



Investment Advisory Committee (IAC) Meeting

**Wednesday, 4/2/2025
9:00 AM - 12:30 PM ET**

1. Approval of Minutes (August 14, 2024, November 6, 2024)

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Resolution of Appreciation - Michael R. Beasley - Page 9
IAC Scenario Analysis 2024 - Title Slide - Page 10

2. CIO Report

04-02-25 CIO Report - 032725 - Page 11
CIO Quarterly Report - QE December 2024 - Page 23
Performance Summary 01-31-2025 - Page 32
Asset Allocation Report - January 2025 - Page 33
Daily Asset Allocation Report 03-25-2025 - Page 34
New Investments and Terminations 04-02-2025 - Page 35

3. Portfolio Diversification Update

IAC Leverage Update 2025 04 - Final, 032825 - Page 37

4. Public Markets Program Review

04-02-25 Public Markets Overview, 032825 - Page 45
Public Equity Presentation 2025, 032725 - Final - Page 46
April 2025 Fixed Income Presentation 040225, 032625 - Page 93

5. Foreign Adversaries Update

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Minutes

A meeting of the Investment Advisory Committee of the Virginia Retirement System was held on August 14, 2024 with the following members present:

Larry Kochard
Michael Beasley
Theodore Economou, joined remotely under § 2.2-3708.3(B)(3)
Palmer Garson
Nancy Leake
Bryan Lewis
Rod Smyth
Hance West

The following Board members were present:

A. Scott Andrews (remote)
John Bennett (remote)
Lawrence Bernert
Michael Disharoon
Jessica Hood
Matthew James

The following staff members were in attendance:

Trish Bishop, Andrew Junkin, Stephen Adelaar, John Alouf, Advait Apte, Rory Badura, Parham Behrooz, Brock Bell, Matt Bennett, Lee Buchanan, Warren Chang, Jeanne Chenault, Michael Cooper, Perry Corsello, Sara Denson, Laurie Fennell, Laura Fields, Antonio Fisher, Kenneth Fleming, Josh Fox, Holly Glass, Katherine Grawe, JT Grier, Mehtab Haleem, Greg Hines, K.C. Howell, Ross Kasarda, Jennifer Kazzie, Jeannie Kim, Kristina Koutrakos, Matt Lacy, Vu Le, Chung Ma, Jennifer MacKnight, Curt Mattson, Scott Mootz, Teresa Nguyen, Walker Noland, Greg Oliff, Jeffery Pereira, Steven Peterson, Vera Pleasants, Laura Pugliese, Shawn Rabalais, Mark Rein, Daniel Schlusser, Michael Scott, Larry Tentor, Korey Turner, Daniel Whitlock, and Steve Woodall.

Also in attendance were Lauren Albanese with Financial Investment News; Harrison Bader with BlackRock; Zach Borgerding, Justin Ferrell, and Erin Shell of the Virginia Auditor of Public Accounts; Doston Bradley of Cerberus Capital; Alfie Crooks with PEI Group; Cyril Espanol of Pageant Media; Mitchell King with BlackRock; Justin Mitchell with Financial Investment News; Alec Ostrowidzki with Goldman Sachs; Katharine Smith

with Financial Investment News, and Spencer Witherspoon with Shenkman Capital Management.

Mr. Kochard called the meeting to order at 8:59 a.m.

Mr. Kochard announced that Mr. Economou would be participating remotely in accordance with § 2.2-3708.3 (B)(3) of the Code of Virginia.

Mr. Kochard took a roll call of each Committee member for attendance purposes:

Mr. Beasley – present
Mr. Economou – present
Ms. Garson – present
Mr. Gayner – not present
Ms. Leake – present
Mr. Lewis – present
Mr. Smyth – present
Mr. West – present
Mr. Kochard – present

Minutes

A motion was made by Mr. Kochard and seconded by Mr. Beasley to approve minutes for the April 10, 2024 Committee meeting. The motion was unanimously approved via roll call:

Mr. Beasley – aye
Mr. Economou – aye
Ms. Garson – aye
Ms. Leake – aye
Mr. Lewis – aye
Mr. Smyth – aye
Mr. West – aye
Mr. Kochard – aye

Charter Review

Mr. Cotter, Director of Legislative and Government Affairs, discussed proposed updates on changes being made to the Investment Advisory Committee charter. A motion was made by Mr. Smyth and seconded by Ms. Leake to approve the changes to the Committee Charter. The motion was unanimously approved via roll call:

Mr. Beasley – aye
Mr. Economou – aye
Ms. Garson – aye
Ms. Leake – aye
Mr. Lewis – aye
Mr. Smyth – aye
Mr. West – aye
Mr. Kochard – aye

CIO Report

Mr. Junkin opened his CIO report by commenting on current market conditions. Mr. Junkin then discussed asset allocation, total fund performance, and tracking error. Last, Mr. Junkin reviewed the New Investments and Terminations Report.

Mr. Beasley commented and wanted it noted that credit should be given to all VRS associates that have done the work to get the investment returns that Mr. Junkin presented today.

**Portfolio Solutions
Group Review**

Mr. Ma provided an overview of the Portfolio Solutions Group and also introduced Mr. Bell and Mr. Mootz, new hires to the group.

Mr. Apte provided a review of the State Plans' forward returns summary, external manager's forward returns comparison, VRS's long term forward returns, and forward returns attribution.

Mr. Mootz provided an overview of Risk Management at VRS. Review topics included an overview of the team, objectives, keys to success, philosophy, looking forward, and a case study.

Mr. Lacy provided a review of the Portfolio Integration and Treasury team. Review topics included reasons to deploy leverage and current funding channels. Mr. Bell provided a review of Treasury enhancements, potential future funding sources, and additional Treasury initiatives in progress.

Mr. Kasarda and Ms. Koutrakos provided a program overview of Diversifying Strategies and discussed the program evolution and objectives. Review topics included an overview of the team, objectives, performance, and looking forward.

Ms. Grawe provided an overview of the Exposure Management Portfolio. Review topics included objectives, investment criteria, diligence framework, and keys to success.

The Committee members engaged in general discussion throughout the presentation.

Adjournment

Mr. Beasley made a motion to adjourn the meeting. Mr. West seconded the motion. Mr. Kochard asked for the Committee members to vote on the motion, the motion was unanimously approved via roll call:

Mr. Beasley – aye
Mr. Economou – aye
Ms. Garson – aye
Ms. Leake – aye
Mr. Lewis – aye
Mr. Smyth – aye
Mr. West – aye
Mr. Kochard – aye

The meeting was adjourned at 12:07 p.m.

Larry Kochard, Chairperson

Minutes

A meeting of the Investment Advisory Committee of the Virginia Retirement System was held on November 6, 2024 with the following members present:

Larry Kochard, joined remotely under § 2.2-3708.3(B)(4)
Michael Beasley, joined remotely under § 2.2-3708.3(B)(4)
Theodore Economou
Palmer Garson
Nancy Leake
Bryan Lewis, joined remotely under § 2.2-3708.3(B)(4)
Rod Smyth, joined remotely under § 2.2-3708.3(B)(4)
Hance West

The following Board members were present:

A. Scott Andrews (remote)
John Bennett (remote)
Lawrence Bernert
Michael Disharoon (remote)
Matthew James

The following staff members were in attendance:

Trish Bishop, Andrew Junkin, Stephen Adelaar, John Alouf, Advait Apte, Rory Badura, Parham Behrooz, Brock Bell, Matt Bennett, Erica Billingslea, Jeanne Chenault, Tom Coleman, Perry Corsello, Sara Denson, Laurie Fennell, Laura Fields, Antonio Fisher, Kenneth Fleming, Jay Gentry, Katherine Grawe, JT Grier, Greg Hines, Dane Honrado, K.C. Howell, Sandy Jack, Cecilia Jones, DeVon Jones, Ross Kasarda, Jeannie Kim, Kristina Koutrakos, Matt Lacy, Chung Ma, Jennifer MacKnight, Curt Mattson, Scott Mootz, Teresa Nguyen, Walker Noland, Greg Oliff, Laura Pugliese, Shawn Rabalais, Jummai Sarki-Hurd, Daniel Schlusser, Jenny Schoeller, Michael Scott, Viet Tran, Korey Turner, Daniel Whitlock, and Steve Woodall.

Also in attendance were Lauren Albanese with Financial Investment News; Muskan Arora with Markets Group; Harrison Bader, Taylor Benson, Julia Dutton, Mitchell King, and Brigid Schutsky with BlackRock; Thomas Cosmer with Pinebridge Investments; Cyril Espanol of Pageant Media; Justin Ferrell with the Virginia Auditor of Public Accounts; and Katharine Smith with Financial Times.

Mr. West called the meeting to order at 9:04 a.m.

Mr. West announced that Mr. Kochard, Mr. Beasley, Mr. Lewis, and Mr. Smyth would be participating remotely in accordance with § 2.2-3708.3 (B)(4) of the Code of Virginia.

Mr. West took a roll call of each Committee member for attendance purposes:

Mr. Beasley – present
Mr. Economou – present
Ms. Garson – present
Mr. Gayner – not present
Ms. Leake – present
Mr. Lewis – present
Mr. Smyth – not present (joined remotely at 10:00am)
Mr. West – present
Mr. Kochard – present

Minutes

Mr. West noted that there is no physical quorum of Investment Advisory Committee members so the minutes from the August 14, 2024, Committee meeting will not be approved during this meeting.

CIO Report

Mr. Junkin began his report with a market overview. Mr. Junkin then discussed total fund performance and asset allocation. Last, Mr. Junkin reviewed the New Investments and Terminations Report.

Global Equity Benchmarking

Mr. Junkin provided an overview of global equity benchmarks. He discussed foreign adversaries, existing exposure, and forward-looking returns.

Asset Allocation Scenario Analysis

Mr. Ma provided scenario analysis for the following possible scenarios: baseline, global recession, stagflation, and productivity boost. Mr. Badura then provided a comparison of valuation measures under the different economic scenarios for the State Plan. Last, Mr. Lacy presented a case study regarding the impacts of leverage in a market drawdown situation.

Asset Allocation Glide Path Update

Mr. Ma provided an asset allocation update. Review topics included a roadmap, expected glide path, and looking forward information.

Private Market Program Reviews

Mr. Howell provided a program overview of Private Assets. Review topics included classification of private assets, reason for investments, and growth opportunities.

Mr. Noland provided a review of the Real Assets Program. Review topics included markets, exposures, managers, co-investments, and looking forward information.

Mr. Alouf provided a review of the Private Equity Program. Review topics included markets, exposures, managers, co-investments, and looking forward information.

Mr. Woodall provided a review of the Credit Strategies Program. Review topics included markets, exposures, managers, co-investments, and looking forward information.

The Committee members engaged in general discussion throughout the presentation.

Adjournment

Because there was no physical quorum, a motion was not necessary to adjourn the meeting.

The meeting was adjourned at 12:20 p.m.

Larry Kochard, Chairperson



Resolution of Appreciation

PRESENTED TO

Michael R. Beasley

*W*HEREAS, Mr. Michael R. Beasley faithfully served the Virginia Retirement System, its members, and retirees as an esteemed member of the Investment Advisory Committee from 2013 through 2024; and

*W*HEREAS, Mr. Beasley served as a member of the Committee working in a collegial manner with his fellow Committee members by actively participating in meeting discussions, and candidly sharing his perspectives based on his extensive experience in the financial industry, along with his aptitude regarding investment strategies and initiatives; and

*W*HEREAS, Mr. Beasley, by virtue of his expert knowledge of the investment industry, shared his wisdom regarding best practices, and actively engaged with and supported staff in discussions about investment initiatives and analysis; and

*W*HEREAS, the Virginia Retirement System Board of Trustees acknowledges and is grateful for Mr. Beasley's service to his country during the Vietnam War, and is humbled by his demonstrated bravery and valor behind enemy lines, along with his dedication and advocacy for his fellow veterans;

*N*OW, THEREFORE, BE IT RESOLVED, that on February 6, 2025, we, the members of the Board of Trustees of the Virginia Retirement System, hereby acknowledge and express our remembrance for Mr. Beasley's loyal service to the Board of Trustees, the Virginia Retirement System, its members, retirees, and the Commonwealth of Virginia, and are grateful for his contributions, stewardship, and commitment while a faithful member of the Investment Advisory Committee.

A. SCOTT ANDREWS, CHAIR

Scenario Analysis

Chung Ma
Managing Director

Rory Badura
Senior Actuary

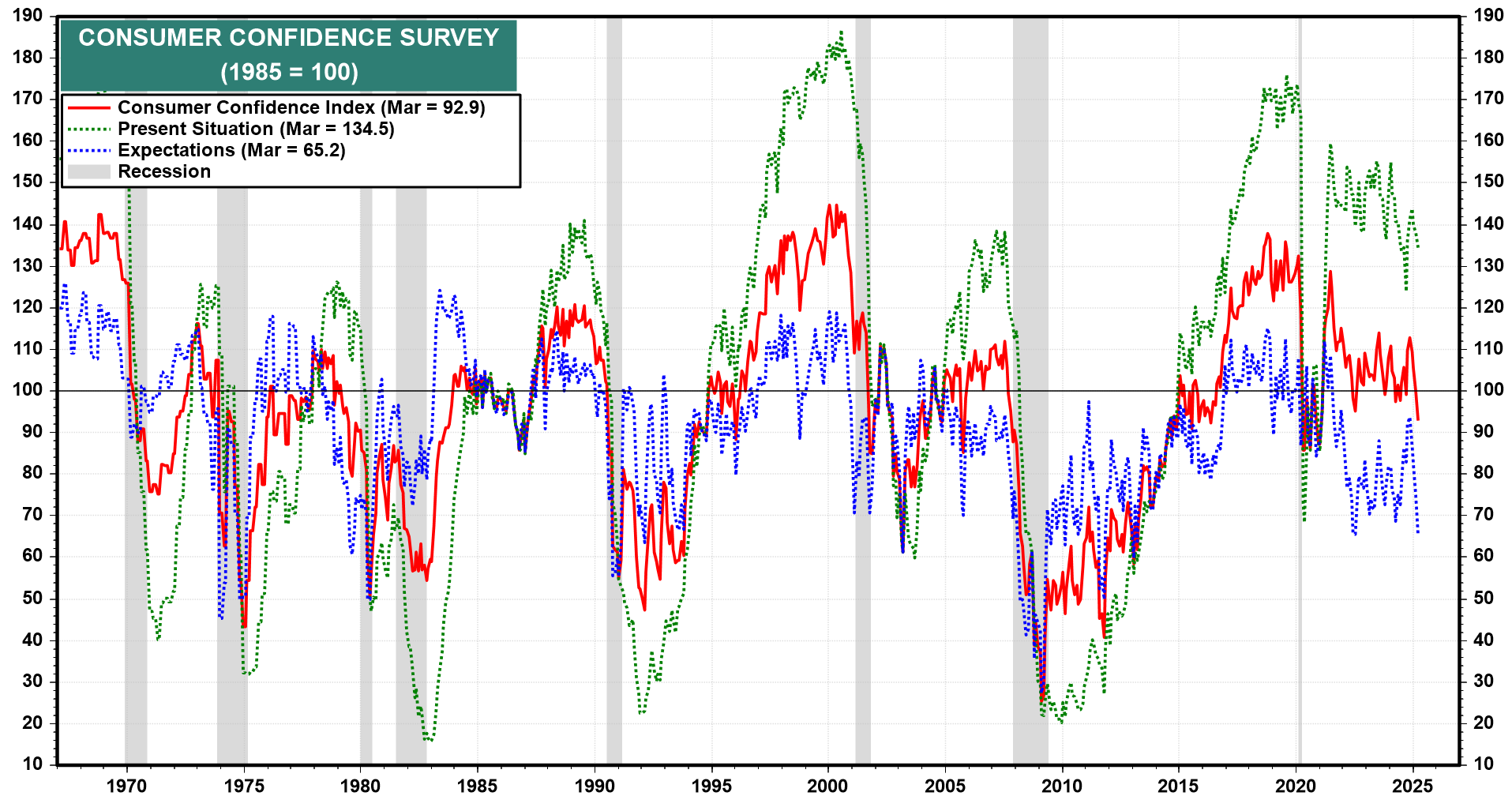
November 6, 2024



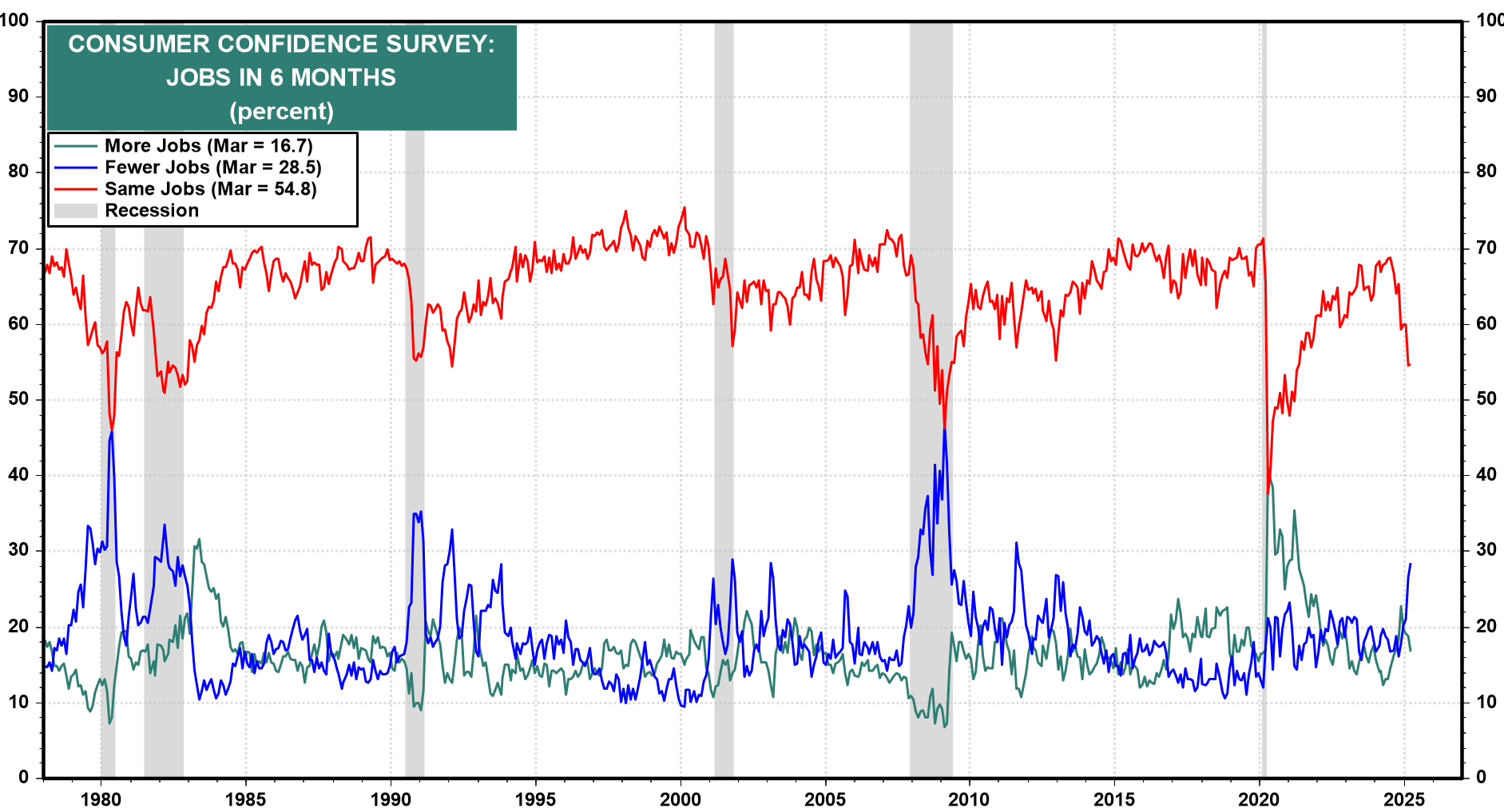


Chief Investment Officer Report

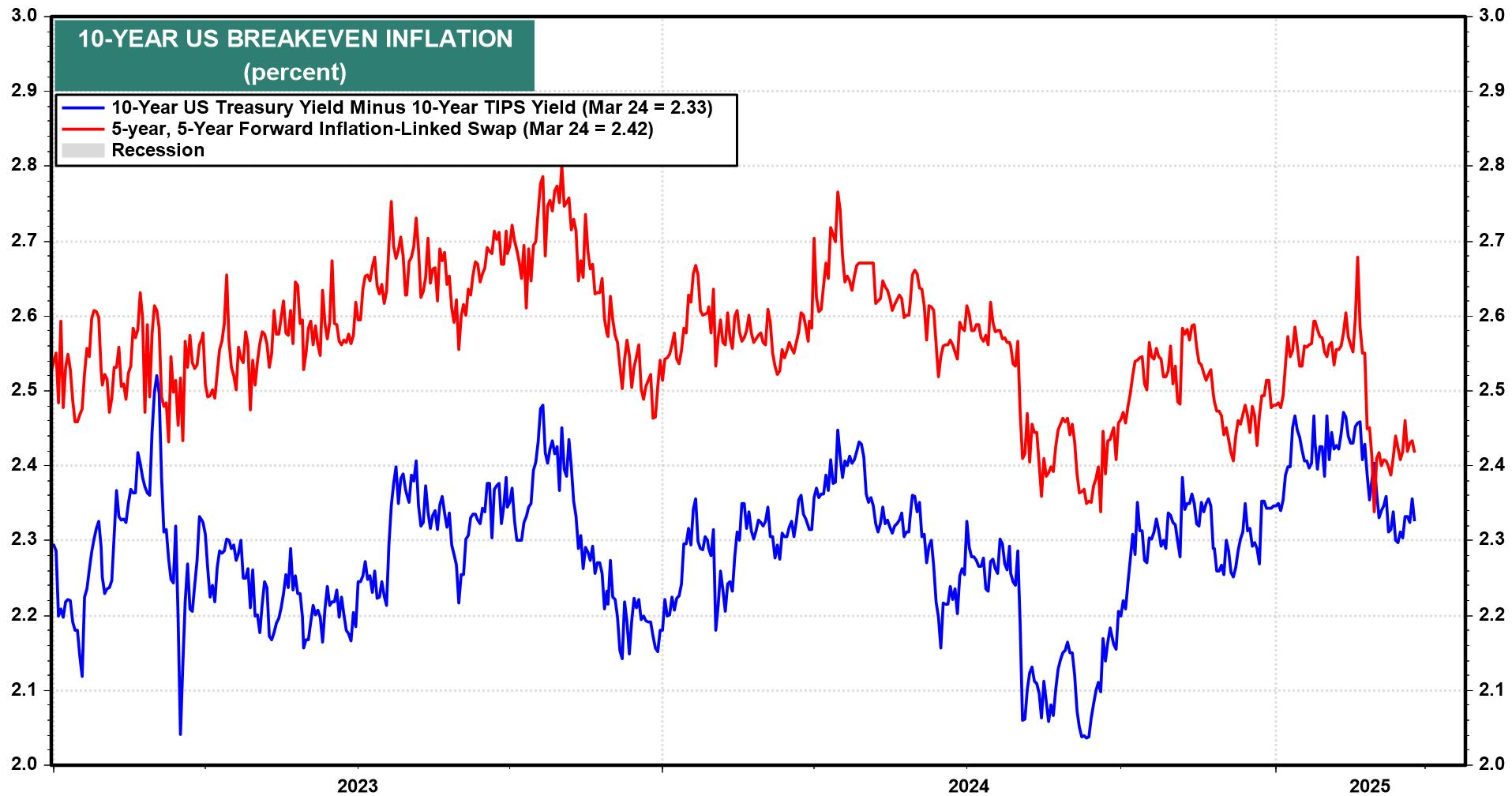
Market Review – April 2025
Andrew Junkin



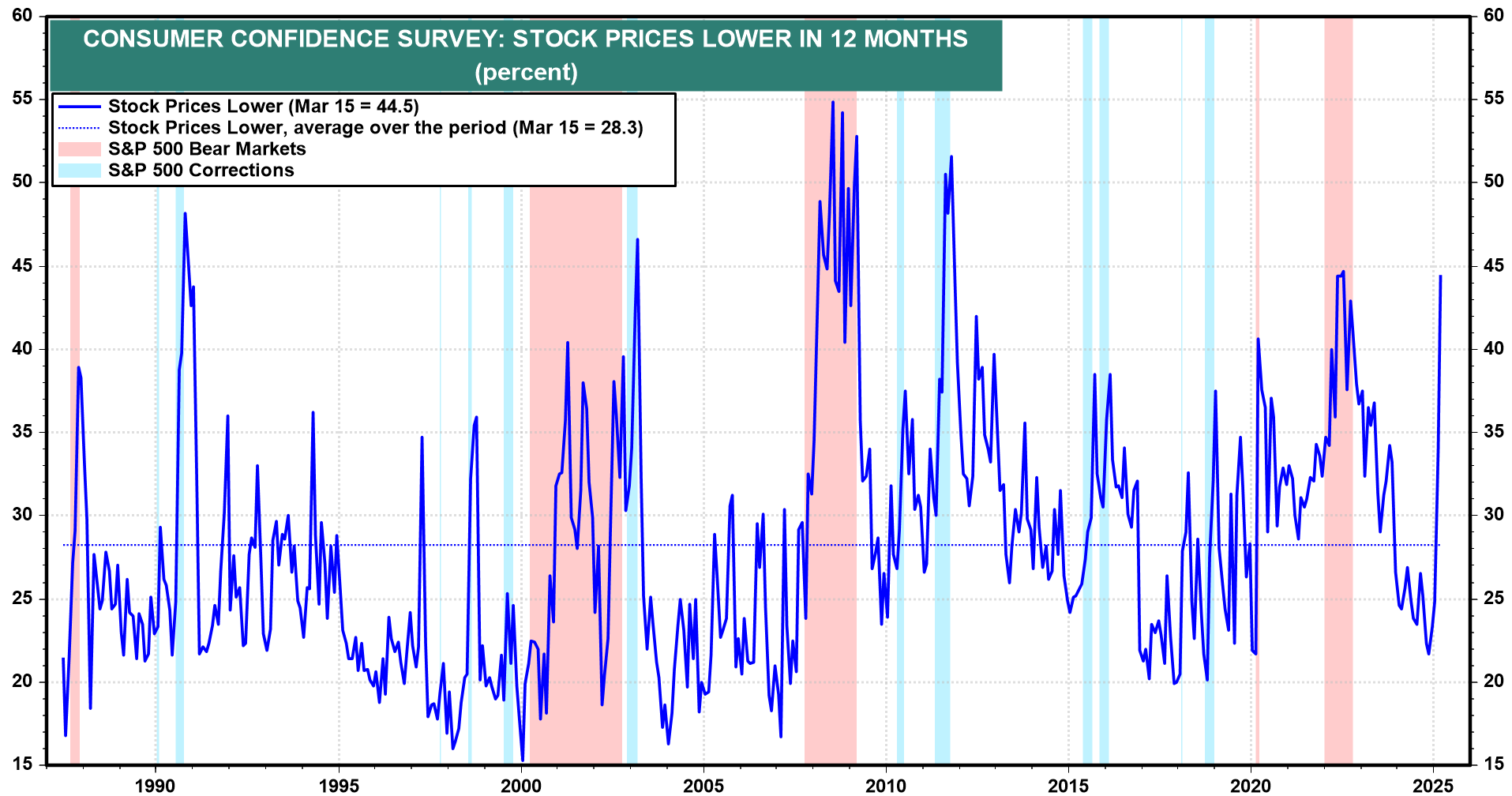
Source: LSEG Datastream and © Yardeni Research, and The Conference Board.

