares to a median of 0.3% for your peers and 0.2% for the U.S. Public universe.

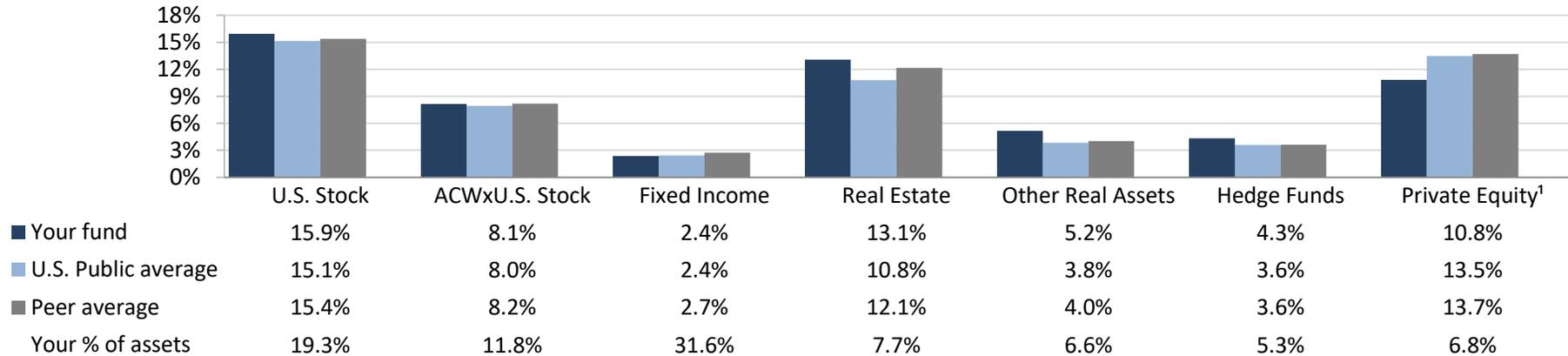
Your 0.8% 5-year value added translates into approximately \$4.0 billion of cumulative value added over 5 years, or \$3.2 billion more than if you had earned the U.S. Public median of 0.2%.



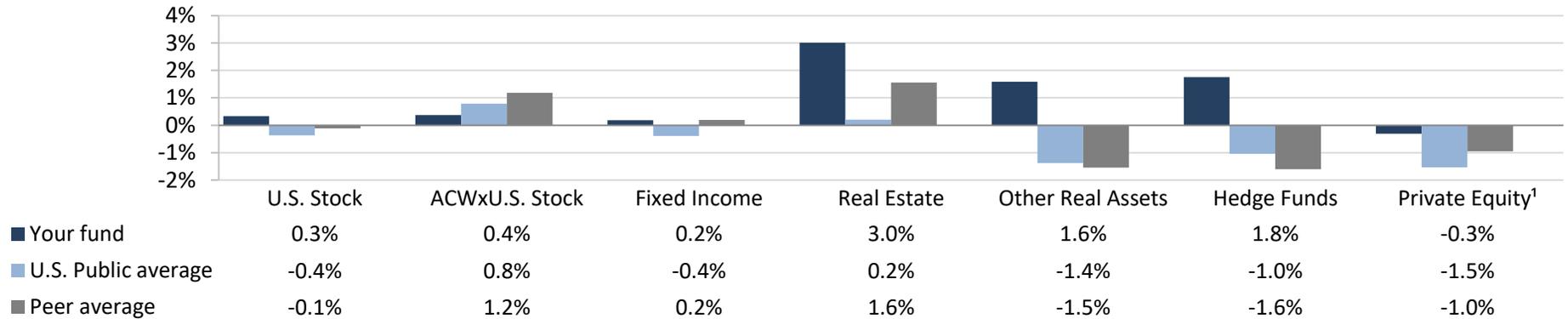
Your value added was impacted by your choice of benchmarks for private equity. CEM suggests using lagged, investable benchmarks for private equity. If your fund used the private equity benchmark suggested by CEM, your 5-year total fund value added would have been 0.2% lower.

# 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, except your fund, were adjusted to reflect lagged, investable, public-market indices. If your fund used the private equity benchmark suggested by CEM, your fund's 5-year private equity net value added would have been -3.8%.

