



**PERSPECTIVES
THAT DRIVE
ENTERPRISE
SUCCESS**



MARCH 2022

A fee study presented to:

Pennsylvania Public School Employees' Retirement System

Executive Summary

Executive Summary and Overall Assessment

- Verus has performed an analysis of the investment management fees for the investments in the PA PSERS portfolio relative to representative market comparables.
- This executive summary provides a high-level overview of our findings. Summary fee evaluations for internally managed assets, externally managed public investments, and externally managed private investments are included in the following slides.
- Greater fee analysis detail for each of the individual investments (both internally and externally managed) can be found in the subsequent sections of this report.
- Overall, Verus finds the investment management fees being paid by PSERS to be reasonable and typically lower than comparable fees available in the market.
 - While there are a few instances of the fees for individual mandates being marginally above their respective market medians, our overall assessment is the investment management fees being paid are largely below market.

Fee Study Assumptions

- This study utilizes 6/30/21 market values
- Performance fees are not considered
- Private markets fee data reflects actual fees paid
 - Provided by PSERS in the FY21 Investment Expenses Report
- All data from eVestment maintained/defined by managers
 - Styles are often broadly defined and may not be a perfect fit for each strategy
- CEM universe was used in the absence of a relevant eVestment universe (internal passive commodities and external active commodities)

Internal Management Fee Summary

- The table below shows the PSERS estimated costs to manage each strategy internally compared to representative external management cost estimates.
- The median total cost to manage PSERS internally run strategies through external management would be approximately 7 bps (\$27 million) annually.
- PSERS current costs are less than 1 bps, or about \$3 million annually, resulting in savings of roughly \$24 million.

Account	Asset Values (\$M)	PSERS Costs		eVestment Median Costs		Difference (\$MM)	Peer Group Quartile Costs (%)	
		%	\$MM	%	\$MM		Top Quartile (Top 25th percentile)	Bottom Quartile (Bottom 25th percentile)
S&P 500 Index ¹	4,904.3	0.007%	0.3	0.03%	1.5	1.1	0.06%	0.02%
S&P 400 Index ¹	831.1	0.013%	0.1	0.05%	0.4	0.3	0.10%	0.03%
S&P 600 Index ¹	872.5	0.012%	0.1	0.04%	0.4	0.3	0.07%	0.04%
ACWI ex-US	3,332.2	0.020%	0.7	0.09%	2.9	2.3	0.11%	0.07%
Emerging Market Equity Index	322.7	0.002%	0.0	0.16%	0.5	0.5	0.20%	0.13%
Active Core Plus Fixed Income	651.3	0.049%	0.3	0.22%	1.5	1.1	0.26%	0.21%
U.S. Long Treasuries	4,511.9	0.006%	0.3	0.03%	1.5	1.2	0.05%	0.03%
Active High Yield	204.4	0.050%	0.1	0.44%	0.9	0.8	0.49%	0.40%
U.S. TIPS (Active)	1,122.2	0.022%	0.2	0.14%	1.6	1.3	0.18%	0.10%
Funded Passive U.S. TIPS	3,045.4	0.008%	0.2	0.03%	0.8	0.5	0.04%	0.02%
U.S. TIPS (Passive)	3,312.9	0.008%	0.3	0.03%	0.8	0.6	0.04%	0.02%
Public Infrastructure	1,222.6	0.020%	0.2	0.61%	7.4	7.2	0.72%	0.52%
Infrastructure Index ²	2,731.4	0.002%	0.1	0.03%	0.8	0.8	0.05%	0.02%
REIT Index	1,526.2	0.002%	0.0	0.10%	1.5	1.5	0.12%	0.08%
Commodity Index ³	2,640.9	0.002%	0.1	0.02%	0.6	0.5	0.03%	0.01%
Gold Index ³	4,324.5	0.002%	0.1	0.02%	0.9	0.8	0.03%	0.01%
Cash Management	3,023.4	0.005%	0.2	0.10%	3.0	2.9	0.14%	0.08%
Tail Risk ⁴	36.6	0.005%	0.0	-	-	-	-	-
Total	38,616.3	0.009%	3.3	0.07%	27.1	23.8	0.09%	0.06%

¹ Pure passive fee estimates were used in this table. The enhanced passive median fees for large cap, mid cap, and small cap, respectively, are 0.25%, 0.37%, and 0.16%.

² Due to insufficient passive infrastructure universe data, a passive U.S. large cap universe was used

³ Due to insufficient eVestment data, the internal passive commodities CEM universe was used

⁴ Tail-risk does not have a comparable universe

External Management Summary - Public Investments

- The table below summarizes PSERS investment management cost for public investment mandates as compared to respective universe medians and ranges as aggregated through the eVestment manager database.
- In total, PSERS external investment management fees are approximately \$62.2 million (51 bps), whereas fees for a similar fund line-up at the median would be estimated to be \$62.4 million (also 51 bps).
- Overall, Verus finds the fees being paid for this part of the portfolio to be reasonable, with the majority of individual strategies having fees lower than comparable median 'rack rate' pricing.
- Performance fees are excluded.

Account	Asset Values (\$M)	PSERS Costs		eVestment Median Costs		Difference (\$MM)	Peer Group Quartile Costs (%)	
		%	\$MM	%	\$MM		Top Quartile (Top 25th percentile)	Bottom Quartile (Bottom 25th percentile)
Baillie Gifford	1,288.7	0.22%	2.8	0.56%	7.1	4.3	0.70%	0.46%
BlackRock EMAA Series 1	669.7	0.30%	2.0	0.67%	4.5	2.5	0.76%	0.51%
BlackRock EMAA Series 2	220.8	0.30%	0.7	0.72%	1.6	0.9	0.80%	0.57%
Effissimo Japan ¹	280.4	0.00%	0.0	0.55%	1.6	1.6	0.66%	0.48%
Marathon	1,088.4	0.33%	3.6	0.56%	6.1	2.5	0.70%	0.46%
The Children's Fund	710.1	1.00%	7.1	0.52%	3.7	-3.4	0.65%	0.41%
Acadian Intl Small Cap	398.8	0.38%	1.5	0.81%	3.2	1.7	0.89%	0.72%
Oberweis Intl Small Cap	363.2	0.84%	3.1	0.81%	2.9	-0.1	0.90%	0.72%
QS Investors Intl Small Cap	127.4	0.71%	0.9	0.85%	1.1	0.2	0.93%	0.80%
Wasatch Intl Small Cap	446.1	0.25%	1.1	0.81%	3.6	2.5	0.88%	0.72%
Cederburg China ¹	327.5	0.00%	0.0	0.72%	2.3	2.3	0.82%	0.63%
Steadview	308.7	1.00%	3.1	0.72%	2.2	-0.9	0.82%	0.58%
Wasatch EM Small Cap Equity	583.7	0.45%	2.6	0.92%	5.4	2.8	1.01%	0.86%
BlackRock FIGA High Yield	988.2	0.45%	4.4	0.41%	4.0	-0.4	0.46%	0.36%
Templeton EM FI	430.0	0.49%	2.1	0.45%	1.9	-0.2	0.53%	0.40%
Bridgewater Non-U.S. TIPS ²	1,900.0	1.22%	23.2	0.13%	2.4	-20.7	0.17%	0.09%
Radcliffe Ultra Short	205.8	0.25%	0.5	0.18%	0.4	-0.1	0.21%	0.15%
Gresham Commodities ³	399.5	0.30%	1.2	0.29%	1.1	0.0	0.65%	0.14%
Wellington Commodities ³	529.5	0.25%	1.3	0.29%	1.5	0.2	0.65%	0.14%
Atlantic MLP	413.3	0.10%	0.4	0.62%	2.5	2.1	0.73%	0.55%
Salient MLP	514.6	0.10%	0.5	0.60%	3.1	2.6	0.73%	0.54%
Total	12,194.3	0.51%	62.2	0.51%	62.4	0.2	0.63%	0.43%

¹ Effissimo and Cederberg charge performance fees only

² Bridgewater Non-US TIPS incurs a management fee on Bridgewater Pure Alpha II only, which has a fee of 3.87%. We assumed a 3.87% fee on \$600M, which is effectively 1.22% on the total exposure.

³ Due to insufficient eVestment data, the external active commodities CEM universe was used

External Management Summary - Private Assets Summary

- The table below summarizes PSERS investment management fees for private investments compared to representative universe medians and ranges.
- This analysis includes base fees only. It does not include carried interest or performance fees.
- Verus finds the fees being paid for the various segments of the private portfolio to be reasonable and typically lower than comparable medians:
 - Private real estate and private infrastructure fees are near the 25th percentile of the universe
 - Private credit fees are below the 25th percentile
 - Private equity fees are below the 5th percentile
 - Absolute return fees are similar to median for those types of strategies
 - Bridgewater accounts for over 20% of the base fees in the absolute return composite

Account	Asset Values (\$MM)	PSERS Costs		Universe Median Costs		Universe Source	Difference (\$MM)	Universe Range of Cost (%)	
		%	\$MM	%	\$MM			Top Quartile (Top 25th percentile)	Bottom Quartile (Bottom 25th percentile)
Private Real Estate	5,124.6	1.01%	51.6	1.25%	64.1	Pitchbook	12.4	1.47%	1.00%
Private Credit	5,871.0	1.08%	63.2	1.50%	88.1	Pitchbook	24.8	1.50%	1.26%
Private Infrastructure	507.5	1.00%	5.1	1.25%	6.3	Pitchbook	1.3	1.47%	1.00%
Private Equity	11,437.1	0.89%	101.6	1.50%	171.6	Pitchbook	70.0	1.75%	1.50%
Private Commodities	282.9	1.84%	5.2	N/A	N/A	Pitchbook	N/A	N/A	N/A
Absolute Return ¹	5,790.0	1.60%	92.7	1.53%	88.7	Aksia	-4.0	N/A	N/A
Total	29,013.2	1.10%	319.4	1.44%	418.7		104.5		

¹Absolute return median fee calculated as follows: Underlying hedge fund allocations relative to total absolute return * average Aksia² management fee. Event-driven is 12% of the absolute return composite, relative value is 54%, and tactical trading is 34%. Average management fees from Aksia² can be found on slide 98

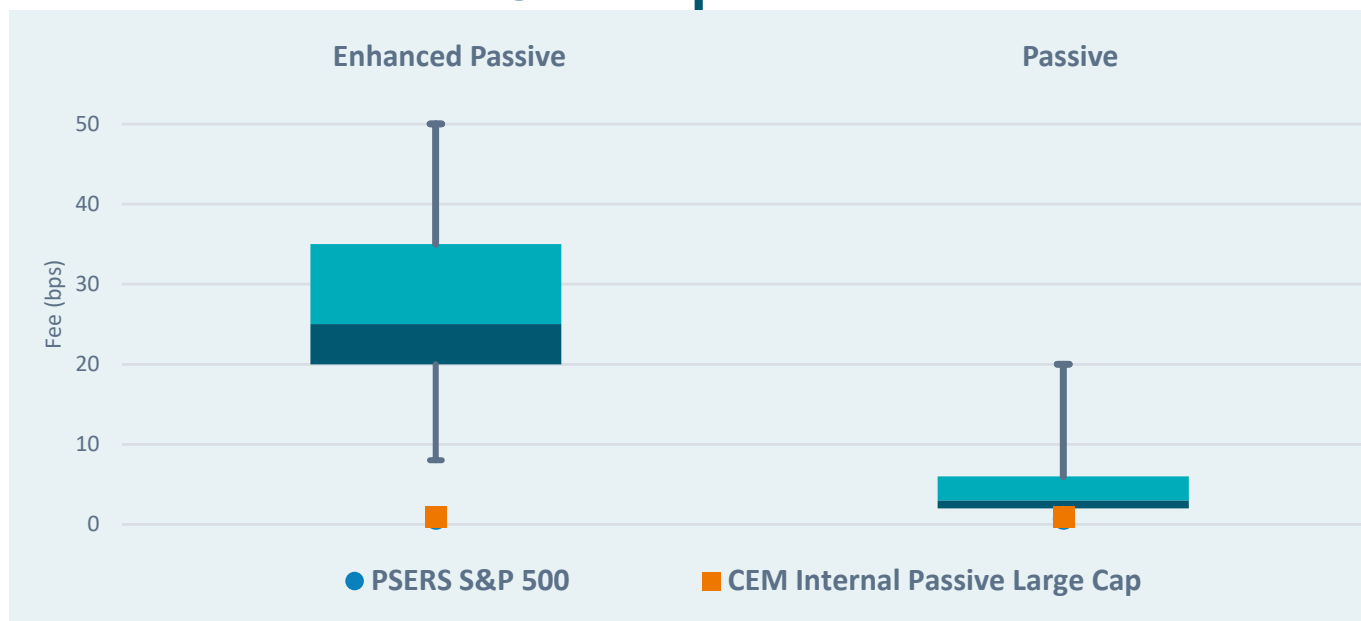
²The data relies upon information provided to Aksia by fund managers and other third parties. Such information may be compiled by Aksia without independent verification of accuracy or completeness, and Aksia makes no representations as to its accuracy and completeness. This information is not intended for public use or distribution, is confidential and proprietary, and intended solely for the information of the intended recipient pursuant to their request.

-Private assets utilize a custom universe created by Verus. Data may be skewed due to limited observations.

-Performance fees are not considered in the analysis

Internal Management – Fee Analysis by Individual Mandate

PSERS S&P 500 Index Composite



Assumed Mandate

eVestment: US Enhanced S&P 500 Equity:

eVestment: US Passive S&P 500 Equity:

Estimated PSERS fee (bps):

Estimated PSERS fee (\$):

CEM Average Peer fee:

\$4,904,290,000

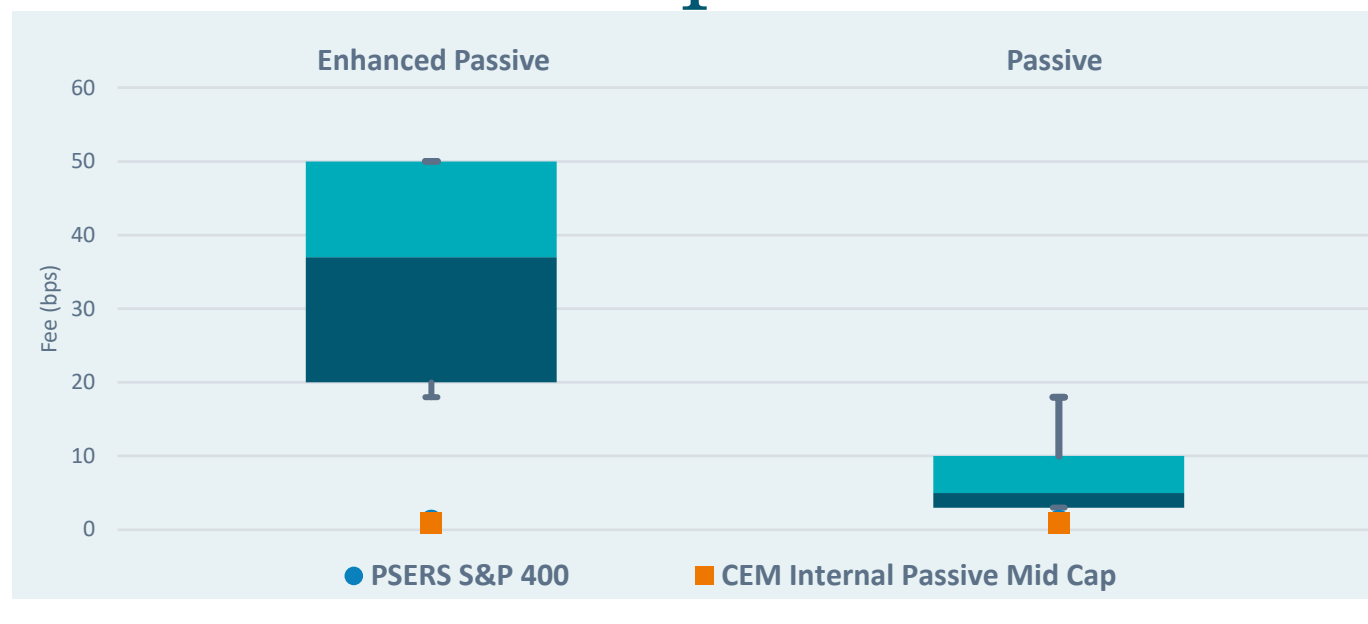
0.7 bps

\$343,300

0.9 bps

eVestment Peer Group	Enhanced Passive Separate Account (bps)	Passive Separate Account (bps)
5th Percentile	8	1
25th Percentile	20	2
Median	25	3
75th Percentile	35	6
95th Percentile	50	20
# of Observations	32	22
eVestment Peer Group	Enhanced Passive Separate Account Fees	Passive Separate Account Fees
5th Percentile	\$4,008,587	\$658,700
25th Percentile	\$9,883,600	\$1,053,358
Median	\$12,310,750	\$1,488,787
75th Percentile	\$17,165,050	\$2,970,074
95th Percentile	\$24,521,500	\$9,686,598
# of Observations	32	22

PSERS S&P 400 Index Composite



Assumed Mandate

eVestment: US Enhanced Mid Cap Equity:

eVestment: US Passive Mid Cap Equity:

Estimated PSERS fee (bps):

Estimated PSERS fee (\$):

CEM Average Peer fee:

\$831,065,000

1.3 bps

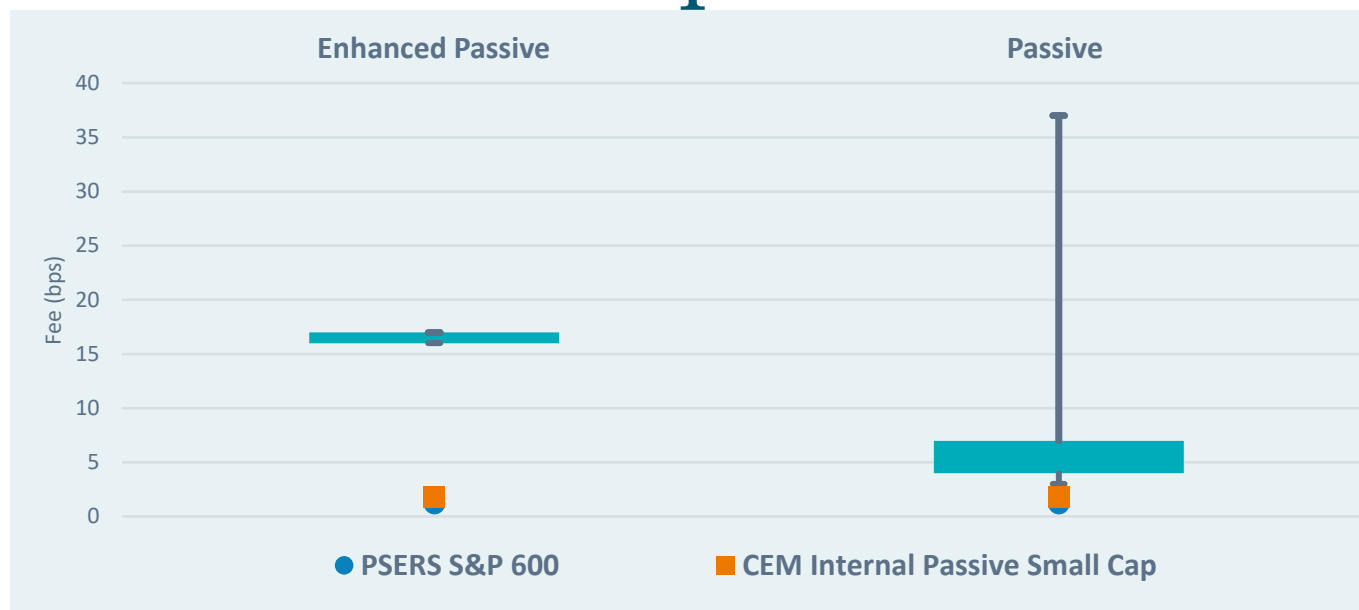
\$108,038

0.9 bps

eVestment Peer Group	Enhanced Passive Separate Account (bps)	Passive Separate Account (bps)
5th Percentile	18	3
25th Percentile	20	3
Median	37	5
75th Percentile	50	10
95th Percentile	50	18
# of Observations	5	14

eVestment Peer Group	Enhanced Passive Separate Account Fees	Passive Separate Account Fees
5th Percentile	\$1,475,536	\$249,427
25th Percentile	\$1,662,200	\$289,321
Median	\$3,033,850	\$434,035
75th Percentile	\$4,155,500	\$846,070
95th Percentile	\$4,171,500	\$1,537,479
# of Observations	5	14

PSERS S&P 600 Index Composite



Assumed Mandate

eVestment: US Enhanced Small Cap Equity:

eVestment: US Passive Small Cap Equity:

Estimated PSERS fee (bps):

\$872,493,000

1.2 bps

Estimated PSERS fee (\$):

\$104,699

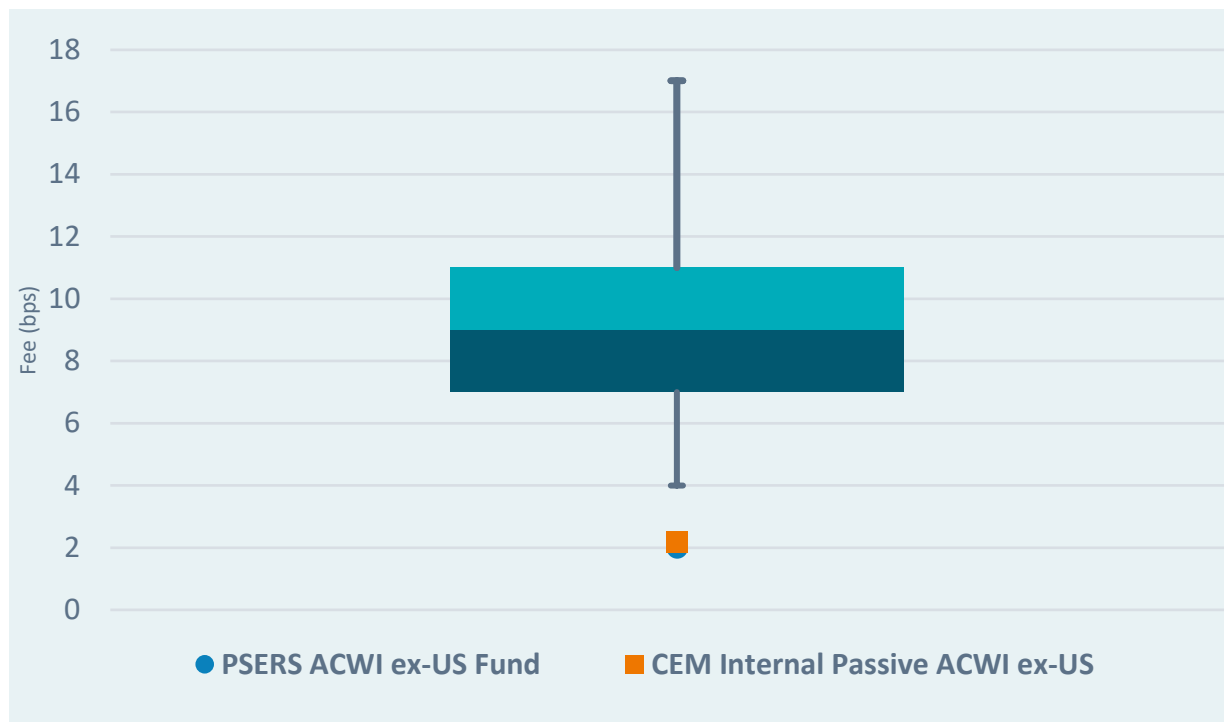
CEM Average Peer fee:

