



Benchmarking results:

- Transparency
- Pension administration
- Investments
- Global leaders

September 20, 2022

CEM works with 500+ plans, including 150 of the world's 300 largest

Fund Types

- DC & DB funds; Sovereign Wealth Funds; Foundations, Endowments; Other asset owners

Clients

- Fiduciaries; Management, Strategy, and Finance teams

Geography

- Funds from 25 countries

Funds

- Data on 500+ funds annually representing 1+ billion members,

Participating Assets

- \$12 trillion



CEM offers 5 benchmarking subscriptions. CalPERS was a founding participant in 4 of them.

	1 Transparency Benchmarking (TB)	2 Pension Administration Benchmarking Subscription (PABS)	3 Investment Benchmarking Subscription (IBS)	4 Global Leaders (GL)	5 Defined Contribution (DC) Benchmarking
Subscription Overview	Comparison of disclosure against 75 funds across 15 geographies	Comparison of member experience and costs against curated peers	Comparison of costs and investment performance against curated peers	Knowledge and best practices forum for most sophisticated global funds	Comparison of costs and investment option performance for U.S. 401(k)/DC plans
Benchmarking Specifics	Review of governance, performance, cost, and RI disclosures	Benchmarking of costs and service levels for key activities	Benchmarking is at total fund, asset class, and mandate levels	Includes 20+ of the world's largest and leading pension plans	Benchmarking is at plan and investment option levels
Subscription Inclusions	<ul style="list-style-type: none"> Electronic Report Live Presentation Ongoing best-practices sharing 	<ul style="list-style-type: none"> Electronic Report Live Presentation Conference Invitations Peer Intelligence Network (PIN) access Original Research 	<ul style="list-style-type: none"> Staffing (FTE) Analysis IBS Dashboard Electronic Report Live Presentation Original Research 	<ul style="list-style-type: none"> Annual deep-dive custom research determined by the participants Annual peer conference Webinars led by peers 	<ul style="list-style-type: none"> DC Dashboard Electronic Report Live Presentation Staffing (FTE) Analysis Original Research

Key takeaways from each of CalPERS' four benchmarking subscriptions

1 Transparency benchmarking (review Oct 2021)

- CalPERS ranked 1st in the USA and 9th globally (vs. 11th the year before).
- CalPERS would have ranked 2nd globally if things it already discloses on its website were easier to find.

2 Pension administration benchmarking (to June 2021)

- CalPERS had the highest plan design complexity in CEM's global database. Complexity negatively impacts service and increases costs.
- CalPERS' service score of 76 was equal to the peer median. CalPERS' score increased from 72 to 76 between 2014 and 2021.
- CalPERS' cost of \$202 per active member and annuitant was \$58 above the peer average of \$144. CalPERS' cost declined from \$285 per member in 2014.

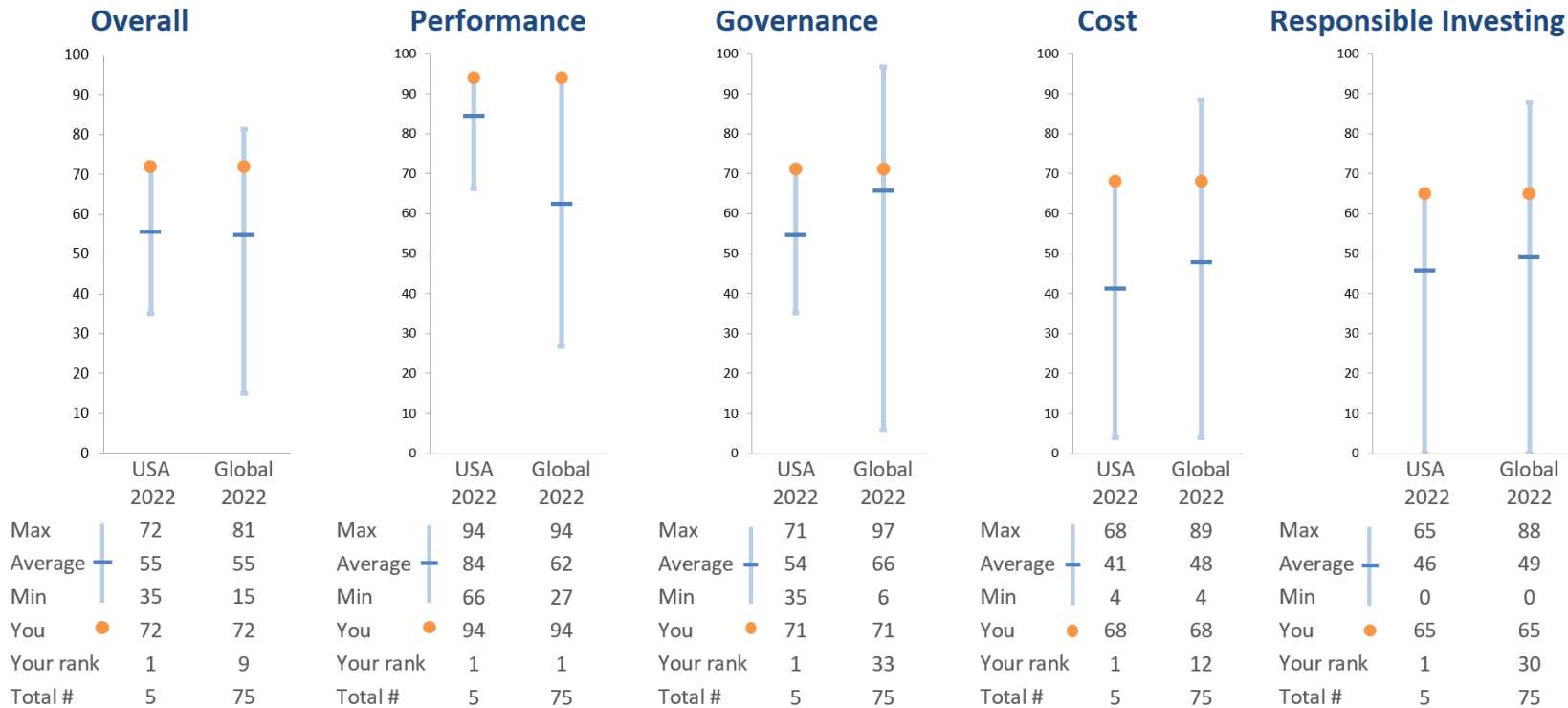
3 Investment benchmarking (to Dec 2020)

