



# Report From the Investment Department

Dec. 14, 2023

- **Matters requiring board action:**
  - Review and approval of the Semiannual Broker Evaluation and associated polices
- **Educational or scheduled updates and reviews requiring no action today:**
  - Summary of Investment Activity Report, October and November 2023
  - Albourne fee validation
  - CEM Benchmarking
  - Callan alternative investment quarterly performance review as of Sept. 30, 2023
  - Callan quarterly performance review as of Sept. 30, 2023
  - Review of October and November investment transactions
- **Summary of requests**

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- Evaluation is conducted twice per year
- Estimated annualized budget of \$12 million, unchanged from prior period
- Net addition of one broker to the aggregate number of brokers on the approved list (two additions, one deletion):

**Additions:**

BestEx Research Securities LLC  
Needham & Company LLC

**Deletion:**

Credit Suisse Securities LLC

- One firm was added that was not on the list reviewed by the board in June 2023 (BTIG - BASS Trading)
  - Per section 15.10 of Statement of Investment Objectives and Policy, the Deputy Executive Director, Investments may approve a broker and the board is notified in the next broker evaluation

- **No changes to existing polices or procedures**
- **Initial review is provided in November, approval in December, effective Jan. 1, 2024**

Callan

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November 7, 2023

Mr. Dale Price, Chair  
State Teachers Retirement Board of Ohio  
275 East Broad Street  
Columbus, OH 43215-3771

**Re: Broker Evaluation – Second Half Fiscal 2024**

The purpose of this letter is to share Callan's comments regarding the semi-annual broker evaluation for the second half of fiscal 2024 conducted by STRS Ohio Staff.

Although we do not comment on the capabilities and performance of individual brokerage firms, Callan is comfortable with the factors taken into consideration by Staff when evaluating brokers to be used to execute trades on behalf of STRS Ohio.

The STRS Ohio Semiannual Broker Evaluation for Second Half Fiscal 2024 is comprehensive in scope, and appropriately documents the governance employed by STRS Ohio Staff in the areas of execution, selection, research, soft dollar policy, and broker usage. The Broker Evaluation is well articulated for the purpose intended, and consistent with other Public Funds classified as institutional in size, and who manage monies internally.

Callan recommends the STRS Ohio Board approve the Semiannual Broker Evaluation and associated policies prepared by Staff.

Regards,



Brady O'Connell, CFA, CAIA  
Senior Vice President



PROPOSED MOTION  
***Semiannual Broker Evaluation and  
Associated Policies***

December 14, 2023

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\_\_\_\_\_ moved, and \_\_\_\_\_ seconded, that the Board approve the Semiannual Broker Evaluation and Associated Policies for the Second Half of Fiscal 2024.

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# Summary of Investment Activity Report



- **Highlights**
- **October returns and activity**
- **November returns and activity**

- **The preliminary total fund net return for October was -1.90%**
  - Major asset classes negative returns; liquidity reserves positive
- **Rebalancing activity**
  - Allocated \$300 million to domestic and international equities
  - Reduced fixed income by \$300 million

- **The preliminary total fund net return for November was +4.86%**
  - Markets rallied driven by favorable economic reports and declining interest rates
  - Domestic equity (8.9%), international equity (7.4%) and fixed income (4.4%)

- **Rebalancing activity**
  - Allocated \$1.1 billion to fixed income
  - Reduced domestic and international equity by \$1.4 billion
- **The preliminary fiscal 2024 total fund net return is estimated at 1.10%**
- **Total investment assets ended November at \$89.2 billion, lower by \$800 million in fiscal 2024**

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# Fee Validation Results - CY2022

State Teachers' Retirement System of Ohio

14 December 2023

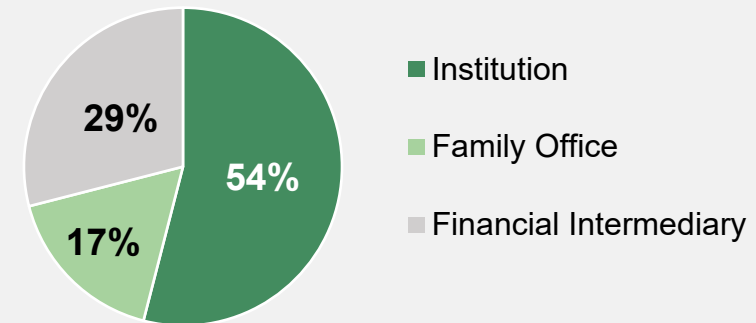
# Albourne Overview

Our goal is to empower our clients to be the best investors that they can be

## Albourne is committed to:

- Non-discretionary advice
- Transparent pricing
- Independent ownership

- >330<sup>1</sup> clients globally
- 53 Public Pension Plans
- Clients have >\$700bn<sup>2</sup> in alternatives
- One of the largest groups of investors in alternative investments



1. The aggregate number of client entities for the Albourne Group worldwide. Clients may be subscribed to multiple services.

2. A conservative aggregation of the estimated investments in alternatives (where known) of Albourne Group clients worldwide, using public sources where possible.

All data as of 1 October 2023

# Why Fee Validation?

- Fee validation became a focus for Albourne in 2014
- Around this time, several of our clients and investors were faced with new regulatory requirements to report fees to constituents and stakeholders
- Fee validation was a natural development of Albourne's services; aligns with our commitment to transparency
- It may be a powerful resource for our clients to be able to say their fees have been validated by a non-discretionary third party
- Albourne can provide an additional level of checks that augments STRS Ohio's current fee processes and procedures



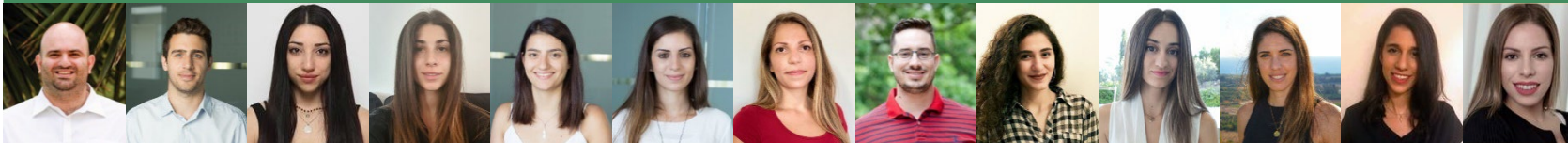
# Fee Team

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## Dedicated Fee Analysts

- Some team members have backgrounds in audit, accounting, finance, operations, data management
- Over 80 years of combined experience in the validation of fees to Alternatives
- Model, analyze, recalculate, validate & process fee structures & fee data
- Harness Albourne expertise, and understanding in Operational and Investment Due Diligence as well as Middle Office support
- Supported by 44 Developers & Software Engineers

### Supporting Fee Validation clients globally



Data as of 2 October 2023

\*Albourne has been providing fee reconciliation service since 2015

# Scope of Service provided to STRS Ohio

## Fee Validation

- Collect and review investment reporting and legal documents for STRS Ohio investments; this includes investments in the Alternative Investments Portfolio and Real Estate funds portfolios
- Validate and calculate the management fees and carried interest incurred by STRS Ohio investments
- Compare the actual fee charged with the Albourne calculated amount and research any differences

## Collection of Fees and Expenses

- Includes management fees, carried interest and other fund expenses
- Reporting provided semi-annually for the periods ending June 30th and December 31st
- Current reporting is for Calendar Year 2022

\*Fund expenses are any expense not included in Management Fee

\*\*Albourne does not provide legal or tax advice

# Fee Validation Process Key Definitions

Terms are predetermined and based on contractual agreements negotiated and executed by STRS Ohio and General Partners

## Management Fee

- Charge paid to Fund Manager for managing investment in fund
- **On Commitment:** Management fee calculated based on the initial committed amount of STRS Ohio investment, not net asset value
- **On Invested Capital:** Management fee calculated on the capital invested in the remaining unsold investments of the fund

## Carried Interest or Profit Share

- The share of profits paid to the General Partner
- Payments only take place when Fund has made realized profits for STRS Ohio in excess of invested capital, fees paid and expenses incurred

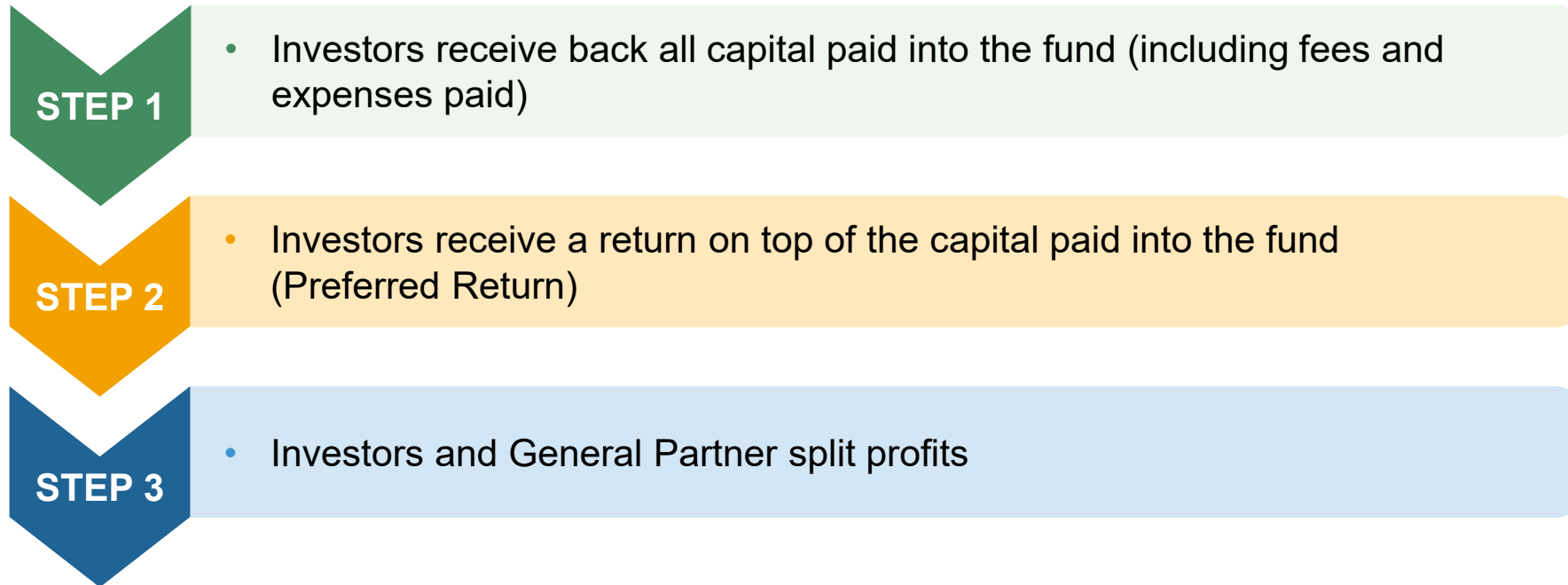
## Other Fund Expenses

- **Operating Expenses**
  - Costs incurred to STRS Ohio investment in a fund which is not included in the Management Fee
  - Varies according to fund but typically includes service provider costs (legal fees, administration costs, custodians)
- **Interest Expense**
  - Interest expenses and other borrowing costs

# Waterfall/Carry

Carried interest is not paid yearly but follows a specific timeline and structure usually referred to as waterfall when an investment has been realized; terms are predetermined and laid out in the agreements made by STRS Ohio and the General Partner\*

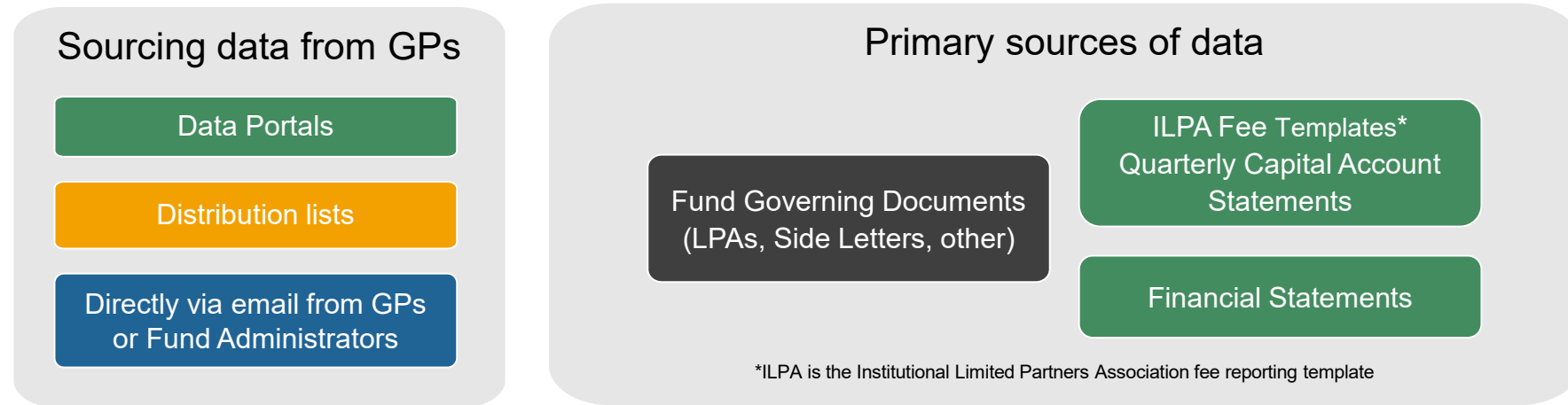
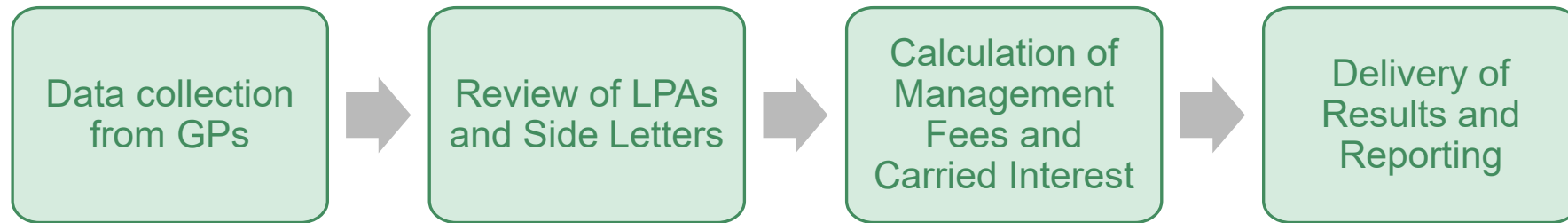
The waterfall is in place to ensure alignment of interest between investors and the General Partner



\*For illustrative purposes only

# Fee Validation Process

Albourne has established channels of communication with STRS Ohio's General Partners which has allowed us to source data for all funds



\*For illustrative purposes only

# Reconciliation Process

Albourne's analysis is process driven to understand discrepancies

The way this analysis works means the first time it is performed is typically the most time consuming

- Several follow-ups identified which required further review by Albourne where we sought explanations from GPs with the assistance of Staff
- Analysis for 2022 successfully completed with no further action required

## Fee Data Collection

- GP Data portals, Distribution lists,
- Email communication with GPs

## Data Controls and Checks

- Data point reviewed and locked
- System generated reporting
- Includes fees, expenses, terms

## Validate Fees

- Review of Fund Governing Documents
- Calculate fees
- Look into discrepancies

# Validation results

Albourne has validated the fees of 447 STRS Ohio investments

## Breakdown of Fees and Expenses for CY2022

	Net Management Fees* (US\$)	Other Fund Expenses (US\$)**		Paid Carried Interest (US\$)
		Operating Expenses	Interest Expenses	
Opportunistic / Diversified	81,762,245	38,039,564	109,873,726	34,190,865
Private Equity	91,218,089	15,251,531	15,667,357	170,106,210
Real Estate	19,362,737	10,947,826	9,466,799	33,282,963
<b>Total</b>	<b>192,343,072</b>	<b>64,238,921</b>	<b>135,007,882</b>	<b>237,580,038</b>

\*The totals above are net of offsets, rebates and waivers which amounted to \$25,403,827.

\*\* Other Fund Expenses includes both Operating Expenses and Interest Expenses

# Conclusion

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In summary, Albourne has:

- Completed the onboarding process of all funds with the help of Staff
- Collected and validated the fees for the calendar year 2022, which were used for the CEM reporting
- Validated the management fees for the FY 2023
- Albourne will continue to validate and provide a comparative analysis of total fees, carried interest and other fund expenses incurred by STRS Ohio.



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STRS Ohio

# CEM Investment Benchmarking Report DB - 2022

December 14, 2023

# Key Takeaways

## Returns

- Your 5-year annualized net total return for the period ending calendar year 2022 was 7.0%. This was above both the U.S. Public median of 5.9% and the peer median of 6.5%.
- Your 5-year annualized policy benchmark return was 6.3% for the period ending calendar year 2022. This was above both the U.S. Public median of 5.1% and the peer median of 5.8%.

## Value added

- Your 5-year net value added was 0.7%, which is net of all costs, including carried interest and other fund expenses. This was equal to both the U.S. Public median of 0.7% and the peer median of 0.7%.

## Cost

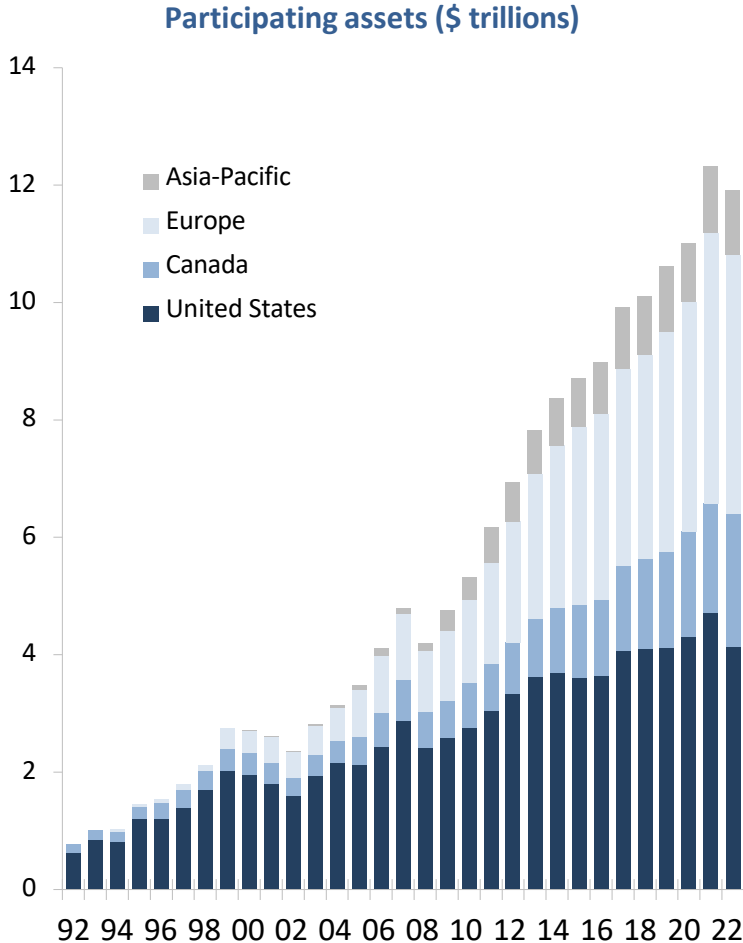
- Your investment cost of 36.6 bps was below your benchmark cost of 49.7 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was low cost primarily because it paid less than peers for similar services.
- Internal management saved \$135 million this year compared to peer median external costs.



# This benchmarking report compares your cost and return performance to the 291 funds in CEM's extensive pension database.

- 146 U.S. pension funds participate. The median U.S. fund had assets of \$8.5 billion and the average U.S. fund had assets of \$28.3 billion. Total participating U.S. assets were \$4.1 trillion.
- 71 Canadian funds participate with assets totaling \$2.3 trillion.
- 65 European funds participate with aggregate assets of \$4.4 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Ireland, Denmark and the U.K.
- 7 Asia-Pacific funds participate with aggregate assets of \$1.1 trillion. Included are funds from Australia, New Zealand, China and South Korea.
- 2 funds from other regions participate.

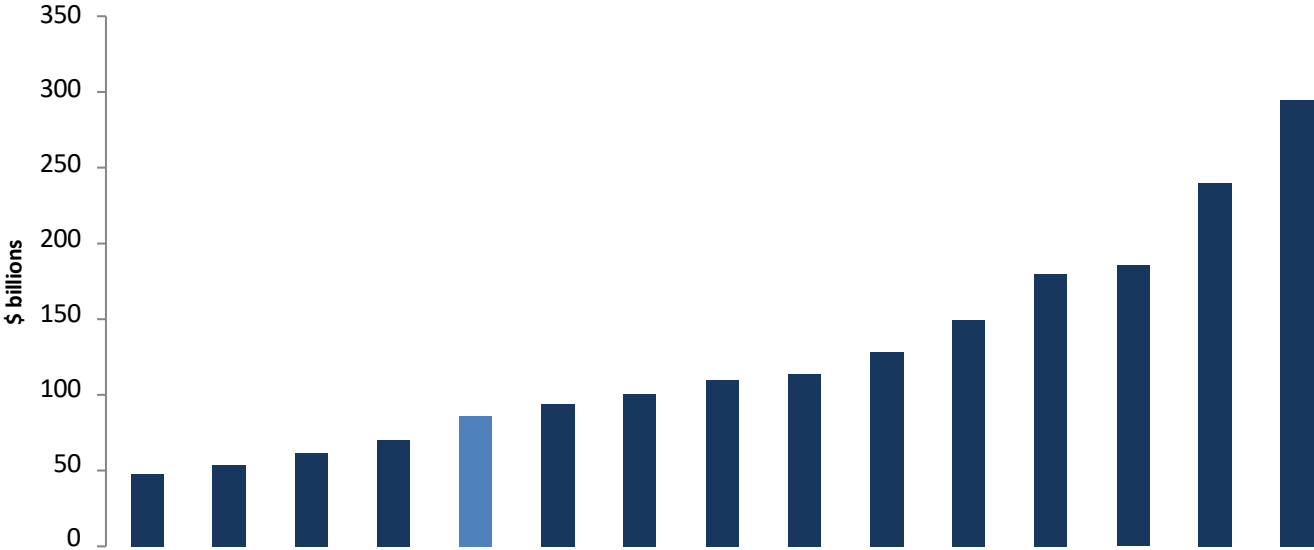
The most meaningful comparisons for your returns and value added are to the U.S. Public universe, which consists of 41 funds.



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

## Peer group for STRS Ohio

- 15 U.S. public sponsors from \$47.9 billion to \$294.4 billion
- Median size of \$109.9 billion versus your \$85.9 billion



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.

## Your 5-year annualized net total return of 7.0% was above the peer median of 6.5%.

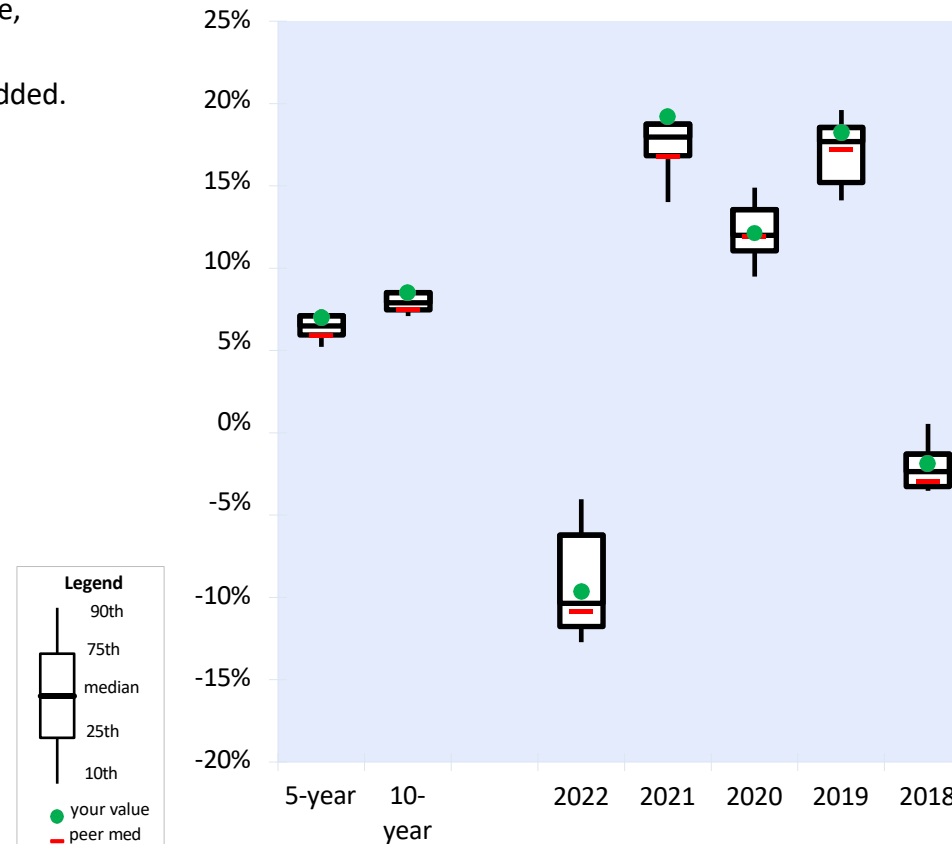
Total returns, by themselves, provide little insight into the reasons behind relative performance. Therefore, we separate total return into its more meaningful components: policy benchmark return and value added.

	Your 5-year
Net total fund return	7.0%
- Policy benchmark return	6.3%
= Net value added	0.7%

This approach enables you to understand the contribution from both policy mix decisions (which tend to be the board's responsibility) and implementation decisions (which tend to be management's responsibility).

The median 5-year net total return for the U.S. Public Universe was 5.9%.

Peer net total returns - quartile rankings



## Your 5-year annualized policy benchmark return of 6.3% was above the peer median of 5.8%.

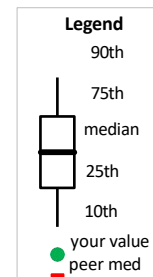
Your policy benchmark return is the return you could have realized had you been invested as per your strategic asset allocation and achieved the benchmark return in each asset class.

