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# Commission Meeting Agenda

Thursday, September 12, 2024 at 9:30 a.m.

RSIC Presentation Center and Streaming Online at [www.rsic.sc.gov](http://www.rsic.sc.gov)

- I. Call to Order and Consent Agenda
  - A. Adoption of Proposed Agenda
  - B. Approval of June 2024 Minutes
- II. Chair's Report
  - A. Chair and Vice-Chair Elections
  - B. Commissioner Committee Selection
- III. Committee Reports
- IV. CEO's Report
  - A. Annual Budget Recommendation
- V. CIO's Report
  - A. Investment Performance – Fiscal Year Review
- VI. Five Year Strategic Asset Allocation Review Discussion
- VII. Delegated Investment Report
- VIII. Executive Session to discuss investment matters pursuant to S.C. Code Sections 9-16-80 and 9-16-320, including particular matters related to the Public Equity and Portable Alpha portfolios, and certain portions of the Consolidated Annual Investment Plan and Statement of Investment Objectives and Policies; to discuss personnel matters pursuant to S.C. Code Ann. Section 30-4-70(a)(1); and to receive advice from legal counsel pursuant to S.C. Code Section 30-4-70(a)(2).
- IX. Potential Action resulting from Executive Session
- X. Adjourn

#### NOTICE OF PUBLIC MEETING

*This notice is given to meet the requirements of the S.C. Freedom of Information Act and the Americans with Disabilities Act. Furthermore, this facility is accessible to individuals with disabilities, and special accommodations will be provided if requested in advance.*

**South Carolina Retirement System Investment Commission  
Meeting Minutes**

**June 13, 2024 9:30 a.m.**

**Capitol Center**

**1201 Main Street, 15<sup>th</sup> Floor**

**Columbia, South Carolina 29201**

**Meeting Location: 1201 Main Street, 15<sup>th</sup> Floor, Ste. 1510 & Streaming Online at  
[www.rsic.sc.gov](http://www.rsic.sc.gov)**

**Commissioners Present:**

Mr. William Hancock, Chair

Ms. Melissa Schumpert, Vice Chair (via telephone)

Ms. Peggy Boykin, PEBA Executive Director (via telephone)

Mr. William J. Condon, Jr.

Mr. Kenneth F. Deon (via telephone)

Mr. Edward Giobbe (via telephone)

Dr. Holley H. Ulbrich (via telephone)

Mr. Reynolds Williams (via telephone)

**I. Call to Order and Consent Agenda**

Chair William H. Hancock called the meeting of the South Carolina Retirement System Investment Commission (“Commission”) to order at 9:30 a.m. Mr. William J. Condon, Jr., made a motion to adopt the agenda as presented. Mr. Edward Giobbe seconded the motion, which was unanimously approved.

Ms. Peggy Boykin made a motion to approve the minutes of the Commission’s April 18-19, 2024, meeting. Ms. Melissa Schumpert seconded the motion, which was approved unanimously.

A link to the entire meeting is below:

[2024 06 13 Commission Meeting \(youtube.com\)](https://www.youtube.com/watch?v=2024_06_13_Commission_Meeting)

**II. Chair’s Report**

Chair Hancock stated that he had nothing to report.

**III. Committee Reports**

Chair Hancock noted that both the Human Resources and Compensation Committee (“HRCC”) and Audit and Enterprise Risk Management Committees (“AERMC”) had met since the last Commission meeting, and each Committee had provided a report that was made available to the Commissioners for review prior to the meeting. Hearing no questions, he concluded the reports.

#### IV. CEO's Report

Chair Hancock recognized Mr. Michael R. Hitchcock, Chief Executive Officer ("CEO"), for his report. Mr. Hitchcock began by stating that elections for the positions of Chair and Vice Chair of the Commission will be held in September of 2024. He reminded the Commissioners that the 2022 Chair and Vice Chair elections were carried over from June of 2022 to September of 2022, and for that reason, those two-year terms would not expire until September of 2024. He recommended that the Commission conduct the elections in September of 2024 but date the commencement of the terms back to July 1, 2024, so that moving forward the elections would be on a normal cycle. Mr. Hitchcock also mentioned that, if any Commissioners would like to request a change in their committee assignment, they should notify him or the Chair Hancock so that they can compile a proposed slate for the committee elections, as required by the Commission's Governance Policy.

Mr. Hitchcock then gave a brief legislative update, including an update on the process for RSIC's budget being approved. After a brief discussion with the Commissioners, he concluded his report.

A link to the CEO's Report is below:

<https://www.youtube.com/watch?v=tIZcfrQcCQM&t=127s>

#### V. CIO's Report

Next, Chair Hancock recognized Mr. Geoffrey Berg, Chief Investment Officer ("CIO"), for the fiscal year-to-date investment performance review as of March 31, 2024. Mr. Berg reported that the Plan was outperforming the policy benchmark for all trailing time periods, and noted that net benefit payments had decreased from a high of \$1.3 billion to less than \$100 million in the year ended March 31, 2024. Mr. Berg then reviewed performance with the Commissioners. He noted that the rally in public equities had propelled the Reference Portfolio to recent outperformance. The Reference Portfolio exceeded the Plan's returns for the fiscal year to date (11.65 percent) and trailing one-year (almost 16 percent), while Plan returns out-performed the Reference Portfolio over a three-year period.

Mr. Berg then reviewed the performance of individual asset classes. He stated that public equity, real assets, and hedge funds were outperforming their benchmarks fiscal year-to-date, but private equity underperformed. Mr. Berg also noted that private debt underperformed relative to its public debt benchmark, but the returns fiscal year-to-date were quite strong at 8.19 percent. Bonds were slightly underperforming with a return two basis points below the benchmark. Mr. Berg reviewed performance attribution, as well as compliance with the Consolidated Annual Investment Plan and Statement of Investment Objectives and Policies ("AIP/SIOP"). He reported that the private equity portfolio is back within its allowable range, but that the total private markets allocation continues to exceed the notification threshold. Mr. Berg reviewed the latest risk estimates and noted that no category had changed more than 0.1 percent recently. After a brief discussion with the Commissioners, he concluded his report.

A link to the CIO's Report is below:

<https://www.youtube.com/watch?v=tlZcfrQcCQM&t=534s>

## VI. Delegated Investment Report

Chair Hancock then recognized Mr. Berg for the delegated investment report. The following delegated investments were closed by Staff following the April 18-19, 2024, Commission meeting.

Delegated Investments (April 18, 2024 to June 12, 2024)			
Asset Class	Investment	Investment Amount	RSIC Commitment Date
Infrastructure	Peppertree Capital Fund X	\$40 M	April 23, 2024
Private Equity	HighVista Private Equity X	\$50 M	April 25, 2024
Private Equity	Paceline Equity Partners Opportunity Fund	\$50 M	May 1, 2025

## VII. Executive Session

Mr. Condon made a motion to recede into executive session to discuss investment matters, including specific co-investments and private equity investments, and certain portions of the AIP/SIOP, pursuant to S.C. Code Sections 9-16-80 and 9-16-320; to discuss personnel matters and to receive advice from legal counsel pursuant to S.C. Code Ann. Section 30-4-70(a)(1)-(2). Dr. Holley H. Ulbrich seconded the motion, which was approved unanimously. The Commission receded into executive session at 9:58 a.m.

## VIII. Potential Actions Resulting from Executive Session

Upon returning to open session, Mr. Hitchcock noted that the Commission did not take any action while in executive session.

## IX. Adjournment

There being no further business, the Commissioners adjourned by acclamation at 11:39 a.m.

[Staff Note: In compliance with S.C. Code Section 30-4-80, public notice of and the agenda for this meeting were delivered to the press and to parties who requested notice and were posted at the entrance, in the lobbies, and near the 15<sup>th</sup> Floor Presentation Center at 1201 Main Street, Columbia, S.C., by 9:11 a.m., on June 11, 2024.]

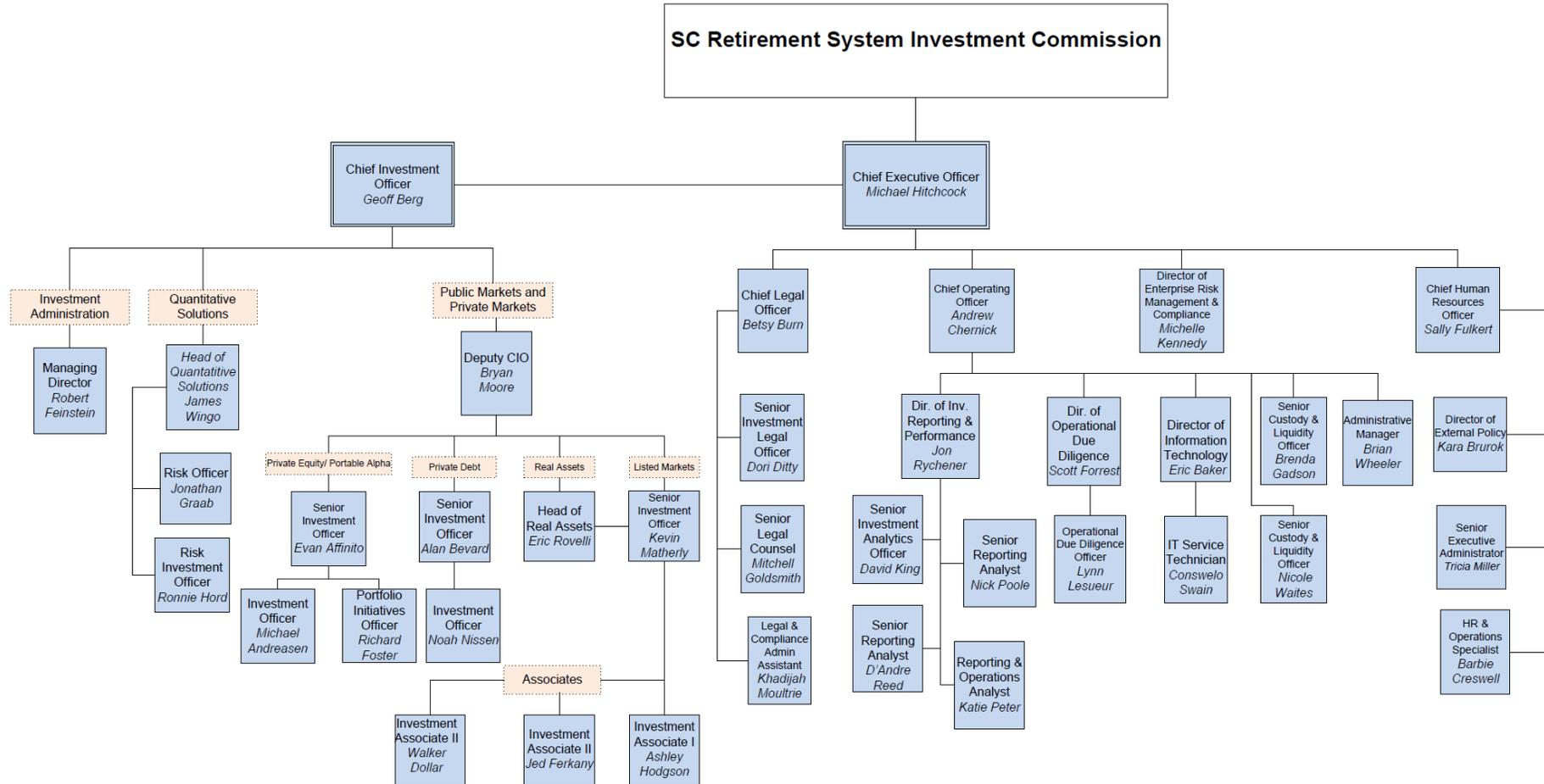
# South Carolina Retirement System Investment Commission

*FY 2025-2026 Budget Request*

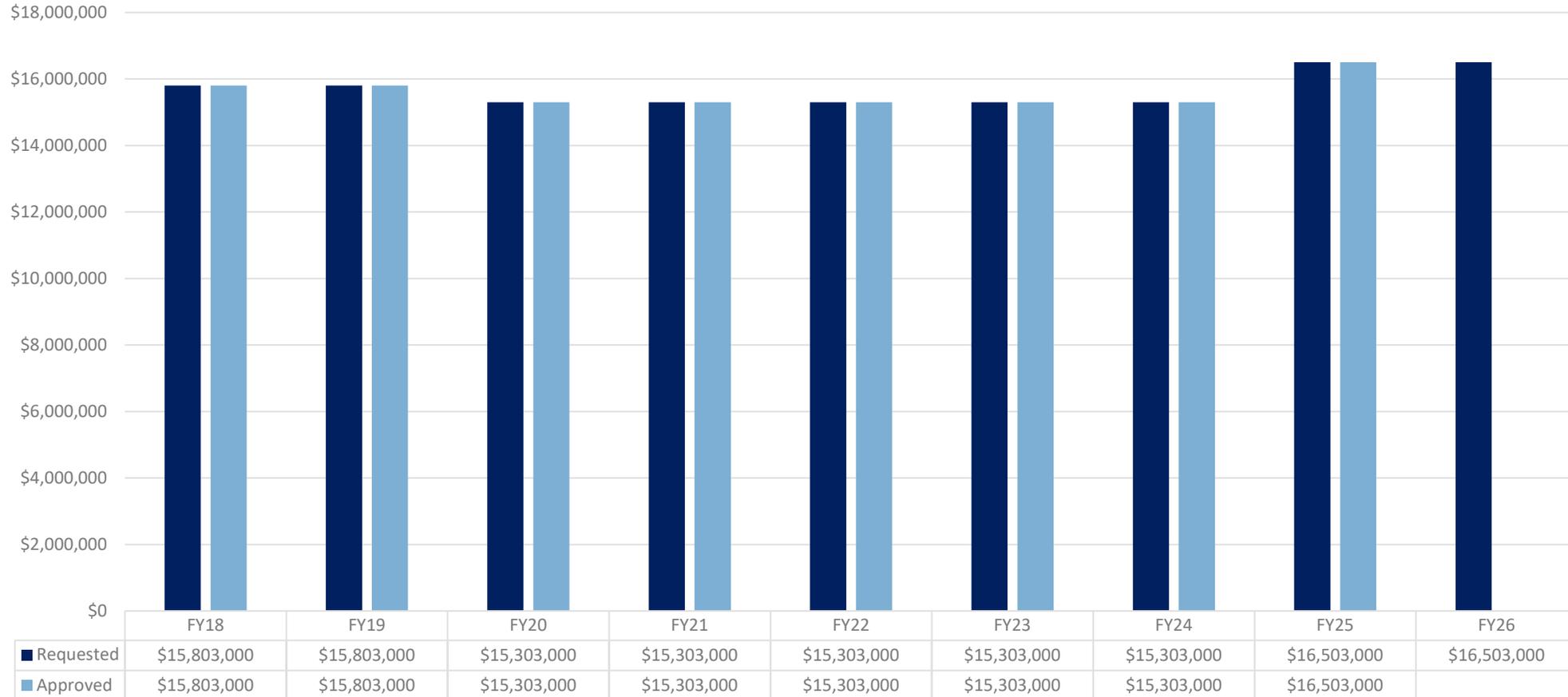
*Michael Hitchcock, CEO*



# Organizational Chart



# Recent Appropriations History



<b>Total Budget (Other Funds)</b>	
<b>\$16,503,000</b>	
Personal Services	\$8,500,000
Other Operating Expenses	\$5,503,000
Employer Contributions	\$2,500,000

The Commission requests no additional budget funds, but instead requests adjustment of how RSIC's total budget is allocated to better align with future budget projections.

- \$600,000 reduction to Other Operating Expenses
  - Continued cost-savings initiatives have resulted in a reduction of Other Operating Expenses.
- \$400,000 increase to Personal Services
  - Budget for potential future funding of Variable Compensation Plan (VCP).
  - VCP creates financial incentive for higher employee retention, as we continue to compete with the private investment sector for talent.
  - Program rewards investment staff when benchmark return goals are exceeded. Impact has a material positive increase to net assets.
- \$200,000 increase to Employer Contributions
  - Necessary to cover employer costs of health insurance, retirement, and social security associated with projected higher budgeted Personal Services.

- Authorized: 51
- Filled: 39
- Vacant: 12
  - 3 Investment Officers
  - 4 Investment Associates
  - 5 Additional Vacancies
- The Commission is not requesting any additional FTEs for FY 2025-2026 and has plans to fill vacant FTEs necessary to best serve the needs of the agency.

The Commission is requesting to maintain the current provisos

- **99.1 (RSIC: Fiduciary Audit)** *For Fiscal Year 2025-26, Section 9-16-380, relating to the solicitation and the bid for a fiduciary audit, is suspended.*
- **117.116 (GP: Retirement System Assets and Custodial Banking Relationship Transfer)** *In order to facilitate the transfer of custodianship of the assets of the Retirement System to the Public Employee Benefit Authority and governance of the custodial banking relationship to the Retirement System Investment Commission, all portions of contracts, agreements, and exemptions from the Consolidated Procurement Code providing for and relating to custodial banking, general banking, accounting, or any other ancillary services are transferred to, and devolved upon, the Public Employee Benefit Authority and the Retirement System Investment Commission in accordance with the authority transferred to the respective agency.*

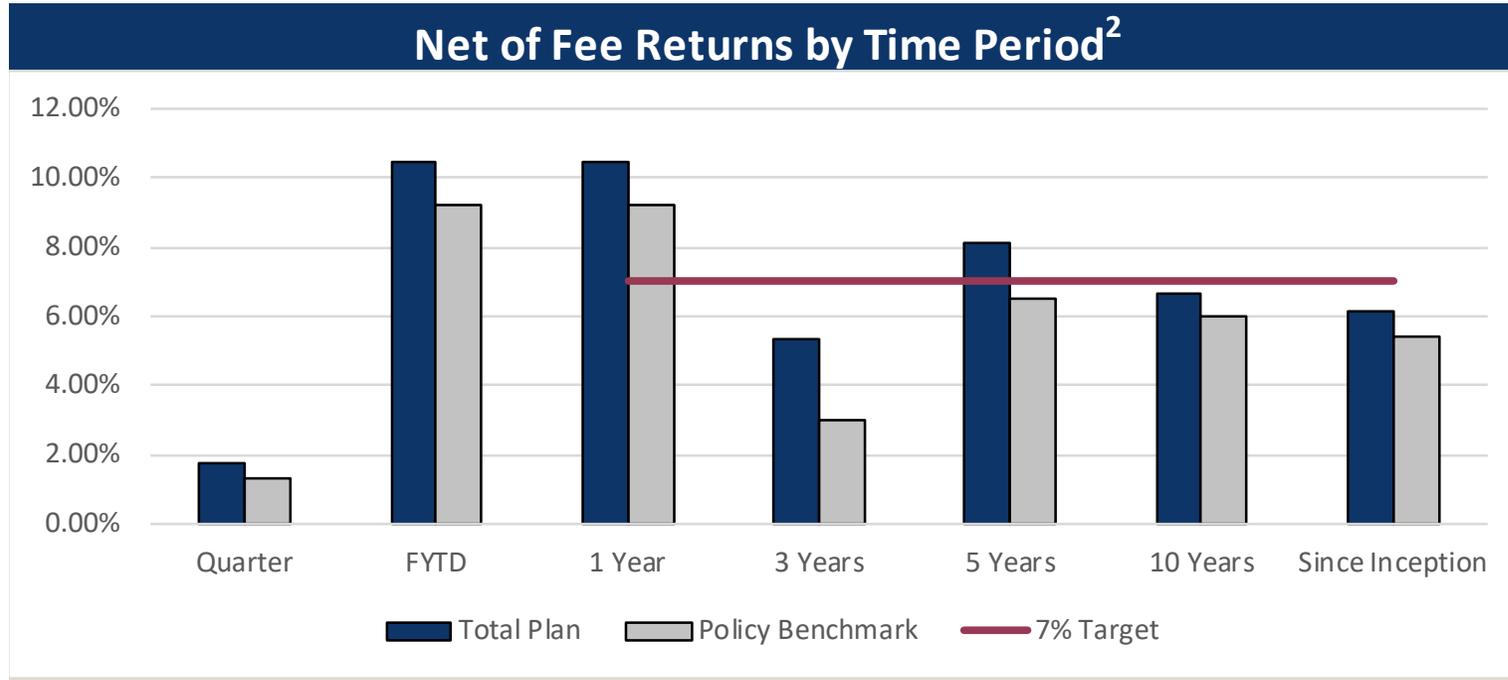
# RSIC Performance Analysis

Data as of 06-30-2024



# Performance - Plan & Policy Benchmark<sup>2</sup>

As of June 30, 2024



Executive Summary	Rolling period performance as of June 30, 2024 <sup>1</sup>		Annualized					
	Market Value (millions)	Quarter	FYTD	1 Year	3 Years	5 Years	10 Years	Since Inception
<b>Total Plan</b>	<b>\$44,875</b>	<b>1.73%</b>	<b>10.49%</b>	<b>10.49%</b>	<b>5.34%</b>	<b>8.14%</b>	<b>6.66%</b>	<b>6.14%</b>
<b>Policy Benchmark</b>		1.35%	9.21%	9.21%	3.01%	6.51%	5.98%	5.44%
<b>Excess Return</b>		0.38%	1.28%	1.28%	2.33%	1.63%	0.68%	0.70%
<b>Net Benefit Payments (millions)</b>		\$78	\$33	\$33	(\$748)	(\$1,859)	(\$7,334)	(\$15,691)



