

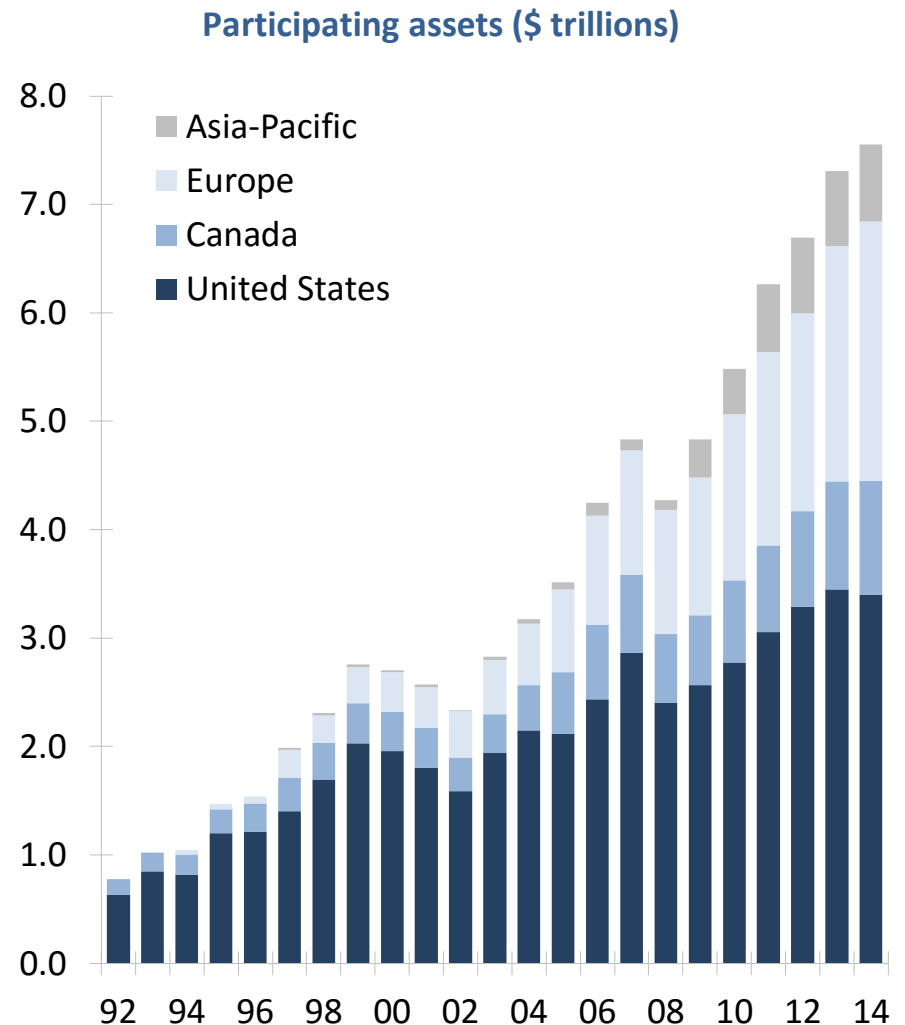
CalPERS
Investment Cost Effectiveness Analysis - Summary of Results
For the 5 year period ending December 31, 2014



This benchmarking report compares CalPERS cost and return performance to CEM's extensive pension database.

- 155 U.S. pension funds participate. The median U.S. fund had assets of \$8.9 billion and the average U.S. fund had assets of \$22.0 billion. Total participating U.S. assets were \$3.4 trillion.
- 79 Canadian funds participate with assets totaling \$1,048 billion.
- 60 European funds participate with aggregate assets of \$2.4 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Ireland, Denmark and the U.K.
- 7 Asia-Pacific funds participate with aggregate assets of \$711 billion. Included are funds from Australia, New Zealand, China and South Korea.
- 2 Gulf region funds participate.

