



Investment Advisory Committee (IAC) Meeting

Wednesday, 8/14/2024

9:00 AM - 12:30 PM ET

1. Approval of Minutes (April 10, 2024)

IAC Meeting Minutes 04102024 - Final - Page 2

2. Investment Advisory Committee Charter Review

Investment Advisory Committee Charter Revision 2024 - Page 6

Investment Advisory Committee Charter Revised clean version 2024 - Page 10

3. CIO Report

CIO Report - August 2024 - Page 14

CIO Quarterly Report - QE June 2024 - Page 23

Daily Asset Allocation Report 08-08-2024 - Page 32

New Investments and Terminations 08-14-2024 - Page 33

4. Portfolio Solutions Group Review

1. Portfolio Solutions Group Overview August 2024B - Page 35

2. CMAs IAC - August 2024 Draft 240809 1200pB - Page 39

3. 2024.07 -- Risk Management IAC Deck -- v3.0 (1)B - Page 54

4. Port Integration Treasury IAC Aug 2024B - Page 64

5. 2024.08 -- Case Study - Market Drawdown Battle Planning -- v1.0B - Page 78

6. Div Strat IAC 20240808 FINALB - Page 92

7. EMP IAC slides 20240814 _6.30.24 perfB - Page 100

Minutes

A meeting of the Investment Advisory Committee of the Virginia Retirement System was held on April 10, 2024 with the following members present:

Larry Kochard
Michael Beasley
Theodore Economou, joined remotely under § 2.2-3708.3(B)(3)
Palmer Garson
Tom Gayner
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
Matthew James

The following staff members were in attendance:

Trish Bishop, Andrew Junkin, Jennifer Schreck, Stephen Adelaar, John Alouf, Advait Apte, Rory Badura, Daniel Ball, Parham Behrooz, Brock Bell, Matt Bennett, Kevin Bliss, Jeanne Chenault, Tom Coleman, Sara Denson, Laurie Fennell, Laura Fields, Josh Fox, Holly Glass, Katherine Grawe, JT Grier, Mehtab Haleem, Dane Honrado, K.C. Howell, Sandy Jack, Ross Kasarda, Jeannie Kim, Kristina Koutrakos, Matt Lacy, Chung Ma, Jennifer MacKnight, Curt Mattson, Kidus Molla, Teresa Nguyen, Walker Noland, Greg Oliff, Vera Pleasants, Daniel Schlussler, Jenny Schoeller, Kristy Scott, Michael Scott, Daniel Whitlock, Scott Weaver, and Steve Woodall.

Also in attendance was John Kevin Balaod of With Intelligence; Jamie Bitz with the Virginia Joint Legislative Audit and Review Commission; Doston Bradley of Cerberus Capital; Thomas Cosmer with Pinebridge; Blake Curtis and Jason Samansky with RVK; Alec Ostrowidzki, affiliation unknown; Katherine Smith, affiliation unknown; Junming Wang, affiliation unknown; and Spencer Witherspoon of Shenkman Capital.

Mr. Kochard called the meeting to order at 9:00 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, entered the meeting at 9:42 a.m.
Ms. Leake – present
Mr. Lewis – present
Mr. Smyth – present
Mr. West – present
Mr. Kochard – present

Minutes

A motion was made by Mr. Beasley and seconded by Mr. Lewis to approve both sets of minutes for the August 23, 2023 and November 15, 2023 Committee meeting. The August minutes were not approved at the November meeting as there was no physical quorum of the Investment Advisory Committee members. The motion was unanimously approved via roll call:

Mr. Beasley – aye
Mr. Economou – aye
Ms. Garson – aye
Mr. Gayner – not present (entered at 9:42 a.m.)
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 economic growth, consumer activity, inflation and employment, household debt, Federal Reserve rate decisions, and the higher real cost of money. Mr. Junkin then presented the Asset Allocation Report, Performance Summary, and Total Fund Tracking Error Report as of December 31, 2023. Last, Mr. Junkin reviewed the New Investments and Terminations Report.

**Leverage
Implementation Update**

Mr. Ma provided an update on the Leverage Implementation. Mr. Ma stated that leverage was launched in January 2024, and discussed the roadmap since launch as well as the continued direction of the glide path

in which the goal of leverage is for a more resilient and diversified portfolio. Mr. Ma also discussed fund position and the progress thus far since leverage implementation.

**Public Market Assets
Program Reviews**

Mr. Grier provided a general overview of Public Market Assets and introduced each program to be covered in the review.

Mr. Schlussler and Mr. Whitlock provided a review of the Public Equity program. Review topics included an overview of program objectives, the team, markets, exposures, results, mandates, and forward-looking plans and priorities.

Mr. Oliff and Mr. Behrooz provided a review of the Fixed Income program. Review topics included an overview of program objectives, the team, markets, exposures, results, forward-looking plans and priorities, and collaboration.

The Committee members engaged in general discussion throughout the reviews provided.

**Benchmark &
Performance Hurdle
Analysis**

RVK was engaged to review Virginia Retirement System's investment policy statement, historical performance, current and historical benchmark and policy definitions, and current and historical incentive compensation hurdles. Blake Curtis and Jason Samansky with RVK presented the methodology used and the results of the study to the Committee. RVK noted that no changes are recommended as a result of the study.

The Committee members engaged in general discussion throughout the presentation. Mr. Kochard thanked Mr. Curtis and Mr. Samansky for their review.

Mr. Beasley made a motion to adjourn the meeting. Ms. Leake 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
Mr. Gayner – aye
Ms. Leake – aye
Mr. Lewis – aye
Mr. Smyth – aye
Mr. West – aye

Mr. Kochard – aye

Adjournment

The meeting was adjourned at 11:16 a.m.

Larry Kochard, Chairperson

**COMMITTEE CHARTER FOR THE
INVESTMENT ADVISORY COMMITTEE (IAC)**

PURPOSE

The purpose of the Investment Advisory Committee (IAC) is to provide the Board with sophisticated, objective, and prudent investment advice.

Commented [SJ1]: Removed because duplicative of the Composition section below.

The IAC shall, except for the defined contribution plans investments:

- a) Review, evaluate, and monitor investments and investment opportunities;
- b) Make appropriate recommendations to the Board about such investments and investment opportunities; and
- c) Make recommendations to the Board about overall asset allocation.

AUTHORITY

Section 51.1-124.26 of the *Code of Virginia* requires the Board of Trustees to establish and maintain the IAC.

Commented [SJ2]: Moved to Composition section.

DUTIES AND RESPONSIBILITIES

The IAC is an advisory committee with the purpose of assisting the Board in fulfilling its fiduciary duty as trustee of the funds of the Retirement System. The Board has established the following duties and responsibilities for the IAC on an as needed basis unless otherwise specified in consideration of the Board's need for certain types of information and advice:

Commented [SJ3]: Added language to reflect the statutory language authorizing the committee.

Commented [SJ4]: Conformed the introductory language across all committee charters to clarify that all duties and responsibilities are performed on an as needed unless a frequency is otherwise specified.

Commented [SJ5]: Removed as duplicative of the Purpose section.

- 1. IAC advice should always be prudent within the context of managing a public pension plan.
- 2. The IAC's recommendations are not binding on the Board, and the IAC has no authority over staff or administrative and investment decisions.
- 3. Periodically, the IAC will review staff's long-term forward return assumptions. Upon the commencement of a Board study on long-term asset allocation and risk tolerance (typically every three years), the IAC will provide the Board with strategic asset allocation advice.
- 4. The IAC will review staff's scenario analysis exercise in which the fund's intermediate-term performance is evaluated based on changes in cyclical variables

such as interest rates and economic growth. This exercise is the source of possible changes in allocation of the portfolio (within Board-allowed constraints).

5. The IAC will periodically review the investment performance results and risk management position of the fund. Primary emphasis should be on longer timeframes, but shorter-term trends should be considered if significant. The IAC is expected to focus on the total fund, program level, and strategy level results, as opposed to individual investment manager results.
6. On an ongoing basis, the IAC will monitor the portfolio for continued suitability with the investment objectives of the fund.
7. On an ongoing basis, the IAC will assist staff in identifying potential investment classes and strategies that might help the fund achieve its objectives.
8. The IAC will address any ad hoc request by the Board for specific information or recommendations regarding existing or potential VRS investments.
9. The IAC, through the IAC chairperson, is authorized to request and consider whatever information it deems relevant in carrying out its duties and responsibilities as outlined in this charter.
10. Perform such other duties when directed to do so by the Board.

COMPOSITION

The IAC is composed of seven to nine members at the discretion of the Board, no more than two of whom may be members of the Board and neither of whom may serve on another VRS advisory committee, in accordance with Va. Code § 51.1-124.26. Except for such Board members, no elected or appointed officials may serve on the IAC. Appointees to the IAC must be approved by a two-thirds vote of the Board. All members of the IAC shall serve at the pleasure of the Board and may be relieved of their positions at any time by a majority vote of the Board. Each non-Board member is appointed to a two-year term and may be reappointed for an unlimited number of additional two-year terms.

Commented [SJ6]: Added statutory language relating to the composition of the committee.

In accordance with Va. Code § 51.1-124.26, members of the IAC shall demonstrate extensive experience in any one or more of the following areas: domestic or international equity or fixed-income securities, cash management, alternative investments, substantial real estate investments, or managed futures.

Commented [SJ7]: Not new language, moved from the Authority section.

OFFICERS

Chairperson

The VRS Board chairperson shall appoint the chairperson of the IAC, subject to a two-thirds vote by the Board. No member of the Board may serve as IAC chairperson.

The IAC chairperson is appointed for a two-year term and may be reappointed for unlimited additional two-year terms.

The IAC chairperson has the following duties:

1. Facilitating the operation of the IAC meetings;
2. Reviewing proposed agendas for IAC meetings;
3. Presiding over meetings of the IAC;
4. Reporting to the Board on the matters considered by the IAC and the recommendations of the IAC; and
5. Performing such additional duties as are required to facilitate the IAC's fulfillment of its responsibilities.

Vice-Chairperson

The IAC shall elect its vice-chairperson at the first meeting following the appointment or reappointment of the IAC chairperson, or at the first meeting following such time as a sitting vice-chairperson becomes unable or unwilling to complete their term. No member of the Board may serve as IAC vice-chairperson.

The term of the vice-chairperson shall commence upon election and shall terminate at the first meeting of the IAC following the appointment or reappointment of an IAC chairperson.

In the event of the absence or incapacity of the IAC chairperson, the vice-chairperson shall preside at meetings of the IAC and shall fulfill such other duties and responsibilities of the chairperson as may be necessary.

Secretary

The Chief Investment Officer (CIO), or the CIO's designee, shall act as secretary to the IAC. ||

The secretary has the following duties:

1. Help the chairperson develop the agenda for IAC meetings;
2. Notify IAC members of meetings;
3. Coordinate and distribute information to IAC members;
4. Act as liaison between the IAC and VRS staff;
5. Coordinate matters on the agenda and presentation for the IAC; and
6. Maintain the minutes and records of all IAC meetings.

Commented [SJ8]: Removed language that the Committee may appoint a secretary other than the Director or the Director's designee. Do not believe this would ever occur. Change consistently made across all committee charters.

CONDUCT OF BUSINESS

1. The rules contained in the current edition of *Robert's Rules of Order Newly Revised* shall govern all IAC meetings insofar as they are applicable and not inconsistent with any of the policies adopted by the Board, including this charter, with particular attention to the rules provided for conduct of business in committees. Special note is to be made of the rules provided for procedure in small boards which are deemed to be appropriate for use in all meetings contemplated in this charter.
2. Unless otherwise specified by the Board, voting by proxy is not allowed.
3. A majority of the members of the IAC shall constitute a quorum at IAC meetings.
4. Except as otherwise specified herein, approval of an action or decision shall be by a majority of those IAC members present and voting at an IAC meeting.
5. The IAC chairperson will seek at all times to develop a consensus of opinion among IAC members in order to be able to present clear and concise recommendations to the Board. In the event that a consensus is not obtainable, the IAC chairperson will present the range of opinions and their rationale to the Board.
6. The IAC chairperson, vice-chairperson or, in their absence, a staff designee, will report to the Board on the content and results of each IAC meeting. The chairperson or vice-chairperson will sign all meeting minutes, as applicable.
7. The IAC will meet jointly with the Board at the Annual Board Retreat. In addition, the IAC will meet at least twice per year, and more often if necessary to meet the objectives listed in this charter.

Commented [SJ9]: Added procedural language relating to small boards. Language was previously in the Board Governance Policy, and is being added to all committee charters.

Commented [SJ10]: Removed language indicating that an abstention vote be considered an absence for purposes of establishing a quorum. This is atypical for board procedures. Usually an abstention does not impact a quorum. Consistent change across all committees.

Commented [SJ11]: Added language to clarify the vice-chair or a staff designee can give the committee report to the Board if the chairperson is unavailable.

CHANGES IN CHARTER

The Board may consider changes to this charter at any of its meetings, and a two-thirds vote of the Board is necessary to implement the changes. The IAC may from time to time consider changes in the charter that are expected to enable the IAC to better serve the needs of the Board. Any charter changes suggested to the Board by the IAC must be approved by a majority vote of the IAC before submission to the Board, where a two-thirds vote of the Board is necessary to implement the changes.

COMMITTEE CHARTER FOR THE INVESTMENT ADVISORY COMMITTEE (IAC)

PURPOSE

The purpose of the Investment Advisory Committee (IAC) is to provide the Board with sophisticated, objective, and prudent investment advice.

The IAC shall, except for the defined contribution plans investments:

- a) Review, evaluate, and monitor investments and investment opportunities;
- b) Make appropriate recommendations to the Board about such investments and investment opportunities; and
- c) Make recommendations to the Board about overall asset allocation.

AUTHORITY

Section 51.1-124.26 of the *Code of Virginia* requires the Board of Trustees to establish and maintain the IAC.

DUTIES AND RESPONSIBILITIES

The IAC is an advisory committee with the purpose of assisting the Board in fulfilling its fiduciary duty as trustee of the funds of the Retirement System. The Board has established the following duties and responsibilities for the IAC on an as needed basis unless otherwise specified in consideration of the Board's need for certain types of information and advice:

1. IAC advice should always be prudent within the context of managing a public pension plan.
2. The IAC's recommendations are not binding on the Board, and the IAC has no authority over staff or administrative and investment decisions.
3. Periodically, the IAC will review staff's long-term forward return assumptions. Upon the commencement of a Board study on long-term asset allocation and risk tolerance (typically every three years), the IAC will provide the Board with strategic asset allocation advice.
4. The IAC will review staff's scenario analysis exercise in which the fund's intermediate-term performance is evaluated based on changes in cyclical variables

- such as interest rates and economic growth. This exercise is the source of possible changes in allocation of the portfolio (within Board-allowed constraints).
5. The IAC will periodically review the investment performance results and risk management position of the fund. Primary emphasis should be on longer timeframes, but shorter-term trends should be considered if significant. The IAC is expected to focus on the total fund, program level, and strategy level results, as opposed to individual investment manager results.
 6. On an ongoing basis, the IAC will monitor the portfolio for continued suitability with the investment objectives of the fund.
 7. On an ongoing basis, the IAC will assist staff in identifying potential investment classes and strategies that might help the fund achieve its objectives.
 8. The IAC will address any ad hoc request by the Board for specific information or recommendations regarding existing or potential VRS investments.
 9. The IAC, through the IAC chairperson, is authorized to request and consider whatever information it deems relevant in carrying out its duties and responsibilities as outlined in this charter.
 10. Perform such other duties when directed to do so by the Board.

COMPOSITION

The IAC is composed of seven to nine members at the discretion of the Board, no more than two of whom may be members of the Board and neither of whom may serve on another VRS advisory committee, in accordance with Va. Code § 51.1-124.26. Except for such Board members, no elected or appointed officials may serve on the IAC. Appointees to the IAC must be approved by a two-thirds vote of the Board. All members of the IAC shall serve at the pleasure of the Board and may be relieved of their positions at any time by a majority vote of the Board. Each non-Board member is appointed to a two-year term and may be reappointed for an unlimited number of additional two-year terms.

In accordance with Va. Code § 51.1-124.26, members of the IAC shall demonstrate extensive experience in any one or more of the following areas: domestic or international equity or fixed-income securities, cash management, alternative investments, substantial real estate investments, or managed futures.

OFFICERS

Chairperson

The VRS Board chairperson shall appoint the chairperson of the IAC, subject to a two-thirds vote by the Board. No member of the Board may serve as IAC chairperson.

The IAC chairperson is appointed for a two-year term and may be reappointed for unlimited additional two-year terms.

The IAC chairperson has the following duties:

1. Facilitating the operation of the IAC meetings;
2. Reviewing proposed agendas for IAC meetings;
3. Presiding over meetings of the IAC;
4. Reporting to the Board on the matters considered by the IAC and the recommendations of the IAC; and
5. Performing such additional duties as are required to facilitate the IAC's fulfillment of its responsibilities.

Vice-Chairperson

The IAC shall elect its vice-chairperson at the first meeting following the appointment or reappointment of the IAC chairperson, or at the first meeting following such time as a sitting vice-chairperson becomes unable or unwilling to complete their term. No member of the Board may serve as IAC vice-chairperson.

The term of the vice-chairperson shall commence upon election and shall terminate at the first meeting of the IAC following the appointment or reappointment of an IAC chairperson.

In the event of the absence or incapacity of the IAC chairperson, the vice-chairperson shall preside at meetings of the IAC and shall fulfill such other duties and responsibilities of the chairperson as may be necessary.

Secretary

The Chief Investment Officer (CIO), or the CIO's designee, shall act as secretary to the IAC.

The secretary has the following duties:

1. Help the chairperson develop the agenda for IAC meetings;
2. Notify IAC members of meetings;
3. Coordinate and distribute information to IAC members;
4. Act as liaison between the IAC and VRS staff;
5. Coordinate matters on the agenda and presentation for the IAC; and
6. Maintain the minutes and records of all IAC meetings.

CONDUCT OF BUSINESS

1. The rules contained in the current edition of *Robert's Rules of Order Newly Revised* shall govern all IAC meetings insofar as they are applicable and not inconsistent with any of the policies adopted by the Board, including this charter, with particular attention to the rules provided for conduct of business in committees. Special note is to be made of the rules provided for procedure in small boards which are deemed to be appropriate for use in all meetings contemplated in this charter.
2. Unless otherwise specified by the Board, voting by proxy is not allowed.
3. A majority of the members of the IAC shall constitute a quorum at IAC meetings.
4. Except as otherwise specified herein, approval of an action or decision shall be by a majority of those IAC members present and voting at an IAC meeting.
5. The IAC chairperson will seek at all times to develop a consensus of opinion among IAC members in order to be able to present clear and concise recommendations to the Board. In the event that a consensus is not obtainable, the IAC chairperson will present the range of opinions and their rationale to the Board.
6. The IAC chairperson, vice-chairperson or, in their absence, a staff designee, will report to the Board on the content and results of each IAC meeting. The chairperson or vice-chairperson will sign all meeting minutes, as applicable.
7. The IAC will meet jointly with the Board at the Annual Board Retreat. In addition, the IAC will meet at least twice per year, and more often if necessary to meet the objectives listed in this charter.

CHANGES IN CHARTER

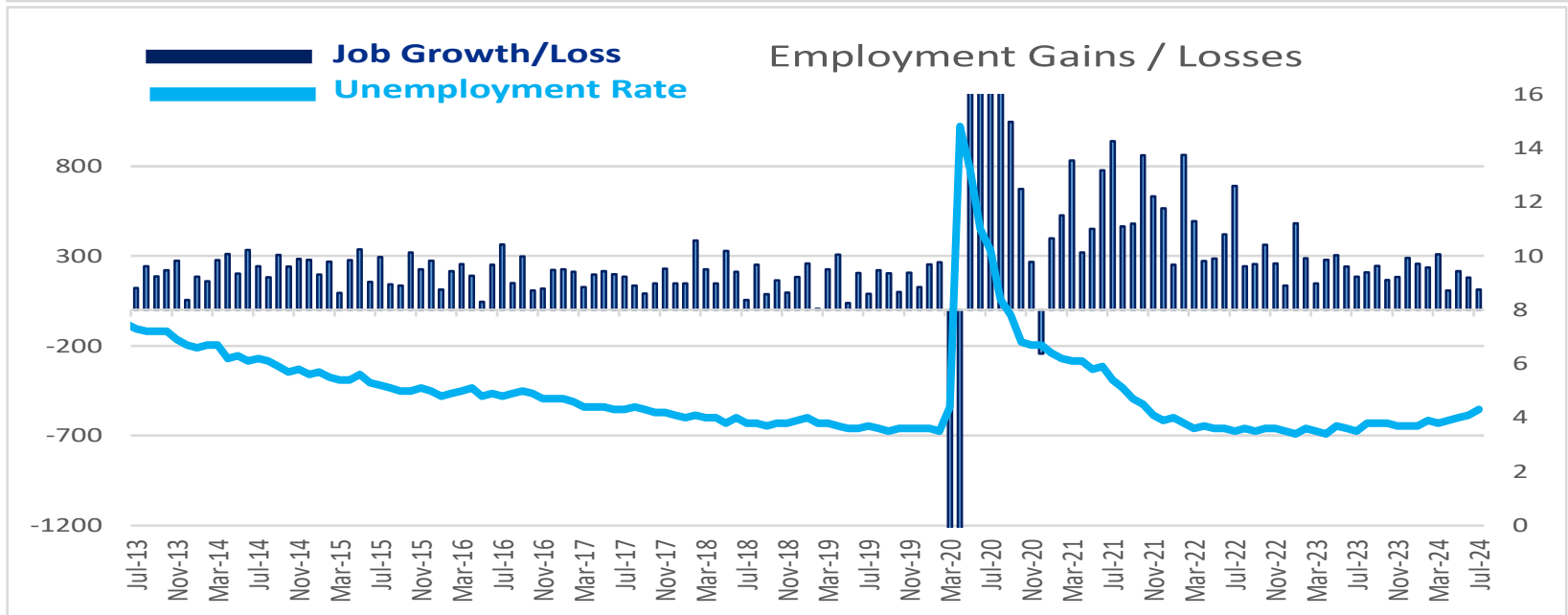
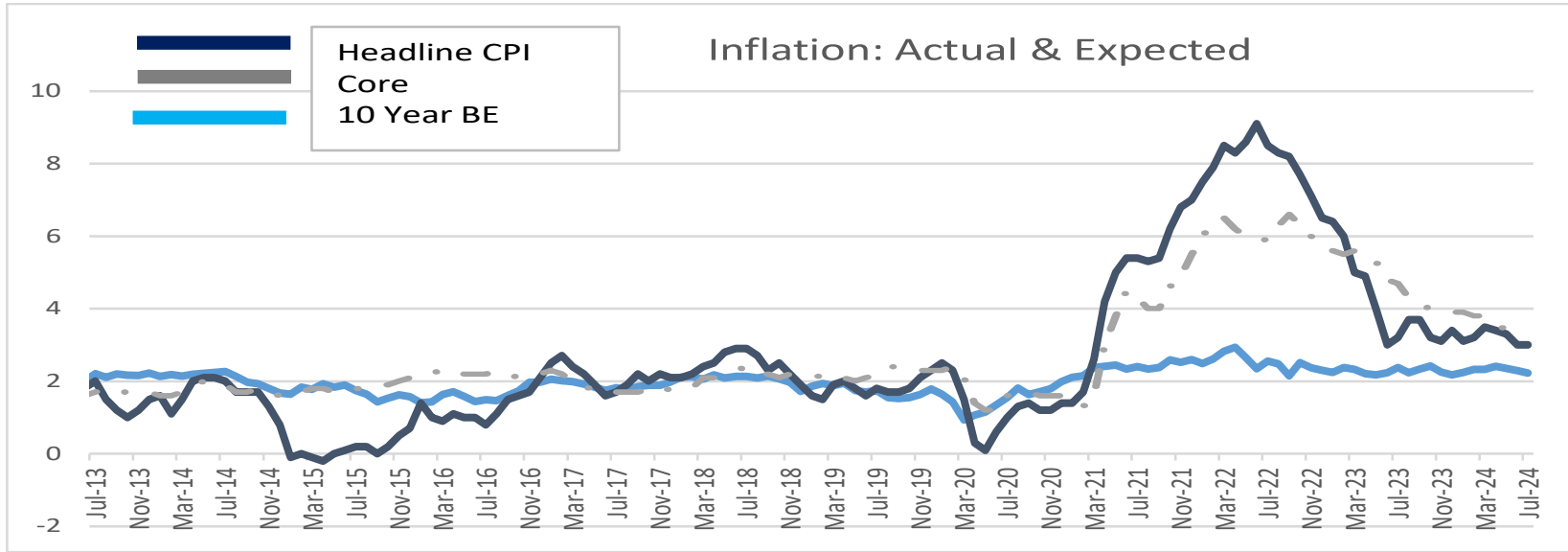
The Board may consider changes to this charter at any of its meetings, and a two-thirds vote of the Board is necessary to implement the changes. The IAC may from time to time consider changes in the charter that are expected to enable the IAC to better serve the needs of the Board. Any charter changes suggested to the Board by the IAC must be approved by a majority vote of the IAC before submission to the Board, where a two-thirds vote of the Board is necessary to implement the changes.

