

**Investment  
Benchmarking Analysis**  
(for the 5-year period ending December 31, 2021)

**South Carolina Retirement System Investment Commission**



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# Key Takeaways

## 2021 Calendar Year

- Your 2021 total plan return after deducting all costs were 18.6%. This was above both the benchmark return of 14.9% and the peer median net return of 18.1%, resulting in a one-year value add of 3.7%.
- Within that return, costs were 87.8 bps, below the benchmark by 8.7 bps. This was above last year's cost of 66.9 bps, largely due to 30.5 bps in performance fees from asset classes that beat their benchmark by 2.6% on average.
- Your fund was slightly low cost because it had a lower cost implementation style and it paid less than peers for similar services.
- You placed in the low cost, positive net value added quadrant for 2021. This contributed to maintaining the same low cost, positive net value added position you achieved over the most recent 5- and 10-year periods.

## 5-year Returns

- Your 5-year net total return was 10.5%. This was below both the U.S. Public median of 11.2% and the peer median of 11.2%.
- Your 5-year policy return was 9.8%. This was below both the U.S. Public median of 10.7% and the peer median of 10.5%.

## 5-year Value added

- Your 5-year net value added was 0.7%. This was equal to both the U.S. Public median of 0.7% and the peer median of 0.7%.

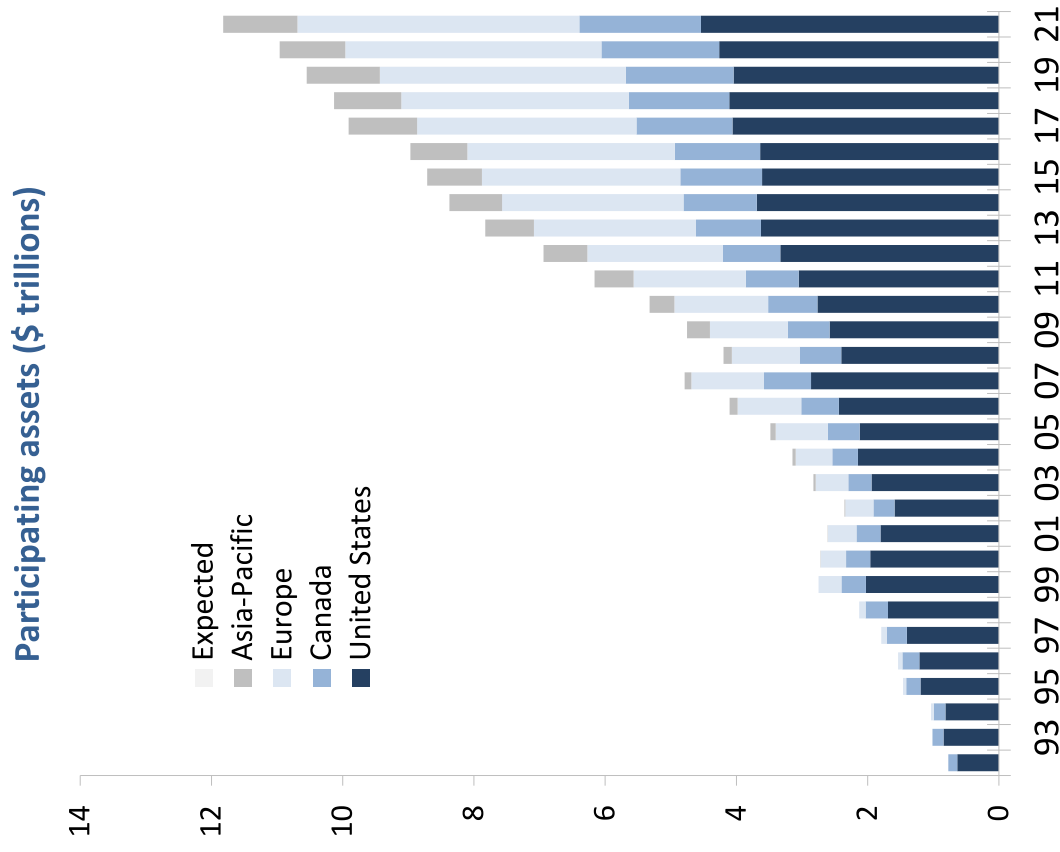
## 5-year Cost

- Your 5-year average costs were 73.8 bps. This was below your benchmark over the period, providing an average annual savings of -9.9 bps.
- Your costs increased by 14.8 bps, from 72.9 bps in 2017 to 87.8 bps in 2021, because you paid more in total for similar investment styles and had a higher cost asset mix. This was partly offset by a lower cost implementation style.

## This benchmarking report compares your cost and return performance to the 271 funds in CEM's extensive pension database.

- 145 U.S. pension funds participate. The median U.S. fund had assets of \$13.2 billion and the average U.S. fund had assets of \$31.3 billion. Total participating U.S. assets were \$4.5 trillion.
- 66 Canadian funds participate with assets totaling \$1.9 trillion.
- 52 European funds participate with aggregate assets of \$4.3 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 \$1.1 trillion. Included are funds from Australia, New Zealand, China and South Korea.
- 2 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 46 funds.





# 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 \$99.3 billion
- Median size of \$39.9 billion versus your \$39.0 billion



To preserve client confidentiality, given potential access to documents as permitted by the Freedom of Information Act, we do not disclose your peers' names in this document. For some of the peers, 2020 cost data was used as a proxy for 2021.

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

### 1. Returns

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

### 2. Net value added

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

### 3. Costs

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

### 4. Cost effectiveness

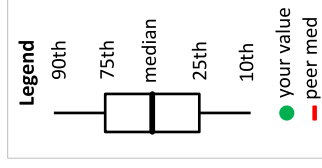
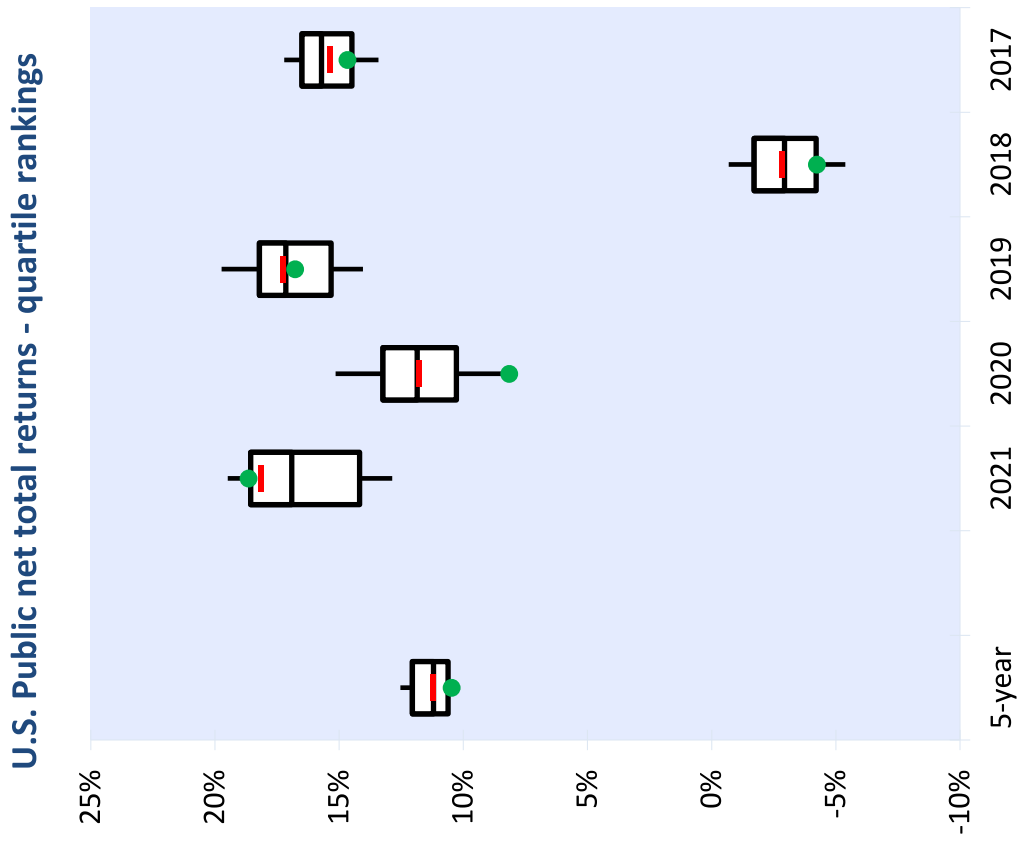
Net implementation value added versus excess cost. Does paying more get you more?

# Your 5-year net total return of 10.5% was below both the U.S. Public median of 11.2% and the peer median of 11.2%.

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	10.5%
- Policy return	9.8%
= Net value added	0.7%

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



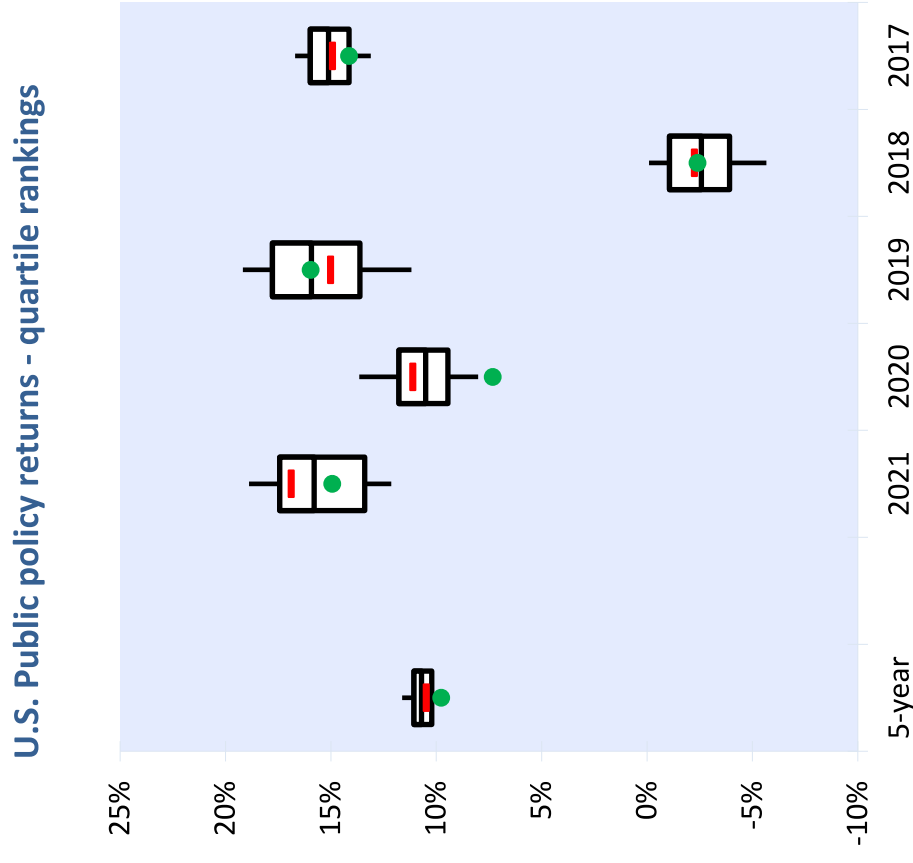
## Your 5-year policy return of 9.8% was below both the U.S. Public median of 10.7% and the peer median of 10.5%.

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

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

- Long term capital market expectations
- Liabilities
- Appetite for risk

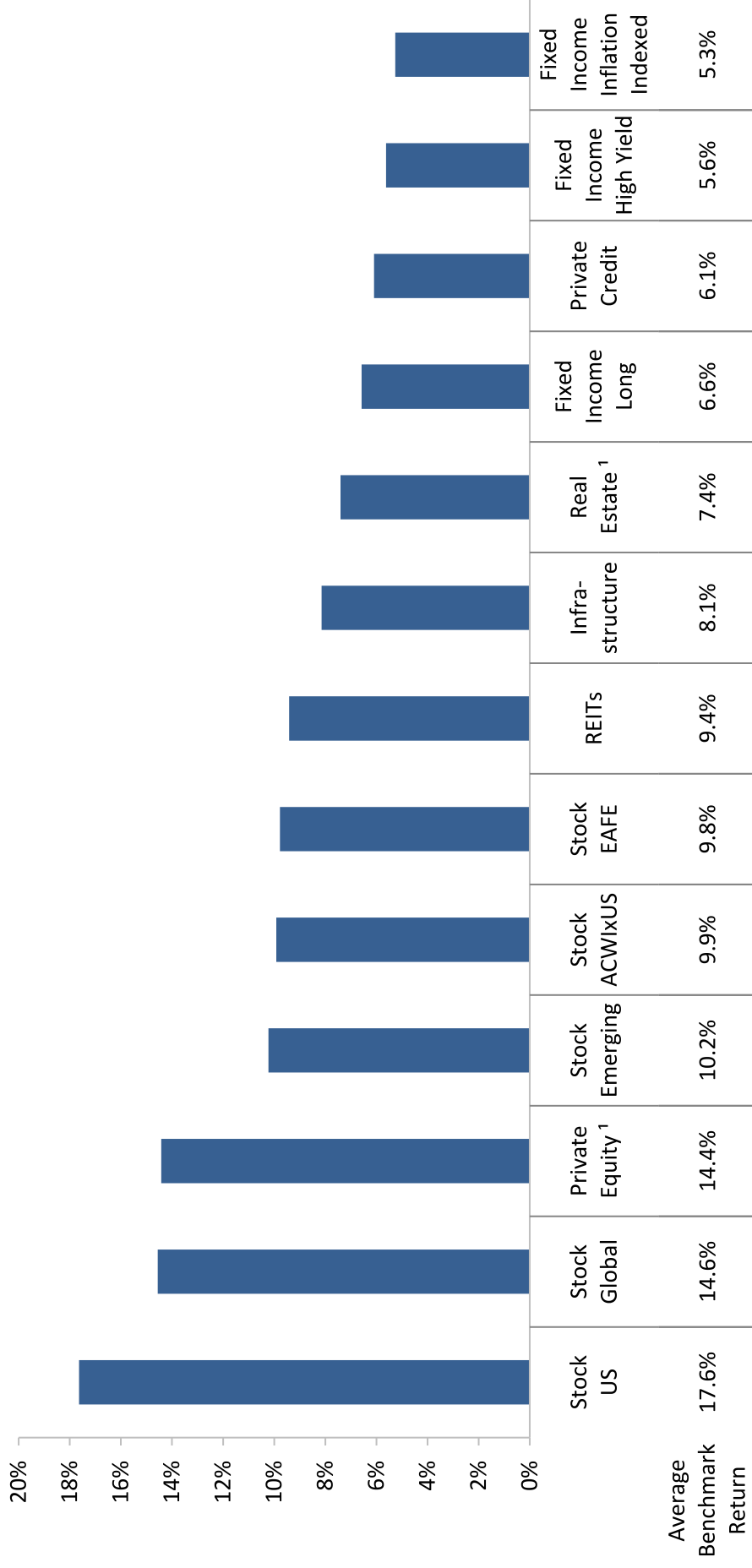
Each of these three factors is different across funds. Therefore, it is not surprising that policy returns often vary widely between funds.



To enable fairer comparisons, the policy returns of all participants, including your fund, were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. Prior to this adjustment, your 5-year policy return was 10.2%, 0.4% higher than your adjusted 5-year policy return of 9.8%. 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 2021 were Stock - U.S. and Stock - Global.

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



1. The private equity benchmark is the average of the default private equity benchmark returns applied to U.S. Public participants. The real estate benchmark is the average of benchmark returns reported by U.S. Public participants.

## Your 5-year policy return of 9.8% was below the U.S. Public median of 10.7% primarily because of:

- The negative impact of a higher allocation to private debt, one of the lower returning asset classes over the past 5 years.
- The negative impact of a slightly lower allocation to total stock, one of the higher returning 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%	18%	-2%	16.0%	17.6%	
Stock - EAFE	0%	4%	-4%	n/a <sup>3</sup>	9.8%	
Stock - Emerging	6%	2%	4%	14.3%	10.2%	
Stock - ACWI x U.S.	2%	7%	-4%	9.4%	9.9%	
Stock - Global	20%	13%	8%	14.4%	14.6%	
Other stock	0%	3%	-3%	n/a <sup>3</sup>	n/a <sup>3</sup>	
<b>Total Stock</b>	<b>44%</b>	<b>46%</b>	<b>-2%</b>	<b>14.9%</b>	<b>14.4%</b>	
Fixed income - U.S.	17%	17%	0%	3.9%	3.7%	
Fixed income - Inflation indexed	0%	3%	-3%	n/a <sup>3</sup>	5.3%	
Cash	1%	-1%	3%	1.2%	1.2%	
Other fixed income <sup>2</sup>	6%	8%	-1%	n/a <sup>3</sup>	n/a <sup>3</sup>	
<b>Total Fixed Income</b>	<b>25%</b>	<b>27%</b>	<b>-2%</b>	<b>4.1%</b>	<b>4.6%</b>	
Global TAA	5%	1%	4%	8.6%	7.4%	
Hedge funds	1%	3%	-2%	8.6%	4.7%	
Infrastructure	3%	1%	2%	8.9%	8.1%	
REITs	2%	1%	1%	10.8%	9.4%	
Real estate ex-REITs	7%	8%	-1%	8.5%	7.4%	
Other real assets <sup>2</sup>	0%	2%	-2%	n/a <sup>3</sup>	n/a <sup>3</sup>	
Private equity	7%	9%	-2%	14.5%	14.4%	
Private debt	6%	2%	5%	6.1%	6.1%	
<b>Total</b>	<b>100%</b>	<b>100%</b>				

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

2. Other fixed income includes: Fixed income - U.S. gov't and Fixed income - High yield. Other real assets include: Commodities and Natural resources.

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.

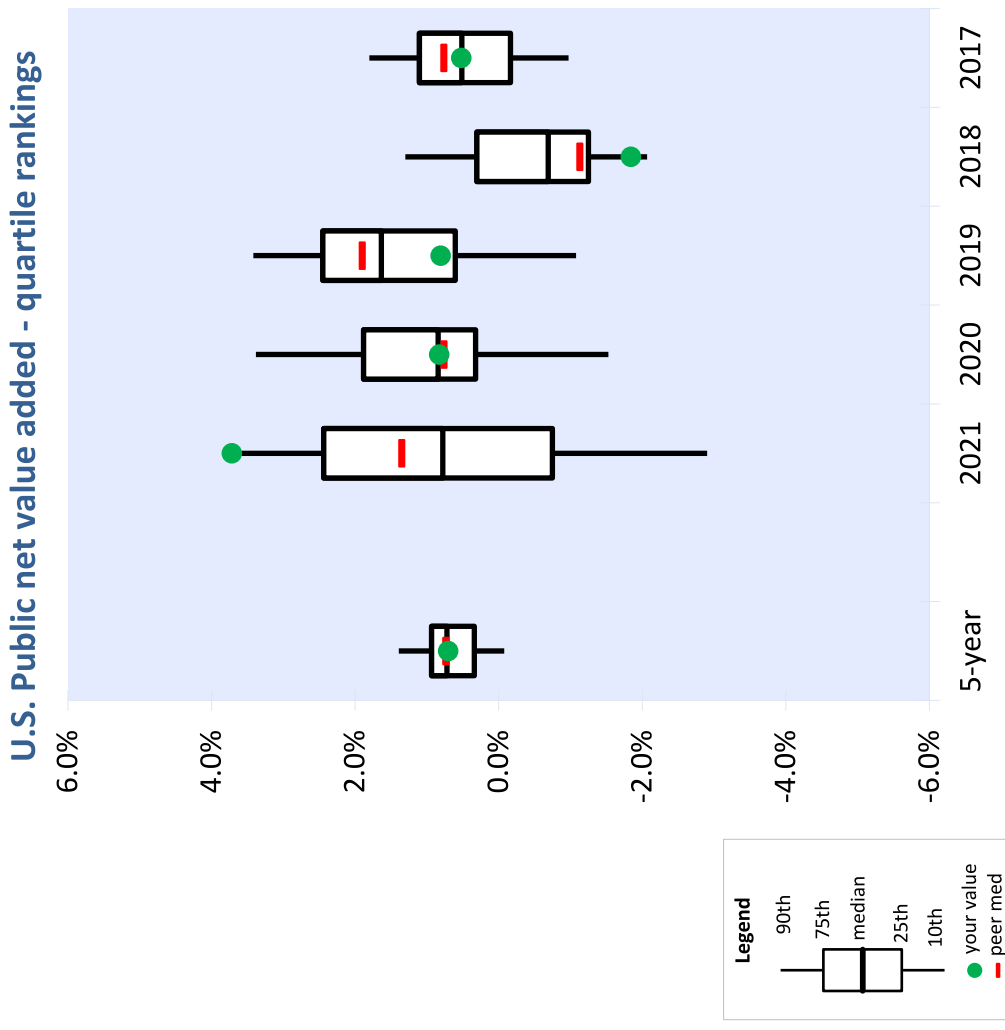
# Net value added is the component of total return from active management. Your 5-year net value added was 0.7%.

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
2021	18.6%	14.9%	3.7%
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%
5-Year	10.5%	9.8%	0.7%

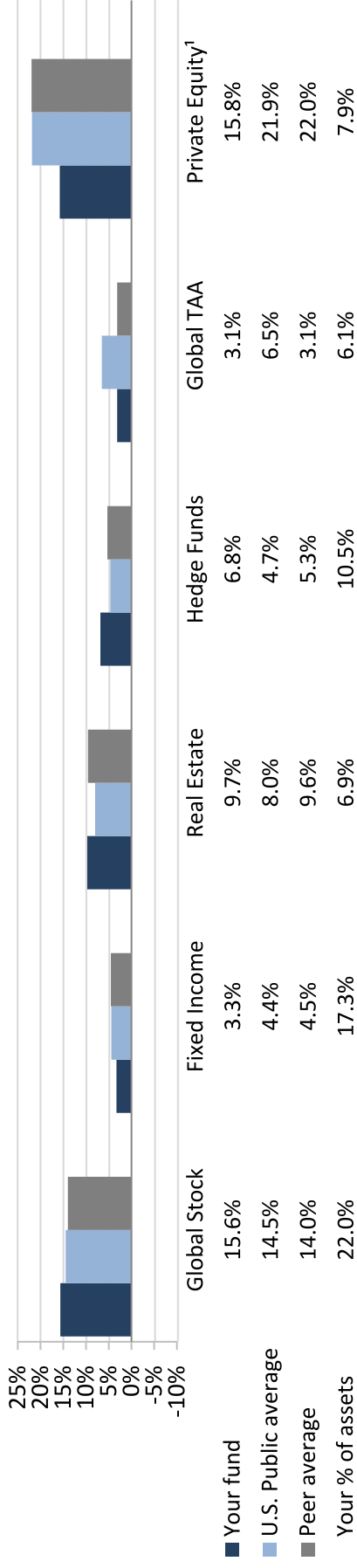
Your 5-year net value added of 0.7% compares to a median of 0.7% for your peers and 0.7% for the U.S. Public universe.



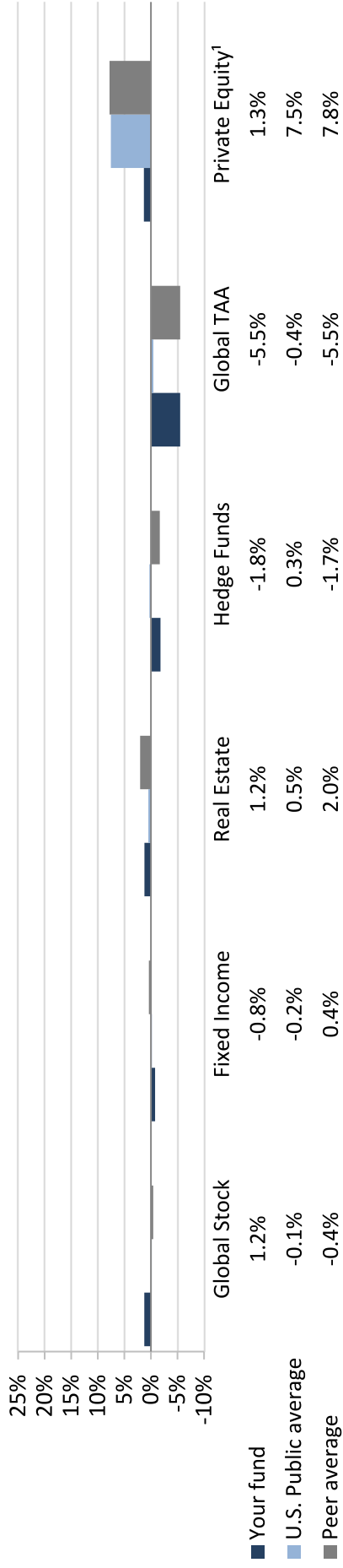
To enable fairer comparisons, the value added for each participant including your fund was adjusted to reflect private equity benchmarks based on lagged, investable public market indices. Prior to this adjustment, your fund's 5-year total fund net value added was 0.3%.

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

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



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



1. To enable fairer comparisons, the private equity benchmarks of all participants, including your fund were adjusted to reflect lagged, investable, public-market indices. Prior to this adjustment, your fund's 5-year private equity net value added was -5.8%.



# Your investment costs, excluding private asset performance fees, were \$342.2 million or 87.8 basis points in 2021.

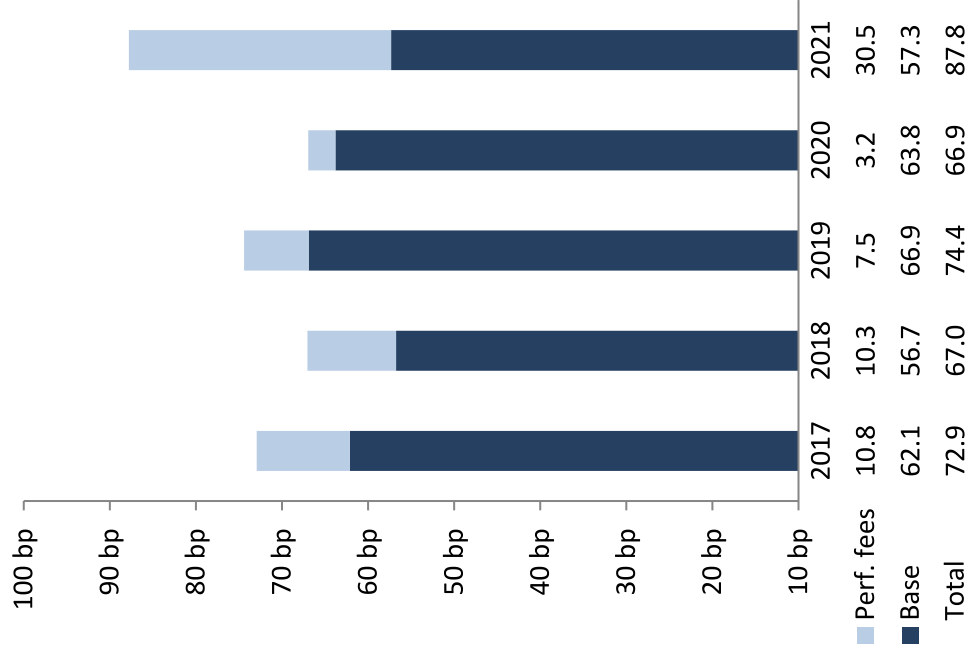
Asset management costs by asset class and style (\$000s)	Internal Mgmt		External Management		Total
	Active	Overseeing of external	Passive fees	Active base fees	
Stock - U.S. broad/all		179			179
Stock - U.S. small cap		256	491		746
Stock - EAFE		263	218		481
Stock - Emerging		139		132	271
Stock - Global		3,080	2,082		5,162
Stock - ACWI x U.S.		0			0
Fixed income - U.S.	5	287		960	1,252
Fixed income - Emerging		70		172	242
Fixed income - High yield		332		4,831	5,163
Cash		230		58	288
REITs		88		933	1,021
Infrastructure <sup>3</sup>		219		6,631	6,850
Infrastructure - Co-invest. <sup>3</sup>		18		180	198
Real estate ex-REITs - LP <sup>1,3</sup>		631		27,598	28,228
Real estate ex-REITs - Co-invest. <sup>3</sup>		13		323	337
Global TAA		135		6,327	13,186
Hedge funds - External active		353		36,125	107,340
Hedge funds - FoFs		529		33,821	75,513
Private equity - Diversified - LP <sup>1,3</sup>		457		54,587	55,044
Private equity - Diversified - Co-invest. <sup>3</sup>		277		2,118	2,395
Private equity - Diversified - FoFs <sup>2,3</sup>		103		11,558	11,661
Private credit - LP <sup>1,3</sup>		565		19,788	20,353
Private credit - Co-invest. <sup>3</sup>		118		1,331	1,449
Derivatives/Overlays		110	658		768
<b>Total excluding private asset performance fees</b>					<b>338,130</b>
<b>Oversight, custodial and other costs <sup>4</sup></b>					<b>86.7bp</b>
Oversight of the fund					1,238
Trustee & custodial					1,394
Consulting and performance measurement					835
Audit					238
Other					382
<b>Total oversight, custodial &amp; other costs</b>					<b>4,087</b>
<b>Total investment costs (excl. transaction costs &amp; private asset performance fees)</b>					<b>342,217</b>
					<b>87.8bp</b>

## Footnotes

1. Fees are the weighted average management cost calculated using the detailed limited partnership survey provided.
2. Default underlying costs for one or more mandates were added: Private equity - Diversified - FoFs 154 bps.
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 increased by 14.8 bps, from 72.9 bps in 2017 to 87.8 bps in 2021, because you paid more in total for similar investment styles and had a higher cost asset mix. This was partly offset by a lower cost implementation style.

Trend in cost



Reasons why your costs increased by 14.8 bps

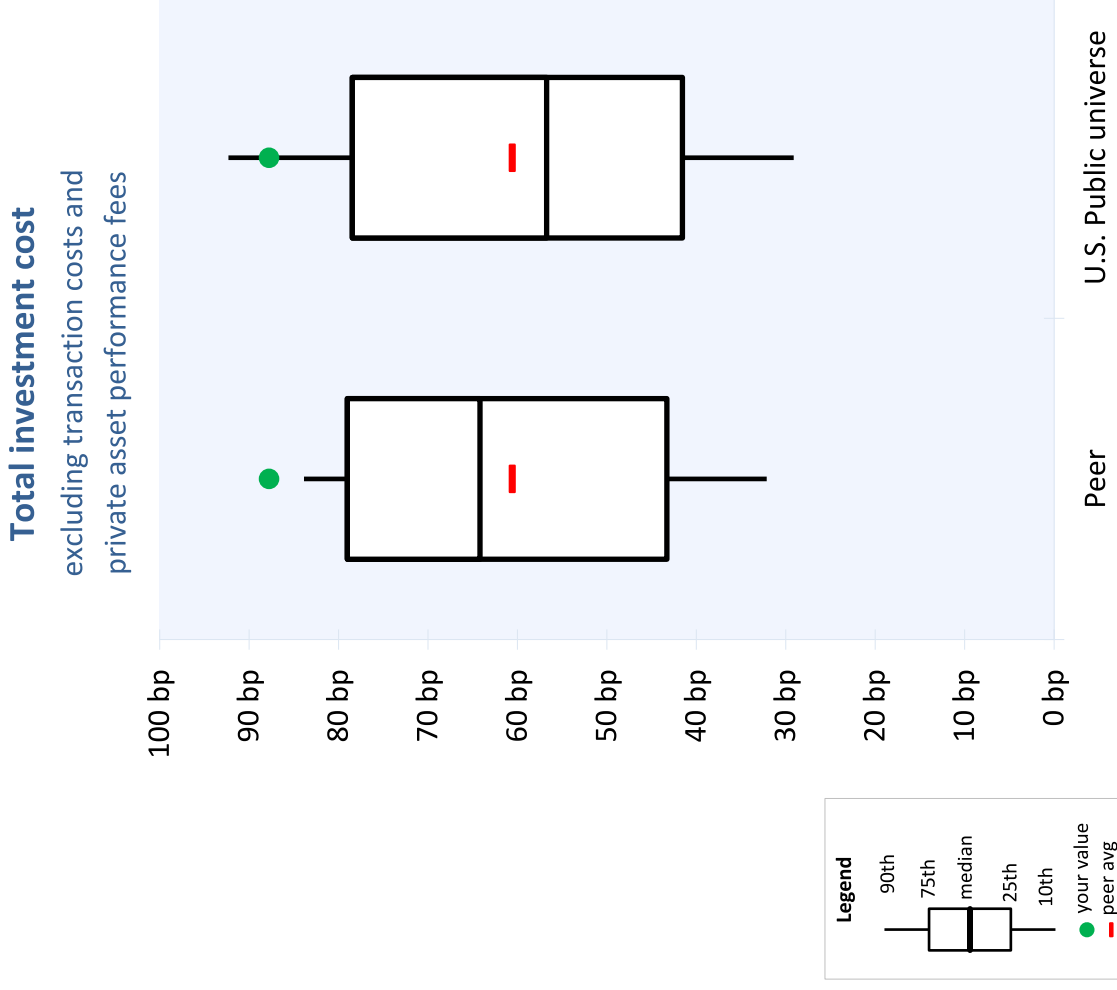
Reasons why your costs increased by 14.8 bps	Impact in bps
1. Higher cost asset mix	
• Mix of Stock	(3.1)
• Less Fixed income: 2017 24% vs 2021 10%	(4.3)
• More Real estate ex-REITs: 2017 6% vs 2021 8%	2.3
• Less Hedge funds & multi-asset: 2017 18% vs 2021 12%	(3.4)
• More Private equity: 2017 7% vs 2021 15%	10.1
• More Private debt: 2017 8% vs 2021 11%	3.5
• All other mix changes	0.9
	<u>6.0</u>
2. Lower cost implementation style	
• More passive, less active	(3.3)
• More LP, less FoF	(1.4)
• More co-investment as a % of LP/Co	(2.1)
• All other implementation style changes	0.2
	<u>(6.6)</u>
3. Paid more in total for similar investment styles	
• Lower public asset base fees	(3.7)
• Higher private asset base fees	(0.2)
• Higher private asset performance fees	19.6
• Similar internal investment management costs	0.0
• Lower oversight, custodial & other costs	(0.1)
• All other differences	0.0
	<u>15.5</u>
Total increase	<u>14.8</u>

# Your total investment cost of 87.8 bps was above the peer median of 64.2 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 39% of your funds assets at the end of 2021 versus a peer average of 28%.
- Fund size. Bigger funds have advantages of scale.

Therefore, to assess whether your costs are high or low given your unique asset mix and size, CEM calculates a benchmark cost for your fund. This analysis is shown on the following page.



## Benchmark cost analysis suggests that, after adjusting for fund size and asset mix, your fund was slightly low cost by 8.7 basis points in 2021.

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 87.8 bp was slightly below your benchmark cost of 96.5 bp. Thus, your cost savings were 8.7 bp.

### Your cost versus benchmark

	\$000s	basis points
Your total investment cost	342,217	87.8 bp
Your benchmark cost	376,248	96.5 bp
Your excess cost	(34,031)	(8.7) bp

# Your fund was slightly low cost because it had a lower cost implementation style and it paid less than peers for similar services.

## Reasons for your low cost status

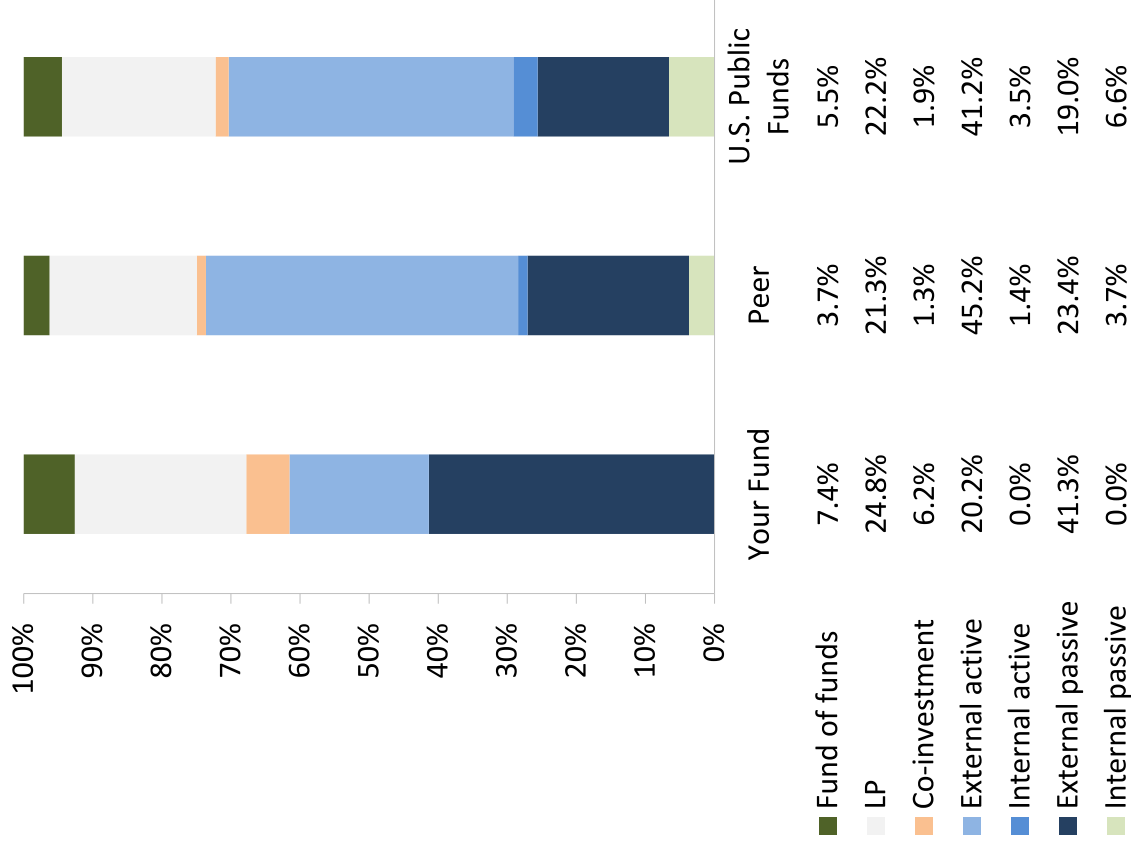
	Excess Cost/ (Savings)	
	\$000s	bps
1. Lower cost implementation style		
• Less active management, more lower cost passive	(24,181)	(6.2)
• More external management, less lower cost internal	1,510	0.4
• More LPs as a percentage of external	22,494	5.8
• Use of fund of funds	(3,054)	(0.8)
• More co-investment as a percentage of LP/Co	(24,198)	(6.2)
• Less overlays	(2,746)	(0.7)
	(30,176)	(7.7)
2. Paying less than peers for similar services		
• External investment management costs	(746)	(0.2)
• Internal investment management costs	0	0.0
• Oversight, custodial & other costs	(3,109)	(0.8)
	(3,855)	(1.0)
<b>Total fund savings (due to structural differences)</b>	<b>(34,031)</b>	<b>(8.7)</b>
Neutralized differences due to performance fees specific to 2021:		
• Paying more for hedge fund performance fees	46,192	11.8
• Paying less for hedge fund FoF performance fees	(23,781)	(6.1)
	22,411	5.7

# Your implementation style was 7.7 bps lower 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	(6.2) bp
Less internal as a % of passive	0.1 bp
Less internal as a % of active	0.3 bp
Less evergreen % in private assets, excl. PE	5.8 bp
More fund of funds % of LP/Co/FoF	(0.8) bp <sup>2</sup>
More co-investment % of LP/Co	(6.2) bp
Less overlays	(0.7) bp
<b>Total impact</b>	<b>(7.7) bp</b>

Implementation style<sup>1</sup>



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.

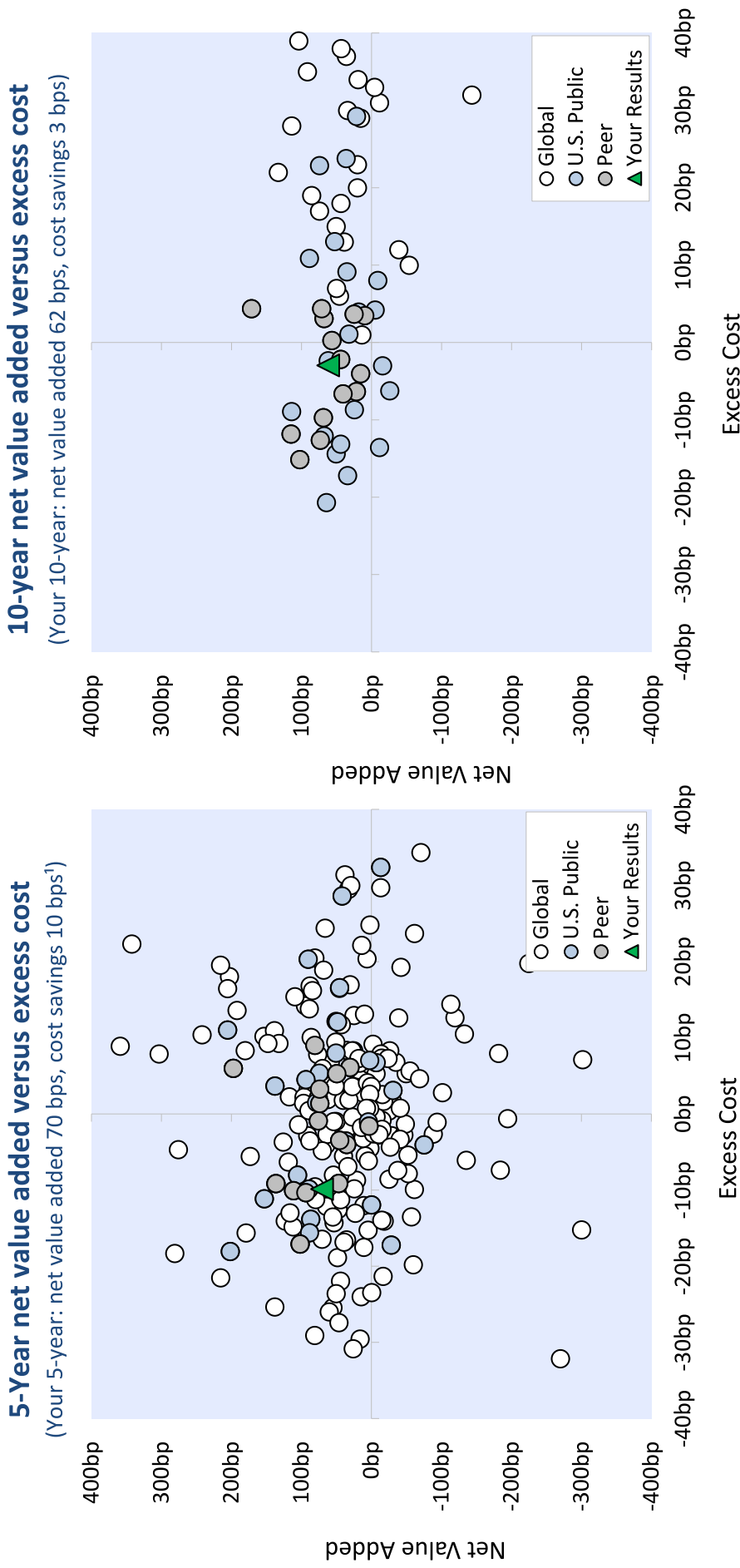
2. Typically, more fund of funds as a % of LP/Co/FoF is higher cost. But your mix of fund of funds decreased your cost.

## 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	Impl. style \$000s	Paying more/(less) \$000s	Total \$000s	Total bps
Stock - U.S. broad/all	1,360	(1,888)	(528)	(6.3) bp
Stock - U.S. small cap	(4,422)	587	(3,836)	(32.2) bp
Stock - EAFE	(4,249)	0	(4,249)	(34.6) bp
Stock - Emerging	902	(3,588)	(2,686)	(41.3) bp
Stock - Global	(17,626)	(26)	(17,652)	(12.3) bp
Stock - ACWI x U.S.	1	(7)	(6)	(25.1) bp
Fixed income - U.S.	290	108	398	4.5 bp
Fixed income - Emerging	82	(935)	(853)	(26.0) bp
Fixed income - High yield	68	385	453	2.9 bp
REITs	267	(667)	(400)	(9.8) bp
Real estate ex-REITs	11,365	(13,253)	(1,888)	(6.0) bp
Infrastructure	(5,627)	(1,054)	(6,681)	(49.2) bp
Hedge funds	12,881	(23,143)	(10,262)	(24.9) bp
Global TAA	99	10,260	10,359	164.8 bp
Private equity - Diversified	(22,853)	1,793	(21,060)	(37.1) bp
Private credit	34	(24,136)	(24,102)	(57.1) bp
Derivatives and overlays	(2,746)	0	(2,746)	(0.7) bp
Oversight, custodial & other	n/a	(3,109)	(3,109)	(0.8) bp
Total	(30,176)	(58,673)	(34,031)	(8.7) bp

# Your 10-year performance placed in the positive value added, low cost quadrant of the cost effectiveness chart.



1. Your 10-year cost savings of 3 basis points is the average of your cost savings for the past 10 years.

	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	5-year
Net value added	371.7 bp	82.8 bp	80.8 bp	(184.2) bp	52.2 bp	(49.5) bp	63.8 bp	15.9 bp	109.2 bp	133.7 bp	70.4 bp
Excess cost	(8.7) bp	(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	(9.9) bp



# Summary of key takeaways

## Returns

- Your 5-year net total return was 10.5%. This was below both the U.S. Public median of 11.2% and the peer median of 11.2%.
- Your 5-year policy return was 9.8%. This was below both the U.S. Public median of 10.7% and the peer median of 10.5%.

## Value added

- Your 5-year net value added was 0.7%. This was equal to both the U.S. Public median of 0.7% and the peer median of 0.7%

## Cost and cost effectiveness

- Your investment cost of 87.8 bps was below your benchmark cost of 96.5 bps. This suggests that your fund was slightly low cost compared to your peers.
- Your fund was slightly low cost because it had a lower cost implementation style and it paid less than peers for similar services.
- Your costs increased by 14.8 bps, from 72.9 bps in 2017 to 87.8 bps in 2021, because you paid more in total for similar investment styles and had a higher cost asset mix. This was partly offset by a lower cost implementation style.

# 2

## Description of peer group and universe

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## Peer group

Your peer group is comprised of 18 global funds, with assets ranging from \$17.6 billion to \$99.3 billion versus your \$39.0 billion. The median size is \$39.9 billion.

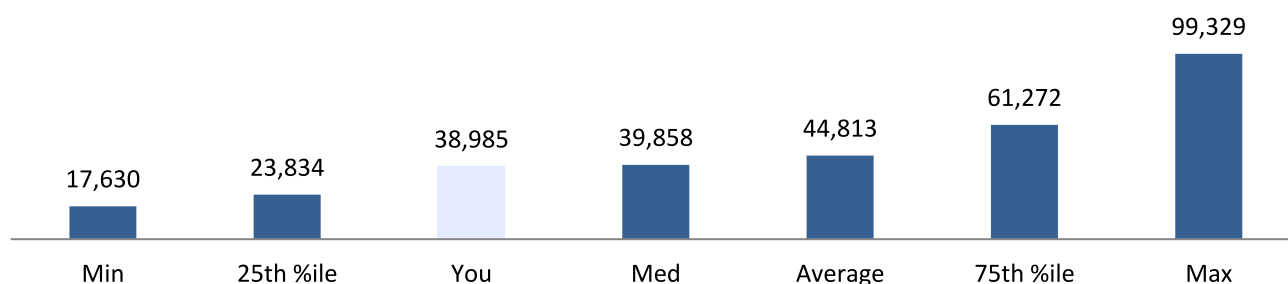
In order to preserve client confidentiality, we do not disclose your peers' names in this document due to the Freedom of Information Act. Your peer group consist of plans with the following characteristics:

### Peer Group Characteristics - 2021

	You	Peers	U.S. Public average
<u>Plan Assets (\$ billions)</u>			
Range	39.0	17.6 - 99.3	2.2 - 411.9
Median		39.9	26.6
<u># of Plans</u>			
Corporate		0	0
Public	1	17	46
Other		1	0
Total		18	46
<u>Implementation style</u>			
% External active	55.6	66.9	61.9
% External passive	44.4	24.4	23.2
% Internal active	0.0	5.3	8.1
% Internal passive	0.0	3.4	6.9
<u>Asset mix</u>			
% Stock	46.9	45.4	45.3
% Fixed Income	9.8	22.7	25.4
% Real Assets	11.6	9.6	10.2
% Private Equity	10.0	12.0	10.7
% Private Credit	8.2	2.3	1.9
% Hedge Funds & Other	13.5	8.0	6.6

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

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

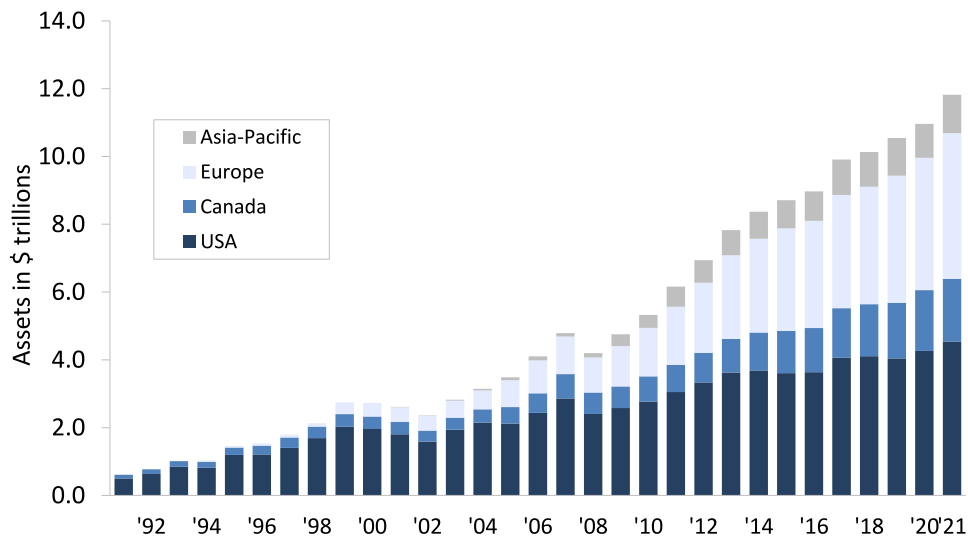


## CEM global universe

CEM has been providing investment benchmarking solutions since 1991. The 2021 survey universe is comprised of 271 funds representing \$11.9 trillion in assets. The breakdown by region is as follows:

- 145 U.S. pension funds with aggregate assets of \$4.5 trillion.
- 66 Canadian pension funds with aggregate assets of \$1.9 trillion.
- 52 European pension funds with aggregate assets of \$4.3 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Denmark, UK, and Ireland.
- 6 Asia-Pacific pension funds with aggregate assets of \$1.1 trillion.

