

Investment
Cost Effectiveness Analysis
(for the 5-year period ending December 31, 2017)

South Carolina Retirement System
Investment Commission



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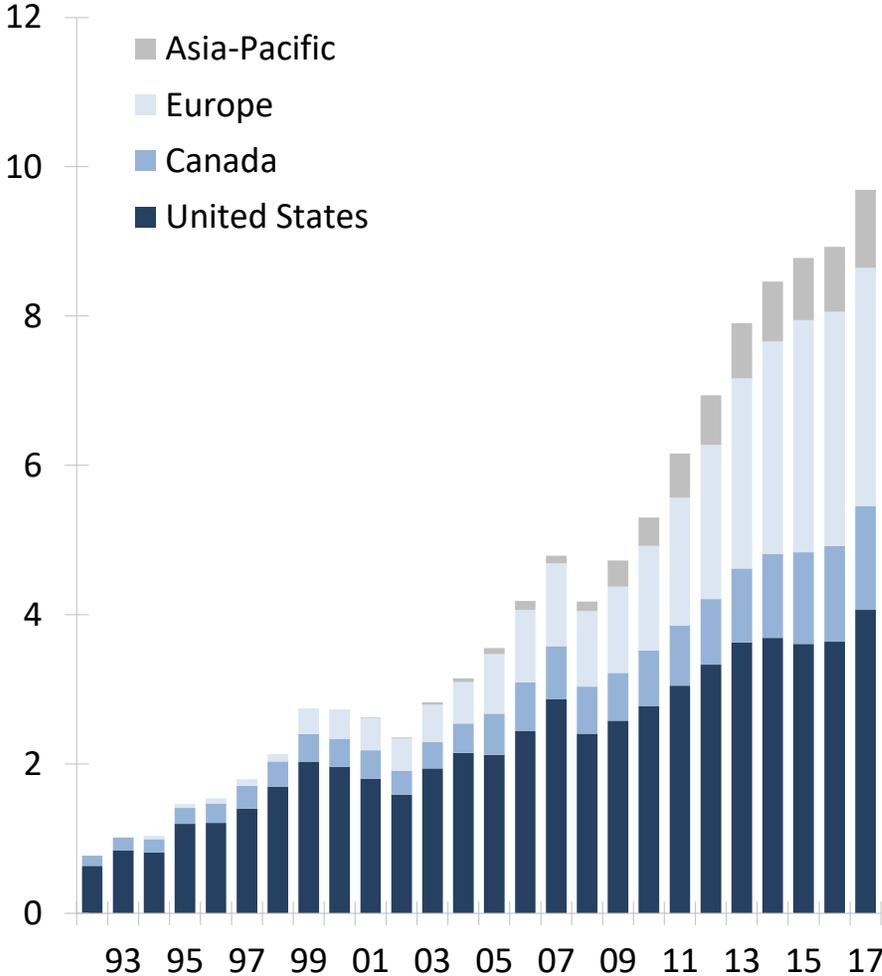
Prepared November 16, 2018. Although the information in this report has been based upon and obtained from sources we believe to be reliable, CEM Benchmarking Inc. ("CEM") does not guarantee its accuracy or completeness. The information contained herein is proprietary and confidential and may not be disclosed to third parties without the express written mutual consent of both CEM and South Carolina Retirement System Investment Commission.

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

- 166 U.S. pension funds participate. The median U.S. fund had assets of \$9.6 billion and the average U.S. fund had assets of \$24.5 billion. Total participating U.S. assets were \$4.1 trillion.
- 78 Canadian funds participate with assets totaling \$1,391.5 billion.
- 75 European funds participate with aggregate assets of \$3.2 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 60 funds.

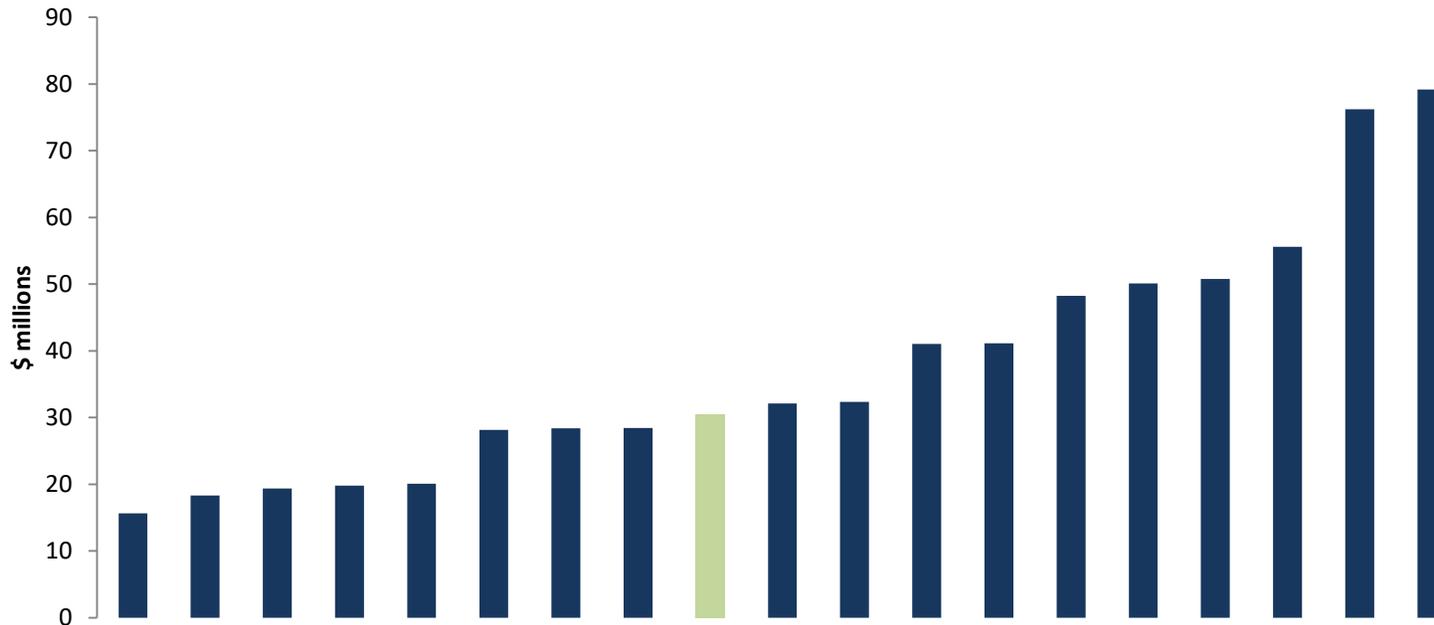
Participating assets (\$ trillions)



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

Peer group for South Carolina Retirement System Investment Commission

- 19 U.S. Public sponsors from \$15.6 billion to \$79.2 billion
- Median size of \$32.1 billion versus your \$30.5 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.

4. Cost effectiveness

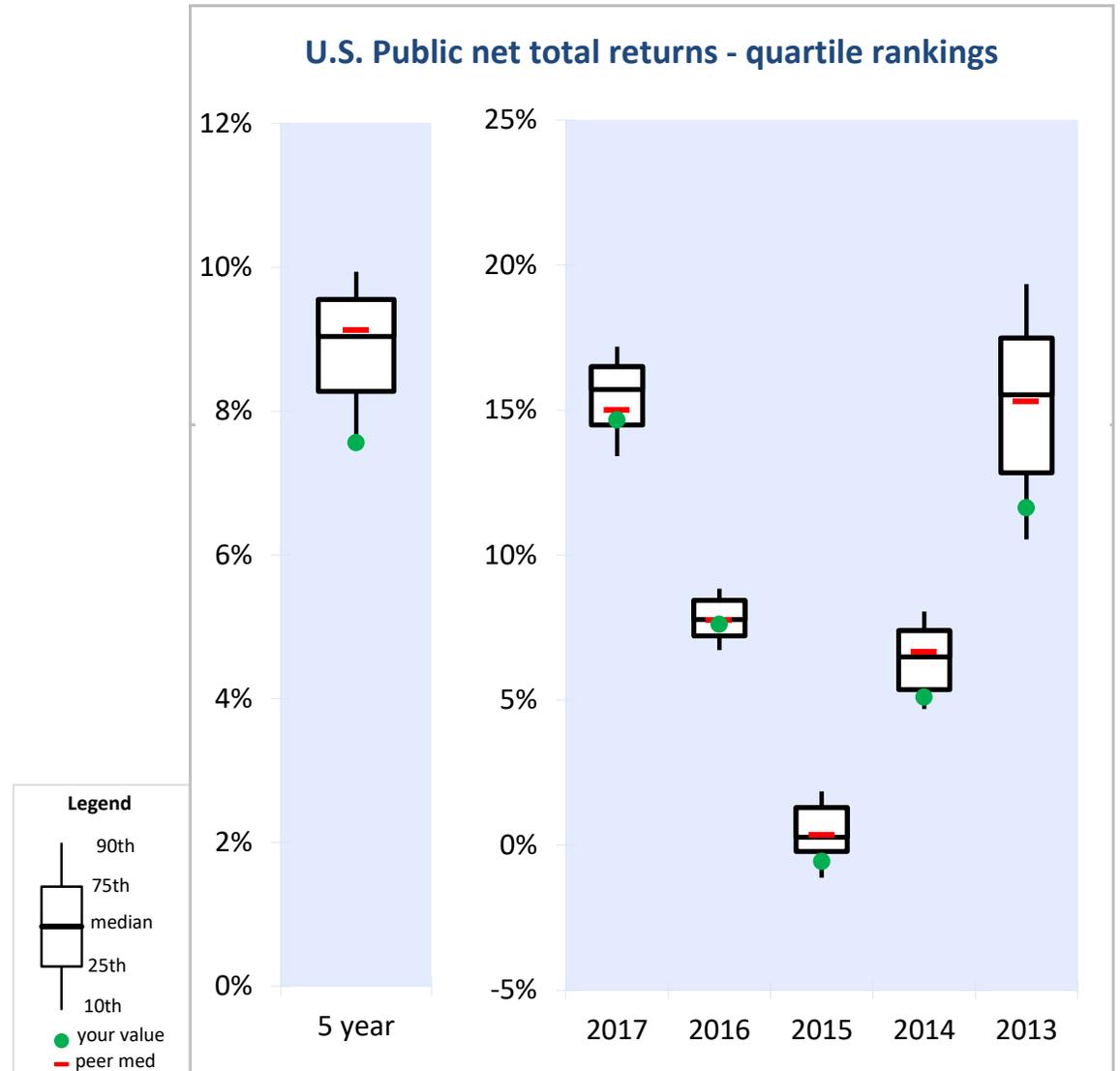
Net implementation value added versus excess cost. Does paying more get you more?

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 9.1%.

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	7.2%
= Net value added	0.3%

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).



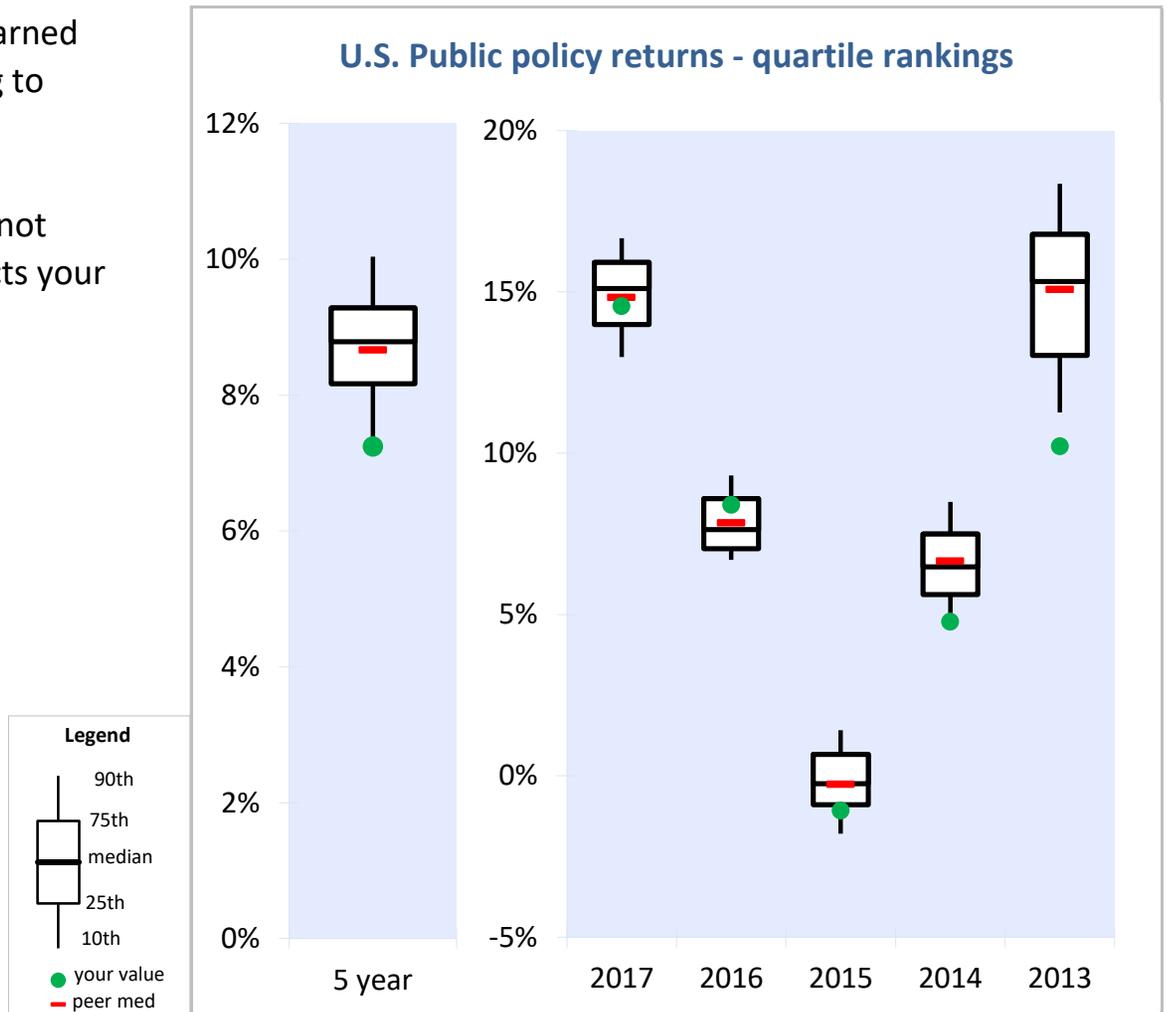
Your 5-year policy return of 7.2% was below both the U.S. Public median of 8.8% and the peer median of 8.7%.

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. Since the policy return for private equity includes your private equity style private debt, we cannot accurately estimate the difference on your total fund policy or total fund value added if you used our benchmark.

Your 5-year policy return of 7.2% was below the U.S. Public median of 8.8% primarily because of:

- The negative impact of your lower weight in aggregate stock. Stock was one of the better performing asset classes over the past 5 years. You had a 35% 5-year average versus the U.S. Public average of 48%.
- Your lower private equity⁵ benchmark return*. Your benchmark returned 11.5% over the past 5 years while the U.S. Public average returned 15%.
- The negative impact of your higher weight in one of the poorer performing asset classes of the past 5 years: Cash. You had 3% on average over the past 5 years versus a U.S. Public average weight of -1%.

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

2. Policy benchmark switched to a single global equity index for public equities in 2013.

3. Does not include Absolute Return hedge fund investments used in Portable Alpha implementation.

4. Other real assets includes natural resources and infrastructure.

5. Private equity includes private equity and private equity style private debt.

6. 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.

	5-Year average policy mix for calendar years 2013-2017 ¹			5-year bmk. return	
	Your Fund	U.S. Public Avg.	More/ Less	Your Fund	U.S. Public Avg.
Aggregated Stock ²	35%	48%	-13%		
Total Stock	35%	48%	-13%	10.8%	11.9%
U.S. Bonds	9%	17%	-9%	2.4%	2.2%
High Yield Bonds	6%	2%	4%	4.7%	5.4%
Fixed Income - Emergir	5%	1%	4%	1.5%	2.3%
Global Bonds	1%	2%	0%	n/a ⁶	2.1%
Cash	3%	-1%	5%	0.4%	0.4%
Other Fixed Income	0%	5%	-5%	n/a ⁶	n/a ⁶
Total Fixed Income	25%	26%	-1%	2.6%	2.8%
Global TAA	10%	1%	9%	6.1%	6.9%
Hedge Funds ³	6%	5%	2%	5.3%	4.7%
Commodities	2%	1%	1%	n/a ⁶	-8.4%
REITs	1%	1%	0%	n/a ⁶	8.2%
Real Estate ex-REITs	5%	8%	-2%	12.3%	10.6%
Other Real Assets ⁴	1%	2%	-1%	n/a ⁶	n/a ⁶
Private Equity ^{5*}	15%	9%	6%	11.5%	15.0%
Total	100%	100%	0%		

*Your private equity benchmark return is weighted by your allocation to private debt, which drives a significant part of the return difference compared to the U.S. Public average. Your 5-year annualized benchmark return for private equity was 16.1%, and your 5-year annualized benchmark return for private debt was 5.6%.

Your policy mix has changed over the past 5 years. At the end of 2017 your policy mix compares 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	2017	2017	2017
U.S. Stock	0%	15%	22%	20%
Emerging Market Stock	0%	5%	2%	2%
ACWIxUS Stock	0%	3%	11%	8%
Global Stock	31%	17%	8%	11%
Total Stock	31%	40%	47%	47%
U.S. Bonds	7%	10%	19%	16%
High Yield Bonds	6%	7%	1%	2%
Fixed Income - Emerging	6%	5%	1%	1%
Global Bonds	3%	0%	1%	2%
Cash	5%	3%	1%	-1%
Other Fixed Income	0%	0%	4%	6%
Total Fixed Income	27%	25%	27%	26%
Global TAA	10%	10%	1%	1%
Hedge Funds ¹	8%	2%	3%	5%
Commodities	3%	0%	1%	1%
REITs	0%	2%	1%	1%
Real Estate ex-REITs	5%	6%	9%	8%
Other Real Assets ²	0%	2%	2%	3%
Private Equity ³	16%	13%	10%	9%
Total	100%	100%	100%	100%

1. Does not include Absolute Return hedge fund investments used in Portable Alpha implementation.

2. Other real assets includes natural resources and infrastructure.

3. Private equity includes private equity and private equity style private debt.

Net value added is the component of total return from active management. Your 5-year net value added was 0.3%.

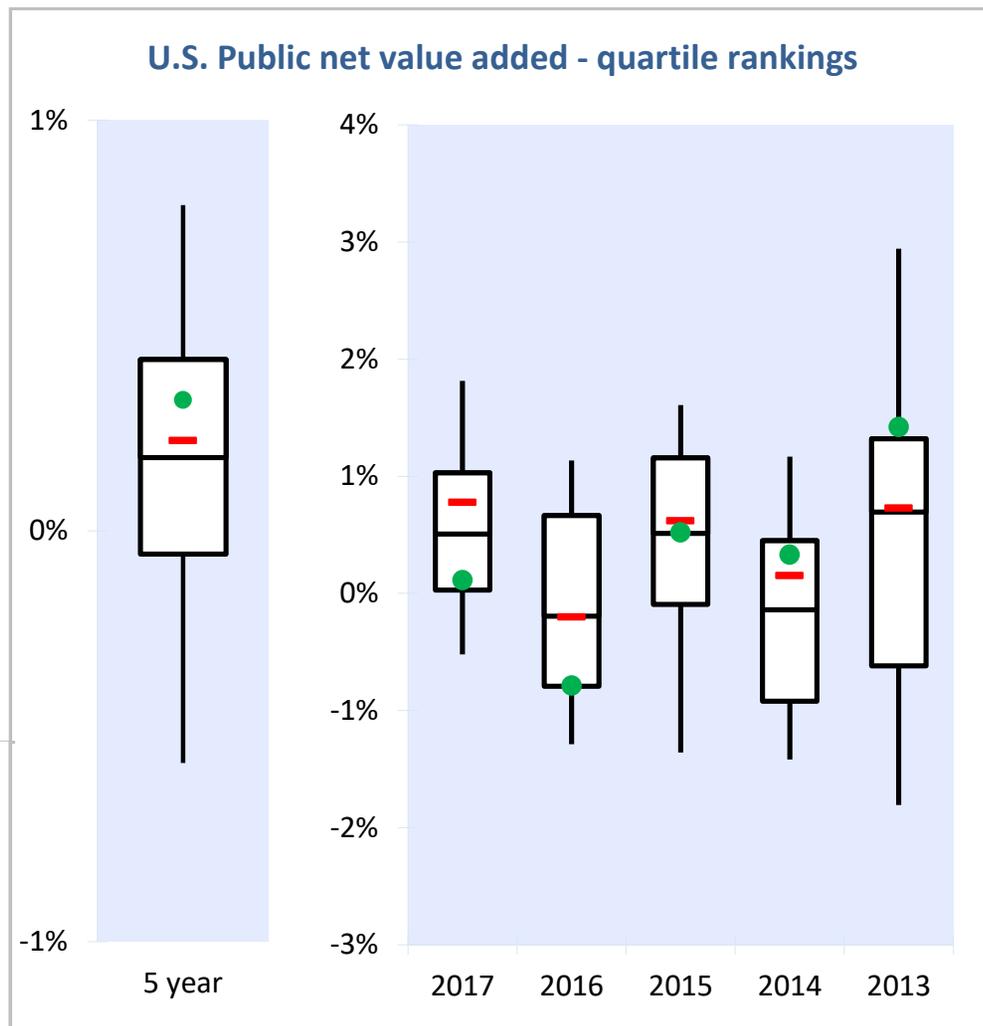
Net value added equals total net return minus policy return.

Value added for South Carolina Retirement System Investment Commission

Year	Net Return	Policy Return	Net value Added
2017	14.7%	14.6%	0.1%
2016	7.6%	8.4%	-0.8%
2015	-0.6%	-1.1%	0.5%
2014	5.1%	4.8%	0.3%
2013	11.6%	10.2%	1.4%
5-Year	7.6%	7.2%	0.3%

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

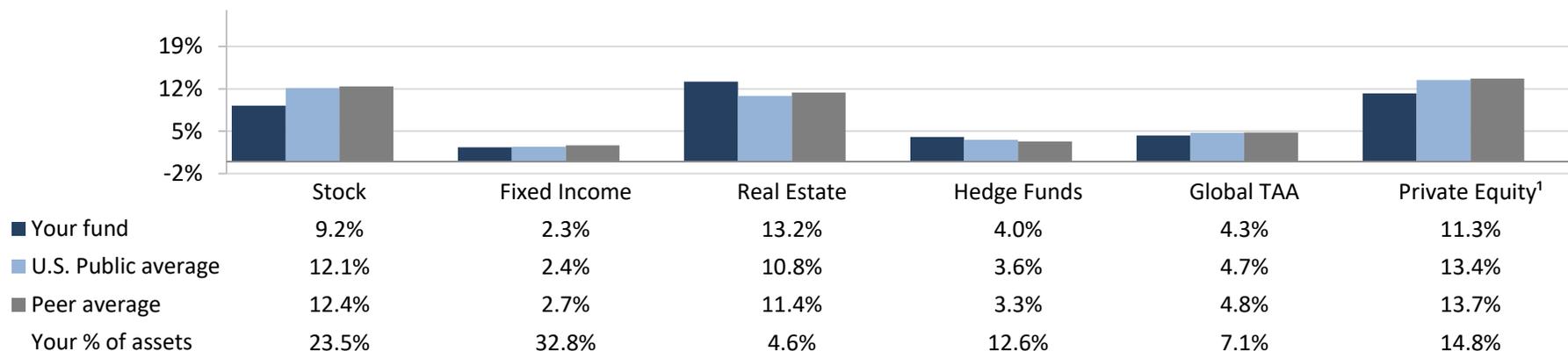
Your 0.3% 5-year value added translates into approximately \$0.6 billion of cumulative value added over 5 years, or \$0.3 billion more than if you had earned the U.S. Public median of 0.2%.



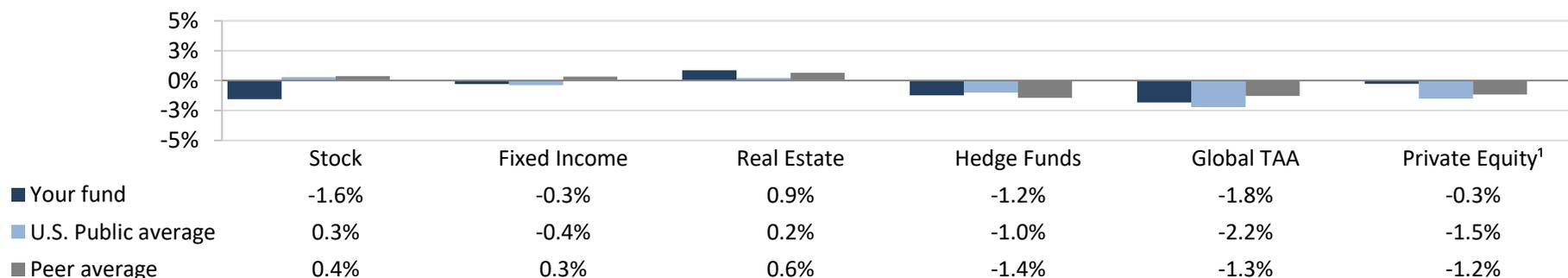
Your value added was impacted by your choice of benchmarks for private equity. CEM suggests using lagged, investable benchmarks for private equity. Since the policy return for private equity includes your private equity style private debt, we cannot accurately estimate the difference on total fund value added if you used our benchmark.

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. Since the policy return for private equity includes your private equity style private debt, we cannot accurately estimate the difference on private equity policy return/value added if you used our benchmark.

Your investment costs benchmarked in this report for calendar year 2017 were \$222.4 million or 72.9 basis points.

Asset management costs by asset class and style (\$000s)	Internal Mgmt		External Management			Total	
	Active	Overseeing of external	Passive fees	Active base fees	Perform. fees ²		
Stock - U.S. Broad/All		744	0	10,406		11,150	
Stock - Emerging		381		9,636		10,017	
Stock - Global		1,343	364	4,801		6,509	
Stock - ACWI x U.S.		236		3,801		4,036	
Fixed Income - U.S.	11	375		3,107		3,492	
Fixed Income - Emerging		437	0	7,412		7,849	
Fixed Income - High Yield		562		7,871		8,433	
Cash	396	235		1,327		1,958	
REITs		137		1,684		1,821	
Global TAA		569		6,125	3,165	9,859	
Hedge Fund - External Not Fund of Fund		416		26,597	17,579	44,592	
Hedge Fund - FoFs		500		21,272	12,220	33,992	
Real Estate - LPs ^{1 2}		502		16,110	20,114	16,612	
Real Estate - Co-Invest. ²		2		4		6	
Infrastructure ²		117		2,066		2,182	
Diversified Private Equity - LPs ^{1 2}		386		19,106	46,572	19,492	
Diversified Private Equity - Co-Invest. ²		134		3,500		3,634	
Diversified Private Equity - FoFs ²		150		7,626	1,577	7,776	
Private Credit - LPs ²		487		24,096	15,639	24,584	
Private Credit - Co-Invest. ²		1		8		9	
Derivatives/Overlays		259	551			810	
Total excluding private asset performance fees						218,815	71.7bp
Oversight, custodial and other costs ³							
Oversight of the fund						1,089	
Trustee & custodial						1,131	
Consulting and performance measurement						1,070	
Audit						17	
Other						321	
Total oversight, custodial & other costs						3,627	1.2bp
Total investment costs (excl. transaction costs & private asset performance fees)						222,442	72.9bp

Footnotes

1. Fees are the weighted average management cost calculated using the detailed limited partnership survey provided.

Refer to Appendix A for full details regarding defaults.

2. 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.

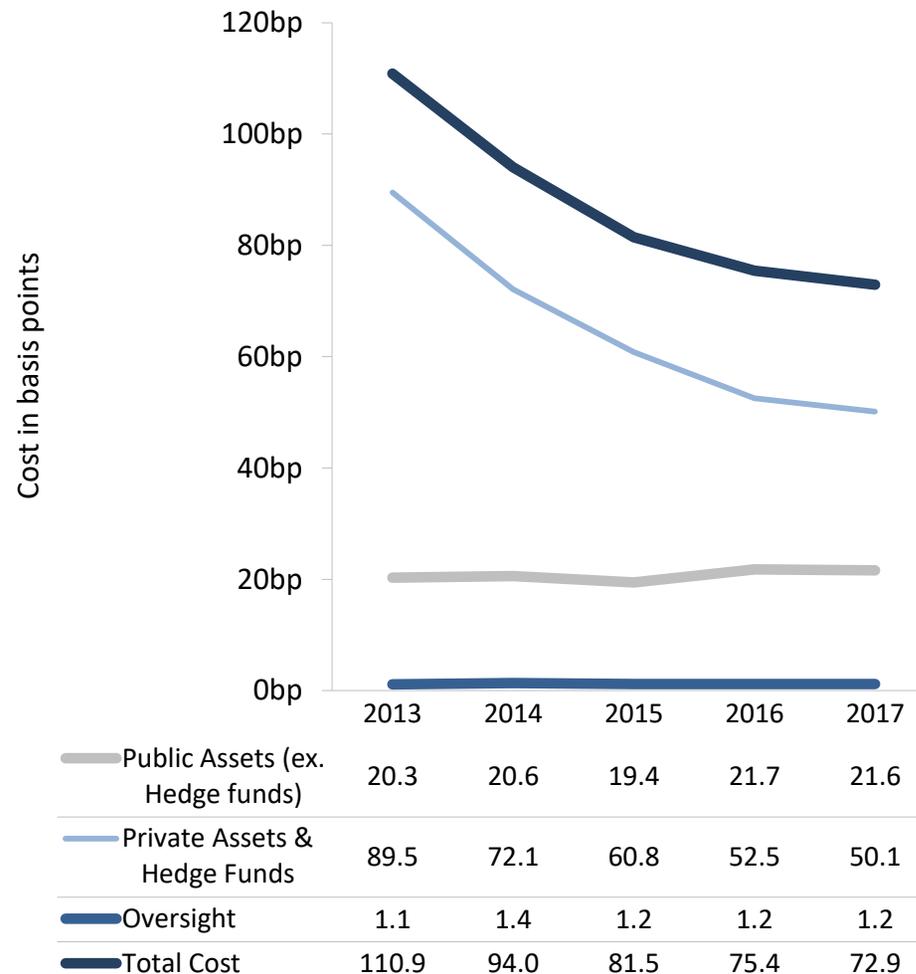
3. Excludes non-investment costs, such as PBGC premiums and preparing cheques for retirees.

Your costs decreased between 2013 and 2017.

Your costs decreased primarily because:

- Starting in 2014, CEM began including hedge fund performance fees in total costs. For illustrative purposes, prior year costs now include hedge fund performance fees. Your cost in 2014 excluding hedge fund performance fees was 86.1 bps.
- You decreased your investment in the highest cost asset classes. Your holdings of hedge funds, private real assets and private equity decreased from 35% of assets in 2013 to 32% in 2017.
- You decreased your use of funds of funds from 33% of hedge funds, private real assets and private equity in 2013 to 24% in 2017. Funds of funds are higher cost than direct funds.

Trend in your investment costs



Your total investment cost of 72.9 bps was above the peer median of 64.5 bps and the U.S. Public median of 61.0 bps.

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

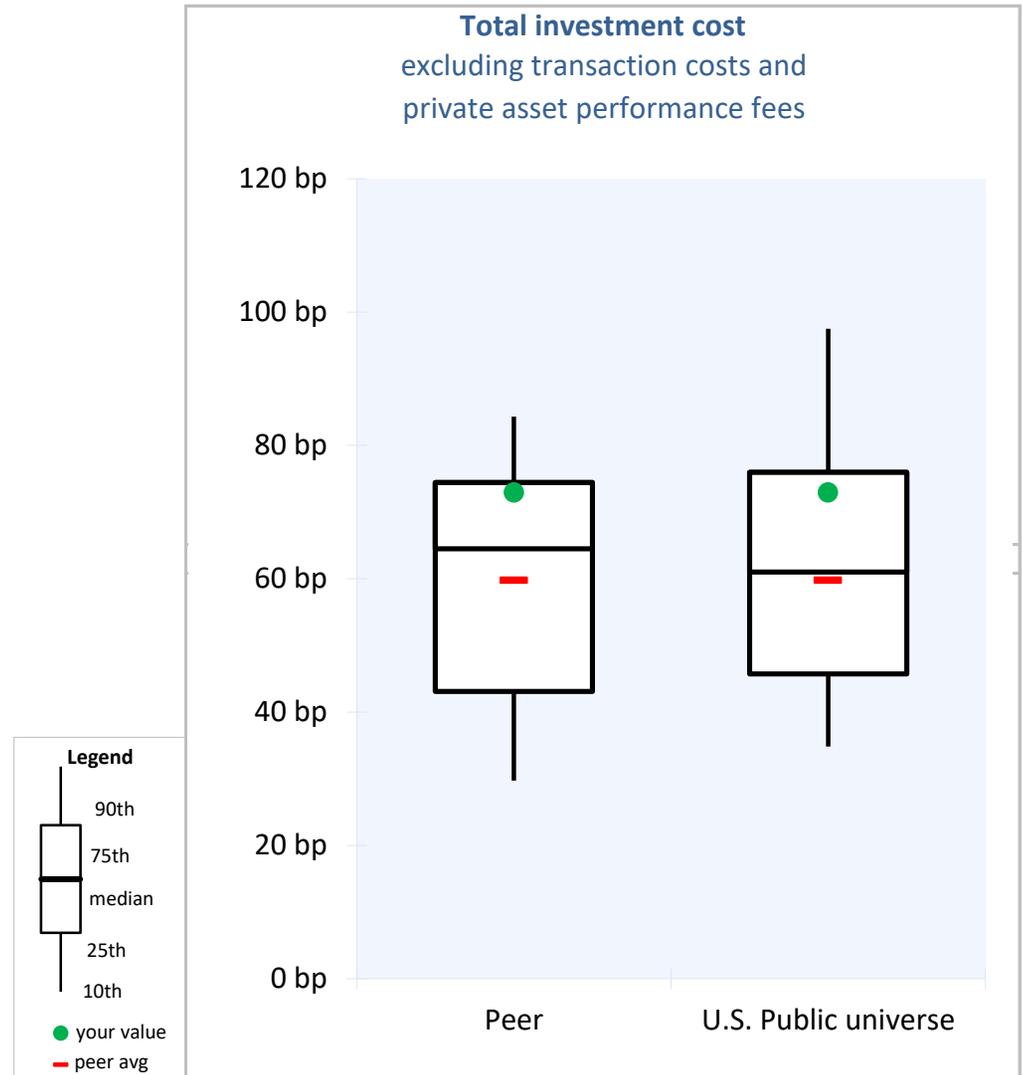
- Asset mix, particularly holdings of the highest cost asset classes: real estate (excl REITS), infrastructure, hedge funds and private equity. These high cost assets equaled 32% of your funds assets at the end of 2017 versus a peer average of 23%.
- Fund size. Bigger funds have advantages of scale.

Asset mix is set by policy and may include high cost asset classes. Peers who do not have high cost asset classes in their policy mix will have lower total costs. Therefore, policy asset mix is a major driver of total cost.

Fund size is also a major driver of cost because funds with a larger size have scale advantages are often able to negotiate lower fees.

A total cost comparison to peers which is not adjusted for asset mix and fund size will not be an appropriate measure because of these factors. Used out of context, a total cost comparison could be misleading and lead to the wrong conclusion.

In order to provide plan sponsors with accurate feedback regarding reasonableness of costs, CEM takes asset mix and overall fund size into consideration. CEM calculates a benchmark cost for your fund that considers your unique asset mix and style. 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 1.5 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 72.9 bp was slightly below your benchmark cost of 74.4 bp. Thus, your cost savings was 1.5 bp.

Your cost versus benchmark

	\$000s	basis points
Your total investment cost	222,442	72.9 bp
Your benchmark cost	226,902	74.4 bp
Your excess cost	(4,460)	(1.5) bp

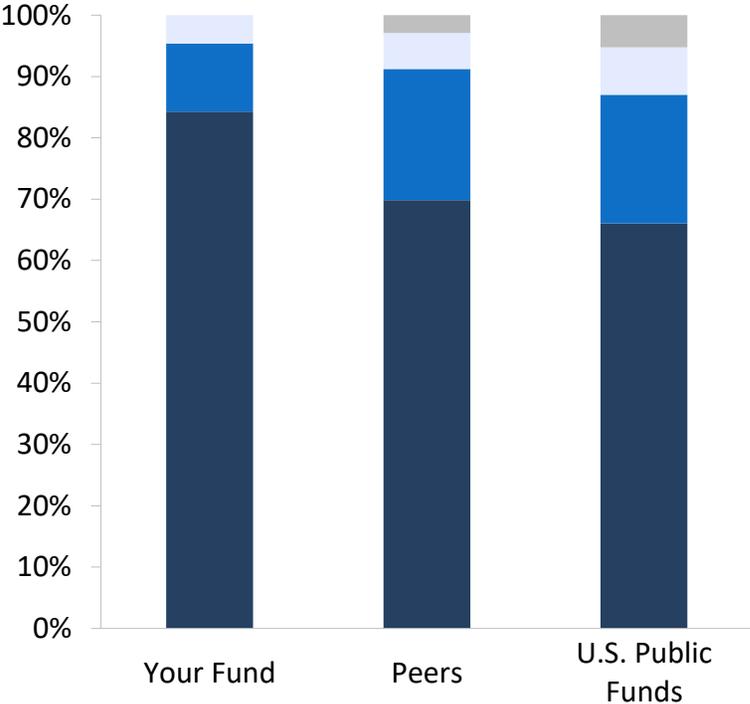
Differences in cost performance are often caused by differences in implementation style.

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 84% versus 70% for your peers).
- Within external active holdings, fund of funds usage because it is more expensive than direct fund investment. You had more in fund of funds. Your 24% of hedge funds, real estate and private equity in fund of funds compared to 14% for your peers.

Implementation style¹



■ Internal passive	0%	3%	5%
■ Internal active	5%	6%	8%
■ External passive	11%	21%	21%
■ External active	84%	70%	66%

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 implementation style cost you 6.8 bp 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) (B)			
Stock - U.S. Broad/All	2,716	99.4%	31.0%	68.4%	38.6 bp	7,178	
Stock - Emerging	1,392	100.0%	80.5%	19.5%	56.8 bp	1,541	
Stock - Global	4,900	50.7%	68.6%	(17.8%)	39.4 bp	(3,442)	
Stock - ACWI x U.S.	859	100.0%	78.7%	21.3%	38.6 bp	707	
Fixed Income - U.S.	1,404	97.3%	70.5%	26.9%	13.4 bp	505	
Fixed Income - Emerging	1,593	98.7%	99.8%	(1.1%)	25.6 bp	(43)	
REITs	501	100.0%	71.8%	28.2%	42.7 bp	602	
Real Estate ex-REITs	1,744	100.0%	98.6%	1.4%	76.2 bp	190	
Impact of more/less external active vs. lower cost styles						7,239	2.4 bp
		<u>LPs % of external active</u>			<u>Premium vs. ea¹</u>		
Real Estate ex-REITs	1,744	100.0%	47.1%	52.9%	53.9 bp	4,972	
Infrastructure	426	0.0%	66.0%	(66.0%)	59.3 bp	(1,666)	
Impact of more/less partnerships as a percentage of external active						3,306	1.1 bp
		<u>Fund of funds % of LPs</u>			<u>Premium vs. direct LP¹</u>		
Real Estate ex-REITs	1,744	0.0%	2.8%	(2.8%)	45.5 bp	(225)	
Hedge Funds	3,345	54.6%	27.2%	27.4%	65.1 bp	5,970	
Top layer perf. fees (on NAV)	3,345	54.6%	27.2%	27.4%	40.1 bp	3,673	
Diversified Private Equity	2,220	18.7%	12.8%	5.9%	70.8 bp	921	
Impact of more/less fund of funds vs. direct LPs						10,338	3.4 bp
Impact of higher use of portfolio level overlays						(11)	(0.0) bp
Impact of mix of internal passive, internal active, and external passive ²						(66)	(0.0) bp
Total impact of differences in implementation style						20,806	6.8 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.

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 8.2 bps.

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

	Style	Your avg holdings in \$mils (A)	Cost in bps			Cost/ (savings) \$000s (A X B)
			Your Fund	Peer median	More/ (less) (B)	
External asset management						
Stock - U.S. Broad/All	passive	17	2.7	1.6	1.1	2
Stock - U.S. Broad/All	active	2,700	41.3	40.3	1.0	272
Stock - Emerging	active	1,392	72.0	63.5	8.5	1,184
Stock - Global*	passive	2,414	4.2	3.9	0.4	90
Stock - Global	active	2,486	22.1	43.6	(21.5)	(5,351)
Stock - ACWI x U.S.	active	859	47.0	42.9	4.1	349
Fixed Income - U.S.	active	1,367	25.5	15.6	9.9	1,351
Fixed Income - Emerging	passive	21	2.7	17.1	(14.4)	(30)
Fixed Income - Emerging	active	1,573	49.9	42.7	7.2	1,129
Fixed Income - High Yield	active	2,052	41.1	35.9	5.2	1,070
Cash	active	857	18.2	Excluded	--	--
REITs	active	501	36.4 ¹	49.9	(13.6)	(680)
Real Estate ex-REITs ²	LP	1,744	95.3	128.6	(33.3)	(5,807)
Infrastructure	active	426	51.3	83.2	(32.0)	(1,360)
Hedge Funds	active	1,520	177.7	135.9	41.8	6,360
Top layer perf. fees (on NAV)	active	1,520	115.7	49.9	65.7	9,987
Hedge Funds	FoF	1,825	21.0	60.0	(39.0)	(7,122)
Top layer perf. fees (on NAV)	FoF	1,825	0.0	18.0	(18.0)	(3,286)
Underlying base fees	FoF	1,825	98.3	141.0	(42.7)	(7,797)
Underlying perf. fees (on NAV)	FoF	1,825	66.9	72.0	(5.1)	(924)
Global TAA	active	2,078	47.5 ¹	62.0	(14.5)	(3,021)
Diversified Private Equity	FoF	415	72.2	70.8	1.4	59
Underlying base fees	FoF	415	115.2	157.0	(41.8)	(1,737)
Diversified Private Equity ²	LP	1,805	128.1	157.0	(28.9)	(5,207)
Private Credit ²	LP	2,296	107.1	127.0	(19.9)	(4,568)
Total impact of paying more/less for external management						(25,039)
Total in bps						(8.2) bp

Footnotes:

1. You paid performance fees in these asset classes.
2. You paid performance fees in these asset classes but they are excluded in this analysis as most of your peers did not have this data readily available for disclosure

'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 0.1 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	30,499	0.4	0.5	(0.1)	(370)
Consulting	30,499	0.4	0.3	0.1	257
Custodial	30,499	0.4	0.4	0.0	0
Audit	30,499	0.0	0.0	(0.0)	(128)
Other	30,499	0.1	0.1	0.0	12
Total for oversight, custodial, other					(229)
Total in bps					(0.1) bp

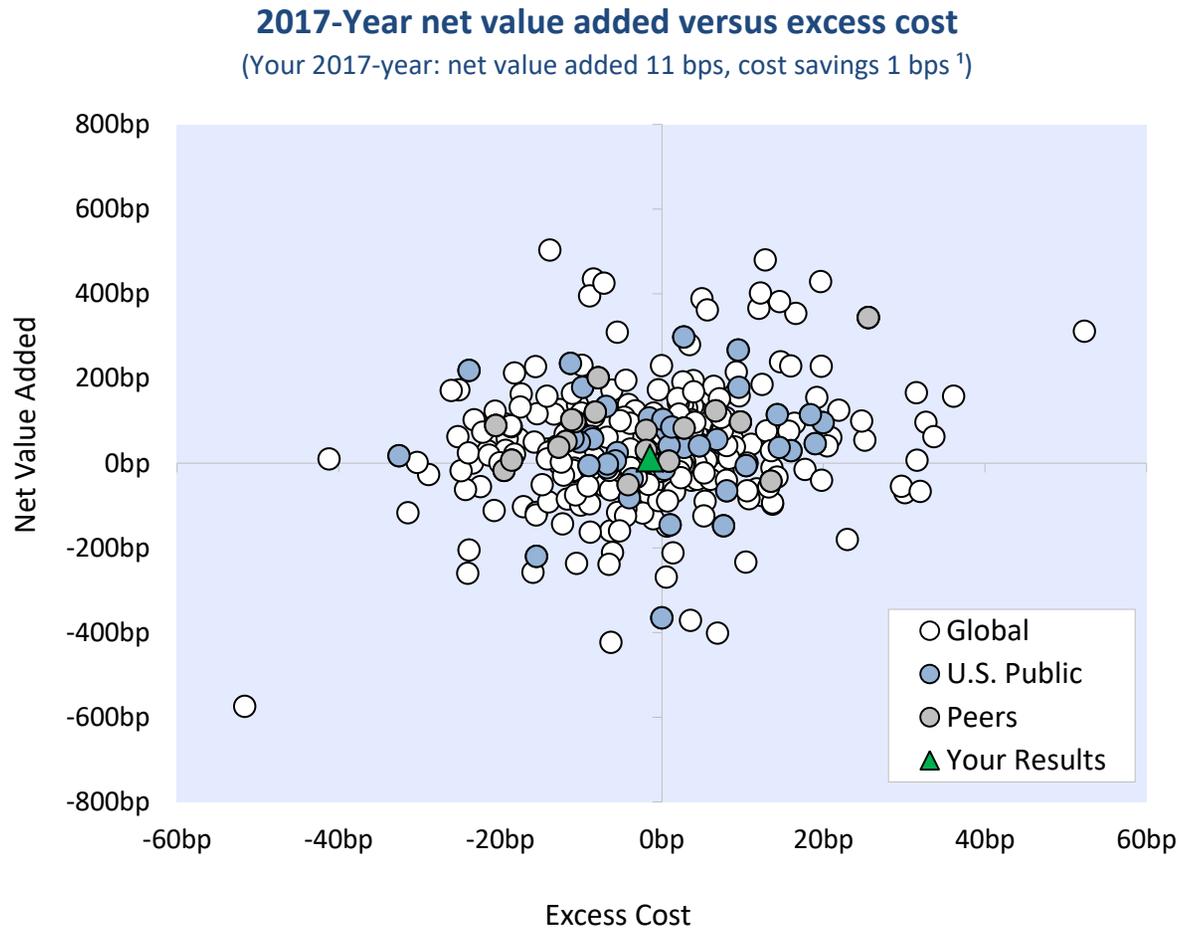
¹Oversight of the fund includes staff salaries, direct expenses (travel, fees paid to directors, director's insurance, etc.) and related unallocated overhead pertaining to overseeing the fund assets. Include the costs of executives and their staff responsible for the total fund or responsible for overseeing multiple asset categories (for example, CEO, CIO office, Board of Director/Investment Committee etc.). Staff responsible for overseeing a single asset class category (i.e. private assets, stock, etc.) have their costs included with that asset category.

In summary, your fund was slightly low cost because you paid less than peers for similar services. These savings were mostly offset by your higher cost implementation style.

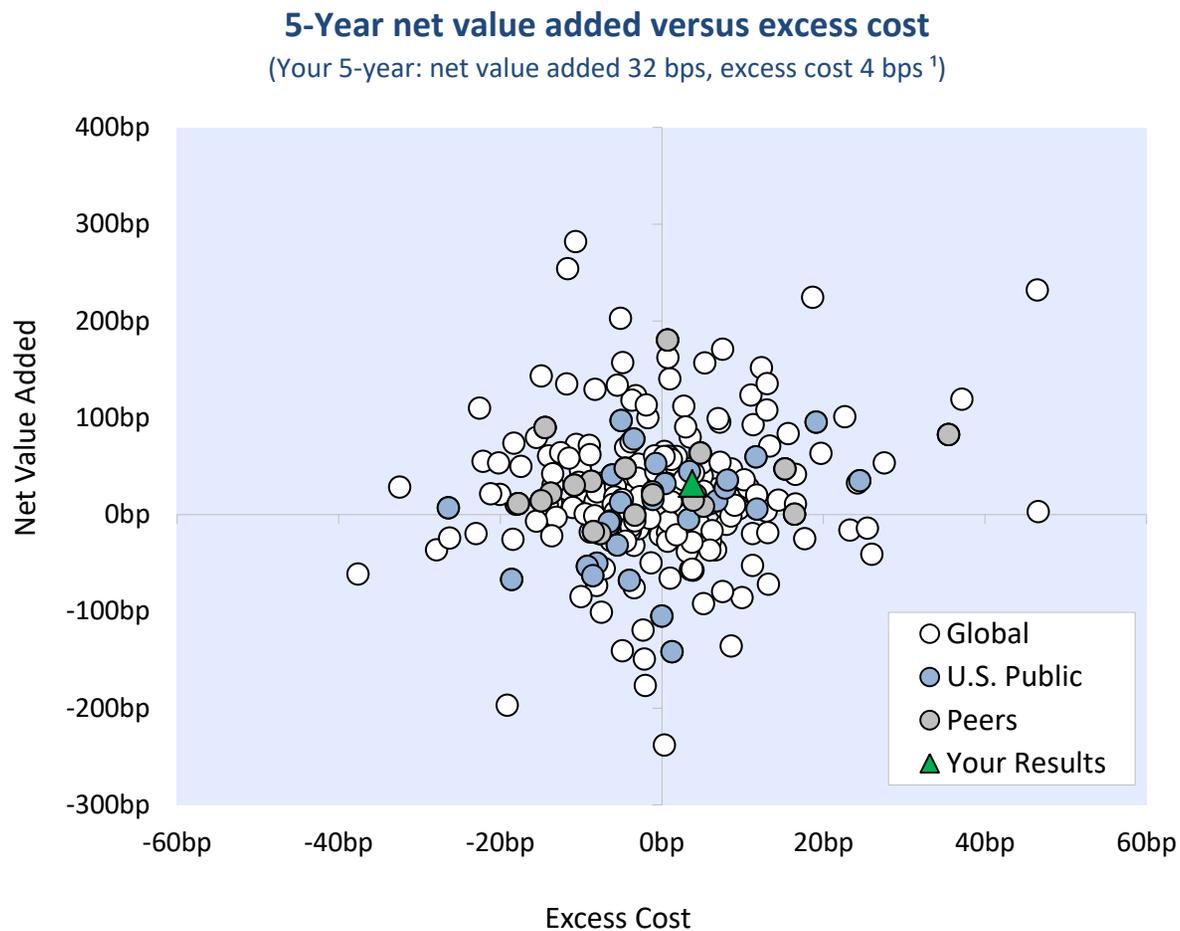
Reasons for your low cost status

	Excess Cost/ (Savings)	
	\$000s	bps
1. Higher cost implementation style		
• More fund of funds	10,338	3.4
• More external active management (less lower cost passive and internal)	7,239	2.4
• More partnerships as a percentage of external	3,306	1.1
• Less overlays	(11)	(0.0)
• Other style differences	(66)	(0.0)
	<u>20,806</u>	<u>6.8</u>
2. Paying less than peers for similar services		
• External investment management costs	(25,039)	(8.2)
• Internal investment management costs	1	0.0
• Oversight, custodial & other costs	(229)	(0.1)
	<u>(19,489)</u>	<u>(8.3)</u>
Total savings	(4,460)	(1.5)

Your 2017-year performance placed in the positive value added, low cost quadrant of the cost effectiveness chart.