- CalPERS' cost, excluding private asset performance fees and transaction costs, was 20.2 bps. This was 14.3 bps below the peer benchmark of 34.4 bps. CalPERS was low cost because it had a lower cost implementation style and it paid less than its peers for similar services.
- CalPERS' 5-year net total return of 9.7% was above the U.S. public median of 9.5%.
- CalPERS was in the desirable low-cost, high-value added quadrant of the cost effectiveness chart for the 5-year period ending 2020.

4 Global Leaders research (to Jan 2022)

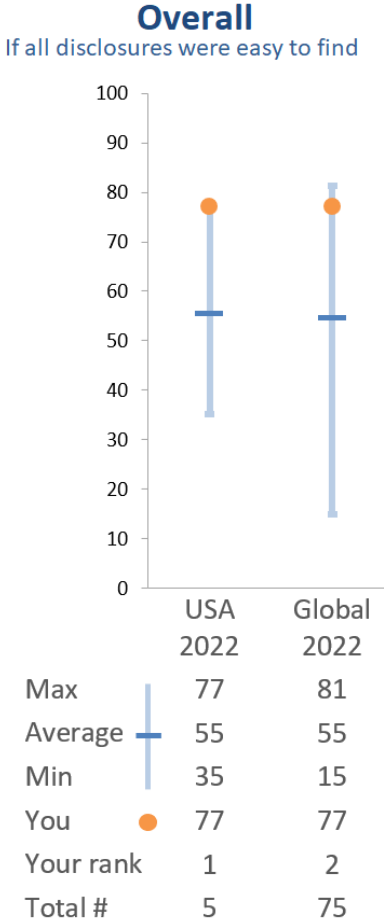
- Size is beneficial. Larger funds added more net value added with less risk than smaller funds.
- Costs matter for active management. Lower cost implementation styles had higher net value added than higher cost implementation styles.
- Private equity co-investment has outperformed other implementation styles. CalPERS uses less co-investment than its Global Leader peers.
- Most private equity and infrastructure benchmarks create more noise than information about performance. Better benchmarks based on investable alternatives can be created for these asset classes.

1 Transparency - CalPERS ranked 1st in the USA and 9th globally



- CalPERS global rank improved from 11th last year to 9th.
- 75 funds were ranked. They were the 5 largest funds from 15 different countries.
 - U.S. funds were CalPERS, CalSTRS, Federal Thrift, NY City Pension, NY State Retirement.
- The overall ranking reflects 4 equally weighted sub-scores :
 - Performance - 46 measures
 - Governance - 35 measures
 - Cost - 55 measures
 - Responsible Investing - 54 measures
- Rankings were done during the period from Sep - Nov 2021 by searching for each of the 190 measures in annual reports and the website.
- CalPERS was cited for best practices:
 - Total fund and asset class returns for multiple time periods.
 - Fees paid to consultants

CalPERS would have ranked 2nd globally if things it already discloses on its website were easier to find.