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

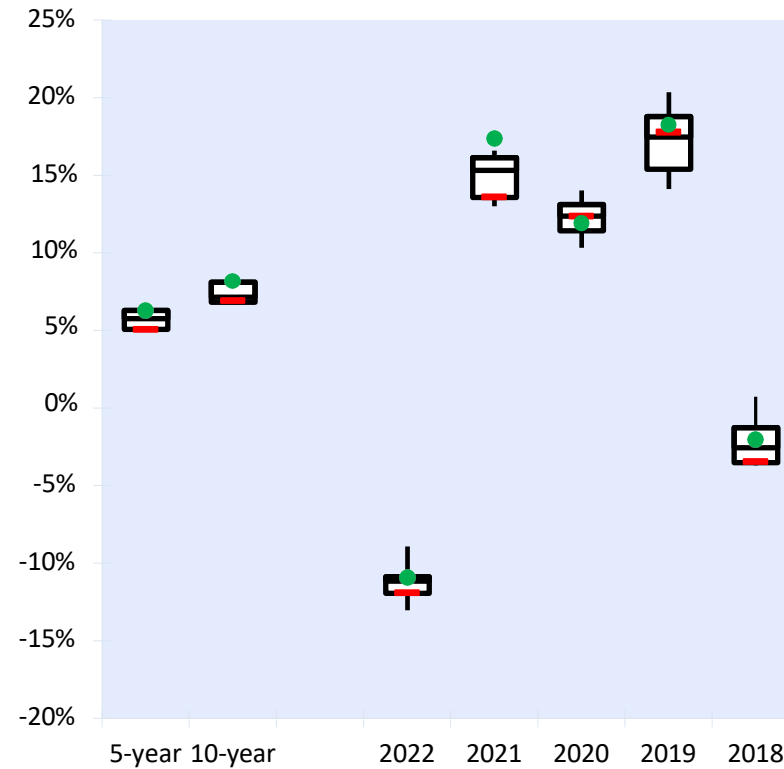
- Long term capital market expectations
- Liabilities
- Appetite for risk

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

The median 5-year policy return for the U.S. Public Universe was 5.1%



Peer policy returns - quartile rankings





## Your 5-year annualized policy benchmark return of 6.3% was above the peer median of 5.8% primarily because of:

- The positive impact of your higher weight in one of the best performing asset classes of the past 5 years: U.S. Stock.
- The positive impact of your lower weight in one of the weaker performing asset classes of the past 5 years: Fixed Income.

1. 5-year weights are based only on plans with 5 years of continuous data.

2. Other fixed income includes long bonds, TIPS, high yield, emerging and global.

3. Total Alternatives includes private equity, private debt, hedge funds, natural resources and infrastructure.

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

	Your Fund	Peer Avg.	U.S. Publ Avg.
Stock - U.S.	28%	18%	17%
Stock - Global	0%	14%	14%
Stock - Non U.S.	23%	14%	15%
<b>Total Stock</b>	<b>51%</b>	<b>46%</b>	<b>47%</b>
Fixed income - U.S.	21%	18%	17%
Cash	1%	0%	-1%
Other Fixed Income <sup>2</sup>	0%	8%	12%
<b>Total Fixed Income</b>	<b>22%</b>	<b>26%</b>	<b>28%</b>
Real estate incl. REITs	10%	11%	9%
Other Alternatives <sup>3</sup>	17%	17%	16%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

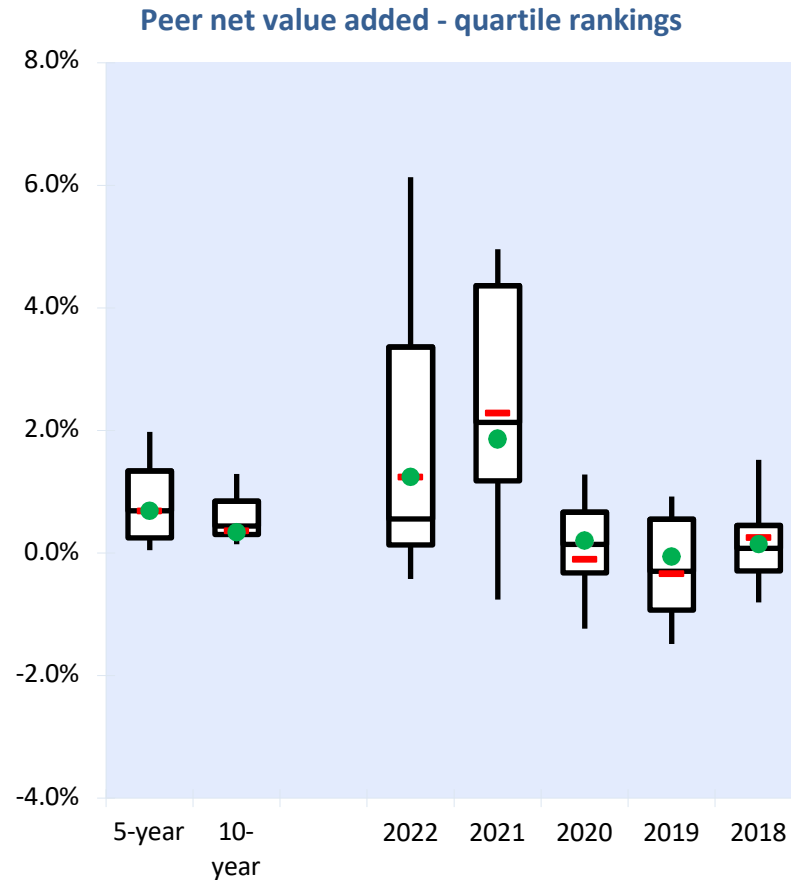
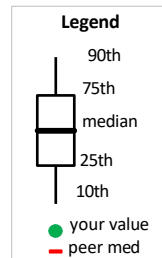
## Net value added is the component of total return from active management. Your 5-year net value added was 0.7%.

Net value added equals total net return minus policy benchmark return.

### Value added for STRS Ohio

Year	Net return	Policy return	Net value added
2022	-9.7%	-10.9%	1.2%
2021	19.2%	17.4%	1.9%
2020	12.1%	11.9%	0.2%
2019	18.2%	18.3%	-0.1%
2018	-1.9%	-2.0%	0.1%
5-Year	7.0%	6.3%	0.7%

Your 5-year net value added of 0.7% compares to a median of 0.7% for your peers and 0.7% for the U.S. Public universe.



## Your investment costs were \$322.8 million or 34.8 basis points in 2022.

Asset management costs by asset class and style (\$000s)	Internal Management*			External	Total	
	Passive	Active	Overseeing of external	Active base fees		
Domestic Equities	96	15,568	237	11,649	27,550	
International Equities	402	8,786	855	35,827	45,870	
Fixed Income		3,146	369	5,108	8,622	
Liquidity Reserves		55			55	
Real Estate <sup>1</sup>	334	17,546	582	19,363	37,825	
Alternative Investments <sup>1</sup>		449	4,508	187,036	191,993	
Total excluding private asset carried interest					311,915	33.7bp
<b>Oversight, custodial and other costs<sup>2</sup></b>						
Oversight & consulting					7,203	
Trustee & custodial					2,512	
Audit					220	
Other					965	
Total oversight, custodial & other costs					10,899	1.2bp
Total investment costs (excl. transaction costs & private asset carried interest)					322,815	34.8bp

\*Internal investment costs were 5.7 bps while external investment costs were 28.0 bps. Of the total investment management costs of 34.8 bps, external manager fees for alternative and real estate investments were 22.3 bps; other investment costs for internal assets, external equity and external fixed income investments that were used to arrive at the net of fee Total Fund return were 12.6 bps.

### Footnotes

1. Total cost excludes carried interest for hedge funds, real estate, infrastructure, natural resources and private equity. The alternative investments and real estate returns (shown throughout this report) are net of all external management fees, carried interest and other fund expenses.
2. Excludes non-investment costs, such as benefit insurance premiums and preparing cheques for retirees.

## Your investment costs in this report were \$338.8 million or 36.6bps which reconciles to your reported costs as follows:

For the comparison to the peer group, CEM has started with your 34.8 bps in costs from the previous page and included the net impact of hedge fund carried interest and private equity management fee offsets.

<b>Investment Costs</b>	<b>\$ millions</b>	<b>basis points</b>
Reported costs	322.8	34.8
<i>Hedge fund carried interest</i>	<i>4.7</i>	
<i>Private equity management fee offsets</i>	<i>11.4</i>	
<b>Total investment costs in this report<sup>1</sup></b>	<b>338.8</b>	<b>36.6</b>

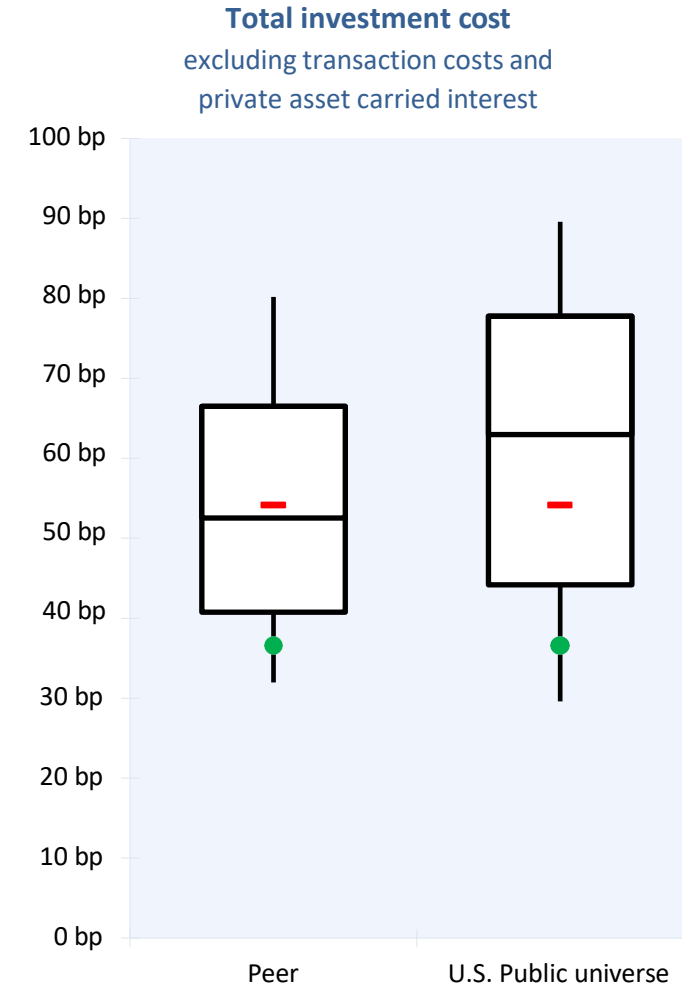
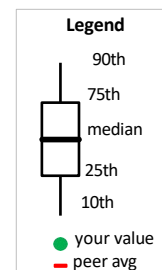
1. CEM excludes private asset carried interest from benchmarking because only a limited number of participants are currently able to provide this data.

## Your total investment cost of 36.6 bps was below the peer median of 52.6 bps.

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

- Asset mix, particularly holdings of the highest cost asset classes: real estate (excl. REITs), infrastructure, hedge funds, private equity and private credit. These high cost assets equaled 30% of your assets at the end of 2022 versus a peer average of 35%.
- Fund size. Bigger funds have advantages of scale.

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



## Benchmark cost analysis suggests that your fund was low cost by 13.2 basis points in 2022.

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

Your total cost of 36.6 bp was below your benchmark cost of 49.8 bp. Thus, your cost savings were 13.2 bp.

### Your cost versus benchmark

	\$000s	basis points
Your total investment cost	338,816	36.6 bp
Your benchmark cost	460,725	49.7 bp
Your excess cost	(121,909)	(13.2) bp
Your total carried interest	237,580	
Your benchmark carried interest	262,225	
Your excess carried interest	(24,645)	

## Your fund was low cost primarily because it paid less than peers for similar services.

### Reasons for your low cost status

	Excess Cost/ (Savings)	
	\$000s	bps
1. Lower cost implementation style compared to peers		
• More active management, less lower cost passive	22,118	2.4
• Less external management, more lower cost internal	(66,346)	(7.2)
• More partnerships as a percentage of external	28,150	3.0
• Use of fund of funds	1,843	0.2
• Less co-investment as a percentage of LP/Co	9,796	1.1
• Less overlays	(1,082)	(0.1)
	<u>(5,521)</u>	<u>(0.6)</u>
2. Paying less than peers for similar services		
• External investment management costs	(117,703)	(12.7)
• Internal investment management costs	747	0.1
• Oversight, custodial & other costs	0	0.0
	<u>(116,956)</u>	<u>(12.6)</u>
<b>Total savings</b>	<b>(122,477)</b>	<b>(13.2)</b>

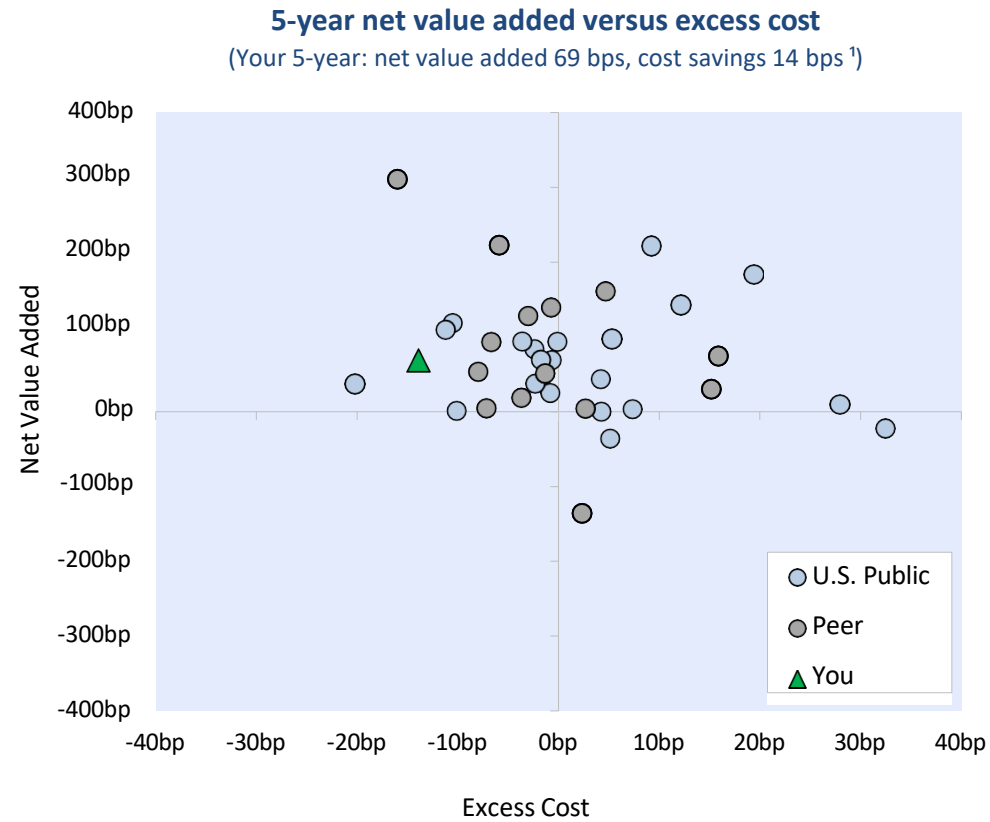
**If your internally managed assets were managed externally and you paid the peer median costs, your costs would have been higher by approximately \$135 million or 14.6 bp.**

**Additional external investment management costs: assuming STRS Ohio no longer had internal holdings and paid peer median external costs**

Asset class/category	Style	STRS Ohio		Peer median external cost (bps)	Cost Savings	
		Avg holdings in \$mils	Internal cost (bps)		in bps	in \$000s
Stock - U.S. large cap	passive	8,439	0.1 bp	0.6 bp	(0.5) bp	(405)
Stock - U.S. large cap	active	13,110	11.5 bp	25.6 bp	(14.1) bp	(18,509)
Stock - U.S. small cap	active	1,347	3.7 bp	63.9 bp	(60.2) bp	(8,115)
Stock - EAFE	active	5,208	7.0 bp	39.1 bp	(32.1) bp	(16,707)
Stock - Emerging	active	2,176	18.5 bp	49.8 bp	(31.3) bp	(6,818)
Stock - Global	active	289	4.1 bp	37.1 bp	(32.9) bp	(953)
Stock - ACWI x U.S.	active	3,412	3.0 bp	33.3 bp	(30.4) bp	(10,359)
Fixed income - U.S.	active	15,522	2.0 bp	12.4 bp	(10.4) bp	(16,108)
Fixed income - Cash	active	1,441	0.4 bp	Excluded	--	--
REITs	passive	1,368	2.4 bp	28.4 bp	(26.0) bp	(3,555)
Real estate	active	6,360	27.6 bp	77.6 bp	(50.0) bp	(31,815)
Natural resources	co	21	2.9 bp	5.3 bp	(2.3) bp	(5)
Private equity - Diversified	co	767	5.5 bp	147.6 bp	(142.1) bp	(10,903)
Private equity - Diversified	active	20	14.7 bp	147.6 bp	(132.9) bp	(261)
Private credit	co	691	7.9 bp	130.9 bp	(123.0) bp	(8,491)
Private credit	active	381	11.0 bp	60.7 bp	(49.6) bp	(1,892)
<b>Total</b>					<b>(14.6) bp</b>	<b>(134,895)</b>



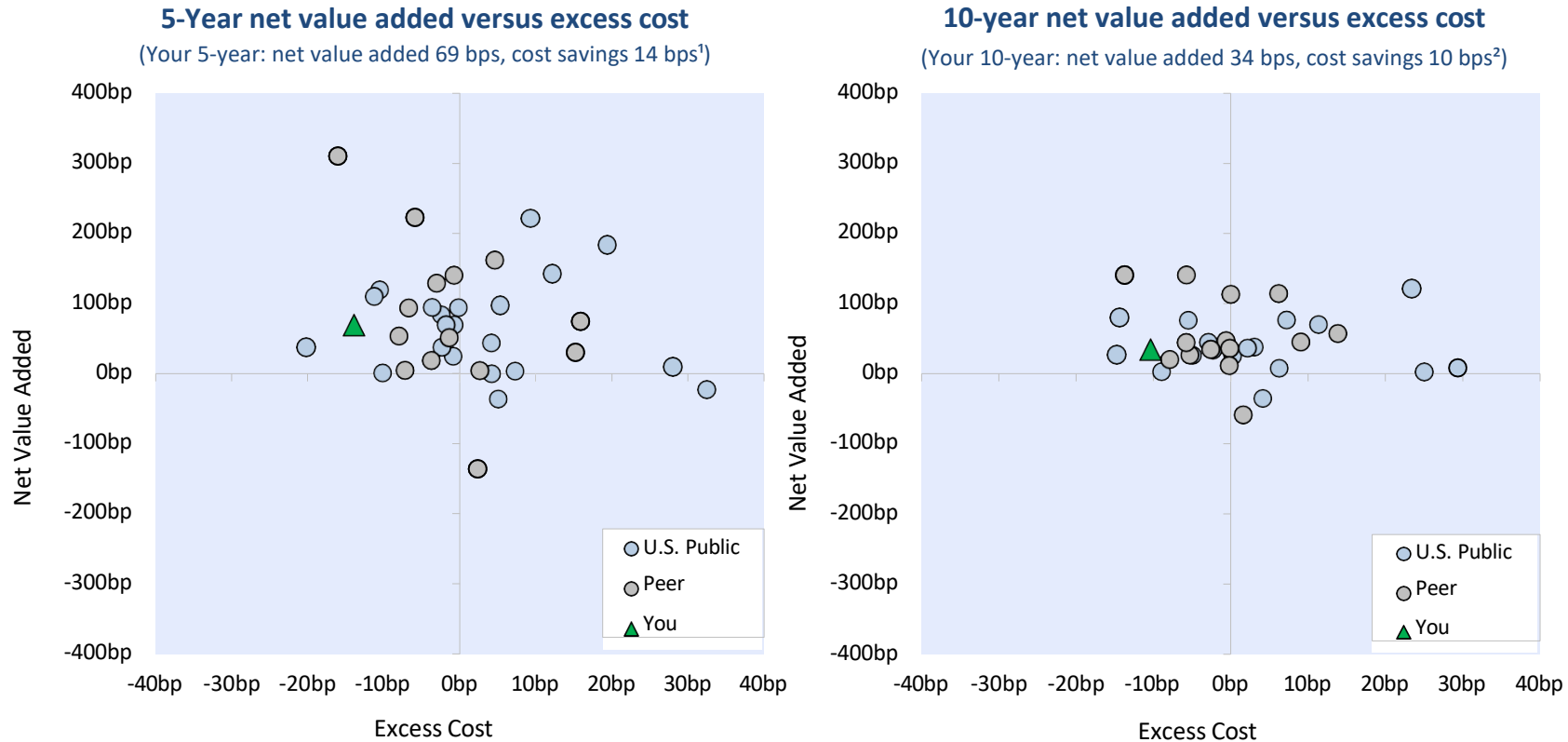
## Your 5-year performance placed in the positive value added, low cost quadrant of the cost effectiveness chart.



1. Your 5-year savings of 13.8 basis points is the average of your peer-based savings for the past 5 years.

	2022	2021	2020	2019	2018	5-year
Net value added	124.3bp	186.1bp	20.3bp	(5.7) bp	14.5bp	69.1bp
Excess cost	(13.2) bp	(13.6) bp	(14.0) bp	(14.0) bp	(14.4) bp	(13.8) bp

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



1. Your 5-year cost savings of 14 basis points is the average of your cost savings for the past 5 years.
2. Your 10-year cost savings of 10 basis points is the average of your cost savings for the past 10 years.

	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	5-year	10-year
Net value added	124.3 bp	186.1 bp	20.3 bp	(5.7) bp	14.5 bp	40.9 bp	3.4 bp	62.5 bp	(42.7) bp	(82.4) bp	69.1 bp	34.0 bp
Excess cost	(13.2) bp	(13.6) bp	(14.0) bp	(14.0) bp	(14.4) bp	(9.9) bp	(7.5) bp	(6.8) bp	(4.1) bp	(5.8) bp	(13.8) bp	(10.3) bp

# Summary of key takeaways

## Returns

- Your 5-year annualized net total return for the period ending calendar year 2022 was 7.0%. This was above both the U.S. Public median of 5.9% and the peer median of 6.5%.
- Your 5-year annualized policy benchmark return was 6.3% for the period ending calendar year 2022. This was above both the U.S. Public median of 5.1% and the peer median of 5.8%.

## Value added

- Your 5-year net value added was 0.7%, which is net of all costs, including carried interest and other fund expenses. This was equal to both the U.S. Public median of 0.7% and the peer median of 0.7%.

## Cost and cost effectiveness

- Your investment cost of 36.6 bps was below your benchmark cost of 49.7 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was low cost primarily because it paid less than peers for similar services.
- Internal management saved \$135 million this year compared to peer median external costs.

# Investment Benchmark Report DB - 2022

## Appendix – Detailed Investment Costs



## Your investment costs were \$322.8 million or 34.8 basis points in 2022.

Asset management costs by asset class and style (\$000s)	Internal Management*			External Active base fees	Total
	Passive	Active	Overseeing of external		
<b>Domestic Equities</b>					
Stock - U.S. large cap	96	15,068	138	1,220	16,522
Stock - U.S. small cap		500	99	10,429	11,028
<b>International Equities</b>					
Stock - EAFE		3,635	378	21,789	25,802
Stock - Emerging		4,022	199	3,281	7,502
Stock - Global		120			120
Stock - ACWI x U.S.		1,009	77	10,757	11,844
Derivatives/Overlays	402		201		603
<b>Fixed Income</b>					
Fixed income - U.S.		3,146			3,146
Fixed income - Emerging			215	2,893	3,109
Fixed income - High yield			153	2,214	2,368
Liquidity Reserves		55			55
<b>Real Estate</b>					
REITs	334				334
Real estate ex-REITs <sup>1</sup>		17,546			17,546
Real estate ex-REITs - LP <sup>1</sup>			582	19,363	19,945
<b>Alternatives</b>					
Infrastructure - LP <sup>1</sup>			9	938	948
Infrastructure - FoFs <sup>1</sup>			0	237	237
Natural resources - LP <sup>1</sup>			53	1,987	2,040
Natural resources - Co-invest. <sup>1</sup>			6		6
Global TAA <sup>1</sup>			59	2,473	2,532
Hedge funds - External active <sup>1</sup>			28	1,676	1,704
Private equity - Diversified - LP <sup>1</sup>		29	361	23,340	23,730
Private equity - Diversified - Co-invest. <sup>1</sup>			424	0	424
LBO - LP <sup>1</sup>			1,465	66,145	67,609
LBO - FoFs <sup>1</sup>			199	16,176	16,375
Venture capital - LP <sup>1</sup>			607	16,172	16,779
Venture capital - FoFs <sup>1</sup>			72	4,335	4,407
Private credit - Internal		421			421
Private credit - LP <sup>1</sup>			843	53,392	54,235
Private credit - Co-invest. <sup>1</sup>			381	166	547
<b>Total excluding private asset carried interest</b>				<b>311,915</b>	<b>33.7bp</b>
<b>Oversight, custodial and other costs <sup>2</sup></b>					
Oversight & consulting				7,203	
Trustee & custodial				2,512	
Audit				220	
Other				965	
<b>Total oversight, custodial &amp; other costs</b>				<b>10,899</b>	<b>1.2bp</b>
<b>Total investment costs (excl. transaction costs &amp; private asset carried interest)</b>				<b>322,815</b>	<b>34.8bp</b>

\*Internal investment costs were 5.7 bps while external investment costs were 28.0 bps. Of the total investment management costs of 34.8 bps, external manager fees for alternative and real estate investments were 22.3 bps; other investment costs for internal assets, external equity and external fixed income investments that were used to arrive at the net of fee Total Fund return were 12.6 bps.

### Footnotes

1. Total cost excludes carried interest for hedge funds, real estate, infrastructure, natural resources and private equity. The alternative investments and real estate returns (shown throughout this report) are net of all external management fees, carried interest and other fund expenses.

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

# Thank you



**Christopher Doll**

Director, Client Coverage

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ChrisD@cembenchmarking.com

CEMbenchmarking.com







- **Matters requiring board action:**
  - Review and approval of the Semiannual Broker Evaluation and associated polices
- **Educational or scheduled updates and reviews requiring no action today:**
  - Summary of Investment Activity Report, October and November 2023
  - Albourne fee validation
  - CEM Benchmarking
  - **Callan alternative investment quarterly performance review as of Sept. 30, 2023**
  - Callan quarterly performance review as of Sept. 30, 2023
  - Review of October and November investment transactions
- **Summary of requests**





December 14, 2023

## **State Teachers Retirement System of Ohio**

Quarterly Alternative Investment Portfolio  
Performance Summary

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**Pete Keliuotis, CFA**  
Executive Vice President

**David Smith, CFA, CTP**  
Senior Vice President

**Tony Lissuzzo, CFA**  
Senior Vice President

**Catherine Beard, CFA**  
Senior Vice President

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## Executive Summary

The STRS Ohio Alternatives Portfolio has improved the risk-adjusted returns of the total fund through added diversification benefits and strong performance.

