

Investment
Cost Effectiveness Analysis
(for the 5-year period ending December 31, 2019)

South Carolina Retirement System Investment Commission



Table of contents

1 Executive summary

2 Peer group and universe

Peer group	2 - 2
CEM global universe	2 - 3
Universe subsets	2 - 4
Implementation style, asset mix, policy mix:	
- by universe subset	2 - 5
- trends from 2015 to 2019	2 - 6
Implementation style by asset class	2 - 7
Actual asset mix - trends from 2015 to 2019	2 - 8
Policy asset mix - trends from 2015 to 2019	2 - 9

3 Returns, benchmarks, value added

Interpreting box and whisker graphs	3 - 2
Net total returns	3 - 3
Policy returns	3 - 4
Net value added	3 - 5
Net returns by asset class	3 - 6
Benchmark returns by asset class	3 - 7
Net value added by asset class	3 - 8
Your policy return and value added calculation:	
- 2019	3 - 9
- 2015 to 2018	3 - 10
Profit/Loss on overlay programs	3 - 11
Appendix - CEM's Private equity benchmark	3 - 12

4 Total cost and benchmark cost

Comparisons of total investment cost	4 - 2
- Trend	4 - 3
- Types of costs	4 - 4
- Detailed breakdown	4 - 5
- Material changes	4 - 6
Total cost versus benchmark cost	4 - 7

Benchmark cost calculation	4 - 8
Cost impact of:	
- differences in implementation style	4 - 9
- overlays	4 - 10
- paying more/-less for similar services	4 - 11
Why you are high/low cost by asset class	4 - 12
Your cost effectiveness ranking	4 - 13
Benchmarking methodology	4 - 14
Cost trend methodology and calculation	4 - 16

5 Cost comparisons

Total investment cost	5 - 2
Governance, operations & support	5 - 3
Asset class costs by implementation style	5 - 4

6 Risk

Comparison of your risk levels to peers	6 - 2
Calculation of asset risk	6 - 3
Reduction in asset risk due to diversification	6 - 4
Asset-liability risk	6 - 5
Liability proxy portfolio	6 - 6
Liability risk	6 - 7
Projected worst case scenarios	6 - 8
Worst case scenarios during the past 5 years	6 - 9
Risk Trends - 2015 to 2019	6 - 10
Risk appendices	6 - 11

7 Appendices

Appendix A - Data Summary	7 - 2
Appendix B - Data quality	
Appendix C - Glossary of terms	

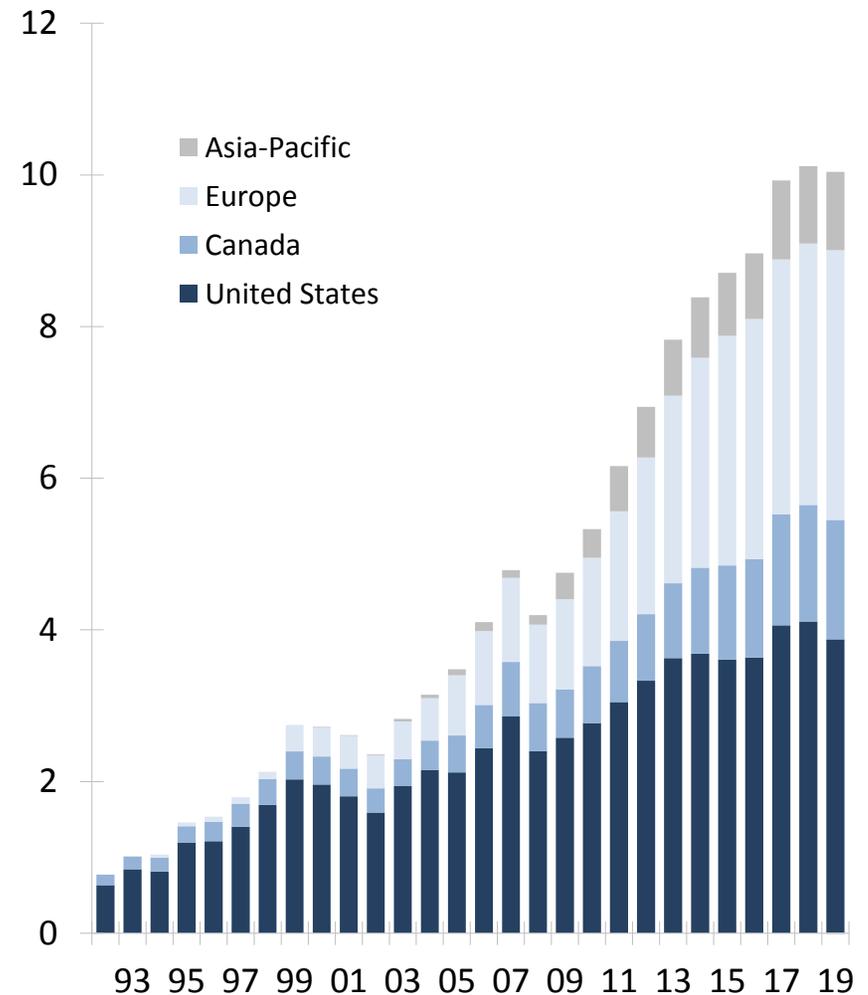
Prepared October 27, 2020. Although the information in this report has been based upon and obtained from sources we believe to be reliable, CEM Benchmarking Inc. ("CEM") does not guarantee its accuracy or completeness. The information contained herein is proprietary and confidential and may not be disclosed 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 292 funds in CEM's extensive pension database.

- 151 U.S. pension funds participate. The median U.S. fund had assets of \$11.4 billion and the average U.S. fund had assets of \$25.7 billion. Total participating U.S. assets were \$3.9 trillion.
- 66 Canadian funds participate with assets totaling \$1.6 trillion.
- 65 European funds participate with aggregate assets of \$3.6 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Ireland, Denmark and the U.K.
- 6 Asia-Pacific funds participate with aggregate assets of \$1.0 trillion. 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 48 funds.

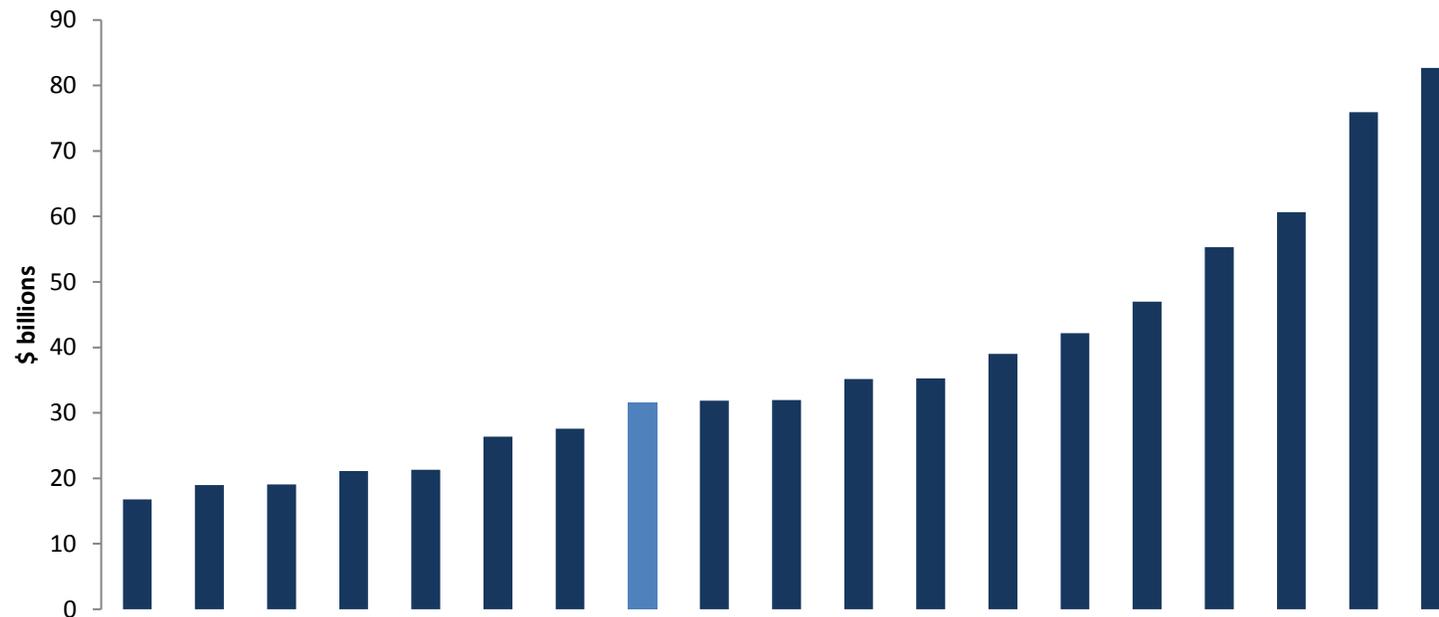
Participating assets (\$ trillions)



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 \$16.8 billion to \$82.7 billion
- Median size of \$32.0 billion versus your \$31.6 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. For some of the peers, 2018 cost data was used as a proxy for 2019.

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.

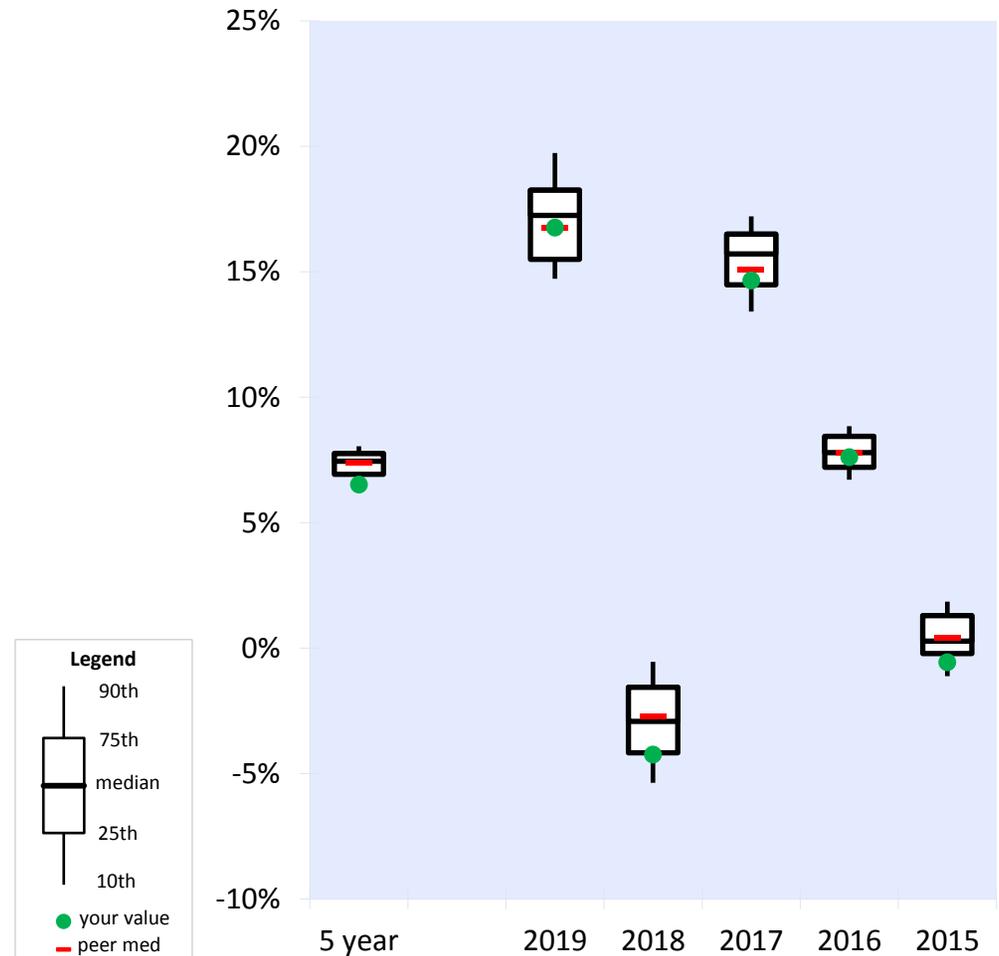
Your 5-year net total return of 6.5% was below both the U.S. Public median of 7.5% and the peer median of 7.4%.

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	6.5%
- Policy return	6.9%
= Net value added	-0.4%

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).

U.S. Public net total returns - quartile rankings



Your 5-year policy return of 6.9% was equal to both the U.S. Public median of 6.9% and the peer median of 6.9%.

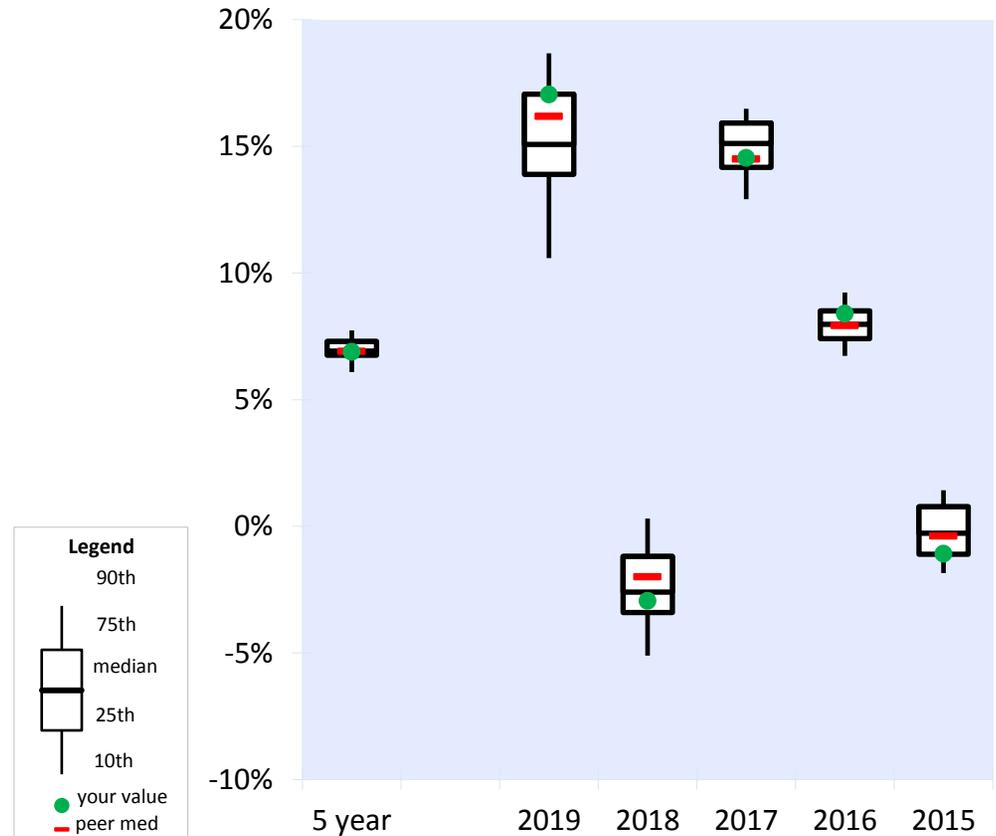
Your policy return is the return you could have earned passively by indexing your investments according to your policy mix.

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.

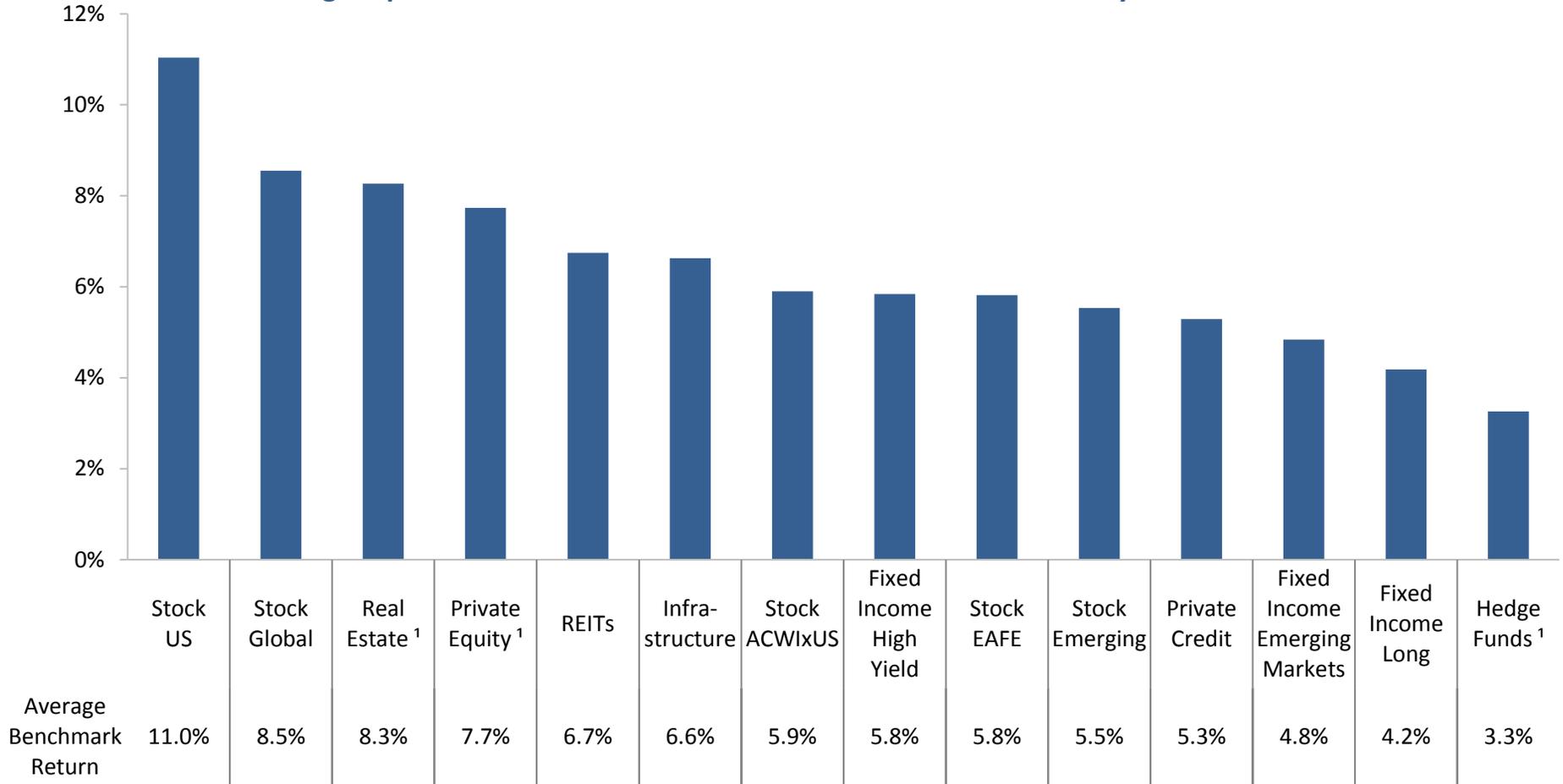
U.S. Public policy returns - quartile rankings



To enable fairer comparisons, the policy returns of all participants except your fund were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. If CEM used this same adjustment for your fund, your 5-year policy return would be 6.6%, 0.2% lower than your actual 5-year policy return of 6.9%. Mirroring this, your 5-year total fund net value added would be 0.2% higher.

Differences in policy returns are caused by differences in benchmarks and policy mix. The two best performing asset classes for the 5 years ending 2019 were Stock - U.S. and Stock - Global.

Average reported benchmark returns for common asset classes - 5-year returns



1. The private equity benchmark is the average of the default private equity benchmark returns applied to U.S. Public participants. The hedge fund and real estate benchmarks are the averages of benchmark returns reported by U.S. Public participants.

Your 5-year policy return of 6.9% was equal to the U.S. Public median of 6.9% primarily because of:

The offsetting impacts of:

- Your lower weight in total public stock, which had a negative impact. You had a 5-year average of 40% in total stock compared to the U.S. public average of 48%. Stock was one of the better performers over the past 5 years.
- Your higher private equity benchmark return, which had a positive impact. Your 5-year private equity benchmark return was 12.0% compared to the U.S. public average of 7.7%. Your benchmark is stock-based with a 3% premium while other participants in the CEM universe are using lagged small-cap equity.

* Policy benchmark switched to a single global equity index for public equities in 2013. Switched back in 2017.

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

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

3. Other real assets includes natural resources and infrastructure.

4. 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 ¹			5-year benchmark return	
	Your Fund	U.S. Publ Avg.	More/ Less	Your Fund	U.S. Publ Avg.
Stock - U.S.	9%	21%	-11%	10.1%	11.0%
Stock - Emerging	4%	2%	2%	5.6%	5.5%
Stock - ACWI x U.S.	2%	8%	-6%	n/a ⁴	5.9%
Stock - Global	25%	11%	14%	8.6%	8.5%
Other Stock	0%	7%	-7%		n/a ⁴
Total Stock*	40%	48%	-8%	8.3%	8.8%
Fixed Income - U.S.	11%	17%	-6%	3.3%	3.1%
Fixed Income - High Yield	6%	2%	4%	5.4%	5.8%
Fixed Income - Emerging	5%	1%	4%	4.6%	4.8%
Cash	2%	-1%	4%	1.1%	1.1%
Other Fixed Income	0%	6%	-7%		n/a ⁴
Total Fixed Income	23%	25%	-2%	3.9%	3.7%
Global TAA	9%	1%	8%	5.7%	5.8%
Hedge Funds ²	4%	4%	0%	4.9%	3.3%
Commodities	1%	1%	0%	n/a ⁴	-3.3%
REITs	2%	1%	1%	n/a ⁴	6.7%
Real Estate ex-REITs	6%	8%	-2%	9.7%	8.4%
Other Real Assets ³	2%	2%	0%	n/a ⁴	n/a ⁴
Private Equity	8%	9%	-1%	12.0%	7.7%
Private Debt	6%	2%	5%	5.5%	5.3%
Total	100%	100%	0%		

Differences in policy return are caused by differences in policy mix and benchmarks. At the end of 2019 your policy mix compared to your peers and the U.S. and U.S. Public universes as follows:

Policy asset mix

Asset class	Your fund		Peer avg. 2019	U.S. Avg. 2019	U.S. Publ avg. 2019
	2015	2019			
Stock - U.S.	0%	16%	20%	15%	19%
Stock - Emerging	0%	7%	1%	2%	2%
Stock - ACWI x U.S.	0%	4%	10%	5%	7%
Stock - Global	34%	18%	8%	10%	10%
Other Stock	0%	0%	7%	6%	8%
Total Stock*	34%	45%	47%	38%	45%
Fixed Income - U.S.	10%	11%	18%	13%	17%
Fixed Income - High Yield	5%	4%	1%	1%	2%
Fixed Income - Emerging	5%	4%	1%	1%	1%
Cash	2%	3%	1%	0%	-1%
Other Fixed Income	0%	0%	3%	26%	7%
Total Fixed Income	22%	22%	25%	42%	26%
Global TAA	10%	7%	0%	1%	1%
Hedge Funds ¹	10%	1%	3%	4%	4%
Commodities	3%	0%	1%	0%	1%
REITs	0%	1%	1%	1%	1%
Real Estate ex-REITs	5%	7%	9%	5%	8%
Other Real Assets ²	0%	3%	2%	1%	2%
Private Equity	9%	6%	9%	6%	9%
Private Debt	7%	7%	3%	1%	2%
Total	100%	100%	100%	100%	100%

* Policy benchmark switched to a single global equity index for public equities in 2013. Switched back in 2017.
 1. Does not include Absolute Return hedge fund investments used in Portable Alpha implementation.
 2. Other real assets includes natural resources and infrastructure.

Net value added is the component of total return from active management. Your 5-year net value added was -0.4%.

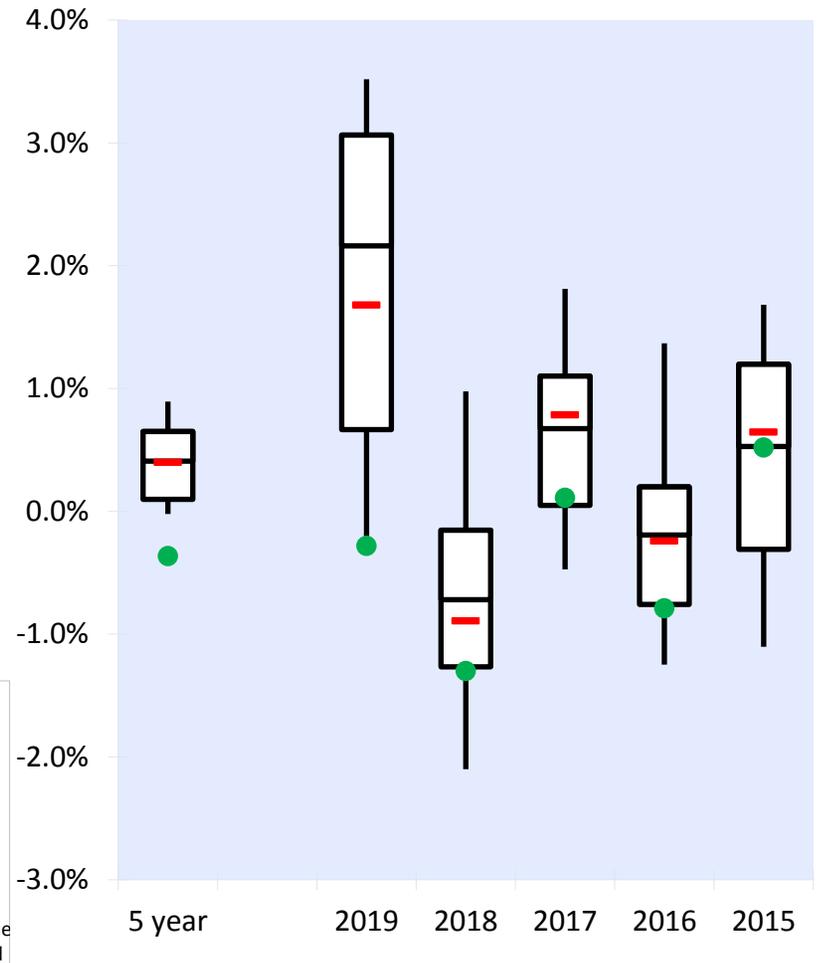
Net value added equals total net return minus policy return.

Value added for South Carolina Retirement System Investment Commission

Year	Net Return	Policy Return	Net Value Added
2019	16.8%	17.1%	-0.3%
2018	-4.2%	-2.9%	-1.3%
2017	14.7%	14.6%	0.1%
2016	7.6%	8.4%	-0.8%
2015	-0.6%	-1.1%	0.5%
5-Year	6.5%	6.9%	-0.4%

Your 5-year net value added of -0.4% compares to a median of 0.4% for your peers and 0.4% for the U.S. Public universe.

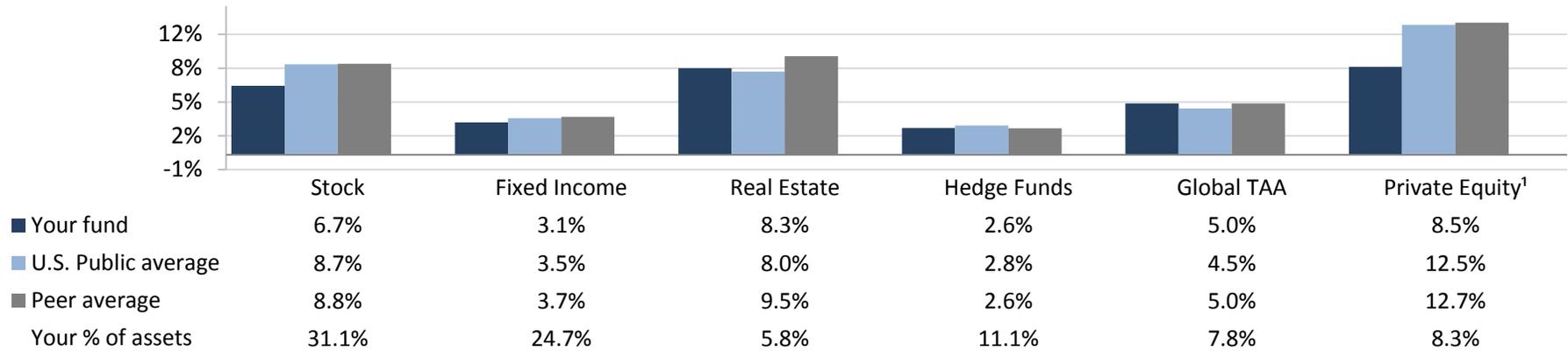
U.S. Public net value added - quartile rankings



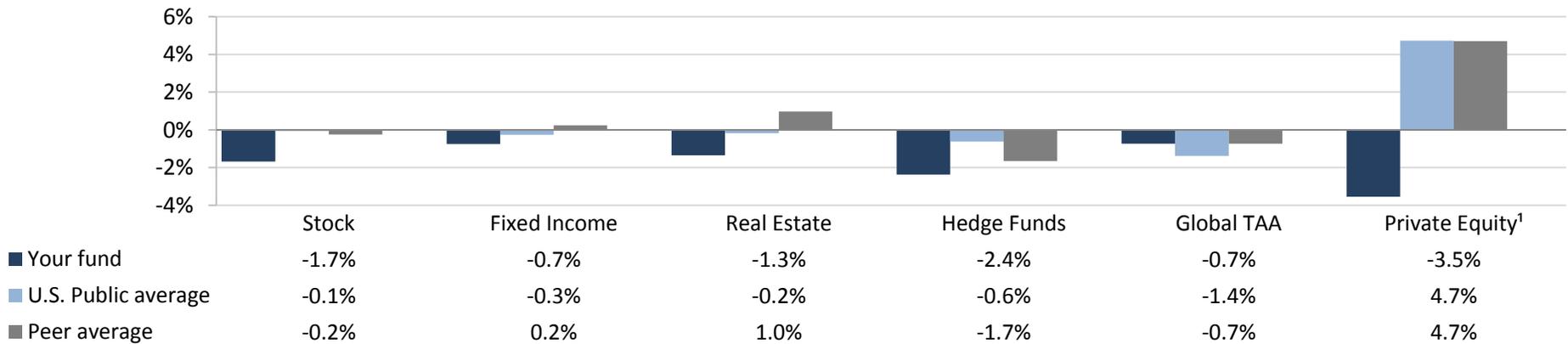
To enable fairer comparisons, the value added for each participant, except your fund, was adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. If CEM used this same adjustment for your fund, your 5-year total fund value added would have been 0.2% higher.

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

5-year average net return by major asset class



5-year average net value added by major asset class



1. To enable fairer comparisons, the private equity benchmarks of all participants, except your fund, were adjusted to reflect lagged, investable, public-market indices. If CEM used this same adjustment for your fund, your fund's 5-year private equity net value added would have been 1.2%.

Your investment costs, excluding private asset performance fees, were \$234.1 million or 74.0 basis points in 2019.

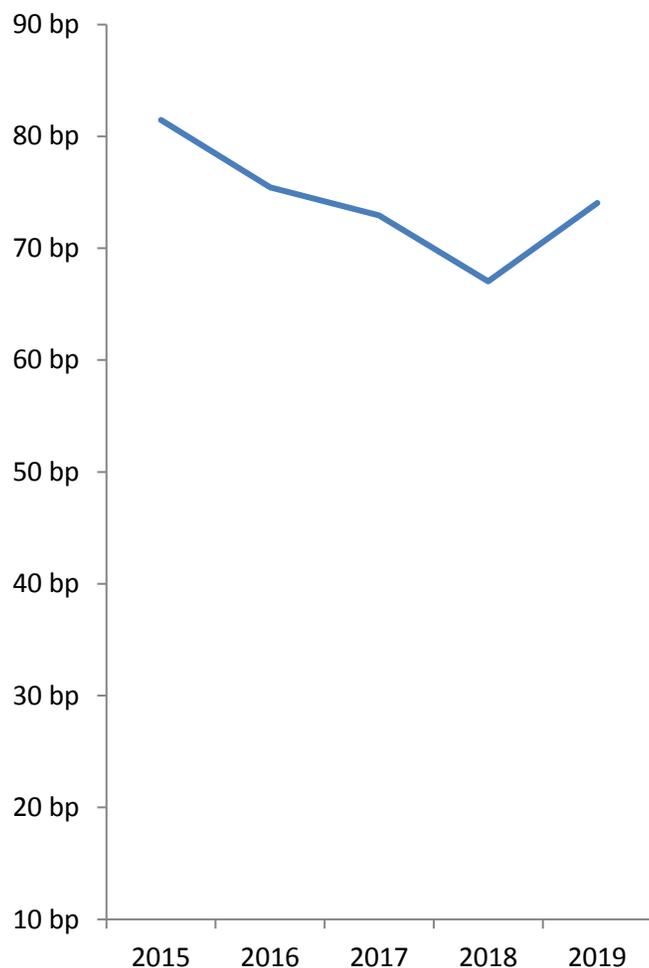
Asset management costs by asset class and style (\$000s)	Internal Mgmt		External Management			Total
	Active	Overseeing of external	Passive fees	Active base fees	Perform. fees ³	
Stock - U.S. Broad/All		779		11,858		12,637
Stock - Emerging		519		5,554		6,073
Stock - Global		1,462	534	5,485		7,480
Stock - ACWI x U.S.		302		3,878		4,181
Fixed Income - U.S.	9	240		1,782		2,032
Fixed Income - Emerging		417		4,987		5,404
Fixed Income - High Yield		427		5,731		6,158
Cash	426	195				621
REITs		224		632		856
Global TAA		758		4,390		5,148
Hedge Funds - External Active		561		34,168	16,939	51,668
Hedge Funds - FoFs		427		13,621	6,783	20,831
Real Estate ex-REITs - LP ^{1 3}		547		27,104	15,691	27,651
Real Estate ex-REITs - Co-Invest. ³		0				0
Infrastructure ³		236		4,082		4,318
Diversified Private Equity - LP ^{1 3}		383		33,292	55,871	33,675
Diversified Private Equity - Co-Invest. ³		157		2,946	3,620	3,103
Diversified Private Equity - FoFs ^{2 3}		114		6,841	8,503	6,956
Private Credit - LP ^{1 3}		559		29,748	9,198	30,307
Private Credit - Co-Invest. ³		13				13
Derivatives/Overlays			800			800
Total excluding private asset performance fees						229,911 72.7bp
Oversight, custodial and other costs ⁴						
Oversight of the fund						1,237
Trustee & custodial						1,670
Consulting and performance measurement						825
Audit						120
Other						357
Total oversight, custodial & other costs						4,209 1.3bp
Total investment costs (excl. transaction costs & private asset performance fees)						234,120 74.0bp

Footnotes

1. Fees are the weighted average management cost calculated using the detailed limited partnership survey provided.
2. Default underlying costs were added: Diversified Private Equity - FoFs 157 bp. Refer to Appendix A for full details regarding defaults.
3. Total cost excludes carry/performance fees for real estate, infrastructure, natural resources and private equity. Performance fees are included for the public market asset classes and hedge funds.
4. Excludes non-investment costs, such as benefit insurance premiums and preparing cheques for retirees.

Your costs decreased by 7.4 bps, from 81.5 bps in 2015 to 74.0 bps in 2019, primarily because you paid less in 2019 for similar investment styles. This was partly offset by a higher cost asset mix and higher cost implementation style.

Trend in cost



Reasons why you costs decreased by 7.4 bps

			Impact in bps
1. Higher cost asset mix			
• More Stock, REITs, Commodities: 37% vs 26%			5.7
• Less Fixed Income: 18% vs 34%			(2.8)
• More Real Estate ex-REITs: 9% vs 5%			4.6
• More Infrastructure: 4% vs 0%			1.4
• Mix of Hedge Funds & Multi-Asset: 19% vs 19%			(4.4)
• More Private Debt: 13% vs 5%			10.1
• All other mix changes			0.1
			<hr/>
			14.7
2. Higher cost implementation style			
• Less passive, more active			3.6
• Less LP, more FoF			3.9
• Less co-investment as a % of LP/Co			1.2
• All other implementation style changes			(0.1)
			<hr/>
			8.6
3. Paid less, net, for similar investment styles			
	<u>2015 cost</u>	<u>2019 cost</u>	
• Lower Private Credit LP base fees	124.3 bp	74.0 bp	(6.5)
• Lower external Stock - Emerging costs	83.8 bp	30.8 bp	(3.3)
• Lower external Global TAA costs	57.8 bp	19.3 bp	(3.2)
• Lower Hedge Funds base fees	222.9 bp	176.1 bp	(2.9)
• Lower Hedge Funds performance fees	244.4 bp	85.9 bp	(9.9)
• Similar internal investment management costs			(0.0)
• Higher oversight, custodial & other costs	1.2 bp	1.3 bp	0.1
• All other differences			(4.9)
			<hr/>
			(30.7)
			<hr/>
Total decrease			(7.4)

Your total investment cost of 74.0 bps was above the peer median of 64.8 bps and the U.S. Public median of 60.0 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 34% of your funds assets at the end of 2019 versus a peer average of 27%.
- Fund size. Bigger funds have advantages of scale.

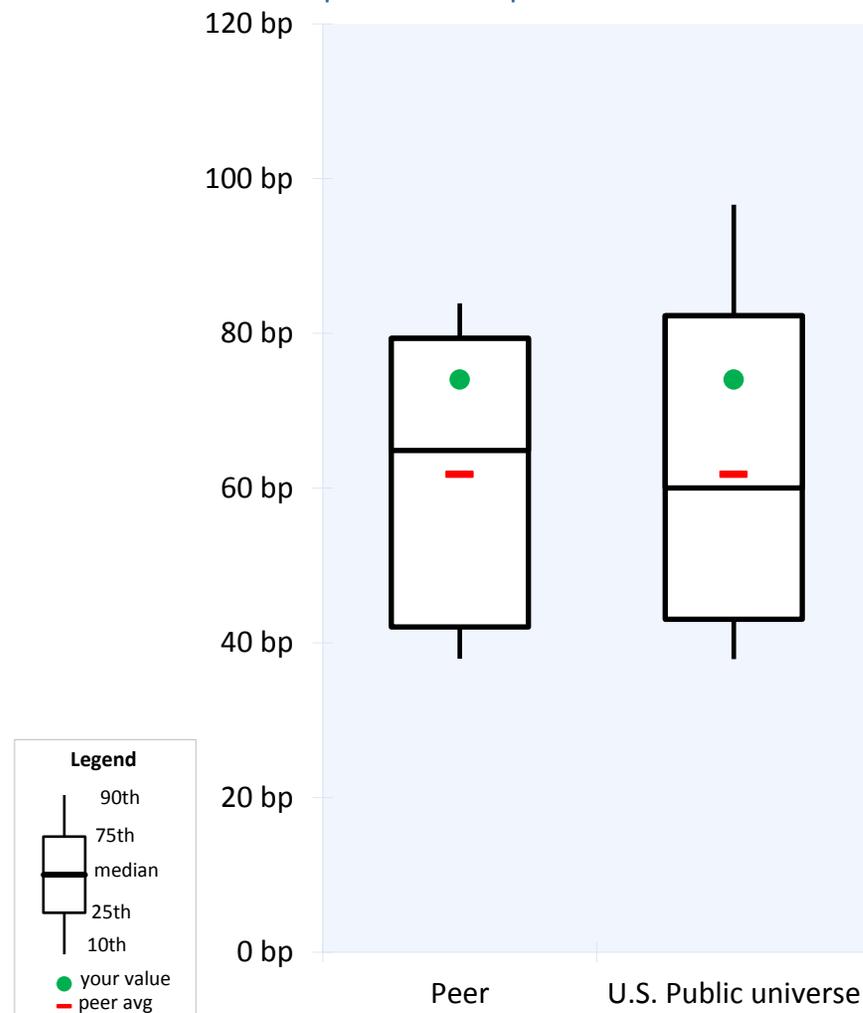
Asset mix is set by policy and may include high cost asset classes. Peers who do not have high cost asset classes in their policy mix will have lower total costs. Therefore, policy asset mix is a major driver of total cost.

Fund size is also a major driver of cost because funds with a larger size have scale advantages and 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.

Total investment cost
excluding transaction costs* and
private asset performance fees



* Initial insights into transaction costs are discussed at the end of section 5.

Benchmark cost analysis suggests that, after adjusting for fund size and asset mix, your fund was low cost by 11.0 basis points in 2019.

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 74.0 bp was below your benchmark cost of 85.1 bp. Thus, your cost savings were 11.0 bp.

Your cost versus benchmark

	\$000s	basis points
Your total investment cost	234,120	74.0 bp
Your benchmark cost	269,013	85.1 bp
Your excess cost	(34,893)	(11.0) bp

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

Reasons for your low cost status

	Excess Cost/ (Savings)	
	\$000s	bps
1. Higher cost implementation style		
• More active management, less lower cost passive	10,815	3.4
• More external management, less lower cost internal	1,225	0.4
• More LPs as a percentage of external	14,559	4.6
• More fund of funds	1,912	0.6
• More co-investment as a percentage of LP/Co	(6,343)	(2.0)
• Less overlays	(68)	(0.0)
	<u>22,099</u>	<u>7.0</u>
2. Paying less than peers for similar services		
• External investment management costs	(55,120)	(17.4)
• Internal investment management costs	1	0.0
• Oversight, custodial & other costs	(1,873)	(0.6)
	<u>(56,992)</u>	<u>(18.0)</u>
Total savings	(34,893)	(11.0)

The table below summarizes why you are high/low cost relative to the peer-median by asset class.

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

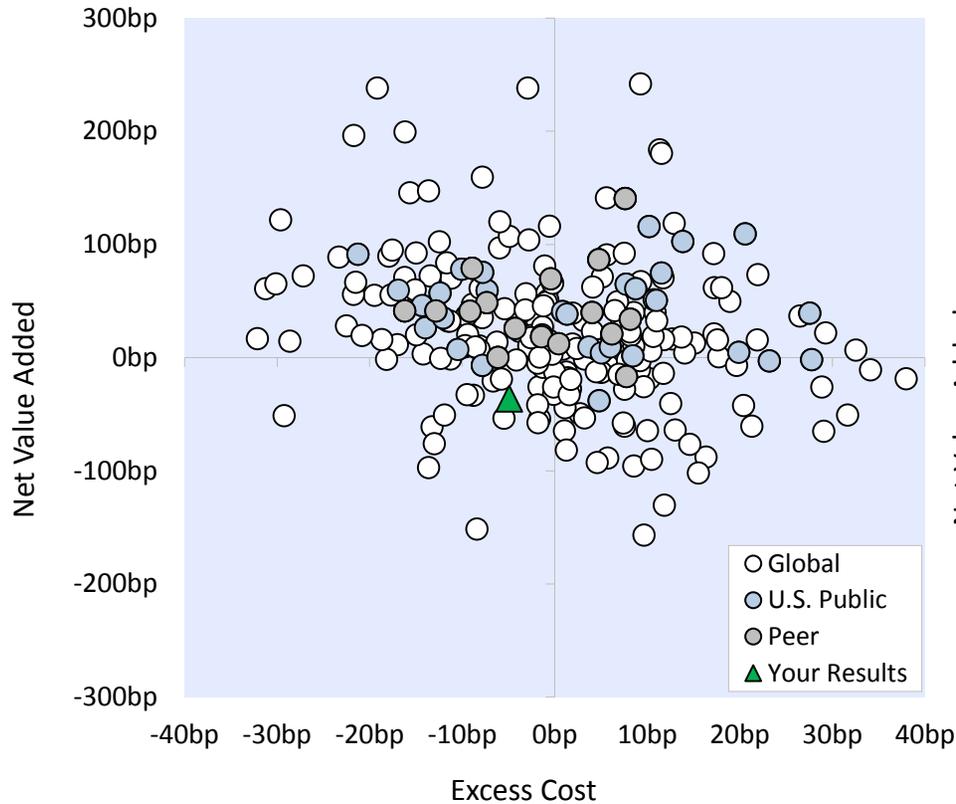
Asset class/category	Style weighted cost			Your average assets (or fee basis) ²	Due to impl. style	Due to paying more/(less)	Total more/(less)
	Your cost	Peer median ¹ = Benchmark	More/(less)				
	(A)	(B)	(C = A - B)	(D)			(C x D)
Asset management costs							
Stock - U.S. Broad/All	45.2 bp	17.4 bp	27.9 bp	2,793	6,315	1,469	7,784
Stock - Emerging	30.8 bp	51.1 bp	(20.4) bp	1,974	2,315	(6,336)	(4,022)
Stock - Global	13.7 bp	18.9 bp	(5.2) bp	5,459	681	(3,525)	(2,843)
Stock - ACWI x U.S.	38.7 bp	31.1 bp	7.6 bp	1,080	1,299	(477)	822
Fixed Income - U.S.	26.5 bp	11.1 bp	15.5 bp	765	328	858	1,186
Fixed Income - Emerging	46.7 bp	41.9 bp	4.8 bp	1,158	42	512	554
Fixed Income - High Yield	47.9 bp	35.6 bp	12.2 bp	1,287	34	1,538	1,571
Cash	2.6 bp	2.6 bp	(0.0) bp	2,401	0	0	(0)
REITs	16.5 bp	24.8 bp	(8.4) bp	520	552	(988)	(436)
Real Estate ex-REITs	97.7 bp	96.4 bp	1.3 bp	2,831	10,504	(10,150)	355
Infrastructure	38.9 bp	115.2 bp	(76.3) bp	1,110	(5,501)	(2,971)	(8,473)
Hedge Funds	151.5 bp	132.4 bp	19.2 bp	3,219	2,679	3,495	6,174
Performance fees (on NAV)	73.7 bp	81.7 bp	(8.0) bp	3,219	803	(3,379)	(2,576)
Global TAA	19.3 bp	63.1 bp	(43.8) bp	2,664	0	(11,655)	(11,655)
Diversified Private Equity	148.8 bp	164.4 bp	(15.5) bp	2,938	(7,471)	2,906	(4,565)
Private Credit	73.2 bp	113.8 bp	(40.6) bp	4,143	9,589	(26,417)	(16,828)
Derivatives and overlays	0.3 bp	0.3 bp	(0.0) bp	31,623	(68)	0	(68)
Total asset management	72.7 bp	83.1 bp	(10.4) bp	31,623	22,099	(55,119)	(33,020)
Oversight, custody and other costs^{3 4}							
Oversight of the Fund	0.4 bp	0.7 bp	(0.4) bp				
Trustee & Custodial	0.5 bp	0.3 bp	0.3 bp				
Consulting	0.3 bp	0.3 bp	0.0 bp				
Audit	0.0 bp	0.1 bp	(0.0) bp				
Other	0.1 bp	0.1 bp	(0.0) bp				
Total oversight, custody & other	1.3 bp	1.9 bp	(0.6) bp	31,623	n/a	(1,873)	(1,873)
Total	74.0 bp	85.1 bp	(11.0) bp	31,623	22,099	(56,992)	(34,893)

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.
2. Total fund average holdings is used as the base when calculating the relative cost impact of the overlay programs.
3. Benchmarks for oversight total and individual lines are based on peer medians. Sum of the lines may be different from the total.
4. Oversight of the fund includes staff salaries, direct expenses (Travel, fees paid to directors, director's insurance, etc.). Staff responsible for overseeing a single asset class category (i.e. private equity, stock, etc.) have their costs included with that asset category.

Your 5-year and 10-year cost effectiveness positions are shown below.

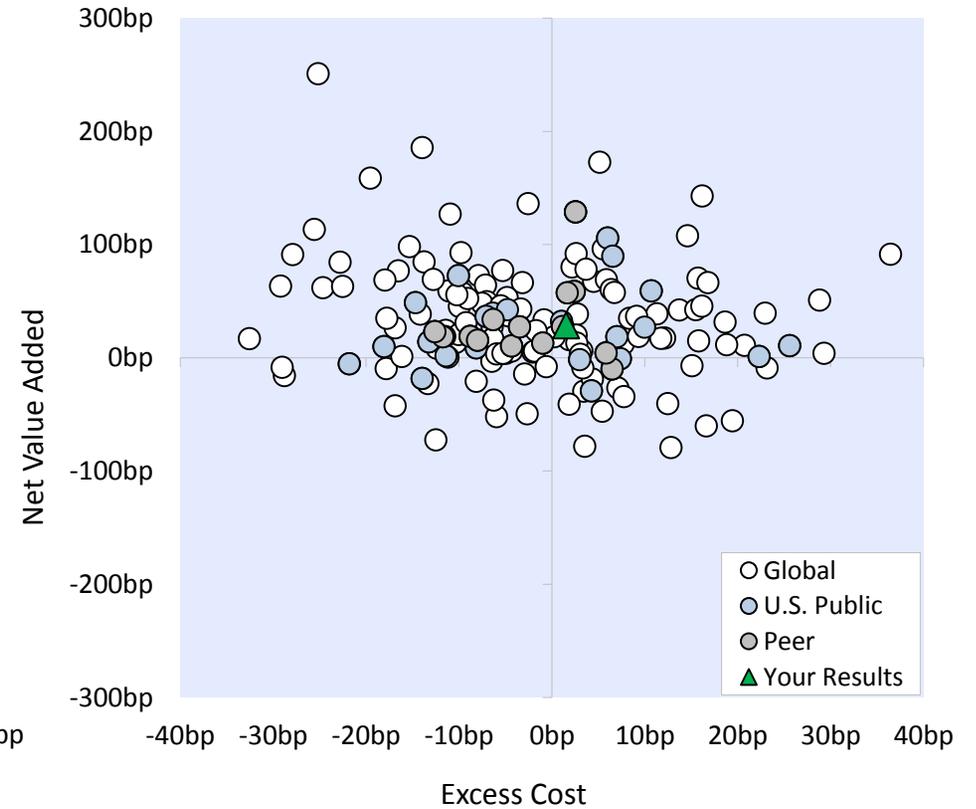
5-Year net value added versus excess cost

(Your 5-year: net value added -36 bps, cost savings 5 bps¹)



10-year net value added versus excess cost

(Your 10-year: net value added 29 bps, excess cost 2 bps)



1. Your 5-year excess cost of 2 basis points is the average of your excess cost for the past 5 years. Excess cost for 2010 and 2011 were calculated using regression analysis.

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	10-year
Net value added	-28.1bp	-130.1bp	11.1bp	-79.0bp	52.0bp	32.8bp	142.0bp	171.5bp	7.5bp	129.6bp	28.6bp
Excess Cost	-11.0bp	-9.6bp	-1.5bp	-1.0bp	5.1bp	13.8bp	2.4bp	-0.5bp	8.5bp	9.2bp	1.5bp

Summary of key takeaways

Returns

- Your 5-year net total return was 6.5%. This was below the U.S. Public median of 7.5% and below the peer median of 7.4%.
- Your 5-year policy return was 6.9%. This was equal to the U.S. Public median of 6.9% and equal to the peer median of 6.9%.

Value added

- Your 5-year net value added was -0.4%. This was below the U.S. Public median of 0.4% and below the peer median of 0.4%.