- CalPERS has an overwhelming amount of information contained in hundreds of documents. Many things were not discovered in our initial review process.
 - For example, our initial review missed disclosures in CalPERS Trust Level Review & Annual Program Reviews which forms part of your September board materials. It was hard to find because it was buried in board materials, and the document's name was not immediately suggestive of asset class costs or performance. If it had been easier to find it would have resulted in the biggest improvement in your score.
- Some of the other global funds do a much better job producing summaries aimed directly at stakeholders that tell the complete story on a subject

2 Pension Administration – 70 leading global pension systems participate

Participants

United States

Arizona SRS
 CalPERS
 CalSTRS
 Colorado PERA
 Delaware PERS
 Florida RS
 Idaho PERS
 Illinois MRF
 Indiana PRS
 Iowa PERS
 KPERs
 LACERA
 Michigan ORS
 Minnesota State RS
 Nevada PERS
 NYC TRS
 NYSLRS
 Ohio PERS
 Oregon PERS
 Pennsylvania PSERS
 PSRS PEERS of Missouri
 South Dakota RS

STRS Ohio
 Texas County and District RS
 TRS Illinois
 TRS of Texas
 Utah RS
 Virginia RS
 Washington State DRS

Canada

Alberta Pension Services
 Alberta Teachers
 BC Pension Corporation
 Canadian Forces PP
 Federal Public Service PP
 HOOPP
 LAPP of Alberta
 Municipal Pension Plan of BC
 OMERS
 Ontario Pension Board
 Ontario Teachers
 OPTrust
 RCMP
 Saskatchewan HEPP

The Netherlands*

ABN Amro PF
 ABP
 bpfBOUW
 Metaal en Techniek
 PF PWRI
 PF Vervoer
 PFZW
 Rabobank PF

Denmark

ATP

United Kingdom*

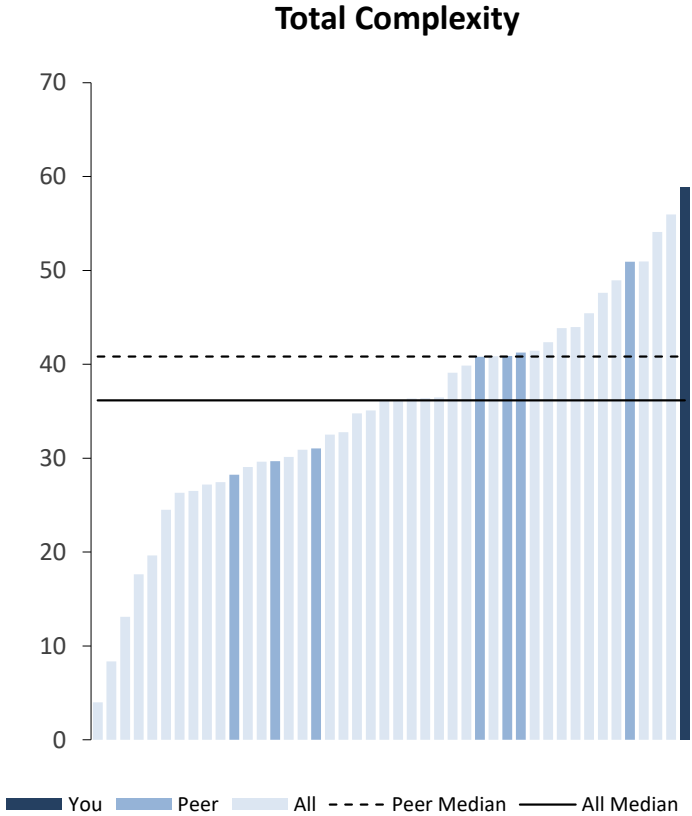
Armed Forces Pension Scheme
 BSA NHS Pensions
 BT Pension Scheme
 Greater Manchester PF
 Irish Construction Workers' PS
 Local Pensions Partnership
 Lothian PF
 Merseyside PF
 Pension Protection Fund
 Principal Civil Service
 Railpen Pension Scheme
 Rolls Royce Pension Fund
 Royal Mail Pensions
 Teachers' Pensions
 Tyne & Wear PF
 Universities Superannuation
 West Midlands Metro
 West Yorkshire PF

* Systems in the UK and most systems in the Netherlands complete different benchmarking surveys and hence your analysis does not include their results.