Your fund achieved 5-year net value added of 32 bps and excess cost of 4 bps on the cost effectiveness chart.



1. Your 5-year excess cost of 4 basis points is the average of your excess cost for the past 5 years.

	2017	2016	2015	2014	2013	5-year
Net value added	11.1bp	-79.0bp	52.0bp	32.8bp	142.0bp	31.8bp
Excess Cost	-1.5bp	-1.0bp	5.1bp	13.8bp	2.4bp	3.8bp

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 9.1%.
- Your 5-year policy return was 7.2%. 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 0.3%. This was above the U.S. Public median of 0.2% and above the peer median of 0.2%.
- In dollar terms, your 0.3% value added equals approximately \$287 million over 5 years.

Cost and cost effectiveness

- Your investment cost of 72.9 bps was below your benchmark cost of 74.4 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. These savings were mostly offset by your higher cost implementation style.
- Your fund achieved 5-year net value added of 32 bps and excess cost of 4 bps on the cost effectiveness chart.

2

Description of peer group and universe

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Implementation style, actual mix and policy mix:	
- by universe subset	5
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Peer group

Your peer group is comprised of 19 U.S. Public public funds, with assets ranging from \$15.6 billion to \$79.2 billion versus your \$30.5 billion. The median size is \$32.1 billion.

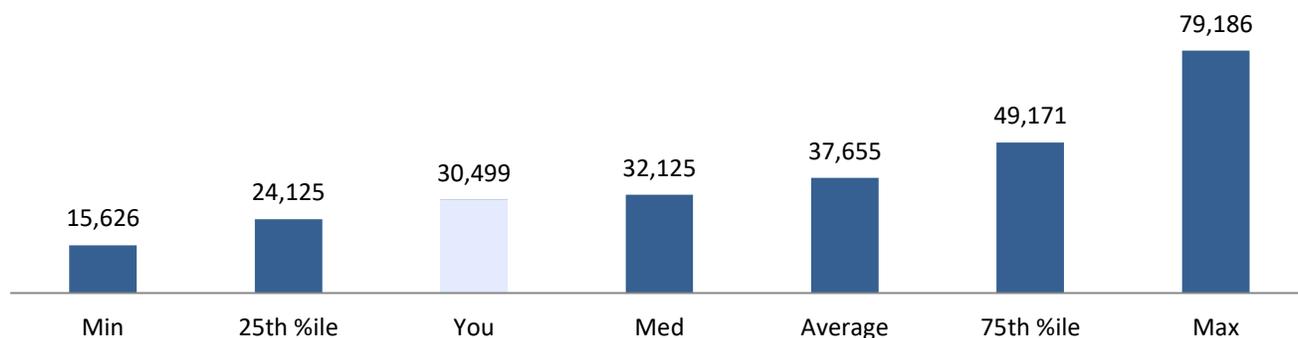
In order to preserve client confidentiality, we do not disclose your peers' names in this document due to the Freedom of Information Act. Your peer group consist of plans with the following characteristics:

Peer Group Characteristics - 2017

	Your Plan	Peers	U.S. Public
<u>Plan Assets (\$ billions)</u>			
Range	30.5	15.6 - 79.2	1.4 - 350.0
Median		32.1	22.9
<u># of Plans</u>			
Corporate		0	0
Public	1	19	60
Other		0	0
Total	1	19	60
<u>Implementation style</u>			
% External active	84.3	69.8	66.1
% External passive	11.1	21.4	20.9
% Internal active	4.6	5.9	7.7
% Internal passive	0.0	2.9	5.2
<u>Asset mix</u>			
% Stock	32.4	46.5	47.0
% Fixed Income	23.8	26.1	25.8
% Real Assets	9.1	11.3	11.1
% Private Equity	13.9	9.6	8.5
% Hedge Funds & Other	20.9	6.4	7.6

Your peer group is selected such that your fund size is usually close to the median of your peer group. Size is the primary criteria for choosing your peer group, because size greatly impacts how much you pay for services. Generally, the larger your fund, the smaller your unit operating costs (i.e., the economies of scale impact).

Total fund assets (\$ millions) - you versus peers

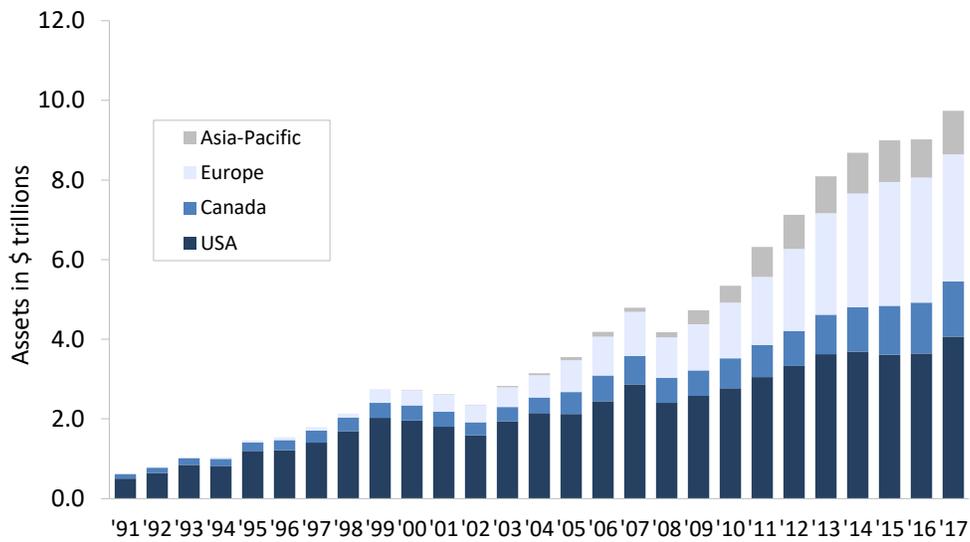


CEM global universe

CEM has been providing investment benchmarking solutions since 1991. The 2017 survey universe is comprised of 330 funds representing \$9.7 trillion in assets. The breakdown by region is as follows:

- 166 U.S. pension funds with aggregate assets of \$4.1 trillion.
- 78 Canadian pension funds with aggregate assets of \$1.4 trillion.
- 75 European pension funds with aggregate assets of \$3.2 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Denmark, UK, and Ireland.
- 8 Asia-Pacific pension funds with aggregate assets of \$1.0 trillion.

CEM global universe



Universe subsets

CEM's global survey universe is comprised of 330 funds with total assets of \$9.7 trillion. Your fund's returns and costs are compared to the following two subsets of the global universe:

- Peers - Your peer group is comprised of 19 U.S. Public public funds ranging in size from \$15.6 - \$79.2 billion. The peer median of \$32.1 billion compares to your \$30.5 billion.
- U.S. Public - The U.S. Public universe is comprised of 60 funds ranging in size from \$1.4 - \$350.0 billion. The median fund is \$22.9 billion.

Universe subsets by number of funds and assets

Peer group ¹	U.S. by type				Global by Country					
	Corp.	Public	Other	Total	U.S.	Canada	Europe	Asia-Pacific	Total	
# of funds										
2017	19	97	60	9	166	166	78	75	11	330
2016	19	100	60	10	170	170	80	79	11	340
2015	19	101	64	11	176	176	80	91	12	359
2014	19	97	68	13	178	178	89	147	13	427
2013	19	111	68	14	193	193	90	155	11	449
# of funds with uninterrupted data for:										
1 yr	19	97	60	9	166	166	78	75	11	330
2 yrs	19	89	55	8	152	152	71	64	10	297
3 yrs	19	77	52	8	137	137	59	62	10	268
4 yrs	19	72	52	8	132	132	56	59	10	257
5 yrs	19	67	48	7	122	122	54	58	8	242
Total assets (\$ billions)										
2017	715	1,054	2,861	150	4,065	4,065	1,391	3,190	1,095	9,742
2016	645	1,017	2,485	136	3,638	3,638	1,282	3,138	958	9,016
2015	620	965	2,510	135	3,610	3,610	1,228	3,107	1,047	8,992
2014	619	1,017	2,509	163	3,689	3,689	1,121	2,850	1,027	8,687
2013	588	1,030	2,445	152	3,627	3,627	990	2,546	930	8,093
2017 asset distribution (\$ billions)										
Avg	37.7	10.9	47.7	16.7	24.5	24.5	17.8	42.5	99.6	29.5
Max	79.2	57.6	350.0	56.6	350.0	350.0	236.8	1,129.9	578.3	1,129.9
75th %ile	49.2	13.5	58.3	16.5	26.6	26.6	10.2	29.8	70.0	24.1
Median	32.1	5.1	22.9	6.9	9.6	9.6	4.1	7.8	26.3	7.7
25th %ile	24.1	2.2	8.2	4.2	3.0	3.0	1.5	3.0	19.3	2.4
Min	15.6	0.2	1.4	2.4	0.2	0.2	0.1	0.4	2.9	0.1

1. Peer group statistics are for your 2017 peer group only as your peer group may have included different funds in prior years.

Implementation style, actual mix and policy mix by universe subset

Implementation style, actual mix and policy mix - 2017 (as a % of year-end assets)

	Your fund ¹	Peer group	U.S. by type				Global by Country				
			Corp.	Public	Other	Total	U.S.	Canada	Europe	Asia-Pacific	Total
Implementation style											
External active	76.5	67.0	74.6	63.0	67.5	70.0	70.0	63.3	47.1	44.4	62.4
Fund of funds	7.8	2.8	2.9	3.0	0.8	2.8	2.8	1.6	3.3	1.8	2.6
External passive	11.1	21.4	18.1	20.9	24.5	19.5	19.5	11.2	27.5	19.2	19.3
Internal active	4.6	5.9	3.1	7.7	2.7	4.7	4.7	19.1	19.2	22.9	12.0
Internal passive	<u>0.0</u>	<u>2.9</u>	<u>1.4</u>	<u>5.2</u>	<u>4.5</u>	<u>3.0</u>	<u>3.0</u>	<u>4.8</u>	<u>2.9</u>	<u>11.7</u>	<u>3.7</u>
Total	100	100	100	100	100	100	100	100	100	100	100
Actual asset mix											
Stock	32.4	46.5	36.5	47.0	48.1	40.9	40.9	43.8	43.3	44.7	42.3
Fixed income	26.9	26.5	47.7	26.5	30.0	39.1	39.1	37.9	39.4	30.8	38.6
Global TAA	6.8	0.6	1.4	0.9	0.6	1.2	1.2	0.5	0.7	0.6	0.9
Real assets	9.1	11.3	4.9	11.1	8.8	7.3	7.3	12.1	9.5	14.6	9.2
Hedge funds	11.0	4.8	5.0	5.0	3.3	4.9	4.9	2.0	1.9	3.5	3.5
Balanced Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.4
Risk Parity	0.0	0.6	0.4	1.0	0.0	0.6	0.6	0.2	0.0	0.7	0.4
Private equity	<u>13.9</u>	<u>9.6</u>	<u>4.1</u>	<u>8.5</u>	<u>9.2</u>	<u>6.0</u>	<u>6.0</u>	<u>3.5</u>	<u>3.3</u>	<u>5.1</u>	<u>4.7</u>
Total	100	100	100	100	100	100	100	100	100	100	100
Policy asset mix											
Stock	39.8	46.3	36.4	46.3	46.8	40.6	40.6	43.3	43.2	48.3	42.1
Fixed income	25.0	27.1	47.5	25.6	31.3	38.7	38.7	39.1	39.5	27.7	38.6
Global TAA	10.0	0.7	1.2	0.9	1.1	1.1	1.1	0.7	0.6	0.7	0.9
Real assets	10.0	12.2	4.8	12.2	9.0	7.7	7.7	12.5	10.3	14.8	9.7
Hedge funds	2.0	3.4	5.1	4.7	3.8	4.9	4.9	1.3	2.0	2.7	3.3
Balanced Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.2
Risk Parity	0.0	0.6	0.4	0.9	0.0	0.5	0.5	0.2	0.1	0.8	0.4
Private equity	<u>13.2</u>	<u>9.6</u>	<u>4.6</u>	<u>9.4</u>	<u>8.1</u>	<u>6.5</u>	<u>6.5</u>	<u>2.9</u>	<u>3.6</u>	<u>4.9</u>	<u>4.9</u>
Total	100	100	100	100	100	100	100	100	100	100	100

1. Due to the fact that your fund provided average assets, the above tables show your implementation style and asset mix using average assets rather than year-end.

Implementation style, actual mix and policy mix trends

Implementation style, actual mix and policy mix - 2013 to 2017 (as a % of year-end assets)

	Your fund ¹					Peer average ²					U.S. Public average ²				
	2017	2016	2015	2014	2013	2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
Implementation style															
External active	76.5	72.4	65.4	64.9	65.5	67.0	66.9	67.1	67.1	67.5	60.7	61.1	61.7	62.0	62.0
Fund of funds	7.8	9.3	9.9	9.3	11.3	2.8	2.6	2.3	2.2	2.0	3.1	3.0	2.9	2.6	2.4
External passive	11.1	12.3	17.8	14.2	9.7	21.4	21.8	21.6	21.1	20.6	21.7	21.8	21.4	21.2	21.1
Internal active	4.6	6.0	7.0	11.5	13.5	5.9	5.8	6.3	6.8	6.9	9.0	8.8	8.7	8.6	8.7
Internal passive	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>2.9</u>	<u>2.9</u>	<u>2.6</u>	<u>2.8</u>	<u>3.0</u>	<u>5.5</u>	<u>5.4</u>	<u>5.4</u>	<u>5.8</u>	<u>5.8</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Actual asset mix															
Stock	32.4	27.5	25.7	18.5	13.5	46.5	45.7	45.9	47.4	48.9	46.5	46.0	46.9	48.5	50.3
Fixed income	26.9	31.7	36.5	42.4	44.4	26.5	27.3	29.2	29.3	29.2	26.4	26.6	27.0	27.0	26.9
Global TAA	6.8	7.0	7.5	7.5	6.5	0.6	0.5	0.6	0.8	0.7	1.0	1.4	1.4	1.6	1.5
Real assets	9.1	6.9	4.2	3.8	3.9	11.3	11.5	10.1	9.4	8.4	11.2	11.3	10.2	9.3	8.4
Hedge funds	11.0	11.5	11.8	12.8	16.2	4.8	5.0	5.0	4.4	4.3	5.1	5.5	5.8	5.5	5.3
Balanced Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Risk Parity	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.5	0.5	0.5	1.0	0.5	0.4	0.4	0.2
Private equity	<u>13.9</u>	<u>15.4</u>	<u>14.5</u>	<u>15.0</u>	<u>15.5</u>	<u>9.6</u>	<u>9.5</u>	<u>8.7</u>	<u>8.2</u>	<u>8.0</u>	<u>8.8</u>	<u>8.8</u>	<u>8.2</u>	<u>7.6</u>	<u>7.4</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Policy asset mix															
Stock	39.8	37.2	34.0	31.0	31.0	46.3	46.5	47.5	47.8	48.6	46.2	46.1	47.4	47.5	48.4
Fixed income	25.0	24.3	22.0	27.0	27.0	27.1	27.7	28.7	28.9	29.5	25.3	26.1	25.6	26.3	27.4
Global TAA	10.0	10.3	10.0	10.0	10.0	0.7	0.9	0.9	0.9	0.9	1.0	1.2	1.3	1.3	1.5
Real assets	10.0	8.2	8.0	8.0	8.0	12.2	11.7	10.3	10.2	9.4	12.4	12.0	10.9	10.7	9.8
Hedge funds	2.0	4.1	10.0	8.0	8.0	3.4	3.3	3.4	3.0	2.8	4.6	4.8	5.1	4.9	4.2
Balanced Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Risk Parity	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.5	0.5	0.8	0.6	0.6	0.5	0.2
Private equity	<u>13.2</u>	<u>15.8</u>	<u>16.0</u>	<u>16.0</u>	<u>16.0</u>	<u>9.6</u>	<u>9.2</u>	<u>8.7</u>	<u>8.6</u>	<u>8.3</u>	<u>9.6</u>	<u>9.2</u>	<u>9.1</u>	<u>8.8</u>	<u>8.4</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

1. Due to the fact that your fund provided average assets, the above tables show your trend in implementation style and asset mix using average assets rather than year-end.

2. Trends are based on the 48 U.S. Public and 19 peer funds with 5 or more consecutive years of data ending 2017.

Implementation style by asset class

Implementation style impacts your costs, because external active management tends to be more expensive than internal or passive (or indexed) management and fund-of-funds usage is more expensive than direct fund investment.

Implementation style by asset class - 2017 (as a % of average assets)

	Your fund %						Peer average %						U.S. Public average %					
	External			Internal			External			Internal			External			Internal		
	Active	FOFs	Index	Active	FOFs	Index	Active	FOFs	Index	Active	FOFs	Index	Active	FOFs	Index	Active	FOFs	Index
Stock - U.S. Broad/All	99.4		0.6	0.0	0.0	31.2		64.6	0.0	4.1	30.4		55.6	1.7	12.2			
Stock - U.S. Large Cap						38.5		36.1	13.1	12.4	31.2		43.0	6.4	19.5			
Stock - U.S. Mid Cap						67.2		0.0	18.9	13.9	54.4		16.7	9.6	19.3			
Stock - U.S. Small Cap						86.4		2.7	6.5	4.4	85.2		8.6	4.0	2.2			
Stock - EAFE						37.4		55.6	6.5	0.5	53.9		32.6	5.8	7.6			
Stock - Global	50.7		49.3	0.0	0.0	68.4		20.0	0.0	11.5	59.7		32.3	3.7	4.3			
Stock - Other						58.9		0.0	3.3	37.8	71.0		18.1	5.5	5.4			
Stock - Emerging	100.0		0.0	0.0	0.0	80.7		10.9	1.0	7.4	77.1		16.0	3.2	3.7			
Stock - ACWI x U.S.	100.0		0.0	0.0	0.0	79.5		20.5	0.0	0.0	68.8		30.2	1.0	0.0			
Stock - Aggregate	75.4		24.6	0.0	0.0	53.7		36.0	4.2	6.1	51.1		35.5	4.0	9.3			
Fixed Income - U.S.	97.3		0.0	2.7	0.0	69.2		9.4	21.0	0.4	57.5		17.6	23.9	1.0			
Fixed Income - U.S. Gov't						6.0		81.5	12.6	0.0	34.7		43.0	22.3	0.0			
Fixed Income - U.S. Credits						100.0		0.0	0.0	0.0	100.0		0.0	0.0	0.0			
Fixed Income - EAFE						0.0		0.0	0.0	0.0	87.6		0.0	12.4	0.0			
Fixed Income - Global						77.6		22.4	0.0	0.0	71.4		3.8	24.8	0.0			
Fixed Income - Other						99.9		0.1	0.0	0.0	90.9		4.2	2.6	2.3			
Fixed Income - Long Bonds						100.0		0.0	0.0	0.0	81.0		2.3	4.0	12.7			
Fixed Income - Emerging	98.7		1.3	0.0	0.0	99.8		0.2	0.0	0.0	99.3		0.1	0.6	0.0			
Fixed Income - Inflation Indexed						44.0		49.1	6.9	0.0	44.7		32.8	7.5	15.0			
Fixed Income - High Yield	100.0		0.0	0.0	0.0	100.0		0.0	0.0	0.0	98.1		1.1	0.5	0.3			
Fixed Income - Mortgages						0.0		100.0	0.0	0.0	21.2		0.9	71.1	6.8			
Fixed Income - Private Debt						100.0		0.0	0.0	0.0	98.0		0.0	2.0	0.0			
Fixed Income - Absolute Return Bond:						0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0			
Fixed Income - Bundled LDI						0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0			
Fixed Income - Convertibles						100.0		0.0	0.0	0.0	100.0		0.0	0.0	0.0			
Cash	38.5			61.5		69.4			30.6		44.0			56.0				
Fixed Income - Aggregate	80.4		0.3	19.3	0.0	70.3		15.2	14.3	0.2	63.2		13.8	20.6	2.4			
Commodities						79.1		20.9	0.0	0.0	77.6		8.4	6.0	8.0			
Infrastructure	100.0	0.0		0.0		96.7	3.3		0.0		84.5	11.8		3.7				
Natural Resources						100.0	0.0		0.0		99.8	0.0		0.2				
REITs	100.0		0.0	0.0	0.0	76.7		20.4	2.9	0.0	72.5		18.1	1.1	8.2			
Real Estate ex-REITs	100.0	0.0		0.0		98.1	0.4		1.6		95.8	0.4		3.8				
Other Real Assets						100.0			0.0		97.4			2.6				
Real Assets	100.0	0.0	0.0	0.0	0.0	94.6	0.3	3.6	1.4	0.0	92.5	0.9	2.1	3.2	1.2			
Hedge Funds	45.4	54.6				73.6	26.4				74.1	25.9						
Global TAA	100.0			0.0		100.0			0.0		96.0			4.0				
Risk Parity						100.0			0.0		89.3			10.7				
Diversified Private Equity	72.0	28.0		0.0		79.6	20.4		0.0		73.5	26.5		0.0				
Venture Capital						59.9	40.1		0.0		65.9	30.1		3.9				
LBO						97.7	2.3		0.0		96.8	3.2		0.0				
Private Credit	100.0	0.0		0.0		100.0	0.0		0.0		100.0	0.0		0.0				
Other Private Equity						100.0			0.0		96.7			3.3				
Private Equity	85.4	14.6		0.0		84.1	15.9		0.0		80.1	19.6		0.3				
Total Fund - Avg. Holdings	76.1	7.9	11.3	4.7	0.0	66.9	2.8	21.5	5.9	2.9	62.9	3.0	21.0	7.8	5.3			

Actual mix

Actual asset mix - 2013 to 2017 (as a % of total average assets)

	Your fund ¹						Peer average %					U.S. Public average %				
	2017	2016	2015	2014	2013		2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
Stock - U.S. Broad/All	8.9	6.5	5.8	8.1	7.6		10.7	9.0	9.5	9.8	11.0	7.5	7.2	6.7	6.6	9.1
Stock - U.S. Large Cap							10.3	12.3	12.0	12.7	11.5	11.8	13.4	14.5	15.3	13.7
Stock - U.S. Mid Cap							0.7	0.9	0.8	0.8	0.1	0.8	0.8	0.9	0.8	0.2
Stock - U.S. Small Cap							1.6	1.9	2.2	2.4	3.3	2.2	2.4	2.9	3.2	4.2
Stock - EAFE				2.5	2.5		4.9	4.8	5.0	5.1	5.3	6.5	6.3	6.7	7.2	8.1
Stock - Global	16.1	16.1	16.6	4.5			5.2	4.8	4.9	4.6	4.5	6.7	5.2	4.2	3.8	3.6
Stock - Other							0.3	0.2	0.2	0.3	0.3	0.9	0.7	1.1	1.2	0.9
Stock - Emerging	4.6	3.4	3.2	3.4	3.4		3.1	2.7	2.2	2.4	2.4	3.6	3.0	2.9	3.3	3.3
Stock - ACWI x U.S.	2.8	1.5					9.8	9.0	9.0	9.3	10.4	7.0	7.6	8.0	7.8	8.2
Stock - Aggregate	32.4	27.5	25.7	18.5	13.5		46.5	45.7	45.9	47.4	48.9	47.0	46.6	48.0	49.2	51.2
Fixed Income - U.S.	4.6	7.1	9.2	8.8	8.2		13.0	14.1	15.2	17.2	17.6	12.7	13.6	14.5	14.1	14.8
Fixed Income - U.S. Gov't							1.9	1.9	1.9	0.4		1.3	0.8	0.6	0.3	0.1
Fixed Income - U.S. Credits							0.9	0.0	0.1	0.2		0.3	0.0	0.3	0.1	0.0
Fixed Income - EAFE												0.1	0.1	0.1	0.1	0.2
Fixed Income - Global			3.0	3.7	3.6		0.9	1.1	1.5	1.5	2.0	1.7	2.0	1.7	1.9	1.9
Fixed Income - Other							1.2	2.0	2.1	1.6	1.4	0.8	1.0	1.0	1.0	0.8
Fixed Income - Long Bonds							0.4	0.4	0.4	0.4	0.4	1.3	0.9	1.0	1.0	0.8
Fixed Income - Emerging	5.2	5.5	4.7	4.0	3.1		1.5	1.5	1.3	1.1	0.9	1.2	1.0	0.9	0.9	0.8
Fixed Income - Inflation Indexed							1.9	2.2	2.9	2.8	2.8	1.9	1.8	1.9	1.8	2.0
Fixed Income - High Yield	6.7	6.8	5.2	4.0	4.3		1.3	1.2	1.3	1.2	1.0	1.7	1.5	1.5	1.6	1.6
Fixed Income - Mortgages							0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2
Fixed Income - Private Debt							0.8	0.6	0.3	0.3	0.1	0.4	0.3	0.3	0.2	0.2
Fixed Income - Absolute Return Bonds																
Fixed Income - Bundled LDI																
Fixed Income - Convertibles							0.2					0.1				
Cash	7.3	9.5	12.1	17.9	19.4		2.1	1.8	2.0	2.3	2.3	2.2	2.1	2.0	2.0	2.2
Fixed Income - Aggregate	23.8	28.9	34.2	38.4	38.7		26.1	26.8	28.9	29.0	28.6	25.8	25.3	25.9	25.2	25.5
Commodities							0.7	0.7	0.6	0.7	0.7	0.6	0.7	0.5	0.6	0.6
Infrastructure	1.4	0.6					0.4	0.3	0.2	0.2	0.2	0.6	0.4	0.3	0.3	0.3
Natural Resources							0.7	0.7	0.6	0.5	0.4	1.2	0.9	0.6	0.5	0.4
REITs	1.6	1.0					1.3	0.9	0.9	1.0	1.0	1.0	0.8	0.8	0.9	0.7
Real Estate ex-REITs	6.0	5.3	4.2	3.8	3.9		7.7	8.0	7.6	6.7	6.0	7.0	7.8	7.3	6.5	6.1
Other Real Assets							0.5	0.9	0.3	0.3	0.2	0.6	0.9	0.7	0.5	0.4
Real Assets	9.1	6.9	4.2	3.8	3.9		11.3	11.5	10.1	9.4	8.4	11.1	11.5	10.2	9.4	8.5
Hedge Funds	11.0	11.5	11.8	12.8	16.2		4.8	5.0	5.0	4.4	4.3	5.0	5.2	5.5	5.4	5.2
Global TAA	6.8	7.0	7.5	7.5	6.5		0.6	0.5	0.6	0.8	0.7	0.9	1.6	1.3	2.1	1.3
Risk Parity							0.6	0.6	0.5	0.5	0.5	1.0	0.6	0.3	0.3	0.2
Diversified Private Equity	8.0	9.7	8.9	9.3	9.6		6.6	6.6	6.2	5.9	6.2	5.6	6.2	5.5	5.5	5.7
Venture Capital							0.4	0.4	0.4	0.3	0.2	0.4	0.4	0.5	0.4	0.4
LBO							1.7	1.6	1.4	1.4	0.9	1.5	1.3	1.6	1.4	1.3
Private Credit	5.8	5.8	5.5	5.7	5.9		0.8	0.9	0.6	0.6	0.6	0.8	0.7	0.5	0.5	0.2
Other Private Equity							0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2
Private Equity	13.9	15.4	14.5	15.0	15.5		9.6	9.5	8.7	8.2	8.0	8.5	8.8	8.4	8.1	7.7
Derivatives/Overlays Mkt Value	3.1	2.9	2.2	4.1	5.8		0.4	0.4	0.3	0.3	0.6	0.7	0.5	0.4	0.4	0.4
Total Fund	100	100	100	100	100		100	100	100	100	100	100	100	100	100	100
Count	1	1	1	1	1		19	19	19	19	19	60	60	64	68	68
Median Assets (\$ billions)	30.5	28.0	29.4	29.2	28.6		32.1	29.0	27.7	28.0	26.8	22.9	17.2	16.6	16.4	15.7

1. Your asset mix is based on average assets rather than year-end.

Policy mix

Policy asset mix - 2013 to 2017 (as a % of total assets)

	Your fund %					Peer average %					U.S. Public average %				
	2017	2016	2015	2014	2013	2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
Stock - U.S. Broad/All	14.6					15.8	14.0	16.0	15.0	16.2	10.3	10.1	10.2	9.5	10.7
Stock - U.S. Large Cap						5.2	6.7	5.5	6.7	6.2	8.2	9.6	9.9	11.1	9.6
Stock - U.S. Mid Cap						0.5	0.5	0.3	0.3	0.1	0.4	0.4	0.4	0.3	0.2
Stock - U.S. Small Cap						0.3	0.3	0.4	0.5	1.1	1.2	1.5	1.6	1.6	2.1
Stock - EAFE						2.8	2.8	3.6	3.5	4.8	4.2	4.9	5.0	5.7	7.2
Stock - Global	17.3	37.2	34.0	31.0	31.0	8.4	9.5	10.1	9.8	7.5	10.9	9.0	9.0	7.8	8.2
Stock - Other						0.2	0.3	0.2	0.2	0.3	0.8	0.6	0.8	0.7	0.7
Stock - Emerging	4.9					1.8	1.4	1.0	0.8	1.3	2.4	2.2	2.2	2.2	2.3
Stock - ACWI x U.S.	3.0					11.2	10.9	10.5	10.9	11.0	7.8	8.3	8.9	9.1	7.5
Stock - Aggregate	39.8	37.2	34.0	31.0	31.0	46.3	46.5	47.5	47.8	48.6	46.3	46.5	48.2	47.9	48.5
Fixed Income - U.S.	10.0	10.3	10.0	7.0	7.0	17.2	17.4	18.8	19.3	19.5	14.8	15.0	15.8	15.7	17.5
Fixed Income - U.S. Gov't						1.6	1.6	1.6			1.1	0.7	0.5	0.4	0.4
Fixed Income - U.S. Credits													0.2		
Fixed Income - EAFE											0.1	0.1	0.1	0.1	0.2
Fixed Income - Global				3.0	3.0	0.8	0.8	0.6	1.6	1.6	1.6	1.8	1.5	1.9	1.4
Fixed Income - Other						1.1	1.6	1.4	0.9	1.3	0.7	0.7	0.5	0.6	0.7
Fixed Income - Long Bonds						0.4	0.4	0.4	0.4	0.4	2.1	1.7	1.5	1.5	1.2
Fixed Income - Emerging	5.0	5.2	5.0	6.0	6.0	1.2	1.3	1.1	0.9	0.9	1.1	0.9	0.9	0.9	0.7
Fixed Income - Inflation Indexed						1.7	2.1	2.2	2.7	2.8	2.7	2.7	2.6	2.6	2.7
Fixed Income - High Yield	7.0	6.8	5.0	6.0	6.0	1.4	1.3	1.3	1.9	2.0	1.9	1.9	1.8	1.8	2.0
Fixed Income - Mortgages											0.0	0.1	0.1	0.0	0.0
Fixed Income - Private Debt						0.8	0.5	0.5	0.3	0.0	0.4	0.4	0.4	0.2	0.1
Fixed Income - Absolute Return Bonds															
Fixed Income - Bundled LDI															
Fixed Income - Convertibles															
Cash	3.0	2.1	2.0	5.0	5.0	0.8	0.7	0.7	1.0	1.0	-1.0	-0.9	-0.9	-0.7	-0.1
Fixed Income - Aggregate	25.0	24.3	22.0	27.0	27.0	27.1	27.7	28.7	28.9	29.5	25.6	25.1	24.9	24.9	26.8
Commodities			3.0	3.0	3.0	0.7	0.8	1.0	1.1	1.0	1.0	1.3	1.0	1.1	1.0
Infrastructure	2.0	1.0				0.4	0.3	0.2	0.2	0.1	0.8	0.6	0.3	0.4	0.4
Natural Resources						0.5	0.7	0.5	0.4	0.4	1.1	1.0	0.7	0.5	0.7
REITs	2.3	0.7				0.8	0.7	0.5	0.8	0.8	0.8	0.6	0.6	0.6	0.6
Real Estate ex-REITs	5.7	6.5	5.0	5.0	5.0	8.5	7.9	7.6	7.1	6.6	7.8	7.7	7.4	7.5	7.0
Other Real Assets						1.2	1.3	0.4	0.6	0.5	0.8	1.1	0.8	0.8	0.4
Real Assets	10.0	8.2	8.0	8.0	8.0	12.2	11.7	10.3	10.2	9.4	12.2	12.2	10.9	10.9	10.1
Hedge Funds	2.0	4.1	10.0	8.0	8.0	3.4	3.3	3.4	3.0	2.8	4.7	4.6	4.9	5.1	4.4
Global TAA	10.0	10.3	10.0	10.0	10.0	0.7	0.9	0.9	0.9	0.9	0.9	1.5	1.4	1.7	1.2
Risk Parity						0.6	0.6	0.6	0.5	0.5	0.9	0.6	0.4	0.4	0.2
Diversified Private Equity	7.2	9.2	9.0	9.0	9.0	7.5	6.7	6.5	6.9	6.6	7.1	7.0	7.0	7.4	7.2
Venture Capital						0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.2
LBO						0.9	1.3	1.3	0.9	0.9	0.9	1.2	1.5	0.9	1.1
Private Credit	6.0	6.6	7.0	7.0	7.0	0.9	0.9	0.7	0.7	0.7	1.0	0.7	0.5	0.5	0.2
Other Private Equity						0.1	0.0	0.0			0.1	0.2	0.1	0.1	0.1
Private Equity	13.2	15.8	16.0	16.0	16.0	9.6	9.2	8.7	8.6	8.3	9.4	9.4	9.3	9.2	8.9
Total Fund	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count	1	1	1	1	1	19	19	19	19	19	60	60	64	68	68

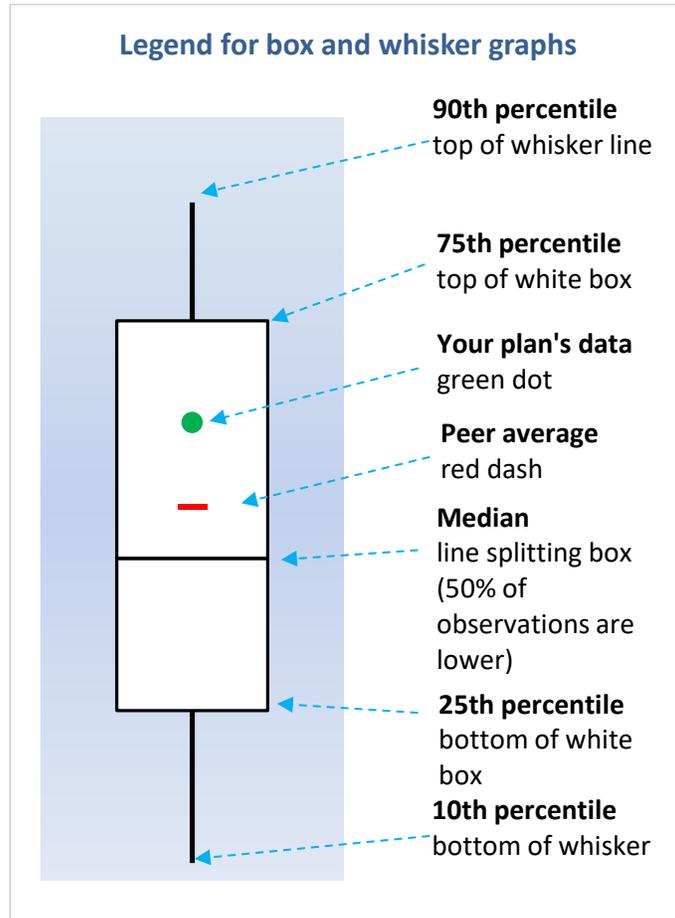
3

Returns, Benchmarks and Value Added

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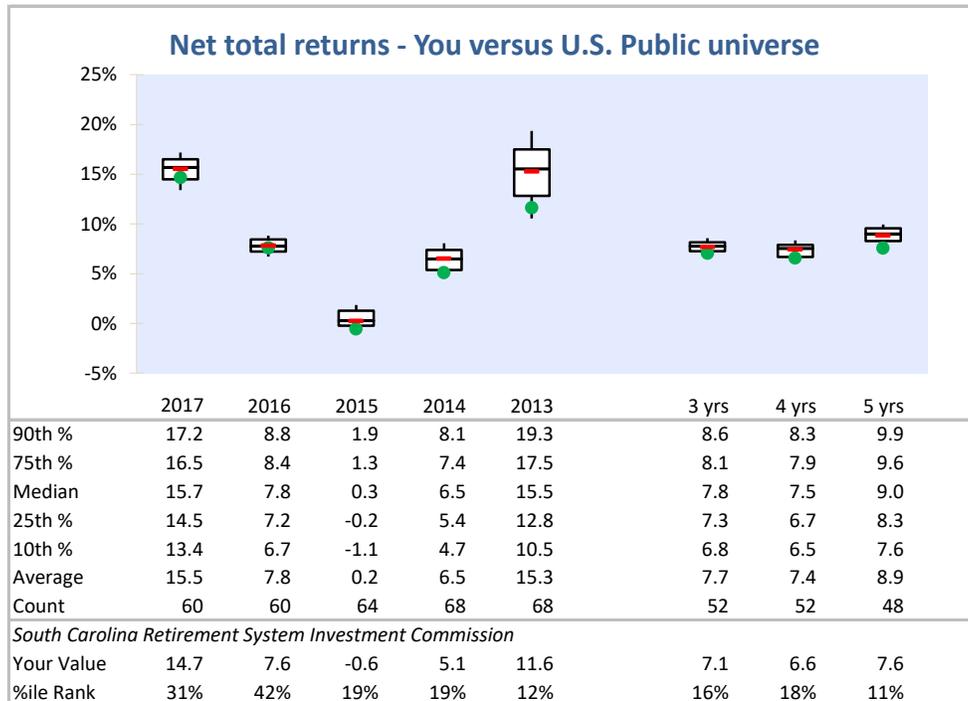
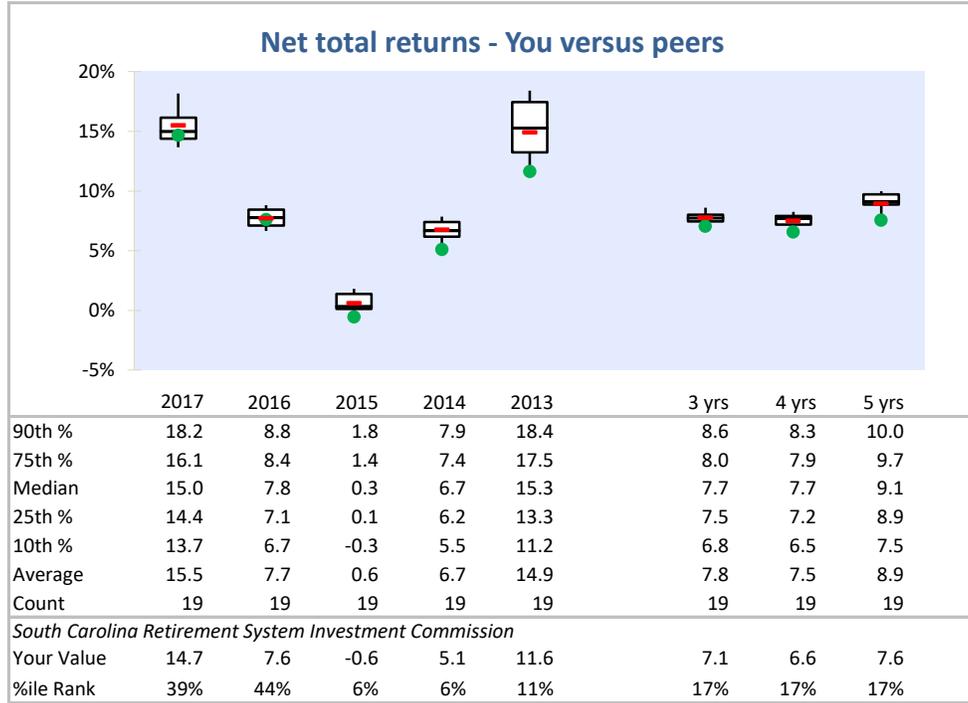
Interpreting box and whisker graphs

Box and whisker graphs are used extensively in this report because they show visually where you rank relative to all observations. At a glance you can see which quartile your data falls in.



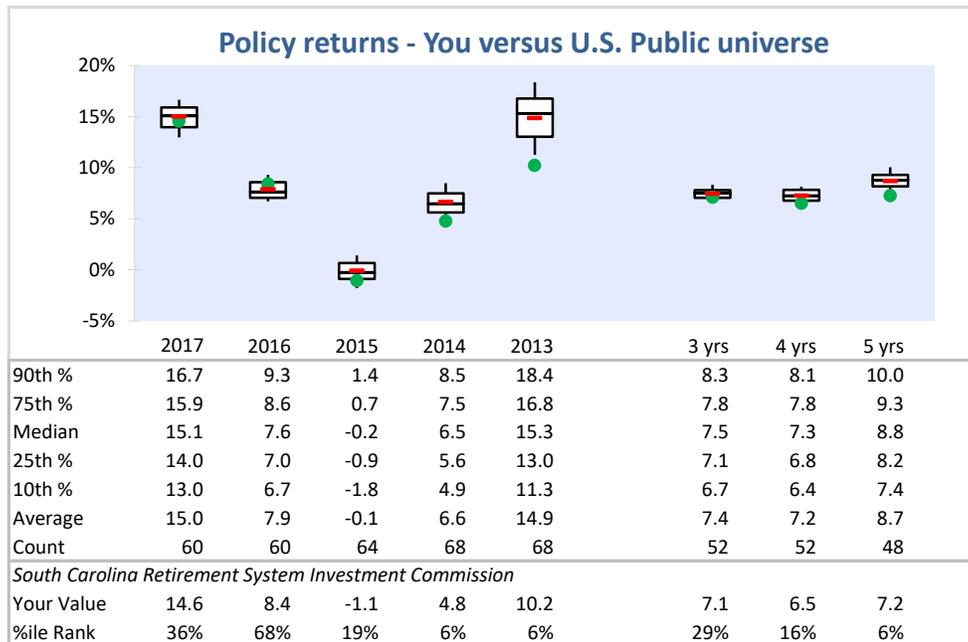
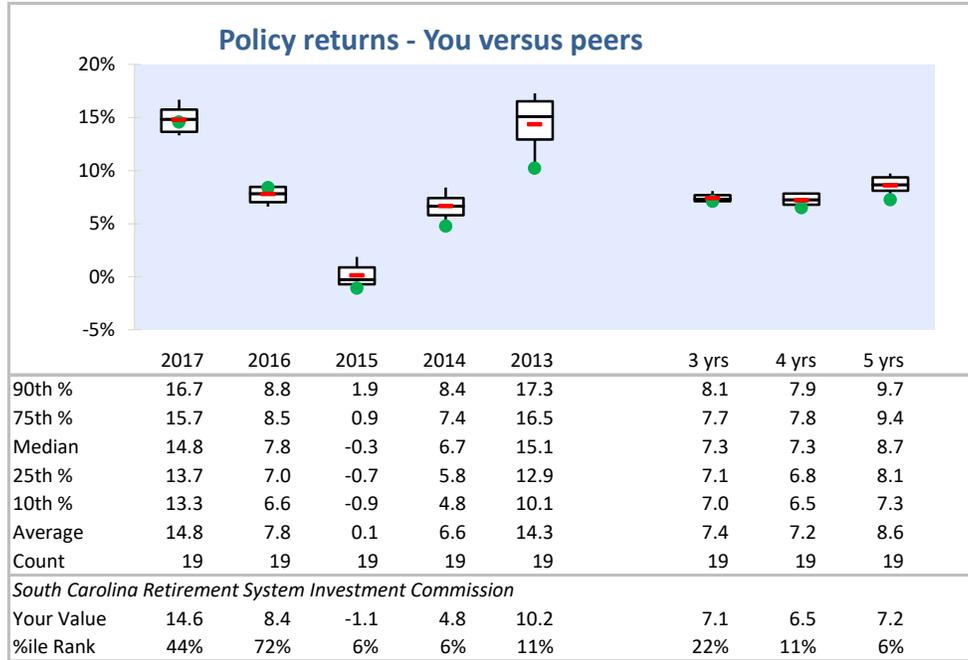
Net total returns

Your 5-year net total return of 7.6% was below the peer median and below the median of the U.S. Public universe. Comparisons of total return do not help you understand the reasons behind relative performance. To understand the relative contributions from policy asset mix decisions and implementation decisions we separate total return into its more meaningful components - policy return and implementation value added.



Policy returns

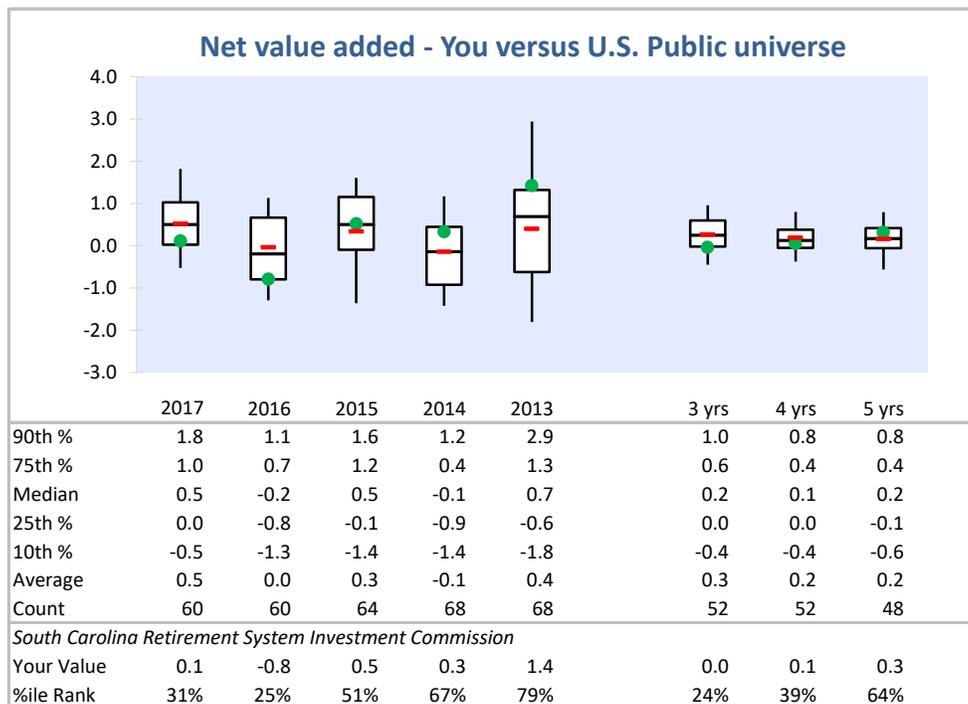
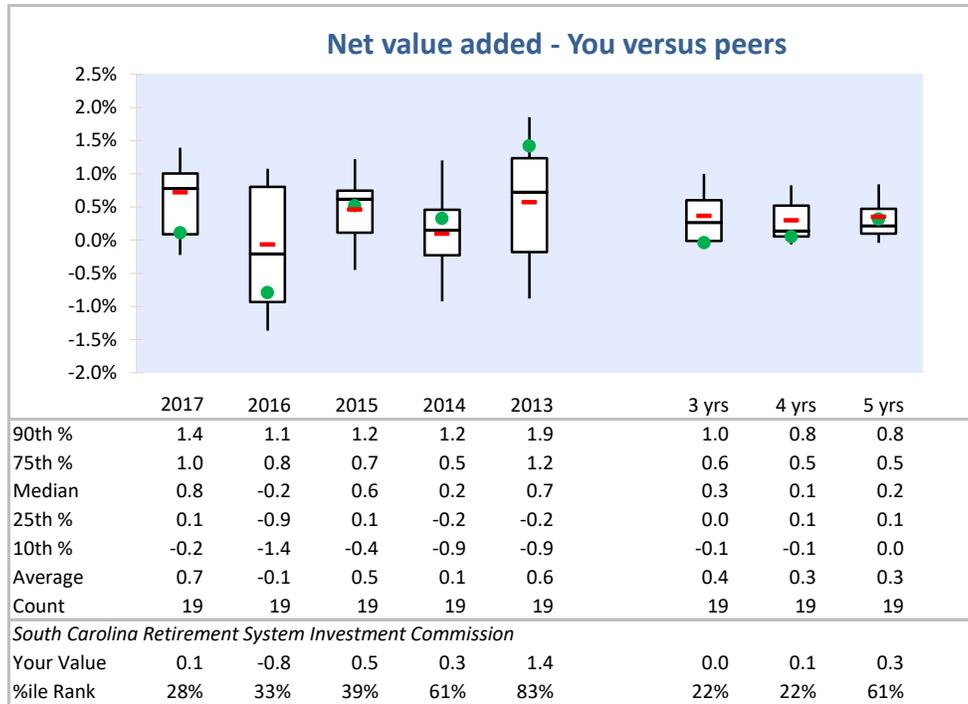
Your 5-year policy return of 7.2% was below the peer median and below the median of the U.S. Public universe. Policy return is the return you would have earned had you passively implemented your policy asset mix decision through your benchmark portfolios.



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. Since the policy return for private equity includes your private equity style private debt, we cannot accurately estimate the difference on your total fund policy or total fund value added if you used our benchmark.

Net value added

Your 5-year net value added of 0.3% was above the peer median and above the median of the U.S. Public universe. Net value added is the difference between your net total return and your policy return.



