



## Investment Advisory Committee (IAC) Meeting

[VRS Boardroom](#)  
[Bank of America](#)  
[Pavilion Building, 3rd Floor](#)

Wednesday, 8/23/2023  
9:00 AM - 12:30 PM ET

### 1. Approval of Minutes (April 12, 2023)

*IAC Meeting Minutes 04122023 - Final - Page 2*

### 2. CIO Report

*CIO Report, August 2023 - Page 7*

*Asset Allocation Report, 06-30-23 - Page 12*

*Daily Asset Allocation Report, 08-16-2023 - Page 13*

*Performance Summary, 06-30-2023 - Page 14*

*Plan Tracking Error, 06-30-23 - Page 15*

*New Investments and Terminations, 08-23-2023 - Page 16*

### 3. Asset Liability Management Update

*ALM Update, August 2023 - Page 18*

### 4. Portfolio Solutions Group Review

*Portfolio Solutions Group Overview, August 2023 - Page 35*

*Risk Management, Risk Based Investments, August 2023 - Page 37*

*Portfolio Strategy, Dynamic Strategies, August 2023 - Page 53*

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## Minutes

A meeting of the Investment Advisory Committee of the Virginia Retirement System was held on April 12, 2023 with the following members present:

Larry Kochard, Chairperson  
Hance West  
Michael Beasley  
Theodore Economou, joined remotely under § 2.2-3708.3  
Palmer Garson  
Tom Gayner  
Nancy Leake  
Bryan Lewis  
Rod Smyth

The following Board members were present:

A. Scott Andrews  
Joseph Montgomery  
John Bennett  
Michael Disharoon  
Brett Hayes

The following staff members were in attendance:

Trish Bishop, Andrew Junkin, Jennifer Schreck, Stephen Adelaar, John Alouf, Advait Apte, Rory Badura, Parham Behrooz, Matthew Bennett, Jeanne Chenault, Michael Cooper, Perry Corsello, Sara Denson, Laura Fields, Laurie Fennell, Josh Fox, Holly Glass, Katherine Grawe, JT Grier, Mehtab Haleem, K.C. Howell, Kristina Koutrakos, Matt Lacy, Vu Le, Chung Ma, Jennifer MacKnight, Curt Mattson, Moses Maxfield, Kidus Molla, Teresa Nguyen, Walker Noland, Greg Oliff, Steven Peterson, Steven Ramirez, Garrett Rhodes, Daniel Schlusser, Jenny Schoeller, Kristy Scott, Michael Scott, Viet Tran, Korey Turner, Leslie Weldon, Daniel Whitlock, Cindy Wilkinson, and Steve Woodall.

Also in attendance was Ira T. Astin, a member retiree; Lauren Albanese of Financial Investment News; Jamie Bitz with Joint Legislative Audit and Review Commission; Tom Cassara and James Walton of Agilis LLC; Joe Ebisa of Pageant Media; Gary Gammon of the Virginia Auditor of Public Accounts; Gregg Gethard of PEI Media; Madeline Katz of Financial Times; Mitchell King and Brigid Schutsky of BlackRock; Alton Wallace of Private Equity Career; and Nicholas Zizzo of SEI.

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 of the Code of Virginia.

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

Mr. Lewis – present  
Mr. West – present  
Mr. Beasley – present  
Ms. Leake – not present (entered at 9:01, just after roll call)  
Ms. Garson – present  
Mr. Smyth – present  
Mr. Gayner – not present (entered at 9:20)  
Mr. Economou – present  
Mr. Kochard – present

#### **Minutes**

A motion was made by Mr. Smyth and seconded by Mr. Beasley to approve the minutes for the November 30, 2022 Committee meeting. The motion was unanimously approved via roll call:

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

#### **CIO Report**

Mr. Junkin opened his CIO report by commenting on market conditions for the first part of the year. Mr. Junkin then presented the Asset Allocation Report, Performance Summary, and Total Fund Tracking Error Report as of December 31, 2022. Last, Mr. Junkin reviewed the New Investments and Terminations Report.

#### **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. Whitlock and Mr. Schlussler provided a review of the Total Public Equity program and the Internal Equity Management program, respectively. Mr. Whitlock's review topics included an overview of program objectives, the team, markets, exposures, results, external

manager breakout including hires and terminations, Diverse Investment Management Engagement managers, and forward-looking plans and priorities. Mr. Schlussler's review topics included asset allocation, the team, markets, exposures, and results.

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

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

**Discuss Risk Profile Enhancement**

Mr. Junkin and Mr. Ma led a discussion regarding the VRS Investment Risk Profile and the introduction of leverage as a tool for risk mitigation. Mr. Junkin discussed the motivation for looking at leverage, provided a definition of leverage, and detailed the key tenets for the use of leverage. Mr. Ma discussed the use of asset allocation leverage, the benefits and considerations for the use of this type of leverage in the VRS Investment portfolio, the cost of implementation, and provided an example of what asset allocation leverage would look like in the current portfolio.

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

**Forward Returns and Scenario Analysis**

Dr. Peterson and Mr. Badura led the Forward Returns and Scenarios discussion. Dr. Peterson discussed the forward returns of the State Plans', External Managers' forward returns comparison, and the VRS Long Term Forward Returns. In addition, Dr. Peterson discussed the forward returns attribution. Mr. Badura then presented five different scenarios and the impact of each scenario on funded status, contribution rates, and liquidity.