Chief Investment Officer Report

Market Review – August 2024

Andrew Junkin

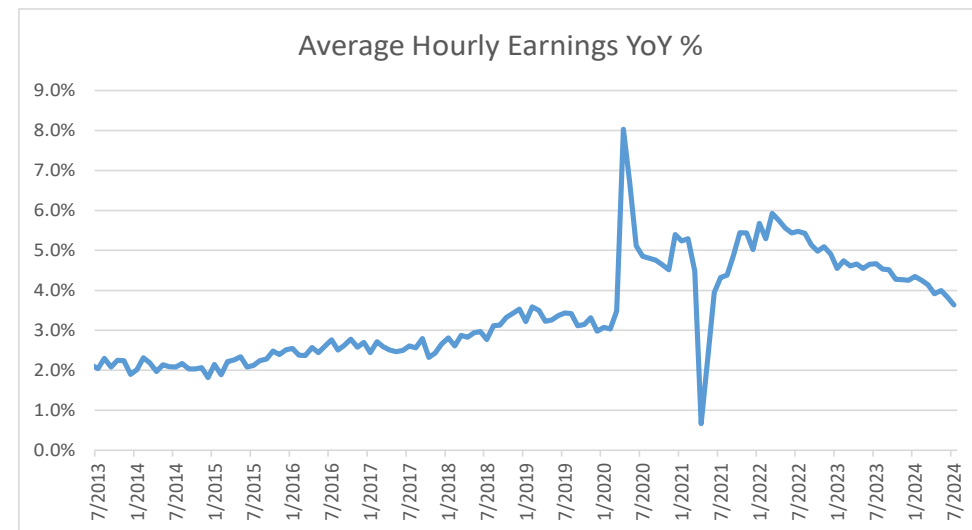
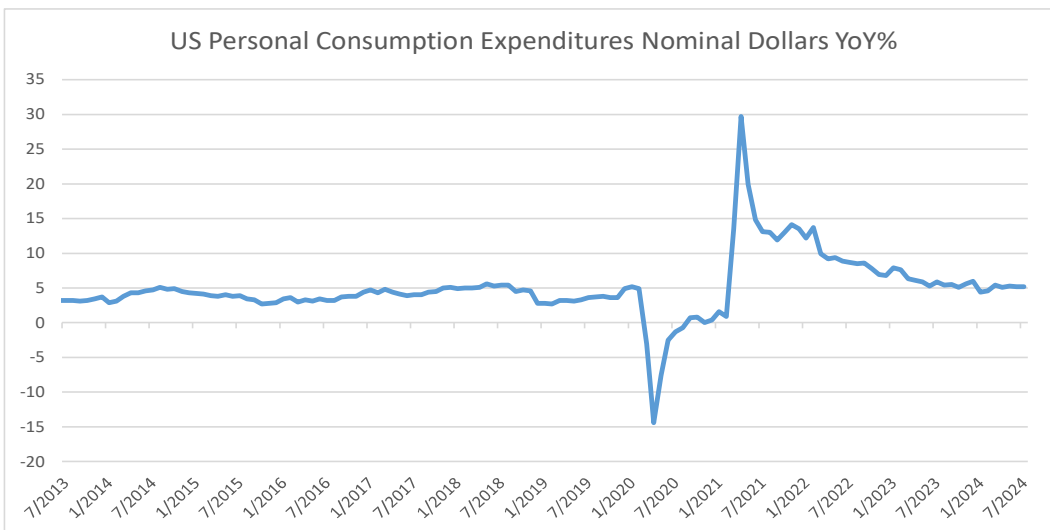
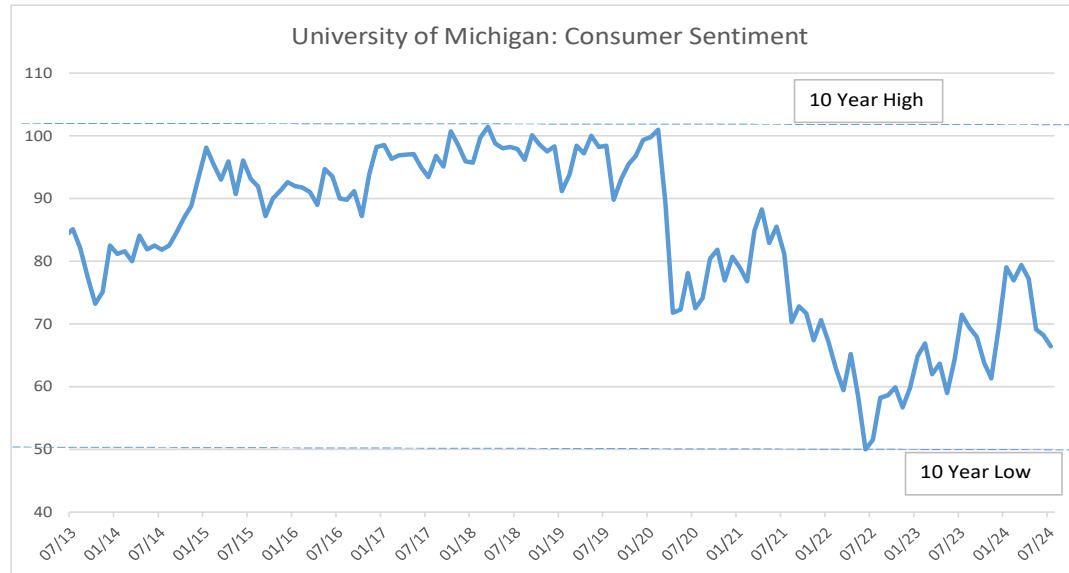
Inflation and Employment



Data Source: Bloomberg

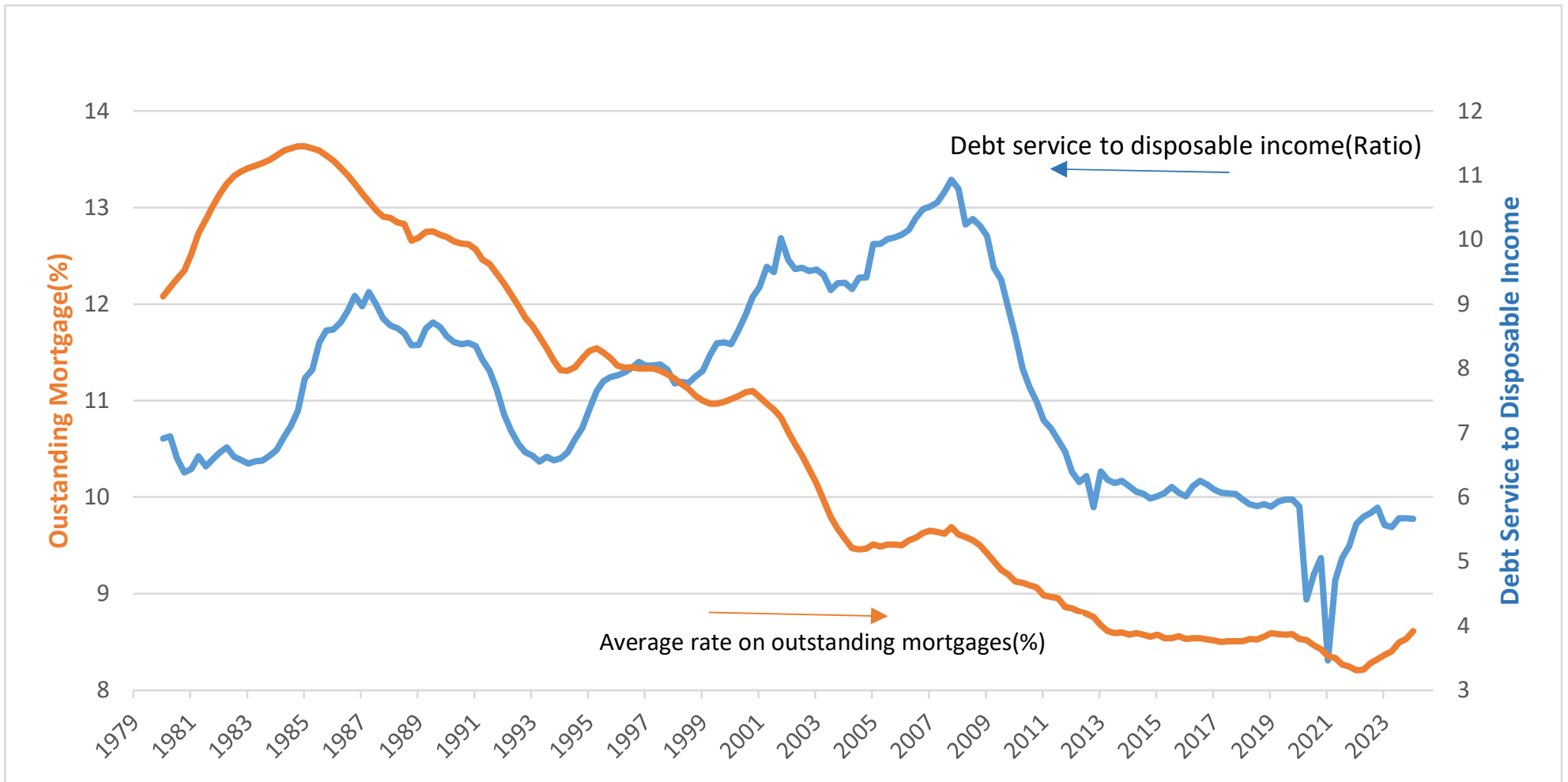


Consumer Activity



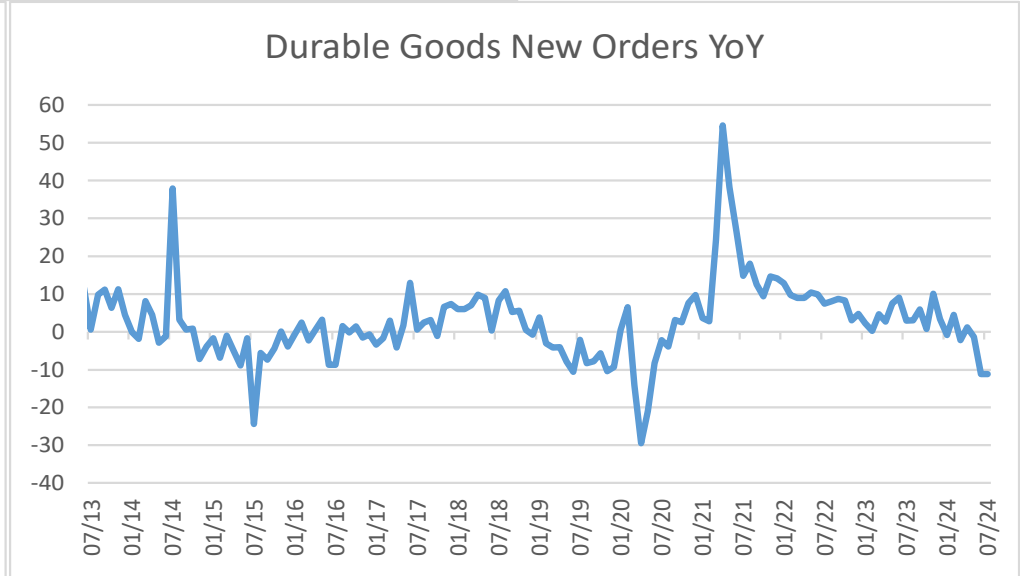
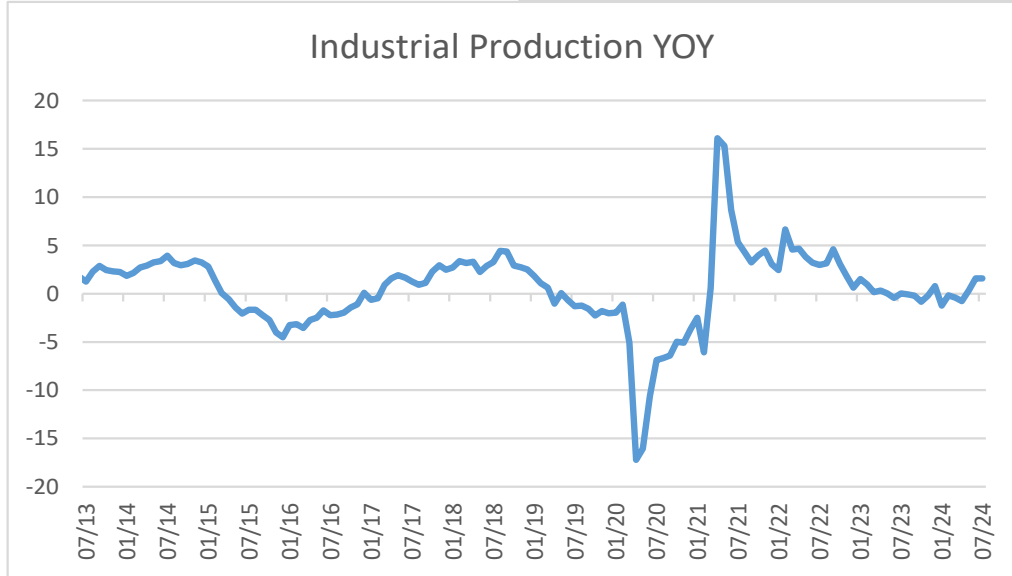
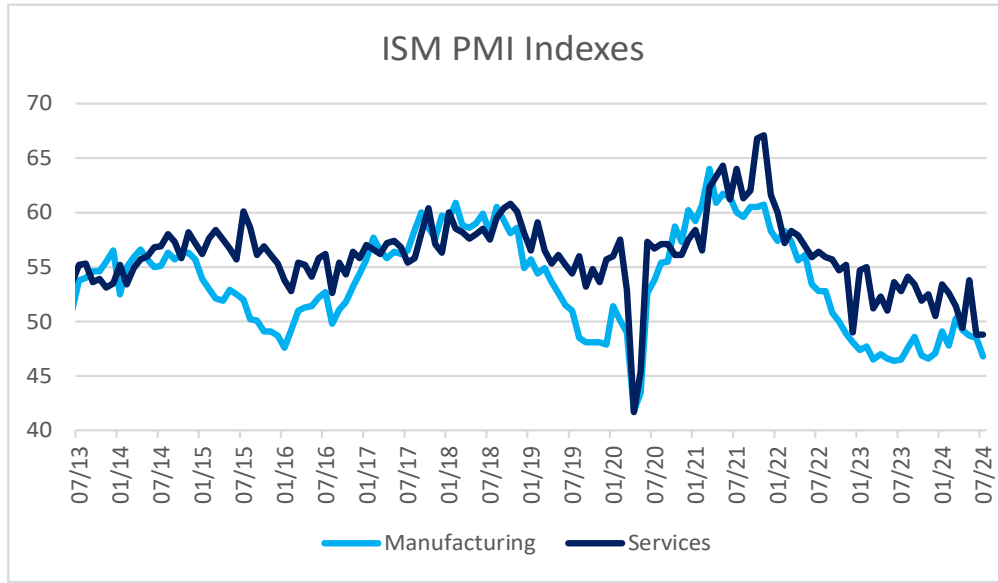
Data Source: Bloomberg

US Household Debt



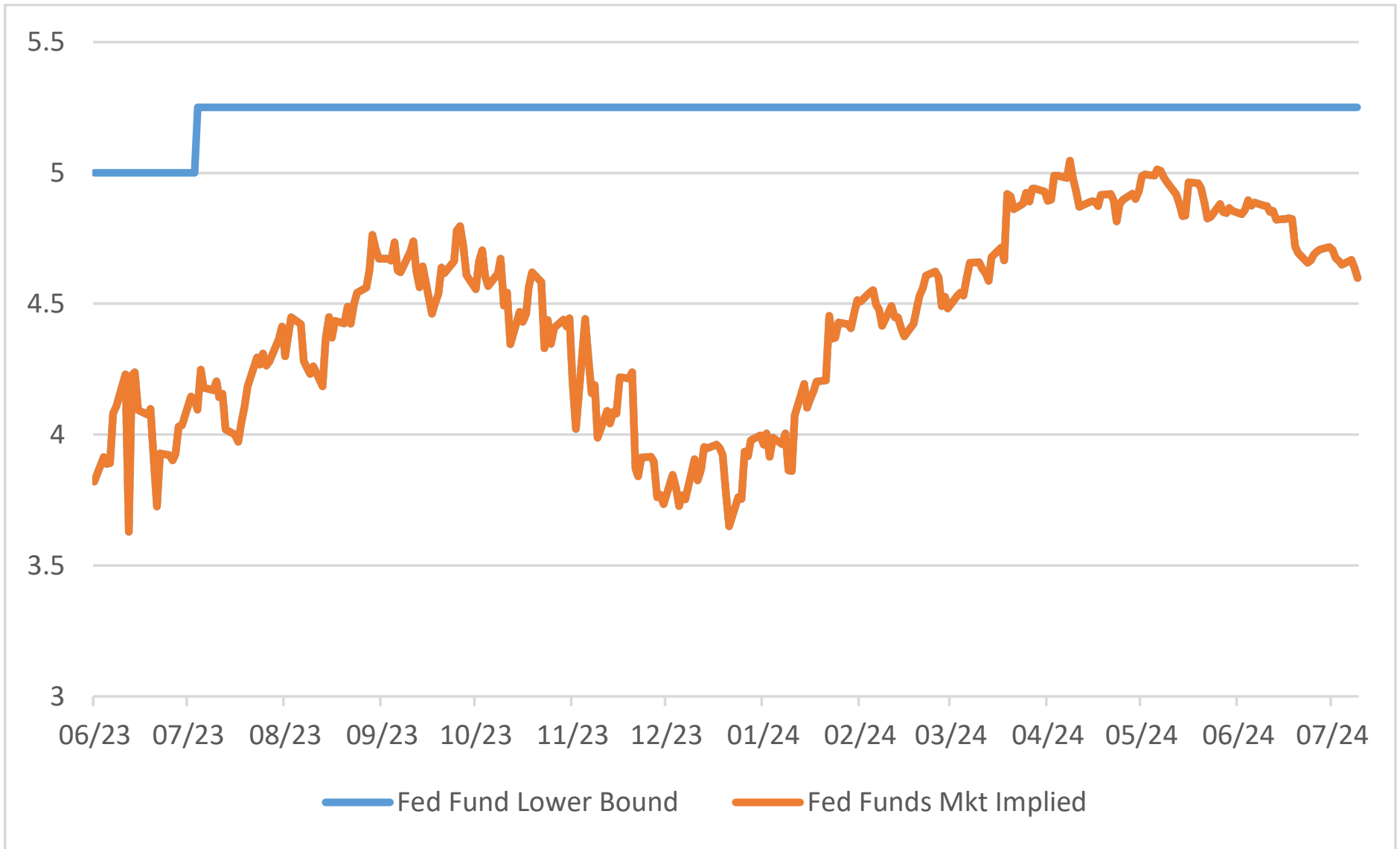
Data Source: Bloomberg, updated quarterly