# Portfolio Performance Framework

As of June 30, 2024

Reference Portfolio		Policy Benchmark		Implementation Benchmark		Plan Return	
Quarter	1.69%	Quarter	1.35%	Quarter	1.50%	Quarter	1.73%
FYTD	13.54%	FYTD	9.21%	FYTD	10.13%	FYTD	10.49%
3-Years	2.49%	3-Years	3.01%	3-Years	3.56%	3-Years	5.34%

Value from Diversification		Quality of Portfolio Structure		Quality of Manager Selection	
Quarter	-0.33%	Quarter	0.15%	Quarter	0.23%
FYTD	-4.33%	FYTD	0.92%	FYTD	0.36%
3-Years	0.53%	3-Years	0.55%	3-Years	1.78%

Actual vs Reference		Actual vs Policy	
Quarter	0.04%	Quarter	0.38%
FYTD	-3.04%	FYTD	1.28%
3-Years	2.85%	3-Years	2.33%



# Asset Class Performance<sup>1,3,4,5</sup>

As of June 30, 2024

Trailing Performance as of 06/30/2024	Portfolio Weight	Annualized			
		Quarter	FYTD	3 Years	5 Years
<b>Public Equity</b>	<b>43.9%</b>	<b>2.50%</b>	<b>18.81%</b>	<b>5.13%</b>	<b>10.60%</b>
<i>Benchmark</i>		<i>2.38%</i>	<i>18.40%</i>	<i>4.70%</i>	<i>10.28%</i>
<b>Bonds</b>	<b>23.8%</b>	<b>0.40%</b>	<b>2.96%</b>	<b>-2.22%</b>	<b>-0.21%</b>
<i>Benchmark</i>		<i>0.07%</i>	<i>2.63%</i>	<i>-3.02%</i>	<i>-0.95%</i>
<b>Private Equity</b>	<b>13.1%</b>	<b>2.54%</b>	<b>5.79%</b>	<b>10.82%</b>	<b>12.90%</b>
<i>Benchmark</i>		<i>1.27%</i>	<i>5.24%</i>	<i>7.46%</i>	<i>13.12%</i>
<b>Private Debt</b>	<b>8.2%</b>	<b>2.96%</b>	<b>11.40%</b>	<b>9.53%</b>	<b>8.04%</b>
<i>Benchmark</i>		<i>2.97%</i>	<i>13.97%</i>	<i>7.50%</i>	<i>6.99%</i>
<b>Real Assets</b>	<b>10.9%</b>	<b>-0.07%</b>	<b>-2.32%</b>	<b>6.55%</b>	<b>6.71%</b>
<i>Benchmark</i>		<i>-0.66%</i>	<i>-9.99%</i>	<i>1.02%</i>	<i>1.74%</i>
<b>Portable Alpha Hedge Funds</b>	11.0%	<b>-0.25%</b>	<b>2.67%</b>	<b>4.58%</b>	<b>5.82%</b>
<b>Total Plan</b>	<b>100.0%</b>	<b>1.73%</b>	<b>10.49%</b>	<b>5.34%</b>	<b>8.14%</b>
<b>RSIC Policy Benchmark</b>		<b>1.35%</b>	<b>9.21%</b>	<b>3.01%</b>	<b>6.51%</b>

\*Portable Alpha Hedge Funds are expressed as gross exposure but, as collateral supporting the Overlay program, net to zero when calculating total Plan market value. Performance is expressed net of LIBOR as an estimate for Overlay financing costs.



Policy  
Benchmark

- **Policy Benchmark:** The return of the five-asset class target portfolio.

Allocation

- **Allocation effect:** isolates the impact of making overweight or underweight decisions to each of the five asset classes.

Implement-  
ation

- **Implementation effect:** measures the impact of decisions to construct each asset class portfolio differently than the benchmark.

Selection

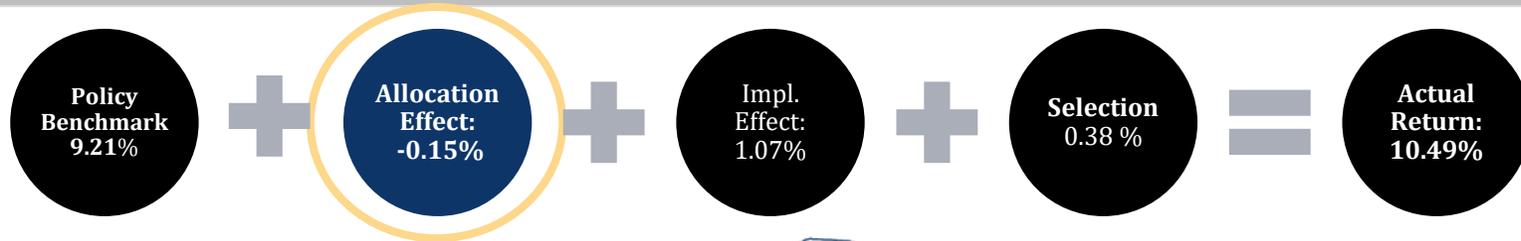
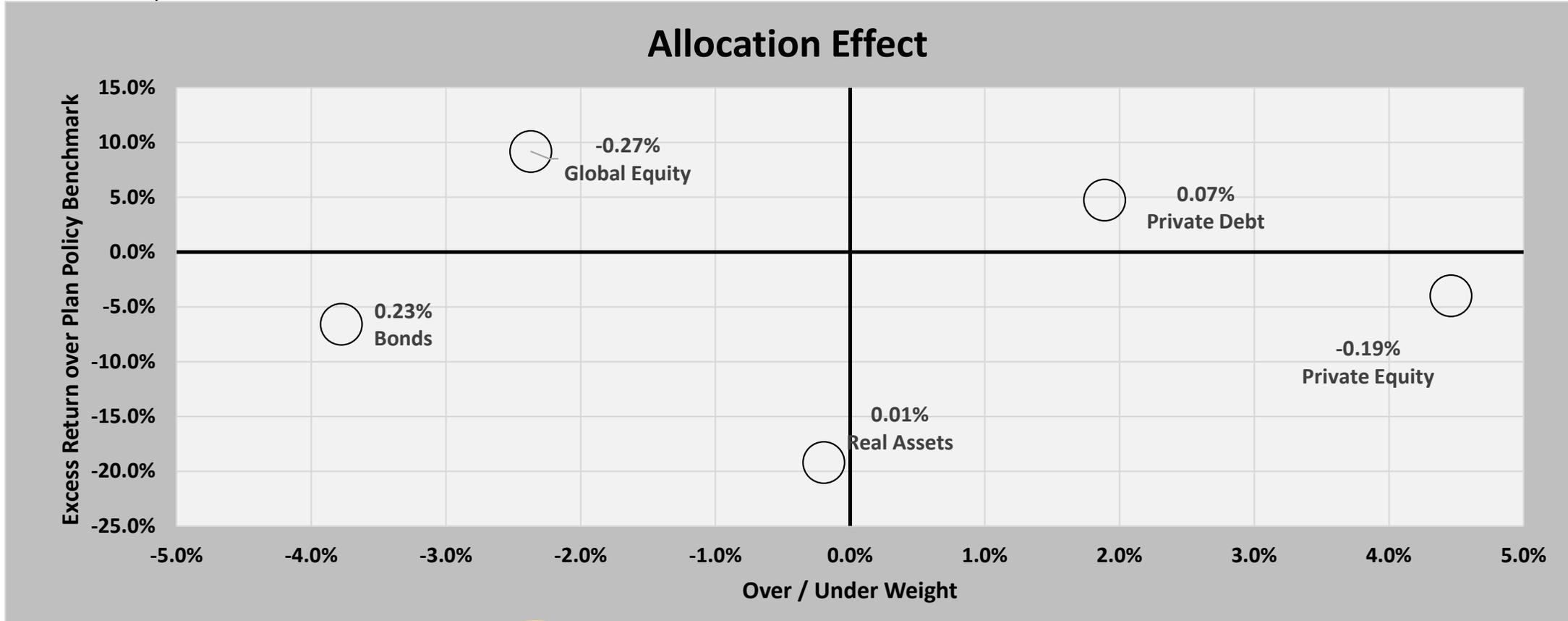
- **Selection effect:** evaluates the impact of manager selection decisions.

Actual  
Return

- The **Actual return** reflects the sum of all of these impacts.

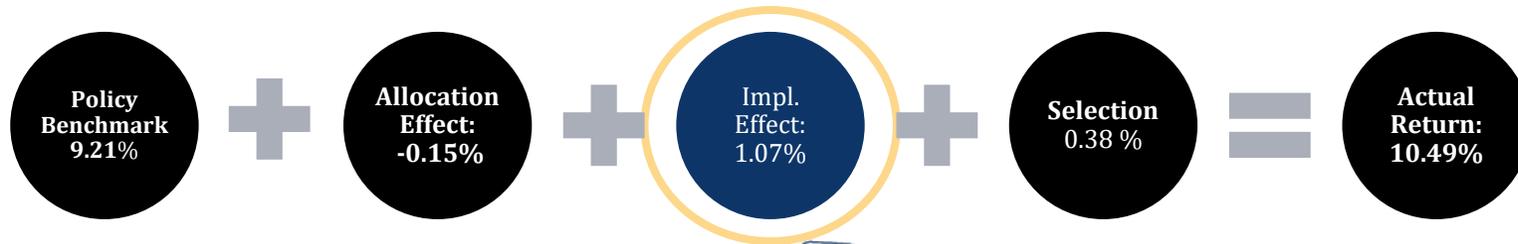
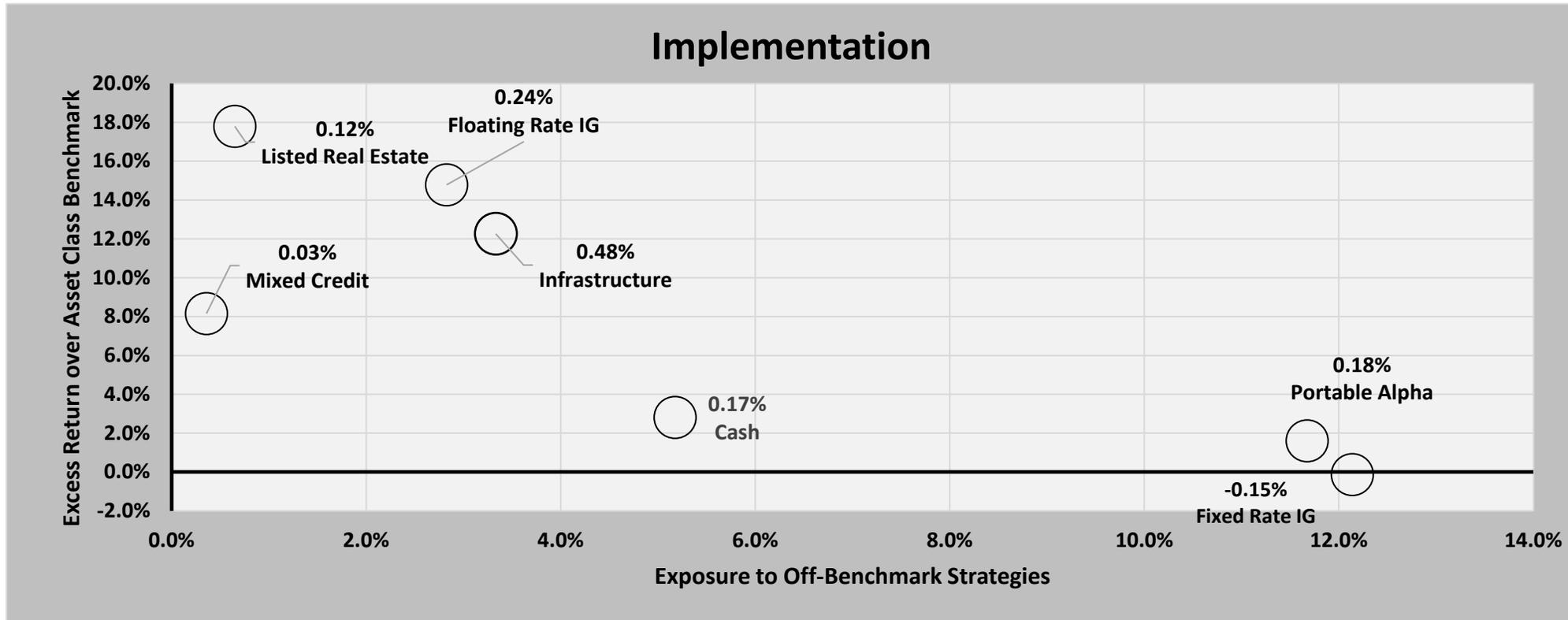
# Attribution – FYTD – Allocation:

As of June 30, 2024



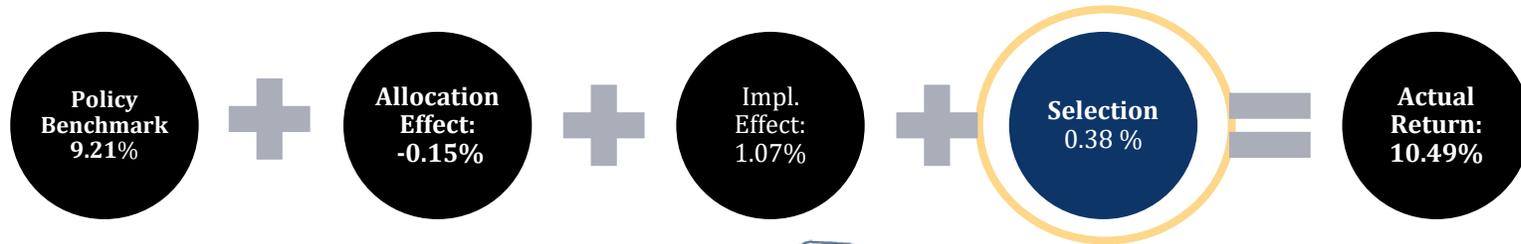
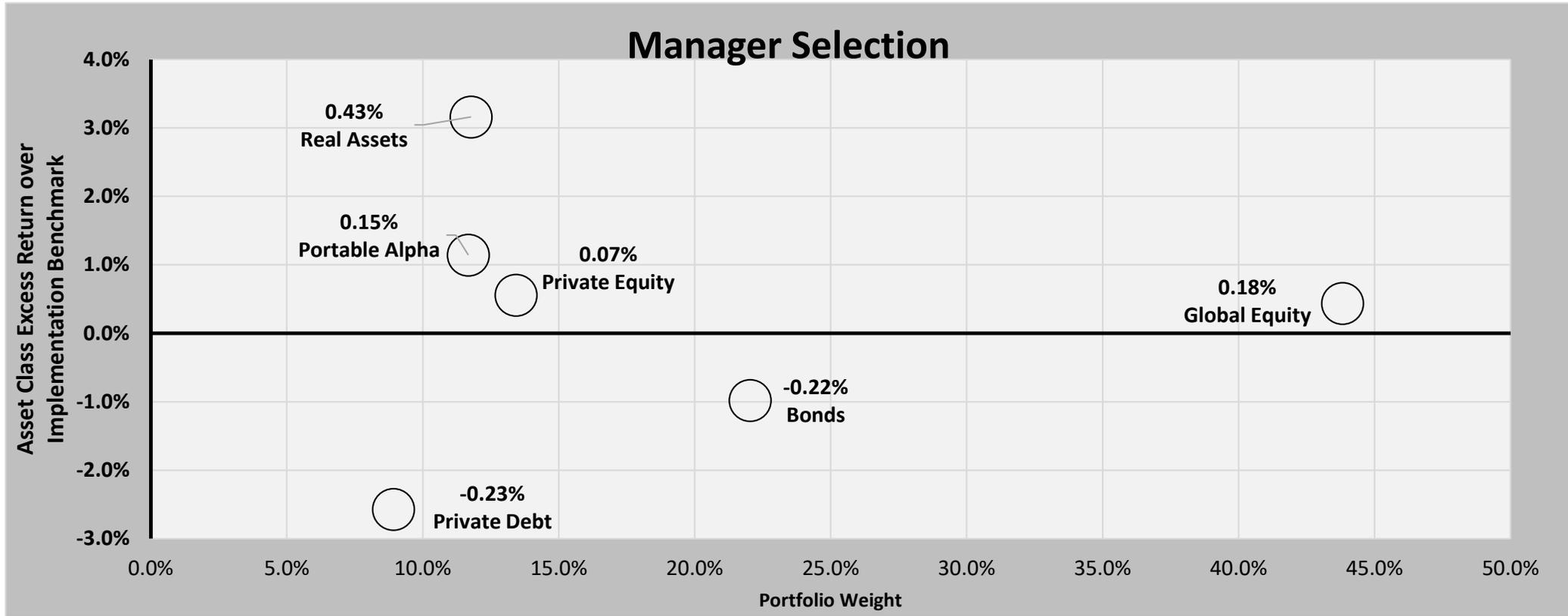
# Attribution – FYTD – Implementation:

As of June 30, 2024



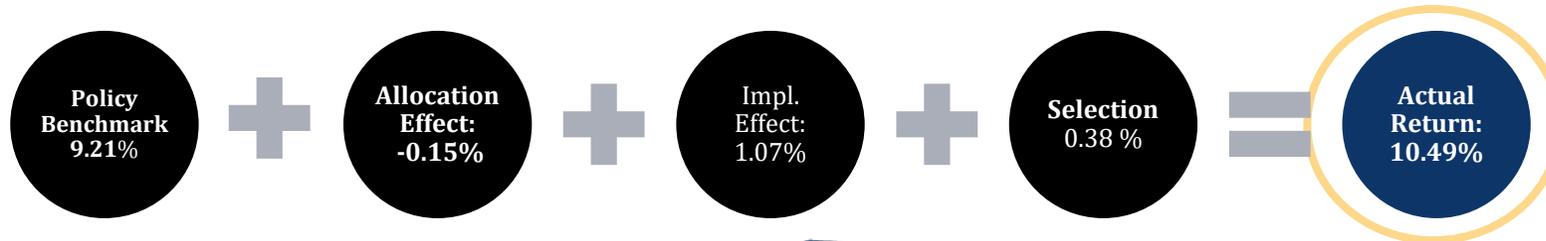
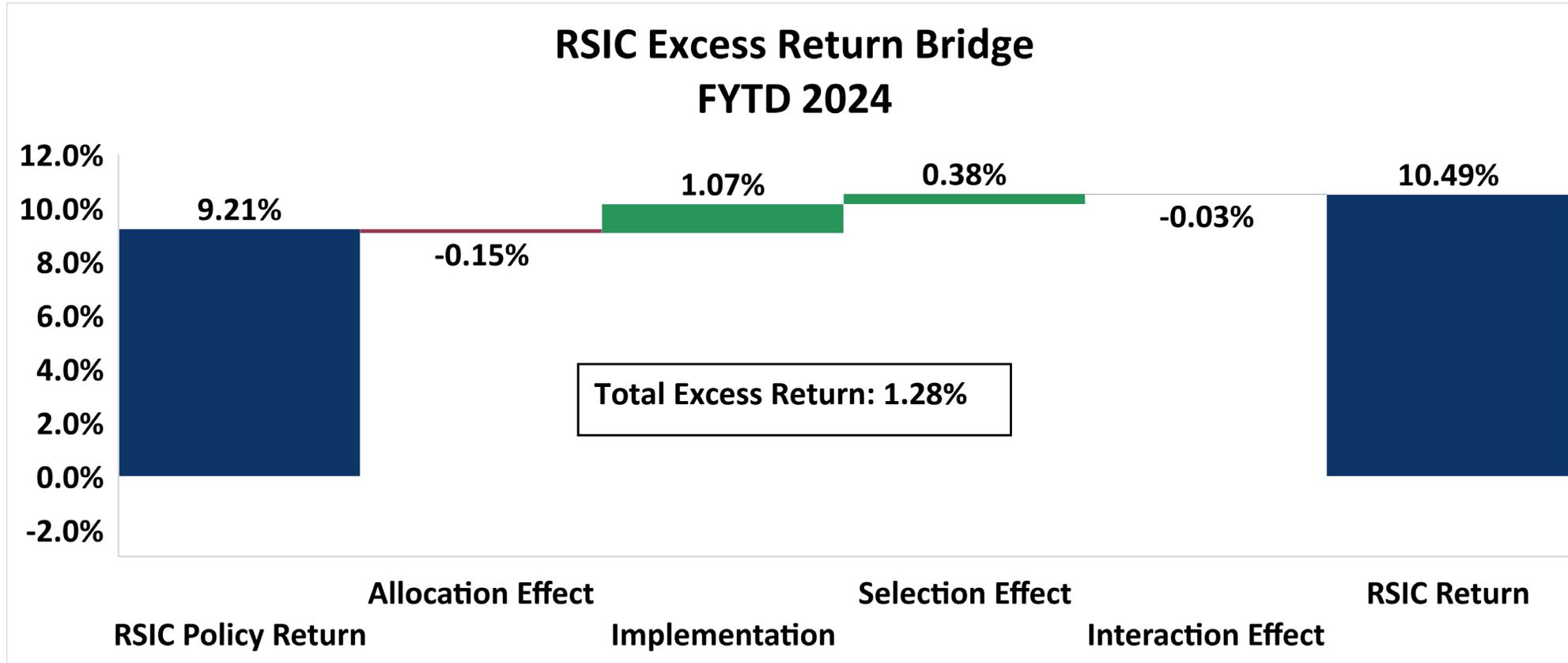
# Attribution – FYTD – Selection:

