

**Investment**  
**Cost Effectiveness Analysis**  
(for the 5-year period ending December 31, 2020)

**South Carolina Retirement System Investment Commission**



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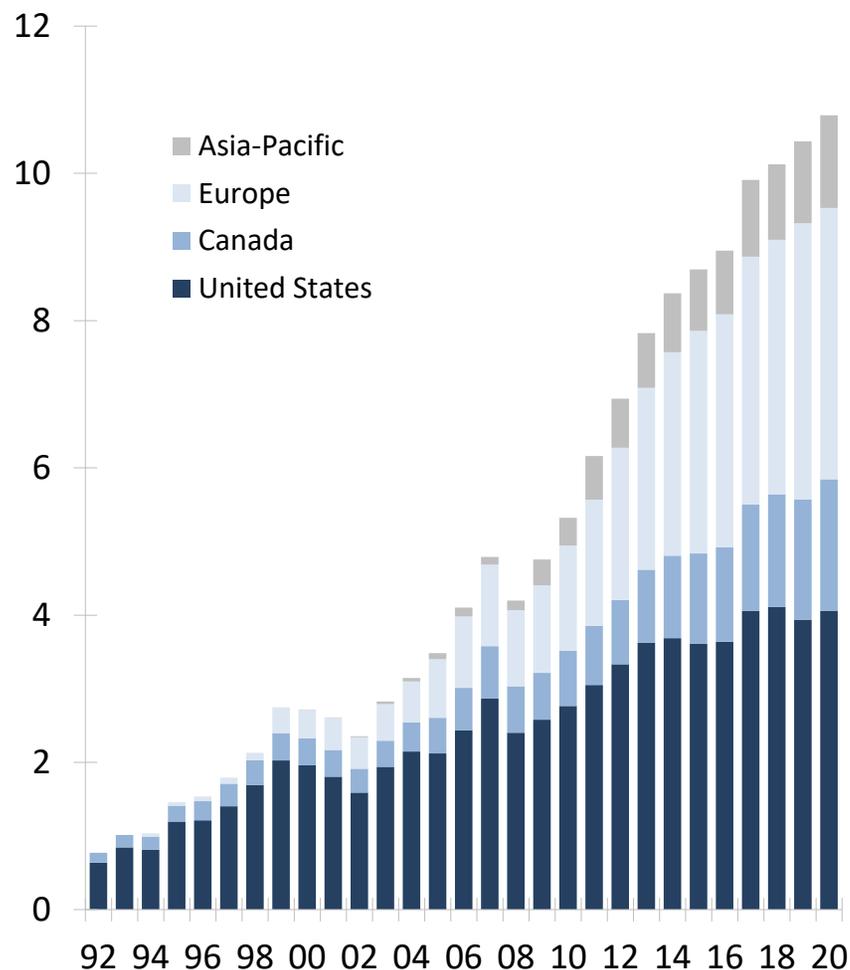
Prepared October 21, 2021. Although the information in this report has been based upon and obtained from sources we believe to be reliable, CEM Benchmarking Inc. ("CEM") does not guarantee its accuracy or completeness. The information contained herein is proprietary and confidential and may not be disclosed 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 276 funds in CEM's extensive pension database.

- 157 U.S. pension funds participate. The median U.S. fund had assets of \$10.1 billion and the average U.S. fund had assets of \$25.8 billion. Total participating U.S. assets were \$4.1 trillion.
- 67 Canadian funds participate with assets totaling \$1.8 trillion.
- 43 European funds participate with aggregate assets of \$3.7 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Ireland, Denmark and the U.K.
- 6 Asia-Pacific funds participate with aggregate assets of \$1.3 trillion. Included are funds from Australia, New Zealand, China and South Korea.
- 3 funds from other regions participate.

The most meaningful comparisons for your returns and value added are to the U.S. Public universe, which consists of 49 funds.

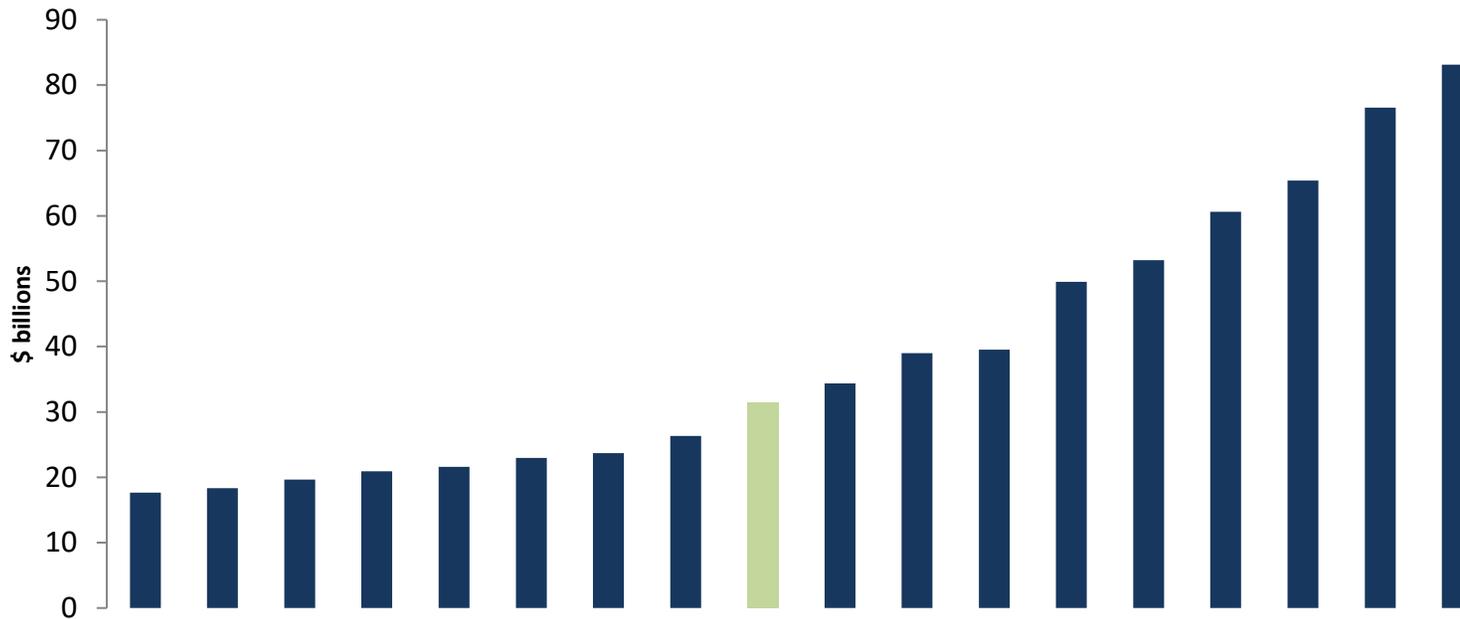
Participating assets (\$ trillions)



# 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

- 18 U.S. Public sponsors from \$17.6 billion to \$83.2 billion
- Median size of \$32.9 billion versus your \$31.5 billion



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

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

### 1. Returns

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

### 2. Net value added

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

### 3. Costs

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

### 4. Cost effectiveness

Net implementation value added versus excess cost.

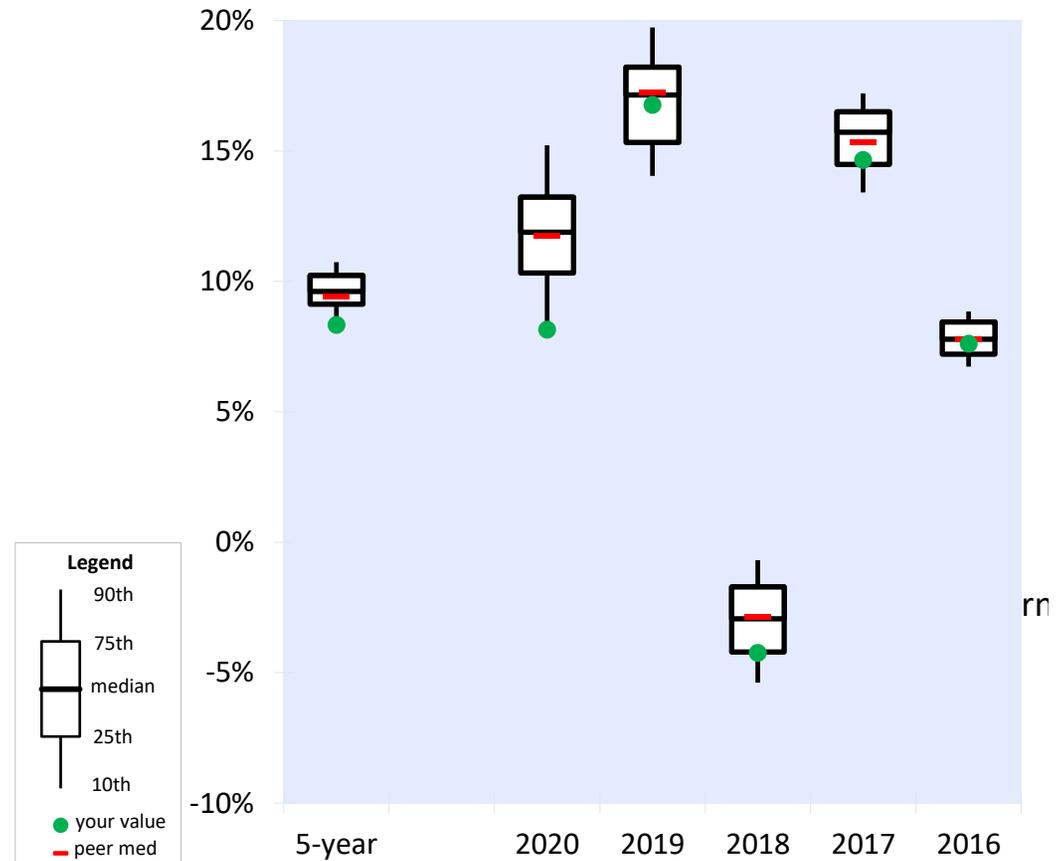
## Your 5-year net total return of 8.3% was below both the U.S. Public median of 9.6% and the peer median of 9.4%.

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	8.3%
- Policy return *	8.4%
= Net value added	-0.1%

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



\* To enable fairer comparisons, the policy returns of all participants, including your fund, were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. Prior to this adjustment, your 5-year policy return was 8.9%, 0.4% higher than your adjusted 5-year policy return of 8.4%. Mirroring this, your 5-year total fund net value added would be 0.4% lower.

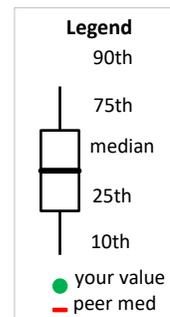
## Your 5-year policy return of 8.4% was below both the U.S. Public median of 9.2% and the peer median of 9.0%.

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

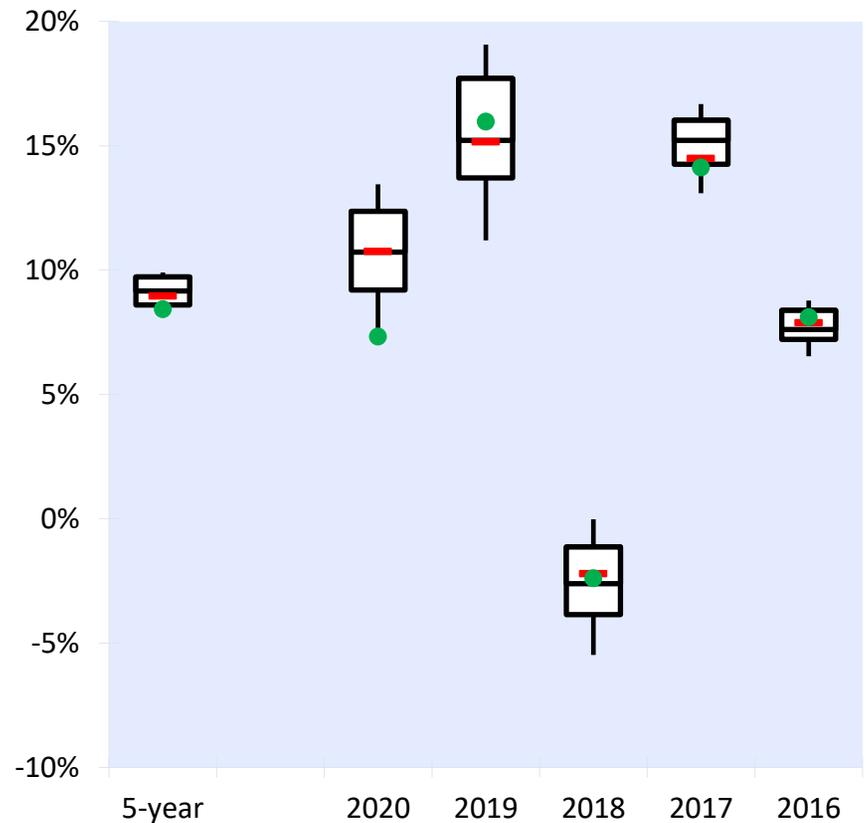
Having a higher or lower relative policy return is not necessarily good or bad. Your policy return reflects your investment policy, which should reflect your:

- 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.



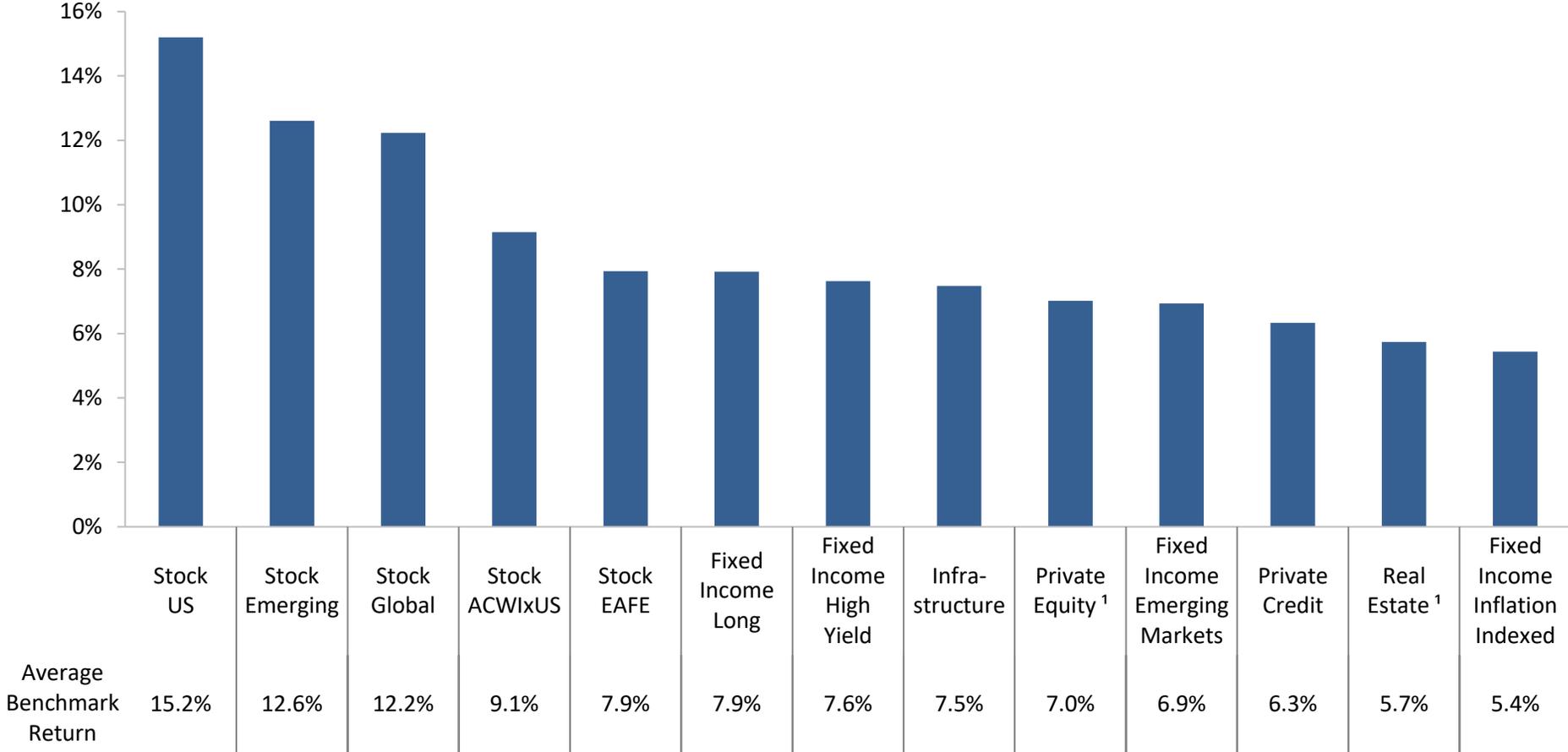
U.S. Public policy returns\* - quartile rankings



\* To enable fairer comparisons, the policy returns of all participants, including your fund, were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. Prior to this adjustment, your 5-year policy return was 8.9%, 0.4% higher than your adjusted 5-year policy return of 8.4%. Mirroring this, your 5-year total fund net value added would be 0.4% lower.

Differences in policy returns are caused by differences in benchmarks and policy mix. The two best performing asset classes for the 5 years ending 2020 were Stock U.S. and Stock Emerging.

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 real estate benchmark is the averages of benchmark returns reported by U.S. Public participants.

## Your 5-year policy return of 8.4% was below the U.S. Public median of 9.2% primarily because of:

- The negative impact of your lower weight in total public stock. You had a 5-year average of 43% compared to the U.S. Public average of 47%. Stock was one of the better performers over the past 5 years.
- The negative impact of your higher weight in private debt, which was one of the worse performing asset classes over the past 5 years.

	5-year average policy mix <sup>1</sup>			5-year benchmark return	
	Your Fund	U.S. Publ Avg.	More/Less	Your Fund	U.S. Publ Avg.
Stock - U.S.	15%	19%	-5%	14.5%	15.2%
Stock - Emerging	5%	2%	3%	12.8%	12.6%
Stock - ACWI x U.S.	2%	7%	-4%	8.1%	9.1%
Stock - Global	21%	12%	9%	12.3%	12.2%
Other Stock <sup>2</sup>	0%	7%	-7%	n/a <sup>3</sup>	n/a <sup>3</sup>
<b>Total Stock*</b>	<b>43%</b>	<b>47%</b>	<b>-5%</b>	<b>12.8%</b>	<b>12.5%</b>
Fixed Income - U.S.	14%	17%	-2%	4.7%	4.6%
Fixed Inc. - Inflation Indexed	0%	3%	-3%	n/a <sup>3</sup>	5.4%
Fixed Income - High Yield	5%	2%	3%	6.7%	7.6%
Cash	2%	-1%	3%	1.2%	1.2%
Other Fixed Income	4%	5%	-1%	n/a <sup>3</sup>	n/a <sup>3</sup>
<b>Total Fixed Income</b>	<b>24%</b>	<b>25%</b>	<b>-1%</b>	<b>5.7%</b>	<b>5.6%</b>
Global TAA	7%	1%	6%	8.5%	7.1%
Hedge Funds**	2%	4%	-2%	7.6%	4.5%
REITs	2%	1%	1%	4.8%	5.2%
Real Estate ex-REITs	7%	8%	-1%	6.6%	5.7%
Other Real Assets <sup>2</sup>	2%	3%	-1%	n/a <sup>3</sup>	n/a <sup>3</sup>
Private Equity <sup>4</sup>	7%	9%	-2%	8.3%	7.0%
Private Debt	6%	2%	5%	5.5%	6.3%
<b>Total</b>	<b>100%</b>	<b>100%</b>			

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

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

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

2. Other stock includes: Stock - EAFE. Other real assets include: Commodities, Natural Resources and Infrastructure.

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

4. To enable fairer comparisons, the private equity benchmarks of all participants, including your fund were adjusted to reflect lagged, investable, public-market indices. Prior to this adjustment, your fund's 5-year private equity policy return was 15.4%.

# Net value added is the component of total return from active management. Your 5-year net value added was -0.1%.

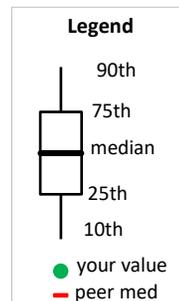
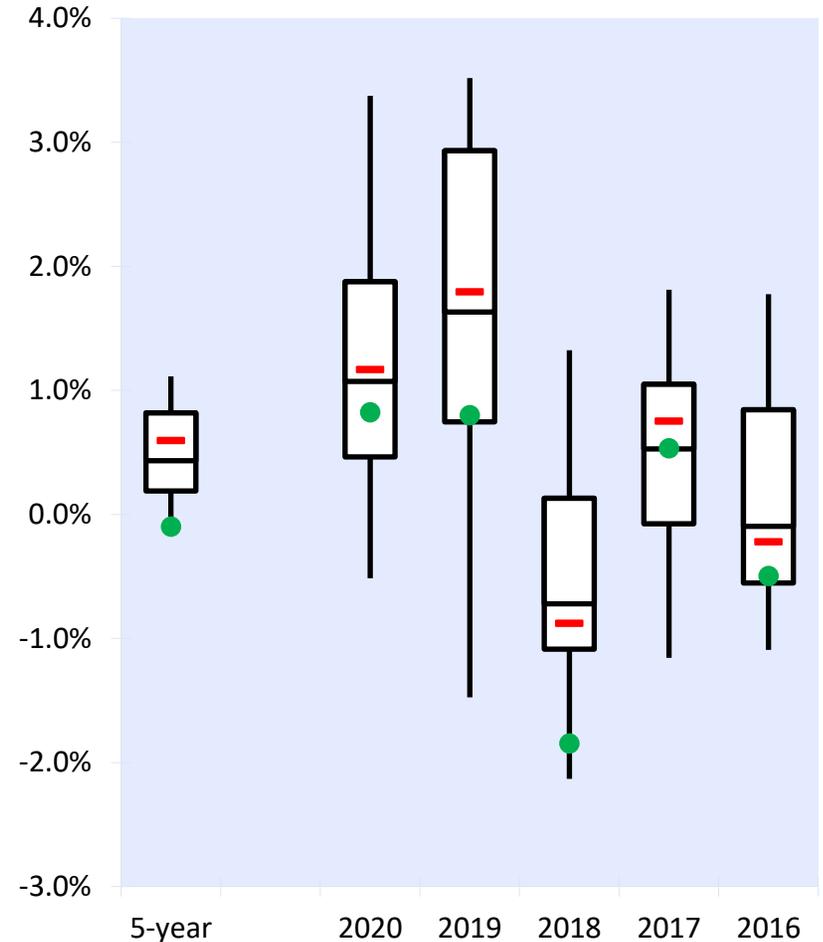
Net value added equals total net return minus policy return.

## Value added for South Carolina Retirement System Investment Commission

Year	Net return	Policy return	Net value added
2020	8.2%	7.3%	0.8%
2019	16.8%	16.0%	0.8%
2018	-4.2%	-2.4%	-1.8%
2017	14.7%	14.1%	0.5%
2016	7.6%	8.1%	-0.5%
5-Year	8.3%	8.4%	-0.1%

Your 5-year net value added of -0.1% compares to a median of 0.6% for your peers and 0.4% for the U.S. Public universe.

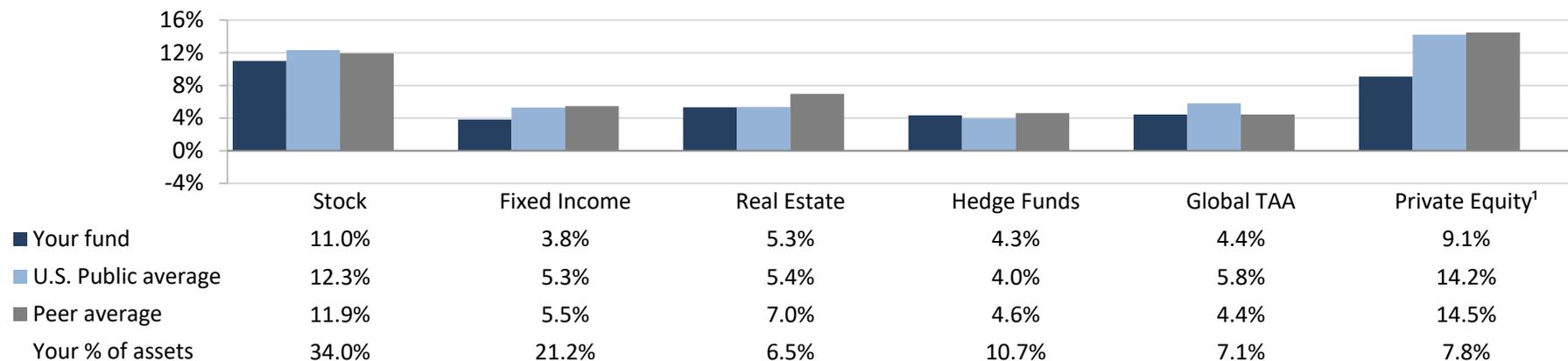
## U.S. Public net value added - quartile rankings



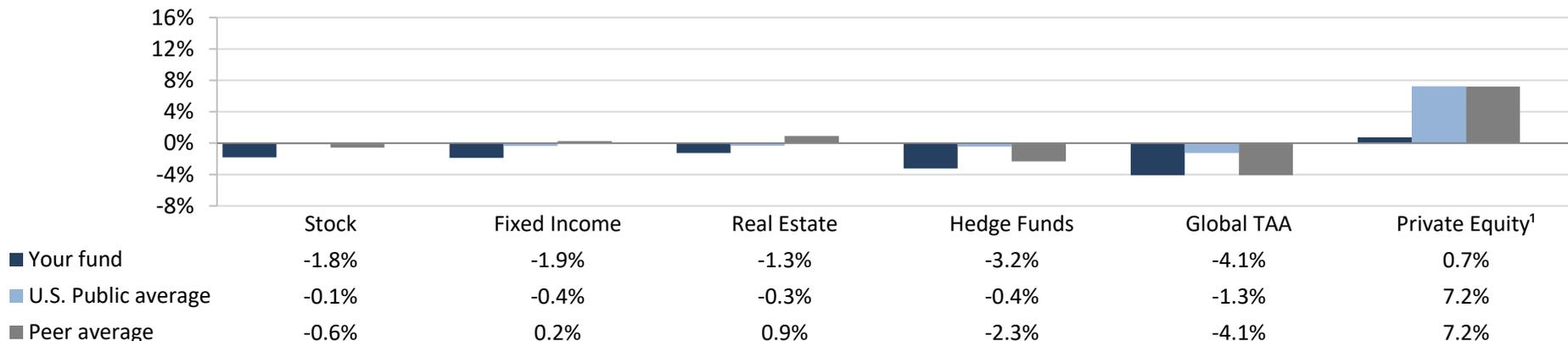
To enable fairer comparisons, the value added for each participant including your fund was adjusted to reflect private equity benchmarks based on lagged, investable public market indices. Prior to this adjustment, your fund's 5-year total fund net value added was -0.5%.

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

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



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



1. To enable fairer comparisons, the private equity benchmarks of all participants, including your fund were adjusted to reflect lagged, investable, public-market indices. Prior to this adjustment, your fund's 5-year private equity net value added was -6.3%.

## Your investment costs, excluding private asset performance fees, were \$210.6 million or 66.9 basis points in 2020.

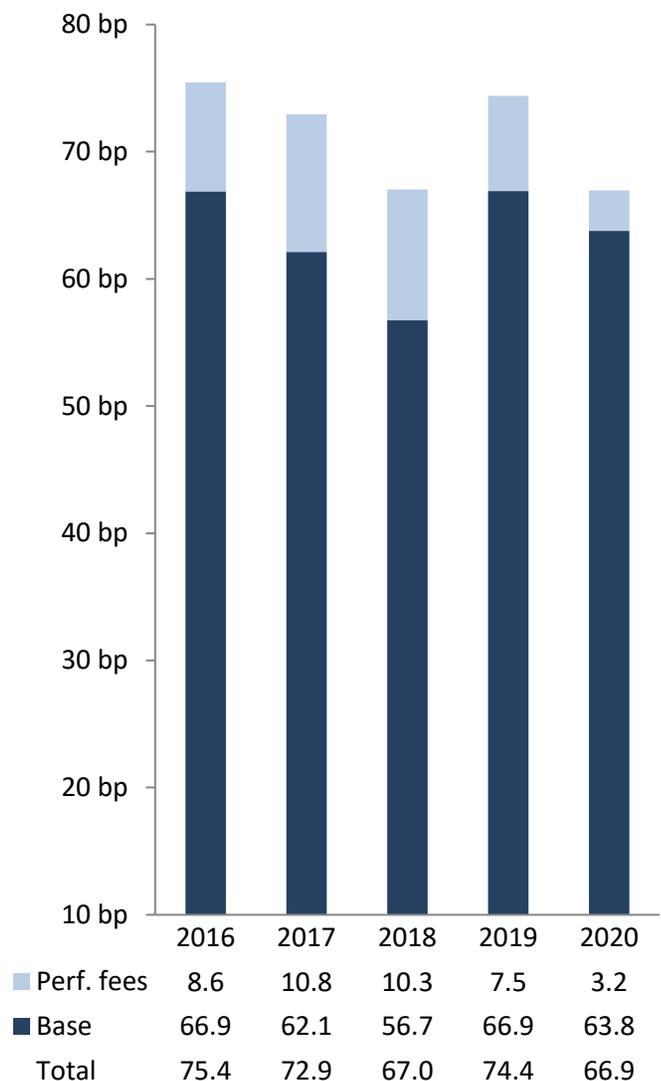
Asset management costs by asset class and style (\$000s)	Internal Mgmt		External Management			Total	
	Active	Overseeing of external	Passive fees	Active base fees	Perform. fees <sup>3</sup>		
Stock - U.S. Broad/All		463	88	2,888		3,439	
Stock - U.S. Small Cap		163	327			490	
Stock - EAFE		166	191			357	
Stock - Emerging		514	148	3,979		4,641	
Stock - Global		1,926	995	2,657		5,577	
Stock - ACWI x U.S.		80		1,388		1,468	
Fixed Income - U.S.	6	190		1,578		1,774	
Fixed Income - Emerging		239		3,391		3,630	
Fixed Income - High Yield		363		5,601		5,965	
Cash	340	254		187		781	
REITs		121		1,530		1,651	
Infrastructure <sup>3</sup>		241		6,997	1,377	7,239	
Infrastructure - Co-Invest. <sup>3</sup>		9		78	2	87	
Real Estate ex-REITs - LP <sup>1 3</sup>		609		23,031	12,174	23,640	
Real Estate ex-REITs - Co-Invest. <sup>3</sup>		5		148	365	153	
Global TAA		336		2,638		2,974	
Hedge Funds - External Active		463		32,516	3,326	36,305	
Hedge Funds - FoFs		377		15,699	6,619	22,695	
Diversified Private Equity - LP <sup>1 3</sup>		278		39,267	18,736	39,545	
Diversified Private Equity - Co-Invest. <sup>3</sup>		229		960	892	1,190	
Diversified Private Equity - FoFs <sup>2 3</sup>		85		12,530	16,058	12,615	
Private Credit - LP <sup>1 3</sup>		579		26,915	909	27,494	
Private Credit - Co-Invest. <sup>3</sup>		40		2,427	486	2,467	
Derivatives/Overlays		236	1			237	
<b>Total excluding private asset performance fees</b>						206,413	65.6bp
<b>Oversight, custodial and other costs <sup>4</sup></b>							
Oversight of the fund						1,198	
Trustee & custodial						1,394	
Consulting and performance measurement						786	
Audit						409	
Other						373	
<b>Total oversight, custodial &amp; other costs</b>						4,161	1.3bp
<b>Total investment costs (excl. transaction costs &amp; private asset performance fees)</b>						210,574	66.9bp

### 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 bps. 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 8.5 bps, from 75.4 bps in 2016 to 66.9 bps in 2020, primarily because you paid less in 2020 for similar investment styles. This was partly offset by a higher cost asset mix.

Trend in cost



Reasons why your costs decreased by 8.5 bps

	Impact in bps		
<b>1. Higher cost asset mix</b>			
• More Stock: 2016 28% vs 2020 41%		2.9	
• Less Fixed Income: 2016 29% vs 2020 16%		(3.2)	
• More Real Estate ex-REITs: 2016 6% vs 2020 8%		2.2	
• More REITs & Infrastructure: 2016 2% vs 2020 5%		1.1	
• Less Hedge Funds & Multi-Asset: 2016 18% vs 2020 14%		(4.8)	
• More Private Equity: 2016 10% vs 2020 12%		1.8	
• More Private Debt: 2016 5% vs 2020 14%		9.9	
		<hr/> 9.8	
<b>2. Lower cost implementation style</b>			
• More passive, less active		(4.1)	
• Less LP, more FoF		2.5	
• All other implementation style changes		(0.1)	
		<hr/> (1.7)	
<b>3. Paid less, net, for similar investment styles</b>	<u>2016 cost</u>	<u>2020 cost</u>	
• Lower Private Credit LP base fees	118.7 bp	68.8 bp	(6.3)
• Lower external active Stock - Emerging costs	78.0 bp	31.0 bp	(2.1)
• Higher Private Equity LP base fees	134.4 bp	159.5 bp	2.0
• Lower Hedge Fund FoF total base fees	128.5 bp	112.3 bp	(0.7)
• Lower Hedge Funds performance fees	123.6 bp	18.9 bp	(5.9)
• Similar internal investment management costs			0.0
• Lower overlays and unfunded strategies costs	0.5 bp	0.1 bp	(0.4)
• Higher oversight, custodial & other costs	1.2 bp	1.3 bp	0.1
• All other differences			(3.3)
			<hr/> (16.6)
<b>Total decrease</b>			<hr/> <hr/> (8.5)

## Your total investment cost of 66.9 bps was above the peer median of 51.8 bps and the U.S. Public median of 55.9 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, private equity and private credit. These high cost assets equaled 35% of your funds assets at the end of 2020 versus a peer average of 26%.
- Fund size. Bigger funds have advantages of scale.

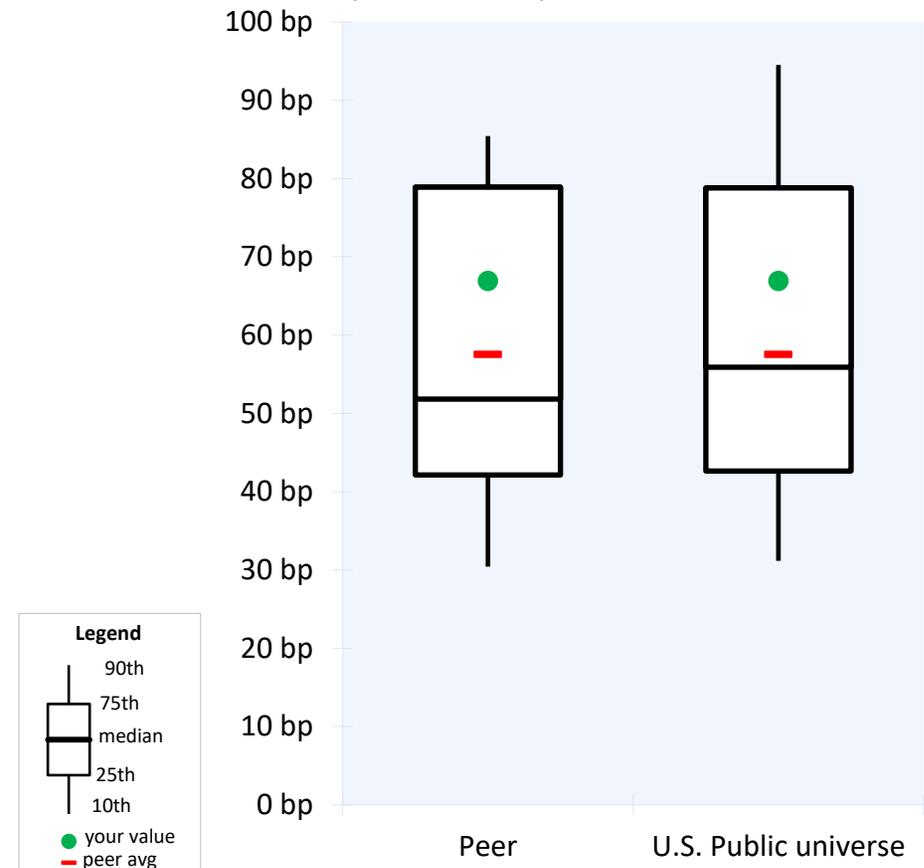
Asset mix is set by policy and may include high cost asset classes. Peers who do not have high cost asset classes in their policy mix will have lower total costs. Therefore, policy asset mix is a major driver of total cost.

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



## Benchmark cost analysis suggests that, after adjusting for fund size and asset mix, your fund was low cost by 18.5 basis points in 2020.

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 66.9 bp was below your benchmark cost of 85.4 bp. Thus, your cost savings were 18.5 bp.

### Your cost versus benchmark

	\$000s	basis points
Your total investment cost	210,574	66.9 bp
Your benchmark cost	268,633	85.4 bp
Your excess cost	(58,058)	(18.5) bp

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

## Reasons for your low cost status

	Excess Cost/ (Savings)	
	\$000s	bps
1. Higher cost implementation style		
• Less active management, more lower cost passive	(8,669)	(2.8)
• More external management, less lower cost internal	1,367	0.4
• More LPs as a percentage of external	13,532	4.3
• More fund of funds	4,680	1.5
• More co-investment as a percentage of LP/Co	(10,012)	(3.2)
• Less overlays	(650)	(0.2)
	<u>248</u>	<u>0.1</u>
2. Paying less than peers for similar services		
• External investment management costs	(56,679)	(18.0)
• Internal investment management costs	(0)	(0.0)
• Oversight, custodial & other costs	(1,627)	(0.5)
	<u>(58,306)</u>	<u>(18.5)</u>
<b>Total savings</b>	<b>(58,058)</b>	<b>(18.5)</b>

## Your implementation style was 0.1 bps higher cost than the peer average.

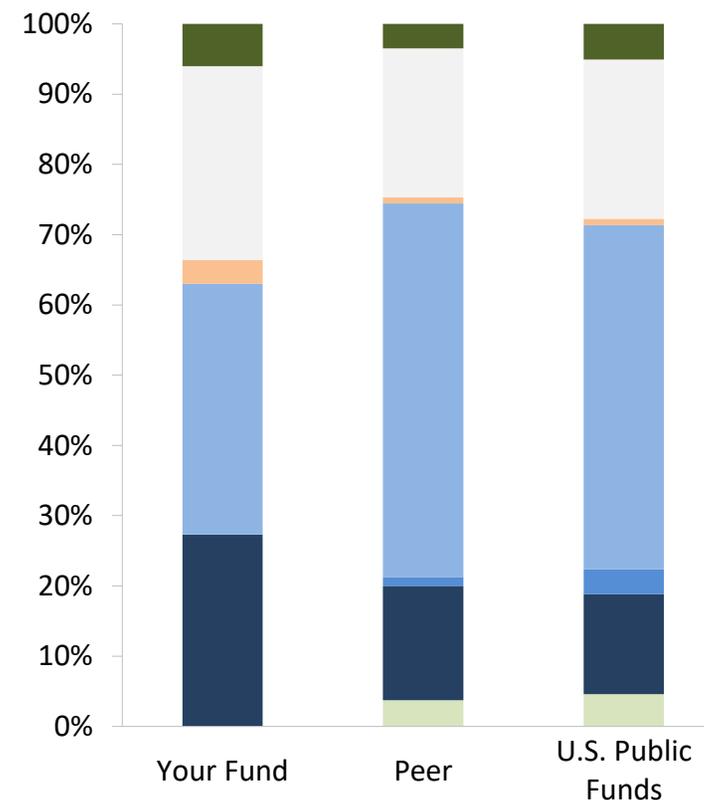
Implementation style is the way in which your fund implements asset allocation. Each implementation choice has a cost. Your first choice is how much to implement passively or actively. The table below summarizes your aggregate choices versus peers and their cost impact.

Implementation choices	Impact
More passive, less active	(2.8) bp
Less internal as a % of passive	0.1 bp
Less internal as a % of active	0.3 bp
Less evergreen % private excl. PE	4.3 bp
More fund of funds % of LP/Co/FoF	1.5 bp
More co-investment % of LP/Co	(3.2) bp
Less overlays	(0.2) bp
<b>Total impact</b>	<b>0.1 bp</b>

1. Implementation style is shown as a % of total fund fee basis because the fee basis is the primary driver of cost for private assets (e.g., new private equity LP commitments increase costs before LP NAV increases). Style weights are based on average holdings. Cash and derivatives are excluded.

The peer and universe style was adjusted to match your asset mix. It equals their average style for each asset class weighted by your fee basis for the asset class. It shows how the average peer would implement your asset mix.

Implementation style<sup>1</sup>



■ Fund of Funds	6.0%	3.5%	5.1%
■ LP	27.6%	21.2%	22.6%
■ Co-Investment	3.3%	0.9%	0.9%
■ External Active	35.7%	53.2%	49.0%
■ Internal Active	0.1%	1.3%	3.5%
■ External Passive	27.3%	16.3%	14.2%
■ Internal Passive	0.0%	3.7%	4.6%

## The table below summarizes why your fund is high/low cost relative to the peer-median by asset class.

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

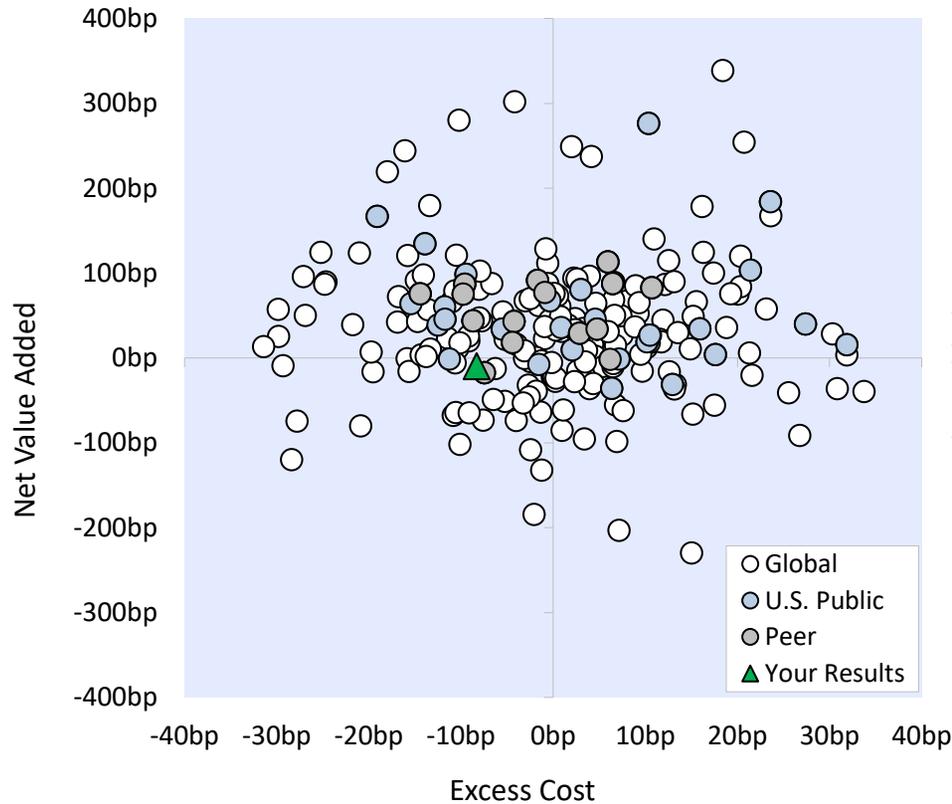
Asset class/category	Style weighted cost			Your average assets (or fee basis) <sup>2</sup>	Due to impl. style	Due to paying more/(less) <sup>3</sup>	Total more/(less)
	Your cost	Peer median <sup>1</sup> = Benchmark	More/(less)				
	(A)	(B)	(C = A - B)	(D)			(C x D)
<b>Asset management costs</b>							
Stock - U.S. Broad/All	19.5 bp	10.4 bp	9.1 bp	1,761	1,183	417	1,601
Stock - U.S. Small Cap	7.9 bp	30.8 bp	(22.9) bp	618	(1,792)	377	(1,415)
Stock - EAFE	5.7 bp	25.4 bp	(19.8) bp	630	(1,389)	145	(1,244)
Stock - Emerging	23.8 bp	39.0 bp	(15.2) bp	1,953	(465)	(2,501)	(2,967)
Stock - Global	7.6 bp	17.3 bp	(9.7) bp	7,318	(6,362)	(726)	(7,088)
Stock - ACWI x U.S.	48.0 bp	28.8 bp	19.2 bp	306	213	376	589
Fixed Income - U.S.	23.9 bp	9.4 bp	14.5 bp	742	235	844	1,079
Fixed Income - Emerging	40.0 bp	34.5 bp	5.4 bp	908	230	263	494
Fixed Income - High Yield	43.2 bp	30.9 bp	12.3 bp	1,381	72	1,621	1,693
Cash	3.7 bp	3.7 bp	(0.0) bp	2,126	0	0	(0)
REITs	35.8 bp	41.4 bp	(5.6) bp	461	255	(511)	(256)
Real Estate ex-REITs	96.7 bp	96.6 bp	0.0 bp	2,462	9,568	(9,558)	9
Infrastructure	57.8 bp	104.7 bp	(46.9) bp	1,267	(4,826)	(1,110)	(5,936)
Hedge Funds	153.7 bp	126.0 bp	27.7 bp	3,191	5,754	(18,335)	(12,581)
Global TAA	23.3 bp	58.2 bp	(34.9) bp	1,277	0	(4,455)	(4,455)
Diversified Private Equity	143.7 bp	163.6 bp	(19.9) bp	3,713	(9,248)	1,855	(7,393)
Private Credit	69.7 bp	111.4 bp	(41.7) bp	4,296	7,470	(25,380)	(17,909)
Derivatives/Overlays	0.1 bp	0.3 bp	(0.2) bp	31,455	(650)	0	(650)
Total asset management	65.6 bp	83.6 bp	(17.9) bp	31,455	248	(56,679)	(56,431)
<b>Oversight, custody and other costs<sup>4</sup></b>							
Oversight of the Fund	0.4 bp	1.0 bp	(0.6) bp				
Trustee & Custodial	0.4 bp	0.3 bp	0.2 bp				
Consulting	0.2 bp	0.2 bp	0.0 bp				
Audit	0.1 bp	0.1 bp	0.1 bp				
Other	0.1 bp	0.1 bp	(0.0) bp				
Total oversight, custody & other	1.3 bp	1.8 bp	(0.5) bp	31,455	n/a	(1,627)	(1,627)
<b>Total</b>	<b>66.9 bp</b>	<b>85.4 bp</b>	<b>(18.5) bp</b>	<b>31,455</b>	<b>248</b>	<b>(58,306)</b>	<b>(58,058)</b>

1. The weighted peer median cost for asset management is the style-weighted average of the peer median costs for all implementation styles (e.g., internal passive, external active, fund of fund, etc.). 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. Total more/less differences include the impact of performance fees, which are not shown separately on this page. Refer to section 4 for a comprehensive breakdown of your differences versus benchmark cost.
4. Benchmarks for oversight total and individual lines are based on peer medians. Sum of the lines may be different from the total.

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

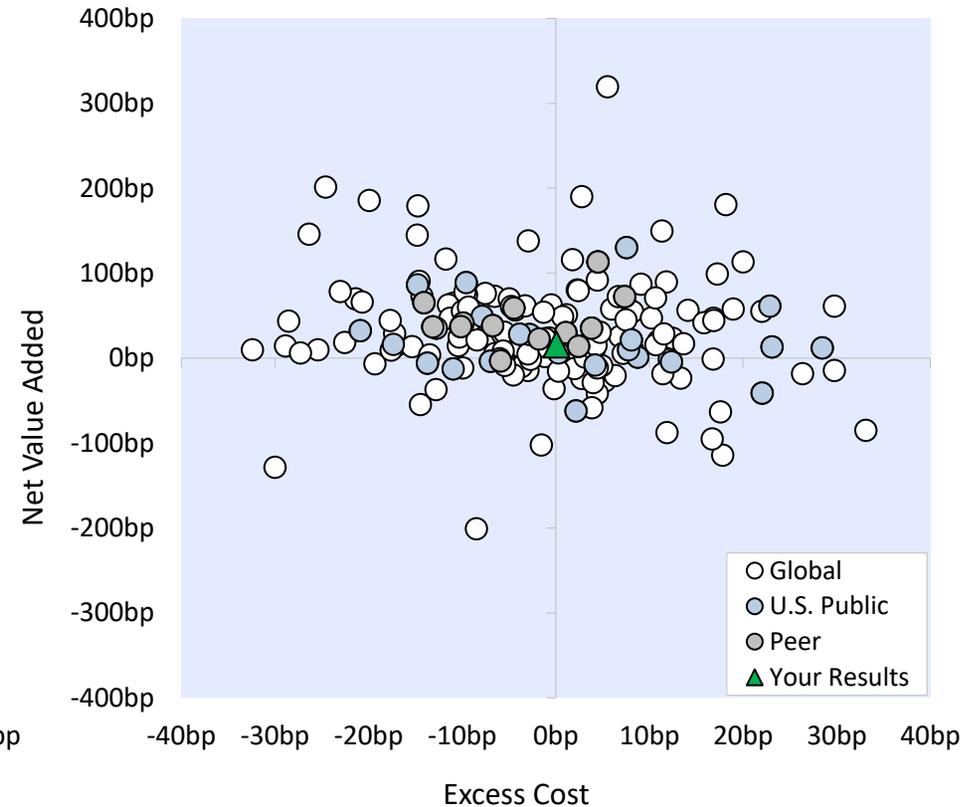
## 5-Year net value added versus excess cost

(Your 5-year: net value added -9.8 bps, cost savings 8.3 bps<sup>1</sup>)



## 10-year net value added versus excess cost

(Your 10-year: net value added 15.9 bps, excess cost 0.1 bps)



1. Your 10-year excess cost of 0.1 basis points is the average of your excess cost for the past 10 years.

Excess cost from 2011 was calculated using using a simplified benchmark model.

