



North Carolina Retirement Systems

CEM Investment Benchmarking Defined Benefit Results 2023

November 20, 2024

CEM at a glance

Founded in 1992 by:

- Keith Ambachtsheer

Chief Executive Officer

- Rashay Jethalal

Office Locations

- Canada
- UK
- USA

Our Mission | To improve the lives of pensioners globally by providing unique insights and access to enhance the decisions of institutional investors and administrators.

CEM by the numbers

- 30 Years serving institutional investors
- 20+ Countries served
- 500 Institutional funds benchmarked
- 150 Of the world's top 300 funds use CEM
- \$14T AUM investment database
- 50M Member data points

Core Products

Subscriptions

- ① Investment Benchmarking Subscription
- ② Defined Contribution Benchmarking
- ③ Pension Administration Benchmarking Subscription
- ④ Transparency Benchmarking
- ⑤ Communities

Services

- ⑥ Custom Research

Data-driven • Objective • Expert • Trusted

Key Takeaways

Returns

- Your 5-year net total return was 6.7%. This was below both the U.S. Public median of 8.7% and the peer median of 9.2%.
- Your 5-year policy return was 6.7%. This was below both the U.S. Public median of 7.5% and the peer median of 7.5%.

Value added

- Your 5-year net value added was 0.0%. This was below both the U.S. Public median of 1.2% and the peer median of 1.5%.

Risk

- Your asset risk of 9.7% was below the U.S. Public median of 11.7%.

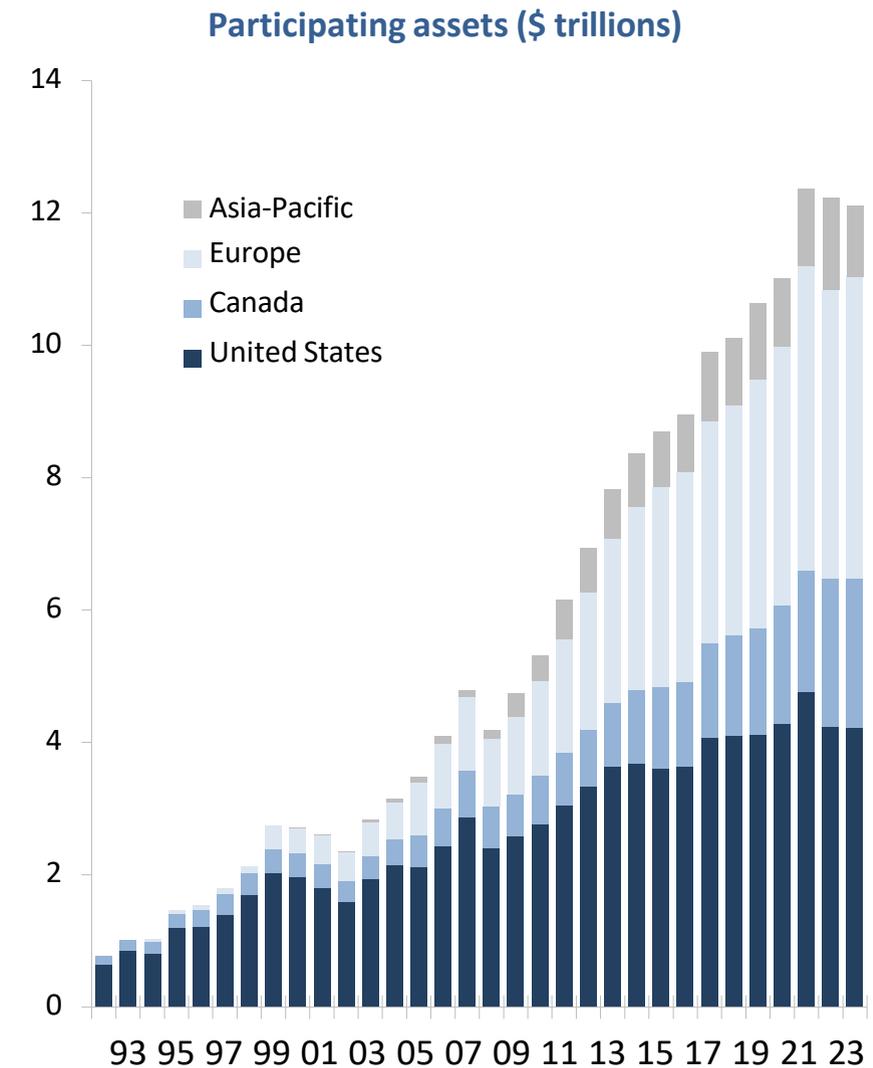
Cost

- Your investment cost of 25.3 bps was below your benchmark cost of 30.9 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was below benchmark cost because it paid less than peers for similar services.
- Your costs decreased by 6.8 bps, from 32.1 bps in 2019 to 25.3 bps in 2023, because you had a lower cost asset mix and paid less in total for similar investment styles.

This benchmarking report compares your cost and performance to the 283 funds in CEM's extensive pension database.

- 145 U.S. pension funds participate. The median U.S. fund had assets of \$9.4 billion and the average U.S. fund had assets of \$29.1 billion. Total participating U.S. assets were \$4.2 trillion.
- 65 Canadian funds participate with assets totaling \$2.3 trillion.
- 63 European funds participate with aggregate assets of \$4.6 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Ireland, Denmark and the UK.
- 6 Asia-Pacific funds participate with aggregate assets of \$1.1 trillion. Included are funds from Australia, New Zealand and South Korea.
- 4 funds from other regions participate.

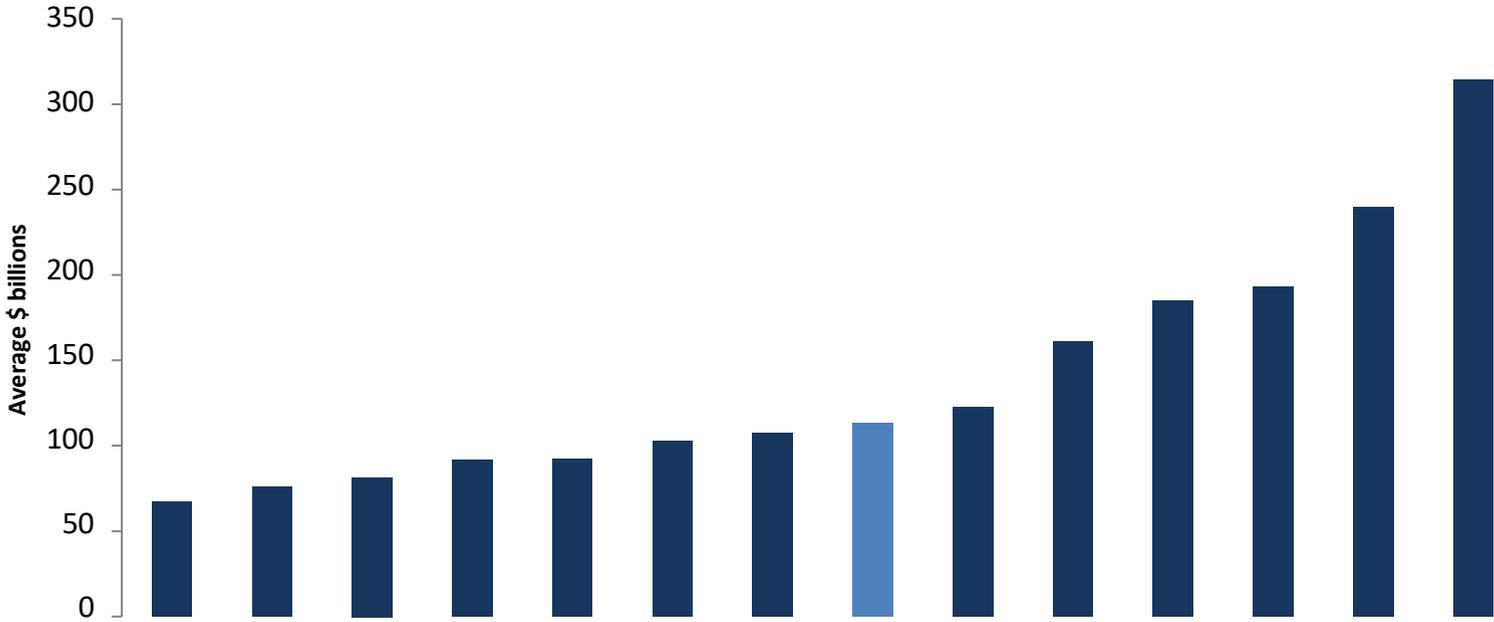
The most meaningful comparisons for your returns and value added are to the U.S. Public universe, which consists of 43 funds. The U.S. Public universe assets totaled \$3.0 trillion and the median fund had assets of \$26.7 billion.