- **Overview**

- The Alternative Investments (or “Alternatives”) program has 20+ year history
- The program is diversified by strategy type and is designed to provide both return enhancement and risk mitigation. The components of the Alternative Program include:
  - Private Equity: investments in private, non-liquid companies that provide high return potential relative to public market asset classes
  - Opportunistic / Diversified (or “O/D”):
    - Opportunistic: Investments are expected to provide both return enhancement and downside protection in equity bear markets
    - Diversified: uncorrelated, liquid strategies, expected to provide diversification benefits for the total fund

- **Performance Comments**

- The Total Alternative Investments Program has positively contributed to total fund performance over the trailing 20-year period
- The Private Equity and Opportunistic Portfolios have performed well relative to private market counterparts, ranking solidly in the second quartile of relevant peer groups.
- The Alternatives Program has primarily been self-funded over the last ten years

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## Total Alternative Investments

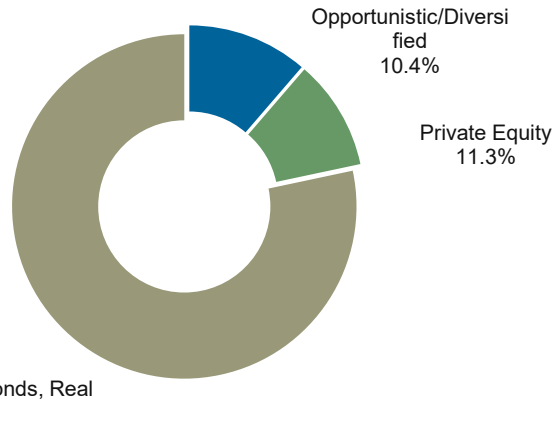
# STRS Ohio Alternative Investments

Private Equity and O/D segments differ in terms of risk/return expectation, providing diversification benefits to the STRS Ohio Total Fund

The following tables illustrate total current and potential exposure by private equity and Opportunistic/Diversified, as of September 30, 2023 in USD millions.

## Total Fund Portfolio Composition

Net Asset Value



## Alternatives Portfolio Composition

Net Asset Value



Traditional (Stocks, Bonds, Real Estate)  
78.3%

Portfolio Exposure by Strategy Type	Net Asset Value <sup>1</sup>	%	Unfunded Commitment <sup>1</sup>	%	Potential Exposure	%	5 Year TWR <sup>2</sup>	10 Year TWR <sup>2</sup>
Private Equity	\$9,903	52.3%	\$2,698	39.6%	\$12,601	48.9%	16.71%	16.04%
Opportunistic/Diversified	\$9,048	47.7%	\$4,155	60.4%	\$13,203	51.1%	7.26%	6.73%
<b>Total Alternatives Program</b>	<b>\$18,951</b>	<b>100.0%</b>	<b>\$6,853</b>	<b>100.0%</b>	<b>\$25,804</b>	<b>100.0%</b>	<b>12.16%</b>	<b>11.45%</b>

In \$ millions

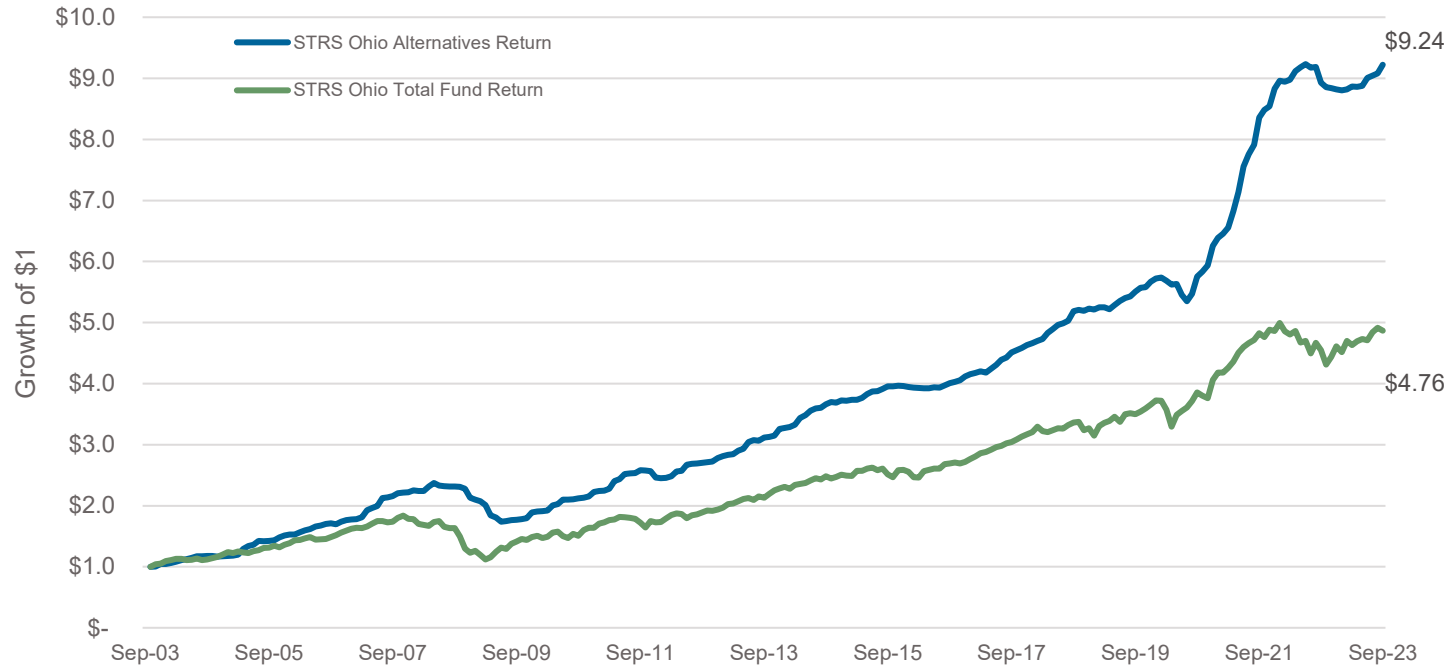
<sup>1</sup> Source is Hamilton Lane

<sup>2</sup> STRS Ohio Alternative Investments returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses

# STRS Ohio 20-Year Performance: Alternatives and STRS Ohio Total Fund

STRS Ohio Alternatives have enhanced Total Fund return and reduced Total Fund risk over the last 20 years

Contribution of Alternative Investments to STRS  
20-Year Total Fund Performance  
(October 01, 2003 to September 30, 2023)



	STRS Ohio Total Fund Return <sup>1</sup>	STRS Ohio Alternatives Return <sup>2</sup>
<b>Annualized Return</b>	8.11%	11.76%
<b>Annualized Risk</b>	10.33%	8.20%
<b>Sharpe Ratio</b>	0.65	1.26

<sup>1</sup> The Total Fund return shown includes Alternative Investments & Real Estate where the return is also net of all external investment management fees and costs, including carried interest and other fund expenses.

<sup>2</sup> STRS Ohio Alternative Investments returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses.

# STRS Ohio 10-Year Performance: Alternatives and STRS Ohio Total Fund

As of September 30, 2023

STRS Ohio 10-Year Alternative Investment Performance – Time-Weighted Returns  
(October 01, 2013 – September 30, 2023)



STRS Ohio Alternatives Performance  
Annualized Returns ending September 30, 2023<sup>1</sup>

	STRS Ohio Alternatives	STRS Ohio Total Fund	Alternatives Blended Benchmark
<b>Last 10 years</b>	11.45%	8.04%	
<b>Last 5 years</b>	12.16%	7.12%	
<b>Last 3 years</b>	16.59%	7.76%	
<b>Last 2.25 years</b>	8.12%	0.91%	6.39%
<b>Last 1 year</b>	4.38%	10.42%	5.10%
<b>Last Quarter</b>	2.16%	(1.68%)	1.71%
<b>Risk (10-Yr)</b>	7.07%	8.70%	
<b>Sharpe Ratio (10-Yr)</b>	1.46	0.80	

- STRS Ohio Alternatives return exceeds STRS Ohio Total Fund return in all time periods except the last one year.
- STRS Ohio Alternatives return trails the STRS Ohio Alternative Investment Blended Benchmark over the last year; however, exceeds the benchmark over the two and one quarter year period since it has been adopted.

<sup>1</sup> STRS Ohio Alternatives Investments returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses

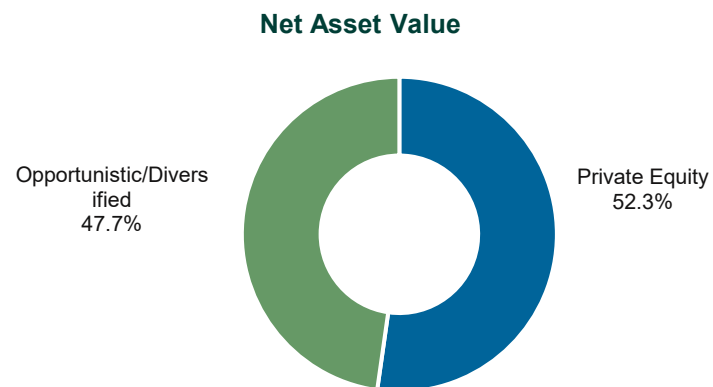
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## Private Equity

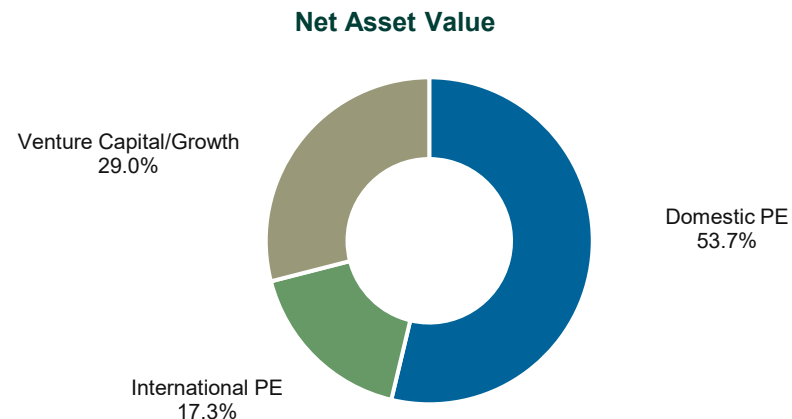
# STRS Ohio Private Equity Investments

The following tables illustrate total current and potential exposure by Private Equity and Opportunistic/Diversified, as of September 30, 2023 in USD millions.

## Alternatives Portfolio Composition



## Private Equity Portfolio Composition



Portfolio Exposure by Strategy Type	Net Asset Value <sup>1</sup>	%	Unfunded Commitment <sup>1</sup>	%	Potential Exposure	%	5 Year TWR <sup>2</sup>	10 Year TWR <sup>2</sup>
Domestic Private Equity	\$5,316	53.7%	\$1,974	73.2%	\$7,220	57.9%	18.23%	17.20%
International Private Equity	\$1,711	17.3%	\$456	16.9%	\$2,167	17.2%	14.89%	15.00%
Venture Capital/Growth	\$2,871	29.0%	\$267	9.9%	\$3,138	24.9%	16.25%	14.68%
Stock Distribution	\$4	0%	-	-	\$4	0%	-	-
<b>Total Private Equity Program</b>	<b>\$9,903</b>	<b>100.0%</b>	<b>\$2,698</b>	<b>100.0%</b>	<b>\$12,529</b>	<b>100.0%</b>	<b>16.71%</b>	<b>16.04%</b>

In \$ millions

<sup>1</sup> Source is Hamilton Lane

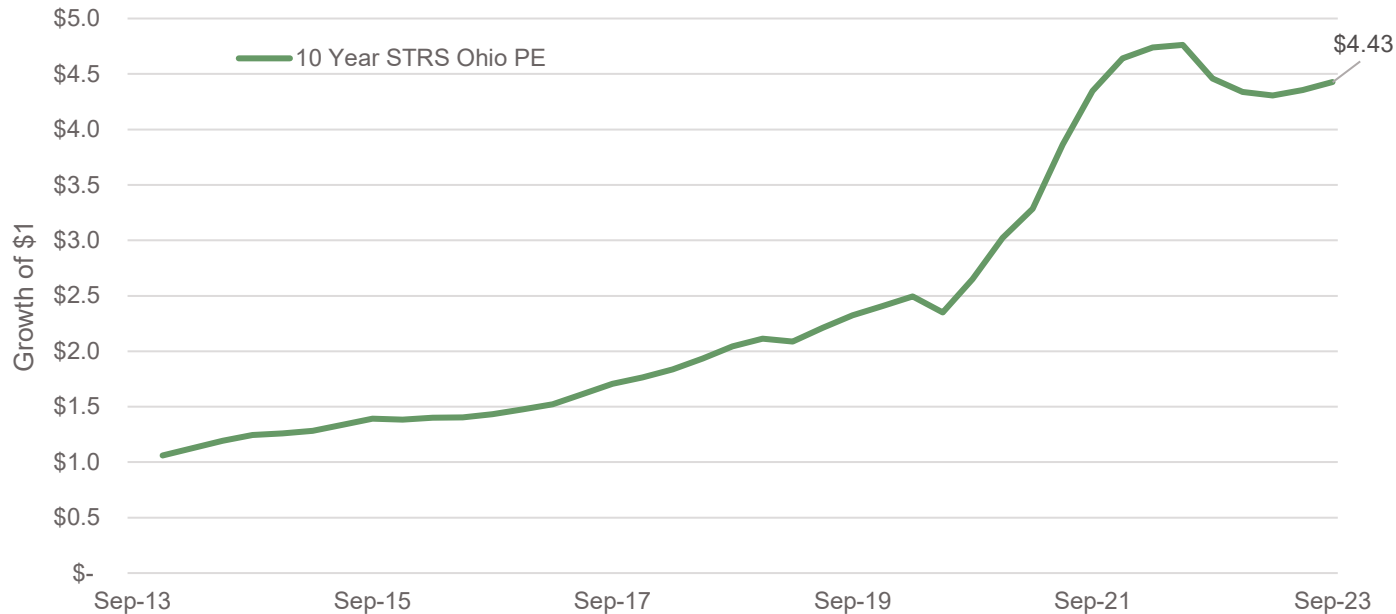
<sup>2</sup> STRS Ohio Private Equity returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses



# STRS Ohio Private Equity Performance

As of September 30, 2023

10-Year Private Equity Performance: Time-Weighted Returns  
(October 01, 2013 to September 30, 2023)



STRS Ohio Private Equity Performance  
Annualized Returns ending September 30, 2023<sup>1</sup>

	STRS Ohio Private Equity	STRS Ohio Private Equity Benchmark
Last 10 years	16.04%	
Last 5 years	16.71%	
Last 3 years	18.63%	
Last 2.25 years	6.21%	6.92%
Last 1 year	(0.73%)	2.11%
Last Quarter	1.65%	1.60%
Risk (10-Yr)	9.54%	
Sharpe Ratio (10-Yr)	1.56	

- STRS Ohio Private Equity returns trail the Private Equity Benchmark for the last two and a quarter years<sup>2</sup> and last one year, however outperformed last quarter.

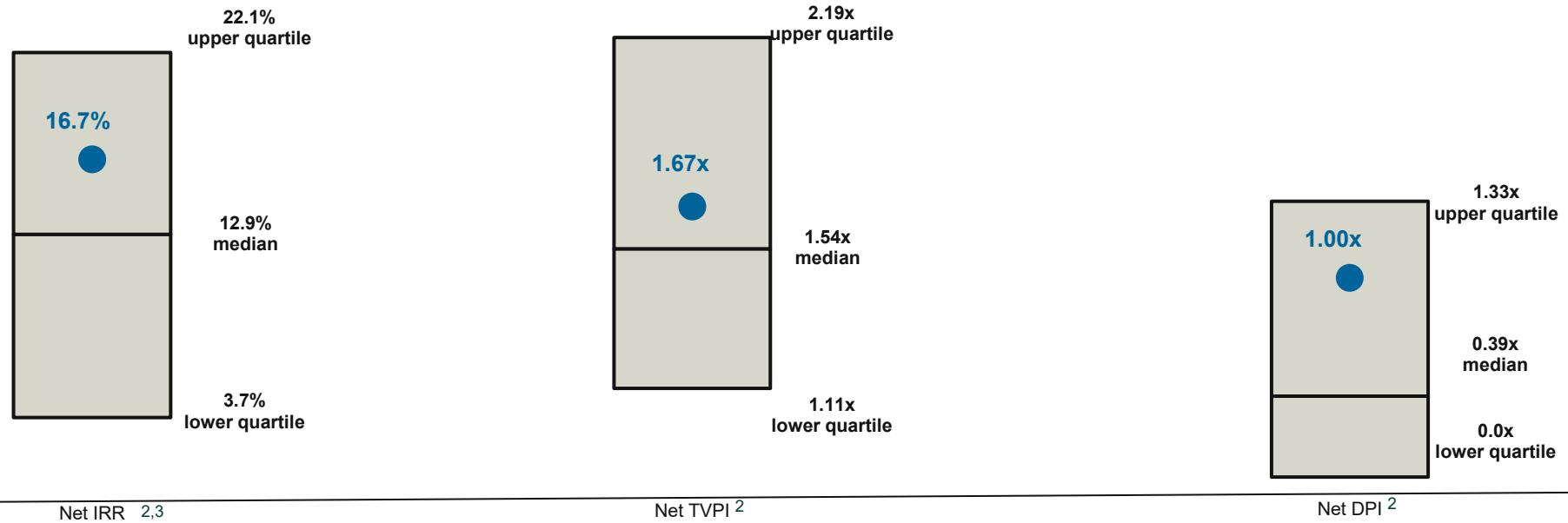
<sup>1</sup> STRS Ohio Private Equity returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses.

<sup>2</sup> Reflects time period the new Private Equity benchmark has been in place.

# STRS Ohio Private Equity 10-Year Relative Performance

10-year performance of the STRS Ohio PE Program ranks solidly in the second quartile in terms of net IRR, net TVPI, and net DPI

10-Year Private Equity Relative Performance <sup>1</sup>  
(October 01, 2013 to September 30, 2023)



<sup>1</sup> Quartile Rankings against the Global Private Equity LSEG/Cambridge database.

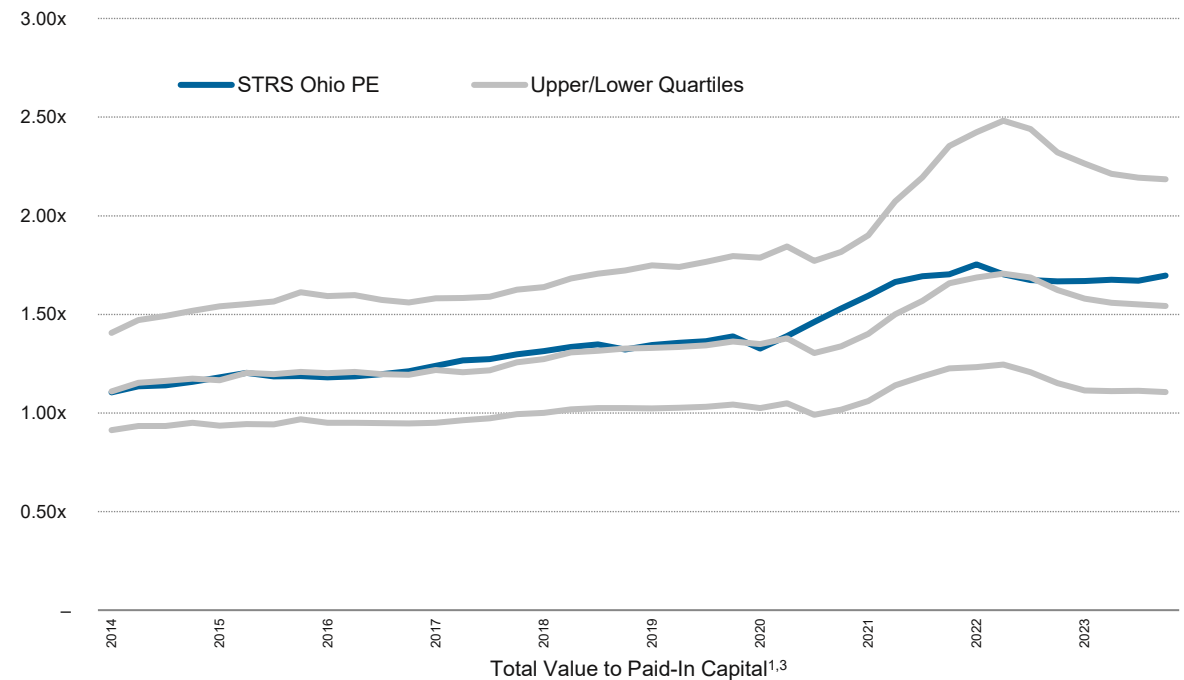
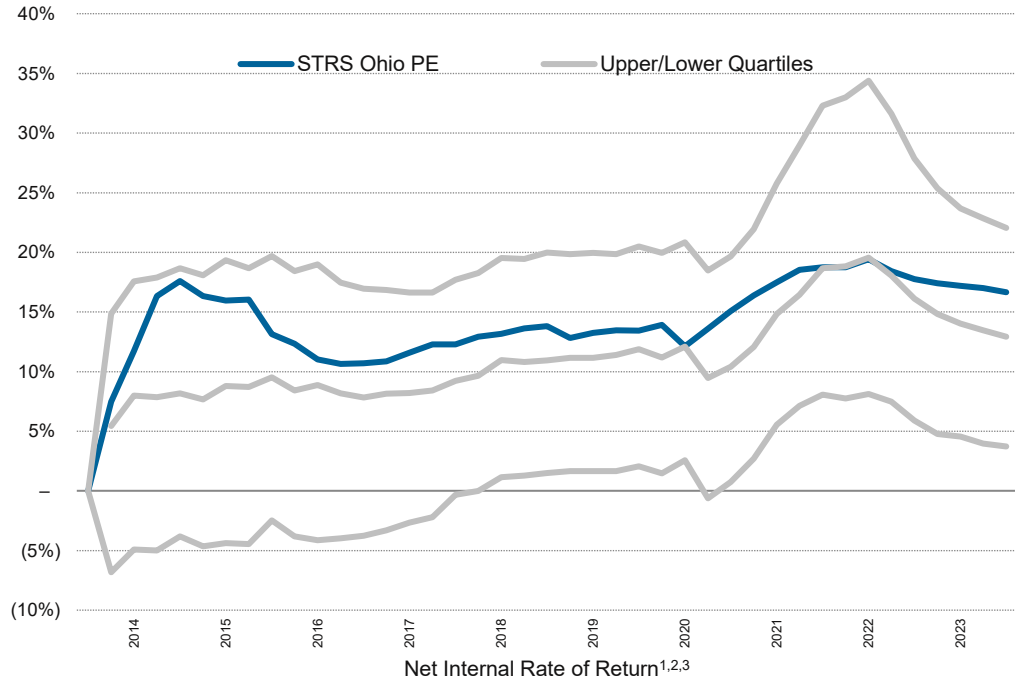
<sup>2</sup> STRS Ohio Private Equity returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses.

<sup>3</sup> IRRs are calculated by HL using the XIRR method and have not been calculated by the GPs.

# STRS Ohio Private Equity Investments 10-Year Performance Trends

Progression of the STRS Ohio Private Equity Program over the past 10 years has been positive, with the program consistently ranking in the second quartile across net IRR and net TVPI performance metrics

The following charts reflect the progression over time of various performance metrics of the fund relative to the respective top, median and lower quartiles of the LSEG/Cambridge private equity peer group.



Source: Hamilton Lane, LSEG/Cambridge

<sup>1</sup> STRS Ohio Private Equity returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses.

<sup>2</sup> IRRs are calculated by HL using the XIRR method and have not been calculated by the GPs.

<sup>3</sup> Quartile Rankings against the Private Equity peer group includes Global Buyout, Growth Equity, and Venture Capital funds from the LSEG/Cambridge database

# STRS Ohio Private Equity 10-Year Performance by Portfolio

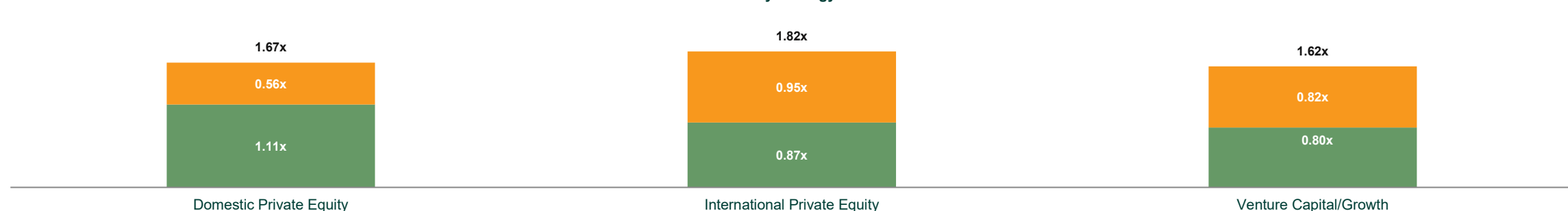
The following table reflects private equity performance by strategy type over a rolling 10-year period. Net IRR and TVPI quartile rankings are relative to a peer group from the LSEG/Cambridge database.

Portfolio Exposure by Strategy Type	Commitment <sup>1</sup>	Funded Amount <sup>1</sup>	Unfunded Commitment <sup>1</sup>	Distributions <sup>1</sup>	Net Asset Value <sup>1</sup>	10 Year TWR <sup>2</sup>	10 Year Net IRR <sup>2,3</sup>	TVPI <sup>2</sup>	DPI <sup>2</sup>	TVPI/IRR Quartile <sup>4</sup>	Performance Status
Domestic Private Equity	\$11,739	\$6,384	\$1,924	\$10,441	\$5,316	17.20%	17.86%	1.67x	1.11x	2 <sup>nd</sup> /2 <sup>nd</sup>	●
International Private Equity	\$2,615	\$1,911	\$467	\$1,679	\$1,711	15.00%	15.43%	1.82x	0.87x	2 <sup>nd</sup> /2 <sup>nd</sup>	●
Venture Capital/Growth	\$3,803	\$2,028	\$278	\$2,634	\$2,871	14.68%	14.58%	1.62x	0.80x	2 <sup>nd</sup> /2 <sup>nd</sup>	●
Stock Distribution	-	-	-	-	\$4	-	-	-	-	-	-
<b>Total Private Equity</b>	<b>\$18,158</b>	<b>\$10,323</b>	<b>\$2,698</b>	<b>\$14,754</b>	<b>\$9,903</b>	<b>16.04%</b>	<b>16.66%</b>	<b>1.67x</b>	<b>1.00x</b>	<b>2<sup>nd</sup>/2<sup>nd</sup></b>	<b>●</b>

Net IRR by Strategy



Net TVPI by Strategy



■ Unrealized (RVPI) ■ Realized (DPI)

In \$ millions.