	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	10-year
Net value added	82.4 bp	80.1 bp	(184.7) bp	53.3 bp	(49.5) bp	64.8 bp	15.3 bp	110.5 bp	133.7 bp	(106.1) bp	15.9 bp
Excess cost	(18.5) bp	(11.0) bp	(9.6) bp	(1.5) bp	(1.0) bp	5.1 bp	13.8 bp	2.4 bp	(0.5) bp	21.4 bp	0.1 bp

# Summary of key takeaways

## Returns

- Your 5-year net total return was 8.3%. This was below the U.S. Public median of 9.6% and below the peer median of 9.4%.
- Your 5-year policy return was 8.4%. This was below the U.S. Public median of 9.2% and below the peer median of 9.0%.

## Value added

- Your 5-year net value added was -0.1%. This was below the U.S. Public median of 0.4% and below the peer median of 0.6%.

## Cost and cost effectiveness

- Your investment cost of 66.9 bps was below your benchmark cost of 85.4 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was low cost because it paid less than peers for similar services.
- Your costs decreased by 8.5 bps, from 75.4 bps in 2016 to 66.9 bps in 2020, primarily because you paid less in 2020 for similar investment styles. This was partly offset by a higher cost asset mix.

# 2

## Description of peer group and universe

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

Your peer group is comprised of 18 global funds, with assets ranging from \$17.6 billion to \$83.2 billion versus your \$31.5 billion. The median size is \$32.9 billion.

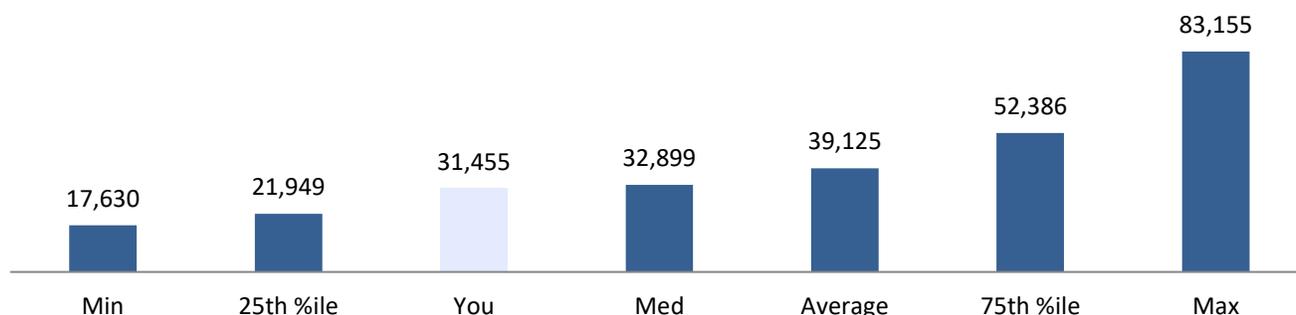
In order to preserve client confidentiality, we do not disclose your peers' names in this document due to the Freedom of Information Act. Your peer group consist of plans with the following characteristics:

### Peer Group Characteristics - 2020

	You	Peers	U.S. Public average
<u>Plan Assets (\$ billions)</u>			
Range	31.5	17.6 - 83.2	1.9 - 367.3
Median		32.9	20.9
<u># of Plans</u>			
Corporate		0	0
Public	1	17	49
Other		1	0
Total		18	49
<u>Implementation style</u>			
% External active	65.4	66.3	63.1
% External passive	30.9	24.6	22.9
% Internal active	3.8	5.6	8.7
% Internal passive	0.0	3.4	5.2
<u>Asset mix</u>			
% Stock	40.0	46.6	45.9
% Fixed Income	16.4	23.6	26.5
% Real Assets	11.9	9.8	10.2
% Private Equity	6.7	10.8	9.1
% Hedge Funds & Other	17.1	6.9	6.3

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

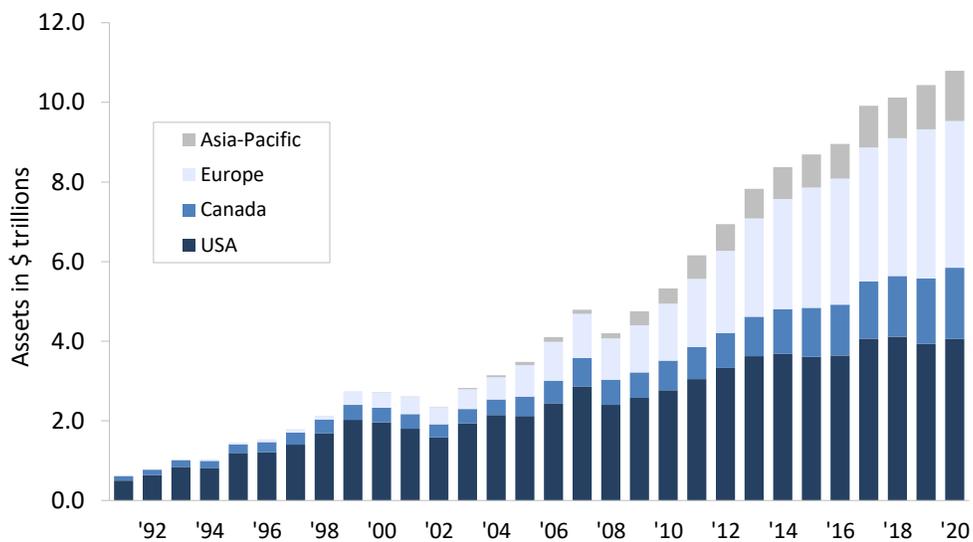


## CEM global universe

CEM has been providing investment benchmarking solutions since 1991. The 2020 survey universe is comprised of 276 funds representing \$10.8 trillion in assets. The breakdown by region is as follows:

- 157 U.S. pension funds with aggregate assets of \$4.1 trillion.
- 67 Canadian pension funds with aggregate assets of \$1.8 trillion.
- 43 European pension funds with aggregate assets of \$3.7 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Denmark, UK, and Ireland.
- 6 Asia-Pacific pension funds with aggregate assets of \$1.3 trillion.

CEM global universe



## Universe subsets

CEM's global survey universe is comprised of 276 funds with total assets of \$10.8 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 18 funds ranging in size from \$17.6 - \$83.2 billion. The peer median of \$32.9 billion compares to your \$31.5 billion.
- U.S. Public - The U.S. Public universe is comprised of 49 funds ranging in size from \$1.9 - \$367.3 billion. The median fund is \$20.9 billion.

### Universe subsets by number of funds and assets

	Peer group <sup>1</sup>	Global by type				Global by Country				
		Corp.	Public	Other	Total	U.S.	Canada	Europe	Asia-Pacific	Total
<b># of funds</b>										
2020	18	139	101	36	276	157	67	43	9	276
2019	16	135	133	41	309	151	71	73	14	309
2018	17	147	147	44	338	170	78	76	14	338
2017	17	151	155	47	353	167	79	91	16	353
2016	17	155	146	47	348	170	80	83	15	348
<b># of funds with uninterrupted data for:</b>										
1 yr	18	139	101	36	276	157	67	43	9	276
2 yrs	16	126	93	34	253	140	64	40	9	253
3 yrs	16	118	93	33	244	135	62	38	9	244
4 yrs	16	111	88	32	231	129	55	38	9	231
5 yrs	16	107	86	32	225	126	52	38	9	225
<b>Total assets (\$ billions)</b>										
2020	704	1,705	7,026	2,101	10,832	4,056	1,788	3,687	1,302	10,832
2019	597	1,637	6,876	2,064	10,577	3,939	1,636	3,749	1,255	10,577
2018	584	1,549	6,807	1,884	10,240	4,109	1,532	3,457	1,142	10,240
2017	600	1,524	6,703	2,004	10,231	4,061	1,445	3,362	1,364	10,231
2016	540	1,477	5,853	1,883	9,212	3,638	1,284	3,163	1,129	9,212
<b>2020 asset distribution (\$ billions)</b>										
Avg	39.1	12.3	69.6	58.4	39.2	25.8	26.7	85.7	144.7	39.2
Max	83.2	70.3	1,359.5	681.9	1,359.5	367.3	376.8	1,359.5	763.5	1,359.5
75th %ile	52.4	16.5	65.4	63.5	30.2	22.7	16.1	47.1	141.1	30.2
Median	32.9	5.9	17.6	17.1	9.5	10.1	5.9	29.4	31.6	9.5
25th %ile	21.9	2.4	5.0	4.1	3.1	3.2	2.1	6.1	9.9	3.1
Min	17.6	0.3	0.0	0.1	0.0	0.3	0.0	0.7	0.9	0.0

1. Peer group statistics are for your 2020 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 - 2020 (as a % of year-end assets)

	Your fund <sup>1</sup>	Peer group	Global by type				Global by Country				
			Corp.	Public	Other	Total	U.S.	Canada	Europe	Asia-Pacific	Total
<b>Implementation style</b>											
External Active	59.8	63.9	70.3	56.8	58.4	63.8	71.4	61.5	42.9	47.6	63.8
Fund of funds	5.6	2.4	2.1	2.5	2.5	2.3	2.3	1.7	2.9	2.8	2.3
External passive	30.9	24.6	19.7	17.0	19.4	18.7	18.9	12.8	27.4	16.4	18.7
Internal Active	3.8	5.6	6.2	17.1	15.0	11.3	4.6	19.2	21.7	20.8	11.3
Internal Passive	<u>0.0</u>	<u>3.4</u>	<u>1.7</u>	<u>6.6</u>	<u>4.8</u>	<u>3.9</u>	<u>2.7</u>	<u>4.8</u>	<u>5.1</u>	<u>12.4</u>	<u>3.9</u>
Total	100	100	100	100	100	100	100	100	100	100	100
<b>Actual asset mix</b>											
Stock	40.0	46.6	31.6	44.9	40.2	37.6	37.5	37.2	36.7	45.7	37.6
Fixed Income <sup>2</sup>	19.3	24.8	52.0	27.2	37.2	41.0	43.0	36.6	42.7	30.5	41.0
Global TAA	4.1	0.3	0.7	0.8	0.2	0.7	0.9	0.5	0.1	0.2	0.7
Real Assets	11.9	9.8	5.9	12.9	12.0	9.3	6.3	16.2	9.2	10.5	9.3
Hedge Funds	10.1	4.6	3.5	3.2	2.5	3.2	4.1	1.8	2.0	4.0	3.2
Balanced Funds	0.0	0.0	0.0	0.6	0.0	0.2	0.0	0.0	1.4	0.0	0.2
Risk Parity	0.0	0.9	0.5	0.4	0.3	0.5	0.7	0.2	0.0	1.0	0.5
Private Debt	7.9	2.2	1.7	2.5	3.1	2.2	1.4	2.9	4.2	1.1	2.2
Private Equity	<u>6.7</u>	<u>10.8</u>	<u>4.1</u>	<u>7.5</u>	<u>4.6</u>	<u>5.4</u>	<u>6.1</u>	<u>4.6</u>	<u>3.7</u>	<u>7.1</u>	<u>5.4</u>
Total	100	100	100	100	100	100	100	100	100	100	100
<b>Policy asset mix</b>											
Stock	47.4	46.1	31.7	45.0	42.2	38.0	37.7	37.5	37.0	51.5	38.0
Fixed Income	26.0	26.9	51.6	27.2	35.8	40.6	42.6	36.0	43.4	27.2	40.6
Global TAA	0.0	0.0	0.7	1.0	0.1	0.7	0.9	0.8	0.1	0.2	0.7
Real Assets	12.0	11.4	6.4	13.8	12.8	9.9	7.2	16.7	9.4	10.2	9.9
Hedge funds	0.0	3.3	3.3	2.6	2.1	2.9	3.8	1.3	2.0	2.9	2.9
Balanced Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Risk Parity	0.0	0.8	0.5	0.4	0.2	0.4	0.6	0.1	0.0	0.6	0.4
Private Debt	7.0	2.3	1.7	2.8	2.8	2.2	1.2	3.4	4.5	1.3	2.2
Private Equity	<u>7.6</u>	<u>9.2</u>	<u>4.1</u>	<u>7.2</u>	<u>3.9</u>	<u>5.2</u>	<u>6.1</u>	<u>4.2</u>	<u>3.5</u>	<u>6.1</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.

2. Includes derivatives and overlays.

## Implementation style, actual mix and policy mix trends

### Implementation style, actual mix and policy mix - 2016 to 2020 (as a % of year-end assets)

	Your fund <sup>1</sup>					Peer average <sup>2</sup>					U.S. Public average <sup>2</sup>				
	2020	2019	2018	2017	2016	2020	2019	2018	2017	2016	2020	2019	2018	2017	2016
<b>Implementation style</b>															
External active	59.8	78.1	79.1	76.5	72.4	64.6	65.8	67.0	66.2	66.1	58.2	59.7	60.7	60.0	60.4
Fund of funds	5.6	5.2	6.3	7.8	9.3	1.8	1.9	2.0	2.4	2.2	2.6	2.7	2.7	3.0	2.8
External passive	30.9	10.6	10.0	11.1	12.3	23.7	22.1	20.6	21.2	21.6	23.4	22.0	21.2	21.6	21.7
Internal active	3.8	6.1	4.6	4.6	6.0	6.0	6.1	6.5	6.8	6.8	9.8	9.4	9.3	9.6	9.4
Internal passive	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>3.9</u>	<u>4.0</u>	<u>3.9</u>	<u>3.4</u>	<u>3.4</u>	<u>6.0</u>	<u>6.2</u>	<u>6.2</u>	<u>5.8</u>	<u>5.6</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
<b>Actual asset mix</b>															
Stock	40.0	35.7	34.3	32.4	27.5	44.5	44.8	43.5	46.4	45.1	45.7	45.8	44.9	47.7	46.9
Fixed income <sup>3</sup>	19.3	20.3	21.5	26.9	31.7	25.1	25.4	25.9	26.2	27.7	26.1	25.9	26.2	25.6	26.1
Global TAA	4.1	8.4	9.4	6.8	7.0	0.3	0.6	0.6	0.4	0.4	1.1	1.3	1.4	1.1	1.7
Real assets	11.9	11.7	10.7	9.1	6.9	10.2	10.8	11.5	11.0	11.1	10.5	10.8	11.0	10.6	10.7
Hedge funds	10.1	10.2	10.9	11.0	11.5	5.2	5.0	5.5	4.9	5.0	4.0	4.4	4.7	4.4	4.7
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	1.0	0.8	0.8	0.8	0.7	0.8	0.8	1.0	1.2	0.6
Private credit	7.9	6.4	5.9	5.8	5.8	2.5	2.2	2.0	1.3	1.1	2.1	1.9	1.9	1.5	1.3
Private equity	<u>6.7</u>	<u>7.3</u>	<u>7.5</u>	<u>8.0</u>	<u>9.7</u>	<u>11.3</u>	<u>10.3</u>	<u>10.2</u>	<u>9.0</u>	<u>9.0</u>	<u>9.7</u>	<u>9.1</u>	<u>8.9</u>	<u>7.8</u>	<u>8.0</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
<b>Policy asset mix</b>															
Stock	47.4	44.8	44.1	39.8	37.2	44.5	45.5	46.5	47.0	47.1	45.6	45.7	46.5	47.6	47.3
Fixed income	26.0	22.4	23.2	25.0	24.3	27.1	27.6	26.5	27.8	28.3	24.9	24.9	24.8	25.4	25.6
Global TAA	0.0	7.0	7.0	10.0	10.3	0.0	0.4	0.4	0.6	0.6	0.9	1.1	1.0	1.0	1.6
Real assets	12.0	12.0	12.0	10.0	8.2	11.7	12.1	11.5	11.2	11.1	12.2	12.3	11.7	11.5	11.3
Hedge funds	0.0	1.0	1.0	2.0	4.1	3.7	2.6	3.0	2.8	2.9	3.6	3.6	4.2	3.9	4.0
Balanced Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Risk Parity	0.0	0.0	0.0	0.0	0.0	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.9	1.0	0.6
Private credit	7.0	6.6	5.8	6.0	6.6	2.5	2.0	2.5	1.4	1.0	2.3	2.1	2.1	1.4	1.3
Private equity	<u>7.6</u>	<u>6.2</u>	<u>7.0</u>	<u>7.2</u>	<u>9.2</u>	<u>9.5</u>	<u>9.1</u>	<u>8.7</u>	<u>8.4</u>	<u>8.2</u>	<u>9.9</u>	<u>9.7</u>	<u>8.8</u>	<u>8.3</u>	<u>8.2</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 43 U.S. Public and 16 peer funds with 5 or more consecutive years of data ending 2020.

3. Includes derivatives and overlays.

## 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 - 2020 (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	54.3		45.7	0.0	0.0	32.7	62.1	0.0	5.1	19.0	64.3	1.8	14.9
Stock - U.S. Large Cap						19.8	56.6	13.1	10.5	22.9	54.2	7.6	15.2
Stock - U.S. Mid Cap						48.8	18.8	19.0	13.4	49.1	7.1	13.7	30.1
Stock - U.S. Small Cap	0.0		100.0	0.0	0.0	72.5	17.2	4.1	6.2	81.4	10.4	5.3	2.9
Stock - EAFE	0.0		100.0	0.0	0.0	52.3	38.0	9.7	0.0	63.4	25.5	5.9	5.3
Stock - Global	15.1		84.9	0.0	0.0	39.1	50.3	0.0	10.5	43.8	37.6	4.4	14.3
Stock - Other						61.0	7.1	22.3	9.7	78.1	8.7	9.2	4.0
Stock - Emerging	71.8		28.2	0.0	0.0	73.9	13.9	1.8	10.3	75.1	16.7	5.0	3.2
Stock - ACWI x U.S.	100.0		0.0	0.0	0.0	79.1	20.1	0.0	0.8	64.3	33.5	1.7	0.5
Stock - Aggregate	30.0		70.0	0.0	0.0	47.3	41.9	4.5	6.3	45.1	40.0	4.9	10.1
Fixed Income - U.S.	97.3		0.0	2.7	0.0	67.1	12.1	20.4	0.4	59.1	14.2	25.1	1.6
Fixed Income - U.S. Gov't						0.0	76.4	0.0	23.6	39.7	40.3	12.8	7.1
Fixed Income - U.S. Credits						100.0	0.0	0.0	0.0	67.5	0.0	32.5	0.0
Fixed Income - EAFE						100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Fixed Income - Global						79.4	20.6	0.0	0.0	61.6	5.3	33.1	0.0
Fixed Income - Other						100.0	0.0	0.0	0.0	96.7	0.4	2.8	0.0
Fixed Income - Long Bonds						76.3	23.7	0.0	0.0	66.7	14.2	19.1	0.0
Fixed Income - Emerging	100.0		0.0	0.0	0.0	88.0	8.6	0.0	3.4	96.4	2.6	0.0	1.0
Fixed Income - Inflation Indexed						47.3	52.7	0.0	0.0	39.0	54.1	0.6	6.3
Fixed Income - High Yield	100.0		0.0	0.0	0.0	97.4	0.0	2.6	0.0	91.3	1.5	7.2	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	45.3		54.7			69.7	30.3			48.3	51.7		
Fixed Income - Aggregate	77.1		0.0	22.9	0.0	65.9	18.5	13.6	2.0	61.7	14.8	21.8	1.8
Commodities						100.0	0.0	0.0	0.0	86.8	4.9	2.4	6.0
Infrastructure	100.0	0.0	0.0			97.6	2.4	0.0		92.7	6.2	1.1	
Natural Resources						100.0	0.0	0.0		99.8	0.1	0.1	
REITs	100.0		0.0	0.0	0.0	87.6	3.2	9.1	0.0	56.0	36.7	1.9	5.3
Real Estate ex-REITs	100.0	0.0	0.0			96.8	0.3	2.9		94.8	0.3	4.8	
Other Real Assets						100.0	0.0	0.0		100.0	0.0	0.0	
Real Assets - Aggregate	100.0	0.0	0.0	0.0	0.0	96.9	0.4	0.1	2.5	92.1	0.7	3.0	3.6
Hedge Funds	55.1	44.9				86.2	13.8			79.3	20.7		
Global TAA	100.0		0.0			100.0		0.0		89.4		10.6	
Risk Parity						100.0		0.0		83.9		16.1	
Private Credit	100.0	0.0	0.0			100.0	0.0	0.0		98.5	0.1	1.4	
Mortgages						100.0		0.0		18.2		81.8	
Diversified Private Equity	84.3	15.7	0.0			84.3	15.7	0.0		77.7	22.2	0.1	
Venture Capital						10.1	89.9	0.0		52.9	47.1	0.0	
LBO						94.2	5.8	0.0		95.1	4.9	0.0	
Other Private Equity						100.0	0.0	0.0		99.9	0.0	0.1	
Private Equity - Aggregate	84.3	15.7	0.0			84.1	15.9	0.0		79.7	20.2	0.1	
Total Fund - Avg. Holdings	59.8	5.6	30.9	3.8	0.0	63.9	2.4	24.6	5.6	3.4	60.4	2.8	22.9

## Actual mix

### Actual asset mix - 2016 to 2020 (as a % of total average assets)

	Your fund <sup>1</sup>					Peer average %					U.S. Public average %				
	2020	2019	2018	2017	2016	2020	2019	2018	2017	2016	2020	2019	2018	2017	2016
Stock - U.S. Broad/All	5.6	8.8	8.7	8.9	6.5	9.4	9.1	8.5	7.7	5.6	7.2	6.1	5.9	6.4	6.2
Stock - U.S. Large Cap						10.7	10.4	11.4	13.3	15.3	11.2	11.6	11.7	12.8	14.3
Stock - U.S. Mid Cap						0.6	0.6	0.5	0.6	0.6	0.6	0.7	1.0	0.8	0.8
Stock - U.S. Small Cap	2.0					1.4	1.2	1.6	1.8	2.2	1.8	1.8	2.2	2.3	2.5
Stock - EAFE	2.0					2.8	3.0	3.7	5.2	5.1	6.4	6.4	6.9	7.0	6.5
Stock - Global	23.3	17.3	16.4	16.1	16.1	7.0	6.0	4.5	4.7	4.3	7.7	6.6	6.4	6.5	5.1
Stock - Other						1.1	1.2	0.9	0.8	0.7	0.9	1.0	0.9	1.0	1.0
Stock - Emerging	6.2	6.2	5.8	4.6	3.4	2.3	2.3	2.4	2.5	2.2	3.5	3.5	3.7	3.8	3.1
Stock - ACWI x U.S.	1.0	3.4	3.4	2.8	1.5	11.3	11.1	10.8	10.7	10.0	6.5	6.3	6.0	6.8	7.4
Stock - Aggregate	40.0	35.7	34.3	32.4	27.5	46.6	44.8	44.4	47.4	46.1	45.9	44.0	44.8	47.4	46.8
Fixed Income - U.S.	2.4	2.4	2.8	4.6	7.1	12.3	11.8	14.0	12.8	13.7	12.6	12.0	13.0	12.6	13.5
Fixed Income - U.S. Gov't						1.7	2.2	2.0	2.2	2.1	2.1	2.2	1.6	1.4	0.9
Fixed Income - U.S. Credits						0.1					0.4	0.3	0.3	0.2	0.2
Fixed Income - EAFE						0.2	0.2	0.3			0.0	0.0	0.0	0.1	0.1
Fixed Income - Global						0.9	1.1	0.5	1.4	1.5	1.2	1.6	1.7	1.4	1.7
Fixed Income - Other						0.7	0.9	0.9	1.3	1.7	0.8	0.8	0.8	0.8	1.0
Fixed Income - Long Bonds						0.7	0.7	0.5	0.5	0.4	1.8	1.5	1.4	1.3	0.9
Fixed Income - Emerging	2.9	3.7	4.7	5.2	5.5	0.9	1.1	1.0	1.1	1.1	1.1	1.3	1.3	1.3	1.1
Fixed Income - Inflation Indexed						2.2	2.6	2.4	2.3	2.6	1.6	1.8	1.8	1.9	1.8
Fixed Income - High Yield	4.4	4.1	4.8	6.7	6.8	1.9	1.7	1.9	2.0	2.0	1.9	1.8	1.9	1.6	1.5
Fixed Income - Absolute Return Bonds															
Fixed Income - Bundled LDI											0.3	0.3	0.2		
Fixed Income - Convertibles						0.0	0.2	0.2	0.2		0.1	0.1	0.1	0.1	
Cash	6.8	7.6	6.7	7.3	9.5	2.1	2.0	2.1	2.0	1.8	2.5	1.8	2.4	2.3	2.1
Fixed Income - Aggregate	16.4	17.7	18.9	23.8	28.9	23.6	24.4	25.6	25.7	27.1	26.5	25.5	26.5	24.9	24.6
Commodities						0.7	0.9	1.0	1.0	1.0	0.4	0.6	0.5	0.5	0.7
Infrastructure	3.0	2.6	2.0	1.4	0.6	0.7	0.7	0.6	0.3	0.2	0.7	0.9	0.5	0.6	0.4
Natural Resources						0.8	1.0	0.9	0.7	0.7	0.8	1.0	0.9	1.2	0.9
REITs	1.5	1.6	2.5	1.6	1.0	0.5	0.7	0.8	0.7	0.8	0.8	0.7	0.8	0.9	0.8
Real Estate ex-REITs	7.4	7.5	6.1	6.0	5.3	7.1	7.5	8.0	7.5	7.7	7.0	7.7	7.7	6.9	7.8
Other Real Assets						0.0	0.0	0.1	0.5	0.4	0.5	0.4	0.4	0.6	0.7
Real Assets - Aggregate	11.9	11.7	10.7	9.1	6.9	9.8	10.8	11.3	10.7	10.8	10.2	11.3	10.9	10.8	11.2
Hedge Funds	10.1	10.2	10.9	11.0	11.5	4.6	5.0	5.1	4.6	4.7	4.0	4.6	4.7	4.8	5.2
Global TAA	4.1	8.4	9.4	6.8	7.0	0.3	0.6	0.6	0.4	0.4	1.0	1.5	1.1	0.9	1.5
Risk Parity						0.9	0.8	0.7	0.7	0.6	0.7	0.9	1.0	1.1	0.7
Mortgages						0.1	0.1	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.1
Private Credit	7.9	6.4	5.9	5.8	5.8	2.1	2.1	1.9	1.2	1.0	1.8	2.0	2.0	1.6	1.3
Diversified Private Equity	6.7	7.3	7.5	8.0	9.7	9.6	9.1	8.7	7.6	7.7	7.2	7.0	6.3	5.6	6.1
Venture Capital						0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.5	0.4	0.4
LBO						0.9	0.9	0.8	0.7	0.6	1.4	1.5	1.6	1.5	1.4
Other Private Equity						0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Private Equity - Aggregate	6.7	7.3	7.5	8.0	9.7	10.8	10.3	9.9	8.6	8.6	9.1	9.1	8.4	7.7	8.1
Derivatives/Overlays Mkt Value	2.9	2.6	2.6	3.1	2.9	1.1	1.0	0.6	0.6	0.7	0.6	0.7	0.4	0.8	0.5
Total Fund	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count	1	1	1	1	1	18	16	17	17	17	49	48	58	60	59
Median Assets (\$ billions)	31.5	31.6	31.3	30.5	28.0	32.9	31.7	30.5	30.5	28.0	20.9	21.0	19.0	19.9	17.1

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

## Policy mix

### Policy asset mix - 2016 to 2020 (as a % of total assets)

	Your fund %					Peer average %					U.S. Public average %				
	2020	2019	2018	2017	2016	2020	2019	2018	2017	2016	2020	2019	2018	2017	2016
Stock - U.S. Broad/All	23.9	16.3	16.4	14.6		12.0	11.3	12.7	12.8	10.6	8.4	7.3	8.2	9.1	9.1
Stock - U.S. Large Cap						7.6	6.2	8.3	8.4	10.0	8.8	8.6	8.8	9.2	10.4
Stock - U.S. Mid Cap						0.4	0.4	0.4	0.4	0.4	0.3	0.5	0.7	0.5	0.4
Stock - U.S. Small Cap	2.9					0.5	0.4	0.4	0.4	0.4	1.2	1.1	1.5	1.3	1.5
Stock - EAFE						1.8	2.1	2.1	3.2	3.2	4.7	4.7	5.2	4.7	5.1
Stock - Global	12.2	18.3	17.7	17.3	37.2	8.9	9.4	8.5	8.7	9.9	11.5	11.0	11.2	10.7	8.9
Stock - Other						3.9	4.5	0.9	0.7	0.8	1.9	2.0	0.8	0.9	0.8
Stock - Emerging	6.2	6.6	6.3	4.9		1.0	1.2	1.1	1.0	0.7	2.4	2.5	2.8	2.5	2.3
Stock - ACWI x U.S.	2.2	3.6	3.7	3.0		10.0	10.0	12.7	11.8	11.5	6.2	6.0	6.9	7.5	8.1
Stock - Aggregate	47.4	44.8	44.1	39.8	37.2	46.1	45.5	47.0	47.4	47.5	45.5	43.8	46.1	46.5	46.7
Fixed Income - U.S.	26.0	11.0	13.0	10.0	10.3	17.2	17.0	17.6	16.6	16.6	14.6	14.2	14.4	14.7	15.0
Fixed Income - U.S. Gov't						1.6	1.8	1.6	1.8	1.8	2.1	1.9	1.4	1.1	0.7
Fixed Income - U.S. Credits						0.2					0.4	0.3	0.5	0.3	0.3
Fixed Income - EAFE						0.2	0.3	0.2			0.0	0.0	0.0	0.1	0.1
Fixed Income - Global						1.0	0.5	0.5	1.6	1.6	1.0	1.3	1.5	1.4	1.5
Fixed Income - Other						0.4	0.4	0.3	1.0	1.3	0.9	0.7	0.4	0.6	0.6
Fixed Income - Long Bonds						0.7	0.8	0.5	0.5	0.5	2.2	2.1	2.0	2.1	1.7
Fixed Income - Emerging		4.0	4.0	5.0	5.2	0.8	0.7	0.9	1.0	1.0	1.0	1.2	1.2	1.2	0.9
Fixed Income - Inflation Indexed						2.3	2.8	2.4	2.4	2.8	2.4	2.9	2.8	2.8	2.7
Fixed Income - High Yield		4.4	5.2	7.0	6.8	1.8	2.3	1.6	2.0	1.8	1.9	1.8	2.0	1.9	1.8
Fixed Income - Absolute Return Bonds															
Fixed Income - Bundled LDI											0.3	0.3	0.2		
Fixed Income - Convertibles							0.2	0.2	0.2		0.0	0.1	0.1	0.1	
Cash		3.0	1.0	3.0	2.1	0.8	0.9	0.9	0.9	0.8	-0.5	-1.6	-0.9	-0.9	-0.9
Fixed Income - Aggregate	26.0	22.4	23.2	25.0	24.3	26.9	27.6	26.7	27.9	28.3	26.3	25.2	25.5	25.2	24.5
Commodities						1.0	1.0	1.0	1.0	1.1	0.6	1.0	1.0	0.9	1.2
Infrastructure	3.0	3.0	3.0	2.0	1.0	1.0	0.9	0.3	0.4	0.2	1.1	1.2	0.6	0.7	0.6
Natural Resources						0.6	1.0	0.6	0.4	0.7	0.8	1.0	0.8	1.1	1.0
REITs		1.5	3.1	2.3	0.7	0.3	0.6	0.6	0.7	0.6	0.5	0.6	0.8	0.8	0.6
Real Estate ex-REITs	9.0	7.5	5.9	5.7	6.5	8.4	8.4	8.4	8.1	7.5	8.2	8.5	8.0	7.7	7.6
Other Real Assets							0.0	0.5	0.4	0.7	0.7	0.6	0.7	0.6	1.0
Real Assets - Aggregate	12.0	12.0	12.0	10.0	8.2	11.4	12.1	11.4	11.0	11.0	11.9	12.8	11.8	11.8	12.0
Hedge Funds		1.0	1.0	2.0	4.1	3.3	2.6	2.8	2.7	2.7	3.8	4.0	4.3	4.4	4.5
Global TAA		7.0	7.0	10.0	10.3		0.4	0.4	0.6	0.6	0.8	1.3	1.1	0.9	1.4
Risk Parity						0.8	0.8	0.7	0.7	0.7	0.6	0.8	0.8	1.0	0.7
Mortgages						0.1	0.1	0.2			0.2	0.3	0.1	0.0	0.1
Private Credit	7.0	6.6	5.8	6.0	6.6	2.2	1.9	2.2	1.3	0.9	1.8	2.1	2.0	1.7	1.4
Diversified Private Equity	7.6	6.2	7.0	7.2	9.2	8.3	8.6	8.2	8.0	7.9	7.5	7.9	6.6	7.1	6.9
Venture Capital						0.1	0.3	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3
LBO						0.8	0.2	0.3	0.3	0.3	1.5	1.2	1.4	0.9	1.2
Other Private Equity											0.1	0.2	0.1	0.1	0.2
Private Equity - Aggregate	7.6	6.2	7.0	7.2	9.2	9.2	9.1	8.6	8.4	8.3	9.2	9.6	8.4	8.4	8.7
Total Fund	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count	1	1	1	1	1	18	16	17	17	17	49	48	58	60	59

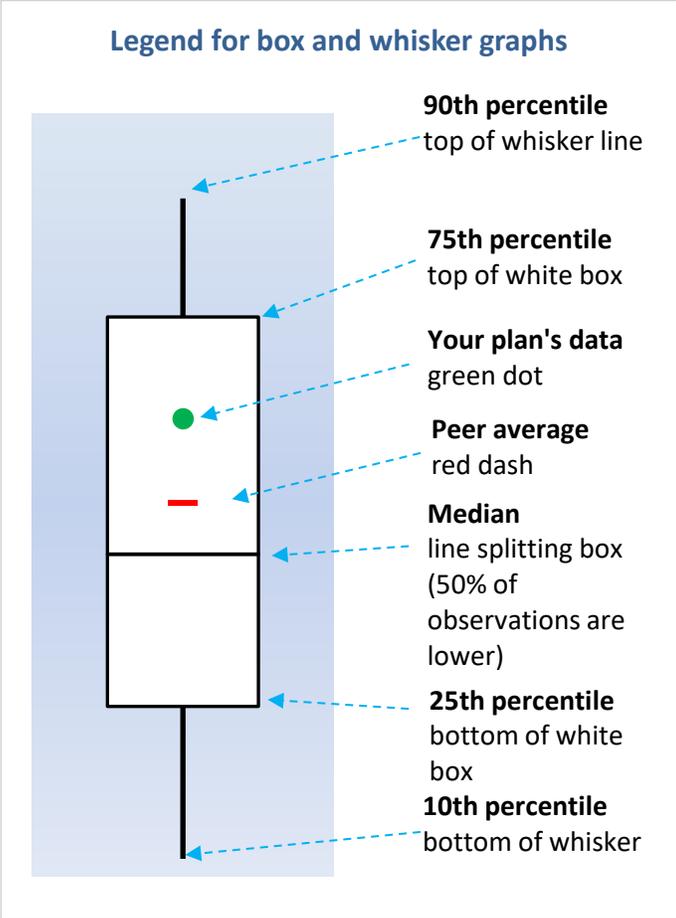
# 3

## Returns, Benchmarks and Value Added

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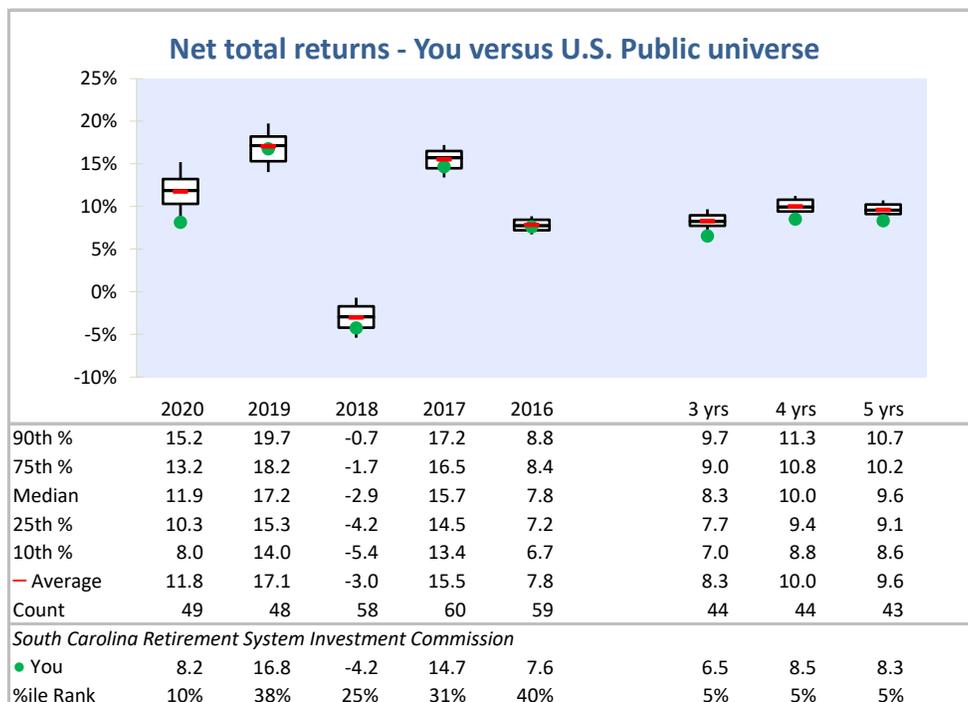
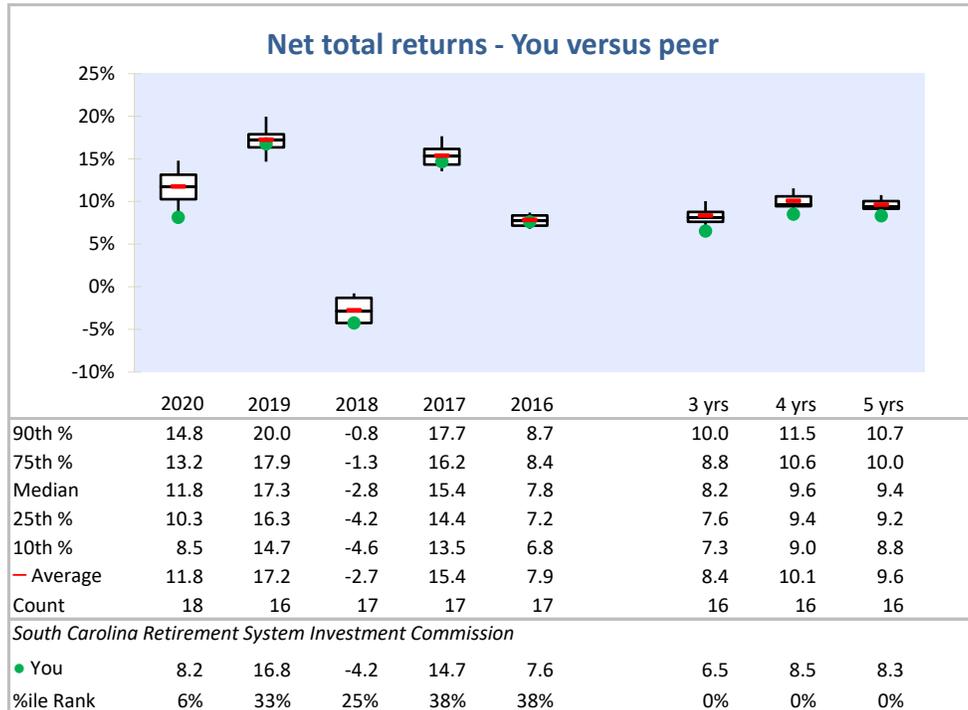
# Interpreting box and whisker graphs

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



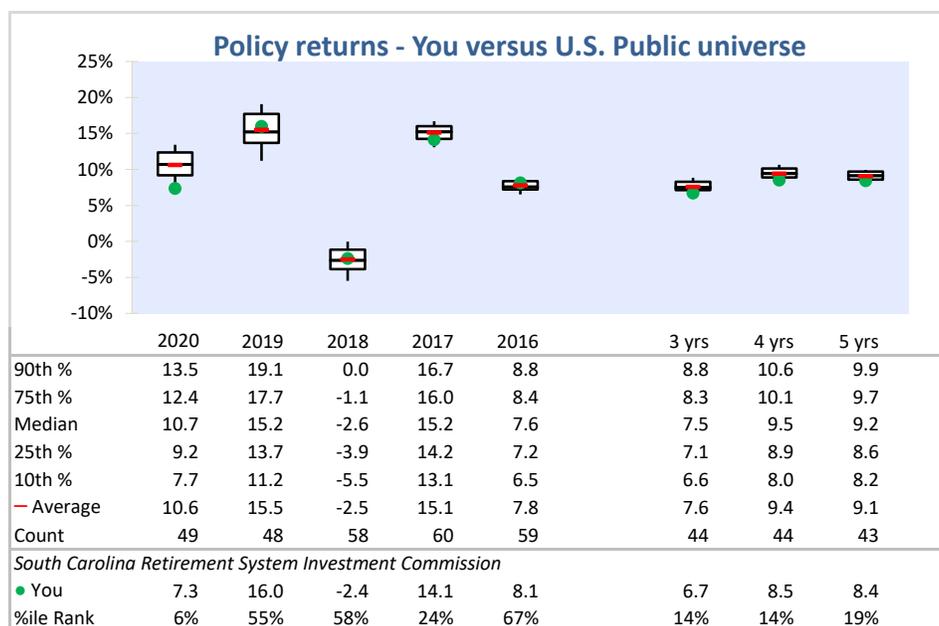
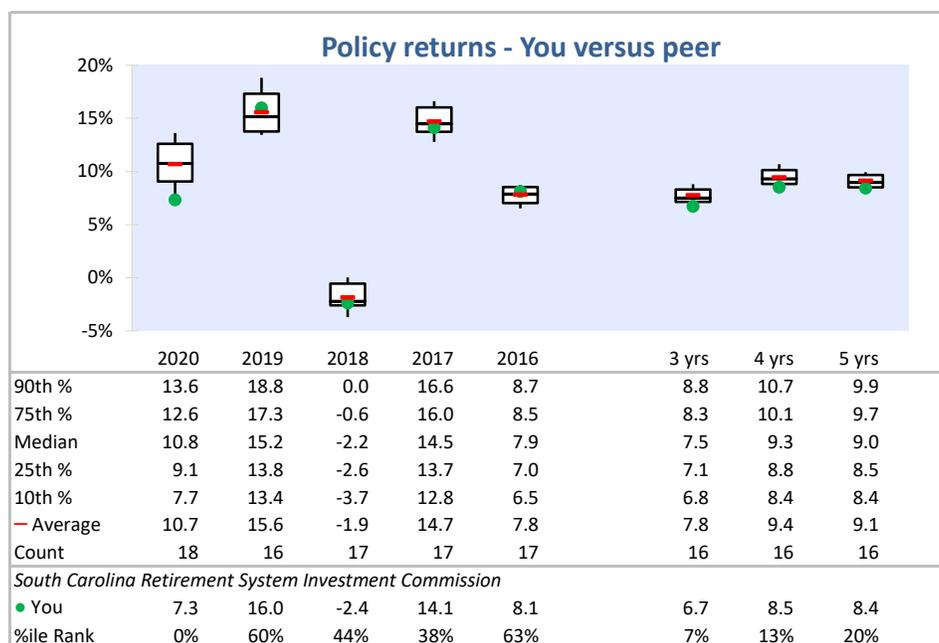
## Net total returns

Your 5-year net total return of 8.3% 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

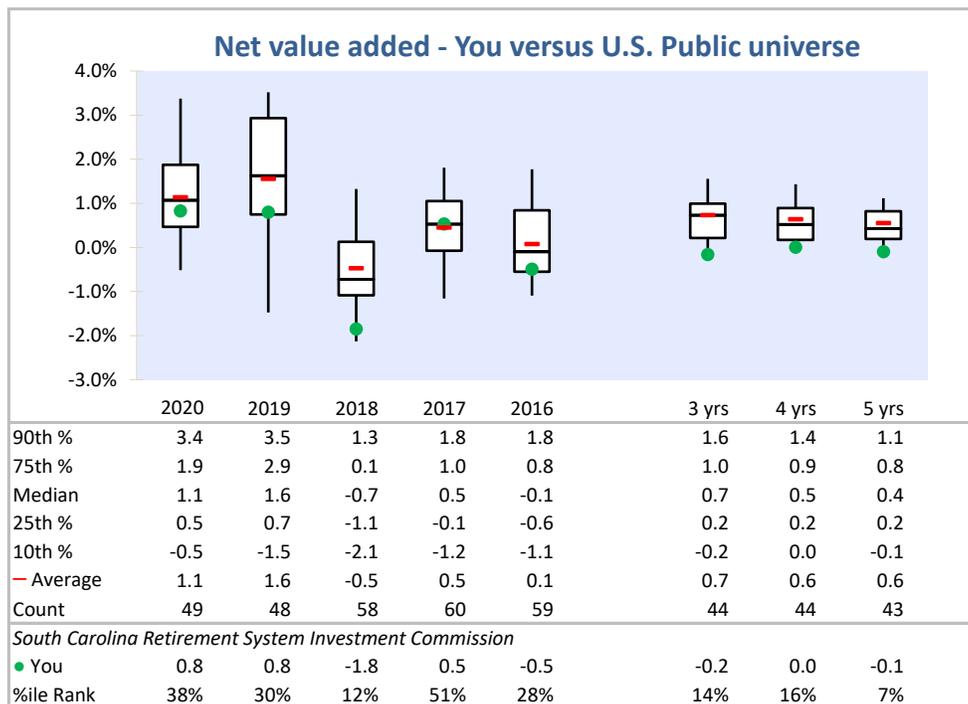
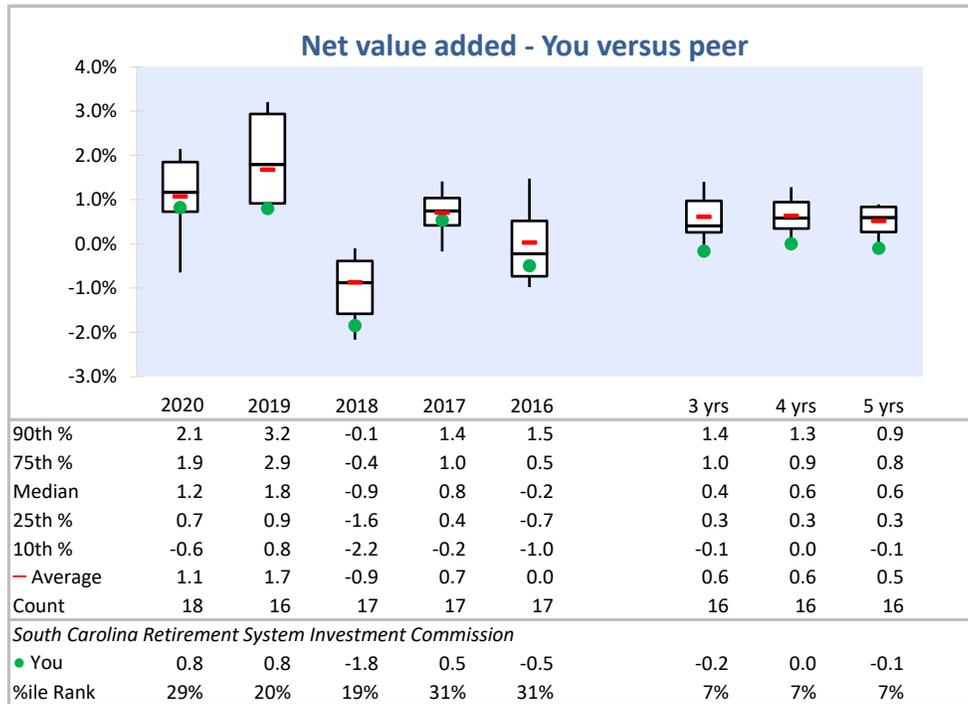
Your 5-year policy return of 8.4% was below the peer median and below the median of the U.S. Public universe. Policy return is the return you would have earned had you passively implemented your policy asset mix decision through your benchmark portfolios.



To enable fairer comparisons, the policy returns of all participants with policy weight in private equity were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. Refer to the appendix of this section for details.