Business Activity



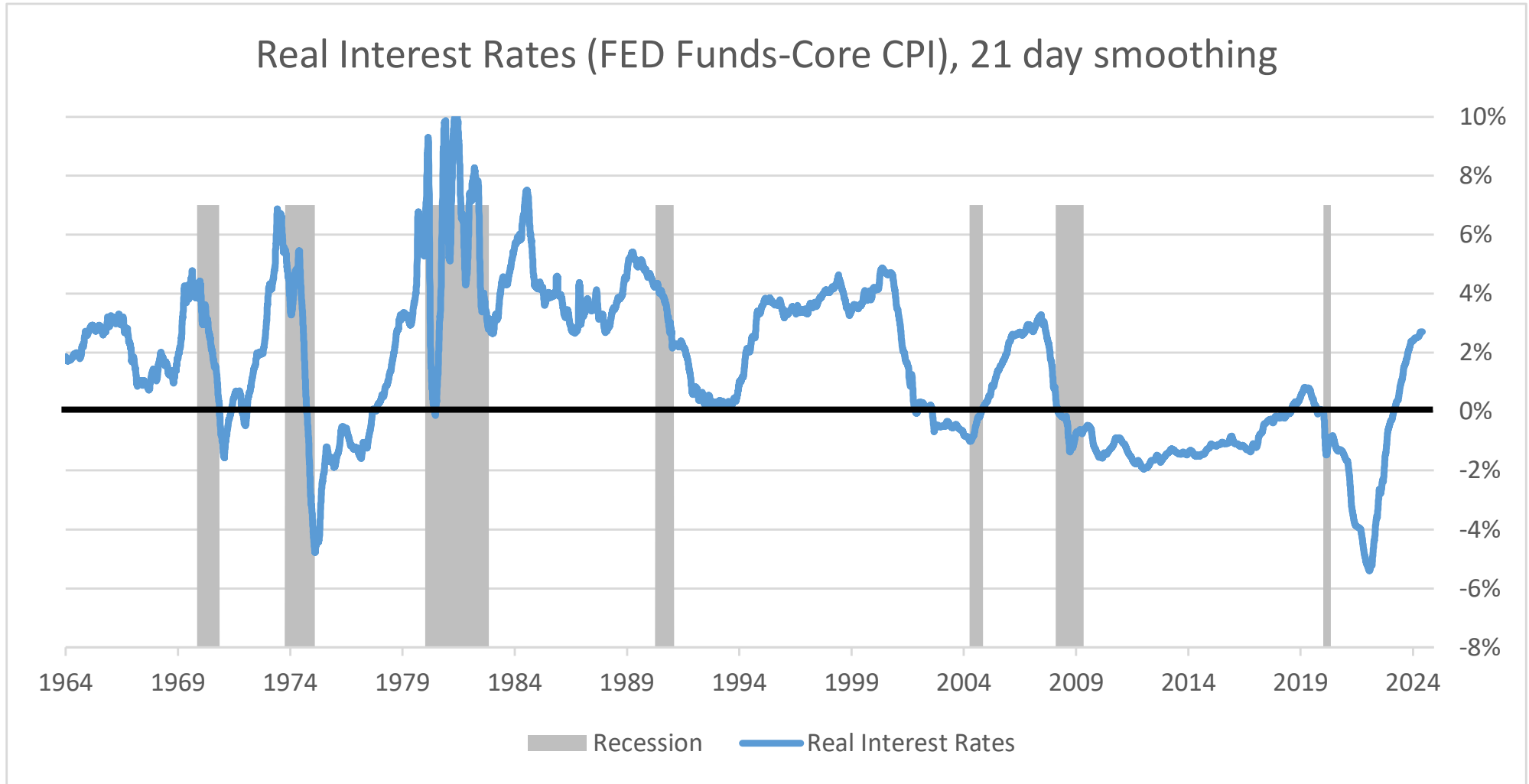
Data Source: Bloomberg

Forward (Implied) vs Fed Fund (Target)



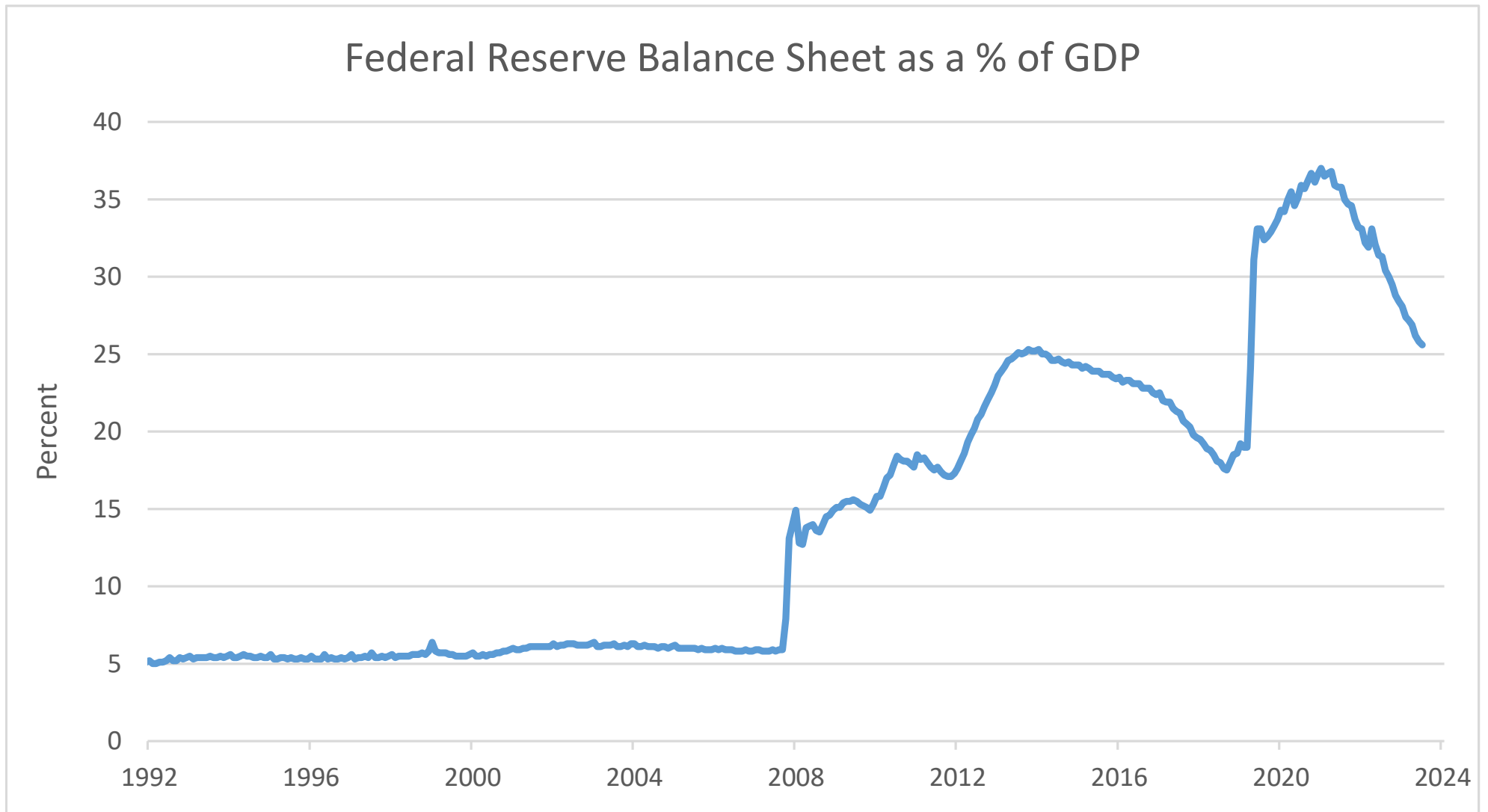
Data Source: Bloomberg ** Implied curve replaced with Dec2024 index which started in June 2023

Higher Real Cost of Money



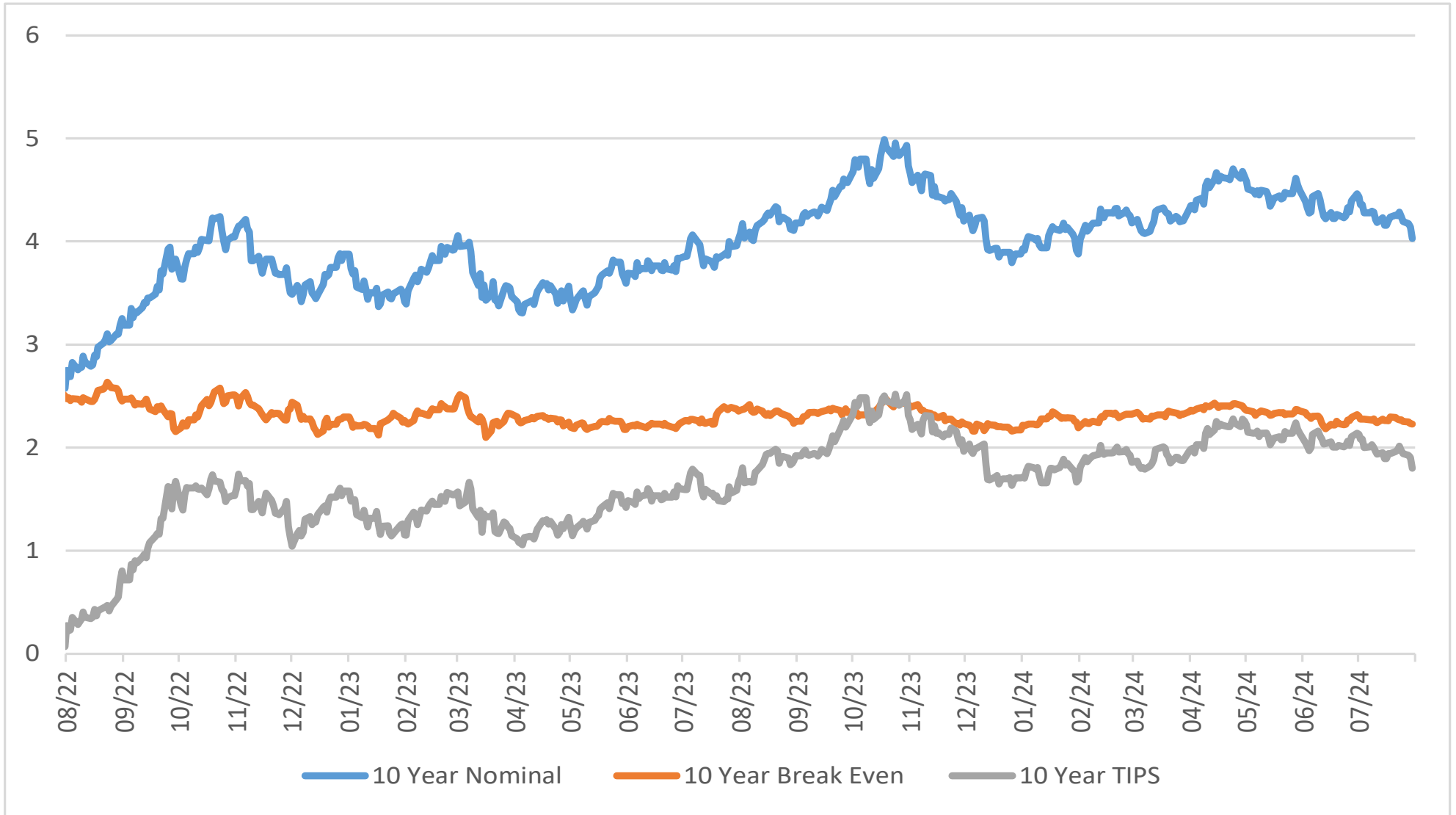
Data Source: Bloomberg

Federal Reserve



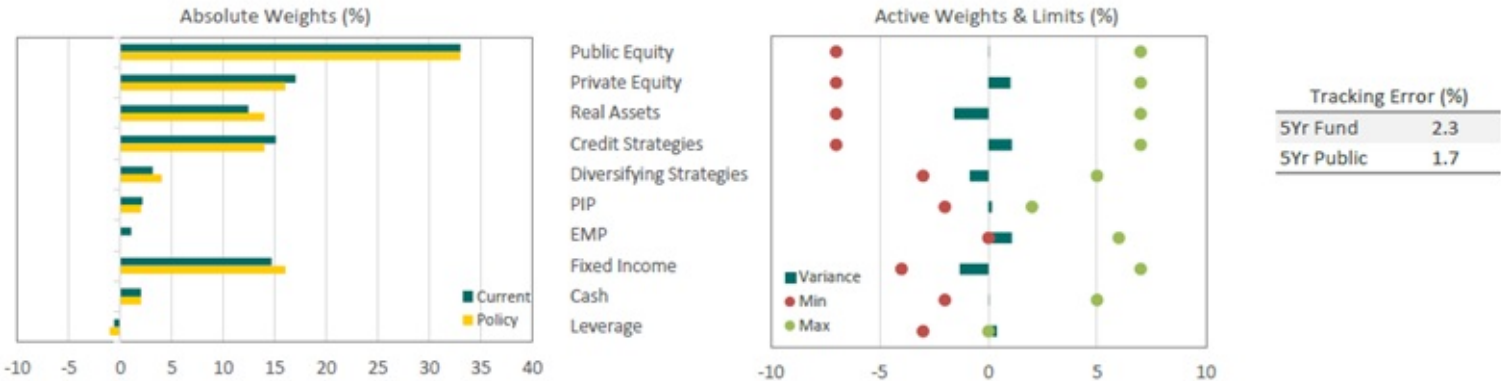
Data Source: Bloomberg

Rate Moves (10Y Nominal, Real & BEI)



Data Source: Bloomberg

Asset Allocation - June 30, 2024



Asset Class	Billions (\$)	Weights (%)					
		Current	Policy	Variance	Min	Max	Internal
Public Equity	37.6	33.0	33.0	0.0	26	40	51
Private Equity	19.4	17.0	16.0	1.0	9	23	0
Real Assets	14.1	12.4	14.0	-1.6	7	21	0
Credit Strategies	17.2	15.1	14.0	1.1	7	21	0
Diversifying Strategies	3.6	3.2	4.0	-0.8	1	9	0
Private Investment Partnerships (PIP)	2.5	2.2	2.0	0.2	0	4	0
Exposure Management Portfolio (EMP)	1.2	1.1	0.0	1.1	0	6	0
Fixed Income	16.7	14.7	16.0	-1.3	12	23	95
Cash	2.3	2.0	2.0	0.0	0	7	0
Leverage	-0.7	-0.6	-1.0	0.4	-3	0	0
Total Fund (Net Market Value)	113.9	100.0	100.0	0.0	n.a.	n.a.	31
Total Fund (Gross Market Value)	114.6	100.6	101.0	-0.4	n.a.	n.a.	0

Policy Group	Current	Policy	Variance	Min	Max	Internal
Public + Private Equity	57.0	49	1.0	39	59	n.a.
Fixed Income + Cash	19.0	18	-1.3	12	27	n.a.

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

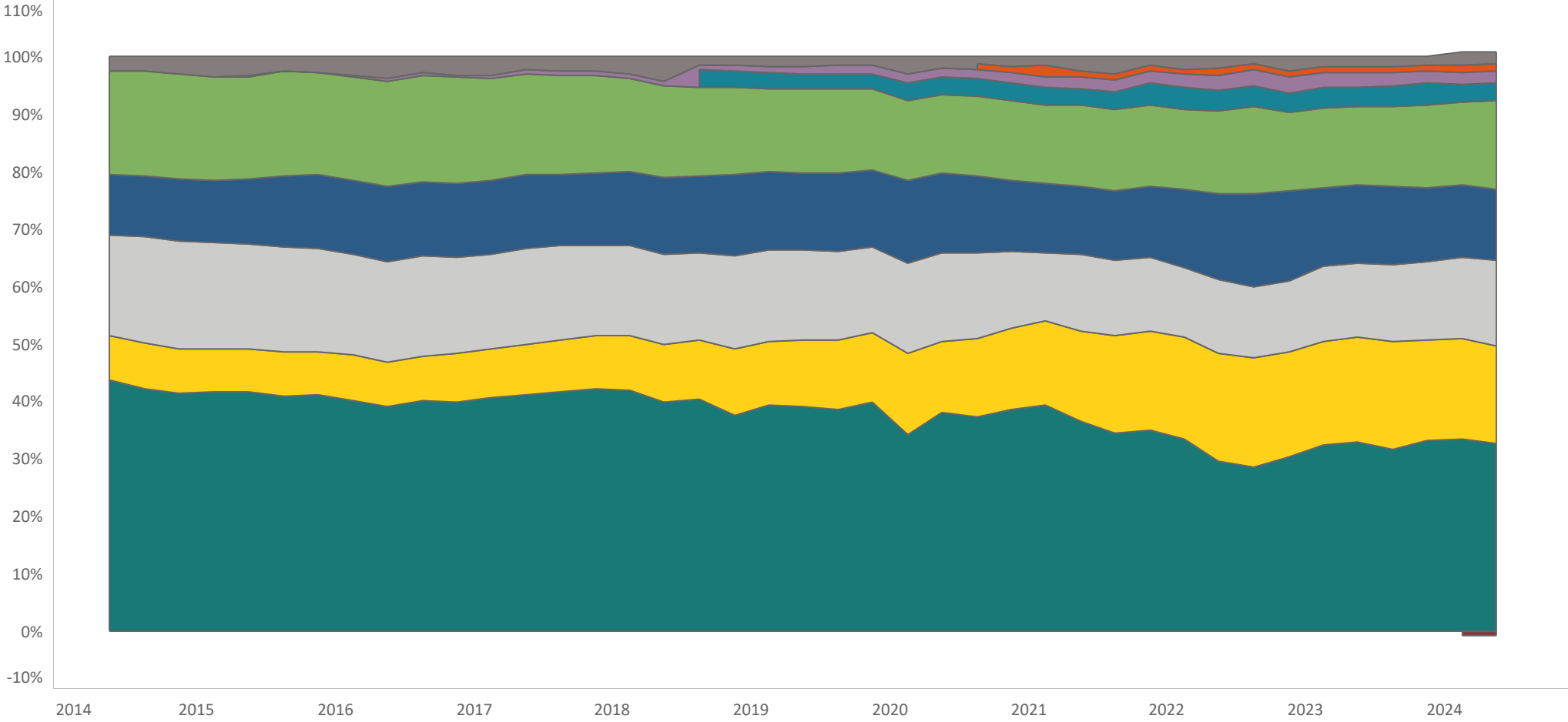
The values shown for each asset class on this report may reflect adjustments related to derivative positions in the Rebalance Account, pending transactions and certain accruals, in order to provide a more descriptive representation of the true economic exposure to each asset class (0 adjustments applied)

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 6/30/2024.

Differences in totals are due to rounding

Asset Allocation Rolling 10-Year

- Public Equity
- Real Assets
- Private Investment Partnerships
- Leverage
- Private Equity
- Credit Strategies
- Exposure Management Portfolio
- Fixed Income
- Diversifying Strategies
- Cash + Other



As of June 30, 2024

Performance - June 30, 2024

	<i>(Net of Fees)</i>						Fiscal YTD	Cal YTD	Market Value (\$MM)
	10 Yr	5 Yr	3 Yr	1 Yr	Qtr	Month			
Total Public Equity	8.5	10.6	5.8	20.1	1.5	0.8	20.1	11.3	37,625
<i>Benchmark</i>	8.5	10.6	4.9	18.0	2.0	1.7	18.0	9.7	
Total Private Equity	14.3	15.8	10.2	5.8	1.1	1.1	5.8	3.8	19,362
<i>Benchmark</i>	11.5	12.3	7.1	24.3	8.5	3.4	24.3	21.2	
Total Real Assets	8.2	6.1	6.2	-3.2	-0.5	-0.5	-3.2	-2.5	14,149
<i>Benchmark</i>	6.1	3.8	3.4	-5.8	-0.8	-0.2	-5.8	-3.8	
Total Credit Strategies	6.1	7.3	6.2	11.7	2.3	1.8	11.7	5.1	17,178
<i>Benchmark</i>	4.8	5.0	4.2	10.8	1.6	0.7	10.8	3.5	
Total Diversifying Strategies	n/a	5.6	4.0	9.7	0.5	-0.8	9.7	5.5	3,589
<i>Benchmark</i>	n/a	5.4	2.5	9.1	1.9	0.6	9.1	3.9	
Total Private Investment Partnerships	n/a	9.6	8.9	8.2	2.1	2.1	8.2	4.4	2,459
<i>Benchmark</i>	n/a	7.6	5.5	8.7	2.8	1.2	8.7	6.2	
Total Fixed Income	2.2	1.1	-2.3	3.8	0.4	1.1	3.8	0.0	16,727
<i>Benchmark</i>	1.5	0.0	-2.8	3.3	0.1	0.9	3.3	-0.4	
Total Fund	7.6	8.7	5.5	9.9	1.0	0.8	9.9	5.0	113,916
<i>VRS Custom Benchmark</i>	6.8	7.2	3.9	11.6	2.3	1.3	11.6	6.6	

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.

Leverage Cost Measurement Information

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

							Fiscal YTD	Cal YTD	Market Value (\$MM)
	10 Yr	5 Yr	3 Yr	1 Yr	Qtr	Month			
Leverage	n/a	n/a	n/a	n/a	1.5	0.5	n/a	n/a	(703)
<i>Benchmark</i>	n/a	n/a	n/a	n/a	1.5	0.5	n/a	n/a	

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

Performance Attribution

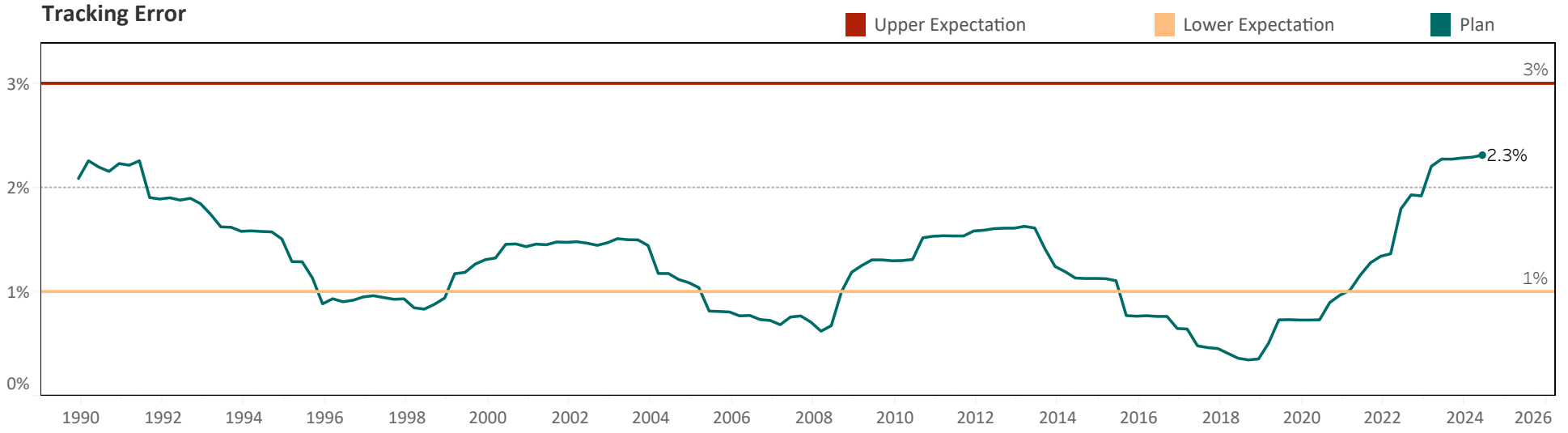
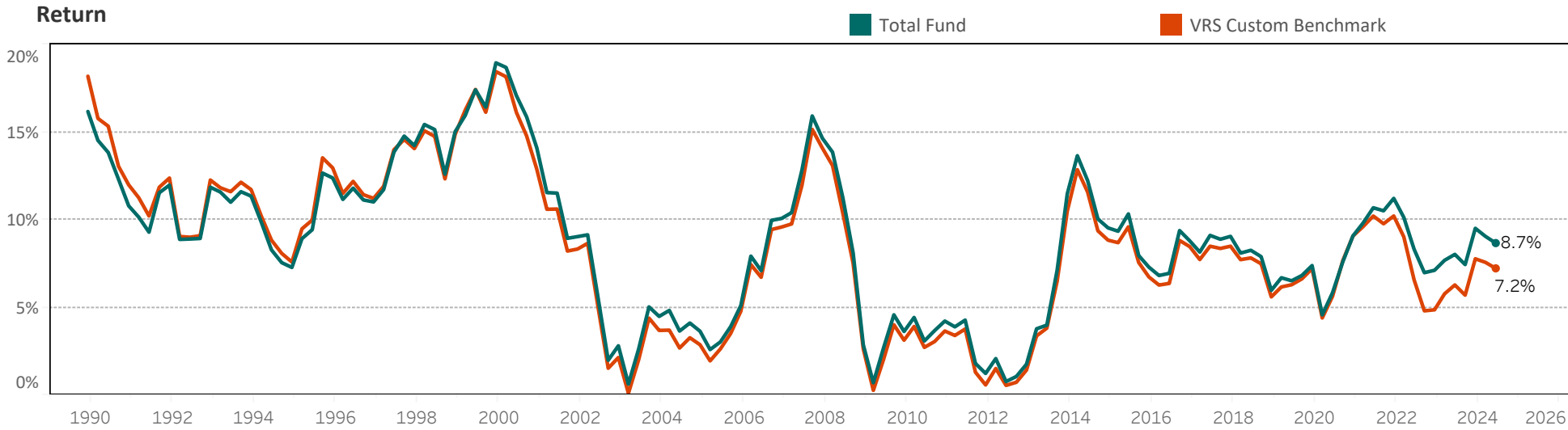
Fiscal Year-To-Date, ending June 30, 2024

	Portfolio		Policy		Attribution		
	Weight	Return	Weight	Return	Allocation	Selection	Total
TOTAL	100.0	9.9	100.0	11.7	0.3	-2.1	-1.8
Public Equity	32.5	20.1	33.5	18.0	-0.1	0.6	0.5
Private Equity	17.8	5.8	16.0	24.3	0.1	-3.3	-3.1
Real Assets	13.1	-3.2	14.0	-5.8	0.2	0.4	0.6
Credit Strategies	14.2	11.7	14.0	10.8	0.0	0.1	0.1
Diversifying Strategies	3.4	9.6	4.0	9.1	0.0	0.0	0.0
Private Investment Partnerships	2.3	8.2	2.0	8.7	0.0	0.0	0.0
Exposure Management Portfolio	1.1	32.0	0.0		0.2	0.0	0.2
Fixed Income	13.9	3.9	15.5	3.3	0.1	0.1	0.2
Cash	1.0	0.1	1.5	5.4	0.1	-0.1	0.0
Other	1.2	-2.8			-0.2	0.0	-0.2
Leverage	-0.3		-0.5		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.