## Your investment costs were \$403.8 million or 42.9 basis points in 2017.

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 <sup>1</sup>	
Stock - U.S. Broad/All			192		4,436		4,628
Stock - U.S. Large Cap	0		324	847	3,581		4,751
Stock - U.S. Mid Cap	0		163	22	5,362		5,547
Stock - U.S. Small Cap			199		7,037		7,236
Stock - EAFE			483	183	9,736		10,402
Stock - Emerging			276		9,616		9,892
Stock - Global			109		2,700		2,809
Stock - ACWI x U.S.			780	1,661	16,867		19,307
Stock - Other			3	167			169
Fixed Income - U.S.		2,042					2,042
Fixed Income - Inflation Indexed			62	17	2,689		2,768
Cash		484					484
Commodities			62		2,747	1,800	4,609
REITs			119	121	1,037		1,278
Global TAA			517		2,000		2,517
Hedge Fund - External Not Fund of Fund			591		43,095	28,654	72,341
Hedge Fund - FoFs			118		13,239	7,841	21,198
Real Estate ex-REITs <sup>1</sup>			627		27,531	321	28,159
Real Estate - LPs <sup>1</sup>			615		49,945	62,600	50,560
Real Estate - Co-Invest. <sup>1</sup>			92		2,241		2,333
Real Estate - FoFs <sup>1</sup>			9		2,447	39	2,455
Infrastructure - LPs <sup>1</sup>			55		6,018	161	6,073
Natural Resources - Co-Invest. <sup>1</sup>			45		1,074		1,119
Natural Resources - LPs <sup>1</sup>			330		35,492	1,439	35,823
Diversified Private Equity - FoFs <sup>1</sup>			321		14,985	15,646	15,306
LBO - LPs <sup>1</sup>			683		32,466	29,824	33,149
Venture Capital - LPs <sup>1</sup>			360		18,041	3,604	18,401
Venture Capital - Co-Invest. <sup>1</sup>			7				7
Private Credit - LPs <sup>1</sup>			330		20,257	17,565	20,587
Private Credit - Co-Invest. <sup>1</sup>			32		1,294		1,326
Other Private Equity - LPs <sup>1</sup>			268		12,036	2,569	12,304
Other Private Equity - Co-Invest. <sup>1</sup>			17				17
Total excluding private asset performance fees							399,599 42.5bp
<b>Oversight, custodial and other costs<sup>2</sup></b>							
Oversight of the fund							2,554
Trustee & custodial							1,550
Audit							84
Total oversight, custodial & other costs							4,188 0.4bp
Total investment costs (excl. transaction costs & private asset performance fees)							403,787 42.9bp

### Footnotes

1. 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.

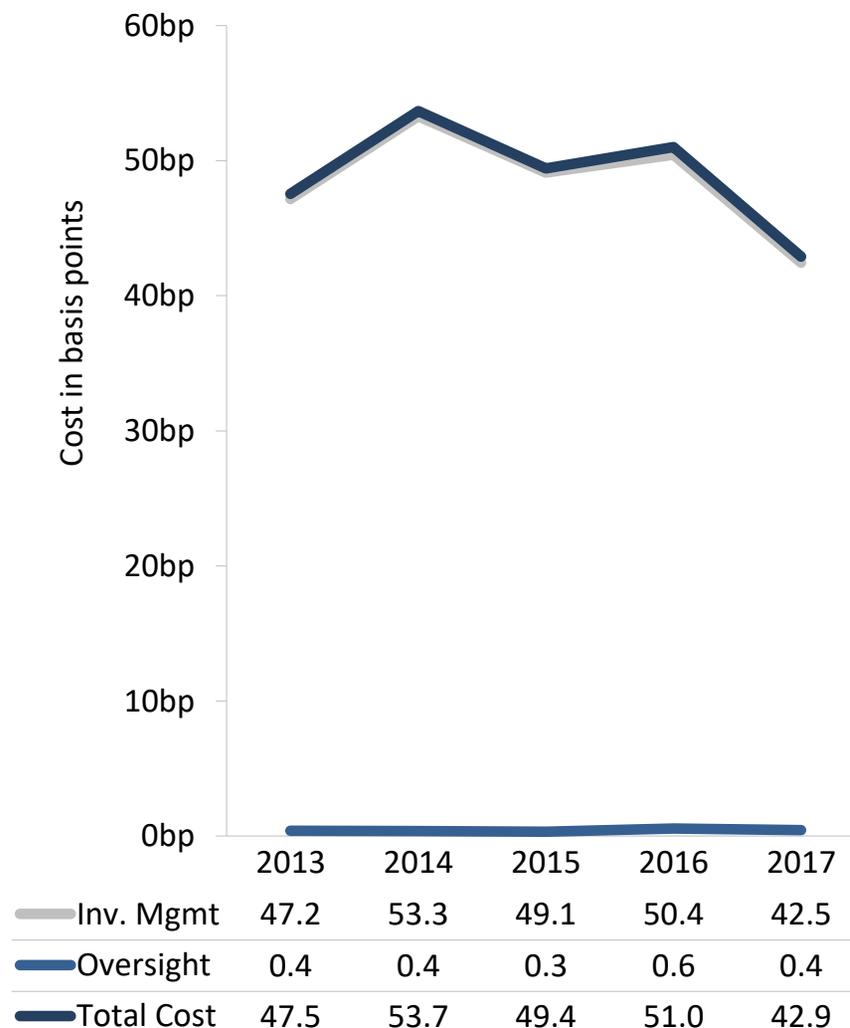
2. Excludes non-investment costs, such as benefit insurance premiums and preparing cheques for retirees.