## Net value added

Your 5-year net value added of -0.1% 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 %					
	2020	2019	2018	2017	2016	5-yr <sup>1</sup>	2020	2019	2018	2017	2016	5-yr <sup>1</sup>	2020	2019	2018	2017	2016	5-yr <sup>1</sup>
Stock - U.S. Broad/All	<i>-11.7</i>	19.6	-7.9	14.3	9.5	<i>4.0</i>	13.5	28.9	-5.6	20.5	9.3	12.1	17.5	29.8	-5.3	20.1	11.1	13.6
Stock - U.S. Large Cap							18.2	34.8	-5.5	22.1	11.4	15.2	20.4	31.4	-4.9	22.3	11.2	15.7
Stock - U.S. Mid Cap							18.7	32.4	-8.8	20.5	16.7	15.0	22.0	31.2	-9.5	18.9	13.6	15.0
Stock - U.S. Small Cap							17.2	26.1	-10.4	14.9	18.2	12.7	16.7	26.7	-11.1	15.6	18.7	12.9
Stock - EAFE							9.4	22.8	-13.6	25.7	2.6	8.5	11.0	22.5	-13.9	25.7	2.9	8.5
Stock - Global	21.6	26.7	-9.0	24.1	6.1	13.1	15.4	20.9	-8.6	23.6	8.6	12.1	16.8	25.1	-8.4	29.4	7.5	12.6
Stock - Other							3.3	14.5	-14.1	13.5	14.1	6.2	-2.5	14.5	-11.8	14.8	10.3	4.1
Stock - Emerging	<i>11.5</i>	18.8	-16.6	37.6	10.1	<i>10.8</i>	19.5	19.2	-15.6	36.0	12.2	13.0	55.2	69.5	-51.1	103.8	44.0	12.9
Stock - ACWI x U.S.	<i>-28.2</i>	23.4	-18.6	31.1	5.1	<i>-0.1</i>	9.0	23.1	-15.4	29.3	3.9	8.7	11.5	21.9	-14.5	28.4	3.6	9.3
Stock - Aggregate	<i>15.5</i>	23.3	-11.0	23.9	7.4	<i>11.0</i>	15.2	25.9	-10.3	24.1	8.9	11.9	15.9	26.1	-9.9	24.6	9.0	12.3
Fixed Income - U.S.	10.2	8.6	-0.4	5.0	3.8	5.4	8.9	9.5	-0.1	4.4	3.8	5.2	8.3	9.0	0.0	4.3	3.8	5.0
Fixed Income - U.S. Gov't							8.4	6.9	0.9	1.8	-0.3	3.5	10.0	9.0	-0.3	4.5	1.2	3.6
Fixed Income - U.S. Credits							11.5						9.5	15.8	-0.1	4.5	4.4	
Fixed Income - EAFE							10.2	10.0	-4.9				11.5	6.1	-0.4	9.6	3.8	5.4
Fixed Income - Global							6.2	8.4	1.6	4.7	4.5	4.6	7.1	7.3	-2.0	13.1	5.8	5.1
Fixed Income - Other							1.5	7.2	2.3	5.4	9.0	5.8	2.5	7.4	1.4	25.1	15.0	5.1
Fixed Income - Long Bonds							17.1	-3.5	-3.5	10.5	7.1		14.6	14.1	-3.6	9.8	3.4	8.2
Fixed Income - Emerging	1.1	13.2	-6.6	13.7	11.7	6.3	5.1	14.9	-5.6	13.5	11.0	7.6	4.9	13.6	-5.9	12.3	10.6	7.4
Fixed Income - Inflation Indexed							13.2	8.9	-1.1	3.6	7.3	7.0	11.3	8.3	-1.3	3.6	5.6	5.6
Fixed Income - High Yield	4.0	7.3	0.5	6.1	8.9	5.3	5.7	13.6	-1.8	7.0	13.4	7.3	6.2	12.5	-1.5	7.0	12.7	7.3
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI													9.7	16.1				
Fixed Income - Convertibles							56.3	22.1	-1.9	12.4			28.0	19.2	-1.3	10.9		
Cash	-0.5	2.7	1.2	0.6	0.4	0.9	1.2	3.5	2.1	0.9	0.5	1.6	1.0	0.4	-0.1	0.9	1.3	1.7
Fixed Income - Aggregate	2.5	6.8	-1.2	5.9	5.4	3.8	8.5	9.6	-0.4	5.0	5.0	5.5	8.6	11.7	-0.7	5.0	4.7	5.3
Commodities							-4.8	10.0	-11.1	3.9	13.2	1.4	-1.2	3.8	-11.3	6.8	12.5	-0.5
Infrastructure	0.5	26.5	-6.7	15.0	-5.7	5.2	4.3	13.0	5.1	9.8	4.9	7.4	5.2	9.7	7.0	12.3	9.0	7.1
Natural Resources							-2.5	0.3	4.3	5.9	4.5	3.5	-7.7	1.7	3.3	6.9	6.5	1.7
REITs	-1.3	27.0	-5.2	7.9	-5.0	4.0	-2.1	25.7	-4.5	9.7	3.2	4.5	-4.2	25.2	-4.7	8.7	4.8	4.8
Real Estate ex-REITs	0.4	5.6	9.9	9.7	1.4	5.3	1.2	6.7	9.1	9.1	8.5	7.0	0.4	5.8	7.7	8.2	8.1	5.4
Other Real Assets							15.0	5.1	0.3	6.9	16.7		2.4	6.5	-2.3	3.4	12.6	6.1
Real Assets - Aggregate	0.2	13.3	3.2	10.2	-0.1	5.2	0.1	8.1	5.0	8.5	7.7	5.8	-0.7	7.3	4.6	7.9	8.1	4.8
Hedge Funds	8.9	4.4	2.5	6.0	0.2	4.3	4.7	5.7	-1.3	4.5	2.9	4.6	3.5	5.3	-1.2	5.9	1.5	4.0
Global TAA	-7.5	20.3	-6.9	11.3	7.8	4.4	2.3	20.4	-6.9	11.3	7.8	4.4	4.6	15.3	-6.2	12.1	7.3	5.8
Risk Parity							13.8	21.2	-7.0	12.4	11.8	10.0	7.7	15.7	-8.0	14.4	11.6	10.2
Mortgages							4.2	7.8	3.1	6.5	4.0		5.2	7.9	3.0	5.7	2.6	5.3
Private Credit	-0.4	6.4	3.3	6.9	8.8	4.9	16.2	6.8	7.2	9.5	7.0	6.2	12.0	6.9	6.9	8.9	7.8	6.4
Diversified Private Equity	6.9	7.7	6.6	13.8	10.6	9.1	16.9	11.2	18.0	17.5	9.2	14.3	17.9	10.3	16.0	17.1	9.0	13.6
Venture Capital							20.9	18.1	23.2	15.3	6.9	15.1	32.9	14.0	20.1	11.4	4.7	15.7
LBO							10.5	9.9	16.2	11.0	7.1	10.8	12.0	13.0	17.1	19.3	13.7	14.1
Other Private Equity							10.1	6.1	5.8	10.4	6.6	7.8	9.8	22.9	23.3	8.8	9.1	20.9
Private Equity - Aggregate	6.9	7.7	6.6	13.8	10.6	9.1	17.8	11.2	17.9	17.4	9.2	14.5	18.9	11.3	16.8	17.3	9.1	14.2
Total Fund Return	8.2	16.8	-4.2	14.7	7.6	8.3	11.8	17.2	-2.7	15.4	7.9	9.6	11.8	17.1	-3.0	15.5	7.8	9.6

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

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

## Benchmark returns by asset class

Asset class	Your fund %						Peer average %						U.S. Public average %					
	2020	2019	2018	2017	2016	5-yr <sup>1</sup>	2020	2019	2018	2017	2016	5-yr <sup>1</sup>	2020	2019	2018	2017	2016	5-yr <sup>1</sup>
Stock - U.S. Broad/All	20.7	26.6	-5.7	20.6	11.8	14.2	19.8	30.4	-5.2	21.9	12.3	15.1	21.2	31.0	-5.2	21.8	12.4	15.5
Stock - U.S. Large Cap							19.3	31.4	-4.6	21.6	12.2	15.3	21.1	31.6	-4.6	21.6	12.4	15.6
Stock - U.S. Mid Cap							17.3	29.5	-7.5	19.9	13.7	13.7	20.8	27.1	-8.0	19.0	12.5	14.3
Stock - U.S. Small Cap	35.8						20.4	26.4	-9.8	15.7	20.1	13.4	19.2	26.2	-10.3	15.4	19.9	13.2
Stock - EAFE	10.7						8.6	22.8	-13.9	25.0	2.0	7.9	8.6	22.5	-13.8	25.0	2.3	7.9
Stock - Global	15.9	27.7	-8.7	22.4	8.2	12.3	16.3	26.8	-9.3	23.6	8.4	12.4	16.2	26.6	-9.3	24.3	8.0	12.2
Stock - Other							-3.4	22.6	-11.6	12.2	15.4	6.1	-4.3	21.7	-9.5	16.3	8.6	5.8
Stock - Emerging	18.3	18.9	-14.6	36.8	11.2	12.8	18.2	18.0	-14.8	36.9	11.3	12.6	18.4	18.3	-14.5	37.2	10.9	12.6
Stock - ACWI x U.S.	10.7	21.5	-14.2	22.4	4.5	8.1	10.9	21.8	-13.8	27.0	4.7	9.1	11.0	21.7	-13.6	27.4	4.6	9.1
Stock - Aggregate	19.6	25.5	-8.9	23.5	8.2	12.8	16.2	26.7	-9.1	23.5	9.2	12.5	16.1	26.4	-9.2	23.8	9.4	12.5
Fixed Income - U.S.	7.5	8.7	0.0	5.0	2.7	4.7	7.8	9.2	-0.2	3.7	3.0	4.6	7.7	8.9	-0.1	3.8	2.8	4.6
Fixed Income - U.S. Gov't							8.4	6.9	0.9	2.3	-0.2	3.6	9.1	8.7	-0.4	4.3	0.8	3.7
Fixed Income - U.S. Credits							10.0						9.0	14.7	-1.4	3.6	3.2	
Fixed Income - EAFE							10.1	5.1	-2.2				10.1	5.1	-2.2	8.4	6.1	4.9
Fixed Income - Global							5.7	9.0	1.7	3.0	4.1	4.2	5.4	9.6	-0.8	5.1	4.9	5.4
Fixed Income - Other							3.5	10.0	1.0	4.6	8.3	5.3	4.1	8.7	0.4	4.4	7.4	5.0
Fixed Income - Long Bonds							16.7	7.8	-4.3	10.4	5.8	9.1	14.1	13.6	-3.3	8.9	3.2	7.9
Fixed Income - Emerging	5.3	14.3	-5.2	12.7	10.2	7.2	4.8	14.5	-4.7	12.0	10.2	7.0	4.5	13.7	-5.0	11.4	9.8	6.9
Fixed Income - Inflation Indexed							13.8	8.9	-2.1	3.3	6.8	6.6	11.6	8.2	-1.4	3.2	5.6	5.4
Fixed Income - High Yield	5.1	11.5	-0.8	5.8	12.3	6.7	4.9	14.2	-2.0	7.1	16.0	7.7	5.5	13.6	-1.8	6.9	15.4	7.6
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI													9.7	17.3	-3.3			
Fixed Income - Convertibles							7.7	23.2	0.2	13.7			10.9	23.0	0.4	17.1		
Cash	0.7	2.3	1.9	0.9	0.3	1.2	0.8	2.3	1.7	0.8	0.3	1.2	0.8	2.3	1.5	1.0	0.4	1.2
Fixed Income - Aggregate	7.5	9.4	-1.0	6.3	6.7	5.7	8.2	9.8	-0.6	4.4	4.5	5.2	9.4	11.7	-1.3	5.3	4.8	5.6
Commodities							-4.9	9.4	-11.7	2.2	10.7	0.9	-7.1	8.5	-10.7	3.0	10.9	0.0
Infrastructure	-7.0	28.7	-7.9	15.8	12.5	7.5	1.6	13.2	4.3	9.0	8.0	7.0	2.3	12.1	4.3	9.1	6.9	7.5
Natural Resources							4.8	7.6	6.9	6.9	5.5	5.7	-3.6	5.5	1.3	6.5	6.8	2.8
REITs	-8.0	26.0	-4.6	5.2	8.5	4.8	-5.9	23.9	-2.7	8.9	7.6	6.1	-7.2	22.8	-4.2	8.2	6.7	5.2
Real Estate ex-REITs	0.3	5.4	8.4	8.4	10.8	6.6	1.4	5.5	7.4	7.2	9.0	6.1	0.8	6.3	6.6	6.6	8.5	5.7
Other Real Assets							7.8	14.0	2.5	0.3	13.8		3.7	10.6	0.1	1.5	12.5	6.1
Real Assets - Aggregate	-1.5	13.8	0.9	9.2	10.8	6.5	0.7	7.7	4.6	6.4	9.0	5.5	-0.2	8.3	3.7	6.2	8.8	5.3
Hedge Funds	11.9	18.2	-6.4	12.6	3.3	7.6	7.4	13.0	0.2	8.5	4.9	6.7	6.0	7.9	-0.3	6.7	3.1	4.5
Global TAA	11.9	18.2	-6.4	12.6	7.9	8.5	12.7	19.7	-6.4	12.6	7.9	8.5	8.1	14.6	-3.7	13.1	5.8	7.1
Risk Parity							22.3	19.1	-5.3	12.4	11.8	9.8	13.7	15.4	-4.7	13.3	9.3	9.3
Mortgages							6.7	8.3	-0.2	0.3	3.0		5.5	8.4	0.8	2.9	2.9	4.9
Private Credit	2.6	4.6	6.7	6.8	7.0	5.5	3.3	7.4	3.8	8.9	11.4	7.0	4.0	9.0	2.8	7.2	12.1	6.6
Diversified Private Equity	3.7	-12.4	25.3	16.0	13.1	8.3	1.0	-9.8	22.9	19.0	8.0	7.3	-1.0	-8.0	20.8	19.5	8.3	7.0
Venture Capital							0.4	-13.3	24.4	15.7	13.8	7.3	0.1	-8.4	20.8	20.2	7.3	7.2
LBO							-3.4	-10.4	23.4	17.1	12.6	7.3	1.8	-9.0	21.6	19.4	9.2	8.0
Other Private Equity							3.7	-12.4	25.3	16.0	13.1	8.3	1.5	-10.8	23.1	19.5	8.1	8.0
Private Equity - Aggregate	3.7	-12.4	25.3	16.0	13.1	8.3	1.0	-9.8	22.9	19.0	8.0	7.3	-0.9	-8.0	20.9	19.4	8.4	7.0
Total Policy Return	7.3	16.0	-2.4	14.1	8.1	8.4	10.7	15.6	-1.9	14.7	7.8	9.1	10.6	15.5	-2.5	15.1	7.8	9.1

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 with policy weight in private equity were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. 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 %					
	2020	2019	2018	2017	2016	5-yr <sup>1</sup>	2020	2019	2018	2017	2016	5-yr <sup>1</sup>	2020	2019	2018	2017	2016	5-yr <sup>1</sup>
Stock - U.S. Broad/All	-32.4	-7.0	-2.2	-6.3	-2.3	-10.2	-6.4	-1.4	-0.3	-1.4	-2.9	-3.0	-3.8	-1.2	0.0	-1.7	-1.2	-2.0
Stock - U.S. Large Cap							-1.1	3.4	-0.9	0.5	-0.8	-0.1	0.0	-0.2	-0.3	0.7	-1.2	0.1
Stock - U.S. Mid Cap							1.5	2.8	-1.4	0.6	3.0	1.3	2.4	4.1	-1.5	-0.1	1.1	1.1
Stock - U.S. Small Cap							-1.5	-0.2	-0.5	-0.8	-1.7	-0.7	-2.2	0.5	-0.5	0.2	-1.2	-0.3
Stock - EAFE							1.1	0.0	0.2	0.8	0.6	0.6	2.5	0.1	-0.1	0.6	0.5	0.6
Stock - Global	5.7	-0.9	-0.3	1.7	-2.1	0.7	-1.0	-5.9	0.7	0.0	0.2	-0.4	0.6	-1.5	0.9	5.0	-0.3	0.3
Stock - Other							10.1	-7.1	-2.5	1.1	-1.3	0.1	4.7	-6.3	-1.3	-1.5	1.2	-1.2
Stock - Emerging	-6.9	-0.1	-2.1	0.7	-1.1	-2.0	1.3	1.3	-0.8	-0.9	0.9	0.4	36.9	51.2	-36.6	66.7	32.9	0.2
Stock - ACWI x U.S.	-38.9	1.9	-4.4	8.7	0.6	-8.2	-1.8	1.4	-1.4	2.1	-0.7	-0.4	0.6	0.2	-0.9	0.9	-0.9	0.1
Stock - Aggregate	-4.2	-2.2	-2.1	0.4	-0.9	-1.8	-1.1	-0.8	-1.2	0.6	-0.3	-0.6	-0.2	-0.3	-0.8	0.8	-0.4	-0.1
Fixed Income - U.S.	2.7	-0.1	-0.4	0.0	1.1	0.6	1.1	0.3	0.1	0.7	0.8	0.6	0.6	0.2	0.1	0.5	1.0	0.4
Fixed Income - U.S. Gov't							0.0	0.0	0.0	-0.5	-0.2	-0.1	0.9	0.0	0.1	0.3	-0.1	-0.1
Fixed Income - U.S. Credits							1.5						0.5	0.7	1.3	0.9	1.3	
Fixed Income - EAFE							0.1	4.9	-2.8				1.4	1.0	1.8	1.2	-2.3	0.5
Fixed Income - Global							0.5	-0.6	-0.1	1.7	0.4	0.4	0.9	-1.7	-1.4	8.0	0.9	0.8
Fixed Income - Other							-2.1	-2.7	1.7	0.8	-0.1	0.1	-1.5	-1.5	1.1	20.7	8.1	-0.3
Fixed Income - Long Bonds							0.3	0.0	0.8	0.1	1.3		0.6	1.3	-0.3	0.9	-0.6	0.3
Fixed Income - Emerging	-4.2	-1.0	-1.5	0.9	1.6	-0.9	0.2	0.5	-0.8	1.5	0.9	0.5	0.4	-0.1	-1.2	0.9	0.8	0.4
Fixed Income - Inflation Indexed							-0.6	0.1	1.0	0.3	0.5	0.4	-0.3	0.1	0.0	0.4	0.0	0.2
Fixed Income - High Yield	-1.1	-4.2	1.3	0.3	-3.4	-1.3	0.8	-0.6	0.2	-0.1	-2.6	-0.4	0.7	-1.1	0.4	0.1	-2.9	-0.4
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI													-0.1	-1.2				
Fixed Income - Convertibles							48.6	-1.1	-2.1	-1.3			17.2	-3.8	-1.7	-6.1		
Cash	-1.2	0.5	-0.7	-0.2	0.1	-0.3	0.4	1.2	0.2	0.1	0.1	0.4	0.2	-1.9	-1.7	-0.2	0.9	0.5
Fixed Income - Aggregate	-5.0	-2.6	-0.2	-0.4	-1.4	-1.9	0.3	-0.2	0.1	0.6	0.5	0.2	-0.8	0.0	0.6	-0.3	-0.2	-0.4
Commodities							1.2	0.6	0.5	1.7	0.5	0.6	6.9	-4.9	-0.7	3.5	1.2	-0.5
Infrastructure	7.4	-2.2	1.2	-0.8	-18.3	-2.4	1.4	2.6	1.8	0.4	-3.1	0.4	2.3	-0.7	2.2	3.1	2.1	0.1
Natural Resources							-7.6	-5.3	-2.7	-1.0	-0.9	-2.1	-5.8	-3.4	2.1	0.5	-0.5	-1.6
REITs	6.7	1.0	-0.6	2.7	-13.5	-0.7	3.8	1.9	-1.8	0.8	-4.4	-1.4	3.0	2.1	-0.5	0.5	-1.8	-0.2
Real Estate ex-REITs	0.1	0.3	1.5	1.3	-9.4	-1.3	-0.2	1.2	1.7	1.9	-0.4	0.9	-0.6	-0.5	1.0	1.6	-0.3	-0.3
Other Real Assets							7.2	-8.9	-1.1	6.6	2.9		-1.8	-4.8	-2.0	1.9	-0.3	-2.1
Real Assets - Aggregate	1.7	-0.5	2.2	1.1	-10.9	-1.3	-0.6	0.3	0.4	2.2	-1.4	0.3	-0.6	-1.0	0.9	1.7	-0.7	-0.4
Hedge Funds	-3.0	-13.8	8.9	-6.6	-3.1	-3.2	-3.3	-8.3	-1.0	-3.9	-2.2	-2.3	-2.7	-2.9	-0.8	-0.8	-1.6	-0.4
Global TAA	-19.3	2.1	-0.6	-1.3	-0.1	-4.1	-10.4	0.8	-0.6	-1.3	-0.1	-4.1	-3.5	0.4	-2.7	-1.3	1.4	-1.3
Risk Parity							1.1	2.1	-1.7	0.0	0.0	0.2	-1.7	-0.4	-3.3	1.1	2.4	0.9
Mortgages							-2.5	-0.5	3.3	2.6	1.0		-0.3	-0.5	2.4	1.5	-0.5	0.3
Private Credit	-3.0	1.8	-3.4	0.1	1.9	-0.6	14.0	-0.6	3.4	0.7	-3.1	-0.5	8.7	-2.1	4.2	1.7	-4.0	0.2
Diversified Private Equity	3.2	20.1	-18.7	-2.2	-2.5	0.7	15.9	21.1	-4.8	-1.7	1.5	7.0	19.1	18.2	-4.5	-2.6	0.4	6.7
Venture Capital							20.6	31.4	-1.2	-0.5	-6.9	7.8	33.7	22.5	-0.4	-9.0	-2.3	8.7
LBO							13.9	20.3	-6.7	-6.9	-5.0	3.5	11.0	22.0	-4.3	-0.3	3.3	6.1
Other Private Equity							6.4	18.5	-19.5	-5.6	-6.4	-0.6	8.3	34.3	0.2	-10.8	1.6	12.9
Private Equity - Aggregate	3.2	20.1	-18.7	-2.2	-2.5	0.7	16.9	21.0	-4.9	-1.8	1.5	7.2	20.0	19.3	-3.9	-2.3	0.8	7.2
Total Fund Return	0.8	0.8	-1.8	0.5	-0.5	-0.1	1.1	1.7	-0.9	0.7	0.0	0.5	1.1	1.6	-0.5	0.5	0.1	0.6

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

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

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

2. To enable fairer comparisons, the policy returns of all participants with policy weight in private equity were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. Refer to the appendix of this section for details.

## Your policy return and value added calculation - 2020

### 2020 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Return	Net return	Value added
Stock - U.S. Broad/All	23.9%	MSCI US IMI Net	20.7%	-11.7%	-32.4%
Stock - U.S. Small Cap	2.9%	MSCI US Small Cap Net Index	35.8%		
Stock - EAFE		MSCI World Ex US Net Index	10.7%		
Stock - Global	12.2%	MSCI World Net Dividend	15.9%	21.6%	5.7%
Stock - Emerging	6.2%	MSCI Emerging Market IMI Net	18.3%	11.5%	-6.9%
Stock - ACWI x U.S.	2.2%	MSCI ACWI x/US Net	10.7%	-28.2%	-38.9%
Fixed Income - U.S.	26.0%	Barclays US Aggregate	7.5%	10.2%	2.7%
Fixed Income - Emerging		50% JPM EMBI Global Diversified/50% JPM-GBI-I	5.3%	1.1%	-4.2%
Fixed Income - High Yield		50%Bar U.S. High Yield 2% / 50%S&P LSTA Lever:	5.1%	4.0%	-1.1%
Cash		BofA Merrill Lynch 3 Month US Treasury Bill GOO	0.7%	-0.5%	-1.2%
Infrastructure	3.0%	Dow Jones Brookfield Global Infrastructure Net I	-7.0%	0.5%	7.4%
REITs		Your REIT benchmark	-8.0%	-1.3%	6.7%
Real Estate ex-REITs	9.0%	NCREIF ODCE Index	0.3%	0.4%	0.1%
Hedge Funds		50% MSCI World Net/50% Barclays US Aggregate	11.9%	8.9%	-3.0%
Global TAA		50% MSCI World Net/50% Barclays US Aggregate	11.9%	-7.5%	-19.3%
Private Credit	7.0%	S&P/LSTA + 150 Bps 3 Month Lag	2.6%	-0.4%	-3.0%
Diversified Private Equity	7.6%	Custom lagged small-cap equity	3.7%	6.9%	3.2%
<b>Total</b>	<b>100.0%</b>				
Net Actual Return (reported by you)					8.2%
Calculated Policy Return = sum of (policy weights X benchmark returns)				11.5%	
Adjustment to reflect rebalancing and overlay impacts				<u>-4.2%</u>	
Policy Return (reported by you)					<u>7.3%</u>
Net Value Added (Net Return - Policy Return)					0.8%

# Your policy return and value added calculations - 2016 to 2019

## 2019 Policy Return and Value Added

Asset class	Policy	Benchmark		Net return	Value added
	weight	Description	Return		
Stock - U.S. Broad/All	16.3%	MSCI US IMI Ne	26.6%	19.6%	-7.0%
Stock - Global	18.3%	MSCI World Net	27.7%	26.7%	-0.9%
Stock - Emerging	6.6%	MSCI Emerging I	18.9%	18.8%	-0.1%
Stock - ACWI x U.S.	3.6%	MSCI ACWI x/U!	21.5%	23.4%	1.9%
Fixed Income - U.S.	11.0%	Barclays US Agg	8.7%	8.6%	-0.1%
Fixed Income - Emerging	4.0%	50% JPM EMBI C	14.3%	13.2%	-1.0%
Fixed Income - High Yield	4.4%	50%Bar U.S. Hig	11.5%	7.3%	-4.2%
Cash	3.0%	BofA Merrill Lyn	2.3%	2.7%	0.5%
Infrastructure	3.0%	Dow Jones Broo	28.7%	26.5%	-2.2%
REITs	1.5%	Your REIT bench	26.0%	27.0%	1.0%
Real Estate ex-REITs	7.5%	NCREIF ODCE In	5.4%	5.6%	0.3%
Hedge Funds	1.0%	50% MSCI Work	18.2%	4.4%	-13.8%
Global TAA	7.0%	50% MSCI Work	18.2%	20.3%	2.1%
Private Credit	6.6%	S&P/LSTA + 150	4.6%	6.4%	1.8%
Diversified Private Equity	6.2%	Custom lagged s	-12.4%	7.7%	20.1%
<b>Total</b>	<b>100.0%</b>				
Net Return (reported by you)					16.8%
Calculated policy return (sum: Policy weights x benchmarks)				16.2%	
Adjustment to reflect rebalancing and overlay impacts				<u>-0.2%</u>	
Policy return (reported by you)					<u>16.0%</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 C	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%	Custom lagged s	16.0%	13.8%	-2.2%
<b>Total</b>	<b>100.0%</b>				
Net Return (reported by you)					14.7%
Calculated policy return (sum: Policy weights x benchmarks)				14.9%	
Adjustment to reflect rebalancing and overlay impacts				<u>-0.8%</u>	
Policy return (reported by you)					<u>14.1%</u>
Net Value Added (Net Return - Policy Return)					0.5%

## 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 C	-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%	Custom lagged s	25.3%	6.6%	-18.7%
<b>Total</b>	<b>100.0%</b>				
Net Return (reported by you)					-4.2%
Calculated policy return (sum: Policy weights x benchmarks)				-2.4%	
Adjustment to reflect rebalancing and overlay impacts				<u>0.0%</u>	
Policy return (reported by you)					<u>-2.4%</u>
Net Value Added (Net Return - Policy Return)					-1.8%

## 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 - Emerging	5.2%	50% JPM EMBI C	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%
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%	Custom lagged s	13.1%	10.6%	-2.5%
<b>Total</b>	<b>100.0%</b>				
Net Return (reported by you)					7.6%
Calculated policy return (sum: Policy weights x benchmarks)				8.2%	
Adjustment to reflect rebalancing and overlay impacts				<u>-0.1%</u>	
Policy return (reported by you)					<u>8.1%</u>
Net Value Added (Net Return - Policy Return)					-0.5%

## Profit/Loss on overlay programs

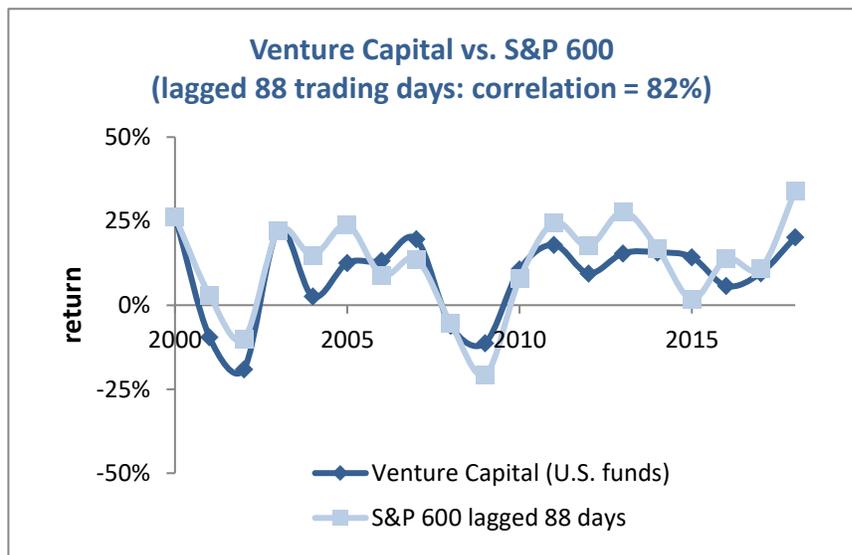
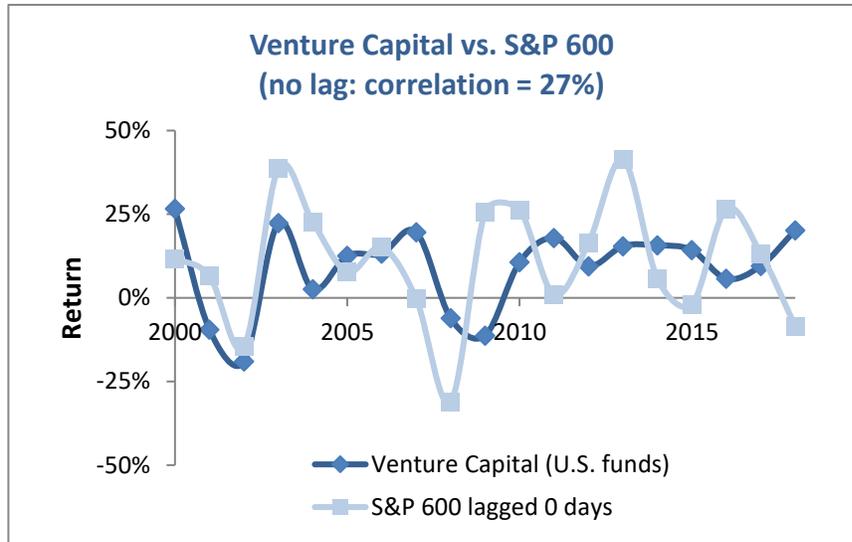
Overlay type	Your fund		Peer median				U.S. Public median			
	2020	2019	2020		2019		2020		2019	
	bps	bps	bps	#	bps	#	bps	#	bps	#
Int. Discretionary Currency							-1.0	1	9.9	1
Ext. Discretionary Currency			-8.1	1	-8.8	1	0.1	3	-1.3	3
Internal Global TAA										
External Global TAA										
Internal PolicyTilt TAA										
External PolicyTilt TAA										
Internal Commodities										
External Commodities			-3.2	1	10.5	1	-3.2	1	10.5	1
Internal Long/Short										
External Long/Short										
Internal Other									49.3	1
External Other							51.8	2	15.3	4

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 -0.7% using the same benchmark lagged to match the average 88 day reporting lag of venture capital funds.



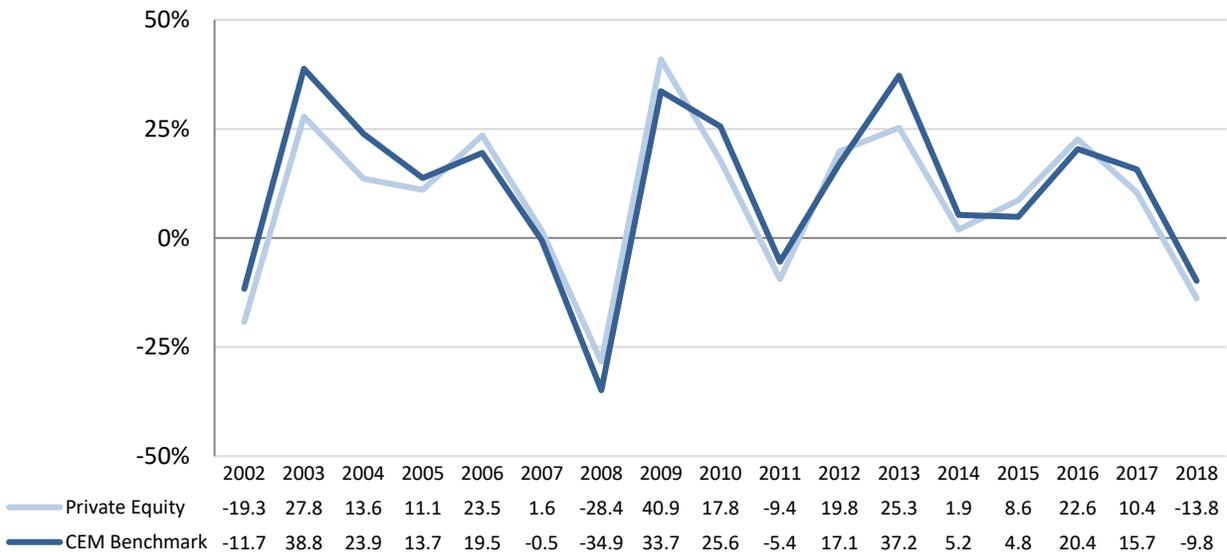
- Un-investable peer-based benchmarks. Peer based benchmarks reflect the reporting lags in peer portfolios so they have much better correlations than un-lagged investable benchmarks. But their relationship statistics are not as good as for lagged investable benchmarks.
- Aspirational premiums (i.e., 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 reported private equity benchmarks 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 86 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 region mix of your default benchmark was 20% Europe ex-UK, 10% Global, 70% U.S.
- The result is the default benchmarks are superior to most self-reported benchmarks. Correlations improve to a median of 82% for the default benchmarks versus 44% for self-reported benchmarks. Other statistics such as volatility were also much better.

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



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

# 4

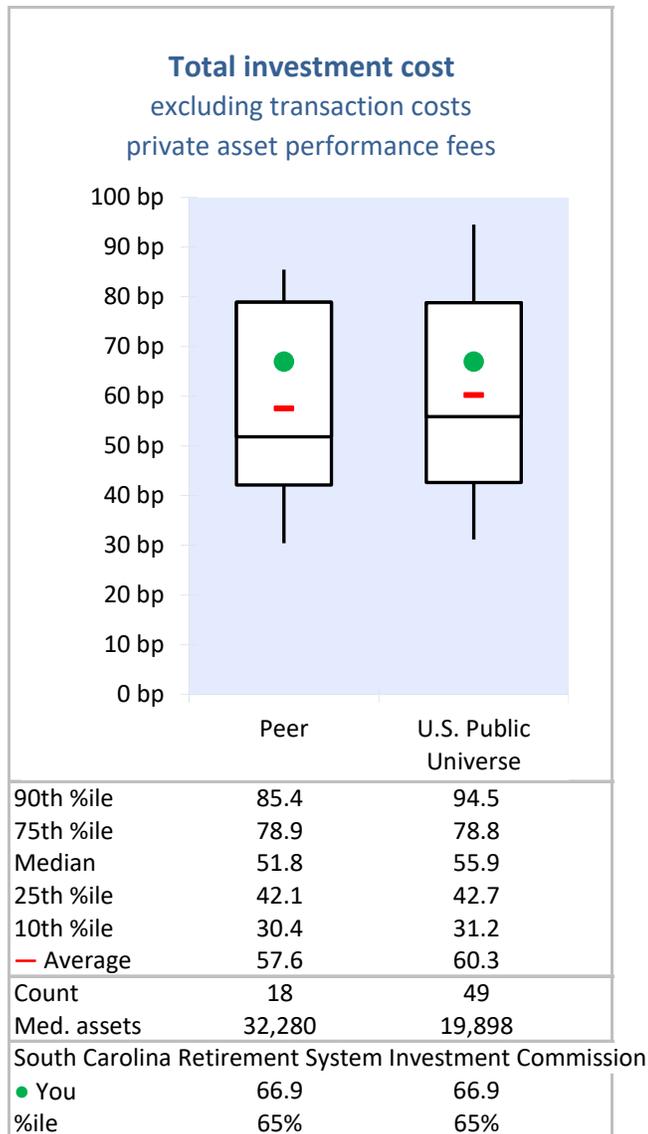
## Cost: total, benchmark, trend

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## Comparisons of total investment cost

Your total investment cost, excluding transaction costs and private asset performance fees, of 66.9 bps was above the peer median of 51.8 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.

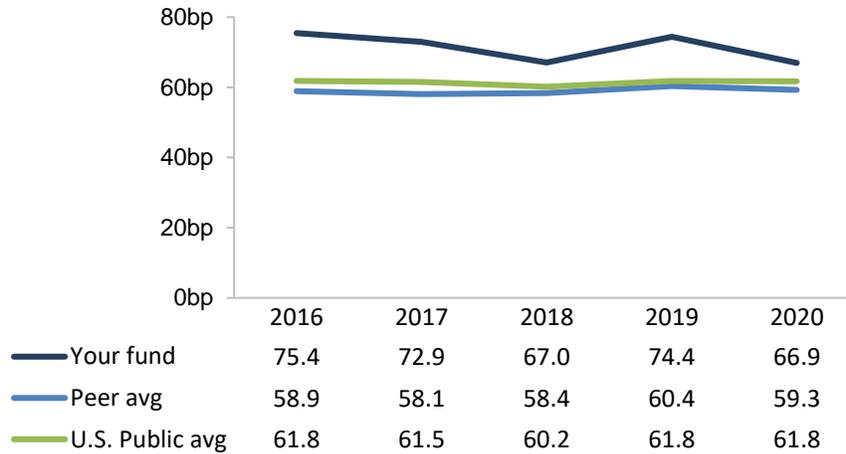


## Trend in total investment cost, you versus peers and universe

Your total investment cost, excluding transaction costs and private asset performance fees, decreased from 75.4 bps in 2016 to 66.9 bps in 2020.

### Trend in total investment cost

(excluding transaction costs and private asset performance fees)



Trend analysis is based on 43 U.S. Public funds and 16 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 &amp; 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 2020 total investment cost, excluding transaction costs and private asset performance fees, was 66.9 bp or \$210.6 million.

	Internal		External Passive		External Active			Total <sup>1</sup>		
	Passive	Active	Fees	Monitoring & Other	Base Fees	Perform. Fees	Monitor. & Other	\$000s	bps	% of Total
<b>Asset management</b>										
Stock - U.S. Broad/All			88	212	2,888	0	252	3,439		2%
Stock - U.S. Small Cap			327	163				490		0%
Stock - EAFE			191	166				357		0%
Stock - Emerging			148	145	3,979	0	369	4,641		2%
Stock - Global			995	1,634	2,657	0	292	5,577		3%
Stock - ACWI x U.S.					1,388	0	80	1,468		1%
Fixed Income - U.S.		6			1,578	0	190	1,774		1%
Fixed Income - Emerging					3,391	0	239	3,630		2%
Fixed Income - High Yield					5,601	0	363	5,965		3%
Cash		340			187	0	254	781		0%
REITs					1,530	0	121	1,651		1%
Real Estate ex-REITs - LP <sup>12</sup>					23,031	12,174	609	23,640		11%
Real Estate ex-REITs - Co-Invest. <sup>1</sup>					148	365	5	153		0%
Infrastructure <sup>1</sup>					6,997	1,377	241	7,239		3%
Infrastructure - Co-Invest. <sup>1</sup>					78	2	9	87		0%
Hedge Funds					32,516	3,326	463	36,305		17%
Hedge Funds - FoFs					7,695	0	377	8,072		4%
Underlying FoF Fees					8,004	6,619		14,623		7%
Global TAA					2,638	0	336	2,974		1%
Diversified Private Equity - LP <sup>12</sup>					39,267	18,736	278	39,545		19%
Diversified Private Equity - FoFs <sup>1</sup>					4,579	9,724	85	4,663		2%
Underlying FoF Fees <sup>12</sup>					7,951	6,335		7,951		4%
Diversified Private Equity - Co-Invest. <sup>1</sup>					960	892	229	1,190		1%
Private Credit - LP <sup>12</sup>					26,915	909	579	27,494		13%
Private Credit - Co-Invest. <sup>1</sup>					2,427	486	40	2,467		1%
Derivatives/Overlays			1	236				237		0%
Total asset management costs excluding private asset performance fees								206,413	65.6bp	98%
<b>Oversight, custodial &amp; other asset related costs</b>										
Oversight of the Fund								1,198		1%
Trustee & Custodial								1,394		1%
Consulting and Performance Measurement								786		0%
Audit								409		0%
Other								373		0%
Total oversight, custodial & other costs								4,161	1.3bp	2%
Total investment costs excluding transaction costs and private asset performance fees								210,574	66.9bp	100%

1. Total cost excludes carry/performance fees for real estate, infrastructure, natural resources, private equity, and private debt. 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 (2020 - 2016)

	Investment costs (\$'000s)					Change (\$'000s)				Change (%)			
	2020	2019	2018	2017	2016	2020	2019	2018	2017	2020	2019	2018	2017
<b>Asset management</b>													
Stock - U.S. Broad/All	3,439	12,637	11,104	11,150	8,849	-9,198	1,533	-46	2,301	-73%	14%	0%	26%
Stock - U.S. Small Cap	490												
Stock - EAFE	357												
Stock - Emerging	4,641	6,073	9,879	10,017	7,464	-1,432	-3,807	-138	2,553	-24%	-39%	-1%	34%
Stock - Global	5,577	7,480	7,572	6,509	7,365	-1,903	-92	1,064	-856	-25%	-1%	16%	-12%
Stock - ACWI x U.S.	1,468	4,181	4,697	4,036	2,571	-2,713	-516	660	1,466	-65%	-11%	16%	57%
Fixed Income - U.S.	1,774	2,032	1,796	3,492	3,070	-258	235	-1,696	422	-13%	13%	-49%	14%
Fixed Income - Emerging	3,630	5,404	6,107	7,849	6,644	-1,774	-703	-1,742	1,205	-33%	-12%	-22%	18%
Fixed Income - High Yield	5,965	6,158	5,847	8,433	8,619	-193	311	-2,586	-186	-3%	5%	-31%	-2%
Cash	781	621	1,358	1,958	2,532	160	-737	-600	-574	26%	-54%	-31%	-23%
REITs	1,651	2,002	1,996	1,821	917	-350	6	174	904	-18%	0%	10%	99%
Real Estate ex-REITs - LP <sup>12</sup>	23,640	27,651	19,845	16,612	17,099	-4,011	7,807	3,233	-487	-15%	39%	19%	-3%
Real Estate ex-REITs - Co-Invest. <sup>1</sup>	153	0	0	6	52	153	0	-6	-46	35588%	-7%	-93%	-88%
Infrastructure <sup>1</sup>	7,239	4,318	3,089	2,182	811	2,920	1,229	907	1,372	68%	40%	42%	169%
Infrastructure - Co-Invest. <sup>1</sup>	87												
Hedge Funds	36,305	51,668	44,499	44,592	41,703	-15,363	7,169	-93	2,889	-30%	16%	0%	7%
Hedge Funds - FoFs	8,072	7,032	4,528	3,830	5,957	1,040	2,504	698	-2,126	15%	55%	18%	-36%
Underlying FoF Fees	14,623	13,799	15,196	30,162	27,322	824	-1,397	-14,966	2,839	6%	-9%	-50%	10%
Global TAA	2,974	5,148	11,833	9,859	11,613	-2,174	-6,685	1,974	-1,753	-42%	-56%	20%	-15%
Diversified Private Equity - LP <sup>12</sup>	39,545	33,675	27,896	19,492	22,454	5,870	5,779	8,404	-2,962	17%	21%	43%	-13%
Diversified Private Equity - FoFs <sup>1</sup>	4,663	3,109	1,518	2,996	4,255	1,555	1,591	-1,479	-1,259	50%	105%	-49%	-30%
Underlying FoF Fees <sup>12</sup>	7,951	3,847	3,500	4,780	6,593	4,104	347	-1,280	-1,813	107%	10%	-27%	-27%
Diversified Private Equity - Co-Invest. <sup>1</sup>	1,190	3,103	3,384	3,634	3,446	-1,913	-281	-250	188	-62%	-8%	-7%	5%
Private Credit - LP <sup>12</sup>	27,494	30,307	19,324	24,584	17,466	-2,813	10,984	-5,260	7,118	-9%	57%	-21%	41%
Private Credit - Co-Invest. <sup>1</sup>	2,467	13	0	9	17	2,454	13	-9	-7	18672%	16325%	-99%	-43%
Derivatives/Overlays	237	800	958	810	1,308	-563	-158	148	-498	-70%	-16%	18%	-38%
Total excl. private asset perf. fees	206,413	231,057	205,926	218,815	208,125	-24,643	25,131	-12,889	10,690	-11%	12%	-6%	5%
<b>Oversight, custodial &amp; other asset related costs</b>													
Oversight of the Fund	1,198	1,237	1,251	1,089	1,056	-38	-14	162	33	-3%	-1%	15%	3%
Trustee & Custodial	1,394	1,670	1,152	1,131	925	-276	518	22	205	-17%	45%	2%	22%
Consulting and Performance Measurement	786	825	764	1,070	940	-39	61	-306	130	-5%	8%	-29%	14%
Audit	409	120	102	17	99	290	17	86	-83	242%	17%	510%	-83%
Other	373	357	363	321	267	16	-6	42	54	4%	-2%	13%	20%
Total oversight, custodial & other	4,161	4,209	3,633	3,627	3,288	-48	576	5	339	-1%	16%	0%	10%
Total investment costs <sup>1</sup>	210,574	235,265	209,559	222,442	211,413	-24,691	25,707	-12,883	11,029	-10%	12%	-6%	5%
Total in basis points	66.9bp	74.4bp	67.0bp	72.9bp	75.4bp								

1. Total cost excludes carry/performance fees for real estate, infrastructure, natural resources, private equity, and private debt. 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 18.5 bps below your benchmark cost of 85.4 bps. This implies that your fund was low cost by 18.5 bps compared to the peer median, after adjusting for your fund's asset mix.

### Your cost versus benchmark

	\$000s	bps
Your fund's total investment costs excluding transaction costs and private asset performance fees	210,574	66.9 bp
- Your fund's benchmark	268,633	85.4 bp
= Your fund's cost savings	-58,058	-18.5 bp

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

The reasons why your fund's total cost was below your benchmark are summarized in the table below. Details of each of the impacts below are provided on pages 9 to 11.

### Reasons why your fund was low cost

	Cost/-Savings impact	
	\$000s	bps
<u>Differences in implementation style:</u>		
More passive	-8,669	-2.8 bp
Less int. pass, % of total passive	327	0.1 bp
Less int. active % of total active	1,040	0.3 bp
Less evergreen % of external	13,532	4.3 bp
More fund of funds	4,680	1.5 bp
More co-investment	-10,012	-3.2 bp
Less overlays and unfunded strategies	-650	-0.2 bp
Total style impact	248	0.1 bp
<u>Paying more/-less for similar services:</u>		
External investment management	-56,679	-18.0 bp
Internal investment management	0	0.0 bp
Oversight, custodial and other	-1,627	-0.5 bp
Total impact of paying more /-less	-58,306	-18.5 bp
Total savings	-58,058	-18.5 bp

## Benchmark cost calculation

Your 2020 benchmark cost was 85.4 basis points or 268.6 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 <sup>1</sup> (B)	Benchmark \$000s (A X B)
<b>Asset management costs</b>			
Stock - U.S. Broad/All	1,761	10.4 bp	1,838
Stock - U.S. Small Cap	618	30.8 bp	1,905
Stock - EAFE	630	25.4 bp	1,601
Stock - Emerging	1,953	39.0 bp	7,608
Stock - Global	7,318	17.3 bp	12,665
Stock - ACWI x U.S.	306	28.8 bp	880
Fixed Income - U.S.	742	9.4 bp	696
Fixed Income - Emerging	908	34.5 bp	3,136
Fixed Income - High Yield	1,381	30.9 bp	4,272
Cash	2,126	3.7 bp	781
REITs	461	41.4 bp	1,908
Real Estate ex-REITs	2,462	96.6 bp	23,784
Infrastructure	1,267	104.7 bp	13,262
Hedge Funds	3,191	126.0 bp	40,208
Perf. fees	3,191	98.3 bp	31,373
Global TAA	1,277	58.2 bp	7,429
Diversified Private Equity	3,713	163.6 bp	60,742
Private Credit	4,296	111.4 bp	47,870
Overlay Programs <sup>2</sup>	31,455	0.3 bp	887
Benchmark for asset management	31,455	83.6 bp	262,844
<b>Oversight, custody and other costs<sup>3</sup></b>			
Oversight	31,455	1.0 bp	
Trustee & Custodial	31,455	0.3 bp	
Consulting	31,455	0.2 bp	
Audit	31,455	0.1 bp	
Other	31,455	0.1 bp	
Benchmark for oversight, custody & other	31,455	1.8 bp	5,788
<b>Total benchmark cost</b>		<b>85.4 bp</b>	<b>268,633</b>

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.

## Cost impact of differences in implementation style

Differences in implementation style (passive vs. active, internal vs. external, etc.) relative to your peers cost you 0.1 bps.

