

**Investment**  
**Cost Effectiveness Analysis**  
(for the 10-year period ending December 31, 2017)

**Norwegian Government Pension Fund**  
**Global**



# Table of contents

## 1 Executive summary

## 2 Peer group and universe

Peer group	2 - 2
CEM global universe	2 - 3
Universe subsets	2 - 4
Implementation style, asset mix, policy mix:	
- by universe subset	2 - 5
- trends from 2013 to 2017	2 - 6
Implementation style by asset class	2 - 7
Actual asset mix - trends from 2013 to 2017	2 - 8
Policy asset mix - trends from 2013 to 2017	2 - 9

## 3 Returns, benchmarks, value added

Interpreting box and whisker graphs	3 - 2
Net total returns	3 - 3
Policy returns	3 - 4
Net value added	3 - 5
Net returns by asset class	3 - 6
Benchmark returns by asset class	3 - 7
Net value added by asset class	3 - 8
Your policy return and value added calculation:	
- 2017	3 - 9
- 2013 to 2016	3 - 10
Profit/Loss on overlay programs	3 - 11
Appendix - CEM's Private equity benchmark	3 - 12

## 4 Total cost and benchmark cost

Comparisons of total investment cost	4 - 2
- Trend	4 - 3
- Types of costs	4 - 4
- Detailed breakdown	4 - 5
- Material changes	4 - 6
Total cost versus benchmark cost	4 - 7
Benchmark cost calculation	4 - 8

### Cost impact of:

- differences in implementation style	4 - 9
- overlays	4 - 10
- lower cost styles	4 - 11
- paying more/-less for similar services	4 - 12
Why you are high/low cost by asset class	4 - 13
Your cost effectiveness ranking	4 - 14
Actual cost versus benchmark cost	4 - 15
Benchmarking methodology	4 - 16
Regression based benchmarks	4 - 18

## 5 Cost comparisons

Total investment cost	5 - 2
Asset class costs by implementation style	5 - 3
Oversight, Custodial & Other Costs	

## 6 Risk - not applicable

## 7 Appendices

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

Prepared January 29, 2019. Although the information in this report has been based upon and obtained from sources we believe to be reliable, CEM Benchmarking Inc. ("CEM") does not guarantee its accuracy or completeness. The information contained herein is proprietary and confidential and may not be disclosed to third parties without the express written mutual consent of both CEM and Norwegian Government Pension Fund Global.

# Key takeaways

## Returns

- All returns have been converted using the GPFG currency basket. However, differences in total returns reflect in large part home-market biases and the relative performance of currencies. So they are not the primary focus of this report.
- Your 10-year net total return was 6.1%. This compares to the Global median of 6.7% and the peer median of 6.1%.
- Your 10-year policy return was 6.0%. This compares to the Global median of 6.7% and the peer median of 6.5%.

## Value added

- Your 10-year net value added was 0.1%. This was equal to the Global median of 0.1% and above the peer median of -0.1%.

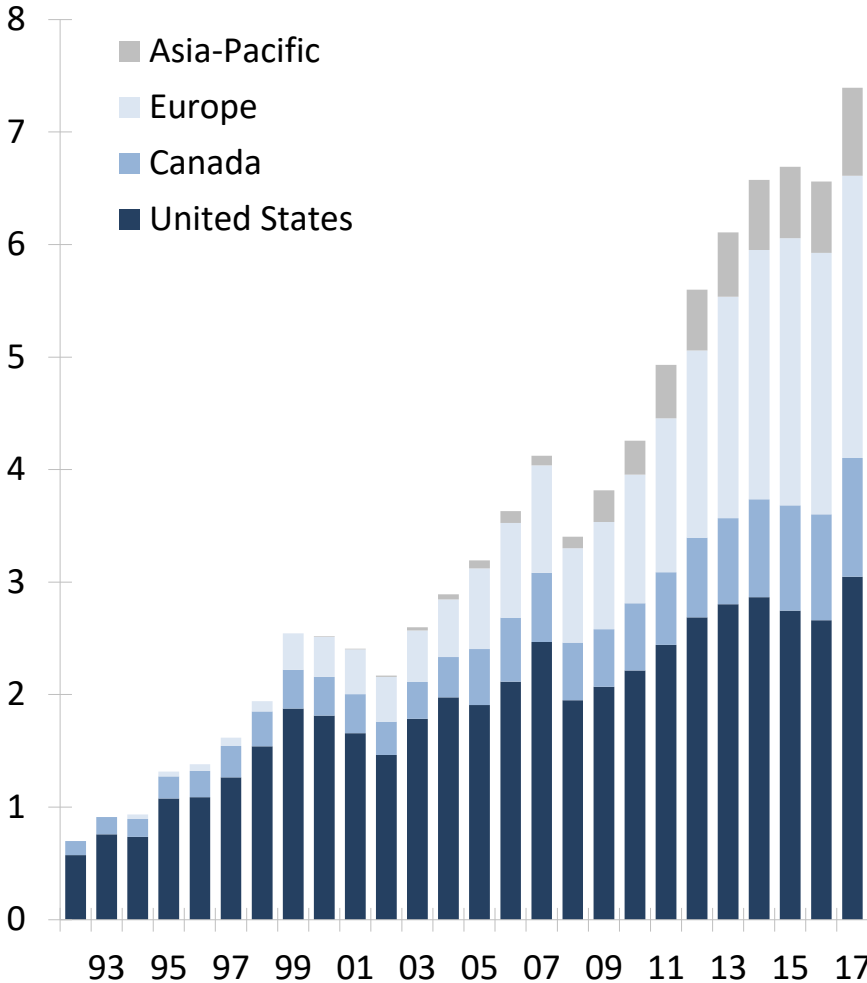
## Cost

- Your investment cost of 6.1 bps was below your benchmark cost of 17.0 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was low cost because you had a lower cost implementation style and you paid less than peers for similar services.
- Your 10-year performance placed in the positive value added, low cost quadrant of the cost effectiveness chart.

# This benchmarking report compares your cost and return performance to the 347 funds in CEM's extensive pension database.

- 166 U.S. pension funds participate. The median U.S. fund had assets of €7.2 billion and the average U.S. fund had assets of €18.4 billion. Total participating U.S. assets were €3.0 trillion.
- 79 Canadian funds participate with assets totaling €1,055.7 billion.
- 89 European funds participate with aggregate assets of €2.5 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Ireland, Denmark and the U.K.
- 11 Asia-Pacific funds participate with aggregate assets of €780.0 billion. Included are funds from Australia, New Zealand, China and South Korea.

Participating assets (€ trillions)



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

### **Peer group for Norwegian Government Pension Fund Global**

- 10 largest Global sponsors from €109 billion to €432 billion
  - Median size of €175 billion versus your €844 billion

- 2 Canadian funds, 2 European funds, 2 Asia-Pacific funds and 4 U.S. funds make up the Global peer group.
- In the report there are also comparisons to CEM's Global database of participants.

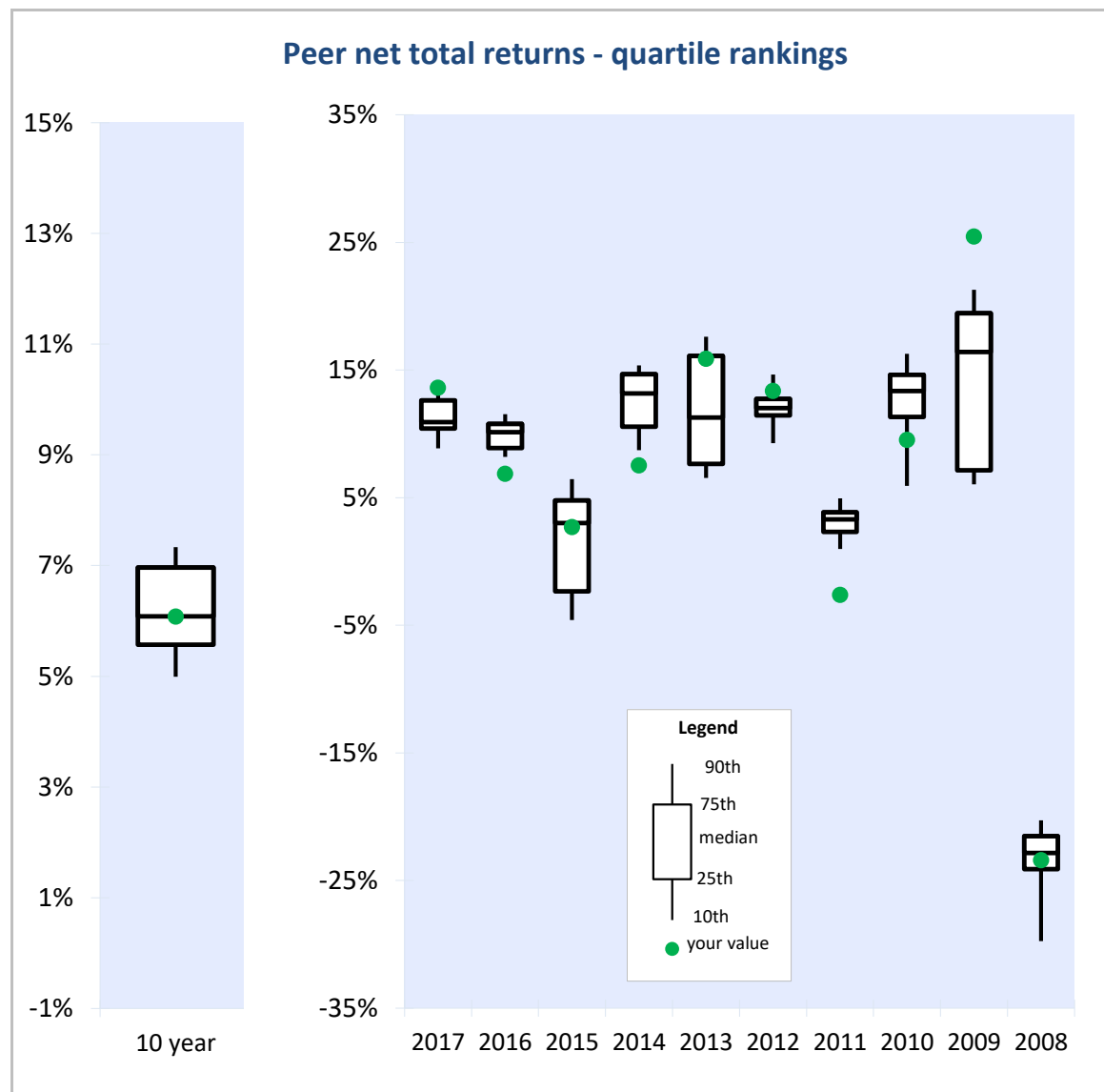
## Your 10-year net total return of 6.1% compares to the peer median of 6.1%

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 10-year
Net total fund return	6.1%
- Policy return	6.0%
= Net value added	0.1%

This approach enables you to understand the contribution from both policy mix decisions (which tend to be the board's responsibility) and implementation decisions (which tend to be management's responsibility). Actual and policy returns have been converted to your currency using unhedged currency returns.

The fund return consists of Equity, Fixed Income and Real Estate. The fund benchmark is the weighted benchmark of Equity and Fixed Income. The benchmark for Real Estate used in the report is prior to 2017 the actual portfolio return, and thereafter the financing cost for the real estate investments.



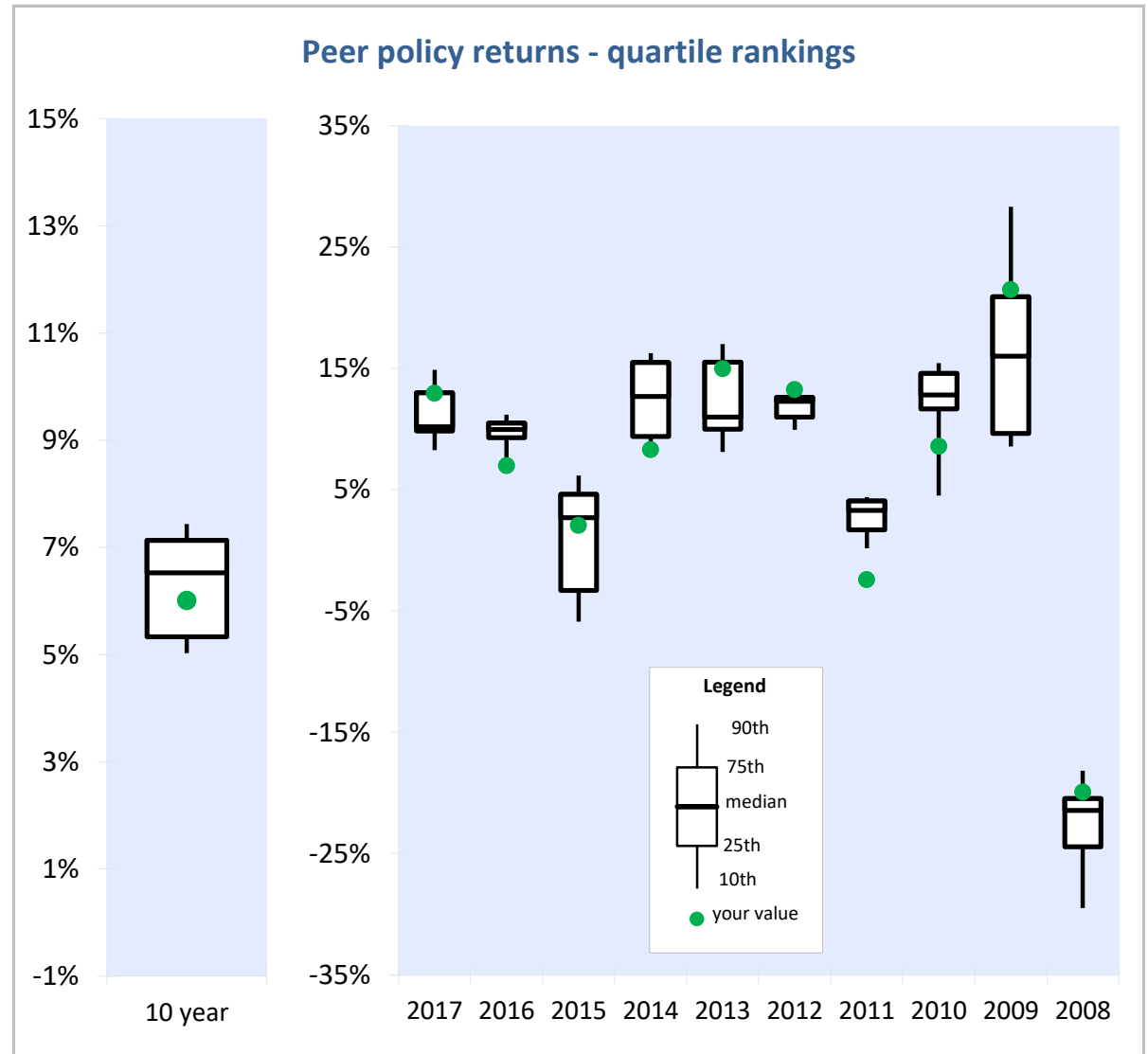
## Your 10-year policy return of 6.0% compares to the peer median of 6.5%.

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 expect.
- 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.



## Your 10-year average policy asset mix compares to the Peer and Global funds as follows.

- Your fund has a small allocation to real assets, and has no hedge funds or private equity whereas the peer funds had allocations of 12%, 3% and 7% respectively. The Global funds' allocations were 8%, 3% and 5%.
- Your policy asset mix is more globally diversified than the average Peer or Global fund.

### 10-year average policy mix<sup>1</sup>

	Your Fund	Peer Avg.	Global Avg.
Stock	60%	48%	47%
Fixed Income	38%	30%	36%
Hedge Funds	0%	3%	3%
Real Assets	1%	12%	8%
Private Equity	0%	7%	5%
Total	100%	100%	100%

Regional allocations can significantly influence the policy return. GPF's overweight in European securities and the peer group's overweight in North American securities would cause a difference in the policy returns. Variations in the fixed income portfolios, such as duration, credit quality and country allocation within regions would have an impact as well. Not being invested in asset classes like private equity and having a lower allocation to real estate also had an impact on GPF's policy return.



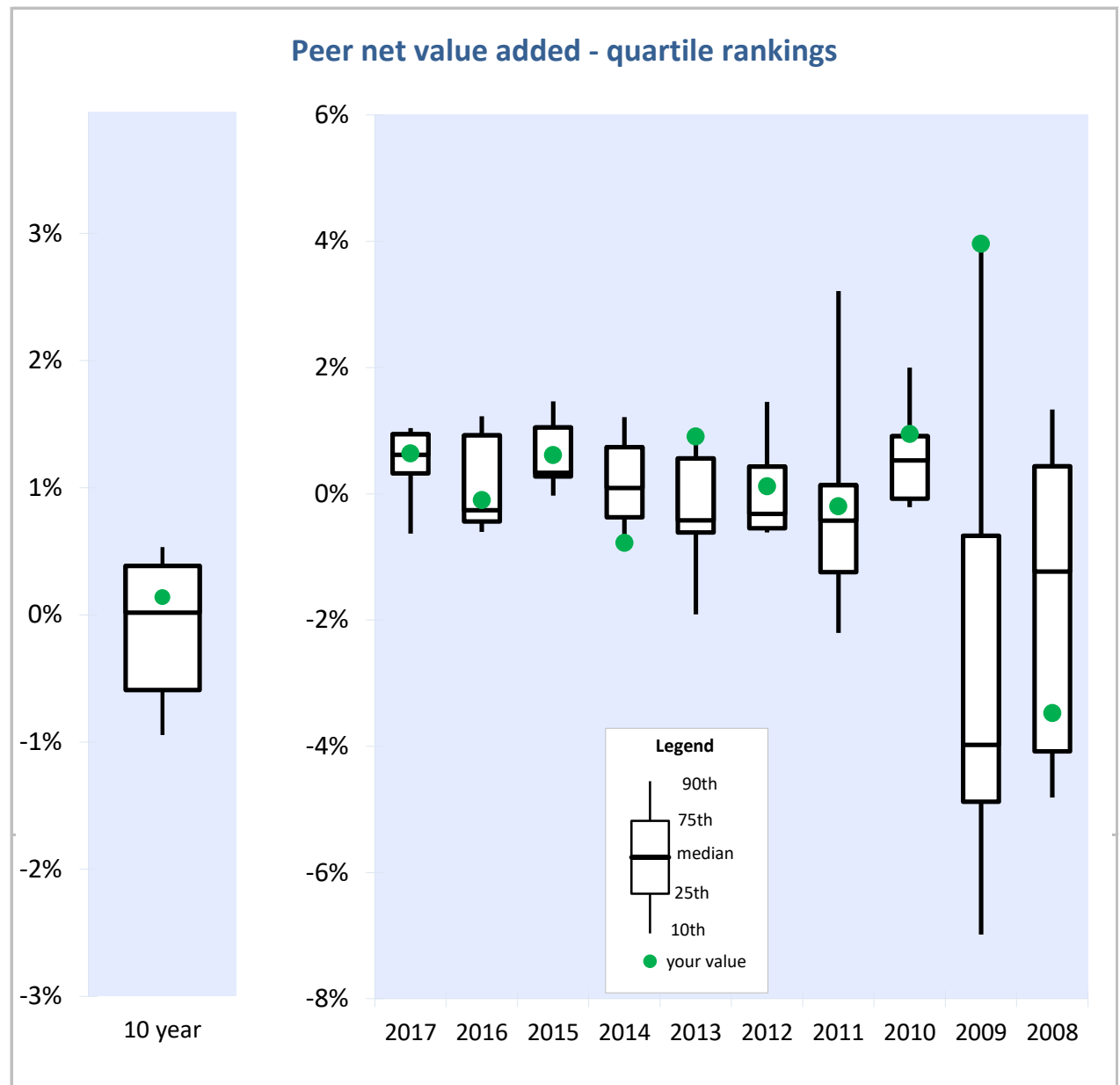
# Net value added is the component of total return from active management. Your 10-year net value added was 0.1%.

Net value added equals total net return minus policy return.

## Value added for Norwegian Government Pension Fund Global

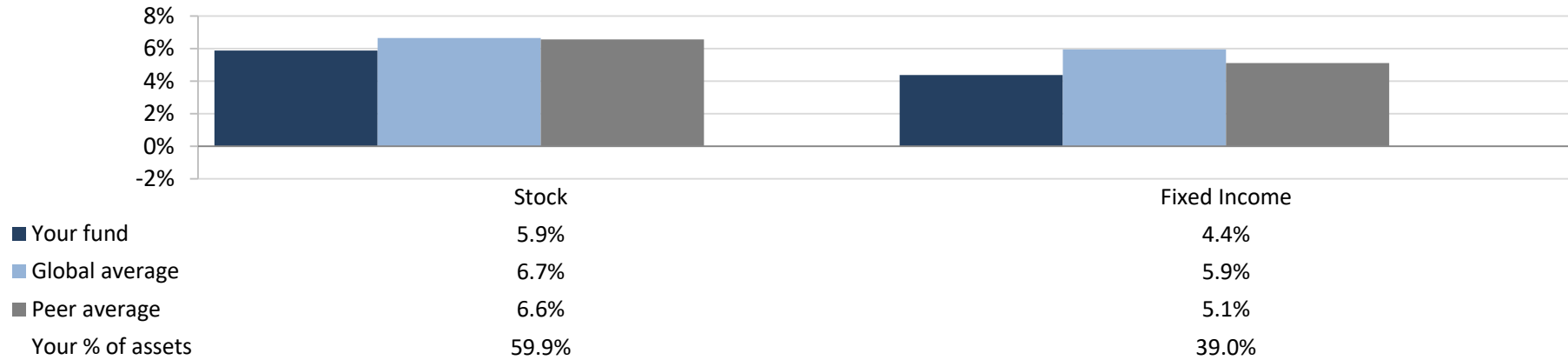
Year	Net Return	Policy Return	Net value Added
2017	13.6%	13.0%	0.6%
2016	6.9%	7.0%	-0.1%
2015	2.7%	2.1%	0.6%
2014	7.5%	8.3%	-0.8%
2013	15.9%	15.0%	0.9%
2012	13.4%	13.2%	0.1%
2011	-2.6%	-2.4%	-0.2%
2010	9.5%	8.6%	0.9%
2009	25.5%	21.5%	4.0%
2008	-23.4%	-19.9%	-3.5%
10-Year	6.1%	6.0%	0.1%

Your 10-year net value added of 0.1% compares to a median of -0.1% for your peers and 0.1% for the Global universe.

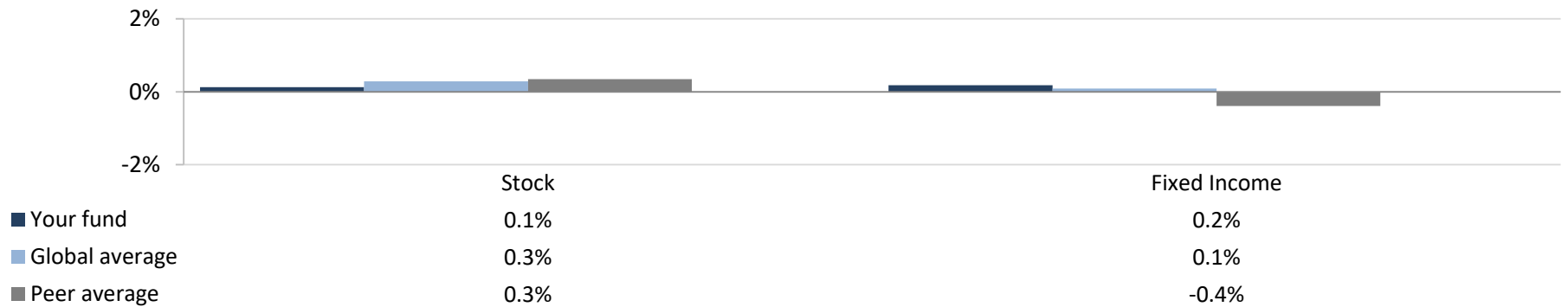


# Comparisons of your 10-year net return and net value added by major asset class.

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



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



## Your investment costs were €519.1 million or 6.1 basis points in 2017.

Asset management costs by asset class and style (€000s)	Internal Mgmt		External Mgmt		Total	
	Active	Overseeing of external	Active base fees	Perform. fees <sup>1</sup>		
Stock - U.S.		83	1,862	-337	1,608	
Stock - EAFE		1,212	21,744	3,404	26,360	
Stock - Emerging		3,683	57,108	95,921	156,712	
Stock - Global	108,209				108,209	
Fixed Income - Emerging			186		186	
Fixed Income - Global	41,515				41,515	
Real Estate <sup>1</sup>	54,425				54,425	
Total excluding private asset performance fees					389,015	4.6bp
<b>Oversight, custodial and other costs <sup>2</sup></b>						
Oversight of the fund					73,798	
Trustee & custodial					41,965	
Consulting and performance measurement					10,050	
Audit					4,312	
Other					0	
Total oversight, custodial & other costs					130,125	1.5bp
Total investment costs (excl. transaction costs & private asset performance fees)					519,140	6.1bp

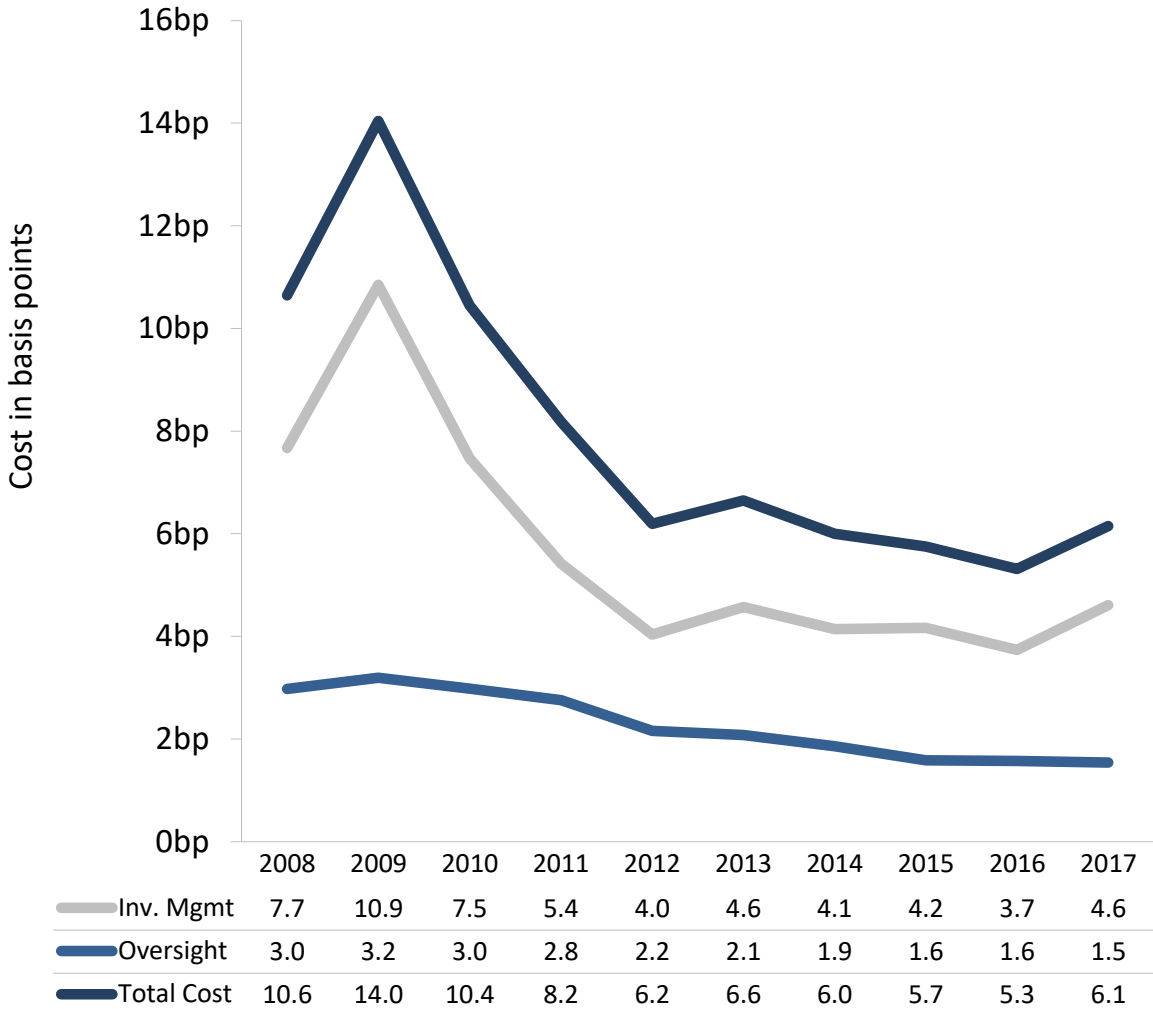
### Footnotes

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.

# Your costs decreased between 2008 and 2017.

Your costs decreased primarily because you increased your use of lower cost internal management from 86% to 95% in 2017.

Trend in your investment costs

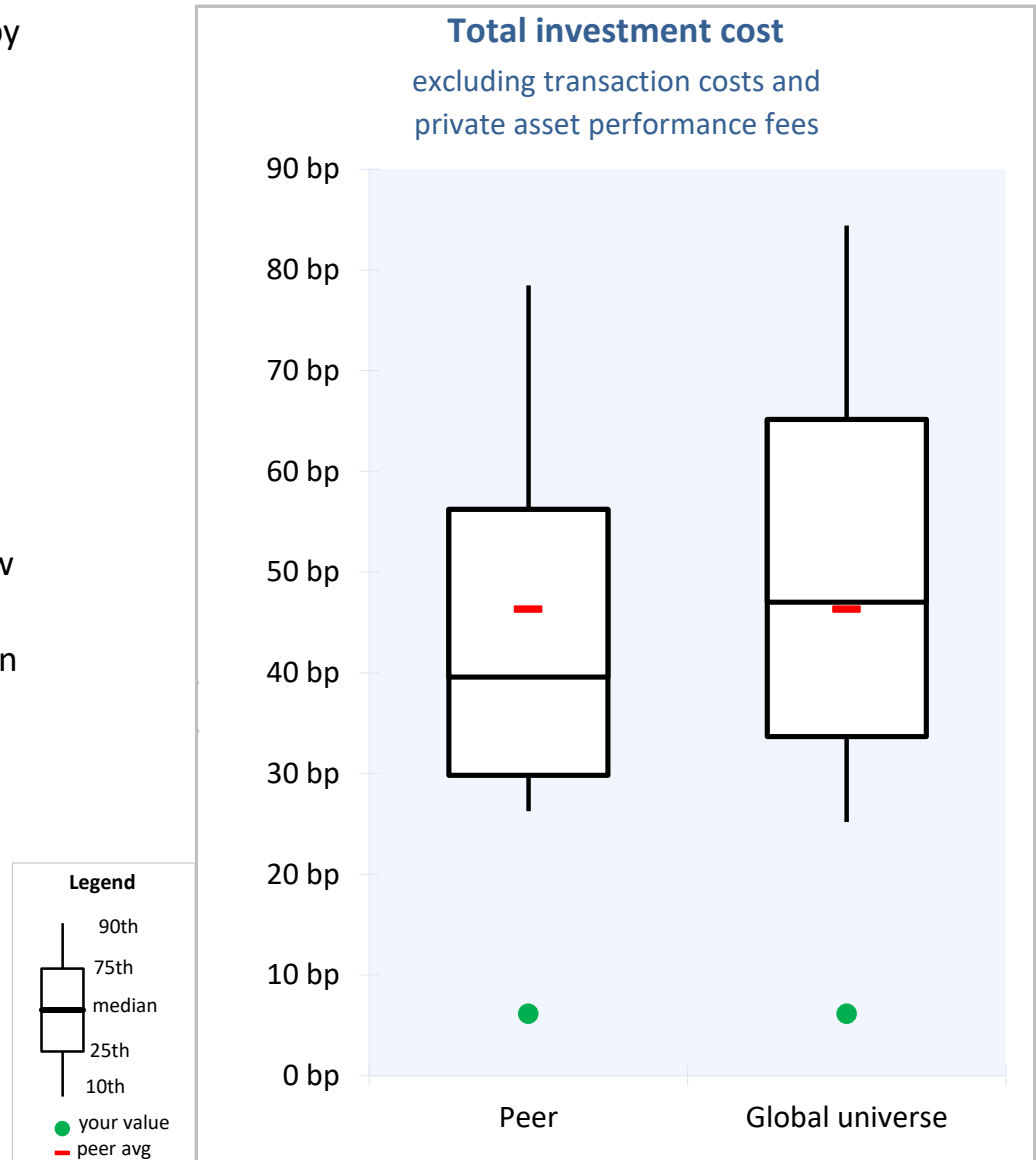


## Your total investment cost of 6.1 bps was the lowest of the peers and was substantially below the peer median of 39.6 bps.

Differences in total investment cost are often caused by two factors that are often outside of management's control:

- Asset mix, particularly holdings of the highest cost asset classes: real estate (excl REITS), infrastructure, hedge funds and private equity. These high cost assets equaled 2% of your funds assets at the end of 2017 versus a peer average of 25%.
- 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 low cost by 10.9 basis points in 2017.

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 6.1 bp was below your benchmark cost of 17.0 bp. Thus, your cost savings was 10.9 bp.

### Your cost versus benchmark

	€000s	basis points
Your total investment cost	519,140	6.1 bp
Your benchmark cost	1,437,094	17.0 bp
Your excess cost	(917,954)	(10.9) bp

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

### Reasons for your low cost status

	Excess Cost/ (Savings)	
	€000s	bps
1. Lower cost implementation style		
• Less external active management (more lower cost internal)	(743,999)	(8.8)
• Less overlays	(82,676)	(1.0)
• Other style differences	87,051	1.0
	<u>(739,624)</u>	<u>(8.8)</u>
2. Paying less than peers for similar services		
• External investment management costs	(1,905)	(0.0)
• Internal investment management costs	(205,041)	(2.4)
• Oversight, custodial & other costs	28,617	0.3
	<u>(178,330)</u>	<u>(2.1)</u>
<b>Total savings</b>	<b>(917,954)</b>	<b>(10.9)</b>

## Alternative benchmark cost

	Average holdings in €mils	GPFG cost in bps	Cost comparison with median peer across all management styles (bps)			Cost comparison with median peer with similar management style (bps)		
			Benchmark cost	Difference to benchmark cost	Contribution to total cost difference	Benchmark cost	Difference to benchmark cost	Contribution to total cost difference
<b>External asset management</b>								
Stock - U.S.	664	24.2	8.5	(15.7)	(0.0)	31.1	6.9	0.0
Stock - EAFE	9,716	27.1	17.2	(9.9)	(0.1)	34.0	6.8	0.1
Stock - Emerging	29,535	53.1	33.8	(19.2)	(0.7)	50.9	(2.2)	(0.1)
Fixed Income - Emerging	583	3.2	19.9	16.7	0.0	26.0	22.8	0.0
<b>Internal asset management</b>								
Stock - Global	509,143	2.1	14.6	12.5	7.5	5.0	2.8	1.7
Fixed Income - Global	273,824	1.5	9.4	7.9	2.6	3.3	1.8	0.6
Real Estate ex-REITs	20,936	26.0	63.9	37.9	0.9	32.2	6.2	0.2
<b>Total, excl. Overlays and overhead</b>		<b>4.6</b>	<b>14.8</b>		<b>10.2</b>	<b>7.1</b>		<b>2.5</b>
Overlay programs	844,401	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Overhead	844,401	1.5	1.2	(0.3)	(0.3)	1.2	(0.3)	(0.3)
<b>Total</b>	<b>844,401</b>	<b>6.1</b>	<b>17.0</b>		<b>10.9</b>	<b>9.2</b>		<b>3.1</b>

Notes:

Internal Global stock uses All stock as the benchmark.

Internal Global fixed income uses All fixed income as the benchmark.



## High-level estimate of management costs incurred if GPFG were managed passively

	Average holdings in €mils	Current cost in bps	Benchmark target cost in bps
<b><i>External asset management</i></b>			
Stock - U.S.	664	24.2	0.8
Stock - EAFE	9,716	27.1	3.0
Stock - Emerging	29,535	53.1	3.4
Fixed Income - Emerging	583	3.2	2.0
<b><i>Internal asset management</i></b>			
Stock - Global	509,143	2.1	0.9
Fixed Income - Global	273,824	1.5	0.8
<b>Total, excl. real estate and overhead</b>		<b>4.6</b>	<b>1.0</b>
Real Estate ex-REITs	20,936	26.0	1.0
Overhead	844,401	1.5	1.5
<b>Total</b>	<b>844,401</b>	<b>6.1</b>	<b>2.6</b>

### Notes:

Internal passive asset class costs at the first quartile are used for the benchmark proxies for the externally managed assets.

Internal Global stock uses All stock as the benchmark.

Internal Global fixed income uses All fixed income as the benchmark.

Real estate uses the weighted average benchmark for stock and fixed income.

The benchmark result needs to be interpreted with caution since the value is very low and based on a limited number of observations.

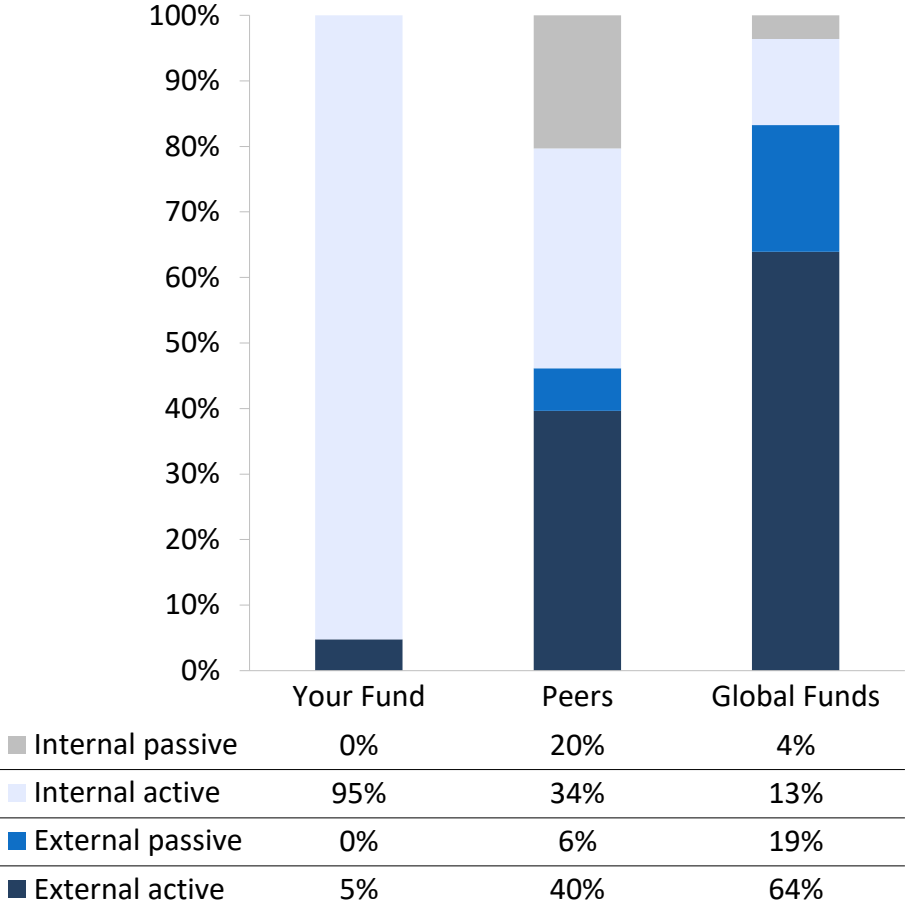
# Differences in cost performance are often caused by differences in implementation style.