As of June 30, 2024



# Attribution – FYTD – Return Bridge:

As of June 30, 2024



# Attribution – FYTD – Attribution Heatmap:

As of December 31, 2023

Attribution Table (BPS)	Allocation	Implementation	Selection	Total
Bonds	23	30	-22	31
Private Debt	7	0	-23	-16
Global Equity	-27	-1	18	-10
Private Equity	-19	0	7	-12
Real Assets	1	60	43	104
Portable Alpha	n/a	18	15	33
<b>Total</b>	<b>-15</b>	<b>107</b>	<b>37</b>	<b>128</b>

- Sources of underperformance:
  - Private Debt vs. listed assets benchmark
  - Longer duration in Bonds portfolio
  - Global Equity underweight
- Sources of outperformance:
  - Underweight to Bonds
  - Portable Alpha
  - Infrastructure and REITS substantially outperformed Real Estate
  - Real Assets manager selection



# Asset Allocation and SIOP Compliance<sup>5</sup>

As of June 30, 2024

Exposure Report as of 06/30/2024	Net Exposure	Policy Targets	Over / Under	Allowable Ranges	SIOP Compliance
Public Equity	43.9%	46.0%	-2.1%	30% - 60%	Yes
Bonds	23.8%	26.0%	-2.2%	15% - 35%	Yes
Private Equity	13.1%	9.0%	4.1%	5% - 13%	No
Private Debt	8.2%	7.0%	1.2%	3% - 11%	Yes
Real Assets	10.9%	12.0%	-1.1%	6% - 18%	Yes
Portable Alpha Hedge Funds	11.0%	n/a	11.0%	0% - 15%	Yes
Total Plan	100.0%	100.0%	0.0%	n/a	Yes
Total Private Markets	31.6%	28.0%	3.6%	0% - 30%	No

Risk Estimates <sup>1</sup>				
June 2024 Exposures and Risk				
<b>Total Risk</b> <sup>2</sup> Prior Quarter	Reference	Policy <sup>3</sup>	Implementation <sup>3</sup>	Actual <sup>5</sup>
	13.6%	12.9%	13.5%	13.6%
	13.5%	12.8%	13.3%	13.4%
<b>Relative Risk</b> <sup>4</sup>	Reference vs Policy	Policy vs Implementation	Implementation vs Actual <sup>5</sup>	
	1.5%	0.8%	0.4%	
	1.4%	0.9%	0.4%	

Footnotes:

- 1 Estimates based on an equal weighted (no-decay) model employing three years of monthly data.
- 2 Total risk shown as volatility, or annualized standard deviation of returns based on current positioning
- 3 Private benchmarks proxied with public alternatives
- 4 Relative risk shown as relative volatility, or annualized standard deviation of the excess returns of one portfolio vs the other
- 5 Actual risk and actual vs implementation relative risk estimated from a set of assumptions and exposures

# Historical (Realized) Volatility vs Forward Volatility

## Realized (Historical) vs Forward Risk Measurements <sup>1</sup>

June 2024 Risk

<b>Forward Risk</b>	Reference	Policy	Implementation	Actual
	13.6%	12.9%	13.5%	13.6%
	↓	↓	↓	↓
<b>Historical Risk <sup>2,3</sup></b>	Portfolio	Policy <sup>3</sup>	Implementation <sup>3</sup>	Actual
	13.6%	9.5%	9.2%	8.4%

Footnotes:

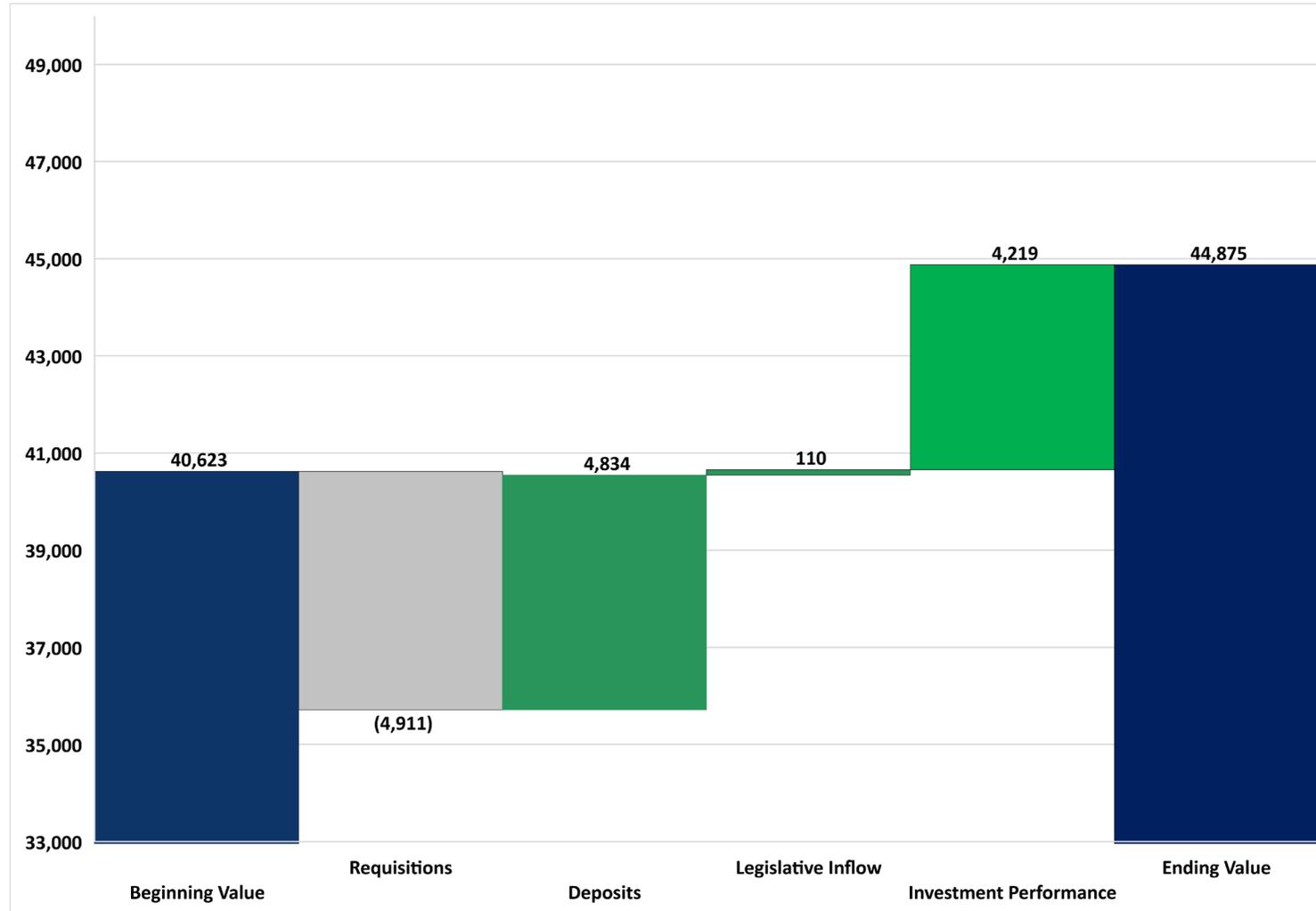
- <sup>1</sup> Historical risk reflects actual historical volatility (rather than expected volatility) for RSIC portfolio, using the past 3 years of monthly data
- <sup>2</sup> Historical risk reflects actual historical positioning (rather than current positioning)
- <sup>3</sup> Policy and Implementation portfolio risk calculated using underlying performance benchmarks (rather than public proxy-based risk benchmarks)

Realized risk reflects actual historical volatility (rather than expected volatility) for RSIC portfolio,  
 Realized risk reflects actual historical positioning (rather than current positioning)  
 Realized risk reflects monthly reported data (instead of daily) to align with data availability  
 Realized risk uses actual performance benchmarks (rather than public proxies) in calculations

# Appendix

# FYTD Benefits and Performance

As of June 30, 2024



Other flows include a \$110 million legislative inflow.

# Asset Allocation and SIOP Compliance<sup>5</sup>

Exposures as of June 30, 2024

Exposure Report as of 06/30/2024	Net Exposure	Policy Targets	Over / Under	Allowable Ranges	SIOP Compliance
<b>Public Equity</b>	<b>43.9%</b>	<b>46.0%</b>	<b>-2.1%</b>	<b>30% - 60%</b>	<b>Yes</b>
<b>Bonds</b>	<b>23.8%</b>	<b>26.0%</b>	<b>-2.2%</b>	<b>15% - 35%</b>	<b>Yes</b>
Investment Grade - Fixed	15.6%	26.0%	-10.4%	10% - 35%	Yes
Investment Grade - Floating	2.2%	n/a	2.2%	0% - 5%	Yes
EMD	0.1%	n/a	0.1%	0% - 6%	Yes
Mixed Credit	0.3%	n/a	0.3%	0% - 8%	Yes
Cash and Short Duration (Net)	5.6%	n/a	5.6%	0% - 7%	Yes
<b>Private Equity</b>	<b>13.1%</b>	<b>9.0%</b>	<b>4.1%</b>	<b>5% - 13%</b>	<b>No</b>
<b>Private Debt</b>	<b>8.2%</b>	<b>7.0%</b>	<b>1.2%</b>	<b>3% - 11%</b>	<b>Yes</b>
<b>Real Assets</b>	<b>10.9%</b>	<b>12.0%</b>	<b>-1.1%</b>	<b>6% - 18%</b>	<b>Yes</b>
Private Real Estate	7.2%	9.0%	-1.8%	n/a	Yes
Public Real Estate	0.5%	n/a	0.5%	n/a	Yes
Private Infrastructure	3.0%	3.0%	0.0%	n/a	Yes
Public Infrastructure	0.2%	n/a	0.2%	n/a	Yes
<b>Portable Alpha Hedge Funds</b>	<b>11.0%</b>	<b>n/a</b>	<b>11.0%</b>	<b>0% - 15%</b>	<b>Yes</b>
<b>Total Plan</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>	<b>n/a</b>	<b>Yes</b>
<b>Total Private Markets</b>	<b>31.6%</b>	<b>28.0%</b>	<b>3.6%</b>	<b>0% - 30%</b>	<b>No</b>

# Performance – Plan & Asset Classes<sup>1,3,4,5</sup>

as of June 30, 2024

Trailing Performance as of 06/30/2024	Portfolio Weight	Annualized			
		Quarter	FYTD	3 Years	5 Years
<b>Public Equity</b>	<b>43.9%</b>	<b>2.50%</b>	<b>18.81%</b>	<b>5.13%</b>	<b>10.60%</b>
<i>Benchmark</i>		<i>2.38%</i>	<i>18.40%</i>	<i>4.70%</i>	<i>10.28%</i>
<b>Bonds</b>	<b>23.8%</b>	<b>0.40%</b>	<b>2.96%</b>	<b>-2.22%</b>	<b>-0.21%</b>
<i>Benchmark</i>		<i>0.07%</i>	<i>2.63%</i>	<i>-3.02%</i>	<i>-0.95%</i>
IG Fixed	15.6%	-0.37%	-0.29%	-4.29%	-1.11%
IG Floating (Hedged)	2.2%	1.57%	10.51%	3.70%	n/a
EMD	0.1%	1.04%	16.08%	-19.13%	-10.96%
Mixed Credit	0.3%	3.23%	16.67%	6.59%	7.28%
Cash and Short Duration (Ne	5.6%	1.30%	5.38%	3.12%	2.23%
<b>Private Equity</b>	<b>13.1%</b>	<b>2.54%</b>	<b>5.79%</b>	<b>10.82%</b>	<b>12.90%</b>
<i>Benchmark</i>		<i>1.27%</i>	<i>5.24%</i>	<i>7.46%</i>	<i>13.12%</i>
<b>Private Debt</b>	<b>8.2%</b>	<b>2.96%</b>	<b>11.40%</b>	<b>9.53%</b>	<b>8.04%</b>
<i>Benchmark</i>		<i>2.97%</i>	<i>13.97%</i>	<i>7.50%</i>	<i>6.99%</i>
<b>Real Assets</b>	<b>10.9%</b>	<b>-0.07%</b>	<b>-2.32%</b>	<b>6.55%</b>	<b>6.71%</b>
<i>Benchmark</i>		<i>-0.66%</i>	<i>-9.99%</i>	<i>1.02%</i>	<i>1.74%</i>
Private Real Estate	7.2%	-0.62%	-6.34%	6.46%	6.06%
Public Real Estate	0.5%	0.41%	7.83%	1.27%	5.98%
Private Infrastructure	3.0%	1.19%	6.94%	7.87%	6.41%
Public Infrastructure	0.2%	-0.66%	-0.66%	0.16%	3.67%
<b>Portable Alpha Hedge Funds</b>	<b>11.0%</b>	<b>-0.25%</b>	<b>2.67%</b>	<b>4.58%</b>	<b>5.82%</b>
<b>Total Plan</b>	<b>100.0%</b>	<b>1.73%</b>	<b>10.49%</b>	<b>5.34%</b>	<b>8.14%</b>
<i>RSIC Policy Benchmark</i>		<i>1.35%</i>	<i>9.21%</i>	<i>3.01%</i>	<i>6.51%</i>

\*Portable Alpha Hedge Funds are expressed as gross exposure but, as collateral supporting the Overlay program, net to zero when calculating total Plan market value. Performance is expressed net of LIBOR as an estimate for Overlay financing costs.



## Footnotes

1. The Policy Benchmark is calculated quarterly using a blend of asset class policy benchmarks and the policy weights for the respective asset classes. Prior to 12/31/2020 the Policy Benchmark was calculated monthly. Asset class benchmarks represent current policy benchmarks blended with past policy benchmarks which may have changed over time. Some asset class policy benchmarks revise over time and these revisions are reflected in subsequent policy benchmark calculations. See Benchmark Disclosure page for current definitions.
2. Benefit payments are the net of Plan contributions and disbursements.
3. “Bonds” asset class includes Cash and Short Duration market value which is the aggregate cash held at the custodian, Russell Investments, and strategic partnerships, short duration within the portfolio, and hedge funds used in collateral pool for Portable Alpha program, net of the notional exposure in the overlay.
4. Asset class returns include Overlay returns as a blend of physical and synthetic returns. Synthetic returns are provided by Russell Investments gross of financing costs. To accommodate for financing costs, LIBOR is added to the synthetic returns and removed from the collateral return. Asset class returns calculated using Caissa, a third-party multi-asset class analytics system.
5. Asset class weights include Overlay exposures which are net notional exposures provided by Russell Investments. RSIC rebalances quarterly and reported exposures reflect any trades made at quarter end that have not settled yet.

## Disclosures

- Plan Returns are provided by BNY Mellon. All returns are time-weighted, total return calculations. Net of fee performance is calculated and presented after the deduction of fees and expenses. Periods greater than one year are annualized. Past performance is no guarantee of future results. Asset class returns are based on values obtained from BNY Mellon and adjusted for overlay exposures provided by Russell Investments. Policy benchmark is the blend of asset class policy benchmarks using policy weights. Asset class benchmarks and policy weights are reviewed annually by the Commission’s consultant and adopted by the Commission and have changed over time. The policy benchmark return history represents a blend of these past policies. Total Plan trailing periods reflect a performance correction that affected the time period 03/31/2015 through 06/30/2022.
- Overlay allocation detail is provided by Russell Investments.
- This report was compiled by the staff of the South Carolina Retirement System Investment Commission and has not been reviewed, approved or verified by the external investment managers. No information contained herein should be used to calculate returns or compare multiple funds, including private equity funds.
- Effective October 1, 2005, the State Retirement System Preservation and Investment Reform Act (“Act 153”) established the Commission and devolved fiduciary responsibility for investment and management of the assets of the South Carolina Retirement Systems upon RSIC.
- Net benefit payments include a one-time \$45 million payment that occurred in October 2023 to cover securities lending collateral losses incurred during the Global Financial Crisis of 2008.
- Allocation / exposure percentages might not add up to totals due to rounding.

## Benchmarks

- **Core Fixed Income:** Bloomberg US Aggregate Bond Index
- **Global Public Equity Blend:** MSCI All Country World Index IMI
- **Private Equity Blend:** Burgiss All PE Benchmark
- **Private Debt :** S&P/LSTA Leveraged Loan Index + 150 basis points on a 3-month lag
- **Private Real Estate Blend:** NCREIF-Open Ended Diversified Core (ODCE) Index *Net of Fees*

**Benchmarks Displayed in this report represent current policy benchmarks as of the SIOP effective 7/1/2020. Asset class benchmarks and policy weights are reviewed annually by the Commission's consultant and adopted by the Commission and have changed over time. The policy benchmark return history represents a blend of these past policies.**

# South Carolina Retirement System Investment Commission

Investment Performance Review

Period Ending: June 30, 2024

Verus<sup>777</sup>®

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Total Retirement System  
Asset Allocation vs. Policy

South Carolina Retirement System Investment Commission  
Period Ending: June 30, 2024

Allocation vs. Targets and Policy  
Quarter Ending June 30, 2024

	MV at 6/30/2024	Overlay Exposures	Net Position	% of Total System	% of Total System (Net)	Policy Targets	Allowable Ranges	SIOP Compliance?
<b>Total System</b>	<b>44,874,698,788</b>	<b>-</b>	<b>44,874,698,788</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>		
<b>Public Equity</b>	<b>19,834,929,497</b>	<b>(151,203,248)</b>	<b>19,683,726,249</b>	<b>44.2%</b>	<b>43.9%</b>	<b>46%</b>	<b>30% - 60%</b>	<b>Yes</b>
Public Equity	19,834,929,497	(151,203,248)	19,683,726,249	44.2%	43.9%	46%	30% - 60%	Yes
<b>Bonds</b>	<b>5,601,890,470</b>	<b>5,086,827,642</b>	<b>10,688,718,112</b>	<b>12.5%</b>	<b>23.8%</b>	<b>26%</b>	<b>15% - 35%</b>	<b>Yes</b>
Investment Grade - Fixed	126,822,699	6,873,157,119	6,999,979,819	0.3%	15.6%	0%	10% - 35%	Yes
Investment Grade - Floating	1,002,041,481	-	1,002,041,481	2.2%	2.2%	0%	0% - 5%	Yes
Emerging Market Debt	32,336,296	-	32,336,296	0.1%	0.1%	0%	0% - 6%	Yes
Mixed Credit	149,304,702	-	149,304,702	0.3%	0.3%	0%	0% - 8%	Yes
Cash and Short Duration	4,291,385,292	(1,786,329,477)	2,505,055,815	9.6%	5.6%	0%	0% - 7%	Yes
<b>Private Equity</b>	<b>5,892,904,199</b>	<b>-</b>	<b>5,892,904,199</b>	<b>13.1%</b>	<b>13.1%</b>	<b>9%</b>	<b>5% - 13%</b>	<b>No</b>
<b>Private Debt</b>	<b>3,700,173,316</b>	<b>-</b>	<b>3,700,173,316</b>	<b>8.2%</b>	<b>8.2%</b>	<b>7%</b>	<b>3% - 11%</b>	<b>Yes</b>
<b>Real Assets</b>	<b>4,909,176,912</b>	<b>-</b>	<b>4,909,176,912</b>	<b>10.9%</b>	<b>10.9%</b>	<b>12%</b>	<b>6% - 18%</b>	<b>Yes</b>
Real Estate	3,450,227,834	-	3,450,227,834	7.7%	7.7%	9%	5% - 13%	Yes
Infrastructure	1,458,949,078	-	1,458,949,078	3.3%	3.3%	3%	0% - 5%	Yes
<b>Portable Alpha Hedge Funds</b>	<b>4,935,624,394</b>	<b>(4,935,624,394)</b>	<b>-</b>	<b>11.0%</b>	<b>0.0%</b>	<b>0%</b>	<b>0% - 15%</b>	<b>Yes</b>