Implementation choices	Assets by style a	Peer benchmark cost			Style 1 %			Cost/ -Savings	
		Style 1 b	Style 2 c	Style 1 -Savings d = b - c	Your Peer average	More/ Less -Less e	\$000s a x d x e	bps	
<b>Passive vs active</b>									
	Total assets	Passive	Active		Passive % of total assets				
Stock - U.S. Broad/All	1,761	1 bp	31 bp	-30 bp	46%	68%	-22%	1,185	
Stock - U.S. Small Cap	618	2 bp	41 bp	-40 bp	100%	26%	74%	-1,801	
Stock - EAFE	630	3 bp	38 bp	-35 bp	100%	37%	63%	-1,389	
Stock - Emerging	1,953	3 bp	48 bp	-45 bp	28%	21%	8%	-674	
Stock - Global	7,318	3 bp	36 bp	-33 bp	85%	58%	27%	-6,604	
Stock - ACWI x U.S.	306	3 bp	36 bp	-33 bp	0%	21%	-21%	213	
Fixed Income - U.S.	742	1 bp	11 bp	-10 bp	0%	12%	-12%	89	
Fixed Income - Emerging	908	6 bp	37 bp	-31 bp	0%	8%	-8%	230	
REITs	461	6 bp	43 bp	-37 bp	0%	5%	-5%	82	
More passive								-8,669	-2.8 bp
<b>Internal passive vs external passive</b>									
	Passive assets	Internal passive	External passive		Internal passive % of passive				
Stock - U.S. Broad/All	804	1 bp	1 bp	0 bp	0%	7%	-7%	-2	
Stock - U.S. Small Cap	618	1 bp	2 bp	-1 bp	0%	24%	-24%	9	
Stock - Emerging	551	2 bp	5 bp	-3 bp	0%	53%	-53%	78	
Stock - Global	6,210	2 bp	4 bp	-2 bp	0%	20%	-20%	242	
Less int. pass, % of total passive								327	0.1 bp
<b>Internal active vs external active</b>									
	Active assets	Internal active	External active		Internal active % of active				
Stock - Emerging	1,401	11 bp	49 bp	-38 bp	0%	2%	-2%	130	
Fixed Income - U.S.	742	3 bp	13 bp	-10 bp	3%	23%	-20%	146	
Fixed Income - High Yield	1,381	5 bp	31 bp	-27 bp	0%	2%	-2%	72	
REITs	461	6 bp	47 bp	-41 bp	0%	9%	-9%	173	
Real Estate ex-REITs	2,462	23 bp	99 bp	-76 bp	0%	3%	-3%	516	
Diversified Private Equity	3,713	10 bp	164 bp	-154 bp	0%	0%	0%	3	
Less int. active % of total active								1,040	0.3 bp
<b>Evergreen vs LP/Co &amp; fund of funds</b>									
	External assets	Ever- green	LP/Co & FoF		Evergreen fund % of external				
Real Estate ex-REITs	2,462	76 bp	137 bp	-61 bp	0%	62%	-62%	9,304	
Infrastructure	1,267	68 bp	132 bp	-64 bp	97%	43%	55%	-4,413	
Private Credit	4,296	86 bp	132 bp	-46 bp	0%	44%	-44%	8,642	
Less evergreen % of external								13,532	4.3 bp
<b>LP/Co vs fund of funds</b>									
	LP/Co & Fund of F.	LP/Co	Fund of funds		LP/Co % of LP/Co & Fund of F.				
Real Estate ex-REITs	2,462	135 bp	197 bp	-62 bp	100%	97%	3%	-382	
Infrastructure	35	129 bp	205 bp	-76 bp	100%	97%	3%	-8	
Hedge Funds	3,191	119 bp	165 bp	-46 bp	55%	85%	-30%	4,325	
Perf. fees	3,191	96 bp	111 bp	-15 bp	55%	85%	-30%	1,428	
Diversified Private Equity	3,713	151 bp	232 bp	-81 bp	86%	84%	2%	-684	
More fund of funds								4,680	1.5 bp
<b>Co-investment vs LP</b>									
	LP/Co	Co-invest	LP		Co-invest % of LP/Co				
Real Estate ex-REITs	2,462	74 bp	136 bp	-62 bp	1%	2%	-1%	130	
Infrastructure	35	15 bp	133 bp	-118 bp	100%	3%	97%	-405	
Diversified Private Equity	3,207	11 bp	157 bp	-146 bp	23%	4%	18%	-8,566	
Private Credit	4,296	32 bp	136 bp	-104 bp	7%	4%	3%	-1,171	
More co-investment								-10,012	-3.2 bp
Less overlays and unfunded strategies								-650	-0.2 bp
Total impact of differences in implementation style								248	0.1 bp

## Cost impact of overlays

As summarized on the previous page, the style impact of overlays saved you 0.2 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)
<b>Internal Overlays</b>				
Rebalancing / Passive Beta - Hedge	31,455	NA	0.00 bp	-12
Duration Management - Hedge	31,455	NA	0.00 bp	-1
Other Overlay - Discretionary	31,455	NA	0.00 bp	-8
<b>External Overlays</b>				
Currency - Hedge	31,455	NA	0.01 bp	-26
Currency - Discretionary	31,455	NA	0.13 bp	-405
Rebalancing / Passive Beta - Hedge	31,455	0.08 bp	0.06 bp	60
Commodity Futures - Discretionary	31,455	NA	0.06 bp	-183
Long/Short - Discretionary	31,455	NA	0.02 bp	-52
Other Overlay - Discretionary	31,455	NA	0.01 bp	-24
Total impact in 000s				-650
Total impact in basis points				-0.2 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 18.5 bps.

	Style	Your avg holdings (mils)	Cost in bps			Cost/ -Savings \$000s bps (A X B)
			Your	Peer median	More/ -less (B)	
<b>External asset management</b>		(A)				
Stock - U.S. Broad/All	passive	804	3.7	0.8	2.9	231
Stock - U.S. Broad/All	active	957	32.8	30.9	1.9	186
Stock - U.S. Small Cap	passive	618	7.9	1.8	6.1	377
Stock - EAFE	passive	630	5.7	3.4	2.3	145
Stock - Emerging	passive	551	5.3	4.9	0.4	24
Stock - Emerging	active	1,401	31.0	49.0	-18.0	-2,525
Stock - Global	passive	6,210	4.2	3.7	0.6	360
Stock - Global	active	1,108	26.6	36.4	-9.8	-1,086
Stock - ACWI x U.S.	active	306	48.0	35.7	12.3	376
Fixed Income - U.S.	active	723	24.5	12.8	11.7	844
Fixed Income - Emerging	active	908	40.0	37.1	2.9	263
Fixed Income - High Yield	active	1,381	43.2	31.5	11.7	1,621
Cash <sup>2</sup>	active	963	4.6	4.6	0.0	0
REITs	active	461	35.8	46.9	-11.1	-511
Real Estate ex-REITs	CO	21	74.4	74.4	0.0	0
Real Estate ex-REITs	LP	2,441	96.8	136.0	-39.2	-9,558
Infrastructure	active	1,232	58.8	68.1	-9.3	-1,146
Infrastructure <sup>1</sup>	CO	35	24.8	14.6	10.2	36
Hedge Funds	active	1,759	187.5	119.0	68.5	12,043
Top layer perf. fees	active	1,759	18.9	96.0	-77.1	-13,564
Hedge Funds	FoF	1,432	56.4	45.8	10.6	1,515
Top layer perf. fees	FoF	1,432	0.0	15.1	-15.1	-2,166
Underlying base fees	FoF	1,432	55.9	119.0	-63.1	-9,036
Underlying perf. fees	FoF	1,432	46.2	96.0	-49.8	-7,127
Global TAA <sup>1</sup>	active	1,277	23.3	58.2	-34.9	-4,455
Diversified Private Equity	FoF	506	92.1	75.0	17.1	865
Underlying base fees <sup>2</sup>	FoF	506	157.0	157.0	0.0	0
Diversified Private Equity	CO	727	16.4	11.2	5.2	379
Diversified Private Equity	LP	2,480	159.5	157.0	2.5	611
Private Credit <sup>1</sup>	CO	297	83.2	32.2	51.0	1,511
Private Credit	LP	3,999	68.8	136.0	-67.2	-26,891
<b>Total for external management</b>						<b>-56,679 -18.0 bp</b>
<b>Internal asset management</b>		(A)			(B)	(A X B)
Fixed Income - U.S.	active	20	2.9	3.1	-0.2	0
Cash <sup>2</sup>	active	1,162	2.9	2.9	0.0	0
<b>Total for internal management</b>						<b>0 0.0 bp</b>
<b>Oversight, custodial, other<sup>3</sup></b>						
Oversight			0.4	1.0	-0.6	
Trustee & Custodial			0.4	0.3	0.2	
Consulting			0.2	0.2	0.0	
Audit			0.1	0.1	0.1	
Other			0.1	0.1	0.0	
<b>Total for oversight, custodial, other</b>						<b>-1,627 -0.5 bp</b>
<b>Total</b>						<b>-58,306 -18.5 bp</b>

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	Benchmark = peer		Your average assets (or fee basis)	More/-less in \$000s		
		weighted median cost <sup>1</sup>	More/-less		Total More/-less	Due to Impl. style	Due to paying more/less
<b>Asset management costs</b>	(A)	(B)	(C = A - B)	(D)	(C X D)		
Stock - U.S. Broad/All	19.5 bp	10.4 bp	9.1 bp	1,761	1,601	1,183	417
Stock - U.S. Small Cap	7.9 bp	30.8 bp	-22.9 bp	618	-1,415	-1,792	377
Stock - EAFE	5.7 bp	25.4 bp	-19.8 bp	630	-1,244	-1,389	145
Stock - Emerging	23.8 bp	39.0 bp	-15.2 bp	1,953	-2,967	-465	-2,501
Stock - Global	7.6 bp	17.3 bp	-9.7 bp	7,318	-7,088	-6,362	-726
Stock - ACWI x U.S.	48.0 bp	28.8 bp	19.2 bp	306	589	213	376
Fixed Income - U.S.	23.9 bp	9.4 bp	14.5 bp	742	1,079	235	844
Fixed Income - Emerging	40.0 bp	34.5 bp	5.4 bp	908	494	230	263
Fixed Income - High Yield	43.2 bp	30.9 bp	12.3 bp	1,381	1,693	72	1,621
Cash	3.7 bp	3.7 bp	0.0 bp	2,126	0	0	0
REITs	35.8 bp	41.4 bp	-5.6 bp	461	-256	255	-511
Real Estate ex-REITs	96.7 bp	96.6 bp	0.0 bp	2,462	9	9,568	-9,558
Infrastructure	57.8 bp	104.7 bp	-46.9 bp	1,267	-5,936	-4,826	-1,110
Hedge Funds	153.7 bp	126.0 bp	27.7 bp	3,191	8,847	4,325	4,522
Perf. fees	31.2 bp	98.3 bp	-67.1 bp	3,191	-21,428	1,428	-22,856
Global TAA	23.3 bp	58.2 bp	-34.9 bp	1,277	-4,455	0	-4,455
Diversified Private Equity	143.7 bp	163.6 bp	-19.9 bp	3,713	-7,393	-9,248	1,855
Private Credit	69.7 bp	111.4 bp	-41.7 bp	4,296	-17,909	7,470	-25,380
Overlay Programs <sup>2</sup>	0.1 bp	0.3 bp	-0.2 bp	31,455	-650	-650	0
<b>Total asset management</b>	<b>65.6 bp</b>	<b>83.6 bp</b>	<b>-17.9 bp</b>	<b>31,455</b>	<b>-56,431</b>	<b>248</b>	<b>-56,679</b>
<b>Oversight, custody and other costs<sup>3</sup></b>							
Oversight of the Fund	0.4 bp	1.0 bp	-0.6 bp				
Trustee & Custodial	0.4 bp	0.3 bp	0.2 bp				
Consulting	0.2 bp	0.2 bp	0.0 bp				
Audit	0.1 bp	0.1 bp	0.1 bp				
Other	0.1 bp	0.1 bp	0.0 bp				
<b>Total oversight, custody &amp; other</b>	<b>1.3 bp</b>	<b>1.8 bp</b>	<b>-0.5 bp</b>	<b>31,455</b>	<b>-1,627</b>	<b>n/a</b>	<b>-1,627</b>
<b>Total</b>	<b>66.9 bp</b>	<b>85.4 bp</b>	<b>-18.5 bp</b>	<b>31,455</b>	<b>-58,058</b>	<b>248</b>	<b>-58,306</b>

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.

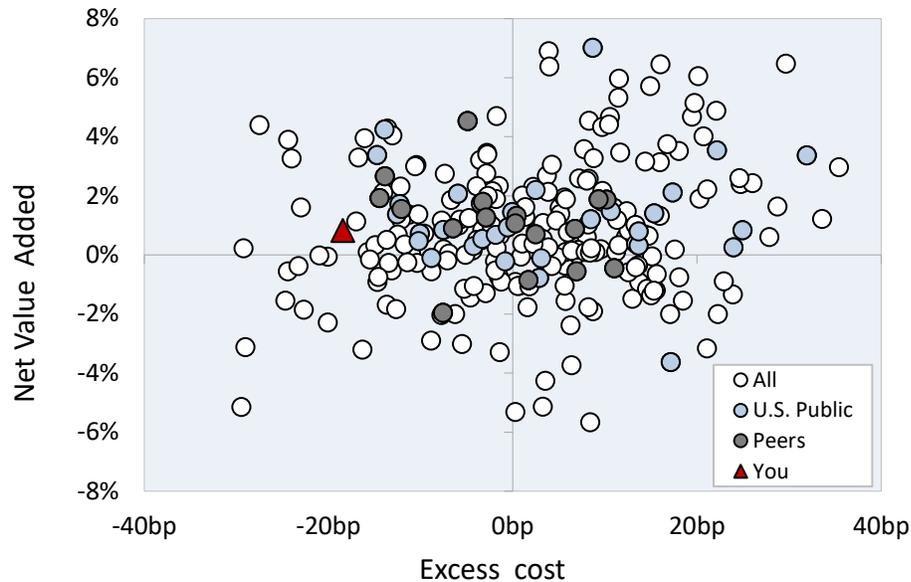
2. Total fund average holdings is used as the base when calculating the relative cost impact of the overlay programs.

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

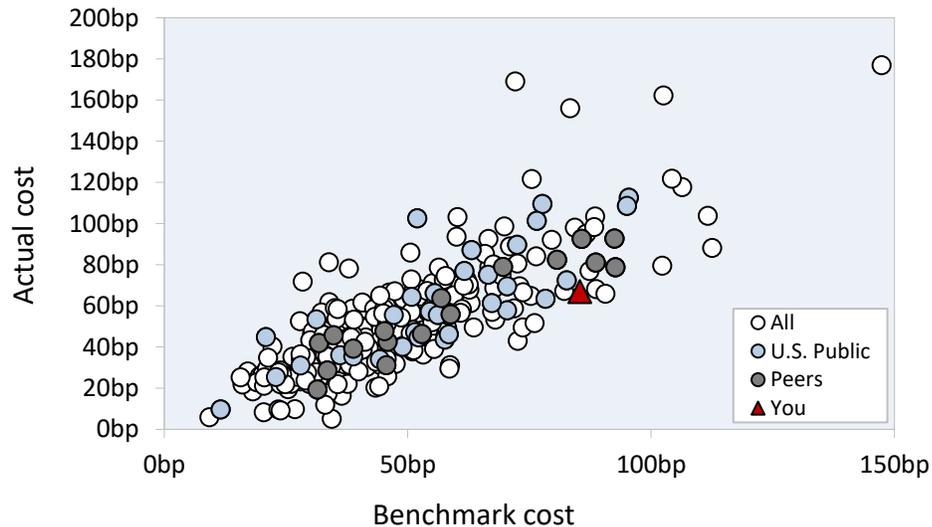
## Your cost effectiveness ranking

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 2020, your fund ranked in the positive value added, low cost quadrant.

**Your 2020 Net value added 0.8%, Excess cost -18 bps**



**Your 2020 Actual cost 66.9 bps, Benchmark cost 85.4 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 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

$$= (5\% \times 1.1 \text{ bp}) + (0\% \times 0.0 \text{ bp}) + (63\% \times 0.8 \text{ bp}) + (32\% \times 30.9 \text{ bp}) = 10.4 \text{ bp}$$

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

$$= 19.5 \text{ bp} - 10.4 \text{ bp} = 9.1 \text{ bp}$$

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)

$$= 6.7 \text{ bp} + 0.0 \text{ bp} + 0.0 \text{ bp} = 6.7 \text{ bp}$$

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

$$= (\text{peer average passive cost} - \text{peer average active cost}) \times (\text{passive \% of asset, you} - \text{passive \% of asset, peer average}) \\ = (0.9 \text{ bp} - 30.9 \text{ bp}) \times (46\% - 68\%) = 6.7 \text{ bp}$$

Peer average passive cost = weighted average by peer average style of peer median costs for internal passive and external passive management

$$= [(5\% \times 1.1 \text{ bp}) + (63\% \times 0.8 \text{ bp})] / (5\% + 63\%) = 0.9 \text{ bp}$$

Peer average active cost = weighted average by peer average style of peer median costs for internal active and external active management

$$= [(0\% \times 0.0 \text{ bp}) + (32\% \times 30.9 \text{ bp})] / (0\% + 32\%) = 30.9 \text{ bp}$$

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

$$= (\text{peer average internal passive cost} - \text{peer average external passive cost}) \times (\text{internal passive \% of passive, you} - \text{internal passive \% of passive, peer average}) \times \text{passive \% of asset, you} \\ = (1.1 \text{ bp} - 0.8 \text{ bp}) \times (0\% - 7\%) \times 46\% = 0.0 \text{ bp}$$

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

$$= (\text{peer average internal active cost} - \text{peer average external active cost}) \times (\text{internal active \% of active, you} - \text{internal active \% of active, peer avg}) \times \text{active \% of asset, you} \\ = (0.0 \text{ bp} - 30.9 \text{ bp}) \times (0\% - 0\%) \times 54\% = 0.0 \text{ bp}$$

Cost impact of paying more/-less

$$= (\text{cost internal passive, you} - \text{cost internal passive, peer}) \times \text{internal passive \% of asset, you} + (\text{cost internal active, you} - \text{cost internal active, peer}) \times \text{internal active \% of asset, you} + (\text{cost external passive, you} - \text{cost external passive, peer}) \times \text{external passive \% of asset, you} + (\text{cost external active, you} - \text{cost external active, peer}) \times \text{external active \% of asset, you} \\ = (0.0 \text{ bp} - 1.1 \text{ bp}) \times 0\% + (0.0 \text{ bp} - 0.0 \text{ bp}) \times 0\% + (3.7 \text{ bp} - 0.8 \text{ bp}) \times 46\% + (32.8 \text{ bp} - 30.9 \text{ bp}) \times 54\% = 2.4 \text{ bp}$$

Your cost versus benchmark (-savings/+excess)

$$= \text{cost impact of differences in implementation style} + \text{cost impact of paying more/-less} \\ = 6.7 \text{ bp} + 2.4 \text{ bp} = 9.1 \text{ bp}$$

## Benchmarking methodology formulas and data

### b) 2020 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			3.7	32.8				1.1		0.8	30.9				10.4
Stock - U.S. Small Cap			7.9					1.2	4.6	1.8	43.4				30.8
Stock - EAFE			5.7						10.4	3.4	43.1				25.4
Stock - Emerging			5.3	31.0				2.2	10.9	4.9	49.0				39.0
Stock - Global			4.2	26.6				1.7		3.7	36.4				17.3
Stock - ACWI x U.S.				48.0				5.0		2.7	35.7				28.8
Fixed Income - U.S.		2.9		24.5				2.0	3.1	0.8	12.8				9.4
Fixed Income - Emerging				40.0				4.0		7.5	37.1				34.5
Fixed Income - High Yield				43.2					4.5		31.5				30.9
Cash		2.9		4.6					2.9		4.6				3.7
REITs				35.8					5.8	6.0	46.9				41.4
Real Estate ex-REITs					74.4	96.8			22.8		75.7	74.4	136.0	60.8	95.4
Underlying base fees														135.7	1.3
Infrastructure				58.8	24.8						68.1	14.6	133.0	70.5	102.4
Underlying base fees														135.0	2.3
Hedge Funds				187.5			56.4				119.0			45.8	107.8
Top layer perf. fees				18.9			0.0				96.0			15.1	83.6
Underlying base fees							55.9							119.0	18.2
Underlying perf. fees							46.2							96.0	14.7
Global TAA				23.3							58.2				58.2
Diversified Private Equity					16.4	159.5	92.1		9.8			11.2	157.0	75.0	138.6
Underlying base fees							157.0							157.0	25.0
Private Credit					83.2	68.8					85.6	32.2	136.0		111.4
Underlying base fees															0.0

## Benchmarking methodology formulas and data

### c) 2020 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%		45.7%	54.3%				4.9%		63.2%	31.9%			
Stock - U.S. Small Cap	0.0%	0.0%	100.0%	0.0%				6.2%	4.2%	20.0%	69.6%			
Stock - EAFE		0.0%	100.0%	0.0%					9.5%	36.7%	53.8%			
Stock - Emerging	0.0%	0.0%	28.2%	71.8%				10.9%	1.9%	9.6%	77.6%			
Stock - Global	0.0%		84.9%	15.1%				11.3%		46.3%	42.4%			
Stock - ACWI x U.S.	0.0%		0.0%	100.0%				0.8%		20.4%	78.8%			
Fixed Income - U.S.	0.0%	2.7%	0.0%	97.3%				0.4%	20.2%	11.9%	67.5%			
Fixed Income - Emerging	0.0%		0.0%	100.0%				3.5%		4.7%	91.8%			
Fixed Income - High Yield		0.0%		100.0%					1.9%		98.1%			
Cash		54.7%		45.3%					54.7%		45.3%			
REITs		0.0%	0.0%	100.0%					8.7%	4.8%	86.5%			
Real Estate ex-REITs		0.0%		0.0%	0.8%	99.2%	0.0%		2.8%		60.4%	0.6%	35.3%	0.9%
Underlying base fees		0.0%		0.0%	0.8%	99.2%	0.0%		2.8%		60.4%	0.6%	35.3%	0.9%
Infrastructure				97.2%	2.8%	0.0%	0.0%				42.5%	1.6%	54.1%	1.7%
Underlying base fees				97.2%	2.8%	0.0%	0.0%				42.5%	1.6%	54.1%	1.7%
Hedge Funds				55.1%			44.9%				84.7%			15.3%
Top layer perf. fees				55.1%			44.9%				84.7%			15.3%
Underlying base fees				55.1%			44.9%				84.7%			15.3%
Underlying perf. fees				55.1%			44.9%				84.7%			15.3%
Global TAA				100.0%							100.0%			
Diversified Private Equity		0.0%			19.6%	66.8%	13.6%		0.0%			3.7%	80.4%	15.9%
Underlying base fees		0.0%			19.6%	66.8%	13.6%		0.0%			3.7%	80.4%	15.9%
Private Credit				0.0%	6.9%	93.1%					43.7%	2.4%	53.8%	
Underlying base fees				0.0%	6.9%	93.1%					43.7%	2.4%	53.8%	

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 staff (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.

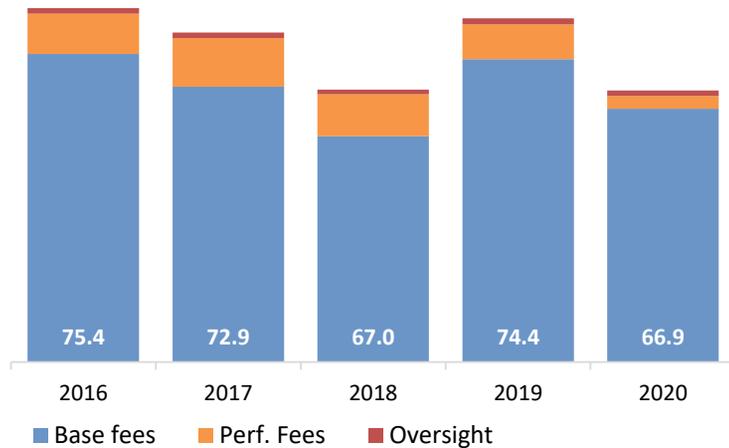
Further, cost difference for style & paying impacts (CostBpsH - CostBpsL) for one style =

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

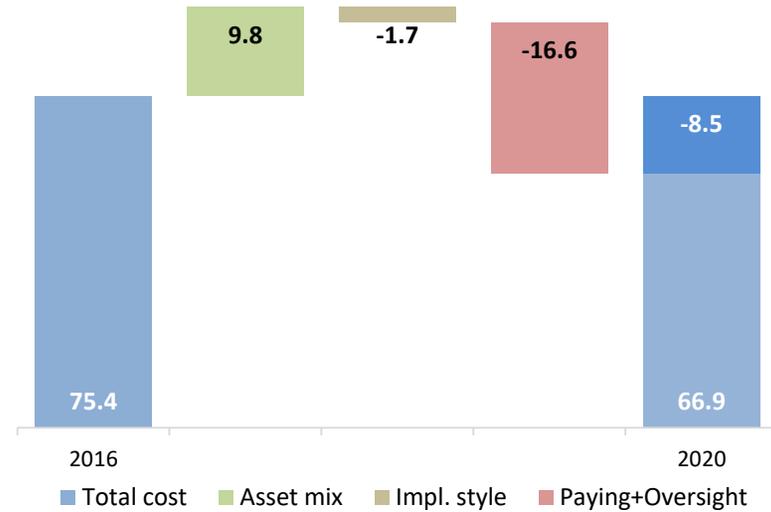
where CostStyleBps is the style cost in basis points; Wg is the weight for that style within the asset class.

## Total plan cost and cost changes

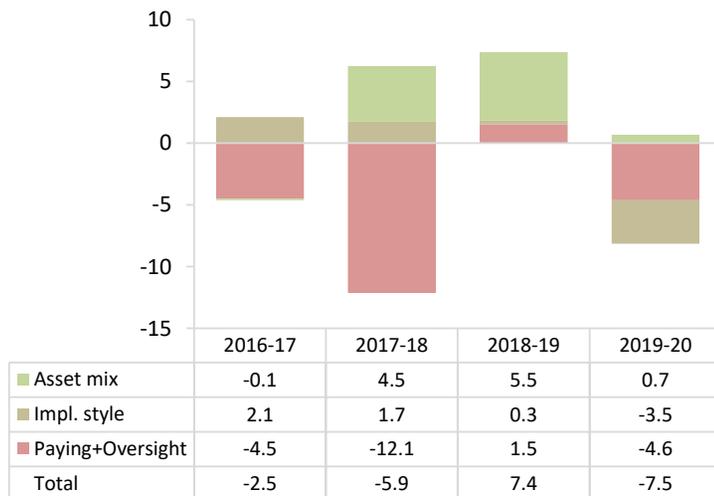
### Total plan cost over time, bps



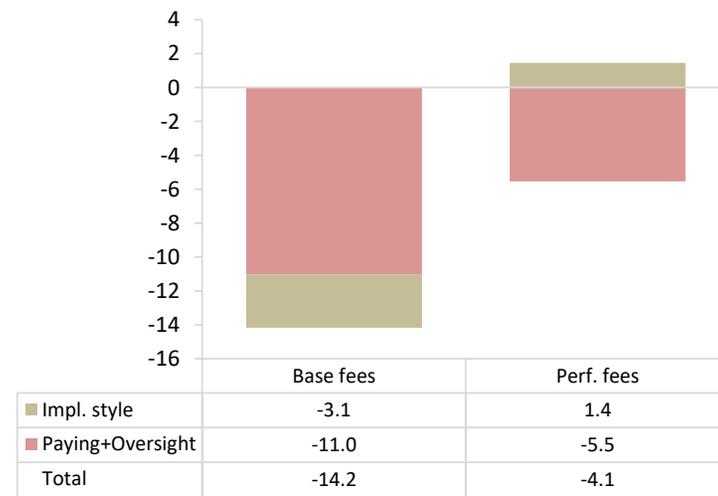
### Cost differences, 2020 versus 2016, bps



### Reasons for cost differences over time, bps



### Impact of base and performance fees, 2020 vs. 2016, bps



## Summary of cost differences, 2020 versus 2016

Your total cost decreased by 8.5 bps between 2016 and 2020 because of changes in: asset mix (9.8 bps), implementation style (-1.7 bps), and paying more/less for similar services (-16.6 bps).

	bps	\$000s
Starting total cost, 2016	75.4	211,413
Growth in asset value		25,882
Asset mix	<u>9.8</u>	<u>30,743</u>
Stock	2.9	9,016
Fixed Income	-3.2	-10,037
Real Estate ex-REITs	2.2	6,906
Real Assets ex Real Estate	1.1	3,337
Hedge Funds & Multi-Asset	-4.8	-15,228
Private Equity	1.8	5,556
Private Debt	9.9	31,192
Implementation style (less expensive vs. more )	<u>-1.7</u>	<u>-5,313</u>
More passive, less active	-4.1	-12,888
Less int. active % of total active	0.0	93
Less evergreen % of external	0.0	-17
More LP, less fund of funds	1.0	3,180
Performance fees	1.4	4,535
More co-investment	-0.1	-217
Paying more/-less for	<u>-16.7</u>	<u>-52,621</u>
Stock	-2.9	-9,148
Fixed Income	-0.6	-1,797
Real Estate ex-REITs	-0.8	-2,405
Real Assets ex Real Estate	1.2	3,717
Hedge Funds & Multi-Asset	-3.7	-11,761
Performance fees	-5.5	-17,408
Private Equity	1.8	5,729
Private Debt	-5.8	-18,319
Overlays and unfunded strategies	-0.4	-1,231
Oversight, custodial, other (pay more/-less)	<u>0.1</u>	<u>471</u>
Total difference	-8.5	-839
Ending total cost, 2020	66.9	210,574

## Summary of cost differences, year over year

	bps	\$000s	bps	\$000s	bps	\$000s	bps	\$000s	bps	\$000s
	2016		2017		2018		2019		2016	
Starting total cost	75.4	211,413	72.9	222,442	67.0	209,559	74.4	235,265	75.4	211,413
Growth in asset value		18,675		5,532		2,445		-1,249		25,882
Asset mix	-0.1	-352	4.5	14,134	5.5	17,433	0.7	2,161	9.8	30,743
Stock	2.9	8,740	1.1	3,497	0.4	1,370	-1.3	-4,176	2.9	9,016
Fixed Income	-0.7	-2,190	-1.6	-4,957	-0.7	-2,247	-0.2	-773	-3.2	-10,037
Real Estate ex-REITs	0.0	-134	0.5	1,711	2.7	8,488	-1.1	-3,463	2.2	6,906
Real Assets ex Real Estate	0.3	1,043	1.0	3,009	0.1	306	0.1	416	1.1	3,337
Hedge Funds & Multi-Asset	-1.3	-3,931	1.0	3,112	-1.7	-5,374	-0.9	-2,887	-4.8	-15,228
Private Equity	-3.9	-12,016	1.7	5,444	1.0	3,285	3.7	11,765	1.8	5,556
Private Debt	2.7	8,136	0.7	2,319	3.7	11,604	0.4	1,278	9.9	31,192
Implementation style (less expensive vs. more )	2.1	6,442	1.7	5,393	0.3	986	-3.5	-11,046	-1.7	-5,313
Passive vs. active	0.4	1,369	0.2	498	0.0	-119	-3.0	-9,458	-4.1	-12,888
Internal active vs. external active	0.0	-66	-0.1	-208	-0.1	-286	0.0	96	0.0	93
Evergreen vs. LP/Co & fund of funds	0.0	0	0.0	0	0.0	0	0.0	-50	0.0	-17
LP/Co vs. fund of funds	1.4	4,416	1.1	3,476	0.7	2,187	0.3	1,042	2.5	7,715
Co-investment vs. LP	0.2	722	0.5	1,627	-0.3	-796	-0.9	-2,676	-0.1	-217
Paying more/-less for	-4.5	-13,785	-12.1	-37,858	1.4	4,309	-4.6	-14,531	-16.7	-52,621
Stock	-2.0	-6,231	-1.0	-3,154	-1.4	-4,521	-0.2	-604	-2.9	-9,148
Fixed Income	0.2	545	-0.7	-2,088	0.5	1,463	-0.4	-1,312	-0.6	-1,797
Real Estate ex-REITs	-0.7	-1,998	0.3	1,042	-0.3	-929	0.0	-66	-0.8	-2,405
Real Assets ex Real Estate	0.4	1,080	-0.6	-2,027	0.3	870	0.7	2,324	1.2	3,717
Hedge Funds & Multi-Asset	-1.9	-5,945	-6.9	-21,591	1.4	4,403	-3.3	-10,515	-9.3	-29,168
Private Equity	0.7	1,999	-0.6	-1,938	1.2	3,696	-1.3	-4,093	1.8	5,729
Private Debt	-0.9	-2,622	-2.6	-8,229	-0.2	-503	0.1	292	-5.8	-18,319
Overlays and unfunded strategies	-0.2	-613	0.0	128	-0.1	-169	-0.2	-558	-0.4	-1,231
Oversight, custodial, other (pay more/-less)	0.0	49	0.0	-85	0.2	534	0.0	-25	0.1	471
Total difference	-2.5	11,029	-5.9	-12,883	7.4	25,707	-7.5	-24,691	-8.5	-839
Ending total cost	72.9	222,442	67.0	209,559	74.4	235,265	66.9	210,574	66.9	210,574
	2017		2018		2019		2020		2020	

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 \$839 thousand in 2020 compared to 2016. An increase of \$26 million was due to the \$3.4 billion rise in plan total average nav holdings. The remaining decrease of \$27 million is explained by the changes in the asset mix (\$31 million), implementation style (-\$5.3 million), and paying more/less for similar services (-\$52 million).

Asset class <sup>1</sup>	2016 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	2020 cost \$000s
	A	B	C	D	E=B+C+D	F=G-A	F-E	G
Stock - U.S. Broad/All	8,849	-1,366	-3,711	-1,417	-6,494	-5,411	1,083	3,439
Stock - U.S. Small Cap	n/a	490	0	0	490	490	0	490
Stock - EAFE	n/a	357	0	0	357	357	0	357
Stock - Emerging	7,464	6,850	-4,007	-6,580	-3,737	-2,823	914	4,641
Stock - Global	7,365	3,715	-5,641	-763	-2,690	-1,788	902	5,577
Stock - ACWI x U.S.	2,571	-1,030	0	-387	-1,417	-1,102	315	1,468
Fixed Income - U.S.	3,070	-2,302	79	552	-1,672	-1,296	376	1,774
Fixed Income - Emerging	6,644	-3,520	471	-778	-3,827	-3,014	813	3,630
Fixed Income - High Yield	8,619	-3,386	0	-323	-3,709	-2,654	1,055	5,965
Cash	2,532	-829	15	-1,247	-2,062	-1,752	310	781
REITs	917	505	0	117	622	734	112	1,651
Real Estate ex-REITs	17,151	6,906	42	-2,405	4,543	6,643	2,100	23,794
Infrastructure	811	2,833	-17	3,600	6,416	6,515	99	7,326
Hedge Funds	29,653	-3,865	10,682	951	7,768	11,398	3,630	41,051
Top layer perf. fees	18,007	-2,347	5,887	-20,425	-16,885	-14,681	2,204	3,326
Underlying base fees	22,330	-2,911	-6,043	-8,106	-17,059	-14,326	2,734	8,004
Underlying perf. fees	4,993	-651	-1,351	3,017	1,015	1,626	611	6,619
Global TAA	11,613	-5,454	0	-4,606	-10,060	-8,638	1,422	2,974
Diversified Private Equity	30,155	4,559	2,587	4,405	11,551	15,243	3,692	45,398
Underlying base fees	6,593	997	-1,769	1,324	552	1,359	807	7,951
Private Credit	17,483	31,192	-2,536	-18,319	10,338	12,478	2,140	29,960
<b>Total for asset management</b>	<b>206,817</b>	<b>30,743</b>	<b>-5,313</b>	<b>-51,390</b>	<b>-25,961</b>	<b>-641</b>	<b>25,319</b>	<b>206,176</b>
Overlays and unfunded strategies <sup>2</sup>	1,308	0		-1,231	-1,231	-1,070	160	237
Oversight	1,056			13	13	142	129	1,198
Trustee & Custodial	940			-269	-269	-154	115	786
Consulting	925			356	356	469	113	1,394
Audit	99			298	298	310	12	409
Other	267			74	74	106	33	373
<b>Total for fund oversight<sup>3</sup></b>	<b>3,288</b>			<b>471</b>	<b>471</b>	<b>873</b>	<b>403</b>	<b>4,161</b>
<b>Total</b>	<b>211,413</b>	<b>30,743</b>	<b>-5,313</b>	<b>-52,150</b>	<b>-26,721</b>	<b>-839</b>	<b>25,882</b>	<b>210,574</b>

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 8.5 bps in 2020 vs. 2016. It was driven by the changes in the asset mix (9.8 bps), implementation style (-1.7 bps), and paying more/less for similar services (-16.6 bps).

Asset class	Asset mix bps	Implement. style bps	Paying more/-less bps	Total difference bps	Total <sup>1</sup> ex asset gr. \$000s
	B	C	D	B+C+D	
Stock - U.S. Broad/All	-0.4	-1.2	-0.5	-2.1	-6,494
Stock - U.S. Small Cap	0.2	0.0	0.0	0.2	490
Stock - EAFE	0.1	0.0	0.0	0.1	357
Stock - Emerging	2.2	-1.3	-2.1	-1.2	-3,737
Stock - Global	1.2	-1.8	-0.2	-0.9	-2,690
Stock - ACWI x U.S.	-0.3	0.0	-0.1	-0.5	-1,417
Fixed Income - U.S.	-0.7	0.0	0.2	-0.5	-1,672
Fixed Income - Emerging	-1.1	0.1	-0.2	-1.2	-3,827
Fixed Income - High Yield	-1.1	0.0	-0.1	-1.2	-3,709
Cash	-0.3	0.0	-0.4	-0.7	-2,062
REITs	0.2	0.0	0.0	0.2	622
Real Estate ex-REITs	2.2	0.0	-0.8	1.4	4,543
Infrastructure	0.9	0.0	1.1	2.0	6,416
Hedge Funds	-1.2	3.4	0.3	2.5	7,768
Top layer perf. fees	-0.7	1.9	-6.5	-5.4	-16,885
Underlying base fees	-0.9	-1.9	-2.6	-5.4	-17,059
Underlying perf. fees	-0.2	-0.4	1.0	0.3	1,015
Global TAA	-1.7	0.0	-1.5	-3.2	-10,060
Diversified Private Equity	1.4	0.8	1.4	3.7	11,551
Underlying base fees	0.3	-0.6	0.4	0.2	552
Private Credit	9.9	-0.8	-5.8	3.3	10,338
<b>Total for asset management</b>	<b>9.8</b>	<b>-1.7</b>	<b>-16.3</b>	<b>-8.3</b>	<b>-25,961</b>
Overlays and unfunded strategies	0.00		-0.39	-0.39	-1,231
Oversight			0.0	0.0	13
Trustee & Custodial			-0.1	-0.1	-269
Consulting			0.1	0.1	356
Audit			0.1	0.1	298
Other			0.0	0.0	74
<b>Total for fund oversight</b>			<b>0.1</b>	<b>0.1</b>	<b>471</b>
<b>Total</b>	<b>9.8</b>	<b>-1.7</b>	<b>-16.6</b>	<b>-8.5</b>	<b>-26,721</b>
<b>Total basis point costs in years 2020 and 2016</b>		<b>66.9</b>	<b>75.4</b>	<b>-8.5</b>	

1. Calculated by multiplying total difference in bps by plan total nav average holdings for year 2020, \$31 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 \$31 million or 9.8 bps.

Asset class	2016 Cost bps	2020 Cost bps	2016 asset <sup>1</sup> weight %	2020 asset <sup>1</sup> weight %	Change in asset weight	Asset mix changes <sup>2</sup> bps	Asset mix changes <sup>3</sup> \$000s
	A	B	C	D	E=D-C	A (or B) x E	
Stock - U.S. Broad/All	48.7	19.5	6%	6%	-1%	-0.4	-1,366
Stock - U.S. Small Cap	n/a	7.9	0%	2%	2%	0.2	490
Stock - EAFE	n/a	5.7	0%	2%	2%	0.1	357
Stock - Emerging	78.0	23.8	3%	6%	3%	2.2	6,850
Stock - Global	16.4	7.6	16%	23%	7%	1.2	3,715
Stock - ACWI x U.S.	60.7	48.0	2%	1%	-1%	-0.3	-1,030
Fixed Income - U.S.	15.4	23.9	7%	2%	-5%	-0.7	-2,302
Fixed Income - Emerging	43.4	40.0	5%	3%	-3%	-1.1	-3,520
Fixed Income - High Yield	45.5	43.2	7%	4%	-2%	-1.1	-3,386
Cash	9.5	3.7	10%	7%	-3%	-0.3	-829
REITs	33.3	35.8	1%	1%	0%	0.2	505
Real Estate ex-REITs	106.3	96.7	6%	8%	2%	2.2	6,906
Infrastructure	29.5	57.8	1%	4%	3%	0.9	2,833
Hedge Funds	92.2	128.6	11%	10%	-1%	-1.2	-3,865
Top layer perf. fees	56.0	10.4	11%	10%	-1%	-0.7	-2,347
Underlying base fees	69.4	25.1	11%	10%	-1%	-0.9	-2,911
Underlying perf. fees	15.5	20.7	11%	10%	-1%	-0.2	-651
Global TAA	59.4	23.3	7%	4%	-3%	-1.7	-5,454
Diversified Private Equity	103.4	122.3	10%	12%	1%	1.4	4,559
Underlying base fees	22.6	21.4	10%	12%	1%	0.3	997
Private Credit	118.3	69.7	5%	14%	8%	9.9	31,192
<b>Total for asset management</b>						<b>9.8</b>	<b>30,743</b>

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 2020, \$31 billion.

## Impact of changes in implementation style

Changes in implementation style (passive vs. active, internal vs. external, etc.) in 2020 vs. 2016 saved you \$5.3 million.

Implementation choices	2020	Cost, 2016			Style 1 %			Cost/ \$000s
	avg. assets \$mils	Style 1	Style 2	Style 1 -Savings	2020	2016	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	1,761	3 bp	49 bp	-46 bp	46%	0%	46%	-3,711
Stock - Emerging	1,953	5 bp	78 bp	-73 bp	28%	0%	28%	-4,007
Stock - Global	7,318	5 bp	31 bp	-26 bp	85%	55%	30%	-5,641
Fixed Income - Emerging	908	4 bp	49 bp	-45 bp	0%	12%	-12%	471
More passive, less active								-12,888
<u>Internal active vs external active</u>	Active assets	Internal active	External active		Internal active % of active			
Fixed Income - U.S.	742	3 bp	17 bp	-14 bp	3%	10%	-7%	79
Cash	2,126	3 bp	18 bp	-15 bp	55%	55%	0%	15
Less int. active % of total active								93
<u>Evergreen vs LP/Co &amp; fund of funds</u>	External assets	Ever-green	LP/Co & FoF		Evergreen fund % of external			
Infrastructure	1,267	30 bp	25 bp	5 bp	97%	100%	-3%	-17
Less evergreen % of external								-17
<u>LP/Co-investment vs fund of funds</u>	LP/Co & FoFs	LP/Co	Fund of funds		LP/Co % of LP/Co + FoFs			
Hedge Funds	3,191	215 bp	129 bp	86 bp	55%	38%	17%	4,639
Perf. fees	3,191	124 bp	39 bp	84 bp	55%	38%	17%	4,535
Diversified Private Equity	3,713	107 bp	215 bp	-108 bp	86%	83%	4%	-1,459
More LP, less fund of funds								7,715
<u>Co-investment vs LP</u>	LP/Co	Co-invest	LP		Co-invest % of LP/Co			
Real Estate ex-REITs	2,462	30 bp	107 bp	-77 bp	1%	1%	0%	42
Diversified Private Equity	3,207	46 bp	134 bp	-88 bp	23%	31%	-8%	2,277
Private Credit	4,296	28 bp	119 bp	-91 bp	7%	0%	7%	-2,536
More co-investment								-217
<b>Total</b>								<b>-5,313</b>

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 2020, you paid \$52 million less for similar asset management and oversight / support services vs. 2016.

Asset class styles where you had assets in both 2020 and 2016 <sup>1</sup>	Style	2020	Cost in bps		More/ -less	Cost/ -Savings \$000s
		avg. assets \$mils	2020	2016		
<u>External asset management</u>		A			B	A x B
Stock - U.S. Broad/All	passive	804	3.7	2.5	1.2	98
Stock - U.S. Broad/All	active	957	32.8	48.7	-15.8	-1,515
Stock - Emerging	active	1,401	31.0	78.0	-47.0	-6,580
Stock - Global	passive	6,210	4.2	4.8	-0.5	-330
Stock - Global	active	1,108	26.6	30.5	-3.9	-433
Stock - ACWI x U.S.	active	306	48.0	60.7	-12.7	-387
Fixed Income - U.S.	active	723	24.5	16.8	7.6	551
Fixed Income - Emerging	active	908	40.0	48.5	-8.6	-778
Fixed Income - High Yield	active	1,381	43.2	45.5	-2.3	-323
Cash	active	963	4.6	17.9	-13.3	-1,283
REITs	active	461	35.8	33.3	2.5	117
Real Estate ex-REITs	CO	21	74.4	30.3	44.1	91
Real Estate ex-REITs	LP	2,441	96.8	107.1	-10.2	-2,496
Infrastructure	active	1,232	58.8	29.5	29.2	3,600
Hedge Funds	active	1,759	187.5	214.9	-27.4	-4,828
Top layer perf. fees	active	1,759	18.9	123.6	-104.7	-18,420
Hedge Funds	FoF	1,432	56.4	16.0	40.4	5,779
Top layer perf. fees	FoF	1,432	0.0	14.0	-14.0	-2,005
Underlying base fees	FoF	1,432	55.9	112.5	-56.6	-8,106
Underlying perf. fees	FoF	1,432	46.2	25.2	21.1	3,017
Global TAA	active	1,277	23.3	59.4	-36.1	-4,606
Diversified Private Equity	FoF	506	92.1	84.5	7.6	386
Underlying base fees	FoF	506	157.0	130.9	26.1	1,324
Diversified Private Equity	CO	727	16.4	46.5	-30.1	-2,189
Diversified Private Equity	LP	2,480	159.5	134.4	25.0	6,208
Private Credit	CO	297	83.2	27.9	55.3	1,639
Private Credit	LP	3,999	68.8	118.7	-49.9	-19,958
Total for external management						-51,426
<u>Internal asset management</u>		A			B	A x B
Fixed Income - U.S.	active	20	2.9	2.6	0.3	1
Cash	active	1,162	2.9	2.6	0.3	35
Total for internal management						36
Overlays and unfunded strategies		31,455	0.1	0.5	-0.4	-1,231
Oversight		31,455	0.4	0.4	0.0	12.8
Trustee & Custodial		31,455	0.2	0.3	-0.1	-269
Consulting		31,455	0.4	0.3	0.1	356
Audit		31,455	0.1	0.0	0.1	298
Other		31,455	0.1	0.1	0.0	74
Total for fund oversight						471
Total						-52,150

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

# 5

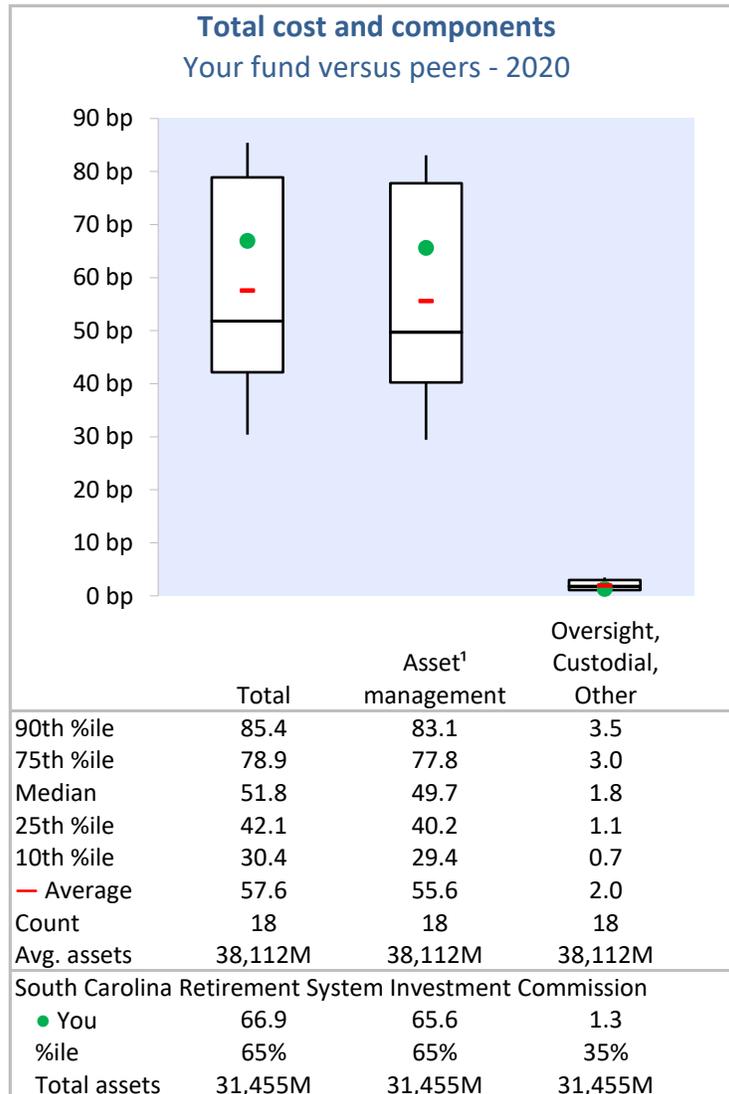
## Cost comparisons

Total fund cost	2
Governance, operations & support	3
Public asset classes	
- Stock	4
- Fixed Income	13
- Commodities	26
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- Venture capital	34
- Private credit	35
- Other private equity	37
Global TAA	38
RiskParity	39
Hedge Funds	40
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## Total fund cost

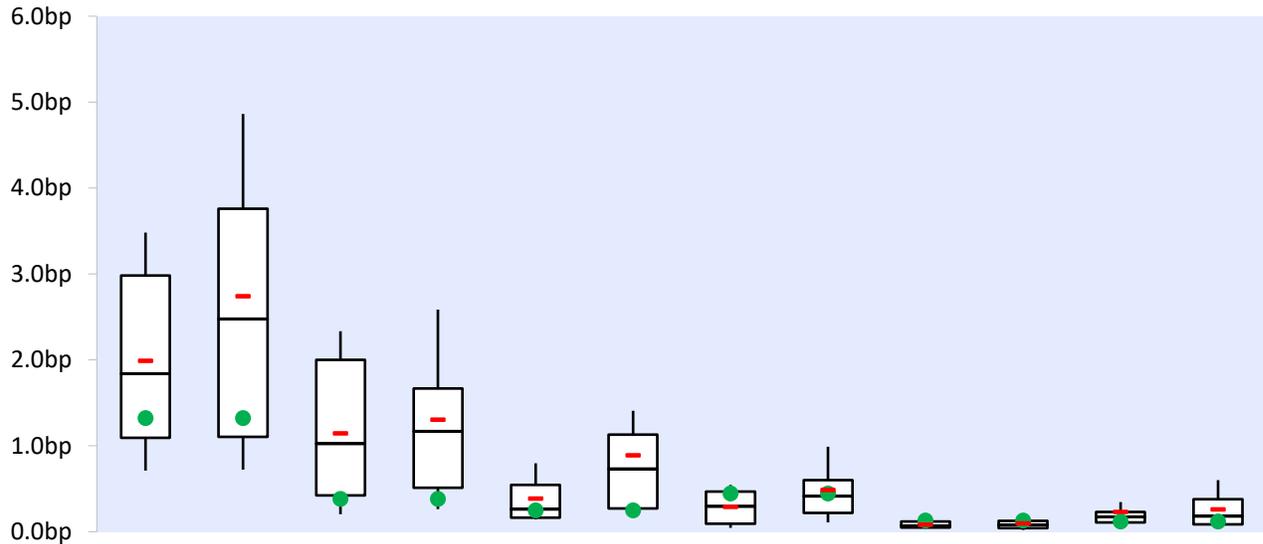
Total costs are benchmarked in the previous section. In this section, your fund's costs are compared on a line-item basis to your peers. This enables you to understand better why you may be a high or low cost fund and it also identifies and quantifies major cost differences that may warrant further investigation.