Implementation style is defined as the way in which your fund implements asset allocation. It includes internal, external, active, passive and fund of funds styles.

The greatest cost impact is usually caused by differences in the use of:

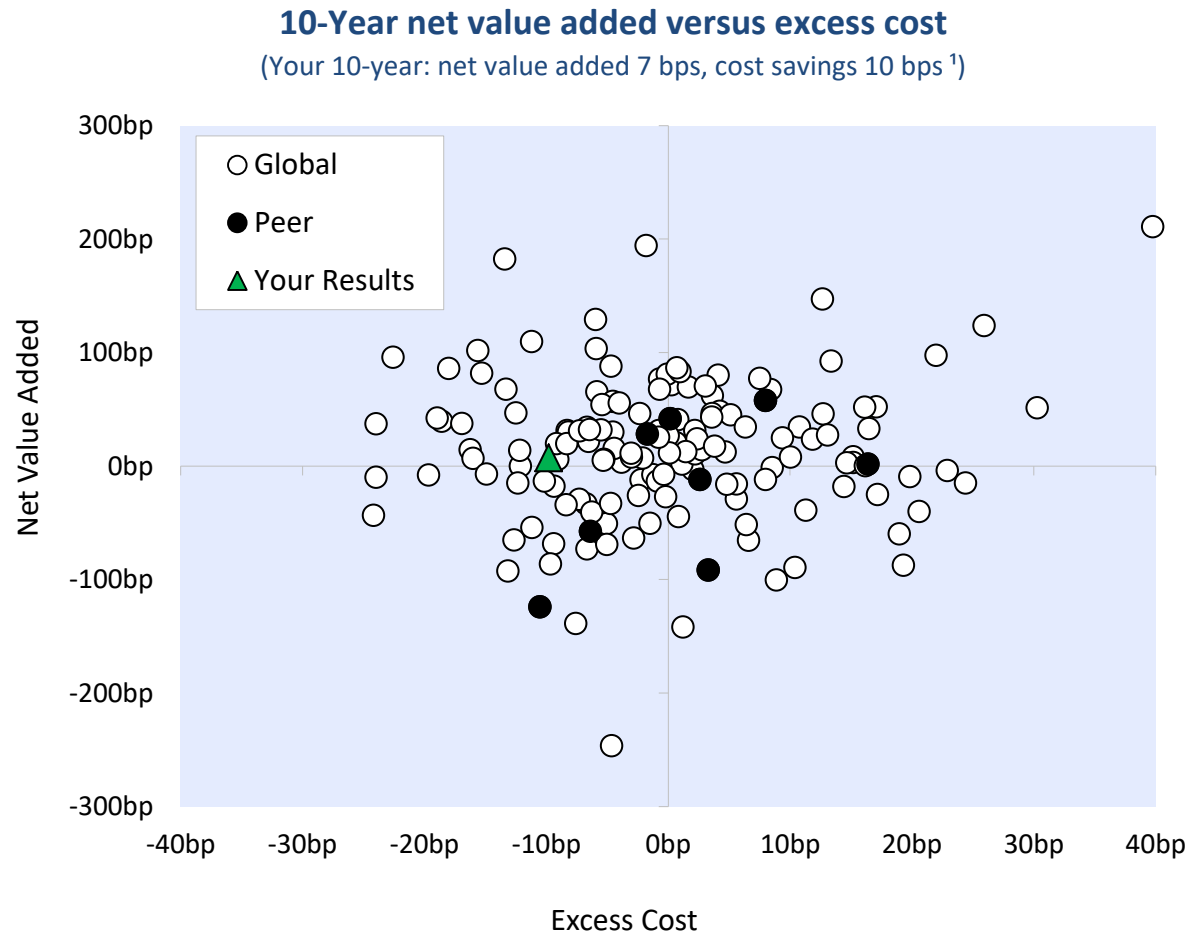
- External active management because it tends to be much more expensive than internal or passive management. You used less external active management than your peers (your 5% versus 40% for your peers).
- Within external active holdings, fund of funds usage because it is more expensive than direct fund investment. You had less in fund of funds. Your 0% of hedge funds, real estate and private equity in fund of funds compared to 11% for your peers.

Implementation style<sup>1</sup>



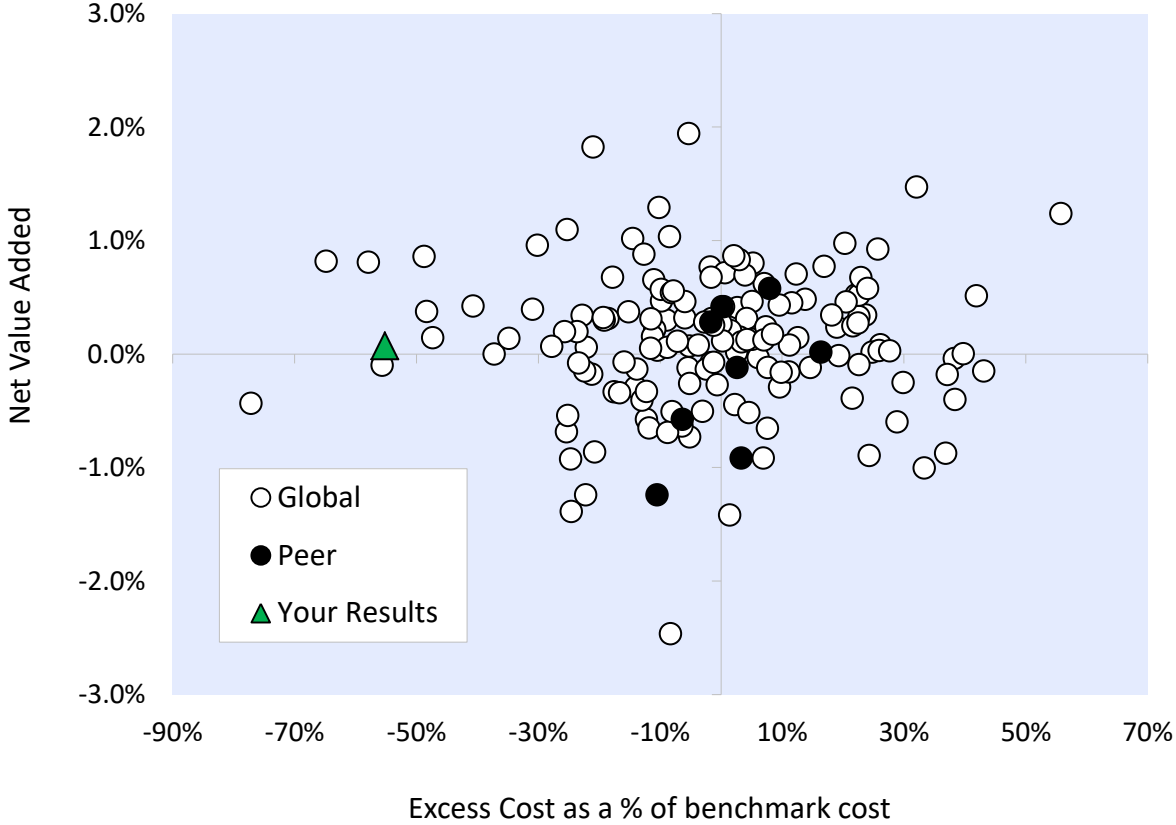
1. The graph above does not take into consideration the impact of derivatives. The values in the graph above are calculated using average holdings.

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



# 10-year Excess cost as a % of benchmark cost versus Net value added

10-year excess cost as a % of BM cost vs. net value added



# 2

## Description of peer group and universe

Peer group	2
CEM global universe	3
Universe subsets	4
Implementation style, actual mix and policy mix:	
- by universe subset	5
- trends from 2013 to 2017	6
Implementation style by asset class	7
Actual mix from 2013 to 2017	8
Policy mix from 2013 to 2017	9

## Peer group

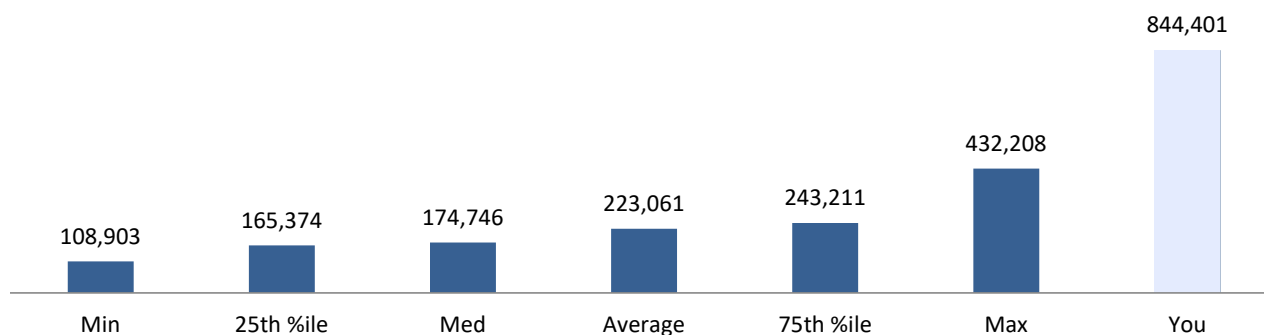
Your peer group is comprised of 10 Global funds, with assets ranging from €108.9 billion to €432.2 billion versus your €844.4 billion. The median size is €174.7 billion.

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 - 2017

	Your Plan	Peers	Global average
<u>Plan Assets (\$ billions)</u>			
Range	844.4	108.9 - 432.2	0.1 - 844.4
Median		174.7	5.7
<u># of Plans</u>			
Corporate		0	151
Public	1	8	149
Other		2	47
Total	1	10	347
<u>Implementation style</u>			
% External active	4.8	39.7	63.9
% External passive	0.0	6.5	19.3
% Internal active	95.2	33.5	13.2
% Internal passive	0.0	20.3	3.6
<u>Asset mix</u>			
% Stock	65.0	42.1	42.8
% Fixed Income	32.5	28.8	37.7
% Real Assets	2.5	14.3	9.2
% Private Equity	0.0	9.1	4.7
% Hedge Funds & Other	0.0	5.8	5.6

### Total fund assets (€ millions) - you versus peers

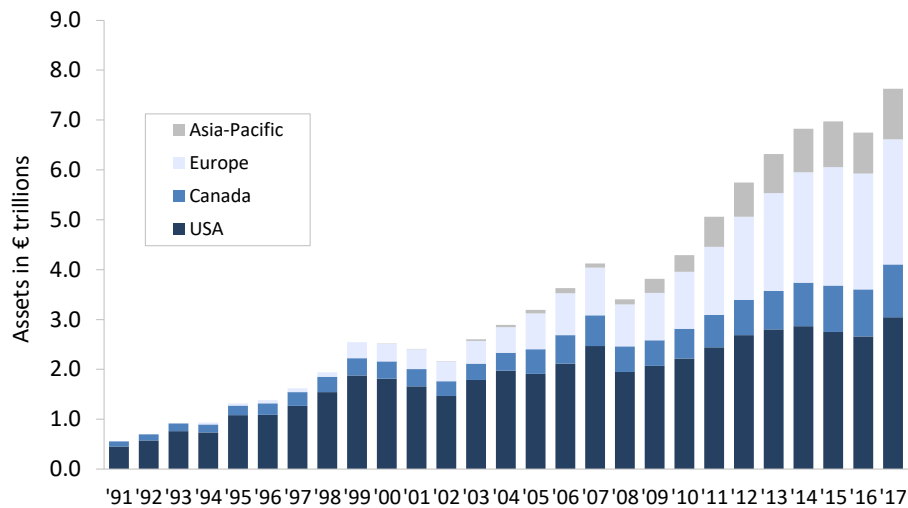


## CEM global universe

CEM has been providing investment benchmarking solutions since 1991. The 2017 survey universe is comprised of 347 funds representing €7.6 trillion in assets. The breakdown by region is as follows:

- 166 U.S. pension funds with aggregate assets of €3.0 trillion.
- 79 Canadian pension funds with aggregate assets of €1.1 trillion.
- 89 European pension funds with aggregate assets of €2.5 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Denmark, UK, and Ireland.
- 8 Asia-Pacific pension funds with aggregate assets of €780.0 billion.

CEM global universe



## Universe subsets

CEM's global survey universe is comprised of 347 funds with total assets of €7.6 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 10 Global funds ranging in size from €108.9 - €432.2 billion. The peer median of €174.7 billion compares to your €844.4 billion.
- Global - The global universe is comprised of 347 funds ranging in size from €0.1 - €844.4 billion. The median fund is €5.7 billion.

### Universe subsets by number of funds and assets

	Peer group <sup>1</sup>	Global by type				Global by Country				
		Corp.	Public	Other	Total	U.S.	Canada	Europe	Asia-Pacific	Total
<b># of funds</b>										
2017	10	151	149	47	347	166	79	89	13	347
2016	10	154	145	47	346	170	80	84	12	346
2015	10	161	148	55	364	176	80	95	13	364
2014	10	164	208	55	427	178	89	147	13	427
2013	10	185	201	63	449	193	90	155	11	449
2012	10	188	204	58	450	203	89	144	14	450
2011	10	195	115	67	377	204	89	70	14	377
2010	9	180	121	47	348	206	95	38	9	348
2009	9	177	116	44	337	208	93	27	9	337
2008	8	175	116	48	339	214	90	23	12	339
<b># of funds with uninterrupted data for:</b>										
1 yr	10	151	149	47	347	166	79	89	13	347
2 yrs	10	137	136	41	314	153	71	78	12	314
3 yrs	10	117	126	39	282	138	59	73	12	282
4 yrs	10	107	125	37	269	133	56	69	11	269
5 yrs	10	99	120	35	254	123	54	68	9	254
6 yrs	10	91	116	29	236	118	52	59	7	236
7 yrs	10	87	78	28	193	115	48	23	7	193
8 yrs	9	80	73	22	175	106	48	17	4	175
9 yrs	9	76	67	21	164	99	47	14	4	164
10 yrs	8	68	66	21	155	91	47	14	3	155
<b>Total assets (€ billions)</b>										
2017	2,231	1,161	4,981	1,486	7,628	3,047	1,056	2,509	1,016	7,628
2016	1,954	1,078	4,309	1,361	6,748	2,661	940	2,324	823	6,748
2015	1,935	1,100	4,467	1,404	6,971	2,747	934	2,376	914	6,971
2014	1,863	1,162	4,377	1,286	6,825	2,867	871	2,215	873	6,825
2013	1,705	1,104	4,056	1,156	6,316	2,803	765	1,967	780	6,316
2012	1,573	1,094	3,796	854	5,744	2,687	707	1,665	685	5,744
2011	1,366	1,074	3,224	763	5,061	2,443	644	1,368	605	5,061
2010	1,202	939	2,742	609	4,290	2,215	598	1,142	335	4,290
2009	1,083	858	2,359	598	3,815	2,071	512	952	281	3,815
2008	862	735	2,104	566	3,404	1,950	513	838	104	3,404
<b>2017 asset distribution (€ billions)</b>										
Avg	223.1	7.7	33.4	31.6	22.0	18.4	13.4	28.2	78.2	22.0
Max	432.2	51.5	844.4	409.4	844.4	261.6	177.0	844.4	432.2	844.4
75th %ile	243.2	10.0	28.2	30.7	18.0	19.8	7.6	19.2	60.2	18.0
Median	174.7	3.3	7.4	9.7	5.7	7.2	3.0	6.0	33.1	5.7
25th %ile	165.4	1.4	2.6	2.4	1.8	2.2	1.1	2.4	17.4	1.8
Min	108.9	0.1	0.1	0.2	0.1	0.2	0.1	0.3	2.2	0.1

1. Peer group statistics are for your 2017 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 - 2017 (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	4.8	37.5	68.1	55.6	57.8	61.3	69.8	63.4	47.0	38.8	61.3
Fund of funds	0.0	2.1	2.4	2.9	2.3	2.6	2.8	1.6	3.3	1.6	2.6
External passive	0.0	6.5	19.9	19.6	16.7	19.3	19.8	11.1	26.2	16.3	19.3
Internal active	95.2	33.5	7.7	16.9	19.0	13.2	4.7	19.3	20.5	33.5	13.2
Internal passive	<u>0.0</u>	<u>20.3</u>	<u>2.0</u>	<u>5.1</u>	<u>4.2</u>	<u>3.6</u>	<u>3.0</u>	<u>4.6</u>	<u>3.0</u>	<u>9.9</u>	<u>3.6</u>
Total	100	100	100	100	100	100	100	100	100	100	100
<b>Actual asset mix</b>											
Stock	65.0	42.1	36.3	49.2	43.1	42.8	41.2	44.1	43.7	48.5	42.8
Fixed income	32.5	29.8	49.5	26.9	37.7	38.2	39.0	37.7	38.2	29.8	38.2
Global TAA	0.0	0.1	0.9	1.3	0.1	1.0	1.1	0.4	1.2	0.5	1.0
Real assets	2.5	14.3	5.7	11.8	12.0	9.2	7.2	12.2	9.7	13.0	9.2
Hedge funds	0.0	3.7	3.8	3.2	2.4	3.4	4.8	2.0	1.9	3.0	3.4
Balanced Funds	0.0	0.0	0.0	0.9	0.0	0.4	0.0	0.0	1.6	0.0	0.4
Risk Parity	0.0	1.0	0.3	0.5	0.4	0.4	0.6	0.2	0.0	0.6	0.4
Private equity	<u>0.0</u>	<u>9.1</u>	<u>3.5</u>	<u>6.2</u>	<u>4.3</u>	<u>4.7</u>	<u>5.9</u>	<u>3.4</u>	<u>3.7</u>	<u>4.7</u>	<u>4.7</u>
Total	100	100	100	100	100	100	100	100	100	100	100
<b>Policy asset mix</b>											
Stock	64.8	45.5	36.3	49.0	42.3	42.5	40.9	43.4	43.6	51.8	42.5
Fixed income	31.8	29.9	49.3	26.9	37.6	38.1	38.6	38.8	38.0	28.2	38.1
Global TAA	0.0	0.2	0.9	1.4	0.1	1.0	1.1	0.6	1.2	0.6	1.0
Real assets	3.4	13.1	5.8	12.6	12.7	9.7	7.6	12.7	10.3	12.7	9.7
Hedge funds	0.0	2.8	3.8	2.8	2.8	3.2	4.8	1.4	2.2	1.9	3.2
Balanced Funds	0.0	0.0	0.0	0.4	0.0	0.2	0.0	0.0	0.7	0.0	0.2
Risk Parity	0.0	1.1	0.2	0.5	0.5	0.4	0.6	0.2	0.1	0.7	0.4
Private equity	<u>0.0</u>	<u>7.4</u>	<u>3.8</u>	<u>6.4</u>	<u>4.0</u>	<u>4.9</u>	<u>6.4</u>	<u>3.0</u>	<u>4.0</u>	<u>4.2</u>	<u>4.9</u>
Total	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 implementation style and asset mix using average assets rather than year-end.

## Implementation style, actual mix and policy mix trends

### Implementation style, actual mix and policy mix - 2013 to 2017 (as a % of year-end assets)

	Your fund <sup>1</sup>					Peer average <sup>2</sup>					Global average <sup>2</sup>				
	2017	2016	2015	2014	2013	2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
<b>Implementation style</b>															
External active	4.8	4.3	4.1	4.1	3.7	38.8	38.9	38.2	37.5	54.7	64.4	64.2	64.2	63.9	65.2
External passive	0.0	0.0	0.0	0.0	0.0	5.8	5.6	6.5	6.6	6.2	16.4	16.7	17.1	17.3	16.5
Internal active	95.2	95.7	95.9	95.9	96.3	37.4	37.9	37.0	37.2	20.6	14.7	14.5	13.9	13.8	13.1
Internal passive	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>18.0</u>	<u>17.6</u>	<u>18.2</u>	<u>18.8</u>	<u>18.4</u>	<u>4.5</u>	<u>4.7</u>	<u>4.7</u>	<u>5.0</u>	<u>5.3</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
<b>Actual asset mix</b>															
Stock	65.0	60.3	61.9	61.2	62.7	41.8	40.9	42.5	43.3	43.4	40.9	41.0	42.2	43.5	45.6
Fixed income	32.5	36.6	35.4	37.4	36.4	28.7	29.5	29.7	30.4	29.2	37.6	37.3	36.6	37.1	35.3
Global TAA	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	1.0	1.3	1.6	1.6	1.4
Real assets	2.5	3.1	2.7	1.4	0.9	15.5	15.8	14.6	13.6	14.0	10.2	10.1	9.4	8.5	8.5
Hedge funds	0.0	0.0	0.0	0.0	0.0	3.7	3.6	3.4	2.8	3.4	3.8	4.1	4.2	3.9	3.9
Balanced Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Risk Parity	0.0	0.0	0.0	0.0	0.0	0.6	0.5	0.3	0.1	0.0	0.5	0.2	0.2	0.2	0.1
Private equity	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>9.6</u>	<u>9.6</u>	<u>9.4</u>	<u>9.7</u>	<u>9.9</u>	<u>6.0</u>	<u>5.9</u>	<u>5.7</u>	<u>5.2</u>	<u>5.2</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
<b>Policy asset mix</b>															
Stock	64.8	62.2	61.6	61.1	60.9	46.6	47.1	45.4	44.9	44.9	41.2	41.8	42.9	43.3	44.8
Fixed income	31.8	35.3	35.3	36.7	38.1	28.9	29.4	29.7	30.3	29.9	37.6	37.3	36.7	36.8	36.4
Global TAA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.3	1.4	1.4	1.4
Real assets	3.4	2.5	3.1	2.2	1.0	14.1	13.5	13.3	13.2	13.2	10.4	10.0	9.4	9.1	8.7
Hedge funds	0.0	0.0	0.0	0.0	0.0	2.5	2.1	2.9	3.0	3.8	3.3	3.5	3.6	3.5	3.1
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	0.6	0.6	0.6	0.6	0.0	0.4	0.2	0.2	0.2	0.1
Private equity	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>7.3</u>	<u>7.3</u>	<u>8.0</u>	<u>8.0</u>	<u>8.2</u>	<u>6.0</u>	<u>5.9</u>	<u>5.8</u>	<u>5.6</u>	<u>5.5</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 155 Global and 8 peer funds with 10 or more consecutive years of data ending 2017.

## 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 - 2017 (as a % of average assets)

	Your fund %				Peer average %				Global average %				
	External		Internal		External		Internal		External		Internal		
	Active	FOFs	Index	Active	Index	Active	FOFs	Index	Active	Index	Active	Index	
Stock - U.S.	100.0		0.0	0.0	0.0	22.0	31.2	9.1	37.6	41.7	42.1	8.9	7.3
Stock - EAFE	100.0		0.0	0.0	0.0	43.4	20.9	12.0	23.7	51.4	26.8	18.3	3.6
Stock - Global	0.0		0.0	100.0	0.0	31.8	0.0	47.8	20.5	62.1	25.9	10.2	1.8
Stock - Other						27.6	0.0	47.3	25.1	68.1	8.5	16.1	7.2
Stock - Emerging	100.0		0.0	0.0	0.0	60.6	5.3	12.6	21.4	75.7	16.5	5.6	2.2
Stock - ACWI x U.S.						0.0	0.0	0.0	0.0	70.7	28.7	0.6	0.0
<b>Total Stock</b>	<b>7.3</b>		<b>0.0</b>	<b>92.7</b>	<b>0.0</b>	<b>34.4</b>	<b>13.7</b>	<b>25.3</b>	<b>26.7</b>	<b>56.5</b>	<b>28.5</b>	<b>10.9</b>	<b>4.1</b>
Fixed Income - U.S.						41.8	0.0	50.4	7.8	58.4	24.0	15.2	2.4
Fixed Income - EAFE						1.6	0.0	98.4	0.0	33.8	32.3	28.3	5.5
Fixed Income - Global	0.0		0.0	100.0	0.0	13.4	0.0	69.3	17.3	62.2	9.1	25.0	3.8
Fixed Income - Other						14.3	0.0	4.4	81.3	61.6	11.0	22.0	5.4
Fixed Income - Long Bonds						6.7	0.0	21.2	72.1	78.7	12.2	5.2	3.8
Fixed Income - Emerging	100.0		0.0	0.0	0.0	64.1	0.0	35.9	0.0	82.7	4.4	12.4	0.5
Fixed Income - Inflation Indexed						5.7	12.5	65.2	16.5	10.8	42.0	26.1	21.2
Fixed Income - High Yield						94.5	0.0	5.3	0.2	92.7	1.0	6.2	0.1
Fixed Income - Mortgages						34.5	0.0	65.5	0.0	67.5	8.2	17.3	7.0
Fixed Income - Private Debt						45.7	0.0	54.3	0.0	74.6	0.0	19.9	5.5
Fixed Income - Bundled LDI						0.0	0.0	0.0	0.0	27.2	49.5	23.4	0.0
Fixed Income - Convertibles						100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Cash						11.1		88.9		50.7		49.3	
<b>Total Fixed Income</b>	<b>0.2</b>		<b>0.0</b>	<b>99.8</b>	<b>0.0</b>	<b>22.0</b>	<b>1.1</b>	<b>47.9</b>	<b>29.0</b>	<b>61.0</b>	<b>16.9</b>	<b>17.7</b>	<b>4.5</b>
Commodities						1.8	0.0	98.2	0.0	60.2	12.9	19.4	7.5
Infrastructure						27.5	0.0	72.5		73.6	4.9	21.6	
Natural Resources						62.7	0.2	37.1		81.0	0.9	18.0	
REITs						8.0	0.0	92.0	0.0	73.2	17.0	6.5	3.4
Real Estate	0.0	0.0		100.0		62.6	0.5	37.0		77.0	6.5	16.5	
Other Real Assets						54.3		45.7		97.1		2.9	
<b>Total Real Assets</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>100.0</b>	<b>0.0</b>	<b>45.8</b>	<b>0.3</b>	<b>0.0</b>	<b>53.9</b>	<b>76.2</b>	<b>5.0</b>	<b>1.8</b>	<b>16.5</b>
Hedge Funds						81.9	18.1			68.4	31.6		
Global TAA						85.1		14.9		87.3		12.7	
Balanced Funds						0.0	0.0			62.4	37.6		
Risk Parity						55.9		44.1		93.3		6.7	
Diversified Private Equity						54.5	24.6	20.9		64.8	30.4	4.8	
Venture Capital						93.4	6.6	0.0		61.6	36.4	2.0	
LBO						78.1	1.6	20.2		93.2	4.3	2.4	
Private Credit						94.9	3.4	1.7		97.9	0.9	1.2	
Other Private Equity						99.9		0.1		89.5		10.5	
<b>Total Private Equity</b>						<b>64.1</b>	<b>16.9</b>	<b>19.0</b>		<b>72.1</b>	<b>23.4</b>	<b>4.5</b>	
<b>Total Fund - Avg. Holdings</b>	<b>4.8</b>	<b>0.0</b>	<b>0.0</b>	<b>95.2</b>	<b>0.0</b>	<b>36.6</b>	<b>2.1</b>	<b>6.6</b>	<b>34.1</b>	<b>61.2</b>	<b>2.6</b>	<b>19.4</b>	<b>13.2</b>

## Actual mix

### Actual asset mix - 2013 to 2017 (as a % of total average assets)

	Your fund <sup>1</sup>					Peer average %					Global average %				
	2017	2016	2015	2014	2013	2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
Stock - U.S.	0.1	0.1				12.3	12.2	13.0	13.6	14.0	12.2	13.4	13.5	13.0	14.5
Stock - EAFE	1.2	1.0				7.7	5.5	6.1	6.4	6.6	7.9	8.3	8.2	10.0	10.9
Stock - Global	60.3	56.3	61.9	61.2	62.7	12.4	14.2	13.2	12.4	11.1	12.8	11.7	11.7	13.1	12.0
Stock - Other						4.1	4.0	4.6	4.9	5.3	3.9	4.2	4.1	4.4	4.6
Stock - Emerging	3.5	2.8				5.5	5.2	5.5	5.5	5.3	3.5	3.0	2.9	3.0	3.0
Stock - ACWI x U.S.											2.6	2.6	2.7	2.3	2.5
Stock - Aggregate	65.0	60.3	61.9	61.2	62.7	42.1	41.0	42.4	42.9	42.3	42.8	43.3	43.2	45.8	47.6
Fixed Income - U.S.						4.6	4.8	5.0	4.7	4.2	5.7	6.1	6.7	5.5	5.8
Fixed Income - EAFE						3.5	3.7	3.6	3.3	3.2	3.9	3.7	4.4	4.7	5.0
Fixed Income - Global	32.4	36.3	35.4	37.4	36.4	6.4	3.4	3.1	2.4	2.8	2.9	2.7	2.9	3.2	3.2
Fixed Income - Other						6.7	9.6	10.0	11.1	11.5	5.4	6.0	6.0	5.8	5.4
Fixed Income - Long Bonds						1.5	1.4	1.4	1.3	1.2	11.2	10.2	9.8	8.7	7.4
Fixed Income - Emerging	0.1	0.3				1.1	1.0	1.0	1.0	1.1	1.1	1.0	1.1	1.1	1.1
Fixed Income - Inflation Indexed						2.5	2.8	2.5	2.5	2.4	2.1	2.4	2.0	2.0	2.1
Fixed Income - High Yield						1.0	0.9	1.1	1.0	1.0	1.2	1.3	1.3	1.1	1.3
Fixed Income - Mortgages						0.8	1.3	1.3	1.3	1.2	0.5	0.4	0.4	0.3	0.3
Fixed Income - Private Debt						0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.3
Fixed Income - Bundled LDI											1.1	0.2	0.1	0.1	0.1
Fixed Income - Convertibles						0.1					0.1	0.0	0.0	0.0	0.0
Cash						0.0	0.4	0.5	1.9	2.5	2.1	2.0	1.8	2.1	2.0
Fixed Income - Aggregate	32.5	36.6	35.4	37.4	36.4	28.8	30.0	30.1	31.0	31.7	37.7	36.6	37.0	34.9	34.0
Commodities						1.0	1.0	1.0	1.2	1.5	0.3	0.3	0.3	0.4	0.5
Infrastructure						2.9	2.6	2.3	2.0	2.0	1.9	1.8	1.4	1.1	0.9
Natural Resources						0.9	0.9	0.7	0.7	0.8	0.5	0.4	0.3	0.3	0.2
REITs						1.2	1.4	1.4	1.3	1.4	0.7	0.6	0.6	0.5	0.5
Real Estate	2.5	3.1	2.7	1.4	0.9	8.0	8.3	7.9	7.2	7.4	5.6	5.8	5.5	5.3	5.0
Other Real Assets						0.2	0.2	0.1	0.3	0.2	0.2	0.3	0.3	0.3	0.3
Real Assets	2.5	3.1	2.7	1.4	0.9	14.3	14.4	13.4	12.7	13.3	9.2	9.1	8.5	7.8	7.4
Hedge Funds						3.7	3.6	3.4	2.9	3.3	3.4	3.8	3.8	3.6	3.6
Global TAA						0.1	0.6	0.6	0.6	0.6	1.0	1.2	1.7	2.8	2.5
Balanced Funds											0.4	0.4	0.4	0.4	0.4
Risk Parity						1.0	0.4	0.2	0.1		0.4	0.2	0.2	0.2	0.1
Diversified Private Equity						6.2	6.5	6.0	5.5	5.6	3.3	3.5	3.4	3.1	3.1
Venture Capital						0.2	0.1	0.1	0.3	0.3	0.2	0.2	0.3	0.2	0.2
LBO						2.1	2.1	2.2	2.6	2.6	0.5	0.5	0.5	0.5	0.4
Private Credit						0.3					0.4	0.2	0.2	0.1	0.0
Other Private Equity						0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2
Private Equity						9.1	9.0	8.7	8.7	8.8	4.7	4.8	4.6	4.1	3.9
Derivatives/Overlays Mkt Value						0.9	1.0	1.2	1.2	0.0	0.5	0.5	0.6	0.5	0.6
Total Fund	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count	1	1	1	1	1	10	10	10	10	10	347	346	364	427	449
Median Assets (€ billions)	844.4	776.1	783.2	655.7	568.2	174.7	161.8	163.2	148.6	136.9	5.7	4.8	4.5	3.4	3.0

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

## Policy mix

### Policy asset mix - 2013 to 2017 (as a % of total assets)

	Your fund %					Peer average %					Global average %				
	2017	2016	2015	2014	2013	2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
Stock - U.S.						9.4	9.9	9.8	10.2	10.4	11.4	12.3	12.6	11.7	13.0
Stock - EAFE						6.4	4.6	4.6	4.6	4.5	7.3	7.7	7.6	9.4	10.1
Stock - Global	64.8	62.2	61.6	61.1	60.9	22.6	23.6	20.3	18.6	17.5	14.6	13.9	13.4	14.6	13.3
Stock - Other						3.1	2.9	3.0	3.9	4.1	3.7	4.0	4.3	4.3	4.5
Stock - Emerging						3.9	3.8	4.2	4.2	4.5	2.9	2.7	2.8	2.7	2.7
Stock - ACWI x U.S.											2.7	2.8	3.0	2.6	2.4
Stock - Aggregate	64.8	62.2	61.6	61.1	60.9	45.5	44.8	42.0	41.5	41.1	42.5	43.3	43.6	45.2	46.2
Fixed Income - U.S.						5.1	5.0	6.0	5.9	5.1	6.0	6.2	6.8	5.9	6.6
Fixed Income - EAFE						4.4	4.5	4.2	3.9	3.8	3.9	3.8	4.5	4.8	5.2
Fixed Income - Global	31.8	35.3	35.3	36.7	38.1	5.5	2.5	2.6	3.2	3.3	3.1	3.1	3.1	3.4	3.3
Fixed Income - Other						6.8	10.2	11.2	11.9	12.1	6.0	6.4	6.3	6.2	6.0
Fixed Income - Long Bonds						1.2	1.2	1.2	1.1	1.3	11.7	10.7	10.4	9.2	8.3
Fixed Income - Emerging						1.2	1.0	1.1	1.0	1.3	1.0	1.0	1.1	1.0	1.2
Fixed Income - Inflation Indexed						3.1	3.1	3.0	3.0	3.0	2.3	2.6	2.2	2.1	2.2
Fixed Income - High Yield						0.8	0.9	0.6	0.6	0.5	1.2	1.4	1.4	1.2	1.3
Fixed Income - Mortgages						0.3	1.0	0.6	0.6	0.7	0.5	0.4	0.4	0.2	0.2
Fixed Income - Private Debt						0.5	0.3	0.0	0.0	0.2	0.5	0.5	0.5	0.3	0.3
Fixed Income - Bundled LDI											1.2	0.1	0.1	0.1	0.1
Fixed Income - Convertibles											0.1	0.0	0.0	0.0	0.0
Cash						0.9	0.9	0.5	0.6	0.4	0.6	0.9	0.7	0.8	0.8
Fixed Income - Aggregate	31.8	35.3	35.3	36.7	38.1	29.9	30.3	31.0	31.8	31.8	38.1	37.2	37.5	35.2	35.4
Commodities						0.8	0.9	1.1	1.2	1.7	0.3	0.4	0.5	0.5	0.6
Infrastructure						2.5	2.1	2.3	2.1	2.2	2.0	1.9	1.6	1.4	1.1
Natural Resources						0.7	0.7	1.9	1.9	1.7	0.4	0.3	0.3	0.2	0.2
REITs						1.2	1.2	1.3	1.3	1.3	0.6	0.5	0.5	0.5	0.5
Real Estate	3.4	2.5	3.1	2.2	1.0	7.9	8.1	7.7	7.6	7.4	6.1	5.9	5.6	5.8	5.6
Other Real Assets						0.1	0.1	0.1	0.7	0.7	0.3	0.4	0.4	0.3	0.3
Real Assets	3.4	2.5	3.1	2.2	1.0	13.1	13.1	14.4	14.7	15.0	9.7	9.4	8.9	8.8	8.3
Hedge Funds						2.8	2.5	3.0	3.1	3.7	3.2	3.3	3.3	3.4	3.3
Global TAA						0.2	0.7	0.5	0.5	0.6	1.0	1.3	1.6	2.6	2.3
Balanced Funds											0.2	0.2	0.2	0.2	0.2
Risk Parity						1.1	0.5	0.5	0.5		0.4	0.2	0.2	0.2	0.1
Diversified Private Equity						7.1	8.0	8.5	7.9	7.9	4.0	4.1	3.9	3.7	3.6
Venture Capital						0.0					0.1	0.2	0.2	0.2	0.2
LBO											0.3	0.3	0.4	0.3	0.3
Private Credit						0.3					0.4	0.2	0.2	0.1	0.0
Other Private Equity											0.2	0.2	0.1	0.1	0.1
Private Equity						7.4	8.0	8.5	7.9	7.9	4.9	5.1	4.8	4.4	4.2
Total Fund	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count	1	1	1	1	1	10	10	10	10	10	347	346	364	427	449

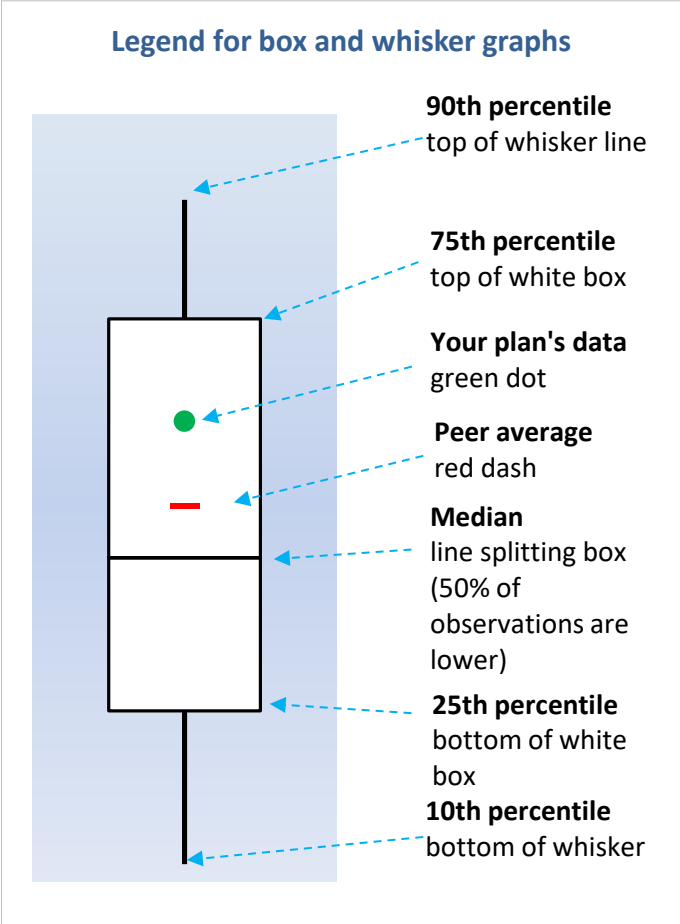
# 3

## Returns, Benchmarks and Value Added

Interpreting box and whisker graphs	2
Net total returns	3
Policy returns	4
Net value added	5
Net returns by asset class	6
Benchmark returns by asset class	7
Net value added by asset class	8
Your policy return and value added calculation:	
- 2017	9
- 2013 to 2017	10
Profit/Loss on overlay programs	11
Appendix - CEM's Private equity benchmark	12