## Your costs decreased slightly between 2013 and 2017.

Your costs decreased primarily because:

- Starting in 2014, CEM began including hedge fund performance fees in total costs. Prior year costs do not include hedge fund performance fees. Your cost in 2014 excluding hedge fund performance fees was 39.9 bps.
- You decreased your use of funds of funds from 13% of hedge funds, private real assets and private equity in 2013 to 7% in 2017. Funds of funds are higher cost than direct funds.

Trend in your investment costs

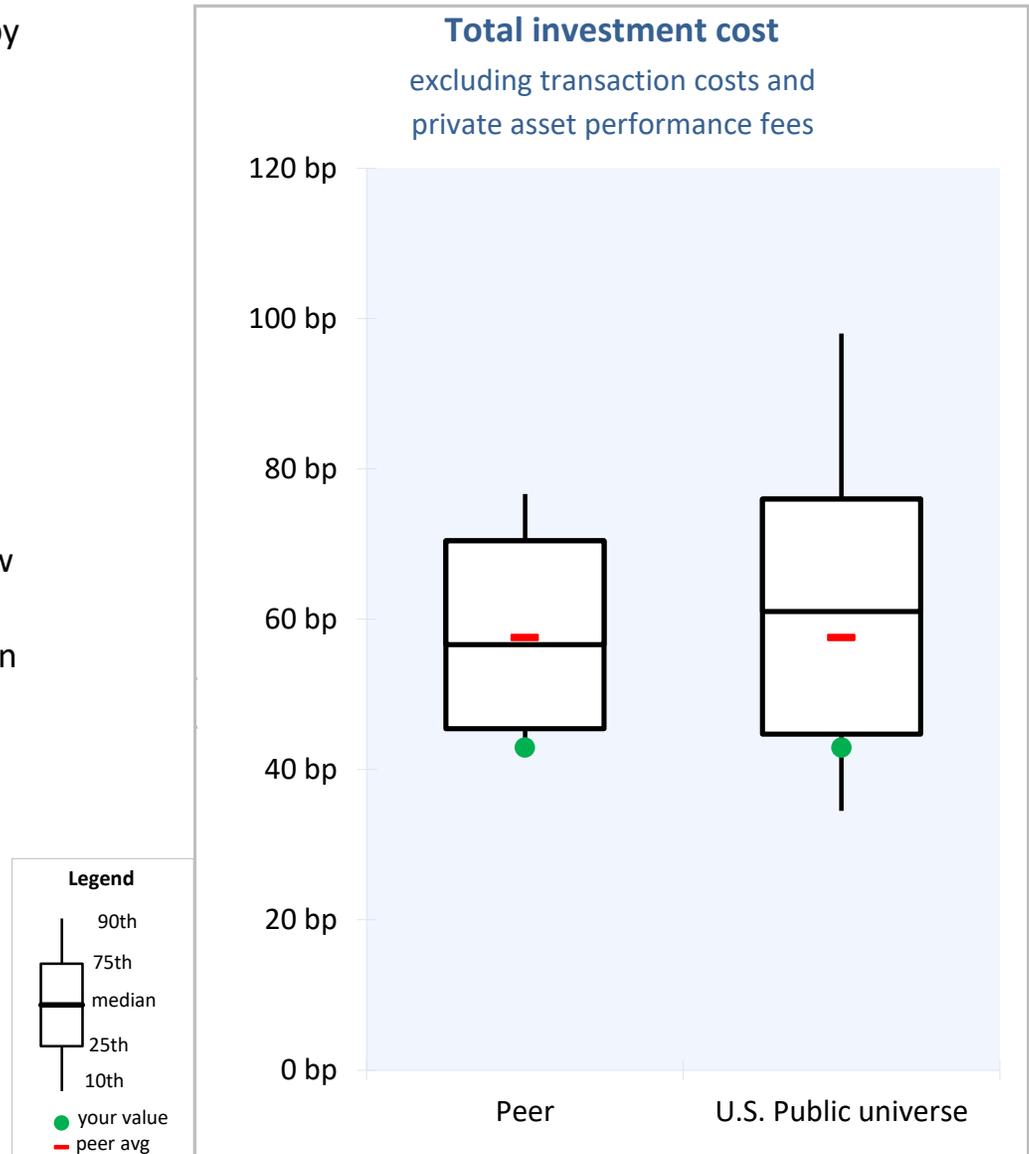


## Your total investment cost of 42.9 bps was below the peer median of 56.6 bps.

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 28% of your funds assets at the end of 2017 versus a peer average of 27%.
- 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 low cost by 11.3 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 42.9 bp was below your benchmark cost of 54.2 bp. Thus, your cost savings was 11.3 bp.

### Your cost versus benchmark

	\$000s	basis points
Your total investment cost	403,787	42.9 bp
Your benchmark cost	510,107	54.2 bp
Your excess cost	(106,320)	(11.3) bp

# Your fund was 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		
• Less external active management (more lower cost passive and internal)	(2,525)	(0.3)