<sup>1</sup> Source is Hamilton Lane

<sup>2</sup> STRS Ohio Private Equity returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses.

<sup>3</sup> IRRs are calculated by HL using the XIRR method and have not been calculated by the GPs.

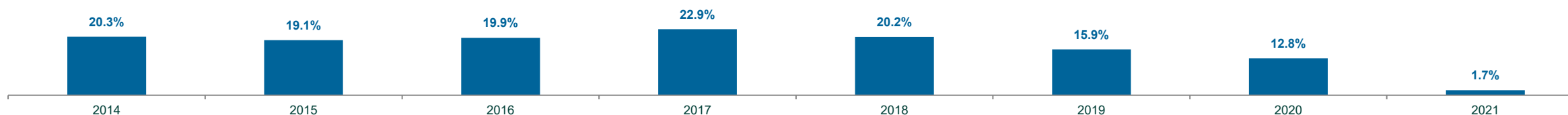
<sup>4</sup> Quartile Rankings against the Global Private Equity LSEG/Cambridge database.

# STRS Ohio Private Equity Portfolio Summary Performance by Vintage Year

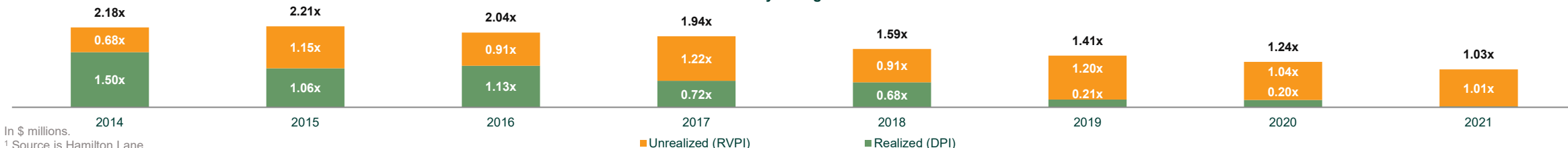
The following table reflects private equity vintage year performance over a 10-year period. Quartile ranks for vintage years less than five years old are labelled as not meaningful. Net IRR and TVPI quartile rankings are relative to a peer group from the LSEG/Cambridge database.

Portfolio Exposure by Vintage Year	Commitment <sup>1</sup>	Funded Amount <sup>1</sup>	Unfunded Commitment <sup>1</sup>	Distributions <sup>1</sup>	Net Asset Value <sup>1</sup>	DPI <sup>2</sup>	TVPI <sup>2</sup>	TVPI Quartile <sup>2,3</sup>	Net IRR <sup>2,4</sup>	IRR Quartile <sup>3</sup>	Performance Status
2014	\$651	\$823	\$67	\$1,234	\$559	1.50x	2.18x	2 <sup>nd</sup>	20.34%	2 <sup>nd</sup>	●
2015	\$853	\$772	\$48	\$819	\$889	1.06x	2.21x	2 <sup>nd</sup>	19.11%	2 <sup>nd</sup>	●
2016	\$1,010	\$1,050	\$96	\$1,191	\$956	1.13x	2.04x	2 <sup>nd</sup>	19.93%	2 <sup>nd</sup>	●
2017	\$1,158	\$1,447	\$307	\$1,038	\$1,767	0.72x	1.94x	3 <sup>rd</sup>	22.91%	2 <sup>nd</sup>	●
2018	\$2,060	\$2,018	\$184	\$1,372	\$1,835	0.68x	1.59x	3 <sup>rd</sup>	20.22%	2 <sup>nd</sup>	●
2019	\$1,758	\$1,375	\$268	\$283	\$1,661	0.21x	1.41x	3 <sup>rd</sup>	15.94%	3 <sup>rd</sup>	●
2020	\$685	\$286	\$75	\$57	\$298	0.20x	1.24x	NM	12.83%	NM	-
2021	\$679	\$558	\$272	\$10	\$563	0.02x	1.03x	NM	1.74%	NM	-
2022	\$815	\$115	\$768	\$0	\$113	0.00x	0.97x	NM	NM	NM	-
2023	\$329	\$5	\$256	\$0	\$4	0.01x	0.76x	NM	NM	NM	-

Net IRR by Vintage Year



Net TVPI by Vintage Year



In \$ millions.

<sup>1</sup> Source is Hamilton Lane

<sup>2</sup> STRS Ohio Private Equity returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses.

<sup>3</sup> IRRs are calculated by HL using the XIRR method and have not been calculated by the GPs.

<sup>4</sup> Quartile Rankings against the Global Private Equity LSEG/Cambridge database.

## STRS Ohio Private Equity 10-Year Performance by General Partner

The following table reflects aggregate 10-year performance of the top ten STRS Ohio GP relationships by NAV. Net IRR and TVPI quartile rankings are relative to a peer group from the LSEG/Cambridge database. Organization status is reflective of Callan's opinion of stability and health of each investment manager.

Portfolio Exposure by General Partner	Organization Status	Performance Status	Commitments <sup>1</sup>	Funded Amount <sup>1</sup>	Uncalled <sup>1</sup>	Distributed <sup>1</sup>	NAV <sup>1</sup>	Net IRR <sup>2,3</sup>	Net TVPI <sup>2</sup>	IRR/TVPI Quartiles <sup>4</sup>
Thoma Bravo	●	●	\$1,085	\$1,220	\$250	\$1,393	\$1,039	25.31%	1.96x	1 <sup>st</sup> / 2 <sup>nd</sup>
Bain Capital/Ventures	●	●	\$1,364	\$613	\$40	\$1,394	\$617	15.80%	1.71x	3 <sup>rd</sup> / 3 <sup>rd</sup>
Tiger Iron Capital *	●	●	\$450	\$350	\$101	\$10	\$555	15.38%	1.60x	3 <sup>rd</sup> / 2 <sup>nd</sup>
GCM Grosvenor	●	●	\$875	\$669	\$61	\$1,412	\$543	37.84%	2.48x	1 <sup>st</sup> / 1 <sup>st</sup>
Silver Lake Partners	●	●	\$468	\$390	\$43	\$335	\$447	18.48%	1.74x	2 <sup>nd</sup> / 2 <sup>nd</sup>
TA Associates	●	●	\$452	\$387	\$69	\$329	\$432	29.84%	1.89x	1 <sup>st</sup> / 1 <sup>st</sup>
Commonfund	●	●	\$245	\$192	\$8	\$358	\$429	22.69%	3.26x	2 <sup>nd</sup> / 2 <sup>nd</sup>
Francisco Partners	●	●	\$690	\$341	\$204	\$682	\$423	24.80%	2.43x	2 <sup>nd</sup> / 1 <sup>st</sup>
General Catalyst	●	●	\$272	\$229	\$23	\$140	\$422	22.17%	2.27x	2 <sup>nd</sup> / 1 <sup>st</sup>
Hermes GPE *	●	●	\$450	\$486	\$52	\$423	\$348	15.99%	1.59x	3 <sup>rd</sup> / 3 <sup>rd</sup>

### Stoplight Review Legend

- Above median performance or less than three years old; no organizational concerns
- Two performance metrics third quartile; organizational issues to monitor
- At least one performance metric in the fourth quartile; significant organizational issues
- No observations or updates to report

In \$ millions

Refer to the Peer Group Definitions slide in the Appendix for individual benchmarks used

\* Less than 10 years of history. Net IRR and TVPI represent since inception returns from STRS Ohio first commitment to the GP

<sup>1</sup> Source is Hamilton Lane

<sup>2</sup> STRS Ohio Private Equity returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses.

<sup>3</sup> IRRs are calculated by HL using the XIRR method and have not been calculated by the GPs.

<sup>4</sup> Quartile Rankings against the Global Private Equity LSEG/Cambridge database.

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## Opportunistic/Diversified

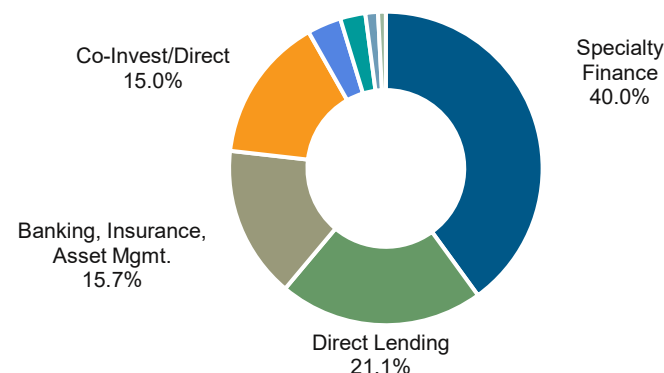
# STRS Ohio Opportunistic/Diversified Investments

The following tables illustrate total current and potential exposure by Private Equity and Opportunistic/Diversified, as of September 30, 2023 in USD millions.

**Alternatives Portfolio Composition**  
Net Asset Value



**O/D Portfolio Composition**  
Net Asset Value



Portfolio Exposure by Strategy Type	Net Asset Value <sup>1</sup>	%	Unfunded Commitment <sup>1</sup>	%	Potential Exposure	%	5 Year TWR <sup>2</sup>	10 Year TWR <sup>2</sup>
Specialty Finance	\$3,524	39.0%	\$2,092	50.8%	\$5,586	43.7%	7.89%	10.29%
Direct Lending	\$1,853	20.5%	\$803	19.5%	\$2,583	20.2%	-	-
Banking, Insurance, & Asset Mgmt.	\$1,406	15.5%	\$498	12.1%	\$1,878	14.7%	14.48%	14.97%
Co-Invest/Direct	\$1,324	14.6%	\$503	12.2%	\$1,634	12.8%	14.06%	-
Natural Resources	\$309	3.4%	\$52	1.3%	\$365	2.9%	(0.15%)	(1.85%)
Liquid Alternatives	\$446	4.9%	-	-	\$446	3.5%	4.38%	-
Hedge Funds	\$118	1.3%	-	-	\$43	0.3%	0.92%	2.33%
Infrastructure	\$66	0.7%	\$171	4.2%	\$237	1.8%	4.26%	4.67%
Public-Private Investment Funds	\$0.5	0.0%	\$3	0%	\$3	0.0%	1.47%	5.78%
<b>Total Opportunistic/Diversified</b>	<b>\$9,048</b>	<b>100.0%</b>	<b>\$4,155</b>	<b>100.0%</b>	<b>\$13,203</b>	<b>100.0%</b>	<b>7.26%</b>	<b>6.73%</b>

In \$ millions

<sup>1</sup> Source is Hamilton Lane

<sup>2</sup> STRS Ohio Private Equity returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses



# STRS Ohio 10-Year Opportunistic/Diversified Performance

10-Year O/D Performance: Time-Weighted Returns  
(October 01, 2013 to September 30, 2023)



STRS Ohio O/D Performance  
Annualized Returns ending September 30, 2023

	STRS Ohio O/D	STRS Ohio O/D Benchmark
Last 10 years	6.73%	
Last 5 years	7.26%	
Last 3 years	13.59%	
Last 2.25 years	10.10%	6.42%
Last 1 year	10.67%	7.84%
Last Quarter	2.72%	1.80%
Risk (10-Yr)	5.29%	
Sharpe Ratio (10-Yr)	1.06	

- STRS Ohio O/D returns exceed the O/D Benchmark over the last two and a quarter years<sup>2</sup>, last one year, and last quarter.

<sup>1</sup> STRS Ohio Opportunistic/Diversified returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses

<sup>2</sup> Reflects time period the new Private Equity benchmark has been in place.

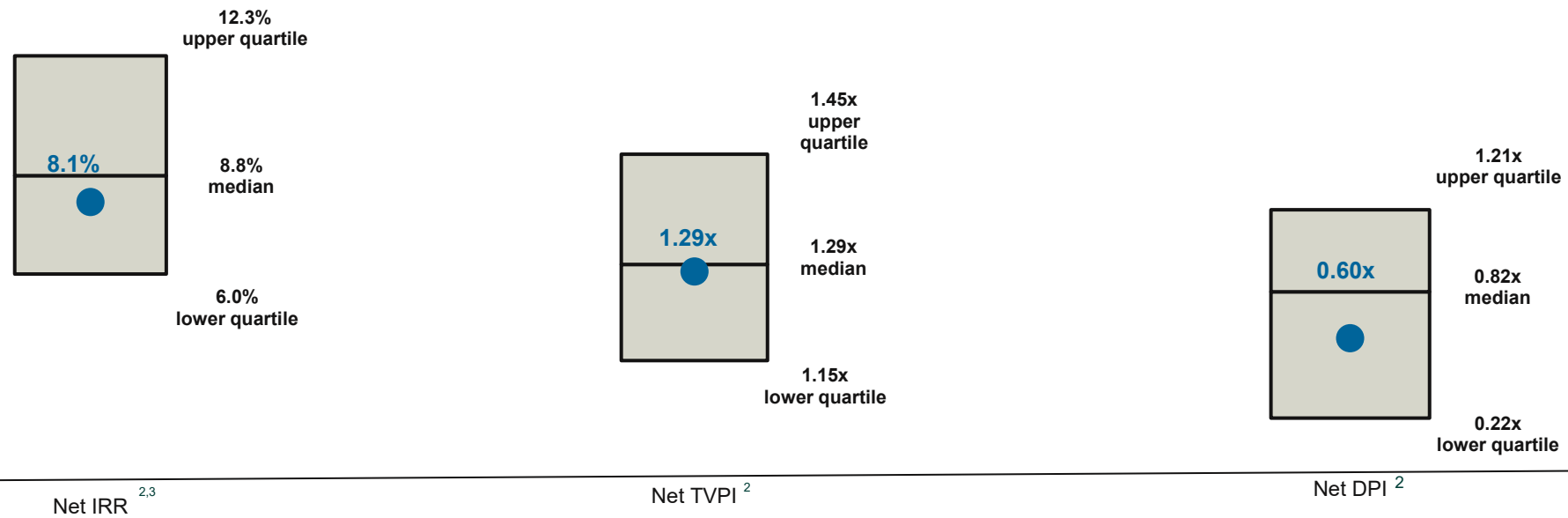
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## Opportunistic

# STRS Ohio Opportunistic 10-Year Relative Performance

The STRS Ohio Opportunistic Portfolio ranks near the median across all performance metrics

10-Year Opportunistic Relative Performance<sup>1</sup>  
(October 01, 2013 to September 30, 2023)



- The Opportunistic portfolio has generated 3<sup>rd</sup> quartile performance in terms of net IRR and DPI, although falls right below median. The portfolio ranks at the median in terms of net TVPI.

Source: Hamilton Lane, LSEG/Cambridge

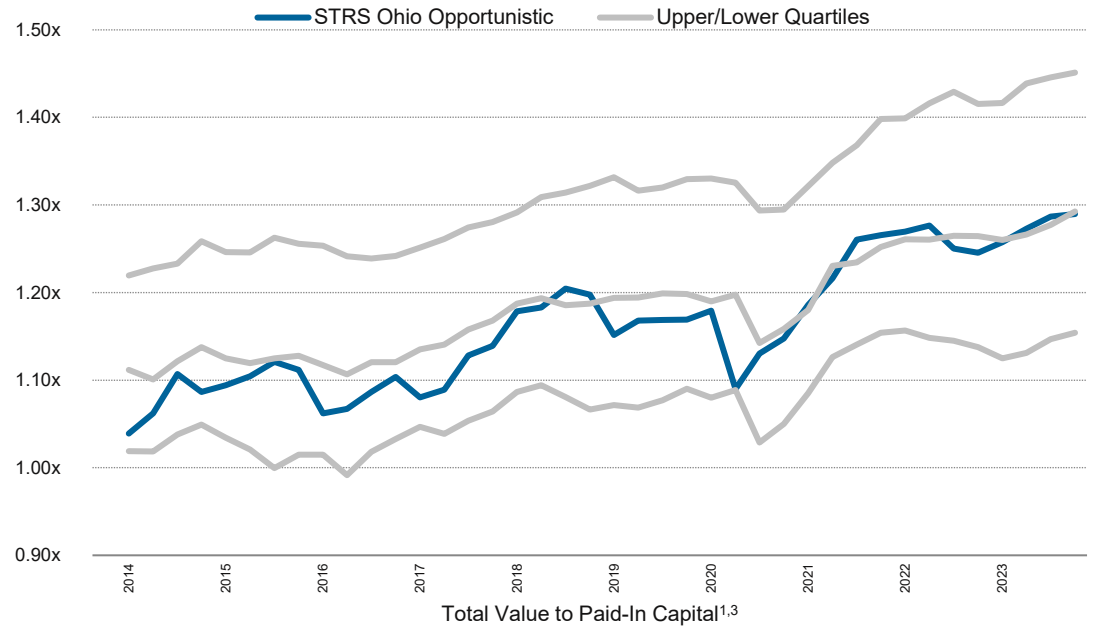
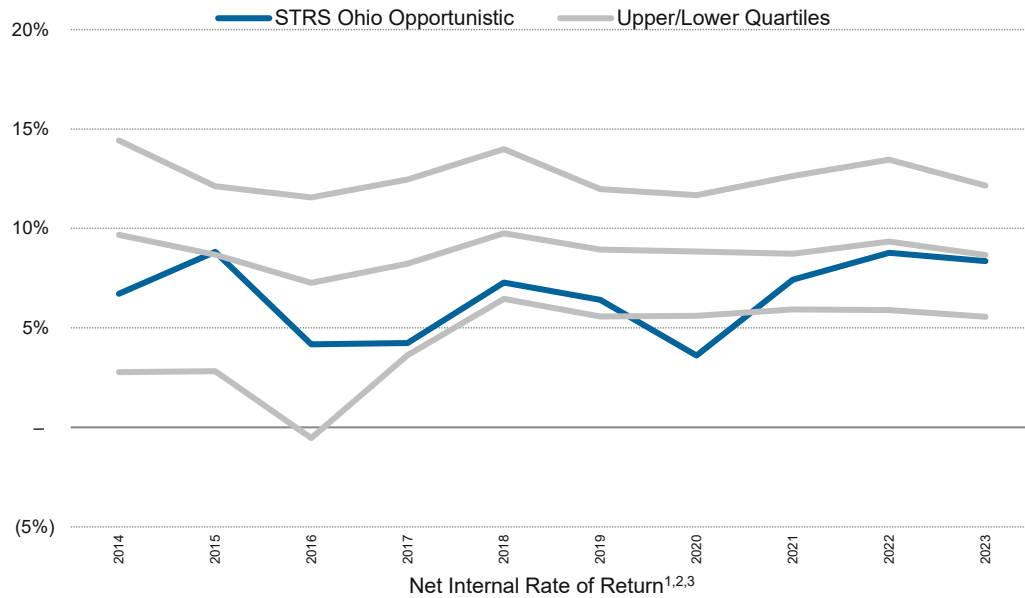
<sup>1</sup> Quartile Rankings against the Global Private Credit LSEG/Cambridge database.

<sup>2</sup> STRS Ohio Opportunistic returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses.

<sup>3</sup> IRRs are calculated by HL using the XIRR method and have not been calculated by the GPs.

# STRS Ohio Opportunistic Investments 10-Year Performance Trends

The following charts reflect the progression over time of various performance metrics of the fund relative to the respective top, median and lower quartiles of the LSEG/Cambridge private credit peer group.



Source: Hamilton Lane, LSEG/Cambridge

<sup>1</sup> STRS Ohio Opportunistic returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses.

<sup>2</sup> IRRs are calculated by HL using the XIRR method and have not been calculated by the GPs.

<sup>3</sup> Quartile Rankings against the Private Credit peer group includes Senior Debt, Credit Opportunities, and Subordinated Debt funds from the LSEG/Cambridge database.

# STRS Ohio Opportunistic 10-Year Performance by Portfolio

The following table reflects Opportunistic performance by strategy type since inception. Net IRR and TVPI quartile rankings are relative to a peer group from the LSEG/Cambridge database.

Portfolio Exposure by Strategy Type	Commitments <sup>1</sup>	Funded Amount <sup>1</sup>	Unfunded Commitment <sup>1</sup>	Distributions <sup>1</sup>	Net Asset Value <sup>1</sup>	10 Year TWR <sup>2</sup>	10 Year Net IRR <sup>2,3</sup>	TVPI <sup>2</sup>	DPI <sup>2</sup>	TVPI/IRR Quartile <sup>4</sup>	Performance Status
Specialty Finance	\$6,235	\$4,706	\$2,131	\$3,427	\$3,524	10.29%	10.08%	1.29x	0.63x	2 <sup>nd</sup> /2 <sup>nd</sup>	●
Direct Lending *	\$2,871	\$2,425	\$801	\$1,275	\$1,853	-	8.84%	1.27x	0.52x	2 <sup>nd</sup> /2 <sup>nd</sup>	●
Banking and Insurance	\$1,424	\$1,220	\$495	\$1,183	\$1,406	14.97%	14.06%	1.73x	0.79x	1 <sup>st</sup> /1 <sup>st</sup>	●
Co-Invest/Direct *	\$1,613	\$1,382	\$502	\$486	\$1,324	-	16.54%	1.35x	0.37x	1 <sup>st</sup> /1 <sup>st</sup>	●
Natural Resources	\$1,039	\$691	\$52	\$751	\$310	(1.85%)	(4.35%)	0.77x	0.55x	4 <sup>th</sup> /4 <sup>th</sup>	●
Infrastructure	\$325	\$98	\$171	\$165	\$66	4.67%	11.92%	1.34x	0.95x	2 <sup>nd</sup> /2 <sup>nd</sup>	●
Public-Private Funds	\$188	\$17	\$3	\$70	\$0.4	5.78%	17.00%	1.42x	1.41x	-	-
<b>Total Opportunistic</b>	<b>\$13,507</b>	<b>\$10,539</b>	<b>\$4,155</b>	<b>\$7,357</b>	<b>\$8,483</b>	<b>8.27%</b>	<b>8.14%</b>	<b>1.29x</b>	<b>0.60x</b>	<b>2<sup>nd</sup>/3<sup>rd</sup></b>	<b>●</b>

Net IRR by Strategy



Net TVPI by Strategy



\* Less than 10 years of history. Net IRR, Net TVPI, and TWR represent since inception returns from STRS Ohio's first commitment to the portfolio strategy

<sup>1</sup> Source is Hamilton Lane

<sup>2</sup> STRS Ohio Opportunistic returns are presented net of all external investment management fees and costs, including carried interest and other fund expenses.

<sup>3</sup> IRRs are calculated by HL using the XIRR method and have not been calculated by the GPs.

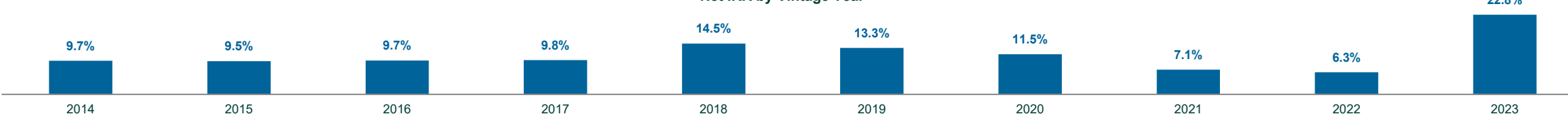
<sup>4</sup> Quartile Rankings against the Private Credit peer group includes Senior Debt, Credit Opportunities, and Subordinated Debt funds from the LSEG/Cambridge database.

# STRS Ohio Opportunistic Performance by Vintage Year

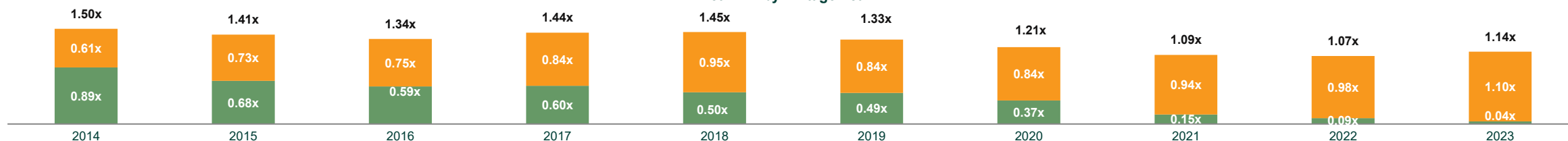
The following table reflects Opportunistic vintage year performance over a rolling 10-year period. Only mature vintages, defined as four years and up, are shown. Net IRR and TVPI quartile rankings are relative to a peer group from the LSEG/Cambridge database.

Portfolio Exposure by Vintage Year	Commitment <sup>1</sup>	Funded Amount <sup>1</sup>	Unfunded Commitment <sup>1</sup>	Distributions <sup>1</sup>	Net Asset Value <sup>1</sup>	DPI <sup>2</sup>	TVPI <sup>2</sup>	TVPI Quartile <sup>3</sup>	Net IRR <sup>2,4</sup>	IRR Quartile <sup>3</sup>	Stoplight Status
2014	\$1,253	\$1,304	\$134	\$1,163	\$824	0.89x	1.50x	1 <sup>st</sup>	9.66%	1 <sup>st</sup>	●
2015	\$1,139	\$1,618	\$325	\$1,094	\$1,193	0.68x	1.41x	2 <sup>nd</sup>	9.51%	2 <sup>nd</sup>	●
2016	\$199	\$233	\$48	\$136	\$175	0.59x	1.34x	3 <sup>rd</sup>	9.69%	2 <sup>nd</sup>	●
2017	\$744	\$471	\$38	\$281	\$397	0.60x	1.44x	2 <sup>nd</sup>	9.81%	2 <sup>nd</sup>	●
2018	\$1,548	\$1,393	\$402	\$702	\$1,318	0.50x	1.45x	1 <sup>st</sup>	14.54%	1 <sup>st</sup>	●
2019	\$2,073	\$1,665	\$600	\$824	\$1,403	0.49x	1.33x	2 <sup>nd</sup>	13.27%	1 <sup>st</sup>	●
2020	\$1,355	\$914	\$390	\$331	\$758	0.37x	1.21x	NM	11.52%	NM	-
2021	\$2,425	\$1,479	\$1,083	\$225	\$1,397	0.15x	1.09x	NM	7.08%	NM	-
2022	\$1,484	\$757	\$581	\$67	\$741	0.09x	1.07x	NM	6.34%	NM	-
2023	\$327	\$155	\$307	\$83	\$117	0.04x	1.14x	NM	22.79%	NM	-

Net IRR by Vintage Year



Net TVPI by Vintage Year



<sup>1</sup> Source is Hamilton Lane

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<sup>3</sup> Quartile Rankings against the Private Credit peer group includes Senior Debt, Credit Opportunities, and Subordinated Debt funds from the LSEG/Cambridge database.

<sup>4</sup> IRRs are calculated by HL using the XIRR method and have not been calculated by the GPs.