1.8 bps

eVestment Peer Group	Enhanced Passive Separate Account (bps)	Passive Separate Account (bps)
5th Percentile	16	3
25th Percentile	16	4
Median	16	4
75th Percentile	17	7
95th Percentile	17	37
# of Observations	2	25

eVestment Peer Group	Enhanced Passive Separate Account Fees	Passive Separate Account Fees
5th Percentile	\$1,365,775	\$256,898
25th Percentile	\$1,393,875	\$330,372
Median	\$1,429,000	\$388,996
75th Percentile	\$1,464,125	\$626,245
95th Percentile	\$1,492,225	\$3,234,763
# of Observations	2	25

PSERS ACWI ex-US Fund

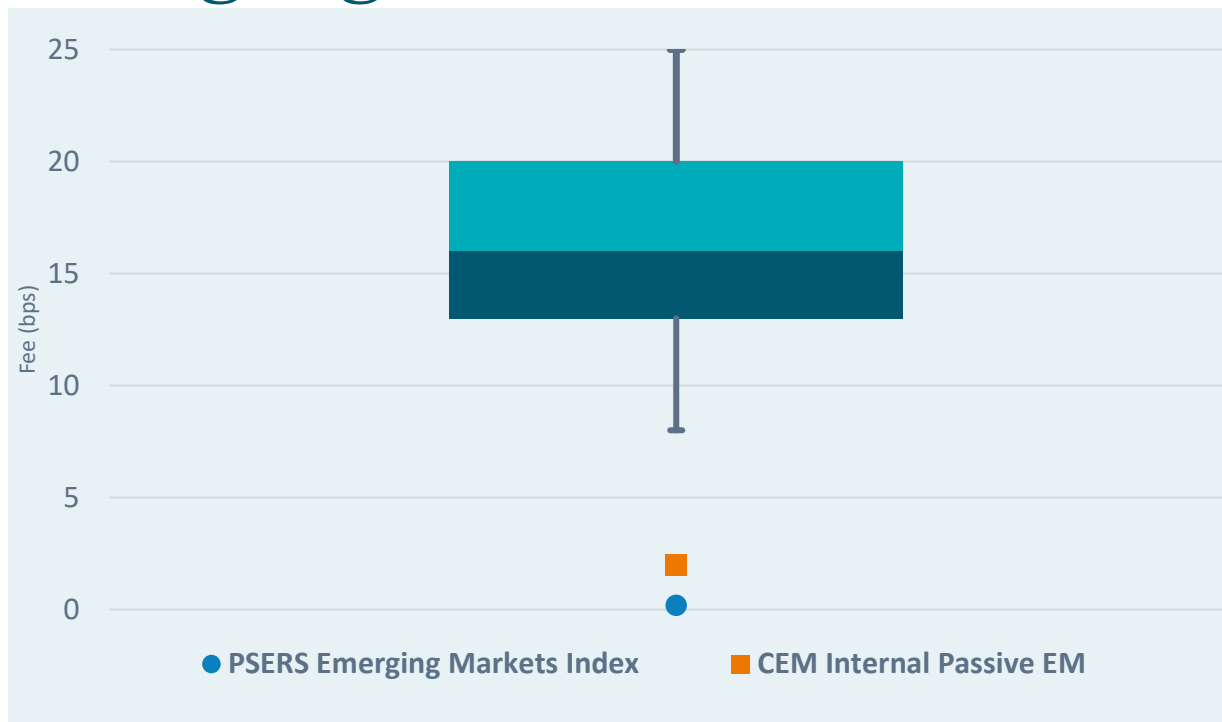


Assumed Mandate:

eVestment: ACWI ex-US Passive \$3,332,152,000
 Estimated PSERS fee (bps): 2.0 bps
 Estimated PSERS fee (\$): \$666,430
 CEM Average Peer fee: 2.2 bps

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$1,384,439	4
25th Percentile	\$2,438,309	7
Median	\$2,946,881	9
75th Percentile	\$3,529,427	11
95th Percentile	\$5,734,351	17
# of Observations	10	10

PSERS Emerging Markets Index



Assumed Mandate:

eVestment: Global Emerging Mkts Passive

\$322,673,000

Estimated PSERS fee (bps):

0.2 bps

Estimated PSERS fee (\$):

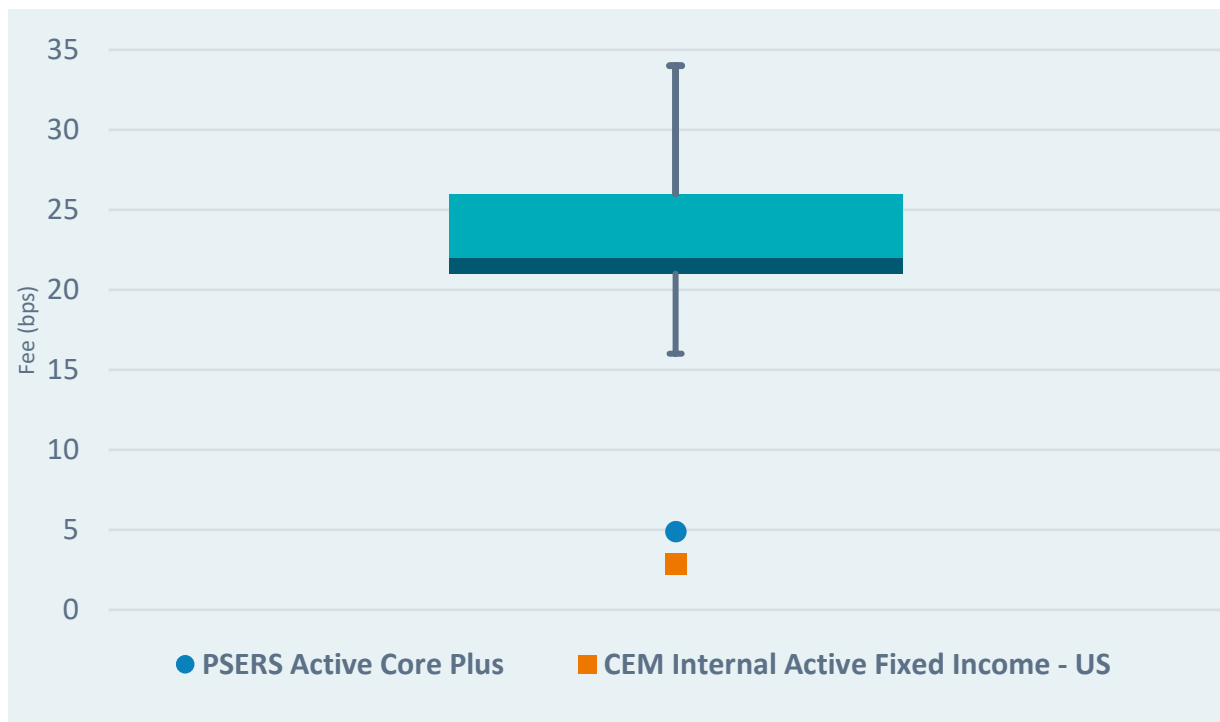
\$6,453

CEM Average Peer fee:

2.0 bps

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$248,172	8
25th Percentile	\$412,700	13
Median	\$509,510	16
75th Percentile	\$645,400	20
95th Percentile	\$795,756	25
# of Observations	13	13

PSERS Active Core Plus Fixed Income



Assumed Mandate:

eVestment: US Core Plus Fixed Income

\$651,261,000

Estimated PSERS fee (bps):

4.9 bps

Estimated PSERS fee (\$):

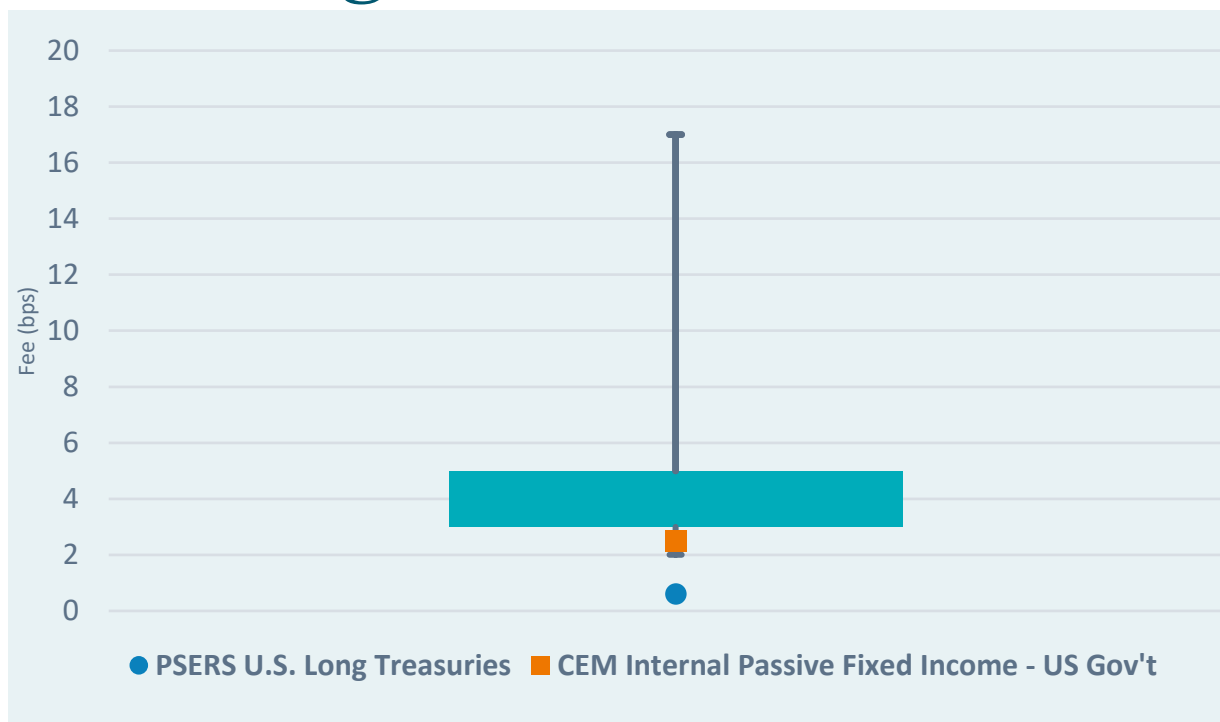
\$319,118

CEM Average Peer fee:

2.9 bps

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$1,051,890	16
25th Percentile	\$1,342,394	21
Median	\$1,465,020	22
75th Percentile	\$1,698,150	26
95th Percentile	\$2,235,272	34
# of Observations	125	125

PSERS U.S. Long Treasuries



Assumed Mandate:

eVestment: US Passive Long Duration

\$4,511,856,000

Estimated PSERS fee (bps):

0.6 bps

Estimated PSERS fee (\$):

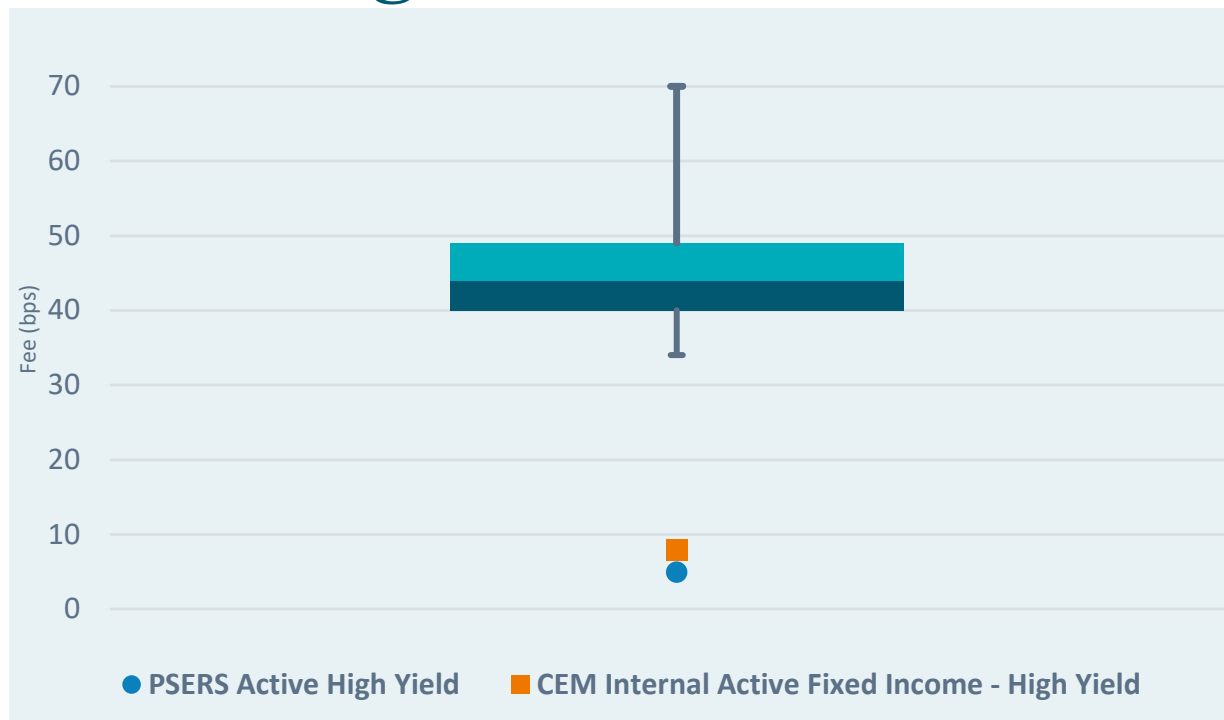
\$270,711

CEM Average Peer fee:

2.5 bps

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$1,042,618	2
25th Percentile	\$1,147,975	3
Median	\$1,493,570	3
75th Percentile	\$2,050,355	5
95th Percentile	\$7,652,706	17
# of Observations	9	9

PSERS Active High Yield

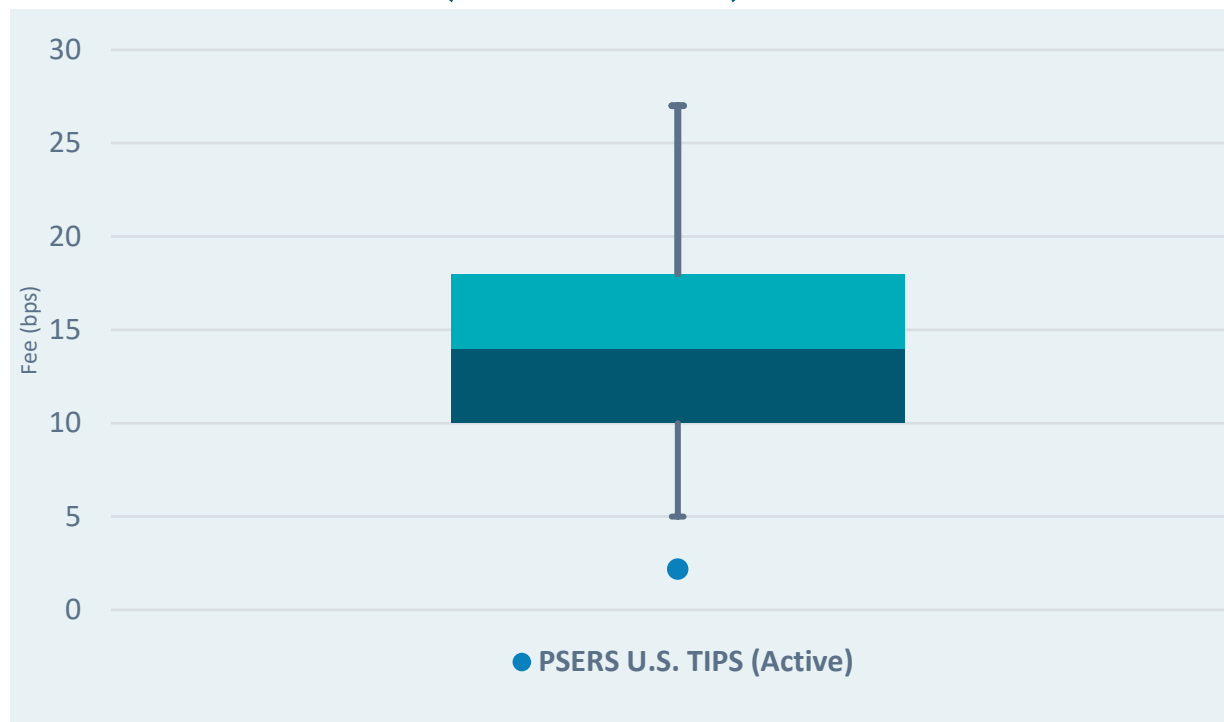


Assumed Mandate:

eVestment: US High Yield \$204,358,000
 Estimated PSERS fee (bps): 5.0 bps
 Estimated PSERS fee (\$): \$102,179
 CEM Average Peer fee: 8.0 bps

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$686,000	34
25th Percentile	\$815,400	40
Median	\$892,600	44
75th Percentile	\$994,800	49
95th Percentile	\$1,430,580	70
# of Observations	202	202

PSERS U.S. TIPS (Active)



Assumed Mandate:

eVestment: US TIPS / Inflation Fixed Income

\$1,122,225,000

Estimated PSERS fee (bps):

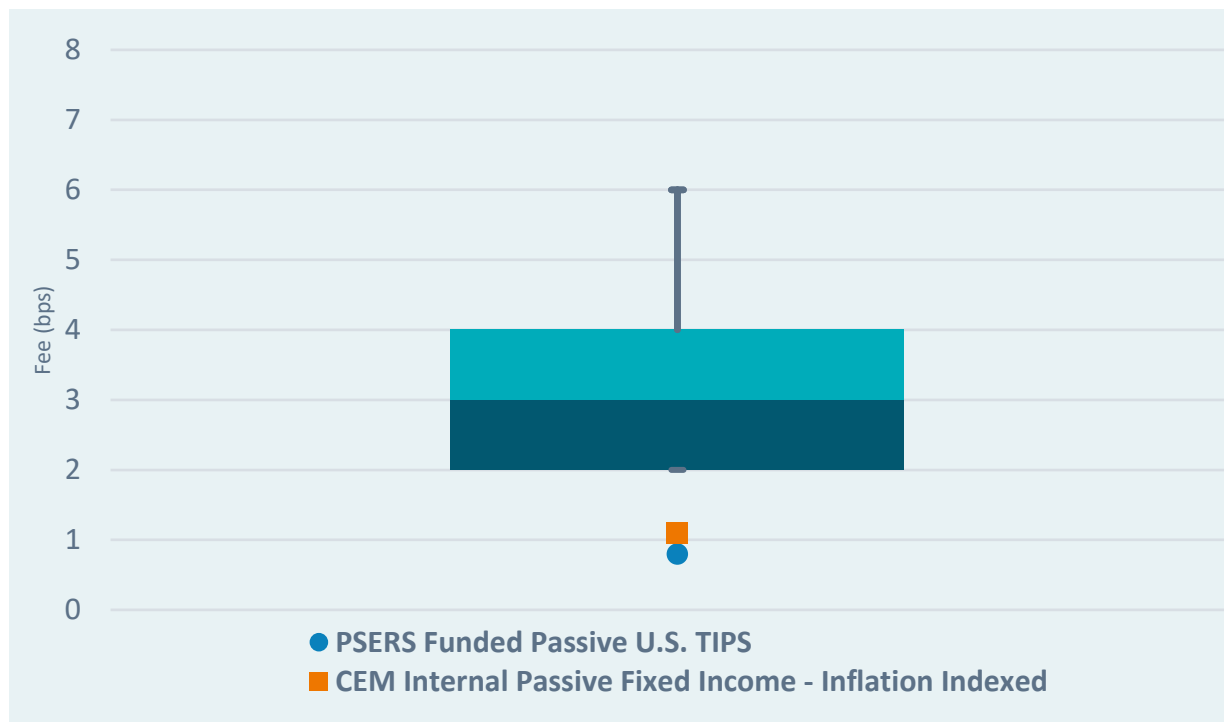
2.2 bps

Estimated PSERS fee (\$):

\$246,890

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$581,725	5
25th Percentile	\$1,122,200	10
Median	\$1,627,190	14
75th Percentile	\$2,078,090	18
95th Percentile	\$3,086,050	27
# of Observations	36	36

