

Investment Board Meeting Agenda

Thursday, September 26, 2024

Conference Telephone #: 301-715-8592

Meeting ID: 847 3999 6500

10:30 a.m. - 2:45 p.m.

- 10:30 a.m. Call to Order / Roll Call of Members**
- 10:35 p.m. Approval of Minutes from the June 20, 2024, Board Meeting**
- 10:40 a.m. IPERS CEO Report – Greg Samorajski**
- 10:50 a.m. FY2026 IPERS Budget**
Tara Hagan and Greg Samorajski, *IPERS*
- 11:30 a.m. CY2023 CEM Investment Benchmarking Review**
Christopher Doll, *CEM Benchmarking, Inc.*
- 12:00 p.m. Lunch Break**
- 12:15 p.m. FY2024 Investment Performance Review**
Thomas Toth and Ali Kazemi, *Wilshire*
- 12:45 p.m. Annual Asset Allocation Review**
Thomas Toth, Ali Kazemi and Ned McGuire, *Wilshire*
- 1:15 p.m. Annual Review of Investment Policy and Goal Statement**
Sriram Lakshminarayanan, *IPERS*
- 1:45 p.m. Break**
- 2:00 p.m. IPERS Investment Staff Reports**
- Beta Report – Sriram Lakshminarayanan
 - Alpha Report – Investment Team
 - Private Market Program – Investment Team
 - Risk Report – Sriram Lakshminarayanan
- 2:15 p.m. Election of Chair and Vice Chair**
- 2:35 p.m. Public Comments**
- 2:40 p.m. Other Business**
- Confirm Next Meeting – December 6, 2024
 - Next BAC Meeting – October 28, 2024
 - Confirm Calendar Year 2025 Meeting Dates
- 2:45 p.m. Adjourn**



INVESTMENT BOARD MEETING MINUTES

IPERS Headquarters

7401 Register Drive, Des Moines, Iowa

June 20, 2024

The following people participated in the IPERS Investment Board Meeting held on Thursday, June 20, 2024.

Members of the Board – Present

Justin Kirchhoff, Chair

Bill Bemis

Tami Loge

Kris Rowley

Treasurer Roby Smith

Matt Watters

Representative Martin Graber

Senator Mark Lofgren

Senator Pam Jochum

Members of the Board – Absent

Representative Amy Nielsen

Administration and Staff

Greg Samorajski, CEO

Sriram Lakshminarayanan, CIO

John Fujiwara, Head of Strategy

Sheldon Lien, Senior Investment Officer

Pat Reinhardt, Senior Investment Officer

Keith Scholten, Senior Investment Officer

Marcus Dong, Retirement Investment Officer

Kate Fishman, Retirement Investment Officer

Ankit Saw, Retirement Investment Officer

Melinda McElroy, Executive Assistant

Elizabeth Hennessey, General Counsel

Shawna Lode, Director of Communications

David Martin, Chief Benefits Officer

Wilshire Associates

Thomas Toth

Ali Kazemi

Proceedings

Justin Kirchhoff, chair, called the meeting to order at 8:30 a.m.

Approval of Minutes of Previous Meeting

Tami Loge moved to approve the March 22, 2024, Investment Board meeting minutes. Matt Watters seconded. The minutes were approved by unanimous voice vote.

CEO Report

Greg Samorajski reported that he recently attended a national conference of pension plan directors. The main themes discussed were modernization of pension administration systems and considerations, and possibilities of applying artificial intelligence to business process. Greg next discussed the newly created Strategy Division within IPERS. The division will continue its communication and legislative liaison responsibilities but will be expanded to engage and educate members, employers and external stakeholders. Concluding his report, he announced that IPERS is progressing with its plan to deliver most documents digitally. Soon IPERS will roll out an online retirement application for Regular members.

Private Markets Program Annual Review

Pat Reinhardt and Marcus Dong presented the annual review of IPERS' private markets program. The program consists of three main portfolios: private equity, private credit and private real assets; no changes were recommended to the portfolios. Pat concluded the report by noting that portfolio restructuring in the private real assets portfolio will be a key focus moving forward.

Real Assets Equity Manager Hiring Recommendation

Pat Reinhardt and Marcus Dong reviewed that this RFP was issued on November 18, 2022, with the purpose of identifying non-core real assets equity products across infrastructure, real estate, and other real asset mandates such as timber and farmland. The evaluation of the proposals was conducted in three phases. Phase 1 was an evaluation of the minimum qualifications. Of the 154 proposals received, 29 did not meet the minimum qualifications. Phase 2 was an evaluation of the responses and how they would fit in IPERS' existing real assets portfolio. At this point, the evaluation committee removed the other real assets proposals from further consideration, and 45 responses were selected for Phase 3. Fourteen finalists were selected for interviews, eight infrastructure and six real estate products.

The evaluation committee recommended that the Investment Board approve the hiring of nine investment firms/strategies for the real sssets portfolio. Manager recommendations are contingent on final due diligence and successful contract negotiations prior to funding.

Firm Name	Strategy Name	Status
Kayne Anderson	KAREP VII	2- 3 Allocations
KKR	KKR REPA IV	
Blue Owl (fka Oak Street)	Net Lease Property Fund	2-3 Bench Managers
LCN Capital Partners	North American Fund Series	

Elm Tree	Net Lease Fund Series	1-2 Allocations 2-3 Bench Managers
Macquarie	MIP VI	
Morgan Stanley	NHIP IV	
Stonepeak	Infrastructure Fund Series	
ECP	Energy Fund Series	

Bill Bemis moved to approve the hiring recommendations. Tami Loge seconded. The motion carried by unanimous roll call vote.

Ayes: Justin Kirchhoff, Bill Bemis, Treasurer Smith, Tami Loge, Kris Rowley and Matt Watters

Nays: None

MOTION PASSED

Search for Excess Returns

John Fujiwara and Sheldon Lien provided an educational presentation on what absolute return strategies are and how they're different from traditional investment strategies. They also reviewed the lengthy search process for reviewing and selecting absolute return strategies for the IPERS portfolio.

IPERS Investment Staff Reports

Beta Report

Sriram Lakshminarayanan reviewed the fund's asset allocation and stated that all asset classes were within policy ranges as of June 7, 2024. The total fund market value estimate on that date was \$43.4 billion.

Alpha Report

The Investments Division staff reviewed the alpha report, noting material organizational concerns with LARS manager PGIM Wadhwani.

Private Markets Program

Pat Reinhardt reviewed the private market program managers, noting performance issues with Heitman CREDIT.

Risk Report

Sriram Lakshminarayanan presented IPERS' risk monitoring report, noting plan-level total active risk is stable at 0.21%.

Securities Litigation Report

Elizabeth Hennessey reported on the status of each case in which IPERS is serving in an active role and provided the total funds recovered from May 1, 2023, through June 1, 2024.

Public Comments

None.

Other Business

None

Confirm Next Meeting Dates

The next regularly scheduled meetings of the Investment Board are Wednesday, September 26 and Thursday, September 27, 2024.

Adjourn

With no further business to come before the Investment Board, Bill Bemis moved to adjourn. Tami Loge seconded. The motion was approved by unanimous voice vote. The meeting adjourned at 10:50 p.m.

FY2026 Budget Request

Unlike most state government agencies, IPERS receives no funding from the general fund or any other government source.

IPERS' annual administrative budget comes entirely from the IPERS Trust Fund that is funded only with member and employer contributions.

IPERS' administrative budget is subject to appropriation from the Iowa Legislature. The administrative budget provides the funding necessary for IPERS to act as a responsible fiduciary by earning investment returns and delivering services to members.

IPERS' administrative budget does *not* include funds for benefit payments, refunds or investment management expenses. These items are *not* subject to appropriation.

IPERS' FY2026 budget request reflects the funding necessary to achieve its mission and vision and achieve excellence through reimagined and modernized service delivery operations.

Service delivery excellence is only possible with the people, tools and programs necessary to accomplish its goals.

MISSION STATEMENT

The Iowa Public Employees' Retirement System (IPERS) is the fiduciary responsible for administering the IPERS Trust Fund. IPERS exists for the exclusive benefit of its members and fulfills its obligations to cost-effectively pay benefits, maintain stable contribution rates, protect member information and provide outstanding service.

VISION STATEMENT

IPERS is committed to maintaining its status as one of the nation's most well-funded public retirement plans and seeks to establish itself as an innovative leader in the delivery of service to all stakeholders.

Agency	Program	Fund Source (GF, RIIF, etc.)	FY26 Requested Increase	New or Existing Program	One-time or Ongoing	FTE	FY2025 Appropriation	Explanation
IPERS	Service Delivery	IPERS Trust Fund	\$ 60,000,000	Existing	One-time	0		Explanation on next page.
IPERS	Service Delivery	IPERS Trust Fund	\$ 250,000	Existing	Ongoing	0		ID.me allows people to provide proof of their legal identity to securely access personal information online. Other state and federal agencies us ID.me. At IPERS, the service would offer an easier and more secure method for members to access their online retirement account.
IPERS	Service Delivery	IPERS Trust Fund	\$ 100,000	Existing	Ongoing	0		Rather than mailing paper checks to members who request them, IPERS wishes to provide a payment card. Other state agencies have success with this method.
IPERS	Service Delivery	IPERS Trust Fund	\$ 247,608	Existing	Ongoing	3		Management Analyst 3 (3 FTE): The vendor that is helping IPERS transition to a cloud-based pension administration system recommends acquiring three new staff to support implementation of the new system.
IPERS	Service Delivery	IPERS Trust Fund	\$ 80,403	Existing	Ongoing	1		Executive Officer 1 (1 FTE): IPERS requests an Executive Officer 1 in the Benefits Division to support the Chief Benefits Officer.
IPERS	Service Delivery	IPERS Trust Fund	\$ 67,586	Existing	Ongoing	1		Retirement Benefit Officer* (RBO)(1 FTE): IPERS will reassign duties to ease the workload for its RBOs. Last year IPERS' request for four new RBOs was deferred. By realigning duties, IPERS is requesting just one RBO. Moving administrative responsibilities means RBOs can use their time to deliver outstanding customer service.
IPERS	Service Delivery	IPERS Trust Fund	\$ 174,003	Existing	Ongoing	3		Secretary 2 (3 FTE): IPERS proposes the addition of three new employees in the Finance and Administration Division to assume clerical tasks that RBOs currently complete. These duties do not require the six months of training that RBOs receive. This arrangement better aligns skills with responsibilities.
IPERS	Service Delivery	IPERS Trust Fund	\$ 750,000	Existing	Ongoing	0		IPERS wishes to follow the lead of other pension systems that outsource the management of disability benefits. The requested amount is a place holder until IPERS issues an RFP and gathers firm costs. Assuming the actual cost is lower, IPERS will adjust its next static budget calculation.
IPERS	Service Delivery	IPERS Trust Fund	\$ 102,437	New	Ongoing	1		Executive Officer 3 (1 FTE): This position will join IPERS' new Strategy Division as the Digital Experience Program Manager. This position transform existing service delivery business processes and web portals into an entirely digital lifecycle experience for IPERS members and employers.
			\$ 61,772,037			9	\$ 7,612,050	
IPERS	Compliance & Risk Management	IPERS Trust Fund	\$ 67,587	Existing	Ongoing	1		Retirement Compliance Officer* (1 FTE): IPERS annually corrects more than \$1 million in contribution errors from employers. An additional FTE means IPERS can audit more employer records to more quickly identify and correct errors.
			\$ 67,587			1	\$ 1,556,467	
IPERS	Shared Costs & Services	IPERS Trust Fund	\$ 98,060	Existing	Ongoing	1		Accountant 4 (1 FTE): As part of the new Finance and Administration Division, IPERS requests an Accountant 4 to supervise the accounting team. This will allow the CFO to focus on implementing a new general ledger system and contribute to the cloud-based pension administration system project. Growth in the trust fund means more responsibilities for this team.
IPERS	Shared Costs & Services	IPERS Trust Fund	\$ 71,509	Existing	Ongoing	1		Program Planner 2 (1 FTE)*: At the conclusion of a recent cybersecurity audit, the vendor recommended hiring a staff person to create written documentation of IPERS' policies and procedures, and to assist with record retention.
IPERS	Shared Costs & Services	IPERS Trust Fund	\$ 102,437	Existing	Ongoing	1		Executive Officer 3 (1 FTE): IPERS seeks to hire a new legislative liaison, as the current liaison was promoted to a new role.
			\$ 272,006			3	\$ 8,616,249	
IPERS	Investment Management	IPERS Trust Fund	\$ 587,200	Existing	Ongoing	0		Explanation on next page.
			\$ 587,200				\$ 3,747,165	
			\$ 62,698,830			13	\$ 21,531,931	
								* Repeat request. Request deferred in FY2025.

FY2026 Budget Request

Explanations

PENSION ADMINISTRATION SYSTEM (PAS), \$60 MILLION

IPERS' contract with Vitech, the current PAS vendor, expires in FY2026. IPERS expects to transition from the current on-premise PAS to a cloud-based, modern architecture solution. Our rationale is two-fold: 1. Collectively, the pension industry is transitioning from on-premise PAS solutions. 2. Vitech is allocating more support to its cloud-based pension solution resulting in inadequate support for the on-premise solution at IPERS.

Two years ago, the legislature approved IPERS' request to spend up to \$750,000 to hire a consultant to study the PAS marketplace and recommend options to move forward. Based on their experience working with other pension systems, the consultant estimates the cost to adopt a new PAS solution will cost \$60 million over 10 years. This amount assumes that IPERS pursues a sole source agreement with Vitech and that acceptable contract terms are achieved. The estimate includes the cost of a project oversight contractor but does not include the cost to hire additional staff necessary to facilitate the multi-year transition. Vitech is currently beginning its assessment of IPERS' future needs and will provide its own cost proposal during Q1 2025. If IPERS and Vitech are unable to negotiate a successful contract, IPERS will seek an alternate provider. In that scenario, costs will likely be considerably higher.

INCENTIVE COMPENSATION PROGRAM, \$587,200

In 2022 the Governor's office and the Legislature approved IPERS' request to hire additional investment staff and to implement an incentive compensation program. A larger staff is necessary because of anticipated retirements and the opportunity to launch new strategies to implement the Board's risk and strategy targets.

However, IPERS has not been successful in its quest to hire new investment personnel, primarily because salary limits are far less than what the private sector and many other public pension systems offer. Initially, the Investment Board recommended an incentive compensation cap of 50% of base salary to supplement salaries. Instead, the Governor and Legislature approved a pilot program that capped annual incentive compensation payments at \$25,000 per person. The information below demonstrates the success of the current program and justifies IPERS' request to increase the program to 50% of base salary.

Among our peers, IPERS is recognized for its quality benchmarking strategy that enables IPERS to reliably measure the value staff adds to the fund. Staff adds value using a three-tier approach:

1. Reduce costs by structuring and sourcing investments efficiently
2. Source best-of-breed investment strategies that are accretive to IPERS' long-term performance
3. Bring (traditionally) outsourced investment duties in-house (slowly)

IPERS added about \$56.2 million in FY2023 and \$111 million in FY2024* in the public market portfolio. Incentive compensation equaled \$141,600 in FY2023 and is projected to equal approximately \$171,300 in FY2024.

*Not yet certified



Iowa PERS

CEM Investment Benchmarking Report DB - 2023

September 26, 2024

Key Takeaways

Returns

- Your 5-year net total return was 9.4%. This was above both the U.S. Public median of 8.9% and the peer median of 8.6%.
- Your 5-year policy return was 7.7%. This was equal to the U.S. Public median of 7.7% and above the peer median of 7.3%.

Value added

- Your 5-year net value added was 1.6%. This was above both the U.S. Public median of 1.2% and the peer median of 1.1%.

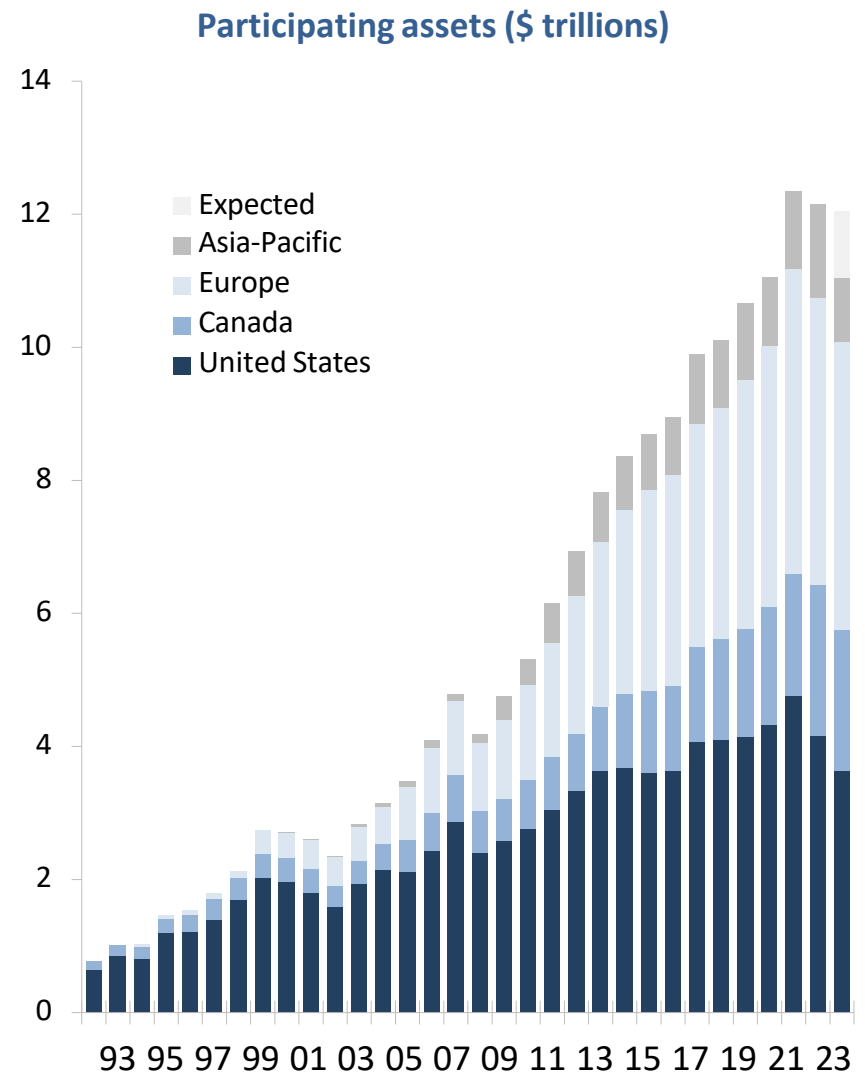
Cost

- Your investment cost of 41.1 bps was below your benchmark cost of 55.6 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was below benchmark cost because it paid less than peers for similar services and it had a lower cost implementation style.
- Your costs increased by 3.4 bps, from 37.7 bps in 2019 to 41.1 bps in 2023, primarily because you had a higher cost asset mix. This was partly offset by paying less in total for similar investment styles.

This benchmarking report compares your cost and performance to the 260 funds in CEM's extensive pension database.

- 136 U.S. pension funds participate. The median U.S. fund had assets of \$9.2 billion and the average U.S. fund had assets of \$26.7 billion. Total participating U.S. assets were \$3.6 trillion.
- 62 Canadian funds participate with assets totaling \$2.1 trillion.
- 56 European funds participate with aggregate assets of \$4.3 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Ireland, Denmark and the UK.
- 4 Asia-Pacific funds participate with aggregate assets of \$945.4 billion. Included are funds from Australia, New Zealand, China and South Korea.
- 2 funds from other regions participate.

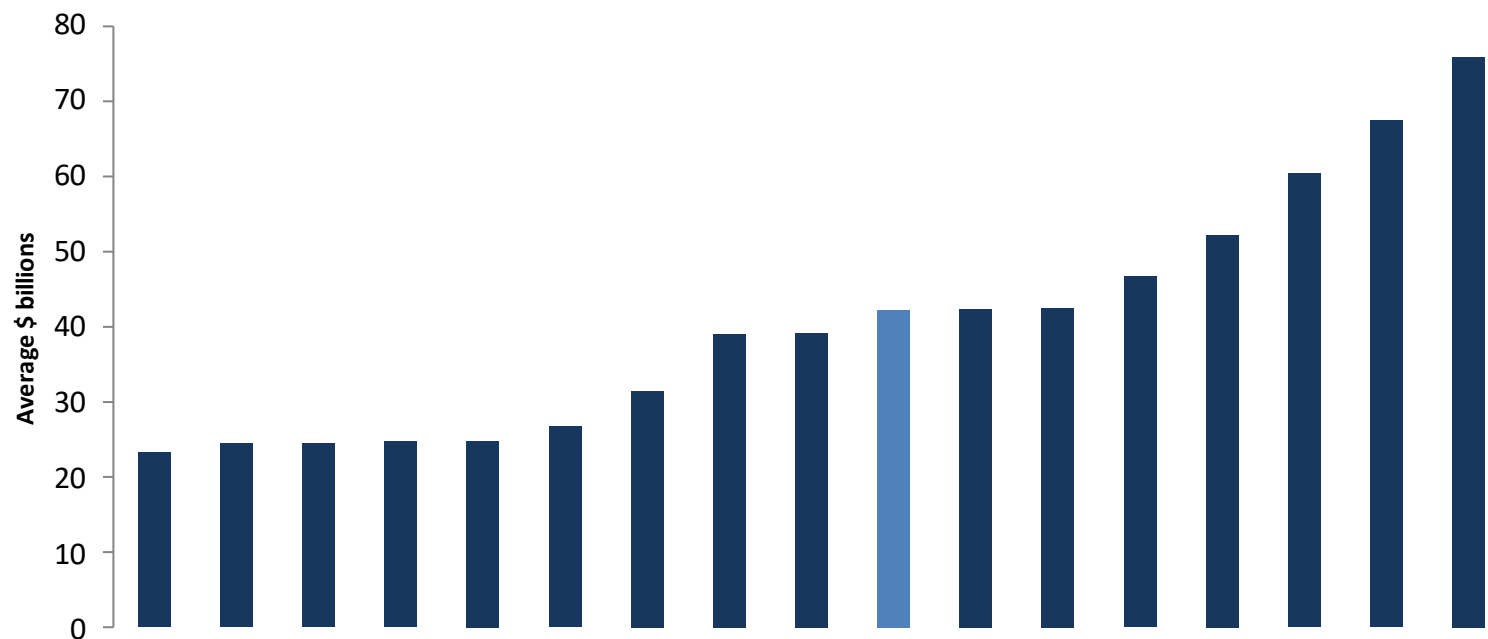
The most meaningful comparisons for your returns and value added are to the U.S. Public universe, which consists of 36 funds. The U.S. Public universe assets totaled \$2.4 trillion and the median fund had assets of \$25.7 billion.



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

Peer group for Iowa Public Employees' Retirement System

- 17 U.S. sponsors from \$23.2 billion to \$75.9 billion
- Median size of \$39.1 billion versus your \$42.2 billion



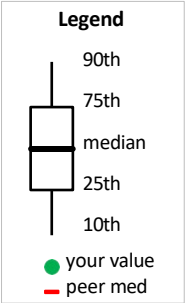
To preserve client confidentiality, given potential access to documents as permitted by the Freedom of Information Act, we do not disclose your peers' names in this document. For some of the peers, 2022 cost data was used as a proxy for 2023.

Your 5-year net total return of 9.4% was above both the U.S. Public median of 8.9% and the peer median of 8.6%.

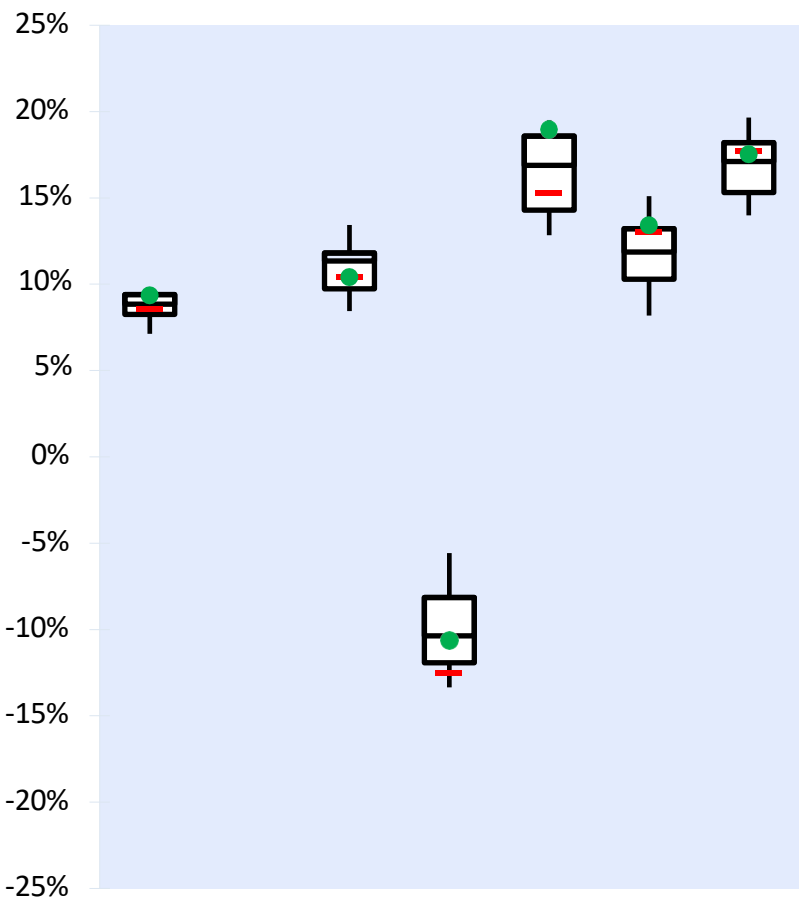
Total returns, by themselves, provide little insight into the reasons behind relative performance. Therefore, we separate total return into its more meaningful components: policy return and value added.

	Your 5-year
Net total fund return	9.4%
- Policy return	7.7%
= Net value added	1.6%

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).



U.S. Public net total returns - quartile rankings



	5-year	2023	2022	2021	2020	2019
You	9.4%	10.4%	-10.6%	18.9%	13.4%	17.5%
Peer median	8.6%	10.4%	-12.5%	15.3%	13.0%	17.7%
U.S. Public median	8.9%	11.4%	-10.4%	16.9%	11.9%	17.1%

Your 5-year policy return of 7.7% was equal to the U.S. Public median of 7.7% and above the peer median of 7.3%.

Your policy return is the return you could have earned passively by indexing your investments according to your policy mix.

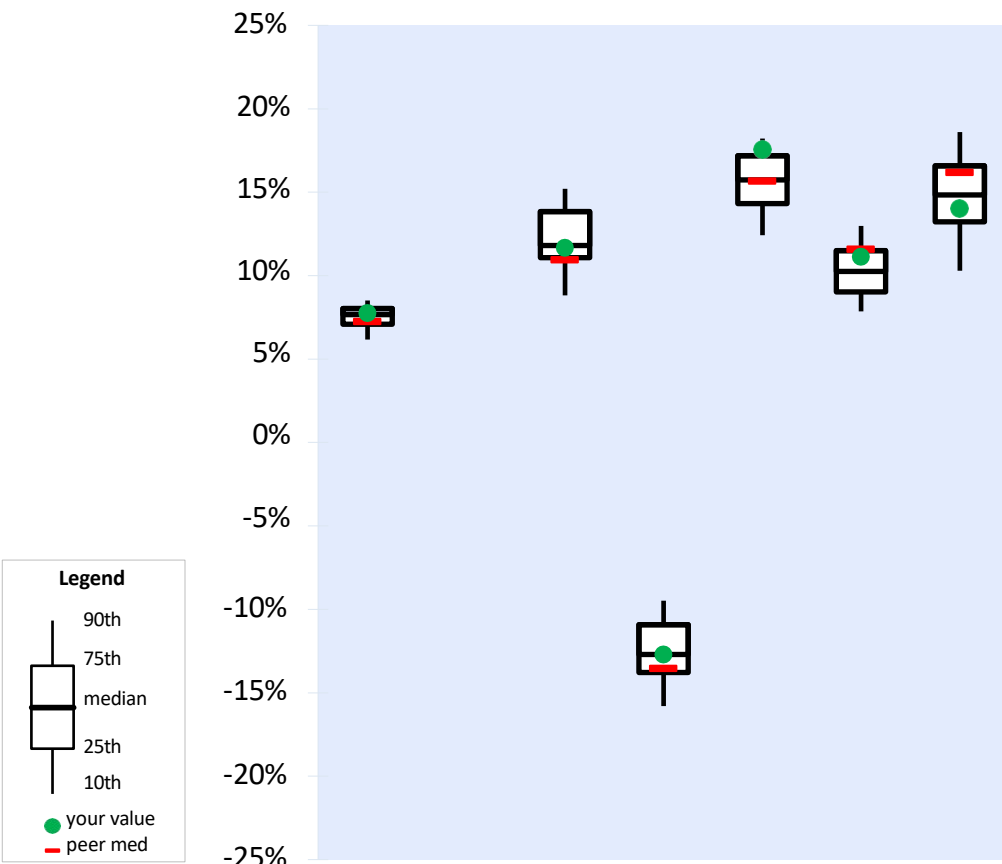
Having a higher or lower relative policy return is not necessarily good or bad. Your policy return reflects your investment policy, which should reflect your:

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

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

To enable fairer comparisons, the policy returns of all participants, including your fund, were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. Prior to this adjustment, your 5-year policy return was 9.2%, 1.5% higher than your adjusted 5-year policy return of 7.7%. Mirroring this, your 5-year total fund net value added would be 1.5% lower.

U.S. Public policy returns - quartile rankings



	5-year	2023	2022	2021	2020	2019
You	7.7%	11.7%	-12.7%	17.6%	11.1%	14.0%
Peer median	7.3%	11.0%	-13.5%	15.7%	11.6%	16.2%
U.S. Public median	7.7%	11.8%	-12.7%	15.7%	10.3%	14.9%

Your 5-year policy return of 7.7% was equal to the U.S. Public median of 7.7% primarily because of:

- The offsetting impacts of your higher allocation to U.S. Stock, which was one of the better performing asset classes over the past 5 years, and U.S. Fixed Income, which was one of the poorer performing asset classes over the past 5 years.

	5-year average policy mix ¹			5-year benchmark return	
	Your Fund	U.S. Publ Avg.	More/Less	Your Fund	U.S. Publ Avg.
Stock - U.S.	24%	18%	6%	15.4%	15.0%
Stock - EAFE	0%	4%	-4%	n/a ³	8.3%
Stock - ACWI x U.S.	18%	7%	11%	7.1%	7.5%
Stock - Global	0%	13%	-13%	n/a ³	12.0%
Other Stock ²	0%	5%	-5%	n/a ³	n/a ³
Total Stock	42%	47%	-4%	12.0%	11.7%
Fixed Income - U.S.	26%	17%	9%	1.4%	1.2%
Fixed Income - Long bonds	0%	1%	-1%	n/a ³	-2.6%
Fixed Inc. - Inflation indexed	1%	4%	-3%	n/a ³	2.5%
Cash	1%	-1%	2%	1.9%	1.9%
Other Fixed Income ²	3%	5%	-1%	n/a ³	n/a ³
Total Fixed Income	31%	25%	6%	1.7%	1.5%
Hedge funds	0%	3%	-3%	n/a ³	4.0%
Natural resources	1%	1%	1%	5.5%	5.4%
REITs	0%	1%	0%	n/a ³	6.4%
Real estate ex-REITs	6%	9%	-2%	4.3%	5.0%
Other Real Assets ²	1%	2%	-2%	n/a ³	n/a ³
Private equity	14%	11%	4%	4.0%	4.0%
Private debt	4%	3%	1%	6.9%	6.9%
Total	100%	100%			

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

2. Other stock includes: Stock - Emerging. Other fixed income includes: Fixed income - U.S. gov't and Fixed income - U.S. credits. Other real assets include: Commodities and Infrastructure.

3. A value of 'n/a' is shown if asset class returns are not available for the full 5 years or if they are broad and incomparable.

Net value added is the component of total return from active management. Your 5-year net value added was 1.6%.

Net value added equals total net return minus policy return.

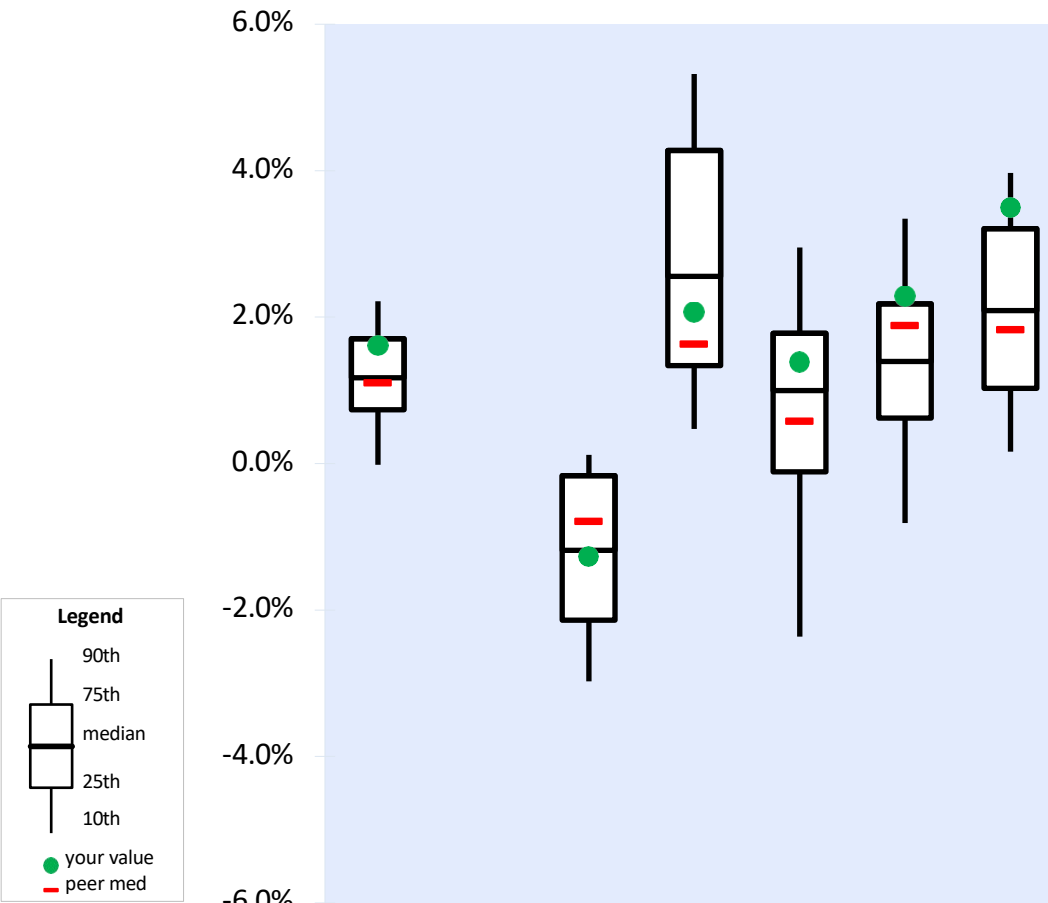
Value added for Iowa Public Employees' Retirement System

Year	Net return	Policy return	Net value added
2023	10.4%	11.7%	-1.3%
2022	-10.6%	-12.7%	2.1%
2021	18.9%	17.6%	1.4%
2020	13.4%	11.1%	2.3%
2019	17.5%	14.0%	3.5%
5-Year	9.4%	7.7%	1.6%

Your 5-year net value added of 1.6% compares to a median of 1.1% for your peers and 1.2% for the U.S. Public universe.

To enable fairer comparisons, the value added for each participant including your fund was adjusted to reflect private equity benchmarks based on lagged, investable public market indices. Prior to this adjustment, your fund's 5-year total fund net value added was 0.1%.

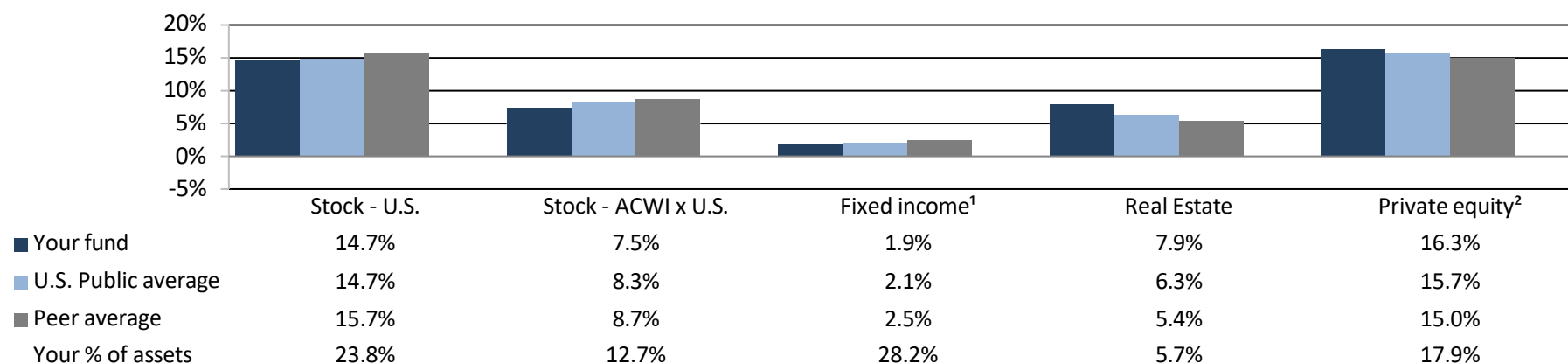
U.S. Public net value added - quartile rankings



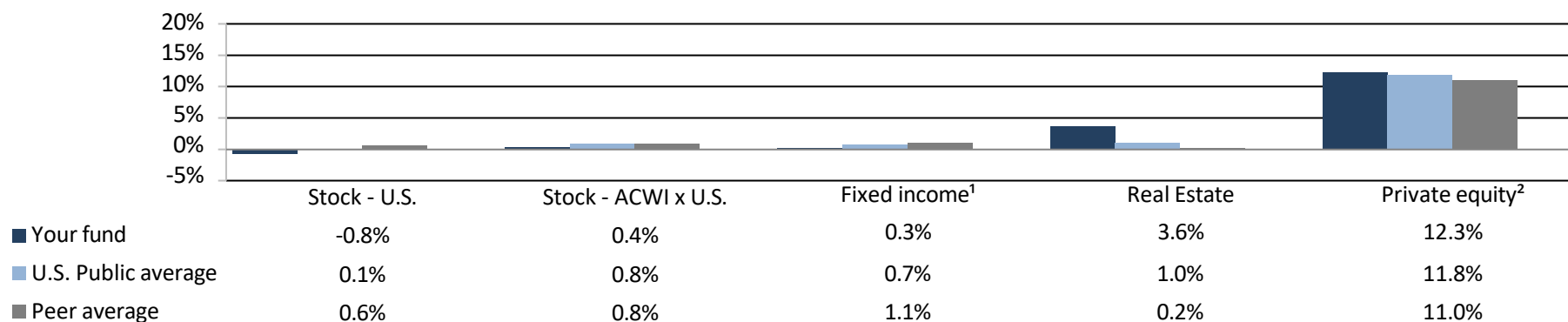
	5-year	2023	2022	2021	2020	2019
You	1.6%	-1.3%	2.1%	1.4%	2.3%	3.5%
Peer median	1.1%	-0.8%	1.6%	0.6%	1.9%	1.8%
U.S. Public median	1.2%	-1.2%	2.6%	1.0%	1.4%	2.1%

Comparisons of your 5-year net return and net value added by major asset class:

5-year average net return by major asset class



5-year average net value added by major asset class



1. Excludes cash and leverage.

2. To enable fairer comparisons, the private equity benchmarks of all participants, including your fund were adjusted to reflect lagged, investable, public-market indices. Prior to this adjustment, your fund's 5-year private equity net value added was -1.2%.

Your investment costs, excluding private asset performance fees, were \$167.5 million or 41.1 basis points in 2023.

Asset management costs by asset class and style (\$000s)	Internal Overseeing of external	External Management			Total
		Passive fees	Active base fees	Perform. fees ²	
Stock - U.S. broad/all		175	247	3,934	4,356
Stock - Emerging		1	945	1,607	2,553
Stock - ACWI x U.S.		566	635	2,862	4,062
Fixed income - U.S.		-308	393	407	492
Fixed income - High yield			469		469
Cash			383		383
Infrastructure ²			2,230	777	2,230
Natural resources ²			2,226	157	2,226
Real estate ex-REITs ²			11,397	1,333	11,397
Private equity - Diversified - LP/Value add ^{1 2}	9,890		103,583	72,508	113,473
Private equity - Diversified - Co-invest. ²	1,478				1,478
Private credit - Core/Evergreen ²			15,835		15,835
Derivatives/Overlays	475	162		3,621	4,257
Total excluding private asset performance fees					163,213 40.0bp
Oversight, custodial and other costs ³					
Oversight of the fund					2,377
Trustee & custodial					783
Consulting and performance measurement					480
Audit					168
Other					450
Total oversight, custodial & other costs					4,257 1.0bp
Total investment costs (excl. transaction costs & private asset performance fees)					167,470 41.1bp

Footnotes

1. CEM-imputed costs were applied to the following manager base fees:

Private equity - Diversified - LP/Value add 150 bp.

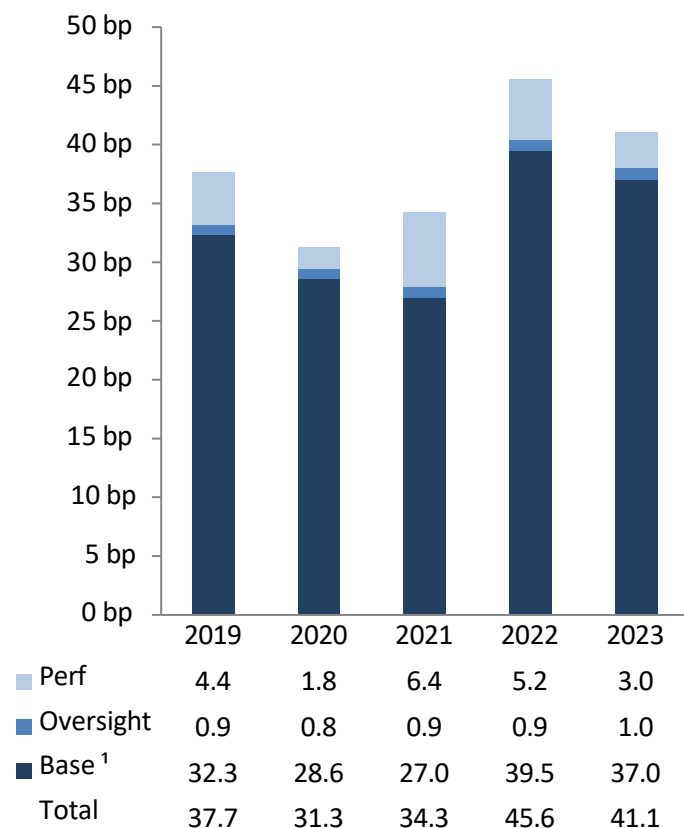
Refer to Appendix A for full details regarding the different forms of cost completion.

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

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

Your costs increased by 3.4 bps, from 37.7 bps in 2019 to 41.1 bps in 2023, primarily because you had a higher cost asset mix. This was partly offset by paying less in total for similar investment styles.

Trend in cost



* The cost trend model is based on your average assets.

1. Includes fees for managing internal assets and internal costs of monitoring external programs, where allocated.

Reasons why your costs increased by 3.4 bps

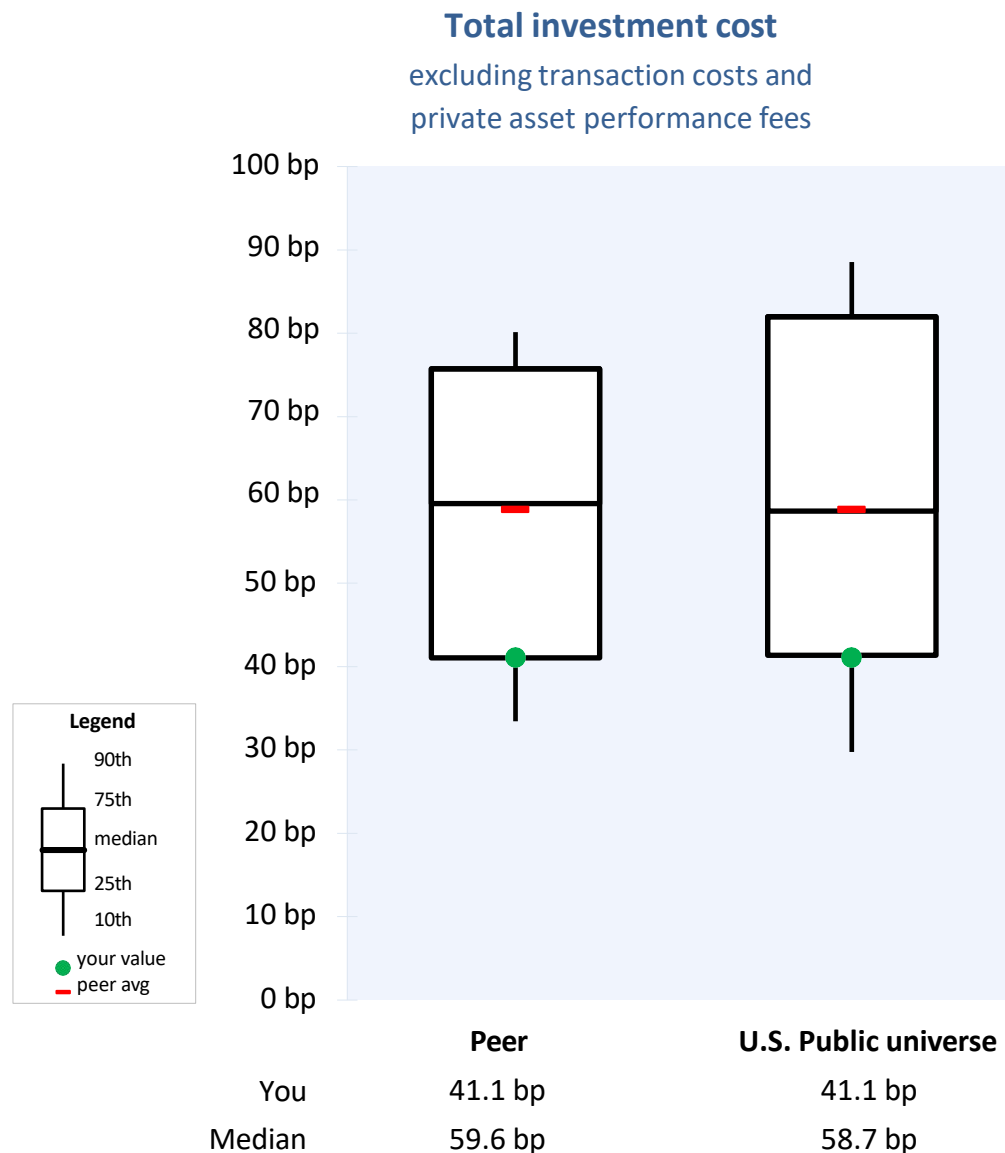
	Impact in bps	
1. Higher cost asset mix		
• More Private equity: 2019 14% vs 2023 19%		9.0
• More Private debt: 2019 2% vs 2023 5%		3.3
• All other mix changes		0.2
		<u>12.5</u>
2. Lower cost implementation style		
• More passive, less active		(1.6)
• Less co-investment as a % of LP/Co		0.6
		<u>(1.0)</u>
3. Paid less in total for similar investment styles	<u>2019 cost</u>	<u>2023 cost</u>
• Lower Private Equity LP/Value add base fees	180.9 bp	164.3 bp
• Lower Private Credit base fees	108.8 bp	74.9 bp
• Lower external active U.S. Broad/All Stock costs	40.0 bp	17.3 bp
• Lower external active U.S. Fixed Income costs	10.3 bp	1.9 bp
• Lower costs for overlays and unfunded strategies	1.8 bp	1.0 bp
• Higher oversight, custodial & other costs	0.9 bp	1.0 bp
• All other differences		
		(0.7)
		<u>(8.2)</u>
Total increase		<u><u>3.4</u></u>

Before adjusting for asset mix differences, your total investment cost of 41.1 bps was below the peer median of 59.6 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 32% of your assets at the end of 2023 versus a peer average of 29%.
- Fund size - bigger funds have advantages of scale.

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



Benchmark cost analysis suggests that, after adjusting for fund size and asset mix, your fund was below benchmark cost by 14.5 basis points in 2023.

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 41.1 bp was below your benchmark cost of 55.6 bp. Thus, your cost savings were 14.5 bp.

Your cost versus benchmark

	\$000s	basis points
Your total investment cost	167,470	41.1 bp
Your benchmark cost	226,755	55.6 bp
Your excess cost	(59,285)	(14.5) bp

Your fund was below benchmark cost because it paid less than peers for similar services and it had a lower cost implementation style.

Reasons for your low cost status

		Excess Cost/ (Savings)	
		\$000s	bps
1. Lower cost implementation style			
• Less active management, more lower cost passive		(9,356)	(2.3)
• More external management, less lower cost internal		1,265	0.3
• Less LPs as a percentage of external		(10,859)	(2.7)
• Less fund of funds		(5,599)	(1.4)
• More co-investment as a percentage of LP/Co		(6,458)	(1.6)
• More overlays		2,540	0.6
		(28,467)	(7.0)
2. Paying less than peers for similar services			
• External investment management costs		(25,883)	(6.3)
• Oversight, custodial & other costs		(4,935)	(1.2)
		(30,818)	(7.6)
Total savings		(59,285)	(14.5)

Your implementation style was 7.0 bps lower cost than the peer average.

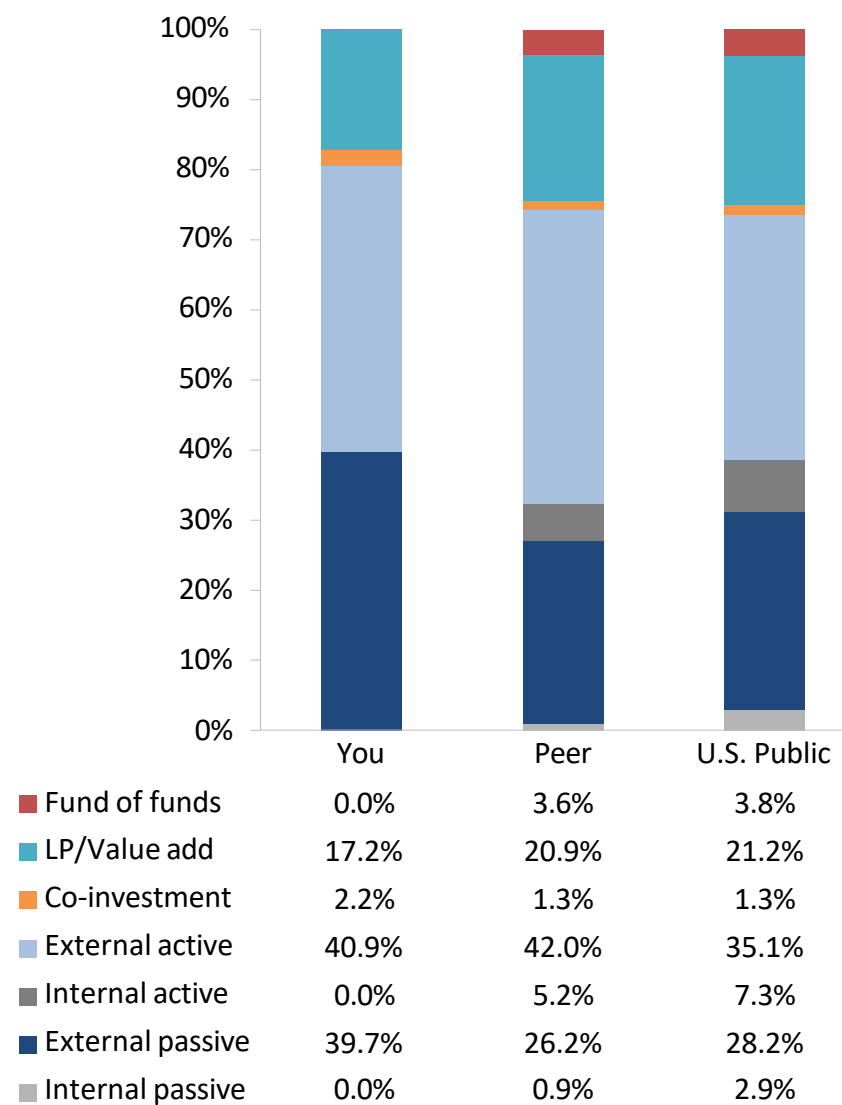
Implementation style is the way in which your fund implements asset allocation. Each implementation choice has a cost. Your first choice is how much to implement passively or actively. The table below summarizes your aggregate choices versus peers and their cost impact.

Implementation choices	Impact
Less active, more passive	(2.3) bp
Less internal as a % of passive	0.0 bp
Less internal as a % of active	0.3 bp
Less LPs as a % of external	(2.7) bp
Less fund of funds	(1.4) bp
More co-investment as a percentage of LP/Co	(1.6) bp
More overlays	0.6 bp
Total impact	(7.0) bp

The peer and universe style was adjusted to match your asset mix. It equals their average style for each asset class weighted by your fee basis for the asset class. It shows how the average peer would implement your asset mix.

1. Implementation style is shown as a % of total fund fee basis because the fee basis is the primary driver of cost for private assets (e.g., new private equity LP commitments increase costs before LP NAV increases). Style weights are based on average holdings. Cash and derivatives are excluded.

Implementation style¹



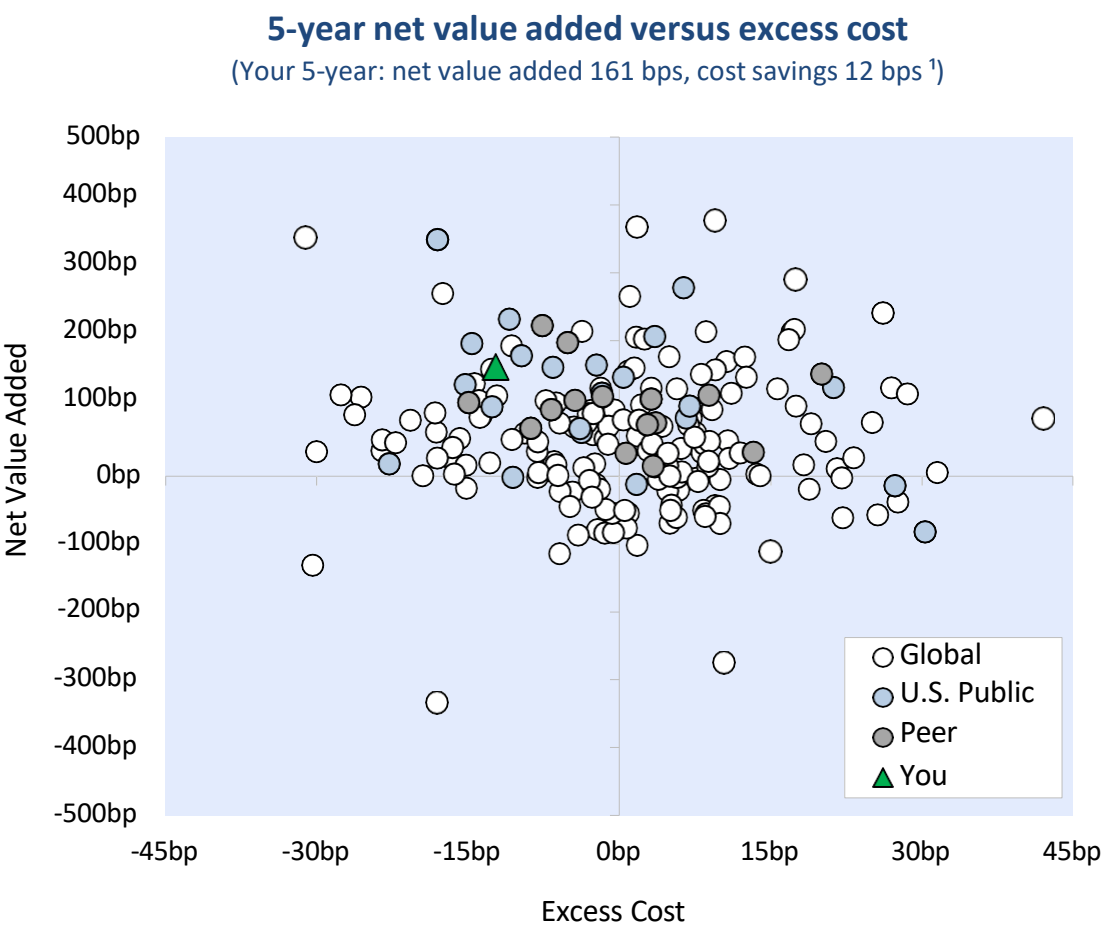
The table below summarizes why your fund is high/low cost relative to the peer-median by asset class.

Why are you high/(low) cost by asset class?

Asset class/category	Style weighted cost			Your average assets (or fee basis) ²	Due to impl. style	Due to paying more/(less)	Total more/(less)
	Your cost	Peer median ¹ = Benchmark	More/(less)				
Asset management costs	(A)	(B)	(C = A - B)	(D)			(C x D)
Stock - U.S. broad/all	4.6 bp	7.5 bp	(2.9) bp	9,407	1,386	(4,067)	(2,681)
Stock - Emerging	13.9 bp	47.7 bp	(33.9) bp	1,841	(2,754)	(3,478)	(6,233)
Stock - ACWI x U.S.	8.4 bp	29.3 bp	(20.9) bp	4,847	(4,623)	(5,530)	(10,154)
Fixed income - U.S.	0.5 bp	8.0 bp	(7.5) bp	9,607	(2,396)	(4,770)	(7,167)
Fixed income - Emerging	0.0 bp	35.1 bp	(35.1) bp	407	0	(1,430)	(1,430)
Fixed income - High yield	5.9 bp	27.8 bp	(22.0) bp	798	74	(1,827)	(1,753)
Real estate ex-REITs	41.5 bp	88.4 bp	(46.9) bp	2,745	(3,659)	(9,200)	(12,859)
Infrastructure	72.5 bp	93.7 bp	(21.2) bp	308	(514)	(137)	(651)
Natural resources	73.8 bp	80.7 bp	(6.9) bp	302	(750)	541	(209)
Private equity - Diversified	147.3 bp	162.8 bp	(15.5) bp	7,804	(12,057)	(42)	(12,099)
Private credit	74.9 bp	82.7 bp	(7.8) bp	2,114	(5,714)	4,059	(1,655)
Derivatives/Overlays	1.0 bp	0.4 bp	0.6 bp	40,776	2,540	0	2,540
Total asset management	40.0 bp	53.4 bp	(13.3) bp	40,776	(28,467)	(25,883)	(54,350)
Oversight, custody and other costs³							
Oversight of the Fund	0.6 bp	0.9 bp	(0.3) bp				
Trustee & Custodial	0.2 bp	0.4 bp	(0.2) bp				
Consulting	0.1 bp	0.2 bp	(0.1) bp				
Audit	0.0 bp	0.1 bp	(0.0) bp				
Other	0.1 bp	0.1 bp	0.0 bp				
Total oversight, custody & other	1.0 bp	2.3 bp	(1.2) bp	40,776	n/a	(4,935)	(4,935)
Total	41.1 bp	55.6 bp	(14.5) bp	40,776	(28,467)	(30,818)	(59,285)

1. The weighted peer median cost for asset management is the style-weighted average of the peer median costs for all implementation styles (e.g., internal passive, external active, fund of fund, etc.).
2. Total fund average holdings is used as the base when calculating the relative cost impact of the overlay programs.
3. Benchmarks for oversight total and individual lines are based on peer medians. Sum of the lines may be different from the total.

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



1. Your 5-year savings of 12.2 basis points is the average of your peer-based savings for the past 5 years.

	5-year	2023	2022	2021	2020	2019
Net value added	161.3bp	(126.5) bp	206.7bp	138.4bp	228.7bp	349.9bp
Excess cost	(12.2) bp	(14.5) bp	(13.4) bp	(9.0) bp	(14.0) bp	(10.3) bp

Summary of key takeaways

Returns

- Your 5-year net total return was 9.4%. This was above both the U.S. Public median of 8.9% and the peer median of 8.6%.
- Your 5-year policy return was 7.7%. This was equal to the U.S. Public median of 7.7% and above the peer median of 7.3%.

Value added

- Your 5-year net value added was 1.6%. This was above both the U.S. Public median of 1.2% and the peer median of 1.1%.

Cost

- Your investment cost of 41.1 bps was below your benchmark cost of 55.6 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was below benchmark cost because it paid less than peers for similar services and it had a lower cost implementation style.
- Your costs increased by 3.4 bps, from 37.7 bps in 2019 to 41.1 bps in 2023, primarily because you had a higher cost asset mix. This was partly offset by paying less in total for similar investment styles.

Thank you



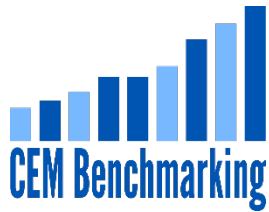
Christopher Doll

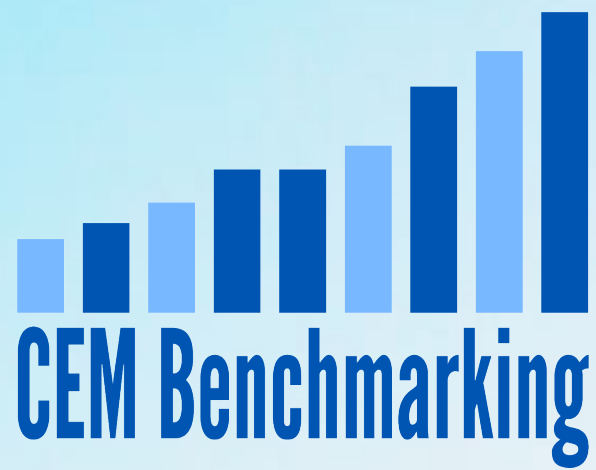
Director, Client Coverage

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ChrisD@cembenchmarking.com

CEMbenchmarking.com





Wilshire

Iowa Public Employees' Retirement System

Fiscal Year 2024 Annual Investment Summary

Quarterly Market Review

June 30, 2024

Market Commentary

U.S. Equity

The U.S. stock market was up 3.3% for the second quarter and is up 13.6% for the year-to-date. A majority of sectors were negative, however, with the best performing being technology (+12.5%) and the worst being materials (-5.5%) and industrials (-3.3%). Small-cap underperformed large-cap by 850 basis points while growth stocks generally outperformed value.

As yields began to rise in early 2022, few were immune to the consequences of higher debt service payments, including the U.S. government. Higher rates and the size of the total U.S. debt – currently 120% of annual gross domestic product (GDP) – has resulted in net interest payments rising to equal 13% of the annual U.S. budget, roughly equal to the dollars spent on national defense and Medicare. A recent report by the non-partisan Congressional Budget Office (CBO) projects interest costs to continue to grow as deficits are expected for the next ten years. The CBO forecasts deficits to remain greater than 5% of annual GDP, which would be “more than the 3.7 percent that deficits have averaged over the past 50 years.”