• More partnerships as a percentage of external	2,740	0.3
• More fund of funds	9,976	1.1
• Less overlays	(2,565)	(0.3)
• Other style differences	(2,185)	(0.2)
	5,441	0.6
2. Paying less than peers for similar services		
• External investment management costs	(101,514)	(10.8)
• Internal investment management costs	(5,261)	(0.6)
• Oversight, custodial & other costs	(4,987)	(0.5)
	(111,762)	(11.9)
<b>Total savings</b>	<b>(106,320)</b>	<b>(11.3)</b>

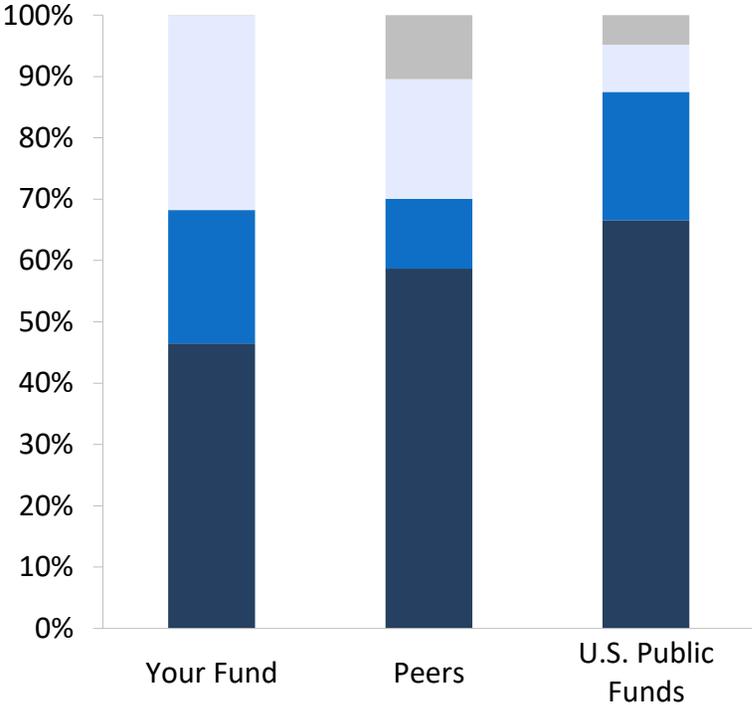
# Differences in cost performance are often caused by differences in implementation style.

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 less external active management than your peers (your 46% versus 59% for your peers).
- Within external active holdings, fund of funds usage because it is more expensive than direct fund investment. You had similar amounts in fund of funds. Your 7% of hedge funds, real estate and private equity in fund of funds compared to 5% for your peers.

Implementation style<sup>1</sup>



■ Internal passive	0%	10%	5%
■ Internal active	32%	19%	8%
■ External passive	22%	11%	21%
■ External active	46%	59%	67%

1. The graph above does not take into consideration the impact of derivatives. The values in the graph above are calculated using average holdings.