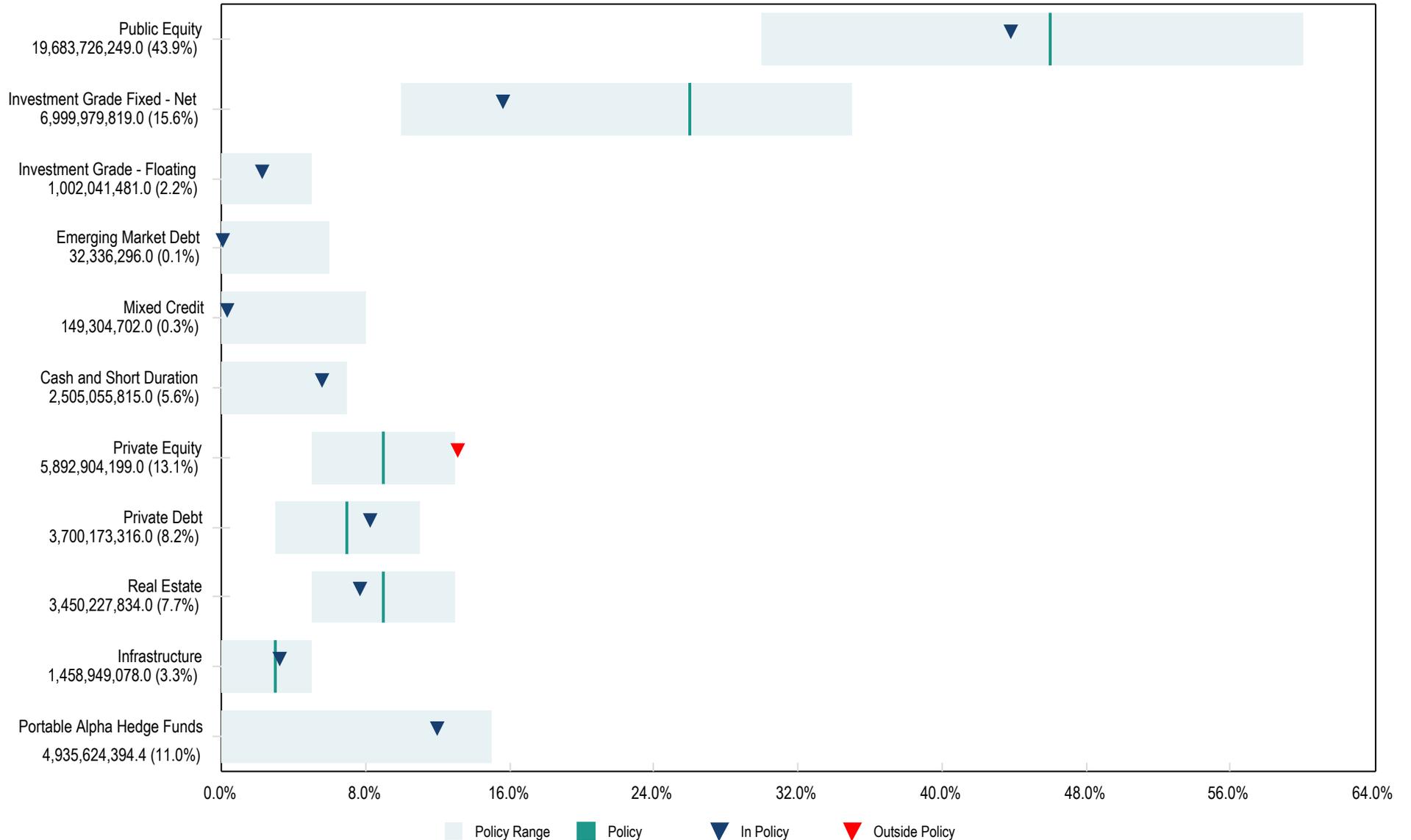
Includes cash in the Russell Overlay separate account

Percentages may not sum to 100% due to rounding

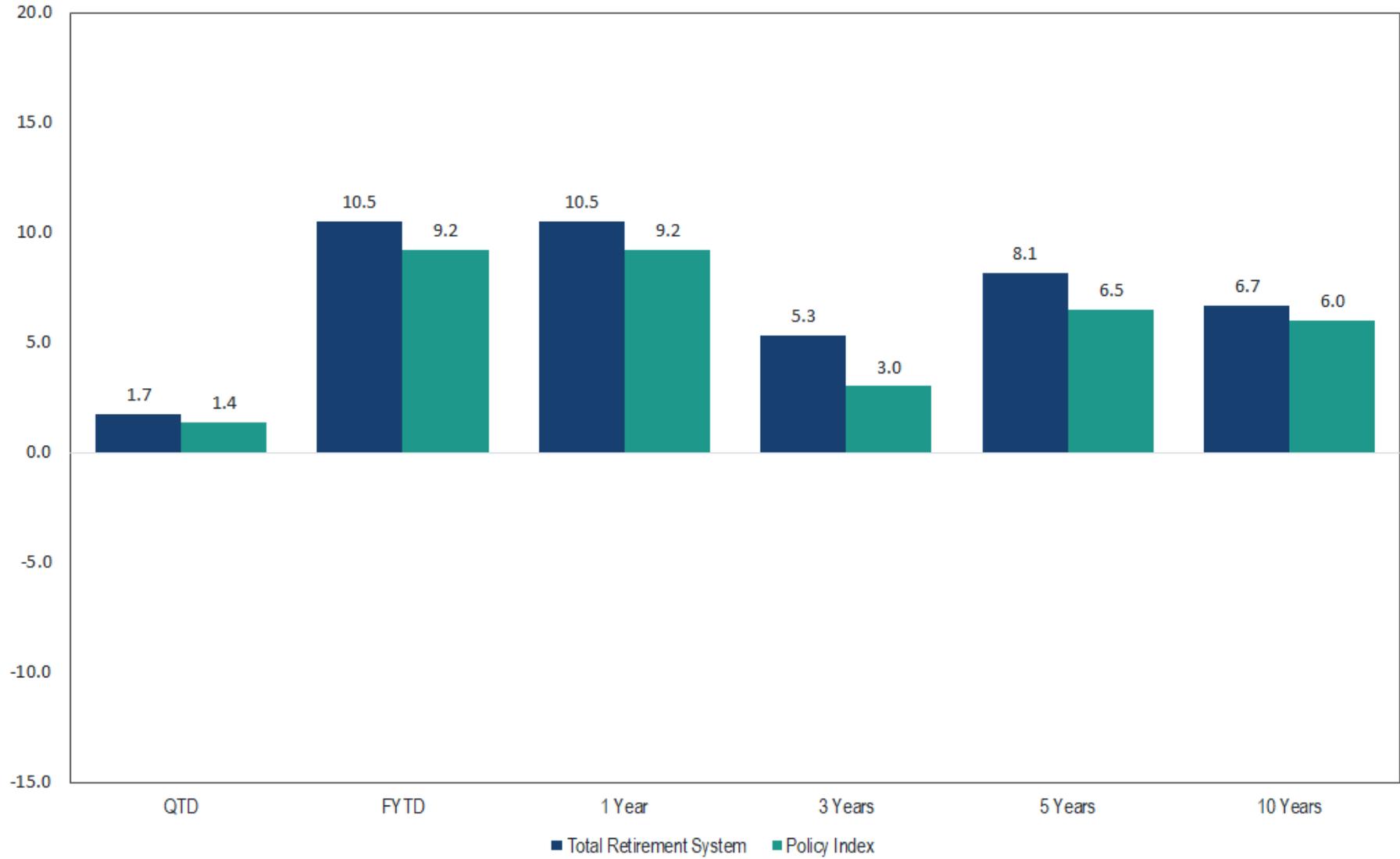
Total Retirement System  
Asset Allocation Compliance

South Carolina Retirement System Investment Commission  
Period Ending: June 30, 2024

Actual vs. Policy Ranges:  
(Including Overlay)

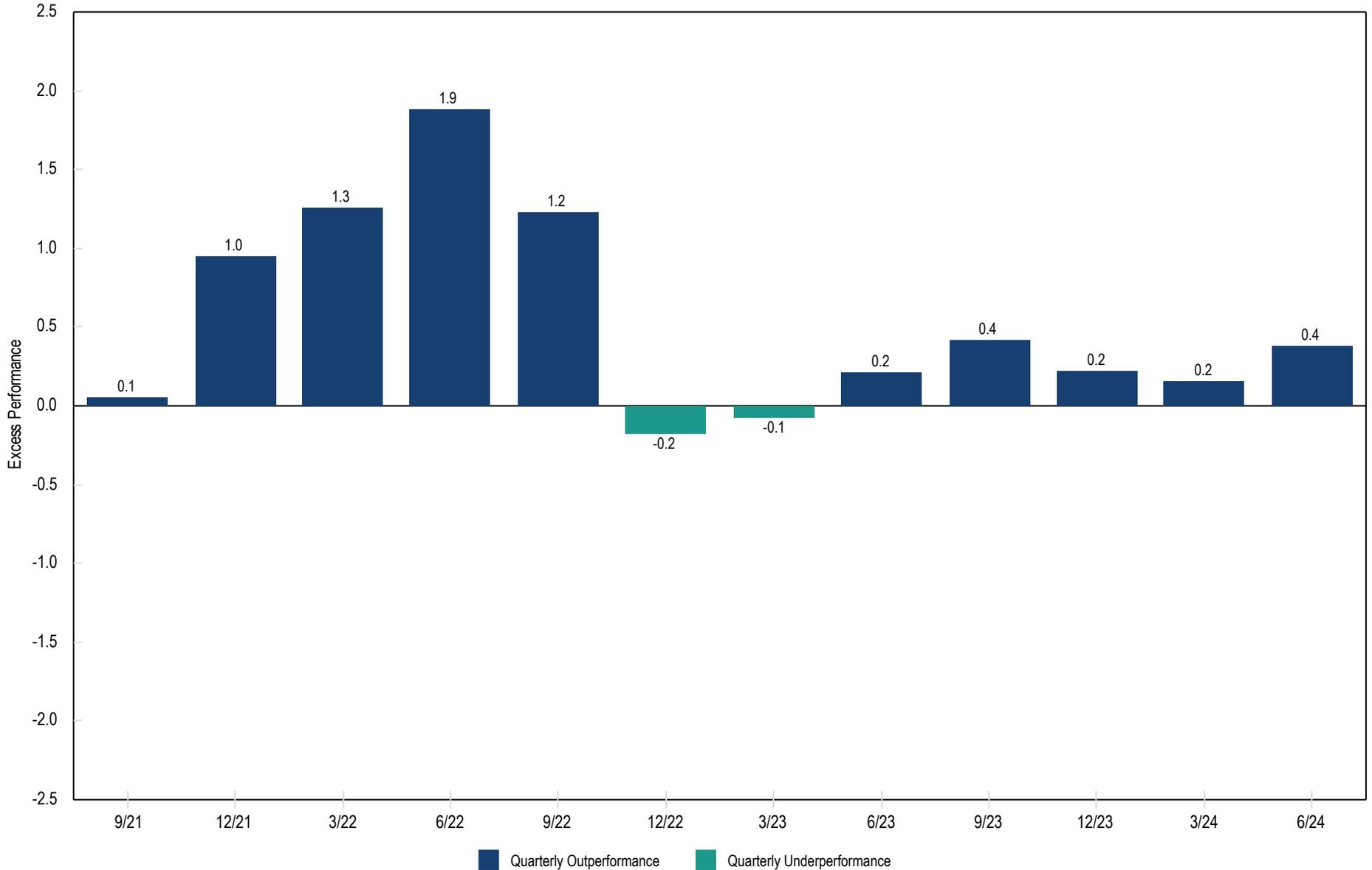


Net Return Summary



Returns for periods greater than one year are annualized.

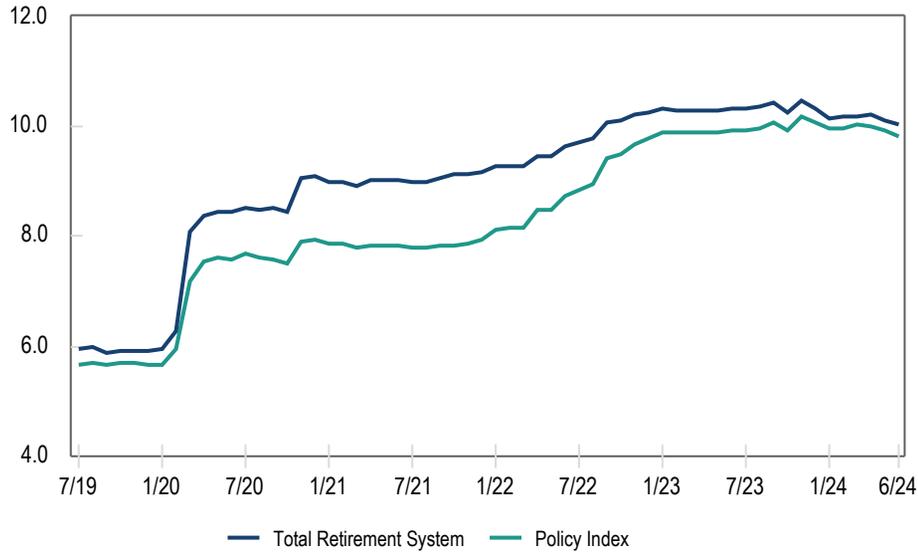
Quarterly Excess Performance vs. Policy Benchmark



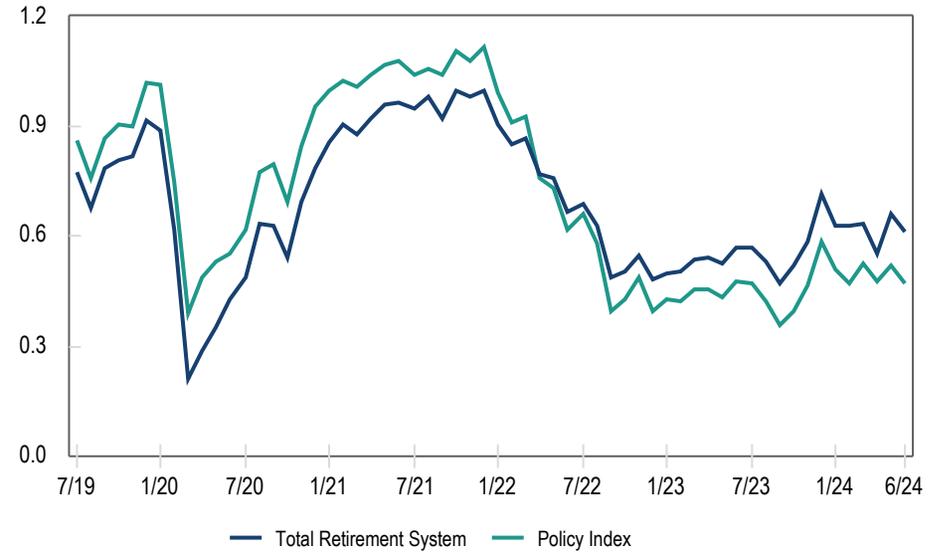
# Total Retirement System Risk Analysis - 5 Years (Net of Fees)