Non-U.S. Equity

New data in England shows that the country has recovered from a mild recession last year, albeit at a tepid pace. Prospects in Germany are dimming due to global trade conflicts that are weighing on the industrial sector. Economic activity in China remains uneven as manufacturing activity fell in June while services slipped to a five-month low. Many expect the Chinese government to offer policy support in the short term.

Fixed Income

The U.S. Treasury yield curve was up across most of the maturity spectrum during the quarter. The 10-year Treasury yield ended the quarter at 4.40%, up 20 basis points. Credit spreads were up during the quarter with high yield bond spreads up 10 basis points after falling below 3% in March. The FOMC left the overnight rate unchanged while their “dot plot” is messaging that the current expectation is for a modest decrease in rates in 2024. Fed Chair Jerome Powell said about rates, “Fortunately, we have a strong economy and we have the ability to approach this question carefully.”

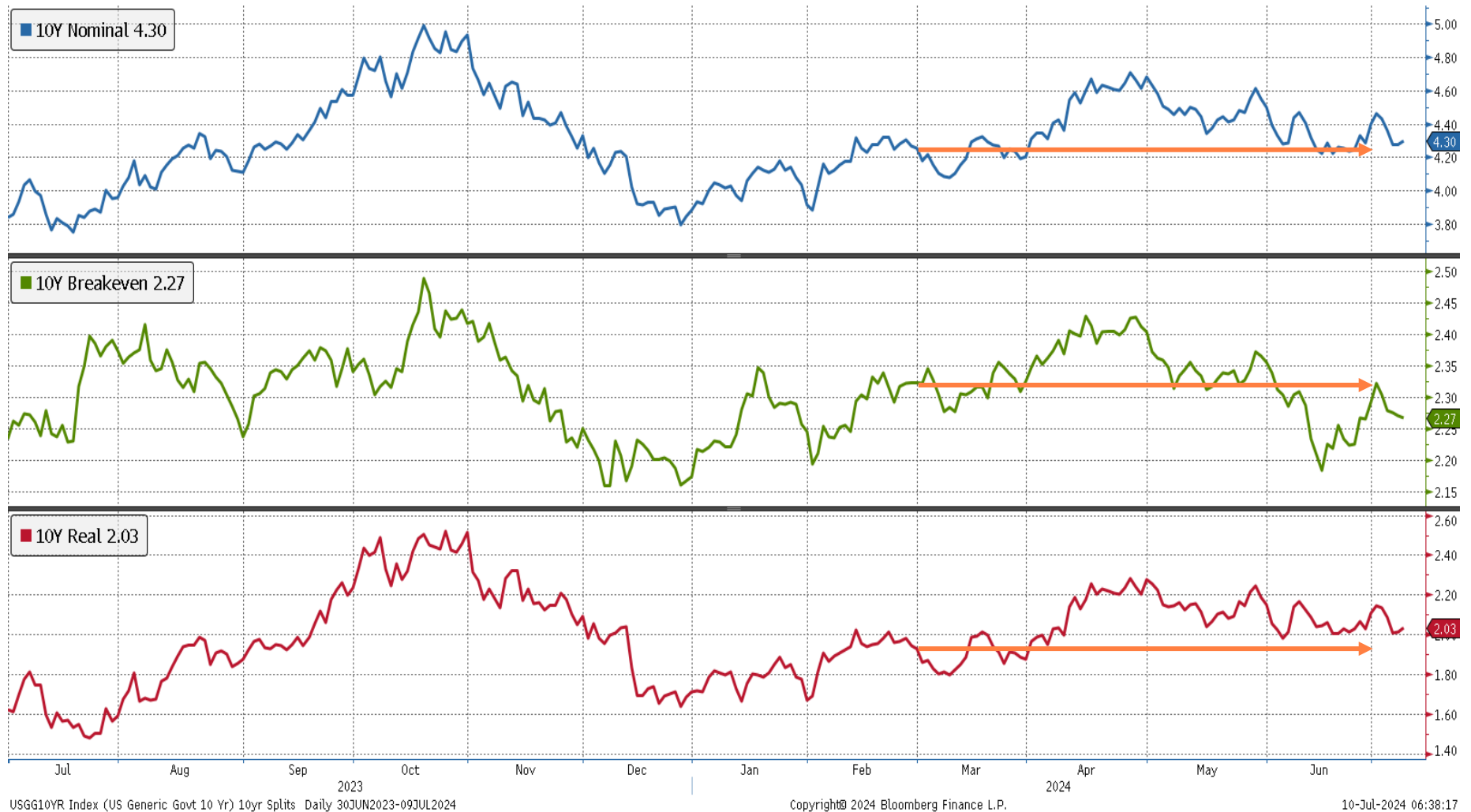
June 2024 Asset Class Assumptions

	Equity						Fixed Income						Dev ex-U.S. Bond (Hdg)	Real Assets					U.S. CPI
	U.S. Stock	Dev ex-U.S. Stock	Emg Stock	Global ex-U.S. Stock	Global Stock	Private Equity	Cash	Core Bond	LT Core Bond	TIPS	High Yield	Private Credit		U.S. RES	Global RES	Private RE	Cmdty	Real Assets	
Compound Return (%)	4.50	5.50	5.75	5.85	5.10	7.45	4.00	5.25	5.20	4.60	6.50	8.20	3.20	5.85	6.00	6.25	6.30	7.00	2.30
Arithmetic Return (%)	5.85	7.00	8.75	7.50	6.45	11.20	4.00	5.35	5.65	4.75	6.95	8.95	3.30	7.25	7.25	7.15	7.45	7.75	2.30
Risk (%)	17.00	18.00	26.00	19.00	17.05	29.65	0.75	4.70	9.85	6.00	10.00	12.75	4.00	17.50	16.45	13.90	16.00	12.60	1.75
Yield (%)	1.35	3.00	2.35	2.80	1.90	0.00	4.00	5.65	5.70	4.85	9.90	5.10	4.10	4.15	4.15	2.70	4.00	3.70	0.00
Growth Factor Exposure	8.00	8.00	8.00	8.00	8.00	14.00	0.00	-0.90	-2.40	-3.00	4.00	5.10	-1.00	6.00	6.00	3.50	0.00	2.70	0.00
Inflation Factor Exposure	-3.00	-1.00	3.00	0.10	-1.85	-4.25	0.00	-2.55	-6.85	2.50	-1.00	-1.50	-3.00	1.00	1.80	1.00	12.00	5.25	1.00

Correlations

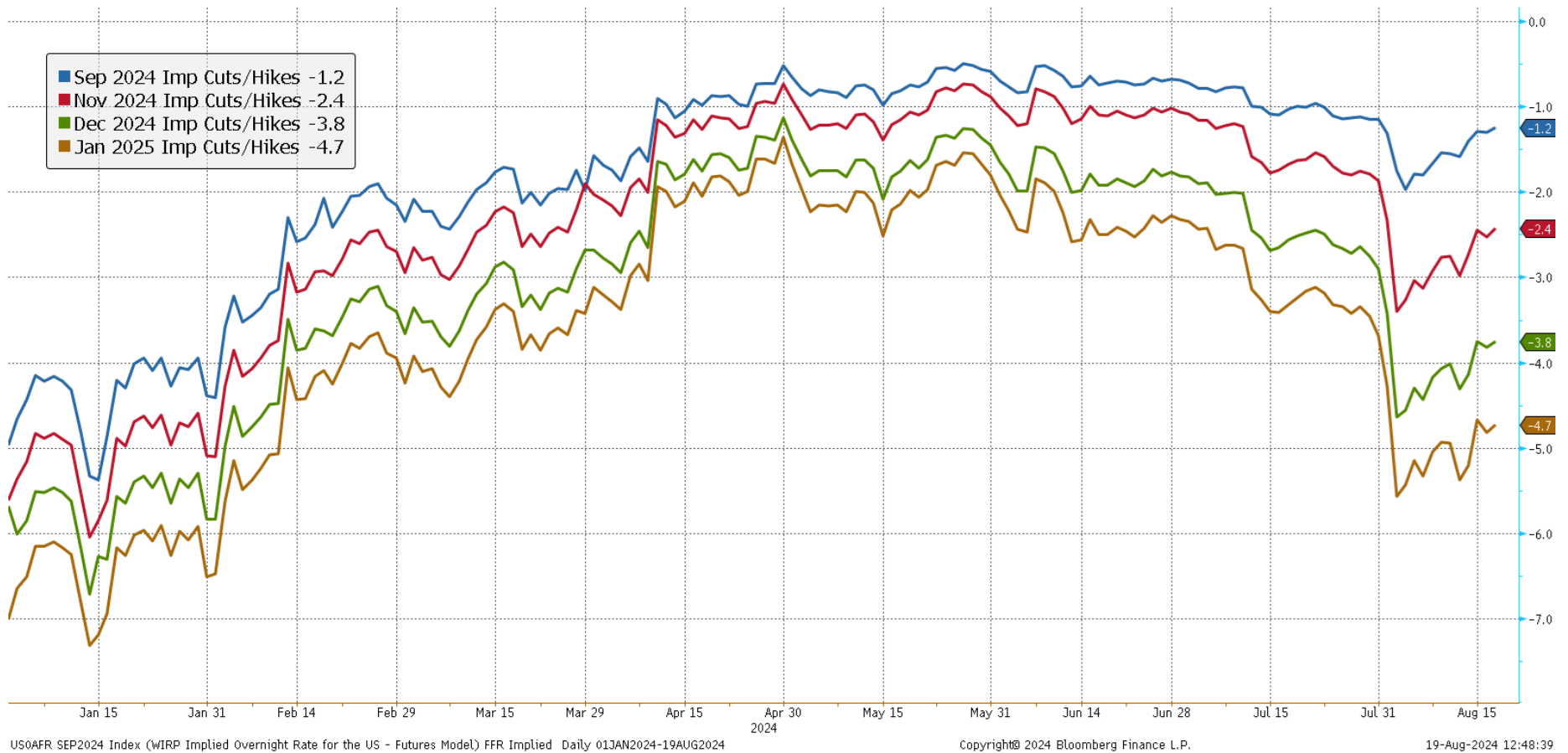
U.S. Stock	1.00																		
Dev ex-U.S. Stock (USD)	0.81	1.00																	
Emerging Mkt Stock	0.74	0.74	1.00																
Global ex-U.S. Stock	0.84	0.95	0.89	1.00															
Global Stock	0.95	0.91	0.84	0.94	1.00														
Private Equity	0.72	0.63	0.61	0.67	0.73	1.00													
Cash Equivalents	-0.05	-0.09	-0.05	-0.08	-0.06	0.00	1.00												
Core Bond	0.28	0.13	0.00	0.08	0.20	0.30	0.18	1.00											
LT Core Bond	0.31	0.15	0.01	0.11	0.24	0.31	0.11	0.94	1.00										
TIPS	-0.05	0.00	0.15	0.06	-0.01	-0.03	0.20	0.60	0.48	1.00									
High Yield Bond	0.54	0.39	0.49	0.46	0.53	0.31	-0.10	0.24	0.32	0.05	1.00								
Private Credit	0.67	0.55	0.57	0.59	0.67	0.44	0.00	0.24	0.30	0.00	0.75	1.00							
Dev ex-U.S. Bond (Hdg)	0.16	0.25	-0.01	0.16	0.17	0.26	0.10	0.67	0.65	0.39	0.26	0.22	1.00						
U.S. RE Securities	0.57	0.47	0.44	0.49	0.56	0.49	-0.05	0.17	0.22	0.10	0.56	0.61	0.05	1.00					
Global RE Securities	0.63	0.56	0.54	0.59	0.64	0.55	-0.05	0.17	0.21	0.11	0.60	0.67	0.04	0.97	1.00				
Private Real Estate	0.55	0.45	0.45	0.49	0.54	0.50	-0.05	0.19	0.25	0.09	0.57	0.62	0.05	0.78	0.77	1.00			
Commodities	0.25	0.34	0.39	0.38	0.32	0.28	0.00	-0.03	-0.03	0.25	0.29	0.29	-0.10	0.25	0.28	0.25	1.00		
Real Assets	0.61	0.62	0.66	0.68	0.66	0.56	-0.03	0.24	0.26	0.32	0.64	0.69	0.05	0.78	0.83	0.76	0.62	1.00	
Inflation (CPI)	-0.10	-0.15	-0.13	-0.15	-0.13	-0.10	0.10	-0.12	-0.12	0.15	-0.08	0.00	-0.08	0.05	0.04	0.05	0.44	0.21	1.00

The Rate Environment



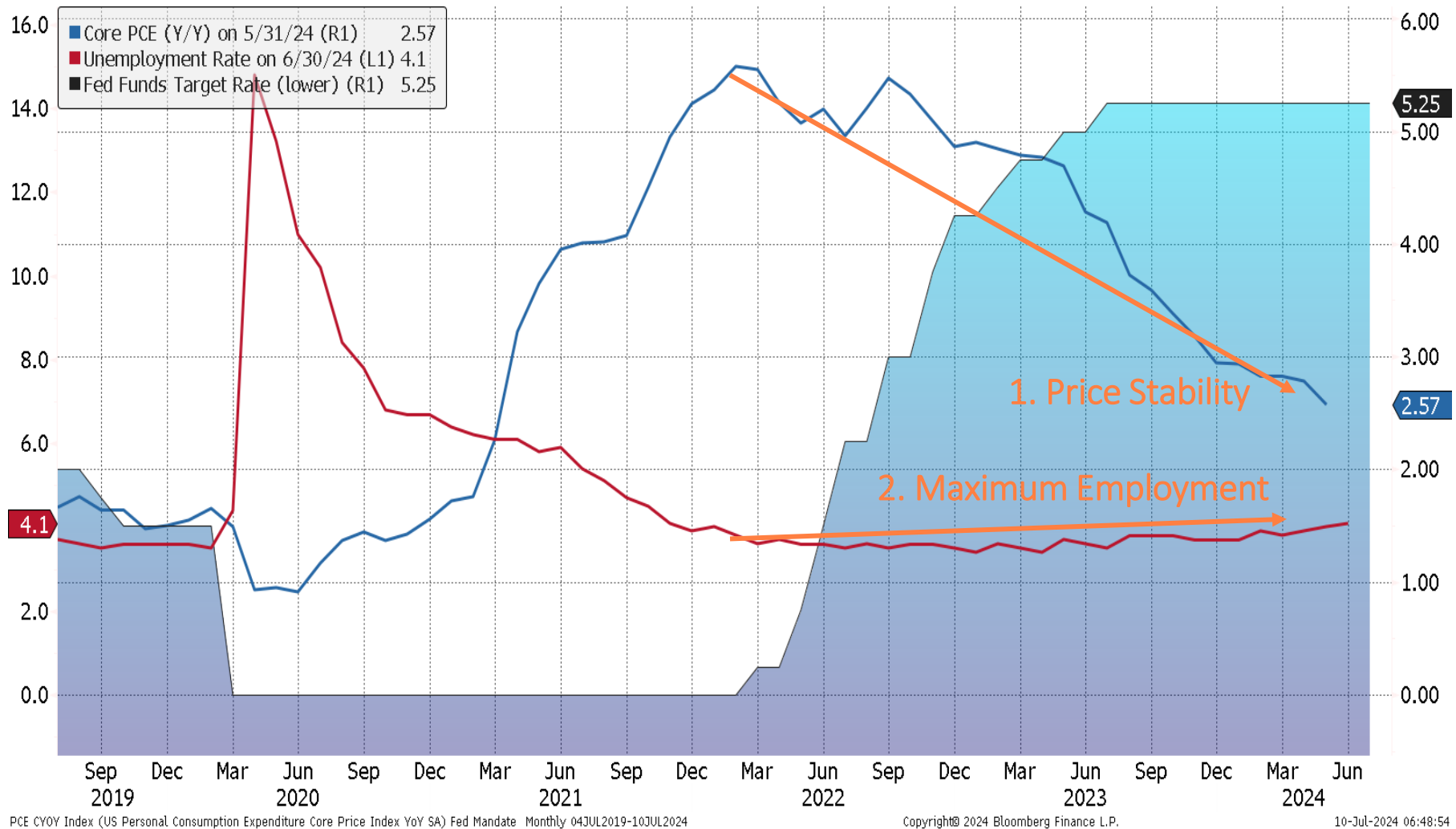
Data Source: Bloomberg

Fed Funds Rate: Market Expectations



Data Source: Bloomberg

Keeping it Simple: Progress on the Fed's Dual Mandate



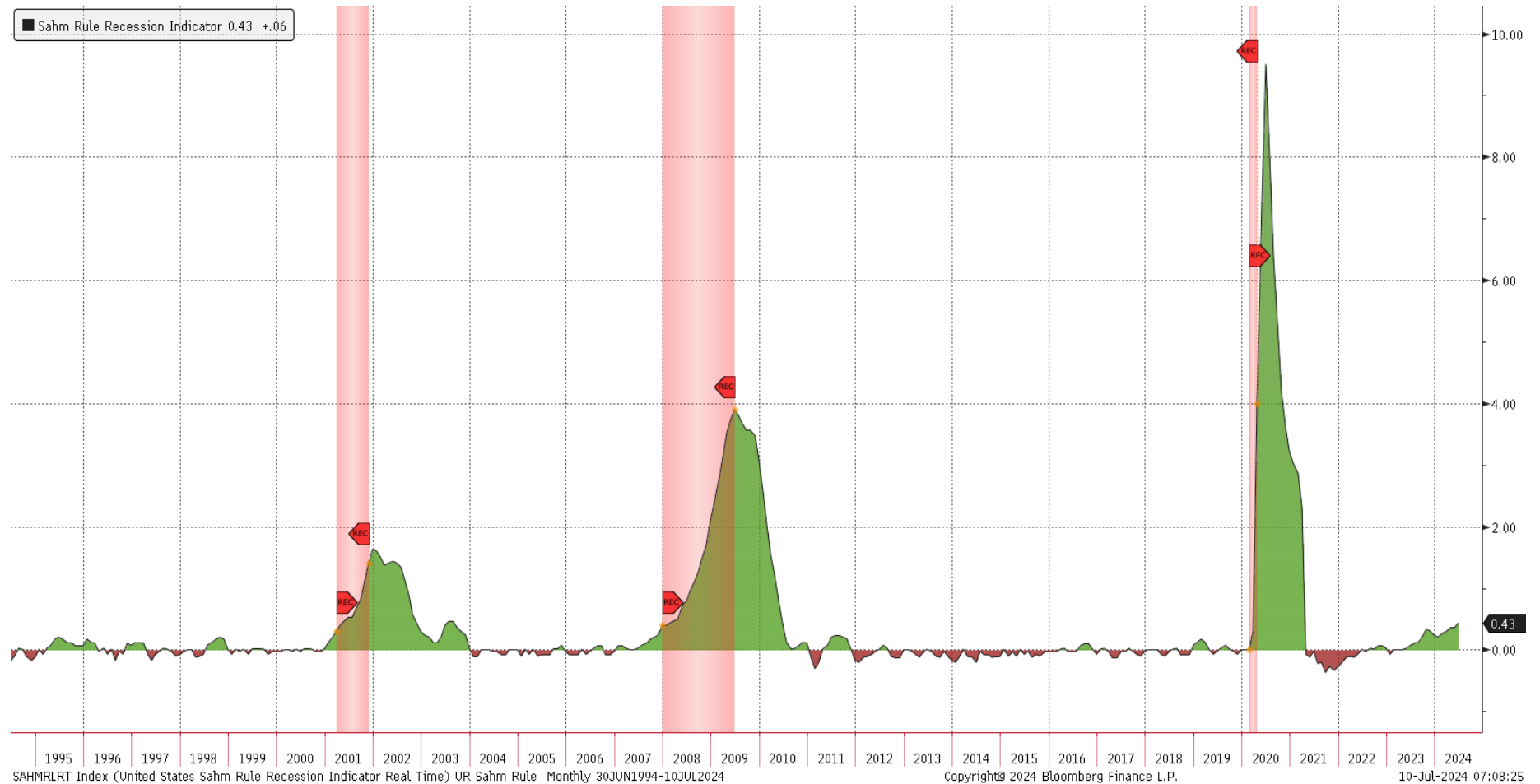
Data Source: Bloomberg

Economic Surprises: Releases Falling Short of Expectations



Data Source: Bloomberg

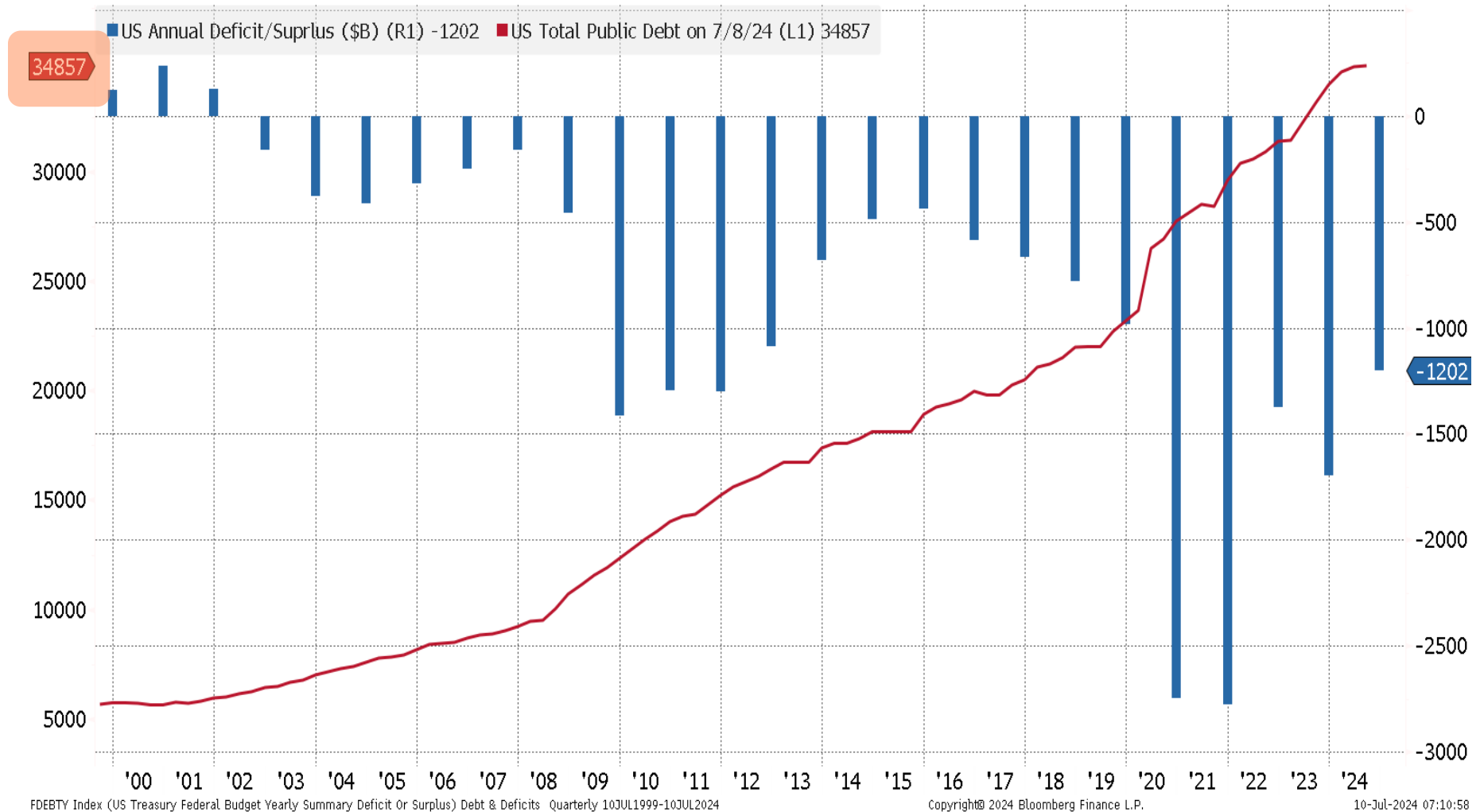
Unemployment: “Not broken, just bent”¹



Data Source: Bloomberg

¹Pink, “Just Give Me a Reason,” The Truth About Love (2012)

Deficits & Debt on an Unsustainable Pace



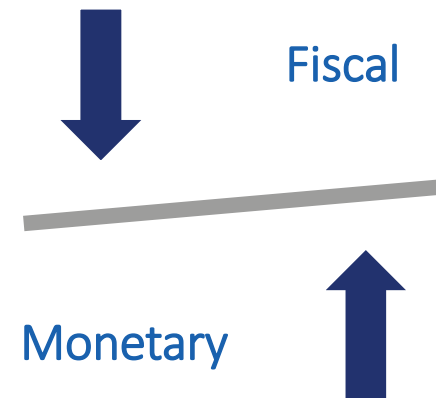
Data Source: Bloomberg

Fiscal Dominance: Complicating Monetary Policy

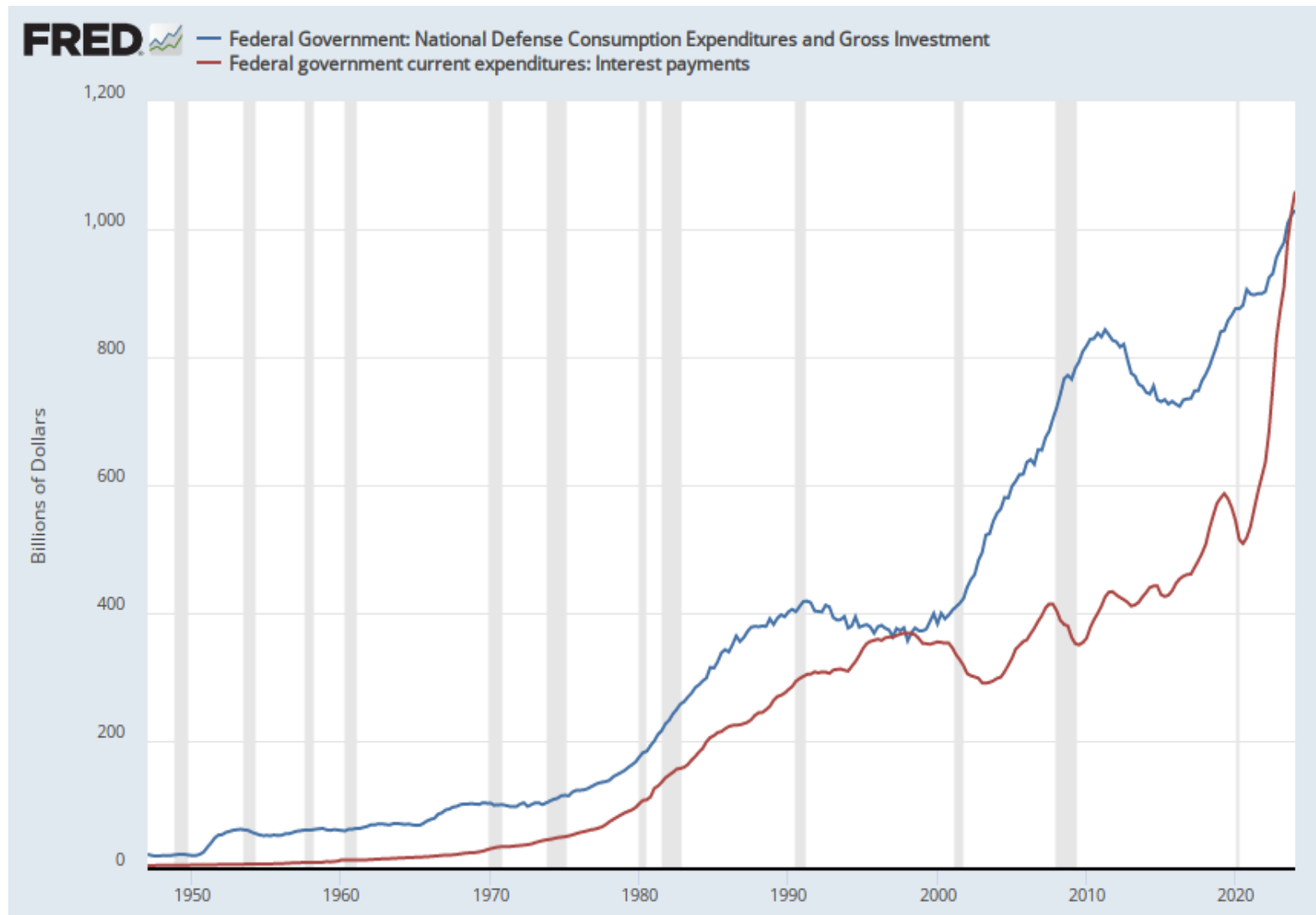
Fiscal Dominance: when a government's debt is sufficiently high to undermine the central bank's influence on inflation

Long-term Risks/Implications

- **Higher Inflation Rates:** potential for higher future inflation rates (as unsustainable debt levels leads to money printing)
- **Higher Interest Rates:** should central bankers be required to battle sustained inflation rates
- **Currency Depreciation:** as investors lose faith in a government's ability to control inflation
- **Budgeting Conflicts/Tradeoffs:** as interest payments required to meet rising debt levels crowds out other spending/investing priorities



Fiscal Dominance in a Chart



Data Source: U.S. Bureau of Economic Analysis

Asset Class Performance

Asset Class Returns - Best to Worst

2019	2020	2021	2022	2023	2024 YTD	Annualized 5-Year as of 6/24
U.S. Equity 31.0%	U.S. Equity 20.8%	REITs 46.2%	Commodities 16.1%	U.S. Equity 26.1%	U.S. Equity 13.6%	U.S. Equity 14.4%
REITs 25.8%	Emrg Mrkts 18.7%	Commodities 27.1%	T-Bills 1.3%	Developed 18.9%	Emrg Mrkts 7.7%	Commodities 7.2%
Developed 22.7%	U.S. TIPS 11.0%	U.S. Equity 26.7%	High Yield -11.2%	REITs 16.1%	Developed 5.7%	Developed 7.0%
Emrg Mrkts 18.9%	Developed 8.3%	Developed 11.8%	U.S. TIPS -11.8%	High Yield 13.4%	Commodities 5.1%	REITs 4.0%
High Yield 14.3%	Core Bond 7.5%	U.S. TIPS 6.0%	Core Bond -13.0%	Emrg Mrkts 10.3%	T-Bills 2.6%	High Yield 3.9%
Core Bond 8.7%	High Yield 7.1%	High Yield 5.3%	Developed -14.0%	Core Bond 5.5%	High Yield 2.6%	Emrg Mrkts 3.5%
U.S. TIPS 8.4%	T-Bills 0.7%	T-Bills 0.0%	U.S. Equity -19.0%	T-Bills 5.1%	U.S. TIPS 0.7%	T-Bills 2.2%
Commodities 7.7%	Commodities -3.1%	Core Bond -1.5%	Emrg Mrkts -19.7%	U.S. TIPS 3.9%	REITs -0.3%	U.S. TIPS 2.1%
T-Bills 2.3%	REITs -7.9%	Emrg Mrkts -2.2%	REITs -26.8%	Commodities -1.3%	Core Bond -0.7%	Core Bond -0.2%

Data Sources: Bloomberg

Note: Developed asset class is developed equity markets ex-U.S., ex-Canada

Total Fund

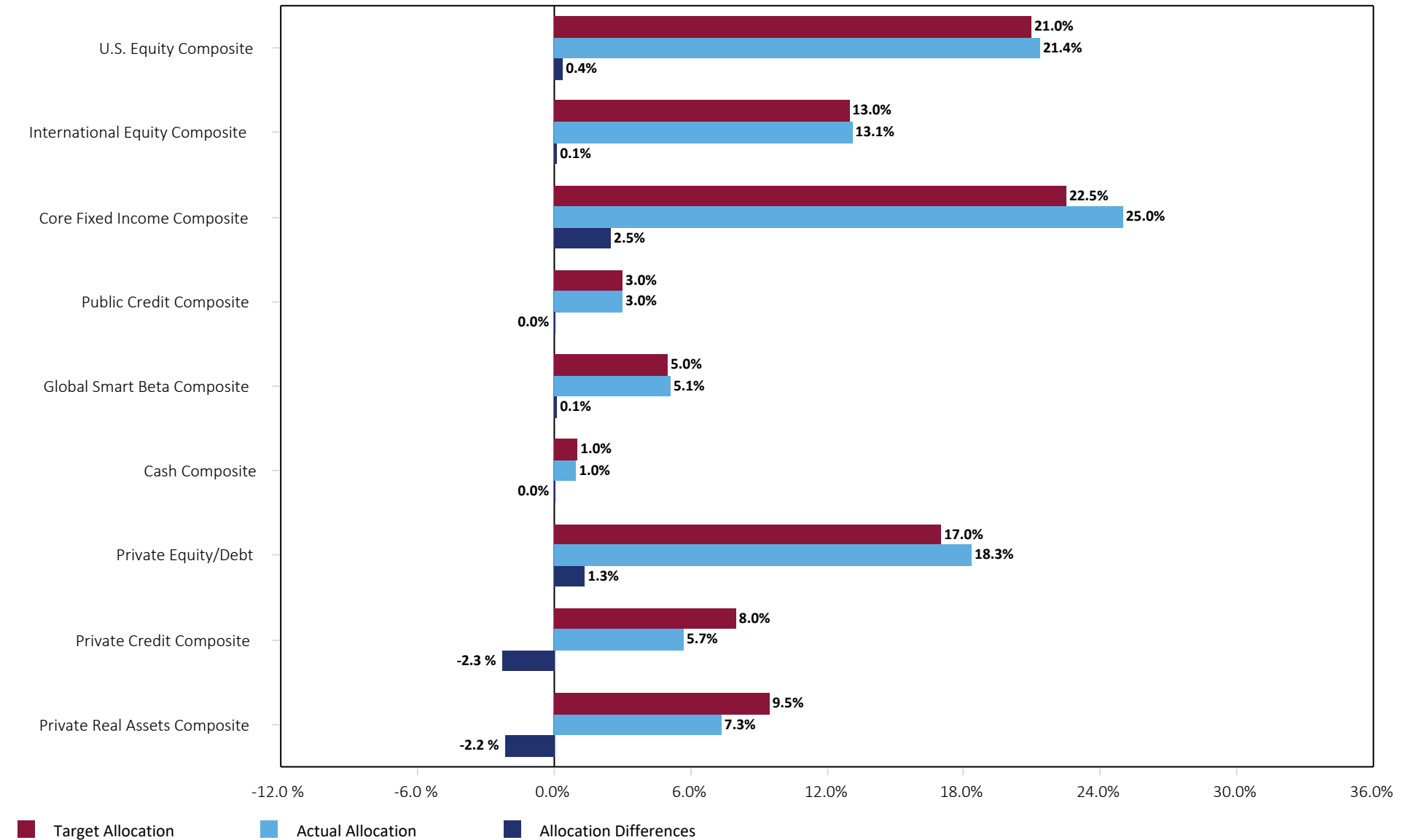
Executive Summary (as of 6/30/2024)

- Total Fund returned 9.1% during FY 2024, outperforming the Total Fund Policy Benchmark¹ (“policy”) return of 8.8% over the same period.
- Manager alpha across public markets was strong for the year with positive double-digit returns and relative against their benchmarks. U.S. Equity, International Equity, and Public Credit led their policies, while Core Fixed Income slightly trailed their respective index.
- 10-year annualized returns were 7.5% for Total Fund, slightly outpacing the policy return.
- IPERS ranks very favorably versus peers across most time horizons. Total Fund return has ranked in or near the top decile against all public plans with greater than \$1 billion in assets over 5-, and 10-years.
- IPERS’ 5-year risk-adjusted returns remain top-decile relative to all public plans greater than \$1 billion in Total Fund assets—outpacing 83% of peers.

Asset Allocation Compliance

Total Fund

Periods Ended As of June 30, 2024

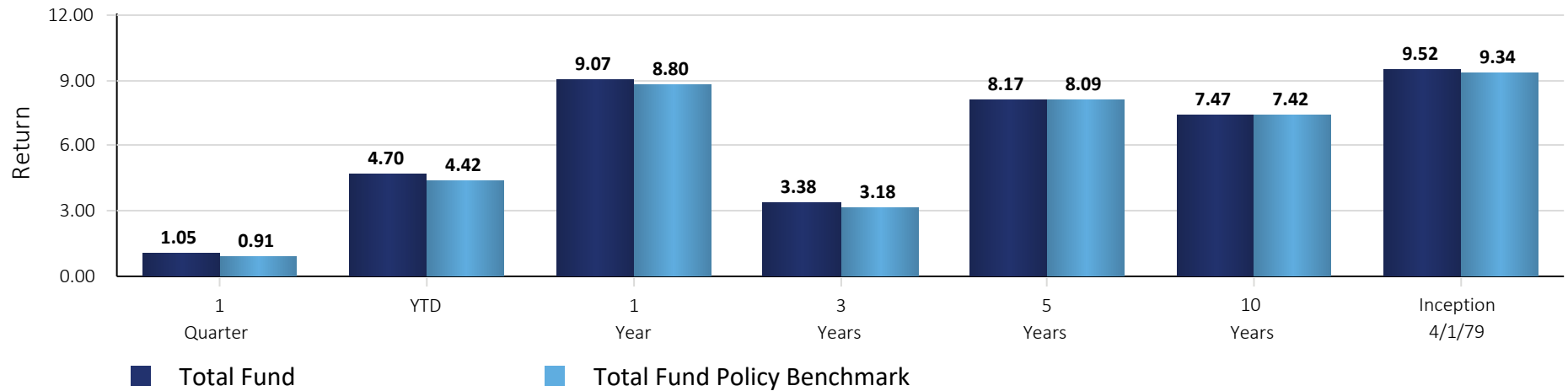


Total Fund Summary

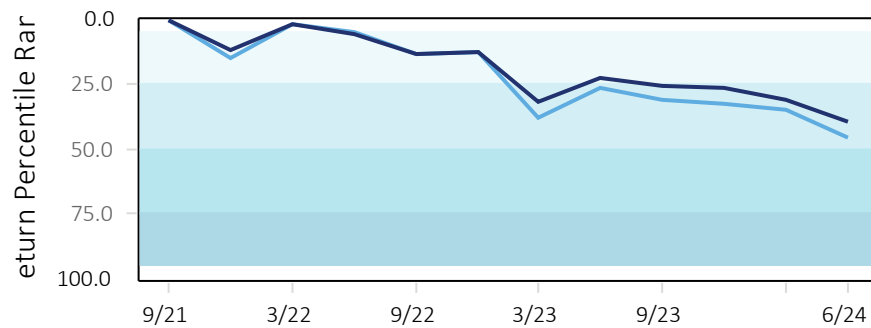
Total Fund

Periods Ended June 30, 2024

Comparative Performance

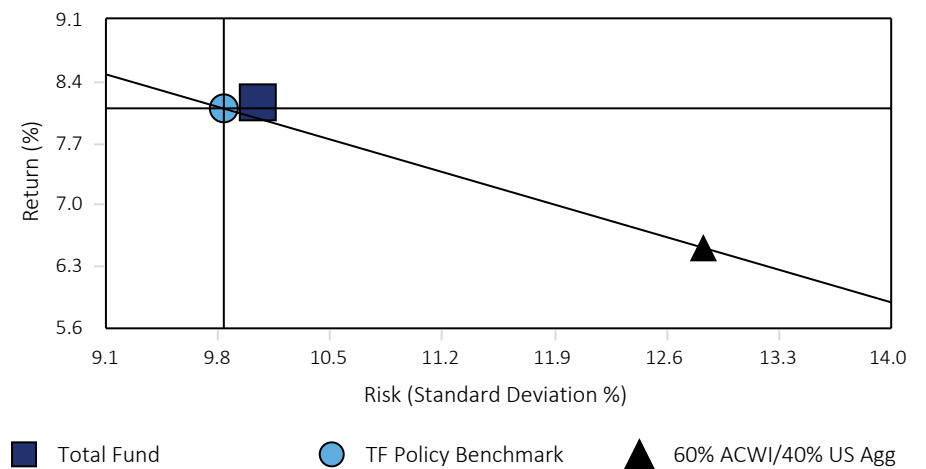


Rolling Percentile Rank: All Public Plans >\$1B-Total Fund



	Total Period	5-25 Count	25-Median Count	Median-75 Count	75-95 Count
— Total Fund	12	7 (58%)	5 (42%)	0 (0%)	0 (0%)
— Benchmark	12	6 (50%)	6 (50%)	0 (0%)	0 (0%)

Risk and Return (5-year)



Asset Allocation & Performance

Total Fund

Periods Ended June 30, 2024

	Performance (%) net of fees										Market Value \$	%
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	30 Years	Since Inception	Inception Date		
Total Fund	1.05	9.07	9.07	3.38	8.17	7.47	7.70	8.57	9.52	4/1/1979	43,611,782,410	100.00
Total Fund Policy Benchmark	0.91	8.80	8.80	3.18	8.09	7.42	7.78	8.33	9.34			
Public Markets Reference Index	1.35	11.63	11.63	1.63	6.27	5.80	6.53	7.04				
CPI + 3%	1.34	6.06	6.06	8.11	7.29	5.88	5.63	5.62	6.48			
All Public Plans > \$1B-Total Fund Median	1.03	9.57	9.57	3.03	7.16	6.29	6.70	7.69				
Actuarial Rate	1.71	7.00	7.00	7.00	7.00	7.10	7.30	7.34	7.06			
Public Markets Composite	1.30	11.96	11.96	2.22	6.50				6.81	10/1/2016	29,926,518,257	68.62
Public Markets Reference Index	1.35	11.63	11.63	1.63	6.27				6.73			
U.S. Equity Composite	3.53	24.22	24.22	8.98	14.43	12.36	9.85	10.60	11.54	4/1/1975	9,258,057,566	21.23
U.S. Equity Composite Benchmark	3.22	23.12	23.12	8.37	14.41	12.35	10.29	10.70				
International Equity Composite	1.69	12.72	12.72	1.11	6.10	4.19	5.94	5.64	5.48	10/1/1989	5,679,515,378	13.02
International Equity Policy Index	0.96	11.62	11.62	0.46	5.55	4.04	6.11	5.38	5.35			
Core Fixed Income Composite	0.03	2.37	2.37	-3.34	-0.12	1.66	3.56	4.94	6.23	7/1/1985	11,014,971,861	25.26
Core Fixed Income Policy Index	0.07	2.63	2.63	-2.95	-0.06	1.55	3.39	4.73	5.87			
Public Credit Composite	1.08	10.65	10.65	0.60	3.00	3.66	5.81		5.71	4/1/1998	1,311,454,414	3.01
Public Credit Policy Index	0.88	9.75	9.75	0.37	2.71	3.55	5.83		5.60			
Global Smart Beta Composite	-2.04	13.38	13.38	4.29	8.26				7.76	8/1/2017	2,147,080,585	4.92
Global Smart Beta Policy Index	-1.96	13.65	13.65	4.50	8.44				7.88			
MSCI AC World Index (Net)	2.87	19.38	19.38	5.43	10.76				9.71			

Asset Allocation & Performance

Total Fund

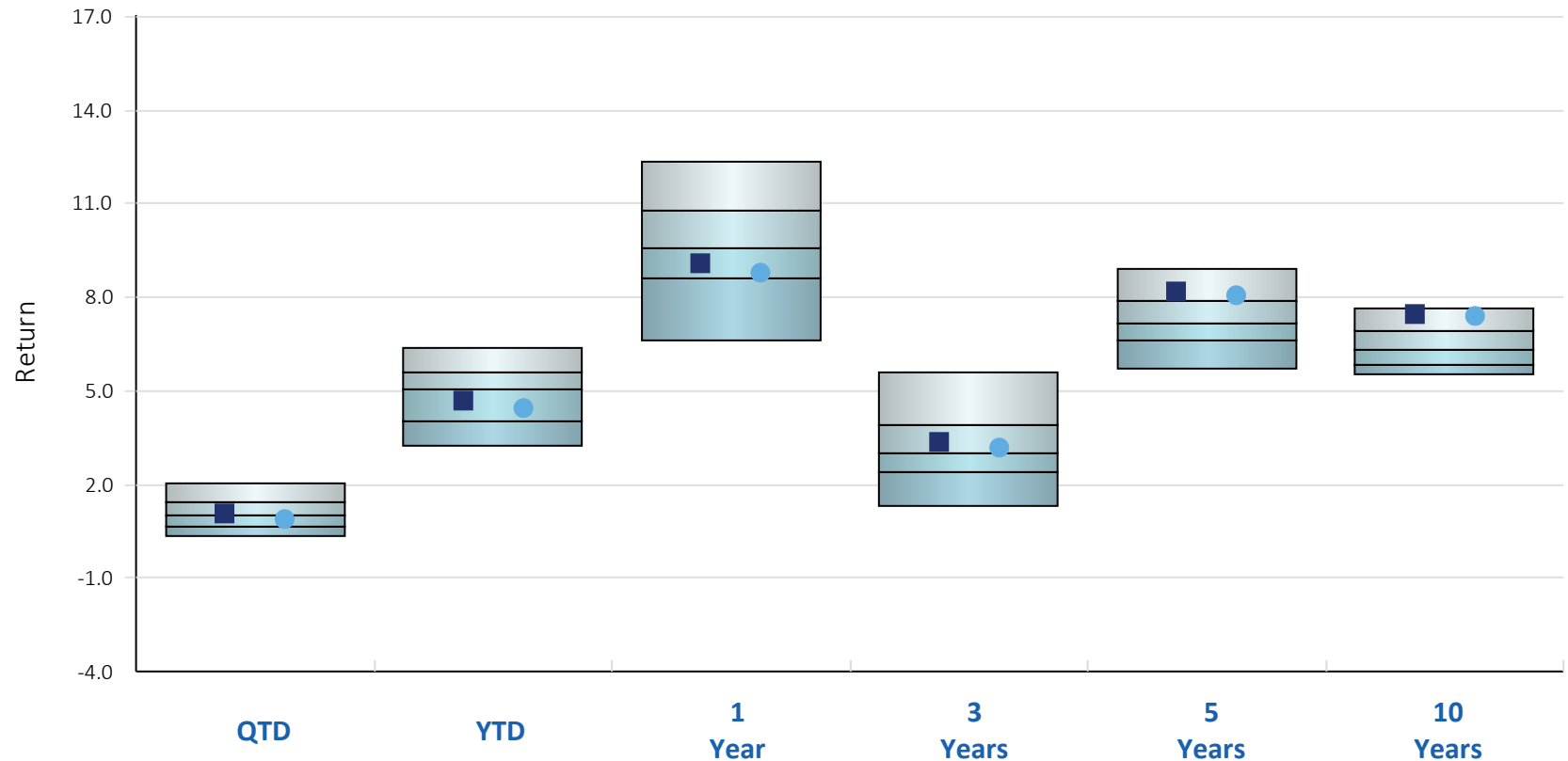
Periods Ended June 30, 2024

	Performance (%) net of fees										Market Value \$	%
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	30 Years	Since Inception	Inception Date		
LARS	-1.21	7.09	7.09	10.40	8.29				8.27	1/1/2017	240,969,772	0.55
LIBOR 3 Month	1.37	5.61	5.61	3.59	2.49				2.31			
Cash Composite	0.03	6.16	6.16	6.11	5.19	3.92	2.99		3.50	7/1/1995	515,438,453	1.18
90 Day U.S. Treasury Bill	1.32	5.40	5.40	3.03	2.16	1.50	1.54		2.34			
Private Markets Composite	0.50	3.05	3.05	7.03	13.53				14.05	10/1/2016	13,685,264,152	31.38
Private Equity/Debt	1.32	6.33	6.33	7.36	17.07	15.99	15.87	14.58	12.96	10/1/1985	8,015,118,676	18.38
Private Equity Policy Index	1.32	6.33	6.33	7.36	17.07	15.99	13.33	13.83	14.56			
Private Credit Composite	1.99	8.52	8.52	7.30	7.08				7.48	10/1/2016	2,587,089,758	5.93
Private Credit Policy Index	1.99	8.52	8.52	7.30	7.08				7.48			
Private Real Assets Composite	-2.75	-8.37	-8.37	4.48	6.54				7.22	10/1/2016	3,083,055,719	7.07
Private Real Assets Policy Index	-2.75	-8.37	-8.37	4.48	6.54				7.22			

Plan Sponsor Peer Group Analysis

Total Fund vs All Public Plans > \$1B-Total Fund

Periods Ended June 30, 2024



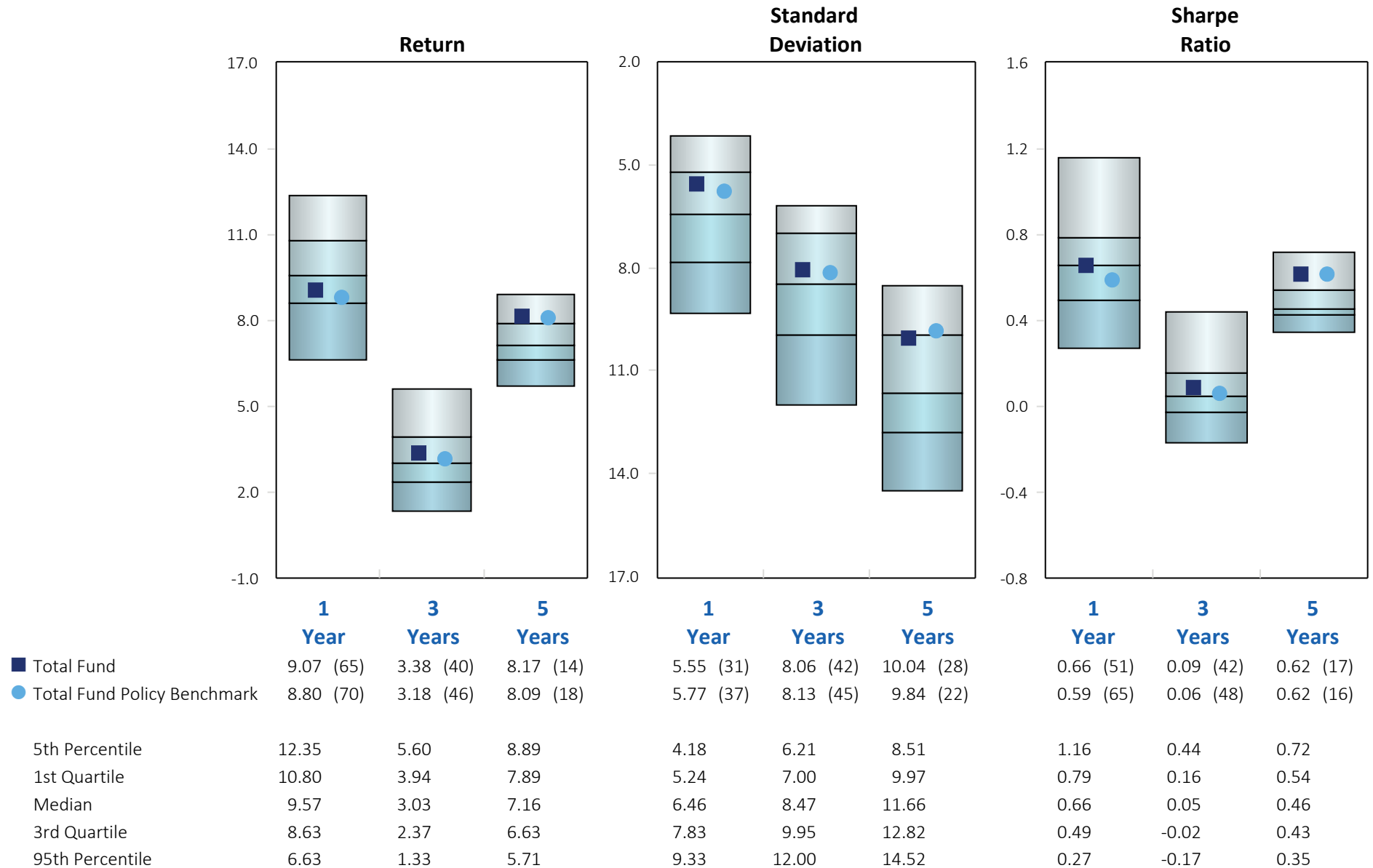
	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Total Fund	1.05 (50)	4.70 (61)	9.07 (65)	3.38 (40)	8.17 (14)	7.47 (10)
● Total Fund Policy Benchmark	0.91 (58)	4.42 (70)	8.80 (70)	3.18 (46)	8.09 (18)	7.42 (11)
5th Percentile	2.04	6.40	12.35	5.60	8.89	7.63
1st Quartile	1.42	5.62	10.80	3.94	7.89	6.90
Median	1.03	5.03	9.57	3.03	7.16	6.29
3rd Quartile	0.66	4.05	8.63	2.37	6.63	5.82
95th Percentile	0.35	3.25	6.63	1.33	5.71	5.54
Population	96	96	96	91	88	83

Parenteses contain percentile rankings.
Calculation based on quarterly periodicity.

Plan Sponsor Peer Group Analysis - Multi Statistics

Total Fund vs All Public Plans > \$1B-Total Fund

Periods Ended June 30, 2024



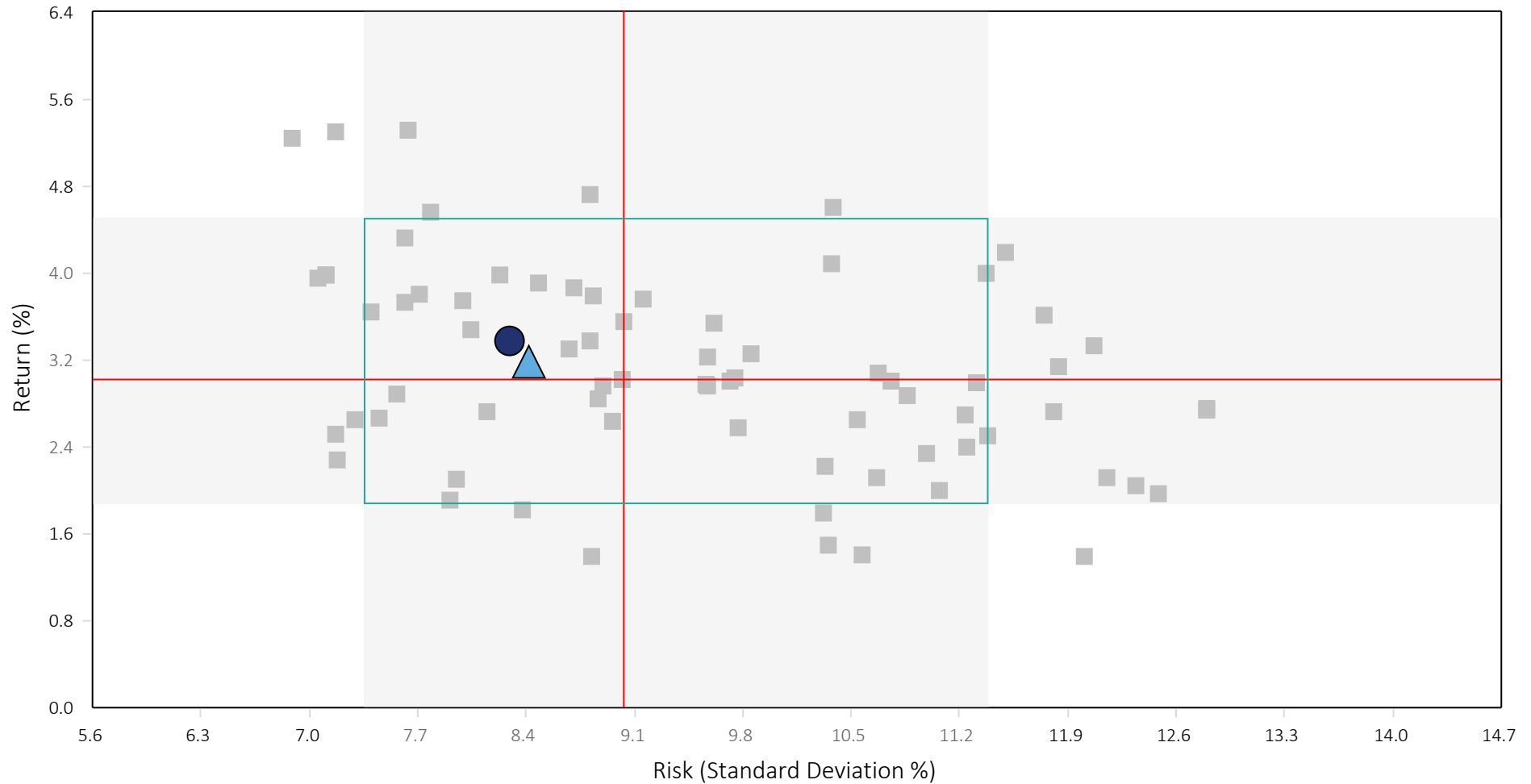
Parentheses contain percentile rankings.

Calculation based on quarterly periodicity.