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

Peer group for North Carolina Retirement Systems

- 14 U.S. sponsors from \$67.5 billion to \$314.1 billion
- Median size of \$110.6 billion versus your \$113.4 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, 2022 cost data was used as a proxy for 2023.

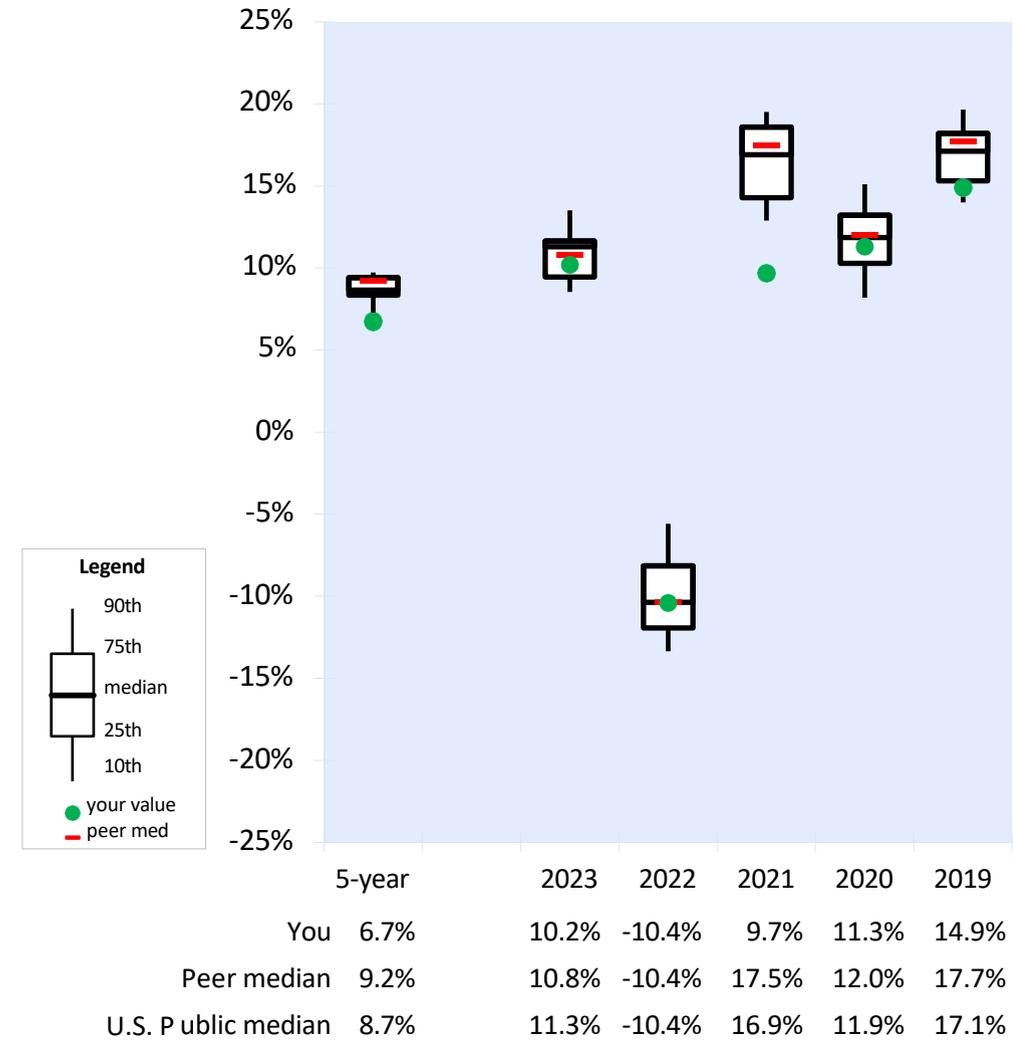
Your 5-year net total return of 6.7% was below both the U.S. Public median of 8.7% and the peer median of 9.2%.

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	6.7%
- Policy return	6.7%
= Net value added	0.0%

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

U.S. Public net total returns - quartile rankings



Your 5-year policy return of 6.7% was below both the U.S. Public median of 7.5% and the peer median of 7.5%.

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

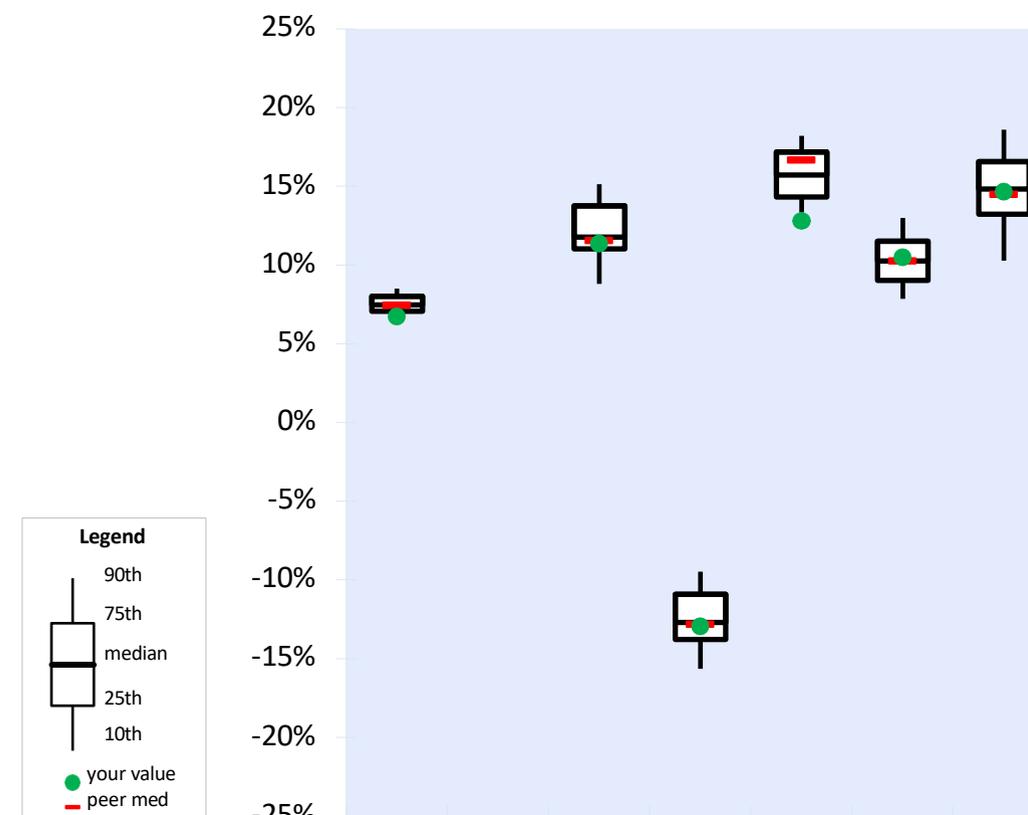
Having a higher or lower relative policy return is not necessarily good or bad. Your policy return reflects your investment policy, which should reflect your:

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

Each of these 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 7.1%, 0.4% higher than your adjusted 5-year policy return of 6.7%. Mirroring this, your 5-year total fund net value added would be 0.4% lower.

U.S. Public policy returns - quartile rankings



	5-year	2023	2022	2021	2020	2019
You	6.7%	11.4%	-12.9%	12.8%	10.5%	14.7%
Peer median	7.5%	11.6%	-12.8%	16.7%	10.3%	14.5%
U.S. Public median	7.5%	11.8%	-12.7%	15.7%	10.3%	14.9%

Your 5-year policy return of 6.7% was below the U.S. Public median of 7.5%.

This was primarily due to the negative impact of your higher weight for Fixed Income, which was one of the poorer performing asset classes over the past 5 years.

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

2. Other stock includes: Stock - Emerging. Other fixed income includes: Fixed income - Long bonds and Fixed income - High yield. Other real assets include: Infrastructure.

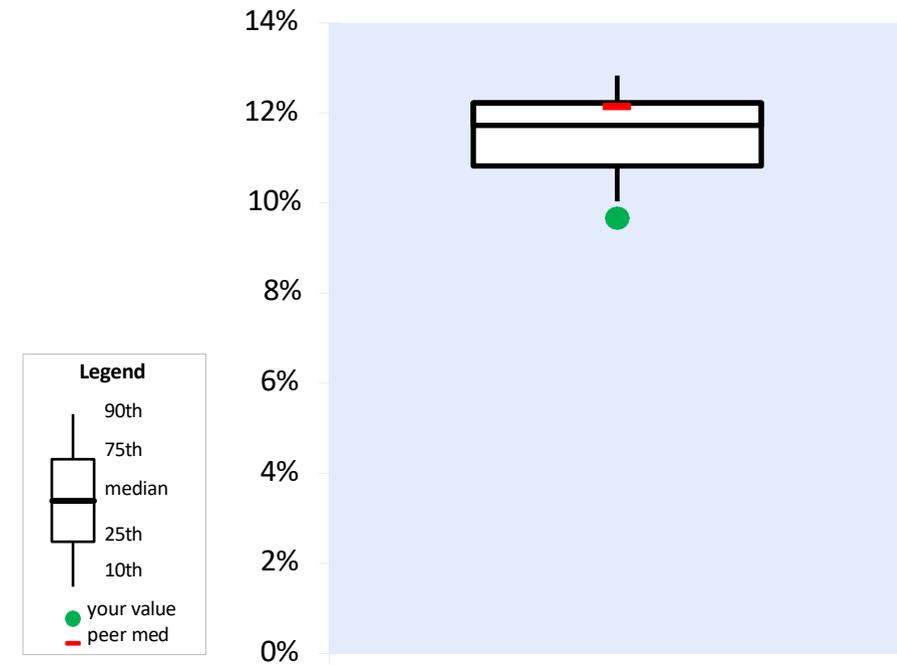
3. A value of 'n/a' is shown if asset class returns are not available for the full 5 years or if they are broad and incomparable.

	5-year average policy mix ¹			5-year benchmark return	
	Your Fund	U.S. Publ Avg.	More/ Less	Your Fund	U.S. Publ Avg.
Stock - U.S.	22%	17%	5%	15.1%	15.0%
Stock - EAFE	0%	4%	-4%	8.2%	8.3%
Stock - ACWI x U.S.	19%	6%	13%	7.2%	7.4%
Stock - Global	0%	14%	-14%	n/a ³	12.0%
Other Stock ²	0%	4%	-4%	n/a ³	n/a ³
Total Stock	40%	45%	-5%	11.3%	11.7%
Fixed Income - U.S.	25%	16%	9%	0.9%	1.2%
Fixed Inc. - Inflation indexed	2%	3%	-2%	3.3%	2.6%
Cash	5%	-1%	7%	1.8%	1.9%
Other Fixed Income ²	0%	6%	-7%	n/a ³	n/a ³
Total Fixed Income	32%	25%	8%	1.7%	1.5%
Global TAA	2%	1%	1%	4.2%	6.4%
Hedge funds	3%	3%	0%	5.9%	4.4%
Commodities	1%	1%	0%	7.2%	5.9%
Natural resources	4%	1%	3%	3.6%	5.7%
REITs	1%	1%	0%	3.0%	5.9%
Real estate ex-REITs	7%	9%	-2%	6.5%	5.1%
Other Real Assets ²	0%	2%	-2%	n/a ³	n/a ³
Private equity	6%	11%	-5%	4.0%	4.0%
Private debt	4%	3%	1%	6.6%	6.1%
Total	100%	100%			

Your asset risk of 9.7% was below the U.S. Public median of 11.7%.

The asset risk is the standard deviation of your policy mix at the end of the year. Your asset risk is calculated using standard asset class-specific policy benchmarks across all participants. The model uses the historical variance of, and covariance between, the asset classes in your policy mix.

U.S. Public risk levels at December 31, 2023



	Asset risk
90th %ile	12.8%
75th %ile	12.2%
Median	11.7%
25th %ile	10.8%
10th %ile	10.0%
Peer median	12.1%
You	9.7%
%ile rank	0%

Net value added is the component of total return from active management. Your 5-year net value added was 0.0%.

Net value added equals total net return minus policy return.