# South Carolina Retirement System Investment Commission Period Ending: June 30, 2024

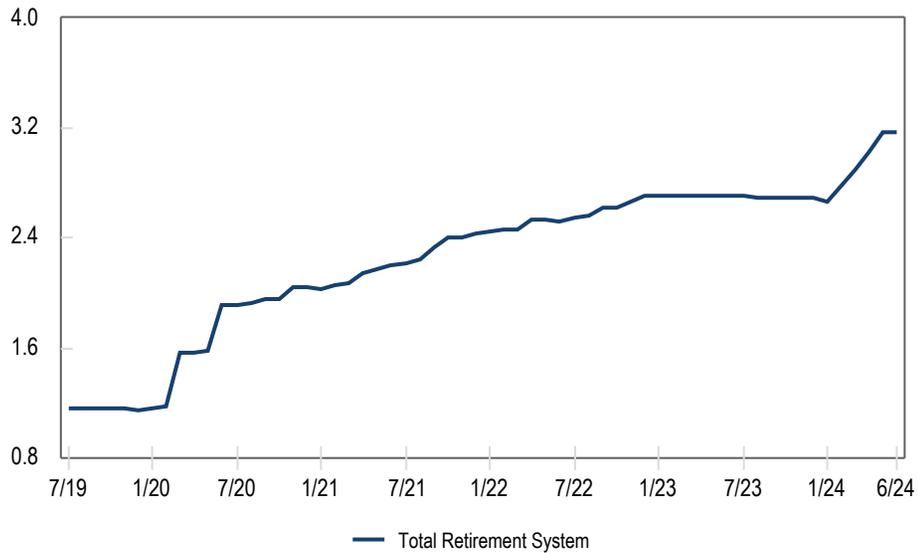
### Rolling 5 Year Std. Deviation



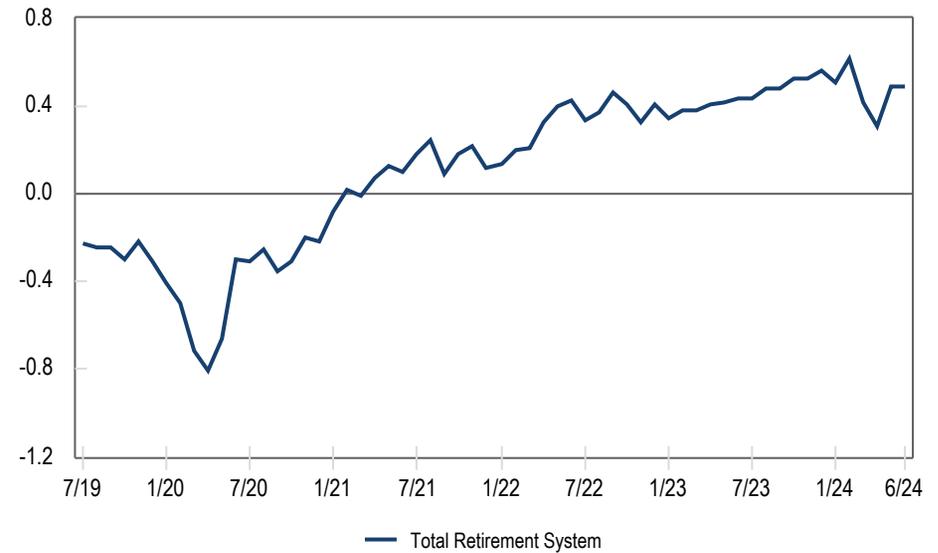
### Rolling 5 Year Sharpe Ratio



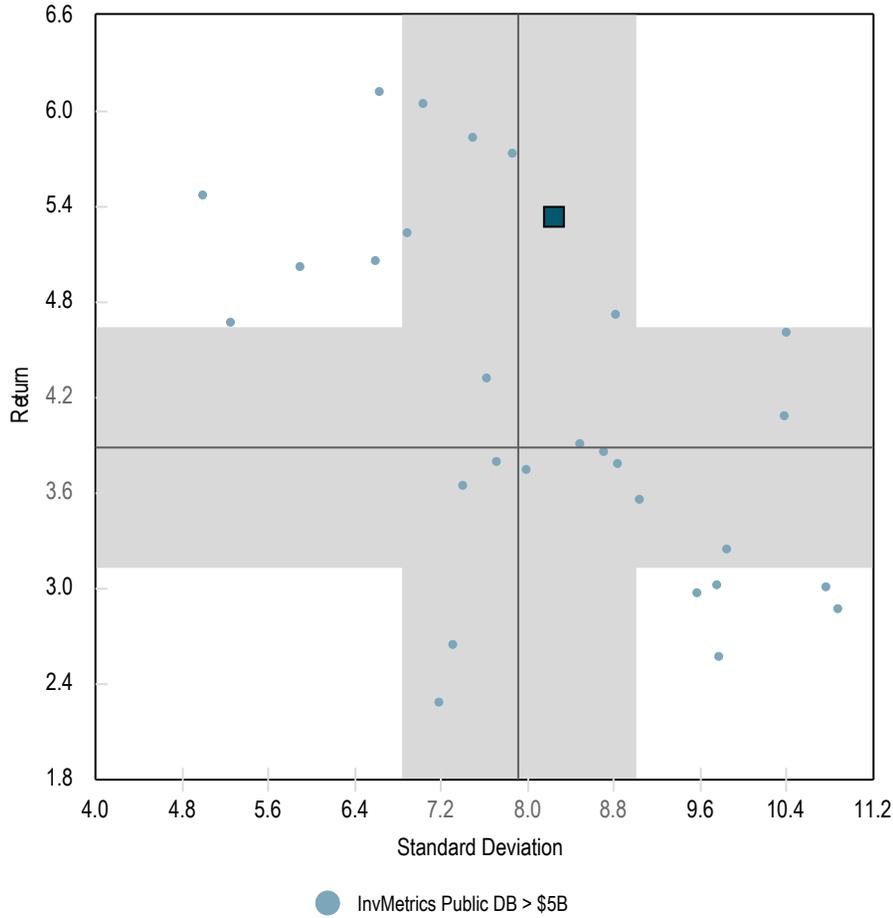
### Rolling 5 Year Tracking Error



### Rolling 5 Year Information Ratio

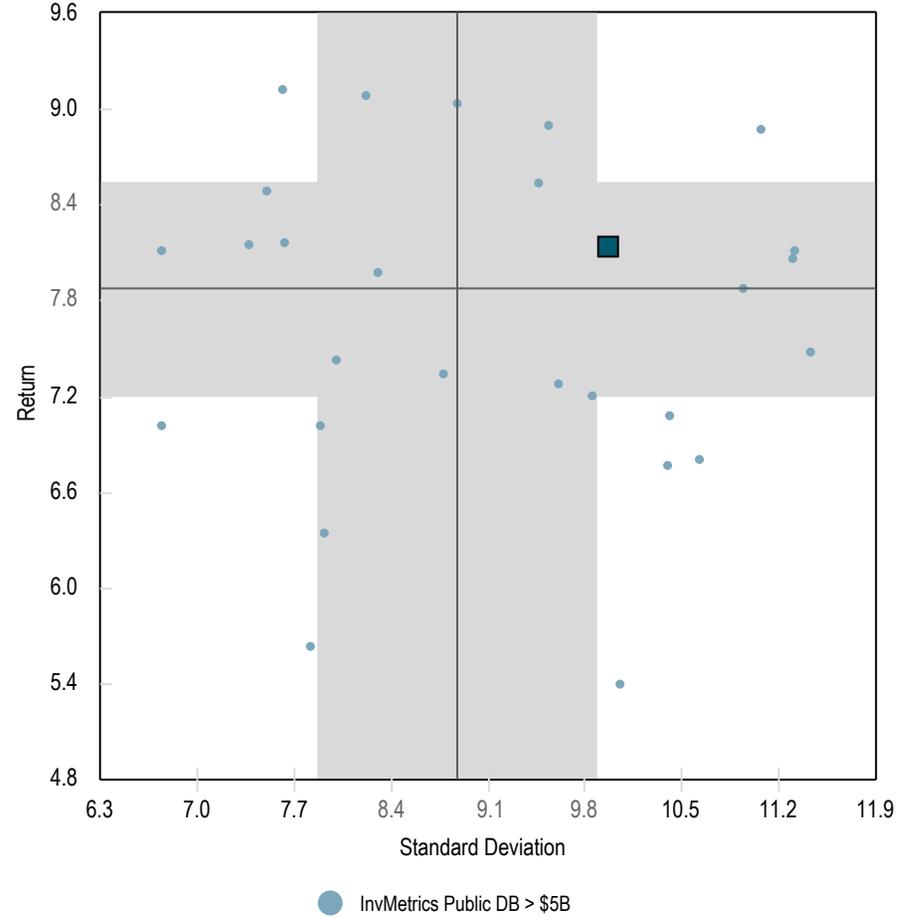


3 Years Return vs. Standard Deviation



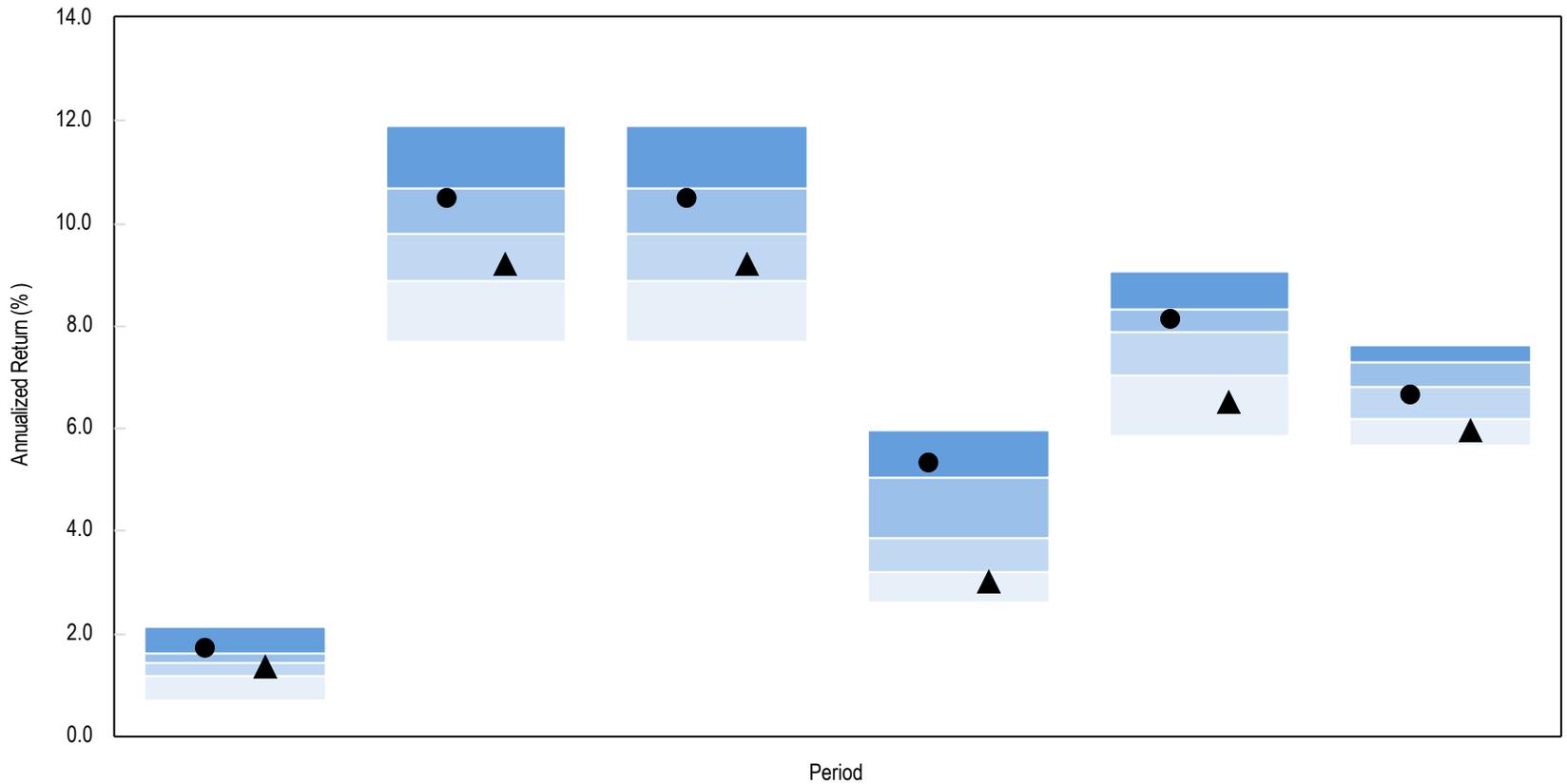
	Return	Standard Deviation
■ Total Retirement System	5.34	8.25
— Median	3.89	7.92
Population	28	28

5 Years Return vs. Standard Deviation



	Return	Standard Deviation
■ Total Retirement System	8.14	9.96
— Median	7.88	8.87
Population	27	27

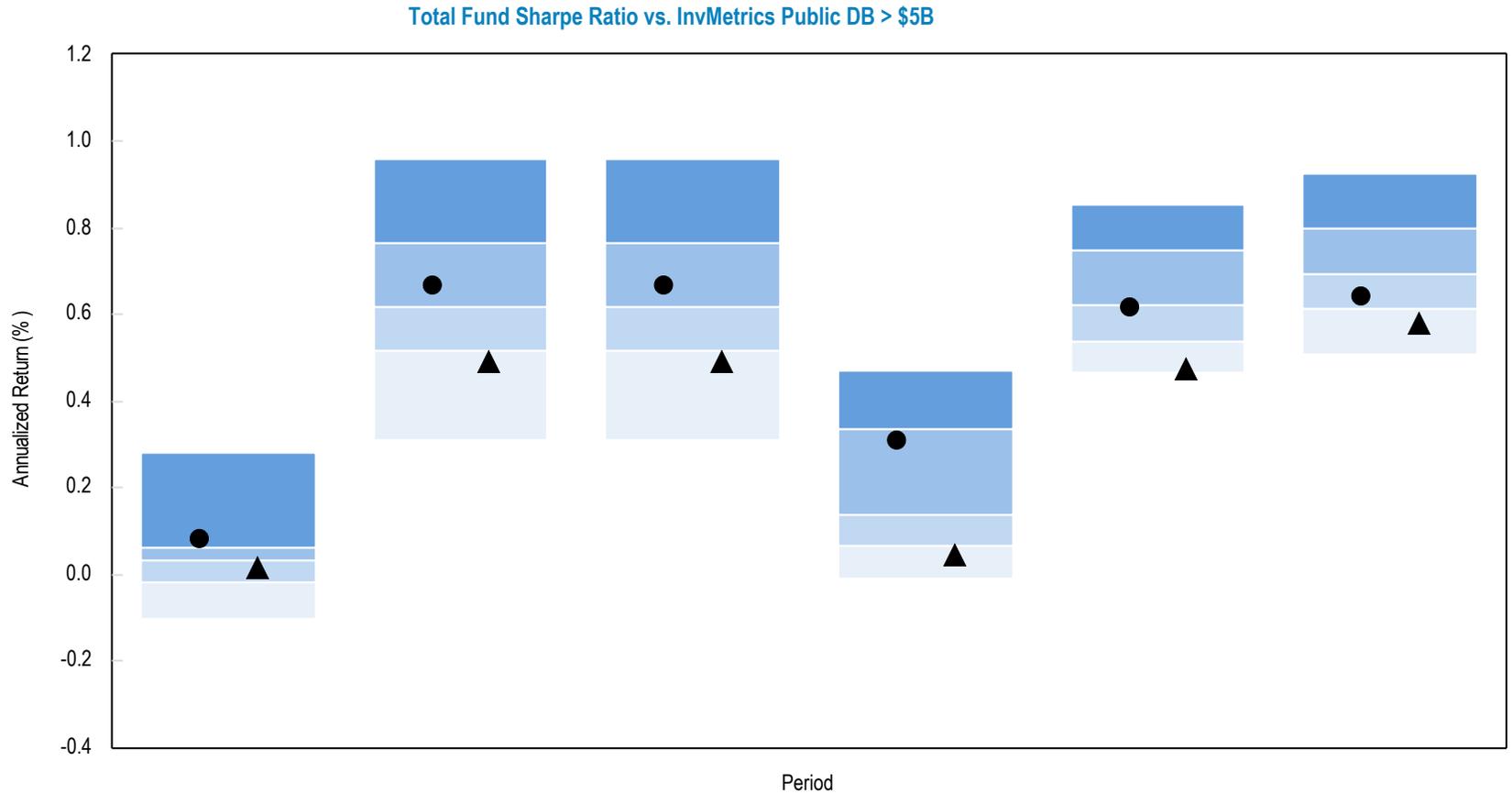
Total Fund Cumulative Performance vs. InvMetrics Public DB > \$5B



	QTD	Fiscal YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs
● Total Retirement System	1.73 (20)	10.49 (30)	10.49 (30)	5.34 (17)	8.14 (33)	6.66 (59)
▲ Policy Index	1.35 (53)	9.21 (65)	9.21 (65)	3.01 (82)	6.52 (91)	5.98 (83)
5th Percentile	2.15	11.90	11.90	5.98	9.08	7.62
1st Quartile	1.61	10.70	10.70	5.03	8.33	7.29
Median	1.44	9.82	9.82	3.89	7.88	6.83
3rd Quartile	1.19	8.87	8.87	3.20	7.05	6.20
95th Percentile	0.72	7.70	7.70	2.60	5.85	5.68
Population	31	31	31	28	27	26

Total Retirement System  
Peer Universe Comparison: Sharpe Ratio

South Carolina Retirement System Investment Commission  
Period Ending: June 30, 2024



	QTD	Fiscal YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs
● Total Retirement System	0.08 (22)	0.67 (40)	0.67 (40)	0.31 (31)	0.62 (51)	0.64 (59)
▲ Policy Index	0.02 (53)	0.49 (82)	0.49 (82)	0.04 (85)	0.47 (90)	0.58 (86)
5th Percentile	0.28	0.96	0.96	0.47	0.85	0.93
1st Quartile	0.06	0.76	0.76	0.34	0.75	0.80
Median	0.03	0.62	0.62	0.14	0.62	0.69
3rd Quartile	-0.02	0.52	0.52	0.07	0.54	0.62
95th Percentile	-0.10	0.31	0.31	-0.01	0.47	0.51
Population	31	31	31	28	27	26

Total Retirement System  
Asset Class Performance Summary (Net of Fees)

South Carolina Retirement System Investment Commission  
Period Ending: June 30, 2024

	Market Value	% of Portfolio	QTD	Fiscal YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	Inception	Inception Date
<b>Total Retirement System</b>	<b>44,874,698,788</b>	<b>100.0</b>	<b>1.7</b>	<b>10.5</b>	<b>10.5</b>	<b>5.3</b>	<b>8.1</b>	<b>6.7</b>	<b>6.1</b>	<b>Oct-05</b>
<i>Policy Index</i>			1.4	9.2	9.2	3.0	6.5	6.0	5.3	
<b>Public Equity</b>	<b>19,834,929,497</b>	<b>44.2</b>	<b>2.5</b>	<b>18.8</b>	<b>18.8</b>	<b>5.0</b>	<b>9.8</b>	<b>7.8</b>	<b>6.6</b>	<b>Oct-05</b>
<i>Public Equity Blended Benchmark</i>			2.4	18.4	18.4	4.7	10.4	8.2	7.3	
<b>Total Bonds</b>	<b>4,879,292,174</b>	<b>10.9</b>	<b>1.5</b>	<b>7.2</b>	<b>7.2</b>	<b>1.9</b>	<b>2.7</b>	<b>2.5</b>	<b>3.4</b>	<b>Oct-05</b>
<i>Bonds Blended Benchmark</i>			0.1	2.6	2.6	-3.0	-0.2	1.3	3.0	
<i>Investment Grade - Fixed</i>	126,822,699	0.3	1.6	3.6	3.6	-1.9	1.3	-	2.4	Jul-15
<i>Investment Grade - Floating</i>	1,002,041,481	2.2	2.1	11.8	11.8	4.4	-	-	6.3	Jul-20
<i>Mixed Credit</i>	149,304,702	0.3	3.2	16.7	16.7	6.6	7.3	5.0	6.5	May-08
<i>50% S&amp;P LSTA Leveraged Loan Index/50% Blmbg. High Yield Index</i>			1.5	10.8	10.8	3.9	4.8	4.6	5.6	
<b>Emerging Market Debt</b>	<b>32,336,296</b>	<b>0.1</b>	<b>1.0</b>	<b>16.1</b>	<b>16.1</b>	<b>-19.1</b>	<b>-11.0</b>	<b>-4.3</b>	<b>-0.3</b>	<b>Jul-09</b>
<i>50% JPM EMBI Global Div (USD)/50% JPM GBI EM Global Div</i>			-0.7	4.9	4.9	-2.9	-0.6	0.9	3.5	
<b>Cash - Short Duration</b>	<b>3,568,786,996</b>	<b>8.0</b>	<b>1.3</b>	<b>5.1</b>	<b>5.1</b>	<b>2.6</b>	<b>2.3</b>	<b>1.6</b>	<b>1.8</b>	<b>Oct-05</b>
<i>90 Day U.S. Treasury Bill</i>			1.3	5.4	5.4	3.0	2.2	1.5	1.5	
<i>Short Duration</i>	172,484,941	0.4	1.3	5.8	5.8	2.7	2.8	2.3	2.2	Mar-10
<i>Bloomberg U.S. Gov/Credit 1-3 Year Index</i>			1.0	4.9	4.9	0.6	1.2	1.4	1.4	
<b>Private Equity</b>	<b>5,892,904,199</b>	<b>13.1</b>	<b>2.5</b>	<b>5.8</b>	<b>5.8</b>	<b>10.8</b>	<b>12.9</b>	<b>11.5</b>	<b>9.3</b>	<b>Apr-07</b>
<i>Private Equity Blended Benchmark</i>			1.3	5.3	5.3	7.5	15.6	14.4	12.3	
<b>Private Debt</b>	<b>3,700,173,316</b>	<b>8.2</b>	<b>2.9</b>	<b>11.4</b>	<b>11.4</b>	<b>9.5</b>	<b>8.0</b>	<b>6.4</b>	<b>7.3</b>	<b>Jun-08</b>
<i>S&amp;P LSTA Leveraged Loan Index + 150 bps 3-mo lag</i>			2.8	14.2	14.2	7.6	7.0	6.1	5.7	
<b>Real Assets</b>	<b>4,909,176,912</b>	<b>10.9</b>	<b>-0.1</b>	<b>-2.3</b>	<b>-2.3</b>	<b>6.5</b>	<b>6.7</b>	<b>9.0</b>	<b>7.1</b>	<b>Jul-08</b>
<i>Real Assets Blended Benchmark</i>			-0.7	-10.0	-10.0	1.0	1.8	3.2	2.7	
<b>Private Real Estate</b>	<b>3,226,577,819</b>	<b>7.2</b>	<b>-0.6</b>	<b>-6.3</b>	<b>-6.3</b>	<b>6.5</b>	<b>6.1</b>	<b>8.8</b>	<b>6.8</b>	<b>Jul-08</b>
<i>Private Real Estate Blended Benchmark</i>			-0.7	-10.0	-10.0	1.0	2.5	6.0	4.4	
<b>Public Real Estate</b>	<b>223,650,015</b>	<b>0.5</b>	<b>0.4</b>	<b>7.8</b>	<b>7.8</b>	<b>1.0</b>	<b>5.8</b>	<b>-</b>	<b>5.6</b>	<b>Jul-16</b>
<i>FTSE NAREIT Equity REIT</i>			0.1	7.8	7.8	0.3	3.9	5.9	4.0	
<b>Private Infrastructure</b>	<b>1,356,306,609</b>	<b>3.0</b>	<b>1.2</b>	<b>7.0</b>	<b>7.0</b>	<b>7.8</b>	<b>6.3</b>	<b>-</b>	<b>7.2</b>	<b>Jul-18</b>
<i>Dow Jones Brookfield Global Infrastructure</i>			-0.1	2.7	2.7	1.2	2.9	3.7	4.5	
<b>Public Infrastructure</b>	<b>102,642,469</b>	<b>0.2</b>	<b>-0.7</b>	<b>-0.7</b>	<b>-0.7</b>	<b>0.2</b>	<b>3.7</b>	<b>-</b>	<b>4.9</b>	<b>Jun-16</b>
<i>Dow Jones Brookfield Global Infrastructure</i>			-0.1	2.7	2.7	1.2	2.9	3.7	5.3	
<b>Hedge Funds Portable Alpha</b>	<b>4,935,624,394</b>	<b>11.0</b>	<b>1.1</b>	<b>8.2</b>	<b>8.2</b>	<b>8.1</b>	<b>8.4</b>	<b>6.5</b>	<b>8.1</b>	<b>Jul-07</b>
<i>HFRI Conservative Fund of Funds Less LIBOR</i>			-0.7	1.0	1.0	-0.1	2.3	1.6	0.7	
<b>Russell Overlay</b>	<b>722,598,296</b>	<b>1.6</b>								

Return calculations are rounded to the nearest tenth of percent and may differ slightly from BNYM reported returns.

Total Retirement System  
Risk Analysis - 5 Years (Net of Fees)

South Carolina Retirement System Investment Commission  
Period Ending: June 30, 2024

	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
<b>Total Retirement System</b>	<b>8.1</b>	<b>10.0</b>	<b>0.5</b>	<b>1.0</b>	<b>0.6</b>	<b>3.2</b>
<i>Policy Index</i>	6.5	9.8	-	1.0	0.5	0.0
<b>Public Equity</b>	<b>9.8</b>	<b>18.1</b>	<b>-0.3</b>	<b>1.0</b>	<b>0.5</b>	<b>1.2</b>
<i>Public Equity Blended Benchmark</i>	10.4	17.6	-	1.0	0.5	0.0
<b>Total Bonds</b>	<b>2.7</b>	<b>4.2</b>	<b>0.5</b>	<b>0.3</b>	<b>0.1</b>	<b>6.0</b>
<i>Bonds Blended Benchmark</i>	-0.2	6.2	-	1.0	-0.4	0.0
<b>Mixed Credit</b>	<b>7.3</b>	<b>7.8</b>	<b>0.4</b>	<b>0.7</b>	<b>0.7</b>	<b>6.3</b>
<i>50% S&amp;P LSTA Leveraged Loan Index/50% Blmbg. U.S. Corporate High Yield Index</i>	4.8	7.8	-	1.0	0.4	0.0
<b>Emerging Market Debt</b>	<b>-11.0</b>	<b>23.3</b>	<b>-0.3</b>	<b>0.6</b>	<b>-0.4</b>	<b>22.9</b>
<i>50% JP Morgan EMBI Global Diversified (USD)/50% JP Morgan EMBI Global Diversified</i>	-0.6	11.0	-	1.0	-0.2	0.0
<b>Cash - Short Duration</b>	<b>2.3</b>	<b>0.9</b>	<b>0.1</b>	<b>0.7</b>	<b>0.1</b>	<b>0.8</b>
<i>90 Day U.S. Treasury Bill</i>	2.2	0.6	-	1.0	-	0.0
<b>Short Duration</b>	<b>2.8</b>	<b>1.7</b>	<b>0.4</b>	<b>0.5</b>	<b>0.4</b>	<b>1.7</b>
<i>90 Day U.S. Treasury Bill</i>	2.2	0.6	-	1.0	-	0.0
<b>Private Equity</b>	<b>12.9</b>	<b>7.3</b>	<b>-0.2</b>	<b>0.1</b>	<b>1.4</b>	<b>15.0</b>
<i>Private Equity Blended Benchmark</i>	15.6	13.9	-	1.0	0.9	0.0
<b>Private Debt</b>	<b>8.0</b>	<b>4.3</b>	<b>0.1</b>	<b>-0.1</b>	<b>1.3</b>	<b>8.7</b>
<i>S&amp;P LSTA Leveraged Loan Index + 150 bps 3-mo lag</i>	7.0	7.0	-	1.0	0.7	0.0
<b>Real Assets</b>	<b>6.7</b>	<b>4.7</b>	<b>0.7</b>	<b>0.4</b>	<b>0.9</b>	<b>6.4</b>
<i>Real Assets Blended Benchmark</i>	1.8	8.0	-	1.0	0.0	0.0
<b>Private Real Estate</b>	<b>6.1</b>	<b>4.9</b>	<b>0.6</b>	<b>0.4</b>	<b>0.7</b>	<b>6.0</b>
<i>Private Real Estate Blended Benchmark</i>	2.5	7.4	-	1.0	0.1	0.0
<b>Public Real Estate</b>	<b>5.8</b>	<b>20.4</b>	<b>0.8</b>	<b>1.0</b>	<b>0.3</b>	<b>2.7</b>
<i>FTSE NAREIT All Equity REITs</i>	3.4	20.5	-	1.0	0.2	0.0
<b>Private Infrastructure</b>	<b>6.3</b>	<b>3.7</b>	<b>0.1</b>	<b>0.0</b>	<b>1.1</b>	<b>16.8</b>
<i>Dow Jones Brookfield Global Infrastructure</i>	2.9	17.1	-	1.0	0.1	0.0
<b>Public Infrastructure</b>	<b>3.7</b>	<b>16.3</b>	<b>0.2</b>	<b>0.9</b>	<b>0.2</b>	<b>2.4</b>
<i>Dow Jones Brookfield Global Infrastructure</i>	2.9	17.1	-	1.0	0.1	0.0
<b>Hedge Funds Portable Alpha</b>	<b>8.4</b>	<b>4.2</b>	<b>1.9</b>	<b>0.7</b>	<b>1.4</b>	<b>3.0</b>
<i>HFRI Conservative Fund of Funds Less LIBOR</i>	2.3	4.3	-	1.0	0.1	0.0

Page excludes managers with less than 5 years of history.