Plan Sponsor Scattergram

Total Fund vs All Public Plans > \$1B-Total Fund

Periods Ended July 1, 2021 To June 30, 2024

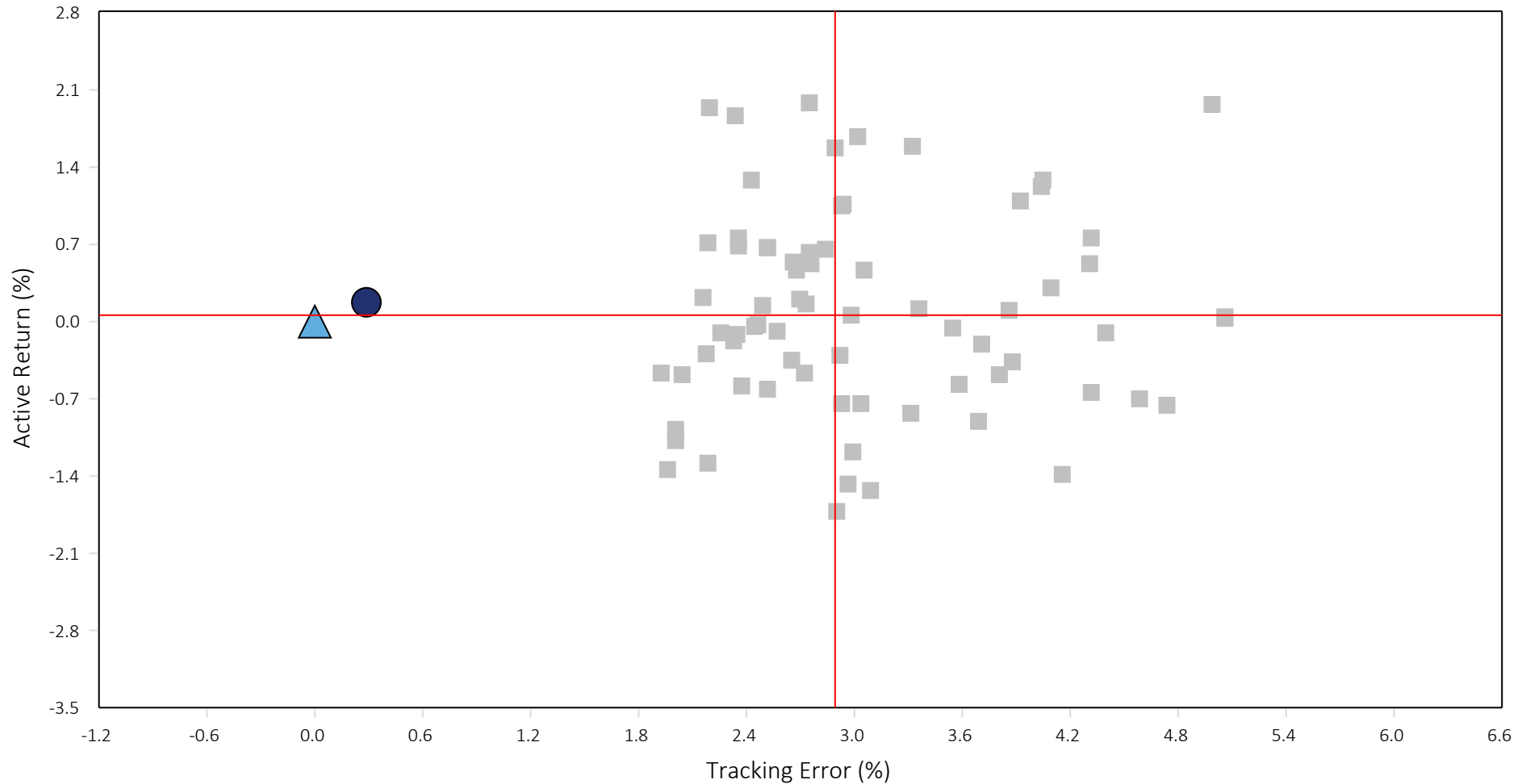


	Return	Standard Deviation
● Total Fund	3.38	8.29
▲ Total Fund Policy Benchmark	3.18	8.42
— Median	3.03	9.04

Plan Sponsor Scattergram

Total Fund vs All Public Plans > \$1B-Total Fund

Periods Ended July 1, 2021 To June 30, 2024



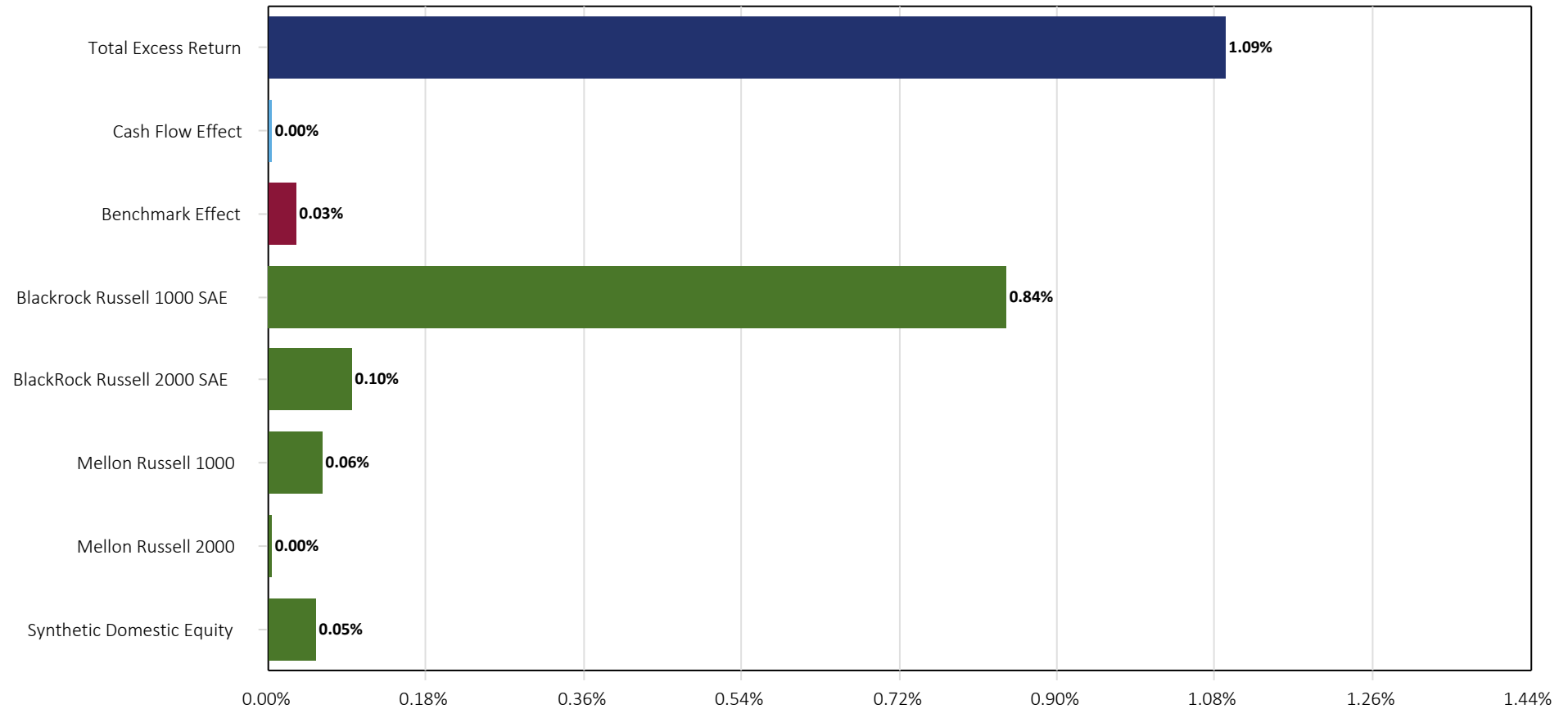
	Active Return	Tracking Error
● Total Fund	0.18	0.29
▲ Total Fund Policy Benchmark	0.00	0.00
— Median	0.06	2.89

Asset Class Attribution

U.S. Equity Composite

Periods Ended 1 Year Ending June 30, 2024

1 Year

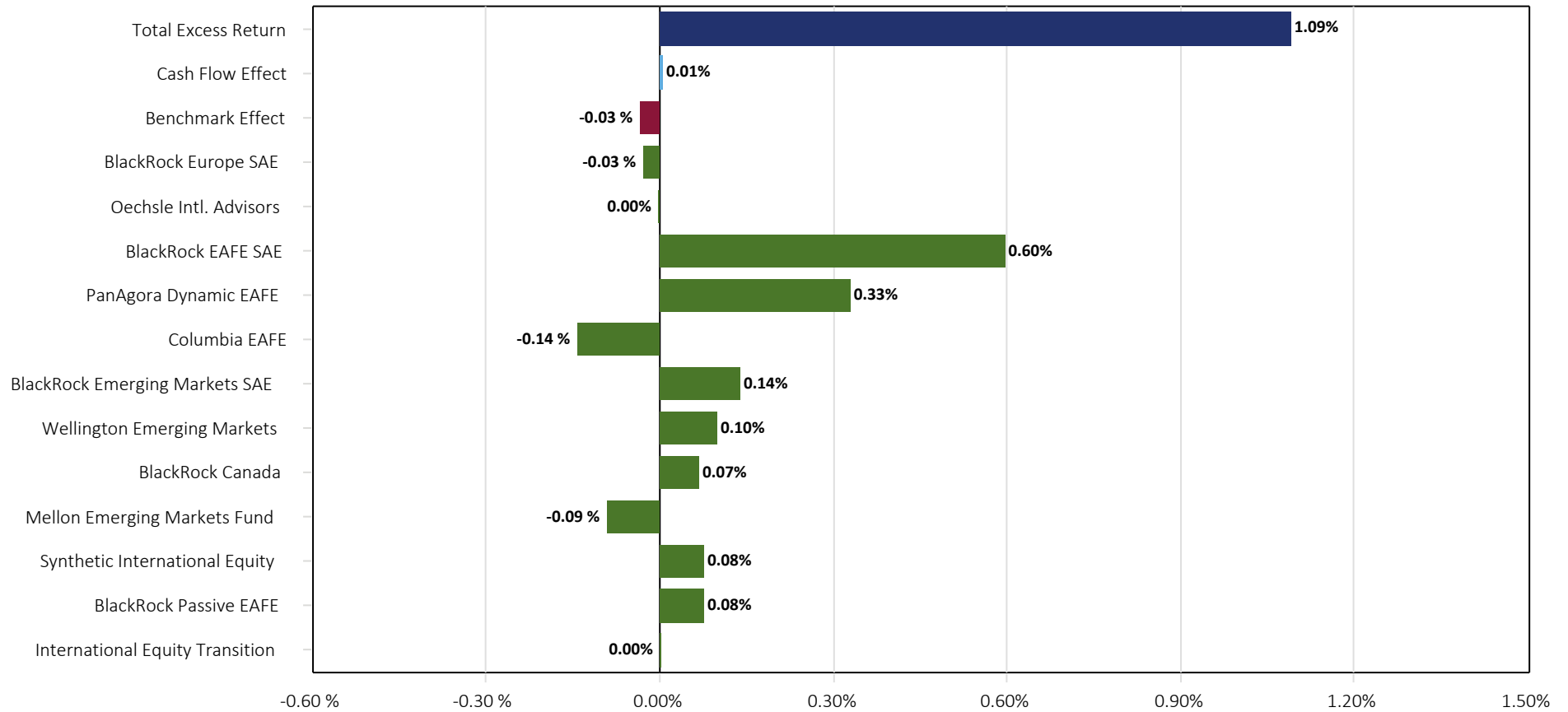


Asset Class Attribution

International Equity Composite

Periods Ended 1 Year Ending June 30, 2024

1 Year

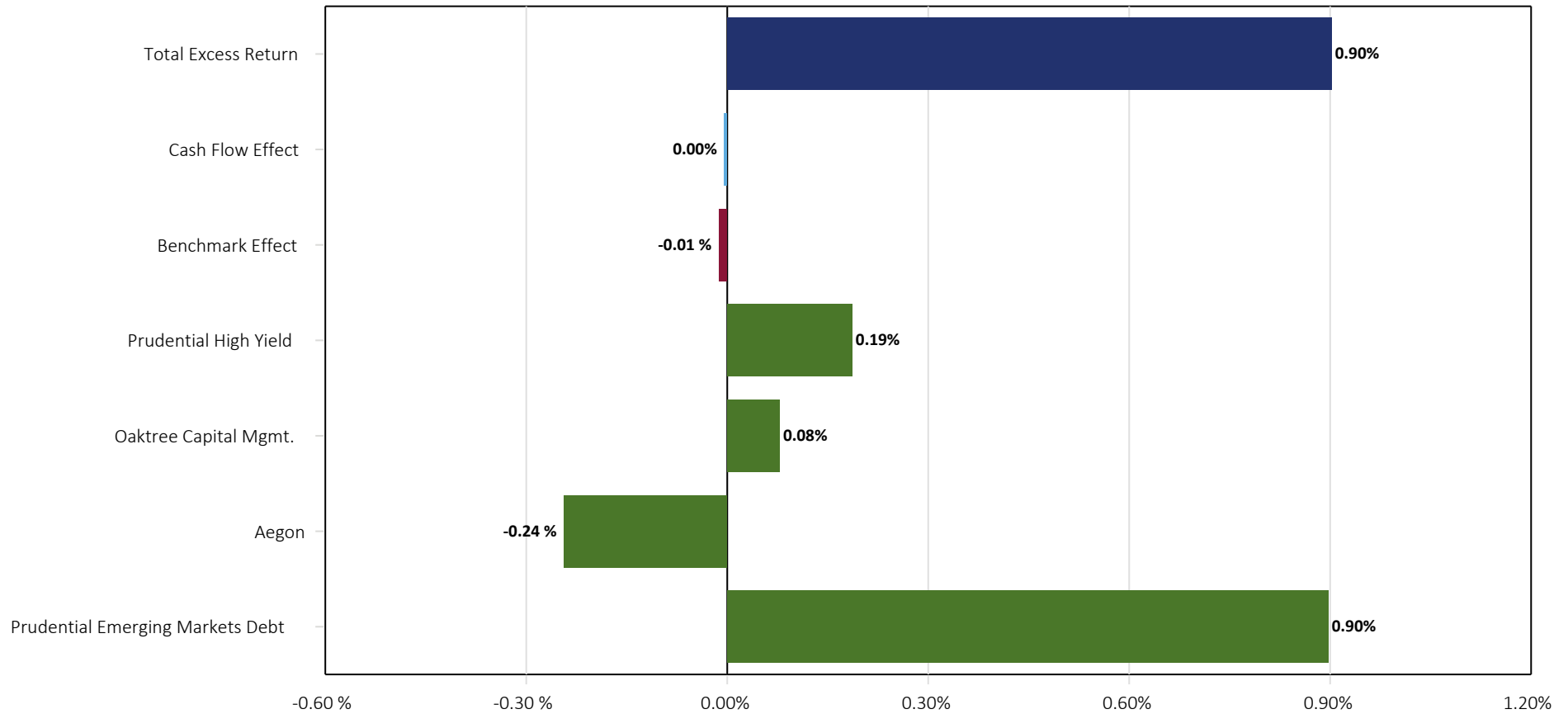


Asset Class Attribution

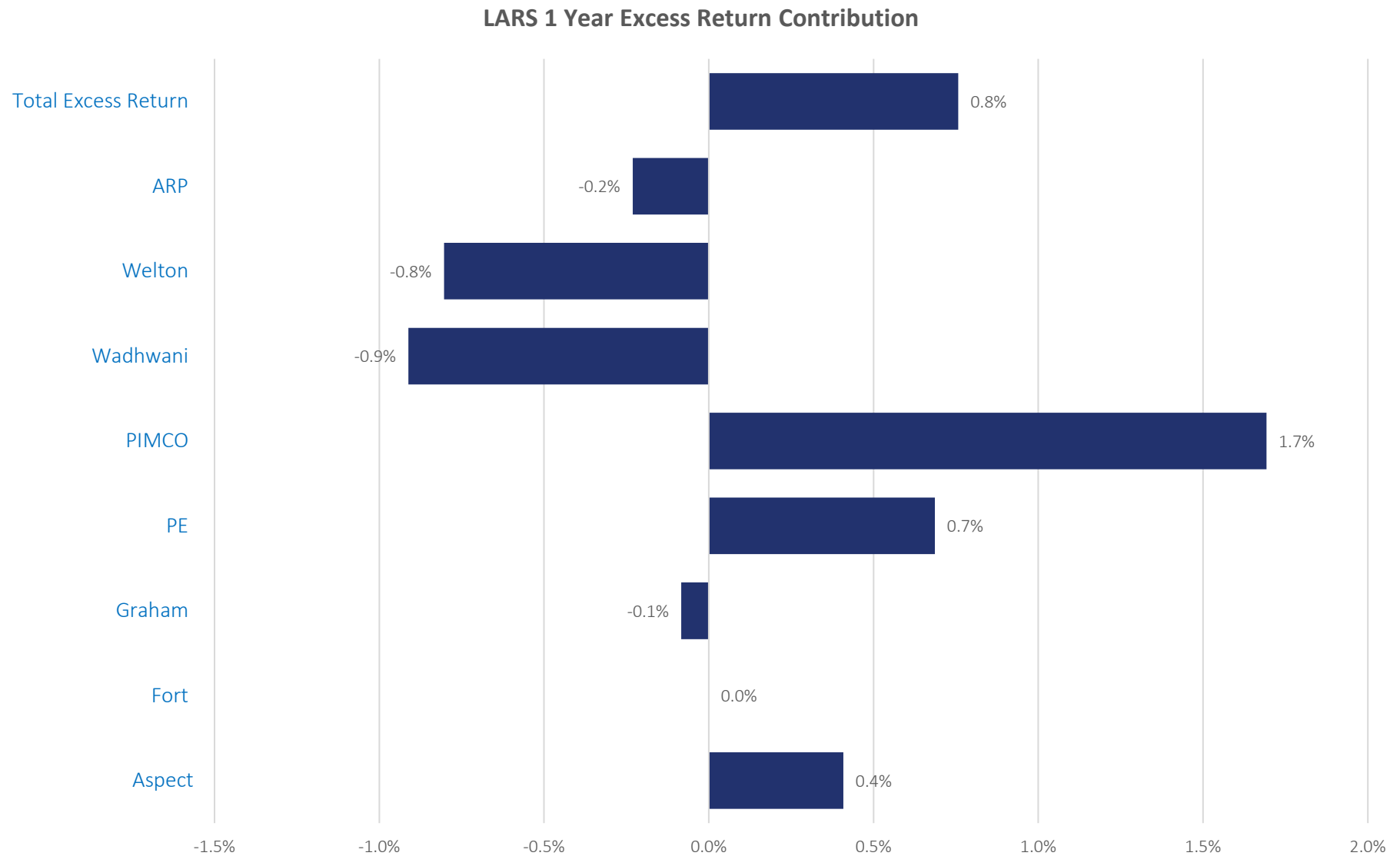
Public Credit Composite

Periods Ended 1 Year Ending June 30, 2024

1 Year



LARS Program Attribution



Public Markets Composite

Asset Allocation & Performance

U.S. Equity Composite

Periods Ended June 30, 2024

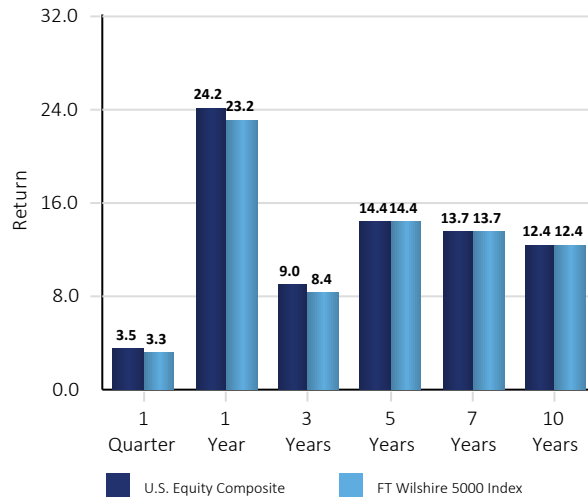
	Performance (%) net of fees									Market Value \$	%
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date		
U.S. Equity Composite	3.53	24.22	24.22	8.98	14.43	12.36	9.85	11.54	4/1/1975	9,258,057,566	100.00
U.S. Equity Composite Benchmark	3.22	23.12	23.12	8.37	14.41	12.35	10.29				
Active Equity Composite	3.77	25.65	25.65	6.94	12.76	11.69	8.86	7.12	1/1/1999	2,212,873,783	23.90
Blackrock Russell 1000 SAE	4.45	26.91	26.91					16.13	5/1/2022	1,997,258,833	21.57
Russell 1000 Index	3.57	23.88	23.88					14.96			
BlackRock Russell 2000 SAE	-3.27	13.13	13.13	-1.26	8.58			8.15	5/1/2019	215,614,950	2.33
Russell 2000 Index	-3.28	10.06	10.06	-2.58	6.94			6.45			
Passive Equity Composite	3.43	23.57	23.57	8.05	14.09	11.97	10.48	8.63	1/1/1999	7,045,183,783	76.10
Mellon Russell 1000	3.58	23.97	23.97					15.03	5/1/2022	6,737,037,005	72.77
Russell 1000 Index	3.57	23.88	23.88					14.96			
Mellon Russell 2000	-3.25	10.21	10.21					6.27	5/1/2022	246,584,040	2.66
Russell 2000 Index	-3.28	10.06	10.06					6.06			
Synthetic Domestic Equity	13.40	24.19	24.19	21.09	49.73			34.43	4/1/2017	61,562,738	0.66
Northern Trust Domestic Equity Transition											0.00
All Public Plans > \$1B-US Equity Segment Median	2.00	19.27	19.27	6.44	12.37	10.88	9.41				
Russell 3000 Index	3.22	23.12	23.12	8.05	14.14	12.15	10.17	12.06	1/1/1979		
Wilshire 4500 Completion Index	-3.42	15.03	15.03	-0.44	10.14	9.22	9.76	10.53	1/1/1984		
FT Wilshire 5000 Index	3.31	23.15	23.15	8.36	14.41	12.36	10.29	11.06	1/1/1971		

Performance Summary

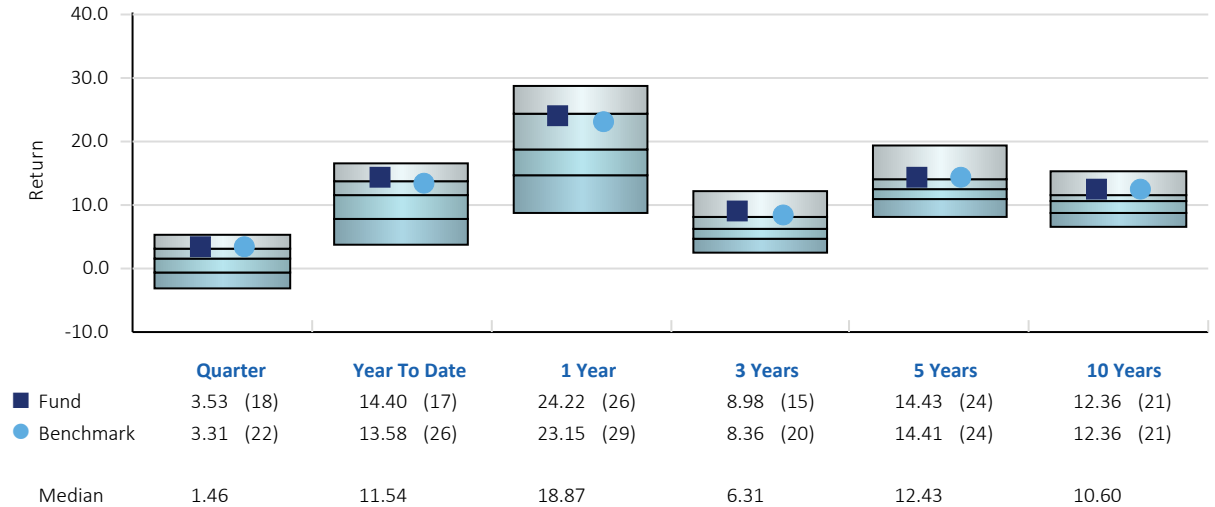
U.S. Equity Composite

Periods Ended June 30, 2024

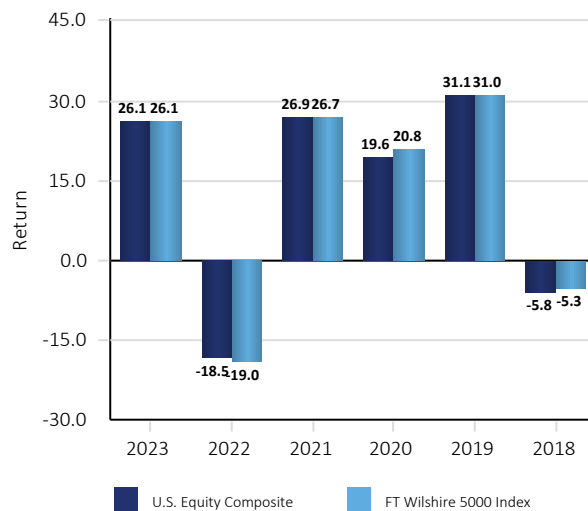
Comparative Performance



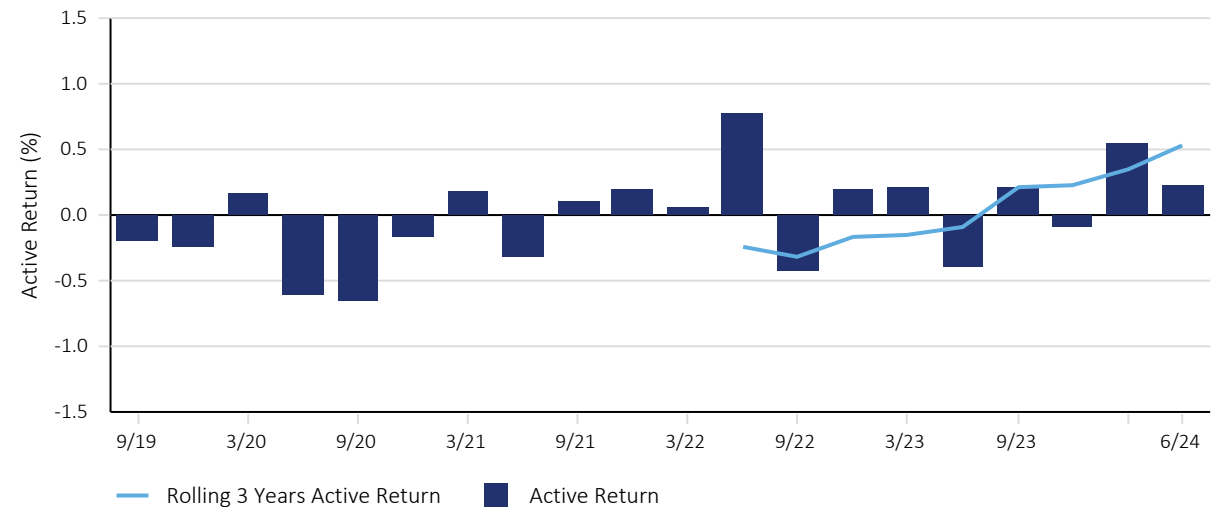
Peer Group Analysis: IM U.S. All Cap Core Equity (SA+CF)



Comparative Performance



Rolling 3 Years Performance



Asset Allocation & Performance

International Equity Composite

Periods Ended June 30, 2024

	Performance (%) net of fees									Market Value \$	%
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date		
International Equity Composite	1.69	12.72	12.72	1.11	6.10	4.19	5.94	5.48	10/1/1989	5,679,515,378	100.00
International Equity Policy Index	0.96	11.62	11.62	0.46	5.55	4.04	6.11	5.35			
BlackRock Canada	-1.94	9.47	9.47	3.06	8.30	4.43	7.75	7.06	12/1/2000	424,546,227	7.48
MSCI Canada (Net)	-2.14	8.60	8.60	2.25	7.43	3.64	7.05	6.38			
BlackRock Passive EAFE	-0.20	11.79	11.79	3.29	6.85			7.30	4/1/2019	2,085,135,022	36.71
MSCI EAFE (Net)	-0.42	11.54	11.54	2.89	6.46			6.88			
BlackRock EAFE SAE	1.60	13.86	13.86	4.92	7.69			7.88	5/1/2019	1,163,976,223	20.49
MSCI EAFE (Net)	-0.42	11.54	11.54	2.89	6.46			6.42			
BlackRock Emerging Markets SAE	4.89	14.30	14.30	-5.52	2.86			2.48	5/1/2019	399,383,820	7.03
MSCI Emerging Markets (Net)	5.00	12.55	12.55	-5.07	3.10			2.70			
Columbia EAFE										7,440,474	0.13
PanAgora Dynamic EAFE	1.10	15.73	15.73	4.96	7.80			7.43	5/1/2019	369,224,390	6.50
MSCI EAFE (Net)	-0.42	11.54	11.54	2.89	6.46			6.42			
Wellington Emerging Markets	6.69	15.19	15.19	-5.71	4.97	4.22		8.22	3/1/2009	258,346,318	4.55
Wellington EM Custom Benchmark	5.00	12.55	12.55	-5.07	3.10	2.79		7.94			
Mellon Emerging Markets Fund	5.11	11.95	11.95	-5.35	2.93			3.64	7/1/2015	917,033,486	16.15
MSCI Emerging Markets (Net)	5.00	12.55	12.55	-5.07	3.10			3.71			
Synthetic International Equity	0.17	10.80	10.80	22.10	-123.26			-135.70	4/1/2017	42,372,193	0.75
Active International Equity	2.65	14.64	14.64	1.37	6.49	4.37	5.49	5.67	1/1/2004	2,210,105,844	38.91
Passive International Equity	0.94	11.60	11.60	1.29	5.82	3.95	6.01	6.06	1/1/2004	3,469,086,928	61.08
All Public Plans > \$1B-Intl. Equity Segment Median	0.41	11.43	11.43	0.35	6.80	5.22	6.95				
MSCI AC World ex USA (Net)	0.96	11.62	11.62	0.46	5.55	3.84	5.78	4.91	1/1/1999		

Asset Allocation & Performance

International Equity Composite

Periods Ended June 30, 2024

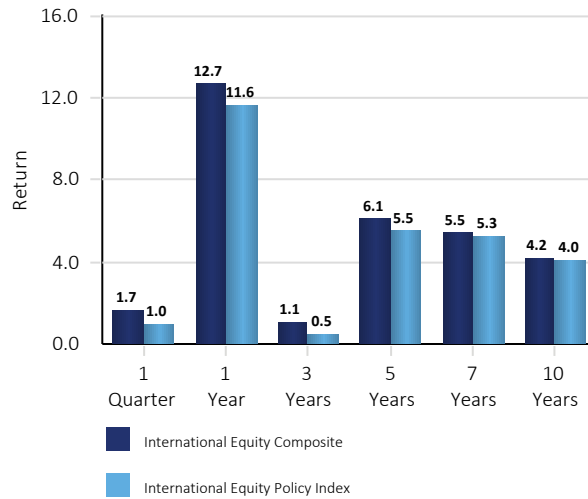
	Performance (%) net of fees									Market Value \$	%
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date		
MSCI EAFE (Net)	-0.42	11.54	11.54	2.89	6.46	4.33	5.63	8.42	1/1/1970		
MSCI Emerging Markets (Net)	5.00	12.55	12.55	-5.07	3.10	2.79	7.27	7.70	1/1/1999		

Performance Summary

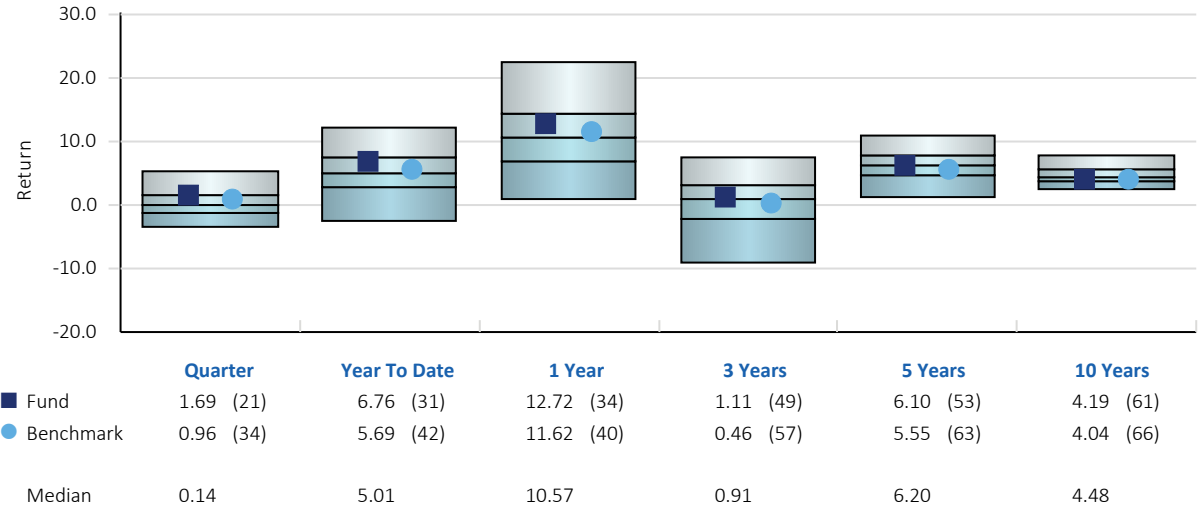
International Equity Composite

Periods Ended June 30, 2024

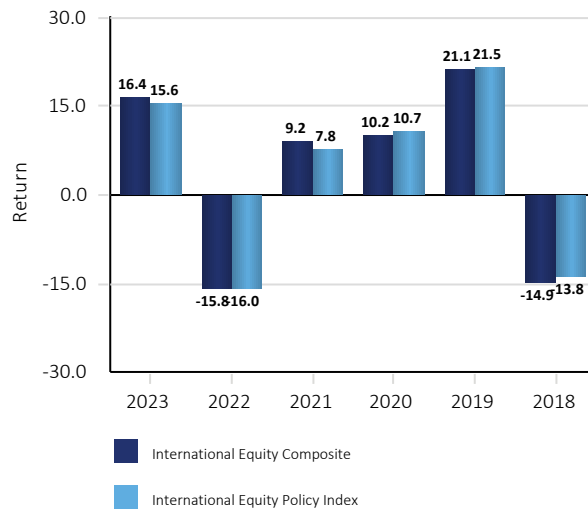
Comparative Performance



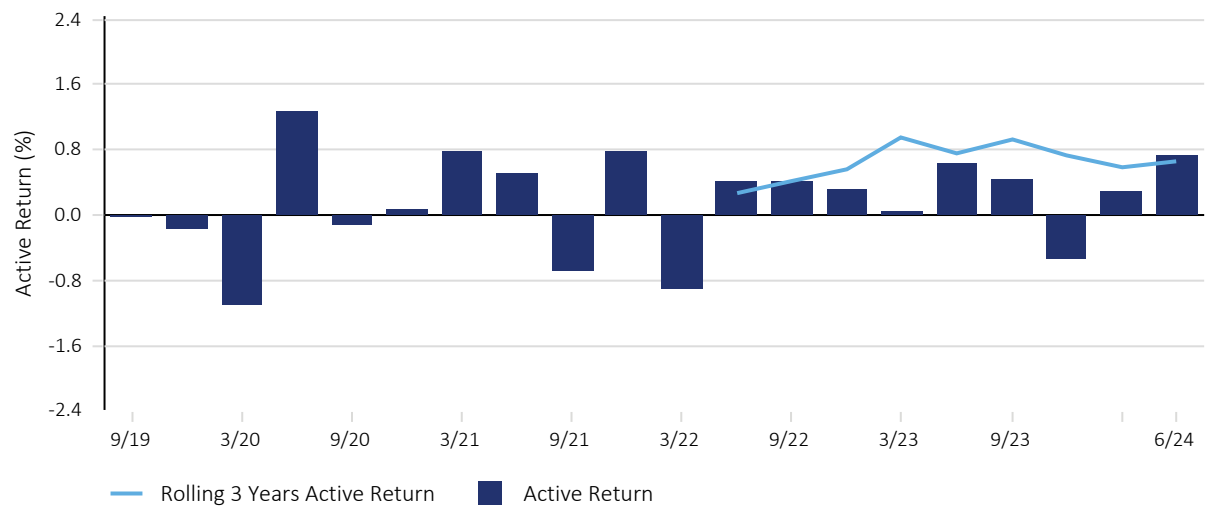
Peer Group Analysis: IM International Equity (SA+CF)



Comparative Performance



Rolling 3 Years Performance



Asset Allocation & Performance

Total Fixed Composite

Periods Ended June 30, 2024

	Performance (%) net of fees									Market Value \$
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date	
Total Fixed Composite	0.14	3.27	3.27	-2.89	0.27	1.92	3.86	6.45	7/1/1985	12,326,426,276
Fixed Income Policy Index	0.15	3.40	3.40	-2.71	0.09	1.63	3.43	5.88		
Total US Fixed Income Composite	0.11	2.98	2.98	-2.93	0.26	1.89	3.85	6.43	7/1/1985	11,882,926,231
Fixed Income Policy Index	0.15	3.40	3.40	-2.71	0.09	1.63	3.43	5.88		
Core Fixed Income Composite	0.03	2.37	2.37	-3.34	-0.12	1.66	3.56	6.23	7/1/1985	11,014,971,861
Core Fixed Income Policy Index	0.07	2.63	2.63	-2.95	-0.06	1.55	3.39	5.87		
Active Core Fixed Composite	-0.14	0.98	0.98	-3.72	-0.13	1.68	3.70	3.88	9/1/1995	1,555,175,902
Blackrock										2,534
Principal Global Investors										452
Mackay Shields Core Plus										57
Prudential Fixed Income										1,625
TCW Asset Management										99,519
Western Asset Mgmt										339,080
Passive Fixed Composite	0.06	2.61	2.61	-3.35	-0.85	1.03	2.99	4.94	7/1/1990	9,459,795,959
Mellon Aggregate	0.08	2.67	2.67	-2.99	-0.21	1.37	3.16	5.05	7/1/1990	9,434,737,969
Blmbg. U.S. Aggregate Index	0.07	2.63	2.63	-3.02	-0.23	1.35	3.12	5.00		
Synthetic Fixed Income	-8.11	-12.98	-12.98	-34.00	-22.57			-16.84	4/1/2017	25,057,990
Relative Value Composite	-0.14	0.94	0.94	-3.24				-2.58	11/1/2020	1,554,732,636
Relative Value Policy Index	0.07	2.63	2.63	-2.95				-2.29		

Asset Allocation & Performance

Total Fixed Composite

Periods Ended June 30, 2024

	Performance (%) net of fees									Market Value \$
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date	
BlackRock Universal	0.59	5.53	5.53	-1.58				-0.87	11/1/2020	648,347,589
Core Fixed Income Policy Index	0.07	2.63	2.63	-2.95				-2.29		
Prudential Universal	-0.55	1.93	1.93	-3.05				-2.61	3/1/2021	516,526,364
Core Fixed Income Policy Index	0.07	2.63	2.63	-2.95				-2.43		
Man EM Global Macro	1.95							-7.10	10/1/2023	150,599,361
Blmbg. U.S. Aggregate Index	0.07							6.06		
Mesirow EM Currency	-2.46							-4.32	10/1/2023	239,259,323
Blmbg. U.S. Aggregate Index	0.07							6.06		
Public Credit Composite	1.08	10.65	10.65	0.60	3.00	3.66	5.81	5.71	4/1/1998	1,311,454,414
Public Credit Policy Index	0.88	9.75	9.75	0.37	2.71	3.55	5.83	5.60		
High Yield Composite	1.15	10.46	10.46	1.62	4.14	4.23	6.27	6.06	4/1/1998	867,954,370
High Yield Policy Index	1.09	10.43	10.43	1.64	3.90	4.12	6.29	5.95		
Aegon	1.01	9.69	9.69	1.32	3.69	4.31		5.47	2/1/2012	426,158,226
High Yield Policy Index	1.09	10.43	10.43	1.64	3.90	4.12		5.25		
Prudential High Yield	1.27	11.00	11.00	1.65	4.54			4.54	7/1/2019	440,378,389
Blmbg. U.S. High Yield - 2% Issuer Cap	1.09	10.43	10.43	1.64	3.90			3.90		
Emerging Market Debt Composite	0.93	11.02	11.02	-1.60	0.59	2.47		2.37	10/1/2012	443,500,044
JPM EMBI Global Index (USD)	0.44	8.35	8.35	-2.22	0.27	2.35		2.45		
Prudential Emerging Markets Debt	0.93	11.02	11.02	-1.60	0.59			3.16	5/1/2016	443,500,044
JPM EMBI Global Index (USD)	0.44	8.35	8.35	-2.22	0.27			2.27		
Active Fixed Composite	0.41	5.43	5.43	-1.95	1.10	2.36	4.11	6.64	7/1/1985	2,866,630,316

Asset Allocation & Performance

Total Fixed Composite

Periods Ended June 30, 2024

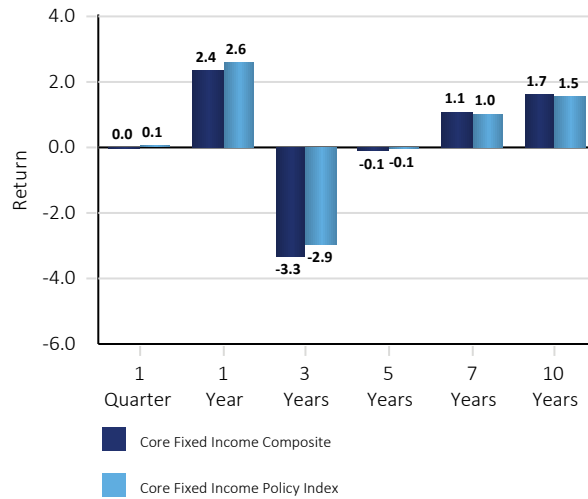
	Performance (%) net of fees									Market Value \$
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date	
All Public Plans > \$1B-US Fixed Income Segment Median	0.33	3.52	3.52	-2.18	0.80	2.04	3.98			
Blmbg. U.S. Universal Index	0.19	3.47	3.47	-2.68	0.11	1.63	3.43	5.24	1/1/1990	
Blmbg. U.S. Aggregate Index	0.07	2.63	2.63	-3.02	-0.23	1.35	3.12	6.53	1/1/1976	
Bloomberg U.S. Government/Credit Index	0.05	2.74	2.74	-3.11	-0.07	1.51	3.21	6.44	1/1/1973	
Blmbg. U.S. Credit Index	-0.05	4.42	4.42	-2.94	0.54	2.21	4.02	6.93	1/1/1973	
Blmbg. U.S. Treasury Index	0.10	1.55	1.55	-3.26	-0.65	0.91	2.70	6.22	1/1/1973	
Blmbg. U.S. Mortgage Backed Securities	0.07	2.12	2.12	-2.92	-0.76	0.89	2.90	6.51	1/1/1976	
Blmbg. U.S. High Yield - 2% Issuer Cap	1.09	10.43	10.43	1.64	3.90	4.30	6.65	7.03	1/1/1993	
FTSE High Yield Cash Pay	1.11	10.46	10.46	1.85	3.82	4.08	6.34	7.41	1/1/1989	
JPM Global Government Bond Index (Hedged)	-0.44	2.35	2.35	-2.61	-0.56	1.69	3.17	5.45	2/1/1986	
JPM EMBI Global Index (USD)	0.44	8.35	8.35	-2.22	0.27	2.35	5.87	7.33	1/1/1994	

Performance Summary

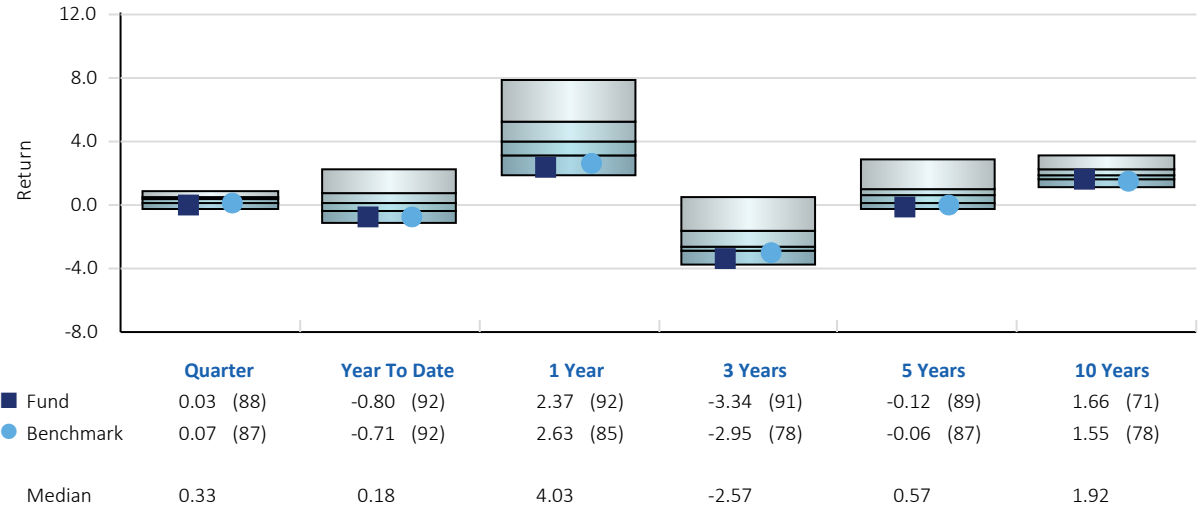
Core Fixed Income Composite

Periods Ended June 30, 2024

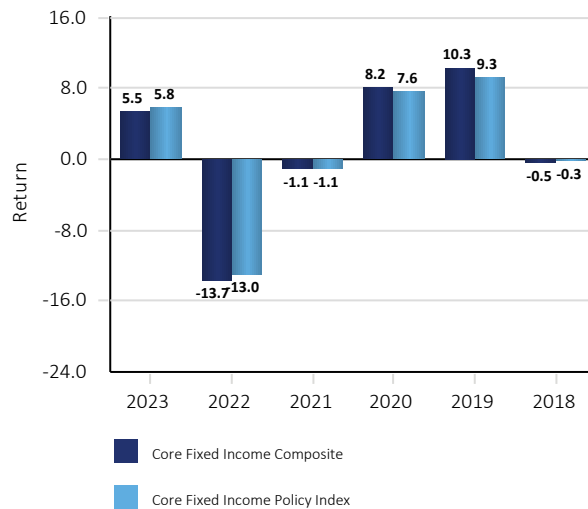
Comparative Performance



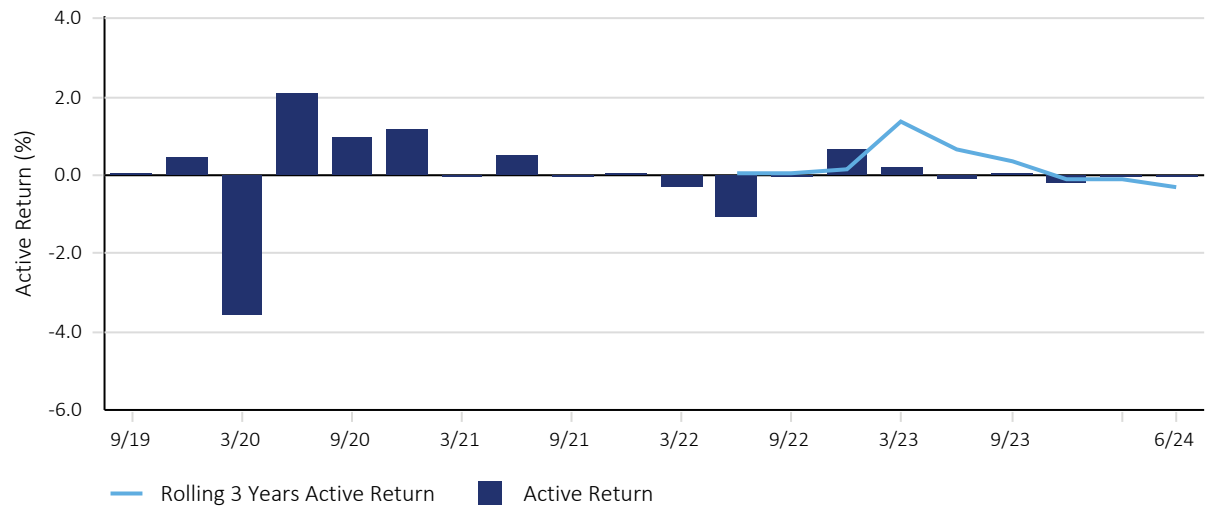
Peer Group Analysis: IM U.S. Broad Market Core+ Fixed Income (SA+CF)



Comparative Performance



Rolling 3 Years Performance

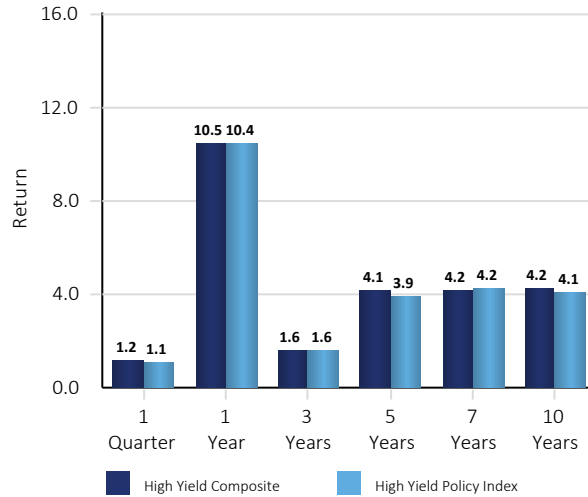


Performance Summary

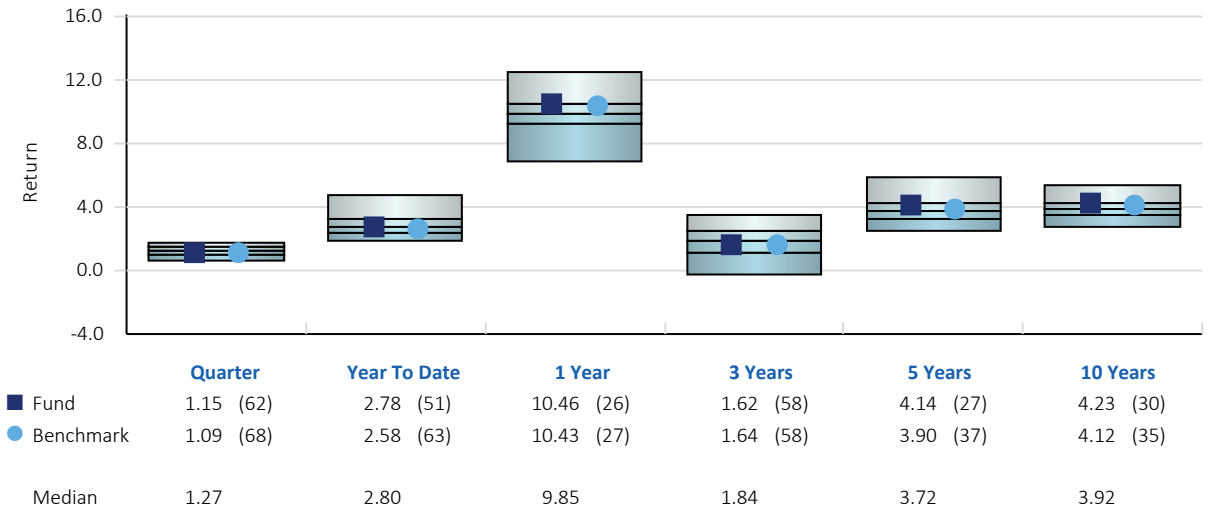
High Yield Composite

Periods Ended June 30, 2024

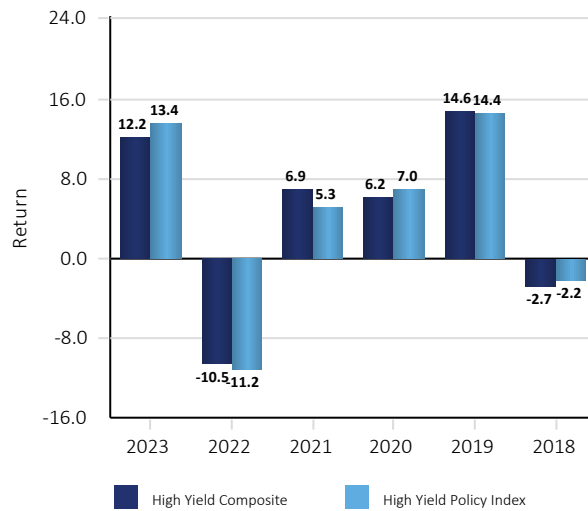
Comparative Performance



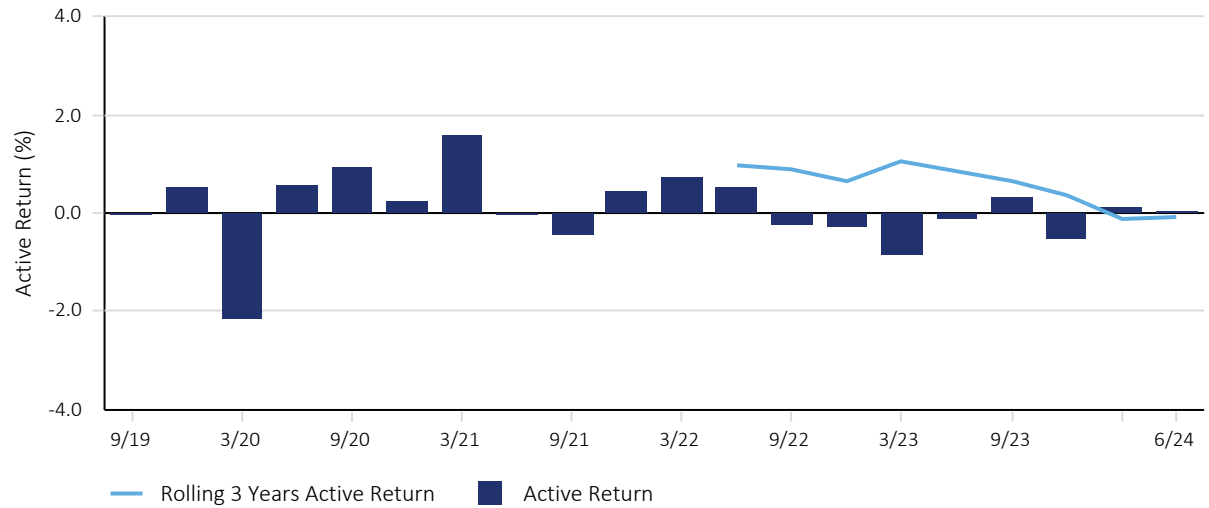
Peer Group Analysis: IM U.S. High Yield Bonds (SA+CF)



Comparative Performance



Rolling 3 Years Performance



Asset Allocation & Performance

Global Smart Beta Composite

Periods Ended June 30, 2024

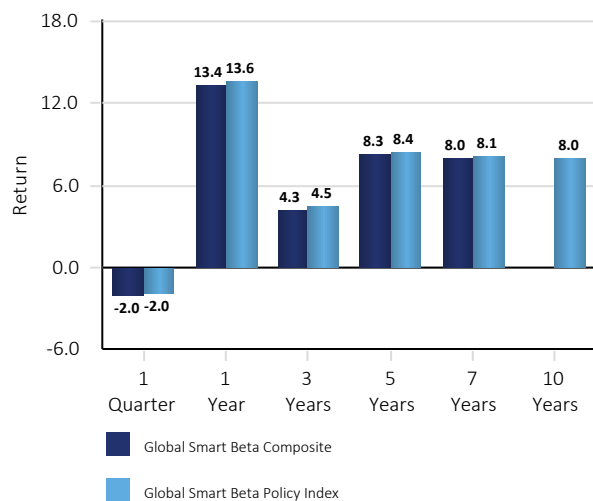
	Performance (%) net of fees									Market Value \$
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date	
Global Smart Beta Composite	-2.04	13.38	13.38	4.29	8.26			7.76	8/1/2017	2,147,080,585
Global Smart Beta Policy Index	-1.96	13.65	13.65	4.50	8.44			7.88		
MSCI AC World Index (Net)	2.87	19.38	19.38	5.43	10.76			9.71		
U.S. Equity Smart Beta	-3.08	13.98	13.98	6.22	10.14			9.93	8/1/2017	1,287,718,597
Russell 1000 Comprehensive Factor Index	-3.07	13.92	13.92	6.18	10.13			9.91		
Developed Ex-U.S. Equity Smart Beta	-1.88	10.04	10.04	0.28	4.88			4.34	8/1/2017	635,551,477
FTSE Dev. Ex-U.S. Comprehensive Factor Index (N)	-1.85	10.22	10.22	0.53	5.05			4.41		
Emerging Markets Smart Beta	3.85	19.50	19.50	6.25	8.40			5.76	8/1/2017	223,810,511
FTSE Emerging Comprehensive Factor Index (N)	4.26	21.10	21.10	7.07	9.11			6.29		
Russell 1000 Comprehensive Factor Index	-3.07	13.92	13.92	6.18	10.13	10.06	11.35	11.17	8/1/2001	
FTSE Dev. Ex-U.S. Comprehensive Factor Index (N)	-1.85	10.22	10.22	0.53	5.05	4.83	8.11	9.57	10/1/2001	
FTSE Emerging Comprehensive Factor Index (N)	4.26	21.10	21.10	7.07	9.11	5.37	11.53	13.82	10/1/2001	

Performance Summary

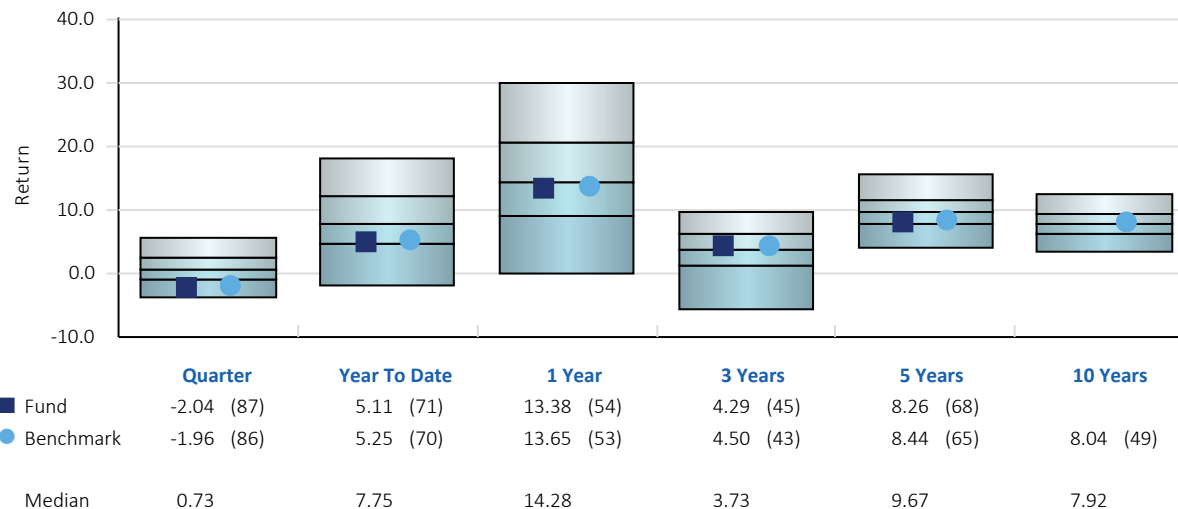
Global Smart Beta Composite

Periods Ended June 30, 2024

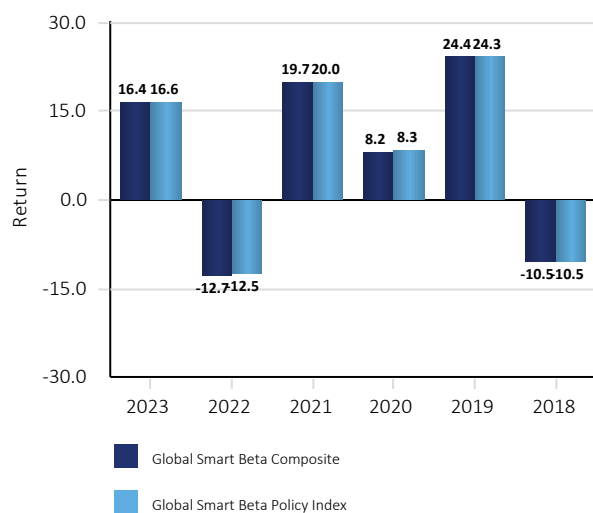
Comparative Performance



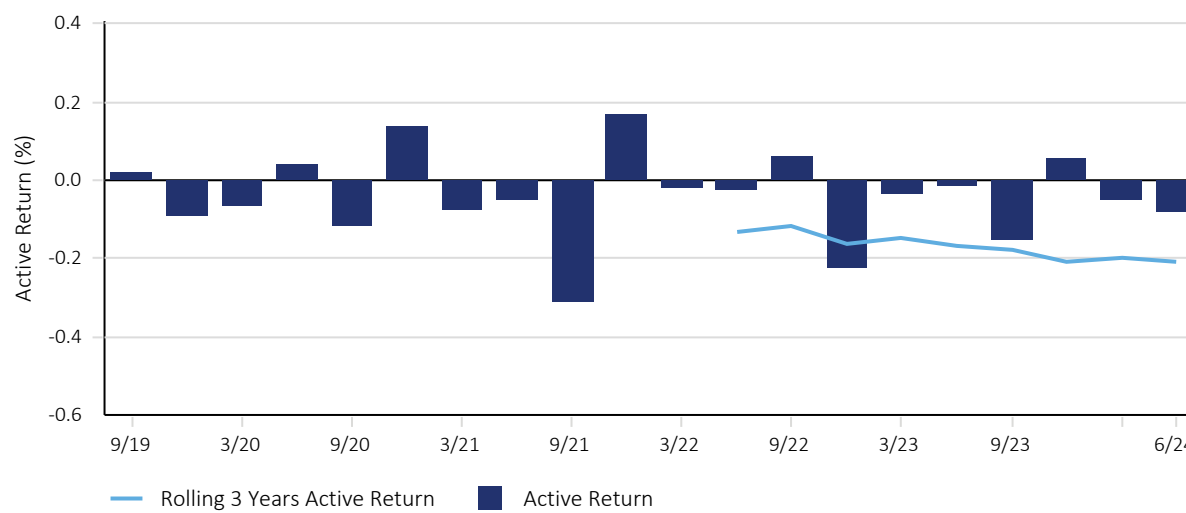
Peer Group Analysis: IM Global Equity (SA+CF)



Comparative Performance



Rolling 3 Years Performance



Appendix

Cash Flow Summary

Total Fund

1 Quarter Ending June 30, 2024

	Begin Value	Contributions	Distributions	Net Transfers	Fees	Expenses	Capital Apprec./ Deprec.	End Value
Total Fund	43,432,901,007	835,149,867	-1,109,095,418		-12,324,614	-17,743	465,169,311	43,611,782,410
Public Markets Composite	29,799,260,811	621,169,529	-818,310,206	-60,674,377	-688,526	-17,743	385,778,770	29,926,518,257
U.S. Equity Composite	9,290,284,940	30,535		-350,000,000	-30,535		317,772,626	9,258,057,566
Active Equity Composite	2,992,149,463	72,707		-840,000,000	-72,707		60,724,320	2,212,873,783
Blackrock Russell 1000 SAE	2,726,627,173	64,806		-800,000,000	-64,806		70,631,661	1,997,258,833
BlackRock Russell 2000 SAE	265,522,290	7,901		-40,000,000	-7,901		-9,907,341	215,614,950
Passive Equity Composite	6,298,135,477	-42,172		490,000,000	42,172		257,048,306	7,045,183,783
Mellon Russell 1000	6,032,028,120	-54,985		450,000,000	54,985		255,008,886	6,737,037,005
Mellon Russell 2000	211,827,385	3,109		40,000,000	-3,109		-5,243,345	246,584,040
Synthetic Domestic Equity	54,279,972	9,705			-9,705		7,282,766	61,562,738
Northern Trust Domestic Equity Transition								
International Equity Composite	5,696,779,760	447,746		-110,000,000	-447,746	-6,004	92,741,622	5,679,515,378
Active International Equity	2,670,486,201	321,174		-515,000,000	-321,174	-6,004	54,625,647	2,210,105,844
BlackRock Europe SAE	11,014,892						-8,480	11,006,412
Oechsle Intl. Advisors	733,812						-5,606	728,207
BlackRock EAFE SAE	1,507,702,157	94,689		-360,000,000	-94,689		16,274,065	1,163,976,223
PanAgora Dynamic EAFE	426,359,221	41,091		-60,000,000	-41,091	-36	2,865,205	369,224,390
Columbia EAFE	7,472,134						-31,660	7,440,474
Active Emerging Markets Equity Composite	717,203,984	185,394		-95,000,000	-185,394	-5,968	35,532,122	657,730,138
BlackRock Emerging Markets SAE	440,402,570	52,958		-60,000,000	-52,958		18,981,250	399,383,820
Wellington Emerging Markets	276,801,414	132,436		-35,000,000	-132,436	-5,968	16,550,872	258,346,318

Cash Flow Summary

Total Fund

1 Quarter Ending June 30, 2024

	Begin Value	Contributions	Distributions	Net Transfers	Fees	Expenses	Capital Apprec./ Deprec.	End Value
Passive International Equity	3,025,964,468	126,572		405,000,000	-126,572		38,122,460	3,469,086,928
BlackRock Canada	432,637,138	21,543			-21,543		-8,090,911	424,546,227
Mellon Emerging Markets Fund	802,925,490	13,236		70,000,000	-13,236		44,107,995	917,033,486
Synthetic International Equity	42,296,014	6,241			-6,241		76,180	42,372,193
BlackRock Passive EAFE	1,748,105,826	85,552		335,000,000	-85,552		2,029,196	2,085,135,022
International Equity Transition	329,090						-6,484	322,606
Active Fixed Composite	2,855,389,832	125,629		-687,650	-125,629	-6,082	11,934,217	2,866,630,316
Total US Fixed Income Composite	11,719,286,904	34,226		149,312,350	-34,226	-1,172	14,328,149	11,882,926,231
Total Fixed Composite	12,158,694,775	34,226		149,312,350	-34,226	-6,082	18,425,234	12,326,426,276
Core Fixed Income Ex RV	9,697,454,056	-91,403		149,312,350	91,403		3,331,503	9,850,097,909
Core Fixed Income Composite	10,861,366,010	-91,403		149,312,350	91,403	-383	4,293,885	11,014,971,861
Passive Fixed Composite	9,303,304,943	-91,403		150,000,000	91,403		6,491,017	9,459,795,959
Mellon Aggregate	9,276,051,389	-105,435		150,000,000	105,435		8,686,580	9,434,737,969
Synthetic Fixed Income	27,253,554	14,033			-14,033		-2,195,564	25,057,990
Active Core Fixed Composite	1,558,061,067			-687,650		-383	-2,197,132	1,555,175,902
MacKay Shields Core Plus	686,641			-687,650			1,066	57
Prudential Fixed Income	1,558						66	1,625
Principal Global Investors	10,923						-10,471	452
TCW Asset Management	100,054						-534	99,519
Western Asset Mgmt	339,007						73	339,080
Blackrock	2,500						34	2,534
Relative Value Composite	1,556,920,385					-383	-2,187,366	1,554,732,636
BlackRock Universal	644,539,750						3,807,839	648,347,589
Prudential Universal	519,372,204					-383	-2,845,457	516,526,364

Cash Flow Summary

Total Fund

1 Quarter Ending June 30, 2024

	Begin Value	Contributions	Distributions	Net Transfers	Fees	Expenses	Capital Apprec./ Deprec.	End Value
Man EM Global Macro	147,717,646						2,881,714	150,599,361
Mesirow EM Currency	245,290,785						-6,031,462	239,259,323
Public Credit Composite	1,297,328,765	125,629			-125,629	-5,699	14,131,349	1,311,454,414
High Yield Composite	857,920,894	125,629			-125,629	-789	10,034,265	867,954,370
Prudential High Yield	434,870,232					-789	5,508,945	440,378,389
Oaktree Capital Mgmt.	1,263,604						154,151	1,417,755
Aegon	421,787,058	125,629			-125,629		4,371,168	426,158,226
Emerging Market Debt Composite	439,407,871					-4,911	4,097,084	443,500,044
Prudential Emerging Markets Debt	439,407,871					-4,911	4,097,084	443,500,044
Global Smart Beta Composite	2,231,739,057	176,019		-40,000,000	-176,019	-2,706	-44,655,766	2,147,080,585
Developed Ex-U.S. Equity Smart Beta	657,672,554	52,234		-10,000,000	-52,234	-385	-12,120,693	635,551,477
Emerging Markets Smart Beta	215,491,301	17,385			-17,385	-2,321	8,321,531	223,810,511
U.S. Equity Smart Beta	1,358,575,202	106,399		-30,000,000	-106,399		-40,856,605	1,287,718,597
Managed Short Term Cash Composite	421,762,279	620,481,003	-818,310,206	290,013,273		-2,950	1,495,054	515,438,453
STIF	177,845,996	620,481,003	-818,310,206	290,243,488		-2,950	4,211,350	274,468,681
LARS	243,916,284						-2,946,512	240,969,772
Cash - Securities Lending Income				-230,216			230,216	
Private Markets Composite	13,633,640,196	213,980,338	-290,785,213	60,674,377	-11,636,088		79,390,541	13,685,264,152
Private Equity/Debt	7,966,675,558	-56,287,310			-2,909,382		107,639,810	8,015,118,676
Pathway Fund of Funds	7,078,412,835	1,975,635			-2,718,599		96,134,488	7,173,804,359

Cash Flow Summary

Total Fund

1 Quarter Ending June 30, 2024

	Begin Value	Contributions	Distributions	Net Transfers	Fees	Expenses	Capital Apprec./ Deprec.	End Value
Private Equity/Debt Long Perf	888,262,723	-58,262,945			-190,783		11,505,322	841,314,317
LBO Composite	483,637,913	-23,576,232			-127,856		5,211,997	465,145,822
Venture Capital Composite	404,624,810	-34,686,713			-62,927		6,293,325	376,168,495
Private Credit Composite	2,476,386,911			60,674,377	-5,303,823		55,332,292	2,587,089,758
Private Corporate Debt Composite	932,635,124			16,752,714	-1,595,758		18,137,260	965,929,340
Tennenbaum CP Direct Lending	339,615,468			-10,159,363	-821,471		6,287,962	334,922,597
Monroe Capital	405,893,959			2,780,667	-533,821		7,612,734	415,753,539
PPEF XXV B	187,125,697			24,131,409	-240,466		4,236,564	215,253,205
Private Real Asset Debt Composite	710,829,859			-6,071,866	-1,679,548		12,766,459	715,844,904
Principal Real Estate Debt II	6,537,009			-2,935,833	-16,068		14,360	3,599,468
PGIM Real Estate Global Debt	116,958,904			-399,958	-215,747		2,957,773	119,300,972
Kayne Anderson Real Estate Debt IV	101,266,126			-2,988,278	-235,626		2,770,670	100,812,892
Heitman Credit	109,856,441			-1,735,892	-204,140		-5,181,785	102,734,624
IFM US Infrastructure Debt Fund	90,551,861			-754,342	-101,320		532,129	90,228,328
JP Morgan Global Transport Income Fund	101,445,030			-2,195,364	-253,354		2,550,294	101,546,606
ITE Rail Fund IA	80,167,607			-977,514	-487,301		7,555,784	86,258,576
PGIM PREDS	71,855,670			-1,440,397	-140,107		1,240,073	71,515,238
Oaktree RECIF	25,500,000			7,376,088	-25,885		359,928	33,210,131
Principal OEDF	6,691,212			-20,376			-32,767	6,638,070
Opportunistic Credit Composite	832,921,928			49,993,529	-2,028,517		24,428,573	905,315,513
KKR Global Corporate Debt	282,358,688			1,963,016	-640,154		8,398,676	292,080,226
Crestline Opportunistic Credit	200,889,912			-12,722,772	-648,692		6,635,087	194,153,535
ARES PCS II	67,810,585			-1,725,421	-234,812		2,255,401	68,105,753
Audax Mezzanine Coinvest	16,196,107			-4,280,235			402,265	12,318,136

Cash Flow Summary

Total Fund

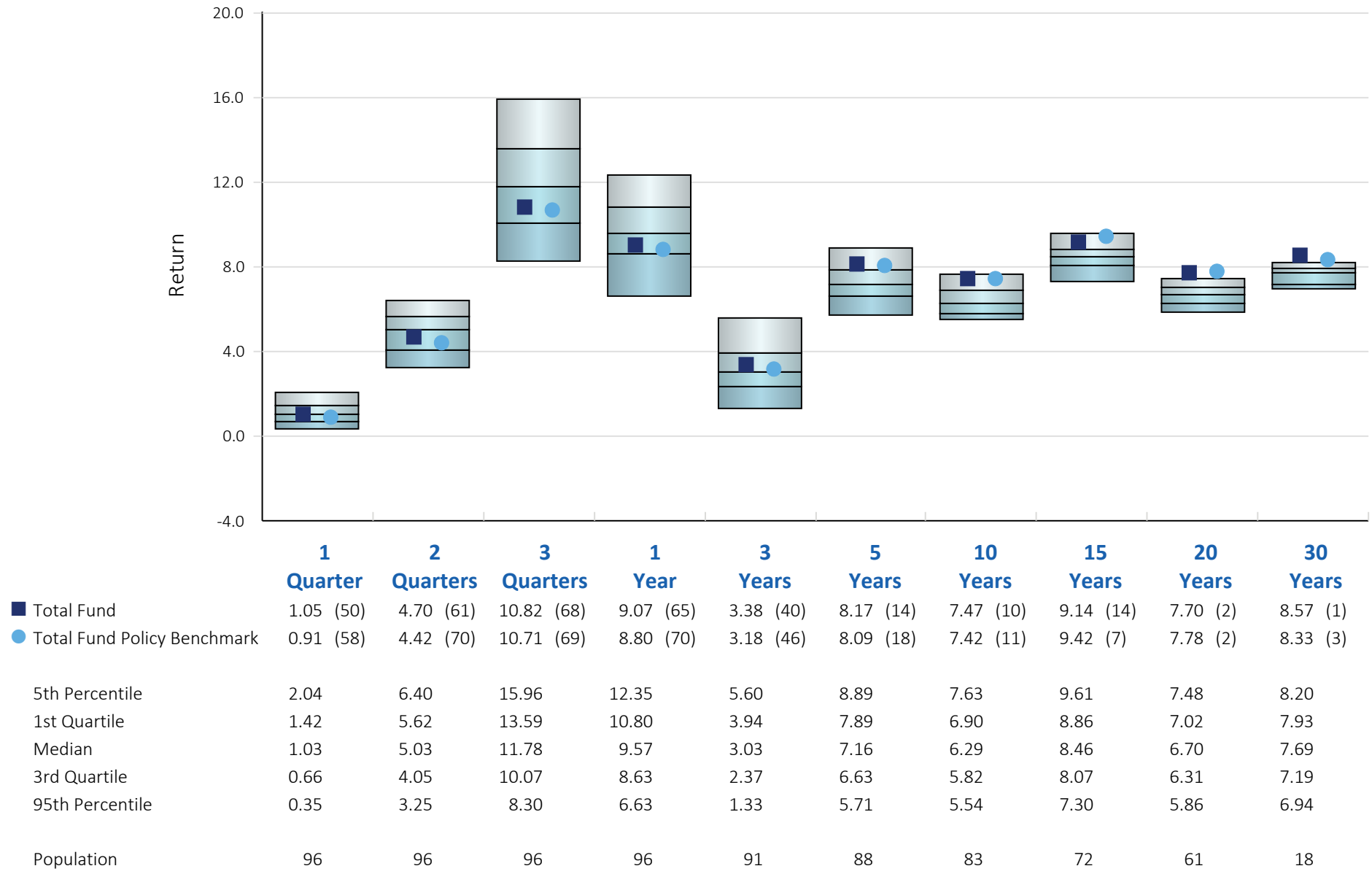
1 Quarter Ending June 30, 2024

	Begin Value	Contributions	Distributions	Net Transfers	Fees	Expenses	Capital Apprec./ Deprec.	End Value
Marathon SPS	134,891,896			50,000,000	-337,230		3,077,384	187,632,050
Arrowmark	98,507,147			-3,517,790			3,146,886	98,136,242
Audax Mezzanine V	32,267,594			-2,891,585	-167,629		533,529	29,741,909
Crestline Opportunistic Credit - Series 2				23,168,317			-20,654	23,147,663
Private Real Assets Composite	3,190,577,727	270,267,648	-290,785,213		-3,422,882		-83,581,561	3,083,055,719
Private Other Real Assets Composite	658,976,030		-5,653,216		-1,185,053		19,363,894	671,501,654
UBS Farmland Investors	106,261,617		-900,000		-222,622		5,706,165	110,845,159
Forest Investment Associates	227,449,509		-2,800,000		-375,897		6,430,098	230,703,710
Brookfield Super-Core Infrastructure	325,264,905		-1,953,216		-586,535		7,227,631	329,952,785
Private Real Estate Composite	2,531,601,696	270,267,648	-285,131,996		-2,237,829		-102,945,455	2,411,554,064
UBS	513,725,046		-3,700,000		-515,047		-22,961,655	486,548,343
Clarion Partners	467,652,388		-217,797,058				-7,389,655	242,465,675
RREEF America LLC	761,652,819	230,707,148	-53,877,938		-865,816		-28,352,538	909,263,674
Invesco Separate Account	788,571,444	39,560,500	-9,757,000		-856,965		-44,241,607	773,276,372
Settlement Proceeds								

Plan Sponsor Peer Group Analysis

Total Fund vs All Public Plans > \$1B-Total Fund

Periods Ended June 30, 2024



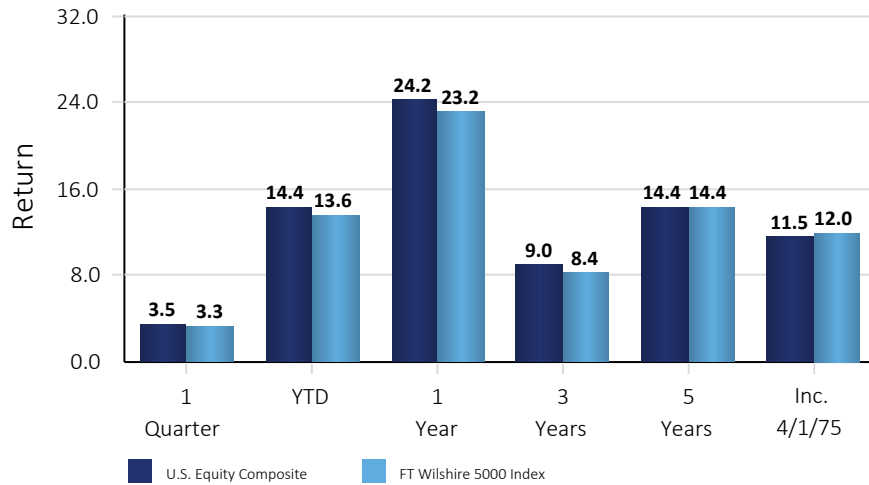
Parentheses contain percentile rankings.
Calculation based on quarterly periodicity.

