

**Investment
Benchmarking Analysis**
(for the 5-year period ending December 31, 2022)

UNJSPF



Key Takeaways

Returns

- Your 5-year net total return was 4.2%. This was above both the Global median of 3.3% and the peer median of 3.9%.
- Your 5-year policy return was 4.2%. This was above both the Global median of 2.7% and the peer median of 2.7%.

Value added

- Your 5-year net value added was 0.0%. This was below both the Global median of 0.6% and the peer median of 1.0%.

Cost

- Your investment cost of 32.7 bps was below your benchmark cost of 34.0 bps. This suggests that your fund was slightly low cost compared to your peers.
- Your fund was below benchmark cost because it paid less than peers for similar services. These savings were mostly offset by a higher cost implementation style.
- Your costs increased by 4.8 bps, from 27.9 bps in 2018 to 32.7 bps in 2022, primarily because you increased your allocation to private market assets. This was partly offset by paying less in total for these assets.

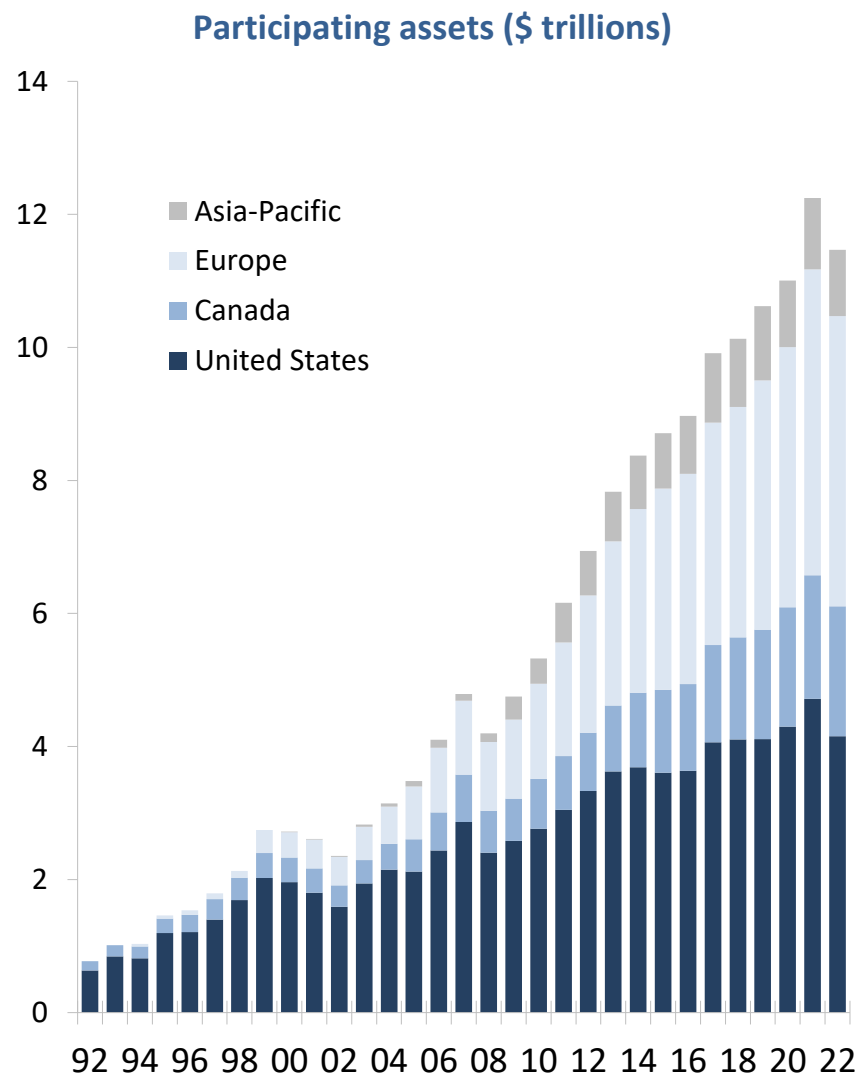
Risk

- Your asset risk of 10.8% was above the Global median of 9.1%. Your asset-liability risk of 11.8% was above the Global median of 9.8%.

This benchmarking report compares your cost and return performance to the 285 funds in CEM's extensive pension database.

- 147 U.S. pension funds participate. The median U.S. fund had assets of \$8.5 billion and the average U.S. fund had assets of \$28.2 billion. Total participating U.S. assets were \$4.2 trillion.
- 69 Canadian funds participate with assets totaling \$2.0 trillion.
- 62 European funds participate with aggregate assets of \$4.4 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Ireland, Denmark and the U.K.
- 5 Asia-Pacific funds participate with aggregate assets of \$997.2 billion. Included are funds from Australia, New Zealand, China and South Korea.
- 2 funds from other regions participate.