Net returns by asset class

Asset class	Your fund %						Peer average %						U.S. Public average %					
	2017	2016	2015	2014	2013	5-yr ¹	2017	2016	2015	2014	2013	5-yr ¹	2017	2016	2015	2014	2013	5-yr ¹
Stock - U.S. Broad/All	14.3	9.5	-14.0	8.6	35.6	9.7	20.5	9.7	-0.7	10.5	33.9	13.9	20.3	11.1	-0.4	11.0	33.3	14.6
Stock - U.S. Large Cap							22.1	11.2	1.2	13.2	33.1	15.6	22.2	11.2	0.9	12.7	33.6	15.6
Stock - U.S. Mid Cap							18.3	16.5	-3.1	10.0	36.0	14.0	18.6	13.0	-2.7	8.7	38.0	14.0
Stock - U.S. Small Cap							15.1	17.9	-3.4	5.1	39.9	14.1	15.6	18.4	-3.7	5.0	39.0	14.2
Stock - EAFE				-5.1	14.7		25.3	3.3	0.5	-2.0	22.8	9.3	25.7	2.9	0.1	-3.5	23.2	9.1
Stock - Global	24.1	6.1	-0.4				24.7	7.8	-0.6	5.4	26.8	12.4	29.4	7.3	-0.9	3.7	24.2	12.5
Stock - Other							18.4	13.2	-9.6	-2.1	15.9	4.5	15.3	11.5	-6.0	3.1	18.7	7.5
Stock - Emerging	37.6	10.1	-15.9	-0.3	-3.2	4.2	36.0	12.4	-15.0	-2.0	-1.5	4.7	36.7	10.6	-13.6	-1.3	-1.5	5.0
Stock - ACWI x U.S.	31.1	5.1					29.7	3.6	-2.5	-3.6	19.3	8.5	28.6	3.5	-2.7	-3.7	19.1	7.9
Stock - Aggregate	23.9	7.4	-5.4	4.0	18.9	9.2	24.6	9.0	-1.3	5.4	27.3	12.4	24.7	9.0	-1.7	5.0	26.7	12.1
Fixed Income - U.S.	5.0	3.8	0.5	5.1	-1.7	2.5	4.7	3.8	0.4	6.2	-1.4	2.7	4.3	3.8	0.2	5.8	-1.5	2.4
Fixed Income - U.S. Gov't							1.8	-0.3	0.9	1.0			4.6	0.7	1.0	4.5	-5.0	
Fixed Income - U.S. Credits							6.5	6.0	-1.8	4.4			6.5	6.0	-2.2	6.5	-1.2	
Fixed Income - EAFE													9.6	3.8	-8.1	-1.3	-3.1	-0.7
Fixed Income - Global			-0.6	2.7	-1.5		5.1	3.2	0.1	6.2	-0.5	2.7	12.5	5.8	-2.0	3.7	-0.6	4.2
Fixed Income - Other							5.6	8.2	-0.6	4.7	15.5	4.9	26.5	14.2	0.3	5.6	9.5	17.4
Fixed Income - Long Bonds							10.5	7.1	-3.9	20.0			9.8	3.4	-3.8	22.3	-7.5	4.1
Fixed Income - Emerging	13.7	11.7	-6.4	0.1	-8.7	1.7	13.0	10.8	-5.7	-0.1	-8.1	2.0	12.5	10.7	-5.3	-0.8	-7.7	2.1
Fixed Income - Inflation Indexed							3.9	5.6	-1.8	4.8	-7.3	1.1	3.6	5.7	-1.7	4.6	-7.8	0.9
Fixed Income - High Yield	6.1	8.9	-1.3	1.2	6.5	4.2	7.2	11.4	-2.7	2.0	6.6	5.2	7.1	12.5	-3.2	3.3	7.1	5.5
Fixed Income - Mortgages							10.1	2.3	2.2	5.5			5.2	2.9	3.8	7.2	5.6	5.5
Fixed Income - Private Debt							8.2	6.8	-1.2	6.1	8.4	4.4	7.1	6.3	2.4	7.1	8.1	4.5
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI																		
Fixed Income - Convertibles							12.4						10.9					
Cash	0.6	0.4	0.1	0.2	1.1	0.5	0.9	0.8	0.4	0.2	0.3	0.5	0.9	1.3	0.0	0.4	0.2	0.5
Fixed Income - Aggregate	5.9	5.4	-1.0	1.6	0.0	2.3	5.2	4.7	-0.3	5.3	-1.2	2.7	5.1	4.7	-0.6	5.4	-1.4	2.4
Commodities							0.7	11.3	-26.1	-17.3	-6.8	-9.1	6.7	12.4	-26.5	-16.6	-7.9	-8.9
Infrastructure	15.0	-5.7					10.5	5.7	-2.3	13.9	7.0	7.4	11.9	9.0	4.3	15.8	10.0	9.9
Natural Resources							8.5	7.8	-2.9	10.2	8.6	6.0	6.9	6.4	-5.4	11.7	7.4	5.3
REITs	7.9	-5.0					9.8	2.9	1.9	19.3	5.3	7.7	8.7	4.8	2.2	20.2	4.4	8.0
Real Estate ex-REITs	9.7	1.4	15.5	19.4	21.1	13.2	8.9	9.0	13.9	13.2	12.1	11.4	8.4	8.2	12.8	12.6	12.6	10.8
Other Real Assets							4.9	13.7	-22.4	6.3	14.8	0.8	2.9	12.5	-13.1	4.6	10.8	1.9
Real Assets	10.2	-0.1	15.5	19.4	21.1	13.0	8.4	7.9	8.2	12.0	9.9	9.2	7.8	8.1	7.2	11.3	9.9	9.0
Hedge Funds	6.0	0.2	0.0	3.0	11.5	4.0	4.8	1.9	0.1	3.7	10.1	3.3	6.0	1.5	-0.6	4.1	10.1	3.6
Global TAA	11.3	7.8	-5.2	4.8	3.4	4.3	15.1	8.0	-5.3	5.8	1.2	4.8	12.6	7.5	-3.6	5.3	1.9	4.7
Risk Parity							12.4	11.8	-8.1	6.8	-2.7	3.7	13.7	12.5	-9.5	7.9	-2.6	4.5
Diversified Private Equity	13.8	10.6	4.0	17.0	21.4	13.2	17.4	9.3	8.0	17.0	16.7	13.6	17.0	9.0	8.3	15.6	16.5	13.3
Venture Capital							13.7	1.2	13.4	16.0	6.7	9.8	11.4	4.4	14.3	18.7	14.6	12.8
LBO							18.2	11.7	6.7	14.9	17.2	15.2	19.8	14.2	10.2	14.7	16.5	14.0
Private Credit	6.9	8.8	0.6	10.5	15.5	8.4	11.8	8.9	4.5	11.2	14.5	9.8	10.6	7.9	5.0	10.6	14.5	9.8
Other Private Equity							14.5	4.1	2.6	8.7	15.0	8.6	10.4	8.4	8.3	16.4	16.0	11.7
Private Equity	10.9	9.9	2.7	14.5	19.0	11.3	17.5	9.1	8.5	17.0	16.6	13.7	17.0	9.2	9.0	15.5	16.3	13.4
Total Fund Return	14.7	7.6	-0.6	5.1	11.6	7.6	15.5	7.7	0.6	6.7	14.9	8.9	15.5	7.8	0.2	6.5	15.3	8.9

You were not able to provide full year returns for all of the components of returns of asset classes with values shown in italics. The composite calculation only uses those components with a full year return.

1. The 5-year return number only includes funds with continuous data over the last 5 years.

Benchmark returns by asset class

Asset class	Your fund %						Peer average %						U.S. Public average %					
	2017	2016	2015	2014	2013	5-yr ¹	2017	2016	2015	2014	2013	5-yr ¹	2017	2016	2015	2014	2013	5-yr ¹
Stock - U.S. Broad/All	20.6	11.8	0.5	12.6	33.6	15.3	21.8	12.3	0.9	12.7	33.3	15.7	21.7	12.4	0.7	12.7	33.2	15.7
Stock - U.S. Large Cap							21.6	12.2	1.1	13.3	32.8	15.7	21.5	12.4	1.0	13.2	32.9	15.7
Stock - U.S. Mid Cap							19.9	13.7	-1.8	11.2	35.7	15.3	18.9	12.5	-2.0	10.8	34.4	15.3
Stock - U.S. Small Cap							15.9	19.7	-3.5	5.9	38.9	14.5	15.3	20.1	-3.4	6.0	37.9	14.4
Stock - EAFE				-4.9	22.8		25.0	2.3	-0.2	-4.2	22.9	8.5	25.0	2.3	-1.0	-4.2	22.1	8.1
Stock - Global	22.4	8.2	-2.4	4.2	22.8	10.6	23.9	8.1	-1.9	4.6	23.9	11.2	24.2	7.9	-1.7	3.4	22.2	10.8
Stock - Other							16.4	15.0	-10.2	-2.0	12.9	4.4	15.8	8.7	-6.7	1.1	19.1	7.0
Stock - Emerging	36.8	11.2	-14.9	-2.2	-2.6	4.3	37.0	11.3	-15.0	-2.1	-2.7	4.3	37.1	10.9	-14.5	-1.9	-1.7	4.5
Stock - ACWI x U.S.	22.4	4.5					27.6	4.3	-5.0	-3.8	16.2	7.2	27.7	4.5	-4.8	-3.7	16.4	7.3
Stock - Aggregate	23.5	8.2	-2.4	4.2	22.8	10.8	23.9	9.3	-1.6	5.5	25.6	12.0	23.9	9.4	-2.0	5.1	25.5	11.9
Fixed Income - U.S.	5.0	2.7	0.6	6.0	-2.0	2.4	3.9	2.9	0.4	6.1	-2.0	2.2	3.8	2.8	0.4	6.1	-2.1	2.2
Fixed Income - U.S. Gov't							2.3	-0.2	0.7	0.8			4.3	0.8	0.8	4.5	-3.9	
Fixed Income - U.S. Credits							3.7	3.7	0.2	5.8			3.7	3.7	-0.7	6.3	-2.0	
Fixed Income - EAFE													8.4	6.1	-6.0	-3.0	-3.8	-0.5
Fixed Income - Global			1.0	7.6	-0.1		3.3	3.7	0.4	4.9	-1.6	1.7	5.0	4.8	-0.9	3.6	-1.7	2.1
Fixed Income - Other							4.2	7.8	-1.2	5.9	6.7	3.8	4.2	6.6	0.4	5.8	5.1	3.8
Fixed Income - Long Bonds							10.4	5.8	-2.8	20.5	-9.5	4.4	8.9	3.2	-1.9	20.1	-9.9	3.7
Fixed Income - Emerging	12.7	10.2	-7.1	0.7	-7.1	1.5	12.2	10.1	-4.0	0.0	-6.8	2.0	11.7	9.8	-4.9	0.2	-6.4	2.3
Fixed Income - Inflation Indexed							3.5	5.4	-1.9	5.0	-5.8	1.0	3.3	5.6	-1.7	4.7	-6.7	0.9
Fixed Income - High Yield	5.8	12.3	-1.2	3.4	3.7	4.7	7.3	15.5	-3.7	2.6	6.7	5.5	7.0	15.4	-3.9	2.3	6.6	5.4
Fixed Income - Mortgages								2.3	2.2	6.1	0.7		3.0	2.9	2.0	4.4	0.2	2.3
Fixed Income - Private Debt							8.3	11.9	0.4	8.3	9.5	8.1	7.5	10.1	-0.1	4.6	6.5	5.4
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI																		
Fixed Income - Convertibles							13.7						17.1					
Cash	0.9	0.3	0.1	0.5	0.1	0.4	0.8	0.3	0.0	0.1	0.2	0.3	1.0	0.4	0.1	0.2	0.1	0.4
Fixed Income - Aggregate	6.3	6.7	-1.6	3.4	-1.3	2.6	4.4	4.4	-0.3	5.4	-1.8	2.4	5.3	4.9	-0.3	7.2	-2.5	2.8
Commodities			-24.7	-17.0	-9.5		2.4	10.4	-20.6	-15.0	-8.5	-8.8	3.0	10.9	-22.8	-16.6	-4.7	-8.4
Infrastructure	15.8	12.5					8.9	7.8	3.3	5.5	3.3	5.0	8.8	6.9	5.0	6.4	6.6	6.5
Natural Resources							7.5	6.6	0.2	5.1	6.8	4.6	6.5	6.8	-0.5	7.0	7.5	5.2
REITs	5.2	8.5					8.9	7.0	3.7	23.4	3.3	8.6	8.2	6.7	2.9	21.1	3.2	8.2
Real Estate ex-REITs	8.4	10.8	15.7	13.2	13.8	12.3	7.2	9.0	13.5	11.4	11.6	10.8	6.6	8.5	13.7	11.8	11.6	10.6
Other Real Assets							2.8	10.5	-14.3	6.8	13.1	2.4	1.9	12.4	-10.0	4.7	10.1	2.5
Real Assets	9.2	10.8	0.6	1.8	5.1	5.4	6.7	8.8	8.3	8.8	8.9	8.3	6.2	8.8	7.4	9.0	9.2	8.1
Hedge Funds	12.6	3.3	-1.1	3.0	9.1	5.3	7.0	3.8	2.2	4.2	8.5	5.3	7.1	3.2	1.3	4.0	9.3	4.7
Global TAA	12.6	7.9	-2.0	2.3	10.4	6.1	10.7	7.5	1.9	4.0	8.5	6.1	12.9	5.9	1.3	5.0	10.4	6.9
Risk Parity							12.4	11.8	-8.1	6.8	-2.7	3.7	14.4	9.8	-3.7	6.3	3.7	5.8
Diversified Private Equity ¹	21.9	16.3	0.9	18.0	25.1	16.1	18.7	9.7	2.1	19.1	28.4	15.1	17.5	10.3	2.6	16.9	29.8	15.1
Venture Capital ¹							17.0	10.4	3.1	16.0	30.6	15.2	17.6	10.4	3.2	15.6	31.0	15.0
LBO ¹							16.6	10.7	2.7	16.0	30.6	15.2	17.7	10.0	3.2	16.0	30.8	15.0
Private Credit ¹	6.8	7.0	2.4	5.4	6.5	5.6	14.9	8.0	4.0	12.4	23.3	11.8	16.8	10.5	4.8	11.3	23.3	11.8
Other Private Equity ¹							17.2	9.4	4.6	12.4	33.1	15.6	19.0	8.2	3.6	13.6	31.6	14.9
Private Equity	15.0	12.4	1.5	12.4	17.0	11.5	18.2	9.4	2.4	18.4	28.3	14.9	17.6	10.0	2.7	16.9	29.7	15.0
Total Policy Return	14.6	8.4	-1.1	4.8	10.2	7.2	14.8	7.8	0.1	6.6	14.3	8.6	15.0	7.9	-0.1	6.6	14.9	8.7

1. The 5-year return number only includes funds with continuous data over the last 5 years.

2. 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. Since the policy return for private equity includes your private equity style private debt, we cannot accurately estimate the difference on your total fund policy or total fund value added if you used our benchmark.

Net value added by asset class

Asset class	Your fund %						Peer average %						U.S. Public average %						
	2017	2016	2015	2014	2013	5-yr ¹	2017	2016	2015	2014	2013	5-yr ¹	2017	2016	2015	2014	2013	5-yr ¹	
Stock - U.S. Broad/All	-6.3	-2.3	-14.5	-3.9	2.1	-5.6	-1.3	-2.5	-1.7	-2.1	0.5	-1.8	-1.5	-1.2	-1.2	-1.7	0.1	-1.1	
Stock - U.S. Large Cap							0.5	-0.9	0.1	-0.1	0.2	-0.1	0.7	-1.2	-0.1	-0.5	0.6	-0.1	
Stock - U.S. Mid Cap							-1.6	2.8	-1.3	-1.2	0.3	-1.3	-0.3	0.5	-0.7	-2.2	3.6	-1.3	
Stock - U.S. Small Cap							-0.8	-1.8	0.1	-0.8	1.0	-0.4	0.3	-1.6	-0.3	-1.0	1.1	-0.2	
Stock - EAFE				-0.2	-8.1		0.3	0.9	0.7	0.6	-0.1	0.7	0.7	0.6	1.3	0.3	1.2	1.0	
Stock - Global	1.7	-2.1	1.9				0.8	-0.3	1.3	0.8	2.8	1.0	5.0	-0.4	0.6	0.5	2.2	1.8	
Stock - Other							0.3	-1.8	0.7	-0.1	3.0	0.1	-2.0	2.0	0.7	2.3	-0.8	1.3	
Stock - Emerging	0.7	-1.1	-1.0	1.9	-0.7	-0.1	-1.0	1.2	0.0	0.1	1.2	0.4	-0.5	-0.6	0.8	0.6	0.2	0.4	
Stock - ACWI x U.S.	8.7	0.6					1.9	-0.5	2.7	0.2	3.7	1.4	0.8	-0.9	2.2	0.0	2.9	0.8	
Stock - Aggregate	0.4	-0.9	-3.1	-0.2	-3.9	-1.6	0.6	-0.3	0.3	-0.1	1.7	0.4	0.8	-0.4	0.3	-0.1	1.2	0.3	
Fixed Income - U.S.	0.0	1.1	0.0	-0.9	0.3	0.1	0.8	0.9	-0.1	0.2	0.6	0.5	0.5	1.0	-0.2	-0.3	0.5	0.2	
Fixed Income - U.S. Gov't							-0.5	-0.2	0.1	0.2			0.3	-0.1	0.2	0.0	0.1		
Fixed Income - U.S. Credits							1.4	2.3	-2.0	-1.4			1.4	2.3	-1.4	0.2	0.8		
Fixed Income - EAFE													1.2	-2.3	-2.1	1.7	0.9	0.1	
Fixed Income - Global			-1.7	-4.9	-1.4		1.8	-0.5	-0.3	0.5	0.7	0.6	7.5	1.0	-1.2	0.0	0.9	1.8	
Fixed Income - Other							1.4	-0.1	0.6	-0.3	3.0	0.6	22.2	7.7	-0.2	0.2	2.9	13.7	
Fixed Income - Long Bonds							0.1	1.3	-1.1	-0.4			0.9	-0.6	-1.8	3.3	1.5	0.3	
Fixed Income - Emerging	0.9	1.6	0.7	-0.6	-1.6	0.1	0.8	0.7	-1.0	-0.1	-1.3	-0.1	0.8	0.9	-0.1	-1.0	-1.3	-0.2	
Fixed Income - Inflation Indexed							0.4	0.2	0.1	-0.3	-1.5	0.1	0.4	0.1	0.0	-0.3	-0.9	0.0	
Fixed Income - High Yield	0.3	-3.4	-0.1	-2.2	2.8	-0.5	-0.2	-4.1	0.8	-0.6	0.1	-0.3	0.1	-3.1	0.9	0.7	0.4	-0.1	
Fixed Income - Mortgages								0.0	0.0	-0.6			1.2	0.0	1.8	2.8	5.5	2.9	
Fixed Income - Private Debt							0.2	-3.6	1.2	-2.2	-1.0	0.1	-0.6	-3.0	2.9	1.9	1.8	0.3	
Fixed Income - Absolute Return Bonds																			
Fixed Income - Bundled LDI																			
Fixed Income - Convertibles							-1.3						-6.1						
Cash	-0.2	0.1	0.0	-0.3	1.0	0.1	0.1	0.5	0.3	0.2	0.2	0.2	-0.2	0.9	0.0	0.1	0.1	0.2	
Fixed Income - Aggregate	-0.4	-1.4	0.7	-1.8	1.2	-0.3	0.8	0.3	0.0	-0.1	0.6	0.3	-0.2	-0.2	-0.3	-1.8	1.1	-0.4	
Commodities							-1.6	-1.7	0.0	2.1	1.4	-0.3	3.4	1.1	-3.5	1.5	-3.1	-0.9	
Infrastructure	-0.8	-18.3					1.6	-2.1	-5.6	8.3	3.7	2.5	3.0	2.1	-0.7	8.7	3.4	3.6	
Natural Resources							1.0	1.2	-3.1	5.2	1.8	1.4	0.5	-0.5	-4.5	4.7	-1.2	-0.3	
REITs	2.7	-13.5					0.9	-4.0	-1.8	-4.1	1.7	-0.8	0.5	-1.8	-0.8	-1.0	1.1	-0.4	
Real Estate ex-REITs	1.3	-9.4	-0.1	6.3	7.3	0.9	1.7	0.1	0.5	1.9	0.5	0.6	1.9	-0.2	-0.8	0.8	1.0	0.2	
Other Real Assets							2.1	3.2	-8.1	-0.5	1.7	-1.6	1.0	-0.4	-3.1	0.5	-0.5	-0.6	
Real Assets	1.1	-10.9	15.0	17.6	16.0	7.6	1.6	-0.8	-0.2	3.2	1.0	1.0	1.7	-0.6	-0.2	2.3	0.7	0.9	
Hedge Funds	-6.6	-3.1	1.1	0.0	2.4	-1.2	-1.9	-1.8	-2.1	-0.9	1.6	-1.4	-1.2	-1.7	-1.9	0.0	0.6	-1.0	
Global TAA	-1.3	-0.1	-3.2	2.6	-7.0	-1.8	4.4	0.5	-7.2	1.8	-7.3	-1.3	-0.3	1.5	-4.9	0.3	-8.4	-2.2	
Risk Parity							0.0	0.0	0.0	0.0	0.0	0.0	-0.6	2.7	-7.0	0.6	-6.4	-1.3	
Diversified Private Equity ¹	-8.0	-5.7	3.2	-1.0	-3.7	-2.9	-1.6	-0.1	5.8	-2.1	-11.7	-1.6	-0.6	-1.1	5.5	-1.3	-13.2	-1.8	
Venture Capital ¹							-3.7	-8.1	9.3	1.1	-24.8	-5.5	-6.3	-5.9	10.6	3.8	-16.5	-2.2	
LBO ¹							1.3	1.8	3.3	0.0	-14.2	0.0	2.0	4.7	6.7	-0.6	-14.5	-1.1	
Private Credit ¹	0.1	1.9	-1.8	5.1	9.0	2.8	-3.2	0.2	1.6	-1.2	-8.8	-2.0	-6.3	-3.2	2.5	-2.4	-8.8	-2.0	
Other Private Equity ¹							-2.7	-5.7	-7.2	-3.7	-18.1	-7.1	-8.7	0.3	4.4	3.4	-16.1	-3.2	
Private Equity	-4.1	-2.4	1.2	2.0	2.0	-0.3	-0.8	-0.1	5.9	-1.4	-11.7	-1.2	-0.7	-0.8	6.2	-1.3	-13.3	-1.5	
Total fund	0.1	-0.8	0.5	0.3	1.4	0.3	0.7	-0.1	0.5	0.1	0.6	0.3	0.5	0.0	0.3	-0.1	0.4	0.2	

Total net value add is determined by both actual and policy allocation. It is the outcome of total net return (page 6) minus total benchmark return (page 7). Aggregate net returns are an asset weighted average of all categories that the fund has an actual allocation to. Aggregate benchmark returns are a policy weighted average and includes only those categories that are part of your policy fund's mix.

You were not able to provide full year returns for all of the components of returns of asset classes with values shown in italics. The composite calculation only uses those components with a full year return.

1. The 5-year return number only includes funds with continuous data over the last 5 years.

2. 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. Since the policy return for private equity includes your private equity style private debt, we cannot accurately estimate the difference on your total fund policy or total fund value added if you used our benchmark.

Your policy return and value added calculation - 2017

2017 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Return	Net return	Value added
Stock - U.S. Broad/All	14.6%	MSCI US IMI Net	20.6%	14.3%	-6.3%
Stock - Global	17.3%	MSCI World Net Dividend	22.4%	24.1%	1.7%
Stock - Emerging	4.9%	MSCI Emerging Market IMI Net	36.8%	37.6%	0.7%
Stock - ACWI x U.S.	3.0%	MSCI ACWI x/US Net	22.4%	31.1%	8.7%
Fixed Income - U.S.	10.0%	Barclays US Aggregate	5.0%	5.0%	0.0%
Fixed Income - Emerging	5.0%	50% JPM EMBI Global Diversified/50% JPM-GBI-I	12.7%	13.7%	0.9%
Fixed Income - High Yield	7.0%	50%Bar U.S. High Yield 2% / 50%S&P LSTA Lever:	5.8%	6.1%	0.3%
Cash	3.0%	BofA Merrill Lynch 3 Month US Treasury Bill G00	0.9%	0.6%	-0.2%
Infrastructure	2.0%	Dow Jones Brookfield Global Infrastructure Net I	15.8%	15.0%	-0.8%
REITs	2.3%	Your REIT benchmark	5.2%	7.9%	2.7%
Real Estate ex-REITs	5.7%	NCREIF ODCE Index + 75 bps	8.4%	9.7%	1.3%
Hedge Funds	2.0%	50% MSCI World Net/50% Barclays US Aggregate	12.6%	6.0%	-6.6%
Global TAA	10.0%	50% MSCI World Net/50% Barclays US Aggregate	12.6%	11.3%	-1.3%
Diversified Private Equity	7.2%	80% Russell 3000 / 20% MSCI EAFE Lagged + 300	21.9%	13.8%	-8.0%
Private Credit	6.0%	S&P/LSTA + 150 Bps 3 Month Lag	6.8%	6.9%	0.1%
Total	100.0%				
Net Actual Return (reported by you)					14.7%
Calculated Policy Return = sum of (policy weights X benchmark returns)				15.3%	
Adjustment to reflect rebalancing and overlay impacts				<u>-0.8%</u>	
Policy Return (reported by you)					<u>14.6%</u>
Net Value Added (Net Return - Policy Return)					0.1%

Your policy return and value added calculations - 2013 to 2016

2016 Policy Return and Value Added

Asset class	Policy weight	Benchmark		Net return	Value added
		Description	Return		
Stock - U.S. Broad/All		MSCI US Net & I	11.8%	9.5%	-2.3%
Stock - Global	37.2%	MSCI ACWI Net	8.2%	6.1%	-2.1%
Stock - Emerging		MSCI Emerging I	11.2%	10.1%	-1.1%
Stock - ACWI x U.S.		MSCI ACWI x/U:	4.5%	5.1%	0.6%
Fixed Income - U.S.	10.3%	Barclays US Agg	2.7%	3.8%	1.1%
Fixed Income - Global					
Fixed Income - Emerging	5.2%	50% JPM EMBI (	10.2%	11.7%	1.6%
Fixed Income - High Yield	6.8%	50%Bar U.S. Hig	12.3%	8.9%	-3.4%
Cash	2.1%	BofA Merrill Lyn	0.3%	0.4%	0.1%
Commodities					
Infrastructure	1.0%	Dow Jones Broo	12.5%	-5.7%	-18.3%
REITs	0.7%	Your REIT bench	8.5%	-5.0%	-13.5%
Real Estate ex-REITs	6.5%	NCREIF ODCE In	10.8%	1.4%	-9.4%
Hedge Funds	4.1%	HFRI Fund Weig	3.3%	0.2%	-3.1%
Global TAA	10.3%	50% MSCI Work	7.9%	7.8%	-0.1%
Diversified Private Equity	9.2%	80% Russell 300	16.3%	10.6%	-5.7%
Private Credit	6.6%	S&P/LSTA + 150	7.0%	8.8%	1.9%
Total	100.0%				
Net Return (reported by you)					7.6%
Calculated policy return (sum: Policy weights x benchmarks)				8.5%	
Adjustment to reflect rebalancing and overlay impacts				<u>-0.1%</u>	
Policy return (reported by you)					<u>8.4%</u>
Net Value Added (Net Return - Policy Return)					-0.8%

2014 Policy Return and Value Added

Asset class	Policy weight	Benchmark		Net return	Value added
		Description	Return		
Stock - U.S. Broad/All		Russell 3000 (de	12.6%	8.6%	-3.9%
Stock - EAFE		MSCI EAFE net (	-4.9%	-5.1%	-0.2%
Stock - Global	31.0%	MSCI ACWI Net	4.2%		
Stock - Emerging		MSCI Emerging I	-2.2%	-0.3%	1.9%
Fixed Income - U.S.	7.0%	Barclays US Agg	6.0%	5.1%	-0.9%
Fixed Income - Global	3.0%		7.6%	2.7%	-4.9%
Fixed Income - Emerging	6.0%	50% JPM EMBI (	0.7%	0.1%	-0.6%
Fixed Income - High Yield	6.0%	33%BarCapUS C	3.4%	1.2%	-2.2%
Cash	5.0%	90 D T-Bill / Bart	0.5%	0.2%	-0.3%
Commodities	3.0%	Bloomberg Com	-17.0%		
Real Estate ex-REITs	5.0%	NCREIF ODCE In	13.2%	19.4%	6.3%
Hedge Funds	8.0%	HFRI Fund Weig	3.0%	3.0%	0.0%
Global TAA	10.0%	50% MSCI Work	2.3%	4.8%	2.6%
Diversified Private Equity	9.0%	80% Russell 300	18.0%	17.0%	-1.0%
Private Credit	7.0%	S&P/LSTA + 150	5.4%	10.5%	5.1%
Total	100.0%				
Net Return (reported by you)					5.1%
Calculated policy return (sum: Policy weights x benchmarks)				4.8%	
Adjustment to reflect rebalancing and overlay impacts				<u>0.0%</u>	
Policy return (reported by you)					<u>4.8%</u>
Net Value Added (Net Return - Policy Return)					0.3%

2015 Policy Return and Value Added

Asset class	Policy weight	Benchmark		Net return	Value added
		Description	Return		
Stock - U.S. Broad/All		Russell 3000	0.5%	-14.0%	-14.5%
Stock - Global	34.0%	MSCI All Countr	-2.4%	-0.4%	1.9%
Stock - Emerging		MSCI Emerging I	-14.9%	-15.9%	-1.0%
Stock - ACWI x U.S.					
Fixed Income - U.S.	10.0%	Barclays US Agg	0.6%	0.5%	0.0%
Fixed Income - Global			1.0%	-0.6%	-1.7%
Fixed Income - Emerging	5.0%	50% JPM EMBI (	-7.1%	-6.4%	0.7%
Fixed Income - High Yield	5.0%	33%Bar U.S. Hig	-1.2%	-1.3%	-0.1%
Cash	2.0%	BofA Merrill Lyn	0.1%	0.1%	0.0%
Commodities	3.0%	Bloomberg Com	-24.7%		
Infrastructure					
REITs					
Real Estate ex-REITs	5.0%	NCREIF ODCE In	15.7%	15.5%	-0.1%
Hedge Funds	10.0%	HFRI Fund Weig	-1.1%	0.0%	1.1%
Global TAA	10.0%	50% MSCI Work	-2.0%	-5.2%	-3.2%
Diversified Private Equity	9.0%	80% Russell 300	0.9%	4.0%	3.2%
Private Credit	7.0%	S&P/LSTA + 150	2.4%	0.6%	-1.8%
Total	100.0%				
Net Return (reported by you)					-0.6%
Calculated policy return (sum: Policy weights x benchmarks)					-1.2%
Adjustment to reflect rebalancing and overlay impacts					<u>0.1%</u>
Policy return (reported by you)					<u>-1.1%</u>
Net Value Added (Net Return - Policy Return)					0.5%

2013 Policy Return and Value Added

Asset class	Policy weight	Benchmark		Net return	Value added
		Description	Return		
Stock - U.S. Broad/All		Russell 3000 (de	33.6%	35.6%	2.1%
Stock - EAFE		MSCI EAFE net (	22.8%	14.7%	-8.1%
Stock - Global	31.0%	MSCI ACWI	22.8%		
Stock - Emerging		MSCI Emerging I	-2.6%	-3.2%	-0.7%
Fixed Income - U.S.	7.0%	Barclays US Agg	-2.0%	-1.7%	0.3%
Fixed Income - Global	3.0%		-0.1%	-1.5%	-1.4%
Fixed Income - Emerging	6.0%	JPM EMBI Glob	-7.1%	-8.7%	-1.6%
Fixed Income - High Yield	6.0%	Barclays US Corj	3.7%	6.5%	2.8%
Cash	5.0%	90 D T-Bill / Mer	0.1%	1.1%	1.0%
Commodities	3.0%	Dow Jones UBS	-9.5%		
Real Estate ex-REITs	5.0%	NCREIF ODCE In	13.8%	21.1%	7.3%
Hedge Funds	8.0%	HFRI Fund Weig	9.1%	11.5%	2.4%
Global TAA	10.0%	50% MSCI Work	10.4%	3.4%	-7.0%
Diversified Private Equity	9.0%	80% Russell 300	25.1%	21.4%	-3.7%
Private Credit	7.0%	S&P/LSTA + 150	6.5%	15.5%	9.0%
Total	100.0%				
Net Return (reported by you)					11.6%
Calculated policy return (sum: Policy weights x benchmarks)				11.6%	
Adjustment to reflect rebalancing and overlay impacts				<u>-1.4%</u>	
Policy return (reported by you)					<u>10.2%</u>
Net Value Added (Net Return - Policy Return)					1.4%

Profit/Loss on overlay programs

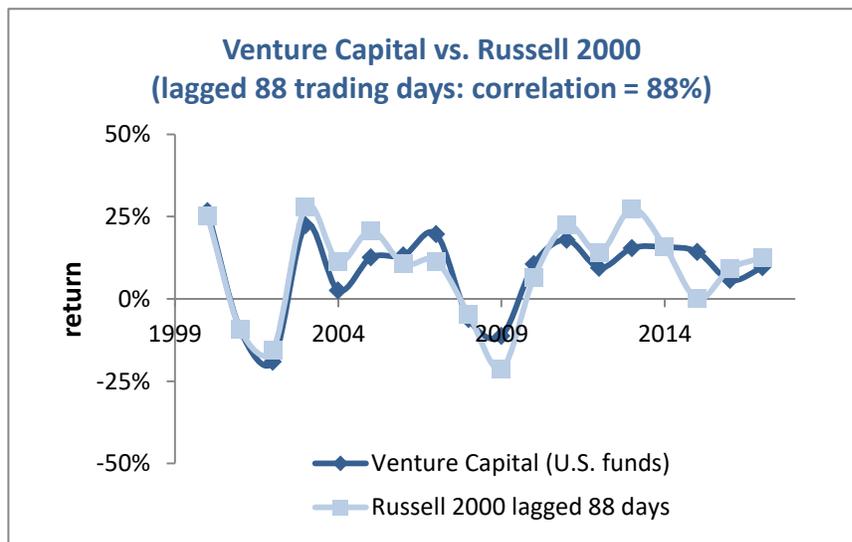
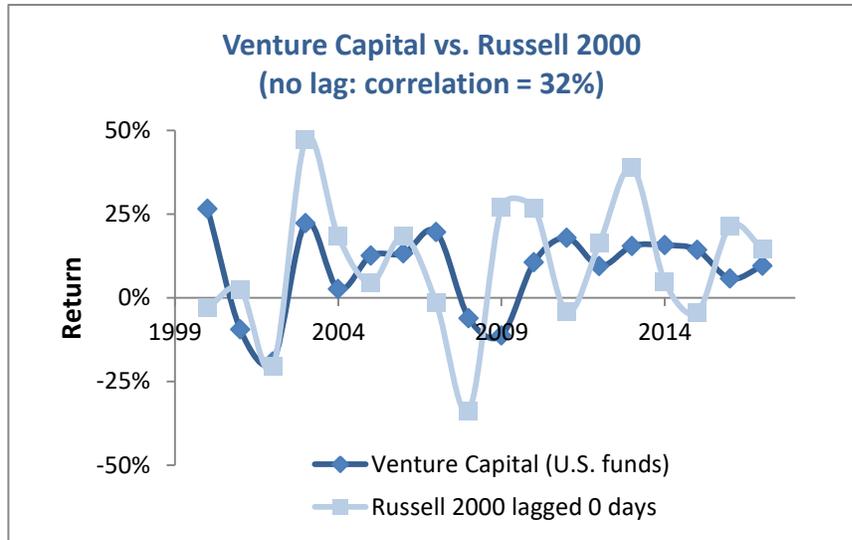
Overlay type	Your fund		Peer median				U.S. Public median			
	2017	2016	2017		2016		2017		2016	
	bps	bps	bps	#	bps	#	bps	#	bps	#
Int. Discretionary Currency							-4.8	1	2.7	2
Ext. Discretionary Currency							0.0	2	-1.0	2
Internal Global TAA							0.0	1	0.0	1
External Global TAA										
Internal PolicyTilt TAA										
External PolicyTilt TAA										
Internal Commodities										
External Commodities			0.1	1			0.1	1	202.8	1
Internal Long/Short										
External Long/Short										
Internal Other							0.0	1	0.3	2
External Other			0.0	1			9.0	4	17.8	3

Profit/loss in basis points was calculated using total fund average holdings. This was done to measure the impact of the program at the total fund level.

Appendix - Private equity benchmarks used by most funds are flawed.

A high proportion of the benchmarks used for illiquid assets by participants in the CEM universe are flawed. Flaws include:

- Timing mismatches due to lagged reporting. For example, as the graphs on the right demonstrate, reported venture capital returns clearly lag the returns of stock indices. Yet most funds that use stock indices to benchmark their private equity do not use lagged benchmarks. The result is substantial noise when interpreting performance. For example, for 2008 the Russell 2000 index return was -33.8% versus -4.8% if lagged 88 trading days. Thus if a fund earned the average reported venture capital return for 2008 of -6.1%, they would have mistakenly believed that their value added from venture capital was 27.7% using the un-lagged benchmarks versus -1.3% using the same benchmark lagged to match the average 88 day reporting lag of venture capital funds.



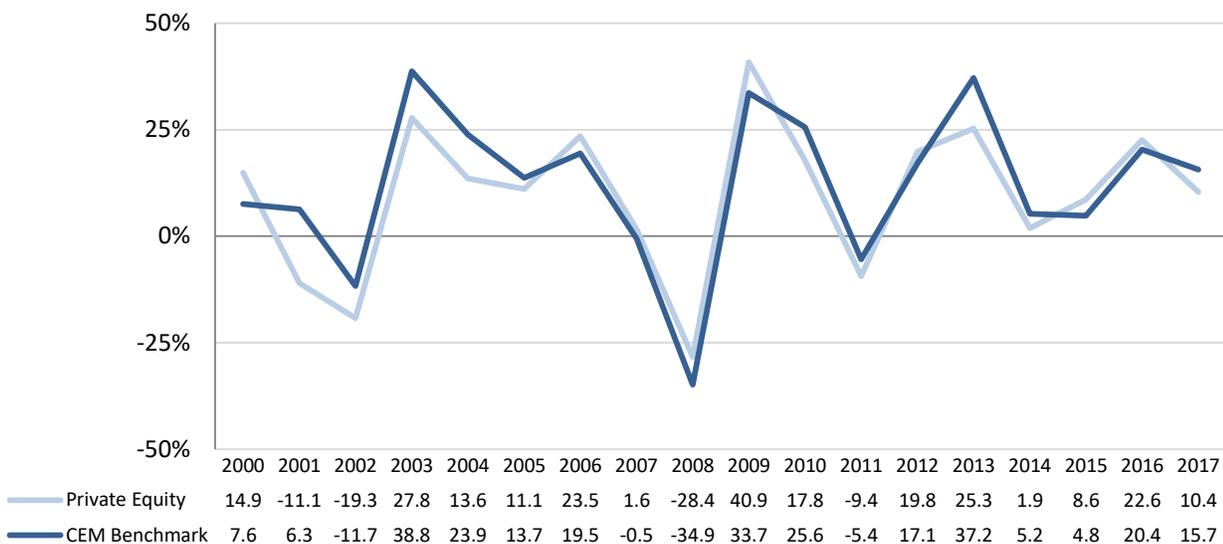
- Un-investable peer-based benchmarks. Peer based benchmarks reflect the reporting lags in peer portfolios so they have much better correlations than un-lagged investable benchmarks. But their relationship statistics are not as good as for lagged investable benchmarks.
- Aspirational premiums (i.e., benchmark + 2%). Premiums cannot be achieved passively, and evidence suggests that a fund has to be substantially better than average to attain them. More importantly, when comparing performance to other funds, they need to be excluded to ensure a level playing field.

To enable fairer comparisons, CEM uses default private equity benchmarks.

Benchmarks used for private equity by most participants in the CEM universe are flawed (see previous page). So to enable fairer comparisons, CEM replaced the reported private equity benchmarks of all funds except yours with defaults. The defaults are:

- Investable. They are comprised of lagged small cap benchmarks.
- Custom lagged for each participant. Your default benchmark had a lag of 16 trading days. Different portfolios had different lags. CEM estimated the lag on private equity portfolios with multi-year histories by comparing annual private equity returns to public market proxies with 1 day of lag, 2 days of lag, 3 days of lag, etc. At some number of days lag, correlation between the two series is maximized. The median lag was 85 trading days (i.e., approximately 119 calendar days or 3.9 calendar months)
- Regional mix adjusted based on the average estimated mix of regions in private equity portfolios for a given country.
- The result is the default benchmarks are superior to most self-reported benchmarks. Correlations improve to a median of 82% for the default benchmarks versus 44% for self-reported benchmarks. Other statistics such as volatility were also much better.

Private equity returns versus reported and default benchmark returns - Global median



1. To enable better comparison between lagged returns and lagged benchmarks, lags have been removed from both. See "Asset allocation and fund performance of defined benefit pension funds in the United States, 1998-2014" by Alexander D. Beath and Chris Flynn for details.

4

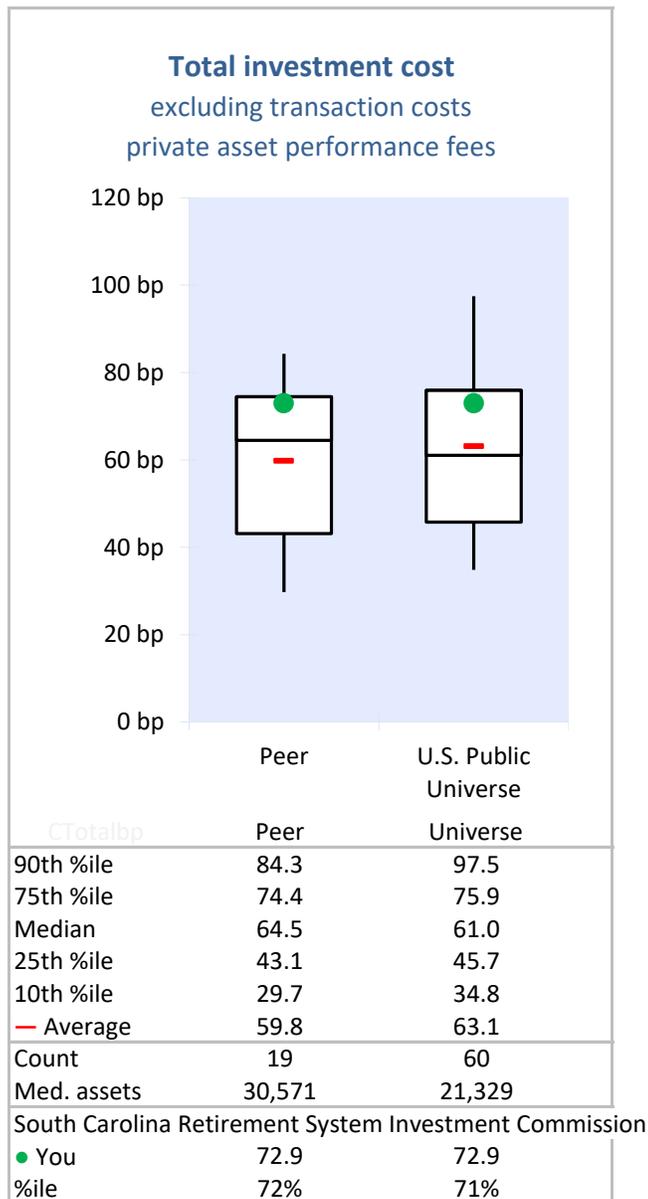
Total cost and benchmark cost

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Comparisons of total investment cost

Your total investment cost, excluding transaction costs and private asset performance fees, of 72.9 bps was above the peer median of 64.5 bps.

Differences in total investment cost are often caused by two factors that are usually outside of management's control: asset mix and fund size. Therefore, to assess whether your fund's total investment cost is high or low given your unique asset mix and size, CEM calculates a benchmark cost for your fund. Benchmark cost analysis begins on page 7 of this section.

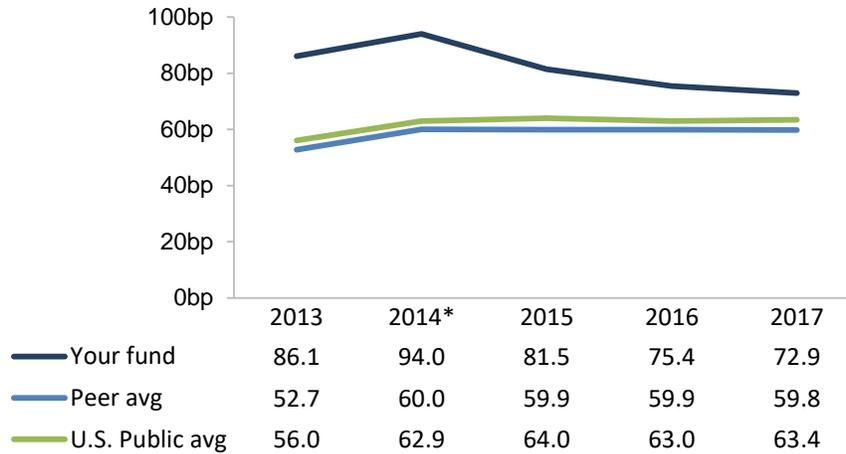


Trend in total investment cost

Your total investment cost, excluding transaction costs and private asset performance fees, decreased from 86.1 bps in 2013 to 72.9 bps in 2017.

Trend in total investment cost

(excluding transaction costs and private asset performance fees)



Trend analysis is based on 48 U.S. Public funds and 19 peer funds with 5 or more consecutive years of data.

* Since 2014, hedge fund performance fees have been included for all participants.

Types of costs included in your total investment cost

The table below outlines the types of costs included in your total investment cost.

Asset class	Internal		External			
	In-house total cost	Transaction costs	Manager base fees	Monitoring & other costs	Perform. fees (active only)	Transaction costs
<u>Public</u> (Stock, Fixed income, commodities, REITs)	✓	✗	✓	✓	✓	✗
Derivatives/Overlays	✓	✗	✓	✓	✓	✗
<u>Hedge funds & Global TAA</u>						
Hedge Funds	n/a	n/a	✓	✓	✓	✗
Global TAA	✓	✗	✓	✓	✓	✗
<u>Private real assets</u> (Infrastructure, natural resources, real estate ex-REITs, other real assets)	✓	✗	✓	✓	✗	✗
<u>Private equity</u> (Diversified private equity, venture capital, LBO, other private equity)	✓	✗	✓*	✓	✗	✗

*External manager base fees represent gross contractual management fees.

- ✓ indicates cost is included.
- ✗ indicates cost is excluded.
- Green shading indicates that the cost type has been newly added for the 2014 data year.
- CEM currently excludes external private asset performance fees and all transaction costs from your total cost because only a limited number of participants are currently able to provide complete data.

Detailed breakdown of your total investment cost

Your 2017 total investment cost, excluding transaction costs and private asset performance fees, was 72.9 bp or \$222.4 million.

Your investment costs

	Internal		External Passive		External Active			Total ¹		
	Passive	Active	Fees	Monitoring & Other	Base Fees	Perform. Fees	Monitor. & Other	\$000s	bps	% of Total
Asset management										
Stock - U.S. Broad/All			0	5	10,406		740	11,150		5%
Stock - EAFE										
Stock - Emerging					9,636		381	10,017		5%
Stock - Global			364	662	4,801		681	6,509		3%
Stock - ACWI x U.S.					3,801		236	4,036		2%
Fixed Income - U.S.		11			3,107		375	3,492		2%
Fixed Income - Emerging			0	6	7,412		431	7,849		4%
Fixed Income - Global										
Fixed Income - High Yield					7,871		562	8,433		4%
Cash		396			1,327		235	1,958		1%
REITs					1,684	0	137	1,821		1%
Real Estate ex-REITs ¹										
Real Estate - LPs ¹²					16,110	20,114	502	16,612		7%
Real Estate - Co-Invest. ¹					4		2	6		0%
Infrastructure ¹					2,066	0	117	2,182		1%
Hedge Funds					26,597	17,579	416	44,592		20%
Hedge Fund - FoFs					3,330	0	500	3,830		2%
Underlying FoF Fees					17,942	12,220		30,162		14%
Global TAA					6,125	3,165	569	9,859		4%
Diversified Private Equity - LPs ¹²					19,106	46,572	386	19,492		9%
Diversified Private Equity - FoFs ¹					2,846	0	150	2,996		1%
Underlying FoF Fees ¹					4,780	1,577		4,780		2%
Diversified Private Equity - Co-Invest. ¹					3,500		134	3,634		2%
Private Credit - LPs ¹²					24,096	15,639	487	24,584		11%
Private Credit - Co-Invest. ¹					8		1	9		0%
Derivatives/Overlays			551	259				810		0%
Total asset management costs excluding private asset performance fees								218,815	71.7bp	98%
Oversight, custodial & other asset related costs										
Oversight of the Fund								1,089		0%
Trustee & Custodial								1,131		1%
Consulting and Performance Measurement								1,070		0%
Audit								17		0%
Other								321		0%
Total oversight, custodial & other costs								3,627	1.2bp	2%
Total investment costs excluding transaction costs and private asset performance fees								222,442	72.9bp	100%

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. Default costs added. Refer to Appendix A.

Changes in your investment costs

The table below shows how your investment costs have changed from year to year by asset class.

Change in your investment costs (2017 - 2013)

	Investment costs (\$000s)					Change (\$000s)				Change (%)			
	2017	2016	2015	2014	2013	2017	2016	2015	2014	2017	2016	2015	2014
Asset management													
Stock - U.S. Broad/All	11,150	8,849	8,242	10,355	10,152	2,301	607	-2,113	203	26%	7%	-20%	2%
Stock - EAFE				5,308	1,941				3,367				173%
Stock - Emerging	10,017	7,464	7,908	8,342	9,806	2,553	-444	-433	-1,464	34%	-6%	-5%	-15%
Stock - Global	6,509	7,365	7,498	589		-856	-133	6,909		-12%	-2%	1174%	
Stock - ACWI x U.S.	4,036	2,571				1,466				57%			
Fixed Income - U.S.	3,492	3,070	3,886	4,675	4,693	422	-816	-790	-18	14%	-21%	-17%	0%
Fixed Income - Emerging	7,849	6,644	3,402	3,240	1,707	1,205	3,242	162	1,533	18%	95%	5%	90%
Fixed Income - Global			1,594	3,452	3,193			-1,858	260			-54%	8%
Fixed Income - High Yield	8,433	8,619	7,488	6,894	8,468	-186	1,131	593	-1,573	-2%	15%	9%	-19%
Cash	1,958	2,532	3,314	2,779	2,875	-574	-781	535	-97	-23%	-24%	19%	-3%
REITs	1,821	917				904				99%			
Real Estate ex-REITs ¹	0	0	7	8	17		-7	-1	-8		-100%	-11%	-50%
Real Estate - LPs ¹²	16,612	17,099	16,205	15,007	17,116	-487	894	1,198	-2,110	-3%	6%	8%	-12%
Real Estate - Co-Invest. ¹	6	52				-46				-88%			
Infrastructure ¹	2,182	811				1,372				169%			
Hedge Funds	44,592	41,703	59,180	56,964	23,105	2,889	-17,477	2,215	33,859	7%	-30%	4%	147%
Hedge Fund - FoFs	3,830	5,957	4,322	10,167	20,270	-2,126	1,635	-5,845	-10,103	-36%	38%	-57%	-50%
Underlying FoF Fees	30,162	27,322	44,079	69,151	44,298	2,839	-16,757	-25,072	24,854	10%	-38%	-36%	56%
Global TAA	9,859	11,613	12,684	13,017	11,676	-1,753	-1,072	-332	1,340	-15%	-8%	-3%	11%
Diversified Private Equity - LPs ¹²	19,492	22,454	19,242	24,296	29,318	-2,962	3,212	-5,053	-5,022	-13%	17%	-21%	-17%
Diversified Private Equity - FoFs ¹	2,996	4,255	6,301	3,187	3,077	-1,259	-2,046	3,114	110	-30%	-32%	98%	4%
Underlying FoF Fees ¹	4,780	6,593	10,231	5,632	7,305	-1,813	-3,639	4,600	-1,674	-27%	-36%	82%	-23%
Diversified Private Equity - Co-Invest. ¹	3,634	3,446	1,543	1,827	714	188	1,902	-284	1,113	5%	123%	-16%	156%
Private Credit - LPs ¹²	24,584	17,466	17,606	24,377	33,568	7,118	-140	-6,771	-9,191	41%	-1%	-28%	-27%
Private Credit - Co-Invest. ¹	9	17	46	4	4	-7	-29	42	0	-43%	-64%	1018%	-2%
Derivatives/Overlays	810	1,308	1,037	1,414	1,490	-498	270	-376	-76	-38%	26%	-27%	-5%
Total excl. private asset perf. fees	218,815	208,125	235,815	270,685	234,792	10,690	-27,690	-34,869	35,893	5%	-12%	-13%	15%
Oversight, custodial & other asset related costs													
Oversight of the Fund	1,089	1,056	1,201	1,478	1,319	33	-145	-277	159	3%	-12%	-19%	12%
Trustee & Custodial	1,131	925	766	426	317	205	160	340	108	22%	21%	80%	34%
Consulting and Performance Measurement	1,070	940	1,030	998	865	130	-90	32	133	14%	-9%	3%	15%
Audit	17	99	201	816	315	-83	-102	-615	502	-83%	-51%	-75%	160%
Other	321	267	345	287	293	54	-78	59	-7	20%	-23%	20%	-2%
Total oversight, custodial & other	3,627	3,288	3,543	4,005	3,109	339	-255	-462	896	10%	-7%	-12%	29%
Total investment costs ¹	222,442	211,413	239,358	274,690	237,901	11,029	-27,945	-35,331	36,789	5%	-12%	-13%	15%
Total in basis points	72.9bp	75.4bp	81.5bp	94.0bp	86.1bp								

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. Default costs added. Refer to Appendix A.