## Differences in external active usage in public market asset classes saved you 0.3 bp relative to your peers.

### Calculation of the cost impact of differences in external active usage

Asset class*	Your avg holdings in \$mils (A)	% External active			Premium vs passive & internal <sup>1</sup> (C)	Cost/ (savings)	
		You	Peer average	More/ (less) (B)		\$000s	bps
Stock - U.S. Broad/All	1,252	100.0%	20.4%	79.6%	33.1 bp	3,303	
Stock - U.S. Large Cap	12,838	7.4%	15.0%	(7.6%)	24.7 bp	(2,397)	
Stock - U.S. Mid Cap	1,410	72.5%	37.5%	35.0%	46.2 bp	2,280	
Stock - U.S. Small Cap	1,299	100.0%	67.2%	32.8%	57.0 bp	2,430	
Stock - EAFE	3,827	80.2%	53.8%	26.4%	28.8 bp	2,906	
Stock - Emerging	1,797	100.0%	69.0%	31.0%	50.1 bp	2,790	
Stock - Global	708	100.0%	71.6%	28.4%	35.2 bp	708	
Stock - ACWI x U.S.	11,281	39.1%	76.6%	(37.5%)	33.9 bp	(14,364)	
Stock - Other	172	0.0%	21.3%	(21.3%)	41.1 bp	(151)	
Fixed Income - U.S.	24,157	0.0%	35.1%	(35.1%)	10.6 bp	(8,977)	
Fixed Income - Inflation Indexed	681	91.8%	16.4%	75.4%	14.8 bp	758	
Commodities	678	100.0%	77.8%	22.2%	64.6 bp	974	
REITs	667	48.2%	60.2%	(12.0%)	38.8 bp	(310)	
Real Estate ex-REITs	9,268	100.0%	90.7%	9.3%	64.2 bp	5,537	
Natural Resources	5,156	100.0%	99.1%	0.9%	71.9 bp	321	
Global TAA	1,469	100.0%	78.5%	21.5%	52.0 bp	1,642	
Diversified Private Equity	990	100.0%	100.0%	0.0%	111.9 bp	3	
Other Private Equity	1,498	100.0%	99.9%	0.1%	105.1 bp	21	
Impact of more/less external active vs. lower cost styles						(2,525)	(0.3) bp

\*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.

## In total, differences in implementation style cost you 0.6 bp relative to your peers.

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

Asset class*	Your avg holdings in \$mils (A)	Implementation style			Premiums vs external active <sup>1</sup> (C)	Cost/ (savings) \$000s bps (A X B X C)	
		You	Peer average	More/ (less) (B)			
		<u>LPs % of external active</u>					
Real Estate ex-REITs	9,268	58.5%	52.8%	5.8%	47.9 bp	2,564	
Infrastructure	557	100.0%	83.3%	16.7%	54.6 bp	508	
Natural Resources	5,156	100.0%	79.1%	20.9%	-3.1 bp	(331)	
Impact of more/less partnerships as a percentage of external active						2,740	0.3 bp
		<u>Fund of funds % of LPs</u>			vs. direct LP <sup>1</sup>		
Real Estate ex-REITs	5,426	1.7%	2.2%	(0.6%)	69.1 bp	(213)	
Infrastructure	557	0.0%	10.0%	(10.0%)	24.4 bp	(136)	
Natural Resources	5,156	0.0%	0.1%	(0.1%)	104.5 bp	(70)	
Hedge Funds	6,301	13.5%	6.8%	6.7%	78.4 bp	3,331	
Top layer perf. fees (on NAV)	6,301	13.5%	6.8%	6.7%	27.7 bp	1,178	
Diversified Private Equity	990	100.0%	6.2%	93.8%	79.1 bp	7,339	
Venture Capital	1,324	0.0%	6.2%	(6.2%)	49.6 bp	(409)	
LBO	2,956	0.0%	6.2%	(6.2%)	56.7 bp	(1,044)	
Impact of more/less fund of funds vs. direct LPs						9,976	1.1 bp
<u>Overlays and other</u>							
Impact of higher use of portfolio level overlays						(2,565)	(0.3) bp
Impact of mix of internal passive, internal active, and external passive <sup>2</sup>						(2,185)	(0.2) bp
Total impact of differences in implementation style						5,441	0.6 bp

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

1. The cost premium versus external active is the additional cost of direct limited partnerships relative to the cost of external active implementation within private assets. The premium versus direct limited partnerships is the additional premium of fund of funds relative to the cost of direct limited partnerships.