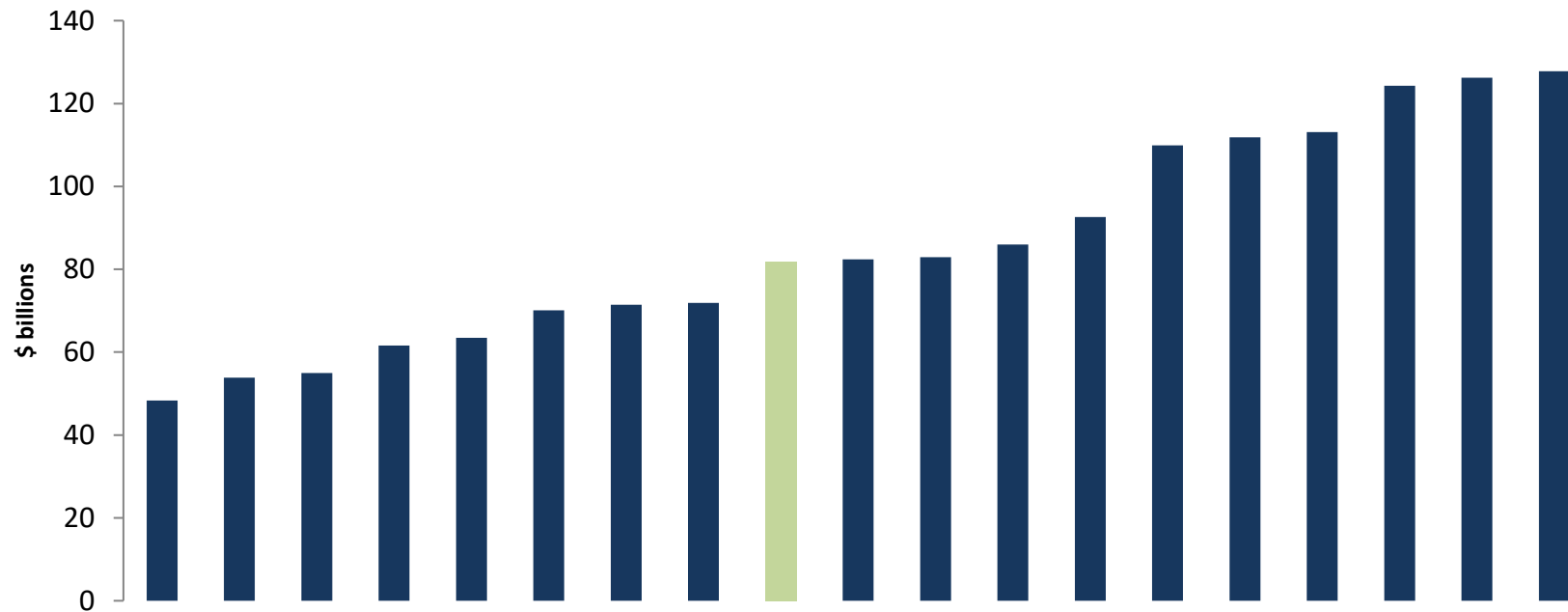
The most meaningful comparisons for your returns and value added are to the Global universe, which consists of 285 funds.



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

Peer group for UNJSPF

- 19 Global sponsors from \$48.3 billion to \$127.8 billion
- Median size of \$82.4 billion versus your \$81.9 billion



The names of the above fund sponsors in your peer group are confidential and may not be disclosed to third parties. All other information in this report is confidential and may not be disclosed to third parties without the express written mutual consent of CEM Benchmarking Inc and UNJSPF. For some of the peers, 2021 cost data was used as a proxy for 2022.

Your 5-year net total return of 4.2% was above both the Global median of 3.3% and the peer median of 3.9%.

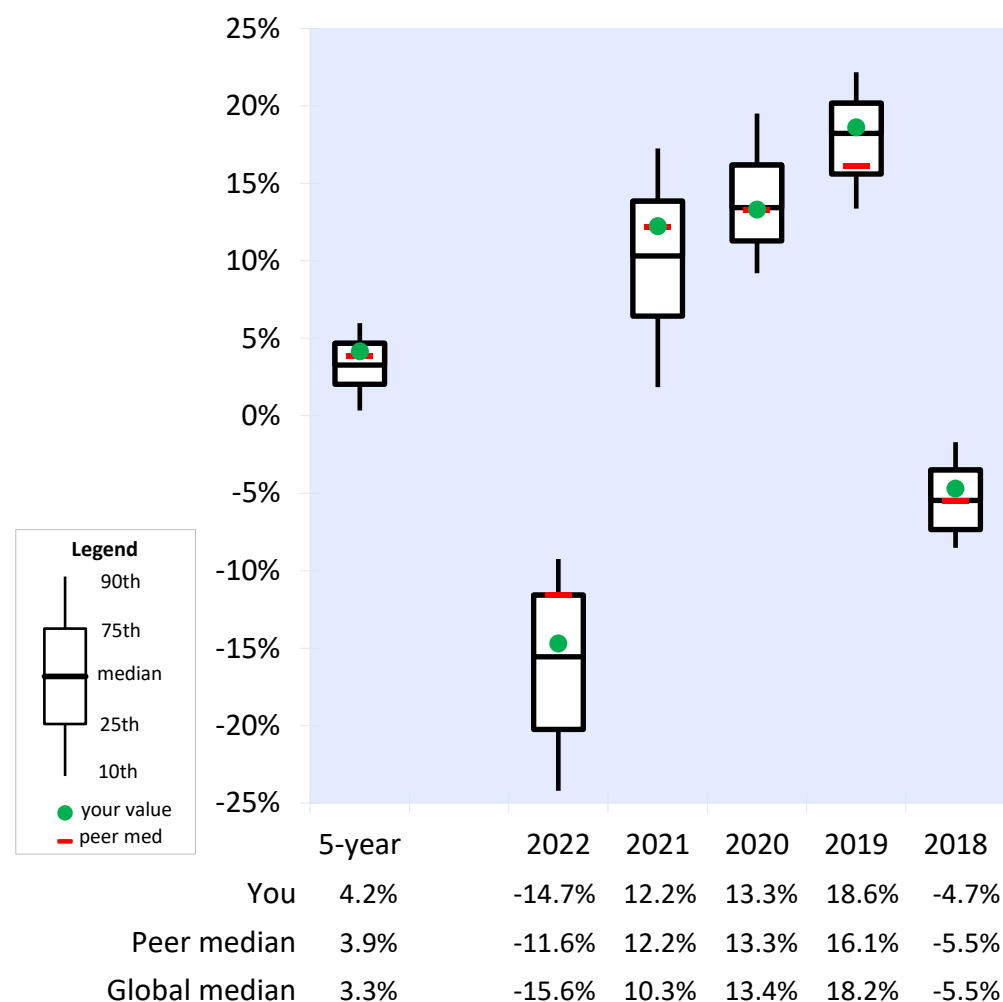
Total returns, by themselves, provide little insight into the reasons behind relative performance. Therefore, we separate total return into its more meaningful components: policy return and value added.