Cost and cost effectiveness

- Your investment cost of 74.0 bps was below your benchmark cost of 85.1 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was low cost because you paid less than peers for similar services.
- Your costs decreased by 7.4 bps, from 81.5 bps in 2015 to 74.0 bps in 2019, primarily because you paid less in 2019 for similar investment styles. This was partly offset by a higher cost asset mix and higher cost implementation style.

2

Description of peer group and universe

Peer group	2
CEM global universe	3
Universe subsets	4
Implementation style, actual mix and policy mix:	
- by universe subset	5
- trends from 2015 to 2019	6
Implementation style by asset class	7
Actual mix from 2015 to 2019	8
Policy mix from 2015 to 2019	9

Peer group

Your peer group is comprised of 19 global funds, with assets ranging from \$16.8 billion to \$82.7 billion versus your \$31.6 billion. The median size is \$32.0 billion.

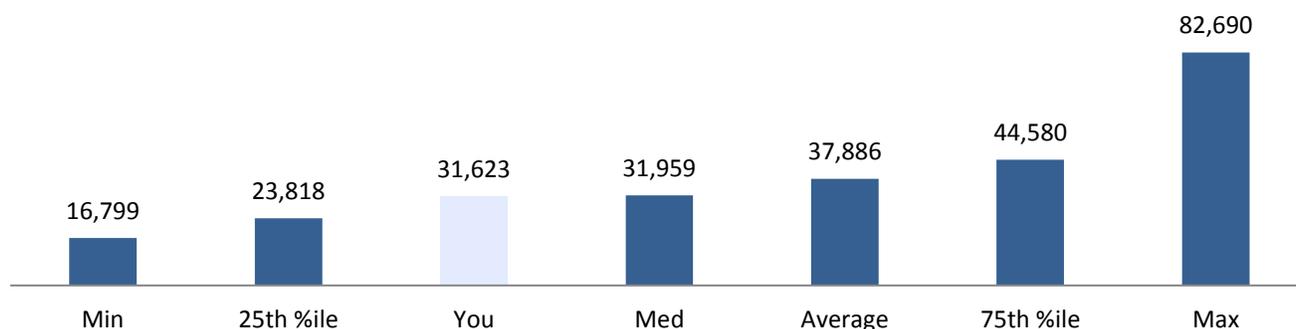
In order to preserve client confidentiality, we do not disclose your peers' names in this document due to the Freedom of Information Act. Your peer group consist of plans with the following characteristics:

Peer Group Characteristics - 2019

	Your Plan	Peers	U.S. Public
<u>Plan Assets (\$ billions)</u>			
Range	31.6	16.8 - 82.7	0.7 - 354.8
Median		32.0	21.2
<u># of Plans</u>			
Corporate		0	0
Public	1	16	48
Other		3	0
Total		19	48
<u>Implementation style</u>			
% External active	83.3	67.8	65.0
% External passive	10.6	21.6	20.4
% Internal active	6.1	6.2	8.9
% Internal passive	0.0	4.3	5.7
<u>Asset mix</u>			
% Stock	35.7	45.2	44.9
% Fixed Income	17.7	23.2	25.8
% Real Assets	11.7	11.4	11.0
% Private Equity	7.3	9.7	8.8
% Hedge Funds & Other	21.2	7.4	7.2

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

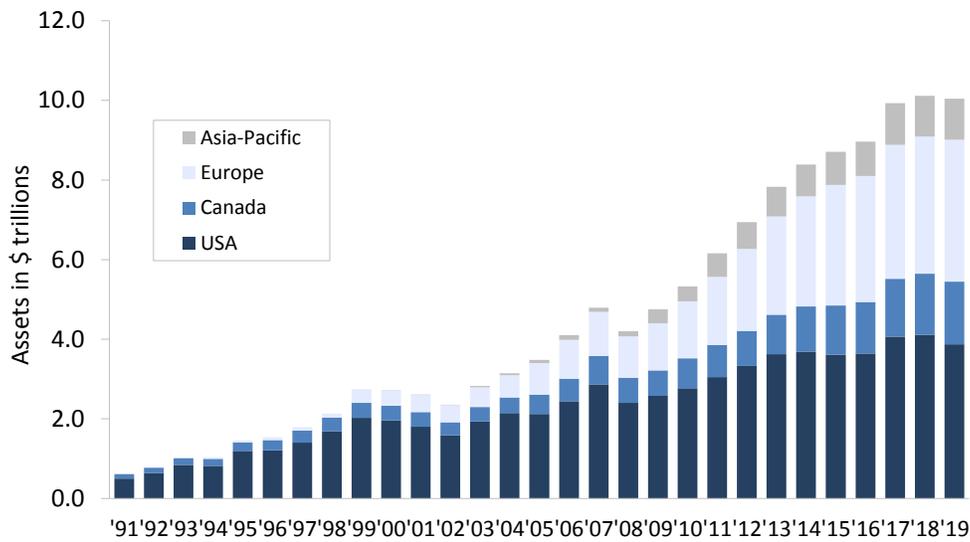


CEM global universe

CEM has been providing investment benchmarking solutions since 1991. The 2019 survey universe is comprised of 292 funds representing \$10.1 trillion in assets. The breakdown by region is as follows:

- 151 U.S. pension funds with aggregate assets of \$3.9 trillion.
- 66 Canadian pension funds with aggregate assets of \$1.6 trillion.
- 65 European pension funds with aggregate assets of \$3.6 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Denmark, UK, and Ireland.
- 6 Asia-Pacific pension funds with aggregate assets of \$1.0 trillion.

CEM global universe



Universe subsets

CEM's global survey universe is comprised of 292 funds with total assets of \$10.1 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 funds ranging in size from \$16.8 - \$82.7 billion. The peer median of \$32.0 billion compares to your \$31.6 billion.
- U.S. Public - The U.S. Public universe is comprised of 48 funds ranging in size from \$0.7 - \$354.8 billion. The median fund is \$21.2 billion.

Universe subsets by number of funds and assets

	Peer group ¹	Global by type				Global by Country				
		Corp.	Public	Other	Total	U.S.	Canada	Europe	Asia-Pacific	Total
# of funds										
2019	19	133	119	40	292	151	66	65	10	292
2018	19	147	144	45	336	170	78	75	13	336
2017	18	150	155	47	352	167	80	91	14	352
2016	18	155	146	47	348	170	81	83	14	348
2015	17	162	149	53	364	176	81	92	15	364
# of funds with uninterrupted data for:										
1 yr	19	133	119	40	292	151	66	65	10	292
2 yrs	19	125	118	38	281	145	63	64	9	281
3 yrs	18	115	114	35	264	135	57	63	9	264
4 yrs	18	109	112	35	256	131	54	62	9	256
5 yrs	17	103	106	33	242	125	49	59	9	242
Total assets (\$ billions)										
2019	720	1,595	6,565	1,957	10,118	3,874	1,576	3,558	1,110	10,118
2018	668	1,547	6,823	1,862	10,232	4,109	1,539	3,446	1,139	10,232
2017	653	1,497	6,720	2,004	10,221	4,061	1,462	3,362	1,336	10,221
2016	587	1,477	5,867	1,883	9,227	3,638	1,298	3,163	1,128	9,227
2015	538	1,449	5,871	1,760	9,080	3,609	1,243	3,026	1,203	9,080
2019 asset distribution (\$ billions)										
Avg	37.9	12.0	55.2	48.9	34.7	25.7	23.9	54.7	111.0	34.7
Max	82.7	71.3	1,312.5	650.2	1,312.5	354.8	326.3	1,312.5	569.5	1,312.5
75th %ile	44.6	16.8	44.3	41.1	27.2	26.3	14.7	35.6	114.6	27.2
Median	32.0	6.2	12.3	11.5	8.9	11.4	5.0	11.1	43.4	8.9
25th %ile	23.8	2.5	3.8	3.1	3.0	3.4	1.8	3.9	2.7	3.0
Min	16.8	0.3	0.2	0.1	0.1	0.3	0.1	0.6	0.6	0.1

1. Peer group statistics are for your 2019 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 - 2019 (as a % of year-end assets)

	Your fund ¹	Peer group	Global by type				Global by Country				
			Corp.	Public	Other	Total	U.S.	Canada	Europe	Asia-Pacific	Total
<u>Implementation style</u>											
External Active	78.1	65.0	69.2	56.5	61.9	63.0	71.4	58.9	48.5	57.5	63.0
Fund of funds	5.2	2.8	2.2	3.0	2.5	2.6	2.5	1.7	3.7	2.4	2.6
External passive	10.6	21.6	18.7	17.0	19.1	18.1	17.5	12.7	25.6	11.6	18.1
Internal Active	6.1	6.2	7.7	18.1	11.9	12.5	5.5	21.7	18.6	19.5	12.5
Internal Passive	<u>0.0</u>	<u>4.3</u>	<u>2.2</u>	<u>5.4</u>	<u>4.5</u>	<u>3.8</u>	<u>3.1</u>	<u>5.0</u>	<u>3.6</u>	<u>9.0</u>	<u>3.8</u>
Total	100	100	100	100	100	100	100	100	100	100	100
<u>Actual asset mix</u>											
Stock	35.7	45.2	31.0	46.4	41.6	38.7	36.9	39.0	41.5	45.2	38.7
Fixed Income	20.3	23.7	52.4	25.4	35.2	39.1	42.0	35.7	37.4	28.3	39.1
Global TAA	8.4	0.5	0.7	1.6	0.2	1.0	1.1	0.8	1.0	1.3	1.0
Real Assets	11.7	11.4	6.1	13.2	12.2	9.8	7.0	15.7	10.5	8.9	9.8
Hedge Funds	10.2	5.0	3.7	3.2	2.6	3.3	4.5	1.9	1.9	4.7	3.3
Balanced Funds	0.0	0.0	0.0	0.7	0.0	0.3	0.0	0.0	1.3	0.0	0.3
Risk Parity	0.0	1.5	0.5	0.7	1.0	0.7	0.9	0.2	0.1	3.5	0.7
Private Debt	6.4	3.1	1.5	2.1	3.5	2.0	1.5	2.5	3.0	1.5	2.0
Private Equity	<u>7.3</u>	<u>9.7</u>	<u>4.1</u>	<u>6.8</u>	<u>3.7</u>	<u>5.1</u>	<u>6.2</u>	<u>4.3</u>	<u>3.4</u>	<u>6.7</u>	<u>5.1</u>
Total	100	100	100	100	100	100	100	100	100	100	100
<u>Policy asset mix</u>											
Stock	44.8	45.2	31.3	46.5	42.1	39.0	37.1	39.3	41.7	47.5	39.0
Fixed Income	22.4	25.4	52.4	26.1	35.4	39.3	42.0	36.6	37.3	29.7	39.3
Global TAA	7.0	0.4	0.6	1.5	0.2	0.9	1.0	0.9	0.8	1.1	0.9
Real Assets	12.0	12.2	6.3	13.6	12.6	10.1	7.6	15.4	10.9	8.1	10.1
Hedge funds	1.0	3.4	3.3	2.8	2.0	2.9	3.8	1.5	2.0	3.6	2.9
Balanced Funds	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.4	0.0	0.1
Risk Parity	0.0	1.5	0.5	0.5	1.0	0.6	0.8	0.2	0.2	2.0	0.6
Private Debt	6.6	3.1	1.4	2.2	3.2	1.9	1.3	2.3	3.1	2.3	1.9
Private Equity	<u>6.2</u>	<u>8.7</u>	<u>4.3</u>	<u>6.6</u>	<u>3.6</u>	<u>5.2</u>	<u>6.4</u>	<u>3.7</u>	<u>3.7</u>	<u>5.7</u>	<u>5.2</u>
Total	100	100	100	100	100	100	100	100	100	100	100

1. Since 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 - 2015 to 2019 (as a % of year-end assets)

	Your fund ¹					Peer average ²					U.S. Public average ²				
	2019	2018	2017	2016	2015	2019	2018	2017	2016	2015	2019	2018	2017	2016	2015
Implementation style															
External active	78.1	79.1	76.5	72.4	65.4	65.7	67.3	66.1	65.9	64.7	61.4	62.4	61.6	62.0	62.5
Fund of funds	5.2	6.3	7.8	9.3	9.9	1.9	1.9	2.4	2.4	2.3	2.7	2.6	3.0	2.8	2.9
External passive	10.6	10.0	11.1	12.3	17.8	22.8	21.2	21.8	22.0	23.1	21.0	20.1	20.6	20.7	20.3
Internal active	6.1	4.6	4.6	6.0	7.0	5.8	5.9	6.5	6.4	7.0	9.2	8.9	9.2	9.1	8.9
Internal passive	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>3.8</u>	<u>3.7</u>	<u>3.3</u>	<u>3.2</u>	<u>2.9</u>	<u>5.7</u>	<u>6.0</u>	<u>5.6</u>	<u>5.4</u>	<u>5.3</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Actual asset mix															
Stock	35.7	34.3	32.4	27.5	25.7	45.4	44.3	47.3	46.4	46.2	45.9	45.1	48.0	47.3	48.0
Fixed income	20.3	21.5	26.9	31.7	36.5	23.8	24.7	25.3	26.4	29.0	25.5	25.9	25.3	25.8	26.5
Global TAA	8.4	9.4	6.8	7.0	7.5	0.6	0.6	0.4	0.7	0.7	1.2	1.4	1.0	1.6	1.4
Real assets	11.7	10.7	9.1	6.9	4.2	11.3	11.8	11.0	11.2	10.3	11.0	11.0	10.6	10.7	9.9
Hedge funds	10.2	10.9	11.0	11.5	11.8	4.5	4.6	4.2	4.3	4.0	4.3	4.6	4.4	4.7	5.1
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	1.2	1.1	1.0	0.6	0.6	0.8	0.9	1.2	0.5	0.5
Private credit	6.4	5.9	5.8	5.8	5.5	3.4	3.3	2.5	2.2	1.5	2.3	2.2	1.8	1.5	1.2
Private equity	<u>7.3</u>	<u>7.5</u>	<u>8.0</u>	<u>9.7</u>	<u>8.9</u>	<u>9.7</u>	<u>9.6</u>	<u>8.3</u>	<u>8.2</u>	<u>7.7</u>	<u>9.0</u>	<u>8.9</u>	<u>7.8</u>	<u>7.9</u>	<u>7.6</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Policy asset mix															
Stock	44.8	44.1	39.8	37.2	34.0	45.6	46.0	46.6	47.3	47.5	45.9	46.6	47.7	47.5	48.6
Fixed income	22.4	23.2	25.0	24.3	22.0	26.0	25.4	26.5	26.7	28.6	24.9	24.4	25.0	25.2	25.4
Global TAA	7.0	7.0	10.0	10.3	10.0	0.4	0.4	0.6	0.9	0.9	1.0	1.0	0.9	1.5	1.3
Real assets	12.0	12.0	10.0	8.2	8.0	12.1	11.6	11.2	11.5	10.4	12.2	11.8	11.5	11.4	10.5
Hedge funds	1.0	1.0	2.0	4.1	10.0	2.8	2.9	2.7	2.8	2.8	3.6	4.3	3.9	4.0	4.3
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	1.3	1.3	1.3	0.7	0.7	0.6	0.8	1.0	0.6	0.6
Private credit	6.6	5.8	6.0	6.6	7.0	3.4	4.0	3.0	2.3	1.6	2.3	2.4	1.8	1.7	1.0
Private equity	<u>6.2</u>	<u>7.0</u>	<u>7.2</u>	<u>9.2</u>	<u>9.0</u>	<u>8.4</u>	<u>8.3</u>	<u>8.1</u>	<u>7.8</u>	<u>7.5</u>	<u>9.5</u>	<u>8.7</u>	<u>8.2</u>	<u>8.1</u>	<u>8.3</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 45 U.S. Public and 17 peer funds with 5 or more consecutive years of data ending 2019.

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 - 2019 (as a % of average assets)

	Your fund %				Peer average %				U.S. Public average %							
	External		Internal		External		Internal		External		Internal					
	Active	FOFs	Index	Active Index	Active	FOFs	Index	Active Index	Active	FOFs	Index	Active Index				
Stock - U.S. Broad/All	100.0		0.0	0.0	0.0		40.0	56.1	0.0	3.9	27.7	53.8	2.1	16.4		
Stock - U.S. Large Cap							25.5	41.4	13.4	19.7	23.8	52.9	7.0	16.3		
Stock - U.S. Mid Cap							37.0	0.0	15.5	47.4	45.9	19.2	12.2	22.6		
Stock - U.S. Small Cap							84.5	2.0	5.9	7.7	79.0	12.5	5.2	3.3		
Stock - EAFE							65.3	20.1	13.6	0.9	66.5	21.0	6.8	5.7		
Stock - Global	53.3		46.7	0.0	0.0		47.1	41.3	0.0	11.6	46.6	33.3	6.6	13.4		
Stock - Other							89.2	0.0	0.0	10.8	95.3	1.3	0.0	3.5		
Stock - Emerging	100.0		0.0	0.0	0.0		82.1	4.6	1.9	11.4	82.8	7.9	5.5	3.8		
Stock - ACWI x U.S.	100.0		0.0	0.0	0.0		70.7	28.7	0.0	0.6	63.5	33.6	1.2	1.7		
Stock - Aggregate	77.4		22.6	0.0	0.0		50.3	36.9	4.1	8.6	48.3	36.1	5.0	10.5		
Fixed Income - U.S.	96.8		0.0	3.2	0.0		62.8	10.8	26.0	0.4	58.3	14.8	25.1	1.8		
Fixed Income - U.S. Gov't							9.4	72.1	0.0	18.4	47.8	36.5	8.9	6.9		
Fixed Income - U.S. Credits							100.0	0.0	0.0	0.0	72.3	0.0	27.7	0.0		
Fixed Income - EAFE							100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Fixed Income - Global							64.9	35.1	0.0	0.0	63.1	7.0	29.9	0.0		
Fixed Income - Other							100.0	0.0	0.0	0.0	96.4	0.6	3.0	0.0		
Fixed Income - Long Bonds							100.0	0.0	0.0	0.0	52.3	14.3	24.1	9.3		
Fixed Income - Emerging	100.0		0.0	0.0	0.0		98.9	0.0	1.1	0.0	98.4	1.1	0.5	0.0		
Fixed Income - Inflation Indexed							19.7	67.7	12.6	0.0	40.9	43.2	1.8	14.0		
Fixed Income - High Yield	100.0		0.0	0.0	0.0		99.0	0.0	1.0	0.0	96.1	1.4	2.5	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	100.0	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	20.7			79.3			63.5		36.5		35.3		64.7			
Fixed Income - Aggregate	65.6		0.0	34.4	0.0		62.4	18.1	17.6	1.8	60.7	14.1	22.4	2.7		
Commodities							83.5		13.8	2.7	0.0	74.7	9.7	4.1	11.5	
Infrastructure	100.0	0.0		0.0			98.2	1.8		0.0	89.5	6.5		4.0		
Natural Resources							100.0	0.0		0.0	99.5	0.0		0.4		
REITs	100.0		0.0	0.0	0.0		63.1		31.7	5.2	0.0	71.7	19.5	2.1	6.7	
Real Estate ex-REITs	100.0	0.0		0.0			98.2	0.4		1.4	95.3	0.4		4.3		
Other Real Assets							100.0			0.0	94.4			5.6		
Real Assets - Aggregate	100.0	0.0	0.0	0.0	0.0		94.7	0.4	3.4	1.5	0.0	92.6	0.7	1.9	3.8	1.1
Hedge Funds	61.3	38.7					75.5	24.5			72.5	27.5				
Global TAA	100.0			0.0			100.0			0.0	91.8			8.2		
Risk Parity							100.0			0.0	76.8			23.2		
Private Credit	100.0	0.0		0.0			100.0	0.0		0.0	99.3	0.0		0.7		
Mortgages							100.0			0.0	15.3			84.7		
Diversified Private Equity	82.5	17.5		0.0			82.2	17.0		0.8	81.0	18.6		0.4		
Venture Capital							58.7	41.3		0.0	62.2	37.3		0.5		
LBO							96.9	3.1		0.0	96.1	3.9		0.0		
Other Private Equity							100.0	0.0		0.0	99.9	0.0		0.1		
Private Equity - Aggregate	82.5	17.5		0.0			83.7	15.6		0.7	82.8	16.8		0.3		
Total Fund - Avg. Holdings	78.1	5.2	10.6	6.1	0.0		65.0	2.8	21.6	6.2	4.3	62.3	2.8	20.4	8.9	5.7

Actual mix

Actual asset mix - 2015 to 2019 (as a % of total average assets)

	Your fund ¹					Peer average %					U.S. Public average %				
	2019	2018	2017	2016	2015	2019	2018	2017	2016	2015	2019	2018	2017	2016	2015
Stock - U.S. Broad/All	8.8	8.7	8.9	6.5	5.8	11.6	11.3	11.6	9.9	8.4	6.5	6.0	6.4	6.2	6.0
Stock - U.S. Large Cap						10.1	9.9	11.4	13.3	14.7	12.0	11.5	12.8	14.3	15.2
Stock - U.S. Mid Cap						0.7	0.7	0.5	0.6	0.5	0.7	1.0	0.8	0.8	0.9
Stock - U.S. Small Cap						1.1	1.1	1.4	1.6	2.1	1.9	2.2	2.3	2.5	2.9
Stock - EAFE						2.2	2.7	4.2	4.2	4.6	6.2	7.0	7.0	6.5	6.8
Stock - Global	17.3	16.4	16.1	16.1	16.6	5.6	4.8	4.4	4.0	4.3	6.4	6.3	6.5	5.1	4.2
Stock - Other						1.0	0.7	0.7	0.6	0.2	1.2	0.9	1.0	1.0	1.2
Stock - Emerging	6.2	5.8	4.6	3.4	3.2	2.0	2.2	2.2	1.9	1.9	3.1	3.8	3.8	3.1	2.9
Stock - ACWI x U.S.	3.4	3.4	2.8	1.5		11.0	10.6	11.2	10.2	9.4	6.8	5.9	6.8	7.4	7.9
Stock - Aggregate	35.7	34.3	32.4	27.5	25.7	45.2	44.0	47.6	46.5	46.2	44.9	44.6	47.4	46.8	48.0
Fixed Income - U.S.	2.4	2.8	4.6	7.1	9.2	12.5	13.2	12.0	12.9	16.3	12.6	12.8	12.6	13.5	14.5
Fixed Income - U.S. Gov't						2.1	2.0	2.4	2.3	2.1	2.2	1.8	1.4	0.9	0.6
Fixed Income - U.S. Credits						0.6	0.6	0.6	0.8		0.6	0.4	0.2	0.2	0.3
Fixed Income - EAFE						0.2	0.2					0.0	0.1	0.1	0.1
Fixed Income - Global					3.0	0.7	0.8	1.7	1.9	1.2	1.5	1.7	1.4	1.7	1.7
Fixed Income - Other						0.7	0.7	1.2	1.6	1.9	0.8	0.7	0.8	1.0	0.9
Fixed Income - Long Bonds						0.5	0.4	0.4	0.4	0.4	1.1	1.4	1.3	0.9	1.0
Fixed Income - Emerging	3.7	4.7	5.2	5.5	4.7	1.4	1.4	1.2	1.0	1.0	1.2	1.3	1.3	1.1	0.9
Fixed Income - Inflation Indexed						1.7	1.7	1.7	2.0	2.6	1.6	1.8	1.9	1.8	1.9
Fixed Income - High Yield	4.1	4.8	6.7	6.8	5.2	1.1	1.2	1.4	1.1	1.2	1.7	1.9	1.6	1.5	1.5
Fixed Income - Absolute Return Bonds															
Fixed Income - Bundled LDI											0.3	0.2			
Fixed Income - Convertibles						0.2	0.1	0.2			0.1	0.1	0.1		
Cash	7.6	6.7	7.3	9.5	12.1	1.7	1.8	2.0	1.8	2.0	2.3	2.4	2.3	2.1	2.0
Fixed Income - Aggregate	17.7	18.9	23.8	28.9	34.2	23.2	24.2	24.6	25.7	28.7	25.8	26.4	24.9	24.6	25.3
Commodities						1.0	1.0	0.9	0.9	0.5	0.5	0.5	0.5	0.7	0.5
Infrastructure	2.6	2.0	1.4	0.6		0.8	0.7	0.5	0.5	0.5	0.7	0.5	0.6	0.4	0.3
Natural Resources						0.9	0.9	0.7	0.7	0.7	0.9	0.9	1.2	0.9	0.6
REITs	1.6	2.5	1.6	1.0		0.8	0.7	0.7	0.8	0.7	0.8	0.8	0.9	0.8	0.8
Real Estate ex-REITs	7.5	6.1	6.0	5.3	4.2	7.7	8.4	7.7	8.1	7.7	7.5	7.8	6.9	7.8	7.3
Other Real Assets						0.2	0.2	0.5	0.4	0.3	0.5	0.4	0.6	0.7	0.7
Real Assets - Aggregate	11.7	10.7	9.1	6.9	4.2	11.4	11.8	11.1	11.3	10.3	11.0	10.9	10.8	11.2	10.2
Hedge Funds	10.2	10.9	11.0	11.5	11.8	5.0	5.1	4.4	4.6	4.0	4.4	4.8	4.8	5.2	5.5
Global TAA	8.4	9.4	6.8	7.0	7.5	0.5	0.5	0.4	0.7	0.7	1.5	1.1	0.9	1.5	1.3
Risk Parity						1.5	1.4	1.0	0.6	0.6	0.9	1.0	1.1	0.7	0.4
Mortgages						0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2
Private Credit	6.4	5.9	5.8	5.8	5.5	3.0	3.0	2.3	2.0	1.5	2.2	2.0	1.6	1.3	1.0
Diversified Private Equity	7.3	7.5	8.0	9.7	8.9	7.8	7.8	6.7	6.7	6.2	6.7	6.5	5.6	6.1	5.5
Venture Capital						0.3	0.4	0.3	0.3	0.4	0.5	0.4	0.4	0.4	0.5
LBO						1.4	1.4	1.2	1.1	1.0	1.5	1.6	1.5	1.4	1.6
Other Private Equity						0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3
Private Equity - Aggregate	7.3	7.5	8.0	9.7	8.9	9.7	9.6	8.3	8.2	7.7	8.8	8.6	7.7	8.1	7.9
Derivatives/Overlays Mkt Value	2.6	2.6	3.1	2.9	2.2	0.4	0.3	0.4	0.4	0.3	0.5	0.4	0.8	0.5	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	18	18	17	48	59	60	59	64
Median Assets (\$ billions)	31.6	31.3	30.5	28.0	29.4	32.0	31.3	31.2	28.5	27.7	21.2	19.1	19.9	17.1	16.6

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

Policy mix

Policy asset mix - 2015 to 2019 (as a % of total assets)

	Your fund %					Peer average %					U.S. Public average %				
	2019	2018	2017	2016	2015	2019	2018	2017	2016	2015	2019	2018	2017	2016	2015
Stock - U.S. Broad/All	16.3	16.4	14.6			12.3	14.2	15.1	13.5	13.1	7.6	8.3	9.1	9.1	9.6
Stock - U.S. Large Cap						7.1	7.1	6.8	8.4	9.3	9.4	8.6	9.2	10.4	10.6
Stock - U.S. Mid Cap						0.6	0.6	0.3	0.3	0.3	0.5	0.7	0.5	0.4	0.4
Stock - U.S. Small Cap						0.1	0.2	0.2	0.2	0.4	1.2	1.4	1.3	1.5	1.6
Stock - EAFE						1.5	1.5	2.5	2.5	2.7	4.6	5.3	4.7	5.1	5.1
Stock - Global	18.3	17.7	17.3	37.2	34.0	8.3	8.4	8.3	9.3	9.8	10.1	11.0	10.7	8.9	9.0
Stock - Other						3.8	0.7	0.6	0.7	0.3	2.2	0.8	0.9	0.8	0.9
Stock - Emerging	6.6	6.3	4.9			1.2	1.2	1.0	0.8	0.8	2.3	2.9	2.5	2.3	2.2
Stock - ACWI x U.S.	3.6	3.7	3.0			10.3	12.0	11.8	11.3	10.8	6.8	6.8	7.5	8.1	8.8
Stock - Aggregate	44.8	44.1	39.8	37.2	34.0	45.2	45.6	46.7	47.1	47.5	44.7	45.8	46.5	46.7	48.2
Fixed Income - U.S.	11.0	13.0	10.0	10.3	10.0	16.2	16.2	15.5	15.6	19.0	14.2	14.2	14.7	15.0	15.8
Fixed Income - U.S. Gov't						1.5	1.5	1.7	1.7	1.8	1.9	1.7	1.1	0.7	0.5
Fixed Income - U.S. Credits						0.8	0.8	0.9	1.1		0.8	0.5	0.3	0.3	0.2
Fixed Income - EAFE						0.2	0.2					0.0	0.1	0.1	0.1
Fixed Income - Global						0.5	0.5	1.6	1.7	0.7	1.3	1.5	1.4	1.5	1.5
Fixed Income - Other						0.1	0.2	0.9	1.2	1.6	0.5	0.4	0.6	0.6	0.5
Fixed Income - Long Bonds						0.5	0.4	0.4	0.4	0.5	1.9	2.0	2.1	1.7	1.5
Fixed Income - Emerging	4.0	4.0	5.0	5.2	5.0	1.4	1.4	1.2	1.1	1.1	1.2	1.2	1.2	0.9	0.9
Fixed Income - Inflation Indexed						1.8	1.7	1.6	1.9	2.2	2.8	2.7	2.8	2.7	2.6
Fixed Income - High Yield	4.4	5.2	7.0	6.8	5.0	1.4	1.0	1.3	1.0	1.1	2.0	1.9	1.9	1.8	1.8
Fixed Income - Absolute Return Bonds															
Fixed Income - Bundled LDI											0.3	0.2			
Fixed Income - Convertibles						0.1	0.2	0.2			0.1	0.1	0.1		
Cash	3.0	1.0	3.0	2.1	2.0	0.8	0.8	0.8	0.7	0.7	-1.1	-1.0	-1.0	-1.0	-0.9
Fixed Income - Aggregate	22.4	23.2	25.0	24.3	22.0	25.4	24.9	26.1	26.4	28.6	26.0	25.4	25.1	24.4	24.5
Commodities					3.0	1.1	1.0	0.9	1.0	0.9	0.9	1.0	0.9	1.2	1.0
Infrastructure	3.0	3.0	2.0	1.0		1.0	0.4	0.5	0.6	0.5	0.9	0.5	0.7	0.6	0.3
Natural Resources						0.8	0.5	0.4	0.9	0.7	0.9	0.8	1.1	1.0	0.7
REITs	1.5	3.1	2.3	0.7		0.6	0.6	0.7	0.6	0.5	0.6	0.8	0.8	0.6	0.6
Real Estate ex-REITs	7.5	5.9	5.7	6.5	5.0	8.5	8.7	8.3	7.9	7.4	8.3	8.1	7.7	7.6	7.4
Other Real Assets						0.2	0.6	0.5	0.7	0.3	0.5	0.7	0.6	1.0	0.8
Real Assets - Aggregate	12.0	12.0	10.0	8.2	8.0	12.2	11.8	11.3	11.7	10.4	12.2	11.8	11.8	12.0	10.9
Hedge Funds	1.0	1.0	2.0	4.1	10.0	3.4	3.5	3.1	3.2	2.8	3.7	4.5	4.5	4.6	4.9
Global TAA	7.0	7.0	10.0	10.3	10.0	0.4	0.4	0.6	0.9	0.9	1.2	1.0	0.9	1.4	1.3
Risk Parity						1.5	1.5	1.2	0.7	0.7	0.8	0.8	1.0	0.7	0.5
Mortgages						0.1	0.2				0.1	0.1	0.0	0.1	0.1
Private Credit	6.6	5.8	6.0	6.6	7.0	3.0	3.5	2.9	2.2	1.6	2.1	2.0	1.7	1.4	0.9
Diversified Private Equity	6.2	7.0	7.2	9.2	9.0	7.5	7.5	7.1	6.8	6.4	7.4	6.8	7.1	6.9	7.0
Venture Capital						0.4	0.2	0.2	0.2	0.2	0.4	0.3	0.3	0.3	0.2
LBO						0.7	0.9	0.9	0.9	1.0	1.5	1.3	0.9	1.2	1.5
Other Private Equity											0.0	0.1	0.1	0.2	0.1
Private Equity - Aggregate	6.2	7.0	7.2	9.2	9.0	8.7	8.6	8.2	7.9	7.5	9.3	8.6	8.4	8.7	8.8
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	18	18	17	48	59	60	59	64

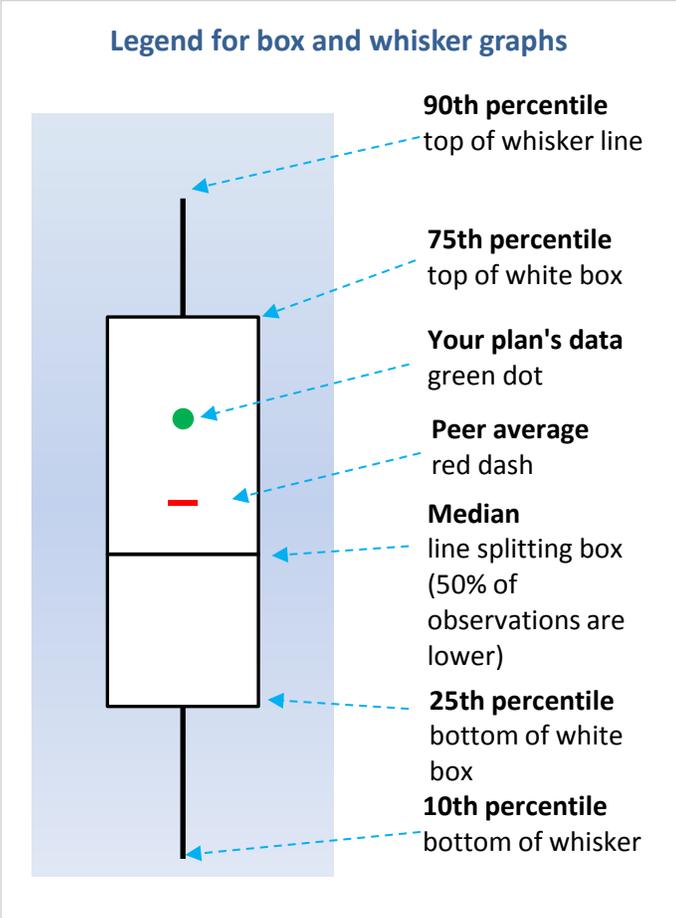
3

Returns, Benchmarks and Value Added

Interpreting box and whisker graphs	2
Net total returns	3
Policy returns	4
Net value added	5
Net returns by asset class	6
Benchmark returns by asset class	7
Net value added by asset class	8
Your policy return and value added calculation:	
- 2019	9
- 2015 to 2019	10
Profit/Loss on overlay programs	11
Appendix - CEM's Private equity benchmark	12

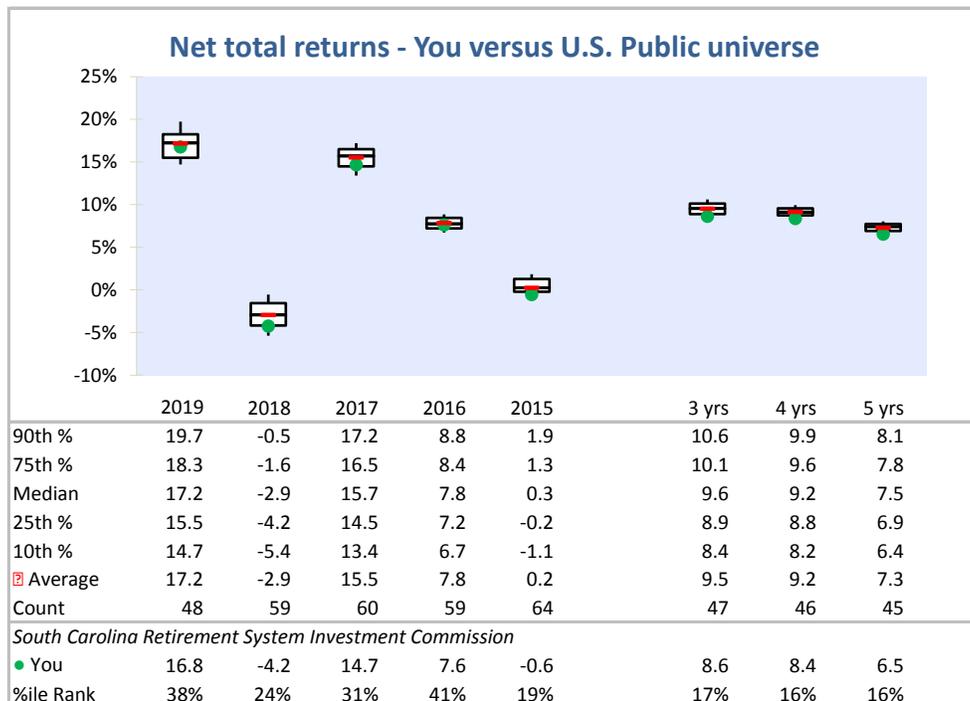
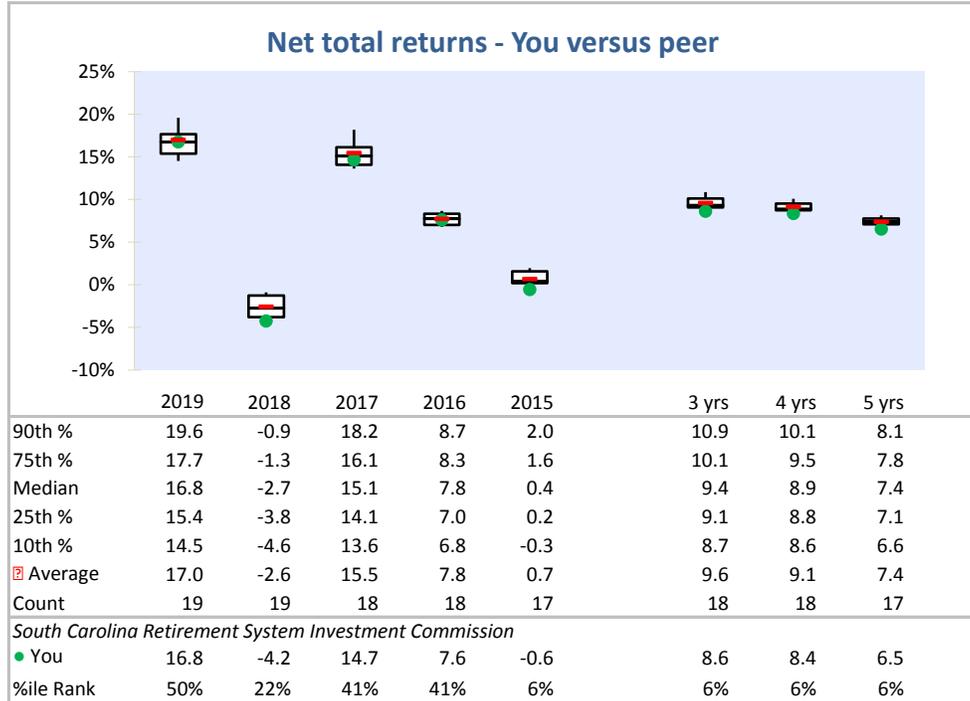
Interpreting box and whisker graphs

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.



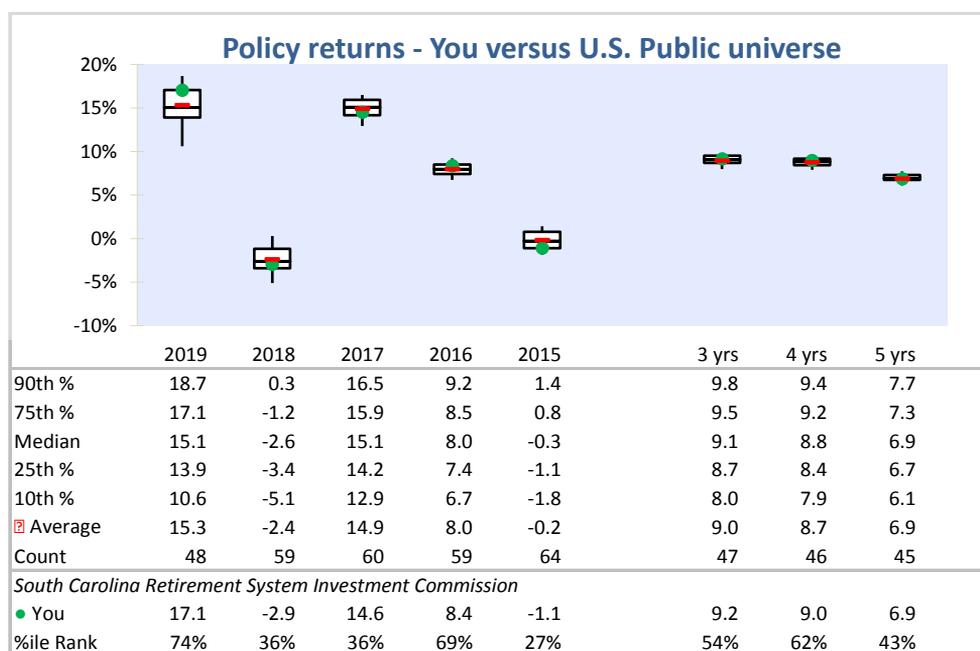
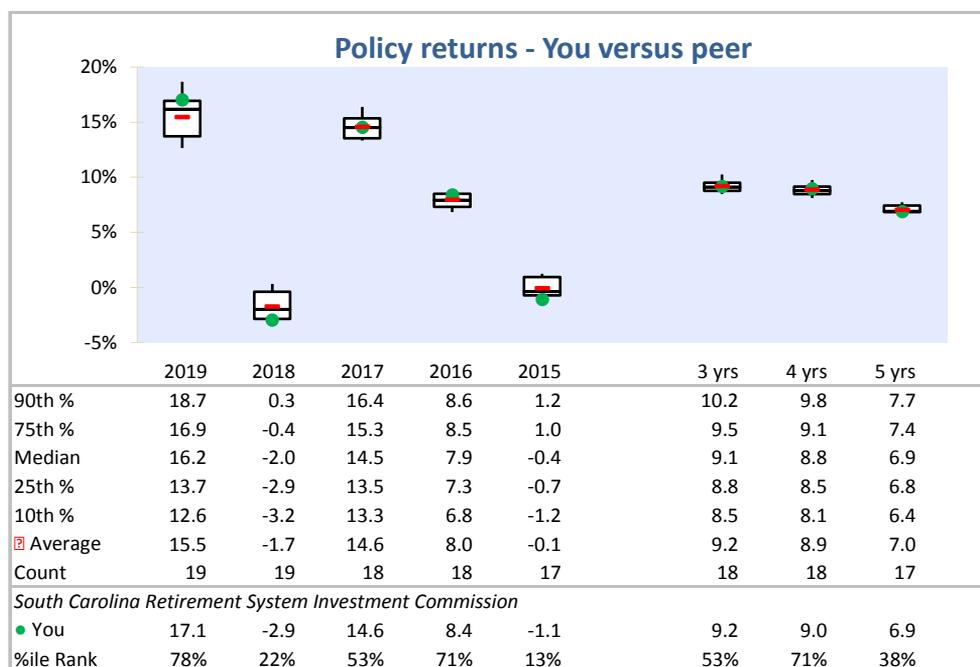
Net total returns

Your 5-year net total return of 6.5% 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

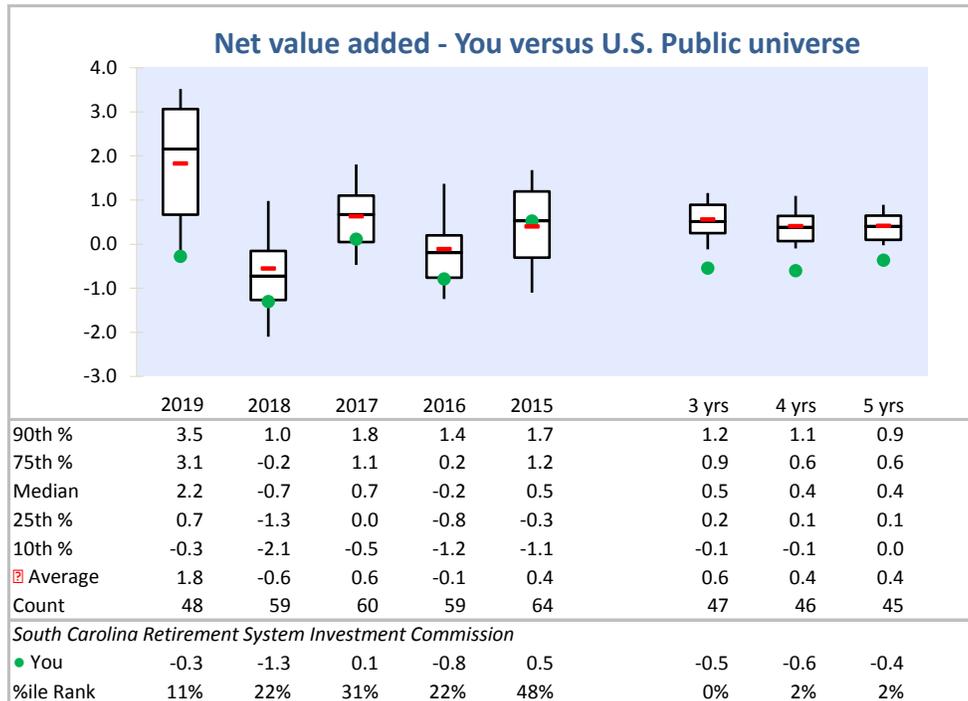
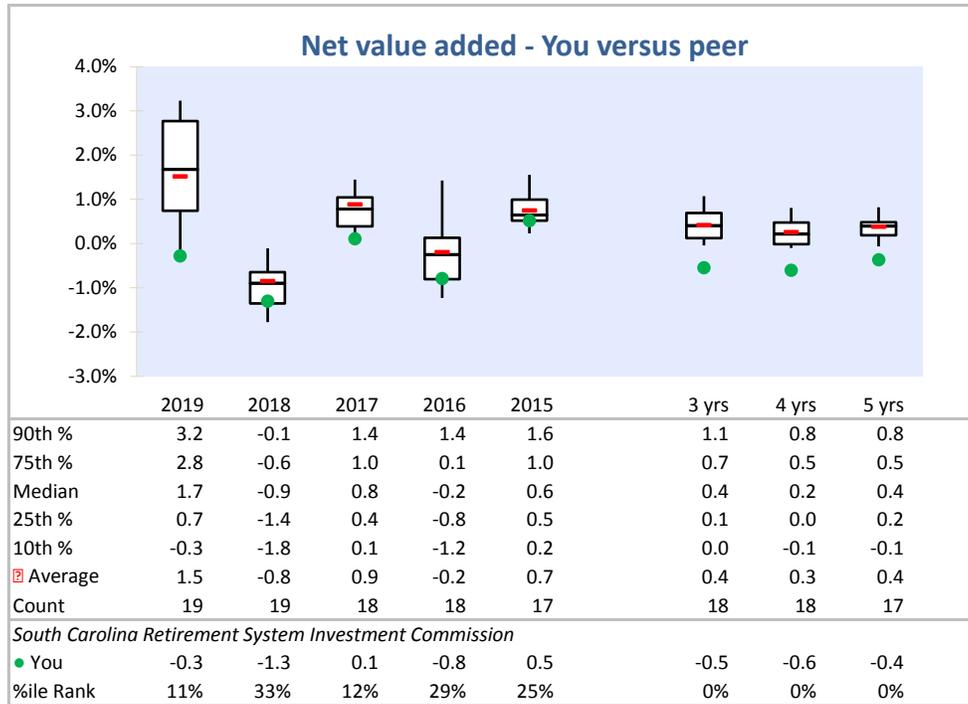
Your 5-year policy return of 6.9% was below the peer median and below the median of the U.S. Public universe. Policy return is the return you would have earned had you passively implemented your policy asset mix decision through your benchmark portfolios.



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. If CEM used this same adjustment for your fund, your 5-year policy return would be 6.6%, 0.2% lower than your actual 5-year policy return of 6.9%. Mirroring this, your 5-year total fund net value added would be 0.2% higher. The correlation between your private equity returns and the benchmark based on investable, public market indices lagged by 85 business days is 0.78 versus a correlation of 0.44 using your reported benchmarks. Refer to the appendix of this section for details.