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



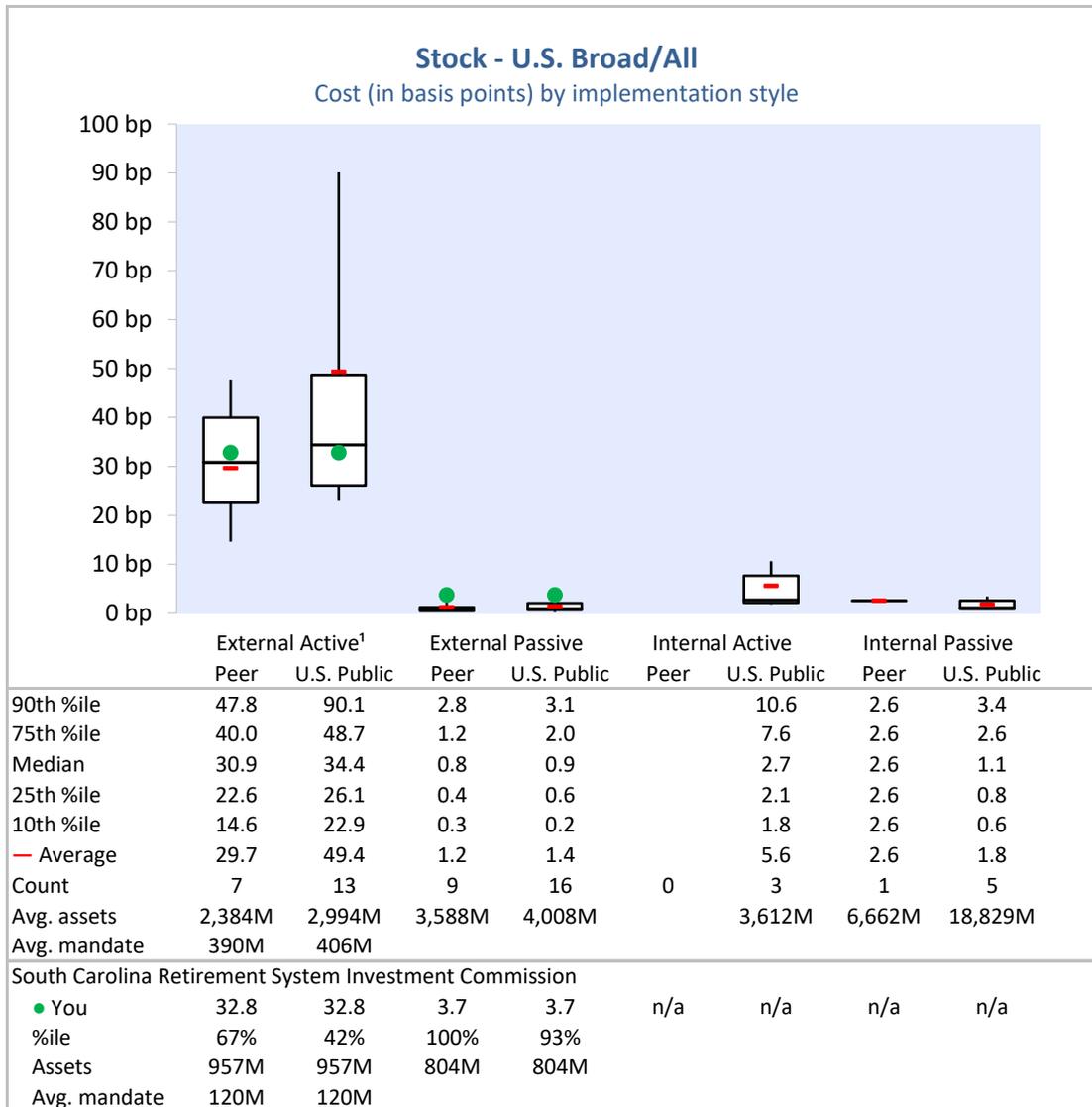
## Governance, operations & support

Cost as a % of total plan assets



	<u>Total</u>		<u>Oversight<sup>1</sup></u>		<u>Consulting &amp; 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	3.5	4.9	2.3	2.6	0.8	1.4	0.5	1.0	0.1	0.2	0.3	0.6
75th %ile	3.0	3.8	2.0	1.7	0.5	1.1	0.5	0.6	0.1	0.1	0.2	0.4
Median	1.8	2.5	1.0	1.2	0.3	0.7	0.3	0.4	0.1	0.1	0.2	0.2
25th %ile	1.1	1.1	0.4	0.5	0.2	0.3	0.1	0.2	0.0	0.0	0.1	0.1
10th %ile	0.7	0.7	0.2	0.3	0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.0
— Average	2.0	2.7	1.1	1.3	0.4	0.9	0.3	0.5	0.1	0.1	0.2	0.3
Count	18	49	18	49	15	39	17	47	16	43	14	33
Avg. assets	38,112M	53,934M	38,112M	53,934M	38,112M	53,934M	38,112M	53,934M	38,112M	53,934M	38,112M	53,934M
South Carolina Retirement System Investment Commission												
● You	1.3	1.3	0.4	0.4	0.2	0.2	0.4	0.4	0.1	0.1	0.1	0.1
%ile	35%	29%	18%	15%	43%	21%	69%	52%	87%	76%	31%	34%
Plan assets	31,455M	31,455M	31,455M	31,455M	31,455M	31,455M	31,455M	31,455M	31,455M	31,455M	31,455M	31,455M

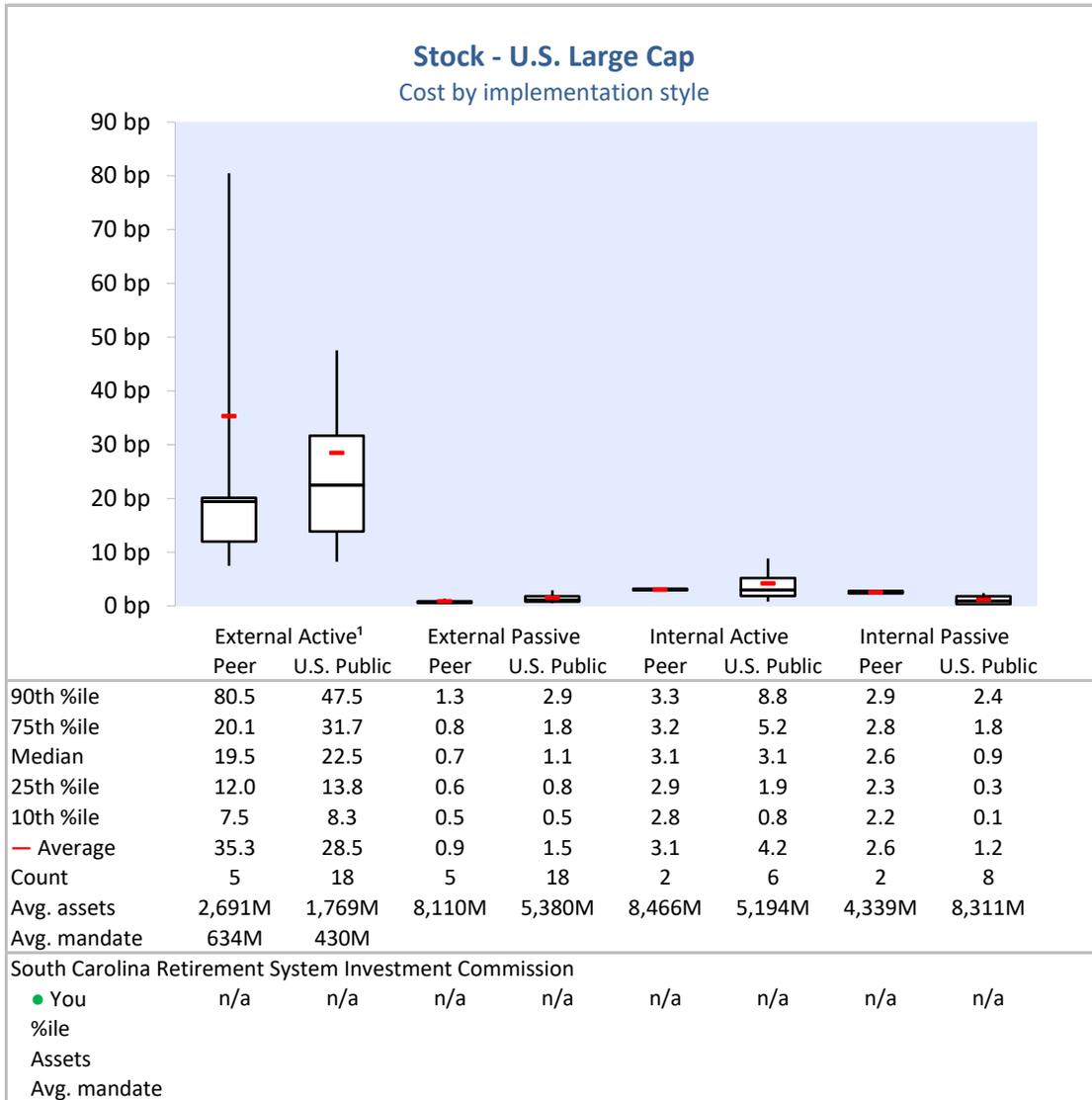
1. Oversight costs include the salaries and benefits of executives and their staff responsible for overseeing the entire fund or multiple asset classes and the fees/salaries of the Board or Investment Committee. All costs associated with the above including fees/salaries, travel, director's insurance 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	30.2	26.5	34.6
Performance fees*	0.0	2.4	13.0
Internal and other	<u>2.6</u>	<u>0.7</u>	<u>1.7</u>
Total	32.8	29.7	49.4

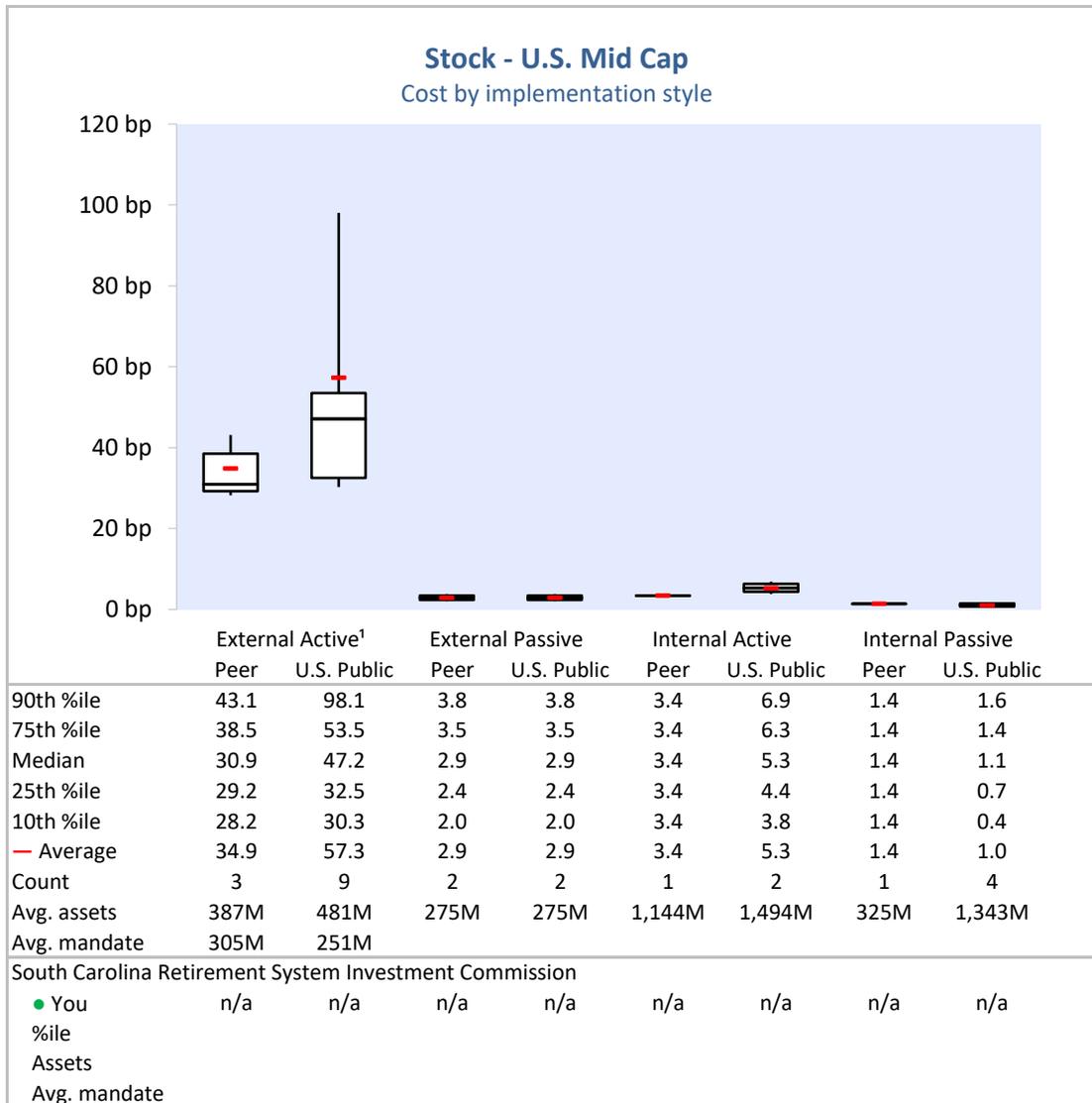
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 5.6 bps for peers (3 funds) and 42.3 bps for U.S. Public participants (4 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	35.2	27.3
Performance fees*	n/a	n/a	0.9
Internal and other	<u>n/a</u>	<u>0.1</u>	<u>0.3</u>
Total	n/a	35.3	28.5

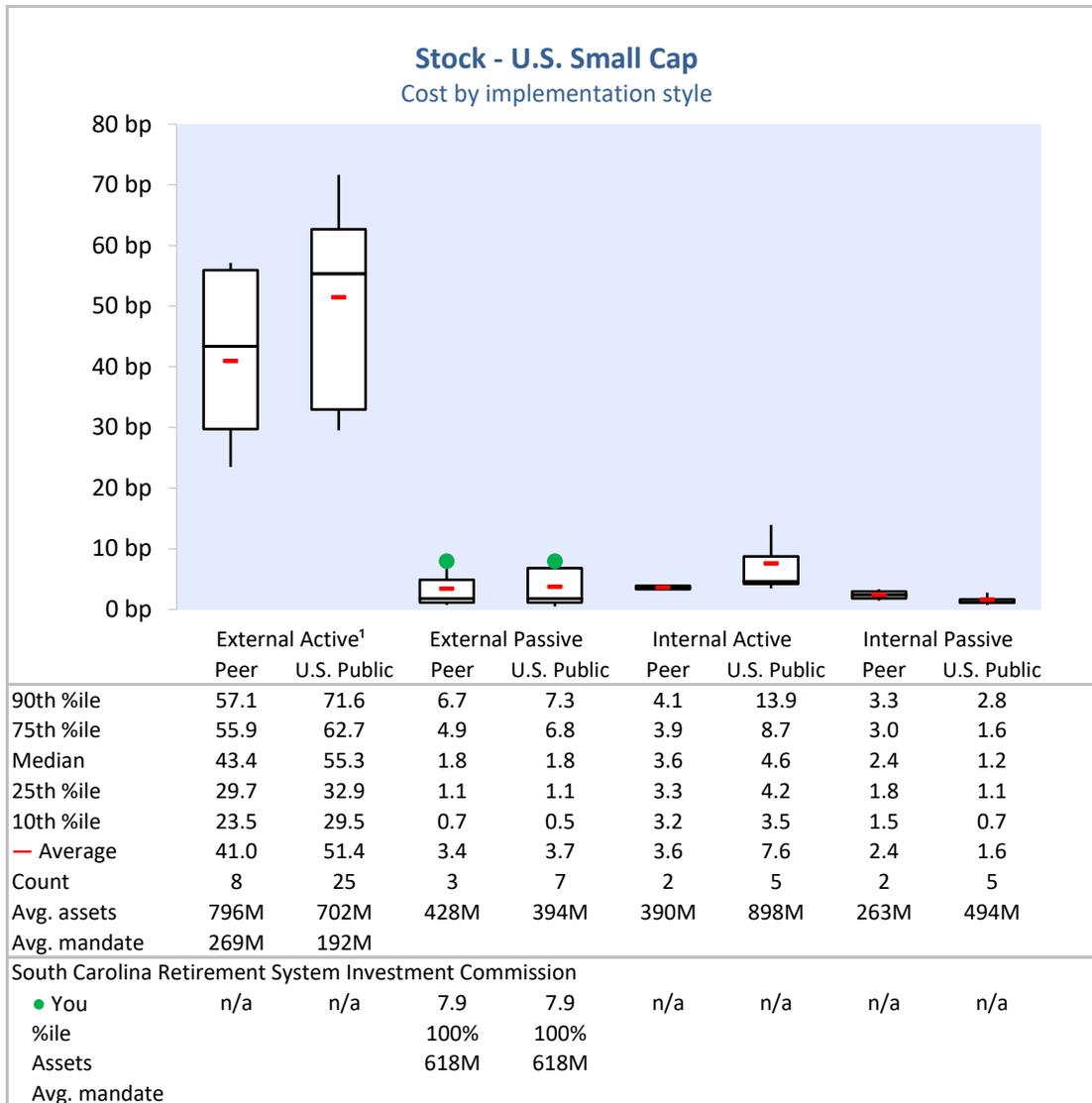
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 5.6 bps for U.S. Public participants (3 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	34.6	51.3
Performance fees*	n/a	n/a	5.7
Internal and other	<u>n/a</u>	<u>0.3</u>	<u>0.3</u>
Total	n/a	34.9	57.3

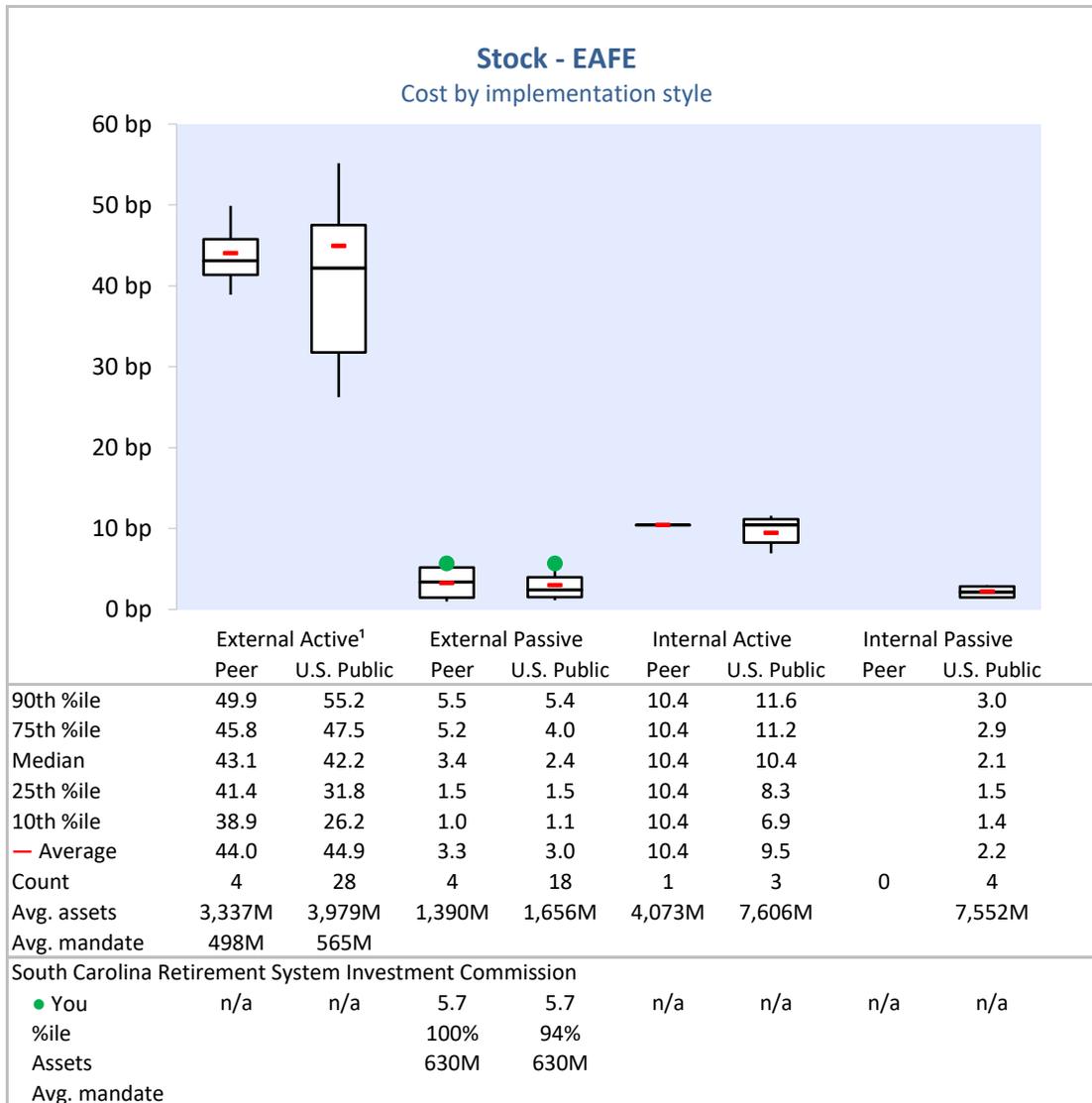
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 25.4 bps for U.S. Public participants (2 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	37.7	47.7
Performance fees*	n/a	3.0	3.5
Internal and other	<u>n/a</u>	<u>0.2</u>	<u>0.3</u>
Total	n/a	41.0	51.4

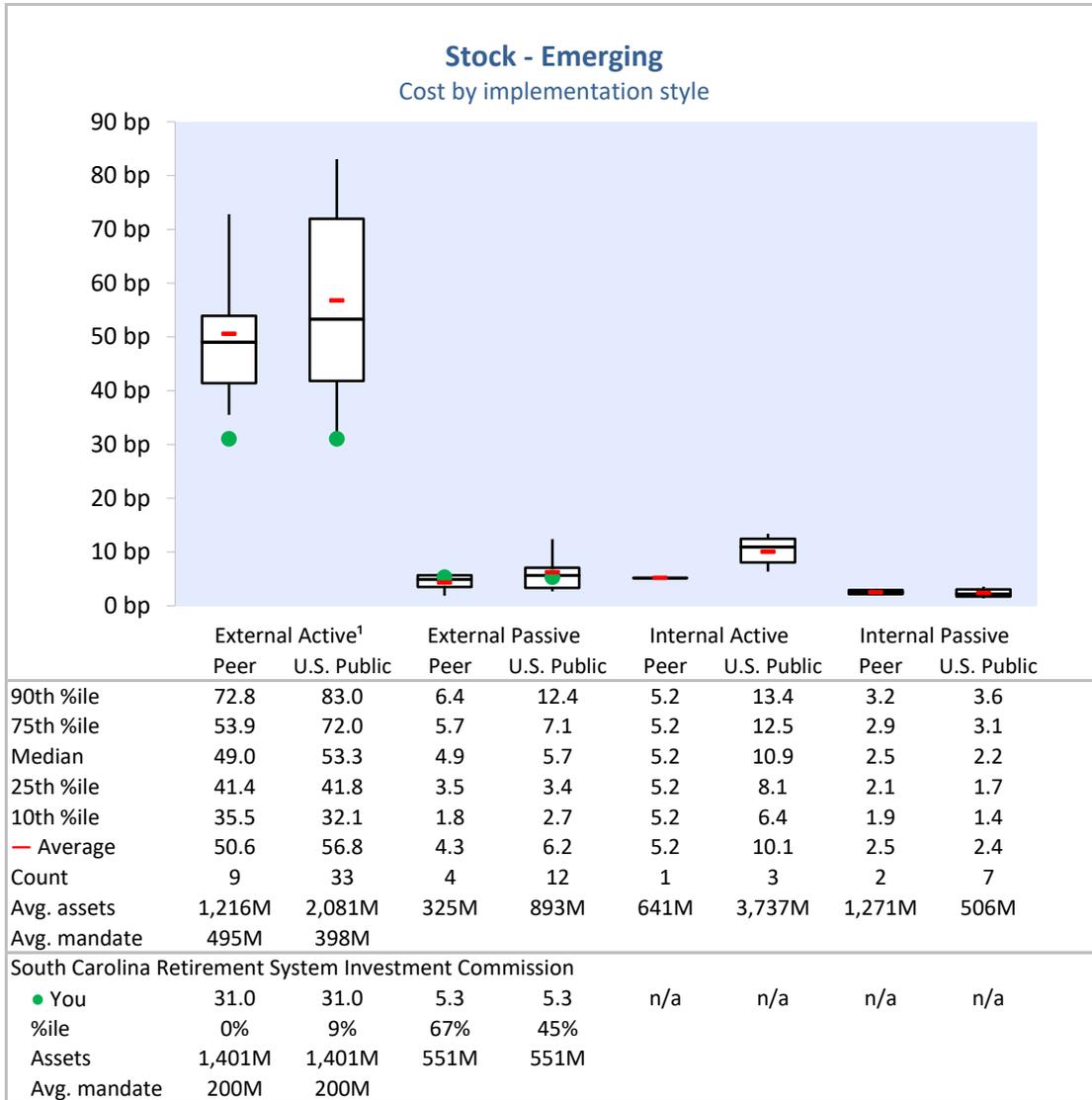
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 12.2 bps for peers (2 funds) and 21.7 bps for U.S. Public participants (4 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	42.0	38.3
Performance fees*	n/a	1.9	6.3
Internal and other	<u>n/a</u>	<u>0.2</u>	<u>0.3</u>
Total	n/a	44.0	44.9

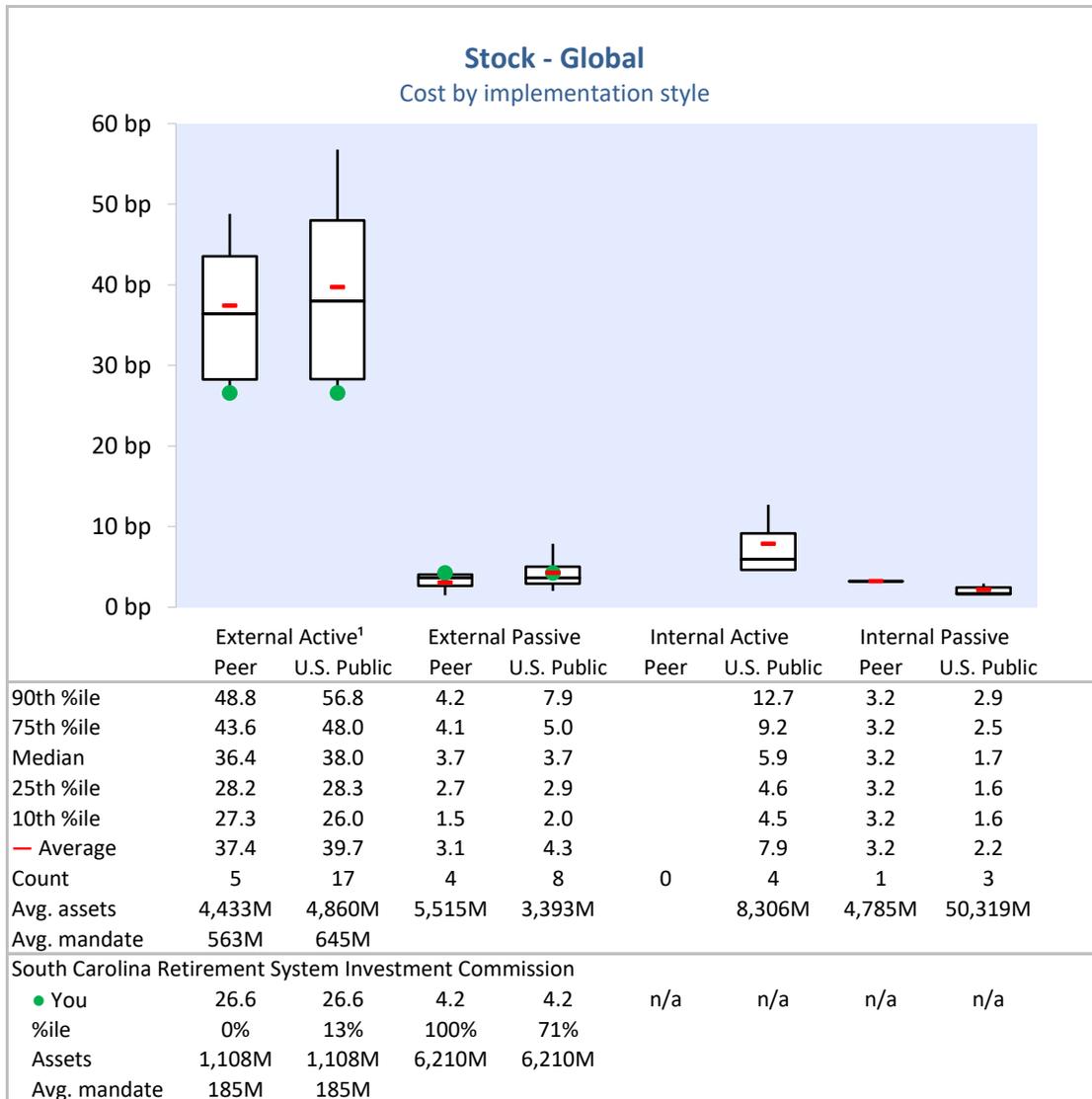
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 7.6 bps for peers (1 fund) and 25.2 bps for U.S. Public participants (7 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	28.4	43.4	49.4
Performance fees*	0.0	6.3	6.5
Internal and other	2.6	0.9	0.8
Total	31.0	50.6	56.8

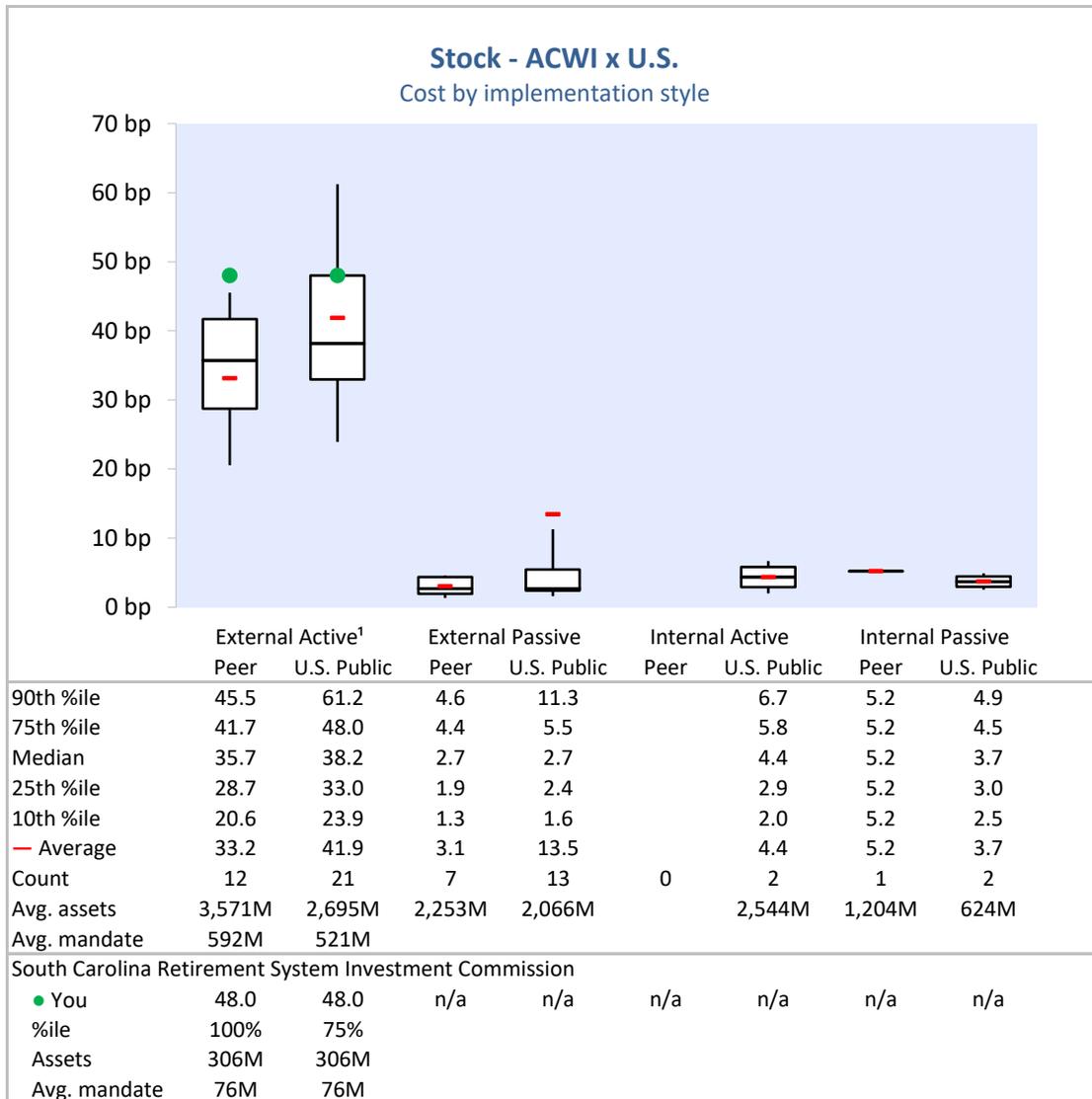
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 18.8 bps for peers (3 funds) and 30.8 bps for U.S. Public participants (7 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	24.0	34.3	37.5
Performance fees*	0.0	1.7	1.6
Internal and other	2.6	1.5	0.7
Total	26.6	37.4	39.7

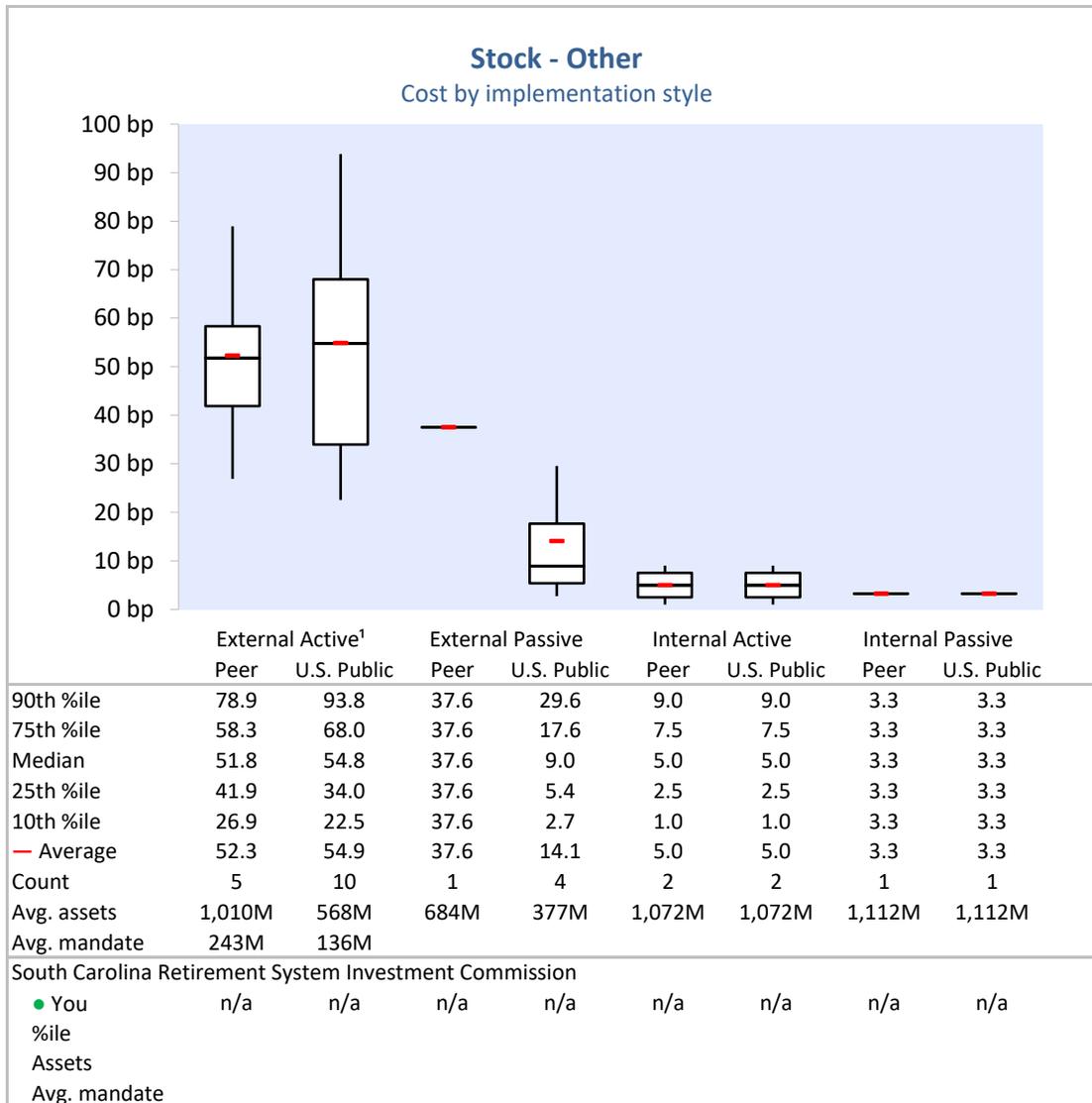
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 4.1 bps for peers (2 funds) and 5.3 bps for U.S. Public participants (5 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	45.4	30.6	41.1
Performance fees*	0.0	2.3	0.3
Internal and other	2.6	0.4	0.5
Total	48.0	33.2	41.9

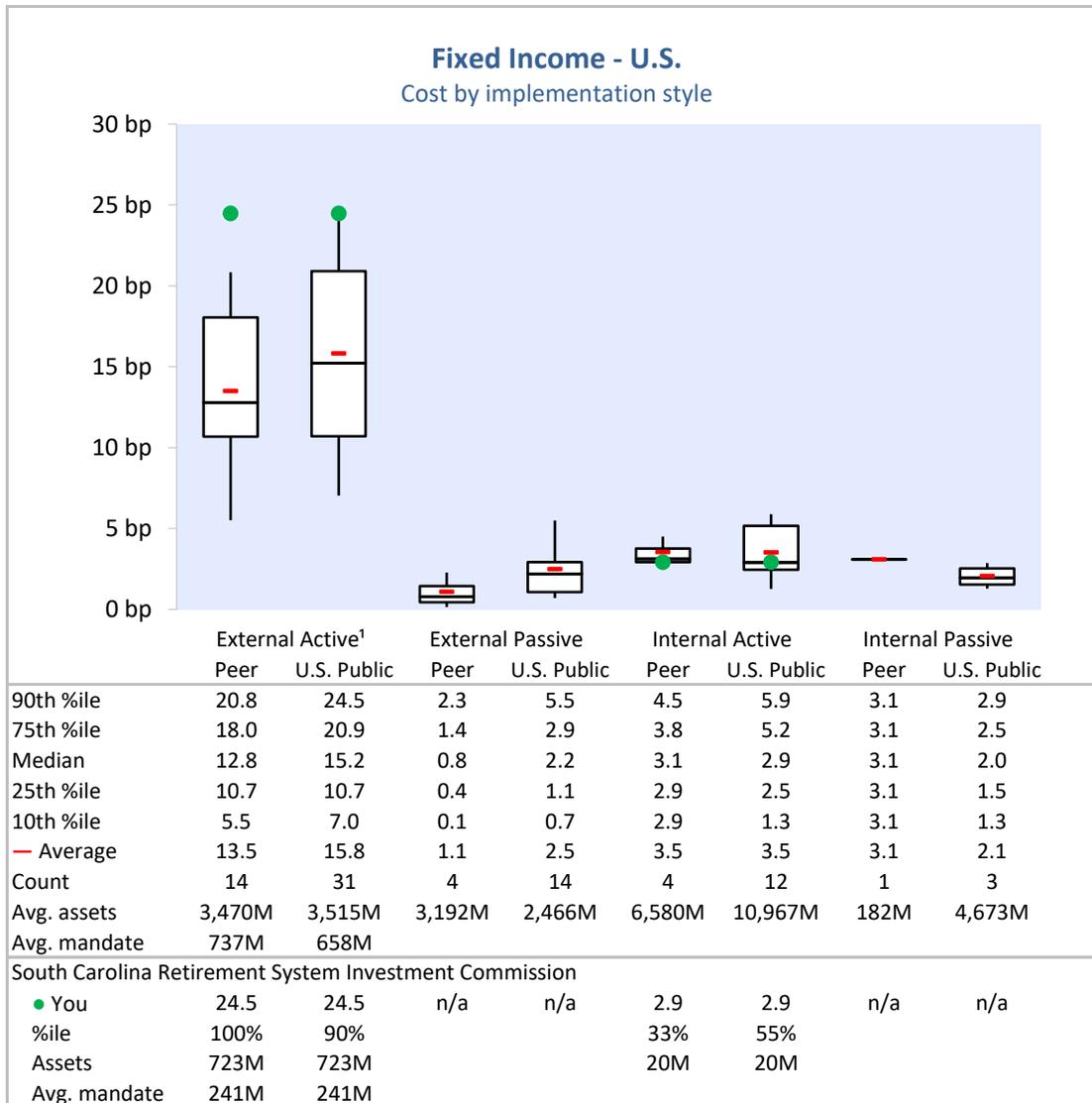
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 6.8 bps for peers (4 funds) and 2.4 bps for U.S. Public participants (3 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	52.3	54.7
Performance fees*	n/a	n/a	0.0
Internal and other	<u>n/a</u>	<u>0.0</u>	<u>0.3</u>
Total	n/a	52.3	54.9

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

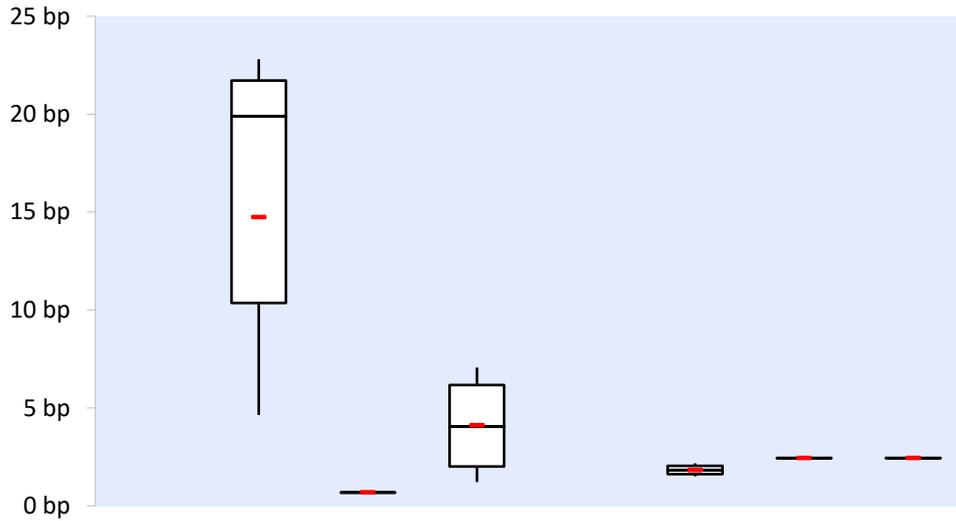


#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	21.8	12.9	14.8
Performance fees*	0.0	0.1	0.6
Internal and other	2.6	0.5	0.4
Total	24.5	13.5	15.8

\* 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 0.3 bps for peers (4 funds) and 3.1 bps for U.S. Public participants (6 funds).

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



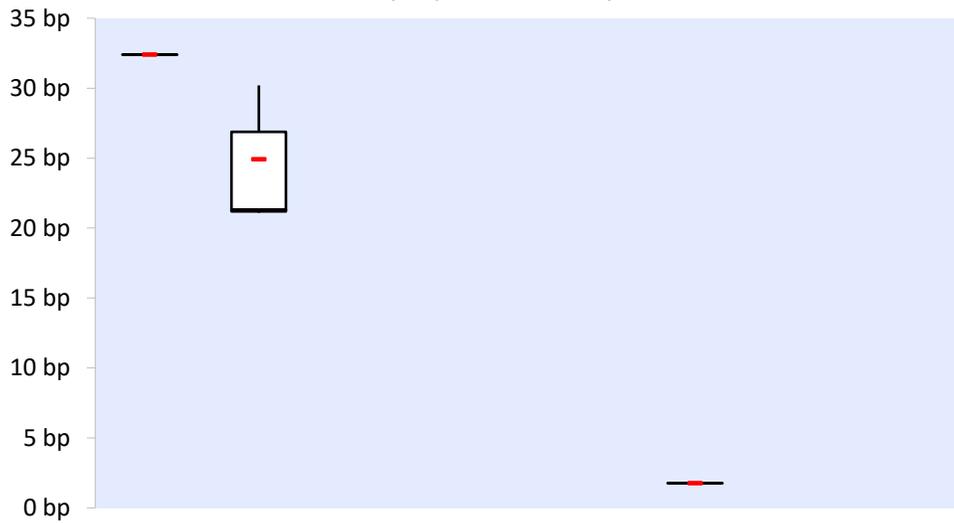
	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile		22.8	0.7	7.1		2.2	2.5	2.5
75th %ile		21.7	0.7	6.2		2.0	2.5	2.5
Median		19.9	0.7	4.1		1.8	2.5	2.5
25th %ile		10.4	0.7	2.0		1.6	2.5	2.5
10th %ile		4.6	0.7	1.2		1.5	2.5	2.5
— Average		14.8	0.7	4.1		1.8	2.5	2.5
Count	0	3	1	4	0	2	1	1
Avg. assets		13,962M	12,937M	3,420M		20,585M	5,622M	5,622M
Avg. mandate		198M						
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	14.8
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	14.8

No funds reported a performance fee.