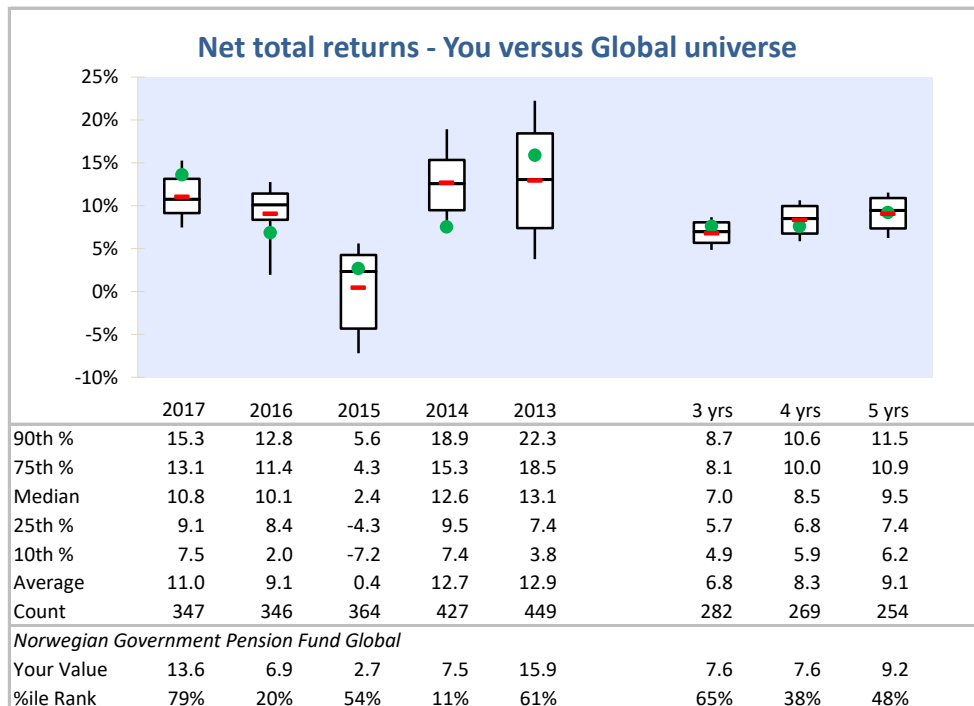
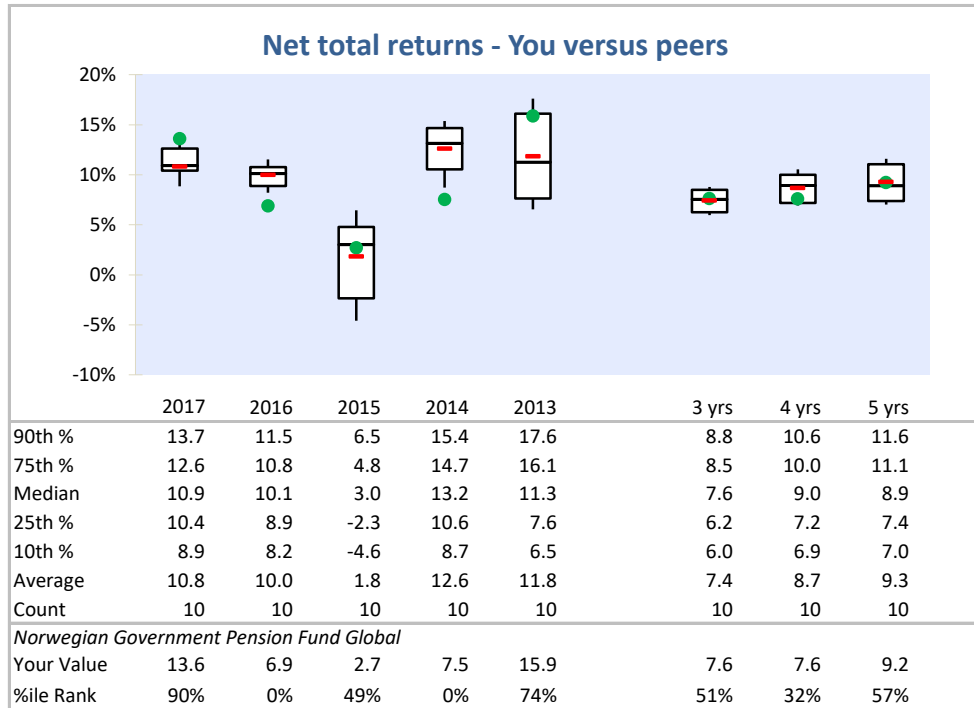
# Interpreting box and whisker graphs

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



## Net total returns

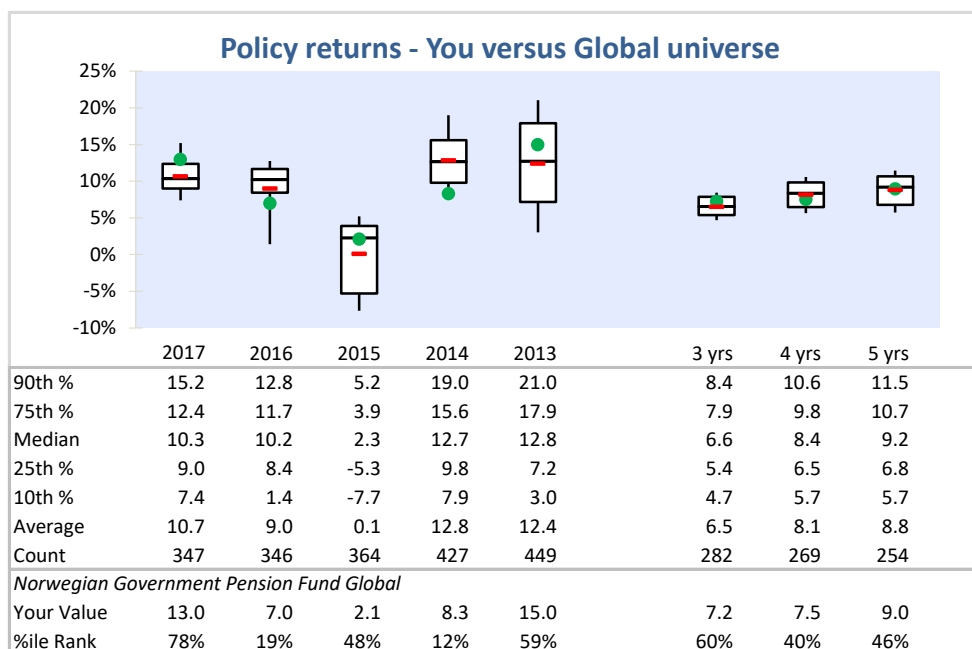
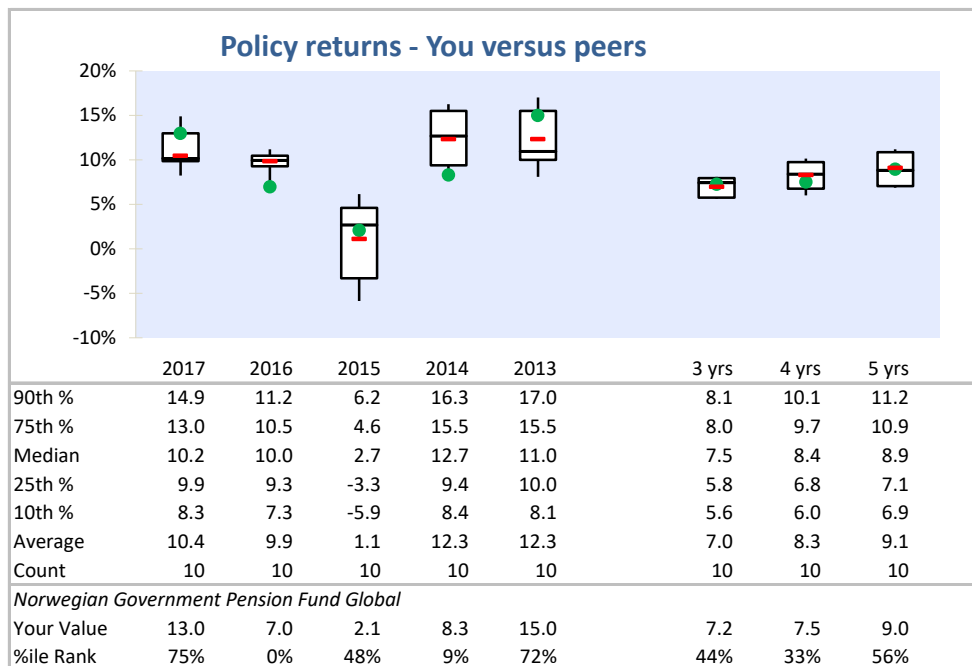
Your 5-year net total return of 9.2% was above the peer median and close to the Global universe median. Comparisons of total return do not help you understand the reasons behind relative performance. To understand the relative contributions from policy asset mix decisions and implementation decisions we separate total return into its more meaningful components - policy return and implementation value added.





## Policy returns

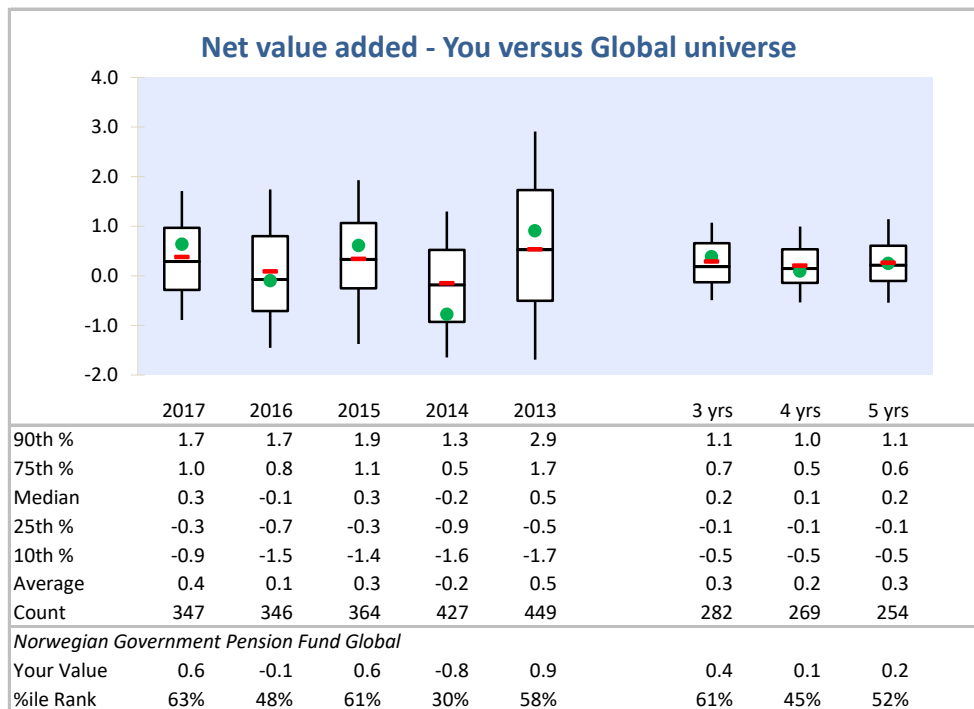
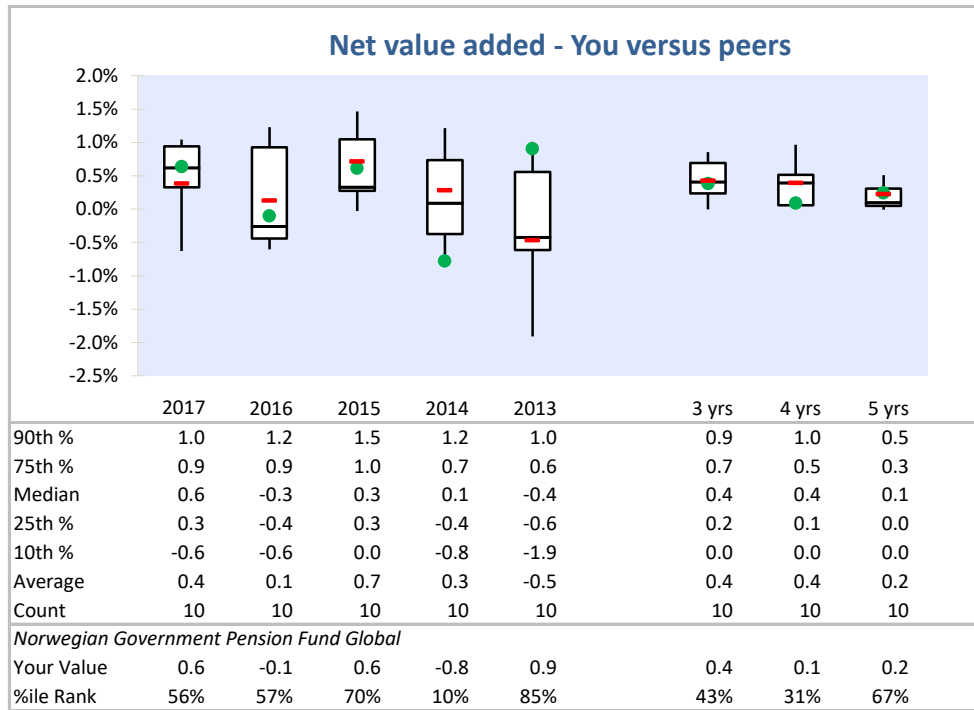
Your 5-year policy return of 9.0% was above the peer median and close to the Global universe median. Policy return is the return you would have earned had you passively implemented your policy asset mix decision through your benchmark portfolios.



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

## Net value added

Your 5-year net value added of 0.2% was above the peer median and close to the Global 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 %						Global average %					
	2017	2016	2015	2014	2013	5-yr <sup>1</sup>	2017	2016	2015	2014	2013	5-yr <sup>1</sup>	2017	2016	2015	2014	2013	5-yr <sup>1</sup>
Stock - U.S.	18.4	22.7					14.2	14.7	5.0	16.9	34.8	16.7	14.9	14.8	3.9	18.4	35.0	17.0
Stock - EAFE	27.2	2.1					20.1	5.0	3.7	1.7	21.9	10.6	19.7	3.7	3.6	2.7	25.8	10.8
Stock - Global	18.9	8.7	3.8	7.9	26.3	12.8	14.5	9.6	5.2	11.2	24.2	13.0	19.0	8.7	3.3	11.4	26.8	13.6
Stock - Other							15.5	17.2	-0.1	13.5	14.4	11.5	10.8	22.1	-11.4	9.4	17.5	8.2
Stock - Emerging	26.1	11.0					29.1	13.9	-10.2	6.2	-1.5	6.7	28.4	12.4	-10.1	5.2	-0.1	6.5
Stock - ACWI x U.S.							22.4	5.6	1.9	3.4	19.6	10.0						
Stock - Aggregate	19.4	8.7	3.8	7.9	26.3	12.9	17.4	11.7	1.9	10.8	23.3	12.8	18.1	11.2	0.8	10.6	25.7	12.9
Fixed Income - U.S.							-0.9	6.0	4.8	16.0	-2.6	4.5	0.1	6.1	3.9	13.6	-0.7	4.4
Fixed Income - EAFE							7.6	3.5	-5.2	5.3	2.0	2.5	7.0	0.7	-4.1	14.1	4.0	3.7
Fixed Income - Global	3.3	4.2	0.3	6.9	0.1	2.9	1.3	6.4	4.2	13.6	2.2	4.9	5.4	4.7	-1.6	9.2	3.1	3.4
Fixed Income - Other							61.0	29.7	4.7	10.2	6.7	24.6	6.1	7.2	-3.7	9.4	-0.3	3.2
Fixed Income - Long Bonds							5.0	6.8	-2.1	24.7	-2.9	6.0	6.2	9.6	-1.7	24.3	-8.3	5.7
Fixed Income - Emerging	5.8	13.1					5.9	9.9	-5.2	0.5	-6.9	0.7	8.2	12.2	-3.4	5.0	-5.4	3.3
Fixed Income - Inflation Indexed							2.4	5.6	-2.4	8.1	-5.9	1.7	2.1	7.7	-2.2	14.0	-4.0	2.3
Fixed Income - High Yield							2.0	15.2	1.8	11.9	9.9	7.5	3.9	13.0	-0.8	7.2	9.3	6.2
Fixed Income - Mortgages							5.4	5.5	2.8	11.0	2.4	5.8	5.6	6.0	-0.5	8.1	3.3	4.1
Fixed Income - Private Debt							1.1	10.4	4.4	6.1	8.8	6.5	5.0	6.0	1.9	7.5	7.6	5.7
Fixed Income - Bundled LDI													8.3	13.2	-9.2	66.5	-13.0	11.1
Fixed Income - Convertibles							6.7						7.4	4.3	-2.1	1.7	16.8	9.5
Cash							0.8	5.7	-2.2	5.9	1.9	2.3	-0.5	1.3	-0.7	3.4	1.3	0.9
Fixed Income - Aggregate	3.3	4.3	0.3	6.9	0.1	2.9	1.9	6.1	1.1	12.1	-1.2	3.7	4.2	6.9	-1.5	13.8	-1.2	4.0
Commodities							16.3	22.4	-36.2	-21.0	-10.3	-14.2	-0.4	15.3	-23.4	-11.5	-5.1	-7.7
Infrastructure							10.1	10.3	6.4	18.6	12.2	11.2	13.4	5.9	8.8	12.6	8.9	9.8
Natural Resources							1.8	-1.8	-8.6	11.0	5.0	0.2	2.6	8.1	-1.9	15.7	7.6	5.5
REITs							5.1	4.6	9.8	23.6	9.6	9.3	6.5	5.7	4.7	25.3	5.6	9.0
Real Estate	8.8	0.6	9.8	10.1	11.3	8.1	7.3	11.9	14.0	16.7	11.1	12.0	6.8	7.2	11.0	14.3	11.3	9.8
Other Real Assets							-9.7	3.7	1.9	14.4	12.6	2.3	-0.8	8.2	-4.7	9.9	4.2	3.2
Real Assets	8.8	0.6	9.8	10.1	11.3	8.1	6.1	10.5	7.7	14.2	9.1	9.3	6.7	7.1	8.0	13.5	9.5	8.8
Hedge Funds							-0.7	1.9	4.1	8.1	7.8	4.5	1.9	1.6	1.6	9.3	9.9	5.0
Global TAA							4.8	9.7	1.5	16.4	2.6	6.8	4.6	6.2	-0.1	9.2	7.6	4.5
Balanced Funds													14.7	-6.4	2.4	8.3	15.2	6.5
Risk Parity							8.6	16.1		15.3			8.0	14.3	-5.3	14.7	-2.2	5.7
Diversified Private Equity							14.0	13.0	12.6	18.3	18.4	15.1	13.1	9.3	12.5	19.8	15.1	14.0
Venture Capital							11.2	6.1	12.2	18.7	16.8	11.5	9.2	3.4	15.8	21.2	14.6	12.4
LBO							13.2	11.9	11.3	18.1	19.8	14.7	13.1	13.2	11.7	21.8	16.3	13.8
Private Credit							10.7						7.5	9.2	4.7	13.2	14.7	11.5
Other Private Equity							13.1	14.4	13.0	17.5	14.0	12.6	8.7	8.0	8.8	16.6	14.6	11.1
Private Equity							13.5	12.7	11.9	17.7	19.1	14.8	12.3	9.4	12.2	19.6	15.0	13.9
Total Fund Return	13.6	6.9	2.7	7.5	15.9	9.2	10.8	10.0	1.8	12.6	11.8	9.3	11.0	9.1	0.4	12.7	12.9	9.1

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 %						Global average %					
	2017	2016	2015	2014	2013	5-yr <sup>1</sup>	2017	2016	2015	2014	2013	5-yr <sup>1</sup>	2017	2016	2015	2014	2013	5-yr <sup>1</sup>
Stock - U.S.	18.9	16.1					13.9	16.2	5.4	18.5	34.6	17.8	14.8	15.3	4.1	19.1	33.9	17.1
Stock - EAFE	25.6	3.8					18.5	5.2	2.7	2.4	24.8	9.9	18.7	3.5	2.9	2.6	24.7	10.1
Stock - Global	18.7	8.6	3.0	8.7	25.0	12.5	14.7	10.3	3.8	9.1	23.9	12.5	17.0	9.8	2.8	11.5	25.5	13.0
Stock - Other							14.0	11.8	-1.0	8.0	14.4	8.1	10.9	20.6	-12.1	9.3	14.2	7.2
Stock - Emerging	20.5	10.7					28.9	13.6	-10.8	6.1	-1.9	6.3	29.2	13.1	-10.5	5.3	-0.6	6.3
Stock - ACWI x U.S.													21.2	6.7	0.1	3.2	17.3	9.3
Stock - Aggregate	18.7	8.6	3.0	8.7	25.0	12.5	17.1	11.3	1.7	9.8	22.3	12.2	17.4	11.7	0.3	10.7	24.3	12.5
Fixed Income - U.S.							-0.3	4.5	5.1	15.5	-2.3	4.3	-0.2	5.2	3.6	13.0	-1.5	3.9
Fixed Income - EAFE							7.2	3.6	-4.8	3.4	-0.8	1.6	6.5	0.3	-3.3	14.9	3.4	3.5
Fixed Income - Global	2.9	4.2	0.6	7.6	-0.2	3.0	1.0	5.3	3.5	11.6	0.8	4.1	4.2	3.1	-0.9	8.8	2.6	2.7
Fixed Income - Other							1.7	7.2	-1.0	8.3	5.8	5.0	3.5	6.6	-3.2	11.1	-0.3	2.5
Fixed Income - Long Bonds							3.9	5.4	-0.3	26.5	-5.4	5.7	6.0	9.0	-1.7	24.0	-8.9	5.4
Fixed Income - Emerging	2.9	13.0					5.9	10.6	-5.8	0.7	-5.2	1.0	7.1	11.3	-2.3	6.7	-4.7	3.7
Fixed Income - Inflation Indexed							2.0	5.6	-2.2	8.1	-8.3	1.3	2.3	7.6	-2.0	15.1	-3.8	2.7
Fixed Income - High Yield							1.5	14.7	-0.9	7.3	6.0	6.4	4.2	15.4	-1.8	6.9	8.6	6.6
Fixed Income - Mortgages							2.4	5.4	-2.7	6.5	-1.3	2.1	4.3	5.2	-2.6	5.3	0.6	1.9
Fixed Income - Private Debt							0.7	13.4	-2.0	4.6	7.2	4.7	4.0	5.6	-0.3	6.3	5.4	4.5
Fixed Income - Bundled LDI													7.9	11.5	-9.1	53.2	-4.4	10.8
Fixed Income - Convertibles							9.7						12.1	9.3	-0.8	2.5	18.6	8.8
Cash							-0.3	2.5	-1.7	3.0	1.2	0.5	-0.4	0.8	-1.1	3.0	1.2	0.5
Fixed Income - Aggregate	2.9	4.2	0.6	7.6	-0.2	3.0	1.8	5.7	-0.1	11.2	-2.5	3.0	4.1	6.4	-1.3	14.4	-1.8	3.9
Commodities							2.4	15.5	-28.2	-23.3	-2.2	-11.0	-0.1	12.4	-22.3	-12.3	-2.8	-7.0
Infrastructure							4.6	8.9	1.6	12.0	8.7	7.0	9.6	3.5	3.1	9.2	7.6	5.9
Natural Resources							1.4	7.5	-8.0	6.7	7.7	3.7	2.2	7.3	1.8	11.4	9.2	6.0
REITs							5.0	7.9	9.8	24.4	12.2	10.0	6.4	6.9	4.8	24.4	5.9	9.1
Real Estate	8.3	0.8	10.0	10.4	11.8	8.2	5.3	11.1	12.5	13.5	10.4	10.4	5.5	6.9	10.5	14.0	10.8	9.3
Other Real Assets							3.1	9.0	3.9	9.9	16.9	10.6	1.7	7.7	-2.8	8.6	9.0	5.3
Real Assets	8.3	0.8	10.0	10.4	11.8	8.2	4.4	10.7	6.1	12.0	9.7	8.4	5.7	6.5	6.8	12.2	9.0	7.8
Hedge Funds							1.0	4.7	3.0	8.6	5.4	4.7	3.0	3.0	2.6	8.0	7.9	5.0
Global TAA							7.0	9.1	9.3	13.9	10.5	9.9	6.7	4.8	3.1	7.9	9.2	5.8
Balanced Funds													20.9	-6.4	4.8	7.7	16.4	8.5
Risk Parity							9.9	14.7	-3.5	15.1			7.5	12.8	0.0	14.2	7.7	8.5
Diversified Private Equity <sup>1</sup>							12.1	14.9	4.3	19.2	30.6	15.7	15.5	10.5	5.4	20.5	30.9	16.0
Venture Capital <sup>1</sup>							10.6	18.4	1.9	23.4	27.1	16.1	14.7	9.7	6.5	21.1	30.5	16.0
LBO <sup>1</sup>							10.7	18.4	1.9	23.4	27.1	15.9	14.5	10.0	6.8	21.3	29.2	15.8
Private Credit <sup>1</sup>							15.1						16.0	10.9	5.7	17.6	32.9	15.7
Other Private Equity <sup>1</sup>							11.2	19.4	5.1	15.9	28.5	15.2	16.7	8.8	5.5	19.3	30.7	15.7
Private Equity							12.1	14.9	4.3	19.2	29.8	15.6	15.4	10.4	5.5	20.4	30.8	16.0
Total Policy Return	13.0	7.0	2.1	8.3	15.0	9.0	10.4	9.9	1.1	12.3	12.3	9.1	10.7	9.0	0.1	12.8	12.4	8.8

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

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

## Net value added by asset class

Asset class	Your fund %						Peer average %						Global average %					
	2017	2016	2015	2014	2013	5-yr <sup>1</sup>	2017	2016	2015	2014	2013	5-yr <sup>1</sup>	2017	2016	2015	2014	2013	5-yr <sup>1</sup>
Stock - U.S.	-0.5	6.6					0.3	-1.5	-0.3	-1.7	0.2	-0.5	0.0	-0.5	-0.2	-0.7	1.0	-0.1
Stock - EAFE	1.6	-1.7					1.6	-0.2	1.1	-0.7	-2.9	0.7	0.9	0.2	0.7	0.1	0.9	0.6
Stock - Global	0.2	0.1	0.8	-0.9	1.3	0.3	-0.3	-0.9	1.5	2.6	0.8	0.8	1.8	-1.1	0.4	-0.2	1.0	0.5
Stock - Other							1.5	8.0	-2.2	5.4	-1.9	2.7	-0.1	0.7	1.1	0.2	3.4	1.3
Stock - Emerging	5.6	0.4					0.2	0.3	0.7	-0.1	0.4	0.3	-0.9	-0.8	0.4	-0.1	0.5	0.2
Stock - ACWI x U.S.													1.2	-1.1	1.8	0.2	2.4	0.7
Stock - Aggregate	0.7	0.1	0.8	-0.9	1.3	0.4	0.3	0.2	0.6	1.2	1.2	0.7	0.6	-0.6	0.5	-0.1	1.4	0.4
Fixed Income - U.S.							-0.6	1.6	-0.3	0.6	-0.2	0.2	0.3	1.0	0.3	0.3	0.8	0.5
Fixed Income - EAFE							0.4	-0.1	-0.4	1.9	2.8	0.9	0.4	0.2	-0.2	-0.8	0.5	0.1
Fixed Income - Global	0.4	0.1	-0.3	-0.7	0.2	-0.1	0.3	0.4	0.2	0.4	0.1	0.3	1.4	1.7	-1.0	0.0	0.4	0.5
Fixed Income - Other							59.2	22.4	5.0	0.5	-1.6	18.8	2.6	0.7	-0.3	-0.4	0.4	1.0
Fixed Income - Long Bonds							1.1	0.8	-1.7	-1.8	2.5	0.3	0.3	0.3	-0.2	0.3	0.6	0.3
Fixed Income - Emerging	2.9	0.1					0.0	-0.7	0.6	-0.2	-1.8	-0.3	1.1	0.9	-1.0	-1.8	-0.7	-0.3
Fixed Income - Inflation Indexed							0.3	0.0	-0.2	0.0	1.2	0.4	-0.1	0.1	0.0	-1.3	-0.2	-0.2
Fixed Income - High Yield							0.5	0.5	0.3	3.5	2.1	0.7	-0.3	-2.1	1.1	0.0	0.3	-0.3
Fixed Income - Mortgages							1.9	1.1	2.3	3.0	3.1	2.0	1.1	0.6	1.6	2.0	3.0	2.0
Fixed Income - Private Debt							0.4	0.3	1.9	0.2	-0.9	0.4	1.0	0.5	2.2	0.8	2.6	1.5
Fixed Income - Bundled LDI													0.0	1.7	-0.2	13.3	-0.2	-0.3
Fixed Income - Convertibles							-2.9						-4.7	-5.0	-1.3	-0.8	-5.9	-0.4
Cash							1.6	3.9	-2.5	1.4	0.6	1.0	-0.1	0.5	0.0	0.2	0.0	0.3
Fixed Income - Aggregate	0.4	0.2	-0.3	-0.7	0.2	0.0	0.1	0.5	0.2	-0.1	0.9	0.3	0.1	0.5	-0.2	-0.7	0.6	0.0
Commodities							12.2	6.8	-8.0	2.3	-8.1	-3.1	0.0	2.1	-0.8	2.2	-1.8	0.0
Infrastructure							5.5	1.7	3.5	5.4	2.3	3.6	3.8	2.2	6.0	3.2	1.3	3.7
Natural Resources							0.1	-10.0	-0.5	4.3	-4.5	-8.0	0.5	0.5	-3.6	4.1	-2.3	-0.6
REITs							0.1	-2.1	0.0	-0.9	-2.6	-0.6	0.3	-1.3	-0.4	0.8	-0.3	-0.1
Real Estate	0.5	-0.2	-0.2	-0.3	-0.4	-0.1	2.1	0.9	-0.5	2.3	0.0	1.0	1.3	0.4	0.3	0.4	0.5	0.5
Other Real Assets							-12.9	-3.9	-2.0	2.2	-8.6	-8.3	-2.5	-0.1	-2.7	0.0	-5.8	-2.0
Real Assets	0.5	-0.2	-0.2	-0.3	-0.4	-0.1	1.7	0.0	0.2	1.3	-1.3	0.4	0.9	0.6	1.2	1.2	0.5	1.0
Hedge Funds							-1.7	-1.8	-2.7	-2.0	2.4	-1.1	-1.2	-1.2	-1.1	1.0	2.1	-0.2
Global TAA							-2.2	0.6	-7.8	2.6	-7.9	-3.1	-1.7	1.3	-3.3	1.2	-1.3	-1.3
Balanced Funds													-6.2	1.1	-2.8	0.5	-1.3	-1.9
Risk Parity							-1.3	1.4		0.2			0.5	1.6	-5.9	-0.1	-9.9	-2.8
Diversified Private Equity <sup>1</sup>							2.0	-1.1	7.3	-0.9	-12.1	-0.6	-2.5	-1.3	6.9	-0.7	-15.8	-2.0
Venture Capital <sup>1</sup>							0.5	-10.4	6.8	-6.8	-12.6	-5.3	-5.2	-6.6	9.0	-0.2	-15.6	-3.6
LBO <sup>1</sup>							2.5	-4.6	5.9	-7.4	-9.6	-2.1	-1.5	3.8	4.2	0.7	-12.9	-2.0
Private Credit <sup>1</sup>							-4.4						-8.2	-5.8	-0.2	-4.8	-19.8	-5.2
Other Private Equity <sup>1</sup>							1.9	-2.2	2.9	3.4	-17.5	-3.7	-7.9	-0.8	3.0	-3.2	-15.8	-4.8
Private Equity							1.4	-1.4	6.6	-1.5	-11.5	-0.9	-3.3	-1.0	6.5	-0.9	-15.7	-2.1
Total fund	0.6	-0.1	0.6	-0.8	0.9	0.2	0.4	0.1	0.7	0.3	-0.5	0.2	0.4	0.1	0.3	-0.2	0.5	0.3

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

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

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

## Your policy return and value added calculation - 2017

### 2017 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Return	Net return	Value added
Stock - U.S.		Custom	18.9%	18.4%	-0.5%
Stock - EAFE		Custom	25.6%	27.2%	1.6%
Stock - Global	64.8%	Your Stock: Global benchmark	18.7%	18.9%	0.2%
Stock - Emerging		Custom	20.5%	26.1%	5.6%
Fixed Income - Global	31.8%	Barclays Global Aggregate + Barclays Global Inflation	2.9%	3.3%	0.4%
Fixed Income - Emerging		Barclays Global Aggregate + Barclays Global Inflation	2.9%	5.8%	2.9%
Real Estate	3.4%	Custom	8.3%	8.8%	0.5%
<b>Total</b>	<b>100.0%</b>				
Net Actual Return (reported by you)					13.6%
Calculated Policy Return = sum of (policy weights X benchmark returns)				13.3%	
Adjustment to reflect rebalancing and overlay impacts				<u>-0.4%</u>	
Policy Return (reported by you)					<u>13.0%</u>
Net Value Added (Net Return - Policy Return)					0.6%

The fund return consists of Equity, Fixed Income and Real Estate. The fund benchmark is the weighted benchmark of Equity and Fixed Income, the benchmark for Real Estate used in the report is the actual portfolio return.

## Your policy return and value added calculations - 2013 to 2016

### 2016 Policy Return and Value Added

Asset class	Policy weight	Benchmark		Net return	Value added
		Description	Return		
Stock - U.S.		Custom	16.1%	22.7%	6.6%
Stock - EAFE		Custom	3.8%	2.1%	-1.7%
Stock - Global	62.2%	Your Stock: Glot	8.6%	8.7%	0.1%
Stock - Emerging		Your Stock: Eme	10.7%	11.0%	0.4%
Fixed Income - Global	35.3%	Barclays Global	4.2%	4.2%	0.1%
Fixed Income - Emerging		Custom	13.0%	13.1%	0.1%
Real Estate	2.5%	Custom	0.8%	0.6%	-0.2%
<b>Total</b>	<b>100.0%</b>				
Net Return (reported by you)					6.9%
Calculated policy return (sum: Policy weights x benchmarks)				6.8%	
Adjustment to reflect rebalancing and overlay impacts				<u>0.1%</u>	
Policy return (reported by you)					<u>7.0%</u>
Net Value Added (Net Return - Policy Return)					-0.1%

### 2014 Policy Return and Value Added

Asset class	Policy weight	Benchmark		Net return	Value added
		Description	Return		
Stock - Global	61.1%	Your Stock: Glot	8.7%	7.9%	-0.9%
Fixed Income - Global	36.7%	Barclays Global	7.6%	6.9%	-0.7%
Real Estate	2.2%	Custom	10.4%	10.1%	-0.3%
<b>Total</b>	<b>100.0%</b>				
Net Return (reported by you)					7.5%
Calculated policy return (sum: Policy weights x benchmarks)				8.3%	
Adjustment to reflect rebalancing and overlay impacts				<u>0.0%</u>	
Policy return (reported by you)					<u>8.3%</u>
Net Value Added (Net Return - Policy Return)					-0.8%

### 2015 Policy Return and Value Added

Asset class	Policy weight	Benchmark		Net return	Value added
		Description	Return		
Stock - U.S.		Custom			
Stock - EAFE		Custom			
Stock - Global	61.6%	Your Stock: Glot	3.0%	3.8%	0.8%
Stock - Emerging					
Fixed Income - Global	35.3%	Barclays Global	0.6%	0.3%	-0.3%
Fixed Income - Emerging					
Real Estate	3.1%	Custom	10.0%	9.8%	-0.2%
<b>Total</b>	<b>100.0%</b>				
Net Return (reported by you)					2.7%
Calculated policy return (sum: Policy weights x benchmarks)				2.4%	
Adjustment to reflect rebalancing and overlay impacts				<u>-0.3%</u>	
Policy return (reported by you)					<u>2.1%</u>
Net Value Added (Net Return - Policy Return)					0.6%

### 2013 Policy Return and Value Added

Asset class	Policy weight	Benchmark		Net return	Value added
		Description	Return		
Stock - Global	60.9%	Your Stock: Glot	25.0%	26.3%	1.3%
Fixed Income - Global	38.1%	Barclays Global	-0.2%	0.1%	0.2%
Real Estate	1.0%	Custom	11.8%	11.3%	-0.4%
<b>Total</b>	<b>100.0%</b>				
Net Return (reported by you)					15.9%
Calculated policy return (sum: Policy weights x benchmarks)				15.3%	
Adjustment to reflect rebalancing and overlay impacts				<u>-0.3%</u>	
Policy return (reported by you)					<u>15.0%</u>
Net Value Added (Net Return - Policy Return)					0.9%

## Profit/Loss on overlay programs

Overlay type	Your fund		Peer median				Global median			
	2017	2016	2017		2016		2017		2016	
	bps	bps	bps	#	bps	#	bps	#	bps	#
Int. Discretionary Currency			-4.8	1	7.6	1	0.1	13	0.0	15
Ext. Discretionary Currency			-0.1	1	-3.5	1	-0.1	12	5.4	9
Internal Global TAA			0.4	2	-0.3	2	15.0	8	0.0	9
External Global TAA							6.4	3	22.0	2
Internal PolicyTilt TAA							-0.2	10	0.0	10
External PolicyTilt TAA							18.2	2	318.6	1
Internal Commodities							15.9	2	5.5	2
External Commodities							1.9	3	107.0	2
Internal Long/Short					-0.8	1	9.0	7	2.4	8
External Long/Short							38.6	1		
Internal Other			-0.3	1	0.9	1	0.6	12	0.8	12
External Other							0.0	10	1.6	11

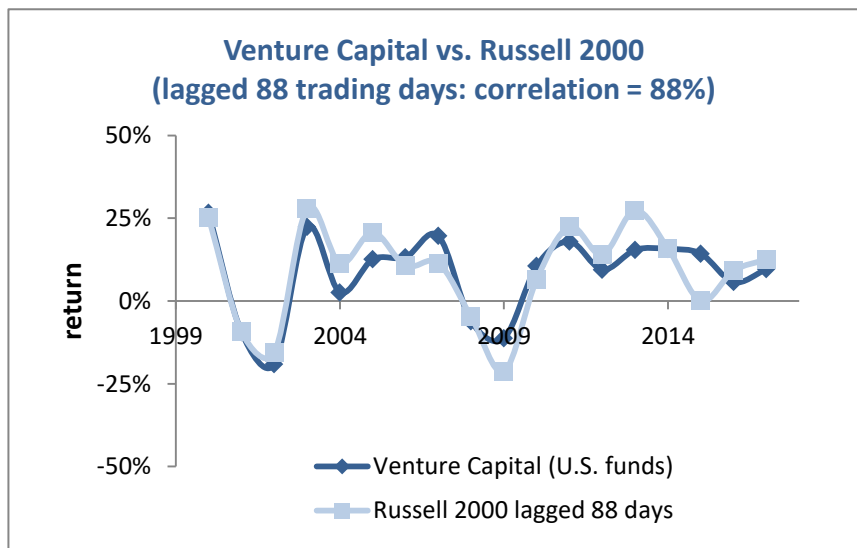
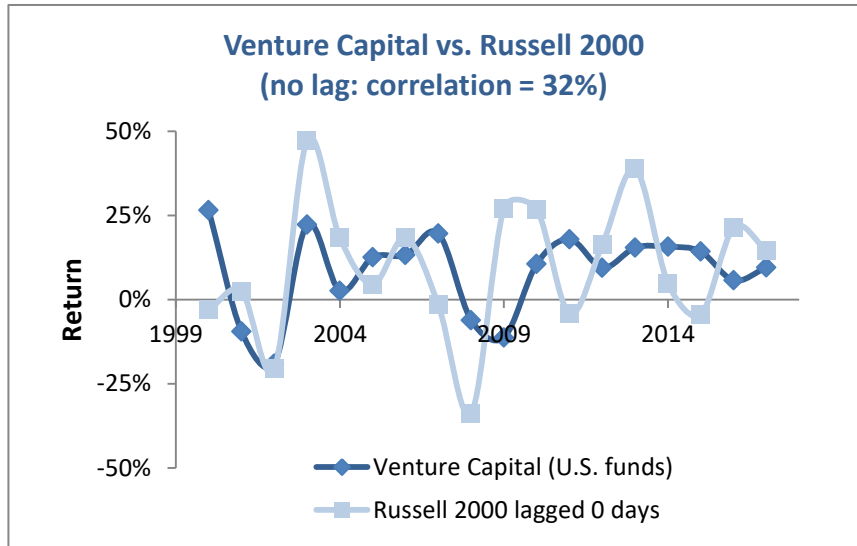
Profit/loss in basis points was calculated using total fund average holdings. This was done to measure the impact of the program at the total fund level.