2. 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 10.8 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)	
		(A)			(B)	(A X B)
<b>External asset management</b>						
Stock - U.S. Broad/All	active	1,252	37.0 <sup>1</sup>	35.7	1.3	158
Stock - U.S. Large Cap	passive	11,873	0.9	0.9	(0.0)	(57)
Stock - U.S. Large Cap	active	952	39.2 <sup>1</sup>	26.7	12.5	1,187
Stock - U.S. Mid Cap	passive	375	0.7	5.0	(4.3)	(160)
Stock - U.S. Mid Cap	active	1,022	54.0 <sup>1</sup>	54.0	0.0	0
Stock - U.S. Small Cap	active	1,299	55.7 <sup>1</sup>	63.3	(7.6)	(981)
Stock - EAFE	passive	759	2.6	2.4	0.2	13
Stock - EAFE	active	3,068	33.3 <sup>1</sup>	34.4	(1.1)	(335)
Stock - Emerging	active	1,797	55.0 <sup>1</sup>	57.8	(2.7)	(490)
Stock - Global	active	708	39.7 <sup>1</sup>	43.6	(3.9)	(277)
Stock - ACWI x U.S.*	passive	6,875	2.6	4.3	(1.7)	(1,194)
Stock - ACWI x U.S.	active	4,407	39.8 <sup>1</sup>	40.1	(0.2)	(106)
Stock - Other	passive	172	9.9	1.0	8.9	153
Fixed Income - Inflation Indexed	passive	56	3.9	1.4	2.5	14
Fixed Income - Inflation Indexed*	active	625	43.9 <sup>1</sup>	16.6	27.4	1,710
Commodities	active	678	68.0 <sup>1</sup>	68.0	0.0	0
REITs*	passive	345	5.3	6.8	(1.5)	(53)
REITs	active	322	34.0 <sup>1</sup>	43.0	(9.0)	(289)
Real Estate ex-REITs	active	3,842	73.3	64.1	9.2	3,523
Real Estate ex-REITs	FoF	91	104.4	68.5	35.9	327
Underlying base fees	FoF	91	165.0	111.0	54.0	492
Real Estate ex-REITs	LP	5,335	99.1	110.4	(11.3)	(6,026)
Infrastructure	LP	557	109.1	135.3	(26.2)	(1,457)
Natural Resources	LP	5,156	71.7	95.5	(23.9)	(12,311)
Hedge Funds	active	5,449	80.2	127.6	(47.4)	(25,820)
Top layer perf. fees (on NAV)	active	5,449	52.6	62.3	(9.7)	(5,290)
Hedge Funds	FoF	852	78.0	64.9	13.0	1,112
Underlying base fees	FoF	852	78.8	141.0	(62.2)	(5,303)
Underlying perf. fees (on NAV)	FoF	852	92.0	72.0	20.0	1,705
Global TAA	active	1,469	17.1 <sup>1</sup>	62.0	(44.9)	(6,593)
Diversified Private Equity	FoF	990	71.0	69.3	1.6	163
Underlying base fees	FoF	990	83.6	157.0	(73.4)	(7,262)
Venture Capital	LP	1,324	139.1	193.9	(54.8)	(7,260)
LBO	LP	2,956	112.1	157.0	(44.9)	(13,266)
Private Credit	LP	3,471	63.1	95.8	(32.7)	(11,337)
Other Private Equity	LP	1,498	82.2 <sup>1</sup>	113.4	(31.2)	(4,669)
Total impact of paying more/less for external management						(101,514)
Total in bps						(10.8) bp

#### Footnotes:

1. You paid performance fees in these asset classes. \*Universe median used as peer data was insufficient.

For cost benchmarking purposes the performance fees/carry for real estate, infrastructure, natural resources and private equity have been excluded.

## The net impact of paying more/less for internal asset management costs saved 0.6 bps.

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

	Style	Your avg holdings in \$mils	Cost in bps			Cost/ (savings) \$000s
			Your Fund	Peer median	More/ (less)	
<b><i>Internal asset management</i></b>		(A)			(B)	(A X B)
Stock - U.S. Large Cap	passive	13	0.1	0.6	(0.5)	(1)
Stock - U.S. Mid Cap*	passive	13	0.1	0.8	(0.6)	(1)
Fixed Income - U.S.	active	24,157	0.8	3.0	(2.2)	(5,259)
Cash	active	5,728	0.8 Excluded		--	--
Total for internal management						(5,261)
Total in bps						(0.6) bp

'Excluded' indicates that the asset class was excluded from this analysis due to comparability concerns with peers.

\*Universe median used as peer data was insufficient.