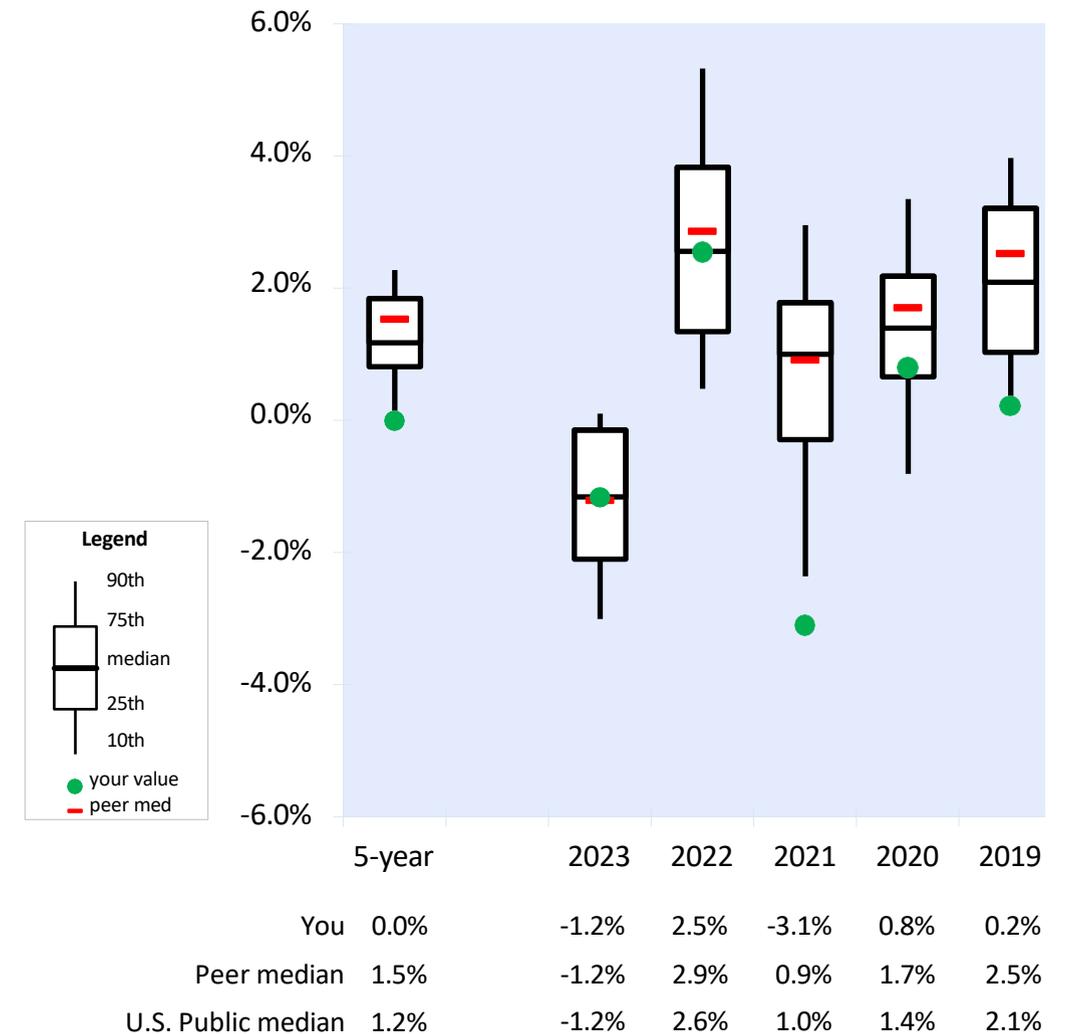
Value added for North Carolina Retirement Systems

Year	Net return	Policy return	Net value added
2023	10.2%	11.4%	-1.2%
2022	-10.4%	-12.9%	2.5%
2021	9.7%	12.8%	-3.1%
2020	11.3%	10.5%	0.8%
2019	14.9%	14.7%	0.2%
5-Year	6.7%	6.7%	0.0%

Your 5-year net value added of 0.0% compares to a median of 1.5% for your peers and 1.2% for the U.S. Public universe.

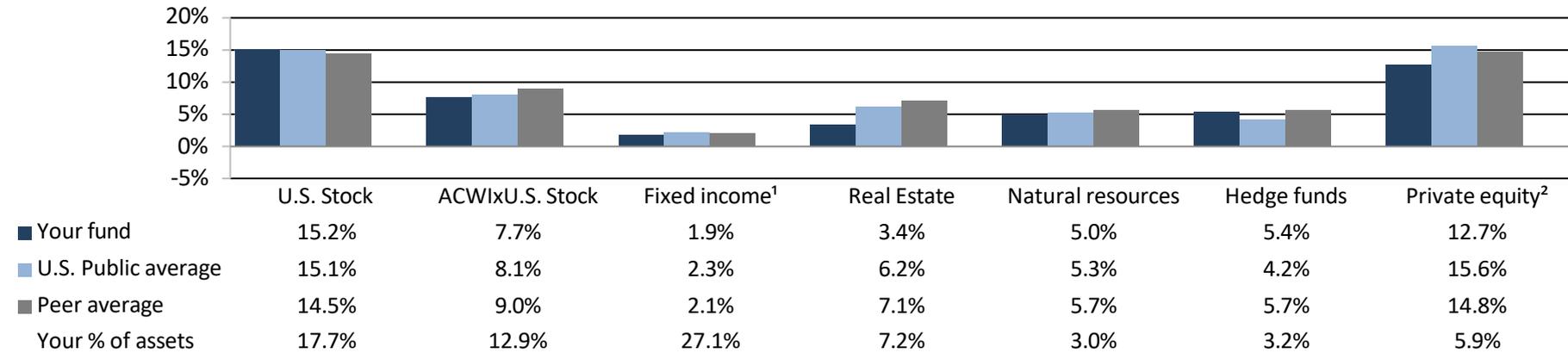
To enable fairer comparisons, the value added for each participant including your fund was adjusted to reflect private equity benchmarks based on lagged, investable public market indices. Prior to this adjustment, your fund's 5-year total fund net value added was -0.4%.

U.S. Public net value added - quartile rankings

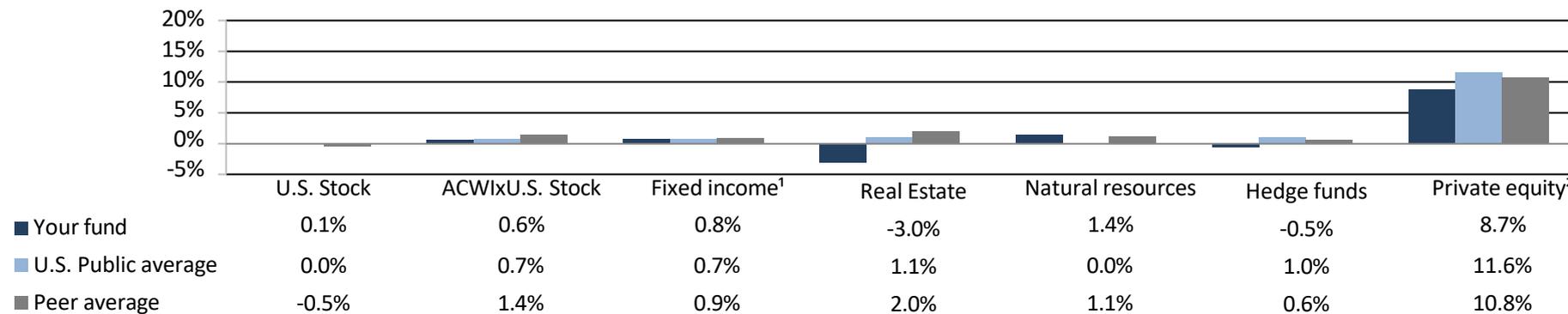


Comparisons of your 5-year net return and net value added by major asset class:

5-year average net return by major asset class



5-year average net value added by major asset class



1. Excludes cash and leverage.

2. 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 1.6%.

Your investment costs, excluding private asset performance fees, were \$287.1 million or 25.3 basis points in 2023.