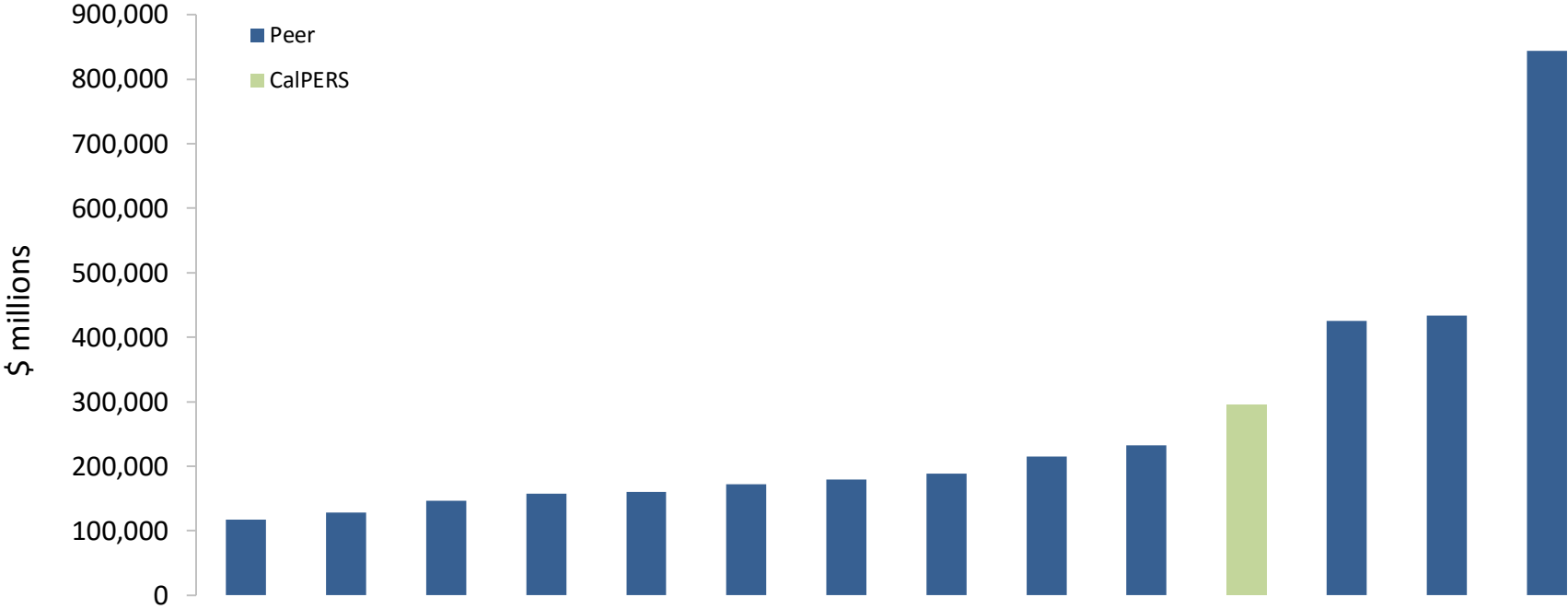
The most meaningful comparisons for CalPERS returns and value added are to the U.S. universe.



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

Peer group for CalPERS

- 14 global sponsors from \$117 billion to \$844 billion
- Median size of \$184 billion versus CalPERS \$295 billion
- 6 U.S. Sponsors, 3 Canadian, 3 European, 2 Asia-Pacific



To preserve client confidentiality, given potential access to documents as permitted by the Freedom of Information Act, we do not disclose your peers' names in this document.

CalPERS investment costs were \$1,188.9 million or 41.1 basis points in 2014.