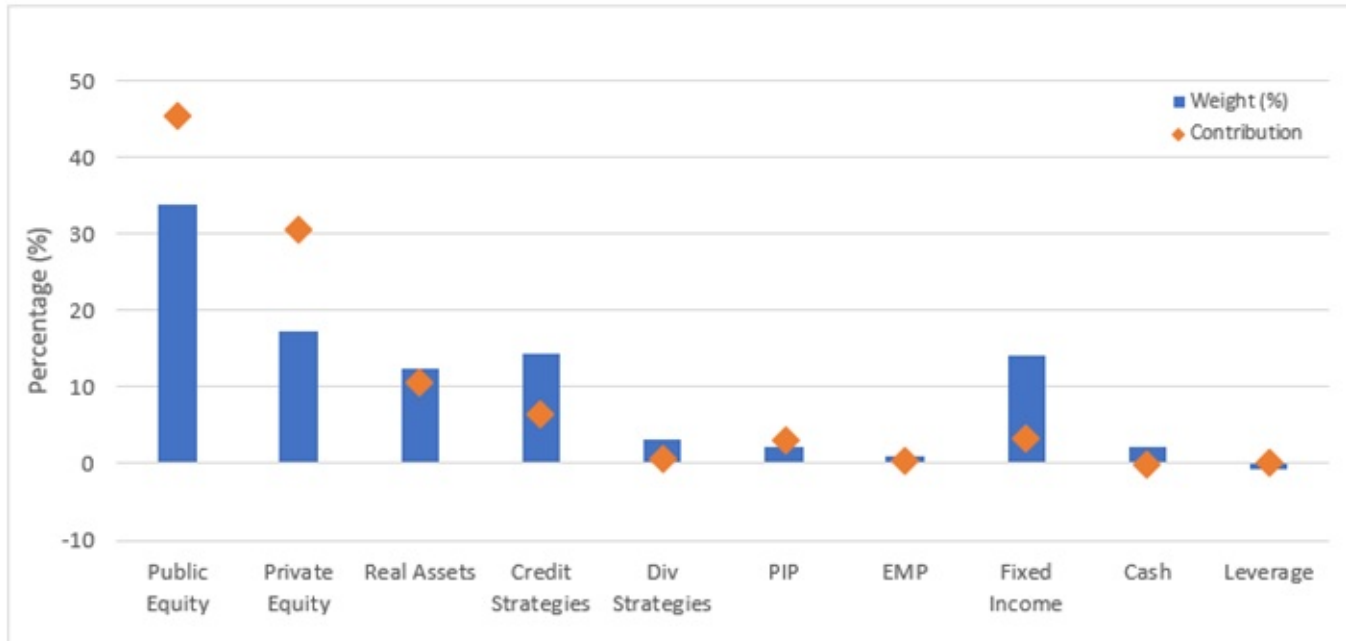
Total Fund Rolling 5-Year



As of June 30, 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.

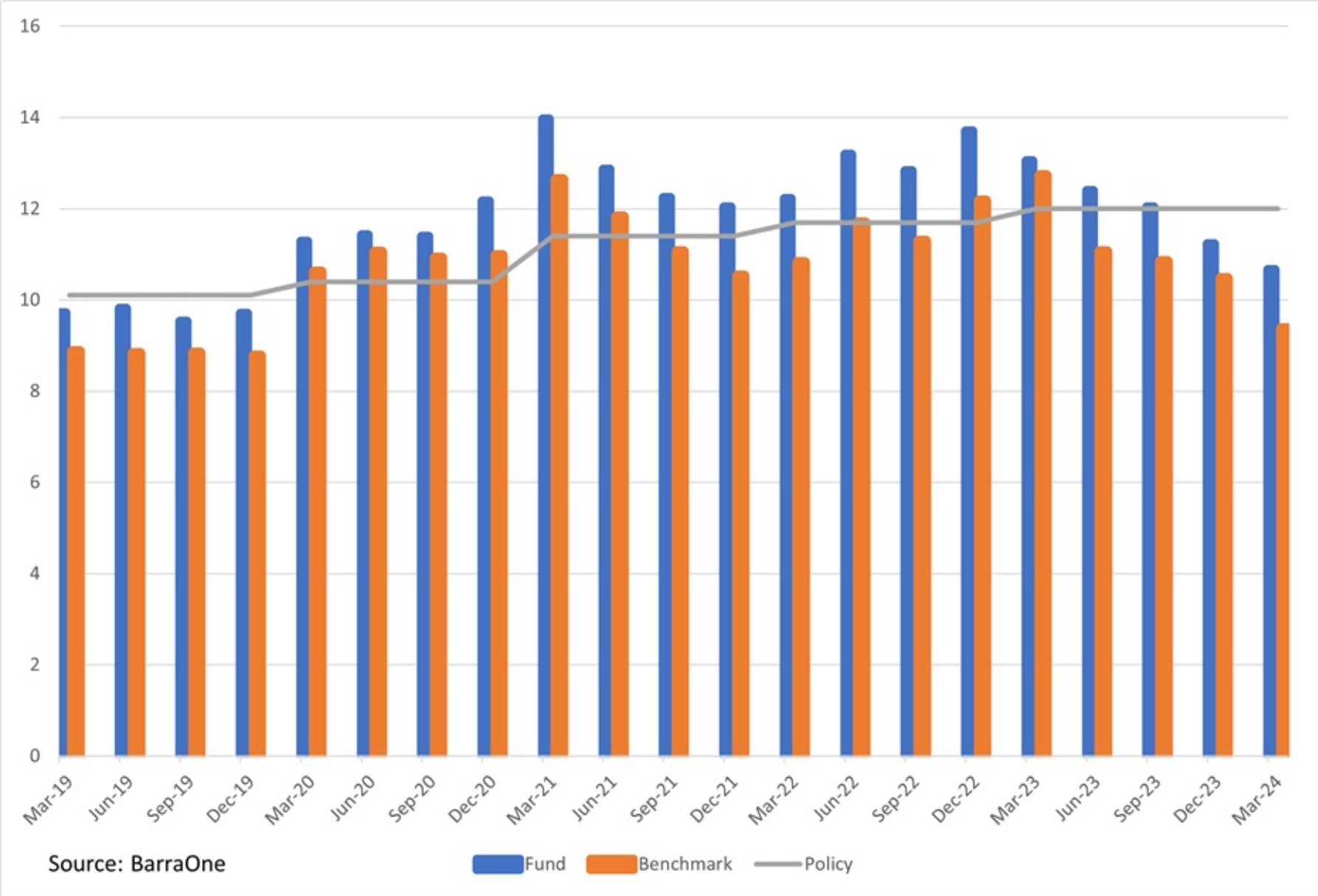
Projected Volatility and Risk Contribution - Mar 31, 2024



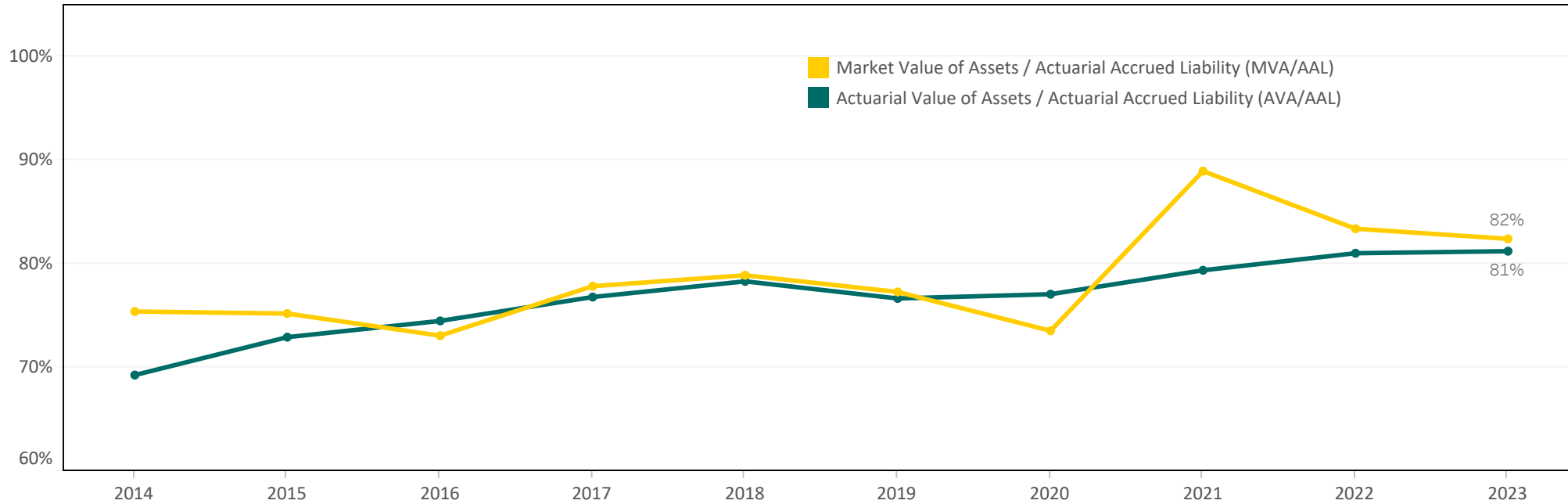
Asset Class	Market Value		Volatility (%)	
	Billions (\$)	Weight (%)	Contribution	Projected
Public Equity	38.3	33.9	45.3	15.0
Private Equity	19.4	17.2	30.6	21.0
Real Assets	14.1	12.5	10.5	11.1
Credit Strategies	16.2	14.3	6.6	6.1
Diversifying Strategies	3.5	3.1	0.5	3.9
Private Investment Partnerships (PIP)	2.4	2.1	2.9	15.5
Exposure Management Portfolio (EMP)	1.2	1.1	0.5	16.6
Fixed Income	16.0	14.2	3.2	6.8
Cash	2.6	2.3	-0.1	1.3
Leverage	-0.7	-0.6	0.0	0.0
Total Fund (Net Market Value)	113.0	100.0	100.0	10.7

Source: BNY Mellon, BarraOne

VRS Fund Projected Volatility - Mar 31, 2024



Funded Status - Assets/Liabilities



As of end of fiscal year.

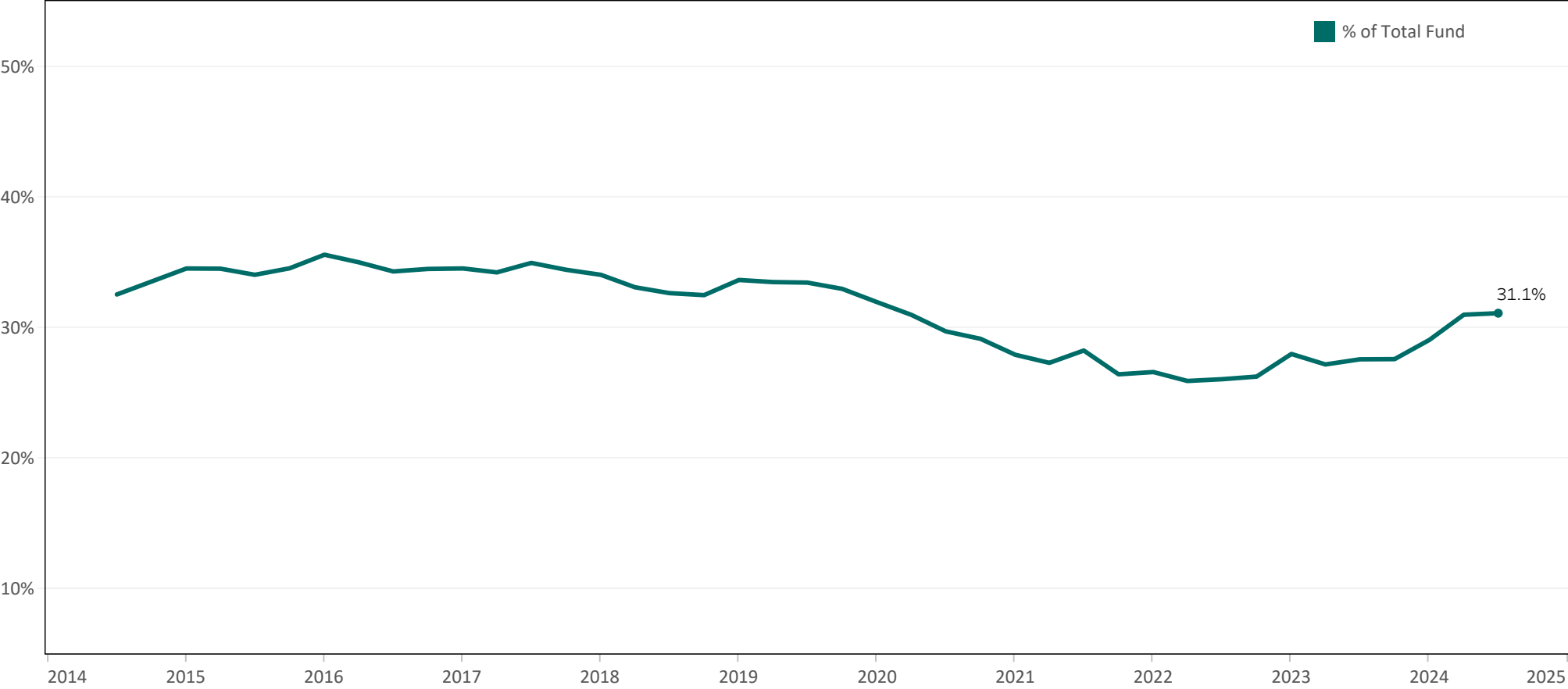
Market Value of Assets (MVA) - The value at which assets could be traded on the market.

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

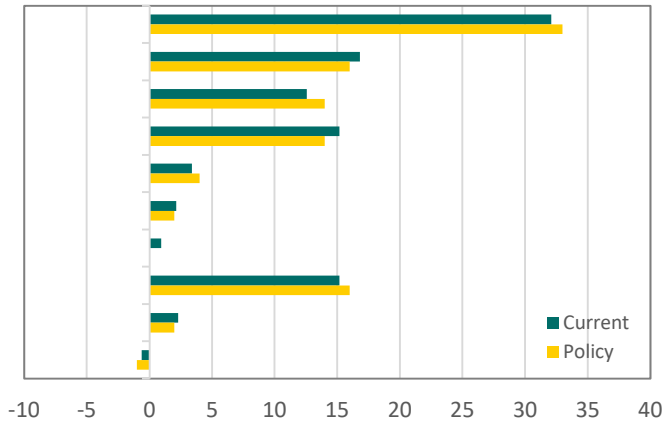


As of June 30, 2024

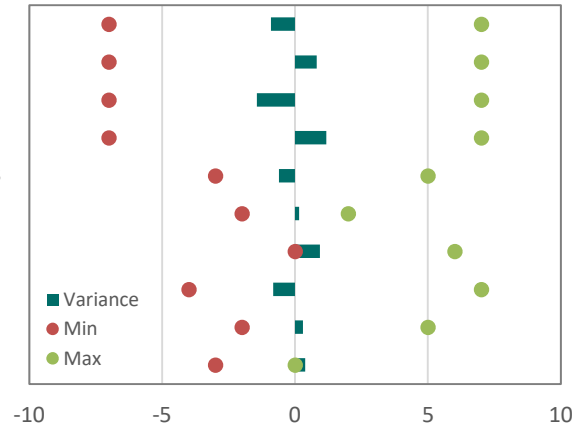
Daily Asset Allocation Report

August 8, 2024

Absolute Weights (%)



Active Weights & Limits (%)



Tracking Error (%)

5Yr Fund	2.3
5Yr Public	1.7

Weights (%)

Asset Class	Billions (\$)	Current	Policy	Variance	Min	Max	Internal
Public Equity	36.4	32.1	33.0	-0.9	26	40	51
Private Equity	19.1	16.8	16.0	0.8	9	23	0
Real Assets	14.2	12.6	14.0	-1.4	7	21	0
Credit Strategies	17.2	15.2	14.0	1.2	7	21	0
Diversifying Strategies	3.9	3.4	4.0	-0.6	1	9	0
Private Investment Partnerships (PIP)	2.4	2.2	2.0	0.2	0	4	0
Exposure Management Portfolio (EMP)	1.1	0.9	0.0	0.9	0	6	0
Fixed Income	17.2	15.2	16.0	-0.8	12	23	95
Cash	2.6	2.3	2.0	0.3	0	7	0
Leverage	-0.7	-0.6	-1.0	0.4	-3	0	0
Total Fund (Net Market Value)	113.3	100.0	100.0	0.0	<i>n.a.</i>	<i>n.a.</i>	31
Total Fund (Gross Market Value)	114.0	100.6	101.0	-0.4	<i>n.a.</i>	<i>n.a.</i>	0

Exposures by Policy Groups

Public + Private Equity	55.4	48.9	49	-0.1	39	59	<i>n.a.</i>
Fixed Income + Cash	19.8	17.5	18	-0.5	12	27	<i>n.a.</i>

- Total Fund includes the following amount held by the Treasurer of VA: \$ 121 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 6/30/2024
- Differences in totals are due to rounding

Program	Action	Effective Date	Commitment/Current Value	Funding/Defunding Period	Description
Real Assets	Hired	05/23/2024	\$200 Million	5 years	Resource Capital Mining Separate Account – A separate account focused on global mining equity and debt investments.
Real Assets	Hired	05/31/2024	\$225 Million	4 years	IPI Partners Fund III – Closed-end commingled fund investing in data centers globally.
Real Assets	Hired	06/04/2024	\$150 Million	4 years	Pretium Single Family Rental Fund VI – Closed-end commingled fund focused exclusively on newly built, Build to Rent single family homes throughout the U.S.
Real Assets	Hired	06/14/2024	\$45 Million	Immediate	Affinius US Eagle Real Estate Fund – An open-end fund investing in diversified, enhanced core real estate in the United States.
Real Assets	Hired	07/31/2024	\$150 Million	5 years	Carlyle Realty Fund X – A closed-end fund investing in diversified, opportunistic real estate in the United States.
Private Equity	Hired	07/11/2024	\$200 Million	5 years	EnCap Energy Capital Fund XII - A US focused upstream oil and gas fund.
Private Equity	Hired	05/10/2024	\$250 Million	5 years	**Veritas Capital Fund IX – A US middle market fund investing in businesses providing products, software, and services, primarily technology or technology-enabled solutions to government and commercial customers worldwide.
Private Equity	Hired	04/24/2024	\$150 Million	6 years	Monomoy Fund V – A US middle market fund investing in businesses that can be purchased at a good valuation, and concurrently are capable of material operational improvement, including cash generation.
Private Equity	Hired	05/21/2024	\$50 Million	6 years	H.I.G. LBO VII – A US middle market fund investing in businesses involving transactional or corporate complexity.
Private Equity	Hired	06/24/2024	\$250 Million	6 years	Olympus Growth VIII - A US middle market buyout fund investing in fundamentally sound businesses with potential for significant growth or operational improvement.
Private Equity	Hired	07/25/2024	\$750 Million	5 years	GCM Grosvenor VRS VI - A separate account for investing in primarily smaller market buyout and growth equity funds in the US and Europe.
Private Equity	Hired	07/02/2024	\$250 Million	6 years	Thoma Bravo XVI - A mega buyout fund with a sole focus on the software industry.

VRS Investment Department
 Recap of New Investments/Terminations
 Time Period: 04/11/2024 – 08/14/2024



Program	Action	Effective Date	Commitment/ Current Value	Funding/ Defunding Period	Description
Credit Strategies	Hired	05/14/2024	\$250 Million	2 years	Castlelake Asset-Based Private Credit III – A commingled fund focused on asset-based investments in specialty finance, real assets, and aviation.
Dynamic Strategies	Hired	07/15/2024	\$200 Million	Immediate	PineBridge Global Dynamic Asset Allocation - A multi-asset absolute return portfolio.
Total Fund	Terminated	07/25/2024	\$1.8 Billion Notional	Immediate	Systematica – Developed market currency strategy.

** The manager is considered DIME under the definition that considers industry best practices and defines an ownership threshold of greater than or equal to 33% and less than 51% of firm ownership or carry.