CEM global universe



## Universe subsets

CEM's global survey universe is comprised of 271 funds with total assets of \$11.9 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 - \$99.3 billion. The peer median of \$39.9 billion compares to your \$39.0 billion.
- U.S. Public - The U.S. Public universe is comprised of 46 funds ranging in size from \$2.2 - \$411.9 billion. The median fund is \$26.6 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
<u># of funds</u>										
2021	18	124	109	38	271	145	66	52	8	271
2020	18	135	136	37	308	158	69	72	9	308
2019	16	135	136	42	313	152	72	75	14	313
2018	17	147	148	44	339	170	78	77	14	339
2017	17	151	154	47	352	167	80	89	16	352
<u># of funds with uninterrupted data for:</u>										
1 yr	18	124	109	38	271	145	66	52	8	271
2 yrs	18	118	105	33	256	137	62	50	7	256
3 yrs	16	109	99	32	240	125	61	47	7	240
4 yrs	16	104	99	31	234	121	60	46	7	234
5 yrs	16	97	94	30	221	115	54	45	7	221
<u>Total assets (\$ billions)</u>										
2021	807	1,707	7,780	2,377	11,863	4,541	1,852	4,296	1,174	11,863
2020	704	1,719	7,278	2,090	11,086	4,261	1,795	3,904	1,126	11,086
2019	597	1,637	6,891	2,162	10,690	4,042	1,644	3,747	1,257	10,690
2018	584	1,549	6,817	1,884	10,250	4,109	1,532	3,467	1,142	10,250
2017	600	1,524	6,702	2,004	10,230	4,061	1,462	3,343	1,364	10,230
<u>2021 asset distribution (\$ billions)</u>										
Avg	44.8	13.8	71.4	62.6	43.8	31.3	28.1	82.6	146.8	43.8
Max	99.3	130.0	1,627.2	751.0	1,627.2	411.9	362.1	1,627.2	799.7	1,627.2
75th %ile	61.3	18.2	60.7	67.5	33.5	27.0	17.2	49.9	91.2	33.5
Median	39.9	6.3	17.6	17.3	10.8	13.2	6.0	15.4	50.9	10.8
25th %ile	23.8	2.5	5.9	3.2	3.5	3.5	2.2	5.5	27.5	3.5
Min	17.6	0.4	0.1	0.1	0.1	0.4	0.1	0.7	3.6	0.1

1. Peer group statistics are for your 2021 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 - 2021 (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	48.0	64.2	73.1	55.3	60.4	64.1	72.1	62.5	46.2	48.9	64.1
Fund of funds	7.6	2.7	2.3	2.7	2.2	2.5	2.6	1.7	3.1	2.0	2.5
External passive	44.4	24.4	18.0	17.0	19.0	17.7	18.1	11.9	24.1	17.3	17.7
Internal Active	0.0	5.3	5.2	18.7	13.6	11.8	4.1	18.8	23.3	19.8	11.8
Internal Passive	<u>0.0</u>	<u>3.4</u>	<u>1.4</u>	<u>6.3</u>	<u>4.9</u>	<u>3.8</u>	<u>3.1</u>	<u>5.0</u>	<u>3.2</u>	<u>12.1</u>	<u>3.8</u>
Total	100	100	100	100	100	100	100	100	100	100	100
<b>Actual asset mix</b>											
Stock	46.9	45.4	29.4	45.9	44.0	38.1	35.4	37.7	44.7	46.8	38.1
Fixed Income <sup>2</sup>	11.2	24.5	52.3	25.6	33.3	38.9	42.9	34.5	34.5	31.0	38.9
Global TAA	1.6	0.2	0.5	0.8	0.2	0.5	0.6	0.5	0.4	0.1	0.5
Real Assets	11.6	9.6	6.3	13.4	12.3	10.0	6.6	16.8	10.9	10.6	10.0
Hedge Funds	10.6	5.0	3.9	2.8	1.9	3.2	4.5	1.7	1.2	3.3	3.2
Balanced Funds	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.7	0.0	0.1
Risk Parity	0.0	1.0	0.5	0.4	0.1	0.4	0.8	0.0	0.0	0.1	0.4
Private Debt	8.2	2.3	1.9	2.6	3.7	2.4	1.6	3.3	3.7	1.4	2.4
Private Equity	<u>10.0</u>	<u>12.0</u>	<u>5.3</u>	<u>8.2</u>	<u>4.5</u>	<u>6.3</u>	<u>7.6</u>	<u>5.4</u>	<u>3.8</u>	<u>6.8</u>	<u>6.3</u>
Total	100	100	100	100	100	100	100	100	100	100	100
<b>Policy asset mix</b>											
Stock	46.0	46.2	29.4	45.4	43.7	37.9	35.5	36.9	43.6	52.9	37.9
Fixed Income	26.0	26.1	53.5	25.9	33.6	39.6	44.3	34.9	34.1	27.8	39.6
Global TAA	0.0	0.1	0.4	0.9	0.2	0.6	0.6	0.7	0.3	0.2	0.6
Real Assets	12.0	10.7	6.5	14.8	13.1	10.8	7.2	17.5	12.1	10.6	10.8
Hedge funds	0.0	3.2	3.2	1.9	1.7	2.5	3.4	1.4	1.1	2.3	2.5
Balanced Funds	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.4	0.0	0.1
Risk Parity	0.0	1.3	0.5	0.4	0.0	0.4	0.7	0.0	0.0	0.0	0.4
Private Debt	7.0	2.2	1.8	3.1	3.6	2.6	1.4	4.1	4.4	1.2	2.6
Private Equity	<u>9.0</u>	<u>10.2</u>	<u>4.7</u>	<u>7.3</u>	<u>4.2</u>	<u>5.7</u>	<u>6.8</u>	<u>4.5</u>	<u>4.0</u>	<u>5.1</u>	<u>5.7</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 - 2017 to 2021 (as a % of year-end assets)

	Your fund <sup>1</sup>					Peer average <sup>2</sup>					U.S. Public average <sup>2</sup>				
	2021	2020	2019	2018	2017	2021	2020	2019	2018	2017	2021	2020	2019	2018	2017
<b>Implementation style</b>															
External active	48.0	59.8	78.1	79.1	76.5	64.4	64.7	65.8	67.0	66.2	57.2	57.1	59.0	59.9	59.5
Fund of funds	7.6	5.6	5.2	6.3	7.8	2.1	1.8	1.9	2.0	2.4	3.1	2.4	2.3	2.2	2.2
External passive	44.4	30.9	10.6	10.0	11.1	24.1	23.7	22.1	20.6	21.2	22.7	23.0	21.8	21.2	21.7
Internal active	0.0	3.8	6.1	4.6	4.6	5.6	5.9	6.1	6.5	6.8	9.1	10.0	9.9	10.0	10.4
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>3.9</u>	<u>4.0</u>	<u>3.9</u>	<u>3.4</u>	<u>7.9</u>	<u>7.5</u>	<u>7.1</u>	<u>6.7</u>	<u>6.2</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
<b>Actual asset mix</b>															
Stock	46.9	40.0	35.7	34.3	32.4	43.1	44.2	44.5	43.5	46.4	43.9	44.4	44.7	44.5	47.1
Fixed income <sup>3</sup>	11.2	19.3	20.3	21.5	26.9	25.0	25.1	25.4	25.9	26.2	26.9	28.0	27.7	27.7	26.9
Global TAA	1.6	4.1	8.4	9.4	6.8	0.2	0.3	0.6	0.6	0.4	0.6	1.0	1.3	1.3	0.9
Real assets	11.6	11.9	11.7	10.7	9.1	9.9	10.5	11.1	11.5	11.0	10.5	10.4	10.6	10.8	10.5
Hedge funds	10.6	10.1	10.2	10.9	11.0	5.6	5.2	5.0	5.5	4.9	4.4	3.9	4.1	4.4	4.1
Balanced Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Risk Parity	0.0	0.0	0.0	0.0	0.0	1.1	1.0	0.8	0.8	0.8	1.2	1.1	0.9	1.1	1.4
Private credit	8.2	7.9	6.4	5.9	5.8	2.6	2.5	2.2	2.0	1.3	1.9	1.9	1.8	1.7	1.3
Private equity	<u>10.0</u>	<u>6.7</u>	<u>7.3</u>	<u>7.5</u>	<u>8.0</u>	<u>12.4</u>	<u>11.3</u>	<u>10.3</u>	<u>10.2</u>	<u>9.0</u>	<u>10.6</u>	<u>9.4</u>	<u>8.7</u>	<u>8.5</u>	<u>7.6</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
<b>Policy asset mix</b>															
Stock	46.0	47.4	44.8	44.1	39.8	44.7	44.5	45.5	46.5	47.0	44.6	44.5	44.8	46.0	46.9
Fixed income	26.0	26.0	22.4	23.2	25.0	26.3	27.1	27.6	26.5	27.8	26.3	26.9	26.8	26.6	27.1
Global TAA	0.0	0.0	7.0	7.0	10.0	0.1	0.0	0.4	0.4	0.6	0.8	0.9	1.1	0.9	0.8
Real assets	12.0	12.0	12.0	12.0	10.0	10.9	11.7	12.1	11.5	11.2	12.3	12.2	12.2	11.6	11.4
Hedge funds	0.0	0.0	1.0	1.0	2.0	3.6	3.7	2.6	3.0	2.8	2.8	3.0	3.1	3.7	3.4
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	1.4	0.9	0.8	0.8	0.8	1.1	0.9	0.8	1.0	1.2
Private credit	7.0	7.0	6.6	5.8	6.0	2.4	2.5	2.0	2.5	1.4	2.2	2.0	2.0	1.7	1.0
Private equity	<u>9.0</u>	<u>7.6</u>	<u>6.2</u>	<u>7.0</u>	<u>7.2</u>	<u>10.5</u>	<u>9.5</u>	<u>9.1</u>	<u>8.7</u>	<u>8.4</u>	<u>9.9</u>	<u>9.5</u>	<u>9.2</u>	<u>8.5</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 40 U.S. Public and 16 peer funds with 5 or more consecutive years of data ending 2021.

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 - 2021 (as a % of average assets)

	Your fund %				Peer average %				U.S. Public average %				
	External		Internal		External		Internal		External		Internal		
	Active	FOFs	Index	Active Index	Active	FOFs	Index	Active Index	Active	FOFs	Index	Active Index	
Stock - U.S. broad/all	100.0		0.0	0.0	0.0	31.5	62.9	0.0	5.6	21.0	60.7	1.3	17.0
Stock - U.S. large cap						22.4	53.7	13.1	10.8	22.7	53.4	8.2	15.7
Stock - U.S. mid cap						55.3	10.6	19.5	14.6	38.4	4.4	12.0	45.2
Stock - U.S. small cap	0.0		100.0	0.0	0.0	66.2	23.3	4.5	6.1	71.0	18.4	6.8	3.8
Stock - EAFE	0.0		100.0	0.0	0.0	72.8	16.1	11.1	0.0	67.0	20.7	6.5	5.8
Stock - Global	0.0		100.0	0.0	0.0	35.4	56.0	0.0	8.6	37.2	42.6	3.9	16.4
Stock - Other						37.8	0.0	47.1	15.0	71.8	11.8	12.4	4.0
Stock - Emerging	100.0		0.0	0.0	0.0	73.9	13.2	2.0	10.9	73.6	17.6	5.2	3.6
Stock - ACWI x U.S.	100.0		0.0	0.0	0.0	82.2	16.9	0.0	0.9	66.7	29.6	1.6	2.0
Stock - Aggregate	8.2		91.8	0.0	0.0	47.1	41.7	4.7	6.5	43.2	40.2	5.0	11.7
Fixed income - U.S.	98.2		0.0	1.8	0.0	67.2	12.3	20.2	0.4	59.0	15.1	24.3	1.6
Fixed income - U.S. gov't						0.0	79.6	0.0	20.4	20.5	53.9	3.7	21.9
Fixed income - U.S. credits						100.0	0.0	0.0	0.0	34.7	6.1	59.2	0.0
Fixed income - EAFE						100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Fixed income - Global						90.5	9.5	0.0	0.0	46.4	2.9	50.7	0.0
Fixed income - Other						99.8	0.2	0.0	0.0	99.9	0.1	0.0	0.0
Fixed income - Long bonds						60.2	39.8	0.0	0.0	50.1	19.6	0.0	30.3
Fixed income - Emerging	100.0		0.0	0.0	0.0	92.2	5.7	0.0	2.1	97.1	2.1	0.0	0.8
Fixed income - Inflation indexed						42.0	58.0	0.0	0.0	30.7	57.0	1.6	10.7
Fixed income - High yield	100.0		0.0	0.0	0.0	97.3	0.0	2.7	0.0	90.5	1.5	7.9	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						0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Fixed income - Public mortgages						100.0	0.0	0.0	0.0	76.7	0.0	23.3	0.0
Cash	100.0		0.0			73.8		26.2		43.2		56.8	
Fixed income - Aggregate	99.6		0.0	0.4	0.0	64.7	20.9	12.4	2.0	58.4	16.7	20.2	4.7
Commodities						100.0	0.0	0.0	0.0	61.6	7.4	3.3	27.6
Infrastructure	100.0	0.0		0.0		97.9	2.1		0.0	90.9	8.5		0.6
Natural resources						100.0	0.0		0.0	99.7	0.1		0.2
REITs	100.0		0.0	0.0	0.0	83.4	2.9	7.9	5.8	50.9	39.5	1.8	7.9
Real estate ex-REITs	100.0	0.0		0.0		97.2	0.2		2.6	93.1	0.3		6.6
Other real assets						100.0	0.0		0.0	93.1	0.0		6.9
Other listed real assets						100.0	0.0	0.0	0.0	81.9	18.1	0.0	0.0
Real assets - Aggregate	100.0	0.0	0.0	0.0	0.0	96.8	0.3	0.2	2.4	0.3	88.3	0.8	4.4
Hedge funds	40.0	60.0				85.8	14.2			75.6	24.4		
Global TAA	100.0			0.0		95.2		4.8		85.1		14.9	
Risk parity						100.0		0.0		83.2		16.8	
Private credit	100.0	0.0		0.0		100.0	0.0	0.0		98.6	0.1	1.2	
Mortgages						100.0		0.0		67.4		32.6	
Private equity - Diversified	87.7	12.3		0.0		83.9	16.1	0.0		76.9	23.1	0.1	
Venture capital						7.1	92.9	0.0		67.7	32.3	0.0	
LBO						93.2	6.8	0.0		95.6	4.4	0.0	
Private equity - Other						100.0	0.0	0.0		99.9	0.0	0.1	
Private equity - Aggregate	87.7	12.3		0.0		83.4	16.6	0.0		79.9	20.1	0.0	
Total Fund - Avg. Holdings	48.0	7.6	44.4	0.0	0.0	64.2	2.7	24.4	5.3	3.4	58.6	3.2	23.2



## Actual mix

### Actual asset mix - 2017 to 2021 (as a % of total average assets)

	Your fund <sup>1</sup>					Peer average %					U.S. Public average %				
	2021	2020	2019	2018	2017	2021	2020	2019	2018	2017	2021	2020	2019	2018	2017
Stock - U.S. broad/all	2.1	5.6	8.8	8.7	8.9	9.5	9.4	9.1	8.5	7.7	8.1	6.9	6.1	5.9	6.4
Stock - U.S. large cap						10.5	10.7	10.4	11.4	13.3	10.9	10.4	11.6	11.7	12.8
Stock - U.S. mid cap						0.5	0.6	0.6	0.5	0.6	0.5	0.6	0.7	1.0	0.8
Stock - U.S. small cap	3.1	2.0				1.4	1.4	1.2	1.6	1.8	1.7	1.8	1.8	2.2	2.3
Stock - EAFE	3.2	2.0				2.1	2.8	3.0	3.7	5.2	5.7	6.1	6.4	6.9	7.0
Stock - Global	36.9	23.3	17.3	16.4	16.1	8.1	7.0	6.0	4.5	4.7	8.1	8.3	6.6	6.4	6.5
Stock - Other						0.7	0.8	0.9	0.9	0.8	1.1	1.0	0.9	0.9	1.0
Stock - Emerging	1.7	6.2	6.2	5.8	4.6	1.9	2.3	2.3	2.4	2.5	2.9	3.3	3.5	3.7	3.8
Stock - ACWI x U.S.	0.0	1.0	3.4	3.4	2.8	10.7	11.3	11.1	10.8	10.7	6.3	6.6	6.4	6.0	6.8
Stock - Aggregate	46.9	40.0	35.7	34.3	32.4	45.4	46.4	44.5	44.4	47.4	45.3	45.1	43.9	44.8	47.4
Fixed income - U.S.	2.3	2.4	2.4	2.8	4.6	11.5	12.3	11.8	14.0	12.8	11.8	11.9	12.0	13.0	12.6
Fixed income - U.S. gov't						1.9	1.7	2.2	2.0	2.2	1.6	2.3	2.2	1.6	1.4
Fixed income - U.S. credits						0.2	0.1				0.5	0.6	0.3	0.3	0.2
Fixed income - EAFE						0.1	0.2	0.2	0.3		0.0	0.0	0.0	0.0	0.1
Fixed income - Global						0.6	0.9	1.1	0.5	1.4	0.8	1.2	1.6	1.7	1.4
Fixed income - Other						0.6	0.7	0.9	0.9	1.3	0.8	0.7	0.8	0.8	0.8
Fixed income - Long bonds						0.6	0.7	0.7	0.5	0.5	1.4	1.9	1.5	1.4	1.3
Fixed income - Emerging	0.8	2.9	3.7	4.7	5.2	1.1	0.9	1.1	1.0	1.1	1.2	1.3	1.3	1.3	1.3
Fixed income - Inflation indexed						2.6	2.2	2.6	2.4	2.3	2.1	1.6	1.8	1.8	1.9
Fixed income - High yield	4.0	4.4	4.1	4.8	6.7	1.8	1.9	1.7	1.9	2.0	1.9	2.0	1.8	1.9	1.6
Fixed income - Absolute return bonds															
Fixed income - Bundled LDI											0.8	0.3	0.3	0.2	
Fixed income - Convertibles							0.0	0.2	0.2	0.2	0.0	0.1	0.1	0.1	0.1
Fixed income - Public mortgages						0.0					0.1	0.1	0.1	0.0	0.0
Cash	2.8	6.8	7.6	6.7	7.3	1.7	2.1	2.0	2.1	2.0	2.2	2.6	1.8	2.4	2.3
Fixed income - Aggregate	9.8	16.4	17.7	18.9	23.8	22.7	23.6	24.4	25.6	25.7	25.4	26.5	25.6	26.5	24.9
Commodities						0.1	0.7	0.9	1.0	1.0	0.3	0.4	0.6	0.5	0.5
Infrastructure	2.8	3.0	2.6	2.0	1.4	0.7	0.7	0.7	0.6	0.3	0.8	0.7	0.9	0.5	0.6
Natural resources						0.8	0.8	1.0	0.9	0.7	0.8	0.7	1.0	0.9	1.3
REITs	1.1	1.5	1.6	2.5	1.6	0.5	0.5	0.7	0.8	0.7	0.9	0.7	0.7	0.8	0.9
Real estate ex-REITs	7.7	7.4	7.5	6.1	6.0	7.1	7.1	7.5	8.0	7.5	6.9	7.1	7.6	7.7	6.9
Other real assets						0.0	0.0	0.0	0.1	0.5	0.2	0.5	0.4	0.4	0.5
Other listed real assets						0.3	0.3	0.3			0.3	0.3	0.2		0.1
Real assets - Aggregate	11.6	11.9	11.7	10.7	9.1	9.6	10.1	11.1	11.3	10.7	10.2	10.5	11.4	10.9	10.8
Hedge funds	10.6	10.1	10.2	10.9	11.0	5.0	4.6	5.0	5.1	4.6	4.1	4.4	4.6	4.7	4.8
Global TAA	1.6	4.1	8.4	9.4	6.8	0.2	0.3	0.6	0.6	0.4	0.6	0.9	1.5	1.1	0.9
Risk parity						1.0	0.9	0.8	0.7	0.7	1.0	0.9	0.9	1.0	1.1
Mortgages						0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.1
Private credit	8.2	7.9	6.4	5.9	5.8	2.3	2.1	2.1	1.9	1.2	1.9	1.9	2.1	2.0	1.6
Private equity - Diversified	10.0	6.7	7.3	7.5	8.0	10.7	9.6	9.1	8.7	7.6	8.1	7.1	7.0	6.3	5.6
Venture capital						0.2	0.2	0.2	0.2	0.2	0.6	0.4	0.5	0.5	0.4
LBO						0.9	0.9	0.9	0.8	0.7	1.9	1.5	1.5	1.6	1.5
Private equity - Other						0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Private equity - Aggregate	10.0	6.7	7.3	7.5	8.0	12.0	10.8	10.3	9.9	8.6	10.7	9.1	9.1	8.4	7.7
Derivatives/Overlays Mkt Value	1.3	2.9	2.6	2.6	3.1	1.8	1.1	1.0	0.6	0.6	0.9	0.7	0.7	0.4	0.8
Total Fund	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count	1	1	1	1	1	18	18	16	17	17	46	51	48	58	60
Median Assets (\$ billions)	39.0	31.5	31.6	31.3	30.5	39.9	32.9	31.7	30.5	30.5	26.6	21.6	21.0	19.0	19.9

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

## Policy mix

### Policy asset mix - 2017 to 2021 (as a % of total assets)

	Your fund %					Peer average %					U.S. Public average %				
	2021	2020	2019	2018	2017	2021	2020	2019	2018	2017	2021	2020	2019	2018	2017
Stock - U.S. broad/all		23.9	16.3	16.4	14.6	11.2	12.0	11.3	12.7	12.8	7.8	8.2	7.3	8.2	9.1
Stock - U.S. large cap						7.7	7.6	6.2	8.3	8.4	8.4	7.8	8.6	8.8	9.2
Stock - U.S. mid cap						0.4	0.4	0.4	0.4	0.4	0.2	0.3	0.5	0.7	0.5
Stock - U.S. small cap	3.0	2.9				0.6	0.5	0.4	0.4	0.4	1.1	1.1	1.1	1.5	1.3
Stock - EAFE	2.0					1.9	1.8	2.1	2.1	3.2	4.5	4.4	4.7	5.2	4.7
Stock - Global	35.8	12.2	18.3	17.7	17.3	9.9	8.9	9.4	8.5	8.7	13.4	12.4	11.0	11.2	10.7
Stock - Other						3.7	3.9	4.5	0.9	0.7	2.3	2.2	2.0	0.8	0.9
Stock - Emerging	5.2	6.2	6.6	6.3	4.9	1.0	1.0	1.2	1.1	1.0	2.1	2.1	2.5	2.8	2.5
Stock - ACWI x U.S.		2.2	3.6	3.7	3.0	9.9	10.0	10.0	12.7	11.8	5.8	6.2	6.0	6.9	7.5
Stock - Aggregate	46.0	47.4	44.8	44.1	39.8	46.2	46.1	45.5	47.0	47.4	45.5	44.7	43.8	46.1	46.5
Fixed income - U.S.	24.0	26.0	11.0	13.0	10.0	16.0	17.2	17.0	17.6	16.6	14.2	14.1	14.2	14.4	14.7
Fixed income - U.S. gov't						1.7	1.6	1.8	1.6	1.8	1.4	2.3	1.9	1.4	1.1
Fixed income - U.S. credits						0.3	0.2				0.7	0.5	0.3	0.5	0.3
Fixed income - EAFE						0.1	0.2	0.3	0.2		0.0	0.0	0.0	0.0	0.1
Fixed income - Global						0.9	1.0	0.5	0.5	1.6	0.9	1.0	1.3	1.5	1.4
Fixed income - Other						0.3	0.4	0.4	0.3	1.0	0.8	0.8	0.6	0.4	0.6
Fixed income - Long bonds						0.7	0.7	0.8	0.5	0.5	2.0	2.4	2.1	2.0	2.1
Fixed income - Emerging	1.0		4.0	4.0	5.0	0.8	0.8	0.7	0.9	1.0	1.1	1.1	1.2	1.2	1.2
Fixed income - Inflation indexed						2.7	2.3	2.8	2.4	2.4	2.9	2.4	2.9	2.8	2.8
Fixed income - High yield	1.0		4.4	5.2	7.0	1.8	1.8	2.3	1.6	2.0	1.8	1.9	1.8	2.0	2.0
Fixed income - Absolute return bonds															
Fixed income - Bundled LDI											0.8	0.2	0.3	0.2	
Fixed income - Convertibles								0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Fixed income - Public mortgages											0.1	0.1	0.1	0.0	0.0
Cash			3.0	1.0	3.0	0.8	0.8	0.9	0.9	0.9	-0.9	-0.6	-1.6	-0.9	-0.9
Fixed income - Aggregate	26.0	26.0	22.4	23.2	25.0	26.1	26.9	27.6	26.7	27.9	26.0	26.3	25.3	25.5	25.4
Commodities						0.3	1.0	1.0	1.0	1.0	0.7	0.8	1.0	1.0	0.9
Infrastructure	3.0	3.0	3.0	3.0	2.0	1.2	1.0	0.9	0.3	0.4	1.4	1.2	1.2	0.6	0.7
Natural resources						0.7	0.6	1.0	0.6	0.4	0.8	0.7	1.0	0.8	1.1
REITs	1.0		1.5	3.1	2.3	0.5	0.3	0.6	0.6	0.7	0.7	0.5	0.6	0.8	0.8
Real estate ex-REITs	8.0	9.0	7.5	5.9	5.7	8.1	8.4	8.4	8.4	8.1	8.1	8.2	8.5	8.0	7.7
Other real assets						0.0		0.0	0.5	0.4	0.2	0.7	0.6	0.7	0.6
Other listed real assets											0.1	0.1			0.1
Real assets - Aggregate	12.0	12.0	12.0	12.0	10.0	10.7	11.4	12.1	11.4	11.0	12.1	12.2	12.8	11.8	11.8
Hedge funds			1.0	1.0	2.0	3.2	3.3	2.6	2.8	2.7	2.7	4.0	4.0	4.3	4.4
Global TAA			7.0	7.0	10.0	0.1		0.4	0.4	0.6	0.8	0.8	1.3	1.1	0.9
Risk parity						1.3	0.8	0.8	0.7	0.7	1.0	0.7	0.8	0.8	1.0
Mortgages							0.1	0.1	0.2		0.1	0.1	0.2	0.1	0.0
Private credit	7.0	7.0	6.6	5.8	6.0	2.2	2.2	1.9	2.2	1.3	2.0	2.0	2.1	2.0	1.5
Private equity - Diversified	9.0	7.6	6.2	7.0	7.2	9.8	8.3	8.6	8.2	8.0	8.0	7.7	7.9	6.6	7.1
Venture capital						0.1	0.1	0.3	0.1	0.1	0.2	0.1	0.3	0.3	0.3
LBO						0.4	0.8	0.2	0.3	0.3	1.6	1.3	1.2	1.4	0.9
Private equity - Other											0.1	0.0	0.2	0.1	0.1
Private equity - Aggregate	9.0	7.6	6.2	7.0	7.2	10.2	9.2	9.1	8.6	8.4	9.9	9.2	9.6	8.4	8.4
Total Fund	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count	1	1	1	1	1	18	18	16	17	17	46	51	48	58	60

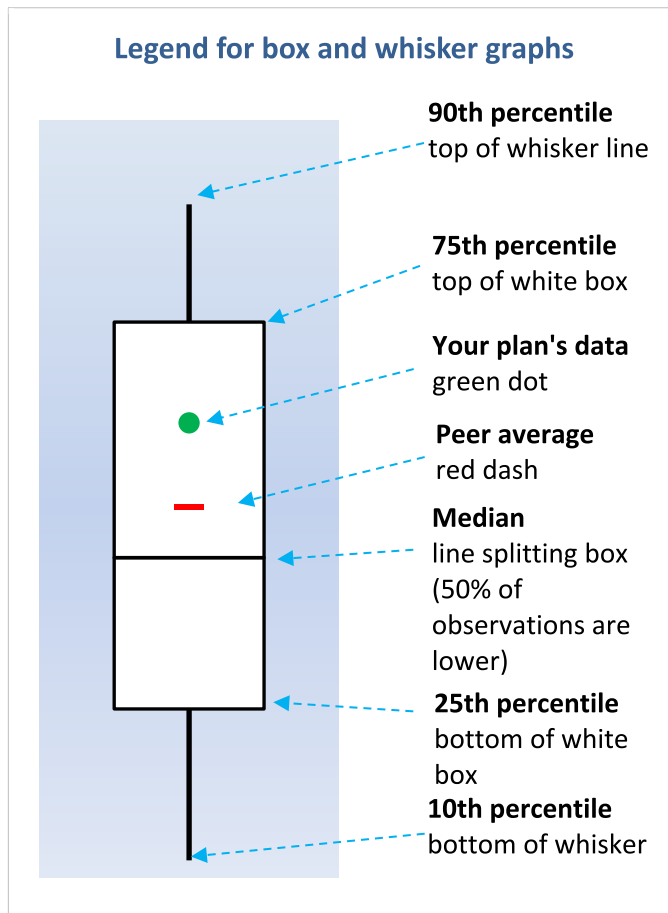
# 3

## Returns, Benchmarks and Value Added

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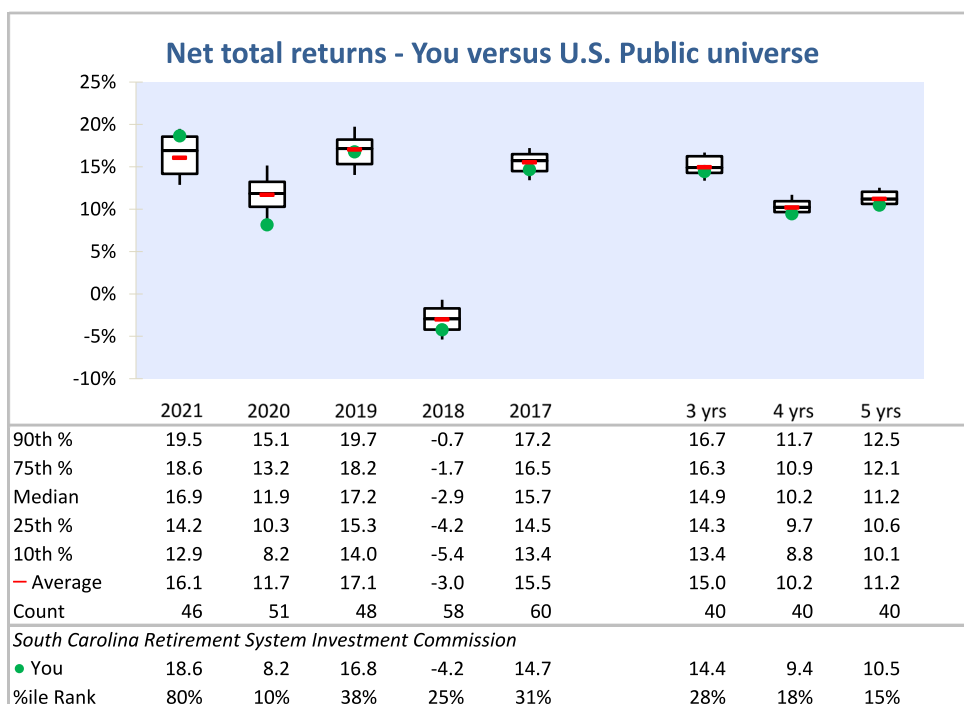
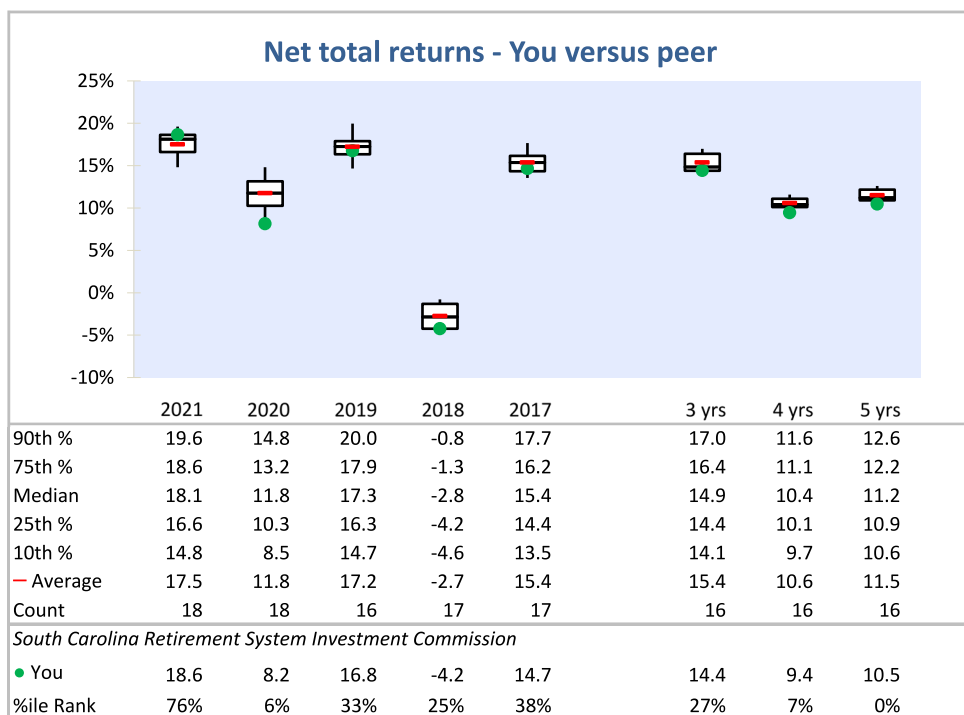
## Interpreting box and whisker graphs

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.



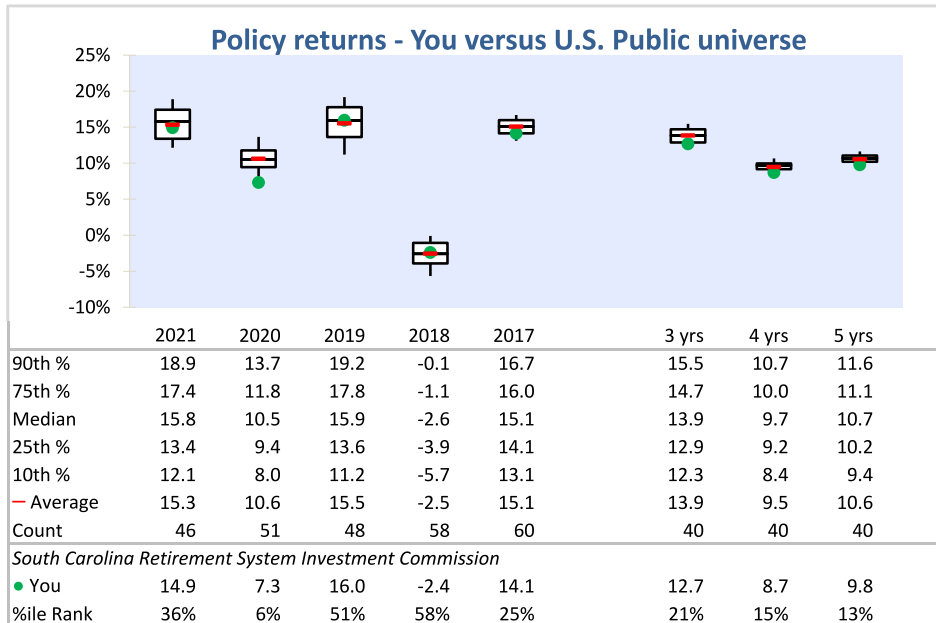
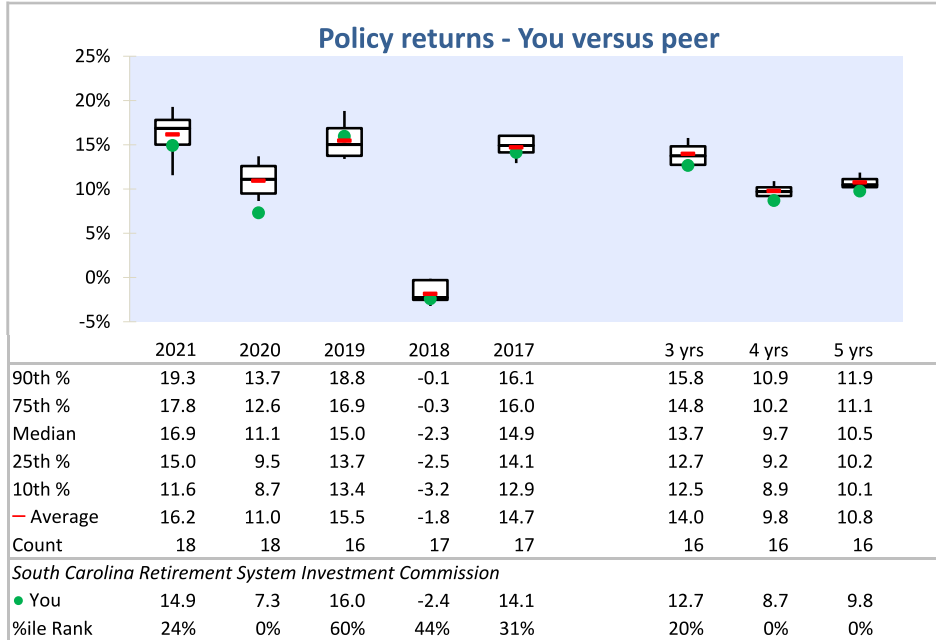
## Net total returns

Your 5-year net total return of 10.5% was below the peer median and below the median of the U.S. Public universe. Comparisons of total return do not help you understand the reasons behind relative performance. To understand the relative contributions from policy asset mix decisions and implementation decisions we separate total return into its more meaningful components - policy return and implementation value added.



## Policy returns

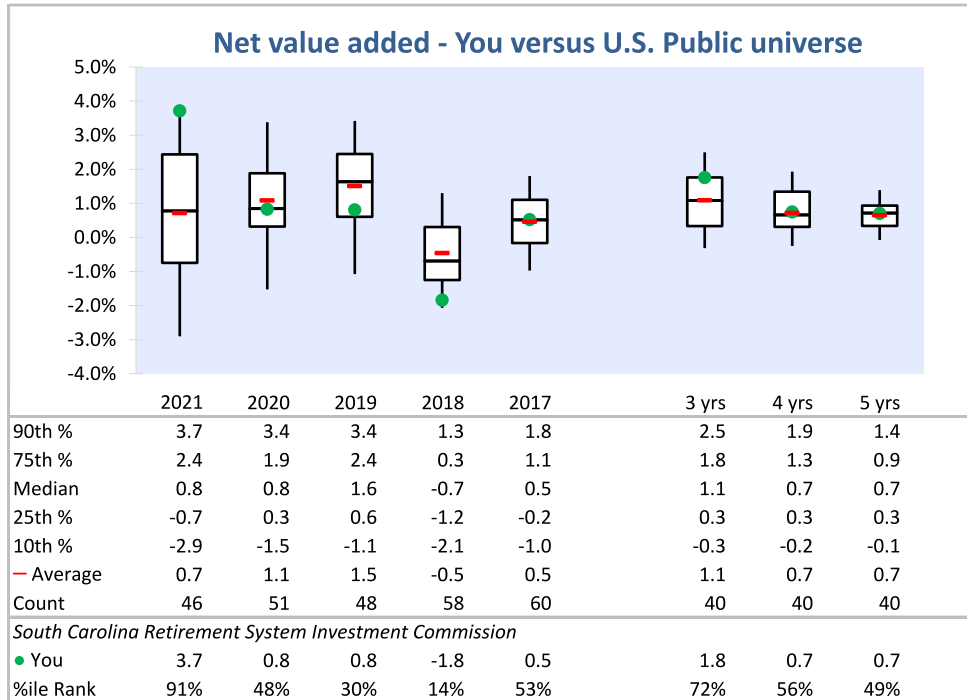
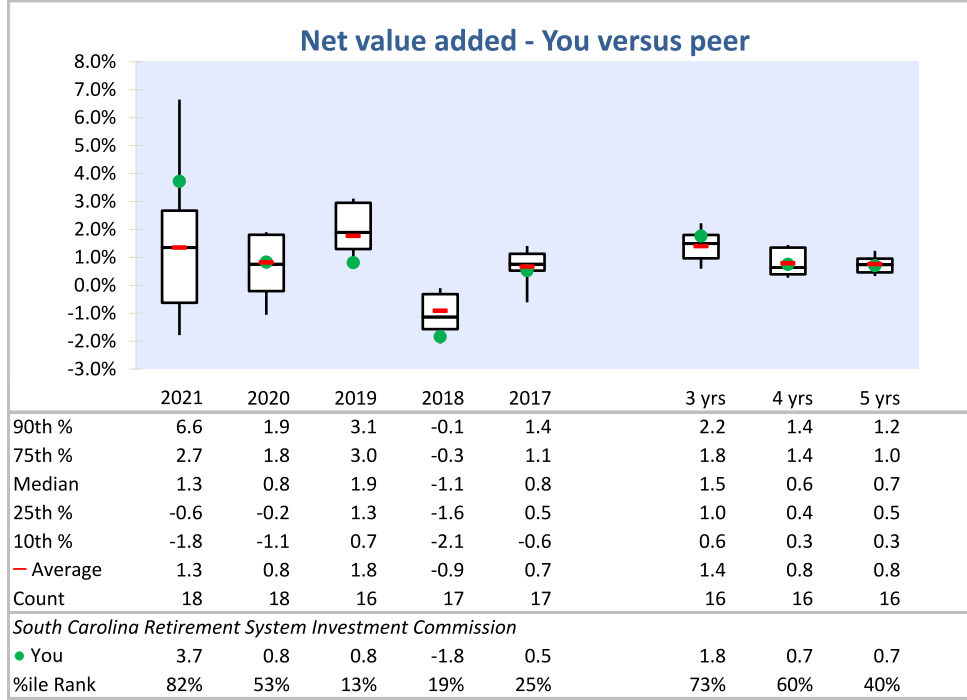
Your 5-year policy return of 9.8% was below the peer median and below the median of the U.S. Public universe. Policy return is the return you would have earned had you passively implemented your policy asset mix decision through your benchmark portfolios.