Asset management costs by asset class and style (\$000s)	Internal Management			External Management			Total	
	Passive	Active	Overseeing of external	Passive fees	Active base fees	Perform. fees ²		
Public Market Equities	1,724	23,944	3,825		73,355	77,042	179,891	
Fixed Income	33	27,618	318		7,312	4,199	39,480	
Global TAA			1,835		6,147	8,775	16,757	
Hedge Funds - Direct			6,408		53,916	66,190	126,514	
Hedge Funds - Fund of Funds			948		19,206 ¹	13,384 ¹	33,537	
Commodities		205					205	
Real Estate - LPs			26,420		189,559	621,349 ²	215,979	
Infrastructure		1,228					1,228	
Infrastructure - LPs			3,058		9,572	38,796 ²	12,630	
Natural Resources - LPs			666		7,165		7,831	
Diversified Private Equity		2,252	14,430	773	427,321		444,776	
Diversified Priv.Eq. - Fund of Funds			3,963		81,724		85,687	
Overlay Programs		125					125	
Total asset management costs excluding private asset performance fees							1,164,640	40.3bp
Oversight, custodial and other costs ³								
Oversight & consulting							13,406	
Trustee & custodial							4,722	
Audit							1,197	
Other							4,895	
Total oversight, custodial & other costs							24,220	0.8bp
Total investment cost (excluding transaction and private asset performance fees)							1,188,859	41.1bp

Footnotes

¹ Default underlying costs were added to fund of funds.

The defaults added were: Hedge Funds 150 bps base fees 144 bp performance fees;

Refer to Appendix A for full details.

² 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.

³ Excludes non-investment costs, such as PBGC premiums and preparing checks for retirees.

The following cost types are included in the calculation of 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 & Global TAA</u>						
<i>Hedge Funds</i>	--	--	✓	✓	✓	✗
<i>Global TAA</i>	✓	✗	✓	✓	✓	✗
<u>Private equity</u> (Diversified private equity, venture capital, LBO, other private equity)	✓	✗	✓*	✓	✗	✗
<u>Private real assets</u> (Infrastructure, natural resources, real estate ex-REITs, other real assets)	✓	✗	✓	✓	✗	✗

*External manager base fees represent gross contractual management fees.

- "--" indicates that the cost type is not applicable.
- 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.

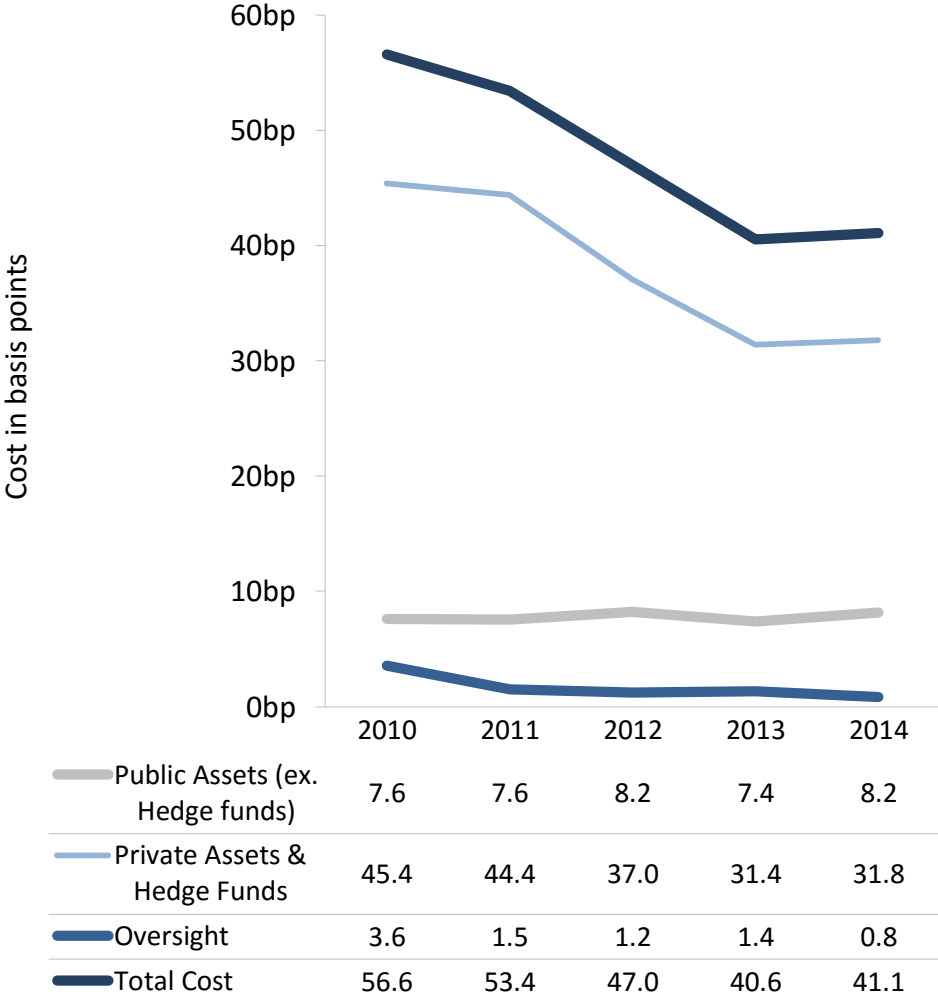
CalPERS costs decreased between 2010 and 2014.