Net value added

Your 5-year net value added of -0.4% was below the peer median and below 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 %					
	2019	2018	2017	2016	2015	5-yr ¹	2019	2018	2017	2016	2015	5-yr ¹	2019	2018	2017	2016	2015	5-yr ¹
Stock - U.S. Broad/All	19.6	-7.9	14.3	9.5	-14.0	3.5	28.7	-5.6	20.5	9.8	-1.0	9.2	30.0	-5.3	20.1	11.1	-0.5	9.7
Stock - U.S. Large Cap							35.3	-5.4	22.1	11.3	1.4	11.9	32.5	-4.9	22.3	11.2	0.9	11.7
Stock - U.S. Mid Cap							28.5	-10.0	18.8	18.6	-3.2	9.6	31.1	-9.5	18.9	13.6	-2.7	10.1
Stock - U.S. Small Cap							26.1	-10.2	15.1	17.9	-3.2	8.4	26.6	-11.1	15.6	18.7	-3.7	8.6
Stock - EAFE							22.4	-13.7	26.3	2.7	0.8	6.8	22.3	-14.0	25.7	2.9	0.0	6.5
Stock - Global	26.7	-9.0	24.1	6.1	-0.4	8.6	19.5	-9.4	23.6	8.6	-0.6	8.4	24.0	-8.4	29.4	7.5	-0.9	8.9
Stock - Other							11.4	-11.2	10.1	13.7	-14.1	3.2	14.1	-11.8	14.8	10.3	-6.2	2.3
Stock - Emerging	18.8	-16.6	37.6	10.1	-15.9	4.7	19.4	-15.5	35.7	12.3	-15.0	5.5	20.2	-15.6	36.6	10.6	-13.6	5.5
Stock - ACWI x U.S.	23.4	-18.6	31.1	5.1			23.2	-15.0	29.9	4.2	-2.5	6.8	23.4	-14.5	28.4	3.6	-2.7	6.4
Stock - Aggregate	23.3	-11.0	23.9	7.4	-5.4	6.7	26.2	-9.8	24.2	9.1	-1.3	8.8	26.3	-10.0	24.6	9.0	-1.7	8.7
Fixed Income - U.S.	8.6	-0.4	5.0	3.8	0.5	3.4	9.7	-0.1	4.5	3.9	0.5	3.7	9.1	0.0	4.3	3.8	0.2	3.4
Fixed Income - U.S. Gov't							6.9	0.6	2.5	0.8	0.9	2.0	8.5	-0.2	4.5	1.2	1.0	2.1
Fixed Income - U.S. Credits								0.0	3.8	2.9				-0.1	4.5	4.4	-2.2	
Fixed Income - EAFE							10.0	-4.9						-0.4	9.6	3.8	-8.1	
Fixed Income - Global					-0.6		8.4	0.0	6.2	4.5	-1.1	3.6	9.2	-2.0	13.1	5.8	-2.0	3.6
Fixed Income - Other							7.1	2.6	5.7	9.1	-0.7	4.8	7.4	1.4	25.1	15.0	0.3	4.3
Fixed Income - Long Bonds								-3.5	10.5	7.1	-3.9		17.2	-3.6	9.8	3.4	-3.8	4.4
Fixed Income - Emerging	13.2	-6.6	13.7	11.7	-6.4	4.7	14.6	-6.5	13.0	11.1	-6.8	5.5	13.9	-5.9	12.3	10.6	-5.3	5.4
Fixed Income - Inflation Indexed							7.9	-1.2	3.8	6.0	-1.9	3.4	8.3	-1.3	3.6	5.6	-1.7	3.2
Fixed Income - High Yield	7.3	0.5	6.1	8.9	-1.3	4.2	13.4	-2.3	7.1	12.4	-2.7	5.5	13.0	-1.5	7.0	12.7	-3.2	5.3
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI													16.1					
Fixed Income - Convertibles							22.1	-1.9	12.4				22.1	-1.3	10.9			
Cash	2.7	1.2	0.6	0.4	0.1	1.0	2.6	2.0	0.8	0.5	0.3	1.2	2.5	-0.1	0.9	1.3	0.0	1.4
Fixed Income - Aggregate	6.8	-1.2	5.9	5.4	-1.0	3.1	9.4	-0.6	5.1	4.5	-0.3	3.7	9.6	-0.7	5.0	4.7	-0.6	3.5
Commodities							11.2	-11.5	4.4	13.7	-26.5	-2.6	1.0	-11.3	6.8	12.5	-26.5	-7.0
Infrastructure	26.5	-6.7	15.0	-5.7			13.8	9.1	11.4	5.4	-1.4	10.1	9.8	7.2	12.3	9.0	4.3	8.4
Natural Resources							-0.6	5.4	8.1	8.0	-3.9	2.7	1.6	3.4	6.9	6.5	-5.4	2.8
REITs	27.0	-5.2	7.9	-5.0			25.2	-4.6	9.8	2.4	1.9	5.5	25.7	-4.6	8.7	4.8	2.2	6.4
Real Estate ex-REITs	5.6	9.9	9.7	1.4	15.5	8.3	6.8	9.1	9.2	8.8	13.9	9.5	5.3	7.7	8.2	8.1	12.8	8.0
Other Real Assets							5.3	-0.9	5.0	15.1	-23.8	-4.7	5.1	-2.3	3.4	12.5	-12.3	0.2
Real Assets - Aggregate	13.3	3.2	10.2	-0.1	15.5	8.3	8.0	5.5	8.8	8.1	8.7	7.5	6.9	4.7	7.9	8.1	7.4	6.5
Hedge Funds	4.4	2.5	6.0	0.2	0.0	2.6	5.2	-0.9	5.2	2.2	0.1	2.6	5.5	-1.0	5.9	1.5	-0.5	2.8
Global TAA	20.3	-6.9	11.3	7.8	-5.2	5.0	20.4	-6.9	11.3	9.4	-5.2	5.0	15.0	-5.7	12.1	7.3	-3.4	4.5
Risk Parity							19.5	-6.0	11.8	11.8	-8.1	5.4	23.2	-8.0	14.4	11.6	-8.3	6.5
Mortgages							5.5	4.2	10.1	2.3	2.2		8.9	3.0	5.7	2.6	3.7	4.8
Private Credit	6.4	3.3	6.9	8.8	0.6	5.2	6.7	6.8	9.3	8.4	3.7	5.8	7.2	7.0	8.9	7.8	3.6	6.4
Diversified Private Equity	7.7	6.6	13.8	10.6	4.0	8.5	10.2	18.2	17.2	8.4	7.4	12.1	10.2	15.7	17.0	8.9	8.4	11.9
Venture Capital							10.0	25.9	14.5	2.6	13.8	8.6	10.7	20.1	11.2	4.1	14.3	11.4
LBO							19.8	16.6	17.9	12.3	8.5	14.1	17.1	17.2	19.8	14.2	10.2	15.2
Other Private Equity							6.1	5.8	10.4	6.6	2.6	6.3	36.9	23.3	8.8	9.1	8.3	24.8
Private Equity - Aggregate	7.7	6.6	13.8	10.6	4.0	8.5	11.4	18.6	17.7	8.8	8.2	12.7	11.6	16.6	17.3	9.1	9.2	12.5
Total Fund Return	16.8	-4.2	14.7	7.6	-0.6	6.5	17.0	-2.6	15.5	7.8	0.7	7.4	17.2	-2.9	15.5	7.8	0.2	7.3

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 %					
	2019	2018	2017	2016	2015	5-yr ¹	2019	2018	2017	2016	2015	5-yr ¹	2019	2018	2017	2016	2015	5-yr ¹
Stock - U.S. Broad/All	26.6	-5.7	20.6	11.8	0.5	10.1	30.4	-5.2	21.8	12.3	1.0	11.3	30.9	-5.2	21.8	12.4	0.7	11.3
Stock - U.S. Large Cap							31.4	-4.6	21.5	12.2	1.2	11.6	31.4	-4.6	21.6	12.4	1.1	11.5
Stock - U.S. Mid Cap							29.2	-7.8	20.4	13.7	-1.5	10.1	28.9	-8.0	19.0	12.5	-2.0	9.6
Stock - U.S. Small Cap							26.6	-9.5	16.0	19.7	-3.4	9.0	26.5	-10.3	15.4	19.9	-3.4	8.6
Stock - EAFE							22.6	-13.9	25.0	2.0	-0.3	6.1	22.4	-13.8	25.0	2.3	-1.1	5.8
Stock - Global	27.7	-8.7	22.4	8.2	-2.4	8.6	26.8	-10.1	23.6	8.4	-1.9	8.6	26.8	-9.3	24.3	8.0	-1.7	8.5
Stock - Other							23.8	-7.3	14.1	13.9	-10.9	8.1	21.4	-9.5	16.3	8.6	-7.3	4.5
Stock - Emerging	18.9	-14.6	36.8	11.2	-14.9	5.6	18.0	-14.8	36.9	11.3	-15.1	5.4	18.2	-14.5	37.2	10.9	-14.5	5.5
Stock - ACWI x U.S.	21.5	-14.2	22.4	4.5			21.8	-13.9	27.8	4.1	-5.0	5.9	21.7	-13.6	27.4	4.6	-4.8	5.9
Stock - Aggregate	25.5	-8.9	23.5	8.2	-2.4	8.3	27.0	-8.9	23.5	9.3	-1.5	9.0	26.5	-9.2	23.8	9.4	-2.0	8.8
Fixed Income - U.S.	8.7	0.0	5.0	2.7	0.6	3.3	9.5	-0.2	3.7	3.0	0.4	3.2	9.1	-0.1	3.8	2.8	0.4	3.1
Fixed Income - U.S. Gov't							7.9	0.6	2.3	-0.2	0.7	2.1	8.6	-0.3	4.3	0.8	0.8	2.2
Fixed Income - U.S. Credits							11.4	0.0	3.5	2.7			12.2	-1.1	3.6	3.2	-0.7	
Fixed Income - EAFE							5.1	-2.2					-2.2	8.4	6.1	-6.0		
Fixed Income - Global					1.0		8.1	0.7	4.1	3.6	0.1	3.1	9.3	-0.8	5.1	4.9	-0.9	3.5
Fixed Income - Other							10.3	0.9	4.7	9.0	-1.4	4.1	9.5	0.4	4.4	7.4	0.4	4.1
Fixed Income - Long Bonds							19.1	-4.3	10.4	5.8	-2.8	5.3	18.1	-3.3	8.9	3.2	-1.9	4.2
Fixed Income - Emerging	14.3	-5.2	12.7	10.2	-7.1	4.6	14.4	-5.0	11.8	10.1	-6.4	4.7	13.9	-5.0	11.4	9.8	-4.9	4.8
Fixed Income - Inflation Indexed							8.5	-1.6	3.6	5.7	-1.7	2.9	8.9	-1.4	3.2	5.6	-1.7	2.8
Fixed Income - High Yield	11.5	-0.8	5.8	12.3	-1.2	5.4	13.9	-2.1	7.0	15.4	-3.5	5.9	13.4	-1.8	6.9	15.4	-3.9	5.8
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI													17.3	-3.3				
Fixed Income - Convertibles							23.2	0.2	13.7				23.2	0.4	17.1			
Cash	2.3	1.9	0.9	0.3	0.1	1.1	2.3	1.7	0.8	0.3	0.0	1.1	2.3	1.6	1.0	0.4	0.1	1.1
Fixed Income - Aggregate	9.4	-1.0	6.3	6.7	-1.6	3.9	10.0	-0.6	4.5	3.9	-0.4	3.4	11.0	-1.3	5.3	4.9	-0.3	3.7
Commodities					-24.7		9.7	-11.7	2.4	10.4	-19.6	-2.3	9.0	-10.7	3.0	10.9	-22.8	-3.3
Infrastructure	28.7	-7.9	15.8	12.5			13.6	4.6	8.7	7.7	3.8	6.7	11.9	4.4	9.1	6.9	5.0	6.6
Natural Resources							7.5	2.3	5.6	6.8	-2.7	3.4	7.1	1.4	6.5	6.8	-0.5	4.3
REITs	26.0	-4.6	5.2	8.5			22.7	-2.9	8.9	7.4	4.3	7.4	22.1	-4.3	8.2	6.7	2.9	6.7
Real Estate ex-REITs	5.4	8.4	8.4	10.8	15.7	9.7	5.8	7.5	7.2	9.0	13.5	8.7	6.5	6.6	6.6	8.5	13.7	8.4
Other Real Assets							10.1	3.0	-0.3	12.9	-21.0	-4.5	9.2	0.1	1.5	12.5	-8.7	0.4
Real Assets - Aggregate	13.8	0.9	9.2	10.8	0.6	6.9	7.8	4.6	6.3	9.1	7.9	7.1	8.5	3.7	6.2	8.8	7.5	6.8
Hedge Funds	18.2	-6.4	12.6	3.3	-1.1	4.9	9.7	0.2	8.5	4.2	2.2	4.2	8.0	-0.1	6.7	3.1	1.3	3.3
Global TAA	18.2	-6.4	12.6	7.9	-2.0	5.7	19.7	-6.4	12.6	6.7	-2.3	5.7	14.3	-3.7	13.1	5.8	1.1	5.8
Risk Parity							19.6	-4.0	14.7	11.8	-8.1	5.4	17.3	-4.7	13.3	9.3	-1.8	6.1
Mortgages							8.7	0.6		2.3	2.2		9.1	0.7	2.9	2.9	2.0	3.7
Private Credit	4.6	6.7	6.8	7.0	2.4	5.5	8.4	2.8	8.6	11.8	-1.1	5.5	9.3	2.7	7.2	12.1	-0.3	5.4
Diversified Private Equity	5.1	17.5	21.9	16.3	0.9	12.0	-10.0	23.4	17.3	10.5	1.3	7.9	-9.8	21.8	17.7	10.6	2.0	7.8
Venture Capital							-13.3	24.4	15.7	13.8	0.1	7.3	-11.0	22.6	17.3	10.8	2.3	7.5
LBO							-13.1	24.6	15.7	13.6	0.0	7.3	-11.3	22.8	17.0	11.4	2.1	7.5
Other Private Equity							-13.3	24.4	15.6	13.8	0.1	7.3	-12.7	23.3	17.7	9.5	1.9	7.3
Private Equity - Aggregate	5.1	17.5	21.9	16.3	0.9	12.0	-10.2	23.4	17.2	10.6	1.3	7.8	-10.0	21.9	17.6	10.6	2.0	7.7
Total Policy Return	17.1	-2.9	14.6	8.4	-1.1	6.9	15.5	-1.7	14.6	8.0	-0.1	7.0	15.3	-2.4	14.9	8.0	-0.2	6.9

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. If CEM used this same adjustment for your fund, your 5-year policy return would be 6.6%, 0.2% lower than your actual 5-year policy return of 6.9%. Mirroring this, your 5-year total fund net value added would be 0.2% higher. The correlation between your private equity returns and the benchmark based on investable, public market indices lagged by 85 business days is 0.78 versus a correlation of 0.44 using your reported benchmarks. Refer to the appendix of this section for details.

Net value added by asset class

Asset class	Your fund %						Peer average %						U.S. Public average %					
	2019	2018	2017	2016	2015	5-yr ¹	2019	2018	2017	2016	2015	5-yr ¹	2019	2018	2017	2016	2015	5-yr ¹
Stock - U.S. Broad/All	-7.0	-2.2	-6.3	-2.3	-14.5	-6.6	-1.6	-0.3	-1.3	-2.5	-2.0	-2.0	-0.9	-0.1	-1.7	-1.2	-1.2	-1.6
Stock - U.S. Large Cap							3.9	-0.8	0.6	-0.9	0.2	0.3	1.1	-0.3	0.7	-1.2	-0.1	0.2
Stock - U.S. Mid Cap							-0.7	-2.2	-1.6	4.9	-1.7	-0.5	2.3	-1.5	-0.1	1.1	-0.7	0.5
Stock - U.S. Small Cap							-0.6	-0.7	-0.8	-1.8	0.2	-0.7	0.0	-0.5	0.2	-1.2	-0.3	-0.2
Stock - EAFE							-0.5	0.2	1.3	0.7	1.2	0.4	-0.2	-0.2	0.6	0.5	1.3	0.5
Stock - Global	-0.9	-0.3	1.7	-2.1	1.9	0.1	-7.4	0.7	0.0	0.2	1.4	-0.2	-2.8	0.9	5.0	-0.3	0.6	0.3
Stock - Other							-12.8	-3.2	-4.6	-0.2	-3.2	-4.9	-6.9	-1.3	-1.5	1.2	1.1	-1.4
Stock - Emerging	-0.1	-2.1	0.7	-1.1	-1.0	-0.9	1.5	-0.8	-1.2	1.0	0.1	0.2	1.9	-1.1	-0.5	-0.6	0.8	0.0
Stock - ACWI x U.S.	1.9	-4.4	8.7	0.6			1.5	-1.0	1.8	0.2	2.7	1.0	1.7	-0.9	0.9	-0.9	2.2	0.5
Stock - Aggregate	-2.2	-2.1	0.4	-0.9	-3.1	-1.7	-0.8	-0.9	0.7	-0.2	0.3	-0.2	-0.3	-0.8	0.8	-0.4	0.3	-0.1
Fixed Income - U.S.	-0.1	-0.4	0.0	1.1	0.0	0.1	0.5	0.1	0.8	0.9	0.1	0.5	0.3	0.1	0.5	1.0	-0.2	0.3
Fixed Income - U.S. Gov't							0.0	0.0	-0.5	-0.2	0.1	-0.1	0.0	0.1	0.3	-0.1	0.2	-0.1
Fixed Income - U.S. Credits								0.0	0.3	0.2				1.0	0.9	1.3	-1.4	
Fixed Income - EAFE							4.9	-2.8						1.8	1.2	-2.3	-2.1	
Fixed Income - Global					-1.7		0.1	-0.8	2.1	0.9	-1.2	0.2	-0.5	-1.4	8.0	0.9	-1.2	0.3
Fixed Income - Other							-3.2	2.4	1.0	0.1	-0.2	0.6	-2.5	1.1	20.7	8.1	-0.8	0.2
Fixed Income - Long Bonds								0.8	0.1	1.3	-1.1		1.1	-0.3	0.9	-0.6	-1.8	0.2
Fixed Income - Emerging	-1.0	-1.5	0.9	1.6	0.7	0.1	0.2	-1.5	1.2	1.0	-0.4	0.4	0.3	-1.2	0.9	0.8	-0.1	0.4
Fixed Income - Inflation Indexed							0.0	0.4	0.2	0.3	-0.1	0.6	-0.2	0.0	0.4	0.0	0.0	0.2
Fixed Income - High Yield	-4.2	1.3	0.3	-3.4	-0.1	-1.1	-0.7	-0.2	0.1	-3.0	0.8	-0.4	-0.3	0.4	0.1	-2.9	0.9	-0.5
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI													-1.2					
Fixed Income - Convertibles							-1.1	-2.1	-1.3				-1.1	-1.7	-6.1			
Cash	0.5	-0.7	-0.2	0.1	0.0	-0.1	0.3	0.1	0.0	0.2	0.3	0.1	0.3	-1.6	-0.2	0.9	0.0	0.3
Fixed Income - Aggregate	-2.6	-0.2	-0.4	-1.4	0.7	-0.7	-0.2	0.0	0.7	0.6	0.1	0.2	-1.3	0.6	-0.3	-0.2	-0.4	-0.3
Commodities							1.2	0.2	2.0	0.7	0.4	0.9	-8.1	-0.7	3.5	1.2	-3.5	-2.7
Infrastructure	-2.2	1.2	-0.8	-18.3			2.5	5.3	2.8	-2.3	-5.2	3.9	0.8	2.3	3.1	2.1	-0.7	2.0
Natural Resources							-6.8	3.1	2.5	1.2	-1.2	-1.2	-5.3	2.1	0.5	-0.5	-4.5	-1.3
REITs	1.0	-0.6	2.7	-13.5			2.0	-1.7	0.8	-5.0	-2.3	-2.2	2.5	-0.3	0.5	-1.8	-0.8	-0.6
Real Estate ex-REITs	0.3	1.5	1.3	-9.4	-0.1	-1.3	1.3	1.6	2.0	0.0	0.5	1.0	-1.1	1.0	1.6	-0.3	-0.8	-0.2
Other Real Assets							-8.6	-3.3	5.3	2.2	-2.8	-0.2	-5.5	-2.0	1.9	-0.4	-3.6	-0.1
Real Assets - Aggregate	-0.5	2.2	1.1	-10.9	15.0	1.3	0.2	0.9	2.6	-1.0	0.8	0.6	-1.7	0.9	1.7	-0.7	-0.1	0.0
Hedge Funds	-13.8	8.9	-6.6	-3.1	1.1	-2.4	-6.8	-0.6	-3.3	-2.1	-2.1	-1.7	-2.9	-0.7	-0.8	-1.6	-1.8	-0.6
Global TAA	2.1	-0.6	-1.3	-0.1	-3.2	-0.7	0.8	-0.6	-1.3	2.7	-2.9	-0.7	-0.1	-2.3	-1.3	1.4	-4.5	-1.4
Risk Parity							-0.6	-2.0	-2.9	0.0	0.0	0.0	4.7	-3.3	1.1	2.4	-8.0	0.0
Mortgages							-3.2	3.6		0.0	0.0		-0.2	2.4	1.5	-0.5	1.7	0.6
Private Credit	1.8	-3.4	0.1	1.9	-1.8	-0.3	-1.4	4.0	0.8	-2.4	5.0	1.2	-1.7	4.3	1.7	-4.0	4.3	1.3
Diversified Private Equity	2.6	-10.9	-8.0	-5.7	3.2	-3.5	19.3	-5.1	-0.2	-1.8	5.9	4.1	19.8	-5.9	-0.7	-1.5	6.2	4.1
Venture Capital							23.3	1.6	-1.2	-11.2	13.7	1.3	22.4	-2.4	-6.1	-6.5	11.6	4.0
LBO							32.8	-8.1	2.2	-1.2	8.6	6.7	29.5	-5.5	2.8	3.1	7.8	7.8
Other Private Equity							19.4	-18.5	-5.2	-7.2	2.5	-1.0	49.6	0.0	-9.0	0.1	6.2	17.4
Private Equity - Aggregate	2.6	-10.9	-8.0	-5.7	3.2	-3.5	20.6	-4.8	0.4	-1.6	6.8	4.7	21.3	-5.1	-0.3	-1.4	7.0	4.7
Total Fund Return	-0.3	-1.3	0.1	-0.8	0.5	-0.4	1.5	-0.8	0.9	-0.2	0.7	0.4	1.8	-0.6	0.6	-0.1	0.4	0.4

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.

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. If CEM used this same adjustment for your fund, your 5-year policy return would be 6.6%, 0.2% lower than your actual 5-year policy return of 6.9%. Mirroring this, your 5-year total fund net value added would be 0.2% higher. The correlation between your private equity returns and the benchmark based on investable, public market indices lagged by 85 business days is 0.78 versus a correlation of 0.44 using your reported benchmarks. Refer to the appendix of this section for details.

Your policy return and value added calculation - 2019

2019 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Return	Net return	Value added
Stock - U.S. Broad/All	16.3%	MSCI US IMI Net	26.6%	19.6%	-7.0%
Stock - Global	18.3%	MSCI World Net Dividend	27.7%	26.7%	-0.9%
Stock - Emerging	6.6%	MSCI Emerging Market IMI Net	18.9%	18.8%	-0.1%
Stock - ACWI x U.S.	3.6%	MSCI ACWI x/US Net	21.5%	23.4%	1.9%
Fixed Income - U.S.	11.0%	Barclays US Aggregate	8.7%	8.6%	-0.1%
Fixed Income - Emerging	4.0%	50% JPM EMBI Global Diversified/50% JPM-GBI-I	14.3%	13.2%	-1.0%
Fixed Income - High Yield	4.4%	50%Bar U.S. High Yield 2% / 50%S&P LSTA Lever:	11.5%	7.3%	-4.2%
Cash	3.0%	BofA Merrill Lynch 3 Month US Treasury Bill G00	2.3%	2.7%	0.5%
Infrastructure	3.0%	Dow Jones Brookfield Global Infrastructure Net I	28.7%	26.5%	-2.2%
REITs	1.5%	Your REIT benchmark	26.0%	27.0%	1.0%
Real Estate ex-REITs	7.5%	NCREIF ODCE Index + 100 bps	5.4%	5.6%	0.3%
Hedge Funds	1.0%	50% MSCI World Net/50% Barclays US Aggregate	18.2%	4.4%	-13.8%
Global TAA	7.0%	50% MSCI World Net/50% Barclays US Aggregate	18.2%	20.3%	2.1%
Private Credit	6.6%	S&P/LSTA + 150 Bps 3 Month Lag	4.6%	6.4%	1.8%
Diversified Private Equity	6.2%	80% Russell 3000 / 20% MSCI EAFE Lagged + 300	5.1%	7.7%	2.6%
Total	100.0%				
Net Actual Return (reported by you)					16.8%
Calculated Policy Return = sum of (policy weights X benchmark returns)				17.3%	
Adjustment to reflect rebalancing and overlay impacts				<u>-0.2%</u>	
Policy Return (reported by you)					<u>17.1%</u>
Net Value Added (Net Return - Policy Return)					-0.3%

Your policy return and value added calculations - 2015 to 2018

2018 Policy Return and Value Added

Asset class	Policy	Benchmark		Net return	Value added
	weight	Description	Return		
Stock - U.S. Broad/All	16.4%	MSCI US IMI Ne	-5.7%	-7.9%	-2.2%
Stock - Global	17.7%	MSCI World Net	-8.7%	-9.0%	-0.3%
Stock - Emerging	6.3%	MSCI Emerging I	-14.6%	-16.6%	-2.1%
Stock - ACWI x U.S.	3.7%	MSCI ACWI x/U:	-14.2%	-18.6%	-4.4%
Fixed Income - U.S.	13.0%	Barclays US Agg	0.0%	-0.4%	-0.4%
Fixed Income - Emerging	4.0%	50% JPM EMBI (	-5.2%	-6.6%	-1.5%
Fixed Income - High Yield	5.2%	50%Bar U.S. Hig	-0.8%	0.5%	1.3%
Cash	1.0%	Bofa Merrill Lyn	1.9%	1.2%	-0.7%
Infrastructure	3.0%	Dow Jones Broo	-7.9%	-6.7%	1.2%
REITs	3.1%	Your REIT bench	-4.6%	-5.2%	-0.6%
Real Estate ex-REITs	5.9%	NCREIF ODCE In	8.4%	9.9%	1.5%
Hedge Funds	1.0%	50% MSCI Work	-6.4%	2.5%	8.9%
Global TAA	7.0%	50% MSCI Work	-6.4%	-6.9%	-0.6%
Private Credit	5.8%	S&P/LSTA + 150	6.7%	3.3%	-3.4%
Diversified Private Equity	7.0%	80% Russell 300	17.5%	6.6%	-10.9%
Total	100.0%				
Net Return (reported by you)					-4.2%
Calculated policy return (sum: Policy weights x benchmarks)				-2.9%	
Adjustment to reflect rebalancing and overlay impacts				<u>0.0%</u>	
Policy return (reported by you)					<u>-2.9%</u>
Net Value Added (Net Return - Policy Return)					-1.3%

2016 Policy Return and Value Added

Asset class	Policy	Benchmark		Net return	Value added
	weight	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%
Private Credit	6.6%	S&P/LSTA + 150	7.0%	8.8%	1.9%
Diversified Private Equity	9.2%	80% Russell 300	16.3%	10.6%	-5.7%
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%

2017 Policy Return and Value Added

Asset class	Policy	Benchmark		Net return	Value added
	weight	Description	Return		
Stock - U.S. Broad/All	14.6%	MSCI US IMI Ne	20.6%	14.3%	-6.3%
Stock - Global	17.3%	MSCI World Net	22.4%	24.1%	1.7%
Stock - Emerging	4.9%	MSCI Emerging I	36.8%	37.6%	0.7%
Stock - ACWI x U.S.	3.0%	MSCI ACWI x/U:	22.4%	31.1%	8.7%
Fixed Income - U.S.	10.0%	Barclays US Agg	5.0%	5.0%	0.0%
Fixed Income - Emerging	5.0%	50% JPM EMBI (	12.7%	13.7%	0.9%
Fixed Income - High Yield	7.0%	50%Bar U.S. Hig	5.8%	6.1%	0.3%
Cash	3.0%	Bofa Merrill Lyn	0.9%	0.6%	-0.2%
Infrastructure	2.0%	Dow Jones Broo	15.8%	15.0%	-0.8%
REITs	2.3%	Your REIT bench	5.2%	7.9%	2.7%
Real Estate ex-REITs	5.7%	NCREIF ODCE In	8.4%	9.7%	1.3%
Hedge Funds	2.0%	50% MSCI Work	12.6%	6.0%	-6.6%
Global TAA	10.0%	50% MSCI Work	12.6%	11.3%	-1.3%
Private Credit	6.0%	S&P/LSTA + 150	6.8%	6.9%	0.1%
Diversified Private Equity	7.2%	80% Russell 300	21.9%	13.8%	-8.0%
Total	100.0%				
Net Return (reported by you)					14.7%
Calculated policy return (sum: Policy weights x benchmarks)				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%

2015 Policy Return and Value Added

Asset class	Policy	Benchmark		Net return	Value added
	weight	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		Barclays 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%
Private Credit	7.0%	S&P/LSTA + 150	2.4%	0.6%	-1.8%
Diversified Private Equity	9.0%	80% Russell 300	0.9%	4.0%	3.2%
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%

Profit/Loss on overlay programs

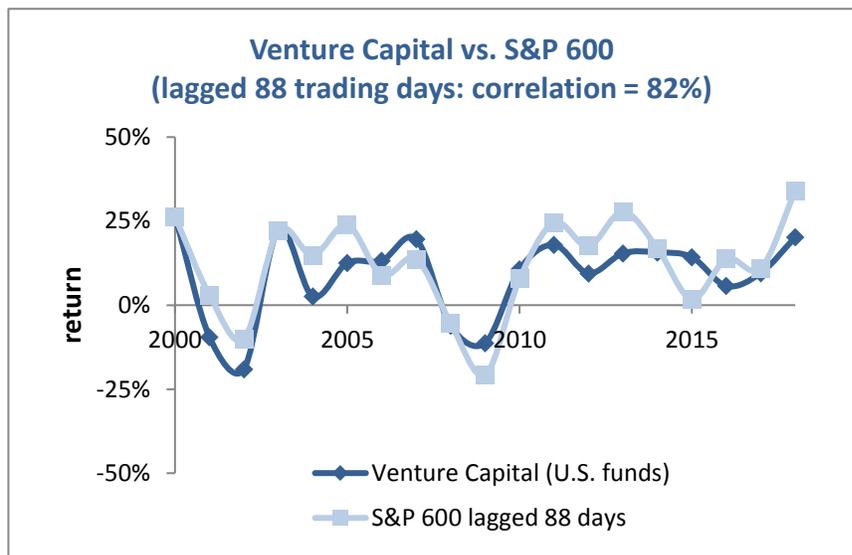
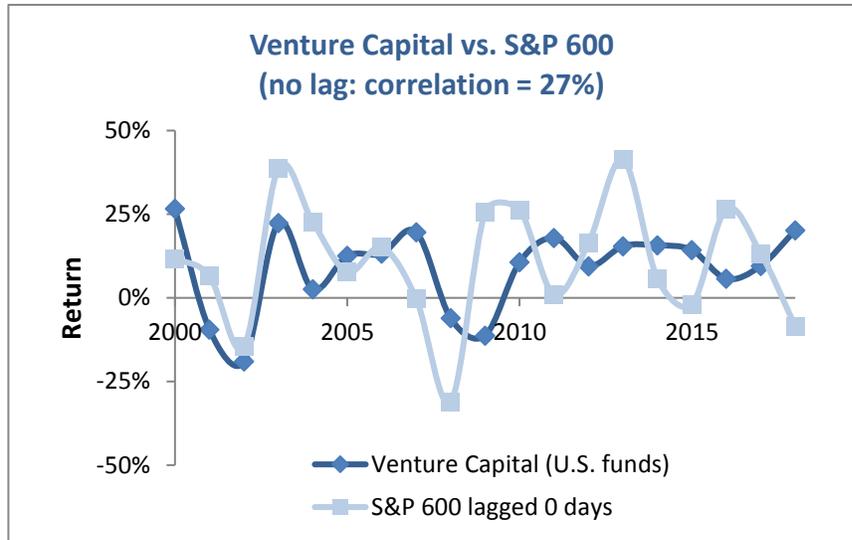
Overlay type	Your fund		Peer median				U.S. Public median			
	2019	2018	2019		2018		2019		2018	
	bps	bps	bps	#	bps	#	bps	#	bps	#
Int. Discretionary Currency							-3.4	1	-3.4	1
Ext. Discretionary Currency			-8.8	1	5.7	1	-0.8	3	0.3	3
Internal Global TAA										
External Global TAA										
Internal PolicyTilt TAA										
External PolicyTilt TAA										
Internal Commodities										
External Commodities			10.5	1	-1.9	1	10.5	1	-1.9	1
Internal Long/Short										
External Long/Short										
Internal Other									0.0	1
External Other							23.4	3	-7.1	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 S&P 600 index return was -31.1% versus -5.4% 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 25.0% using the un-lagged benchmarks versus -7% using the same benchmark lagged to match the average 88 day reporting lag of venture capital funds.



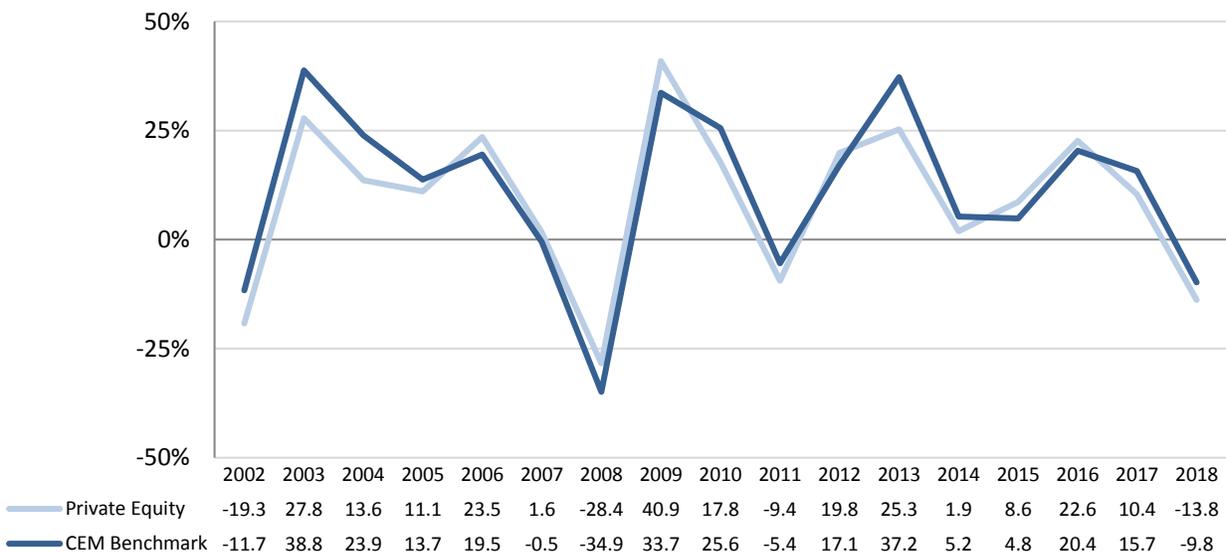
- Un-investable peer-based benchmarks. Peer based benchmarks reflect the reporting lags in peer portfolios so they have much better correlations than un-lagged investable benchmarks. But their relationship statistics are not as good as for lagged investable benchmarks.
- Aspirational premiums (i.e., 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 85 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.

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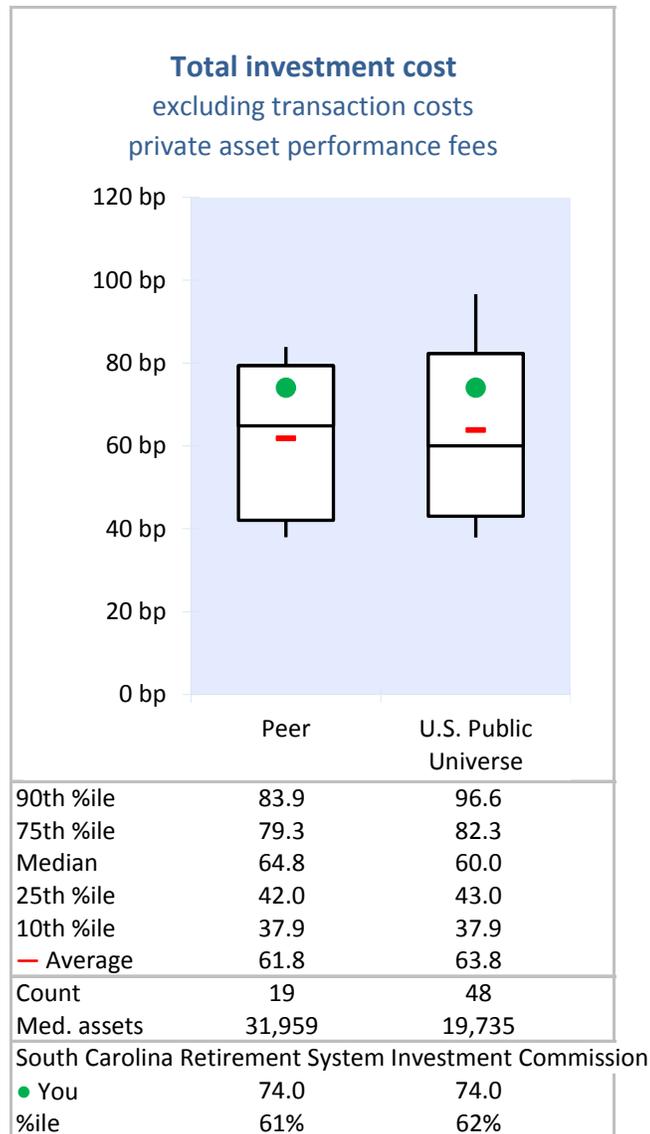
Cost: total, benchmark, trend

Comparisons of total investment cost	2
Trend in total investment cost, you versus peers and universe	3
Types of costs included in your total investment cost	4
Detailed breakdown of your total investment cost	5
Changes in your investment costs	6
Benchmark cost model	
Total cost versus benchmark cost	7
Benchmark cost calculation	8
Cost impact of:	
- differences in implementation style	9
- overlays	10
- paying more/-less for similar services	11
Summary of why you are high or low cost by asset class	12
Your cost effectiveness ranking	13
Benchmarking methodology formulas and data	14
Cost trend model, 2015 - 2019	
Methodology of the cost trend model	16
Cost trend charts	17
Summary of cost differences, 2019 versus 2015	18
Summary of cost differences, year over year	19
Reasons by asset class and cost type, \$000	20
Reasons by asset class and cost type, basis points	21
Impact of changes in asset mix	22
Impact of changes in implementation style	23
Impact of paying more/-less for similar services	24

Comparisons of total investment cost

Your total investment cost, excluding transaction costs and private asset performance fees, of 74.0 bps was above the peer median of 64.8 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.

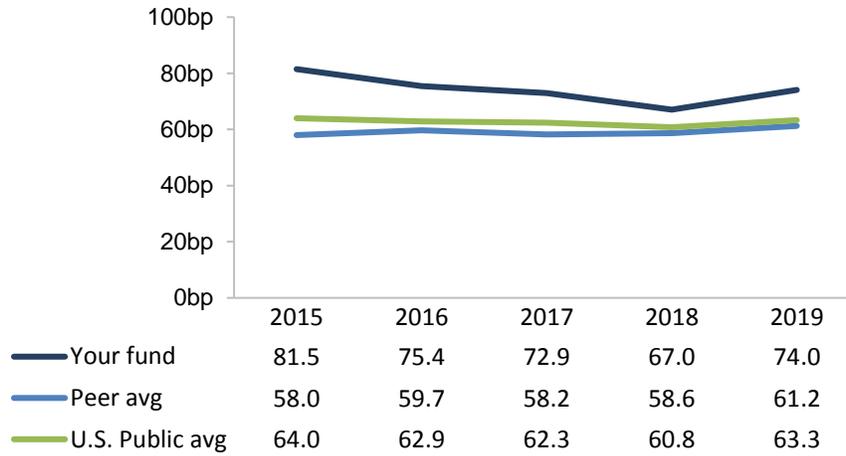


Trend in total investment cost, you versus peers and universe

Your total investment cost, excluding transaction costs and private asset performance fees, decreased from 81.5 bps in 2015 to 74.0 bps in 2019.

Trend in total investment cost

(excluding transaction costs and private asset performance fees)



Trend analysis is based on 45 U.S. Public funds and 17 peer funds with 5 or more consecutive years of data.

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.
- CEM currently excludes performance fees for certain external assets 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 2019 total investment cost, excluding transaction costs and private asset performance fees, was 74.0 bp or \$234.1 million.

	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					11,858		779	12,637		5%
Stock - Emerging					5,554		519	6,073		3%
Stock - Global			534	665	5,485		797	7,480		3%
Stock - ACWI x U.S.					3,878		302	4,181		2%
Fixed Income - U.S.		9			1,782		240	2,032		1%
Fixed Income - Emerging					4,987		417	5,404		2%
Fixed Income - High Yield					5,731		427	6,158		3%
Cash		426			0		195	621		0%
REITs					632		0	856		0%
Real Estate ex-REITs ¹										
Real Estate ex-REITs - LP ¹²					27,104	15,691	547	27,651		12%
Real Estate ex-REITs - Co-Invest. ¹					0	0	0	0		0%
Infrastructure ¹					4,082	0	236	4,318		2%
Hedge Funds					34,168	16,939	561	51,668		22%
Hedge Funds - FoFs					6,605	0	427	7,032		3%
Underlying FoF Fees					7,016	6,783		13,799		6%
Global TAA					4,390	0	758	5,148		2%
Diversified Private Equity - LP ¹²					33,292	55,871	383	33,675		14%
Diversified Private Equity - FoFs ¹					2,995	1,084	114	3,109		1%
Underlying FoF Fees ¹²					3,847	7,419		3,847		2%
Diversified Private Equity - Co-Invest. ¹					2,946	3,620	157	3,103		1%
Private Credit - LP ¹²					29,748	9,198	559	30,307		13%
Private Credit - Co-Invest. ¹					0		13	13		0%
Derivatives/Overlays			800					800		0%
Total asset management costs excluding private asset performance fees								229,911	72.7bp	98%
Oversight, custodial & other asset related costs										
Oversight of the Fund								1,237		1%
Trustee & Custodial								1,670		1%
Consulting and Performance Measurement								825		0%
Audit								120		0%
Other								357		0%
Total oversight, custodial & other costs								4,209	1.3bp	2%
Total investment costs excluding transaction costs and private asset performance fees								234,120	74.0bp	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 (2019 - 2015)

	Investment costs (\$000s)					Change (\$000s)				Change (%)			
	2019	2018	2017	2016	2015	2019	2018	2017	2016	2019	2018	2017	2016
Asset management													
Stock - U.S. Broad/All	12,637	11,104	11,150	8,849	8,242	1,533	-46	2,301	607	14%	0%	26%	7%
Stock - Emerging	6,073	9,879	10,017	7,464	7,908	-3,807	-138	2,553	-444	-39%	-1%	34%	-6%
Stock - Global	7,480	7,572	6,509	7,365	7,498	-92	1,064	-856	-133	-1%	16%	-12%	-2%
Stock - ACWI x U.S.	4,181	4,697	4,036	2,571		-516	660	1,466		-11%	16%	57%	
Fixed Income - U.S.	2,032	1,796	3,492	3,070	3,886	235	-1,696	422	-816	13%	-49%	14%	-21%
Fixed Income - Emerging	5,404	6,107	7,849	6,644	3,402	-703	-1,742	1,205	3,242	-12%	-22%	18%	95%
Fixed Income - High Yield	6,158	5,847	8,433	8,619	7,488	311	-2,586	-186	1,131	5%	-31%	-2%	15%
Cash	621	1,358	1,958	2,532	3,314	-737	-600	-574	-781	-54%	-31%	-23%	-24%
REITs	856	1,996	1,821	917		-1,140	174	904		-57%	10%	99%	
Real Estate ex-REITs ¹	0	0	0	0	7				-7				-100%
Real Estate ex-REITs - LP ¹²	27,651	19,845	16,612	17,099	16,205	7,807	3,233	-487	894	39%	19%	-3%	6%
Real Estate ex-REITs - Co-Invest. ¹	0	0	6	52		0	-6	-46		-7%	-93%	-88%	
Infrastructure ¹	4,318	3,089	2,182	811		1,229	907	1,372		40%	42%	169%	
Hedge Funds	51,668	44,499	44,592	41,703	59,180	7,169	-93	2,889	-17,477	16%	0%	7%	-30%
Hedge Funds - FoFs	7,032	4,528	3,830	5,957	4,322	2,504	698	-2,126	1,635	55%	18%	-36%	38%
Underlying FoF Fees	13,799	15,196	30,162	27,322	44,079	-1,397	-14,966	2,839	-16,757	-9%	-50%	10%	-38%
Global TAA	5,148	11,833	9,859	11,613	12,684	-6,685	1,974	-1,753	-1,072	-56%	20%	-15%	-8%
Diversified Private Equity - LP ¹²	33,675	27,896	19,492	22,454	19,242	5,779	8,404	-2,962	3,212	21%	43%	-13%	17%
Diversified Private Equity - FoFs ¹	3,109	1,518	2,996	4,255	6,301	1,591	-1,479	-1,259	-2,046	105%	-49%	-30%	-32%
Underlying FoF Fees ¹²	3,847	3,500	4,780	6,593	10,231	347	-1,280	-1,813	-3,639	10%	-27%	-27%	-36%
Diversified Private Equity - Co-Invest. ¹	3,103	3,384	3,634	3,446	1,543	-281	-250	188	1,902	-8%	-7%	5%	123%
Private Credit - LP ¹²	30,307	19,324	24,584	17,466	17,606	10,984	-5,260	7,118	-140	57%	-21%	41%	-1%
Private Credit - Co-Invest. ¹	13	0	9	17	46	13	-9	-7	-29	16325%	-99%	-43%	-64%
Derivatives/Overlays	800	958	810	1,308	1,037	-158	148	-498	270	-16%	18%	-38%	26%
Total excl. private asset perf. fees	229,911	205,926	218,815	208,125	235,815	23,985	-12,889	10,690	-27,690	12%	-6%	5%	-12%
Oversight, custodial & other asset related costs													
Oversight of the Fund	1,237	1,251	1,089	1,056	1,201	-14	162	33	-145	-1%	15%	3%	-12%
Trustee & Custodial	1,670	1,152	1,131	925	766	518	22	205	160	45%	2%	22%	21%
Consulting and Performance Measurement	825	764	1,070	940	1,030	61	-306	130	-90	8%	-29%	14%	-9%
Audit	120	102	17	99	201	17	86	-83	-102	17%	510%	-83%	-51%
Other	357	363	321	267	345	-6	42	54	-78	-2%	13%	20%	-23%
Total oversight, custodial & other	4,209	3,633	3,627	3,288	3,543	576	5	339	-255	16%	0%	10%	-7%
Total investment costs ¹	234,120	209,559	222,442	211,413	239,358	24,561	-12,883	11,029	-27,945	12%	-6%	5%	-12%
Total in basis points	74.0bp	67.0bp	72.9bp	75.4bp	81.5bp								

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 11.0 bps below your benchmark cost of 85.1 bps. This implies that your fund was low cost by 11.0 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 costs excluding transaction costs and private asset performance fees	234,120	74.0 bp
- Your fund's benchmark	269,013	85.1 bp
= Your fund's cost savings	-34,893	-11.0 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 11.

Reasons why your fund was low cost

	Cost/-Savings impact	
	\$000s	bps
<u>Differences in implementation style:</u>		
Less passive	10,815	3.4 bp
Less int. pass, % of total passive	97	0.0 bp
Less int. active % of total active	1,128	0.4 bp
Less evergreen % of external	14,559	4.6 bp
More fund of funds	1,912	0.6 bp
More co-investment	-6,343	-2.0 bp
Less overlays and unfunded strategies	-68	0.0 bp
Total style impact	22,099	7.0 bp
<u>Paying more/-less for similar services:</u>		
External investment management	-55,120	-17.4 bp
Internal investment management	1	0.0 bp
Oversight, custodial and other	-1,873	-0.6 bp
Total impact of paying more /-less	-56,992	-18.0 bp
Total savings	-34,893	-11.0 bp

Benchmark cost calculation

Your 2019 benchmark cost was 85.1 basis points or 269.0 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).

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	2,793	17.4 bp	4,853
Stock - Emerging	1,974	51.1 bp	10,094
Stock - Global	5,459	18.9 bp	10,324
Stock - ACWI x U.S.	1,080	31.1 bp	3,359
Fixed Income - U.S.	765	11.1 bp	846
Fixed Income - Emerging	1,158	41.9 bp	4,850
Fixed Income - High Yield	1,287	35.6 bp	4,586
Cash	2,401	2.6 bp	621
REITs	520	24.8 bp	1,292
Real Estate ex-REITs	2,831	96.4 bp	27,297
Infrastructure	1,110	115.2 bp	12,791
Hedge Funds	3,219	132.4 bp	42,602
Perf. fees (on NAV)	3,219	81.7 bp	26,298
Global TAA	2,664	63.1 bp	16,803
Diversified Private Equity	2,938	164.4 bp	48,298
Private Credit	4,143	113.8 bp	47,148
Overlay Programs ²	31,623	0.3 bp	868
Benchmark for asset management	31,623	83.1 bp	262,931
Oversight, custody and other costs³			
Oversight	31,623	0.7 bp	
Trustee & Custodial	31,623	0.3 bp	
Consulting	31,623	0.3 bp	
Audit	31,623	0.1 bp	
Other	31,623	0.1 bp	
Benchmark for oversight, custody & other	31,623	1.9 bp	6,082
Total benchmark cost		85.1 bp	269,013

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 15 of this section.

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

3. Benchmarks for oversight total and individual lines are based on peer medians. Sum of the lines may be different from the total.

Cost impact of differences in implementation style

Differences in implementation style (passive vs. active, internal vs. external, etc.) relative to your peers cost you 7.0 bps.

Implementation choices	Assets by style a	Peer benchmark cost			Style 1 %			Cost/ -Savings \$000s a x d x e	bps
		Style 1 b	Style 2 c	Style 1 -Savings d = b - c	Your Peer average	More/ -Less e			
Passive vs active									
	Total assets	Passive	Active		Passive % of total assets				
Stock - U.S. Broad/All	2,793	1 bp	40 bp	-39 bp	0%	58%	-58%	6,315	
Stock - Emerging	1,974	5 bp	62 bp	-57 bp	0%	19%	-19%	2,095	
Stock - Global	5,459	3 bp	35 bp	-32 bp	47%	50%	-3%	584	
Stock - ACWI x U.S.	1,080	3 bp	43 bp	-40 bp	0%	30%	-30%	1,299	
Fixed Income - U.S.	765	1 bp	12 bp	-11 bp	0%	10%	-10%	87	
REITs	520	7 bp	33 bp	-27 bp	0%	31%	-31%	435	
Less passive								10,815	3.4 bp
Internal passive vs external passive									
	Passive assets	Internal passive	External passive		Internal passive % of passive				
Stock - Global	2,550	2 bp	4 bp	-2 bp	0%	23%	-23%	97	
Less int. pass, % of total passive								97	0.0 bp
Internal active vs external active									
	Active assets	Internal active	External active		Internal active % of active				
Stock - Emerging	1,974	14 bp	63 bp	-48 bp	0%	2%	-2%	220	
Fixed Income - U.S.	765	4 bp	16 bp	-12 bp	3%	29%	-26%	241	
Fixed Income - Emerging	1,158	8 bp	42 bp	-34 bp	0%	1%	-1%	42	
Fixed Income - High Yield	1,287	10 bp	36 bp	-26 bp	0%	1%	-1%	34	
REITs	520	6 bp	35 bp	-30 bp	0%	8%	-8%	117	
Real Estate ex-REITs	2,831	23 bp	97 bp	-74 bp	0%	1%	-1%	281	
Diversified Private Equity	2,938	41 bp	165 bp	-124 bp	0%	1%	-1%	194	
Less int. active % of total active								1,128	0.4 bp
Evergreen vs LP/Co & fund of funds									
	External assets	Ever-green	LP/Co & FoF		Evergreen fund % of external				
Real Estate ex-REITs	2,831	70 bp	134 bp	-64 bp	0%	57%	-57%	10,222	
Infrastructure	1,110	66 bp	144 bp	-78 bp	100%	37%	63%	-5,501	
Private Credit	4,143	69 bp	138 bp	-69 bp	0%	35%	-35%	9,839	
Less evergreen % of external								14,559	4.6 bp
LP/Co vs fund of funds									
	LP/Co & Fund of F.	LP/Co	Fund of funds		LP/Co % of LP/Co & Fund of F.				
Real Estate ex-REITs	2,831	133 bp	161 bp	-28 bp	100%	98%	2%	-162	
Hedge Funds	3,219	120 bp	173 bp	-53 bp	61%	77%	-16%	2,679	
Perf. fees (on NAV)	3,219	78 bp	94 bp	-16 bp	61%	77%	-16%	803	
Diversified Private Equity	2,938	152 bp	247 bp	-95 bp	92%	87%	5%	-1,408	
More fund of funds								1,912	0.6 bp
Co-investment vs LP									
	LP/Co	Co-invest	LP		Co-invest % of LP/Co				
Real Estate ex-REITs	2,831	73 bp	134 bp	-61 bp	0%	1%	-1%	164	
Diversified Private Equity	2,693	20 bp	157 bp	-137 bp	20%	3%	17%	-6,257	
Private Credit	4,143	57 bp	138 bp	-81 bp	1%	0%	1%	-250	
More co-investment								-6,343	-2.0 bp
Less overlays and unfunded strategies								-68	0.0 bp
Total impact of differences in implementation style								22,099	7.0 bp

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.