	Your 5-year
Net total fund return	4.2%
- Policy return	4.2%
= 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).

Actual and policy returns have been converted to your currency using unhedged currency returns. A currency conversion table is provided in Appendix-B of the report.

Global net total returns - quartile rankings



Your 5-year policy return of 4.2% was above both the Global median of 2.7% and the peer median of 2.7%.

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

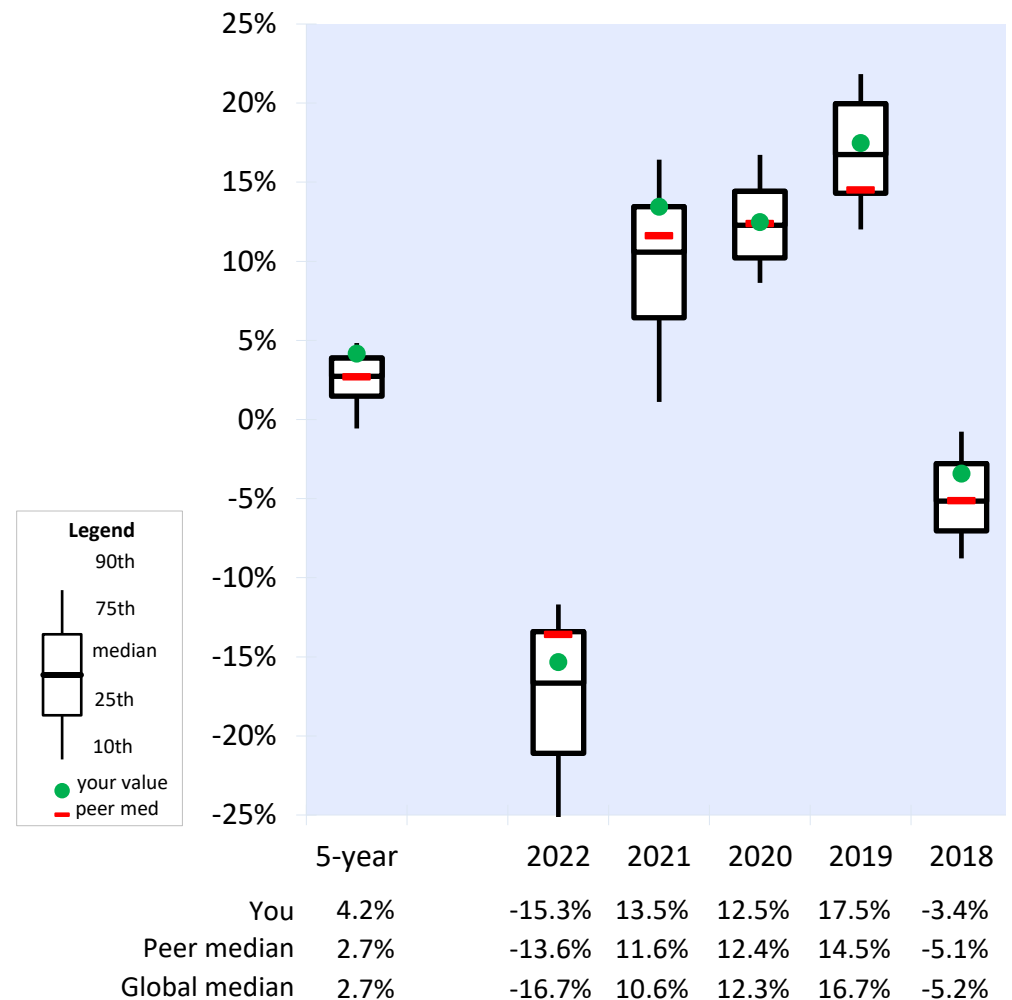
Having a higher or lower relative policy return is not necessarily good or bad. Your policy return reflects your investment policy, which should reflect your:

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

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

To enable fairer comparisons, the policy returns of all participants, 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 4.0%, 0.2% higher than your adjusted 5-year policy return of 4.2%. Mirroring this, your 5-year total fund net value added would be 0.2% lower.

Global policy returns - quartile rankings



Differences in policy return are caused by differences in policy mix and benchmarks.