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# PERSPECTIVES THAT DRIVE ENTERPRISE SUCCESS



SEPTEMBER 12, 2024

Asset-Liability Study Primer

**South Carolina RSIC**

# Asset-liability process timeline

Date	Deliverable
September 12, 2024	<ul style="list-style-type: none"> <li>• Asset-liability education</li> <li>• Review asset classes to include</li> <li>• Review various reference portfolios</li> <li>• Agree on goals and objectives</li> </ul>
December 12, 2024	<ul style="list-style-type: none"> <li>• Review initial Asset-Liability Study portfolios and analysis</li> </ul>
March 2025	<ul style="list-style-type: none"> <li>• Reach consensus on Reference Portfolio</li> <li>• Narrow Policy Portfolio options</li> <li>• Draft of proposed changes to SIOP/AIP</li> <li>• Actuarial update from GRS (if needed)</li> <li>• Address any remaining questions and unresolved issues</li> </ul>
April 2025	<p>Commissioners' approve:</p> <ul style="list-style-type: none"> <li>• Policy portfolio</li> <li>• Reference portfolio</li> <li>• Benchmarks</li> <li>• Ranges</li> <li>• SIOP/AIP</li> </ul>

# RSIC asset-liability background

- Commission's primary purpose is to establish an investment program that is designed to meet the Commission's investment objective
  - The most significant action the Commission takes in fulfilling this responsibility is setting the long-term asset allocation policy
  - The Commission will conduct an Asset-Liability Management Study and asset allocation review every five years
  - Commission will design a portfolio that includes a mix of assets that it believes will likely generate a long-term rate of return that meets its investment objective which is conditioned by its fiduciary duty to only expose the Plan's assets to a prudent level of market risk
- Policy Portfolio is established with a long-term perspective
- State law requires the Commission to diversify the assets of the portfolio and to consider:
  - i. General economic conditions;
  - ii. Possible effect of inflation or deflation
  - iii. Role that each investment or course of action plays within the overall portfolio
  - iv. Needs for liquidity, regularity of income, and preservation or appreciation of capital; and
  - v. Adequacy of funding for the Plan based on reasonable actuarial factors

*Source: RSIC Statement of Investment Objectives and Policies*

# Investment Objectives

- Design an investment program that produces a long-term rate of return that when added to contributions, funds current and future benefit payments
- Invest and manage the Plan's assets solely in the interest of the Plan's beneficiaries
- Design a program guided by the Plan's particular design, structure, and risk factors
- Balance the need to provide sufficient liquidity to fund current net benefit payments while also growing the portfolio
- Construct a portfolio that generates a reasonable probability of meeting or exceeding the assumed annual rate of return on the Plan's assets set by the General Assembly, currently 7.0%

Source: RSIC Statement of Investment Objectives and Policies

# Asset-liability process overview

- Setting the strategic asset allocation is the single-largest determinant of future investment performance
- It is important to develop a thoughtful strategic asset allocation based on your enterprise objectives and risk tolerance
- An Asset-Liability Study's objective is to choose an asset allocation based on an understanding of how investment alternatives may behave in different economic environments
- Asset allocation decisions should be reviewed not just in isolation, but in the context of the liabilities they are intended to satisfy. This involves asking not only what we think may happen (deterministic) but also, what could happen (stochastic).
- To evaluate different asset allocations, we use a variety of approaches

## Key Inputs:

- **Capital market assumptions**
- **Actuarial liabilities (benefit payment stream)**
- **Current funded status**
- **Expected contributions**

## Analytical Modeling Tools:

**MPI**  
*Risk and Return Analysis*

**Winklevoss Technologies ProVal**  
*Stochastic Modelling*

**MSCI BarraOne**  
*Stress Testing, Scenario Analysis, Risk Analysis*

## Decision factors:

**Funded status**

**Return expectations**

**Sensitivity Analysis**

**Contribution expectations**

**Stress tests**

**Liquidity coverage**

# Capital market assumptions

The starting point in constructing a high quality, “efficient” portfolio is to answer four basic questions:

1. What are the appropriate Asset Classes for RSIC (e.g., stocks, bonds, real estate)?
2. What is the expected Return for each asset class?
3. What is the expected Risk of investing in each asset class?
4. How are the returns of these asset classes Correlated over time?

Other factors beyond the four above also must be considered, including liquidity needs, ability to use leverage and potential impact of equity market drawdowns (tail-risk)

# Asset class risk vs. return

The RSIC portfolio has exposure to the majority of asset class exposures.



In addition to different risk/return profiles, asset classes have varying levels of liquidity, transparency and complexity.

For illustrative purposes only

# Actuarial liabilities

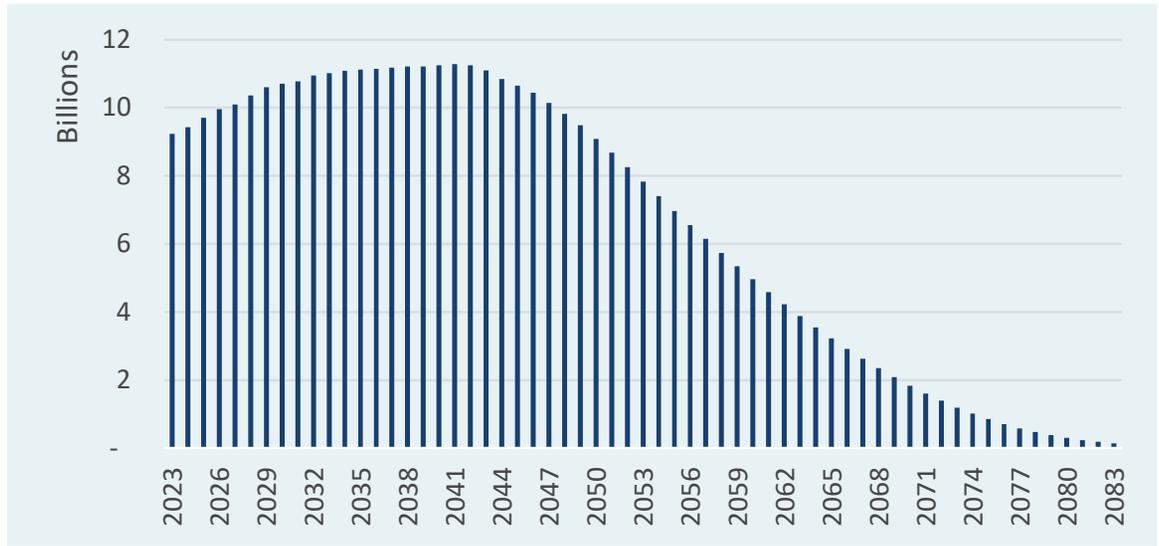
- **Expected benefit payment stream is determined by:**
  - Benefit formula
  - Actuarial assumptions:
    - Salary increases
    - Mortality
    - Retirement/disability/terminations

- **Actuarial liabilities are determined by discounting the expected cash flows by the actuarial assumed rate of return to determine present value:**

$$PV = FV \times 1/(1+r)^n$$

PV = present value  
 FV = future value (expected benefit payment)  
 r = actuarial assumed rate of return  
 n = number of periods

Illustrative Benefit Payment Stream (Not RSIC Data):



- Higher actuarial assumed rates of return result in lower actuarial liabilities (and vice-versa):

Impact of actuarial assumed rate of return on plan liabilities (single payment sample):

<i>Illustrative Example (not RSIC data)</i>	Lower	Current	Higher
Actuarial Assumed Rate of Return	6.0%	<b>7.0%</b>	8.0%
2044 Benefit Payment (\$ bn)	11.1	11.1	11.1
Years	20	20	20
Actuarial Liability	3.5	2.9	2.4

# RSIC Plans' funded status – June 30, 2023

(Dollar amounts expressed in thousands)

	SCRS	PORS	GARS	JSRS	SCNG	Total
<b>Liabilities</b>						
Actuarial Accrued Liability	\$ 59,164,049	\$ 9,706,642	\$ 67,853	\$ 477,736	\$ 68,975	\$ 69,485,255
% of total	85.1%	14.0%	0.1%	0.7%	0.1%	100.0%
<b>Assets</b>						
Market value	\$ 34,286,962	\$ 6,405,925	\$ 45,560	\$ 221,630	\$ 42,943	\$ 41,003,020
Actuarial value	\$ 34,253,870	\$ 6,400,701	\$ 45,723	\$ 221,629	\$ 43,401	\$ 40,965,324
<b>Unfunded accrued liability</b>						
Market value	\$ (24,877,087)	\$ (3,300,717)	\$ (22,293)	\$ (256,106)	\$ (26,032)	\$ (28,482,235)
Actuarial value	\$ (24,910,179)	\$ (3,305,941)	\$ (22,130)	\$ (256,107)	\$ (25,574)	\$ (28,519,931)
<b>Funded Status</b>						
Market value	58.0%	66.0%	67.1%	46.4%	62.3%	59.0%
Actuarial value	57.9%	65.9%	67.4%	46.4%	62.9%	59.0%

Source: GRS Actuarial Valuation Report as of July 1, 2023

# Expected contributions

- Contributions have a meaningful impact on a plan's ability to assume drawdown and illiquidity risk
- Forced selling of assets to fund a plan's cash flow needs during a market downturn results in realized (i.e. permanent) capital losses
- The passage of the 2017 Pension Reform Bill has resulted in more reliable and consistent contributions to the Plans

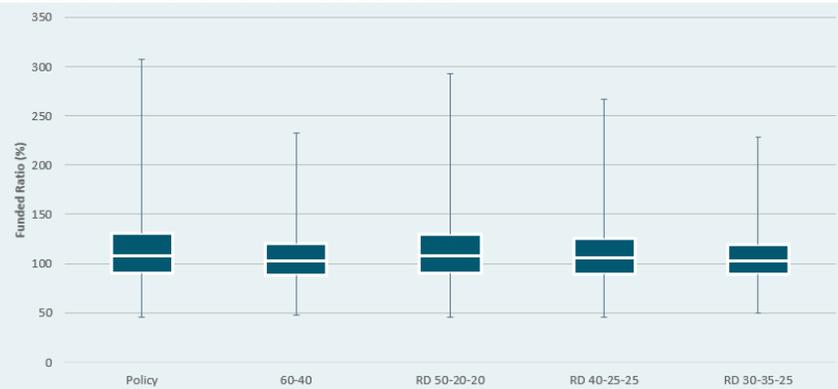
Predictable contributions allow for better informed risk-taking and help mitigate illiquidity risk.

# Stochastic forecasting

- Under a stochastic approach, the results of thousands of independent and path dependent simulations are aggregated to develop a distribution of potential outcomes
- This allows us to assign probabilities to an unknown future to develop median, volatility, range, and percentile metrics for a variety of variables
- This is a useful technique for quantifying risk
- **The exhibits below are for illustrative purposes and do not reflect actual RSIC Data:**

## Expected funded ratio

FUNDED RATIO SIMULATION FOR PLAN YEAR ENDING 2025

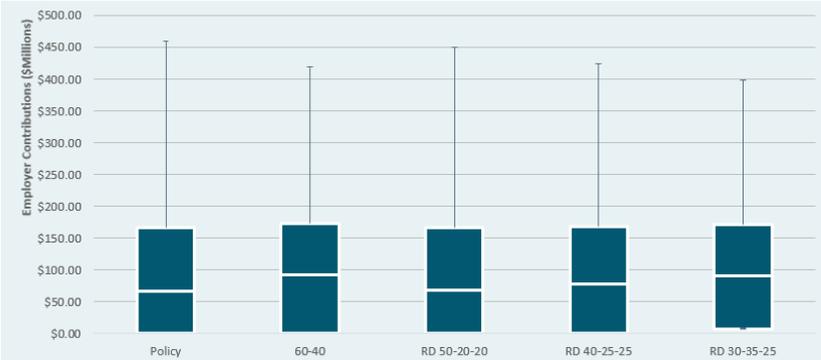


	Policy	60-40	RD 50-20-20	RD 40-25-25	RD 30-35-25
Best Case	307	232	293	267	229
Median	108	103	108	106	103
Worst Case	45	48	45	46	50

Based on 5,000 independent simulations. Best case defined as 100<sup>th</sup> percentile. Worst case defined as 0<sup>th</sup> percentile. Median outcome is the 50<sup>th</sup> percentile.

## Expected employer contributions

EMPLOYER CONTRIBUTION SIMULATION FOR PLAN YEAR ENDING 2025



	Policy	60-40	RD 50-20-20	RD 40-25-25	RD 30-35-25
Best Case	-	-	-	-	-
Median	65,858,027.00	91,613,558.00	68,193,586.00	77,115,728.00	90,921,010.00
Worst Case	458,822,661.00	419,259,361.00	448,838,819.00	424,592,345.00	398,329,377.00

Based on 5,000 independent simulations. Best case defined as 0<sup>th</sup> percentile. Worst case defined as 100<sup>th</sup> percentile. Median outcome is the 50<sup>th</sup> percentile.

# Deterministic forecasting

- Under a deterministic approach, we analyze the impact of a pre-determined event
- This is a useful technique for answering specific questions
  - Base Case: “what happens if I achieve my expected performance?”
  - Economic Regimes: “what happens if we enter a recessionary environment?”
  - Underperforming assumptions or economic shocks: “what happens to my annual contributions if I underperform the assumed rate of return by 50 bps per year?”
- **The exhibits below are for illustrative purposes and do not reflect actual RSIC Data:**

## Base case: the plan earns 7.0% every year for next 20 years



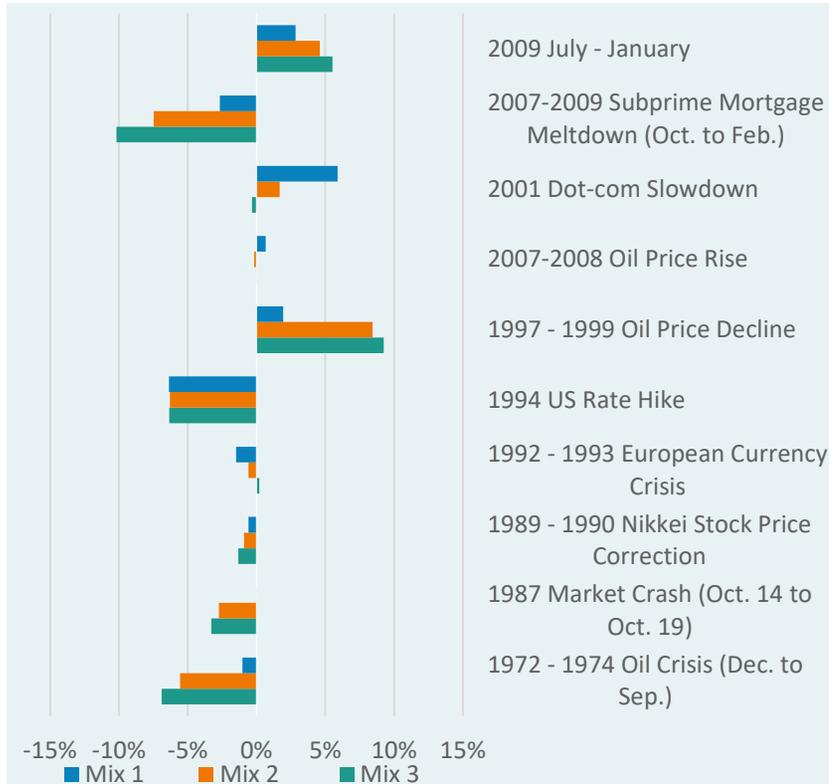
## Actuarial funded status outcomes



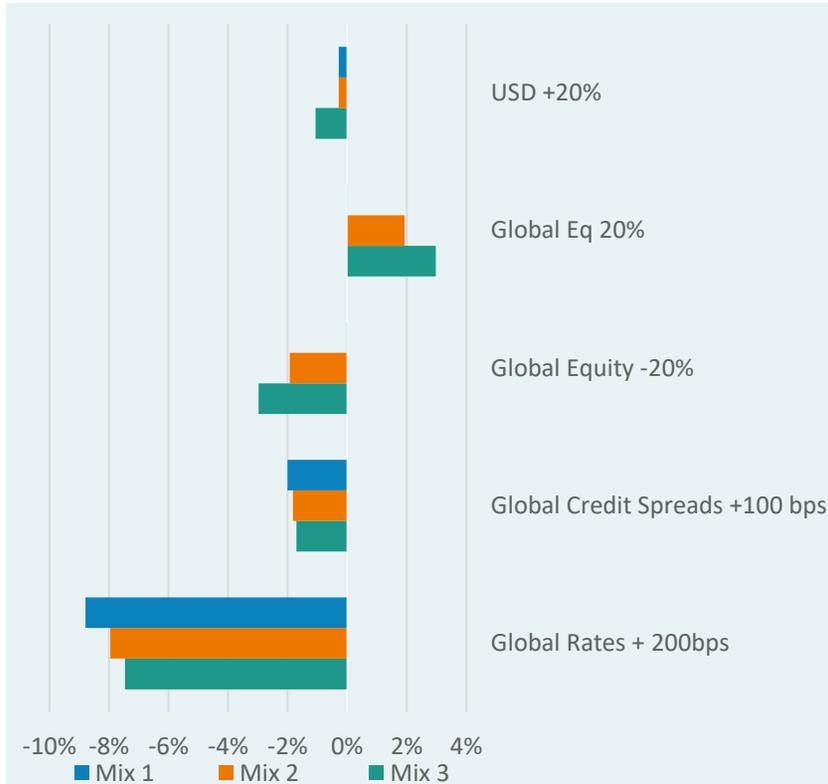
# Deterministic forecasting

Scenario analysis provides another lens to portfolio design (for illustrative purposes only – not actual RSIC data):

TAIL RISK – SCENARIO ANALYSIS



TAIL RISK – SCENARIO ANALYSIS (ONLY DIRECTLY IMPACTED ASSETS MOVE)



Scenario analysis incorporates historical capital market events. Stress tests are plausible future economic environments. Both are types of deterministic analysis.

Source: MSCI Barra.

LEFT: Barra measures how the current portfolio would be expected to perform if it was held during a historical period, based on the portfolio's current risk factor exposures. The same market behavior of the historical event is applied to the portfolio. For example, if during the historical period interest rate factors fell by -5%, for example, Barra applies a -5% interest rate factor drop to assets exposed to that factor.

RIGHT: This analysis measures the total portfolio performance impact, where a specific individual asset class is shocked, with the assumption that no other asset classes are impacted by the shock. For example, a "Global Equity -20%" shock measures how much the equities in the current portfolio would be impacted by the shock, and assumes no other asset classes are impacted. The "Global Rates +200bps" shock measures how much the fixed income holdings in the current portfolio would be impacted by the shock to rates, and assumes no other asset classes are impacted. Once the individual asset class impact is measured, the total portfolio performance impact is measured given the weight of the underlying asset class in the portfolio.

# Liquidity risk assessment overview

Liquidity should be managed to reasonably ensure that the plan can meet its obligations under various market conditions

To gauge the health of a plan's liquidity position, we leverage a cash-flow based analysis that is rooted in the Basel III banking regulation framework.