Total cost versus benchmark cost

Your fund's total investment cost, excluding transaction costs and private asset performance fees, was 1.5 bps below your benchmark cost of 74.4 bps. This implies that your fund was low cost by 1.5 bps compared to the peer median, after adjusting for your fund's asset mix.

Your cost versus benchmark

	\$000s	bps
Your fund's total investment cost excluding transaction costs and illiquid asset performance fees	222,442	72.9 bp
- Your fund's benchmark	226,902	74.4 bp
= Your fund's cost savings	-4,460	-1.5 bp

Your benchmark cost is an estimate of your total costs assuming that you paid the peer median cost for each of your investment mandates and fund oversight. The calculation of your benchmark cost is shown on the following page.

The reasons why your fund's total cost was below your benchmark are summarized in the table below. Details of each of the impacts below are provided on pages 9 to 12.

Reasons why your fund was low cost

	Cost/-Savings impact	
	\$000s	bps
<u>Differences in implementation style:</u>		
External active vs. low cost styles	7,239	2.4 bp
Partnerships vs. external active	3,306	1.1 bp
Fund of funds vs. external direct	10,338	3.4 bp
Mix of internal and passive styles	-66	0.0 bp
Style impact of overlays	-11	0.0 bp
Total style impact	20,806	6.8 bp
<u>Paying more/-less for similar services:</u>		
External investment management	-25,039	-8.2 bp
Internal investment management	1	0.0 bp
Oversight, custodial and other	-229	-0.1 bp
Total impact of paying more /-less	-25,267	-8.3 bp
Total savings	-4,460	-1.5 bp

Benchmark cost calculation

Your 2017 benchmark cost was 74.4 basis points or 226.9 million. It equals your holdings for each asset class multiplied by the peer median cost for the asset class. The peer median cost is the style weighted average for all implementation styles (i.e., internal passive, internal active, external passive, external active).

Calculation of your 2017 benchmark cost

Asset class	Your average assets (A)	Weighted peer median cost ¹ (B)	Benchmark \$000s (A X B)
Asset management costs			
Stock - U.S. Broad/All	2,716	13.6 bp	3,699
Stock - Emerging	1,392	52.4 bp	7,291
Stock - Global	4,900	31.2 bp	15,279
Stock - ACWI x U.S.	859	34.7 bp	2,980
Fixed Income - U.S.	1,404	11.6 bp	1,633
Fixed Income - Emerging	1,593	42.6 bp	6,793
Fixed Income - High Yield	2,052	35.9 bp	7,363
Cash	2,223	8.8 bp	1,958
REITs	501	37.9 bp	1,899
Real Estate ex-REITs	1,744	100.3 bp	17,488
Infrastructure	426	122.4 bp	5,209
Hedge Funds	3,345	153.6 bp	51,376
Perf. fees (on NAV)	3,345	60.8 bp	20,348
Global TAA	2,078	62.0 bp	12,881
Diversified Private Equity	2,220	166.1 bp	36,866
Private Credit	2,296	127.0 bp	29,161
Overlay Programs ²	30,499	0.3 bp	821
Benchmark for asset management	30,499	73.1 bp	223,046
Oversight, custody and other costs			
Oversight of the Fund	30,499	0.5 bp	1,459
Trustee & Custodial	30,499	0.4 bp	1,131
Consulting and Performance Measuremen	30,499	0.3 bp	813
Audit	30,499	0.0 bp	145
Other	30,499	0.1 bp	309
Benchmark for oversight, custody & other		1.3 bp	3,856
Total benchmark cost		74.4 bp	226,902

1. The weighted peer median cost for asset management is the style-weighted average of the peer median costs for all implementation styles (i.e., internal passive, internal active, external passive, external active, fund of fund). The style weights by asset class for your fund and the peers are shown on page 17 of this section.

2. Total fund average holdings is used as the base when calculating the relative cost impact of the overlay programs.

Cost impact of differences in implementation style

Differences in implementation style (i.e., external active management versus lower cost indexed and internal management, fund of funds versus lower cost direct LPs, and overlay usage) relative to your peers cost you 6.8 bps.

Calculation of the cost impact of differences in implementation style

	Your avg holdings (mils)	% External active			Premium vs. internal and passive ¹	Cost/ -Savings \$000s	
	(A)	You	Peer average	More/ -Less	(C)	(A X B X C)	
Stock - U.S. Broad/All	2,716	99%	31%	68%	39 bp	7,178	
Stock - Emerging	1,392	100%	80%	20%	57 bp	1,541	
Stock - Global	4,900	51%	69%	-18%	39 bp	-3,442	
Stock - ACWI x U.S.	859	100%	79%	21%	39 bp	707	
Fixed Income - U.S.	1,404	97%	70%	27%	13 bp	505	
Fixed Income - Emerging	1,593	99%	100%	-1%	26 bp	-43	
REITs	501	100%	72%	28%	43 bp	602	
Real Estate ex-REITs	1,744	100%	99%	1%	76 bp	190	
Total impact of differences in external active management usage						7,239	2.4 bp
		<i>External LPs</i>			<i>Premium vs. external active¹</i>		
		<i>% of external active</i>					
Real Estate ex-REITs	1,744	100%	47%	53%	54 bp	4,972	
Infrastructure	426	0%	66%	-66%	59 bp	-1,666	
Total impact of differences in limited partnership usage						3,306	1.1 bp
		<i>Fund of fund</i>			<i>Premium vs. direct LPs¹</i>		
		<i>% of external LPs</i>					
Real Estate ex-REITs	1,744	0%	3%	-3%	46 bp	-225	
Hedge Funds	3,345	55%	27%	27%	65 bp	5,970	
Perf. fees (on NAV)	3,345	55%	27%	27%	40 bp	3,673	
Diversified Private Equity	2,220	19%	13%	6%	71 bp	921	
Total impact of differences in fund of fund usage						10,338	3.4 bp
<i>Overlay usage</i>							
Impact of lower use of portfolio level overlays (see page 10)						-11	0.0 bp
<i>Mix of low cost styles</i>							
Impact of mix of internal indexed, internal active, external indexed (see page 11)						-66	0.0 bp
Total						20,806	6.8 bp

1. The external active cost 'premium vs internal and passive' is the additional cost of external active management and fund of funds relative to the average of the other lower cost implementation styles: internal passive, internal active and external passive. These calculations are specific to your peer group. The fund-of-funds 'premium vs. direct LPs' is the peer-median cost of fund-of-funds minus the peer median cost for direct external active management.

Cost impact of overlays

As summarized on the previous page, the style impact of overlays saved you 0.0 bps. If you use more overlays than your peers, or more expensive types of overlays, then it increases your relative cost.

Calculation of the cost impact of differences in the use of portfolio level overlays

	Your average total holdings (mils)	Cost as % of total holdings		Cost/-Savings Impact (000s)
		You	Peer avg.	
	(A)	(B)	(C)	A X (B - C)
Currency - Hedge	30,499	NA	0.00 bp	-9
Rebalancing / Passive Beta - Hedge	30,499	NA	0.01 bp	-17
Duration Management - Hedge	30,499	NA	0.00 bp	0
Other Overlay - Discretionary	30,499	NA	0.00 bp	0
External Overlays				
Currency - Hedge	30,499	NA	0.18 bp	-538
Rebalancing / Passive Beta - Hedge	30,499	0.27 bp	0.04 bp	702
Commodity Futures - Discretionary	30,499	NA	0.03 bp	-88
Long/Short - Discretionary	30,499	NA	0.01 bp	-33
Other Overlay - Discretionary	30,499	NA	0.01 bp	-26
Total impact in 000s				-11
Total impact in basis points				0.0 bp

Cost impact of lower cost styles

As summarized on page 9, your mix of 'lower-cost' internal and passive styles saved you 0.0 bps. Details are shown below.

Cost impact of differences in your mix of 'lower-cost' implementation styles

	Your non-external active holdings (mils)	Percent holdings (of non-external-active)						Cost/-Savings ¹ (000s)
		Internal passive		Internal active		External passive		
		You	Peers	You	Peers	You	Peers	
Stock - U.S. Broad/All	17	0%	6%			100%	94%	0
Stock - Global	2,414	0%	37%			100%	63%	-68
Fixed Income - U.S.	37	0%	1%	100%	69%	0%	30%	2
Fixed Income - Emerging	21					100%	100%	0
Cash	1,366			100%	100%			0
Total impact in 000s								-66
Total impact in basis points								0.0 bp

1. Cost/-savings for each asset class equals non-external active holdings within each asset class X cumulative impact from the three lower cost styles. By formula: [(peer median cost for the style - peer weighted average cost of lower cost styles) X (your weight for the style - peer weight for the style)]. Peer median costs for each style are shown on page 15.

Cost impact of paying more/-less for similar services

Differences in what you paid relative to your peers for similar asset management and related oversight and support services saved you 8.3 bps.

Calculation of the cost impact of paying more/-less

	Style	Your avg holdings (mils) (A)	Cost in bps			Cost/-Savings	
			Your	Peer median	More/-less (B)	\$000s (A X B)	bps
External asset management							
Stock - U.S. Broad/All	passive	17	2.7	1.6	1.1	2	
Stock - U.S. Broad/All	active	2,700	41.3	40.3	1.0	272	
Stock - Emerging	active	1,392	72.0	63.5	8.5	1,184	
Stock - Global ¹	passive	2,414	4.2	3.9	0.4	90	
Stock - Global	active	2,486	22.1	43.6	-21.5	-5,351	
Stock - ACWI x U.S.	active	859	47.0	42.9	4.1	349	
Fixed Income - U.S.	active	1,367	25.5	15.6	9.9	1,351	
Fixed Income - Emerging ²	passive	21	2.7	17.1	-14.4	-30	
Fixed Income - Emerging	active	1,573	49.9	42.7	7.2	1,129	
Fixed Income - High Yield	active	2,052	41.1	35.9	5.2	1,070	
Cash ³	active	857	18.2	18.2	0.0	0	
REITs	active	501	36.4	49.9	-13.6	-680	
Real Estate ex-REITs	LP	1,744	95.3	128.6	-33.3	-5,807	
Infrastructure	active	426	51.3	83.2	-32.0	-1,360	
Hedge Funds	active	1,520	177.7	135.9	41.8	6,360	
Top layer perf. fees (on NAV)	active	1,520	115.7	49.9	65.7	9,987	
Hedge Funds	FoF	1,825	21.0	60.0	-39.0	-7,122	
Top layer perf. fees (on NAV)	FoF	1,825	0.0	18.0	-18.0	-3,286	
Underlying base fees	FoF	1,825	98.3	141.0	-42.7	-7,797	
Underlying perf. fees (on NAV)	FoF	1,825	66.9	72.0	-5.1	-924	
Global TAA	active	2,078	47.5	62.0	-14.5	-3,021	
Diversified Private Equity	FoF	415	72.2	70.8	1.4	59	
Underlying base fees	FoF	415	115.2	157.0	-41.8	-1,737	
Diversified Private Equity	LP	1,805	128.1	157.0	-28.9	-5,207	
Private Credit	LP	2,296	107.1	127.0	-19.9	-4,568	
Total for external management						-25,039	-8.2 bp
Internal asset management							
Fixed Income - U.S.	active	37	2.9	2.8	0.2	1	
Cash ³	active	1,366	2.9	2.9	0.0	0	
Total for internal management						1	0.0 bp
Oversight, custodial, other							
Oversight of the Fund		30,499	0.4	0.5	-0.1	-370	
Trustee & Custodial		30,499	0.4	0.4	0.0	0	
Consulting		30,499	0.4	0.3	0.1	257	
Audit		30,499	0.0	0.0	0.0	-128	
Other		30,499	0.1	0.1	0.0	12	
Total for oversight, custodial, other						-229	-0.1 bp
Total						-25,267	-8.3 bp

1. Universe median used because peer data was insufficient.

2. Database median used because peer and universe data were insufficient.

3. The impact of this line is neutralized by setting the benchmark cost to You.

Summary of why you are high or low cost by asset class

The table below summarizes where you are high and low cost by asset class. It also quantifies how much is due to differences in implementation style (i.e., differences in the mix of external active, external passive, internal active, internal passive and fund of fund usage) and how much is due to paying more or less for similar services (i.e., same asset class and style).

Summary of why you are high or low cost by asset class

	Your cost ¹	Benchmark = peer weighted median cost ¹	More/-less	Your average assets (or fee basis)	'More/-less in \$000s		
					Total More/-less	Due to Impl. style	Due to paying more/less
	(A)	(B)	(C = A - B)	(D)	(C X D)		
Asset management costs							
Stock - U.S. Broad/All	41.0 bp	13.6 bp	27.4 bp	2,716	7,451	7,178	274
Stock - Emerging	72.0 bp	52.4 bp	19.6 bp	1,392	2,726	1,541	1,184
Stock - Global	13.3 bp	31.2 bp	-17.9 bp	4,900	-8,771	-3,510	-5,261
Stock - ACWI x U.S.	47.0 bp	34.7 bp	12.3 bp	859	1,056	707	349
Fixed Income - U.S.	24.9 bp	11.6 bp	13.2 bp	1,404	1,859	507	1,352
Fixed Income - Emerging	49.3 bp	42.6 bp	6.6 bp	1,593	1,056	-43	1,099
Fixed Income - High Yield	41.1 bp	35.9 bp	5.2 bp	2,052	1,070	0	1,070
Cash	8.8 bp	8.8 bp	0.0 bp	2,223	0	0	0
REITs	36.4 bp	37.9 bp	-1.6 bp	501	-78	602	-680
Real Estate ex-REITs	95.3 bp	98.8 bp	-3.5 bp	1,744	-615	5,193	-5,807
Underlying base fees	0.0 bp	1.5 bp	-1.5 bp	1,744	-255	-255	0
Infrastructure	51.3 bp	120.0 bp	-68.8 bp	426	-2,927	-1,567	-1,360
Underlying base fees	0.0 bp	2.3 bp	-2.3 bp	426	-99	-99	0
Hedge Funds	92.2 bp	115.3 bp	-23.1 bp	3,345	-7,721	-6,959	-762
Perf. fees (on NAV)	52.5 bp	41.3 bp	11.3 bp	3,345	3,772	-2,929	6,702
Underlying base fees	53.6 bp	38.3 bp	15.3 bp	3,345	5,131	12,929	-7,797
Underlying perf. fees (on NAV)	36.5 bp	19.6 bp	17.0 bp	3,345	5,678	6,602	-924
Global TAA	47.5 bp	62.0 bp	-14.5 bp	2,078	-3,021	0	-3,021
Diversified Private Equity	117.7 bp	145.9 bp	-28.2 bp	2,220	-6,271	-1,123	-5,148
Underlying base fees	21.5 bp	20.2 bp	1.4 bp	2,220	307	2,044	-1,737
Private Credit	107.1 bp	127.0 bp	-19.9 bp	2,296	-4,568	0	-4,568
Underlying base fees	0.0 bp	0.0 bp	0.0 bp	2,296	0	0	0
Overlay Programs ²	0.3 bp	0.3 bp	0.0 bp	30,499	-11	-11	0
Total asset management	71.7 bp	73.1 bp	-1.4 bp	30,499	-4,232	20,806	-25,038
Oversight, custody and other costs							
Oversight of the Fund	0.4 bp	0.5 bp	-0.1 bp	30,499	-370	n/a	-370
Trustee & Custodial	0.4 bp	0.4 bp	0.0 bp	30,499	0	n/a	0
Consulting	0.4 bp	0.3 bp	0.1 bp	30,499	257	n/a	257
Audit	0.0 bp	0.0 bp	0.0 bp	30,499	-128	n/a	-128
Other	0.1 bp	0.1 bp	0.0 bp	30,499	12	n/a	12
Total oversight, custody & other	1.2 bp	1.3 bp	-0.1 bp	30,499	-229	n/a	-229
Total	72.9 bp	74.4 bp	-1.5 bp	30,499	-4,460	20,806	-25,267

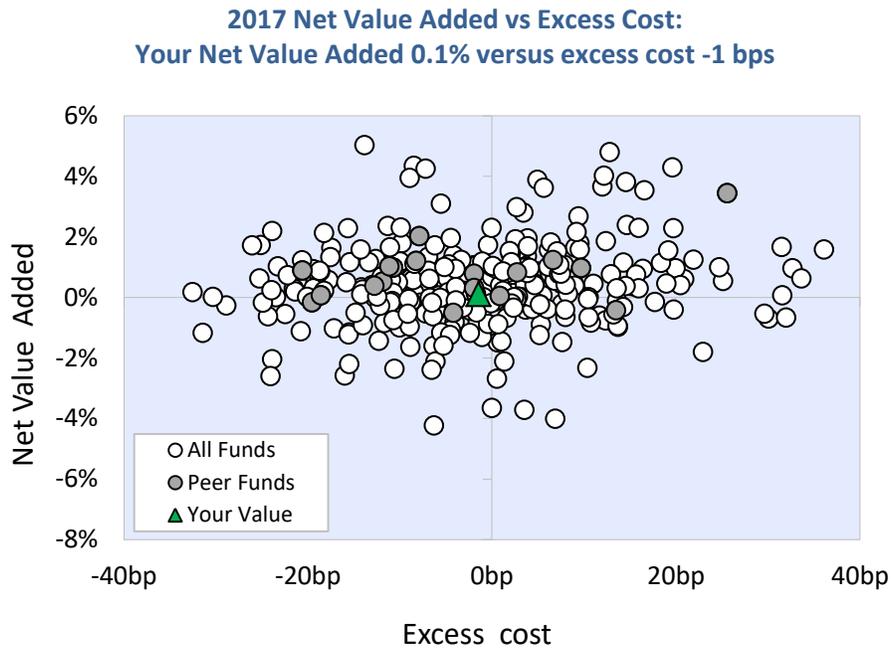
1. The weighted peer median cost for asset management is the style-weighted average of the peer median costs for all implementation styles (i.e., internal passive, internal active, external passive, external active, fund of fund). It excludes performance fees on private assets. The style weights by asset class for your fund and the peers are shown on page 17 of this section.

2. Total fund average holdings is used as the base when calculating the relative cost impact of the overlay programs.

Your cost effectiveness ranking

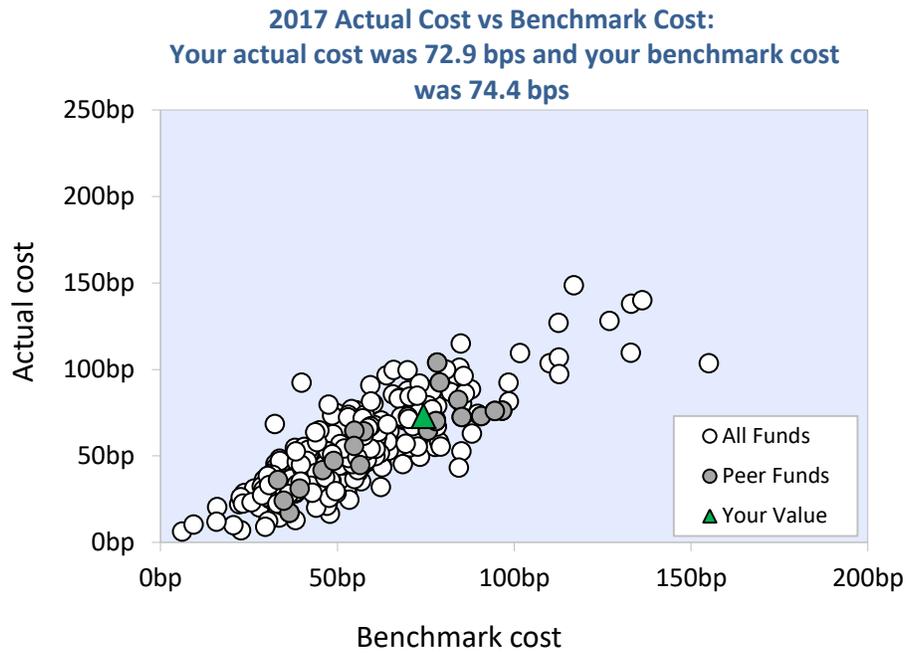
Being high or low cost is neither good nor bad. The more important question is, are you receiving sufficient value for your excess cost? At the total fund level, we provide insight into this question by combining your value added and your excess cost to create a snapshot your cost effectiveness performance relative to that of the survey universe.

For the 2017 year, your fund ranked in the positive value added, low cost quadrant.



1 Benchmark cost and excess cost calculations are based on regression analysis (see Appendix B in this section) for all funds except your fund. Your fund's benchmark cost is based on peer-median costs (per page 7 of this section).

Actual cost versus benchmark cost



1 Benchmark cost calculations are based on regression analysis (see Appendix B in this section) for all funds except your fund. Your fund's benchmark cost is based on peer-median costs (per page 7 of this section).

Appendix A: Benchmarking methodology formulas and data

a) Formulas

Example calculations are for 'Stock - U.S. Broad/All' unless otherwise indicated.

Asset class peer cost

$$\begin{aligned} &= \text{Weighted average by peer average style of peer median costs for asset class} \\ &= [(0.04 \times 2.4 \text{ bp}) + (0.00 \times 0.0 \text{ bp}) + (0.65 \times 1.6 \text{ bp}) + (0.31 \times 40.3 \text{ bp})] = 13.6 \text{ bp} \end{aligned}$$

Peer average low cost (by asset class)

$$\begin{aligned} &= \text{Weighted average by peer average style of peer median costs for internal passive, internal active and} \\ &\quad \text{external passive management for asset class} \\ &= [(0.04 \times 2.4 \text{ bp}) + (0.00 \times 0.0 \text{ bp}) + (0.65 \times 1.6 \text{ bp})] / (0.04 + 0.00 + 0.65) = 1.6 \text{ bp} \end{aligned}$$

External active cost premium (by asset class)

$$\begin{aligned} &= \text{Peer median external active cost - peer average low cost} \\ &= 40.3 \text{ bp} - 1.6 \text{ bp} = 38.6 \text{ bp} \end{aligned}$$

Impact from other differences in implementation style (by Asset Class)=

$$\begin{aligned} &= [(\text{Your int. pass. \%} - \text{average peer int. pass. \%}) \times (\text{peer median int. pass. cost} - \text{peer average low cost}) \\ &\quad + (\text{your int. act. \%} - \text{peer average int. act. \%}) \times (\text{peer median int. act. cost} - \text{peer average low cost}) \\ &\quad + (\text{your ext. pass. \%} - \text{average peer ext. pass. \%}) \times (\text{median peer ext. pass. cost} - \text{peer average low cost})] \\ &\quad \times \text{your average holdings} \end{aligned}$$

Appendix A: Benchmarking methodology formulas and data (page 2 of 2)

b) 2017 cost data used to calculate weighted peer median costs and impact of mix differences.

Asset Class	Your costs (basis points)						Peer median costs (basis points)						
	Internal Passive	Internal Active	External Passive	External Active	Limited Partner.	Fund of Funds	Internal Passive	Internal Active	External Passive	External Active	Limited Partner.	Fund of Funds	Weighted Median
Stock - U.S. Broad/All			2.7	41.3			2.4		1.6	40.3			13.6
Stock - Emerging				72.0			5.6	11.1	7.1	63.5			52.4
Stock - Global			4.2	22.1			4.6		3.9	43.6			31.2
Stock - ACWI x U.S.				47.0					4.3	42.9			34.7
Fixed Income - U.S.		2.9		25.5			1.0	2.8	1.0	15.6			11.6
Fixed Income - Emerging			2.7	49.9					17.1	42.7			42.6
Fixed Income - High Yield				41.1						35.9			35.9
Cash		2.9		18.2				2.9		18.2			8.8
REITs				36.4				7.3	7.3	49.9			37.9
Real Estate ex-REITs					95.3			25.2		76.0	128.6	63.1	98.8
Underlying base fees					0.0							111.0	1.5
Infrastructure				51.3						83.2	141.9	54.8	120.0
Underlying base fees				0.0								104.9	2.3
Hedge Funds				177.7		21.0				135.9		60.0	115.3
Perf. fees (on NAV)				115.7		0.0				49.9		18.0	41.3
Underlying base fees				0.0		98.3						141.0	38.3
Underlying perf. fees (on NAV)				0.0		66.9						72.0	19.6
Global TAA				47.5						62.0			62.0
Diversified Private Equity					128.1	72.2					157.0	70.8	145.9
Underlying base fees					0.0	115.2						157.0	20.2
Private Credit					107.1						127.0		127.0
Underlying base fees					0.0								0.0

c) 2017 Style weights used to calculate the weighted peer median costs and impact of mix differences.

Style Weights	You (%)						Peer average (%)					
	Internal Passive	Internal Active	External Passive	External Active	Limited Partner.	Fund of Funds	Internal Passive	Internal Active	External Passive	External Active	Limited Partner.	Fund of Funds
Stock - U.S. Broad/All	0.0%		0.6%	99.4%			4.1%		64.9%	31.0%		
Stock - Emerging	0.0%	0.0%	0.0%	100.0%			7.8%	1.0%	10.7%	80.5%		
Stock - Global	0.0%		49.3%	50.7%			11.5%		19.9%	68.6%		
Stock - ACWI x U.S.			0.0%	100.0%					21.3%	78.7%		
Fixed Income - U.S.	0.0%	2.7%	0.0%	97.3%			0.4%	20.2%	8.9%	70.5%		
Fixed Income - Emerging			1.3%	98.7%					0.2%	99.8%		
Fixed Income - High Yield				100.0%						100.0%		
Cash		61.5%		38.5%				61.5%		38.5%		
REITs		0.0%	0.0%	100.0%				3.5%	24.7%	71.8%		
Real Estate ex-REITs		0.0%		0.0%	100.0%	0.0%		1.4%		52.1%	45.1%	1.3%
Underlying base fees		0.0%		0.0%	100.0%	0.0%		1.4%		52.1%	45.1%	1.3%
Infrastructure				100.0%	0.0%	0.0%				34.0%	63.8%	2.2%
Underlying base fees				100.0%	0.0%	0.0%				34.0%	63.8%	2.2%
Hedge Funds				45.4%		54.6%				72.8%		27.2%
Perf. fees (on NAV)				45.4%		54.6%				72.8%		27.2%
Underlying base fees				45.4%		54.6%				72.8%		27.2%
Underlying perf. fees (on NAV)				45.4%		54.6%				72.8%		27.2%
Global TAA				100.0%						100.0%		
Diversified Private Equity					81.3%	18.7%					87.2%	12.8%
Underlying base fees					81.3%	18.7%					87.2%	12.8%
Private Credit					100.0%						100.0%	
Underlying base fees					100.0%						100.0%	

The above data was adjusted as noted when there were insufficient peers, or for other reasons where direct comparisons were inappropriate.

Appendix B: Regression based benchmarks

Regression Benchmark Cost Equations

	2017		2016		2015		2014		2013	
	Coeff.	"t"	Coeff.	"t"	Coeff.	"t"	Coeff.	"t"	Coeff.	"t"
Constant	69.5	14.6	78.5	17.4	77.6	16.9	77.7	16.9	70.8	17.1
Size in millions (Log 10)	-13.2	-11.1	-14.1	-13.0	-14.0	-12.8	-13.7	-12.5	-12.7	-12.5
<u>Percentage of assets in:</u>										
Stocks	20.1	4.4	7.7	1.9	10.4	2.5	7.9	1.9	15.8	4.0
Real estate	75.0	5.2	73.3	5.6	60.2	4.3	56.1	3.8	62.6	4.5
Private equity & hedge funds	273.8	30.8	259.6	30.1	272.5	30.9	292.1	31.8	224.3	25.7
Country variable (1 if Cdn)	-4.1	-2.1	-2.9	-1.6	-1.5	-0.8	-3.0	-1.7	-3.3	-1.9
R-squared	All		All		All		All		All	
Sample size	74%		69%		69%		69%		59%	
	378		490		509		526		551	

In order to compare your fund's cost effectiveness to the survey universe, a benchmark cost for all participants is required.

The benchmark operating cost for all other funds is determined using regression analysis. The regression equation coefficients and "t statistics" are shown in the table above. An absolute "t" of greater than 2 indicates that the coefficient is statistically significant in predicting the dependent variable, in this case, the benchmark cost.

The benchmark equations have been remarkably robust. Although the coefficients change every year, primarily because of changes in the composition of the survey universe, they remain similar in relative magnitude and direction.

Most importantly, the R-squareds have been high. In 2017, the R-squared was 74% which means that fund size, asset mix and nationality explain more than 74% of the differences in costs between funds. This is good explanatory power.

Below is a description of the coefficients:

- Size = Log10 (fund size in millions)
- % Stocks = proportion in stocks (coefficient changed in 2011)
- % Real estate = proportion directly invested in real estate and infrastructure.
- % Private equity = proportion in direct and fund-of-funds venture capital, other private equity and hedge funds.
- Country variable = 1 if your country of origin is Canada, otherwise 0.

5

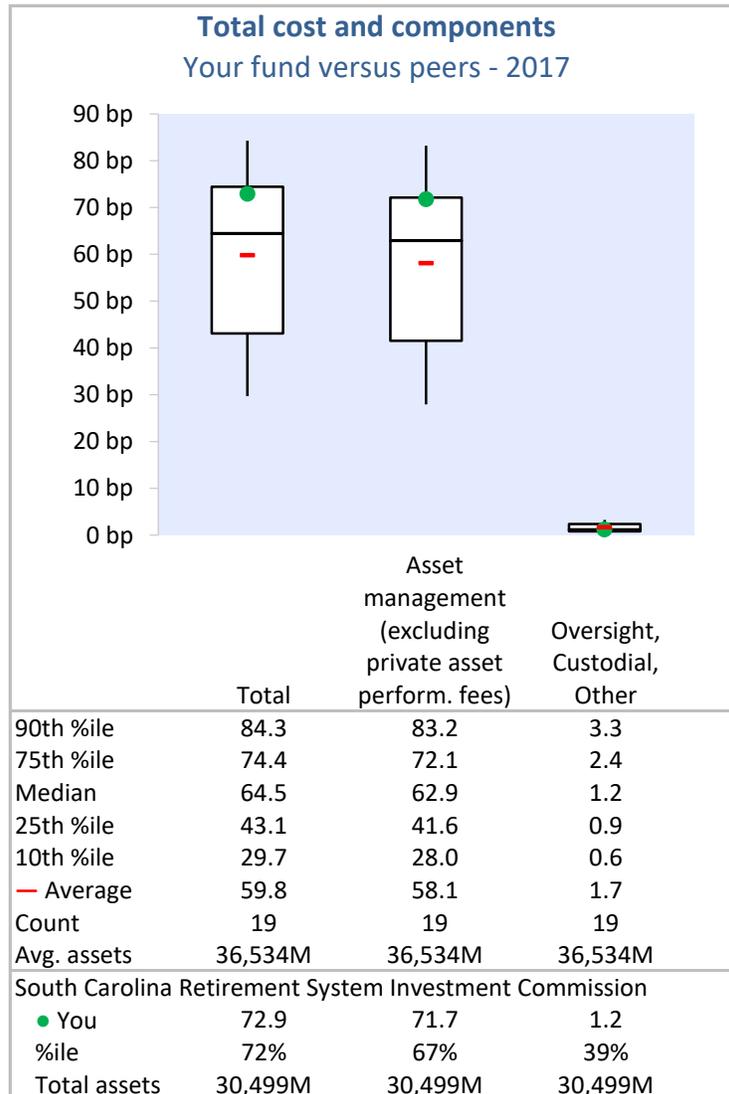
Cost comparisons

Total fund cost	2
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Total fund cost

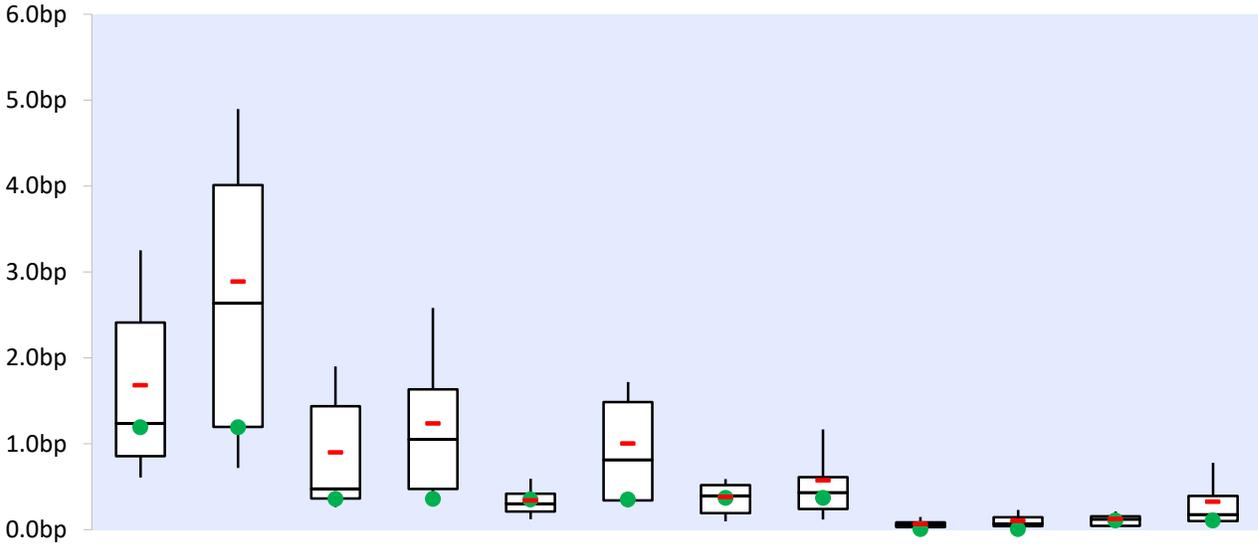
Total costs are benchmarked in the previous section. In this section, your fund's costs are compared on a line-item basis to your peers. This enables you to understand better why you may be a high or low cost fund and it also identifies and quantifies major cost differences that may warrant further investigation.

The 25th to 75th percentile range is the most relevant since higher and lower values may include outliers caused by unusual circumstances, such as performance-based fees. Count refers to the number of funds in your peer group that have costs in this category. It enables you to gauge the statistical significance.



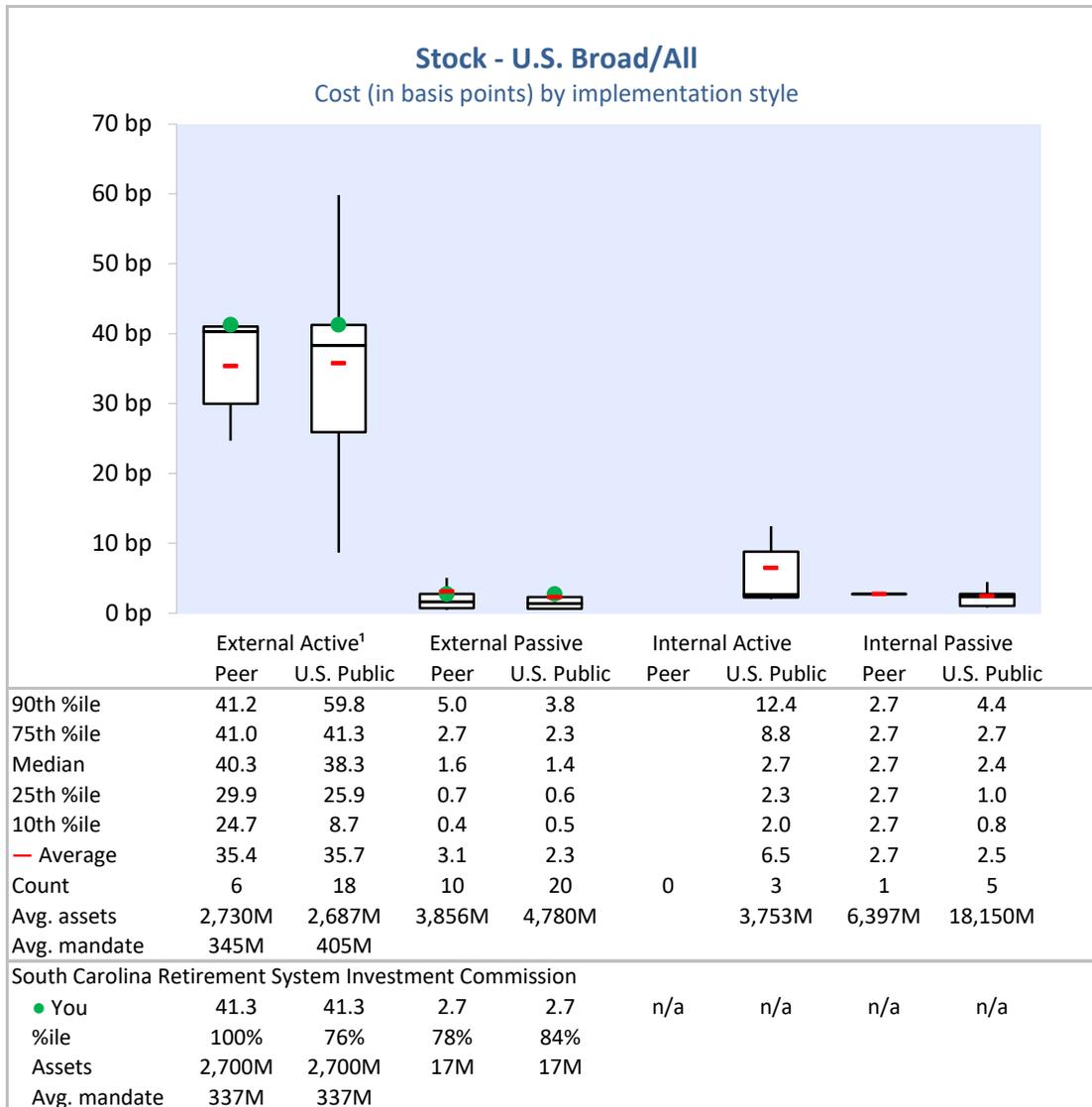
Governance, operations & support

Cost as a % of total plan assets



	<u>Total</u>		<u>Oversight¹</u>		<u>Consulting & Perf. Meas.</u>		<u>Custody</u>		<u>Audit</u>		<u>Other</u>	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	3.3	4.9	1.9	2.6	0.6	1.7	0.6	1.2	0.1	0.2	0.2	0.8
75th %ile	2.4	4.0	1.4	1.6	0.4	1.5	0.5	0.6	0.1	0.1	0.2	0.4
Median	1.2	2.6	0.5	1.1	0.3	0.8	0.4	0.4	0.1	0.1	0.1	0.2
25th %ile	0.9	1.2	0.4	0.5	0.2	0.3	0.2	0.2	0.0	0.0	0.0	0.1
10th %ile	0.6	0.7	0.3	0.3	0.1	0.3	0.1	0.1	0.0	0.0	0.0	0.0
— Average	1.7	2.9	0.9	1.2	0.3	1.0	0.4	0.6	0.1	0.1	0.1	0.3
Count	19	60	19	60	15	47	18	58	16	52	15	41
Avg. assets	36,534M	46,290M	36,534M	46,290M	36,534M	46,290M	36,534M	46,290M	36,534M	46,290M	36,534M	46,290M
South Carolina Retirement System Investment Commission												
● You	1.2	1.2	0.4	0.4	0.4	0.4	0.4	0.4	0.0	0.0	0.1	0.1
%ile	39%	24%	17%	14%	71%	26%	47%	37%	0%	0%	43%	28%
Plan assets	30,499M	30,499M	30,499M	30,499M	30,499M	30,499M	30,499M	30,499M	30,499M	30,499M	30,499M	30,499M

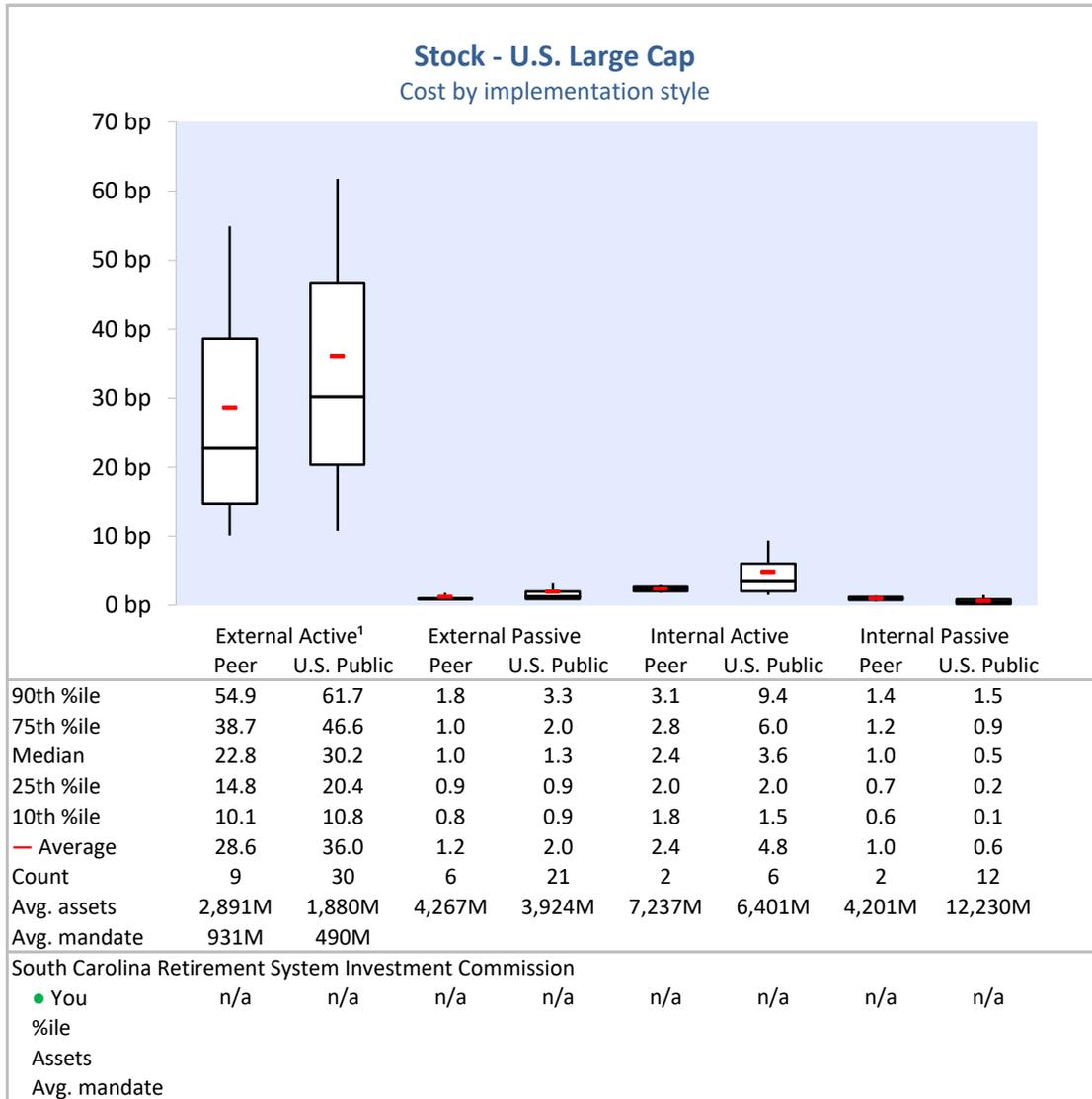
1. Oversight costs include the salaries and benefits of executives and their staff responsible for overseeing the entire fund or multiple asset classes and the fees/salaries of the Board or Investment Committee. All costs associated with the above including fees/salaries, travel, director's insurance and attributed overhead are included. Given fiduciary obligations, having the lowest oversight costs is not necessarily optimal. Some sponsors with lower-than-average executive and administration costs compensate by having-higher-than average consulting costs.