Asset management costs by asset class and style (\$000s)	Internal Management			External Management			Total
	Passive	Active	Overseeing of external	Passive fees	Active base fees	Perform. fees ¹	
Stock - U.S. broad/all			111		4,763		4,875
Stock - U.S. large cap	176	42					218
Stock - U.S. mid cap			111		7,725		7,836
Stock - U.S. small cap			95		5,596		5,691
Stock - EAFE			234	0	8,552		8,786
Stock - Emerging			59		1,575		1,634
Stock - ACWI x U.S.			803	1,328	26,192		28,323
Stock - Other			1		317		318
Fixed income - U.S.		1,604					1,604
Fixed income - Inflation indexed			105	19	4,649		4,774
Cash		794					794
Commodities			16		203		219
REITs			145		2,999		3,144
Infrastructure - LP/Value add ¹			73		6,154	6,297	6,227
Natural resources - LP/Value add ¹			197		16,970	8,556	17,167
Natural resources - Co-invest. ¹			13		69	27	82
Real estate ex-REITs ¹			756		26,750	7,520	27,506
Real estate ex-REITs - LP/Value add ¹			268		31,290	5,309	31,558
Real estate ex-REITs - Co-invest. ¹			48		1,762	1,677	1,810
Real estate ex-REITs - FoFs ¹			11		1,408		1,418
Global TAA			109		2,000		2,109
Hedge funds - External active			161		30,149	7,266	37,575
Hedge funds - FoFs			24		6,740		6,764
Private equity - Diversified - FoFs ¹			87		5,281	218	5,368
LBO - LP/Value add ¹			297		26,517	37,062	26,814
Venture capital - LP/Value add ¹			162		10,511	6,594	10,672
Venture capital - Co-invest. ¹			9			1,319	9
Private credit - LP/Value add ¹			213		23,713	6,880	23,927
Private credit - Co-invest. ¹			23		2,156		2,179
Private equity - Other - LP/Value add ¹			319		13,576	890	13,895
Private equity - Other - Co-invest. ¹			3				3
Total excluding private asset performance fees							283,297 25.0bp

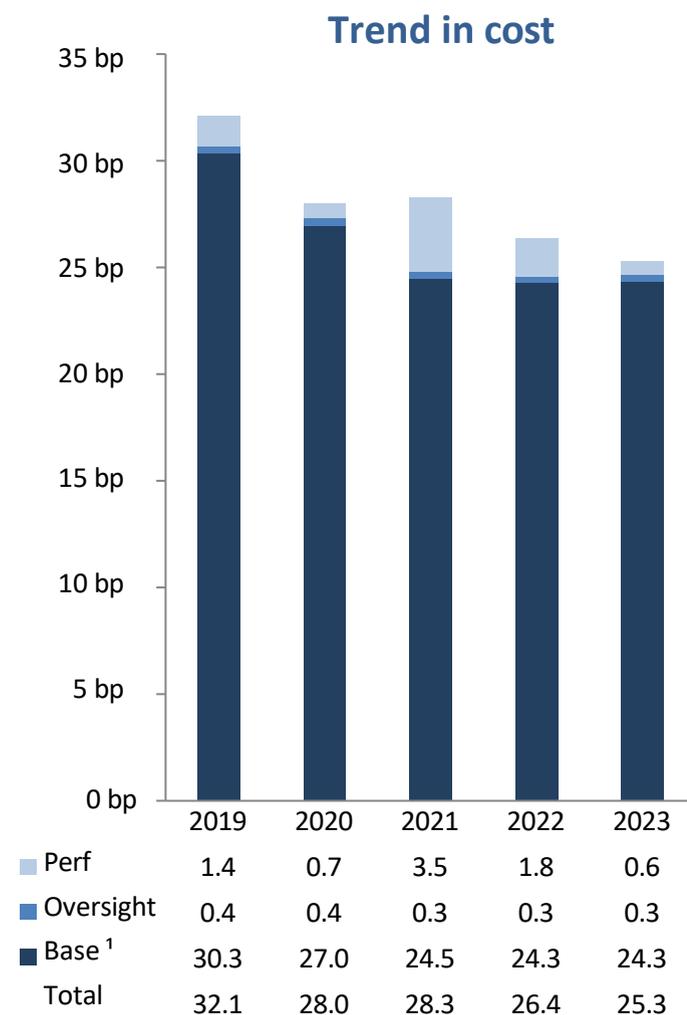
Oversight, custodial and other costs ²	Total
Oversight of the fund	2,149
Trustee & custodial	1,550
Consulting and performance measurement	0
Audit	81
Other	0
Total oversight, custodial & other costs	3,779 0.3bp

Total investment costs (excl. transaction costs & private asset performance fees) 287,076 25.3bp

1. Total cost excludes carry/performance fees for real estate, infrastructure, natural resources and private equity. Performance fees are included for the public market asset classes and hedge funds.

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

Your costs decreased by 6.8 bps, from 32.1 bps in 2019 to 25.3 bps in 2023, because you had a lower cost asset mix and paid less in total for similar investment styles.



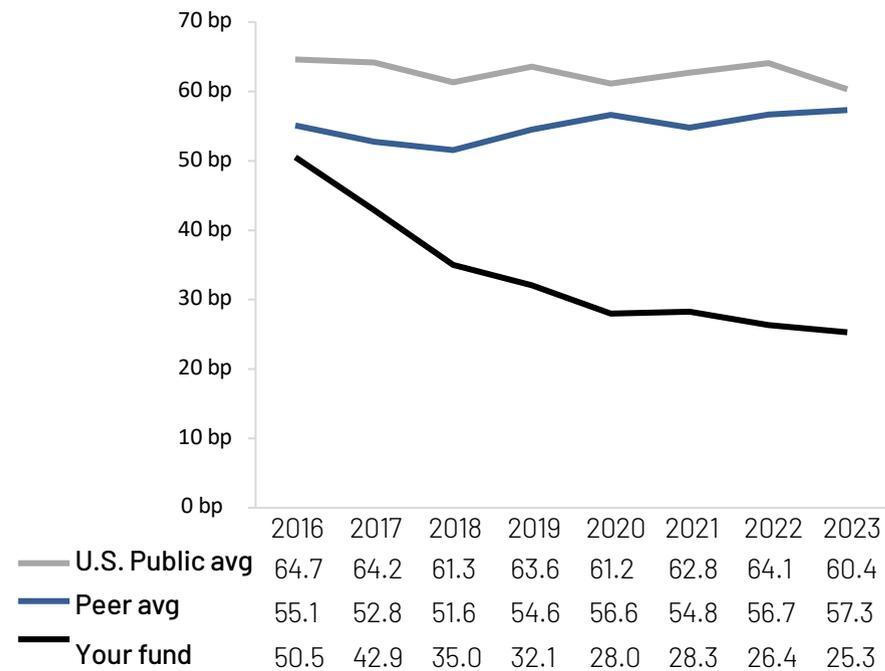
1. Includes fees for managing internal assets and internal costs of monitoring external programs, where allocated.