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 0.7% was below the peer median and close to the U.S. Public universe median. 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 %					
	2021	2020	2019	2018	2017	5-yr <sup>1</sup>	2021	2020	2019	2018	2017	5-yr <sup>1</sup>	2021	2020	2019	2018	2017	5-yr <sup>1</sup>
Stock - U.S. broad/all		<i>-11.7</i>	19.6	-7.9	14.3		25.6	13.5	28.9	-5.6	20.5	16.5	25.2	17.6	29.8	-5.3	20.1	17.5
Stock - U.S. large cap							28.0	18.2	34.8	-5.5	22.1	18.7	26.1	20.0	31.4	-4.9	22.3	18.9
Stock - U.S. mid cap							23.6	18.4	32.4	-8.8	20.5	16.7	23.8	20.3	31.2	-9.5	18.9	16.5
Stock - U.S. small cap	19.4						22.8	17.2	26.1	-10.4	14.9	13.7	21.1	17.3	26.7	-11.1	15.6	12.9
Stock - EAFE	11.5						13.2	9.4	22.8	-13.6	25.7	10.7	11.6	11.3	22.5	-13.9	25.7	10.4
Stock - Global	18.9	21.6	26.7	-9.0	24.1	15.6	17.6	15.4	20.9	-8.6	23.6	14.0	18.0	16.9	25.1	-8.4	29.4	14.5
Stock - Other							27.8	3.9	18.1	-14.1	13.5	12.3	12.3	0.5	15.7	-11.8	14.8	3.8
Stock - Emerging	18.0	<i>11.5</i>	18.8	-16.6	37.6	<i>12.4</i>	2.5	19.5	19.2	-15.6	36.0	11.1	1.4	20.0	20.3	-15.6	36.6	10.9
Stock - ACWI x U.S.	-9.5	-28.2	23.4	-18.6	31.1	-3.1	8.5	9.0	23.1	-15.4	29.3	8.8	8.0	11.6	21.9	-14.5	28.4	10.1
Stock - Aggregate	<i>18.4</i>	<i>15.5</i>	23.3	-11.0	23.9	<i>13.2</i>	19.2	15.2	26.0	-10.3	24.1	14.1	18.4	15.9	26.1	-9.9	24.6	14.3
Fixed income - U.S.	4.0	10.2	8.6	-0.4	5.0	5.4	-0.7	8.9	9.5	-0.1	4.4	4.4	-0.7	8.2	9.0	0.0	4.3	4.2
Fixed income - U.S. gov't							-1.5	8.4	6.9	0.9	1.8	3.2	-2.6	10.8	9.0	-0.3	4.5	3.2
Fixed income - U.S. credits							23.4	11.5					5.8	9.0	15.8	-0.1	4.5	
Fixed income - EAFE							-5.4	10.2	10.0	-4.9			-7.1	11.5	6.1	-0.4	9.6	4.2
Fixed income - Global							-1.7	6.2	8.4	1.6	4.7	3.5	-2.1	0.3	7.3	-2.0	13.1	3.6
Fixed income - Other							7.5	1.5	7.2	2.3	5.4	5.6	4.8	2.4	7.4	1.4	25.1	4.6
Fixed income - Long bonds							-3.3	17.1	-3.5	-3.5	10.5		-3.1	14.9	14.1	-3.6	9.8	7.1
Fixed income - Emerging	-3.8	1.1	13.2	-6.6	13.7	3.2	-3.2	5.1	14.9	-5.6	13.5	4.7	-4.8	5.5	13.6	-5.9	12.3	3.9
Fixed income - Inflation indexed							5.8	13.2	8.9	-1.1	3.6	6.0	5.8	11.1	8.3	-1.3	3.6	5.4
Fixed income - High yield	5.3	4.0	7.3	0.5	6.1	4.6	5.7	5.7	13.6	-1.8	7.0	5.8	5.9	6.0	12.5	-1.5	7.0	6.0
Fixed income - Absolute return bonds																		
Fixed income - Bundled LDI													-3.2	9.7	16.1			
Fixed income - Public mortgages							6.0						2.8	5.3	11.2	2.8	7.1	6.2
Fixed income - Convertibles								56.3	22.1	-1.9	12.4		1.0	21.4	19.2	-1.3	10.9	
Cash	-0.1	-0.5	2.7	1.2	0.6	0.8	0.1	1.2	3.5	2.1	0.9	1.4	0.4	-0.4	0.4	-0.1	0.9	1.5
Fixed income - Aggregate	2.7	2.5	6.8	-1.2	5.9	3.3	0.6	8.5	9.6	-0.4	5.0	4.5	0.3	8.3	11.7	-0.7	5.0	4.4
Commodities							12.2	-4.8	10.0	-11.1	3.9	1.3	18.1	-0.2	3.8	-11.3	6.8	0.2
Infrastructure	12.5	0.5	26.5	-6.7	15.0	9.0	11.0	4.3	13.0	5.1	9.8	10.2	15.6	5.2	9.7	7.0	12.3	9.7
Natural resources							11.3	-2.5	0.3	4.3	5.9	4.8	18.0	-6.7	1.5	3.2	6.8	4.0
REITs	44.1	-1.3	27.0	-5.2	7.9	13.1	38.4	-2.1	25.7	-4.5	9.7	12.6	37.1	-3.7	25.2	-4.7	8.7	11.6
Real estate ex-REITs	24.3	0.4	5.6	9.9	9.7	9.7	21.1	1.2	6.7	9.1	9.1	9.6	22.5	0.3	5.7	7.7	8.2	8.0
Other real assets							10.9	15.0	5.1	0.3	6.9	14.5	7.4	-2.8	7.5	-2.5	4.0	6.3
Real assets - Aggregate	23.2	0.2	13.3	3.2	10.2	9.7	21.9	0.1	8.0	5.0	8.5	8.5	23.6	-0.6	7.3	4.6	7.8	7.6
Hedge funds	12.8	8.9	4.4	2.5	6.0	6.8	8.3	4.5	5.7	-1.2	4.9	5.3	10.5	4.1	5.3	-1.2	6.0	4.7
Global TAA	1.2	-7.5	20.3	-6.9	11.3	3.1	6.2	2.3	20.4	-6.9	11.3	3.1	8.5	5.3	15.3	-6.2	12.1	6.5
Risk parity							12.8	13.8	21.2	-6.7	12.7	10.2	13.3	6.8	15.7	-7.9	14.4	9.9
Mortgages							9.9	4.2	7.8	3.1	6.5		7.5	5.3	7.3	3.1	5.3	5.2
Private credit	19.6	-0.4	6.4	3.3	6.9	6.9	12.8	16.2	6.8	7.2	9.5	6.7	13.6	9.6	6.9	6.9	8.9	7.4
Private equity - Diversified	49.0	6.9	7.7	6.6	13.8	15.8	52.5	17.1	11.2	18.0	17.5	21.6	51.4	17.2	10.3	16.0	17.1	21.0
Venture capital							61.2	20.9	18.1	23.2	15.3	26.2	60.8	31.6	14.0	20.1	11.4	26.6
LBO							49.0	10.5	9.9	16.2	11.0	22.1	47.6	13.5	13.1	17.1	19.3	21.0
Private equity - Other							22.9	10.1	6.1	5.8	10.4	10.9	29.0	10.4	22.9	23.3	8.8	23.7
Private equity - Aggregate	49.0	6.9	7.7	6.6	13.8	15.8	53.2	18.0	11.2	17.9	17.4	22.0	52.4	18.6	11.4	16.8	17.3	21.9
Total Fund Return	18.6	8.2	16.8	-4.2	14.7	10.5	17.5	11.8	17.2	-2.7	15.4	11.5	16.1	11.7	17.1	-3.0	15.5	11.2

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 %					
	2021	2020	2019	2018	2017	5-yr <sup>1</sup>	2021	2020	2019	2018	2017	5-yr <sup>1</sup>	2021	2020	2019	2018	2017	5-yr <sup>1</sup>
Stock - U.S. broad/all		20.7	26.6	-5.7	20.6		25.5	19.8	30.4	-5.2	21.9	17.8	25.7	21.0	31.0	-5.2	21.8	18.3
Stock - U.S. large cap							27.8	19.3	31.4	-4.6	21.6	18.4	27.2	20.8	31.6	-4.6	21.6	18.7
Stock - U.S. mid cap							22.9	17.3	29.5	-7.5	19.9	16.8	22.8	19.3	27.1	-8.0	19.0	16.1
Stock - U.S. small cap	19.1	35.8					18.1	20.4	26.4	-9.8	15.7	13.7	18.3	18.9	26.2	-10.3	15.4	12.9
Stock - EAFE	11.1	10.7					10.9	8.6	22.8	-13.9	25.0	9.7	11.3	8.5	22.5	-13.8	25.0	9.8
Stock - Global	18.5	15.9	27.7	-8.7	22.4	14.4	18.4	16.3	26.8	-9.3	23.6	14.4	18.9	16.1	26.6	-9.3	24.3	14.6
Stock - Other							24.5	-3.4	22.6	-11.6	12.2	12.3	19.7	-1.7	21.2	-9.5	16.3	8.1
Stock - Emerging	18.8	18.3	18.9	-14.6	36.8	14.3	1.2	18.2	18.0	-14.8	36.9	10.6	-0.9	18.4	18.3	-14.5	37.2	10.2
Stock - ACWI x U.S.	11.1	10.7	21.5	-14.2	22.4	9.4	9.0	10.9	21.8	-13.8	27.0	9.9	8.7	10.9	21.7	-13.6	27.4	9.9
Stock - Aggregate	18.3	19.6	25.5	-8.9	23.5	14.9	18.9	16.2	26.7	-9.1	23.5	14.5	18.4	15.9	26.4	-9.2	23.8	14.4
Fixed income - U.S.	-1.5	7.5	8.7	0.0	5.0	3.9	-1.4	7.8	9.2	-0.2	3.7	3.7	-1.5	7.8	8.9	-0.1	3.8	3.7
Fixed income - U.S. gov't							-1.5	8.4	6.9	0.9	2.3	3.3	-2.5	10.5	8.7	-0.4	4.3	3.8
Fixed income - U.S. credits							5.3	10.0					0.8	8.4	14.7	-1.4	3.6	
Fixed income - EAFE							-4.7	10.1	5.1	-2.2			-7.1	10.1	5.1	-2.2	8.4	3.1
Fixed income - Global							-1.6	5.7	9.0	1.7	3.0	2.9	-1.6	5.0	9.6	-0.8	5.1	3.7
Fixed income - Other							3.1	3.5	10.0	1.0	4.6	4.4	3.3	4.4	8.9	0.4	4.4	4.2
Fixed income - Long bonds							-4.6	16.7	7.8	-4.3	10.4	6.8	-3.9	13.5	13.6	-3.3	8.9	6.6
Fixed income - Emerging	-1.8	5.3	14.3	-5.2	12.7	4.8	-3.9	4.8	14.5	-4.7	12.0	4.2	-4.5	5.2	13.7	-5.0	11.4	4.0
Fixed income - Inflation indexed							5.7	13.8	8.9	-2.1	3.3	5.8	5.7	10.9	8.2	-1.4	3.2	5.3
Fixed income - High yield	5.2	5.1	11.5	-0.8	5.8	5.3	5.2	4.9	14.2	-2.0	7.1	5.6	4.9	5.4	13.6	-1.8	6.9	5.6
Fixed income - Absolute return bonds																		
Fixed income - Bundled LDI													-3.2	9.7	17.3	-3.3		
Fixed income - Public mortgages													1.7	2.5	8.5	2.8	5.8	4.9
Fixed income - Convertibles									7.7	23.2	0.2	13.7	15.9	24.6	23.0	0.4	17.1	
Cash	0.2	0.7	2.3	1.9	0.9	1.2	0.1	0.8	2.3	1.7	0.8	1.2	0.0	0.8	2.3	1.5	1.0	1.2
Fixed income - Aggregate	-1.3	7.5	9.4	-1.0	6.3	4.1	-0.4	8.2	9.8	-0.6	4.4	4.1	-0.5	9.4	11.7	-1.3	5.2	4.6
Commodities							21.9	-4.9	9.4	-11.7	2.2	2.3	27.6	-4.8	8.5	-10.7	3.0	2.8
Infrastructure	19.9	-7.0	28.7	-7.9	15.8	8.9	14.3	1.6	13.2	4.3	9.0	8.0	13.7	2.2	12.1	4.3	9.1	8.1
Natural resources							13.4	4.8	7.6	6.9	6.9	7.9	19.7	-3.5	5.5	1.3	6.5	5.2
REITs	43.2	-8.0	26.0	-4.6	5.2	10.8	29.8	-5.9	23.9	-2.7	8.9	10.2	32.9	-7.7	22.8	-4.3	8.3	9.4
Real estate ex-REITs	21.1	0.3	5.4	8.4	8.4	8.5	17.4	1.4	5.5	7.4	7.2	7.6	18.3	0.2	6.3	6.7	6.7	7.4
Other real assets							9.1	7.8	14.0	2.5	0.3	8.1	11.6	1.6	10.6	0.1	2.1	5.9
Real assets - Aggregate	22.6	-1.5	13.8	0.9	9.2	8.7	18.1	0.7	7.7	4.6	6.4	7.4	18.9	-0.4	8.3	3.7	6.3	7.0
Hedge funds	8.5	11.9	18.2	-6.4	12.6	8.6	7.0	7.4	13.0	0.2	8.5	6.8	5.8	6.2	7.9	-0.3	6.7	4.7
Global TAA	8.5	11.9	18.2	-6.4	12.6	8.6	9.7	12.7	19.7	-6.4	12.6	8.6	9.0	7.6	14.6	-3.7	13.1	7.4
Risk parity							14.2	22.3	19.1	-5.3	15.2	10.0	13.5	10.7	15.4	-4.7	13.6	9.6
Mortgages							2.5	6.7	8.3	-0.2	0.3		0.7	7.0	7.9	0.4	2.3	3.7
Private credit	9.9	2.6	4.6	6.7	6.8	6.1	8.9	3.3	7.4	3.8	8.9	6.5	8.0	4.7	9.0	2.8	7.4	6.1
Private equity - Diversified	49.0	3.6	-12.5	25.3	16.1	14.5	44.3	3.2	-11.0	23.4	19.4	14.2	47.2	1.8	-7.9	20.3	19.5	14.4
Venture capital							51.5	0.3	-13.4	24.3	18.7	13.6	46.8	1.9	-9.3	21.1	21.0	14.5
LBO							40.2	4.4	-11.8	24.0	22.2	14.5	43.7	3.7	-9.6	22.0	21.4	14.8
Private equity - Other							49.0	3.6	-12.5	25.3	16.1	14.5	49.5	2.6	-9.5	22.1	20.3	14.3
Private equity - Aggregate	49.0	3.6	-12.5	25.3	16.1	14.5	44.3	3.2	-11.0	23.4	19.4	14.2	46.5	2.1	-7.9	20.4	19.7	14.4
Total Policy Return	14.9	7.3	16.0	-2.4	14.1	9.8	16.2	11.0	15.5	-1.8	14.7	10.8	15.3	10.6	15.5	-2.5	15.1	10.6

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 %					
	2021	2020	2019	2018	2017	5-yr <sup>1</sup>	2021	2020	2019	2018	2017	5-yr <sup>1</sup>	2021	2020	2019	2018	2017	5-yr <sup>1</sup>
Stock - U.S. broad/all		-32.4	-7.0	-2.2	-6.3		0.6	-6.4	-1.4	-0.3	-1.4	-1.2	-0.4	-3.7	-1.2	0.0	-1.7	-0.8
Stock - U.S. large cap							0.2	-1.1	3.4	-0.9	0.5	0.2	-1.1	-0.2	-0.2	-0.3	0.7	0.2
Stock - U.S. mid cap							0.6	1.1	2.8	-1.4	0.6	-0.1	1.0	1.8	4.1	-1.5	-0.1	0.7
Stock - U.S. small cap	0.3						4.7	-1.5	-0.2	-0.5	-0.8	0.0	2.8	-1.3	0.5	-0.5	0.2	0.0
Stock - EAFE	0.3						2.3	1.1	0.0	0.2	0.8	1.0	0.2	2.8	0.1	-0.1	0.6	0.6
Stock - Global	0.3	5.7	-0.9	-0.3	1.7	1.2	0.1	-1.0	-5.9	0.7	0.0	-0.4	-0.6	0.8	-1.5	0.9	5.0	-0.1
Stock - Other							0.6	11.5	-1.4	-2.5	1.1	0.0	-7.4	3.7	-4.3	-1.3	-1.5	-4.3
Stock - Emerging	-0.8	-6.9	-0.1	-2.1	0.7	-2.0	1.0	1.3	1.3	-0.8	-0.9	0.5	2.2	1.6	2.0	-1.1	-0.5	0.7
Stock - ACWI x U.S.	-20.6	-38.9	1.9	-4.4	8.7	-12.5	-0.5	-1.8	1.4	-1.4	2.1	-1.1	-0.7	0.7	0.2	-0.9	0.9	0.2
Stock - Aggregate	0.1	-4.2	-2.2	-2.1	0.4	-1.7	0.3	-1.0	-0.7	-1.2	0.6	-0.4	0.0	0.1	-0.3	-0.8	0.8	-0.1
Fixed income - U.S.	5.6	2.7	-0.1	-0.4	0.0	1.6	0.7	1.1	0.3	0.1	0.7	0.6	0.8	0.4	0.2	0.1	0.5	0.5
Fixed income - U.S. gov't							0.0	0.0	0.0	0.0	-0.5	-0.1	-0.3	0.4	0.0	0.1	0.3	-0.1
Fixed income - U.S. credits							18.1	1.5					4.7	0.6	0.7	1.3	0.9	
Fixed income - EAFE							-0.7	0.1	4.9	-2.8			0.0	1.4	1.0	1.8	1.2	1.1
Fixed income - Global							0.2	0.5	-0.6	-0.1	1.7	0.6	0.1	-5.0	-1.7	-1.4	8.0	0.3
Fixed income - Other							3.5	-2.1	-2.7	1.7	0.8	0.7	1.5	-2.0	-1.5	1.1	20.7	0.0
Fixed income - Long bonds							1.3	0.3	0.0	0.8	0.1		0.8	0.5	1.3	-0.3	0.9	0.5
Fixed income - Emerging	-2.0	-4.2	-1.0	-1.5	0.9	-1.6	0.4	0.2	0.5	-0.8	1.5	0.4	-0.4	0.9	-0.1	-1.2	0.9	-0.1
Fixed income - Inflation indexed							0.2	-0.6	0.1	1.0	0.3	0.2	0.0	-0.2	0.1	0.0	0.4	0.1
Fixed income - High yield	0.0	-1.1	-4.2	1.3	0.3	-0.7	0.5	0.8	-0.6	0.2	-0.1	0.3	0.9	0.6	-1.1	0.4	0.1	0.3
Fixed income - Absolute return bonds																		
Fixed income - Bundled LDI													0.0	-0.1	-1.2			
Fixed income - Public mortgages													-0.5	2.8	0.5	0.0	1.3	1.3
Fixed income - Convertibles							48.6	-1.1	-2.1	-1.3			-14.9	-3.2	-3.8	-1.7	-6.1	
Cash	-0.3	-1.2	0.5	-0.7	-0.2	-0.4	0.1	0.4	1.2	0.2	0.1	0.3	0.4	-1.2	-1.9	0.7	-0.2	0.3
Fixed income - Aggregate	4.0	-5.0	-2.6	-0.2	-0.4	-0.8	1.0	0.3	-0.2	0.1	0.6	0.4	0.7	-1.0	0.0	0.6	-0.3	-0.2
Commodities							-14.9	1.2	0.6	0.5	1.7	-2.4	-11.4	5.2	-4.9	-0.7	3.5	-3.0
Infrastructure	-7.4	7.4	-2.2	1.2	-0.8	0.1	-3.9	1.4	2.6	1.8	0.4	2.1	1.7	2.7	-0.7	2.2	3.1	1.5
Natural resources							-2.0	-7.6	-5.3	-2.7	-1.0	-3.1	0.4	-4.4	-3.3	1.9	0.5	-1.8
REITs	0.9	6.7	1.0	-0.6	2.7	2.3	7.2	3.8	1.9	-1.8	0.8	2.4	3.8	4.0	2.1	-0.4	0.4	2.2
Real estate ex-REITs	3.2	0.1	0.3	1.5	1.3	1.2	3.8	-0.2	1.2	1.7	1.9	2.0	4.1	0.0	-0.5	0.9	1.4	0.5
Other real assets							0.0	7.2	-8.9	-1.1	6.6	6.4	-5.3	-3.4	-5.2	-2.2	1.9	0.4
Real assets - Aggregate	0.6	1.7	-0.5	2.2	1.1	1.1	3.7	-0.6	0.3	0.4	2.2	1.0	4.7	-0.2	-1.1	0.9	1.5	0.4
Hedge funds	4.3	-3.0	-13.8	8.9	-6.6	-1.8	2.1	-3.5	-8.3	-0.8	-3.6	-1.7	5.1	-2.2	-2.9	-0.7	-0.7	0.3
Global TAA	-7.3	-19.3	2.1	-0.6	-1.3	-5.5	-3.5	-10.4	0.8	-0.6	-1.3	-5.5	-0.2	-2.3	0.4	-2.7	-1.3	-0.4
Risk parity							-1.3	1.1	2.1	-1.4	-2.5	0.2	-0.2	-0.2	-0.4	-3.3	0.8	0.4
Mortgages							7.4	-2.5	-0.5	3.3	2.6		6.9	-2.3	-0.6	3.0	1.6	1.5
Private credit	9.7	-3.0	1.8	-3.4	0.1	0.8	3.7	14.0	-0.6	3.4	0.7	0.2	4.8	5.4	-2.1	4.1	1.4	0.9
Private equity - Diversified	0.0	3.3	20.2	-18.7	-2.3	1.3	6.3	13.9	22.3	-5.4	-2.1	7.4	2.9	15.3	18.1	-4.1	-2.5	6.7
Venture capital							9.7	20.6	31.5	-1.1	-4.9	12.6	11.9	30.2	23.3	-0.8	-9.9	12.2
LBO							-2.5	6.1	21.6	-7.6	-14.4	8.4	-1.1	10.2	22.7	-4.8	-2.4	6.5
Private equity - Other							-26.1	6.5	18.6	-19.4	-5.7	-3.6	-20.6	7.8	32.8	1.1	-11.5	9.5
Private equity - Aggregate	0.0	3.3	20.2	-18.7	-2.3	1.3	7.0	14.8	22.2	-5.5	-2.2	7.8	4.8	16.3	19.1	-3.4	-2.6	7.5
Total Fund Return	3.7	0.8	0.8	-1.8	0.5	0.7	1.3	0.8	1.8	-0.9	0.7	0.8	0.7	1.1	1.5	-0.5	0.5	0.7

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 - 2021

### 2021 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Return	Net return	Value added
Stock - U.S. broad/all		MSCI US IMI Net			
Stock - U.S. small cap	3.0%	MSCI US Small Cap Net Index	19.1%	19.4%	0.3%
Stock - EAFE	2.0%	MSCI World Ex US Net Index	11.1%	11.5%	0.3%
Stock - Global	35.8%	MSCI World Net Dividend	18.5%	18.9%	0.3%
Stock - Emerging	5.2%	MSCI Emerging Market IMI Net	18.8%	18.0%	-0.8%
Stock - ACWI x U.S.		MSCI ACWI x/US Net	11.1%	-9.5%	-20.6%
Fixed income - U.S.	24.0%	Barclays US Aggregate	-1.5%	4.0%	5.6%
Fixed income - Emerging	1.0%	JP Morgan EMBI GD	-1.8%	-3.8%	-2.0%
Fixed income - High yield	1.0%	50%Bar U.S. High Yield 2% / 50%S&P LSTA Lever	5.2%	5.3%	0.0%
Cash		ICE LIBOR USD 3 Month Index	0.2%	-0.1%	-0.3%
Infrastructure	3.0%	Dow Jones Brookfield Global Infrastructure Net	19.9%	12.5%	-7.4%
REITs	1.0%	Your REIT benchmark	43.2%	44.1%	0.9%
Real estate ex-REITs	8.0%	NCREIF ODCE Index	21.1%	24.3%	3.2%
Hedge funds		50% MSCI World Net/50% Barclays US Aggregat	8.5%	12.8%	4.3%
Global TAA		50% MSCI World Net/50% Barclays US Aggregat	8.5%	1.2%	-7.3%
Private credit	7.0%	S&P/LSTA + 150 Bps 3 Month Lag	9.9%	19.6%	9.7%
Private equity - Diversified	9.0%	Custom lagged small-cap equity	49.0%	49.0%	0.0%
<b>Total</b>	<b>100.0%</b>				
Net Actual Return (reported by you)					18.6%
Calculated Policy Return = sum of (policy weights X benchmark returns)				15.9%	
Adjustment to reflect rebalancing and overlay impacts				<u>-1.0%</u>	
Policy Return (reported by you)					<u>14.9%</u>
Net Value Added (Net Return - Policy Return)					3.7%

# Your policy return and value added calculations - 2017 to 2020

## 2020 Policy Return and Value Added

Asset class	Policy	Benchmark		Net return	Value added
	weight	Description	Return		
Stock - U.S. broad/all	23.9%	MSCI US IMI Ne	20.7%	-11.7%	-32.4%
Stock - U.S. small cap	2.9%	MSCI US Small C	35.8%		
Stock - EAFE		MSCI World Ex I	10.7%		
Stock - Global	12.2%	MSCI World Net	15.9%	21.6%	5.7%
Stock - Emerging	6.2%	MSCI Emerging	18.3%	11.5%	-6.9%
Stock - ACWI x U.S.	2.2%	MSCI ACWI x/U:	10.7%	-28.2%	-38.9%
Fixed income - U.S.	26.0%	Barclays US Agg	7.5%	10.2%	2.7%
Fixed income - Emerging		50% JPM EMBI I	5.3%	1.1%	-4.2%
Fixed income - High yield		50%Bar U.S. Hig	5.1%	4.0%	-1.1%
Cash		BofA Merrill Lyr	0.7%	-0.5%	-1.2%
Infrastructure	3.0%	Dow Jones Broc	-7.0%	0.5%	7.4%
REITs		Your REIT bencf	-8.0%	-1.3%	6.7%
Real estate ex-REITs	9.0%	NCREIF ODCE In	0.3%	0.4%	0.1%
Hedge funds		50% MSCI Worl	11.9%	8.9%	-3.0%
Global TAA		50% MSCI Worl	11.9%	-7.5%	-19.3%
Private credit	7.0%	S&P/LSTA + 150	2.6%	-0.4%	-3.0%
Private equity - Diversified	7.6%	Custom lagged :	3.6%	6.9%	3.3%
<b>Total</b>	<b>100.0%</b>				
Net Return (reported by you)					8.2%
Calculated policy return (sum: Policy weights x benchmarks)				11.5%	
Adjustment to reflect rebalancing and overlay impacts				-4.2%	
Policy return (reported by you)					7.3%
Net Value Added (Net Return - Policy Return)					0.8%

## 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	-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 I	-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 Lyr	1.9%	1.2%	-0.7%
Infrastructure	3.0%	Dow Jones Broc	-7.9%	-6.7%	1.2%
REITs	3.1%	Your REIT bencf	-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 Worl	-6.4%	2.5%	8.9%
Global TAA	7.0%	50% MSCI Worl	-6.4%	-6.9%	-0.6%
Private credit	5.8%	S&P/LSTA + 150	6.7%	3.3%	-3.4%
Private equity - Diversified	7.0%	Custom lagged :	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				0.0%	
Policy return (reported by you)					-2.4%
Net Value Added (Net Return - Policy Return)					-1.8%

## 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 - U.S. small cap					
Stock - EAFE					
Stock - Global	18.3%	MSCI World Net	27.7%	26.7%	-0.9%
Stock - Emerging	6.6%	MSCI Emerging	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 I	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 Lyr	2.3%	2.7%	0.5%
Infrastructure	3.0%	Dow Jones Broc	28.7%	26.5%	-2.2%
REITs	1.5%	Your REIT bencf	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 Worl	18.2%	4.4%	-13.8%
Global TAA	7.0%	50% MSCI Worl	18.2%	20.3%	2.1%
Private credit	6.6%	S&P/LSTA + 150	4.6%	6.4%	1.8%
Private equity - Diversified	6.2%	Custom lagged :	-12.5%	7.7%	20.2%
<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				-0.2%	
Policy return (reported by you)					16.0%
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	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 I	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 Lyr	0.9%	0.6%	-0.2%
Infrastructure	2.0%	Dow Jones Broc	15.8%	15.0%	-0.8%
REITs	2.3%	Your REIT bencf	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 Worl	12.6%	6.0%	-6.6%
Global TAA	10.0%	50% MSCI Worl	12.6%	11.3%	-1.3%
Private credit	6.0%	S&P/LSTA + 150	6.8%	6.9%	0.1%
Private equity - Diversified	7.2%	Custom lagged :	16.1%	13.8%	-2.3%
<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				-0.8%	
Policy return (reported by you)					14.1%
Net Value Added (Net Return - Policy Return)					0.5%

## Profit/Loss on overlay programs

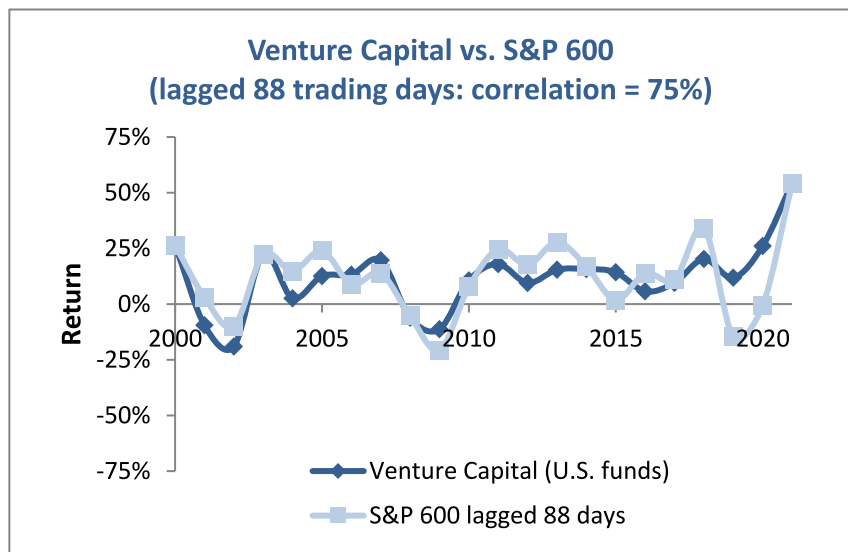
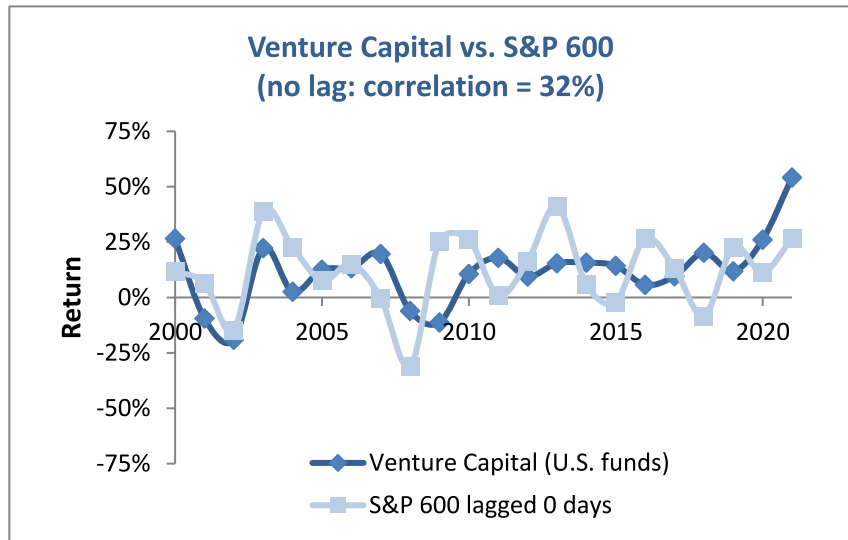
Overlay type	Your fund		Peer median				U.S. Public median			
	2021	2020	2021		2020		2021		2020	
	bps	bps	bps	#	bps	#	bps	#	bps	#
Int. Discretionary Currency							-15.1	1	50.8	1
Ext. Discretionary Currency			-4.8	1	-8.1	1	-0.5	3	-1.0	3
Internal Global TAA										
External Global TAA										
Internal PolicyTilt TAA										
External PolicyTilt TAA										
Internal Commodities										
External Commodities			3.6	1	-3.2	1	3.6	1	-3.2	1
Internal Long/Short										
External Long/Short										
Internal Other										
External Other							-3.2	1	51.8	2

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.



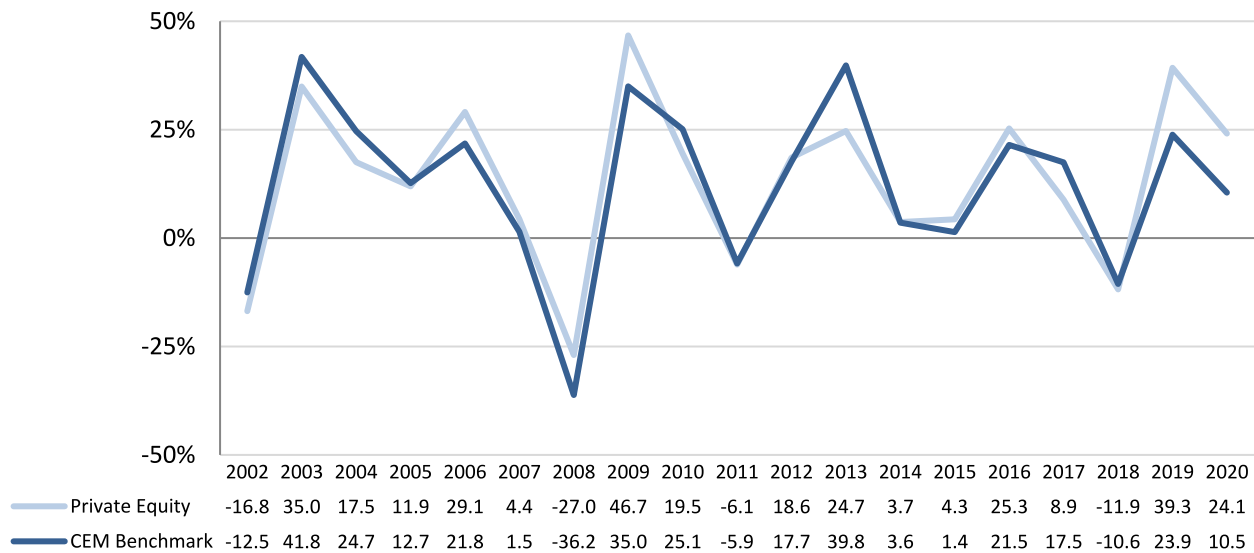
- Un-investable peer-based benchmarks. Peer based benchmarks reflect the reporting lags in peer portfolios so they have much better correlations than un-lagged investable benchmarks. But their relationship statistics are not as good as for lagged investable benchmarks.
- Aspirational premiums (i.e.,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

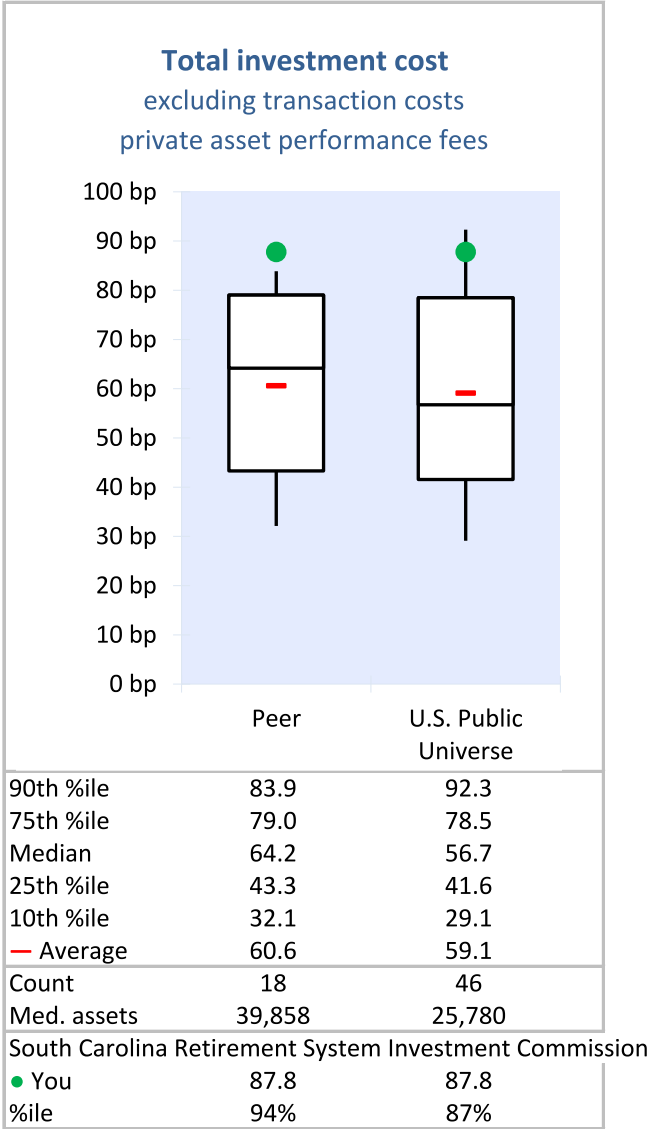
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## Comparisons of total investment cost

Your total investment cost, excluding transaction costs and private asset performance fees, of 87.8 bps was above the peer median of 64.2 bps.

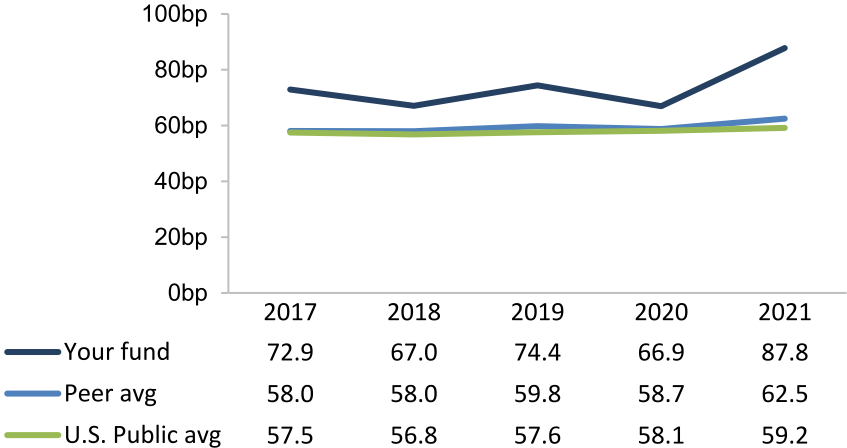
Differences in total investment cost are often caused by two factors that are usually outside of management's control: asset mix and fund size. Therefore, to assess whether your fund's total investment cost is high or low given your unique asset mix and size, CEM calculates a benchmark cost for your 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, increased from 72.9 bps in 2017 to 87.8 bps in 2021.

**Trend in total investment cost**  
(excluding transaction costs and private asset performance fees)



Trend analysis is based on 40 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 2021 total investment cost, excluding transaction costs and private asset performance fees, was 87.8 bp or \$342.2 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					0	0	179	179		0%
Stock - U.S. small cap			491	256				746		0%
Stock - EAFE			218	263				481		0%
Stock - Emerging					132		139	271		0%
Stock - Global			2,082	3,079	0	0	1	5,162		2%
Stock - ACWI x U.S.					0	0	0	0		0%
Fixed income - U.S.		5			960	0	287	1,252		0%
Fixed income - Emerging					172	0	70	242		0%
Fixed income - High yield					4,831	0	332	5,163		2%
Cash					58	0	230	288		0%
REITs					933	0	88	1,021		0%
Real estate ex-REITs - LP <sup>12</sup>					27,598	111,620	631	28,228		8%
Real estate ex-REITs - Co-invest. <sup>1</sup>					323	528	13	337		0%
Infrastructure <sup>1</sup>					6,631	5,891	219	6,850		2%
Infrastructure - Co-invest. <sup>1</sup>					180	488	18	198		0%
Hedge funds					36,125	70,863	353	107,340		31%
Hedge funds - FoFs					9,122	0	529	9,651		3%
Underlying FoF fees					24,699	41,163		65,862		19%
Global TAA					6,327	6,725	135	13,186		4%
Private equity - Diversified - LP <sup>12</sup>					54,587	101,809	457	55,044		16%
Private equity - Diversified - FoFs <sup>1</sup>					3,430	23,019	103	3,534		1%
Underlying FoF fees <sup>12</sup>					8,128	12,052		8,128		2%
Private equity - Diversified - Co-invest. <sup>1</sup>					2,118	15,383	277	2,395		1%
Private credit - LP <sup>12</sup>					19,788	28,100	565	20,353		6%
Private credit - Co-invest. <sup>1</sup>					1,331	-1,336	118	1,449		0%
Derivatives/Overlays			658	110				768		0%
<b>Total asset management costs excluding private asset performance fees</b>								<b>338,130</b>	<b>86.7bp</b>	<b>99%</b>
<b>Oversight, custodial &amp; other asset related costs</b>										
Oversight of the fund								1,238		0%
Trustee & custodial								1,394		0%
Consulting and performance measurement								835		0%
Audit								238		0%
Other								382		0%
<b>Total oversight, custodial &amp; other costs</b>								<b>4,087</b>	<b>1.0bp</b>	<b>1%</b>
<b>Total investment costs excluding transaction costs and private asset performance fees</b>								<b>342,217</b>	<b>87.8bp</b>	<b>100%</b>

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 (2021 - 2017)

	Investment costs (\$000s)					Change (\$000s)				Change (%)			
	2021	2020	2019	2018	2017	2021	2020	2019	2018	2021	2020	2019	2018
<b>Asset management</b>													
Stock - U.S. broad/all	179	3,439	12,637	11,104	11,150	-3,260	-9,198	1,533	-46	-95%	-73%	14%	0%
Stock - U.S. small cap	746	490				257				52%			
Stock - EAFE	481	357				124				35%			
Stock - Emerging	271	4,641	6,073	9,879	10,017	-4,370	-1,432	-3,807	-138	-94%	-24%	-39%	-1%
Stock - Global	5,162	5,577	7,480	7,572	6,509	-415	-1,903	-92	1,064	-7%	-25%	-1%	16%
Stock - ACWI x U.S.	0	1,468	4,181	4,697	4,036	-1,468	-2,713	-516	660	-100%	-65%	-11%	16%
Fixed income - U.S.	1,252	1,774	2,032	1,796	3,492	-522	-258	235	-1,696	-29%	-13%	13%	-49%
Fixed income - Emerging	242	3,630	5,404	6,107	7,849	-3,388	-1,774	-703	-1,742	-93%	-33%	-12%	-22%
Fixed income - High yield	5,163	5,965	6,158	5,847	8,433	-802	-193	311	-2,586	-13%	-3%	5%	-31%
Cash	288	781	621	1,358	1,958	-493	160	-737	-600	-63%	26%	-54%	-31%
REITs	1,021	1,651	2,002	1,996	1,821	-630	-350	6	174	-38%	-18%	0%	10%
Real estate ex-REITs - LP <sup>12</sup>	28,228	23,640	27,651	19,845	16,612	4,588	-4,011	7,807	3,233	19%	-15%	39%	19%
Real estate ex-REITs - Co-invest. <sup>1</sup>	337	153	0	0	6	183	153	0	-6	119%	35588%	-7%	-93%
Infrastructure <sup>1</sup>	6,850	7,239	4,318	3,089	2,182	-388	2,920	1,229	907	-5%	68%	40%	42%
Infrastructure - Co-invest. <sup>1</sup>	198	87				110				126%			
Hedge funds	107,340	36,305	51,668	44,499	44,592	71,035	-15,363	7,169	-93	196%	-30%	16%	0%
Hedge funds - FoFs	9,651	8,072	7,032	4,528	3,830	1,579	1,040	2,504	698	20%	15%	55%	18%
Underlying FoF fees	65,862	14,623	13,799	15,196	30,162	51,239	824	-1,397	-14,966	350%	6%	-9%	-50%
Global TAA	13,186	2,974	5,148	11,833	9,859	10,212	-2,174	-6,685	1,974	343%	-42%	-56%	20%
Private equity - Diversified - LP <sup>12</sup>	55,044	39,545	33,675	27,896	19,492	15,499	5,870	5,779	8,404	39%	17%	21%	43%
Private equity - Diversified - FoFs <sup>1</sup>	3,534	4,663	3,109	1,518	2,996	-1,130	1,555	1,591	-1,479	-24%	50%	105%	-49%
Underlying FoF fees <sup>12</sup>	8,128	7,951	3,847	3,500	4,780	176	4,104	347	-1,280	2%	107%	10%	-27%
Private equity - Diversified - Co-invest. <sup>1</sup>	2,395	1,190	3,103	3,384	3,634	1,206	-1,913	-281	-250	101%	-62%	-8%	-7%
Private credit - LP <sup>12</sup>	20,353	27,494	30,307	19,324	24,584	-7,141	-2,813	10,984	-5,260	-26%	-9%	57%	-21%
Private credit - Co-invest. <sup>1</sup>	1,449	2,467	13	0	9	-1,018	2,454	13	-9	-41%	18672%	16325%	-99%
Derivatives/Overlays	768	237	800	958	810	530	-563	-158	148	223%	-70%	-16%	18%
Total excl. private asset perf. fees	338,130	206,413	231,057	205,926	218,815	131,717	-24,643	25,131	-12,889	64%	-11%	12%	-6%
<b>Oversight, custodial &amp; other asset related costs</b>													
Oversight of the fund	1,238	1,198	1,237	1,251	1,089	39	-38	-14	162	3%	-3%	-1%	15%
Trustee & custodial	1,394	1,394	1,670	1,152	1,131		-276	518	22	0%	-17%	45%	2%
Consulting and performance measurement	835	786	825	764	1,070	49	-39	61	-306	6%	-5%	8%	-29%
Audit	238	409	120	102	17	-172	290	17	86	-42%	242%	17%	510%
Other	382	373	357	363	321	9	16	-6	42	2%	4%	-2%	13%
Total oversight, custodial & other	4,087	4,161	4,209	3,633	3,627	-74	-48	576	5	-2%	-1%	16%	0%
Total investment costs <sup>1</sup>	342,217	210,574	235,265	209,559	222,442	131,643	-24,691	25,707	-12,883	63%	-10%	12%	-6%
Total in basis points	87.8bp	66.9bp	74.4bp	67.0bp	72.9bp								

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 8.7 bps below your benchmark cost of 96.5 bps. This implies that your fund was low cost by 8.7 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	342,217	87.8 bp
- Your fund's benchmark	376,248	96.5 bp
= Your fund's cost savings	-34,031	-8.7 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	-24,181	-6.2 bp
Less int. pass, % of total passive	371	0.1 bp
Less int. active % of total active	1,139	0.3 bp
Less evergreen % of external	22,494	5.8 bp
Less fund of funds	-3,054	-0.8 bp
More co-investment	-24,198	-6.2 bp
Less overlays and unfunded strategies	-2,746	-0.7 bp
Total style impact	-30,176	-7.7 bp
<u>Paying more/-less for similar services:</u>		
External investment management	21,665	5.6 bp
Internal investment management	0	0.0 bp
Oversight, custodial and other	-3,109	-0.8 bp
Total impact of paying more /-less	18,556	4.8 bp
Total cost override	-22,411	-5.7 bp
Total savings	-34,031	-8.7 bp

## Benchmark cost calculation

Your 2021 benchmark cost was 96.5 basis points or 376.2 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	Weighted peer median cost <sup>1</sup>	Benchmark \$000s
	(A)	(B)	(A X B)
<b>Asset management costs</b>			
Stock - U.S. broad/all	835	8.5 bp	707
Stock - U.S. small cap	1,193	38.4 bp	4,582
Stock - EAFE	1,229	38.5 bp	4,730
Stock - Emerging	651	45.4 bp	2,957
Stock - Global	14,372	15.9 bp	22,815
Stock - ACWI x U.S.	2	27.3 bp	6
Fixed income - U.S.	883	9.7 bp	854
Fixed income - Emerging	328	33.4 bp	1,096
Fixed income - High yield	1,547	30.4 bp	4,710
Cash	1,075	2.7 bp	288
REITs	410	34.7 bp	1,422
Real estate ex-REITs	3,167	96.2 bp	30,453
Infrastructure	1,357	101.2 bp	13,730
Hedge funds	4,114	130.1 bp	53,541
Perf. fees	4,114	151.5 bp	62,346
Global TAA	628	45.0 bp	2,828
Private equity - Diversified	5,675	158.9 bp	90,160
Private credit	4,223	108.7 bp	45,904
Overlay Programs <sup>2</sup>	38,985	0.9 bp	3,514
Benchmark for asset management	38,985	88.9 bp	346,640
<b>Oversight, custody and other costs<sup>3</sup></b>			
Oversight	38,985	1.0 bp	
Trustee & custodial	38,985	0.2 bp	
Consulting	38,985	0.2 bp	
Audit	38,985	0.1 bp	
Other	38,985	0.1 bp	
Benchmark for oversight, custody, other	38,985	1.8 bp	7,196
Total cost override	38,985	5.7 bp	22,411
Total benchmark cost		96.5 bp	376,248

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 saved you 7.7 bps.

Implementation choices	Assets by style	Peer benchmark cost			Style 1 %			Cost/ -Savings \$000s	bps
		Style 1	Style 2	Style 1 -Savings	Your	Peer average	More/ -Less		
	a	b	c	d = b - c	e			a x d x e	
<u>Passive vs active</u>	Total	Passive	Active		Passive % of total assets				
Stock - U.S. broad/all	835	1 bp	25 bp	-24 bp	0%	68%	-68%	1,360	
Stock - U.S. small cap	1,193	1 bp	53 bp	-52 bp	100%	29%	71%	-4,416	
Stock - EAFE	1,229	4 bp	45 bp	-41 bp	100%	16%	84%	-4,249	
Stock - Emerging	651	5 bp	58 bp	-53 bp	0%	23%	-23%	814	
Stock - Global	14,372	3 bp	41 bp	-37 bp	100%	67%	33%	-18,003	
Stock - ACWI x U.S.	2	4 bp	33 bp	-29 bp	0%	19%	-19%	1	
Fixed income - U.S.	883	2 bp	11 bp	-9 bp	0%	12%	-12%	98	
Fixed income - Emerging	328	7 bp	36 bp	-29 bp	0%	9%	-9%	82	
REITs	410	3 bp	38 bp	-35 bp	0%	9%	-9%	133	
More passive								-24,181	-6.2 bp
<u>Internal passive vs external passive</u>	Passive assets	Internal passive	External passive		Internal passive % of passive				
Stock - U.S. small cap	1,193	2 bp	1 bp	0 bp	0%	22%	-22%	-6	
Stock - Global	14,366	2 bp	4 bp	-2 bp	0%	13%	-13%	377	
Less int. pass, % of total passive								371	0.1 bp
<u>Internal active vs external active</u>	Active assets	Internal active	External active		Internal active % of active				
Stock - Emerging	651	8 bp	59 bp	-51 bp	0%	3%	-3%	88	
Fixed income - U.S.	883	3 bp	13 bp	-10 bp	2%	23%	-22%	192	
Fixed income - High yield	1,547	8 bp	31 bp	-23 bp	0%	2%	-2%	68	
REITs	410	6 bp	41 bp	-35 bp	0%	9%	-9%	134	
Real estate ex-REITs	3,167	23 bp	98 bp	-75 bp	0%	2%	-2%	559	
Global TAA	628	14 bp	47 bp	-33 bp	0%	5%	-5%	99	
Private equity - Diversified	5,675	21 bp	159 bp	-138 bp	0%	0%	0%	-1	
Less int. active % of total active								1,139	0.3 bp
<u>Evergreen vs LP/Co &amp; fund of funds</u>	External assets	Ever-green	LP/Co & FoF		Evergreen fund % of external				
Real estate ex-REITs	3,167	77 bp	132 bp	-55 bp	0%	62%	-62%	10,940	
Infrastructure	1,357	63 bp	126 bp	-62 bp	94%	39%	54%	-4,614	
Hedge funds	4,114	122 bp	180 bp	-58 bp	40%	86%	-46%	10,876	
Perf. fees	4,114	150 bp	161 bp	-11 bp	40%	86%	-46%	2,005	
Private credit	4,223	98 bp	116 bp	-19 bp	0%	42%	-42%	3,287	
Less evergreen % of external								22,494	5.8 bp
<u>LP/Co vs fund of funds</u>	LP/Co & Fund of F.	LP/Co	Fund of funds		LP/Co % of LP/Co & Fund of F.				
Real estate ex-REITs	3,167	132 bp	169 bp	-37 bp	100%	99%	1%	-169	
Infrastructure	86	124 bp	204 bp	-80 bp	100%	97%	3%	-18	
Private equity - Diversified	5,675	146 bp	226 bp	-80 bp	91%	84%	6%	-2,867	
Less fund of funds								-3,054	-0.8 bp
<u>Co-investment vs LP</u>	LP/Co	Co-invest	LP		Co-invest % of LP/Co				
Real estate ex-REITs	3,167	64 bp	134 bp	-70 bp	3%	3%	0%	35	
Infrastructure	86	8 bp	130 bp	-122 bp	100%	5%	95%	-995	
Private equity - Diversified	5,148	14 bp	155 bp	-141 bp	34%	6%	28%	-19,985	
Private credit	4,223	28 bp	123 bp	-95 bp	15%	7%	8%	-3,253	
More co-investment								-24,198	-6.2 bp
Less overlays and unfunded strategies								-2,746	-0.7 bp
Total impact of differences in implementation style								-30,176	-7.7 bp



## Cost impact of overlays

As summarized on the previous page, the style impact of overlays saved you 0.7 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)
	(A)	You (B)	Peer avg. (C)	A X (B - C)
<b>Internal Overlays</b>				
Rebalancing / Passive beta - Hedge	38,985	NA	0.00 bp	-8
Duration management - Hedge	38,985	NA	0.00 bp	-1
Other overlay - Discretionary	38,985	NA	0.00 bp	-10
<b>External Overlays</b>				
Currency - Hedge	38,985	NA	0.01 bp	-35
Currency - Discretionary	38,985	NA	0.12 bp	-457
Rebalancing / Passive beta - Hedge	38,985	0.20 bp	0.08 bp	459
Commodity futures - Discretionary	38,985	NA	0.38 bp	-1,479
Long/Short - Discretionary	38,985	NA	0.28 bp	-1,095
Other overlay - Discretionary	38,985	NA	0.03 bp	-121
Total impact in 000s				-2,746
Total impact in basis points				-0.7 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 cost you 4.8 bps.