Manager Summary

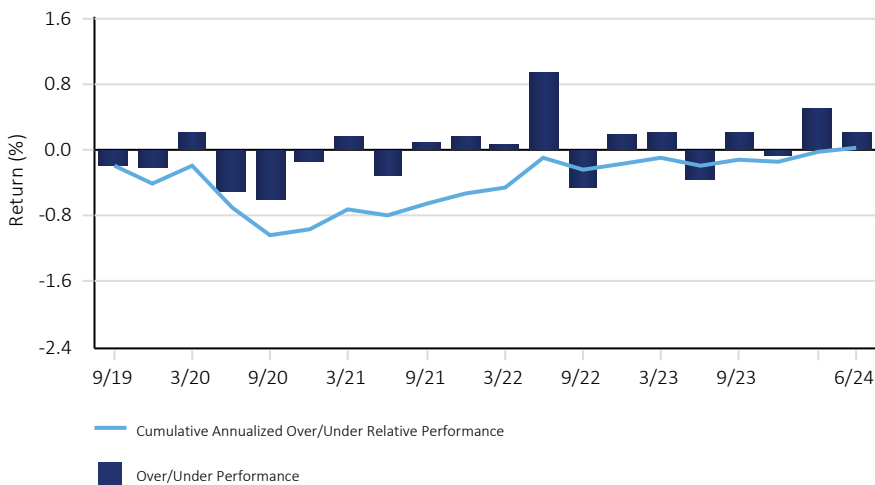
U.S. Equity Composite vs IM U.S. All Cap Equity (SA+CF)

Periods Ended June 30, 2024

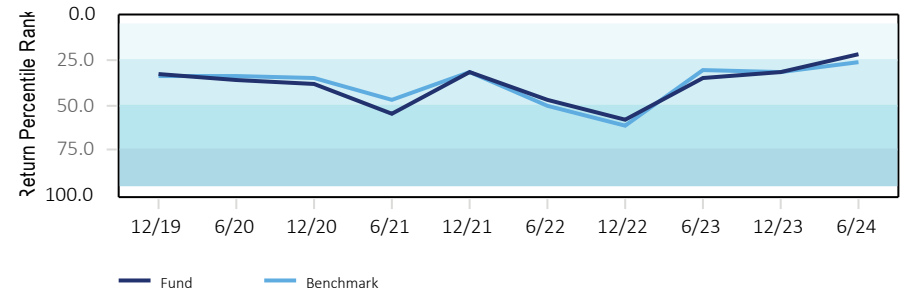
Comparative Performance



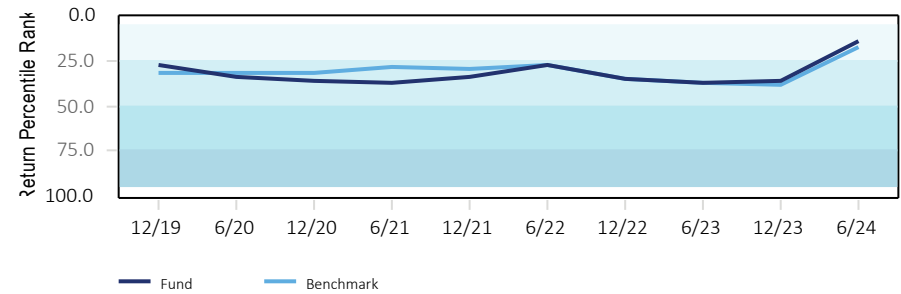
Relative Performance



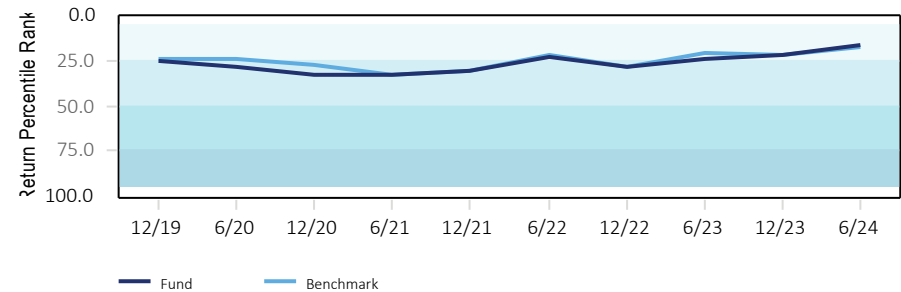
1 Year Rolling Percentile Ranking



3 Year Rolling Percentile Ranking



5 Year Rolling Percentile Ranking

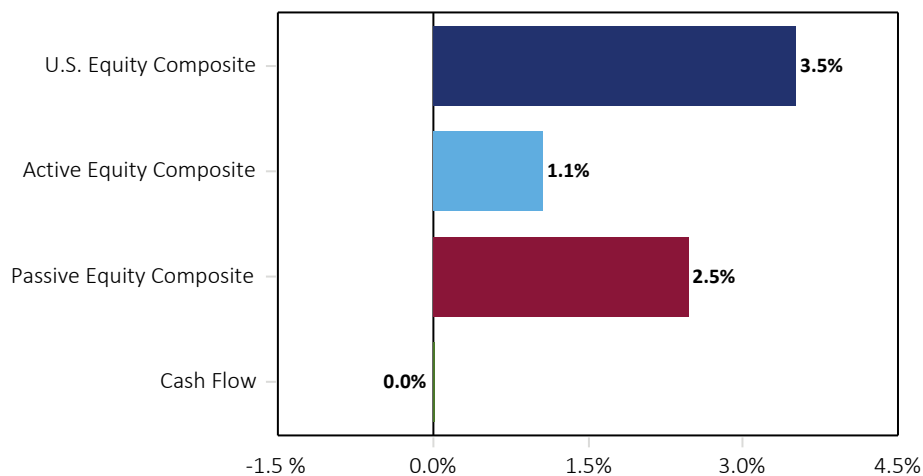


Return and Risk Contribution

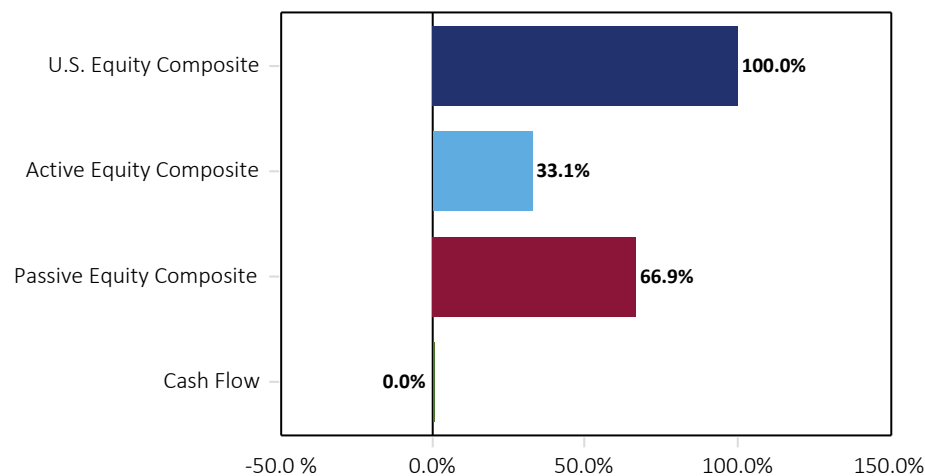
U.S. Equity Composite

Periods Ended 1 Quarter June 30, 2024

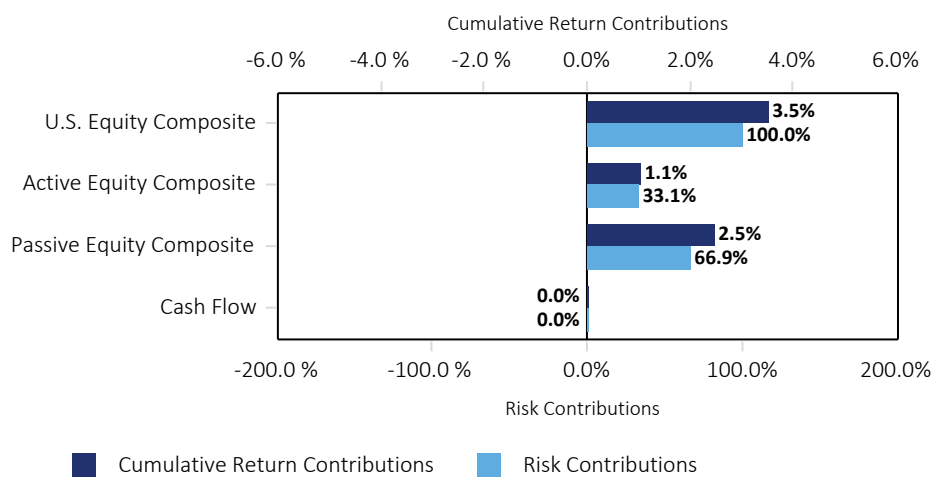
Cumulative Return Contributions



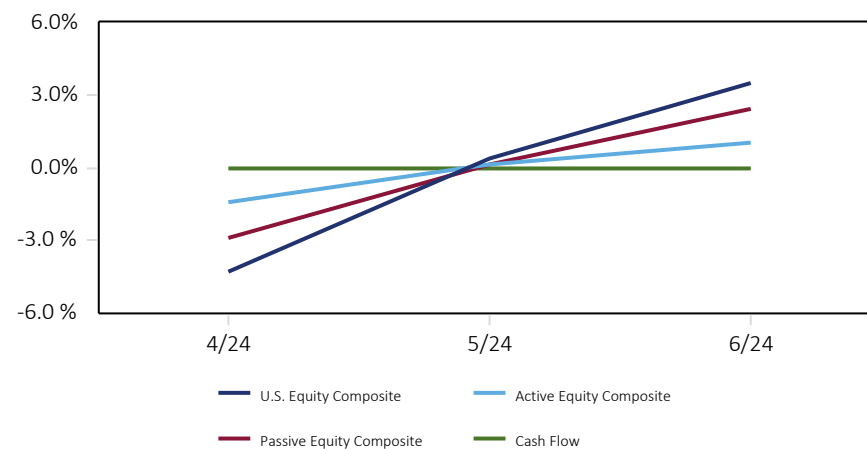
Risk Contributions



Cumulative Return and Risk Contributions



Cumulative Return Contributions History

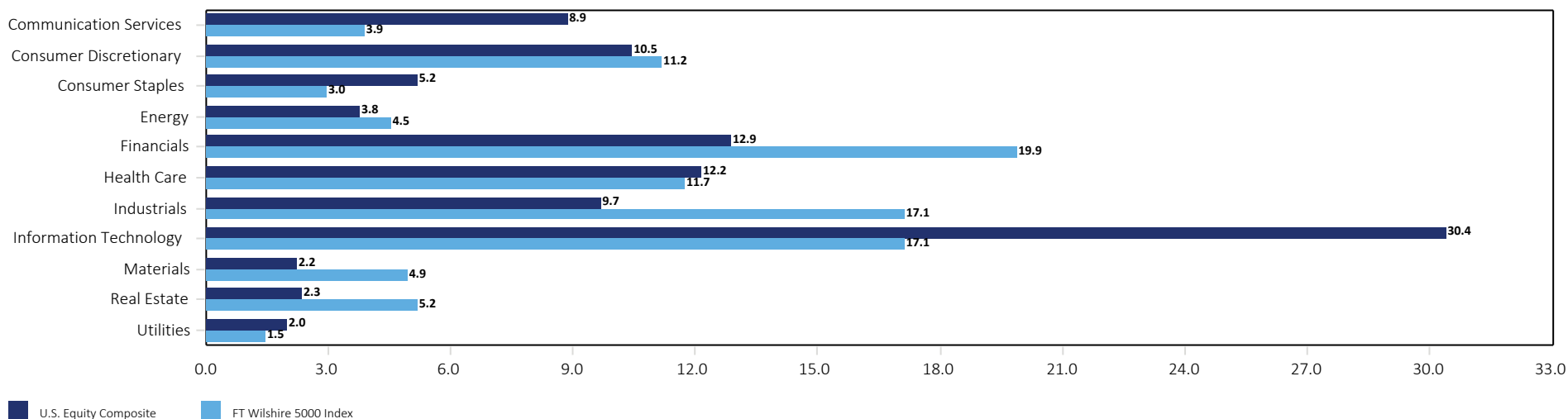


Portfolio Characteristics

U.S. Equity Composite

Periods Ended As of June 30, 2024

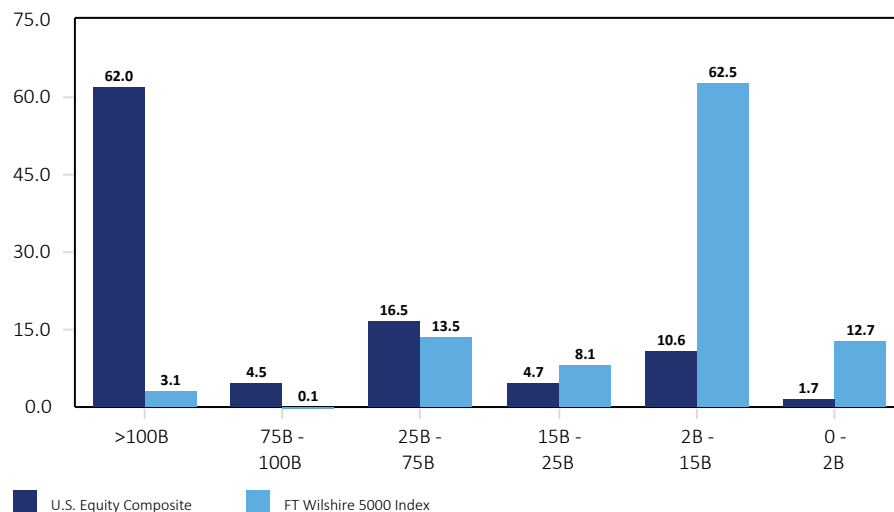
Sector Weights (%)



Portfolio Characteristics

	Portfolio	Benchmark
Wtd. Avg. Mkt. Cap \$	888,203,984,935	38,966,593,995
Median Mkt. Cap \$	2,027,340,140	890,279,770
Price/Earnings ratio	25.6	18.4
Price/Book ratio	4.7	2.9
5 Yr. EPS Growth Rate (%)	17.7	15.5
Current Yield (%)	1.3	1.2
Beta (5 Years, Monthly)	0.98	1.00
Number of Stocks	3,060	2,874

Distribution of Market Capitalization (%)

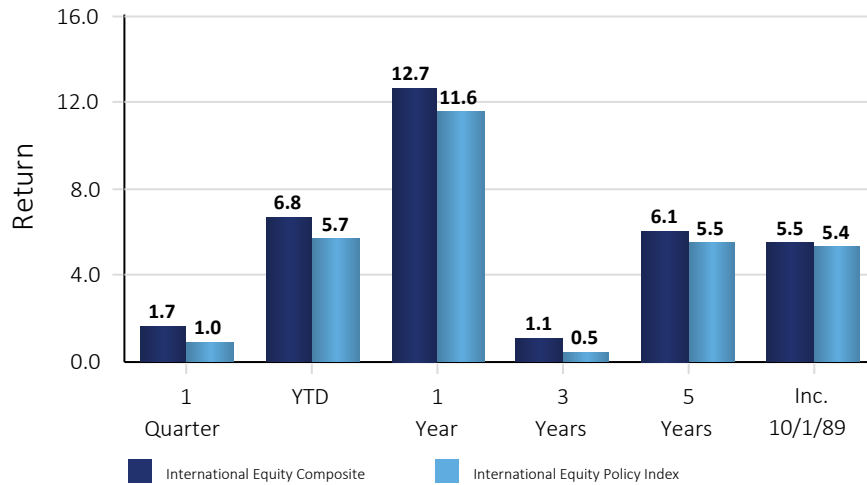


Manager Summary

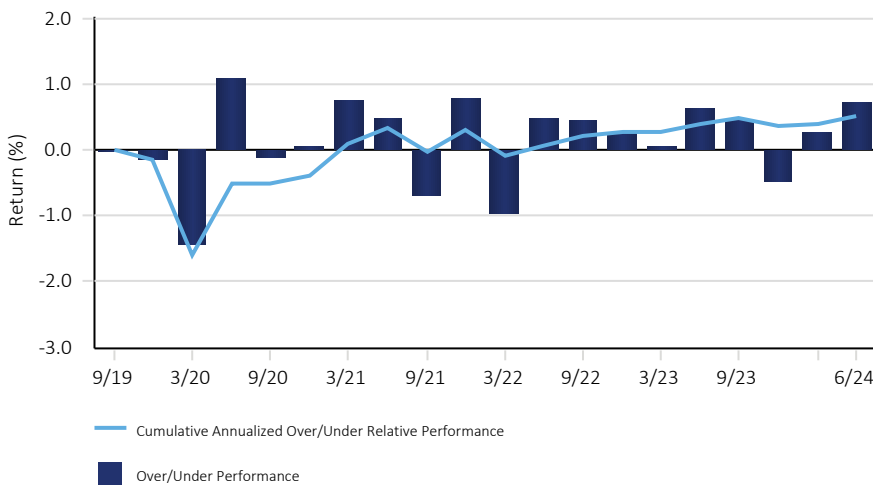
International Equity Composite vs IM International Equity (SA+CF)

Periods Ended June 30, 2024

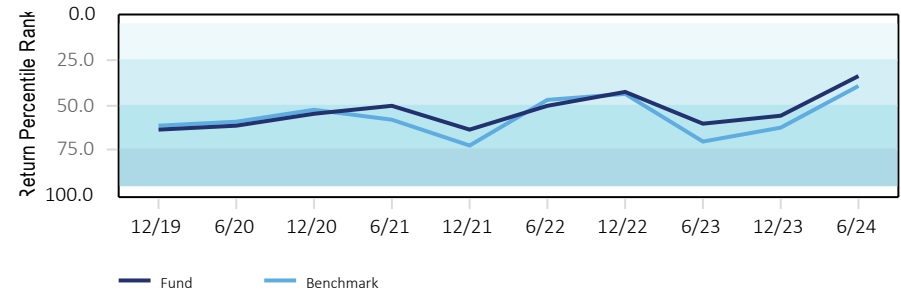
Comparative Performance



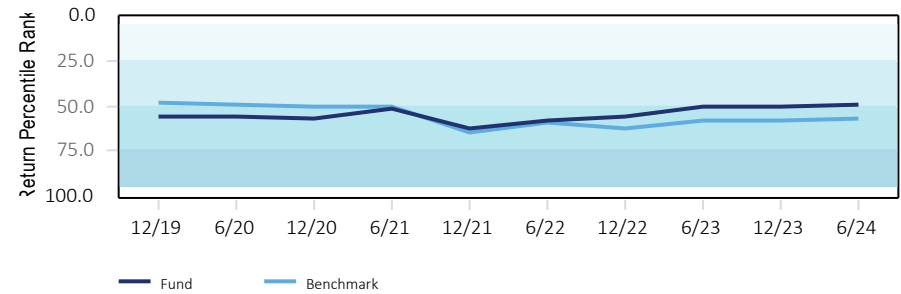
Relative Performance



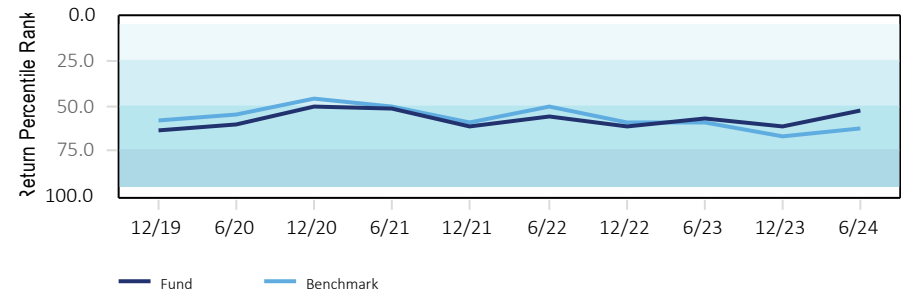
1 Year Rolling Percentile Ranking



3 Year Rolling Percentile Ranking



5 Year Rolling Percentile Ranking

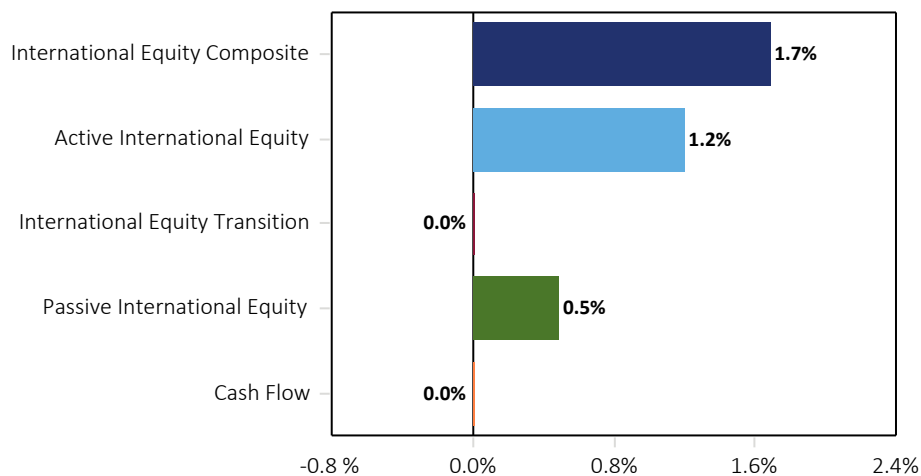


Return and Risk Contribution

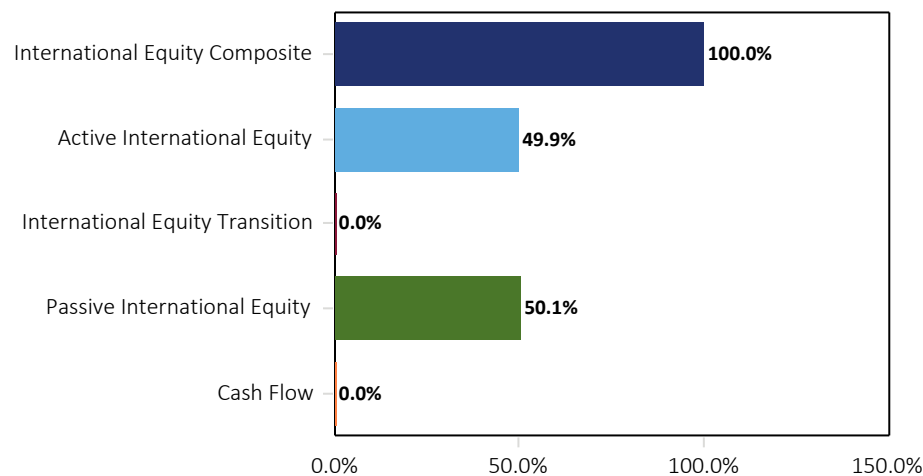
International Equity Composite

Periods Ended 1 Quarter June 30, 2024

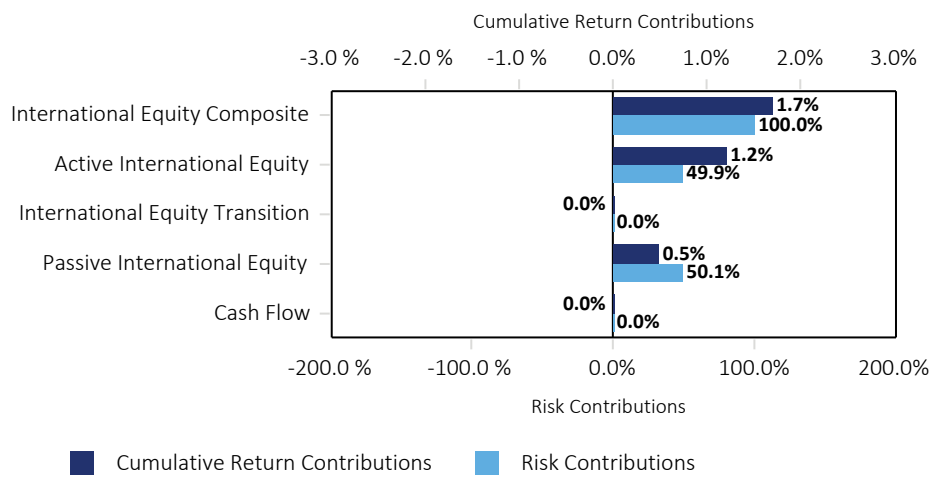
Cumulative Return Contributions



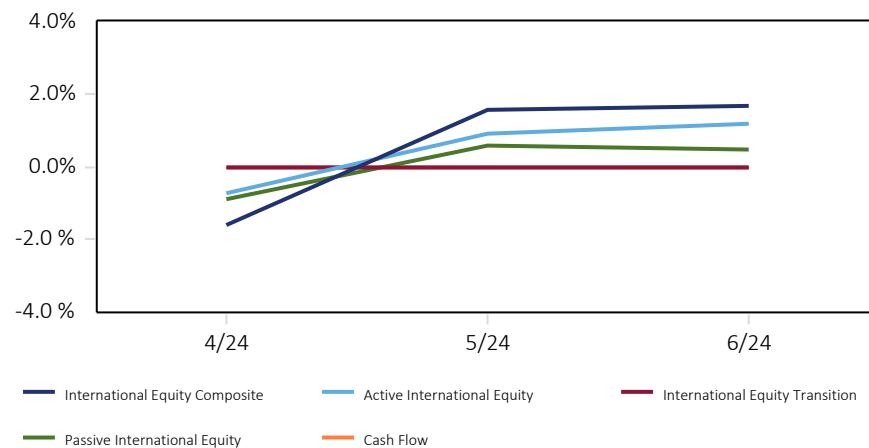
Risk Contributions



Cumulative Return and Risk Contributions



Cumulative Return Contributions History

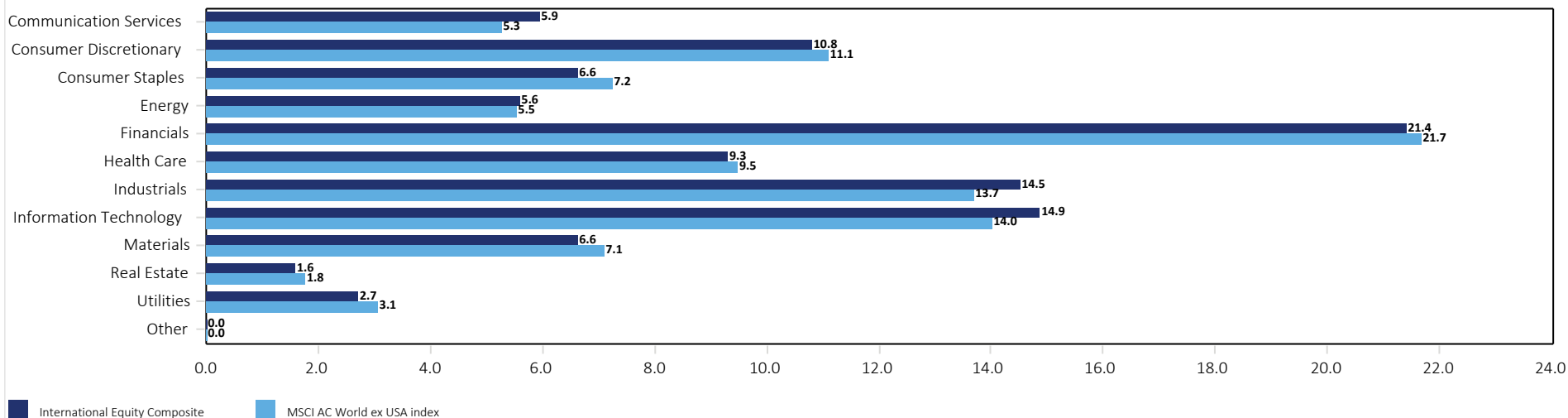


Portfolio Characteristics

International Equity Composite

Periods Ended As of June 30, 2024

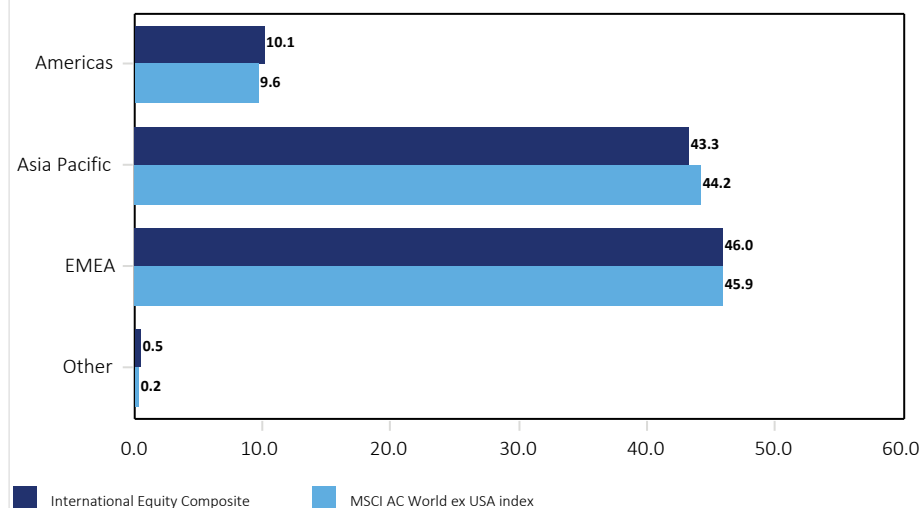
Sector Weights (%)



Portfolio Characteristics

	Portfolio	Benchmark
Wtd. Avg. Mkt. Cap \$	114,559,168,321	112,366,545,202
Median Mkt. Cap \$	9,789,317,835	9,176,173,546
Price/Earnings ratio	14.3	16.3
Price/Book ratio	2.7	2.6
5 Yr. EPS Growth Rate (%)	11.1	10.3
Current Yield (%)	2.2	3.0
Beta (5 Years, Monthly)	1.01	1.00
Number of Stocks	2,562	2,159

Region Allocation



Country/RegionAllocation

International Equity Composite

Periods Ended June 30, 2024

	International Equity Composite	MSCI AC World ex USA index		International Equity Composite	MSCI AC World ex USA index
Canada	7.76	7.44	Brazil	1.40	1.23
United States	0.20	0.09	Chile	0.17	0.13
Americas	7.96	7.53	Colombia	0.02	0.03
Australia	4.20	4.55	Mexico	0.53	0.62
Hong Kong	1.72	1.65	Peru	0.06	0.05
Japan	14.48	14.44	Americas	2.18	2.06
New Zealand	0.20	0.16	China	5.92	6.35
Singapore	1.03	0.97	India	5.25	5.56
Asia Pacific	21.63	21.79	Indonesia	0.39	0.46
Austria	0.21	0.12	Korea	3.43	3.52
Belgium	0.35	0.51	Malaysia	0.38	0.40
Denmark	2.72	2.53	Philippines	0.11	0.15
Finland	0.58	0.64	Taiwan	5.71	5.62
France	6.50	6.63	Thailand	0.50	0.38
Germany	5.57	5.46	Asia Pacific	21.69	22.45
Ireland	0.92	0.97	Czech Republic	0.02	0.04
Israel	0.37	0.47	Egypt	0.01	0.02
Italy	1.71	1.51	Greece	0.17	0.14
Netherlands	4.05	3.95	Hungary	0.14	0.07
Norway	0.38	0.38	Kuwait	0.18	0.21
Portugal	0.07	0.10	Poland	0.25	0.26
Spain	2.07	1.63	Qatar	0.19	0.23
Sweden	2.28	2.06	Saudi Arabia	0.99	1.13
Switzerland	5.97	6.60	South Africa	0.75	0.79
United Kingdom	9.06	8.95	Turkey	0.23	0.23
EMEA	42.82	42.50	United Arab Emirates	0.28	0.32
Developed Markets	72.41	71.82	EMEA	3.20	3.43
			Emerging Markets	27.07	27.94
			Frontier Markets	0.02	0.00

Country/RegionAllocation

International Equity Composite

Periods Ended June 30, 2024

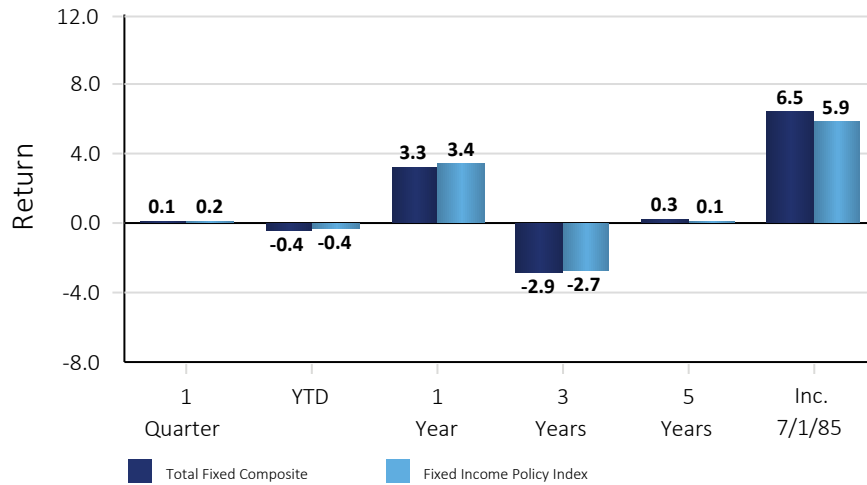
	International Equity Composite	MSCI AC World ex USA index
Cash	0.00	0.00
Other	0.50	0.25
Total	100.00	100.00

Manager Summary

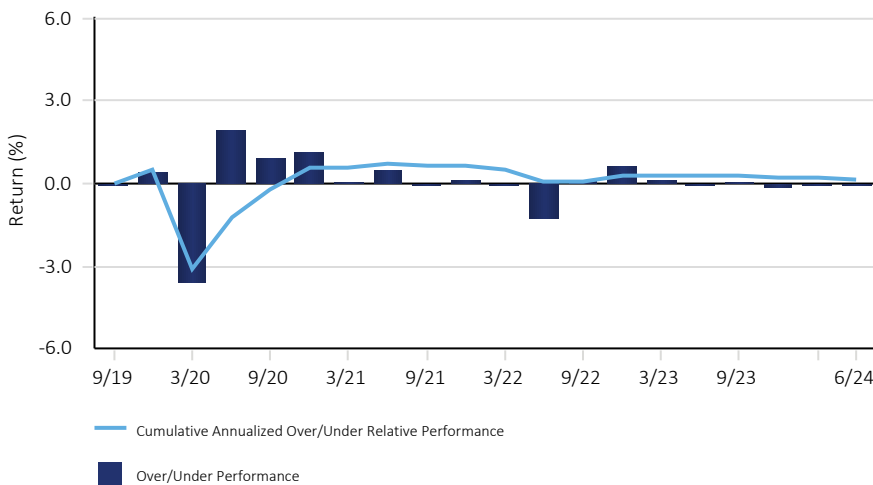
Total Fixed Composite vs IM U.S. Fixed Income (SA+CF)

Periods Ended June 30, 2024

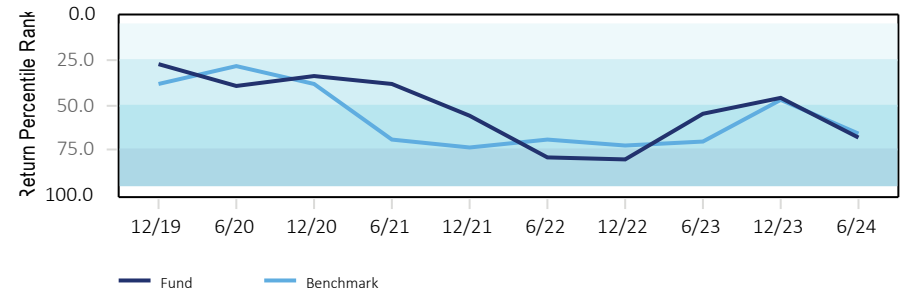
Comparative Performance



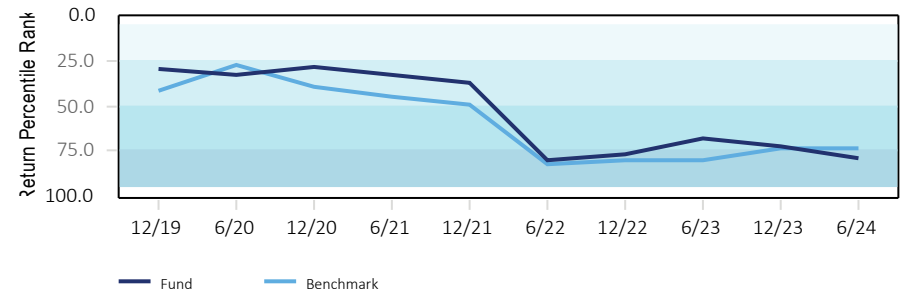
Relative Performance



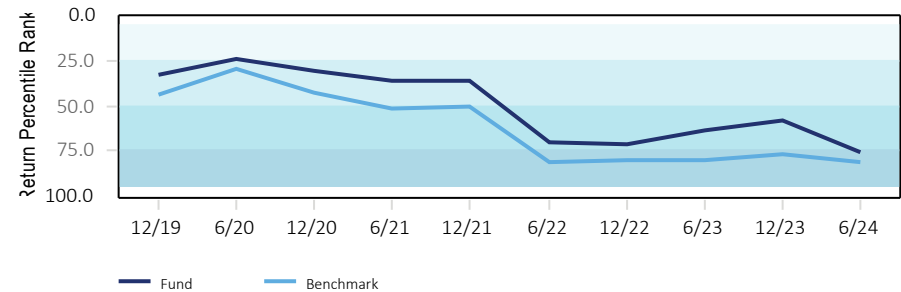
1 Year Rolling Percentile Ranking



3 Year Rolling Percentile Ranking



5 Year Rolling Percentile Ranking

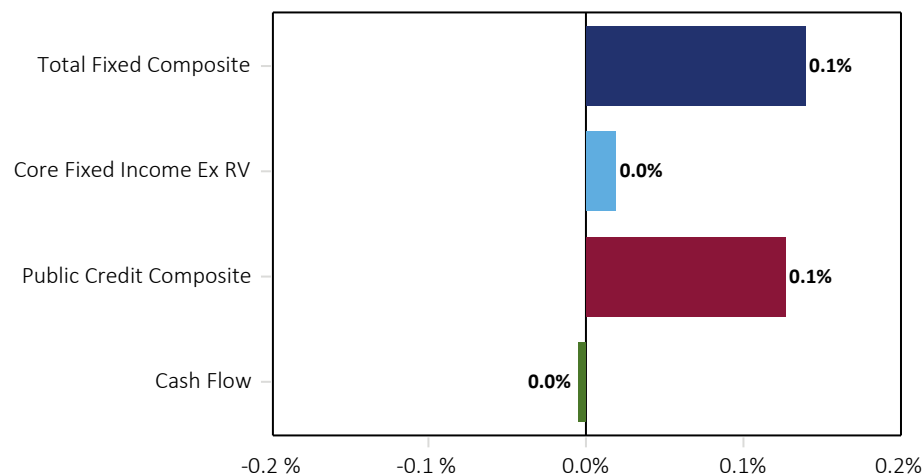


Return and Risk Contribution

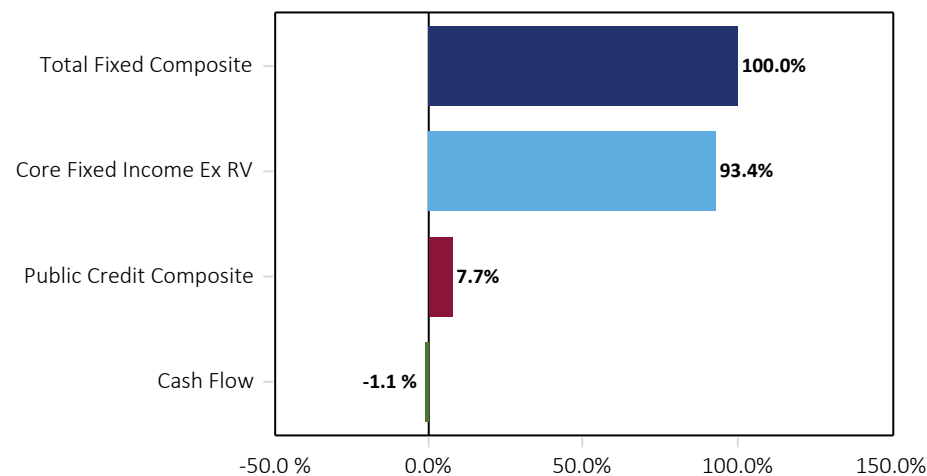
Total Fixed Composite

Periods Ended 1 Quarter June 30, 2024

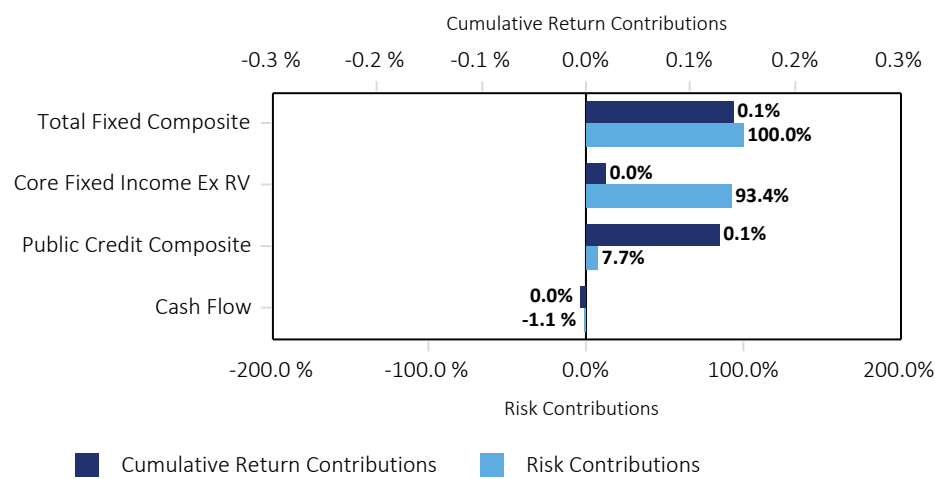
Cumulative Return Contributions



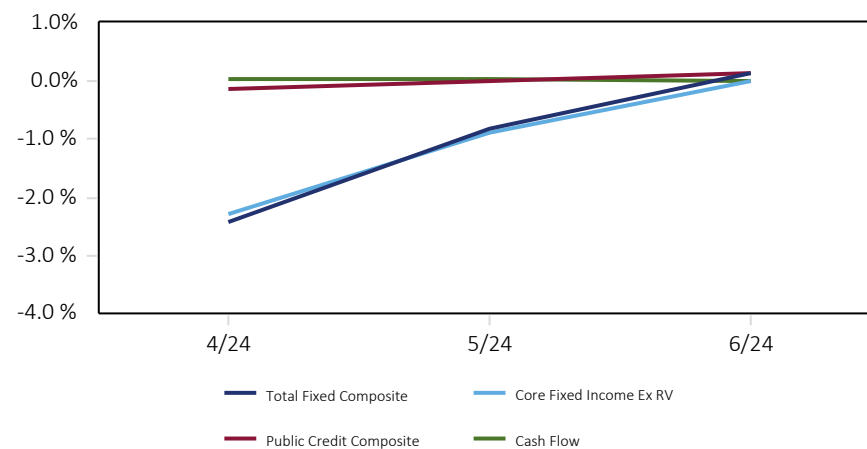
Risk Contributions



Cumulative Return and Risk Contributions



Cumulative Return Contributions History



Portfolio Characteristics

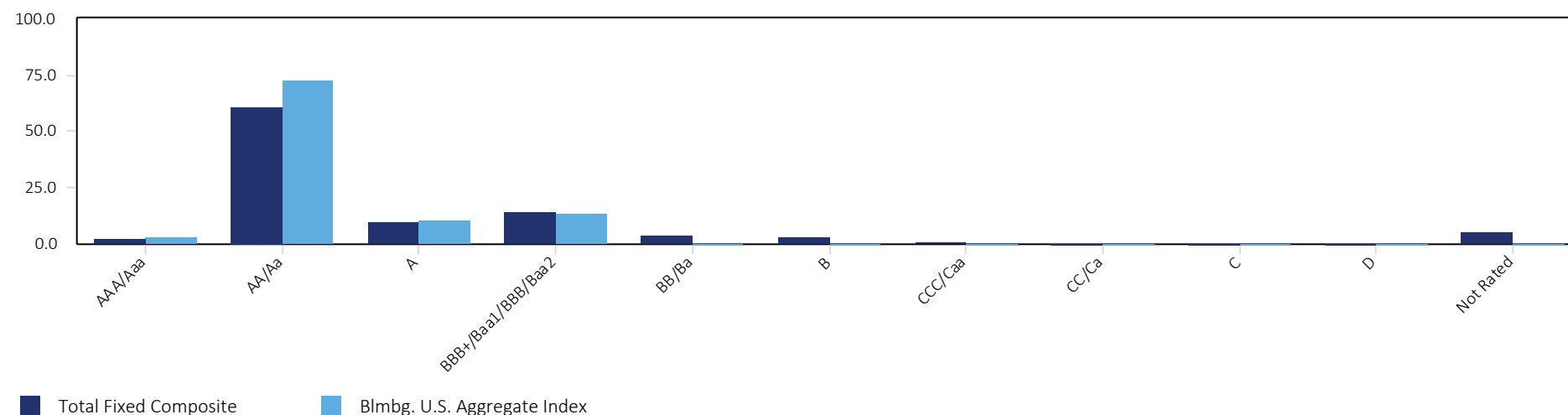
Total Fixed Composite vs Blmbg. U.S. Aggregate Index

Periods Ended As of June 30, 2024

Portfolio Characteristics

	Portfolio	Benchmark
Avg. Quality	AA	AA
Convexity	0.27	0.28
Coupon Rate (%)	3.63	3.41
Current Yield	3.63	4.93
Effective Duration	5.86	5.96
Yield To Maturity (%)	5.30	4.93
Years to Maturity	8.51	8.39
Holdings Count	14,923	13,617

Credit Quality Distribution (%)

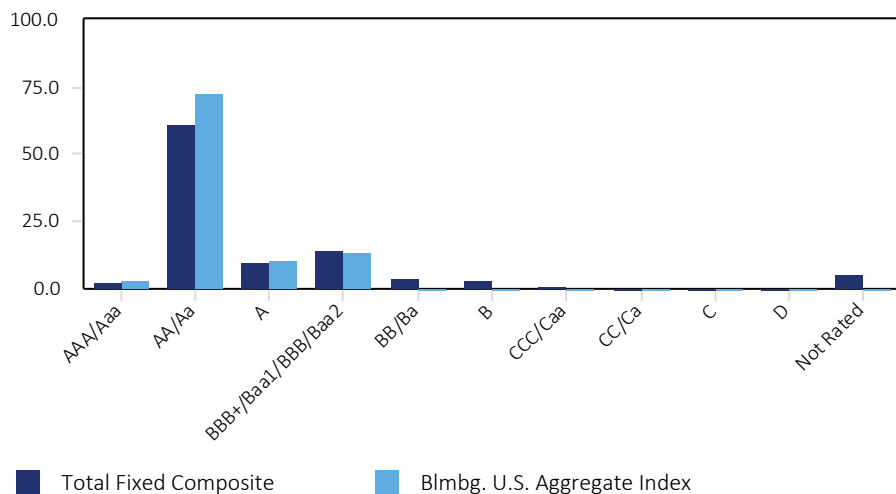


Portfolio Characteristics

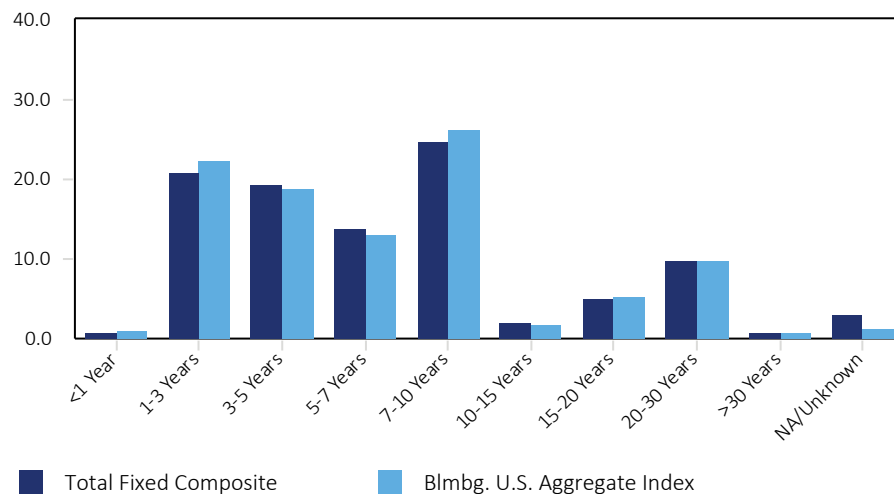
Total Fixed Composite vs Blmbg. U.S. Aggregate Index

Periods Ended As of June 30, 2024

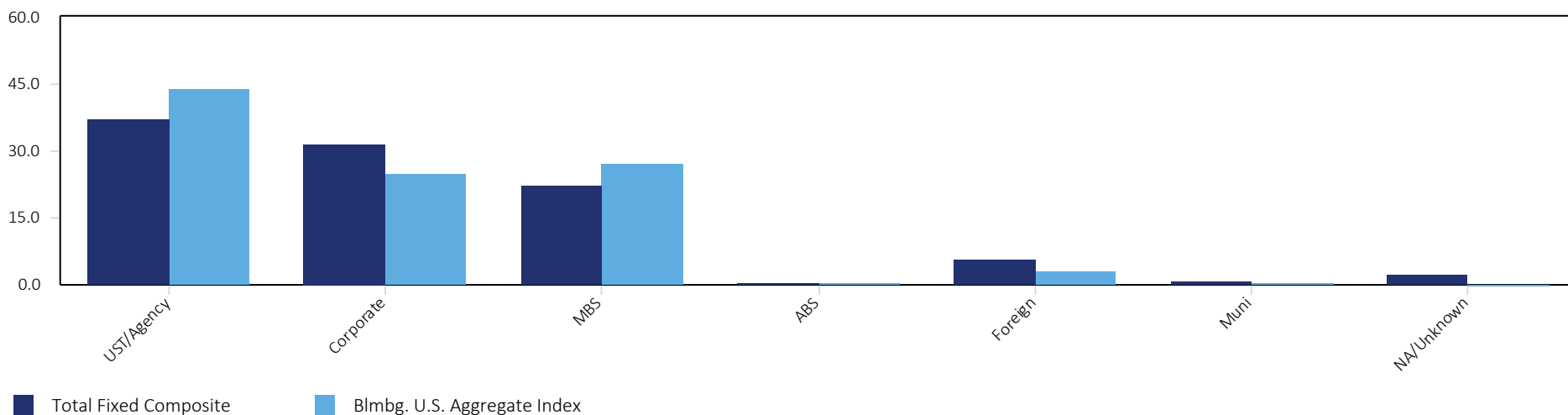
Credit Quality Distribution (%)



Maturity Distribution (%)



Sector Distribution (%)

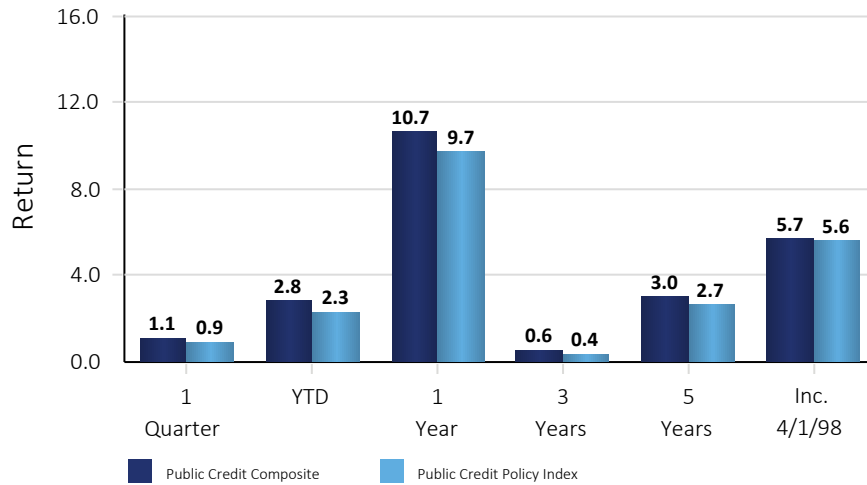


Manager Summary

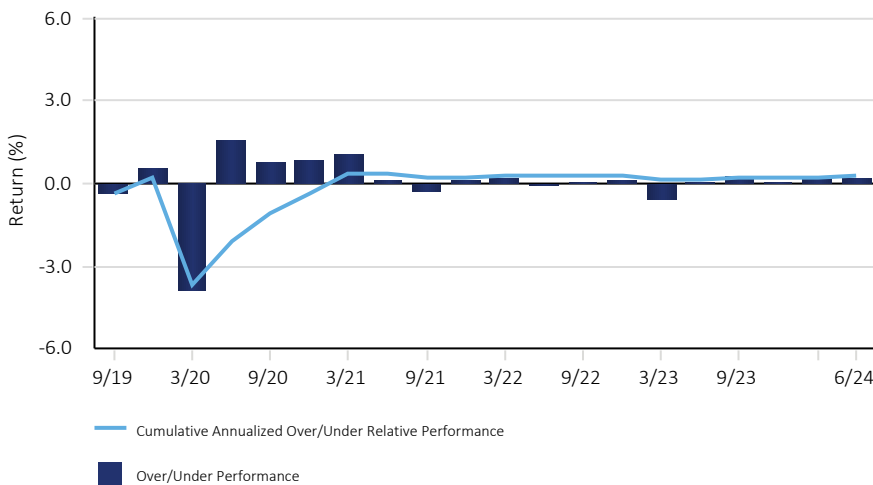
Public Credit Composite vs IM U.S. High Yield Bonds (SA+CF)