Policy asset mix

Asset class	Your fund					Peer avg. 2022	Global avg. 2022
	2018	2019	2020	2021	2022		
Stock - Europe	11%	10%	9%	8%	9%	3%	1%
Stock - Asia-Pacific	7%	6%	5%	4%	5%	1%	0%
Stock - U.S.	31%	29%	30%	31%	32%	14%	8%
Stock - Emerging	7%	12%	12%	11%	6%	4%	2%
Stock - Global	0%	0%	0%	0%	0%	11%	16%
Other Stock ¹	2%	2%	2%	1%	0%	7%	9%
Total Stock	58%	58%	57%	56%	51%	40%	37%
Fixed income - U.S.	0%	10%	10%	10%	19%	7%	7%
Fixed income - Emerging	0%	4%	4%	4%	1%	2%	1%
Fixed income - Global	27%	0%	0%	0%	0%	4%	2%
Fixed income - Public mortgages	0%	15%	15%	14%	9%	1%	0%
Cash	1%	1%	1%	1%	2%	-2%	0%
Other Fixed Income ¹	0%	0%	0%	0%	0%	17%	30%
Total Fixed Income	28%	30%	30%	30%	31%	29%	40%
Hedge funds	0%	0%	0%	0%	0%	2%	2%
Real estate incl. REITs	9%	7%	7%	7%	9%	10%	7%
Other Real Assets ¹	0%	0%	0%	0%	0%	5%	4%
Private equity - Aggregate	5%	5%	6%	7%	8%	11%	6%
Private debt - Aggregate	0%	0%	0%	0%	0%	4%	3%
Total	100%	100%	100%	100%	100%	100%	100%

1. Other stock includes: Stock - EAFE and Stock - ACWI x U.S.. Other fixed income includes: Fixed income - Canada, Fixed income - Europe, Fixed income - Europe gov't, fixed income - long bonds, Fixed income - Inflation indexed, Fixed income - EAFE and Fixed income - Bundled LDI. Other real assets include: Commodities, Natural resources and Infrastructure.

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.

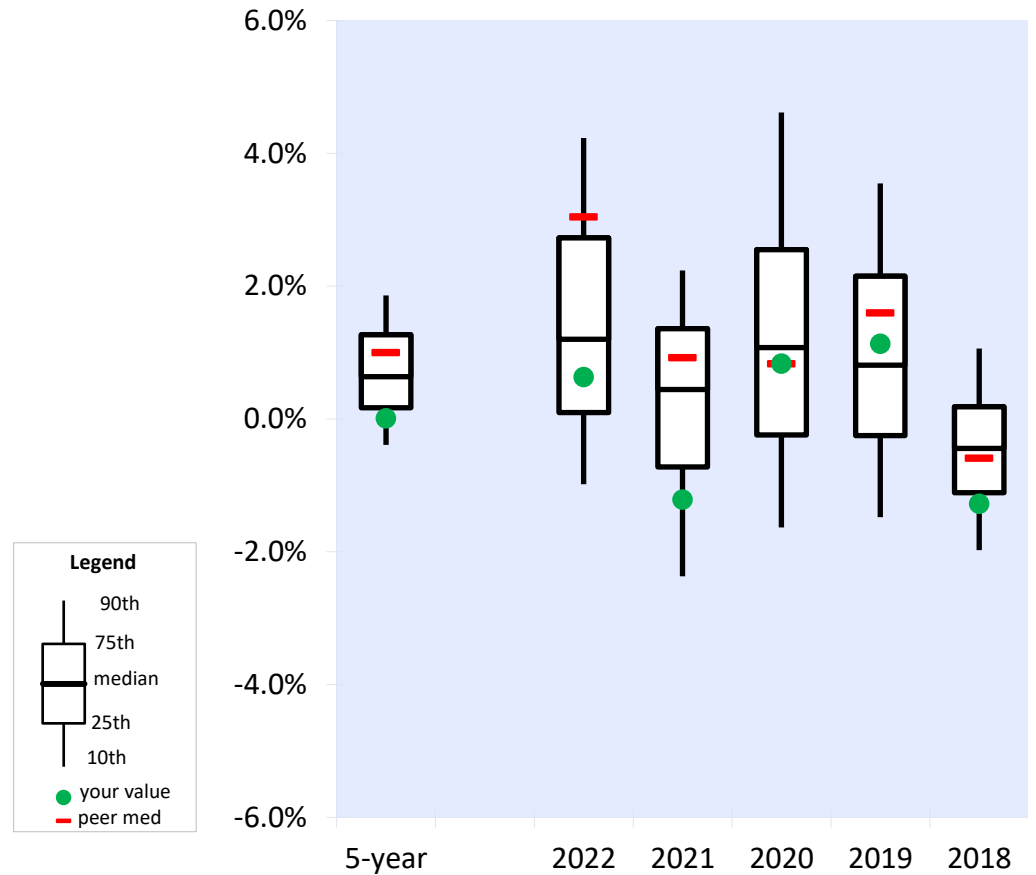
Value added for UNJSPF

Year	Net return	Policy return	Net value added
2022	-14.7%	-15.3%	0.6%
2021	12.2%	13.5%	-1.2%
2020	13.3%	12.5%	0.8%
2019	18.6%	17.5%	1.1%
2018	-4.7%	-3.4%	-1.3%
5-Year	4.2%	4.2%	0.0%

Your 5-year net value added of 0.0% compares to a median of 1.0% for your peers and 0.6% for the Global 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 0.2%.

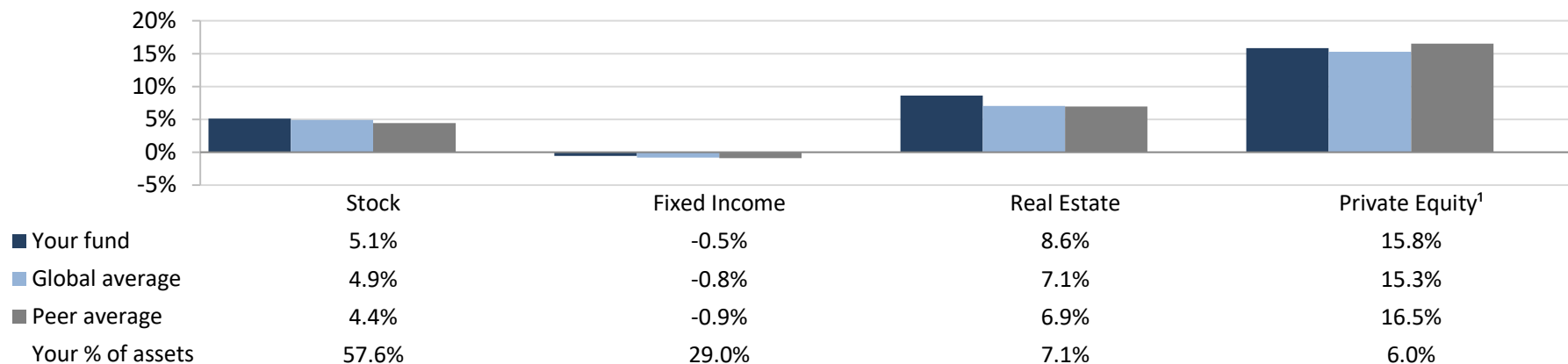
Global net value added - quartile rankings