	Your average total holdings (mils)	Cost as % of total holdings		Cost/-Savings Impact (000s)
		You	Peer avg.	
	(A)	(B)	(C)	A X (B - C)
Internal Overlays				
Rebalancing / Passive Beta - Hedge	31,623	NA	0.00 bp	-3
Duration Management - Hedge	31,623	NA	0.00 bp	-1
Other Overlay - Discretionary	31,623	NA	0.00 bp	-5
External Overlays				
Currency - Hedge	31,623	NA	0.01 bp	-35
Currency - Discretionary	31,623	NA	0.11 bp	-358
Rebalancing / Passive Beta - Hedge	31,623	0.25 bp	0.04 bp	687
Commodity Futures - Discretionary	31,623	NA	0.09 bp	-291
Long/Short - Discretionary	31,623	NA	0.01 bp	-31
Other Overlay - Discretionary	31,623	NA	0.01 bp	-32
Total impact in 000s				-68
Total impact in basis points				0.0 bp

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 18.0 bps.

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	active	2,793	45.2	40.0	5.3	1,469	
Stock - Emerging	active	1,974	30.8	62.9	-32.1	-6,336	
Stock - Global	passive	2,550	4.7	3.6	1.1	292	
Stock - Global	active	2,909	21.6	34.7	-13.1	-3,816	
Stock - ACWI x U.S.	active	1,080	38.7	43.1	-4.4	-477	
Fixed Income - U.S.	active	741	27.3	15.7	11.6	857	
Fixed Income - Emerging	active	1,158	46.7	42.2	4.4	512	
Fixed Income - High Yield	active	1,287	47.9	35.9	12.0	1,538	
Cash ²	active	497	3.9	3.9	0.0	0	
REITs	active	520	16.5	35.4	-19.0	-988	
Real Estate ex-REITs	CO	1	7.3	72.9	-65.6	-4	
Real Estate ex-REITs	LP	2,831	97.7	133.5	-35.8	-10,146	
Infrastructure	active	1,110	38.9	65.7	-26.8	-2,971	
Hedge Funds	active	1,972	176.1	120.0	56.1	11,067	
Top layer perf. fees (on NAV)	active	1,972	85.9	78.0	7.9	1,559	
Hedge Funds	FoF	1,247	56.4	53.4	3.0	376	
Top layer perf. fees (on NAV)	FoF	1,247	0.0	16.0	-16.0	-1,995	
Underlying base fees	FoF	1,247	56.3	120.0	-63.7	-7,947	
Underlying perf. fees (on NAV)	FoF	1,247	54.4	78.0	-23.6	-2,943	
Global TAA ¹	active	2,664	19.3	63.1	-43.8	-11,655	
Diversified Private Equity	FoF	245	126.9	90.3	36.6	896	
Underlying base fees ²	FoF	245	157.0	157.0	0.0	0	
Diversified Private Equity	CO	550	56.4	20.1	36.3	1,996	
Diversified Private Equity	LP	2,143	157.1	157.1	0.1	14	
Private Credit ¹	CO	46	2.8	56.9	-54.0	-250	
Private Credit	LP	4,097	74.0	137.9	-63.9	-26,167	
Total for external management						-55,120	-17.4 bp
Internal asset management							
Fixed Income - U.S.	active	24	3.9	3.6	0.3	1	
Cash ²	active	1,904	2.2	2.2	0.0	0	
Total for internal management						1	0.0 bp
Oversight, custodial, other³							
Oversight			0.4	0.7	-0.4		
Trustee & Custodial			0.5	0.3	0.3		
Consulting			0.3	0.3	0.0		
Audit			0.0	0.1	0.0		
Other			0.1	0.1	0.0		
Total for oversight, custodial, other		31,623	1.3	1.9	-0.6	-1,873	-0.6 bp
Total						-56,992	-18.0 bp

1. Universe median used because peer data was insufficient.

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

3. The benchmark for 'oversight, custodial and other costs' is based on the total costs for these activities.

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).

	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
Asset management costs	(A)	(B)	(C = A - B)	(D)	(C X D)		
Stock - U.S. Broad/All	45.2 bp	17.4 bp	27.9 bp	2,793	7,784	6,315	1,469
Stock - Emerging	30.8 bp	51.1 bp	-20.4 bp	1,974	-4,022	2,315	-6,336
Stock - Global	13.7 bp	18.9 bp	-5.2 bp	5,459	-2,843	681	-3,525
Stock - ACWI x U.S.	38.7 bp	31.1 bp	7.6 bp	1,080	822	1,299	-477
Fixed Income - U.S.	26.5 bp	11.1 bp	15.5 bp	765	1,186	328	858
Fixed Income - Emerging	46.7 bp	41.9 bp	4.8 bp	1,158	554	42	512
Fixed Income - High Yield	47.9 bp	35.6 bp	12.2 bp	1,287	1,571	34	1,538
Cash	2.6 bp	2.6 bp	0.0 bp	2,401	0	0	0
REITs	16.5 bp	24.8 bp	-8.4 bp	520	-436	552	-988
Real Estate ex-REITs	97.7 bp	96.4 bp	1.3 bp	2,831	355	10,504	-10,150
Infrastructure	38.9 bp	115.2 bp	-76.3 bp	1,110	-8,473	-5,501	-2,971
Hedge Funds	151.5 bp	132.4 bp	19.2 bp	3,219	6,174	2,679	3,495
Perf. fees (on NAV)	73.7 bp	81.7 bp	-8.0 bp	3,219	-2,576	803	-3,379
Global TAA	19.3 bp	63.1 bp	-43.8 bp	2,664	-11,655	0	-11,655
Diversified Private Equity	148.8 bp	164.4 bp	-15.5 bp	2,938	-4,565	-7,471	2,906
Private Credit	73.2 bp	113.8 bp	-40.6 bp	4,143	-16,828	9,589	-26,417
Overlay Programs ²	0.3 bp	0.3 bp	0.0 bp	31,623	-68	-68	0
Total asset management	72.7 bp	83.1 bp	-10.4 bp	31,623	-33,020	22,099	-55,119
Oversight, custody and other costs³							
Oversight of the Fund	0.4 bp	0.7 bp	-0.4 bp				
Trustee & Custodial	0.5 bp	0.3 bp	0.3 bp				
Consulting	0.3 bp	0.3 bp	0.0 bp				
Audit	0.0 bp	0.1 bp	0.0 bp				
Other	0.1 bp	0.1 bp	0.0 bp				
Total oversight, custody & other	1.3 bp	1.9 bp	-0.6 bp	31,623	-1,873	n/a	-1,873
Total	74.0 bp	85.1 bp	-11.0 bp	31,623	-34,893	22,099	-56,992

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 15 of this section.

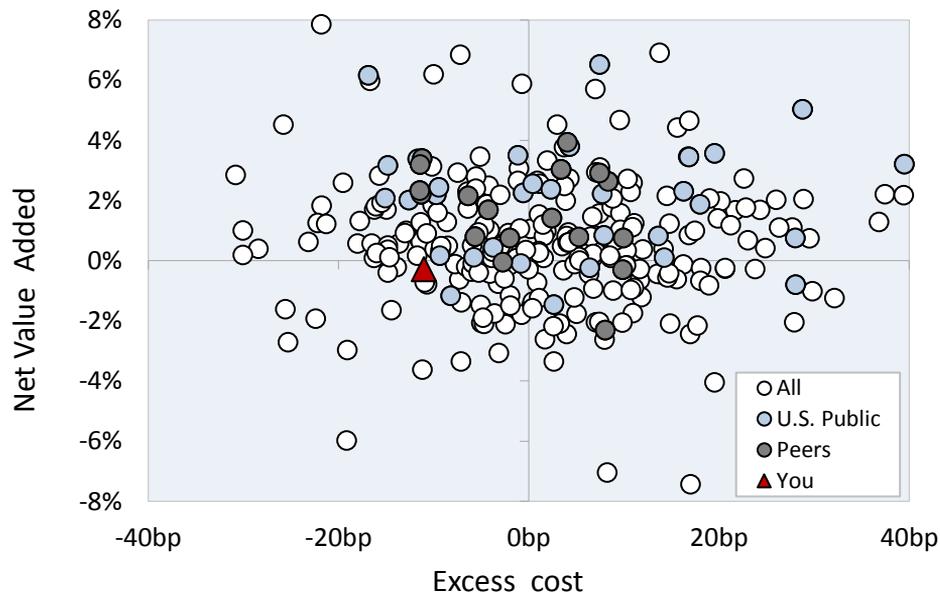
2. Total fund average holdings is used as the base when calculating the relative cost impact of the overlay programs.

3. Benchmarks for oversight total and individual lines are based on peer medians. Sum of the lines may be different from the total.

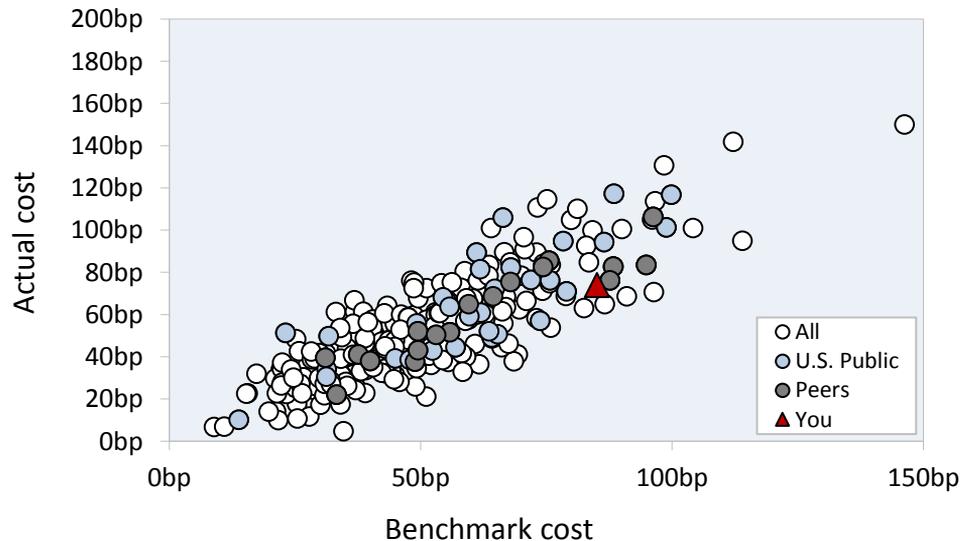
Your cost effectiveness ranking

Being high or low cost is neither good nor bad. More important is whether you are receiving sufficient value for your excess cost. At the total fund level, we provide insight into this question by combining your value added and excess cost to create a snapshot of your cost effectiveness performance relative to that of the global universe. In 2019, your fund ranked in the negative value added, low cost quadrant.

Your 2019 Net value added -0.3%, Excess cost -11 bps



Your 2019 Actual cost 74.0 bps, Benchmark cost 85.1 bps



For all funds except your fund, benchmark cost equals the sum of group median costs x fund's average holdings by asset class plus group median cost of derivatives/overlays plus group median cost of oversight/support. Group is peer if the fund is in the peer group, universe - if the fund is part of the universe, and global/database otherwise. Your fund's benchmark cost is calculated using peer-based methodology per page 7 of this section.

Benchmarking methodology formulas and data

a) Formulas

Example calculations for 'Stock - U.S. Broad/All'

Asset class peer cost = weighted average by peer average style of peer median costs
= (4% x 1.2 bp) + (0% x 0.0 bp) + (54% x 0.9 bp) + (42% x 40.0 bp) = 17.4 bp

Your cost versus benchmark (-savings/+excess) = asset class your cost - asset class peer cost
= 45.2 bp - 17.4 bp = 27.9 bp

Attribution of 'your cost versus benchmark' to impact of style mix and impact of cost/paying more

Cost impact of differences in implementation style (-savings/+excess)

= cost impacts of passive vs active (A), internal passive vs external passive (B), internal active vs external active (C)
= 22.6 bp + 0.0 bp + 0.0 bp = 22.6 bp

A) Impact of Passive vs Active management (-savings/+excess)

= (peer average passive cost - peer average active cost) x
(passive % of asset, you - passive % of asset, peer average)
= (1.0 bp - 40.0 bp) x (0% - 58%) = 22.6 bp

Peer average passive cost = weighted average by peer average style of peer median costs for
internal passive and external passive management
= [(4% x 1.2 bp) + (54% x 0.9 bp)] / (4% + 54%) = 1.0 bp

Peer average active cost = weighted average by peer average style of peer median costs for
internal active and external active management
= [(0% x 0.0 bp) + (42% x 40.0 bp)] / (0% + 42%) = 40.0 bp

B) Impact of Internal Passive vs External Passive management (-savings/+excess)

= (peer average internal passive cost - peer average external passive cost) x
(internal passive % of passive, you - internal passive % of passive, peer average) x passive % of asset, you
= (1.2 bp - 0.9 bp) x (0% - 0%) x 0% = 0.0 bp

C) Impact of Internal Active vs External Active management (-savings/+excess)

= (peer average internal active cost - peer average external active cost) x
(internal active % of active, you - internal active % of active, peer avg) x active % of asset, you
= (0.0 bp - 40.0 bp) x (0% - 0%) x 100% = 0.0 bp

Cost impact of paying more/-less

= (cost internal passive, you - cost internal passive, peer) x internal passive % of asset, you +
(cost internal active, you - cost internal active, peer) x internal active % of asset, you +
(cost external passive, you - cost external passive, peer) x external passive % of asset, you +
(cost external active, you - cost external active, peer) x external active % of asset, you
= (0.0 bp - 1.2 bp) * 0% + (0.0 bp - 0.0 bp) * 0% + (0.0 bp - 0.9 bp) * 0% + (45.2 bp - 40.0 bp) * 100% = 5.3 bp

Your cost versus benchmark (-savings/+excess)

= cost impact of differences in implementation style + cost impact of paying more/-less
= 22.6 bp + 5.3 bp = 27.9 bp

Benchmarking methodology formulas and data

b) 2019 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	Co-invest	Limited Partner.	Fund of Funds	Internal Passive	Internal Active	External Passive	External Active	Co-invest	Limited Partner.	Fund of Funds	Weighted Median
Stock - U.S. Broad/All				45.2				1.2		0.9	40.0				17.4
Stock - Emerging				30.8				2.7	14.4	7.0	62.9				51.1
Stock - Global			4.7	21.6				1.9		3.6	34.7				18.9
Stock - ACWI x U.S.				38.7				2.4		3.4	43.1				31.1
Fixed Income - U.S.		3.9		27.3				2.1	3.6	0.8	15.7				11.1
Fixed Income - Emerging				46.7					8.4		42.2				41.9
Fixed Income - High Yield				47.9					9.8		35.9				35.6
Cash		2.2		3.9					2.2		3.9				2.6
REITs				16.5					5.7	6.6	35.4				24.8
Real Estate ex-REITs					7.3	97.7			23.4		69.9	72.9	133.5	44.9	95.4
Underlying base fees														115.9	1.0
Infrastructure				38.9							65.7	5.5	147.8	44.4	113.9
Underlying base fees														90.4	1.3
Hedge Funds				176.1			56.4				120.0			53.4	104.6
Perf. fees (on NAV)				85.9			0.0				78.0			16.0	63.6
Underlying base fees							56.3							120.0	27.8
Underlying perf. fees (on NAV)							54.4							78.0	18.1
Global TAA				19.3							63.1				63.1
Diversified Private Equity					56.4	157.1	126.9		41.4			20.1	157.1	90.3	143.5
Underlying base fees							157.0							157.0	20.9
Private Credit					2.8	74.0					69.0	56.9	137.9		113.8
Underlying base fees															0.0

c) 2019 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	Co-invest	Limited Partner.	Fund of Funds	Internal Passive	Internal Active	External Passive	External Active	Co-invest	Limited Partner.	Fund of Funds	
Stock - U.S. Broad/All	0.0%		0.0%	100.0%				4.0%		53.9%	42.1%				
Stock - Emerging	0.0%	0.0%	0.0%	100.0%				10.7%	1.9%	7.8%	79.6%				
Stock - Global	0.0%		46.7%	53.3%				11.6%		38.5%	49.9%				
Stock - ACWI x U.S.	0.0%		0.0%	100.0%				0.6%		29.7%	69.7%				
Fixed Income - U.S.	0.0%	3.2%	0.0%	96.8%				0.4%	26.2%	9.6%	63.8%				
Fixed Income - Emerging		0.0%		100.0%					1.1%		98.9%				
Fixed Income - High Yield		0.0%		100.0%					1.0%		99.0%				
Cash		79.3%		20.7%					79.3%		20.7%				
REITs		0.0%	0.0%	100.0%					5.2%	31.4%	63.4%				
Real Estate ex-REITs		0.0%		0.0%	0.0%	100.0%	0.0%		1.3%		56.0%	0.4%	41.4%	0.9%	
Underlying base fees		0.0%		0.0%	0.0%	100.0%	0.0%		1.3%		56.0%	0.4%	41.4%	0.9%	
Infrastructure				100.0%	0.0%	0.0%	0.0%				36.6%	1.6%	60.3%	1.4%	
Underlying base fees				100.0%	0.0%	0.0%	0.0%				36.6%	1.6%	60.3%	1.4%	
Hedge Funds				61.3%			38.7%				76.9%			23.1%	
Perf. fees (on NAV)				61.3%			38.7%				76.9%			23.1%	
Underlying base fees				61.3%			38.7%				76.9%			23.1%	
Underlying perf. fees (on NAV)				61.3%			38.7%				76.9%			23.1%	
Global TAA				100.0%							100.0%				
Diversified Private Equity		0.0%			18.7%	72.9%	8.3%		0.5%			3.0%	83.2%	13.3%	
Underlying base fees		0.0%			18.7%	72.9%	8.3%		0.5%			3.0%	83.2%	13.3%	
Private Credit				0.0%	1.1%	98.9%					34.6%	0.2%	65.1%		
Underlying base fees				0.0%	1.1%	98.9%					34.6%	0.2%	65.1%		

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

Methodology of the cost trend model

CEM cost trend model relies on four factors or reasons to explain the cost differences over time: asset value, asset mix, implementation style, and paying more/less for similar services.

Factors affecting the cost differences

Asset value. If we keep the last three factors constant, costs will normally follow changes in the asset holdings. For external implementations, among the reasons is the common practice of charging management fees based on the value of assets under management. For internal, more assets requires additional internal stuff (front and back office) and other operating expenditures. In the current model, for simplicity, we assume that costs change proportionately to the plan average assets.

Change in asset value only affects the cost amounts and does not affect costs in basis points. These are determined by the changes in the last three factors.

Asset mix. These are the cost differences associated with increasing / decreasing allocations to one or more of the asset classes, while keeping other factors constant. Higher allocations to more expensive assets will increase the cost both in amounts and in basis points.

Implementation style. These are changes in costs associated with increasing / decreasing allocations to one or more of the management styles within the same asset class.

Paying more/less for similar services. These cost differences reflect changes in the fees / internal costs in basis points for the same implementation style within the same asset class or same oversight service.

Attribution of the cost differences and other assumptions

Change in the cost amount for one asset =

Sum of impacts of asset value, asset mix, implementation style, and paying more/less for similar services.

Change in the basis point costs for one asset =

Sum of basis point impacts of asset mix, implementation style, and paying more/less for similar services.

For overlays, we do not differentiate between implementation styles and use entire asset category.

Oversight costs are only affected by changes in asset value and paying more/less for similar services.

The base model attributes cost differences between any two years. Trends and cumulative results are built upon combinations of multiple two-year attributions. When an entire asset class is missing in one of the two years, the cost difference for that asset is attributed to the asset value and mix impacts only. Impacts of other factors is 0. When an implementation style within the same asset class is missing in one of the two years, the cost difference for that style is attributed to the effects of the implementation style, while impact of paying more/less for similar services is 0. Impacts of changes in the asset value and asset mix are still accounted for.

General simplified formula for attributing basis point cost differences for one asset class

Cost difference in bps = impact of asset mix + impacts of style & paying =

$$[\text{CostBpsL} \times (\text{HavgHpct} - \text{HavgLpct})] + [\text{HavgHpct} \times (\text{CostBpsH} - \text{CostBpsL})]$$

where L/H are lower and higher years; HavgPct is % of asset's average holdings in total nav holdings;

CostBps is the asset total cost in basis points for a particular year.

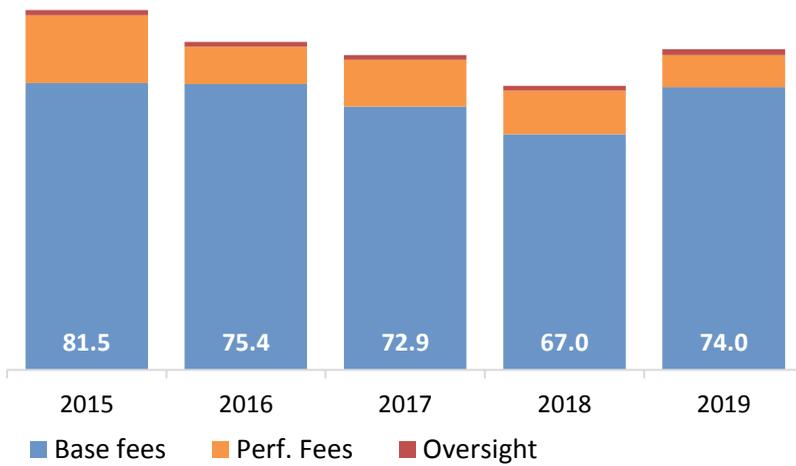
Further, cost difference for style & paying impacts (CostBpsH - CostBpsL) for one style =

$$\text{style impact} [\text{CostStyleBpsL} \times (\text{WgH} - \text{WgL})] + \text{paying impact} [\text{WgH} \times (\text{CostStyleBpsH} - \text{CostStyleBpsL})]$$

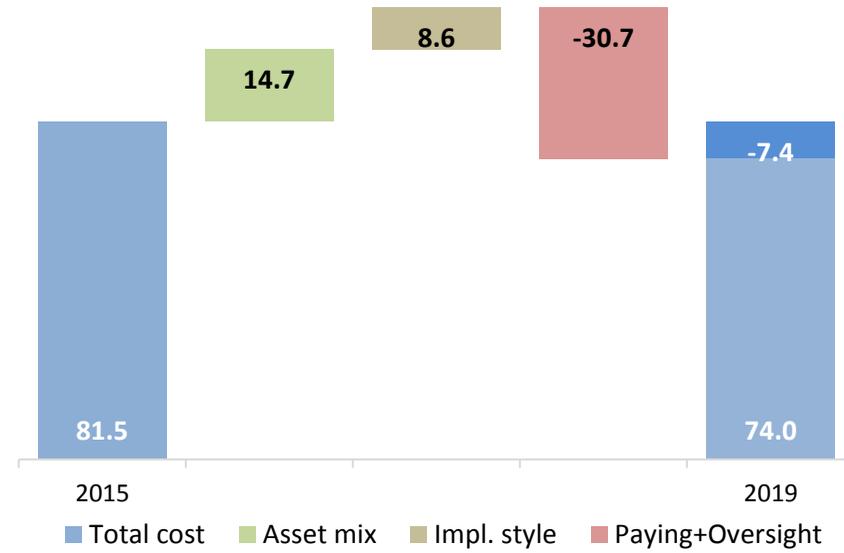
where CostStyleBps is the style cost in basis points; Wg is the weight for that style within the asset class.

Total plan cost and cost changes

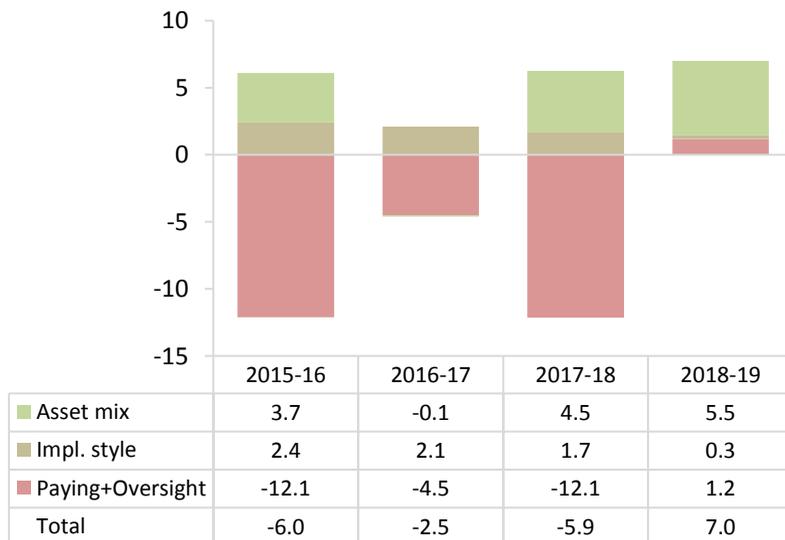
Total plan cost over time, bps



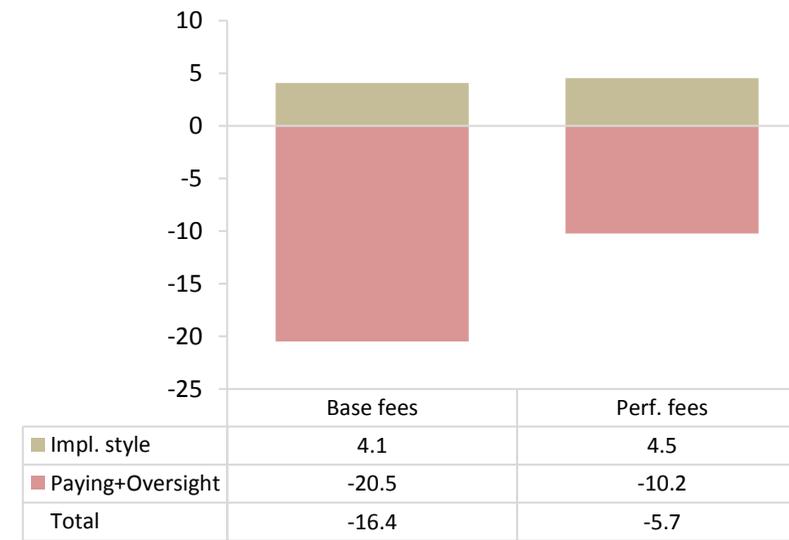
Cost differences, 2019 versus 2015, bps



Reasons for cost differences over time, bps



Impact of base and performance fees, 2019 vs. 2015, bps



Summary of cost differences, 2019 versus 2015

Your total cost decreased by 7.4 bps between 2015 and 2019 because of changes in: asset mix (14.7 bps), implementation style (8.6 bps), and paying more/less for similar services (-30.7 bps).

	bps	\$000s
Starting total cost, 2015	81.5	239,358
Growth in asset value		18,268
Asset mix	<u>14.7</u>	<u>46,408</u>
Stock, REITs, Commodities	5.7	17,940
Fixed Income	-2.8	-8,719
Real Estate ex-REITs	4.6	14,465
Real Assets ex Real Estate	1.4	4,318
Hedge Funds & Multi-Asset	-4.4	-13,812
Private Equity	0.1	182
Private Debt	10.1	32,034
Implementation style (less expensive vs. more)	<u>8.6</u>	<u>27,240</u>
Less passive, more active	3.6	11,277
More int. active % of total active	-0.1	-261
More LP, less fund of funds	-0.6	-1,851
Performance fees	4.5	14,330
Less co-investment	1.2	3,743
Paying more/-less for	<u>-30.8</u>	<u>-97,550</u>
Stock, REITs, Commodities	-6.5	-20,706
Fixed Income	0.0	-116
Real Estate ex-REITs	-1.5	-4,868
Hedge Funds & Multi-Asset	-7.9	-25,106
Performance fees	-10.2	-32,364
Private Equity	2.1	6,668
Private Debt	-6.6	-20,742
Overlays and unfunded strategies	-0.1	-317
Oversight, custodial, other (pay more/-less)	<u>0.1</u>	<u>396</u>
Total difference	-7.4	-5,238
Ending total cost, 2019	74.0	234,120

Summary of cost differences, year over year

	bps	\$000s	bps	\$000s	bps	\$000s	bps	\$000s	bps	\$000s
	2015		2016		2017		2018		2015	
Starting total cost	81.5	239,358	75.4	211,413	72.9	222,442	67.0	209,559	81.5	239,358
Growth in asset value		-11,050		18,675		5,532		2,445		18,268
Asset mix	<u>3.7</u>	<u>10,314</u>	<u>-0.1</u>	<u>-352</u>	<u>4.5</u>	<u>14,134</u>	<u>5.5</u>	<u>17,433</u>	<u>14.7</u>	<u>46,408</u>
Stock, REITs, Commodities	1.6	4,607	3.1	9,408	1.4	4,481	0.2	676	5.7	17,940
Fixed Income	-0.1	-412	-0.7	-2,190	-1.6	-4,957	-0.7	-2,247	-2.8	-8,719
Real Estate ex-REITs	1.0	2,731	0.0	-134	0.5	1,711	2.7	8,488	4.6	14,465
Real Assets ex Real Estate	0.3	811	0.1	376	0.6	2,024	0.3	1,000	1.4	4,318
Hedge Funds & Multi-Asset	-1.2	-3,229	-1.3	-3,931	1.0	3,112	-1.7	-5,374	-4.4	-13,812
Private Equity	1.6	4,439	-3.9	-12,016	1.7	5,444	1.0	3,285	0.1	182
Private Debt	0.5	1,368	2.7	8,136	0.7	2,319	3.7	11,604	10.1	32,034
Implementation style (less expensive vs. more)	<u>2.4</u>	<u>6,749</u>	<u>2.1</u>	<u>6,442</u>	<u>1.7</u>	<u>5,393</u>	<u>0.3</u>	<u>986</u>	<u>8.6</u>	<u>27,240</u>
Passive vs. active	2.8	7,902	0.4	1,369	0.2	498	0.0	-119	3.6	11,277
Internal active vs. external active	0.1	171	0.0	-66	-0.1	-208	-0.1	-286	-0.1	-261
LP/Co vs. fund of funds	-0.6	-1,758	1.4	4,416	1.1	3,476	0.7	2,187	3.9	12,480
Co-investment vs. LP	0.2	433	0.2	722	0.5	1,627	-0.3	-796	1.2	3,743
Paying more/-less for	<u>-12.1</u>	<u>-33,867</u>	<u>-4.5</u>	<u>-13,785</u>	<u>-12.1</u>	<u>-37,858</u>	<u>1.0</u>	<u>3,163</u>	<u>-30.8</u>	<u>-97,550</u>
Stock, REITs, Commodities	-1.8	-4,947	-2.0	-6,076	-1.3	-4,010	-1.6	-4,989	-6.5	-20,706
Fixed Income	-0.1	-272	0.2	545	-0.7	-2,088	0.5	1,463	0.0	-116
Real Estate ex-REITs	-0.4	-1,247	-0.7	-1,998	0.3	1,042	-0.3	-929	-1.5	-4,868
Real Assets ex Real Estate	0.0	0	0.3	925	-0.4	-1,172	0.1	193	0.0	0
Hedge Funds & Multi-Asset	-9.3	-26,186	-1.9	-5,945	-6.9	-21,591	1.4	4,403	-18.2	-57,470
Private Equity	-0.2	-698	0.7	1,999	-0.6	-1,938	1.2	3,696	2.1	6,668
Private Debt	-0.3	-835	-0.9	-2,622	-2.6	-8,229	-0.2	-503	-6.6	-20,742
Overlays and unfunded strategies	0.1	318	-0.2	-613	0.0	128	-0.1	-169	-0.1	-317
Oversight, custodial, other (pay more/-less)	<u>0.0</u>	<u>-91</u>	<u>0.0</u>	<u>49</u>	<u>0.0</u>	<u>-85</u>	<u>0.2</u>	<u>534</u>	<u>0.1</u>	<u>396</u>
Total difference	-6.0	-27,945	-2.5	11,029	-5.9	-12,883	7.0	24,561	-7.4	-5,238
Ending total cost	75.4	211,413	72.9	222,442	67.0	209,559	74.0	234,120	74.0	234,120
	2016		2017		2018		2019		2019	

Sum of all changes (except for the total) between adjacent years will differ from the changes between starting and ending years in the last two columns.

Reasons by asset class and cost type, \$000

Your total cost has decreased by \$5.2 million in 2019 compared to 2015. An increase of \$18 million was due to the \$2.2 billion rise in plan total average nav holdings. The remaining decrease of \$24 million is explained by the changes in the asset mix (\$46 million), implementation style (\$27 million), and paying more/less for similar services (-\$97 million).

Asset class ¹	2015 cost \$000s	Asset mix \$000s	Implement. style \$000s	Paying more/-less \$000s	Total ex asset gr. \$000s	Total difference \$000s	Growth in asset value \$000s	2019 cost \$000s
	A	B	C	D	E=B+C+D	F=G-A	F-E	G
Stock - U.S. Broad/All	8,242	4,552	5,686	-6,472	3,766	4,395	629	12,637
Stock - Emerging	7,908	8,037	0	-10,476	-2,439	-1,836	604	6,073
Stock - Global	7,498	314	2,854	-3,758	-590	-18	572	7,480
Stock - ACWI x U.S.	n/a	4,181	0	0	4,181	4,181	0	4,181
Fixed Income - U.S.	3,886	-3,082	110	822	-2,150	-1,854	297	2,032
Fixed Income - Emerging	3,402	-811	2,771	-218	1,743	2,002	260	5,404
Fixed Income - Global	1,594	-1,716	0	0	-1,716	-1,594	122	n/a
Fixed Income - High Yield	7,488	-1,786	0	-116	-1,901	-1,330	571	6,158
Cash	3,314	-1,325	-1,017	-603	-2,945	-2,693	253	621
REITs	n/a	856	0	0	856	856	0	856
Real Estate ex-REITs	16,212	14,465	606	-4,868	10,202	11,440	1,237	27,652
Infrastructure	n/a	4,318	0	0	4,318	4,318	0	4,318
Hedge Funds	32,556	-4,704	16,088	-4,665	6,720	9,205	2,485	41,761
Top layer perf. fees	30,946	-4,471	19,348	-31,245	-16,368	-14,007	2,362	16,939
Underlying base fees	30,215	-4,365	-10,935	-10,205	-25,506	-23,200	2,306	7,016
Underlying perf. fees	13,864	-2,003	-5,018	-1,119	-8,139	-7,081	1,058	6,783
Global TAA	12,684	1,731	0	-10,236	-8,504	-7,536	968	5,148
Diversified Private Equity	27,087	132	3,981	6,619	10,732	12,799	2,067	39,886
Underlying base fees	10,231	50	-7,264	49	-7,165	-6,385	781	3,847
Private Credit	17,652	32,034	29	-20,742	11,321	12,669	1,347	30,320
Total for asset management	234,778	46,408	27,240	-97,233	-23,585	-5,667	17,918	229,111
Overlays and unfunded strategies ²	1,037	0		-317	-317	-237	79	800
Oversight	1,201			-56	-56	36	92	1,237
Trustee & Custodial	1,030			-283	-283	-205	79	825
Consulting	766			846	846	904	58	1,670
Audit	201			-97	-97	-81	15	120
Other	345			-14	-14	12	26	357
Total for fund oversight ³	3,543			396	396	666	270	4,209
Total	239,358	46,408	27,240	-97,154	-23,506	-5,238	18,268	234,120

1. Cost differences for asset classes are attributed to the effects of:

- Asset growth, asset mix, implementation style, and paying for similar services, when the asset class exists in both years.
- Asset growth and asset mix, when the asset class exists only in one of the years.

2. Cost differences for overlays are attributed to the effects of:

- Asset growth and paying more/less for similar services, when the fund has overlays in both years.
- Asset growth and asset mix, when the fund has overlays only in one of the years.

3. Cost differences for oversight are attributed to the effects of asset growth and paying more/less for similar services.

Reasons by asset class and cost type, basis points

Your total cost has decreased by 7.4 bps in 2019 vs. 2015. It was driven by the changes in the asset mix (14.7 bps), implementation style (8.6 bps), and paying more/less for similar services (-30.7 bps).

Asset class	Asset mix bps	Implement. style bps	Paying more/-less bps	Total difference bps	Total ¹ ex asset gr. \$000s
	B	C	D	B+C+D	
Stock - U.S. Broad/All	1.4	1.8	-2.0	1.2	3,766
Stock - Emerging	2.5	0.0	-3.3	-0.8	-2,439
Stock - Global	0.1	0.9	-1.2	-0.2	-590
Stock - ACWI x U.S.	1.3	0.0	0.0	1.3	4,181
Fixed Income - U.S.	-1.0	0.0	0.3	-0.7	-2,150
Fixed Income - Emerging	-0.3	0.9	-0.1	0.6	1,743
Fixed Income - Global	-0.5	0.0	0.0	-0.5	-1,716
Fixed Income - High Yield	-0.6	0.0	0.0	-0.6	-1,901
Cash	-0.4	-0.3	-0.2	-0.9	-2,945
REITs	0.3	0.0	0.0	0.3	856
Real Estate ex-REITs	4.6	0.2	-1.5	3.2	10,202
Infrastructure	1.4	0.0	0.0	1.4	4,318
Hedge Funds	-1.5	5.1	-1.5	2.1	6,720
Top layer perf. fees	-1.4	6.1	-9.9	-5.2	-16,368
Underlying base fees	-1.4	-3.5	-3.2	-8.1	-25,506
Underlying perf. fees	-0.6	-1.6	-0.4	-2.6	-8,139
Global TAA	0.5	0.0	-3.2	-2.7	-8,504
Diversified Private Equity	0.0	1.3	2.1	3.4	10,732
Underlying base fees	0.0	-2.3	0.0	-2.3	-7,165
Private Credit	10.1	0.0	-6.6	3.6	11,321
Total for asset management	14.7	8.6	-30.7	-7.5	-23,585
Overlays and unfunded strategies	0.00		-0.10	-0.10	-317
Oversight			0.0	0.0	-56
Trustee & Custodial			-0.1	-0.1	-283
Consulting			0.3	0.3	846
Audit			0.0	0.0	-97
Other			0.0	0.0	-14
Total for fund oversight			0.1	0.1	396
Total	14.7	8.6	-30.7	-7.4	-23,506
Total basis point costs in years 2019 and 2015		74.0	81.5	-7.4	

1. Calculated by multiplying total difference in bps by plan total nav average holdings for year 2019, \$32 billion. Similarly, basis point costs on this page are converted from the amounts on the previous page using the same total nav holdings as the fee basis.

Impact of changes in asset mix

Changes in the asset mix increased your total cost by \$46 million or 14.7 bps.

Asset class	2015 Cost bps	2019 Cost bps	2015 asset ¹ weight %	2019 asset ¹ weight %	Change in asset weight	Asset mix changes ² bps	Asset mix changes ³ \$000s
	A	B	C	D	E=D-C	A (or B) x E	
Stock - U.S. Broad/All	48.1	45.2	6%	9%	3%	1.4	4,552
Stock - Emerging	83.8	30.8	3%	6%	3%	2.5	8,037
Stock - Global	15.4	13.7	17%	17%	1%	0.1	314
Stock - ACWI x U.S.	n/a	38.7	0%	3%	3%	1.3	4,181
Fixed Income - U.S.	14.4	26.5	9%	2%	-7%	-1.0	-3,082
Fixed Income - Emerging	24.6	46.7	5%	4%	-1%	-0.3	-811
Fixed Income - Global	18.0	n/a	3%	0%	-3%	-0.5	-1,716
Fixed Income - High Yield	48.8	47.9	5%	4%	-1%	-0.6	-1,786
Cash	9.3	2.6	12%	8%	-4%	-0.4	-1,325
REITs	n/a	16.5	0%	2%	2%	0.3	856
Real Estate ex-REITs	112.7	97.7	5%	9%	4%	4.6	14,465
Infrastructure	n/a	38.9	0%	4%	4%	1.4	4,318
Hedge Funds	94.3	129.7	12%	10%	-2%	-1.5	-4,704
Top layer perf. fees (on NAV)	89.6	52.6	12%	10%	-2%	-1.4	-4,471
Underlying base fees	87.5	21.8	12%	10%	-2%	-1.4	-4,365
Underlying perf. fees (on NAV)	40.1	21.1	12%	10%	-2%	-0.6	-2,003
Global TAA	57.8	19.3	7%	8%	1%	0.5	1,731
Diversified Private Equity	99.7	135.7	9%	9%	0%	0.0	132
Underlying base fees	37.6	13.1	9%	9%	0%	0.0	50
Private Credit	123.2	73.2	5%	13%	8%	10.1	32,034
Total for asset management						14.7	46,408

1. Weight % = asset's average (NAV for performance lines) holdings / plan total nav average holdings.

2. If asset is not available in one of the years, the entire weighted cost difference in bps is attributed to the asset mix.

3. Calculated by multiplying asset mix changes in bps by plan total nav average holdings for year 2019, \$32 billion.

Impact of changes in implementation style

Changes in implementation style (passive vs. active, internal vs. external, etc.) in 2019 vs. 2015 cost you \$27 million.

Implementation choices	2019	Cost, 2015			Style 1 %			Cost/ \$000s
	avg. assets \$mils	Style 1	Style 2	Style 1 -Savings	2019	2015	More/ -Less	
	A	B	C	D = B - C	E			A x D x E
<u>Passive vs active</u>	Total assets	Passive	Active		Passive % of total assets			
Stock - U.S. Broad/All	2,793	9 bp	68 bp	-60 bp	0%	34%	-34%	5,651
Stock - Global	5,459	5 bp	35 bp	-30 bp	47%	64%	-17%	2,854
Fixed Income - Emerging	1,158	10 bp	49 bp	-39 bp	0%	62%	-62%	2,771
Less passive, more active								11,277
<u>Internal active vs external active</u>	Active assets	Internal active	External active		Internal active % of active			
Stock - U.S. Broad/All	2,793	3 bp	68 bp	-66 bp	0%	0%	0%	35
Fixed Income - U.S.	765	2 bp	16 bp	-14 bp	3%	14%	-10%	110
Cash	2,401	2 bp	15 bp	-13 bp	79%	47%	33%	-1,017
Real Estate ex-REITs	2,831	3 bp	115 bp	-112 bp	0%	2%	-2%	612
More int. active % of total active								-261
<u>LP/Co-investment vs fund of funds</u>	External assets	LP/Co	Fund of funds		LP/Co % of external assets			
Hedge Funds	3,219	223 bp	158 bp	65 bp	61%	37%	25%	5,153
Perf. fees (on NAV)	3,219	244 bp	63 bp	181 bp	61%	37%	25%	14,330
Diversified Private Equity	2,938	101 bp	250 bp	-149 bp	92%	76%	16%	-7,004
More LP, less fund of funds								12,480
<u>Co-investment vs LP</u>	LP/Co	Co-invest	LP		Co-invest % of LP/Co			
Real Estate ex-REITs	2,831	7 bp	115 bp	-108 bp	0%	0%	0%	-6
Diversified Private Equity	2,693	23 bp	138 bp	-115 bp	20%	32%	-12%	3,721
Private Credit	4,143	27 bp	124 bp	-97 bp	1%	1%	0%	29
Less co-investment								3,743
Total								27,240

Cost differences are attributed exclusively to the effects of implementation style when the style existed in one of the years only.

Impact of paying more/-less for similar services

In 2019, you paid \$97 million less for similar asset management and oversight / support services vs. 2015.

Asset class styles where you had assets in both 2019 and 2015 ¹	Style	2019	Cost in bps		More/ -less	Cost/ -Savings
		avg. assets \$mils	2019	2015		\$000s
<u>External asset management</u>		A			B	A x B
Stock - U.S. Broad/All	active	2,793	45.2	68.4	-23.2	-6,472
Stock - Emerging	active	1,974	30.8	83.8	-53.1	-10,476
Stock - Global	passive	2,550	4.7	4.6	0.1	22
Stock - Global	active	2,909	21.6	34.6	-13.0	-3,780
Fixed Income - U.S.	active	741	27.3	16.3	11.0	818
Fixed Income - Emerging	active	1,158	46.7	48.5	-1.9	-218
Fixed Income - High Yield	active	1,287	47.9	48.8	-0.9	-116
Cash	active	497	3.9	15.4	-11.5	-570
Real Estate ex-REITs	LP	2,831	97.7	114.9	-17.2	-4,868
Hedge Funds	active	1,972	176.1	222.9	-46.8	-9,234
Top layer perf. fees (on NAV)	active	1,972	85.9	244.4	-158.5	-31,245
Hedge Funds	FoF	1,247	56.4	19.8	36.6	4,569
Underlying base fees	FoF	1,247	56.3	138.1	-81.8	-10,205
Underlying perf. fees (on NAV)	FoF	1,247	54.4	63.4	-9.0	-1,119
Global TAA	active	2,664	19.3	57.8	-38.4	-10,236
Diversified Private Equity	FoF	245	126.9	95.5	31.4	770
Underlying base fees	FoF	245	157.0	155.0	2.0	49
Diversified Private Equity	CO	550	56.4	23.1	33.2	1,829
Diversified Private Equity	LP	2,143	157.1	138.4	18.8	4,020
Private Credit	CO	46	2.8	26.9	-24.1	-111
Private Credit	LP	4,097	74.0	124.3	-50.4	-20,631
Total for external management						-97,203
<u>Internal asset management</u>		A			B	A x B
Fixed Income - U.S.	active	24	3.9	2.4	1.5	4
Cash	active	1,904	2.2	2.4	-0.2	-34
Total for internal management						-30
Overlays and unfunded strategies		31,623	0.3	0.4	-0.1	-317
Oversight		31,623	0.4	0.4	0.0	-55.9
Trustee & Custodial		31,623	0.3	0.4	-0.1	-283
Consulting		31,623	0.5	0.3	0.3	846
Audit		31,623	0.0	0.1	0.0	-97
Other		31,623	0.1	0.1	0.0	-14
Total for fund oversight						396
Total						-97,154

1. Cost differences are attributed to paying more/less for similar services only if the asset-class style existed in both years.

5

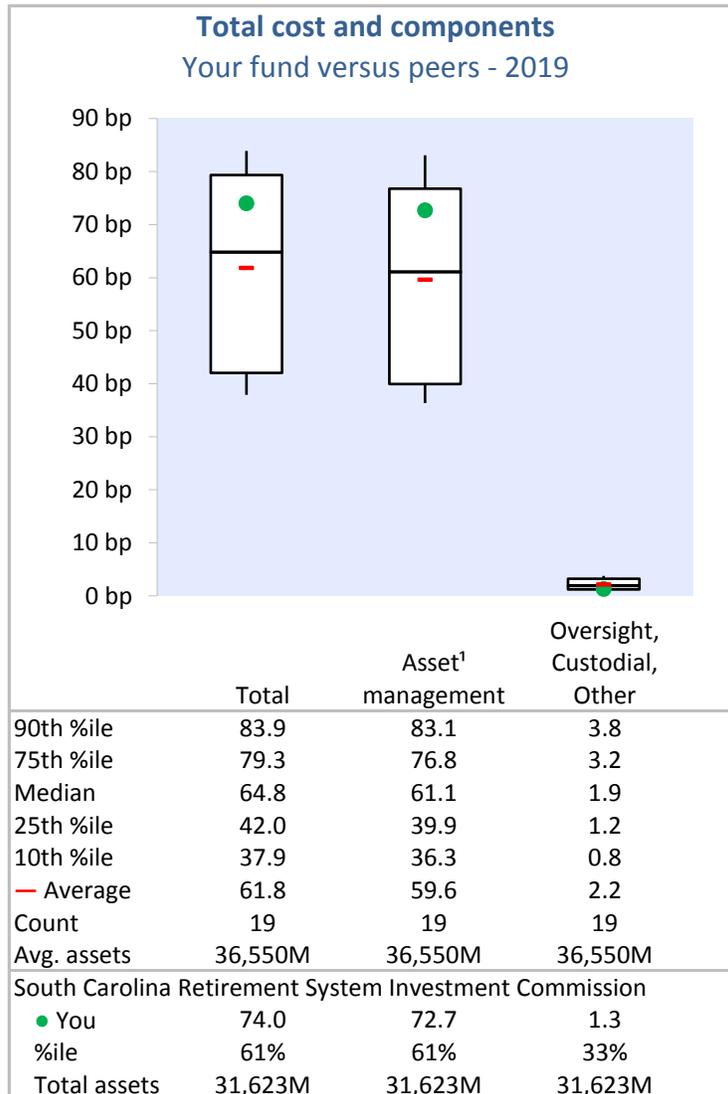
Cost comparisons

Total fund cost	2
Governance, operations & support	3
Public asset classes	
- Stock	4
- Fixed Income	13
- Commodities	27
- REITs	28
Real asset classes	
- Real estate ex-REITs	29
- Infrastructure	30
- Natural resources	31
- Other real assets	32
Private equity	
- Diversified private equity	33
- LBO	34
- Venture capital	35
- Private credit	36
- Other private equity	38
Global TAA	39
RiskParity	40
Hedge Funds	41
Overlays	42
Transaction costs	45

Total fund cost

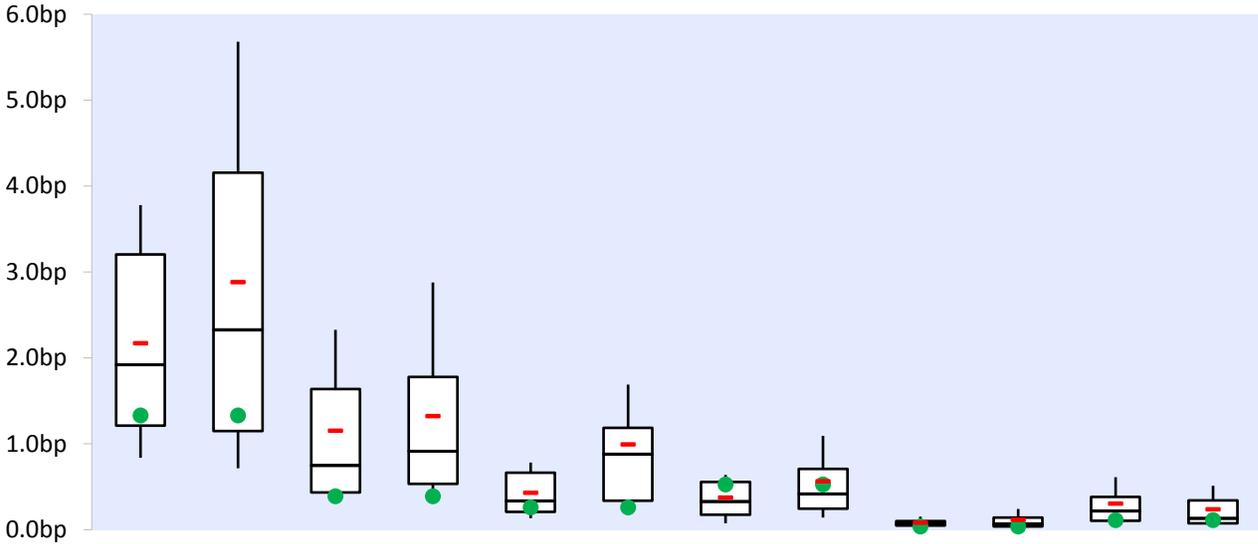
Total costs are benchmarked in the previous section. In this section, your fund's costs are compared on a line-item basis to your peers. This enables you to understand better why you may be a high or low cost fund and it also identifies and quantifies major cost differences that may warrant further investigation.