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	38.5	30.7	30.1
Performance fees*	n/a	3.6	3.4
Internal and other	<u>2.7</u>	<u>1.1</u>	<u>2.2</u>
Total	41.3	35.4	35.7

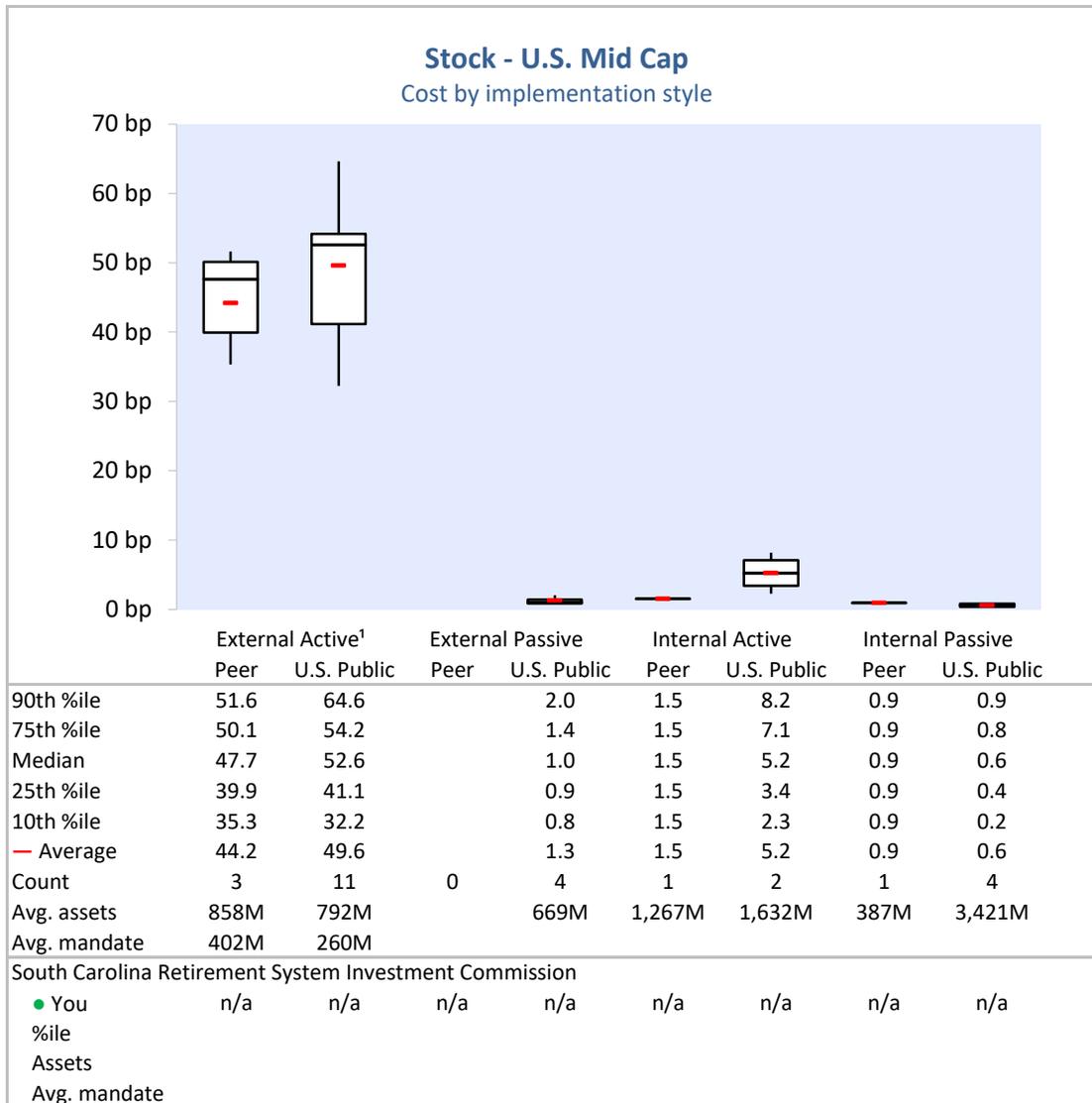
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 3.0 bps for peers (21 funds) and 8.8 bps for U.S. Public participants (7 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	25.4	32.4
Performance fees*	n/a	2.9	3.3
Internal and other	<u>n/a</u>	<u>0.3</u>	<u>0.3</u>
Total	n/a	28.6	36.0

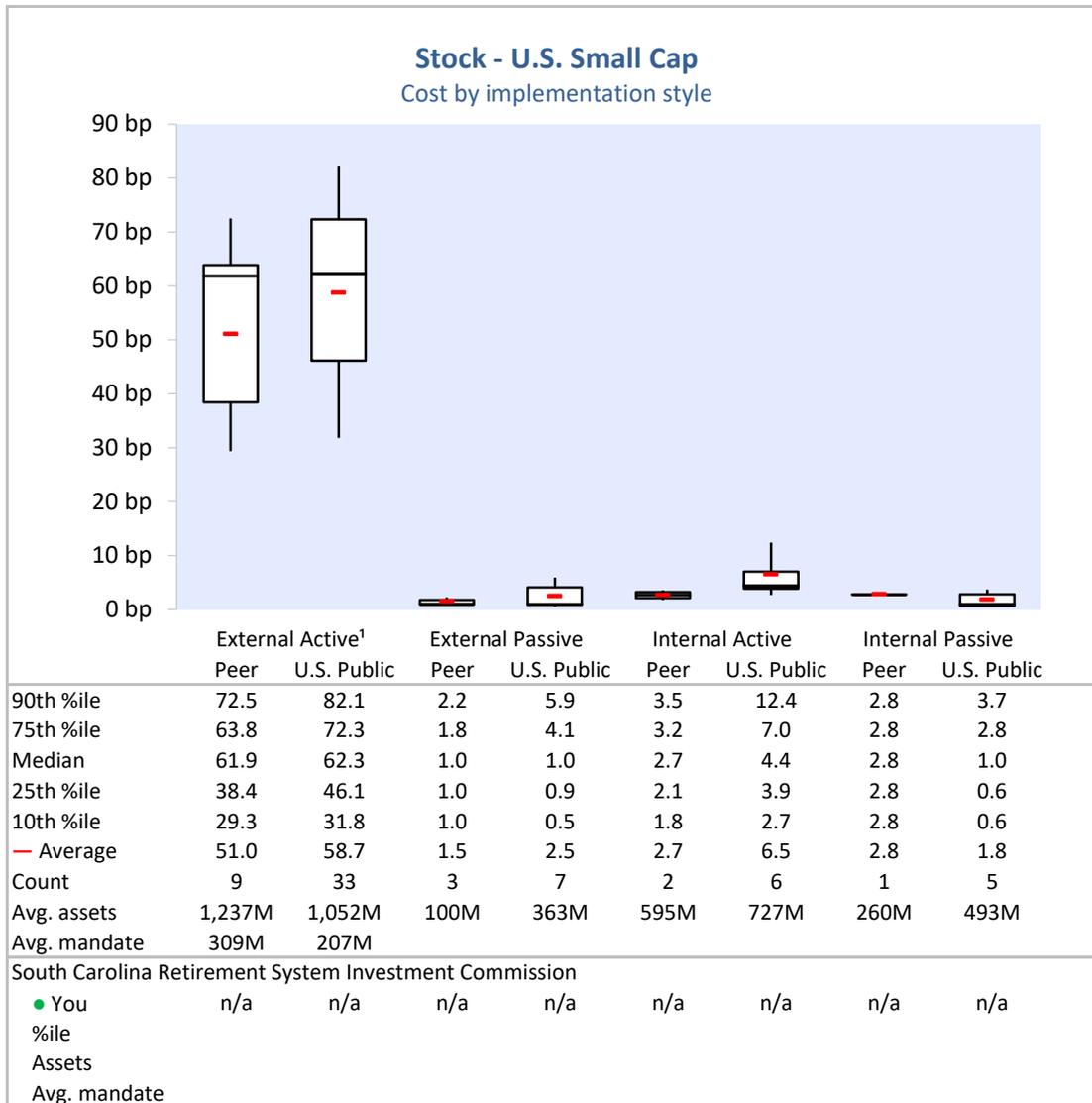
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 5.3 bps for peers (5 funds) and 7.6 bps for U.S. Public participants (13 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	43.9	49.1
Performance fees*	n/a	n/a	0.0
Internal and other	<u>n/a</u>	<u>0.3</u>	<u>0.5</u>
Total	n/a	44.2	49.6

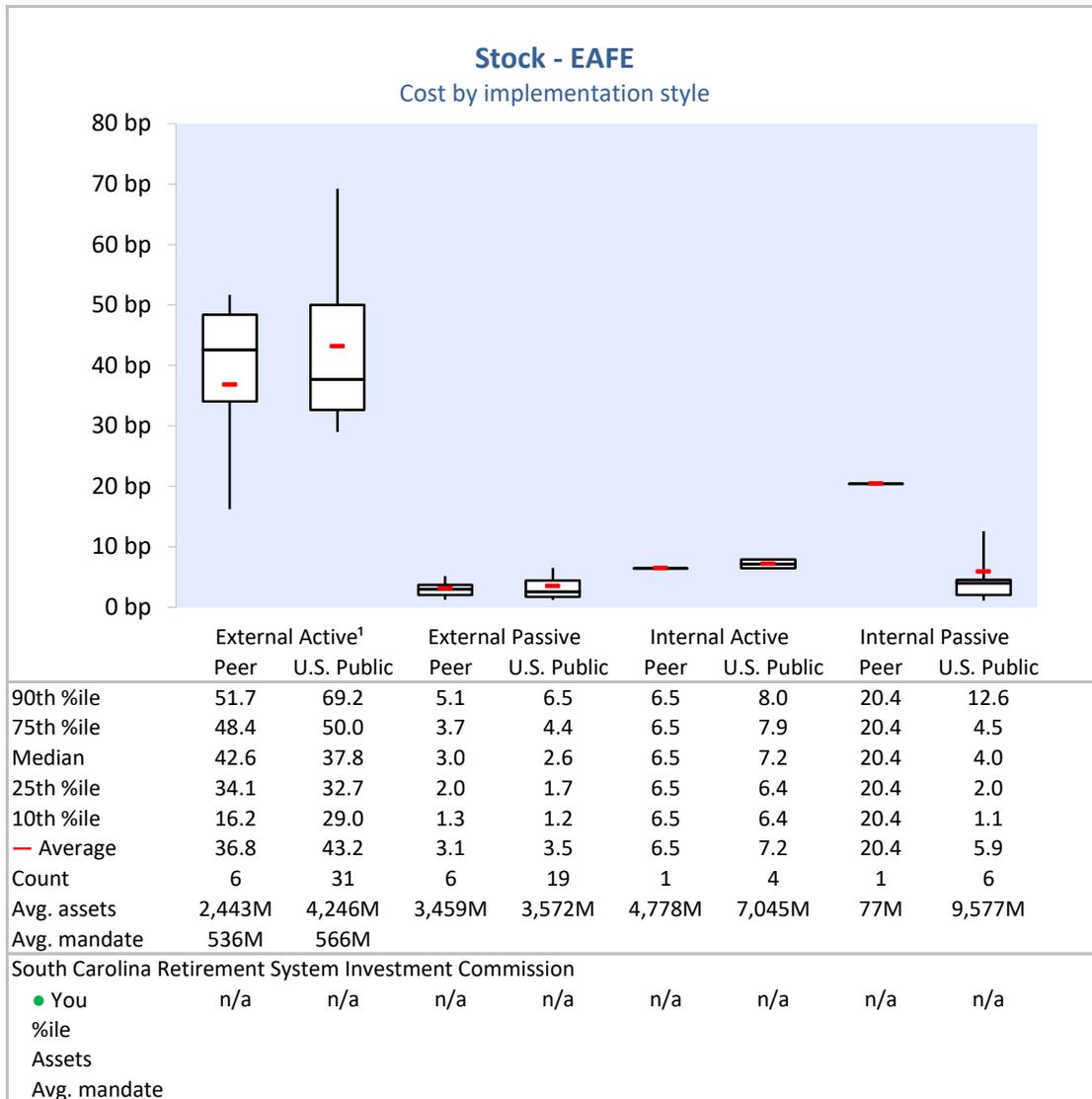
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for U.S. Public participants (2 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	51.0	56.7
Performance fees*	n/a	-0.2	1.0
Internal and other	<u>n/a</u>	<u>0.3</u>	<u>1.1</u>
Total	n/a	51.0	58.7

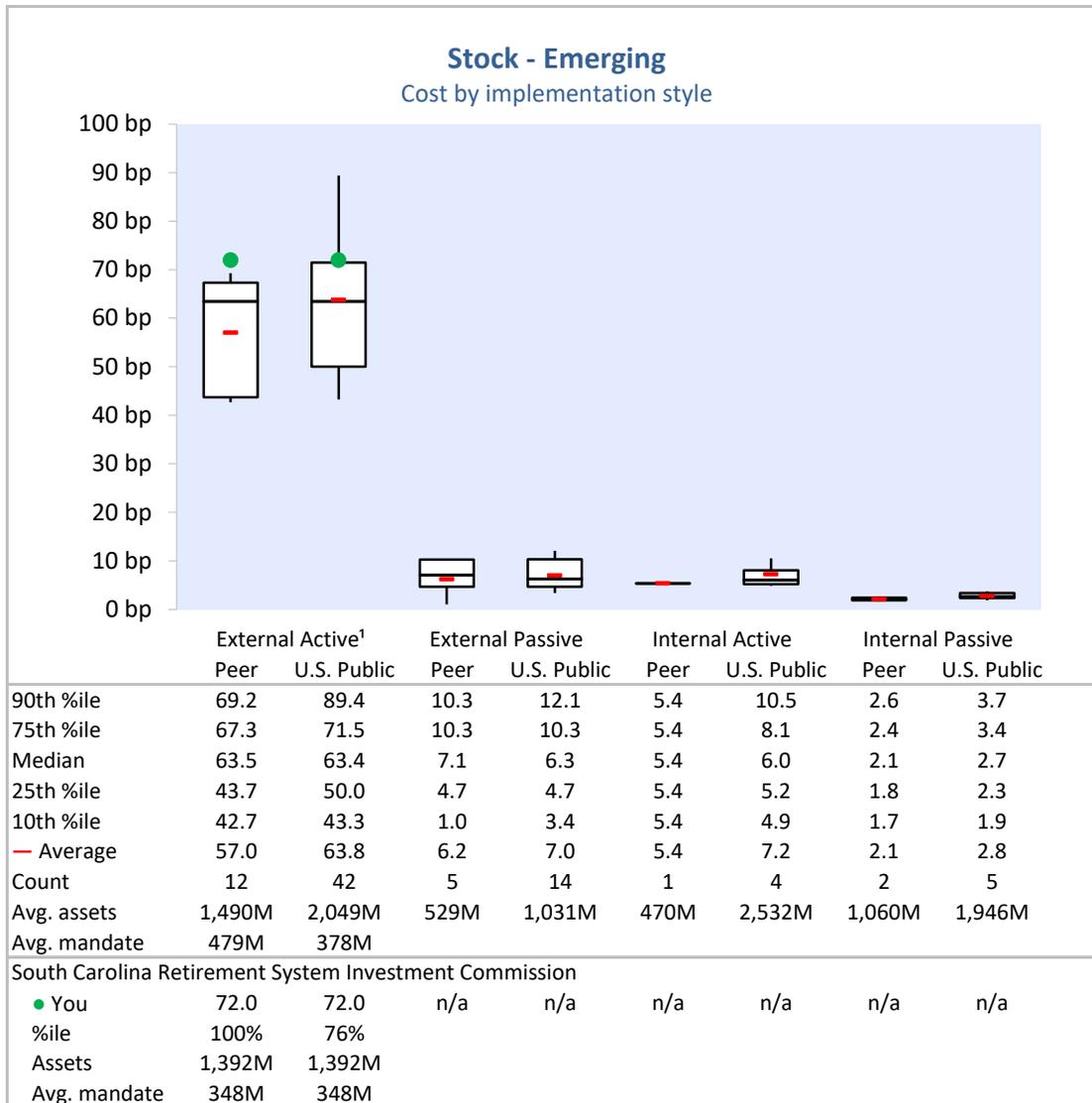
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is -0.5 bps for peers (4 funds) and 3.6 bps for U.S. Public participants (9 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	35.6	39.0
Performance fees*	n/a	1.1	3.8
Internal and other	<u>n/a</u>	<u>0.2</u>	<u>0.4</u>
Total	n/a	36.8	43.2

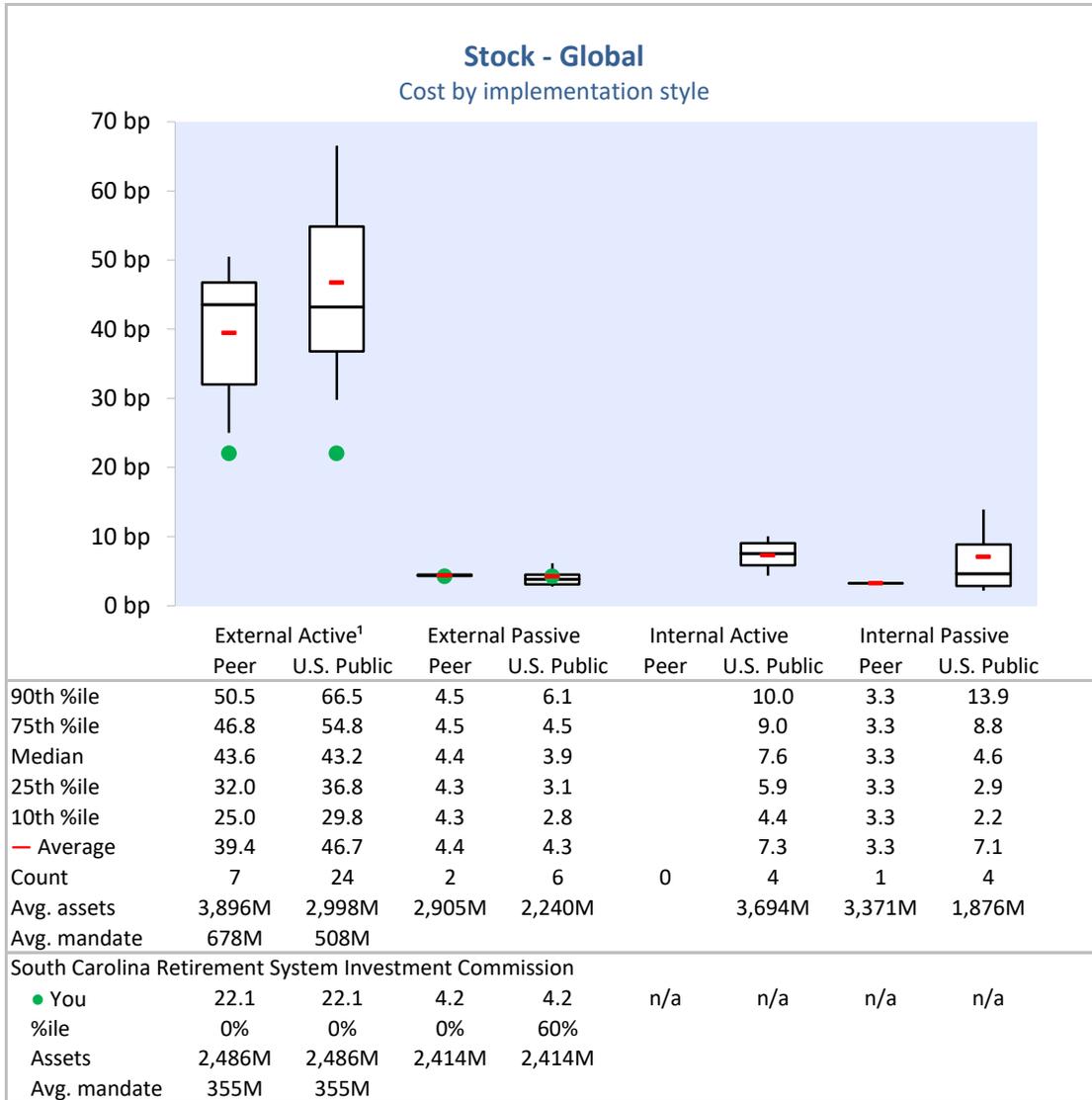
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 2.3 bps for peers (3 funds) and 14.6 bps for U.S. Public participants (8 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	69.2	55.9	62.4
Performance fees*	n/a	0.4	0.7
Internal and other	2.7	0.7	0.6
Total	72.0	57.0	63.8

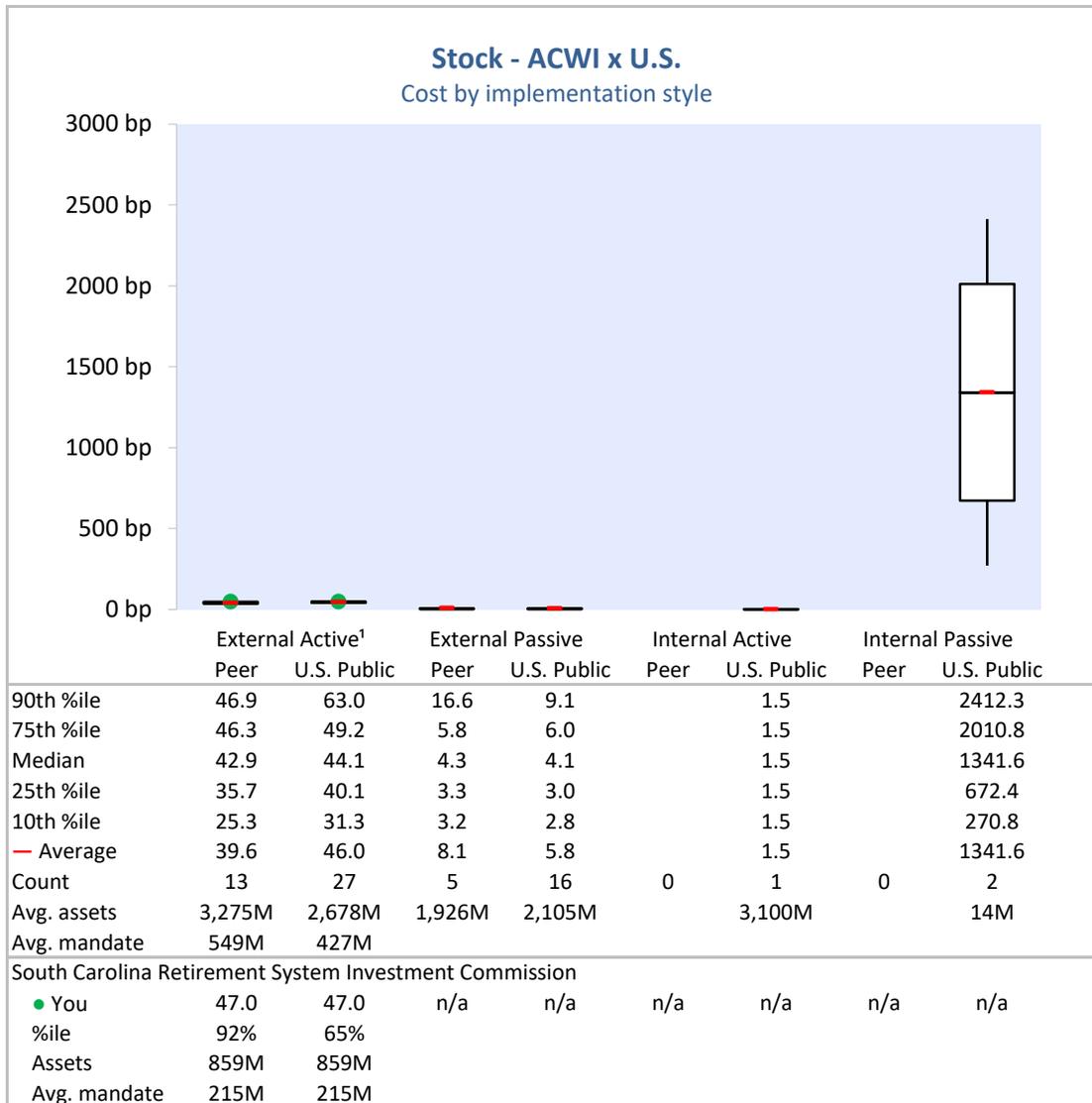
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 1.1 bps for peers (4 funds) and 2.9 bps for U.S. Public participants (10 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	19.3	37.7	41.0
Performance fees*	n/a	0.8	5.2
Internal and other	2.7	1.0	0.5
Total	22.1	39.4	46.7

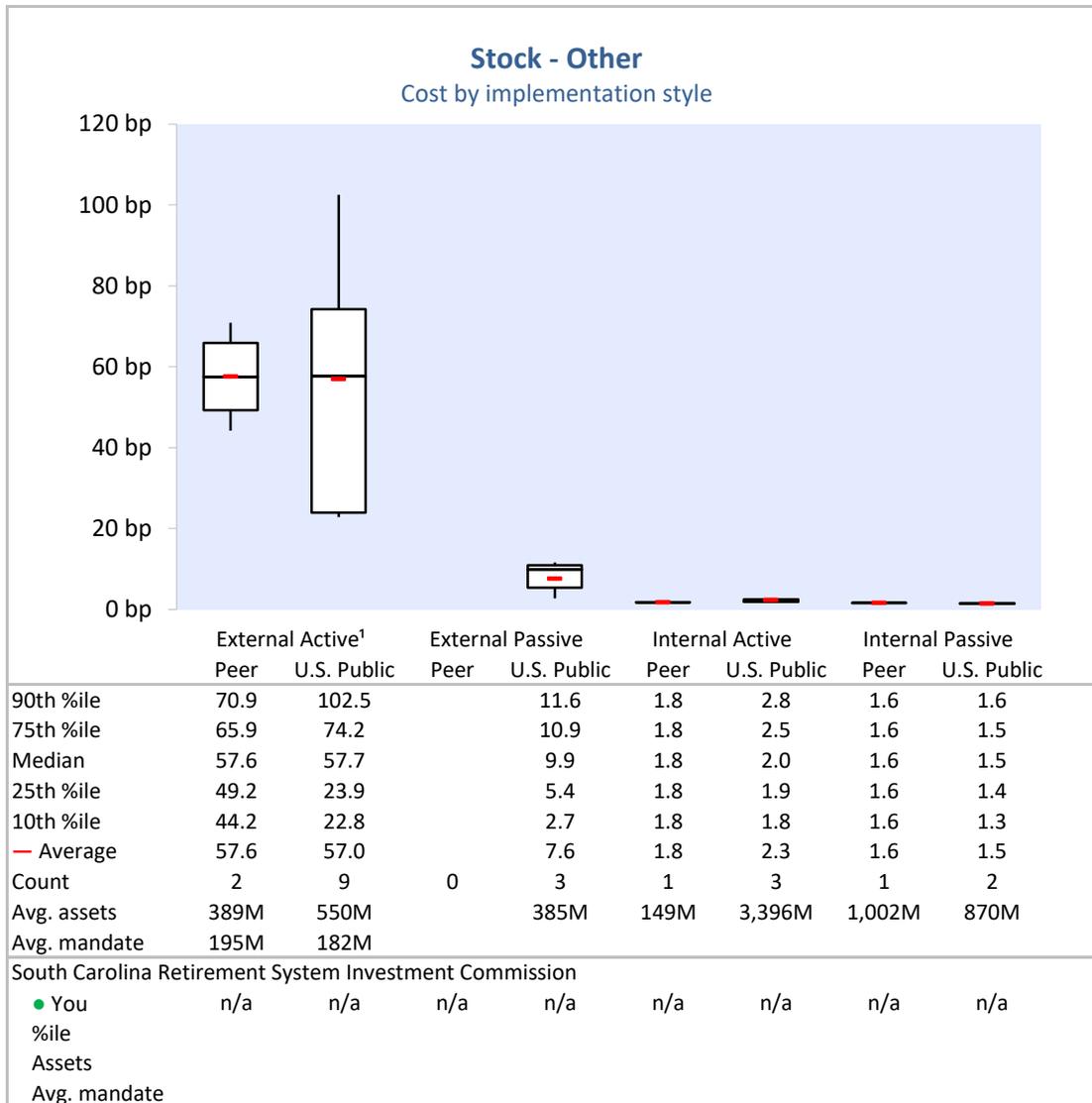
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 1.8 bps for peers (3 funds) and 13.8 bps for U.S. Public participants (9 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	44.2	36.4	43.2
Performance fees*	n/a	2.7	2.2
Internal and other	2.7	0.4	0.6
Total	47.0	39.6	46.0

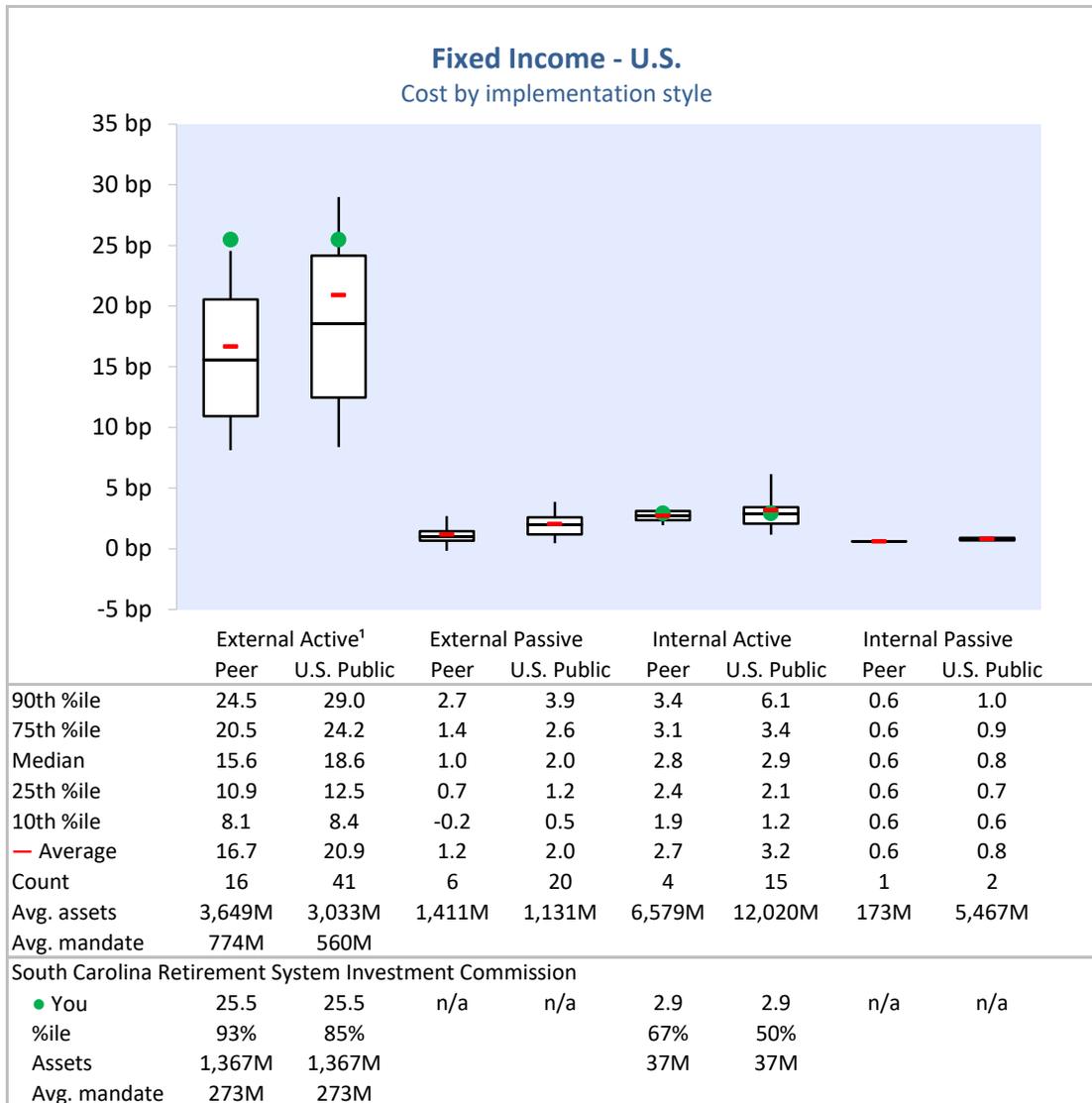
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 7.1 bps for peers (5 funds) and 6.1 bps for U.S. Public participants (10 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	57.6	56.7
Performance fees*	n/a	n/a	0.0
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>0.2</u>
Total	n/a	57.6	57.0

* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for U.S. Public participants (1 fund).

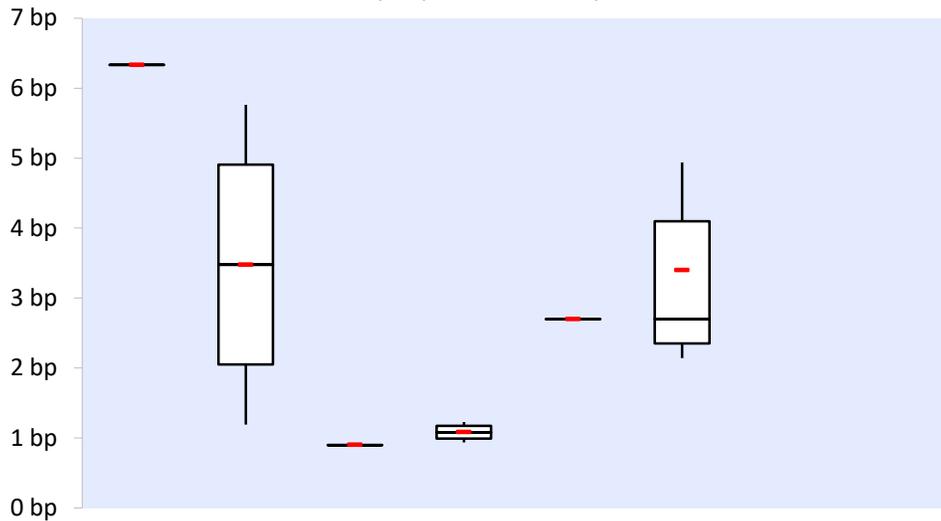


1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	22.7	15.7	17.9
Performance fees*	n/a	0.4	2.4
Internal and other	2.7	0.6	0.6
Total	25.5	16.7	20.9

* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 1.3 bps for peers (5 funds) and 8.3 bps for U.S. Public participants (12 funds).

Fixed Income - U.S. Gov't Cost by implementation style



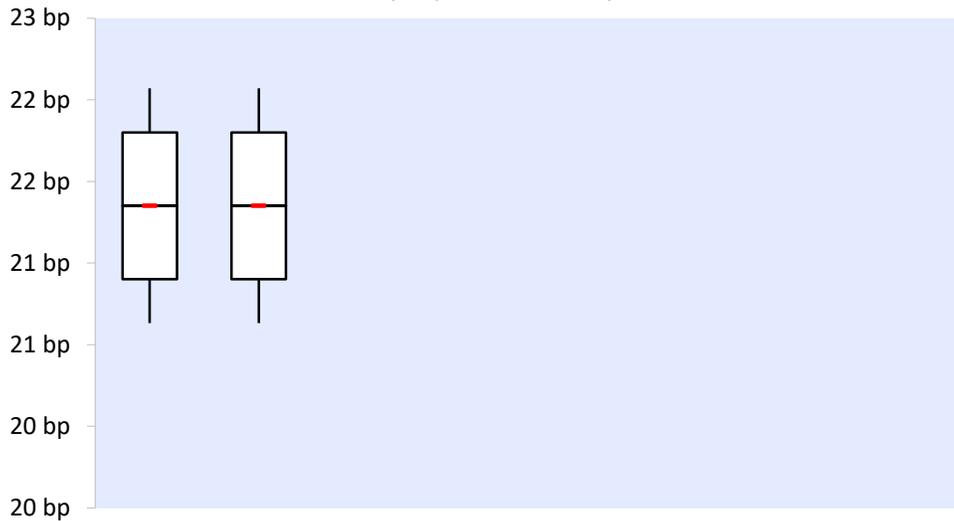
	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	6.3	5.8	0.9	1.2	2.7	4.9		
75th %ile	6.3	4.9	0.9	1.2	2.7	4.1		
Median	6.3	3.5	0.9	1.1	2.7	2.7		
25th %ile	6.3	2.0	0.9	1.0	2.7	2.3		
10th %ile	6.3	1.2	0.9	0.9	2.7	2.1		
— Average	6.3	3.5	0.9	1.1	2.7	3.4		
Count	1	2	1	2	1	3	0	0
Avg. assets	1,670M	12,538M	11,395M	6,523M	3,504M	2,368M		
Avg. mandate		23,406M						
South Carolina Retirement System Investment Commission								
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile								
Assets								
Avg. mandate								

1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	5.7	3.1
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>0.7</u>	<u>0.3</u>
Total	n/a	6.3	3.5

No funds reported a performance fee.

Fixed Income - U.S. Credits Cost by implementation style

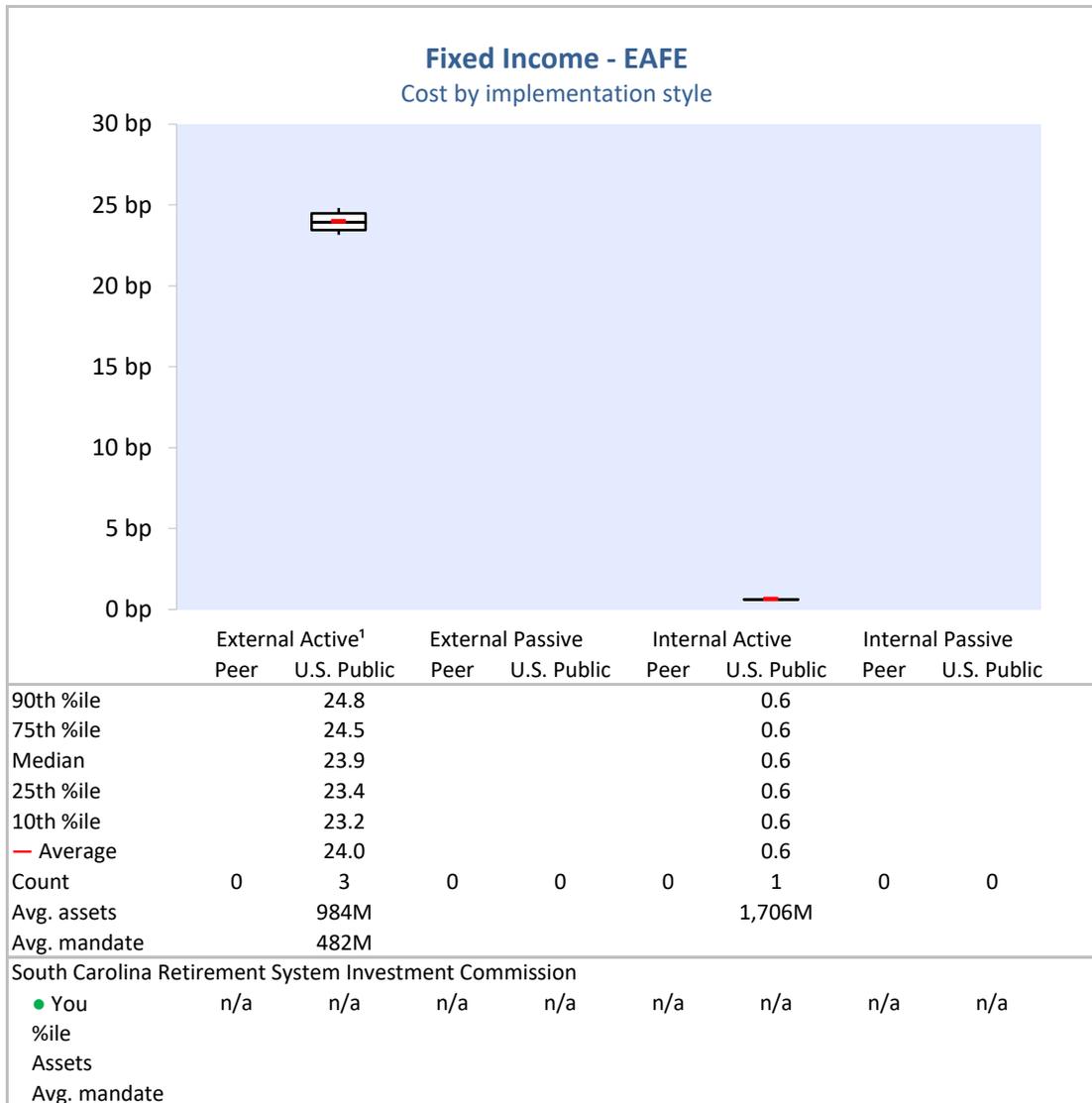


	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	22.1	22.1						
75th %ile	21.8	21.8						
Median	21.4	21.4						
25th %ile	20.9	20.9						
10th %ile	20.6	20.6						
— Average	21.4	21.4						
Count	2	2	0	0	0	0	0	0
Avg. assets	1,302M	1,302M						
Avg. mandate	307M	307M						
South Carolina Retirement System Investment Commission								
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile								
Assets								
Avg. mandate								

1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	21.2	21.2
Performance fees*	n/a	0.0	0.0
Internal and other	<u>n/a</u>	<u>0.1</u>	<u>0.1</u>
Total	n/a	21.4	21.4

* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for peers (1 fund) and 0.0 bps for U.S. Public participants (1 fund).

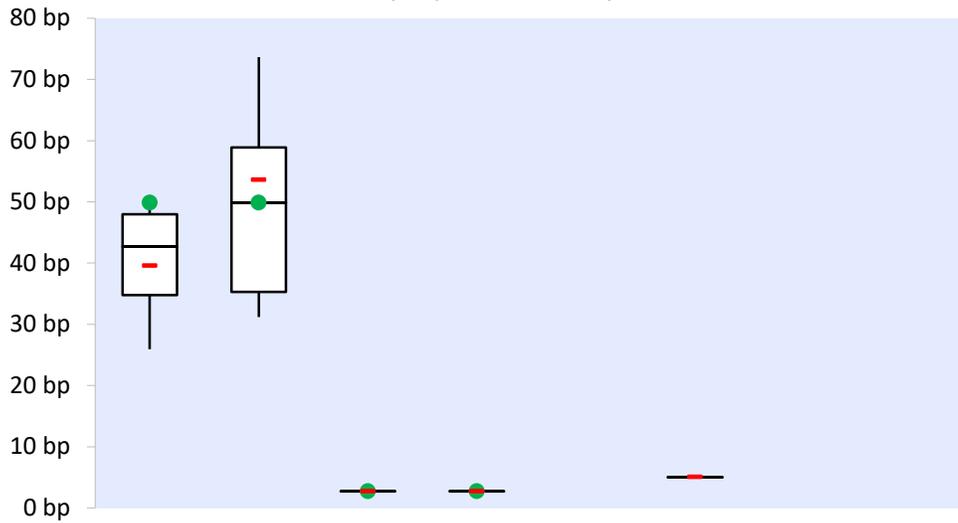


1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	n/a	18.9
Performance fees*	n/a	n/a	4.8
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>0.2</u>
Total	n/a	n/a	24.0

* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 14.5 bps for U.S. Public participants (1 fund).

Fixed Income - Emerging Cost by implementation style

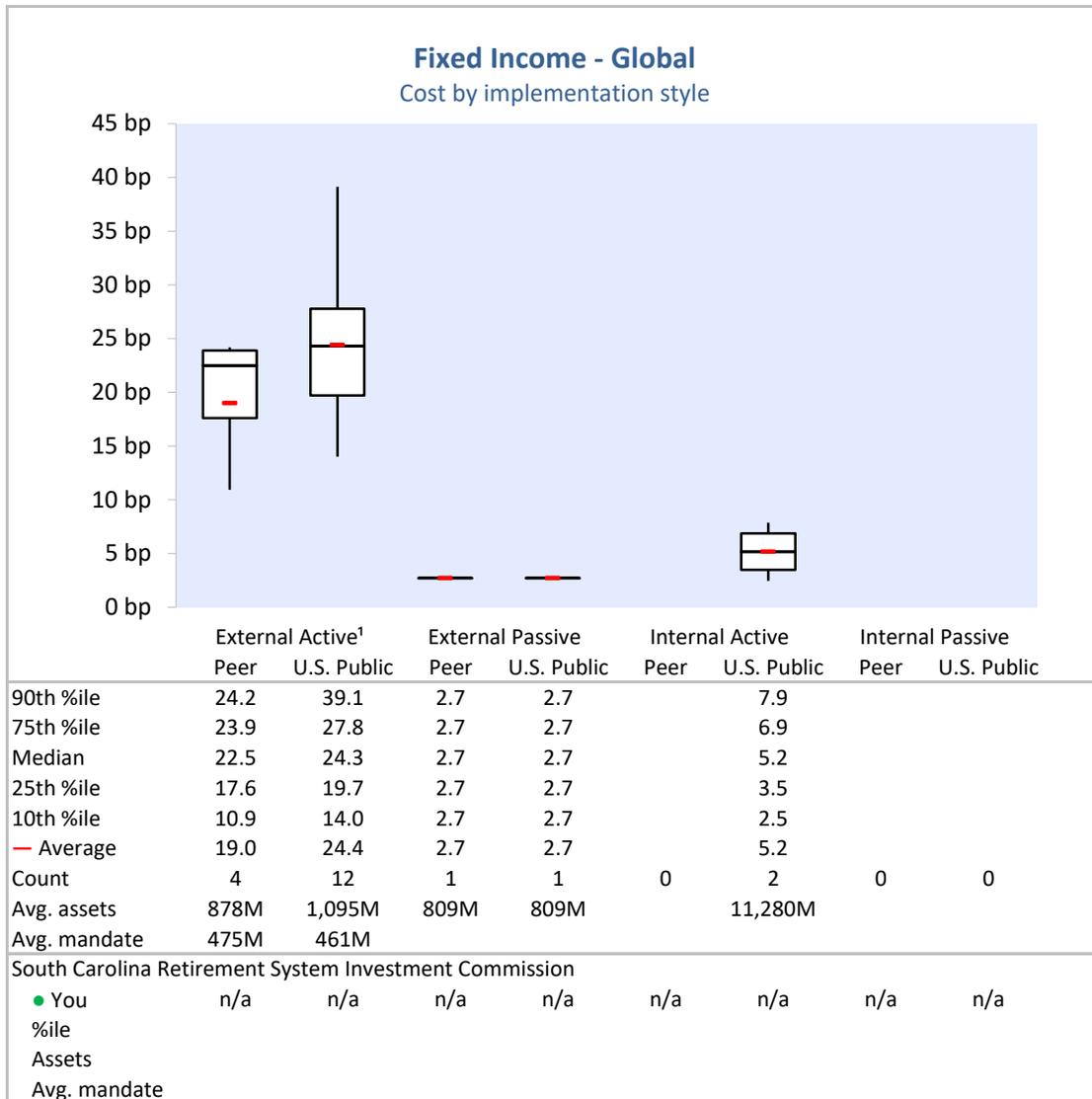


	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	49.9	73.6	2.7	2.7		5.0		
75th %ile	48.0	58.9	2.7	2.7		5.0		
Median	42.7	49.9	2.7	2.7		5.0		
25th %ile	34.8	35.3	2.7	2.7		5.0		
10th %ile	25.9	31.2	2.7	2.7		5.0		
— Average	39.6	53.6	2.7	2.7		5.0		
Count	11	27	1	1	0	1	0	0
Avg. assets	998M	1,116M	21M	21M		1,546M		
Avg. mandate	377M	312M						
South Carolina Retirement System Investment Commission								
● You	49.9	49.9	2.7	2.7	n/a	n/a	n/a	n/a
%ile	90%	50%	100%	100%				
Assets	1,573M	1,573M	21M	21M				
Avg. mandate	225M	225M						

1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	47.1	36.1	47.0
Performance fees*	n/a	2.9	6.2
Internal and other	2.7	0.6	0.4
Total	49.9	39.6	53.6

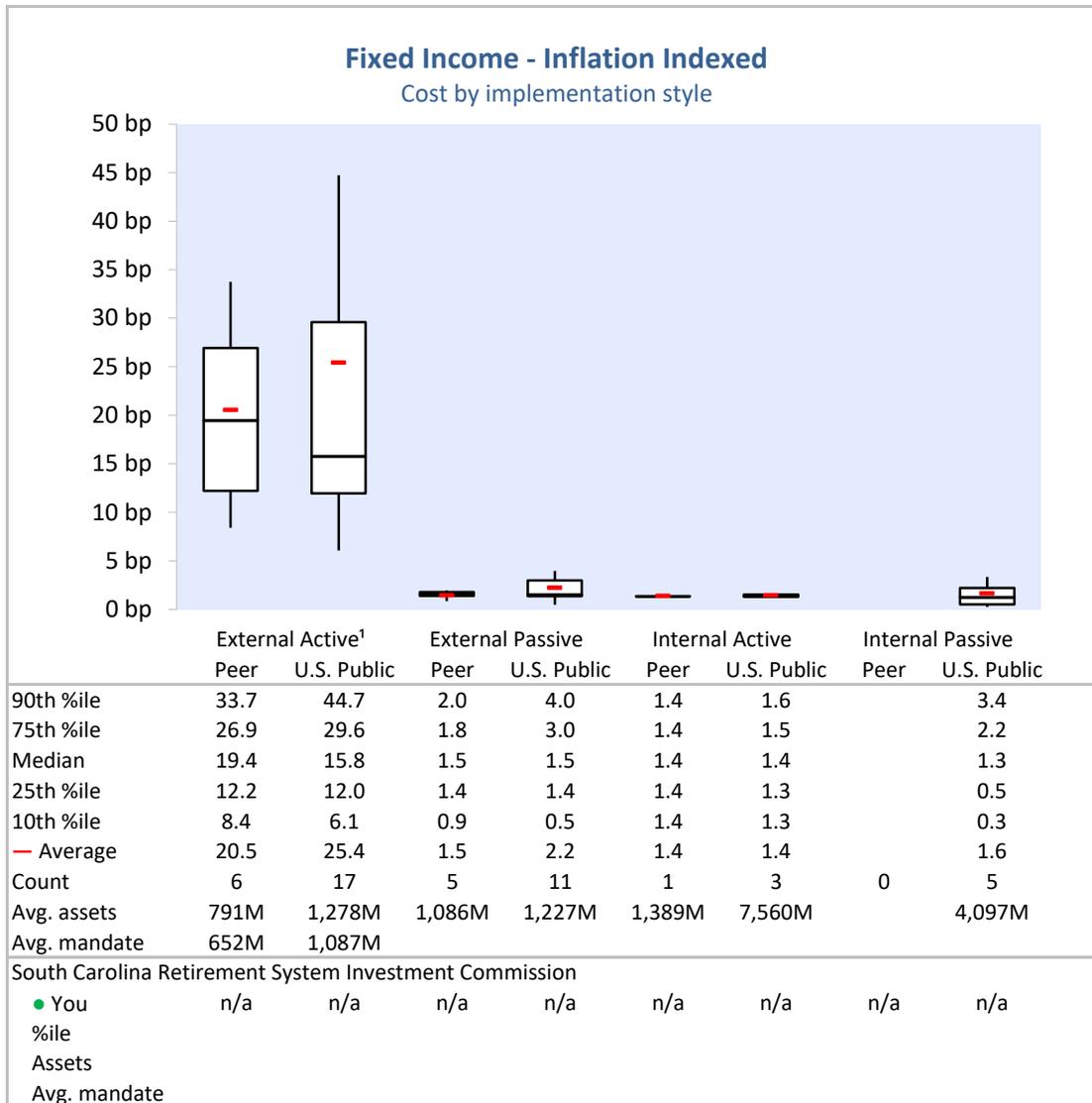
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 6.3 bps for peers (5 funds) and 18.6 bps for U.S. Public participants (9 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	18.7	24.2
Performance fees*	n/a	n/a	0.0
Internal and other	<u>n/a</u>	<u>0.2</u>	<u>0.2</u>
Total	n/a	19.0	24.4

* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for U.S. Public participants (3 funds).

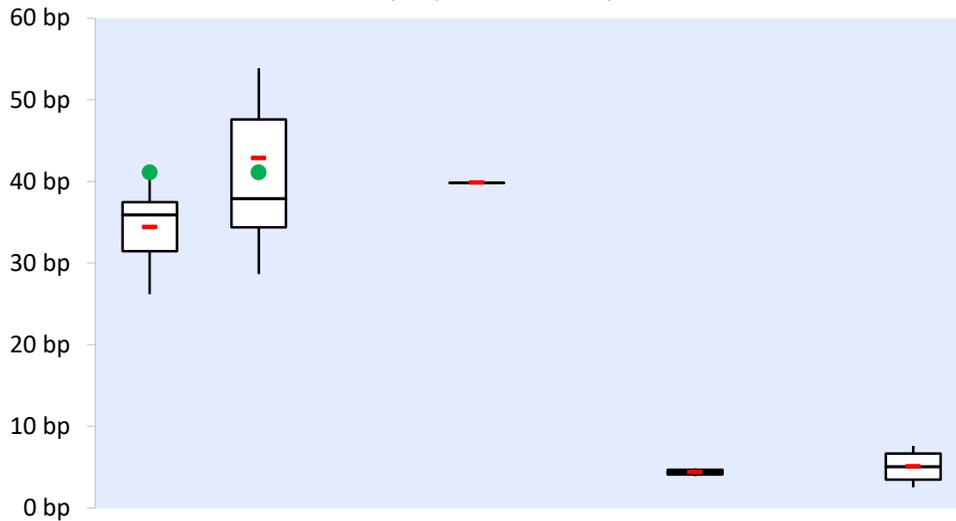


1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	20.3	24.3
Performance fees*	n/a	0.0	0.9
Internal and other	<u>n/a</u>	<u>0.3</u>	<u>0.2</u>
Total	n/a	20.5	25.4

* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for peers (1 fund) and 3.6 bps for U.S. Public participants (4 funds).

Fixed Income - High Yield Cost by implementation style



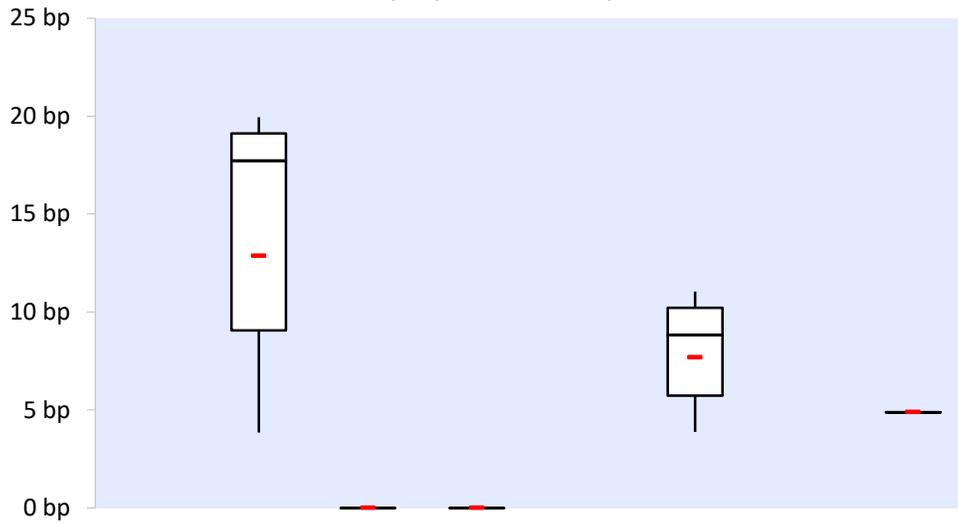
	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	40.5	53.9		39.8		4.8		7.6
75th %ile	37.5	47.6		39.8		4.7		6.7
Median	35.9	37.9		39.8		4.4		5.1
25th %ile	31.5	34.4		39.8		4.1		3.5
10th %ile	26.2	28.6		39.8		3.9		2.5
— Average	34.4	42.9		39.8		4.4		5.1
Count	10	31	0	1	0	2	0	2
Avg. assets	894M	1,266M		60M		751M		181M
Avg. mandate	385M	294M						
South Carolina Retirement System Investment Commission								
● You	41.1	41.1	n/a	n/a	n/a	n/a	n/a	n/a
%ile	100%	67%						
Assets	2,052M	2,052M						
Avg. mandate	342M	342M						

1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	38.4	32.5	40.9
Performance fees*	n/a	1.4	0.9
Internal and other	2.7	0.6	1.0
Total	41.1	34.4	42.9

* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 3.4 bps for peers (4 funds) and 3.9 bps for U.S. Public participants (7 funds).