PSERS Funded Passive U.S. TIPS

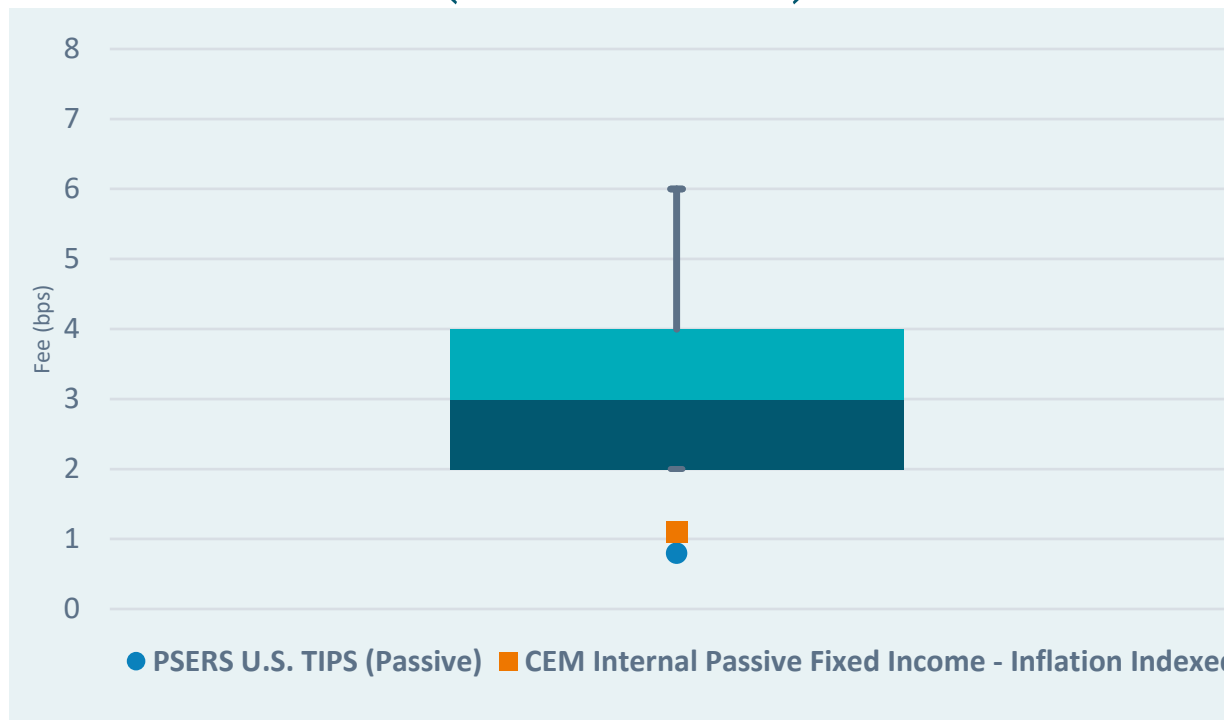


Assumed Mandate:

eVestment: US Passive TIPS \$3,045,360,000
 Estimated PSERS fee (bps): 0.8 bps
 Estimated PSERS fee (\$): \$243,629
 CEM Average Peer fee: 1.1 bps

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$666,080	2
25th Percentile	\$755,215	2
Median	\$781,350	3
75th Percentile	\$1,338,160	4
95th Percentile	\$1,841,240	6
# of Observations	7	7

PSERS U.S. TIPS (Passive)

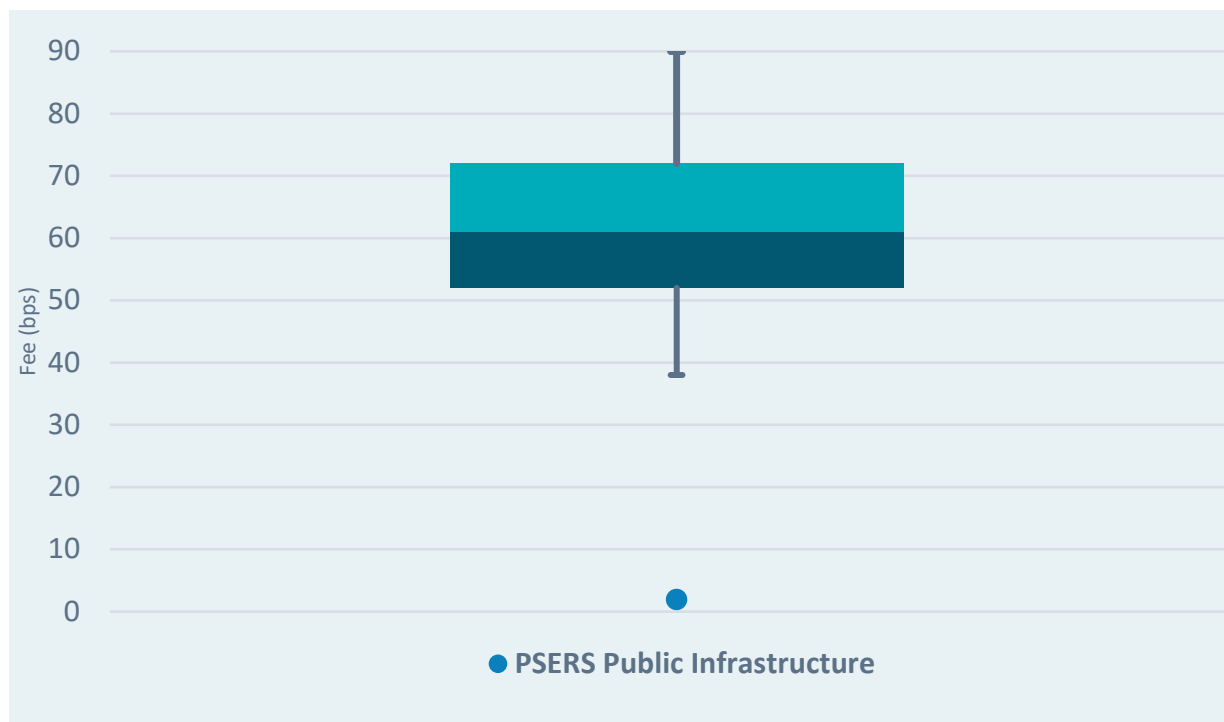


Assumed Mandate:

eVestment: US Passive TIPS	\$3,312,937,000
Estimated PSERS fee (bps):	0.8 bps
Estimated PSERS fee (\$):	\$265,035
CEM Average Peer fee:	1.1 bps

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$719,580	2
25th Percentile	\$815,402	2
Median	\$848,225	3
75th Percentile	\$1,445,160	4
95th Percentile	\$2,001,740	6
# of Observations	7	7

PSERS Public Infrastructure



Assumed Mandate:

eVestment: Infrastructure

\$1,222,614,000

Estimated PSERS fee (bps):

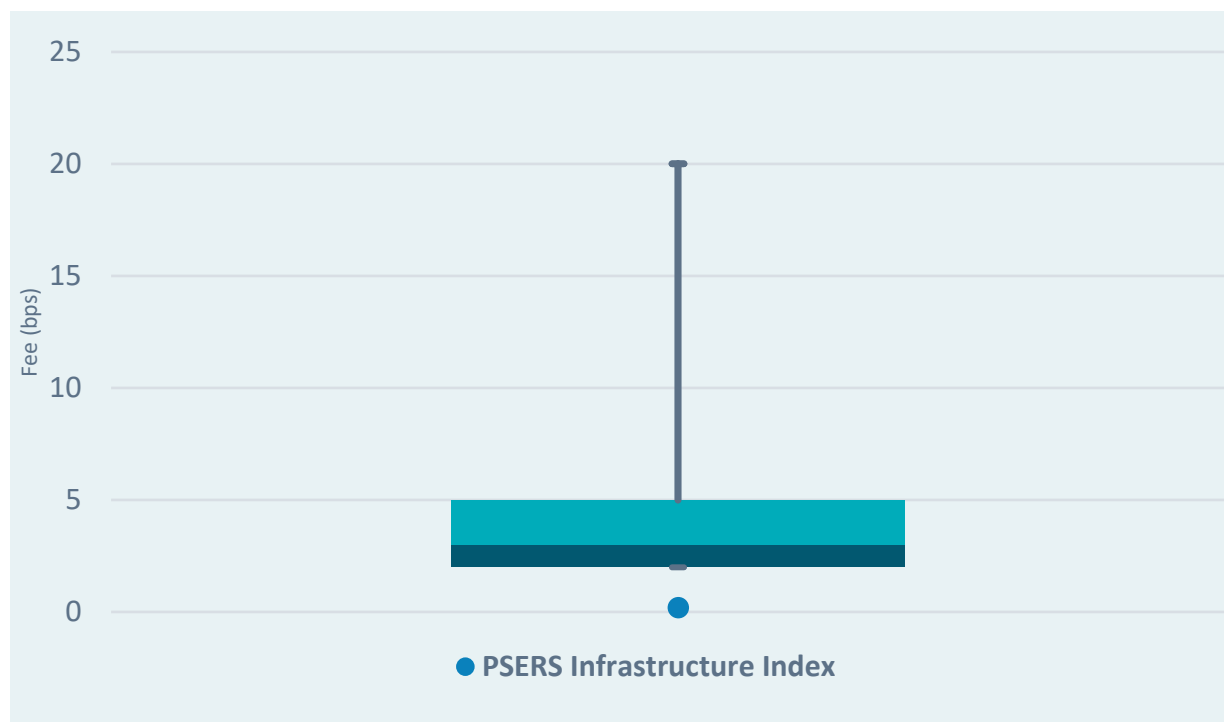
2.0 bps

Estimated PSERS fee (\$):

\$244,523

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$4,676,055	38
25th Percentile	\$6,313,000	52
Median	\$7,423,100	61
75th Percentile	\$8,767,275	72
95th Percentile	\$11,003,400	90
# of Observations	48	48

PSERS Infrastructure Index



Assumed Mandate:

eVestment: US Passive Large Cap Equity¹

\$2,731,400,000

Estimated PSERS fee (bps):

0.2 bps

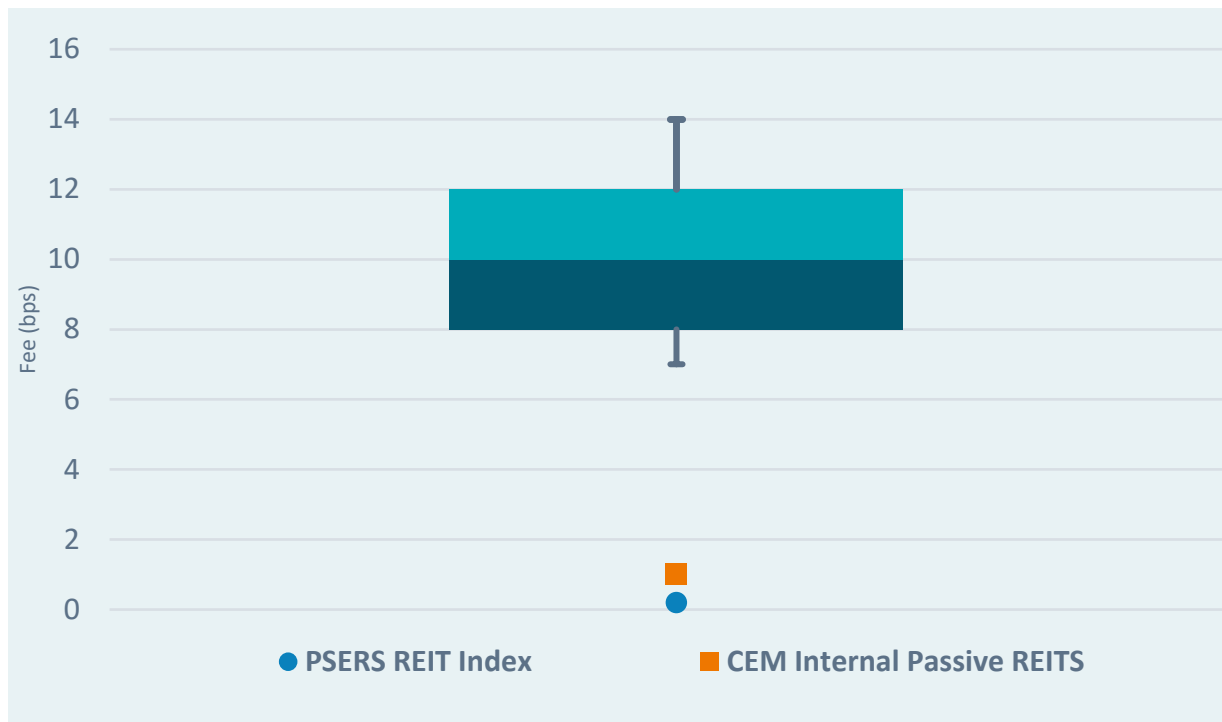
Estimated PSERS fee (\$):

\$54,628

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$421,390	2
25th Percentile	\$614,280	2
Median	\$831,295	3
75th Percentile	\$1,457,735	5
95th Percentile	\$5,462,800	20
# of Observations	60	60

¹Due to insufficient passive infrastructure universe data, a passive U.S. large cap universe was used

PSERS REIT Index

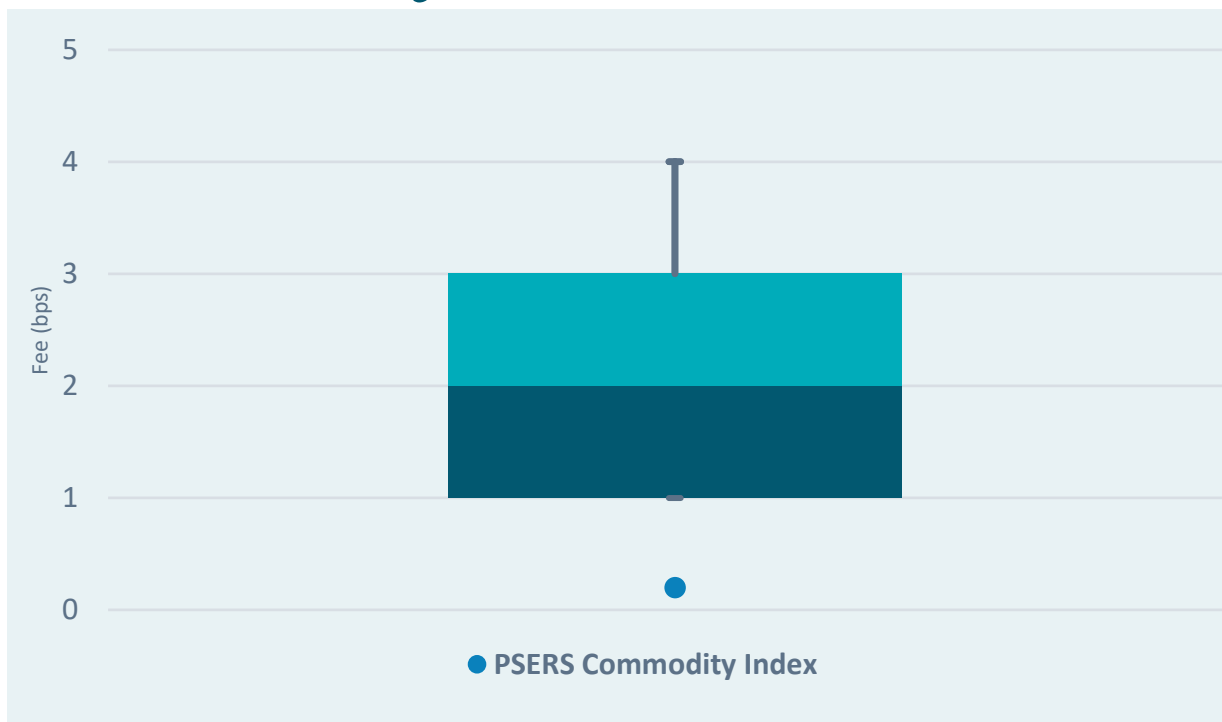


Assumed Mandate:

eVestment: US Passive REIT + Passive Global REIT	\$1,526,243,000
Estimated PSERS fee (bps):	0.2 bps
Estimated PSERS fee (\$):	\$30,525
CEM Average Peer fee:	1.0 bps

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$1,136,655	7
25th Percentile	\$1,309,804	8
Median	\$1,526,240	10
75th Percentile	\$1,848,864	12
95th Percentile	\$2,106,963	14
# of Observations	3	3

PSERS Commodity Index



Assumed Mandate:

CEM: Internal Passive Commodities

\$2,640,862,000

Estimated PSERS fee (bps):

0.2 bps

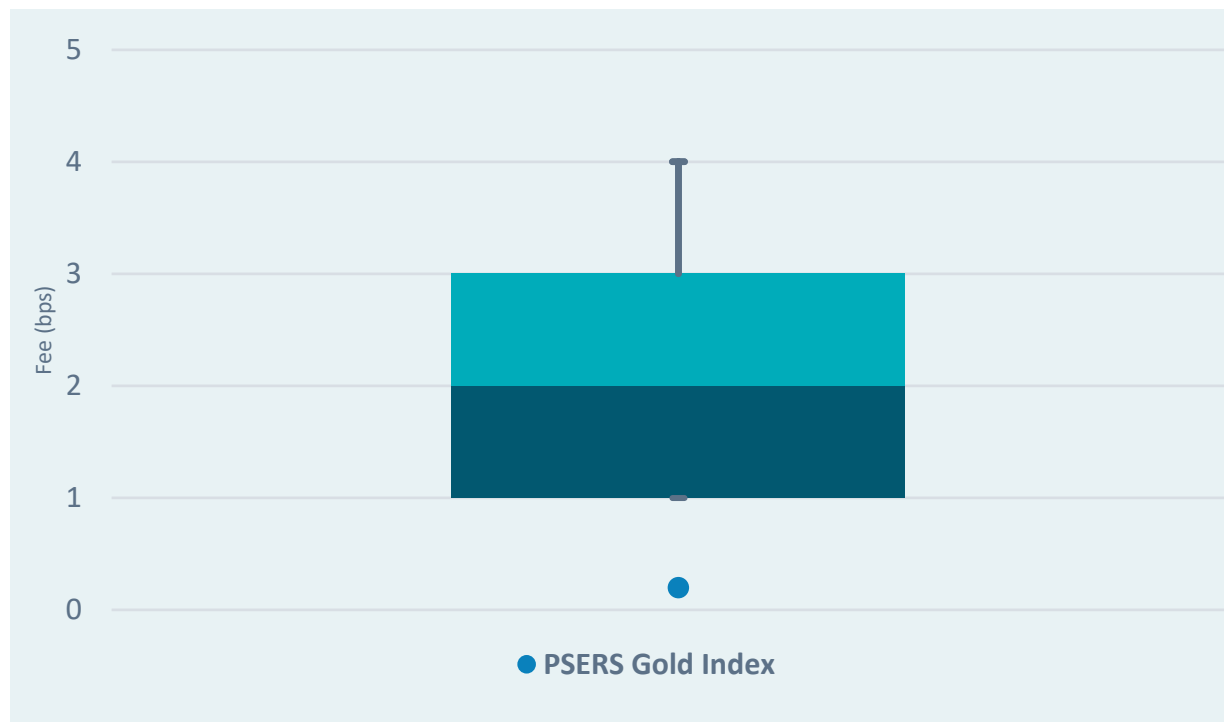
Estimated PSERS fee (\$):

\$52,817

CEM Peer Group ¹	Separate Account Fees	Separate Account (bps)
10th Percentile	\$158,452	1
25th Percentile	\$316,903	1
Median	\$554,581	2
75th Percentile	\$792,259	3
90th Percentile	\$950,710	4
# of Observations	2	2

¹Due to insufficient eVestment data, the internal passive commodities CEM universe was used.

PSERS Gold Index



Assumed Mandate:

CEM: Internal Passive Commodities

\$4,324,467,000

Estimated PSERS fee (bps):

0.2 bps

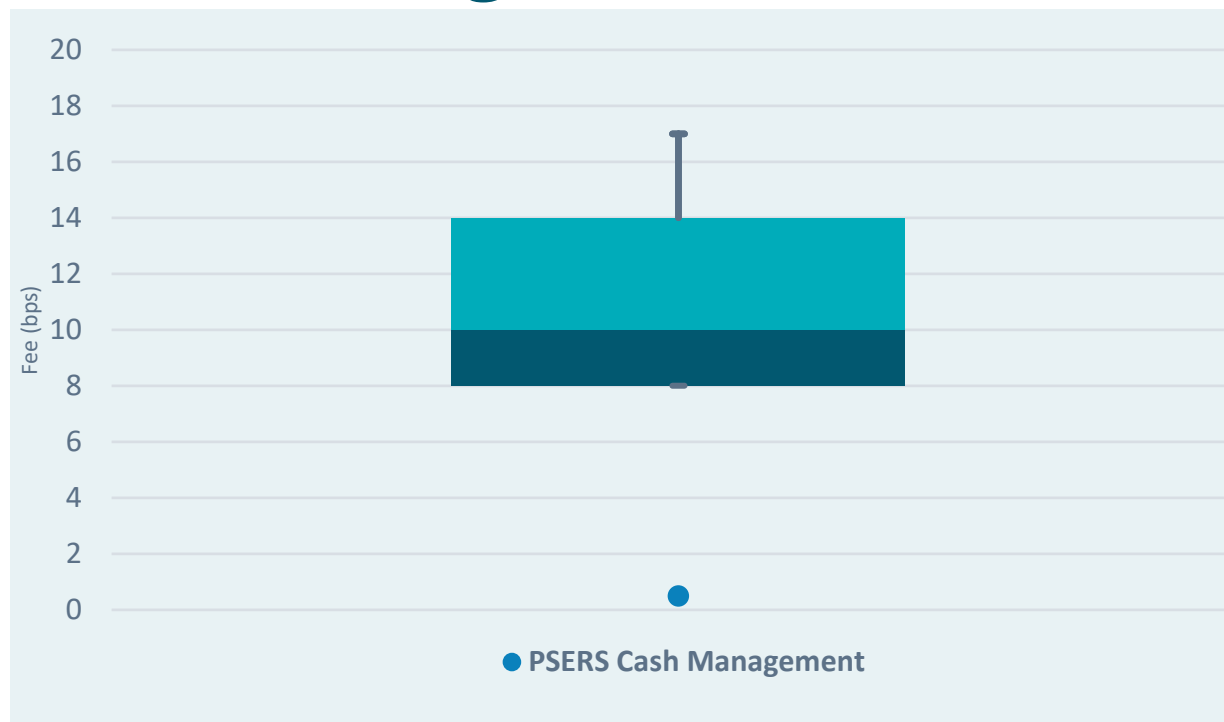
Estimated PSERS fee (\$):

\$86,489

CEM Peer Group ¹	Separate Account Fees	Separate Account (bps)
10th Percentile	\$259,468	1
25th Percentile	\$518,936	1
Median	\$908,138	2
75th Percentile	\$1,297,340	3
90th Percentile	\$1,556,808	4
# of Observations	2	2

¹Due to insufficient eVestment data, the internal passive commodities CEM universe was used.