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.



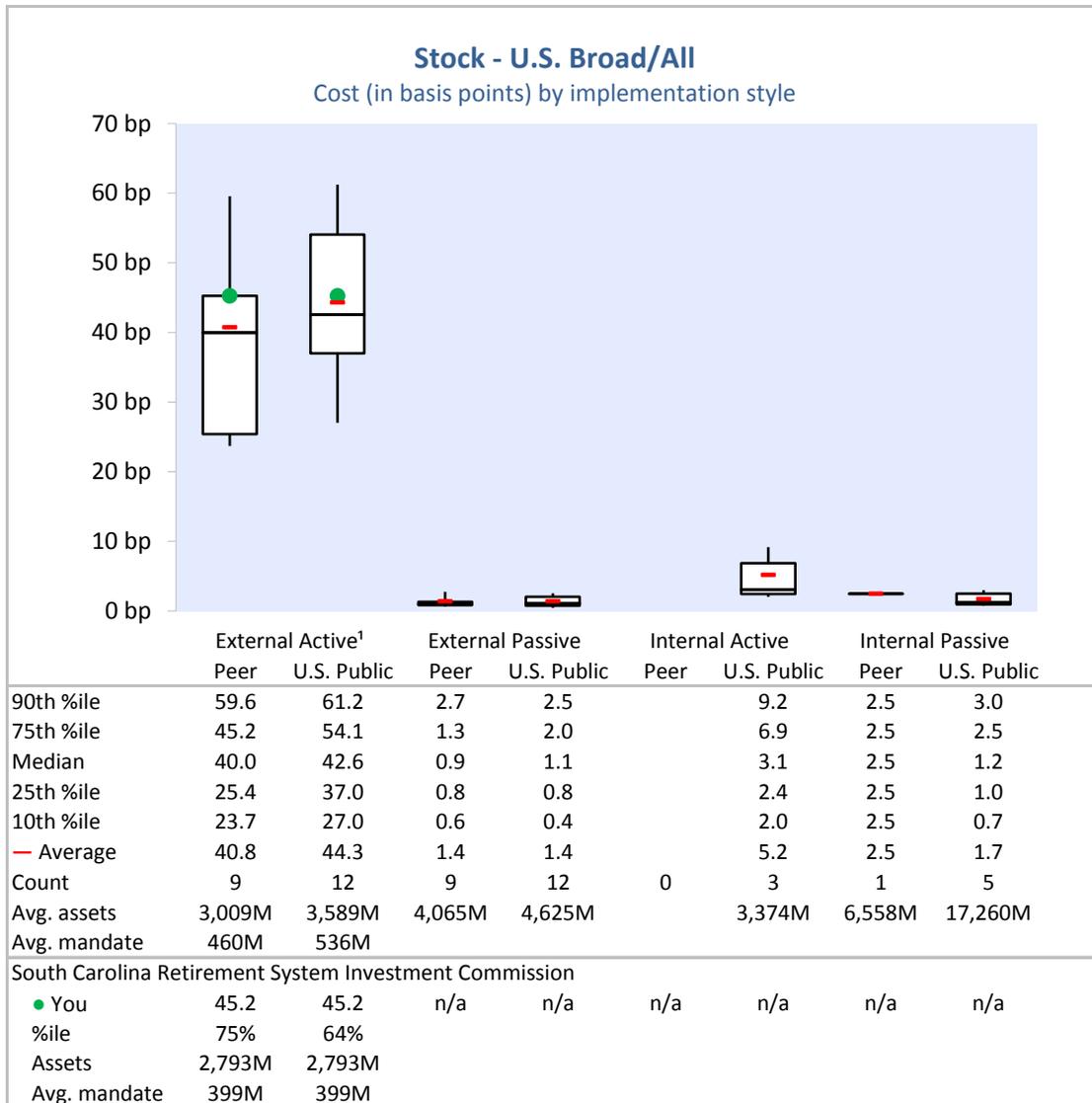
Governance, operations & support

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	3.8	5.7	2.3	2.9	0.8	1.7	0.6	1.1	0.2	0.2	0.6	0.5
75th %ile	3.2	4.2	1.6	1.8	0.7	1.2	0.6	0.7	0.1	0.1	0.4	0.3
Median	1.9	2.3	0.7	0.9	0.3	0.9	0.3	0.4	0.1	0.1	0.2	0.1
25th %ile	1.2	1.1	0.4	0.5	0.2	0.3	0.2	0.2	0.0	0.0	0.1	0.1
10th %ile	0.8	0.7	0.3	0.3	0.1	0.2	0.1	0.1	0.0	0.0	0.1	0.1
— Average	2.2	2.9	1.2	1.3	0.4	1.0	0.4	0.6	0.1	0.1	0.3	0.2
Count	19	48	19	48	15	37	18	45	15	41	16	34
Avg. assets	36,550M	51,659M	36,550M	51,659M	36,550M	51,659M	36,550M	51,659M	36,550M	51,659M	36,550M	51,659M
South Carolina Retirement System Investment Commission												
● You	1.3	1.3	0.4	0.4	0.3	0.3	0.5	0.5	0.0	0.0	0.1	0.1
%ile	33%	30%	17%	13%	36%	17%	71%	57%	7%	25%	27%	39%
Plan assets	31,623M	31,623M	31,623M	31,623M	31,623M	31,623M	31,623M	31,623M	31,623M	31,623M	31,623M	31,623M

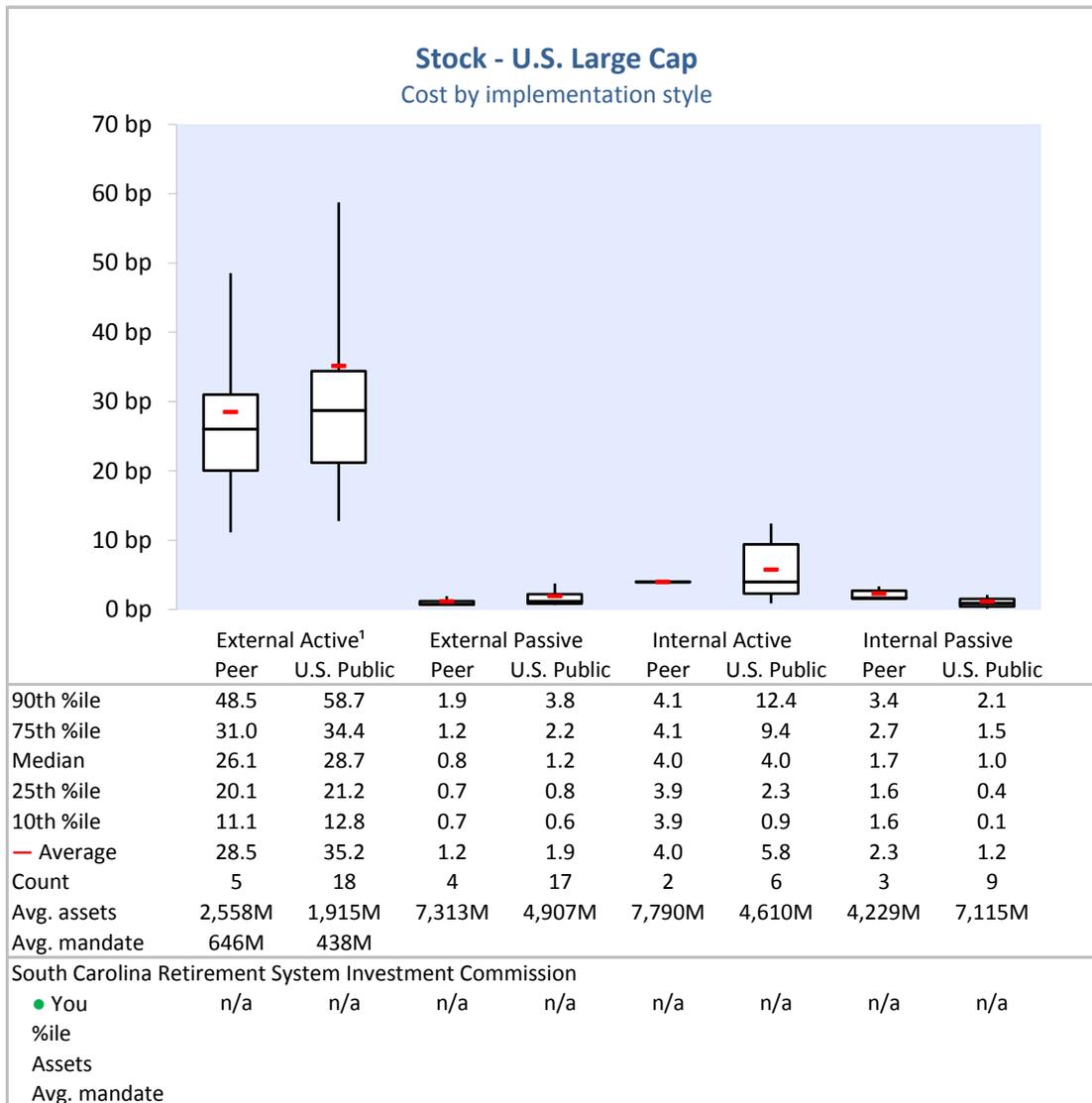
1. Oversight costs include the salaries and benefits of executives and their staff responsible for overseeing the entire fund or multiple asset classes and the fees/salaries of the Board or Investment Committee. All costs associated with the above including fees/salaries, travel, director's insurance 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	42.5	34.8	38.2
Performance fees*	n/a	4.9	4.7
Internal and other	<u>2.8</u>	<u>1.0</u>	<u>1.4</u>
Total	45.2	40.8	44.3

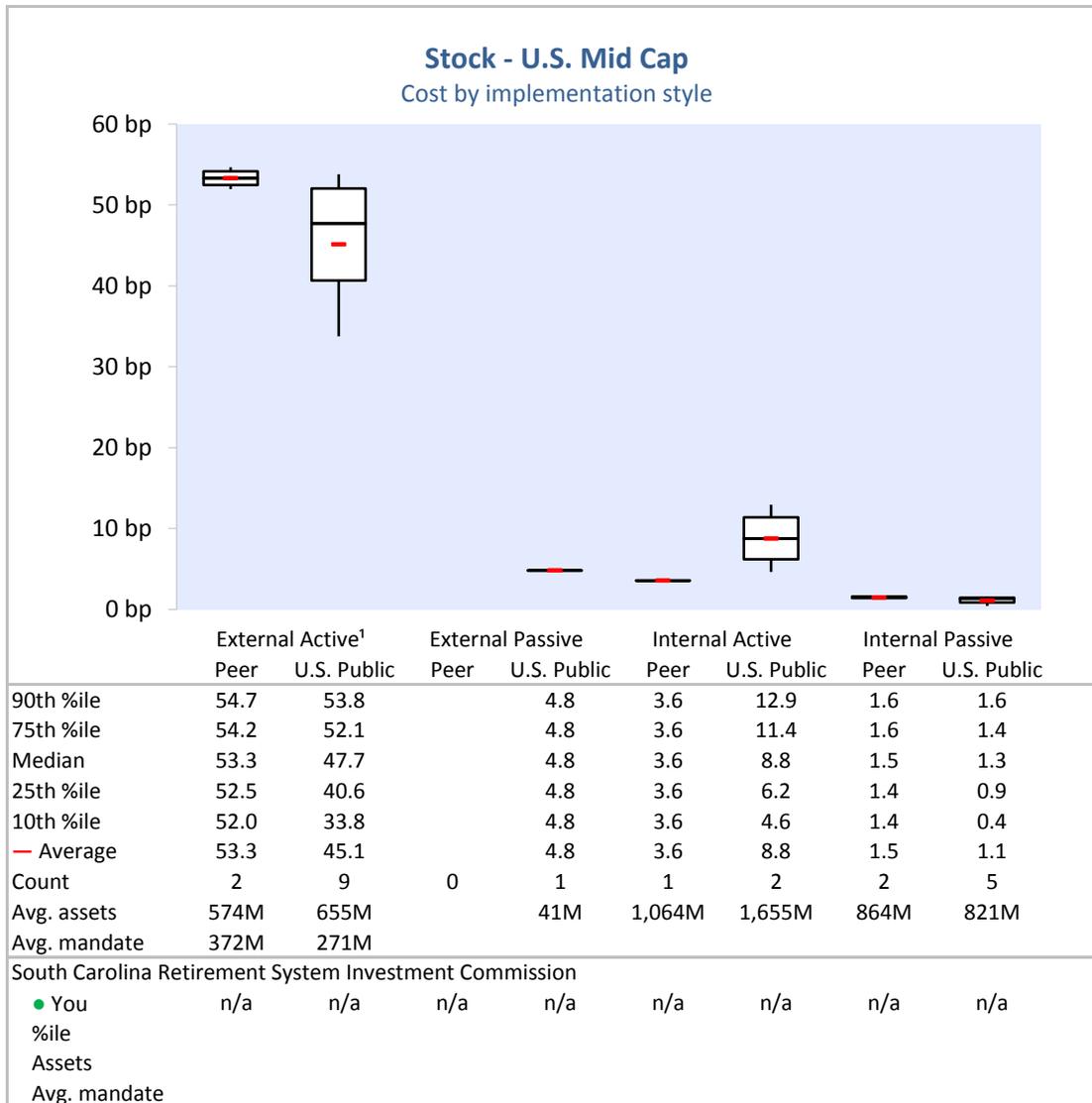
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 3.0 bps for peers (44 funds) and 18.8 bps for U.S. Public participants (3 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	22.5	25.8
Performance fees*	n/a	5.9	9.1
Internal and other	<u>n/a</u>	<u>0.1</u>	<u>0.3</u>
Total	n/a	28.5	35.2

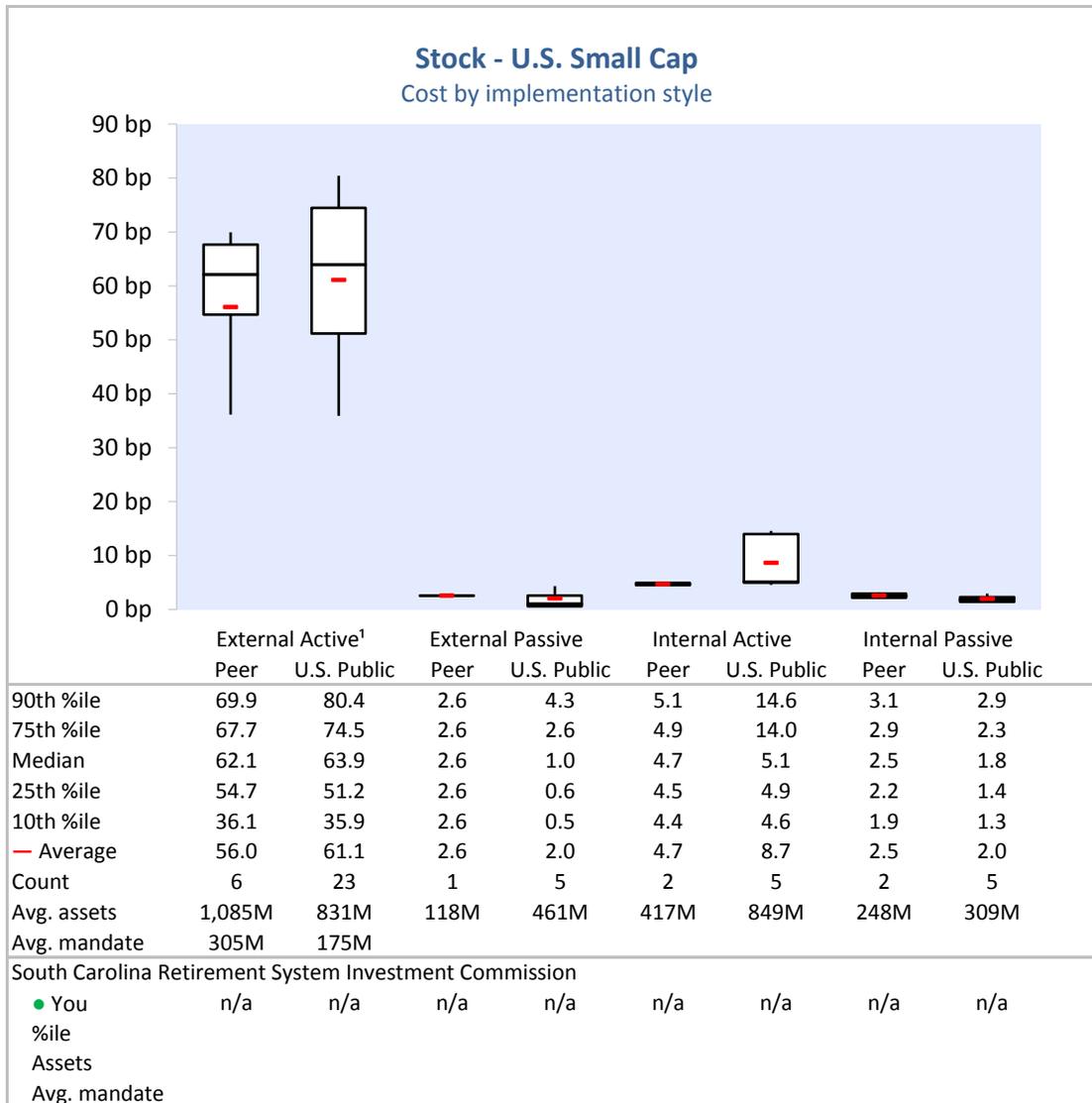
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 29.4 bps for peers (1 fund) and 41.1 bps for U.S. Public participants (4 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	52.7	44.7
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>0.6</u>	<u>0.4</u>
Total	n/a	53.3	45.1

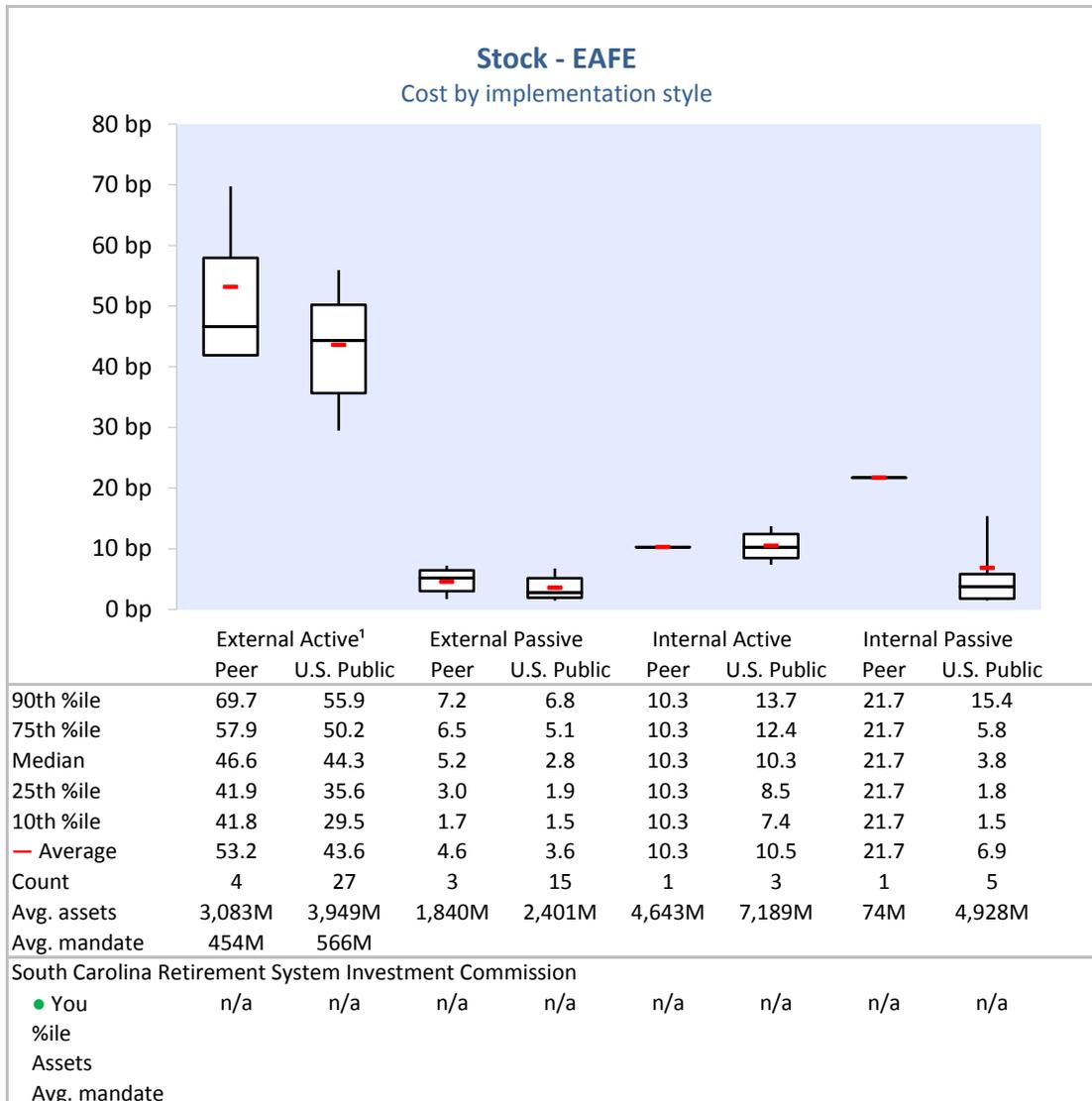
No funds reported a performance fee.



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	53.7	59.3
Performance fees*	n/a	2.0	1.5
Internal and other	<u>n/a</u>	<u>0.4</u>	<u>0.3</u>
Total	n/a	56.0	61.1

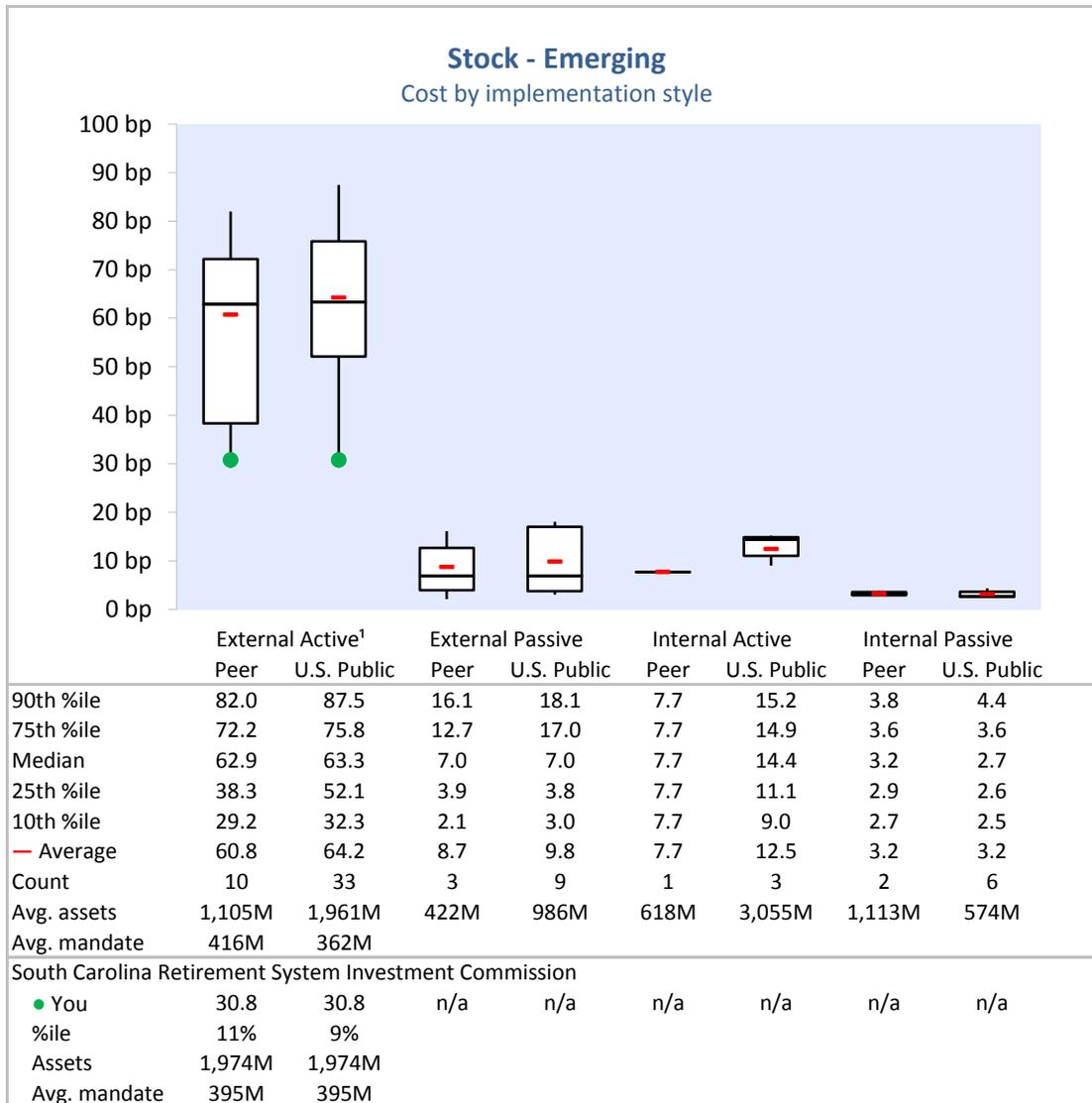
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 6.0 bps for peers (2 funds) and 8.7 bps for U.S. Public participants (4 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	45.6	40.1
Performance fees*	n/a	7.3	3.1
Internal and other	<u>n/a</u>	<u>0.2</u>	<u>0.4</u>
Total	n/a	53.2	43.6

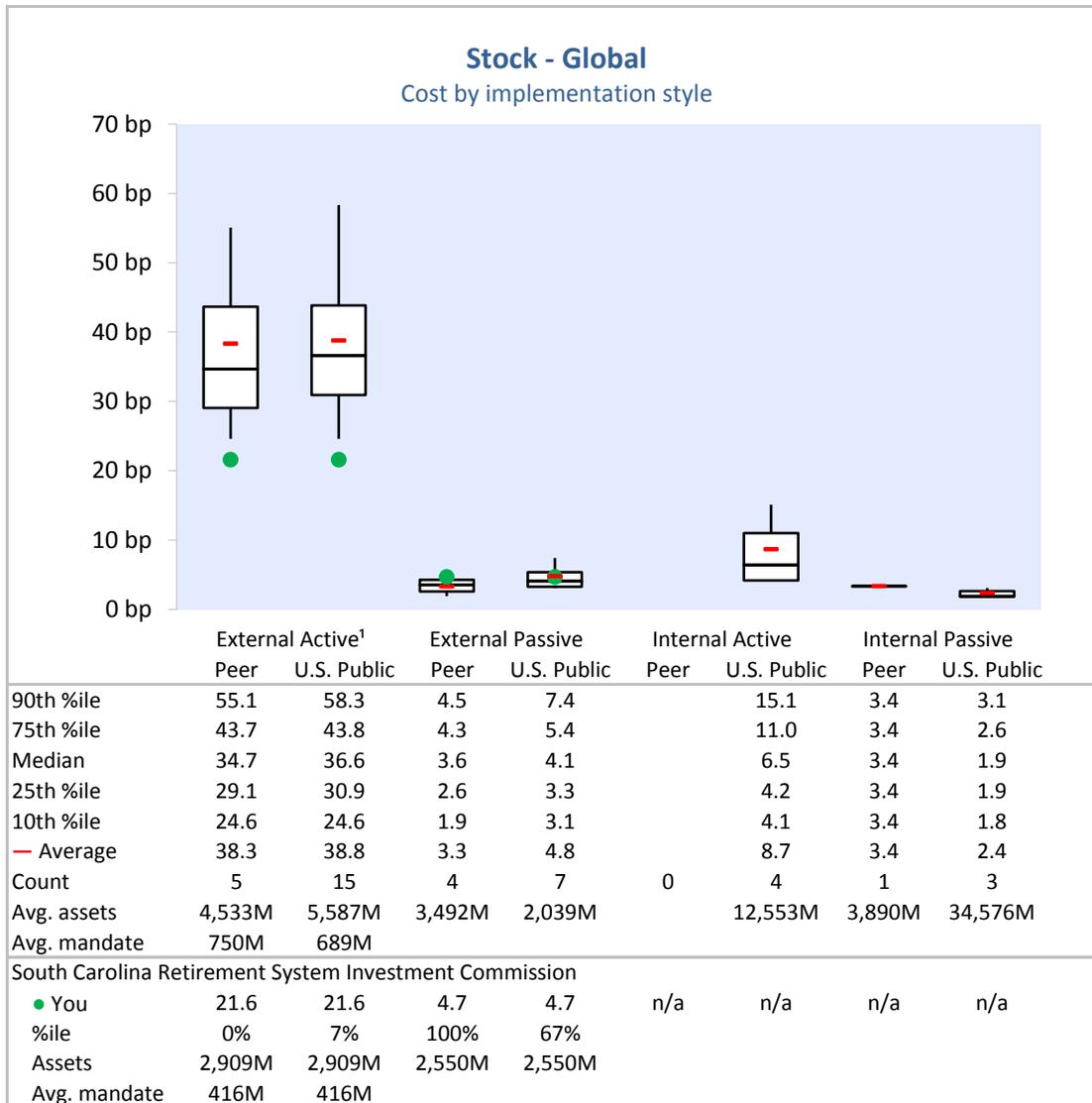
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 29.4 bps for peers (1 fund) and 16.7 bps for U.S. Public participants (5 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	28.1	49.7	58.6
Performance fees*	n/a	10.1	4.7
Internal and other	2.6	0.9	0.9
Total	30.8	60.8	64.2

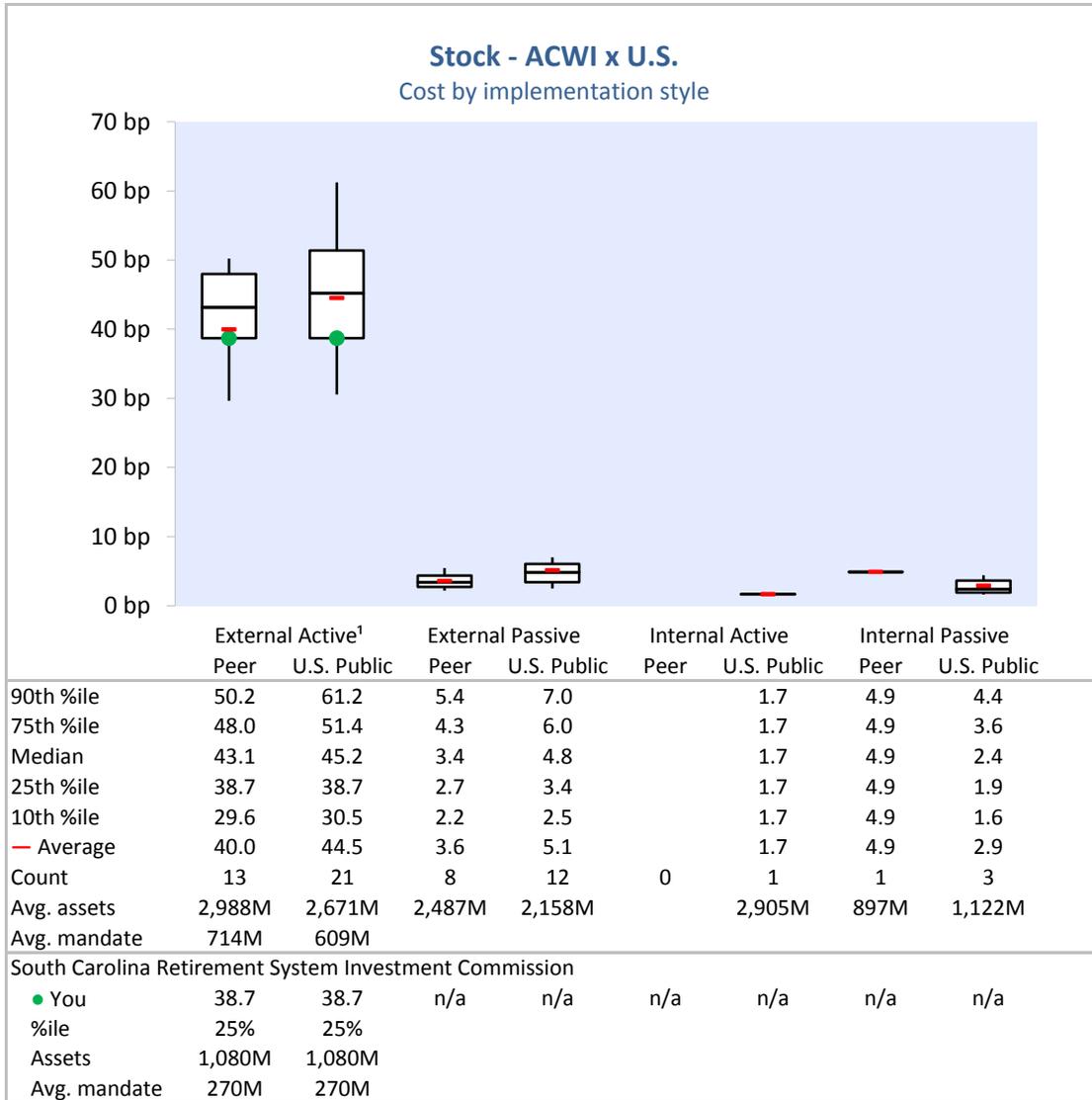
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 50.7 bps for peers (2 funds) and 26.0 bps for U.S. Public participants (6 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	18.9	36.0	35.9
Performance fees*	n/a	0.8	2.1
Internal and other	2.7	1.6	0.8
Total	21.6	38.3	38.8

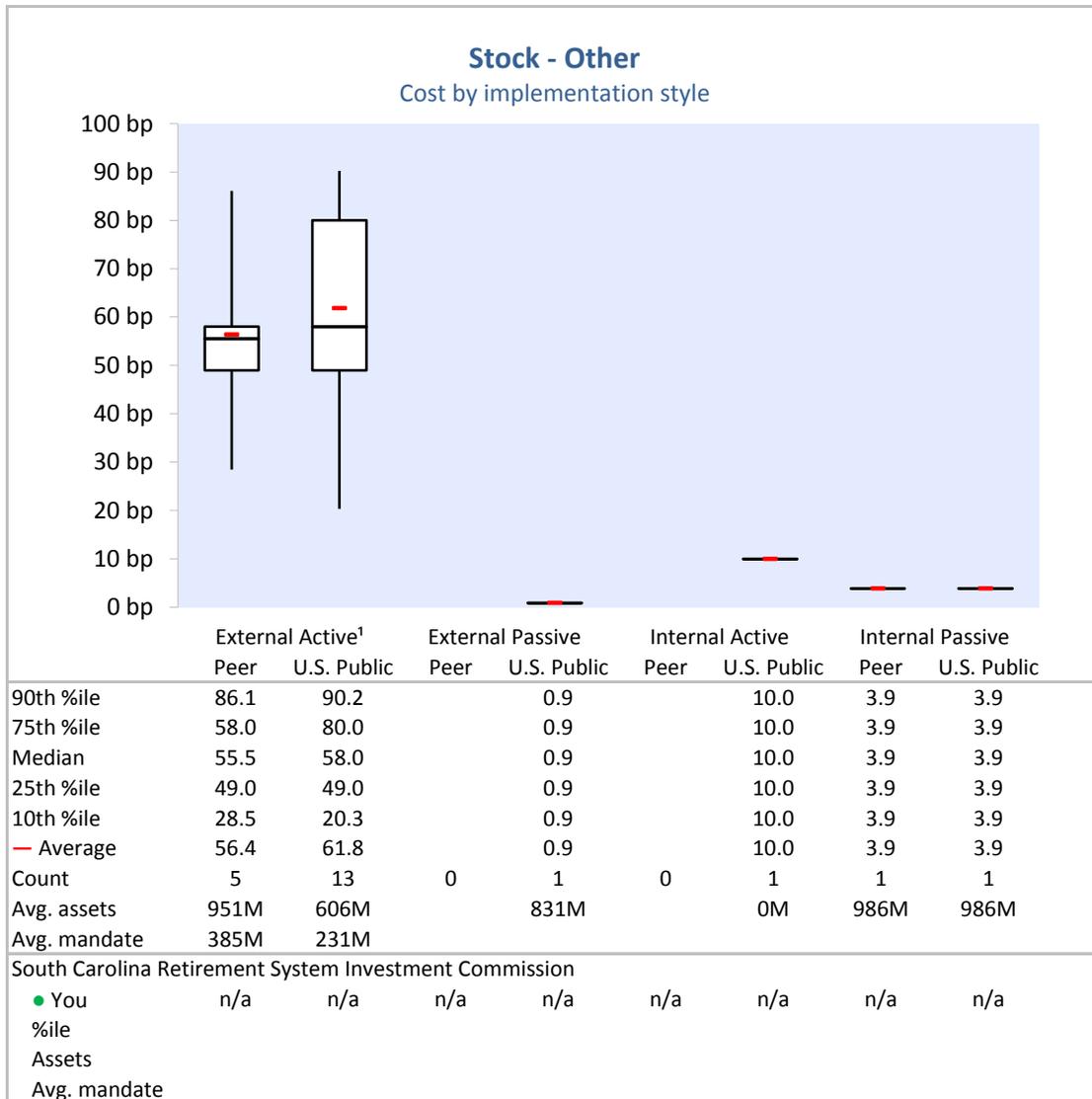
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 3.9 bps for peers (1 fund) and 7.9 bps for U.S. Public participants (4 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	35.9	38.1	43.0
Performance fees*	n/a	1.4	0.8
Internal and other	2.8	0.5	0.7
Total	38.7	40.0	44.5

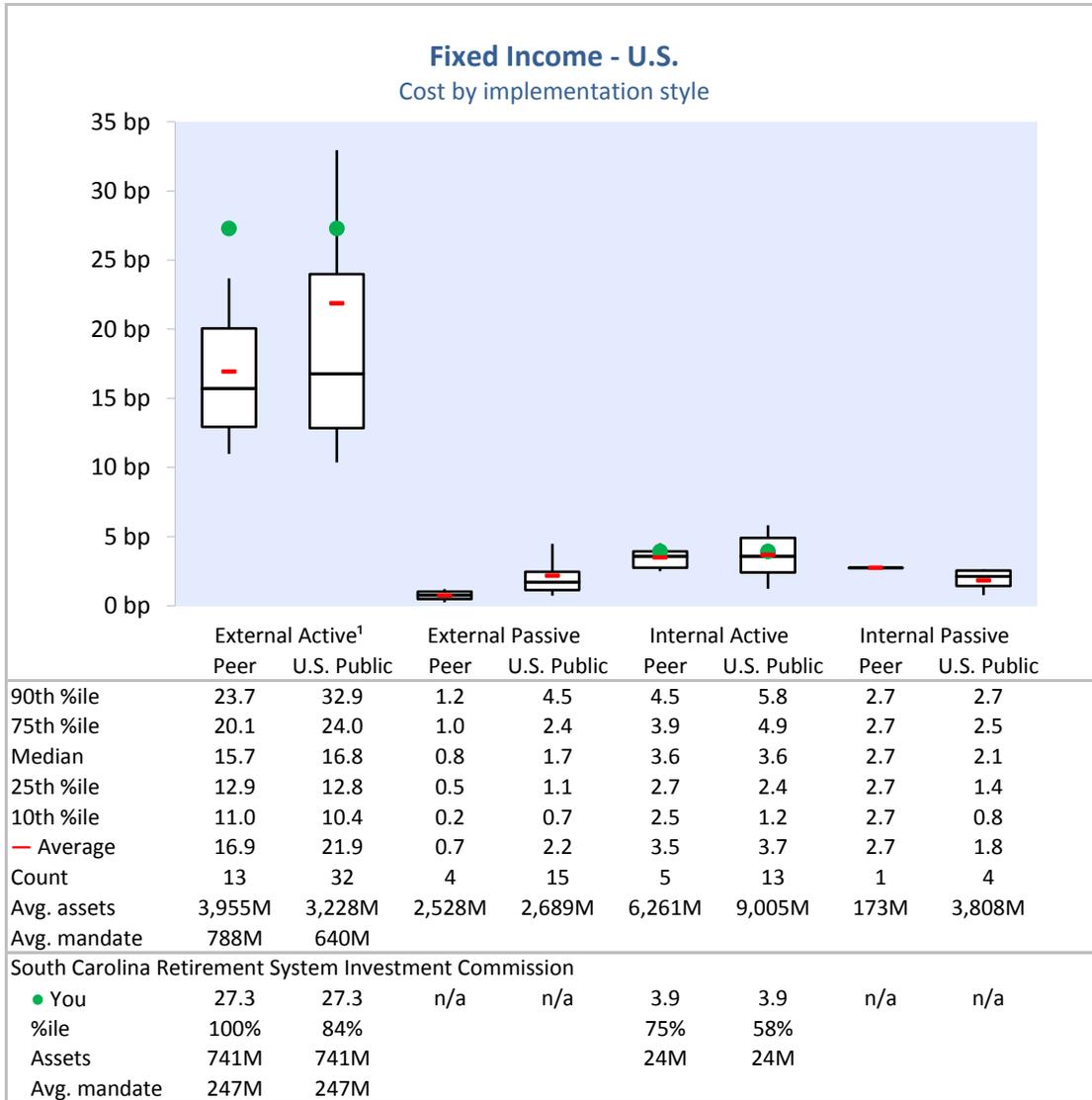
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 4.5 bps for peers (4 funds) and 3.4 bps for U.S. Public participants (5 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	51.3	60.6
Performance fees*	n/a	5.1	0.0
Internal and other	<u>n/a</u>	<u>0.0</u>	<u>1.2</u>
Total	n/a	56.4	61.8

* 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 25.7 bps for peers (1 fund) and 0.0 bps for U.S. Public participants (1 fund).

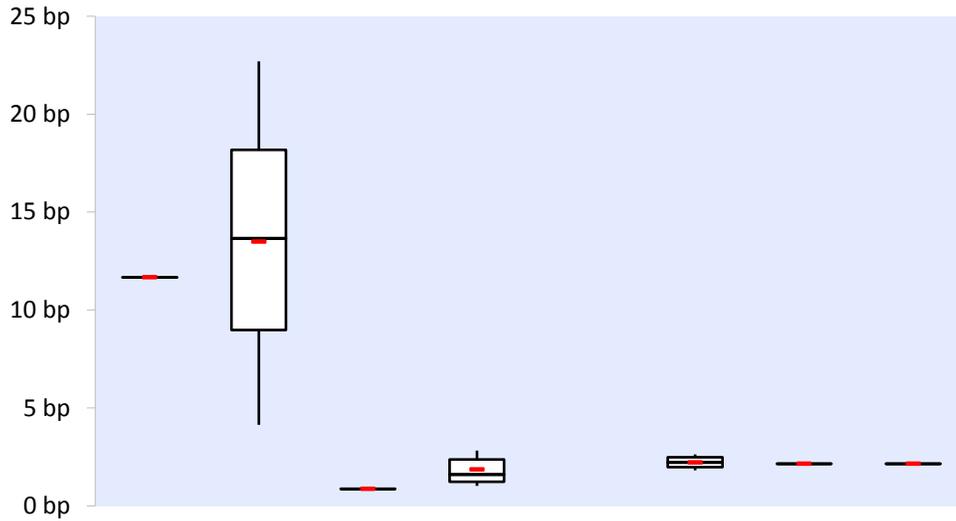


1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	24.0	15.5	19.8
Performance fees*	n/a	0.4	1.3
Internal and other	<u>3.2</u>	<u>1.0</u>	<u>0.7</u>
Total	27.3	16.9	21.9

* 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 2.4 bps for peers (2 funds) and 5.4 bps for U.S. Public participants (8 funds).

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



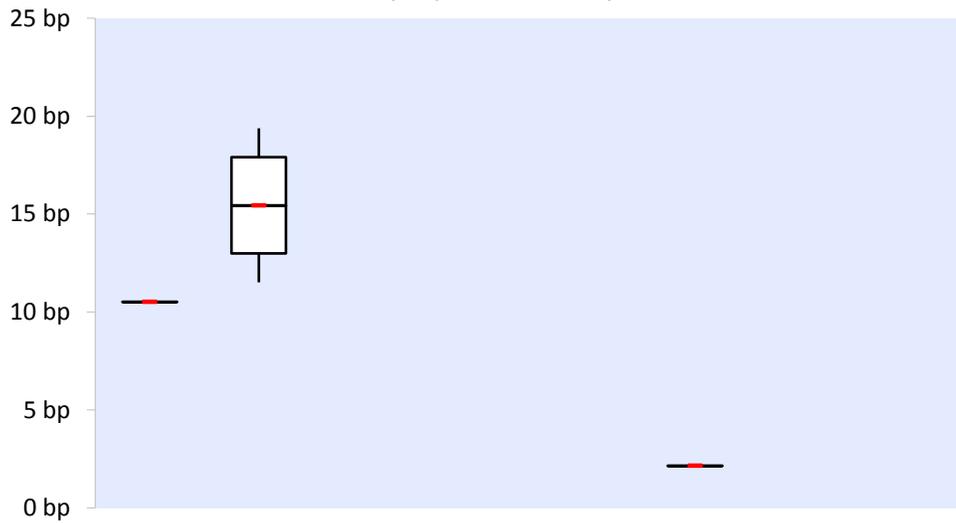
	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	11.7	22.7	0.9	2.8		2.6	2.2	2.2
75th %ile	11.7	18.2	0.9	2.4		2.5	2.2	2.2
Median	11.7	13.7	0.9	1.6		2.2	2.2	2.2
25th %ile	11.7	9.0	0.9	1.2		2.0	2.2	2.2
10th %ile	11.7	4.1	0.9	1.0		1.8	2.2	2.2
— Average	11.7	13.5	0.9	1.9		2.2	2.2	2.2
Count	1	4	1	3	0	2	1	1
Avg. assets	1,016M	8,561M	11,968M	4,140M		14,213M	5,455M	5,455M
Avg. mandate		53M						
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	9.7	13.0
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>2.0</u>	<u>0.5</u>
Total	n/a	11.7	13.5

No funds reported a performance fee.

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

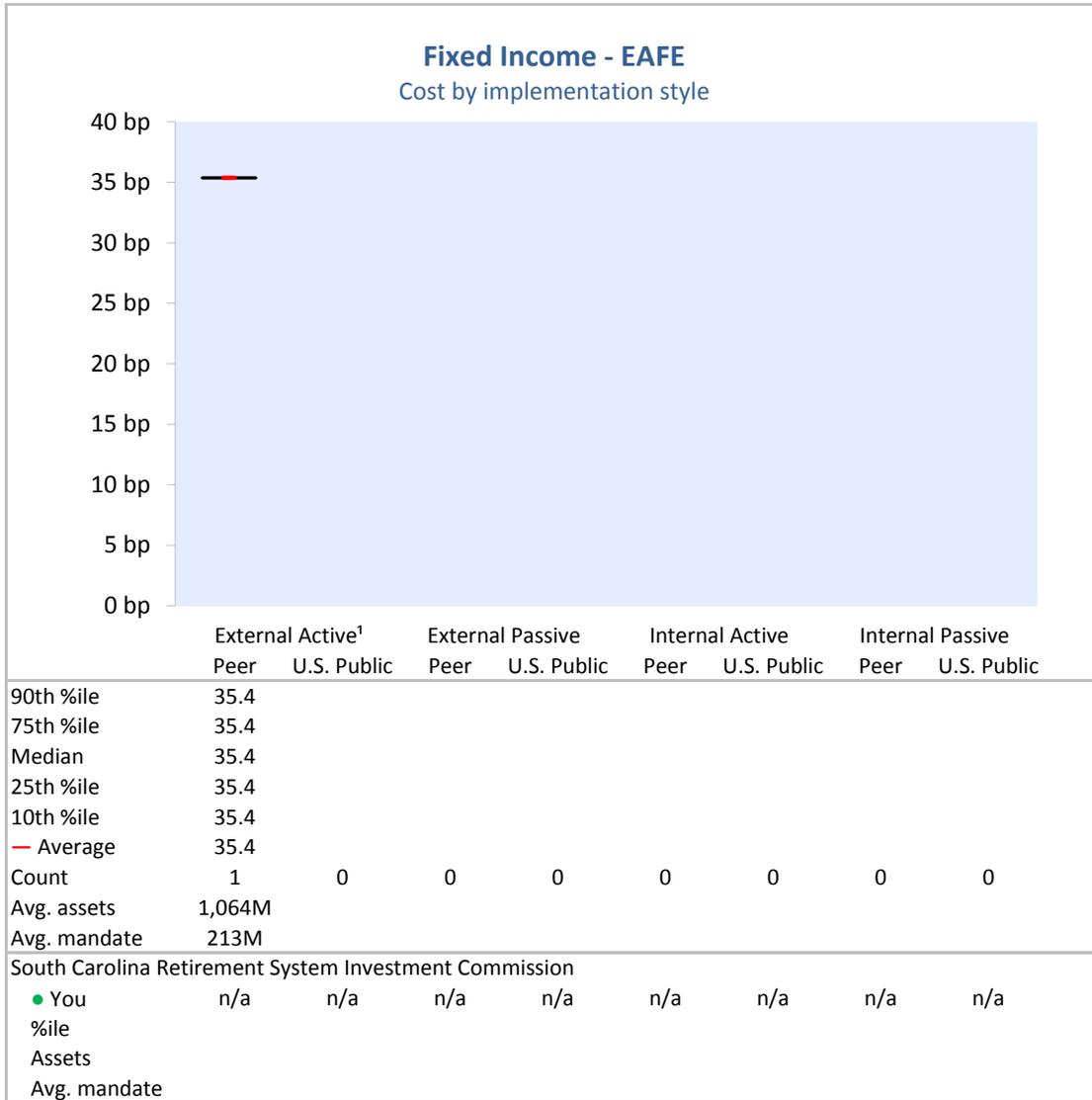


	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	10.5	19.4				2.2		
75th %ile	10.5	17.9				2.2		
Median	10.5	15.4				2.2		
25th %ile	10.5	13.0				2.2		
10th %ile	10.5	11.5				2.2		
— Average	10.5	15.4				2.2		
Count	1	2	0	0	0	1	0	0
Avg. assets	3,096M	1,596M				25,934M		
Avg. mandate	1,548M	798M						
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	9.6	15.0
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>1.0</u>	<u>0.5</u>
Total	n/a	10.5	15.4

No funds reported a performance fee.