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

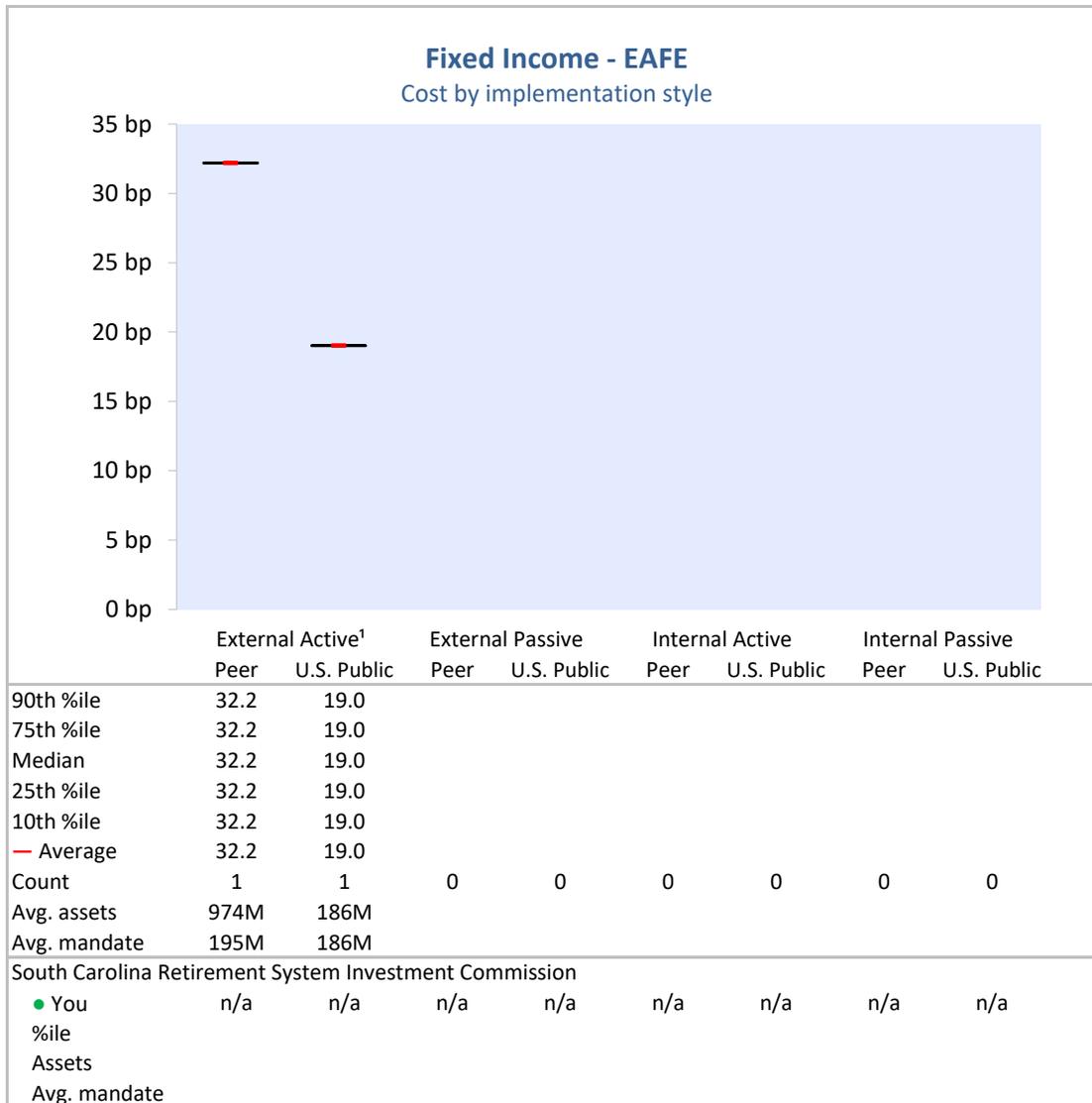


	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	32.4	30.2				1.8		
75th %ile	32.4	26.9				1.8		
Median	32.4	21.3				1.8		
25th %ile	32.4	21.2				1.8		
10th %ile	32.4	21.1				1.8		
— Average	32.4	24.9				1.8		
Count	1	3	0	0	0	1	0	0
Avg. assets	926M	631M				25,215M		
Avg. mandate	154M	243M						
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	32.4	24.9
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	32.4	24.9

No funds reported a performance fee.

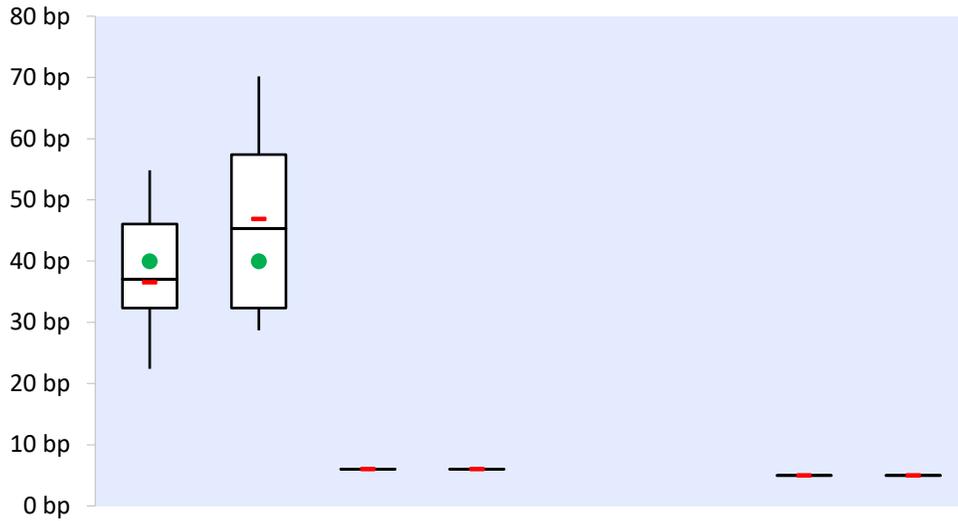


#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	30.6	19.0
Performance fees*	n/a	1.6	n/a
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
Total	n/a	32.2	19.0

\* 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 1.6 bps for peers (1 fund).

### Fixed Income - Emerging Cost by implementation style

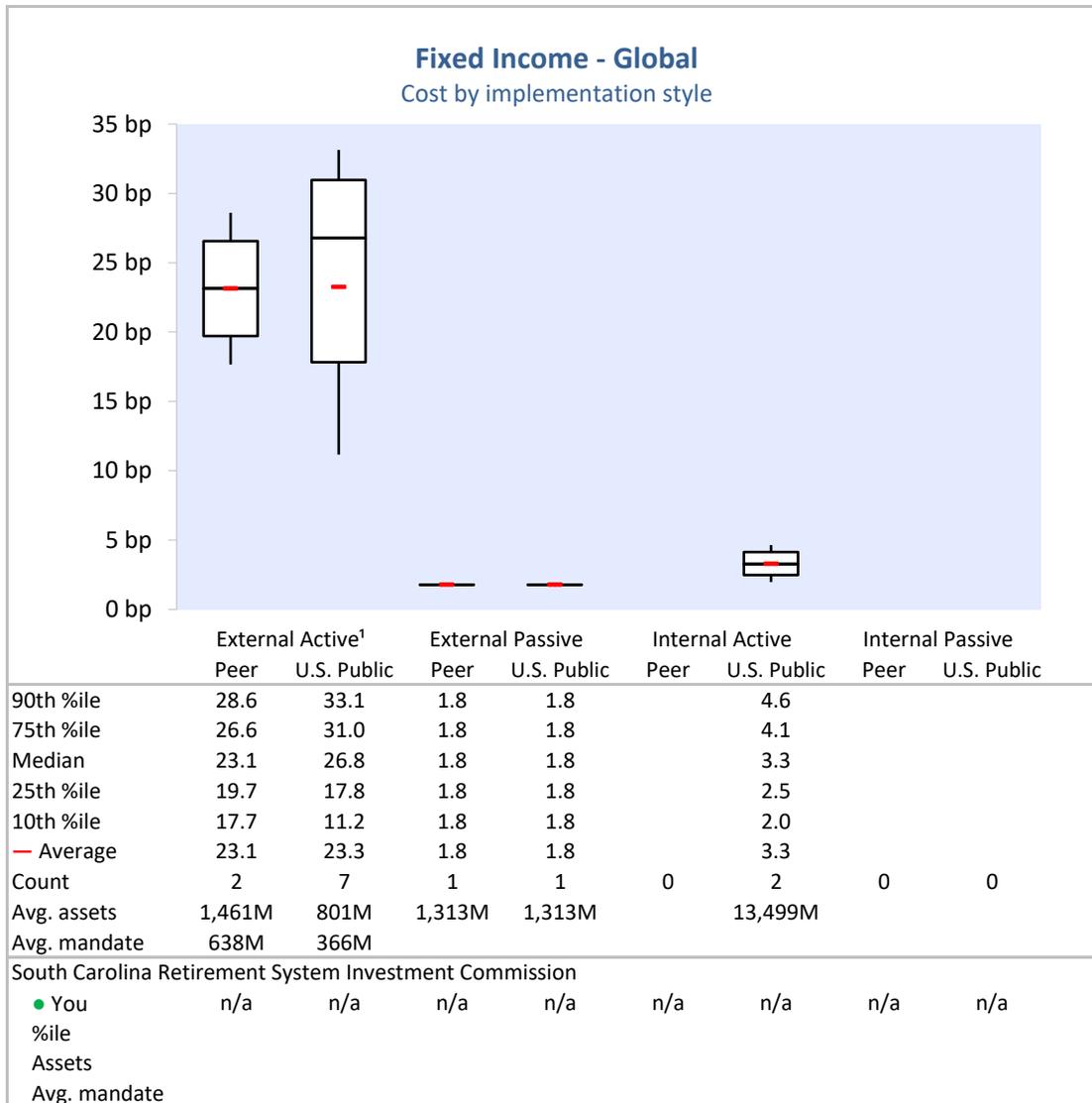


	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	54.8	70.2	6.0	6.0			5.0	5.0
75th %ile	46.0	57.4	6.0	6.0			5.0	5.0
Median	37.1	45.3	6.0	6.0			5.0	5.0
25th %ile	32.3	32.3	6.0	6.0			5.0	5.0
10th %ile	22.4	28.7	6.0	6.0			5.0	5.0
— Average	36.6	46.9	6.0	6.0			5.0	5.0
Count	8	20	1	1	0	0	1	1
Avg. assets	523M	1,029M	448M	448M			445M	445M
Avg. mandate	243M	288M						
South Carolina Retirement System Investment Commission								
● You	40.0	40.0	n/a	n/a	n/a	n/a	n/a	n/a
%ile	57%	42%						
Assets	908M	908M						
Avg. mandate	227M	227M						

#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	37.3	35.3	45.9
Performance fees*	0.0	0.5	0.4
Internal and other	2.6	0.7	0.6
Total	40.0	36.6	46.9

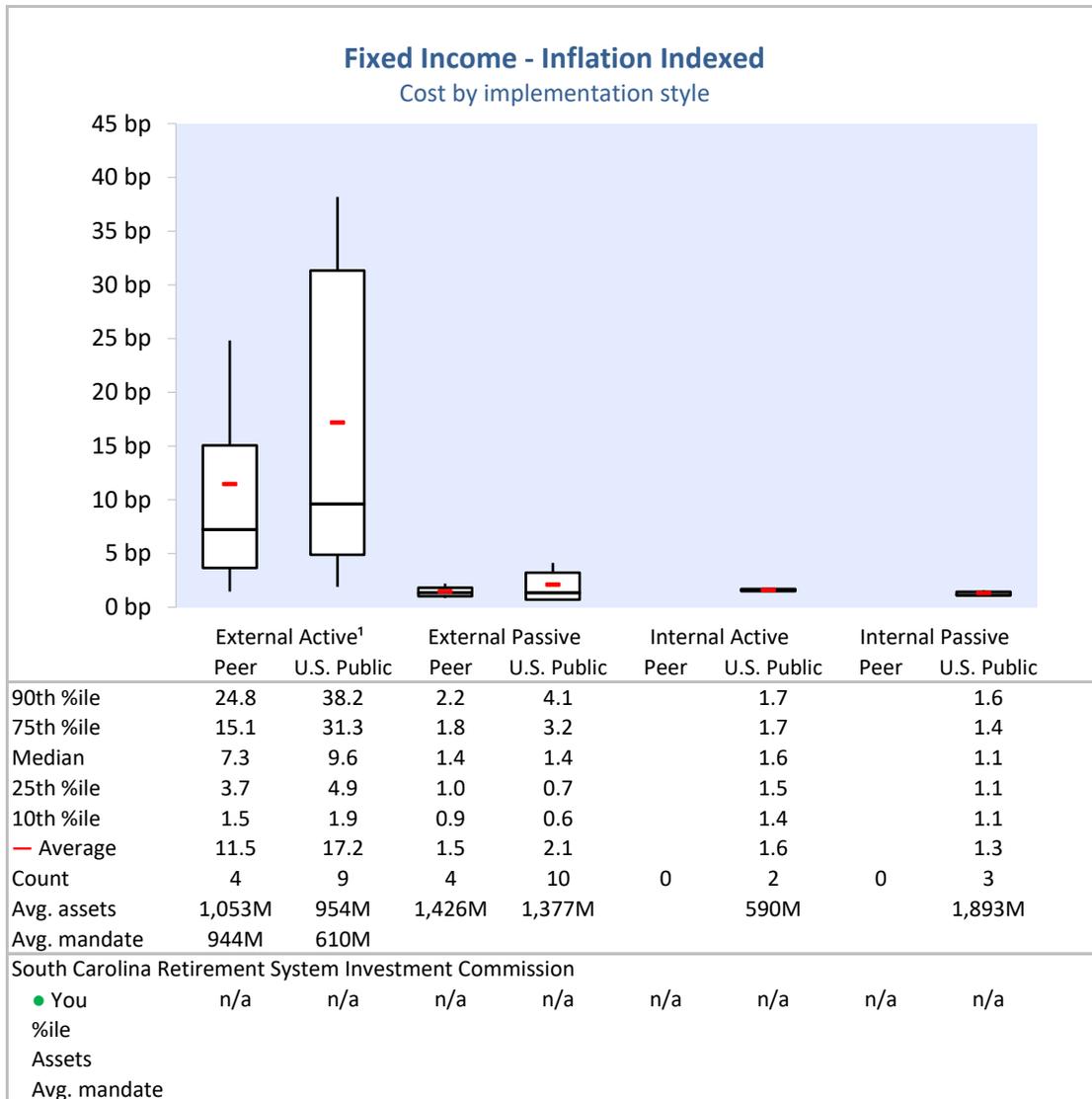
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 1.4 bps for peers (3 funds) and 1.8 bps for U.S. Public participants (4 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	22.9	20.9
Performance fees*	n/a	n/a	2.0
Internal and other	<u>n/a</u>	<u>0.2</u>	<u>0.3</u>
Total	n/a	23.1	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 14.2 bps for U.S. Public participants (1 fund).

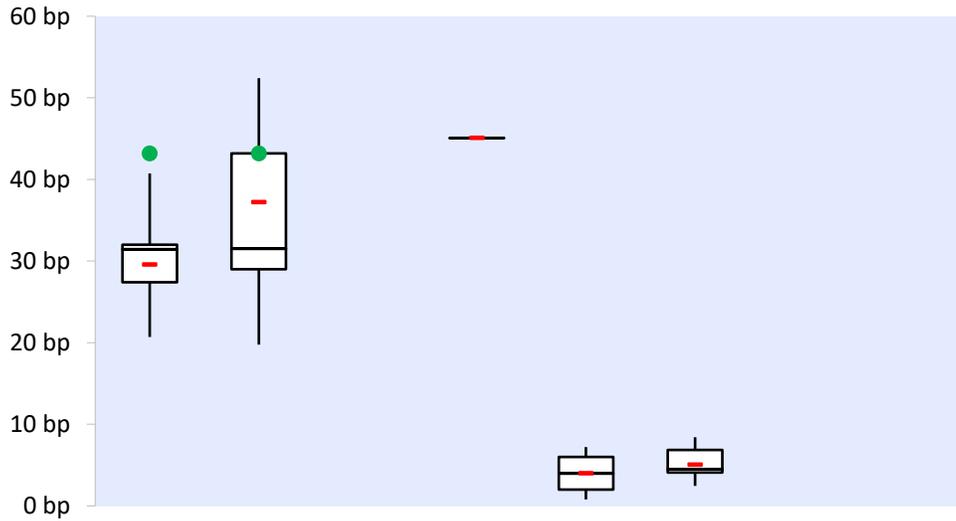


#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	11.3	17.0
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>0.2</u>	<u>0.2</u>
Total	n/a	11.5	17.2

No funds reported a performance fee.

### Fixed Income - High Yield Cost by implementation style



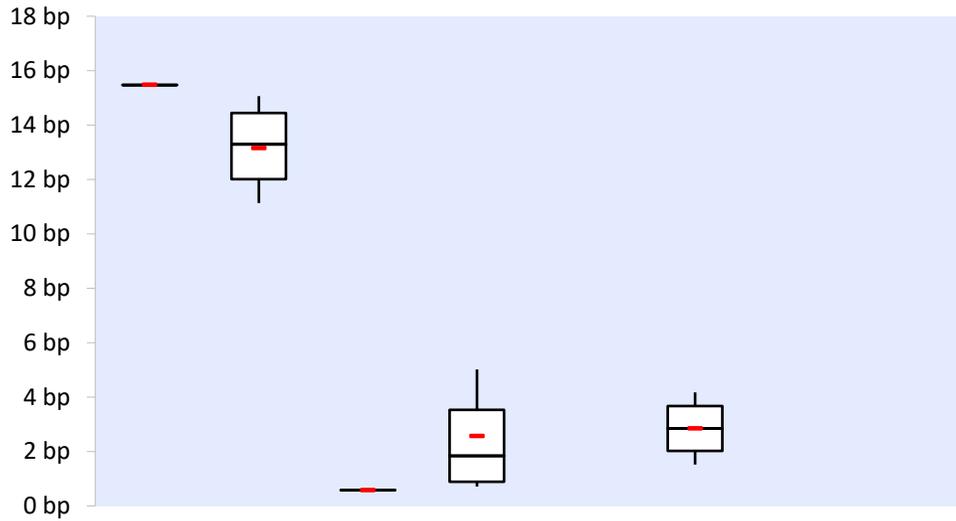
	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	40.7	52.4		45.1	7.2	8.4		
75th %ile	32.0	43.2		45.1	6.0	6.8		
Median	31.5	31.5		45.1	4.0	4.5		
25th %ile	27.4	29.0		45.1	2.0	4.1		
10th %ile	20.7	19.7		45.1	0.8	2.5		
— Average	29.6	37.2		45.1	4.0	5.1		
Count	9	25	0	1	2	7	0	0
Avg. assets	1,225M	1,409M		80M	185M	2,172M		
Avg. mandate	369M	300M						
South Carolina Retirement System Investment Commission								
● You	43.2	43.2	n/a	n/a	n/a	n/a	n/a	n/a
%ile	100%	75%						
Assets	1,381M	1,381M						
Avg. mandate	276M	276M						

#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	40.6	29.1	33.4
Performance fees*	0.0	0.0	2.9
Internal and other	2.6	0.5	0.9
Total	43.2	29.6	37.2

\* 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 (2 funds) and 14.6 bps for U.S. Public participants (5 funds).

### Fixed Income - Long Bonds Cost by implementation style

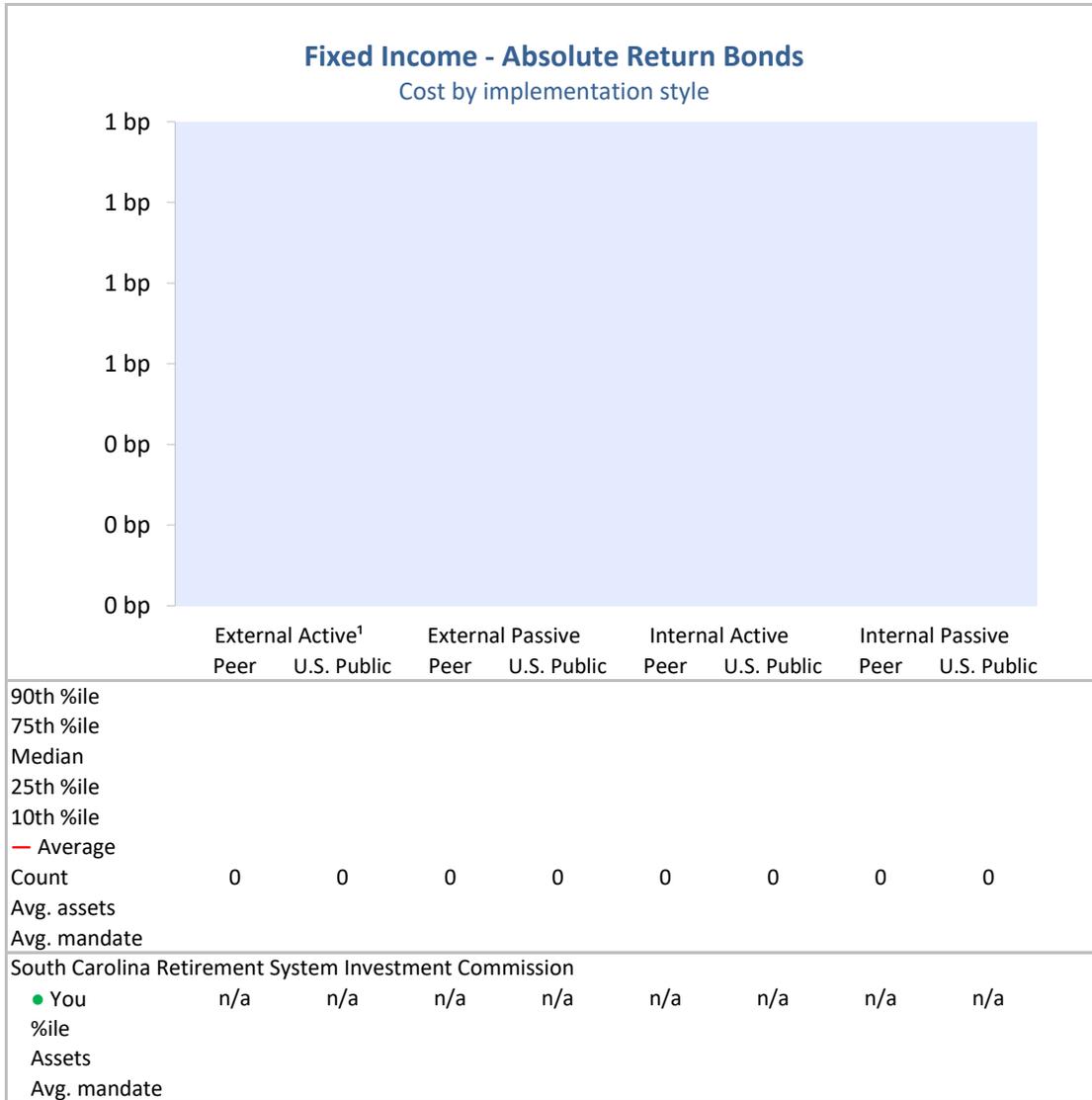


	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	15.5	15.1	0.6	5.0		4.2		
75th %ile	15.5	14.4	0.6	3.5		3.7		
Median	15.5	13.3	0.6	1.8		2.8		
25th %ile	15.5	12.0	0.6	0.9		2.0		
10th %ile	15.5	11.1	0.6	0.7		1.5		
— Average	15.5	13.2	0.6	2.6		2.8		
Count	1	4	1	4	0	2	0	0
Avg. assets	3,192M	8,319M	494M	256M		15,420M		
Avg. mandate	1,596M	1,551M						
South Carolina Retirement System Investment Commission								
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile								
Assets								
Avg. mandate								

#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	15.0	12.5
Performance fees*	n/a	n/a	0.5
Internal and other	<u>n/a</u>	<u>0.4</u>	<u>0.2</u>
Total	n/a	15.5	13.2

\* 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 1.8 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



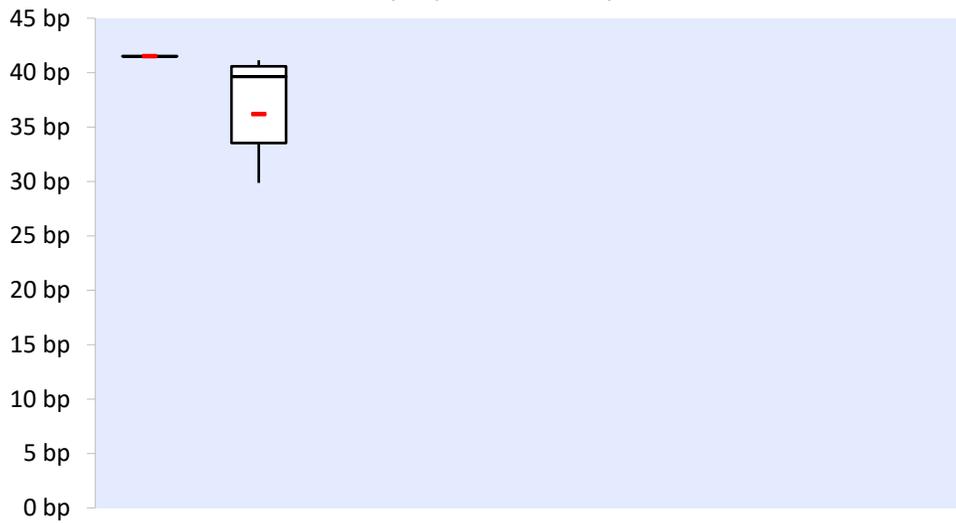
	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile		5.2						
75th %ile		5.2						
Median		5.2						
25th %ile		5.2						
10th %ile		5.2						
— Average		5.2						
Count	0	1	0	0	0	0	0	0
Avg. assets		16,743M						
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	5.2
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	5.2

No funds reported a performance fee.

### Fixed Income - Convertibles Cost by implementation style

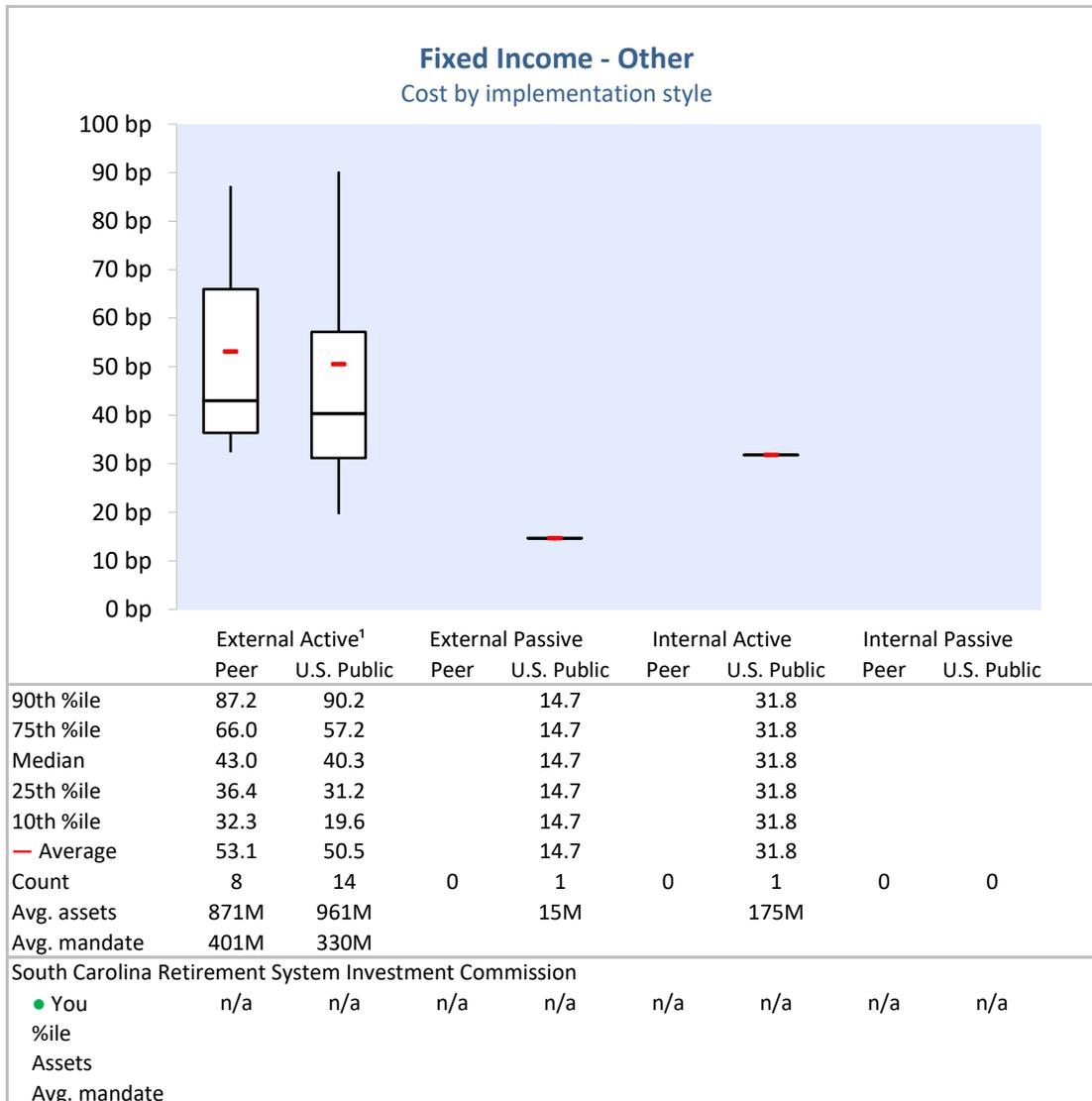


	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	41.5	41.1						
75th %ile	41.5	40.6						
Median	41.5	39.6						
25th %ile	41.5	33.5						
10th %ile	41.5	29.9						
— Average	41.5	36.2						
Count	1	3	0	0	0	0	0	0
Avg. assets	636M	889M						
Avg. mandate	636M	337M						
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	40.4	35.8
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>1.1</u>	<u>0.4</u>
Total	n/a	41.5	36.2

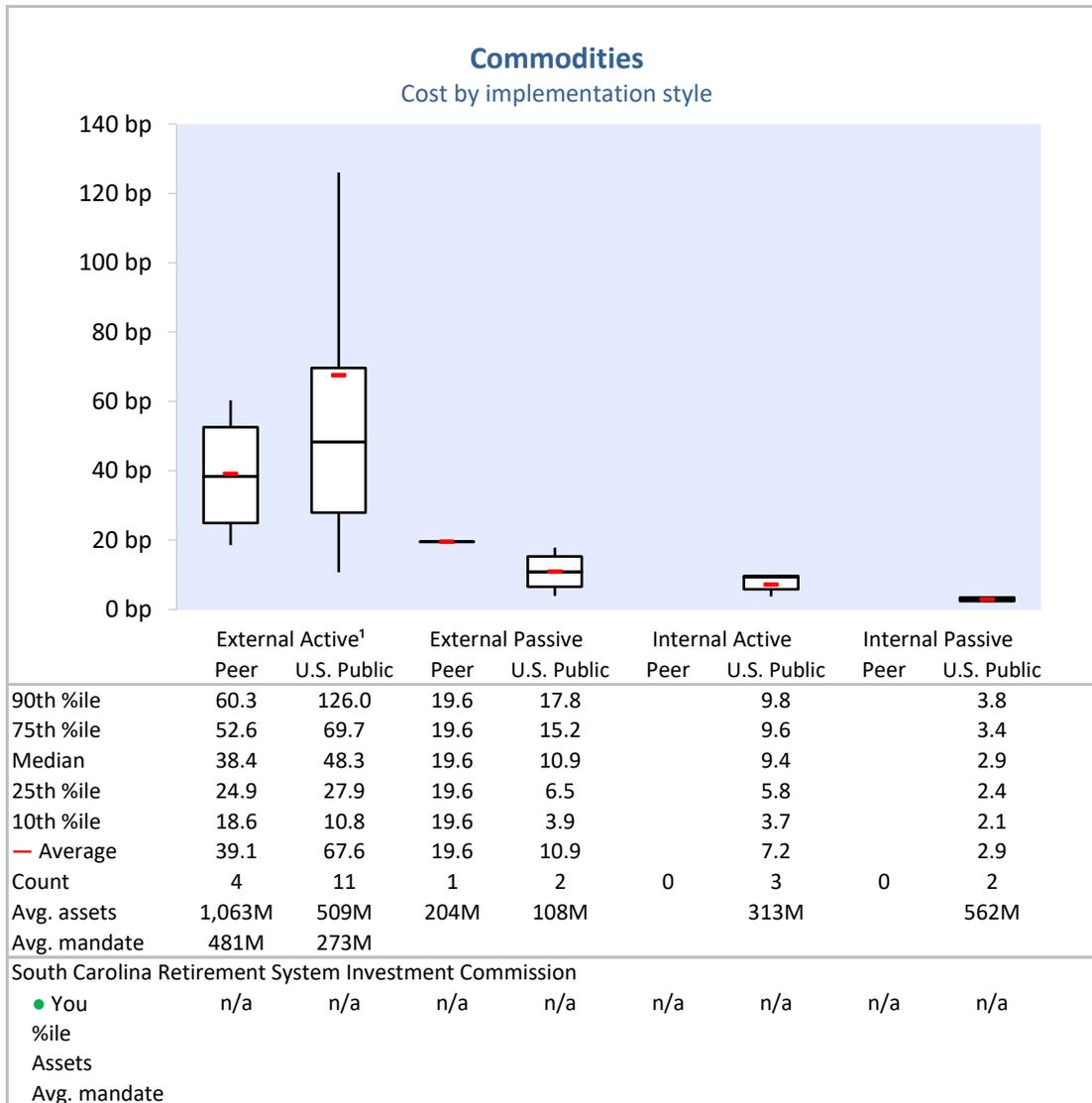
No funds reported a performance fee.



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	49.9	44.1
Performance fees*	n/a	2.3	5.9
Internal and other	<u>n/a</u>	<u>0.9</u>	<u>0.6</u>
Total	n/a	53.1	50.5

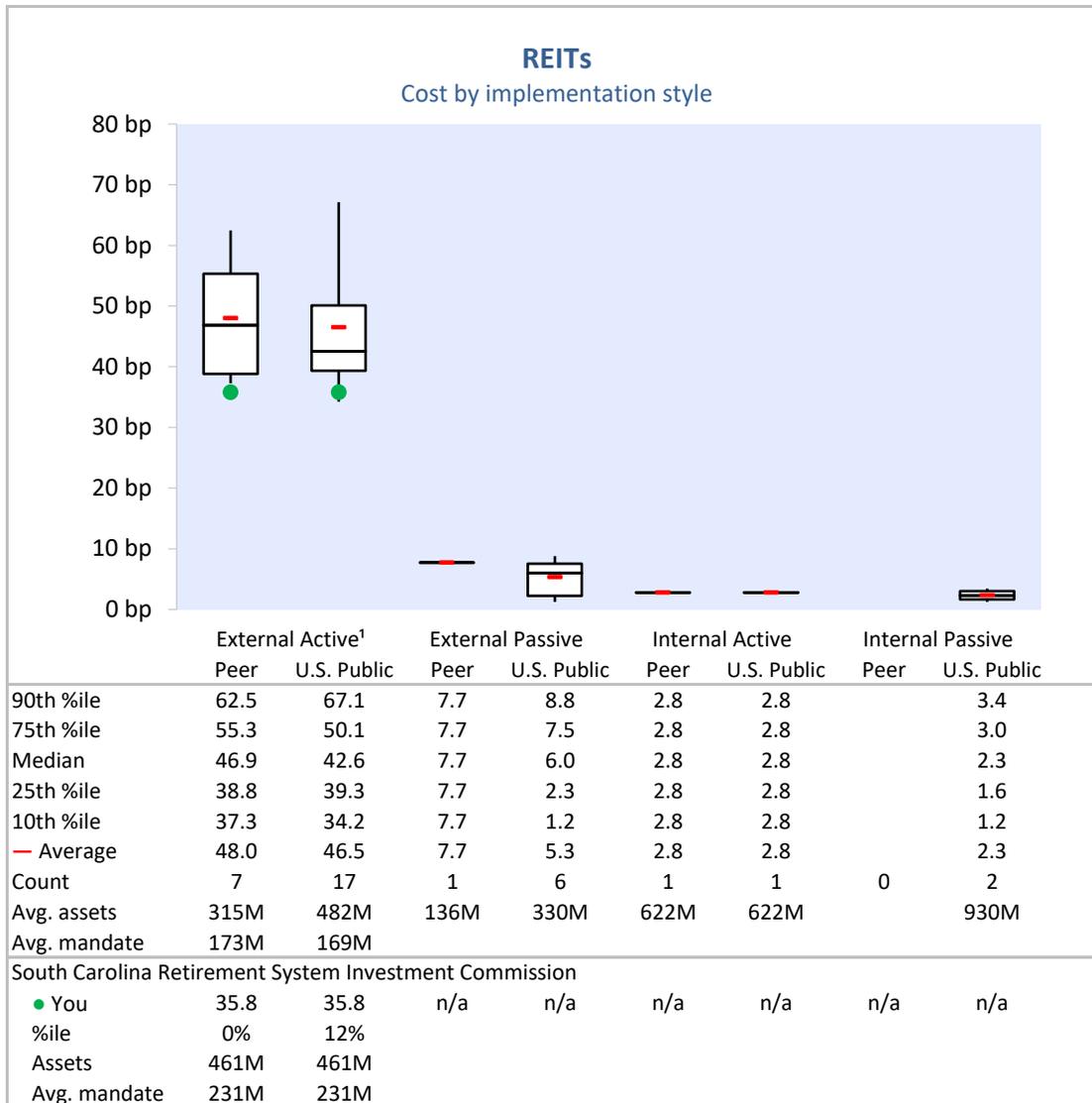
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 18.4 bps for peers (1 fund) and 41.0 bps for U.S. Public participants (2 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	29.3	62.8
Performance fees*	n/a	9.6	3.5
Internal and other	<u>n/a</u>	<u>0.3</u>	<u>1.2</u>
Total	n/a	39.1	67.6

\* 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 38.2 bps for peers (1 fund) and 9.7 bps for U.S. Public participants (4 funds).



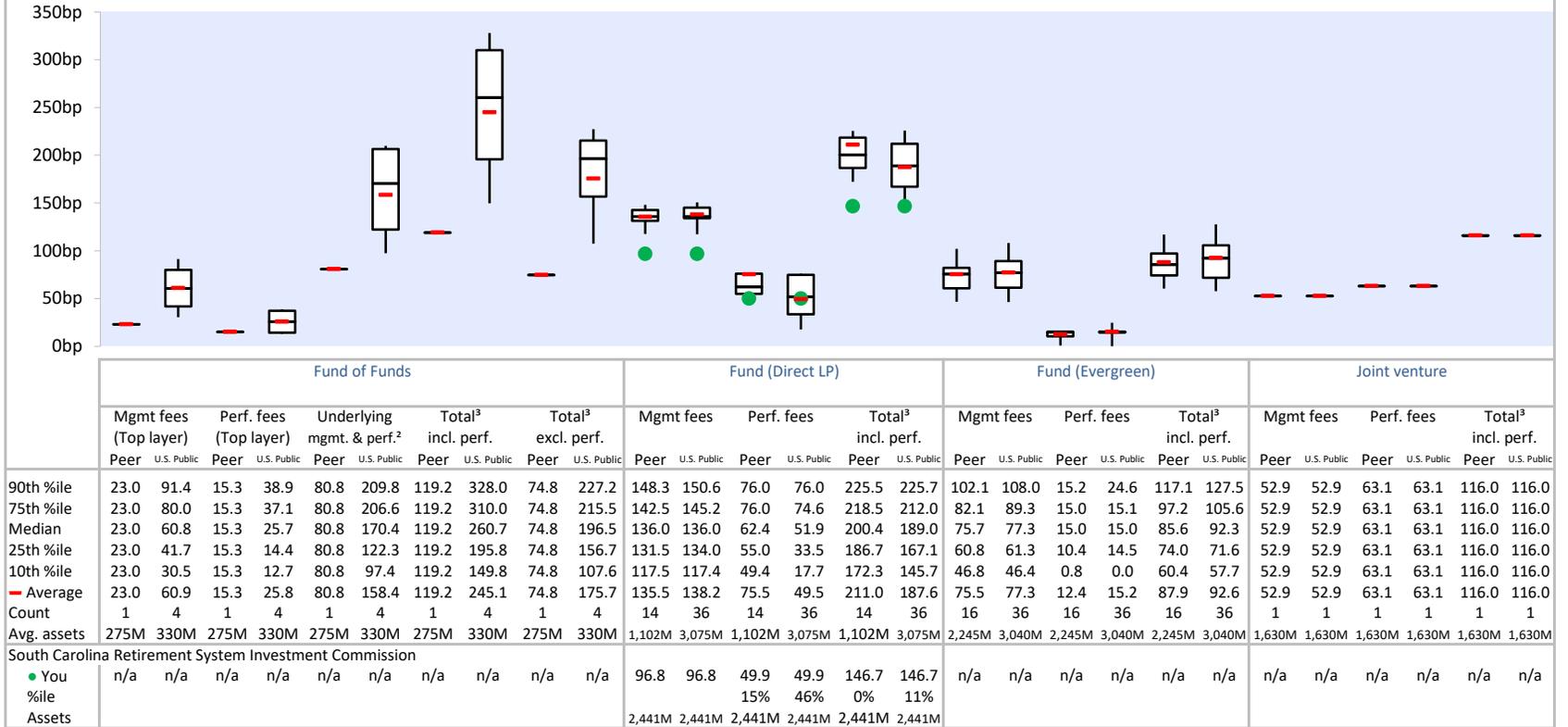
1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	33.2	37.4	40.2
Performance fees*	0.0	9.8	5.5
Internal and other	2.6	0.9	0.8
Total	35.8	48.0	46.5

\* 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 22.8 bps for peers (3 funds) and 13.4 bps for U.S. Public participants (7 funds).

## Real Estate ex-REITs

Cost as a % of the amount fees are based on<sup>1</sup>



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

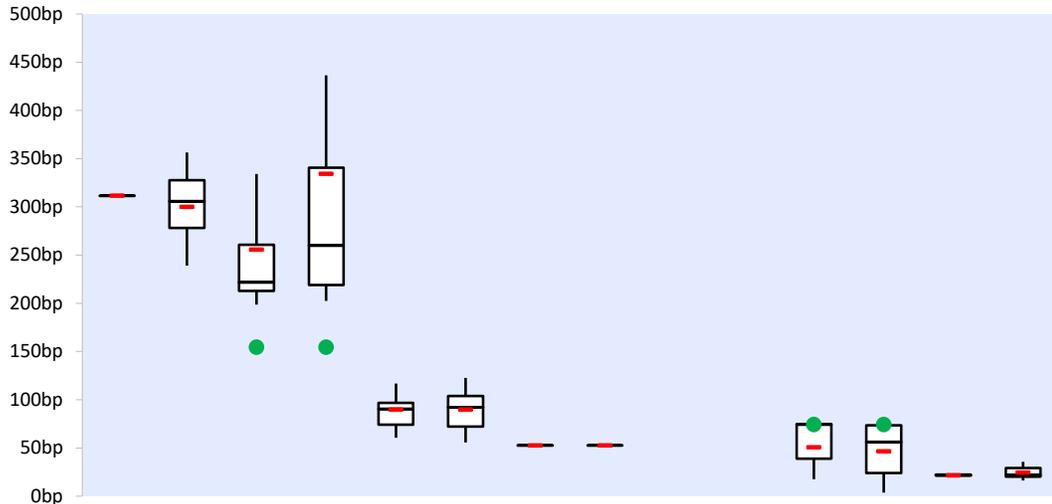
2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 52 bps (on amount fees are based on) for underlying management fees and 29 bps (on NAV) for underlying performance fees were used.

3. The total cost also includes the internal cost of monitoring and selecting real estate investments. Your cost of monitoring and selecting was 2.5 bps for LPs. The peer average cost of monitoring and selecting was 3.9 bps for LPs and 1.8 bps for external (not LPs).

LP base fee is the weighted average management fee of 94 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 106 bps (25.8 million).

## Real Estate ex-REITs - contd.

### Cost as a % of NAV



	Fund of Funds		Fund (Direct LP)		Fund (Evergreen)		Joint venture		Oper. Sub.		Co-Inv.		Internal	
	Total <sup>1</sup> incl. perf.		Total <sup>1</sup> incl. perf.		Total <sup>1</sup> incl. perf.		Total <sup>1</sup> incl. perf.		Total <sup>1</sup> incl. perf.		Total <sup>1</sup> incl. perf.		Total	
	Peer	U.S. Public	Peer	U.S. Public										
90th %ile	311.6	356.5	334.0	436.4	116.7	122.6	52.9	52.9			74.9	74.6	22.6	35.5
75th %ile	311.6	327.7	260.5	340.6	96.7	103.8	52.9	52.9			74.7	73.4	22.4	29.1
Median	311.6	305.8	221.7	260.2	90.7	92.3	52.9	52.9			74.4	56.5	21.9	21.9
25th %ile	311.6	278.2	212.9	218.9	74.0	72.0	52.9	52.9			38.9	24.0	21.4	20.2
10th %ile	311.6	239.1	198.6	202.4	60.4	55.7	52.9	52.9			17.7	3.7	21.1	16.2
— Average	311.6	300.1	255.8	334.6	89.9	89.9	52.9	52.9			51.0	46.7	21.9	24.5
Count	1	4	14	36	16	36	1	1	0	0	3	8	2	6
Avg. assets	105M	280M	968M	2,191M	2,213M	3,118M	1,630M	1,630M			105M	1,860M	218M	2,781M
South Carolina Retirement System Investment Commission														
● You	n/a	n/a	154.8	154.8	n/a	n/a	n/a	n/a	n/a	n/a	74.4	74.4	n/a	n/a
%ile			0%	6%							50%	86%		
Assets			2,314M	2,314M							21M	21M		

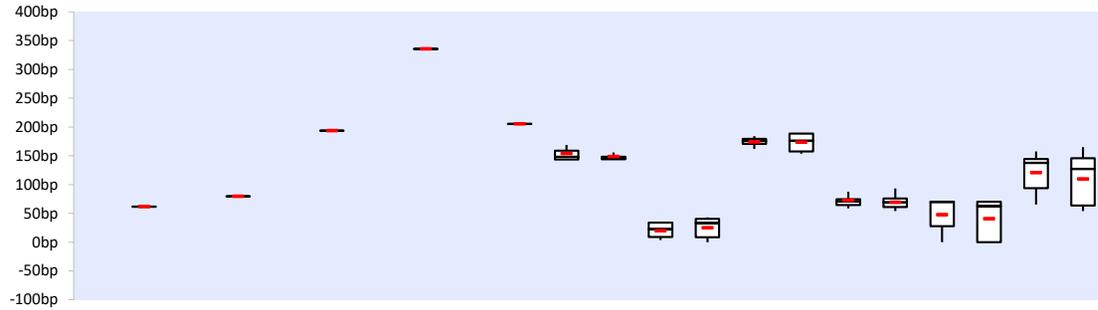
1. The total cost also includes the internal cost of monitoring and selecting real estate investments.
2. Co-investment is included with direct LPs because it can only be done alongside direct LPs. Co-investment is done by 3 of your peers and 8 of the U.S. Public funds.
3. The total cost also includes the internal cost of monitoring and selecting real estate investments. Internal and other - FoFs The peer average cost of monitoring and selecting was 3.9 bps for LPs and 1.8 bps for external (not LPs).

LP base fee is the weighted average management fee of 94 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 106 bps (25.8 million).