## 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 Russell 2000 index return was -33.8% versus -4.8% 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 27.7% using the un-lagged benchmarks versus -1.3% using the same benchmark lagged to match the average 88 day reporting lag of venture capital funds.



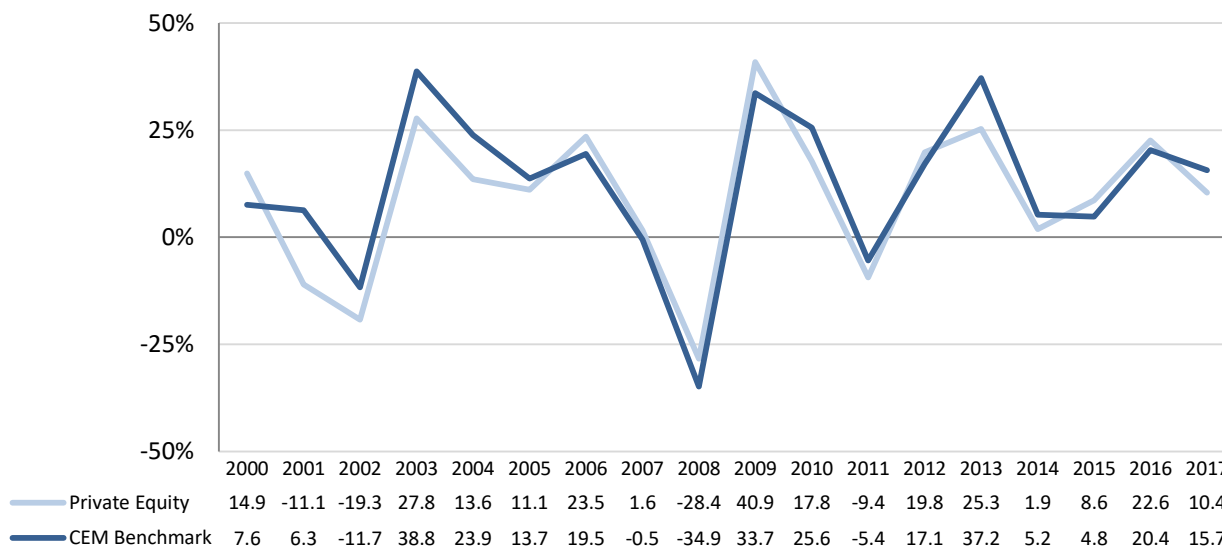
- Un-investable peer-based benchmarks. Peer based benchmarks reflect the reporting lags in peer portfolios so they have much better correlations than un-lagged investable benchmarks. But their relationship statistics are not as good as for lagged investable benchmarks.
- Aspirational premiums (i.e., benchmark + 2%). Premiums cannot be achieved passively, and evidence suggests that a fund has to be substantially better than average to attain them. More importantly, when comparing performance to other funds, they need to be excluded to ensure a level playing field.

## To enable fairer comparisons, CEM uses default private equity benchmarks.

Benchmarks used for private equity by most participants in the CEM universe are flawed (see previous page). So to enable fairer comparisons, CEM replaced the reported private equity benchmarks of all funds except yours with defaults. The defaults are:

- Investable. They are comprised of lagged small cap benchmarks.
- Custom lagged for each participant. Different portfolios had different lags. CEM estimated the lag on private equity portfolios by comparing annual private equity returns to public market proxies with 1 day of lag, 2 days of lag, 3 days of lag, etc. At some number of days lag, correlation between the two series is maximized. The median lag was 85 trading days (i.e., approximately 119 calendar days or 3.9 calendar months)
- Regional mix adjusted based on the average estimated mix of regions in private equity portfolios for a given country.
- The result is the default benchmarks are superior to most self-reported benchmarks. Correlations improve to a median of 82% for the default benchmarks versus 44% for self-reported benchmarks. Other statistics such as volatility were also much better.

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



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

# 4

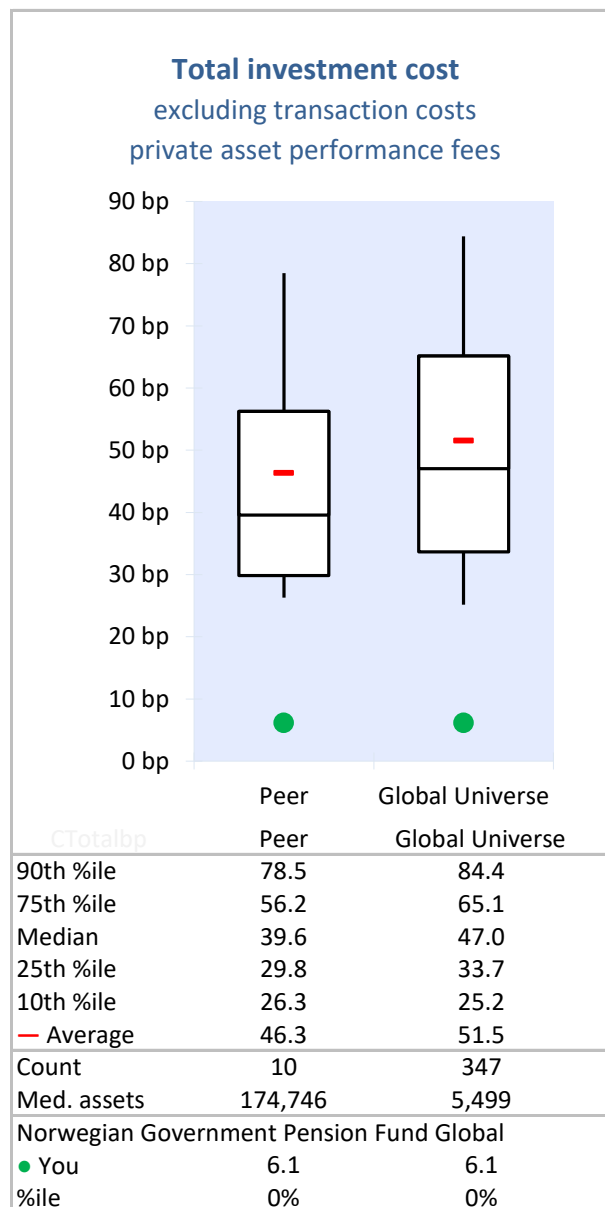
## Total cost and benchmark cost

Comparisons of total investment cost	2
Trend in total investment cost	3
Types of costs included in your total investment cost	4
Detailed breakdown of your total investment cost	5
Changes in your investment costs	6
Total cost versus benchmark cost	7
Benchmark cost calculation	8
Cost impact of:	
- differences in implementation style	9
- overlays	10
- lower cost styles	11
- paying more/-less for similar services	12
Summary of why you are high or low cost by asset class	13
Your cost effectiveness ranking	14
Actual cost versus benchmark cost	15
Appendix A: Benchmarking methodology formulas and data	16
Appendix B: Regression based benchmarks	18

## Comparisons of total investment cost

Your total investment cost, excluding transaction costs and private asset performance fees, of 6.1 bps was below the peer median of 39.6 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.

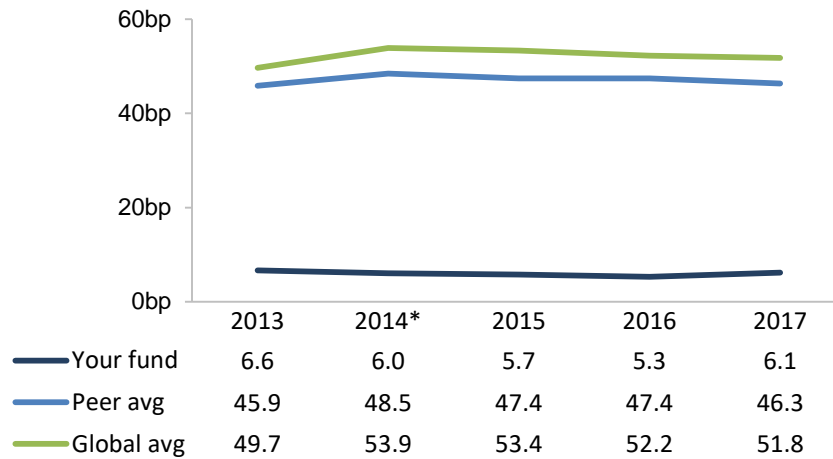


## Trend in total investment cost

Your total investment cost, excluding transaction costs and private asset performance fees, decreased from 6.6 bps in 2013 to 6.1 bps in 2017.

### Trend in total investment cost

(excluding transaction costs and private asset performance fees)



Trend analysis is based on 254 Global funds and 10 peer funds with 5 or more consecutive years of data.

\* Since 2014, hedge fund performance fees have been included for all participants.

## 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.
- Green shading indicates that the cost type has been newly added for the 2014 data year.
- CEM currently excludes external private asset performance fees 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 2017 total investment cost, excluding transaction costs and private asset performance fees, was 6.1 bp or €519.1 million.

### Your investment costs

	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.					1,862	-337	83	1,608		0%
Stock - EAFE					21,744	3,404	1,212	26,360		5%
Stock - Emerging					57,108	95,921	3,683	156,712		30%
Stock - Global		108,209						108,209		21%
Fixed Income - Emerging					186		0	186		0%
Fixed Income - Global		41,515						41,515		8%
Real Estate <sup>1</sup>		54,425						54,425		10%
Real Estate - Operating Sub. <sup>1</sup>										
Total asset management costs excluding private asset performance fees								389,015	4.6bp	75%
<b>Oversight, custodial &amp; other asset related costs</b>										
Oversight of the Fund								73,798		14%
Trustee & Custodial								41,965		8%
Consulting and Performance Measurement								10,050		2%
Audit								4,312		1%
Other										
Total oversight, custodial & other costs								130,125	1.5bp	25%
Total investment costs excluding transaction costs and private asset performance fees								519,140	6.1bp	100%

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

## 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 (2017 - 2013)

	Investment costs (€000s)					Change (€000s)				Change (%)			
	2017	2016	2015	2014	2013	2017	2016	2015	2014	2017	2016	2015	2014
<b>Asset management</b>													
Stock - U.S.	1,608	1,827				-219				-12%			
Stock - EAFE	26,360	25,123				1,237				5%			
Stock - Emerging	156,712	67,156				89,556				133%			
Stock - Global	108,209	102,953	249,652	214,185	210,993	5,256	-146,699	35,467	3,192	5%	-59%	17%	2%
Fixed Income - Emerging	186	5,042				-4,856				-96%			
Fixed Income - Global	41,515	40,473	37,010	29,004	27,155	1,042	3,463	8,006	1,849	3%	9%	28%	7%
Real Estate <sup>1</sup>	54,425	0	0	0	0	54,425							
Real Estate - Operating Sub. <sup>1</sup>		47,438	39,477	28,131	21,479		7,961	11,346	6,652		20%	40%	31%
Total excl. private asset perf. fees	389,015	290,012	326,139	271,320	259,627	99,003	-36,127	54,819	11,693	34%	-11%	20%	5%
<b>Oversight, custodial &amp; other asset related costs</b>													
Oversight of the Fund	73,798	66,954	67,859	59,310	67,148	6,844	-905	8,549	-7,838	10%	-1%	14%	-12%
Trustee & Custodial	41,965	39,503	42,400	51,964	43,763	2,462	-2,897	-9,564	8,201	6%	-7%	-18%	19%
Consulting and Performance Measurement	10,050	9,570	8,868	6,363	2,292	480	702	2,505	4,071	5%	8%	39%	178%
Audit	4,312	6,110	4,840	4,314	4,667	-1,798	1,270	526	-353	-29%	26%	12%	-8%
Other													
Total oversight, custodial & other	130,125	122,137	123,967	121,951	117,870	7,988	-1,830	2,016	4,081	7%	-1%	2%	3%
Total investment costs <sup>1</sup>	519,140	412,149	450,106	393,271	377,497	106,991	-37,957	56,835	15,774	26%	-8%	14%	4%
Total in basis points	6.1bp	5.3bp	5.7bp	6.0bp	6.6bp								

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.



## Total cost versus benchmark cost

Your fund's total investment cost, excluding transaction costs and private asset performance fees, was 10.9 bps below your benchmark cost of 17.0 bps. This implies that your fund was low cost by 10.9 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 cost excluding transaction costs and illiquid asset performance fees	519,140	6.1 bp
- Your fund's benchmark	1,437,094	17.0 bp
= Your fund's cost savings	-917,954	-10.9 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 12.

### Reasons why your fund was low cost

	Cost/-Savings impact	
	€000s	bps
<u>Differences in implementation style:</u>		
External active vs. low cost styles	-743,999	-8.8 bp
Partnerships vs. external active	0	0.0 bp
Fund of funds vs. external direct	0	0.0 bp
Mix of internal and passive styles	87,051	1.0 bp
Style impact of overlays	-82,676	-1.0 bp
Total style impact	-739,624	-8.8 bp
<u>Paying more/-less for similar services:</u>		
External investment management	-1,905	0.0 bp
Internal investment management	-205,041	-2.4 bp
Oversight, custodial and other	28,617	0.3 bp
Total impact of paying more /-less	-178,330	-2.1 bp
Total savings	-917,954	-10.9 bp

## Benchmark cost calculation

Your 2017 benchmark cost was 17.0 basis points or 1.4 billion. 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).

### Calculation of your 2017 benchmark cost

Asset class	Your average assets (A)	Weighted peer median cost <sup>1</sup> (B)	Benchmark €000s (A X B)
<b>Asset management costs</b>			
Stock - U.S.	664	8.5 bp	566
Stock - EAFE	9,716	17.2 bp	16,722
Stock - Emerging	29,535	33.8 bp	99,858
Stock - Global	509,143	14.6 bp	742,976
Fixed Income - Emerging	583	19.9 bp	1,162
Fixed Income - Global	273,824	9.4 bp	257,042
Real Estate	20,936	64.3 bp	134,584
Overlay Programs <sup>2</sup>	844,401	1.0 bp	82,676
Benchmark for asset management	844,401	15.8 bp	1,335,585
<b>Oversight, custody and other costs</b>			
Oversight of the Fund	844,401	0.5 bp	39,985
Trustee & Custodial	844,401	0.6 bp	47,705
Consulting and Performance Measuremer	844,401	0.0 bp	0
Audit	844,401	0.0 bp	1,942
Other	844,401	0.1 bp	11,876
Benchmark for oversight, custody & other		1.2 bp	101,508
<b>Total benchmark cost</b>		<b>17.0 bp</b>	<b>1,437,094</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). The style weights by asset class for your fund and the peers are shown on page 17 of this section.

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

## Cost impact of differences in implementation style

Differences in implementation style (i.e., external active management versus lower cost indexed and internal management, fund of funds versus lower cost direct LPs, and overlay usage) relative to your peers saved you 8.8 bps.

### Calculation of the cost impact of differences in implementation style

	Your avg holdings (mils)	% External active			Premium vs. internal and passive <sup>1</sup>	Cost/-Savings
	(A)	You	Peer average	More/-Less	(C)	€000s bps
	(A)	(B)			(C)	(A X B X C)
Stock - U.S.	664	100%	23%	77%	29 bp	1,497
Stock - EAFE	9,716	100%	44%	56%	30 bp	16,283
Stock - Emerging	29,535	100%	61%	39%	44 bp	50,330
Stock - Global	509,143	0%	35%	-35%	32 bp	-566,514
Fixed Income - Emerging	583	100%	64%	36%	17 bp	354
Fixed Income - Global	273,824	0%	22%	-22%	30 bp	-178,688
Real Estate	20,936	0%	71%	-71%	46 bp	-67,262
Total impact of differences in external active management usage						-743,999 -8.8 bp
<i>Overlay usage</i>						
Impact of lower use of portfolio level overlays (see page 10)						-82,676 -1.0 bp
<i>Mix of low cost styles</i>						
Impact of mix of internal indexed, internal active, external indexed (see page 11)						87,051 1.0 bp
Total						-739,624 -8.8 bp

1. The external active cost 'premium vs internal and passive' is the additional cost of external active management and fund of funds relative to the average of the other lower cost implementation styles: internal passive, internal active and external passive. These calculations are specific to your peer group.

## Cost impact of overlays

As summarized on the previous page, the style impact of overlays saved you 1.0 bps. If you use more overlays than your peers, or more expensive types of overlays, then it increases your relative cost.

### Calculation of the cost impact of differences in the use of portfolio level overlays

	Your average total holdings (mils)	Cost as % of total holdings		Cost/-Savings Impact (000s)
		You	Peer avg.	
	(A)	(B)	(C)	A X (B - C)
Currency - Hedge	844,401	NA	0.01 bp	-688
Currency - Discretionary	844,401	NA	0.07 bp	-5,845
Rebalancing / Passive Beta - Hedge	844,401	NA	0.00 bp	-406
Duration Management - Hedge	844,401	NA	0.01 bp	-794
Global TAA - Discretionary	844,401	NA	0.15 bp	-12,905
Policy tilt TAA - Discretionary	844,401	NA	0.08 bp	-6,699
Commodity Futures - Discretionary	844,401	NA	0.01 bp	-567
Long/Short - Discretionary	844,401	NA	0.60 bp	-50,933
Other Overlay - Discretionary	844,401	NA	0.00 bp	-20
<b>External Overlays</b>				
Currency - Discretionary	844,401	NA	0.05 bp	-3,818
Total impact in 000s				-82,676
Total impact in basis points				-1.0 bp

## Cost impact of lower cost styles

As summarized on page 9, your mix of 'lower-cost' internal and passive styles cost you 1.0 bps. Details are shown below.

### Cost impact of differences in your mix of 'lower-cost' implementation styles

	Your non-external active holdings (mils)	Percent holdings (of non-external-active)						Cost/-Savings <sup>1</sup> (000s)
		Internal passive		Internal active		External passive		
		You	Peers	You	Peers	You	Peers	
Stock - Global	509,143	0%	40%	100%	39%	0%	21%	75,853
Fixed Income - Global	273,824	0%	37%	100%	61%	0%	1%	11,198
Real Estate	20,936			100%	100%			0
Underlying base fees	20,936			100%	100%			0
Total impact in 000s								87,051
Total impact in basis points								1.0 bp

1. Cost/-savings for each asset class equals non-external active holdings within each asset class X cumulative impact from the three lower cost styles. By formula: [ (peer median cost for the style - peer weighted average cost of lower cost styles) X (your weight for the style - peer weight for the style) ]. Peer median costs for each style are shown on page 15.

## Cost impact of paying more/-less for similar services

Differences in what you paid relative to your peers for similar asset management and related oversight and support services saved you 2.1 bps.

### Calculation of the cost impact of paying more/-less

	Style	Your avg holdings (mils)	Cost in bps			Cost/-Savings	
			Your	Peer median	More/-less	€000s	bps
<b>External asset management</b>		(A)			(B)	(A X B)	
Stock - U.S.	active	664	24.2	31.1	-6.9	-455	
Stock - EAFE	active	9,716	27.1	34.0	-6.8	-6,645	
Stock - Emerging	active	29,535	53.1	50.9	2.2	6,525	
Fixed Income - Emerging	active	583	3.2	26.0	-22.8	-1,329	
Total for external management						-1,905	0.0 bp
<b>Internal asset management</b>		(A)			(B)	(A X B)	
Stock - Global	active	509,143	2.1	5.0	-2.8	-144,106	
Fixed Income - Global	active	273,824	1.5	3.3	-1.8	-48,038	
Real Estate ex-REITs	active	20,936	26.0	32.2	-6.2	-12,897	
Total for internal management						-205,041	-2.4 bp
<b>Oversight, custodial, other</b>							
Oversight of the Fund		844,401	0.9	0.5	0.4	33,813	
Trustee & Custodial		844,401	0.5	0.6	-0.1	-5,740	
Consulting		844,401	0.1	0.0	0.1	10,050	
Audit		844,401	0.1	0.0	0.0	2,370	
Other		844,401	0.0	0.1	-0.1	-11,876	
Total for oversight, custodial, other						28,617	0.3 bp
<b>Total</b>						-178,330	-2.1 bp

1. Database median used because peer and universe data were insufficient.

## 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).

### Summary of why you are high or low cost by asset class

	Your cost <sup>1</sup>	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
<b>Asset management costs</b>	(A)	(B)	(C = A - B)	(D)	(C X D)		
Stock - U.S.	24.2 bp	8.5 bp	15.7 bp	664	1,042	1,497	-455
Stock - EAFE	27.1 bp	17.2 bp	9.9 bp	9,716	9,638	16,283	-6,645
Stock - Emerging	53.1 bp	33.8 bp	19.2 bp	29,535	56,855	50,330	6,525
Stock - Global	2.1 bp	14.6 bp	-12.5 bp	509,143	-634,767	-490,661	-144,106
Fixed Income - Emerging	3.2 bp	19.9 bp	-16.7 bp	583	-976	354	-1,329
Fixed Income - Global	1.5 bp	9.4 bp	-7.9 bp	273,824	-215,527	-167,489	-48,038
Real Estate	26.0 bp	63.9 bp	-37.9 bp	20,936	-79,322	-66,425	-12,897
Underlying base fees	0.0 bp	0.4 bp	-0.4 bp	20,936	-837	-837	0
Overlay Programs <sup>2</sup>	0.0 bp	1.0 bp	-1.0 bp	844,401	-82,676	-82,676	0
Total asset management	4.6 bp	15.8 bp	-11.2 bp	844,401	-946,570	-739,624	-206,946
<b>Oversight, custody and other costs</b>							
Oversight of the Fund	0.9 bp	0.5 bp	0.4 bp	844,401	33,813	n/a	33,813
Trustee & Custodial	0.5 bp	0.6 bp	-0.1 bp	844,401	-5,740	n/a	-5,740
Consulting	0.1 bp	0.0 bp	0.1 bp	844,401	10,050	n/a	10,050
Audit	0.1 bp	0.0 bp	0.0 bp	844,401	2,370	n/a	2,370
Other	0.0 bp	0.1 bp	-0.1 bp	844,401	-11,876	n/a	-11,876
Total oversight, custody & other	1.5 bp	1.2 bp	0.3 bp	844,401	28,617	n/a	28,617
<b>Total</b>	<b>6.1 bp</b>	<b>17.0 bp</b>	<b>-10.9 bp</b>	<b>844,401</b>	<b>-917,954</b>	<b>-739,624</b>	<b>-178,330</b>

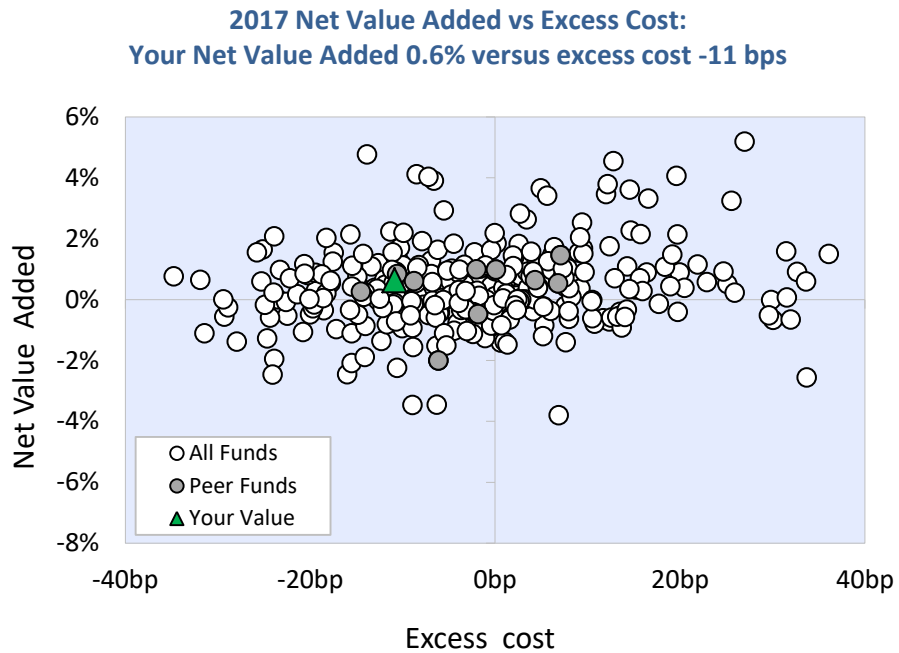
1. The weighted peer median cost for asset management is the style-weighted average of the peer median costs for all implementation styles (i.e., internal passive, internal active, external passive, external active, fund of fund). It excludes performance fees on private assets. The style weights by asset class for your fund and the peers are shown on page 17 of this section.

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

## Your cost effectiveness ranking

Being high or low cost is neither good nor bad. The more important question is, are you receiving sufficient value for your excess cost? At the total fund level, we provide insight into this question by combining your value added and your excess cost to create a snapshot your cost effectiveness performance relative to that of the survey universe.

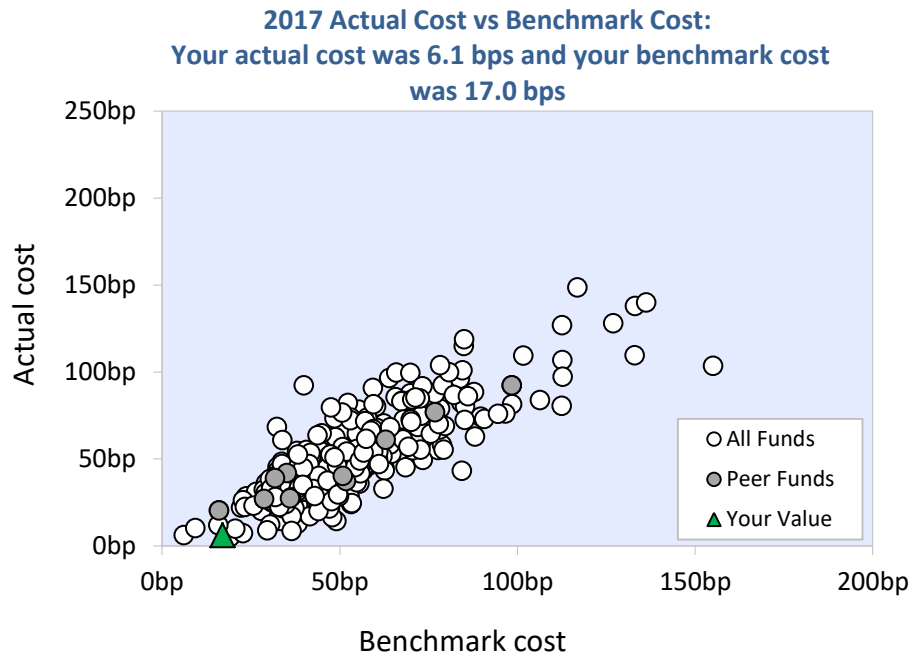
For the 2017 year, your fund ranked in the positive value added, low cost quadrant.



1 Benchmark cost and excess cost calculations are based on regression analysis (see Appendix B in this section) for all funds except your fund. Your fund's benchmark cost is based on peer-median costs (per page 7 of this section).



## Actual cost versus benchmark cost



1 Benchmark cost calculations are based on regression analysis (see Appendix B in this section) for all funds except your fund. Your fund's benchmark cost is based on peer-median costs (per page 7 of this section).

## Appendix A: Benchmarking methodology formulas and data

### a) Formulas

Example calculations are for 'Stock - U.S.' unless otherwise indicated.

Asset class peer cost

$$\begin{aligned} &= \text{Weighted average by peer average style of peer median costs for asset class} \\ &= [(0.37 \times 1.1 \text{ bp}) + (0.09 \times 4.0 \text{ bp}) + (0.31 \times 2.4 \text{ bp}) + (0.23 \times 31.1 \text{ bp})] = 8.5 \text{ bp} \end{aligned}$$

Peer average low cost (by asset class)

$$\begin{aligned} &= \text{Weighted average by peer average style of peer median costs for internal passive, internal active and} \\ &\text{external passive management for asset class} \\ &= [(0.37 \times 1.1 \text{ bp}) + (0.09 \times 4.0 \text{ bp}) + (0.31 \times 2.4 \text{ bp})] / (0.37 + 0.09 + 0.31) = 2.0 \text{ bp} \end{aligned}$$

External active cost premium (by asset class)

$$\begin{aligned} &= \text{Peer median external active cost - peer average low cost} \\ &= 31.1 \text{ bp} - 2.0 \text{ bp} = 29.1 \text{ bp} \end{aligned}$$

Impact from other differences in implementation style (by Asset Class)=

$$\begin{aligned} &= [ (\text{Your int. pass. \%} - \text{average peer int. pass. \%}) \times (\text{peer median int. pass. cost} - \text{peer average low cost}) \\ &+ (\text{your int. act. \%} - \text{peer average int. act. \%}) \times (\text{peer median int. act. cost} - \text{peer average low cost}) \\ &+ (\text{your ext. pass. \%} - \text{average peer ext. pass. \%}) \times (\text{median peer ext. pass. cost} - \text{peer average low cost}) ] \\ &\times \text{your average holdings} \end{aligned}$$

## Appendix A: Benchmarking methodology formulas and data (page 2 of 2)

### b) 2017 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	Limited Partner.	Fund of Funds	Internal Passive	Internal Active	External Passive	External Active	Limited Partner.	Fund of Funds	Weighted Median
Stock - U.S.				24.2			1.1	4.0	2.4	31.1			8.5
Stock - EAFE				27.1			4.9	6.4	2.1	34.0			17.2
Stock - Emerging				53.1			5.0	9.6	10.4	50.9			33.8
Stock - Global		2.1					2.0	5.0	3.6	35.7			14.6
Fixed Income - Emerging				3.2				9.1		26.0			19.9
Fixed Income - Global		1.5					2.2	3.3	3.9	32.6			9.4
Real Estate		26.0						32.2		75.3	78.0	47.6	63.9
Underlying base fees		0.0										111.0	0.4

### c) 2017 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	Limited Partner.	Fund of Funds	Internal Passive	Internal Active	External Passive	External Active	Limited Partner.	Fund of Funds
Stock - U.S.	0.0%	0.0%	0.0%	100.0%			37.4%	9.1%	31.0%	22.6%		
Stock - EAFE	0.0%	0.0%	0.0%	100.0%			23.6%	11.7%	21.0%	43.7%		
Stock - Emerging	0.0%	0.0%	0.0%	100.0%			20.5%	13.4%	5.2%	60.9%		
Stock - Global	0.0%	100.0%	0.0%	0.0%			26.5%	25.3%	13.7%	34.5%		
Fixed Income - Emerging		0.0%		100.0%				35.8%		64.2%		
Fixed Income - Global	0.0%	100.0%	0.0%	0.0%			29.2%	47.8%	1.1%	21.9%		
Real Estate		100.0%		0.0%	0.0%	0.0%		29.5%		17.4%	52.7%	0.4%
Underlying base fees		100.0%		0.0%	0.0%	0.0%		29.5%		17.4%	52.7%	0.4%

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

## Appendix B: Regression based benchmarks

### Regression Benchmark Cost Equations

	2017		2016		2015		2014		2013	
	Coeff.	"t"	Coeff.	"t"	Coeff.	"t"	Coeff.	"t"	Coeff.	"t"
Constant	69.5	14.6	78.5	17.4	77.6	16.9	77.7	16.9	70.8	17.1
Size in millions (Log 10)	-13.2	-11.1	-14.1	-13.0	-14.0	-12.8	-13.7	-12.5	-12.7	-12.5
<u>Percentage of assets in:</u>										
Stocks	20.1	4.4	7.7	1.9	10.4	2.5	7.9	1.9	15.8	4.0
Real estate	75.0	5.2	73.3	5.6	60.2	4.3	56.1	3.8	62.6	4.5
Private equity & hedge funds	273.8	30.8	259.6	30.1	272.5	30.9	292.1	31.8	224.3	25.7
Country variable (1 if Cdn)	-4.1	-2.1	-2.9	-1.6	-1.5	-0.8	-3.0	-1.7	-3.3	-1.9
	All		All		All		All		All	
R-squared	74%		69%		69%		69%		59%	
Sample size	378		490		509		526		551	

In order to compare your fund's cost effectiveness to the survey universe, a benchmark cost for all participants is required.

The benchmark operating cost for all other funds is determined using regression analysis. The regression equation coefficients and "t statistics" are shown in the table above. An absolute "t" of greater than 2 indicates that the coefficient is statistically significant in predicting the dependent variable, in this case, the benchmark cost.

The benchmark equations have been remarkably robust. Although the coefficients change every year, primarily because of changes in the composition of the survey universe, they remain similar in relative magnitude and direction.

Most importantly, the R-squareds have been high. In 2017, the R-squared was 74% which means that fund size, asset mix and nationality explain more than 74% of the differences in costs between funds. This is good explanatory power.

Below is a description of the coefficients:

- Size = Log10 (fund size in millions)
- % Stocks = proportion in stocks (coefficient changed in 2011)
- % Real estate = proportion directly invested in real estate and infrastructure.
- % Private equity = proportion in direct and fund-of-funds venture capital, other private equity and hedge funds.
- Country variable = 1 if your country of origin is Canada, otherwise 0.

# 5

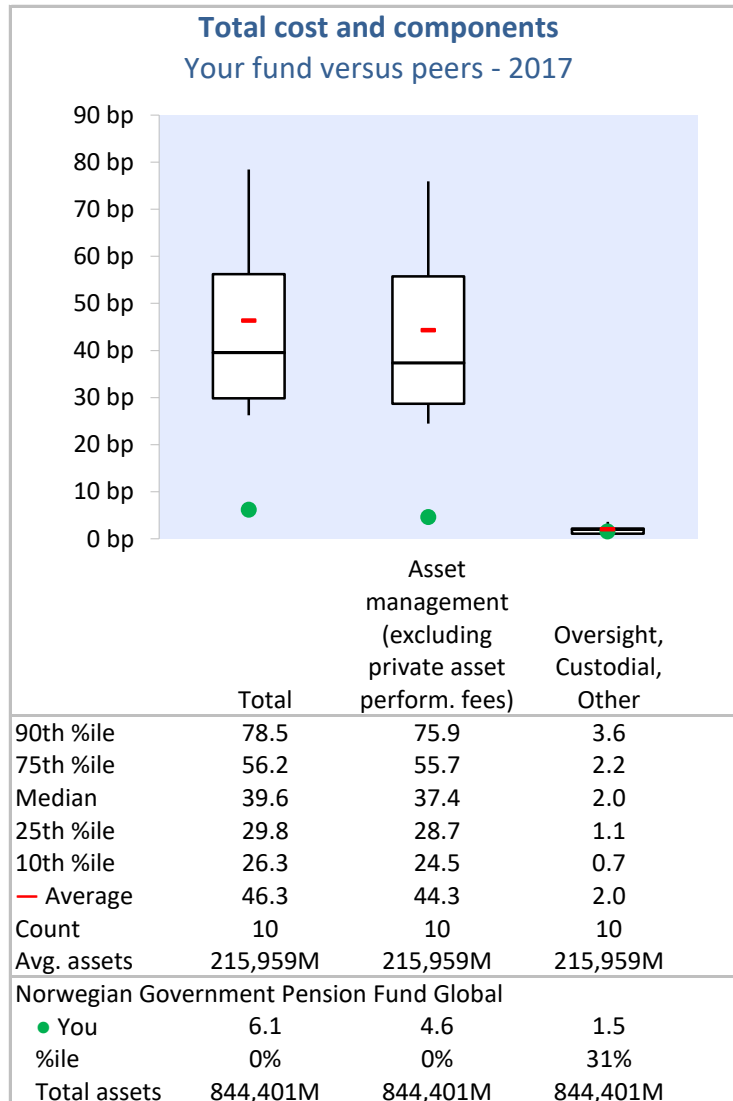
## Cost comparisons

Total fund cost	2
Governance, operations & support	3
Public asset classes	
- Stock	4
- Fixed Income	10
- Commodities	23
- REITs	24
Real asset classes	
- Real estate ex-REITs	25
- Infrastructure	26
- Natural resources	27
- Other real assets	28
Private equity	
- Diversified private equity	29
- LBO	30
- Venture capital	31
- Private credit	32
- Other private equity	33
Global TAA	34
RiskParity	35
Hedge Funds	36
Overlays	37

## Total fund cost

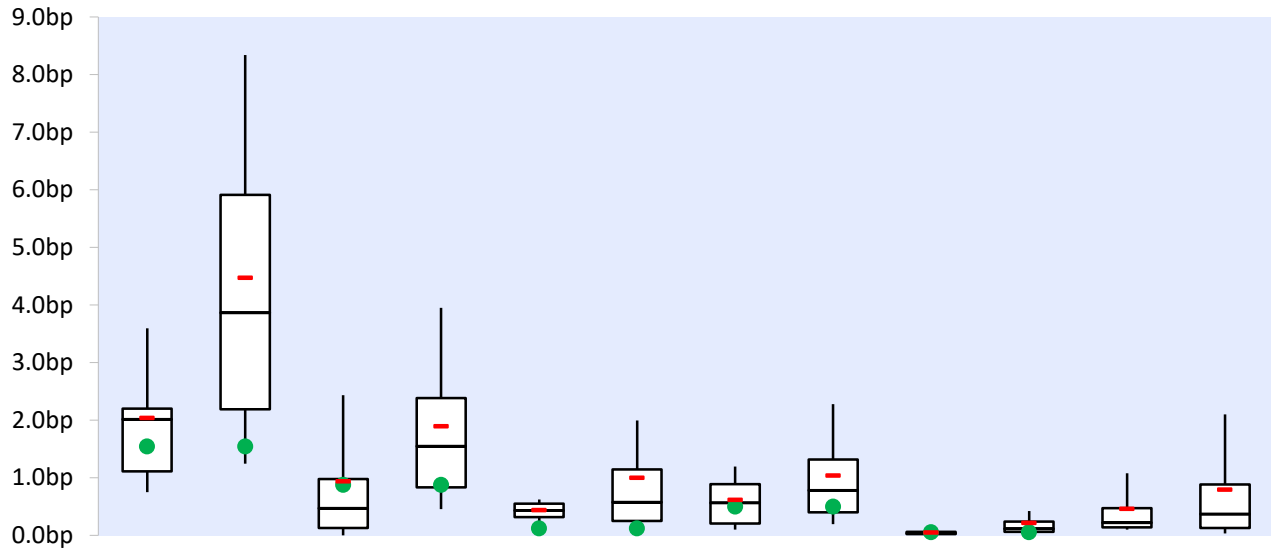
Total costs are benchmarked in the previous section. In this section, your fund's costs are compared on a line-item basis to your peers. This enables you to understand better why you may be a high or low cost fund and it also identifies and quantifies major cost differences that may warrant further investigation.

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.