■ Unrealized (RVPI)

■ Realized (DPI)

# STRS Ohio Opportunistic 10-Year Performance by General Partner

The following table reflects aggregate since-inception performance of the top 10 STRS Ohio Opportunistic GP relationships by NAV. Net IRR and TVPI quartile rankings are relative to a peer group from the LSEG/Cambridge database. Organization status is reflective of Callan's opinion of stability and health of each investment manager.

Portfolio Exposure by General Partner	Organization Status	Performance Status	Commitments <sup>1</sup>	Funded Amount <sup>1</sup>	Uncalled <sup>1</sup>	Distributed <sup>1</sup>	NAV <sup>1</sup>	Net IRR <sup>2,3</sup>	Net TVPI <sup>2</sup>	IRR/TVPI Quartiles <sup>4</sup>
Sixth Street Partners	●	●	\$1,790	\$1,417	\$652	\$1,163	\$950	10.79%	1.37x	2 <sup>nd</sup> /2 <sup>nd</sup>
Blue Owl Capital *	●	●	\$778	\$650	\$335	\$400	\$775	16.55%	1.81x	1 <sup>st</sup> /1 <sup>st</sup>
Ares Management Corporation	●	●	\$1,307	\$807	\$331	\$766	\$684	12.72%	1.41x	1 <sup>st</sup> /1 <sup>st</sup>
Reverence Capital Partners *	●	●	\$574	\$524	\$189	\$318	\$663	23.55%	2.02x	1 <sup>st</sup> /1 <sup>st</sup>
Oaktree Capital Management	●	●	\$539	\$470	\$124	\$287	\$389	9.32%	1.36x	2 <sup>nd</sup> /2 <sup>nd</sup>
Angelo Gordon	●	●	\$555	\$384	\$41	\$115	\$321	8.52%	1.16x	3 <sup>rd</sup> /2 <sup>nd</sup>
Golub Capital *	●	●	\$327	\$389	\$1	\$261	\$314	7.72%	1.48x	3 <sup>rd</sup> /1 <sup>st</sup>
Fortress Investment Group LLC *	●	●	\$510	\$407	\$242	\$246	\$256	12.50%	1.23x	2 <sup>nd</sup> /2 <sup>nd</sup>
Stone Point Capital *	●	●	\$300	\$223	\$83	\$21	\$236	8.93%	1.15x	3 <sup>rd</sup> /2 <sup>nd</sup>
Cerberus Capital *	●	●	\$350	\$213	\$164	\$56	\$228	13.32%	1.33x	2 <sup>nd</sup> /2 <sup>nd</sup>

### Stoplight Review Legend

- Above median performance or less than three years old; no organizational concerns
- Two performance metrics third quartile; organizational issues to monitor
- At least one performance metric in the fourth quartile; significant organizational issues
- No observations or updates to report

\*Less than 10 years of history. Net IRR and TVPI represent since inception returns from STRS Ohio's first commitment to the GP

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## Private Equity Market Overview

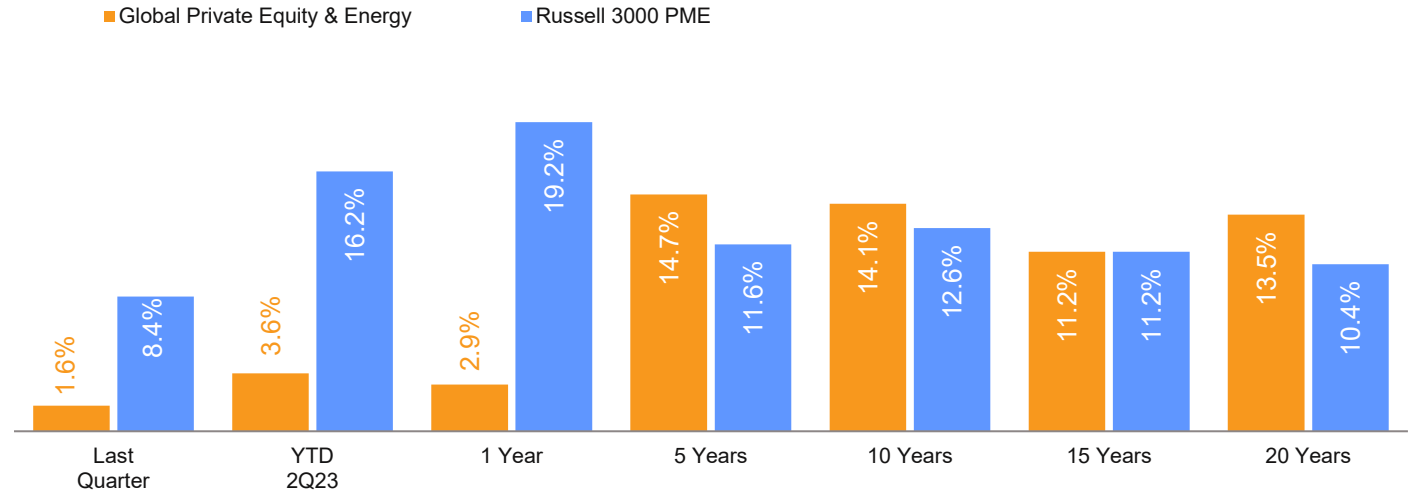


# Private Equity Market Trends

## Smoothing Effect in Performance

- Public equity's strong recovery in 2023 (led by the "Magnificent 7" technology stocks) has left private equity in its wake.
- Private equity doesn't recover as quickly as the public markets, because the smoothing effect dampens private equity returns in both up and down markets.
- Private equity only saw about a quarter of the gains of the public markets in 1H23, on a PME basis.
- Venture capital and growth equity are the only strategies that saw negative returns this past year, as those strategies continue to struggle with falling valuations.

Net IRRs as of 06/30/2023



Net IRRs by Strategy as of 06/30/2023

Strategy	Last Quarter	YTD 2Q23	1 Year	5 Years	10 Years	20 Years
Venture Capital	-0.7%	-1.5%	-9.3%	18.9%	18.2%	13.2%
Growth Equity	1.3%	2.6%	-0.3%	15.6%	15.0%	12.8%
Buyouts	2.6%	6.1%	8.1%	15.7%	15.3%	11.2%
Mezzanine	3.2%	9.9%	10.7%	11.1%	11.2%	10.5%
Credit Opportunities	1.4%	3.6%	7.4%	7.1%	7.6%	9.1%
Control-Oriented Distressed	1.2%	2.8%	4.9%	13.6%	12.0%	10.7%
Private Energy	1.5%	1.5%	6.6%	4.4%	4.0%	4.7%

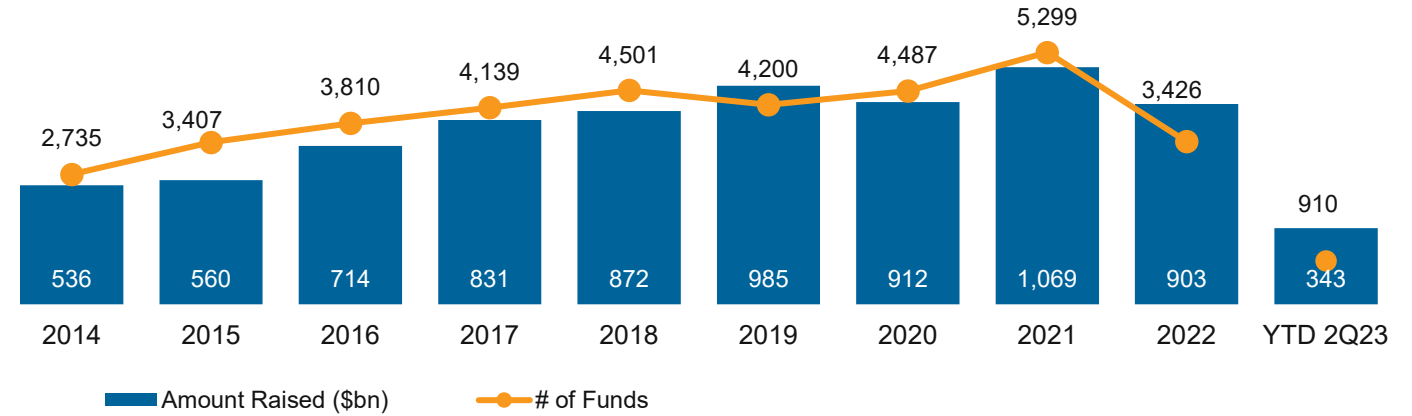
Source: Refinitiv/Cambridge. PME: Public Market Equivalent.

# Private Equity Market Trends

## “Flight to Quality” in Fundraising

- Fundraising declined back to historical levels in 2022 after its frenzied peak in 2021.
- So far, 2023 has been another down year, with LPs being more selective with their commitments.
- With significantly fewer funds closing this year and constrained LP commitment budgets, many GPs are reluctant to come back to market in the near term.

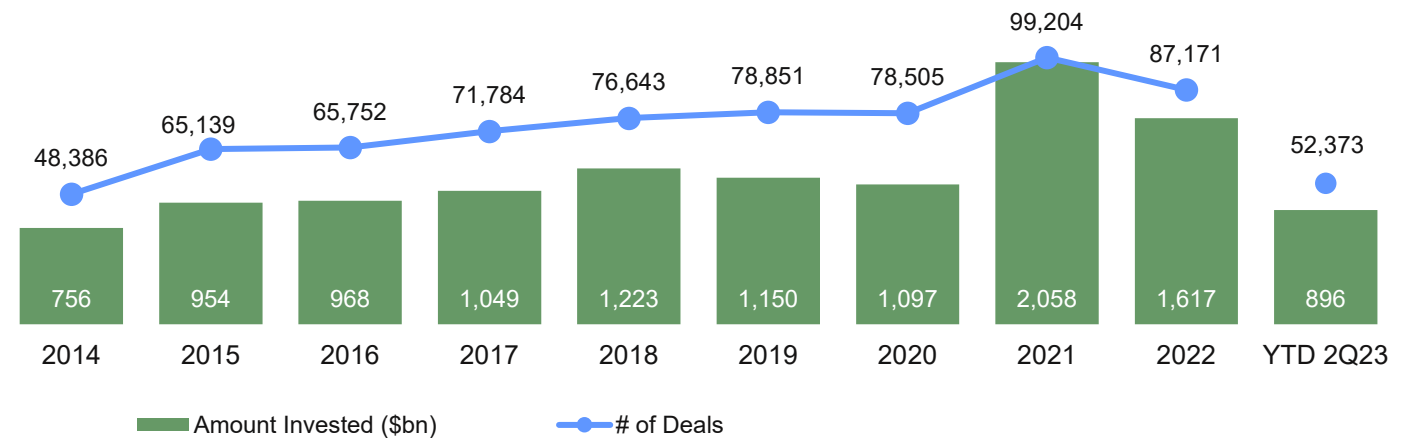
Annual Fundraising



## Slowdown in Deal and Exit Activity

- Both investment and exit activity have slowed markedly, following rising interest rates, declines in the public markets, and resulting price uncertainty.

Annual Deal Activity



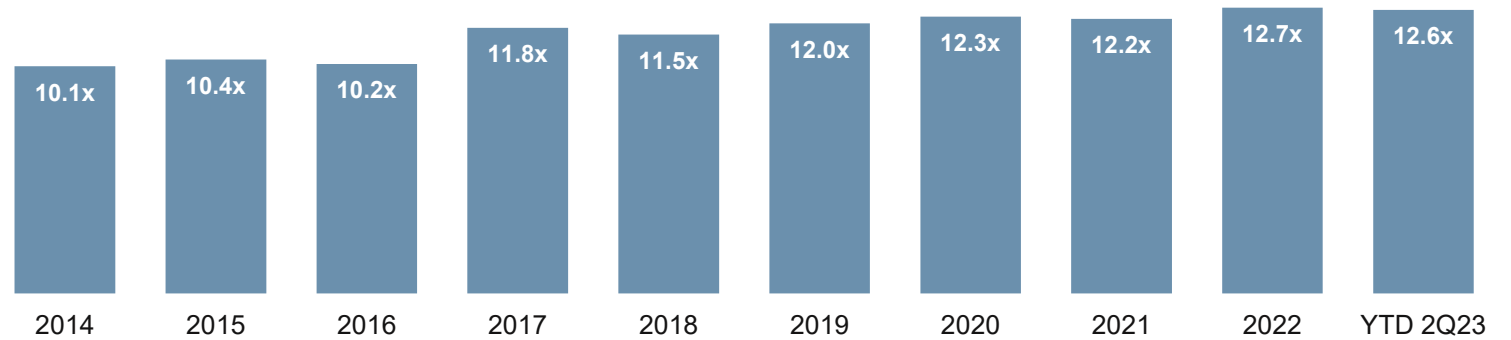
Source: PitchBook

# Private Equity Market Trends

## Buyout Valuations Plateau

- Although buyout valuations have plateaued in the first half of this year, EBITDA multiples remain elevated on an absolute basis, especially given the increases in interest rates.
- The bid-ask spread remains wide as many sellers are unwilling to accept lower valuations, which has contributed to slower deal activity this year.

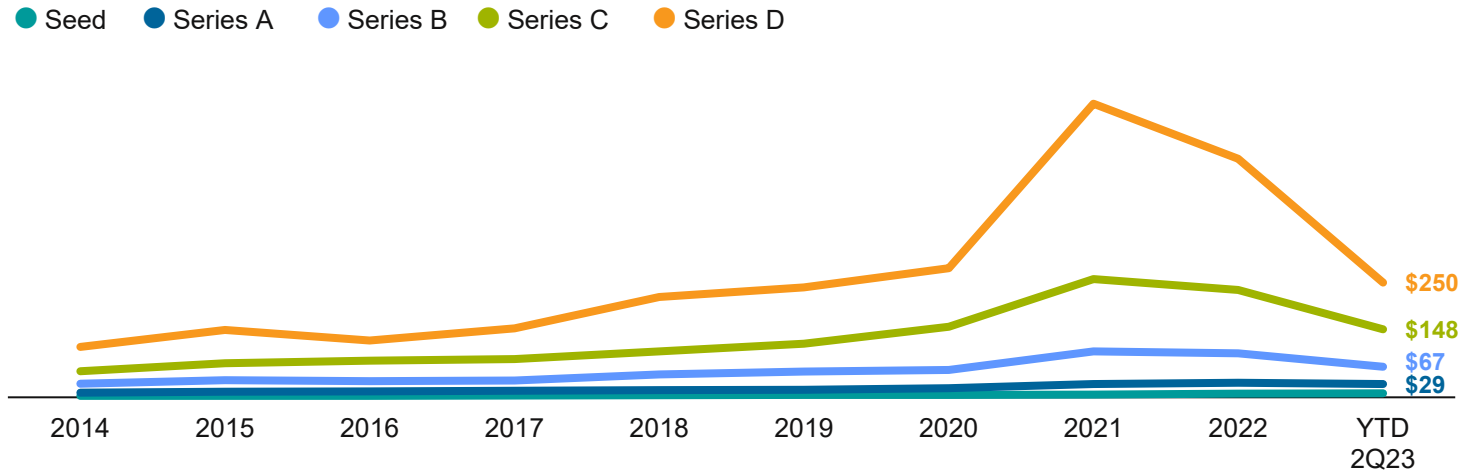
US Buyout EBITDA Multiples



## Late-Stage Valuations Plummet

- Late-stage venture-backed companies have seen a drastic drop in valuations, back to pre-pandemic levels. Late-stage valuations are especially sensitive to public markets declines given these companies are closer to an IPO.

Venture Capital Pre-Money Valuations (\$m)



Source: PitchBook. Both charts show the median multiple or valuation for each calendar year.

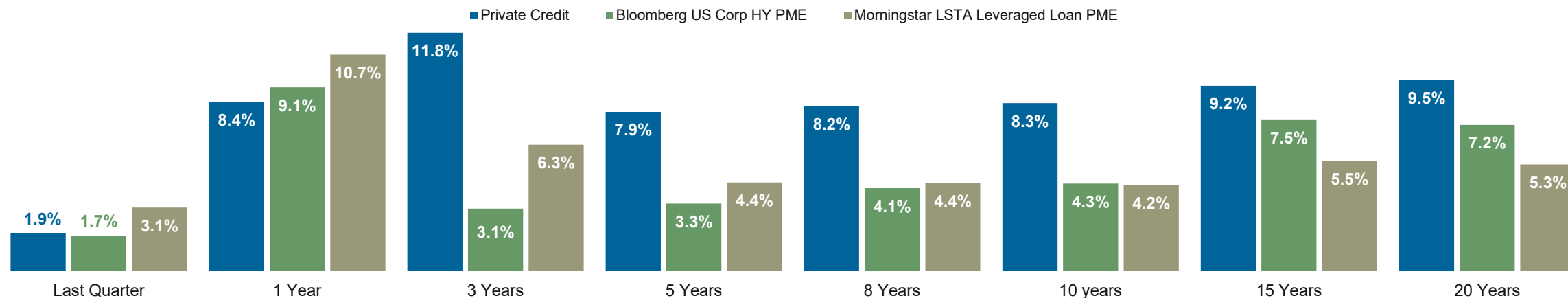
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## Private Credit Market Overview

# Private Credit Market Overview

Performance over time and compared to relevant indices

Pooled Horizon Net IRRs as of June 30, 2023



Pooled Horizon Net IRRs by Strategy as of June 30, 2023

Strategy	Last Quarter	1 Year	3 Years	5 Years	8 Years	10 Years	15 Years	20 Years
Senior Debt	1.9%	8.6%	8.0%	6.3%	6.9%	6.8%	7.0%	N/A
Subordinated Credit	3.2%	10.7%	15.0%	11.1%	11.2%	11.2%	10.7%	10.6%
Credit Opportunities	1.4%	7.4%	11.9%	7.1%	7.4%	7.6%	9.2%	8.9%
<b>Total Private Credit</b>	<b>1.9%</b>	<b>8.4%</b>	<b>11.8%</b>	<b>7.9%</b>	<b>8.2%</b>	<b>8.3%</b>	<b>9.2%</b>	<b>9.5%</b>

- Private credit performance varies across sub-asset class and underlying return drivers. Over the past three years, the asset class has generated a net IRR of 11.8%, outperforming leveraged loans as of June 30, 2023. Higher-risk strategies have performed better than lower-risk strategies.

Source: Refinitiv/Cambridge; index definitions provided in the Appendix.

# 2Q 2023 Private Credit Fundraising Landscape

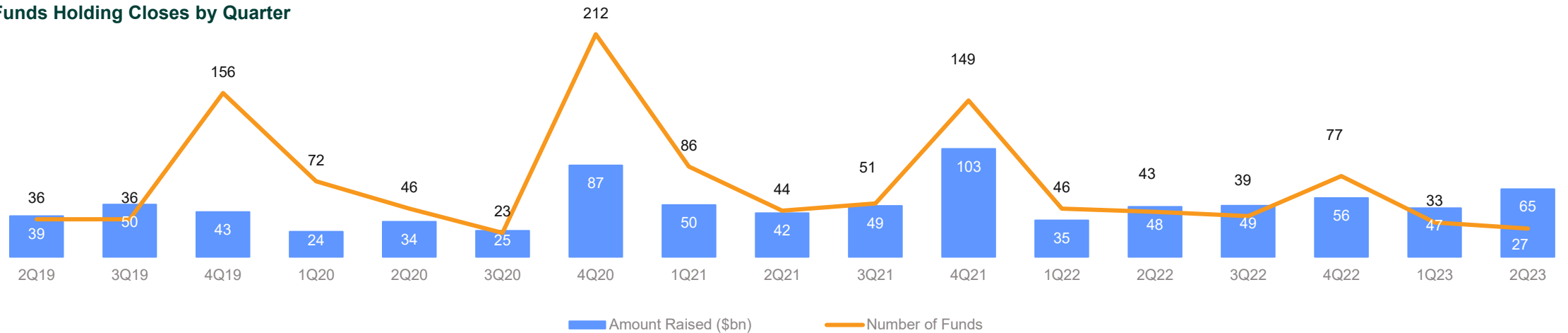
## Activity remains strong through 2Q23

- ▶ Private credit fundraising was robust leading into the Covid dislocation with a particular focus on direct lending, asset-based lending and distressed strategies.
- ▶ In the current rising rate environment, a renewed focus has been placed on relative value, downside protection and managers' internal workout resources.
- ▶ Renewed interest in strategies with strong collateral protection such as asset-based lending as well as capital solutions and distressed strategies.
- ▶ Larger sponsor-backed lending seeing a new focus due to the high yield/BSL disintermediation by private debt.

## Largest Funds Holding Closes in 2Q23

Name	Amount (\$millions)	Strategy
HSBC Bank UK London SME Fund	\$18,713	Direct Lending
HPS Strategic Investment Partners V	\$12,000	Mezzanine Debt
HPS Core Senior Lending Fund II	\$7,300	Direct Lending
Permira Credit Solutions V	\$4,520	Direct Lending

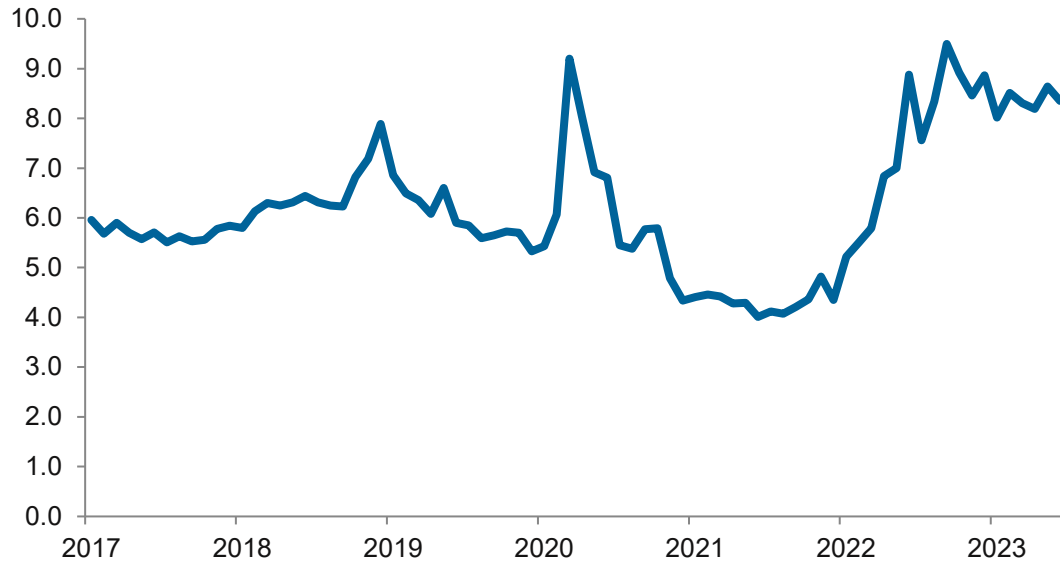
## Funds Holding Closes by Quarter



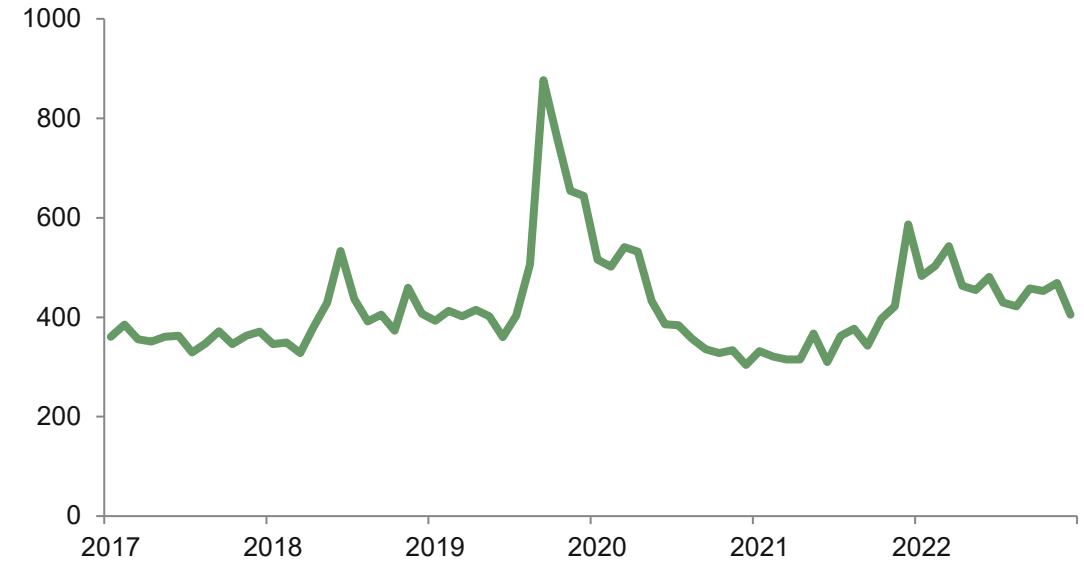
Source: Pitchbook

## 2Q 2023 Yield Spreads

High Yield Effective Yields Ended 6/30/23



US Corporate High Yield Spreads Ended 6/30/23

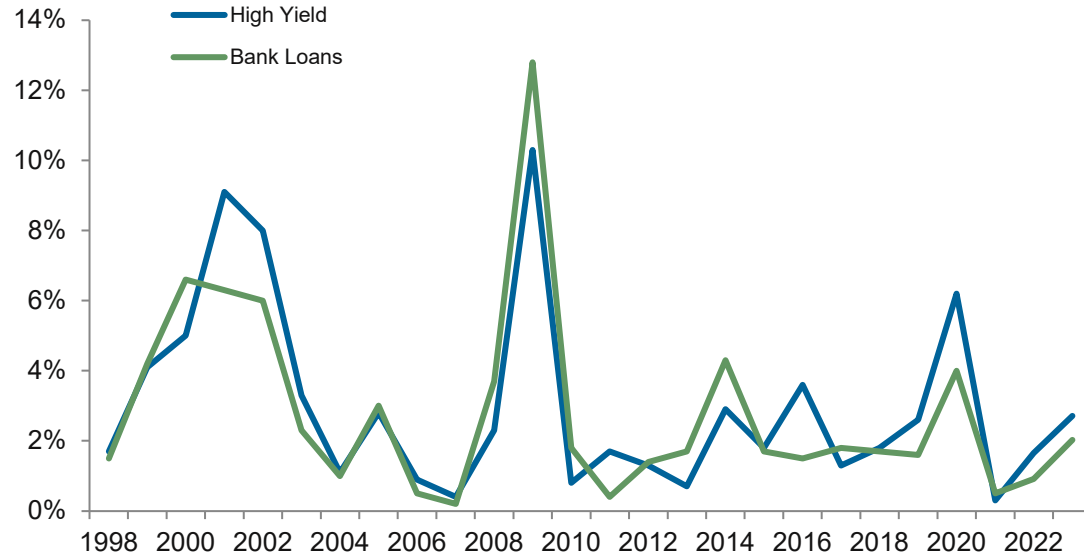


- ▶ U.S. sub-investment grade corporate yields rose dramatically at the beginning of 2022 with yields peaking in September. This was a combination of higher interest rates due to tighter Fed policy and a widening of high yield spreads.
- ▶ Spreads widened during the first half of 2022 due to weaker credit conditions as the U.S. economic outlook worsened. This has since moderated.