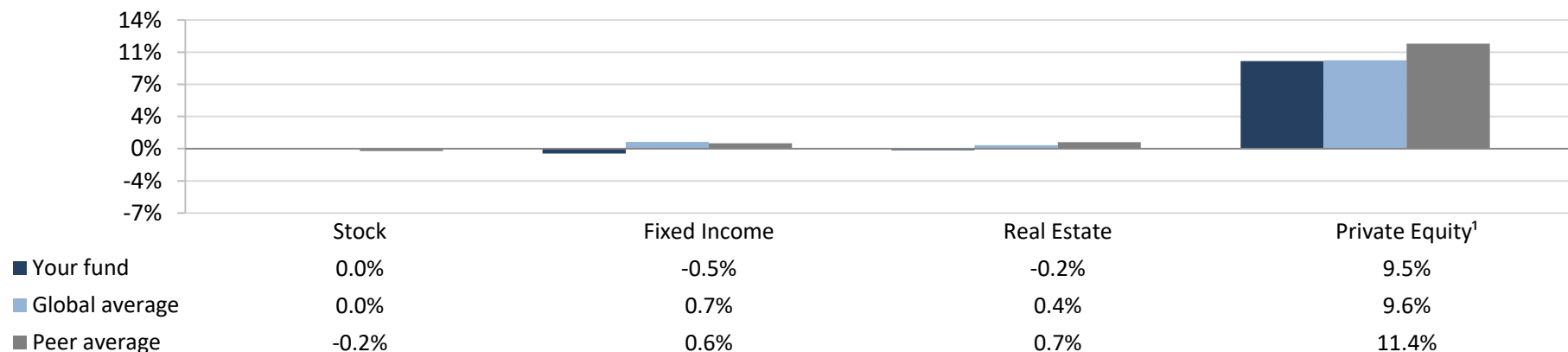
You	0.0%	0.6%	-1.2%	0.8%	1.1%	-1.3%
Peer median	1.0%	3.0%	0.9%	0.8%	1.6%	-0.6%
Global median	0.6%	1.2%	0.4%	1.1%	0.8%	-0.4%

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 8.8%.

Your investment costs, excluding private asset performance fees, were \$267.8 million or 32.7 basis points in 2022.

Asset management costs by asset class and style (\$000s)	Internal Mgmt*		External Management			Total	
	Active	Overseeing of external	Passive fees	Active base fees	Perform. fees ¹		
Stock - U.S.	11,146	272		11,492		22,909	
Stock - Europe	2,062	90		2,825		4,977	
Stock - Asia-Pacific	2,197	14		264		2,475	
Stock - Emerging	5,387					5,387	
Stock - other	743					743	
Fixed income - U.S.	2,165	93	223			2,480	
Fixed income - Emerging	753					753	
Fixed income - Global	21					21	
Fixed income - Public mortgages	4,900					4,900	
Cash	957					957	
Infrastructure - LP ¹		734		3,566		4,299	
Natural resources - LP ¹		4		82		86	
Real estate ¹		791		28,195	-4,618	28,987	
Real estate - LP ¹		3,145		53,769	-311	56,915	
Private equity - Diversified - LP ¹		4,461		118,928	110,365	123,389	
Private equity - Diversified - Co-invest. ¹		460				460	
Total excluding private asset performance fees						259,738	31.7bp
Oversight, custodial and other costs²							
Oversight & consulting						3,772	
Trustee & custodial						1,220	
Consulting and performance measurement						0	
Audit						0	
Other						3,086	
Total oversight, custodial & other costs						8,078	1.0bp
Total investment costs (excl. transaction costs & private asset performance fees)						267,817	32.7bp

Footnotes

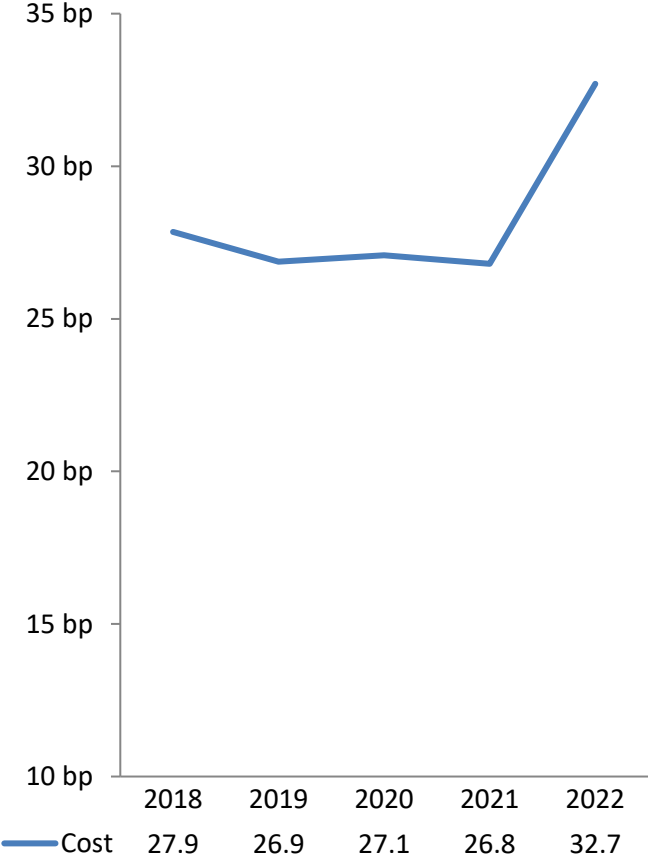
1. Total cost excludes carry/performance fees for real estate, infrastructure, natural resources and private equity. Performance fees are included for the public market asset classes and hedge funds.