Portfolio Solutions Group Overview

Chung Ma
Managing Director

Overview: Portfolio Solutions Group

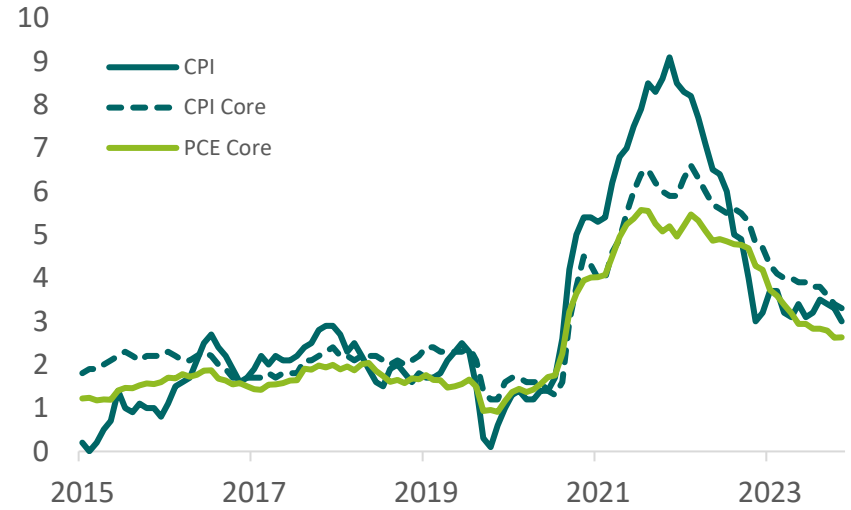
Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Chung Ma	Managing Director	MA	CFA	28	10
Audrey Manley	Portfolio Assistant	AD		2	2
Ross Kasarda	Director, Portfolio Solutions	MA	CFA	20	20
Greg Hines	Sr. Investment Officer	MA	CFA	13	10
Kristina Koutrakos	Director, Portfolio Solutions	MBA	CAIA	25	8
Katie Grawe	Portfolio Manager	MBA		25	6
Matt Lacy	Director, Portfolio Integration	MA	CFA	25	25
Brock Bell	Director, Treasury	AB		17	<1
Scott Mootz	Director, Investment Sciences	MBA	CFA	17	13
Advait Apte	Sr. Investment Officer	PhD	CFA	7	7

Generally Supportive Data ...

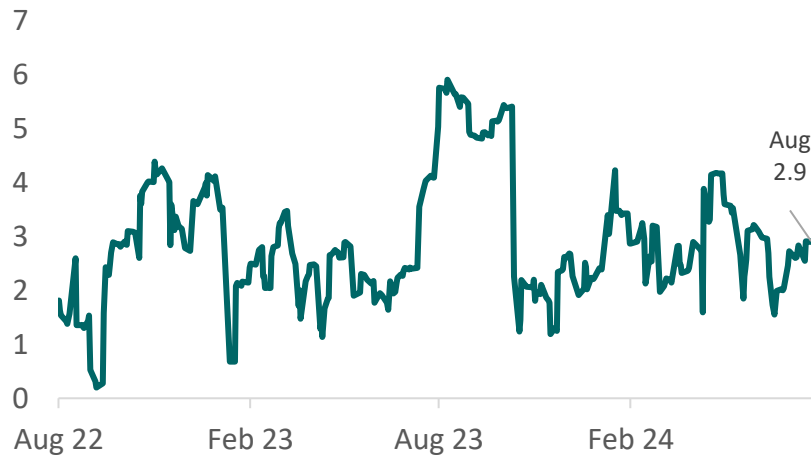
US Equities - Profit Margins



Inflation



Atlanta Fed GDP Now

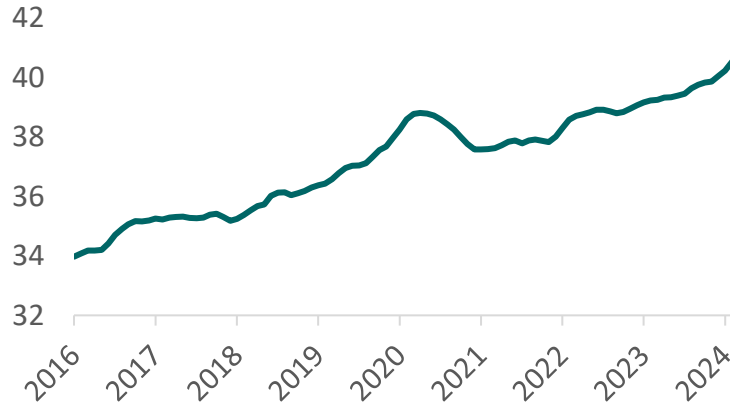


Leading Economic Indicators

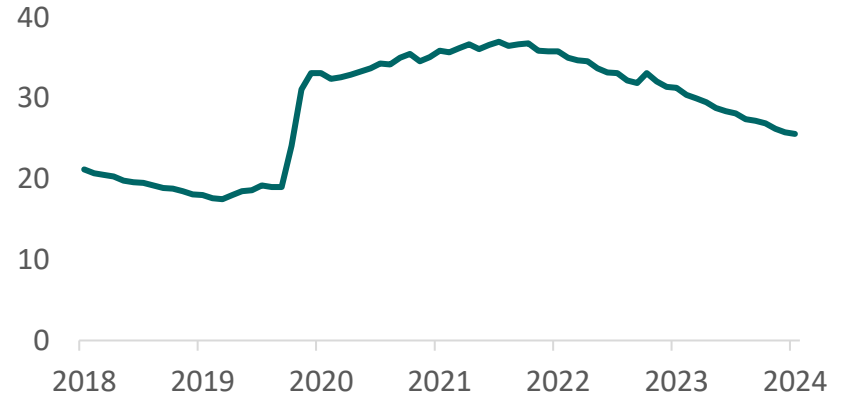


... But Longer-term Challenges Remain

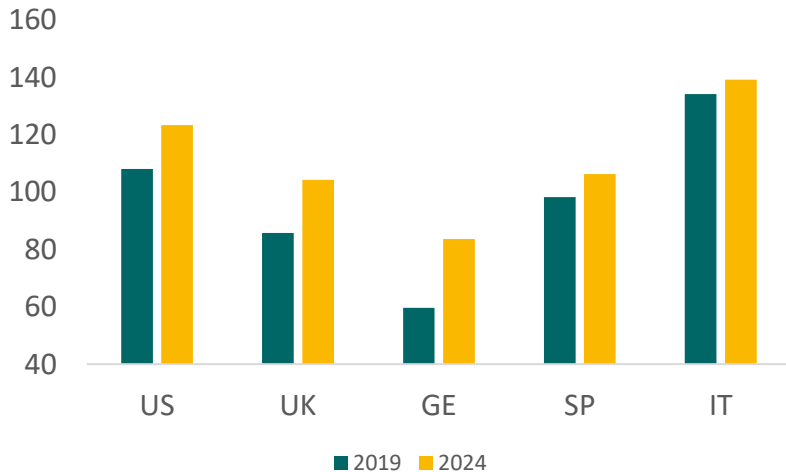
**Geopolitical Risk
(United States)**



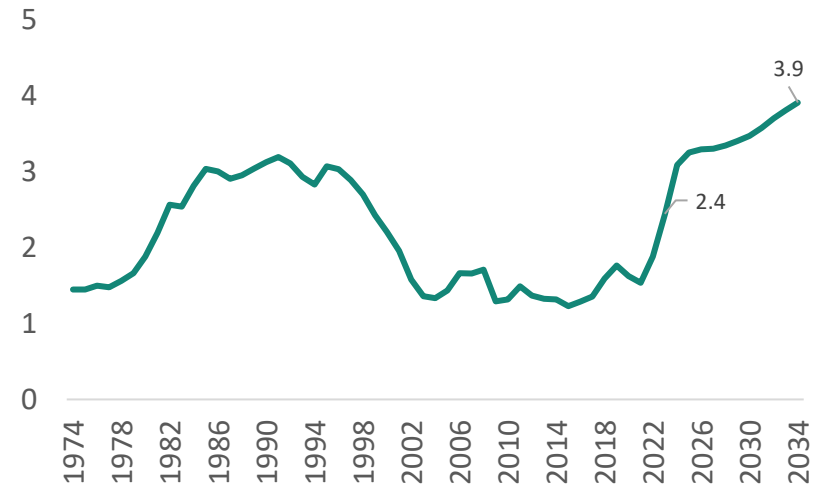
**Fed Balance Sheet
(% of GDP)**



**Debt
(% of GDP)**



**Forecasted Debt Servicing
(% of GDP)**





Forward Returns

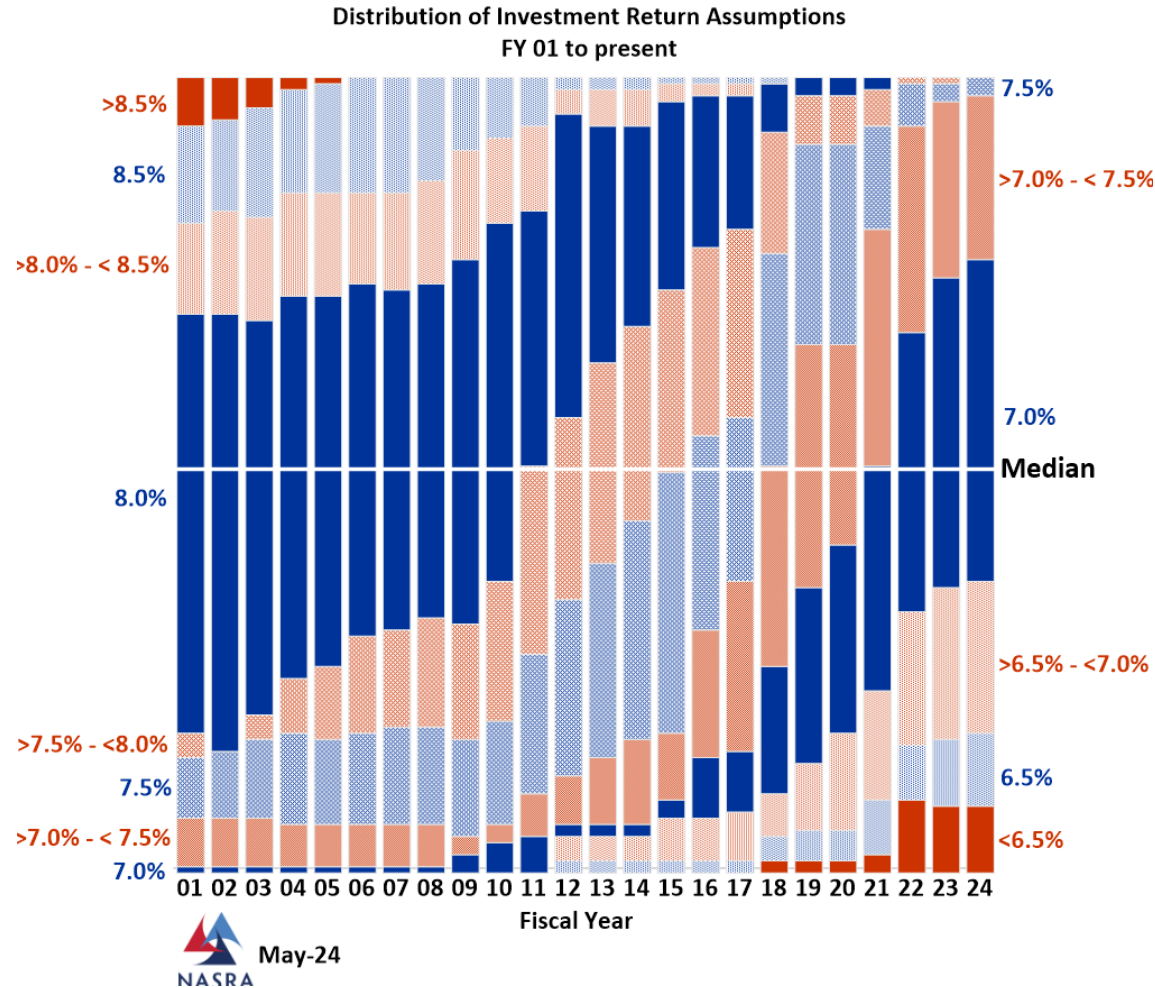
Chung Ma
Managing Director

Advait Apte
Senior Investment Officer

Agenda

- State Plans' Forward Returns Summary
- External Managers' Forward Returns Comparison
- VRS Long Term Forward Returns
- Forward Returns Attribution

Public Pension Plan Discount Rate Revisions Over Time (2024)

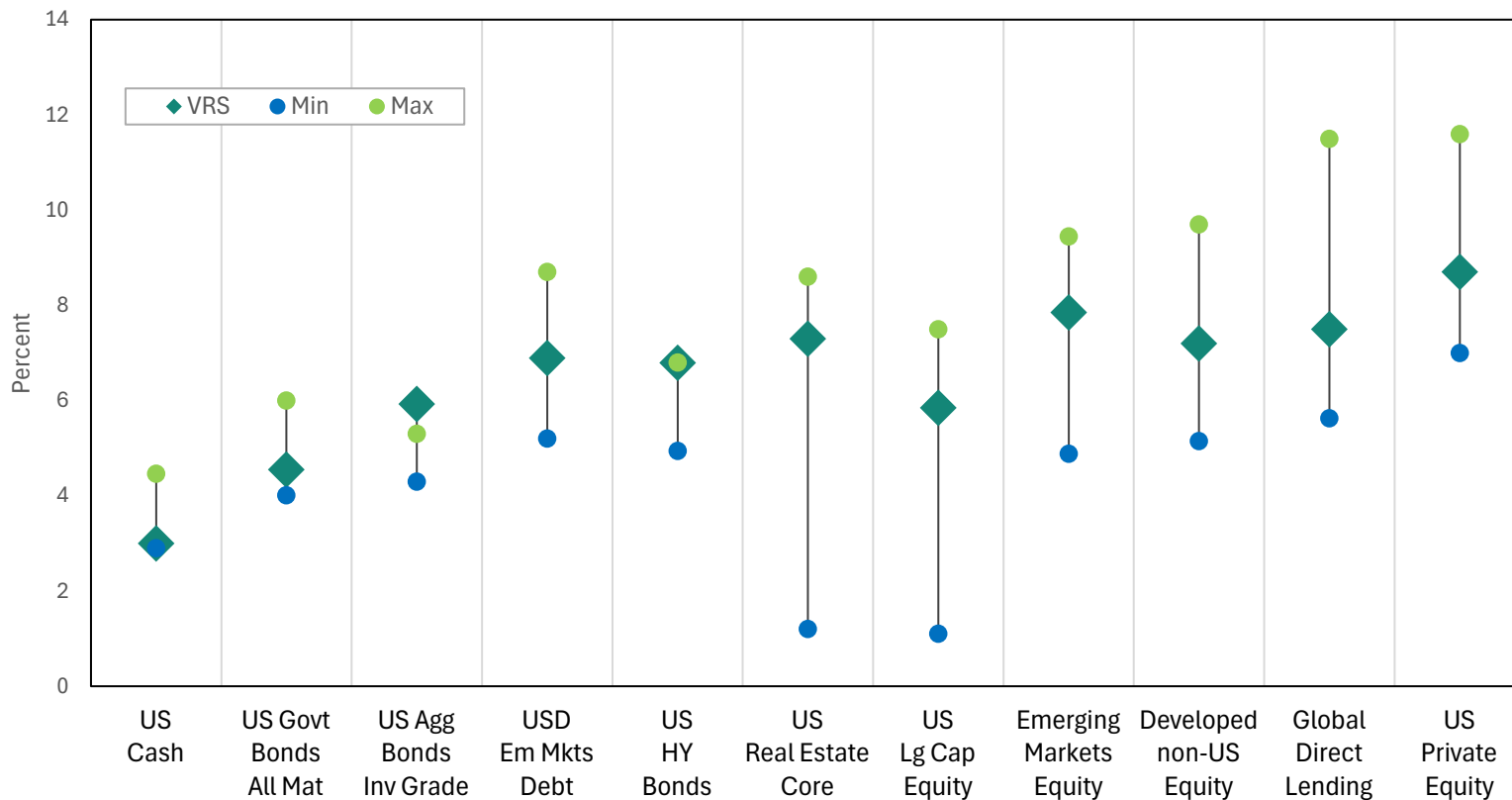


External Managers' 10-Yr Forward Return History

	2015	2017	2018	2019	2020	2021	2022	2023	2024
U.S. Core Fixed	3.0	3.1	3.1	3.4	1.5	1.6	2.7	4.1	5.0
Credit (HY)	5.0	4.6	4.4	5.0	4.8	3.5	4.8	6.3	6.2
Core Real Estate	5.4	5.5	5.2	5.7	5.3	5.9	5.2	5.4	6.1
U.S. Stocks	6.2	6.0	5.5	5.7	5.5	4.0	5.2	6.8	5.9
Int'l Developed Stocks	6.9	6.4	6.8	6.7	6.2	6.2	6.6	8.1	7.1
Emerging Stocks	8.4	7.5	7.1	8.2	7.6	6.6	7.5	9.2	7.7
Private Equity	8.9	7.2	7.7	9.2	8.9	9.5	9.3	9.8	9.1

Notes: External Managers' Forward Returns as of 12/31/2023

Long Term Forward Return Expectations External Managers and VRS



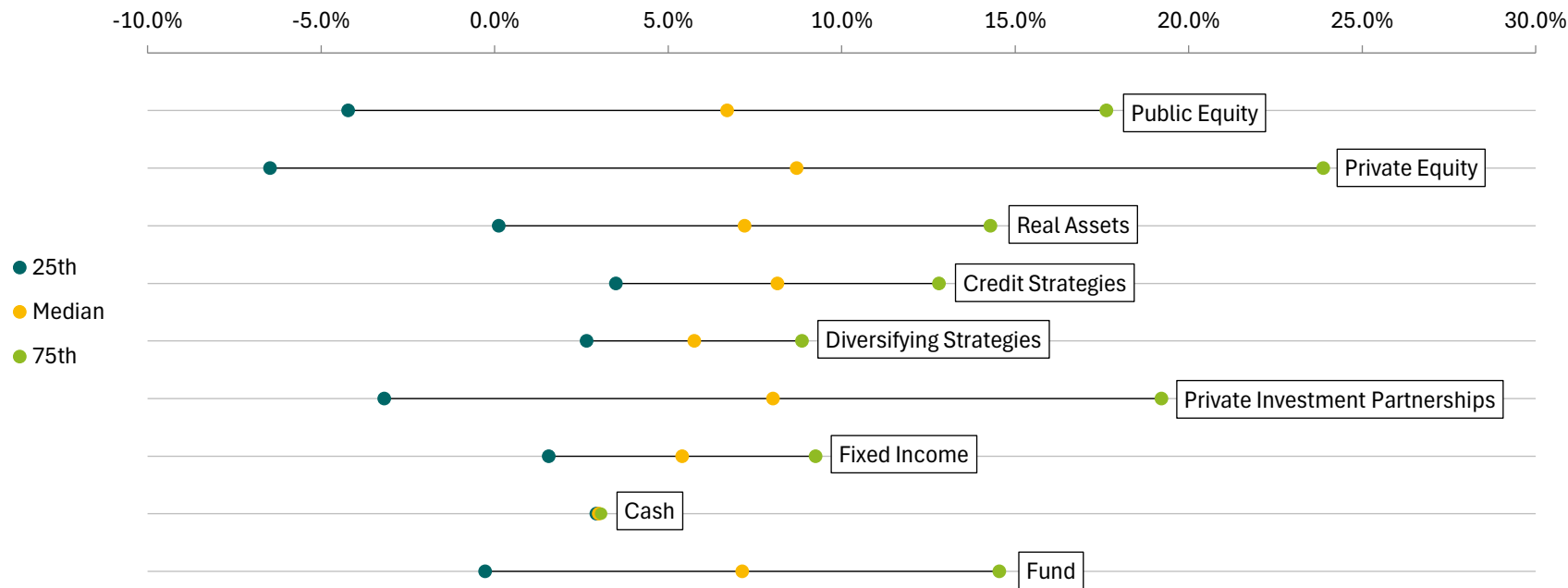
VRS Forward Return Expectations										
3.0	4.6	5.9	6.9	6.8	7.3	5.9	7.9	7.2	7.5	8.7

Forward Returns and Volatilities By Asset Class (20 year)

Asset Class	2024			2023		
	Wt.	Exp.Ret	Exp.Vol	Wt.	Exp.Ret	Exp.Vol
Public Equity	33.0%	6.7%	16.2%	34.0%	7.0%	16.2%
Private Equity	16.0%	8.7%	22.5%	16.0%	9.0%	23.8%
Real Assets	14.0%	7.2%	10.5%	14.0%	6.5%	11.0%
Credit Strategies	14.0%	8.1%	6.9%	14.0%	7.9%	5.4%
Diversifying Strategies	4.0%	5.8%	4.6%	4.0%	6.2%	5.3%
Private Investment Partnerships	2.0%	8.0%	16.6%	2.0%	7.8%	17.0%
Fixed Income	16.0%	5.4%	5.7%	15.0%	4.9%	5.2%
Cash	2.0%	3.0%	0.1%	1.0%	3.0%	0.1%
Leverage	-1.0%	3.5%	0.1%			
<i>Currency Return Adjustment</i>		0.1%			0.1%	
Total Fund		7.1%	11.0%		7.1%	11.2%