Periods Ended June 30, 2024

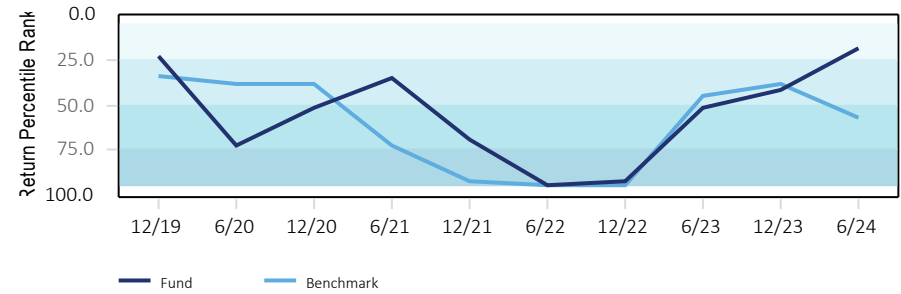
Comparative Performance



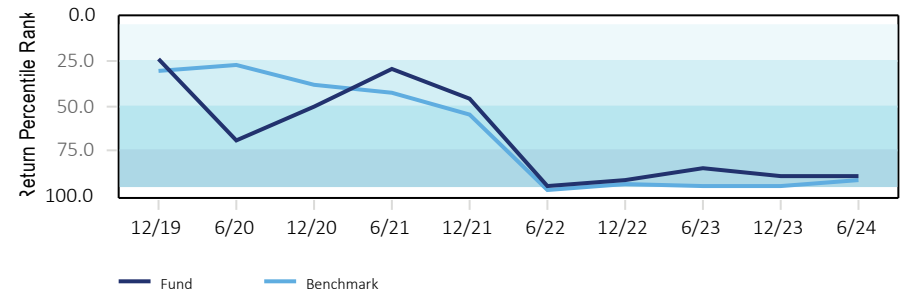
Relative Performance



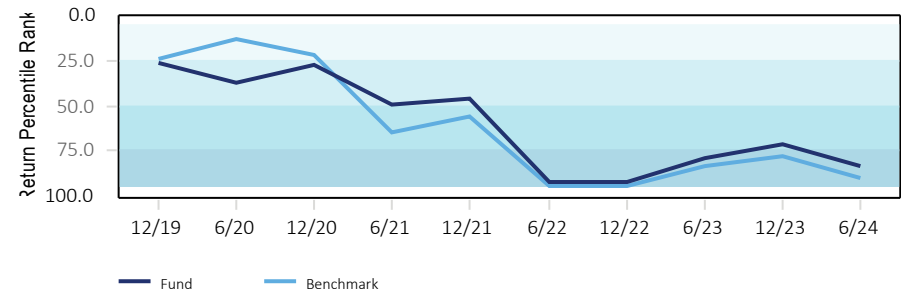
1 Year Rolling Percentile Ranking



3 Year Rolling Percentile Ranking



5 Year Rolling Percentile Ranking

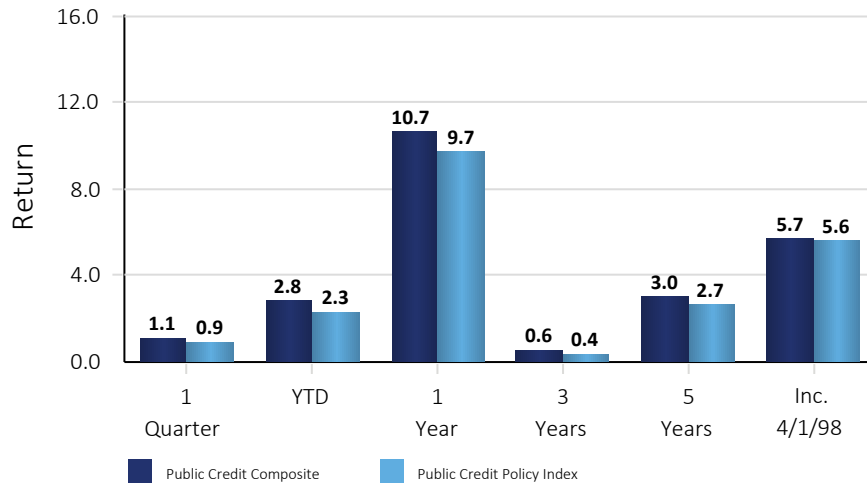


Manager Summary

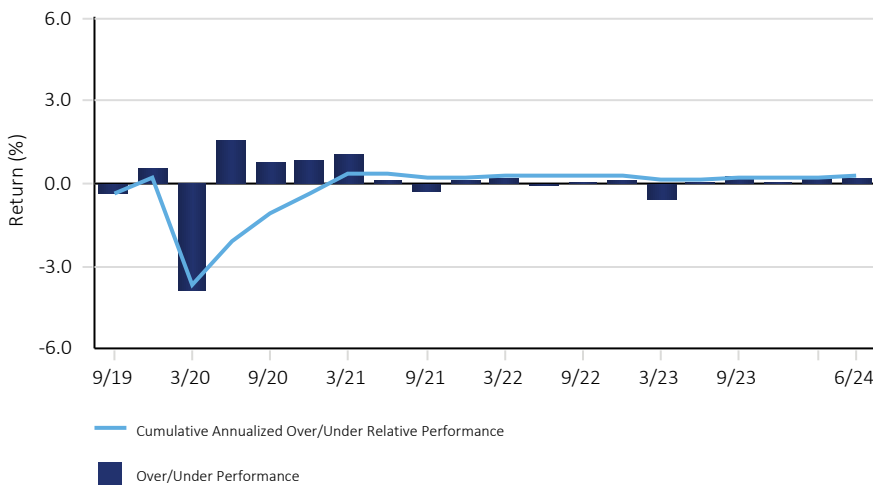
Public Credit Composite vs IM Emerging Markets Debt (SA+CF)

Periods Ended June 30, 2024

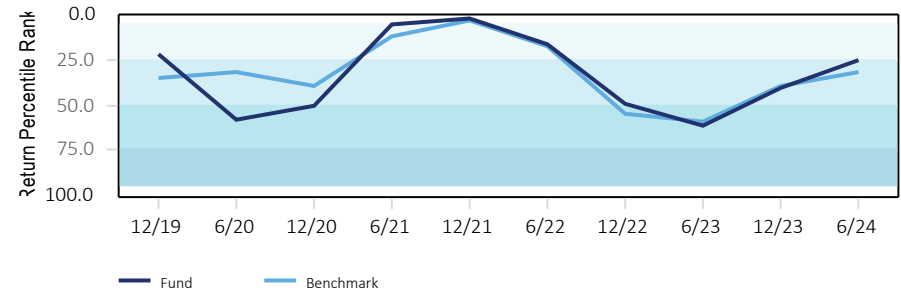
Comparative Performance



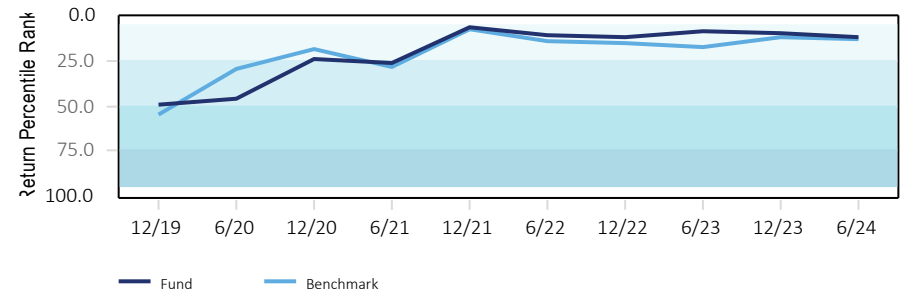
Relative Performance



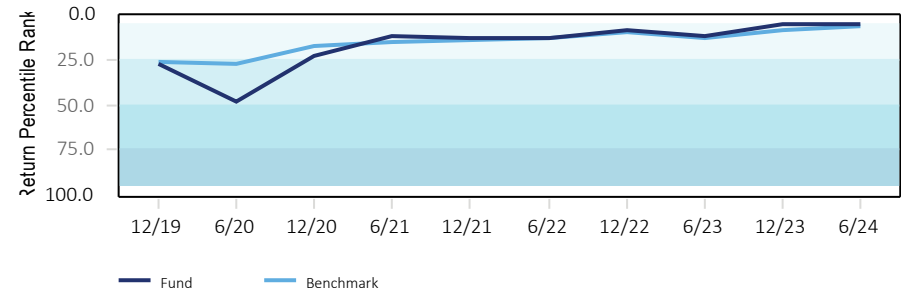
1 Year Rolling Percentile Ranking



3 Year Rolling Percentile Ranking



5 Year Rolling Percentile Ranking

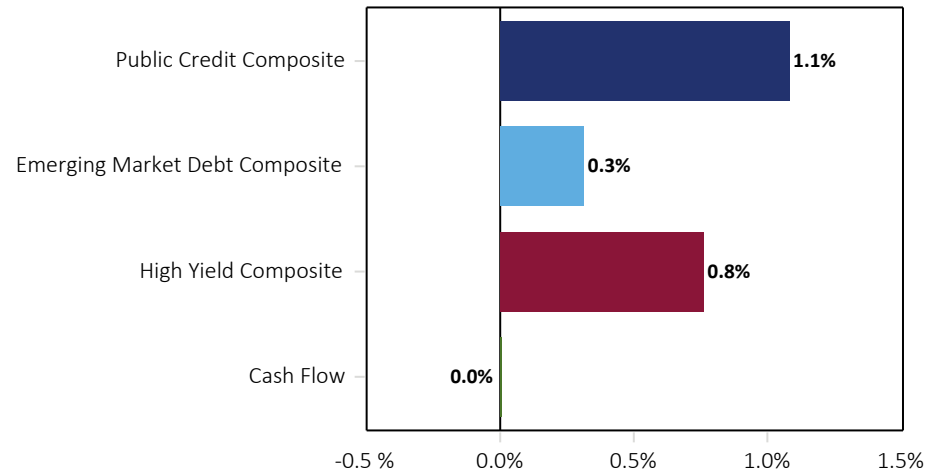


Return and Risk Contribution

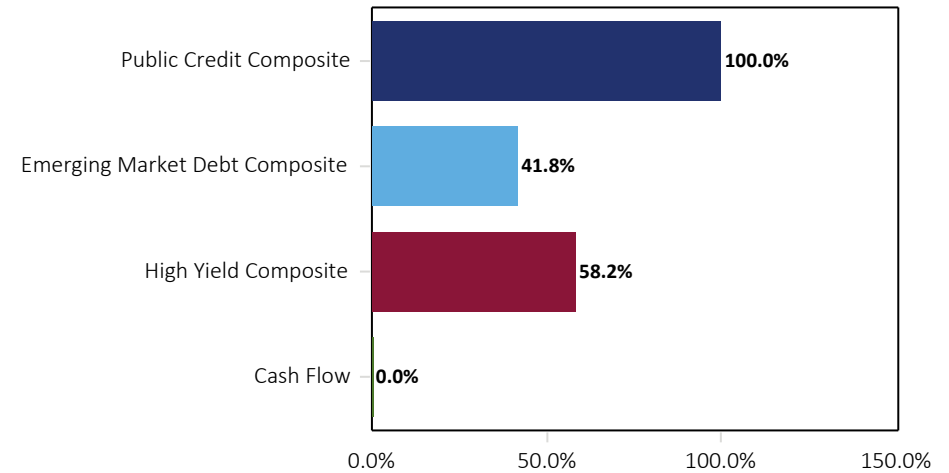
Public Credit Composite

Periods Ended 1 Quarter June 30, 2024

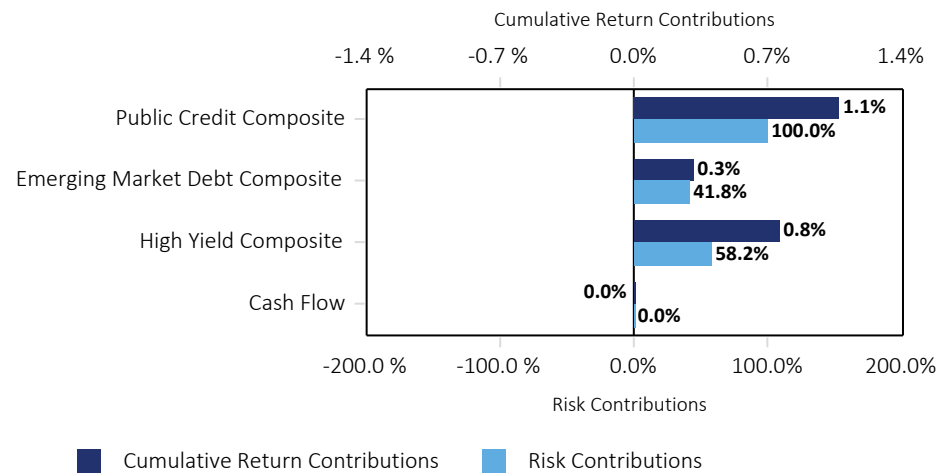
Cumulative Return Contributions



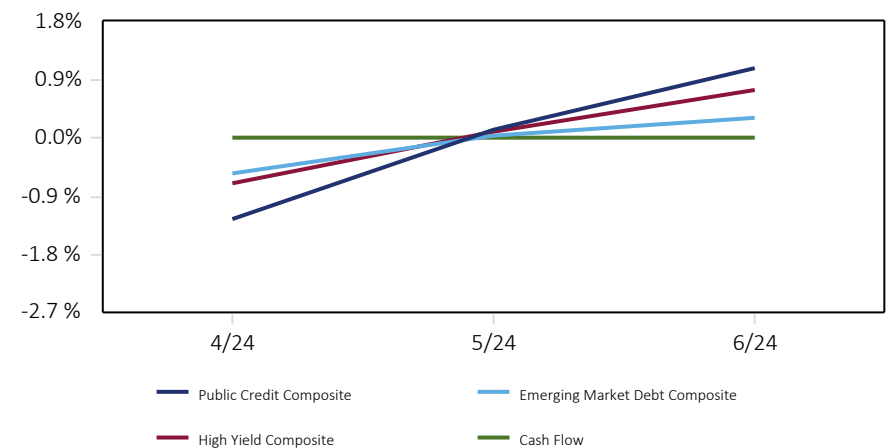
Risk Contributions



Cumulative Return and Risk Contributions



Cumulative Return Contributions History



Asset Allocation & Performance

Private Markets Composite

Periods Ended June 30, 2024

	Performance (%) net of fees									Market Value \$
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date	
Private Markets Composite	0.50	3.05	3.05	7.03	13.53			14.05	10/1/2016	13,685,264,152
Private Equity/Debt	1.32	6.33	6.33	7.36	17.07	15.99	15.87	12.96	10/1/1985	8,015,118,676
Private Equity Policy Index	1.32	6.33	6.33	7.36	17.07	15.99	13.33	14.56		
Private Credit Composite	1.99	8.52	8.52	7.30	7.08			7.48	10/1/2016	2,587,089,758
Private Credit Policy Index	1.99	8.52	8.52	7.30	7.08			7.48		
Private Real Assets Composite	-2.75	-8.37	-8.37	4.48	6.54			7.22	10/1/2016	3,083,055,719
Private Real Assets Policy Index	-2.75	-8.37	-8.37	4.48	6.54			7.22		
Russell 3000 + 3%	3.98	26.82	26.82	11.29	17.57	15.51	13.48	15.43	1/1/1979	
Morningstar LSTA US Leveraged Loan + 1%	2.15	12.21	12.21	7.20	6.58	5.64	5.97	6.09	1/1/1997	
CPI + 5%	1.82	8.12	8.12	10.21	9.38	7.94		7.78	7/1/2012	

Asset Allocation & Performance

Private Credit Composite

Periods Ended June 30, 2024

	Performance (%) net of fees									Market Value \$
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date	
Private Credit Composite	1.99	8.52	8.52	7.30	7.08			7.48	10/1/2016	2,587,089,758
Private Corporate Debt Composite	1.74	8.05	8.05	7.45	7.19			7.33	1/1/2017	965,929,340
Tennenbaum CP Direct Lending	1.61	8.99	8.99	6.78	7.06			7.31	1/1/2017	334,922,597
Monroe Capital	1.73	7.12	7.12	7.62	6.90			7.36	4/1/2017	415,753,539
PPEF XXV B	1.98	7.93	7.93					8.31	3/1/2022	215,253,205
Private Real Asset Debt Composite	1.57	6.30	6.30	5.84	5.96	7.28		7.43	7/1/2013	715,844,904
Principal Real Estate Debt II	-0.04	6.80	6.80	2.51	4.49			5.80	10/1/2017	3,599,468
PGIM Real Estate Global Debt	2.35	9.86	9.86	7.55	6.86			6.84	10/1/2018	119,300,972
Kayne Anderson Real Estate Debt IV	2.54	10.44	10.44					8.15	6/1/2022	100,812,892
Heitman Credit	-4.98	-3.48	-3.48					-2.85	10/1/2022	102,734,624
IFM US Infrastructure Debt Fund	0.48	3.42	3.42					4.20	1/1/2023	90,228,328
JP Morgan Global Transport Income Fund	2.31	8.50	8.50					7.25	5/1/2023	101,546,606
ITE Rail Fund IA	8.93							9.49	9/1/2023	86,258,576
PGIM PREDS	1.55							1.55	12/1/2023	71,515,238
Oaktree RECIF	1.01							1.01	1/1/2024	33,210,131
Principal OEDF	-0.49								3/1/2024	6,638,070
Opportunistic Credit Composite	2.60	10.76	10.76					8.10	8/1/2021	905,315,513
KKR Global Corporate Debt	2.74	9.99	9.99	7.35	7.51			7.74	4/1/2019	292,080,226
Crestline Opportunistic Credit	3.14	11.33	11.33					8.53	8/1/2021	194,153,535
ARES PCS II	3.06	14.59	14.59					5.78	10/1/2021	68,105,753
Audax Mezzanine Coinvest	3.12	13.55	13.55					11.48	11/1/2021	12,318,136
Marathon SPS	1.72	6.85	6.85					6.44	11/1/2021	187,632,050
Arrowmark	3.31	15.77	15.77					9.35	1/1/2022	98,136,242
Audax Mezzanine V	1.25	9.38	9.38					18.51	6/1/2022	29,741,909
Crestline Opportunistic Credit - Series 2									5/1/2024	23,147,663

Asset Allocation & Performance

Private Credit Composite

Periods Ended June 30, 2024

	Performance (%) net of fees									Market Value \$
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date	
Morningstar LSTA US Leveraged Loan + 1%	2.15	12.21	12.21	7.20	6.58	5.64	5.97	6.09	1/1/1997	

Asset Allocation & Performance

Private Real Assets Composite

Periods Ended June 30, 2024

	Performance (%) net of fees									Market Value \$
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date	
Private Real Assets Composite	-2.75	-8.37	-8.37	4.48	6.54			7.22	10/1/2016	3,083,055,719
Private Real Assets Policy Index	-2.75	-8.37	-8.37	4.48	6.54			7.22		
Private Real Estate Composite	-4.19	-12.76	-12.76	2.63	5.81	8.18	7.80	6.65	4/1/1987	2,411,554,064
Private Real Estate Policy Index	-0.66	-9.99	-9.99	1.02	2.27	5.47	7.07	8.09		
Private Other Real Assets Composite	2.76	10.77	10.77	9.98	6.46			5.66	10/1/2016	671,501,654
CPI + 5%	1.82	8.12	8.12	10.21	9.38			8.63		
NCREIF Fund Index-ODCE (VW) (Net)	-0.66	-9.99	-9.99	1.02	2.27	5.47	5.81	7.02	1/1/1978	
CPI - All Urban Consumers (Unadjusted)	0.59	2.97	2.97	4.96	4.17	2.80	2.55	3.16	2/1/1913	
CPI + 5%	1.82	8.12	8.12	10.21	9.38	7.94	7.68		2/1/1913	

Asset Allocation & Performance

Private Real Estate Composite (G)

Periods Ended June 30, 2024

	Performance (%) gross of fees								
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date
Private Real Estate Composite (G)	-4.10	-12.42	-12.42	3.06	6.28	8.73	8.67	7.49	4/1/1987
Private Real Estate Composite (N)	-4.19	-12.76	-12.76	2.63	5.81	8.18	7.80	6.65	
Private Real Estate Policy Index	-0.66	-9.99	-9.99	1.02	2.27	5.47	7.07	8.09	
Clarion Partners (G)	-2.84	-30.89	-30.89	-10.19	-5.72	1.86		4.52	7/1/2005
Clarion Partners (N)	-2.84	-31.01	-31.01	-10.52	-6.12	1.30		3.76	
Invesco Separate Account (G)	-5.58	-12.24	-12.24	7.16	10.84	12.63	11.20	11.16	7/1/1996
Invesco Separate Account (N)	-5.69	-12.65	-12.65	6.68	10.31	12.03	10.31	10.20	
RREEF America LLC (G)	-3.00	-5.30	-5.30	4.43	7.78	9.30	9.81	10.19	4/1/1997
RREEF America LLC (N)	-3.09	-5.69	-5.69	3.99	7.31	8.77	8.77	9.25	
UBS (G)	-4.48	-5.36	-5.36	8.11	10.59	11.44	10.08	10.40	10/1/1998
UBS (N)	-4.58	-5.74	-5.74	7.69	10.13	10.94	9.46	9.79	
NCREIF Fund Index-ODCE (VW) (Net)	-0.66	-9.99	-9.99	1.02	2.27	5.47	5.81	7.02	1/1/1978

Asset Allocation & Performance

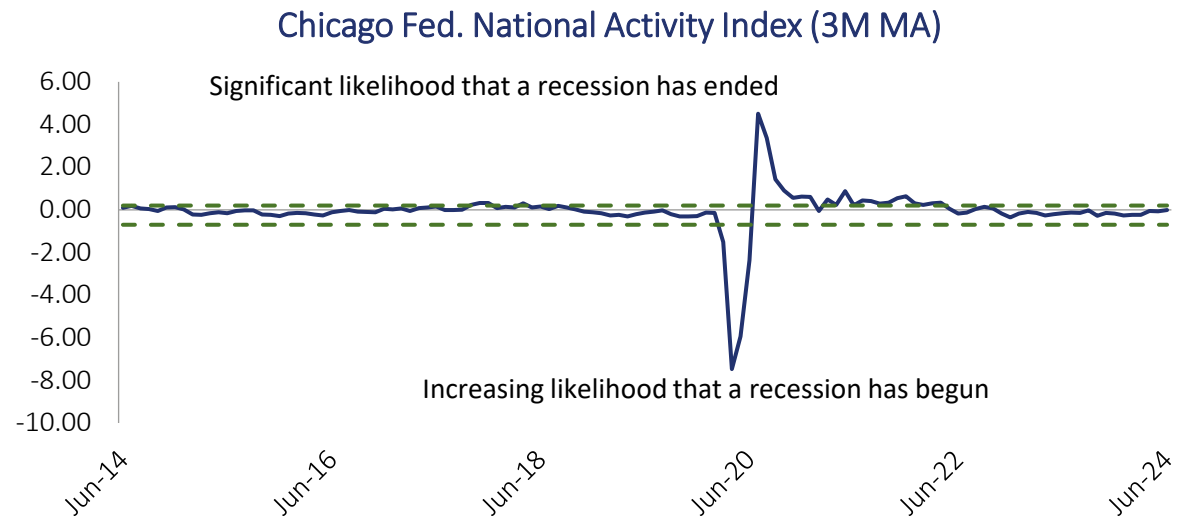
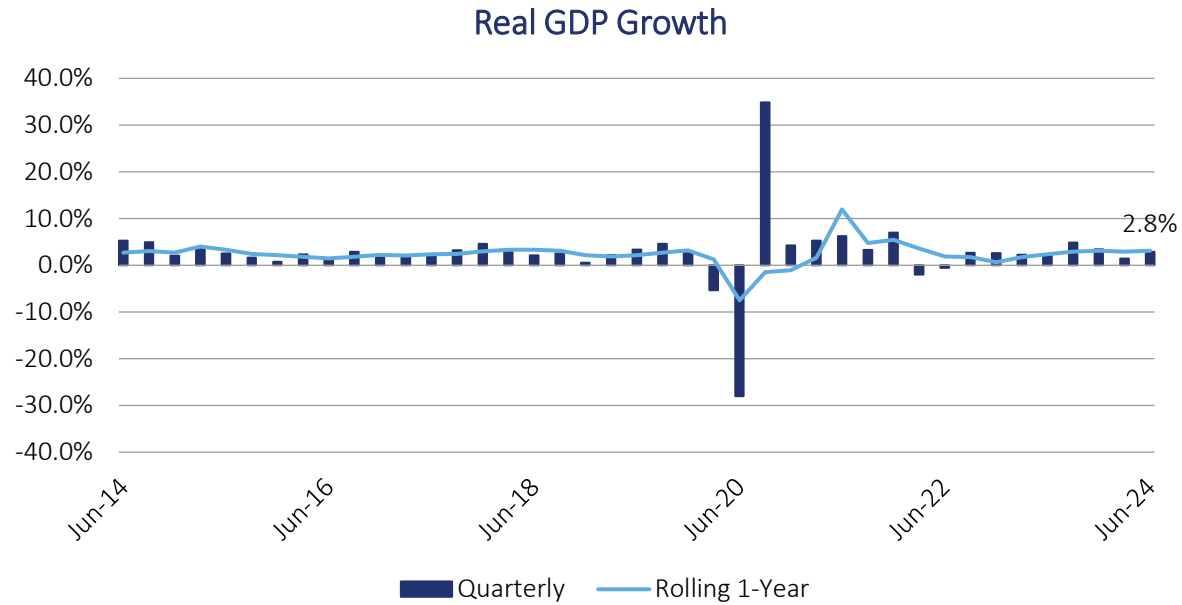
Private Other Real Assets Composite

Periods Ended June 30, 2024

	Performance (%) net of fees								
	1 Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	20 Years	Since Inception	Inception Date
Private Other Real Assets Composite	2.76	10.77	10.77	9.98	6.46			5.66	10/1/2016
CPI + 5%	1.82	8.12	8.12	10.21	9.38			8.63	
Forest Investment Associates	2.66	12.60	12.60	12.35	7.78	5.78		6.44	7/1/2012
CPI + 5%	1.82	8.12	8.12	10.21	9.38	7.94		7.78	
UBS Farmland Investors	5.16	8.53	8.53	7.35	5.09			7.25	7/1/2016
CPI + 5%	1.82	8.12	8.12	10.21	9.38			8.54	
Brookfield Super-Core Infrastructure	2.05	10.20	10.20					8.03	4/1/2022
CPI + 5%	1.82	8.12	8.12					9.22	
NCREIF Farmland Index	-0.21	2.54	2.54	6.77	5.82	6.90	12.06	7.68	10/1/1980
NCREIF Timberland Index	1.71	9.84	9.84	10.99	7.18	5.89	7.12	10.80	4/1/1987

Economic/Market Activity

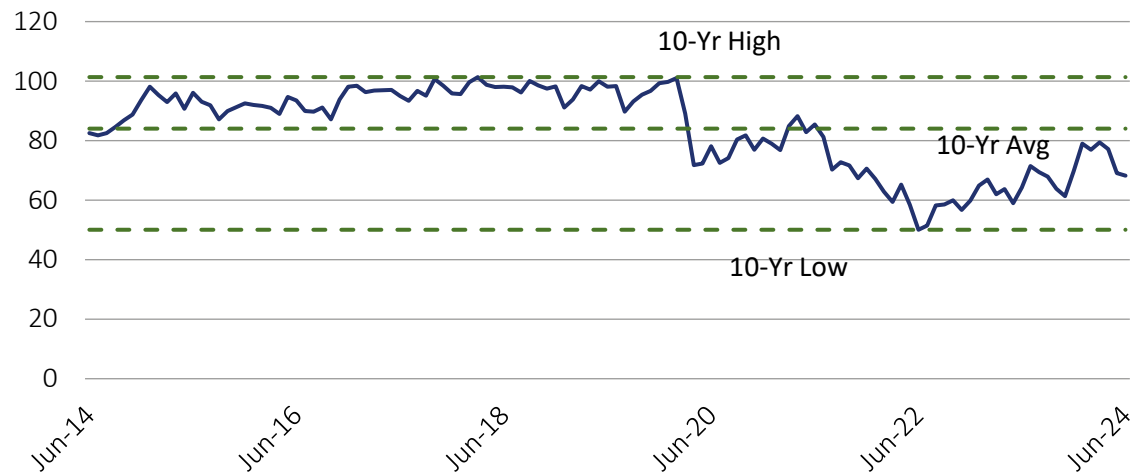
Economic Growth



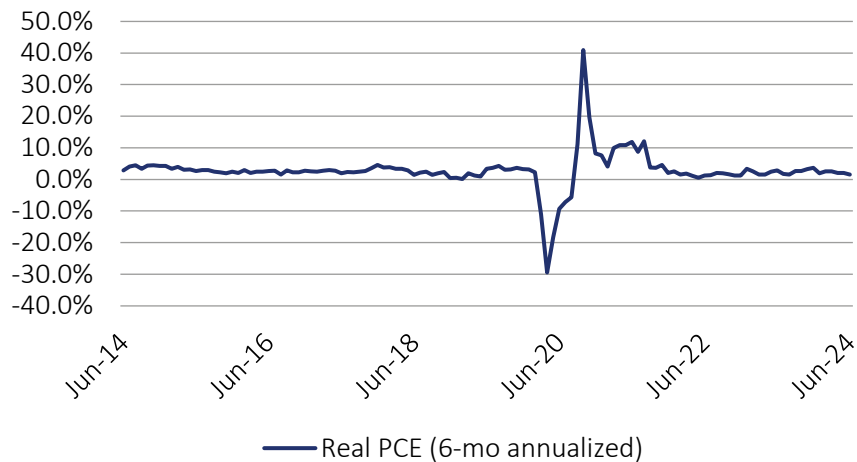
Data Source: Bloomberg

Consumer Activity

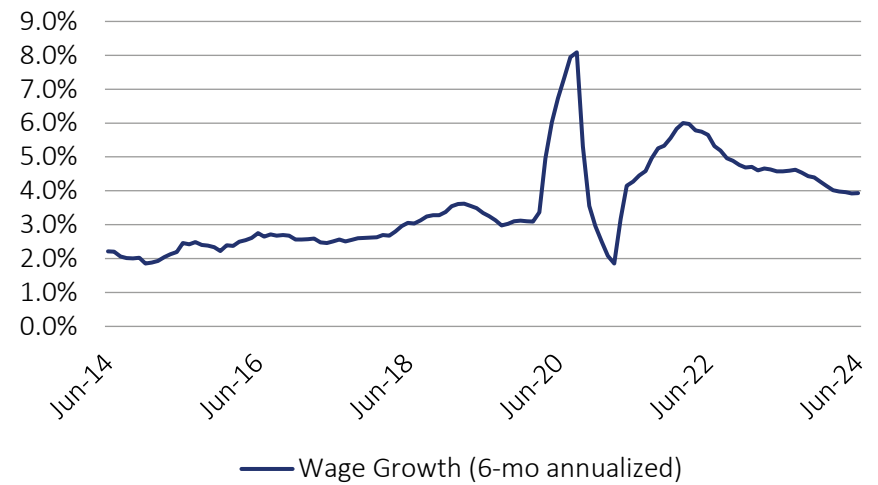
University of Michigan: Consumer Sentiment



Real Personal Consumption Expenditures



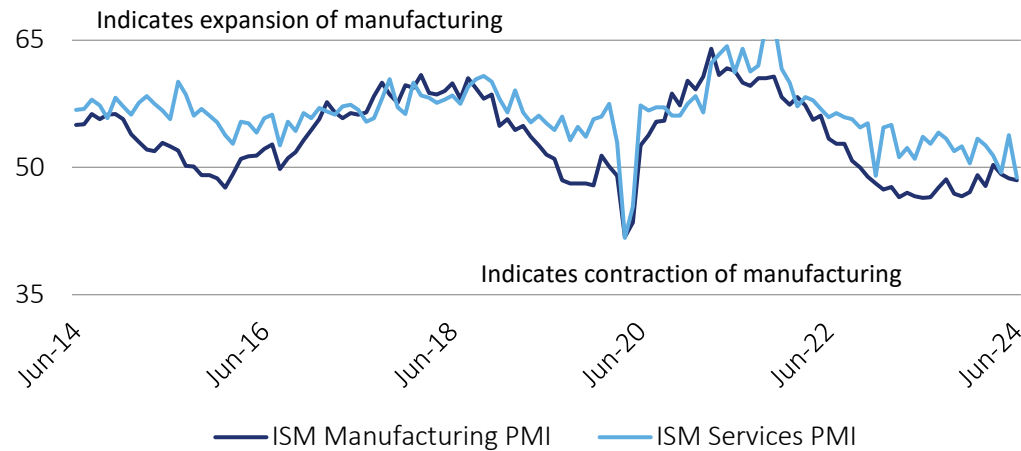
Average Hourly Earnings



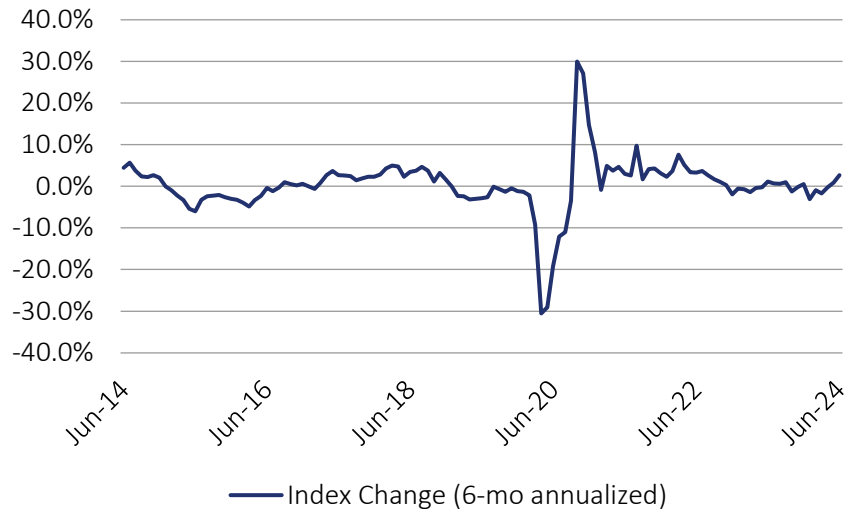
Data Source: Bloomberg

Business Activity

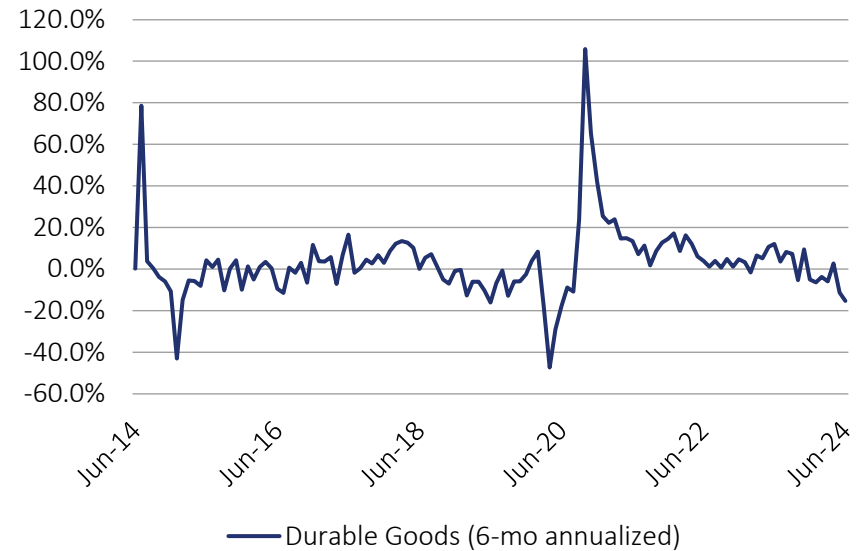
ISM Report on Business



Industrial Production Index



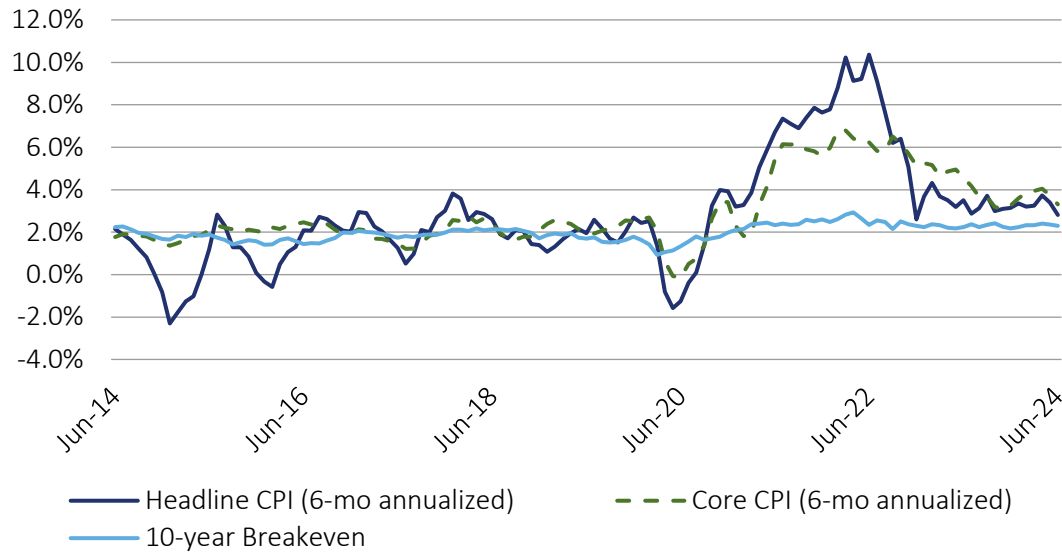
Durable Goods New Orders



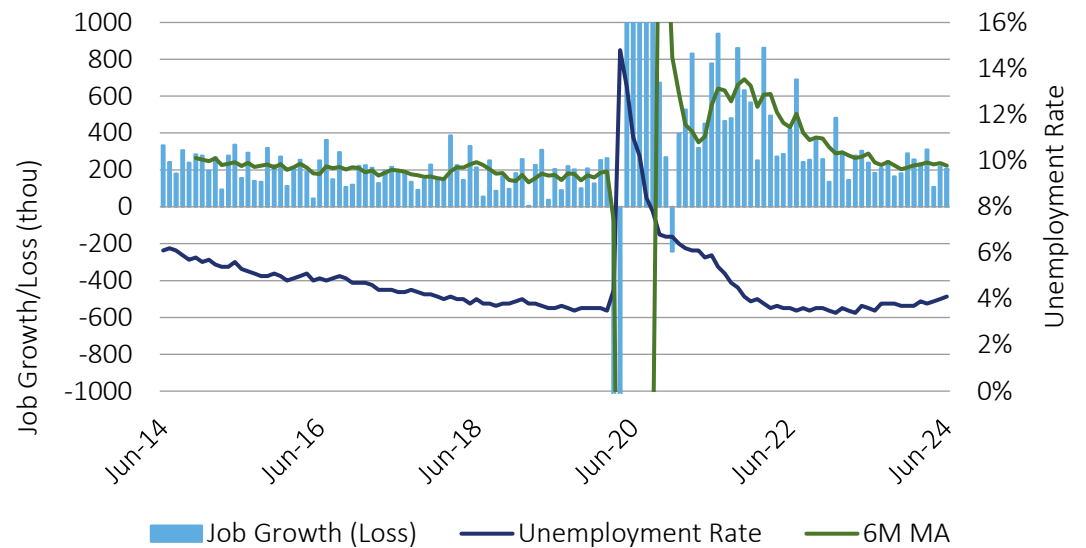
Data Source: Bloomberg

Inflation and Employment

Inflation: Actual & Expected



Employment Gains/Losses

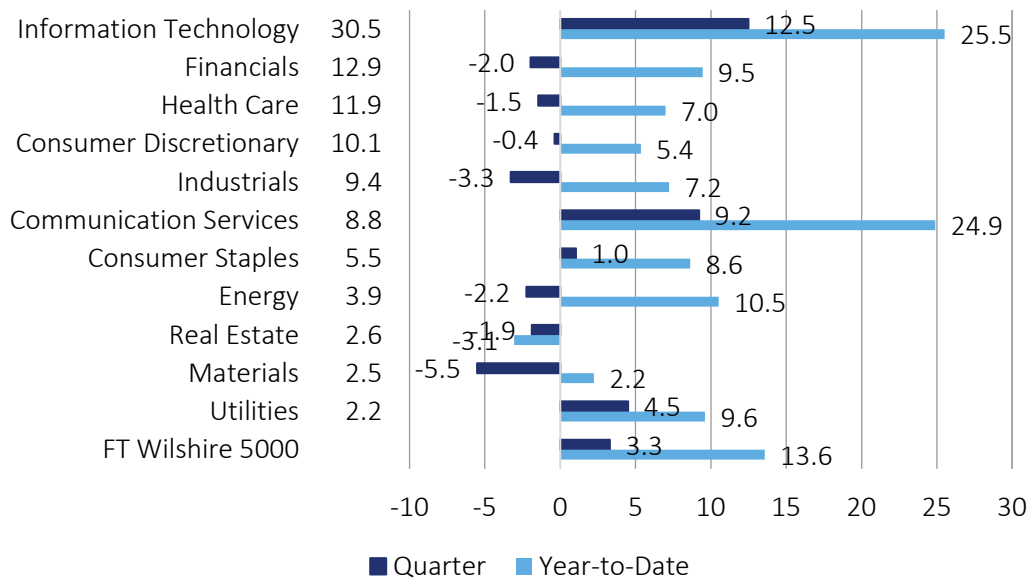


Data Source: Bloomberg

U.S. Equity Market

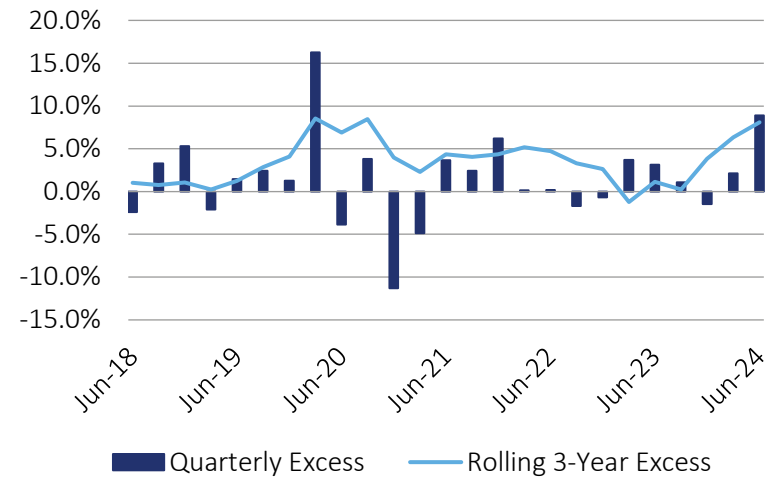
As of 6/30/2024	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
FT Wilshire 5000	3.3	13.6	23.2	8.4	14.4	12.4
FT Wilshire U.S. Large Cap	4.4	15.1	24.8	9.6	15.2	12.9
FT Wilshire U.S. Small Cap	-4.1	3.5	12.6	1.4	8.9	8.4
FT Wilshire U.S. Large Growth	9.7	22.7	35.8	11.4	19.5	n/a
FT Wilshire U.S. Large Value	-0.8	7.7	14.3	7.3	10.6	n/a
FT Wilshire U.S. Small Growth	-3.9	4.0	11.3	-1.4	8.0	n/a
FT Wilshire U.S. Small Value	-4.4	3.1	14.0	4.0	9.4	n/a
Wilshire REIT Index	-0.2	-0.3	8.6	0.3	4.0	5.9
MSCI USA Min. Vol. Index	0.8	8.5	14.6	6.2	8.3	10.7
FTSE RAFI U.S. 1000 Index	-0.8	9.1	18.6	8.2	12.9	10.6

U.S. Sector Weight and Return (%)

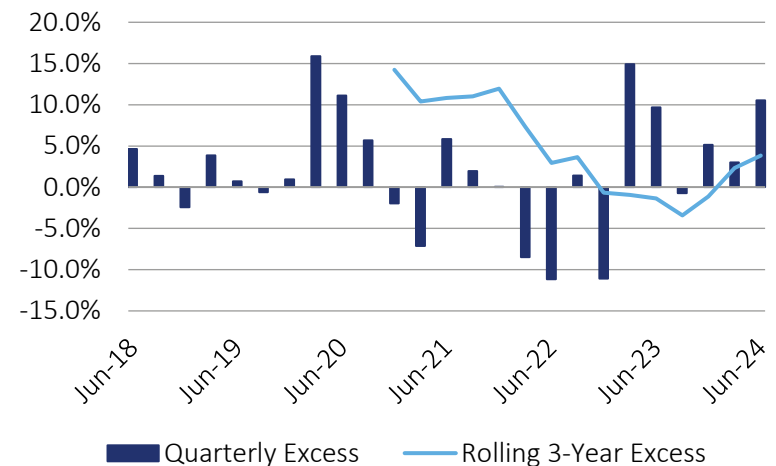


Data Sources: Bloomberg, Wilshire Atlas

Large Cap vs. Small Cap



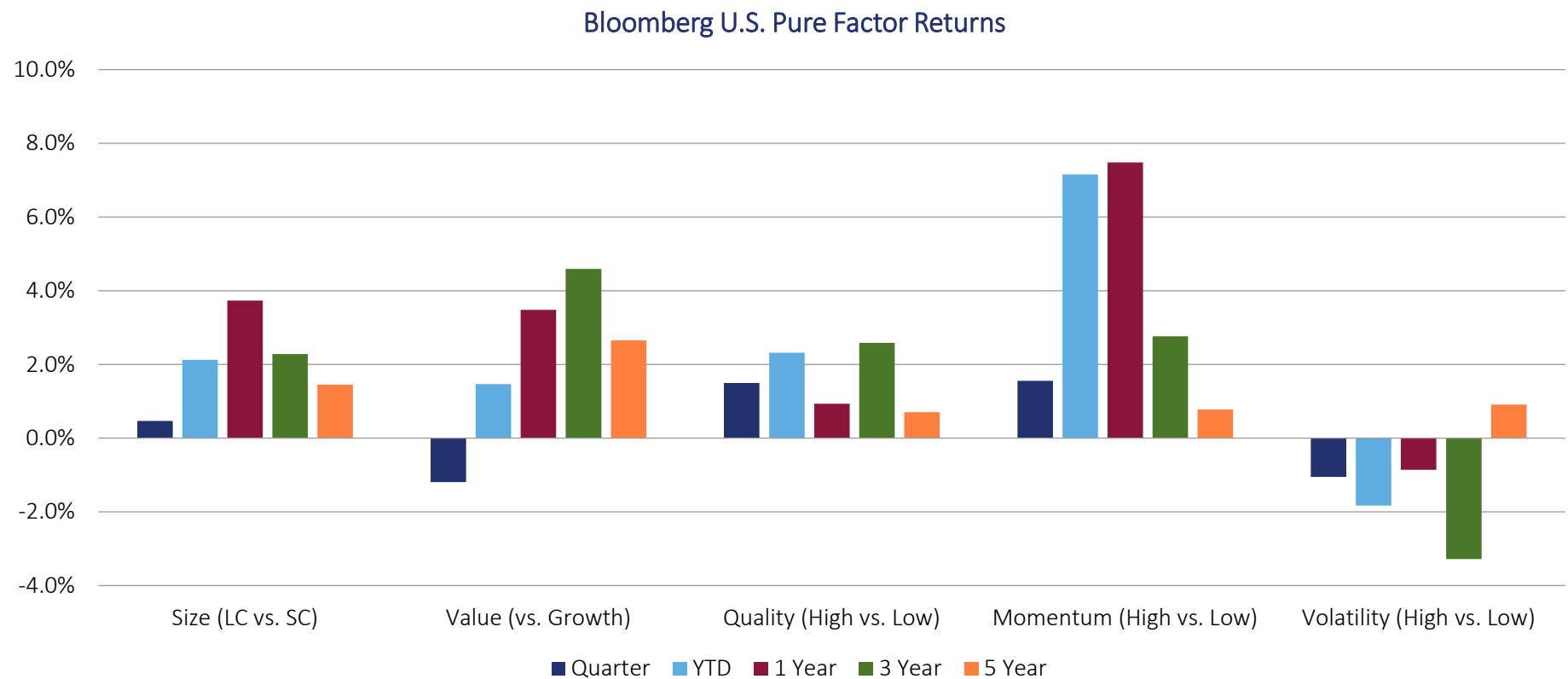
Large Growth vs. Large Value



U.S. Factor Returns

Factor returns represent the contribution from large cap, value, etc. stocks within Bloomberg's Portfolio & Risk Analytics module

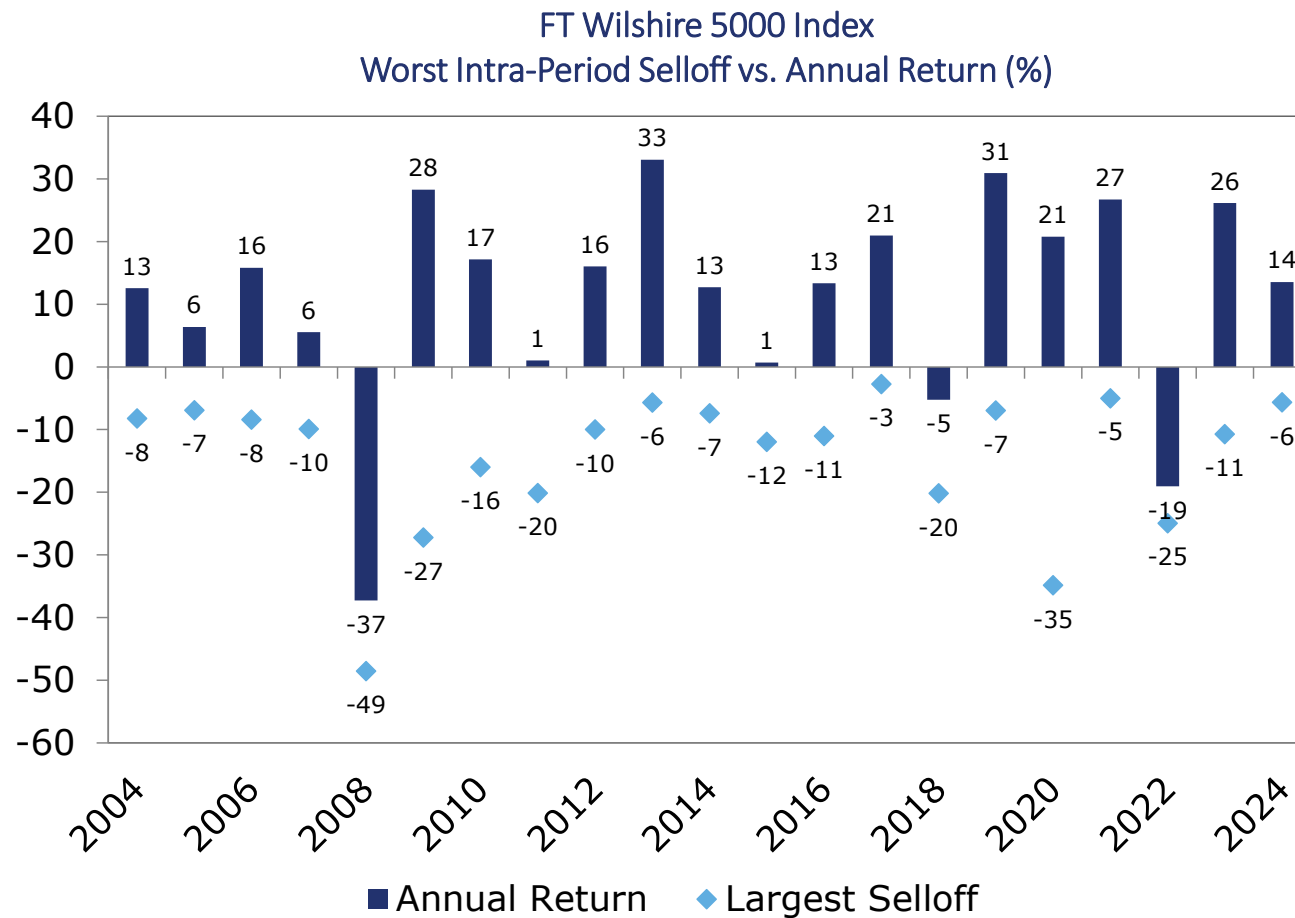
Momentum had a strong quarter while high volatility detracted



Data Source: Bloomberg

Annual Equity Market Selloffs

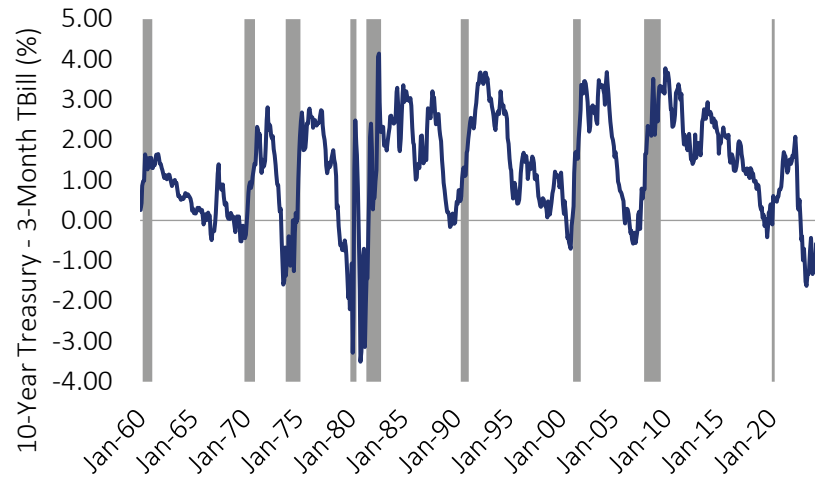
U.S. equity has been fairly tame, so far, during 2024 except for a modest sell-off in April



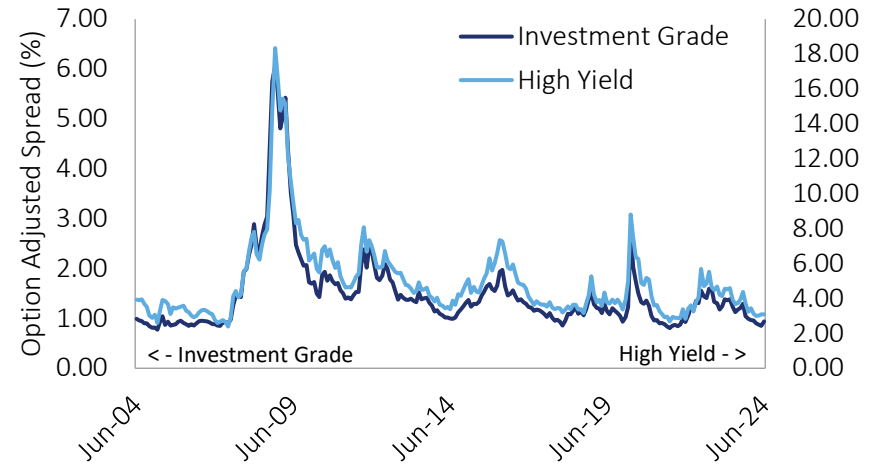
Data Sources: Wilshire Web, Bloomberg

Risk Monitor

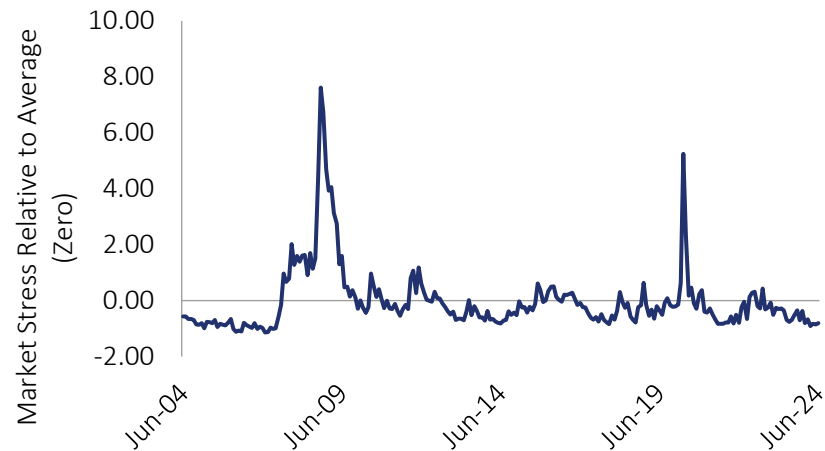
Yield Curve Slope vs Recessions (IN GRAY)



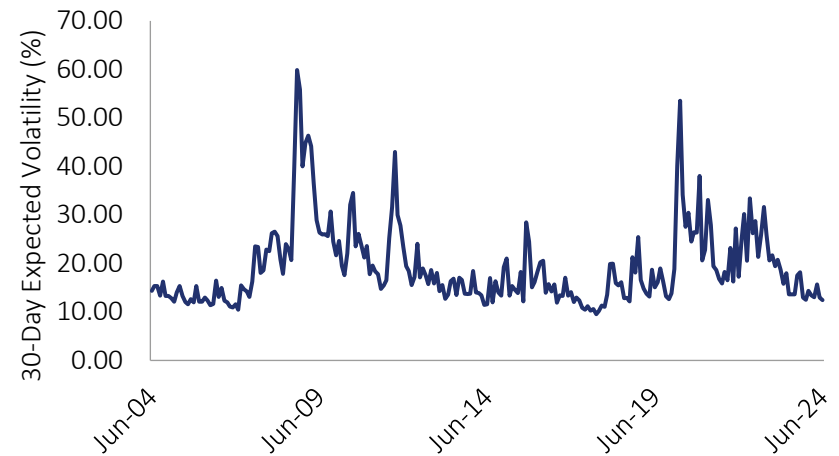
Bloomberg Credit Indexes



St. Louis Fed. Financial Stress Index



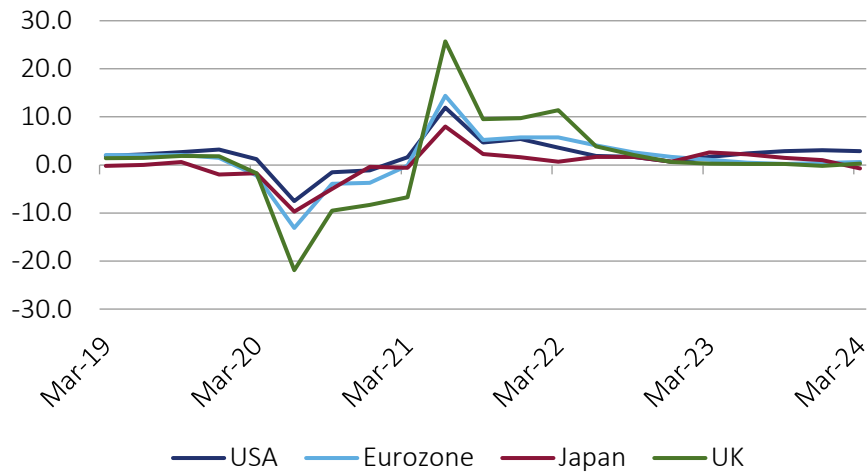
CBOE Volatility Index



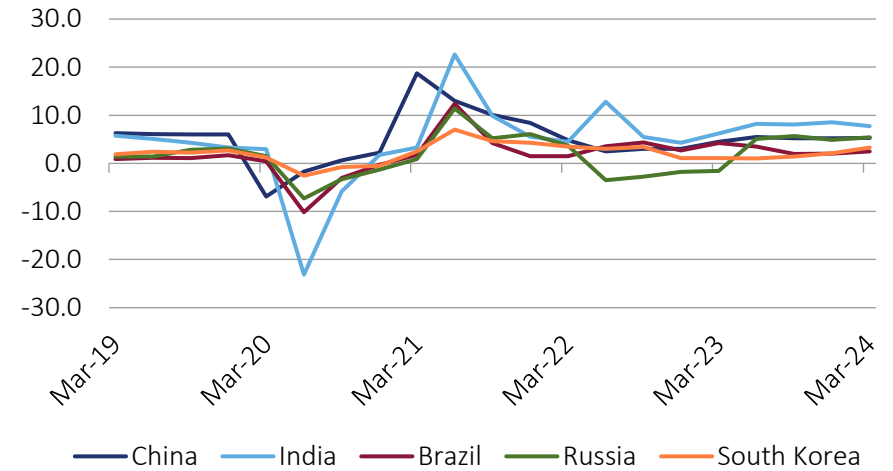
Data Source: Bloomberg

Non-U.S. Growth and Inflation

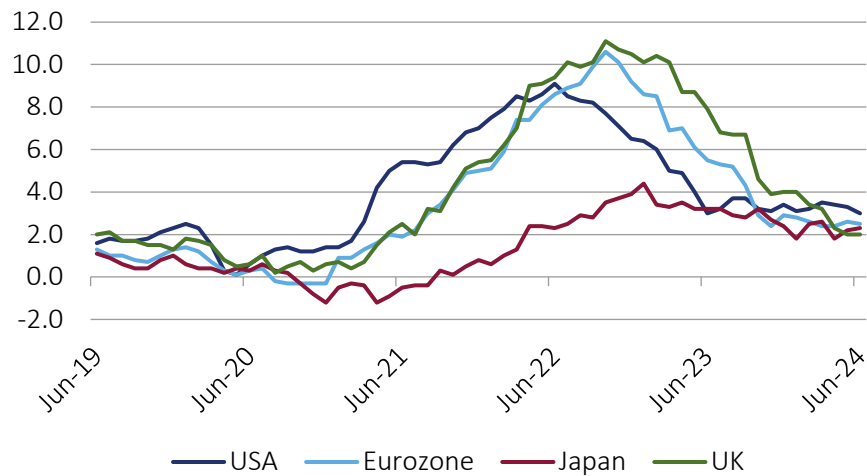
Developed Markets Real GDP Growth YoY (%)



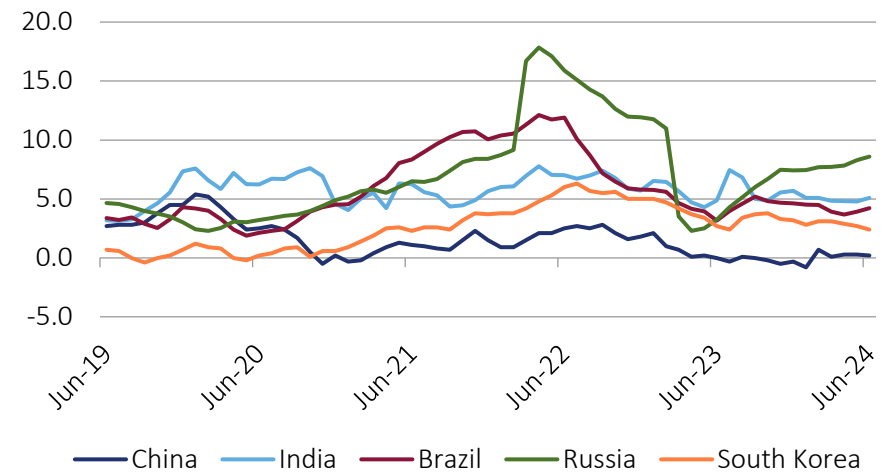
Emerging Markets Real GDP Growth YoY (%)



Developed Markets CPI Growth YoY (%)



Emerging Markets CPI Growth YoY (%)

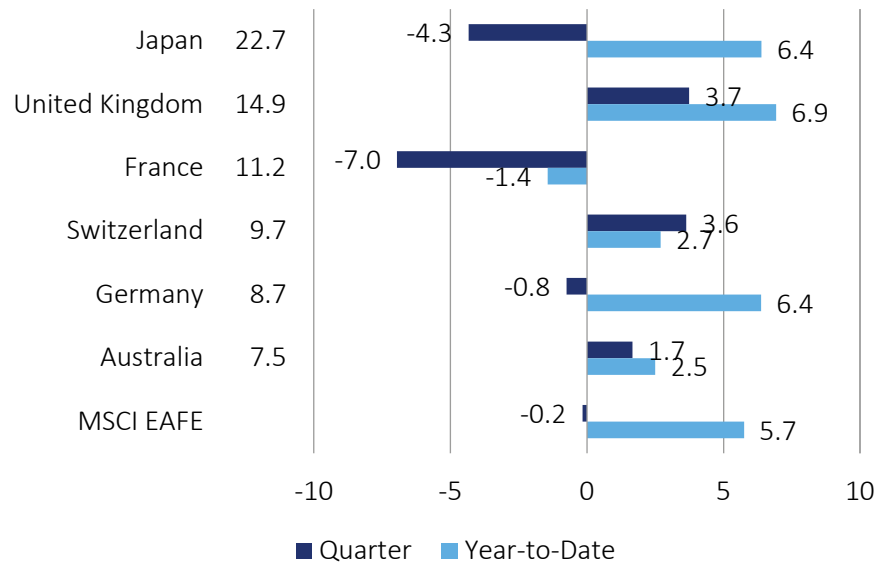


Data Source: Bloomberg

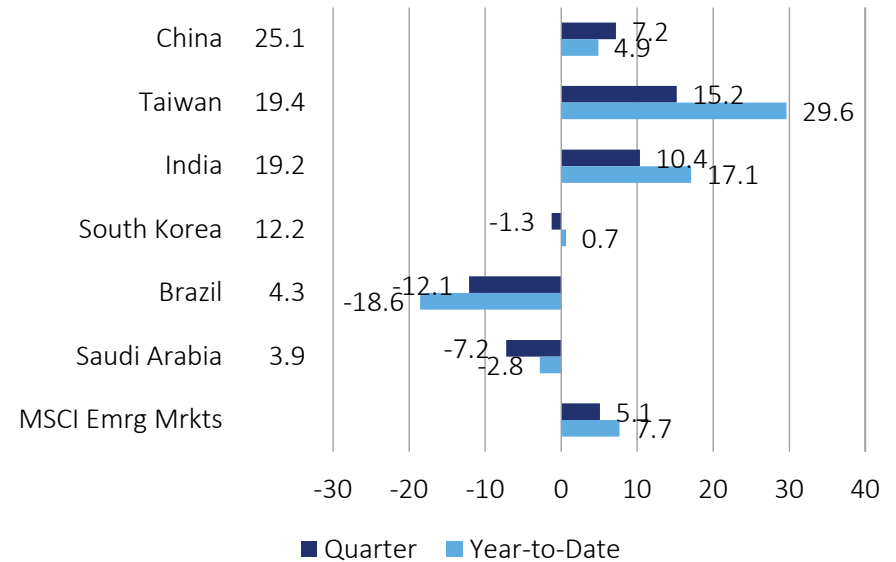
Non-U.S. Equity Market

As of 6/30/2024	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
MSCI ACWI ex-US (\$G)	1.2	6.0	12.2	1.0	6.1	4.3
MSCI EAFE (\$G)	-0.2	5.7	12.1	3.4	7.0	4.8
MSCI Emerging Markets (\$G)	5.1	7.7	13.0	-4.7	3.5	3.2
MSCI Frontier Markets (\$G)	-1.9	3.7	11.3	-0.2	-0.5	-0.5
MSCI ACWI ex-US Growth (\$G)	0.9	6.9	10.2	-2.3	5.8	5.1
MSCI ACWI ex-US Value (\$G)	1.5	5.0	14.3	4.0	6.1	3.6
MSCI ACWI ex-US Small (\$G)	0.8	3.1	11.8	-1.0	6.6	4.9
MSCI ACWI Minimum Volatility	0.5	5.4	9.7	3.2	5.3	7.4
MSCI EAFE Minimum Volatility	-0.2	2.2	6.7	0.3	2.3	4.0
FTSE RAFI Developed ex-US	-0.8	4.8	13.0	4.8	7.6	4.3
MSCI EAFE LC (G)	1.3	11.5	15.7	8.7	9.5	7.9
MSCI Emerging Markets LC (G)	6.3	11.2	16.0	-1.2	6.0	6.2

Developed Markets Weight and Return (%)



Emerging Markets Weight and Return (%)

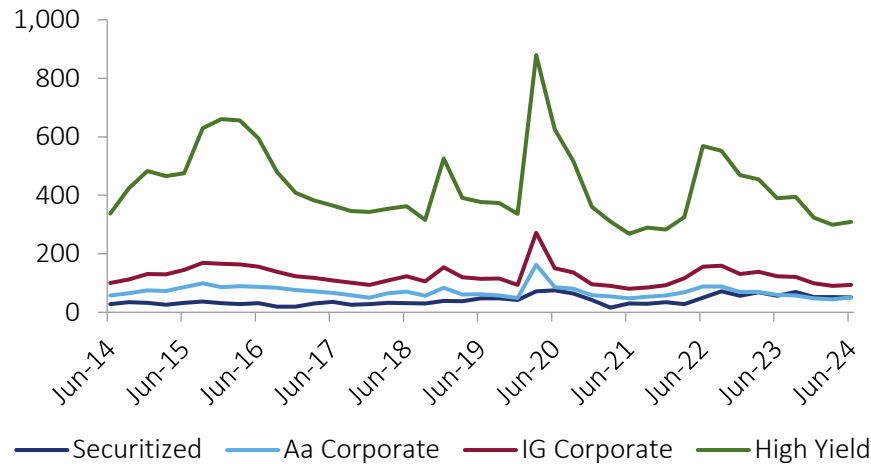


Data Source: Bloomberg

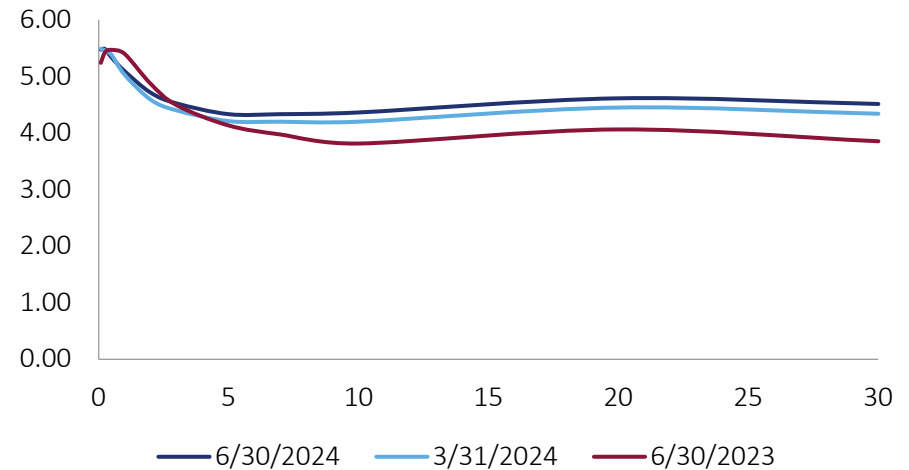
U.S. Fixed Income

As of 6/30/2024	YTW	Dur.	QTR	YTD	1 YR	3 YR	5 YR	10 YR
Bloomberg Aggregate	5.0	6.1	0.1	-0.7	2.6	-3.0	-0.2	1.3
Bloomberg Treasury	4.6	5.9	0.1	-0.9	1.5	-3.3	-0.7	0.9
Bloomberg Gov't-Rel.	5.1	5.2	0.3	-0.1	3.3	-2.1	0.2	1.5
Bloomberg Securitized	5.2	5.9	0.1	-0.8	2.4	-2.8	-0.6	1.0
Bloomberg Corporate	5.5	6.9	-0.1	-0.5	4.6	-3.0	0.6	2.3
Bloomberg LT Gov't/Credit	5.2	13.8	-1.7	-4.1	-1.6	-8.5	-2.2	1.6
Bloomberg LT Treasury	4.6	15.1	-1.8	-5.0	-5.6	-10.5	-4.3	0.6
Bloomberg LT Gov't-Rel.	5.7	11.5	-1.1	-2.5	0.7	-6.0	-1.4	2.0
Bloomberg LT Corporate	5.7	12.7	-1.7	-3.4	2.2	-6.9	-0.8	2.5
Bloomberg U.S. TIPS*	4.4	7.2	0.8	0.7	2.7	-1.3	2.1	1.9
Bloomberg High Yield	7.9	3.1	1.1	2.6	10.4	1.6	3.9	4.3
S&P/LSTA Leveraged Loan	9.2	0.3	1.9	4.4	11.1	6.1	5.5	4.6
Treasury Bills	5.3	0.3	1.3	2.6	5.5	3.0	2.2	1.5

Fixed Income Option Adjusted Spread (bps)



Treasury Yield Curve (%)



*Yield and Duration statistics are for a proxy index based on similar maturity, the Bloomberg Barclays U.S. Treasury 7-10 Year Index.