**Discuss Proposed Benchmark Changes**

Next, Mr. Junkin led a discussion on a proposed benchmark change for Private Equity and Credit Strategies. Specifically, Mr. Junkin recommended adjusting the regional weights of the current Private Equity benchmark to better reflect the global private equity opportunity set. In addition, Mr. Junkin recommended removing Investment Grade from the Credit Strategies portfolio and benchmark, and reweighting the Credit Strategies benchmark to 50% High Yield Bonds and 50% Bank Loans. Last, Mr. Junkin recommended a benchmark study be conducted to review alternative ways to benchmark Public Equity.

The recommended benchmarks are:

Private Equity: The regional benchmarks of the MSCI ACWI IMI Index (net VRS tax rates) lagged by three months, weighted to reflect the Private Equity opportunity set (currently 75% North America, 20% Europe, and 5% Asia and Emerging Markets) effective January 1, 2024.

Credit Strategies: A blend of the Morningstar LSTA Performing Loan Index (50%) and Bloomberg US High Yield Ba/B Issuer Cap Index (50%) effective July 1, 2023.

Private Investment Partnerships: The recommended change to the Private Equity benchmark also impacts the Private Investment Partnerships benchmark. Therefore, the Private Investment Partnerships benchmark would be the weighted average of the custom Private Equity Benchmark (the regional benchmarks of the MSCI ACWI IMI Index (net VRS tax rates) lagged by three months, weighted to reflect the Private Equity opportunity set (currently 75% North America, 20% Europe, and 5% Asia and Emerging Markets)) (33%), the NCREIF Private Real Estate Benchmark (ODCE Index (net) lagged by three months) (25%), the Other Real Assets Custom Benchmark (the CPI-U Index plus 400 basis points per annum lagged by three months) (8%), the Bloomberg US High Yield Ba/B 2% Issuer Cap Index (17%), and the Morningstar LSTA Performing Loan Index (17%) effective January 1, 2024

After some discussion, the committee indicated its agreement with both proposed benchmark changes, as well as with the study to examine the Public Equity benchmark.

### **Adjournment**

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

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

The meeting was adjourned at 12:19 p.m.

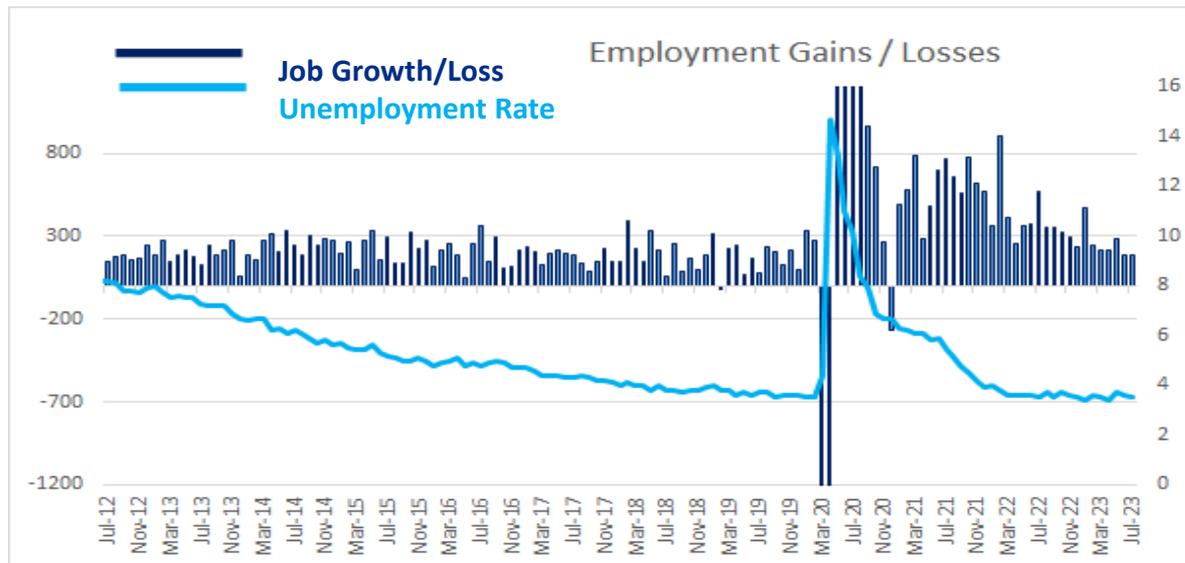
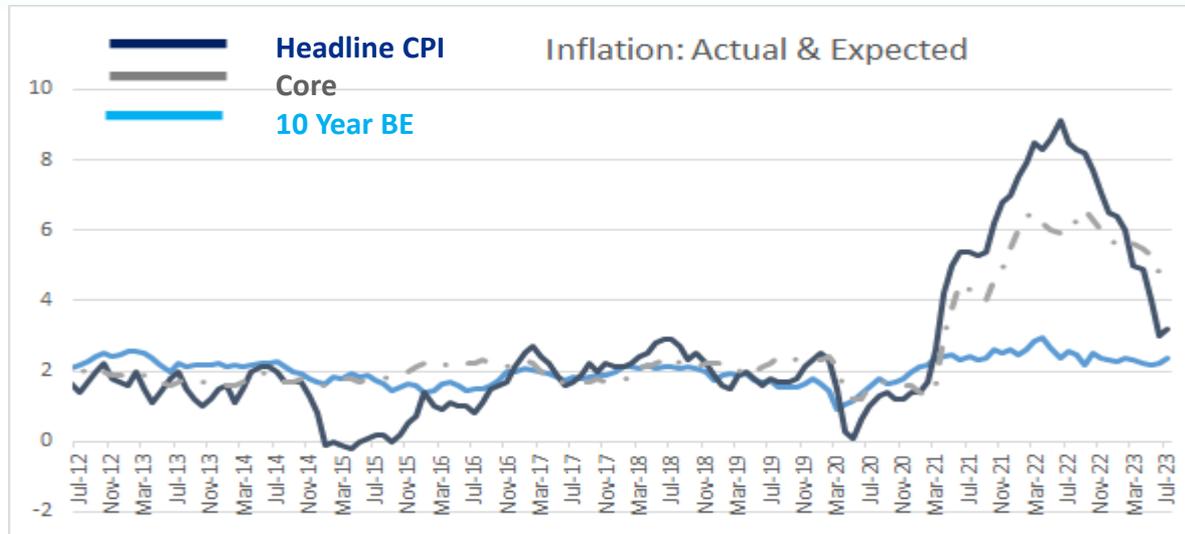
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Larry Kochard, Chairperson