VRS Forward Returns By Asset Class

Annualized 20 Year Expected Returns



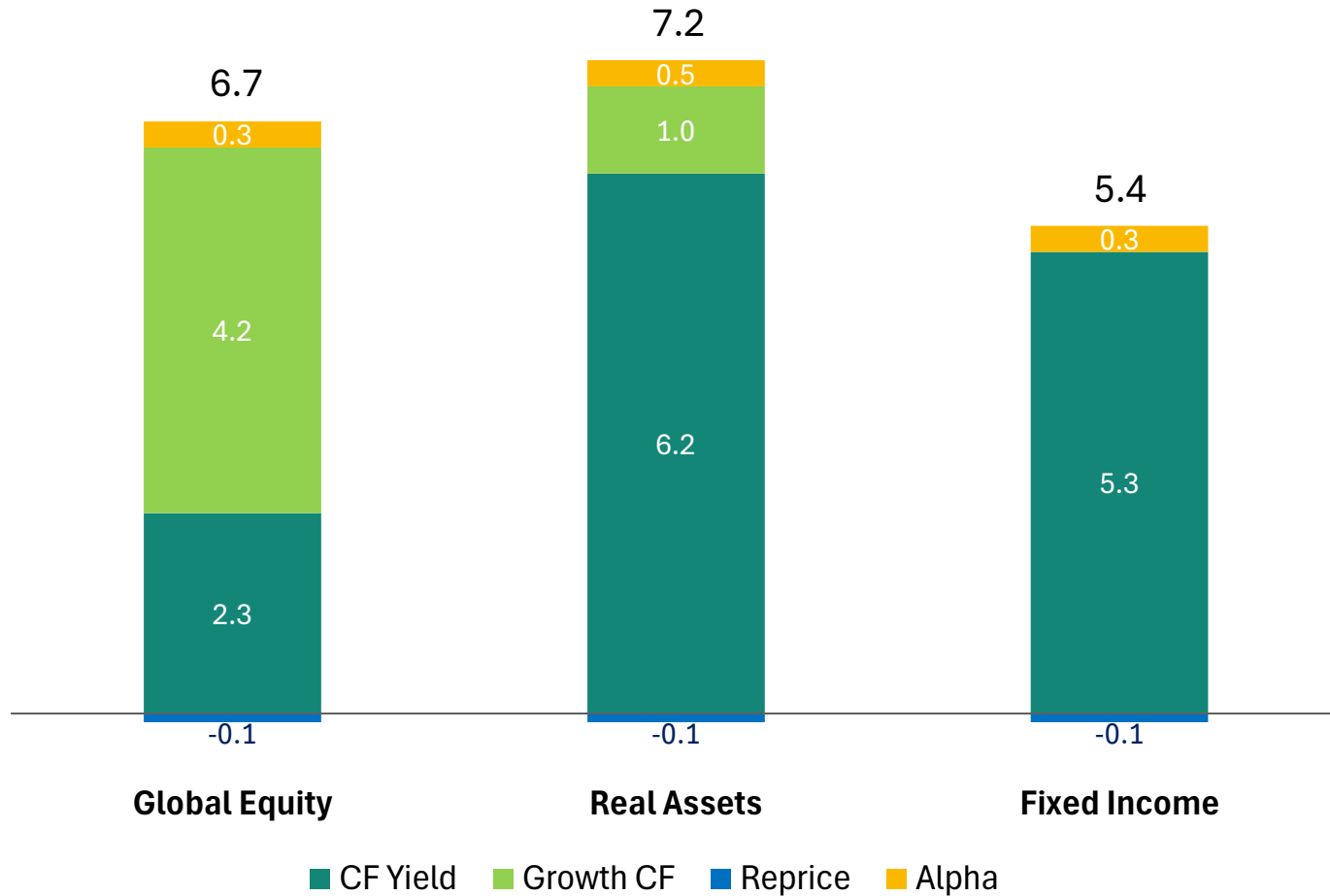
P	PubEq	PvtEq	RA	CS	DS	PIP	FI	Cash	Fund
P25	-4.2%	-6.5%	0.1%	3.5%	2.7%	-3.2%	1.6%	2.9%	-0.3%
P50	6.7%	8.7%	7.2%	8.1%	5.8%	8.0%	5.4%	3.0%	7.1%
P75	17.6%	23.9%	14.3%	12.8%	8.9%	19.2%	9.2%	3.1%	14.5%

Forward Returns Attribution

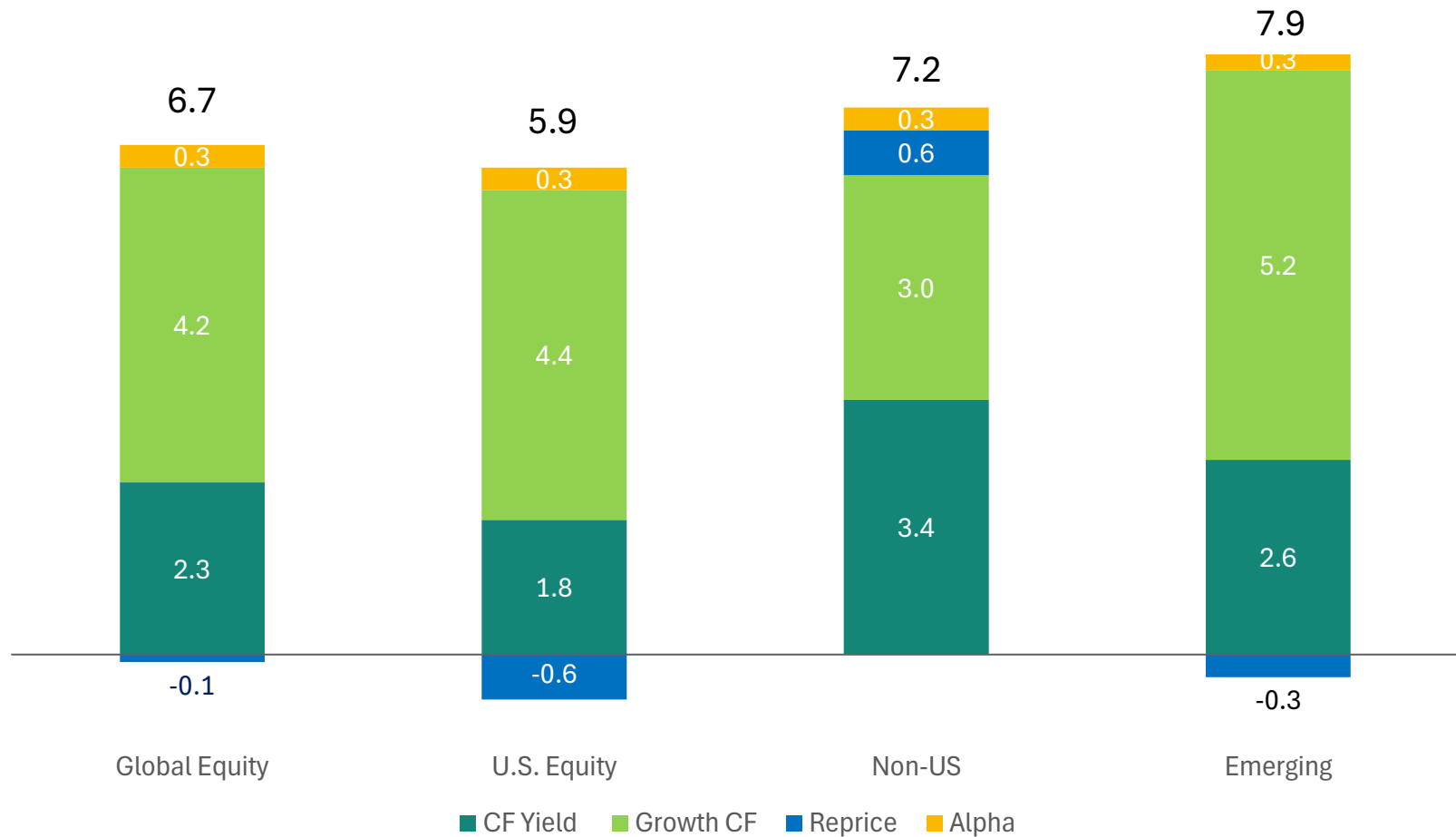
	Return	CF Yield	Growth in CF	Reprice	Alpha
Global Eq (10 yr)	6.7%	2.3%	4.2%	-0.1%	0.3%
US Eq	5.9%	1.8%	4.4%	-0.6%	0.3%
Non-US Eq	7.2%	3.4%	3.0%	0.6%	0.3%
EM Eq	7.9%	2.6%	5.2%	-0.3%	0.3%
Real Assets (20 yr)	7.2%	6.2%	1.0%	-0.1%	0.5%
Private RE	7.3%	4.8%	2.5%	-0.1%	0.4%
Global REITs	7.9%	5.2%	2.5%	0.0%	0.3%
Infrastructure	7.1%	3.7%	3.4%	-0.1%	1.0%
Energy & Mining	7.6%	25.0%	-17.0%	0.0%	0.7%
Timberland	5.0%	3.0%	2.5%	-0.2%	0.7%
Farmland	5.4%	4.8%	1.5%	0.0%	0.7%
Tot. ORA	6.9%	8.8%	-1.8%	-0.1%	0.9%
Total IFI (20 yr)	5.4%	5.3%	0.0%	-0.1%	0.3%
Treasury	4.6%	4.6%	0.0%	-0.1%	0.1%
Agency	5.0%	4.9%	0.0%	-0.1%	0.2%
MBS	5.6%	5.4%	0.0%	-0.1%	0.4%
CMBS	6.6%	6.4%	0.0%	-0.2%	0.4%
ABS	7.0%	6.8%	0.0%	-0.1%	0.4%
IG Credit	5.9%	5.7%	0.0%	-0.2%	0.4%
HY Credit	6.8%	6.9%	0.0%	-0.5%	0.4%
JPM EMBI Core	6.9%	7.0%	0.0%	-0.4%	0.2%

Notes: RA is net of leverage; IFI CF Yield includes growth in CF

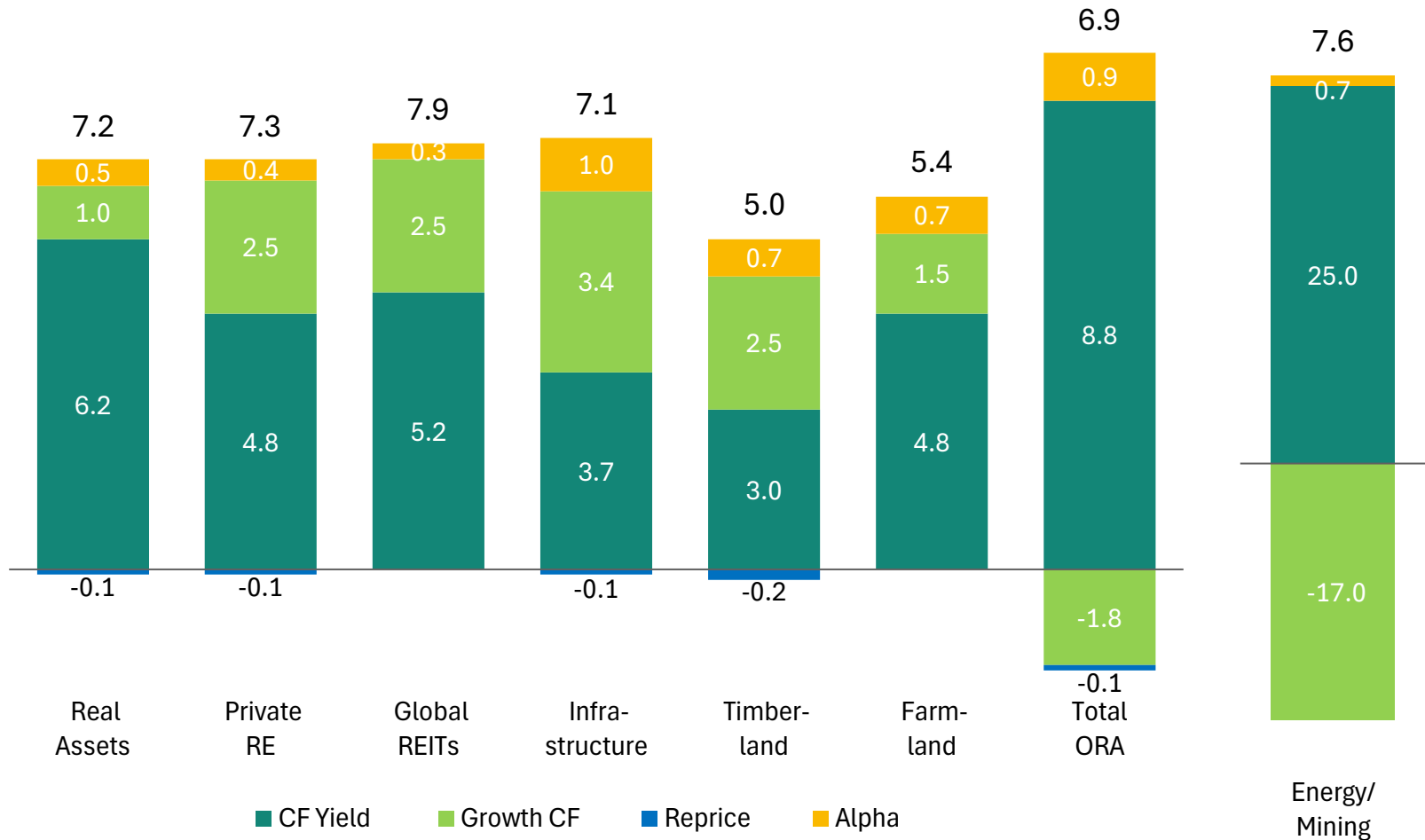
Total Fund – Selected Attribution (Percent)



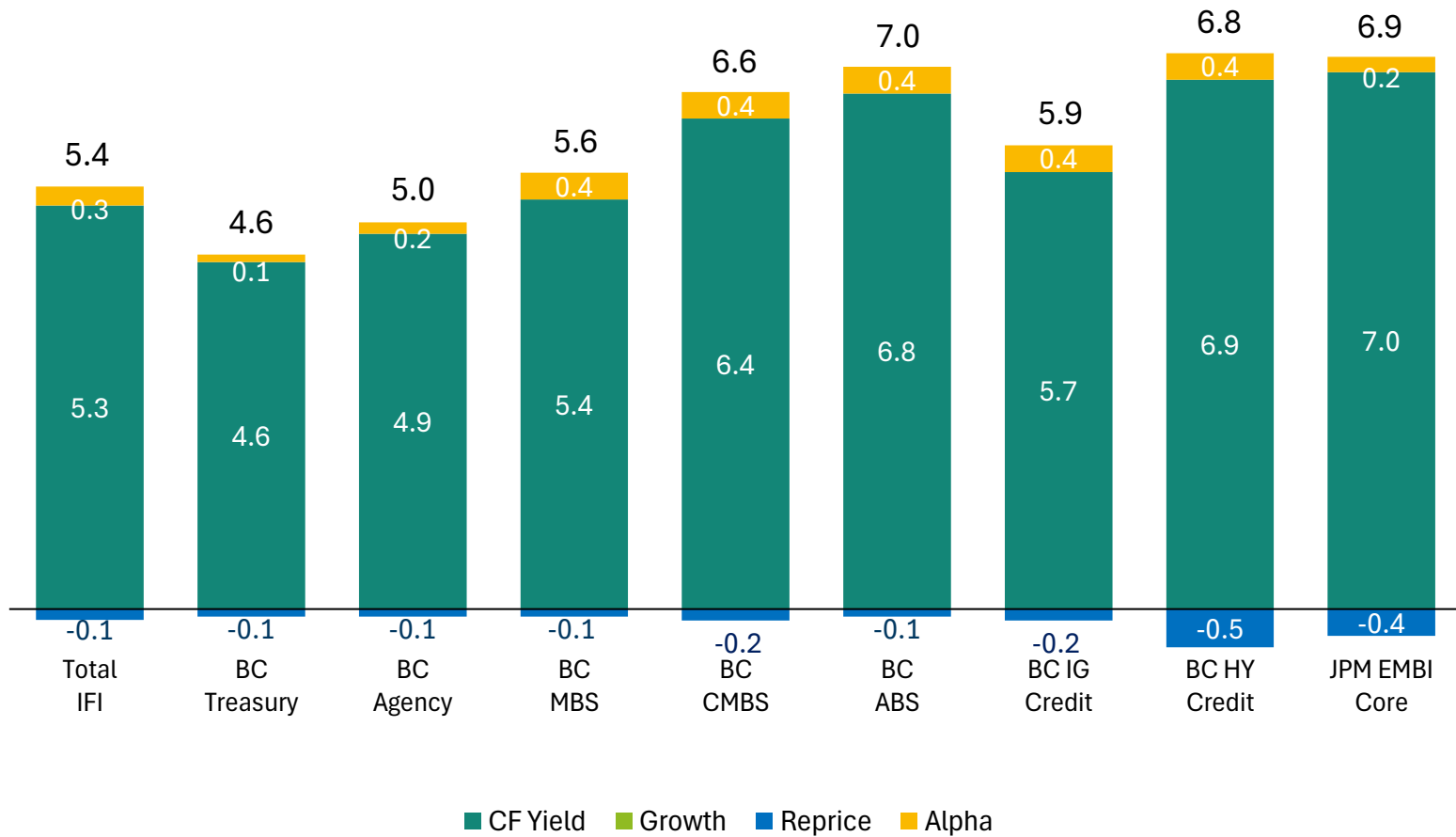
Global Equity Attribution (Percent)



Real Assets Attribution (Percent)



Fixed Income Attribution (Percent)



Macro Factor Impact on Forward Returns

	Factor	Impact	
Alpha	Elevated Vol	+	
	Growth In Yield	Taxes	-
		Productivity	-
		De-Globalization	-
		Nominal Rates	+
Real Yield	Rates v Inflation	+	
	Discount Factor	-	
Inflation	Fed QT	+	
	Commodity Prices	-	
	Nominal Wage Growth	-	
	Oil	+	
Revaluation	P/E Mean Reversion	-	
	Risk Aversion	-	

Appendix



Forward Returns and Volatilities By Asset Class (20 year)

Asset Class and Strategy	Current		
	Wt.	Exp.Ret	Exp.Vol
Public Equity	33.0%	6.7%	16.2%
US Equity	19.5%	5.9%	
Non-US Equity	10.5%	7.2%	
EM Equity	3.0%	7.9%	
Private Equity	16.0%	8.7%	22.5%
Real Assets	14.0%	7.2%	10.5%
Private Real Estate	9.4%	7.3%	
Public Real Estate	0.0%	7.9%	
Other Real Assets	4.6%	6.9%	
Credit Strategies	14.0%	8.1%	6.9%
Asset Backed	1.3%	8.3%	
Bank Loans	0.6%	6.0%	
Direct Lending	3.4%	7.5%	
Distressed	1.4%	10.0%	
Diversified PC	2.4%	8.5%	
High Yield	0.9%	7.0%	
Mezzanine	1.5%	9.0%	
Opportunistic	2.5%	8.0%	
Diversifying Strategies	4.0%	5.8%	4.6%
Private Investment Partnerships	2.0%	8.0%	16.6%
Fixed Income	16.0%	5.4%	5.7%
Treasury	6.0%	4.6%	
Agency	0.1%	5.0%	
MBS	5.5%	5.6%	
CMBS	0.2%	6.6%	
ABS	0.2%	7.0%	
IG	2.8%	5.9%	
HY	0.5%	6.8%	
JPM EMBI Core	0.9%	6.9%	
Cash	2.0%	3.0%	0.1%
Leverage	-1.0%	3.5%	0.1%
Currency Return Adjustment		0.1%	
Total Fund		7.1%	11.0%



Risk Management at VRS

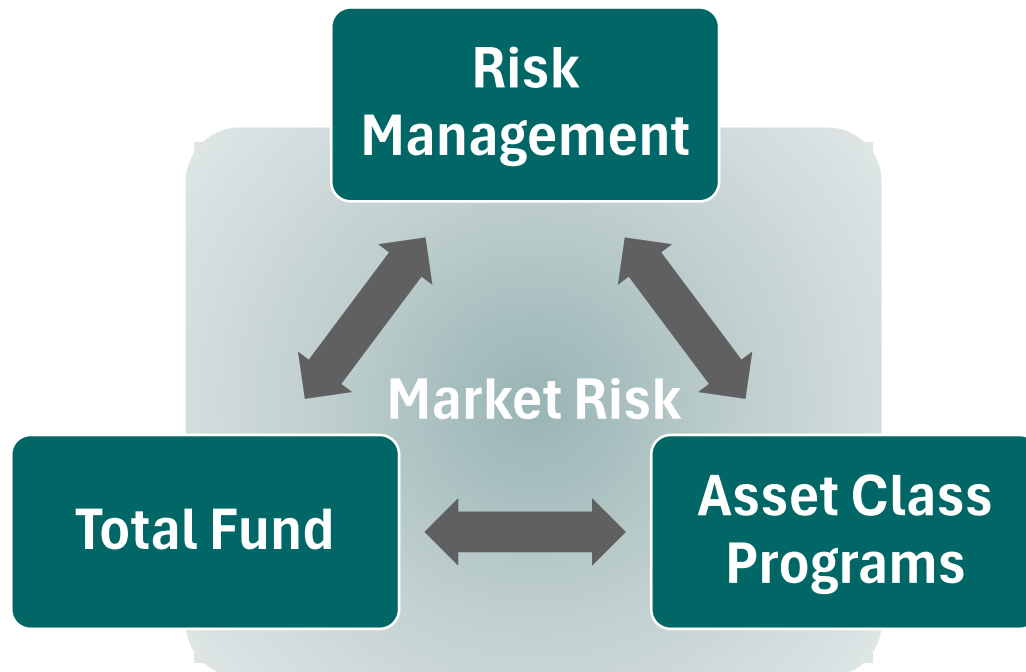
Scott Mootz
Director

Annual Review Topics

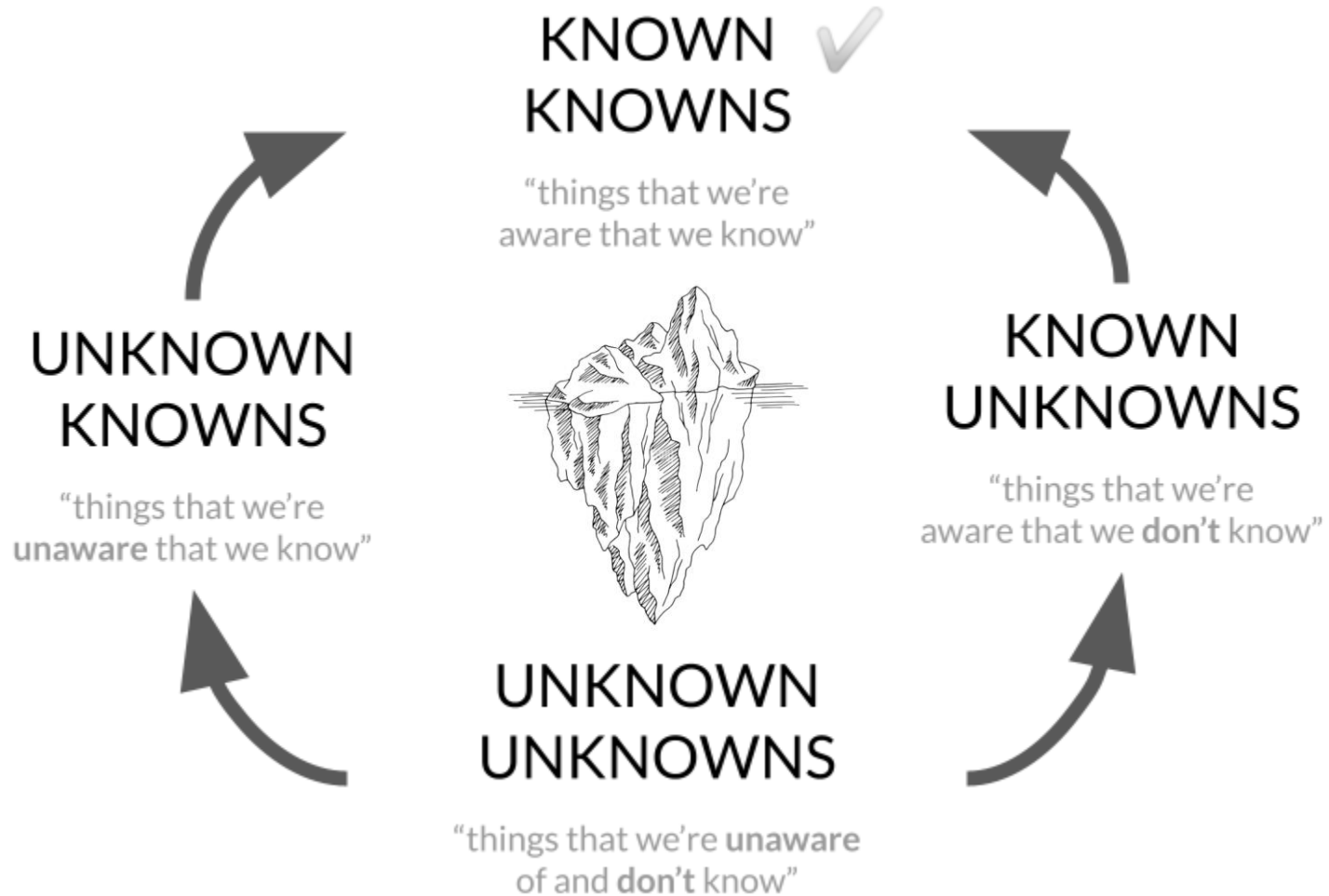


Team Members

Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Scott Mootz	Director	MBA	CFA	17	13
Advait Apte	Sr. Investment Officer	PhD	CFA	7	7
Daniel Sery	Research Analyst	BA	-	1	1
Additional Resources	Portfolio Solutions Group, Asset Class Programs, Management Committee, Investment Operations, Compliance Team, Legal/Regulatory Team, Investment Decision Support				



What is Risk Management? Why is it Important?