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

* Internal FTE and support costs have been allocated to asset classes based on CEM methodology. Refer to Appendix A2 for details.

Your costs increased by 4.8 bps, from 27.9 bps in 2018 to 32.7 bps in 2022, primarily because you increased your allocation to private market assets. This was partly offset by paying less in total for these assets.

Trend in cost



Reasons why your costs increased by 4.8 bps

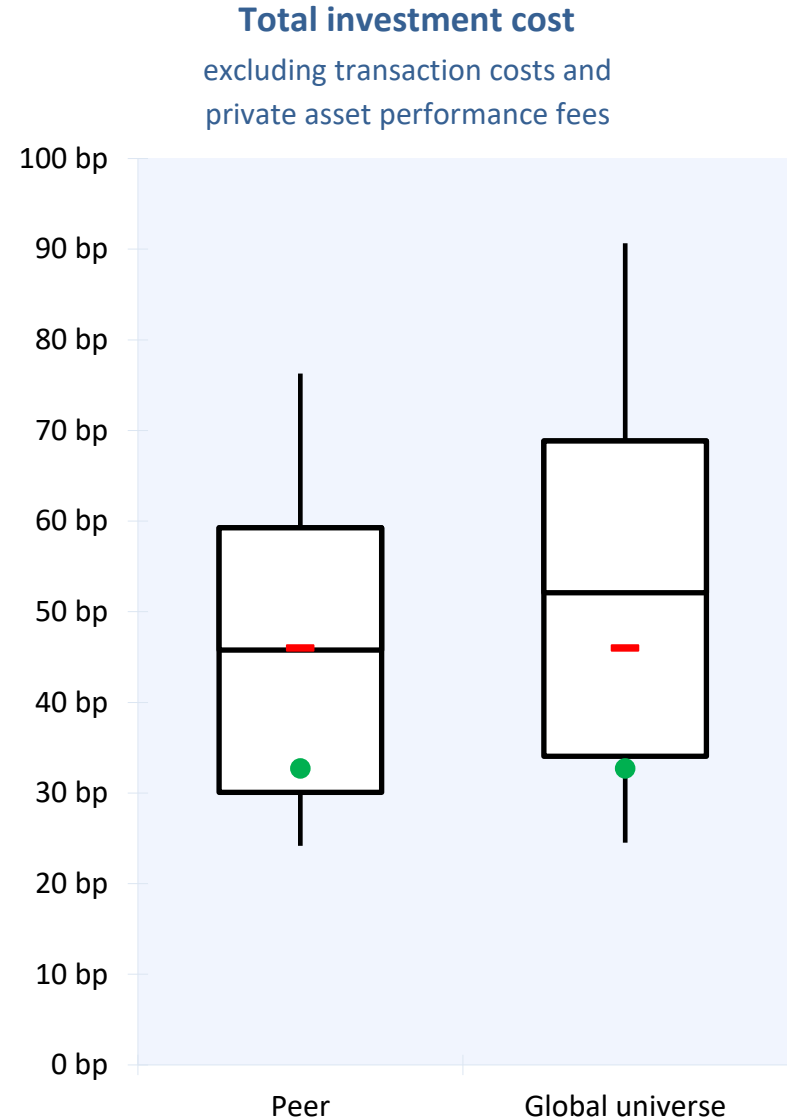
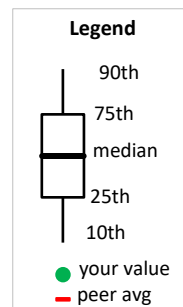
			Impact in bps
1. Higher cost asset mix			
• More Real estate ex-REITs: 2018 8% vs 2022 11%			3.4
• More Private equity: 2018 6% vs 2022 13%			9.5
• All other mix changes			0.1
			<hr/> 13.0
2. Lower cost implementation style			
• More co-investment as a % of LP/Co			(0.8)
• All other implementation style changes			(0.5)
			<hr/> (1.3)
3. Paid less in total for similar investment styles			
	<u>2018 cost</u>	<u>2022 cost</u>	
• Lower Private Equity LP base fees	156.0 bp	125.8 bp	(3.6)
• Lower Real Estate LP base fees	124.0 bp	97.5 bp	(1.9)
• Lower internal investment management costs			(0.7)
• Lower oversight, custodial & other costs	1.5 bp	1.0 bp	(0.5)
• All other differences			(0.1)
			<hr/> (6.8)
Total increase			<hr/> <hr/> 4.8

Your total investment cost of 32.7 bps was below the peer median of 45.8 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 17% of your assets at the end of 2022 versus a peer average of 33%.
- 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 below benchmark cost by 1.3 basis points in 2022.