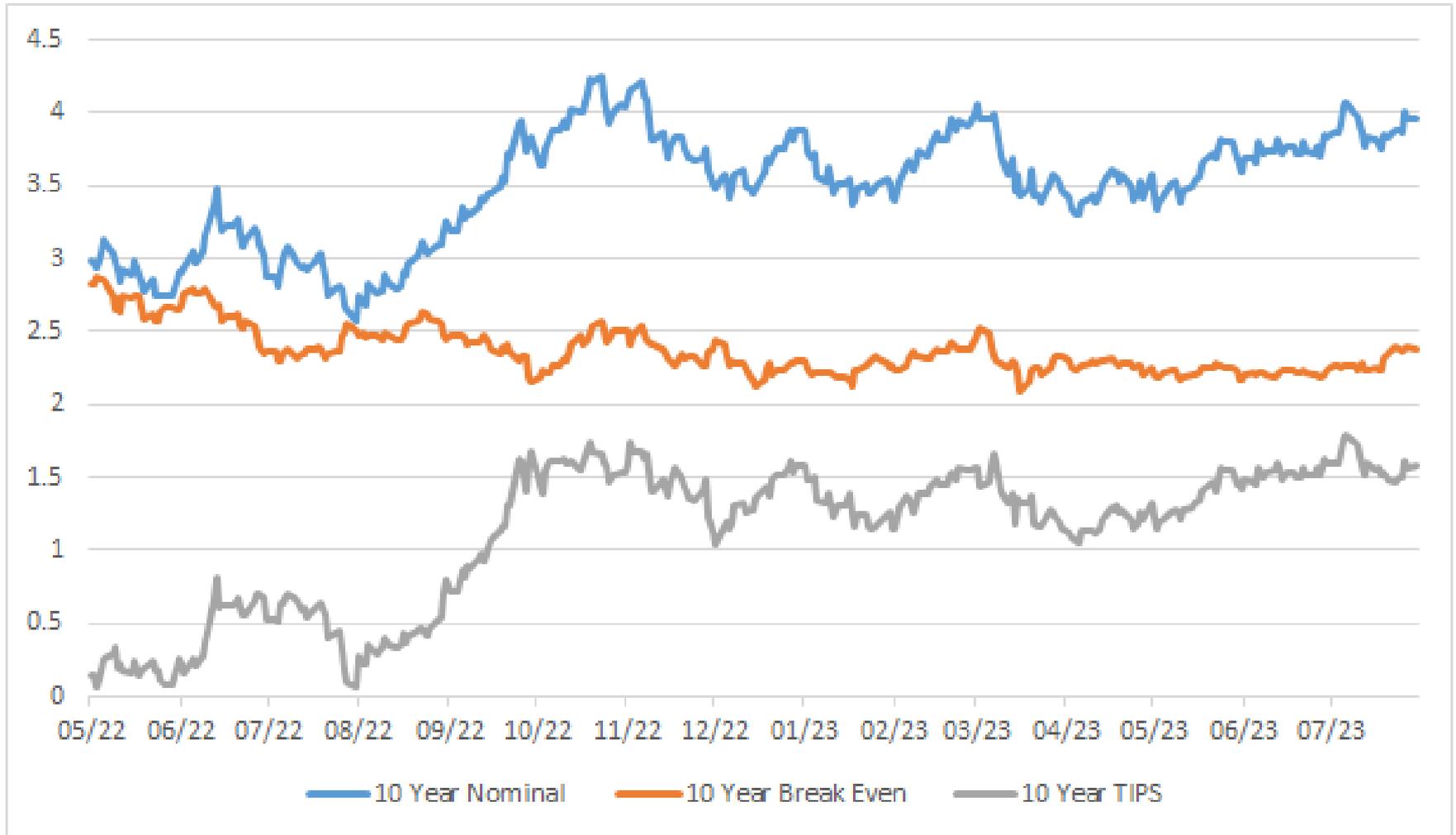
# Chief Investment Officer Report Market Review - July 2023 Andrew Junkin