Starting in 2014, CEM began including hedge fund performance fees in total costs. Prior year costs do not include hedge fund performance fees. This is the reason for the slight up-tick in costs in 2014

CalPERS costs decreased primarily because:

- CalPERS decreased its investment in the highest cost asset classes. Its holdings of hedge funds, real estate and private equity decreased from 24% of assets in 2010 to 21% in 2014.
- CalPERS increased its use of lower cost passive and internal management from 64% of assets in 2010 to 69% in 2014.

Trend in your investment costs

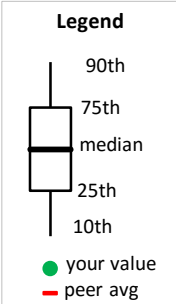
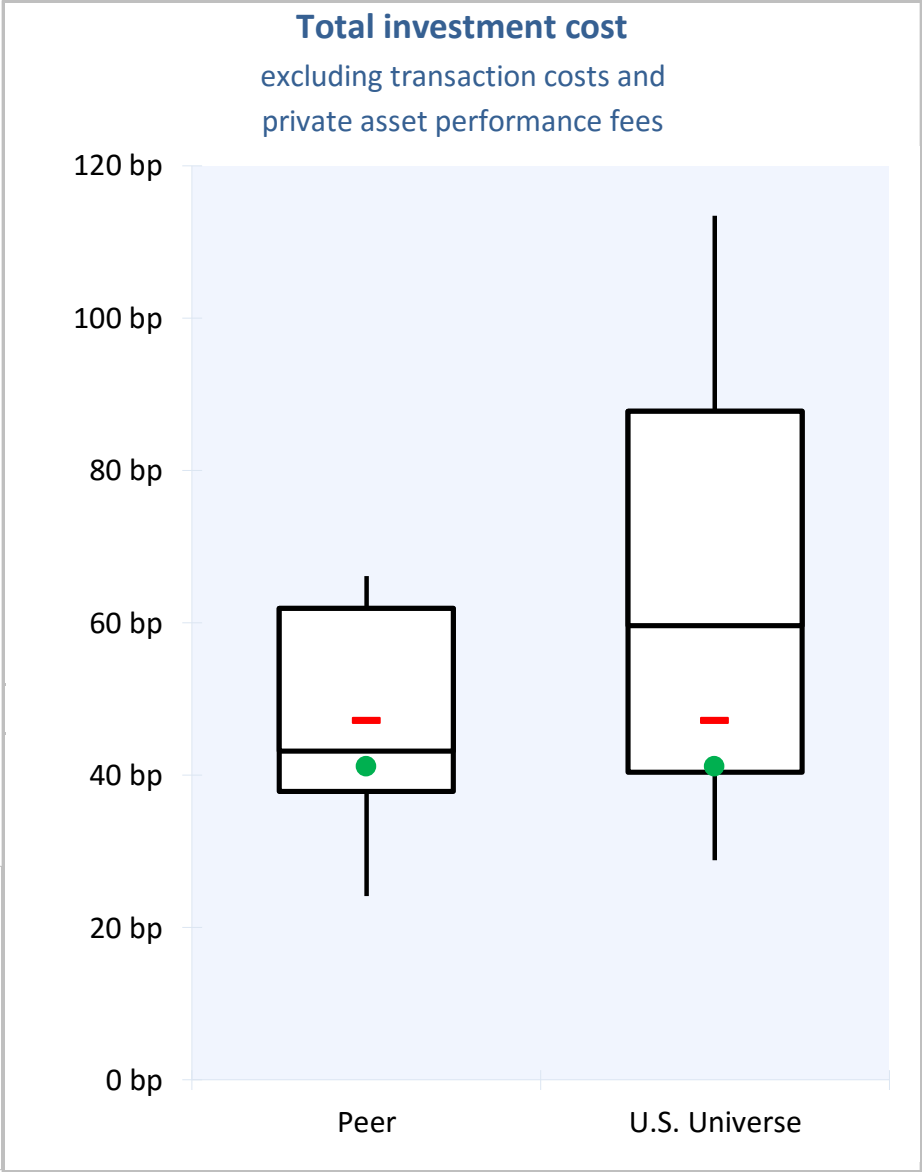