	Style	Your avg holdings (mils) (A)	Cost in bps			Cost/-Savings	
			Your	Peer median	More/-less (B)	\$000s (A X B)	bps
<b>External asset management</b>							
Stock - U.S. broad/all	active	835	2.1	24.7	-22.6	-1,888	
Stock - U.S. small cap	passive	1,193	6.3	1.3	4.9	587	
Stock - EAFE	passive	1,229	3.9	3.9	0.0	0	
Stock - Emerging	active	651	4.2	59.3	-55.1	-3,588	
Stock - Global	passive	14,366	3.6	3.6	0.0	0	
Stock - Global	active	7	2.1	40.8	-38.7	-26	
Stock - ACWI x U.S.	active	2	2.1	32.9	-30.8	-7	
Fixed income - U.S.	active	868	14.4	13.1	1.2	108	
Fixed income - Emerging	active	328	7.4	35.9	-28.5	-935	
Fixed income - High yield	active	1,547	33.4	30.9	2.5	385	
Cash <sup>3</sup>	active	1,075	2.7	2.7	0.0	0	
REITs	active	410	24.9	41.2	-16.3	-667	
Real estate ex-REITs	CO	88	38.1	63.7	-25.7	-227	
Real estate ex-REITs	LP	3,079	91.7	134.0	-42.3	-13,026	
Infrastructure	active	1,271	53.9	63.2	-9.3	-1,187	
Infrastructure	CO	86	23.1	7.6	15.4	132	
Hedge funds	active	1,645	221.8	121.8	100.0	16,442	
Top layer perf. fees	active	1,645	430.9	150.0	280.9	46,192	
Hedge funds	FoF	2,470	39.1	53.7	-14.6	-3,612	
Top layer perf. fees <sup>2</sup>	FoF	2,470	0.0	20.7	-20.7	-5,105	
Underlying base fees	FoF	2,470	100.0	126.0	-26.0	-6,419	
Underlying perf. fees	FoF	2,470	166.7	140.0	26.7	6,588	
Global TAA <sup>1</sup>	active	628	209.8	46.6	163.3	10,260	
Private equity - Diversified	CO	1,727	13.9	13.9	0.0	0	
Private equity - Diversified	LP	3,421	160.9	154.9	6.0	2,059	
Private equity - Diversified	FoF	528	67.0	72.0	-5.0	-266	
Underlying base fees <sup>3</sup>	FoF	528	154.0	154.0	0.0	0	
Private credit <sup>1</sup>	CO	635	22.8	28.4	-5.6	-355	
Private credit	LP	3,588	56.7	123.0	-66.3	-23,781	
Total for external management						21,665	5.6 bp
<b>Internal asset management</b>							
Fixed income - U.S.	active	(A) 16			(B) 0.2	(A X B) 0	
Total for internal management						0	0.0 bp
<b>Oversight, custody and other costs<sup>4</sup></b>							
Oversight			0.3	1.0	-0.6		
Trustee & custodial			0.4	0.2	0.1		
Consulting			0.2	0.2	0.0		
Audit			0.1	0.1	0.0		
Other			0.1	0.1	0.0		
Benchmark for oversight, custody, other		38,985	1.0	1.8	-0.8	-3,109	-0.8 bp
Total						18,556	4.8 bp

1. Universe median used because peer data was insufficient.

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

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

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

## 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 weighted median cost <sup>1</sup>	More/-less	Your average assets (or fee basis)	More/-less in \$000s		
					Total More/-less	Due to Impl. style	Due to paying more/less
	(A)	(B)	(C = A - B)	(D)	(C X D)		
<b>Asset management costs</b>							
Stock - U.S. broad/all	2.1 bp	8.5 bp	-6.3 bp	835	-528	1,360	-1,888
Stock - U.S. small cap	6.3 bp	38.4 bp	-32.2 bp	1,193	-3,836	-4,422	587
Stock - EAFE	3.9 bp	38.5 bp	-34.6 bp	1,229	-4,249	-4,249	0
Stock - Emerging	4.2 bp	45.4 bp	-41.3 bp	651	-2,686	902	-3,588
Stock - Global	3.6 bp	15.9 bp	-12.3 bp	14,372	-17,652	-17,626	-26
Stock - ACWI x U.S.	2.1 bp	27.3 bp	-25.1 bp	2	-6	1	-7
Fixed income - U.S.	14.2 bp	9.7 bp	4.5 bp	883	398	290	108
Fixed income - Emerging	7.4 bp	33.4 bp	-26.0 bp	328	-853	82	-935
Fixed income - High yield	33.4 bp	30.4 bp	2.9 bp	1,547	453	68	385
Cash	2.7 bp	2.7 bp	0.0 bp	1,075	0	0	0
REITs	24.9 bp	34.7 bp	-9.8 bp	410	-400	267	-667
Real estate ex-REITs	90.2 bp	96.2 bp	-6.0 bp	3,167	-1,888	11,365	-13,253
Infrastructure	51.9 bp	101.2 bp	-49.2 bp	1,357	-6,681	-5,627	-1,054
Hedge funds	172.1 bp	130.1 bp	42.0 bp	4,114	17,287	10,876	6,411
Perf. fees	272.3 bp	151.5 bp	120.7 bp	4,114	49,680	2,005	47,675
Global TAA	209.8 bp	45.0 bp	164.8 bp	628	10,359	99	10,260
Private equity - Diversified	121.8 bp	158.9 bp	-37.1 bp	5,675	-21,060	-22,853	1,793
Private credit	51.6 bp	108.7 bp	-57.1 bp	4,223	-24,102	34	-24,136
Overlay Programs <sup>2</sup>	0.2 bp	0.9 bp	-0.7 bp	38,985	-2,746	-2,746	0
Total asset management	86.7 bp	88.9 bp	-2.2 bp	38,985	-8,510	-30,176	21,665
<b>Oversight, custody and other costs<sup>3</sup></b>							
Oversight of the fund	0.3 bp	1.0 bp	-0.6 bp				
Trustee & custodial	0.4 bp	0.2 bp	0.1 bp				
Consulting	0.2 bp	0.2 bp	0.0 bp				
Audit	0.1 bp	0.1 bp	0.0 bp				
Other	0.1 bp	0.1 bp	0.0 bp				
Total oversight, custody & other	1.0 bp	1.8 bp	-0.8 bp	38,985	-3,109	n/a	-3,109
<b>Total</b>	<b>87.8 bp</b>	<b>96.5 bp</b>	<b>-8.7 bp</b>	<b>38,985</b>	<b>-11,619</b>	<b>-30,176</b>	<b>18,556</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.

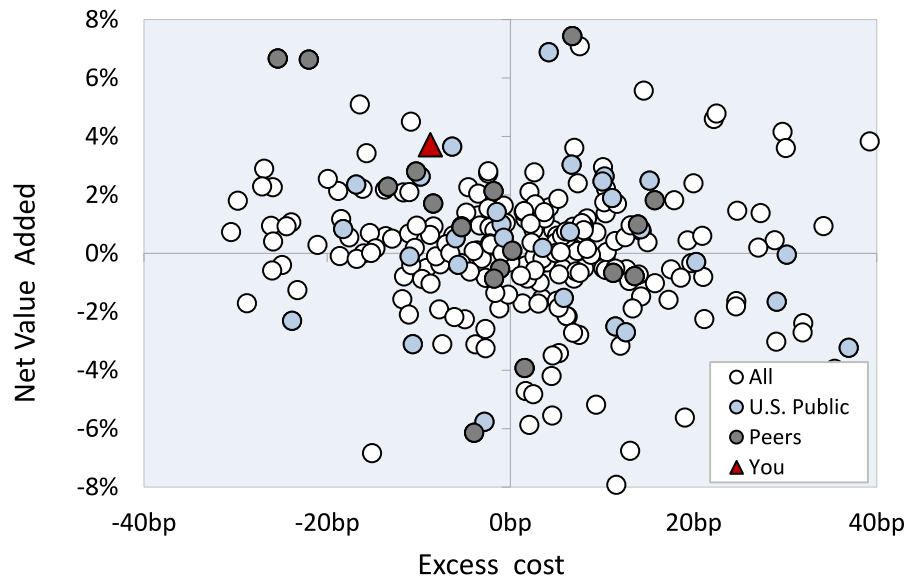
2. Total fund average holdings is used as the base when calculating the relative cost impact of the overlay programs.

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

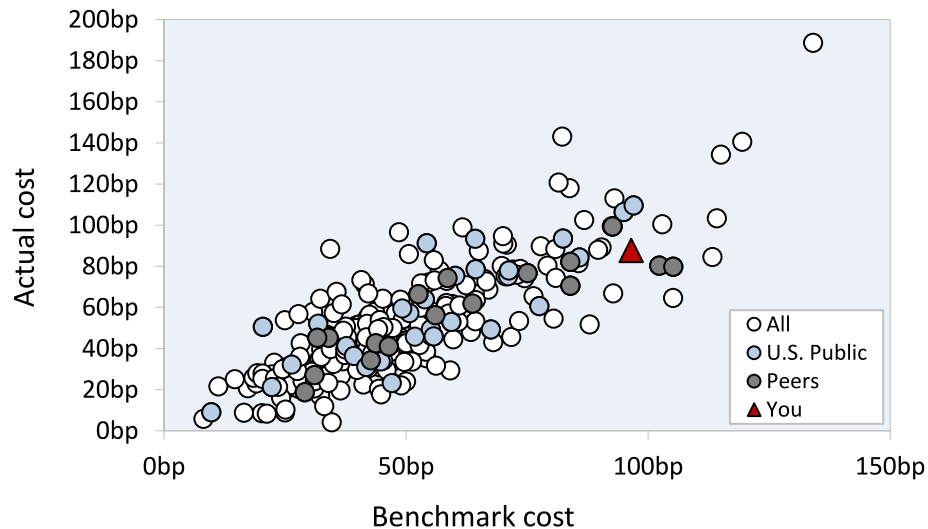
## Your cost effectiveness ranking

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 2021, your fund ranked in the positive value added, low cost quadrant.

**Your 2021 Net value added 3.7%, Excess cost -9 bps**



**Your 2021 Actual cost 87.8 bps, Benchmark cost 96.5 bps**



For all funds except your fund, benchmark cost equals the sum of group median costs x fund's average holdings by asset class plus group median cost of derivatives/overlays plus group median cost of oversight/support. Group is peer if the fund is in the peer group, universe - if the fund is part of the universe, and global/database otherwise. Your fund's benchmark cost is calculated using peer-based methodology per page 14 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

$$= (6\% \times 1.0 \text{ bp}) + (0\% \times 0.0 \text{ bp}) + (62\% \times 0.8 \text{ bp}) + (32\% \times 24.7 \text{ bp}) = 8.5 \text{ bp}$$

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

$$= 2.1 \text{ bp} - 8.5 \text{ bp} = -6.3 \text{ bp}$$

#### 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)

$$= 16.3 \text{ bp} + 0.0 \text{ bp} + 0.0 \text{ bp} = 16.3 \text{ bp}$$

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

$$\begin{aligned} &= (\text{peer average passive cost} - \text{peer average active cost}) \times \\ &\quad (\text{passive \% of asset, you} - \text{passive \% of asset, peer average}) \\ &= (0.8 \text{ bp} - 24.7 \text{ bp}) \times (0\% - 68\%) = 16.3 \text{ bp} \end{aligned}$$

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

$$= [(6\% \times 1.0 \text{ bp}) + (62\% \times 0.8 \text{ bp})] / (6\% + 62\%) = 0.8 \text{ bp}$$

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

$$= [(0\% \times 0.0 \text{ bp}) + (32\% \times 24.7 \text{ bp})] / (0\% + 32\%) = 24.7 \text{ bp}$$

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

$$\begin{aligned} &= (\text{peer average internal passive cost} - \text{peer average external passive cost}) \times \\ &\quad (\text{internal passive \% of passive, you} - \text{internal passive \% of passive, peer average}) \times \text{passive \% of asset, you} \\ &= (1.0 \text{ bp} - 0.8 \text{ bp}) \times (0\% - 0\%) \times 0\% = 0.0 \text{ bp} \end{aligned}$$

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

$$\begin{aligned} &= (\text{peer average internal active cost} - \text{peer average external active cost}) \times \\ &\quad (\text{internal active \% of active, you} - \text{internal active \% of active, peer avg}) \times \text{active \% of asset, you} \\ &= (0.0 \text{ bp} - 24.7 \text{ bp}) \times (0\% - 0\%) \times 100\% = 0.0 \text{ bp} \end{aligned}$$

##### Cost impact of paying more/-less

$$\begin{aligned} &= (\text{cost internal passive, you} - \text{cost internal passive, peer}) \times \text{internal passive \% of asset, you} + \\ &\quad (\text{cost internal active, you} - \text{cost internal active, peer}) \times \text{internal active \% of asset, you} + \\ &\quad (\text{cost external passive, you} - \text{cost external passive, peer}) \times \text{external passive \% of asset, you} + \\ &\quad (\text{cost external active, you} - \text{cost external active, peer}) \times \text{external active \% of asset, you} \\ &= (0.0 \text{ bp} - 1.0 \text{ bp}) \times 0\% + (0.0 \text{ bp} - 0.0 \text{ bp}) \times 0\% + (0.0 \text{ bp} - 0.8 \text{ bp}) \times 0\% + (2.1 \text{ bp} - 24.7 \text{ bp}) \times 100\% = -22.6 \text{ bp} \end{aligned}$$

##### Your cost versus benchmark (-savings/+excess)

= cost impact of differences in implementation style + cost impact of paying more/-less

$$= 16.3 \text{ bp} + -22.6 \text{ bp} = -6.3 \text{ bp}$$

## Benchmarking methodology formulas and data

### b) 2021 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				2.1				1.0		0.8	24.7				8.5
Stock - U.S. small cap			6.3					1.6	11.3	1.3	56.2				38.4
Stock - EAFE			3.9						13.2	3.9	50.0				38.5
Stock - Emerging				4.2				5.0	8.0	4.1	59.3				45.4
Stock - Global			3.6	2.1				1.6		3.6	40.8				15.9
Stock - ACWI x U.S.				2.1				5.0		3.8	32.9				27.3
Fixed income - U.S.		3.3		14.4				1.8	3.1	1.8	13.1				9.7
Fixed income - Emerging				7.4				3.7		8.6	35.9				33.4
Fixed income - High yield				33.4					8.0		30.9				30.4
Cash				2.7							2.7				2.7
REITs				24.9				1.4	5.9	6.2	41.2				34.7
Real estate ex-REITs					38.1	91.7			22.8		77.1	63.7	134.0	64.3	95.6
Underlying base fees														104.4	0.6
Infrastructure				53.9	23.1						63.2	7.6	130.0	74.9	99.1
Underlying base fees														129.0	2.0
Hedge funds				221.8			39.1				121.8			53.7	112.0
Top layer perf. fees				430.9			0.0				150.0			20.7	131.4
Underlying base fees							100.0							126.0	18.1
Underlying perf. fees							166.7							140.0	20.1
Global TAA				209.8					13.8		46.6				45.0
Private equity - Diversified					13.9	160.9	67.0		20.8			13.9	154.9	72.0	134.8
Underlying base fees							154.0							154.0	24.1
Private credit					22.8	56.7					97.8	28.4	123.0		108.7
Underlying base fees															0.0

## Benchmarking methodology formulas and data

### c) 2021 Style weights used to calculate the weighted peer median costs and impact of mix differences.

Style Weights	You (%)							Peer average (%)						
	Internal Passive	Internal Active	External Passive	External Active	Co-invest	Limited Partner.	Fund of Funds	Internal Passive	Internal Active	External Passive	External Active	Co-invest	Limited Partner.	Fund of Funds
Stock - U.S. broad/all	0.0%		0.0%	100.0%				5.7%		62.4%	31.9%			
Stock - U.S. small cap	0.0%	0.0%	100.0%	0.0%				6.3%	4.6%	22.4%	66.7%			
Stock - EAFE		0.0%	100.0%	0.0%					11.5%	15.8%	72.7%			
Stock - Emerging	0.0%	0.0%	0.0%	100.0%				11.6%	2.0%	11.8%	74.6%			
Stock - Global	0.0%		100.0%	0.0%				8.8%		57.7%	33.5%			
Stock - ACWI x U.S.	0.0%		0.0%	100.0%				0.8%		18.6%	80.6%			
Fixed income - U.S.	0.0%	1.8%	0.0%	98.2%				0.4%	20.5%	12.0%	67.1%			
Fixed income - Emerging	0.0%		0.0%	100.0%				2.2%		6.5%	91.3%			
Fixed income - High yield		0.0%		100.0%					1.9%		98.1%			
Cash		0.0%		100.0%					0.0%		100.0%			
REITs	0.0%	0.0%	0.0%	100.0%				6.2%	8.4%	3.1%	82.3%			
Real estate ex-REITs		0.0%		0.0%	2.8%	97.2%	0.0%		2.3%		61.0%	1.1%	35.1%	0.5%
Underlying base fees		0.0%		0.0%	2.8%	97.2%	0.0%		2.3%		61.0%	1.1%	35.1%	0.5%
Infrastructure				93.7%	6.3%	0.0%	0.0%				39.3%	3.1%	56.1%	1.6%
Underlying base fees				93.7%	6.3%	0.0%	0.0%				39.3%	3.1%	56.1%	1.6%
Hedge funds				40.0%			60.0%				85.6%			14.4%
Top layer perf. fees				40.0%			60.0%				85.6%			14.4%
Underlying base fees				40.0%			60.0%				85.6%			14.4%
Underlying perf. fees				40.0%			60.0%				85.6%			14.4%
Global TAA		0.0%		100.0%					4.8%		95.2%			
Private equity - Diversified		0.0%			30.4%	60.3%	9.3%		0.0%			5.1%	79.3%	15.6%
Underlying base fees		0.0%			30.4%	60.3%	9.3%		0.0%			5.1%	79.3%	15.6%
Private credit				0.0%	15.0%	85.0%					41.7%	4.0%	54.3%	
Underlying base fees				0.0%	15.0%	85.0%					41.7%	4.0%	54.3%	

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 =

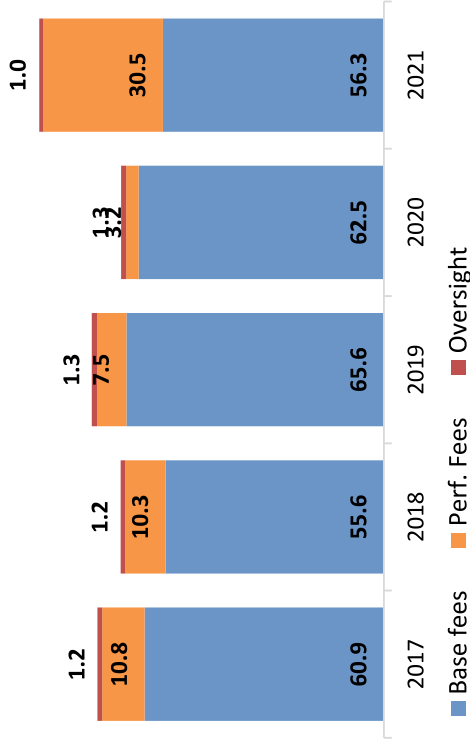
$$\text{style impact} [ \text{CostStyleBpsL} \times (\text{WgH} - \text{WgL}) ] + \text{paying impact} [ \text{WgH} \times (\text{CostStyleBpsH} - \text{CostStyleBpsL}) ]$$

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

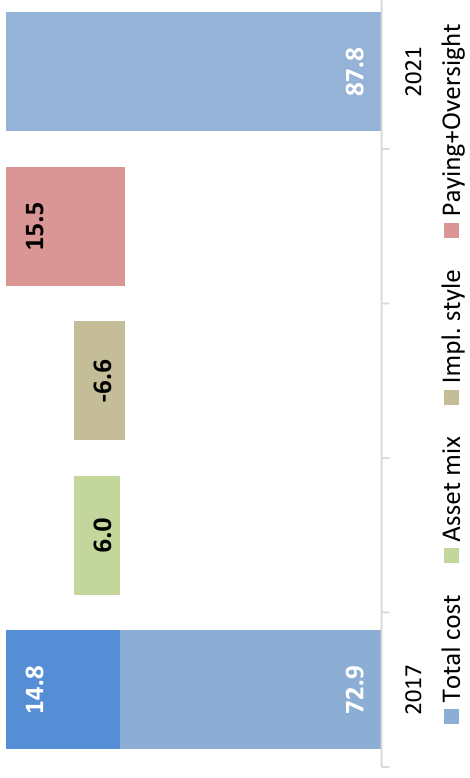


## Total plan cost and cost changes

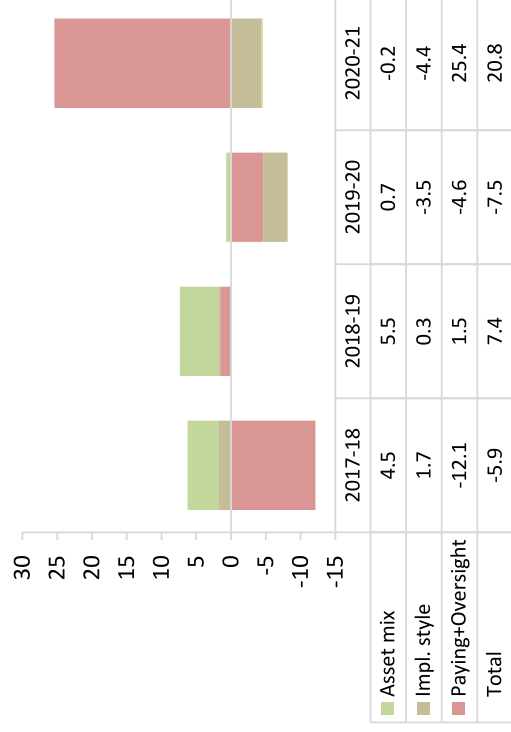
Total plan cost over time, bps



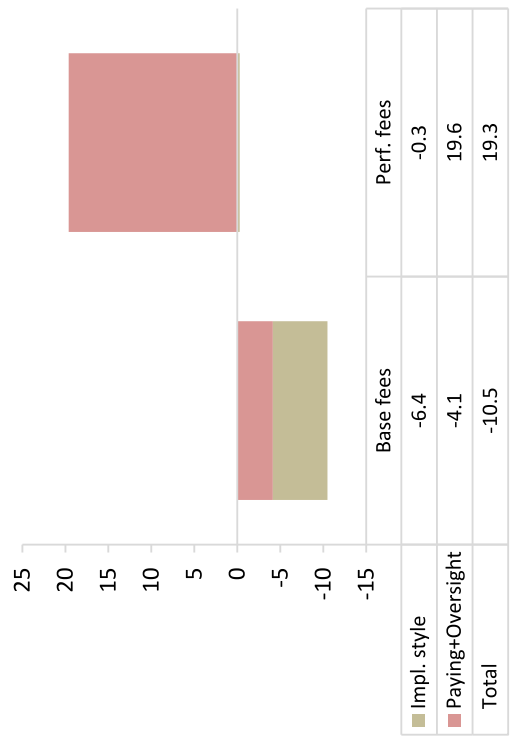
Cost differences, 2021 versus 2017, bps



Reasons for cost differences over time, bps



Impact of base and performance fees, 2021 vs. 2017, bps



## Summary of cost differences, 2021 versus 2017

Your total cost increased by 14.8 bps between 2017 and 2021 because of changes in: asset mix (6.0 bps), implementation style (-6.6 bps), and paying more/less for similar services (15.5 bps).

	bps	\$000s
Starting total cost, 2017	72.9	222,442
Growth in asset value		61,889
Asset mix	<u>6.0</u>	<u>23,395</u>
Stock	-3.1	-12,095
Fixed income	-4.3	-16,661
Real estate ex-REITs	2.3	8,935
Real assets ex real estate	0.9	3,330
Hedge funds & multi-asset	-3.4	-13,420
Private equity	10.1	39,510
Private debt	3.5	13,796
Implementation style (less expensive vs. more )	<u>-6.6</u>	<u>-25,860</u>
More passive, less active	-3.3	-12,930
Less int. active % of total active	0.3	1,031
Less evergreen % of external	-0.1	-242
More LP, less fund of funds	-1.1	-4,471
Performance fees	-0.3	-1,094
More co-investment	-2.1	-8,154
Paying more/-less for	<u>15.6</u>	<u>60,901</u>
Stock	-2.2	-8,649
Fixed income	-1.3	-5,223
Real estate ex-REITs	-0.2	-960
Real assets ex real estate	0.0	-136
Hedge funds & multi-asset	5.7	22,345
Performance fees	19.6	76,471
Private equity	-1.1	-4,291
Private debt	-4.7	-18,389
Overlays and unfunded strategies	-0.1	-268
Oversight, custodial, other (pay more/-less)	<u>-0.1</u>	<u>-549</u>
Total difference	14.8	119,775
Ending total cost, 2021	87.8	342,217

## Summary of cost differences, year over year

	2017		2018		2019		2020		2021	
	bps	\$'000s	bps	\$'000s	bps	\$'000s	bps	\$'000s	bps	\$'000s
Starting total cost	72.9	222,442	67.0	209,559	74.4	235,265	66.9	210,574	72.9	222,442
Growth in asset value		5,532		2,445		-1,249		50,413		61,889
Asset mix										
Stock	4.5	14,134	5.5	17,433	0.7	2,161	-0.2	-803	6.0	23,395
Fixed income	1.1	3,497	0.4	1,370	-1.3	-4,176	-1.0	-4,011	-3.1	-12,095
Real estate ex-REITs	-1.6	-4,957	-0.7	-2,247	-0.2	-773	-1.2	-4,560	-4.3	-16,661
Real assets ex real estate	0.5	1,711	2.7	8,488	-1.1	-3,463	0.3	1,121	2.3	8,935
Hedge funds & multi-asset	1.0	3,009	0.1	306	0.1	416	-0.5	-1,811	0.9	3,330
Private equity	1.0	3,112	-1.7	-5,374	-0.9	-2,887	0.2	719	-3.4	-13,420
Private debt	1.7	5,444	1.0	3,285	3.7	11,765	4.0	15,417	10.1	39,510
Implementation style (less expensive vs. more )	0.7	2,319	3.7	11,604	0.4	1,278	-2.0	-7,678	3.5	13,796
Passive vs. active	1.7	5,393	0.3	986	-3.5	-11,046	-4.4	-16,965	-6.6	-25,860
Internal active vs. external active	0.2	498	0.0	-119	-3.0	-9,458	-0.8	-3,271	-3.3	-12,930
Evergreen vs. LP/Co & fund of funds	-0.1	-208	-0.1	-286	0.0	96	0.0	115	0.3	1,031
LP/Co vs. fund of funds	0.0	0	0.0	0	0.0	-50	0.0	-163	-0.1	-242
Co-investment vs. LP	1.1	3,476	0.7	2,187	0.3	1,042	-1.5	-5,990	-1.4	-5,565
Paying more/-less for	0.5	1,627	-0.3	-796	-0.9	-2,676	-2.0	-7,655	-2.1	-8,154
Stock	-12.1	-37,858	1.4	4,309	-4.6	-14,531	25.7	100,069	15.6	60,901
Fixed income	-1.0	-3,154	-1.4	-4,521	-0.2	-604	-1.5	-5,672	-2.2	-8,649
Real estate ex-REITs	-0.7	-2,088	0.5	1,463	-0.4	-1,312	-0.9	-3,667	-1.3	-5,223
Real assets ex real estate	0.3	1,042	-0.3	-929	0.0	-66	-0.5	-1,908	-0.2	-960
Hedge funds & multi-asset	-0.6	-2,027	0.3	870	0.7	2,324	-0.3	-1,082	0.0	-136
Private equity	-6.9	-21,591	1.4	4,403	-3.3	-10,515	31.2	121,494	25.3	98,816
Private debt	-0.6	-1,938	1.2	3,696	-1.3	-4,093	-0.4	-1,422	-1.1	-4,291
Overlays and unfunded strategies	-2.6	-8,229	-0.2	-503	0.1	292	-2.1	-8,147	-4.7	-18,389
Oversight, custodial, other (pay more/-less)	0.0	128	-0.1	-169	-0.2	-558	0.1	474	-0.1	-268
Total difference	0.0	-85	0.2	534	0.0	-25	-0.3	-1,070	-0.1	-549
Ending total cost	-5.9	-12,883	7.4	25,707	-7.5	-24,691	20.8	131,643	14.8	119,775
	67.0	209,559	74.4	235,265	66.9	210,574	87.8	342,217	87.8	342,217
	2018		2019		2020		2021		2021	

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 increased by \$120 million in 2021 compared to 2017. An increase of \$62 million was due to the \$8.5 billion rise in plan total average nav holdings. The remaining increase of \$58 million is explained by the changes in the asset mix (\$23 million), implementation style (-\$26 million), and paying more/less for similar services (\$60 million).

Asset class <sup>1</sup>	2017 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	2021 cost \$000s
	A	B	C	D	E=B+C+D	F=G-A	F-E	G
Stock - U.S. broad/all	11,150	-10,823	20	-3,270	-14,073	-10,971	3,102	179
Stock - U.S. small cap	n/a	746	0	0	746	746	0	746
Stock - EAFE	n/a	481	0	0	481	481	0	481
Stock - Emerging	10,017	-8,121	0	-4,412	-12,533	-9,746	2,787	271
Stock - Global	6,509	10,771	-12,970	-958	-3,157	-1,346	1,811	5,162
Stock - ACWI x U.S.	4,036	-5,148	0	-10	-5,159	-4,036	1,123	0
Fixed income - U.S.	3,492	-2,267	18	-962	-3,212	-2,240	972	1,252
Fixed income - Emerging	7,849	-8,418	20	-1,393	-9,790	-7,607	2,184	242
Fixed income - High yield	8,433	-4,420	0	-1,196	-5,616	-3,270	2,346	5,163
Cash	1,958	-1,556	1,013	-1,672	-2,215	-1,670	545	288
REITs	1,821	-838	0	-469	-1,307	-800	507	1,021
Real estate ex-REITs	16,618	8,935	-652	-960	7,323	11,946	4,624	28,565
Infrastructure	2,182	4,167	-242	333	4,259	4,866	607	7,048
Hedge funds	30,844	-1,491	-3,520	11,715	6,704	15,285	8,581	46,129
Top layer perf. fees	17,579	-850	-2,597	51,840	48,393	53,284	4,891	70,863
Underlying base fees	17,942	-868	2,207	426	1,765	6,757	4,992	24,699
Underlying perf. fees	12,220	-591	1,503	24,631	25,543	28,943	3,400	41,163
Global TAA	9,859	-9,620	0	10,204	584	3,327	2,743	13,186
Private equity - Diversified	26,122	33,399	525	-6,341	27,583	34,851	7,268	60,973
Underlying base fees	4,780	6,111	-6,144	2,050	2,018	3,348	1,330	8,128
Private credit	24,593	13,796	-5,041	-18,389	-9,634	-2,792	6,842	21,802
Total for asset management	218,005	23,395	-25,860	61,169	58,703	119,358	60,654	337,362
Overlays and unfunded strategies <sup>2</sup>	810	0		-268	-268	-42	225	768
Oversight	1,089			-154	-154	149	303	1,238
Trustee & custodial	1,070			-533	-533	-235	298	835
Consulting	1,131			-51	-51	264	315	1,394
Audit	17			216	216	221	5	238
Other	321			-28	-28	61	89	382
Total for fund oversight <sup>3</sup>	3,627			-549	-549	460	1,009	4,087
Total	222,442	23,395	-25,860	60,352	57,886	119,775	61,889	342,217

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 increased by 14.8 bps in 2021 vs. 2017. It was driven by the changes in the asset mix (6.0 bps), implementation style (-6.6 bps), and paying more/less for similar services (15.5 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	-2.8	0.0	-0.8	-3.6	-14,073
Stock - U.S. small cap	0.2	0.0	0.0	0.2	746
Stock - EAFE	0.1	0.0	0.0	0.1	481
Stock - Emerging	-2.1	0.0	-1.1	-3.2	-12,533
Stock - Global	2.8	-3.3	-0.2	-0.8	-3,157
Stock - ACWI x U.S.	-1.3	0.0	0.0	-1.3	-5,159
Fixed income - U.S.	-0.6	0.0	-0.2	-0.8	-3,212
Fixed income - Emerging	-2.2	0.0	-0.4	-2.5	-9,790
Fixed income - High yield	-1.1	0.0	-0.3	-1.4	-5,616
Cash	-0.4	0.3	-0.4	-0.6	-2,215
REITs	-0.2	0.0	-0.1	-0.3	-1,307
Real estate ex-REITs	2.3	-0.2	-0.2	1.9	7,323
Infrastructure	1.1	-0.1	0.1	1.1	4,259
Hedge funds	-0.4	-0.9	3.0	1.7	6,704
Top layer perf. fees	-0.2	-0.7	13.3	12.4	48,393
Underlying base fees	-0.2	0.6	0.1	0.5	1,765
Underlying perf. fees	-0.2	0.4	6.3	6.6	25,543
Global TAA	-2.5	0.0	2.6	0.1	584
Private equity - Diversified	8.6	0.1	-1.6	7.1	27,583
Underlying base fees	1.6	-1.6	0.5	0.5	2,018
Private credit	3.5	-1.3	-4.7	-2.5	-9,634
Total for asset management	6.0	-6.6	15.7	15.1	58,703
Overlays and unfunded strategies	0.00		-0.07	-0.07	-268
Oversight			0.0	0.0	-154
Trustee & custodial			-0.1	-0.1	-533
Consulting			0.0	0.0	-51
Audit			0.1	0.1	216
Other			0.0	0.0	-28
Total for fund oversight			-0.1	-0.1	-549
Total	6.0	-6.6	15.5	14.8	57,886
Total basis point costs in years 2021 and 2017		87.8	72.9	14.8	

1. Calculated by multiplying total difference in bps by plan total nav average holdings for year 2021, \$39 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 \$23 million or 6.0 bps.

Asset class	2017 Cost bps	2021 Cost bps	2017 asset <sup>1</sup> weight %	2021 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	41.0	2.1	9%	2%	-7%	-2.8	-10,823
Stock - U.S. small cap	n/a	6.3	0%	3%	3%	0.2	746
Stock - EAFE	n/a	3.9	0%	3%	3%	0.1	481
Stock - Emerging	72.0	4.2	5%	2%	-3%	-2.1	-8,121
Stock - Global	13.3	3.6	16%	37%	21%	2.8	10,771
Stock - ACWI x U.S.	47.0	2.1	3%	0%	-3%	-1.3	-5,148
Fixed income - U.S.	24.9	14.2	5%	2%	-2%	-0.6	-2,267
Fixed income - Emerging	49.3	7.4	5%	1%	-4%	-2.2	-8,418
Fixed income - High yield	41.1	33.4	7%	4%	-3%	-1.1	-4,420
Cash	8.8	2.7	7%	3%	-5%	-0.4	-1,556
REITs	36.4	24.9	2%	1%	-1%	-0.2	-838
Real estate ex-REITs	95.3	90.2	6%	8%	2%	2.3	8,935
Infrastructure	51.3	51.9	1%	3%	2%	1.1	4,167
Hedge funds	92.2	112.1	11%	11%	0%	-0.4	-1,491
Top layer perf. fees	52.5	172.2	11%	11%	0%	-0.2	-850
Underlying base fees	53.6	60.0	11%	11%	0%	-0.2	-868
Underlying perf. fees	36.5	100.0	11%	11%	0%	-0.2	-591
Global TAA	47.5	209.8	7%	2%	-5%	-2.5	-9,620
Private equity - Diversified	117.7	107.4	7%	15%	7%	8.6	33,399
Underlying base fees	21.5	14.3	7%	15%	7%	1.6	6,111
Private credit	107.1	51.6	8%	11%	3%	3.5	13,796
Total for asset management						6.0	23,395

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 2021, \$39 billion.

## Impact of changes in implementation style

Changes in implementation style (passive vs. active, internal vs. external, etc.) in 2021 vs. 2017 saved you \$26 million.

Implementation choices	2021	Cost, 2017			Style 1 %			Cost/ \$000s
	avg. assets \$mils	Style 1	Style 2	Style 1 -Savings	2021	2017	More/ -Less	
	A	B	C	D = B - C	E	E		A x D x E
<u>Passive vs active</u>	Total	Passive	Active		Passive % of total assets			
Stock - U.S. broad/all	835	3 bp	41 bp	-39 bp	0%	1%	-1%	20
Stock - Global	14,372	4 bp	22 bp	-18 bp	100%	49%	51%	-12,970
Fixed income - Emerging	328	3 bp	50 bp	-47 bp	0%	1%	-1%	20
More passive, less active								-12,930
<u>Internal active vs external active</u>	Active assets	Internal active	External active		Internal active % of active			
Fixed income - U.S.	883	3 bp	25 bp	-23 bp	2%	3%	-1%	18
Cash	1,075	3 bp	18 bp	-15 bp	0%	61%	-61%	1,013
Less int. active % of total active								1,031
<u>Evergreen vs LP/Co &amp; fund of funds</u>	External assets	Ever- green	LP/Co & FoF		Evergreen fund % of external			
Infrastructure	1,357	51 bp	23 bp	28 bp	94%	100%	-6%	-242
Less evergreen % of external								-242
<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	4,114	178 bp	119 bp	58 bp	40%	45%	-5%	-1,313
Perf. fees	4,114	116 bp	67 bp	49 bp	40%	45%	-5%	-1,094
Private equity - Diversified	5,675	128 bp	187 bp	-59 bp	91%	81%	9%	-3,158
More LP, less fund of funds								-5,565
<u>Co-investment vs LP</u>	LP/Co	Co-invest	LP		Co-invest % of LP/Co			
Real estate ex-REITs	3,167	8 bp	96 bp	-87 bp	3%	0%	2%	-652
Private equity - Diversified	5,148	74 bp	148 bp	-74 bp	34%	27%	6%	-2,461
Private credit	4,223	27 bp	107 bp	-80 bp	15%	0%	15%	-5,041
More co-investment								-8,154
<b>Total</b>								<b>-25,860</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 2021, you paid \$60 million more for similar asset management and oversight / support services vs. 2017.

Asset class styles where you had assets in both 2021 and 2017 <sup>1</sup>	Style	2021	Cost in bps			Cost/
		avg. assets \$mils	2021	2017	More/ -less	-Savings \$000s
<u>External asset management</u>		A			B	A x B
Stock - U.S. broad/all	active	835	2.1	41.3	-39.1	-3,270
Stock - Emerging	active	651	4.2	72.0	-67.8	-4,412
Stock - Global	passive	14,366	3.6	4.2	-0.7	-944
Stock - Global	active	7	2.1	22.1	-19.9	-13
Stock - ACWI x U.S.	active	2	2.1	47.0	-44.8	-10
Fixed income - U.S.	active	868	14.4	25.5	-11.1	-963
Fixed income - Emerging	active	328	7.4	49.9	-42.5	-1,393
Fixed income - High yield	active	1,547	33.4	41.1	-7.7	-1,196
Cash	active	1,075	2.7	18.2	-15.6	-1,672
REITs	active	410	24.9	36.4	-11.4	-469
Real estate ex-REITs	CO	88	38.1	8.4	29.6	262
Real estate ex-REITs	LP	3,079	91.7	95.7	-4.0	-1,222
Infrastructure	active	1,271	53.9	51.3	2.6	333
Hedge funds	active	1,645	221.8	177.7	44.1	7,246
Top layer perf. fees	active	1,645	430.9	115.7	315.2	51,840
Hedge funds	FoF	2,470	39.1	21.0	18.1	4,469
Underlying base fees	FoF	2,470	100.0	98.3	1.7	426
Underlying perf. fees	FoF	2,470	166.7	66.9	99.7	24,631
Global TAA	active	628	209.8	47.5	162.4	10,204
Private equity - Diversified	CO	1,727	13.9	74.4	-60.6	-10,456
Private equity - Diversified	LP	3,421	160.9	148.1	12.8	4,391
Private equity - Diversified	FoF	528	67.0	72.2	-5.2	-276
Underlying base fees	FoF	528	154.0	115.2	38.8	2,050
Private credit	CO	635	22.8	27.0	-4.2	-267
Private credit	LP	3,588	56.7	107.2	-50.5	-18,122
Total for external management						61,168
<u>Internal asset management</u>		A			B	A x B
Fixed income - U.S.	active	16	3.3	2.9	0.4	1
Total for internal management						1
Overlays and unfunded strategies		38,985	0.2	0.3	-0.1	-268
Oversight		38,985	0.3	0.4	0.0	-154.1
Trustee & custodial		38,985	0.2	0.4	-0.1	-533
Consulting		38,985	0.4	0.4	0.0	-51
Audit		38,985	0.1	0.0	0.1	216
Other		38,985	0.1	0.1	0.0	-28
Total for fund oversight						-549
Total						60,352

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



# 5

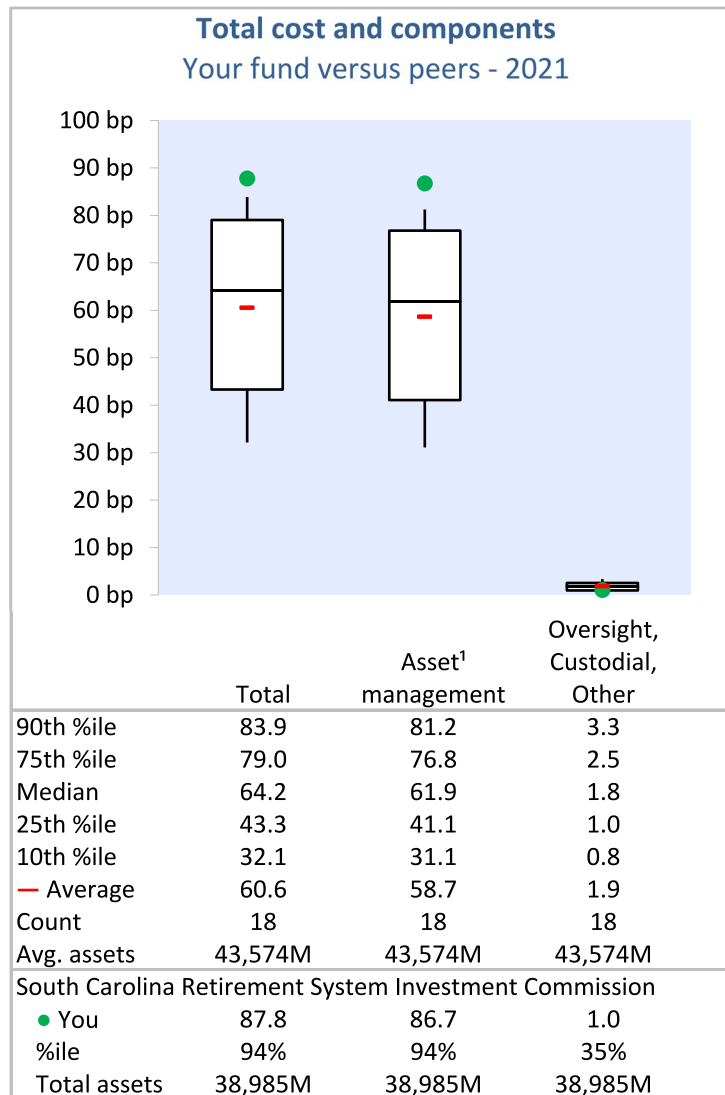
## Cost comparisons

Total fund cost	2
Governance, operations & support	3
Public asset classes	
- Stock	4
- Fixed Income	13
- Commodities	27
- REITs	28
Real asset classes	
- Real estate ex-REITs	29
- Infrastructure	31
- Natural resources	32
- Other real assets	33
Private equity	
- Diversified private equity	34
- LBO	35
- Venture capital	36
- Private credit	37
- Mortgages	38
- Other private equity	39
Global TAA	40
RiskParity	41
Hedge Funds	42
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## Total fund cost

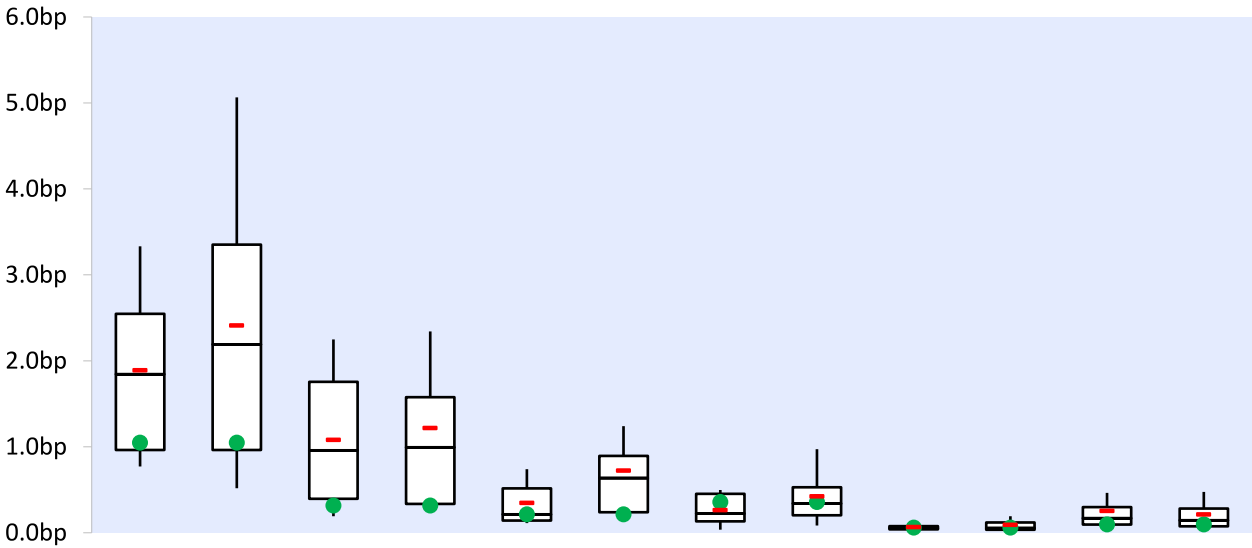
Total costs are benchmarked in the previous section. In this section, your fund's costs are compared on a line-item basis to your peers. This enables you to understand better why you may be a high or low cost fund and it also identifies and quantifies major cost differences that may warrant further investigation.

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.