# Inflation and Employment

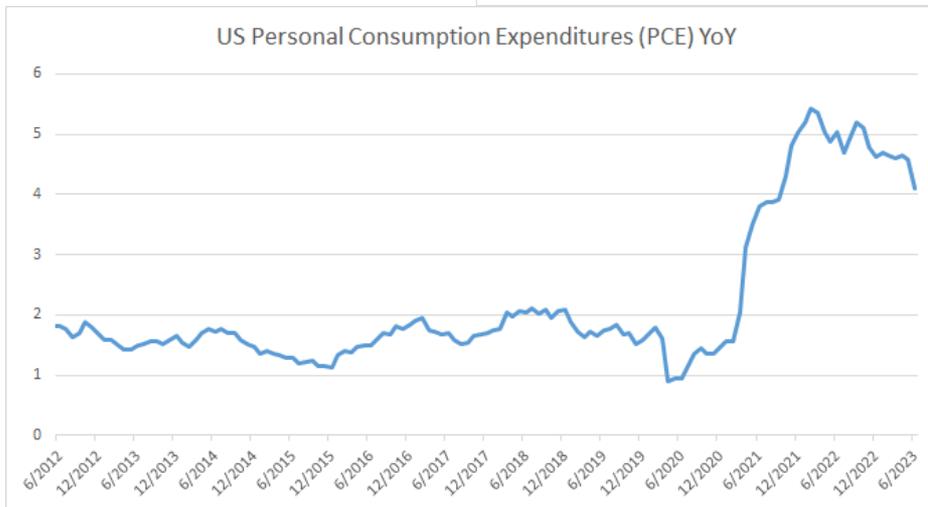
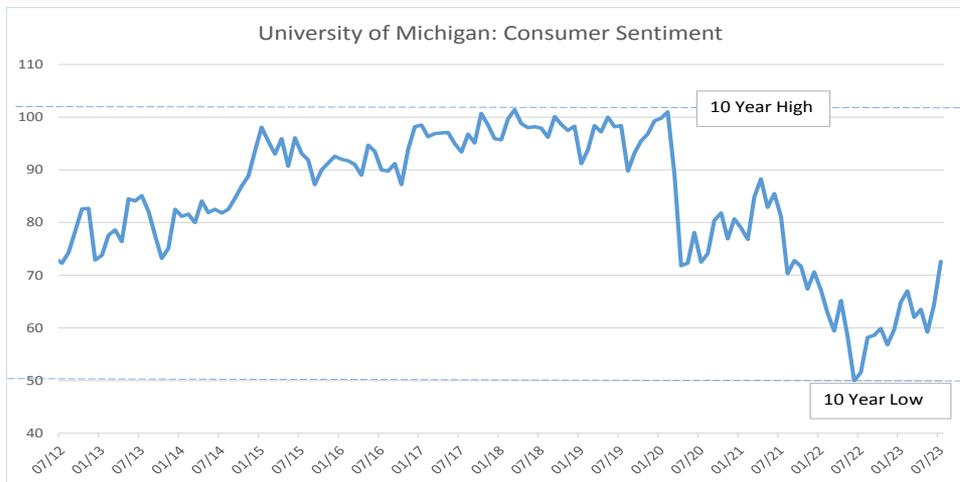


# Rate Moves (10Y Nominal, Real & BEI)



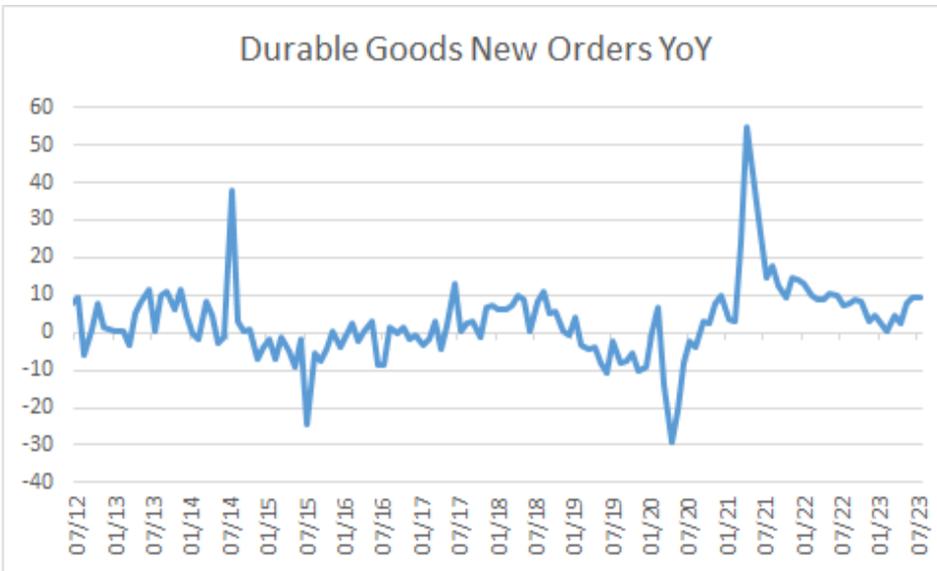
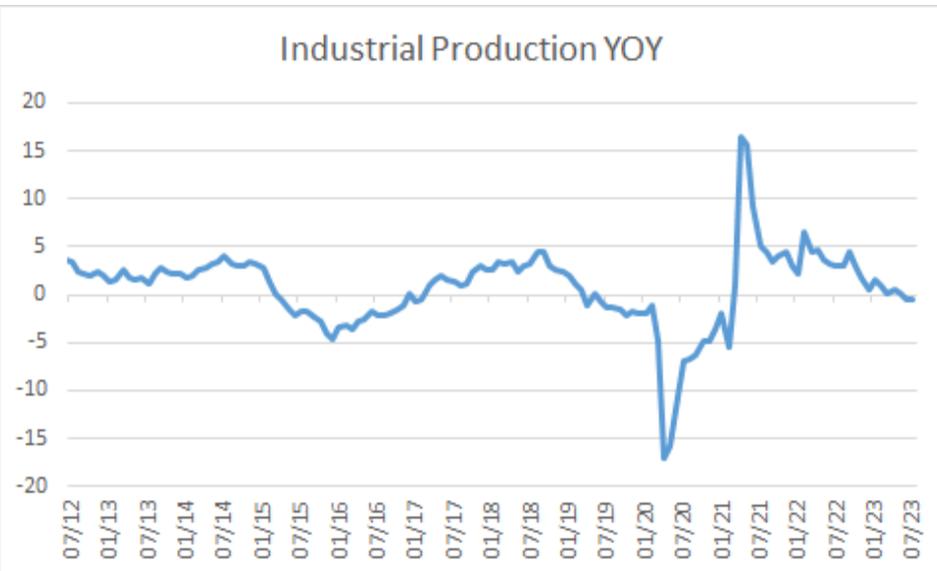
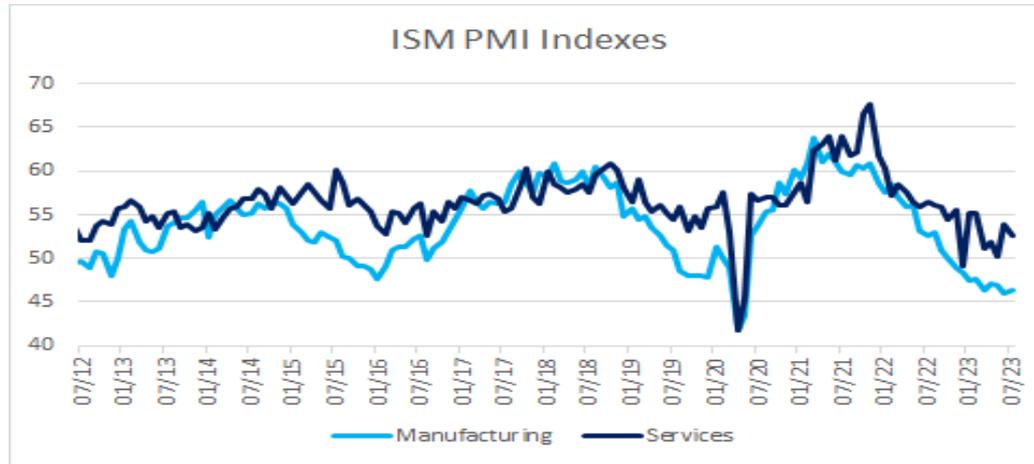
Data Source: Bloomberg