CalPERS' custom peer group is comprised of 8 of the largest systems

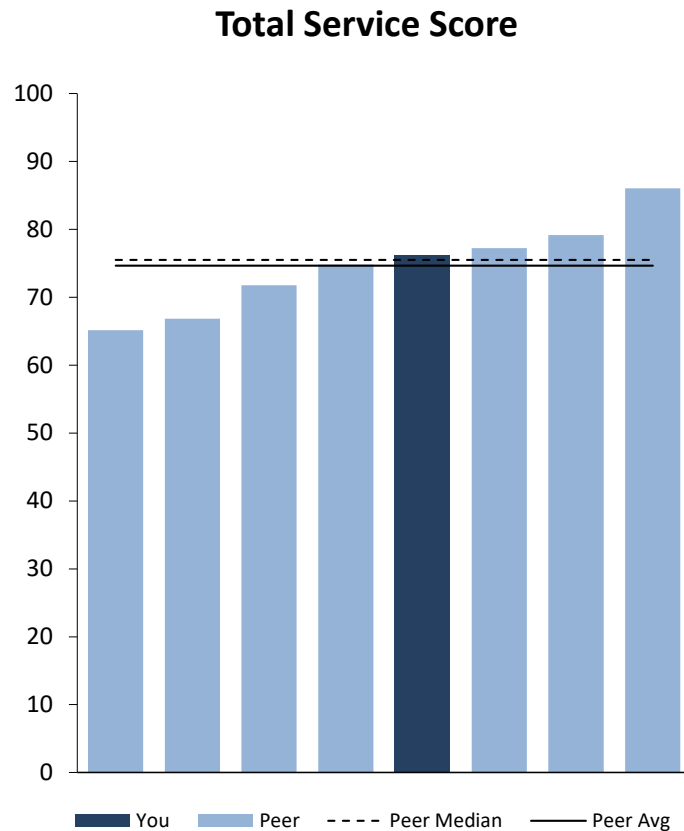
Custom Peer Group for CalPERS			
Peers (sorted by size)	Membership (in 000's)		
	Active Members	Annuitants	Total
CalPERS	864	753	1,617
TRS of Texas	919	458	1,377
NYSLRS	502	497	999
CalSTRS	449	318	767
BC Pension Corporation	356	215	571
Michigan ORS	178	283	461
OMERS	289	162	451
Ontario Teachers	183	148	331
Peer Median	403	301	669
Peer Average	467	354	822

CalPERS had the highest plan design complexity in CEM's global database.



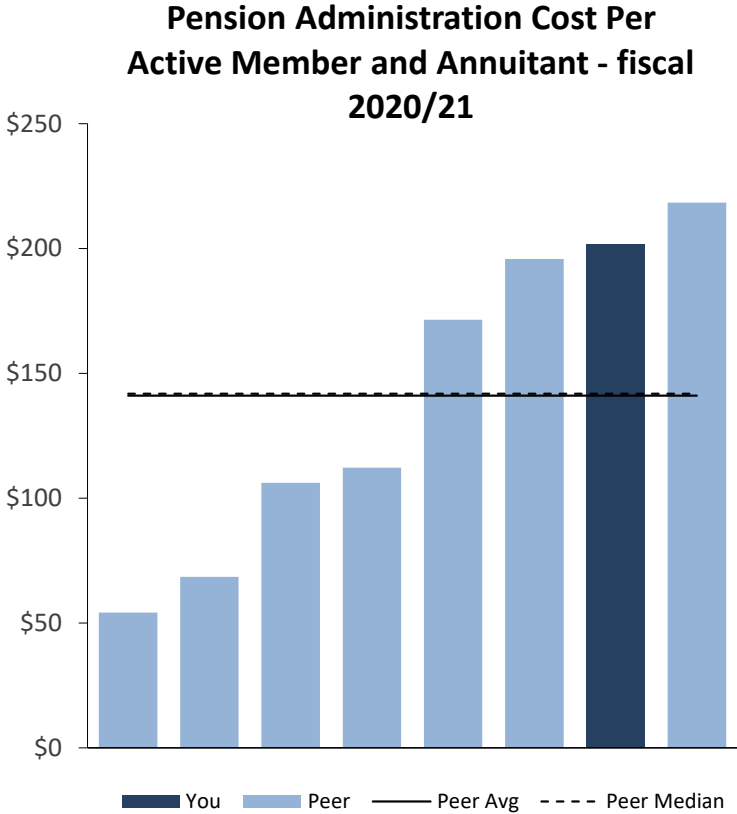
- Complexity negatively impacts service and increases costs.
- Reasons why CalPERS had the most complex plan design include more:
 - Plan customization choices for employers
 - Pension payment options
 - Plan types
 - COLA rule sets.

CalPERS' service score of 76 was equal to the peer median.

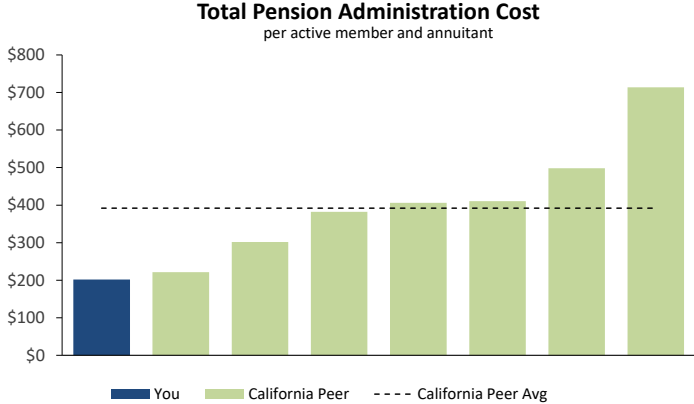


- CalPERS' score increased from 72 to 76 between 2014 and 2021.
- Service is defined from a member's perspective. Higher service means more channels, faster turnaround times, more availability, more choice, better content and higher quality.
- Higher service is not always cost effective. For example, the ability to reach a service representative instantly 24 hours a day is higher service, but not cost effective.