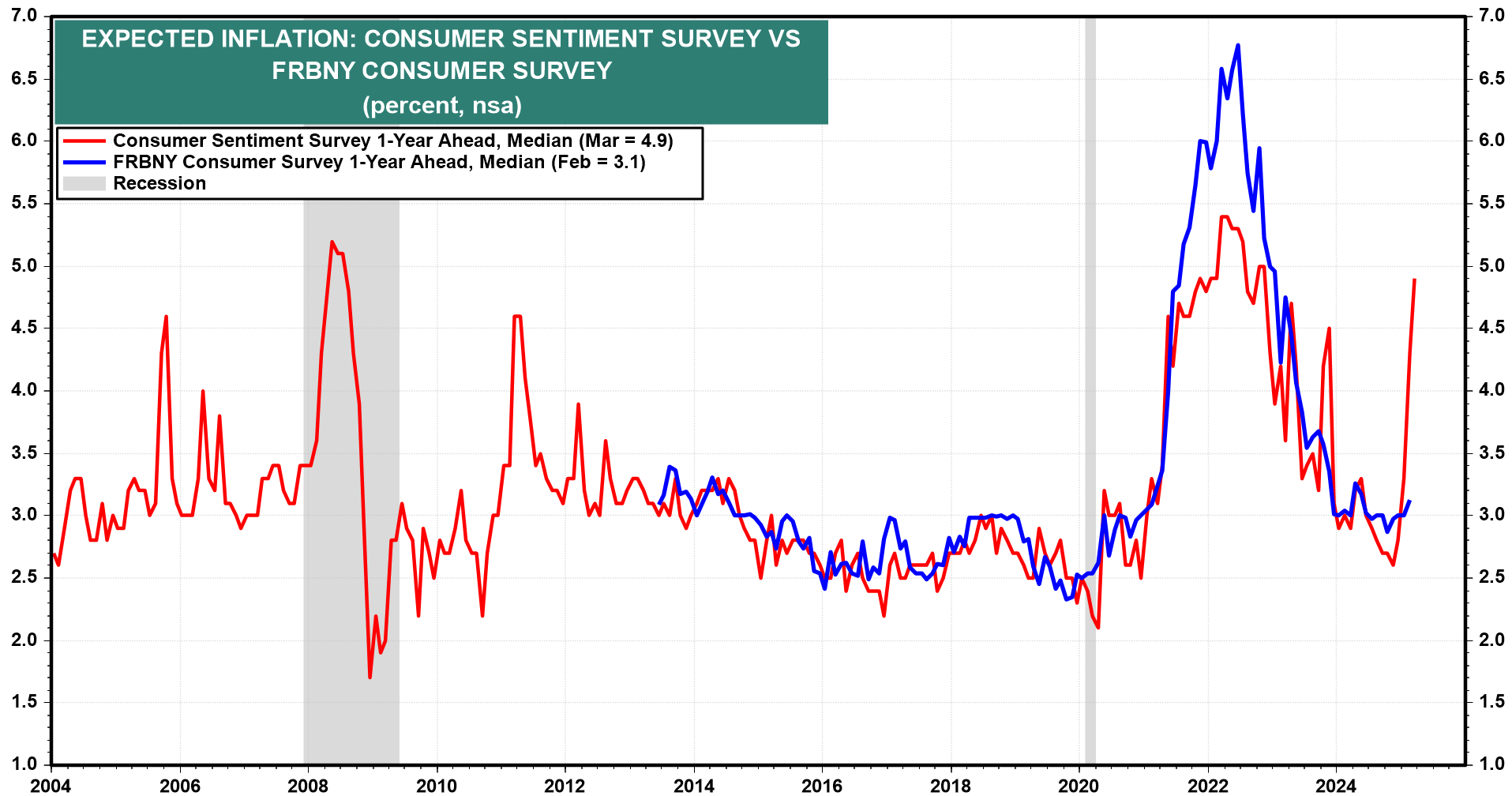


Source: LSEG Datastream and © Yardeni Research, and The Conference Board.

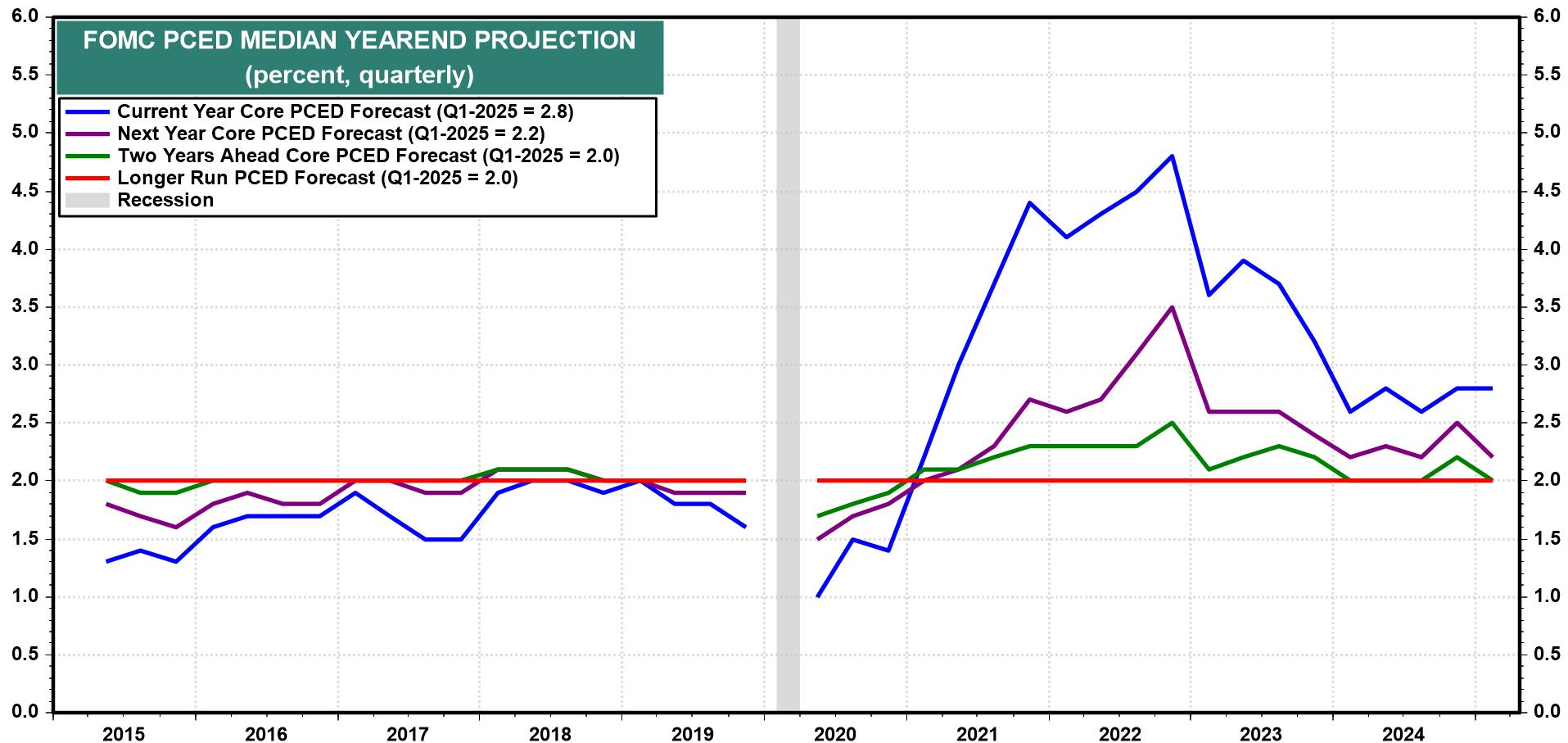


Source: LSEG Datastream and © Yardeni Research, Federal Reserve and Refinitiv.

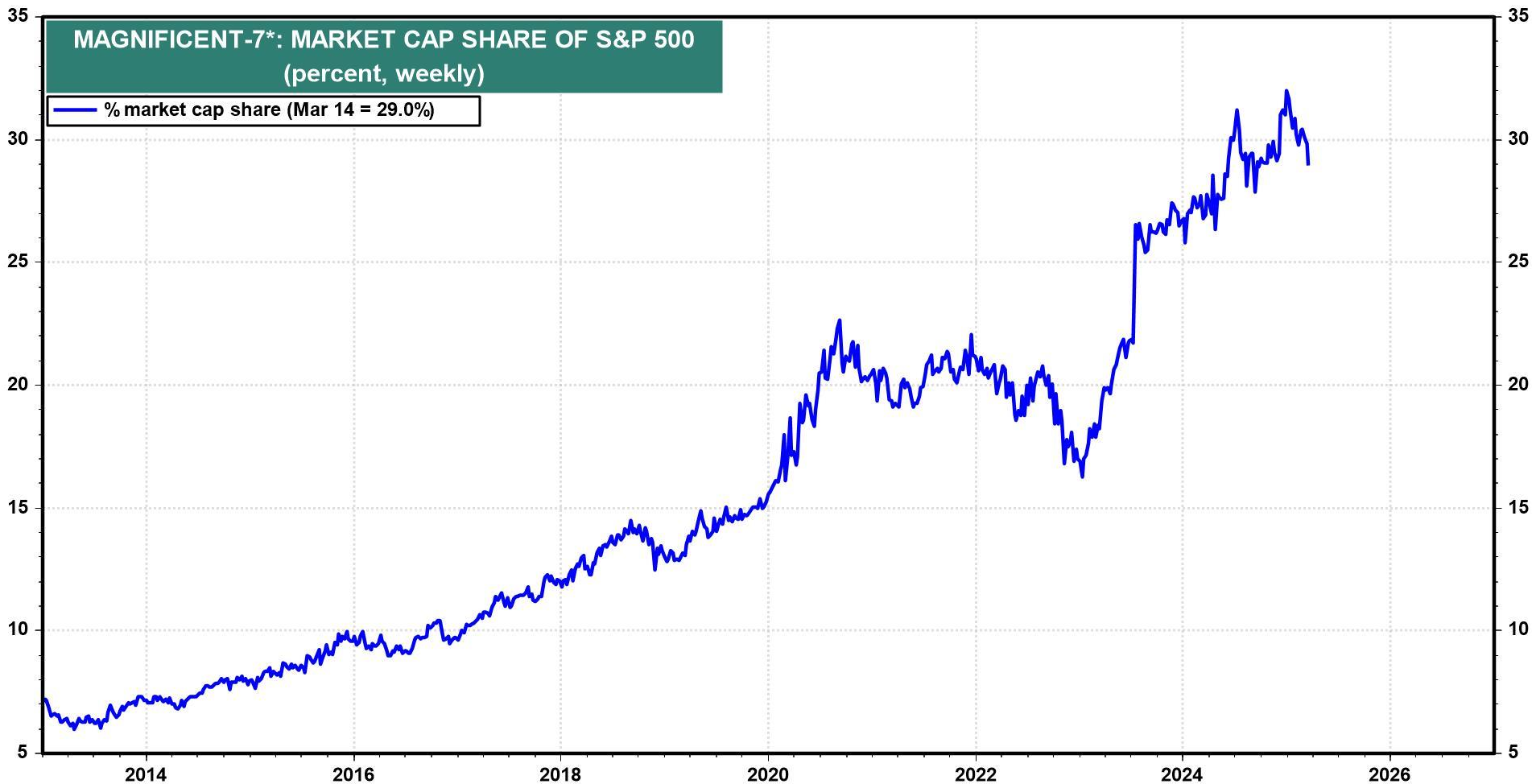




Source: LSEG Datastream and © Yardeni Research. Survey Research Center & Federal Reserve Bank of New York.

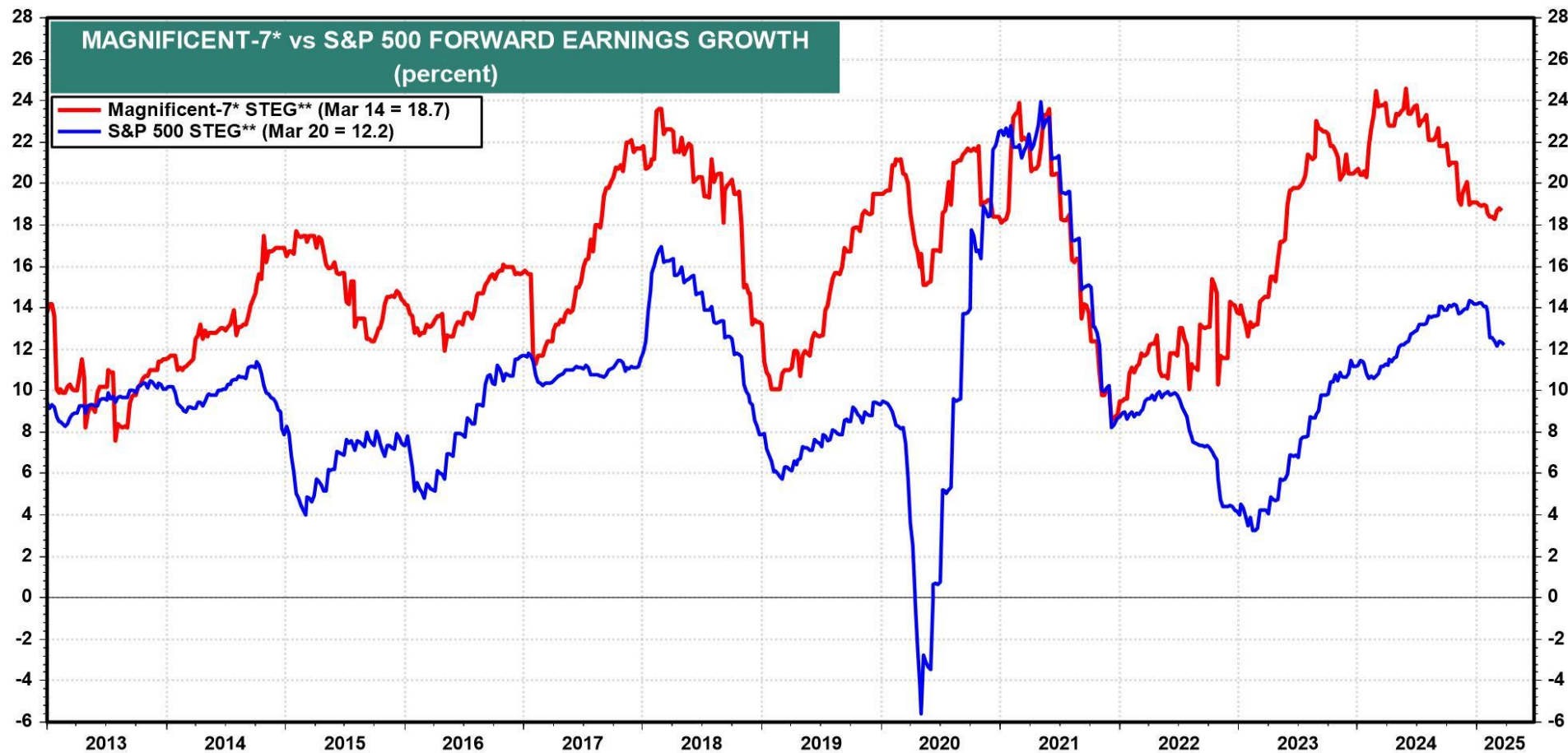


Source: LSEG Datastream and © Yardeni Research. Federal Reserve FOMC Summary of Economic Projections.



Source: LSEG Datastream and © Yardeni Research. Standard & Poor's.

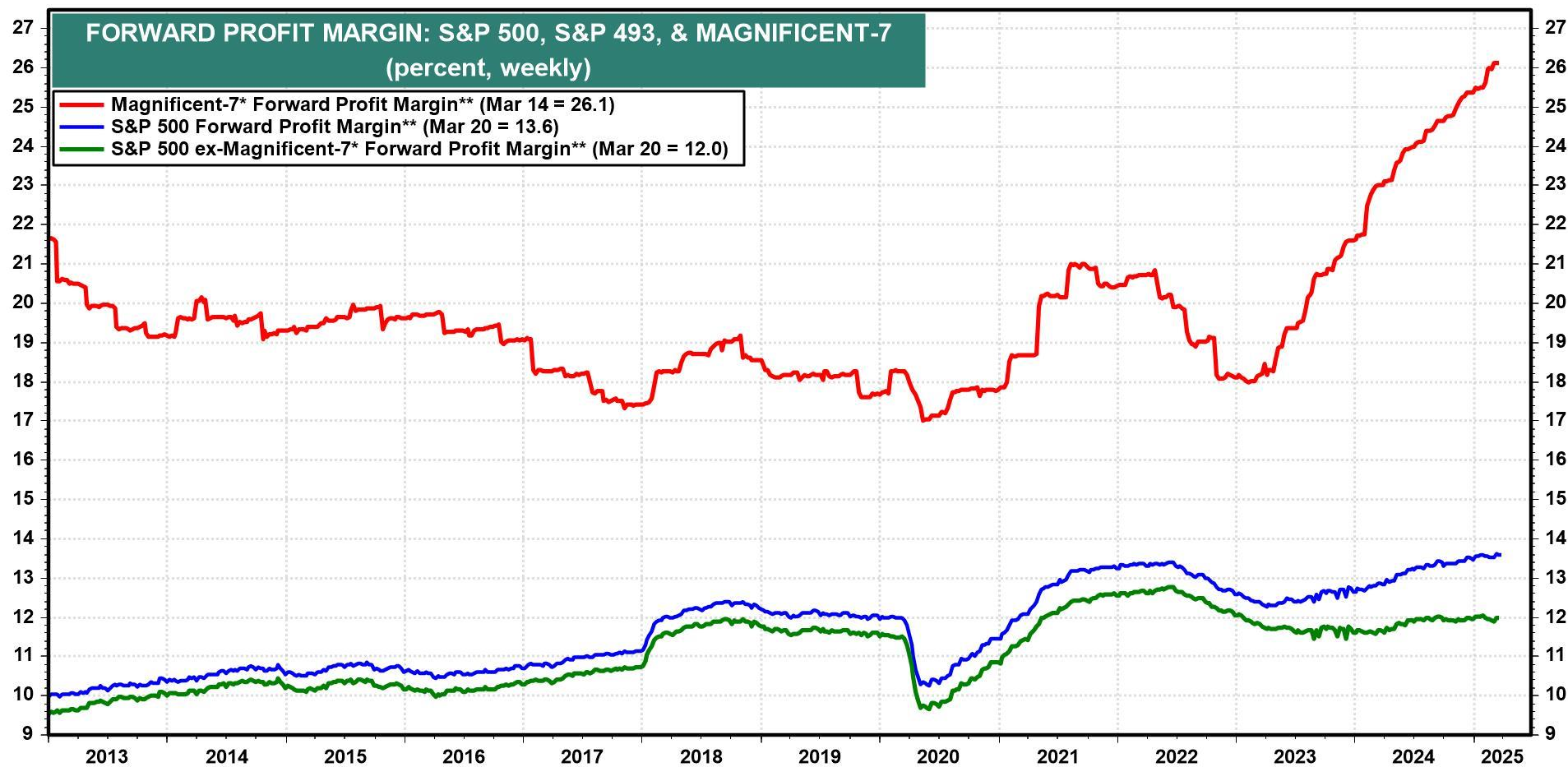
* Magnificent-7 stocks include Alphabet (Google), Amazon, Apple, Meta (Facebook), Microsoft, NVIDIA, and Tesla. Both classes of Alphabet are included.



Source: LSEG Datastream and © Yardeni Research. LSEG I/B/E/S.

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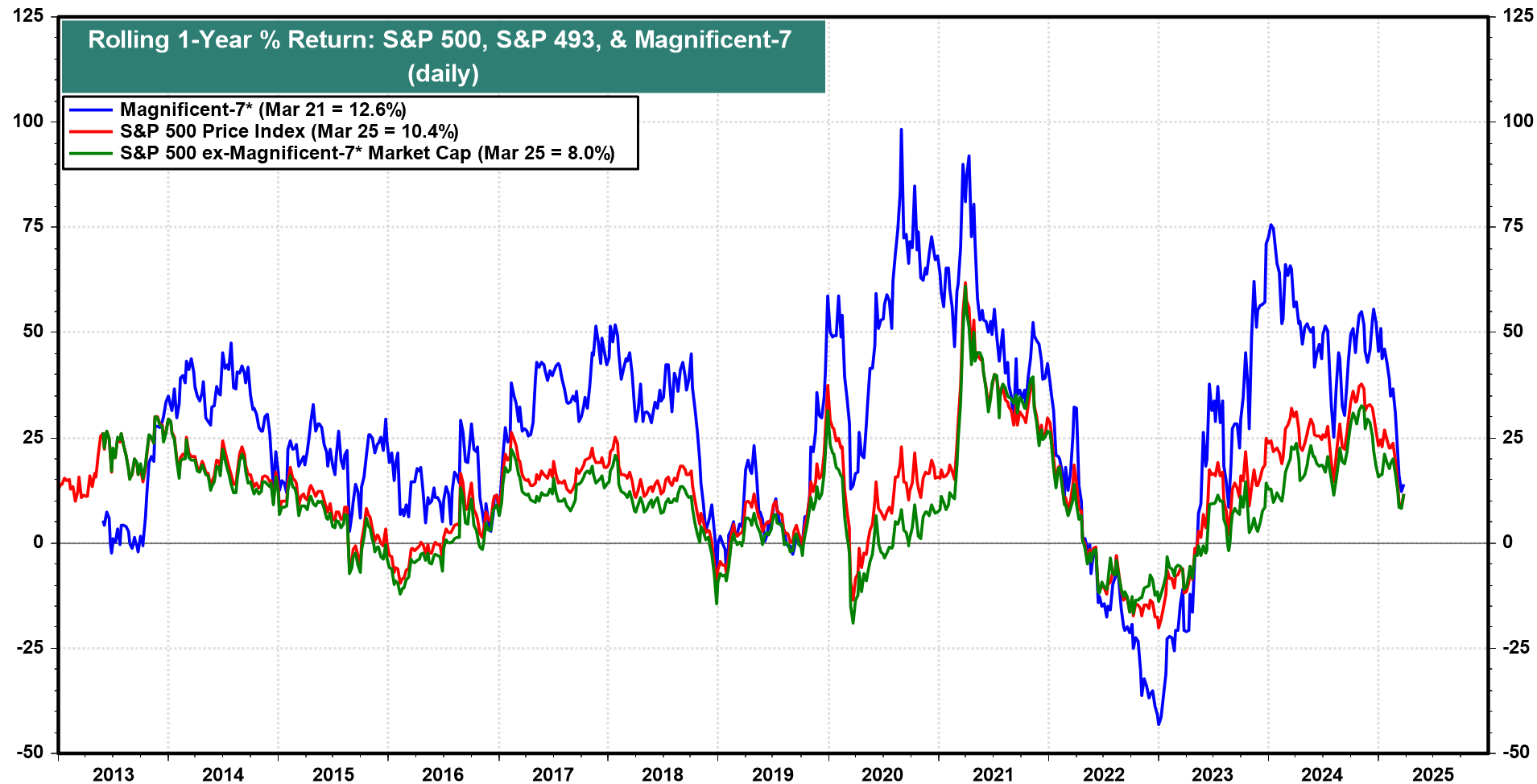
** Analysts' consensus expected short-term earnings growth rate over the next 52 weeks.