Reasons why your costs decreased by 6.8 bps

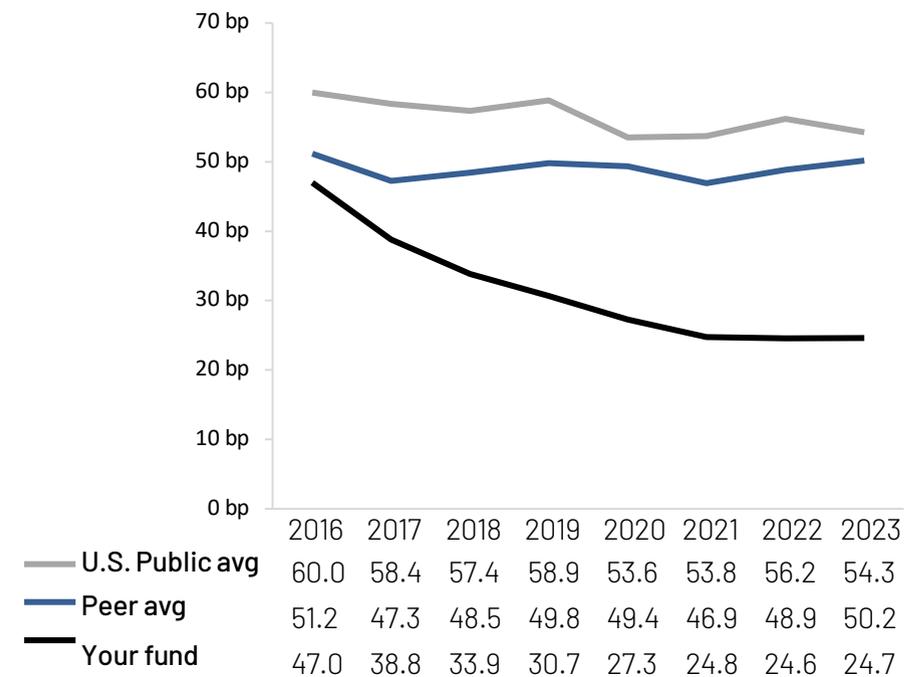
	Impact in bps		
1. Lower cost asset mix			
• Less REITs & Commodities & Infrastructure & Natural resources: 2019 6% vs 2023 4%		(1.6)	
• Less Hedge funds & multi-asset: 2019 5% vs 2023 4%		(1.2)	
• Less Private equity: 2019 6% vs 2023 5%		(2.0)	
• All other mix changes		(0.9)	
		<u>(5.8)</u>	
2. Higher cost implementation style			
• Less passive, more active		1.1	
• All other implementation style changes		0.1	
		<u>1.2</u>	
3. Paid less in total for similar investment styles			
	<u>2019 cost</u>	<u>2023 cost</u>	
• Lower Real Estate ex-REITs base fees	79.9 bp	61.3 bp	(0.7)
• Higher LBO base fees	117.0 bp	167.2 bp	0.7
• Lower Infrastructure base fees	136.4 bp	75.9 bp	(0.4)
• Lower Private Equity - Other base fees	63.2 bp	50.3 bp	(0.3)
• Lower Hedge Funds underlying perf. fees (on nav)	88.8 bp	0.0 bp	(0.3)
• Lower internal investment management costs			(0.1)
• All other differences			(1.0)
			<u>(2.2)</u>
Total decrease			<u><u>(6.8)</u></u>

Your investment costs excluding performance fees have declined every year since 2016.

Investment costs excluding private asset performance fees



Investment costs excluding all performance fees

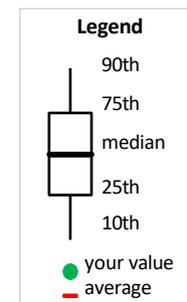
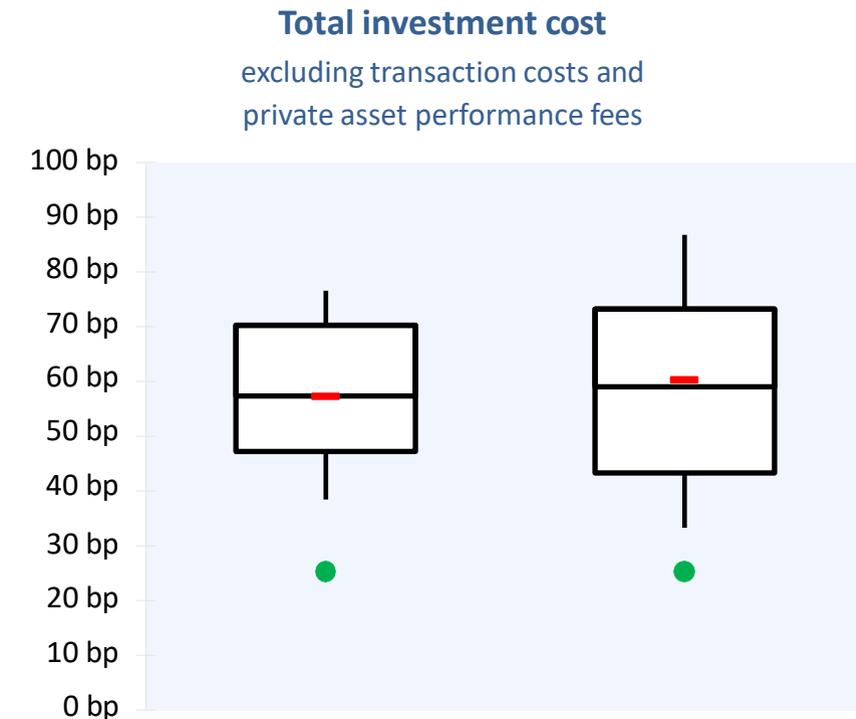


Before adjusting for asset mix differences, your total investment cost of 25.3 bps was among the lowest of the peers and was substantially below the peer median of 57.4 bps.

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 22% of your assets at the end of 2023 versus a peer average of 38%.
- 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.



	Peer	U.S. Public universe
90th %ile	76.6	86.8
75th %ile	70.3	73.3
Median	57.4	59.0
25th %ile	47.3	43.4
10th %ile	38.5	33.3
Average	57.3	60.4
You	25.3	25.3
%ile rank	0%	5%

Benchmark cost analysis suggests that, after adjusting for fund size and asset mix, your fund was below benchmark cost by 5.6 basis points in 2023.

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 25.3 bp was below your benchmark cost of 30.9 bp. Thus, your cost savings were 5.6 bp.

Your cost versus benchmark

	\$000s	basis points
Your total investment cost	287,076	25.3 bp
Your benchmark cost	350,338	30.9 bp
Your excess cost	(63,263)	(5.6) bp

Your fund was below benchmark cost because it paid less than peers for similar services.

Reasons for your low cost status

	Excess Cost/ (Savings)	
	\$000s	bps
1. Higher cost implementation style		
• Use of active management vs. lower cost passive	(2,193)	(0.2)
• Use of external management vs. lower cost internal	12,902	1.1
• More LPs as a percentage of external	19,587	1.7
• More fund of funds	3,226	0.3
• Less co-investment as a percentage of LP/Co	12,731	1.1
• Less overlays	(2,299)	(0.2)
	<u>43,955</u>	<u>3.9</u>
2. Paying less than peers for similar services		
• External investment management costs	(86,777)	(7.6)
• Internal investment management costs	(11,206)	(1.0)
• Oversight, custodial & other costs	(9,235)	(0.8)
	<u>(107,218)</u>	<u>(9.5)</u>
Total savings	(63,263)	(5.6)

Your implementation style was 3.9 bps higher cost than the peer average.