CalPERS' cost of \$202 per active member and annuitant was \$58 above the peer average of \$144.

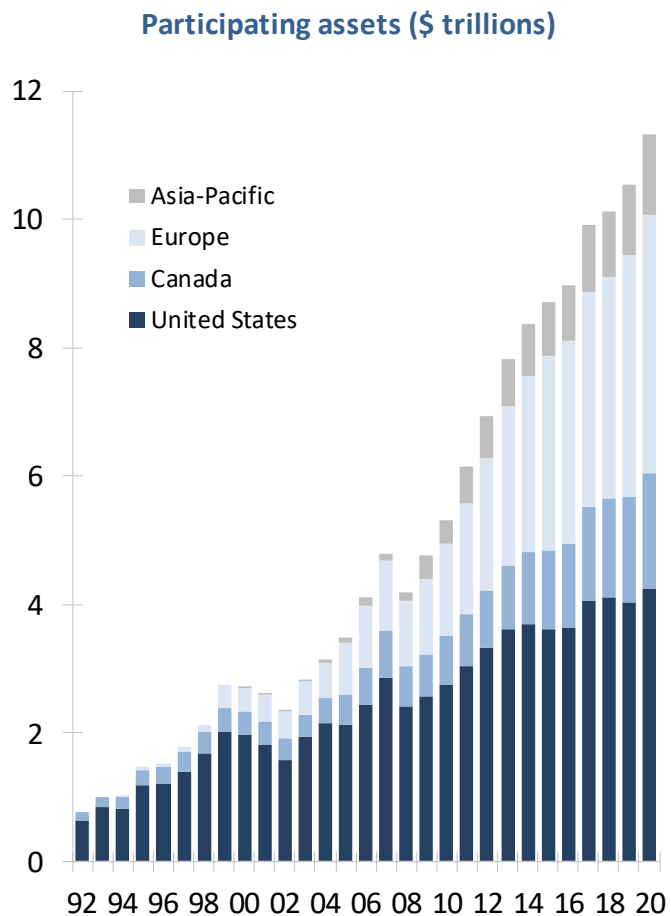


- CalPERS' cost declined from \$285 per member in 2014 to \$202 in fy 2020/21.
- CalPERS cost per member was the lowest of a subset of 8 of the 9* California systems benchmarked over the past several years. The comparison is not entirely fair because CalPERS has a substantial scale-advantage relative to most.



* A subset of the 9 CA systems benchmarked was used to enhance confidentiality. One system was randomly excluded.

3 Investment benchmarking – 321 funds representing \$11.5 trillion in assets participate.



- Returns and NVA are compared primarily to the U.S. public universe.
- The most valuable comparisons for cost comparisons is to CalPERS' custom peer group because size impacts cost.



Benchmark cost analysis suggests that CalPERS is low cost by 14.3 bps or \$593 million.