Data Source: Bloomberg

Federal Reserve

The Federal Open Market Committee has left their overnight rate unchanged since July of 2023

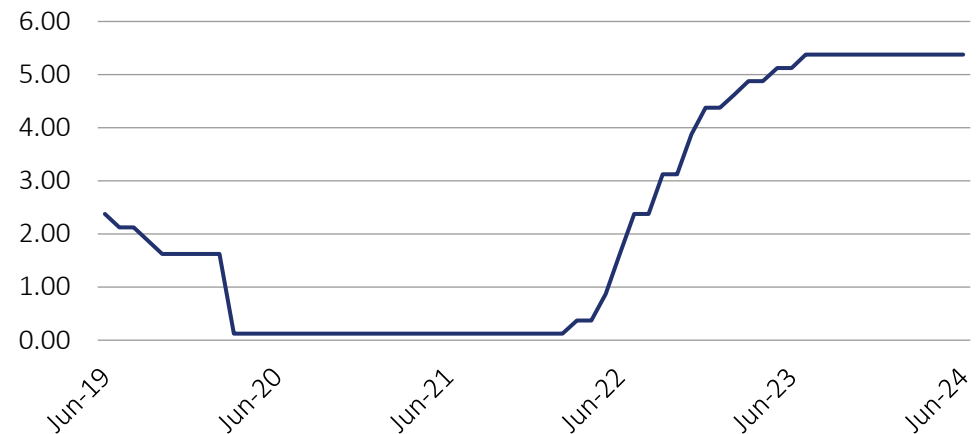
QE4 was larger than the 3 phases of quantitative easing – combined – following the global financial crisis

The Fed's balance sheet has begun to shrink again during the past year

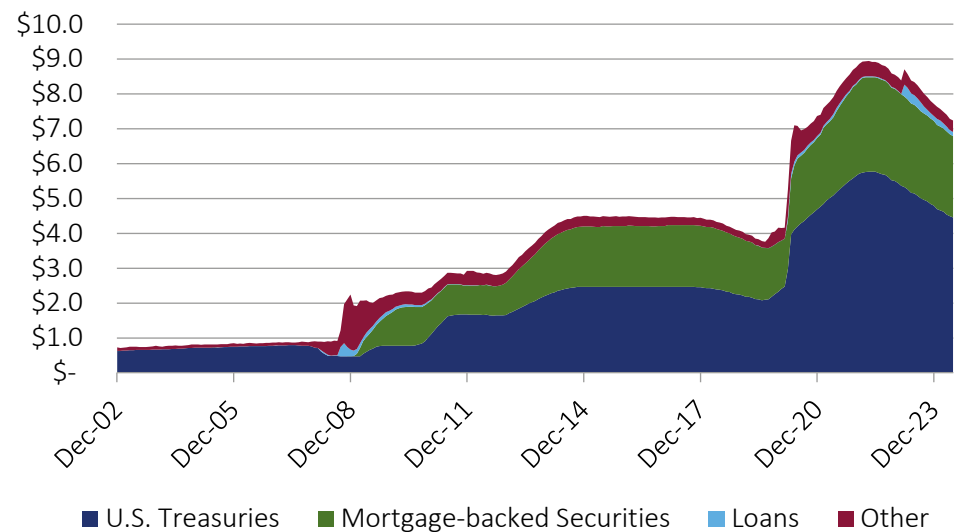
	Announced	Closed	Amount (bil)
QE1	11/25/2008	3/31/2010	\$1,403
QE2	11/3/2010	6/29/2012	\$568
QE3	9/13/2012	10/29/2014	\$1,674
QE4	3/23/2020	3/15/2022	\$4,779

Data Source: Bloomberg

Federal Funds Rate (Mid %)



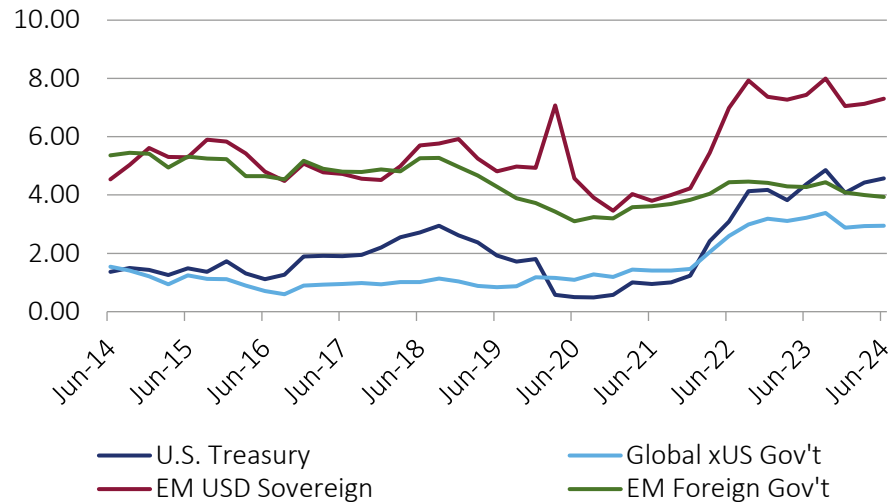
Federal Reserve Balance Sheet (\$T)



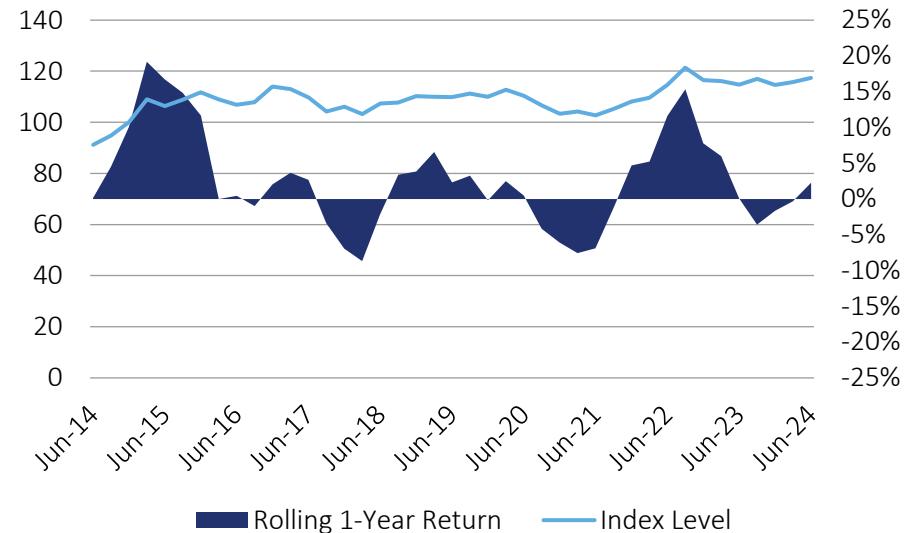
Non-U.S. Fixed Income

As of 6/30/2024	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
Developed Markets						
Bloomberg Global Aggregate xUS	-2.1	-5.3	-0.7	-7.5	-3.6	-1.9
Bloomberg Global Aggregate xUS*	0.1	0.7	5.3	-0.5	0.5	2.5
Bloomberg Global Inflation Linked xUS	-2.2	-5.4	-1.6	-9.7	-3.7	-1.5
Bloomberg Global Inflation Linked xUS*	-1.4	-2.3	1.4	-4.9	-1.5	2.5
Emerging Markets (Hard Currency)						
Bloomberg EM USD Aggregate	0.7	2.2	8.0	-2.2	0.5	2.5
Emerging Markets (Foreign Currency)						
Bloomberg EM Local Currency Gov't	-0.2	-1.2	3.8	-1.3	0.7	0.5
Bloomberg EM Local Currency Gov't*	1.8	3.7	8.0	3.0	2.9	3.1
Euro vs. Dollar	-0.7	-3.0	-1.8	-3.3	-1.2	-2.4
Yen vs. Dollar	-5.9	-12.3	-10.3	-11.6	-7.7	-4.5
Pound vs. Dollar	0.2	-0.7	-0.5	-2.9	-0.1	-3.0

Global Fixed Income Yield to Worst (%)



U.S. Dollar Index: Advanced Economies

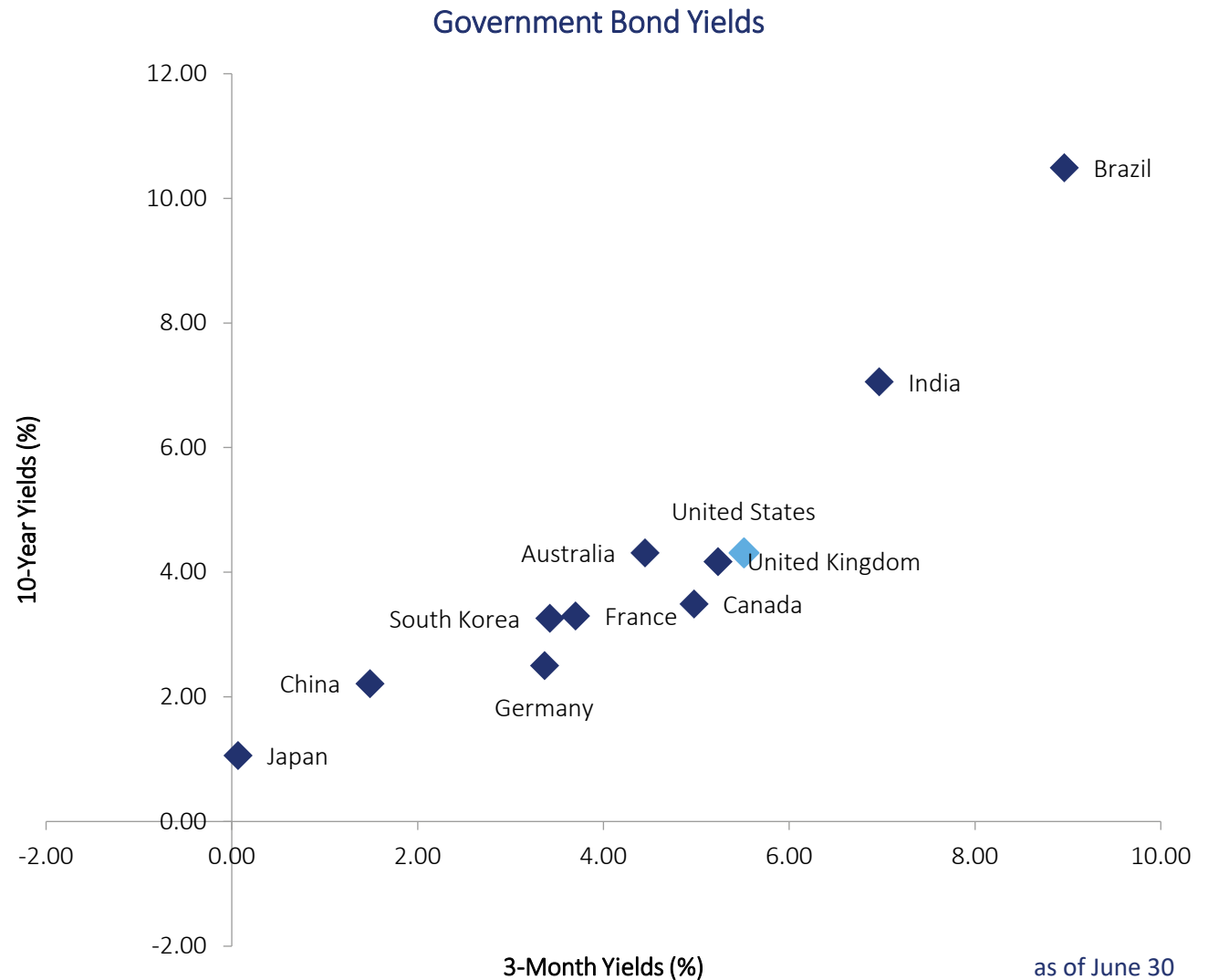


*Returns are reported in terms of local market investors, which removes currency effects.

Data Source: Bloomberg

Global Interest Rates

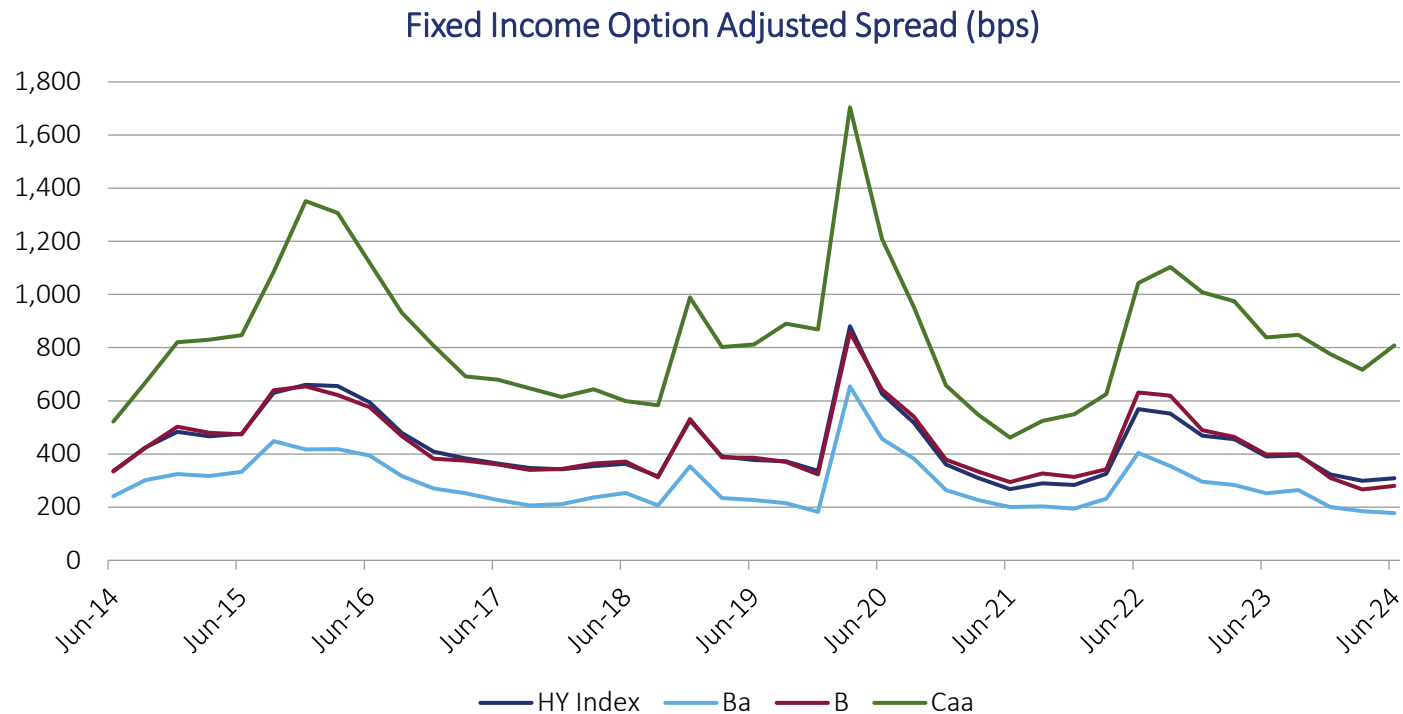
Short-term rates have turned positive in most larger countries; longer-term rates near 4.0% in the U.K. and Australia



Data Source: Bloomberg

High Yield Bond Market

As of 6/30/2024	Weight	YTW	QTR	YTD	1 YR	3 YR	5 YR	10 YR
Bloomberg High Yield		7.9	1.1	2.6	10.4	1.6	3.9	4.3
S&P LSTA Leveraged Loan		9.2	2.1	4.1	10.8	5.9	5.2	4.2
High Yield Quality Distribution								
Ba U.S. High Yield	50.6%	6.6	1.3	2.5	9.6	1.3	4.2	4.7
B U.S. High Yield	36.6%	7.7	1.0	2.4	10.5	2.0	3.6	4.0
Caa U.S. High Yield	11.3%	12.8	0.0	2.1	11.9	1.2	3.0	3.6
Ca to D U.S. High Yield	1.5%	22.0	4.7	18.5	28.3	2.6	4.3	-2.1

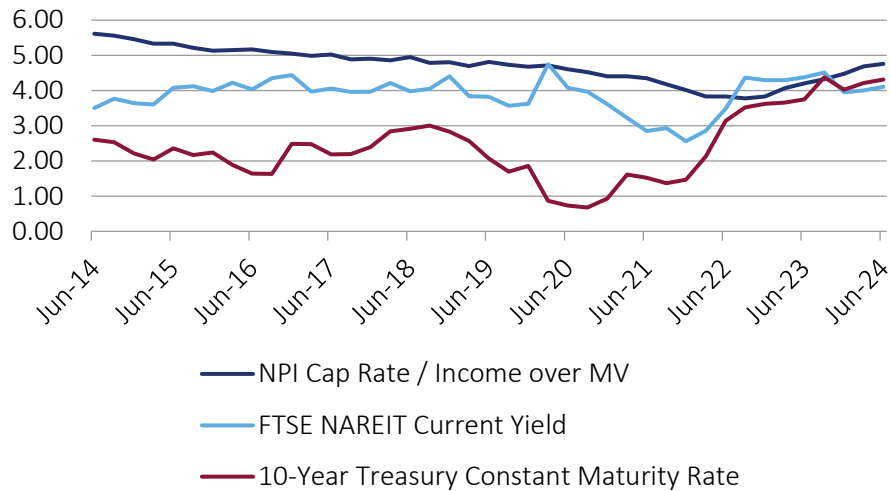


Data Source: Bloomberg

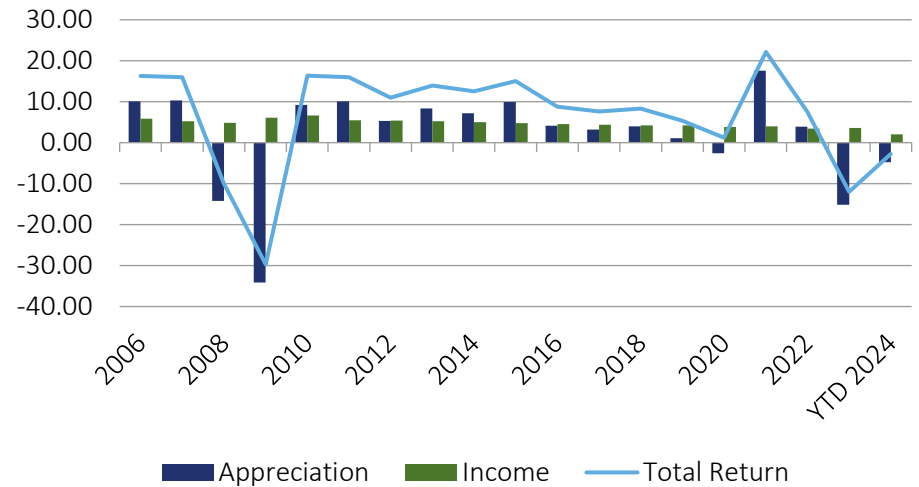
Real Assets

As of 6/30/2024	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
Bloomberg U.S. TIPS	0.8	0.7	2.7	-1.3	2.1	1.9
Bloomberg Commodity Index	2.9	5.1	5.0	5.7	7.2	-1.3
Bloomberg Gold Index	4.9	12.7	20.6	9.1	9.4	5.0
Wilshire Global RESI Index	-1.2	-1.3	8.7	-1.1	2.1	4.3
NCREIF ODCE Fund Index	-0.4	-2.8	-9.3	1.9	3.2	6.4
NCREIF Timberland Index	1.7	3.9	9.9	11.0	7.2	5.9
FTSE Global Core Infrastructure 50/50	1.0	2.8	5.3	3.0	3.9	5.6
Alerian Midstream Energy	5.4	16.1	26.7	16.5	11.3	3.7
Bitcoin	-12.6	45.6	103.7	21.4	40.3	57.8

Real Estate Valuation (%)



NCREIF ODCE Fund Index Return (%)



Data Sources: Bloomberg, National Council of Real Estate Investment Fiduciaries

Policy Definitions

Historical Hybrid Composition

Total Fund Policy Benchmark

Periods Ended June 30, 2024

Policy Index	Weight (%)
Apr-2024	
Russell 3000 Index	21.03
Blmbg. U.S. Aggregate Index	25.54
MSCI AC World ex USA (Net)	13.02
Global Smart Beta Policy Index	5.01
Private Equity Policy Index	18.34
90 Day U.S. Treasury Bill	1.00
Private Credit Policy Index	5.70
Private Real Assets Policy Index	7.35
Public Credit Policy Index	3.01
Jan-2024	
Russell 3000 Index	20.97
Blmbg. U.S. Aggregate Index	25.47
MSCI AC World ex USA (Net)	12.98
Global Smart Beta Policy Index	4.99
Private Equity Policy Index	18.58
90 Day U.S. Treasury Bill	1.00
Private Credit Policy Index	5.65
Private Real Assets Policy Index	7.36
Public Credit Policy Index	3.00

Policy Index	Weight (%)
Oct-2023	
Russell 3000 Index	20.41
Blmbg. U.S. Aggregate Index	24.79
MSCI AC World ex USA (Net)	12.64
Global Smart Beta Policy Index	4.86
Private Equity Policy Index	19.71
90 Day U.S. Treasury Bill	0.97
Private Credit Policy Index	5.69
Private Real Assets Policy Index	8.01
Public Credit Policy Index	2.92
Jul-2023	
Russell 3000 Index	20.75
Blmbg. U.S. Aggregate Index	21.74
MSCI AC World ex USA (Net)	16.30
Global Smart Beta Policy Index	4.94
Private Equity Policy Index	19.12
90 Day U.S. Treasury Bill	0.99
Private Credit Policy Index	5.30
Private Real Assets Policy Index	7.90
Public Credit Policy Index	2.96

Historical Hybrid Composition

Total Fund Policy Benchmark

Periods Ended June 30, 2024

Policy Index Weight (%)

Apr-2023

Russell 3000 Index	20.42
Blmbg. U.S. Universal Index	22.36
MSCI AC World ex USA (Net)	16.04
Global Smart Beta Policy Index	4.86
Private Equity Policy Index	19.22
90 Day U.S. Treasury Bill	0.97
Private Credit Policy Index	4.86
Private Real Assets Policy Index	8.35
Public Credit Policy Index	2.92

Jan-2023

Russell 3000 Index	20.16
Blmbg. U.S. Universal Index	22.09
MSCI AC World ex USA (Net)	15.84
Global Smart Beta Policy Index	4.80
Private Equity Policy Index	19.81
90 Day U.S. Treasury Bill	0.96
Private Credit Policy Index	4.69
Private Real Assets Policy Index	8.77
Public Credit Policy Index	2.88

Policy Index Weight (%)

Oct-2022

Russell 3000 Index	19.68
Blmbg. U.S. Universal Index	21.56
MSCI AC World ex USA (Net)	15.46
Global Smart Beta Policy Index	4.69
Private Equity Policy Index	20.78
90 Day U.S. Treasury Bill	0.94
Private Credit Policy Index	4.66
Private Real Assets Policy Index	9.42
Public Credit Policy Index	2.81

Jul-2022

Russell 3000 Index	19.35
Blmbg. U.S. Universal Index	21.54
MSCI AC World ex USA (Net)	15.39
Global Smart Beta Policy Index	5.28
Private Equity Policy Index	21.03
90 Day U.S. Treasury Bill	0.88
Private Credit Policy Index	4.15
Private Real Assets Policy Index	8.86
Public Credit Policy Index	3.52

Historical Hybrid Composition

Total Fund Policy Benchmark

Periods Ended June 30, 2024

Policy Index	Weight (%)
Apr-2022	
Russell 3000 Index	20.17
Blmbg. U.S. Universal Index	23.84
MSCI AC World ex USA (Net)	16.04
Global Smart Beta Policy Index	5.50
Private Equity Policy Index	19.65
90 Day U.S. Treasury Bill	0.92
Private Credit Policy Index	3.39
Private Real Assets Policy Index	6.82
Public Credit Policy Index	3.67
Jan-2022	
Wilshire 5000 Total Market Index	20.77
Blmbg. U.S. Universal Index	24.55
MSCI AC World ex USA (Net)	16.52
Global Smart Beta Policy Index	5.67
Private Equity Policy Index	18.60
90 Day U.S. Treasury Bill	0.94
Private Credit Policy Index	3.04
Private Real Assets Policy Index	6.13
Public Credit Policy Index	3.78

Policy Index	Weight (%)
Oct-2021	
Wilshire 5000 Total Market Index	20.84
Blmbg. U.S. Universal Index	24.63
MSCI AC World ex USA (Net)	16.58
Global Smart Beta Policy Index	5.68
Private Equity Policy Index	18.90
90 Day U.S. Treasury Bill	0.95
Private Credit Policy Index	2.91
Private Real Assets Policy Index	5.72
Public Credit Policy Index	3.79
Jul-2021	
Wilshire 5000 Total Market Index	21.37
Blmbg. U.S. Universal Index	25.25
MSCI AC World ex USA (Net)	17.00
Global Smart Beta Policy Index	5.83
Private Equity Policy Index	17.51
90 Day U.S. Treasury Bill	0.97
Private Credit Policy Index	2.68
Private Real Assets Policy Index	5.51
Public Credit Policy Index	3.88

Historical Hybrid Composition

Total Fund Policy Benchmark

Periods Ended June 30, 2024

Policy Index	Weight (%)
Apr-2021	
Wilshire 5000 Total Market Index	21.63
Blmbg. U.S. Universal Index	25.56
MSCI AC World ex USA (Net)	17.21
Global Smart Beta Policy Index	5.90
Private Equity Policy Index	16.74
90 Day U.S. Treasury Bill	0.98
Private Credit Policy Index	2.75
Private Real Assets Policy Index	5.30
Public Credit Policy Index	3.93
Jan-2021	
Wilshire 5000 Total Market Index	21.94
Blmbg. U.S. Universal Index	25.93
MSCI AC World ex USA (Net)	17.45
Global Smart Beta Policy Index	5.98
Private Equity Policy Index	15.49
90 Day U.S. Treasury Bill	1.00
Private Credit Policy Index	2.86
Private Real Assets Policy Index	5.36
Public Credit Policy Index	3.99

Policy Index	Weight (%)
Oct-2020	
Wilshire 5000 Total Market Index	21.78
Blmbg. U.S. Universal Index	25.74
MSCI AC World ex USA (Net)	17.32
Global Smart Beta Policy Index	5.94
Private Equity Policy Index	15.37
90 Day U.S. Treasury Bill	0.99
Private Credit Policy Index	3.04
Private Real Assets Policy Index	5.86
Public Credit Policy Index	3.96
Jul-2020	
Wilshire 5000 Total Market Index	21.38
Blmbg. U.S. Universal Index	27.22
MSCI AC World ex USA (Net)	17.01
Global Smart Beta Policy Index	5.83
Private Equity Policy Index	14.44
90 Day U.S. Treasury Bill	0.97
Private Credit Policy Index	3.15
Private Real Assets Policy Index	6.11
Public Credit Policy Index	3.89
Apr-1979	
Total Fund Policy Benchmark	100.00

* Policy weights prior to July 2020 available on following page

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Wilshire

Iowa Public Employees' Retirement System

Annual Asset Allocation Review

September 2024

Contents

Background & Overview

Asset Allocation Approach

Asset Allocation Inputs

Asset Liability Projections

Observations & Recommendations

Appendix

Background & Overview

History of Asset Allocation Decisions – Last 6 Years*

➤ 2019

1. Eliminate 7% allocation to public real assets (REITS, MLPs and TIPS)
2. International equities +2.5%, Global Smart Beta +3%
3. Core-plus Bond +1%, Public Credit +0.5%

➤ 2020

1. Core-plus Bond -8%
2. Private equity from +2%, Private credit +5%, Private real assets from +1%

➤ 2022

1. Core-plus Bond -1%, Public Credit -1%, All public equity allocations -1%
2. Private equity +4%, Private real assets +1%

➤ 2023

1. Core-plus Bond +3.5%,
2. International equity -3.5%

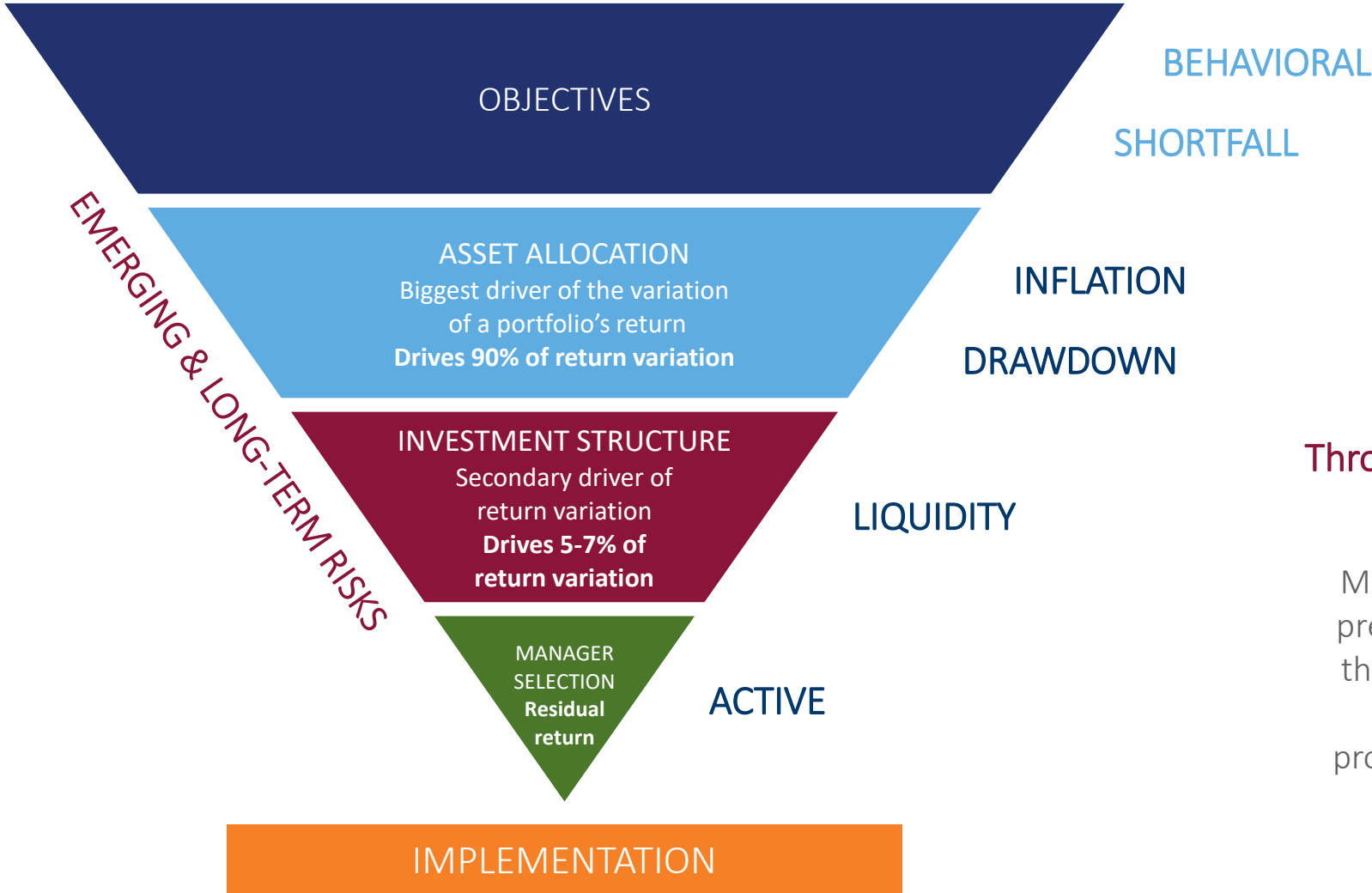
*No Changes made to asset allocation in 2017, 2018, and 2021

Overview

- IPERS has liability discount rate assumption of 7.0% over the long term
- Analysis utilizes long term horizon asset class return expectations
- Evaluate potential opportunities to reduce the absolute and drawdown risk of the portfolio while meeting return objectives

Asset Allocation Approach

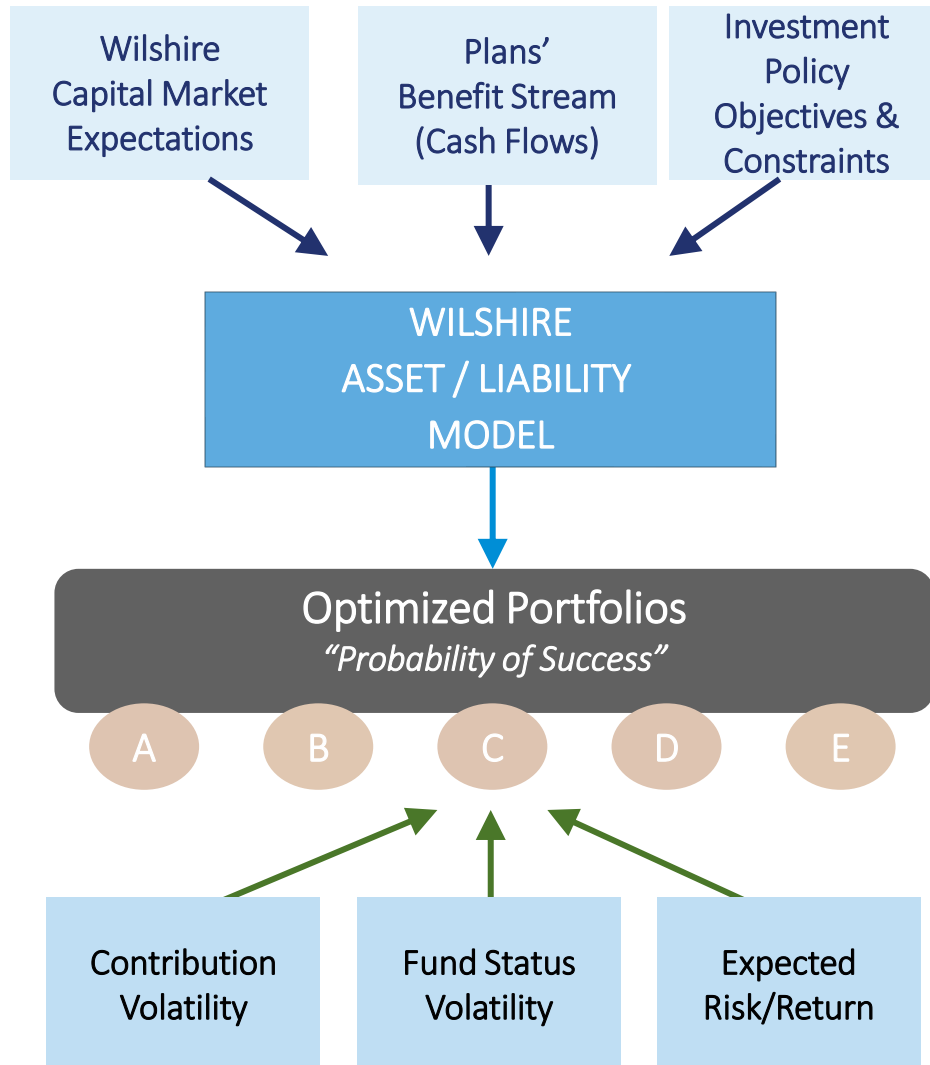
Focus on Decisions That are Most Impactful



Address Key Risks Throughout the Investment Process

Many of the six key risks are present at multiple points in the investment process, but each distinct step in the process is focused on one or two primary risks.

Asset Allocation Process



- The mission of a defined benefit plan is to fund benefits promised to participants
- The role of asset allocation is to manage risk in order to fulfill that core mission
 - **Maximize safety** of promised benefits
 - **Minimize cost** of funding these benefits
- Wilshire's Asset Liability Model provides methodology for selecting a target portfolio that considers both goals
- Rigorously developed capital market assumptions for risk and return (see appendix)
- Given that short-term volatility is also important, we identify the impact of the asset allocation decision on funded ratios, annual contribution requirements, and other metrics
- Strategic asset allocation is not a guide to outperforming in every market ... but it should provide a roadmap for success over a market cycle

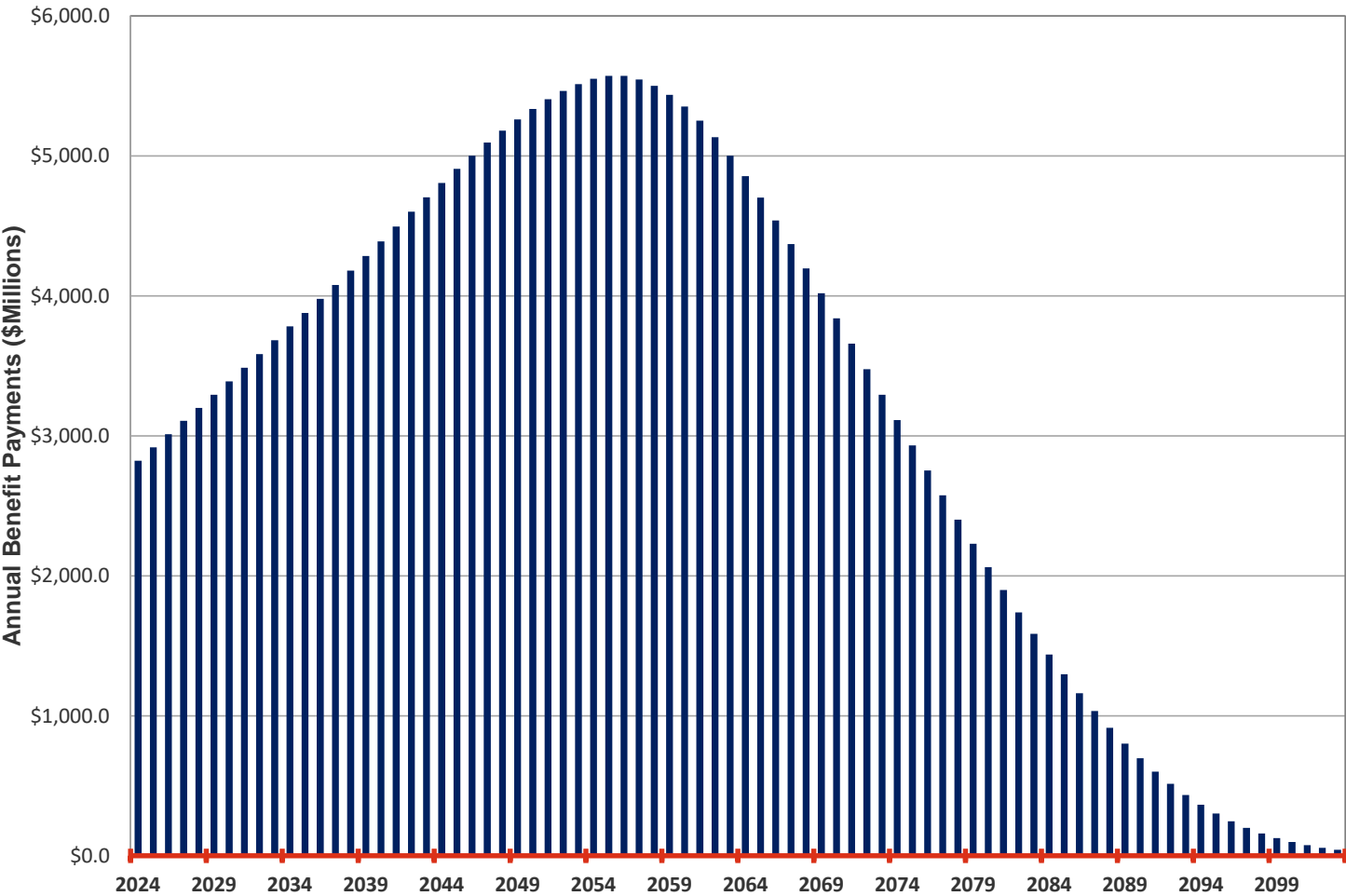
Asset Allocation Inputs

Plan Status

\$ - Billion	June 30, 2023	June 30, 2024
Asset and Liability Data		
1. Actuarial Accrued Liability (AAL)	45.3	47.2
<u>2. Market Value of Assets (MVA)</u>	<u>41.1</u>	<u>43.6</u>
3. AAL MVA Funded Status (Unfunded Liability) (1. - 2.)	4.2	3.6
<u>4. AAL MVA Funded Ratio (2. / 1.)</u>	<u>90.7%</u>	<u>92.4%</u>
5. Actuarial Value of Assets (AVA)	41.0	42.9
6. AAL AVA Funded Status (Unfunded Liability) (1. - 5.)	4.3	4.3
<u>7. AAL AVA Funded Ratio (5. / 1.)</u>	<u>90.3%</u>	<u>90.9%</u>
Economic Assumptions		
Investment Return	7.00%	7.00%

- June 30, 2023, data was provided in the actuarial valuation reports by the plan actuary.
- June 30, 2024, liability data was provided by the plan actuary. Asset data is provided and calculated by Wilshire using data from the report and additional metrics provided by the actuary.

Projected Benefit Payments

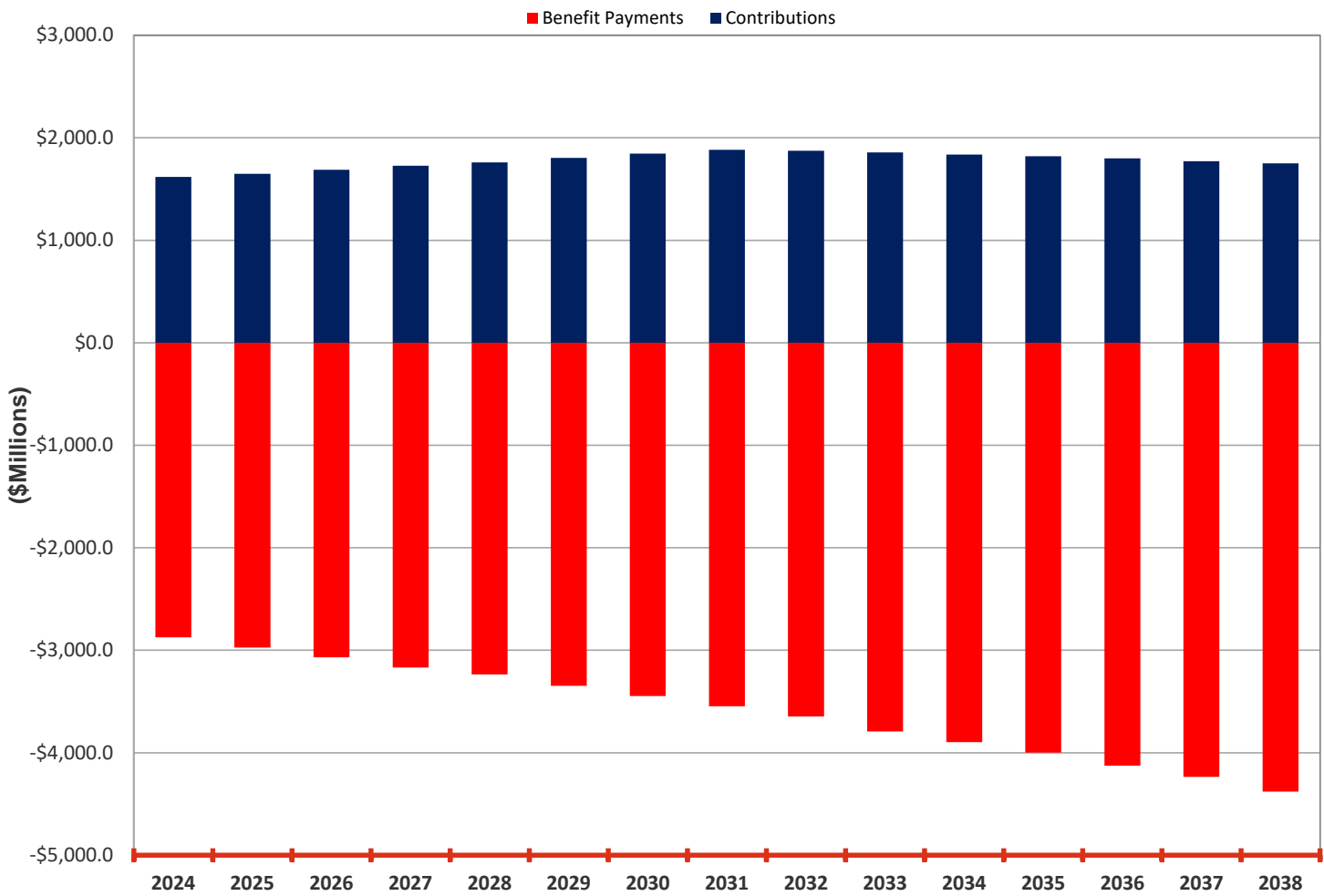


- Benefit payments provided by plan actuary.
- Closed group population, i.e., no new entrants assumed

Current cash flow needs

The peak in liquidity needs (cash flow provided by actuary) for the current membership is in 31 years, when projected annual benefit payments increase from \$2.8 billion to \$5.6 billion

Projected Cash In and Outflows



Current cash flow needs

- Annual benefit payments are projected to increase, while annual contributions are projected to decrease over the long run
- The plan will remain cash flow negative over the foreseeable future
- This does not reflect any future contribution rate changes that may occur as funding status changes

Capital Market Assumptions

Wilshire’s Capital Market Assumptions as of June 30, 2024

Wilshire’s asset class return, risk and correlation assumptions are developed on multi-year forward looking expected rates of return and historical risk and correlation, adjusted to incorporate recent trends

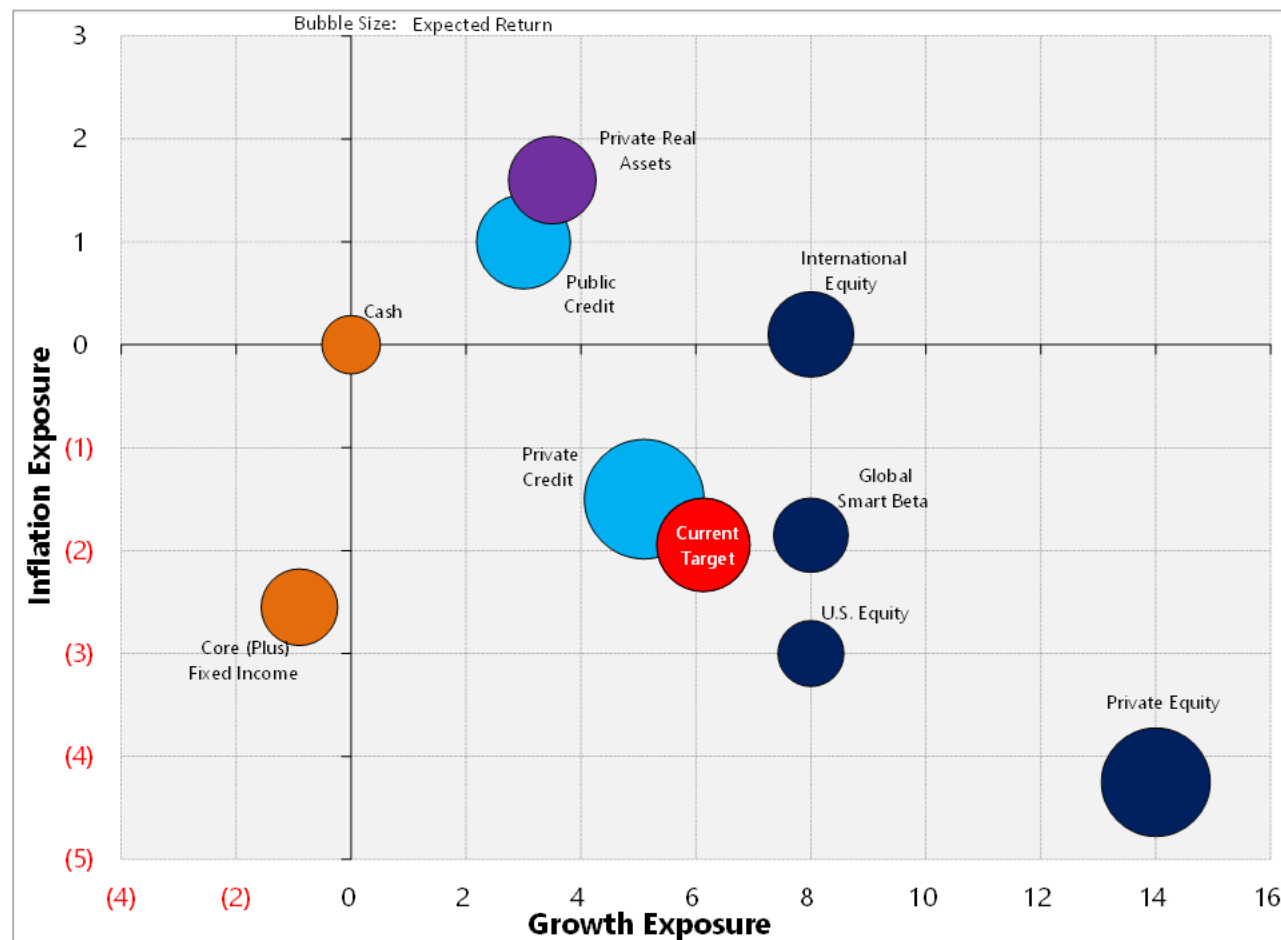
Public market return expectations represent a passive investment in the asset class (beta). They do not reflect value added from active management (alpha).

Asset Classes	Expected Return 10 Years	Expected Return 20 Years	Expected Return 30 Years	Risk	Cash Yield	Factor Exposure Growth	Factor Exposure Inflation	Liquidity Market Level	Liquidity Stressed Metric
U.S. Equity	4.50	5.35	6.20	17.00	1.35	8.00	-3.00	100	0
International Equity	5.85	6.45	7.00	19.00	2.80	8.00	0.10	85	0
Private Equity	7.45	8.25	9.05	29.65	0.00	14.00	-4.25	0	0
Global Smart Beta	5.10	5.85	6.60	17.05	1.90	8.00	-1.85	85	0
Public Credit	6.45	6.30	6.15	8.95	9.00	3.00	1.00	80	0
Private Credit	8.20	8.25	8.30	12.75	5.10	5.10	-1.50	0	0
Core (Plus) Fixed Income	5.25	5.15	5.05	4.70	5.65	-0.90	-2.55	100	85
Cash	4.00	3.80	3.65	0.75	4.00	0.00	0.00	100	100
Private Real Assets	6.00	6.30	6.60	10.80	2.90	3.50	1.60	0	0

Economic Factor Exposure – Asset Classes

Concentrated factor tilts can represent portfolio vulnerability (e.g., reliance on growth markets)

To the extent possible, a portfolio with factor neutrality is desirable for weathering unexpected future market environments



Potential Portfolios – Asset and Liability Modeling

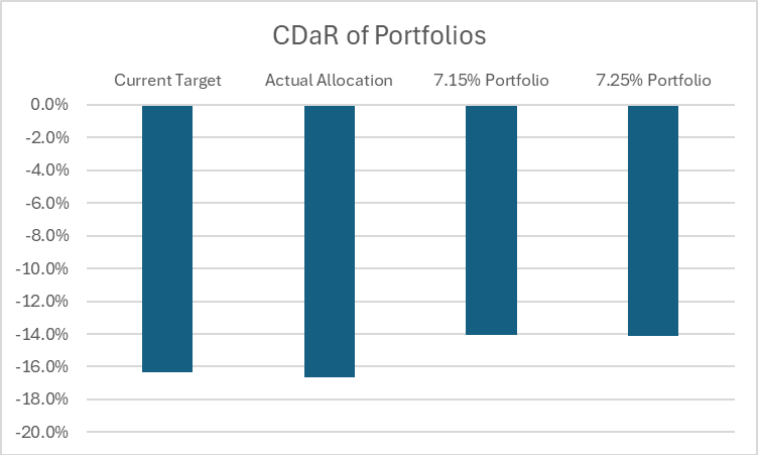
Portfolios Modeled

Asset Class	Current Target	Actual Allocation	Optimization Constraints	30 Year 7.15% Portfolio	30 Year 7.25% Portfolio
U.S. Equity	21.00%	21.40%	18% - 24% ¹	18.00%	18.00%
International Equity	13.00%	13.10%	10% - 16% ¹	10.50%	10.50%
Private Equity	17.00%	18.30%	15% - 19%	15.00%	15.75%
Global Smart Beta	<u>5.00%</u>	<u>5.10%</u>	2% - 8%	<u>4.00%</u>	<u>2.00%</u>
Total Growth Assets	56.00%	57.90%		47.50%	46.25%
Public Credit	3.00%	3.00%	1% - 5%	5.00%	5.00%
Private Credit	<u>8.00%</u>	<u>5.70%</u>	6% - 10%	<u>7.50%</u>	<u>10.00%</u>
Total Defensive Growth Assets	11.00%	8.70%		12.50%	15.00%
Core (Plus) Fixed Income	22.50%	25.10%	19.5% - 25.5%	25.50%	25.50%
Cash	<u>1.00%</u>	<u>1.00%</u>	0% - 3%	<u>3.00%</u>	<u>1.75%</u>
Total Defensive / Rate Sensitive Assets	23.50%	26.10%		28.50%	27.25%
Private Real Assets	<u>9.50%</u>	<u>7.30%</u>	7.5% - 11.5%	<u>11.50%</u>	<u>11.50%</u>
Total RA / Inflation Sensitive Assets	9.50%	7.30%		11.50%	11.50%
Total Assets	100.0%	100.0%		100.0%	100.0%
Expected Return - 10 Years (%)	6.48	6.43		6.43	6.55
Expected Return - 20 Years (%)	6.90	6.86		6.79	6.90
Expected Return - 30 Years (%)	7.33	7.29		7.15	7.25
Standard Deviation of Return (%)	12.64	12.78		11.33	11.44
+ / (-) in Expected Return - 10 Years (bps)		(5)		(5)	7
+ / (-) in Expected Return - 20 Years (bps)		(4)		(11)	0
+ / (-) in Expected Return - 30 Years (bps)		(4)		(18)	(8)
+ / (-) in SD of Return (bps)		14		(131)	(120)
Sharpe Ratio	0.20	0.19		0.21	0.22

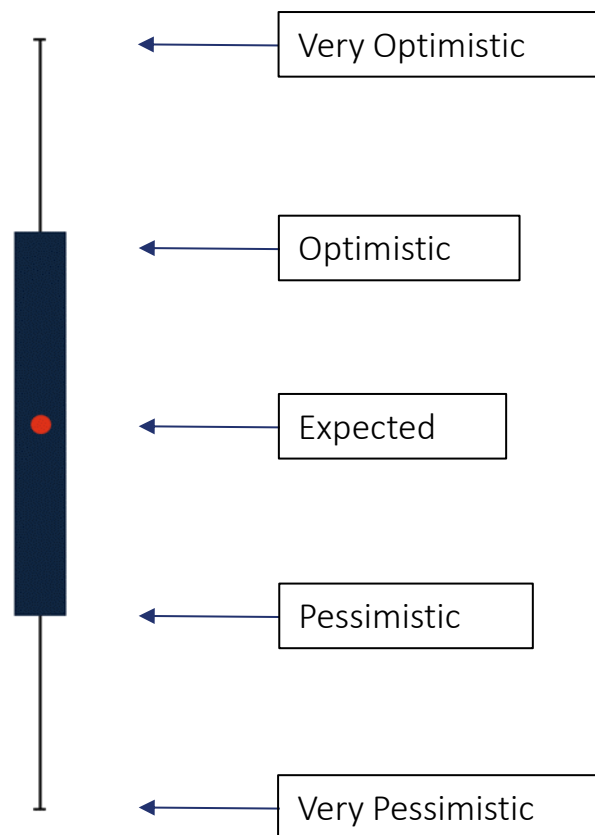
¹ U.S. Equity and International Equity are constrained to have market weight ratio. Currently at 63%/37%.