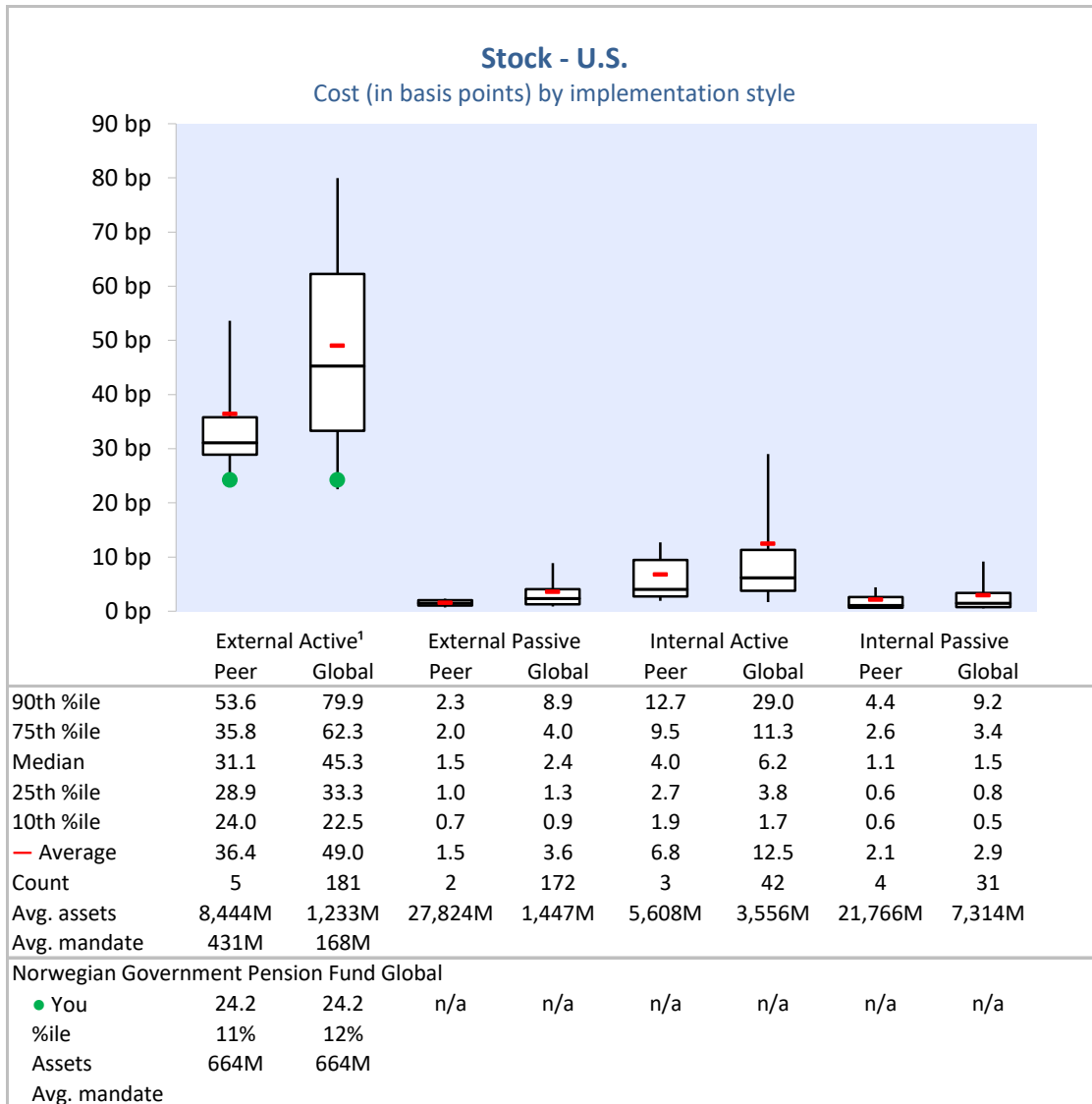
## Governance, operations & support

Cost as a % of total plan assets



	Total		Oversight <sup>1</sup>		Consulting & Perf. Meas.		Custody		Audit		Other	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	3.6	8.3	2.4	4.0	0.6	2.0	1.2	2.3	0.1	0.4	1.1	2.1
75th %ile	2.2	5.9	1.0	2.4	0.6	1.1	0.9	1.3	0.1	0.2	0.5	0.9
Median	2.0	3.9	0.5	1.6	0.4	0.6	0.6	0.8	0.0	0.1	0.2	0.4
25th %ile	1.1	2.2	0.1	0.8	0.3	0.3	0.2	0.4	0.0	0.1	0.1	0.1
10th %ile	0.7	1.2	0.0	0.5	0.2	0.1	0.1	0.2	0.0	0.0	0.1	0.0
— Average	2.0	4.5	0.9	1.9	0.4	1.0	0.6	1.0	0.0	0.2	0.5	0.8
Count	10	347	10	347	2	285	10	341	7	310	8	241
Avg. assets	215,959M	21,455M	215,959M	21,455M	215,959M	21,455M	215,959M	21,455M	215,959M	21,455M	215,959M	21,455M
Norwegian Government Pension Fund Global												
● You	1.5	1.5	0.9	0.9	0.1	0.1	0.5	0.5	0.1	0.1	n/a	n/a
%ile	31%	13%	73%	27%	0%	11%	41%	31%	59%	19%		
Plan assets	844,401M	844,401M	844,401M	844,401M	844,401M	844,401M	844,401M	844,401M	844,401M	844,401M	844,401M	844,401M

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.

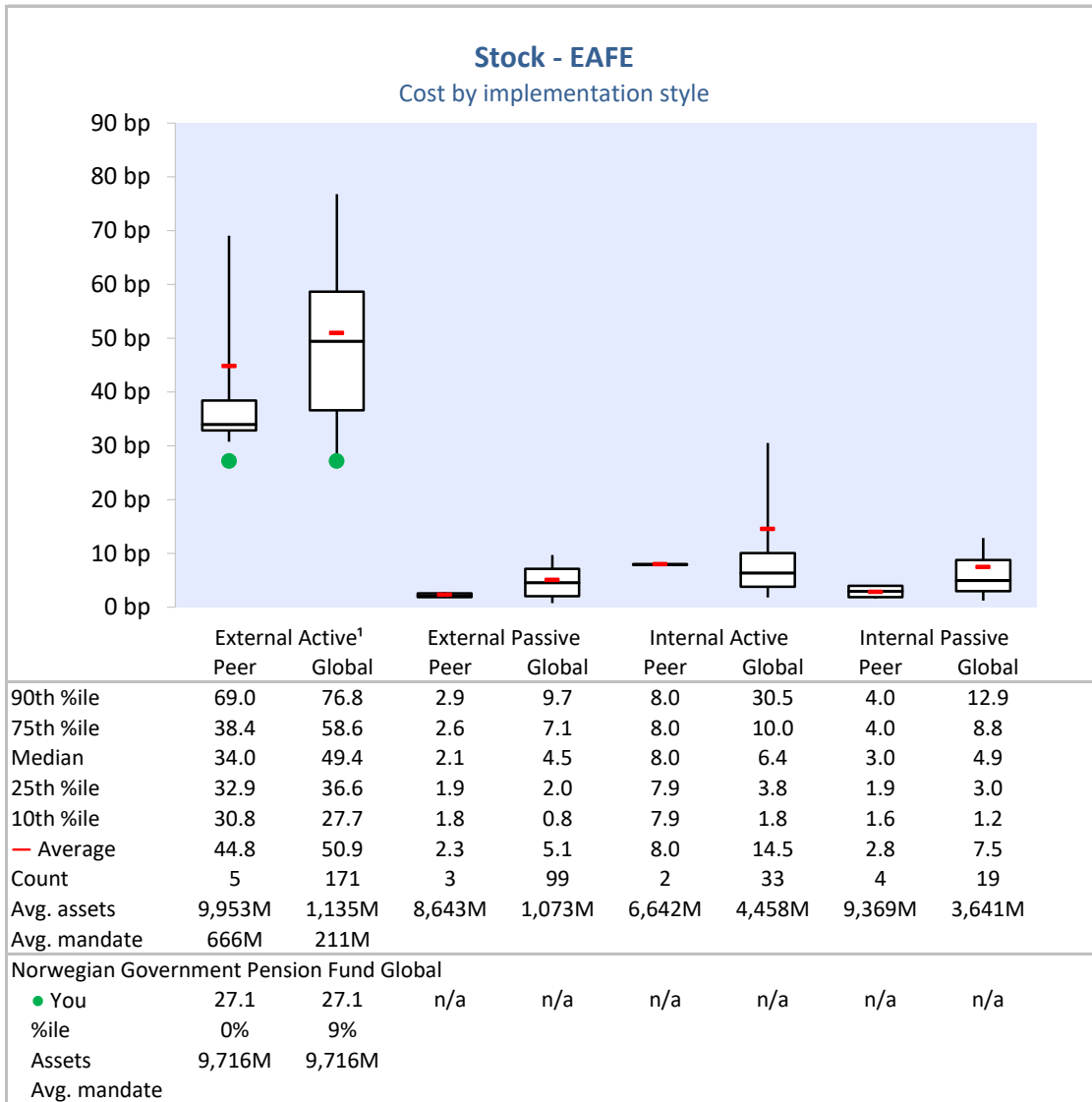


1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	28.0	24.6	45.0
Performance fees*	-5.1	10.3	3.2
Internal and other	<u>1.2</u>	<u>1.5</u>	<u>0.8</u>
Total	24.2	36.4	49.0

\* 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 4.0 bps for peers (52 funds) and 12.6 bps for Global participants (46 funds).

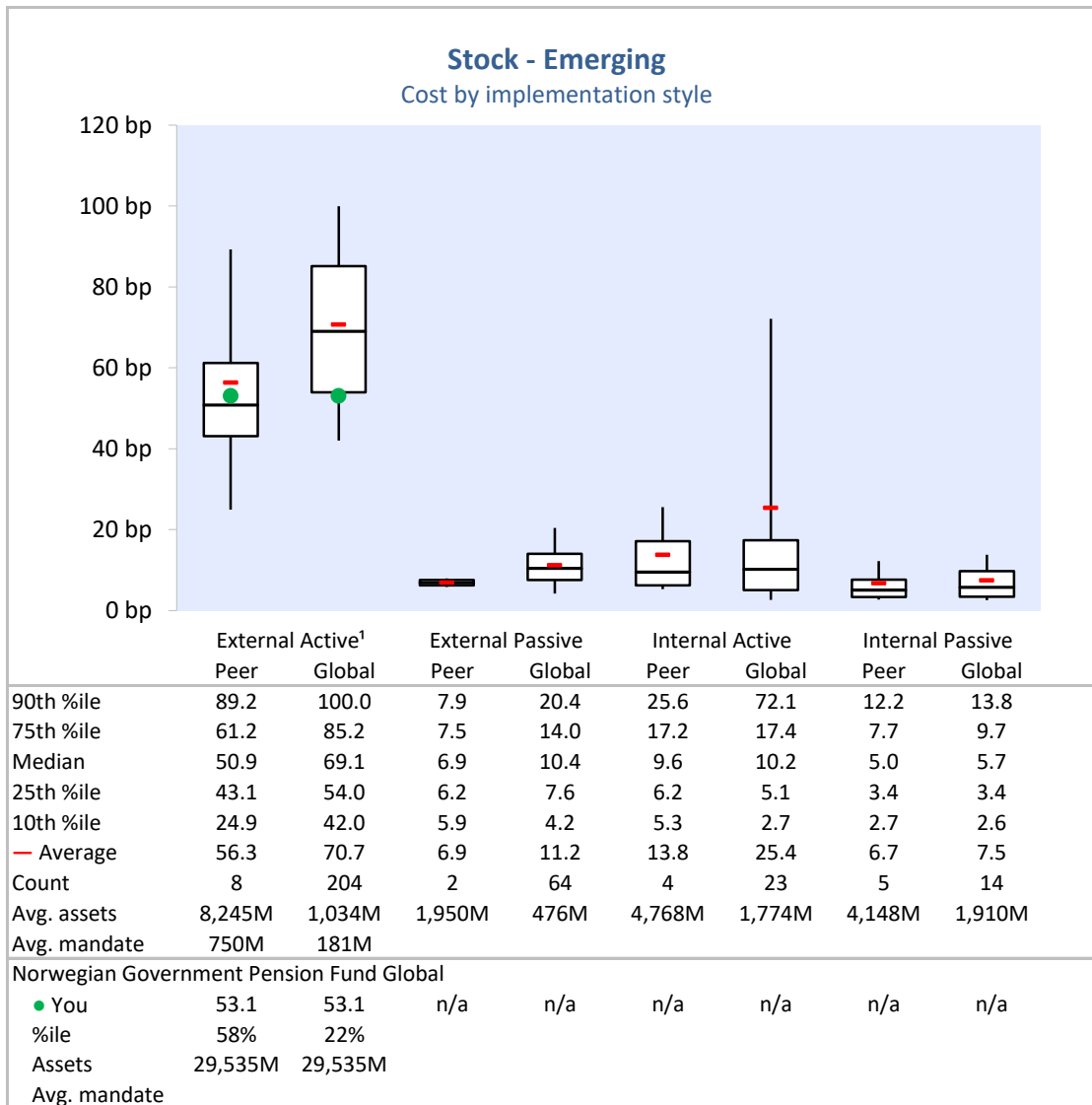




#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	22.4	26.0	46.0
Performance fees*	3.5	18.0	4.0
Internal and other	<u>1.2</u>	<u>0.8</u>	<u>0.9</u>
Total	27.1	44.8	50.9

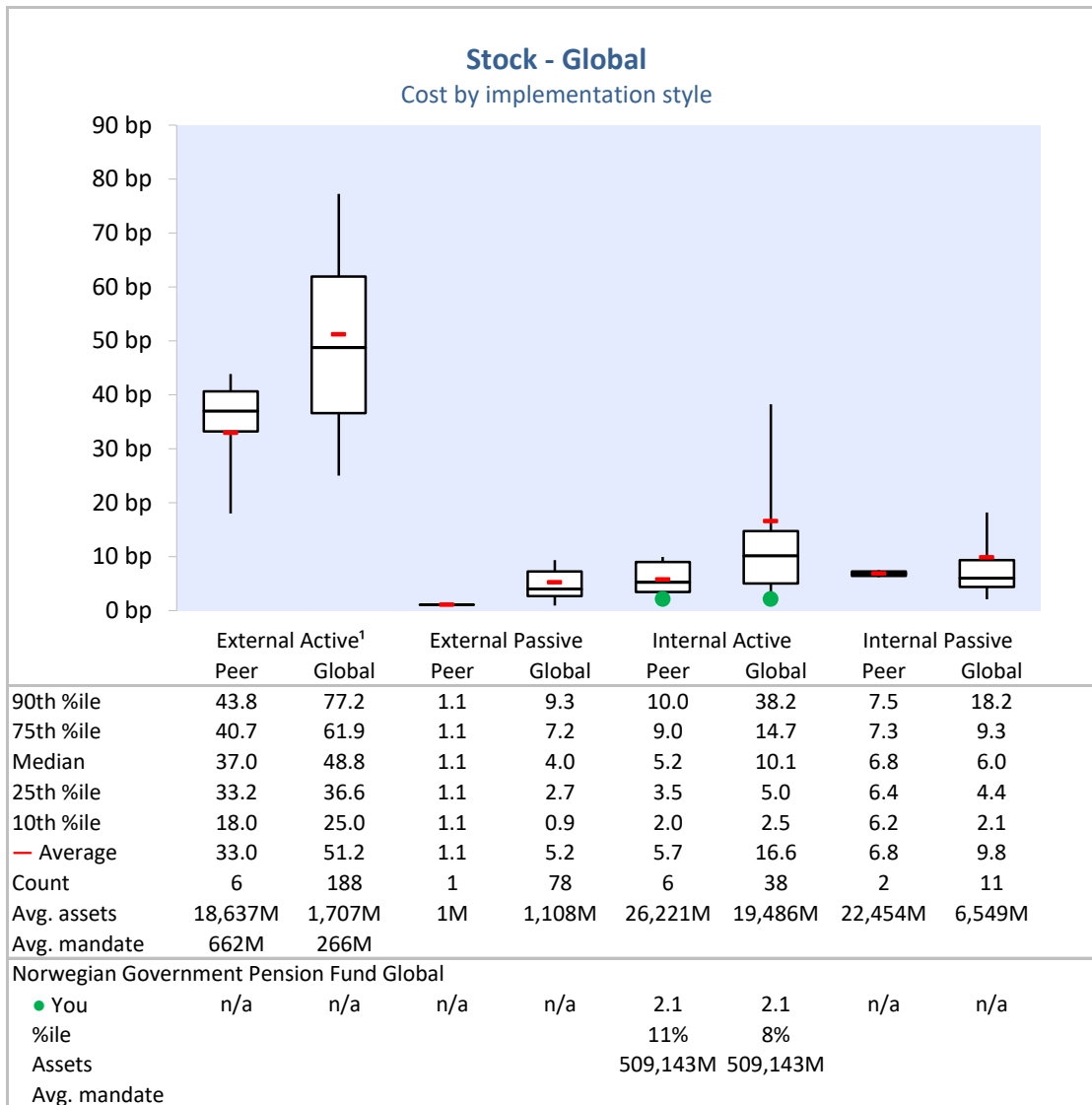
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 22.5 bps for peers (4 funds) and 15.0 bps for Global participants (46 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	19.3	37.3	65.6
Performance fees*	32.5	14.4	3.9
Internal and other	<u>1.2</u>	<u>4.7</u>	<u>1.2</u>
Total	53.1	56.3	70.7

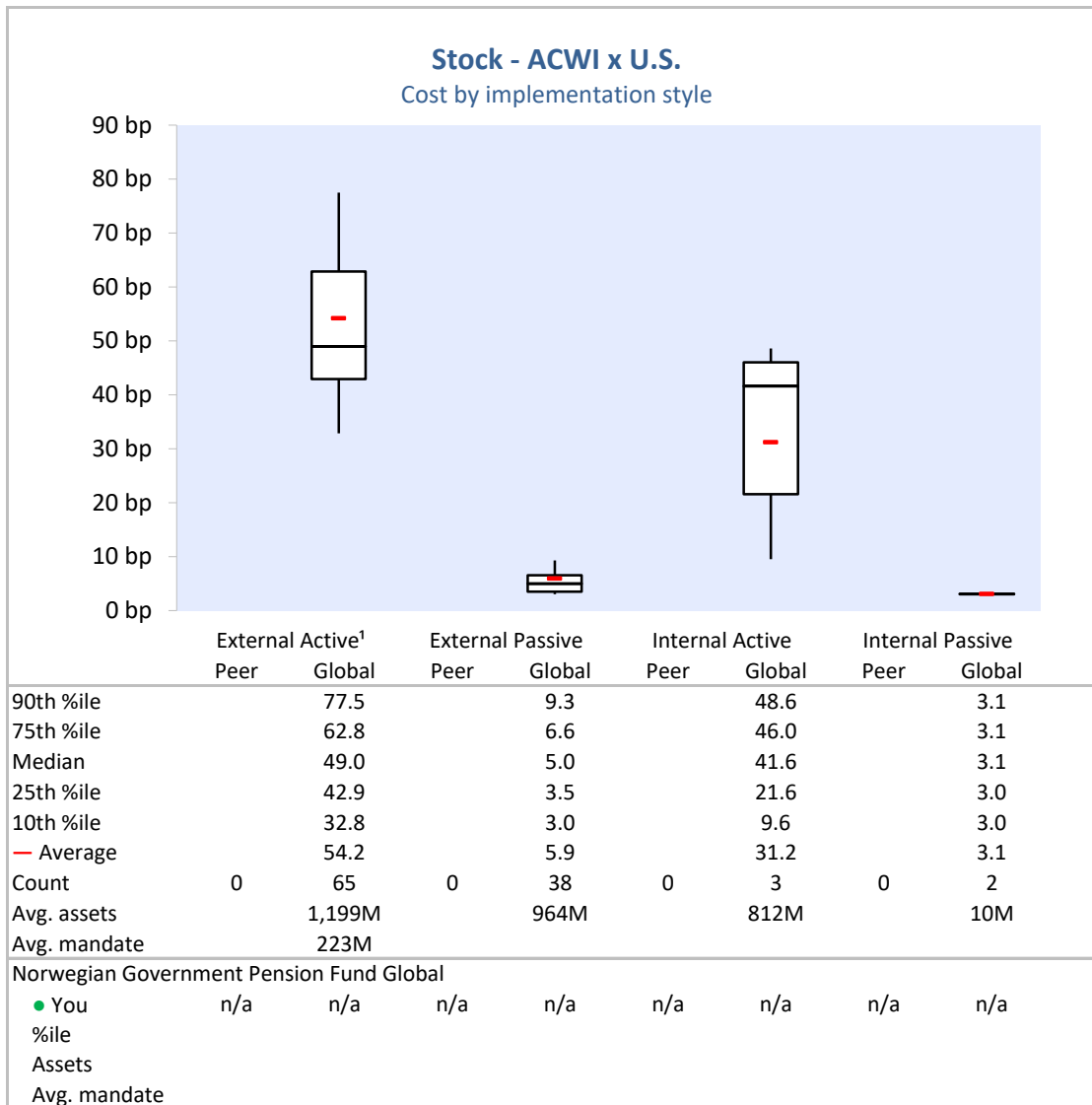
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 19.1 bps for peers (6 funds) and 17.7 bps for Global participants (45 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	25.1	45.3
Performance fees*	n/a	4.8	4.9
Internal and other	<u>n/a</u>	<u>3.0</u>	<u>1.0</u>
Total	n/a	33.0	51.2

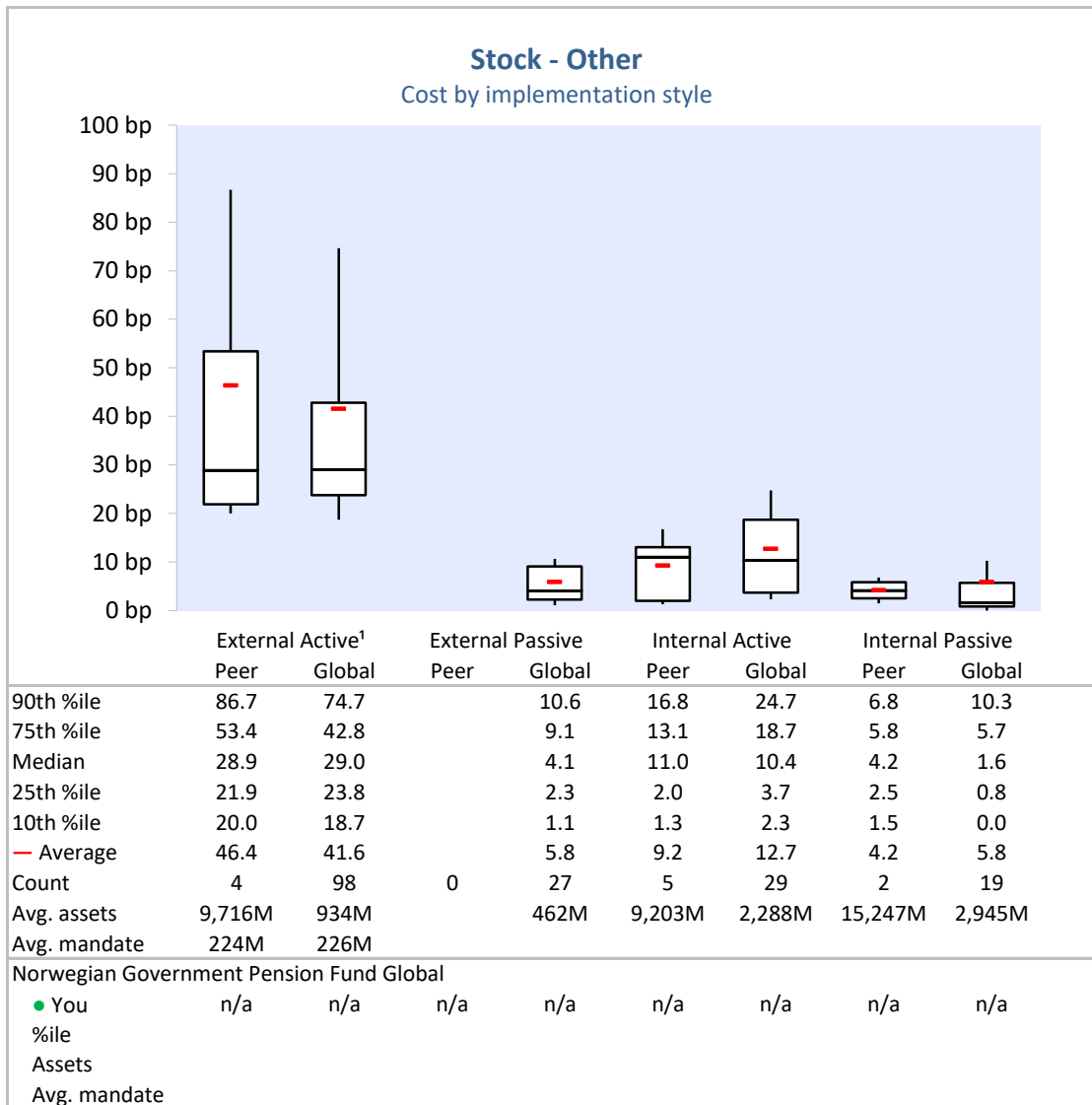
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 5.8 bps for peers (5 funds) and 16.7 bps for Global participants (55 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	n/a	51.2
Performance fees*	n/a	n/a	2.6
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>0.4</u>
Total	n/a	n/a	54.2

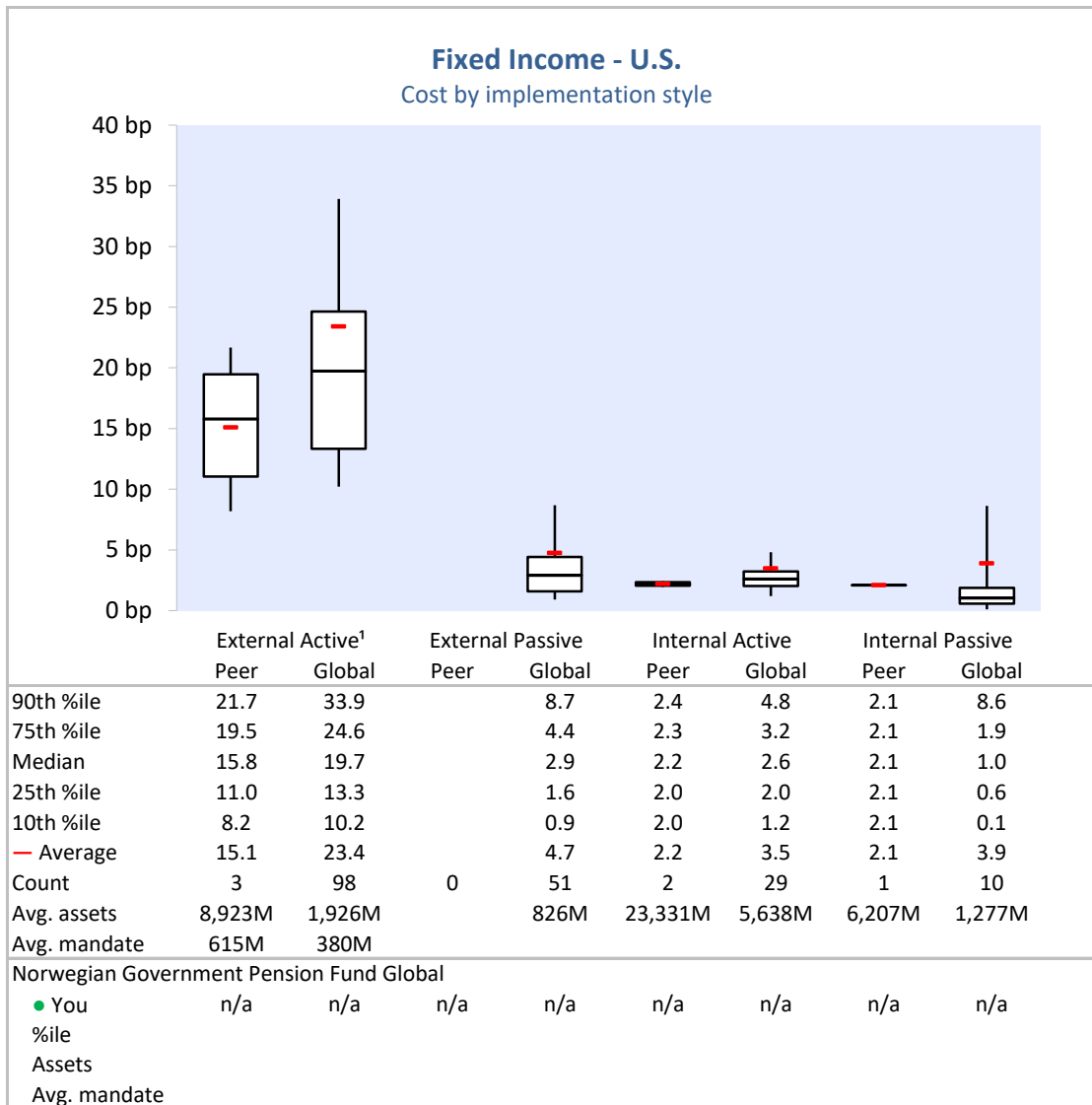
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 10.4 bps for Global participants (16 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	45.5	37.0
Performance fees*	n/a	0.2	4.0
Internal and other	<u>n/a</u>	<u>0.7</u>	<u>0.6</u>
Total	n/a	46.4	41.6

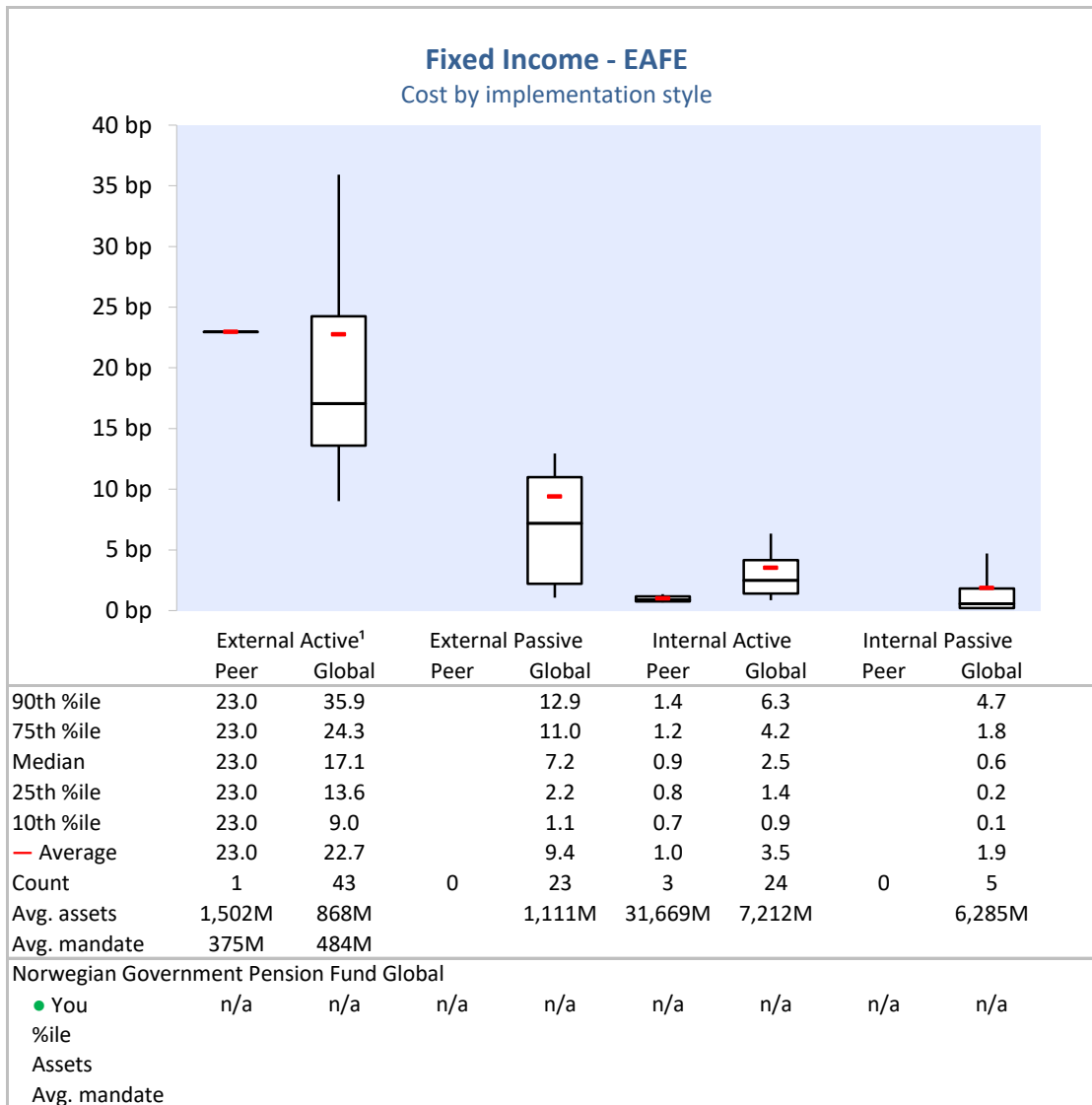
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.5 bps for peers (2 funds) and 21.7 bps for Global participants (18 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	13.1	21.6
Performance fees*	n/a	0.0	1.2
Internal and other	<u>n/a</u>	<u>2.0</u>	<u>0.6</u>
Total	n/a	15.1	23.4

\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for peers (1 fund) and 5.5 bps for Global participants (21 funds).

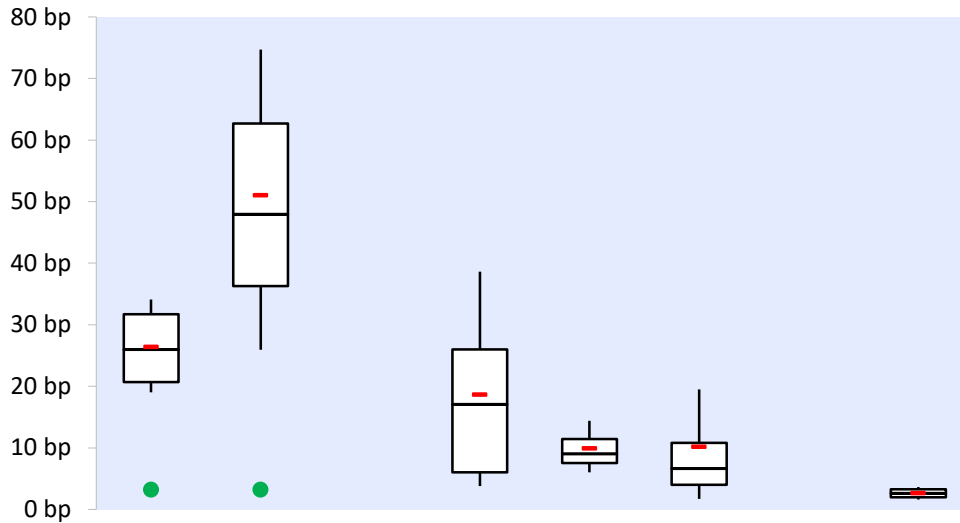


#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	7.8	18.3
Performance fees*	n/a	14.5	3.4
Internal and other	<u>n/a</u>	<u>0.6</u>	<u>1.0</u>
Total	n/a	23.0	22.7

\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 14.5 bps for peers (1 fund) and 11.4 bps for Global participants (13 funds).

### Fixed Income - Emerging Cost by implementation style



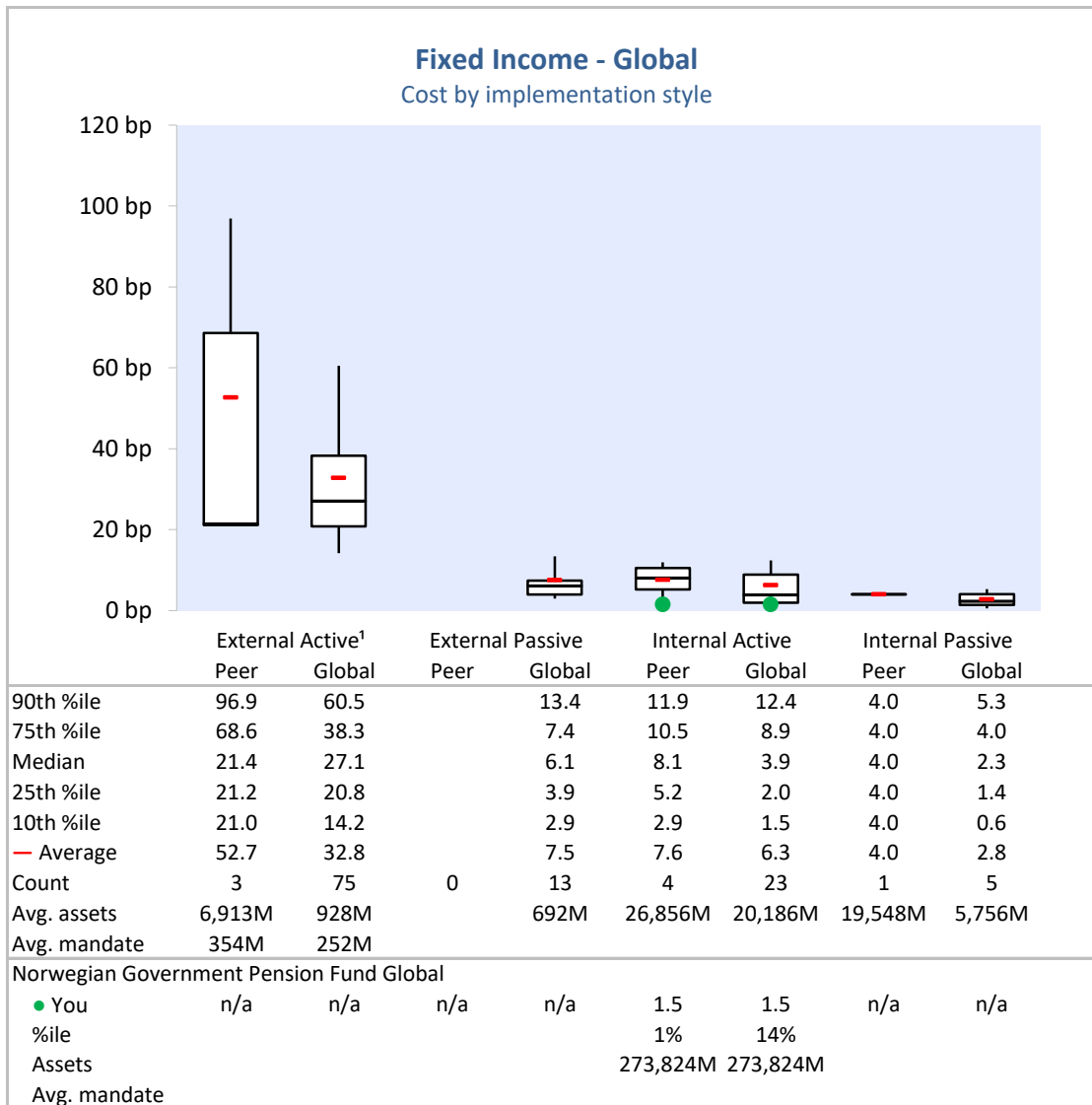
	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	34.1	74.7		38.6	14.4	19.5		3.6
75th %ile	31.7	62.7		26.0	11.4	10.8		3.3
Median	26.0	48.0		17.1	9.1	6.6		2.6
25th %ile	20.7	36.3		6.0	7.5	4.0		2.0
10th %ile	19.0	25.9		3.8	6.0	1.7		1.6
— Average	26.4	51.0		18.6	9.9	10.2		2.6
Count	4	95	0	7	4	18	0	2
Avg. assets	4,560M	707M		352M	2,331M	1,204M		1,023M
Avg. mandate	416M	194M						
Norwegian Government Pension Fund Global								
● You	3.2	3.2	n/a	n/a	n/a	n/a	n/a	n/a
%ile	0%	0%						
Assets	583M	583M						
Avg. mandate								

#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	3.2	24.1	47.7
Performance fees*	n/a	0.5	2.1
Internal and other	<u>0.0</u>	<u>1.7</u>	<u>1.2</u>
Total	3.2	26.4	51.0

\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.7 bps for peers (3 funds) and 10.6 bps for Global participants (19 funds).