Keys to Successful Risk Management



1. Risk-Aware Organizational Culture and Structure

- Risk Management Requires Institutional Buy-In
- Alignment & Management of Institutional Interests
- Independent Risk Management Function
- Risk Takers That Think Like Risk Managers



2. Clear Definitions & Understanding of Risk

- Define Your Fiduciary Responsibilities
- Bottom's Up Modelling of Risks



3. Risk Assessment and Monitoring

- Risk Models Require Constant Vigilance & Skepticism
- Risk Management Does Not Mean Risk Avoidance

Risk Management at VRS

Mission: Ensure key investment risks are *identified, assessed, & managed*
Philosophy: Risk taking should be *deliberate, diversified, & sized appropriately*

Total Plan Risk

- Enterprise Risk System
- Liquidity Management
- “What If” impact modelling
- Scenario Analysis & Stress Testing

Asset Class Risk

- Independent Asset Class Views
- Partnership & Coordination with Asset Class Programs
- Unique Public & Private Markets Modelling

Market Risk

- Internal Dashboards & Signal Monitoring
- Asset Class Programs/External Managers Views
- Strategy Team Outlook
- Capital Market Assumptions



**Monitor Risks and Identify
Actionable Items**

Risk Management Examples

Forward-looking Risk Estimates:

Asset	E(Ret)	Risk	BM Risk	EqBeta	BM EqBeta	TE
Total Fund	7.1	10.4	9.2	0.66	0.60	2.9

Liquidity:

Current Liquidity Schedule						
	Cash	Within 3 Months		>3Mo Public	Private	TOTAL
	1-3 Days	1 Month	1 Qtr	> 1 Qtr	Private	
Total Fund (\$ MM)	32,812	21,840	4,387	4,310	51,010	114,359
<i>% of Fund</i>	29%	19%	4%	4%	45%	

Stress Scenario Shock:

	Equity +20%	Equity -20%
Economic Exposure	13.7%	-13.6%
Smoothed Exposure	12.4%	-11.6%
Benchmark	12.5%	-12.4%

What Are Other Large Allocators Focused On?



Looking Ahead

- Enhance the timeliness & accuracy of risk reporting
- Improve “What If” capabilities for evaluating portfolio shifts & scenario planning
- Enrich Private Credit Risk Modelling
- Evaluate alternative Total Plan Risk Systems
- Explore Internal Diversifying Strategies
- New Hire

Q&A



Portfolio Integration and Treasury Team

Matt Lacy
Program Director

Brock Bell
Director

Team Members

Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Matt Lacy	Program Director	MA	CFA	25	25
Brock Bell	Director	BA		18	<1
TBA	Analyst	TBA	TBA	TBA	TBA
Additional Resources	Portfolio Solutions Group, Asset Class Programs, Management Committee, Investment Operations, Compliance Team, Legal/Regulatory Team, Investment Decision Support				

Why Do We Want to Deploy Leverage?

- Additional capital to invest in diversifying assets
- Additional liquidity to meet increasing monthly retiree obligations
- Dry powder available to invest when asset prices are attractive
- Ability to enhance returns

Current Funding Channels

■ Synthetic Equity

- Replace physical equity with synthetic overlay
- Retain cash cushion to absorb MTM losses
- Deploy remaining cash to the plan

■ Cash Release

- Extension of existing agency lending program
- Use cash collateral that would normally be deployed to the cash reinvestment pool in other parts of the plan

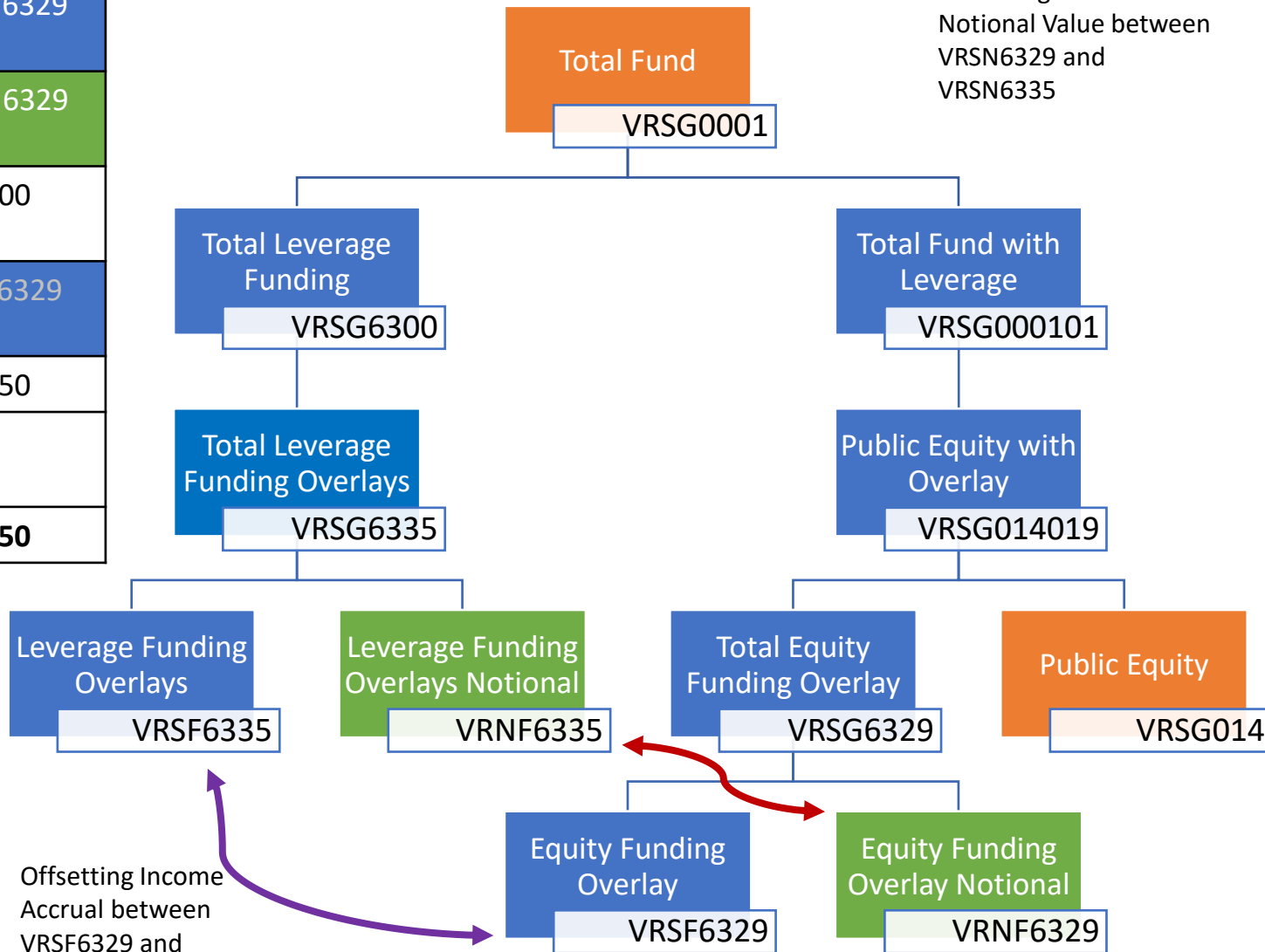
■ Costs have been in-line with expectations

- Funding ~10 bps richer than SOFR + 50 bps benchmark

Synthetic Equity Funding

Total Equity Funding Overlay	G6329
Equity Funding Overlay Notional	N6329
Notional Paired with VRSN6335	500
Equity Funding Overlay	F6329
Cash	150
Swap (\$650 Notional)	
Total NAV	650

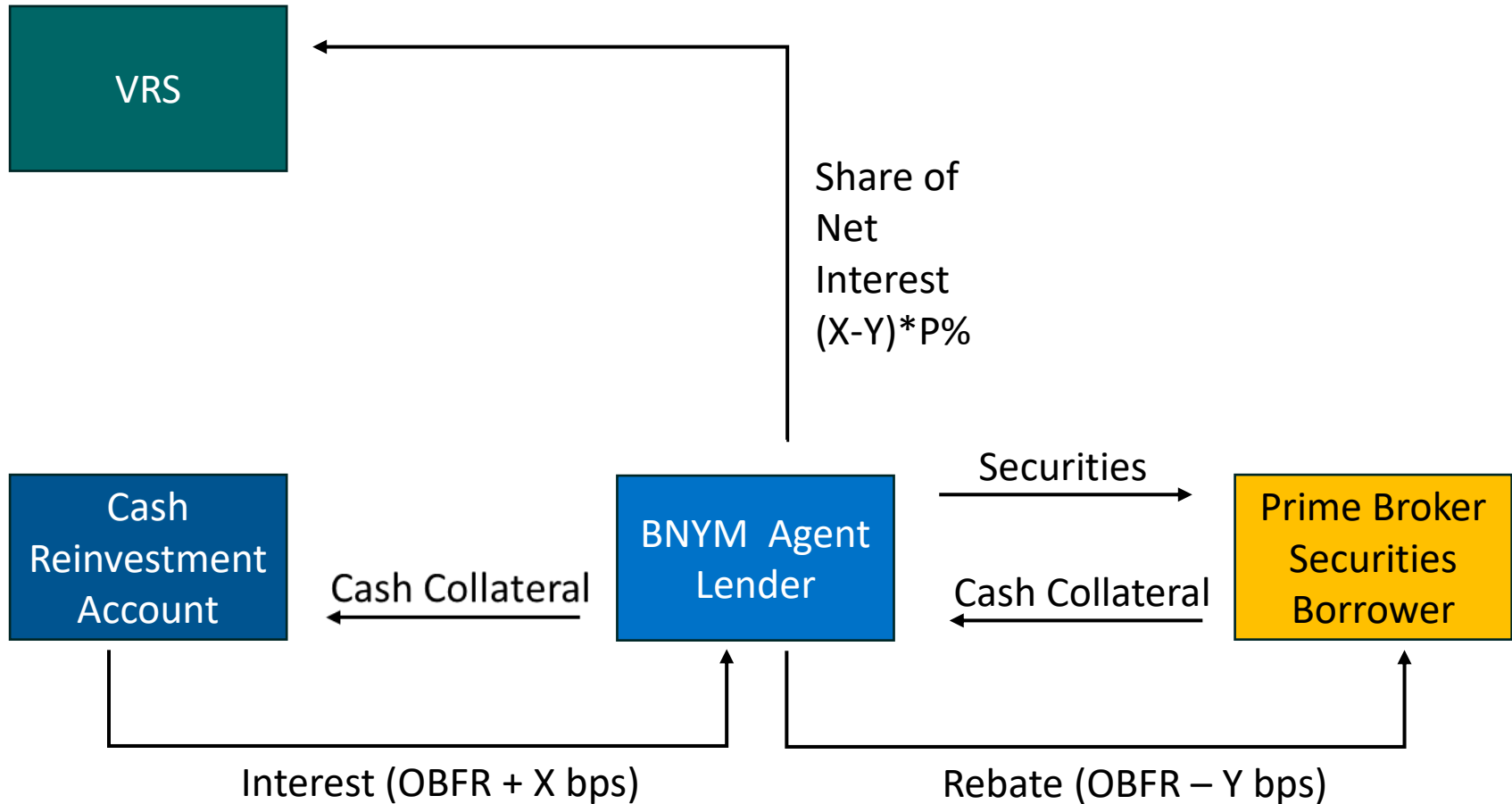
Offsetting 500mm Notional Value between VRSN6329 and VRSN6335



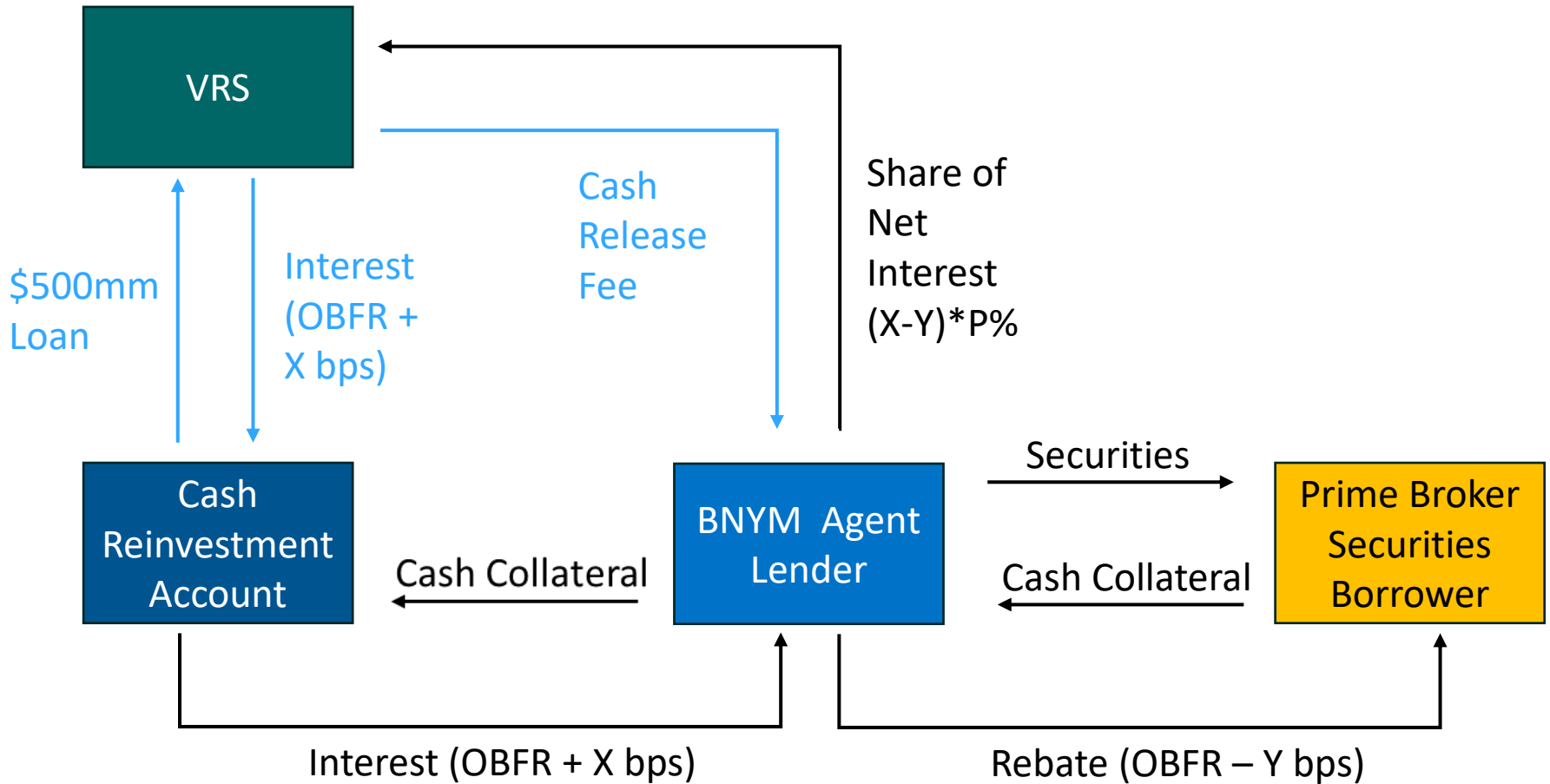
Leverage Funding Overlays compensates **Equity Funding Overlay** for the cost of providing the loan

Offsetting Income Accrual between VRSF6329 and VRSF6335

Agency Securities Lending



Cash Release Program



Securities Lending Utilization

	Equity	Fixed Income	Total
Program Market Value	38.1	17.0	55.1
Securities on Loan Market Value	2.6	6.4	9.0
Utilization %	7%	38%	16%
Securities on Loan Collateralized with Cash	1.4	2.3	3.7
Securities on Loan Collateralized with Non Cash	1.2	4.1	5.3
Cash Loans (% of Total Loans)	53%	36%	41%
Non Cash Loans (% of Total Loans)	47%	64%	59%

**Values in Billions of USD*

Treasury Enhancements

- Negotiated 67% increase in our cash release capacity
 - Dollar-for-dollar increase in available liquidity and borrowing power
- Partnership with securities lending data vendor
 - Provides independent benchmarking and peer comparison for securities lending revenue and performance
 - Tools to proactively identify trading and optimization opportunities
- Onboarded 2 new ISDA swap financing counterparties
 - Additional balance sheet capacity
 - More competitive pricing
 - Progressing in negotiations with 3-4 additional new counterparties

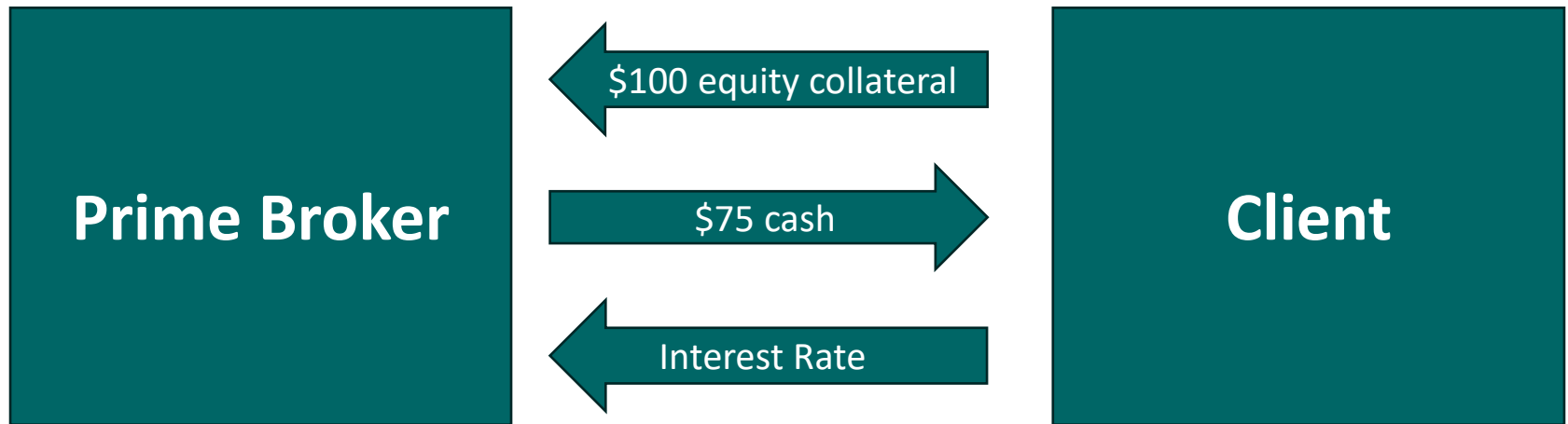
Potential Future Funding Sources

- **Self-Directed Lending**
 - One-off, tactical trades that VRS team negotiates directly with specific borrowers
 - Utilize more inventory to increase both revenue and liquidity
 - Leverages agent lender for execution and operational infrastructure
 - Augments existing regular-way agent lending program
- **Fixed Income Index Swaps**
 - Compliments equity index swaps
 - Highly liquid and lower overall cost of funding relative to equity index swaps
- **Single-Security Total Return Swaps**
 - Optimize financing rates, margin, and funding duration
 - Able to maintain active management

Prime Brokerage Margin Lending

- What is Prime Brokerage?
 - Clearing & settlement
 - Trade execution
 - Securities lending
 - Margin lending
- Prime Brokerage Margin Lending
 - Creates significant borrowing capacity while maintaining the desired amount of risk
 - Lower cost of funding than current equity index swaps
 - Unlike other funding facilities, financing only paid when borrowing from available capacity (i.e. funding "dry powder")
 - Able to maintain active management

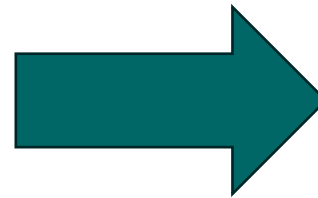
Margin Lending Visualization



- Prime broker lends cash to clients, using client long positions as collateral
- Client pays a financing rate for the cash loan (Risk-free rate + spread)

PB Margin Lending Sample Drawdown Scenario

Metric	Current Portfolio
Long Market Value	\$10,000,000,000
Net Cash	\$100,000,000
Account Equity	\$10,100,000,000
Margin Requirement	\$2,200,000,000
Margin Excess	\$7,900,000,000
Borrowed Cash	\$500,000,000
Remaining Margin Excess	\$7,400,000,000



	20% Drawdown
	\$8,000,000,000
	\$100,000,000
	\$8,100,000,000
	\$1,760,000,000
	\$6,340,000,000
	\$500,000,000
	\$5,840,000,000

Additional Treasury Initiatives in Progress

■ Counterparty Risk Management Process

- Independent and observable metrics to assess counterparty risk
- Counterparty risk committee will include representation from Treasury, Risk, Operations, Legal and Compliance
- Process to limit and unwind exposure, if necessary

■ Liquidity Management Process

- Enhancements to liquidity monitoring and reporting

■ Additional Treasury Resources

- In process of hiring junior analyst
- Focus on technical and operational skills
- Operations team hiring additional resources to support PB infrastructure