Portfolios Modeled

Asset Class	Current Target	Actual Allocation	30 Year 7.15% Portfolio	30 Year 7.25% Portfolio
Total Growth Assets	56.00%	57.90%	47.50%	46.25%
Total Defensive Growth Assets	11.00%	8.70%	12.50%	15.00%
Total Defensive / Rate Sensitive Assets	23.50%	26.10%	28.50%	27.25%
Total RA / Inflation Sensitive Assets	9.50%	7.30%	11.50%	11.50%
Total Assets	100.0%	100.0%	100.0%	100.0%
Expected Return - 10 Years (%)	6.48	6.43	6.43	6.55
Expected Return - 20 Years (%)	6.90	6.86	6.79	6.90
Expected Return - 30 Years (%)	7.33	7.29	7.15	7.25
Standard Deviation of Return (%)	12.64	12.78	11.33	11.44
Contribution to Asset Volatility (%):				
Growth	85.1	87.9	80.4	78.4
Defensive Growth	6.9	5.1	8.5	10.5
Defensive/Rate Sensitive	2.9	3.3	4.0	4.0
RA/Inflation Sensitive	5.1	3.7	7.1	7.1
Cash Yield	3.0	3.0	3.3	3.4
Growth Factor	6.1	6.1	5.4	5.5
Inflation Factor	-1.9	-2.1	-1.8	-1.8
Liquidity				
Market	62.2	65.4	62.8	59.9
Stressed	20.1	22.3	24.7	23.4



Box and Whisker Graphs



In each year of the simulation, there are 5,000 independent economic trial results.

Expected: 50% of the potential scenarios result in higher than this value and 50% results in lower

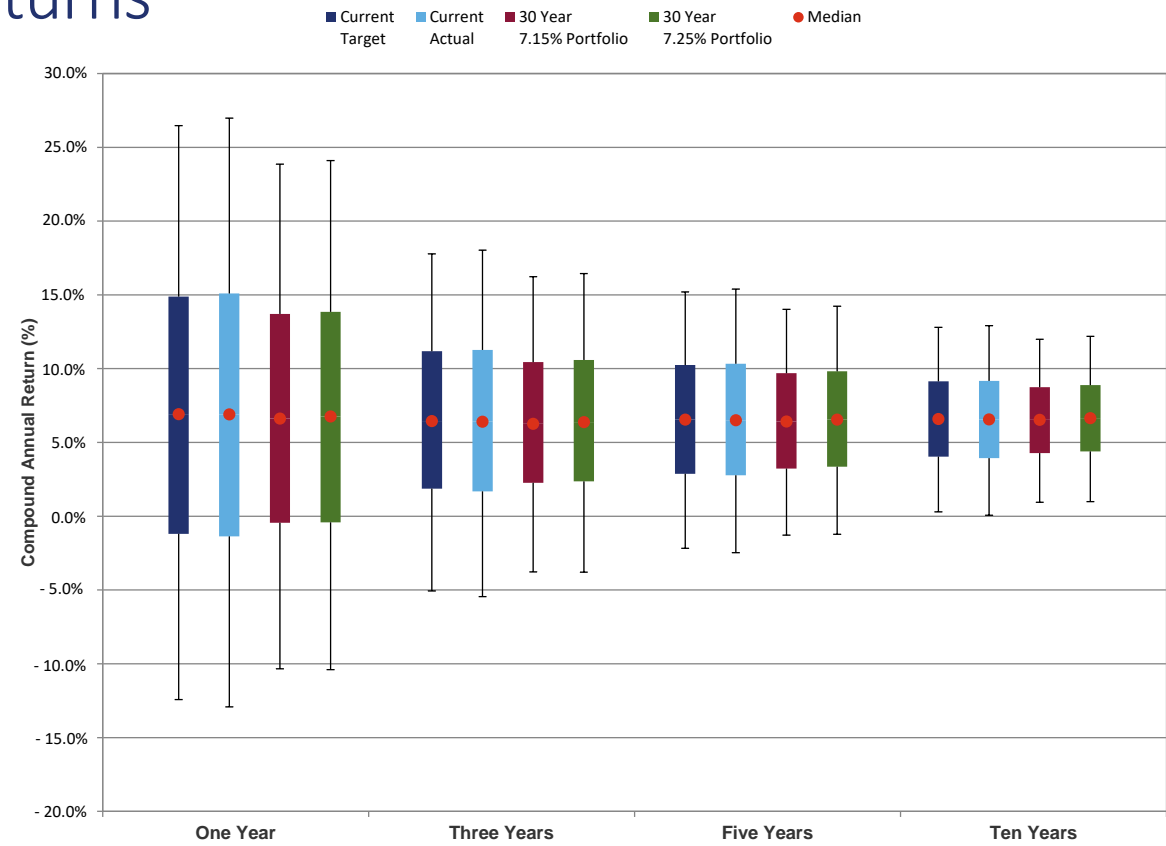
Very optimistic: Only 5% of the scenarios result in higher than this value and 95% result in lower

Optimistic: Only 25% of the scenarios result in higher than this value and 75% result in lower

Pessimistic: 75% of the scenarios results in higher than this value and 25% result in lower

Very pessimistic: 95% of the scenarios result in higher than this value and 5% result in lower

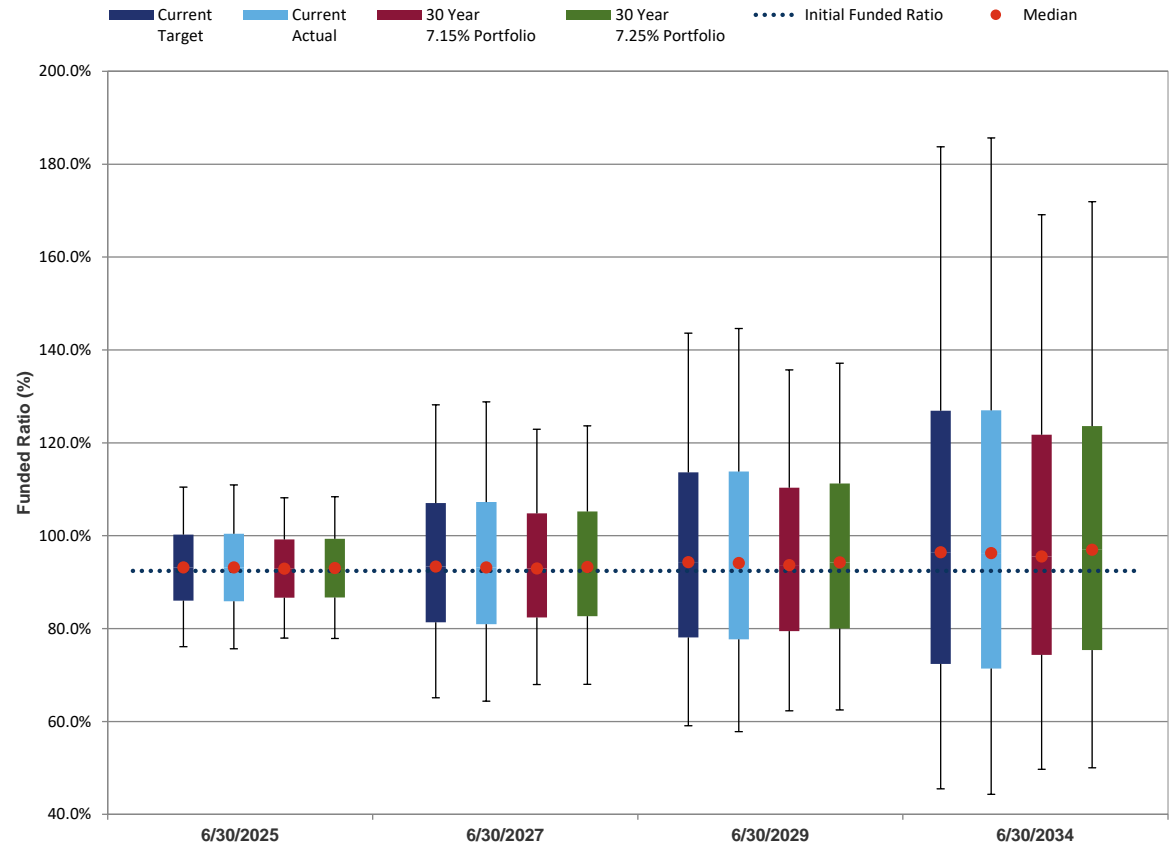
Distribution of Returns*



(%)	One Year				Three Years				Five Years				Ten Years			
	Current Target	Current Actual	30 Year 7.15% Portfolio	30 Year 7.25% Portfolio	Current Target	Current Actual	30 Year 7.15% Portfolio	30 Year 7.25% Portfolio	Current Target	Current Actual	30 Year 7.15% Portfolio	30 Year 7.25% Portfolio	Current Target	Current Actual	30 Year 7.15% Portfolio	30 Year 7.25% Portfolio
Very Optimistic	26.46	26.98	23.86	24.10	17.77	18.03	16.23	16.44	15.20	15.40	14.02	14.24	12.80	12.91	11.99	12.19
Optimistic	14.89	15.09	13.71	13.84	11.19	11.26	10.45	10.59	10.25	10.33	9.70	9.83	9.14	9.17	8.75	8.88
Median (Expected)	6.91	6.90	6.62	6.76	6.45	6.41	6.26	6.38	6.55	6.51	6.42	6.54	6.59	6.56	6.53	6.64
Pessimistic	-1.19	-1.37	-0.45	-0.41	1.87	1.69	2.26	2.37	2.88	2.77	3.24	3.36	4.04	3.94	4.28	4.39
Very Pessimistic	-12.42	-12.91	-10.34	-10.39	-5.06	-5.44	-3.78	-3.79	-2.18	-2.47	-1.28	-1.23	0.30	0.07	0.95	0.99

*For periods longer than one year, returns are compound annual.
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AAL MVA Funded Ratio



Shortfall Risk:

The potential for the current policy to have a lower median funded ratio than the alternative policies.

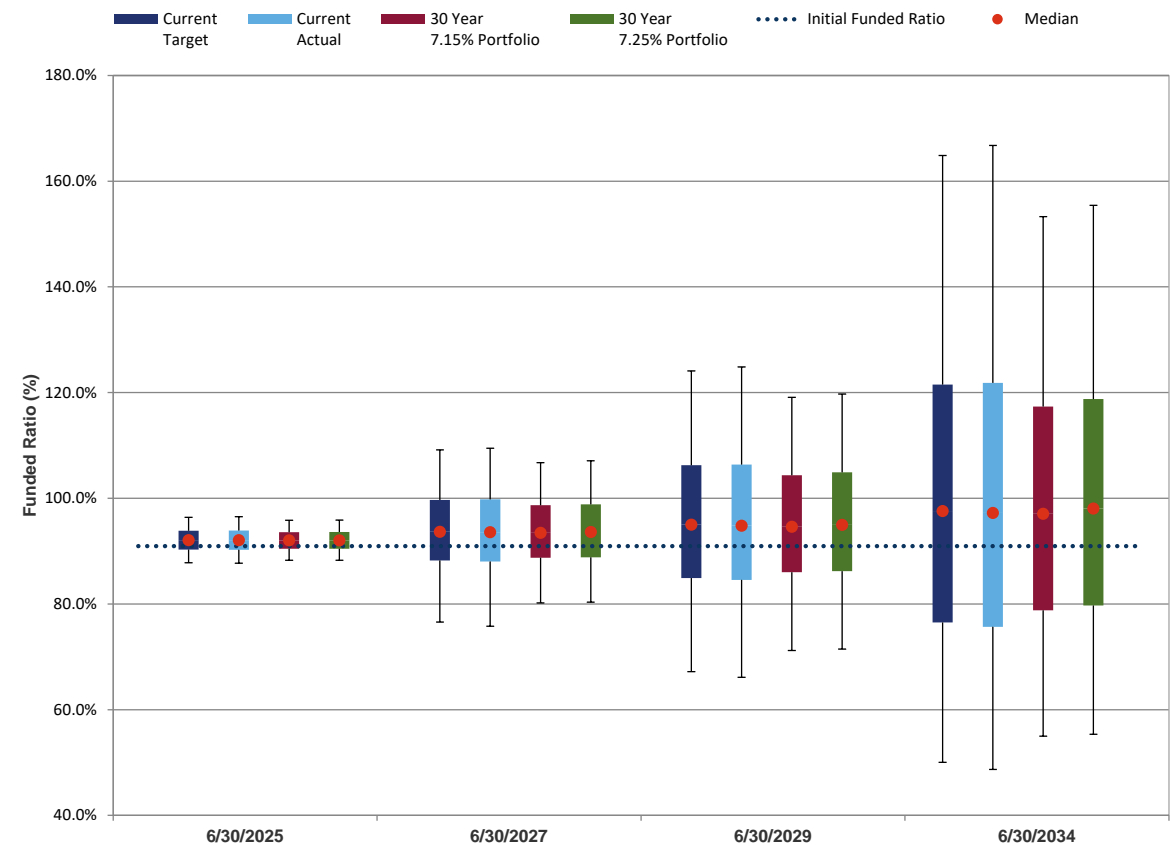
Drawdown Risk:

The potential for the current policy to have a lower “very pessimistic” funded ratio than the alternative policies.

Initial Funded Ratio = 92.4%

(%)	6/30/2025				6/30/2027				6/30/2029				6/30/2034			
	Current Target	Current Actual	7.15% Portfolio	7.25% Portfolio	Current Target	Current Actual	7.15% Portfolio	7.25% Portfolio	Current Target	Current Actual	7.15% Portfolio	7.25% Portfolio	Current Target	Current Actual	7.15% Portfolio	7.25% Portfolio
Very Optimistic	110.5	110.9	108.2	108.4	128.2	128.8	122.9	123.6	143.6	144.6	135.7	137.1	183.7	185.7	169.1	171.9
Optimistic	100.2	100.4	99.2	99.3	107.0	107.3	104.8	105.2	113.7	113.8	110.4	111.2	126.9	127.0	121.7	123.6
Median (Expected)	93.2	93.2	92.9	93.1	93.4	93.2	92.9	93.3	94.3	94.1	93.7	94.3	96.5	96.2	95.5	97.0
Pessimistic	86.0	85.9	86.7	86.7	81.4	80.9	82.4	82.7	78.1	77.7	79.5	80.0	72.4	71.4	74.3	75.4
Very Pessimistic	76.1	75.7	77.9	77.9	65.1	64.4	68.0	68.0	59.1	57.8	62.3	62.5	45.5	44.3	49.7	50.0

AAL AVA Funded Ratio



Shortfall Risk:

The potential for the current policy to have a lower median funded ratio than the alternative policies.

Drawdown Risk:

The potential for the current policy to have a lower “very pessimistic” funded ratio than the alternative policies.

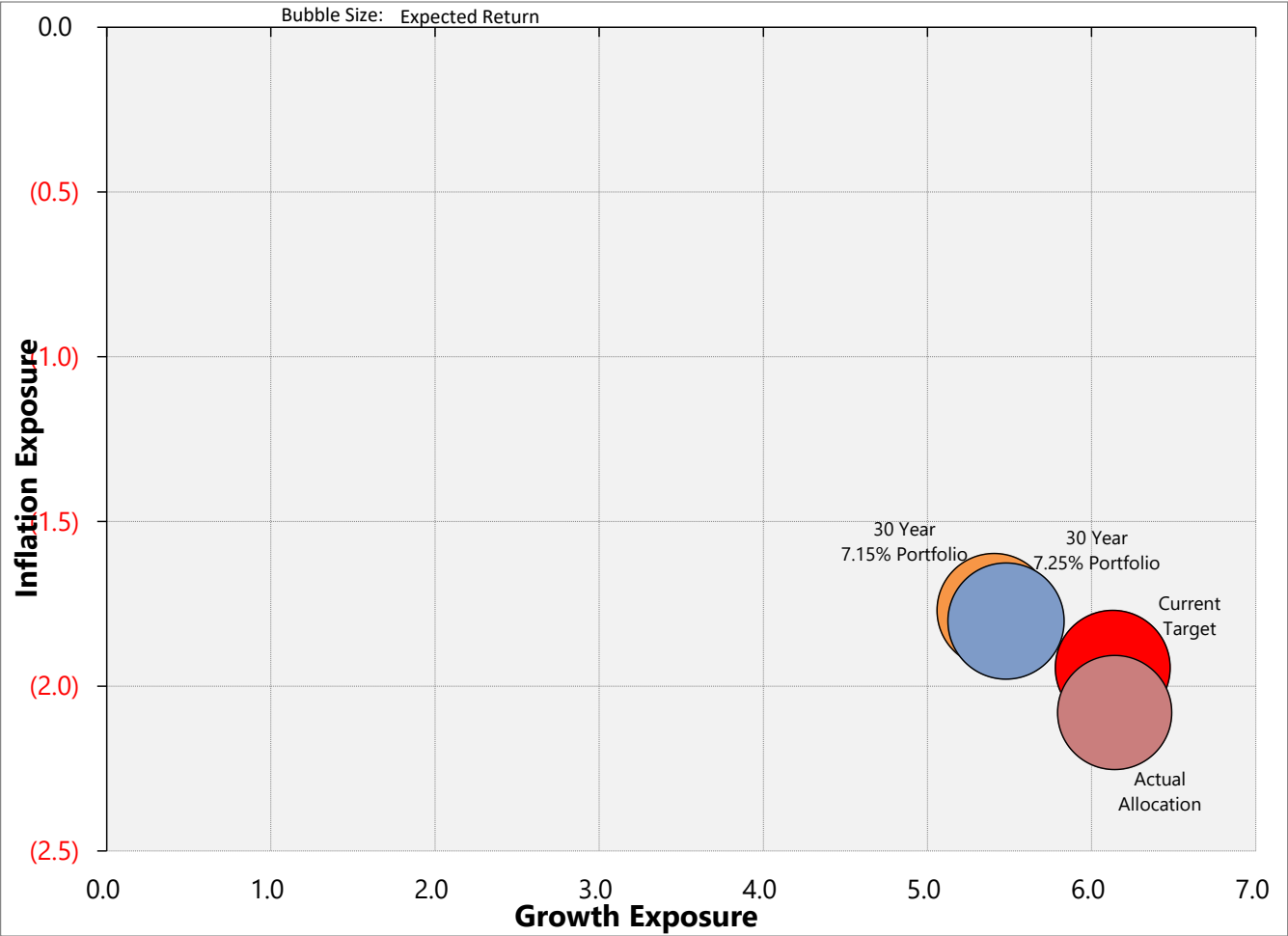
Initial Funded Ratio = 90.9%

(%)	6/30/2025				6/30/2027				6/30/2029				6/30/2034			
	Current Target	Current Actual	7.15% Portfolio	7.25% Portfolio	Current Target	Current Actual	7.15% Portfolio	7.25% Portfolio	Current Target	Current Actual	7.15% Portfolio	7.25% Portfolio	Current Target	Current Actual	7.15% Portfolio	7.25% Portfolio
Very Optimistic	96.4	96.5	95.8	95.9	109.1	109.5	106.8	107.1	124.1	124.8	119.1	119.7	164.8	166.8	153.3	155.4
Optimistic	93.8	93.9	93.6	93.6	99.7	99.8	98.7	98.8	106.3	106.4	104.4	104.9	121.5	121.8	117.3	118.8
Median (Expected)	92.1	92.1	92.0	92.1	93.7	93.6	93.5	93.6	95.0	94.8	94.6	95.0	97.6	97.2	97.1	98.1
Pessimistic	90.3	90.3	90.5	90.5	88.2	88.0	88.8	88.8	84.9	84.5	86.0	86.2	76.5	75.7	78.8	79.7
Very Pessimistic	87.8	87.7	88.3	88.3	76.6	75.8	80.2	80.3	67.2	66.1	71.2	71.5	50.0	48.7	55.0	55.3

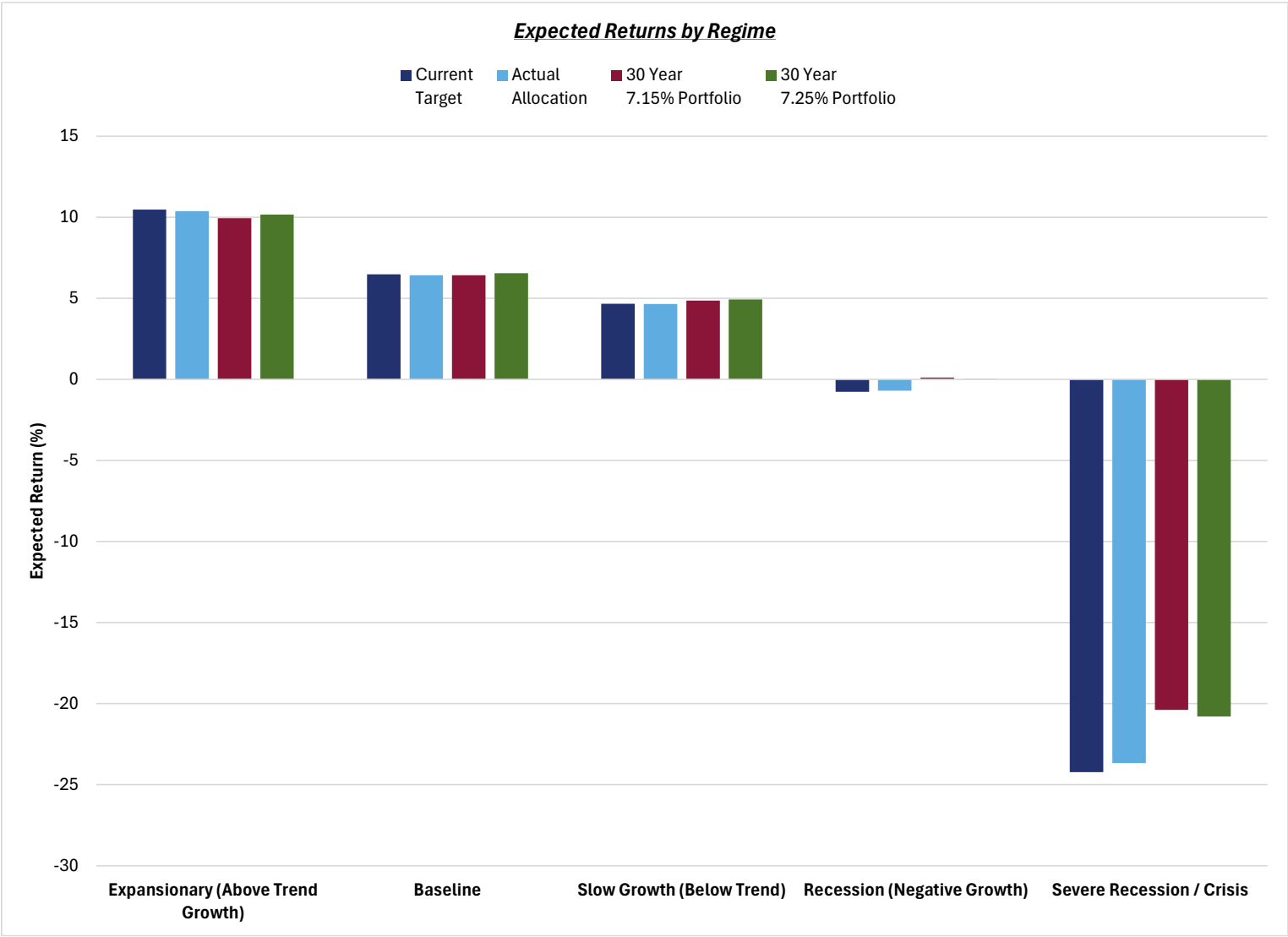
Economic Factor Exposure – Potential Portfolios Modeled

Concentrated factor tilts can represent portfolio vulnerability (e.g., reliance on growth markets)

To the extent possible, a portfolio with factor neutrality is desirable for weathering unexpected future market environments



Stress Testing: Regime Assumptions





Illustrative Examples – Lower Risk Asset and Liability Modeling

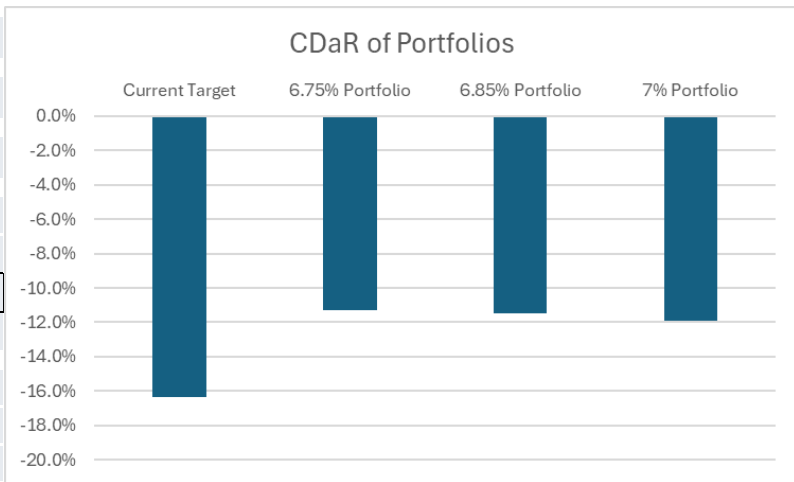
Portfolios Modeled

Asset Class	Current Target	Optimization Constraints	30 Year 6.75% Portfolio	30 Year 6.85% Portfolio	30 Year 7.00% Portfolio
U.S. Equity	21.00%	15% - 35% ¹	15.25%	15.25%	15.25%
International Equity	13.00%	9% - 19.5% ¹	9.00%	9.00%	9.00%
Private Equity	17.00%	15% - 19%	15.00%	15.00%	15.00%
Global Smart Beta	5.00%	1% - 9%	1.00%	1.00%	1.00%
Total Growth Assets	56.00%		40.25%	40.25%	40.25%
Public Credit	3.00%	1% - 5%	1.00%	1.00%	1.00%
Private Credit	8.00%	0% - 10%	1.50%	3.50%	8.00%
Total Defensive Growth Assets	11.00%		2.50%	4.50%	9.00%
Core (Plus) Fixed Income	22.50%	0% - 50%	47.75%	47.75%	43.25%
Cash	1.00%	0% - 2%	2.00%	0.00%	0.00%
Total Defensive / Rate Sensitive Assets	23.50%		49.75%	47.75%	43.25%
Private Real Assets	9.50%	7.5% - 11.5%	7.50%	7.50%	7.50%
Total RA / Inflation Sensitive Assets	9.50%		7.50%	7.50%	7.50%
Total Assets	100.0%		100.0%	100.0%	100.0%
Expected Return - 10 Years (%)	6.48		6.21	6.29	6.43
Expected Return - 20 Years (%)	6.90		6.48	6.57	6.71
Expected Return - 30 Years (%)	7.33		6.76	6.85	7.00
Standard Deviation of Return (%)	12.64		9.64	9.81	10.09
+ / (-) in Expected Return - 10 Years (bps)			(27)	(19)	(5)
+ / (-) in Expected Return - 20 Years (bps)			(42)	(33)	(19)
+ / (-) in Expected Return - 30 Years (bps)			(57)	(48)	(33)
+ / (-) in SD of Return (bps)			(300)	(283)	(255)
Sharpe Ratio	0.20		0.23	0.23	0.24

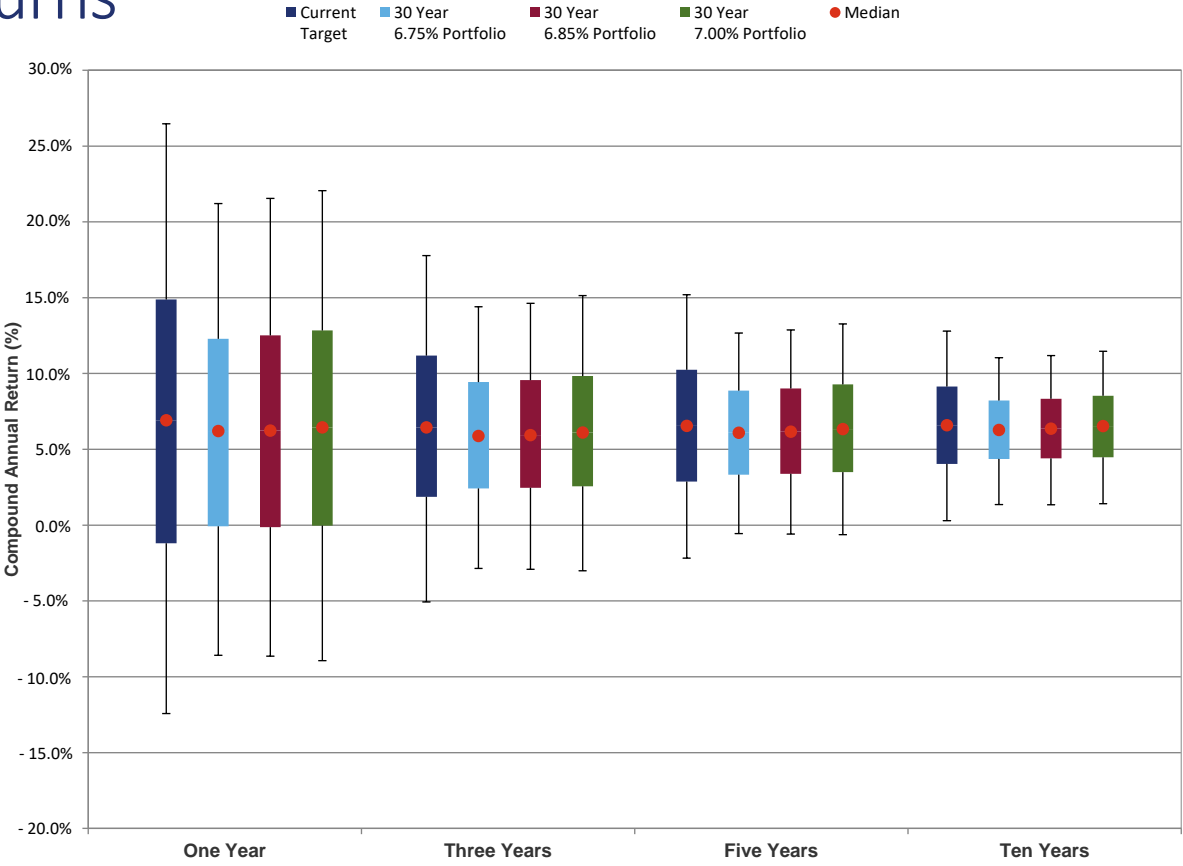
¹ U.S. Equity and International Equity are constrained to have market weight ratio. Currently at 63%/37%.

Portfolios Modeled

Asset Class	Current Target	30 Year 6.75% Portfolio	30 Year 6.85% Portfolio	30 Year 7.00% Portfolio
Total Growth Assets	56.00%	40.25%	40.25%	40.25%
Total Defensive Growth Assets	11.00%	2.50%	4.50%	9.00%
Total Defensive / Rate Sensitive Assets	23.50%	49.75%	47.75%	43.25%
Total RA / Inflation Sensitive Assets	9.50%	7.50%	7.50%	7.50%
Total Assets	100.0%	100.0%	100.0%	100.0%
Expected Return - 10 Years (%)	6.48	6.21	6.29	6.43
Expected Return - 20 Years (%)	6.90	6.48	6.57	6.71
Expected Return - 30 Years (%)	7.33	6.76	6.85	7.00
Standard Deviation of Return (%)	12.64	9.64	9.81	10.09
Contribution to Asset Volatility (%):				
Growth	85.1	81.9	80.4	78.2
Defensive Growth	6.9	1.8	3.5	7.5
Defensive/Rate Sensitive	2.9	11.3	11.1	9.3
RA/Inflation Sensitive	5.1	5.0	5.0	5.0
Cash Yield	3.0	3.6	3.7	3.6
Growth Factor	6.1	4.1	4.2	4.4
Inflation Factor	-1.9	-2.2	-2.2	-2.2
Liquidity				
Market	62.2	74.3	72.3	67.8
Stressed	20.1	42.6	40.6	36.8



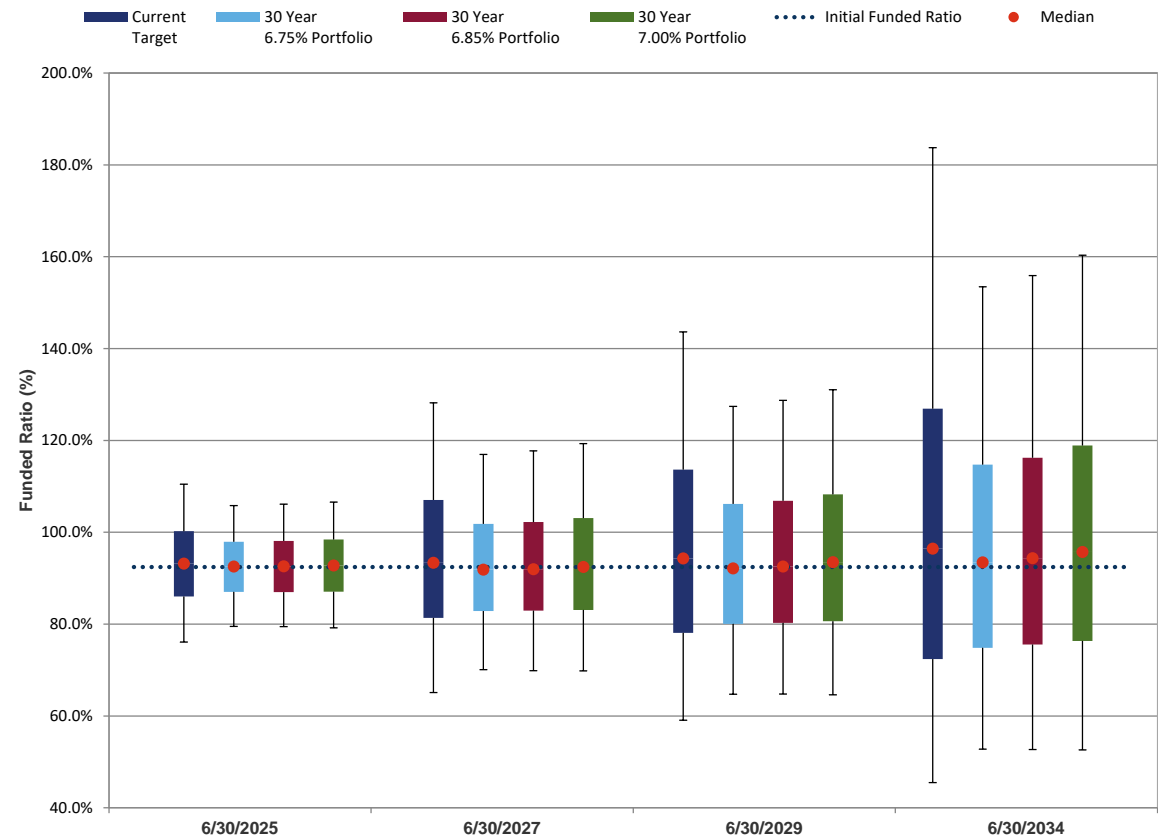
Distribution of Returns*



(%)	One Year				Three Years				Five Years				Ten Years			
	Current Target	30 Year 6.75% Portfolio	30 Year 6.85% Portfolio	30 Year 7.00% Portfolio	Current Target	30 Year 6.75% Portfolio	30 Year 6.85% Portfolio	30 Year 7.00% Portfolio	Current Target	30 Year 6.75% Portfolio	30 Year 6.85% Portfolio	30 Year 7.00% Portfolio	Current Target	30 Year 6.75% Portfolio	30 Year 6.85% Portfolio	30 Year 7.00% Portfolio
Very Optimistic	26.46	21.21	21.55	22.06	17.77	14.40	14.63	15.15	15.20	12.67	12.87	13.26	12.80	11.04	11.18	11.47
Optimistic	14.89	12.29	12.51	12.84	11.19	9.44	9.56	9.84	10.25	8.88	9.02	9.28	9.14	8.22	8.34	8.54
Median (Expected)	6.91	6.20	6.23	6.45	6.45	5.88	5.94	6.11	6.55	6.09	6.17	6.33	6.59	6.28	6.36	6.53
Pessimistic	-1.19	-0.08	-0.14	-0.04	1.87	2.42	2.46	2.57	2.88	3.33	3.39	3.50	4.04	4.36	4.41	4.48
Very Pessimistic	-12.42	-8.59	-8.63	-8.93	-5.06	-2.86	-2.90	-3.01	-2.18	-0.56	-0.58	-0.63	0.30	1.36	1.34	1.42

*For periods longer than one year, returns are compound annual.

AAL MVA Funded Ratio



Shortfall Risk:

The potential for the current policy to have a lower median funded ratio than the alternative policies.

Drawdown Risk:

The potential for the current policy to have a lower “very pessimistic” funded ratio than the alternative policies.

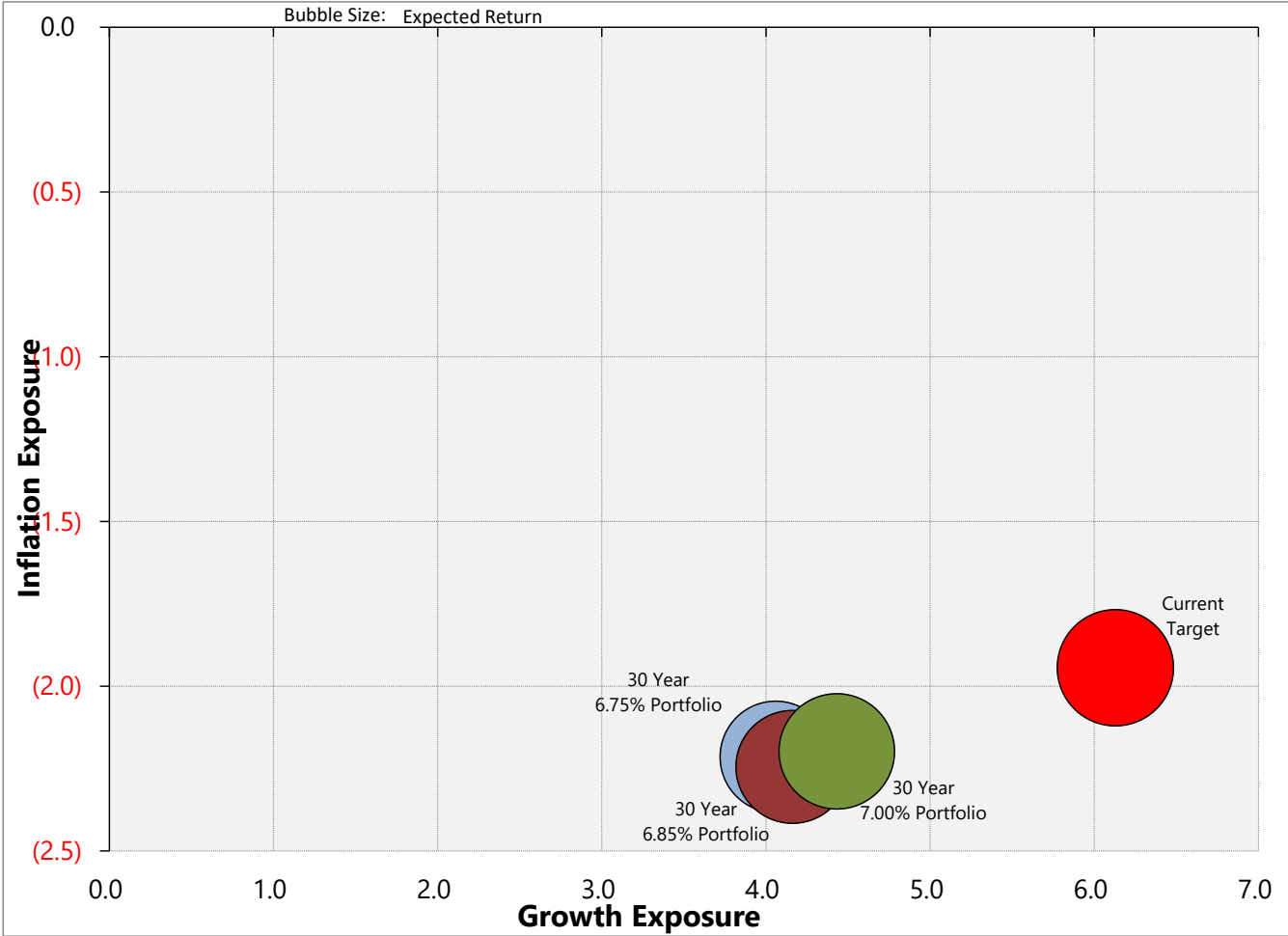
Initial Funded Ratio = 92.4%

(%)	6/30/2025				6/30/2027				6/30/2029				6/30/2034			
	Current Target	6.75% Portfolio	6.85% Portfolio	7.00% Portfolio	Current Target	6.75% Portfolio	6.85% Portfolio	7.00% Portfolio	Current Target	6.75% Portfolio	6.85% Portfolio	7.00% Portfolio	Current Target	6.75% Portfolio	6.85% Portfolio	7.00% Portfolio
Very Optimistic	110.5	105.8	106.1	106.6	128.2	117.0	117.7	119.3	143.6	127.4	128.7	131.0	183.7	153.4	155.9	160.3
Optimistic	100.2	97.9	98.1	98.4	107.0	101.8	102.2	103.1	113.7	106.2	106.9	108.3	126.9	114.7	116.2	118.9
Median (Expected)	93.2	92.6	92.6	92.8	93.4	91.9	92.0	92.4	94.3	92.2	92.6	93.5	96.5	93.5	94.4	95.7
Pessimistic	86.0	87.0	87.0	87.0	81.4	82.9	83.0	83.1	78.1	80.0	80.3	80.6	72.4	74.8	75.5	76.3
Very Pessimistic	76.1	79.5	79.4	79.2	65.1	70.1	69.9	69.8	59.1	64.8	64.8	64.6	45.5	52.8	52.7	52.6

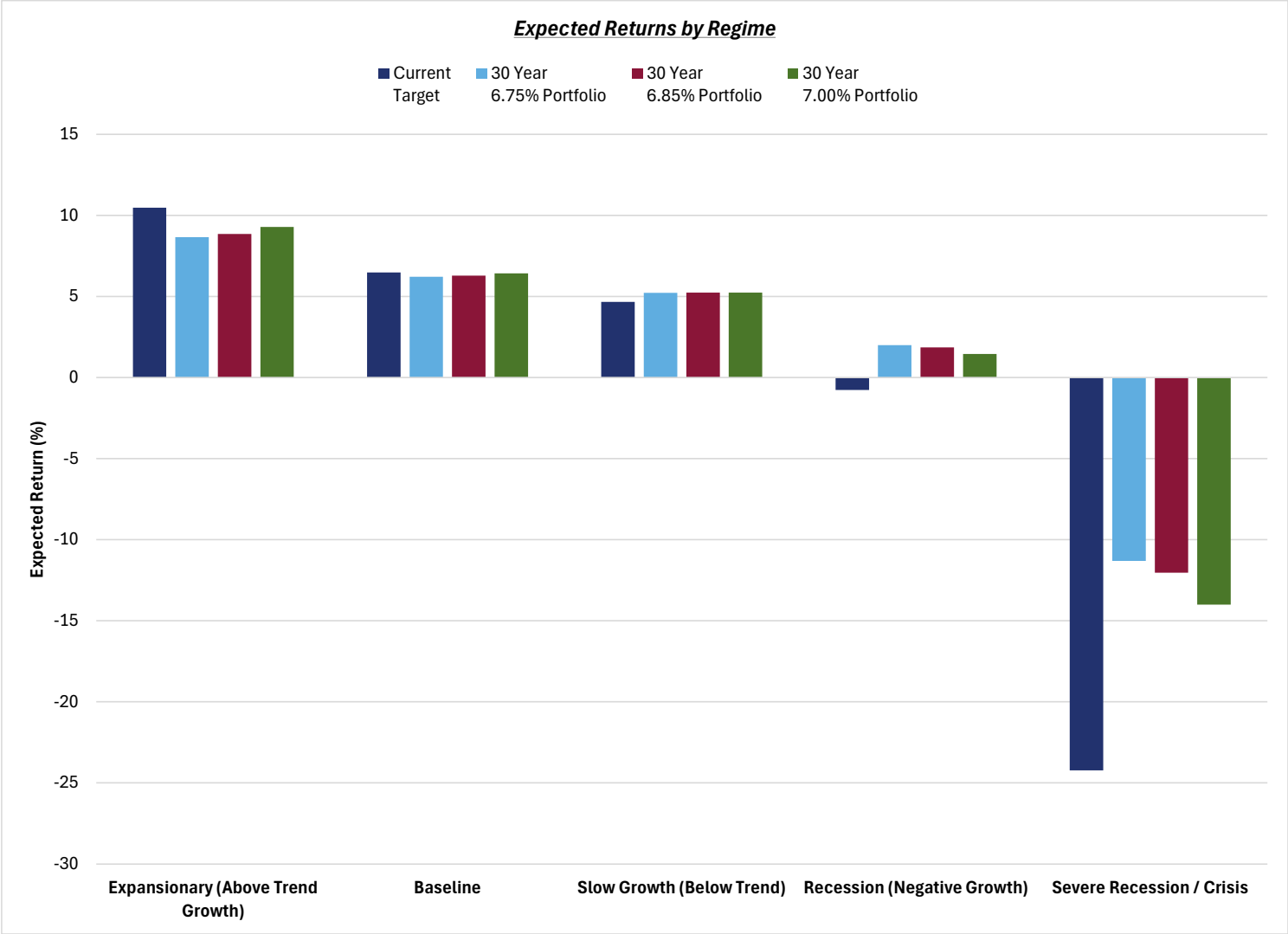
Economic Factor Exposure – Lower Risk Portfolios Modeled

Concentrated factor tilts can represent portfolio vulnerability (e.g., reliance on growth markets)

To the extent possible, a portfolio with factor neutrality is desirable for weathering unexpected future market environments



Stress Testing: Regime Assumptions



Observations & Recommendation

Revisit the Checklist

- ☐ Provide IPERS participants with retirement benefits
 - Current portfolio has ample liquidity (20% available in stressed environment)
 - De-risking options do increase liquidity

- ☐ Improve funded status of the plan for the sole purpose of providing benefits
 - Current portfolios and de-risking options all have a median funded status of 96-97% over 10 years (based on market value of assets)

- ☐ Reduce potential for permanent impairment (drawdown)
 - Drawdown risk for current portfolio is in range with peers (-16%)
 - De-risking options do decrease downside risk and IPERS has adopted portfolios in the past with lower levels of CDaR

 - Wilshire believes maintaining the current portfolio target allocation is a reasonable option given IPERS' investment horizon
 - However, if the board would like to reduce portfolio drawdown risk, the two potential target portfolios are also reasonable and maintain IPERS long term objectives (however would take 3-5 years to implement)

Appendix

Risk Assessment Framework

Wilshire's multi-dimensional view of risk integrates organizational and investment considerations into a comprehensive framework for evaluating strategic decisions.

Shortfall: Support distributions and long-term growth

Behavioral: Instill strong governance

Drawdown: Limit portfolio losses

Inflation: Preserve long-term purchasing power

Liquidity: Balance near-term needs, long-term opportunities

Active: Ensure unique exposures

Emerging & Long-Term: Environmental, Social & Governance risks, such as externalities, intangibles and reputation may be linked to various risk lenses



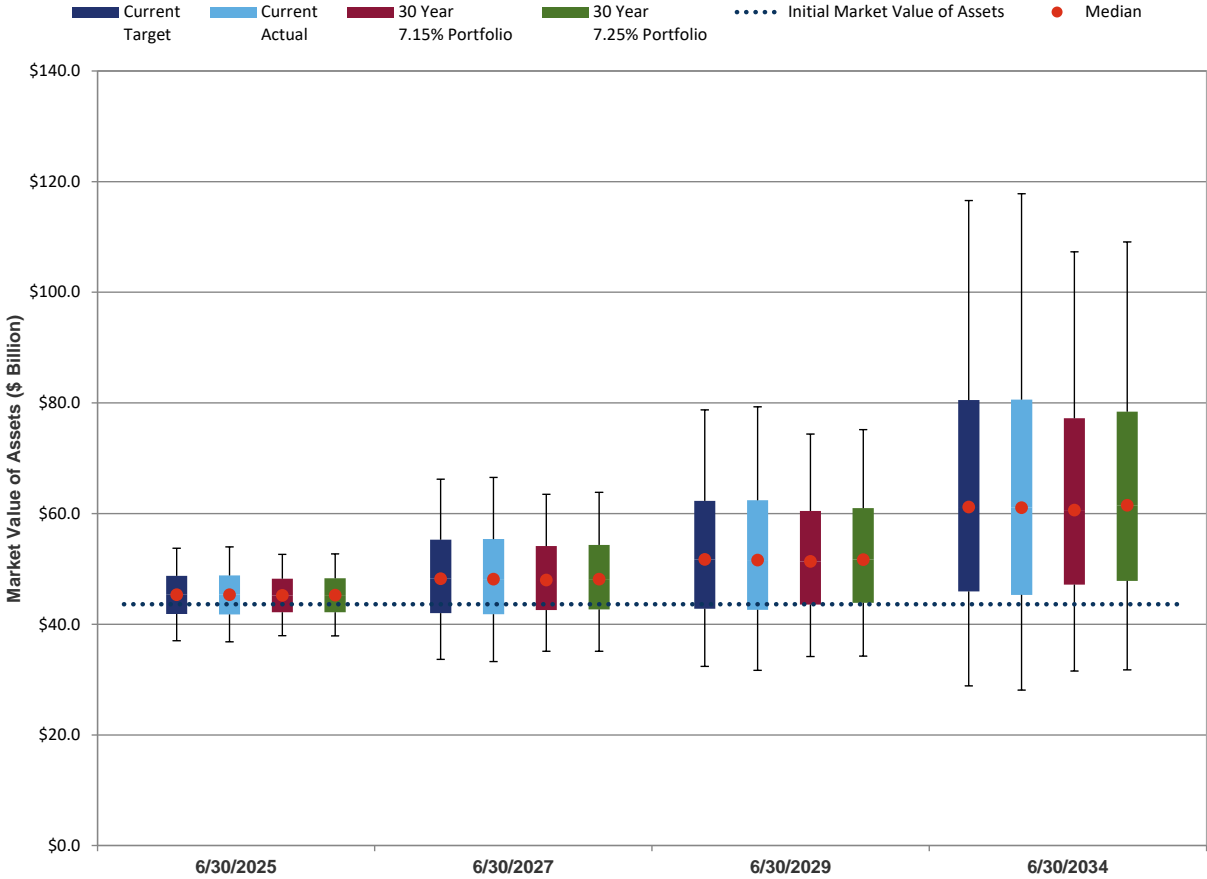
Background & Overview

- The asset allocation decision is the most important decision an investor can make
 - The asset allocation decision drives 90% of return variability among portfolios
- The appropriate asset allocation policy is determined by an investor's risk tolerance and return expectation requirements
- Each investor's risk tolerance and return requirements should be viewed in the context of the liabilities that the assets are supporting
- Wilshire recommends revisiting the asset allocation decision every three to five years, or sooner, as market conditions warrant
 - IPERS reviews asset allocation annually and last reviewed in September 2023
- IPERS has liability discount rate assumption of 7.0% over the long term



Potential Portfolios Additional Asset-Liability Modeling

Market Value of Assets – MVA



Shortfall Risk:

The potential for the current policy to have a lower median market value of assets than the alternative policies.

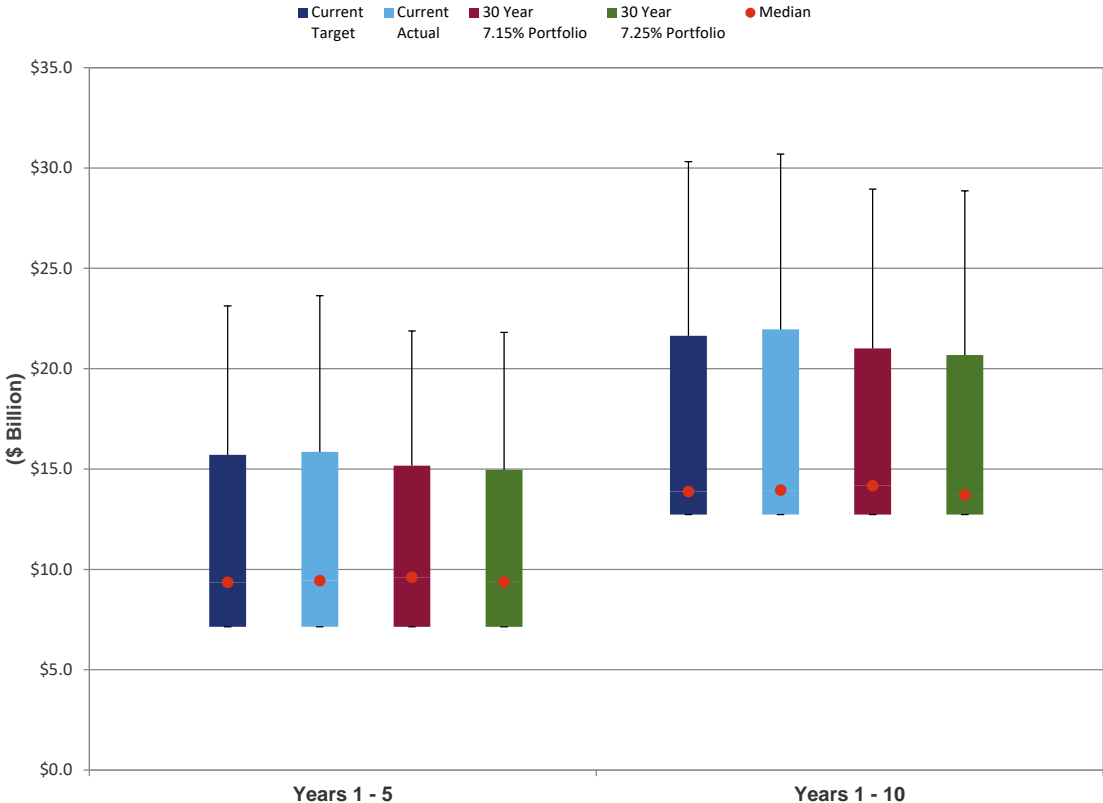
Drawdown Risk:

The potential for the current policy to have a lower “very pessimistic” market value of assets than the alternative policies.

Initial MVA = \$43.6 Billion

(\$ Billion)	6/30/2025				6/30/2027				6/30/2029				6/30/2034			
	Current Target	Current Actual	30 Year 7.15% Portfolio	30 Year 7.25% Portfolio	Current Target	Current Actual	30 Year 7.15% Portfolio	30 Year 7.25% Portfolio	Current Target	Current Actual	30 Year 7.15% Portfolio	30 Year 7.25% Portfolio	Current Target	Current Actual	30 Year 7.15% Portfolio	30 Year 7.25% Portfolio
Very Optimistic	53.7	54.0	52.6	52.7	66.2	66.5	63.5	63.9	78.7	79.3	74.4	75.2	116.6	117.8	107.3	109.1
Optimistic	48.8	48.8	48.3	48.3	55.3	55.4	54.1	54.4	62.3	62.4	60.5	61.0	80.5	80.6	77.2	78.4
Median (Expected)	45.3	45.3	45.2	45.3	48.2	48.1	48.0	48.2	51.7	51.6	51.4	51.7	61.2	61.1	60.6	61.5
Pessimistic	41.8	41.8	42.2	42.2	42.0	41.8	42.6	42.7	42.8	42.6	43.6	43.9	45.9	45.3	47.2	47.8
Very Pessimistic	37.0	36.8	37.9	37.9	33.6	33.2	35.1	35.1	32.4	31.7	34.2	34.3	28.9	28.1	31.6	31.7

MVA Economic Cost



Shortfall Risk:

The potential for the current allocation to have a higher median economic cost than the alternative policies.

Drawdown Risk:

The potential for the current allocation to have a higher “very pessimistic” economic cost than the alternative policies.

EROA = 7.00%

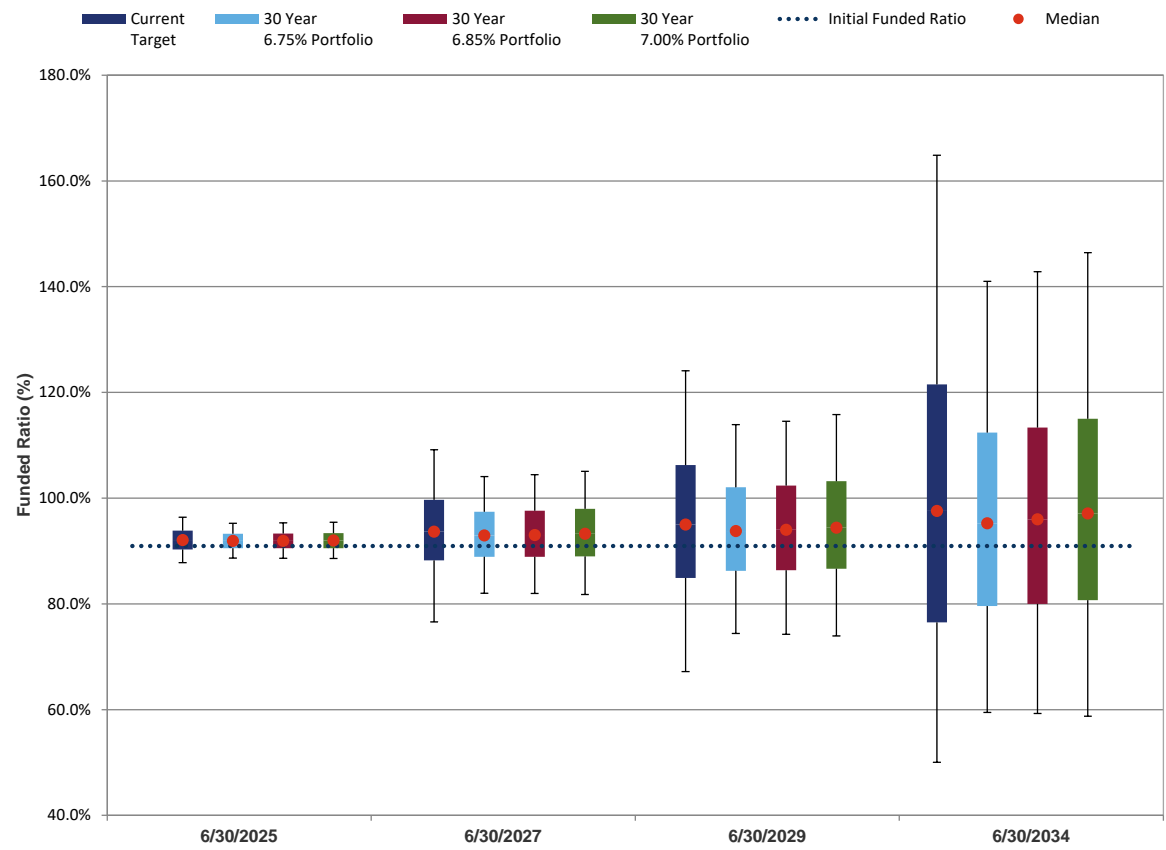
Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.

(\$ Billion)	Years 1 - 5				Years 1 - 10			
	Current Target	Current Actual	30 Year 7.15% Portfolio	30 Year 7.25% Portfolio	Current Target	Current Actual	30 Year 7.15% Portfolio	30 Year 7.25% Portfolio
Very Pessimistic	23.1	23.6	21.9	21.8	30.3	30.7	29.0	28.9
Pessimistic	15.7	15.9	15.2	15.0	21.6	22.0	21.0	20.7
Median (Expected)	9.4	9.4	9.6	9.4	13.9	13.9	14.2	13.7
Optimistic	7.1	7.1	7.1	7.1	12.7	12.7	12.7	12.7
Very Optimistic	7.1	7.1	7.1	7.1	12.7	12.7	12.7	12.7



Illustrative Examples – Lower Risk Additional Asset-Liability Modeling

AAL AVA Funded Ratio



Shortfall Risk:

The potential for the current policy to have a lower median funded ratio than the alternative policies.

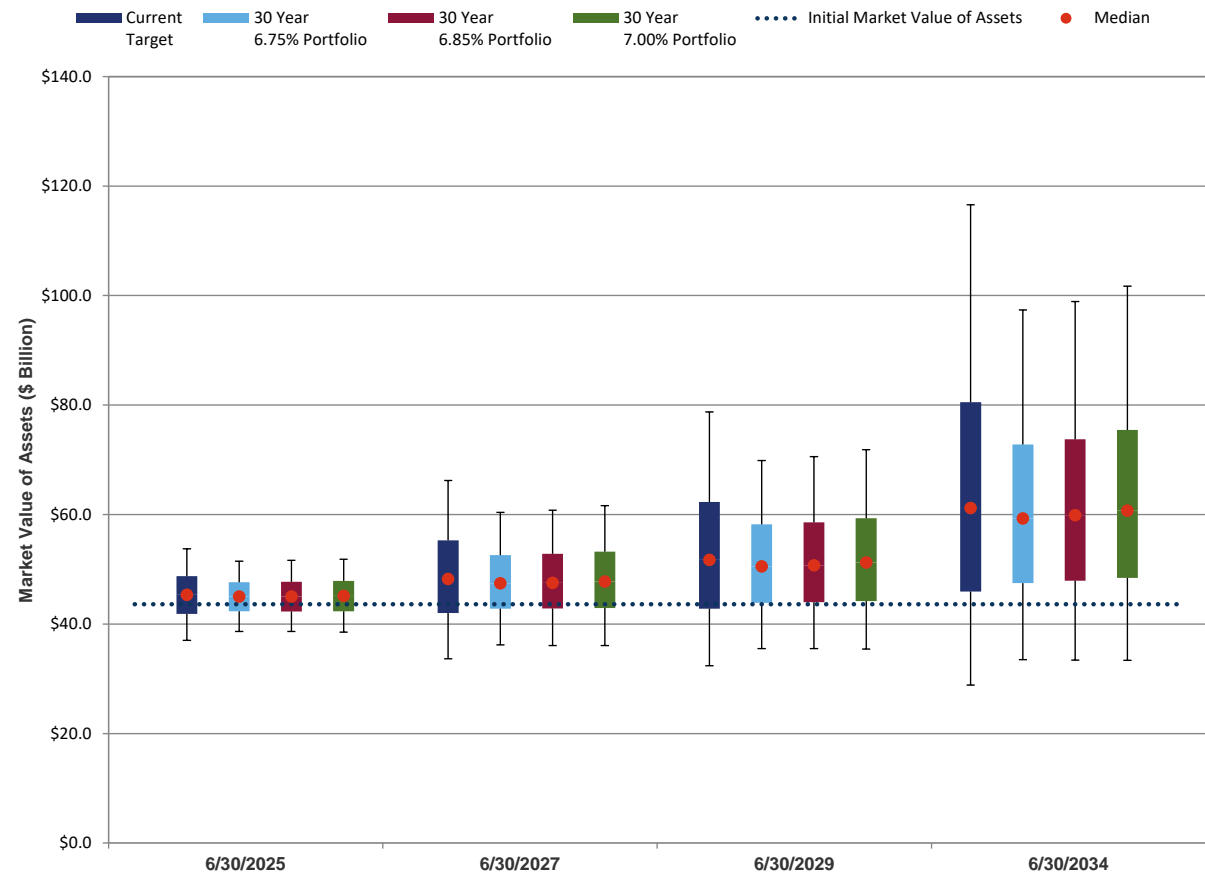
Drawdown Risk:

The potential for the current policy to have a lower “very pessimistic” funded ratio than the alternative policies.