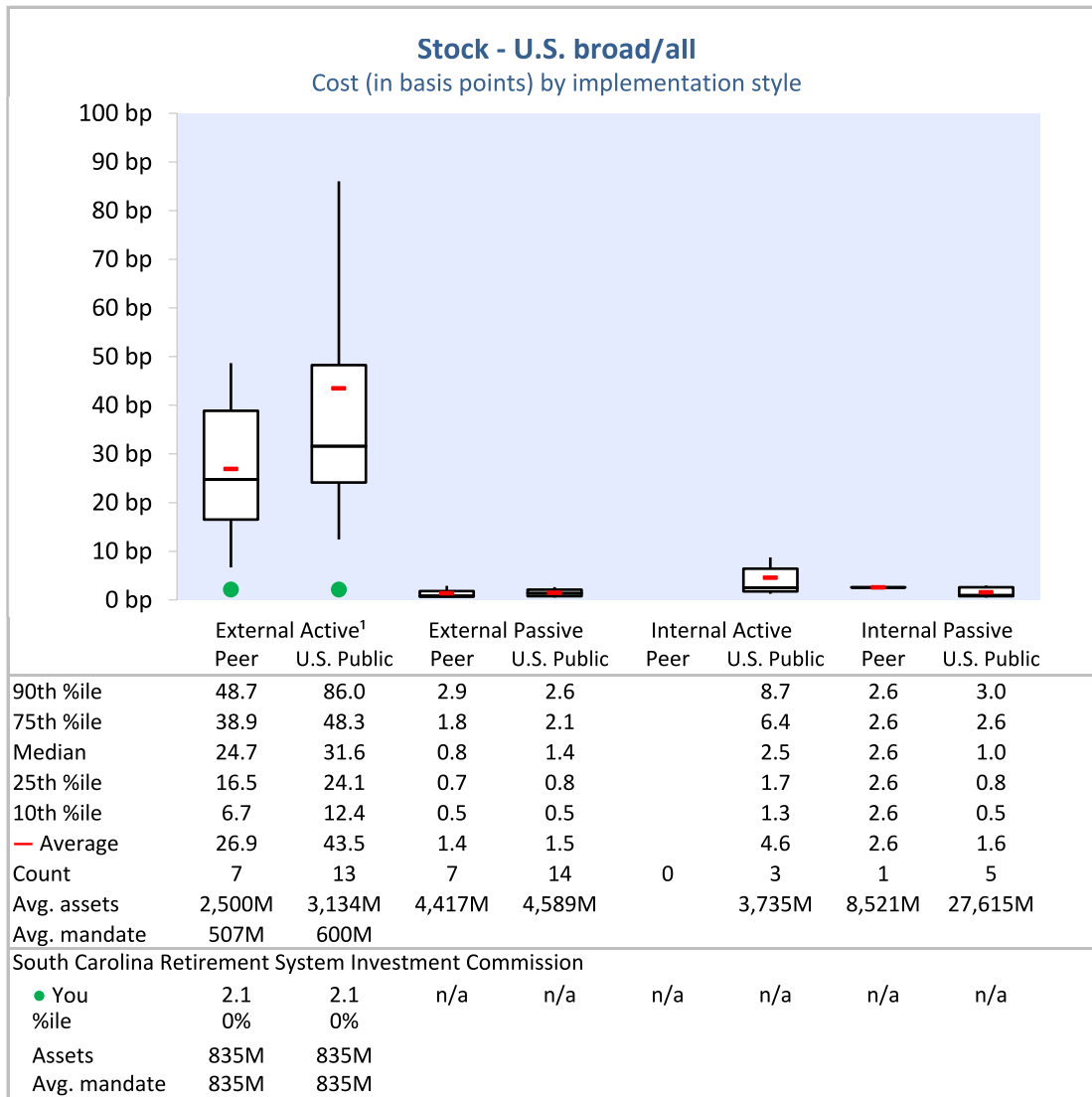
## Governance, operations & support

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	3.3	5.1	2.2	2.3	0.7	1.2	0.5	1.0	0.1	0.2	0.5	0.5
75th %ile	2.5	3.4	1.8	1.6	0.5	0.9	0.5	0.5	0.1	0.1	0.3	0.3
Median	1.8	2.2	1.0	1.0	0.2	0.6	0.2	0.3	0.1	0.1	0.2	0.1
25th %ile	1.0	1.0	0.4	0.3	0.1	0.2	0.1	0.2	0.0	0.0	0.1	0.1
10th %ile	0.8	0.5	0.2	0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0
— Average	1.9	2.4	1.1	1.2	0.3	0.7	0.3	0.4	0.1	0.1	0.3	0.2
Count	18	46	18	46	15	36	17	43	16	40	15	32
Avg. assets	43,574M	66,365M	43,574M	66,365M	43,574M	66,365M	43,574M	66,365M	43,574M	66,365M	43,574M	66,365M
South Carolina Retirement System Investment Commission												
● You	1.0	1.0	0.3	0.3	0.2	0.2	0.4	0.4	0.1	0.1	0.1	0.1
%ile	35%	31%	18%	22%	50%	20%	69%	52%	60%	54%	29%	39%
Plan assets	38,985M	38,985M	38,985M	38,985M	38,985M	38,985M	38,985M	38,985M	38,985M	38,985M	38,985M	38,985M

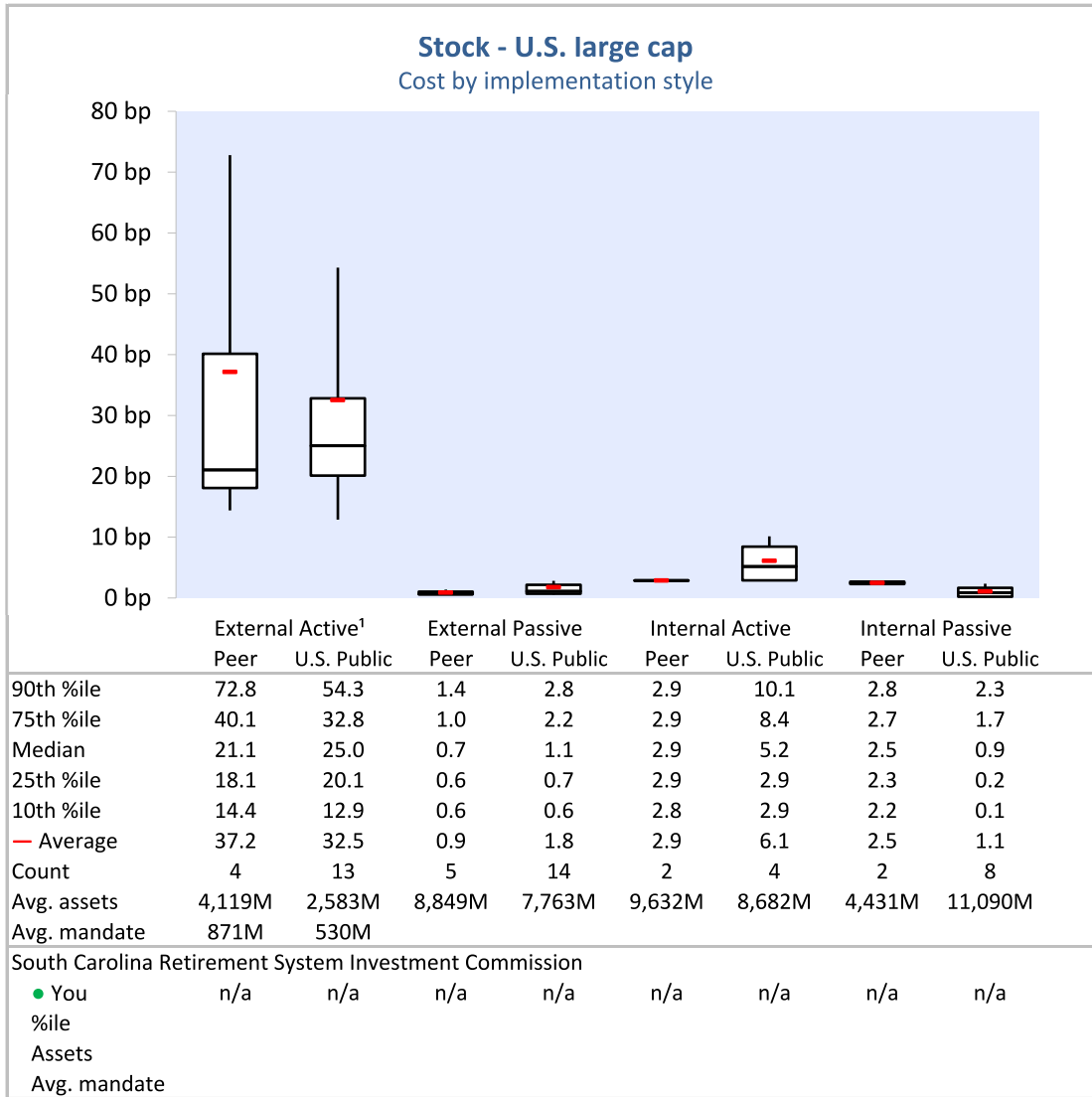
1. Oversight costs include the salaries and benefits of executives and their staff responsible for overseeing the entire fund or multiple asset classes and the fees/salaries of the Board or Investment Committee. All costs associated with the above including fees/salaries, travel, director's insurance 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	0.0	23.4	34.1
Performance fees*	0.0	2.8	8.0
Internal and other	<u>2.1</u>	<u>0.7</u>	<u>1.4</u>
Total	2.1	26.9	43.5

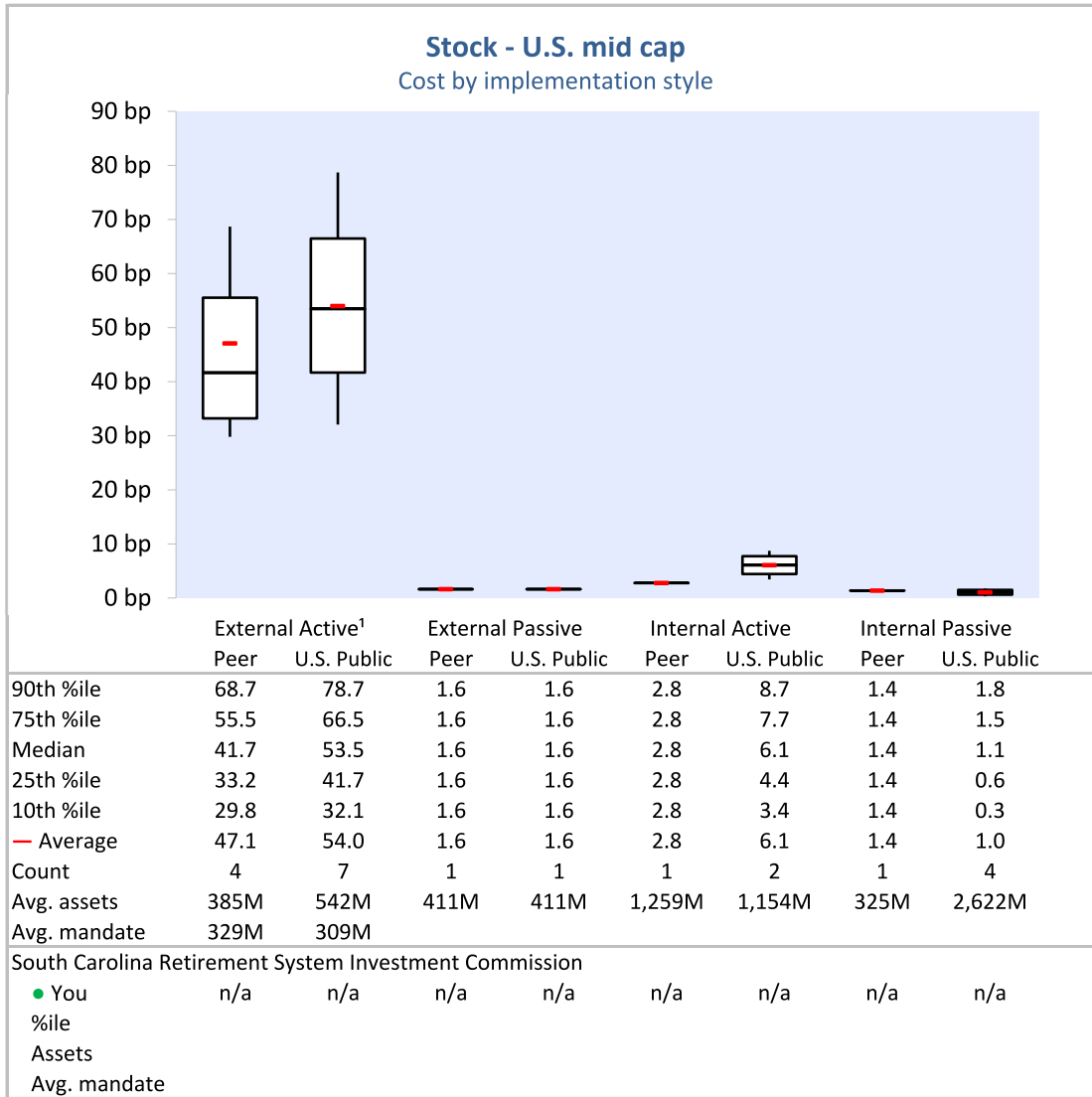
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 6.5 bps for peers (3 funds) and 34.5 bps for U.S. Public participants (3 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	37.1	31.9
Performance fees*	n/a	0.0	0.4
Internal and other	<u>n/a</u>	<u>0.1</u>	<u>0.3</u>
Total	n/a	37.2	32.5

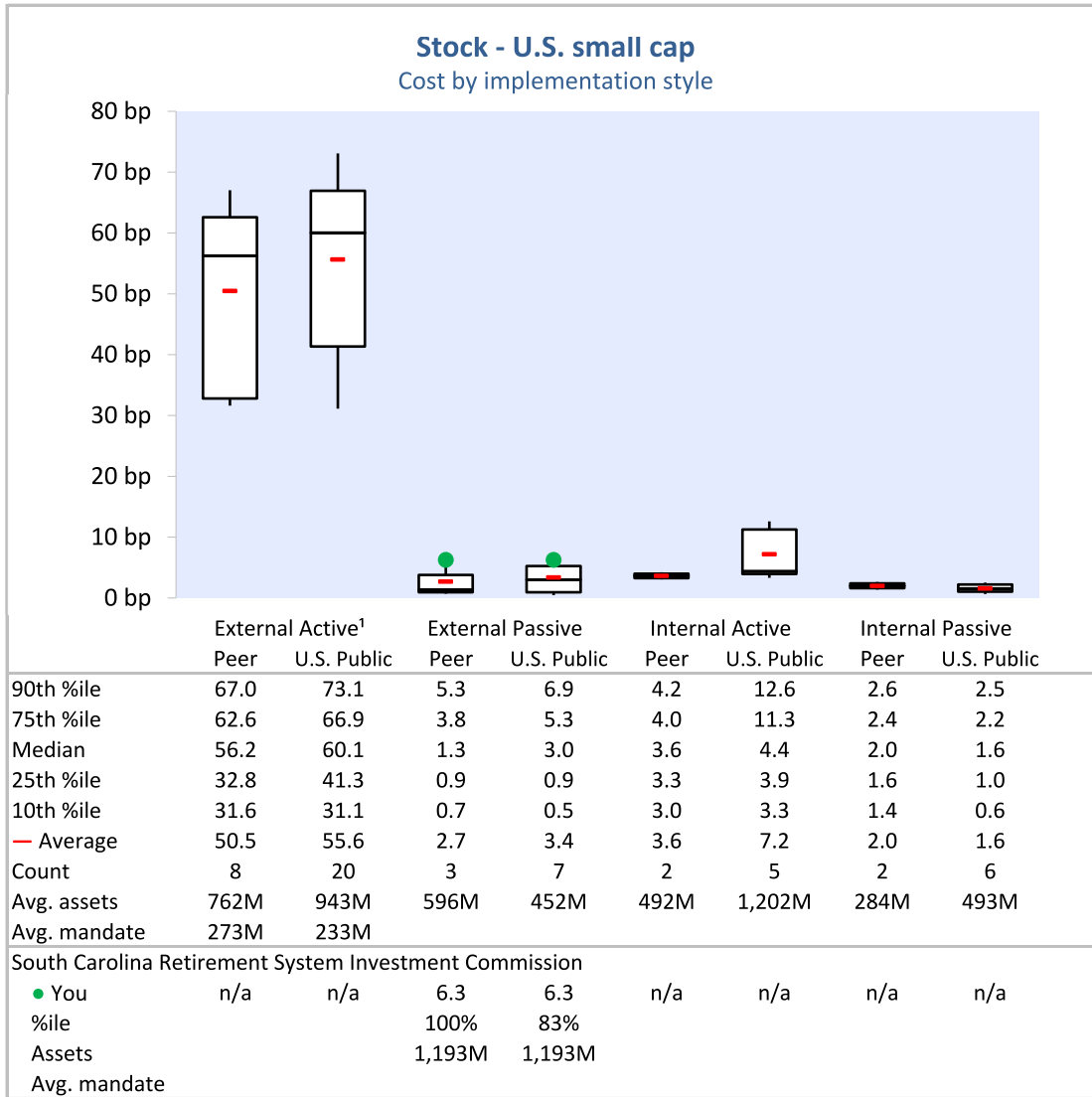
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for peers (1 fund) and 2.3 bps for U.S. Public participants (2 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	46.9	46.1
Performance fees*	n/a	n/a	7.7
Internal and other	<u>n/a</u>	<u>0.1</u>	<u>0.2</u>
Total	n/a	47.1	54.0

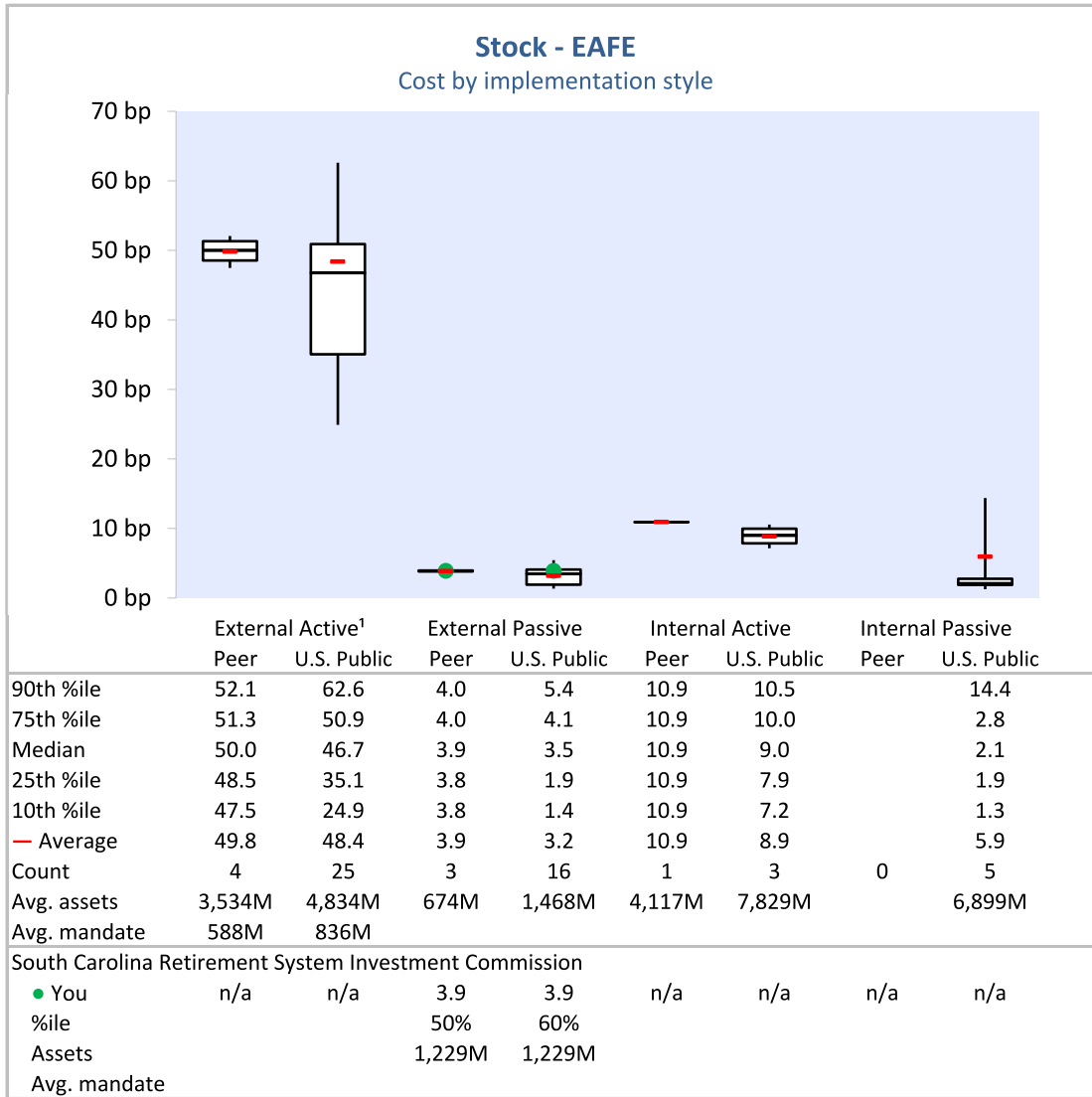
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 54.2 bps for U.S. Public participants (1 fund).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	45.4	52.3
Performance fees*	n/a	4.9	3.1
Internal and other	<u>n/a</u>	<u>0.1</u>	<u>0.2</u>
Total	n/a	50.5	55.6

\* 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 19.5 bps for peers (2 funds) and 12.4 bps for U.S. Public participants (5 funds).

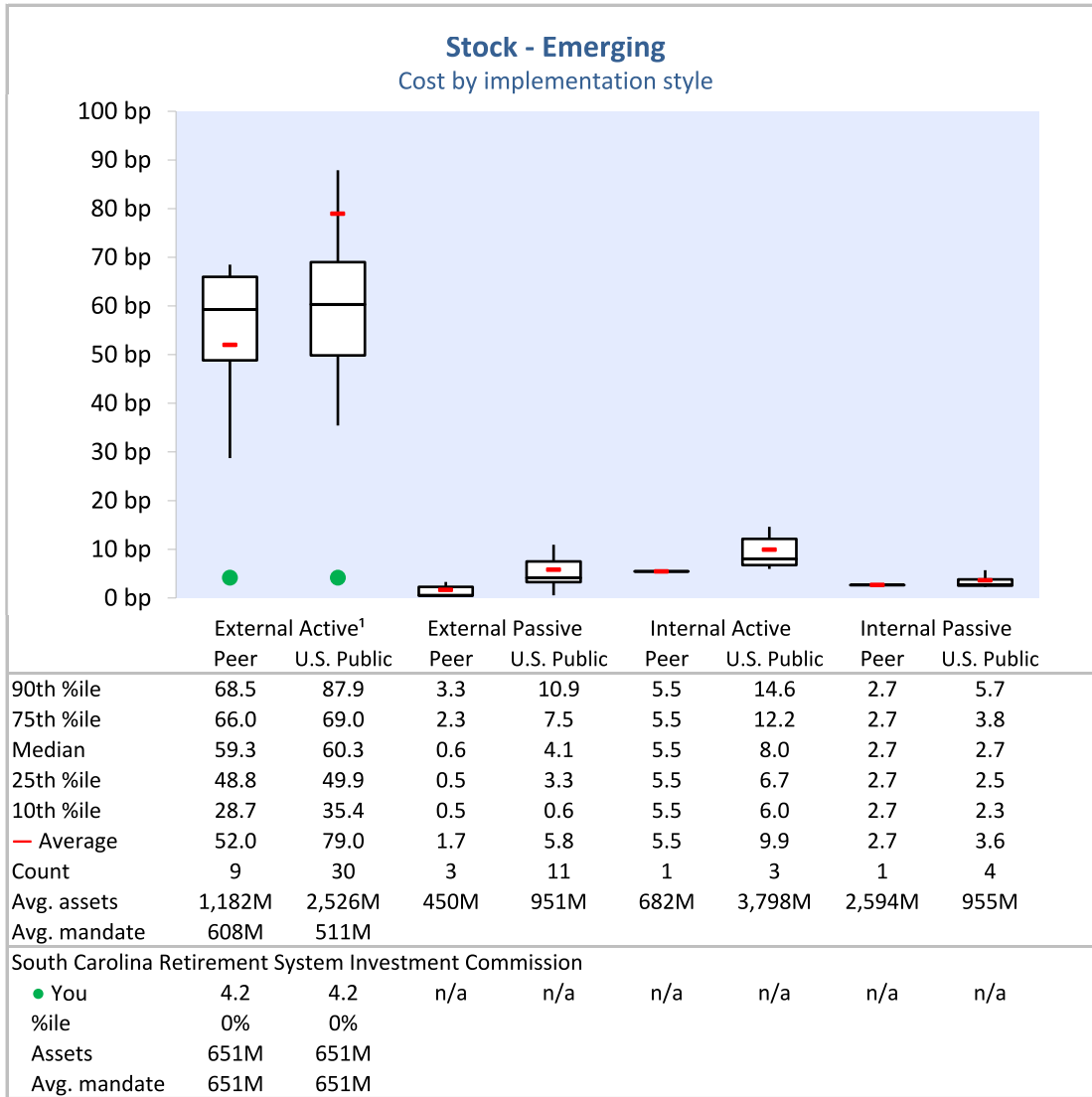


1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	45.8	40.5
Performance fees*	n/a	3.9	7.6
Internal and other	<u>n/a</u>	<u>0.1</u>	<u>0.3</u>
Total	n/a	49.8	48.4

\* 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 15.6 bps for peers (1 fund) and 31.8 bps for U.S. Public participants (6 funds).

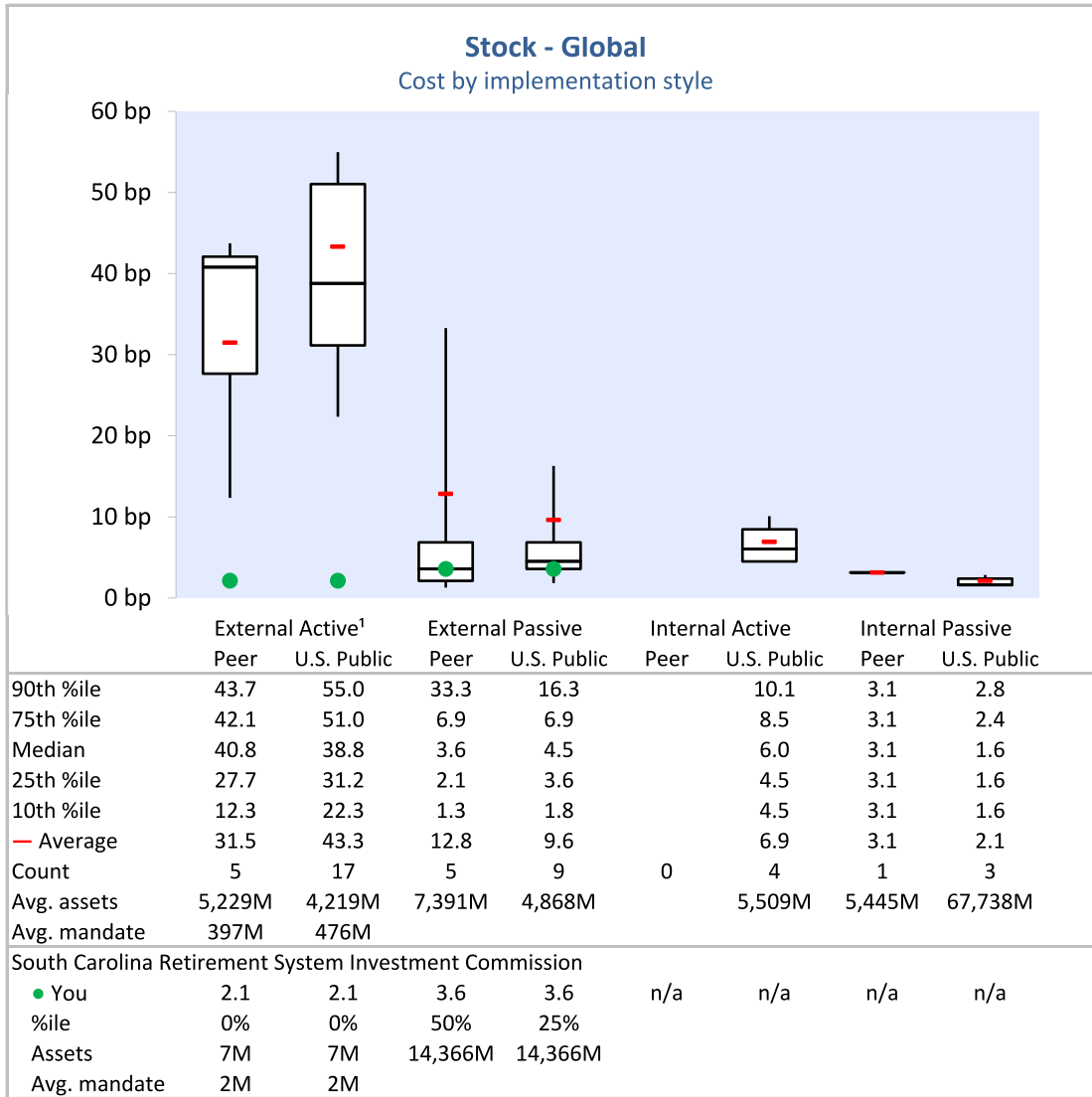




1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	2.0	46.3	52.0
Performance fees*	n/a	5.1	26.3
Internal and other	<u>2.1</u>	<u>0.6</u>	<u>0.6</u>
Total	4.2	52.0	79.0

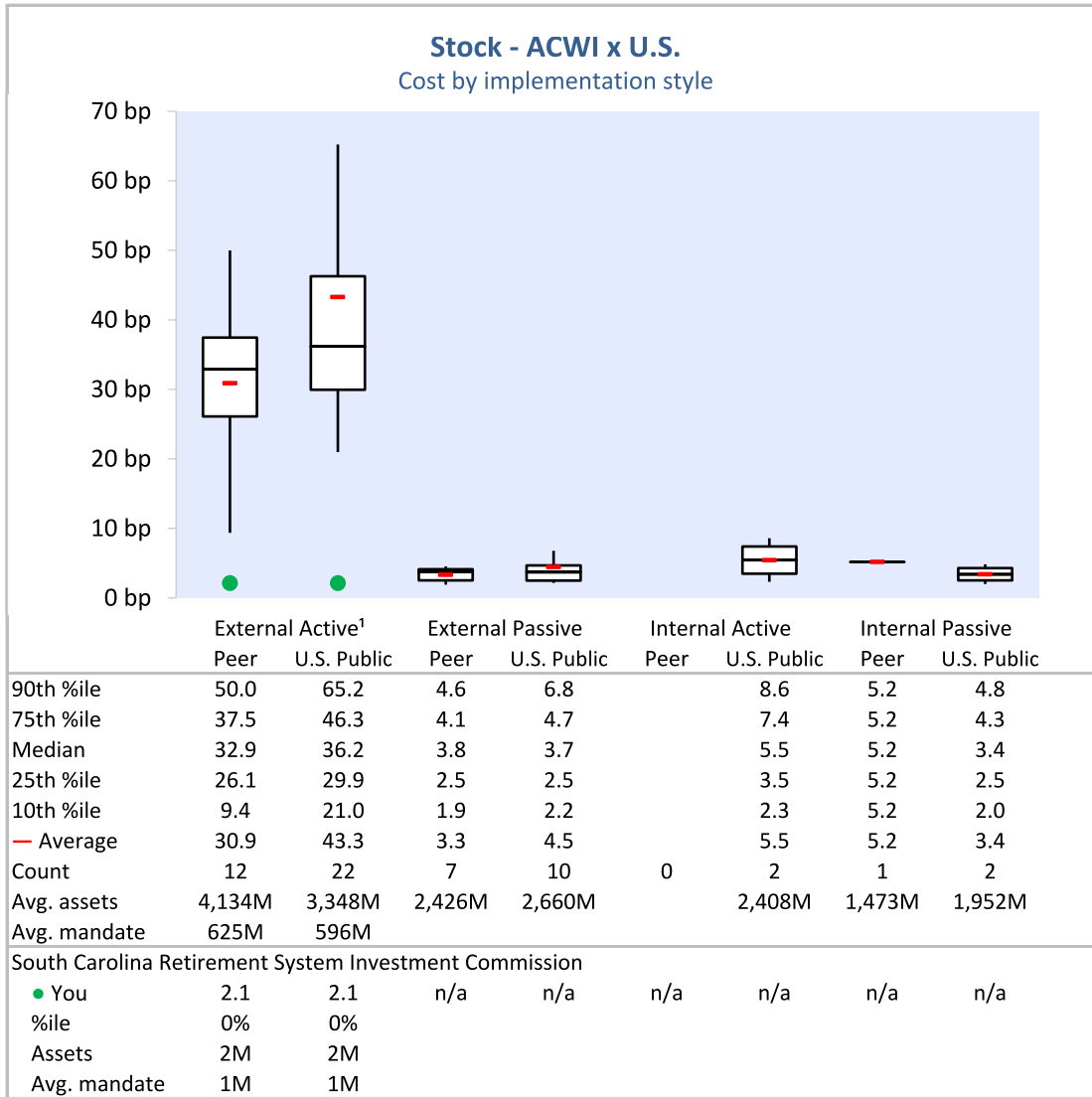
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 45.7 bps for peers (1 fund) and 112.8 bps for U.S. Public participants (7 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	0.0	28.9	34.8
Performance fees*	0.0	1.1	7.9
Internal and other	<u>2.1</u>	<u>1.4</u>	<u>0.6</u>
Total	2.1	31.5	43.3

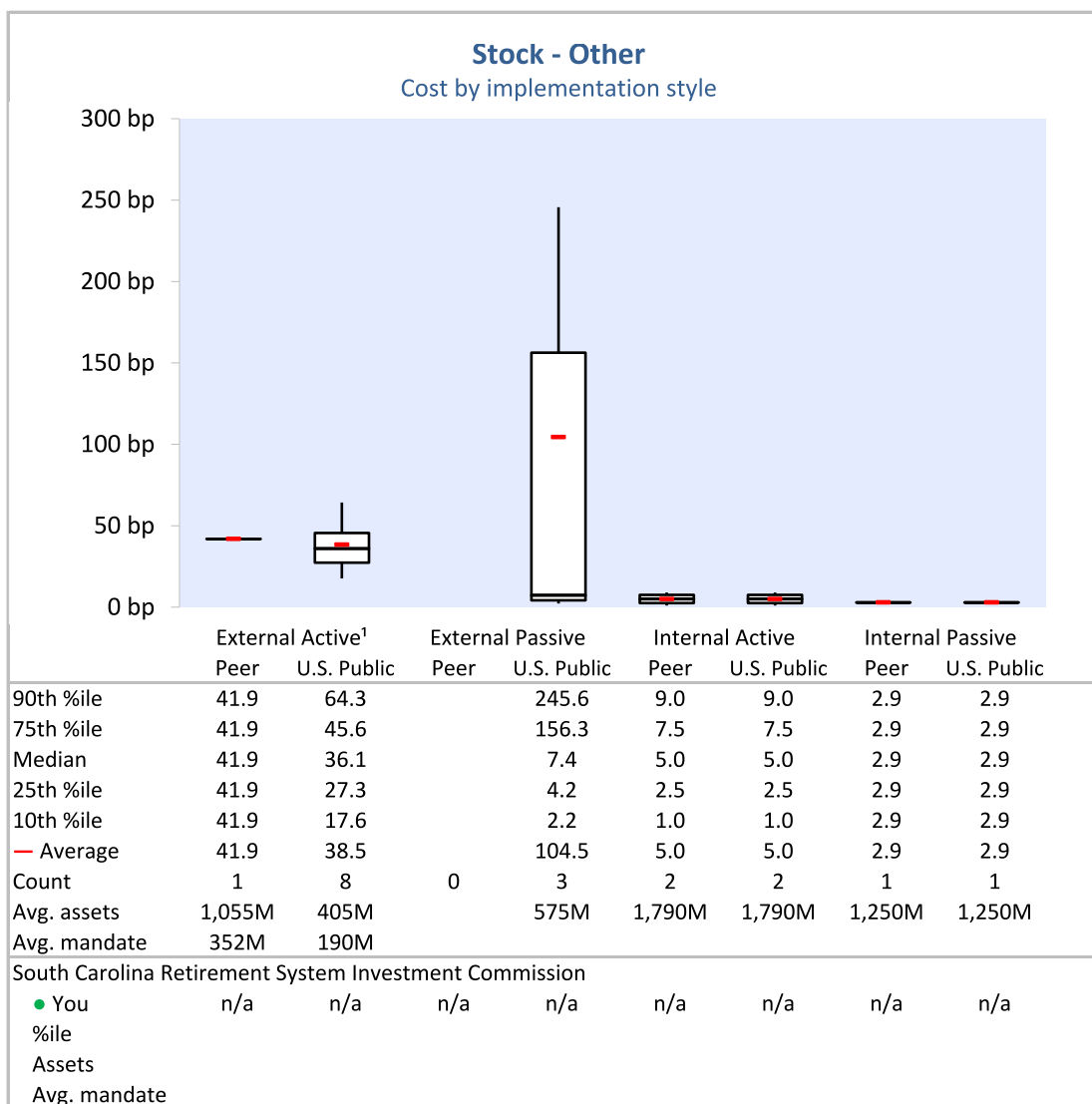
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 2.8 bps for peers (2 funds) and 22.3 bps for U.S. Public participants (6 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	0.0	27.4	36.6
Performance fees*	0.0	3.2	6.2
Internal and other	<u>2.1</u>	<u>0.3</u>	<u>0.4</u>
Total	2.1	30.9	43.3

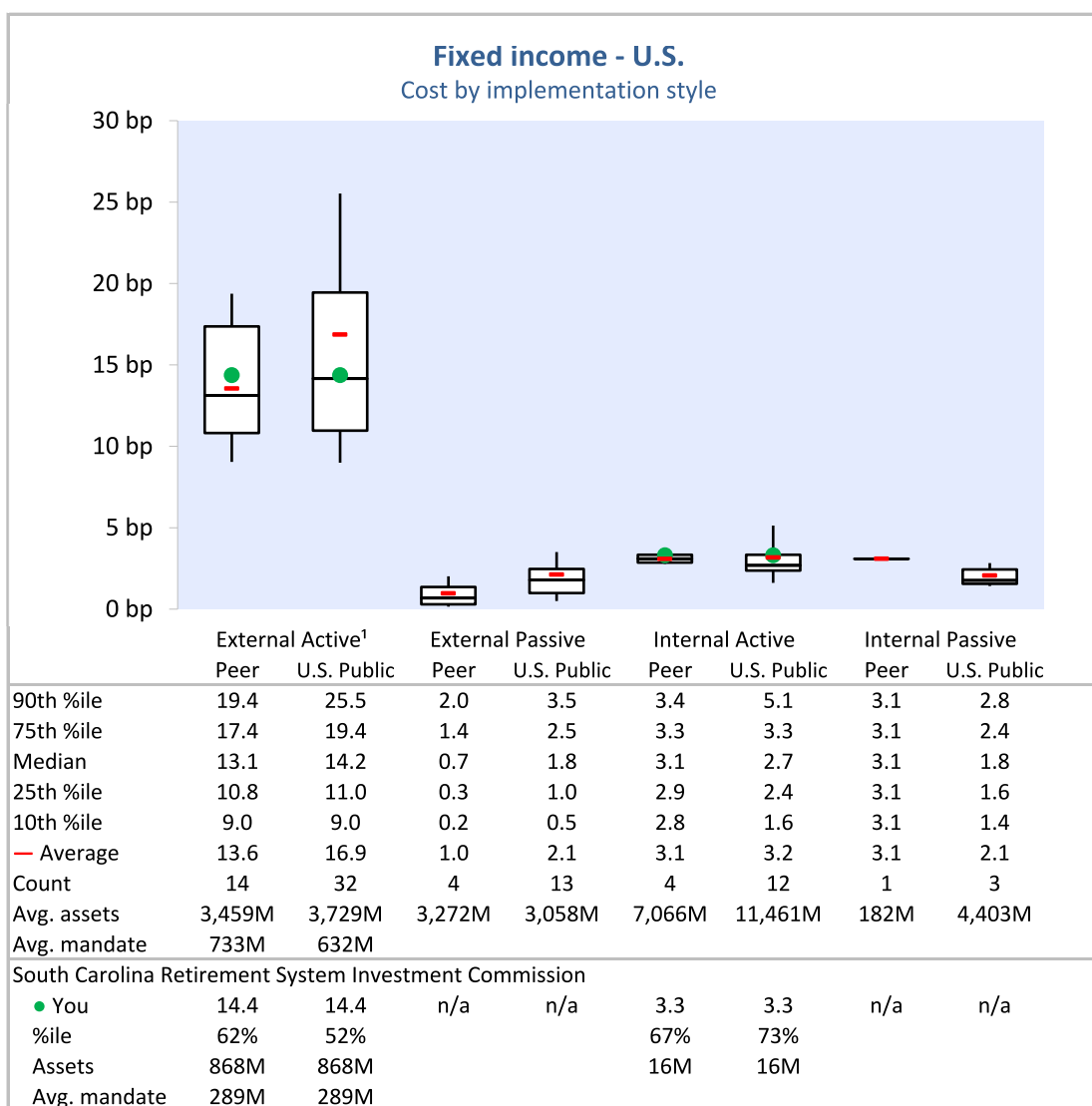
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 9.6 bps for peers (4 funds) and 34.3 bps for U.S. Public participants (4 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	41.9	34.5
Performance fees*	n/a	n/a	3.3
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>0.6</u>
Total	n/a	41.9	38.5

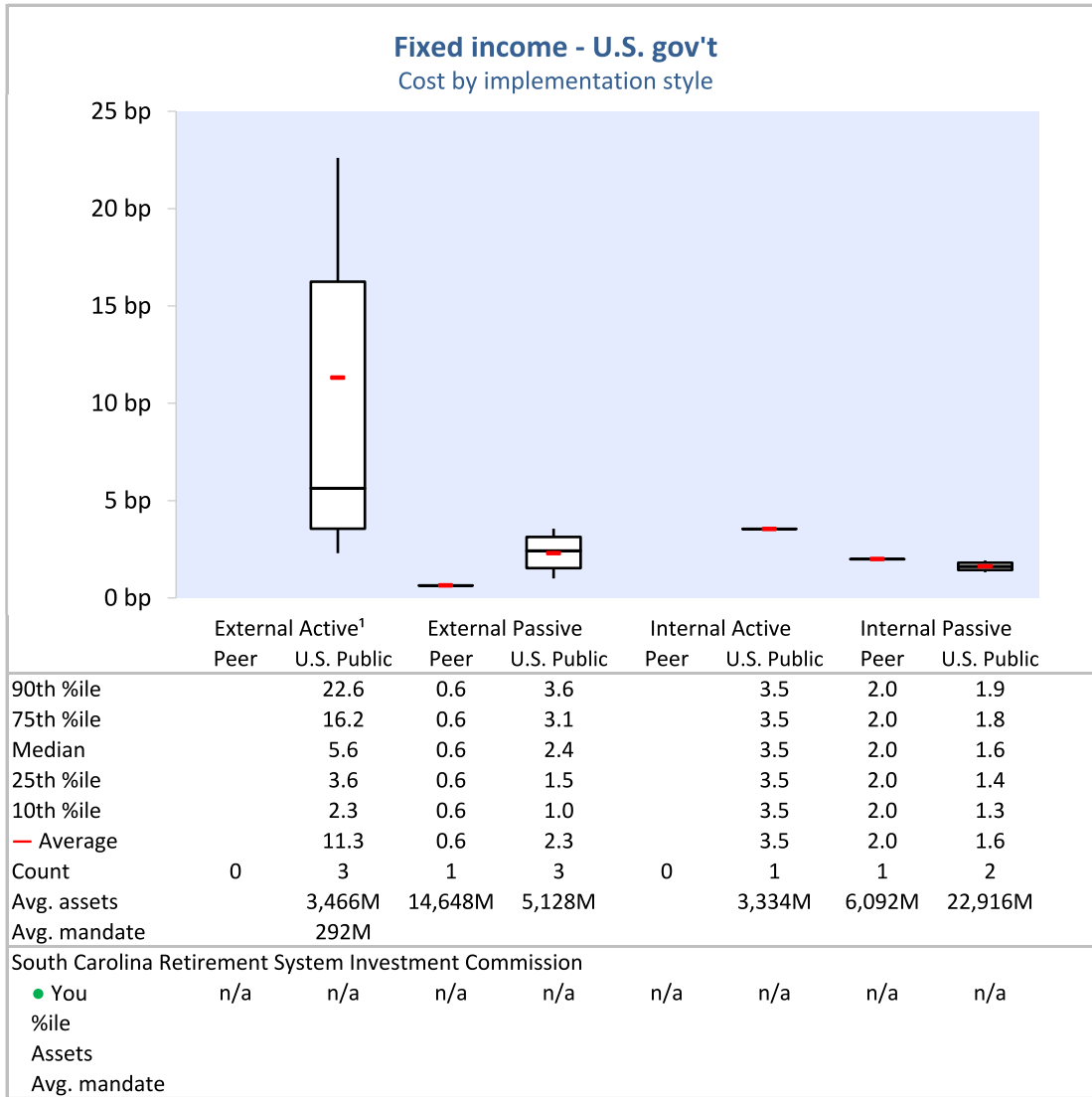
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 8.8 bps for U.S. Public participants (3 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	11.1	12.0	15.6
Performance fees*	0.0	1.0	0.8
Internal and other	<u>3.3</u>	<u>0.5</u>	<u>0.5</u>
Total	14.4	13.6	16.9

\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 2.9 bps for peers (5 funds) and 3.5 bps for U.S. Public participants (7 funds).

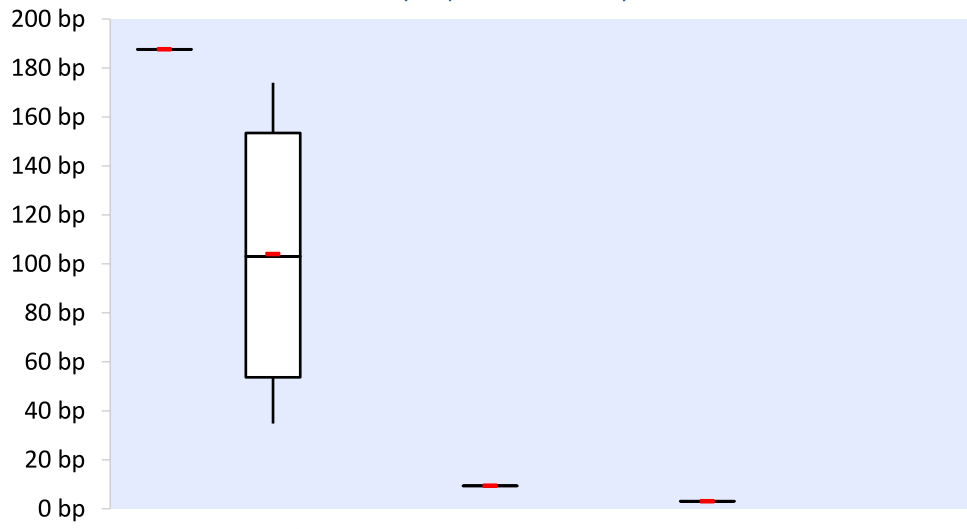


1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	n/a	11.3
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	11.3

No funds reported a performance fee.

**Fixed income - U.S. credits**  
Cost by implementation style

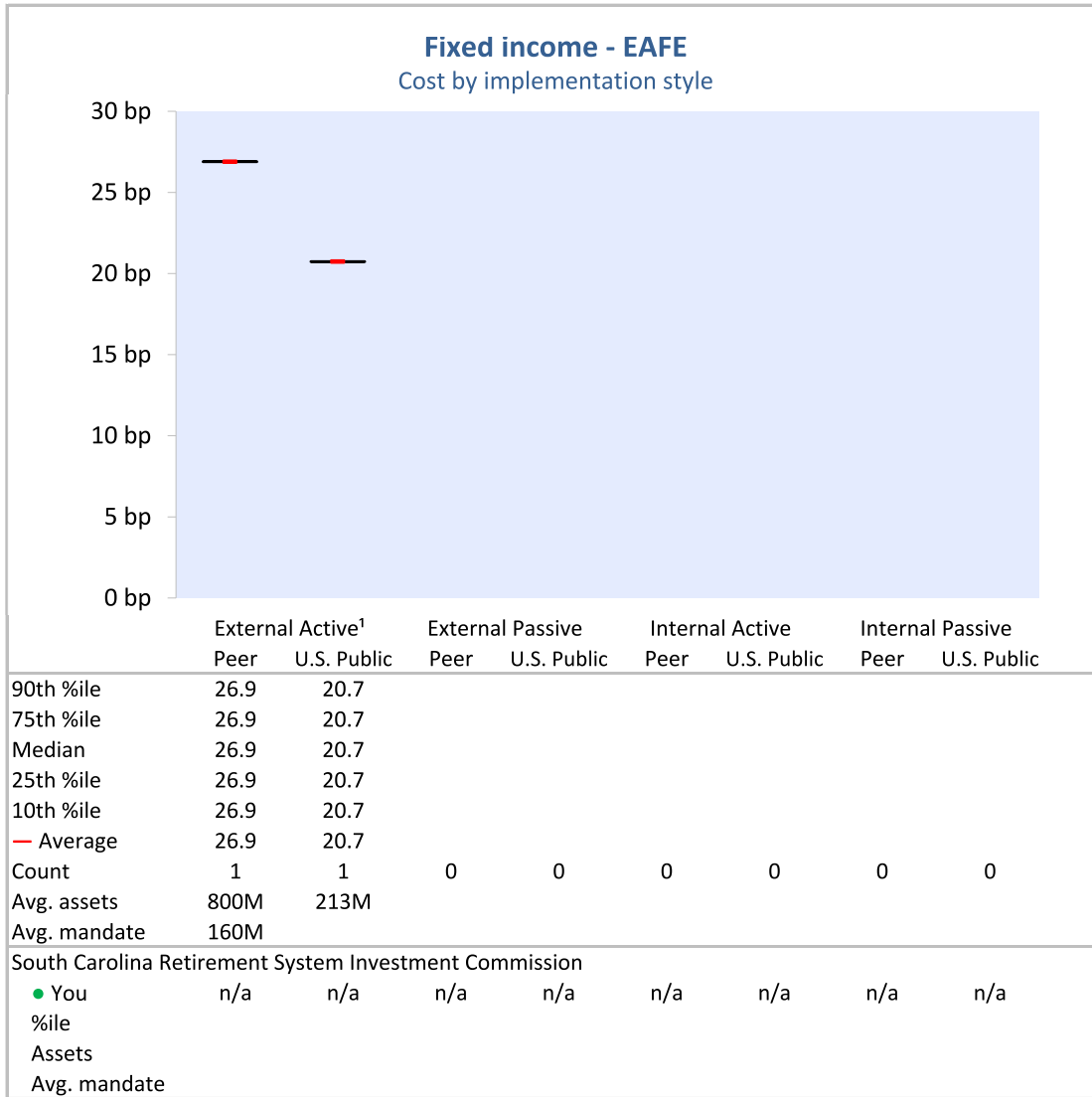


	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	187.6	174.0		9.4		3.1		
75th %ile	187.6	153.5		9.4		3.1		
Median	187.6	103.1		9.4		3.1		
25th %ile	187.6	53.7		9.4		3.1		
10th %ile	187.6	34.8		9.4		3.1		
— Average	187.6	104.0		9.4		3.1		
Count	1	4	0	1	0	1	0	0
Avg. assets	1,611M	1,071M		57M		59,901M		
Avg. mandate	269M	212M						
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	59.1	68.8
Performance fees*	n/a	128.5	35.0
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>0.2</u>
Total	n/a	187.6	104.0

\* 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 128.5 bps for peers (1 fund) and 70.0 bps for U.S. Public participants (2 funds).

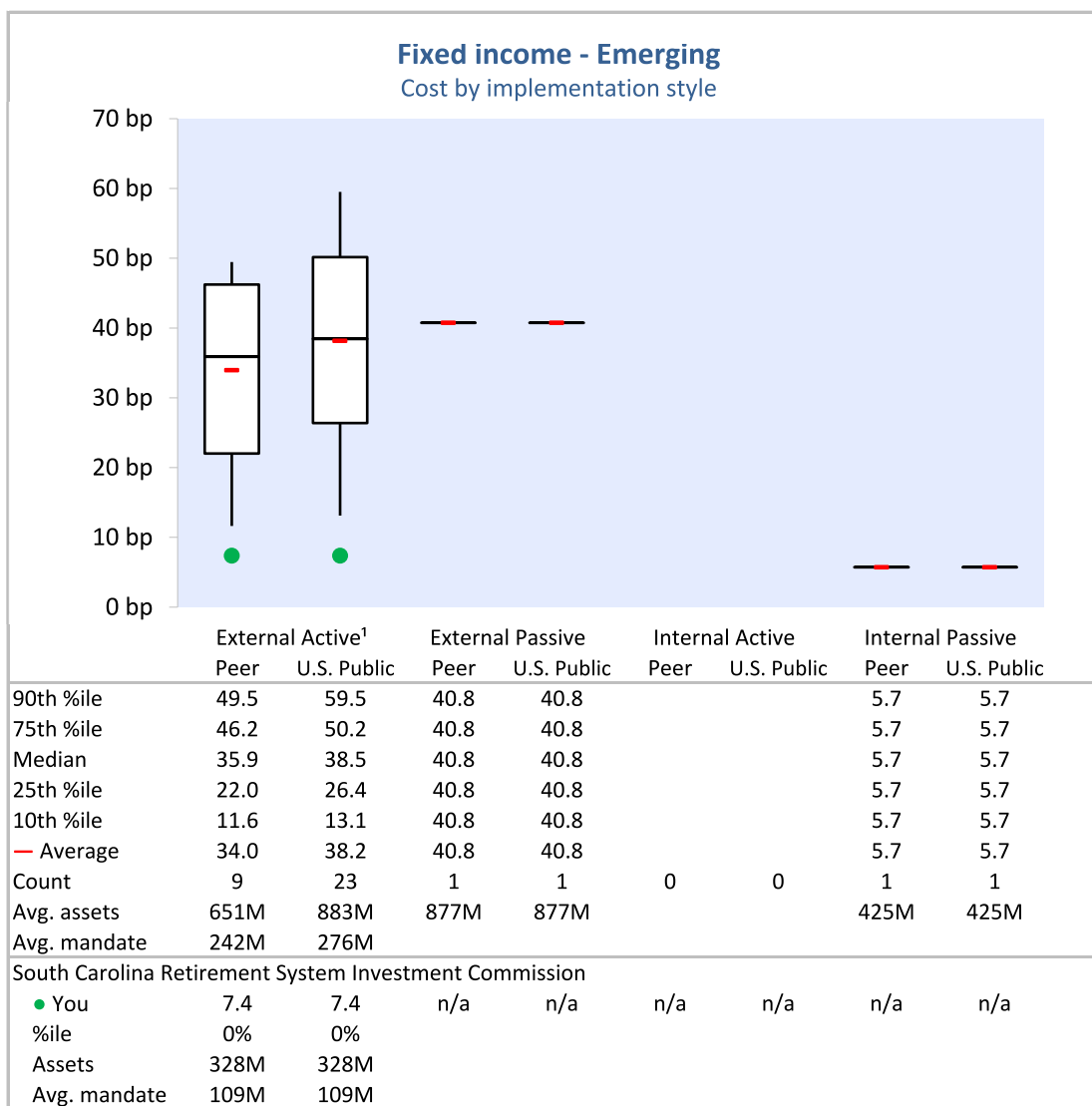


1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	26.9	20.7
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	26.9	20.7

No funds reported a performance fee.