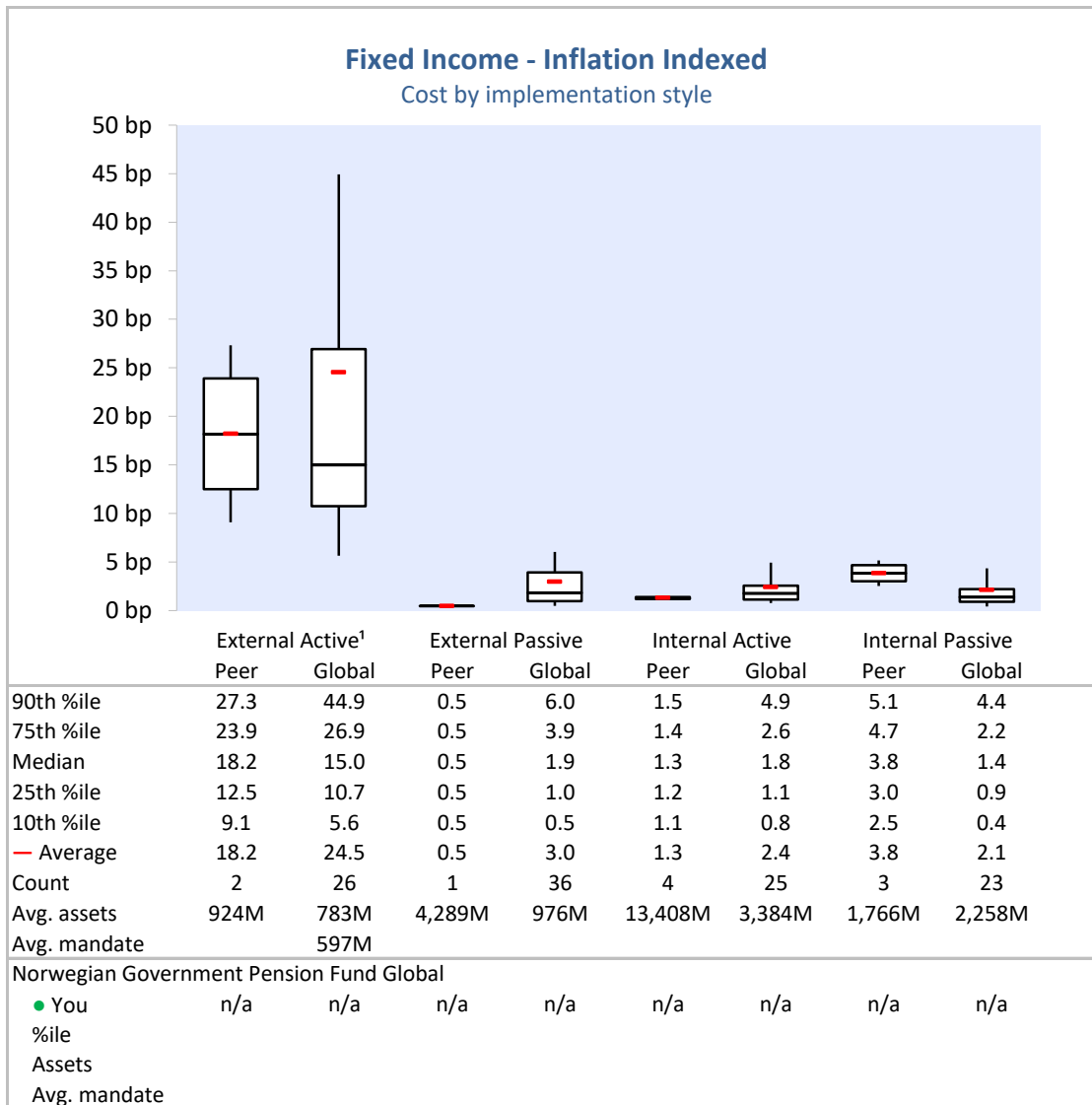




#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	30.2	31.3
Performance fees*	n/a	13.6	0.8
Internal and other	<u>n/a</u>	<u>8.9</u>	<u>0.7</u>
Total	n/a	52.7	32.8

\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 20.5 bps for peers (2 funds) and 3.7 bps for Global participants (17 funds).



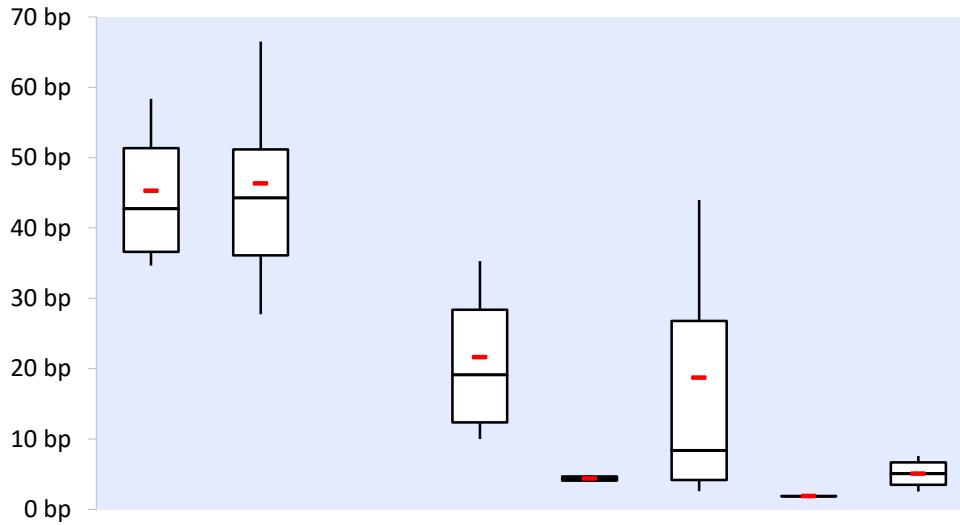
#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	13.7	22.3
Performance fees*	n/a	3.7	2.0
Internal and other	<u>n/a</u>	<u>0.7</u>	<u>0.3</u>
Total	n/a	18.2	24.5

\* 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 7.5 bps for peers (1 fund) and 7.3 bps for Global participants (7 funds).

## Fixed Income - High Yield

### Cost by implementation style



	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	58.4	66.5		35.3	4.8	44.0	1.9	7.6
75th %ile	51.4	51.1		28.4	4.7	26.8	1.9	6.7
Median	42.7	44.3		19.1	4.4	8.4	1.9	5.1
25th %ile	36.6	36.1		12.4	4.1	4.2	1.9	3.5
10th %ile	34.7	27.7		10.0	3.9	2.6	1.9	2.5
— Average	45.3	46.3		21.6	4.4	18.7	1.9	5.1
Count	6	111	0	4	2	13	1	2
Avg. assets	2,277M	588M		103M	561M	438M	65M	135M
Avg. mandate	233M	169M						
Norwegian Government Pension Fund Global								
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile								
Assets								
Avg. mandate								

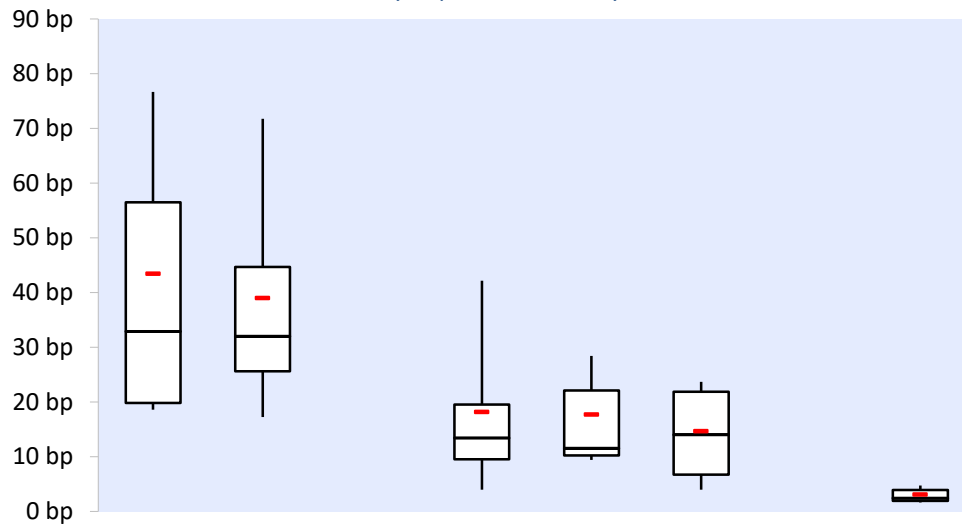
#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	40.7	43.2
Performance fees*	n/a	0.0	1.5
Internal and other	<u>n/a</u>	<u>4.6</u>	<u>1.6</u>
Total	n/a	45.3	46.3

\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for peers (2 funds) and 9.0 bps for Global participants (19 funds).

## Fixed Income - Mortgages

### Cost by implementation style



	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	76.7	71.8		42.2	28.4	23.7		4.8
75th %ile	56.5	44.7		19.5	22.1	21.9		3.9
Median	32.9	32.0		13.4	11.6	14.0		2.4
25th %ile	19.8	25.6		9.6	10.2	6.7		1.9
10th %ile	18.6	17.3		4.0	9.4	4.0		1.6
— Average	43.4	39.0		18.1	17.7	14.6		3.1
Count	4	39	0	9	3	11	0	3
Avg. assets	1,574M	457M		71M	4,018M	1,571M		383M
Avg. mandate		272M						
Norwegian Government Pension Fund Global								
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile								
Assets								
Avg. mandate								

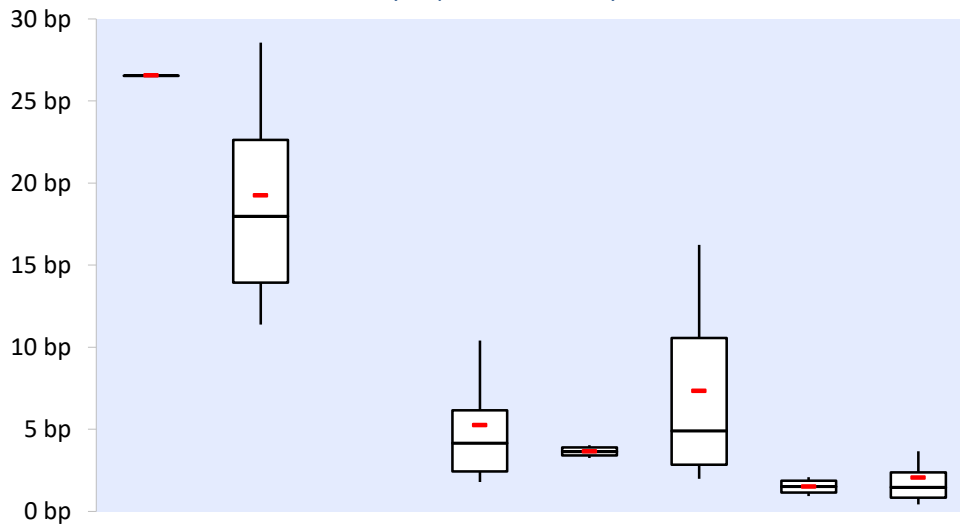
#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	33.5	34.3
Performance fees*	n/a	0.0	0.3
Internal and other	<u>n/a</u>	<u>10.0</u>	<u>4.3</u>
Total	n/a	43.4	39.0

\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.0 bps for peers (1 fund) and 4.0 bps for Global participants (3 funds).

## Fixed Income - Long Bonds

### Cost by implementation style



	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	26.5	28.6		10.4	4.0	16.2	2.1	3.7
75th %ile	26.5	22.6		6.2	3.9	10.6	1.9	2.4
Median	26.5	18.0		4.2	3.6	4.9	1.5	1.5
25th %ile	26.5	13.9		2.4	3.4	2.8	1.2	0.8
10th %ile	26.5	11.4		1.8	3.3	2.0	0.9	0.4
— Average	26.5	19.2		5.2	3.6	7.3	1.5	2.0
Count	1	95	0	38	2	15	2	13
Avg. assets	1,070M	2,547M		350M	2,882M	1,484M	6,071M	3,209M
Avg. mandate		426M						
Norwegian Government Pension Fund Global								
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile								
Assets								
Avg. mandate								

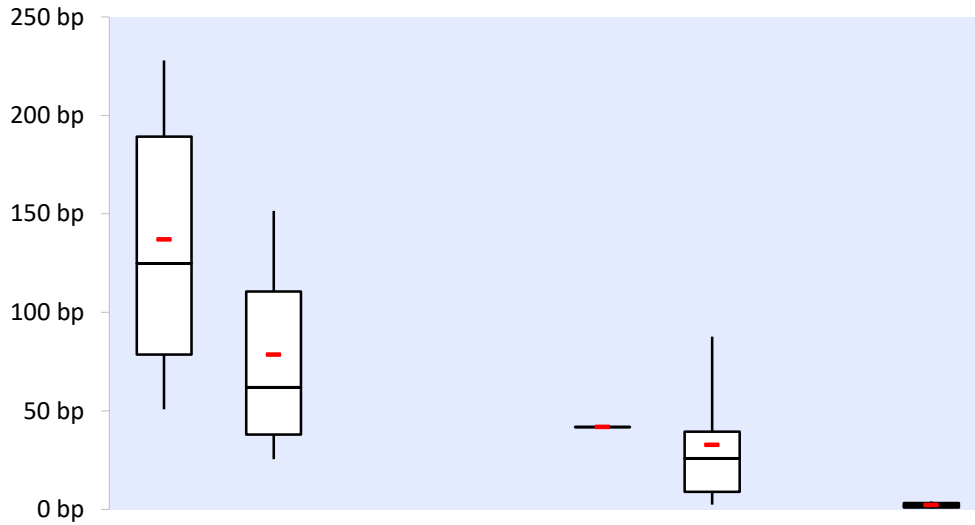
#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	18.9	18.0
Performance fees*	n/a	6.8	1.0
Internal and other	<u>n/a</u>	<u>0.8</u>	<u>0.3</u>
Total	n/a	26.5	19.2

\* 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 6.8 bps for peers (1 fund) and 7.3 bps for Global participants (13 funds).

## Fixed Income - Private Debt

### Cost by implementation style



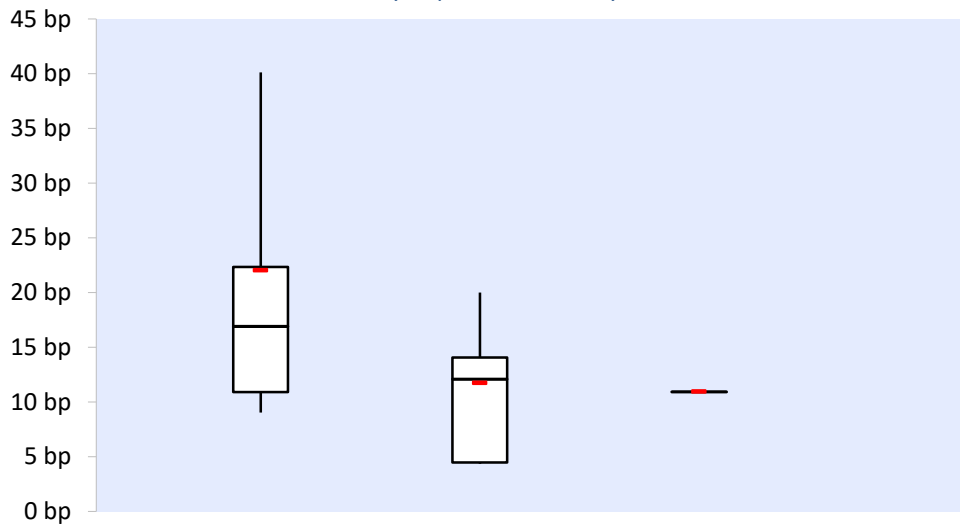
	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	227.9	151.6			41.9	87.7		4.1
75th %ile	189.3	110.5			41.9	39.4		3.3
Median	124.9	62.0			41.9	26.0		2.0
25th %ile	78.6	38.1			41.9	9.0		1.0
10th %ile	50.8	25.5			41.9	2.4		0.4
— Average	136.9	78.5			41.9	32.7		2.2
Count	3	61	0	0	1	14	0	3
Avg. assets	1,466M	412M			6,489M	1,276M		362M
Avg. mandate	271M	108M						
Norwegian Government Pension Fund Global								
● 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	Global Average
Base fees	n/a	115.5	67.2
Performance fees*	n/a	5.1	7.6
Internal and other	<u>n/a</u>	<u>16.3</u>	<u>3.6</u>
Total	n/a	136.9	78.5

\* 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 15.3 bps for peers (1 fund) and 29.0 bps for Global participants (16 funds).

### Fixed Income - Bundled LDI Cost by implementation style



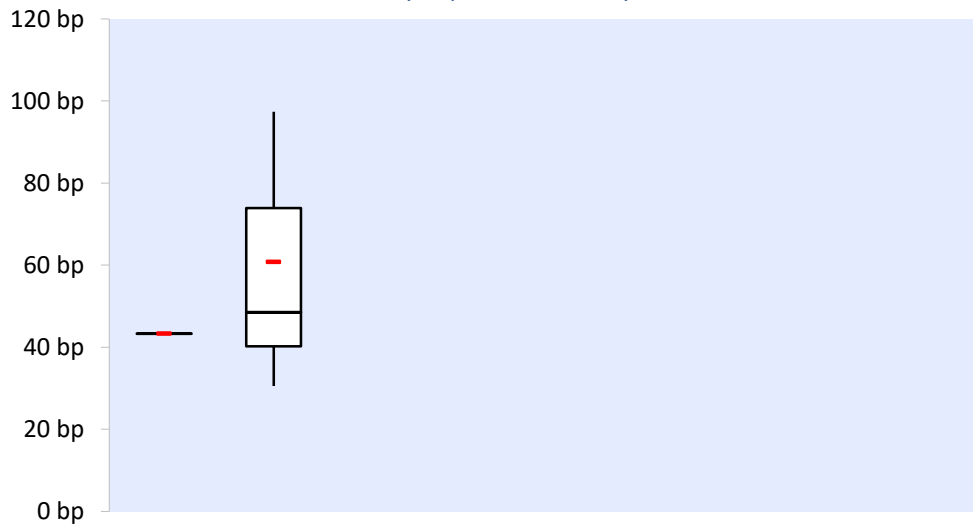
	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile		40.1		20.0		10.9		
75th %ile		22.3		14.1		10.9		
Median		16.9		12.1		10.9		
25th %ile		10.9		4.5		10.9		
10th %ile		9.0		4.4		10.9		
— Average		22.0		11.7		10.9		
Count	0	6	0	7	0	1	0	0
Avg. assets		340M		2,702M		846M		
Avg. mandate		325M						
Norwegian Government Pension Fund Global								
● 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	Global Average
Base fees	n/a	n/a	22.0
Performance fees*	n/a	n/a	n/a
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>0.0</u>
Total	n/a	n/a	22.0

No funds reported a performance fee.

### Fixed Income - Convertibles Cost by implementation style



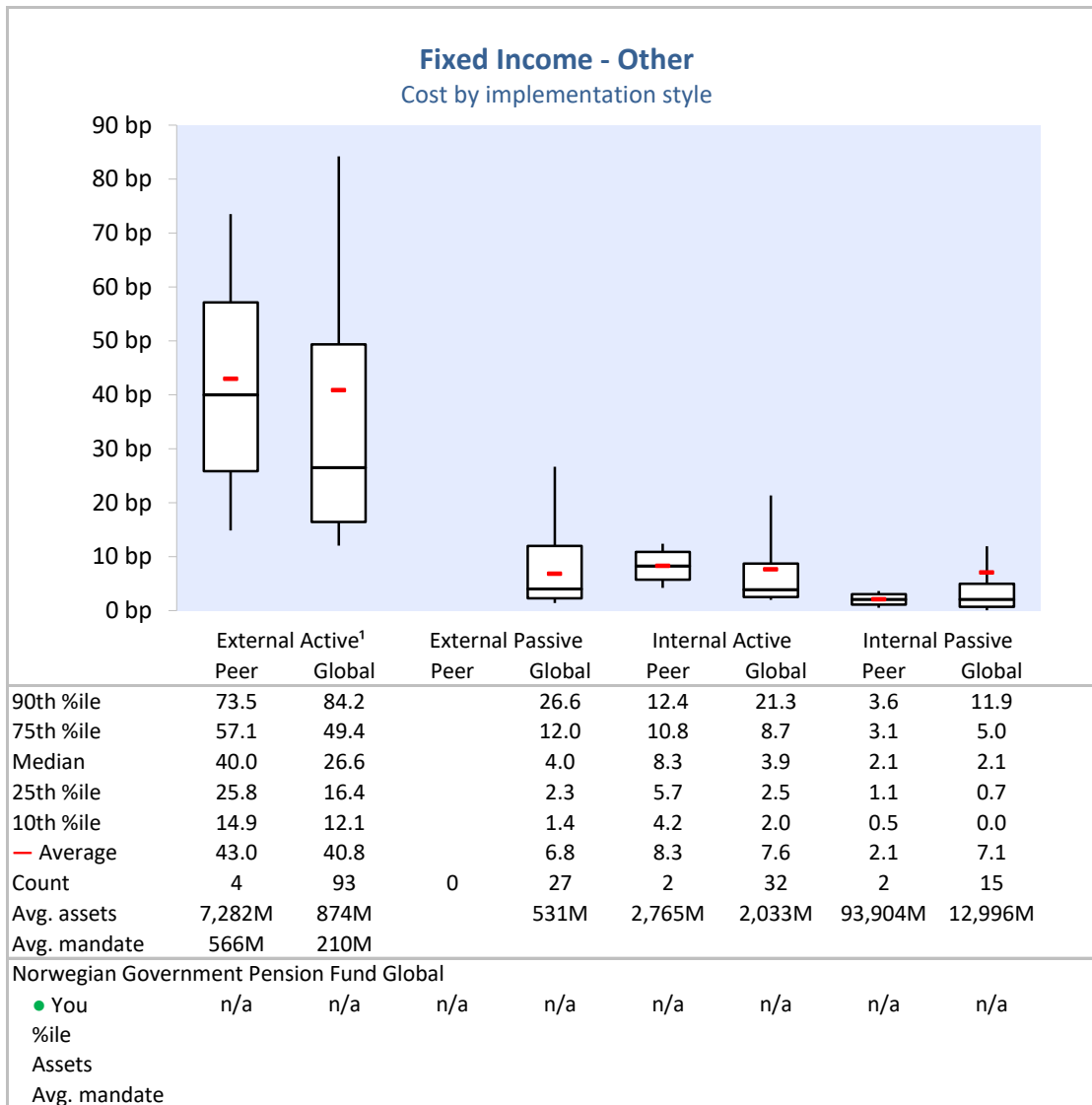
	External Active <sup>1</sup>		External Passive		Internal Active		Internal Passive	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	43.3	97.4						
75th %ile	43.3	73.9						
Median	43.3	48.5						
25th %ile	43.3	40.2						
10th %ile	43.3	30.6						
— Average	43.3	60.7						
Count	1	7	0	0	0	0	0	0
Avg. assets	1,401M	634M						
Avg. mandate		240M						
Norwegian Government Pension Fund Global								
● 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	Global Average
Base fees	n/a	43.3	47.2
Performance fees*	n/a	n/a	12.6
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>0.9</u>
Total	n/a	43.3	60.7

\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 29.4 bps for Global participants (3 funds).

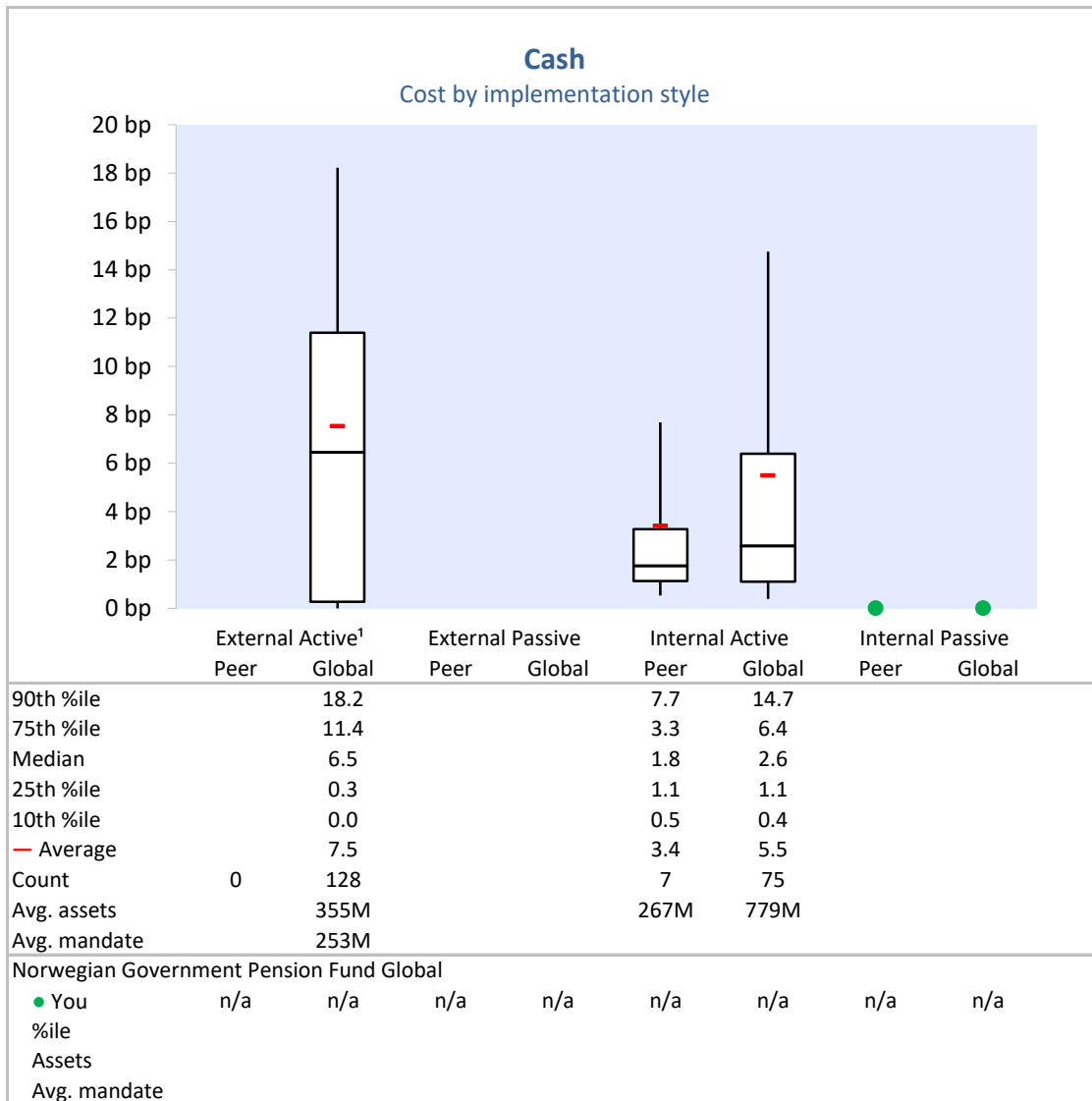




#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	41.5	34.8
Performance fees*	n/a	0.0	4.8
Internal and other	<u>n/a</u>	<u>1.4</u>	<u>1.3</u>
Total	n/a	43.0	40.8

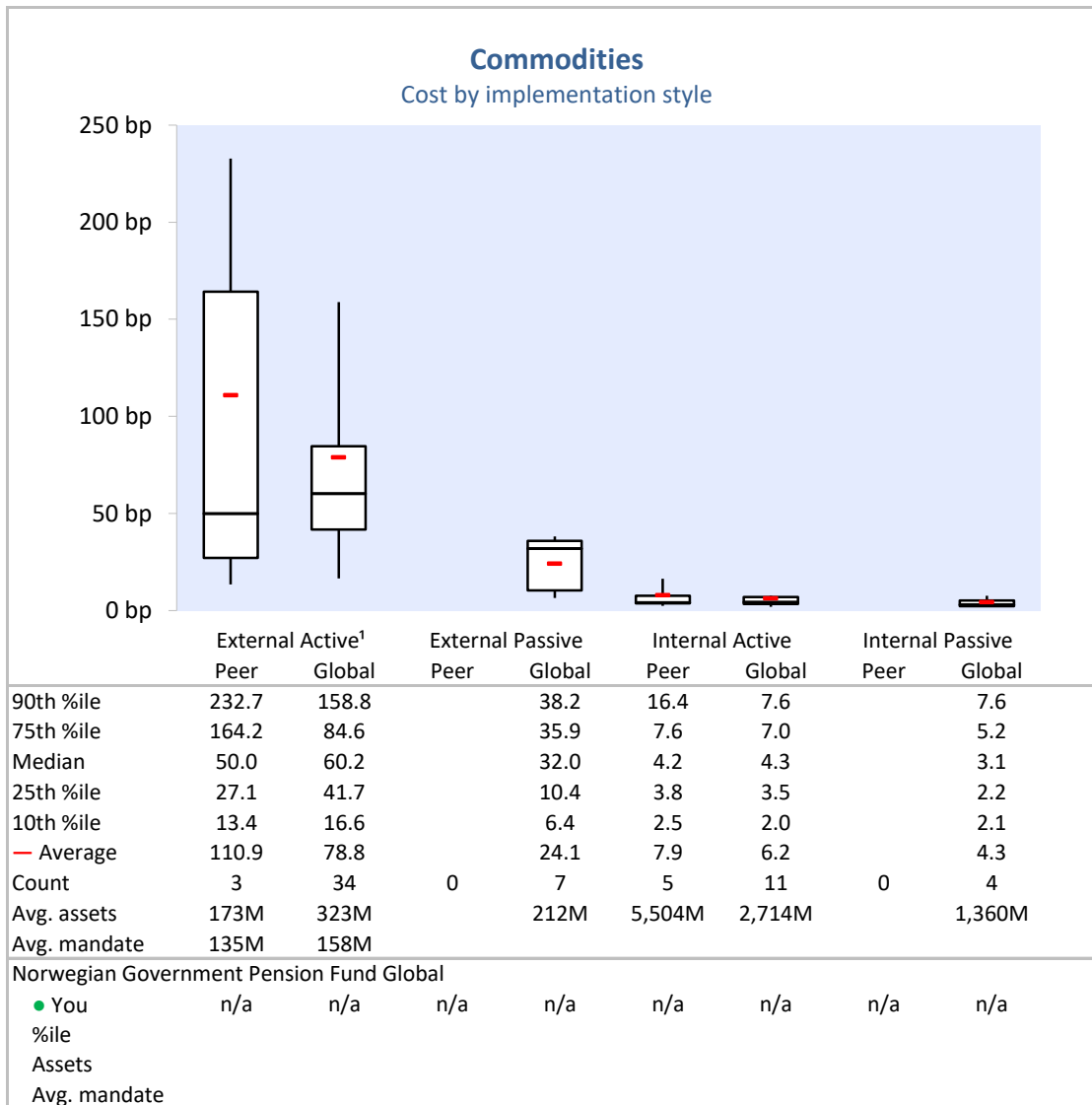
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 0.1 bps for peers (2 funds) and 21.1 bps for Global participants (21 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	n/a	6.9
Performance fees*	n/a	n/a	0.3
Internal and other	<u>n/a</u>	<u>n/a</u>	<u>0.3</u>
Total	n/a	n/a	7.5

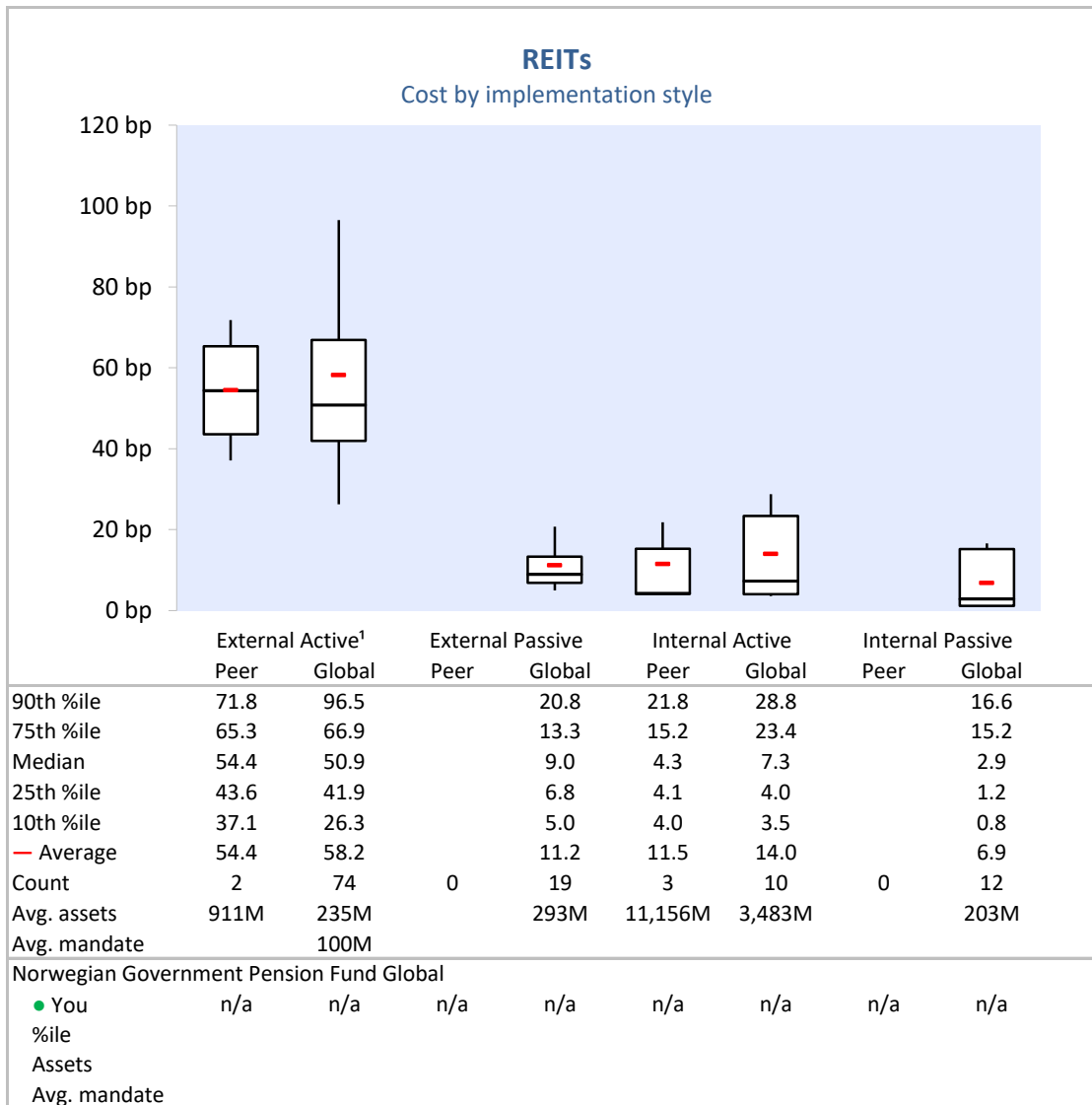
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 3.1 bps for Global participants (14 funds).



#### 1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	44.0	62.2
Performance fees*	n/a	58.1	14.9
Internal and other	<u>n/a</u>	<u>8.7</u>	<u>1.7</u>
Total	n/a	110.9	78.8

\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 87.2 bps for peers (2 funds) and 33.7 bps for Global participants (15 funds).



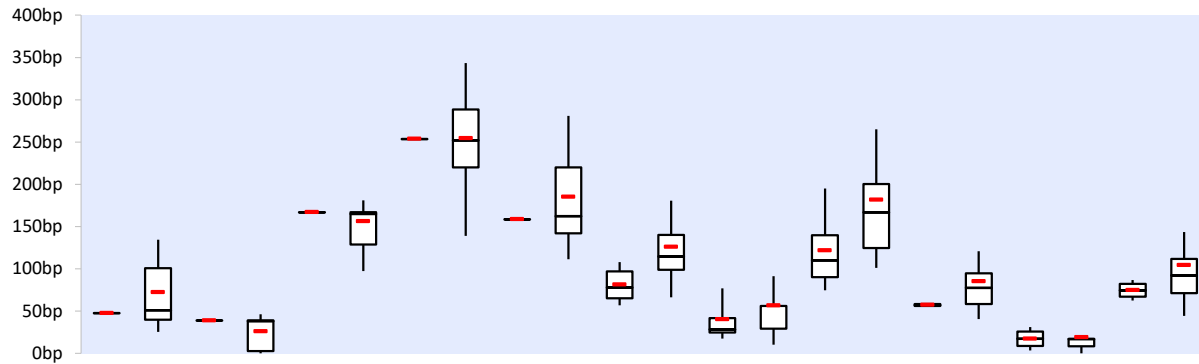
1. Breakdown of external active fees

	You	Peer Average	Global Average
Base fees	n/a	41.4	54.4
Performance fees*	n/a	n/a	2.9
Internal and other	<u>n/a</u>	<u>13.1</u>	<u>0.9</u>
Total	n/a	54.4	58.2

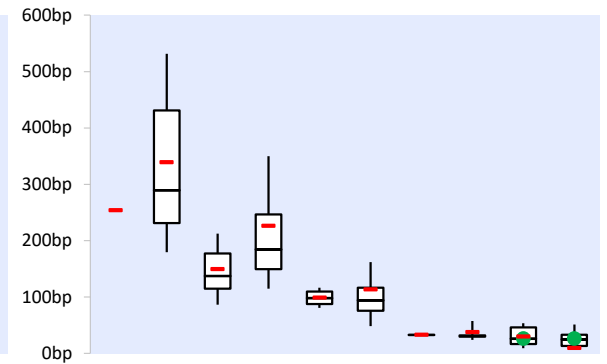
\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for those funds that reported a performance fee is 12.7 bps for Global participants (17 funds).