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

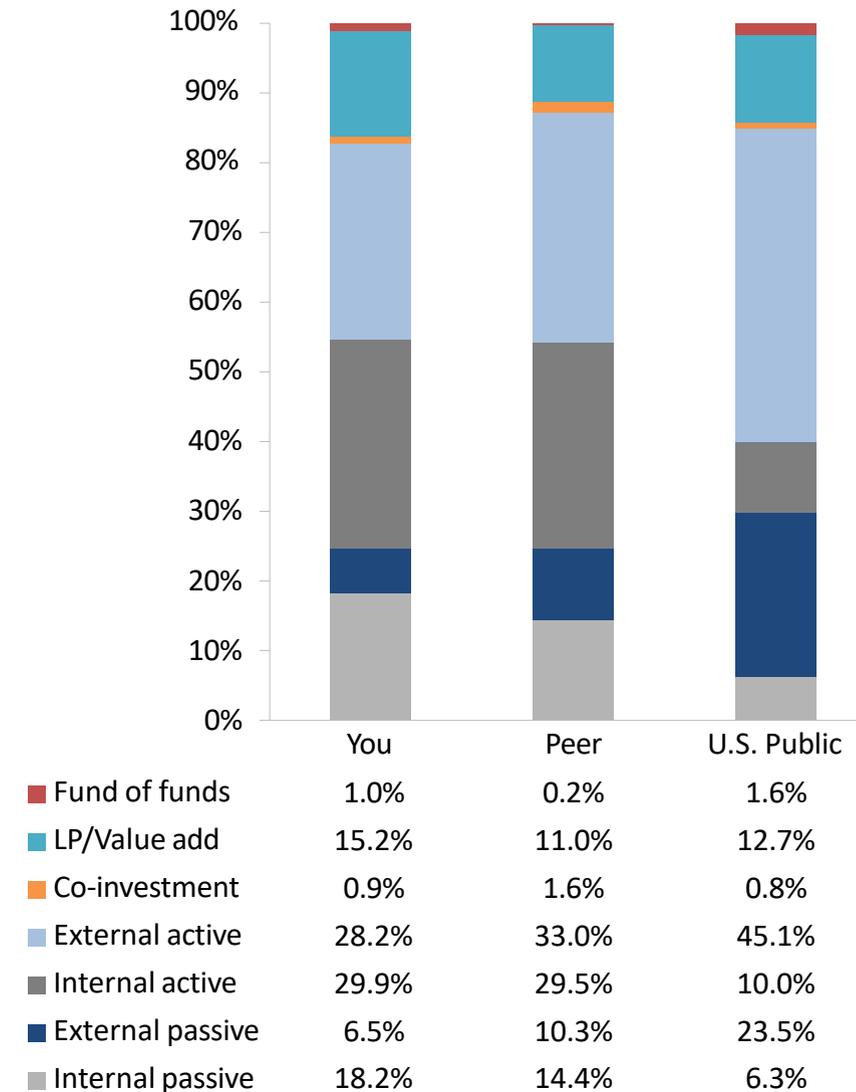
Implementation choices	Impact
Less active, more passive	(0.2) bp
More internal as a % of passive	(0.0) bp
More internal as a % of active	1.2 bp ²
More LPs as a % of external	1.7 bp
More fund of funds	0.3 bp
Less co-investment as a percentage of LP/Co	1.1 bp
Less overlays	(0.2) bp
Total impact	3.9 bp

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.

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.

2. Typically, more internal as a % of active is lower cost. But your mix of internal by asset class increased your cost.

Implementation style¹



The net impact of paying less for similar services saved 9.5 bps.

Cost impact of paying more/(less)

Style	Your avg holdings in \$mils (A)	Cost in bps			Cost/ (savings) \$000s bps (A X B)	
		Your Fund	Peer median	More/ (less) (B)		
External asset management						
Stock - U.S. broad/all	active	1,485	32.8	34.0	(1.1)	(168)
Stock - U.S. mid cap	active	1,480	52.9	52.9	0.0	0
Stock - U.S. small cap	active	1,271	44.8	57.4	(12.7)	(1,609)
Stock - EAFE	passive	2	0.6	2.8	(2.2)	(0)
Stock - EAFE	active	3,128	28.1	37.9	(9.8)	(3,058)
Stock - Emerging	active	785	20.8	62.1	(41.2)	(3,237)
Stock - ACWI x U.S.*	passive	6,289	2.5	4.2	(1.8)	(1,102)
Stock - ACWI x U.S.	active	7,802	34.3	34.3	0.0	0
Stock - Other	active	9	373.8	Excluded	--	--
Fixed income - Inflation indexed	passive	64	3.8	1.0	2.8	18
Fixed income - Inflation indexed*	active	1,313	36.2	20.0	16.1	2,119
Commodities	active	204	10.7	24.4	(13.6)	(278)
REITs	active	1,020	30.8	37.2	(6.4)	(650)
Real estate ex-REITs	active	4,485	61.3	64.3	(2.9)	(1,320)
Real estate ex-REITs	CO	295	61.3	65.9	(4.6)	(134)
Real estate ex-REITs	LP	3,216	98.1	119.1	(20.9)	(6,736)
Real estate ex-REITs	FoF	92	71.5	71.5	0.0	0
Underlying base fees	FoF	92	82.2	82.2	0.0	0
Infrastructure	LP	821	75.9	152.2	(76.4)	(6,269)
Natural resources	CO	82	10.0	5.1	4.9	40
Natural resources	LP	2,289	75.0	127.1	(52.1)	(11,915)
Hedge funds	active	2,802	108.2	108.2	0.0	0
Performance fees (on NAV)	active	2,802	25.9	105.0	(79.1)	(22,157)
Hedge funds	FoF	420	76.0	55.0	21.0	881
Top layer perf. fees (on NAV)**	FoF	420	0.0	10.0	(10.0)	(420)
Underlying base fees	FoF	420	85.2	125.0	(39.8)	(1,671)
Underlying perf. fees (on NAV)	FoF	420	0.0	105.0	(105.0)	(4,407)
Global TAA	active	1,866	11.3	47.3	(36.0)	(6,711)
Private equity - Diversified	FoF	499	38.1	64.5	(26.3)	(1,313)
Underlying base fees	FoF	499	69.4	150.0	(80.6)	(4,019)
Venture capital**	CO	28	3.3	13.6	(10.3)	(29)
Venture capital	LP	625	170.8	164.1	6.7	417
LBO	LP	1,604	167.2	152.7	14.5	2,323
Private equity - Other	CO	50	0.7	Excluded	--	--
Private equity - Other	LP	2,763	50.3	Excluded	--	--
Private credit**	CO	433	50.3	50.1	0.2	10
Private credit	LP	3,606	66.4	109.0	(42.7)	(15,381)
Total for external management						(86,777) (7.6 bp)

Cost impact of paying more/(less)

Style	Your avg holdings in \$mils (A)	Cost in bps			Cost/ (savings) \$000s bps (A X B)	
		Your Fund	Peer median	More/ (less) (B)		
Internal asset management						
Stock - U.S. large cap	passive	17,868	0.1	0.7	(0.6)	(1,087)
Stock - U.S. large cap	active	561	0.7	4.5	(3.7)	(209)
Fixed income - U.S.	active	28,788	0.6	4.0	(3.4)	(9,909)
Cash	active	14,250	0.6	Excluded	--	--
Total for internal management						(11,206) (1.0 bp)
Oversight, custodial, other						
Oversight		113,436	0.2	0.7	(0.5)	
Consulting		113,436	0.0	0.0	0.0	
Custodial		113,436	0.1	0.2	(0.1)	
Audit		113,436	0.0	0.0	(0.0)	
Other		113,436	0.0	0.1	(0.1)	
Total for oversight, custodial, other²			0.3	1.1	(0.8)	(9,235) (0.8 bp)
Total						(107,218) (9.5 bp)

**Database median used as peer and universe data were insufficient.

1. 'Amount fees are based on' is the basis for calculating costs for private assets.