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 32.7 bp was slightly below your benchmark cost of 34.0 bp. Thus, your cost savings were 1.3 bp.

Your cost versus benchmark

	\$000s	basis points
Your total investment cost	267,817	32.7 bp
Your benchmark cost	278,642	34.0 bp
Your excess cost	(10,826)	(1.3) bp

Your fund was below benchmark cost because it paid less than peers for similar services. These savings were mostly offset by a higher cost implementation style.

Reasons for your low cost status

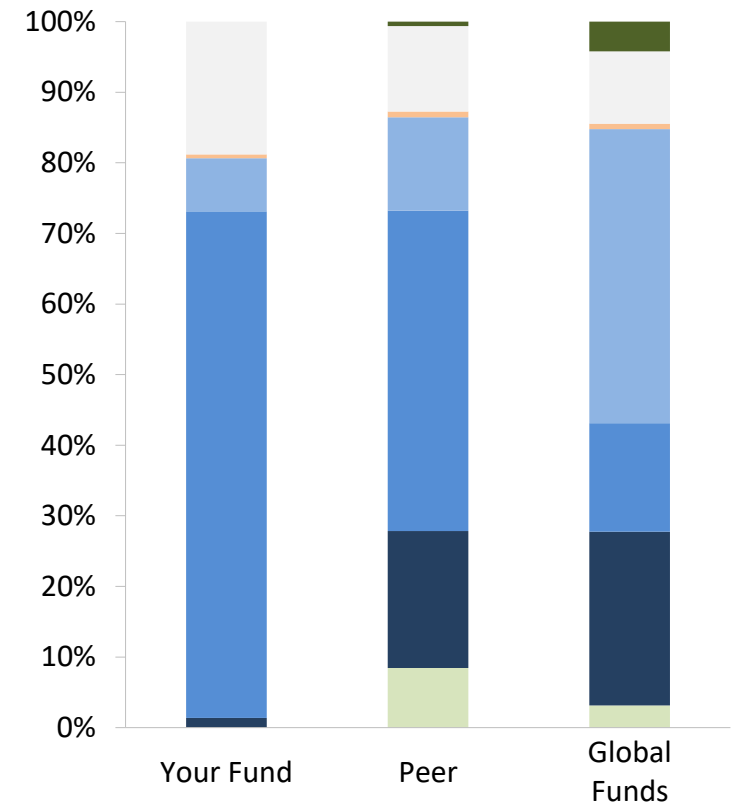
	Excess Cost/ (Savings)	
	\$000s	bps
1. Higher cost implementation style		
• More active management, less lower cost passive	30,419	3.7
• Less external management, more lower cost internal	(4,020)	(0.5)
• More LPs as a percentage of external	8,829	1.1
• Less fund of funds	(4,520)	(0.6)
• Less co-investment as a percentage of LP/Co	5,053	0.6
• Less overlays	(5,302)	(0.6)
	<u>30,459</u>	<u>3.7</u>
2. Paying less than peers for similar services		
• External investment management costs	(27,967)	(3.4)
• Internal investment management costs	(3,941)	(0.5)
• Oversight, custodial & other costs	(9,377)	(1.1)
	<u>(41,285)</u>	<u>(5.0)</u>
Total savings	(10,826)	(1.3)

Your implementation style was 3.7 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 passive, more active	3.7 bp
Less internal as a % of passive	0.0 bp
More internal as a % of active	(0.5) bp
Less evergreen % in private assets, excl. PE	1.1 bp
Less fund of funds	(0.6) bp
Less co-investment as a percentage of LP/Co	0.6 bp
Less overlays	(0.6) bp
Total impact	3.7 bp

Implementation style¹



Fund of funds	0.0%	0.6%	4.2%
LP	18.8%	12.1%	10.2%
Co-investment	0.6%	0.8%	0.8%
External active	7.5%	13.2%	41.7%
Internal active	71.7%	45.4%	15.4%
External passive	1.4%	19.4%	24.6%
Internal passive	0.0%	8.5%	3.1%

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.