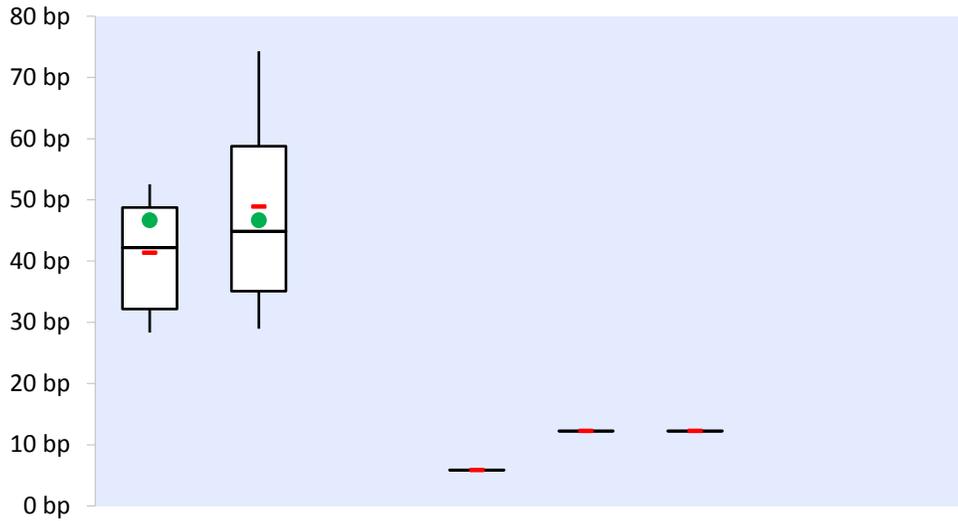


1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	29.6	n/a
Performance fees*	n/a	5.8	n/a
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
Total	n/a	35.4	n/a

* 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 5.8 bps for peers (1 fund).

Fixed Income - Emerging Cost by implementation style

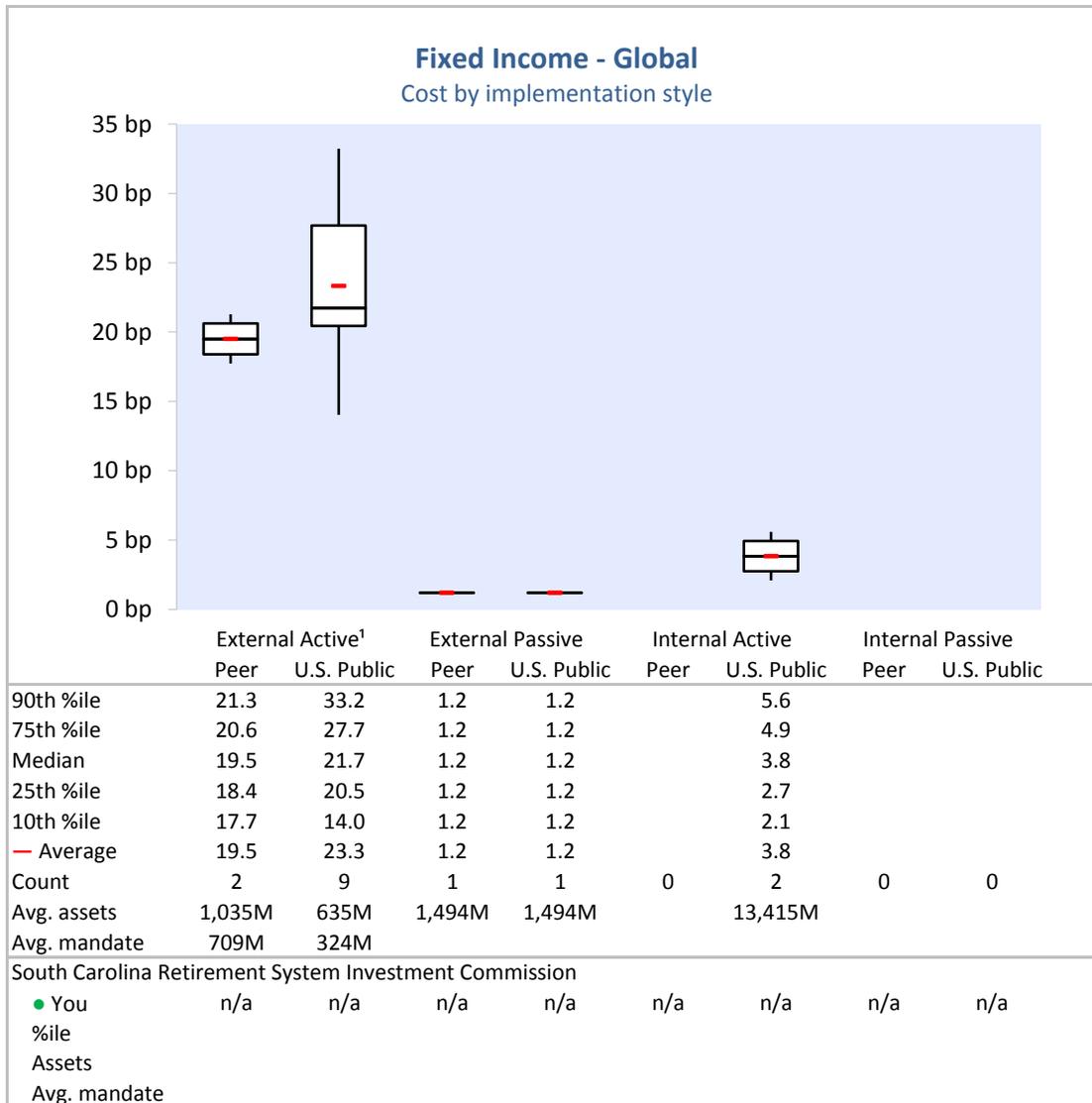


	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	52.6	74.3		5.9	12.3	12.3		
75th %ile	48.7	58.8		5.9	12.3	12.3		
Median	42.2	44.9		5.9	12.3	12.3		
25th %ile	32.1	35.1		5.9	12.3	12.3		
10th %ile	28.3	28.9		5.9	12.3	12.3		
— Average	41.4	48.9		5.9	12.3	12.3		
Count	10	22	0	1	1	1	0	0
Avg. assets	877M	1,046M		38M	229M	229M		
Avg. mandate	353M	270M						
South Carolina Retirement System Investment Commission								
● You	46.7	46.7	n/a	n/a	n/a	n/a	n/a	n/a
%ile	67%	52%						
Assets	1,158M	1,158M						
Avg. mandate	193M	193M						

1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	43.1	39.3	47.5
Performance fees*	n/a	1.3	0.7
Internal and other	3.6	0.7	0.6
Total	46.7	41.4	48.9

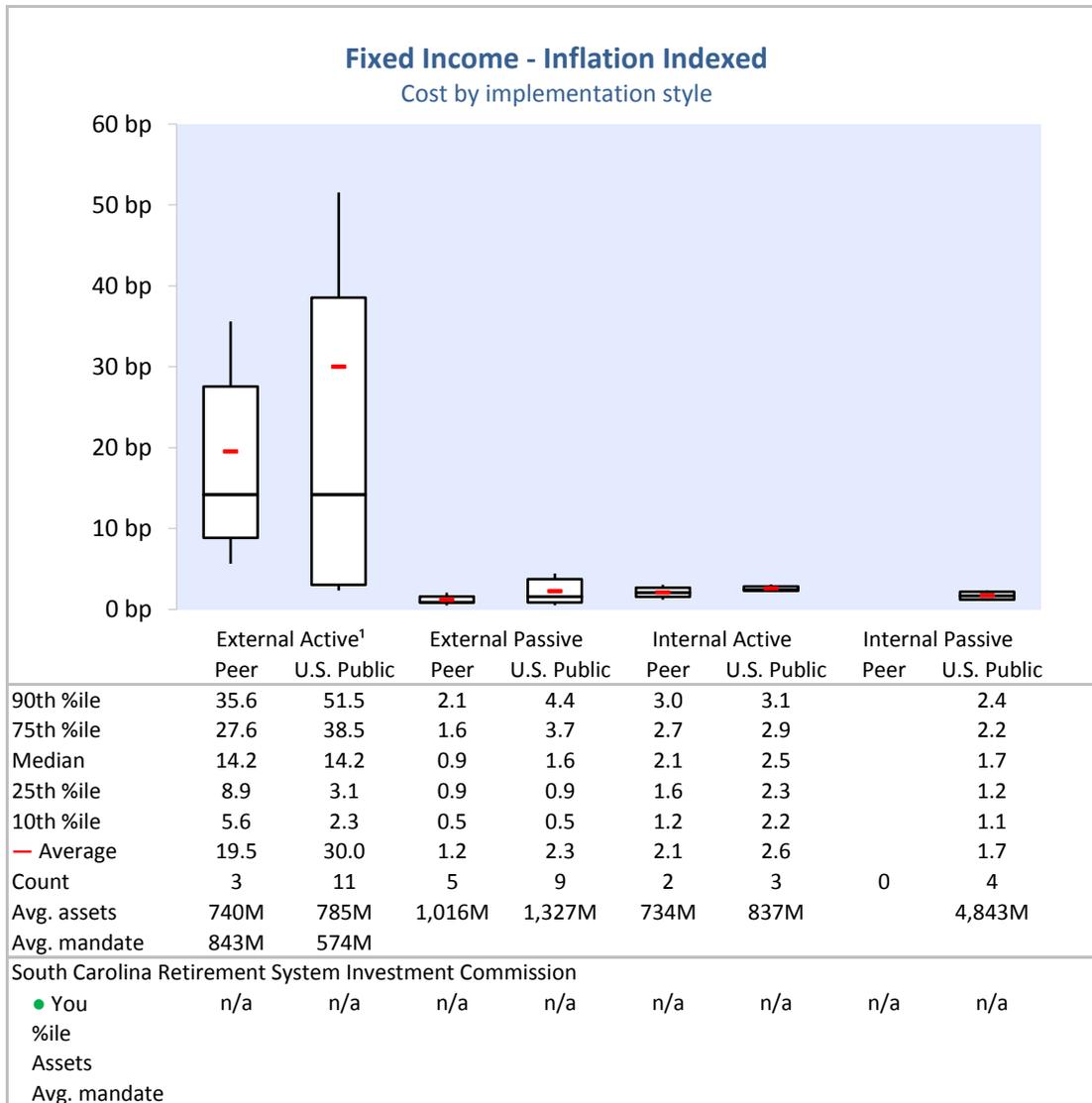
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 6.7 bps for peers (2 funds) and 4.0 bps for U.S. Public participants (4 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	19.1	21.3
Performance fees*	n/a	n/a	1.6
Internal and other	<u>n/a</u>	<u>0.4</u>	<u>0.4</u>
Total	n/a	19.5	23.3

* 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 7.1 bps for U.S. Public participants (2 funds).

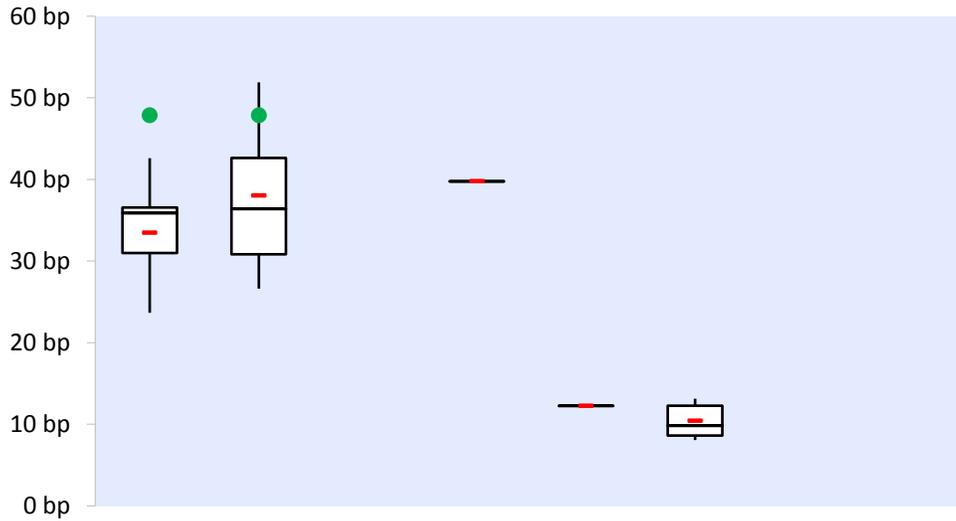


1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	17.8	26.6
Performance fees*	n/a	0.0	2.4
Internal and other	<u>n/a</u>	<u>1.8</u>	<u>1.0</u>
Total	n/a	19.5	30.0

* 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 (1 fund) and 13.4 bps for U.S. Public participants (2 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	42.6	51.9		39.8	12.3	13.1		
75th %ile	36.6	42.6		39.8	12.3	12.3		
Median	35.9	36.4		39.8	12.3	9.8		
25th %ile	31.0	30.8		39.8	12.3	8.6		
10th %ile	23.6	26.6		39.8	12.3	8.1		
— Average	33.5	38.0		39.8	12.3	10.4		
Count	9	28	0	1	1	5	0	0
Avg. assets	735M	1,145M		65M	181M	922M		
Avg. mandate	371M	267M						
South Carolina Retirement System Investment Commission								
● You	47.9	47.9	n/a	n/a	n/a	n/a	n/a	n/a
%ile	100%	81%						
Assets	1,287M	1,287M						
Avg. mandate	257M	257M						

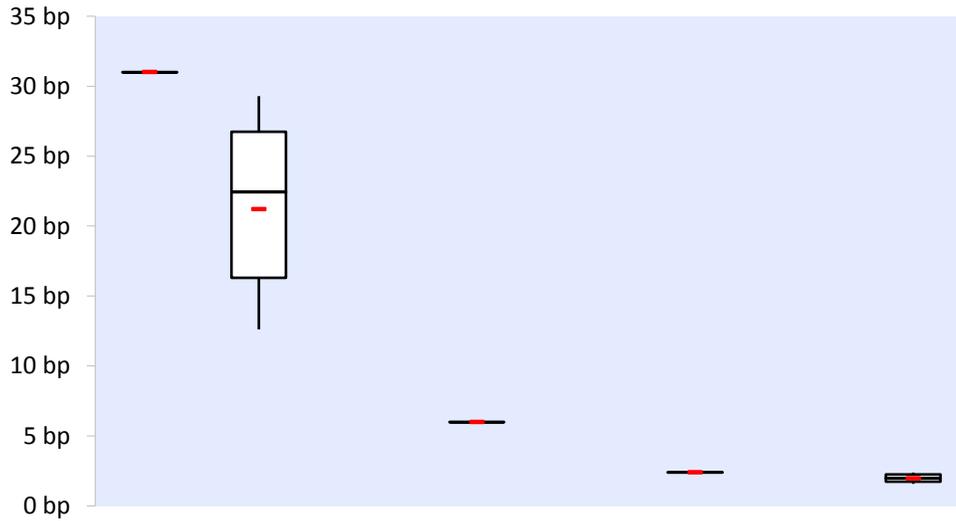
1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	44.5	32.8	36.0
Performance fees*	n/a	0.0	1.0
Internal and other	<u>3.3</u>	<u>0.6</u>	<u>1.1</u>
Total	47.9	33.5	38.0

* 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 (1 fund) and 6.8 bps for U.S. Public participants (4 funds).

Fixed Income - Long Bonds

Cost by implementation style

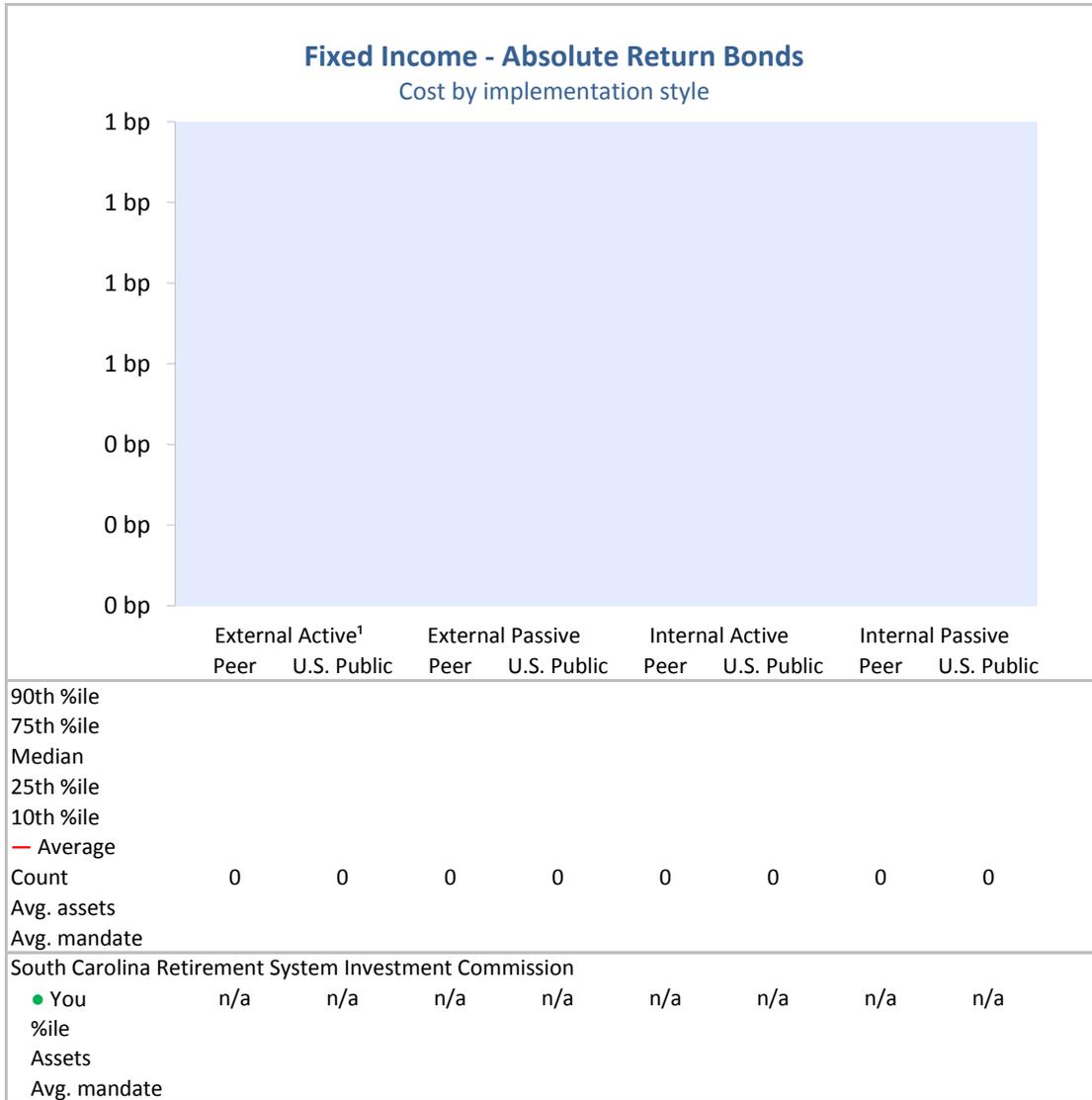


	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	31.0	29.3		6.0		2.4		2.4
75th %ile	31.0	26.7		6.0		2.4		2.2
Median	31.0	22.5		6.0		2.4		2.0
25th %ile	31.0	16.3		6.0		2.4		1.7
10th %ile	31.0	12.6		6.0		2.4		1.6
— Average	31.0	21.2		6.0		2.4		2.0
Count	1	3	0	1	0	1	0	2
Avg. assets	1,312M	8,069M		620M		19,084M		4,799M
Avg. mandate	656M	656M						
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	29.9	19.2
Performance fees*	n/a	n/a	1.5
Internal and other	<u>n/a</u>	<u>1.1</u>	<u>0.5</u>
Total	n/a	31.0	21.2

* 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 4.4 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	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 - Bundled LDI Cost by implementation style



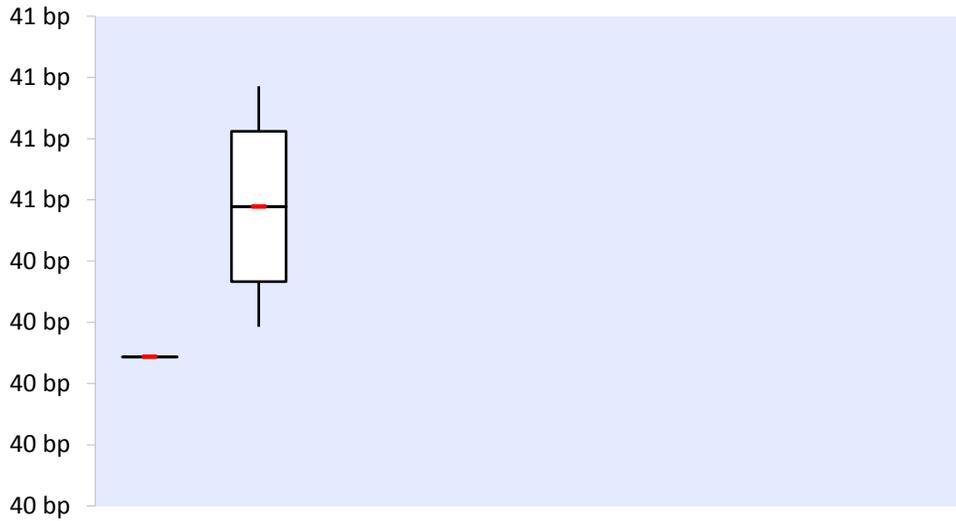
	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile		5.4						
75th %ile		5.4						
Median		5.4						
25th %ile		5.4						
10th %ile		5.4						
— Average		5.4						
Count	0	1	0	0	0	0	0	0
Avg. assets		14,561M						
Avg. mandate								
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	5.4
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	5.4

No funds reported a performance fee.

Fixed Income - Convertibles Cost by implementation style

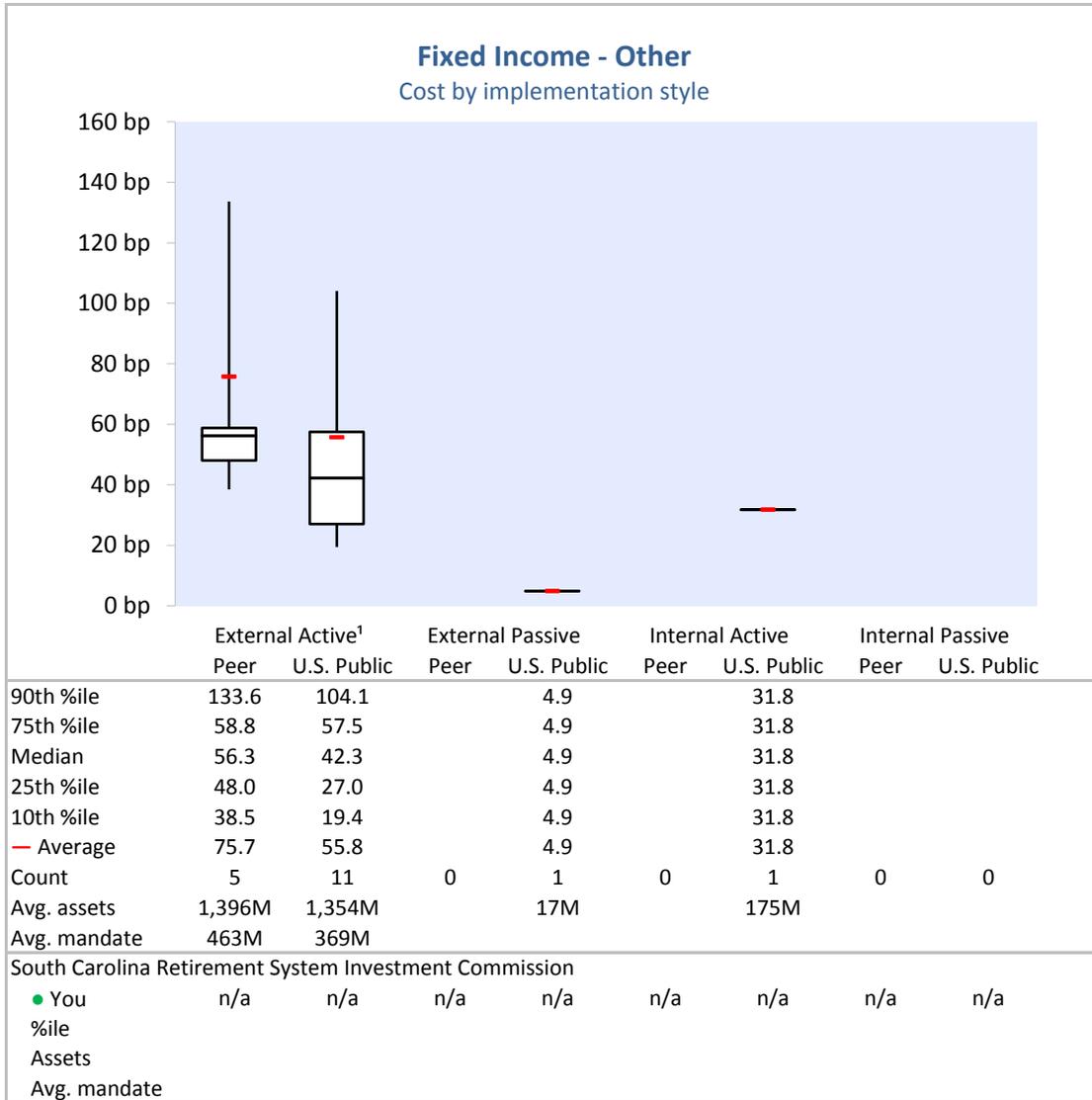


	External Active ¹		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	40.1	41.0						
75th %ile	40.1	40.8						
Median	40.1	40.6						
25th %ile	40.1	40.3						
10th %ile	40.1	40.2						
— Average	40.1	40.6						
Count	1	2	0	0	0	0	0	0
Avg. assets	2,554M	2,199M						
Avg. mandate	639M	639M						
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	39.1	40.1
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>1.0</u>	<u>0.5</u>
Total	n/a	40.1	40.6

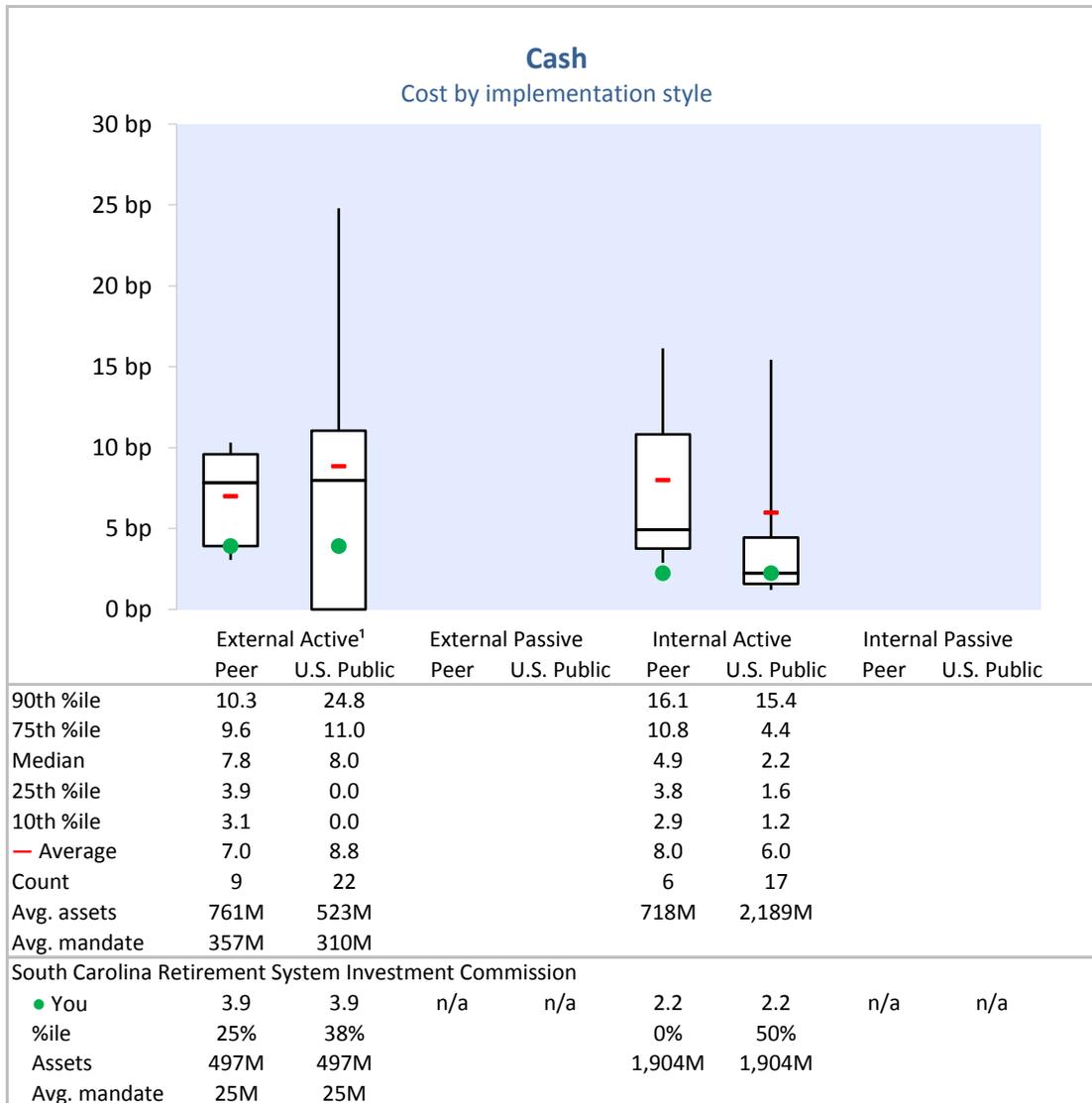
No funds reported a performance fee.



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	53.2	45.4
Performance fees*	n/a	21.1	9.6
Internal and other	<u>n/a</u>	<u>1.5</u>	<u>0.8</u>
Total	n/a	75.7	55.8

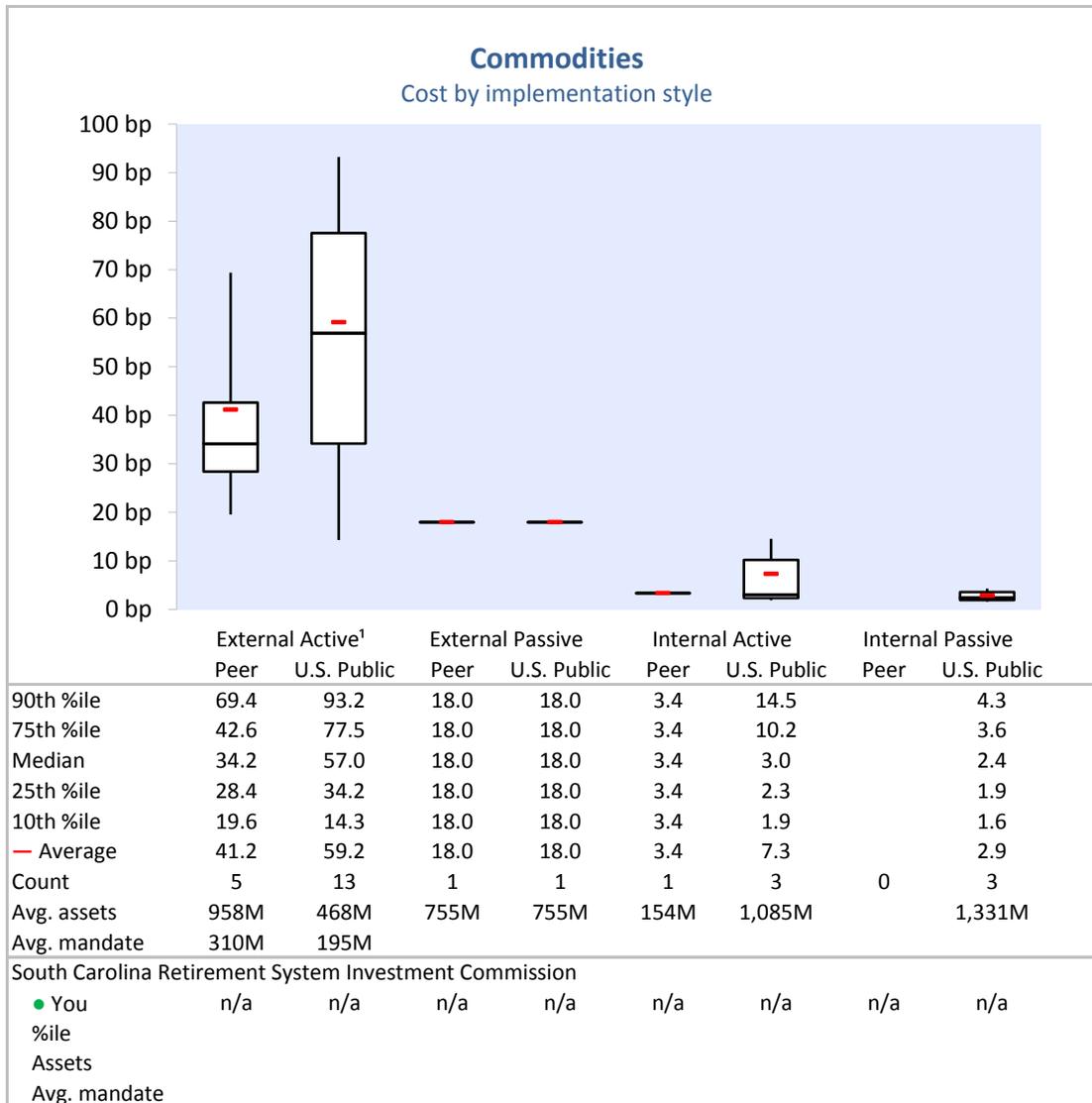
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 105.5 bps for peers (1 fund) and 105.5 bps for U.S. Public participants (1 fund).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	0.0	6.4	8.3
Performance fees*	n/a	n/a	0.2
Internal and other	<u>3.9</u>	<u>0.6</u>	<u>0.3</u>
Total	3.9	7.0	8.8

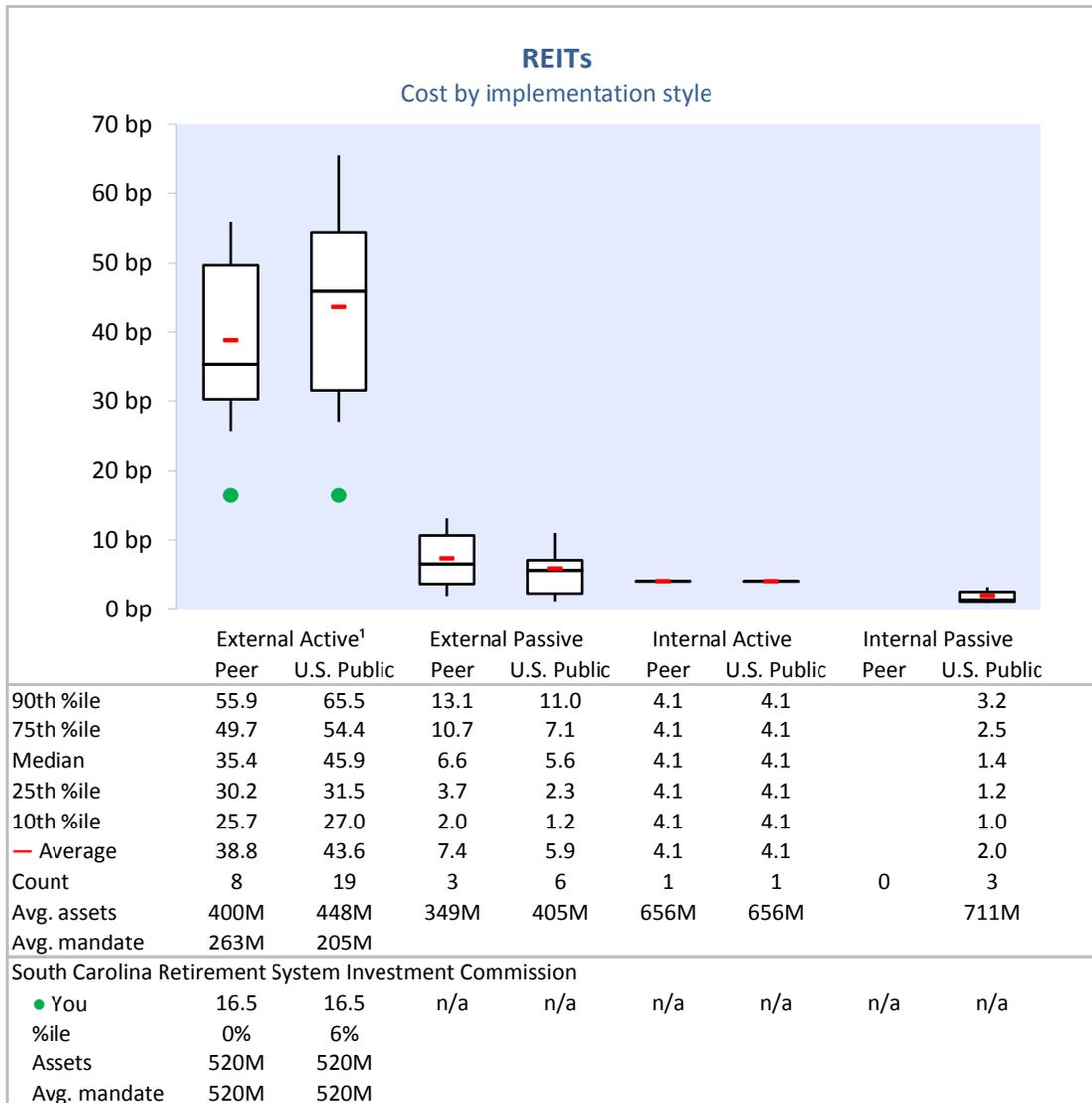
* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 2.7 bps for U.S. Public participants (2 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	40.9	56.9
Performance fees*	n/a	0.0	0.0
Internal and other	<u>n/a</u>	<u>0.3</u>	<u>2.3</u>
Total	n/a	41.2	59.2

* 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 0.0 bps for peers (1 fund) and 0.0 bps for U.S. Public participants (2 funds).



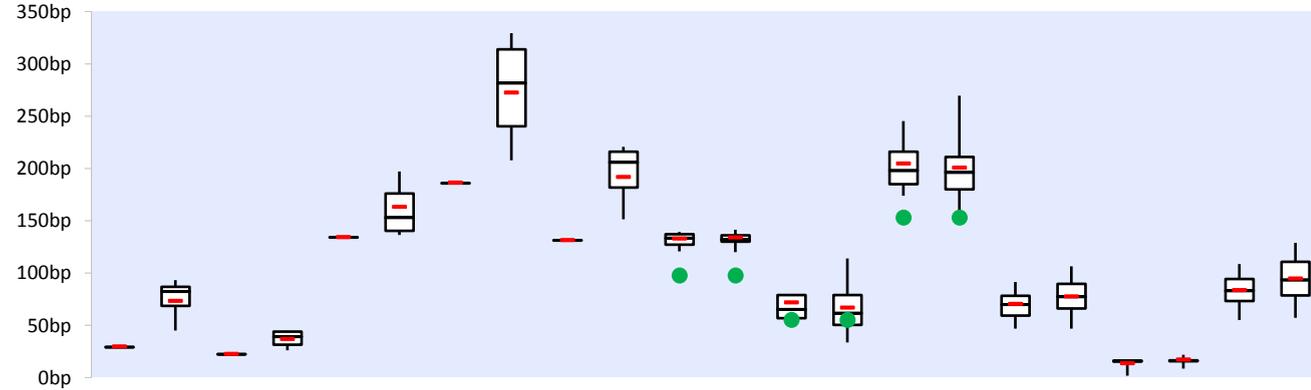
1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	12.1	32.5	39.0
Performance fees*	0.0	5.1	3.7
Internal and other	<u>4.3</u>	<u>1.3</u>	<u>0.9</u>
Total	16.5	38.8	43.6

* 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 10.1 bps for peers (4 funds) and 14.2 bps for U.S. Public participants (5 funds).

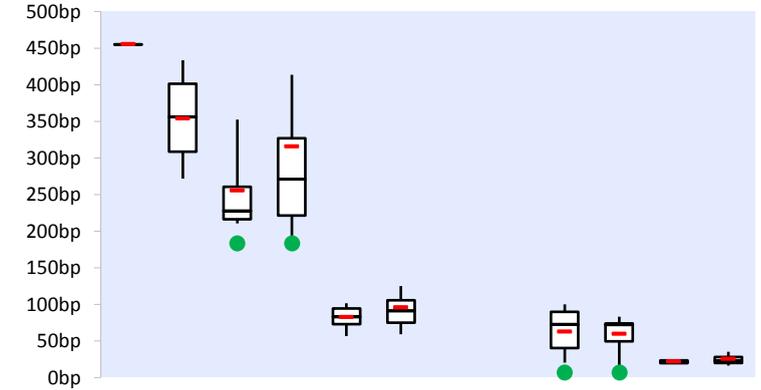
Real Estate ex-REITs

Cost as a % of the amount fees are based on¹



	Fund of Funds										Direct LP						Evergreen					
	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
90th %ile	29.5	93.2	22.5	44.7	134.1	197.2	186.1	329.3	131.3	220.5	139.1	141.4	79.0	113.9	245.2	269.5	91.5	106.5	16.9	22.0	108.6	128.7
75th %ile	29.5	86.7	22.5	44.1	134.1	175.8	186.1	313.8	131.3	215.8	136.9	136.0	79.0	79.0	215.8	211.0	78.1	89.5	16.0	16.5	94.1	110.5
Median	29.5	82.3	22.5	39.1	134.1	153.1	186.1	281.7	131.3	205.8	133.5	132.3	65.4	62.0	198.0	196.2	69.9	77.4	16.0	16.0	83.2	93.4
25th %ile	29.5	68.5	22.5	31.5	134.1	140.2	186.1	240.2	131.3	181.7	127.1	130.0	56.8	50.2	185.0	180.0	59.3	65.9	15.4	16.0	73.2	78.6
10th %ile	29.5	45.1	22.5	26.1	134.1	136.5	186.1	207.7	131.3	151.4	120.7	120.0	54.9	33.5	174.0	157.7	46.7	46.7	1.8	8.6	55.0	57.0
Average	29.5	72.9	22.5	36.4	134.1	162.9	186.1	272.3	131.3	191.7	132.7	133.6	71.6	66.6	204.3	200.3	70.3	77.4	13.2	17.0	83.5	94.4
Count	1	4	1	4	1	4	1	4	1	4	14	36	14	36	14	36	15	35	15	35	15	35
Avg. assets	275M	344M	275M	344M	275M	344M	275M	344M	275M	344M	1,483M	3,082M	1,483M	3,082M	1,483M	3,082M	2,559M	2,996M	2,559M	2,996M	2,559M	2,996M
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	97.7	97.7	55.4	55.4	153.1	153.1	n/a	n/a	n/a	n/a	n/a	n/a
%ile											0%	0%	23%	43%	9%							
Assets											2,831M	2,831M	2,831M	2,831M	2,831M	2,831M						

Cost as a % of NAV



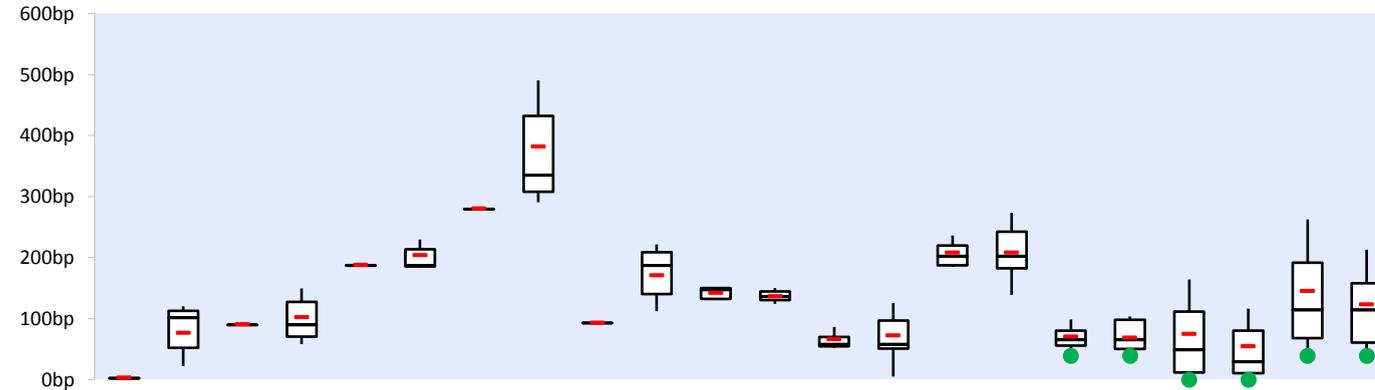
	Fund of Funds		Direct LP		Evergreen		Oper. Sub.		Co-Inv.		Internal	
	Total ³ incl. perf.		Total ³ incl. perf.		Total ³ incl. perf.		Total		Total		Total	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	455.2	433.6	352.2	413.7	101.4	125.2			100.0	83.2	24.6	35.1
75th %ile	455.2	401.3	260.5	326.7	94.1	105.5			89.8	73.7	23.5	28.0
Median	455.2	356.3	227.9	271.3	83.2	91.3			72.9	72.4	21.6	23.4
25th %ile	455.2	308.8	216.2	221.2	73.2	75.1			40.1	49.8	19.7	20.0
10th %ile	455.2	271.8	210.7	193.7	56.4	59.1			20.4	6.9	18.5	16.1
Average	455.2	353.7	255.1	315.3	82.5	95.7			62.3	59.4	21.6	25.0
Count	1	4	14	36	15	35	0	0	3	9	2	7
Avg. assets	112M	283M	1,280M	2,272M	2,577M	3,019M			89M	1,473M	224M	2,280M
South Carolina Retirement System Investment Commission												
You	n/a	n/a	183.8	183.8	n/a	n/a	n/a	n/a	7.3	7.3	n/a	n/a
%ile			0%	9%					0%	13%		
Assets			2,359M	2,359M					1M	1M		

- 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 102 bps (on amount fees are based on) for underlying management fees and 32 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 1.9 bps for LPs. The peer average cost of monitoring and selecting was 4.2 bps for LPs and 2.0 bps for external (not LPs).

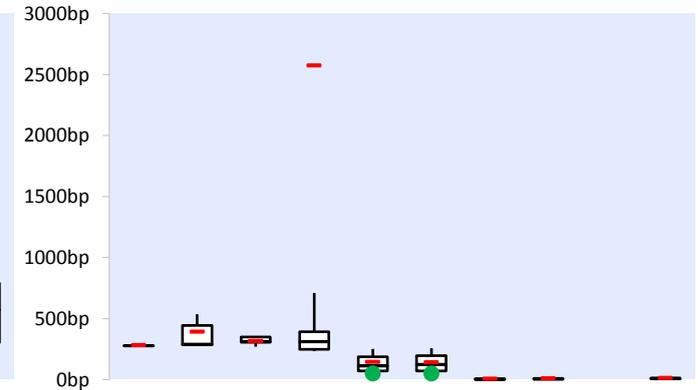
LP base fee is the weighted average management fee of 96 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 84 bps (23.8 million).

Infrastructure

Cost as a % of the amount fees are based on¹



Cost as a % of NAV

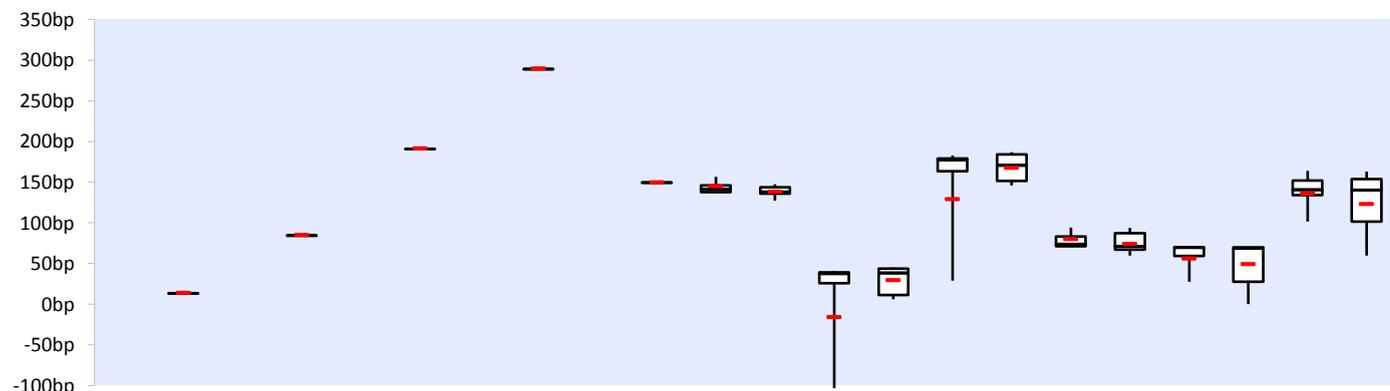


	Fund of Funds										Direct LP						Evergreen						Fund of Funds		Direct LP		Evergreen		Co-Inv.		Internal			
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. ²		Total ³ incl. perf.		Total ³ excl. perf.		Mgmt fees		Perf. fees		Total ³ incl. perf.		Mgmt fees		Perf. fees		Total ³ incl. perf.		Total ³ incl. perf.		Total		Total							
	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	2.5	119.9	90.0	149.6	187.4	229.5	279.9	490.3	92.9	221.7	149.9	149.9	86.1	125.7	236.0	273.8	98.5	103.6	164.1	116.4	262.6	212.9	279.9	536.0	355.7	709.5	250.0	257.1	5.3	10.8	12.5			
75th %ile	2.5	112.9	90.0	127.3	187.4	213.7	279.9	432.1	92.9	208.8	149.7	144.3	69.8	97.0	219.5	242.4	79.9	97.9	111.3	80.2	191.3	158.2	279.9	443.6	349.4	390.5	186.7	196.1	4.9	8.8	11.3			
Median	2.5	101.3	90.0	90.0	187.4	187.4	279.9	335.2	92.9	187.2	147.8	136.4	58.3	58.3	202.4	202.4	65.7	65.7	48.9	29.6	114.6	114.6	279.9	289.4	311.8	311.8	114.6	126.9	4.4	5.5	9.2			
25th %ile	2.5	51.9	90.0	70.2	187.4	185.4	279.9	307.6	92.9	140.1	132.2	130.3	54.5	50.7	187.3	182.6	56.0	50.1	11.9	10.5	67.9	60.6	279.9	284.7	305.1	248.8	71.2	71.2	3.8	4.4	7.2			
10th %ile	2.5	22.3	90.0	58.4	187.4	184.2	279.9	291.0	92.9	111.8	130.3	124.2	52.3	5.2	184.7	138.7	45.7	32.4	4.7	0.0	50.5	32.4	279.9	281.8	270.2	233.6	59.7	41.6	3.5	3.7	6.0			
Average	2.5	76.1	90.0	101.7	187.4	203.6	279.9	381.4	92.9	170.2	141.7	136.0	66.1	71.8	207.8	207.8	70.3	68.5	74.3	53.9	144.6	122.5	279.9	389.0	314.6	2571.0	143.3	140.0	4.4	7.0	9.2			
Count	1	3	1	3	1	3	1	3	1	3	5	15	5	15	5	15	4	8	4	8	4	8	1	3	5	15	4	8	2	3	0	2		
Avg. assets	240M	109M	240M	109M	240M	109M	240M	109M	240M	109M	1,279M	1,155M	1,279M	1,155M	1,279M	1,155M	664M	703M	664M	703M	664M	703M	240M	108M	728M	722M	604M	537M	84M	195M		976M		
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	38.9	38.9	0.0	0.0	38.9	38.9	n/a	n/a	n/a	n/a	52.0	52.0	n/a	n/a	n/a	n/a		
%ile																	0%	14%			0%	14%					0%	14%						
Assets																	1,110M	1,110M	1,110M	1,110M	1,110M	1,110M	0M	0M	830M	830M	0M	0M	0M	0M	0M	0M		

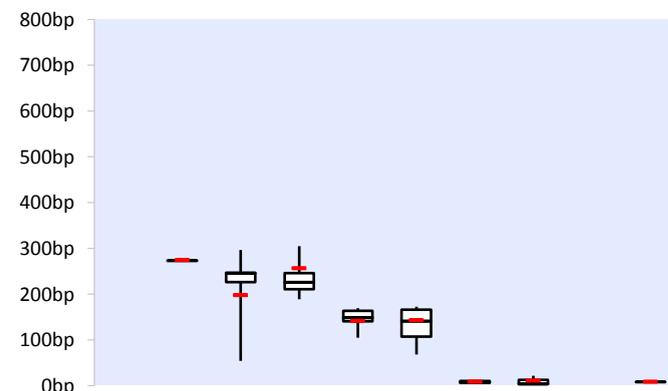
- The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
- The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 90 bps (on amount fees are based on) for underlying management fees and 97 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 2.1 bps for external (not LPs). The peer average cost of monitoring and selecting was 2.5 bps for fund of funds, 3.1 bps for LPs and 2.6 bps for external (not LPs).