2. Oversight, custodial, and other costs are benchmarked using the peer median cost for the total of the pieces. The individual line items are shown for comparison but not used in the benchmark.

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	3,318	(168)	3,150	21.2 bp
Stock - U.S. large cap	(4,426)	(1,297)	(5,723)	(3.1) bp
Stock - U.S. mid cap	4,963	0	4,963	33.5 bp
Stock - U.S. small cap	3,029	(1,609)	1,420	11.2 bp
Stock - EAFE	3,631	(3,058)	572	1.8 bp
Stock - Emerging	1,270	(3,237)	(1,967)	(25.1) bp
Stock - ACWI x U.S.	(7,600)	(1,102)	(8,702)	(6.2) bp
Stock - Other	--	--	Excluded	Excluded
Fixed income - U.S.	(3,438)	(9,909)	(13,346)	(4.6) bp
Fixed income - Inflation indexed	2,065	2,137	4,201	30.5 bp
Commodities	222	(278)	(56)	(2.7) bp
REITs	1,149	(650)	499	4.9 bp
Real estate ex-REITs	10,697	(8,191)	2,507	3.1 bp
Infrastructure	3,833	(6,269)	(2,436)	(29.7) bp
Natural resources	6,571	(11,875)	(5,303)	(22.4) bp
Hedge funds	3,195	(27,774)	(24,579)	(76.3) bp
Global TAA	2,030	(6,711)	(4,682)	(25.1) bp
Private equity - Diversified	3,746	(5,332)	(1,587)	(31.8) bp
Venture capital	479	388	867	13.3 bp
LBO	1,918	2,323	4,242	26.5 bp
Private equity - Other	--	--	Excluded	Excluded
Private credit	9,603	(15,371)	(5,769)	(14.3) bp
Derivatives and overlays	(2,299)	0	(2,299)	(0.2) bp
Oversight, custodial & other	n/a	(9,235)	(9,235)	(0.8) bp
Total	43,955	(107,218)	(63,263)	(5.6) bp

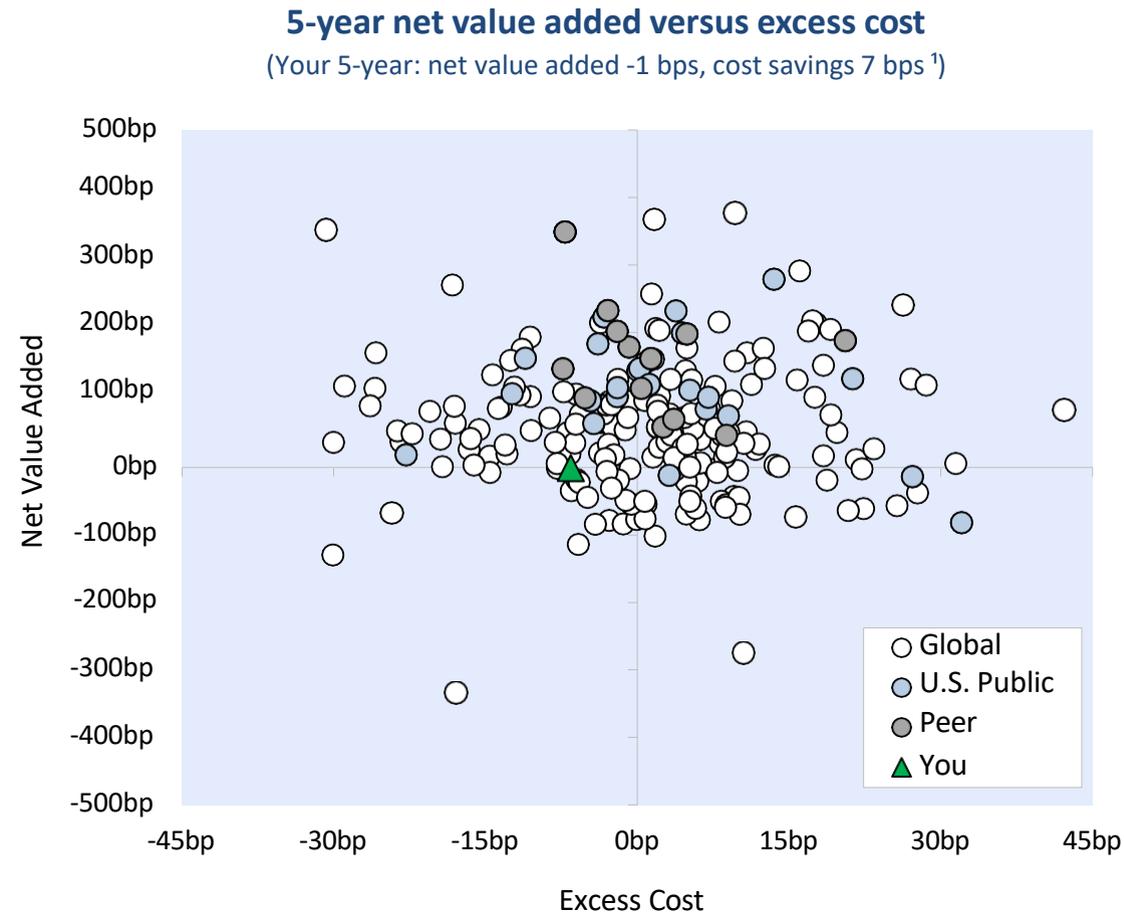
If your internally managed assets were managed externally and you paid the peer median costs, your costs would have been higher by approximately \$39.1 million or 3.4 bps.

Additional external investment management costs: assuming North Carolina no longer had internal holdings and paid peer median external costs

	Style	North Carolina RS		Peer median external cost (bps)	Cost savings	
		Avg holdings in \$mils	Internal cost (bps)		(bps)	\$000s
		(A)			(B)	(A X B)
Stock - U.S. large cap	passive	17,868	0.1	0.5	(0.4)	(656)
Stock - U.S. large cap	active	561	0.7	34.2	(33.5)	(1,878)
Fixed income - U.S.	active	28,788	0.6	13.2	(12.7)	(36,520)
Cash	active	14,250	0.6	Excluded	--	--
Total					(3.4) bp	(39,053)

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

Your fund achieved a 5-year net value added of -1 bps and cost savings of 7 bps on the cost effectiveness chart.



1. Your 5-year savings of 6.6 basis points is the average of your peer-based savings for the past 5 years.

	5-year	2023	2022	2021	2020	2019
Net value added	(1.2) bp	(116.7) bp	254.5bp	(310.5) bp	79.5bp	22.0bp
Excess cost	(6.6) bp	(5.6) bp	(6.4) bp	(5.0) bp	(7.9) bp	(8.0) bp

Thank you



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