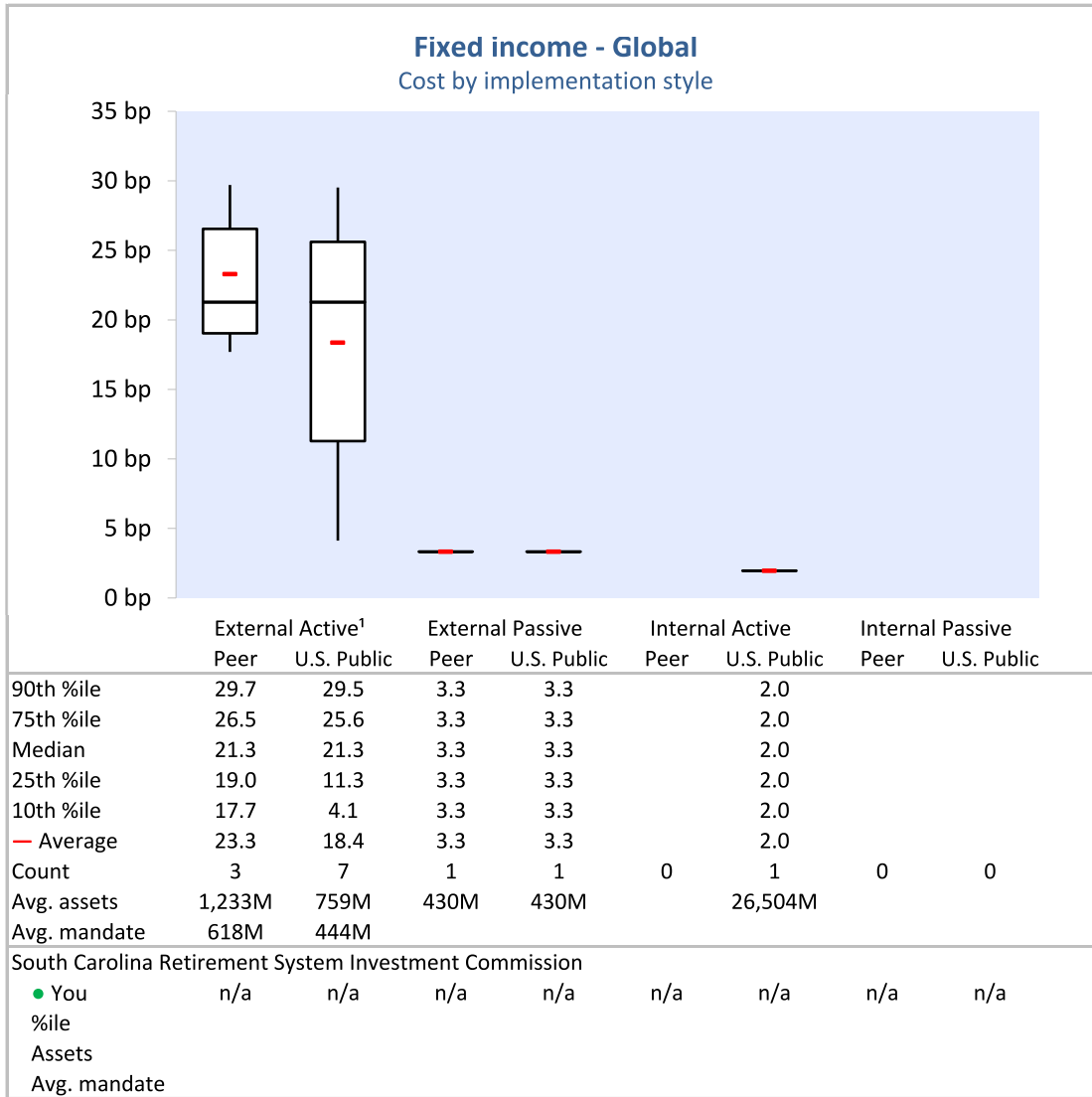




#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	5.2	31.2	36.7
Performance fees*	0.0	1.4	0.6
Internal and other	<u>2.1</u>	<u>1.3</u>	<u>0.9</u>
Total	7.4	34.0	38.2

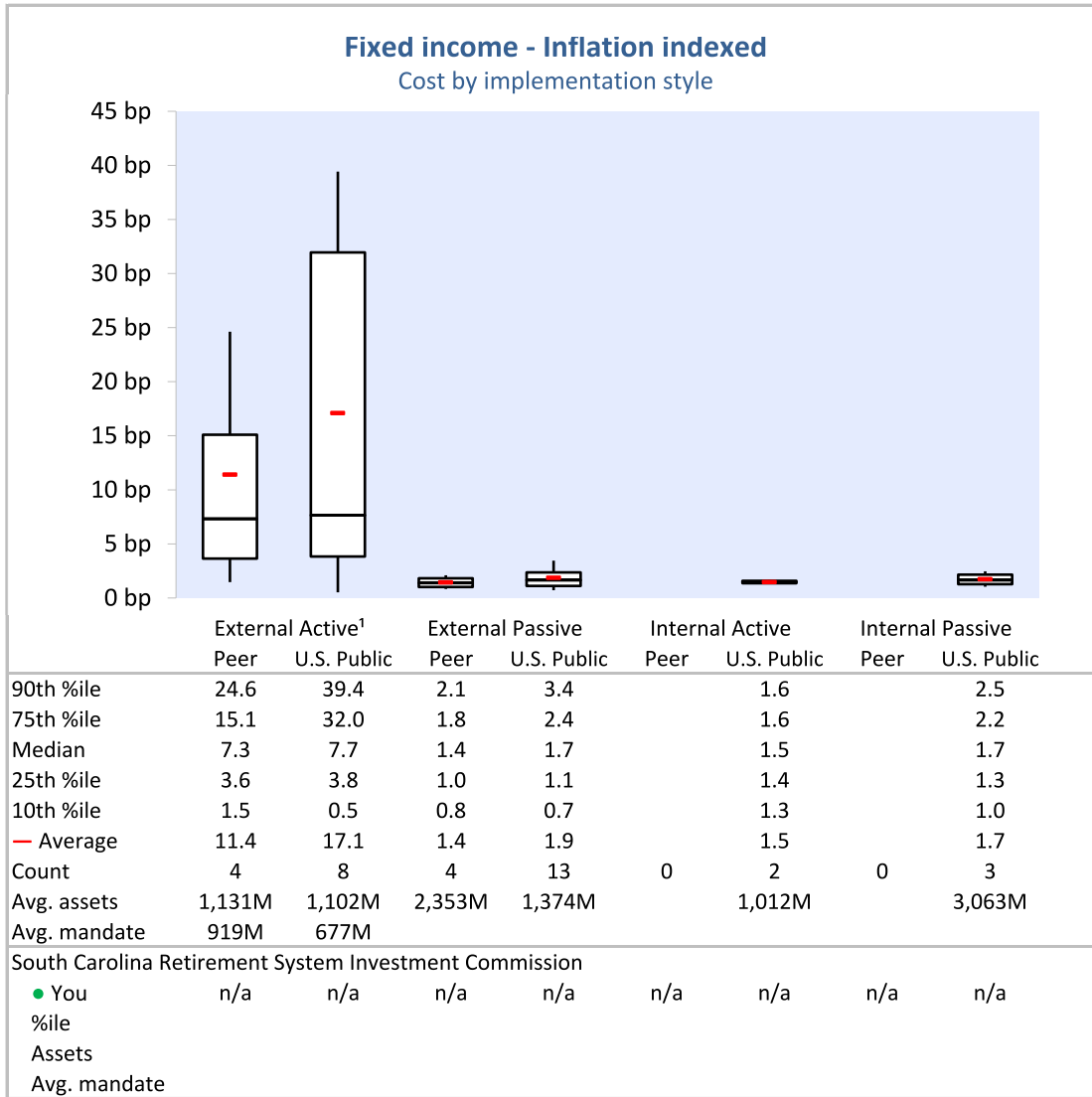
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 4.2 bps for peers (3 funds) and 2.6 bps for U.S. Public participants (5 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	20.5	16.9
Performance fees*	n/a	n/a	0.0
Internal and other	<u>n/a</u>	<u>2.8</u>	<u>1.4</u>
Total	n/a	23.3	18.4

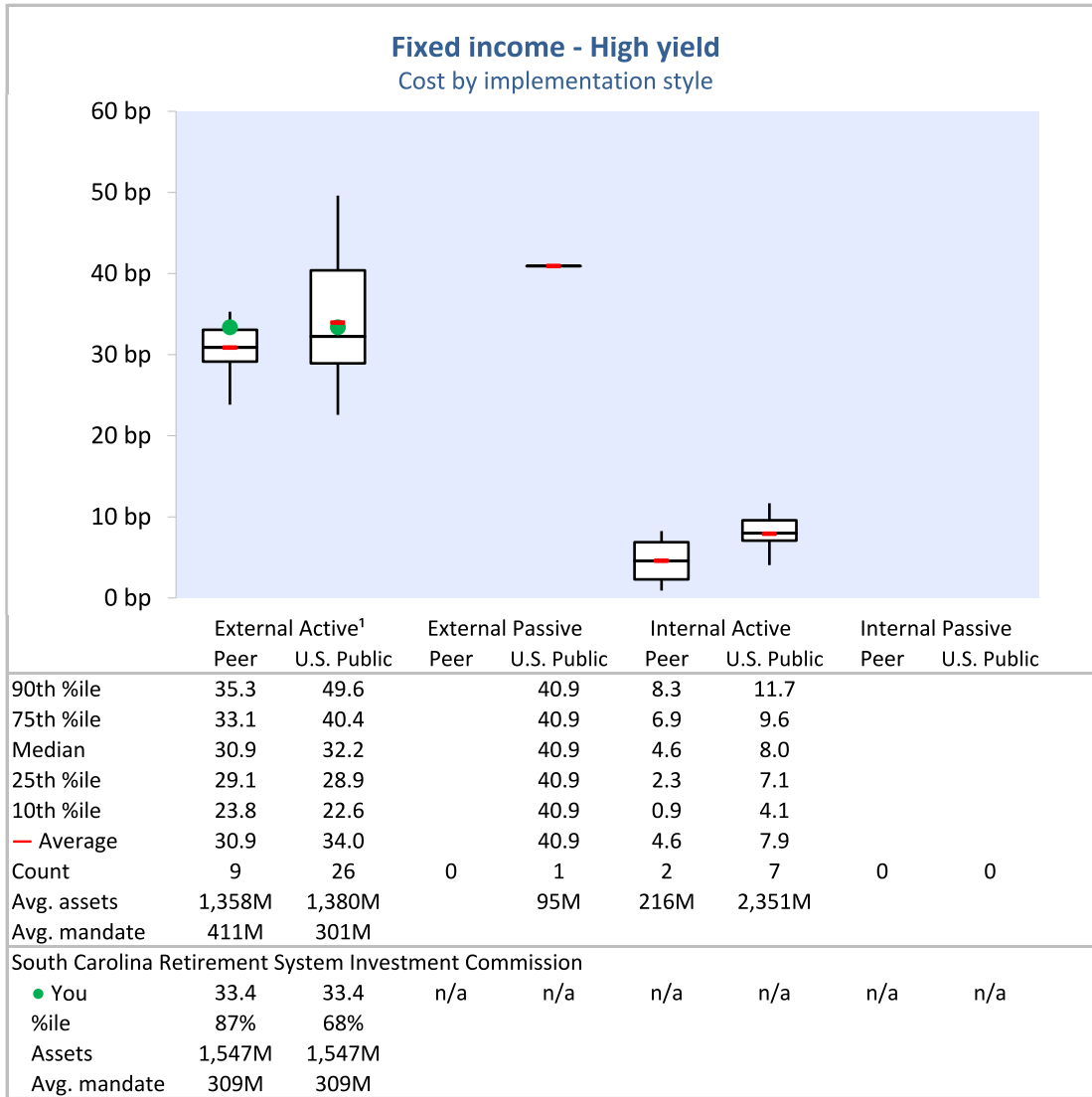
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for U.S. Public participants (1 fund).



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	10.2	16.4
Performance fees*	n/a	1.1	0.5
Internal and other	<u>n/a</u>	<u>0.2</u>	<u>0.2</u>
Total	n/a	11.4	17.1

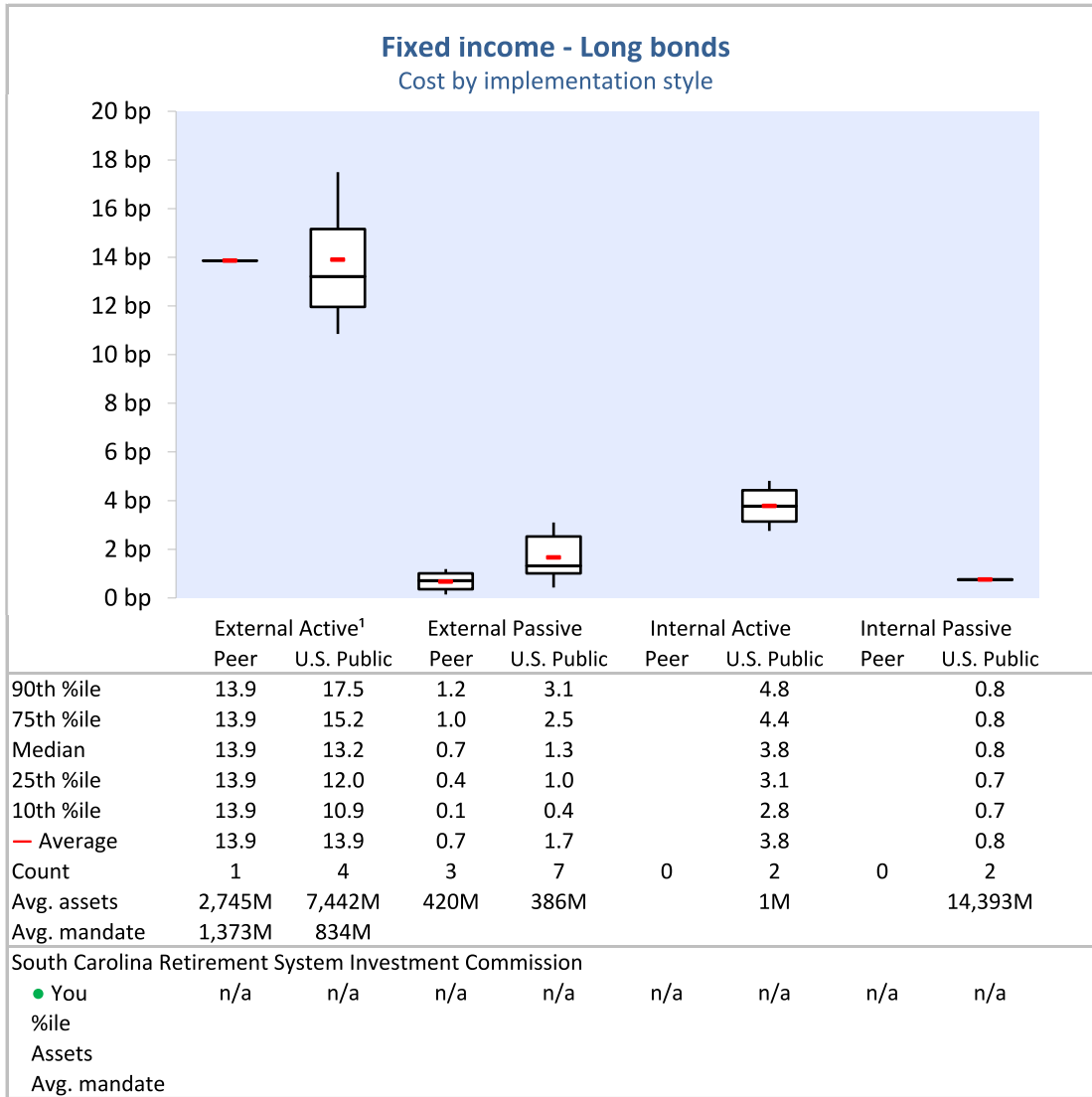
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 4.3 bps for peers (1 fund) and 4.3 bps for U.S. Public participants (1 fund).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	31.2	27.9	32.1
Performance fees*	0.0	2.6	1.3
Internal and other	<u>2.1</u>	<u>0.4</u>	<u>0.6</u>
Total	33.4	30.9	34.0

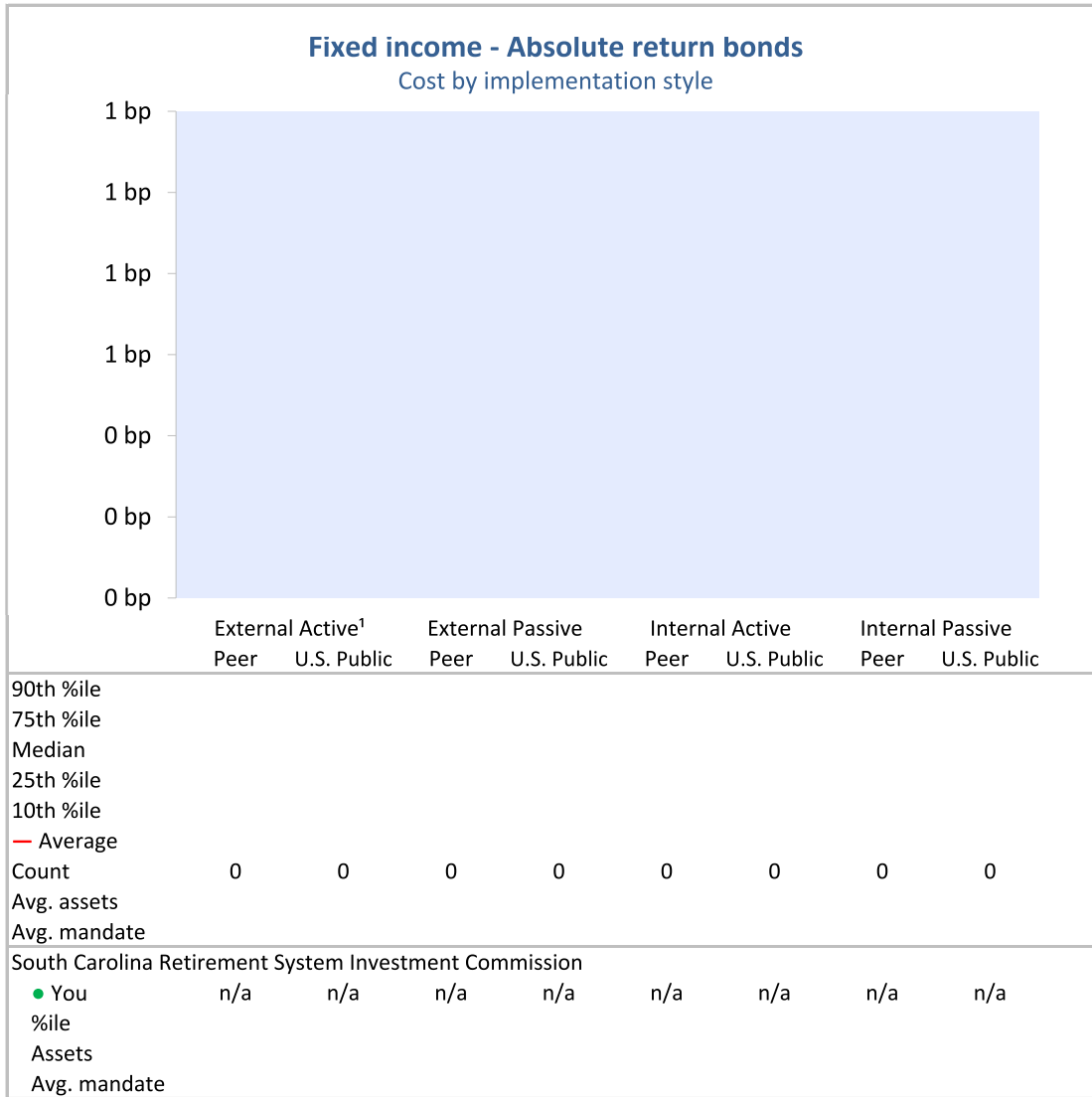
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 7.7 bps for peers (3 funds) and 5.6 bps for U.S. Public participants (6 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	13.4	11.5
Performance fees*	n/a	n/a	2.2
Internal and other	<u>n/a</u>	<u>0.4</u>	<u>0.2</u>
Total	n/a	13.9	13.9

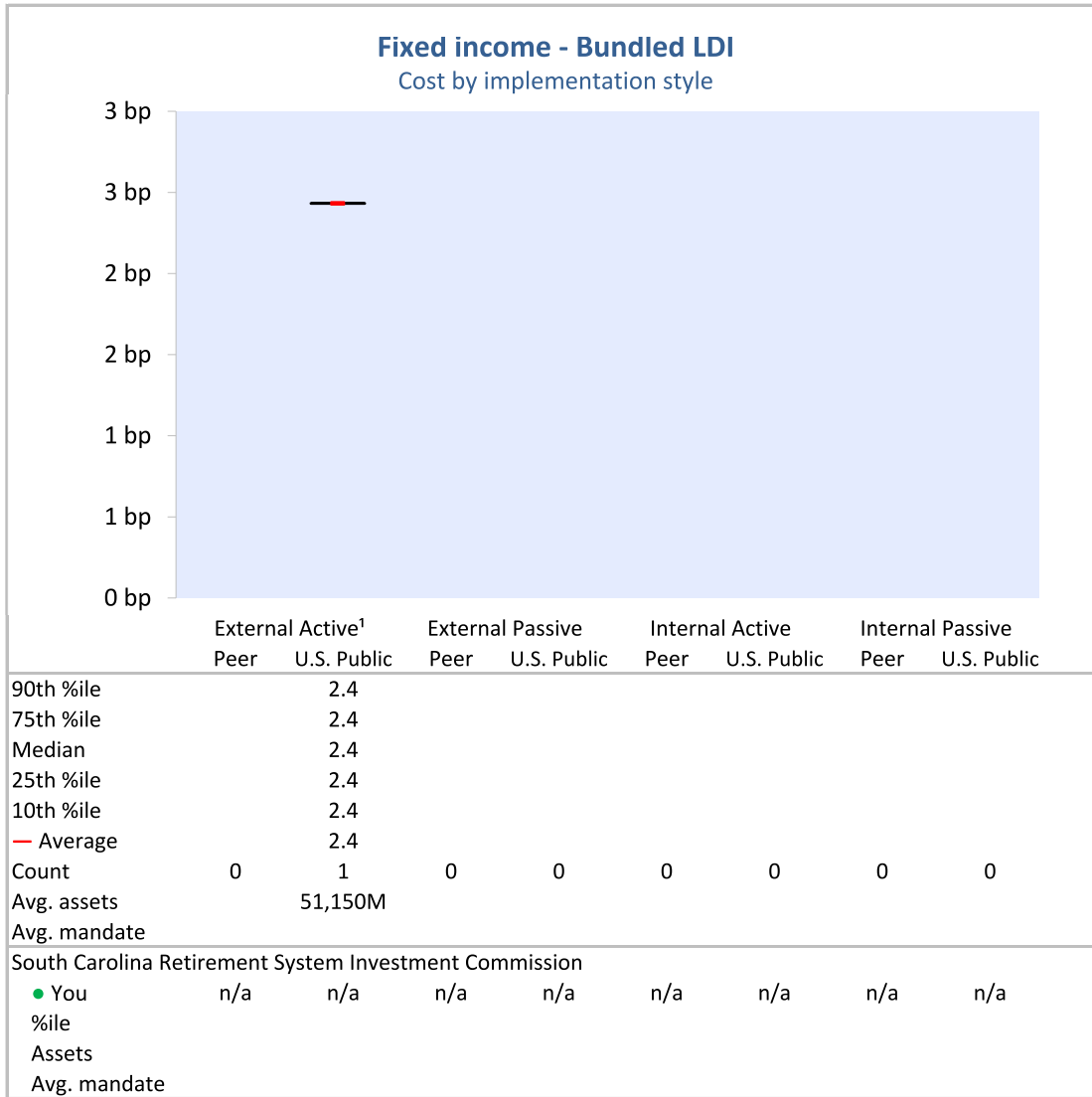
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 8.8 bps for U.S. Public participants (1 fund).



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.

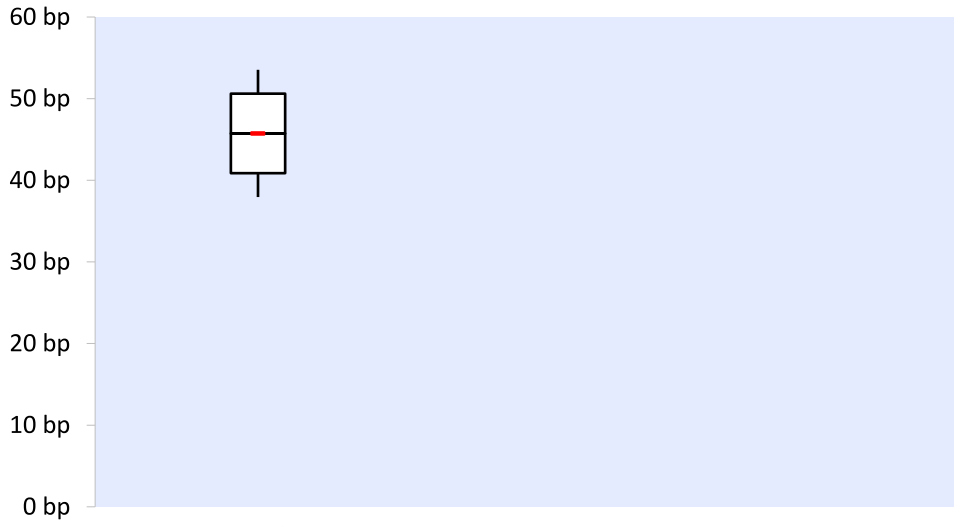


1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	n/a	2.4
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
Total	n/a	n/a	2.4

No funds reported a performance fee.

### Fixed income - Convertibles Cost by implementation style



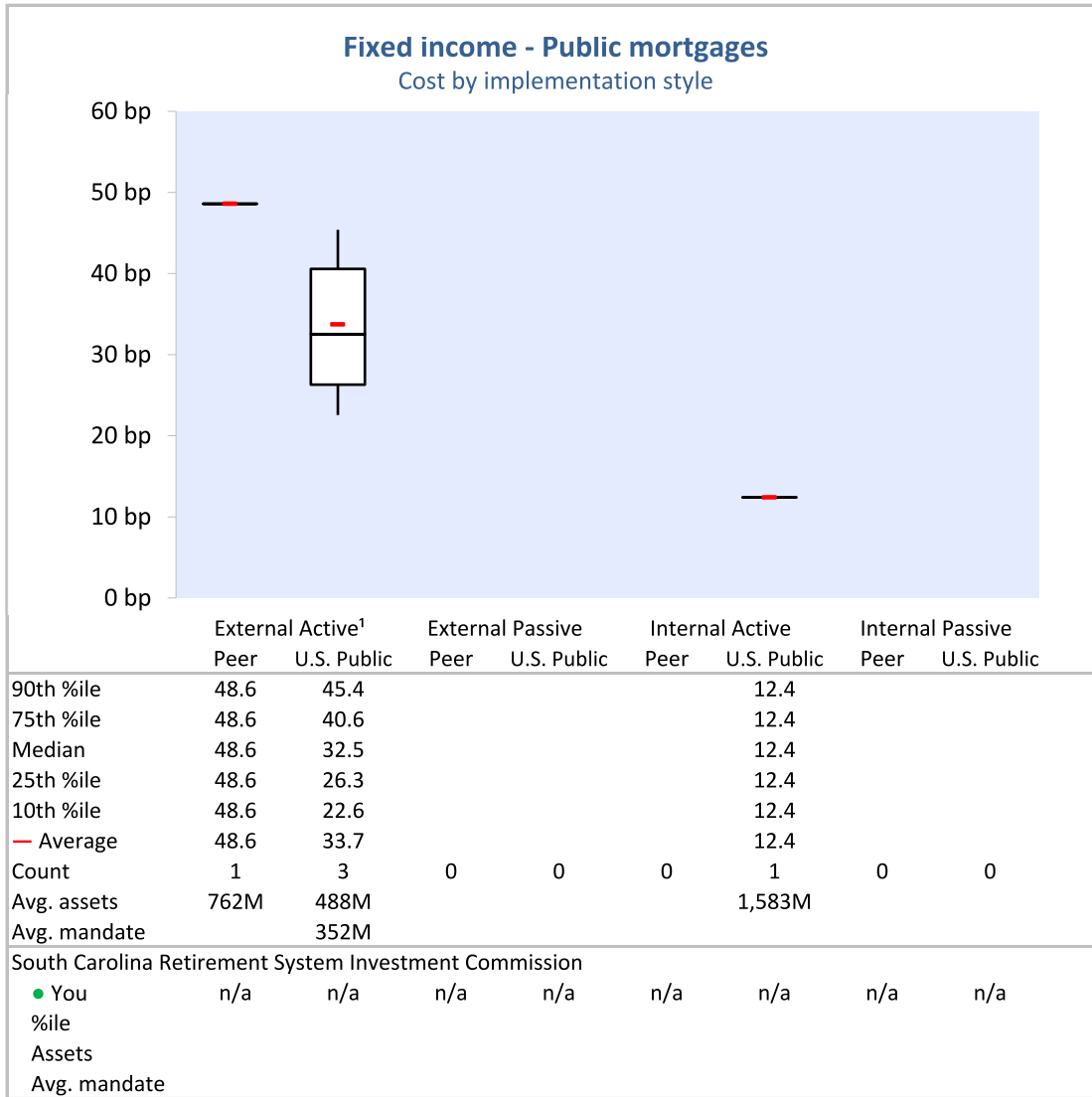
	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile		53.5						
75th %ile		50.6						
Median		45.7						
25th %ile		40.9						
10th %ile		37.9						
— Average		45.7						
Count	0	2	0	0	0	0	0	0
Avg. assets		1,183M						
Avg. mandate		72M						
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	45.7
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	45.7

No funds reported a performance fee.

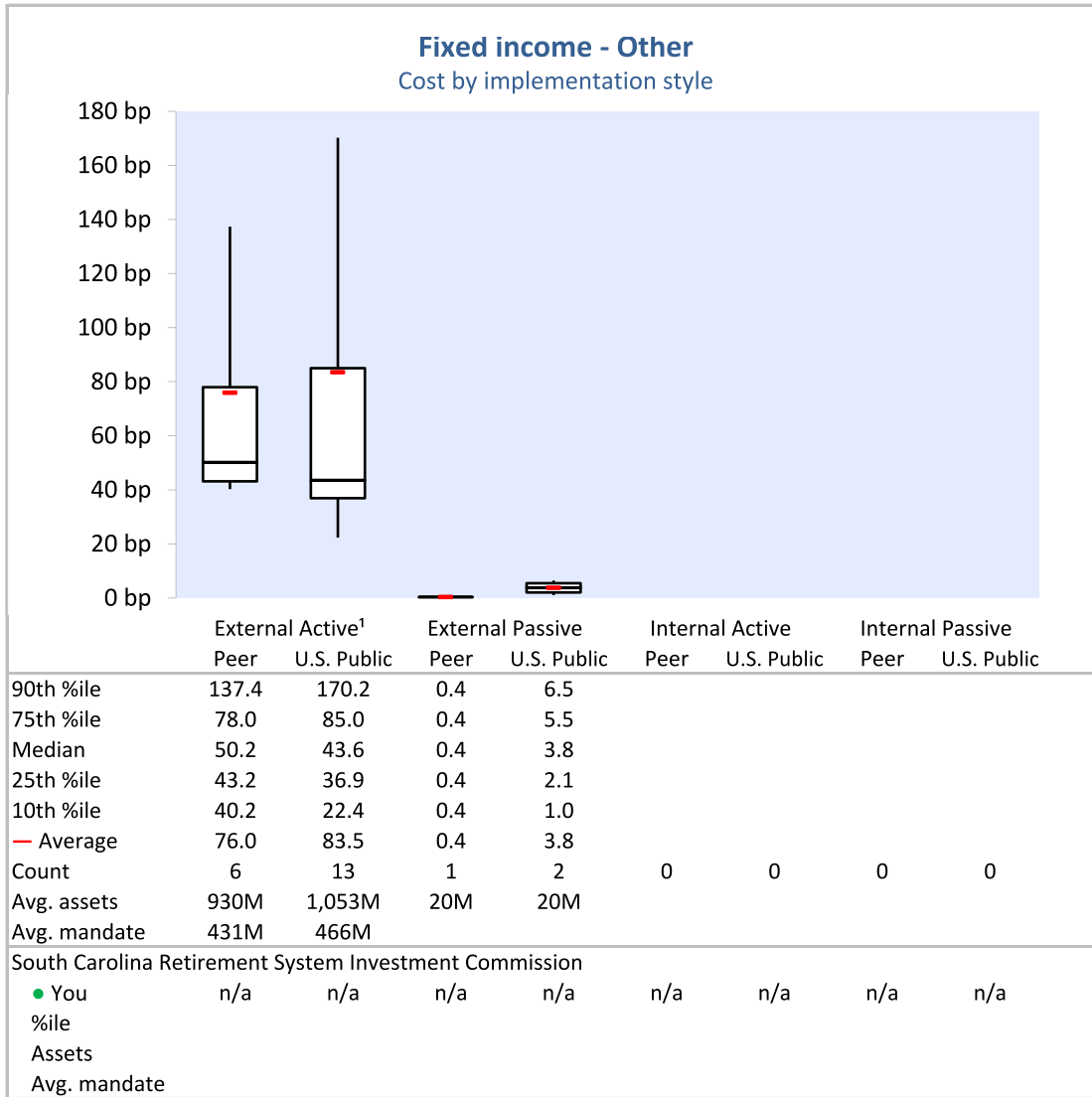




1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	48.0	33.3
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>0.6</u>	<u>0.4</u>
Total	n/a	48.6	33.7

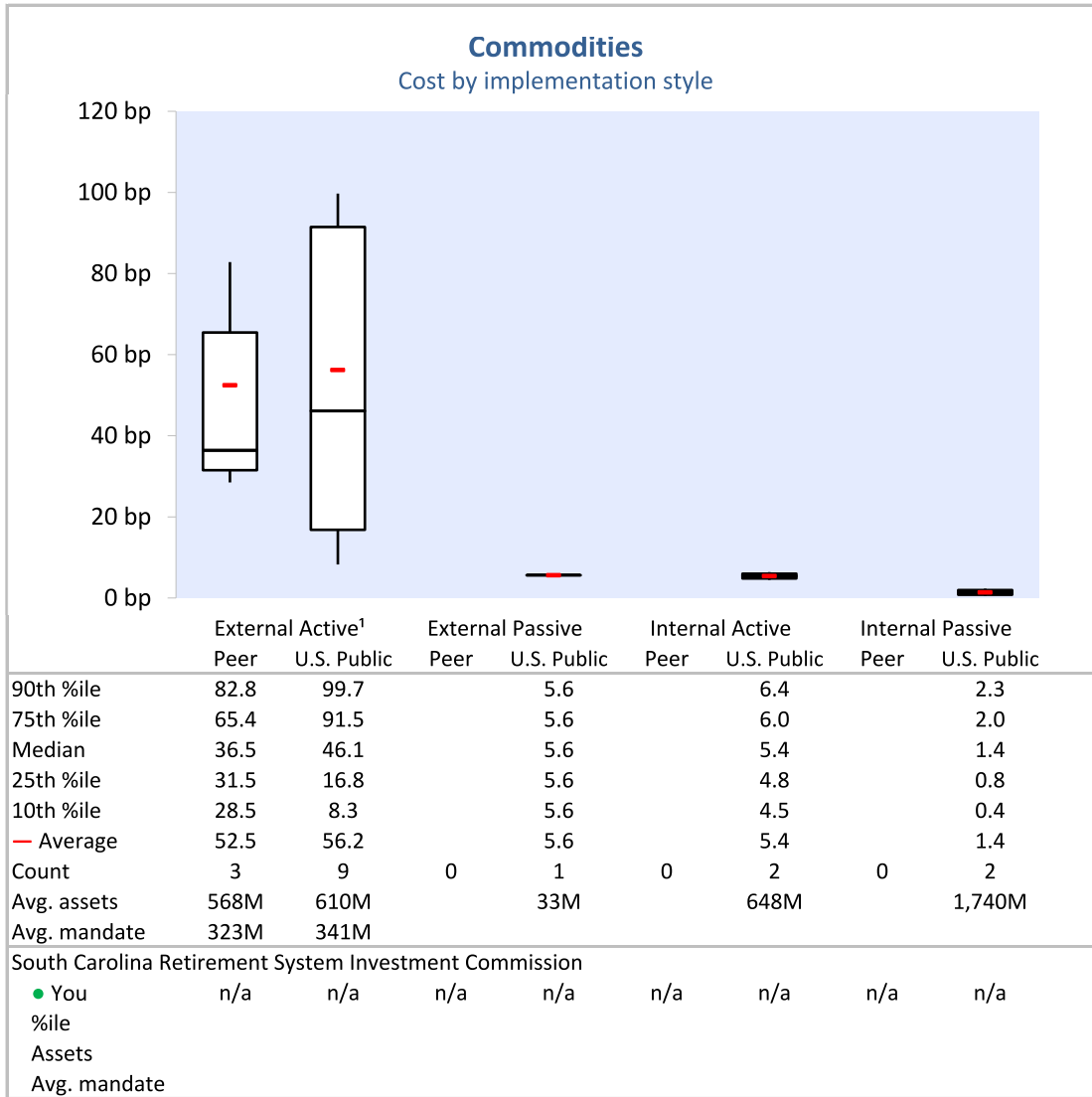
No funds reported a performance fee.



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	57.1	57.0
Performance fees*	n/a	18.2	26.2
Internal and other	<u>n/a</u>	<u>0.7</u>	<u>0.4</u>
Total	n/a	76.0	83.5

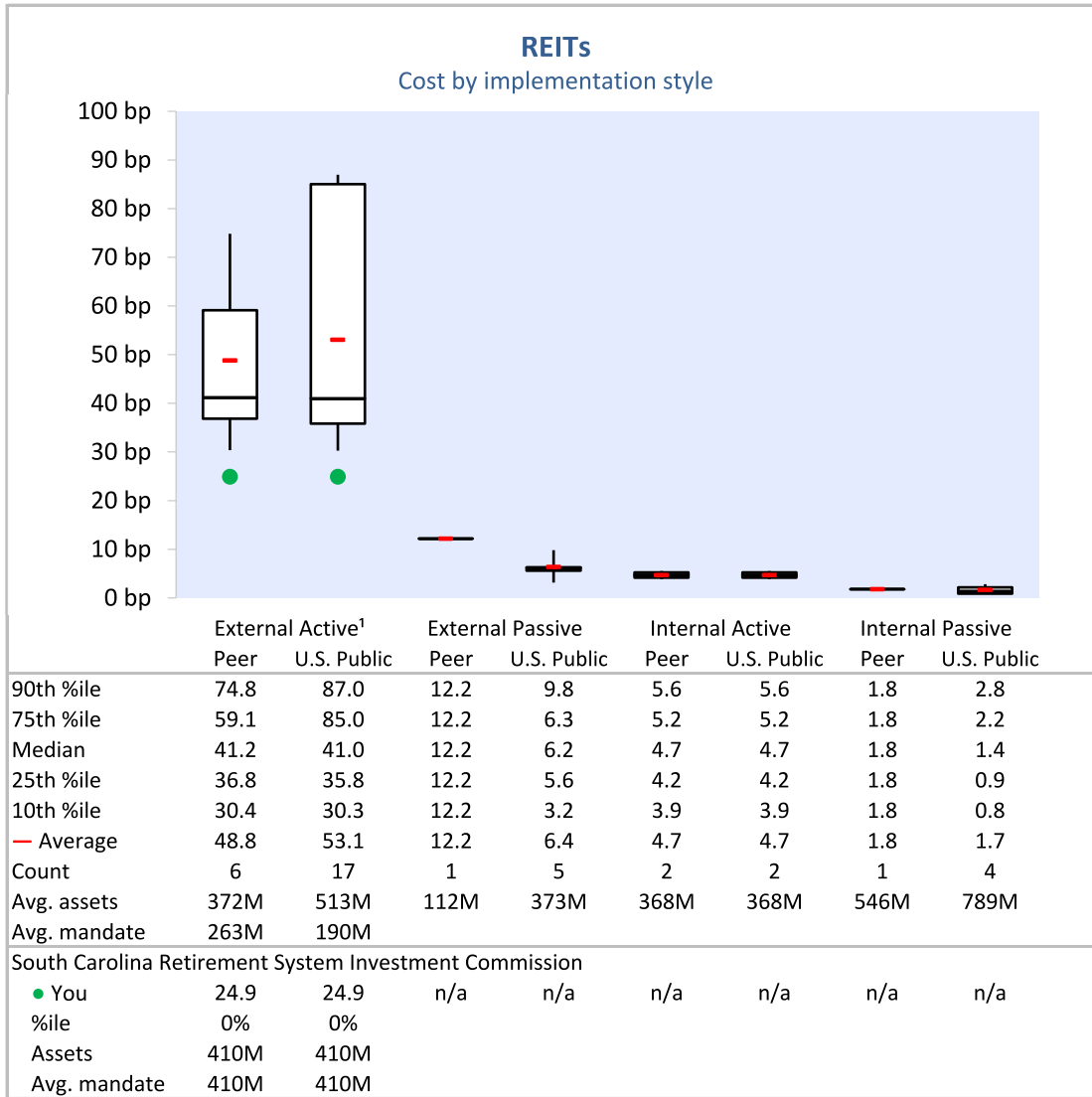
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 108.9 bps for peers (1 fund) and 170.1 bps for U.S. Public participants (2 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	52.5	49.6
Performance fees*	n/a	n/a	5.3
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>1.3</u>
Total	n/a	52.5	56.2

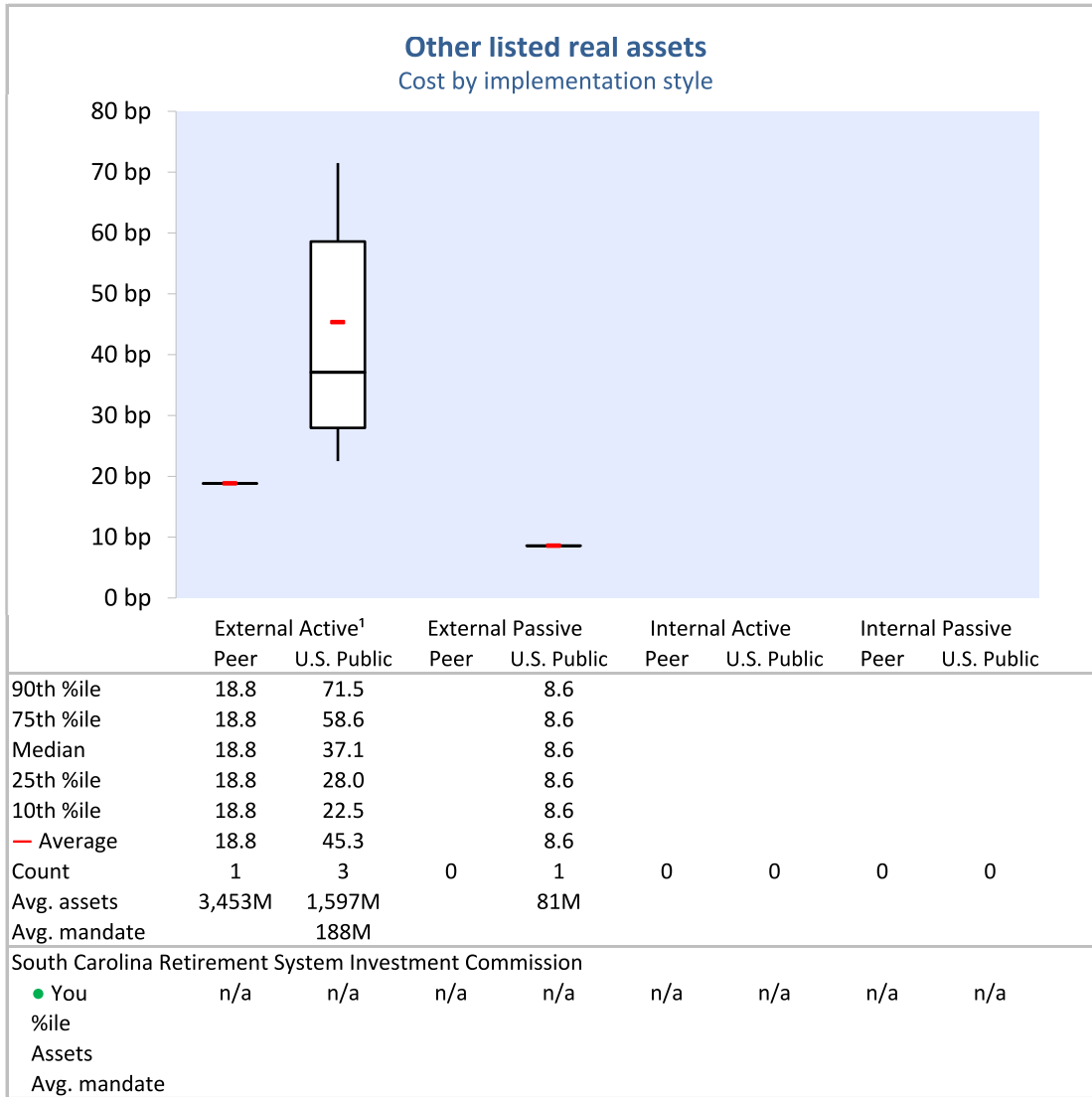
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 12.0 bps for U.S. Public participants (4 funds).



1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	22.8	32.6	39.7
Performance fees*	0.0	14.9	12.4
Internal and other	<u>2.1</u>	<u>1.3</u>	<u>1.0</u>
Total	24.9	48.8	53.1

\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 29.7 bps for peers (3 funds) and 30.1 bps for U.S. Public participants (7 funds).



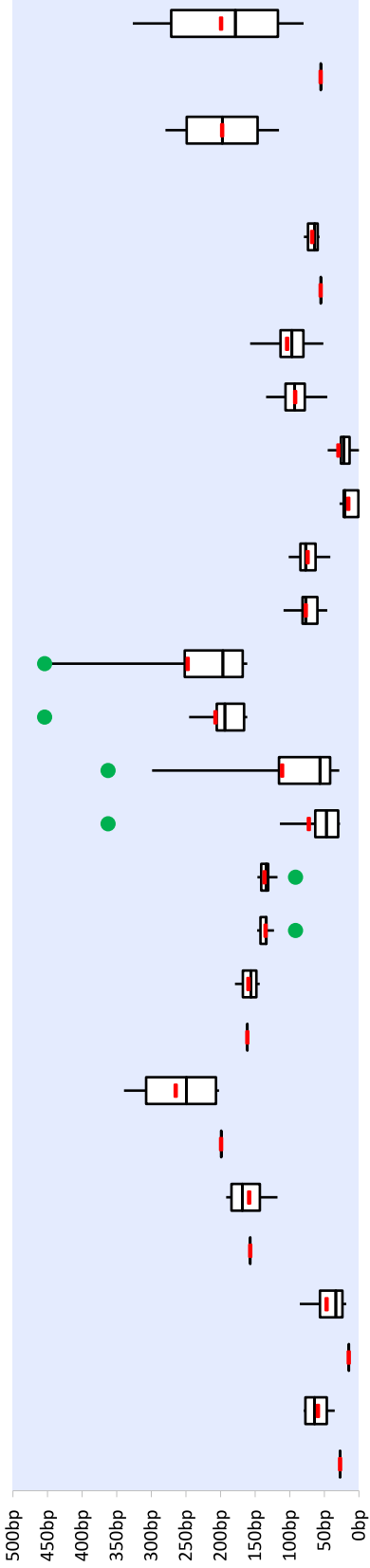
#### 1. Breakdown of external active fees

	You	Peer Average	U.S. Public Average
Base fees	n/a	18.8	45.0
Performance fees*	n/a	n/a	0.0
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>0.3</u>
Total	n/a	18.8	45.3

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

## Real estate ex-REITs

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



	Fund of Funds				Fund (Direct LP)				Fund (Evergreen)				Joint venture					
	Mgmt fees (Top layer) Peer	Perf. fees (Top layer) Peer	Underlying mgmt. & perf. <sup>2</sup> Peer	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> excl. perf. Peer	Mgmt fees Peer	Perf. fees Peer	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> excl. perf. Peer	Mgmt fees Peer	Perf. fees Peer	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> excl. perf. Peer	Mgmt fees Peer	Perf. fees Peer	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> excl. perf. Peer	
90th %ile	27.3	79.8	14.7	85.5	175M	326M	175M	326M	175M	326M	1.313M	2.071M	1.313M	2.071M	1.313M	2.071M	1.313M	2.071M
75th %ile	27.3	77.3	14.7	56.3	157.2	184.2	199.2	307.5	161.3	167.7	142.2	141.2	63.0	115.5	205.5	251.7	81.6	84.5
Median	27.3	64.3	14.7	33.4	157.2	168.5	199.2	249.4	161.3	156.0	134.0	134.0	47.0	56.5	193.9	196.6	77.1	77.2
25th %ile	27.3	46.3	14.7	23.8	157.2	143.1	199.2	206.6	161.3	148.1	134.0	131.0	30.1	41.5	165.9	167.9	60.1	62.7
10th %ile	27.3	34.9	14.7	18.3	157.2	117.7	199.2	202.2	161.3	143.3	122.8	117.7	27.4	28.3	161.4	161.5	45.8	41.5
Average	27.3	59.4	14.7	46.6	157.2	158.7	199.2	264.7	161.3	159.7	134.9	136.4	72.4	111.1	207.3	247.5	76.9	74.1
Count	1	4	1	4	1	4	1	4	1	4	14	35	14	35	16	35	16	35
Avg. assets	175M	326M	175M	326M	175M	326M	175M	326M	175M	326M	1.313M	2.071M	1.313M	2.071M	1.313M	2.071M	1.313M	2.071M
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	91.7	91.7	362.6	362.6	454.3	454.3	100%	91%
%ile Assets	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.079M	3.079M	3.079M	3.079M	3.079M	3.079M	3.079M	3.079M

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

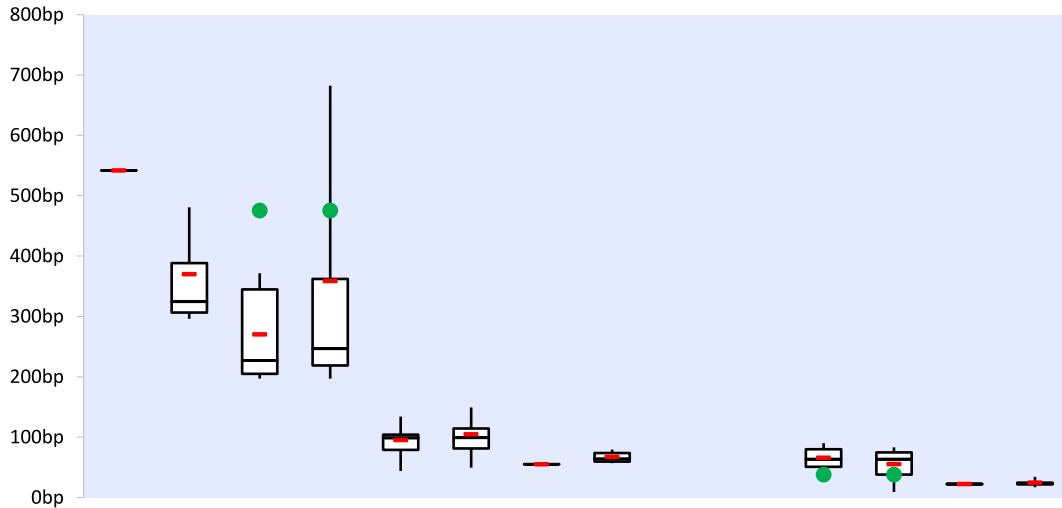
2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 134 bps (on amount fees are based on) for underlying management fees and 23 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 2.0 bps for LPs. The peer average cost of monitoring and selecting was 3.3 bps for LPs and 1.3 bps for external (not LPs).