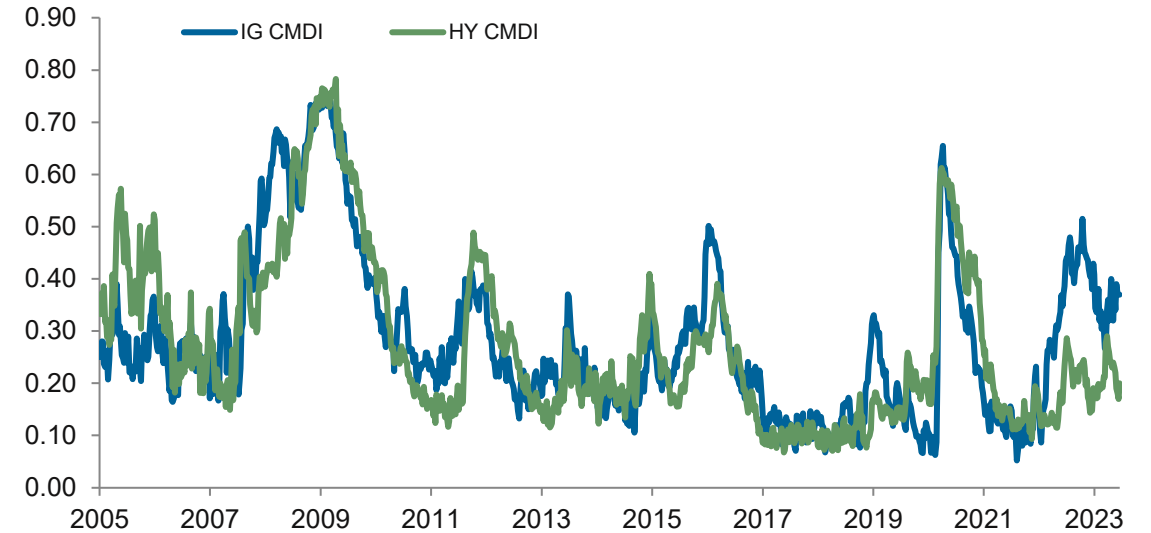
Sources: Bank of America, Federal Reserve Bank of St. Louis

## 2Q 2023 Distressed and Opportunistic Debt

US Corporate Default Rates Ended 6/30/23



Corporate Bond Market Distress Index (CMDI) Ended 6/30/23



- ▶ Default rates for U.S. corporate bonds ticked up in 1Q but remained well below the historical average of 3%-4%. Callan expects defaults to increase somewhat in coming months as economic growth slows and potentially turns negative.
- ▶ The Corporate Bond Market Distress Index (CMDI) rose rapidly during the first nine months of 2022, especially for investment grade bonds, highlighting market volatility and a drying up of liquidity, but has fallen since then. In 2023, as the IG distress index continues to fall, the HY bond indicator is on the rise. The CMDI incorporates a range of indicators, including new issuance and pricing for primary and secondary market bonds and relative pricing between traded and nontraded bonds.

Source: Federal Reserve Bank of New York, JPM

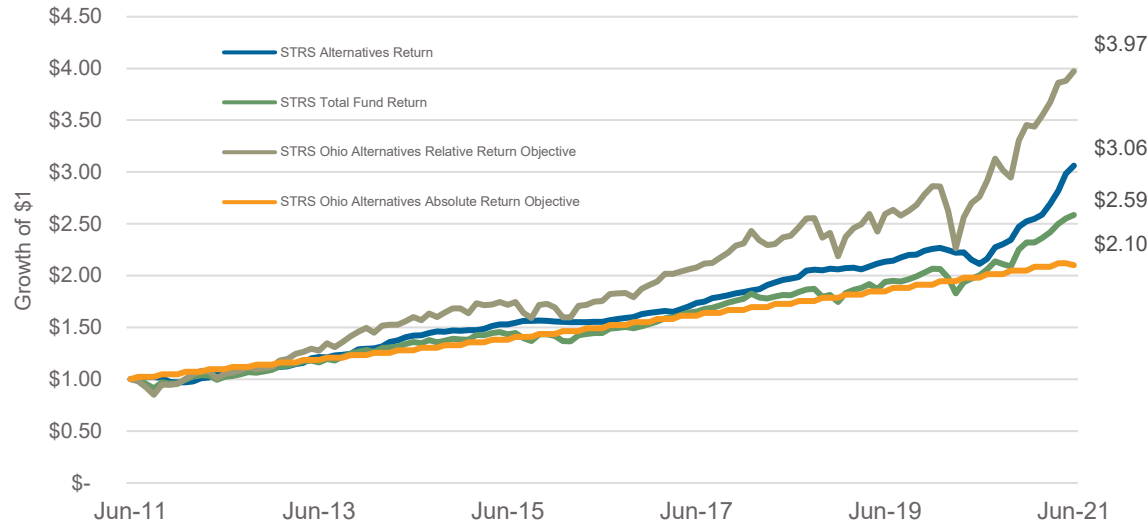


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## Appendix

# STRS Ohio Alternatives Performance (Private Equity + O/D)

STRS Ohio Alternative Investment Performance  
Ten Years: June 30, 2011 to June 30, 2021 <sup>1,2</sup>



STRS Ohio Alternative Investments Performance Comparison  
Annualized Periods ending June 2021

	STRS Ohio Alternatives	STRS Ohio Total Fund	STRS Ohio Alternatives Relative Return Objective <sup>2</sup>	STRS Ohio Alternatives Absolute Return Objective <sup>2,3</sup>
<b>Last 10 years</b>	11.84%	9.97%	14.79%	7.81%
<b>Last 5 years</b>	14.52%	12.34%	17.77%	7.27%
<b>Last 3 years</b>	15.83%	12.62%	18.55%	7.09%
<b>Fiscal Year 2021</b>	44.99%	29.28%	43.91%	7.09%
<b>Risk (10-Yr)</b>	4.91%	7.80%	14.15%	
<b>Sharpe Ratio (10-Yr)</b>	2.30	1.21	1.00	

- STRS Ohio Alternatives returns exceed STRS Ohio Total Fund returns in all time periods.
- STRS Ohio Alternatives returns have meaningfully exceeded long-term Absolute Return Objectives over all time periods
- STRS Ohio Alternatives returns meaningfully exceeded the Relative Return Objective in FY2021
- STRS Ohio Alternatives returns have lagged the Relative Return Objective in longer term historical periods due to lower-risk / lower yielding Opportunistic/Diversified (or “O/D”) returns (as described on a later slide), but STRS Ohio Alternatives have provided a better long-term risk-adjusted return than the Relative Return Objective as illustrated above by the significantly lower volatility and significantly higher Sharpe Ratio over the 10-year period.

<sup>1</sup> STRS Ohio Alternatives returns are always presented net of all management fees, fund expenses and carried interest

<sup>2</sup> STRS Ohio measured Alternatives performance relative to the Alternatives Relative Return Objective and the Alternatives Absolute Return Objective through 6/30/2021

<sup>3</sup> Higher returns over longer periods reflect Objectives from earlier STRS Ohio Asset Allocation Studies

# STRS Ohio Private Equity Performance

STRS Ohio Private Equity Performance  
Ten Years: June 30, 2011 to June 30, 2021 <sup>1,2,3,4</sup>



STRS Ohio Private Equity Performance  
Annualized Periods ending June 2021 <sup>1,2</sup>

	STRS Ohio Alternatives	STRS Ohio Alternatives Relative Return Objective <sup>2,3</sup>	STRS Ohio Alternatives Absolute Return Objective <sup>2,4</sup>
<b>Last 10 years</b>	17.29%	16.06%	8.83%
<b>Last 5 years</b>	22.47%	19.05%	8.32%
<b>Last 3 years</b>	25.96%	19.90%	8.15%
<b>Fiscal Year 2021</b>	64.48%	45.56%	8.15%
<b>Risk (10-Yr)</b>	6.53%	14.14%	
<b>Sharpe Ratio (10-Yr)</b>	2.56	1.10	

- STRS Ohio Private Equity returns exceed Absolute Return Objectives for all time periods
- STRS Ohio Private Equity returns outperformed the Relative Return Objective in all time periods
- STRS Ohio Private Equity returns have also generated significantly better risk-adjusted returns than the Relative Return Objective as illustrated above by the significantly lower volatility and significantly higher Sharpe Ratio over the 10-year period

<sup>1</sup> STRS Ohio PE returns are always presented net of all management fees, fund expenses and carried interest

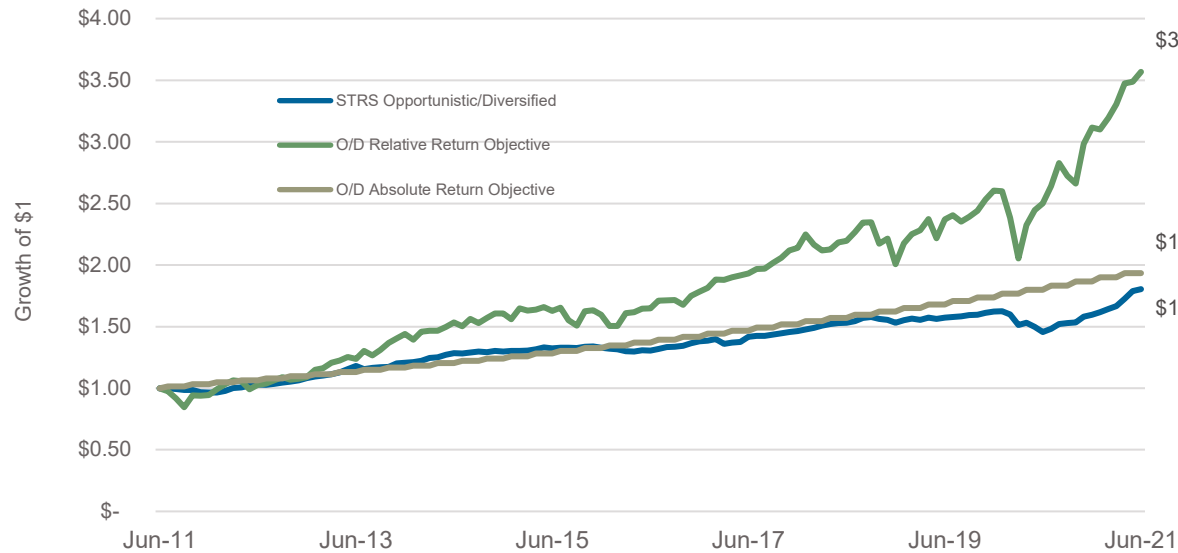
<sup>2</sup> STRS Ohio measured Private Equity performance relative to the Private Equity Relative Return Objective and the Private Equity Absolute Return Objective through 06/30/2021

<sup>3</sup> STRS Ohio Private Equity Relative Return Objective equals the Russell 3000 Equity Index plus 1% per year

<sup>4</sup> STRS Ohio Private Equity Absolute Return Objective is based upon a 10.70% Objective starting fiscal 2007, a 9.00% Objective starting fiscal 2013 and an 8.15% Objective starting fiscal 2018

# STRS Ohio Opportunistic/Diversified (O/D) Performance

STRS Ohio O/D Performance  
Ten Years: June 30, 2011 to June 30, 2021 <sup>1,2,3,4</sup>



STRS Ohio Private Equity Performance  
Annualized Periods ending June 2021 <sup>1,2</sup>

	STRS Ohio Opportunistic/Diversified <sup>2</sup>	STRS Ohio O/D Relative Return Objective <sup>3</sup>	STRS Ohio O/D Absolute Return Objective <sup>4</sup>
<b>Last 10 years</b>	6.08%	13.57%	6.79%
<b>Last 5 years</b>	6.69%	16.73%	6.48%
<b>Last 3 years</b>	5.64%	17.57%	6.35%
<b>Fiscal Year 2021</b>	24.07%	42.78%	6.35%
<b>Risk (10-Yr)</b>	4.23%	14.15%	
<b>Sharpe Ratio (10-Yr)</b>	1.30	0.92	

- STRS Ohio Opportunistic/Diversified returns have trailed Relative Return Objectives over all periods shown but have exceeded the Absolute Return Objective in two of the four time periods shown. STRS Ohio Private Equity returns outperformed the Relative Return Objective in all time periods
- The Relative Return Objective underperformance is due primarily to (1) very strong public US stock returns over the last 10 years, (2) an investment emphasis on credit assets within Opportunistic and (3) an emphasis on lower risk Diversified strategies within O/D that have caused lower returns, which collectively made the Relative Return Objective difficult to outperform.

<sup>1</sup> STRS Ohio O/D returns are always presented net of all management fees, fund expenses and carried interest

<sup>2</sup> STRS Ohio measured O/D performance relative to the O/D Relative Return Objective and the O/D Absolute Return Objective through 06/30/2021

<sup>3</sup> STRS Ohio O/D Relative Return Objective equals the Russell 3000 Equity Index minus 1% per year

<sup>4</sup> STRS Ohio O/D Absolute Return Objective is based upon a 7.50% Objective starting in fiscal 2009, a 7.00% Objective beginning fiscal 2013 and an 6.35% Objective beginning

# Alternatives Program Benchmark Definitions

## Total Fund Benchmarks – Time-Weighted

Alternative Investments Blended Benchmark	Effective July 1, 2022, the Alternative Investment Blended Benchmark consist of the Private Equity Benchmark multiplied by 47.4% plus the Opportunistic/diversified Blended Benchmark multiplied by 52.6%. From July 1, 2021 to June 30, 2022 the Alternative Investment Blended Benchmark consisted of the Private Equity Benchmark multiplied by 41.2% plus the Opportunistic/diversified Blended Benchmark multiplied by 58.8%.
Alternative Investments Blended Relative Return Objective	Through June 30, 2021, the Alternative Investments Blended Relative Return Objective is calculated monthly using a blend of the Private Equity and Opportunistic/Diversified Relative Return Objectives based on the policy weights in effect during the respective periods.
Alternative Investments Absolute Return Objective	Through June 30, 2021, the absolute return objective for Total Alternative Investments is 7.09% (Blended), Private Equity is 8.15%, and Opportunistic/Diversified is 6.35%, all of which are based on the 2017 Asset Liability Study.
Private Equity Benchmark	The Private Equity Benchmark is the Cambridge Associates Private Equity and Venture Capital Index one quarter lagged to be consistent with external fund reporting effective July 1, 2021.
Private Equity Absolute Return Objective	Through June 30, 2021, the absolute return objective for Private Equity is 8.15%, based on the 2017 Asset Liability Study.
Private Equity Relative Return Objective	Through June 30, 2021, the Private Equity Relative Return Objective is calculated monthly and is the Russell 3000 Index plus 1%.
Opportunistic/Diversified Blended Benchmark	The Opportunistic/Diversified blended benchmark consists of the actual Opportunistic Investments Portfolio weight multiplied by the Cambridge Associates Private Credit Index one quarter lagged to be consistent with external fund reporting plus the actual weight of the Diversified Investments Portfolio multiplied by the HFRI Fund of Funds Composite Index, which is a monthly index where subsequent revisions will be reflected in the following period effective July 1, 2021.
Opportunistic/Diversified Absolute Return Objective	Through June 30, 2021, the absolute return objective for Opportunistic/Diversified is 6.35%, based on the 2017 Asset Liability Study.
Opportunistic/Diversified Relative Return Objective	Through June 30, 2021, the Opportunistic Relative Return Objective is calculated monthly and is the Russell 3000 Index minus 1%.

## Alternative Investments Peer Groups

Private Equity	LSEG/Cambridge database, includes vintage years 2007-2023, Global Buyout, Growth Equity, and Venture Capital strategy types
Opportunistic	LSEG/Cambridge database, includes vintage years 2009-2023, Global Credit Opportunities, Senior Debt, and Subordinated Debt

# Private Equity Peer Group Definitions

## General Partner

Thoma Bravo	2012-2016, 2018, 2020-2022 US Buyout
Bain Capital	2007-2009, 2014-2015, 2017-2019 US Venture Capital and Buyout
Tiger Iron	2018-2019 US Venture Capital
Grosvenor	2007-2008, 2010, 2014-2015 US Buyout
Silver Lake	2007, 2013, 2017-2020 US Buyout
TA Associates	2010, 2016, 2019, 2020, 2021 Global Buyout and Growth Equity
Commonfund	2010, 2012, 2013, 2015 Global Venture Capital
Francisco Partners	2011, 2015-2016, 2018, 2020, 2022 US Buyout
General Catalyst	2011, 2013, 2016, 2018, 2020-2021 US Venture Capital
Hermes GPE	2014, 2016-2018 Global Growth Equity

## Strategy

Domestic Private Equity	2007-2023 US Buyout
Venture Capital/Growth	2007-2023 US Venture Capital
International Private Equity	2007-2023 Non-US Buyout
Total Private Equity	2007-2023 Global Buyout, Growth Equity, Venture Capital

Vintage Year	Global Buyout, Venture Capital, Growth Equity
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## Opportunistic/Diversified Peer Group Definitions

### General Partner

Sixth Street Partners	2011, 2012, 2014, 2015, 2018-2022 Credit Opportunities
Blue Owl Capital	2014-2015, 2017-2018, 2020, 2022, 2023 Credit Opportunities, Senior Debt, Subordinated Debt
Ares Management Corporation	2012, 2017-2023 Credit Opportunities, Senior Debt
Reverence Capital Partners	2014, 2019, 2020, 2021, 2023 Credit Opportunities, Senior Debt, Subordinated Debt
Oaktree Capital Management	2011, 2013, 2015-2018 Credit Opportunities
Angelo Gordon	2019-2022 Credit Opportunities, Senior Debt, Subordinated Debt
Golub Capital	2014, 2018-2020 Senior Debt, Subordinated Debt
Fortress Investment Group LLC	2014, 2018-2020, 2023 Credit Opportunities
Stone Point Capital	2020-2023 Subordinated Debt, Senior Debt, Buyout
Cerberus Capital	2018, 2019, 2022 Credit Opportunities

### Strategy

Specialty Finance	2011-2023 Credit Opportunities
Direct Lending	2011, 2014-2023 Senior Debt
Banking and Insurance	2014, 2015, 2017-2023 Credit Opportunities, Senior Debt, Subordinated Debt
Co-Investment/Direct	2018-2023 Subordinated Debt, Credit Opportunities, Senior Debt
Energy and Natural Resources	2010, 2012, 2013-2015, 2017-2020 Private Energy
Infrastructure	2009, 2013, 2020-2022 Infrastructure
Total Opportunistic	2009 - 2023 Credit Opportunities, Senior Debt, Subordinated Debt

Vintage Year	Credit Opportunities, Senior Debt, Subordinated Debt
--------------	--

- **Matters requiring board action:**
  - Review and approval of the Semiannual Broker Evaluation and associated polices
- **Educational or scheduled updates and reviews requiring no action today:**
  - Summary of Investment Activity Report, October and November 2023
  - Albourne fee validation
  - CEM Benchmarking
  - Callan alternative investment quarterly performance review as of Sept. 30, 2023
  - **Callan quarterly performance review as of Sept. 30, 2023**
  - Review of October and November investment transactions
- **Summary of requests**





# Callan LLC

## Performance Review

STRS Ohio Board Meeting

December 2023

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**Michael Joecken**  
Senior Vice President

**Brady O'Connell, CFA, CAIA**  
Senior Vice President

# Trustee Summary Report Period Ending September 30, 2023

## STRS Ohio Total Fund Report Fiscal YTD 1, 3, 5, 10 & 20 Years Ending September, 2023

Periods Ending September, 2023  
Annualized Rates of Return

Experienced Returns	Fiscal YTD	1 Year	3 Years	5 Years	10 Years	20 Years
<b>Have returns affected funded ratio?</b>						
1. Total fund return *	-1.68%	10.42%	7.76%	7.12%	8.04%	8.11%
2. Actuarial discount rate ***	1.75%	7.00%	7.00%	7.18%	7.41%	7.68%
3. Relative Performance (1-2)	-3.43%	3.42%	0.76%	-0.06%	0.64%	0.43%
<b>Has plan been rewarded for capital market risk?</b>						
4. Total fund benchmark return	-1.78%	10.51%	6.59%	6.46%	7.56%	7.71%
5. Minimum risk/high cost policy of 91-Day T-Bills	1.31%	4.47%	1.70%	1.72%	1.12%	1.36%
6. Impact of asset mix policy (4-5)	-3.09%	6.04%	4.89%	4.74%	6.44%	6.35%
<b>Has plan been rewarded for active management risk?</b>						
7. Active management effect (1-4) *	0.10%	-0.09%	1.17%	0.66%	0.48%	0.40%
8. Net active management return estimated **	0.07%	-0.22%	1.05%	0.54%	0.35%	0.28%

\* Gross Returns are net of transaction costs and gross of management fees, except for alternative investments & real estate where the return is also net of all external investment management fees and costs, including carried interest and other fund expenses. Certain Callan returns may differ from STRS due to rounding.

\*\* Net returns are net of all internal and external investment management fees and costs, including carried interest and other fund expenses.

\*\*\* The actuarial rate of return assumption was decreased from 7.45% to 7.00%, effective as of 6/30/2021.

The STRS real estate return includes the use of leverage.

The STRS Ohio total fund policy return (blended benchmark) is 26% Russell 3000, 22% International Blended Benchmark, 22% Fixed Income Blended Benchmark, 10% Real Estate Blended Benchmark, 19% Alternative Investments Blended Benchmark (prior to July 1, 2021, the Alternative Investment benchmark was the Alternative Investment Actual Return), and 1% 90-day Treasury Bill as of July 1, 2022.



## STRS Ohio Investment Performance

# STRS Asset Allocation v. Policy Target

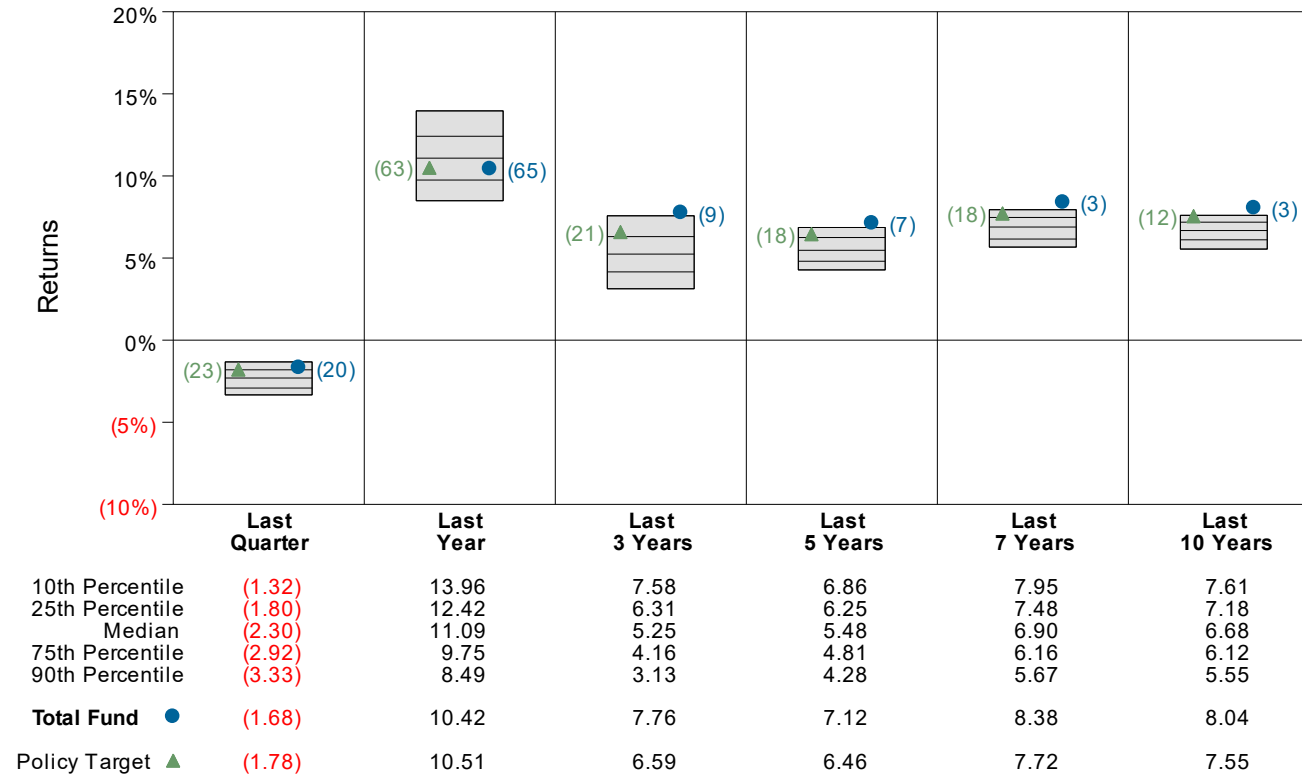
As of September 30, 2023



Asset Class	\$Millions Actual	Weight Actual	Target	Percent Difference	\$Millions Difference
Domestic Equity	22,756	26.0%	26.0%	0.0%	18
International Equity	19,203	22.0%	22.0%	(0.0%)	(37)
Fixed Income	16,665	19.1%	22.0%	(2.9%)	(2,575)
Liquidity Reserve	1,177	1.3%	1.0%	0.3%	302
Real Estate	8,704	10.0%	10.0%	(0.0%)	(42)
Alternative Investments	18,951	21.7%	19.0%	2.7%	2,334
<b>Total</b>	<b>87,455</b>	<b>100.0%</b>	<b>100.0%</b>		

# STRS Ohio v. Callan Public Fund Sponsor Database

## Callan Public Fund Sponsor Database

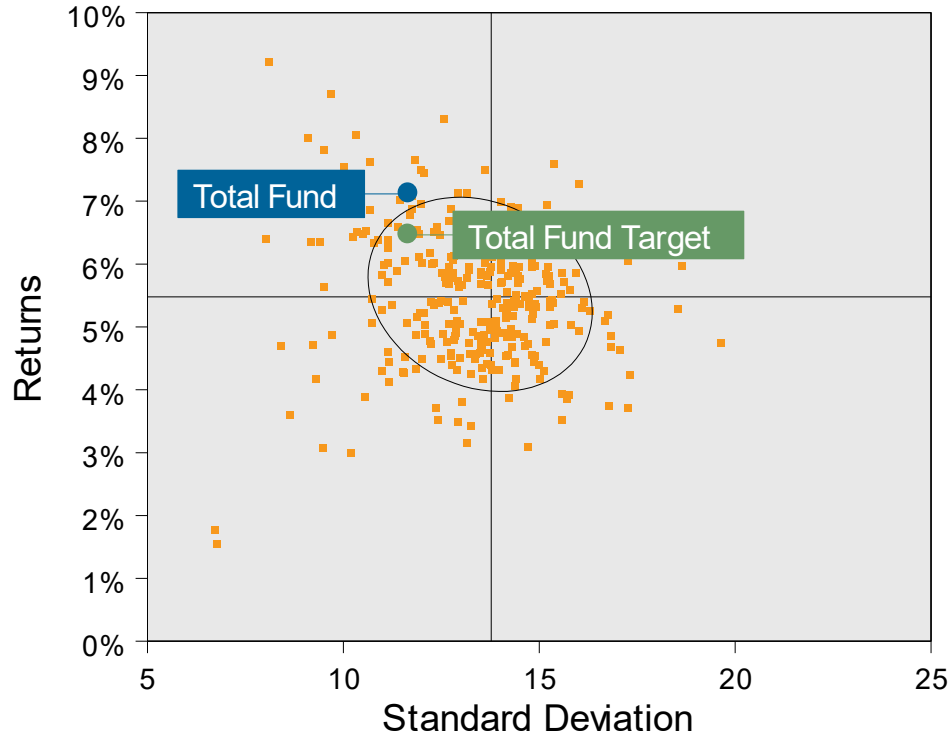


- For one-year ended 9/30/2023, STRS Ohio underperformed the benchmark by 9 basis points and ranked at the 65<sup>th</sup> percentile of the Callan Public Fund Sponsor Database.
- For the past five-years ended 9/30/2023, STRS Ohio had a 66 basis point advantage over the benchmark and ranked at the 7<sup>th</sup> percentile of the Callan Public Fund Sponsor Database.
- For 10-years ended 9/30/2023, STRS Ohio bested the benchmark by 49 basis points and ranked at the 3<sup>rd</sup> percentile of the Callan Public Fund Sponsor Database.