Source: LSEG Datastream and © Yardeni Research. LSEG I/B/E/S.

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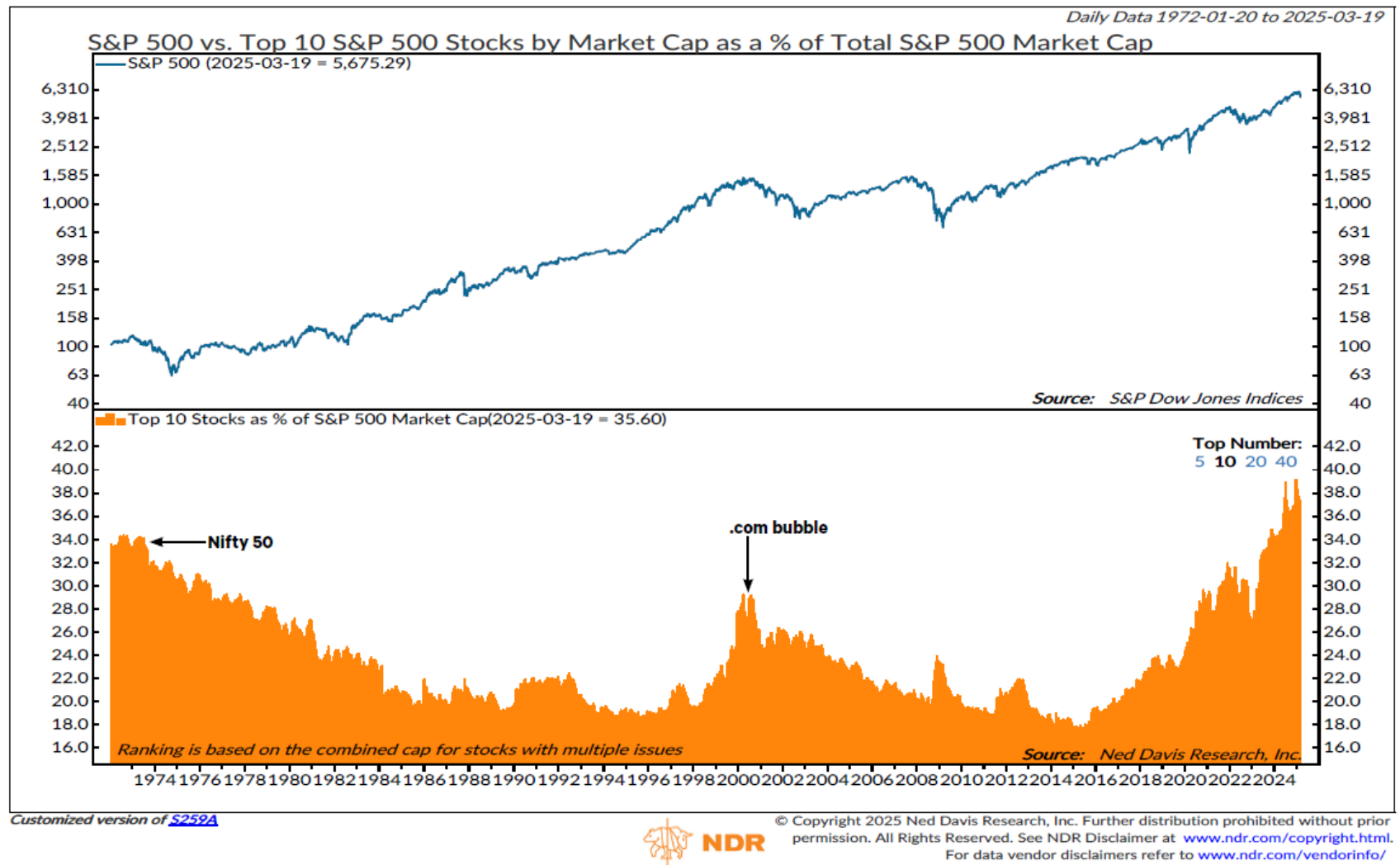
** Aggregate forward consensus expected operating earnings as a percentage of aggregate forward consensus expected revenues.



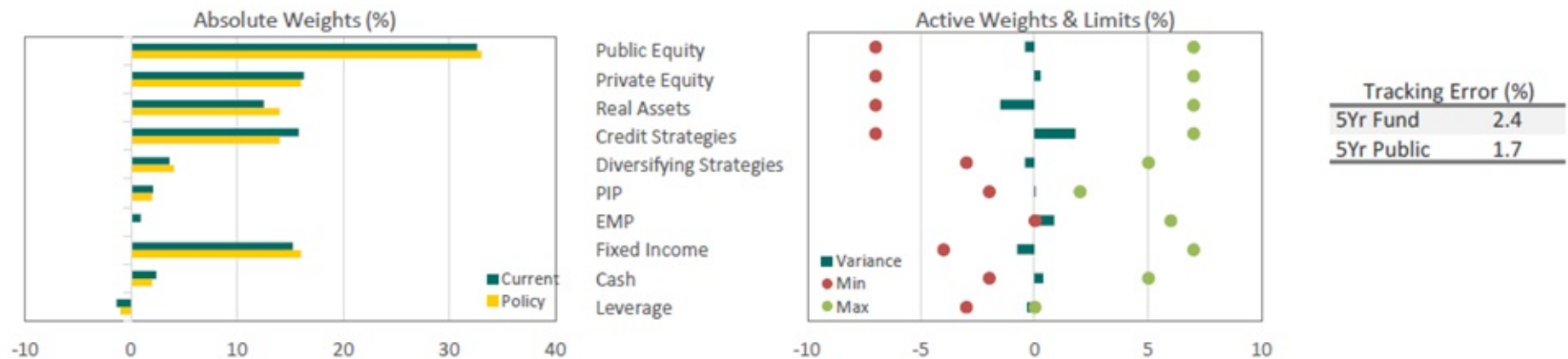
Source: LSEG Datastream and © Yardeni Research. Standard & Poor's.

* Magnificent-7 stocks include Alphabet (Google), Amazon, Apple, Meta (Facebook), Microsoft, NVIDIA, and Tesla. Both classes of Alphabet are included.

Trees don't grow to the sky.



Asset Allocation - December 31, 2024



Asset Class	Billions (\$)	Weights (%)					
		Current	Policy	Variance	Min	Max	Internal
Public Equity	38.1	32.6	33.0	-0.4	26	40	50
Private Equity	19.0	16.3	16.0	0.3	9	23	12
Real Assets	14.6	12.5	14.0	-1.5	7	21	17
Credit Strategies	18.5	15.8	14.0	1.8	7	21	4
Diversifying Strategies	4.2	3.6	4.0	-0.4	1	9	0
Private Investment Partnerships (PIP)	2.4	2.0	2.0	0.0	0	4	0
Exposure Management Portfolio (EMP)	1.0	0.9	0.0	0.9	0	6	0
Fixed Income	17.8	15.2	16.0	-0.8	12	23	95
Cash	2.8	2.4	2.0	0.4	0	7	0
Leverage	-1.6	-1.3	-1.0	-0.3	-3	0	0
Total Fund (Net Market Value)	116.9	100.0	100.0	0.0	n.a.	n.a.	36
Total Fund (Gross Market Value)	118.5	101.3	101.0	0.3	n.a.	n.a.	0
Exposures by Policy Groups							
Public + Private Equity	57.1	48.9	49	-0.1	39	59	n.a.
Fixed Income + Cash	20.6	17.6	18	-0.4	12	27	n.a.

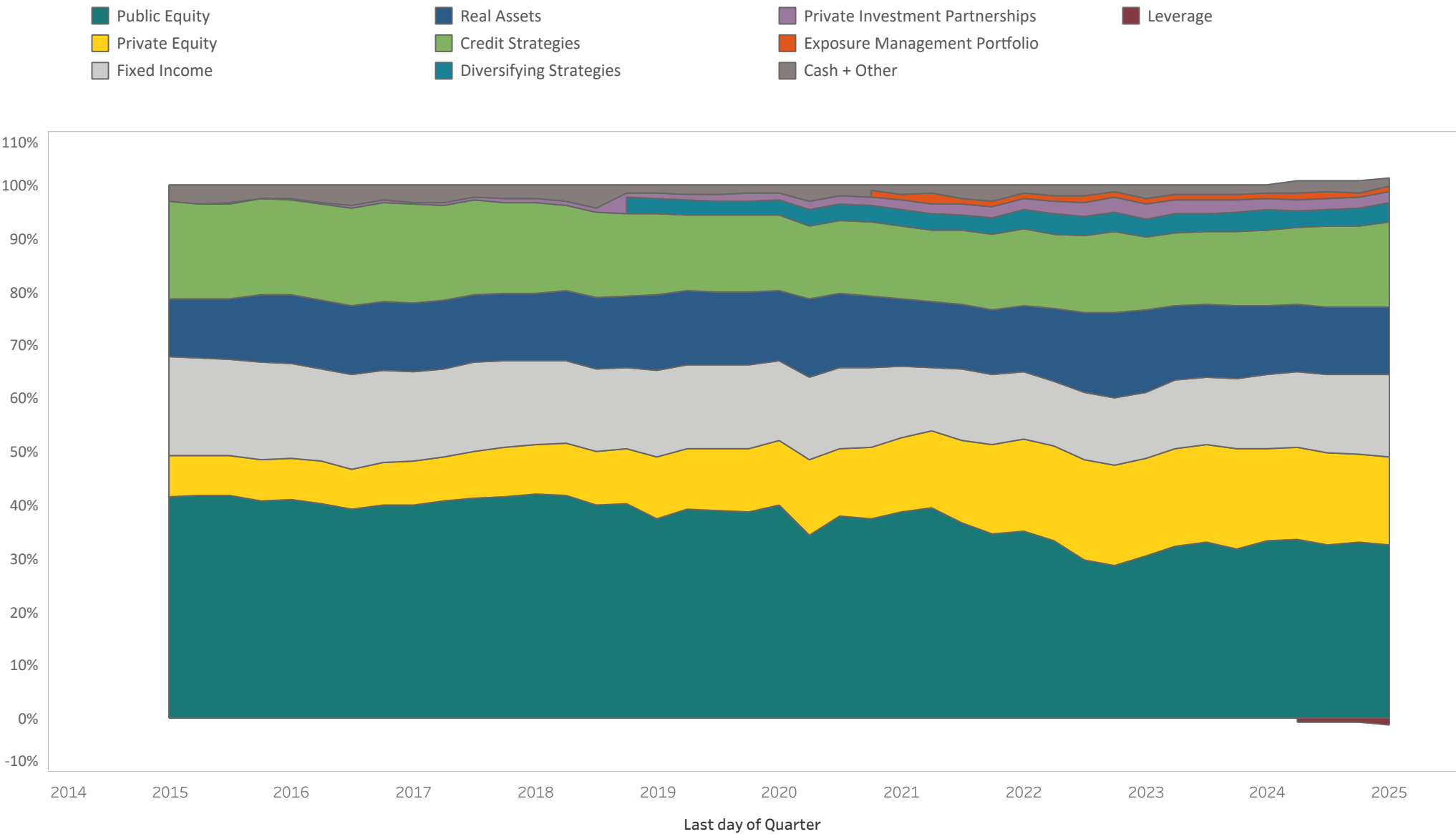
Total Fund includes the following amount held by the Treasurer of VA: \$482 million

The values shown for each asset class on this report may reflect adjustments related to derivative positions in the Rebalance Account, pending transactions and certain accruals, in order to provide a more descriptive representation of the true economic exposure to each asset class (0 adjustments applied)

The VRS Defined Benefit Plan Investment Policy Statement established the total fund tracking error range as the allowable observed tracking error calculated quarterly using 5 years of history as of 12/31/2024.

Differences in totals are due to rounding

Asset Allocation Rolling 10-Year



As of December 31, 2024

Performance - December 31, 2024

	(Net of Fees)						Fiscal YTD	Cal YTD	Market Value (\$MM)
	10 Yr	5 Yr	3 Yr	1 Yr	Qtr	Month			
Total Public Equity	9.1	10.1	6.2	17.7	-0.8	-3.0	5.7	17.7	38,102
<i>Benchmark</i>	9.1	10.0	5.1	16.0	-1.6	-3.0	5.8	16.0	
Total Private Equity	14.0	14.6	4.2	6.3	1.8	2.1	2.3	6.3	19,029
<i>Benchmark</i>	12.1	13.1	8.2	32.6	6.6	1.9	9.4	32.6	
Total Real Assets	7.7	5.7	3.4	-1.0	0.8	0.7	1.5	-1.0	14,621
<i>Benchmark</i>	5.6	3.3	0.7	-3.3	0.4	0.2	0.5	-3.3	
Total Credit Strategies	6.7	7.7	6.5	10.6	2.6	1.8	5.2	10.6	18,498
<i>Benchmark</i>	5.4	5.0	5.1	8.0	1.1	0.0	4.3	8.0	
Total Diversifying Strategies	n/a	5.0	3.4	6.6	1.3	0.9	1.0	6.6	4,193
<i>Benchmark</i>	n/a	5.3	2.7	7.8	1.8	0.6	3.7	7.8	
Total Private Investment Partnerships	8.7	10.1	7.1	10.9	3.9	3.8	6.2	10.9	2,384
<i>Benchmark</i>	7.6	7.8	5.1	11.1	2.6	0.7	4.6	11.1	
Total Fixed Income	2.3	1.0	-1.6	2.4	-2.8	-1.6	2.4	2.4	17,828
<i>Benchmark</i>	1.5	-0.1	-2.1	1.8	-2.9	-1.6	2.2	1.8	
Total Fund	7.8	8.3	4.4	8.9	0.2	-0.4	3.8	8.9	116,927
<i>VRS Custom Benchmark</i>	7.1	7.1	4.0	11.6	0.4	-0.9	4.7	11.6	

Effective July 2013, the VRS Custom Benchmark is a blend of the Asset Class Benchmarks at policy weights.

Effective January 2024, the Total Fund includes leverage.

The VRS Cash Account, the Treasurer Short-Term Investment Account, the VRS Rebalancing Account, transition activity and accounts with market values of less than \$1 million are included in the Total Fund's market value. Differences in market value totals are due to rounding.

The Performance Report may differ from the VRS Annual Comprehensive Financial Report (ACFR) due to each report's requirements and objectives.

Leverage Cost Measurement Information

(Information provided for purposes of monitoring the cost effectiveness of leverage implementation.)

	10 Yr	5 Yr	3 Yr	1 Yr	Qtr	Month	Fiscal YTD	Cal YTD	Market Value (\$MM)
Leverage	n/a	n/a	n/a	n/a	1.4	0.4	2.9	n/a	(1,555)
<i>Benchmark</i>	n/a	n/a	n/a	n/a	1.3	0.4	2.8	n/a	

Effective January 2024, the Leverage Custom Benchmark is the Secured Overnight Financing Rate (SOFR) plus 50 basis points per annum.

Performance Attribution

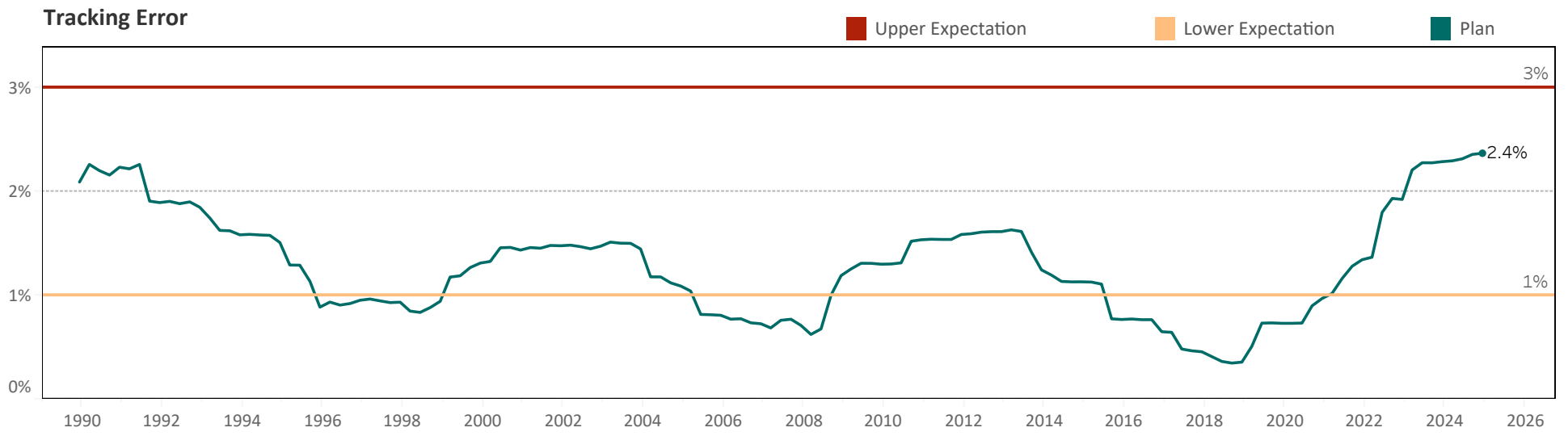
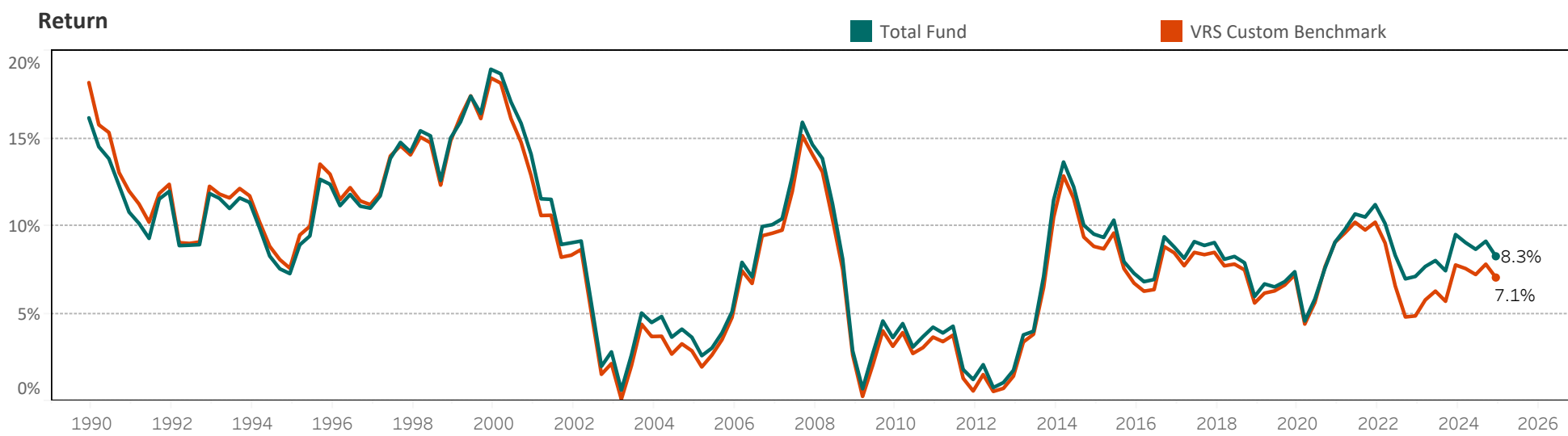
Fiscal Year-To-Date, ending December 31, 2024

	Portfolio		Policy		Attribution		
	Weight	Return	Weight	Return	Allocation	Selection	Total
TOTAL	100.0	3.8	100.0	4.8	0.0	-1.0	-1.0
Public Equity	33.2	5.7	33.0	5.8	0.0	0.0	0.0
Private Equity	16.4	2.3	16.0	9.4	0.0	-1.2	-1.2
Real Assets	12.5	1.5	14.0	0.5	0.1	0.1	0.2
Credit Strategies	15.2	5.2	14.0	4.3	0.0	0.1	0.1
Diversifying Strategies	3.4	1.0	4.0	3.8	0.0	-0.1	-0.1
Private Investment Partnerships	2.1	6.2	2.0	4.6	0.0	0.0	0.0
Exposure Management Portfolio	0.9	-2.0	0.0		-0.1	0.0	-0.1
Fixed Income	15.1	2.4	16.0	2.2	0.0	0.0	0.1
Cash	1.0	0.2	2.0	2.6	0.0	0.0	0.0
Other	1.0	2.3			0.0	0.0	0.0
Leverage	-0.7	2.9	-1.0	2.8	0.0	0.0	0.0

Differences in totals are due to rounding.

In return attribution, **allocation** refers to the value added by having different asset class weights in the portfolio than the asset class weights in the benchmark. **Selection** refers to the value added by holding individual securities or instruments within the asset class in different than benchmark weights.

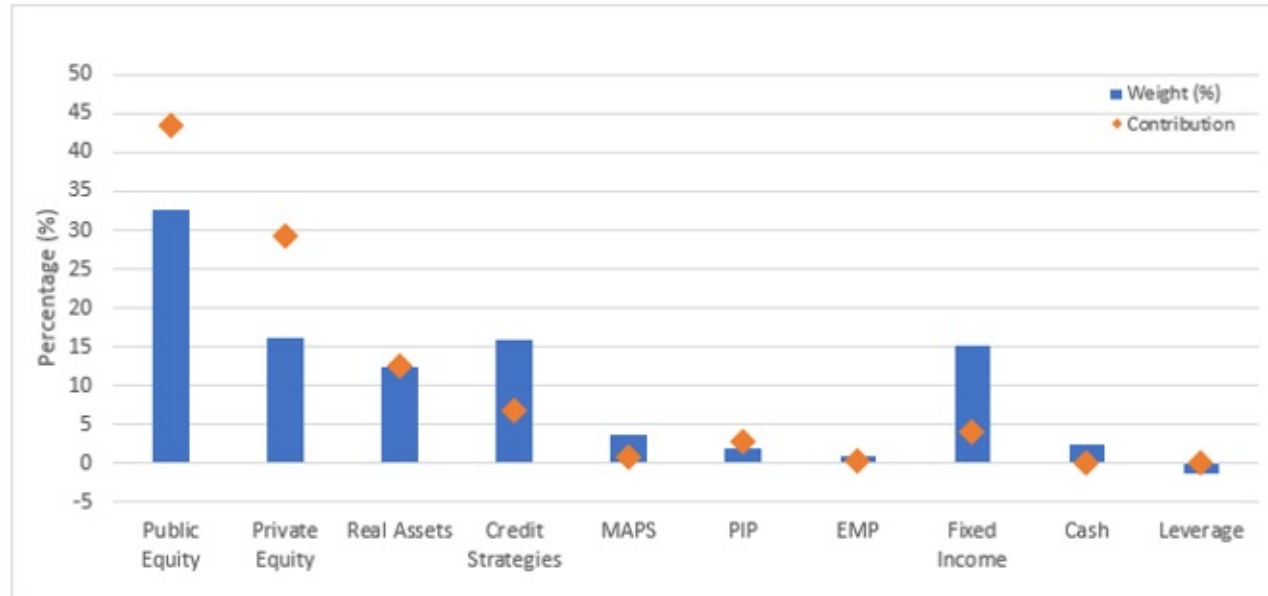
Total Fund Rolling 5-Year



As of December 31, 2024

The VRS Defined Benefit Plan Investment Policy Statement established the total fund tracking error range as the allowable observed tracking error calculated quarterly using 5 years of history.