CalPERS total investment cost of 41.1 bps was slightly below the peer median of 43.2 bps.

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

- Asset mix, particularly holdings of the highest cost asset classes: real estate (excl REITS), infrastructure, hedge funds and private equity. These high cost assets equaled 21% of CalPERS assets at the end of 2014 versus a peer average of 21%.
- Fund size. Bigger funds have advantages of scale.

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



Benchmark cost analysis suggests that, after adjusting for fund size and asset mix, CalPERS fund was slightly low cost by 1.8 basis points in 2014.

CalPERS benchmark cost is an estimate of what CalPERS cost would be given its actual asset mix and the median costs that its peers pay for similar services. It represents the cost CalPERS peers would incur if they had its actual asset mix.

CalPERS total cost of 41.1 bp was slightly below its benchmark cost of 42.9 bp. Thus, its cost savings was 1.8 bp.

Your cost versus benchmark

	\$000s	basis points
CalPERS total investment cost	1,188,859	41.1 bp
CalPERS benchmark cost	1,240,360	42.9 bp
CalPERS excess cost	(51,501)	(1.8) bp

CalPERS was slightly low cost because it had a lower cost implementation style and paid less than peers for similar services

Reasons for CalPERS low cost status

	Excess Cost/ (Savings)	
	\$000s	bps
1. Lower cost implementation style		
• Less fund of funds	(23,389)	(0.8)
• Use of external active management (vs. lower cost passive and internal)	42,700	1.5
• Less overlays	(42,373)	(1.5)
• Other style differences	(9,726)	(0.3)
	<u>(32,788)</u>	<u>(1.1)</u>
2. Paying less than peers for similar services		
• External investment management costs	(4,452)	(0.2)
• Internal investment management costs	11,509	0.4
• Oversight, custodial & other costs	(25,769)	(0.9)
	<u>(18,712)</u>	<u>(0.6)</u>
Total savings	(51,501)	(1.8)