PSERS Cash Management



Assumed Mandate:

eVestment: US Cash Management

\$3,023,417,000

Estimated PSERS fee (bps):

0.5 bps

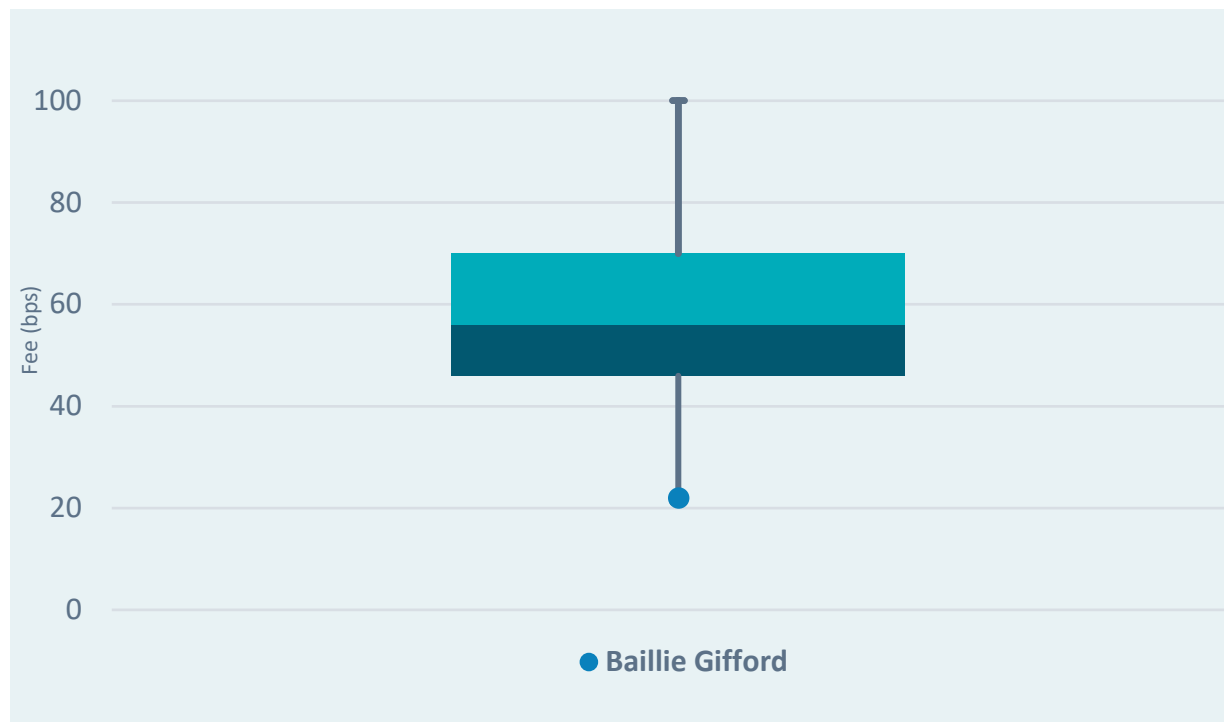
Estimated PSERS fee (\$):

\$151,171

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$2,260,514	8
25th Percentile	\$2,538,736	8
Median	\$3,048,420	10
75th Percentile	\$4,349,291	14
95th Percentile	\$4,931,886	17
# of Observations	38	38

External Management Fee Analysis by Individual Mandate

Baillie Gifford



Assumed Mandate:

eVestment: All ACWI ex-US Equity

\$1,288,698,000

Reported Manager fee (bps):

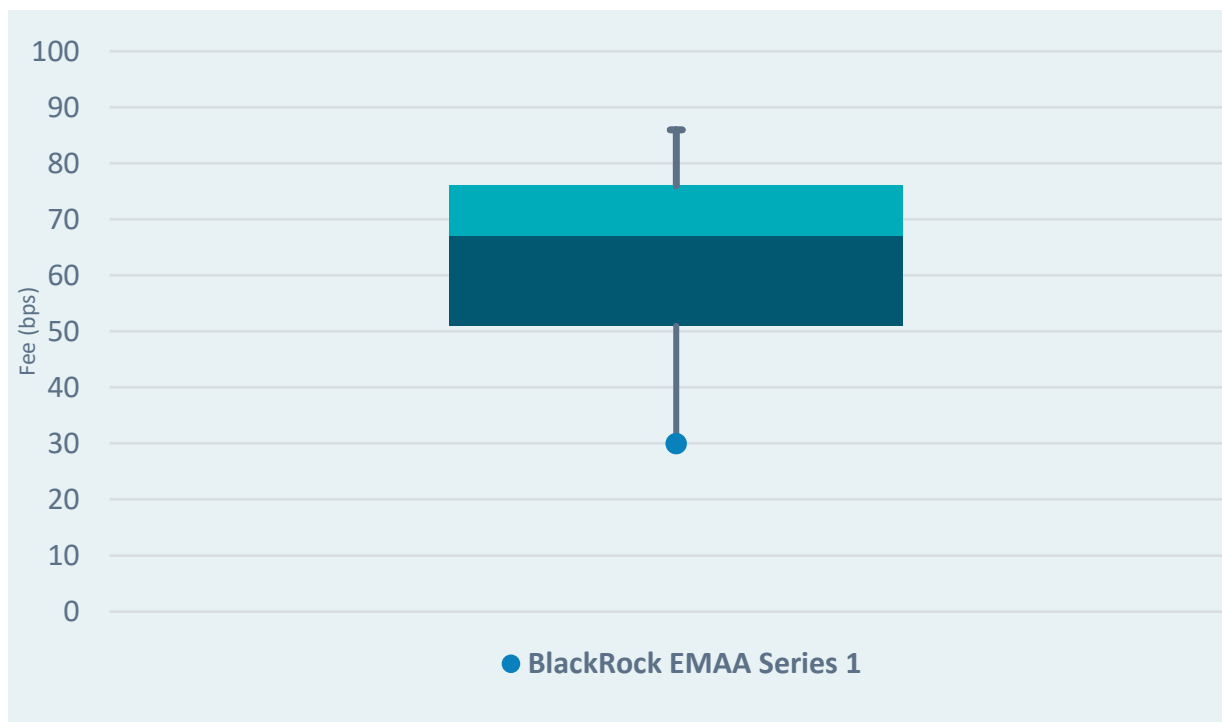
22.0 bps

Estimated PSERS fee (\$):

\$2,835,136

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$2,743,025	21
25th Percentile	\$5,892,900	46
Median	\$7,145,350	56
75th Percentile	\$9,020,900	70
95th Percentile	\$12,887,000	100
# of Observations	296	296

BlackRock Emerging Markets Alpha Advantage Fund Series 1



Assumed Mandate:

eVestment: Global EM Large Cap Core

\$669,749,000

Reported Manager fee (bps):

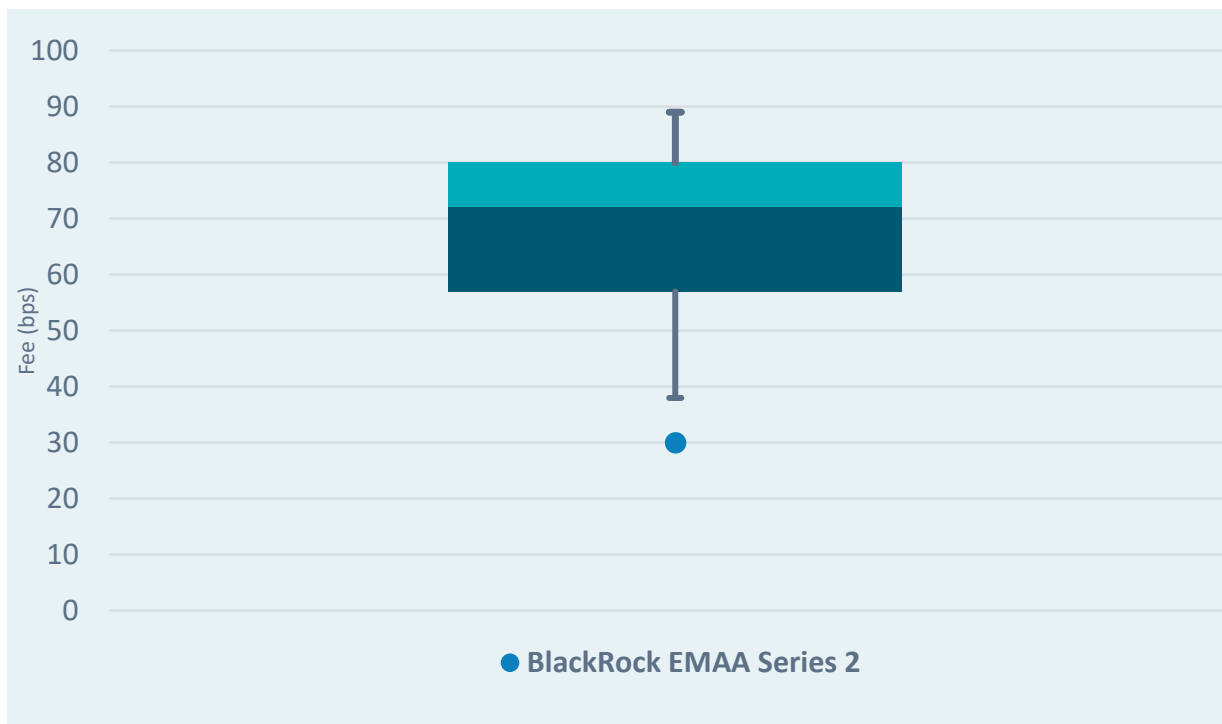
30.0 bps

Estimated PSERS fee (\$):

\$2,009,247

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$1,995,039	30
25th Percentile	\$3,414,538	51
Median	\$4,490,875	67
75th Percentile	\$5,116,875	76
95th Percentile	\$5,780,375	86
# of Observations	54	54

BlackRock Emerging Markets Alpha Advantage Fund Series 2



Assumed Mandate:

eVestment: Global EM Large Cap Core

\$220,764,000

Reported Manager fee (bps):

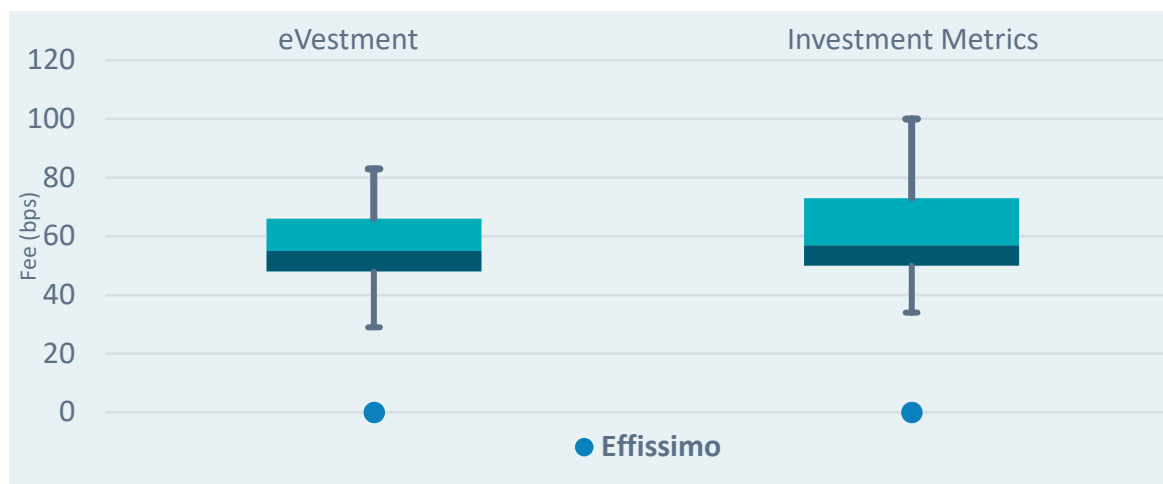
30.0 bps

Estimated PSERS fee (\$):

\$662,292

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$841,683	38
25th Percentile	\$1,249,005	57
Median	\$1,602,630	72
75th Percentile	\$1,768,624	80
95th Percentile	\$1,964,702	89
# of Observations	54	54

Effissimo Capital Partners Feeder Fund 2 - Japan



Assumed Mandate:

eVestment: EAFE All Cap Core Equity

\$280,351,000

Assumed Mandate:

Investment Metrics: Japan Equity

> \$100 Million

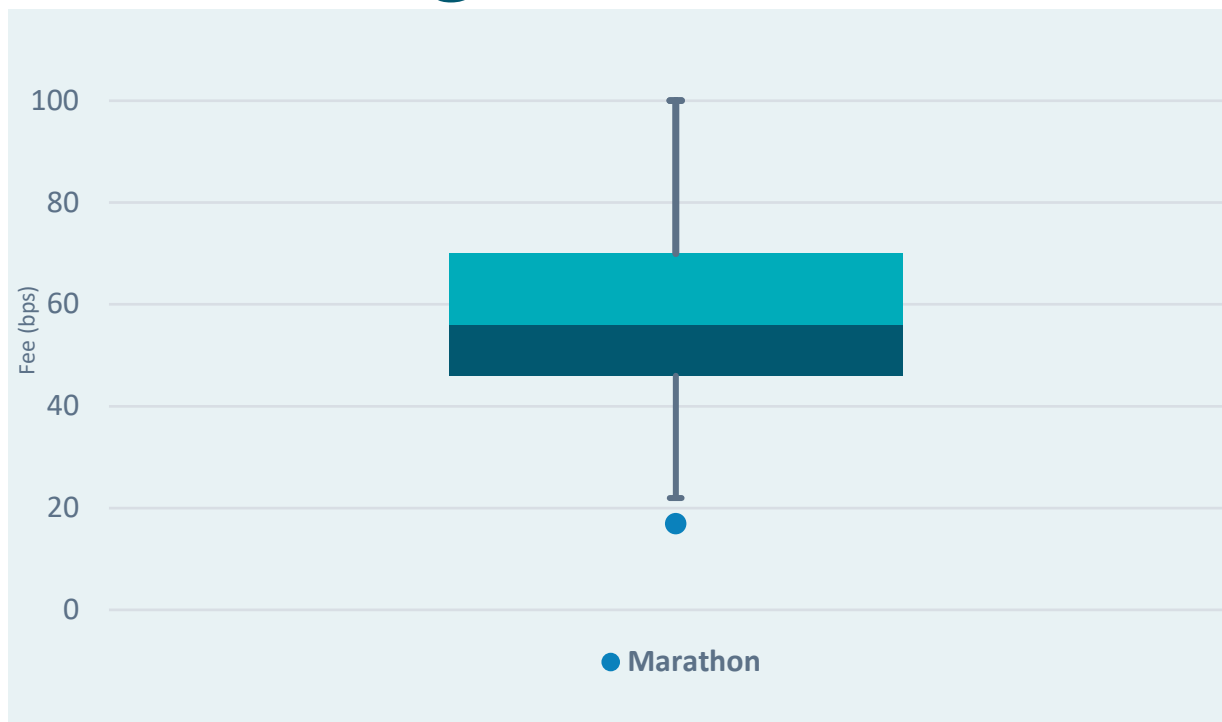
Reported Manager fee (bps)¹:

0.0 bps

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$807,960	29
25th Percentile	\$1,345,920	48
Median	\$1,552,000	55
75th Percentile	\$1,860,100	66
95th Percentile	\$2,323,200	83
# of Observations	65	65
Investment Metrics Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$953,193	34
25th Percentile	\$1,401,755	50
Median	\$1,598,001	57
75th Percentile	\$2,046,562	73
95th Percentile	\$2,803,510	100
# of Observations	81	81

¹ Effissimo charges performance fees only

Marathon Asset Mgmt



Assumed Mandate:

eVestment: All ACWI ex-US Equity

\$1,088,401,000

Reported Manager fee (bps):

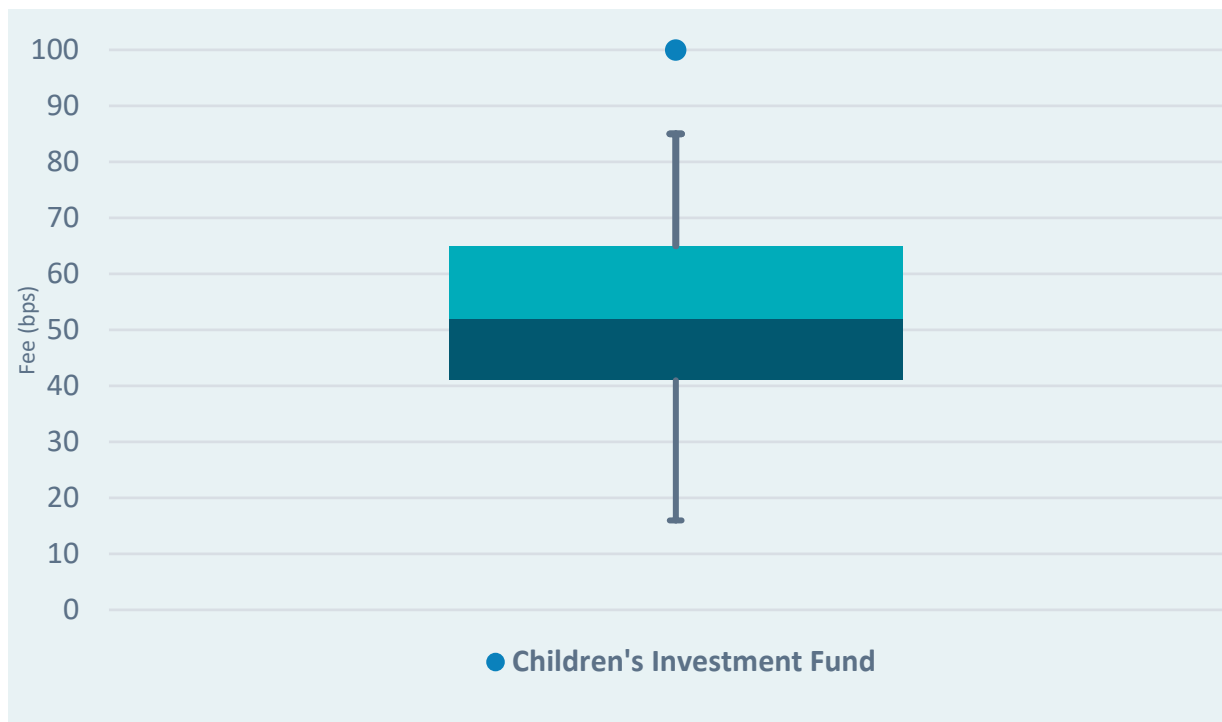
33.0 bps

Estimated PSERS fee (\$):

\$3,591,723

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$2,342,425	22
25th Percentile	\$4,991,550	46
Median	\$6,052,850	56
75th Percentile	\$7,618,800	70
95th Percentile	\$10,884,000	100
# of Observations	296	296

The Children's Investment Fund, LP



Assumed Mandate:

eVestment: Global Equity

\$710,095,000

Reported Manager fee (bps):

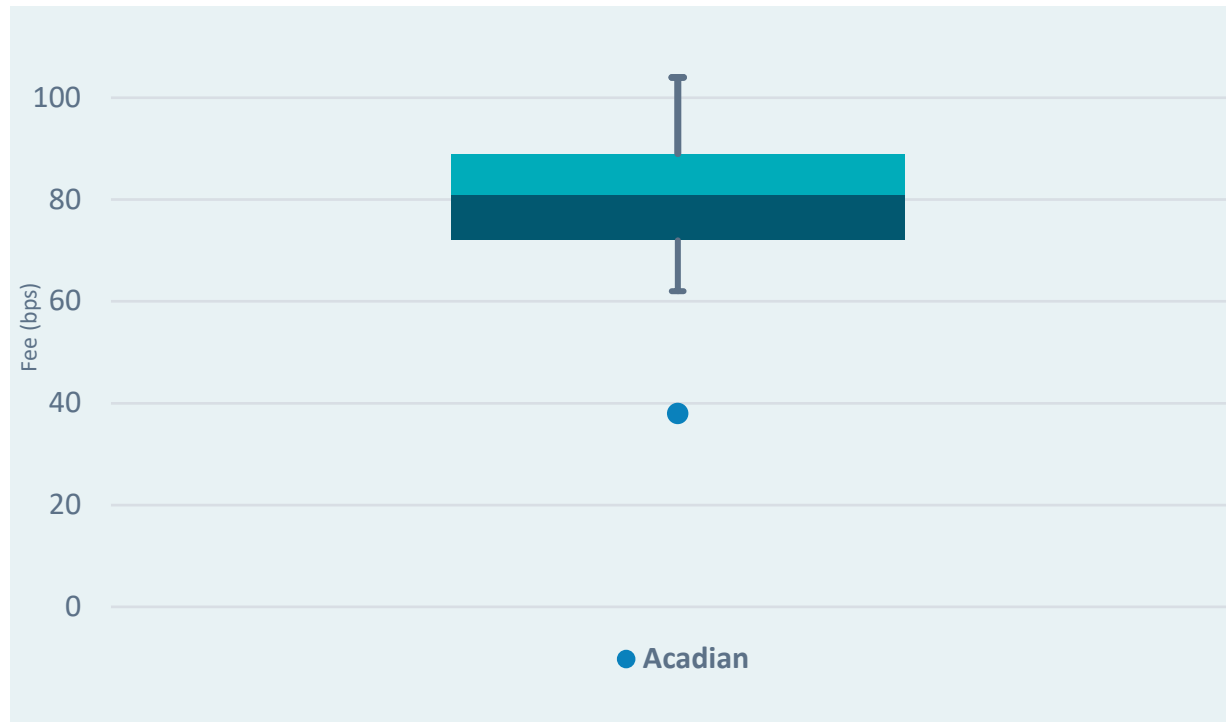
100 bps

Estimated PSERS fee (\$):

\$7,100,950

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$1,160,100	16
25th Percentile	\$2,927,900	41
Median	\$3,680,500	52
75th Percentile	\$4,615,650	65
95th Percentile	\$6,035,850	85
# of Observations	981	981

Acadian Asset Mgmt International Small Cap



Assumed Mandate:

eVestment: ACWI ex-US Small Cap Equity

\$398,788,000

Reported Manager fee (bps):