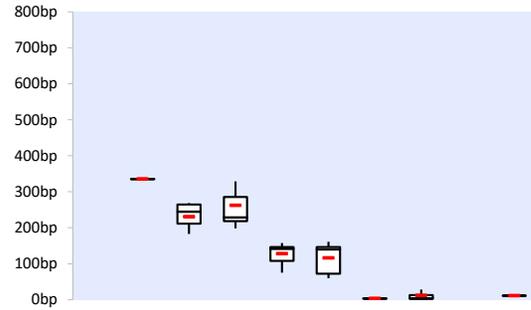


## Natural Resources

Cost as a % of the amount fees are based on<sup>1</sup>

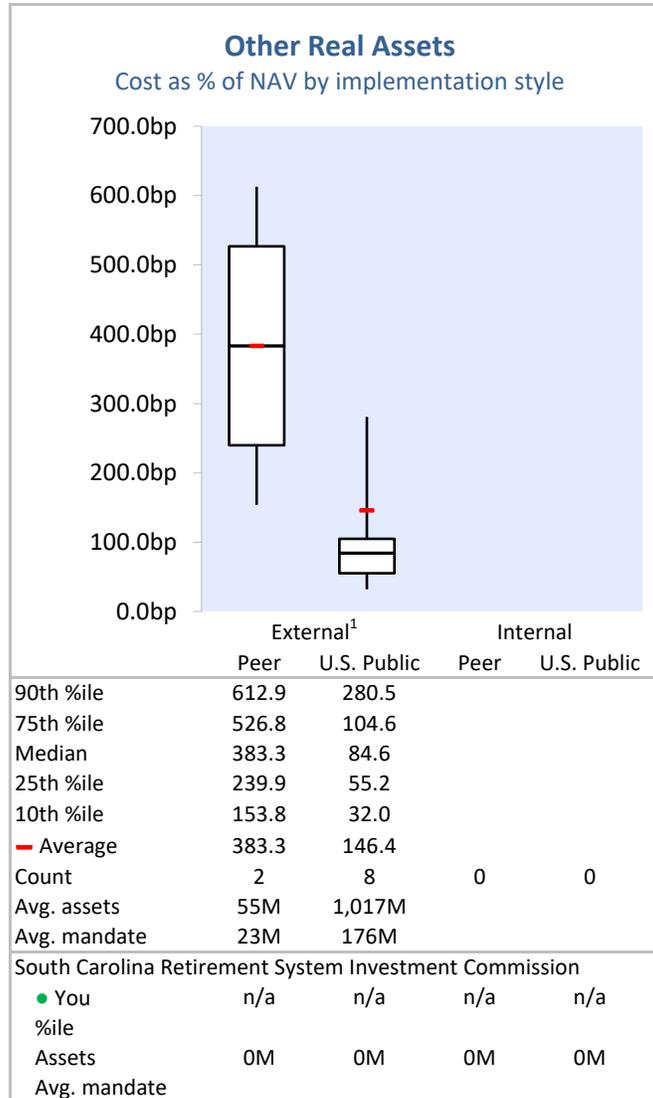


Cost as a % of NAV



	Fund of Funds						Fund (Direct LP)						Fund (Evergreen)						Fund of Funds		Fund (Direct LP)		Fund (Evergreen)		Co-Inv.		Internal					
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. <sup>2</sup>		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> 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	61.7	80.0	194.0	335.7	205.7	168.7	155.8	34.3	43.3	184.4	189.7	87.5	93.2	70.0	70.2	157.5	165.0	335.7	268.5	329.0	157.5	161.0	3.7	28.1	3.7	28.1	3.7	28.1	3.7	28.1	3.7	28.1
75th %ile	61.7	80.0	194.0	335.7	205.7	158.7	148.3	33.8	40.7	179.3	188.4	74.7	75.7	70.0	70.0	144.7	145.7	335.7	264.9	285.5	146.4	146.6	3.7	12.9	3.7	12.9	3.7	12.9	3.7	12.9	3.7	12.9
Median	61.7	80.0	194.0	335.7	205.7	148.6	145.8	22.8	33.6	176.0	176.5	71.1	69.5	70.0	62.9	137.9	127.2	335.7	245.3	228.8	142.6	140.3	3.7	4.1	3.7	4.1	3.7	4.1	3.7	4.1	3.7	4.1
25th %ile	61.7	80.0	194.0	335.7	205.7	143.7	144.0	9.1	8.4	170.7	157.3	64.3	60.9	27.9	0.0	93.8	63.8	335.7	211.6	218.7	108.3	72.5	3.7	3.2	3.7	3.2	3.7	3.2	3.7	3.2	3.7	3.2
10th %ile	61.7	80.0	194.0	335.7	205.7	143.2	144.0	3.7	0.1	161.9	153.4	59.0	53.8	0.0	0.0	65.2	53.8	335.7	182.5	198.0	75.4	59.7	3.7	2.4	3.7	2.4	3.7	2.4	3.7	2.4	3.7	2.4
Average	61.7	80.0	194.0	335.7	205.7	153.9	148.8	20.1	25.1	174.0	173.9	72.7	69.3	48.0	40.8	120.7	110.1	335.7	231.2	262.5	128.0	116.2	3.7	12.0	3.7	12.0	3.7	12.0	3.7	12.0	3.7	12.0
Count	0	1	0	1	0	1	0	1	0	1	4	15	4	15	4	15	7	10	7	10	7	10	0	1	0	1	0	1	0	1	0	1
Avg. assets	38M		38M		38M		38M		38M		1,423M	1,577M	1,423M	1,577M	1,423M	1,577M	362M	345M	362M	345M	362M	345M	38M	38M	1,039M	1,074M	339M	322M	104M	889M	0M	0M
South Carolina Retirement System Investment Commission	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
● You %ile Assets	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of n/a bps (on amount fees are based on) for underlying management fees and n/a bps (on NAV) for underlying performance fees were used.
3. The total cost also includes the internal cost of monitoring and selecting natural resource investments. The peer average cost of monitoring and selecting was 13.5 bps for LPs and 3.9 bps for external (not LPs).



#### 1. Breakdown of external fees

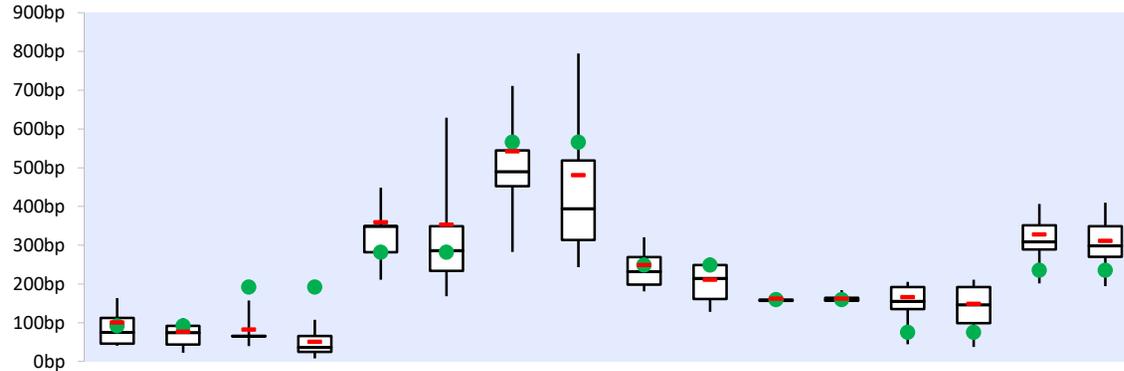
	Your Plan	Peer Average	U.S. Public Average
Base fees	n/a	383.3	145.6
Internal and other	n/a	0.0	2.0
Total*	n/a	383.3	146.4
Performance fees**	n/a	175.3	96.3

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

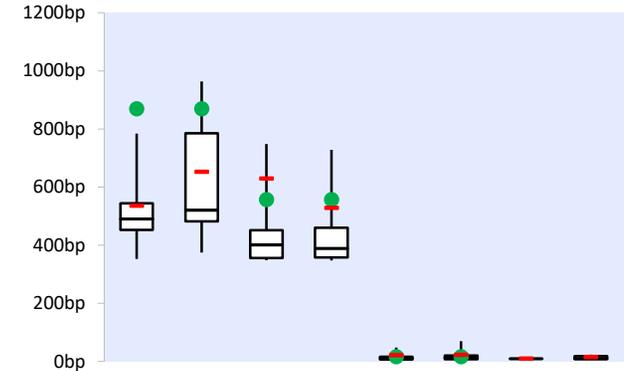
\*\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for only those funds that reported a performance fee is 175.3 bps for peers (2 funds) and 96.3 bps for Global participants (8 funds).

## Diversified Private Equity

Cost as a % of the amount fees are based on<sup>1</sup>



Cost as a % of NAV

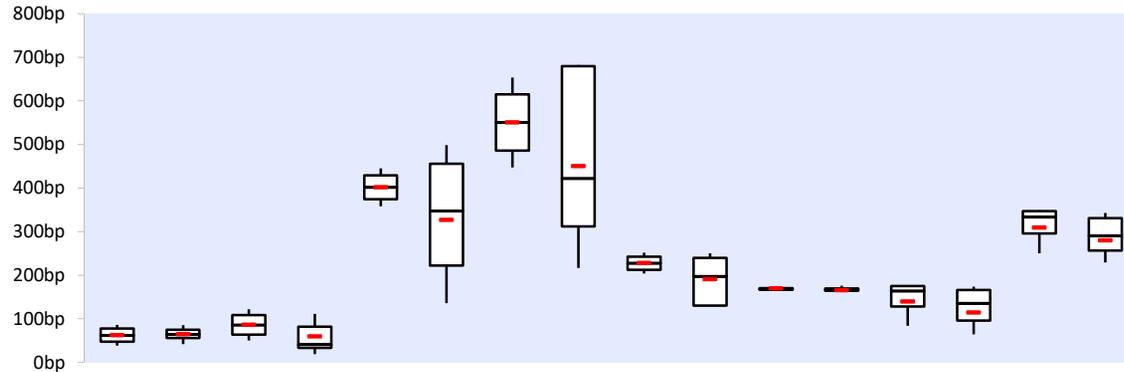


	Fund of Funds										Direct LP						Fund of Funds		Direct LP		Co-Investment		Internal	
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. <sup>2</sup>		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> incl. perf.		Total incl. perf.		Total			
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public		
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public		
90th %ile	163.3	111.8	157.0	107.2	448.4	628.7	711.4	794.8	320.3	268.8	173.2	184.2	205.4	210.7	406.8	409.4	784.2	963.5	748.0	728.6	47.5	69.5	9.8	23.3
75th %ile	111.9	91.5	66.0	66.0	349.0	349.0	544.6	518.7	268.9	248.5	159.8	164.7	192.0	192.0	351.0	349.0	544.6	785.1	451.3	460.1	15.8	20.2	9.8	18.3
Median	75.0	74.0	66.0	36.3	349.0	286.4	490.0	394.7	232.0	214.4	157.0	158.0	155.8	146.5	308.5	298.1	490.0	520.5	400.7	389.3	11.2	12.7	9.8	9.8
25th %ile	45.7	43.6	66.0	24.7	282.1	233.5	452.7	313.4	198.6	161.4	157.0	157.0	135.5	98.5	289.0	269.7	452.7	482.2	355.5	358.0	6.8	7.8	9.8	8.8
10th %ile	40.8	22.4	40.1	7.9	211.1	168.4	283.0	243.6	180.6	128.1	149.0	145.4	44.7	37.7	201.1	194.1	353.2	375.2	349.0	347.6	4.7	3.6	9.8	8.1
Average	100.7	76.8	82.2	51.0	359.0	353.2	541.9	481.0	249.0	211.2	161.7	162.1	165.8	148.9	327.5	311.0	535.7	652.2	629.4	528.3	21.1	22.4	9.8	14.7
Count	9	26	9	26	9	26	9	26	9	26	16	34	16	34	16	34	9	26	16	34	6	12	1	3
Avg. assets	1,132M	943M	1,132M	943M	1,132M	943M	1,132M	943M	1,132M	943M	4,752M	5,619M	4,752M	5,619M	4,752M	5,619M	972M	693M	3,795M	4,406M	710M	1,324M	9M	145M
South Carolina Retirement System Investment Commission																								
You	92.1	92.1	192.0	192.0	282.1	282.1	566.2	566.2	249.1	249.1	159.5	159.5	75.6	75.6	235.0	235.0	869.0	869.0	556.7	556.7	16.4	16.4	n/a	n/a
%ile	63%	76%	100%	100%	25%	44%	87%	84%	63%	76%	73%	58%	13%	18%	13%	18%	100%	80%	80%	85%	80%	64%		
Assets	506M	506M	506M	506M	506M	506M	506M	506M	506M	506M	2,480M	2,480M	2,480M	2,480M	2,480M	2,480M	330M	330M	1,047M	1,047M	727M	727M	0M	0M

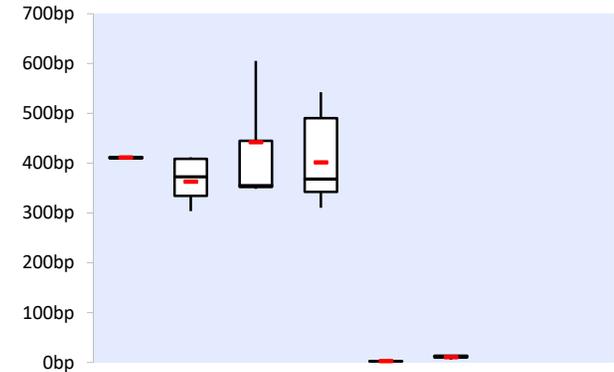
- The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
- The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 157 bps (on amount fees are based on) for underlying management fees and 192 bps (on NAV) for underlying performance fees were used.
- The total cost also includes the internal cost of monitoring and selecting private equity investments. Your cost of monitoring and selecting was 1.7 bps for fund of funds. The peer average cost of monitoring and selecting was 4.0 bps for fund of funds.

## LBO

Cost as a % of the amount fees are based on<sup>1</sup>



Cost as a % of NAV

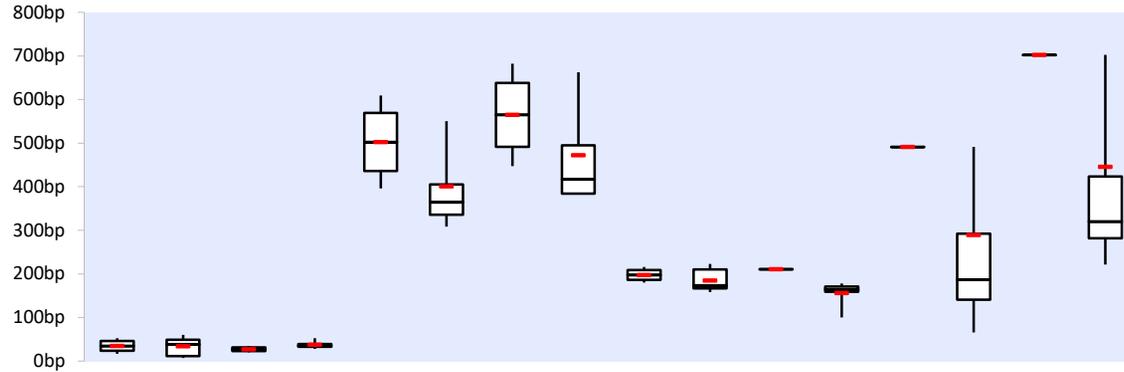


	Fund of Funds										Direct LP						Fund of Funds		Direct LP		Co-Investment		Internal	
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. <sup>2</sup>		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> 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	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	86.5	85.4	122.1	111.4	445.2	498.7	653.9	682.2	251.5	250.4	173.9	176.0	176.2	173.7	349.0	343.1	412.9	411.5	605.2	542.3	2.7	14.7		
75th %ile	77.6	74.9	108.7	81.8	429.0	456.0	615.2	679.7	242.6	239.9	170.7	169.7	175.0	166.0	347.0	331.2	412.2	408.7	444.8	490.3	2.7	13.3		
Median	62.7	64.6	86.2	41.3	401.9	347.7	550.7	421.8	227.7	197.8	168.4	166.3	163.8	135.8	333.4	291.0	411.0	373.3	355.0	368.6	2.7	12.2		
25th %ile	47.7	56.0	63.7	33.4	374.8	222.5	486.3	311.9	212.7	130.6	167.1	165.0	128.5	96.2	295.6	256.6	409.8	334.3	352.2	342.5	2.7	9.6		
10th %ile	38.8	42.1	50.3	19.0	358.5	136.3	447.6	216.5	203.8	129.4	165.8	161.4	84.2	64.5	250.0	229.5	409.1	303.8	348.4	310.6	2.7	5.4		
Average	62.7	64.2	86.2	59.4	401.9	326.4	550.7	450.0	227.7	190.9	169.4	165.4	139.8	114.6	309.2	280.0	411.0	362.6	442.0	401.4	2.7	10.7		
Count	2	5	2	5	2	5	2	5	2	5	4	14	4	14	4	14	2	5	4	14	1	4	0	0
Avg. assets	81M	959M	81M	959M	81M	959M	81M	959M	81M	959M	1,222M	5,181M	1,222M	5,181M	1,222M	5,181M	103M	716M	1,134M	3,728M	162M	1,290M		
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	n/a	n/a
%ile																								
Assets	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M

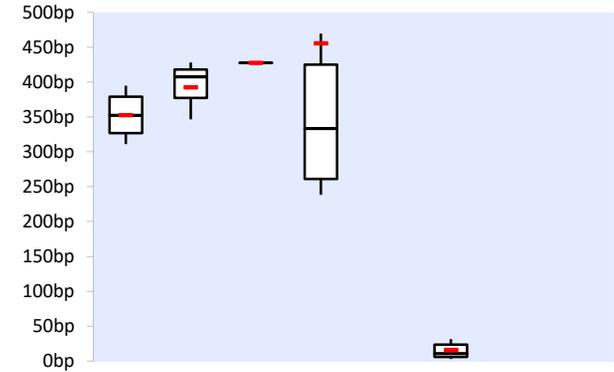
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 165 bps (on amount fees are based on) for underlying management fees and 177 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 6.3 bps for fund of funds.

## Venture Capital

Cost as a % of the amount fees are based on<sup>1</sup>



Cost as a % of NAV



	Fund of Funds										Direct LP					
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. <sup>2</sup>		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> 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	52.6	60.0	34.3	52.4	609.5	550.3	682.2	662.6	215.6	223.0	211.3	177.7	491.2	491.2	702.4	702.4
75th %ile	45.9	49.0	31.6	39.2	569.5	405.4	638.1	495.1	208.9	210.3	211.3	171.0	491.2	292.2	702.4	423.7
Median	34.8	38.1	27.2	35.1	502.8	364.8	564.7	416.9	197.8	173.4	211.3	164.3	491.2	187.4	702.4	320.3
25th %ile	23.6	11.4	22.7	32.5	436.1	335.7	491.3	384.4	186.6	166.5	211.3	159.0	491.2	140.7	702.4	281.9
10th %ile	16.9	7.1	20.0	27.7	396.0	308.4	447.3	381.9	179.9	158.1	211.3	100.0	491.2	65.8	702.4	221.2
— Average	34.8	33.9	27.2	37.4	502.8	401.0	564.7	472.3	197.8	184.9	211.3	156.2	491.2	289.5	702.4	445.7
Count	2	8	2	8	2	8	2	8	2	8	1	11	1	11	1	11
Avg. assets	223M	441M	223M	441M	223M	441M	223M	441M	223M	441M	71M	949M	71M	949M	71M	949M
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

Fund of Funds		Direct LP		Co-Investment		Internal	
Total <sup>3</sup> incl. perf.		Total <sup>3</sup> incl. perf.		Total incl. perf.		Total	
Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
394.6	428.3	427.8	469.5			31.5	
379.0	417.9	427.8	425.1			23.8	
352.9	407.6	427.8	333.6			10.8	
326.8	377.2	427.8	261.1			5.9	
311.1	346.5	427.8	238.5			3.0	
352.9	392.6	427.8	455.7			16.2	
2	8	1	11	0	3	0	0
223M	441M	117M	834M		115M		
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0M	0M	0M	0M	0M	0M	0M	0M

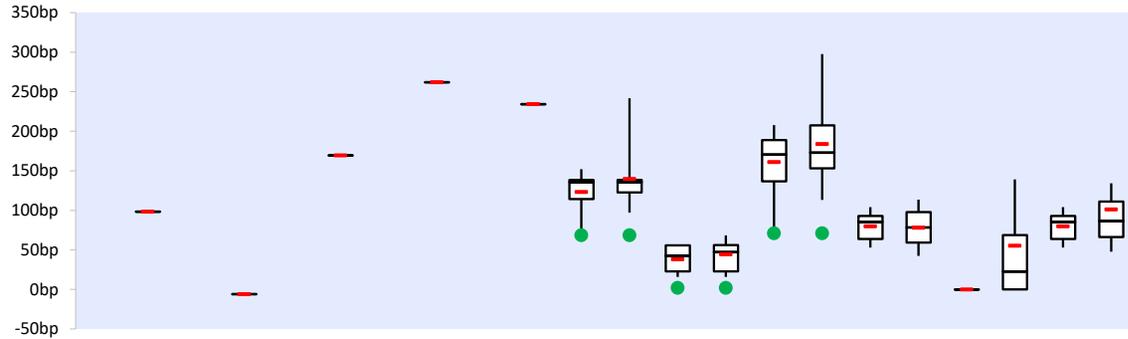
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.

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 163 bps (on amount fees are based on) for underlying management fees and 200 bps (on NAV) for underlying performance fees were used.

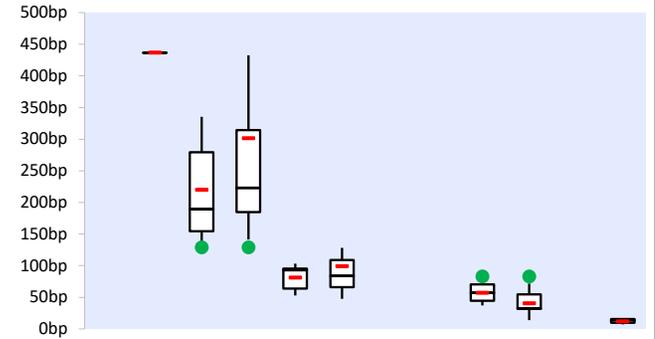
3. The total cost also includes the internal cost of monitoring and selecting private equity investments. The peer average cost of monitoring and selecting was 5.1 bps for fund of funds.

## Private Credit

Cost as a % of the amount fees are based on<sup>1</sup>



Cost as a % of NAV

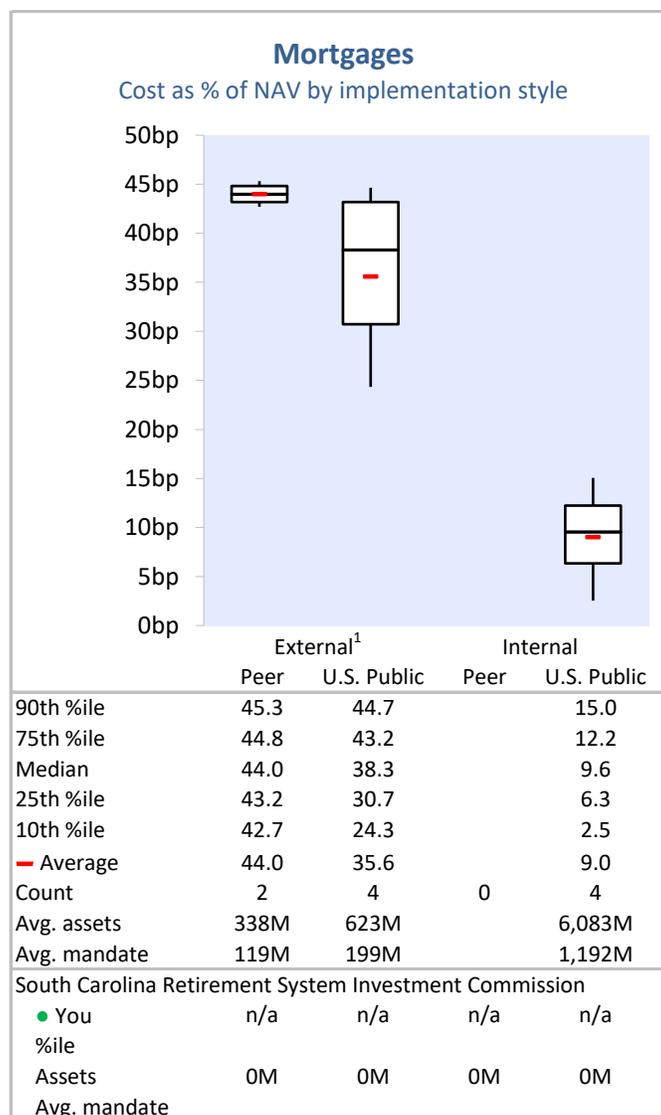


	Fund of Funds						Direct LP						Evergreen									
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. <sup>2</sup>		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> 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	98.3		-5.8		169.6		262.1		234.3	152.2	241.9	56.1	68.4	207.7	297.6	104.2	113.5	0.0	138.9	104.2	134.1	
75th %ile	98.3		-5.8		169.6		262.1		234.3	138.3	138.5	55.9	56.0	188.9	207.5	93.0	97.6	0.0	68.7	93.0	111.0	
Median	98.3		-5.8		169.6		262.1		234.3	136.0	136.0	42.7	47.2	170.5	173.2	85.6	78.5	0.0	22.9	85.6	86.7	
25th %ile	98.3		-5.8		169.6		262.1		234.3	114.1	122.6	22.8	22.8	136.8	153.3	63.6	59.2	0.0	0.0	63.6	66.2	
10th %ile	98.3		-5.8		169.6		262.1		234.3	61.9	97.2	15.9	15.9	69.5	113.2	52.9	42.4	0.0	0.0	52.9	47.5	
Average	98.3		-5.8		169.6		262.1		234.3	123.2	139.6	38.1	44.5	161.2	184.1	79.9	78.2	0.0	55.5	79.9	101.3	
Count	0	1	0	1	0	1	0	1	0	1	10	18	10	18	10	18	5	12	1	5	5	12
Avg. assets		6M		6M		6M		6M		6M	877M	1,167M	877M	1,167M	877M	1,167M	2,081M	1,379M	10,405M	3,309M	2,081M	1,379M
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	68.8	68.8	2.3	2.3	71.0	71.0	n/a	n/a	n/a	n/a	n/a	n/a	
%ile										11%	6%			11%	6%							
Assets										3,999M	3,999M	3,999M	3,999M	3,999M	3,999M							

	Fund of Funds		Direct LP		Evergreen		Oper. Sub.		Co-Inv.		Internal	
	Total <sup>3</sup> incl. perf.		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> incl. perf.		Total		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
	436.8		335.2	432.4	103.2	128.3			78.0	71.7		16.8
	436.8		279.2	314.4	95.4	109.0			70.3	54.6		15.8
	436.8		189.6	223.1	93.0	84.1			57.5	32.2		14.1
	436.8		154.3	184.5	63.6	66.2			44.6	31.8		9.8
	436.8		121.8	141.5	52.9	47.5			36.9	14.0		7.2
	436.8		220.3	301.8	81.2	99.1			57.5	40.8		12.4
Count	0	1	10	18	5	12	0	0	2	5	0	3
Avg. assets		4M	673M	881M	2,063M	1,434M			210M	262M		360M
	n/a	n/a	129.2	129.2	n/a	n/a	n/a	n/a	83.2	83.2	n/a	n/a
			11%	6%					100%	100%		
			2,199M	2,199M					297M	297M		

- 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 real estate investments. Your cost of monitoring and selecting was 1.4 bps for LPs. The peer average cost of monitoring and selecting was 3.0 bps for LPs and 0.7 bps for external (not LPs).

LP base fee is the weighted average management fee of 67 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 55 bps (22.2 million).



#### 1. Breakdown of external fees

	Your Plan	Peer Average	U.S. Public Average
Base fees	n/a	43.2	34.8
Internal and other	<u>n/a</u>	<u>1.7</u>	<u>1.6</u>
Total*	n/a	44.0	35.6
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.

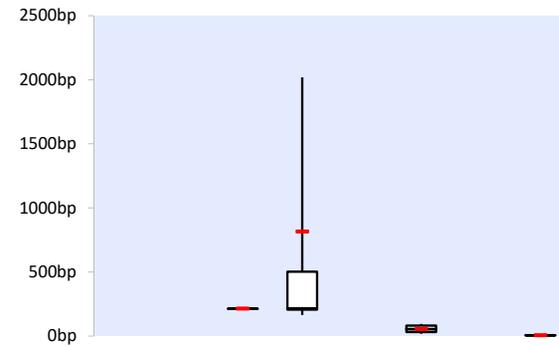
\*\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for only those funds that reported a performance fee is 175.3 bps for peers (2 funds) and 96.3 bps for Global participants (8 funds).

## Other Private Equity

Cost as a % of the amount fees are based on<sup>1</sup>



Cost as a % of NAV

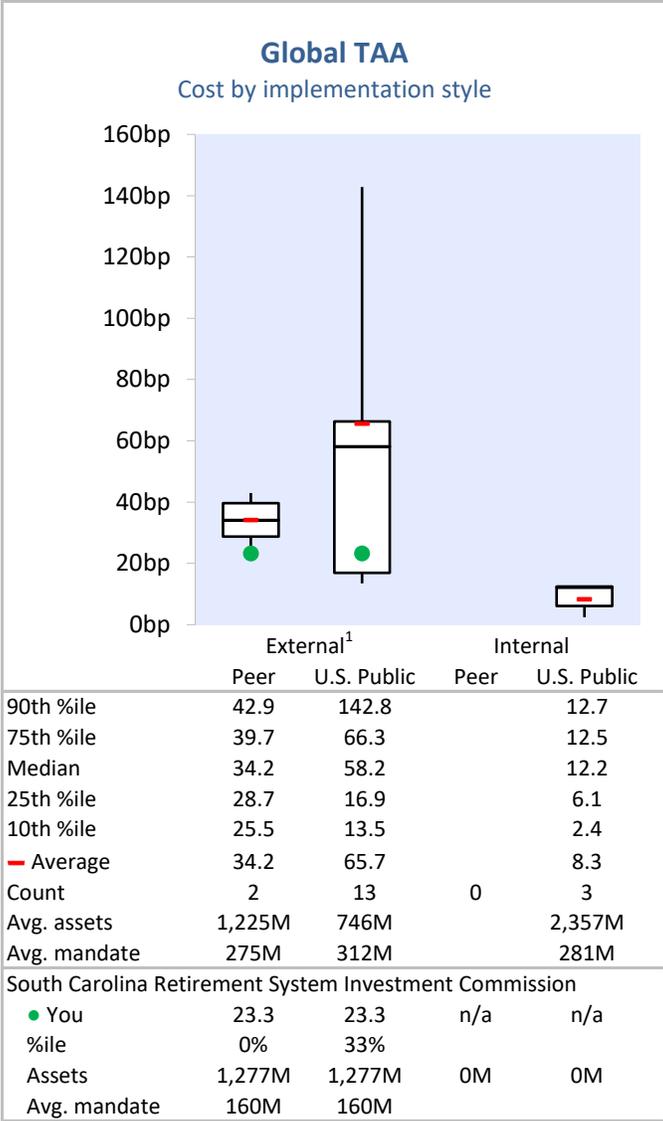


	Fund of Funds										Direct LP					
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. <sup>2</sup>		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	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										124.2	127.1	90.0	242.2	214.2	264.5	
75th %ile										124.2	115.2	90.0	146.8	214.2	222.7	
Median										124.2	66.4	90.0	90.0	214.2	205.9	
25th %ile										124.2	37.0	90.0	22.1	214.2	108.4	
10th %ile										124.2	7.2	90.0	11.6	214.2	84.5	
— Average										124.2	71.8	90.0	106.9	214.2	178.7	
Count	0	0	0	0	0	0	0	0	0	1	7	1	7	1	7	
Avg. assets										1,637M	1,276M	1,637M	1,276M	1,637M	1,276M	
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	
Assets	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	

	Fund of Funds		Direct LP		Co-Investment		Internal	
	Total <sup>3</sup> incl. perf.		Total <sup>3</sup> 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
			214.2	2018.9			95.8	7.2
			214.2	502.5			81.1	7.2
			214.2	214.2			56.6	7.2
			214.2	207.2			32.1	7.2
			214.2	164.7			17.5	7.2
			214.2	815.6			56.6	7.2
0	0		1.0	7	0	2	0	1
			1,637M	741M		19M		7M
n/a	n/a		n/a	n/a			n/a	n/a
0M	0M		0M	0M		0M	0M	0M

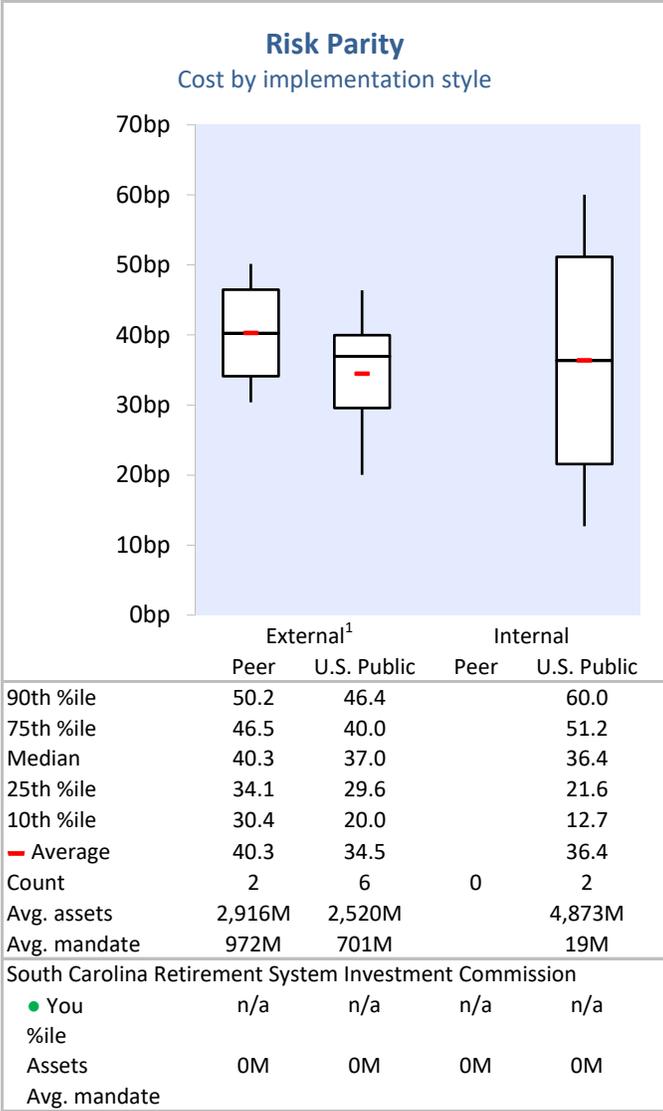
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.  
 2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund 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	20.7	30.8	55.4
Internal and other	<u>2.6</u>	<u>3.4</u>	<u>5.4</u>
Performance fees	0.0	0.0	10.0
Total*	23.3	34.2	65.7

\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for peers (2 funds) and 10.0 bps for U.S. Public participants (8 funds).



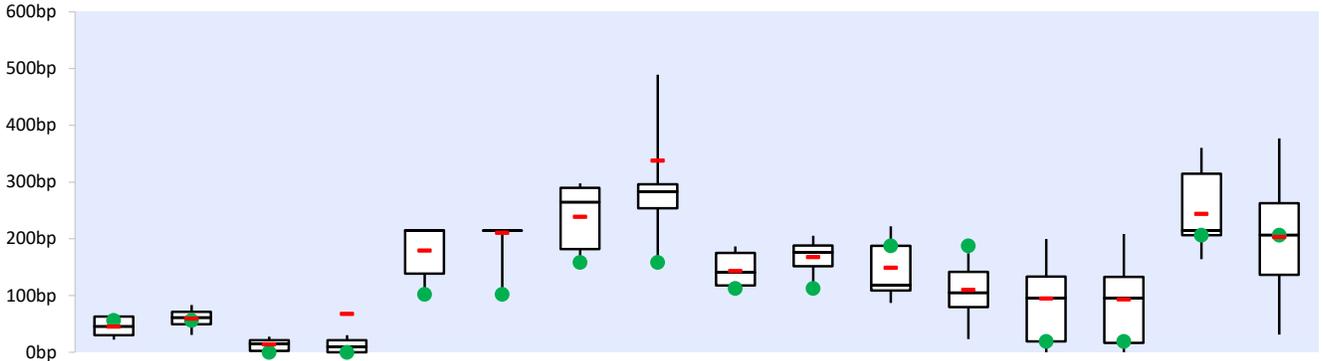
1. Breakdown of external fees

	Your Plan	Peer Average	U.S. Public Average
Base fees	n/a	40.1	33.7
Internal and other	<u>n/a</u>	<u>0.3</u>	<u>1.1</u>
Performance fees	n/a	0.0	0.0
Total*	n/a	40.3	34.5

\* 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 0.0 bps for peers (1 fund) and 0.0 bps for U.S. Public participants (4 funds).

## Hedge Funds

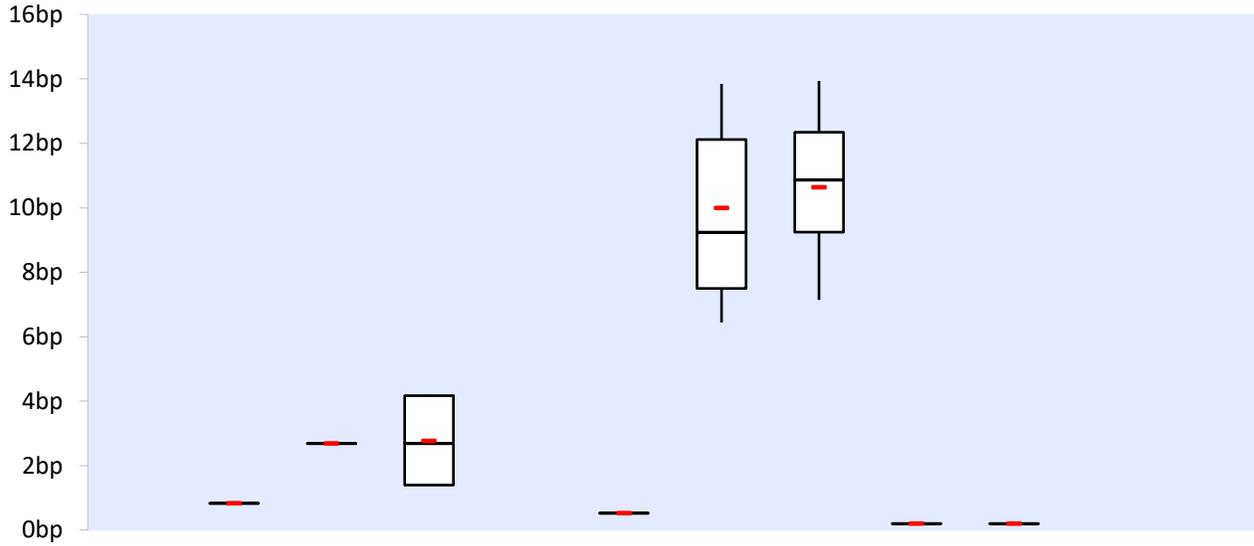
### Cost by implementation style



	Fund of Funds										External Direct					
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. and perf. <sup>1</sup>		Total <sup>2</sup> incl. perf.		Total <sup>2</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>2</sup> 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	67.5	83.3	27.5	30.0	215.0	215.0	297.6	489.3	186.5	205.5	222.1	174.5	199.8	208.6	360.5	377.1
75th %ile	62.8	71.1	21.0	21.0	215.0	215.0	290.1	296.1	174.9	188.1	187.5	141.7	133.4	132.7	314.8	263.0
Median	45.8	61.3	15.1	9.7	215.0	215.0	264.6	283.3	141.1	176.1	119.0	105.2	96.0	96.0	215.0	207.0
25th %ile	30.3	49.2	2.3	0.0	138.8	215.0	181.8	254.1	117.8	151.9	109.0	79.8	18.9	16.6	206.4	136.6
10th %ile	22.1	30.6	0.0	0.0	107.8	105.5	153.6	163.3	101.8	119.0	87.1	23.4	0.0	0.0	163.9	31.3
— Average	45.1	59.4	14.2	67.6	179.3	210.7	238.6	337.7	143.1	167.9	149.0	110.0	94.8	93.2	243.8	203.2
Count	6	14	6	14	6	14	6	14	6	14	9	26	9	26	9	26
Avg. assets	591M	427M	591M	427M	591M	427M	591M	427M	591M	427M	3,118M	2,894M	3,118M	2,894M	3,118M	2,894M
South Carolina Retirement System Investment Commission																
● You	56.4	56.4	0.0	0.0	102.1	102.1	158.5	158.5	112.3	112.3	187.5	187.5	18.9	18.9	206.4	206.4
%ile	60%	31%	0%	0%	0%	8%	20%	8%	20%	8%	75%	92%	25%	28%	25%	48%
Assets	1,432M	1,432M	1,432M	1,432M	1,432M	1,432M	1,432M	1,432M	1,432M	1,432M	1,759M	1,759M	1,759M	1,759M	1,759M	1,759M

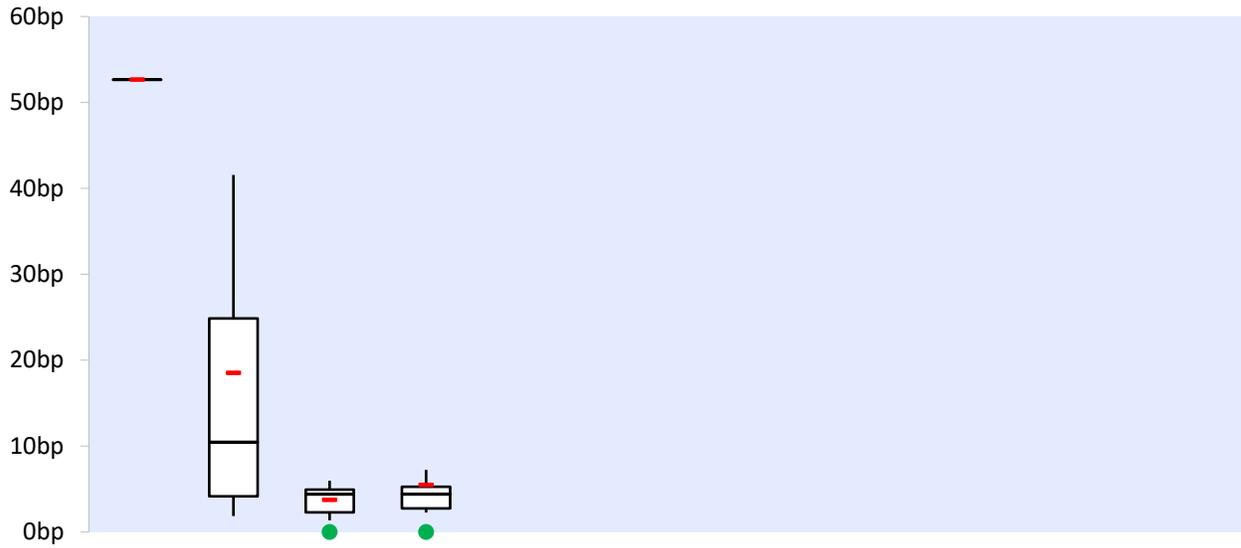
- The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 119 bps (on NAV) for underlying management fees and 96 bps (on NAV) for underlying performance fees were used.
- The total cost also includes the internal cost of monitoring and selecting real estate investments. The peer average cost of monitoring and selecting was 2.5 bps for fund of funds and 4.3 bps for LPs.

**Overlays: currency, duration**  
Cost by implementation style



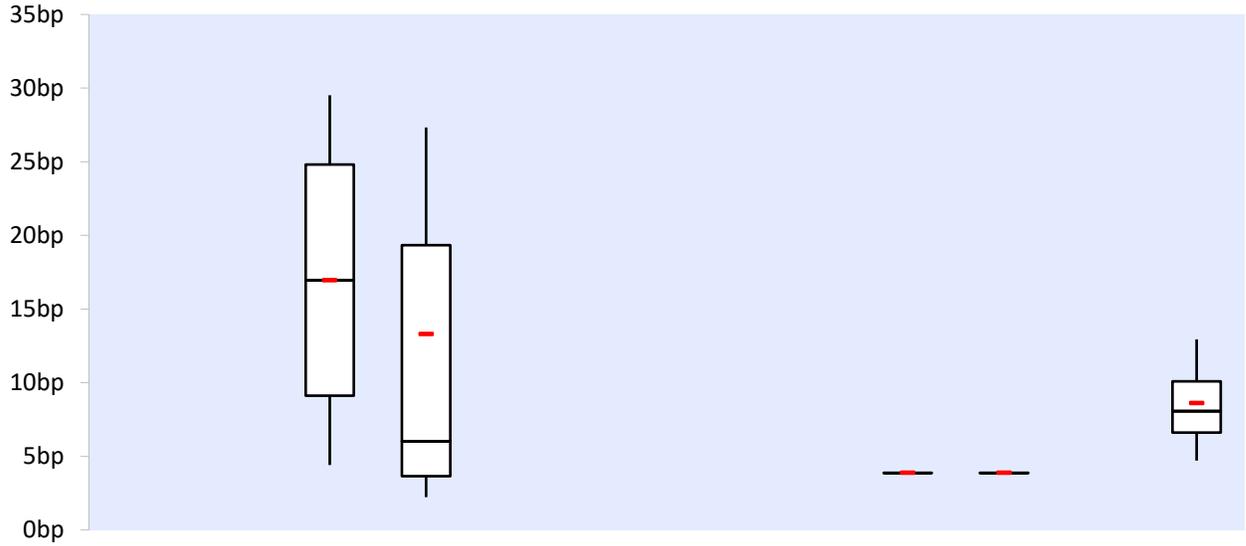
	Currency Hedge				Discretionary Currency				Duration Management			
	Internal		External		Internal		External		Internal		External	
	% of notional		% of notional		% of notional		% of notional		% of notional		% of notional	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile		0.8	2.7	4.2		0.5	13.8	13.9	0.2	0.2		
75th %ile		0.8	2.7	4.2		0.5	12.1	12.3	0.2	0.2		
Median		0.8	2.7	2.7		0.5	9.2	10.9	0.2	0.2		
25th %ile		0.8	2.7	1.4		0.5	7.5	9.2	0.2	0.2		
10th %ile		0.8	2.7	1.4		0.5	6.4	7.1	0.2	0.2		
— Average		0.8	2.7	2.8		0.5	10.0	10.6	0.2	0.2		
Count	0	1	1	5	0	1	3	5	1	1	0	0
Avg. notional		3,811M	3,460M	996M		38,387M	3,666M	3,615M	1,808M	1,808M		
South Carolina Retirement System Investment Commission												
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile												
Avg. notional												

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



	Passive Beta/Rebalancing				Global TAA				Policy Tilt TAA			
	Internal		External		Internal		External		Internal		External	
	% of notional	% of notional	% of notional	% of notional	% of notional	% of notional	% 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	52.7	41.5	6.0	7.2								
75th %ile	52.7	24.9	4.9	5.3								
Median	52.7	10.5	4.4	4.4								
25th %ile	52.7	4.1	2.3	2.7								
10th %ile	52.7	1.9	1.4	2.3								
— Average	52.7	18.5	3.7	5.5								
Count	1	4	7	11	0	0	0	0	0	0	0	0
Avg. notional	110M	3,113M	1,741M	2,959M								
South Carolina Retirement System Investment Commission												
● You	n/a	n/a	0.0	0.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile			0%	0%								
Avg. notional			5,014M	5,014M								

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



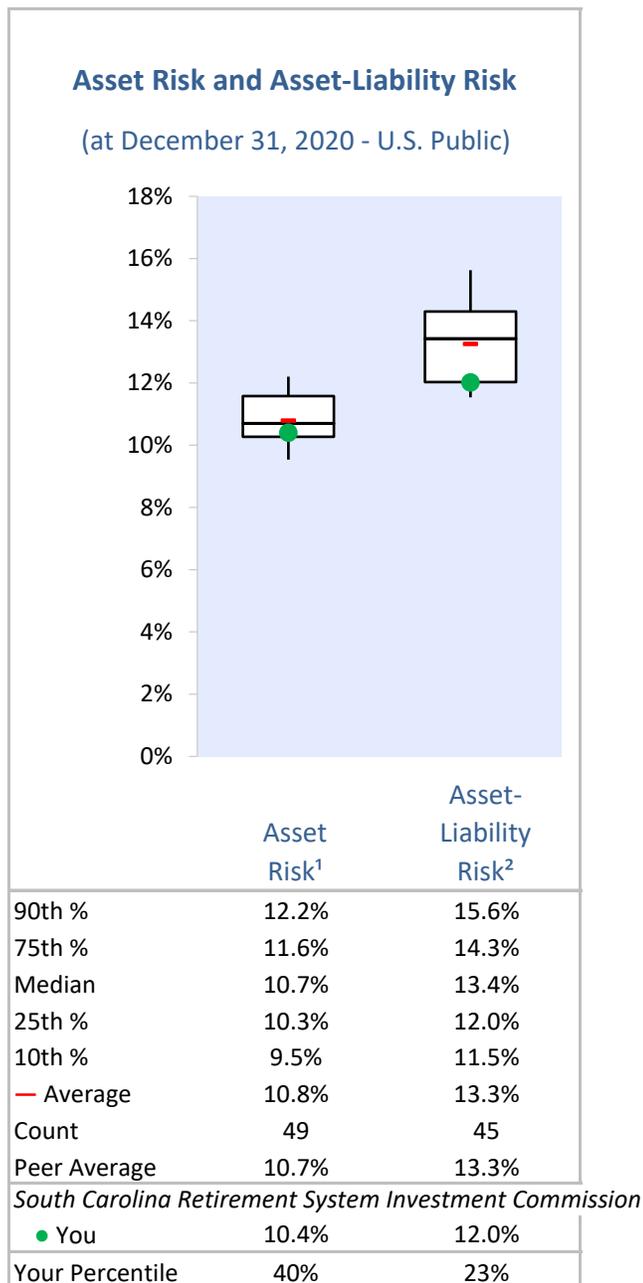
	Commodity				Long/ Short				Other			
	Internal		External		Internal		External		Internal		External	
	% of notional		% of notional		% of notional		% of notional		% of notional		% of notional	
	Peer	U.S. Public										
90th %ile			29.5	27.3					3.9	3.9		12.9
75th %ile			24.8	19.3					3.9	3.9		10.1
Median			17.0	6.0					3.9	3.9		8.1
25th %ile			9.1	3.7					3.9	3.9		6.6
10th %ile			4.4	2.2					3.9	3.9		4.7
— Average			17.0	13.3					3.9	3.9		8.6
Count	0	0	2	3	0	0	0	0	1	1	0	4
Avg. notional			348M	516M					651M	651M		834M
South Carolina Retirement System Investment Commission												
● You	n/a	n/a										
%ile												
Avg. notional												

# 6

## Risk

Comparison of your risk levels to the U.S. Public universe	2
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## Comparison of your risk levels to the U.S. Public universe



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

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

## Calculation of asset risk

Before considering the benefit of diversification, the weighted average risk of the asset classes in your asset mix policy was 12.8%.