Fixed Income - Mortgages Cost by implementation style



	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile		19.9	0.0	0.0		11.0		4.9
75th %ile		19.1	0.0	0.0		10.2		4.9
Median		17.7	0.0	0.0		8.8		4.9
25th %ile		9.1	0.0	0.0		5.7		4.9
10th %ile		3.8	0.0	0.0		3.9		4.9
— Average		12.9	0.0	0.0		7.7		4.9
Count	0	3	1	1	0	3	0	1
Avg. assets		677M	37M	37M		4,610M		801M
Avg. mandate		69M						
South Carolina Retirement System Investment Commission								
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile								
Assets								
Avg. mandate								

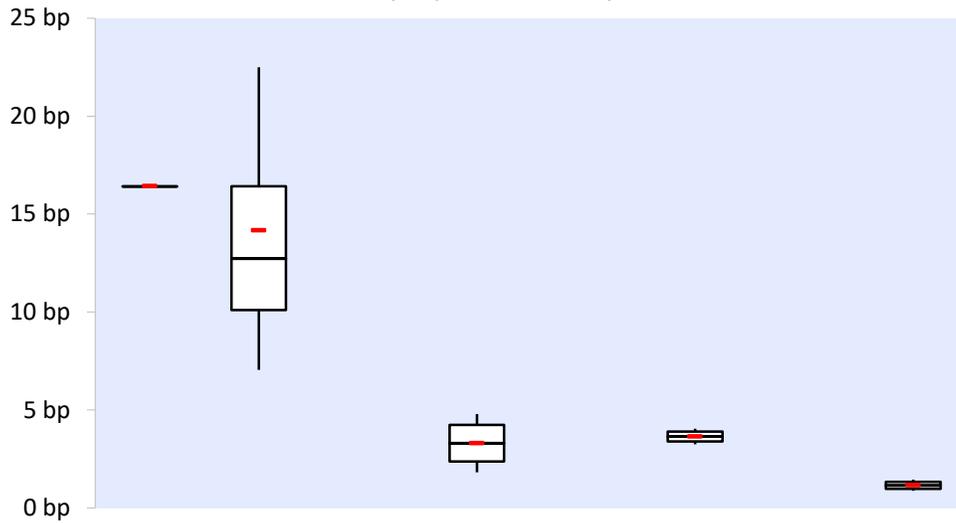
1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	n/a	12.7
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>0.1</u>
Total	n/a	n/a	12.9

No funds reported a performance fee.

Fixed Income - Long Bonds

Cost by implementation style



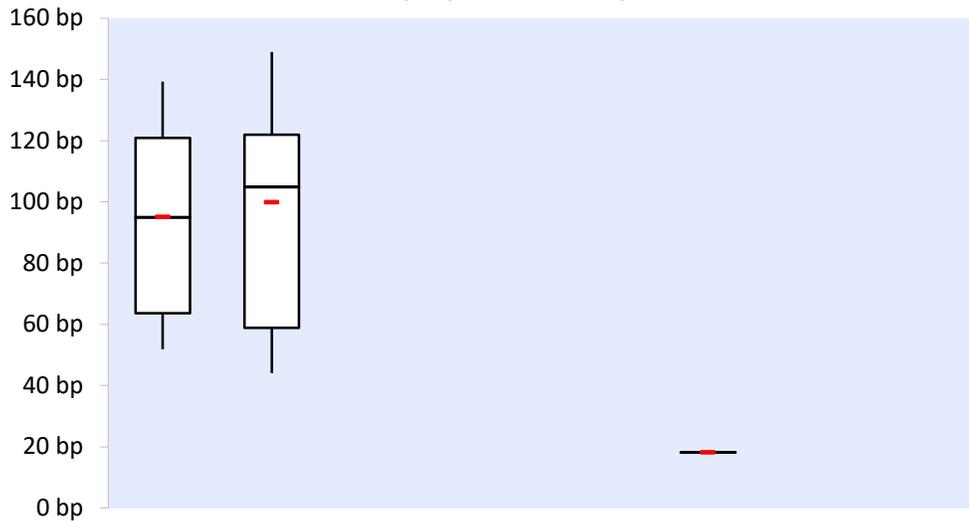
	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	16.4	22.5		4.8		4.0		1.4
75th %ile	16.4	16.4		4.2		3.9		1.3
Median	16.4	12.7		3.3		3.6		1.2
25th %ile	16.4	10.1		2.4		3.4		1.0
10th %ile	16.4	7.1		1.8		3.3		0.9
— Average	16.4	14.2		3.3		3.6		1.2
Count	1	5	0	2	0	2	0	2
Avg. assets	2,048M	4,608M		747M		3,856M		7,092M
Avg. mandate	1,024M	1,108M						
South Carolina Retirement System Investment Commission								
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile								
Assets								
Avg. mandate								

1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	15.4	12.4
Performance fees*	n/a	n/a	1.4
Internal and other	<u>n/a</u>	<u>1.0</u>	<u>0.4</u>
Total	n/a	16.4	14.2

* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 6.8 bps for U.S. Public participants (1 fund).

Fixed Income - Private Debt Cost by implementation style

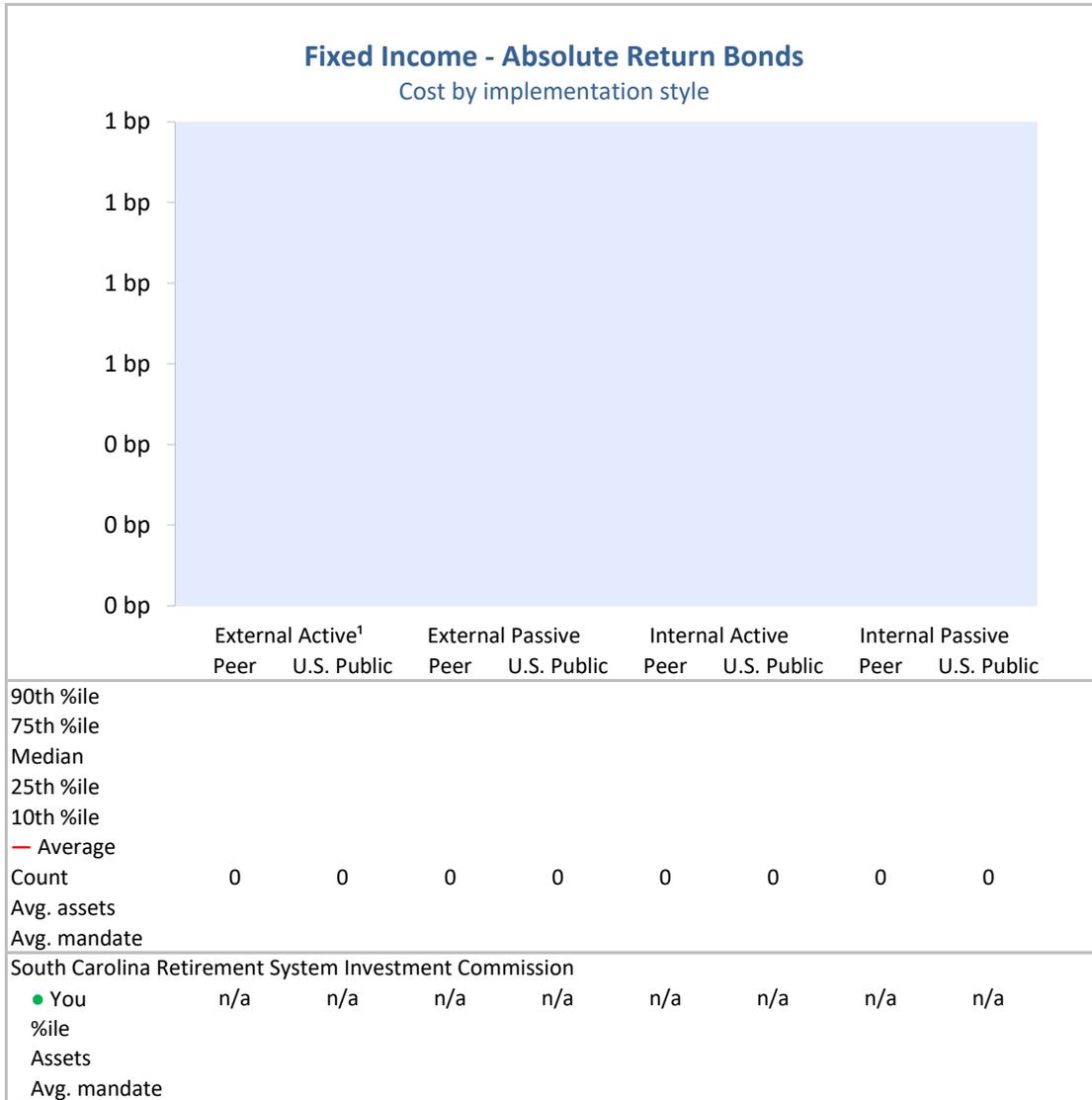


	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	139.3	148.9				18.1		
75th %ile	120.9	121.9				18.1		
Median	95.0	104.9				18.1		
25th %ile	63.6	58.8				18.1		
10th %ile	51.8	44.1				18.1		
— Average	95.0	99.9				18.1		
Count	5	12	0	0	0	1	0	0
Avg. assets	1,438M	1,306M				494M		
Avg. mandate	143M	217M						
South Carolina Retirement System Investment Commission								
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile								
Assets								
Avg. mandate								

1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	94.3	90.0
Performance fees*	n/a	0.0	8.9
Internal and other	<u>n/a</u>	<u>0.7</u>	<u>0.9</u>
Total	n/a	95.0	99.9

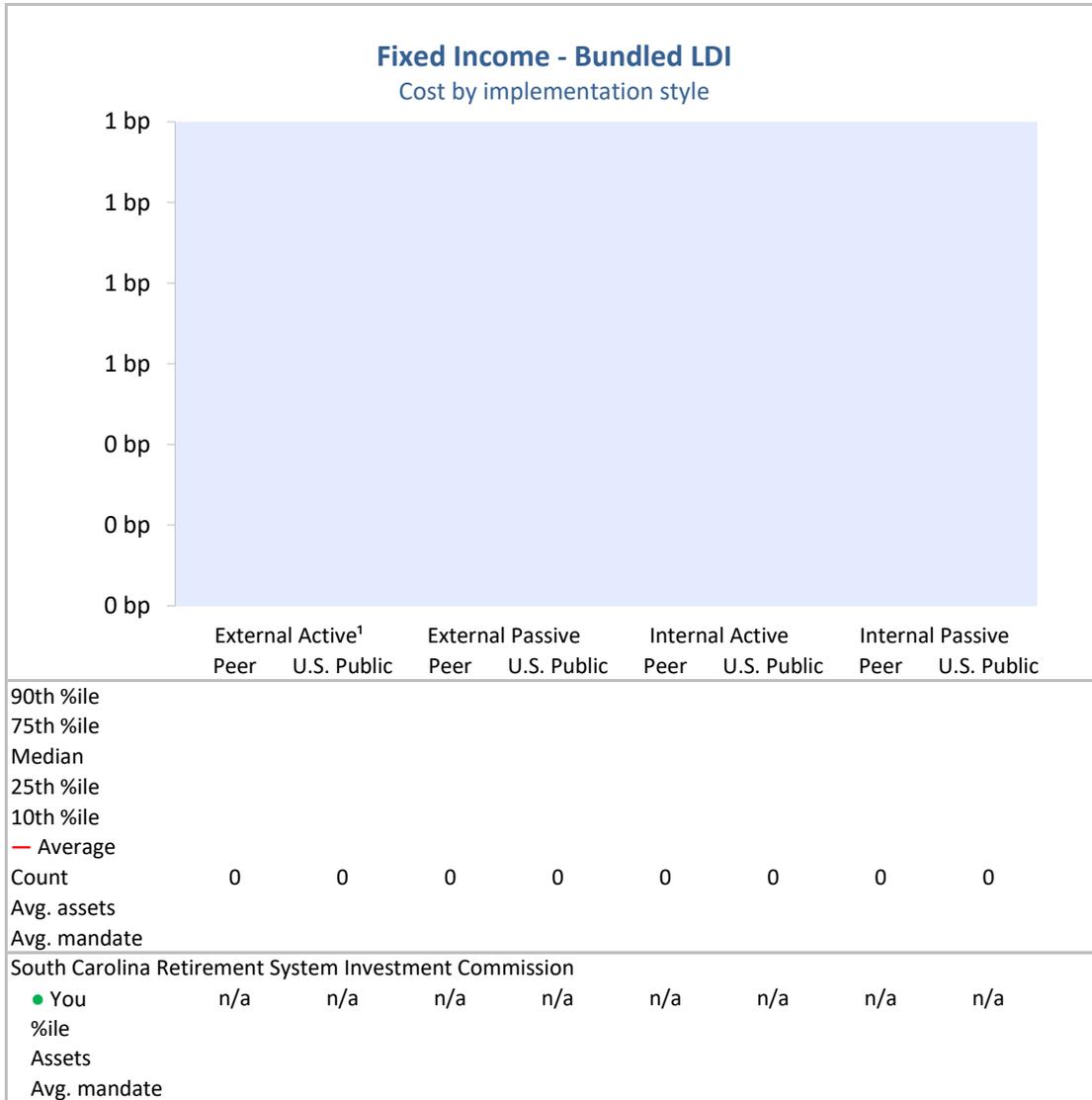
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for peers (2 funds) and 21.4 bps for U.S. Public participants (5 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	n/a	n/a
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
Total	n/a	n/a	n/a

No funds reported a performance fee.

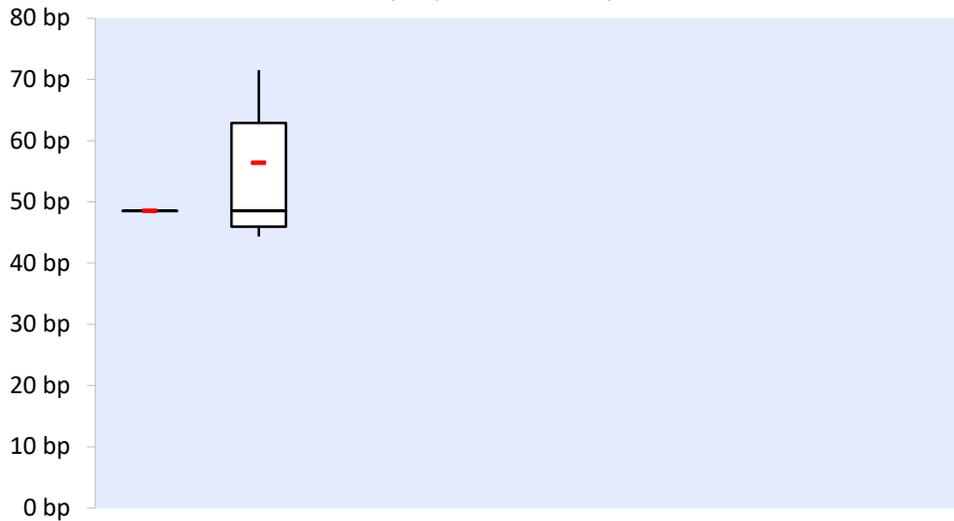


1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	n/a	n/a
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
Total	n/a	n/a	n/a

No funds reported a performance fee.

Fixed Income - Convertibles Cost by implementation style

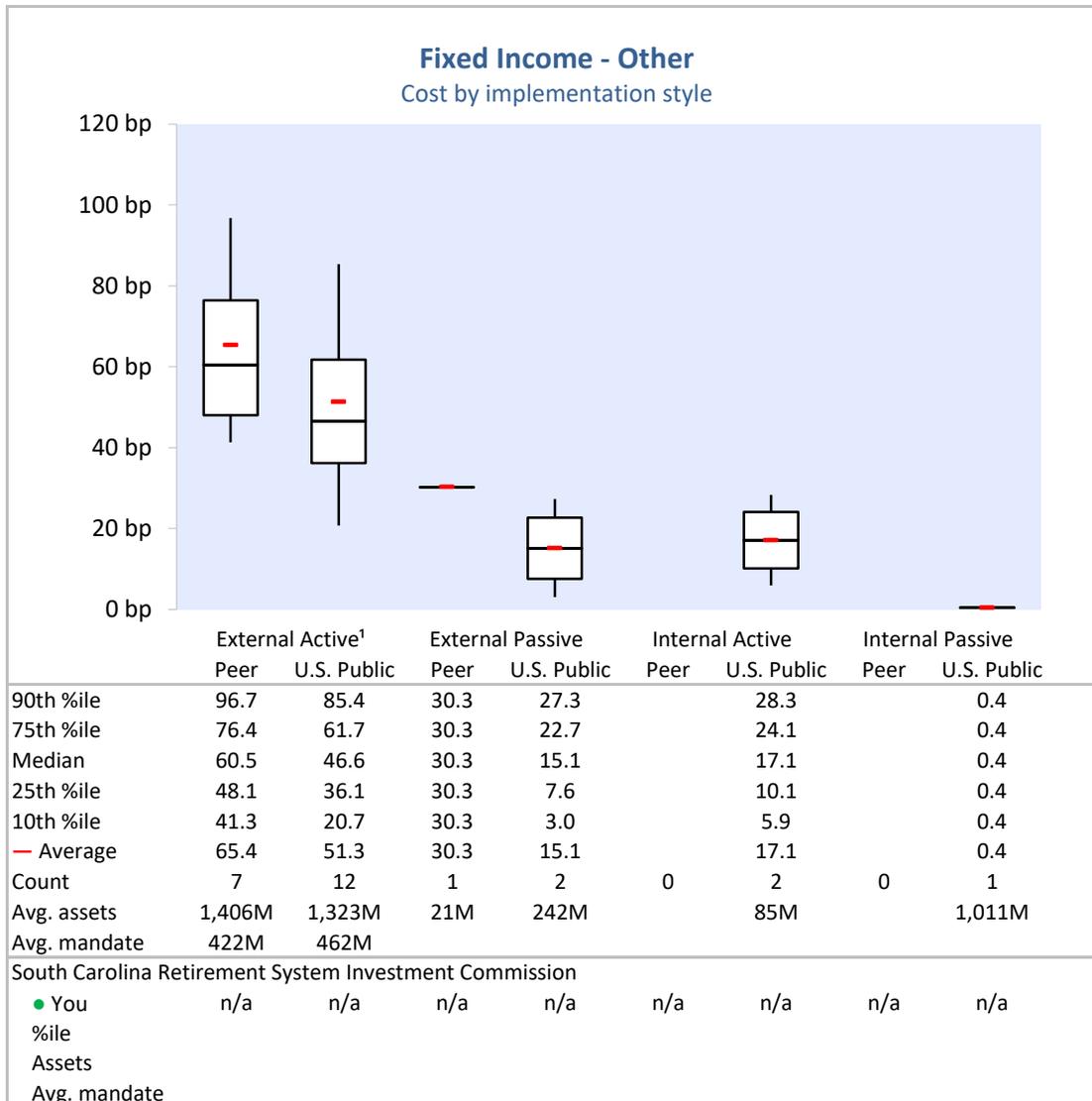


	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	48.5	71.5						
75th %ile	48.5	62.9						
Median	48.5	48.5						
25th %ile	48.5	45.9						
10th %ile	48.5	44.4						
— Average	48.5	56.4						
Count	1	3	0	0	0	0	0	0
Avg. assets	2,550M	1,523M						
Avg. mandate	638M	391M						
South Carolina Retirement System Investment Commission								
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile								
Assets								
Avg. mandate								

1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	47.1	55.9
Performance fees*	n/a	0.0	0.0
Internal and other	<u>n/a</u>	<u>1.4</u>	<u>0.5</u>
Total	n/a	48.5	56.4

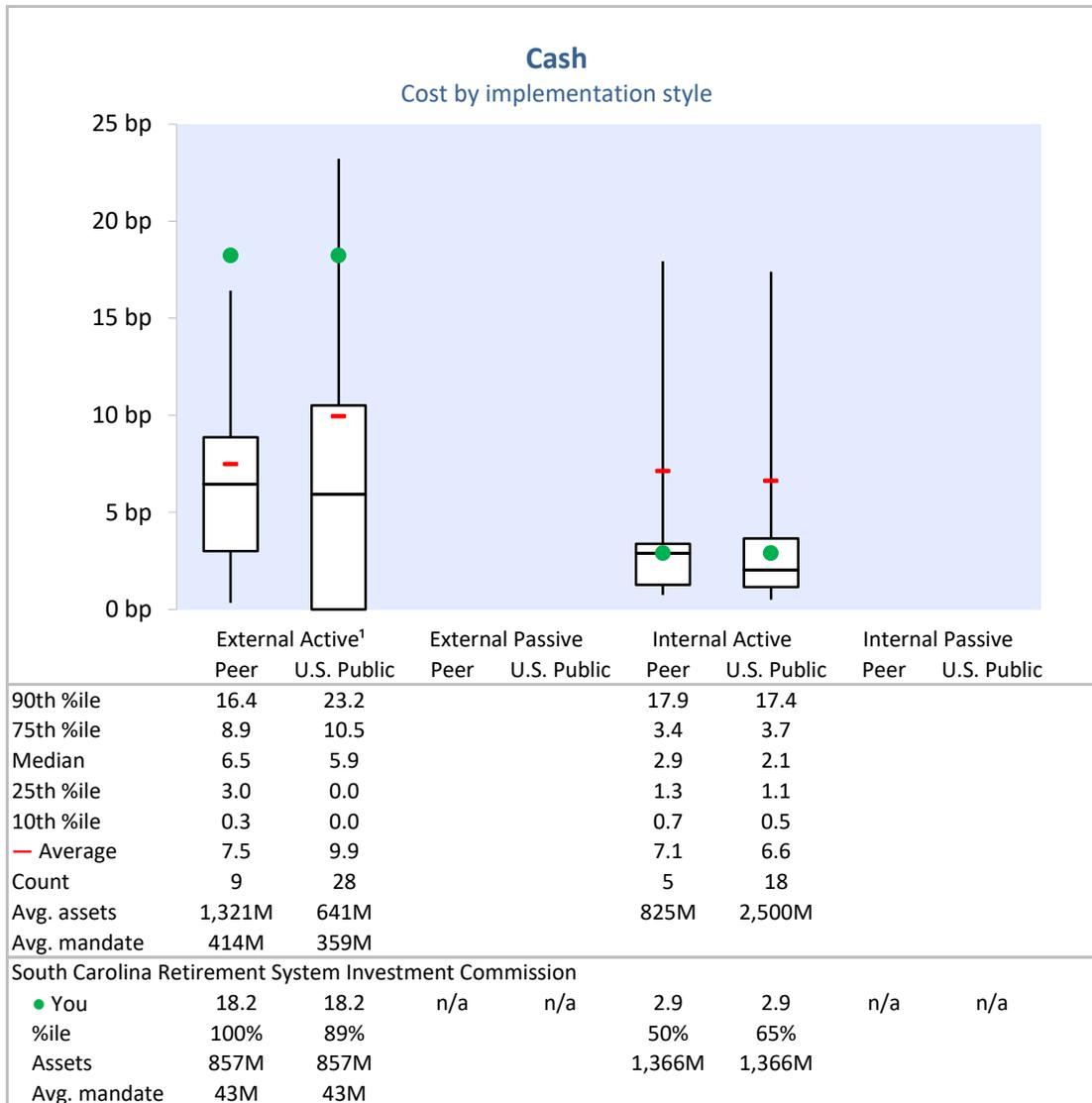
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for peers (1 fund) and 0.0 bps for U.S. Public participants (1 fund).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	55.3	45.4
Performance fees*	n/a	9.3	5.4
Internal and other	<u>n/a</u>	<u>0.8</u>	<u>0.5</u>
Total	n/a	65.4	51.3

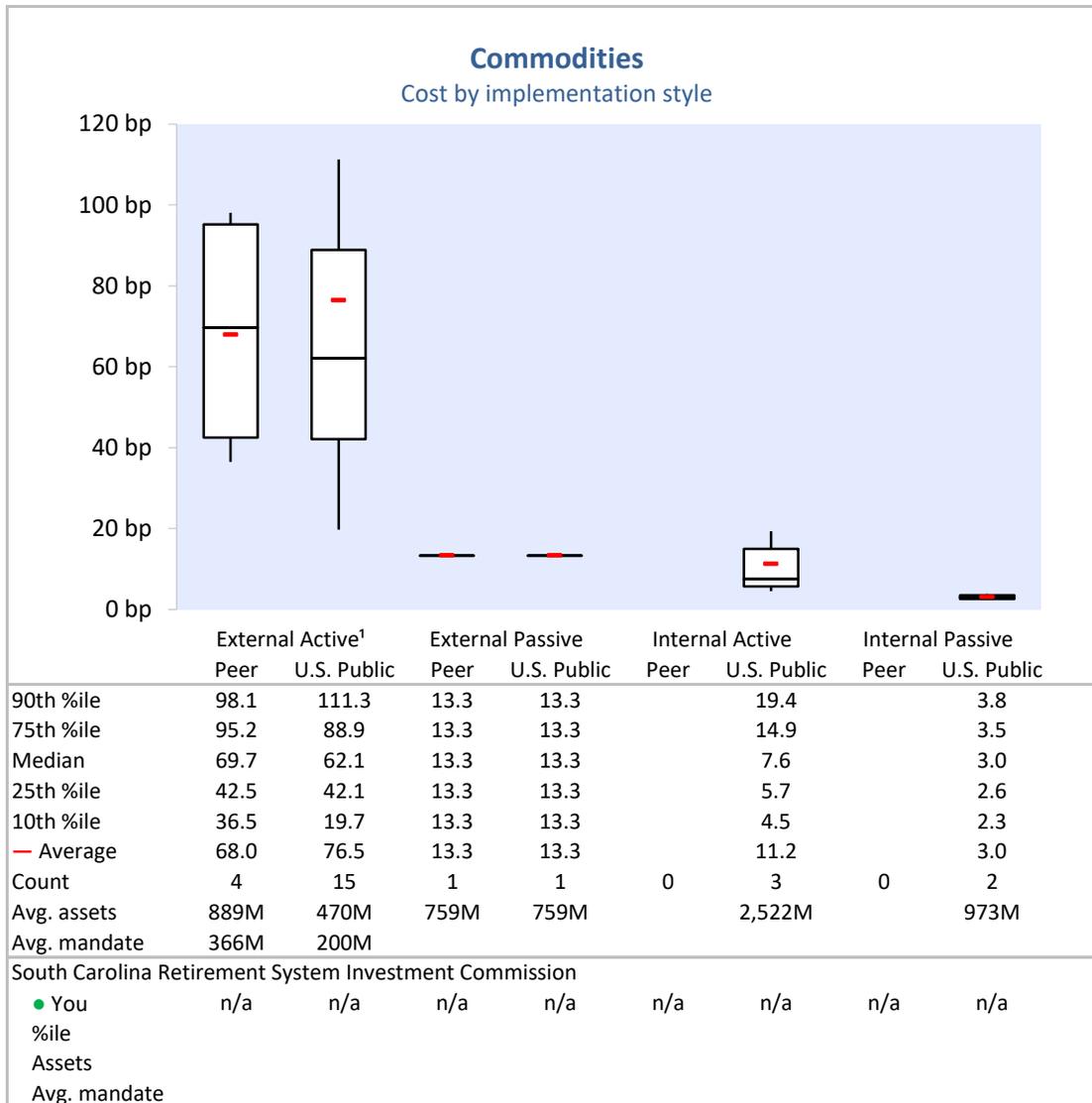
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 21.6 bps for peers (3 funds) and 21.6 bps for U.S. Public participants (3 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	15.5	7.1	9.2
Performance fees*	n/a	0.0	0.6
Internal and other	2.7	0.4	0.1
Total	18.2	7.5	9.9

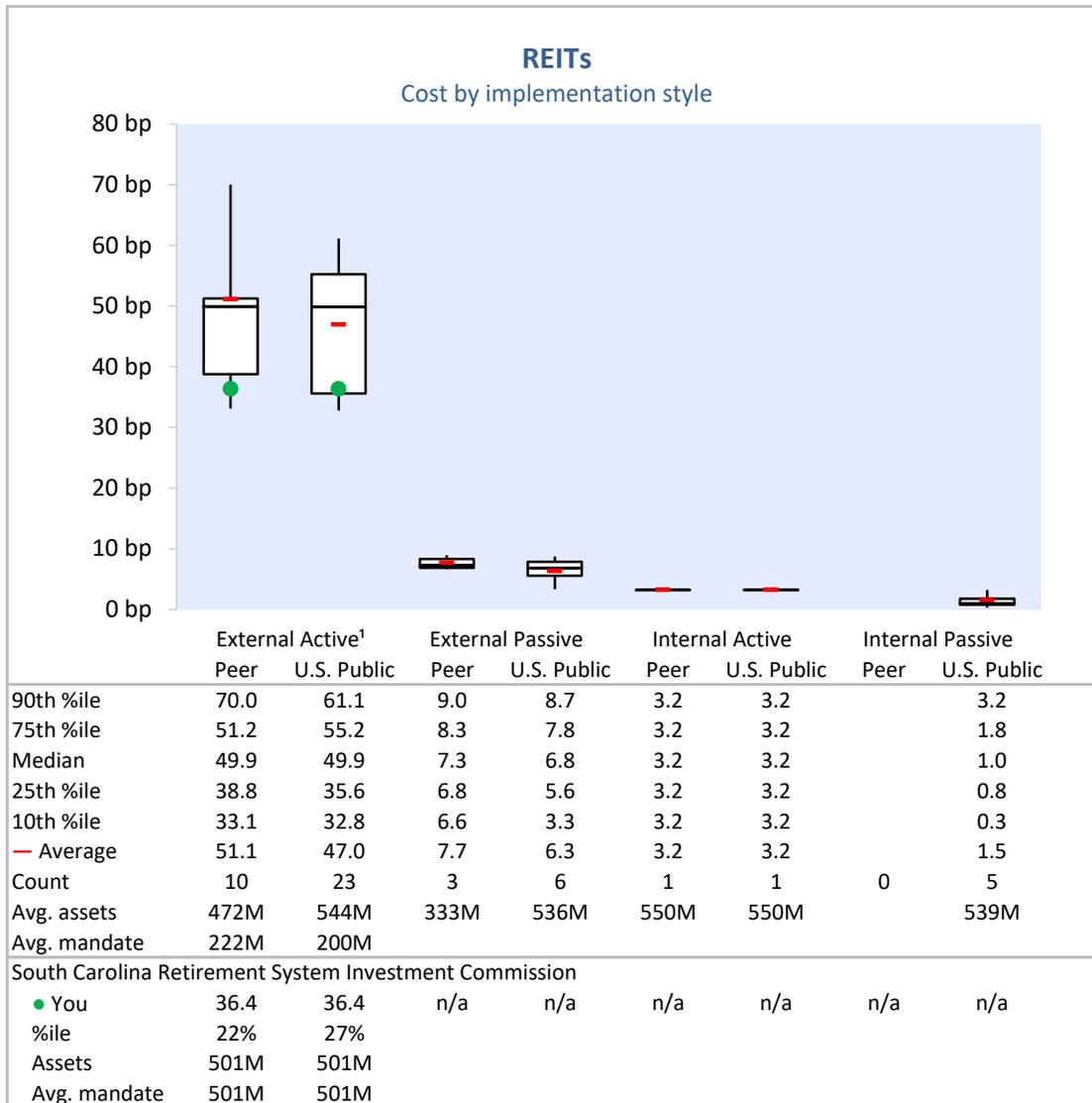
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for peers (3 funds) and 2.6 bps for U.S. Public participants (7 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	55.6	66.5
Performance fees*	n/a	11.8	9.1
Internal and other	<u>n/a</u>	<u>0.6</u>	<u>0.9</u>
Total	n/a	68.0	76.5

* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 47.3 bps for peers (1 fund) and 22.9 bps for U.S. Public participants (6 funds).



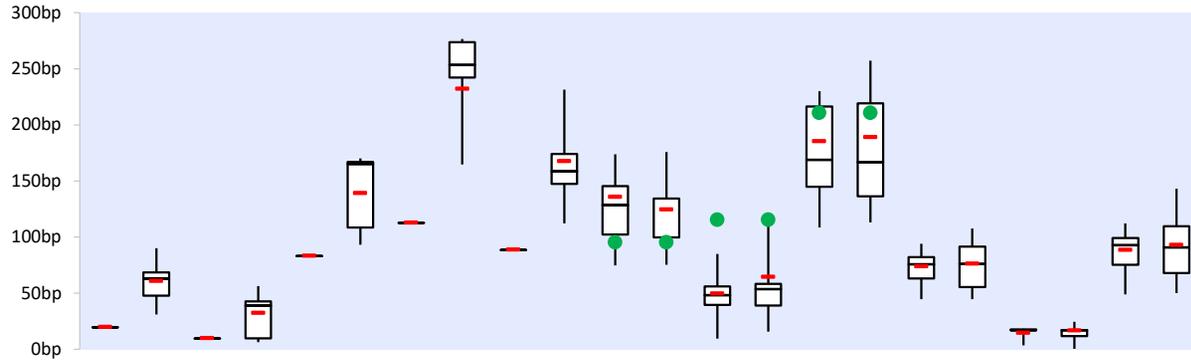
1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	33.6	50.5	45.9
Performance fees*	0.0	0.0	0.6
Internal and other	2.7	0.7	0.5
Total	36.4	51.1	47.0

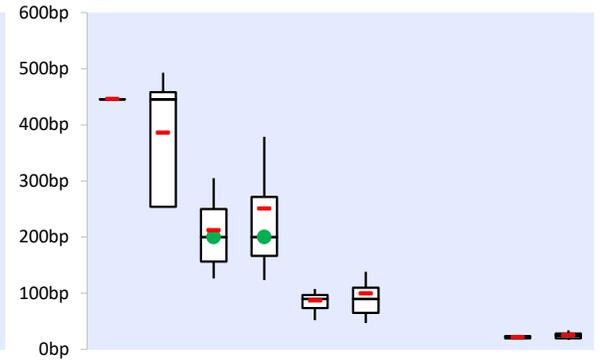
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for peers (3 funds) and 1.5 bps for U.S. Public participants (9 funds).

Real Estate ex-REITs

Cost as a % of the amount fees are based on¹



Cost as a % of NAV

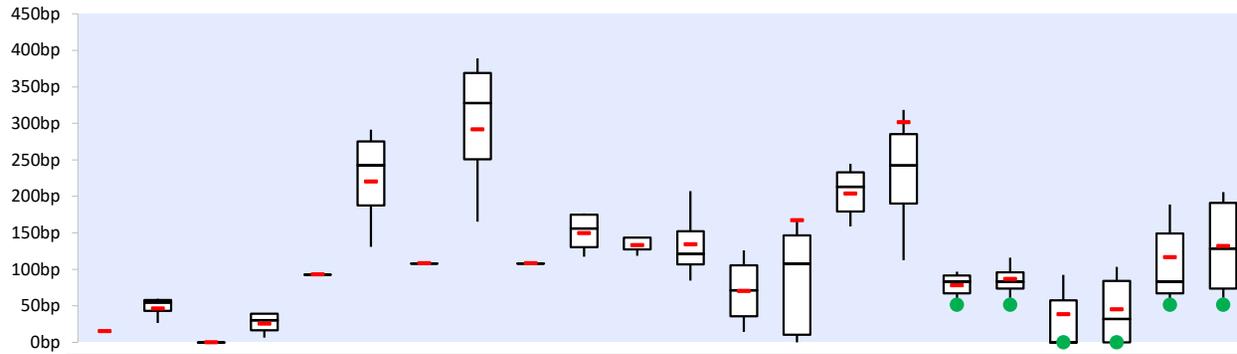


	Fund of Funds										Direct LP & Co-Inv.						External (not LP)						Fund of Funds		Direct LP & Co-Inv.		External (not LP)		Oper. Sub.		Internal	
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. ²		Total ³ incl. perf.		Total ³ excl. perf.		Mgmt fees		Perf. fees		Total ³ incl. perf.		Mgmt fees		Perf. fees		Total ³ incl. perf.		Total ³ incl. perf.		Total		Total		Total		Total	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	19.8	90.1	9.9	56.3	83.2	170.2	112.8	276.4	88.8	231.3	173.8	175.7	85.0	115.3	230.1	257.4	94.0	107.6	18.2	24.5	112.1	143.1	445.7	493.2	305.2	378.9	107.5	138.1			24.6	33.8
75th %ile	19.8	68.5	9.9	42.7	83.2	167.0	112.8	273.7	88.8	174.1	145.5	134.5	56.0	58.4	216.3	219.3	82.1	91.4	17.6	17.1	99.2	109.5	445.7	458.5	249.7	271.3	96.8	109.5			23.4	27.8
Median	19.8	63.1	9.9	39.0	83.2	165.2	112.8	253.7	88.8	158.7	128.6	116.9	48.3	53.7	168.9	167.0	76.0	76.0	17.0	17.0	93.0	90.8	445.7	445.7	199.9	199.9	89.8	89.8			21.5	25.2
25th %ile	19.8	47.7	9.9	9.9	83.2	108.4	112.8	242.3	88.8	147.4	102.1	99.8	39.6	39.1	144.7	136.4	63.2	55.5	17.0	11.7	75.3	67.9	445.7	253.8	156.3	166.8	73.5	65.0			19.5	19.6
10th %ile	19.8	30.9	9.9	6.5	83.2	93.3	112.8	164.6	88.8	112.2	74.8	75.2	9.5	15.7	108.6	113.0	44.6	44.8	3.6	0.3	48.8	50.1	445.7	253.7	126.4	123.5	51.7	46.9			18.3	16.9
— Average	19.8	60.7	9.9	32.2	83.2	139.2	112.8	232.1	88.8	167.7	135.8	124.6	49.5	64.5	185.3	189.1	73.8	76.2	14.6	16.8	88.4	92.9	445.7	385.6	212.1	250.5	86.8	99.4			21.5	25.2
Count	1	5	1	5	1	5	1	5	1	5	15	43	15	43	15	43	15	36	15	36	15	36	1	5	15	43	15	36	0	0	2	8
Avg. assets	388M	455M	388M	455M	388M	455M	388M	455M	388M	455M	1,773M	3,313M	1,773M	3,313M	1,773M	3,313M	2,147M	2,719M	2,147M	2,719M	2,147M	2,719M	98M	298M	1,576M	2,711M	2,162M	2,603M			224M	2,072M
South Carolina Retirement System Investment Commission																																
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	95.3	95.3	115.3	115.3	210.6	210.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile											21%	21%	100%	90%	71%	69%																
Assets											1,744M	1,744M	1,744M	1,744M	1,744M	1,744M																

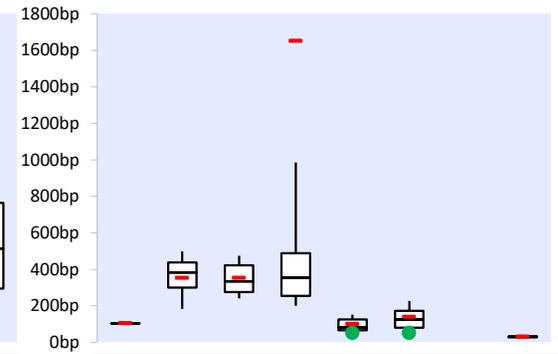
- The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
- The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 69 bps (on amount fees are based on) for underlying management fees and 14 bps (on NAV) for underlying performance fees were used.
- The total cost also includes the internal cost of monitoring and selecting real estate investments. Your cost of monitoring and selecting was 2.7 bps for LPs. The peer average cost of monitoring and selecting was 3.9 bps for LPs and 2.1 bps for external (not LPs).
- Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 3 of your peers and 6 of the U.S. Public funds.

Infrastructure

Cost as a % of the amount fees are based on¹



Cost as a % of NAV

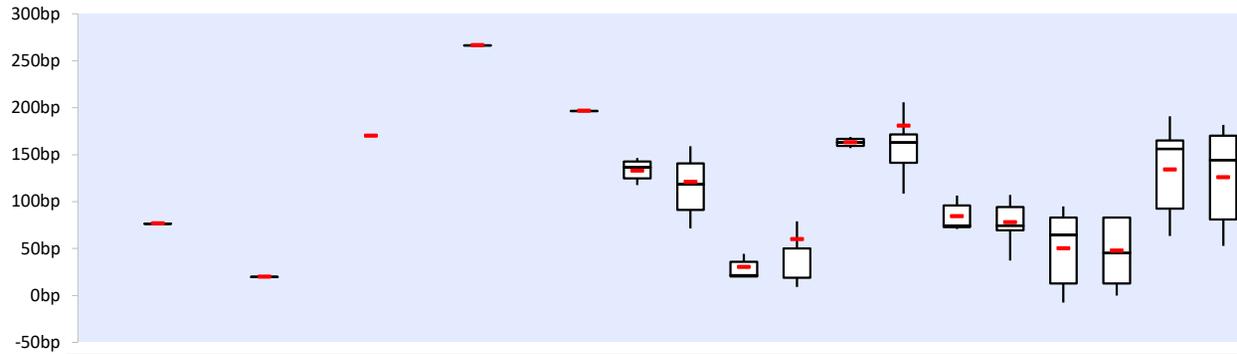


	Fund of Funds										Direct LP & Co-Inv.						External (not LP)						Fund of Funds		Direct LP & Co-Inv.		External (not LP)		Internal	
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. ²		Total ³ incl. perf.		Total ³ excl. perf.		Mgmt fees		Perf. fees		Total ³ incl. perf.		Mgmt fees		Perf. fees		Total ³ incl. perf.		Total ³ incl. perf.		Total ³ incl. perf.		Total			
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public		
90th %ile	15.4	59.7	0.0	39.7	92.8	291.2	108.2	389.3	108.2	176.7	144.3	207.2	126.1	169.9	244.7	318.3	96.6	116.1	92.3	103.2	188.9	205.9	105.0	498.5	474.3	985.3	152.1	226.2	33.9	
75th %ile	15.4	57.9	0.0	39.3	92.8	275.1	108.2	369.0	108.2	174.9	143.4	152.0	105.6	146.5	232.9	285.4	91.6	95.8	57.7	84.3	149.3	190.9	105.0	437.0	421.7	487.6	125.6	172.9	32.6	
Median	15.4	54.8	0.0	30.6	92.8	242.7	108.2	328.1	108.2	155.9	141.9	121.4	71.3	107.8	213.3	242.6	83.2	83.1	0.0	32.4	83.2	128.6	105.0	384.4	334.1	355.4	81.3	125.6	30.5	
25th %ile	15.4	43.3	0.0	16.6	92.8	187.7	108.2	250.9	108.2	130.4	127.3	106.8	35.7	10.3	179.1	190.1	67.2	73.5	0.0	0.1	67.2	73.9	105.0	300.7	275.7	254.4	66.3	80.2	28.4	
10th %ile	15.4	26.5	0.0	6.6	92.8	130.8	108.2	165.3	108.2	117.1	118.5	84.6	14.3	0.0	158.6	112.3	57.7	60.8	0.0	0.0	57.7	61.0	105.0	183.3	240.7	201.0	57.3	65.6	27.1	
— Average	15.4	46.4	0.0	25.3	92.8	220.1	108.2	291.8	108.2	149.5	133.2	134.3	70.4	167.0	203.6	301.3	78.1	86.7	38.5	45.2	116.6	131.9	105.0	353.3	353.6	1651.4	100.8	139.1	30.5	
Count	1	4	1	4	1	4	1	4	1	4	3	16	3	16	3	16	3	6	3	6	3	6	1	4	3	16	3	6	0	2
Avg. assets	164M	240M	164M	240M	164M	240M	164M	240M	164M	240M	400M	2,149M	211M	2,672M	611M	4,821M	384M	523M	384M	523M	384M	523M	169M	237M	335M	517M	407M	484M	902M	
South Carolina Retirement System Investment Commission																														
● You %ile	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	51.3	51.3	0.0	0.0	51.3	51.3	n/a	n/a	n/a	n/a	51.3	51.3	n/a	n/a
Assets																	426M	426M	426M	426M	426M	426M	0M	0M	0M	0M	426M	426M	0M	0M

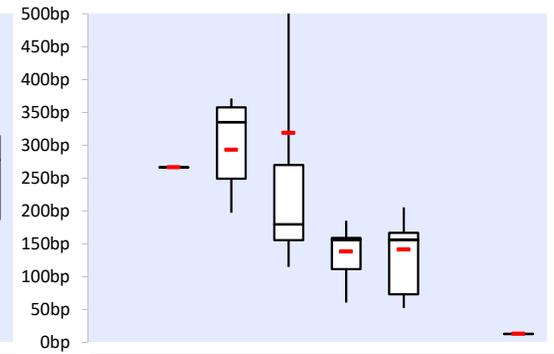
- The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
- The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 93 bps (on amount fees are based on) for underlying management fees and 0 bps (on NAV) for underlying performance fees were used.
- The total cost also includes the internal cost of monitoring and selecting infrastructure investments. Your cost of monitoring and selecting was 2.7 bps for external (not LPs). The peer average cost of monitoring and selecting was 3.4 bps for fund of funds, 4.8 bps for LPs and 2.2 bps for external (not LPs).
- Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 2 of your peers and 3 of the U.S. Public funds.

Natural Resources

Cost as a % of the amount fees are based on¹



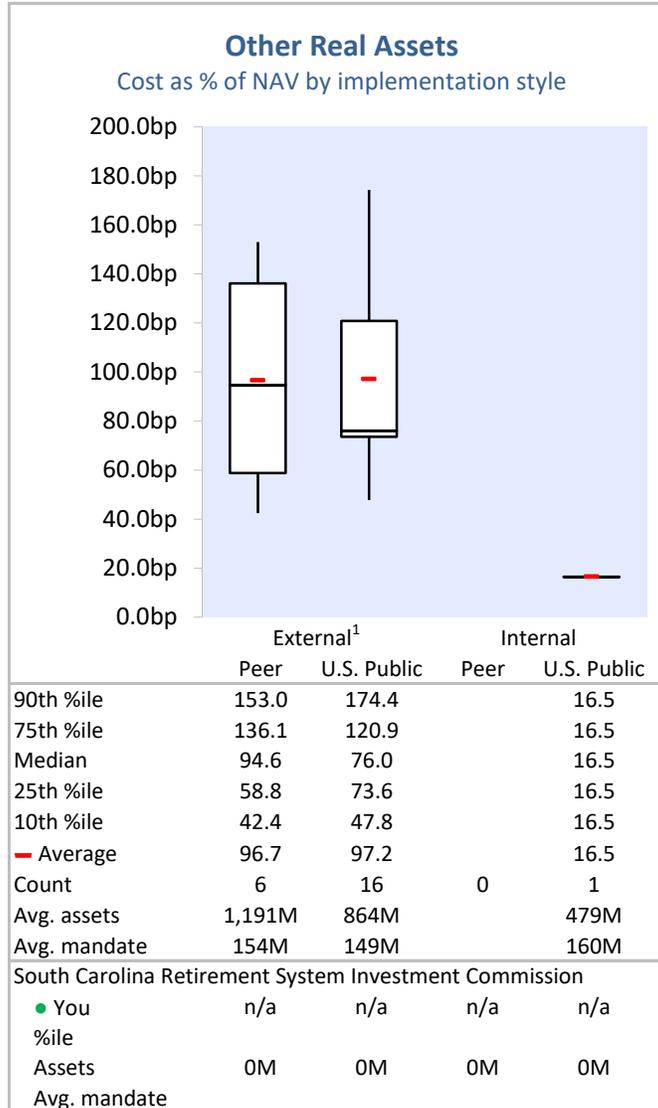
Cost as a % of NAV



	Fund of Funds						Direct LP & Co-Inv.						External (not LP)									
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. ²		Total ³ incl. perf.		Total ³ excl. perf.		Mgmt fees		Perf. fees		Total ³ incl. perf.		Mgmt fees		Perf. fees		Total ³ incl. perf.	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	76.6	20.0	170.0	266.6	196.6	146.3	159.0	44.4	78.9	169.0	205.7	106.4	107.1	94.9	83.7	191.0	181.7					
75th %ile	76.6	20.0	170.0	266.6	196.6	142.7	140.7	35.9	50.0	166.8	171.4	95.9	94.3	82.9	83.0	165.3	170.3					
Median	76.6	20.0	170.0	266.6	196.6	136.6	118.5	21.7	36.0	163.0	163.0	74.6	74.6	64.7	45.2	156.2	144.4					
25th %ile	76.6	20.0	170.0	266.6	196.6	124.8	91.3	20.3	19.0	159.3	141.2	72.8	69.5	12.9	12.9	92.4	81.1					
10th %ile	76.6	20.0	170.0	266.6	196.6	117.7	71.3	19.5	8.9	157.1	108.6	70.9	37.3	-7.6	0.0	63.3	52.7					
— Average	76.6	20.0	170.0	266.6	196.6	132.8	120.9	30.2	59.8	163.0	180.7	84.2	78.0	50.0	47.8	134.2	125.8					
Count	0	1	0	1	0	1	0	1	0	1	3	17	3	17	3	17	7	15	7	15	7	15
Avg. assets	27M		27M		27M		27M		27M		398M	2,056M	91M	1,016M	489M	3,072M	739M	808M	739M	808M	739M	808M
South Carolina Retirement System Investment Commission																						
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile																						
Assets																						

	Fund of Funds		Direct LP & Co-Inv.		External (not LP)		Internal	
	Total ³ incl. perf.		Total ³ incl. perf.		Total ³ incl. perf.		Total	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
	266.6	371.4	694.3	185.0	205.5			12.9
	266.6	357.9	269.8	159.0	166.8			12.9
	266.6	335.5	179.8	156.2	156.2			12.9
	266.6	249.2	155.6	111.6	73.0			12.9
	266.6	197.5	114.7	60.4	52.2			12.9
	266.6	292.9	318.7	138.4	141.3			12.9
Count	0	1	3	17	7	15	0	1
Avg. assets	27M		238M	915M	610M	700M	224M	
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	0M	0M	0M	0M	0M	0M	0M	0M

- The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
- The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of n/a bps (on amount fees are based on) for underlying management fees and n/a bps (on NAV) for underlying performance fees were used.
- The total cost also includes the internal cost of monitoring and selecting natural resource investments. The peer average cost of monitoring and selecting was 4.1 bps for LPs and 2.4 bps for external (not LPs).
- Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 2 of your peers and 3 of the U.S. Public funds.