Case Study: Market Drawdown Battle Planning

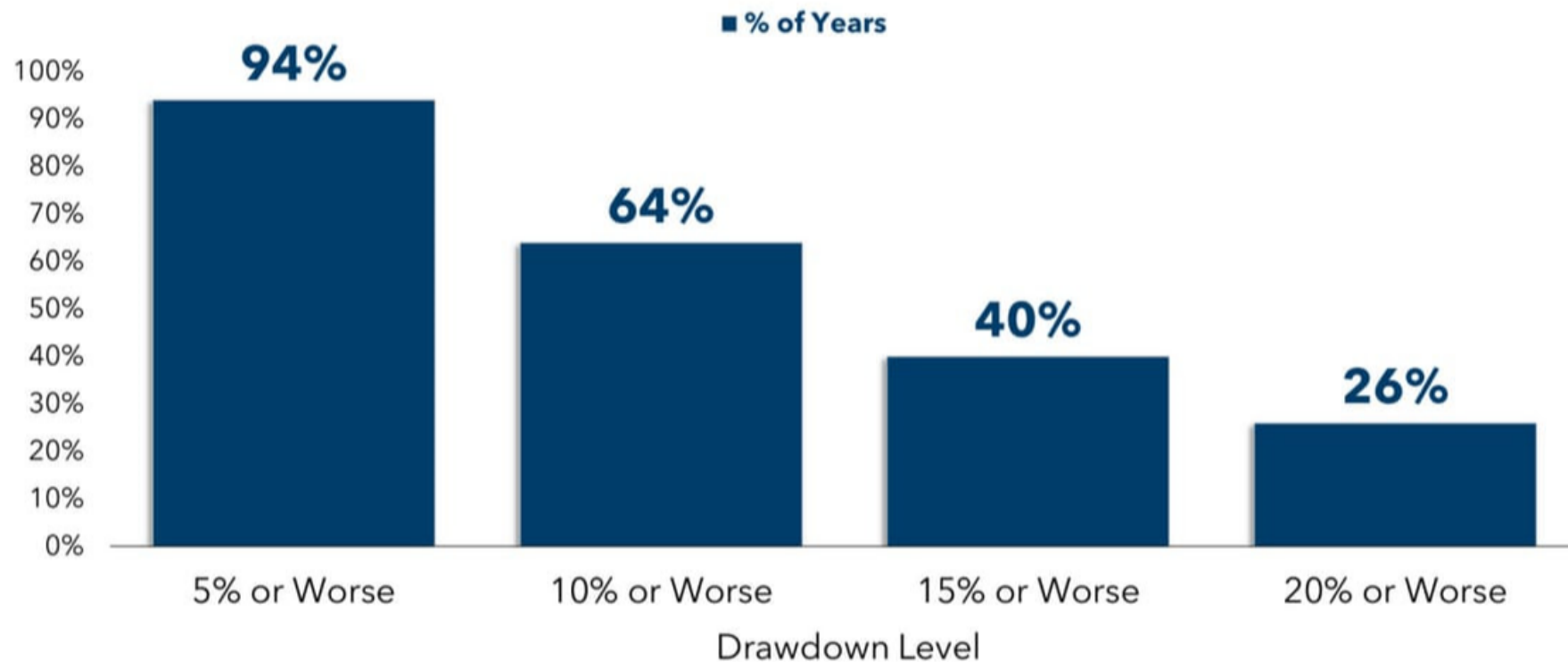
Portfolio Solutions Group

Case Study: Drawdowns are a Normal Part of Investing

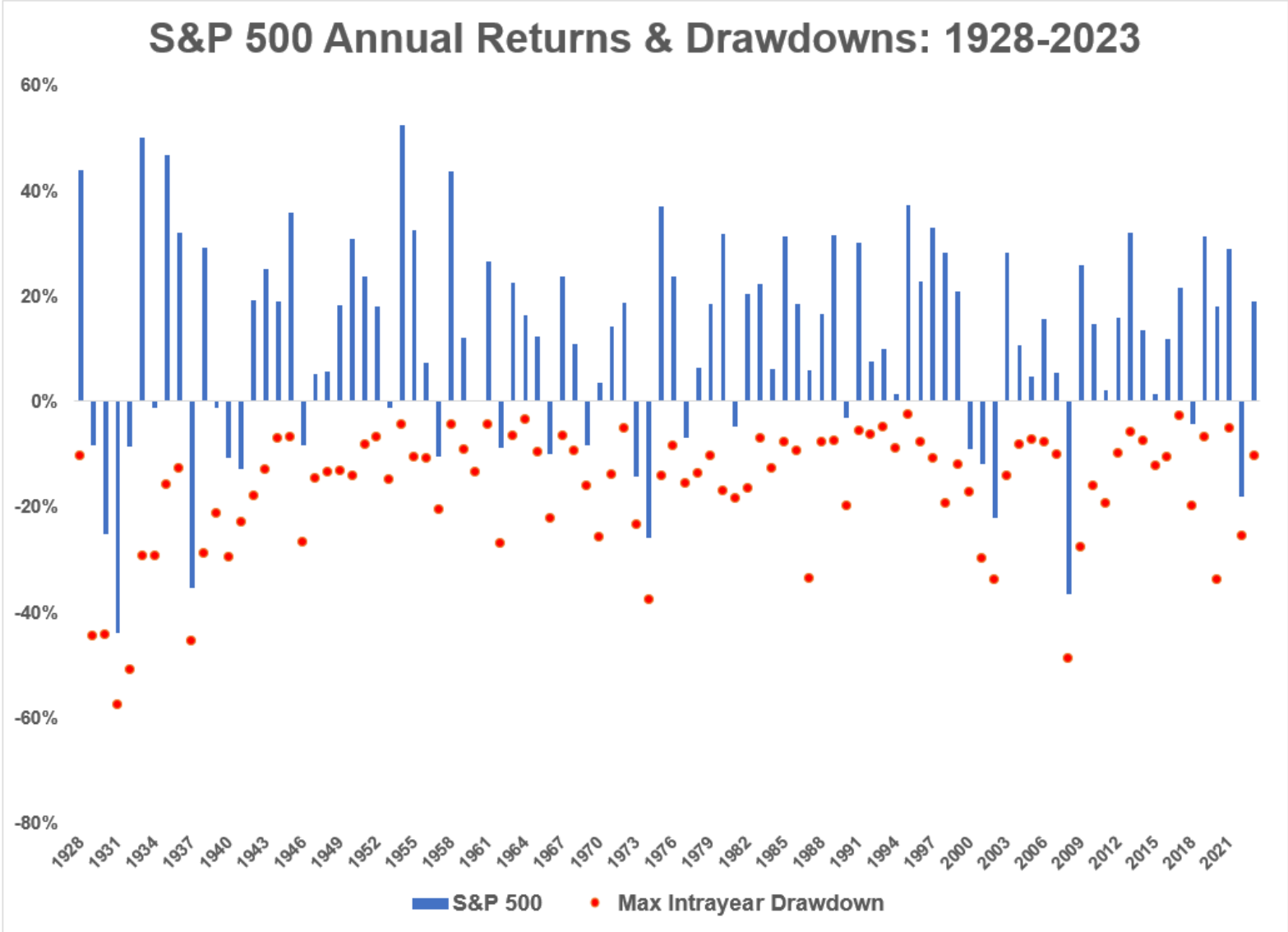
94% of Years Have a Drawdown of 5% or Worse

% of Years in the S&P 500 with x% Drawdown

1928 - 2023



Case Study: Large Drawdowns Can Occur Even in Winning Years



Case Study: Market Drawdown Battle Planning

Assumptions:

- 6/30 Public NAVs & Private Unfunded Commitments
- 3.5% Expected Net Fund Draws
- 6.5% Expected Public Investments Growth and 2% Illiquidity Premium (8.5% Private Investments Growth)
- -25% Equity Market Shock, 50% private market impact (-12.5%)
- We evaluate shocks to private investment Calls and Distributions vs. base expectations (33% adverse in both cases)

Outcome:

Stress impact of private cash flows could result in a \$6B (~5% of pre-drawdown Fund NAV) incremental 1Yr liquidity need

Market Drawdown Battle Plan: Short Horizon

- Equities Sell off 25% over a month
- Private Assets do not mark lower
- Variations:
 - A: Fixed Income performance -8% or 8%?
 - B: Do we have immediate capital calls from Private Assets?
- Objectives:
 - Fund immediate cash flow needs
 - Reduce basis risk vs. policy
 - Allocate to dislocated assets

VRS Portfolio: Historical Monthly Drawdowns

	3/31/2020	9/30/2022	10/31/2008	11/30/2008	Fall 2008
Public Equity	-14.6%	-8.4%	-18.5%	-7.0%	-24.2%
Fixed Income	-2.2%	-4.6%	-3.4%	2.2%	-1.2%
Credit Strategies	-8.4%	-1.9%	-11.9%	-4.3%	-15.8%
Real Assets	-0.6%	1.7%	-7.9%	-5.3%	-12.8%
Private Equity	3.5%	-3.8%	-0.2%	0.0%	-0.3%
PIP	2.2%	-1.2%	N/A	N/A	N/A
Dstrat	-12.7%	-7.4%	N/A	N/A	N/A
RBI	-5.5%	-0.6%	N/A	N/A	N/A
Total Fund	-6.9%	-4.0%	-12.3%	-4.1%	-15.9%

Scenario 1 : Liquidity Demands

- Margin for existing Equity derivative contracts
 - Cash cushion falls from 30% to 6%
 - Top back up to 20% and add delta
- Benefit payments to retirees – Assume normal monthly payout of ~330mm
- No outsized capital calls for private assets
- Goal is to rebalance back to policy targets
- Challenge: Bonds did not hold up and will not provide a ready source of funds

Initial Portfolio – Downside Shock

	Policy		Active	Return	New Port	New
	Wgt	Port Wgt	Wgt	Shock	Wgt	Active
						Wgt
Public Equity	33.0%	33.4%	0.4%	-25.0%	27.7%	-5.3%
Fixed Income	16.0%	14.9%	-1.1%	-8.0%	15.2%	-0.8%
Credit Strategies	14.0%	14.8%	0.8%	0.0%	16.4%	2.4%
Real Assets	14.0%	12.3%	-1.7%	0.0%	13.6%	-0.4%
Private Equity	16.0%	17.0%	1.0%	0.0%	18.8%	2.8%
PIP	2.0%	2.1%	0.1%	0.0%	2.3%	0.3%
Diversifying Strategies	4.0%	3.2%	-0.8%	0.0%	3.5%	-0.5%
EMP	0.0%	1.2%	1.2%	0.0%	1.3%	1.3%
Cash	2.0%	1.7%	-0.3%	0.0%	1.9%	-0.1%
Leverage	-1.0%	-0.6%	0.4%	0.0%	-0.7%	0.3%

Use Cash and Leverage to get Equities Closer to Policy

	New Active Wgt	Trades	Post Trade Wgt	Post Trade Act Wgt
Public Equity	-5.3%	3.0%	30.9%	-2.1%
Fixed Income	-0.8%	0.0%	15.2%	-0.8%
Credit Strategies	2.4%	0.0%	16.4%	2.4%
Real Assets	-0.4%	0.0%	13.6%	-0.4%
Private Equity	2.8%	0.0%	18.9%	2.9%
PIP	0.3%	0.0%	2.3%	0.3%
Diversifying Strategies	-0.5%	0.0%	3.5%	-0.5%
EMP	1.3%	0.0%	1.3%	1.3%
Cash	-0.1%	-0.7%	0.8%	-1.2%
Leverage	0.3%	-2.3%	-3.0%	-2.0%
Equities		3.0%		
Physical		2.0%		
Synthetic		1.0%		
Leverage		-2.3%		
Cash Release		-1.5%		
Synthetic Funding		-0.8%		

Scenario 2 : Liquidity Demands

- Margin for existing Equity derivative contracts
 - Cash cushion falls from 30% to 6%
 - Top back up to 20% and add delta
- Benefit payments to retirees – Assume normal monthly payout of ~330mm
- **Private Credit calls \$2 billion of capital**
- Goals:
 - Generate funding to meet large capital call
 - Attempt to mitigate equity underweight
- Challenge: Bonds performed well and can supply funding, but this is a large call

Scenario 2: Downside Shock

	Policy		Active	Return	New Port	New
	Wgt	Port Wgt	Wgt	Shock	Wgt	Active
						Wgt
Public Equity	33.0%	33.4%	0.4%	-25.0%	27.0%	-6.0%
Fixed Income	16.0%	14.9%	-1.1%	8.0%	17.3%	1.3%
Credit Strategies	14.0%	14.8%	0.8%	0.0%	15.9%	1.9%
Real Assets	14.0%	12.3%	-1.7%	0.0%	13.3%	-0.7%
Private Equity	16.0%	17.0%	1.0%	0.0%	18.3%	2.3%
PIP	2.0%	2.1%	0.1%	0.0%	2.3%	0.3%
Diversifying Strategies	4.0%	3.2%	-0.8%	0.0%	3.4%	-0.6%
EMP	0.0%	1.2%	1.2%	0.0%	1.3%	1.3%
Cash	2.0%	1.7%	-0.3%	0.0%	1.8%	-0.2%
Leverage	-1.0%	-0.6%	0.4%	0.0%	-0.7%	0.3%

Sell bonds, spend cash, add leverage to fund capital call and equity exposure

	New Active Wgt	Trades	Post Trade Wgt	Post Trade Act Wgt
Public Equity	-6.0%	2.5%	29.7%	-3.3%
Fixed Income	1.3%	-1.5%	15.9%	-0.1%
Credit Strategies	1.9%	0.0%	17.9%	3.9%
Real Assets	-0.7%	0.0%	13.3%	-0.7%
Private Equity	2.3%	0.0%	18.4%	2.4%
PIP	0.3%	0.0%	2.3%	0.3%
Diversifying Strategies	-0.6%	0.0%	3.5%	-0.5%
EMP	1.3%	0.0%	1.3%	1.3%
Cash	-0.2%	1.2%	0.7%	-1.3%
Leverage	0.3%	-2.2%	-2.9%	-1.9%
Equities		2.5%		
Physical		1.0%		
Synthetic		1.5%		
Leverage		-2.2%		
Cash Release		-1.0%		
Synthetic Funding		-1.2%		

Testing Assumptions

- Accessing cash release program
 - Inventory still available? Hedge Funds de-risk?
 - Trade-off if selling bonds
- Sell physical assets and replace with levered synthetic overlays
 - T-costs to sell physicals
 - Difficult funding environment for banks. May prefer futures and acceptance of basis risk
 - Cannibalization of securities lending inventory
 - Loss of alpha opportunities

Q&A



Diversifying Strategies

Ross Kasarda
Director

Kristina Koutrakos
Director

Program Evolution & Objectives

Risk-Based Investments

Strategies that are likely to provide convex returns in more prolonged bear markets

Investments that seek to diversify the return drivers with low correlation to overall Plan returns

Dynamic Strategies

Strategies that seek to add value through asset allocation decisions and the incorporation of broad, thematic views

Investments that seek to diversify the return drivers with low correlation to other active return streams

Diversifying Strategies

Strategies that are likely to diversify the VRS return stream and risk exposures across market cycles and investment environments

Actively managed mix of risk mitigation and return enhancing strategies

Actionable knowledge transfer across the Plan

Annual Review Topics



Team Members

Professional	Position	Highest Degree / Credentials	Investment Experience	VRS Tenure
Ross Kasarda	Director	MA, CFA	20	20
Kristina Koutrakos	Director	MBA, CAIA	25	8
Katherine Grawe	Portfolio Manager	MBA	25	6
Greg Hines	Senior Investment Officer	MA, CFA	13	11
Additional Resources	Portfolio Solutions Group VRS Investment Staff External Managers & Research Partners Investment Operations Department Portfolio Assistant			

Portfolio Expectations

- Uncorrelated returns to growth assets
- Return over a full cycle $>$ cash + 250 bps
- Diversifying risk exposures to traditional betas

Program Structure

Diversifying Strategies

Risk Responders

- Strategies that are likely to provide convex returns in more prolonged bear markets

Strategy types:

Long duration

Risk Hedging

Trend

Dispersion

Return Enhancers

- Investments that seek to diversify the return drivers with low correlation to overall Plan returns

Strategy types:

Relative Value

Arbitrage

Factor Strategies

Global Macro

Adaptive Portfolio Allocation



Higher Market Risk Levels



Higher Hedging Costs



Higher Cash Rates



Returns & Risk

TRAILING RETURNS	Since Inception	5 Year	3 Year	1 Year
Diversifying Strategies	5.0	5.6	4.0	9.7
Benchmark	5.5	5.4	2.5	9.1
Excess Return	-0.5	0.2	1.6	0.5

FISCAL YEAR RETURNS	FY19	FY20	FY21	FY22	FY23	FY24
Diversifying Strategies	2.2	-3.2	20.4	-4.7	7.7	9.7
Benchmark	6.0	3.9	16.6	-8.2	7.4	9.1
Excess Return	-3.8	-7.1	3.8	3.5	0.3	0.5

RISK METRICS	Since Inception	5 Year	3 Year	1 Year
Volatility	7.6	7.8	6.4	4.2
Tracking Error	3.3	7.5	3.6	3.5
Beta to MSCI ACWI	0.4	0.4	0.3	0.2

Data as of June 2024. Program changes for the former Dynamic Strategies portfolio removed beta starting 12/31/2023. Ex ante beta closer to 0 with the new structure. Inception July 2018.

Looking Ahead



Total Plan Fit

As the total fund evolves, what are the most diversifying assets and exposures?



Idea Amplification

Where and how can we best deploy funds to capitalize on market dislocations across the Plan?



Risk Assessment

How can we continue to evolve how we monitor and measure risk and find ways to manage and mitigate?



Exposure Management Portfolio

Katie Grawe
Portfolio Manager

Agenda

- Motivation & objectives
- Characteristics & investment criteria
- Diligence framework
- Keys to success

Motivation & Objectives

- Clarify objectives, analytical, & process framework

- Optimize decision making
 - Generate more ideas
 - Idea socialization & transparency
 - Collaboration
 - Resource management: competition for brainspace

- VRS Edge
 - Internal investment talent
 - External relationships
 - Implementation skill



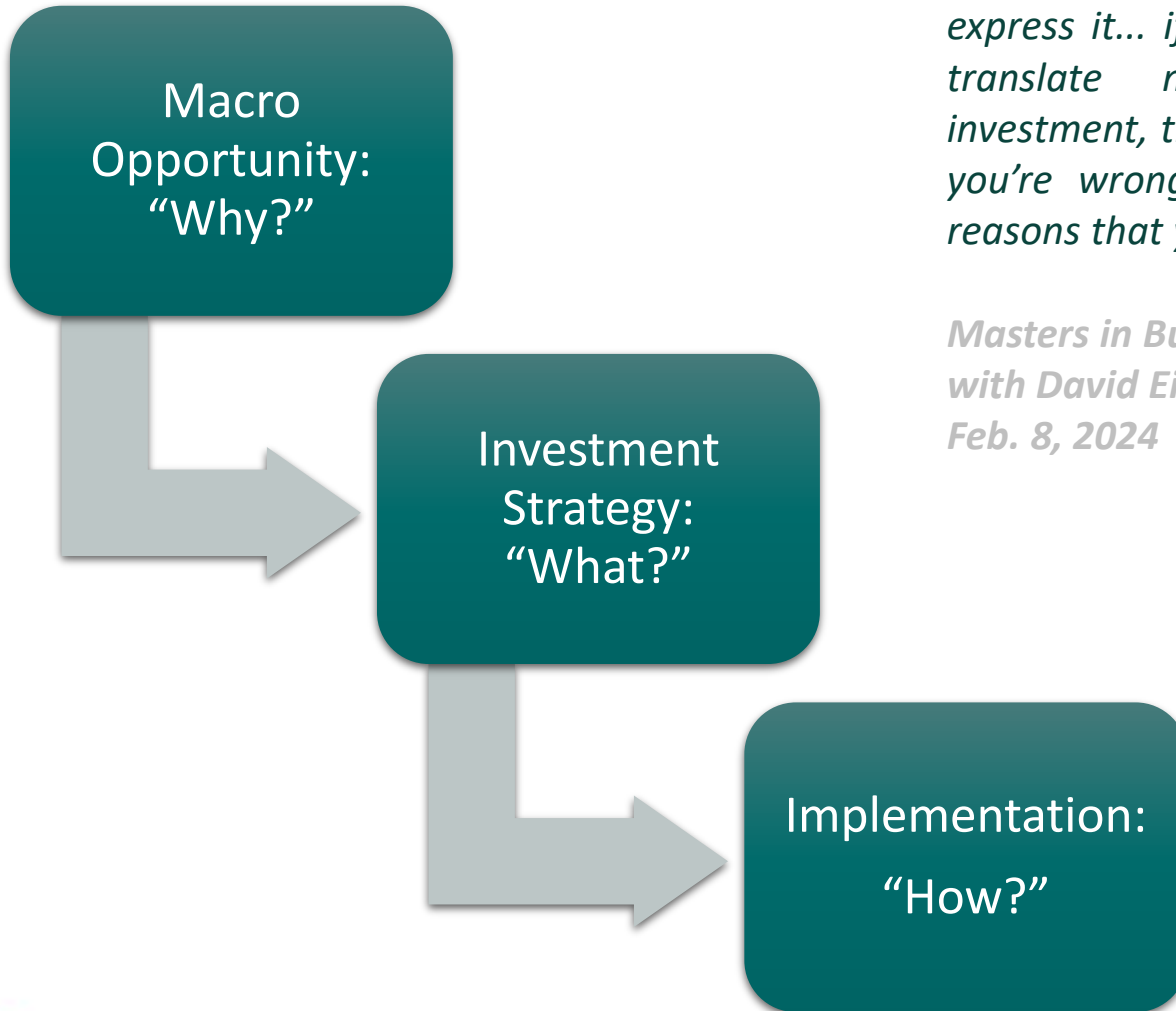
Characteristics & Investment criteria

- Cross-asset, relative value orientation; macro underpinning
- High conviction, opportunistic ideas over an intermediate horizon
 - Capitalize on both big public market levers as well as idiosyncratic opportunities
 - Fit in with VRS as “more barge than jet ski”
 - Total Fund++ hurdle
- Trade criteria:
 - Amplification/risk reduction trades: sizing positions from programs (“Exposure management”)
 - New ideas or “tweeners”: providing a home to ideas that might not otherwise fit
- Inclusive, VRS-wide effort

Generic diligence framework for EMP ideas

What I've learned over time is, is if you have an idea, find the most direct way to express it... if you can make your insight translate most directly into the investment, then at least if you're right or you're wrong, it's going to be for the reasons that you thought."

Masters in Business Podcast interview with David Einhorn, Greenlight Capital, Feb. 8, 2024



Idiosyncratic exposure to macro driven dislocations

Keys to Success

- Process improvement is a process
 - Embedded feedback mechanisms
 - Practice, like anything new
- Communication & collaboration:
 - Process & decision-making transparency
- Economic alignment

Learning from mistakes as well as successes...

*Linchpin analysis*¹

- Identify the main uncertain factors or key variables (drivers) that will determine an outcome.
- Identify working assumptions (linchpin premises) about how the key drivers will operate.
- Advance convincing evidence and reasoning to support the linchpin premises.
- Address any indicators or signposts that would render linchpin premises unreliable.
- Ask what dramatic events or triggers could reverse the expected outcomes.

¹ Roger Z George, "Fixing the Problem of Analytical Mind-Sets: Alternative Analysis," *International Journal of Intelligence & Counterintelligence*, Vol. 17, No. 3, 2004, 391, and Mike Mauboussin, *Consilient Observer* March 16, 2022