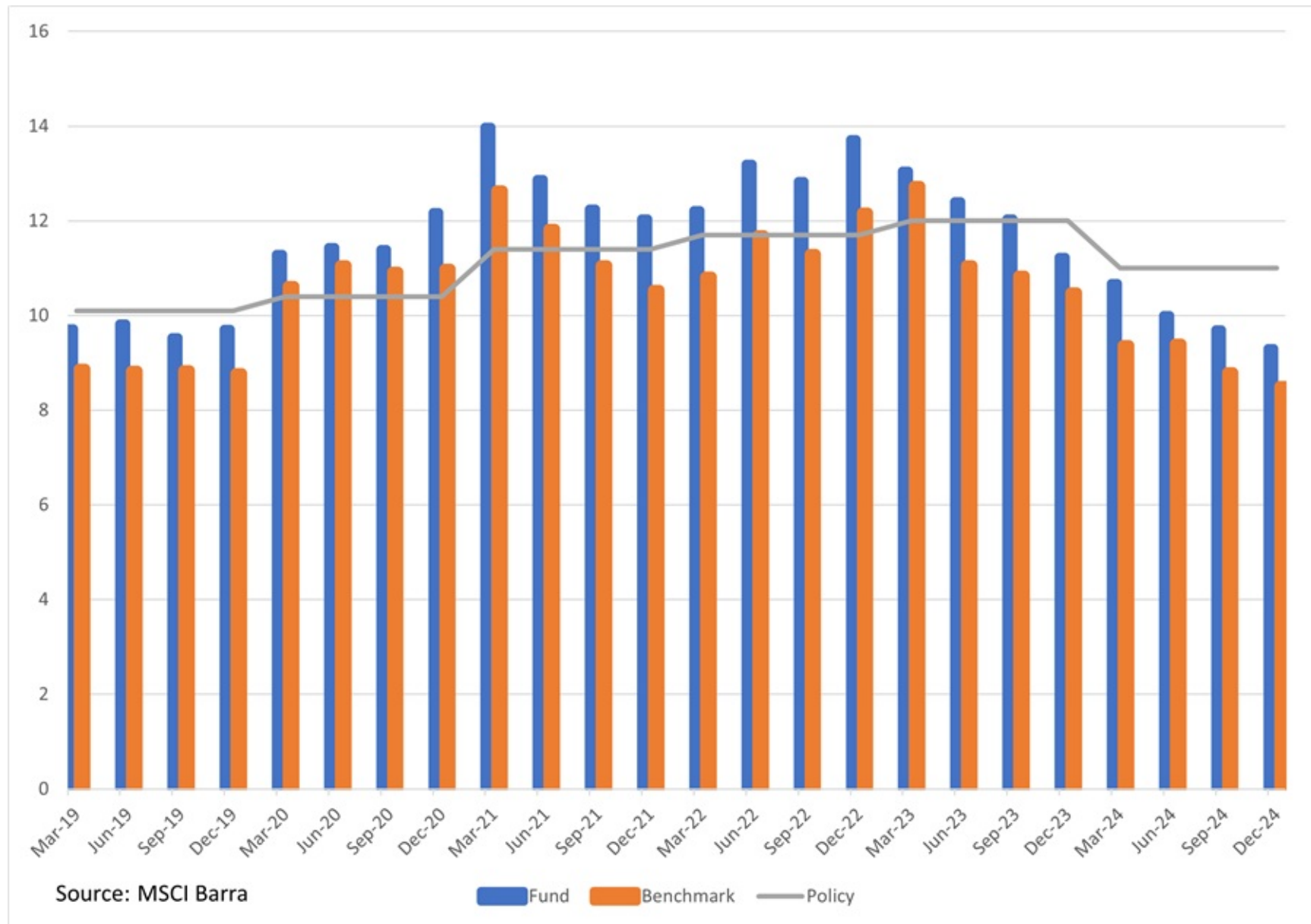
Projected Volatility and Risk Contribution - December 31, 2024



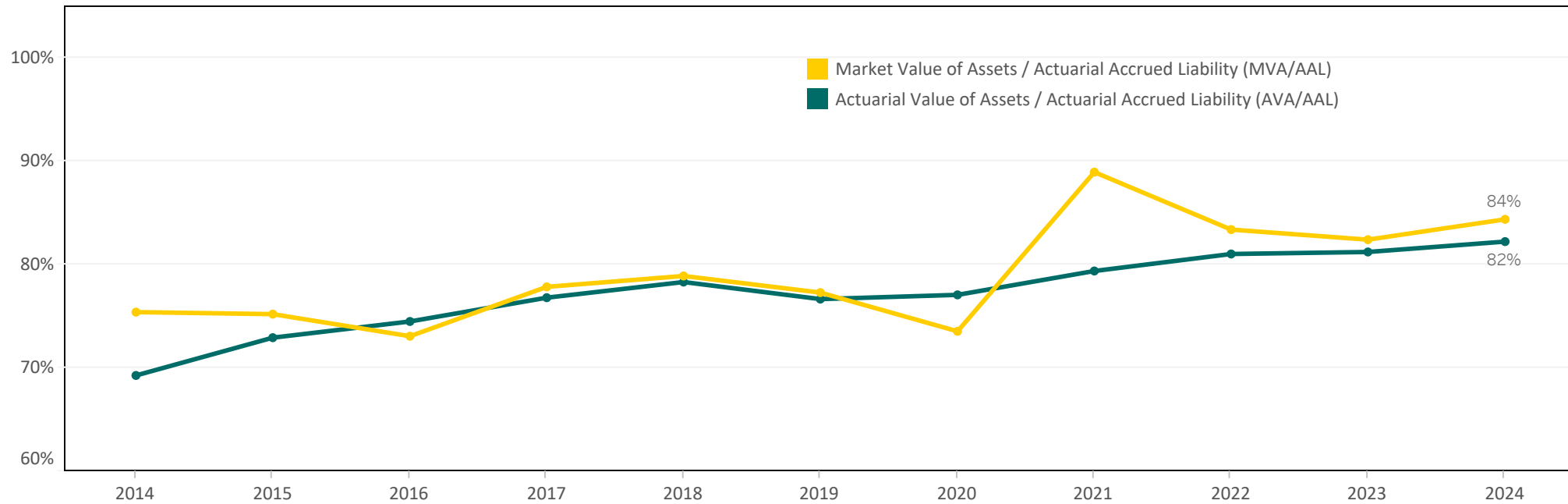
Asset Class	Market Value		Volatility (%)	
	Billions (\$)	Weight (%)	Projected	Contribution
Public Equity	38.1	32.6	13.4	43.4
Private Equity	19.0	16.3	19.0	29.3
Real Assets	14.6	12.5	12.0	12.5
Credit Strategies	18.5	15.8	5.0	6.7
Diversifying Strategies	4.2	3.6	2.5	0.7
Private Investment Partnership (PIP)	2.4	2.0	14.0	2.9
Exposure Management Portfolio (EMP)	1.0	0.9	16.1	0.4
Fixed Income	17.8	15.2	7.0	4.0
Cash	2.8	2.4	0.8	0.1
Leverage	-1.6	-1.3	0.0	0.0
Total Fund (Net Market Value)	116.9	100.0	9.3	100.0

Source: BNY Mellon, MSCI Barra

VRS Fund Projected Volatility - December 31, 2024



Funded Status - Assets/Liabilities



As of end of fiscal year.

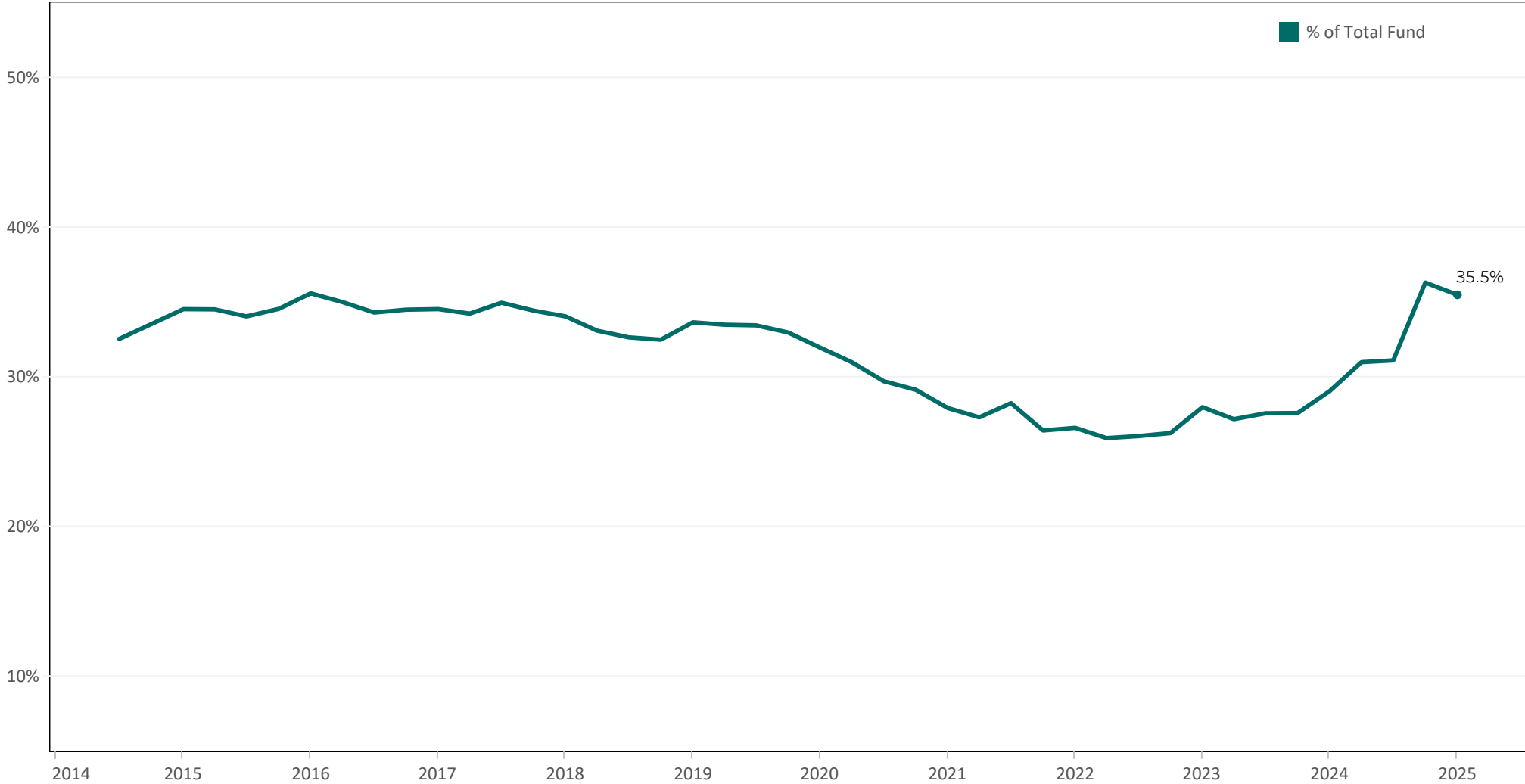
Market Value of Assets (MVA) - The value at which assets could be traded on the market.

Actuarial Value of Assets (AVA) - VRS generally uses a smoothed value of assets for actuarial value. The smoothed value phases-in investment gains and losses over a five year period to reduce volatility.

Actuarial Accrued Liability (AAL) - represents the portion of the Present Value of Future Projected Benefits attributable to service earned (or accrued) as of the valuation date.

Funded Status - The ratio of a plan's current assets to the actuarial accrued liability (AAL). In financial reporting of public pension plans, funded status is reported using the MVA and the liabilities as of the reporting date. When referring to funding of the plan, the funded status equals the actuarial value of assets divided by the actuarial accrued liability as of the valuation date.

Internally Managed Assets



As of 9/30/2024, the percentage includes both internally managed Public Market Assets and Private Market Assets where VRS has full discretion.

PERFORMANCE SUMMARY
Rolling Periods Ending
January 31, 2025



TOTAL FUND PERFORMANCE
(Net of Fees)

	10 Yr	5 Yr	3 Yr	1 Yr	Qtr	Month	Fiscal YTD	Cal YTD	Market Value (\$MM)
Total Public Equity	9.5	11.3	9.3	20.8	5.0	4.0	9.9	4.0	38,836
<i>Benchmark</i>	9.6	11.0	8.2	19.3	4.1	3.4	9.3	3.4	
Total Private Equity	14.1	14.6	4.2	6.4	2.0	0.0	2.4	0.0	19,106
<i>Benchmark</i>	11.7	12.1	5.8	34.2	2.4	-2.0	7.2	-2.0	
Total Real Assets	7.6	5.7	3.6	-0.9	0.8	0.0	1.5	0.0	14,767
<i>Benchmark</i>	5.5	3.3	0.4	-2.0	0.7	0.4	0.9	0.4	
Total Credit Strategies	6.8	7.6	6.9	10.6	2.5	0.3	5.5	0.3	18,649
<i>Benchmark</i>	5.4	5.1	5.7	8.6	2.0	1.0	5.4	1.0	
Total Diversifying Strategies	n/a	5.4	4.1	6.8	3.2	0.9	1.9	0.9	4,545
<i>Benchmark</i>	n/a	5.4	3.8	7.7	1.8	0.6	4.3	0.6	
Total Private Investment Partnerships	8.7	10.1	7.1	10.9	3.9	0.0	6.2	0.0	2,375
<i>Benchmark</i>	7.6	7.5	4.4	12.4	1.7	-0.2	4.4	-0.2	
Total Fixed Income	2.1	0.8	-0.6	3.3	0.3	0.7	3.1	0.7	17,951
<i>Benchmark</i>	1.3	-0.3	-1.2	2.7	0.1	0.6	2.8	0.6	
Total Fund	8.0	8.6	5.6	10.0	2.6	1.5	5.3	1.5	117,901
<i>VRS Custom Benchmark</i>	7.2	7.2	4.9	13.4	2.3	1.1	5.9	1.1	

Effective July 2013, the VRS Custom Benchmark is a blend of the Asset Class Benchmarks at policy weights.

Effective January 2024, the Total Fund includes leverage.

The VRS Cash Account, the Treasurer Short-Term Investment Account, the VRS Rebalancing Account, transition activity and accounts with market values of less than \$1 million are included in the Total Fund's market value. Differences in market value totals are due to rounding.

The Performance Report may differ from the VRS Annual Comprehensive Financial Report (ACFR) due to each report's requirements and objectives.

Leverage Cost Measurement Information

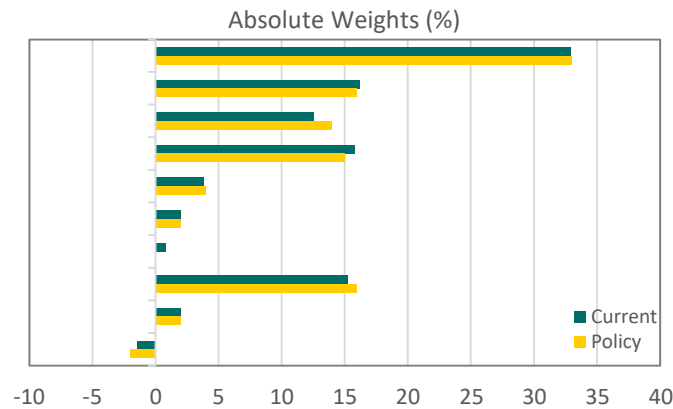
(Information provided for purposes of monitoring the cost effectiveness of leverage implementation.)

	10 Yr	5 Yr	3 Yr	1 Yr	Qtr	Month	Fiscal YTD	Cal YTD	Market Value (\$MM)
Leverage	n/a	n/a	n/a	n/a	1.4	0.5	3.4	0.5	(1,757)
<i>Benchmark</i>	n/a	n/a	n/a	n/a	1.3	0.4	3.3	0.4	

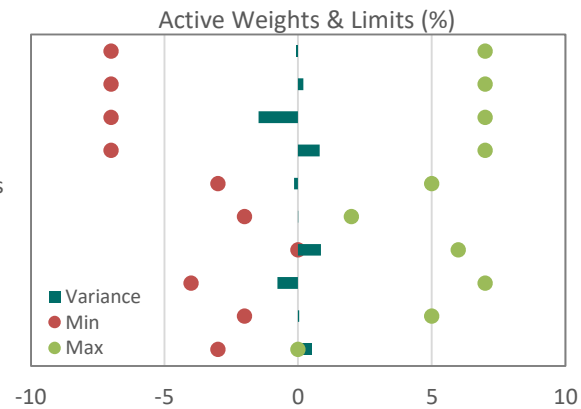
Effective January 2024, the Leverage Custom Benchmark is the Secured Overnight Financing Rate (SOFR) plus 50 basis points per annum.

Asset Allocation Report

January 31, 2025



Public Equity
Private Equity
Real Assets
Credit Strategies
Diversifying Strategies
PIP
EMP
Fixed Income
Cash
Leverage



Tracking Error (%)	
5Yr Fund	2.4
5Yr Public	1.7

Asset Class	Billions (\$)	Weights (%)					
		Current	Policy	Variance	Min	Max	Internal
Public Equity	38.8	32.9	33.0	-0.1	26	40	51
Private Equity	19.1	16.2	16.0	0.2	9	23	12
Real Assets	14.8	12.5	14.0	-1.5	7	21	17
Credit Strategies	18.6	15.8	15.0	0.8	7	21	4
Diversifying Strategies	4.5	3.9	4.0	-0.1	1	9	0
Private Investment Partnerships (PIP)	2.4	2.0	2.0	0.0	0	4	0
Exposure Management Portfolio (EMP)	1.0	0.9	0.0	0.9	0	6	0
Fixed Income	18.0	15.2	16.0	-0.8	12	23	95
Cash	2.4	2.1	2.0	0.1	0	7	0
Leverage	-1.8	-1.5	-2.0	0.5	-3	0	0
Total Fund (Net Market Value)	117.9	100.0	100.0	0.0	n.a.	n.a.	36
Total Fund (Gross Market Value)	119.7	101.5	102.0	-0.5	n.a.	n.a.	0

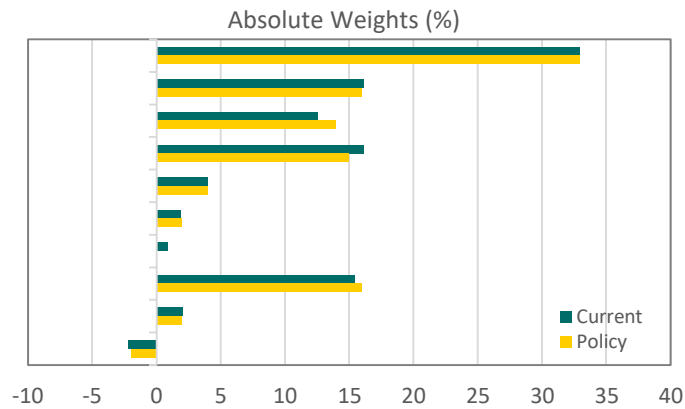
Exposures by Policy Groups

Public + Private Equity	57.9	49.1	49	0.1	39	59	n.a.
Fixed Income + Cash	20.4	17.3	18	-0.7	12	27	n.a.

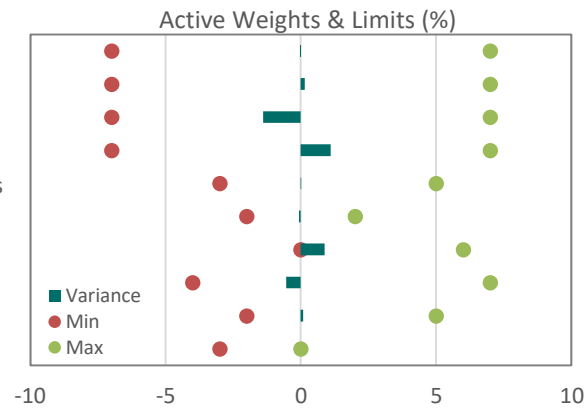
- Total Fund includes the following amount held by the Treasurer of VA: \$ 81 million
- The values shown for each asset class on this report may reflect adjustments related to derivative positions in the Rebalance Account, pending transactions and certain accruals, in order to provide a more descriptive representation of the true economic exposure to each asset class (0 adjustments applied)
- The VRS Defined Benefit Plan Investment Policy Statement established the total fund tracking error range as the allowable observed tracking error calculated quarterly using 5 years of history as of 12/31/2024.
- Differences in totals are due to rounding

Daily Asset Allocation Report

March 25, 2025



Public Equity
Private Equity
Real Assets
Credit Strategies
Diversifying Strategies
PIP
EMP
Fixed Income
Cash
Leverage



Tracking Error (%)	
5Yr Fund	2.4
5Yr Public	1.7

Asset Class	Billions (\$)	Weights (%)					
		Current	Policy	Variance	Min	Max	Internal
Public Equity	39.1	33.0	33.0	0.0	26	40	51
Private Equity	19.1	16.1	16.0	0.1	9	23	14
Real Assets	14.9	12.6	14.0	-1.4	7	21	17
Credit Strategies	19.1	16.1	15.0	1.1	7	21	5
Diversifying Strategies	4.8	4.0	4.0	0.0	1	9	0
Private Investment Partnerships (PIP)	2.3	1.9	2.0	-0.1	0	4	0
Exposure Management Portfolio (EMP)	1.0	0.9	0.0	0.9	0	6	0
Fixed Income	18.3	15.5	16.0	-0.5	12	23	95
Cash	2.5	2.1	2.0	0.1	0	7	0
Leverage	-2.6	-2.2	-2.0	-0.2	-3	0	0
Total Fund (Net Market Value)	118.4	100.0	100.0	0.0	n.a.	n.a.	37
Total Fund (Gross Market Value)	121.0	102.2	102.0	0.2	n.a.	n.a.	0

Exposures by Policy Groups

Public + Private Equity	58.2	49.1	49	0.1	39	59	n.a.
Fixed Income + Cash	20.8	17.5	18	-0.5	12	27	n.a.

- Total Fund includes the following amount held by the Treasurer of VA: \$ 446 million
- The values shown for each asset class on this report may reflect adjustments related to derivative positions in the Rebalance Account, pending transactions and certain accruals, in order to provide a more descriptive representation of the true economic exposure to each asset class (0 adjustments applied)
- The VRS Defined Benefit Plan Investment Policy Statement established the total fund tracking error range as the allowable observed tracking error calculated quarterly using 5 years of history as of 12/31/2024
- Differences in totals are due to rounding

Program	Action	Effective Date	Commitment/ Current Value	Funding/ Defunding Period	Description
Real Assets	Hired	11/01/2024	\$200 Million	4 years	QuadCP Fund II – U.S. focused closed-end fund focused on opportunistic real estate.
Real Assets	Hired	11/20/2024	\$125 Million	4 years	Artemis Income & Growth Fund II – A closed-end fund investing in diversified, core-plus real estate in the U.S.
Real Assets	Hired	11/20/2024	\$50 Million	4 years	Artemis Income & Growth Fund II Separate Account - A separate account focused on investing with smaller, real estate fund managers in the U.S.
Real Assets	Hired	12/20/2024	\$200 Million	5 years	Taurus Mining Royalty Fund, LP – A closed-end fund investing in mining royalties on a global basis.
Real Assets	Hired	12/30/2024	\$150 Million	2 years	Silver Creek Aggregate Reserves Fund I – A closed-end fund investing in aggregate reserves in the U.S.
Real Assets	Hired	01/02/2025	\$100 Million	5 years	PetroCap Partners Fund IV, LP – A closed-end fund investing in oil and gas properties in the U.S.
Real Assets	Hired	02/28/2025	\$250 Million	3 years	Hamilton Lane VA Real Estate SMA – A separate account focused on investing with smaller, real estate fund managers on a global basis.
Exposure Management Portfolio	Hired	10/09/2024	\$150 Million	2 years	Pretium Homebuilder Finance Fund - A debt strategy investing in residential transition and homebuilder finance loans.
Diversifying Strategies	Terminated	09/30/2024	\$150 Million	Immediate	Orchard Liquid Credit Fund – A long volatility credit hedge fund.
Diversifying Strategies	Hired	12/10/2024	\$400 Million	2 years	Brevan Howard Opportunistic Program - A multi-asset absolute return strategy.
Diversifying Strategies	Hired	12/31/2024	\$250 Million	Immediate	Neuberger Berman Insurance Linked Strategies Fund - A closed-end fund focused on insurance-linked securities.
Private Equity	Hired	10/23/2024	\$100 Million	5 years	Harbourvest Co-Investment Fund VII – A global direct co-investment fund that invests in both buyout and growth equity transactions.
Private Equity	Hired	12/17/2024	\$200 Million	6 years	Peak Rock Capital IV – A mid-market buyout fund focused on operationally intensive companies with the ability to provide transformational growth.

Program	Action	Effective Date	Commitment/ Current Value	Funding/ Defunding Period	Description
Private Equity	Hired	12/18/2024	\$75 Million	6 years	GTCR Strategic Growth Fund II – A mid-market buyout fund that partners with management leaders to identify, acquire and build market-leading companies through acquisitions and organic growth.
Private Equity	Hired	1/29/2025	€140 Million	6 years	CVC Strategic Opportunities III – A longer term private equity fund focused on stable, compounding businesses with lower targeted risk and return than traditional buyout funds.
Private Equity	Hired	2/13/2025	\$225 Million	5 years	Bain Capital XIV – A primarily US focused large market buyout fund concentrated on complex situations in five primary sectors: consumer, financial & business services, healthcare, industrials, and technology.
Credit Strategies	Hired	12/19/2024	\$200 Million	6 years	Audax Direct Lending Solutions III - A closed-end drawdown fund providing senior financing to sponsor-backed U.S. middle market companies.
Credit Strategies	Hired	12/24/2024	\$275 Million	4 years	Ares Special Opportunities Fund III – A fund that will provide middle market companies with flexible capital solutions, primarily in the form of debt and structured equity.
Credit Strategies	Hired	2/7/2025	\$200 Million	4 years	HPS Asset Value III – A fund that will provide equipment lease financing on mission critical assets in Europe and the US.
Public Equity	Terminated	12/31/2024	\$87 Million	Immediate	Nitorum – A long/short equity hedge fund.
Total Fund	Opened	10/31/2024	\$200 Million	Immediate	BSCL Layoff Strategy – An internally managed enhanced cash strategy.