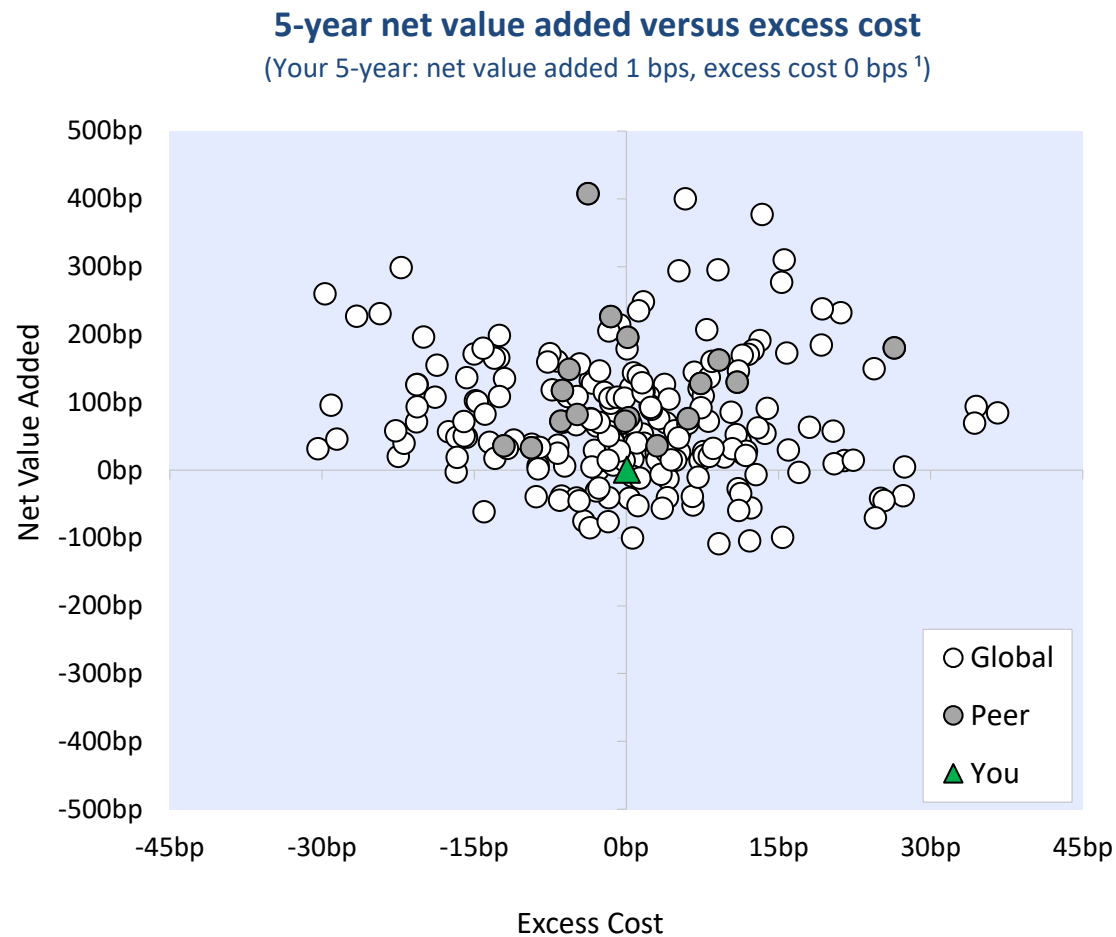
The table below summarizes why your fund is high/low cost relative to the peer-median by asset class.

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

Asset class/category	Style weighted cost			Your average assets (or fee basis) ²	Due to impl. style	Due to paying more/(less) ³	Total more/(less)
	Your cost	Peer median ¹ = Benchmark	More/(less)				
	(A)	(B)	(C = A - B)	(D)			(C x D)
Asset management costs							
Stock - U.S.	8.5 bp	7.0 bp	1.4 bp	27,047	3,470	429	3,899
Stock - Europe	7.4 bp	8.5 bp	(1.1) bp	6,719	193	(935)	(742)
Stock - Asia-Pacific	6.3 bp	22.5 bp	(16.3) bp	3,949	(4,645)	(1,779)	(6,424)
Stock - Emerging	8.5 bp	22.6 bp	(14.1) bp	6,353	(8,961)	0	(8,961)
Stock - other	5.7 bp	4.6 bp	1.0 bp	1,314	61	75	136
Fixed income - U.S.	2.4 bp	5.3 bp	(2.8) bp	10,182	(2,983)	113	(2,870)
Fixed income - Emerging	8.0 bp	26.1 bp	(18.1) bp	941	(1,202)	(503)	(1,706)
Fixed income - Global	8.0 bp	6.5 bp	1.5 bp	26	(2)	6	4
Fixed income - Public mortgages	5.6 bp	8.0 bp	(2.4) bp	8,755	(864)	(1,228)	(2,092)
Cash	3.2 bp	3.2 bp	0.0 bp	2,994	0	0	0
Real estate	94.0 bp	54.0 bp	40.0 bp	9,143	39,578	(3,015)	36,562
Infrastructure	127.8 bp	55.6 bp	72.2 bp	336	2,497	(67)	2,430
Natural resources	98.8 bp	52.2 bp	46.6 bp	9	57	(17)	41
Private equity - Diversified	120.5 bp	136.5 bp	(16.0) bp	10,280	8,563	(24,986)	(16,424)
Derivatives/Overlays	0.0 bp	0.6 bp	(0.6) bp	81,900	(5,302)	0	(5,302)
Total asset management	31.7 bp	31.9 bp	(0.2) bp	81,900	30,459	(31,908)	(1,449)
Oversight, custody and other costs⁴							
Oversight of the Fund	0.5 bp	1.4 bp	(0.9) bp				
Trustee & Custodial	0.1 bp	0.3 bp	(0.2) bp				
Consulting	0.0 bp	0.0 bp	0.0 bp				
Audit	0.0 bp	0.0 bp	(0.0) bp				
Other	0.4 bp	0.1 bp	0.3 bp				
Total oversight, custody & other	1.0 bp	2.1 bp	(1.1) bp	81,900	n/a	(9,377)	(9,377)
Total	32.7 bp	34.0 bp	(1.3) bp	81,900	30,459	(41,285)	(10,826)

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

Your fund achieved a 5-year net value added of 1 bps and excess cost of 0 bps on the cost effectiveness chart.



1. Your 5-year excess cost of 0.1 basis points is the average of your peer-based excess cost for the past 5 years.

	2022	2021	2020	2019	2018	5-year
Net value added	63.0bp	(121.3) bp	83.6bp	113.2bp	(127.7) bp	0.7bp
Excess cost	(1.3) bp	(0.2) bp	(0.1) bp	(0.3) bp	2.2bp	0.1bp

Comparison of risk levels:

Your asset risk of 10.8% was above the Global median of 9.1%. Asset risk is the standard deviation of your policy return. It is based on the historical variance of, and covariance between, the asset classes in your policy mix.

Your asset-liability risk of 11.8% was above the Global median of 9.8%. Asset-liability risk is the standard deviation of funded status caused by market factors. It is a function of the standard deviations of your asset risk, your marked-to-market liabilities and the correlation between the two.

Global risk levels at December 31, 2022