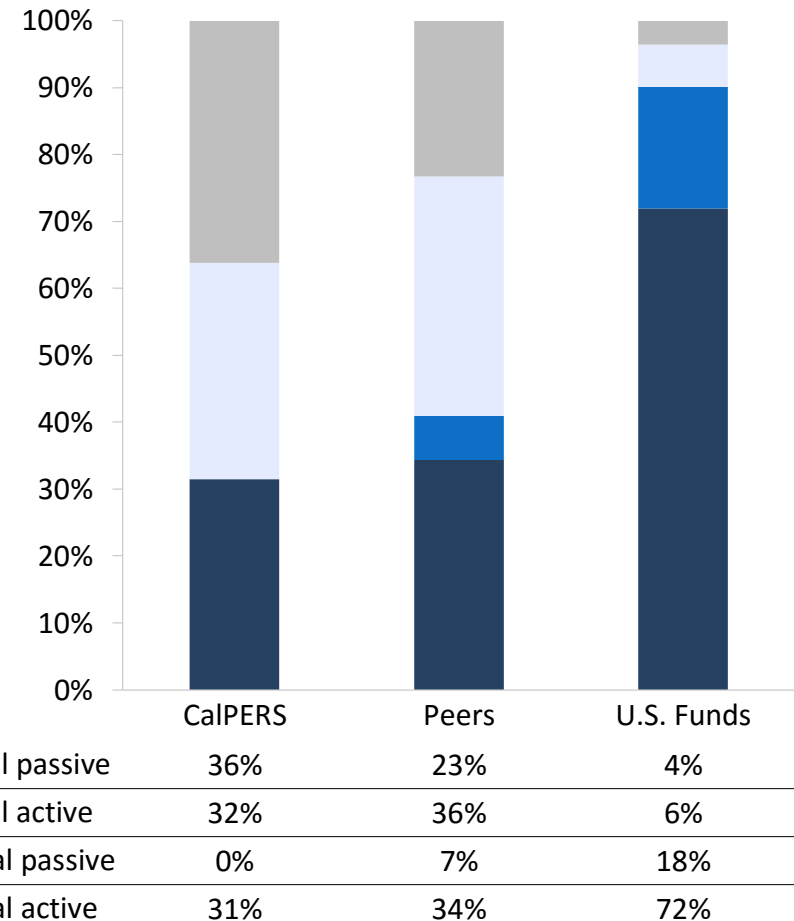
Differences in cost performance are often caused by differences in implementation style.

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. CalPERS used less external active management than its peers (its 31% versus 34% for its peers).
- Within external active holdings, fund of funds usage because it is more expensive than direct fund investment. CalPERS had less in fund of funds. CalPERS 9% of hedge funds, real estate and private equity in fund of funds compared to 15% for your peers.

Implementation style¹



1. The graph above does not take into consideration the impact of derivatives.

Differences in implementation style saved CalPERS 1.1 bp relative to its peers.

Calculation of the cost impact of differences in implementation style

Asset class	CalPERS avg holdings in \$mils (A)	% External active			Premium vs passive & internal ¹ (C)	Cost/ (savings) \$000s bps (A X B X C)	
		You	Peer average	More/ (less) (B)			
Public Market Equities	155,149	15.8%	31.7%	(15.9%)	44.1 bp	(108,832)	
Fixed Income	65,692	5.8%	16.4%	(10.6%)	23.7 bp	(16,574)	
Global TAA	1,115	100.0%	75.8%	24.2%	Insufficient ²	0	
Commodities	2,614	0.0%	1.0%	(1.0%)	207.0 bp	(564)	
Infrastructure	1,366	63.5%	23.9%	39.6%	89.3 bp	4,829	
of which Ltd Partnerships represent:		100.0%	61.1%	38.9%	54.3 bp	1,835	
Real Estate ex-REITs	23,786	100.0%	62.6%	37.4%	53.7 bp	47,784	
of which Ltd Partnerships represent:		100.0%	69.0%	31.0%	49.5 bp	36,513	
Natural Resources	2,635	100.0%	55.4%	44.6%	77.6 bp	9,113	
of which Ltd Partnerships represent:		100.0%	81.9%	18.1%	-33.9 bp	(1,612)	
Diversified Private Equity	33,326	100.0%	86.2%	13.8%	152.5 bp	70,208	
Impact of less/more external active vs. lower cost styles						42,700	1.5 bp
		<u>Fund of funds % of LPs</u>			<u>Premium vs. direct LP¹</u>		
Hedge Funds	4,061	19.1%	22.5%	(3.4%)	104.0 bp	(1,451)	
Infrastructure - LPs	867	0.0%	26.6%	(26.6%)	Insufficient ²	0	
Real Estate ex-REITs - LPs	23,786	0.0%	10.8%	(10.8%)	34.3 bp	(8,807)	
Natural Resources - LPs	2,635	0.0%	0.0%	0.0%		0	
Diversified Private Equity - LPs	33,326	15.2%	20.0%	(4.8%)	82.1 bp	(13,131)	
Impact of less/more fund of funds vs. direct LPs						(23,389)	(0.8) bp
<u>Overlays and other</u>							
Impact of lower use of portfolio level overlays						(42,373)	(1.5) bp
Impact of mix of internal passive, internal active, and external passive ³						(9,726)	(0.3) bp
Total impact of differences in implementation style						(32,788)	(1.1) bp