## Real Estate ex-REITs

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



Cost as a % of NAV



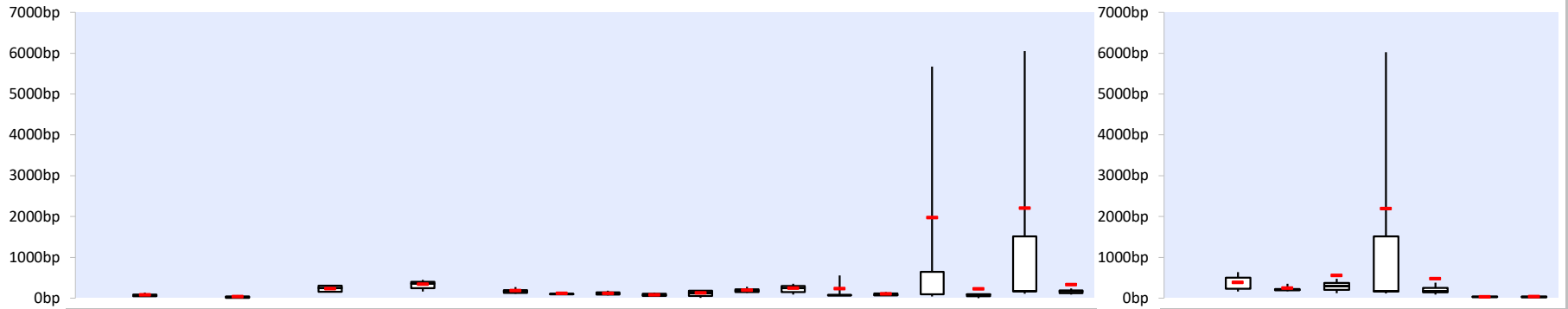
	Fund of Funds										Direct LP & Co-Inv.						External (not LP)						Fund of Funds		Direct LP & Co-Inv.		External (not LP)		Oper. Sub.		Internal	
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. <sup>2</sup>		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> incl. perf.		Total		Total			
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global		
90th %ile	47.7	134.5	39.0	46.4	167.0	181.1	253.7	343.6	158.7	280.9	107.9	180.7	77.1	91.5	195.0	264.9	59.0	120.9	31.2	20.8	86.8	143.7	253.7	531.6	212.4	349.6	116.3	162.0	33.0	57.7	53.8	51.2
75th %ile	47.7	100.6	39.0	39.0	167.0	167.0	253.7	288.5	158.7	220.0	97.1	140.2	41.7	56.0	139.8	200.2	58.3	94.7	26.1	17.0	82.2	111.8	253.7	431.0	177.1	246.8	109.7	116.6	33.0	31.8	46.5	33.2
Median	47.7	51.4	39.0	38.3	167.0	165.2	253.7	252.2	158.7	162.4	78.0	114.9	28.6	51.0	110.1	167.0	57.2	77.8	17.4	17.0	74.6	92.5	253.7	289.6	137.5	184.8	98.6	94.2	33.0	30.0	26.2	25.2
25th %ile	47.7	39.8	39.0	2.9	167.0	128.8	253.7	220.0	158.7	142.1	65.4	99.0	24.7	29.4	90.1	124.6	56.2	58.6	8.8	8.3	67.1	71.3	253.7	231.4	114.7	149.4	87.6	75.6	33.0	29.7	16.6	13.4
10th %ile	47.7	25.5	39.0	0.0	167.0	97.3	253.7	139.2	158.7	111.5	57.0	66.5	17.5	10.3	74.5	101.3	55.5	40.7	3.6	0.0	62.5	44.5	253.7	179.7	86.6	114.9	80.9	48.4	33.0	24.1	9.4	6.3
Average	47.7	72.3	39.0	25.9	167.0	156.1	253.7	254.3	158.7	185.1	81.4	125.9	40.3	56.7	121.7	181.8	57.2	85.2	17.4	19.2	74.6	104.4	253.7	339.1	149.2	226.3	98.6	113.5	33.0	37.7	29.8	9.4
Count	1	39	1	39	1	39	1	39	1	39	8	142	8	140	8	142	2	169	2	169	2	169	1	39	8	142	2	169	1	7	6	51
Avg. assets	370M	333M	370M	333M	370M	333M	370M	333M	370M	333M	11,537M	1,291M	11,537M	1,310M	11,537M	1,291M	19,366M	954M	19,366M	954M	19,366M	954M	370M	292M	9,395M	1,078M	14,754M	894M	19,427M	7,134M	5,213M	2,309M
Norwegian Government Pension Fund Global																																
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	26.0	26.0
%ile																																
Assets																																

- The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
- The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 111 bps (on amount fees are based on) for underlying management fees and 56 bps (on NAV) for underlying performance fees were used.
- The total cost also includes the internal cost of monitoring and selecting real estate investments. The peer average cost of monitoring and selecting was 3.7 bps for fund of funds, 8.2 bps for LPs and 3.4 bps for external (not LPs).
- Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 2 of your peers and 13 of the Global funds.

## Infrastructure

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

Cost as a % of NAV

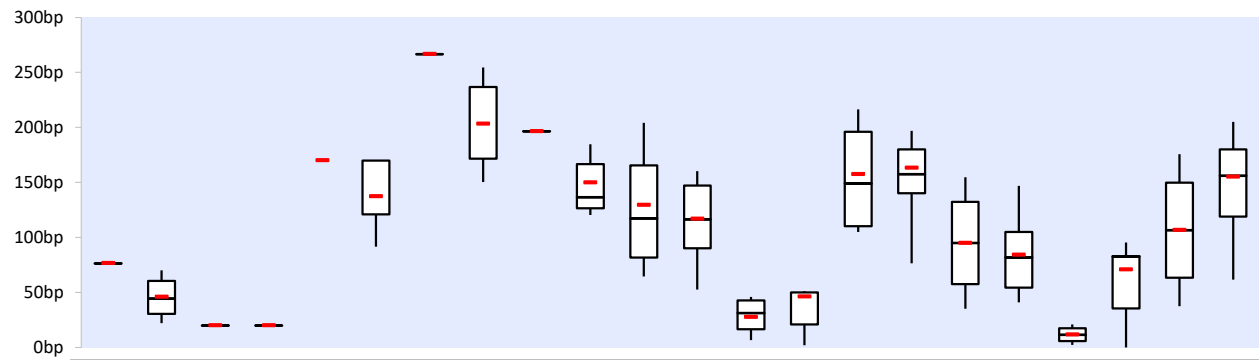


	Fund of Funds										Direct LP & Co-Inv.						External (not LP)						Fund of Funds		Direct LP & Co-Inv.		External (not LP)		Internal		
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. <sup>2</sup>		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> incl. perf.		Total				
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global			
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global			
90th %ile		136.1		75.6		302.0		448.8		273.1	151.6	179.4	133.6	185.0	274.6	349.7	554.8	150.1	5670.7	98.2	6054.9	235.4		640.1	353.6	472.0	6026.2	377.6	44.5	51.1	
75th %ile		85.7		40.0		302.0		402.8		195.4	107.8	141.2	110.0	185.0	219.4	299.9	83.0	111.7	642.2	91.0	1511.5	192.4		499.0	220.8	374.1	1511.5	249.6	40.0	41.4	
Median		60.8		35.3		248.6		357.8		174.0	102.5	113.6	72.3	128.9	179.2	252.4	73.6	83.1	96.9	91.0	174.0	172.2		396.0	201.0	296.2	174.0	174.9	31.3	31.3	
25th %ile		44.3		8.6		152.3		246.4		127.9	94.1	84.2	54.0	52.2	150.3	147.1	70.4	67.6	91.0	47.0	170.5	124.5		232.3	194.5	204.6	160.1	139.5	26.7	21.1	
10th %ile		40.0		0.0		144.5		159.8		108.2	89.8	68.3	30.7	3.6	126.7	87.6	64.7	50.4	36.6	0.9	110.7	84.7		159.8	166.9	118.1	111.9	87.8	17.1	9.6	
Average		80.3		33.1		230.2		343.6		182.1	114.7	116.3	78.8	129.6	193.5	243.5	231.4	104.7	1970.7	222.9	2202.1	327.6		383.9	240.5	551.9	2192.3	472.3	31.0	32.5	
Count		0		21		0		21		0	6	110	6	108	6	110	5	62	5	62	5	62	62		0	21	6	110	5	7	29
Avg. assets				108M		108M		108M		108M	688M	12,791M	473M	13,998M	1,161M	26,789M	1,870M	499M	1,870M	499M	1,870M	499M		106M	2,351M	358M	1,953M	470M	5,727M	3,540M	
Norwegian Government Pension Fund Global																															
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile																															
Assets																															

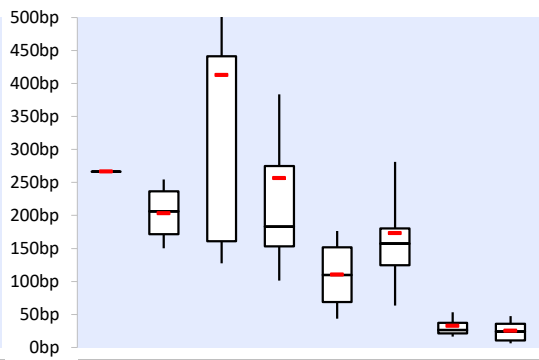
- The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
- The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of n/a bps (on amount fees are based on) for underlying management fees and n/a bps (on NAV) for underlying performance fees were used.
- The total cost also includes the internal cost of monitoring and selecting infrastructure investments. The peer average cost of monitoring and selecting was 9.6 bps for LPs and 16.5 bps for external (not LPs).
- Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 3 of your peers and 14 of the Global funds.

## Natural Resources

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



Cost as a % of NAV

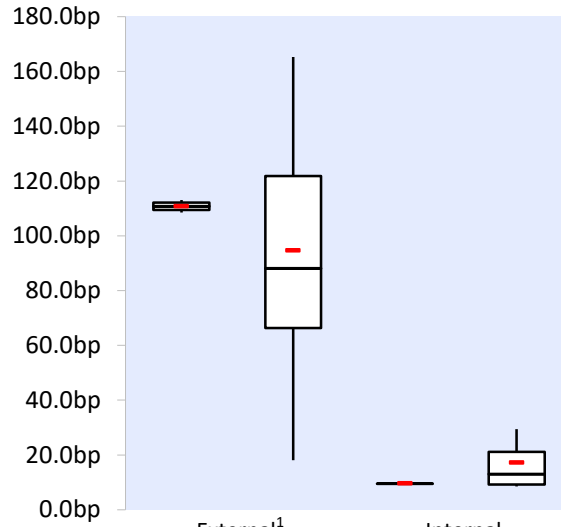


	Fund of Funds										Direct LP & Co-Inv.						External (not LP)						Fund of Funds		Direct LP & Co-Inv.		External (not LP)		Internal	
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. <sup>2</sup>		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> incl. perf.		Total		Total		Total	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	76.6	70.2	20.0	20.0	170.0	170.0	266.6	254.6	196.6	184.6	204.3	160.2	46.0	51.2	216.5	197.0	154.9	146.9	20.9	95.6	175.8	205.1	266.6	254.6	875.5	383.3	176.5	281.2	53.4	47.5
75th %ile	76.6	60.6	20.0	20.0	170.0	170.0	266.6	236.6	196.6	166.6	165.5	147.3	42.7	50.0	196.1	180.0	132.4	104.9	17.4	83.0	149.9	180.0	266.6	236.6	441.1	275.0	151.7	180.4	37.6	35.8
Median	76.6	44.5	20.0	20.0	170.0	170.0	266.6	206.6	196.6	136.6	117.6	116.6	31.5	36.8	149.1	157.7	95.0	82.0	11.6	83.0	106.6	156.2	266.6	206.6	189.8	183.4	110.2	157.4	26.6	24.4
25th %ile	76.6	30.6	20.0	20.0	170.0	120.9	266.6	171.5	196.6	126.5	81.8	90.3	16.6	21.0	110.4	140.2	57.6	54.5	5.8	35.4	63.4	118.9	266.6	171.5	161.1	153.4	68.8	124.6	21.5	10.6
10th %ile	76.6	22.2	20.0	20.0	170.0	91.5	266.6	150.5	196.6	120.5	64.6	52.7	6.6	2.0	104.9	76.6	35.1	40.9	2.3	0.0	37.5	61.6	266.6	150.5	127.5	101.4	43.9	63.7	16.3	6.6
— Average	76.6	45.9	20.0	20.0	170.0	137.3	266.6	203.2	196.6	149.9	129.6	117.0	27.8	46.4	157.4	163.4	95.0	84.3	11.6	70.9	106.6	155.2	266.6	203.2	412.5	256.4	110.2	173.1	32.5	25.4
Count	1	3	1	3	1	3	1	3	1	3	4	38	4	38	4	38	2	37	2	37	2	37	1	3	4	38	2	37	4	13
Avg. assets	20M	40M	20M	40M	20M	40M	20M	40M	20M	40M	518M	4,447M	111M	1,762M	630M	6,209M	880M	364M	880M	364M	880M	364M	20M	40M	1,963M	436M	856M	322M	1,338M	1,130M
Norwegian Government Pension Fund Global																														
● You %ile	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Assets																														

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 120 bps (on amount fees are based on) for underlying management fees and 50 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 1.6 bps for fund of funds and 14.7 bps for LPs and 14.7 bps for external (not LPs).
4. Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 3 of your peers and 14 of the Global funds.

## Other Real Assets

Cost as % of NAV by implementation style



	External <sup>1</sup>		Internal	
	Peer	Global	Peer	Global
90th %ile	113.0	165.3	9.6	29.4
75th %ile	112.2	121.8	9.6	21.1
Median	110.8	88.1	9.6	13.0
25th %ile	109.4	66.3	9.6	9.2
10th %ile	108.6	18.1	9.6	8.6
— Average	110.8	94.6	9.6	17.3
Count	2	43	1	4
Avg. assets	1,436M	403M	1,415M	477M
Avg. mandate	501M	92M		119M
Norwegian Government Pension Fund Global				
● You	n/a	n/a	n/a	n/a
%ile				
Assets	0M	0M	0M	0M
Avg. mandate				

### 1. Breakdown of external fees

	Your Plan	Peer Average	Global Average
Base fees	n/a	106.2	93.0
Internal and other	<u>n/a</u>	<u>4.6</u>	<u>3.9</u>
Total*	n/a	110.8	94.6
Performance fees**	n/a	-2.0	29.7

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

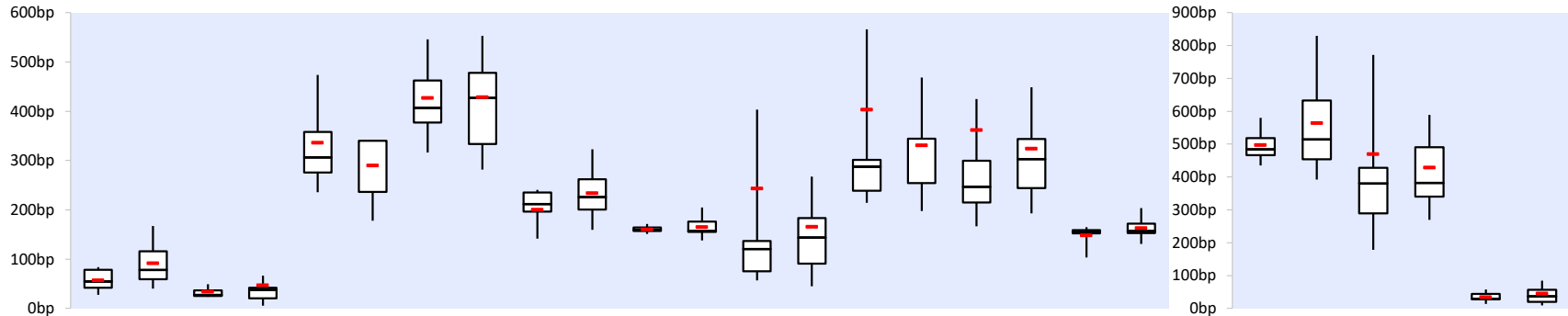
\*\* For funds that did not report a performance fee, a value of 'zero' was used. The average performance fee for only those funds that reported a performance fee is -2.0 bps for peers (2 funds) and 29.7 bps for Global participants (43 funds).



## Diversified Private Equity

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

Cost as a % of NAV



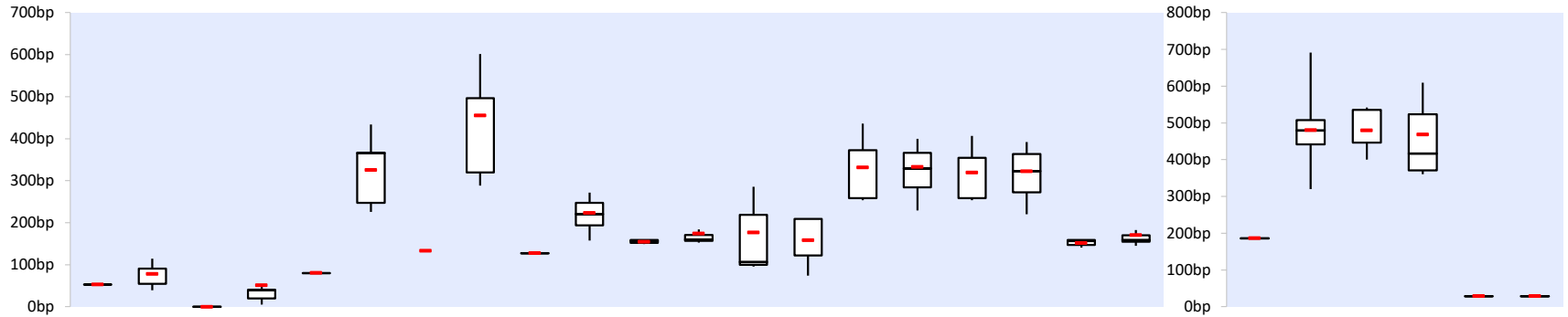
	Fund of Funds										Direct LP						Direct LP & Co-Inv. <sup>4</sup>				Fund of Funds		Direct LP & Co-Inv. <sup>4</sup>		Internal	
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. <sup>2</sup>		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		incl. perf.		incl. perf.		Total	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	83.7	167.3	49.1	66.1	473.7	340.0	545.7	553.1	240.7	322.9	171.6	205.0	403.1	267.2	566.0	468.4	424.5	448.7	164.5	203.7	580.2	829.5	771.4	589.3	57.8	84.2
75th %ile	78.2	115.6	36.8	42.0	358.2	340.0	462.2	477.9	235.2	262.2	164.4	176.1	136.6	183.0	301.5	344.2	299.5	344.0	158.8	172.2	518.6	632.7	428.3	490.8	44.0	56.7
Median	54.9	78.2	27.5	37.6	306.9	304.0	406.6	426.9	211.9	226.3	159.4	157.0	120.4	143.6	287.7	307.5	247.2	302.9	156.8	157.0	484.5	514.8	380.8	382.3	29.2	36.6
25th %ile	41.8	59.0	25.1	20.3	275.5	236.5	377.0	333.7	196.2	200.8	157.0	155.2	75.5	91.0	238.5	254.1	214.7	244.3	152.3	152.6	466.1	453.6	289.2	340.0	28.9	19.8
10th %ile	27.6	40.1	23.3	5.4	235.9	178.2	316.3	281.5	141.6	159.1	150.8	137.9	56.6	44.9	214.1	197.3	166.4	192.6	103.3	130.8	435.2	392.0	178.2	269.4	13.5	9.1
Average	57.2	91.5	33.7	47.0	336.1	290.2	427.0	428.7	200.2	233.8	160.1	165.4	243.1	165.7	403.3	331.1	361.7	324.0	148.2	162.9	497.0	564.2	469.9	429.1	34.5	45.0
Count	8	143	8	143	8	143	8	143	8	143	9	162	9	162	9	162	10	164	10	164	8	143	10	163	5	19
Avg. assets	4,098M	580M	4,098M	580M	4,098M	580M	4,098M	580M	4,098M	580M	8,847M	1,746M	8,847M	1,746M	8,847M	1,746M	8,923M	1,827M	8,923M	1,827M	4,232M	499M	6,888M	1,360M	4,017M	2,484M
Norwegian Government Pension Fund Global																										
● You %ile	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Assets	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M

- The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
- The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 157 bps (on amount fees are based on) for underlying management fees and 183 bps (on NAV) for underlying performance fees were used.
- The total cost also includes the internal cost of monitoring and selecting private equity investments. The peer average cost of monitoring and selecting was 6.3 bps for fund of funds.
- Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 5 of your peers and 19 of the Global funds.

## LBO

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

Cost as a % of NAV



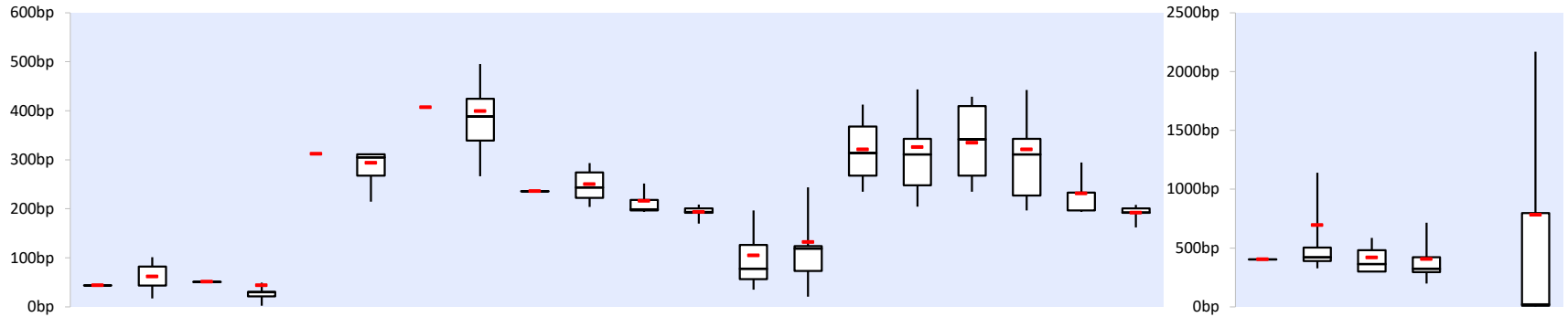
	Fund of Funds										Direct LP						Direct LP & Co-Inv. <sup>4</sup>				Fund of Funds		Direct LP & Co-Inv. <sup>4</sup>		Internal		
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. <sup>2</sup>		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		incl. perf.		incl. perf.		Total		
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	
90th %ile	53.0	114.3	0.0	53.0	80.5	434.0	133.5	601.3	127.5	271.3	159.8	184.1	285.6	209.0	435.6	399.6	406.8	392.1	159.8	182.6	186.6	691.1	542.1	609.1	29.2	29.2	
75th %ile	53.0	90.4	0.0	40.0	80.5	366.0	133.5	496.4	127.5	247.4	158.7	170.5	218.5	209.0	372.4	366.0	354.4	363.8	158.7	170.0	186.6	507.9	535.3	523.8	29.2	29.2	
Median	53.0	64.6	0.0	39.8	80.5	366.0	133.5	460.5	127.5	221.1	157.0	160.5	106.6	159.9	267.1	329.6	267.1	323.1	157.0	158.8	186.6	479.8	523.9	416.6	29.2	29.2	
25th %ile	53.0	54.8	0.0	20.0	80.5	247.1	133.5	319.5	127.5	194.0	152.2	157.0	99.8	121.9	258.5	284.4	258.5	272.7	147.1	155.0	186.6	441.9	446.6	370.9	29.2	29.2	
10th %ile	53.0	39.2	0.0	4.9	80.5	226.0	133.5	288.1	127.5	157.6	149.3	152.9	95.7	73.9	253.4	229.0	253.4	219.9	141.1	145.1	186.6	319.6	400.2	360.6	29.2	29.2	
Average	53.0	78.4	0.0	51.2	80.5	325.7	133.5	455.2	127.5	223.3	155.0	174.5	176.6	158.5	331.6	333.0	319.6	322.2	151.5	170.9	186.6	480.8	479.9	468.5	29.2	29.2	
Count	1	14	1	14	1	14	1	14	1	14	3	47	3	47	3	47	3	47	3	47	1	14	3	47	1	1	
Avg. assets	780M	228M	780M	228M	780M	228M	780M	228M	780M	228M	14,532M	2,117M	14,532M	2,117M	14,532M	2,117M	14,820M	2,178M	14,820M	2,178M	558M	173M	9,154M	1,472M	7,472M	7,472M	
Norwegian Government Pension Fund Global																											
● You %ile	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Assets	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	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 74 bps (on amount fees are based on) for underlying management fees and 8 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 33.7 bps for fund of funds.
4. Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 1 of your peers and 6 of the Global funds.

## Venture Capital

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

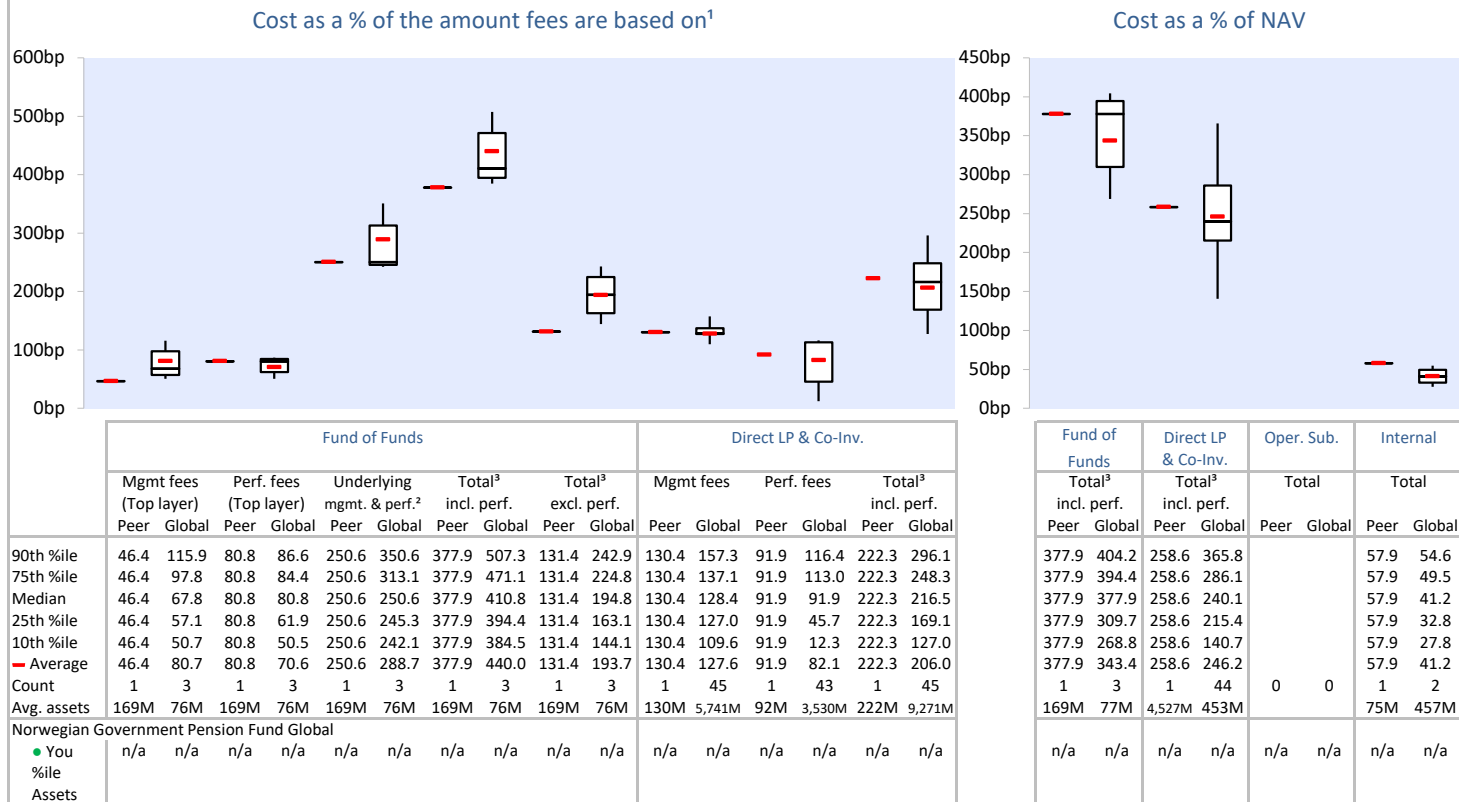
Cost as a % of NAV



	Fund of Funds										Direct LP						Direct LP & Co-Inv. <sup>4</sup>				Fund of Funds		Direct LP & Co-Inv. <sup>4</sup>		Internal	
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. & perf. <sup>2</sup>		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> incl. perf.		Total <sup>3</sup> excl. perf.		incl. perf.		incl. perf.		Total	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	43.8	101.4	51.0	49.6	312.0	312.7	406.9	495.5	235.8	293.4	251.5	208.6	196.5	243.7	412.5	443.8	428.9	442.6	294.2	208.2	403.4	1140.2	584.8	714.2		2170.0
75th %ile	43.8	82.3	51.0	30.1	312.0	311.0	406.9	424.2	235.8	274.3	217.9	201.0	126.4	123.8	367.6	342.7	409.3	342.9	233.0	200.9	403.4	504.9	481.8	422.6		795.9
Median	43.8	53.2	51.0	30.0	312.0	305.0	406.9	388.5	235.8	244.0	198.8	193.5	78.1	119.0	314.3	311.0	342.2	311.0	198.7	192.3	403.4	421.0	364.0	325.2		22.5
25th %ile	43.8	43.4	51.0	21.3	312.0	267.9	406.9	339.4	235.8	222.2	196.8	192.0	56.7	73.4	267.6	248.0	267.6	226.8	196.8	192.0	403.4	390.8	300.5	294.9		9.4
10th %ile	43.8	16.9	51.0	2.4	312.0	214.6	406.9	266.4	235.8	204.1	193.9	170.1	35.2	20.8	234.7	204.5	234.7	196.7	193.9	161.8	403.4	327.2	295.4	197.4		3.8
Average	43.8	61.7	51.0	43.9	312.0	293.7	406.9	399.3	235.8	250.0	215.9	193.5	105.0	132.3	320.9	325.8	334.8	320.8	231.1	192.1	403.4	693.5	418.4	406.7		782.8
Count	1	24	1	24	1	24	1	24	1	24	4	49	4	49	4	49	4	50	4	50	1	24	4	50	0	4
Avg. assets	157M	190M	157M	190M	157M	190M	157M	190M	157M	190M	642M	284M	642M	284M	642M	284M	650M	281M	650M	281M	157M	190M	650M	281M		166M
Norwegian Government Pension Fund Global																										
● You %ile	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Assets	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	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 192 bps (on amount fees are based on) for underlying management fees and 119 bps (on NAV) for underlying performance fees were used.
3. Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 2 of your peers and 3 of the Global funds.

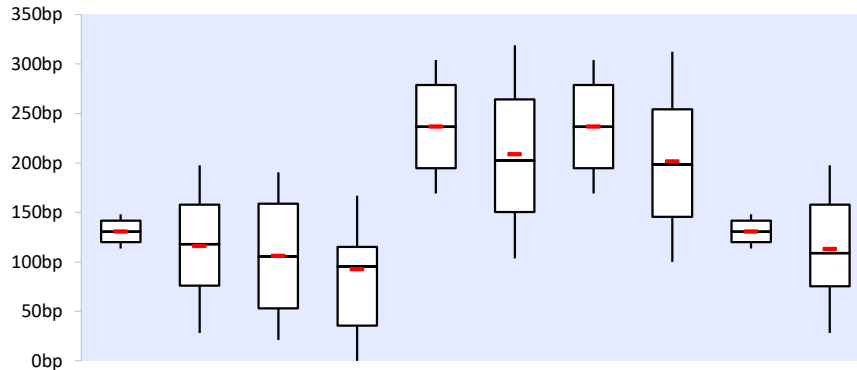
## Private Credit



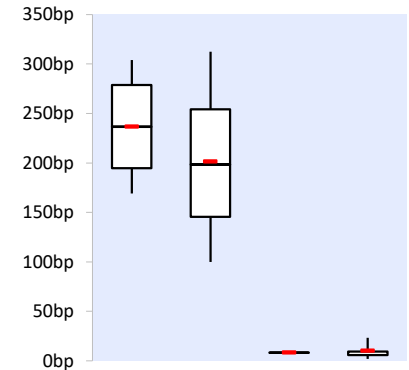
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
2. The fees of fund of funds include both the top layer fees paid to the fund of funds manager and the underlying fees paid to the 'underlying partnerships' held by the fund of funds. Most funds were unable to provide the underlying fees so defaults of 85 bps (on amount fees are based on) for underlying management fees and 166 bps (on NAV) for underlying performance fees were used.
3. The total cost also includes the internal cost of monitoring and selecting private credit investments. The peer average cost of monitoring and selecting was 5.0 bps for fund of funds
4. Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by 1 of your peers and 6 of the Global funds.

## Other Private Equity

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

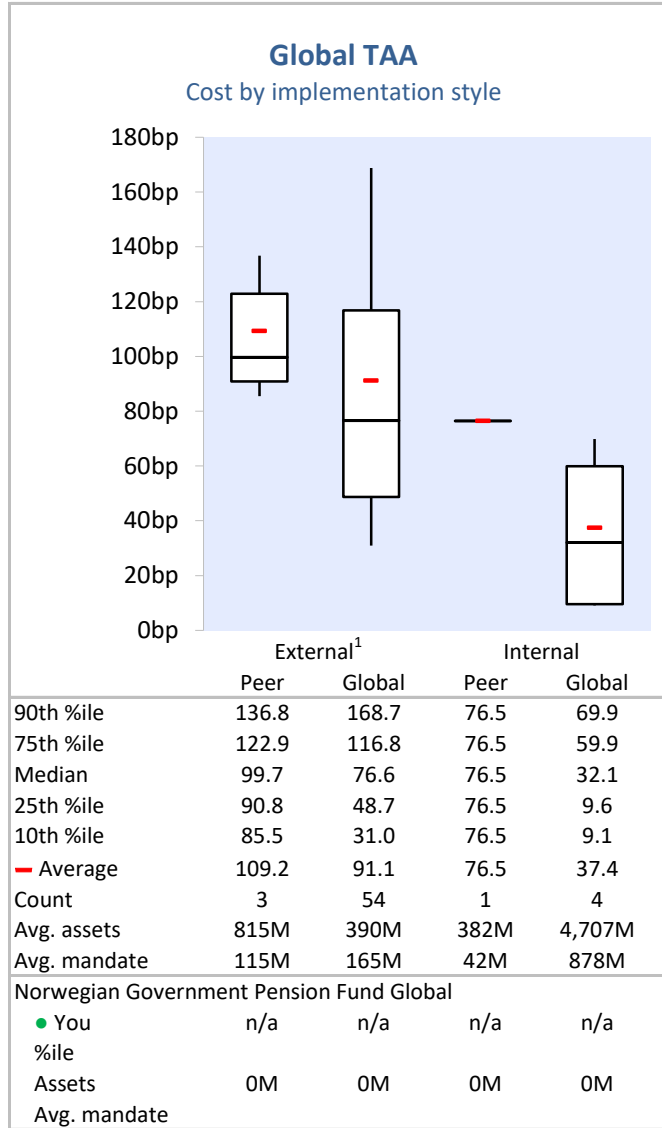


Cost as a % of NAV



	Direct LP						Direct LP & Co-Inv. <sup>3</sup>				Direct LP & Co-Inv. <sup>3</sup>		Internal	
	Mgmt fees		Perf. fees		Total <sup>2</sup> incl. perf.		Total <sup>2</sup> incl. perf.		Total <sup>2</sup> excl. perf.		Total <sup>2</sup> incl. perf.		Total	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	148.1	197.7	190.6	166.9	304.0	319.0	304.0	312.3	148.1	197.7	304.0	312.3	8.4	23.4
75th %ile	141.6	157.8	158.8	115.0	278.7	264.3	278.7	254.3	141.6	157.8	278.7	254.3	8.4	9.5
Median	130.7	118.0	105.9	95.5	236.6	202.7	236.6	198.6	130.7	109.0	236.6	198.6	8.4	8.3
25th %ile	119.9	76.2	52.9	35.7	194.5	150.4	194.5	145.4	119.9	75.5	194.5	145.4	8.4	5.9
10th %ile	113.4	28.3	21.2	0.1	169.3	103.5	169.3	99.9	113.4	28.3	169.3	99.9	8.4	2.1
— Average	130.7	116.2	105.9	92.6	236.6	208.7	236.6	201.5	130.7	112.9	236.6	201.5	8.4	10.2
Count	2	43	2	43	2	43	2	43	2	43	2	43	1	9
Avg. assets	4,306M	572M	4,306M	572M	4,306M	572M	4,306M	593M	4,306M	593M	4,306M	593M	3M	312M
Norwegian Government Pension Fund Global														
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile														
Assets	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M

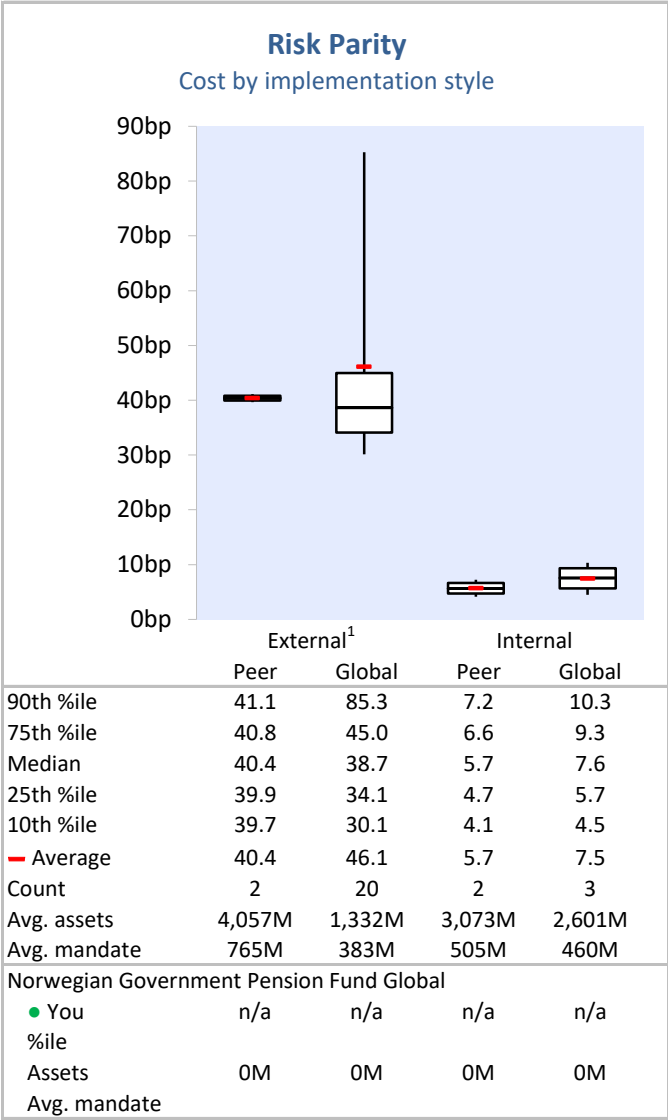
1. The base for fees is usually the committed amount during the commitment period, and unreturned invested capital afterwards.
2. The total cost also includes the internal cost of monitoring and selecting private equity investments.
3. Co-investment is included with direct LPs because it can only be done alongside direct LPs. CEM uses this combined style in its benchmark cost analysis to ensure funds that reduce their costs by using co-investment receive benchmark credit. Co-investment is done by none of your peers and 3 of the Global funds.



#### 1. Breakdown of external fees

	Your Plan	Peer Average	Global Average
Base fees	n/a	87.3	73.5
Internal and other	<u>n/a</u>	<u>14.6</u>	<u>16.6</u>
Performance fees	n/a	18.3	19.1
Total*	n/a	109.2	91.1

\* 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 18.3 bps for peers (2 funds) and 19.1 bps for Global participants (35 funds).



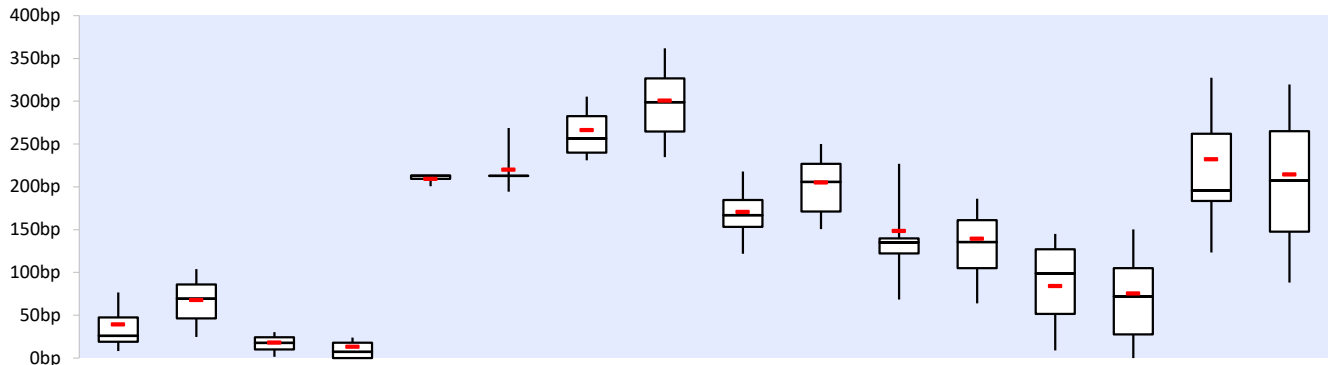
1. Breakdown of external fees

	Your Plan	Peer Average	Global Average
Base fees	n/a	34.4	40.3
Internal and other	<u>n/a</u>	<u>2.8</u>	<u>1.7</u>
Performance fees	n/a	3.2	7.2
Total*	n/a	40.4	46.1

\* 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 3.2 bps for peers (2 funds) and 7.2 bps for Global participants (14 funds).