Portfolio Diversification Update

Andrew Junkin
Chief Investment Officer

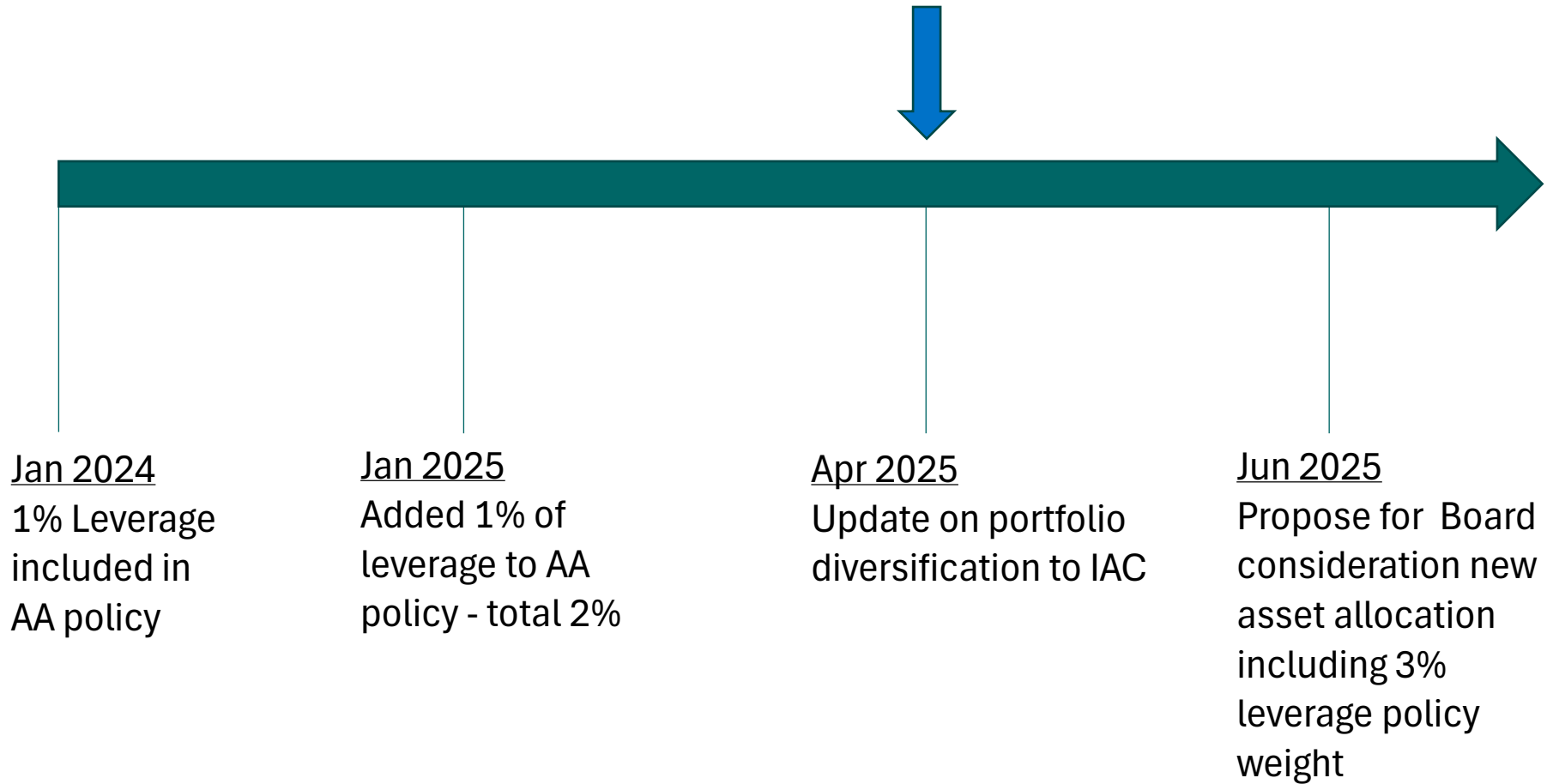
Chung Ma
Managing Director, Portfolio Solutions Group

April 2, 2025

Agenda

- Roadmap
- Expected glide path
- Implementation progress
- Looking forward

Roadmap



Expected Glide Path

Policy Weights

	Current	July 2025	2026	LT Target
Public Equity	33	32 ↓	32	32
Fixed Income	16	16	16	16
Credit	15	16 ↑	16	16
Real Assets	14	14	15 ↑	15
Private Equity	16	16	15 ↓	15
Div. Strategies	4	5 ↑	6 ↑	6
PIP	2	2	1 ↓	1
Cash	2	2	2	2
Gross MV*	102	103	103	103
Leverage	-2	-3 ↓	-3	-3
Net MV*	100	100	100	100

* MV-market value

Implementation Progress

- Leverage successfully running since January 2024
- Further diversifying portfolio with increases in weight to Fixed Income, Credit, and Cash while decreasing weight to Public Equity
- Refining existing processes and establishing new tools

Looking Forward

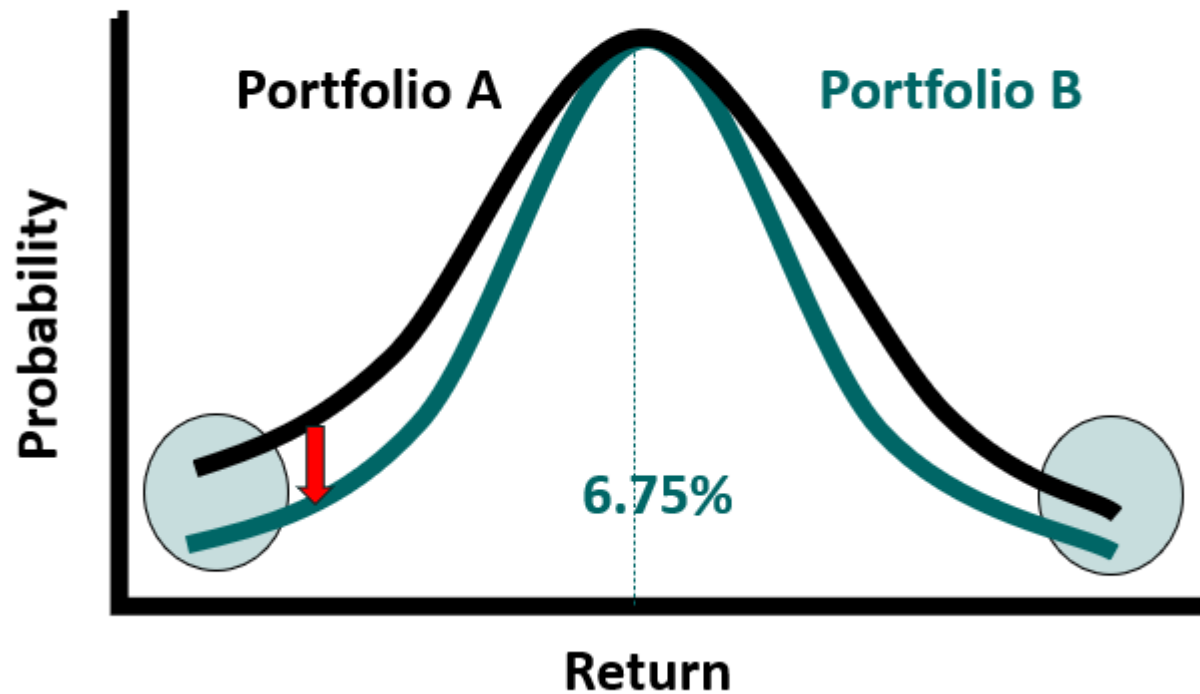
- Keep developing infrastructure for leverage operations, including adding new funding sources
- Maintain active knowledge-sharing with peer asset owners and securities financing community
- Stay abreast of potential regulatory changes
- Simplify reporting and explore centralizing data

Appendix



Portfolio Preferences

Illustrative





Public Markets Assets

Program Reviews
April 2, 2025

Total Public Equity

Dan Whitlock
Dan Schlusser
Program Directors



Public Equity Annual Review Topics

- Overview
- Markets
- Exposures
- Results
- Mandates
- Looking Forward

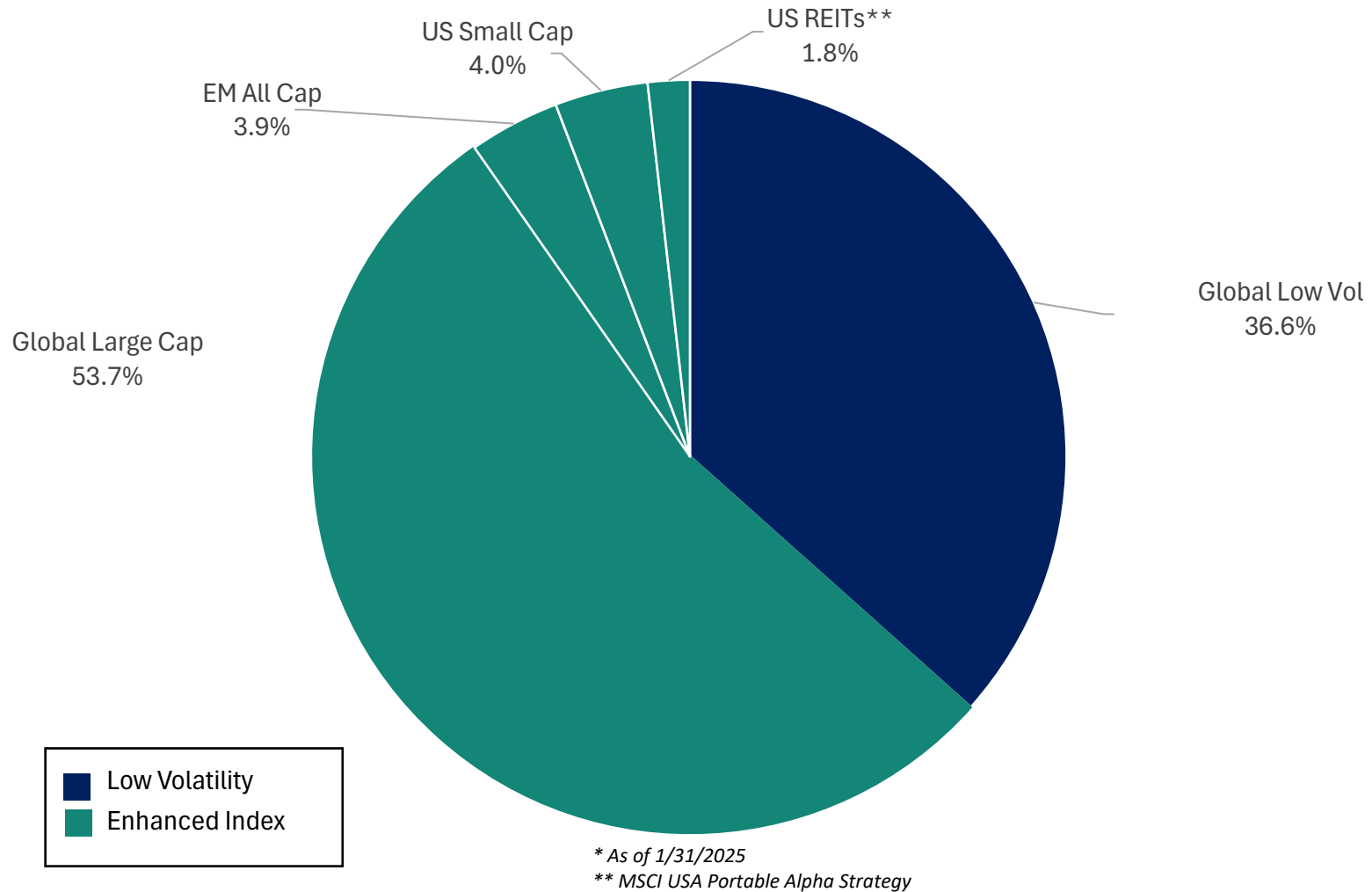
Global Equity Team Members

Professional	Position	Area(s) of Focus	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Dan Whitlock	Program Director	Public Equity	MBA	CFA, CAIA	23	23
Stephen Adelaar	Sr. Portfolio Manager	Hedge Funds, Emerging Markets, Defined Contribution Plan	MS	CFA	25	18
Holly Glass	Portfolio Manager	Small Cap, Risk Management, Transition Management, Internal	MA	CFA	24	24
Korey Turner	Sr. Investment Analyst	Global, Reporting	MS/MBA		5	5
Kelly Baker	Portfolio Assistant		AAS		15	10
Additional Resources	Internal Equity Team, Portfolio Solutions Group, Governance Team, Management Committee, Operations Team, Compliance Team, Legal/Regulatory Team, Investment Decision Support					

Internal Equity Team Members

Professional	Position	Area(s) of Focus	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Dan Schlussler	Program Director	Internal Equity	MBA	CFA	29	12
Ryan Carlson	Portfolio Manager	U.S. Small Cap & REIT, Investment Tools	BS	CFA	22	5
Bill Chen	Sr. Investment Officer	Research	MBA	CFA	7	2
Joe Kennebeck	Sr. Investment Officer	Head Trader	BA		32	18
Aaron Lazar	Sr. Investment Officer	U.S. REIT, Swaps & Equity Trading, Currency Hedge	MA	Passed CFA Level 1	11	11
Vu Le	Sr. Portfolio Manager	Global Enhanced, Research, Currency Hedge	PhD	CFA	14	13
Alex Muniz	Sr. Portfolio Manager	Global Low Volatility, Research	MA	CFA	24	24
Garret Rhodes	Investment Officer	Global Enhanced, Emerging Markets, Currency Hedge, Research	MS	CFA	6	6
Larry Tentor	Sr. Portfolio Manager	Global Low Volatility, Data Infrastructure, Investment Tools	PhD	FRM	23	17
Weldon Wirick	Portfolio Manager	Emerging Markets, Trading	MA	CFA	23	19
Additional Resources	Investment Operations Department Portfolio Solutions Group Investment Decision Support					

Internal Equity Asset Allocation



Internal Equity Philosophy

Philosophy – Risk Controlled Relative Value

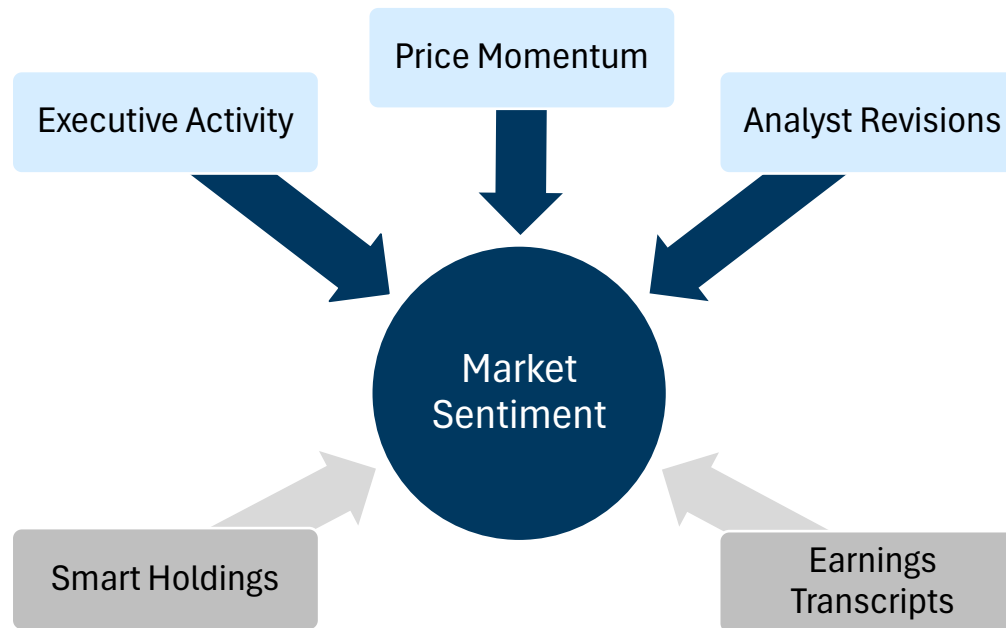
- Markets are relatively efficient
- Behavioral biases create exploitable opportunities
- Systematic strategies are effective at capitalizing on these opportunities



Internal Equity Philosophy

Market Sentiment – identify stocks that have positive market recognition

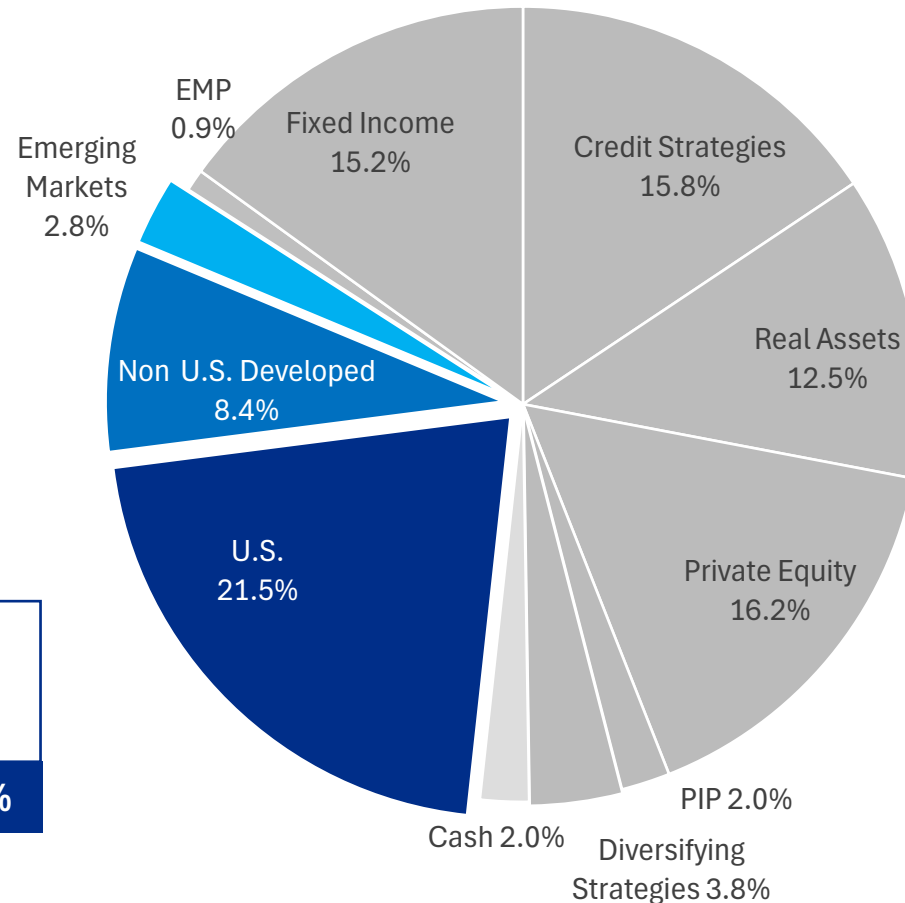
- Stock price movements show persistence in the intermediate term
- Analyst revisions have a predictable impact on stock prices
- Market sentiment indicates potential investment opportunities



Total Public Equity Asset Allocation

*Note: Includes Plan Leverage of 0.4%

Other Slides Exclude Plan Leverage



U.S. Equity	21.5%
Non-U.S. Developed	8.4%
Emerging Market	2.8%
Total Public Equity	32.7%

As of 01/31/2025

Total Public Equity Philosophy

- **Primary Objective**

Gain exposure to global economic growth & the global equity risk premium

- **Specific Return Objective**

Outperform the strategic benchmark over three to five years

- **Approach**

Both the program and benchmark have a lower absolute volatility than the capitalization weighted broad market to provide less downside risk to the plan

- **Strategic Benchmark (as of 1/1/2024)**

85% MSCI All-Country World Index Investable Markets Index and 15% MSCI World Minimum Volatility Index

Positioning

Total Public Equity Characteristics

As of: 1/31/25

\$38.1 Billion
32.3% of Plan Assets

61% Domestic (-4.3% vs. bmk)
29% Non-US Developed (+3.3% vs. bmk)
10% Emerging Markets (+1.0% vs. bmk)

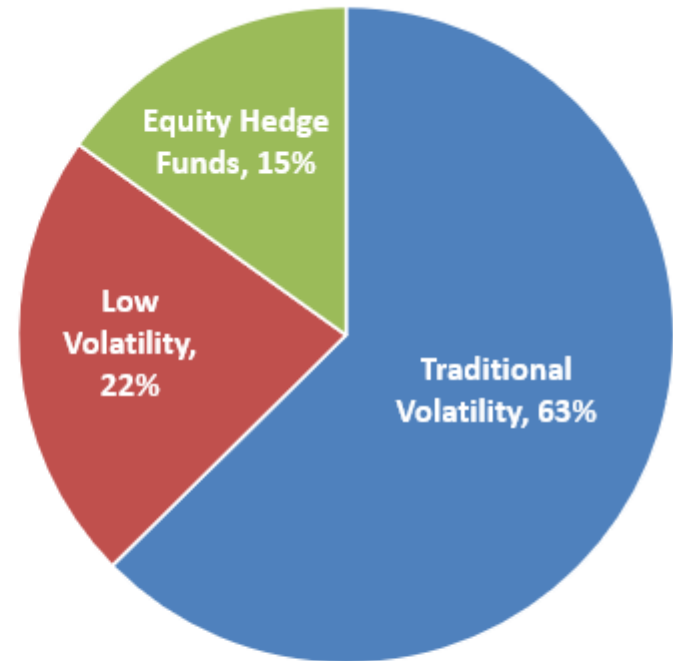
68% Active
32% Enhanced

51% Internal
49% External

63% Traditional Volatility
22% Low Volatility
15% Equity Hedge Funds

13.28% Forecasted Portfolio Risk (Barra)
13.46% Forecasted Strategic Benchmark Risk (Barra)
1.36% Forecasted Active Risk (Barra)

24 External Mandates (13 Traditional & 11 HFs)
18 External Managers (9 Traditional & 9 HFs)



Total Public Equity Portfolio Characteristics

Portfolio Characteristics	Program	Benchmark
Dividend Yield	2.2%	2.0%
Price to Book	2.5	3.0
Price to Earnings (F12)	16.1	18.0
Price to Earnings (T12)	19.4	21.9
Return on Equity	13.1%	12.3%
Debt to Assets	21.7%	22.9%
Sales Growth	2.4%	3.4%
Operating Income Growth	5.4%	4.5%
Cash Flow Growth	3.4%	2.1%
Profit Margin	8.3%	8.2%

Generally More Attractive Value, Quality, and Earnings Metrics

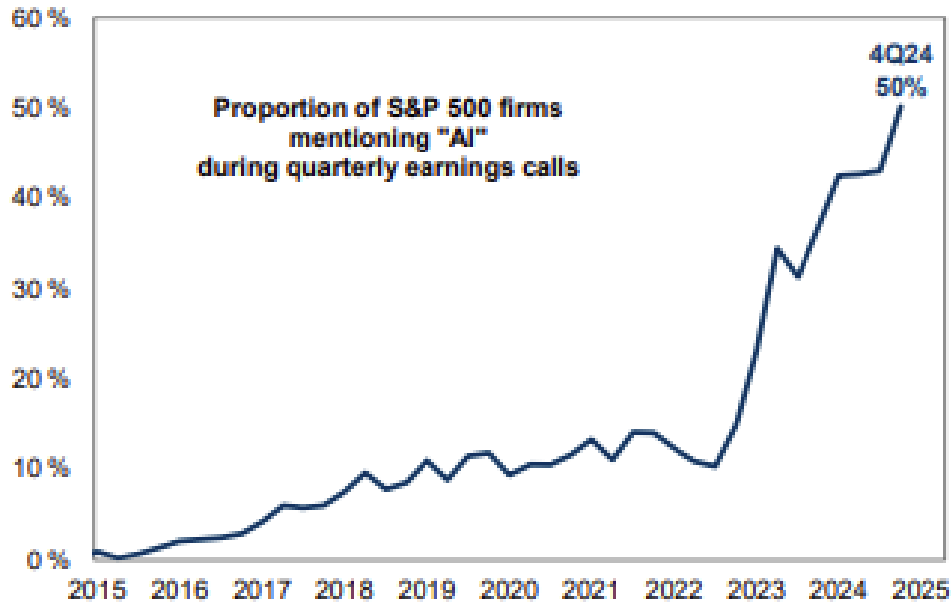
Public Equity Portfolio Changes

- Raised ~\$6 billion for plan needs in 2024
- Initiatives included:
 - Portfolio monitoring around the benchmark change
 - Hedge Fund changes
- 1 Manager Termination

Total PE	Jan-24	Jan-25	Difference
Traditional	66%	63%	-3%
Low Volatility	16%	22%	6%
Hedge Funds	18%	15%	-3%
Active	65%	68%	3%
Enhanced	35%	32%	-3%
Internal	51%	51%	0%
External	49%	49%	0%
AUM (billions)	35	38	3
% of Total Fund	32%	32%	0%