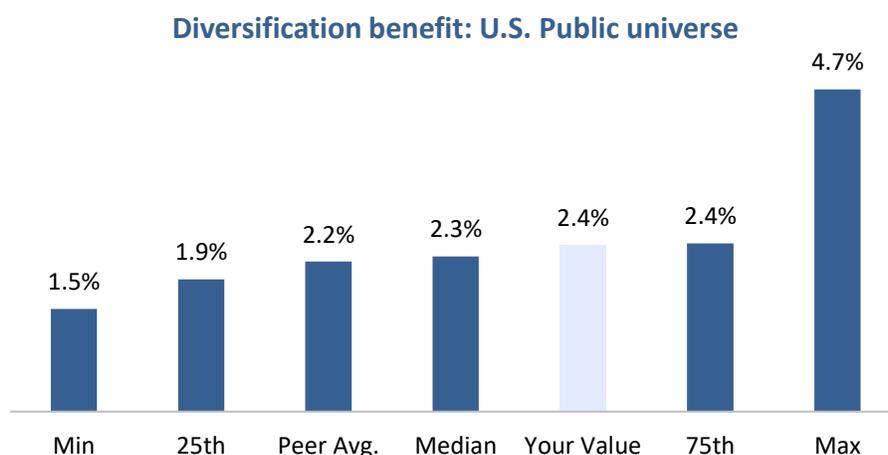
### Calculation of your weighted asset class risk

Asset Class	Policy weight (A)	Risk <sup>1</sup> (B)	Weighted risk (A X B)
Stock: U.S. Broad/All	23.9%	15%	3.7%
Stock: U.S. Small Cap	2.9%	20%	0.6%
Stock: Emerging	6.2%	22%	1.4%
Stock: Global	12.2%	15%	1.9%
Stock: ACWI x U.S.	2.2%	17%	0.4%
Bonds: U.S.	26.0%	5%	1.4%
Real Estate ex-REITs	9.0%	10%	0.9%
Infrastructure	3.0%	14%	0.4%
Diversified Private Equity	7.6%	25%	1.9%
Private Credit	7.0%	6%	0.4%
Weighted Total			12.8%

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.

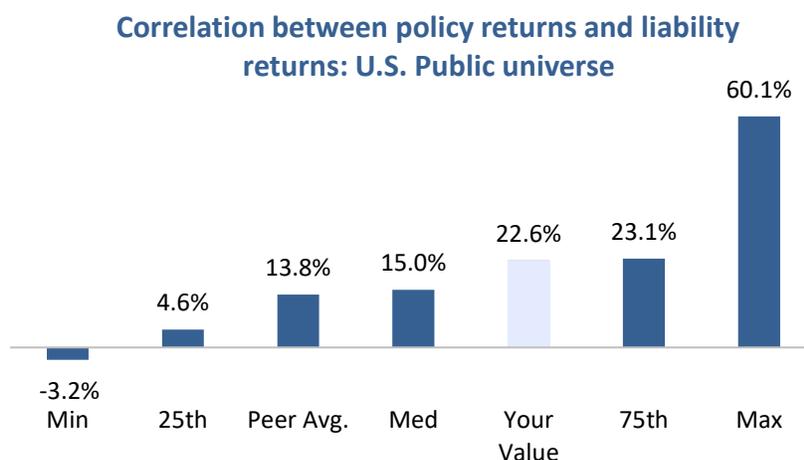
### Components of asset risk

	You	Peer median*	Peer average	U.S. Public median*	U.S. Public average
Weighted asset risk	12.8%	12.8%	12.9%	13.0%	13.1%
Benefit of diversification	2.4%	2.3%	2.2%	2.3%	2.3%
Asset risk	10.4%	10.6%	10.7%	10.7%	10.8%

\* 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 returns<sup>1</sup> (liability risk =  $\sqrt{R_A^2 + R_L^2 - 2\rho_{AL}R_AR_L}$ ).

### Components of asset-liability risk

	You	Peer median	Peer average	U.S. Public median	U.S. Public average
Asset risk ( $R_A$ )	10.4%	10.6%	10.7%	10.7%	10.8%
Liability risk ( $R_L$ )	8.8%	9.2%	9.4%	9.6%	9.4%
Correlation between policy returns and liability returns ( $\rho_{AL}$ )	22.6%	16.4%	13.8%	15.0%	15.3%
Asset-liability risk	12.0%	13.2%	13.3%	13.4%	13.3%

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	14.1	94%	12.0	63%	12.0	64%
Nominal Bonds	10.0	6%	12.4	37%	13.0	36%
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	46	85%
Other	6	11%
<b>Total</b>	<b>54</b>	<b>100%</b>

## 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	22	0
>0% and <50%	0	0	0
50%	0	1	0
>50% and <100%	0	6	0
100%	0	18	0
<b>Total</b>	<b>0</b>	<b>47</b>	<b>0</b>

## 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 59%.

	Your fund	Peer Average	U.S. Public Average
Active Members	58%	52%	54%
Retired Members	42%	48%	46%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

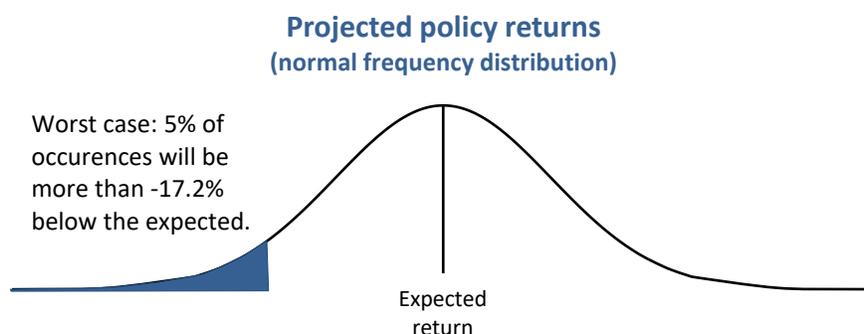
## Projected worst case scenarios

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.

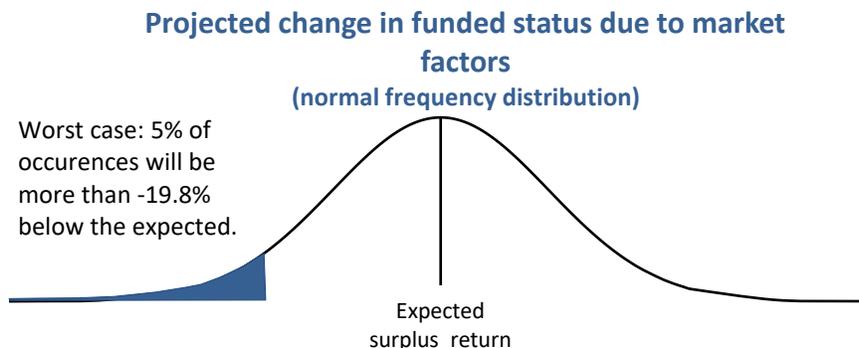
### a) Worst case policy returns

Every year there is a 5% probability that your policy return will be worse than your expected policy return by more than -17.2% (-17.2% equals -1.65 X your asset risk of 10.4%). -17.2% is the starting point of worst case outcomes. They could be much worse.



### b) Worst case impact on funded status

Every year, there is a 5% probability that changes in your mark-to-market funded status caused by market factors ("Surplus Returns") will be worse than expected by more than -19.8%. (-19.8% equals -1.65 X your asset-liability risk of 12.0%). -19.8% 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 -2.4% in 2018.

#### Historic policy returns - U.S. Public universe

	2020	2019	2018	2017	2016
90th %	13.5%	19.1%	0.0%	16.7%	8.8%
75th %	12.4%	17.7%	-1.1%	16.0%	8.4%
Median	10.7%	15.2%	-2.6%	15.2%	7.6%
25th %	9.2%	13.7%	-3.9%	14.2%	7.2%
10th %	7.7%	11.2%	-5.5%	13.1%	6.5%
Average	10.6%	15.5%	-2.5%	15.1%	7.8%
Count	49	48	58	60	59
Peer Avg	10.7%	15.6%	-1.9%	14.7%	7.8%
Your Value	7.3%	16.0%	-2.4%	14.1%	8.1%

### 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 -7.1% in 2020.

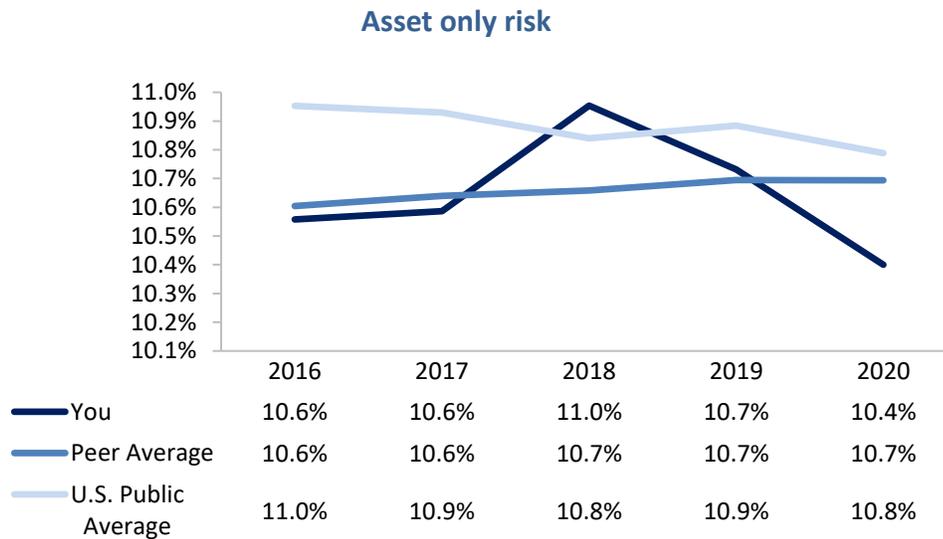
#### Historic changes in funded status caused by market factors - U.S. Public universe

	2020	2019	2018	2017	2016
90th %	1.5%	7.9%	2.3%	8.7%	4.9%
75th %	-1.4%	7.1%	0.8%	7.7%	4.4%
Median	-3.3%	5.1%	-0.3%	6.7%	2.8%
25th %	-4.4%	3.0%	-1.9%	5.1%	1.4%
10th %	-6.9%	1.5%	-3.5%	3.1%	0.1%
Average	-3.0%	5.0%	-0.4%	6.4%	2.8%
Count	45	44	53	54	55
Peer Avg	-2.7%	5.5%	-0.2%	6.5%	2.7%
Your Value	-7.1%	5.3%	-0.9%	7.4%	1.1%

## Risk Trends - 2016 to 2020

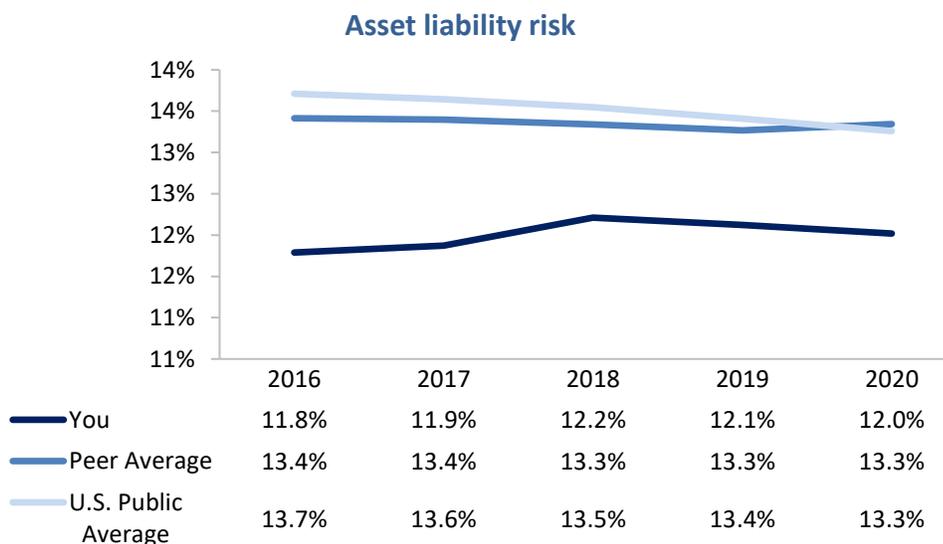
### a) Asset risk trends

Asset risk will only change if policy asset mix changes. Between 2016 and 2020 the asset risk for your fund decreased from 10.6% to 10.4%.



### b) Asset-liability risk trends

Asset-liability risk will change if policy asset mix changes, or if the nature of your liabilities changes. Between 2016 and 2020 the asset-liability risk for your fund increased from 11.8% to 12.0%.



## 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 59%. The percentage of liability that relates to retirees is higher than the retirees as a percentage of active and retired members because retirees have accrued a higher benefit.

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

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

Percentage change in pension liability cost

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

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

Modified duration relative to changes in real yields

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

Modified duration relative to changes in nominal yields

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

## 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	
2020	0.91	-1.00	-0.44	-1.01	1.23
2019	1.91	-0.78	0.57	-0.64	1.81
2018	2.69	0.28	1.21	0.51	2.44
2017	2.41	-0.65	0.71	-0.31	2.13
2016	3.06	0.08	1.02	-0.26	2.10

## 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

$\sigma_X$  = standard deviation of monthly returns for asset class X

$w_Y$  = policy weight of asset class Y

$\sigma_Y$  = standard deviation of monthly returns for asset class Y

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

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

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

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

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

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

### Asset-liability risk

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

## Appendix C - Correlation Matrix

	Stock: U.S. Broad/All	Stock: U.S. Small Cap	Stock: Emerging	Stock: Global	Stock: ACWI x U.S.	Bonds: U.S.	Real Assets: Real Estate ex-REITs	Real Assets: Infrastructure	Diversified Private Equity	Private Credit	Nominal Bond: Duration 10	Nominal Bond: Duration 11	Real Return Bond: Duration 14	Real Return Bond: Duration 15
Stock: U.S. Broad/All	1.00	0.89	0.69	0.90	0.77	0.18	0.57	0.67	0.89	0.51	-0.04	-0.04	0.10	0.09
Stock: U.S. Small Cap	0.89	1.00	0.66	0.77	0.69	0.09	0.59	0.48	0.86	0.51	-0.14	-0.13	0.02	0.01
Stock: Emerging	0.69	0.66	1.00	0.77	0.77	0.03	0.45	0.49	0.77	0.46	-0.13	-0.14	0.21	0.20
Stock: Global	0.90	0.77	0.77	1.00	0.97	0.09	0.56	0.64	0.90	0.53	-0.09	-0.10	0.15	0.14
Stock: ACWI x U.S.	0.77	0.69	0.77	0.97	1.00	0.08	0.53	0.57	0.87	0.53	-0.09	-0.10	0.17	0.16
Bonds: U.S.	0.18	0.09	0.03	0.09	0.08	1.00	0.38	0.07	0.05	0.01	0.93	0.92	0.83	0.83
Real Assets: Real Estate ex-REITs	0.57	0.59	0.45	0.56	0.53	0.38	1.00	0.47	0.71	0.50	0.19	0.19	0.38	0.37
Real Assets: Infrastructure	0.67	0.48	0.49	0.64	0.57	0.07	0.47	1.00	0.55	0.36	-0.06	-0.05	0.25	0.24
Diversified Private Equity	0.89	0.86	0.77	0.90	0.87	0.05	0.71	0.55	1.00	0.69	-0.22	-0.23	0.12	0.12
Private Credit	0.51	0.51	0.46	0.53	0.53	0.01	0.50	0.36	0.69	1.00	-0.26	-0.27	0.09	0.08
Nominal Bond: Duration 10	-0.04	-0.14	-0.13	-0.09	-0.09	0.93	0.19	-0.06	-0.22	-0.26	1.00	1.00	0.75	0.75
Nominal Bond: Duration 11	-0.04	-0.13	-0.14	-0.10	-0.10	0.92	0.19	-0.05	-0.23	-0.27	1.00	1.00	0.75	0.75
Real Return Bond: Duration 14	0.10	0.02	0.21	0.15	0.17	0.83	0.38	0.25	0.12	0.09	0.75	0.75	1.00	1.00
Real Return Bond: Duration 15	0.09	0.01	0.20	0.14	0.16	0.83	0.37	0.24	0.12	0.08	0.75	0.75	1.00	1.00

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

	Stock: U.S. Broad/All	Stock: U.S. Large Cap	Stock: U.S. Small Cap	Stock: EAFE	Stock: Emerging	Stock: Global	Stock: ACWI x U.S.	Bonds: U.S.	Bonds: Emerging	Bonds: High Yield	Bonds: Long Bonds	Bonds: Cash	Real Assets: Real Estate ex-REITs	Hedge Funds	Diversified Private Equity	Private Credit	Nominal Bond: Duration 10	Nominal Bond: Duration 13	Real Return Bond: Duration 10	Real Return Bond: Duration 11
Stock: U.S. Broad/All	1.00	0.99	0.89	0.69	0.69	0.90	0.77	0.18	0.54	0.61	0.16	0.01	0.57	0.79	0.89	0.51	-0.04	-0.03	0.05	0.05
Stock: U.S. Large Cap	0.99	1.00	0.82	0.75	0.67	0.90	0.77	0.11	0.53	0.60	0.09	0.01	0.55	0.78	0.88	0.48	-0.07	-0.07	0.05	0.05
Stock: U.S. Small Cap	0.89	0.82	1.00	0.62	0.66	0.77	0.69	0.09	0.49	0.61	0.08	-0.01	0.59	0.71	0.86	0.51	-0.14	-0.12	0.01	0.00
Stock: EAFE	0.69	0.75	0.62	1.00	0.71	0.95	0.99	0.14	0.55	0.53	0.14	0.02	0.53	0.87	0.87	0.51	-0.04	-0.04	0.13	0.12
Stock: Emerging	0.69	0.67	0.66	0.71	1.00	0.77	0.77	0.03	0.69	0.58	0.03	-0.01	0.45	0.79	0.77	0.46	-0.13	-0.14	0.18	0.18
Stock: Global	0.90	0.90	0.77	0.95	0.77	1.00	0.97	0.09	0.59	0.62	0.08	-0.04	0.56	0.87	0.90	0.53	-0.09	-0.10	0.11	0.10
Stock: ACWI x U.S.	0.77	0.77	0.69	0.99	0.77	0.97	1.00	0.08	0.59	0.58	0.07	-0.05	0.53	0.89	0.87	0.53	-0.09	-0.11	0.15	0.14
Bonds: U.S.	0.18	0.11	0.09	0.14	0.03	0.09	0.08	1.00	0.35	0.26	0.93	0.29	0.38	0.17	0.05	0.01	0.93	0.91	0.81	0.81
Bonds: Emerging	0.54	0.53	0.49	0.55	0.69	0.59	0.59	0.35	1.00	0.60	0.33	0.01	0.49	0.63	0.60	0.42	0.18	0.18	0.51	0.50
Bonds: High Yield	0.61	0.60	0.61	0.53	0.58	0.62	0.58	0.26	0.60	1.00	0.24	0.00	0.58	0.68	0.74	0.74	0.01	0.01	0.24	0.23
Bonds: Long Bonds	0.16	0.09	0.08	0.14	0.03	0.08	0.07	0.93	0.33	0.24	1.00	0.15	0.39	0.17	0.03	0.00	0.91	0.92	0.76	0.78
Bonds: Cash	0.01	0.01	-0.01	0.02	-0.01	-0.04	-0.05	0.29	0.01	0.00	0.15	1.00	0.00	-0.07	-0.11	-0.12	0.18	0.16	0.08	0.07
Real Assets: Real Estate ex-REITs	0.57	0.55	0.59	0.53	0.45	0.56	0.53	0.38	0.49	0.58	0.39	0.00	1.00	0.57	0.71	0.50	0.19	0.18	0.42	0.41
Hedge Funds	0.79	0.78	0.71	0.87	0.79	0.87	0.89	0.17	0.63	0.68	0.17	-0.07	0.57	1.00	0.80	0.60	-0.06	-0.07	0.34	0.33
Diversified Private Equity	0.89	0.88	0.86	0.87	0.77	0.90	0.87	0.05	0.60	0.74	0.03	-0.11	0.71	0.80	1.00	0.69	-0.22	-0.24	0.19	0.18
Private Credit	0.51	0.48	0.51	0.51	0.46	0.53	0.53	0.01	0.42	0.74	0.00	-0.12	0.50	0.60	0.69	1.00	-0.26	-0.28	0.14	0.12
Nominal Bond: Duration 10	-0.04	-0.07	-0.14	-0.04	-0.13	-0.09	-0.09	0.93	0.18	0.01	0.91	0.18	0.19	-0.06	-0.22	-0.26	1.00	0.98	0.74	0.75
Nominal Bond: Duration 13	-0.03	-0.07	-0.12	-0.04	-0.14	-0.10	-0.11	0.91	0.18	0.01	0.92	0.16	0.18	-0.07	-0.24	-0.28	0.98	1.00	0.72	0.73
Real Return Bond: Duration 10	0.05	0.05	0.01	0.13	0.18	0.11	0.15	0.81	0.51	0.24	0.76	0.08	0.42	0.34	0.19	0.14	0.74	0.72	1.00	1.00
Real Return Bond: Duration 11	0.05	0.05	0.00	0.12	0.18	0.10	0.14	0.81	0.50	0.23	0.78	0.07	0.41	0.33	0.18	0.12	0.75	0.73	1.00	1.00

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## Appendices

Appendix A - Data Summary

Appendix B - Data quality

Appendix C - Glossary of terms

## Appendix A - Data Summary

South Carolina Retirement System Investment Commission

Plan Info	2020	2019	2018	2017	2016
Survey Preparer	Kevin Reinhard	Kevin Reinhard	Kevin Reinhard	Kevin Reinhard	Landry C. Phillips
Additional Contact	Jon Rychener				
Type of fund (corporate, public, other)	Public	Public	Public	Public	Public
Total fund size (\$mils) as at December 31	35,611.8	33,502.8	29,259.8	31,801.4	28,771.1
Asset-class level holdings provided on survey are: year end or average?	Average	Average	Average	Average	Average
Total return for year ended	8.19%	16.81%	-4.20%	14.70%	7.61%
Is the return net or gross?	Net of manager fees	Net of all investment costs			
Total fund policy or benchmark return	8.35%	17.05%	-2.94%	14.55%	8.40%

Ancillary Data	2020	2019	2018	2017	2016
What is your hedging policy for: Foreign Holdings					
What were your actuarial fees in 000s?	271	405	382	485	277
How many plan members/beneficiaries do you have:					
Active?	241,285	240,009	235,390	233,423	252,494
Active (no-accrual)?				6,630	
Retired?	171,280	168,851	166,126	156,901	158,492
Other?	219,515	210,922	202,146	193,988	183,796
What type of plan(s) do you have?	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,				
What % of the plan's liabilities pertain to retired members?	59%	61%	62%	64%	65%
Actuarial valuation assumptions for funding purposes:					
Liability discount rate	7.3%	7.3%	7.3%	7.3%	7.5%
Salary progression rate	3.0%	3.0%	3.0%	3.0%	3.3%
What was your actuarial assumption for expected rate of return?	7.3%	7.3%	7.3%	7.3%	7.5%

## Appendix A - Data Summary: Policy Weights and Benchmarks

South Carolina Retirement System Investment Commission

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Asset Class	Year	Policy Weight	Benchmark	
			Description	Return
Stock - U.S. Broad/All	2020	23.9	MSCI US IMI Net	20.7
	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
Stock - U.S. Small Cap	2020	2.9	MSCI US Small Cap Net Index	35.8
Stock - EAFE	2020		MSCI World Ex US Net Index	10.7
Stock - Emerging	2020	6.2	MSCI Emerging Market IMI Net	18.3
	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
Stock - Global	2020	12.2	MSCI World Net Dividend	15.9
	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
Stock - ACWI x U.S.	2020	2.2	MSCI ACWI x/US Net	10.7
	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.	2020	26.0	Barclays US Aggregate	7.5
	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
Fixed Income - Emerging	2020		50% JPM EMBI Global Diversified/50% JPM-GBI-EM Global	5.3
	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
Fixed Income - High Yield	2020		50%Bar U.S. High Yield 2% / 50%S&P LSTA Leveraged Loan	5.1
	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
Cash	2020		BofA Merrill Lynch 3 Month US Treasury Bill G001	0.7
	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
REITs	2020		Your REIT benchmark	-8.0
	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	2020	9.0	NCREIF ODCE Index	0.3
	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
Infrastructure	2020	3.0	Dow Jones Brookfield Global Infrastructure Net Index	-7.0
	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	2020		50% MSCI World Net/50% Barclays US Aggregate	11.9
	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
Global TAA	2020		50% MSCI World Net/50% Barclays US Aggregate	11.9
	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

## Appendix A - Data Summary: Policy Weights and Benchmarks

South Carolina Retirement System Investment Commission

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Asset Class	Year	Policy Weight	Benchmark	
			Description	Return
Diversified Private Equity	2020	7.6	Burgiss ALL PE Universe	17.1
	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
Private Credit	2020	7.0	S&P/LSTA + 150 Bps 3 Month Lag	2.6
	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

## 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)				Cost (bps)				
				Internal & Other	Base Fees	Perf Fees	Total	Internal & Other	Base Fees	Perf Fees	Total	
Stock - U.S. Broad/All	External Passive	2020	803.9		211.5	87.6		299.1	2.6	1.1		3.7
		2019										
		2018										
		2017	16.6	-15.01	4.6	-		4.6	2.7	-		2.7
		2016	0.1	-33.37	0.0	-		0.0	2.5	-		2.5
	External Active	2020	956.6	-11.66	251.7	2,887.9	-	3,139.6	2.6	30.2	-	32.8
		2019	2,792.7	19.62	779.2	11,857.7		12,636.9	2.8	42.5		45.2
		2018	2,724.9	-7.90	822.9	10,281.2		11,104.1	3.0	37.7		40.8
		2017	2,699.6	14.48	739.8	10,405.9		11,145.7	2.7	38.5		41.3
		2016	1,818.6	9.97	522.1	8,327.1	-	8,849.2	2.9	45.8	-	48.7
Stock - U.S. Small Cap	External Passive	2020	618.0		162.6	327.0		489.6	2.6	5.3		7.9
Stock - EAFE	External Passive	2020	629.6		165.7	191.5		357.2	2.6	3.0		5.7
Stock - Emerging	External Passive	2020	551.4		145.1	148.2		293.3	2.6	2.7		5.3
	External Active	2020	1,401.2	11.45	368.7	3,978.8	-	4,347.4	2.6	28.4	-	31.0
		2019	1,973.6	18.75	518.7	5,554.0		6,072.7	2.6	28.1		30.8
		2018	1,813.7	-16.64	547.7	9,331.5		9,879.2	3.0	51.4		54.5
		2017	1,391.8	37.58	381.4	9,635.5		10,016.9	2.7	69.2		72.0
		2016	957.0	10.83	274.8	7,189.3	-	7,464.1	2.9	75.1	-	78.0
Stock - Global	External Passive	2020	6,209.9	16.43	1,634.0	994.8		2,628.8	2.6	1.6		4.2
		2019	2,549.9	27.84	664.8	533.5		1,198.3	2.6	2.1		4.7
		2018	2,324.8	-7.93	702.0	503.1		1,205.1	3.0	2.2		5.2
		2017	2,414.1	22.89	661.5	364.4		1,025.9	2.7	1.5		4.2
		2016	2,469.9	7.66	709.1	467.9		1,177.0	2.9	1.9		4.8
	External Active	2020	1,108.4	50.73	291.7	2,656.7	-	2,948.4	2.6	24.0	-	26.6
		2019	2,908.7	25.74	797.1	5,484.9		6,281.9	2.7	18.9		21.6
		2018	2,787.4	-9.95	841.7	5,525.4		6,367.1	3.0	19.8		22.8
		2017	2,486.0	25.26	681.2	4,801.4		5,482.7	2.7	19.3		22.1
		2016	2,028.6	4.64	582.4	5,605.6	-	6,188.0	2.9	27.6	-	30.5
Stock - ACWI x U.S.	External Active	2020	305.8	-28.21	80.5	1,387.8	-	1,468.3	2.6	45.4	-	48.0
		2019	1,079.8	23.36	302.5	3,878.3		4,180.8	2.8	35.9		38.7
		2018	1,057.7	-18.55		4,696.7		4,696.7		44.4		44.4
		2017	859.4	31.09	235.5	3,800.8		4,036.3	2.7	44.2		47.0
		2016	423.7	5.75	121.7	2,449.0	-	2,570.6	2.9	57.8	-	60.7
Fixed Income - U.S.	Internal Active	2020	19.9	5.53	5.8			5.8	2.9			2.9
		2019	24.1	7.34	9.5			9.5	3.9			3.9
		2018	31.3	3.81	9.9			9.9	3.2			3.2
		2017	37.4	3.37	10.8			10.8	2.9			2.9
		2016	202.0	5.51	52.9			52.9	2.6			2.6
	External Active	2020	722.5	10.33	190.1	1,578.4	-	1,768.5	2.6	21.8	-	24.5
		2019	741.2	8.66	240.0	1,782.5		2,022.4	3.2	24.0		27.3
		2018	839.1	-0.56	253.4	1,533.1		1,786.5	3.0	18.3		21.3
		2017	1,367.0	5.02	374.6	3,107.0		3,481.6	2.7	22.7		25.5
		2016	1,790.8	3.74	514.1	2,503.0	-	3,017.2	2.9	14.0	-	16.8
Fixed Income - Emerging	External Passive	2020										
	2019											
	2018											
	2017	20.7	19.62	5.7	-		5.7	2.7	-		2.7	

## 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)				Cost (bps)					
				Internal & Other	Base Fees	Perf Fees	Total	Internal & Other	Base Fees	Perf Fees	Total		
External Passive (cont'd) External Active	2016	178.2	8.01	51.2	18.9		70.1	2.9	1.1		3.9		
	2020	908.0	1.10	238.9	3,391.0	-	3,630.0	2.6	37.3	-	40.0		
	2019	1,158.4	13.23	416.6	4,987.5		5,404.0	3.6	43.1		46.7		
	2018	1,456.7	-6.63	439.9	5,667.3		6,107.2	3.0	38.9		41.9		
	2017	1,572.6	13.60	430.9	7,412.2		7,843.2	2.7	47.1		49.9		
	2016	1,354.1	12.70	388.8	6,184.8	-	6,573.6	2.9	45.7	-	48.5		
Fixed Income - High Yield External Active	2020	1,381.0	4.00	363.4	5,601.2	-	5,964.6	2.6	40.6	-	43.2		
	2019	1,286.8	7.27	426.8	5,730.9		6,157.7	3.3	44.5		47.9		
	2018	1,492.5	0.48	450.7	5,395.8		5,846.5	3.0	36.2		39.2		
	2017	2,051.7	6.14	562.2	7,870.5		8,432.7	2.7	38.4		41.1		
	2016	1,893.1	9.35	543.5	8,075.2	-	8,618.7	2.9	42.7	-	45.5		
	Cash	Internal Active	2020	1,162.4	0.09	339.9			339.9	2.9			2.9
2019			1,904.0	3.06	426.1			426.1	2.2			2.2	
2018			1,407.4	1.71	447.1			447.1	3.2			3.2	
2017			1,366.3	1.06	396.2			396.2	2.9			2.9	
2016			1,473.8	0.70	386.1			386.1	2.6			2.6	
External Active			2020	963.5	-1.25	253.5	187.4	-	441.0	2.6	1.9	-	4.6
		2019	496.8	1.56	194.9	-		194.9	3.9	-		3.9	
		2018	681.5	0.11	205.8	705.4		911.2	3.0	10.4		13.4	
		2017	856.7	-0.06	234.7	1,327.3		1,562.0	2.7	15.5		18.2	
		2016	1,199.7	0.29	344.4	1,590.6	211.3	2,146.4	2.9	13.3	1.8	17.9	
		REITs	External Active	2020	461.3	-1.28	121.4	1,529.9	-	1,651.3	2.6	33.2	-
2019				520.3	27.01	224.2	1,777.4	-	2,001.6	4.3	34.2	-	38.5
2018	784.0			-5.20	236.8	1,758.8	-	1,995.5	3.0	22.4	-	25.5	
2017	500.8			7.88	137.2	1,683.9	-	1,821.1	2.7	33.6	-	36.4	
2016	275.8			-4.62	79.2	838.0	-	917.2	2.9	30.4	-	33.3	
Global TAA	External Active			2020	1,276.9	-7.46	336.0	2,638.1	-	2,974.1	2.6	20.7	-
		2019	2,663.6	20.28	758.2	4,389.9	-	5,148.1	2.8	16.5	-	19.3	
		2018	2,931.3	-6.93	885.2	6,444.9	4,503.4	11,833.4	3.0	22.0	15.4	40.4	
		2017	2,077.6	11.30	569.3	6,125.3	3,164.8	9,859.4	2.7	29.5	15.2	47.5	
		2016	1,956.2	8.41	561.6	10,240.4	810.6	11,612.5	2.9	52.3	4.1	59.4	

## 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 10 for more details)

Asset Class/Style	Year	Asset (\$millions)	Fee basis (\$millions)	Return %	Cost (\$000)							
					Internal & Other	Base Fees	Perf Fees	Underlying fees		Total		
								Base	Perf	excl. perf	incl. perf	
Hedge Funds												
External Active	2020	1,759.4		2.90	462.9	32,516.3	3,325.9			32,979.2	36,305.1	
	2019	1,971.9		2.74	561.3	34,167.6	16,939.2			34,728.9	51,668.1	
	2018	1,907.4		6.56	576.0	21,960.4	21,962.8			22,536.4	44,499.2	
	2017	1,519.9		6.87	416.5	26,596.7	17,578.7			27,013.1	44,591.8	
	2016	1,232.0		6.49	353.7	26,121.3	15,227.9			26,475.0	41,702.9	
	Fund of Funds	2020	1,431.9		16.18	376.8	7,695.3	-	8,003.9	6,619.3	16,076.0	22,695.2
		2019	1,246.9		7.08	426.5	6,605.4	-	7,015.7	6,783.0	14,047.7	20,830.6
		2018	1,491.6		-2.70	450.4	3,065.0	1,012.9	10,487.3	4,708.5	14,002.7	19,724.2
		2017	1,825.5		5.25	500.2	3,330.2	-	17,942.0	12,219.8	21,772.4	33,992.2
		2016	1,984.7		-0.10	569.8	2,608.4	2,778.6	22,329.5	4,993.0	25,507.7	33,279.3
Real Estate ex-REITs												
Co-Investment	2020	20.6		-0.03	5.4	148.0	364.5			153.5	518.0	
	2019	0.6		28.63	0.4	-	-			0.4	0.4	
	2018	1.5		-59.67	0.5	-	-			0.5	0.5	
	2017	7.5		-8.22	2.1	4.3				6.4	6.4	
	2016	17.1		-15.33	4.9	47.0				52.0	52.0	
	LP	2020	2,313.8	2,441.1	0.42	608.8	23,031.4	12,173.9			23,640.2	35,814.1
		2019	2,358.7	2,830.7	5.64	547.5	27,103.6	15,690.9			27,651.1	43,342.0
		2018	1,914.6	1,965.5	9.93	578.2	19,266.4	16,742.4			19,844.5	36,586.9
		2017	1,830.5	1,736.6	9.82	501.6	16,110.3	20,114.4			16,611.9	36,726.3
		2016	1,475.4	1,597.0	2.95	423.6	16,675.4	10,588.5			17,098.9	27,687.5
Infrastructure												
Co-Investment	2020	35.2		3.19	9.3	78.1	2.3			87.4	89.7	
	External Active	2020	916.1	1,231.5	0.37	241.0	6,997.5	1,377.0			7,238.5	8,615.5
		2019	830.0	1,110.1	26.51	236.3	4,081.9	-			4,318.2	4,318.2
		2018	631.2	831.2	-6.65	190.6	2,898.4	-			3,089.0	3,089.0
		2017	425.7	425.7	15.00	116.7	2,065.8	-			2,182.5	2,182.5
		2016	159.2	274.4	-5.23	45.7	764.9	-			810.6	810.6
Diversified Private Equity												
Co-Investment	2020	727.0		8.22	229.3	960.3	892.5			1,189.5	2,082.0	
	2019	550.2		12.89	156.6	2,945.9	3,620.1			3,102.5	6,722.6	
	2018	396.7		-29.24	119.8	3,263.9				3,383.7	3,383.7	
	2017	488.2		8.28	133.8	3,499.9				3,633.7	3,633.7	
	2016	741.5		10.44	212.9	3,232.8				3,445.6	3,445.6	
	LP	2020	1,047.0	2,479.9	2.36	277.7	39,267.3	18,736.3			39,544.9	58,281.3
		2019	1,344.7	2,143.2	6.32	382.8	33,292.1	55,870.5			33,674.8	89,545.3
		2018	1,474.3	1,841.1	13.35	445.2	27,451.1	19,305.3			27,896.3	47,201.6
		2017	1,408.0	1,316.4	17.10	385.8	19,106.4	46,571.8			19,492.2	66,064.0
		2016	1,345.0	1,670.4	13.75	386.2	22,068.2	43,990.4			22,454.3	66,444.7
	Fund of Funds	2020	329.9	506.5	18.62	84.6	4,578.8	9,723.6	7,951.3	6,334.8	12,614.7	28,673.1
		2019	401.0	245.0	5.37	114.2	2,994.6	1,084.5	3,846.8	7,418.7	6,955.6	15,458.7
		2018	473.3	428.2	15.66	142.9	1,374.8	-	3,499.5	4,158.9	5,017.3	9,176.2
		2017	546.9	415.1	10.42	149.9	2,846.4	-	4,779.8	1,577.0	7,776.1	9,353.1
		2016	629.5	503.8	4.15	180.7	4,074.3	1,017.1	6,592.6	(1,679.1)	10,847.6	10,185.6
Private Credit												
Co-Investment	2020	296.7		1.78	40.1	2,426.6	485.6			2,466.7	2,952.3	
	2019	46.2		-1.66	13.1	-	-			13.1	13.1	
	2018	0.3		18.65	0.1	0.0				0.1	0.1	
	2017	3.5		1.98	1.0	8.4				9.4	9.4	
	2016	5.9		3.65	1.7	14.8				16.5	16.5	
	LP	2020	2,199.1	3,998.9	-0.72	578.6	26,915.1	909.2			27,493.7	28,402.9
		2019	1,963.2	4,096.7	6.60	558.8	29,748.3	9,198.2			30,307.2	39,505.3
		2018	1,836.9	2,569.5	3.29	554.7	18,768.9	12,110.3			19,323.6	31,433.9
		2017	1,779.0	2,292.7	6.94	487.5	24,096.4	15,638.8			24,583.9	40,222.7

## 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 10 for more details)

Asset Class/Style	Year	Asset (\$millions)	Fee basis (\$millions)	Return %	Cost (\$000)						
					Internal & Other	Base Fees	Perf Fees	Underlying fees		Total	
								Base	Perf	excl. perf	incl. perf
LP (cont'd)	2016	1,607.1	1,471.9	8.88	461.4	17,004.6	16,791.4			17,466.0	34,257.5

1. External Active' style is alternatively named 'Fund (Evergreen, Core)' on the survey. This category typically includes core funds having perpetual or undefined lifetimes and operated by an external manager who invests in opportunities where a large part of expected return is income or yield. They are often described as core or core+ investments. Include funds-of-one and separately managed accounts (SMAs) if they are operated by an external manager.

2. LP' style is alternatively named 'Fund (LP, Value Add)' on the survey. This category typically includes value-add or opportunistic funds having a pre-defined term and a GP/LP structure. Typically, the investment period is less than 12 years. They are operated by an external manager who invests in opportunities where a large part of the expected return is capital gains due to repositioning or redevelopment.

## Appendix A Data Summary - Costs in bps: Hedge Funds and Private Market

South Carolina Retirement System Investment Commission  
(Default costs are highlighted with blue shading. See page 10 for more details)

Asset Class/Style	Year	Cost on NAV (bps)							Cost on fee basis (bps)								
		Internal & Other	Base Fees	Perf Fees	Underlying fees Base	Perf	Total excl. perf	Total incl. perf	Internal & Other	Base Fees	Perf Fees	Underlying fees Base	Perf	Total excl. perf	Total incl. perf		
Hedge Funds	External Active	2020	2.6	184.8	18.9			187.5	206.4	2.6	184.8	18.9			187.5	206.4	
		2019	2.8	173.3	85.9			176.1	262.0	2.8	173.3	85.9			176.1	262.0	
		2018	3.0	115.1	115.1			118.2	233.3	3.0	115.1	115.1			118.2	233.3	
		2017	2.7	175.0	115.7			177.7	293.4	2.7	175.0	115.7			177.7	293.4	
		2016	2.9	212.0	123.6			214.9	338.5	2.9	212.0	123.6			214.9	338.5	
	Fund of Funds	2020	2.6	53.7	-	55.9	46.2	112.3	158.5	2.6	53.7	-	55.9	46.2	112.3	158.5	
		2019	3.4	53.0	-	56.3	54.4	112.7	167.1	3.4	53.0	-	56.3	54.4	112.7	167.1	
		2018	3.0	20.5	6.8	70.3	31.6	93.9	132.2	3.0	20.5	6.8	70.3	31.6	93.9	132.2	
		2017	2.7	18.2	-	98.3	66.9	119.3	186.2	2.7	18.2	-	98.3	66.9	119.3	186.2	
		2016	2.9	13.1	14.0	112.5	25.2	128.5	167.7	2.9	13.1	14.0	112.5	25.2	128.5	167.7	
Real Estate ex-REITs	Co-Investment	2020	2.6	71.8	176.7			74.4	251.1	2.6	71.8	176.7			74.4	251.1	
		2019	7.3	-	-			7.3	7.3	7.3	-	-			7.3	7.3	
		2018	3.0	-	-			3.0	3.0	3.0	-	-			3.0	3.0	
		2017	2.7	5.7				8.4	8.4	2.7	5.7				8.4	8.4	
		2016	2.9	27.5				30.3	30.3	2.9	27.5				30.3	30.3	
	LP	2020	2.6	99.5	52.6			102.2	154.8	2.5	94.3	49.9			96.8	146.7	
		2019	2.3	114.9	66.5			117.2	183.8	1.9	95.7	55.4			97.7	153.1	
		2018	3.0	100.6	87.4			103.7	191.1	2.9	98.0	85.2			101.0	186.1	
		2017	2.7	88.0	109.9			90.8	200.6	2.9	92.8	115.8			95.7	211.5	
		2016	2.9	113.0	71.8			115.9	187.7	2.7	104.4	66.3			107.1	173.4	
Infrastructure	Co-Investment	2020	2.6	22.2	0.7			24.8	25.5	2.6	22.2	0.7			24.8	25.5	
		External Active	2020	2.6	76.4	15.0			79.0	94.0	2.0	56.8	11.2			58.8	70.0
			2019	2.8	49.2	-			52.0	52.0	2.1	36.8	-			38.9	38.9
	2018		3.0	45.9	-			48.9	48.9	2.3	34.9	-			37.2	37.2	
	2017	2.7	48.5	-			51.3	51.3	2.7	48.5	-			51.3	51.3		
	2016	2.9	48.0	-			50.9	50.9	1.7	27.9	-			29.5	29.5		
Diversified Private Equity	Co-Investment	2020	3.2	13.2	12.3			16.4	28.6	3.2	13.2	12.3			16.4	28.6	
		2019	2.8	53.5	65.8			56.4	122.2	2.8	53.5	65.8			56.4	122.2	
		2018	3.0	82.3				85.3	85.3	3.0	82.3				85.3	85.3	
		2017	2.7	71.7				74.4	74.4	2.7	71.7				74.4	74.4	
		2016	2.9	43.6				46.5	46.5	2.9	43.6				46.5	46.5	
		LP	2020	2.7	375.1	179.0			377.7	556.7	1.1	158.3	75.6			159.5	235.0
	2019		2.8	247.6	415.5			250.4	665.9	1.8	155.3	260.7			157.1	417.8	
	2018		3.0	186.2	130.9			189.2	320.2	2.4	149.1	104.9			151.5	256.4	
	2017		2.7	135.7	330.8			138.4	469.2	2.9	145.1	353.8			148.1	501.8	
	2016		2.9	164.1	327.1			166.9	494.0	2.3	132.1	263.4			134.4	397.8	
	Fund of Funds	2020	2.6	138.8	294.7	241.0	192.0	382.3	869.0	1.7	90.4	192.0	157.0	125.1	249.1	566.2	
		2019	2.8	74.7	27.0	95.9	185.0	173.5	385.5	4.7	122.2	44.3	157.0	302.8	283.9	630.9	
		2018	3.0	29.0	-	73.9	87.9	106.0	193.9	3.3	32.1	-	81.7	97.1	117.2	214.3	
		2017	2.7	52.0	-	87.4	28.8	142.2	171.0	3.6	68.6	-	115.2	38.0	187.3	225.3	
2016		2.9	64.7	16.2	104.7	(26.7)	172.3	161.8	3.6	80.9	20.2	130.9	(33.3)	215.3	202.2		
Private Credit	Co-Investment	2020	1.4	81.8	16.4			83.2	99.5	1.4	81.8	16.4			83.2	99.5	
		2019	2.8	-	-			2.8	2.8	2.8	-	-			2.8	2.8	
		2018	2.8	0.4				3.2	3.2	2.8	0.4				3.2	3.2	
		2017	2.7	24.3				27.0	27.0	2.7	24.3				27.0	27.0	
		2016	2.9	25.0				27.9	27.9	2.9	25.0				27.9	27.9	
	LP	2020	2.6	122.4	4.1			125.0	129.2	1.4	67.3	2.3			68.8	71.0	
		2019	2.8	151.5	46.9			154.4	201.2	1.4	72.6	22.5			74.0	96.4	
		2018	3.0	102.2	65.9			105.2	171.1	2.2	73.0	47.1			75.2	122.3	
		2017	2.7	135.5	87.9			138.2	226.1	2.1	105.1	68.2			107.2	175.4	

### Appendix A Data Summary - Costs in bps: Hedge Funds and Private Market

South Carolina Retirement System Investment Commission  
 (Default costs are highlighted with blue shading. See page 10 for more details)

Asset Class/Style	Year	Cost on NAV (bps)						Cost on fee basis (bps)							
		Internal & Other	Base Fees	Perf Fees	Underlying fees Base	Perf	Total excl. perf incl. perf	Internal & Other	Base Fees	Perf Fees	Underlying fees Base	Perf	Total excl. perf incl. perf		
LP (cont'd)	2016	2.9	105.8	104.5			108.7	213.2	3.1	115.5	114.1			118.7	232.7

## 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 <sup>1</sup>	2020	1,198.5	0.4bp
	2019	1,236.7	0.4bp
	2018	1,251.1	0.4bp
	2017	1,089.1	0.4bp
	2016	1,056.3	0.4bp
Custodial total	2020	1,394.3	0.4bp
	2019	1,670.0	0.5bp
	2018	1,152.4	0.4bp
	2017	1,130.5	0.4bp
	2016	925.3	0.3bp
Custodial foreign (if available)	2017	670.5	0.2bp
	2016	460.6	0.2bp
Custodial domestic (if available)	2017	460.0	0.2bp
	2016	464.7	0.2bp
Consulting / performance measurement	2020	785.7	0.2bp
	2019	825.1	0.3bp
	2018	763.7	0.2bp
	2017	1,070.0	0.4bp
	2016	940.0	0.3bp
Audit	2020	409.3	0.1bp
	2019	119.7	0.0bp
	2018	102.4	0.0bp
	2017	16.8	0.0bp
	2016	99.4	0.0bp
Other (legal etc)	2020	373.3	0.1bp
	2019	357.3	0.1bp
	2018	363.2	0.1bp
	2017	320.9	0.1bp
	2016	266.9	0.1bp
Total	2020	4,161.1	1.3bp
	2019	4,208.9	1.3bp
	2018	3,632.7	1.2bp
	2017	3,627.3	1.2bp
	2016	3,288.0	1.2bp

Summary of All Asset Management Costs			
		000s	bps
Investment Management Costs	2020	206,413.4	65.6bp
	2019	231,056.6	73.1bp
	2018	205,925.8	65.9bp
	2017	218,814.6	71.7bp
	2016	208,125.1	74.3bp
Oversight, Custodial & Other Costs	2020	4,161.1	1.3bp
	2019	4,208.9	1.3bp
	2018	3,632.7	1.2bp
	2017	3,627.3	1.2bp
	2016	3,288.0	1.2bp
Total	2020	210,574.4	66.9bp
	2019	235,265.5	74.4bp
	2018	209,558.6	67.0bp
	2017	222,441.9	72.9bp
	2016	211,413.0	75.4bp

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

## Appendix A - Data Summary: Overlays

South Carolina Retirement System Investment Commission

Overlays		Internal					External								
		Notional amount (mils)	Market value (mils)	Profit/Loss (000s)	Cost (000s)	% of Notion. (bps)	Duration (years)	Notional amount (mils)	Market value (mils)	Profit/Loss (000s)	Base fees (000s)	Perf. fees (000s)	Over-sight (000s)	Total (000s)	% of Notion. (bps)
Rebalancing/	2020						5,014.0	897.8		1.2		236.2	237.4	0.5	
Passive Beta	2019						7,408.6	809.4		800.0			800.0	1.1	

## Appendix A - Data Summary: Comments and defaults

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

- 2020 - Real Estate ex-REITs - LP: LP base fee is the weighted average management fee of 94 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 106 bps (25.8 million).
- 2020 - Diversified Private Equity - LP: LP base fee is the weighted average management fee of 158 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 102 bps (25.2 million).
- 2020 - 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.
- 2020 - Diversified Private Equity - FoFs: A default of 192 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.
- 2020 - Private Credit - LP: LP base fee is the weighted average management fee of 67 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 55 bps (22.2 million).
- 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).

## 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 30th 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.