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

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

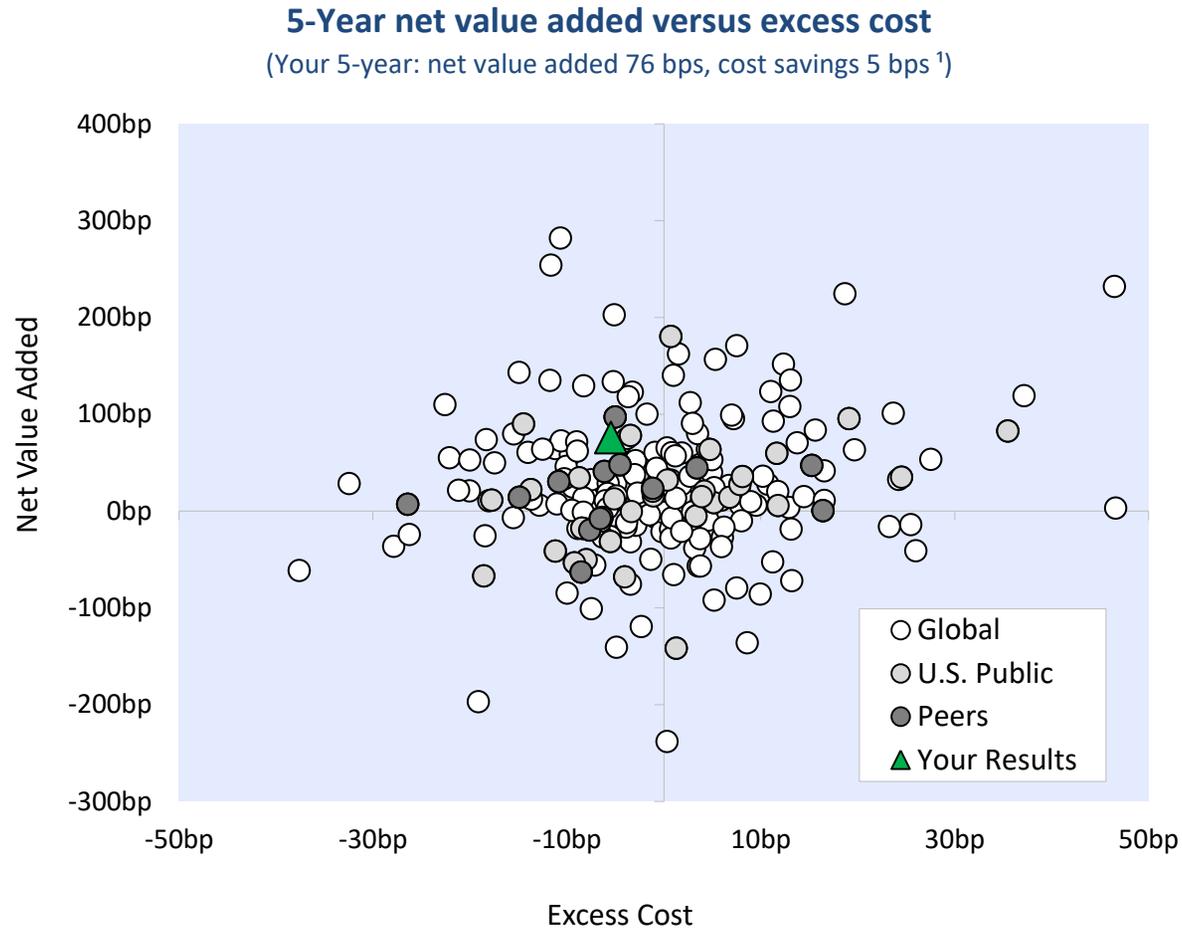
	Your avg holdings in \$mils (A)	Cost in bps			Cost/ (savings) \$000s (A X B)
		Your Fund	Peer median	More/ (less) (B)	
Oversight	94,126	0.3	0.5	(0.2)	(1,933)
Consulting	94,126	0.0	0.0	0.0	0
Custodial	94,126	0.2	0.4	(0.2)	(1,875)
Audit	94,126	0.0	0.0	(0.0)	(145)
Other	94,126	0.0	0.1	(0.1)	(1,034)
Total for oversight, custodial, other					(4,987)
Total in bps					(0.5) bp

**In summary, your fund was low cost because you paid less than peers for similar services.**

### Reasons for your low cost status

	Excess Cost/ (Savings)	
	\$000s	bps
<b>1. Higher cost implementation style</b>		
• More fund of funds	9,976	1.1
• Less external active management (more lower cost passive and internal)	(2,525)	(0.3)
• More partnerships as a percentage of external	2,740	0.3
• Less overlays	(2,565)	(0.3)
• Other style differences	(2,185)	(0.2)
	<u>5,441</u>	<u>0.6</u>
<b>2. Paying less than peers for similar services</b>		
• External investment management costs	(101,514)	(10.8)
• Internal investment management costs	(5,261)	(0.6)
• Oversight, custodial & other costs	(4,987)	(0.5)
	<u>(111,762)</u>	<u>(11.9)</u>
<b>Total savings</b>	<b>(106,320)</b>	<b>(11.3)</b>