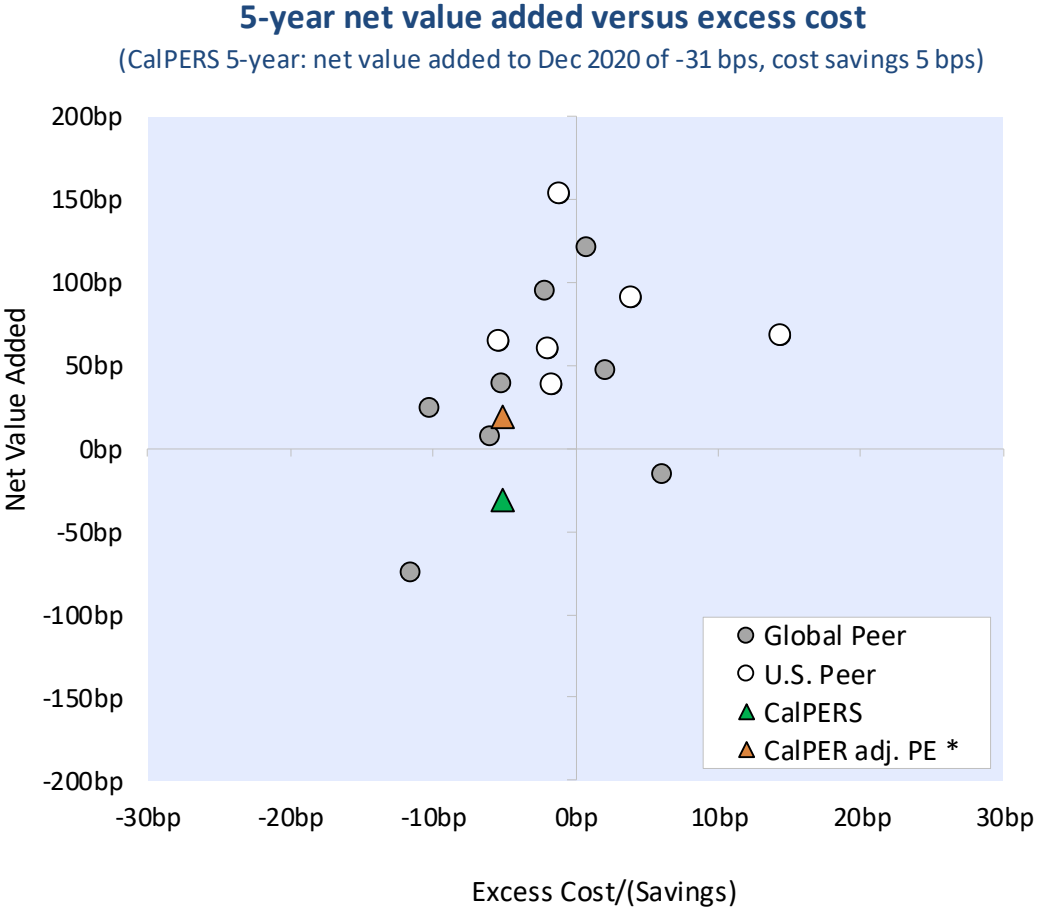
Your cost versus benchmark

	\$000s	basis points
CalPERS total investment cost *	837,956	20.2 bp
CalPERS benchmark cost	1,430,545	34.4 bp
CalPERS excess cost	(592,588)	(14.3) bp

* Excludes transaction costs and private asset performance fees

- CalPERS benchmark cost is an estimate of what its cost would be given its actual asset mix and the median costs that its peers pay for similar services.
- The reasons why CalPERS was low cost are:
 - It had a low-cost implementation style (6.7 bps savings). For example, it was 57% indexed vs. a peer average of 33%.
 - It paid less than peers for similar implementation styles and services (7.6 bps savings).

CalPERS was in the desirable low-cost, high-value added quadrant of the cost effectiveness chart for the 5-year period ending 2020 when compared on a like for like basis (pink triangle).



- Your net value added for the 5-year ending December 2020 was -31 bps using your private equity benchmark instead of a benchmark based on lagged, investable public market indices* (green triangle).
- For the 5-years ending December 2021, your net value added was +9 bps using your private equity benchmark

* 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. If CEM used this same adjustment for your fund, your 5-year policy return would be 9.5%, 0.5% lower than your actual 5-year policy return of 10.0%. Mirroring this, your 5-year total fund net value added would be 0.5% higher.

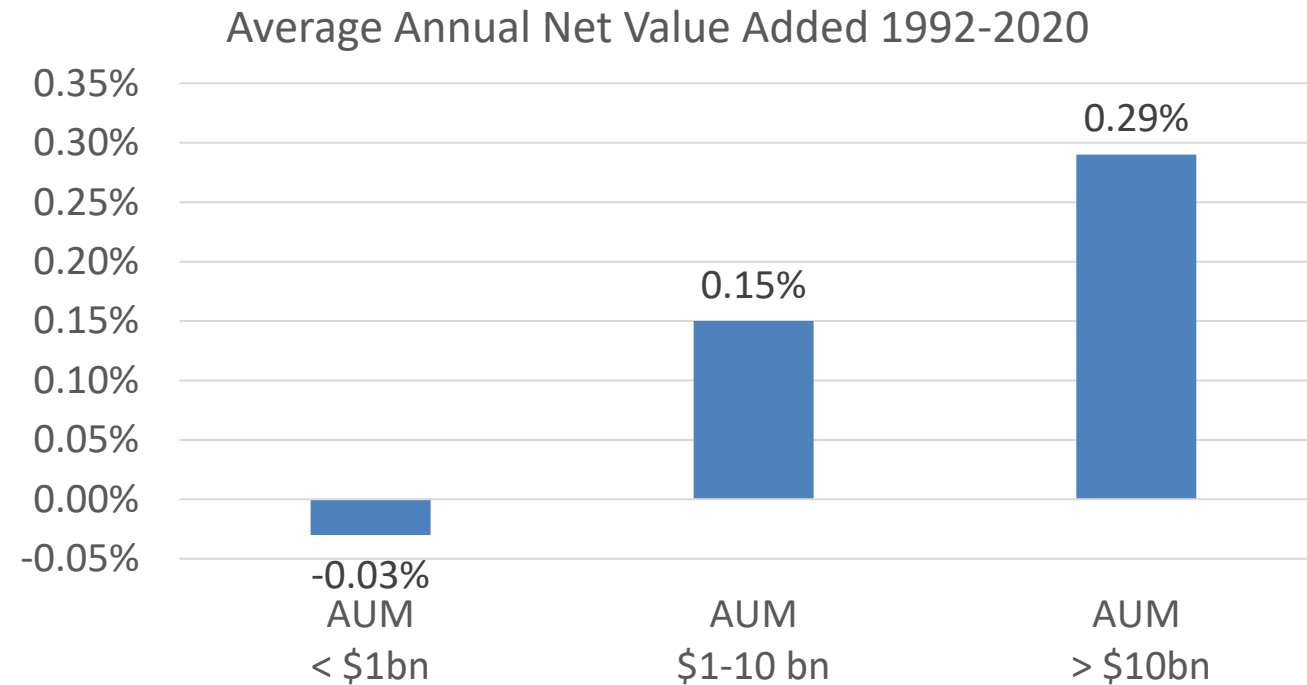
** Your 5-year savings of 5.2 basis points is the average of your savings for the