Natural Resources

Cost as a % of the amount fees are based on¹



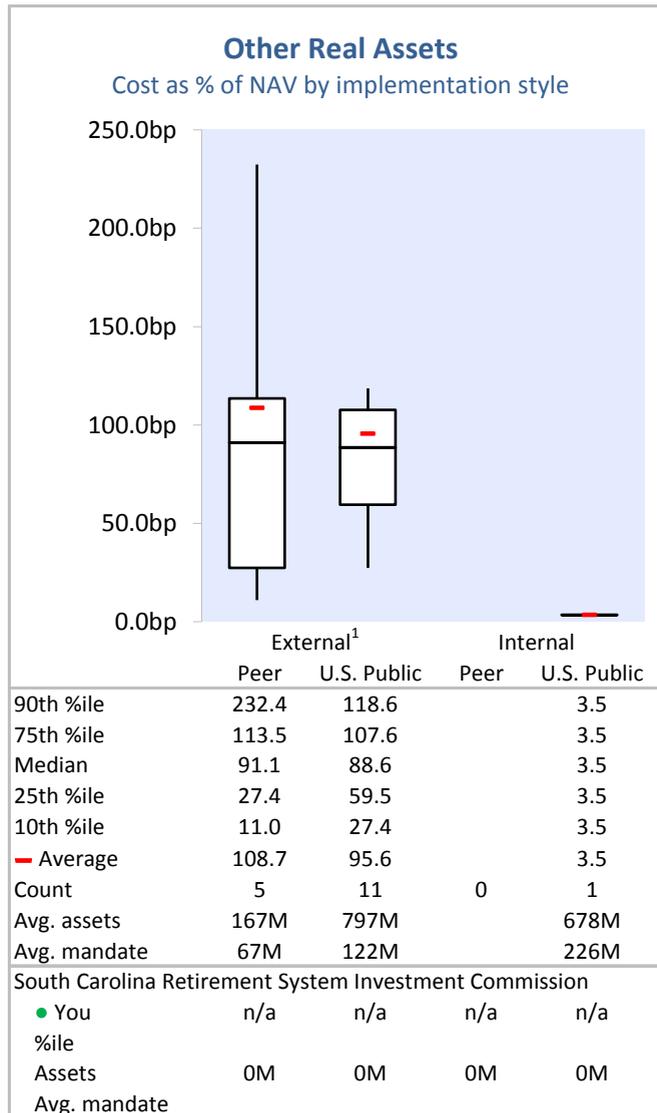
Cost as a % of NAV



	Fund of Funds						Direct LP						Evergreen									
	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
90th %ile		13.6		84.6		191.0		289.2		149.6	156.9	147.4	40.8	45.1	182.7	187.1	94.1	93.9	70.0	70.0	164.1	163.0
75th %ile		13.6		84.6		191.0		289.2		149.6	145.9	143.9	39.2	44.0	179.2	184.1	83.4	87.6	70.0	70.0	152.2	154.0
Median		13.6		84.6		191.0		289.2		149.6	141.4	138.1	37.8	38.5	177.8	170.7	73.8	71.5	70.0	69.1	141.0	140.7
25th %ile		13.6		84.6		191.0		289.2		149.6	137.6	136.1	25.8	11.4	163.4	151.5	71.3	67.4	59.3	27.9	134.2	101.7
10th %ile		13.6		84.6		191.0		289.2		149.6	136.6	127.1	-124.6	6.2	28.9	146.1	71.0	59.7	27.9	0.0	101.7	59.7
Average		13.6		84.6		191.0		289.2		149.6	145.0	138.1	-16.0	29.2	129.0	167.4	79.6	73.8	56.0	48.9	135.6	122.7
Count	0	1	0	1	0	1	0	1	0	1	5	14	5	14	5	14	6	11	6	11	6	11
Avg. assets		28M		28M		28M		28M		28M	1,427M	1,743M	1,427M	1,743M	1,427M	1,743M	380M	370M	380M	370M	380M	370M
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		Evergreen		Co-Inv.		Internal	
	Total ³ incl. perf.		Total ³ incl. perf.		Total ³ 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
	273.4	296.0	304.7	169.0	172.4	11.4	21.6		8.1	
	273.4	246.2	246.1	163.2	165.4	10.1	12.2		8.1	
	273.4	245.7	226.0	148.5	141.3	8.1	4.0		8.1	
	273.4	226.3	211.0	140.9	106.7	6.0	3.2		8.1	
	273.4	54.1	188.6	104.5	68.3	4.8	2.8		8.1	
	273.4	197.3	256.2	140.7	142.7	8.1	10.0		8.1	
Count	0	1	5	14	6	11	2	5	0	1
Avg. assets	30M	1,072M	1,228M	362M	318M	53M	722M		237M	
You										
	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

- 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 2.7 bps for LPs and 1.0 bps for external (not LPs).



1. Breakdown of external fees

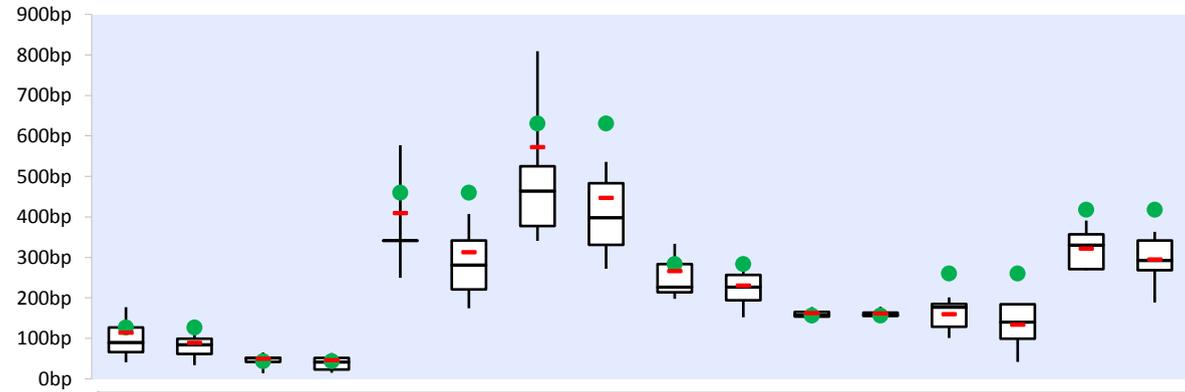
	Your Plan	Peer Average	U.S. Public Average
Base fees	n/a	94.1	88.2
Internal and other	n/a	24.4	16.3
Total*	n/a	108.7	95.6
Performance fees**	n/a	61.6	63.1

* 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 61.6 bps for peers (5 funds) and 63.1 bps for Global participants (11 funds).

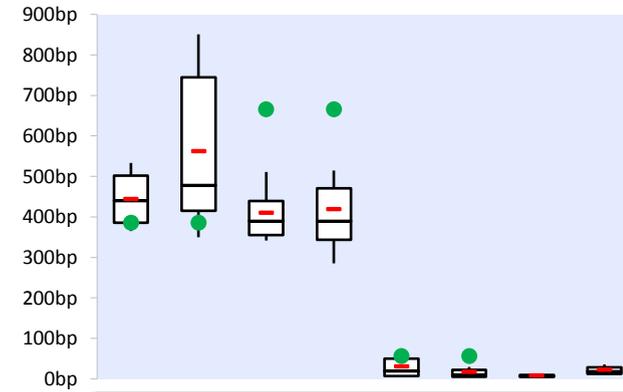
Diversified Private Equity

Cost as a % of the amount fees are based on¹



	Fund of Funds										Direct 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.	
	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	176.8	121.1	65.1	63.6	576.6	406.9	809.0	535.6	333.8	278.1	176.8	177.9	201.2	186.5	390.8	363.6
75th %ile	126.9	99.7	52.0	52.0	342.0	342.0	525.1	483.1	283.9	256.7	165.9	163.9	185.0	184.3	357.3	342.0
Median	90.3	85.3	52.0	41.8	342.0	281.7	464.2	397.8	227.2	227.0	157.1	157.2	177.4	140.6	331.4	292.4
25th %ile	66.5	61.9	42.1	23.3	342.0	221.4	377.4	330.6	214.2	194.4	154.0	155.8	128.8	99.0	271.4	268.8
10th %ile	41.1	33.7	14.2	14.9	250.1	174.3	340.9	272.1	198.1	152.5	138.5	143.5	101.5	41.7	268.8	189.1
— Average	113.3	88.7	48.9	45.1	408.8	312.1	571.0	445.8	265.8	229.6	161.6	160.8	159.2	133.3	320.8	294.1
Count	9	24	9	24	9	24	9	24	9	24	16	34	16	34	16	34
Avg. assets	1,089M	737M	1,089M	737M	1,089M	737M	1,089M	737M	1,089M	737M	4,364M	5,275M	4,364M	5,275M	4,364M	5,275M
South Carolina Retirement System Investment Commission																
● You	126.9	126.9	44.3	44.3	459.8	459.8	630.9	630.9	283.9	283.9	157.1	157.1	260.7	260.7	417.8	417.8
%ile	75%	91%	38%	57%	88%	96%	88%	96%	75%	91%	53%	48%	100%	100%	93%	97%
Assets	245M	245M	245M	245M	245M	245M	245M	245M	245M	245M	2,143M	2,143M	2,143M	2,143M	2,143M	2,143M

Cost as a % of NAV

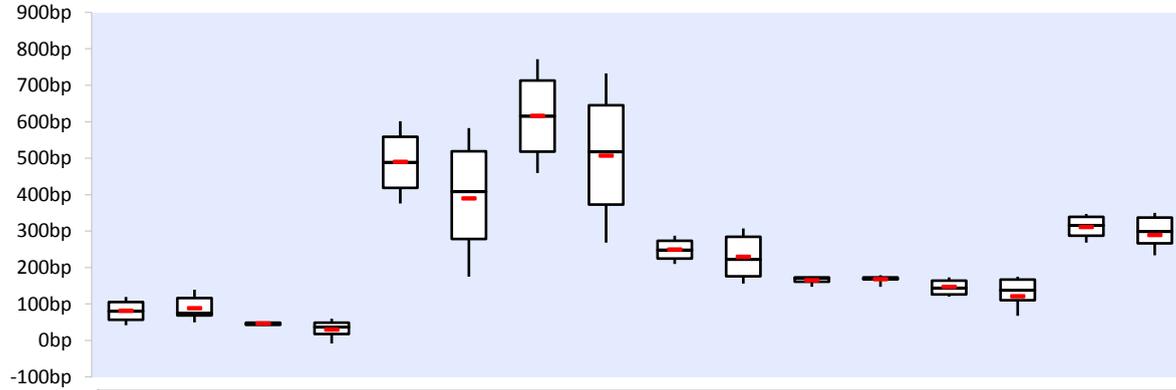


Fund of Funds		Direct LP		Co-Investment		Internal	
Total ³ incl. perf.		Total ³ incl. perf.		Total incl. perf.		Total	
Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
533.4	850.8	511.1	514.1	64.8	29.9	10.9	35.8
501.7	744.6	439.3	470.9	49.8	22.0	9.6	29.0
440.1	478.5	390.2	390.2	20.1	10.3	7.3	19.0
385.5	415.6	354.8	343.4	7.4	5.6	5.1	12.5
365.4	350.1	342.0	285.1	5.6	4.8	3.8	12.1
443.6	561.6	409.3	418.0	30.2	16.6	7.3	22.5
9	24	16	34	6	11	2	4
1,016M	596M	3,329M	4,183M	525M	1,292M	195M	215M
385.5	385.5	665.9	665.9	56.4	56.4	n/a	n/a
25%	17%	100%	97%	80%	100%		
401M	401M	1,345M	1,345M	550M	550M	0M	0M

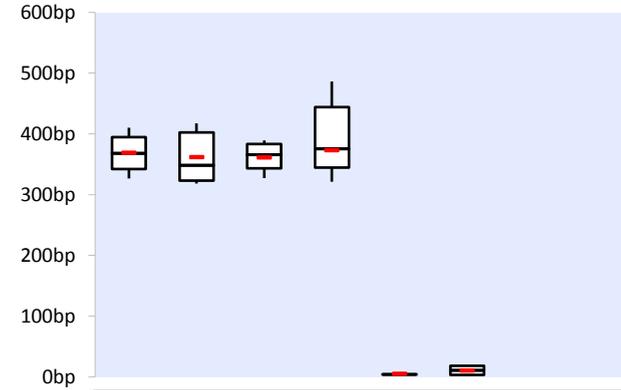
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund 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 185 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. Your cost of monitoring and selecting was 4.7 bps for fund of funds. The peer average cost of monitoring and selecting was 5.7 bps for fund of funds.

LBO

Cost as a % of the amount fees are based on¹



Cost as a % of NAV

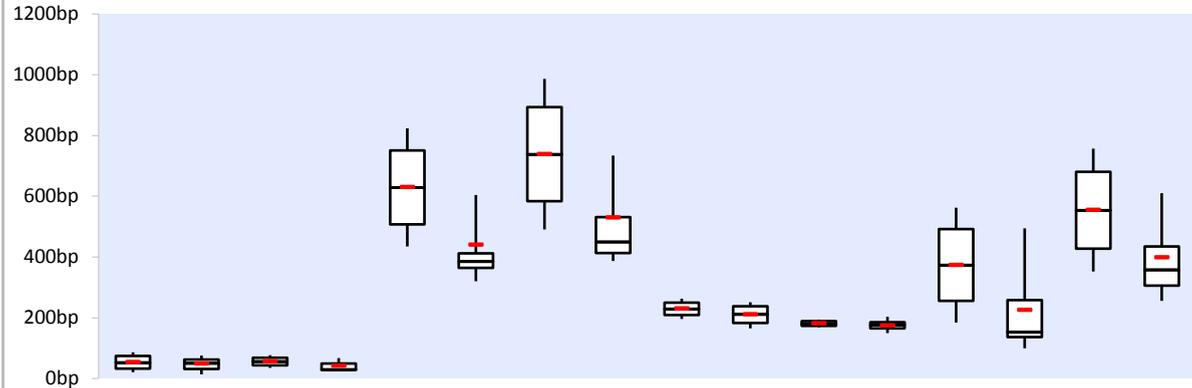


	Fund of Funds										Direct LP						Fund of Funds		Direct LP		Co-Investment		Internal	
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. ²		Total ³ incl. perf.		Total ³ excl. perf.		Mgmt fees		Perf. fees		Total ³ incl. perf.		Total ³ incl. perf.		Total incl. perf.		Total			
	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		
90th %ile	119.8	138.9	50.3	59.3	601.5	582.6	771.6	732.8	287.8	306.9	174.8	179.2	173.5	175.2	347.0	349.5	410.1	417.5	389.3	486.3	4.5	18.1		
75th %ile	105.3	116.4	48.6	48.6	559.3	519.1	713.1	644.9	273.3	284.4	173.3	173.1	163.7	167.0	338.6	336.9	394.4	402.4	383.3	444.1	4.5	18.1		
Median	81.0	74.7	45.7	37.2	488.8	409.0	615.6	517.5	249.0	222.9	170.8	169.1	144.0	138.6	316.3	299.1	368.3	348.6	366.2	375.6	4.5	11.3		
25th %ile	56.8	68.6	42.9	17.8	418.4	278.1	518.1	372.6	224.8	175.6	161.3	168.0	126.5	110.0	287.8	266.9	342.2	323.4	343.5	344.6	4.5	3.4		
10th %ile	42.3	50.0	41.1	-8.2	376.2	175.4	459.6	268.5	210.3	155.9	147.5	147.2	120.6	67.9	268.1	233.3	326.5	318.4	327.2	321.3	4.5	1.3		
Average	81.0	87.9	45.7	29.4	488.8	389.0	615.6	506.3	249.0	228.6	163.9	167.3	146.2	120.7	310.1	287.9	368.3	361.5	360.5	372.6	4.5	10.2		
Count	2	6	2	6	2	6	2	6	2	6	4	14	4	14	4	14	2	6	4	14	1	4		
Avg. assets	58M	517M	58M	517M	58M	517M	58M	517M	58M	517M	1,899M	4,465M	1,899M	4,465M	1,899M	4,465M	91M	433M	1,525M	3,425M	174M	611M		
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	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		

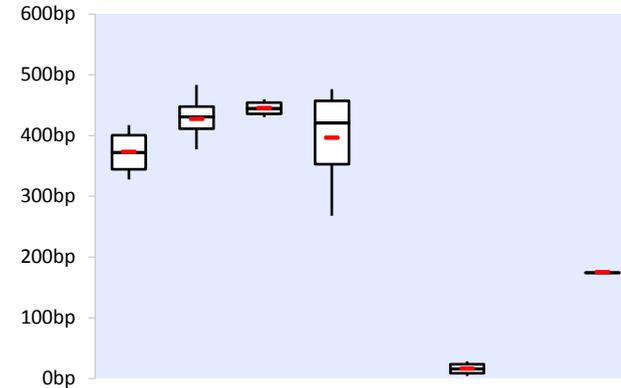
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 168 bps (on amount fees are based on) for underlying management fees and 180 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 9.7 bps for fund of funds.

Venture Capital

Cost as a % of the amount fees are based on¹

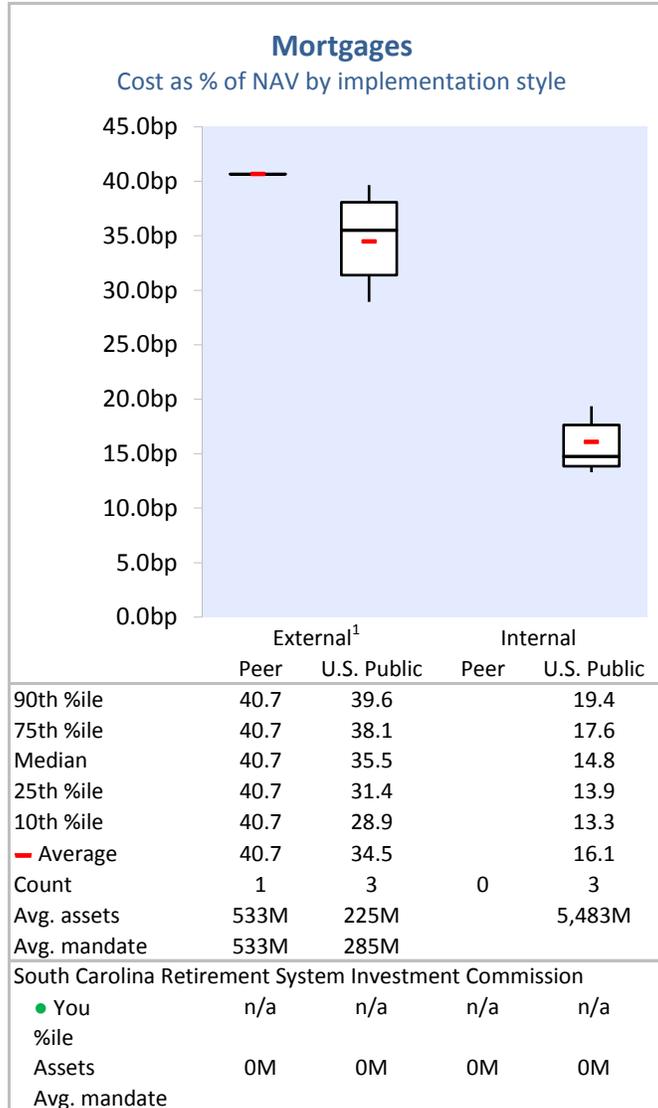


Cost as a % of NAV



	Fund of Funds										Direct 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.	
	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	86.4	75.2	76.7	67.5	823.2	603.5	986.3	734.5	262.4	251.2	194.0	203.1	562.8	493.8	756.8	610.5
75th %ile	74.1	62.4	68.9	48.8	750.3	411.6	893.3	531.2	250.1	238.4	189.1	184.9	491.8	258.1	680.9	435.0
Median	53.5	50.1	55.9	30.0	628.9	386.0	738.3	450.4	229.5	211.3	181.0	177.4	373.5	153.6	554.5	358.2
25th %ile	32.9	32.0	43.0	28.7	507.4	364.7	583.3	413.5	208.9	182.9	172.9	165.3	255.2	136.8	428.1	306.3
10th %ile	20.5	13.6	35.2	27.6	434.6	319.7	490.3	387.1	196.5	165.5	168.1	149.7	184.2	100.0	352.3	256.3
— Average	53.5	48.4	55.9	41.3	628.9	440.0	738.3	529.7	229.5	211.3	181.0	173.4	373.5	224.6	554.5	398.0
Count	2	8	2	8	2	8	2	8	2	8	2	13	2	13	2	13
Avg. assets	181M	444M	181M	444M	181M	444M	181M	444M	181M	444M	526M	785M	526M	785M	526M	785M
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
Assets	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 176 bps (on amount fees are based on) for underlying management fees and 210 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 8.7 bps for fund of funds.



1. Breakdown of external fees

	Your Plan	Peer Average	U.S. Public Average
Base fees	n/a	39.1	33.4
Internal and other	<u>n/a</u>	<u>1.5</u>	<u>1.7</u>
Total*	n/a	40.7	34.5
Performance fees**	n/a	n/a	n/a

* 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 61.6 bps for peers (5 funds) and 63.1 bps for Global participants (11 funds).

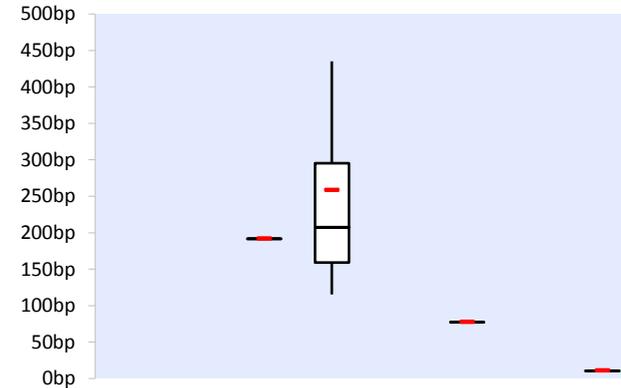
Other Private Equity

Cost as a % of the amount fees are based on¹



	Fund of Funds										Direct 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.	
	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											127.8	209.2	64.0	81.9	191.8	280.9
75th %ile											127.8	150.0	64.0	70.4	191.8	220.4
Median											127.8	63.2	64.0	64.0	191.8	97.9
25th %ile											127.8	43.9	64.0	6.1	191.8	64.3
10th %ile											127.8	24.2	64.0	3.5	191.8	49.5
— Average											127.8	103.4	64.0	43.8	191.8	147.2
Count	0	0	0	0	0	0	0	0	0	0	1	7	1	7	1	7
Avg. assets											1,681M	785M	1,681M	785M	1,681M	785M
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
Assets	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M

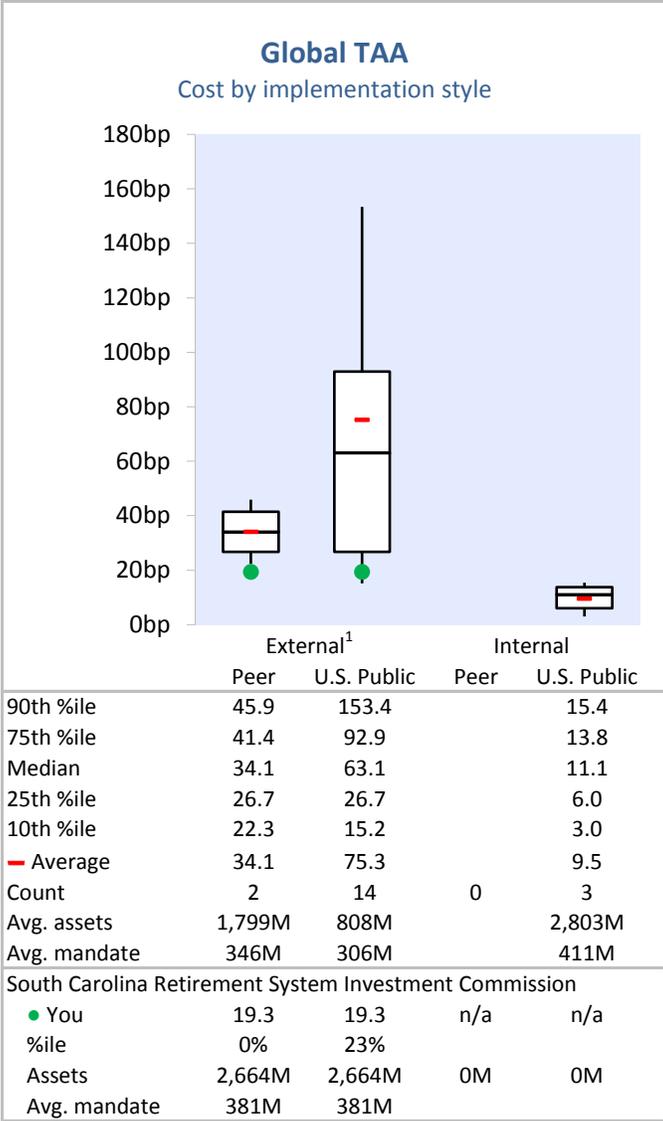
Cost as a % of NAV



	Fund of Funds		Direct LP		Co-Investment		Internal	
	Total ³ incl. perf.		Total ³ 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
90th %ile								
75th %ile								
Median								
25th %ile								
10th %ile								
— Average								
Count	0	0	1	7	0	1	0	1
Avg. assets			1,681M	581M		45M		5M
South Carolina Retirement System Investment Commission								
● You %ile	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

1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.

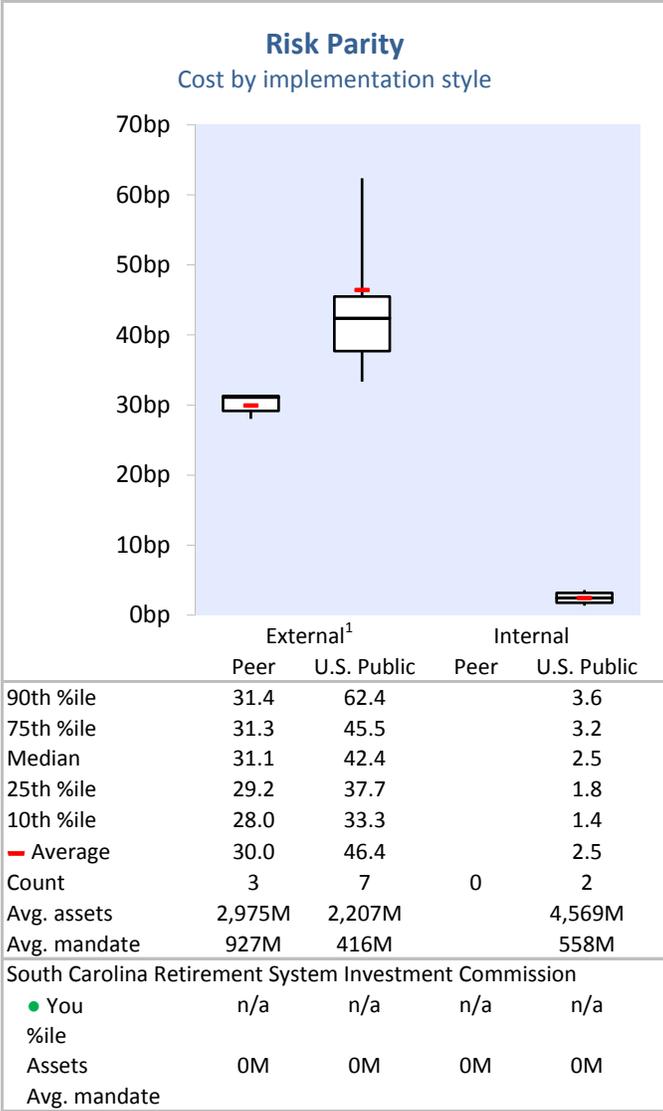
2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of n/a bps (on amount fees are based on) for underlying management fees and n/a bps (on NAV) for underlying performance fees were used.



1. Breakdown of external fees

	Your Plan	Peer Average	U.S. Public Average
Base fees	16.5	30.1	61.8
Internal and other	<u>2.8</u>	<u>4.0</u>	<u>6.1</u>
Performance fees	0.0	0.0	15.9
Total*	19.3	34.1	75.3

* 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 0.0 bps for peers (1 fund) and 15.9 bps for U.S. Public participants (8 funds).



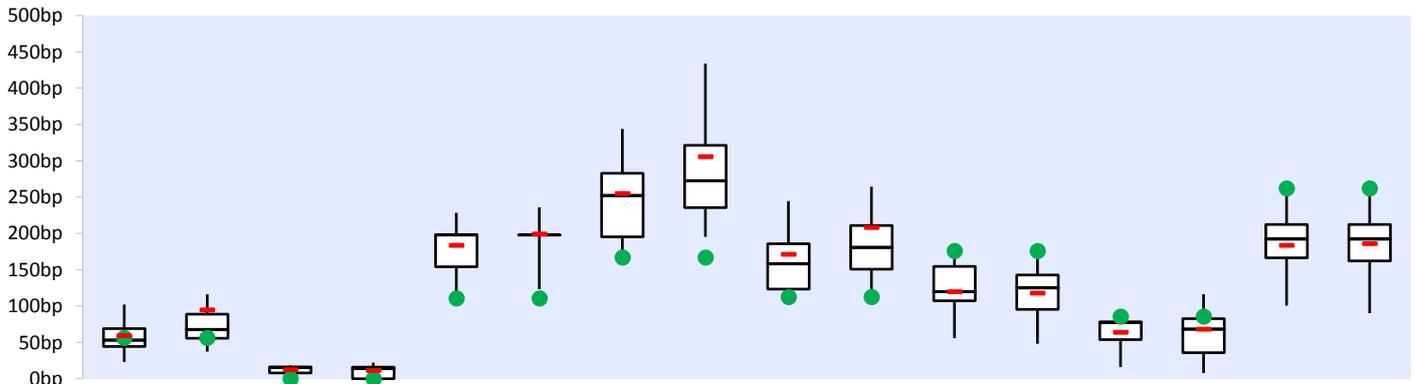
1. Breakdown of external fees

	Your Plan	Peer Average	U.S. Public Average
Base fees	n/a	29.5	45.2
Internal and other	<u>n/a</u>	<u>0.7</u>	<u>1.3</u>
Performance fees	n/a	0.0	0.3
Total*	n/a	30.0	46.4

* 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 0.3 bps for U.S. Public participants (5 funds).

Hedge Funds

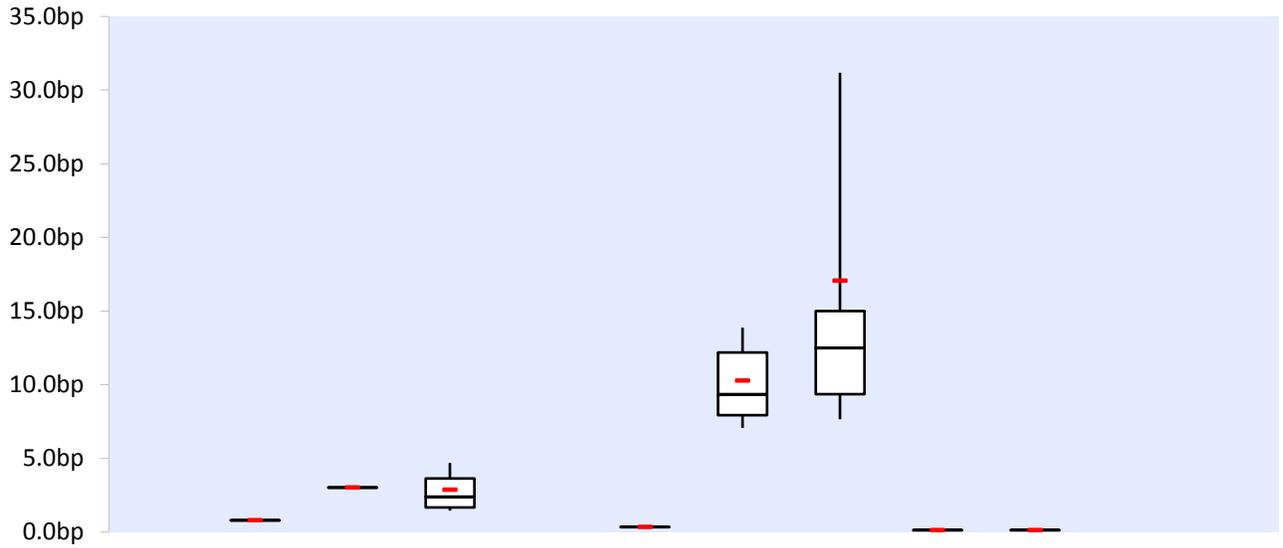
Cost by implementation style



	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	102.1	116.2	18.6	21.9	228.5	236.2	344.1	433.7	244.7	264.5	173.5	169.3	93.7	116.4	265.5	264.6
75th %ile	68.9	88.8	16.0	16.0	198.0	198.0	283.0	321.3	185.8	211.2	154.5	142.7	78.0	82.6	212.2	212.2
Median	53.4	68.1	16.0	14.4	198.0	198.0	252.5	272.7	158.5	181.0	120.0	125.4	78.0	68.6	192.6	192.6
25th %ile	44.3	55.6	8.0	0.0	154.3	198.0	195.4	235.7	123.3	151.0	107.3	95.4	53.9	36.1	166.4	162.4
10th %ile	23.1	37.2	0.0	0.0	109.4	123.5	172.9	195.4	117.1	123.3	55.8	48.4	15.8	7.9	100.9	90.2
— Average	59.0	94.6	12.3	11.5	183.5	199.4	254.8	305.5	171.3	208.0	119.8	117.6	63.9	68.2	183.6	185.8
Count	7	16	7	16	7	16	7	16	7	16	9	25	9	25	9	25
Avg. assets	963M	398M	963M	398M	963M	398M	963M	398M	963M	398M	3,206M	3,243M	3,206M	3,243M	3,206M	3,243M
South Carolina Retirement System Investment Commission																
● You	56.4	56.4	0.0	0.0	110.7	110.7	167.1	167.1	112.7	112.7	176.1	176.1	85.9	85.9	262.0	262.0
%ile	67%	27%	0%	0%	17%	7%	0%	0%	0%	0%	100%	96%	88%	79%	88%	88%
Assets	1,247M	1,247M	1,247M	1,247M	1,247M	1,247M	1,247M	1,247M	1,247M	1,247M	1,972M	1,972M	1,972M	1,972M	1,972M	1,972M

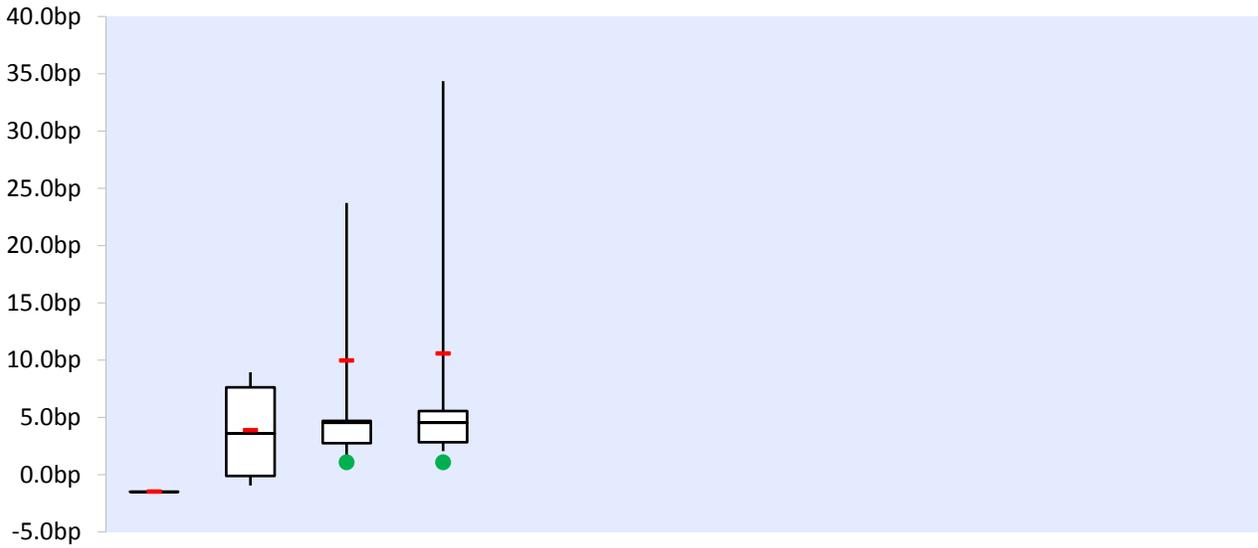
- The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 120 bps (on NAV) for underlying management fees and 78 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 3.2 bps for fund of funds and 3.7 bps for LPs.

Overlays: currency, duration
Cost by implementation style



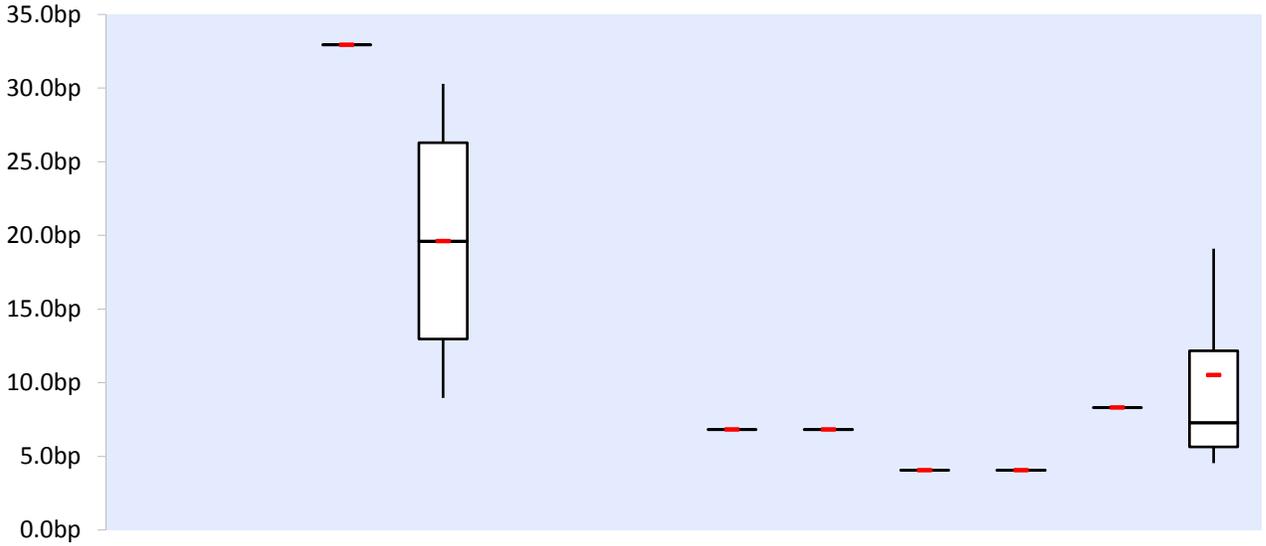
	Currency Hedge				Discretionary Currency				Duration Management			
	Internal		External		Internal		External		Internal		External	
	% of notional		% of notional		% of notional		% of notional		% of notional		% of notional	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile		0.8	3.0	4.7		0.3	13.9	31.2	0.1	0.1		
75th %ile		0.8	3.0	3.6		0.3	12.2	15.0	0.1	0.1		
Median		0.8	3.0	2.4		0.3	9.4	12.5	0.1	0.1		
25th %ile		0.8	3.0	1.7		0.3	7.9	9.4	0.1	0.1		
10th %ile		0.8	3.0	1.5		0.3	7.1	7.6	0.1	0.1		
— Average		0.8	3.0	2.9		0.3	10.3	17.1	0.1	0.1		
Count	0	1	1	4	0	1	3	5	1	1	0	0
Avg. notional		4,255M	3,981M	2,377M		32,326M	2,309M	2,444M	1,319M	1,319M		
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 Peer	% of notional U.S. Public	% of notional Peer	% of notional U.S. Public	% of notional Peer	% of notional U.S. Public	% of notional Peer	% of notional U.S. Public	% of notional Peer	% of notional U.S. Public	% of notional Peer	% of notional U.S. Public
90th %ile	-1.5	9.0	23.7	34.4								
75th %ile	-1.5	7.6	4.7	5.5								
Median	-1.5	3.6	4.6	4.6								
25th %ile	-1.5	-0.1	2.8	2.8								
10th %ile	-1.5	-0.9	1.6	2.1								
— Average	-1.5	3.9	10.0	10.6								
Count	1	4	6	10	0	0	0	0	0	0	0	0
Avg. notional		4,689M	1,752M	3,150M								
South Carolina Retirement System Investment Commission												
● You	n/a	n/a	1.1	1.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile			0%	0%								
Avg. notional			7,409M	7,409M								

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



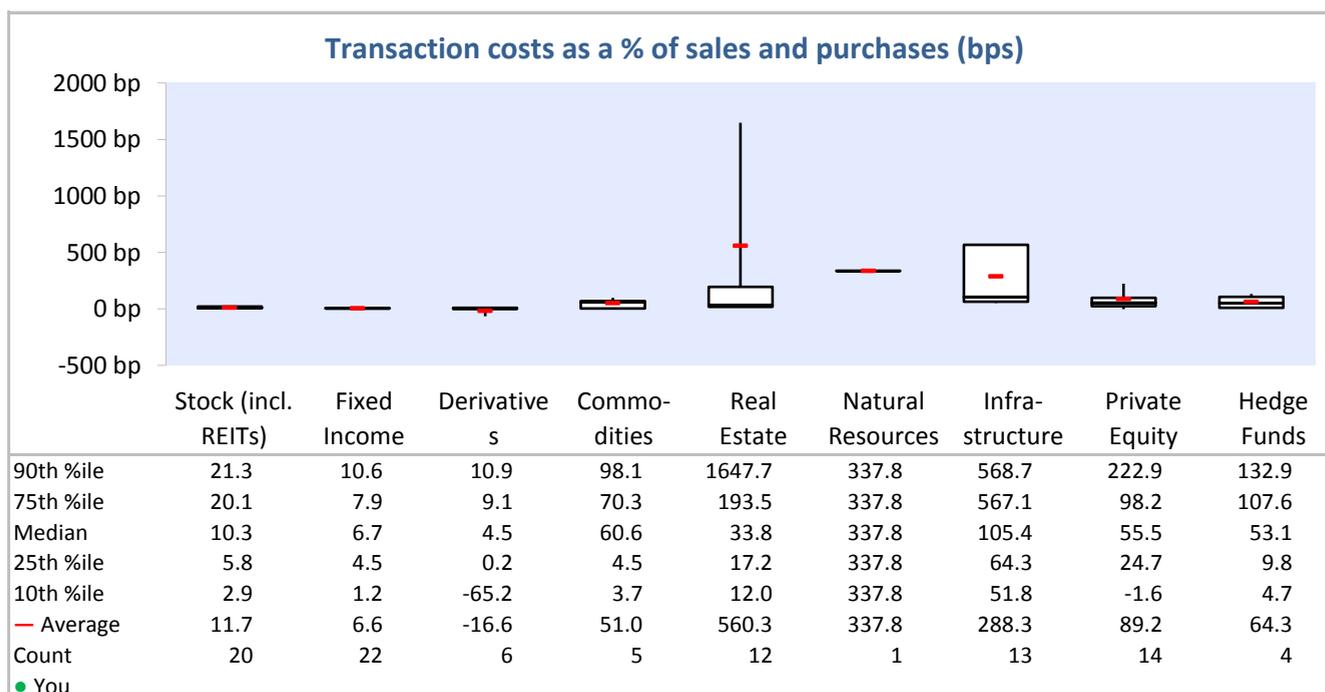
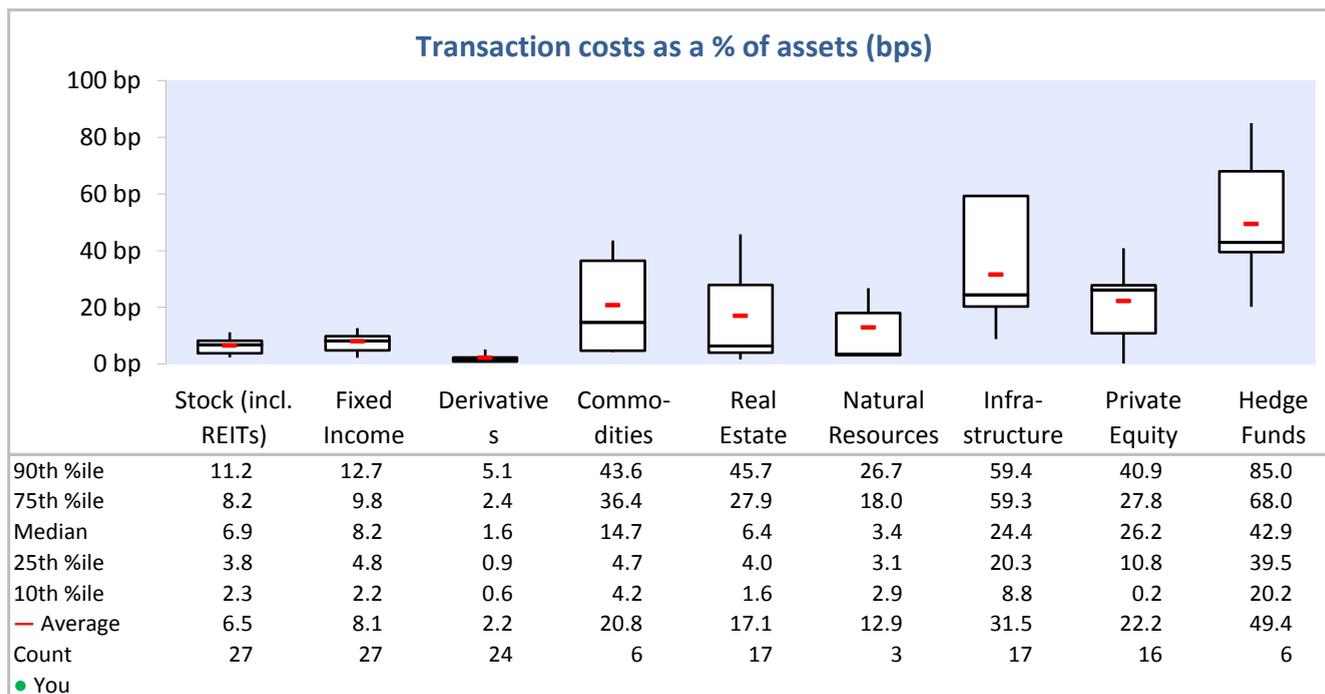
	Commodity				Long/ Short				Other			
	Internal		External		Internal		External		Internal		External	
	% of notional Peer	% of notional U.S. Public	% of notional Peer	% of notional U.S. Public	% of notional Peer	% of notional U.S. Public	% of notional Peer	% of notional U.S. Public	% of notional Peer	% of notional U.S. Public	% of notional Peer	% of notional U.S. Public
90th %ile			33.0	30.3			6.8	6.8	4.1	4.1	8.3	19.1
75th %ile			33.0	26.3			6.8	6.8	4.1	4.1	8.3	12.2
Median			33.0	19.6			6.8	6.8	4.1	4.1	8.3	7.3
25th %ile			33.0	13.0			6.8	6.8	4.1	4.1	8.3	5.6
10th %ile			33.0	9.0			6.8	6.8	4.1	4.1	8.3	4.5
— Average			33.0	19.6			6.8	6.8	4.1	4.1	8.3	10.5
Count	0	0	1	2	0	0	1	1	1	1	1	4
Avg. notional			500M	818M			514M	514M	413M	413M	436M	754M
South Carolina Retirement System Investment Commission												
● You	n/a	n/a										
%ile												
Avg. notional												

Transaction costs

Throughout this report transaction costs are excluded as at this point not enough plans are able to provide consistent data. However, efforts to obtain these costs is increasing globally. This section provides some of the insights obtained from the data that was collected from the transaction cost survey.

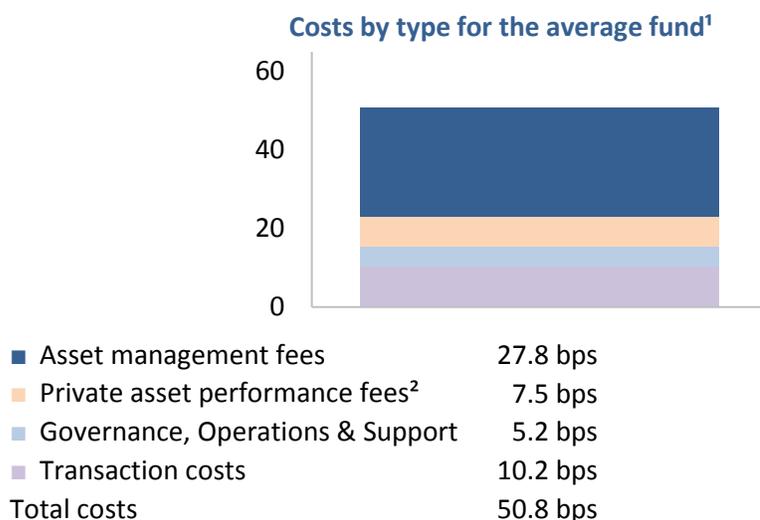
Variance in transaction costs by asset class

Variance in reported cost for public equity and fixed income is smaller compared to the private asset classes. This can in part be explained by differences in transaction volumes.