Initial Funded Ratio = 90.9%

(%)	6/30/2025				6/30/2027				6/30/2029				6/30/2034			
	Current Target	6.75% Portfolio	6.85% Portfolio	7.00% Portfolio	Current Target	6.75% Portfolio	6.85% Portfolio	7.00% Portfolio	Current Target	6.75% Portfolio	6.85% Portfolio	7.00% Portfolio	Current Target	6.75% Portfolio	6.85% Portfolio	7.00% Portfolio
Very Optimistic	96.4	95.2	95.3	95.4	109.1	104.1	104.4	105.1	124.1	113.9	114.5	115.8	164.8	141.0	142.8	146.4
Optimistic	93.8	93.3	93.3	93.4	99.7	97.4	97.6	98.0	106.3	102.1	102.4	103.2	121.5	112.4	113.3	115.0
Median (Expected)	92.1	91.9	91.9	92.0	93.7	93.0	93.0	93.3	95.0	93.8	94.0	94.4	97.6	95.3	96.0	97.1
Pessimistic	90.3	90.5	90.5	90.5	88.2	88.9	88.9	89.0	84.9	86.2	86.4	86.7	76.5	79.6	80.0	80.7
Very Pessimistic	87.8	88.7	88.6	88.6	76.6	82.0	82.0	81.8	67.2	74.4	74.3	73.9	50.0	59.5	59.3	58.8

Market Value of Assets – MVA



Shortfall Risk:

The potential for the current policy to have a lower median market value of assets than the alternative policies.

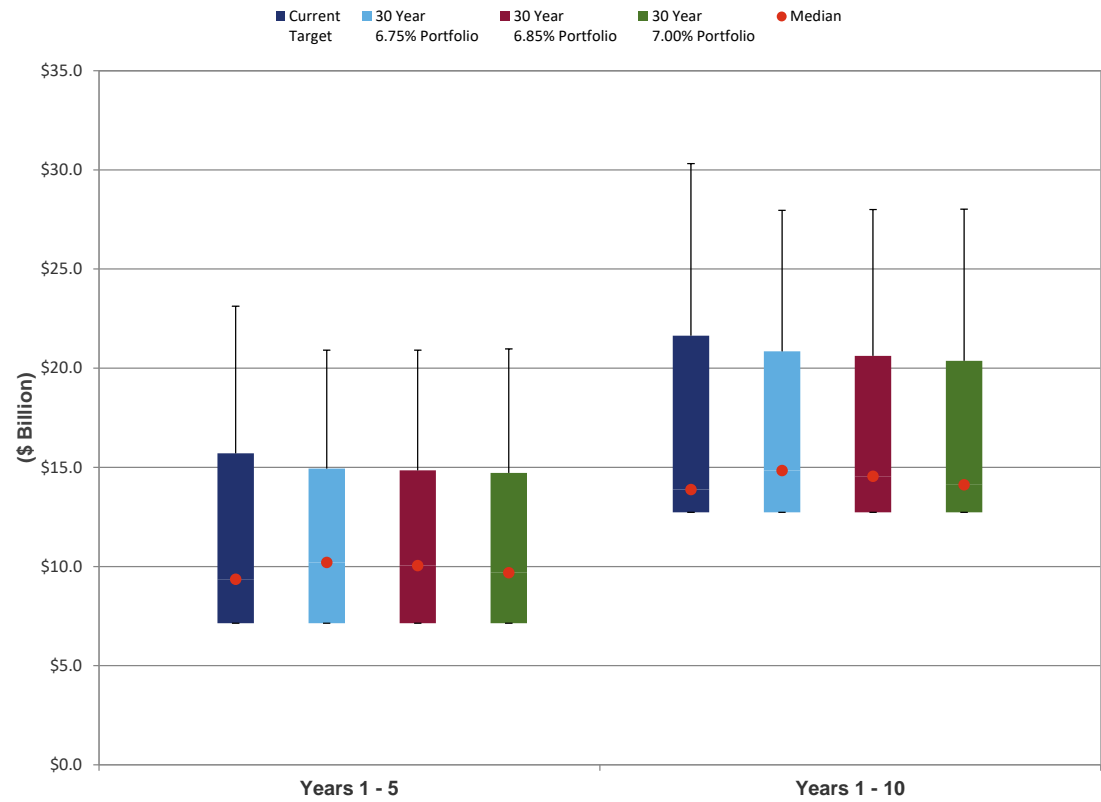
Drawdown Risk:

The potential for the current policy to have a lower “very pessimistic” market value of assets than the alternative policies.

Initial MVA = \$43.6 Billion

(\$ Billion)	6/30/2025				6/30/2027				6/30/2029				6/30/2034			
	Current Target	30 Year 6.75% Portfolio	30 Year 6.85% Portfolio	30 Year 7.00% Portfolio	Current Target	30 Year 6.75% Portfolio	30 Year 6.85% Portfolio	30 Year 7.00% Portfolio	Current Target	30 Year 6.75% Portfolio	30 Year 6.85% Portfolio	30 Year 7.00% Portfolio	Current Target	30 Year 6.75% Portfolio	30 Year 6.85% Portfolio	30 Year 7.00% Portfolio
Very Optimistic	53.7	51.5	51.6	51.8	66.2	60.4	60.8	61.6	78.7	69.9	70.6	71.8	116.6	97.4	98.9	101.7
Optimistic	48.8	47.6	47.7	47.9	55.3	52.6	52.8	53.2	62.3	58.2	58.6	59.3	80.5	72.8	73.8	75.4
Median (Expected)	45.3	45.0	45.0	45.1	48.2	47.5	47.5	47.7	51.7	50.5	50.7	51.2	61.2	59.3	59.9	60.7
Pessimistic	41.8	42.3	42.3	42.3	42.0	42.8	42.9	42.9	42.8	43.9	44.0	44.2	45.9	47.5	47.9	48.4
Very Pessimistic	37.0	38.7	38.6	38.5	33.6	36.2	36.1	36.1	32.4	35.5	35.5	35.4	28.9	33.5	33.4	33.4

MVA Economic Cost



Shortfall Risk:

The potential for the current allocation to have a higher median economic cost than the alternative policies.

Drawdown Risk:

The potential for the current allocation to have a higher “very pessimistic” economic cost than the alternative policies.

EROA = 7.00%

(\$ Billion)	Years 1 - 5				Years 1 - 10			
	Current Target	30 Year 6.75% Portfolio	30 Year 6.85% Portfolio	30 Year 7.00% Portfolio	Current Target	30 Year 6.75% Portfolio	30 Year 6.85% Portfolio	30 Year 7.00% Portfolio
Very Pessimistic	23.1	20.9	20.9	21.0	30.3	28.0	28.0	28.0
Pessimistic	15.7	14.9	14.9	14.7	21.6	20.9	20.6	20.4
Median (Expected)	9.4	10.2	10.0	9.7	13.9	14.8	14.6	14.1
Optimistic	7.1	7.1	7.1	7.1	12.7	12.7	12.7	12.7
Very Optimistic	7.1	7.1	7.1	7.1	12.7	12.7	12.7	12.7

Economic Cost is defined as the present value of contributions plus contributions necessary to fully fund the plan at the end of the projection period.

Capital Market Assumptions

- Wilshire's Capital Market Assumptions as of **June 30, 2024**
- Wilshire's asset class return, risk and correlation assumptions are developed on multi-year forward looking expected rates of return and historical risk and correlation, adjusted to incorporate recent trends
- Public market return expectations represent a passive investment in the asset class (beta). They do not reflect value added from active management (alpha).

	U.S. Equity	International Equity	Private Equity	Global Smart Beta	Public Credit	Private Credit	Core (Plus) Fixed Income	Cash	Private Real Assets
Return - 10-Year (%)	4.50	5.85	7.45	5.10	6.45	8.20	5.25	4.00	6.00
Return - 20-Year (%)	5.35	6.45	8.25	5.85	6.30	8.25	5.15	3.80	6.30
Return - 30-Year (%)	6.20	7.00	9.05	6.60	6.15	8.30	5.05	3.65	6.60
Risk (%)	17.00	19.00	29.65	17.05	8.95	12.75	4.70	0.75	10.80
Correlations									
U.S. Equity	1.00								
International Equity	0.84	1.00							
Private Equity	0.72	0.67	1.00						
Global Smart Beta	0.95	0.94	0.73	1.00					
Public Credit	0.58	0.60	0.40	0.61	1.00				
Private Credit	0.67	0.59	0.44	0.67	0.75	1.00			
Core (Plus) Fixed Income	0.28	0.08	0.30	0.20	0.32	0.24	1.00		
Cash	-0.05	-0.08	0.00	-0.06	-0.08	0.00	0.18	1.00	
Private Real Assets	0.53	0.49	0.48	0.53	0.59	0.61	0.16	-0.06	1.00

Appendix – Asset Allocation Ranges

Allowable Asset Allocation Ranges

Wilshire’s Asset Allocation Committee (WAAC) maintains standard asset allocation parameters which reflect generally observed market practices for institutional asset owners. While Wilshire expects most client portfolios will fall within these asset allocation ranges. Wilshire recognizes and occasionally recommends portfolio allocations that may diverge from these general ranges based on a client’s particular circumstances, goals or needs.

Asset Segment	Corporate DB	Public DB	E&F
Total Equity (Public+Private)	0% - 80%		
Private Equity (Aggregate)	0% - 15%	0% - 20%	0% - 30%
Fixed Income (Core/High-quality - Liquid IG)	10% - 100%	10% - 50%	
Other Fixed Income/Credit (Aggregate)	0% - 25%		
Private/Illiquid Credit (Aggregate)	0% - 15%		
High Yield	0% - 10%		
Other: EMD, Loans, Convertibles	0% - 7.5%		
Total Real Assets (Public + Private)	0% - 25%		
Total Real Estate (Public + Private)	0% - 25%		
RA Other: Commodities, Gold, Infra, GLI, MLPs, O&G, Timber	0% - 5%		
Marketable Alternatives (Aggregate)	0% - 12.5%		0% - 20%
Cash	0% - 5%		
Leverage	0% - 20%		
Total Private/Illiquid	0% - 25%	0% - 35%	0% - 50%

These thresholds were informed by allocation information from Greenwich Associates, and Wilshire Advisors, LLC, universe data and will be reviewed for reasonableness from time to time.

**Last Updated 04/2024*

Appendix – Efficient Frontier

Efficient Frontier Portfolios – Frontier 1

Asset Class	Current Target	Optimization Constraints	Minimum Risk	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6	Portfolio 7	Portfolio 8	Portfolio 9	Maximum Risk
U.S. Equity	21.00%	15% - 35% ¹	15.50%	15.50%	15.00%	15.50%	15.50%	18.00%	21.50%	24.50%	28.00%	31.00%
International Equity	13.00%		9.00%	9.00%	9.00%	9.00%	9.00%	10.50%	12.50%	14.50%	16.00%	18.50%
Private Equity	17.00%		15.00%	15.00%	17.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%
Global Smart Beta	5.00%		1.00%	1.00%	1.00%	2.50%	8.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Total Growth Assets	56.00%		40.50%	40.50%	42.00%	46.00%	51.50%	56.50%	62.00%	67.00%	72.00%	77.50%
Public Credit	3.00%	1% - 5%	1.00%	1.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	1.00%
Private Credit	8.00%		0.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Total Defensive Growth Assets	11.00%		1.00%	11.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	11.00%
Core (Plus) Fixed Income	22.50%	0% - 50%	49.00%	39.50%	31.50%	27.50%	22.00%	17.00%	11.50%	6.50%	1.50%	0.00%
Cash	1.00%		2.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total Defensive / Rate Sensitive Assets	23.50%		51.00%	39.50%	31.50%	27.50%	22.00%	17.00%	11.50%	6.50%	1.50%	0.00%
Private Real Assets	9.50%	7.5% - 11.5%	7.50%	9.00%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%
Total RA / Inflation Sensitive Assets	9.50%		7.50%	9.00%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%
Total Assets	100.0%		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Expected Return - 30 Years (%)	7.33		6.71	7.09	7.27	7.40	7.46	7.52	7.57	7.62	7.66	7.66
Standard Deviation of Return (%)	12.64		9.57	10.31	11.04	11.80	12.50	13.30	14.03	14.77	15.52	16.22
+ / (-) in Expected Return - 30 Years (bps)			(62)	(24)	(6)	7	13	19	24	29	33	33
+ / (-) in SD of Return (bps)			(307)	(233)	(160)	(84)	(14)	66	139	213	288	358
Sharpe Ratio - 30 Years	0.29		0.32	0.33	0.33	0.32	0.30	0.29	0.28	0.27	0.26	0.25

¹ U.S. Equity and International Equity are constrained to have market weight ratio. Currently at 63%/37%.

Efficient Frontier Portfolios – Frontier 2

Asset Class	Current Target	Optimization Constraints	Minimum Risk	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6	Portfolio 7	Portfolio 8	Portfolio 9	Maximum Risk
U.S. Equity	21.00%	18% - 24% ¹	18.00%	18.00%	18.00%	18.00%	18.00%	18.00%	18.00%	18.50%	20.50%	24.00%
International Equity	13.00%	10% - 16% ¹	10.50%	10.50%	10.50%	10.50%	10.50%	10.50%	10.50%	11.00%	12.00%	14.00%
Private Equity	17.00%	15% - 19%	15.00%	16.50%	17.50%	18.50%	19.00%	19.00%	19.00%	19.00%	19.00%	19.00%
Global Smart Beta	5.00%	2% - 8%	5.50%	2.00%	2.00%	2.00%	3.00%	5.00%	7.00%	8.00%	8.00%	5.00%
Total Growth Assets	56.00%		49.00%	47.00%	48.00%	49.00%	50.50%	52.50%	54.50%	56.50%	59.50%	62.00%
Public Credit	3.00%	1% - 5%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	4.50%	2.50%	1.00%	1.00%
Private Credit	8.00%	6% - 10%	6.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Total Defensive Growth Assets	11.00%		11.00%	15.00%	15.00%	15.00%	15.00%	15.00%	14.50%	12.50%	11.00%	11.00%
Core (Plus) Fixed Income	22.50%	19.5% - 25.5%	25.50%	25.50%	25.50%	24.50%	23.00%	21.00%	19.50%	19.50%	19.50%	19.50%
Cash	1.00%	0% - 3%	3.00%	1.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total Defensive / Rate Sensitive Assets	23.50%		28.50%	26.50%	25.50%	24.50%	23.00%	21.00%	19.50%	19.50%	19.50%	19.50%
Private Real Assets	9.50%	7.5% - 11.5%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	10.00%	7.50%
Total RA / Inflation Sensitive Assets	9.50%		11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	11.50%	10.00%	7.50%
Total Assets	100.0%		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Expected Return - 30 Years (%)	7.33		7.12	7.31	7.37	7.42	7.45	7.47	7.49	7.50	7.50	7.49
Standard Deviation of Return (%)	12.64		11.44	11.69	11.95	12.20	12.43	12.69	12.96	13.18	13.47	13.69
+/(-) in Expected Return - 30 Years (bps)			(21)	(2)	4	9	12	14	16	17	17	16
+/(-) in SD of Return (bps)			(120)	(95)	(69)	(44)	(21)	5	32	54	83	105
Sharpe Ratio - 30 Years	0.29		0.30	0.31	0.31	0.31	0.31	0.30	0.30	0.29	0.29	0.28

¹ U.S. Equity and International Equity are constrained to have market weight ratio. Currently at 63%/37%.

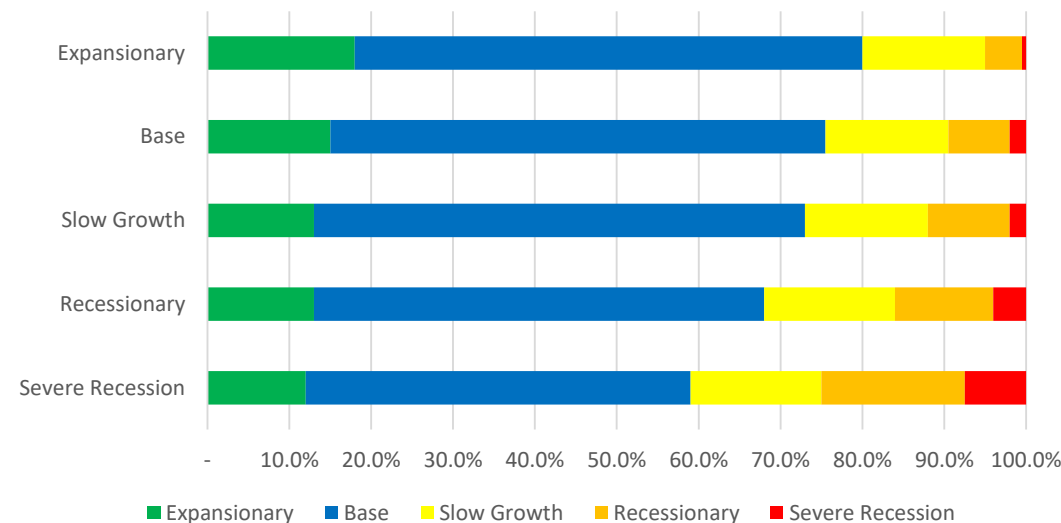
Appendix – Regimes

Efficient Frontier Portfolios

Managing drawdown risk – the “uncertainty around the uncertainty”

- Most simulation models assume returns are log-normally distributed*
- Though reasonable in most years, left-tail events occur more frequently than predicted
- A regime switching model can help us pre-experience uncomfortable return paths that fall outside a normal distribution’s field of view

	expansionary	base	slow growth	recessionary	severe recession
expansionary	18.0%	62.0%	15.0%	4.5%	0.5%
base	15.0%	60.5%	15.0%	7.5%	2.0%
slow growth	13.0%	60.0%	15.0%	10.0%	2.0%
recessionary	13.0%	55.0%	16.0%	12.0%	4.0%
severe recession	12.0%	47.0%	16.0%	17.5%	7.5%



*Probability distribution of random outcomes whose logarithms are normally distributed with positive skewness versus those of a normal distribution with symmetry, equally distributed with both positive and negative

Stress Testing: Regime Assumptions

- In below trend and worse environments, the portfolio's return expectations is materially lower and the volatility is materially higher
- Volatility in the below trend and worse environments are left-skewed, i.e. negative-skewed

	US Stocks	Dev xUS Stocks	EM Stocks	Prvt Mkts	Cash	Core Bonds	LT Bonds	US TIPS	HY	US RES	Private RE	Commodities	Current Target
Expansionary/Above Trend Growth													
Return (%)	9.85	10.85	11.10	16.80	4.00	4.65	3.60	2.60	9.15	9.85	8.60	6.30	10.48
Risk (%)	12.00	13.00	21.00	22.15	0.75	5.20	10.85	6.50	8.00	13.50	10.90	16.00	9.49
Baseline/Trend Growth													
Return (%)	4.50	5.50	5.75	7.45	4.00	5.25	5.20	4.60	6.50	5.85	6.25	6.30	6.48
Risk (%)	17.00	18.00	26.00	29.65	0.75	4.70	9.85	6.00	10.00	17.50	13.90	16.00	12.64
Slow Growth/Below Trend													
Return (%)	1.85	2.85	3.10	2.80	4.00	5.55	6.00	5.60	5.15	3.85	5.10	6.30	4.67
Risk (%)	22.00	23.00	31.00	37.15	0.75	5.70	11.85	7.50	12.00	21.50	16.90	18.00	16.24
Recessionary/Negative Growth													
Return (%)	(5.50)	(4.50)	(4.25)	(10.05)	4.00	6.40	8.20	8.35	1.50	(1.65)	1.90	6.30	(0.77)
Risk (%)	27.00	28.00	36.00	44.65	0.75	6.70	13.85	9.00	15.00	27.50	21.90	21.00	19.96
Severe Recession/Deflation													
Return (%)	(43.50)	(42.50)	(42.25)	(50.00)	4.00	10.65	19.60	22.60	(17.50)	(30.15)	(14.75)	6.30	(24.22)
Risk (%)	42.00	43.00	51.00	54.65	0.75	14.70	29.85	21.00	20.00	42.50	33.90	26.00	28.35

Stress Testing: Regime Descriptions

Regime Descriptions

- **Expansionary/Above Trend Growth** – Regime when the economy is coming out of a recession, or the economy is running above long-run capacity. Wilshire does not project the economy to remain in this regime over longer periods.
- **Baseline/Trend Growth** – The long term expected state of the economy. Wilshire's capital market assumptions are based on this regime.
- **Slow Growth/Below Trend** – Regime when the economy is running at less than full capacity.
- **Recessionary/Negative Growth** – Regime when the economy has below zero growth. Wilshire expects the economy would be in a recession.
- **Severe Recession/Deflation** – Regime when the economy defined by significantly negative growth. Wilshire does not project the economy to remain in this regime over longer periods.

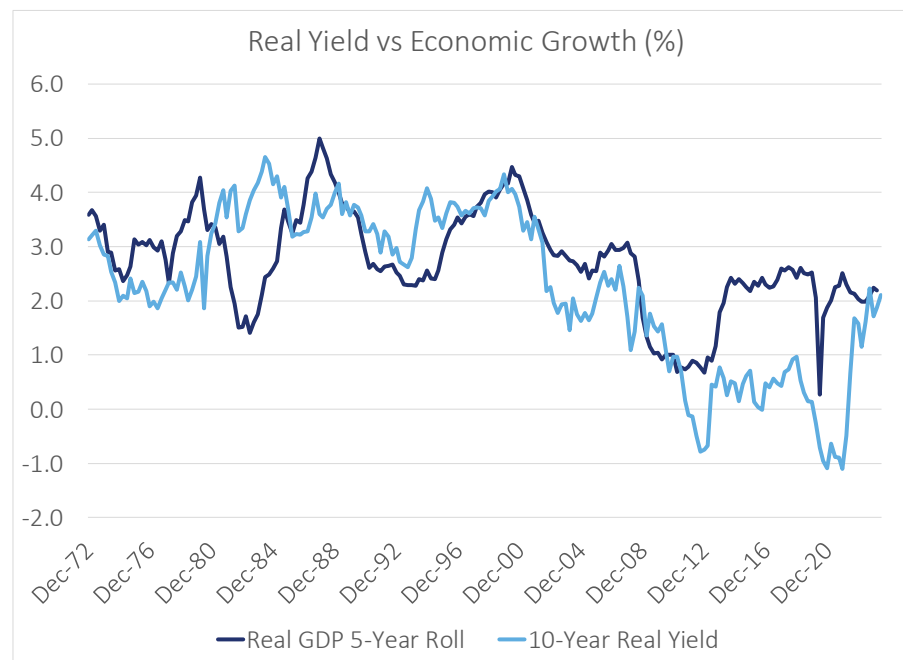
Appendix – Economic Factor Exposures

Why Introduce Factors?

- **Risk Assessment:** Including factors within the asset allocation process provides an opportunity to measure asset class (and portfolio) exposures to key economic factors
- **Economic Efficiency:** If the underlying economic activity that drives asset performance can be identified, perhaps it can be used to assist in building economically-efficient portfolios
- **Portfolio Stability:** Macroeconomic risk factors – when separated from the valuation component inherent in investment pricing – may exhibit more stable correlations and, therefore, can better inform the allocation process

Growth Proxy

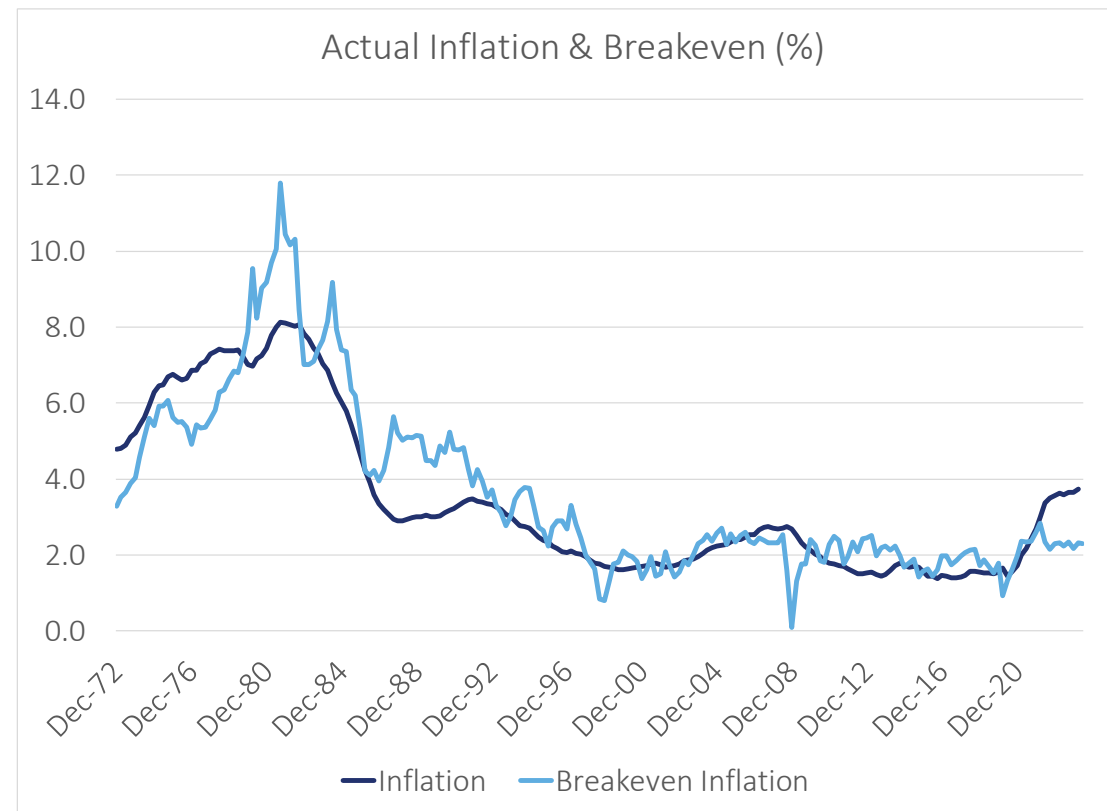
- Interest rates contain information and can reflect economic factors
- Nominal yields aggregate two important and distinct sources of economic information – real yields and expected inflation
- Disaggregating these factors should prove beneficial in developing a set of factors with improved explanatory power



Data Source: Federal Reserve, Bridgewater

Inflation Proxy

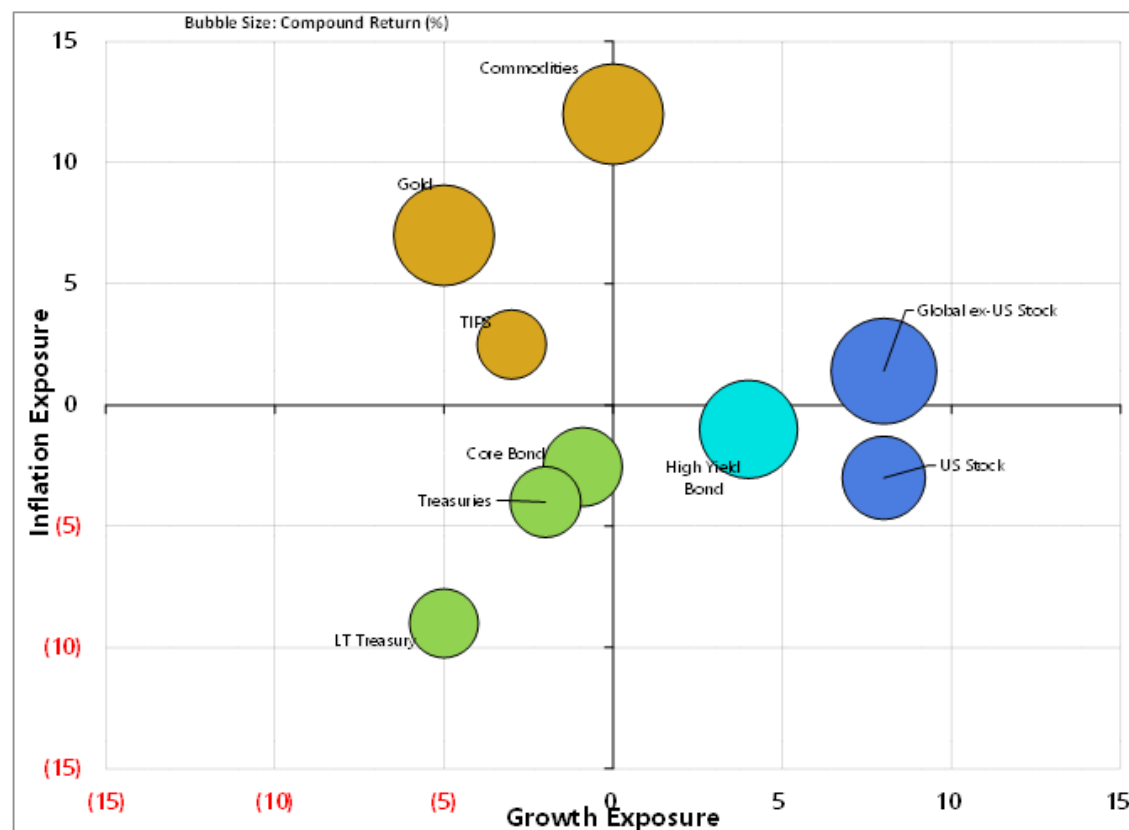
- Breakeven inflation is the market's expectation for inflation
- Tends to follow closely with actual, recent inflation and can act as a timely signal of trends in consumer prices



Data Source: Federal Reserve, Bridgewater

Wilshire's Approach

- Employ a 2-factor regression model (growth and inflation) to formulate factor assumptions
- Growth proxy is enhanced by high yield bond spreads to better capture shifts in growth forecasts



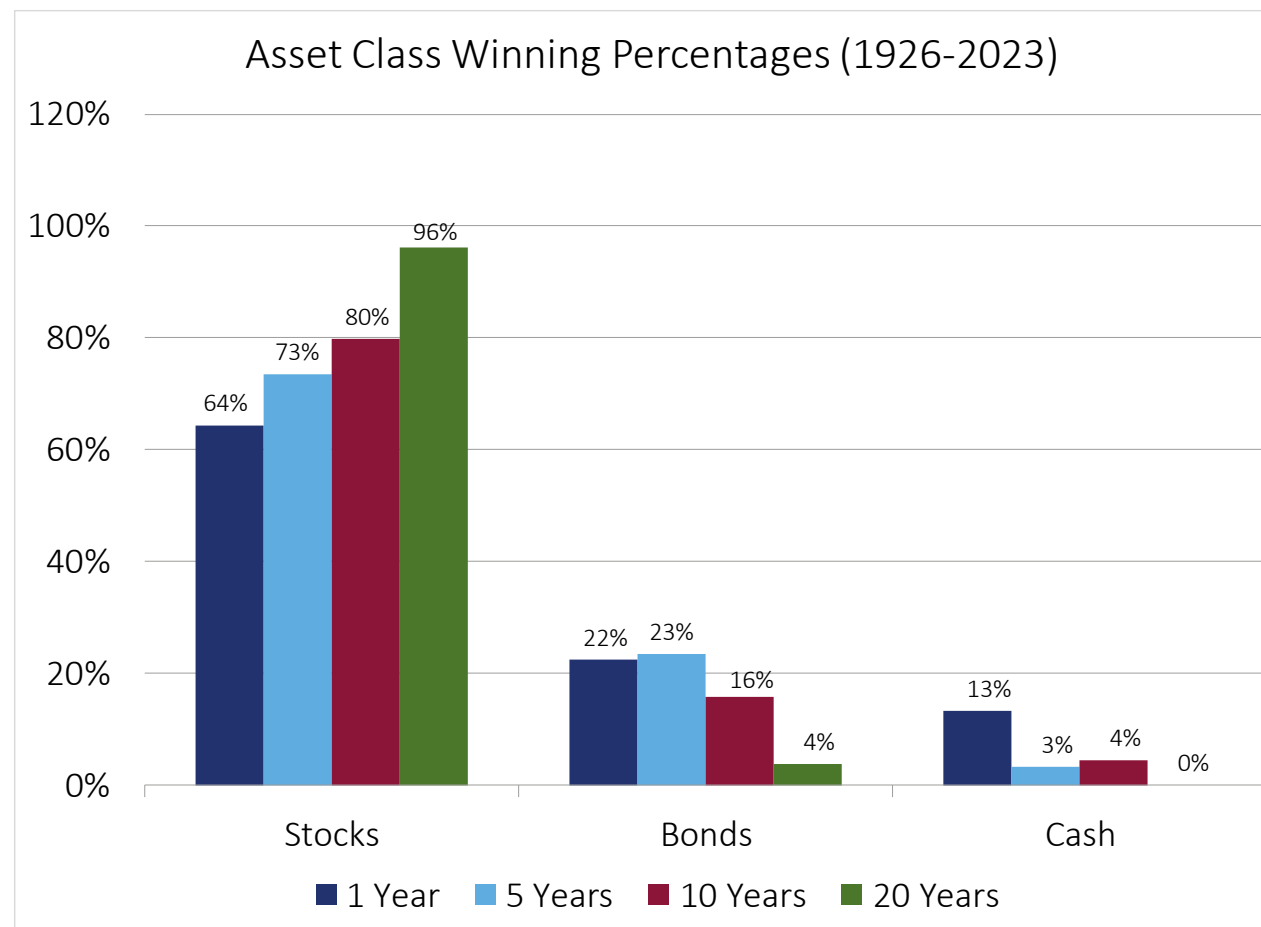
Appendix – Liquidity

Liquidity Risk: What Are The Consequences?

Default/Insolvency is the most severe outcome from having insufficient liquidity, but...

There are many other, more likely, disruptive impacts that a lack of liquidity can impose on an investment portfolio

- Liquidity breaches can rob an investor of their biggest advantage: a long-term investment horizon
- The timing and price of such sales dictated by liquidity needs rather than by explicit investment rationale
- Can destroy portfolio value and effectively strip a portfolio from its ability to recover from market sell-offs



Wilshire Liquidity Metric

Wilshire's Liquidity Metric framework has two levels:

- **Market Level of Liquidity**
- **Overall Level of Liquidity**

Market Level of Liquidity

- Quantified on scale from 0% (low liquidity) to 100% (high liquidity)
- Designed to capture general notion of marketable versus private/off-market transactions
 - Marketable asset classes typically reflect a 90% or 100%
 - Private asset classes reflect 0%
- Goal is to reflect the tradability of assets, which is helpful in connecting these values back to our definitional framework (i.e., to quantify the differences between Convertible Liquidity and Delayed Liquidity)

Wilshire Liquidity Metric

Wilshire's Liquidity Metric framework has two levels:

- **Market Level of Liquidity**
- **Overall Level of Liquidity**

Overall Liquidity Metric

Includes a penalty process to reflect the loss in practical liquidity due to asset class volatility and sensitivity to particular economic environments

Penalty components:

1. **Growth Penalty:**
 - Impacts asset classes with vulnerability to slowing growth
 - Recognizes the hit to liquidity that can occur during growth related bear markets
2. **Inflation Penalty:**
 - Impacts asset classes with vulnerability to rising inflation
 - Recognizes the hit to liquidity that can occur during inflation driven bear markets
3. **Volatility Penalty:**
 - Impacts higher volatility asset classes
 - Recognizes the hit to liquidity that can occur from any form of volatility

Wilshire Stressed Liquidity Metric

Stressed Level of Liquidity Metric

Asset Class	Market Liquidity	Liquidity Penalty Components			Applied Penalty	Stressed Liquidity
		Growth	Inflation	Volatility		
US Equity	100	50		24	50	0
Dev ex-US Equity	100	50		26	50	0
EM Equity	90	50		40	50	0
Private Equity	0	50		40	0	0
Cash Equivalents	100				0	100
Core Bonds	100		8		8	86
High Yield Bonds	80	40		10	40	0
US Real Estate Securities	90	50		24	50	0
Private Real Estate	0	50		18	0	0
Commodities	90			20	20	55

Applied Penalty = Min(Max(Growth + Inflation, Volatility), Market Liquidity)

Stressed Liquidity * = Market Liquidity - (1.75 x Applied Penalty)

** If less than 20, Stressed Liquidity is assumed to be 0*

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BETA REPORT

IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM PORTFOLIO

PRELIMINARY (Unreconciled) MARKET VALUES AT

9/13/2024

	Actual		Overlay		Total		Policy		Difference	
PUBLIC MARKETS										
Domestic	\$	9,567,427,389	\$	24,740,599	\$	9,592,167,989	\$	9,559,515,858	\$	32,652,130
International	\$	5,896,952,955	\$	42,867,312	\$	5,939,820,266	\$	5,915,874,793	\$	23,945,473
Global Smart Beta	\$	2,283,865,001			\$	2,283,865,001	\$	2,276,715,451	\$	7,149,551
Total Equities	\$	17,748,245,345			\$	17,815,853,256	\$	17,752,106,102	\$	63,747,154
Core Fixed Income	\$	11,526,606,528	\$	61,655,997	\$	11,588,262,526	\$	11,607,663,419	\$	(19,400,894)
Public Credit	\$	1,373,959,573			\$	1,373,959,573	\$	1,366,925,615	\$	7,033,958
Cash	\$	571,646,040	\$	(129,263,908)	\$	442,382,132	\$	457,135,779	\$	(14,753,647)
PRIVATE MARKETS	\$	13,596,775,792			\$	13,596,775,792	\$	13,633,402,363	\$	(36,626,571)
Private Equity	\$	7,879,049,877			\$	7,879,049,877	\$	7,914,723,397	\$	(35,673,520)
Private Credit	\$	2,651,601,235			\$	2,651,601,235	\$	2,644,216,763	\$	7,384,471
Private Real Assets	\$	3,066,124,680			\$	3,066,124,680	\$	3,074,462,203	\$	(8,337,523)
TOTAL FUND	\$	44,817,233,279					\$	44,817,233,279	\$	-

	Actual	Overlay	Total	Policy	Difference
PUBLIC MARKETS					
Domestic	21.35%	0.06%	21.40%	21.33%	0.07%
International	13.16%	0.10%	13.25%	13.20%	0.05%
Global Smart Beta	5.10%		5.10%	5.08%	0.02%
Total Equities	39.60%		39.75%	39.61%	0.14%
Core Plus	25.72%	0.14%	25.86%	25.90%	-0.04%
Public Credit	3.07%		3.07%	3.05%	0.02%
Cash	1.28%	-0.29%	0.99%	1.02%	-0.03%
PRIVATE MARKETS					
Private Equity	17.58%		17.58%	17.66%	-0.08%
Private Credit	5.92%		5.92%	5.90%	0.02%
Private Real Assets	6.84%		6.84%	6.86%	-0.02%
TOTAL FUND	100.00%			100.00%	0.00%

BETA REPORT							
IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM PORTFOLIO							
PRELIMINARY (Unreconciled) MARKET VALUES AT							
9/13/2024							
PUBLIC PORTFOLIO		69.66%	\$	31,220,457,487			
Manager Name	Manager % of Asset Class	Total Market Value		Manager Name	Manager % of Asset Class	Total Market Value	
Blackrock R2000 SAE	2.40%	\$	229,207,812	Western	0.00%	\$	339,171
Blackrock Russell 1000 Alpha Tilts	21.56%	\$	2,063,140,593	IPERS MESIROW EM CURRENCY	2.13%	\$	244,993,554
DOMESTIC EQUITY - ACTIVE	5.11%	\$	2,292,348,405	IPERS MAN EM GLOBAL MACRO	1.32%	\$	152,004,573
Mellon - Russell 1000 Index	72.67%	\$	6,952,686,272	Blackrock	0.00%	\$	3,702
Mellon - Russell 2000 Index	2.54%	\$	243,232,533	Principal Global Investors	0.00%	\$	2,197
Rhumbline Advisers	0.00%	\$	-	TCW	0.00%	\$	102,907
Parametric - Domestic Equity	0.83%	\$	79,160,180	Prudential	0.00%	\$	1,533
NT Transition Manager	0.00%	\$	-	BlackRock Universal Alpha	2.70%	\$	311,263,391
DOMESTIC EQUITY - PASSIVE	16.23%	\$	7,275,078,985	BlackRock Universal Beta	3.22%	\$	371,486,701
TOTAL DOMESTIC EQUITY	21.35%	\$	9,567,427,389	Mackay Shields	0.00%	\$	57
Blackrock - Canada	7.88%	\$	464,718,358	PGIM GLRV Alpha	2.33%	\$	268,120,810
Passive - Blackrock EAFE	35.89%	\$	2,116,345,661	PGIM GLRV Beta	2.41%	\$	278,251,349
Parametric - Int'l Equity	0.87%	\$	51,268,726	CORE PLUS - ACTIVE	3.63%	\$	1,626,569,946
Mellon Passive Emerging	16.77%	\$	989,133,669	Parametric - Fixed Income	0.27%	\$	30,748,787
INTERNATIONAL EQUITY - PASSIVE	8.08%	\$	3,621,466,414	Mellon SLH Agg	85.62%	\$	9,869,287,795
Blackrock EAFE SAE	20.65%	\$	1,217,811,677	CORE PLUS - PASSIVE	22.09%	\$	9,900,036,582
Blackrock EM SAE	6.73%	\$	396,725,067	TOTAL CORE PLUS	25.72%	\$	11,526,606,528
Blackrock Europe Alpha Tilt	0.19%	\$	11,467,523	Oaktree Capital Management	0.10%	\$	1,419,097
BMO EAFE	0.04%	\$	2,600,013	Aegon USA	32.43%	\$	445,542,915
International Equity Transition	0.01%	\$	326,170	Prudential EMD	34.11%	\$	468,663,270
Oechsle	0.01%	\$	753,448	PGIM High Yield	33.36%	\$	458,334,292
PanAgora Dynamic EAFE	6.57%	\$	387,387,669	TOTAL PUBLIC CREDIT	3.07%	\$	1,373,959,573
Columbia EAFE Equity	0.09%	\$	5,152,064	UBS - US	59.99%	\$	1,370,024,277
Wellington EM	4.29%	\$	253,262,909	UBS - Developed ex US	30.06%	\$	686,554,929
INTERNATIONAL EQUITY - ACTIVE	5.08%	\$	2,275,486,541	UBS - EM	9.95%	\$	227,285,796
TOTAL INTERNATIONAL EQUITY	13.16%	\$	5,896,952,955	TOTAL GLOBAL SMART BETA EQUITIES	5.10%	\$	2,283,865,001
				Cash Account	60.17%	\$	343,943,188
				LARS Liquid Assets	39.83%	\$	227,702,852
				Parametric - Directed Trades	0.00%	\$	-
				Parametric - Synthetic Cash	0.00%	\$	-
				Public Real Assets Cash	0.00%	\$	-
				Pending Cash	0.00%	\$	-
				CASH ACCOUNT	1.28%	\$	571,646,040
PRIVATE PORTFOLIO		30.34%	\$	13,596,775,792			
Manager Name	Manager % of Asset Class	Total Market Value		Manager Name	Manager % of Asset Class	Total Market Value	
Legacy Portfolio	10.31%	\$	812,479,386	RREEF	39.28%	\$	940,663,673
Pathway PE Fund XXV	89.69%	\$	7,066,570,491	Clarion Partners	8.37%	\$	200,453,139
PRIVATE EQUITY	17.58%	\$	7,879,049,877	Invesco	32.15%	\$	769,807,873
BlackRock	35.15%	\$	334,922,597	UBS Realty	20.20%	\$	483,698,344
Pathway XXV-B	22.00%	\$	209,639,165	REAL ESTATE	5.34%	\$	2,394,623,028
Monroe Capital	42.86%	\$	408,390,763	Brookfield Super Core Infrastructure	49.14%	\$	329,952,785
DIRECT LENDING	2.13%	\$	952,952,524	Forest Invest	34.36%	\$	230,703,710
ArrowMark	9.74%	\$	94,756,625	UBS Farmland Investors	16.51%	\$	110,845,157
Crestline Opps Credit IA	19.64%	\$	191,084,229	OTHER REAL ASSETS	1.50%	\$	671,501,652
Crestline Opps Credit IA SRS	5.67%	\$	55,127,861	PRIVATE REAL ASSETS	6.84%	\$	3,066,124,680
Audax Mezzanine Fund V	3.33%	\$	32,359,592				
Marathon SPS IA Fund, L.P.	24.78%	\$	241,132,050				
KKR Goldfinch	29.10%	\$	283,148,178				
Ares Private Credit Solutions II	6.51%	\$	63,303,223				
Audax Mezzanine Coinvest IA	1.24%	\$	12,104,670				
OPPORTUNISTIC	2.17%	\$	973,016,426				
Oaktree RECIF	6.64%	\$	48,210,131				
IPERS Principal OEDF	0.91%	\$	6,638,070				
ITE	11.75%	\$	85,281,061				
IFM USIDF	13.09%	\$	95,006,149				
PGIM RE Global Debt	16.44%	\$	119,300,972				
IPERS PGIM PREDS	9.73%	\$	70,569,315				
Principal RE Debt II	0.50%	\$	3,599,468				
KARED IV	13.32%	\$	96,660,301				
IPERS GTIF	13.70%	\$	99,393,777				
Heitman Credit	13.92%	\$	100,973,041				
REAL ASSETS CREDIT	1.62%	\$	725,632,285				
PRIVATE CREDIT	5.92%	\$	2,651,601,235				
GRAND TOTAL		\$	44,817,233,279				
	PERCENT	DOLLARS					
PUBLIC MARKET	69.66%	\$	31,220,457,487				
PRIVATE MARKET	30.34%	\$	13,596,775,792				
TOTAL	100.00%	\$	44,817,233,279				

RECENT MARKET VALUES	
9/13/2024	\$ 44,817,233,279
9/6/2024	\$ 44,250,534,844
8/30/2024	\$ 44,772,625,260
8/23/2024	\$ 44,896,225,860
8/16/2024	\$ 44,515,605,954
8/9/2024	\$ 43,764,683,681
8/2/2024	\$ 43,818,659,538
7/26/2024	\$ 44,085,805,312
7/19/2024	\$ 44,057,151,673

IPERS Portfolio Structure and Allocations
Quarter End June 30, 2024
\$43.6 Billion

Public Markets – 69% of Total Fund (Equities 39%)				
Domestic Equity \$9.3 Billion 21.2%		International Equity \$5.7 Billion 13.0%		Global Smart Beta \$2.1 Billion 4.9%
Active \$2.2 Billion 23.9%	Passive \$7.0 Billion 76.1%	Active \$2.2 Billion 38.9%	Passive \$3.5 Billion 61.1%	Passive \$2.1 Billion 100.0%
BlackRock (R1000 SAE) \$2.0 billion	BNY Mellon (R1000) \$6.7 billion	BlackRock (EAFE SAE) \$1.2 billion	BlackRock (EAFE) \$2.1 billion	UBS (U.S. Equity Smart Beta) \$1.3 billion
BlackRock (R2000 SAE) \$215.6 million	BNY Mellon (R2000) \$246.6 million	Panagora (Dynamic EAFE) \$369.2 million	BlackRock (Canada) \$424.5 million	UBS (Developed ex U.S. Smart Beta) \$635.6 million
	Parametric (Synthetic) \$61.6 million	BlackRock (Emerging SAE) \$399.4 million	BNY Mellon (Emerging) \$917.0 million	UBS (Emerging Market Smart Beta) \$223.8 million
		Wellington (Emerging) \$258.3 million	Parametric (Synthetic) \$42.4 million	

Terminated managers with residual amounts in their accounts are not included.

IPERS Portfolio Structure and Allocations
Quarter End June 30, 2024
\$43.6 Billion

Public Markets – 69% of Total Fund (Fixed Income and Cash 30%)				
Core Fixed Income \$11.0 Billion 25.3%			Public Credit \$1.3 Billion 3.0%	Cash \$515.4 Million 1.2%
Active \$1.6 Billion 14.1%		Passive \$9.5 Billion 85.9%	Active \$1.3 Billion 100.0%	
BlackRock Universal (Relative Value) \$648.3 million	PGIM Universal (Relative Value) \$516.5 million	BNY Mellon Agg (Core) \$9.4 billion	Aegon USA (High Yield) \$426.2 million	BNY Mellon (Cash) \$274.5 million
Man EM Global Macro (Relative Value) \$150.6 million	Mesirow EM Currency (Relative Value) \$239.3 million	Parametric (Synthetic) \$25.1 million	PGIM (High Yield) \$440.4 million	LARS Liquid Assets (Cash) \$241.0 million
			PGIM (Emerging Market Debt) \$443.5million	

Terminated managers with residual amounts in their accounts are not included.

IPERS Portfolio Structure and Allocations
Quarter End June 30, 2024
\$43.6 Billion

Private Markets – 31% of Total Fund				
Private Equity \$8.0 Billion 18.4%	Private Real Assets \$3.1 Billion 7.1%	Private Credit \$2.6 Billion 5.9%		
Pathway Capital (Private Equity) \$8.0 billion	Clarion Partners (RE Equity) \$242.5 million	Tennenbaum Capital (Direct Lending) \$334.9 million	PGIM PREDS (Real Assets Credit) \$71.5 million	Audax Mezz Coinvest (Opportunistic Credit) \$12.3 million
	Invesco (RE Equity) \$773.3 million	Monroe Capital (Direct Lending) \$415.8 million	Heitman Credit (Real Asset Credit) \$102.7 million	Audax Mezz V (Opportunistic Credit) \$29.7 million
	RREEF (RE Equity) \$909.3 million	Pathway Capital (Direct Lending) \$215.3 million	IFM USIDF (Real Asset Credit) \$90.2 million	Arrowmark (Opportunistic Credit) \$98.1 million
	UBS Realty (RE Equity) \$486.5 million	Oaktree RECIF (Real Assets Credit) \$33.2 million	PGIM RE Global Debt (Real Assets Credit) \$119.3 million	Crestline Opp Credit (Opportunistic Credit) \$194.2 million
	Forest Investment (Timber) \$230.7 million	Principal OEDF (Real Assets Credit) \$6.6 million	Kayne Anderson IV (Real Assets Credit) \$100.8 million	Crestline Opp Credit 2 (Opportunistic Credit) \$23.1 million
	UBS Farmland Investors (Farmland) \$110.8 million	Principal Global II (Real Assets Credit) \$3.6 million	JP Morgan GTIF (Real Asset Credit) \$101.5 million	Marathon SPS IA (Opportunistic Credit) \$187.6 million
	Brookfield (Infrastructure) \$330.0 million	ITE Rail Fund (Real Asset Credit) \$86.3 million	KKR Goldfinch (Opportunistic Credit) \$292.1 million	ARES PCS II (Opportunistic Credit) \$68.1 million

Alpha Report

For periods ending June 30, 2024

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IPERS' Active Manager Alpha Scorecard

Net of Fees as of 2Q24	2Q24	1 Year	3 Year	5 Year	SI	Perf	Org	People	Process
Domestic Equity									
BlackRock - Russell 1000 SAE	0.88%	3.03%	NA	NA	1.17%				
BlackRock - Russell 2000 SAE	0.01%	3.07%	1.32%	1.64%	1.70%				
International Equity									
BlackRock – EAFE SAE	2.02%	2.32%	2.03%	1.23%	1.46%				
PanAgora - Dynamic EAFE	1.52%	4.19%	2.07%	1.34%	1.01%				
Wellington - Emerging Markets	1.69%	2.64%	-0.64%	1.87%	0.28%				
BlackRock - Emerging Markets SAE	-0.11%	1.75%	-0.45%	-0.24%	-0.22%				
Core Fixed Income									
BlackRock - Universal	0.52%	2.90%	1.37%	NA	1.42%				
PGIM - Universal	-0.62%	-0.70%	-0.10%	NA	-0.18%				
Man EM Global Macro	1.88%	NA	NA	NA	-13.16%				
Mesirow EM Currency	-2.53%	NA	NA	NA	-10.38%				
Public Credit									
PGIM - High Yield	0.18%	0.57%	0.01%	0.64%	0.64%				
Aegon USA - High Yield	-0.08%	-0.74%	-0.32%	-0.21%	0.22%				
PGIM - Emerging Market Debt	0.49%	2.67%	0.62%	0.32%	0.89%				
LARS									
Aspect Capital	-2.92%	3.68%	NA	NA	8.09%				
Graham Capital Management	-1.34%	-0.71%	6.99%	0.54%	4.27%				
P/E Global	-0.10%	4.36%	9.03%	0.46%	4.32%				
PIMCO	3.04%	11.20%	NA	NA	12.53%				
Welton Global	-1.15%	-6.80%	-1.58%	NA	-1.58%				
ARP	-0.48%	-0.93%	NA	NA	-2.11%				



No Concerns



Minor Concerns



Material Concerns

IPERS' Active Manager Listing

MANAGER	INCEPTION DATE	MANDATE	BENCHMARK
Domestic Equity			
BlackRock - Russell 1000 SAE	May 2022	Large Cap	Russell 1000
BlackRock - Russell 2000 SAE	May 2019	Small Cap	Russell 2000
International Equity			
BlackRock – EAFE SAE	May 2019	Developed EAFE	MSCI EAFE Index (net)
PanAgora - Dynamic EAFE	May 2019	Developed EAFE	MSCI EAFE Index (net)
Wellington - Emerging Markets	February 2009	Global Emerging Markets	MSCI Emerging Markets (net)
BlackRock - Emerging Markets SAE	May 2019	Global Emerging Markets	MSCI Emerging Markets (net)
Core Fixed Income			
BlackRock - Universal	November 2020	Relative Value	Bloomberg Barclays U.S. Aggregate
PGIM - Universal	March 2021	Relative Value	Bloomberg Barclays U.S. Aggregate
Man EM Global Macro	October 2023	Relative Value	Bloomberg Barclays U.S. Aggregate
Mesirow EM Currency	October 2023	Relative Value	Bloomberg Barclays U.S. Aggregate
Public Credit			
PGIM - High Yield	June 2019	High Yield	Bloomberg US HY 2% Capped Index
Aegon USA - High Yield	February 2012	High Yield	High Yield Policy Index
PGIM - Emerging Market Debt	April 2016	Emerging Market Debt	JP Morgan EMBI Global
LARS			
Aspect Capital	March 2022	Diversified Trend	Absolute Return
Graham Capital Management	December 2016	Tactical Trend	Absolute Return
P/E Global	December 2016	FX Strategy	Absolute Return
PIMCO	July 2022	Commodity Alpha	Absolute Return
Welton Global	June 2021	Welton Global	Absolute Return
ARP	November 2022	Alternative Risk Premium	Absolute Return

Private Market Program Manager Updates

For periods ending June 30, 2024

IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

September 26, 2024



IPERS' PMP Manager Scorecard

	1 Year	5 Year	10 Year	SI	Performance	Organization	People	Process
Private Equity								
Multi-Strategy								
Pathway	6.3%	17.1%	16.0%	13.0%				
Private Credit								
Direct Lending								
BlackRock	9.0%	7.1%	N/A	7.3%				
Monroe	7.1%	6.9%	N/A	7.4%				
Pathway	7.9%	N/A	N/A	8.3%				
Opportunistic								
Arrowmark	15.8%	N/A	N/A	9.4%				
Ares Private Credit Solutions II	14.6%	N/A	N/A	5.8%				
Audax Mezzanine Fund V	9.4%	N/A	N/A	18.5%				
Audax Mezzanine Co-Invest Fund	13.6%	N/A	N/A	11.5%				
Crestline Series I	11.3%	N/A	N/A	8.5%				
Crestline Series II	N/A	N/A	N/A	-0.1%				
KKR	10.0%	7.5%	N/A	7.7%				
Marathon	6.9%	N/A	N/A	6.4%				
Real Assets								
Heitman CREDIT	-3.5%	N/A	N/A	-2.9%				
IFM USIDF	3.4%	N/A	N/A	4.2%				
PGIM Global Real Estate Debt	9.9%	6.9%	N/A	6.8%				
Principal Real Estate Debt II	6.8%	4.5%	N/A	5.8%				
Kayne Anderson Real Estate Debt IV	10.4%	N/A	N/A	8.2%				
JP Morgan GTIF	8.5%	N/A	N/A	7.3%				
ITE Rail Fund IA	N/A	N/A	N/A	9.5%				
PGIM PREDS	N/A	N/A	N/A	1.6%				
Oaktree RECIF	N/A	N/A	N/A	1.0%				
Principal OEDF	-0.5%	N/A	N/A	-0.5%				



No Concerns




Minor Concerns




Material Concerns

IPERS' PMP Manager Scorecard

	1 Year	5 Year	10 Year	SI	Performance	Organization	People	Process
Private Real Assets								
Real Estate								
Clarion Partners	-31.0%	-6.1%	1.3%	3.8%				
Invesco	-12.7%	10.3%	12.0%	10.2%				
RREEF	-5.7%	7.3%	8.8%	9.3%				
UBS Realty	-5.7%	10.1%	10.9%	9.8%				
Other Real Assets								
Brookfield	10.2%	N/A	N/A	8.0%				
Forest Investment Associates	12.6%	7.8%	5.8%	6.4%				
UBS Farmland	8.5%	5.1%	N/A	7.3%				

 No Concerns

 Minor Concerns

 Material Concerns

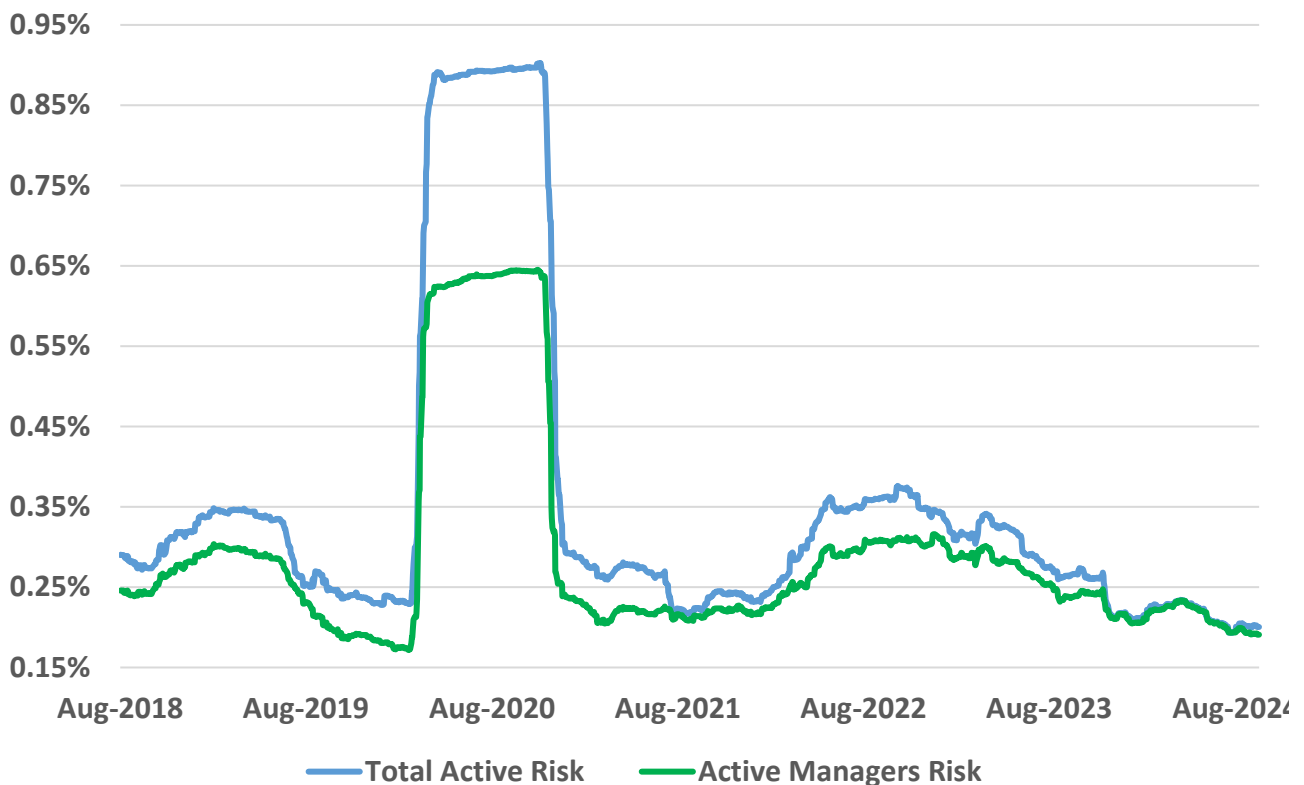
Active Risk –180 Days (Sep 2024)

	Active	Passive	Misfit	Total
Equities				
Domestic Equities	0.09%	0.01%	0.00%	0.09%
International Equities	0.08%	0.03%	0.00%	0.09%
Global Smart Beta Equities	-	0.00%	0.00%	0.00%
Fixed Income				
Core Fixed Income	0.10%	0.02%	0.00%	0.10%
Public Credit	0.02%	-	0.00%	0.02%
Cash/LARS	0.07%	-	-	0.07%
Asset Allocation	-	0.06%	-	0.06%
Total Public Markets	0.19%	0.07%	0.00%	0.20%

- Plan-level Total Active Risk stable at 0.20%
- No meaningful increases or decreases planned in the next quarter
- The effect of higher market volatility on active risk remains to be seen

Target	1.50%
Upper Limit	3.00%

External Active Risk –180 Days (Sep 2024)



2025

Board Meetings

JANUARY						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

FEBRUARY						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

MARCH						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

APRIL						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

MAY						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

JUNE						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

JULY						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

AUGUST						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

SEPTEMBER						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

OCTOBER						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

NOVEMBER						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

DECEMBER						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

March 28, 2025

CY2024 Investment Performance

June 19, 2025

Private Markets Program Review

September 24-25, 2025

Continuing Education Session

FY2025 Investment Performance Review

Asset Allocation

Investment Policy & Goal Statement

December 5, 2025

Actuarial Valuation Presentation