	5-year	2020	2019	2018	2017	2016
Excess cost/(Savings)	(5.2) bp	(14.3) bp	(1.1) bp	(1.7) bp	(5.8) bp	(3.3) bp

4 Global Leaders – Past research topics

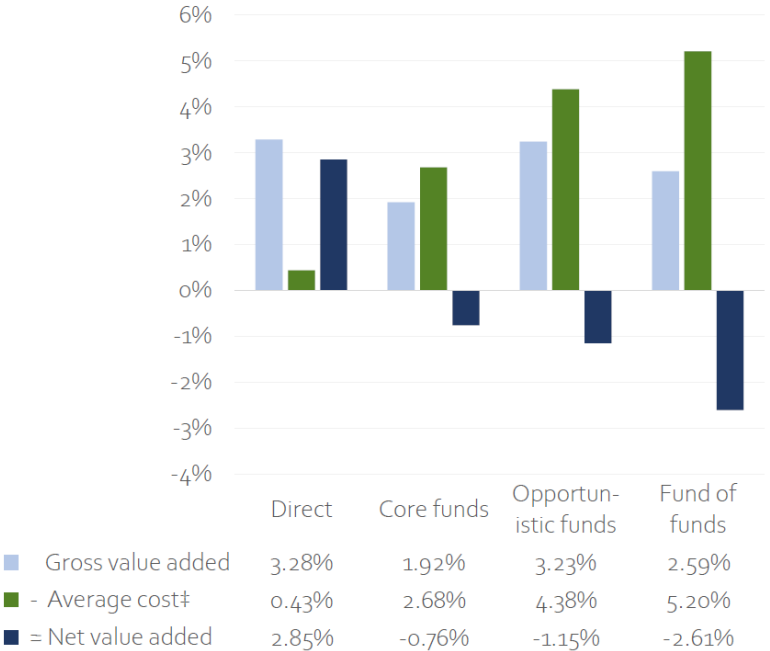
- Infrastructure Programs (2022)
- Optimizing Real Estate Performance (2021)
- Private equity programs – Structure, Process, Staffing, Benchmarking and Performance
- Responsible Investing – Comparison of cost and performance between PRI and Non-PRI signatories
- Review of Financial Reporting and Public Disclosures
- Governance
- Leverage
- Transaction costs
- Investment Operations
- Hedge funds – Programs, performance and benchmarks
- Data and Systems
- Performance targets
- Risk – How funds manage risk
- Organization design
- Full time equivalent staff benchmarking

Size is beneficial. Larger funds added more net value added with less risk than smaller funds.

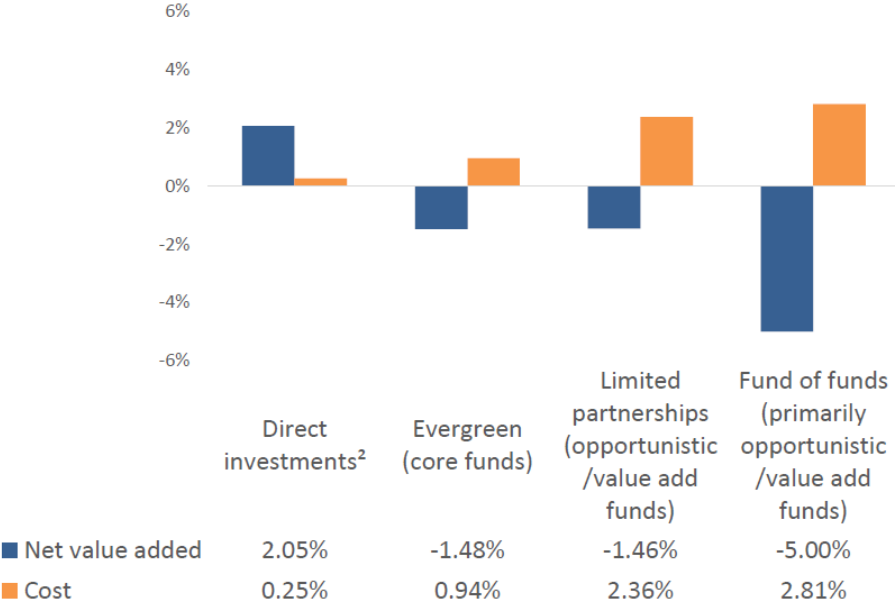


Costs matter for active management. Lower cost implementation styles had higher net value added (NVA) than higher cost implementation styles.