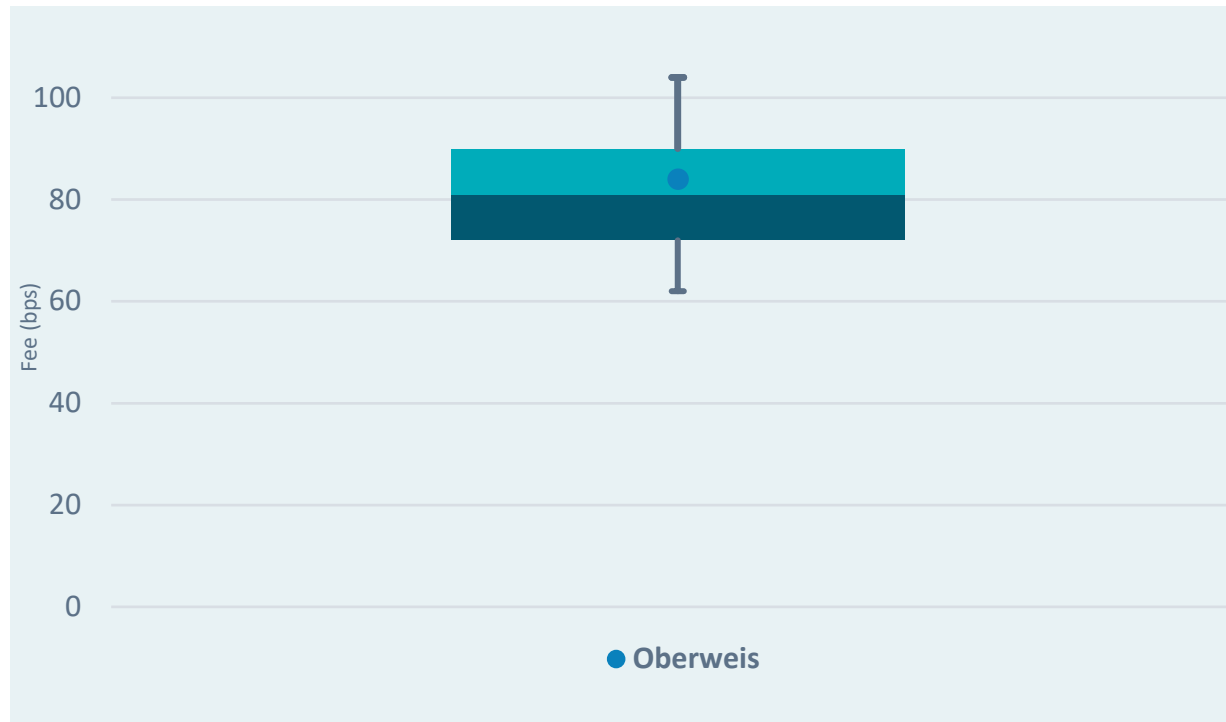
38.0 bps

Estimated PSERS fee (\$):

\$1,515,394

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$2,472,982	62
25th Percentile	\$2,866,530	72
Median	\$3,230,320	81
75th Percentile	\$3,540,320	89
95th Percentile	\$4,167,658	104
# of Observations	57	57

Oberweis Asset Mgmt International Small Cap



Assumed Mandate:

eVestment: ACWI ex-US Small Cap Equity

\$363,164,000

Reported Manager fee (bps):

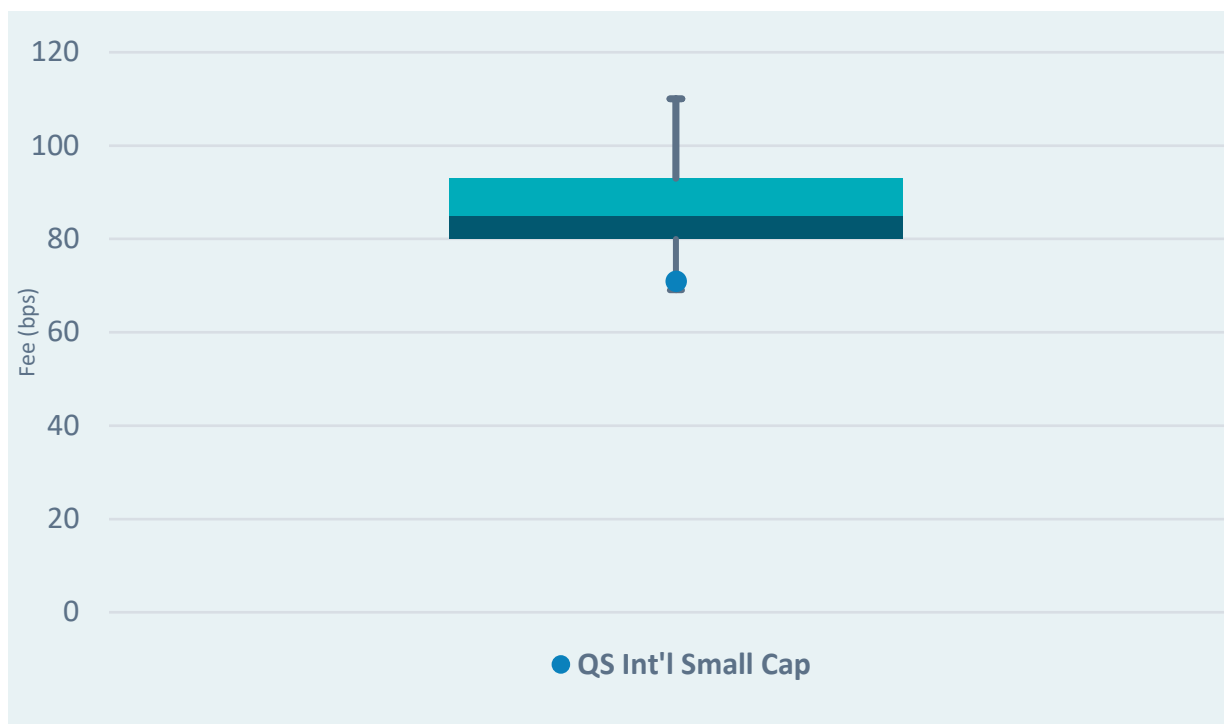
84.0 bps

Estimated PSERS fee (\$):

\$3,050,578

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$2,266,328	62
25th Percentile	\$2,617,120	72
Median	\$2,945,280	81
75th Percentile	\$3,255,280	90
95th Percentile	\$3,804,232	104
# of Observations	57	57

QS Investors International Small Cap



Assumed Mandate:

eVestment: ACWI ex-US Small Cap Equity

\$127,361,000

Reported Manager fee (bps):

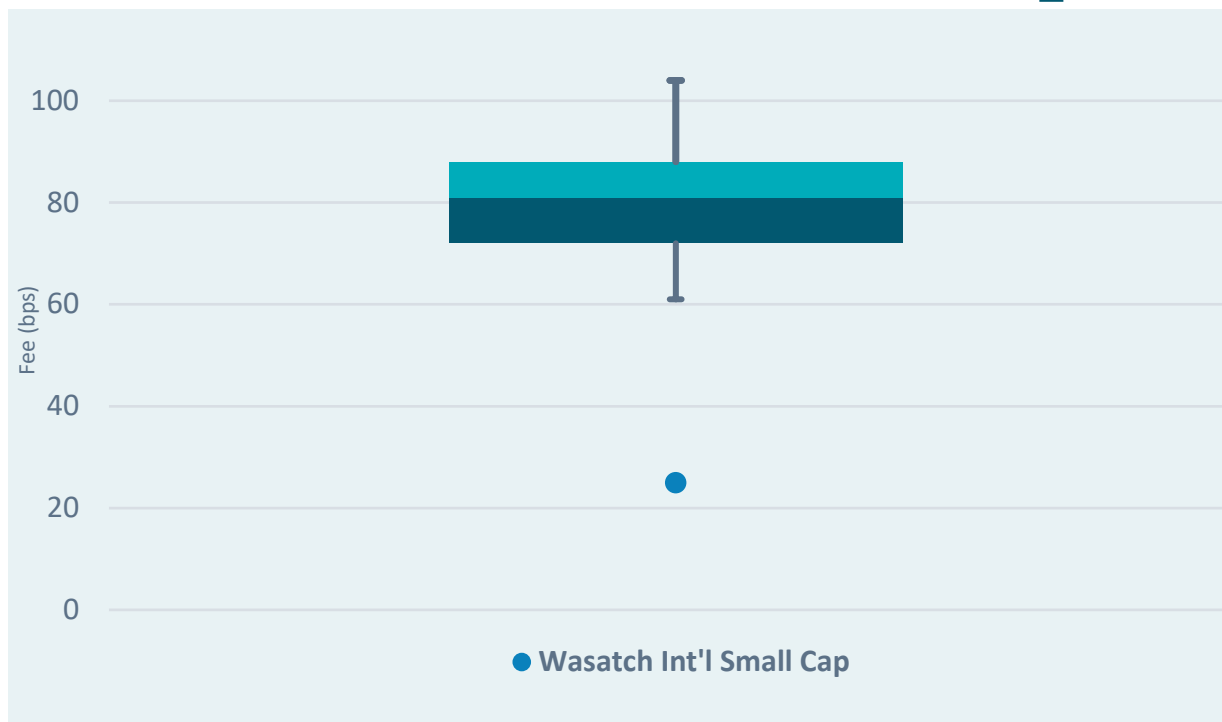
71.0 bps

Estimated PSERS fee (\$):

\$904,263

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$880,576	69
25th Percentile	\$1,018,880	80
Median	\$1,081,380	85
75th Percentile	\$1,182,560	93
95th Percentile	\$1,399,072	110
# of Observations	57	57

Wasatch International Small Cap



Assumed Mandate:

eVestment: ACWI ex-US Small Cap Equity

\$446,085,000

Reported Manager fee (bps):

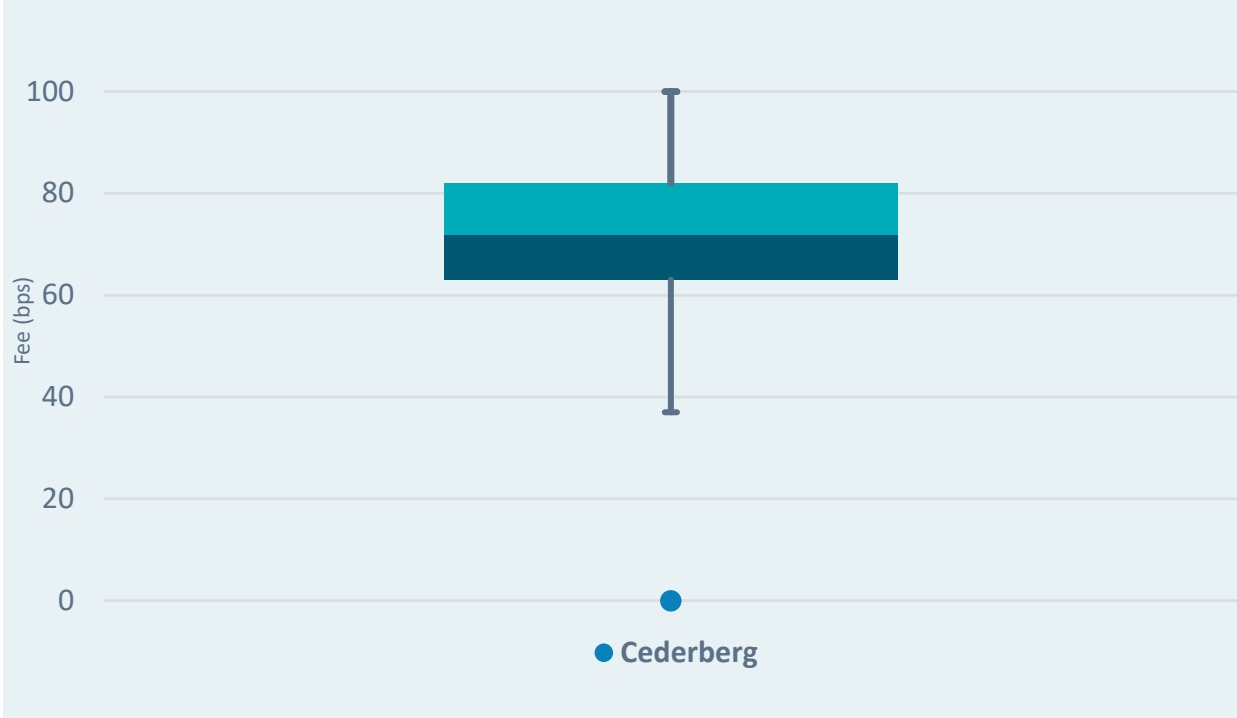
25.0 bps

Estimated PSERS fee (\$):

\$1,115,213

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$2,747,322	61
25th Percentile	\$3,197,630	72
Median	\$3,608,720	81
75th Percentile	\$3,918,720	88
95th Percentile	\$4,650,118	104
# of Observations	57	57

Cederberg China Equity Fund



Assumed Mandate:

eVestment: Global EM All Cap Equity

\$327,499,000

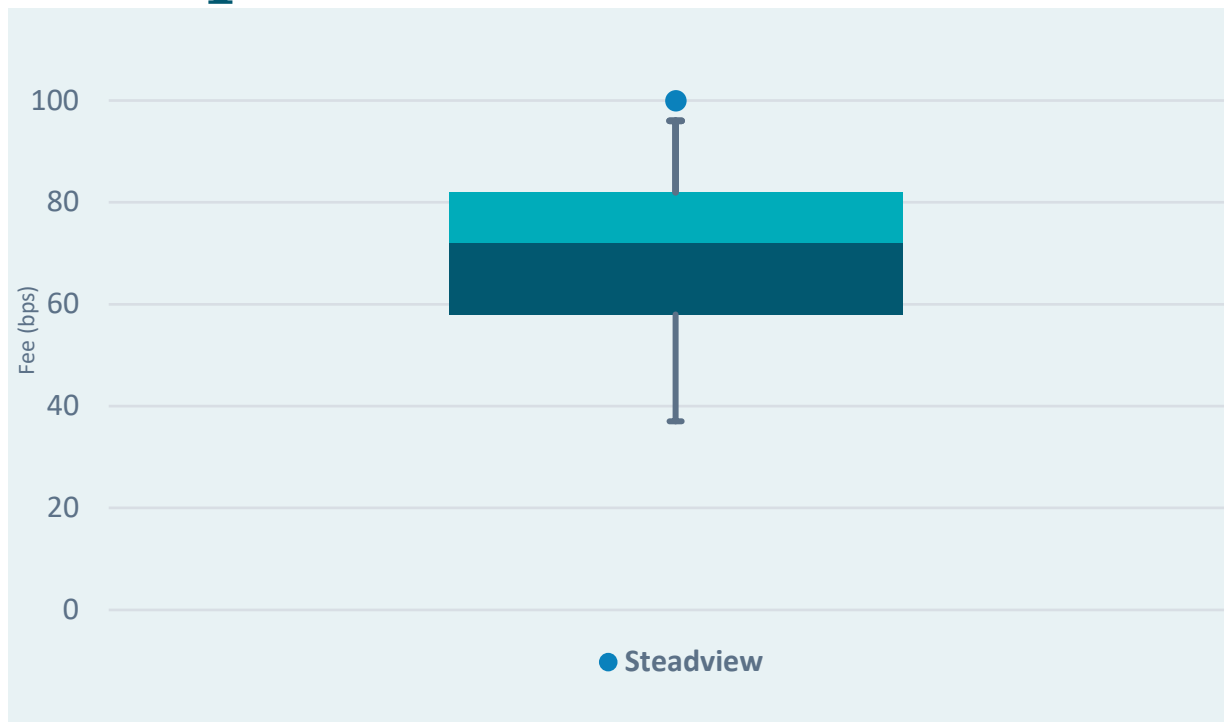
Reported Manager fee (bps)¹:

0.0 bps

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$1,219,350	37
25th Percentile	\$2,051,250	63
Median	\$2,347,000	72
75th Percentile	\$2,695,000	82
95th Percentile	\$3,275,000	100
# of Observations	217	217

¹Cederberg charges performance fees only

Steadview Capital Partners LP



Assumed Mandate:

eVestment: Global EM Large Cap Equity

\$308,690,000

Reported Manager fee (bps):

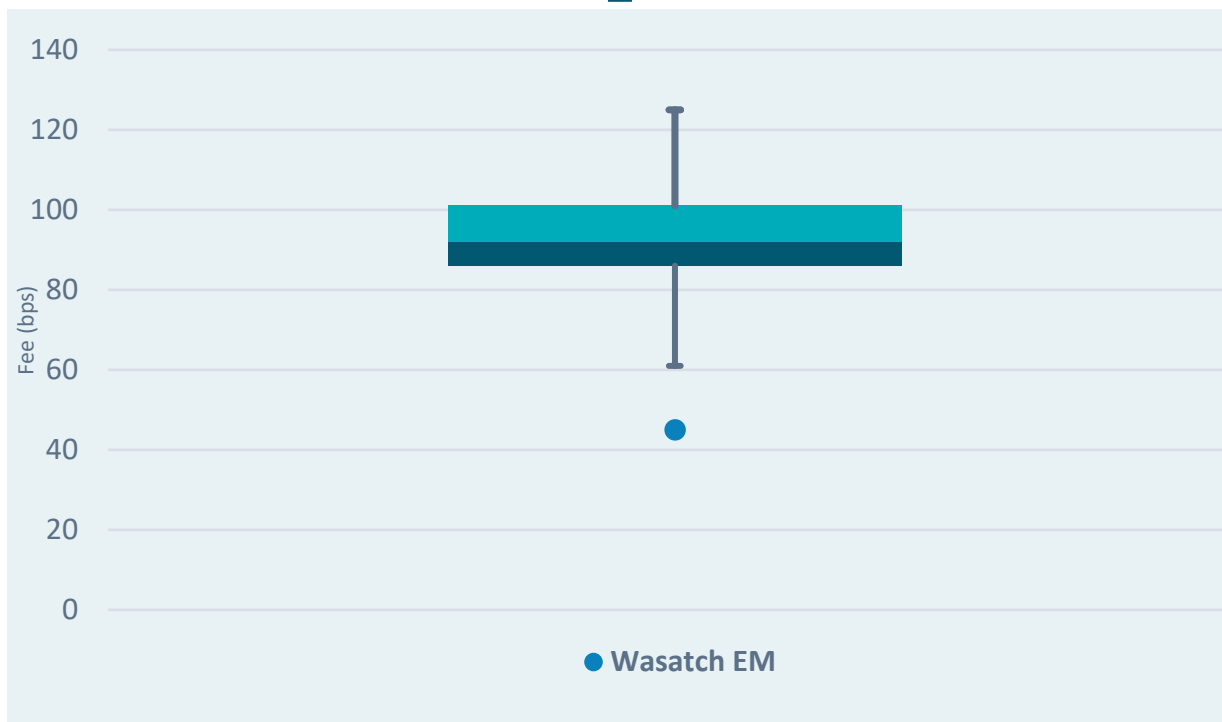
100 bps

Estimated PSERS fee (\$):

\$3,086,900

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$1,142,274	37
25th Percentile	\$1,797,850	58
Median	\$2,231,550	72
75th Percentile	\$2,544,600	82
95th Percentile	\$2,963,520	96
# of Observations	89	89

Wasatch EM Small Cap



Assumed Mandate:

eVestment: Global EM Small Cap

\$583,677,000

Reported Manager fee (bps):

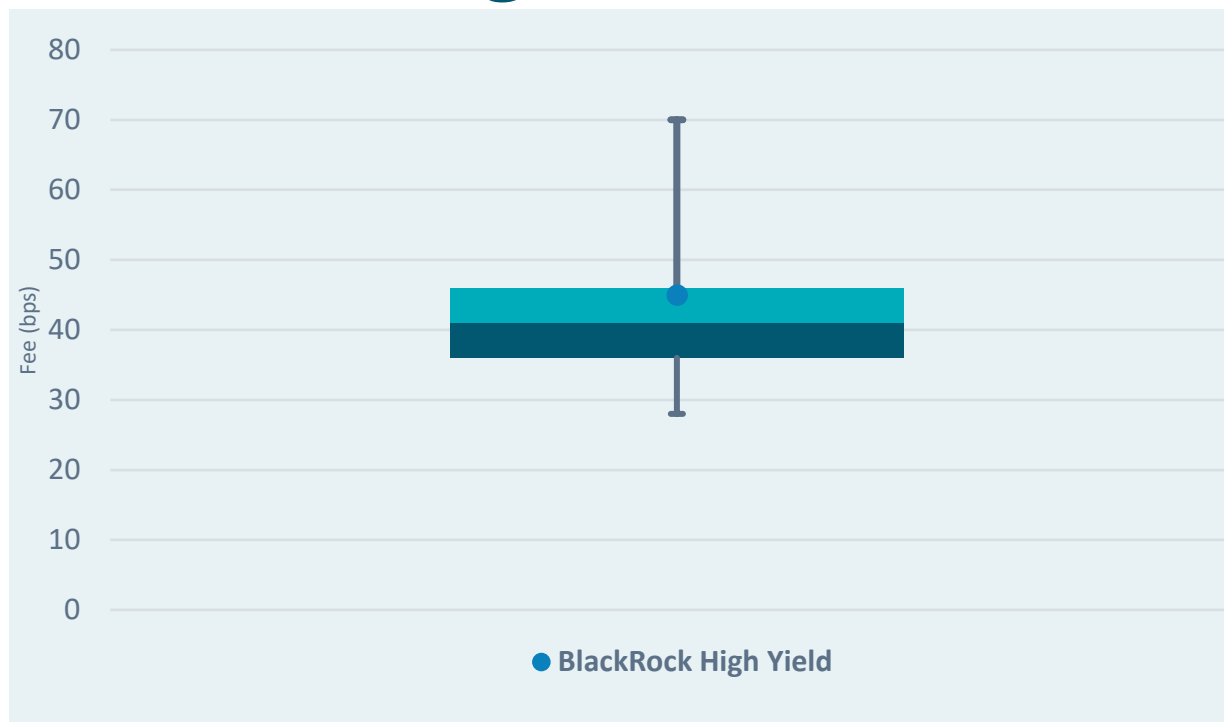
45.0 bps

Estimated PSERS fee (\$):

\$2,626,547

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$3,602,842	61
25th Percentile	\$4,998,950	86
Median	\$5,390,800	92
75th Percentile	\$5,896,238	101
95th Percentile	\$7,296,250	125
# of Observations	64	64

BlackRock FIGA High Yield



Assumed Mandate:

eVestment: US High Yield

\$988,181,000

Reported Manager fee (bps):

45.0 bps

Estimated PSERS fee (\$):