1. Breakdown of external fees

	Your Plan	Peer Average	U.S. Public Average
Base fees	n/a	95.6	95.1
Internal and other	<u>n/a</u>	<u>3.1</u>	<u>6.6</u>
Total*	n/a	96.7	97.2
Performance fees**	n/a	35.2	33.2

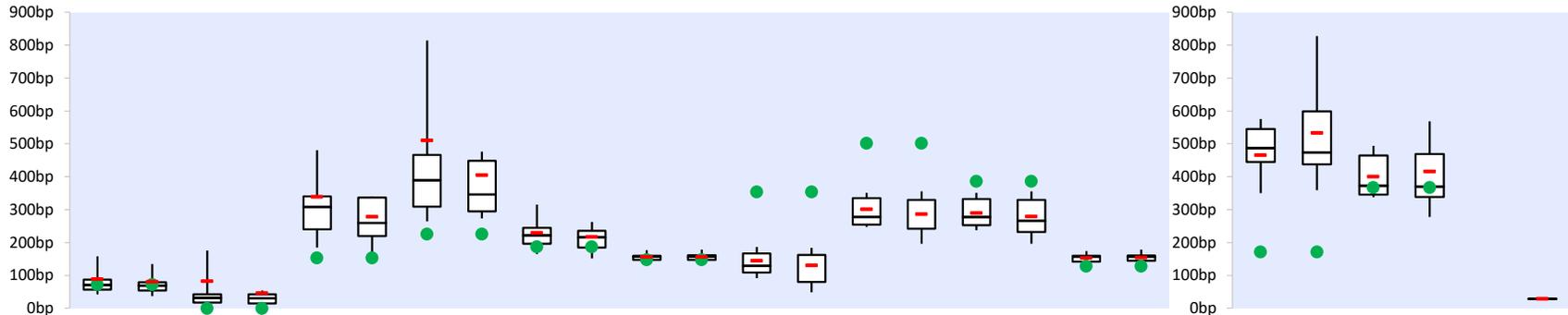
* Total cost excludes performance fees because most participants did not provide performance fees for other real assets.

** For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for only those funds that reported a performance fee is 35.2 bps for peers (6 funds) and 33.2 bps for Global participants (16 funds).

Diversified Private Equity

Cost as a % of the amount fees are based on¹

Cost as a % of NAV

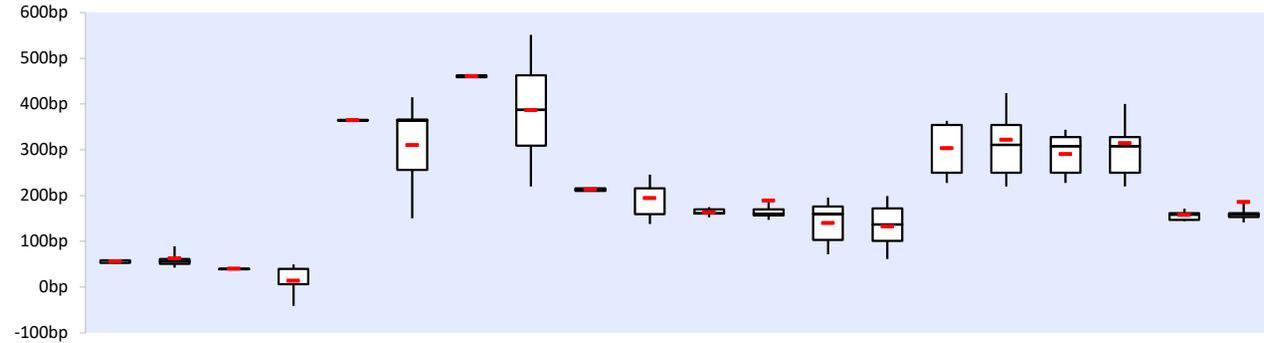


	Fund of Funds										Direct LP						Direct LP & Co-Inv. ⁴				Fund of Funds		Direct LP & Co-Inv. ⁴		Internal					
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. ²		Total ³ incl. perf.		Total ³ excl. perf.		Mgmt fees		Perf. fees		Total ³ incl. perf.		Total ³ incl. perf.		Total ³ excl. perf.		Total ³ incl. perf.		Total ³ incl. perf.		Total					
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public		
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public		
90th %ile	158.0	134.2	175.7	53.7	480.5	340.0	814.3	476.2	315.0	262.7	176.8	178.0	186.7	184.1	350.5	355.4	350.5	355.4	173.8	178.0	575.7	827.8	494.1	567.9			28.9			
75th %ile	87.5	79.4	42.0	42.0	340.0	336.3	466.7	448.3	244.5	235.3	159.9	160.9	166.3	162.6	334.5	329.9	332.3	329.9	159.9	160.1	544.8	598.9	464.4	469.1			28.9			
Median	70.8	69.3	31.5	30.8	308.2	259.2	389.2	346.2	222.3	215.4	157.0	157.0	128.8	126.8	278.6	270.8	277.3	266.3	157.0	157.0	487.5	474.1	373.2	370.6			28.9			
25th %ile	56.5	53.7	17.2	14.8	240.2	219.5	308.8	294.2	195.9	184.8	146.8	146.8	108.3	80.0	254.2	241.5	252.5	231.8	141.4	144.4	445.1	437.8	346.0	338.8			28.9			
10th %ile	42.0	37.0	4.4	5.9	184.7	160.9	263.8	272.8	164.7	151.3	138.5	134.3	91.8	48.3	247.0	196.0	237.6	196.0	129.1	125.3	349.7	358.8	338.0	277.4			28.9			
Average	89.0	80.4	82.7	45.9	338.8	278.7	510.5	405.0	229.8	217.3	156.5	156.3	144.7	130.1	301.2	286.3	289.5	279.5	153.2	153.9	465.8	533.1	400.8	416.3			28.9			
Count	8	29	8	29	8	29	8	29	8	29	14	39	14	39	14	39	14	39	14	39	0	1	8	29	14	39	0	1		
Avg. assets	1,147M	1,053M	1,147M	1,053M	1,147M	1,053M	1,147M	1,053M	1,147M	1,053M	5,142M	5,102M	5,142M	5,102M	5,142M	5,102M	5,296M	5,352M	5,296M	5,352M	848M	761M	3,445M	3,912M			72M			
South Carolina Retirement System Investment Commission																														
You	72.2	72.2	0.0	0.0	153.1	153.1	225.3	225.3	187.3	187.3	148.1	148.1	353.8	353.8	501.8	501.8	386.2	386.2	128.1	128.1	171.0	171.0	367.6	367.6	n/a	n/a				
%ile	57%	64%	0%	0%	0%	0%	0%	4%	14%	29%	31%	32%	100%	97%	100%	97%	100%	97%	8%	13%	0%	0%	38%	45%						
Assets	415M	415M	415M	415M	415M	415M	415M	415M	415M	415M	1,316M	1,316M	1,316M	1,316M	1,316M	1,316M	1,805M	1,805M	1,805M	1,805M	547M	547M	1,896M	1,896M	0M	0M				

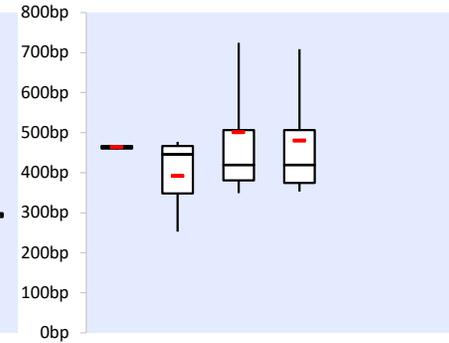
- The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
- The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 157 bps (on amount fees are based on) for underlying management fees and 183 bps (on NAV) for underlying performance fees were used.
- The total cost also includes the internal cost of monitoring and selecting private equity investments. Your cost of monitoring and selecting was 2.7 bps for fund of funds. The peer average cost of monitoring and selecting was 3.6 bps for fund of funds.
- Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 4 of your peers and 8 of the U.S. Public funds.

LBO

Cost as a % of the amount fees are based on¹



Cost as a % of NAV



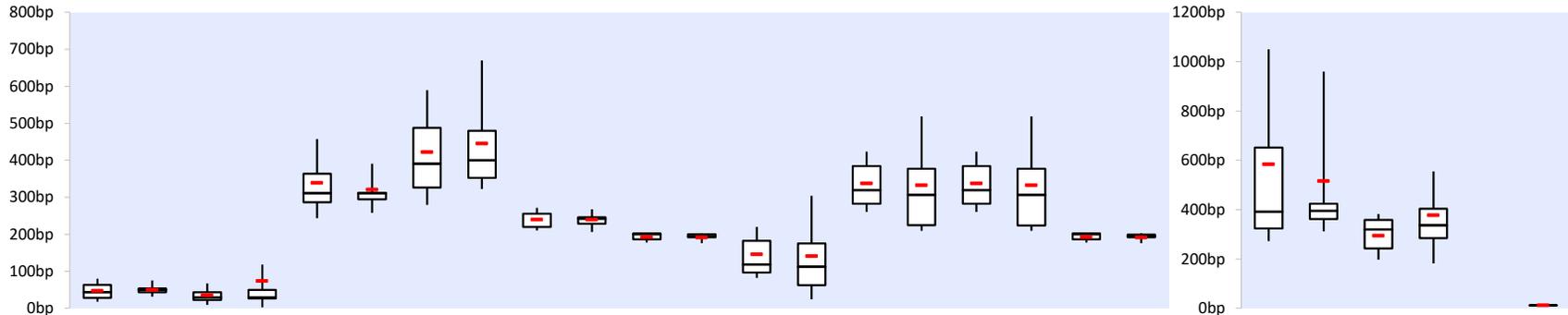
	Fund of Funds										Direct LP						Direct LP & Co-Inv. ⁴				Fund of Funds		Direct LP & Co-Inv. ⁴		Internal				
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. ²		Total ³ incl. perf.		Total ³ excl. perf.		Mgmt fees		Perf. fees		Total ³ incl. perf.		Total ³ incl. perf.		Total ³ excl. perf.		Total ³ incl. perf.		Total ³ incl. perf.		Total				
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	
90th %ile	60.6	89.0	40.0	49.3	365.7	414.6	463.8	551.3	217.6	246.0	174.5	186.8	195.9	198.9	363.5	424.1	343.6	400.2	171.3	183.6	469.1	476.8	724.3	708.5					
75th %ile	58.9	61.4	39.9	39.9	365.3	366.0	462.6	462.6	215.9	215.9	169.7	169.7	176.3	172.1	354.0	354.0	327.8	327.8	161.5	161.7	467.0	467.0	506.1	506.1					
Median	56.1	56.7	39.8	32.4	364.7	364.7	460.5	387.7	213.1	199.4	161.5	160.0	159.9	137.2	329.6	311.2	308.6	308.6	159.0	158.8	463.5	446.0	419.8	419.8					
25th %ile	53.3	51.1	39.6	6.3	364.0	256.3	458.5	309.4	210.3	159.2	160.8	157.0	103.2	100.9	249.8	250.0	249.8	250.0	146.6	153.4	460.0	348.0	381.0	374.9					
10th %ile	51.6	42.4	39.6	-40.8	363.6	150.5	457.3	219.9	208.6	138.0	152.3	147.1	71.9	61.1	227.5	219.9	227.5	219.9	144.4	141.4	457.9	252.7	349.1	352.7					
Average	56.1	62.7	39.8	13.7	364.7	309.9	460.5	386.3	213.1	194.5	163.3	188.8	139.9	132.7	303.2	321.5	290.6	314.0	157.6	185.5	463.5	391.9	500.9	479.5					
Count	2	6	2	6	2	6	2	6	2	6	5	17	5	17	5	17	5	17	5	17	0	0	0	0					
Avg. assets	76M	469M	76M	469M	76M	469M	76M	469M	76M	469M	2,553M	4,092M	2,553M	4,092M	2,553M	4,092M	2,694M	4,234M	2,694M	4,234M	75M	371M	1,915M	3,133M					
South Carolina Retirement System Investment Commission																													
● You %ile	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Assets	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M

1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 157 bps (on amount fees are based on) for underlying management fees and 209 bps (on NAV) for underlying performance fees were used.
3. The total cost also includes the internal cost of monitoring and selecting private equity investments. The peer average cost of monitoring and selecting was 10.9 bps for fund of funds.
4. Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 2 of your peers and 4 of the U.S. Public funds.

Venture Capital

Cost as a % of the amount fees are based on¹

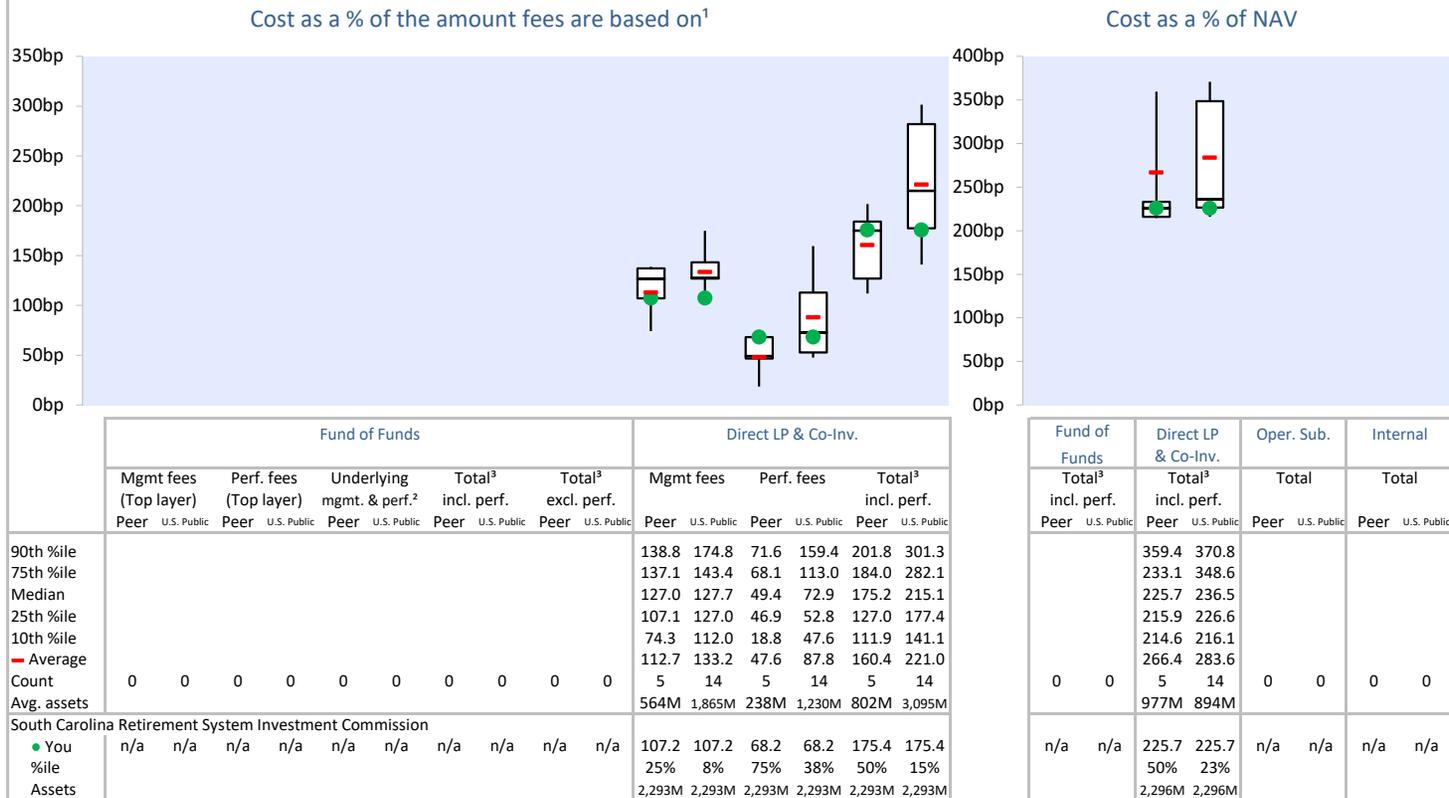
Cost as a % of NAV



	Fund of Funds										Direct LP						Direct LP & Co-Inv. ⁴				Fund of Funds & Co-Inv. ⁴		Internal			
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. ²		Total ³ incl. perf.		Total ³ excl. perf.		Mgmt fees		Perf. fees		Total ³ incl. perf.		Total ³ incl. perf.		Total ³ excl. perf.		Total incl. perf.		Total incl. perf.		Total	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	79.5	75.2	67.0	118.4	457.7	390.8	589.8	670.1	271.5	267.2	203.2	203.4	220.2	304.0	423.4	518.4	423.4	518.4	203.2	203.4	1049.8	959.4	381.8	555.4		12.5
75th %ile	63.4	53.8	43.2	49.9	363.4	311.8	487.9	480.1	255.4	245.8	202.2	199.6	182.2	175.6	384.5	377.1	384.5	377.0	202.2	199.4	652.2	424.3	358.5	404.2		12.5
Median	44.1	50.5	30.0	30.0	311.0	311.0	391.7	399.9	236.1	242.5	200.6	194.4	119.0	112.6	319.6	307.0	319.6	307.0	200.6	194.0	391.7	394.8	319.6	337.0		12.5
25th %ile	28.1	43.6	22.5	26.3	286.9	294.5	326.2	352.5	220.1	228.3	186.2	192.0	96.2	62.2	282.4	224.7	282.4	223.9	186.2	191.9	323.7	362.4	243.2	284.7		12.5
10th %ile	18.0	31.5	9.0	3.0	243.4	257.6	279.4	322.7	210.0	206.0	177.5	175.9	82.5	24.2	260.0	209.5	260.0	209.5	177.5	175.9	272.4	312.2	197.3	181.5		12.5
Average	47.4	50.4	35.7	73.7	339.2	321.1	422.4	445.1	239.4	239.4	192.1	191.8	146.0	141.1	338.0	332.9	338.0	332.7	192.1	191.6	584.2	516.3	294.6	378.0		12.5
Count	4	10	4	10	4	10	4	10	4	10	3	16	3	16	3	16	3	16	3	16	4	10	3	16	0	1
Avg. assets	126M	328M	126M	328M	126M	328M	126M	328M	126M	328M	380M	722M	380M	722M	380M	722M	380M	723M	380M	723M	126M	328M	380M	723M		541M
South Carolina Retirement System Investment Commission																										
You %ile	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Assets	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M

1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 192 bps (on amount fees are based on) for underlying management fees and 119 bps (on NAV) for underlying performance fees were used.
3. The total cost also includes the internal cost of monitoring and selecting private equity investments. The peer average cost of monitoring and selecting was 5.0 bps for fund of funds.
4. Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by none of your peers and 2 of the U.S. Public funds.

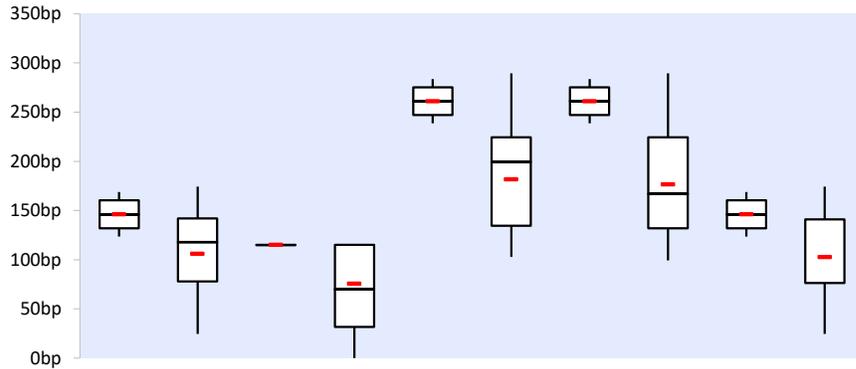
Private Credit



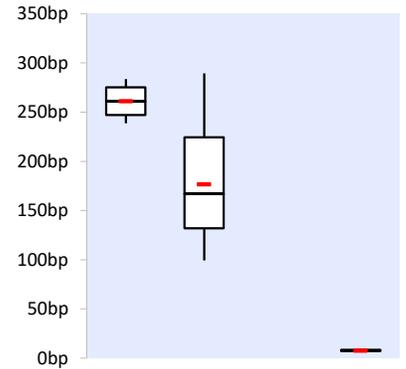
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of n/a bps (on amount fees are based on) for underlying management fees and n/a bps (on NAV) for underlying performance fees were used.
3. The total cost also includes the internal cost of monitoring and selecting private credit investments. Your cost of monitoring and selecting was 2.7 bps for LPs. The peer average cost of monitoring and selecting was 4.2 bps for LPs.
4. Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 1 of your peers and 2 of the U.S. Public funds.

Other Private Equity

Cost as a % of the amount fees are based on¹

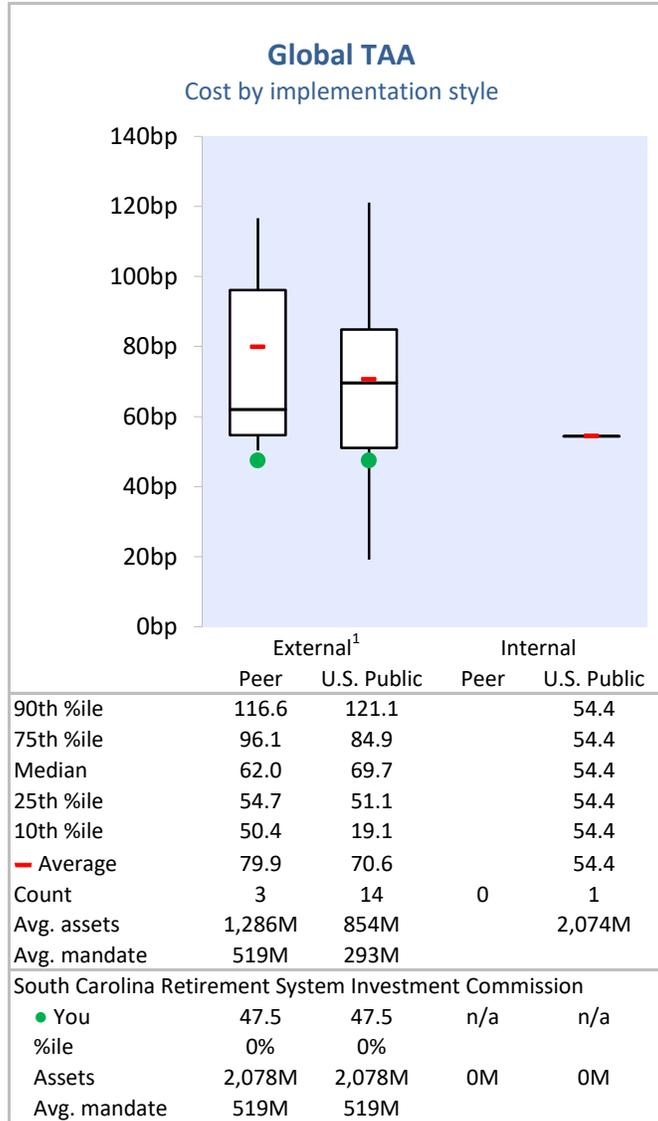


Cost as a % of NAV



	Direct LP						Direct LP & Co-Inv. ³				Direct LP & Co-Inv. ³		Internal		
	Mgmt fees		Perf. fees		Total ² incl. perf.		Total ² incl. perf.		Total ² excl. perf.		Total ² incl. perf.		Total		
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	
	90th %ile	168.7	174.3	115.0	115.0	283.7	289.3	283.7	289.3	168.7	174.3	283.7	289.3		8.4
75th %ile	160.2	142.0	115.0	115.0	275.2	224.4	275.2	224.4	160.2	140.8	275.2	224.4		8.3	
Median	146.2	118.0	115.0	70.2	261.2	199.6	261.2	167.2	146.2	97.5	261.2	167.2		8.3	
25th %ile	132.1	77.9	115.0	31.7	247.1	134.4	247.1	131.9	132.1	76.5	247.1	131.9		7.3	
10th %ile	123.6	24.7	115.0	0.0	238.6	102.8	238.6	99.4	123.6	24.7	238.6	99.4		6.7	
— Average	146.2	106.0	115.0	75.6	261.2	181.7	261.2	176.6	146.2	102.7	261.2	176.6		7.7	
Count	2	11	2	11	2	11	2	11	2	11	2	11	0	3	
Avg. assets	948M	846M	948M	846M	948M	846M	948M	910M	948M	910M	948M	910M		93M	
South Carolina Retirement System Investment Commission															
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile															
Assets	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M

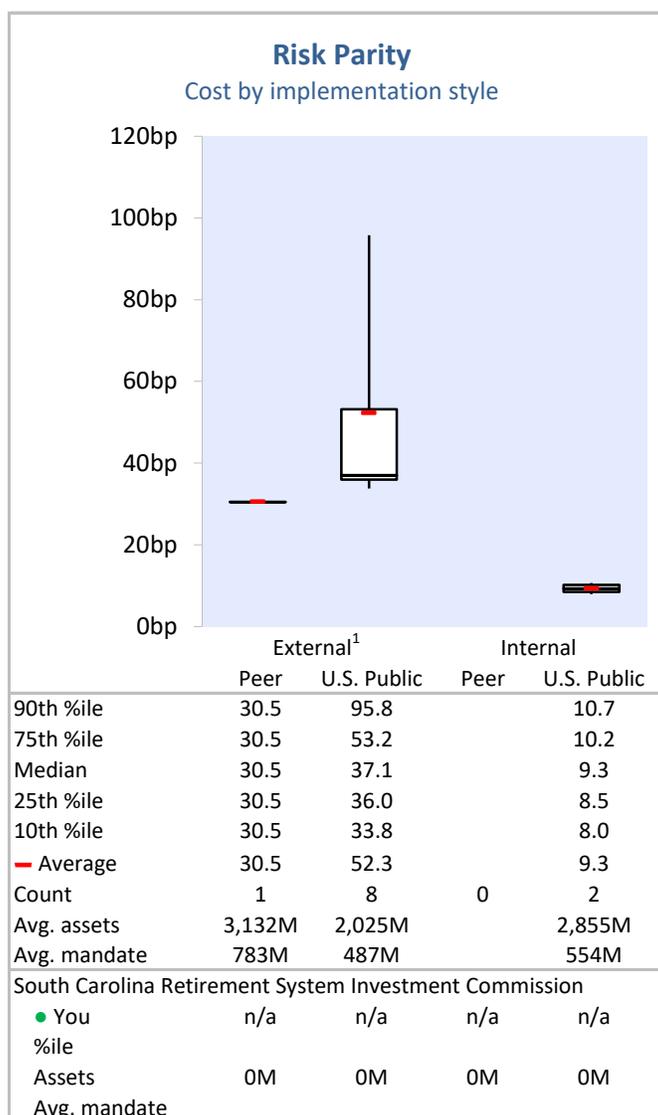
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
2. The total cost also includes the internal cost of monitoring and selecting private equity investments.
3. Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by none of your peers and 2 of the U.S. Public funds.



1. Breakdown of external fees

	Your Plan	Peer Average	U.S. Public Average
Base fees	29.5	42.6	59.4
Internal and other	<u>2.7</u>	<u>1.8</u>	<u>5.4</u>
Performance fees	15.2	54.2	15.5
Total*	47.5	79.9	70.6

* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 54.2 bps for peers (2 funds) and 15.5 bps for U.S. Public participants (8 funds).



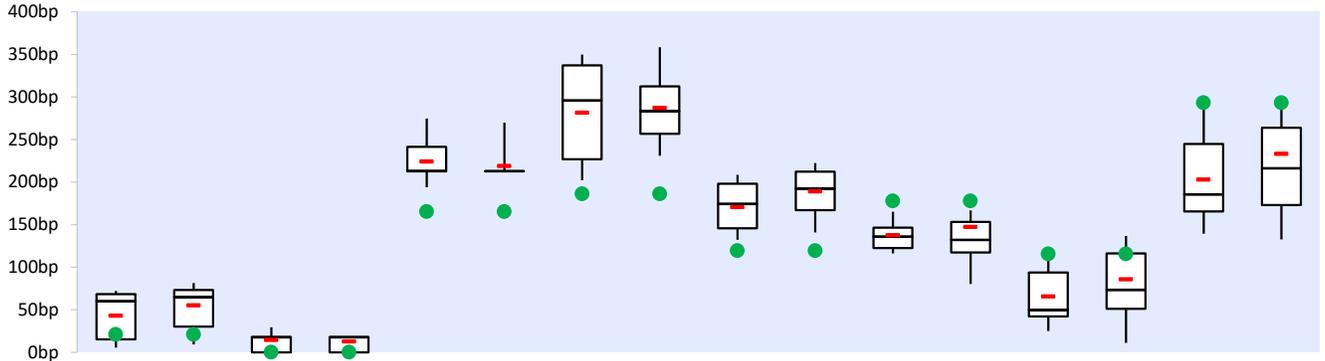
1. Breakdown of external fees

	Your Plan	Peer Average	U.S. Public Average
Base fees	n/a	29.5	48.0
Internal and other	<u>n/a</u>	<u>1.0</u>	<u>1.3</u>
Performance fees	n/a	n/a	5.0
Total*	n/a	30.5	52.3

* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 5.0 bps for U.S. Public participants (6 funds).

Hedge Funds

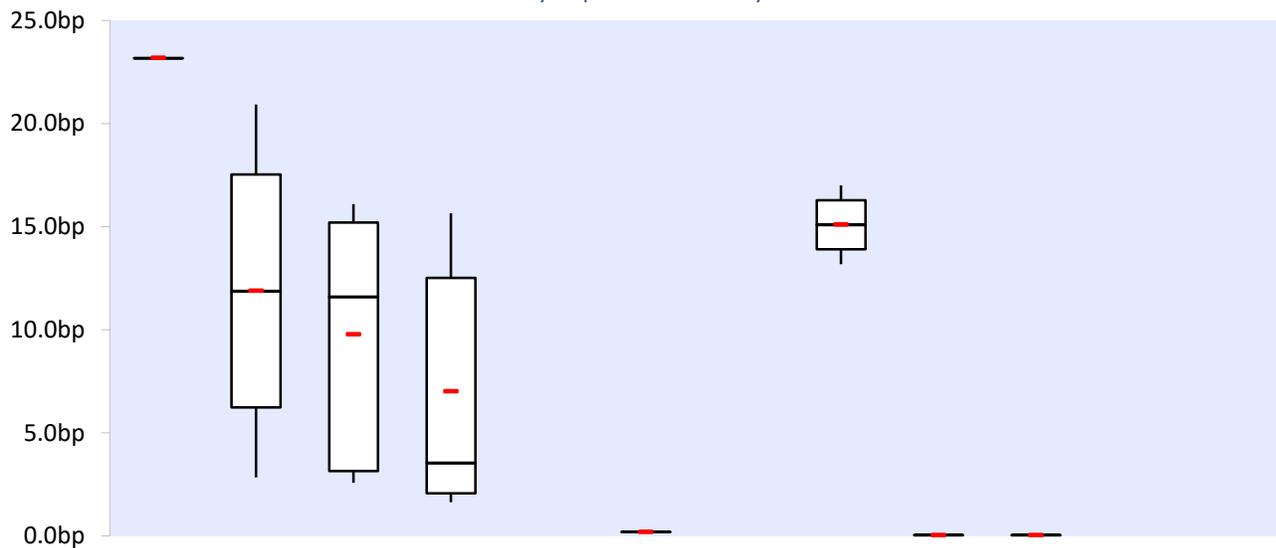
Cost by implementation style



	Fund of Funds										External Direct					
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. and perf. ¹		Total ² incl. perf.		Total ² excl. perf.		Mgmt fees		Perf. fees		Total ² incl. perf.	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	72.2	81.6	29.5	18.0	274.9	269.9	350.0	358.5	208.6	222.6	165.3	166.8	123.7	136.9	293.1	293.4
75th %ile	68.2	73.3	18.0	18.0	241.5	213.0	337.2	312.6	198.1	212.2	146.6	153.4	93.8	116.2	244.8	263.9
Median	60.0	64.9	18.0	18.0	213.0	213.0	295.9	283.6	174.4	192.3	135.9	132.2	49.9	73.7	185.8	216.4
25th %ile	15.2	30.0	0.0	0.0	213.0	213.0	226.7	256.9	145.7	166.9	122.4	117.2	42.3	51.0	165.4	172.9
10th %ile	5.7	9.4	0.0	0.0	193.9	213.0	202.3	231.0	132.3	141.0	116.1	80.2	25.1	11.1	139.2	132.8
— Average	42.9	55.2	14.4	12.8	224.2	218.8	281.5	286.8	170.6	188.8	137.4	147.4	65.4	85.7	202.8	233.0
Count	7	21	7	21	7	21	7	21	7	21	7	31	7	31	7	31
Avg. assets	1,070M	635M	1,070M	635M	1,070M	635M	1,070M	635M	1,070M	635M	3,981M	3,174M	3,981M	3,174M	3,981M	3,174M
South Carolina Retirement System Investment Commission																
● You	21.0	21.0	0.0	0.0	165.2	165.2	186.2	186.2	119.3	119.3	177.7	177.7	115.7	115.7	293.4	293.4
%ile	33%	15%	0%	0%	0%	0%	0%	0%	0%	0%	100%	93%	83%	73%	100%	90%
Assets	1,825M	1,825M	1,825M	1,825M	1,825M	1,825M	1,825M	1,825M	1,825M	1,825M	1,520M	1,520M	1,520M	1,520M	1,520M	1,520M

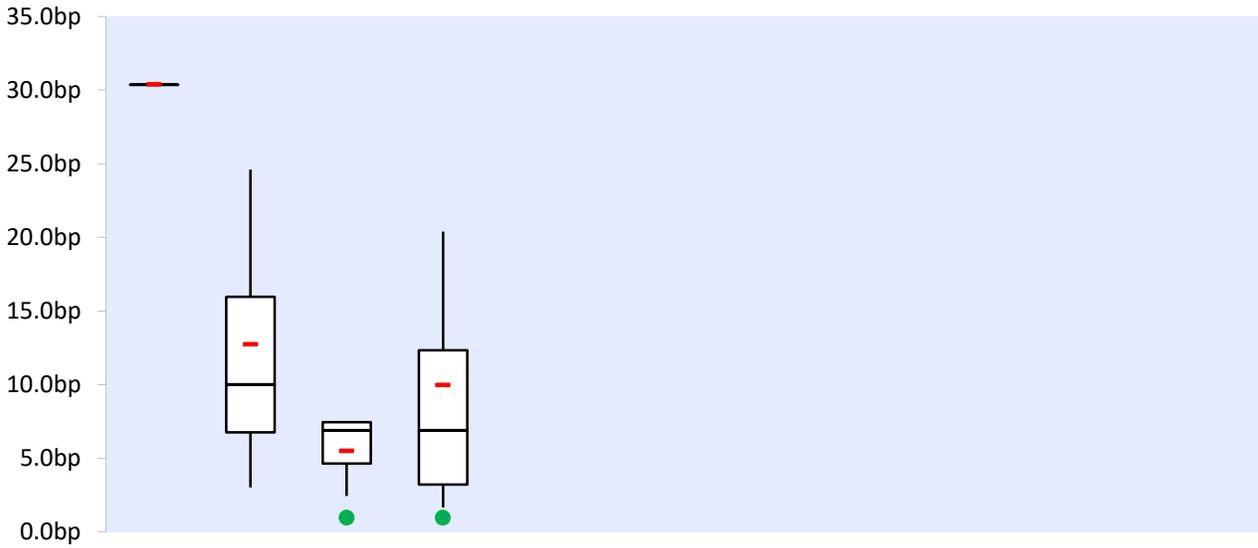
- The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 141 bps (on NAV) for underlying management fees and 72 bps (on NAV) for underlying performance fees were used.
- The total cost also includes the internal cost of monitoring and selecting real estate investments. The peer average cost of monitoring and selecting was 2.3 bps for fund of funds and 2.5 bps for LPs.

Overlays: currency, duration Cost by implementation style



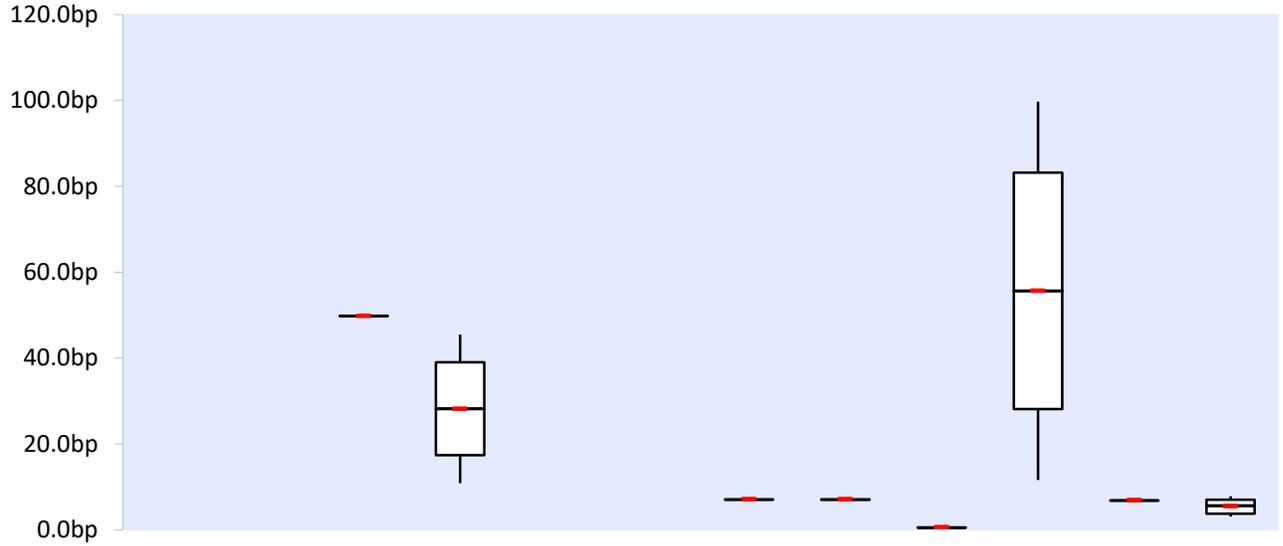
	Currency Hedge				Discretionary Currency				Duration Management			
	Internal		External		Internal		External		Internal		External	
	% of notional		% of notional		% of notional		% of notional		% of notional		% of notional	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	23.2	20.9	16.1	15.6	0.2	17.0	0.0	0.0	0.0	0.0		
75th %ile	23.2	17.5	15.2	12.5	0.2	16.3	0.0	0.0	0.0	0.0		
Median	23.2	11.9	11.6	3.5	0.2	15.1	0.0	0.0	0.0	0.0		
25th %ile	23.2	6.2	3.1	2.1	0.2	13.9	0.0	0.0	0.0	0.0		
10th %ile	23.2	2.8	2.6	1.6	0.2	13.2	0.0	0.0	0.0	0.0		
— Average	23.2	11.9	9.8	7.0	0.2	15.1	0.0	0.0	0.0	0.0		
Count	1	2	5	8	0	1	0	2	1	1	0	0
Avg. notional	200M	2,928M	2,862M	2,551M		34,506M		4,750M	1,666M	1,666M		
South Carolina Retirement System Investment Commission												
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile												
Avg. notional												

Overlays: passive beta/rebalancing, global TAA, policy tilt TAA
 Cost by implementation style



	Passive Beta/Rebalancing				Global TAA				Policy Tilt TAA			
	Internal		External		Internal		External		Internal		External	
	% of notional		% of notional		% of notional		% of notional		% of notional		% of notional	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	30.4	24.6	7.5	20.4								
75th %ile	30.4	16.0	7.5	12.3								
Median	30.4	10.0	6.9	6.9								
25th %ile	30.4	6.8	4.6	3.2								
10th %ile	30.4	3.0	2.4	1.7								
— Average	30.4	12.7	5.5	10.0								
Count	1	4	5	11	0	0	0	0	0	0	0	0
Avg. notional	281M	3,842M	1,642M	2,151M								
South Carolina Retirement System Investment Commission												
● You	n/a	n/a	1.0	1.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile			0%	0%								
Avg. notional			5,742M	5,742M								

Overlays: commodity, long/short, other
 Cost by implementation style



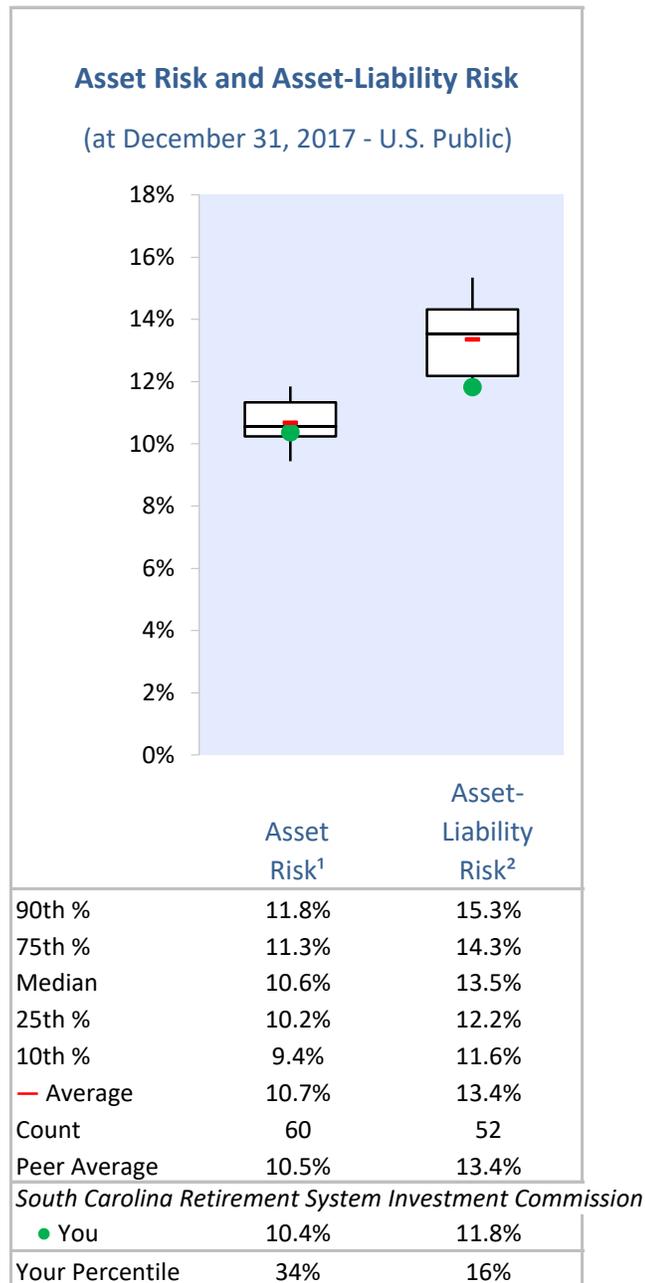
	Commodity				Long/ Short				Other			
	Internal		External		Internal		External		Internal		External	
	% of notional		% of notional		% of notional		% of notional		% of notional		% of notional	
	Peer	U.S. Public										
90th %ile			49.8	45.5			7.1	7.1	0.6	99.7	6.9	7.8
75th %ile			49.8	39.0			7.1	7.1	0.6	83.2	6.9	7.0
Median			49.8	28.2			7.1	7.1	0.6	55.7	6.9	5.7
25th %ile			49.8	17.4			7.1	7.1	0.6	28.1	6.9	3.8
10th %ile			49.8	10.9			7.1	7.1	0.6	11.6	6.9	3.1
— Average			49.8	28.2			7.1	7.1	0.6	55.7	6.9	5.6
Count	0	0	1	2	0	0	1	1	1	2	1	6
Avg. notional			213M	727M			539M	539M	116M	106M	428M	814M
South Carolina Retirement System Investment Commission												
● You	n/a	n/a										
%ile												
Avg. notional												

6

Risk

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Comparison of your risk levels to the U.S. Public universe



1. Asset risk is the expected volatility of your policy return. It is based on the historical variance of, and covariance between, the asset classes in your asset mix policy. It is expressed as an annual standard deviation.

2. Asset-liability risk is the expected volatility of surplus returns. Surplus returns are the changes in a plan's marked-to-market funded status caused by market factors. Asset liability risk is a function of the volatility of policy returns (asset risk), the volatility of surplus returns (surplus risk) and the correlation between policy returns and surplus returns.

Calculation of asset risk

Before considering the benefit of diversification, the weighted average risk of the asset classes in your asset mix policy was 12.6%.

Calculation of your weighted asset class risk

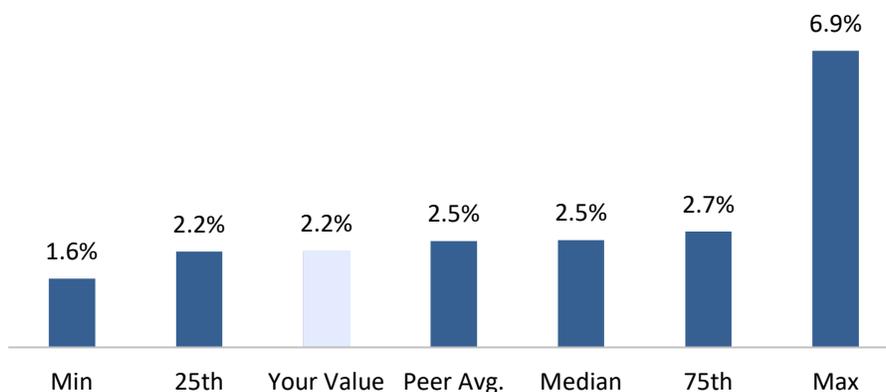
Asset Class	Policy weight (A)	Risk ¹ (B)	Weighted risk (A X B)
Stock: U.S. Broad/All	14.6%	15%	2.2%
Stock: Emerging	4.9%	23%	1.1%
Stock: Global	17.3%	15%	2.6%
Stock: ACWI x U.S.	3.0%	17%	0.5%
Bonds: U.S.	10.0%	5%	0.5%
Bonds: Emerging	5.0%	12%	0.6%
Bonds: High Yield	7.0%	8%	0.6%
Bonds: Cash	3.0%	1%	0.0%
REITs	2.3%	20%	0.5%
Real Estate ex-REITs	5.7%	12%	0.7%
Infrastructure	2.0%	14%	0.3%
Hedge Fund	2.0%	7%	0.1%
Funded TAA	10.0%	7%	0.7%
Diversified Private Equity	7.2%	24%	1.7%
Private Credit	6.0%	8%	0.5%
Weighted Total			12.6%

1. Risk is the standard deviation of returns for the asset class based on standard benchmarks used by CEM.

Reduction in asset risk due to diversification

Your asset risk is less than your weighted asset risk because of the benefit of diversification. Diversification reduces risk because when one asset class has a negative return, it might be offset by another asset class with a positive return. The lower the correlation between your policy asset classes, the greater the diversification benefit. The correlation between your policy asset classes is shown on page 15 of this section.

Diversification benefit: U.S. Public universe



The benefit of diversification equals weighted asset risk minus asset risk.

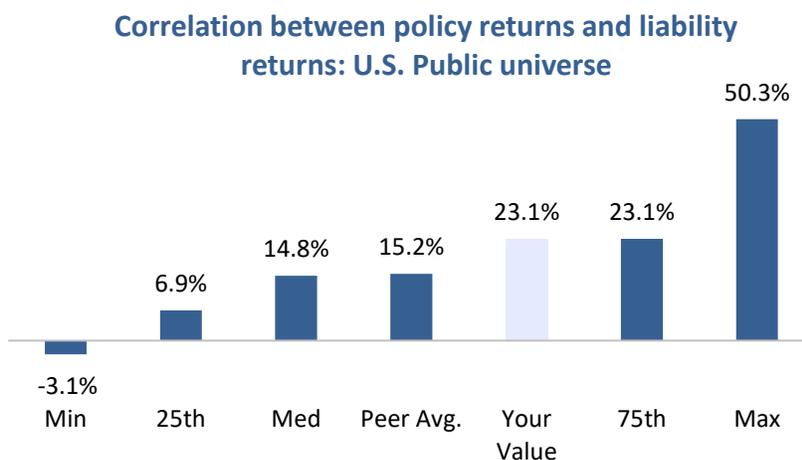
Components of asset risk

	You	Peer median*	Peer average	U.S. Public median*	U.S. Public average
Weighted asset risk	12.6%	12.8%	13.0%	13.2%	13.2%
Benefit of diversification	2.2%	2.5%	2.5%	2.5%	2.6%
Asset risk	10.4%	10.4%	10.5%	10.6%	10.7%

* Comparisons of components of asset risk should be interpreted with caution because it is not always possible to separate the diversification benefit from the weighted asset risk. For example, global stock as an asset class includes the diversification benefit of its geographic components within its asset risk.

Asset-liability risk

Your plan would not have any asset-liability risk if your assets perfectly matched your liabilities. If they matched, then the correlation between asset returns and liability returns would be 100%. If liabilities increased, assets would increase by a like amount (and vice versa). Thus higher correlation between your asset returns and liability returns reduces your asset-liability risk.



In addition to the correlation between asset returns and liability returns, asset-liability risk is also a function of the volatility of asset returns (asset risk) and the volatility of liability returns¹ (liability risk = $\sqrt{R_A^2 + R_L^2 - 2\rho_{AL}R_AR_L}$).

Components of asset-liability risk

	You	Peer median	Peer average	U.S. Public median	U.S. Public average
Asset risk (R_A)	10.4%	10.4%	10.5%	10.6%	10.7%
Liability risk (R_L)	8.5%	9.8%	9.7%	9.7%	9.7%
Correlation between policy returns and liability returns (ρ_{AL})	23.1%	18.5%	15.2%	14.8%	15.6%
Asset-liability risk	11.8%	13.4%	13.4%	13.5%	13.4%

1. Liability returns equal the changes in your marked-to-market liabilities caused by market factors. These are assumed to equal the return on your liability proxy portfolio (see next page).

Liability proxy portfolio

Your liability proxy portfolio is the portfolio of nominal and inflation-indexed bonds that best matches the sensitivity of your liabilities to changes in real and nominal interest rates.

Comparisons of liability proxy portfolio

	Your fund		Peer average		U.S. Public	
	Duration	% of Assets	Duration	% of Assets	Duration	% of Assets
Inflation Indexed Bonds	13.4	95%	12.1	56%	12.2	56%
Nominal Bonds	10.0	5%	12.9	44%	13.7	44%
Total		100%		100%		100%

Your liability proxy portfolio is a tool that:

- Helps you understand how the unsmoothed market value of your liabilities responds to changes in real and nominal interest rates.
- Helps you make better asset mix policy decisions by providing an understanding of which assets will decrease your asset-liability risk (i.e., assets that behave similarly to the neutral asset mix) and which assets will increase your risk.
- Helps you understand how your liabilities are different from your peers. Differences in liabilities mean that the same asset will have different risk / reward characteristics for different funds. For example, the risk of a nominal bond for a fund with 100% inflation sensitivity is much higher than it is for a fund with less than 100% inflation sensitivity.

Asset-liability risk could theoretically be eliminated if your actual asset mix matched the liability proxy portfolio. However, we recognize that this is neither an option nor a goal for most funds because:

- The supply of inflation-indexed assets is limited. These assets are required to match the obligations of pension liabilities.
- This low-risk strategy also has a lower expected return, implying either higher future funding costs or lower future benefits.