LP base fee is the weighted average management fee of 90 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 104 bps (32.1 million).

## Real estate ex-REITs - contd.

### Cost as a % of NAV



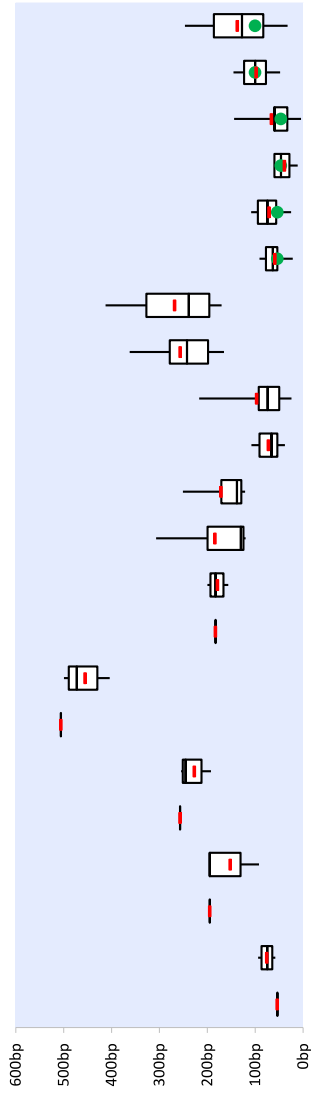
	Fund of Funds		Fund (Direct LP)		Fund (Evergreen)		Joint venture		Oper. Sub.		Co-Inv.		Internal	
	Total <sup>1</sup> incl. perf.		Total <sup>1</sup> incl. perf.		Total <sup>1</sup> incl. perf.		Total <sup>1</sup> incl. perf.		Total <sup>1</sup> incl. perf.		Total <sup>1</sup> incl. perf.		Total	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	542.0	480.6	371.4	682.2	134.1	149.1	55.3	79.6			89.8	83.2	22.7	34.3
75th %ile	542.0	388.4	344.8	361.9	104.2	114.3	55.3	73.7			80.0	74.8	22.6	24.7
Median	542.0	324.5	227.0	246.7	98.9	99.2	55.3	63.9			63.7	63.7	22.4	22.8
25th %ile	542.0	306.4	204.8	218.8	79.1	81.2	55.3	59.6			50.9	38.1	22.2	22.0
10th %ile	542.0	296.3	197.0	197.0	44.0	49.6	55.3	57.0			43.2	9.2	22.1	17.0
— Average	542.0	370.2	270.3	358.7	95.5	104.8	55.3	67.6			66.0	55.5	22.4	24.8
Count	1	4	14	35	16	35	1	3	0	0	3	9	2	5
Avg. assets	64M	264M	1,112M	1,625M	2,470M	4,123M	1,567M	5,432M			243M	1,854M	221M	3,458M
South Carolina Retirement System Investment Commission														
● You	n/a	n/a	475.3	475.3	n/a	n/a	n/a	n/a	n/a	n/a	38.1	38.1	n/a	n/a
%ile			100%	82%							0%	25%		
Assets			2,942M	2,942M							62M	62M		

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 9 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 3.3 bps for LPs and 1.3 bps for external (not LPs).

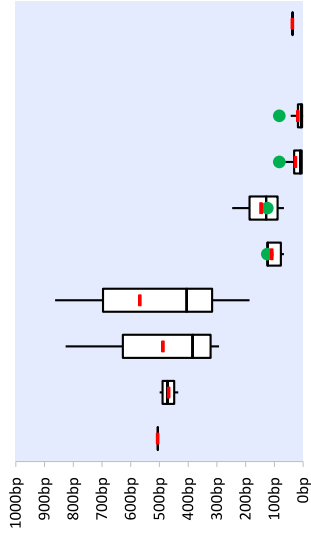
LP base fee is the weighted average management fee of 90 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 104 bps (32.1 million).

## Infrastructure

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 (Evergreen)			Fund (Direct LP)			Fund (Evergreen)			Fund (Direct LP)			Fund (Evergreen)			Fund (Direct LP)			Fund (Evergreen)			Fund (Direct LP)			Fund (Evergreen)												
	Mgmt fees (Top layer) U.S. Public	Perf. fees (Top layer) U.S. Public	Underlying mgmt. & perf. <sup>2</sup> Peer	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> excl. perf. Peer	Total <sup>3</sup> Peer	Mgmt fees U.S. Public	Perf. fees U.S. Public	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> Peer	Mgmt fees U.S. Public	Perf. fees U.S. Public	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> Peer	Mgmt fees U.S. Public	Perf. fees U.S. Public	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> Peer	Mgmt fees U.S. Public	Perf. fees U.S. Public	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> Peer	Mgmt fees U.S. Public	Perf. fees U.S. Public	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> Peer	Mgmt fees U.S. Public	Perf. fees U.S. Public	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> Peer	Mgmt fees U.S. Public	Perf. fees U.S. Public	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> Peer												
90th %ile	53.9	93.8	195.0	257.0	254.7	505.9	499.3	182.9	199.7	182.9	307.0	251.1	107.8	216.9	362.3	412.5	91.1	108.4	60.0	144.2	145.4	246.8	505.9	499.3	826.8	863.3	145.8	246.8	62.0	42.9	37.0	37.0	505.9	499.3	826.8	863.3	145.8	246.8	62.0	42.9	37.0	37.0				
75th %ile	53.9	86.7	195.0	257.0	251.2	505.9	489.3	182.9	193.4	182.9	199.6	170.8	91.1	92.8	278.6	327.2	77.5	94.5	60.0	123.2	123.2	186.4	505.9	489.3	627.3	696.4	124.4	186.4	31.4	18.1	37.0	37.0	505.9	489.3	627.3	696.4	124.4	186.4	31.4	18.1	37.0	37.0				
Median	53.9	74.9	195.0	257.0	245.4	505.9	472.7	182.9	182.9	182.9	130.0	138.3	66.3	74.3	242.4	238.8	63.2	74.6	46.3	59.8	100.2	127.7	505.9	472.7	384.9	405.6	123.2	128.8	9.9	7.6	37.0	37.0	505.9	472.7	384.9	405.6	123.2	128.8	9.9	7.6	37.0	37.0				
25th %ile	53.9	64.4	195.0	257.0	212.3	505.9	429.7	182.9	166.3	124.5	129.0	54.0	49.8	198.4	195.8	53.9	56.2	28.6	33.0	77.5	83.2	505.9	448.9	322.2	316.9	77.5	88.9	4.9	3.5	37.0	37.0	505.9	448.9	322.2	316.9	77.5	88.9	4.9	3.5	37.0	37.0					
10th %ile	53.9	58.1	195.0	257.0	192.4	505.9	403.9	182.9	156.3	120.1	121.1	38.0	24.2	165.2	170.2	21.6	25.1	11.4	4.4	48.2	32.4	505.9	434.7	292.6	186.7	67.0	66.8	4.1	0.0	37.0	37.0	505.9	434.7	292.6	186.7	67.0	66.8	4.1	0.0	37.0	37.0					
Average	53.9	75.8	195.0	257.0	227.2	505.9	455.1	182.9	178.8	184.1	171.3	72.5	97.1	256.6	268.4	58.9	71.3	39.0	66.1	97.9	137.3	505.9	467.9	487.5	568.3	109.0	146.5	26.4	18.3	37.0	37.0	505.9	467.9	487.5	568.3	109.0	146.5	26.4	18.3	37.0	37.0					
Count	1	3	1	3	1	3	1	3	1	3	7	22	7	22	7	22	5	10	5	10	5	10	1	3	7	22	5	10	4	9	0	1	277M	115M	696M	768M	474M	671M	83M	239M	834M	834M				
Avg. assets	277M	116M	277M	116M	277M	116M	277M	116M	277M	116M	1,041M	1,112M	1,041M	1,112M	1,041M	1,112M	543M	1,080M	543M	1,080M	543M	1,080M	277M	115M	696M	768M	474M	671M	83M	239M	834M	834M	834M	834M	834M	834M	834M	834M	834M	834M	834M	834M				
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	53.9	53.9	46.3	46.3	100.2	100.2	n/a	n/a	n/a	n/a	124.4	124.4	82.5	82.5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
%ile	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	25%	22%	50%	33%	50%	33%	25%	22%	50%	33%	50%	33%	75%	44%	100%	100%	75%	44%	100%	100%	75%	44%	100%	100%	75%	44%	100%	100%	75%	44%	100%	100%	75%	44%	100%	100%
Assets	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,271M	1,271M	1,271M	1,271M	1,271M	1,271M	1,271M	1,271M	1,271M	1,271M	1,271M	1,271M	1,271M	1,271M	1,271M	1,024M	1,024M	83M	83M	83M	83M	83M	83M	83M	83M	83M	83M	83M	83M	83M	83M	83M	83M	83M	83M	83M

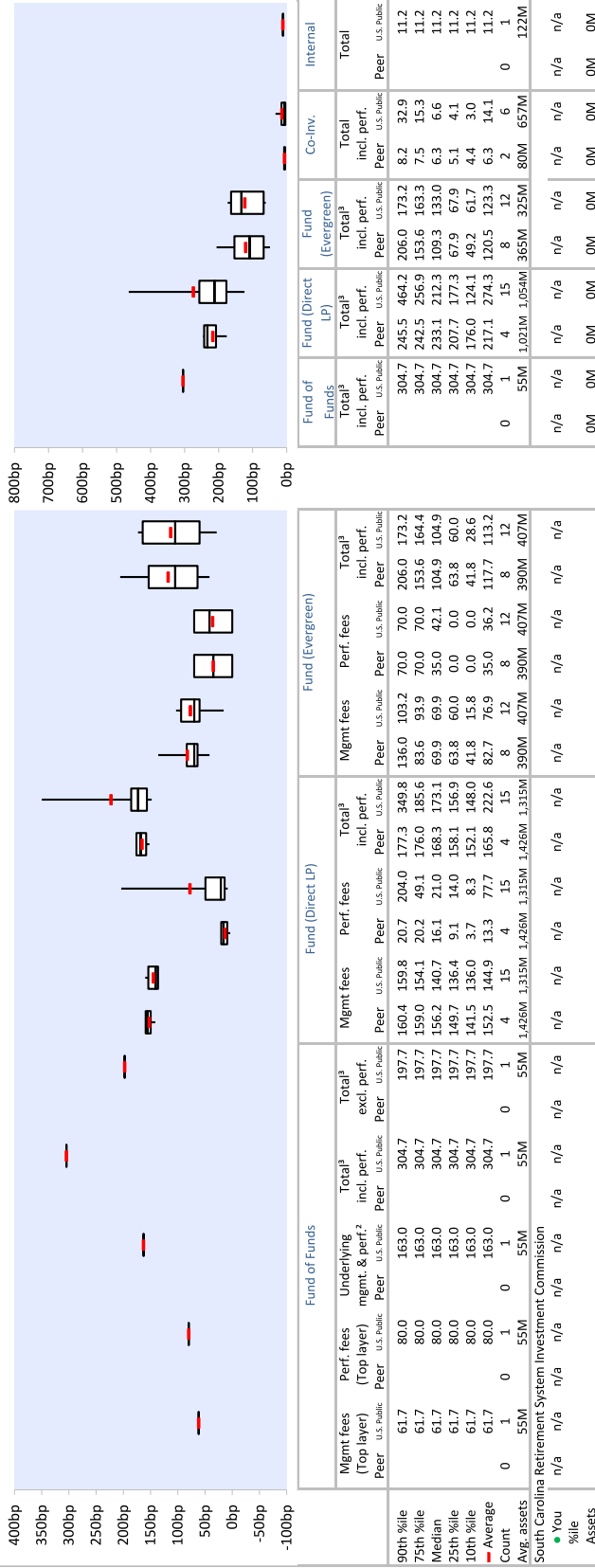
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.  
 2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 129 bps (on amount fees are based on) for underlying management fees and 128 bps (on NAV) for underlying performance fees were used.  
 3. The total cost also includes the internal cost of monitoring and selecting infrastructure investments. Your cost of monitoring and selecting was 1.7 bps for external (not LPs). The peer average cost of monitoring and selecting was 1.7 bps for fund of funds, 3.3 bps for LPs and 1.2 bps for external (not LPs).  
 Some averages on the right chart may be off the chart where there is outlier data resulting from large base or performance fees divided by small NAV.



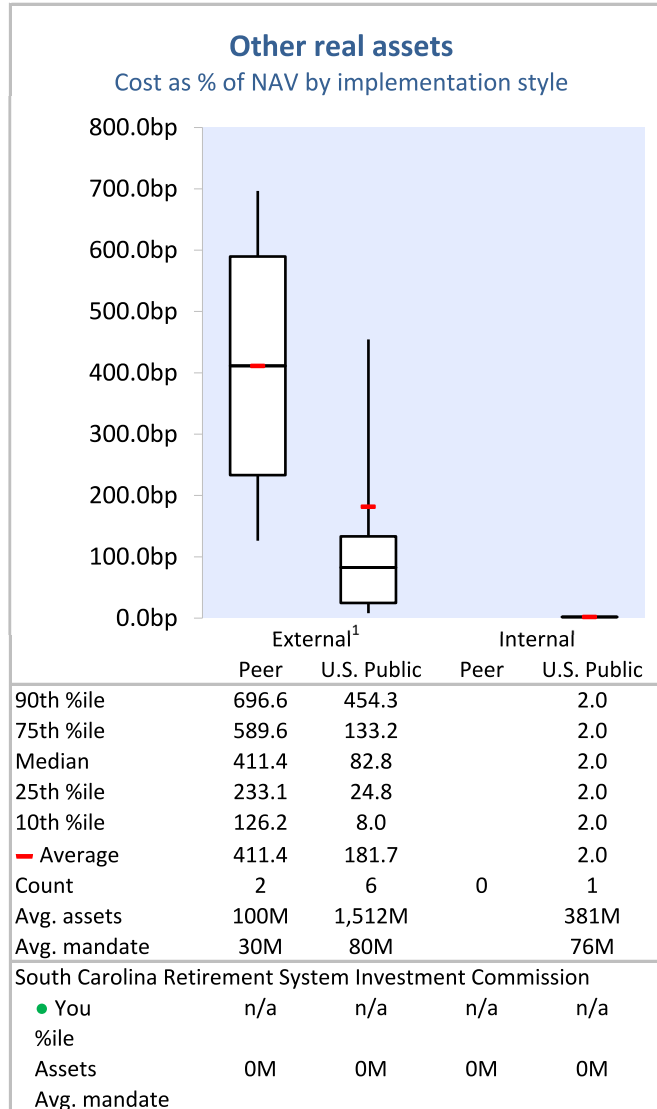
## Natural resources

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

Cost as a % of NAV



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 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 12.1 bps for LPs and 1.8 bps for external (not LPs).



#### 1. Breakdown of external fees

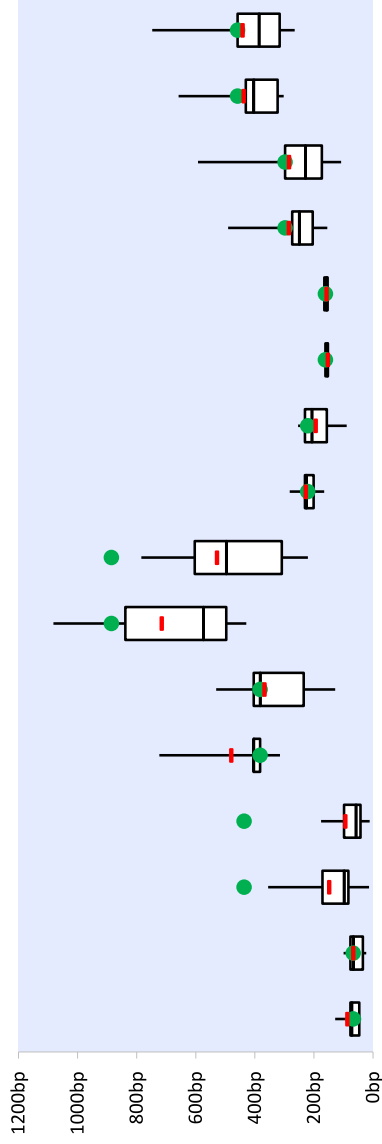
	Your Plan	Peer Average	U.S. Public Average
Base fees	n/a	411.4	180.7
Internal and other	<u>n/a</u>	<u>0.0</u>	<u>1.0</u>
Total*	n/a	411.4	181.7
Performance fees**	n/a	0.0	11.6

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

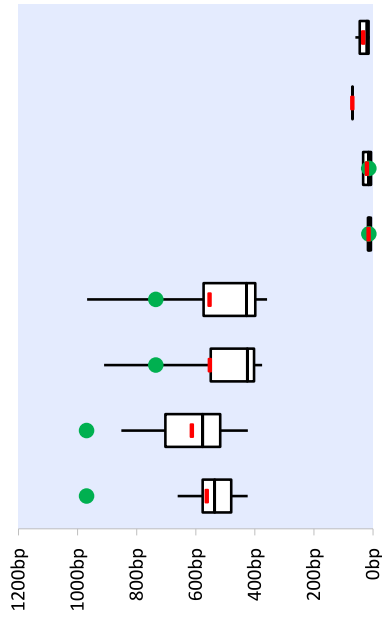
\*\* For funds that did not report a performance fee, a default value of 25 bps was applied. The average performance fee for only those funds that reported a performance fee is 0.0 bps for peers (2 funds) and 5.0 bps for U.S. Public participants (4 funds).

## Private equity - Diversified

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



Cost as a % of NAV



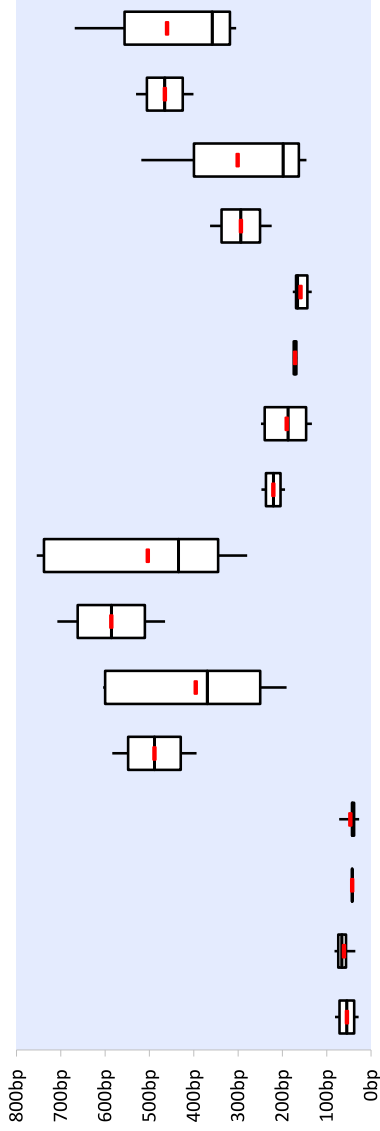
	Fund of Funds						Direct LP							
	Mgmt fees (Top layer) Peer	Perf. fees (Top layer) Peer	Underlying mgmt. & perf. <sup>2</sup> Peer	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> excl. perf. Peer	Total <sup>3</sup> incl. perf. U.S. Public	Mgmt fees Peer	Perf. fees Peer	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> excl. perf. Peer	Total <sup>3</sup> incl. perf. U.S. Public			
90th %ile	128.1	354.9	723.3	531.1	1081.8	784.2	282.1	253.6	168.0	177.5	490.7	592.5	658.1	747.5
75th %ile	76.7	171.1	98.0	404.0	838.3	603.3	230.7	230.7	161.3	164.8	273.5	297.6	430.6	458.5
Median	72.0	67.0	404.0	382.4	574.0	496.9	226.0	206.7	154.9	157.1	250.0	228.7	404.0	386.0
25th %ile	46.9	34.4	83.4	382.4	234.6	496.9	308.7	200.9	152.6	154.0	204.2	173.2	323.1	316.3
10th %ile	40.5	22.9	13.5	11.5	314.9	128.2	429.1	220.6	137.9	141.0	155.1	108.3	302.4	265.2
Average	86.9	67.0	148.5	93.8	479.8	367.1	715.1	527.9	193.8	153.0	157.1	284.6	437.7	441.5
Count	9	25	9	25	9	25	16	33	16	33	16	33	16	33
Avg. assets	1,268M	1,047M	1,268M	1,047M	1,268M	1,047M	1,268M	1,047M	5,539M	6,509M	5,539M	6,509M	5,539M	6,509M
South Carolina Retirement System Investment Commission														
You	67.0	436.2	382.4	382.4	885.5	885.5	221.0	221.0	160.9	160.9	297.6	297.6	458.5	458.5
%ile	38%	50%	25%	50%	88%	96%	38%	54%	67%	63%	80%	75%	80%	75%
Assets	528M	528M	528M	528M	528M	528M	528M	528M	3,421M	3,421M	3,421M	3,421M	3,421M	3,421M

Fund of Funds	Direct LP			Co-Investment			Internal		
	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> incl. perf. U.S. Public	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> incl. perf. U.S. Public	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> incl. perf. U.S. Public		
661.2	852.0	910.4	967.8	27.6	41.0	69.8	60.0		
576.7	702.9	549.2	573.7	17.3	33.7	69.8	45.3		
536.4	576.6	426.0	428.4	13.9	15.6	69.8	20.8		
480.1	517.5	402.6	398.4	7.1	6.8	69.8	15.4		
424.1	424.1	375.4	358.5	4.2	2.8	69.8	12.1		
562.6	613.4	552.3	553.4	15.0	20.4	69.8	33.5		
9	25	16	33	5	14	1	3		
1,192M	821M	5,129M	5,817M	1,222M	1,525M	-3M	155M		
969.4	969.4	735.3	735.3	13.9	13.9	n/a	n/a		
100%	96%	80%	78%	50%	46%	0M	0M		
482M	482M	2,133M	2,133M	1,293M	1,293M	0M	0M		

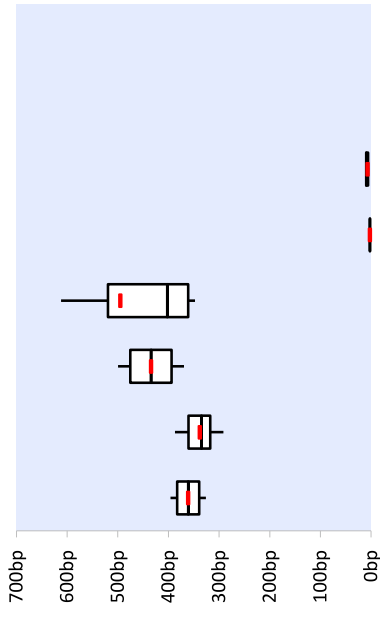
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 154 bps (on amount fees are based on) for underlying management fees and 250 bps (on NAV) for underlying performance fees were used.
3. The total cost also includes the internal cost of monitoring and selecting private equity investments. Your cost of monitoring and selecting was 2.0 bps for fund of funds. The peer average cost of monitoring and selecting was 3.8 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						Co-Investment		Internal			
	Mgmt fees (Top layer) Peer	Perf. fees (Top layer) Peer	Underlying mgmt. & perf. <sup>2</sup> Peer	Total <sup>3</sup> incl. perf. Peer	Total <sup>3</sup> excl. perf. Peer	Total <sup>3</sup> Peer	Mgmt fees Peer	Perf. fees Peer	Total <sup>3</sup> Peer	Total <sup>3</sup> Peer	Total <sup>3</sup> Peer	Total <sup>3</sup> Peer	Total <sup>3</sup> Peer	Total <sup>3</sup> Peer	Total <sup>3</sup> Peer	Total <sup>3</sup> Peer		
90th %ile	81.2	42.9	583.9	604.6	754.3	247.2	248.3	176.3	363.4	518.4	530.2	668.7	395.9	387.0	499.7	612.0	2.3	9.6
75th %ile	71.3	42.8	548.2	600.0	738.0	237.3	239.9	174.5	337.3	399.7	505.9	556.3	382.9	360.5	475.2	519.4	2.3	9.4
Median	54.7	42.7	488.8	370.0	586.2	434.4	187.5	171.6	293.9	198.6	465.4	358.8	361.1	335.0	434.5	402.3	2.3	9.2
25th %ile	38.1	42.6	38.3	429.4	250.2	510.3	146.3	168.6	143.6	250.4	162.7	318.3	339.3	317.5	393.7	360.9	2.3	5.7
10th %ile	28.1	35.5	42.6	393.7	190.4	464.7	133.5	166.8	133.8	224.4	145.9	304.2	326.2	291.4	369.2	347.6	2.3	3.7
Average	54.7	42.7	46.9	488.8	395.7	586.2	190.5	171.6	293.9	301.2	465.4	460.5	361.1	338.3	434.5	495.1	2.3	7.1
Count	2	2	5	2	5	2	5	2	12	2	12	2	2	5	2	12	1	3
Avg. assets	90M	936M	90M	936M	90M	936M	90M	1,969M	6,528M	1,969M	6,528M	1,969M	126M	927M	2,104M	5,815M	246M	2,944M
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
%ile	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M
Assets	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M

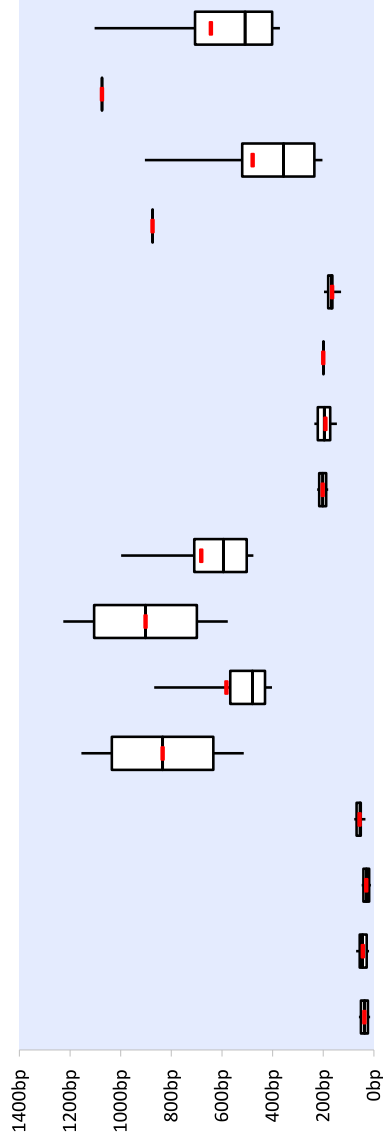
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.

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 166 bps (on amount fees are based on) for underlying management fees and 190 bps (on NAV) for underlying performance fees were used.

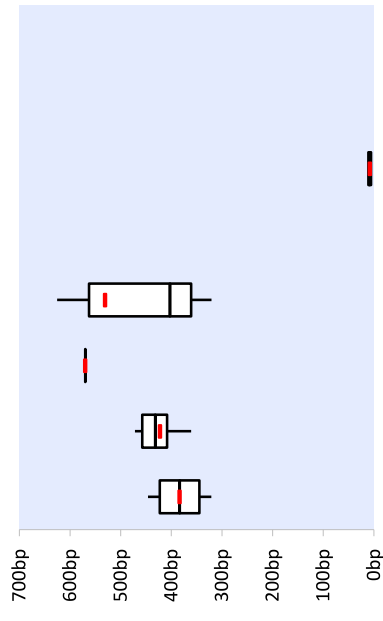
3. The total cost also includes the internal cost of monitoring and selecting private equity investments. The peer average cost of monitoring and selecting was 5.1 bps for fund of funds.

## 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) Peer	Perf. fees (Top layer) Peer	Underlying mgmt. & perf.² Peer	Total³ incl. perf. Peer	Total³ excl. perf. Peer	Total³ Peer	Mgmt fees Peer	Perf. fees Peer	U.S. Public Peer	U.S. Public Peer	U.S. Public Peer	Total³ incl. perf. Peer	Total³ Peer	U.S. Public Peer		
90th %ile	59.4	70.4	77.7	1155.2	867.9	1226.6	997.9	224.4	235.4	199.9	196.9	874.1	904.5	1074.0	1103.2	
75th %ile	51.1	56.4	41.3	68.8	1034.9	567.1	1104.8	709.2	216.1	221.4	199.9	180.7	874.1	520.1	1074.0	706.7
Median	37.4	45.1	30.0	55.0	834.5	480.2	901.9	595.0	202.4	196.6	199.9	167.1	874.1	357.3	1074.0	508.8
25th %ile	23.6	28.7	18.7	51.9	634.0	430.0	699.0	502.7	188.6	172.4	199.9	164.1	874.1	235.4	1074.0	402.0
10th %ile	15.3	19.4	12.0	33.7	513.8	402.2	577.2	476.3	180.3	146.4	199.9	129.7	874.1	203.2	1074.0	371.4
Average	37.4	43.4	30.0	56.2	834.5	582.2	901.9	681.9	191.3	199.9	165.2	874.1	478.6	1074.0	643.8	
Count	2	7	2	7	2	7	2	7	2	7	1	12	1	12	1	12
Avg. assets	270M	541M	270M	541M	270M	541M	270M	541M	270M	541M	59M	1,051M	59M	1,051M	59M	1,051M
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
You %ile Assets	OM	OM	OM	OM	OM	OM	OM	OM	OM	OM	OM	OM	OM	OM	OM	OM

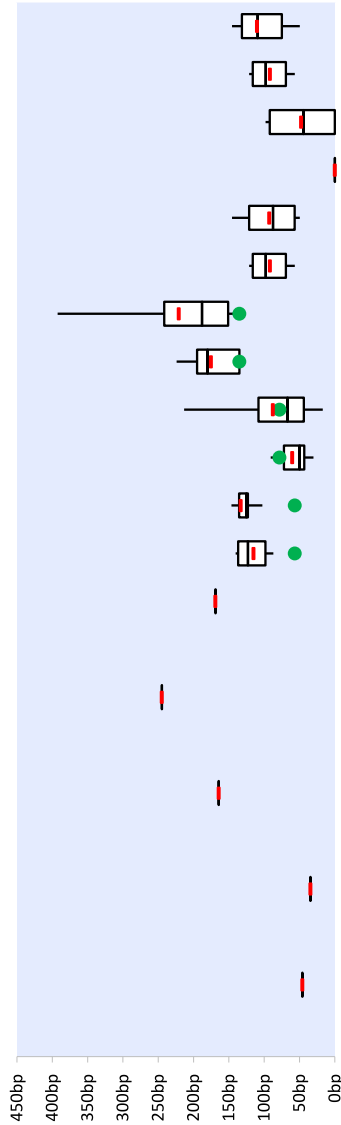
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.

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 250 bps (on NAV) for underlying performance fees were used.

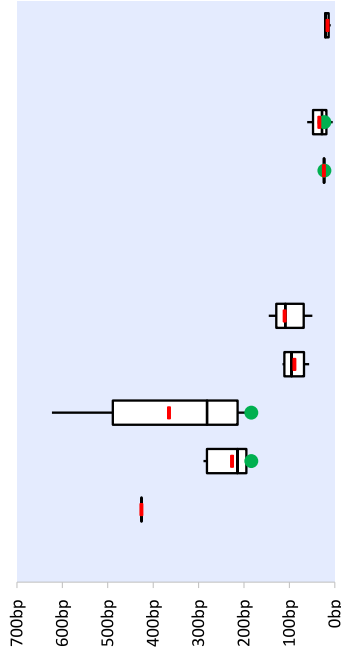
3. The total cost also includes the internal cost of monitoring and selecting private equity investments. The peer average cost of monitoring and selecting was 6.1 bps for fund of funds.

## Private credit

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



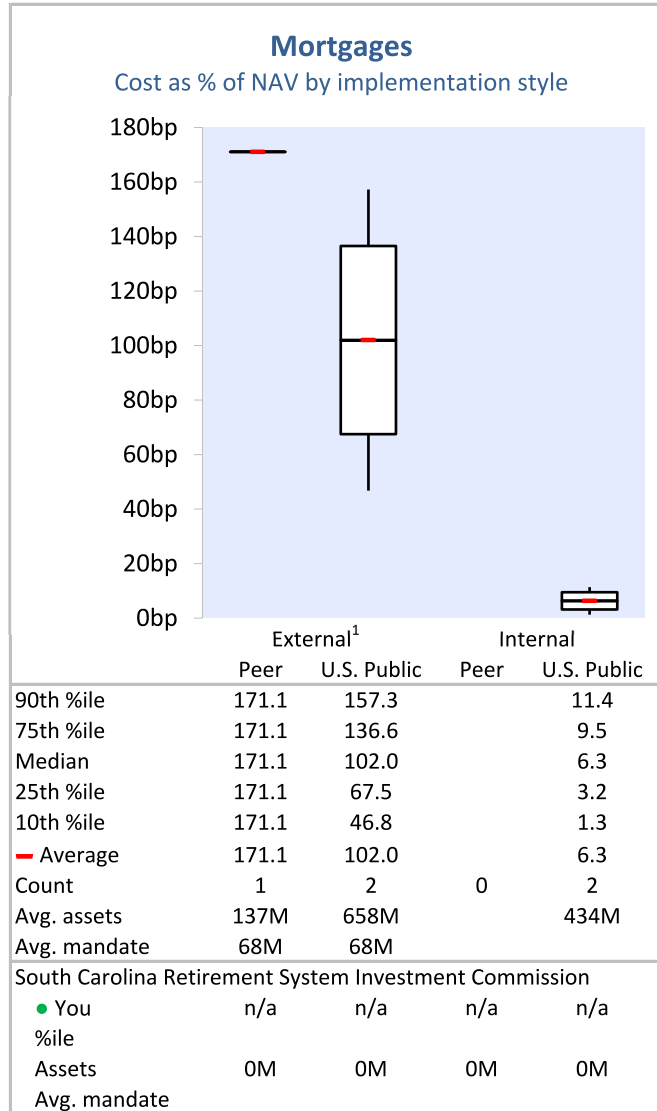
Cost as a % of NAV



	Fund of Funds						Direct LP						Evergreen						Co-Inv.						Internal					
	Mgmt fees (Top layer)	Perf. fees (Top layer)	Underlying mgmt. & perf. <sup>2</sup>	Total <sup>3</sup> excl. perf.	Total <sup>3</sup> incl. perf.	Total <sup>3</sup> Peer	Mgmt fees	Perf. fees	Total <sup>3</sup> incl. perf.	Mgmt fees	Perf. fees	Total <sup>3</sup> incl. perf.	Mgmt fees	Perf. fees	Total <sup>3</sup> incl. perf.	Mgmt fees	Perf. fees	Total <sup>3</sup> incl. perf.	Total	incl. perf.	Total	incl. perf.	Total	incl. perf.	Total	incl. perf.	Total	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	
90th %ile	46.0	34.5	164.4	244.9	169.0	140.5	146.3	90.8	213.4	224.0	392.4	121.3	145.5	0.0	98.0	121.3	145.5	425.9	289.3	623.0	115.2	145.5	24.6	60.9	21.1	21.1	21.0	21.0	21.0	
75th %ile	46.0	34.5	164.4	244.9	169.0	137.0	135.5	72.0	108.1	195.0	241.6	116.2	121.3	0.0	92.1	116.2	131.5	425.9	281.5	488.9	111.2	128.8	24.3	48.1	21.0	21.0	21.0	21.0	21.0	
Median	46.0	34.5	164.4	244.9	169.0	123.0	125.3	50.0	67.1	180.3	188.1	97.8	87.6	0.0	44.4	97.8	109.4	425.9	214.6	281.5	95.1	109.4	23.8	28.4	13.6	13.6	13.6	13.6	13.6	
25th %ile	46.0	34.5	164.4	244.9	169.0	98.3	123.0	43.3	43.8	135.0	151.0	69.3	56.9	0.0	0.0	69.3	75.0	425.9	195.0	214.0	67.9	68.6	23.3	18.5	9.1	9.1	9.1	9.1	9.1	
10th %ile	46.0	34.5	164.4	244.9	169.0	87.0	102.7	30.3	17.1	130.6	133.0	56.6	49.6	0.0	0.0	56.6	49.6	425.9	171.7	186.1	56.6	49.6	23.0	4.6	0.0	0.0	0.0	0.0	0.0	
Average	46.0	34.5	164.4	244.9	169.0	115.1	133.2	60.3	87.8	175.4	221.0	91.9	92.7	0.0	47.7	91.9	110.1	425.9	226.3	365.1	89.0	110.4	23.8	34.1	16.1	16.1	16.1	16.1	16.1	
Count	0	1	0	1	0	1	9	23	9	23	9	23	6	11	1	4	6	0	1	9	23	6	11	2	8	0	3	3	3	
Avg. assets	6M	6M	6M	6M	6M	1.279M	1.442M	1.279M	1.442M	1.279M	1.442M	1.279M	1.442M	2.054M	1.653M	12.322M	4.546M	2.054M	3M	902M	1.100M	2.074M	1.745M	421M	240M	433M	433M	433M	433M	
South Carolina Retirement System Investment Commission	n/a	n/a	n/a	n/a	n/a	56.7	56.7	78.3	78.3	135.0	135.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	183.9	183.9	n/a	n/a	22.8	22.8	n/a	n/a	n/a	
%ile	n/a	n/a	n/a	n/a	n/a	0%	0%	88%	73%	25%	14%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	13%	9%	n/a	n/a	0%	29%	n/a	n/a	n/a		
Assets	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	3.588M	2.635M	2.635M	2.635M	2.635M	549M	549M	549M	549M	549M	549M	549M	

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 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 real estate investments. Your cost of monitoring and selecting was 1.6 bps for LPs. The peer average cost of monitoring and selecting was 4.0 bps for LPs and 0.5 bps for external (not LPs).

LP base fee is the weighted average management fee of 55 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 64 bps (23 million).

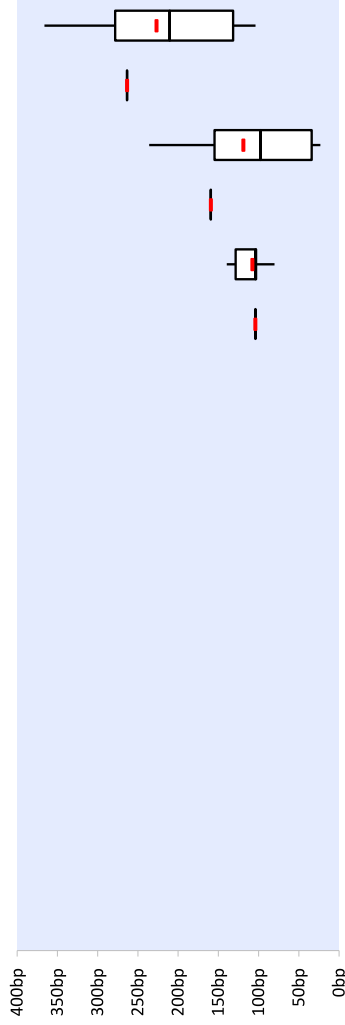


#### 1. Breakdown of external fees

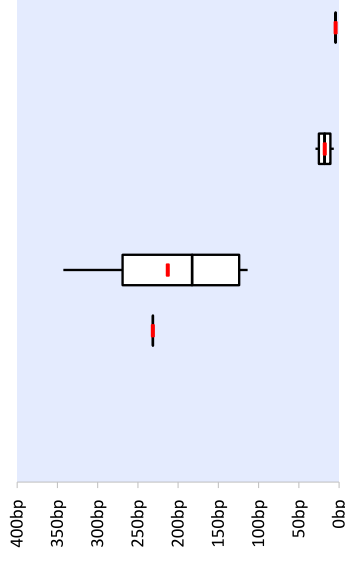
	Your Plan	Peer Average	U.S. Public Average
Base fees	n/a	171.1	102.0
Internal and other	n/a	n/a	n/a
Performance fees	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
Total	n/a	171.1	102.0

## Private equity - Other

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



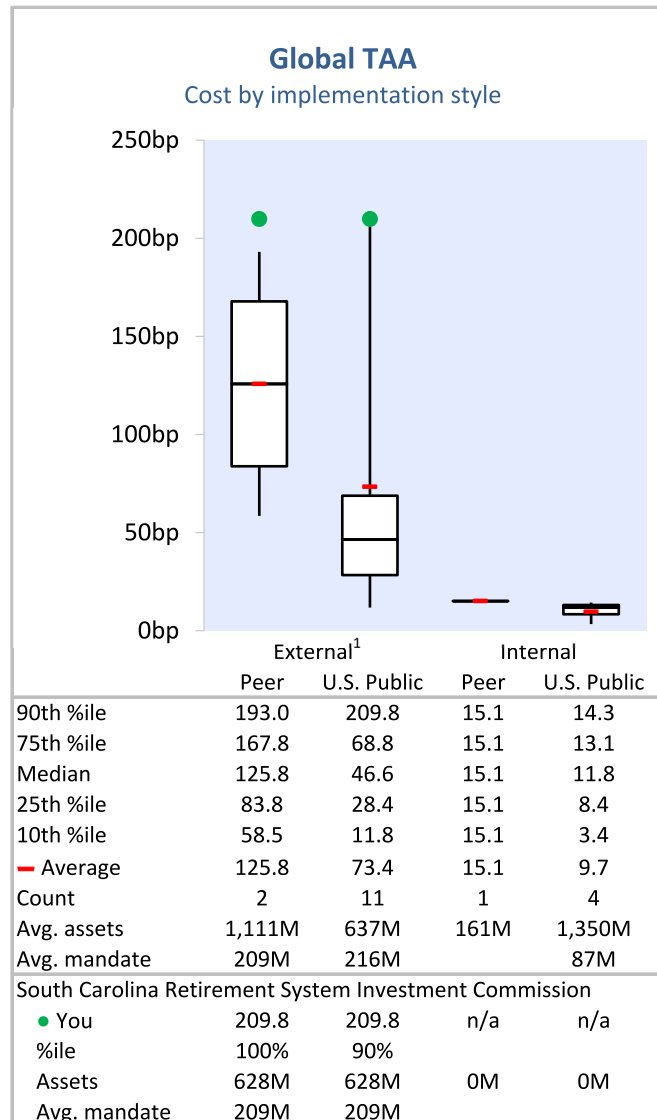
Cost as a % of NAV



	Fund of Funds						Direct LP						Co-Investment		Internal		
	Mgmt fees (Top layer) Peer	U.S. Public	Perf. fees (Top layer) Peer	U.S. Public	Underlying mgmt. & perf. <sup>2</sup> Peer	U.S. Public	Total <sup>3</sup> excl. perf. Peer	U.S. Public	Mgmt fees Peer	U.S. Public	Perf. fees Peer	U.S. Public	Total <sup>3</sup> incl. perf. Peer	U.S. Public	Total incl. perf. Peer	U.S. Public	Total Peer
90th %ile	0	0	0	0	0	0	0	104.1	139.5	159.5	236.0	263.6	366.1	231.4	342.6	29.4	4.5
75th %ile	0	0	0	0	0	0	104.1	128.5	159.5	154.8	263.6	278.2	231.4	269.0	25.1	4.5	
Median	0	0	0	0	0	0	104.1	103.9	159.5	97.7	263.6	210.6	231.4	182.7	18.0	4.5	
25th %ile	0	0	0	0	0	0	104.1	103.2	159.5	34.1	263.6	131.7	231.4	124.2	10.8	4.5	
10th %ile	0	0	0	0	0	0	104.1	80.3	159.5	23.3	263.6	103.8	231.4	113.7	6.6	4.5	
Average	0	0	0	0	0	0	104.1	107.9	159.5	119.0	263.6	226.9	231.4	213.0	18.0	4.5	
Count	0	0	0	0	0	0	1	6	1	6	1	6	1	6	2	0	1
Avg. assets	0M	0M	0M	0M	0M	0M	1,736M	1,485M	1,736M	1,485M	1,736M	1,485M	1,977M	1,235M	77M	13M	
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
You %ile Assets	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 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.

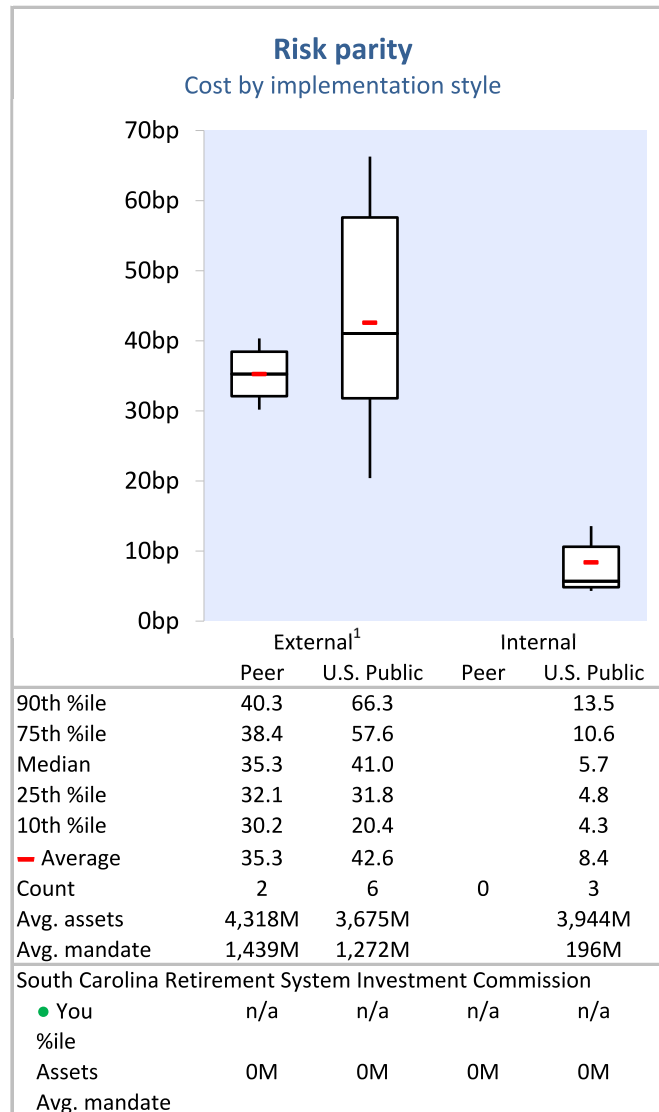




#### 1. Breakdown of external fees

	Your Plan	Peer Average	U.S. Public Average
Base fees	100.7	70.3	63.1
Internal and other	2.1	2.0	1.2
Performance fees	<u>107.0</u>	<u>107.0</u>	<u>21.4</u>
Total*	209.8	125.8	73.4

\* 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 107.0 bps for peers (1 fund) and 21.4 bps for U.S. Public participants (5 funds).



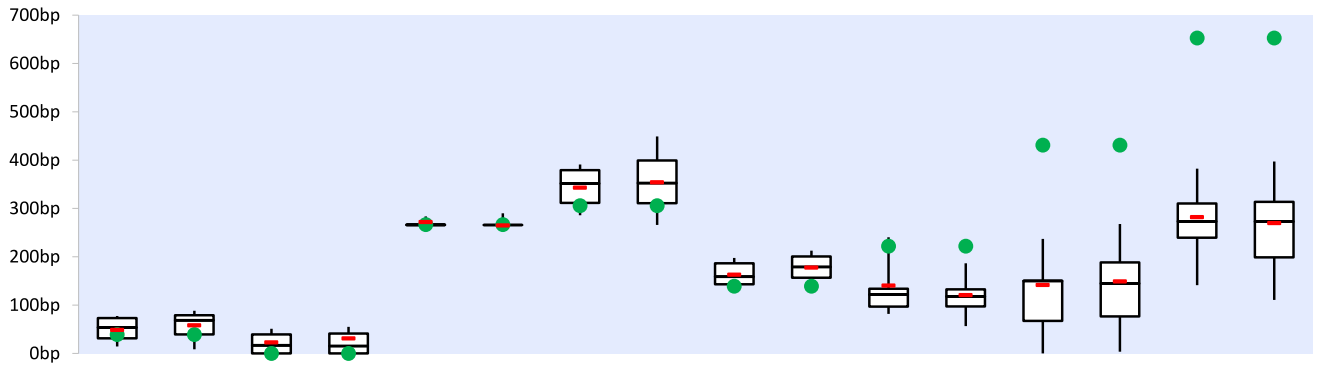
#### 1. Breakdown of external fees

	Your Plan	Peer Average	U.S. Public Average
Base fees	n/a	35.1	40.0
Internal and other	n/a	0.3	0.8
Performance fees	<u>n/a</u>	<u>n/a</u>	<u>6.2</u>
Total*	n/a	35.3	42.6

\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 6.2 bps for U.S. Public participants (2 funds).