Footnotes

- The cost premium is the additional cost of external active management relative to the average of other lower cost implementation styles - internal passive, internal active and external passive.
- A cost premium listed as 'Insufficient' indicates that there was not enough peer data to calculate the premium.
- The 'Impact of mix of internal passive, internal active and external passive' quantifies the net cost impact of differences in cost between, and your relative use of, these 'low-cost' styles.

The net impact of paying more/less for external asset management costs saved 0.2 bps.

Cost impact of paying more/(less) for external asset management

	CalPERS avg holdings in \$mils (A)	Cost in bps			Cost/ (savings) in \$000s (A x B)
		Your Fund	Peer median	More/ (less) (B)	
Public Assets					
Public Market Equities - Active	24,492	63.0 ¹	46.9	16.1	39,310
Fixed Income - Active	3,802	31.1 ¹	26.1	5.0	1,913
Global TAA - Active	1,115	150.3 ¹	86.0	64.3	7,169
Hedge Funds - Active	3,285	385.2 ¹	298.1	87.1	28,616
Hedge Funds - Fund of Fund	776	432.2 ¹	402.0	<u>30.2</u>	<u>2,341</u>
Total Public Assets				2.7	79,349
Private Assets					
Infrastructure - Limited Partnership	867	145.6	137.5	8.1	707
Real Estate ex-REITs - Limited Partnership	23,786	90.8	102.2	(11.4)	(27,080)
Natural Resources - Limited Partnership	2,635	29.7	105.2	(75.5)	(19,894)
Diversified Private Equity - Active	27,006	157.3	158.0	(0.7)	(1,865)
Diversified Private Equity - Fund of Fund	5,056	169.5	240.0	<u>(70.6)</u>	<u>(35,669)</u>
Total Private Assets				(2.9)	(83,801)
Total impact of paying more/less for external management					(4,452)
Total in bps					(0.2) bp

¹ You paid performance fees in these asset classes.

The net impact of paying more/less for internal asset management costs added 0.4 bps.

Cost impact of paying more/(less) for internal asset management

	Your avg holdings in \$mils (A)	Cost in bps			Cost/ (savings) in \$000s (A X B)
		Your Fund	Peer median	More/ (less) (B)	
Public Market Equities - Passive	103,284	0.2	1.0	(0.8)	(8,575)
Public Market Equities - Active	27,373	8.7	4.6	4.2	11,459
Fixed Income - Passive	20	17.2	1.1	16.0	31
Fixed Income - Active	61,870	4.5	3.0	1.5	9,247
Commodities - Active	2,614	0.8	2.8	(2.1)	(537)
Infrastructure - Active	499	24.6	27.0	(2.3)	(116)
Total impact of paying more/less for internal management					11,509
Total in bps					0.4 bp

The net impact of differences in oversight, custodial & other costs saved 0.9 bps.

Cost impact of differences in oversight, custodial & other costs

	Your avg holdings in \$mils (A)	Cost in bps			Cost/ (savings) in \$000s (A X B)
		Your fund	Peer median	More/ (less) (B)	
Oversight & consulting	289,298	0.5	0.8	(0.4)	(10,684)
Custodial	289,298	0.2	0.7	(0.5)	(14,562)
Audit	289,298	0.0	0.0	0.0	136
Other	289,298	0.2	0.2	(0.0)	(658)
Total					(25,769)
Total in bps					(0.9) bp

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• Internal investment management costs	11,509	0.4
• Oversight, custodial & other costs	(25,769)	(0.9)
	<u>(18,712)</u>	<u>(0.6)</u>
Total savings	(51,501)	(1.8)