\$4,446,815

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$2,770,500	28
25th Percentile	\$3,533,700	36
Median	\$4,002,800	41
75th Percentile	\$4,496,900	46
95th Percentile	\$6,917,400	70
# of Observations	201	201

Templeton Emerging Fixed Income



Assumed Mandate:

eVestment: Global EM - Blended Currency

\$430,025,000

Reported Manager fee (bps):

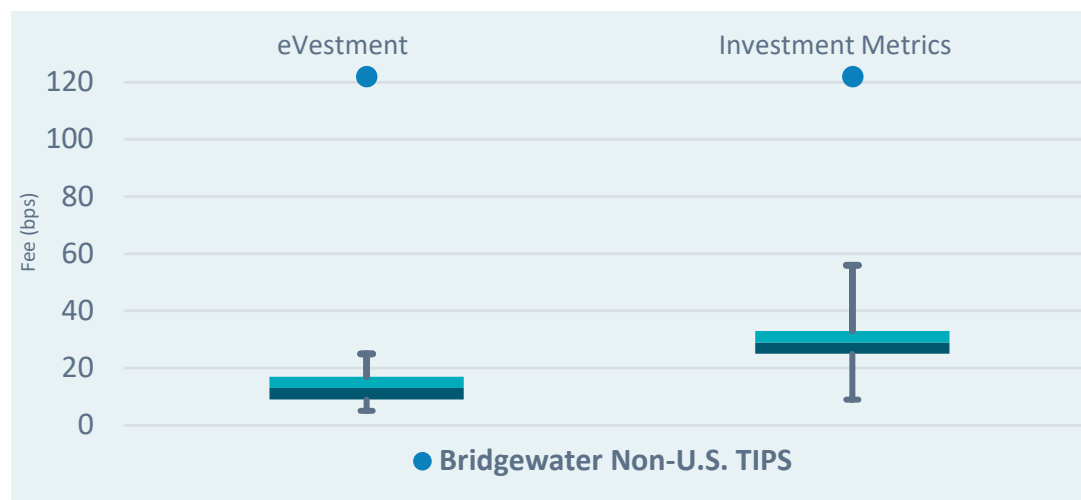
49.0 bps

Estimated PSERS fee (\$):

\$2,107,123

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$1,186,800	27
25th Percentile	\$1,713,500	40
Median	\$1,920,000	45
75th Percentile	\$2,280,000	53
95th Percentile	\$3,144,500	73
# of Observations	75	75

Bridgewater Non-U.S. TIPS



Assumed Mandate:

eVestment: US TIPS / Inflation Fixed Income

\$1,900,000,000 (Fee based on \$600M)

Assumed Mandate:

Investment Metrics: Global TIPS

> \$100 Million

Reported Manager fee (bps):

387 bps¹ (Fee is effectively 122 bps on entire exposure)

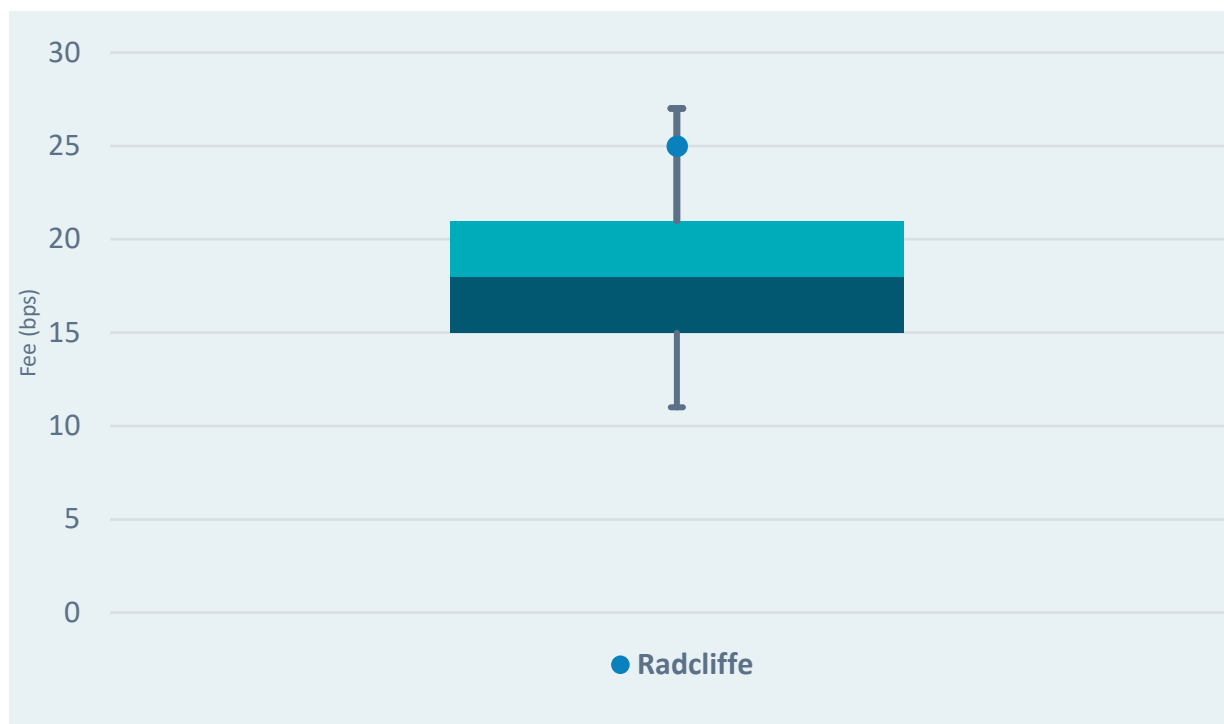
Estimated PSERS fee (\$):

\$23,220,000

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$975,000	5
25th Percentile	\$1,697,500	9
Median	\$2,445,000	13
75th Percentile	\$3,140,625	17
95th Percentile	\$4,750,000	25
# of Observations	34	34
Investment Metrics Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$1,736,600	9
25th Percentile	\$4,750,000	25
Median	\$5,510,000	29
75th Percentile	\$6,270,000	33
95th Percentile	\$10,545,000	56
# of Observations	13	13

¹ Bridgewater Non-US TIPS incurs a management fee on Bridgewater Pure Alpha II only, which has a fee of 3.87%. We assumed a 3.87% fee on \$600M, which is effectively 1.22% on the total exposure.

Radcliffe Capital Fixed Income Ultra Short Duration



Assumed Mandate:

eVestment: US Short Duration FI

\$205,794,000

Reported Manager fee (bps):

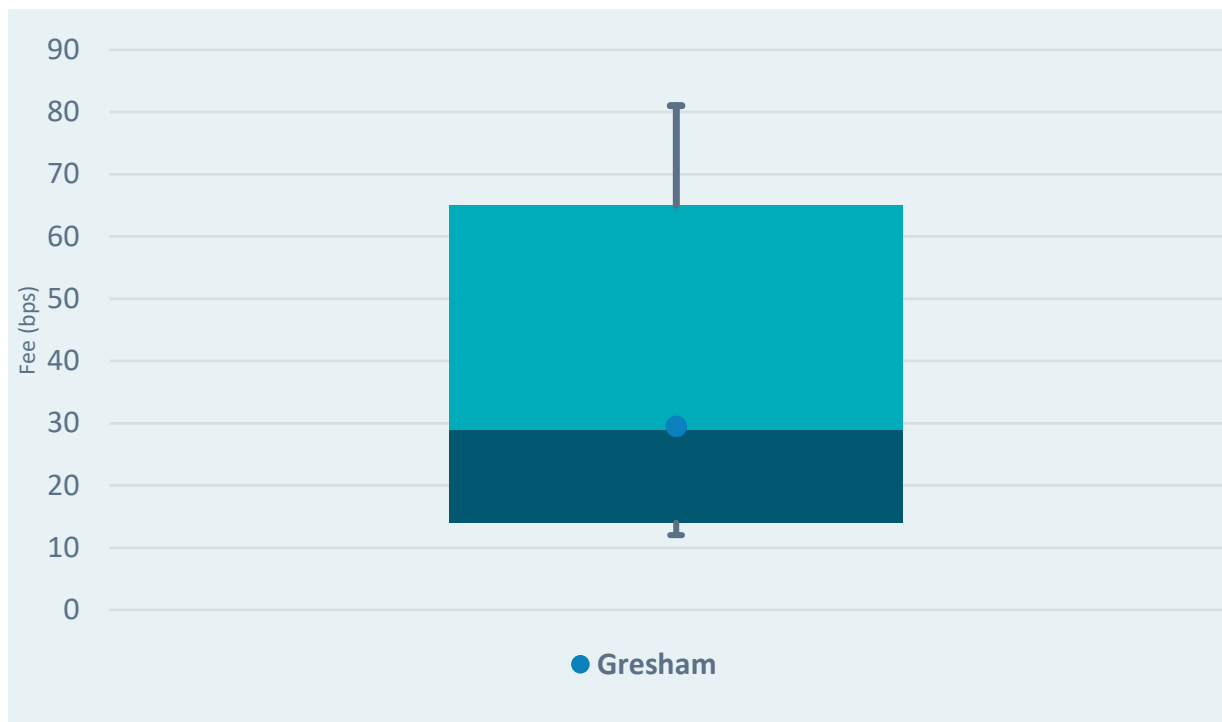
25.0 bps

Estimated PSERS fee (\$):

\$514,485

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$230,662	11
25th Percentile	\$305,800	15
Median	\$369,950	18
75th Percentile	\$431,725	21
95th Percentile	\$555,375	27
# of Observations	212	212

Gresham Commodities



Assumed Mandate:

CEM: External Active Commodities

\$399,535,000

Reported Manager fee (bps):

29.5 bps

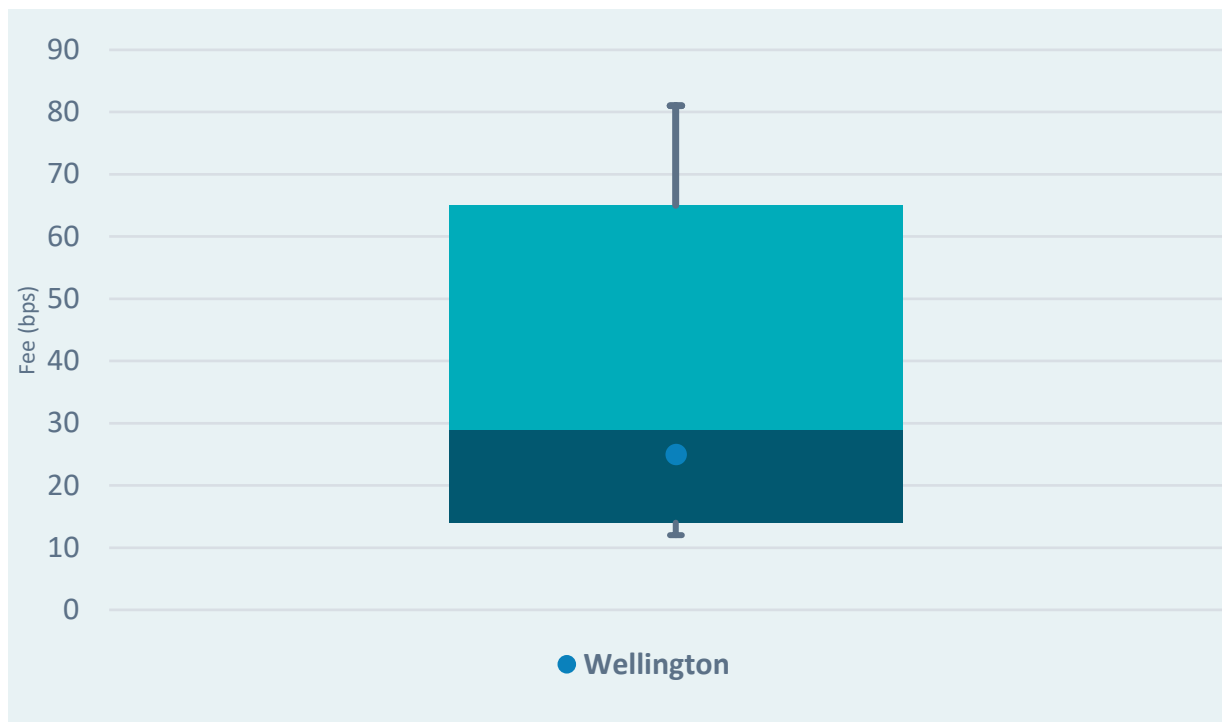
Estimated PSERS fee (\$):

\$1,178,628

CEM Peer Group ¹	Separate Account Fees	Separate Account (bps)
10th Percentile	\$487,433	12
25th Percentile	\$571,335	14
Median	\$1,138,675	29
75th Percentile	\$2,612,959	65
90th Percentile	\$3,236,234	81
# of Observations	7	7

¹Due to insufficient eVestment data, the external active commodities CEM universe was used.

Wellington Commodities



Assumed Mandate:

CEM: External Active Commodities

\$529,531,000

Reported Manager fee (bps):

25.0 bps

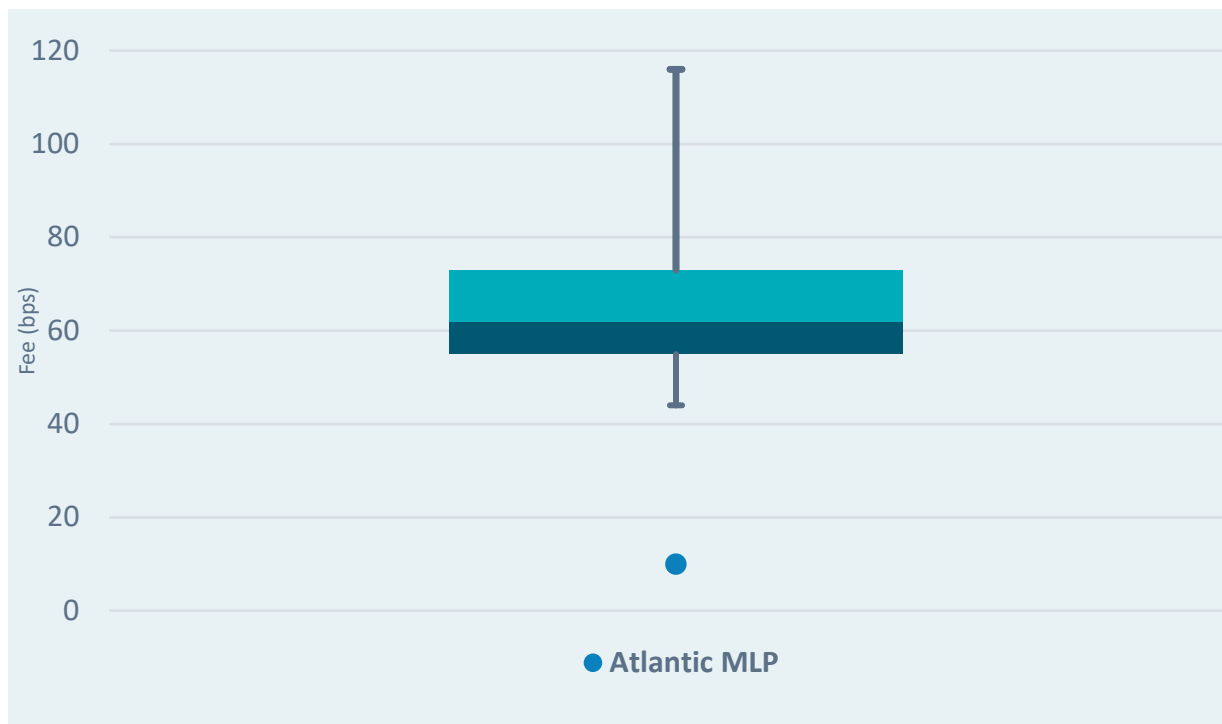
Estimated PSERS fee (\$):

\$1,323,828

CEM Peer Group ¹	Separate Account Fees	Separate Account (bps)
10th Percentile	\$646,028	12
25th Percentile	\$757,229	14
Median	\$1,509,163	29
75th Percentile	\$3,463,133	65
90th Percentile	\$4,289,201	81
# of Observations	7	7

¹Due to insufficient eVestment data, the external active commodities CEM universe was used.

Atlantic Trust Private Wealth Management MLP



Assumed Mandate:

eVestment: Master Limited Partnership

\$413,291,000

Reported Manager fee (bps):

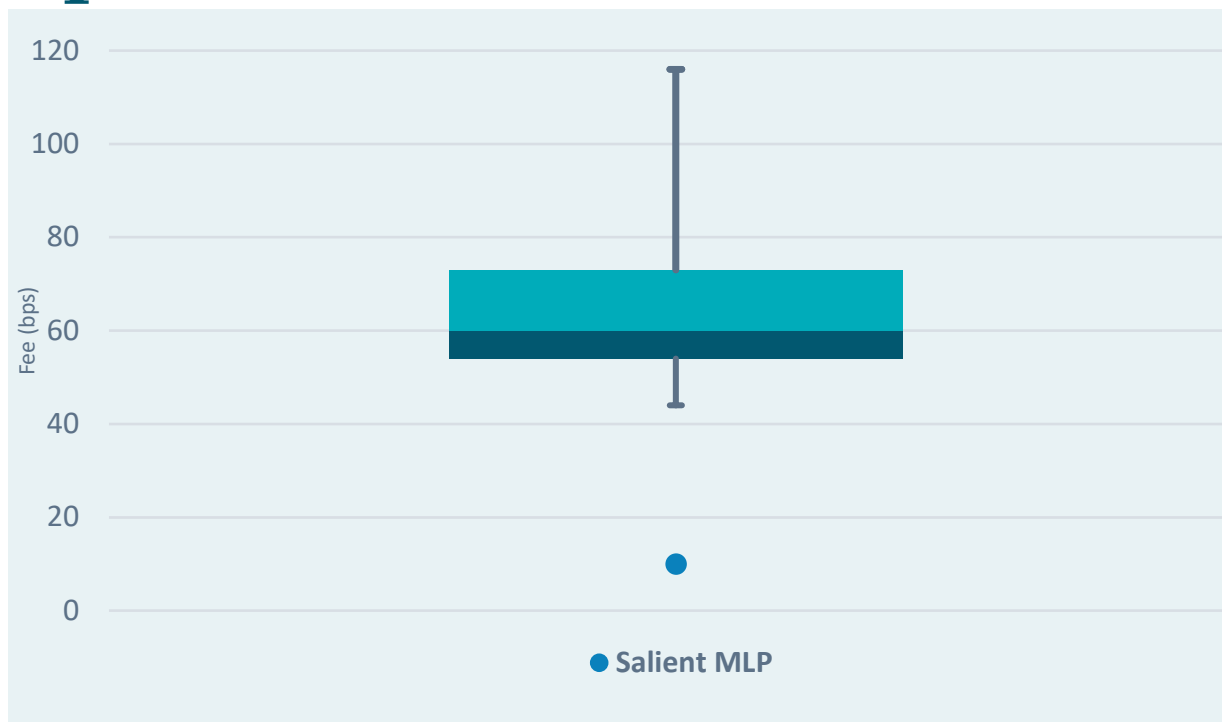
10.0 bps

Estimated PSERS fee (\$):

\$413,291

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$1,841,130	44
25th Percentile	\$2,266,500	55
Median	\$2,548,150	62
75th Percentile	\$3,032,262	73
95th Percentile	\$4,785,437	116
# of Observations	30	30

Salient Capital MLP



Assumed Mandate:

eVestment: Master Limited Partnership

\$514,627,000

Reported Manager fee (bps):

10.0 bps

Estimated PSERS fee (\$):

\$514,627

eVestment Peer Group	Separate Account Fees	Separate Account (bps)
5th Percentile	\$2,269,123	44
25th Percentile	\$2,773,000	54
Median	\$3,105,300	60
75th Percentile	\$3,754,025	73
95th Percentile	\$5,937,725	116
# of Observations	30	30

Private Investment Management Fee Analysis

Private Equity

Private Equity Composite Fee



PSERS average carry for active private equity funds is 18.4%. In our custom universe, the range was 15% to 30%; 96% of observations had a carry level of 20%.

Assumed Mandate:

Verus Custom Private Equity Universe (Pitchbook)

\$11,437,137,000

Reported PSERS fee (\$)

\$101,569,000

Estimated PSERS fee (bps)¹:

89 bps

Verus Peer Group:	Account Fees	Account Fees (bps)
5th Percentile	\$147,539,067	129
25th Percentile	\$171,557,055	150
Median	\$171,557,055	150
75th Percentile	\$200,149,898	175
95th Percentile	\$228,742,740	200
# of Observations	67	67

¹ PSERS Reported fee calculated as the total base fee per the FY21 investment expense report divided by Aon 6/30/21 composite market value.