An estimate of total portfolio transaction costs for the average fund.

Transaction costs are estimated to be 10.2 bps and account for 20% of the average fund's total investment costs.



Calculation of transaction costs for the average fund.

Asset class	Benchmark	Average	Impact
	cost ³	holdings	
	<i>C</i>	<i>P</i>	<i>I = C x P</i>
Stock (incl. REITs)	6.9 bps	31%	2.1 bps
Fixed Income	8.2 bps	53%	4.4 bps
Commodities	14.7 bps	1%	0.1 bps
Real Estate	21.6 bps	6%	1.2 bps
Natural Resources	32.6 bps	0%	0.1 bps
Infrastructure	24.5 bps	2%	0.5 bps
Private Equity	27.0 bps	3%	0.8 bps
Hedge Funds	45.3 bps	1%	0.4 bps
<hr/>			
Total (ex. derivatives)		97%	9.6 bps
Derivatives	1.6 bps	42%	0.7 bps
<hr/>			
Total transaction costs		139%	10.2 bps

1. Total investment cost is calculated as the sum of the median fees paid for the different cost types by the funds that participated in the transaction cost survey.
2. Includes performance fees for real estate, infrastructure, natural resources, private credit and private equity. Performance fees for the public market asset classes, hedge funds and mortgages are included with asset management fees.
3. Benchmark cost is based on median costs of all transaction survey participants. For private assets medians are adjusted to exclude funds with unusually low transaction costs (i.e., lower than 5 bps).

Your total portfolio transaction costs

Your transaction costs can be estimated based on your asset mix and the median universe costs and are estimated to account for 19% of your total investment costs (excl. private asset performance fees). Interpret this number with caution. Funds are working to collect more complete and comparable transaction cost data.

Your estimated transaction costs as part of your total investment costs



	You
■ Asset management fees	72.7 bps
■ Private asset performance fees ¹	Excluded
■ Governance, Operations & Support	1.3 bps
■ Transaction costs	17.1 bps
Total costs	91.1 bps

Calculation of your estimated transaction costs.

Asset class	Benchmark cost ²	Your holdings	Impact
	<i>C</i>	<i>P</i>	<i>I = C x P</i>
Stock (incl. REITs)	6.9 bps	37%	2.6 bps
Fixed Income	8.2 bps	18%	1.5 bps
Commodities	14.7 bps	0%	0.0 bps
Real Estate	21.6 bps	7%	1.6 bps
Natural Resources	32.6 bps	0%	0.0 bps
Infrastructure	24.5 bps	3%	0.6 bps
Private Equity	27.0 bps	7%	2.0 bps
Hedge Funds	45.3 bps	19%	8.4 bps
Total (excl. derivatives)		91%	16.7 bps
Derivatives	1.6 bps	23%	0.4 bps
Total transaction costs		115%	17.1 bps

1. Includes performance fees for real estate, infrastructure, natural resources, private credit and private equity. Performance fees for the public market asset classes, hedge funds and mortgages are included with asset management fees.

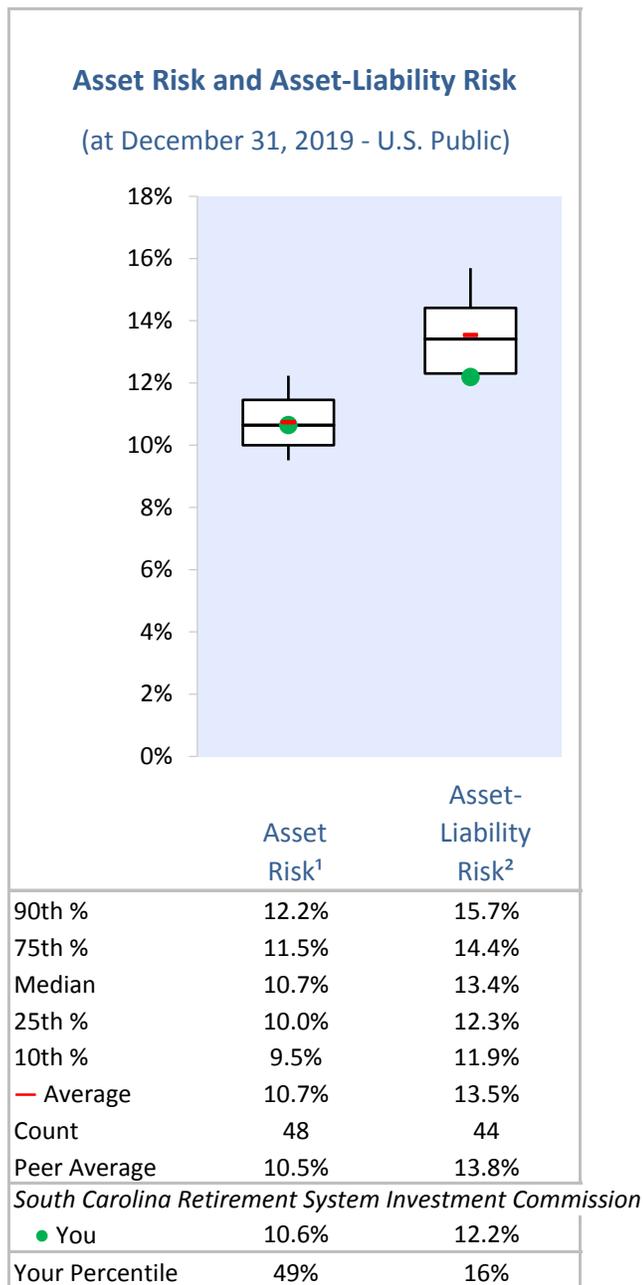
2. Benchmark cost is based on median costs of all transaction survey participants. For private assets medians are adjusted to exclude funds with unusually low transaction costs (i.e., lower than 5 bps).

6

Risk

Comparison of your risk levels to the U.S. Public universe	2
Calculation of asset risk	3
Reduction in asset risk due to diversification	4
Asset-liability risk	5
Liability proxy portfolio	6
Liability risk	7
Projected worst case scenarios	8
Historic worst case scenarios during the past 5 years	9
Risk Trends - 2015 to 2019	10
Appendix A-B - Risk methodology	11
Appendix C - Correlation Matrix	15

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 11.8%.

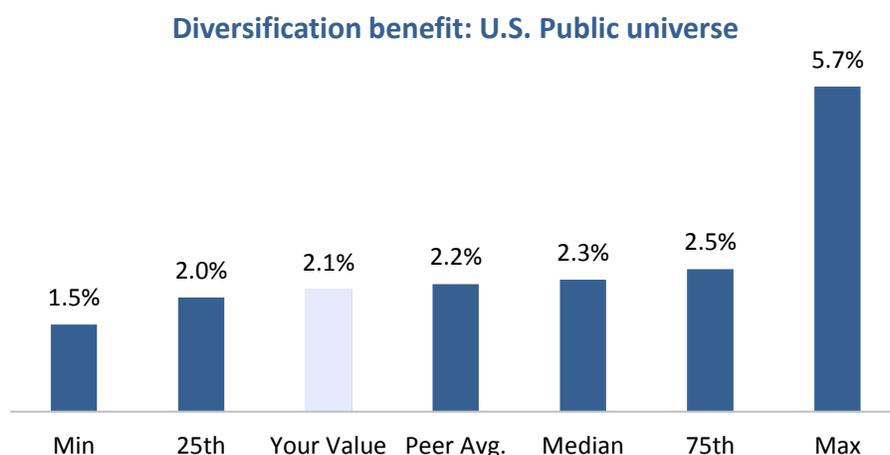
Calculation of your weighted asset class risk

Asset Class	Policy weight (A)	Risk ¹ (B)	Weighted risk (A X B)
Stock: Australia	26.0%	14%	3.5%
Stock: Emerging	2.7%	19%	0.5%
Stock: Global	30.2%	13%	3.9%
Bonds: Australia	4.4%	5%	0.2%
Bonds: Global	6.9%	10%	0.7%
Bonds: Cash	5.5%	1%	0.0%
Real Estate ex-REITs	7.5%	7%	0.5%
Infrastructure	11.7%	13%	1.5%
Hedge Funds	0.2%	8%	0.0%
Diversified Private Equity	1.5%	20%	0.3%
Venture Capital	0.3%	20%	0.1%
LBO	2.0%	20%	0.4%
Private Credit	1.2%	10%	0.1%
Weighted Total			11.8%

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.



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

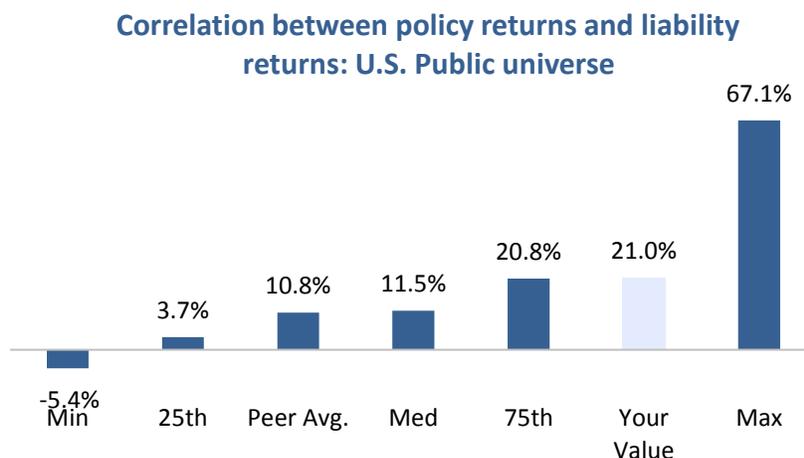
Components of asset risk

	You	Peer median*	Peer average	U.S. Public median*	U.S. Public average
Weighted asset risk	12.8%	12.6%	12.7%	13.0%	13.1%
Benefit of diversification	2.1%	2.2%	2.2%	2.3%	2.3%
Asset risk	10.6%	10.6%	10.5%	10.7%	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)	10.6%	10.6%	10.5%	10.7%	10.7%
Liability risk (R_L)	8.6%	9.9%	9.9%	9.6%	9.6%
Correlation between policy returns and liability returns (ρ_{AL})	21.0%	9.0%	10.8%	11.5%	13.1%
Asset-liability risk	12.2%	13.6%	13.8%	13.4%	13.5%

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	13.7	95%	12.0	48%	11.8	56%
Nominal Bonds	10.0	5%	12.7	52%	13.0	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	1	2%
Career Average	1	2%
Final/Highest/Best Avg	44	83%
Other	7	13%
Total	53	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%	0	23	0
>0% and <50%	0	0	0
50%	0	1	0
>50% and <100%	0	6	0
100%	0	16	0
Total	0	46	0

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 61%.

	Your fund	Peer Average	U.S. Public Average
Active Members	59%	55%	56%
Retired Members	41%	45%	44%
Total	100%	100%	100%

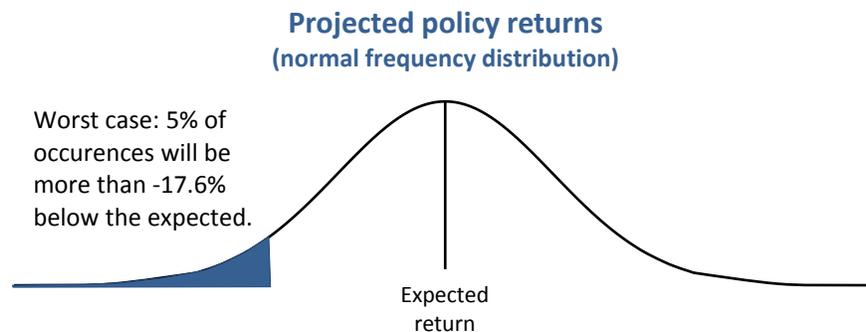
Projected worst case scenarios

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.

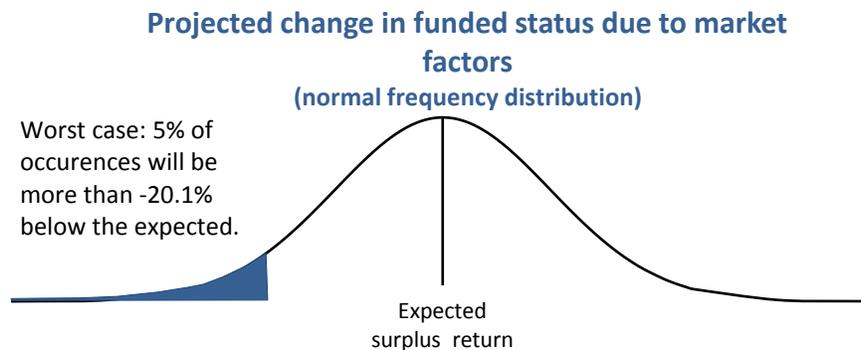
a) Worst case policy returns

Every year there is a 5% probability that your policy return will be worse than your expected policy return by more than -17.6% (-17.6% equals $-1.65 \times$ your asset risk of 10.6%). -17.6% 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 -20.1%. (-20.1% equals $-1.65 \times$ your asset-liability risk of 12.2%). -20.1% 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 -2.9% in 2018.

Historic policy returns - U.S. Public universe

	2019	2018	2017	2016	2015
90th %	18.7%	0.3%	16.5%	9.2%	1.4%
75th %	17.1%	-1.2%	15.9%	8.5%	0.8%
Median	15.1%	-2.6%	15.1%	8.0%	-0.3%
25th %	13.9%	-3.4%	14.2%	7.4%	-1.1%
10th %	10.6%	-5.1%	12.9%	6.7%	-1.8%
Average	15.3%	-2.4%	14.9%	8.0%	-0.2%
Count	48	59	60	59	64
Peer Avg	15.5%	-1.7%	14.6%	8.0%	-0.1%
Your Value	17.1%	-2.9%	14.6%	8.4%	-1.1%

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 -0.9% in 2018.

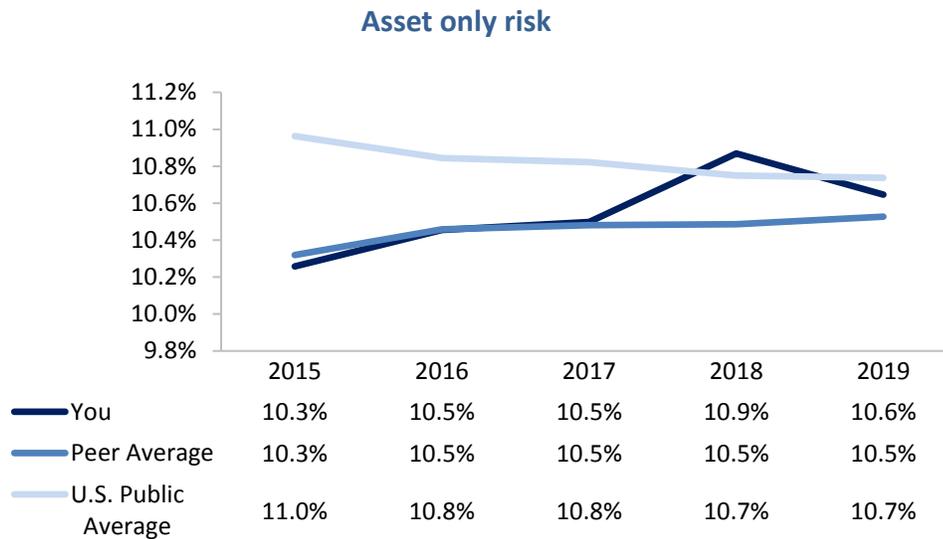
Historic changes in funded status caused by market factors - U.S. Public universe

	2019	2018	2017	2016	2015
90th %	7.9%	2.7%	8.7%	4.9%	4.6%
75th %	7.2%	0.9%	7.7%	4.4%	3.5%
Median	5.4%	-0.2%	6.7%	2.8%	2.1%
25th %	4.2%	-1.7%	5.1%	1.4%	0.8%
10th %	1.8%	-3.4%	3.1%	0.1%	-0.5%
Average	5.2%	-0.3%	6.4%	2.8%	2.1%
Count	44	54	54	55	59
Peer Avg	5.3%	-0.3%	6.2%	3.1%	2.4%
Your Value	5.3%	-0.9%	7.4%	1.1%	2.6%

Risk Trends - 2015 to 2019

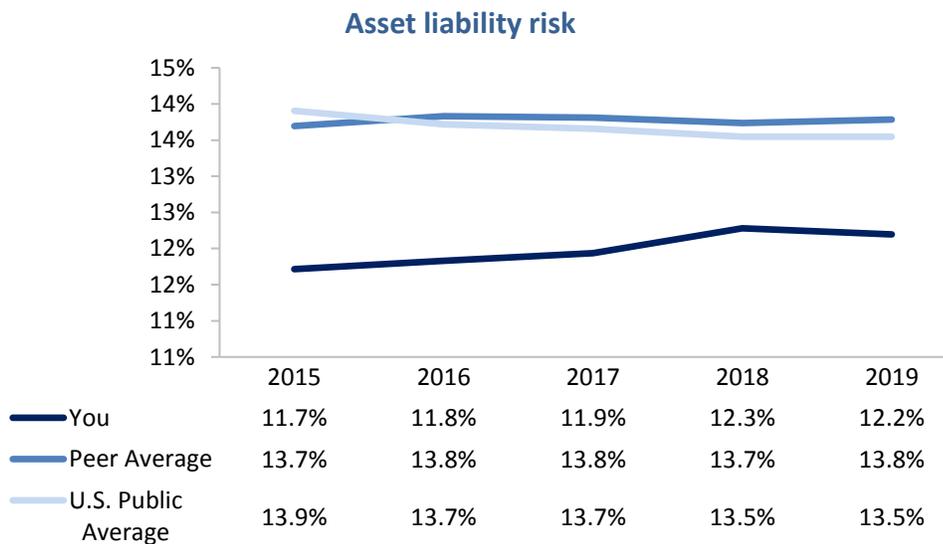
a) Asset risk trends

Asset risk will only change if policy asset mix changes. Between 2015 and 2019 the asset risk for your fund increased from 10.3% to 10.6%.



b) Asset-liability risk trends

Asset-liability risk will change if policy asset mix changes, or if the nature of your liabilities changes. Between 2015 and 2019 the asset-liability risk for your fund increased from 11.7% to 12.2%.



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 61%. 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.

$$\begin{aligned} &\text{Percentage change in pension liability cost} \\ &= (- \text{Modified duration relative to change in real yields} \times \text{change in real yields}) \\ &+ (- \text{Modified duration relative to change in nominal yields} \times \text{change in nominal yields}) \end{aligned}$$

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

$$\begin{aligned} &\text{Modified duration relative to changes in real yields} \\ &= 10 \times [\text{Inflation protection for active members} \times (1 - \% \text{ of liabilities relating to retirees}) \\ &+ \text{Inflation protection for retirees} \times (1 - \% \text{ of liabilities relating to retirees}/4) \\ &+ (\text{Inflation protection for retirees}/10) \times (1.5 - 0.5 \times \% \text{ liabilities relating to retirees})] \end{aligned}$$

$$\begin{aligned} &\text{Modified duration relative to changes in nominal yields} \\ &= 10 \times [(2 - 5 \times \% \text{ Liabilities relating to retirees}/4 - \text{inflation protection for actives} \times \\ &(1 - \% \text{ liabilities relating to retirees}) \\ &- (\text{Inflation protection for retirees}/10) \times (8.5 - 2 \times \% \text{ liabilities relating to retirees}) \\ &- (\text{Inflation protection for retirees}/10) \times (1.5 - 0.5 \times \% \text{ liabilities relating to retirees})] \end{aligned}$$

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	
2019	#N/A	#N/A	#N/A	#N/A	#N/A
2018	2.32	-0.35	0.69	0.08	1.91
2017	2.67	-0.12	0.61	-0.58	1.95
2016	2.79	-0.09	1.18	0.07	1.50
2015	2.88	0.07	1.11	0.18	1.70

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: Australia	Stock: Emerging	Stock: Global	Bonds: Australia	Bonds: Global	Bonds: Cash	Real Assets: Real Estate ex-REITs	Real Assets: Infrastructure	Hedge Funds	Diversified Private Equity	Venture Capital	LBO	Private Credit	Nominal Bond: Duration 0	Nominal Bond: Duration 1
Stock: Australia	1.00	0.60	0.55	0.02	-0.38	-0.09	0.54	0.22	0.00	0.66	0.66	0.66	0.07	-0.08	-0.11
Stock: Emerging	0.60	1.00	0.64	-0.05	-0.16	-0.10	0.24	0.33	0.14	0.61	0.61	0.61	0.21	-0.03	-0.08
Stock: Global	0.55	0.64	1.00	0.03	0.21	-0.16	0.32	0.72	0.58	0.80	0.80	0.80	0.52	-0.05	-0.07
Bonds: Australia	0.02	-0.05	0.03	1.00	0.42	0.14	0.60	0.07	0.19	-0.18	-0.18	-0.18	0.09	0.02	0.04
Bonds: Global	-0.38	-0.16	0.21	0.42	1.00	0.05	0.11	0.36	0.72	-0.16	-0.16	-0.16	0.56	0.21	0.41
Bonds: Cash	-0.09	-0.10	-0.16	0.14	0.05	1.00	-0.08	-0.04	-0.05	-0.19	-0.19	-0.19	-0.09	0.93	0.77
Real Assets: Real Estate ex-REITs	0.54	0.24	0.32	0.60	0.11	-0.08	1.00	0.31	0.20	0.46	0.46	0.46	0.22	-0.02	-0.01
Real Assets: Infrastructure	0.22	0.33	0.72	0.07	0.36	-0.04	0.31	1.00	0.61	0.40	0.40	0.40	0.53	-0.18	-0.28
Hedge Funds	0.00	0.14	0.58	0.19	0.72	-0.05	0.20	0.61	1.00	0.33	0.33	0.33	0.78	-0.12	-0.14
Diversified Private Equity	0.66	0.61	0.80	-0.18	-0.16	-0.19	0.46	0.40	0.33	1.00	1.00	1.00	0.43	-0.20	-0.23
Venture Capital	0.66	0.61	0.80	-0.18	-0.16	-0.19	0.46	0.40	0.33	1.00	1.00	1.00	0.43	-0.20	-0.23
LBO	0.66	0.61	0.80	-0.18	-0.16	-0.19	0.46	0.40	0.33	1.00	1.00	1.00	0.43	-0.20	-0.23
Private Credit	0.07	0.21	0.52	0.09	0.56	-0.09	0.22	0.53	0.78	0.43	0.43	0.43	1.00	-0.21	-0.29
Nominal Bond: Duration 0	-0.08	-0.03	-0.05	0.02	0.21	0.93	-0.02	-0.18	-0.12	-0.20	-0.20	-0.20	-0.21	1.00	0.88
Nominal Bond: Duration 1	-0.11	-0.08	-0.07	0.04	0.41	0.77	-0.01	-0.28	-0.14	-0.23	-0.23	-0.23	-0.29	0.88	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 Funds	Diversified Private Equity	Nominal Bond: Duration 10	Nominal Bond: Duration 14	Real Return Bond: Duration 10	Real Return Bond: Duration 11
Stock: U.S. Broad/All	1.00	0.99	0.89	0.68	0.69	0.90	0.76	0.18	0.55	0.61	0.16	0.03	0.59	0.56	0.78	0.89	-0.04	-0.03	0.03	0.02
Stock: U.S. Large Cap	0.99	1.00	0.82	0.74	0.67	0.90	0.76	0.11	0.54	0.60	0.08	0.03	0.56	0.53	0.77	0.88	-0.06	-0.07	0.02	0.02
Stock: U.S. Small Cap	0.89	0.82	1.00	0.61	0.66	0.77	0.68	0.09	0.50	0.61	0.08	0.01	0.63	0.58	0.69	0.86	-0.13	-0.12	-0.01	-0.02
Stock: EAFE	0.68	0.74	0.61	1.00	0.71	0.95	0.99	0.14	0.55	0.53	0.14	0.03	0.55	0.51	0.87	0.86	-0.04	-0.04	0.12	0.11
Stock: Emerging	0.69	0.67	0.66	0.71	1.00	0.77	0.77	0.02	0.69	0.58	0.02	0.01	0.49	0.45	0.80	0.78	-0.13	-0.14	0.17	0.16
Stock: Global	0.90	0.90	0.77	0.95	0.77	1.00	0.97	0.09	0.59	0.62	0.07	-0.01	0.58	0.54	0.86	0.90	-0.09	-0.11	0.09	0.08
Stock: ACWI x U.S.	0.76	0.76	0.68	0.99	0.77	0.97	1.00	0.08	0.59	0.58	0.06	-0.03	0.56	0.52	0.89	0.86	-0.09	-0.11	0.14	0.13
Bonds: U.S.	0.18	0.11	0.09	0.14	0.02	0.09	0.08	1.00	0.34	0.25	0.93	0.28	0.18	0.38	0.16	0.04	0.93	0.90	0.81	0.81
Bonds: Emerging	0.55	0.54	0.50	0.55	0.69	0.59	0.59	0.34	1.00	0.59	0.32	0.01	0.46	0.49	0.63	0.60	0.18	0.17	0.51	0.50
Bonds: High Yield	0.61	0.60	0.61	0.53	0.58	0.62	0.58	0.25	0.59	1.00	0.23	0.01	0.58	0.57	0.68	0.74	0.01	0.00	0.23	0.22
Bonds: Long Bonds	0.16	0.08	0.08	0.14	0.02	0.07	0.06	0.93	0.32	0.23	1.00	0.14	0.19	0.39	0.15	0.01	0.92	0.93	0.77	0.78
Bonds: Cash	0.03	0.03	0.01	0.03	0.01	-0.01	-0.03	0.28	0.01	0.01	0.14	1.00	-0.03	0.01	-0.04	-0.09	0.16	0.14	0.08	0.07
Real Assets: REITs	0.59	0.56	0.63	0.55	0.49	0.58	0.56	0.18	0.46	0.58	0.19	-0.03	1.00	0.96	0.55	0.75	0.00	-0.01	0.27	0.26
Real Assets: Real Estate ex-REITs	0.56	0.53	0.58	0.51	0.45	0.54	0.52	0.38	0.49	0.57	0.39	0.01	0.96	1.00	0.56	0.70	0.20	0.18	0.41	0.41
Hedge Funds	0.78	0.77	0.69	0.87	0.80	0.86	0.89	0.16	0.63	0.68	0.15	-0.04	0.55	0.56	1.00	0.79	-0.05	-0.08	0.34	0.32
Diversified Private Equity	0.89	0.88	0.86	0.86	0.78	0.90	0.86	0.04	0.60	0.74	0.01	-0.09	0.75	0.70	0.79	1.00	-0.23	-0.26	0.18	0.17
Nominal Bond: Duration 10	-0.04	-0.06	-0.13	-0.04	-0.13	-0.09	-0.09	0.93	0.18	0.01	0.92	0.16	0.00	0.20	-0.05	-0.23	1.00	0.98	0.75	0.76
Nominal Bond: Duration 14	-0.03	-0.07	-0.12	-0.04	-0.14	-0.11	-0.11	0.90	0.17	0.00	0.93	0.14	-0.01	0.18	-0.08	-0.26	0.98	1.00	0.71	0.73
Real Return Bond: Duration 10	0.03	0.02	-0.01	0.12	0.17	0.09	0.14	0.81	0.51	0.23	0.77	0.08	0.27	0.41	0.34	0.18	0.75	0.71	1.00	1.00
Real Return Bond: Duration 11	0.02	0.02	-0.02	0.11	0.16	0.08	0.13	0.81	0.50	0.22	0.78	0.07	0.26	0.41	0.32	0.17	0.76	0.73	1.00	1.00

7

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	2019	2018	2017	2016	2015
Survey Preparer	Kevin Reinhard	Kevin Reinhard	Kevin Reinhard	Landry C. Phillips	Landry C. Phillips
Additional Contact	Jon Rychener	Jon Rychener	Jon Rychener	Jon Rychener	Jon Rychener
Type of fund (corporate, public, other)	Public	Public	Public	Public	Public
Total fund size (\$mils) as at December 31	33,502.8	29,259.8	31,801.4	28,771.1	27,797.3
Asset-class level holdings provided on survey are: year end or average?	Average	Average	Average	Average	Average
Total return for year ended	16.81%	-4.20%	14.70%	7.61%	-0.56%
Is the return net or gross?	Net of manager fees	Net of manager fees	Net of manager fees	Net of all investment costs	Net of all investment costs
Total fund policy or benchmark return	17.05%	-2.94%	14.55%	8.40%	-1.08%

Ancillary Data	2019	2018	2017	2016	2015
What is your hedging policy for: Foreign Holdings					
What were your actuarial fees in 000s?	405	382	485	277	277
How many plan members/beneficiaries do you have:					
Active?	240,009	235,390	233,423	252,494	248,446
Active (no-accrual)?			6,630		
Retired?	168,851	166,126	156,901	158,492	154,639
Other?	210,922	202,146	193,988	183,796	178,086
What type of plan(s) do you have?	Final Average	Final Average	Final Average	Final Average	Final Average
To what extent are your retired members' benefits indexed to inflation?					
Contractual %	100%	100%	100%	100%	100%
If the indexation is subject to a cap, describe the cap	For SCRS and PORS,	For SCRS and PORS,	For SCRS and PORS,	For SCRS and PORS,	For SCRS and PORS,
What % of the plan's liabilities pertain to retired members?	61%	62%	64%	65%	65%
Actuarial valuation assumptions for funding purposes:					
Liability discount rate	7.3%	7.3%	7.3%	7.5%	7.5%
Salary progression rate	3.0%	3.0%	3.0%	3.3%	3.5%
What was your actuarial assumption for expected rate of return?	7.3%	7.3%	7.3%	7.5%	7.5%

Appendix A - Data Summary: Policy Weights and Benchmarks

South Carolina Retirement System Investment Commission

page 1/2

Asset Class	Year	Policy Weight	Benchmark	
			Description	Return
Stock - U.S. Broad/All	2019	16.3	MSCI US IMI Net	26.6
	2018	16.4	MSCI US IMI Net	-5.7
	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	2019	6.6	MSCI Emerging Market IMI Net	18.9
	2018	6.3	MSCI Emerging Market IMI Net	-14.6
	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 - Global	2019	18.3	MSCI World Net Dividend	27.7
	2018	17.7	MSCI World Net Dividend	-8.7
	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
Stock - ACWI x U.S.	2019	3.6	MSCI ACWI x/US Net	21.5
	2018	3.7	MSCI ACWI x/US Net	-14.2
	2017	3.0	MSCI ACWI x/US Net	22.4
	2016		MSCI ACWI x/US Net	4.5
Fixed Income - U.S.	2019	11.0	Barclays US Aggregate	8.7
	2018	13.0	Barclays US Aggregate	0.0
	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	2019	4.0	50% JPM EMBI Global Diversified/50% JPM-GBI-EM Global	14.3
	2018	4.0	50% JPM EMBI Global Diversified/50% JPM-GBI-EM Global	-5.2
	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 - High Yield	2019	4.4	50%Bar U.S. High Yield 2% / 50%S&P LSTA Leveraged Loan	11.5
	2018	5.2	50%Bar U.S. High Yield 2% / 50%S&P LSTA Leveraged Loan	-0.8
	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	2019	3.0	BofA Merrill Lynch 3 Month US Treasury Bill G001	2.3
	2018	1.0	BofA Merrill Lynch 3 Month US Treasury Bill G001	1.9
	2017	3.0	BofA Merrill Lynch 3 Month US Treasury Bill G001	0.9
	2016	2.1	BofA Merrill Lynch 3 Month US Treasury Bill G001	0.3
	2015	2.0	BofA Merrill Lynch 3 Month US Treasury Bill G001	0.1
REITs	2019	1.5	Your REIT benchmark	26.0
	2018	3.1	Your REIT benchmark	-4.6
	2017	2.3	Your REIT benchmark	5.2
	2016	0.7	Your REIT benchmark	8.5
Real Estate ex-REITs	2019	7.5	NCREIF ODCE Index + 100 bps	5.4
	2018	5.9	NCREIF ODCE Index + 100 bps	8.4
	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
Infrastructure	2019	3.0	Dow Jones Brookfield Global Infrastructure Net Index	28.7
	2018	3.0	Dow Jones Brookfield Global Infrastructure Net Index	-7.9
	2017	2.0	Dow Jones Brookfield Global Infrastructure Net Index	15.8
	2016	1.0	Dow Jones Brookfield Global Infrastructure Net Index	12.5
Hedge Funds	2019	1.0	50% MSCI World Net/50% Barclays US Aggregate	18.2
	2018	1.0	50% MSCI World Net/50% Barclays US Aggregate	-6.4
	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
Global TAA	2019	7.0	50% MSCI World Net/50% Barclays US Aggregate	18.2
	2018	7.0	50% MSCI World Net/50% Barclays US Aggregate	-6.4
	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
Diversified Private Equity	2019	6.2	80% Russell 3000 / 20% MSCI EAFE Lagged + 300 Bps	5.1
	2018	7.0	80% Russell 3000 / 20% MSCI EAFE Lagged + 300 Bps	17.5
	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

Appendix A - Data Summary: Policy Weights and Benchmarks

South Carolina Retirement System Investment Commission

page 2/2

Asset Class	Year	Policy Weight	Benchmark	
			Description	Return
Private Credit	2019	6.6	S&P/LSTA + 150 Bps 3 Month Lag	4.6
	2018	5.8	S&P/LSTA + 150 Bps 3 Month Lag	6.7
	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
Fixed Income - Global	2019			
	2015		Barclays Global Aggregate (USDH)	1.0
Commodities	2019			
	2015	3.0	Bloomberg Commodity Index Total Return	-24.7

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

South Carolina Retirement System Investment Commission

Asset Class/Style		Year	Asset (\$millions)	Return %	Cost (\$000)					
					Internal & Other	Base Fees	Perf Fees	Total	Bps	
Stock - U.S. Broad/All	Internal Active	2019								
		2018								
		2017								
		2016								
	External Passive	2015	2.1	29.73	0.6			0.6	2.6	
		2019								
		2018								
		2017	16.6	-15.01	4.6	-		4.6	2.7	
		2016	0.1	-33.37	0.0	-		0.0	2.5	
		2015	582.8	-34.74	154.6	356.0		510.7	8.8	
		External Active	2019	2,792.7	19.62	779.2	11,857.7		12,636.9	45.2
			2018	2,724.9	-7.90	822.9	10,281.2		11,104.1	40.8
2017	2,699.6		14.48	739.8	10,405.9		11,145.7	41.3		
2016	1,818.6		9.97	522.1	8,327.1	-	8,849.2	48.7		
2015	1,129.8	-2.66	299.8	7,430.9	-	7,730.6	68.4			
Stock - Emerging	External Active	2019	1,973.6	18.75	518.7	5,554.0		6,072.7	30.8	
		2018	1,813.7	-16.64	547.7	9,331.5		9,879.2	54.5	
		2017	1,391.8	37.58	381.4	9,635.5		10,016.9	72.0	
		2016	957.0	10.83	274.8	7,189.3	-	7,464.1	78.0	
		2015	943.2	-15.08	250.3	7,658.0	-	7,908.3	83.8	
Stock - Global	External Passive	2019	2,549.9	27.84	664.8	533.5		1,198.3	4.7	
		2018	2,324.8	-7.93	702.0	503.1		1,205.1	5.2	
		2017	2,414.1	22.89	661.5	364.4		1,025.9	4.2	
		2016	2,469.9	7.66	709.1	467.9		1,177.0	4.8	
		2015	3,131.6	-0.36	830.9	613.5		1,444.4	4.6	
	External Active	2019	2,908.7	25.74	797.1	5,484.9		6,281.9	21.6	
		2018	2,787.4	-9.95	841.7	5,525.4		6,367.1	22.8	
		2017	2,486.0	25.26	681.2	4,801.4		5,482.7	22.1	
		2016	2,028.6	4.64	582.4	5,605.6	-	6,188.0	30.5	
		2015	1,749.9	-0.08	464.3	5,589.1	-	6,053.4	34.6	
Stock - ACWI x U.S.	External Active	2019	1,079.8	23.36	302.5	3,878.3		4,180.8	38.7	
		2018	1,057.7	-18.55		4,696.7		4,696.7	44.4	
		2017	859.4	31.09	235.5	3,800.8		4,036.3	47.0	
		2016	423.7	5.75	121.7	2,449.0	-	2,570.6	60.7	
Fixed Income - U.S.	Internal Active	2019	24.1	7.34	9.5			9.5	3.9	
		2018	31.3	3.81	9.9			9.9	3.2	
		2017	37.4	3.37	10.8			10.8	2.9	
		2016	202.0	5.51	52.9			52.9	2.6	
		2015	365.5	1.57	88.2			88.2	2.4	
	External Active	2019	741.2	8.66	240.0	1,782.5		2,022.4	27.3	
		2018	839.1	-0.56	253.4	1,533.1		1,786.5	21.3	
		2017	1,367.0	5.02	374.6	3,107.0		3,481.6	25.5	
		2016	1,790.8	3.74	514.1	2,503.0	-	3,017.2	16.8	
		2015	2,336.9	0.53	620.0	2,972.3	205.0	3,797.4	16.3	
Fixed Income - Emerging	External Passive	2019								
		2018								
		2017	20.7	19.62	5.7	-		5.7	2.7	
		2016	178.2	8.01	51.2	18.9		70.1	3.9	
		2015	852.8	-3.19	226.3	606.0		832.3	9.8	

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

South Carolina Retirement System Investment Commission

Asset Class/Style		Year	Asset (\$millions)	Return %	Cost (\$000)				
					Internal & Other	Base Fees	Perf Fees	Total	Bps
External Active (cont'd)		2019	1,158.4	13.23	416.6	4,987.5		5,404.0	46.7
		2018	1,456.7	-6.63	439.9	5,667.3		6,107.2	41.9
		2017	1,572.6	13.60	430.9	7,412.2		7,843.2	49.9
		2016	1,354.1	12.70	388.8	6,184.8	-	6,573.6	48.5
		2015	529.4	-10.93	140.5	2,429.1	-	2,569.6	48.5
Fixed Income - Global	External Active	2019							
		2018							
		2017							
		2016							
		2015	884.5	-0.45	234.7	1,359.2	-	1,593.9	18.0
Fixed Income - High Yield	External Active	2019	1,286.8	7.27	426.8	5,730.9		6,157.7	47.9
		2018	1,492.5	0.48	450.7	5,395.8		5,846.5	39.2
		2017	2,051.7	6.14	562.2	7,870.5		8,432.7	41.1
		2016	1,893.1	9.35	543.5	8,075.2	-	8,618.7	45.5
		2015	1,535.8	-0.81	407.5	7,080.1	-	7,487.6	48.8
Cash	Internal Active	2019	1,904.0	3.06	426.1			426.1	2.2
		2018	1,407.4	1.71	447.1			447.1	3.2
		2017	1,366.3	1.06	396.2			396.2	2.9
		2016	1,473.8	0.70	386.1			386.1	2.6
		2015	1,656.3	0.58	399.9			399.9	2.4
	External Active	2019	496.8	1.56	194.9	-		194.9	3.9
		2018	681.5	0.11	205.8	705.4		911.2	13.4
		2017	856.7	-0.06	234.7	1,327.3		1,562.0	18.2
		2016	1,199.7	0.29	344.4	1,590.6	211.3	2,146.4	17.9
		2015	1,893.1	-0.21	502.3	2,411.4	-	2,913.7	15.4
REITs	External Active	2019	520.3	27.01	224.2	631.8	-	856.0	16.5
		2018	784.0	-5.20	236.8	1,758.8	-	1,995.5	25.5
		2017	500.8	7.88	137.2	1,683.9	-	1,821.1	36.4
		2016	275.8	-4.62	79.2	838.0	-	917.2	33.3
Global TAA	External Active	2019	2,663.6	20.28	758.2	4,389.9	-	5,148.1	19.3
		2018	2,931.3	-6.93	885.2	6,444.9	4,503.4	11,833.4	40.4
		2017	2,077.6	11.30	569.3	6,125.3	3,164.8	9,859.4	47.5
		2016	1,956.2	8.41	561.6	10,240.4	810.6	11,612.5	59.4
		2015	2,196.2	-4.62	582.7	12,101.6	-	12,684.3	57.8

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

South Carolina Retirement System Investment Commission
(Default costs are highlighted with blue shading. See page 9 for more details)

Asset Class/Style		Year	Asset (\$millions)	Fee basis (\$millions)	Return %	Cost (\$000)					Total	Bps
						Internal & Other	Base Fees	Perf Fees	Underlying Base Fees	Underlying Perf Fees		
Hedge Funds												
External Active	2019	1,971.9		2.74	561.3	34,167.6	16,939.2			51,668.1	262.0	
	2018	1,907.4		6.56	576.0	21,960.4	21,962.8			44,499.2	233.3	
	2017	1,519.9		6.87	416.5	26,596.7	17,578.7			44,591.8	293.4	
	2016	1,232.0		6.49	353.7	26,121.3	15,227.9			41,702.9	338.5	
Fund of Funds	2015	1,266.4		5.69	336.0	27,898.1	30,945.7			59,179.8	467.3	
	2019	1,246.9		7.08	426.5	6,605.4	-	7,015.7	6,783.0	20,830.6	167.1	
	2018	1,491.6		-2.70	450.4	3,065.0	1,012.9	10,487.3	4,708.5	19,724.2	132.2	
	2017	1,825.5		5.25	500.2	3,330.2	-	17,942.0	12,219.8	33,992.2	186.2	
	2016	1,984.7		-0.10	569.8	2,608.4	2,778.6	22,329.5	4,993.0	33,279.3	167.7	
	2015	2,187.8		1.60	580.5	3,741.7	-	30,215.2	13,864.2	48,401.6	221.2	
Real Estate ex-REITs												
Internal Active	2019											
	2018											
	2017											
	2016											
Co-Investment	2015	27.7		18.89	7.4					7.4	2.7	
	2019	0.6		28.63	0.4	-	-			0.4	7.3	
	2018	1.5		-59.67	0.5	-	-			0.5	3.0	
	2017	7.5		-8.22	2.1	4.3				6.4	8.4	
LP	2016	17.1		-15.33	4.9	47.0				52.0	30.3	
	2019	2,358.7	2,830.7	5.64	547.5	27,103.6	15,690.9			27,651.1	97.7	
	2018	1,914.6	1,965.5	9.93	578.2	19,266.4	16,742.4			19,844.5	101.0	
	2017	1,830.5	1,736.6	9.82	501.6	16,110.3	20,114.4			16,611.9	95.7	
	2016	1,475.4	1,597.0	2.95	423.6	16,675.4	10,588.5			17,098.9	107.1	
	2015	1,197.0	1,410.6	16.78	317.6	15,887.0	34,048.0			16,204.6	114.9	
Infrastructure												
External Active	2019	830.0	1,110.1	26.51	236.3	4,081.9	-			4,318.2	38.9	
	2018	631.2	831.2	-6.65	190.6	2,898.4	-			3,089.0	37.2	
	2017	425.7	425.7	15.00	116.7	2,065.8	-			2,182.5	51.3	
	2016	159.2	274.4	-5.23	45.7	764.9	-			810.6	29.5	
Diversified Private Equity												
Co-Investment	2019	550.2		12.89	156.6	2,945.9	3,620.1			3,102.5	56.4	
	2018	396.7		-29.24	119.8	3,263.9				3,383.7	85.3	
	2017	488.2		8.28	133.8	3,499.9				3,633.7	74.4	
	2016	741.5		10.44	212.9	3,232.8				3,445.6	46.5	
LP	2015	667.0		-5.74	177.0	1,366.3				1,543.3	23.1	
	2019	1,344.7	2,143.2	6.32	382.8	33,292.1	55,870.5			33,674.8	157.1	
	2018	1,474.3	1,841.1	13.35	445.2	27,451.1	19,305.3			27,896.3	151.5	
	2017	1,408.0	1,316.4	17.10	385.8	19,106.4	46,571.8			19,492.2	148.1	
	2016	1,345.0	1,670.4	13.75	386.2	22,068.2	43,990.4			22,454.3	134.4	
	2015	1,251.1	1,390.7	5.01	331.9	18,910.5	12,062.7			19,242.4	138.4	
Fund of Funds	2019	401.0	245.0	5.37	114.2	2,994.6	1,084.5	3,846.8	7,418.7	6,955.6	283.9	
	2018	473.3	428.2	15.66	142.9	1,374.8	-	3,499.5	4,158.9	5,017.3	117.2	
	2017	546.9	415.1	10.42	149.9	2,846.4	-	4,779.8	1,577.0	7,776.1	187.3	
	2016	629.5	503.8	4.15	180.7	4,074.3	1,017.1	6,592.6	(1,679.1)	10,847.6	215.3	
	2015	710.4	660.1	11.63	188.5	6,112.5	2,657.9	10,231.4	11,721.4	16,532.4	250.5	
	Private Credit											
Co-Investment	2019	46.2		-1.66	13.1	-	-			13.1	2.8	
	2018	0.3		18.65	0.1	0.0				0.1	3.2	
	2017	3.5		1.98	1.0	8.4				9.4	27.0	
	2016	5.9		3.65	1.7	14.8				16.5	27.9	
LP	2015	17.0		5.83	4.5	41.3				45.8	26.9	
	2019	1,963.2	4,096.7	6.60	558.8	29,748.3	9,198.2			30,307.2	74.0	
	2018	1,836.9	2,569.5	3.29	554.7	18,768.9	12,110.3			19,323.6	75.2	

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

South Carolina Retirement System Investment Commission
 (Default costs are highlighted with blue shading. See page 9 for more details)

Asset Class/Style	Year	Asset (\$millions)	Fee basis (\$millions)	Return %	Cost (\$000)						Total	Bps
					Internal & Other	Base Fees	Perf Fees	Underlying Base Fees	Underlying Perf Fees			
LP (cont'd)	2017	1,779.0	2,292.7	6.94	487.5	24,096.4	15,638.8				24,583.9	107.2
	2016	1,607.1	1,471.9	8.88	461.4	17,004.6	16,791.4				17,466.0	118.7
	2015	1,609.4	1,416.0	0.59	427.0	17,178.8	(247.6)				17,605.8	124.3

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	2019	1,236.7	0.4bp
	2018	1,251.1	0.4bp
	2017	1,089.1	0.4bp
	2016	1,056.3	0.4bp
	2015	1,201.0	0.4bp
Custodial total	2019	1,670.0	0.5bp
	2018	1,152.4	0.4bp
	2017	1,130.5	0.4bp
	2016	925.3	0.3bp
	2015	765.8	0.3bp
Custodial foreign (if available)	2016	460.6	0.2bp
	2015	460.1	0.2bp
Custodial domestic (if available)	2016	464.7	0.2bp
	2015	305.6	0.1bp
Consulting / performance measurement	2019	825.1	0.3bp
	2018	763.7	0.2bp
	2017	1,070.0	0.4bp
	2016	940.0	0.3bp
	2015	1,029.9	0.4bp
Audit	2019	119.7	0.0bp
	2018	102.4	0.0bp
	2017	16.8	0.0bp
	2016	99.4	0.0bp
	2015	201.0	0.1bp
Other (legal etc)	2019	357.3	0.1bp
	2018	363.2	0.1bp
	2017	320.9	0.1bp
	2016	266.9	0.1bp
	2015	345.2	0.1bp
Total	2019	4,208.9	1.3bp
	2018	3,632.7	1.2bp
	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	2019	229,911.0	72.7bp
	2018	205,925.8	65.9bp
	2017	218,814.6	71.7bp
	2016	208,125.1	74.3bp
	2015	235,815.4	80.3bp
Oversight, Custodial & Other Costs	2019	4,208.9	1.3bp
	2018	3,632.7	1.2bp
	2017	3,627.3	1.2bp
	2016	3,288.0	1.2bp
	2015	3,542.9	1.2bp
Total	2019	234,119.9	74.0bp
	2018	209,558.6	67.0bp
	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)	% of Cost (000s)	% of Notion. Duration (bps) (years)	Notional amount (mils)	Market value (mils)	Profit/Loss (000s)	Base fees (000s)	Perf. fees (000s)	Over-sight (000s)	% of Total Notion. Duration (bps) (years)
Rebalancing/	2019					7,408.6	809.4		800.0			800.0	1.1
Passive Beta	2018					6,156.1	797.8		717.1		240.9	958.0	1.6

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:

- 2019 - Real Estate ex-REITs - LP: LP base fee is the weighted average management fee of 96 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 84 bps (23.8 million).
- 2019 - Diversified Private Equity - LP: LP base fee is the weighted average management fee of 155 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 88 bps (18.9 million).
- 2019 - Diversified Private Equity - FoFs: A default of 157 bps (on amount fees are based on) was applied to the fund of fund underlying base fee to enable comparisons of the total cost of different implementation styles.
- 2019 - Diversified Private Equity - FoFs: A default of 185 bps (on NAV) was applied to the fund of fund underlying performance fee to enable comparisons of the total cost of different implementation styles. This default is not included in your total fund cost or in benchmark analysis.
- 2019 - Private Credit - LP: LP base fee is the weighted average management fee of 73 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 41 bps (16.9 million).
- 2018 - Real Estate ex-REITs - LP: LP base fee is the weighted average management fee of 98 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 87 bps (17.2 million).
- 2018 - Diversified Private Equity - LP: LP base fee is the weighted average management fee of 149 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 102 bps (18.8 million).
- 2018 - Private Credit - LP: LP base fee is the weighted average management fee of 73 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 72 bps (18.5 million).
- 2017 - Real Estate ex-REITs - LP: LP base fee is 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).
- 2017 - Diversified Private Equity - LP: LP base fee is 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).
- 2017 - Private Credit - LP: LP base fee is 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).
- 2016 - Real Estate ex-REITs - LP: LP base fee is the weighted average management fee of 104 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 123 bps (19.6 million).
- 2016 - Hedge Funds - FoFs: A default of 14 bps (on NAV) was applied to the fund of fund performance fee to enable comparisons of the total cost of different implementation styles.
- 2016 - Diversified Private Equity - LP: LP base fee is the weighted average management fee of 132 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 132 bps (22.1 million).
- 2015 - Real Estate ex-REITs - LP: LP base fee is the weighted average management fee of 113 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 109 bps (15.3 million).
- 2015 - Diversified Private Equity - LP: LP base fee is the weighted average management fee of 136 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 156 bps (21.7 million).
- 2015 - Diversified Private Equity - FoFs: A default of 155 bps (on amount fees are based on) was applied to the fund of fund underlying base fee to enable comparisons of the total cost of different implementation styles.
- 2015 - Diversified Private Equity - FoFs: A default of 165 bps (on NAV) was applied to the fund of fund underlying performance fee to enable comparisons of the total cost of different implementation styles. This default is not included in your total fund cost or in benchmark analysis.

- 2015 - Private Credit - LP: LP base fee is the weighted average management fee of 121 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 125 bps (17.7 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 29th 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.