# Your 5-year performance placed in the positive value added, low cost quadrant of the cost effectiveness chart.

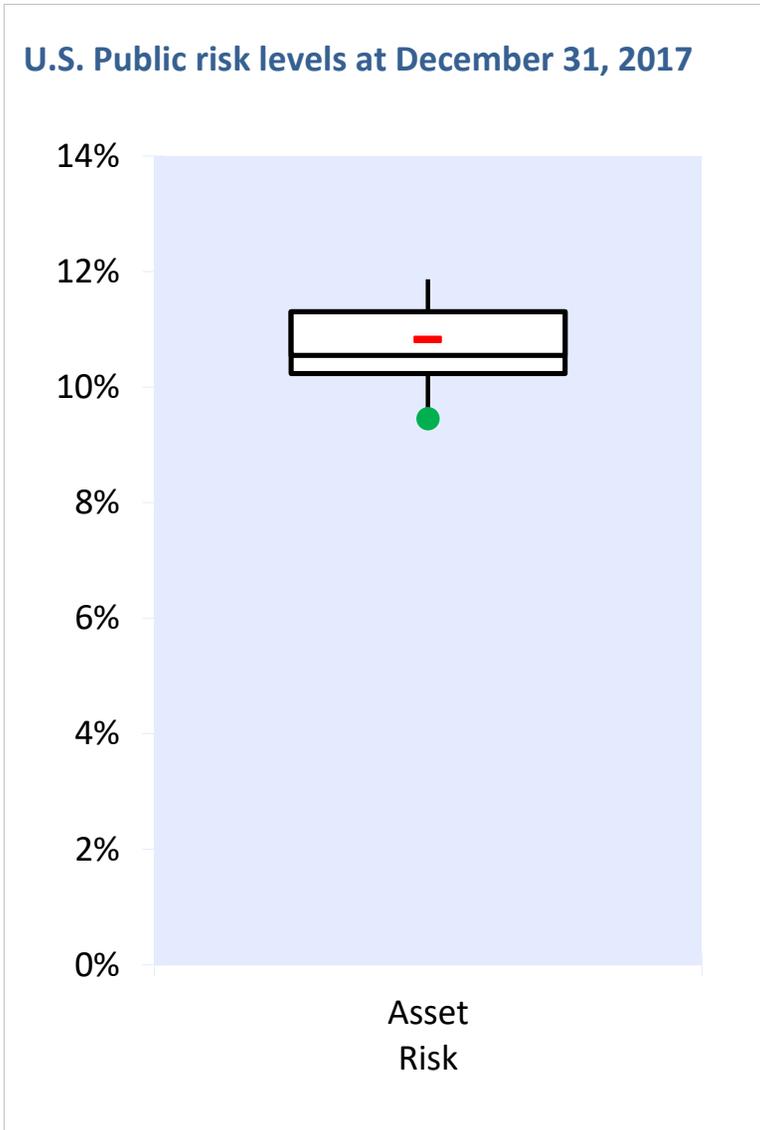
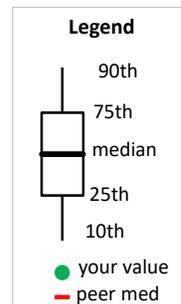


1. Your 5-year cost savings of 5 basis points is the average of your cost savings for the past 5 years.

	2017	2016	2015	2014	2013	5-year
Net value added	73bp	-36bp	65bp	9bp	275bp	76bp
Excess Cost	-11bp	-7bp	-10bp	-2bp	3bp	-5bp

## Comparison of risk levels

Your asset risk of 9.5% was below the U.S. Public median of 10.5%. Asset risk is the standard deviation of your policy return. It is based on the historical variance of, and covariance between, the asset classes in your policy mix.



# Summary of key takeaways

## Returns

- Your 5-year net total return was 7.6%. This was below the U.S. Public median of 9.0% and below the peer median of 9.0%.
- Your 5-year policy return was 6.8%. This was below the U.S. Public median of 8.8% and below the peer median of 8.7%.

## Value added

- Your 5-year net value added was 0.8%. This was above the U.S. Public median of 0.2% and above the peer median of 0.3%.

## Cost and cost effectiveness

- Your investment cost of 42.9 bps was below your benchmark cost of 54.2 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was low cost because you paid less than peers for similar services.

## Risk

- Your asset risk of 9.5% was below the U.S. Public median of 10.5%.