Infrastructure value added[†] and the impact of cost
(CEM universe, 2006-2020)



Real estate Net value added (2005-2019) and median cost for portfolios with 100% of investments in:¹



[†]Value added is calculated using a standardized listed infrastructure benchmark (S&P Global infrastructure) to neutralize for differences in investor benchmarking methodology.

[‡] Average cost here is expressed as a percentage of net asset value.

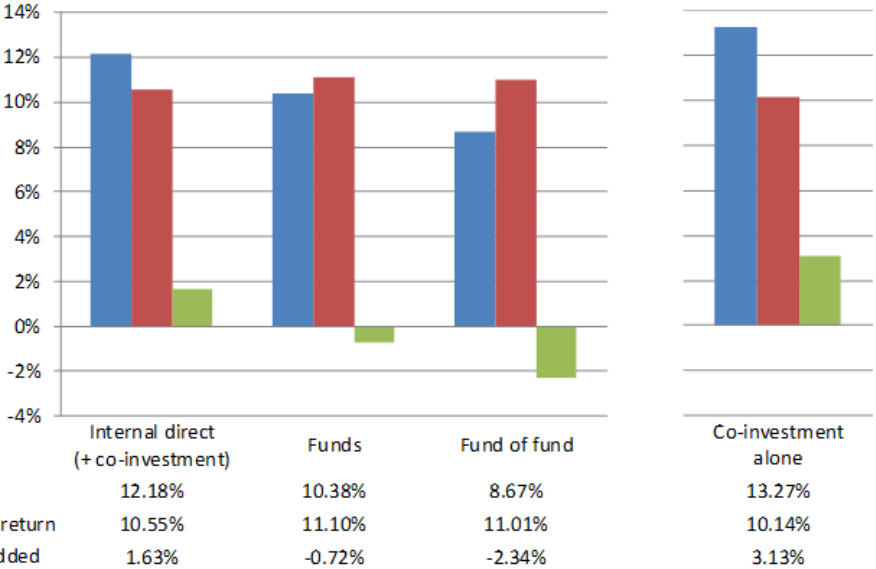
1. Net value added of direct investments, evergreen funds, LP funds, and fund of funds is inferred from regression analysis on portfolios extrapolated to have 100% of each investment style.

2. Direct investments includes internal direct, joint ventures and some SMAs with investor discretion.

Private equity co-investment has outperformed other implementation styles. CalPERS uses less co-investment than its Global Leader peers.

- Co-investment has outperformed other implementation styles. But to date it is only indicative, it is not yet statistically robust.
- CalPERS uses less private equity co-investment than its Global Leader peers. Its 6.8% of LPs compares to a peer average of 22.3%

Net value added by PE implementation style using CEM methodology
 (CEM universe, 1996-2018) (CEM universe, 2008-2018)



Private equity - % by implementation styles

Asset class	You	Global peer	U.S. Public	U.S.	Global
		avg.	avg.	avg.	avg.
Internal	0.0%	22.7%	0.1%	0.5%	4.6%
Co-Investment	5.9%	12.7%	4.5%	2.7%	4.3%
LP	87.2%	56.9%	76.8%	79.3%	69.7%
Fund of Funds	6.9%	7.7%	18.5%	17.4%	21.4%
Co-Invest as a % of LPs	6.8%	22.3%	5.9%	3.5%	6.1%

Most private equity and infrastructure benchmarks create more noise than information about performance. Better benchmarks based on investable alternatives can be created for these asset classes.

Infrastructure benchmarks used by the CEM universe (2020) had low correlations with performance

Use	Type	Example	Average	
			Correlation	NVA
36%	Inflation rate	CPI + 4%	14%	3.0%
15%	Listed infra	S&P Global Infra.	67%	0.4%
13%	Custom	Blend w/ 90 day lag + 3%	40%	1.9%
13%	Absolute	Flat 6%	30%	2.4%
8%	Listed equity	MSCI AC World	10%	-1.5%
7%	Actual	Real asset portfolio return	n/a	n/a
4%	Bond	3 month U.S. T-Bills + 3%	-3%	-0.3%
3%	Interest rate	LIBOR + 3.5%	2%	5.2%
1%	Peer-based	Cambridge Assoc. Infra.	11%	-0.1%

Higher correlations on average are available from an infrastructure benchmark based on listed alternatives

Statistic	You	CEM Universe			
		10 th %'ile	50 th %'ile	90 th %'ile	Avg.
Correlation	70.2%	63.4%	86.8%	99.4%	84.1%
Beta	100%	100%	100%	100%	100%
Alpha	4.6%	-8.4%	-0.3%	4.8%	-1.7%
Net Value Added	4.6%	-8.4%	-0.3%	4.8%	-1.7%

For example, a customized listed infrastructure benchmark for CalPERS was created from: (i) an unhedged 91/9 blend of DJ Brookfield global listed infrastructure and A-grade global corporate bonds, (ii) a moderate amount of smoothing (parameter of 0.8), and (iii) a lag of 130 trading days, or about 6 months. CalPERS' NVA and risk adjusted excess return, alpha, are among the highest in the CEM universe.