# Consumer Activity



Data Source: Bloomberg

# Business Activity

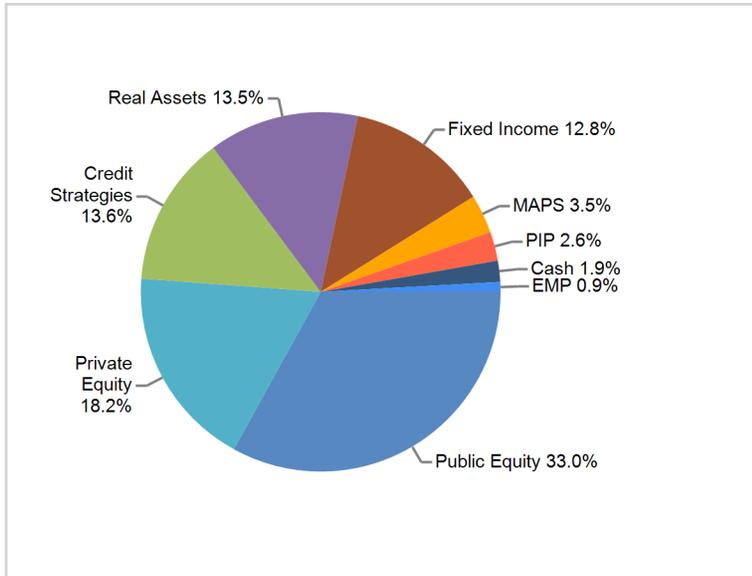


Data Source: Bloomberg

# Asset Allocation Report

## June 30, 2023

For Internal Investment Purposes Only



Tracking Error	
3Yr-Total Fund:	2.75%
3Yr-Total Public:	1.71%
5Yr-Total Fund:	2.28%
5Yr-Total Public:	1.50%

	Current \$Bil	Current Weight	Policy Weight	Variance	Allowable Range		Internal %
<b>Total Fund</b>	<b>105.0</b>						<b>27.6%</b>
<b>Public Equity</b>	<b>34.7</b>	<b>33.0%</b>	<b>34.0%</b>	<b>-1.0%</b>	<b>-5%</b>	<b>+5%</b>	<b>46.9%</b>
<b>Fixed Income</b>	<b>13.5</b>	<b>12.8%</b>	<b>15.0%</b>	<b>-2.2%</b>	<b>-3%</b>	<b>+5%</b>	<b>94.7%</b>
<b>Credit Strategies</b>	<b>14.3</b>	<b>13.6%</b>	<b>14.0%</b>	<b>-0.4%</b>	<b>-5%</b>	<b>+5%</b>	
RS Credit	2.8	2.7%	5.6%	-2.9%			
NRS Credit	11.5	11.0%	8.4%	2.6%			
<b>Real Assets</b>	<b>14.2</b>	<b>13.5%</b>	<b>14.0%</b>	<b>-0.5%</b>	<b>-5%</b>	<b>+5%</b>	
Private RE	9.4	8.9%					
Other RA	4.8	4.6%					
<b>Private Equity</b>	<b>19.1</b>	<b>18.2%</b>	<b>16.0%</b>	<b>2.2%</b>	<b>-5%</b>	<b>+5%</b>	
<b>MAPS</b>	<b>3.7</b>	<b>3.5%</b>	<b>4.0%</b>	<b>-0.5%</b>	<b>-2%</b>	<b>+2%</b>	
DSTRAT	1.7	1.6%					
RBI	2.0	1.9%					0.4%
<b>PIP</b>	<b>2.7</b>	<b>2.6%</b>	<b>2.0%</b>	<b>0.6%</b>	<b>-2%</b>	<b>+2%</b>	
<b>EMP</b>	<b>0.9</b>	<b>0.9%</b>	<b>0.0%</b>	<b>0.9%</b>		<b>+3%</b>	
<b>Cash</b>	<b>2.0</b>	<b>1.9%</b>	<b>1.0%</b>	<b>0.9%</b>	<b>-1%</b>	<b>+4%</b>	