Markets: Artificial Intelligence Focus

Exhibit 5: Mentions of AI on earnings calls over time
as of February 5, 2025



Source: Goldman Sachs Global Investment Research



Goldman Sachs Phases of the AI Trade



Nvidia



AI Infrastructure

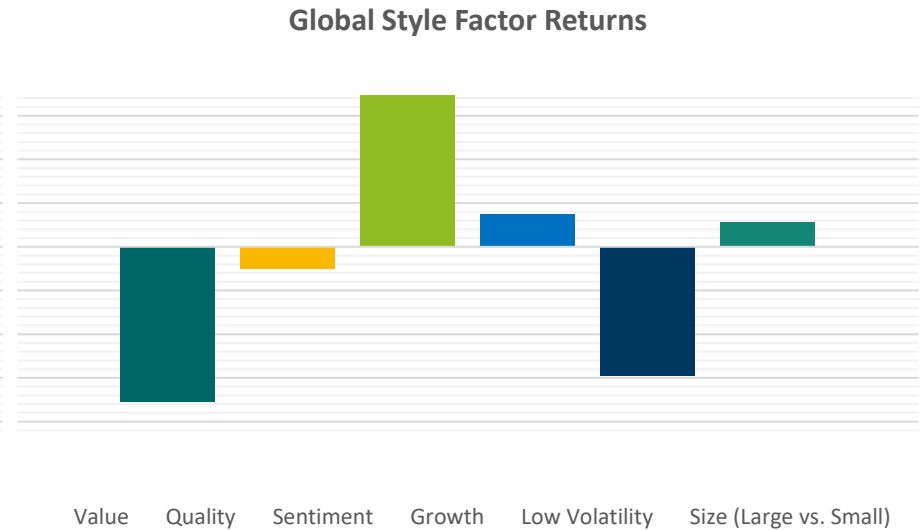
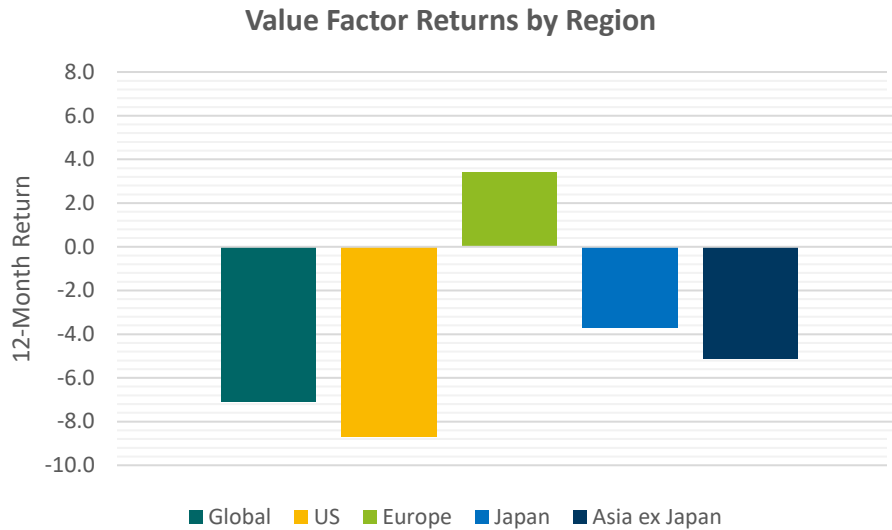


AI Revenue Boost



AI Productivity Enhancers

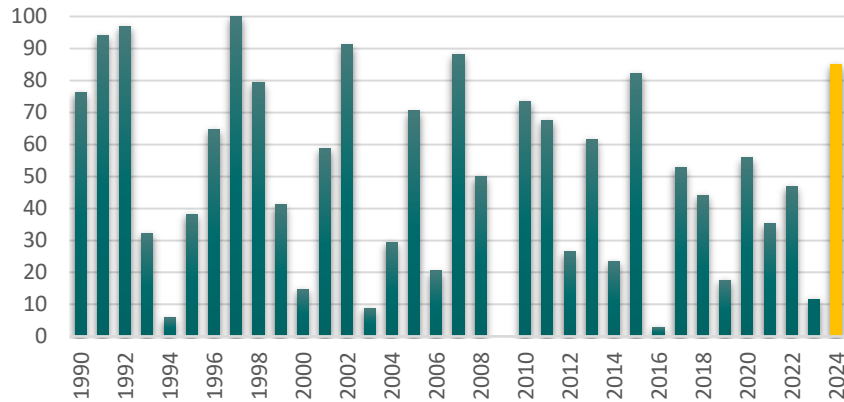
Factor Returns



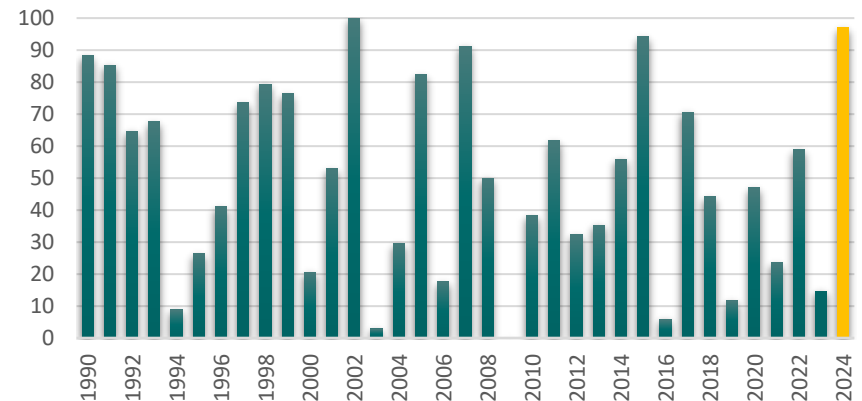
Source: UBS
 Long Minus Benchmark. Region, size and sector neutral, cap-weighted
 One-Year Returns Ending January 31, 2025

Price Momentum Returns

**Global Price Momentum:
Annual Returns (Percentile vs. History)**



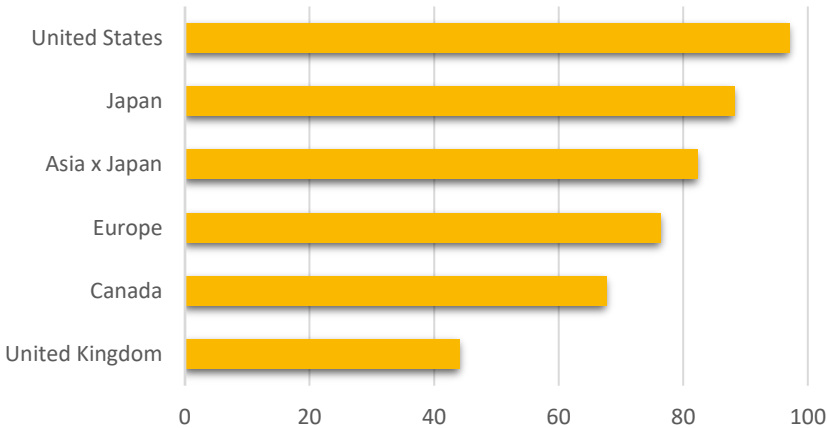
**US Price Momentum:
Annual Returns (Percentile vs. History)**



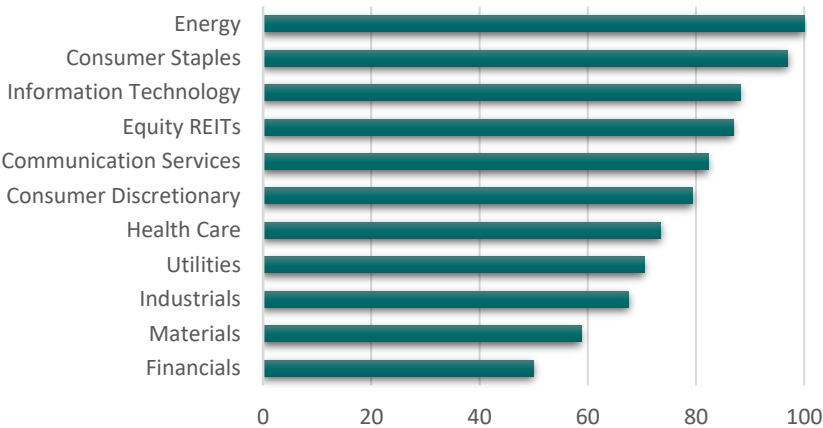
Source: VRS Analysis. Global Developed Standard Universe 1990 - 2024

Price Momentum Returns

Regional Price Momentum:
2024 Returns (Percentile vs. History)



Global Sector Price Momentum:
2024 Returns (Percentile vs. History)



Source: VRS Analysis. Global Developed Standard Universe 1990 - 2024

Price Momentum Return Drivers

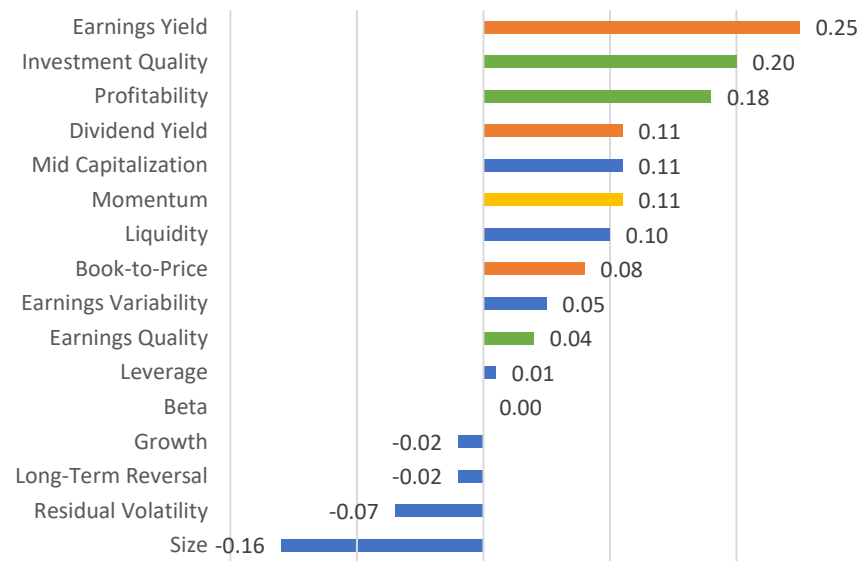
Price Momentum vs. Earnings Momentum:
12-Month Correlation



Source: Empirical Research Partners, VRS Analysis. Global Developed Standard Universe 1990 - 2024

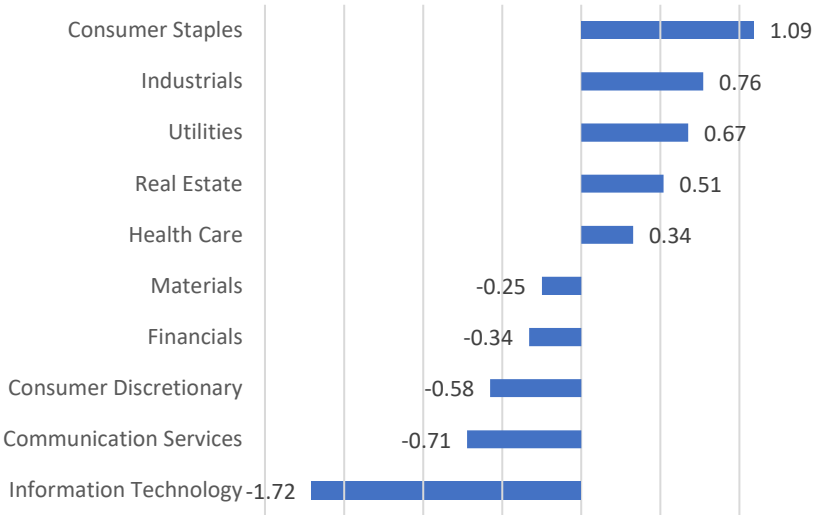
Internal Equity Style Factor and Sector Allocations

Style Factor Active Weights (%)



Source: MSCI Barra, VRS Analysis. As of 1/31/2025

Top & Bottom 5 Sector Active Weights



Internal Equity Program Performance

	IEM Active				IEM Enhanced Index				IEM Low Volatility			
	10 Yr	5 Yr	3 Yr	1 Yr	10 Yr	5 Yr	3 Yr	1 Yr	10 Yr	5 Yr	3 Yr	1 Yr
Total Active Internal Equity	10.39	11.44	9.76	21.12	11.01	12.79	10.50	23.24	8.93	8.55	8.30	17.23
IEM Benchmark	10.27	10.68	8.59	19.76	10.65	11.63	8.95	21.36	9.39	8.64	7.95	16.65
<i>Excess Returns</i>	0.11	0.76	1.16	1.36	0.36	1.16	1.55	1.88	-0.46	-0.09	0.35	0.58
<i>Realized Tracking Error</i>	1.20	1.46	1.36	1.73	1.05	1.30	1.24	1.28	2.05	2.34	2.29	2.92
<i>Realized Information Ratio</i>	0.09	0.52	0.85	0.79	0.34	0.89	1.25	1.46	-0.23	-0.04	0.15	0.20

As of 1/31/2025

Internal Equity Strategy Performance

	Inception Date	Mkt Value (\$MM)	1-Year Return	1-Year Excess	Since Inc. Excess	Since Inc. Tracking
Enhanced Index Strategies		12,259	23.24	1.88	0.43	0.90
U.S. Small Cap (Afton)	Jun-05	770	20.60	0.33	0.61	1.88
U.S. REITs** (Amherst)	Dec-05	357	28.10	1.19	0.97	1.13
EM All Cap (Tuckahoe)	Sep-15	745	13.69	0.58	0.01	1.82
Global Dev. Large Cap (Rivanna)	Sep-22	10,387	24.03	2.12	2.50	1.42
Low Volatility Strategies		7,087	17.23	0.58	1.59	2.70
Global Dev. Large Cap (Bearfence)	Jan-24	7,087	17.26	0.58	0.18	2.82
Other Mandates						
Currency Hedging	Apr-09	1,793	N/A	N/A	N/A	N/A

As of 1/31/2025

**MSCI USA Portable Alpha Strategy

Total Public Equity

	10 Year	5 Year	3 Year	1 Year
Total Public Equity	9.55	11.33	9.32	20.80
Strategic Benchmark	9.58	10.99	8.17	19.30
Excess Return	-0.03	0.34	1.16	1.50
Beta vs. Strategic Benchmark*	0.94	0.93	0.90	
Alpha**	0.35	0.97	1.36	
Active Risk vs. Strategic Benchmark***	1.72	2.30	2.36	
Information Ratio vs. Strategic Benchmark****	-0.02	0.15	0.49	

*Measure of volatility, or systematic risk, of a portfolio in comparison to a benchmark

**Risk-adjusted excess return (accounts for market beta)

***A relative risk measure otherwise known as tracking error, this is the standard deviation of returns relative to a benchmark

****A measure of excess return per unit of relative risk (Portfolio Returns - Benchmark Returns) / Active Risk

As of 01/31/2025

Total Public Equity 1 Year Trailing Update

1 Year Performance Factor Attribution*

Factor Impact Summary:

- Stock selection in the U.S. was positive.
- U.S. and European Momentum were contributors to performance, while a smaller U.S. Size and U.S. Value factors hurt.
- Managers had headwinds from being underweight the U.S.

Attribution	1 Year Trailing (through Jan)
Portfolio Base Return	22.23%
Benchmark Base Return	19.37%
Excess Return (gross of fees)	2.86%
Currency	0.26%
Market	0.26%
Country Allocation	0.38%
Selection	1.96%
Industry	-0.44%
Style	0.22%
Stock Specific Return	2.17%

*Attribution is an estimate and does not contain fees, intra-month trading, t-costs, etc.; some categories that are not material were left off.

External Manager Breakout

	10 Year	5 Year	3 Year	1 Year
External Managers (net of fees)	8.92	11.11	8.85	20.44
Associated Market Cap Benchmarks	8.88	10.49	7.51	19.35
Excess Return	0.04	0.62	1.34	1.09
Beta vs. Benchmarks*	0.94	0.91	0.87	
Alpha**	0.41	1.14	1.58	
Active Risk vs. Benchmarks***	2.49	3.24	3.41	
Information Ratio vs. Benchmarks****	0.02	0.19	0.39	

*Measure of volatility, or systematic risk, of a portfolio in comparison to a benchmark

As of 01/31/2025

**Risk-adjusted excess return (accounts for market beta)

***A relative risk measure otherwise known as tracking error, this is the standard deviation of returns relative to a benchmark

****A measure of excess return per unit of relative risk (Portfolio Returns - Benchmark Returns) / Active Risk

VRS Public Equity external managers have had a low excess return correlation (diversification) to internal management over time and have added value net of all fees.

Total Traditional Public Equity Hires and Terminations – 1 Year

Action	Effective Date	Commitment/ Current Value	Funding/ Defunding Period	Description
Terminated	12/31/2024	\$87 million	Immediate	Nitorum – A long/short equity hedge fund

Diverse Investment Management Engagement (DIME*)

Women & Minority Owned Management Firms Currently In The Lineup

- Ariel managing VRS assets since 2014
African-American, Asian-American & women-owned global equity manager

Continue To Meet With New Prospects & Consider New Investments

- 84 meetings with minority managers or consultants in last 5 years
- 259 meetings since we started tracking this in late 2009

*The manager is considered DIME under the Commonwealth of Virginia definition, which defines ownership threshold of 51% or more

Looking Forward

- Remain a Liquidity Source for the Plan
- Continue To Work Closely With All Cross Functional Teams
- External
 - Opportunistic Manager Selection, Portfolio Management, and Risk Management
 - Continue Women & Minority Manager Outreach
- Internal
 - Ongoing Strategy Enhancement and Research into Diversifying Strategies
 - Prime Brokerage
- Shared
 - Technological Improvements
 - Foreign Adversaries

Foreign Adversaries

- **On November 14, 2024, the VRS Board approved an RBA to authorize the Chief Investment Officer to pursue a policy related to current and future investments in countries designated as foreign adversaries by the Office of the Secretary of Commerce.**

- **Things to consider:**
 - Program Benchmarking
 - Separate Account Guidelines, Compliance Monitors
 - Plans for Commingled Funds
 - Transition Planning/Portfolio Management
 - Internal Equity: Research and Development of ex-Foreign Adversary Strategies

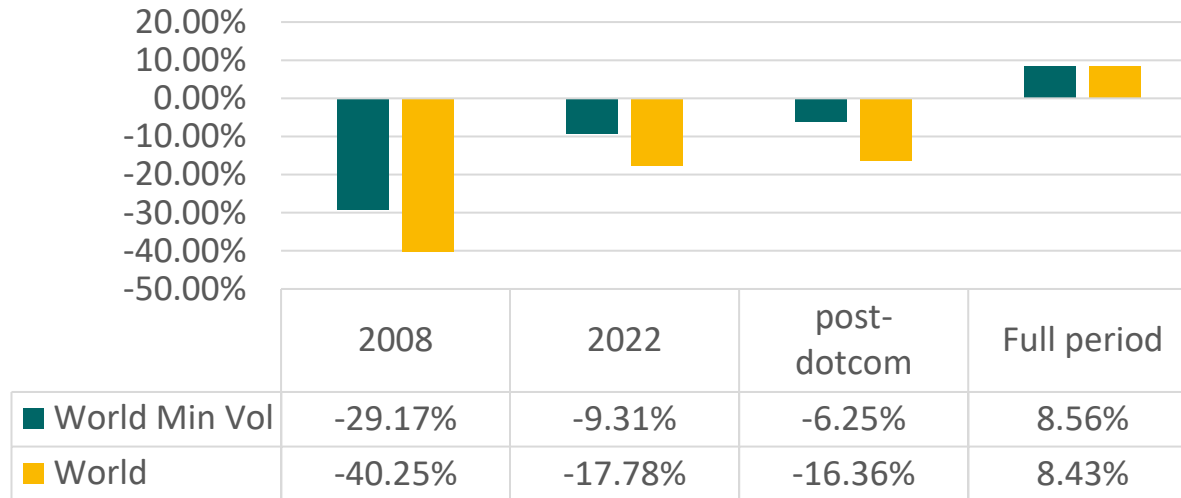
Appendix

Total Public Equity



Total Public Equity Philosophy

Min Vol Drawdowns and Full History



Full period is from May 1988 through January 2025. Index data from Bloomberg. World Min Vol and World are gross, total return, USD.

- **Low Volatility mandates decrease contribution rate volatility.**
- **Low Volatility mandates have historically outperformed over long periods of time by protecting capital, which is imperative to compounding.**
- **Why 15%?**
 - **Spending the risk in other areas of the plan:** Risk modeling shows a ~15% Min Vol Exposure in Public Equity combines with the theoretical higher risk of Private Equity to produce a volatility equal to that of a Public Markets Beta 1 volatility.
 - **Behaviorally staying the course:** The percentage of periods where losses are meaningful versus a capitalization weighted benchmark are tempered. There is a 1 in 100 chance of underperforming by 5% over 3 years at this level.

Total Public Equity Team and Process

	<u>Stephen Adelaar</u>	<u>Holly Glass</u>	<u>Korey Turner</u>	<u>Daniel Whitlock</u>
Strategy Lead	Defined Contribution	<i>IEM Group (Italics)</i>	Global Equity	Total Public Equity
	Emerging Markets	Risk Management	Reporting	
	Hedge Funds	Small Cap		
		Transition Management		
Analyst	<i>Afton (IEM)</i>	Acadian EM	Ariel Global	<i>BearFence</i>
	Baillie Gifford EM	Acadian Small Cap	Coatue	CET Energy Dynamics
	Baillie Gifford Global	<i>Amherst (IEM)</i>	Eminence 150/50	
	Farallon	Arrowstreet Global	<i>Internal EM (IEM)</i>	
	Farallon Healthcare	Cevian	J.P. Morgan	
	LSV Global	Jackson Square	Maverick 130/30	
	LSV Non-U.S. Small Cap	Lansdowne Global	ValueAct Capital	
	LSV U.S. SC	<i>Rivanna</i>		
	Select - Cooper Square	Theleme		
	Select - SEG			
	WCM			

Total Public Equity Manager Evaluation Framework

Sustainable Risk-Adjusted Returns

- Long history, repeatable process, consistent philosophy
- Sustainable team and firm
- Outperformed in a consistently diversified manner
- Outperformed when considering risk profile
- Track record not driven by any particular outsized allocations

Doing Things Differently

- Low correlations to existing book (quantitative & qualitative)
- Something VRS cannot produce internally
- Something one of VRS' existing external managers cannot provide
- Employ a different way of thinking or different strategies

Terms & Back Office

- Favorable fees, liquidity, etc.
- Robust back office
- Partnership mentality
- Resources to manage sizeable allocations

Due Diligence: Constant Re-Underwriting

Existing Portfolio

- **Qualitative:** long-term relationships, frequent communication, monitor organizations & personnel
- **Quantitative:** monitor exposures & performance & risk, risk budget drives allocation, identify new strategic & tactical tilts

Assess Opportunity

- **Qualitative:** identify attractive investments, identify talented managers, utilize network of contacts
- **Quantitative:** multiple data sources/screen universe, identify potential manager, evaluate performance & risk of prospects

Manager Due Diligence

- **Qualitative:** face to face manager meetings, review firm strategy & process, detailed portfolio reviews, reference checks
- **Quantitative:** due diligence of existing managers, attribution, verify performance, assess risk

Portfolio Construction & Risk Management

- **Qualitative:** bottom-up portfolio construction, look for organizational “cracks” & process changes
- **Quantitative:** review targeted policy allocation & portfolio tilts, determine benchmark & manager allocations, perform risk analysis, monitor exposures



Markets: 1 Year Returns

	Global	Developed	Dev ex US	US	EMEA	Asia Pacific	Emerging	EM ASIA	EM LatAm	EM EMEA
All Sectors	20.7%	21.4%	9.4%	26.4%	9.3%	7.4%	14.8%	19.0%	-15.3%	11.4%
Communication Services	37.8%	39.7%	14.7%	44.5%	15.1%	23.8%	23.7%	27.7%	-20.4%	12.7%
Financials	30.4%	33.0%	27.9%	36.5%	29.2%	25.6%	15.1%	21.5%	-13.7%	13.2%
Consumer Discretionary	28.7%	29.1%	3.4%	40.7%	4.6%	13.8%	25.5%	27.2%	-13.7%	12.7%
Information Technology	26.2%	25.8%	7.8%	28.2%	8.2%	21.4%	29.7%	29.8%	-7.3%	22.0%
Industrials	17.9%	18.6%	12.6%	23.3%	16.2%	9.5%	8.1%	10.7%	-2.6%	-0.1%
Utilities	17.4%	19.6%	1.8%	31.0%	1.9%	0.8%	1.3%	2.7%	-13.3%	18.8%
Real Estate	9.1%	9.0%	2.6%	11.1%	0.1%	1.9%	10.3%	-3.3%	-29.5%	58.9%
Consumer Staples	5.9%	7.0%	-4.1%	14.3%	-5.4%	-2.2%	-5.6%	1.1%	-26.6%	6.3%
Health Care	4.9%	4.8%	1.6%	6.1%	2.6%	1.7%	7.1%	10.1%	-33.7%	-4.4%
Energy	4.6%	6.5%	2.6%	8.8%	-1.6%	-9.5%	-8.1%	-9.4%	-9.0%	-0.7%
Materials	2.0%	4.2%	-0.3%	10.0%	1.3%	-13.5%	-8.5%	-10.9%	-15.1%	4.2%

As of 01/31/2025

Unhedged Total Returns

Sources: MSCI and Bloomberg

Total Public Equity Regional Breakout

	10 Year	5 Year	3 Year	1 Year	MV (\$M)
Traditional Public Equity	9.55	11.33	9.32	20.80	38,058
Strategic Benchmark ¹	9.58	10.99	8.17	19.30	
Excess Return	-0.03	0.34	1.16	1.50	
U.S. Program	11.60	11.92	7.84	19.19	1,941
U.S. Benchmark ²	12.47	13.13	8.92	22.03	
Excess Return	-0.87	-1.21	-1.08	-2.84	
Non-U.S. Program	6.07	6.08	4.50	13.96	3,094
Non-U.S. Developed Benchmark ³	5.76	5.01	2.17	11.22	
Excess Return	0.31	1.07	2.33	2.74	
Global Program	11.20	13.48	11.39	21.74	27,253
Global Benchmark ⁴	10.50	11.60	9.02	20.15	
Excess Return	0.70	1.88	2.37	1.59	
Equity Hedge Fund Program	6.80	10.00	8.16	20.88	5,770
Equity Hedge Fund Program Benchmark ⁵	7.29	11.12	8.38	20.37	
Excess Return	-0.50	-1.13	-0.22	0.51	

Please see endnotes for detail on benchmarks

As of 01/31/2025

Total Public Equity

	1 Year
Total Public Equity	20.80
Strategic Benchmark ¹	19.30
Excess Return	1.50

Large One Year Absolute Return Contributors:

Positive: Global managers were up 21.7% with a 72% weight

Negative: U.S. managers were up 19.2% with a 5% weight

Large One Year Relative Return Contributors:

Positive: Global, Non-U.S., and HF Managers

Negative: U.S. Managers

Please see endnotes

As of 01/31/2025

Total Public Equity Top 5

Name	Mandates	# of Mandates	% of Program
VRS Internal Equity	Global, U.S., Emerging	5	51%
Arrowstreet	Global	1	9%
LSV	Global, Non-U.S. Small, U.S. Small	3	6%
Baillie Gifford	Global, Emerging	2	5%
Acadian	Non-U.S. Small, Emerging	2	4%
Total			75%

End Notes

¹Effective January 2024, this is the weighted average of the MSCI ACWI IMI (net VRS taxes) 85% and the MSCI World Min Vol (net of VRS taxes) 15% indices

²Effective March 2017, this is a weighted average of MSCI U.S. Standard and MSCI U.S. Small Cap indices

³Effective February 2020, this is a weighted average of MSCI World ex U.S. Standard (net VRS taxes), MSCI World ex U.S. Small Cap (net of VRS taxes) , and MSCI Emerging IMI (net of VRS taxes) indices

⁴Effective May 2024, this is the weighted average MSCI ACWI Standard (net of VRS taxes) index, the MSCI World Standard (net of VRS taxes) index, the MSCI World (net of VRS taxes) 40% and the MSCI World Min Vol (net of VRS taxes) 60%, and the MSCI World Min Vol (net of VRS taxes) indices.