## Hedge funds

### Cost by implementation style

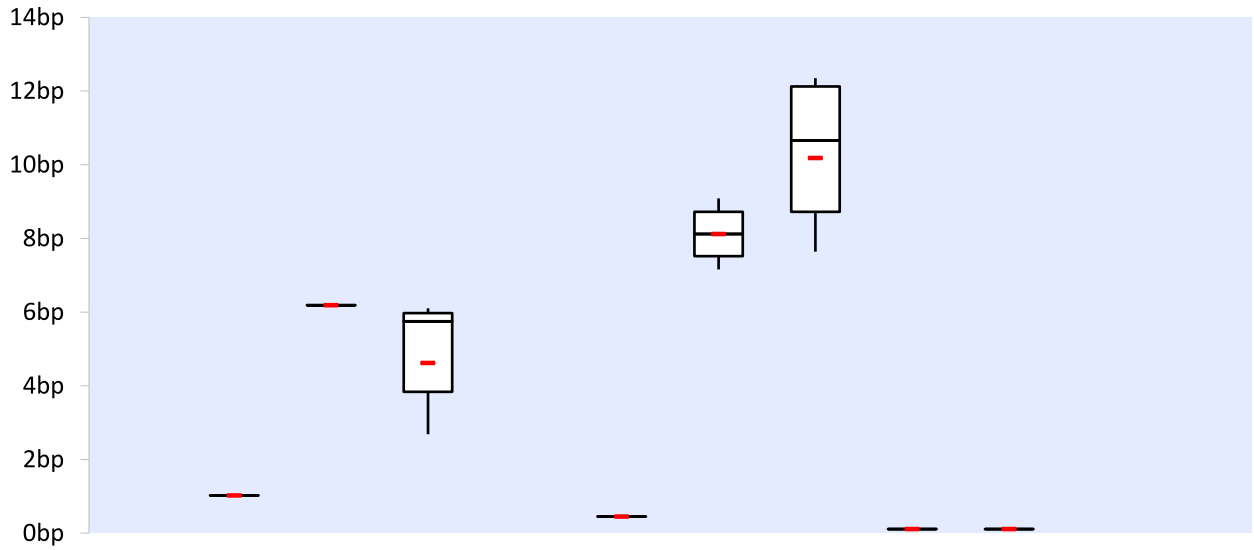


	Fund of Funds										External Direct					
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. and perf. <sup>1</sup>		Total <sup>2</sup> incl. perf.		Total <sup>2</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>2</sup> incl. perf.	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	77.5	88.2	51.0	55.0	283.4	290.1	391.1	449.0	197.5	212.5	240.4	186.5	237.0	267.9	382.3	397.1
75th %ile	73.2	78.9	39.2	41.0	266.5	266.0	379.1	399.3	186.4	200.6	133.8	132.7	150.0	188.3	310.3	313.6
Median	53.7	68.8	17.0	15.4	266.0	266.0	352.0	352.7	158.7	179.2	121.8	118.2	150.0	144.8	273.4	272.9
25th %ile	31.3	39.3	0.0	0.0	266.0	266.0	311.5	311.0	143.0	156.7	97.0	97.2	67.2	76.6	239.5	198.9
10th %ile	14.3	8.6	0.0	0.0	266.0	266.0	285.9	266.0	132.5	129.9	81.7	56.6	0.0	3.5	141.3	110.8
Average	48.5	58.1	22.6	31.2	271.8	264.9	343.0	354.2	162.9	177.8	140.3	120.8	141.8	149.0	282.1	269.7
Count	6	14	6	14	6	14	6	14	6	14	9	22	9	22	9	22
Avg. assets	653M	507M	653M	507M	653M	507M	653M	507M	653M	507M	4,097M	4,396M	4,097M	4,396M	4,097M	4,396M
South Carolina Retirement System Investment Commission																
You	39.1	39.1	0.0	0.0	266.7	266.7	305.8	305.8	139.1	139.1	221.8	221.8	430.9	430.9	652.6	652.6
%ile	40%	23%	0%	0%	80%	85%	20%	23%	20%	15%	88%	95%	100%	100%	100%	100%
Assets	2,470M	2,470M	2,470M	2,470M	2,470M	2,470M	2,470M	2,470M	2,470M	2,470M	1,645M	1,645M	1,645M	1,645M	1,645M	1,645M

1. 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 126 bps (on NAV) for underlying management fees and 140 bps (on NAV) for underlying performance fees were used.

2. The total cost also includes the internal cost of monitoring and selecting real estate investments. The peer average cost of monitoring and selecting was 2.2 bps for fund of funds and 3.2 bps for LPs.

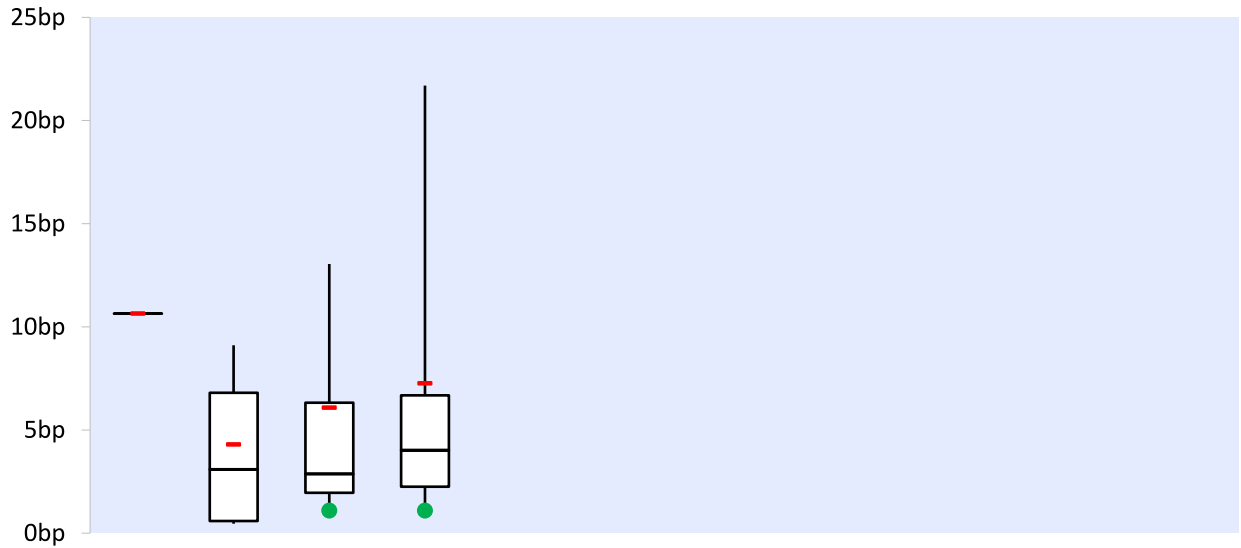
### Overlays: currency, duration Cost by implementation style



	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		1.0	6.2	6.1		0.5	9.1	12.3		0.1	0.1	
75th %ile		1.0	6.2	6.0		0.5	8.7	12.1		0.1	0.1	
Median		1.0	6.2	5.8		0.5	8.1	10.7		0.1	0.1	
25th %ile		1.0	6.2	3.8		0.5	7.5	8.7		0.1	0.1	
10th %ile		1.0	6.2	2.7		0.5	7.2	7.6		0.1	0.1	
— Average		1.0	6.2	4.6		0.5	8.1	10.2		0.1	0.1	
Count	0	1	1	3	0	1	2	4	1	1	0	0
Avg. notional		3,578M	1,824M	2,183M		38,914M	4,948M	4,212M		2,031M	2,031M	
South Carolina Retirement System Investment Commission												
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile												
Avg. notional												

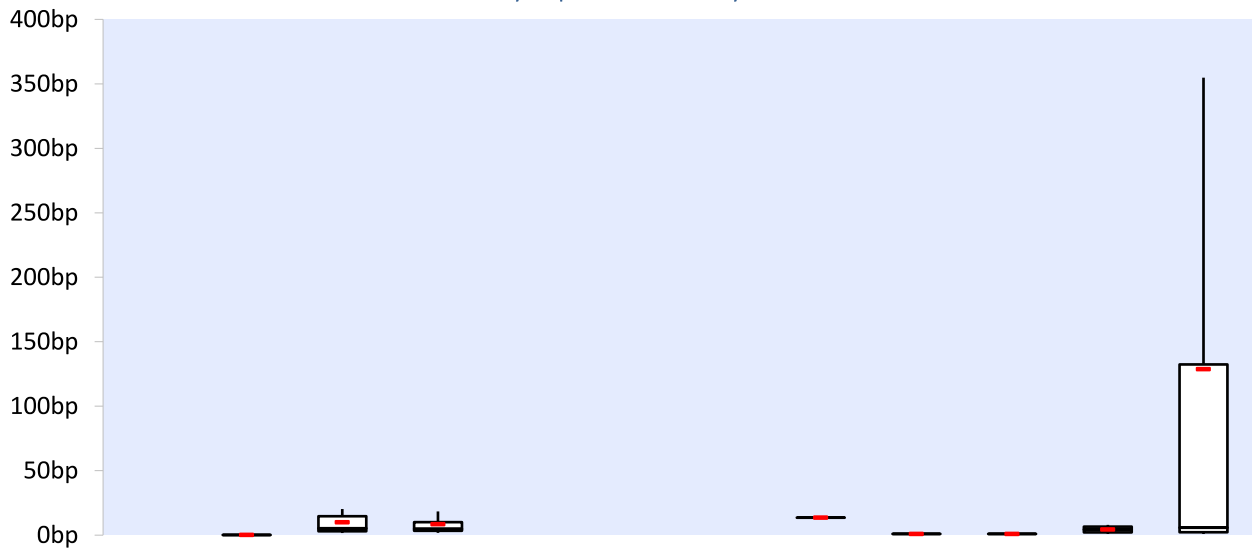
### Overlays: passive beta/rebalancing, global TAA, policy tilt TAA

Cost by implementation style



	Passive Beta/Rebalancing				Global TAA				Policy Tilt TAA			
	Internal		External		Internal		External		Internal		External	
	% of notional		% of notional		% of notional		% of notional		% of notional		% of notional	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile	10.6	9.1	13.0	21.7								
75th %ile	10.6	6.8	6.3	6.7								
Median	10.6	3.1	2.9	4.0								
25th %ile	10.6	0.6	2.0	2.3								
10th %ile	10.6	0.5	0.8	1.1								
— Average	10.6	4.3	6.1	7.3								
Count	1	4	8	11	0	0	0	0	0	0	0	0
Avg. notional	340M	4,397M	1,991M	3,663M								
South Carolina Retirement System Investment Commission												
● You	n/a	n/a	1.1	1.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile			14%	10%								
Avg. notional			6,010M	6,010M								

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



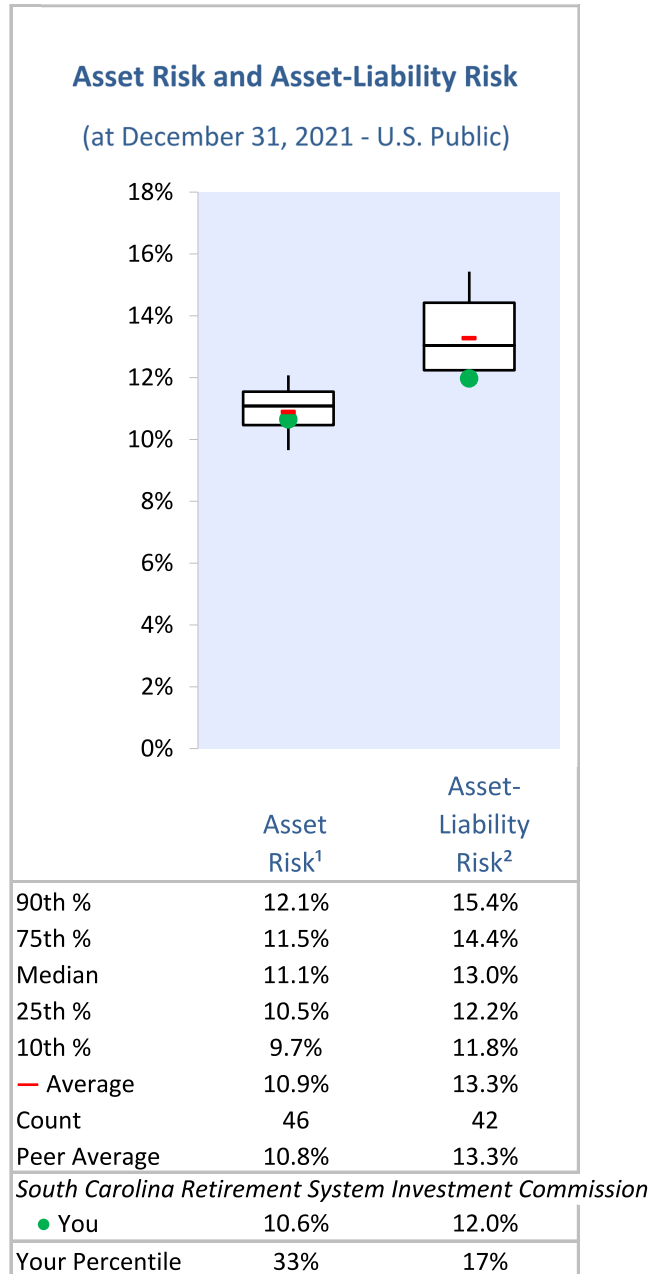
	Commodity				Long/ Short				Other			
	Internal		External		Internal		External		Internal		External	
	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public	Peer	U.S. Public
90th %ile		0.2	20.3	18.4				13.7	1.0	1.0	7.9	354.8
75th %ile		0.2	14.7	10.1				13.7	1.0	1.0	6.6	132.4
Median		0.2	5.4	4.8				13.7	1.0	1.0	4.4	5.9
25th %ile		0.2	3.0	3.3				13.7	1.0	1.0	2.2	2.3
10th %ile		0.2	1.6	1.7				13.7	1.0	1.0	0.9	0.9
— Average		0.2	10.0	8.6				13.7	1.0	1.0	4.4	128.7
Count	0	1	3	4	0	0	0	1	1	1	2	4
Avg. notional		3,178M	1,403M	1,221M				56M	3,256M	3,256M	997M	1,321M
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												

# 6

## Risk

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



1. Asset risk is the expected volatility of your policy return. It is based on the historical variance of, and covariance between, the asset classes in your asset mix policy. It is expressed as an annual standard deviation.
2. Asset-liability risk is the expected volatility of surplus returns. Surplus returns are the changes in a plan's marked-to-market funded status caused by market factors. Asset liability risk is a function of the volatility of policy returns (asset risk), the volatility of surplus returns (surplus risk) and the correlation between policy returns and surplus returns.



## Calculation of asset risk

Before considering the benefit of diversification, the weighted average risk of the asset classes in your asset mix policy was 12.9%.

### Calculation of your weighted asset class risk

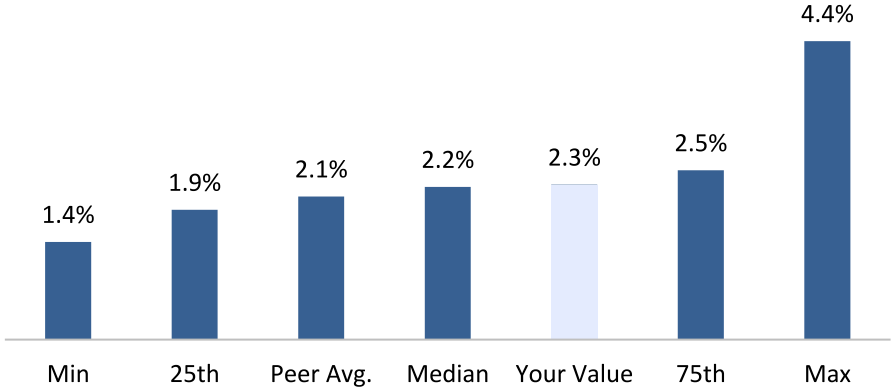
Asset Class	Policy weight	Risk <sup>1</sup>	Weighted risk
	(A)	(B)	(A X B)
Stock: U.S. small cap	3.0%	20%	0.6%
Stock: EAFE	2.0%	17%	0.3%
Stock: Emerging	5.2%	22%	1.2%
Stock: Global	35.8%	15%	5.4%
Bonds: U.S.	24.0%	5%	1.3%
Bonds: Emerging	1.0%	11%	0.1%
Bonds: High yield	1.0%	8%	0.1%
REITs	1.0%	20%	0.2%
Real estate ex-REITs	8.0%	10%	0.8%
Infrastructure	3.0%	14%	0.4%
Private equity - Diversified	9.0%	24%	2.2%
Private credit	7.0%	6%	0.4%
<b>Weighted Total</b>			<b>12.9%</b>

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

## Reduction in asset risk due to diversification

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

### Diversification benefit: U.S. Public universe



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

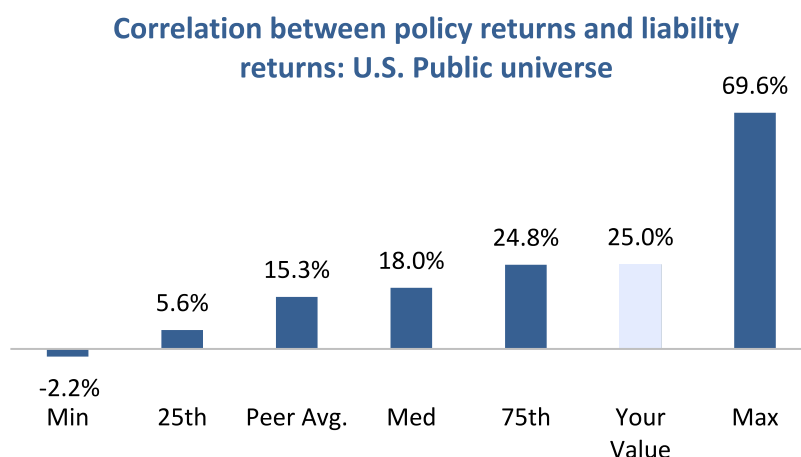
### Components of asset risk

	You	Peer median*	Peer average	U.S. Public median*	U.S. Public average
Weighted asset risk	12.9%	13.1%	12.9%	13.1%	13.1%
Benefit of diversification	2.3%	2.1%	2.1%	2.2%	2.2%
Asset risk	10.6%	10.9%	10.8%	11.1%	10.9%

\* 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 ( $R_A$ )	10.6%	10.9%	10.8%	11.1%	10.9%
Liability risk ( $R_L$ )	8.7%	8.9%	9.3%	9.6%	9.4%
Correlation between policy returns and liability returns ( $\rho_{AL}$ )	25.0%	20.0%	15.3%	18.0%	16.7%
Asset-liability risk	12.0%	12.5%	13.3%	13.0%	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	14.0	94%	12.0	67%	11.9	66%
Nominal Bonds	10.0	6%	13.4	33%	13.3	34%
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	2	4%
Career Average	2	4%
Final/Highest/Best Avg	42	81%
Other	6	12%
Total	52	100%

### b) Contractual inflation protection for retired members

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

Retiree inflation protection	# of plans		
	Corporate	Public	Other
0%	0	21	0
>0% and <50%	0	0	0
50%	0	0	0
>50% and <100%	0	5	0
100%	0	18	0
Total	0	44	0

### c) Member demographics

Member demographics impacts both inflation sensitivity and the duration of plan liabilities. The survey asks for your plan's percentage of liabilities that relate to retired members from your actuarial reports. If you did not provide this number, then it is estimated (see page 12 of this section). Your percentage of liabilities that relate to retired members was 60%.

	Your fund	Peer Average	U.S. Public Average
Active Members	58%	51%	54%
Retired Members	42%	49%	46%
Total	100%	100%	100%

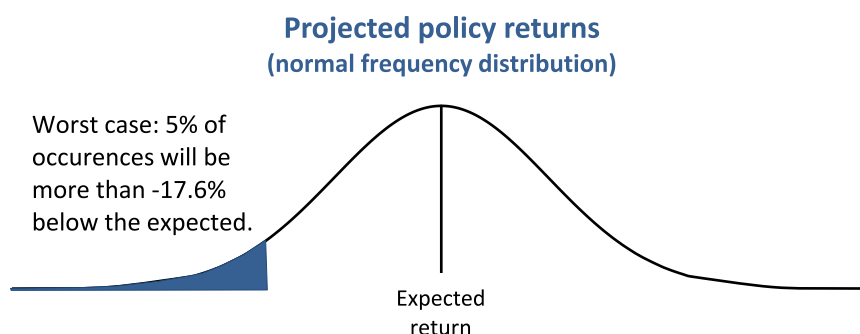
## Projected worst case scenarios

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

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

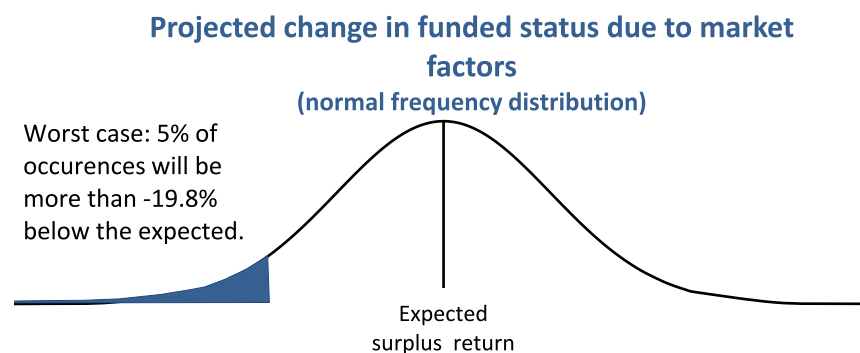
### a) Worst case policy returns

Every year there is a 5% probability that your policy return will be worse than your expected policy return by more than -17.6% (-17.6% equals -1.65 X your asset risk of 10.6%). -17.6% is the starting point of worst case outcomes. They could be much worse.



### b) Worst case impact on funded status

Every year, there is a 5% probability that changes in your mark-to-market funded status caused by market factors ("Surplus Returns") will be worse than expected by more than -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

	2021	2020	2019	2018	2017
90th %	18.9%	13.7%	19.2%	-0.1%	16.7%
75th %	17.4%	11.8%	17.8%	-1.1%	16.0%
Median	15.8%	10.5%	15.9%	-2.6%	15.1%
25th %	13.4%	9.4%	13.6%	-3.9%	14.1%
10th %	12.1%	8.0%	11.2%	-5.7%	13.1%
Average	15.3%	10.6%	15.5%	-2.5%	15.1%
Count	46	51	48	58	60
Peer Avg	16.2%	11.0%	15.5%	-1.8%	14.7%
Your Value	14.9%	7.3%	16.0%	-2.4%	14.1%

### 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.

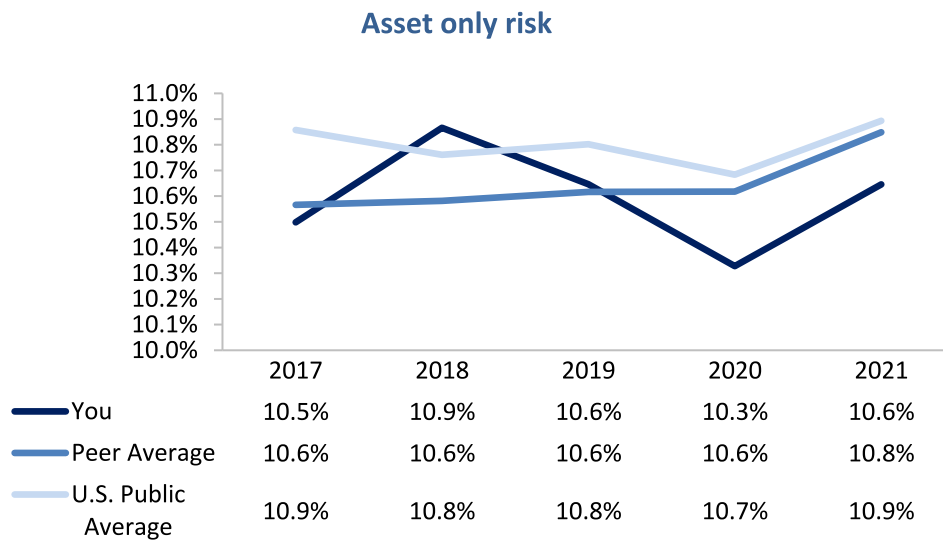
#### Historic changes in funded status caused by market factors - U.S. Public universe

	2021	2020	2019	2018	2017
90th %	21.2%	0.8%	7.9%	2.3%	8.7%
75th %	18.3%	-1.3%	7.1%	0.8%	7.7%
Median	15.4%	-3.5%	5.3%	-0.3%	6.7%
25th %	12.5%	-4.8%	3.6%	-1.9%	5.5%
10th %	9.7%	-7.1%	1.8%	-3.5%	3.1%
Average	15.4%	-3.2%	5.1%	-0.4%	6.5%
Count	42	47	44	53	53
Peer Avg	16.8%	-2.7%	5.5%	-0.2%	6.5%
Your Value	14.3%	-7.1%	5.3%	-0.9%	7.4%

## Risk Trends - 2017 to 2021

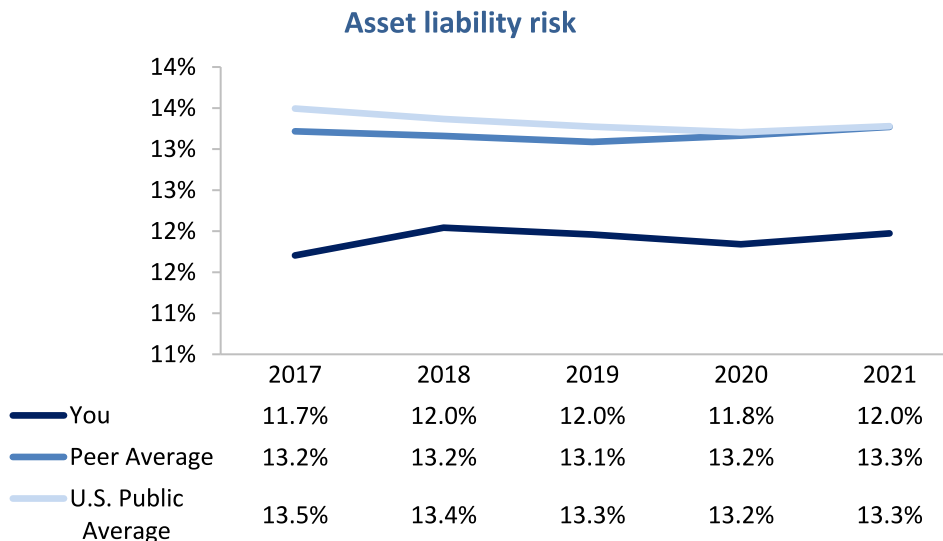
### a) Asset risk trends

Asset risk will only change if policy asset mix changes. Between 2017 and 2021 the asset risk for your fund increased from 10.5% to 10.6%.



### b) Asset-liability risk trends

Asset-liability risk will change if policy asset mix changes, or if the nature of your liabilities changes. Between 2017 and 2021 the asset-liability risk for your fund increased from 11.7% 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.

**Equivalency Table**

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%

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.

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 60%. The percentage of liability that relates to retirees is higher than the retirees as a percentage of active and retired members because retirees have accrued a higher benefit.

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

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

Percentage change in pension liability cost

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

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

Modified duration relative to changes in real yields

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

Modified duration relative to changes in nominal yields

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

## Step 4 - Determining the liability proxy portfolio

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

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

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

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

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

## Step 5 - Liability returns

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

### Liability Return

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

	Long Nominal Bonds		Inflation Indexed Bonds		CPI
	Year end yield	Change in yield	Year end yield	Change in yield	
2021	1.50	0.59	-0.49	-0.05	4.70
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

## 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. small cap	1.00	0.62	0.66	0.77	0.10	0.49	0.61	0.63	0.58	0.48	0.86	0.50	-0.13	-0.13	0.05	0.04
Stock: EAFE	0.62	1.00	0.71	0.95	0.14	0.55	0.53	0.56	0.53	0.57	0.87	0.51	-0.04	-0.03	0.16	0.15
Stock: Emerging	0.66	0.71	1.00	0.77	0.04	0.69	0.58	0.49	0.45	0.48	0.76	0.46	-0.13	-0.13	0.22	0.20
Stock: Global	0.77	0.95	0.77	1.00	0.10	0.59	0.62	0.60	0.57	0.65	0.90	0.53	-0.09	-0.09	0.17	0.16
Bonds: U.S.	0.10	0.14	0.04	0.10	1.00	0.36	0.26	0.18	0.37	0.06	0.07	0.01	0.93	0.93	0.81	0.81
Bonds: Emerging	0.49	0.55	0.69	0.59	0.36	1.00	0.60	0.46	0.49	0.43	0.59	0.42	0.19	0.19	0.54	0.53
Bonds: High yield	0.61	0.53	0.58	0.62	0.26	0.60	1.00	0.57	0.57	0.44	0.73	0.74	0.02	0.02	0.26	0.24
Real Assets: REITs	0.63	0.56	0.49	0.60	0.18	0.46	0.57	1.00	0.96	0.46	0.76	0.50	0.00	0.00	0.28	0.27
Real Assets: Real estate ex-REITs	0.58	0.53	0.45	0.57	0.37	0.49	0.57	0.96	1.00	0.48	0.71	0.49	0.19	0.19	0.40	0.39
Real Assets: Infrastructure	0.48	0.57	0.48	0.65	0.06	0.43	0.44	0.46	0.48	1.00	0.54	0.35	-0.07	-0.08	0.24	0.24
Private equity - Diversified	0.86	0.87	0.76	0.90	0.07	0.59	0.73	0.76	0.71	0.54	1.00	0.68	-0.20	-0.20	0.15	0.14
Private credit	0.50	0.51	0.46	0.53	0.01	0.42	0.74	0.50	0.49	0.35	0.68	1.00	-0.26	-0.26	0.10	0.09
Nominal Bond: Duration 10	-0.13	-0.04	-0.13	-0.09	0.93	0.19	0.02	0.00	0.19	-0.07	-0.20	-0.26	1.00	1.00	0.75	0.75
Nominal Bond: Duration 9	-0.13	-0.03	-0.13	-0.09	0.93	0.19	0.02	0.00	0.19	-0.08	-0.20	-0.26	1.00	1.00	0.75	0.75
Real Return Bond: Duration 13	0.05	0.16	0.22	0.17	0.81	0.54	0.26	0.28	0.40	0.24	0.15	0.10	0.75	0.75	1.00	1.00
Real Return Bond: Duration 14	0.04	0.15	0.20	0.16	0.81	0.53	0.24	0.27	0.39	0.24	0.14	0.09	0.75	0.75	1.00	1.00

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

Stock: U.S. broad/all	1.00	0.99	0.89	0.69	0.68	0.90	0.77	0.18	0.54	0.61	0.17	0.01	0.58	0.80	0.89	0.50	-0.03	-0.03	0.07	0.07
Stock: U.S. large cap	0.99	1.00	0.82	0.75	0.66	0.90	0.76	0.12	0.53	0.60	0.10	0.00	0.56	0.79	0.88	0.48	-0.06	-0.06	0.07	0.07
Stock: U.S. small cap	0.89	0.82	1.00	0.62	0.66	0.77	0.69	0.10	0.49	0.61	0.08	0.00	0.58	0.71	0.86	0.50	-0.13	-0.13	0.02	0.01
Stock: EAFE	0.69	0.75	0.62	1.00	0.71	0.95	0.99	0.14	0.55	0.53	0.15	0.02	0.53	0.87	0.87	0.51	-0.04	-0.04	0.13	0.13
Stock: Emerging	0.68	0.66	0.66	0.71	1.00	0.77	0.77	0.04	0.69	0.58	0.04	0.00	0.45	0.79	0.76	0.46	-0.13	-0.13	0.18	0.17
Stock: Global	0.90	0.90	0.77	0.95	0.77	1.00	0.96	0.10	0.59	0.62	0.09	-0.04	0.57	0.87	0.90	0.53	-0.09	-0.09	0.12	0.12
Stock: ACWI x U.S.	0.77	0.76	0.69	0.99	0.77	0.96	1.00	0.09	0.59	0.58	0.08	-0.04	0.53	0.89	0.87	0.53	-0.09	-0.10	0.16	0.15
Bonds: U.S.	0.18	0.12	0.10	0.14	0.04	0.10	0.09	1.00	0.36	0.26	0.93	0.29	0.37	0.18	0.07	0.01	0.93	0.92	0.80	0.81
Bonds: Emerging	0.54	0.53	0.49	0.55	0.69	0.59	0.59	0.36	1.00	0.60	0.34	0.02	0.49	0.63	0.59	0.42	0.19	0.19	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	0.57	0.68	0.73	0.74	0.02	0.02	0.24	0.23
Bonds: Long bonds	0.17	0.10	0.08	0.15	0.04	0.09	0.08	0.93	0.34	0.24	1.00	0.15	0.39	0.18	0.05	0.00	0.91	0.91	0.77	0.78
Bonds: Cash	0.01	0.00	0.00	0.02	0.00	-0.04	-0.04	0.29	0.02	0.00	0.15	1.00	-0.01	-0.06	-0.11	-0.11	0.18	0.17	0.08	0.07
Real Assets: Real estate ex-REITs	0.58	0.56	0.58	0.53	0.45	0.57	0.53	0.37	0.49	0.57	0.39	-0.01	1.00	0.58	0.71	0.49	0.19	0.19	0.42	0.42
Hedge funds	0.80	0.79	0.71	0.87	0.79	0.87	0.89	0.18	0.63	0.68	0.18	-0.06	0.58	1.00	0.81	0.59	-0.04	-0.05	0.35	0.34
Private equity - Diversified	0.89	0.88	0.86	0.87	0.76	0.90	0.87	0.07	0.59	0.73	0.05	-0.11	0.71	0.81	1.00	0.68	-0.20	-0.21	0.21	0.19
Private credit	0.50	0.48	0.50	0.51	0.46	0.53	0.53	0.01	0.42	0.74	0.00	-0.11	0.49	0.59	0.68	1.00	-0.26	-0.26	0.14	0.12
Nominal Bond: Duration 10	-0.03	-0.06	-0.13	-0.04	-0.13	-0.09	-0.09	0.93	0.19	0.02	0.91	0.18	0.19	-0.04	-0.20	-0.26	1.00	1.00	0.75	0.76
Nominal Bond: Duration 11	-0.03	-0.06	-0.13	-0.04	-0.13	-0.09	-0.10	0.92	0.19	0.02	0.91	0.17	0.19	-0.05	-0.21	-0.26	1.00	1.00	0.74	0.75
Real Return Bond: Duration 10	0.07	0.07	0.02	0.13	0.18	0.12	0.16	0.80	0.51	0.24	0.77	0.08	0.42	0.35	0.21	0.14	0.75	0.74	1.00	1.00
Real Return Bond: Duration 11	0.07	0.07	0.01	0.13	0.17	0.12	0.15	0.81	0.50	0.23	0.78	0.07	0.42	0.34	0.19	0.12	0.76	0.75	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	2021	2020	2019	2018	2017
Survey Preparer	Kevin Reinhard	Kevin Reinhard	Kevin Reinhard	Kevin Reinhard	Kevin Reinhard
Additional Contact	Jon Rychener	Jon Rychener	Jon Rychener	Jon Rychener	Jon Rychener
Type of fund (corporate, public, other)	Public	Public	Public	Public	Public
Total fund size (\$mils) as at December 31	41,654.2	35,611.8	33,502.8	29,259.8	31,801.4
Asset-class level holdings provided on survey are: year end or average?	Average	Average	Average	Average	Average
Total return for year ended	18.68%	8.19%	16.81%	-4.20%	14.70%
Is the return net or gross?	Net of manager fees	Net of manager fees	Net of manager fees	Net of manager fees	Net of manager fees
Total fund policy or benchmark return	15.07%	8.35%	17.05%	-2.94%	14.55%

Ancillary Data	2021	2020	2019	2018	2017
What is your hedging policy for: Foreign Holdings					
What were your actuarial fees in 000s?	260	271	405	382	485
How many plan members/beneficiaries do you have:					
Active?	238,096	241,285	240,009	235,390	233,423
Active (no-accrual)?					6,630
Retired?	173,770	171,280	168,851	166,126	156,901
Other?	229,607	219,515	210,922	202,146	193,988
What type of plan(s) do you have?	Final Average	Final Average	Final Average	Final Average	Final Average
To what extent are your retired members' benefits indexed to inflation?					
Contractual %	100%	100%	100%	100%	100%
If the indexation is subject to a cap, describe the cap	For SCRS and PORS,	For SCRS and PORS,	For SCRS and PORS,	For SCRS and PORS,	For SCRS and PORS,
What % of the plan's liabilities pertain to retired members?	60%	59%	61%	62%	64%
Actuarial valuation assumptions for funding purposes:					
Liability discount rate	7.0%	7.3%	7.3%	7.3%	7.3%
Salary progression rate	3.0%	3.0%	3.0%	3.0%	3.0%
What was your actuarial assumption for expected rate of return?	7.0%	7.3%	7.3%	7.3%	7.3%



## 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	2021		MSCI US IMI Net	
	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
Stock - U.S. small cap	2021	3.0	MSCI US Small Cap Net Index	19.1
	2020	2.9	MSCI US Small Cap Net Index	35.8
Stock - EAFE	2021	2.0	MSCI World Ex US Net Index	11.1
	2020		MSCI World Ex US Net Index	10.7
Stock - Emerging	2021	5.2	MSCI Emerging Market IMI Net	18.8
	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
Stock - Global	2021	35.8	MSCI World Net Dividend	18.5
	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
Stock - ACWI x U.S.	2021		MSCI ACWI x/US Net	11.1
	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
Fixed income - U.S.	2021	24.0	Barclays US Aggregate	-1.5
	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
Fixed income - Emerging	2021	1.0	JP Morgan EMBI GD	-1.8
	2020		50% JPM EMBI Global Diversified/50% JPM-GBI-EM Global	14.3
	2019	4.0	50% JPM EMBI Global Diversified/50% JPM-GBI-EM Global	5.3
	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
Fixed income - High yield	2021	1.0	50%Bar U.S. High Yield 2% / 50%S&P LSTA Leveraged Loan	5.2
	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
Cash	2021		ICE LIBOR USD 3 Month Index	0.2
	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
REITs	2021	1.0	Your REIT benchmark	43.2
	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
Real estate ex-REITs	2021	8.0	NCREIF ODCE Index	21.1
	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
Infrastructure	2021	3.0	Dow Jones Brookfield Global Infrastructure Net Index	19.9
	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
Hedge funds	2021		50% MSCI World Net/50% Barclays US Aggregate	8.5
	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
Global TAA	2021		50% MSCI World Net/50% Barclays US Aggregate	8.5
	2020		50% MSCI World Net/50% Barclays US Aggregate	11.9
	2019	7.0	50% MSCI World Net/50% Barclays US Aggregate	18.2

## 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
	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
Private equity - Diversified	2021	9.0	Burgiss ALL PE Universe	50.5
	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
Private credit	2021	7.0	S&P/LSTA + 150 Bps 3 Month Lag	9.9
	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

## 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	2021											
	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
External active	2021	835.3		179.0	-		179.0	2.1	-			2.1
	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
Stock - U.S. small cap												
External passive	2021	1,192.8	19.39	255.7	490.5		746.2	2.1	4.1			6.3
	2020	618.0		162.6	327.0		489.6	2.6	5.3			7.9
Stock - EAFE												
External passive	2021	1,228.6	11.45	263.3	217.8		481.1	2.1	1.8			3.9
	2020	629.6		165.7	191.5		357.2	2.6	3.0			5.7
Stock - Emerging												
External passive	2021											
	2020	551.4		145.1	148.2		293.3	2.6	2.7			5.3
External active	2021	650.7	17.99	139.5	131.7		271.2	2.1	2.0			4.2
	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
Stock - Global												
External passive	2021	14,365.6	18.89	3,078.9	2,082.0		5,160.9	2.1	1.4			3.6
	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
External active	2021	6.7	-7.36	1.4	-		1.4	2.1	-			2.1
	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
Stock - ACWI x U.S.												
External active	2021	2.3	-9.49	0.5	-		0.5	2.1	-			2.1
	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
Fixed income - U.S.												
Internal active	2021	15.6	3.47	5.2			5.2	3.3				3.3
	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
External active	2021	867.7	4.06	286.9	960.3		1,247.2	3.3	11.1			14.4
	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
Fixed income - Emerging												
External passive	2021											
External passive (cont'd)	2020											

## 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 active	2019										
	2018										
	2017	20.7	19.62	5.7	-		5.7	2.7	-		2.7
	2021	327.9	-3.82	70.3	172.0	-	242.3	2.1	5.2	-	7.4
	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	
Fixed income - High yield											
External active	2021	1,547.1	5.28	331.6	4,831.4	-	5,163.0	2.1	31.2	-	33.4
	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
Cash											
Internal active	2021										
	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
External active	2017	1,366.3	1.06	396.2			396.2	2.9			2.9
	2021	1,075.0	-0.11	230.4	57.6	-	288.0	2.1	0.5	-	2.7
	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
REITs											
External active	2021	409.8	44.09	87.8	933.4	-	1,021.2	2.1	22.8	-	24.9
	2020	461.3	-1.28	121.4	1,529.9	-	1,651.3	2.6	33.2	-	35.8
	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
Global TAA											
External active	2021	628.4	1.18	134.7	6,326.6	6,725.1	13,186.4	2.1	100.7	107.0	209.8
	2020	1,276.9	-7.46	336.0	2,638.1	-	2,974.1	2.6	20.7	-	23.3
	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

## 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	2021	1,644.7		15.41	352.5	36,125.1	70,862.8			36,477.6	107,340.4
		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
	Fund of funds	2021	2,469.7		10.99	529.3	9,122.0	-	24,699.0	41,162.9	34,350.3	75,513.2
		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
Real estate ex-REITs	Co-investment	2021	62.3	88.4	16.48	13.4	323.1	527.8			336.5	864.3
		2020	20.6	20.6	-0.03	5.4	148.0	364.5			153.5	518.0
		2019	0.6	0.6	28.63	0.4	-	-			0.4	0.4
		2018	1.5	1.5	-59.67	0.5	-	-			0.5	0.5
		2017	7.5	7.5	-8.22	2.1	4.3				6.4	6.4
	LP	2021	2,942.1	3,078.7	24.42	630.6	27,597.6	111,619.5			28,228.2	139,847.7
		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
Infrastructure	External active	2021	1,024.0	1,271.3	12.75	219.5	6,631.0	5,891.0			6,850.5	12,741.5
		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
	Co-investment	2021	83.2	85.8	9.41	17.8	180.0	488.0			197.8	685.8
		2020	35.2	35.2	3.19	9.3	78.1	2.3			87.4	89.7
Private equity - Diversified	Co-investment	2021	1,292.8	1,726.7	39.01	277.1	2,118.0	15,383.2			2,395.1	17,778.3
		2020	727.0	727.0	8.22	229.3	960.3	892.5			1,189.5	2,082.0
		2019	550.2	550.2	12.89	156.6	2,945.9	3,620.1			3,102.5	6,722.6
		2018	396.7	396.7	-29.24	119.8	3,263.9				3,383.7	3,383.7
		2017	488.2	488.2	8.28	133.8	3,499.9				3,633.7	3,633.7
	LP	2021	2,133.3	3,420.9	47.37	457.2	54,587.1	101,809.3			55,044.3	156,853.6
		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
	Fund of funds	2021	482.1	527.8	82.95	103.3	3,430.2	23,019.2	8,127.5	12,052.0	11,661.0	46,732.2
		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	
Private credit	Co-investment	2021	548.6	634.9	20.97	117.6	1,331.0	(1,335.7)			1,448.6	112.9
		2020	296.7	296.7	1.78	40.1	2,426.6	485.6			2,466.7	2,952.3
		2019	46.2	46.2	-1.66	13.1	-	-			13.1	13.1
		2018	0.3	0.3	18.65	0.1	0.0				0.1	0.1
		2017	3.5	3.5	1.98	1.0	8.4				9.4	9.4
	LP	2021	2,634.5	3,588.2	19.31	564.7	19,788.4	28,099.9			20,353.1	48,452.9
		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

## 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	
	2017	1,779.0	2,292.7	6.94	487.5	24,096.4	15,638.8			24,583.9	40,222.7

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	Underlying fees Perf	Total excl. perf incl. perf	Internal & Other	Base Fees	Perf Fees	Underlying fees Base	Underlying fees Perf	Total excl. perf incl. perf					
Hedge funds	External active	2021	2.1	219.6	430.9			221.8	652.6	2.1	219.6	430.9			221.8	652.6		
		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		
	Fund of funds	2021	2.1	36.9	-	100.0	166.7	139.1	305.8	2.1	36.9	-	100.0	166.7	139.1	305.8		
		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		
Real estate ex-REITs	Co-investment	2021	2.1	51.8	84.7			54.0	138.7	1.5	36.5	59.7			38.1	97.7		
		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		
	LP	2021	2.1	93.8	379.4			95.9	475.3	2.0	89.6	362.6			91.7	454.3		
		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		
Infrastructure	External active	2021	2.1	64.8	57.5			66.9	124.4	1.7	52.2	46.3			53.9	100.2		
		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		
	Co-investment	2021	2.1	21.6	58.7			23.8	82.5	2.1	21.0	56.9			23.1	79.9		
		2020	2.6	22.2	0.7			24.8	25.5	2.6	22.2	0.7			24.8	25.5		
		Private equity - Diversified	Co-investment	2021	2.1	16.4	119.0			18.5	137.5	1.6	12.3	89.1			13.9	103.0
				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		
LP	2021		2.1	255.9	477.2			258.0	735.3	1.3	159.6	297.6			160.9	458.5		
	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		
Fund of funds	2021	2.1	71.2	477.5	168.6	250.0	241.9	969.4	2.0	65.0	436.2	154.0	228.4	221.0	885.5			
	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			
Private credit	Co-investment	2021	2.1	24.3	(24.3)			26.4	2.1	1.9	21.0	(21.0)			22.8	1.8		
		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		
	LP	2021	2.1	75.1	106.7			77.3	183.9	1.6	55.1	78.3			56.7	135.0		
		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		

## 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)	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: 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>	2021	1,237.9	0.3bp
	2020	1,198.5	0.4bp
	2019	1,236.7	0.4bp
	2018	1,251.1	0.4bp
	2017	1,089.1	0.4bp
Custodial total	2021	1,394.3	0.4bp
	2020	1,394.3	0.4bp
	2019	1,670.0	0.5bp
	2018	1,152.4	0.4bp
	2017	1,130.5	0.4bp
Custodial foreign (if available)	2018	692.4	0.2bp
	2017	670.5	0.2bp
Custodial domestic (if available)	2018	460.0	0.1bp
	2017	460.0	0.2bp
Consulting / performance measurement	2021	835.0	0.2bp
	2020	785.7	0.2bp
	2019	825.1	0.3bp
	2018	763.7	0.2bp
	2017	1,070.0	0.4bp
Audit	2021	237.7	0.1bp
	2020	409.3	0.1bp
	2019	119.7	0.0bp
	2018	102.4	0.0bp
	2017	16.8	0.0bp
Other (legal etc)	2021	382.2	0.1bp
	2020	373.3	0.1bp
	2019	357.3	0.1bp
	2018	363.2	0.1bp
	2017	320.9	0.1bp
Total	2021	4,087.1	1.0bp
	2020	4,161.1	1.3bp
	2019	4,208.9	1.3bp
	2018	3,632.7	1.2bp
	2017	3,627.3	1.2bp

Summary of All Asset Management Costs			
		000s	bps
Investment Management Costs	2021	338,130.0	86.7bp
	2020	206,413.4	65.6bp
	2019	231,056.6	73.1bp
	2018	205,925.8	65.9bp
	2017	218,814.6	71.7bp
Oversight, Custodial & Other Costs	2021	4,087.1	1.0bp
	2020	4,161.1	1.3bp
	2019	4,208.9	1.3bp
	2018	3,632.7	1.2bp
	2017	3,627.3	1.2bp
Total	2021	342,217.1	87.8bp
	2020	210,574.4	66.9bp
	2019	235,265.5	74.4bp
	2018	209,558.6	67.0bp
	2017	222,441.9	72.9bp

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/	2021						6,010.4	514.5		657.5			110.3	767.8	1.3
Passive Beta	2020						5,014.0	897.8		1.2			236.2	237.4	0.5

## 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:

- 2021 - Real estate ex-REITs - LP: LP base fee is the weighted average management fee of 90 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 104 bps (32.1 million).
- 2021 - Private equity - Diversified - LP: LP base fee is the weighted average management fee of 160 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 93 bps (31.9 million).
- 2021 - Private equity - Diversified - FoFs: A default of 154 bps (on amount fees are based on) was applied to the fund of funds underlying base fee to enable comparisons of the total cost of different implementation styles.
- 2021 - Private equity - Diversified - FoFs: A default of 250 bps (on NAV) was applied to the fund of funds 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.
- 2021 - Private credit - LP: LP base fee is the weighted average management fee of 55 bps per the partnership level detail provided by you. This replaces the cost on the main survey of 64 bps (23 million).
- 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 - Private equity - Diversified - 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 - Private equity - Diversified - FoFs: A default of 157 bps (on amount fees are based on) was applied to the fund of funds underlying base fee to enable comparisons of the total cost of different implementation styles.
- 2020 - Private equity - Diversified - FoFs: A default of 192 bps (on NAV) was applied to the fund of funds 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 - Private equity - Diversified - 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 - Private equity - Diversified - FoFs: A default of 157 bps (on amount fees are based on) was applied to the fund of funds underlying base fee to enable comparisons of the total cost of different implementation styles.
- 2019 - Private equity - Diversified - FoFs: A default of 185 bps (on NAV) was applied to the fund of funds 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 - Private equity - Diversified - 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 - Private equity - Diversified - 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).

## 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 31st 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.