Private Equity Fee Schedule (Active Funds)

Account	Commitment (\$MM)	PSERS Reported Fees (%)	
		Management Fee	Carried Interest
NEPA Venture Fund II	5.00	1.50%	20.00%
Adams Capital Management, L.P.	12.50	2.20%	20.00%
Cross Atlantic Technology Fund, L.P.	30.14	2.00%	20.00%
New York Life Capital Partners I, L.P.	200.00	1.00%	12.50%
Co-Investment 2000 Fund, L.P.	135.00	2.00%	20.00%
GSC Recovery II, L.P.	280.00	1.00%	12.50%
SCP Private Equity Partners II, L.P.	125.00	1.75%	20.00%
Sterling Venture Partners, L.P.	33.99	2.04%	20.00%
Cross Atlantic Technology Fund II	21.12	2.00%	20.00%
Perseus-Soros BioPharmaceutical Fund	112.21	1.65%	20.00%
Sterling Capital Partners, L.P.	75.00	1.75%	20.00%
Tenaya Capital IV-P, L.P.	75.00	1.50%	20.00%
Gold Hill Venture Lending 03-A, L.P.	50.00	1.50%	15.00%
LLR Equity Partners II, L.P.	75.00	2.00%	20.00%
Milestone Partners II, L.P.	29.89	1.75%	17.50%
Platinum Equity Capital Partners-A, L.P.	125.00	2.00%	20.00%
Bridgepoint Europe III A, L.P.	250.62	1.50%	20.00%
Crestview Partners, L.P.	150.00	2.00%	20.00%
Evergreen Pacific Partners, L.P.	50.00	1.75%	20.00%
New York Life Capital Partners III-A, L.P.	200.00	1.00%	12.50%
PAI Europe IV-B2, L.P.	125.31	1.50%	20.00%
Strategic Partners Fund III VC, L.P.	50.00	1.00%	10.00%
Strategic Partners Fund III-B, L.P.	200.00	0.25%	5.00%
Versa Capital Fund I, L.P.	75.00	1.75%	20.00%
Aisling Capital II L.P.	50.00	2.00%	20.00%
Catterton Partners VI, L.P.	130.00	2.00%	20.00%
Cerberus Institutional Partners, L.P. (Series 4)	400.00	1.50%	20.00%
Co-Investment Fund II, L.P.	135.00	1.50%	12.50%
Irving Place Capital Partners III L.P.	150.00	1.75%	20.00%
Landmark Equity Partners XIII, L.P.	100.00	0.50%	10.00%
NYLIM Mezzanine Partners II (Parallel Fund) LP	150.00	1.25%	15.00%
Actis Emerging Markets 3, L.P.	200.00	2.00%	20.00%
Apax Europe VII, L.P.	250.62	1.50%	20.00%
Baring Asia Private Equity Fund IV, L.P.	300.00	2.00%	20.00%
Blue Point Capital Partners II (B), L.P.	100.00	1.75%	20.00%
Capital International Private Equity Fund V L.P.	200.00	1.50%	20.00%

Private Equity Fee Schedule (Active Funds)

Account	Commitment (\$MM)	PSERS Reported Fees (%)	
		Management Fee	Carried Interest
Cinven Fund (Fourth), L.P.	187.97	1.50%	20.00%
Gleacher Mezzanine Fund II, L.P.	100.00	1.75%	20.00%
New Mountain Partners III L.P.	300.00	1.75%	20.00%
OCM Opportunities Fund VII L.P.	75.00	1.67%	20.00%
Partners Group Secondary 2008, L.P.	187.97	1.25%	10.00%
Platinum Equity Capital Partners-A II, L.P.	300.00	2.00%	20.00%
PNC Equity Partners II, L.P.	68.07	1.75%	20.00%
StarVest Partners II (Parallel), L.P.	50.00	2.00%	20.00%
StepStone International Investors III L.P.	125.31	1.25%	12.50%
Tenaya Capital V-P, L.P.	75.00	1.75%	20.00%
Trilantic Capital Partners IV L.P.	76.75	1.50%	20.00%
Aisling Capital III, L.P.	50.00	2.00%	20.00%
Bridgepoint Europe IV, L.P.	375.93	1.50%	20.00%
Catterton Growth Partners, L.P.	75.00	2.00%	20.00%
CVC Capital Partners Asia Pacific III, L.P.	300.00	1.50%	20.00%
CVC European Equity Partners V (A), L.P.	375.93	1.33%	20.00%
Evergreen Pacific Partners II, L.P.	80.95	2.00%	20.00%
First Reserve Fund XII, L.P.	250.00	1.36%	20.00%
Landmark Equity Partners XIV, L.P.	150.00	1.00%	10.00%
LLR Equity Partners III, L.P.	187.50	1.75%	20.00%
Milestone Partners III, L.P.	60.00	1.75%	18.70%
New York Life Capital Partners IV-A. L.P.	100.00	1.00%	10.00%
OCM Opportunities Fund VII-b L.P.	225.00	1.50%	20.00%
PAI Europe V, L.P.	125.31	1.50%	20.00%
Strategic Partners Fund IV VC, L.P.	50.00	0.75%	12.50%
Strategic Partners Fund IV, L.P.	100.00	0.75%	12.50%
Versa Capital Fund II, L.P.	150.00	1.75%	20.00%
Crestview Partners II (PF) LP	200.00	2.00%	20.00%
Avenue Special Situations Fund VI, L.P.	75.00	1.25%	20.00%
Baring Asia Private Equity Fund V, L.P.	200.00	2.00%	20.00%
Capital International Private Equity Fund VI, L.P.	100.00	1.50%	20.00%
Coller International Partners VI, L.P.	100.00	1.50%	10.00%
Denham Commodity Partners Fund VI, L.P.	75.00	1.75%	20.00%
Incline Equity Partners III (PSERS), L.P.	65.00	2.00%	15.00%
Milestone Partners IV, L.P.	70.00	1.75%	18.88%
Orchid Asia V, L.P.	40.00	2.00%	20.00%

Private Equity Fee Schedule (Active Funds)

Account	Commitment (\$MM)	PSERS Reported Fees (%)	
		Management Fee	Carried Interest
Partners Group Secondary 2011 (USD), L.P. Inc.	100.00	1.25%	10.00%
Strategic Partners Fund V, L.P.	150.00	0.75%	12.50%
Actis Global 4, L.P.	100.00	1.80%	20.00%
Bain Capital Asia Fund II, L.P.	100.00	2.00%	20.00%
Catterton Partners VII, L.P.	100.00	2.00%	20.00%
Cerberus Institutional Partners V, L.P.	200.00	1.33%	16.00%
GoldPoint Partners Co-Investment V, L.P.	50.00	1.00%	10.00%
NGP Natural Resources X, L.P.	100.00	1.50%	20.00%
Palladium Equity Partners IV, L.P.	75.00	1.85%	20.00%
Platinum Equity Capital Partners-A III, L.P.	200.00	1.75%	20.00%
Summit Partners Growth Equity Fund VIII, L.P.	100.00	1.85%	20.00%
Summit Partners Venture Capital Fund III, L.P.	25.00	1.85%	20.00%
Tenaya Capital VI, L.P.	50.00	2.00%	20.00%
Apollo Investment Fund VIII, L.P.	220.00	1.10%	20.00%
Catterton Growth Partners II, L.P.	75.00	2.00%	20.00%
DCPF VI Oil and Gas Co-Investment Fund, L.P.	25.00	1.00%	20.00%
HgCapital 7 A, L.P.	119.96	1.75%	20.00%
LLR Equity Partners IV, L.P.	200.00	1.75%	20.00%
New Mountain Partners IV, L.P.	100.00	1.75%	20.00%
North Haven PE Asia Fund IV, L.P.	100.00	1.50%	20.00%
Trilantic Capital Partners V (North America), L.P.	100.00	1.50%	20.00%
Bain Capital Fund XI, L.P.	100.00	1.50%	20.00%
Blue Point Capital Partners III (B), L.P.	60.00	1.55%	20.00%
Energy & Minerals Group Fund III, L.P., The	100.00	1.55%	20.00%
HGGC Fund II, L.P.	100.00	2.00%	20.00%
NGP Natural Resources XI, L.P.	100.00	1.50%	20.00%
Odyssey Investment Partners Fund V, L.P.	100.00	2.00%	20.00%
Orchid Asia VI, L.P.	75.00	2.00%	20.00%
Strategic Partners Fund VI, L.P.	150.00	0.75%	12.50%
Baring Asia Private Equity Fund VI, L.P.	100.00	2.00%	20.00%
Bridgepoint Europe V, L.P.	187.97	1.50%	20.00%
Cerberus Institutional Partners VI, L.P.	200.00	1.35%	16.00%
Clearlake Capital Fund IV, L.P.	75.00	2.00%	20.00%
Coller International Partners VII, L.P.	100.00	1.50%	10.00%
Crestview Partners III, L.P.	150.00	1.75%	20.00%
Equistone Partners Europe Fund V, L.P.	73.50	1.75%	20.00%

Private Equity Fee Schedule (Active Funds)

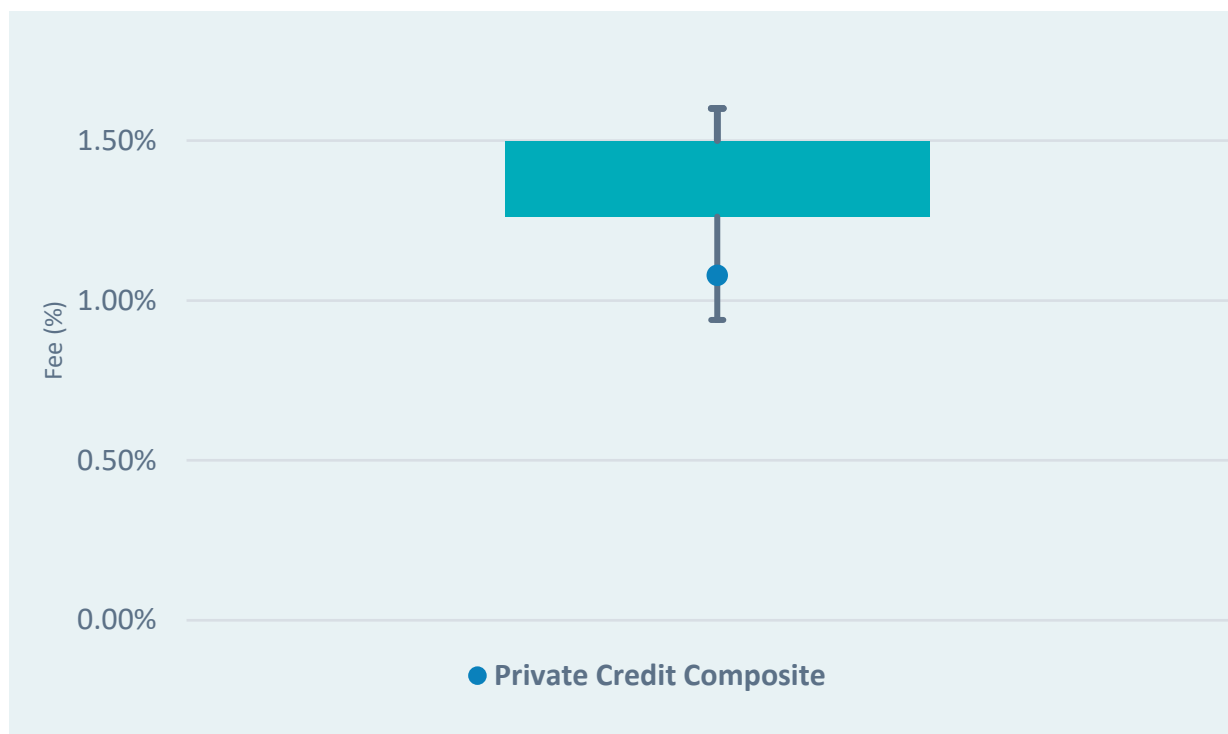
Account	Commitment (\$MM)	PSERS Reported Fees (%)	
		Management Fee	Carried Interest
PAI Europe VI, L.P.	125.31	1.43%	20.00%
Partners Group Secondary 2015 (USD), L.P. Inc.	100.00	1.25%	10.00%
Searchlight Capital II, L.P.	74.00	2.00%	20.00%
Summit Partners Venture Capital Fund IV, L.P.	50.00	1.85%	20.00%
Tenaya Capital VII, L.P.	100.00	2.00%	20.00%
Venor Special Situations Fund II, L.P.	100.00	1.00%	17.50%
Versa Capital Fund III, L.P.	150.00	1.50%	17.50%
Summit Partners Growth Equity Fund IX, L.P.	100.00	1.85%	20.00%
Aisling Capital IV, L.P.	100.00	1.50%	20.00%
Bain Capital Asia Fund III, L.P.	150.00	2.00%	20.00%
Bridgepoint Development Capital III, L.P.	101.64	1.75%	20.00%
L Catterton Growth Partners III, L.P.	100.00	2.00%	20.00%
L Catterton Partners VIII, L.P.	100.00	2.00%	20.00%
Platinum Equity Capital Partners IV, L.P.	300.00	1.75%	20.00%
Strategic Partners Fund VII, L.P.	250.00	0.50%	10.00%
Portfolio Advisors Secondary Fund III, L.P.	125.00	1.00%	10.00%
Apax Digital, L.P.	100.00	1.85%	20.00%
Bain Capital Fund XII, L.P.	125.00	1.50%	20.00%
HgCapital 8, L.P.	133.65	1.75%	20.00%
HGGC Fund III, L.P.	125.00	2.00%	20.00%
Incline Equity Partners IV, L.P.	100.00	2.00%	20.00%
LLR Equity Partners V, L.P.	200.00	1.75%	18.00%
New Mountain Partners V, L.P.	200.00	1.63%	20.00%
Orchid Asia VII, L.P.	75.00	2.00%	20.00%
Platinum Equity Capital Partners V, L.P.	300.00	1.40%	20.00%
Apollo Investment Fund IX, L.P.	225.00	1.40%	20.00%
Bain Capital Asia Fund IV, LP	150.00	2.00%	20.00%
Blue Point Capital Partners IV, L.P.	70.00	1.75%	20.00%
Bridgepoint Europe VI, L.P.	123.81	1.50%	20.00%
Clearlake Capital Fund V, L.P.	100.00	1.75%	20.00%
Equistone Partners Europe Fund VI, SCSp	93.10	1.75%	20.00%
Insight Venture Partners X, L.P.	100.00	1.75%	20.00%
K4 Private Investors	100.00	2.00%	20.00%
PAI Europe VII, L.P.	100.00	1.50%	20.00%
Platinum Equity Small Cap Fund	160.00	2.00%	20.00%
Sante Health Ventures III, LP	75.00	2.00%	20.00%

Private Equity Fee Schedule (Active Funds)

Account	Commitment (\$MM)	PSERS Reported Fees (%)	
		Management Fee	Carried Interest
Trilantic Capital Partners VI (North America), LP	150.00	1.50%	20.00%
Webster Capital IV, LP	75.00	2.00%	20.00%
Incline Equity Partners V, L.P.	150.00	2.00%	20.00%
Hahn & Company III	112.50	2.00%	20.00%
Hahn & Company III-S	37.50	1.50%	15.00%
Incline Elevate Fund	75.00	2.00%	20.00%
Platinum Equity Capital Partners V, L.P.	300.00	1.55%	20.00%
Searchlight Capital III, LP	150.00	1.85%	20.00%
Clearlake Capital Fund VI, L.P.	150.00	1.75%	20.00%
Insight Partners XI, L.P.	150.00	1.75%	20.00%
Summit Partners Growth Equity Fund X, LP	150.00	1.71%	20.00%
Apax X USD, L.P.	150.00	1.45%	20.00%
Bridgepoint Development Capital IV, L.P.	171.35	1.75%	20.00%
Clearlake Flagship Plus Partners, LP	75.00	0.00%	20.00%
Crown CG Private Equity Fund 2019, L.P.	82.17	2.00%	20.00%
Crown CG Private Equity Fund 2019S, L.P.	20.54	0.00%	10.00%
Hg Genesis 9 L.P.	115.73	1.75%	20.00%
Hg Saturn 2 A L.P.	100.00	1.00%	20.00%
Honeydew Co-Invest, L.P.	93.75	0.00%	10.00%
Incline Equity Partners V, L.P.	150.00	2.00%	20.00%
Insight Partners Opportunities Fund I, L.P.	75.00	1.00%	20.00%
LLR Equity Partners VI, LP	200.00	1.75%	18.00%
New Mountain Partners VI, LP	250.00	1.60%	20.00%
Portfolio Advisors Secondary Fund IV, L.P.	150.00	1.00%	10.00%
Portfolio Advisors Secondary Fund, L.P., PA	50.00	1.00%	10.00%
Apax Digital II L.P.	135.00	1.75%	20.00%
Greenoaks Capital Opportunities Fund III, LP	100.00	2.00%	20.00%
Oak HC/FT Partners IV, L.P.	100.00	1.75%	25.00%
Sante Health Ventures IV Parallel A, LP	75.00	2.00%	20.00%
Valar Velocity Fund II, L.P.	30.00	0.00%	20.00%

Private Credit

Private Credit Composite Fee



PSERS average carry for private credit is 16.6%. In our custom universe, the range was 10% to 20% with >71% of observations having a carry level of 20%.

Assumed Mandate:

Verus Custom Private Credit Universe (Pitchbook)

\$5,871,038,000

Reported PSERS fee (\$)

\$63,228,000

Estimated PSERS fee (bps)¹:

108 bps

Verus Peer Group:	Account Fees	Account Fees (bps)
5th Percentile	\$55,187,757	94
25th Percentile	\$73,975,079	126
Median	\$88,065,570	150
75th Percentile	\$88,065,570	150
95th Percentile	\$93,936,608	160
# of Observations	14	14

¹ PSERS Reported fee calculated as the total base fee per the FY21 investment expense report divided by Aon 6/30/21 composite market value.

Private Credit Fee Schedule

Account	Commitment (\$MM)	PSERS Reported Fees (%)			PSERS Actual Fees Paid FY21 (\$MM)		
		Investment Period	Post-Investment Period	Carried Interest	Base Fee ¹	Profit Share ¹	Total
Apollo European Principal Finance Fund II (Dollar A), L.P.	200.00	1.75%	1.50%	20.00%	0.28	0.00	0.28
Apollo European Principal Finance Fund III (Dollar A), LP	200.00	1.40%	1.40%	20.00%	1.86	0.00	1.86
Avenue Energy Opportunities Fund II, L.P.	100.00	0.85%	0.85%	10.00%	0.85	0.00	0.85
Avenue Energy Opportunities Fund, L.P.	200.00	1.00%	1.00%	20.00%	1.46	0.00	1.46
Avenue Europe Special Situations Fund III (U.S.), L.P.	200.00	0.95%	0.95%	20.00%	1.42	0.00	1.42
Bain Capital Credit Managed Account (PSERS), L.P.	500.00	0.50%	0.50%	0.00%	1.74	0.00	1.74
Bain Special Situations Asia I	75.00	1.40%	1.40%	20.00%	0.00	0.00	0.00
Bain Capital Distressed and Special Situations 2013 (A), L.P.	350.00	1.00%	1.00%	20.00%	0.66	0.00	0.66
Bain Capital Distressed and Special Situations 2016 (A), L.P.	250.00	1.00%	1.00%	20.00%	2.61	0.00	2.61
Bain Capital Distressed and Special Situations 2019 (A), L.P.	200.00	1.00%	1.00%	20.00%	1.03	0.00	1.03
Bain Capital Middle Market Credit 2010, L.P.	250.00	0.75%	0.75%	13.50%	0.00	0.00	0.00
Bain Capital Middle Market Credit 2014, LP	200.00	1.00%	1.00%	15.00%	0.75	0.00	0.75
Brigade Distressed Value Offshore Fund Ltd.	100.00	1.00%	1.00%	17.50%	1.91	4.88	6.79
Brigade Structured Credit Offshore Fund Ltd.	200.00	1.00%	1.00%	17.50%	3.05	10.32	13.37
Carlyle Energy Mezzanine Opportunities Fund II, L.P.	250.00	1.25%	1.15%	20.00%	1.53	0.00	1.53
Carlyle Energy Mezzanine Opportunities Fund-Q, L.P.	200.00	1.40%	1.15%	20.00%	0.11	0.00	0.11
Cerberus Levered Loan Opportunities Fund II, L.P.	225.00	1.00%	1.00%	15.00%	8.65	0.00	8.65
Cerberus PSERS Levered Loan Opportunities Fund, L.P.	225.00	1.00%	0.90%	15.00%	0.76	0.00	0.76
Clearlake Opportunities Partners (P) II, L.P.	100.00	1.00%	1.50%	20.00%	0.38	0.00	0.38
Galton Onshore Mortgage Recovery Fund III, L.P.	150.00	1.00%	1.00%	15.00%	0.00	0.00	0.00
Galton Onshore Mortgage Recovery Fund IV, L.P.	150.00	1.00%	1.00%	15.00%	0.11	0.00	0.11
Hayfin SOF II USD Co-Invest, L.P.	40.00	0.30%	0.30%	0.00%	2.62	0.00	2.62
Hayfin SOF II USD, L.P.	160.00	1.73%	1.73%	20.00%	0.40	0.00	0.40
HayFin Special Opportunities Credit Fund (Parallel), L.P.	223.14	1.25%	1.25%	20.00%	1.52	0.00	1.52
ICG Europe Fund V, L.P.	223.14	1.30%	1.30%	20.00%	1.13	0.00	1.13
ICG Europe Fund VI, L.P.	167.36	1.30%	1.05%	20.00%	1.88	0.00	1.88
ICG Europe Fund VII Feeder SCSp	180.00	1.37%	1.12%	20.00%	0.28	0.00	0.28
International Infrastructure Finance Company Fund, L.P.	150.00	1.00%	1.00%	15.00%	0.37	0.00	0.37
Latitude Management Real Estate Capital IV, Inc.	75.00	0.99%	0.99%	20.00%	0.68	0.00	0.68
LBC Credit Partners III, L.P.	240.00	1.25%	1.25%	20.00%	0.70	0.00	0.70
LBC-P Credit Fund, L.P.	350.00	1.00%	1.00%	15.00%	6.05	0.00	6.05
Park Square - PSERS Credit Opportunities Fund, L.P.	200.00	0.60%	0.60%	0.00%	4.05	0.00	4.05
Park Square Capital European Loan Partners, LP Inc.	200.00	0.20%	0.20%	15.00%	0.00	0.00	0.00
Park Square - Capital Partners IV	230.00	1.00%	0.90%	15.00%	0.00	0.00	0.00
PIMCO BRAVO Fund III Onshore Feeder, LP	250.00	0.80%	0.80%	20.00%	1.95	0.00	1.95
PIMCO Commercial Real Estate Debt Fund, L.P.	200.00	0.00%	0.00%	20.00%	0.00	0.00	0.00

¹ Base fee and profit share from PSERS FY21 investment expense report. Accounts that did not appear on the report received \$0 fee.