⁵Effective February 2020, this is the MSCI ACWI IMI (net of VRS taxes) index

Appendix

Internal Equity

Internal Equity Philosophy

Provide Cost Effective Access To The Equity Risk Premium

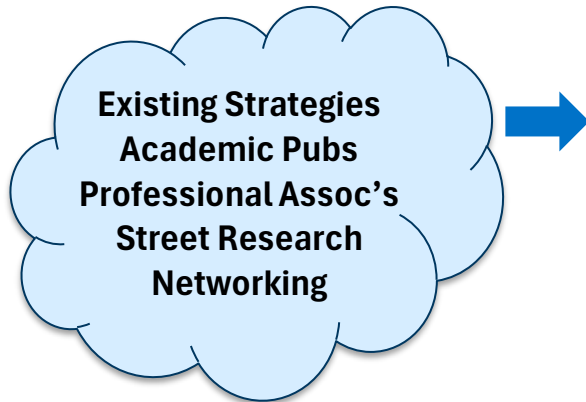
Provide Risk-Controlled Value Added

Provide Insights Into The Capital Markets

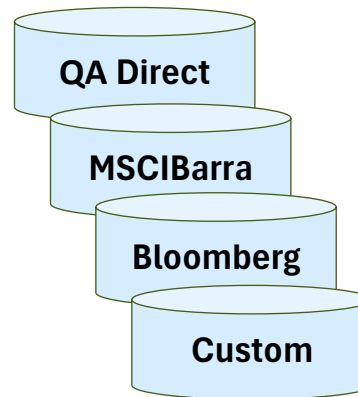
Complement The Total Public Equity Program

Internal Equity Research Process

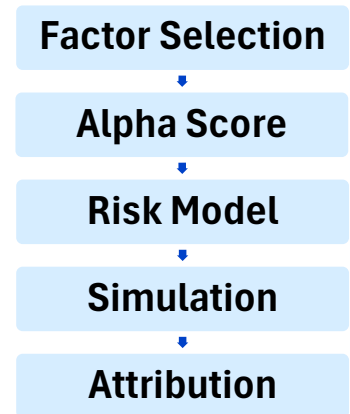
Investment Ideas



Data Collection



Proprietary Research



Internal Equity Factor Selection and Alpha Score

Valuation
Discounted Cash Flow
Relative Valuations



Quality
Prudent Accounting
Return on Equity



Market Sentiment
Momentum
Analyst Revisions



Composite Score

- DCF models provide robust estimates of intrinsic value
- RV models compare stocks within cohorts using accounting metrics
- Valuation models identify stocks trading at a discount or premium

- Cash based earnings are preferred to accrual-based earnings
- High & stable profitability help to avoid value traps
- Quality captures accounting strength & management efficiency

- Stock price movements show persistence in the intermediate term
- Analyst revisions have a predictable impact on stock prices
- Market sentiment indicates potential investment opportunities

Composite score identifies stocks that are trading at a discount, have superior management & positive market recognition

Internal Equity Portfolio & Risk Management

Quantitative

Statistical Risk

- Fundamental Multifactor Risk Models
- PCA Risk Models

Factor Constraints

- Relative or Total Risk
- Return & Risk Factors
- Industries, Sectors, Countries, Regions, etc.

Qualitative

Fundamental & Non-Modeled Risks

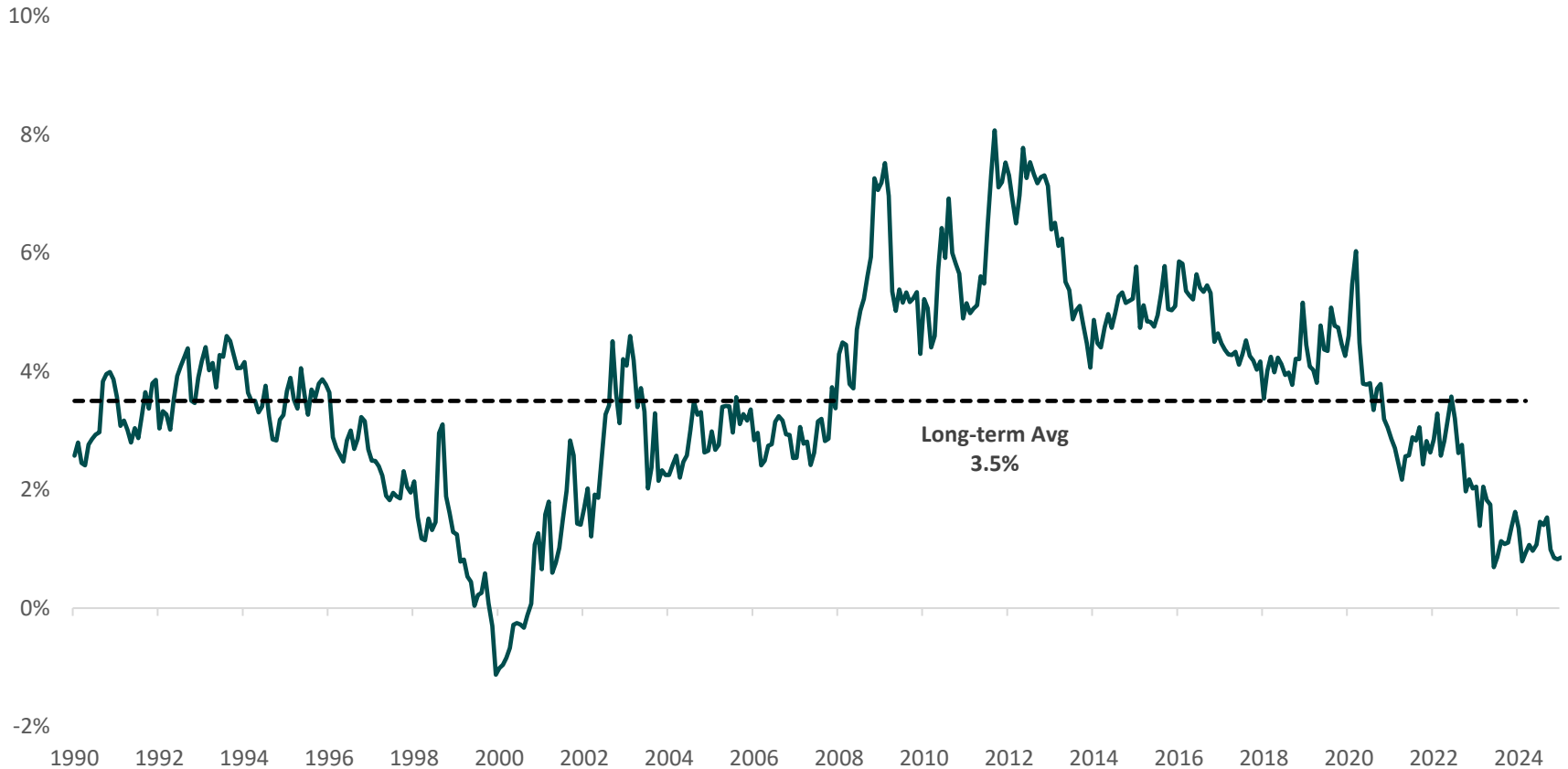
- Forensic Accounting, Shorting Activity, etc.
- Individual Stock Modeling Tools

Expert Assessment

- Continuous Monitoring
- Thematic Trend Analysis
- Proprietary Research

Equity Risk Premium

US Equity Risk Premium

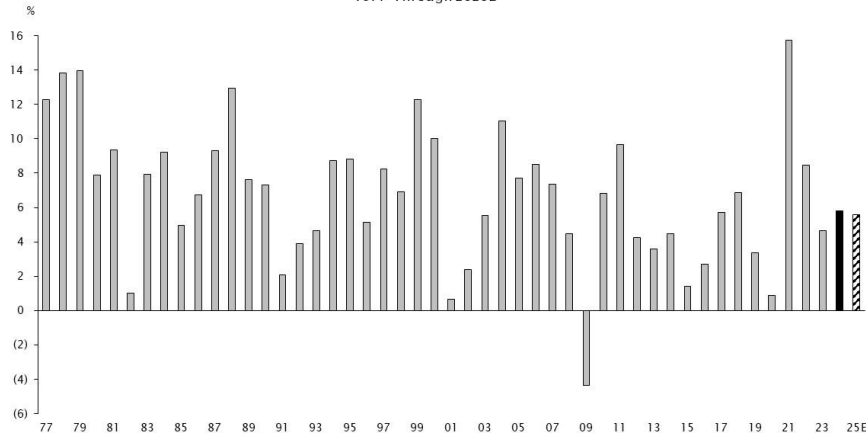


Long-term Avg
3.5%

Source: HOLT Lens © UBS. All rights reserved. Reproduced with permission. May not be forwarded or otherwise distributed.

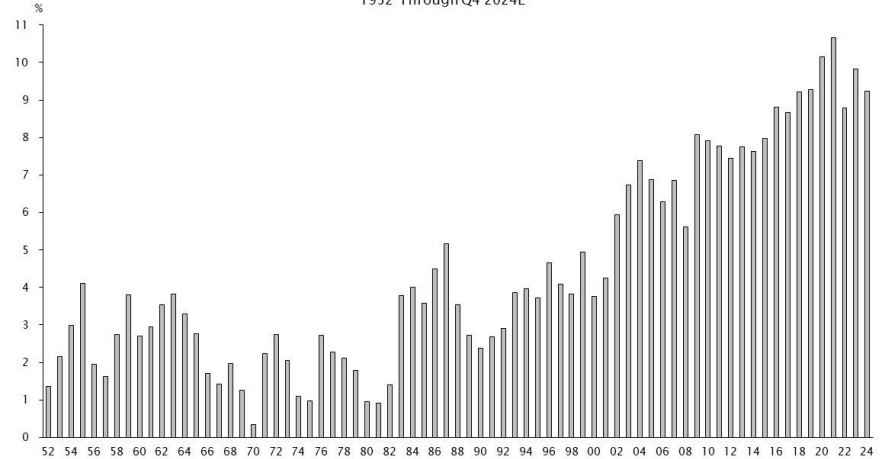
Equity Risk Premium

The Core of the S&P 500¹
Annual Revenue Growth Rates
1977 Through 2025E



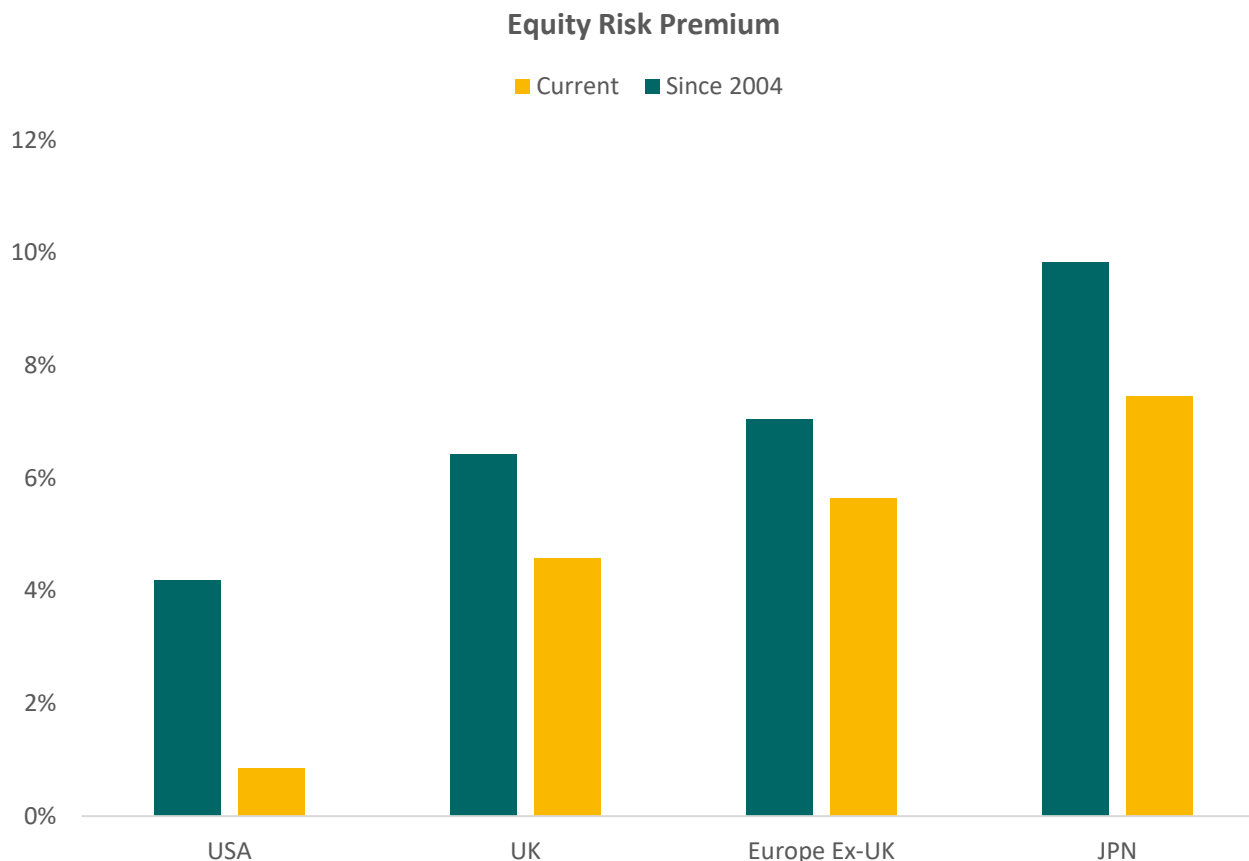
Source: Corporate Reports, Empirical Research Partners Analysis.
¹Excluding financials, REITs, utilities and energy.

The S&P 500¹
Free Cash Flow Margins
1952 Through Q4 2024E



Source: Corporate Reports, Empirical Research Partners Analysis.
¹Excludes financials and REITs; prior to 1976, the large-cap universe is used.

Developed Markets Equity Risk Premium



Source: As of 1/31/2025. HOLT Lens © UBS. All rights reserved. Reproduced with permission. May not be forwarded or otherwise distributed.

Internal Equity Risks & Positions

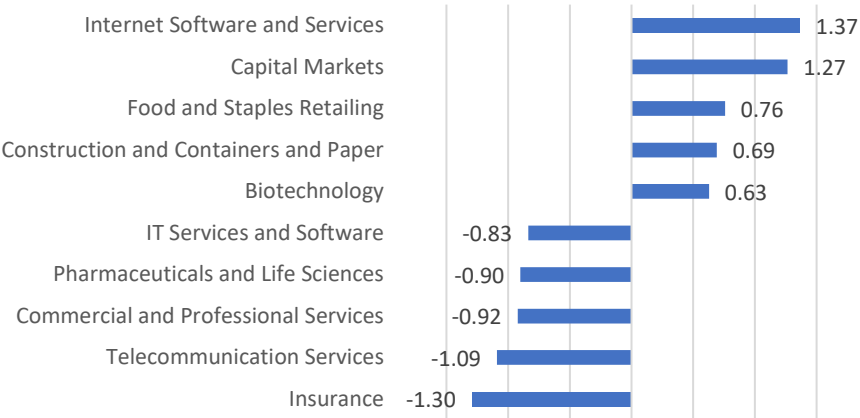
Risk Summary*	Strategy	Mkt Val (\$MM)	Weight	Tracking	% from CF Risk	% from Specific	Risk Attrib	% of TE
Program	Composite	19,347	100.0	1.06	46	54	1.06	100.0
Afton	US Small Cap	770	4.0	1.09	31	69	0.01	1.0
Amherst	US REIT**	357	1.8	1.20	12	88	0.00	0.0
Bearfence	Global Low Vol	7,087	36.6	1.86	42	58	0.57	53.8
Rivanna	Global Dev. Standard	10,387	53.7	1.09	47	53	0.46	43.4
Tuckahoe	Emerging Markets All-Cap	745	3.9	0.85	48	52	0.01	1.0

As of 1/31/2025

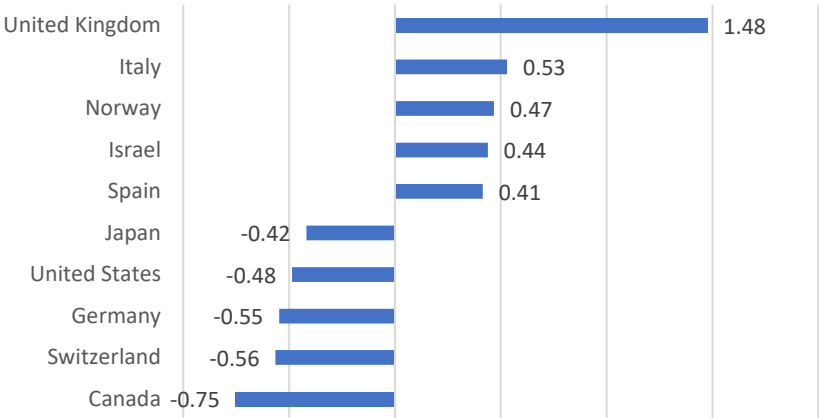
**MSCI USA Portable Alpha Strategy

Internal Equity Industry and Country Allocations

Top & Bottom 5 Industry Active Weights (%)



Top & Bottom 5 Country Active Weights (%)



Source: MSCI Barra, VRS Analysis. As of 1/31/2025

Fixed Income

Parham Behrooz

Greg Oliff

Co-Directors



Fixed Income Annual Review Topics

- Overview
- Markets
- Exposures
- Results
- Looking Forward
- Collaboration

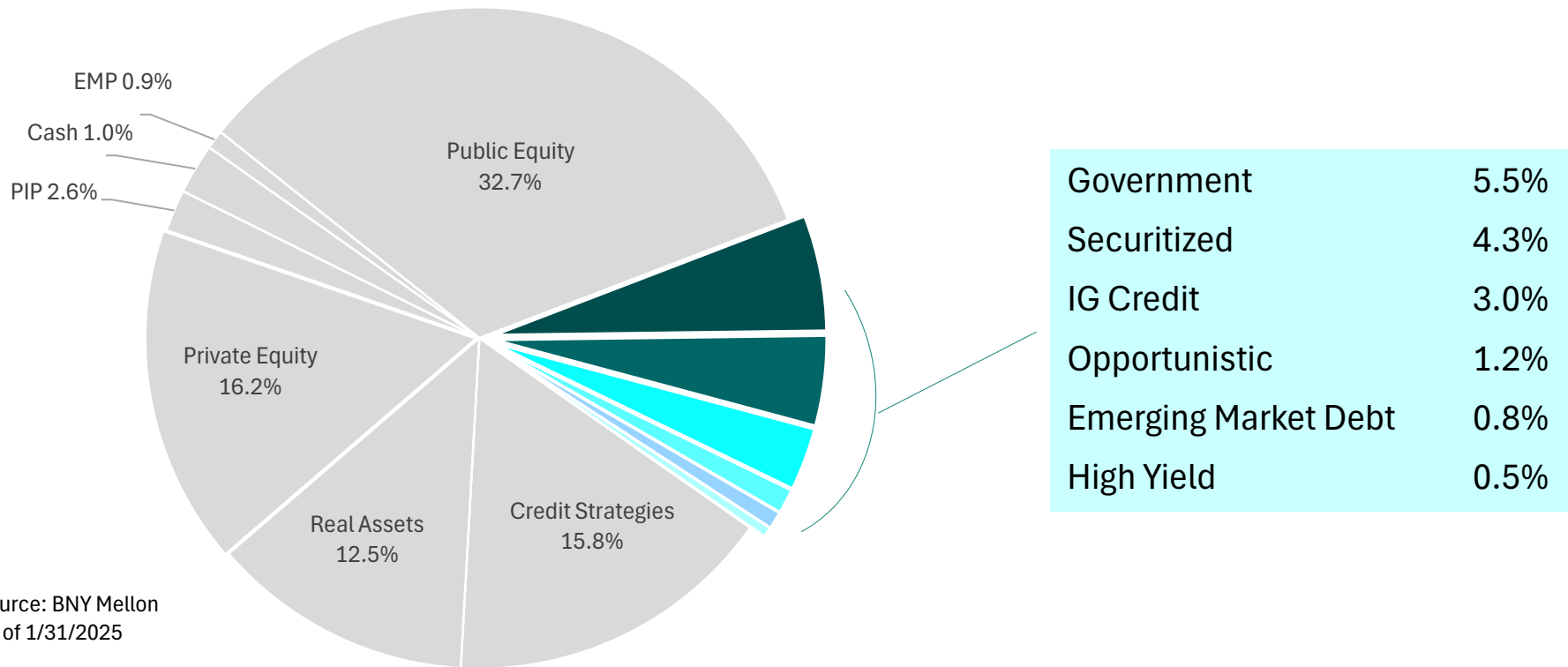
Team Members

Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Parham Behrooz	Co-Director	BS	CFA	28	12
Greg Oliff	Co-Director	MBA	CFA	17	14
Mehtab Haleem	Senior Portfolio Manager	MS		16	4
Teresa Nguyen	Portfolio Manager	MS	CFA	23	8
Omar Zayed	Portfolio Manager	MBA		19	<1
Michael Desai	Investment Officer	MS	**	8	4
Moeen Mostafavi	Investment Officer	Ph. D	**	2	2
Kidus Molla	Investment Analyst	BS	**	3	3
Additional Resources	Investment Operations Department, Portfolio Solutions Group, Investment Decision Support, Management Committee, Operations Team, Compliance Team, and Legal/Regulatory Team.				

** CFA Candidate

Asset Allocation

Total Fixed Income = 15.3%



Philosophy

Risk Controlled Relative Value

Market factors provide opportunities to add value through optimal sector allocation and security selection, while managing risk exposures to the benchmark within controlled parameters



Risk Control

How different are we from the benchmark and are these differences intended and desired?



Relative Value

What should these differences be so that we can maximize excess return?



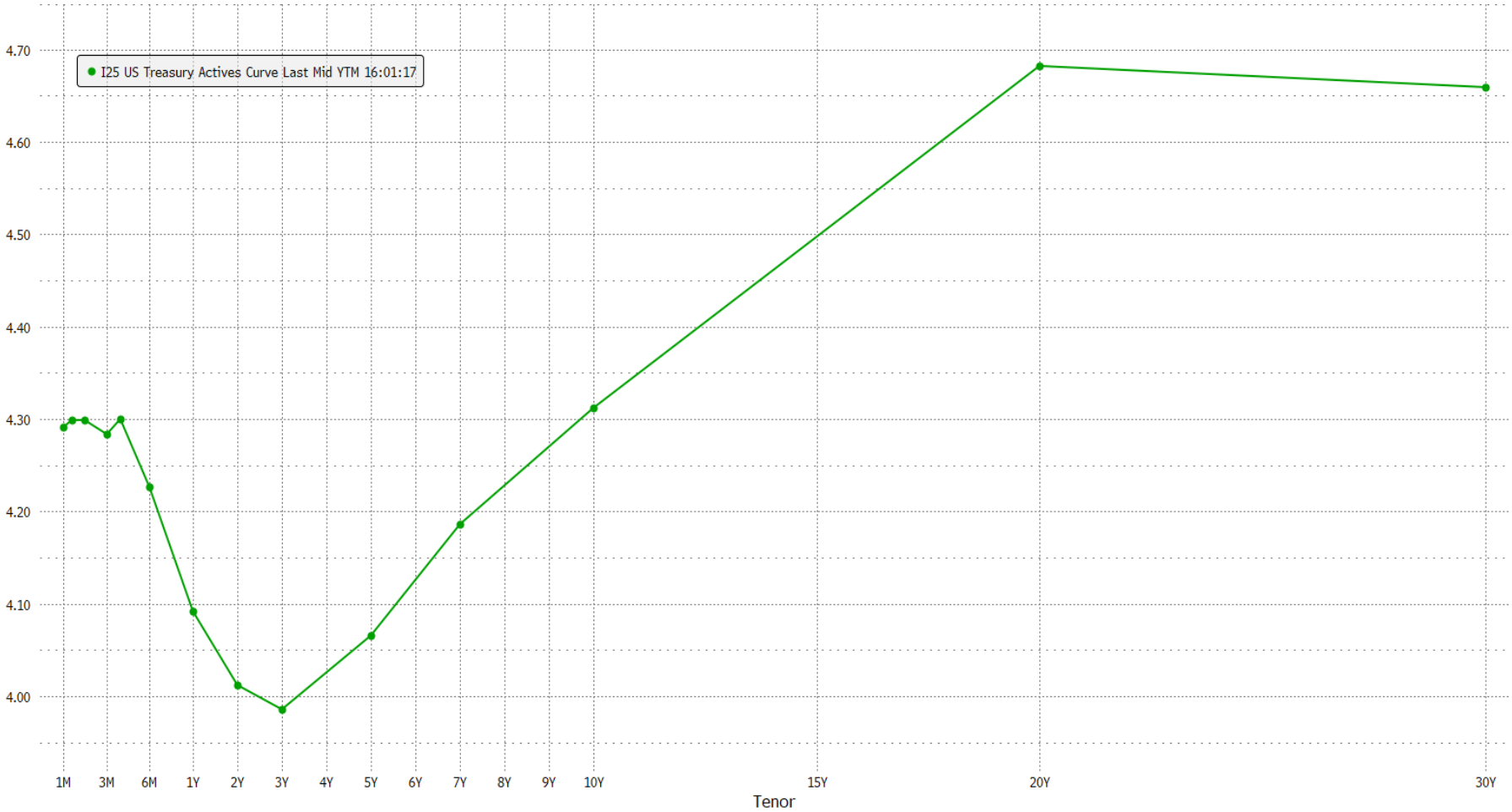
The Fixed Income Program serves as a diversifying asset class, historically providing a hedge against a deflationary economic environment while providing steady income.