## Hedge Funds

### Cost by implementation style



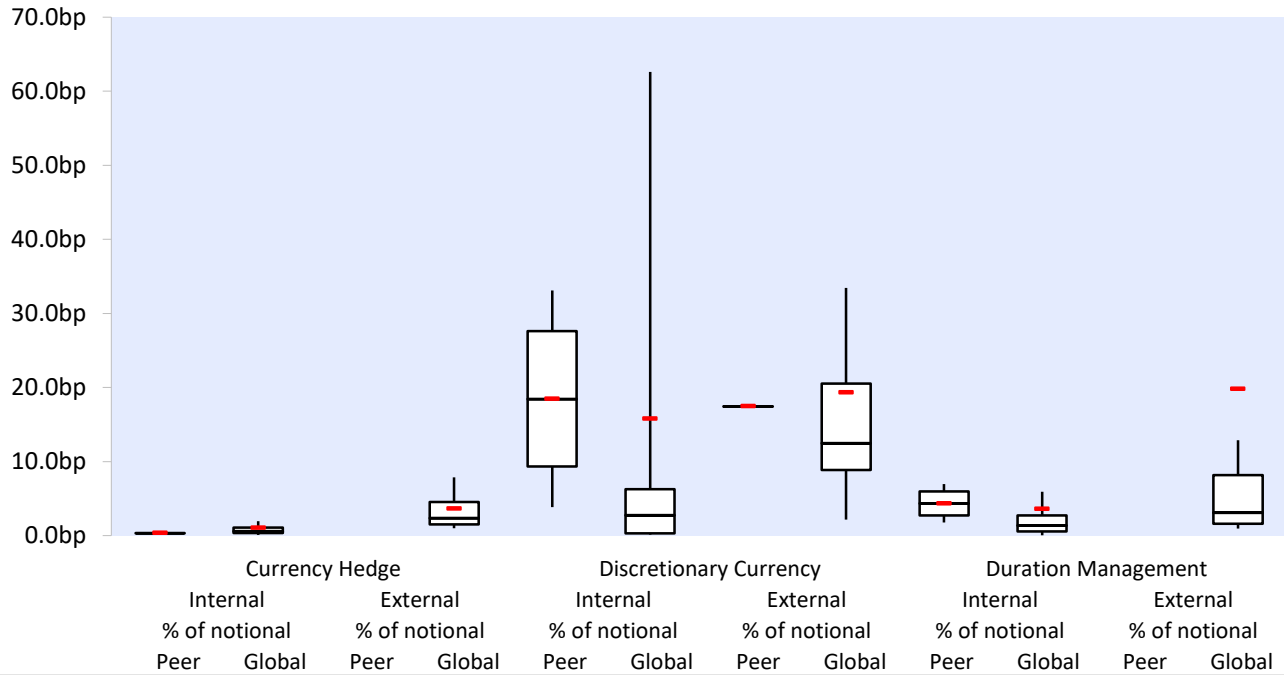
	Fund of Funds										External Direct					
	Mgmt fees (Top layer)		Perf. fees (Top layer)		Underlying mgmt. and perf. <sup>1</sup>		Total <sup>2</sup> incl. perf.		Total <sup>2</sup> excl. perf.		Mgmt fees		Perf. fees		Total <sup>2</sup> incl. perf.	
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	76.7	103.7	30.2	23.8	213.0	268.6	305.3	361.9	217.7	250.0	227.0	186.3	144.8	150.3	327.6	319.7
75th %ile	47.3	85.9	24.0	18.0	213.0	213.0	282.4	326.9	184.7	226.9	139.9	161.0	126.9	104.8	262.1	265.0
Median	25.9	69.3	18.0	7.5	213.0	213.0	256.9	299.1	166.9	205.8	135.2	135.5	99.2	72.0	195.8	207.3
25th %ile	19.1	46.3	10.0	0.0	209.2	213.0	240.0	264.7	153.4	171.3	122.3	104.9	51.5	27.7	183.6	147.5
10th %ile	8.1	24.5	1.2	0.0	200.8	194.2	231.0	234.9	121.8	150.6	68.3	63.8	8.9	0.0	123.5	88.3
— Average	39.2	67.7	17.8	13.0	209.2	219.9	266.2	300.6	170.3	205.0	148.2	139.1	83.9	75.1	232.1	214.2
Count	7	90	7	90	7	90	7	90	7	90	9	131	9	131	9	131
Avg. assets	3,032M	572M	3,032M	572M	3,032M	572M	3,032M	572M	3,032M	572M	5,316M	1,435M	5,316M	1,435M	5,316M	1,435M
Norwegian Government Pension Fund Global																
● You	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
%ile																
Assets	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M	0M

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 141 bps (on NAV) for underlying management fees and 72 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 12.4 bps for fund of

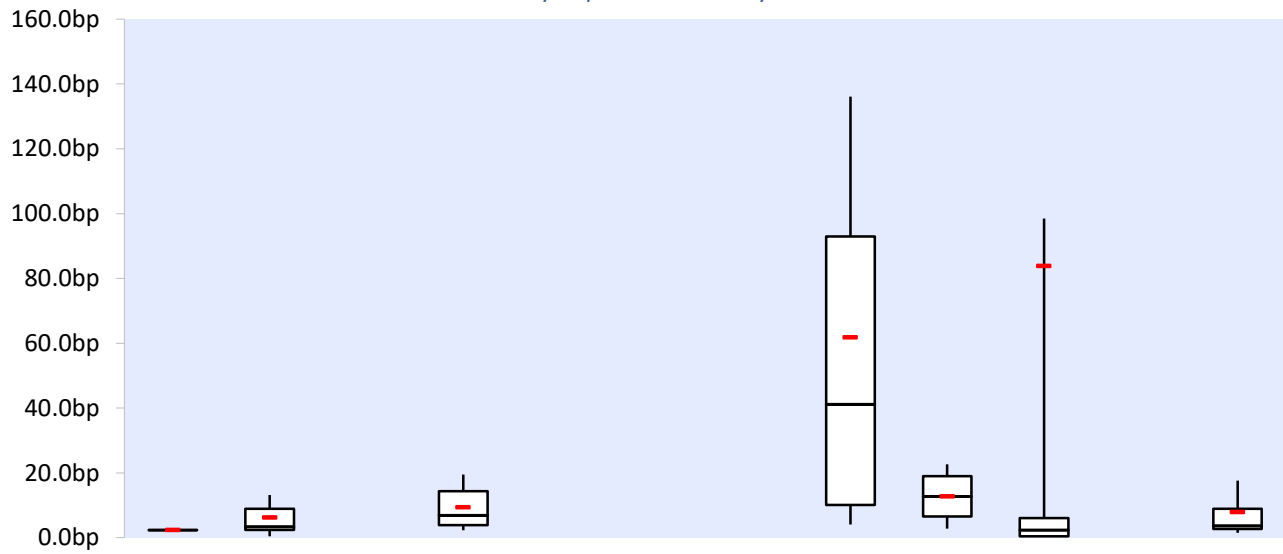


**Overlays: currency, duration**  
Cost by implementation style



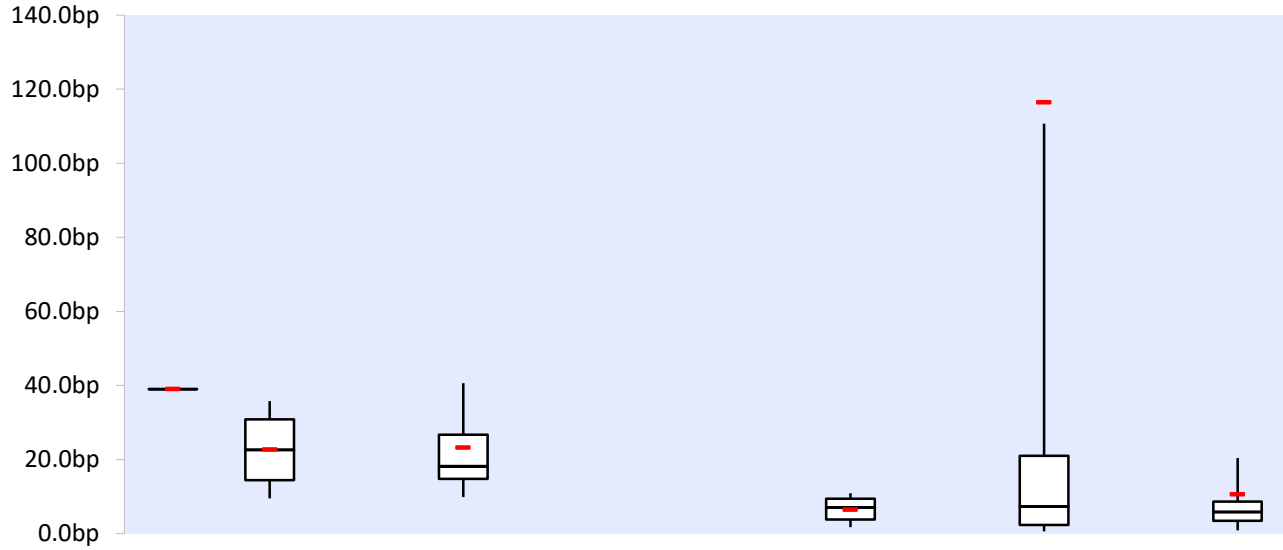
	Currency Hedge		Discretionary Currency				Duration Management				
	% of notional		% of notional		% of notional		% of notional		% of notional		
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	
90th %ile	0.4	2.0	7.9	33.1	62.6	17.5	33.4	6.9	5.9	12.9	
75th %ile	0.4	1.1	4.6	27.6	6.3	17.5	20.5	6.0	2.7	8.2	
Median	0.4	0.6	2.4	18.5	2.8	17.5	12.5	4.4	1.4	3.1	
25th %ile	0.4	0.4	1.5	9.3	0.3	17.5	8.8	2.7	0.6	1.6	
10th %ile	0.4	0.1	1.0	3.9	0.2	17.5	2.2	1.8	0.1	1.0	
— Average	0.4	1.1	3.6	18.5	15.8	17.5	19.3	4.4	3.6	19.8	
Count	1	21	0	48	2	15	1	19	2	15	
Avg. notional	38,616M	6,764M	1,989M	14,485M	6,925M	3,923M	1,279M	7,145M	3,439M	6,357M	
Norwegian Government Pension Fund Global											
● You	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	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	2.4	13.2	19.5				136.1		22.7	98.5		17.6
75th %ile	2.4	8.9	14.3				92.9		18.9	6.0		8.9
Median	2.4	3.4	6.9				41.2		12.7	2.4		3.7
25th %ile	2.4	2.4	3.8				10.1		6.5	0.4		2.7
10th %ile	2.4	0.4	2.3				4.0		2.8	0.2		1.5
— Average	2.4	6.1	9.4				61.8		12.7	83.8		7.9
Count	1	9	0	32	0	0	0	4	2	13	0	4
Avg. notional	3,491M	7,020M		924M				1,906M	86,654M	22,926M		1,920M
Norwegian Government Pension Fund Global												
● 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: commodity, long/short, other**  
Cost by implementation style



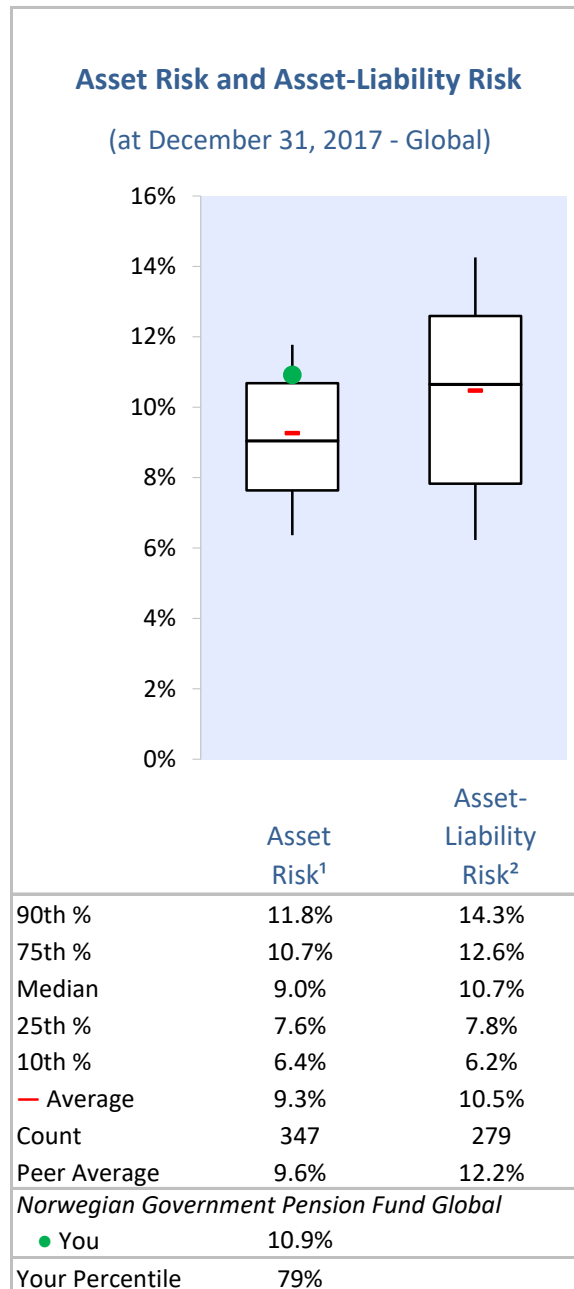
	Commodity				Long/ Short				Other			
	Internal		External		Internal		External		Internal		External	
	% of notional	% of notional	% of notional	% of notional	% of notional	% of notional	% of notional	% of notional	% of notional	% of notional		
	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global	Peer	Global
90th %ile	39.1	35.8		40.6				10.9		110.7		20.4
75th %ile	39.1	30.9		26.7				9.5		21.0		8.6
Median	39.1	22.7		18.3				7.1		7.4		5.9
25th %ile	39.1	14.5		14.8				3.8		2.4		3.4
10th %ile	39.1	9.6		9.9				1.8		0.6		0.9
— Average	39.1	22.7		23.2				6.5		116.4		10.6
Count	1	2	0	4	0	0	0	3	0	11	0	17
Avg. notional	304M	462M		611M				628M		1,063M		436M
Norwegian Government Pension Fund Global												
● 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

Comparison of your risk levels to the Global universe	2
Calculation of asset risk	3
Reduction in asset risk due to diversification	4
Asset-liability risk	5
Liability proxy portfolio	6
Liability risk	7
Projected worst case scenarios	8
Historic worst case scenarios during the past 5 years	9
Risk Trends - 2013 to 2017	10
Appendix A-B - Risk methodology	11
Appendix C - Correlation Matrix	15

## Comparison of your risk levels to the Global 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 12.4%.

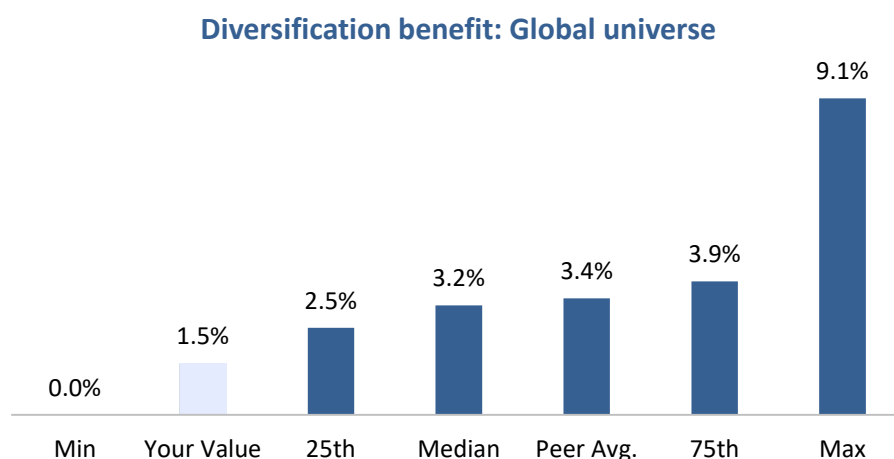
### Calculation of your weighted asset class risk

Asset Class	Policy weight (A)	Risk <sup>1</sup> (B)	Weighted risk (A X B)
Stock: Global	64.8%	15%	9.7%
Bonds: Global	31.8%	7%	2.3%
Real Estate ex-REITs	3.4%	10%	0.4%
Weighted Total			12.4%

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

## Reduction in asset risk due to diversification

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



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

### Components of asset risk

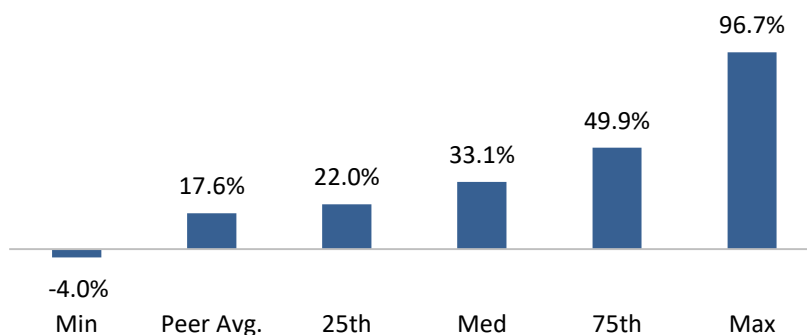
	You	Peer median*	Peer average	Global median*	Global average
Weighted asset risk	12.4%	12.9%	12.9%	12.4%	12.5%
Benefit of diversification	1.5%	2.8%	3.4%	3.2%	3.3%
Asset risk	10.9%	10.2%	9.6%	9.0%	9.3%

\* 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.

**Correlation between policy returns and liability returns: Global universe**



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	Global median	Global average
Asset risk ( $R_A$ )	10.9%	10.2%	9.6%	9.0%	9.3%
Liability risk ( $R_L$ )		8.6%	9.1%	8.5%	8.7%
Correlation between policy returns and liability returns ( $\rho_{AL}$ )		16.0%	17.6%	33.1%	36.1%
Asset-liability risk		11.9%	12.2%	10.7%	10.5%

1. Liability returns equal the changes in your marked-to-market liabilities caused by market factors. These are assumed to equal the return on your liability proxy portfolio (see next page).



## Liability proxy portfolio

Your liability proxy portfolio is the portfolio of nominal and inflation-indexed bonds that best matches the sensitivity of your liabilities to changes in real and nominal interest rates.

### Comparisons of liability proxy portfolio

	Your fund		Peer average		Global average	
	Duration	% of Assets	Duration	% of Assets	Duration	% of Assets
Inflation Indexed Bonds	n/a	0%	11.4	48%	12.3	53%
Nominal Bonds	n/a	100%	19.8	52%	14.9	47%
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 n/a.

Plan type	# of plans	% of Total
Flat Benefit	27	7%
Career Average	83	21%
Final/Highest/Best Avg	234	58%
Other	57	14%
<b>Total</b>	<b>401</b>	<b>100%</b>

### b) Contractual inflation protection for retired members

Your retired members get n/a contractual inflation protection. Your retiree inflation protection is subject to a cap of n/a.

Retiree inflation protection	# of plans		
	Corporate	Public	Other
0%	6	49	27
>0% and <50%	6	1	2
50%	2	4	1
>50% and <100%	8	14	2
100%	21	70	6
<b>Total</b>	<b>43</b>	<b>138</b>	<b>38</b>

### c) Member demographics

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

	Your fund	Peer Average	Global Average
Active Members	n/a	63%	46%
Retired Members	n/a	37%	54%
<b>Total</b>		<b>100%</b>	<b>100%</b>

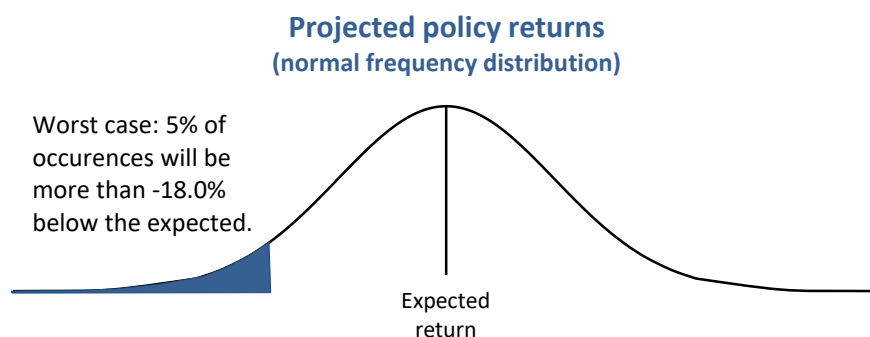
## Projected worst case scenarios

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

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

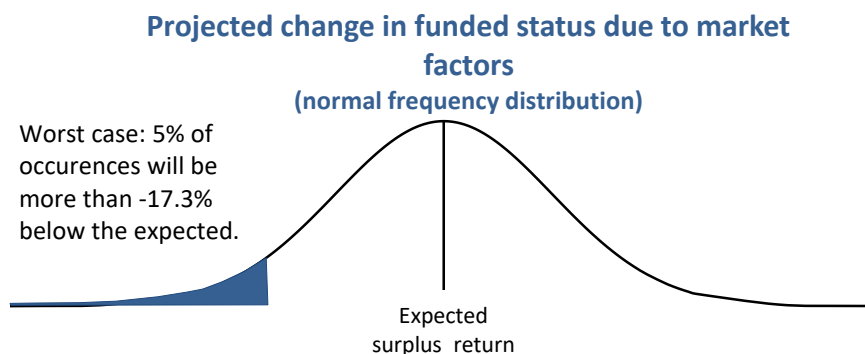
### a) Worst case policy returns

Every year there is a 5% probability that your policy return will be worse than your expected policy return by more than -18.0% (-18.0% equals  $-1.65 \times$  your asset risk of 10.9%). -18.0% is the starting point of worst case outcomes. They could be much worse.



### b) Worst case impact on funded status

For the average Global fund, there is a 5% probability every year that changes in mark-to-market funded status caused by market factors ("Surplus Returns") will be worse than expected by more than -17.3%. (-17.3% equals  $-1.65 \times$  the Global average asset-liability risk of 10.5%).



## 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 2.1% in 2015.

#### Historic policy returns - Global universe

	2017	2016	2015	2014	2013
90th %	15.2%	12.8%	5.2%	19.0%	21.0%
75th %	12.4%	11.7%	3.9%	15.6%	17.9%
Median	10.3%	10.2%	2.3%	12.7%	12.8%
25th %	9.0%	8.4%	-5.3%	9.8%	7.2%
10th %	7.4%	1.4%	-7.7%	7.9%	3.0%
Average	10.7%	9.0%	0.1%	12.8%	12.4%
Count	347	346	364	427	449
Peer Avg	10.4%	9.9%	1.1%	12.3%	12.3%
Your Value	13.0%	7.0%	2.1%	8.3%	15.0%

### b) Historic worst case changes in funded status

During the past 5 years, funds experienced the worst change in marked-to-market funded status caused by market factors ("Surplus Returns") in 2014, when the median fund experienced a -2.0% decline.

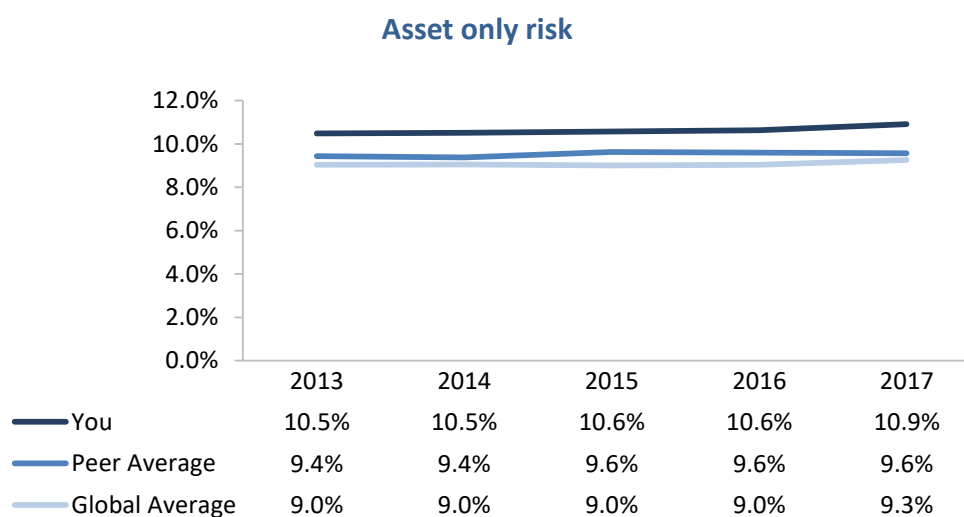
#### Historic changes in funded status caused by market factors - Global universe

	2017	2016	2015	2014	2013
90th %	12.7%	10.5%	7.2%	4.4%	32.9%
75th %	9.3%	8.5%	5.4%	1.5%	27.0%
Median	2.8%	6.4%	1.8%	-2.0%	16.3%
25th %	-0.5%	3.7%	-7.5%	-6.0%	-3.0%
10th %	-2.8%	-0.2%	-10.1%	-9.4%	-8.4%
Average	4.2%	5.8%	-0.9%	-2.1%	13.1%
Count	299	293	317	370	382
Peer Avg	4.7%	5.6%	1.6%	-1.6%	17.1%
Your Value	n/a	n/a	n/a	n/a	n/a

## Risk Trends - 2013 to 2017

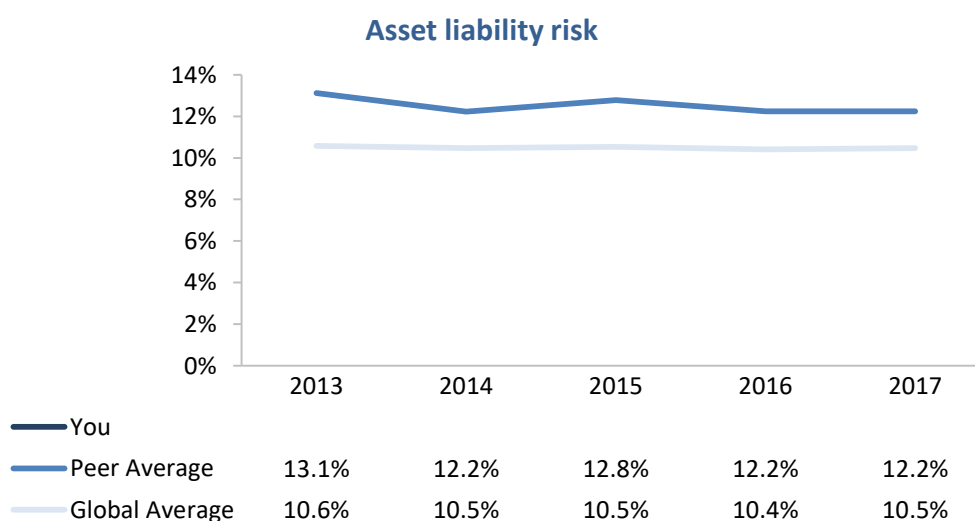
### a) Asset risk trends

Asset risk will only change if policy asset mix changes. Between 2013 and 2017 the asset risk for your fund increased from 10.5% to 10.9%.



### b) Asset-liability risk trends

Asset-liability risk will change if policy asset mix changes, or if the nature of your liabilities changes. Between 2013 and 2017 the asset-liability risk for Global funds that have provided 5 consecutive years of data decreased from 10.6% to 10.5%.



## 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 n/a based on your plan type of n/a.

Final and highest average plans have less than 100% inflation protection because during the averaging period, inflation protection is only 50%, not 100%. This is a natural function of taking an average of more than one year's earnings. Thus the weighted average inflation protection for active members in a 5-year final average plan is around 86% and in a 3-year average plan, 93%. These weighted averages are lower than intuition might suggest because the active members associated with the largest liabilities (i.e., the highest weights) are the ones closest to retirement.

Flat Benefit and Career Average plans are assumed to have 77% inflation protection. Contractually, flat benefit plans have zero inflation protection but negotiated increases tend to closely track inflation. However, just as with Final Average plans, inflation protection between negotiated increases is less than full inflation.

## Step 2 - Proportion of liabilities relating to retirees

The second step is to determine how much of your liabilities relate to your retirees versus your active members. This number is used to weight the liability proxy portfolio's obligations to retirees and active members.

This ratio depends on several factors including the ratio of retired and active members, member demographics and the inflation sensitivity of the promise made to these two member groups. Deferred (also known as inactive) members are ignored because even if they are large in number they tend to represent only a very small fraction of the future liability.

**Equivalency Table**

Retirees as a % of Active + Retirees	Relating to Retirees
0%	0%
10%	22%
20%	35%
30%	45%
40%	55%
50%	63%
60%	71%
70%	79%
80%	86%
90%	93%
100%	100%

Most funds have provided the actual ratio from their actuarial reports (as requested on the survey). If the ratio is not provided, it is estimated based on the "Equivalency" table above.

Your percentage of liabilities that relates to retirees was n/a. The percentage of liability that relates to retirees is higher than the retirees as a percentage of active and retired members because retirees have accrued a higher benefit.

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

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

Percentage change in pension liability cost

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

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

Modified duration relative to changes in real yields

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

Modified duration relative to changes in nominal yields

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

## Step 4 - Determining the liability proxy portfolio

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

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

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

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

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

## Step 5 - Liability returns

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

### Liability Return

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

	Long Nominal Bonds		Inflation Indexed Bonds		CPI
	Year end yield	Change in yield	Year end yield	Change in yield	
2017	0.42	0.08	-0.64	-0.16	1.54
2016	0.34	-0.36	-0.48	-0.10	0.32
2015	0.70	0.03	-0.38	-0.61	0.20
2014	0.67	-0.44	0.23	-1.15	0.98
2013	1.11	-0.79	1.38	-1.43	1.70



## Appendix B - Methodology used to calculate asset and asset-liability risk

### Asset mix

Your asset only mix is a function of your policy asset mix, your currency hedging policy and the presence of any duration overlays.

CEM does not use your specific policy benchmarks. Standard asset class proxies (shown on the next page) are used for each given asset class. Monthly, historical data is used to construct an asset class variance/covariance table. Your specific policy weights are then used to calculate an expected monthly volatility for your policy mix using the following formula, which takes current asset class variances and covariances as expected future variances and covariances.

$$\begin{aligned}\text{Expected monthly variance of policy mix} &= \sum \sum w_X w_Y \text{Cov}(X, Y) \\ &= \sum \sum w_X w_Y \sigma_X \sigma_Y \rho_{X,Y}\end{aligned}$$

where

$w_X$  = policy weight of asset class X

$\sigma_X$  = 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: Global	Bonds: Global	Real Assets: Real Estate ex-REITs
Stock: Global	1.00	0.34	0.52
Bonds: Global	0.34	1.00	-0.01
Real Assets: Real Estate ex-REITs	0.52	-0.01	1.00

# 7

## Appendices

Appendix A - Data Summary

Appendix B - Currency conversion

Appendix C - Data quality

Appendix D - Glossary of terms

## Appendix A - Data Summary

### Norwegian Government Pension Fund Global

Plan Info	2017	2016	2015
Contact	Julie Belck-Olsen	Julie Belck-Olsen	Julie Belck-Olsen
Type of fund (corporate, public, other)	Public	Public	Public
Total fund size (mils) as at December 31	864,249.0	827,241.0	777,429.0
Asset-class level holdings provided on survey are: year end or average?	Average	Average	Average
Total return for year ended	13.66%	6.92%	2.74%
Is the return net or gross?	Gross	Gross	Gross
Total fund policy or benchmark return	12.96%	6.97%	2.07%

Ancillary Data	2017	2016	2015
What is your hedging policy for: Foreign non-U.S. Holdings?			
What were your actuarial fees in 000s?			
How many plan members/beneficiaries do you have: Active? Active (no-accrual)? Retired? Other?			
What type of plan(s) do you have?			
To what extent are your retired members' benefits indexed to inflation? Contractual % If the indexation is subject to a cap, describe the cap			
What % of the plan's liabilities pertain to retired members?			
Actuarial valuation assumptions for funding purposes: Liability discount rate Salary progression rate			
What was your actuarial assumption for expected rate of return?			

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

### Norwegian Government Pension Fund Global

Asset Class		Policy Weight	Benchmark	
			Description	Return
Stock - Europe	2017		Custom	25.6
	2016		Your Stock: Europe benchmark	3.8
	2015			
Stock - U.S. Broad/All	2017		Custom	18.9
	2016		Your Stock: U.S. Broad/All benchmark	16.1
	2015			
Stock - Emerging	2017		Custom	20.5
	2016		Your Stock: Emerging benchmark	10.7
	2015			
Stock - Global	2017	64.8	Your Stock: Global benchmark	18.7
	2016	62.2	Your Stock: Global benchmark	8.6
	2015	61.6	Your Stock: Global benchmark	3.0
Fixed Income - Emerging	2017		Barclays Global Aggregate + Barclays Global Inflation Linked	2.9
	2016		Custom	13.0
	2015			
Fixed Income - Global	2017	31.8	Barclays Global Aggregate + Barclays Global Inflation Linked	2.9
	2016	35.3	Barclays Global Aggregate + Barclays Global Inflation Linked	4.2
	2015	35.3	Barclays Global Aggregate + Barclays Global Inflation Linked	0.6
Real Estate ex-REITs	2017	3.4	Custom	8.3
	2016	2.5	Custom (Actual)	0.8
	2015	3.1	Custom (Actual)	10.0

## Appendix A - Data Summary: Assets, Returns and Costs

### Norwegian Government Pension Fund Global

Asset Class		Assets (millions)					Fees/Costs in 000s											
		Internally		Externally Managed			Internally				Externally Managed							
		Active		Active			Indexed		Active		Indexed			Active				
		Assets	Return	Assets	Return	# of mgrs	000s	bps <sup>1</sup>	000s	bps <sup>1</sup>	Fees	Over- sight	Total 000s	bps <sup>1</sup>	Base Fees	Perform Fees	Internal & Other	Total 000s
Stock - Europe	2017			9,716.0	27.5									21,744.0	3,404.0	1,211.7	26,359.7	27.1
	2016			8,128.0	2.4									16,996.0	3,584.0	4,543.0	25,123.0	30.9
	2015																	
Stock - U.S. Broad/All	2017			664.0	18.6									1,862.0	-337.0	82.8	1,607.8	24.2
	2016			767.0	22.9									1,333.0	338.0	156.0	1,827.0	23.8
	2015																	
Stock - Emerging	2017			29,535.0	26.6									57,108.0	95,921.0	3,683.5	156,712.5	53.1
	2016			22,072.0	11.3									45,509.0	19,998.0	1,649.0	67,156.0	30.4
	2015																	
Stock - Global	2017	509,143.0	18.9			88		108,209.0	2.1									
	2016	436,866.0	8.7			87		102,953.0	2.4									
	2015	454,193.0	4.3	30,644.5	-2.7	81		114,509.0	2.5					63,858.0	64,589.0	6,696.0	135,143.0	44.1
Fixed Income - Global	2017	273,824.0	3.3					41,515.0	1.5									
	2016	282,097.0	4.3			4		40,473.0	1.4									
	2015	275,995.9	0.4	1,530.1	-8.5	3		32,020.0	1.2					4,815.0		175.0	4,990.0	32.6
Fixed Income - Emerging	2017			583.0	5.8									186.0		0.0	186.0	3.2
	2016			2,075.0	13.3									4,755.0		287.0	5,042.0	24.3
	2015																	

1. Cost in basis points = total cost / average holdings.

## Appendix A: Assets, Returns and Costs (cont.)

### Norwegian Government Pension Fund Global

Asset Class		Assets (millions) and Annual Returns				# Ext Mgrs	Investment Fees / Costs in 000s <sup>1</sup>															
		Internal & Co-Inv		External			Internal & Co-Inv					Fund of Funds										
		Assets	Return	Amt fees based on			Assets	Return	Total 000s	bps <sup>1</sup>	Base Fees	Perform Fees	Internal & Other	Total <sup>1</sup> 000s	bps (% of fee basis)	Underlying Fees	Base Fees	Perform Fees	Internal & Other	Total <sup>1</sup> 000s	bps (% of fee basis)	
Infrastructure																						
Domestic Property																						
Real Estate ex-REITs		<u>Direct</u>																				
	2017	20,936.0	9.0				54,425.0	26.0														
	2016																					
	2015																					
		<u>Operating Sub.</u>																				
	2017																					
2016	24,136.0	0.8				0.0	47,438.0	19.7														
2015	20,809.6	10.0				0.0	39,477.0	19.0														

1. Cost in basis points = total cost / average holdings. Total cost excludes private asset performance fees because of comparability issues.

2. For real estate operating subsidiaries, a default cost is applied for investment costs inside the subsidiary.

## Appendix A - Data Summary: Oversight, Custodial and Other Costs

### Norwegian Government Pension Fund Global

Oversight, Custodial and Other Costs			
		000s	bps
Oversight of the fund assets <sup>1</sup>	2017	73,798.0	0.9bp
	2016	66,954.0	0.9bp
	2015	67,859.0	0.9bp
Custodial total	2017	41,965.0	0.5bp
	2016	39,503.0	0.5bp
	2015	42,400.0	0.5bp
Consulting / performance measurement	2017	10,050.0	0.1bp
	2016	9,570.0	0.1bp
	2015	8,868.0	0.1bp
Audit	2017	4,312.0	0.1bp
	2016	6,110.0	0.1bp
	2015	4,840.0	0.1bp
Total	2017	130,125.0	1.5bp
	2016	122,137.0	1.6bp
	2015	123,967.0	1.6bp

Summary of All Asset Management Costs			
		000s	bps
Investment Management Costs	2017	389,015.0	4.6bp
	2016	290,012.0	3.7bp
	2015	326,139.0	4.2bp
Oversight, Custodial & Other Costs	2017	130,125.0	1.5bp
	2016	122,137.0	1.6bp
	2015	123,967.0	1.6bp
Total	2017	519,140.0	6.1bp
	2016	412,149.0	5.3bp
	2015	450,106.0	5.7bp

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: Comments and defaults

Norwegian Government Pension Fund Global

---

## Appendix B - Currency conversion

Norwegian Government Pension Fund Global

All currency amounts have been converted to Euros using Purchasing Power Parity figures per the OECD<sup>1</sup>. The table below shows the foreign exchange rates for the past 5 years.

Currency conversion table					
	2017	2016	2015	2014	2013
United States Dollars - USD*	0.747	0.732	0.761	0.777	0.773
Canada Dollars - CAD	0.597	0.576	0.624	0.619	0.626
Euro - EUR*	1.000	1.000	1.000	1.000	1.000
Sweden Kronor - SEK	0.084	0.081	0.084	0.089	0.090
United Kingdom Pounds - GBP	1.048	1.055	1.087	1.109	1.114
Australia Dollars - AUD	0.500	0.499	0.527	0.518	0.525
New Zealand Dollars - NZD	0.507	0.505	0.536	0.528	0.528

1. Source OECD website.

\* USD - Some participating Asia-Pacific funds report holdings and performance in USD.

EUR - Participating funds from Denmark and Norway report holdings and performance in Euros.

## Appendix C - 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 27th 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 D - 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.