The methodology and formula used to determine your liability proxy portfolio are provided on pages 11-13 of this section.

Liability risk

Differences in liability risk are due to differences in inflation sensitivity and member demographics.

A plan's inflation sensitivity depends on:

a) The type of plan

Final and highest average plans have more inflation sensitivity than career average plans. Conversely, career average plans have more inflation sensitivity than flat benefit plans. Your plan type is final average.

Plan type	# of plans	% of Total
Flat Benefit	0	0%
Career Average	0	0%
Final/Highest/Best Avg	53	88%
Other	7	12%
Total	60	100%

b) Contractual inflation protection for retired members

Your retired members get 100% contractual inflation protection. Your retiree inflation protection is subject to a cap of For SCRS and PORS, eligible retirees and surviving annuitants will receive an annual increase in their pension benefit equal to the lesser of 1% of their retirement allowance or

Retiree inflation protection	# of plans		
	Corporate	Public	Other
0%	4	28	5
>0% and <50%	4	0	0
50%	0	2	0
>50% and <100%	2	6	0
100%	4	20	3
Total	14	56	8

c) Member demographics

Member demographics impacts both inflation sensitivity and the duration of plan liabilities. The survey asks for your plan's percentage of liabilities that relate to retired members from your actuarial reports. If you did not provide this number, then it is estimated (see page 12 of this section). Your percentage of liabilities that relate to retired members was 64%.

	Your fund	Peer Average	U.S. Public Average
Active Members	60%	58%	43%
Retired Members	40%	42%	57%
Total	100%	100%	100%

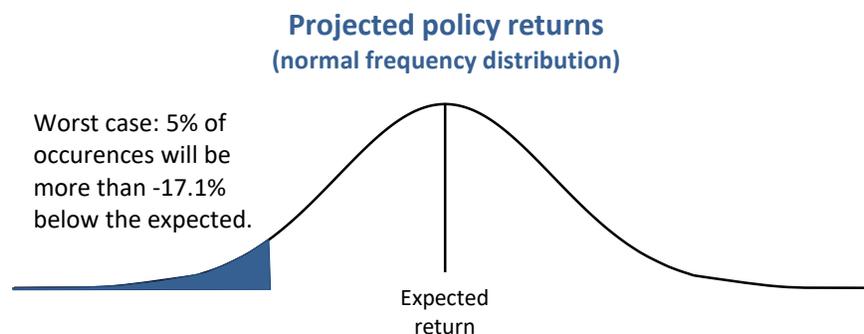
Projected worst case scenarios

We can convert your asset risk and asset-liability risk into worst case outcomes for policy returns and funded status if we make the following simplifying assumptions:

- a) Returns are normally distributed.
- b) Historic return volatility and correlations will continue in the future.
- c) No change in your policy asset mix or liabilities.

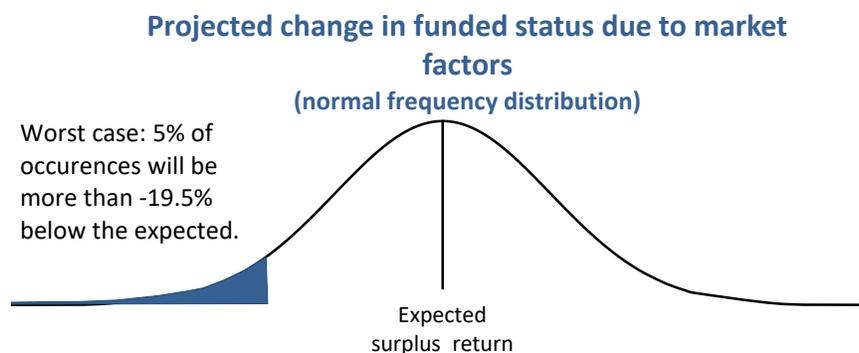
a) Worst case policy returns

Every year there is a 5% probability that your policy return will be worse than your expected policy return by more than -17.1% (-17.1% equals -1.65 X your asset risk of 10.4%). -17.1% is the starting point of worst case outcomes. They could be much worse.



b) Worst case impact on funded status

Every year, there is a 5% probability that changes in your mark-to-market funded status caused by market factors ("Surplus Returns") will be worse than expected by more than -19.5%. (-19.5% equals -1.65 X your asset-liability risk of 11.8%). -19.5% is the starting point of worst case outcomes. They could be much worse.



Historic worst case scenarios during the past 5 years

a) Historic worst case policy returns

During the past 5 years, your lowest policy return was -1.1% in 2015.

Historic policy returns - U.S. Public universe

	2017	2016	2015	2014	2013
90th %	16.7%	9.3%	1.4%	8.5%	18.4%
75th %	15.9%	8.6%	0.7%	7.5%	16.8%
Median	15.1%	7.6%	-0.2%	6.5%	15.3%
25th %	14.0%	7.0%	-0.9%	5.6%	13.0%
10th %	13.0%	6.7%	-1.8%	4.9%	11.3%
Average	15.0%	7.9%	-0.1%	6.6%	14.9%
Count	60	60	64	68	68
Peer Avg	14.8%	7.8%	0.1%	6.6%	14.3%
Your Value	14.6%	8.4%	-1.1%	4.8%	10.2%

b) Historic worst case changes in funded status

During the past 5 years, your worst change in marked-to-market funded status caused by market factors ("Surplus Returns") was -6.7% in 2014.

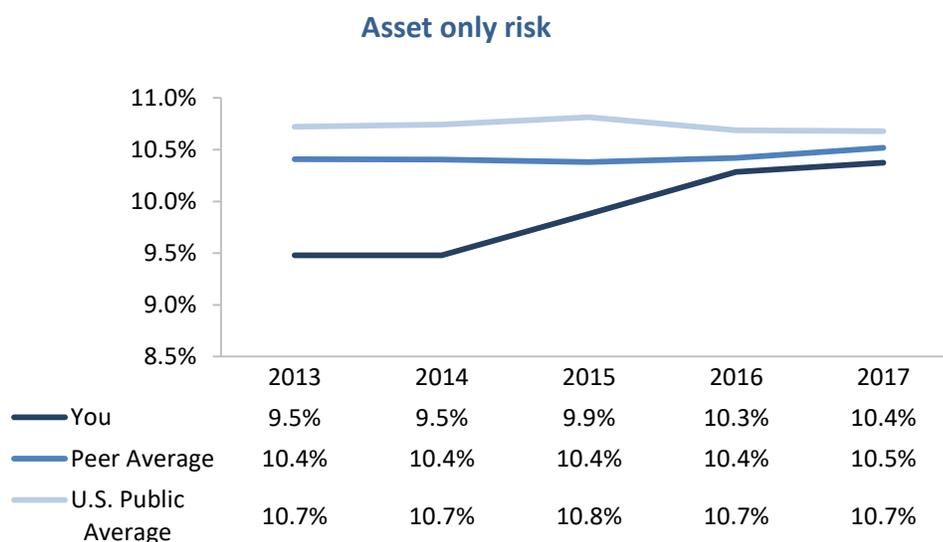
Historic changes in funded status caused by market factors - U.S. Public universe

	2017	2016	2015	2014	2013
90th %	8.6%	4.9%	4.6%	-5.0%	36.9%
75th %	7.7%	4.4%	3.5%	-6.2%	32.9%
Median	6.7%	2.8%	2.1%	-8.0%	29.9%
25th %	5.0%	1.4%	0.8%	-9.8%	26.9%
10th %	3.1%	0.1%	-0.5%	-11.3%	25.1%
Average	6.4%	2.8%	2.1%	-8.1%	30.2%
Count	53	55	59	63	60
Peer Avg	6.4%	2.8%	2.3%	-7.8%	30.4%
Your Value	7.4%	1.1%	2.6%	-6.7%	28.2%

Risk Trends - 2013 to 2017

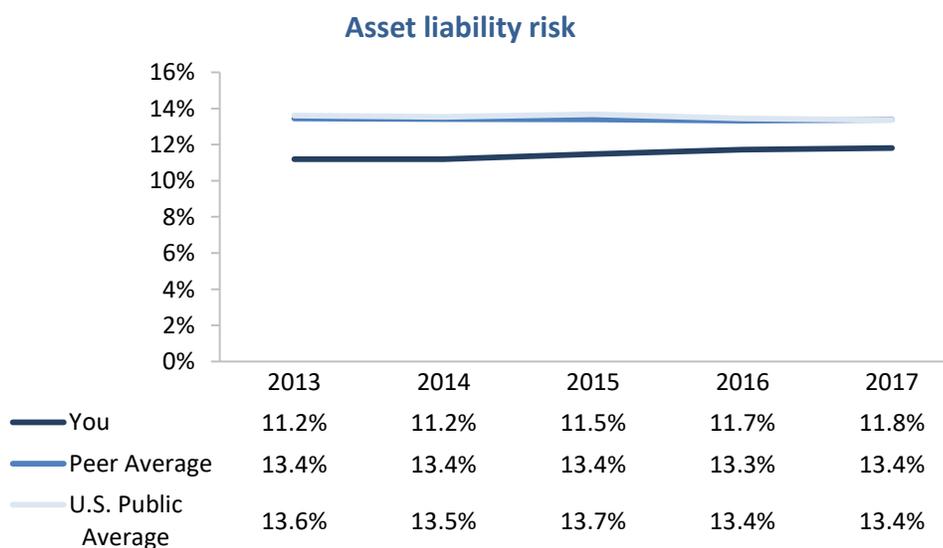
a) Asset risk trends

Asset risk will only change if policy asset mix changes. Between 2013 and 2017 the asset risk for your fund increased from 9.5% to 10.4%.



b) Asset-liability risk trends

Asset-liability risk will change if policy asset mix changes, or if the nature of your liabilities changes. Between 2013 and 2017 the asset-liability risk for your fund increased from 11.2% to 11.8%.



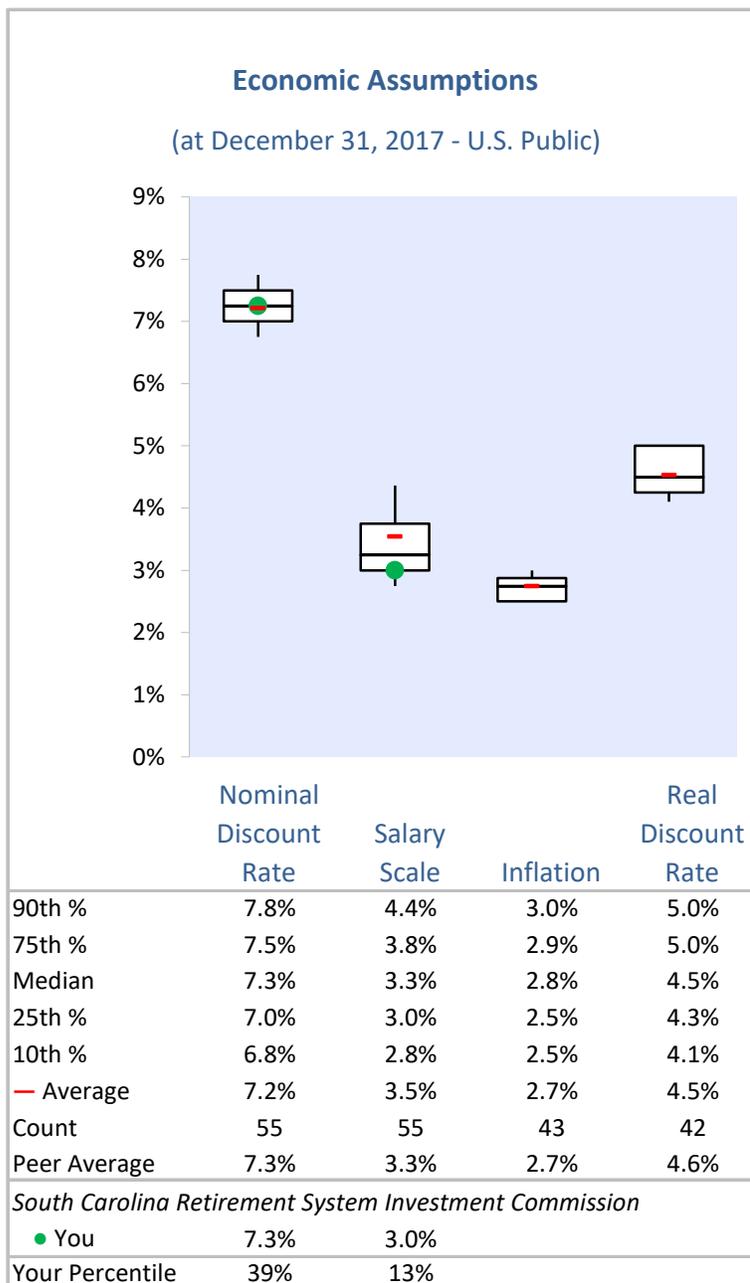
Economic Assumptions used to determine the Accrued Actuarial Liability

The measurement of a plans Accrued Actuarial Liability (AAL) is dependent on the actuarial assumptions used. The most important economic assumption used is the discount rate. For plans that provide contractual cost of living adjustments linked to CPI, the real discount rate (i.e. the nominal discount rate less assumed inflation) is the most important assumption.

For U.S. public pension plans, the nominal discount rate is intended to represent the expected future nominal return on plan assets and should take into account a fund's asset mix.

As a general rule of thumb, for every 1% reduction in discount rate, accrued actuarial liabilities will increase by 12% - 15%.

In recent years, many systems have reduced their discount rates in recognition of the low interest rate environment.

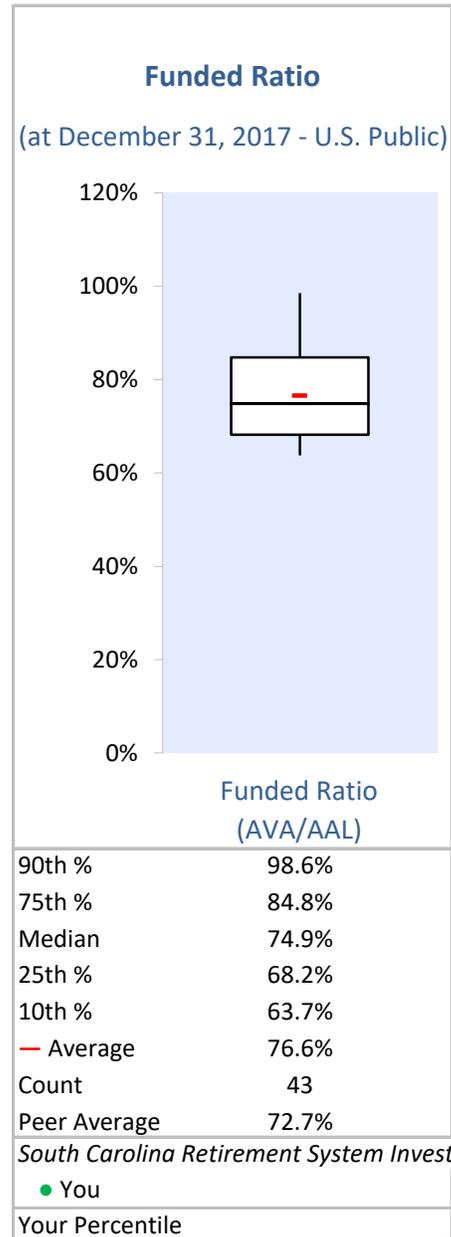


Funded Ratio

For U.S. Public Pension Plans, the funded ratio most often represents the ratio of the Actuarial Value of Assets (AVA) to the Accrued Actuarial Liability (AAL). The AVA adjusts the Market Value of Assets by systematically recognizing investment gains/losses over time (usually 5 years). Market Value funded ratios provide better information, but few systems choose to disclose them.

The box and whiskers chart on the left shows a comparison of unadjusted funded ratios as reported by systems in the CAFR's. The AAL is dependent on the assumptions chosen. As shown on the previous page, these assumptions vary by system.

Funded ratios shown are based on information shown in CAFR's and are calculated at different dates. Thus, this data should be viewed as indicative only and not a direct comparison of like for like figures.



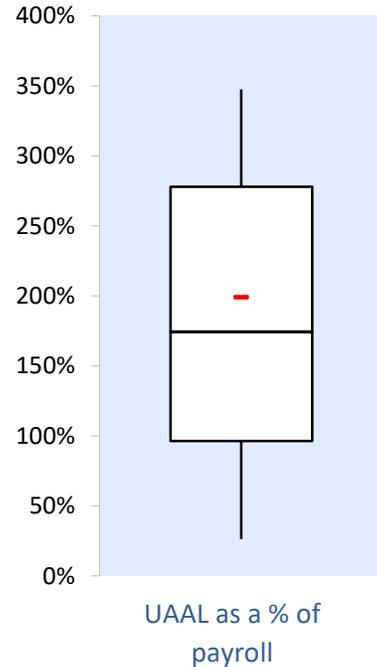
Unfunded Accrued Liability - As a percentage of payroll

Benefit security is ultimately determined by a system sponsor's ability to pay off any funding deficiency, commonly referred to as the Unfunded Accrued Actuarial Liability (UAAL) in CAFR's. Funding deficiencies are liquidated by contributions from members and/or employers.

The size of the UAAL compared the active payroll is an indicator of the size of the funding deficiency relative to the sponsor. A lower ratio indicates that contributions required to liquidate the UAAL are more likely to be manageable for employees and employers.

For a system with an UAAL equal to 100% of payroll, contributions equal to 10% of member payroll would be required to liquidate the UAAL over a 10 year period. These contributions would be in addition to contributions required to pay for current service accruals.

Unfunded Accrued Liability - % of payroll
(at December 31, 2017 - U.S. Public)



90th %	347.6%
75th %	278.0%
Median	174.5%
25th %	96.5%
10th %	26.4%
— Average	199.0%
Count	40
Peer Average	215.7%

South Carolina Retirement System Investment Com

● You

Your Percentile

Appendix A - Methodology and formula used to calculate liability return and liability proxy portfolio

Risk calculation descriptions

CEM would like to recognize and thank Malcolm Hamilton previously of Mercer for providing the key formulas used to calculate liability returns. We would also like to thank Stijn Oude Brunink previously of ORTEC Consultants in the Netherlands who provided the proofs and made adjustments to Mr. Hamilton's formulas. These formulas and this section use several simplifying assumptions that could cause your fund's individual results to differ from actual. We encourage you to pursue more precise calculations of your liability returns.

Step 1 - Inflation sensitivity

The first step in estimating your liability return is to determine your liabilities' inflation sensitivity. The degree of total inflation sensitivity determines the proportion of inflation-indexed bonds versus nominal bonds that belong in your liability proxy portfolio.

Total inflation sensitivity

- = Inflation protection retirees X % liabilities relating to retirees
- + Inflation protection for active members X (1 - % liabilities relating to retirees)

Inflation protection for retirees

On the survey we asked for the amount of contractual inflation protection provided to retirees.

Ad hoc inflation protection is not considered because it is not a contractual liability. However, many funds are managed to maintain historic levels of ad hoc increases. If this is the case with your fund, then your inflation protection may have been understated. Please ask for CEM to make that adjustment for you.

Inflation protection for active members

We inferred inflation protection for your active members to be 86% based on your plan type of Final Average.

Final and highest average plans have less than 100% inflation protection because during the averaging period, inflation protection is only 50%, not 100%. This is a natural function of taking an average of more than one year's earnings. Thus the weighted average inflation protection for active members in a 5-year final average plan is around 86% and in a 3-year average plan, 93%. These weighted averages are lower than intuition might suggest because the active members associated with the largest liabilities (i.e., the highest weights) are the ones closest to retirement.

Flat Benefit and Career Average plans are assumed to have 77% inflation protection. Contractually, flat benefit plans have zero inflation protection but negotiated increases tend to closely track inflation. However, just as with Final Average plans, inflation protection between negotiated increases is less than full inflation.

Step 2 - Proportion of liabilities relating to retirees

The second step is to determine how much of your liabilities relate to your retirees versus your active members. This number is used to weight the liability proxy portfolio's obligations to retirees and active members.

This ratio depends on several factors including the ratio of retired and active members, member demographics and the inflation sensitivity of the promise made to these two member groups. Deferred (also known as inactive) members are ignored because even if they are large in number they tend to represent only a very small fraction of the future liability.

Equivalency Table	
Retirees as a % of Active + Retirees	Relating to Retirees
0%	0%
10%	22%
20%	35%
30%	45%
40%	55%
50%	63%
60%	71%
70%	79%
80%	86%
90%	93%
100%	100%

Most funds have provided the actual ratio from their actuarial reports (as requested on the survey). If the ratio is not provided, it is estimated based on the "Equivalency" table above.

Your percentage of liabilities that relates to retirees was 64%. The percentage of liability that relates to retirees is higher than the retirees as a percentage of active and retired members because retirees have accrued a higher benefit.

Step 3 - Determining your duration relative to real and nominal yields

Duration enables you to determine the change in value of a cash flow, such as your pension liabilities, caused by a change in interest rates. The relationship between duration and cost of your pension liability is as follows.

Percentage change in pension liability cost

$$= (- \text{Modified duration relative to change in real yields} \times \text{change in real yields}) \\ + (- \text{Modified duration relative to change in nominal yields} \times \text{change in nominal yields})$$

The modified duration of your liabilities with respect to changes in real and nominal yields is determined by the following two formulas.

Modified duration relative to changes in real yields

$$= 10 \times [\text{Inflation protection for active members} \times (1 - \% \text{ of liabilities relating to retirees}) \\ + \text{Inflation protection for retirees} \times (1 - \% \text{ of liabilities relating to retirees}/4) \\ + (\text{Inflation protection for retirees}/10) \times (1.5 - 0.5 \times \% \text{ liabilities relating to retirees})]$$

Modified duration relative to changes in nominal yields

$$= 10 \times [(2 - 5 \times \% \text{ Liabilities relating to retirees}/4 - \text{inflation protection for actives} \times \\ (1 - \% \text{ liabilities relating to retirees}) \\ - (\text{Inflation protection for retirees}/10) \times (8.5 - 2 \times \% \text{ liabilities relating to retirees}) \\ - (\text{Inflation protection for retirees}/10) \times (1.5 - 0.5 \times \% \text{ liabilities relating to retirees})]$$

Step 4 - Determining the liability proxy portfolio

Knowing the sensitivity of your pension liabilities to real and nominal interest rates enables you to construct a liability proxy portfolio using a combination of nominal bonds and inflation-indexed bonds.

Duration of inflation-indexed bonds in your liability proxy portfolio =
 Modified Duration Relative to Change in Real yields ÷ Proportion of inflation-indexed bonds in your liability proxy portfolio (this is the total inflation sensitivity)

Duration of nominal bonds in your liability proxy portfolio =
 Modified Duration Relative to Change in Nominal Yields ÷ Proportion of nominal bonds in your liability proxy portfolio (this is 1 minus the total inflation sensitivity)

Proportion of inflation-indexed bonds in your liability proxy portfolio = total inflation sensitivity

Proportion of nominal bonds in your liability proxy portfolio = 1 - total inflation sensitivity

Step 5 - Liability returns

The return earned on your liability proxy portfolio is the liability return and matches the change in your plan's liabilities in response to changes in market factors. It uses a true market valuation rather than a smoothed actuarial valuation. See page 15 for benchmark details.

Liability Return

= Proportion indexed bonds in liability proxy portfolio X (CPI + average real yield)
 + Proportion nominal bonds in liability proxy portfolio X average long bond yield
 - Modified duration relative to change in real yields X change in real yields
 - Modified duration relative to change in nominal yields X change long yields

	Long Nominal Bonds		Inflation Indexed Bonds		CPI
	Year end yield	Change in yield	Year end yield	Change in yield	
2017	2.41	-0.65	0.71	-0.31	2.13
2016	3.06	0.08	1.02	-0.26	2.10
2015	2.98	0.15	1.28	0.39	0.70
2014	2.83	-1.07	0.89	-0.72	0.80
2013	3.90	0.95	1.61	1.46	1.50

Appendix B - Methodology used to calculate asset and asset-liability risk

Asset mix

Your asset only mix is a function of your policy asset mix, your currency hedging policy and the presence of any duration overlays.

CEM does not use your specific policy benchmarks. Standard asset class proxies (shown on the next page) are used for each given asset class. Monthly, historical data is used to construct an asset class variance/covariance table. Your specific policy weights are then used to calculate an expected monthly volatility for your policy mix using the following formula, which takes current asset class variances and covariances as expected future variances and covariances.

$$\begin{aligned}\text{Expected monthly variance of policy mix} &= \sum \sum w_X w_Y \text{Cov}(X, Y) \\ &= \sum \sum w_X w_Y \sigma_X \sigma_Y \rho_{X,Y}\end{aligned}$$

where

w_X = policy weight of asset class X

σ_X = standard deviation of monthly returns for asset class X

w_Y = policy weight of asset class Y

σ_Y = standard deviation of monthly returns for asset class Y

$\text{Cov}(X, Y)$ = covariance of X and Y

$\rho_{X,Y}$ = Pearson's correlation of the returns for X and Y

Each sum is over all asset classes. Assuming normal distribution of returns, we then solve for expected annual standard deviation as:

$$\begin{aligned}\text{Expected annual standard deviation of policy mix} &= \\ &(\text{Expected monthly variance of policy mix})^{1/2} \times (12)^{1/2}\end{aligned}$$

Hedged and unhedged asset classes are treated as separate asset classes in the model. Funds with hedging policies between 0% and 100% have their policy weight allocated between the hedged and unhedged asset classes according to the proportion hedged.

Duration overlays are also treated as a separate asset class. Their weight is taken as notional value divided by total plan assets. For funds with duration overlays, the sum of weights will be greater than 100%. Rather than calculating a return for every possible duration, CEM's total variance/covariance matrix includes bonds with a continual duration of each whole number. A given fund's duration overlay is then represented by the two constant duration bonds closest to the duration of the overlay, with the total weight divided proportionately between them.

Asset-liability risk

Asset-liability risk is calculated in exactly the same way as asset risk with the addition of a short position in the liability proxy portfolio. This portfolio will typically be represented by up to four bonds with continual duration whose summed weights will equal -100%, and whose real and nominal duration match the liability proxy portfolio.

Appendix C - Correlation Matrix

	Stock: U.S. Broad/All	Stock: Emerging	Stock: Global	Stock: ACWI x U.S.	Bonds: U.S.	Bonds: Emerging	Bonds: High Yield	Bonds: Cash	Real Assets: REITs	Real Assets: Real Estate ex-REITs	Real Assets: Infrastructure	Hedge Fund	Funded TAA	Diversified Private Equity	Private Credit	Nominal Bond: Duration 10	Nominal Bond: Duration 11	Real Return Bond: Duration 13	Real Return Bond: Duration 14
Stock: U.S. Broad/All	1.00	0.68	0.89	0.75	0.19	0.53	0.59	0.03	0.57	0.55	0.66	0.78	0.78	0.88	0.59	-0.01	0.00	0.09	0.09
Stock: Emerging	0.68	1.00	0.76	0.76	0.03	0.66	0.57	0.00	0.48	0.47	0.48	0.79	0.79	0.77	0.57	-0.11	-0.12	0.24	0.23
Stock: Global	0.89	0.76	1.00	0.97	0.10	0.55	0.60	-0.02	0.56	0.55	0.63	0.76	0.76	0.89	0.60	-0.06	-0.07	0.16	0.15
Stock: ACWI x U.S.	0.75	0.76	0.97	1.00	0.09	0.55	0.56	-0.04	0.54	0.53	0.56	0.73	0.73	0.86	0.56	-0.07	-0.07	0.20	0.19
Bonds: U.S.	0.19	0.03	0.10	0.09	1.00	0.36	0.26	0.28	0.17	0.28	0.06	0.08	0.08	0.04	0.26	0.94	0.93	0.82	0.82
Bonds: Emerging	0.53	0.66	0.55	0.55	0.36	1.00	0.53	0.02	0.41	0.44	0.41	0.59	0.59	0.54	0.53	0.23	0.22	0.61	0.60
Bonds: High Yield	0.59	0.57	0.60	0.56	0.26	0.53	1.00	0.00	0.55	0.55	0.40	0.64	0.64	0.71	1.00	0.04	0.04	0.26	0.25
Bonds: Cash	0.03	0.00	-0.02	-0.04	0.28	0.02	0.00	1.00	-0.03	-0.01	-0.11	0.13	0.13	-0.07	0.00	0.16	0.16	0.02	0.02
Real Assets: REITs	0.57	0.48	0.56	0.54	0.17	0.41	0.55	-0.03	1.00	0.99	0.40	0.43	0.43	0.74	0.55	0.01	0.01	0.25	0.24
Real Assets: Real Estate ex-REITs	0.55	0.47	0.55	0.53	0.28	0.44	0.55	-0.01	0.99	1.00	0.39	0.42	0.42	0.73	0.55	0.12	0.12	0.31	0.31
Real Assets: Infrastructure	0.66	0.48	0.63	0.56	0.06	0.41	0.40	-0.11	0.40	0.39	1.00	0.43	0.43	0.49	0.40	-0.04	-0.03	0.25	0.25
Hedge Fund	0.78	0.79	0.76	0.73	0.08	0.59	0.64	0.13	0.43	0.42	0.43	1.00	1.00	0.80	0.64	-0.09	-0.09	0.12	0.11
Funded TAA	0.78	0.79	0.76	0.73	0.08	0.59	0.64	0.13	0.43	0.42	0.43	1.00	1.00	0.80	0.64	-0.09	-0.09	0.12	0.11
Diversified Private Equity	0.88	0.77	0.89	0.86	0.04	0.54	0.71	-0.07	0.74	0.73	0.49	0.80	0.80	1.00	0.71	-0.19	-0.20	0.12	0.12
Private Credit	0.59	0.57	0.60	0.56	0.26	0.53	1.00	0.00	0.55	0.55	0.40	0.64	0.64	0.71	1.00	0.04	0.04	0.26	0.25
Nominal Bond: Duration 10	-0.01	-0.11	-0.06	-0.07	0.94	0.23	0.04	0.16	0.01	0.12	-0.04	-0.09	-0.09	-0.19	0.04	1.00	1.00	0.75	0.76
Nominal Bond: Duration 11	0.00	-0.12	-0.07	-0.07	0.93	0.22	0.04	0.16	0.01	0.12	-0.03	-0.09	-0.09	-0.20	0.04	1.00	1.00	0.75	0.75
Real Return Bond: Duration 13	0.09	0.24	0.16	0.20	0.82	0.61	0.26	0.02	0.25	0.31	0.25	0.12	0.12	0.12	0.26	0.75	0.75	1.00	1.00
Real Return Bond: Duration 14	0.09	0.23	0.15	0.19	0.82	0.60	0.25	0.02	0.24	0.31	0.25	0.11	0.11	0.12	0.25	0.76	0.75	1.00	1.00

Correlation Matrix of Common Asset Classes in U.S. Public universe

	Stock: U.S. Broad/All	Stock: U.S. Large Cap	Stock: U.S. Small Cap	Stock: EAFE	Stock: Emerging	Stock: Global	Stock: ACWI x U.S.	Bonds: U.S.	Bonds: Emerging	Bonds: High Yield	Bonds: Long Bonds	Bonds: Cash	Real Assets: REITs	Real Assets: Real Estate ex-REITs	Hedge Fund	Diversified Private Equity	Nominal Bond: Duration 10	Nominal Bond: Duration 13	Real Return Bond: Duration 10	Real Return Bond: Duration 11
Stock: U.S. Broad/All	1.00	0.99	0.88	0.67	0.68	0.89	0.75	0.19	0.53	0.59	0.17	0.03	0.57	0.55	0.78	0.88	-0.01	0.01	0.02	0.02
Stock: U.S. Large Cap	0.99	1.00	0.80	0.73	0.66	0.89	0.75	0.13	0.52	0.58	0.09	0.03	0.55	0.53	0.74	0.87	-0.03	-0.03	0.02	0.02
Stock: U.S. Small Cap	0.88	0.80	1.00	0.59	0.66	0.75	0.66	0.10	0.46	0.59	0.08	0.00	0.61	0.58	0.81	0.85	-0.11	-0.09	-0.03	-0.03
Stock: EAFE	0.67	0.73	0.59	1.00	0.70	0.95	0.99	0.15	0.50	0.51	0.15	0.03	0.54	0.52	0.68	0.85	-0.01	-0.01	0.12	0.12
Stock: Emerging	0.68	0.66	0.66	0.70	1.00	0.76	0.76	0.03	0.66	0.57	0.02	0.00	0.48	0.47	0.79	0.77	-0.11	-0.12	0.18	0.17
Stock: Global	0.89	0.89	0.75	0.95	0.76	1.00	0.97	0.10	0.55	0.60	0.07	-0.02	0.56	0.55	0.76	0.89	-0.06	-0.07	0.09	0.09
Stock: ACWI x U.S.	0.75	0.75	0.66	0.99	0.76	0.97	1.00	0.09	0.55	0.56	0.07	-0.04	0.54	0.53	0.73	0.86	-0.07	-0.08	0.14	0.14
Bonds: U.S.	0.19	0.13	0.10	0.15	0.03	0.10	0.09	1.00	0.36	0.26	0.93	0.28	0.17	0.28	0.08	0.04	0.94	0.91	0.81	0.81
Bonds: Emerging	0.53	0.52	0.46	0.50	0.66	0.55	0.55	0.36	1.00	0.53	0.34	0.02	0.41	0.44	0.59	0.54	0.23	0.22	0.53	0.53
Bonds: High Yield	0.59	0.58	0.59	0.51	0.57	0.60	0.56	0.26	0.53	1.00	0.24	0.00	0.55	0.55	0.64	0.71	0.04	0.03	0.23	0.22
Bonds: Long Bonds	0.17	0.09	0.08	0.15	0.02	0.07	0.07	0.93	0.34	0.24	1.00	0.15	0.18	0.28	0.05	-0.02	0.93	0.94	0.76	0.77
Bonds: Cash	0.03	0.03	0.00	0.03	0.00	-0.02	-0.04	0.28	0.02	0.00	0.15	1.00	-0.03	-0.01	0.13	-0.07	0.16	0.14	0.09	0.07
Real Assets: REITs	0.57	0.55	0.61	0.54	0.48	0.56	0.54	0.17	0.41	0.55	0.18	-0.03	1.00	0.99	0.43	0.74	0.01	0.00	0.25	0.25
Real Assets: Real Estate ex-REITs	0.55	0.53	0.58	0.52	0.47	0.55	0.53	0.28	0.44	0.55	0.28	-0.01	0.99	1.00	0.42	0.73	0.12	0.11	0.33	0.33
Hedge Fund	0.78	0.74	0.81	0.68	0.79	0.76	0.73	0.08	0.59	0.64	0.05	0.13	0.43	0.42	1.00	0.80	-0.09	-0.09	0.12	0.11
Diversified Private Equity	0.88	0.87	0.85	0.85	0.77	0.89	0.86	0.04	0.54	0.71	-0.02	-0.07	0.74	0.73	0.80	1.00	-0.19	-0.22	0.18	0.17
Nominal Bond: Duration 10	-0.01	-0.03	-0.11	-0.01	-0.11	-0.06	-0.07	0.94	0.23	0.04	0.93	0.16	0.01	0.12	-0.09	-0.19	1.00	0.98	0.75	0.76
Nominal Bond: Duration 13	0.01	-0.03	-0.09	-0.01	-0.12	-0.07	-0.08	0.91	0.22	0.03	0.94	0.14	0.00	0.11	-0.09	-0.22	0.98	1.00	0.73	0.74
Real Return Bond: Duration 10	0.02	0.02	-0.03	0.12	0.18	0.09	0.14	0.81	0.53	0.23	0.76	0.09	0.25	0.33	0.12	0.18	0.75	0.73	1.00	1.00
Real Return Bond: Duration 11	0.02	0.02	-0.03	0.12	0.17	0.09	0.14	0.81	0.53	0.22	0.77	0.07	0.25	0.33	0.11	0.17	0.76	0.74	1.00	1.00

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Appendices

Appendix A - Data Summary

Appendix B - Data quality

Appendix C - Glossary of terms

Appendix A - Data Summary

South Carolina Retirement System Investment Commission

Plan Info	2017	2016	2015
Contact	Jon Rychener	Jon Rychener	Jon Rychener
Type of fund (corporate, public, other)	Public	Public	Public
Total fund size (mils) as at December 31	31,801.4	28,771.1	27,797.3
Asset-class level holdings provided on survey are: year end or average?	Average	Average	Average
Total return for year ended	14.70%	7.61%	-0.56%
Is the return net or gross?	Net of manager fees	Net of all investment costs	Net of all investment costs
Total fund policy or benchmark return	14.55%	8.40%	-1.08%

Ancillary Data	2017	2016	2015
What is your hedging policy for:			
Foreign Holdings	75%	75%	75%
What were your actuarial fees in 000s?	485	277	277
How many plan members/beneficiaries do you have:			
Active?	233,423	252,494	248,446
Active (no-accrual)?	6,630		
Retired?	156,901	158,492	154,639
Other?	193,988	183,796	178,086
What type of plan(s) do you have?	Final Average	Final Average	Final Average
To what extent are your retired members' benefits indexed to inflation?			
Contractual %	100%	100%	100%
If the indexation is subject to a cap, describe the cap	For SCRS and PORS, eligible	For SCRS and PORS, eligible	For SCRS and PORS, eligible
What % of the plan's liabilities pertain to retired members?	64%	65%	65%
Actuarial valuation assumptions for funding purposes:			
Liability discount rate	7.3%	7.5%	7.5%
Salary progression rate	3.0%	3.3%	3.5%
What was your actuarial assumption for expected rate of return?	7.3%	7.5%	7.5%

Appendix A - Data Summary: Policy Weights and Benchmarks

South Carolina Retirement System Investment Commission

Asset Class		Policy Weight	Benchmark	
			Description	Return
Stock - U.S. Broad/All	2017	14.6	MSCI US IMI Net	20.6
	2016		MSCI US Net & MSCI US IMI Net Mid-year Blend	11.8
	2015		Russell 3000	0.5
Stock - Emerging	2017	4.9	MSCI Emerging Market IMI Net	36.8
	2016		MSCI Emerging Market Net	11.2
	2015		MSCI Emerging Market Net	-14.9
Stock - ACWI x U.S.	2017	3.0	MSCI ACWI x/US Net	22.4
	2016		MSCI ACWI x/US Net	4.5
	2015			
Stock - Global	2017	17.3	MSCI World Net Dividend	22.4
	2016	37.2	MSCI ACWI Net & MSCI ACWI IMI Net Mid-year Blend	8.2
	2015	34.0	MSCI All Country World Net Index	-2.4
Fixed Income - U.S.	2017	10.0	Barclays US Aggregate	5.0
	2016	10.3	Barclays US Aggregate	2.7
	2015	10.0	Barclays US Aggregate	0.6
Fixed Income - Emerging	2017	5.0	50% JPM EMBI Global Diversified/50% JPM-GBI-EM Global	12.7
	2016	5.2	50% JPM EMBI Global Diversified/50% JPM-GBI-EM Global	10.2
	2015	5.0	50% JPM EMBI Global Diversified/50% JPM-GBI-EM Global	-7.1
Fixed Income - Global	2017			
	2016			
	2015		Barclays Global Aggregate (USDH)	1.0
Fixed Income - High Yield	2017	7.0	50%Bar U.S. High Yield 2% / 50%S&P LSTA Leveraged Loan	5.8
	2016	6.8	50%Bar U.S. High Yield 2% / 50%S&P LSTA Leveraged Loan	12.3
	2015	5.0	33%Bar U.S. High Yield 2% / 33%S&P LSTA Leveraged Loan / 33%Bar Mortgage-Backed Securities	-1.2
Cash	2017	3.0	BofA Merrill Lynch 3 Month US Treasury Bill GOO1	0.9
	2016	2.1	BofA Merrill Lynch 3 Month US Treasury Bill GOO1	0.3
	2015	2.0	BofA Merrill Lynch 3 Month US Treasury Bill GOO1	0.1
Global TAA	2017	10.0	50% MSCI World Net/50% Barclays US Aggregate	12.6
	2016	10.3	50% MSCI World Net/50% Citi WGBI & 50% MSCI World Net/50% Barclays US Aggregate Mid-year Blend	7.9
	2015	10.0	50% MSCI World Net / 50% Citi WGBI	-2.0
Hedge Funds	2017	2.0	50% MSCI World Net/50% Barclays US Aggregate	12.6
	2016	4.1	HFRI Fund Weighted Composite Index & 50% MSCI World Net/50% Barclays US Aggregate Mid-year Blend	3.3
	2015	10.0	HFRI Fund Weighted Composite Index	-1.1
Commodities	2017			
	2016			
	2015	3.0	Bloomberg Commodity Index Total Return	-24.7
REITs	2017	2.3	Your REIT benchmark	5.2
	2016	0.7	Your REIT benchmark	8.5
	2015			
Infrastructure	2017	2.0	Dow Jones Brookfield Global Infrastructure Net Index	15.8
	2016	1.0	Dow Jones Brookfield Global Infrastructure Net Index	12.5
	2015			
Real Estate ex-REITs	2017	5.7	NCREIF ODCE Index + 75 bps	8.4
	2016	6.5	NCREIF ODCE Index + 75 bps	10.8
	2015	5.0	NCREIF ODCE Index + 75 bps	15.7
Diversified Private Equity	2017	7.2	80% Russell 3000 / 20% MSCI EAFE Lagged + 300 Bps	21.9
	2016	9.2	80% Russell 3000 / 20% MSCI EAFE Lagged + 300 Bps	16.3
	2015	9.0	80% Russell 3000 / 20% MSCI EAFE Lagged + 300 Bps	0.9
Private Credit	2017	6.0	S&P/LSTA + 150 Bps 3 Month Lag	6.8
	2016	6.6	S&P/LSTA + 150 Bps 3 Month Lag	7.0
	2015	7.0	S&P/LSTA + 150 Bps 3 Month Lag	2.4

Appendix A - Data Summary: Private Market Assets, Returns and Costs

South Carolina Retirement System Investment Commission

Asset Class		Assets (millions) and Annual Returns								# Ext Mgrs	Investment Fees / Costs in 000s ¹																	
		Internal & Co-Inv		External		Fund of Funds					Internal & Co-Inv		Base		Perform		Internal & Other		Total ¹		bps (% of fee basis)		Fund of Funds					
		Assets	Return	Amt fees based on	Assets	Return	Amt fees based on	Assets	Return		Assets	Return	Total 000s	bps ¹	Fees	Fees	& Other	000s	bps (% of fee basis)	Underlying ² Fees	Base Fees	Perform Fees	Internal & Other	Total ¹ 000s	bps (% of fee basis)			
Infrastructure	2017			<u>Funds</u>						1																		
	2016			425.7	425.7	15.0				1			2,065.8	0.0	116.7	2,182.5	51.3											
	2015			274.4	159.2	-5.2				1			764.9	0.0	45.7	810.6	29.5											
Real Estate ex-REITs	2017	7.5	-8.2							31			6.4	8.4														
	2016	17.1	-15.3							17			52.0	30.3														
	2015	27.7	18.9							27			7.4	2.7														
					<u>LPs</u>																							
		2017			1,736.6	1,830.5	9.8							16,110.3	20,114.4	501.6	16,611.9	95.7										
	2016			1,597.0	1,475.4	3.0							16,675.4	10,588.5	423.6	17,098.9	107.1											
	2015			1,410.6	1,197.0	16.8							15,887.0	34,048.0	317.6	16,204.6	114.9											
Diversified Private Equity	2017	488.2	8.3	1,316.4	1,408.0	17.1	415.1	546.9	10.4	55			3,633.7	74.4	19,106.4	46,571.8	385.8	19,492.2	148.1	4,779.8	2,846.4	0.0	149.9	7,776.1	187.3			
	2016	741.5	10.4	1,670.4	1,345.0	13.8	503.8	629.5	4.2	28			3,445.6	46.5	22,068.2	43,990.4	386.2	22,454.3	134.4	6,592.6	4,074.3	1,017.1	180.7	10,847.6	215.3			
	2015	667.0	-5.7	1,390.7	1,251.1	5.0	660.1	710.4	11.6	62			1,543.3	23.1	18,910.5	12,062.7	331.9	19,242.4	138.4	10,231.4	6,112.5	2,657.9	188.5	16,532.4	250.5			
Private Credit	2017	3.5	2.0	2,292.7	1,779.0	6.9				36			9.4	27.0	24,096.4	15,638.8	487.5	24,583.9	107.2									
	2016	5.9	3.7	1,471.9	1,607.1	8.9				16			16.5	27.9	17,004.6	16,791.4	461.4	17,466.0	118.7									
	2015	17.0	5.8	1,416.0	1,609.4	0.6				33			45.8	26.9	17,178.8	(247.6)	427.0	17,605.8	124.3									

1. Cost in basis points = total cost / average holdings. Total cost excludes private asset performance fees because of comparability issues.
2. Default for fees paid to underlying partnerships have been applied.

Appendix A - Data Summary: Oversight, Custodial and Other Costs

South Carolina Retirement System Investment Commission

Oversight, Custodial and Other Costs			
		000s	bps
Oversight of the fund assets ¹	2017	1,089.1	0.4bp
	2016	1,056.3	0.4bp
	2015	1,201.0	0.4bp
Custodial total	2017	1,130.5	0.4bp
	2016	925.3	0.3bp
	2015	765.8	0.3bp
Custodial foreign (if available)	2017	670.5	
	2016	460.6	
	2015	460.1	
Custodial domestic (if available)	2017	460.0	
	2016	464.7	
	2015	305.6	
Consulting / performance measurement	2017	1,070.0	0.4bp
	2016	940.0	0.3bp
	2015	1,029.9	0.4bp
Audit	2017	16.8	0.0bp
	2016	99.4	0.0bp
	2015	201.0	0.1bp
Other (legal etc)	2017	320.9	0.1bp
	2016	266.9	0.1bp
	2015	345.2	0.1bp
Total	2017	3,627.3	1.2bp
	2016	3,288.0	1.2bp
	2015	3,542.9	1.2bp

Summary of All Asset Management Costs			
		000s	bps
Investment Management Costs	2017	218,814.6	71.7bp
	2016	208,125.1	74.3bp
	2015	235,815.4	80.3bp
Oversight, Custodial & Other Costs	2017	3,627.3	1.2bp
	2016	3,288.0	1.2bp
	2015	3,542.9	1.2bp
Total	2017	222,441.9	72.9bp
	2016	211,413.0	75.4bp
	2015	239,358.3	81.5bp

1. Oversight includes the salaries and benefits of executives and their staff responsible for overseeing the entire fund or multiple asset classes and the fees / salaries of the board or investment committee. All costs associated with the above including fees / salaries, travel, director's insurance and attributed overhead should be included.

Appendix A - Data Summary: Overlays

South Carolina Retirement System Investment Commission

Overlays		Internal					External								
		Notional amount (mils)	Market value (mils)	Profit/Loss (000s)	Cost (000s)	% of Notion. (bps)	Duration (years)	Notional amount (mils)	Market value (mils)	Profit/Loss (000s)	Base fees (000s)	Perf. fees (000s)	Over-sight (000s)	Total (000s)	% of Notion. (bps)	Duration (years)
Rebalancing/	2017						5,742.0	946.6		550.7		259.4	810.1	1.4	
Passive Beta	2016						4,627.1	805.0		1,076.7		231.1	1,307.8	2.8	
	2015						3,394.5	656.7		863.2		174.2	1,037.4	3.1	

Appendix A - Data Summary: Comments and defaults

As discussed with you during the data confirmation process, the following defaults and footnotes are applicable to your data:

- Private Credit - LPs: Fees are the weighted average management fee of 105 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 73 bps (16.7 million).
- Diversified Private Equity - LPs: Fees are the weighted average management fee of 145 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 145 bps (19 million).
- Real Estate - LPs: Fees are the weighted average management fee of 93 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 108 bps (18.8 million).

Appendix B - Data quality

The value of the information contained in these reports is only as good as the quality of the data received. CEM's procedures for checking and improving the data include the following.

Improved survey clarity

Twenty years of feedback from survey participants has led to improved definitions and survey clarity. In addition to immediate feedback from participants, CEM has hosted user workshops to solicit additional feedback and to resolve issues, such as trade-offs between more information and effort on the part of participants.

Computer and desktop verification

Survey responses are compared to norms for the survey universe and to each sponsor's prior year data when available. This typically results in questions generated by our online survey engine as well as additional follow-up to clarify responses or with additional questions.

In addition to these procedures, data quality continues to improve for the following reasons:

Learning curve

This is CEM's 27th year of gathering this data and experience is teaching the firm and the participants how to do a better job.

Growing universe

As our universe of respondents continues to increase in size, so does our confidence in the results as unbiased errors tend to average themselves out.

Any suggestions on how to further improve data quality are welcome.

Currency Conversions

For reports where either the peer group or report universe includes funds from multiple countries, we have converted the returns back to the base currency of the fund we prepared the report for. For example, for a Euro zone fund with peers from the U.S. we converted U.S. returns to Euro based on the currency return for the year using December 31 spot rates.

Appendix C - Glossary of terms

Average cost

- Calculated by dividing actual annual costs by the average of beginning and end-of-year holdings. If beginning-of-year holdings are not available, they are estimated using end-of-year holdings before the effect of this year's return on investment.

Benchmark return

- Rate of return on a portfolio of investable assets (such as the S&P500) designated as the benchmark portfolio against which the fund measures its own performance for that asset class.

F statistics

- Measure of the statistical significance of the regression coefficients taken as a group. Generally, regression equations with 5 coefficients and sample sizes greater than 20 are statistically significant if its F statistic is greater than 3.

Global TAA

- Fully funded segregated asset pool dedicated to active asset allocation.

Impact coefficient

- Estimate of the impact on the dependent variable in a regression of a change in the value of a given explanatory variable

Level of significance

- Degree to which sample data explains the universe from which they are extracted.

N-year peers

- Subset of peer group that have participated in our study for at least the consecutive n years.

Oversight of the fund

- Resources devoted to the oversight of the fund.

Overlay

- Derivative based program (unfunded other than margin requirements), designed to enhance total portfolio return (such as a tactical asset allocation program) or to achieve some specific mandate such as currency hedging.

Passive proportion

- Proportion of assets managed passively, i.e., indexed to broad capital market benchmarks or dedicated to replicate market benchmarks.

Policy mix

- Reflects long-term policy or target asset weights. Policy asset mix is often established by a fund's investment committee or board and is determined by such long term considerations as liability structure, risk tolerance and long term capital markets prospects.

Policy return

- The return you would have earned if you had passively implemented your policy mix decision through your benchmark portfolios. Your policy return equals the sum of your policy weights multiplied by your asset class benchmarks for each asset class.

R squared (coefficient of determination)

- The percentage of the differences in the dependent variable explained by the regression equation. For example, an R squared of 1 means 100% of the differences are explained and an R squared of 0 means that none of the differences are explained.

Value added

- the difference between your total actual return and your policy return. It is a measure of actual value produced over what could have been earned passively.