<u>High-Level Exposure</u>	Current \$Bil	Current Weight	Policy Weight	Variance	Allowable Range	
<b>Total Equity</b>	<b>53.8</b>	<b>51.2%</b>	<b>50.0%</b>	<b>1.2%</b>	<b>-10%</b>	<b>10%</b>
<b>Fixed Income + Cash</b>	<b>15.5</b>	<b>14.7%</b>	<b>16.0%</b>	<b>-1.3%</b>	<b>-4%</b>	<b>9%</b>

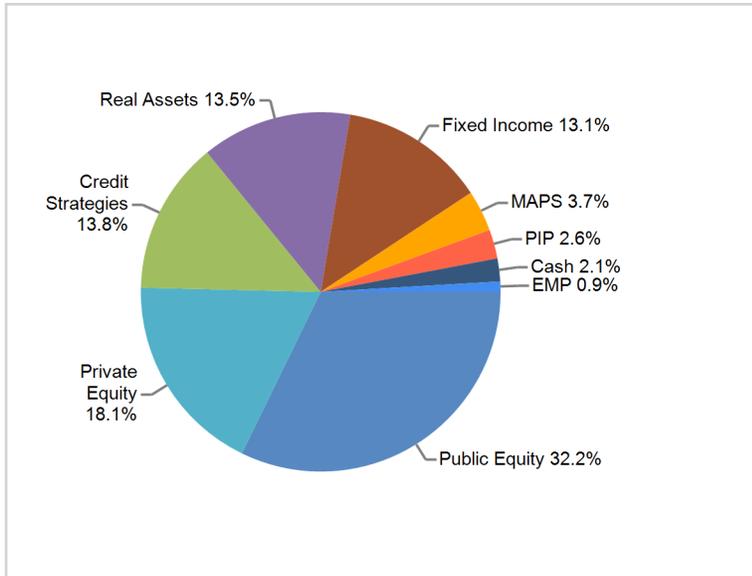
	Current \$Bil	Current Weight	Policy Limit
<b>Hedge Funds</b>	<b>9.8</b>	<b>9.3%</b>	<b>15.0%</b>

\* Total Fund includes the following amt held by the Treasurer of VA: \$ 76 million

• The values shown for each asset class on this report may differ from the VRS Monthly Performance Report due to adjustments related to derivative positions in the Rebalance Account, pending transactions, and certain accruals. The values on this report are a more descriptive representation of the Virginia Retirement System's true economic exposure to each asset class.( 3 adjustments applied )

\*Total Fund and Total Public annualized tracking error is calculated using compounded quarterly returns as of 6/30/2023

\* Differences in totals are due to rounding.



Tracking Error	
3Yr-Total Fund:	2.75%
3Yr-Total Public:	1.71%
5Yr-Total Fund:	2.28%
5Yr-Total Public:	1.50%

	Current \$Bil	Current Weight	Policy Weight	Variance	Allowable Range		Internal %
<b>Total Fund</b>	<b>104.9</b>						<b>27.7%</b>
<b>Public Equity</b>	<b>33.8</b>	<b>32.2%</b>	<b>34.0%</b>	<b>-1.8%</b>	<b>-5%</b>	<b>+5%</b>	<b>47.1%</b>
<b>Fixed Income</b>	<b>13.7</b>	<b>13.1%</b>	<b>15.0%</b>	<b>-1.9%</b>	<b>-3%</b>	<b>+5%</b>	<b>94.7%</b>
<b>Credit Strategies</b>	<b>14.4</b>	<b>13.8%</b>	<b>14.0%</b>	<b>-0.2%</b>	<b>-5%</b>	<b>+5%</b>	
<b>Real Assets</b>	<b>14.2</b>	<b>13.5%</b>	<b>14.0%</b>	<b>-0.5%</b>	<b>-5%</b>	<b>+5%</b>	
Private RE	9.4	8.9%					
Other RA	4.8	4.6%					
<b>Private Equity</b>	<b>19.0</b>	<b>18.1%</b>	<b>16.0%</b>	<b>2.1%</b>	<b>-5%</b>	<b>+5%</b>	
<b>MAPS</b>	<b>3.9</b>	<b>3.7%</b>	<b>4.0%</b>	<b>-0.3%</b>	<b>-2%</b>	<b>+2%</b>	
DSTRAT	1.7	1.6%					6.5%
RBI	2.2	2.1%					0.2%
<b>PIP</b>	<b>2.7</b>	<b>2.6%</b>	<b>2.0%</b>	<b>0.6%</b>	<b>-2%</b>	<b>+2%</b>	
<b>EMP</b>	<b>1.0</b>	<b>0.9%</b>	<b>0.0%</b>	<b>0.9%</b>		<b>+3%</b>	
<b>Cash</b>	<b>2.2</b>	<b>2.1%</b>	<b>1.0%</b>	<b>1.1%</b>	<b>-1%</b>	<b>+4%</b>	

High-Level Exposure	Current \$Bil	Current Weight	Policy Weight	Variance	Allowable Range	
<b>Total Equity</b>	<b>52.9</b>	<b>50.4%</b>	<b>50.0%</b>	<b>0.4%</b>	<b>-10%</b>	<b>10%</b>
<b>Fixed Income + Cash</b>	<b>15.9</b>	<b>15.1%</b>	<b>16.0%</b>	<b>-0.9%</b>	<b>-4%</b>	<b>9%</b>

	Current \$Bil	Current Weight	Policy Limit
<b>Hedge Funds</b>	<b>9.9</b>	<b>9.5%</b>	<b>15.0%</b>

\* Total Fund includes the following amt held by the Treasurer of VA: \$ 178 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 ( 3 adjustments applied )

\*Total Fund and Total Public annualized tracking error is calculated using compounded quarterly returns as of 6/30/2023

\* Differences in totals are due to rounding.