Gross returns are illustrated, except for alternative investments & real estate where the return is net of all external investment management fees and costs, including carried interest and other fund expenses. Certain Callan returns may differ from STRS Ohio due to rounding.

# STRS Ohio v. Callan Public Fund Sponsor Database

Callan Public Fund Sponsor Database (Gross)  
Annualized Five Year Risk vs Return



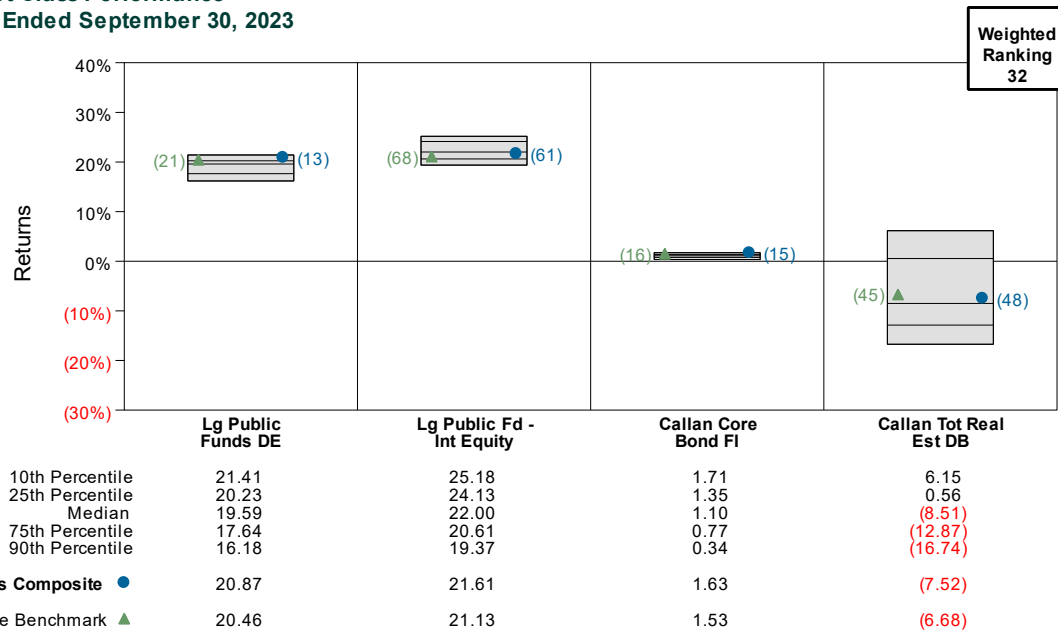
- For the five-years ending September 30, 2023, STRS Ohio posted an annualized return of 7.12% relative to the 6.46% return of the total fund target.
- STRS Ohio achieved a return that ranked at the 7<sup>th</sup> percentile during the last five years, while exhibiting less risk than the median of the Callan Public Fund Sponsor Database, (“risk” as measured by Standard Deviation and Median represented by the vertical crosshair).
- The ellipse represents the 10<sup>th</sup> to the 90<sup>th</sup> percentile of Callan’s Public Fund Sponsor Database.

# STRS Ohio Attribution – 1 Year

## One Year Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	26%	26%	20.87%	20.46%	0.10%	(0.07%)	0.03%
International Equity	22%	22%	21.61%	21.13%	0.09%	(0.03%)	0.05%
Fixed Income	19%	22%	1.63%	1.53%	0.01%	0.36%	0.38%
Real Estate	10%	10%	(7.52%)	(6.68%)	(0.10%)	(0.11%)	(0.21%)
Alternative Investments	21%	19%	4.38%	5.10%	(0.16%)	(0.20%)	(0.36%)
Global Equities	0%	0%	-	-	0.00%	(0.00%)	(0.00%)
Liquidity Reserve	1%	1%	4.76%	4.47%	0.00%	(0.01%)	(0.00%)
Total Fund Allocation	0%	0%	12.08%	12.08%	0.00%	0.03%	0.03%
<b>Total</b>			<b>10.42%</b>	<b>10.51%</b>	<b>+(0.06%)</b>	<b>+(0.03%)</b>	<b>(0.09%)</b>

## Total Asset Class Performance One Year Ended September 30, 2023



- The Total Fund one-year return lagged its benchmark by 9 basis points.
- Relative outperformance from Fixed Income was offset by underperformance from Real Estate and Alternative Investments.
- Asset allocation differences from target had a small net negative impact on performance.

- Domestic Equity outperformed its composite benchmark and ranked at the 13<sup>th</sup> percentile of the peer group.
- International Equity led its benchmark and ranked at the 61<sup>st</sup> percentile of peers.
- Fixed Income led its composite benchmark and ranked at the 15<sup>th</sup> percentile of its peers.
- Real Estate trailed its performance benchmark and ranked at the 48<sup>th</sup> percentile of the peer group.

\*Total Fund Allocation portfolio inception: January 2014.

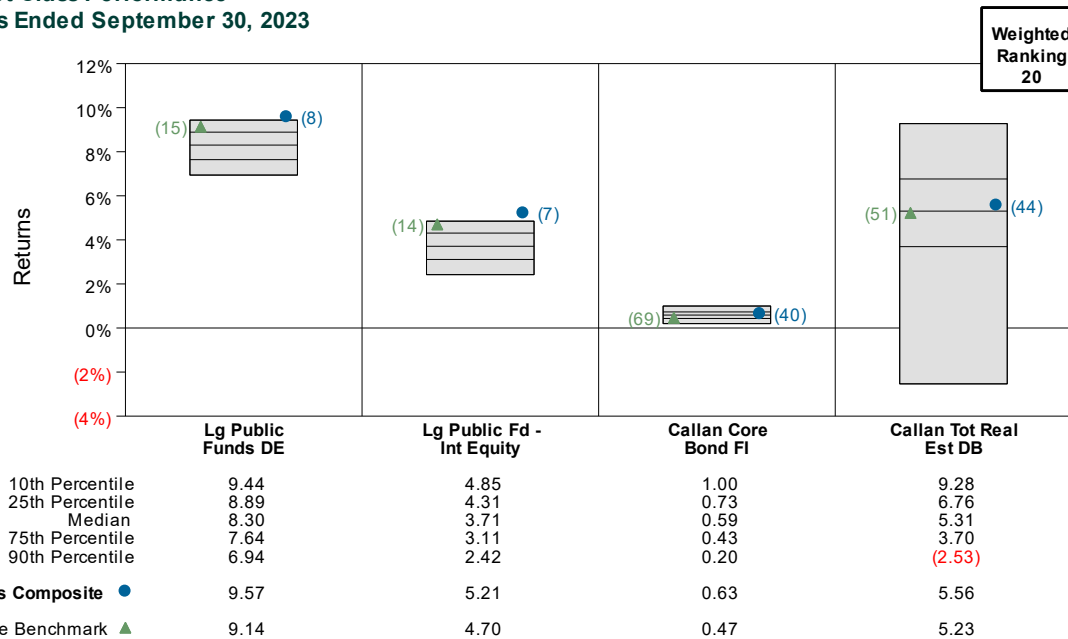
# STRS Ohio Attribution – 5 Years

## Five Year Annualized Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	27%	28%	9.57%	9.14%	0.12%	(0.06%)	0.06%
International Equity	22%	23%	5.21%	4.70%	0.11%	0.02%	0.13%
Fixed Income	19%	21%	0.63%	0.47%	0.03%	0.11%	0.14%
Real Estate	10%	10%	5.56%	5.23%	0.05%	(0.03%)	0.02%
Alternative Investments	19%	17%	12.16%	11.35%	0.16%	0.09%	0.25%
Global Equities	1%	0%	-	-	0.00%	0.00%	0.00%
Liquidity Reserve	2%	1%	1.76%	1.72%	0.00%	0.01%	0.01%
Total Fund Allocation	1%	0%	6.47%	6.47%	0.00%	0.05%	0.05%

**Total** 7.12% = 6.46% + 0.46% + 0.19% 0.66%

## Total Asset Class Performance Five Years Ended September 30, 2023



\*Total Fund Allocation portfolio inception: January 2014.

- The Total Fund five-year return had a 66 basis point advantage over the benchmark.
- Positive relative performance was driven by active management across all asset classes. An underweight to Fixed Income and overweight to Alternative Investments contributed positively.
- At the Total Fund level, both active management and asset allocation decisions added value.

- Domestic Equity outperformed its benchmark and finished at the 8<sup>th</sup> percentile of peers.
- International Equity exceeded its benchmark and finished at the 7<sup>th</sup> percentile of peers.
- Fixed Income outperformed its benchmark and finished at the 40<sup>th</sup> percentile of peers.
- Real Estate beat its benchmark and finished at the 44<sup>th</sup> percentile of peers.



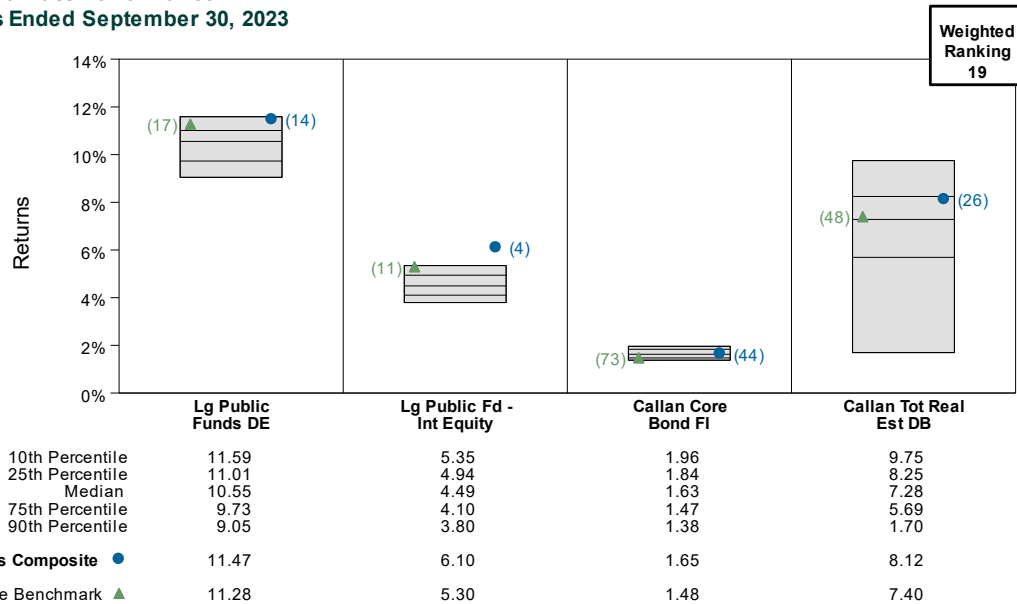
# STRS Ohio Attribution – 10 Years

## Ten Year Annualized Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	29%	29%	11.47%	11.28%	0.05%	(0.05%)	0.00%
International Equity	23%	24%	6.10%	5.30%	0.19%	0.03%	0.22%
Fixed Income	18%	20%	1.65%	1.48%	0.02%	0.09%	0.12%
Real Estate	10%	10%	8.12%	7.40%	0.08%	(0.02%)	0.06%
Alternative Investments	16%	16%	11.45%	11.05%	0.08%	0.02%	0.10%
Global Equities	1%	0%	-	-	0.00%	0.00%	0.00%
Liquidity Reserve	2%	1%	1.16%	1.11%	0.00%	(0.06%)	(0.06%)
Total Fund Allocation	0%	0%	-	-	0.00%	0.04%	0.04%

**Total** **8.04% = 7.55% + 0.43% + 0.06%** **0.49%**

## Total Asset Class Performance Ten Years Ended September 30, 2023

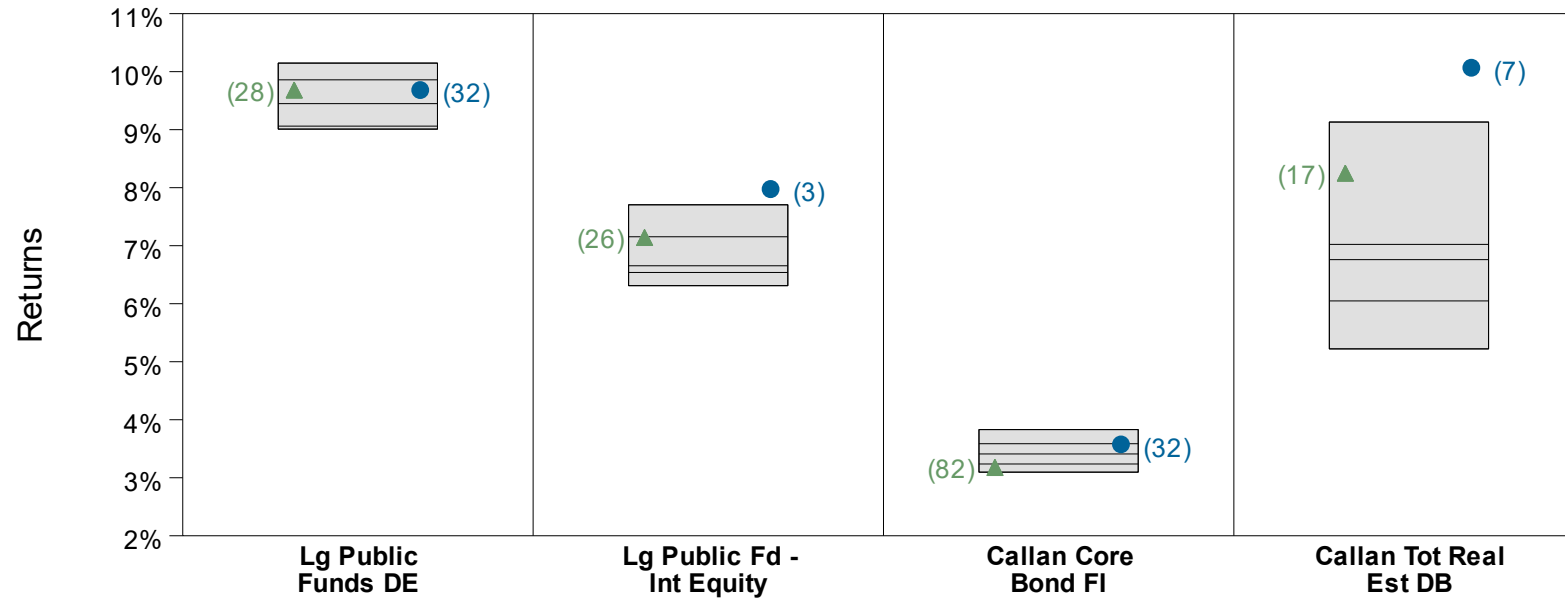


- The Total Fund 10-year return led the benchmark by 49 basis points with outperformance from favorable manager and security selection decisions.
- International Equity, Fixed Income, Real Estate, and Alternative Investments outperformed their respective benchmarks.
- Asset allocation decisions combined for a positive impact during the period.
- Domestic Equity outperformed its benchmark and ranked at the 14<sup>th</sup> percentile of peers.
- International Equity outperformed its benchmark and ranked in at the 4<sup>th</sup> percentile of peers.
- Fixed Income outperformed its benchmark and ranked at the 44<sup>th</sup> percentile of peers.
- Real Estate led its benchmark and ranked at the 26<sup>th</sup> percentile of peers.

\*Total Fund Allocation portfolio inception: January 2014.

# STRS Ohio Asset Class Returns

Total Asset Class Performance  
Twenty Years Ended September 30, 2023



10th Percentile  
25th Percentile  
Median  
75th Percentile  
90th Percentile

**Lg Public Funds DE**

**Lg Public Fd - Int Equity**

**Callan Core Bond FI**

**Callan Tot Real Est DB**

**Asset Class Composite** ●

Composite Benchmark ▲

10.15  
9.86  
9.45  
9.06  
9.01  
9.66  
9.68

7.71  
7.15  
6.66  
6.54  
6.31  
7.95  
7.14

3.83  
3.59  
3.41  
3.24  
3.10  
3.55  
3.18

9.13  
7.02  
6.76  
6.05  
5.22  
10.05  
8.25

■ Total Fund 20-year gross return: 8.11%

Gross returns are illustrated, except for alternative investments & real estate where the return is net of all external investment management fees and costs, including carried interest and other fund expenses. Certain Callan returns may differ from STRS Ohio due to rounding.



## Additional Trustee Summary Reports

# Gross and Net Total Fund Returns Period Ending September 30, 2023

## Gross and Net Total Fund Return

### Periods Ending September, 2023 Annualized Rates of Return

#### Gross and net total fund return

1. Total fund return \*
2. External alternative & real estate mgmt. fees reflected in line 1 \*\*
3. Gross total fund return (1 + 2)
4. Total investment management costs
5. Net total fund return (3-4) \*\*\*

	Fiscal YTD	1 Year	3 Year	5 Year	10 Year	20 Year
1. Total fund return *	-1.68%	10.42%	7.76%	7.12%	8.04%	8.11%
2. External alternative & real estate mgmt. fees reflected in line 1 **	0.06%	0.22%	0.22%	0.23%	0.22%	0.18%
3. Gross total fund return (1 + 2)	-1.62%	10.64%	7.98%	7.35%	8.26%	8.29%
4. Total investment management costs	0.09%	0.35%	0.34%	0.35%	0.35%	0.30%
5. Net total fund return (3-4) ***	-1.71%	10.29%	7.64%	7.00%	7.91%	7.99%

\* Gross Returns are net of transaction costs and gross of management fees, except for alternative investments & real estate where the return is also net of all external investment management fees and costs, including carried interest and other fund expenses.

\*\* Includes management fees net of fee waivers/rebates and does not include carried interest or other fund expenses.

\*\*\* Net returns are net of all internal and external investment management fees and costs, including carried interest and other fund expenses.

# Total Investment Management Costs

## Total Investment Management Costs

	2022 Investment Management Costs *			Dec. 2022 Assets (Billions)
	Fees to Assets Managed (bps)	Fees to Total Fund (bps)	Fees (\$000's)	
<b>Total Investment Management Costs *</b>				
Externally Managed:				
Alternative Investments	104	20	\$ 187,035	\$ 18.4
Real Estate	153	2	\$ 19,363	\$ 1.3
All Other External Managers **	39	6	\$ 52,583	\$ 12.1
Internal Managers	13	7	\$ 63,833	\$ 54.1
<b>Total Investment Management Costs *</b>	<b>35</b>	<b>35</b>	<b>\$ 322,814</b>	<b>\$ 85.9</b>

\* Annual fees are based upon the preliminary CEM investment report for calendar year 2022.

Investment Management costs include internal investment department salaries, incentive compensation, benefits, external manager fees, the allocation of ITS costs, overhead expenses, oversight, custodial & other costs. Investment management costs exclude carried interest and other fund expenses.

\*\* Includes fixed income, domestic equity and international equity external manager fees.



## Investment Manager Performance

# Asset Class Performance vs. Benchmarks

	Last Quarter	Last Year	Last 3 Years	Last 5 Years
<b>Total Domestic Equity</b>	<b>(2.78%)</b>	<b>20.87%</b>	<b>9.66%</b>	<b>9.57%</b>
Domestic Equity Benchmark	(3.25%)	20.46%	9.38%	9.14%
<b>Total International Equity</b>	<b>(2.68%)</b>	<b>21.61%</b>	<b>8.71%</b>	<b>5.21%</b>
Int'l Blended Benchmark	(2.48%)	21.13%	7.21%	4.70%
<b>Total Fixed Income</b>	<b>(2.63%)</b>	<b>1.63%</b>	<b>(4.18%)</b>	<b>0.63%</b>
Fixed Income Blended Benchmark	(2.40%)	1.53%	(4.39%)	0.47%
<b>Total Real Estate</b>	<b>(3.17%)</b>	<b>(7.52%)</b>	<b>7.00%</b>	<b>5.56%</b>
Real Estate Blended Benchmark	(2.23%)	(6.68%)	6.25%	5.23%
<b>Total Alternative Investments</b>	<b>2.16%</b>	<b>4.38%</b>	<b>16.59%</b>	<b>12.16%</b>
Alternative Investment Blended Bmk	1.71%	5.10%	-	-
<b>Liquidity Reserve</b>	<b>1.36%</b>	<b>4.76%</b>	<b>1.81%</b>	<b>1.76%</b>
Liquid Reserve Index	1.31%	4.47%	1.70%	1.72%
<b>Total Fund</b>	<b>(1.68%)</b>	<b>10.42%</b>	<b>7.76%</b>	<b>7.12%</b>
Total Fund Benchmark	(1.78%)	10.51%	6.59%	6.46%

# Asset Class Performance vs. Benchmarks

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Last 30 Years
<b>Total Domestic Equity</b>	<b>11.47%</b>	<b>11.15%</b>	<b>9.66%</b>	<b>7.89%</b>	<b>9.22%</b>
Domestic Equity Benchmark	11.28%	11.05%	9.68%	8.12%	9.92%
<b>Total International Equity</b>	<b>6.10%</b>	<b>6.59%</b>	<b>7.95%</b>	<b>7.41%</b>	-
Int'l Blended Benchmark	5.30%	5.72%	7.14%	6.34%	-
<b>Total Fixed Income</b>	<b>1.65%</b>	<b>3.44%</b>	<b>3.55%</b>	<b>4.27%</b>	<b>4.99%</b>
Fixed Income Blended Benchmark	1.48%	2.94%	3.18%	3.86%	4.41%
<b>Total Real Estate</b>	<b>8.12%</b>	<b>6.36%</b>	<b>10.05%</b>	<b>9.91%</b>	<b>9.94%</b>
Real Estate Blended Benchmark	7.40%	6.43%	8.25%	8.40%	8.58%
<b>Total Alternative Investments</b>	<b>11.45%</b>	<b>9.69%</b>	<b>11.76%</b>	<b>8.94%</b>	<b>9.03%</b>
<b>Liquidity Reserve</b>	<b>1.16%</b>	<b>0.91%</b>	<b>1.52%</b>	<b>2.01%</b>	<b>2.50%</b>
Liquid Reserve Index	1.11%	0.78%	1.35%	1.79%	2.31%
<b>Total Fund</b>	<b>8.04%</b>	<b>8.00%</b>	<b>8.11%</b>	<b>7.32%</b>	<b>7.80%</b>
Total Fund Benchmark	7.55%	7.74%	7.71%	7.04%	7.67%