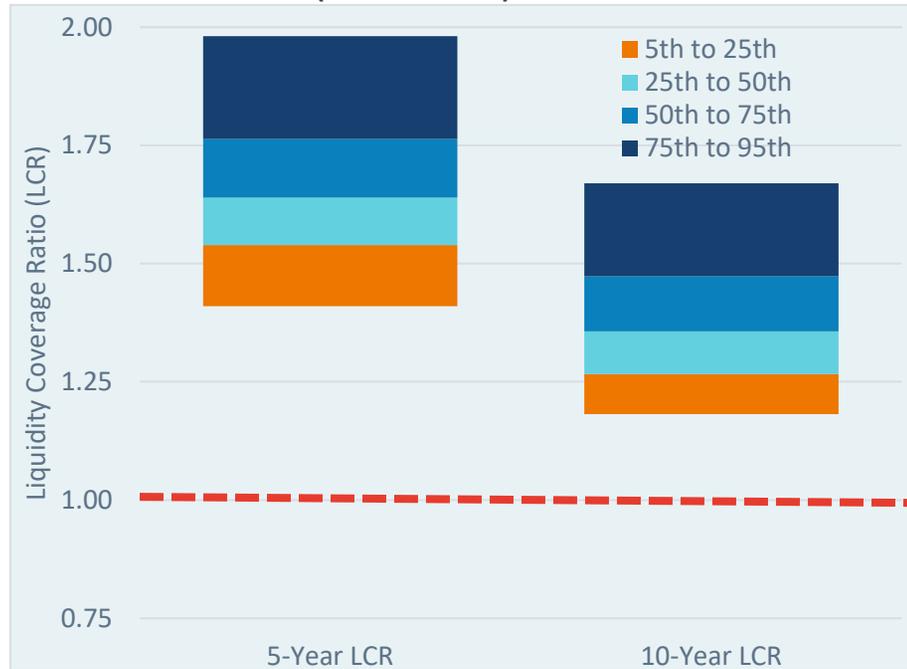
$$\text{Liquidity Coverage Ratio} = \frac{\begin{aligned} & \text{(Starting Liquid Financial Assets + Distributions from Illiquid Assets} \\ & \text{+ Employer and Employee Contributions} \\ & \text{+ **Return of Liquid Assets** (modeled stochastically))} \end{aligned}}{\begin{aligned} & \text{(Benefit Payments + Expenses + Capital Calls for Illiquid Assets)} \end{aligned}}$$

## Determining the appropriate Liquidity Coverage Ratio (LCR):

- While there is no “right” ratio, a value less than 1.0 means there is insufficient liquidity to meet cash outflow needs.
- An appropriate LCR is impacted by several variables:
  - Access to external sources of liquidity (i.e., line of credit)
  - Projected cash flows of the portfolio and their respective volatility
  - Overall risk tolerance

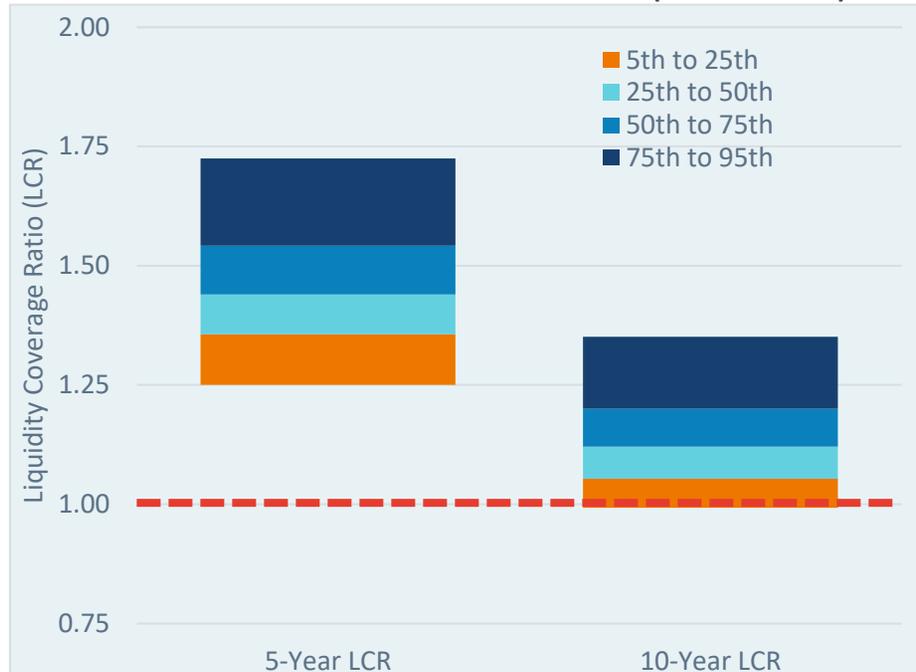
# Liquidity coverage ratio analysis

BASELINE – Illustrative (not RSIC data)



Baseline Contributions	5-Year LCR	10-Year LCR
<b>Percentile</b>		
95%	1.98	1.67
75%	1.76	1.47
50%	1.64	1.36
25%	1.54	1.27
5%	1.41	1.18
<b>Probability (Liquidity Event)</b>	<b>&lt;0.1%</b>	<b>&lt;0.1%</b>

50% OF BASELINE CONTRIBUTIONS - Illustrative (not RSIC data)



50% of Baseline Contributions	5-Year LCR	10-Year LCR
<b>Percentile</b>		
95%	1.72	1.35
75%	1.54	1.20
50%	1.44	1.12
25%	1.36	1.05
5%	1.25	0.99
<b>Probability (Liquidity Event)</b>	<b>&lt;0.1%</b>	<b>6.6%</b>

Based on 1,000 monte carlo simulations of liquidity coverage ratio. See appendix for additional details.

# Appendix

# CMA Methodology

## CORE INPUTS

- We use a fundamental building block approach based on several inputs, including historical data and academic research to create asset class return forecasts.
- For most asset classes, we use the long-term historical volatility after adjusting for autocorrelation.
- Correlations between asset classes are calculated based on the last 10 years. For illiquid assets, such as private equity and private real estate, we use BarraOne correlation estimates.

Asset	Return Methodology	Volatility Methodology*
Inflation	25% weight to the University of Michigan Survey 5-10 year ahead inflation expectation and the Survey of Professional Forecasters (Fed Survey), and the remaining 50% to the market's expectation for inflation as observed through the 10-year TIPS breakeven rate	-
Cash	1/3 * current federal funds rate + 1/3 * U.S. 10-year Treasury yield + 1/3 * Federal Reserve long-term interest rate target	Long-term volatility
Bonds	Nominal bonds: current yield; Real bonds: real yield + inflation forecast	Long-term volatility
International Bonds	Current yield	Long-term volatility
Credit	Current option-adjusted spread + U.S. 10-year Treasury – effective default rate	Long-term volatility
International Credit	Current option-adjusted spread + foreign 10-year Treasury – effective default rate	Long-term volatility
Private Credit	Levered gross return (SOFR + spread + original issuance discounts) – management fees – carried interest	Estimated volatility
Equity	Current yield + real earnings growth (historical average) + inflation on earnings (inflation forecast) + expected P/E change	Long-term volatility
Intl Developed Equity	Current yield + real earnings growth (historical average) + inflation on earnings (intl. inflation forecast) + expected P/E change	Long-term volatility
Private Equity**	US large cap domestic equity forecast * 1.85 beta adjustment	1.2 * Long-term volatility of U.S. small cap
Commodities	Collateral return (cash) + spot return (inflation forecast) + roll return (assumed to be zero)	Long-term volatility
Hedge Funds	Return coming from traditional betas + 15-year historical idiosyncratic return	Long-term volatility
Core Real Estate	Cap rate + real income growth – capex + inflation forecast	65% of REIT volatility
REITs	Core real estate	Long-term volatility
Value-Add Real Estate	Core real estate + 2%	Volatility to produce Sharpe Ratio (g) equal to core real estate
Opportunistic Real Estate	Core real estate + 3%	Volatility to produce Sharpe Ratio (g) equal to core real estate
Infrastructure	Current yield + real income growth + inflation on earnings (inflation forecast)	Long-term volatility
Risk Parity	Modeled as the 10-year return expectations of a <i>representative selection of Risk Parity strategies</i>	Target volatility

\*Long-term historical volatility data is adjusted for autocorrelation (see Appendix)

\*\*Private Equity is modeled assuming an 8.0% floor for expected return, and a 3% return premium ceiling over U.S. Large Cap Equity. These adjustments are in place to recognize that higher interest rates (cost of leverage) act as a drag on expected Private Equity returns but that this drag has had limits historically, and to recognize that future Private Equity total universe performance is likely to be more anchored to public equity performance than in past times, given a more competitive market environment

# 10-year return & risk assumptions

Asset Class	Index Proxy	Ten Year Return Forecast		Standard Deviation Forecast	Sharpe Ratio Forecast (g)	Sharpe Ratio Forecast (a)	10-Year Historical Sharpe Ratio (g)	10-Year Historical Sharpe Ratio (a)
		Geometric	Arithmetic					
<b>Equities</b>								
U.S. Large	S&P 500	5.9%	7.0%	15.5%	0.12	0.19	0.72	0.75
U.S. Small	Russell 2000	6.2%	8.2%	21.4%	0.10	0.19	0.28	0.37
International Developed	MSCI EAFE	8.1%	9.5%	17.6%	0.23	0.31	0.18	0.25
International Small	MSCI EAFE Small Cap	8.8%	10.9%	21.7%	0.22	0.31	0.20	0.27
Emerging Markets	MSCI EM	8.8%	11.4%	24.6%	0.19	0.30	0.06	0.14
Global Equity	MSCI ACWI	6.9%	8.2%	16.7%	0.17	0.25	0.44	0.50
Global Equity ex USA	MSCI ACWI ex USA	8.5%	10.2%	19.5%	0.23	0.31	0.15	0.22
Private Equity	CA Private Equity	8.0%	10.9%	25.6%	0.15	0.27	-	-
Private Equity Direct	CA Private Equity	9.0%	11.8%	25.6%	0.19	0.30	-	-
Private Equity (FoF)	CA Private Equity	7.0%	9.9%	25.6%	0.11	0.23	-	-
<b>Fixed Income</b>								
Cash	30 Day T-Bills	4.1%	4.1%	1.1%	-	-	-	-
U.S. TIPS	Bloomberg U.S. TIPS 5-10	4.7%	4.8%	5.5%	0.11	0.13	0.13	0.15
Non-U.S. Inflation Linked Bonds	Bbg World Govt. Inflation Linked Bond ex U.S.	3.9%	4.2%	7.4%	(0.03)	0.01	(0.15)	(0.11)
U.S. Treasury	Bloomberg Treasury 7-10 Year	4.6%	4.8%	7.1%	0.07	0.10	(0.05)	(0.02)
Long U.S. Treasury	Bloomberg Treasury 20+ Year	4.7%	5.5%	13.2%	0.05	0.11	0.00	0.25
Global Sovereign ex U.S.	Bloomberg Global Treasury ex U.S.	2.7%	3.2%	9.9%	(0.14)	(0.09)	(0.40)	(0.36)
Global Aggregate	Bloomberg Global Aggregate	4.1%	4.3%	6.6%	0.00	0.03	(0.27)	(0.24)
Core Fixed Income	Bloomberg U.S. Aggregate Bond	4.9%	5.0%	4.8%	0.17	0.19	0.00	0.02
Core Plus Fixed Income	Bloomberg U.S. Universal	5.2%	5.3%	4.5%	0.24	0.27	0.07	0.09
Investment Grade Corp. Credit	Bloomberg U.S. Corporate Investment Grade	5.7%	6.0%	8.4%	0.19	0.23	0.17	0.20
Short-Term Gov't/Credit	Bloomberg U.S. Gov't/Credit 1-3 Year	4.7%	4.8%	3.6%	0.17	0.19	(0.07)	(0.07)
Short-Term Credit	Bloomberg Credit 1-3 Year	5.1%	5.2%	3.6%	0.28	0.31	0.23	0.24
Long-Term Credit	Bloomberg Long U.S. Credit	5.7%	6.3%	10.9%	0.15	0.20	0.15	0.20
High Yield Corp. Credit	Bloomberg U.S. Corporate High Yield	6.6%	7.2%	11.0%	0.23	0.28	0.42	0.44
Bank Loans	Morningstar LSTA Leveraged Loan	8.0%	8.4%	9.0%	0.43	0.48	0.58	0.59
Global Credit	Bloomberg Global Credit	5.1%	5.4%	7.7%	0.13	0.17	0.01	0.04
Emerging Markets Debt (Hard)	JPM EMBI Global Diversified	8.7%	9.2%	10.6%	0.43	0.48	0.15	0.20
Emerging Markets Debt (Local)	JPM GBI-EM Global Diversified	6.5%	7.2%	12.2%	0.20	0.25	(0.17)	(0.12)
Private Credit	Morningstar LSTA Leveraged Loan	9.2%	9.8%	11.9%	0.43	0.48	-	-
Private Credit (Direct Lending - Unlevered)	Morningstar LSTA Leveraged Loan	8.0%	8.4%	9.0%	0.43	0.48	-	-
Private Credit (Direct Lending - Levered)	Morningstar LSTA Leveraged Loan	9.5%	10.2%	12.6%	0.43	0.48	-	-
Private Credit (Credit Opportunities)	Morningstar LSTA Leveraged Loan	9.6%	10.3%	12.8%	0.43	0.48	-	-
Private Credit (Junior Capital / Mezzanine)	Morningstar LSTA Leveraged Loan	9.0%	9.6%	11.4%	0.43	0.48	-	-
Private Credit (Distressed)	Morningstar LSTA Leveraged Loan	9.1%	12.7%	29.1%	0.17	0.30	-	-

Investors wishing to produce expected geometric return forecasts for their portfolios should use the arithmetic return forecasts provided here as inputs into that calculation, rather than the single-asset-class geometric return forecasts. This is the industry standard approach, but requires a complex explanation only a heavy quant could love, so we have chosen not to provide further details in this document – we will happily provide those details to any readers of this who are interested.

# 10-year return & risk assumptions

Asset Class	Index Proxy	Ten Year Return Forecast		Standard Deviation Forecast	Sharpe Ratio Forecast (g)	Sharpe Ratio Forecast (a)	10-Year Historical Sharpe Ratio (g)	10-Year Historical Sharpe Ratio (a)
		Geometric	Arithmetic					
<b>Other</b>								
Commodities	Bloomberg Commodity	6.6%	7.8%	16.1%	0.16	0.23	(0.13)	(0.06)
Hedge Funds	HFRI Fund Weighted Composite	4.3%	4.6%	7.5%	0.03	0.07	0.48	0.49
Hedge Fund of Funds	HFRI Fund of Funds Composite	3.3%	3.6%	7.5%	(0.11)	(0.07)	-	-
Hedge Funds (Equity Style)	Custom HFRI Benchmark Mix*	7.2%	8.1%	14.1%	0.22	0.28	-	-
Hedge Funds (Credit Style)	Custom HFRI Benchmark Mix*	7.3%	7.7%	9.4%	0.34	0.38	-	-
Hedge Funds (Asymmetric Style)	Custom HFRI Benchmark Mix*	5.4%	5.6%	6.4%	0.20	0.23	-	-
Real Estate Debt	Bloomberg CMBS IG	7.4%	7.7%	7.5%	0.44	0.48	0.14	0.15
Core Real Estate	NCREIF Property	6.8%	7.5%	12.5%	0.22	0.27	-	-
Value-Add Real Estate	NCREIF Property + 200bps	8.8%	9.9%	15.4%	0.31	0.38	-	-
Opportunistic Real Estate	NCREIF Property + 300bps	9.8%	11.7%	21.1%	0.27	0.36	-	-
REITs	Wilshire REIT	6.8%	8.5%	19.2%	0.14	0.23	0.35	0.42
Global Infrastructure	S&P Global Infrastructure	8.4%	9.7%	16.9%	0.25	0.33	0.20	0.28
Risk Parity**	S&P Risk Parity 10% Vol Index	7.2%	7.8%	10.0%	0.31	0.37	-	-
Currency Beta	MSCI Currency Factor Index	2.3%	2.4%	3.4%	(0.52)	(0.49)	(0.06)	0.21
Inflation		2.5%	-	-	-	-	-	-

Investors wishing to produce expected geometric return forecasts for their portfolios should use the arithmetic return forecasts provided here as inputs into that calculation, rather than the single-asset-class geometric return forecasts. This is the industry standard approach, but requires a complex explanation only a heavy quant could love, so we have chosen not to provide further details in this document – we will happily provide those details to any readers of this who are interested.

\*To represent hedge fund styles, we use a combination of HFRI benchmarks: Equity Style = 33% HFRI Fundamental Growth, 33% HFRI Fundamental Value, 33% HFRI Activist. Credit Style = 20% HFRI Distressed/Restructuring, 20% HFRI Credit Arbitrage, 20% HFRI Fixed Income-Corporate, 20% HFRI Fixed Income-Convertible Arbitrage, 20% HFRI Fixed Income-Asset Backed. Asymmetric Style = 50% HFRI Relative Value, 50% HFRI Macro

\*\*The Risk Parity forecast shown here assumes a 10% target volatility strategy. We recommend customizing this forecast to the target volatility specifications of the risk parity strategy that an investor wishes to model. Please speak with your Verus consultant for customization needs.

# 30-year return & risk assumptions

- Occasionally investors may have a specific need for longer-term capital market forecasts. We have developed a set of 30-year assumptions to meet those needs.
- The return forecasts below have been constructed using our existing building block approach, but with longer-term inputs. Risks and correlations are estimated using the same approach as our 10-year forecasts, using full-history autocorrelation-adjusted realized risk and past 10 year realized correlations.
- These return figures must be thought of separately from our 10-year forecasts and are not meant to imply performance for the 20 years *beyond* our 10-year forecasts.
- Please reach out to your Verus consultant with questions regarding whether 30-year Capital Market Assumptions might be appropriate for your needs.

Asset Class	Index Proxy	Thirty Year Return Forecast		Standard Deviation Forecast	Sharpe Ratio Forecast (g)	Sharpe Ratio Forecast (a)
		Geometric	Arithmetic			
<b>Equities</b>						
U.S. Large	S&P 500	6.3%	7.4%	15.5%	0.14	0.21
U.S. Small	Russell 2000	6.4%	8.4%	21.4%	0.11	0.20
International Developed	MSCI EAFE	7.6%	9.0%	17.6%	0.20	0.28
International Small	MSCI EAFE Small Cap	7.8%	9.9%	21.7%	0.18	0.27
Emerging Markets	MSCI EM	8.3%	10.9%	24.6%	0.17	0.28
Global Equity	MSCI ACWI	7.0%	8.3%	16.7%	0.17	0.25
Global Equity ex-US	MSCI ACWI ex-US	8.0%	9.7%	19.5%	0.20	0.29
Private Equity	Cambridge U.S. Private Equity	8.1%	10.9%	25.6%	0.16	0.27
Private Equity (Direct)	Cambridge U.S. Private Equity	9.1%	11.9%	25.6%	0.20	0.30
Private Equity (Fund of Funds)	Cambridge U.S. Private Equity	7.1%	10.0%	25.6%	0.12	0.23
<b>Fixed Income</b>						
Cash	30 Day T-Bills	4.1%	4.1%	1.1%	-	-
U.S. TIPS	Bloomberg U.S. TIPS 5 - 10	4.7%	4.8%	5.5%	0.11	0.13
Non-U.S. Inflation Linked Bonds	Bbg World Govt. Inflation Linked Bond ex U.S.	3.9%	4.2%	7.4%	(0.03)	0.01
U.S. Treasury	Bloomberg Treasury 7-10 Year	4.7%	4.9%	7.1%	0.08	0.11
Long U.S. Treasury	Bloomberg U.S. Treasury 20+ Year	4.7%	5.5%	13.2%	0.05	0.11
Global Sovereign ex U.S.	Bloomberg Global Treasury ex U.S.	3.2%	3.7%	9.9%	(0.09)	(0.04)
Global Aggregate	Bloomberg Global Aggregate	3.7%	3.9%	6.6%	(0.06)	(0.03)
Core Fixed Income	Bloomberg U.S. Aggregate Bond	5.5%	5.6%	4.8%	0.29	0.31
Core Plus Fixed Income	Bloomberg U.S. Universal	5.9%	6.0%	4.5%	0.40	0.42
Investment Grade Corp. Credit	Bloomberg U.S. Corporate Investment Grade	5.9%	6.2%	8.4%	0.21	0.25
Short-Term Gov't/Credit	Bloomberg U.S. Gov't/Credit 1 - 3 year	4.9%	5.0%	3.6%	0.22	0.25
Short-Term Credit	Bloomberg Credit 1-3 Year	5.5%	5.6%	3.6%	0.39	0.42
Long-Term Credit	Bloomberg Long U.S. Credit	6.0%	6.6%	10.9%	0.17	0.23
High Yield Corp. Credit	Bloomberg U.S. Corporate High Yield	7.4%	8.0%	11.0%	0.30	0.35
Bank Loans	Morningstar Leveraged Loan	7.6%	8.0%	9.0%	0.39	0.43
Global Credit	Bloomberg Global Credit	3.4%	3.7%	7.7%	(0.09)	(0.05)
Emerging Markets Debt (Hard)	JPM EMBI Global Diversified	8.9%	9.4%	10.6%	0.45	0.50
Emerging Markets Debt (Local)	JPM GBI EM Global Diversified	6.5%	7.2%	12.2%	0.20	0.25
Private Credit	Morningstar LSTA Leveraged Loan	9.2%	9.8%	11.9%	0.43	0.48
Private Credit (Direct Lending - Unlevered)	Morningstar LSTA Leveraged Loan	8.0%	8.4%	9.0%	0.43	0.48
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# 30-year return & risk assumptions

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Asset Class	Index Proxy	Thirty Year Return Forecast		Standard Deviation Forecast	Sharpe Ratio Forecast (g)	Sharpe Ratio Forecast (a)
		Geometric	Arithmetic			
<b>Other</b>						
Commodities	Bloomberg Commodity	6.5%	7.7%	16.1%	0.15	0.22
Hedge Funds	HFRI Fund Weighted Composite	4.9%	5.2%	7.5%	0.11	0.15
Hedge Fund of Funds	HFRI Fund of Funds Composite	3.9%	4.2%	7.5%	(0.03)	0.01
Hedge Fund (Equity Style)	Custom HFRI Benchmark Mix*	7.7%	8.6%	14.1%	0.26	0.32
Hedge Fund (Credit Style)	Custom HFRI Benchmark Mix*	8.0%	8.4%	9.4%	0.41	0.46
Hedge Fund (Asymmetric Style)	Custom HFRI Benchmark Mix*	5.5%	5.7%	6.4%	0.22	0.25
Real Estate Debt	Bloomberg IG CMBS	7.4%	7.7%	7.5%	0.44	0.48
Core Real Estate	NCREIF Property	6.7%	7.4%	12.5%	0.21	0.26
Value-Add Real Estate	NCREIF Property + 200bps	8.7%	9.8%	15.4%	0.30	0.37
Opportunistic Real Estate	NCREIF Property + 400bps	9.7%	11.6%	21.1%	0.27	0.36
REITs	Wilshire REIT	6.7%	8.4%	19.2%	0.14	0.22
Global Infrastructure	S&P Global Infrastructure	8.8%	10.1%	16.9%	0.28	0.36
Risk Parity**	Risk Parity	7.9%	8.5%	10.0%	0.38	0.44
Currency Beta	MSCI Currency Factor Mix Index	2.3%	2.4%	3.4%	(0.53)	(0.50)
Inflation		2.4%	-	-	-	-

Investors wishing to produce expected geometric return forecasts for their portfolios should use the arithmetic return forecasts provided here as inputs into that calculation, rather than the single-asset-class geometric return forecasts. This is the industry standard approach, but requires a complex explanation only a heavy quant could love, so we have chosen not to provide further details in this document – we will happily provide those details to any readers of this who are interested.