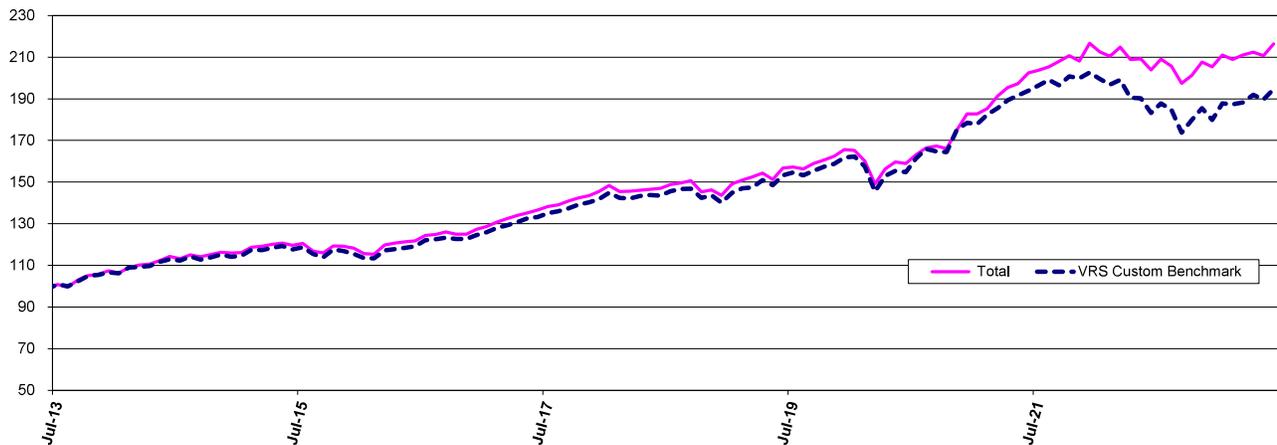
**PERFORMANCE SUMMARY**  
**Rolling Periods Ending**  
**June 30, 2023**



**TOTAL FUND PERFORMANCE**

	10 Yr	5 Yr	3 Yr	1 Yr	Qtr	Month	Fiscal YTD	Cal YTD	Market Value (\$MM)
<b>Total Public Equity Strategies</b>	<b>8.7</b>	<b>7.5</b>	<b>11.6</b>	<b>15.6</b>	<b>5.1</b>	<b>5.5</b>	<b>15.6</b>	<b>11.3</b>	<b>34,691</b>
<i>Benchmark</i>	8.8	8.0	11.4	16.7	6.0	5.9	16.7	13.5	
<b>Total Fixed Income</b>	<b>2.3</b>	<b>1.9</b>	<b>-2.5</b>	<b>0.5</b>	<b>-0.5</b>	<b>-0.1</b>	<b>0.5</b>	<b>2.6</b>	<b>13,453</b>
<i>Benchmark</i>	1.6	0.8	-3.6	-0.1	-0.6	-0.1	-0.1	2.3	
<b>Total Credit Strategies</b>	<b>6.1</b>	<b>6.4</b>	<b>8.3</b>	<b>5.7</b>	<b>2.9</b>	<b>2.0</b>	<b>5.7</b>	<b>5.0</b>	<b>14,327</b>
<i>Benchmark</i>	4.9	4.4	4.3	9.2	2.2	1.8	9.2	5.6	
<b>Total Real Assets</b>	<b>10.0</b>	<b>8.4</b>	<b>11.2</b>	<b>1.7</b>	<b>-0.7</b>	<b>-0.6</b>	<b>1.7</b>	<b>-1.7</b>	<b>14,196</b>
<i>Benchmark</i>	8.0	6.4	7.6	-0.7	-1.4	-0.5	-0.7	-4.5	
<b>Total Private Equity</b>	<b>16.1</b>	<b>17.5</b>	<b>24.9</b>	<b>-0.7</b>	<b>2.9</b>	<b>3.0</b>	<b>-0.7</b>	<b>4.4</b>	<b>19,077</b>
<i>Benchmark</i>	11.1	9.2	16.0	-7.3	7.1	2.5	-7.3	17.7	
<b>Total Private Investment Partnerships</b>	<b>n/a</b>	<b>9.3</b>	<b>16.0</b>	<b>1.9</b>	<b>1.1</b>	<b>1.1</b>	<b>1.9</b>	<b>3.2</b>	<b>2,737</b>
<i>Benchmark</i>	n/a	7.2	10.5	1.1	2.5	1.2	1.1	5.8	
<b>Total Multi-Asset Public Strategies</b>	<b>n/a</b>	<b>4.1</b>	<b>7.3</b>	<b>7.7</b>	<b>3.6</b>	<b>2.6</b>	<b>7.7</b>	<b>5.1</b>	<b>3,664</b>
<i>Benchmark</i>	n/a	4.8	4.8	7.4	2.7	2.1	7.4	6.2	
<b>Total Fund</b>	<b>8.2</b>	<b>8.0</b>	<b>10.8</b>	<b>6.1</b>	<b>2.5</b>	<b>2.7</b>	<b>6.1</b>	<b>5.3</b>	<b>105,041</b>
<i>VRS Custom Benchmark</i>	7.1	6.3	7.9	6.3	3.4	2.7	6.3	8.3	