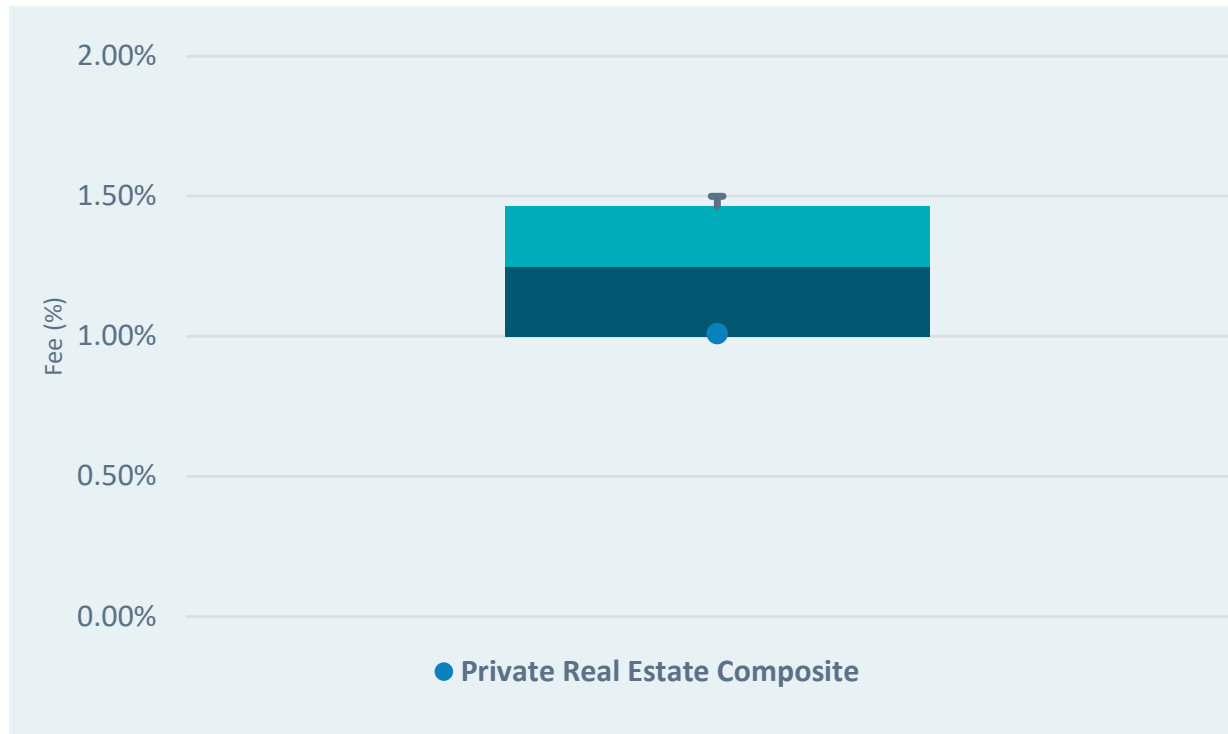
Private Credit Fee Schedule

Account	Commitment (\$MM)	PSERS Reported Fees (%)			PSERS Actual Fees Paid FY21 (\$MM)				
		Investment Period	Post-Investment Period	Carried Interest	Base Fee ¹	Profit Share ¹	Total		
PSERS TAO Partners Parallel Fund, L.P. - (TAO 2.0)	250.00	1.15%	1.15%	16.00%	1.86	0.00	1.86		
PSERS TAO Partners Parallel Fund, L.P. - (TAO 3.0)	250.00	1.15%	1.15%	16.00%	1.85	0.00	1.85		
PSERS TAO Partners Parallel Fund, L.P. - (TAO Contingent)	250.00	1.15%	1.15%	16.00%	0.58	0.00	0.58		
Sankaty Credit Opportunities IV, L.P.	500.00	2.00%	2.00%	20.00%	0.00	0.00	0.00		
Sixth Street Fundamental Strategies Partners (A), L.P.	200.00	1.00%	1.00%	17.50%	0.10	0.00	0.10		
Sixth Street Opportunities Partners II (A), L.P.	100.00	1.75%	1.50%	20.00%	0.02	0.00	0.02		
Sixth Street Opportunities Partners III (A), L.P.	150.00	1.50%	1.25%	20.00%	0.64	0.00	0.64		
Sixth Street Opportunities Partners IV (A), L.P.	150.00	1.50%	1.25%	20.00%	2.25	0.00	2.25		
Sixth Street Specialty Lending Europe II, L.P.	125.00	15 bps / 1.15%	1.15%	20.00%	0.18	0.00	0.18		
SSG Capital Partners V Sidecar, L.P.	150.00	N/A	1.00%	10.00%	0.44	0.00	0.44		
SSG Capital Partners V, L.P.	150.00	1.15%	1.90%	20.00%	2.18	0.00	2.18		
Summit Partners Credit Fund II, L.P.	200.00	1.35%	1.35%	20.00%	0.00	0.00	0.00		
TCI Real Estate Partners Fund III LP	400.00	0.00%	0.00%	15.00%	0.00	0.00	0.00		
Varde Scratch and Dent Feeder I-A, L.P., The	75.00	1.50%	1.50%	15.00%	0.49	0.00	0.49		
Varde Scratch and Dent Feeder, L.P., The	150.00	1.50%	1.50%	15.00%	0.46	0.00	0.46		
Whitehorse Liquidity Partners (Onshore) IV, L.P.	200.00	0.70%	Declines to 90% of base rate and each following year declines to 90% of the previous year, with a floor of 50 bps		Tiered Carry: 10% over 7% stepping up to 12.5% over 9% (standard for investors who commit at least \$200 million)		1.40	0.00	1.40
Total	10,513.6				\$63.2	\$15.2	\$78.4		
Total Composite Market Value and Weighted Fee (\$MM)	5,871.0				1.08%	0.26%	1.34%		

¹ Base fee and profit share from PSERS FY21 investment expense report. Accounts that did not appear on the report received \$0 fee.

Private Real Estate

Private Real Estate Composite Fee



PSERS average carry for private real estate is 18.8%. In our custom universe, the range was 10% to 25%, with >81% of observations having a carry level of 20%.

Assumed Mandate:

Verus Custom Private Real Estate Universe (Pitchbook)	\$5,124,645,000
Reported PSERS fee (\$)	\$51,618,000
Estimated PSERS fee (bps) ¹ :	101 bps

Verus Peer Group:	Account Fees	Account Fees (bps)
5th Percentile	\$51,246,450	100
25th Percentile	\$51,246,450	100
Median	\$64,058,063	125
75th Percentile	\$75,332,282	147
95th Percentile	\$76,869,675	150
# of Observations	43	43

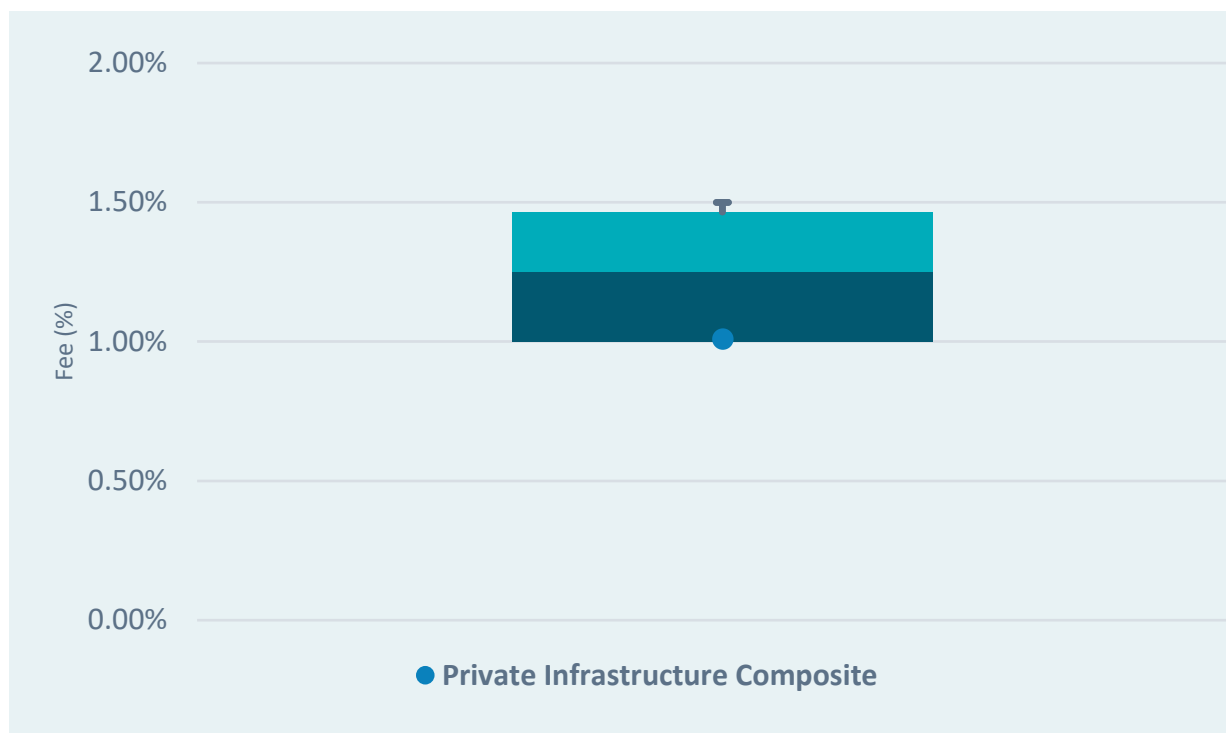
¹ PSERS Reported fee calculated as the total base fee per the FY21 investment expense report divided by Aon 6/30/21 composite market value.

Private Real Estate Fee Schedule

Account	Commitment (\$MM)	PSERS Reported Fees (%)	
		Management Fee	Carried Interest
Brookfield Strategic Real Estate Partners IV, L.P.	300.0	1.25%	20.00%
LEM Multifamily Fund VI, L.P.	100.0	0.90%	20.00%
Carlyle Realty Partners IX, L.P.	200.0	1.00%	20.00%
PGIM Real Estate Capital VII, SCSp	125.0	1.10%	20.00%
Exeter Industrial Value Fund V, L.P.	100.0	1.20%	20.00%
AG Europe Realty Fund III, L.P.	100.0	1.0% on uncalled + 1.5% on invested	20.00%
DRA Growth and Income Fund X, LLC	100.0	0.9% during IP, 0.6% thereafter	20.00%
Cabot Industrial Value Fund VI, L.P.	100.0	1.50%	20.00%
Bell Institutional Fund VII, L.P.	100.0	1.25%	20.00%
Cabot UK Core Plus Industrial Fund SCSp	60.8	0.50%	7.50%
Exeter Industrial Core Fund III, L.P.	100.0	0.90%	15.00%
PSERS YES Holdings, L.P.	303.3	0.50%	10.00%
Cabot Industrial Core Fund II, L.P.	100.0	1.00%	15.00%
AG Realty Value Fund X, L.P.	150.0	1.35%	20.00%
LEM Multifamily Fund V, L.P.	100.0	1.00%	20.00%
Brookfield Strategic Real Estate Partners III-A, L.P.	210.0	1.30%	20.00%
Ares U.S. Real Estate Fund IX, L.P.	100.0	1.25%	20.00%
Carlyle Realty Partners VIII, L.P.	200.0	0.90%	20.00%
AG Europe Realty Fund II, L.P.	100.0	1.50%	20.00%
Almanac Realty Securities VIII, L.P.	150.0	1.25%	20.00%
Brookfield Strategic Real Estate Partners II, L.P.	200.0	1.13%	20.00%
Pramerica Real Estate Capital VI, L.P.	106.5	1.20%	20.00%
DRA Growth and Income Fund IX, LLC	100.0	0.9% during IP, 0.6% thereafter	20.00%
RCG Longview Debt Fund VI, L.P.	75.0	1.25%	20.00%
Bell Institutional Fund VI, L.P.	75.0	1.25%	20.00%
Cabot Industrial Value Fund V, L.P.	100.0	1.50%	20.00%
Exeter Industrial Value Fund IV, L.P.	100.0	1.15%	20.00%

Private Infrastructure

Private Infrastructure Composite Fee



Assumed Mandate:

Verus Custom Private Real Estate (Pitchbook)

\$507,539,000

Reported PSERS fee (\$)

\$5,052,000

Estimated PSERS fee (bps)¹:

100 bps

Verus Peer Group:	Account Fees	Account Fees (bps)
5th Percentile	\$5,075,390	100
25th Percentile	\$5,075,390	100
Median	\$6,344,238	125
75th Percentile	\$7,460,823	147
95th Percentile	\$7,613,085	150
# of Observations	43	43

¹ PSERS Reported fee calculated as the total base fee per the FY21 investment expense report divided by Aon 6/30/21 composite market value.

Private Infrastructure Fee Schedule

Account	PSERS Reported Fees (%)	
	Management Fee	Carried Interest
Blackstone Infrastructure Partners, L.P.	0.90%/0.40% (0.675%/0.30% during 2-year discount period)	12.50%
GCM Grosvenor CIS II, L.P.	0.50%/0.50%	7.50%
Strategic Partners Real Assets II	0.65%/0.65%	10.00%
International Infrastructure Finance Company II, L.P.	1.00%	15.00%
ISquared III	1.28%/1.36%/1.36%	20.00%

Private Commodities

Private Commodities Composite Fees

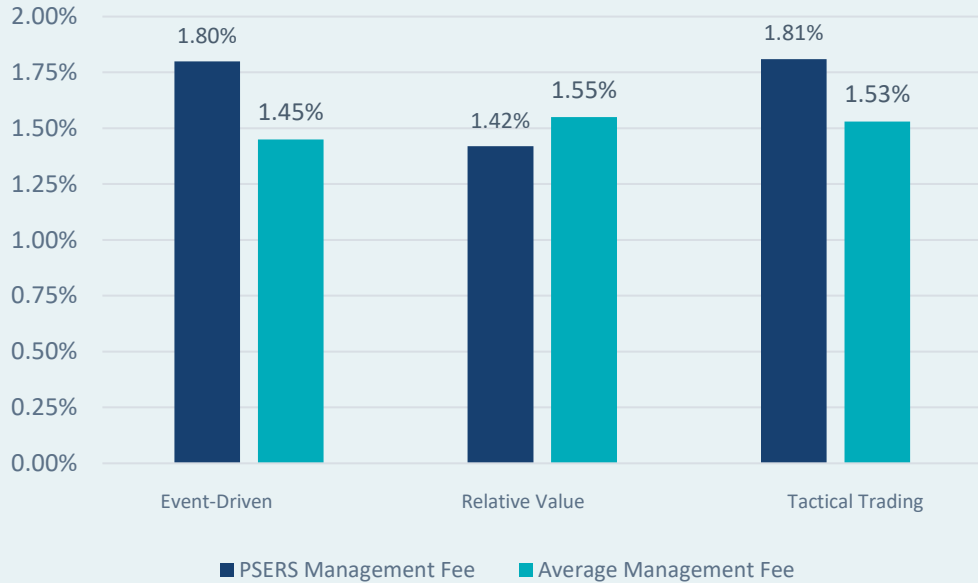
Account	PSERS Reported Fees (%)		PSERS Actual Fees Paid FY21 (\$MM)		
	Management Fee	Carried Interest	Base Fee	Profit Share	Total
Denham Mining Fund, L.P.	1.50%	14.00%	2.05	0.00	2.05
NGP Natural Resources XII, L.P.	1.40%	20.00%	3.15	0.00	3.15
Total			5.20	0.00	5.20

- A comparative universe for private commodities does not exist. The fees appear to be reasonable.
- The composite market value in millions was \$282.9, which implies a weighted fee of 1.84%.

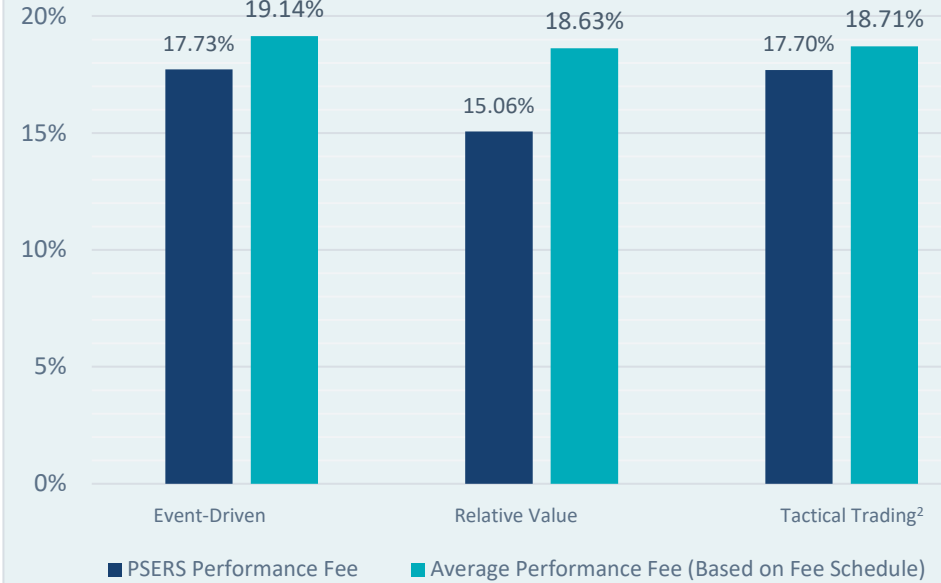
Absolute Return

Absolute Return Composite Fee

Management Fees (%)¹



Performance Fees (%)¹



	% of Hedge Fund Total	Asset Values (\$MM)	PSERS Actual Fees Paid FY21 (\$MM)		PSERS Actual Fees Paid FY21 (%)	
			Base Fee	Profit Share	Base Fee	Profit Share
Total Event Driven	12.0%	696.3	12.56	27.93	1.80%	4.01%
Total Relative Value	54.0%	3,125.5	44.52	61.60	1.42%	1.97%
Total Tactical Trading	34.0%	1,967.5	35.61	13.06	1.81%	0.66%
Hedge Fund Total		5,790.0	\$92.69	\$102.59	1.60%	1.77%

¹ Average management fees and performance fees in the above graph reflects and relies upon information provided to Aksia by fund managers and other third parties. Such information may be compiled by Aksia without independent verification of accuracy or completeness, and Aksia makes no representations as to its accuracy and completeness. This information is not intended for public use or distribution, is confidential and proprietary, and intended solely for the information of the intended recipient pursuant to their request.

² Tactical Trading performance fee assumes a 20% performance fee for Capula Tail Risk Fund. The fee ranges from 20% to 25%

³ Asset values from Aon 6/30/21 report

⁴ Actual Fees paid calculated as total fee in dollars per PSERS investment expense report divided by market value (from Aon). See following slide for more detail.

⁵ Perry Partners base fee excluded from total base fee as it is liquidating and unclassified (see next slide). Given its value of \$0.07M, the calculations do not change with rounding.

Absolute Return Composite Fees

Account	Strategy:	Asset Values (\$MM) ¹	PSERS Reported Fees (%)		PSERS Actual Fees Paid FY21 (\$MM)		
			Management Fee	Performance Fee	Base Fee	Profit Share	Total
Caspian Keystone Focused Fund - A	Event Driven	4.4	None	10.00%	0.23	0.00	0.23
Caspian Keystone Focused Fund - B	Event Driven	0.0	0.25%	25.00%	0.00	0.00	0.00
Caspian Select Credit International	Event Driven	307.1	1.00%	15.00%	2.79	7.17	9.96
Oceanwood Investments SPC	Event Driven	9.8	0.25%	15.00%	0.00	0.00	0.00
Venor Capital Offshore Fund	Event Driven	129.5	1.00%	15.00%	1.81	13.56	15.37
Oceanwood Opportunities Fund	Event Driven	115.2	0.65%	15.00%	0.92	7.21	8.13
Apollo Aviation / Sciens Aviation Special Opportunities II	Event Driven	0.7	1.7% during Investment Period -25bps per year during Harvest Period 1% minimum during Harvest Period	20.00%	0.00	0.00	0.00
Apollo Aviation / SASOF III	Event Driven	23.3	1.7% during Investment Period -25bps per year during Harvest Period 1% minimum during Harvest Period	20.00%	1.50	0.00	1.50
Apollo Aviation / SASOF IV	Event Driven	70.2	1.7% during Investment Period -25bps per year during Harvest Period 1% minimum during Harvest Period	20.00%	1.66	0.00	1.66
Apollo Aviation / SASOF V	Event Driven	3.0	1.7% during Investment Period -25bps per year during Harvest Period 1% minimum during Harvest Period	20.00%	2.56	0.00	2.56
Falko Regional Aircraft Opportunities Fund II	Event Driven	33.1	1.40%	20.00%	1.09	0.00	1.09
Capula Global Relative Value Fund	Relative Value	463.4	1.50%	20.00%	7.65	3.18	10.83
Garda Fixed Income Relative Value Opportunity Fund	Relative Value	628.5	1.50%	20.00%	9.40	15.08	24.48
Aeolus Property Catastrophe	Relative Value	350.0	2.00%	15.00%	6.70	1.41	8.11
Nephila / Palmetto Fund	Relative Value	48.1	1.50%	15.00%	2.52	0.00	2.52
Nephila / Nimbus Weather Fund	Relative Value	188.0	1.25%	15.00%	2.27	5.44	7.71
Nephila / Nimbus Weather Fund ²	Relative Value	0.0	1.50%	15.00%	0.00	0.00	0.00
RenRe / DaVinci	Relative Value	82.3	1.40%	19.00%	1.53	0.00	1.53
RenRe / Medici	Relative Value	69.8	0.75%	0.00%	0.52	0.00	0.52
RenRe / Upsilon	Relative Value	97.0	1.00%	10.00%	1.19	0.48	1.67
Brigade Leveraged Capital Structures	Relative Value	355.4	1.00%	17.50%	3.17	8.42	11.59
PIMCO Global Credit Opportunity (GCOF)	Relative Value	334.2	0.75%	19.25%	3.02	12.39	15.40
OWS Credit Opportunity Offshore Fund	Relative Value	407.5	1.50%	15.00%	5.62	15.20	20.82
HS Group Sponsor Fund II	Relative Value	101.2	0.50%	0.00%	0.92	0.00	0.92
Capula Tail Risk Fund	Tactical Trading	234.8	1.50%	20% if < 10% 25% if > 10%	3.69	0.00	3.69
Bridgewater Pure Alpha Fund II	Tactical Trading	953.2	2.50%	0.00%	22.68	0.00	22.68
AKAZ Offshore Fund	Tactical Trading	246.1	1.00%	30.00%	3.17	2.00	5.16
PIMCO Absolute Return Strategy (PARS)	Tactical Trading	137.4	0.63%	19.25%	1.81	0.00	1.81
PIMCO Commodity Alpha Fund	Tactical Trading	395.9	1.25%	19.25%	4.28	11.06	15.34
Perry Partners	N/A	0.7	1.25%	17.50%	0.07	0.00	0.07
Total		5,790.0			92.76	102.59	195.34

¹ Asset values from Aon 6/30/21 report. Actual fees paid from PSERS FY21 investment expense report.

² Market value and total fees Nimbus Weather Fund are included in the line above. PSERS invests in the same fund with different share classes. Aon performance report and PSERS investment expense report reflect this as one line item.

Appendix

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