# Investment Manager Returns and Peer Group Rankings

	Last Quarter		Last Year		Last 3 Years		Last 5 Years		Last 10 Years	
<b>Total Domestic Equity</b>	<b>(2.78%)</b>	<b>10</b>	<b>20.87%</b>	<b>13</b>	<b>9.66%</b>	<b>50</b>	<b>9.57%</b>	<b>8</b>	<b>11.47%</b>	<b>14</b>
Domestic Equity Benchmark	(3.25%)	32	20.46%	21	9.38%	56	9.14%	15	11.28%	17
Lg Public Funds DE	(3.43%)		19.59%		9.67%		8.30%		10.55%	
<b>Total 1000 Equity</b>	<b>(2.62%)</b>	<b>44</b>	<b>21.94%</b>	<b>46</b>	<b>9.71%</b>	<b>48</b>	<b>10.14%</b>	<b>36</b>	<b>11.79%</b>	<b>48</b>
Russell 1000 Index	(3.15%)	63	21.19%	50	9.53%	50	9.63%	43	11.63%	50
Callan Large Cap	(2.73%)		21.20%		9.47%		9.09%		11.59%	
<b>Total Internal 1000 Equity</b>	<b>(2.62%)</b>	<b>44</b>	<b>21.94%</b>	<b>46</b>	<b>9.77%</b>	<b>47</b>	<b>10.20%</b>	<b>35</b>	<b>11.81%</b>	<b>47</b>
Callan Large Cap	(2.73%)		21.20%		9.47%		9.09%		11.59%	
STRS Analyst Select Fund	(2.40%)	43	21.60%	43	11.11%	41	10.27%	37	10.89%	73
Russell 1000 Index	(3.15%)	82	21.19%	50	9.53%	67	9.63%	56	11.63%	58
Callan Large Cap Core	(2.46%)		21.19%		10.30%		9.80%		11.77%	
Concentrated Select Fund	0.08%	2	19.43%	60	13.86%	20	7.91%	66	-	
Russell 1000 Index	(3.15%)	63	21.19%	50	9.53%	50	9.63%	43	11.63%	50
Callan Large Cap	(2.73%)		21.20%		9.47%		9.09%		11.59%	
STRS Large Cap Passive Quantitative	(2.65%)	45	23.89%	37	10.03%	46	10.79%	23	12.64%	36
Russell Top 200	(2.65%)	45	23.89%	37	10.02%	46	10.79%	23	12.63%	36
Callan Large Cap	(2.73%)		21.20%		9.47%		9.09%		11.59%	
Integrated Factor Index	(4.15%)	86	12.36%	91	8.99%	56	6.89%	79	-	
Russell 1000 Index	(3.15%)	63	21.19%	50	9.53%	50	9.63%	43	11.63%	50
Callan Large Cap	(2.73%)		21.20%		9.47%		9.09%		11.59%	
STRS Large Cap Value	(2.97%)	80	18.07%	31	12.09%	75	7.21%	45	9.39%	41
Large Cap Value Custom Index	(3.16%)	86	14.44%	66	11.05%	83	6.23%	78	8.37%	87
Callan Large Cap Value	(2.07%)		16.45%		13.95%		6.97%		9.17%	
STRS Large Cap Growth	(1.59%)	7	31.84%	8	6.26%	45	12.67%	11	14.46%	15
Russell 1000 Growth Index	(3.13%)	36	27.72%	43	7.97%	26	12.42%	15	14.48%	14
Callan Large Cap Growth	(3.42%)		26.41%		5.97%		10.53%		13.30%	
STRS Mid Cap Value	(4.01%)	64	12.58%	60	13.30%	69	6.11%	59	7.79%	73
Russell Mid Cap Value Idx	(4.46%)	80	11.05%	68	10.98%	90	5.18%	81	7.92%	72
Callan Mid Cap Value	(3.82%)		15.14%		14.63%		6.66%		8.61%	
STRS Mid Cap Growth	(3.34%)	5	19.44%	11	0.77%	66	7.24%	39	10.09%	42
Russell Mid Cap Growth Idx	(5.22%)	44	17.47%	27	2.61%	43	6.97%	42	9.94%	43
Callan Mid Cap Growth	(5.99%)		13.87%		2.07%		6.70%		9.82%	
<b>Total 2000 Equity</b>	<b>(4.14%)</b>	<b>54</b>	<b>11.88%</b>	<b>64</b>	<b>9.71%</b>	<b>74</b>	<b>4.36%</b>	<b>62</b>	<b>8.44%</b>	<b>57</b>
Russell 2000 Index	(5.13%)	78	8.93%	82	7.16%	93	2.40%	95	6.65%	94
Callan Small Cap Core	(3.95%)		13.36%		11.50%		4.89%		8.61%	
<b>Total Internal 2000 Equity</b>	<b>(3.73%)</b>	<b>40</b>	<b>11.18%</b>	<b>67</b>	<b>9.72%</b>	<b>74</b>	<b>2.65%</b>	<b>94</b>	<b>7.18%</b>	<b>85</b>
Small Cap Select	(4.33%)	56	13.05%	52	10.86%	63	2.57%	94	-	
STRS Quantitative 2000	(3.32%)	27	9.93%	74	9.00%	78	2.54%	94	7.46%	83
Russell 2000 Index	(5.13%)	78	8.93%	82	7.16%	93	2.40%	95	6.65%	94
Callan Small Cap Core	(3.95%)		13.36%		11.50%		4.89%		8.61%	

# Investment Manager Returns and Peer Group Rankings

	Last Quarter		Last Year		Last 3 Years		Last 5 Years		Last 10 Years	
<b>Total External 2000 Equity</b>	<b>(4.37%)</b>	<b>50</b>	<b>12.31%</b>	<b>53</b>	<b>9.66%</b>	<b>57</b>	<b>5.31%</b>	<b>43</b>	<b>9.17%</b>	<b>32</b>
Callan Small Cap	(4.37%)		12.62%		11.13%		4.96%		8.52%	
<b>Small Cap Core</b>	<b>(2.12%)</b>	<b>16</b>	<b>16.99%</b>	<b>18</b>	<b>17.59%</b>	<b>6</b>	<b>5.86%</b>	<b>30</b>	<b>9.94%</b>	<b>12</b>
Fuller & Thaler Core	(1.50%)	6	18.71%	12	18.32%	4	8.15%	3	12.08%	3
Fuller & Thaler Micro-Cap	(3.88%)	47	12.22%	63	15.90%	12	0.41%	100	4.85%	99
Russell 2000 Index	(5.13%)	78	8.93%	82	7.16%	93	2.40%	95	6.65%	94
Callan Small Cap Core	(3.95%)		13.36%		11.50%		4.89%		8.61%	
<b>Small Cap Value</b>	<b>(3.90%)</b>	<b>83</b>	<b>13.39%</b>	<b>50</b>	<b>13.96%</b>	<b>81</b>	<b>4.83%</b>	<b>55</b>	<b>8.21%</b>	<b>44</b>
Chartwell	(4.15%)	85	11.44%	70	13.28%	86	2.86%	88	6.79%	89
Neuberger Berman	(3.75%)	82	15.14%	37	14.45%	79	6.58%	24	9.49%	19
Russell 2000 Value Index	(2.96%)	63	7.84%	89	13.32%	85	2.59%	94	6.19%	96
Callan Small Cap Value	(1.97%)		13.45%		16.80%		5.20%		8.01%	
<b>Small Cap Growth</b>	<b>(8.32%)</b>	<b>74</b>	<b>4.24%</b>	<b>78</b>	<b>(4.35%)</b>	<b>91</b>	<b>3.44%</b>	<b>71</b>	<b>9.10%</b>	<b>52</b>
Weatherbie Capital 2000 Growth	(8.32%)	74	4.24%	78	(4.35%)	91	3.44%	71	10.32%	22
Russell 2000 Growth Index	(7.32%)	66	9.59%	60	1.09%	64	1.55%	89	6.72%	97
Callan Small Cap Growth	(6.49%)		10.67%		2.95%		5.00%		9.18%	
<b>Total International Equity</b>	<b>(2.68%)</b>	<b>3</b>	<b>21.61%</b>	<b>61</b>	<b>8.71%</b>	<b>1</b>	<b>5.21%</b>	<b>7</b>	<b>6.10%</b>	<b>4</b>
Int'l Blended Benchmark	(2.48%)	2	21.13%	68	7.21%	5	4.70%	14	5.30%	11
Lg Public Fd - Int Equity	(3.72%)		22.00%		4.58%		3.71%		4.49%	
<b>Total EAFE</b>	<b>(2.02%)</b>	<b>19</b>	<b>24.35%</b>	<b>47</b>	<b>10.79%</b>	<b>10</b>	<b>6.10%</b>	<b>5</b>	<b>6.91%</b>	<b>4</b>
MSCI World ex US 50% Hedged	(2.39%)	24	23.39%	54	9.40%	15	5.63%	9	5.99%	13
Callan NonUS Eq	(4.58%)		23.96%		4.97%		3.76%		4.76%	
<b>Total Internal EAFE</b>	<b>(2.05%)</b>	<b>19</b>	<b>24.10%</b>	<b>49</b>	<b>10.36%</b>	<b>13</b>	<b>4.97%</b>	<b>16</b>	<b>5.76%</b>	<b>15</b>
STRS Structured EAFE	(2.08%)	20	23.62%	53	9.76%	13	5.99%	7	6.36%	7
STRS EAFE Quantitative	(2.02%)	19	24.02%	50	10.86%	9	3.94%	45	5.21%	31
MSCI World ex US 50% Hedged	(2.39%)	24	23.39%	54	9.40%	15	5.63%	9	5.99%	13
Callan NonUS Eq	(4.58%)		23.96%		4.97%		3.76%		4.76%	
<b>Total External EAFE</b>	<b>(1.99%)</b>	<b>19</b>	<b>24.51%</b>	<b>46</b>	<b>11.13%</b>	<b>9</b>	<b>7.08%</b>	<b>2</b>	<b>7.99%</b>	<b>1</b>
Arrowstreet Capital	2.17%	1	30.78%	15	15.41%	1	9.26%	1	9.82%	1
AllianceBernstein EAFE Value	0.37%	3	29.24%	20	13.81%	5	4.97%	16	6.18%	10
MFS	(6.06%)	71	17.58%	89	5.82%	42	6.70%	2	-	
MSCI World ex US 50% Hedged	(2.39%)	24	23.39%	54	9.40%	15	5.63%	9	5.99%	13
Callan NonUS Eq	(4.58%)		23.96%		4.97%		3.76%		4.76%	

# Investment Manager Returns and Peer Group Rankings

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years				
<b>Total Emerging</b>	<b>(2.51%)</b>	<b>16.94%</b>	<b>35</b>	<b>1.82%</b>	<b>37</b>	<b>1.44%</b>	<b>65</b>	<b>2.86%</b>	<b>72</b>
MSCI Emerging Mkts Idx	(2.93%)	11.70%	59	(1.73%)	57	0.56%	78	2.08%	87
Emerging Mkts Equity DB	(3.09%)	13.29%		(0.76%)		2.44%		3.71%	
<b>Total Internal Emerging</b>	<b>(2.21%)</b>	<b>17.26%</b>	<b>34</b>	<b>3.52%</b>	<b>32</b>	<b>2.19%</b>	<b>53</b>	<b>3.42%</b>	<b>57</b>
STRS Active Emerging Combined	(2.24%)	18.33%	29	4.80%	30	2.87%	44	3.72%	50
STRS Emerging Market Quantitative	(2.12%)	14.63%	45	1.03%	41	0.62%	77	-	-
MSCI Emerging Mkts Idx	(2.93%)	11.70%	59	(1.73%)	57	0.56%	78	2.08%	87
Emerging Mkts Equity DB	(3.09%)	13.29%		(0.76%)		2.44%		3.71%	
<b>Total External Emerging</b>	<b>(3.55%)</b>	<b>15.85%</b>	<b>39</b>	<b>(3.72%)</b>	<b>71</b>	<b>(1.17%)</b>	<b>93</b>	<b>1.15%</b>	<b>96</b>
Genesis	(3.54%)	15.71%	40	(3.77%)	71	1.14%	70	2.23%	85
MSCI Emerging Mkts Idx	(2.93%)	11.70%	59	(1.73%)	57	0.56%	78	2.08%	87
Emerging Mkts Equity DB	(3.09%)	13.29%		(0.76%)		2.44%		3.71%	
<b>Total Global Ex-US</b>	<b>(3.70%)</b>	<b>19.70%</b>	<b>78</b>	<b>8.28%</b>	<b>22</b>	<b>5.40%</b>	<b>12</b>	<b>6.02%</b>	<b>12</b>
Int'l Blended Benchmark	(2.48%)	21.13%	69	7.21%	30	4.70%	26	5.30%	27
MSCI ACWI ex US	(3.77%)	20.39%	74	3.74%	62	2.58%	81	3.35%	91
Callan NonUS Eq	(4.58%)	23.96%		4.97%		3.76%		4.76%	
<b>Total Internal Global Ex-US</b>	<b>(2.10%)</b>	<b>23.15%</b>	<b>57</b>	<b>11.10%</b>	<b>9</b>	<b>6.51%</b>	<b>3</b>	<b>6.59%</b>	<b>5</b>
International Value	(2.10%)	23.22%	55	11.13%	9	6.53%	3	-	-
International Analyst	(2.14%)	20.80%	69	-	-	-	-	-	-
Int'l Blended Benchmark	(2.48%)	21.13%	69	7.21%	30	4.70%	26	5.30%	27
MSCI ACWI ex US	(3.77%)	20.39%	74	3.74%	62	2.58%	81	3.35%	91
Callan NonUS Eq	(4.58%)	23.96%		4.97%		3.76%		4.76%	
<b>Total External Global Ex-US</b>	<b>(5.29%)</b>	<b>16.12%</b>	<b>94</b>	<b>4.65%</b>	<b>52</b>	<b>4.31%</b>	<b>35</b>	<b>-</b>	<b>-</b>
Int'l Blended Benchmark	(2.48%)	21.13%	69	7.21%	30	4.70%	26	5.30%	27
Callan NonUS Eq	(4.58%)	23.96%		4.97%		3.76%		4.76%	
<b>Global ex-U.S. Standard</b>	<b>(5.81%)</b>	<b>16.02%</b>		<b>4.90%</b>		<b>4.46%</b>		<b>-</b>	<b>-</b>
Lazard	(4.45%)	21.14%		6.57%		4.62%		-	-
Wellington International Opportunities	(3.94%)	15.89%		4.84%		5.20%		-	-
William Blair	(9.05%)	-		-		-		-	-
Int'l Blended Benchmark	(2.48%)	21.13%		7.21%		4.70%		5.30%	
MSCI ACWI ex US	(3.77%)	20.39%		3.74%		2.58%		3.35%	
<b>Global ex-U.S. Small Cap</b>	<b>(1.82%)</b>	<b>18.15%</b>		<b>-</b>		<b>-</b>		<b>-</b>	<b>-</b>
Acadian	1.13%	22.26%		-		-		-	-
American Century	(5.79%)	12.13%		-		-		-	-
Wellington Small Cap	(1.75%)	19.73%		-		-		-	-
MSCI ACWI exUS SmCap (Dev.Mkts50%Hedg)	(0.44%)	19.18%		-		-		-	-
<b>Total Fixed Income</b>	<b>(2.63%)</b>	<b>1.63%</b>		<b>(4.18%)</b>		<b>0.63%</b>		<b>1.65%</b>	
Fixed Income Blended Benchmark	(2.40%)	1.53%		(4.39%)		0.47%		1.48%	
<b>Core Fixed Income</b>	<b>(3.18%)</b>	<b>1.71%</b>	<b>10</b>	<b>(4.43%)</b>	<b>20</b>	<b>0.51%</b>	<b>63</b>	<b>1.61%</b>	<b>54</b>
Bimbg US Universal	(2.88%)	1.61%	15	(4.68%)	37	0.34%	86	1.43%	82
Callan Core Bond FI	(3.13%)	1.10%		(4.75%)		0.59%		1.63%	
<b>Liquid Treasury Portfolio</b>	<b>(0.81%)</b>	<b>1.33%</b>		<b>(3.16%)</b>		<b>0.74%</b>		<b>-</b>	<b>-</b>
Bimbg US Intmtd Treasury Idx	(0.81%)	1.30%		(3.21%)		0.68%		0.80%	
<b>High-Yield</b>	<b>0.40%</b>	<b>10.67%</b>	<b>43</b>	<b>2.30%</b>	<b>43</b>	<b>3.35%</b>	<b>50</b>	<b>4.57%</b>	<b>42</b>
BNY Mellon	0.54%	10.58%	44	1.85%	62	-	-	-	-
JP Morgan	0.86%	12.06%	5	3.35%	15	-	-	-	-
PGIM	0.51%	10.05%	59	2.66%	29	-	-	-	-
PIMCO	0.01%	10.18%	56	1.73%	67	3.22%	58	4.71%	34
Bimbg High Yield Idx	0.46%	10.28%	54	1.76%	64	2.96%	69	4.24%	61
Callan High Yield Fix Inc	0.59%	10.37%		2.09%		3.35%		4.50%	
<b>Emerging Debt</b>	<b>(1.90%)</b>	<b>9.51%</b>	<b>93</b>	<b>(2.64%)</b>	<b>16</b>	<b>0.54%</b>	<b>27</b>	<b>2.93%</b>	<b>31</b>
Fidelity Instl. Asset Management	(1.29%)	9.96%	91	(2.05%)	7	0.56%	27	3.28%	18
MFS	(2.39%)	8.75%	94	(2.90%)	20	-	-	-	-
Payden & Rygel	(1.85%)	10.67%	71	(3.21%)	27	-	-	-	-
Emerging Debt Index	(2.31%)	7.56%	96	(4.21%)	73	0.23%	46	2.35%	72
Callan Emerging Debt USD	(2.26%)	11.70%		(3.69%)		0.20%		2.67%	
<b>Liquidity Reserve</b>	<b>1.36%</b>	<b>4.76%</b>	<b>52</b>	<b>1.81%</b>	<b>49</b>	<b>1.76%</b>	<b>77</b>	<b>1.16%</b>	<b>89</b>
Liquid Reserve Index	1.31%	4.47%	69	1.70%	57	1.72%	83	1.11%	91
Callan Cash Database	1.36%	4.77%		1.80%		1.87%		1.38%	

# Investment Manager Returns and Peer Group Rankings

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
<b>Total Real Estate</b>	<b>(3.17%)</b>	<b>(7.52%)</b>	<b>7.00%</b>	<b>5.56%</b>	<b>8.12%</b>
Real Estate Blended Benchmark	(2.23%)	(6.68%)	6.25%	5.23%	7.40%
<b>Private Real Estate</b>	<b>(2.58%)</b>	<b>(9.33%)</b>	<b>6.75%</b>	<b>5.55%</b>	<b>8.20%</b>
<b>Direct Real Estate</b>	<b>(2.86%)</b>	<b>(11.27%)</b>	<b>6.06%</b>	<b>5.18%</b>	<b>7.81%</b>
East Region	(2.15%)	(7.86%)	4.04%	1.69%	3.31%
Midwest Region	(1.36%)	(12.86%)	1.66%	1.62%	5.82%
South Region	1.76%	(1.46%)	13.57%	11.30%	12.82%
West Region	(6.19%)	(17.70%)	6.80%	7.86%	11.55%
NCREIF Total Index	(1.37%)	(8.39%)	6.04%	5.26%	7.40%
<b>Commingled Funds Real Estate</b>	<b>(1.35%)</b>	<b>0.51%</b>	<b>10.11%</b>	<b>7.39%</b>	<b>10.13%</b>
Opportunity Fund	(1.43%)	(5.73%)	13.11%	8.80%	11.40%
International	(1.73%)	2.20%	8.55%	6.51%	9.87%
Specialty Real Estate Funds	0.75%	6.66%	11.37%	7.86%	-
NCREIF Total Index	(1.37%)	(8.39%)	6.04%	5.26%	7.40%
<b>Public Real Estate</b>	<b>(6.99%)</b>	<b>3.99%</b>	<b>6.18%</b>	<b>3.00%</b>	<b>6.13%</b>
REITs - Active	(6.97%)	4.78%	-	-	-
External REIT	(7.05%)	-	-	-	-
CenterSquare Investment Management	(7.24%)	-	-	-	-
Heitman	(7.33%)	-	-	-	-
Principal Asset Management	(6.41%)	-	-	-	-
FTSE NAREIT Equity REITs	(7.13%)	2.99%	5.76%	2.77%	5.96%

# Investment Manager Returns and Peer Group Rankings

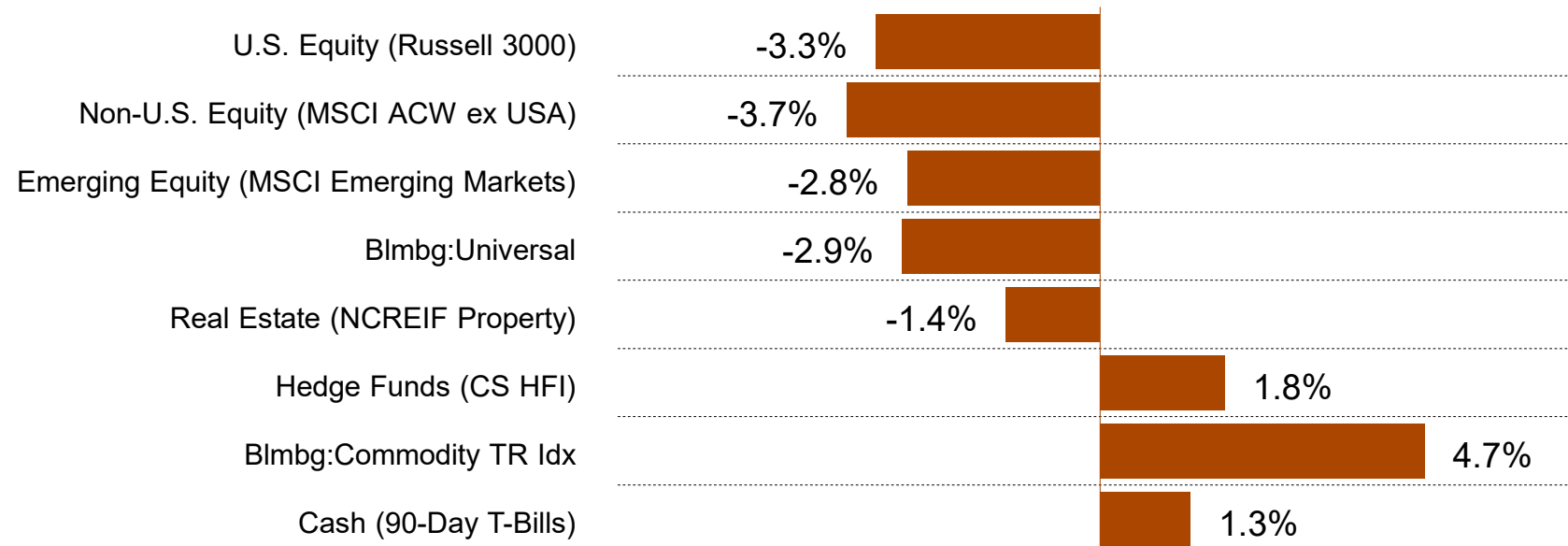
	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
<b>Total Alternative Investments</b>	<b>2.16%</b>	<b>4.38%</b>	<b>16.59%</b>	<b>12.16%</b>	<b>11.45%</b>
Alt. Investment Blended Bmk	1.71%	5.10%	-	-	-
<b>Private Equity</b>	<b>1.65%</b>	<b>(0.73%)</b>	<b>18.63%</b>	<b>16.71%</b>	<b>16.04%</b>
Domestic Private Equity	2.98%	4.94%	20.70%	18.23%	17.20%
Domestic Venture Capital	(0.54%)	(10.68%)	17.58%	16.25%	14.68%
Global Private Equity	1.25%	1.29%	15.77%	14.89%	15.00%
Private Equity Benchmark	1.60%	2.11%	-	-	-
<b>Opportunistic/Diversified</b>	<b>2.72%</b>	<b>10.67%</b>	<b>13.59%</b>	<b>7.26%</b>	<b>6.73%</b>
Opportunistic	2.83%	10.63%	15.22%	8.20%	8.27%
Diversified	1.19%	11.08%	6.60%	3.40%	3.68%
Opportunistic/Div. Blended Bmk	1.80%	7.84%	-	-	-
<b>Total Fund</b>	<b>(1.68%)</b>	<b>10.42%</b>	<b>7.76%</b>	<b>7.12%</b>	<b>8.04%</b>
Total Fund Target	(1.78%)	10.51%	6.59%	6.46%	7.55%



## Market Summary

# Quarterly Market Performance Ending September 30, 2023

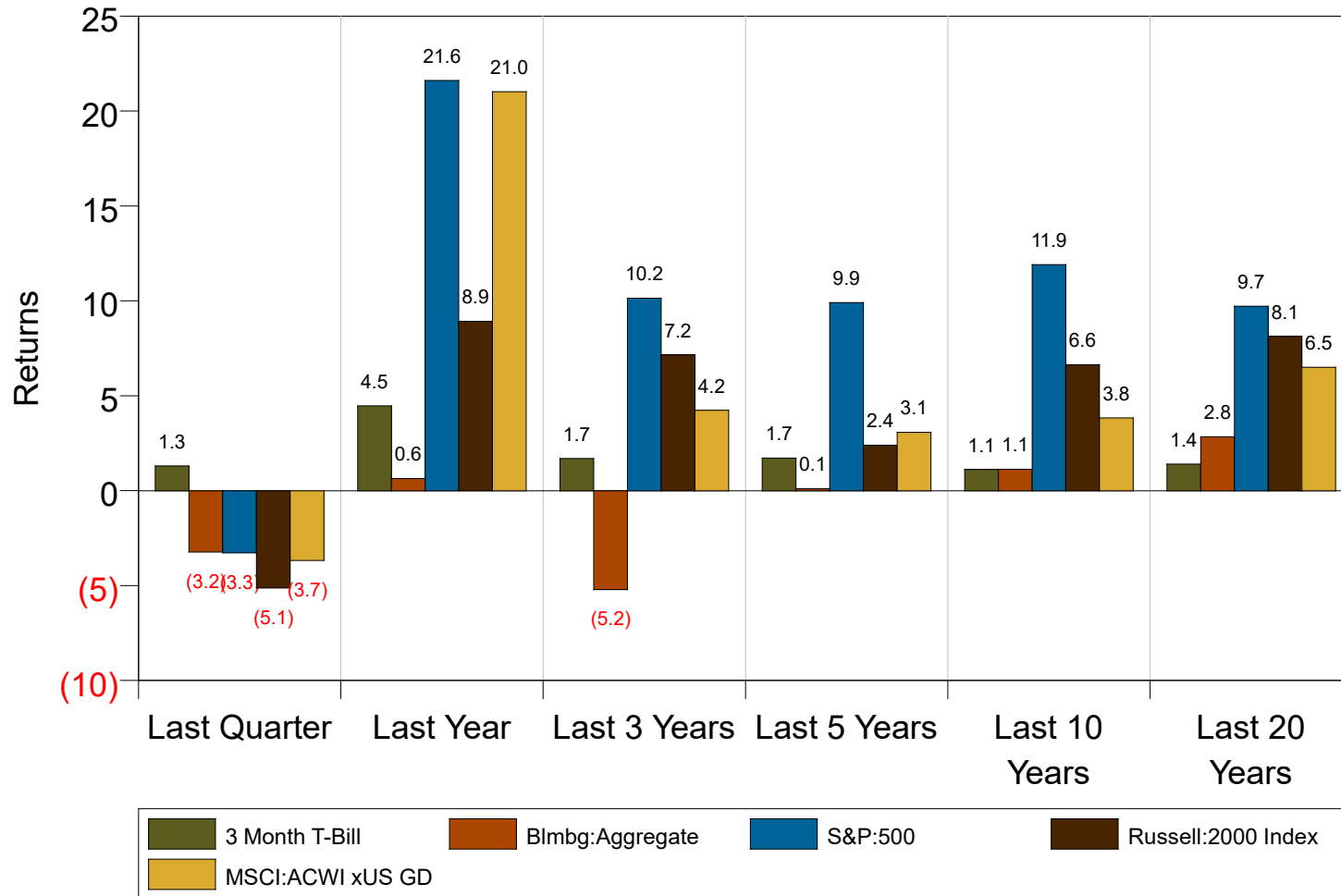
## Broad Market Quarterly Returns



\*Sources: Barclays, Citigroup, Credit Suisse Hedge Index, Merrill Lynch, MSCI, NCREIF, Russell Investment Group, Standard & Poor's

# Performance Across Asset Classes

Time Periods Ended September 30, 2023





- **Matters requiring board action:**
  - Review and approval of the Semiannual Broker Evaluation and associated polices
- **Educational or scheduled updates and reviews requiring no action today:**
  - Summary of Investment Activity Report, October and November 2023
  - Albourne fee validation
  - CEM Benchmarking
  - Callan alternative investment quarterly performance review as of Sept. 30, 2023
  - Callan quarterly performance review as of Sept. 30, 2023
  - **Review of October and November investment transactions**
- **Summary of requests**

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