Interest Rates



Source: Bloomberg
As of 3/25/2025

Yield Curve



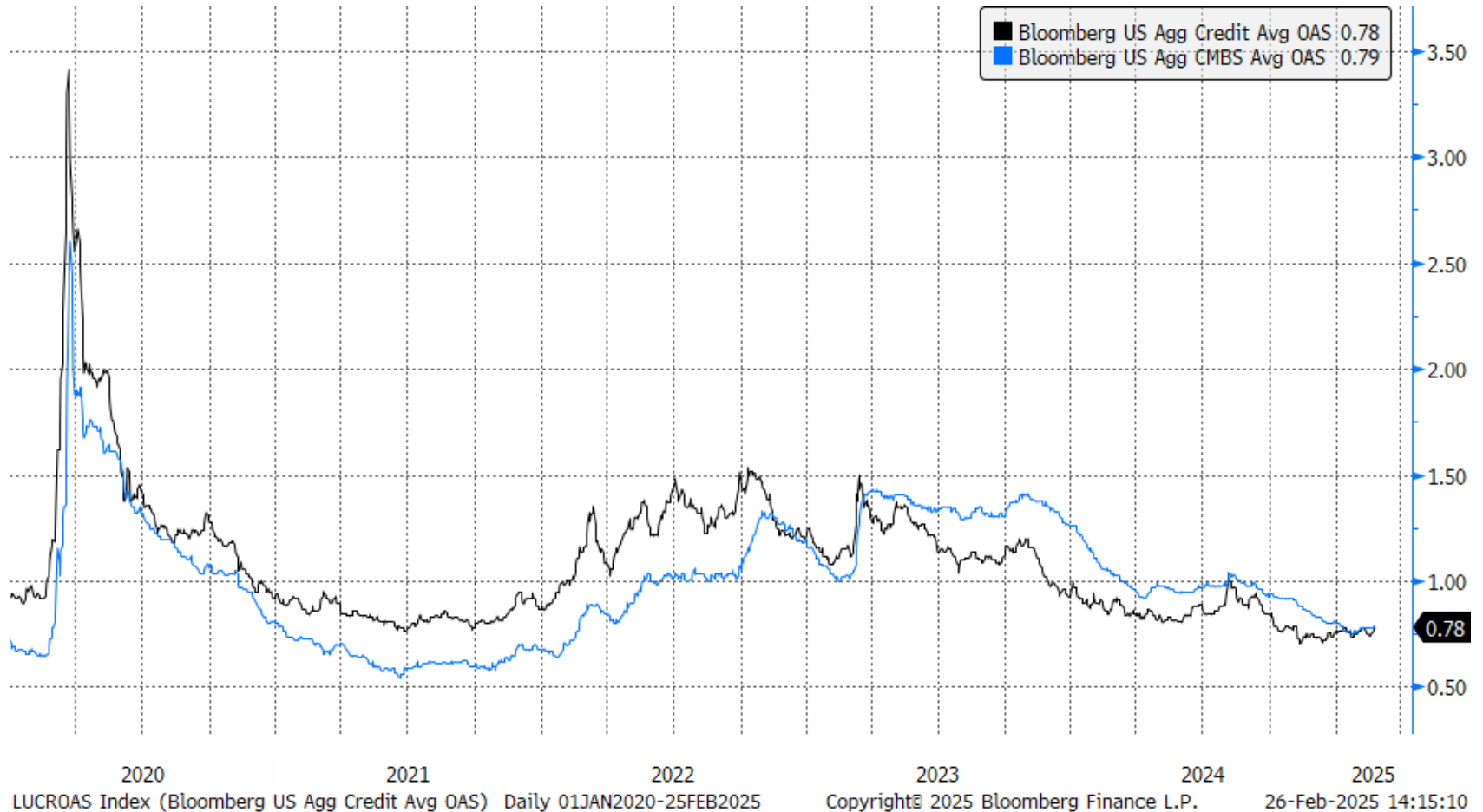
Copyright© 2025 Bloomberg Finance L.P.

25-Mar-2025 16:01:17

Source: Bloomberg
As of 3/25/2025



Credit Spreads

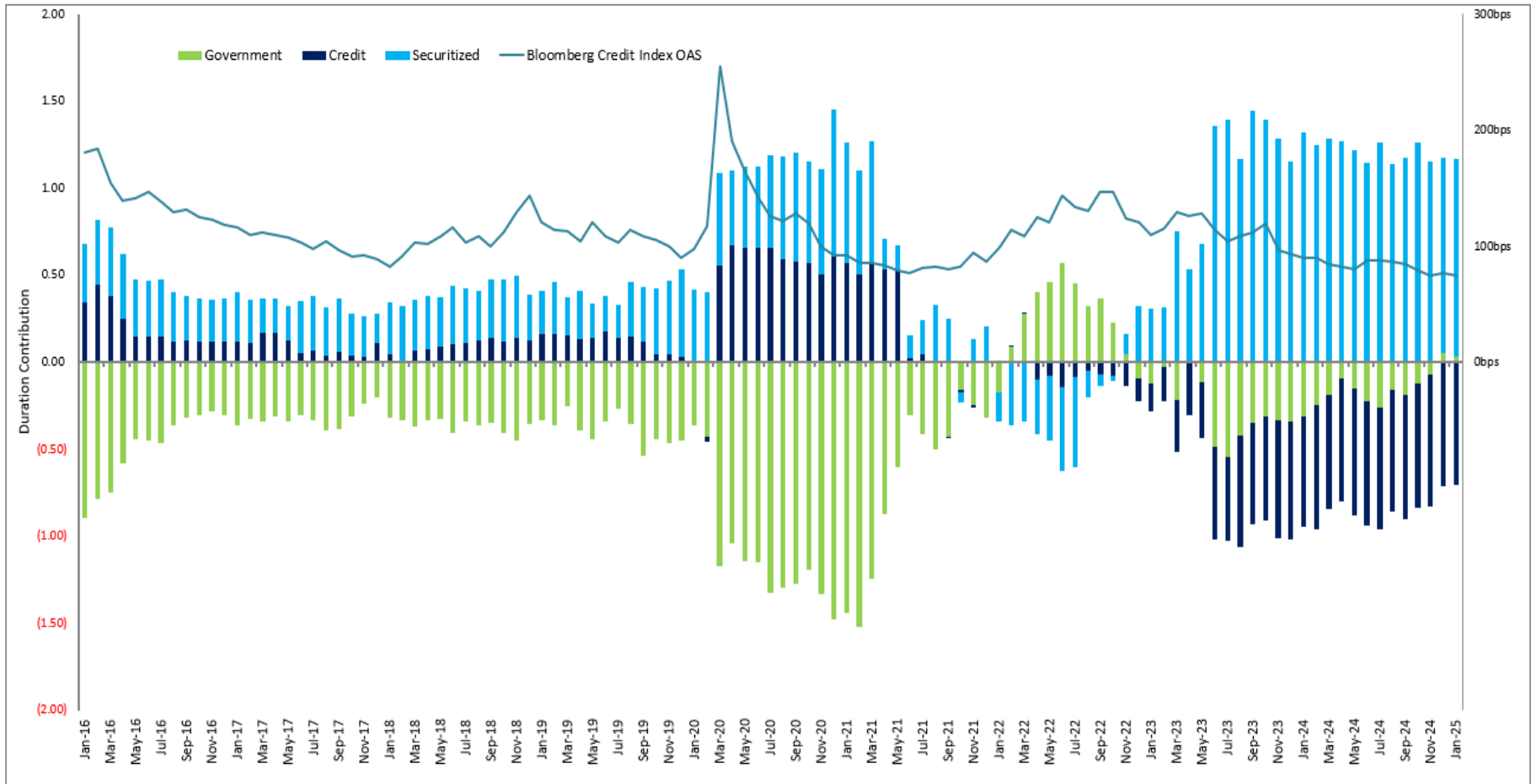


Source: Bloomberg
As of 2/25/2025

Mortgage Spreads

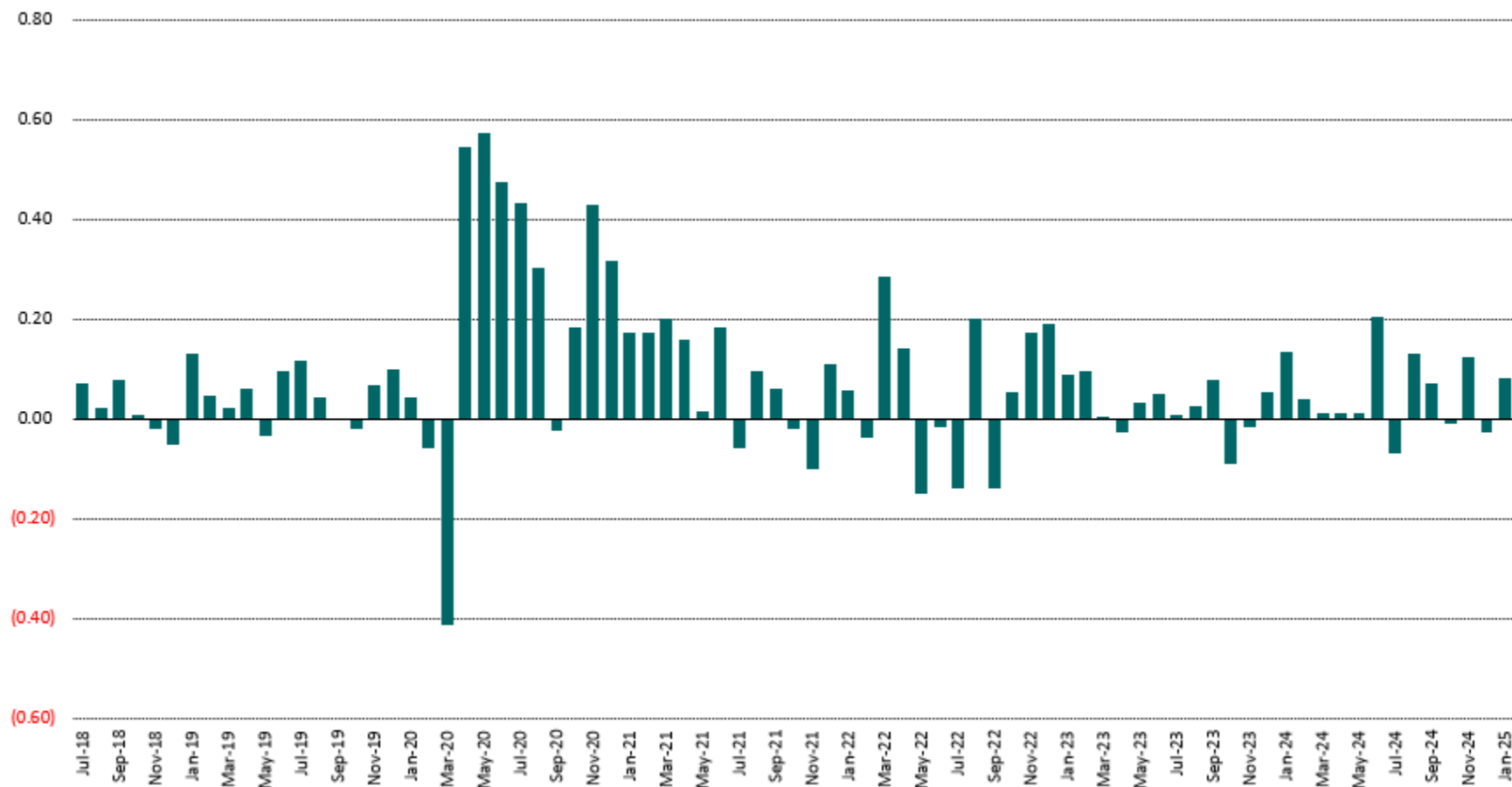


History of Core Sector Tilts



Source: Aladdin, Bloomberg
As of 1/31/2025

Program Monthly Excess Returns

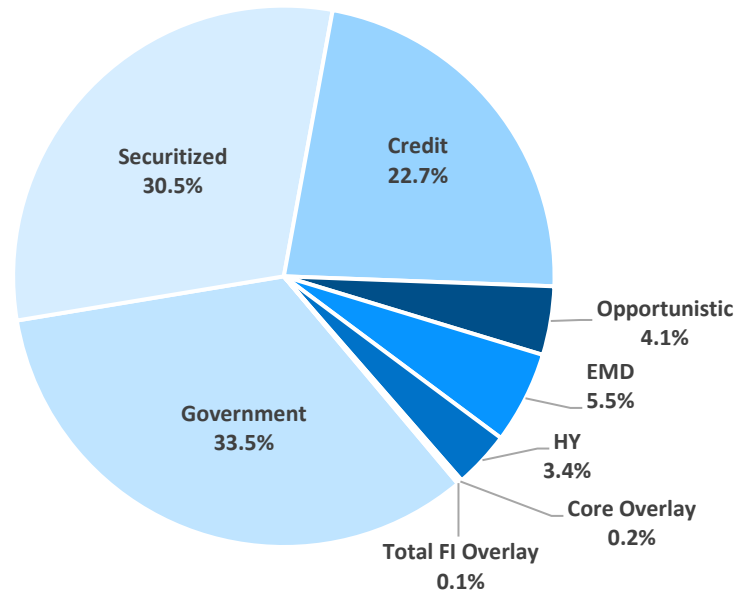


Source: BNY Mellon, VRS
As of 1/31/2025

Portfolio Positioning Over Time

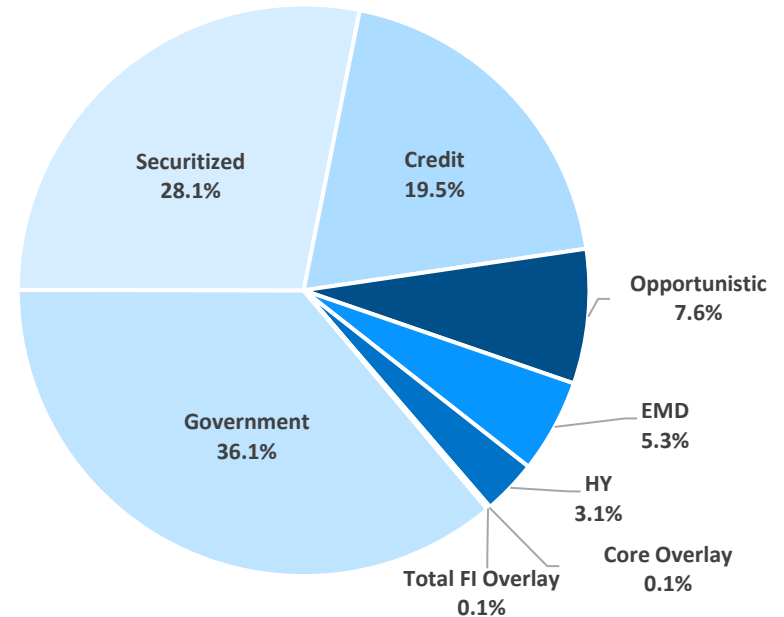
12/31/2023

\$15.0 Billion



01/31/2025

\$18.0 Billion



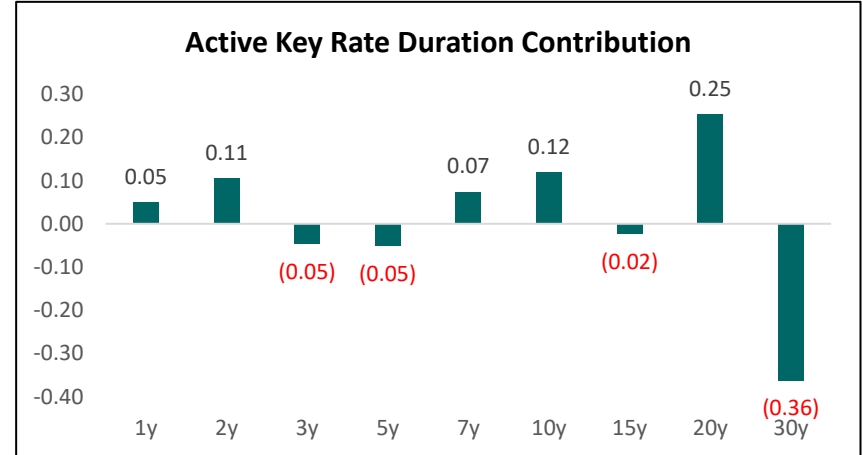
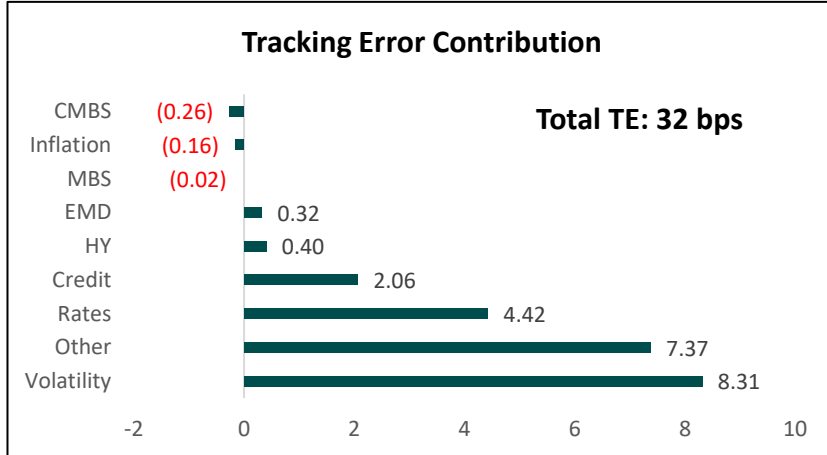
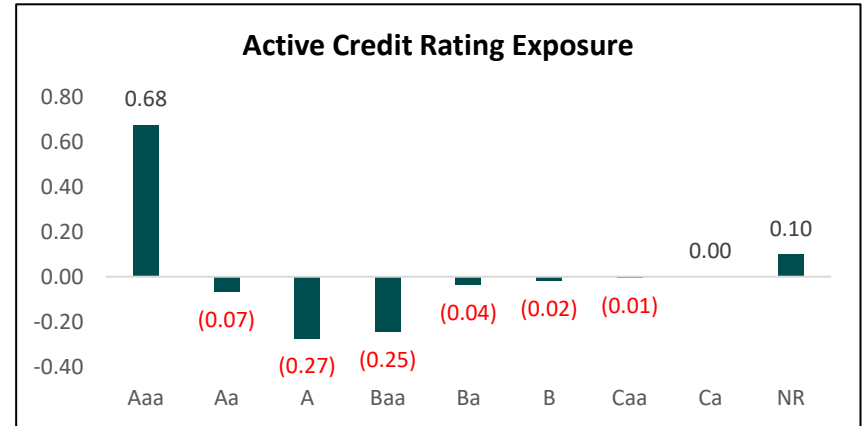
Portfolio	Dec-23	Jan-25	Difference	Portfolio	Dec-23	Jan-25	Difference
Securitized	30.5%	28.1%	(2.4%)	Emerging Market Debt	5.5%	5.3%	(0.2%)
Government	33.5%	36.1%	2.6%	High Yield	3.4%	3.1%	(0.3%)
Credit	22.7%	19.5%	(3.2%)	Opportunistic	4.1%	7.6%	3.5%
Core Overlay	0.2%	0.1%	(0.1%)	Total FI Overlay	0.1%	0.1%	0.0%

Source: BNY Mellon
As of 1/31/2025

Portfolio Characteristics

Total Fixed Income Program Market Value: \$18.0 Billion

Portfolio Characteristics			
	Port	Bench	Diff
Effective Duration	5.91	5.79	0.12
Yield to Maturity	5.26	5.06	0.21
Option Adj. Spread	49	51	-2



Source: Aladdin
As of 1/31/2025

Core Portfolio Attribution Factors for CY 2024

Macro Level

- After holding rates steady for 12 months, the Fed cut 50 bps in September amid concern about labor market softening
- Two additional cuts of 25 bps followed before a pause in January 2025 at 4.25-4.50% as inflation data trended higher and fears of labor weakness abated
- The market is currently pricing in another 50 bps reduction before year end

Program Level

- Fixed Income represents 15.3% of the total fund versus a policy weight of 16%
- Fixed income portfolios are opportunistically reallocated to maintain our defensive positioning
- Team worked vigilantly to use active portfolio positioning to take advantage of opportunities and dislocations within sectors
- Security selection added meaningfully to the Program's excess return for CY24

FI Program Risk / Return Characteristics

Program Excess Return and Statistics				
	10 Year	5 Year	3 Year	1 Year
Core IFI Program	0.79	1.08	0.57	0.62
Tracking Error	0.43	0.54	0.30	0.31
Information Ratio	1.86	2.00	1.87	2.02
Total FI Program	0.81	1.07	0.52	0.58
Tracking Error	0.47	0.60	0.35	0.27
Information Ratio	1.74	1.78	1.48	2.17

10 Year Batting Average

Monthly Excess Returns		
Core IFI Program	88/120	73%

Source: BNY Mellon, Aladdin, VRS
As of 1/31/2025

Core Portfolio Risk / Return Characteristics

Portfolio Excess Return and Statistics				
	10 Year	5 Year	3 Year	1 Year
Government	0.30	0.32	0.25	0.28
Tracking Error	0.16	0.21	0.09	0.10
Information Ratio	1.87	1.56	2.66	2.82
Securitized	0.93	1.57	1.52	1.10
Tracking Error	0.73	0.99	1.10	0.73
Information Ratio	1.27	1.59	1.38	1.51
Credit	0.65	0.54	0.21	0.18
Tracking Error	0.30	0.31	0.27	0.14
Information Ratio	2.20	1.73	0.76	1.28
Opportunistic	–	1.88	1.77	1.92
Tracking Error	–	1.87	2.30	0.76
Information Ratio	–	1.01	0.77	2.54

Source: BNY Mellon, Aladdin, VRS
As of 1/31/2025

EM / HY Portfolio Risk / Return Characteristics

Portfolio Excess Return and Statistics			
	5 Year	3 Year	1 Year
Internal EMD	0.78	1.01	0.53
Tracking Error	0.96	1.13	0.88
Information Ratio	0.81	0.89	0.60
Payden & Rygel EMD	1.13	1.36	2.02
PIMCO EMD	1.11	1.44	1.40
Internal High Yield	0.49	1.26	1.01
Tracking Error	1.27	1.34	0.84
Information Ratio	0.38	0.94	1.20
Man Numeric High Yield*	0.92*	0.74	1.21

*Inception date: for Man Numeric HY is 07/2020, 5-Year numbers not yet available, instead using since inception data.

Source: BNY Mellon, Aladdin, VRS
As of 1/31/2025

Where Are We Focusing?

Continue To Implement Long Term Vision For The Program

Actively Find Ways To Collaborate Across Teams to Add Value to VRS

On The Radar

- Enhancements to portfolio processes and portfolio management tools
- Emphasize cross training throughout the program
- Cross-asset class working groups to enhance expertise
- Expand into more value-adding ideas in the Opportunistic Portfolio

Collaboration Across the Fund

Portfolios

- Treasury: Fixed Income Leverage, Securities Lending, Cash Release & Cash Management
- IEM: Systematic High Yield & Total Fund Rebalance Portfolio
- Diversifying Strategies: Long Duration Portfolio
- Operations: Collateral Management Portfolio

People

- Intentional touch points across programs
- External manager partnership sessions
- Factor based investing and quantitative tool exploration
- Individual team member collaboration

Foreign Adversaries Update

Andrew Junkin

Chief Investment Officer



Helping members
plan for tomorrow,
today