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# Correlation assumptions

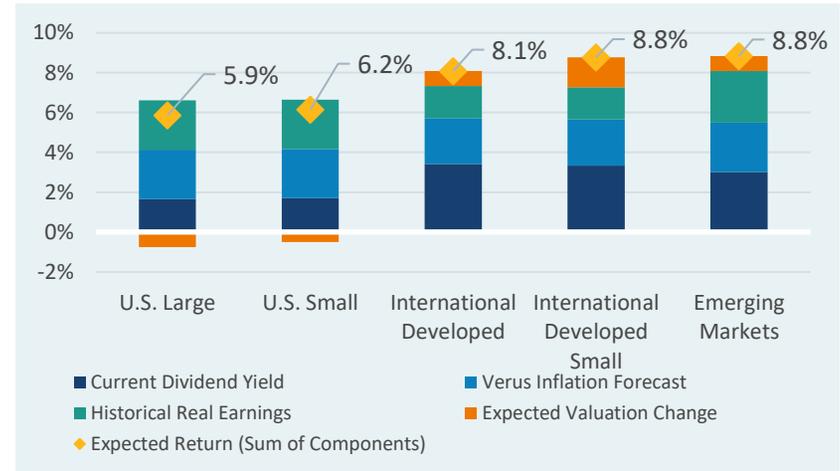
	Cash	US Large	US Small	Intl Large	Intl Small	EM	Global Equity	PE	US TIPS	US Treasury	Global Sovereign ex-US	US Core	Core Plus	Short-Term Gov't/Credit	Short-Term Credit	Long-Term Credit	US HY	Bank Loans	Global Credit	EMD USD	EMD Local	Commodities	Hedge Funds	Real Estate	REITs	Infrastructure	Currency Beta	Risk Parity	
Cash	1.0																												
US Large	-0.1	1.0																											
US Small	-0.2	0.9	1.0																										
Intl Large	-0.1	0.9	0.8	1.0																									
Intl Small	-0.1	0.9	0.8	1.0	1.0																								
EM	-0.1	0.7	0.6	0.8	0.8	1.0																							
Global Equity	-0.1	1.0	0.9	0.9	0.9	0.8	1.0																						
PE	-0.2	0.7	0.7	0.6	0.6	0.6	0.7	1.0																					
US TIPS	-0.1	0.4	0.3	0.4	0.4	0.4	0.5	0.2	1.0																				
US Treasury	0.0	0.1	-0.1	0.0	0.0	0.1	0.1	-0.1	0.7	1.0																			
Global Sovereign ex-US	0.1	0.3	0.2	0.4	0.4	0.5	0.4	0.1	0.7	0.6	1.0																		
US Core	0.0	0.3	0.2	0.3	0.3	0.4	0.3	0.0	0.8	0.9	0.7	1.0																	
Core Plus	0.0	0.4	0.3	0.4	0.4	0.5	0.4	0.1	0.8	0.8	0.8	1.0	1.0																
Short-Term Gov't/Credit	0.2	0.2	0.0	0.2	0.2	0.3	0.2	0.0	0.7	0.8	0.6	0.8	0.8	1.0															
Short-Term Credit	0.2	0.4	0.3	0.4	0.4	0.4	0.4	0.2	0.6	0.5	0.7	0.7	0.8	0.7	1.0														
Long-Term Credit	0.0	0.5	0.4	0.5	0.5	0.5	0.6	0.2	0.8	0.7	0.7	0.9	0.9	0.6	0.8	1.0													
US HY	-0.1	0.8	0.8	0.8	0.8	0.7	0.8	0.5	0.6	0.1	0.5	0.4	0.6	0.3	0.6	0.7	1.0												
Bank Loans	-0.1	0.6	0.6	0.6	0.7	0.6	0.6	0.5	0.3	-0.2	0.2	0.1	0.3	0.0	0.5	0.4	0.8	1.0											
Global Credit	0.0	0.7	0.5	0.7	0.7	0.7	0.7	0.3	0.7	0.5	0.8	0.8	0.9	0.6	0.8	0.9	0.8	0.6	1.0										
EMD USD	-0.1	0.7	0.6	0.7	0.7	0.7	0.7	0.4	0.6	0.3	0.6	0.6	0.7	0.4	0.6	0.8	0.8	0.7	0.9	1.0									
EMD Local	0.0	0.5	0.4	0.7	0.6	0.8	0.7	0.4	0.4	0.2	0.6	0.4	0.5	0.4	0.5	0.6	0.7	0.5	0.8	0.8	1.0								
Commodities	-0.1	0.4	0.4	0.5	0.5	0.5	0.5	0.3	0.2	-0.2	0.2	0.0	0.1	0.0	0.2	0.1	0.5	0.5	0.3	0.4	0.4	1.0							
Hedge Funds	-0.1	0.8	0.9	0.8	0.9	0.8	0.9	0.6	0.3	-0.2	0.3	0.2	0.3	0.0	0.4	0.5	0.8	0.8	0.6	0.7	0.6	0.6	1.0						
Real Estate	-0.3	0.6	0.6	0.5	0.5	0.5	0.6	0.4	0.2	0.0	-0.1	0.1	0.2	0.0	-0.2	0.2	0.4	0.4	0.3	0.4	0.4	0.2	0.5	1.0					
REITs	-0.2	0.7	0.7	0.6	0.6	0.5	0.7	0.5	0.6	0.3	0.3	0.5	0.5	0.2	0.3	0.6	0.7	0.5	0.6	0.6	0.5	0.3	0.6	0.7	1.0				
Infrastructure	-0.2	0.8	0.7	0.8	0.8	0.7	0.8	0.6	0.5	0.1	0.5	0.4	0.5	0.2	0.5	0.6	0.8	0.7	0.7	0.8	0.7	0.6	0.8	0.6	0.7	1.0			
Currency Beta	-0.1	0.0	0.0	-0.2	-0.2	-0.2	-0.1	0.1	-0.2	-0.1	-0.3	-0.2	-0.2	-0.1	-0.3	-0.2	-0.1	-0.1	-0.3	-0.2	-0.2	-0.2	-0.1	0.1	0.0	-0.1	1.0		
Risk Parity	0.0	0.7	0.6	0.7	0.7	0.6	0.7	0.7	0.4	0.4	0.0	0.5	0.5	0.7	0.3	0.7	0.7	0.7	0.5	0.7	0.6	0.5	0.5	0.4	0.0	0.7	-0.2	1.0	

Note: as of 9/30/23 - Correlation assumptions are based on the last ten years. Private Equity and Real Estate correlations are especially difficult to model – we have therefore used BarraOne correlation data to strengthen these correlation estimates.

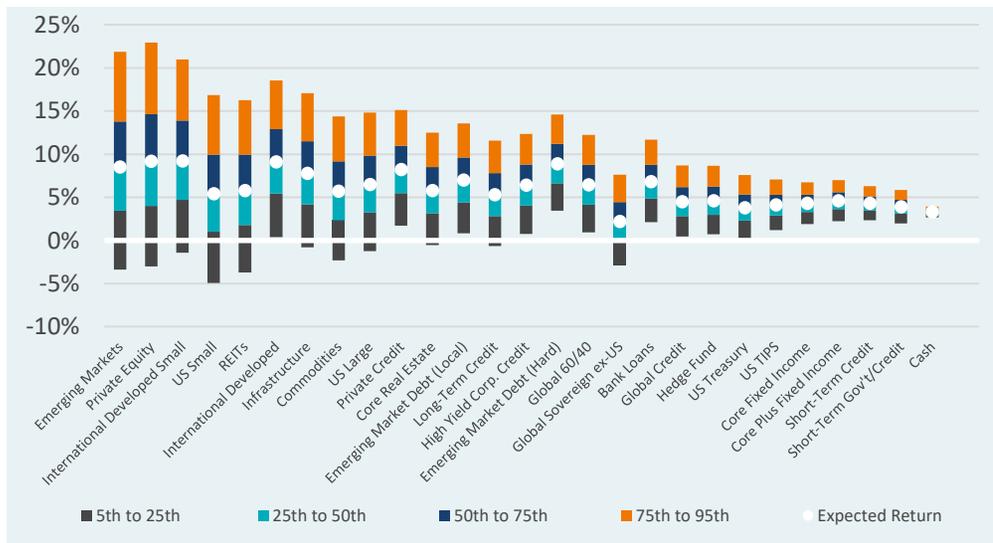
# Capital market assumptions - returns

- Verus’ capital market assumptions are founded on sound academic principles, and clients are given full transparency to our methodology.
- Published every December, the forecasts include 10- and 30-yr forecasts across over 45 asset classes, sub-asset classes and styles. See *appendix for full list*.
- Valuations are updated monthly to allow for more timely consideration of shifting markets

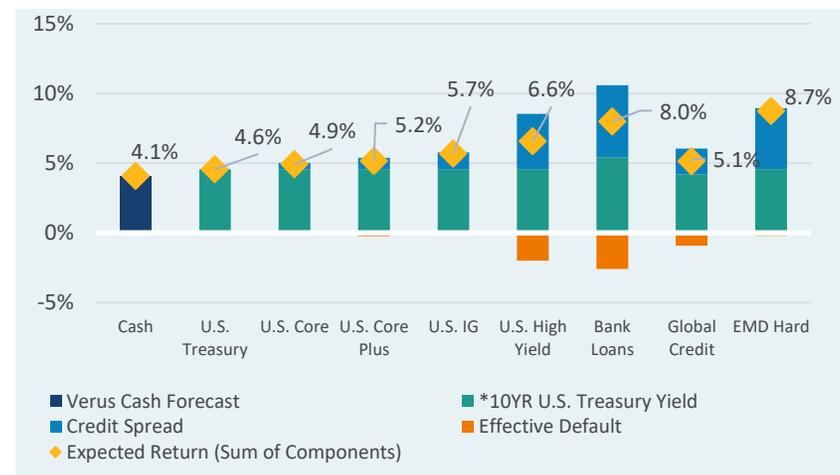
## 2024 EQUITY RETURN FORECASTS



## RANGE OF LIKELY 10-YEAR OUTCOMES



## 2024 FIXED INCOME RETURN FORECASTS

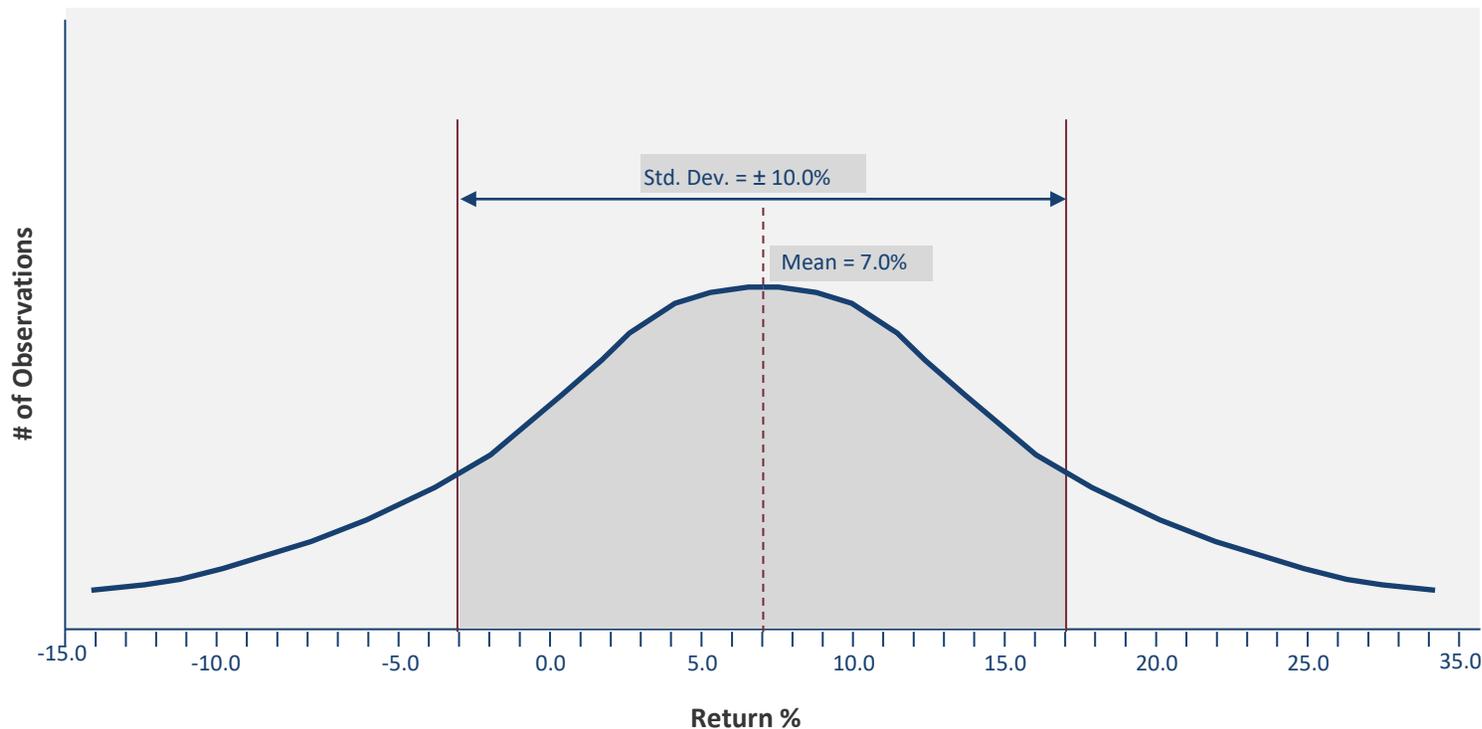


Source: Verus

\*Bank loans uses 3-month USD Libor instead of the Treasury yield

# Capital market assumptions - risk

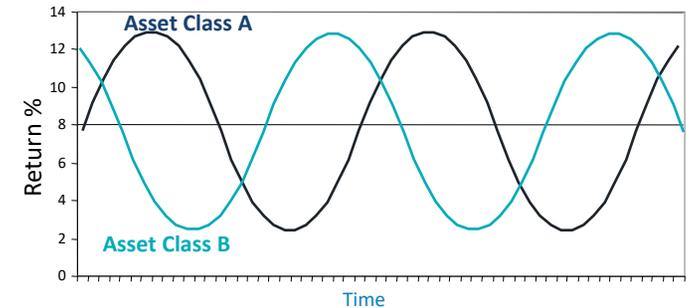
**Standard deviation** can be used as an effective measure of risk by indicating how far from the average, or **mean**, return one is likely to fall in any given time period. The rules of statistics dictate that you will fall within 1 standard deviation of the mean 2/3 of the time, within 2 standard deviations 95% of the time, and within 3 standard deviations 99% of the time



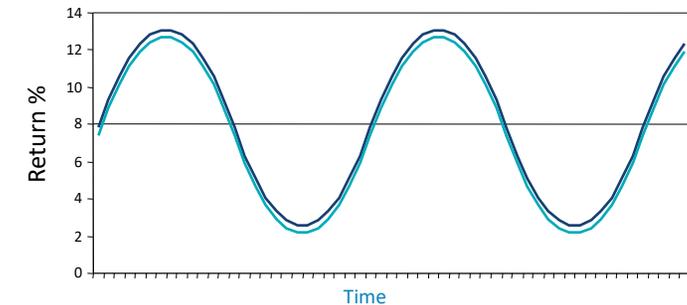
# Capital market assumptions - correlation

- Correlation describes how different asset classes perform in relation to one another over time. It measures the sensitivity of the return of one asset class to that of another, and it is the key to effective diversification
- If two asset classes have identical returns over time, they are perfectly correlated with a correlation coefficient of one. In this case there is no diversification benefit
- If two different asset classes have returns that move in the opposite direction over time, they are said to have perfect negative correlation with a correlation coefficient of minus one. This case provides complete diversification but is practically impossible to achieve in the “real world”

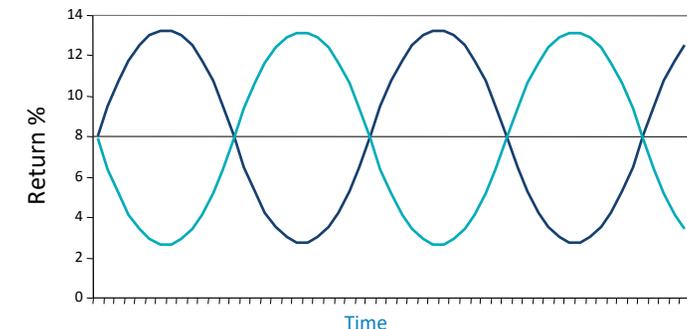
“ $> -1$   
and  
 $< 1$ ”



“ $= 1$ ”



“ $= -1$ ”



# A broader definition of risk

## **Risk is uncertainty.**

This doesn't mean risk can't be managed, it means there are a range of possible events in the future and we can't be certain what will happen.

“Risk means more things can happen than will happen”

— Elroy Dimson (London Business School)

**Known:** Negative possibilities exist in the future

**Unknown:** What event(s) will happen in the future

**Action:** Ensure we are properly compensated for the risk we take

# The world of risks



# Notices & disclosures

**Past performance is no guarantee of future results.** This document is provided for informational purposes only and is directed to institutional clients and eligible institutional counterparties only and is not intended for retail investors. Nothing herein constitutes investment, legal, accounting or tax advice, or a recommendation to buy, sell or hold a security or pursue a particular investment vehicle or any trading strategy. This document may include or imply estimates, outlooks, projections and other “forward-looking statements.” No assurance can be given that future results described or implied by any forward looking information will be achieved. Investing entails risks, including possible loss of principal. Additional information about Verus Advisory, Inc. is available on the SEC’s website at [www.adviserinfo.sec.gov](http://www.adviserinfo.sec.gov).

Verus – also known as Verus Advisory™.

# RSIC Portfolio Long Term Expected Returns

	Current Policy Mix with Portable Alpha (%)	Reference Portfolio #1 (%)	Reference Portfolio #2 (%)	Reference Portfolio #3 (%)
Global Equity	46	70	60	50
Bonds	26	30	40	50
Private Equity	9			
Private Debt	7			
Real Assets	12			
Portable Alpha	10			
Forecast 10 Year Return	7.29	6.53	6.36	6.17
Standard Deviation	12.5	12.3	10.8	9.4
Return/Std. Deviation	0.6	0.5	0.6	0.7
25th percentile ret. - 1 year	-0.7	-1.4	-0.6	0.0
5th percentile ret. - 1 year	-11.2	-11.7	-9.9	-8.2

Source: Verus 2024 CMAs

# Delegated Investments (June 13, 2024 to September 11, 2024)

Asset Class	Investment	Investment Amount	RSIC Commitment Date
Private Credit	FP Credit III	\$40 M	June 25, 2024
Private Equity	Avesi Partners Fund II	\$50 M	June 26, 2024
Private Equity	Kingswood Capital Opportunities III	\$40 M	June 27, 2024
Private Equity	Mill Point Capital Partners III	\$75 M	June 28, 2024
Real Assets	Sculptor Real Estate V	Up to \$100 M	August 23, 2024