**10-Year Performance**  
**Indexed to 100**



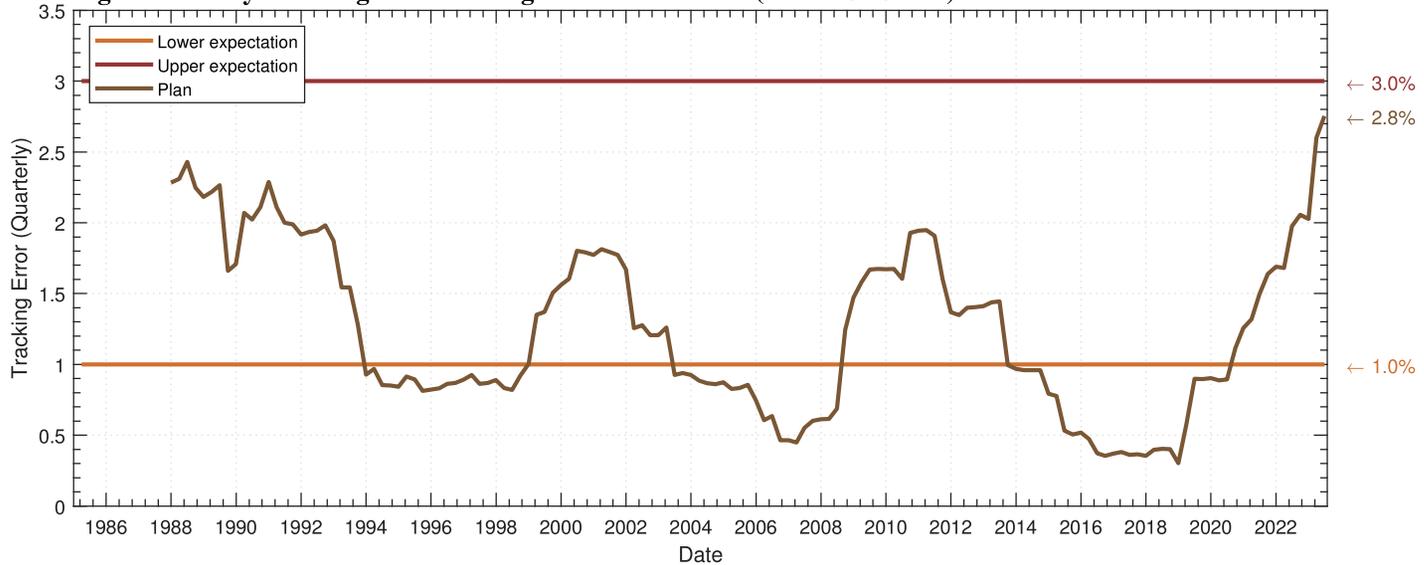
Effective July 2013, the VRS Custom Benchmark is a blend of the Asset Class Benchmarks at policy weights.

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.

# Total Fund Tracking Error



**Figure 1: Policy Tracking Error Rolling Three Year - Plan (as of 06/30/2023)**



**Figure 2: Policy Tracking Error Rolling Five Year - Plan (as of 06/30/2023)**



Virginia Retirement System

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.

**VRS Investment Department**  
Recap of New Investments/Terminations  
Time Period: 04/13/2023 – 08/23/2023



Program	Action	Effective Date	Commitment/ Current Value	Funding/ Defunding Period	Description
Real Assets	Hired	05/09/2023	\$50 Million	5 Years	<b>Lime Rock Resources Fund VI</b> – A closed-end commingled fund investing in domestic oil and gas assets.
Real Assets	Hired	05/15/2023	\$125 Million	4 Years	<b>Westbrook Real Estate Fund XII</b> – A value-add closed-end commingled fund investing in existing real estate assets.
Real Assets	Hired	06/01/2023	\$200 Million	4 Years	<b>Carson JV IV</b> – An Industrial Joint Venture.
Real Assets	Hired	07/28/2023	\$125 Million	5 Years	<b>LS Power Equity Partners V</b> – A closed-end fund investing in power generation and energy transition infrastructure assets in North America.
Real Assets	Hired	08/08/2023	\$200 Million	5 Years	<b>Global Infrastructure Partners Fund V</b> – A closed-end commingled fund investing in global infrastructure.
Private Equity	Hired	07/01/2023	\$300 million	6 Years	<b>GTCR XIV</b> - A buyout fund that invests in Financial Services and Technology, Healthcare, Business & Consumer Services, and Technology, Media & Telecommunications.
Private Equity	Hired	07/01/2023	\$300 million	6 Years	<b>TA XV</b> - A growth equity fund that will invest in global, private, middle-market companies in select growth industries: Technology, Healthcare, Financial Services, Consumer, and Business Services.
Private Equity	Hired	07/03/2023	€200 million	6 Years	<b>CVC IX</b> – A mega buyout fund with a focus on Western Europe. Investments will be diversified across 12 potential industries and sourced from 16 local offices.
Private Equity	Hired	07/31/2023	\$200 million	5 Years	<b>NGP XIII</b> – A North American energy focused private equity firm. Investments will primarily consist of upstream oil and gas exploration and production companies with midstream and mineral investments also considered.
Credit Strategies	Hired	06/21/2023	\$585 million	Immediate	<b>OHA Oak Hill Syndicated Loan</b> - A fund of one mandate investing primarily in leveraged loans and high yield bonds.
Credit Strategies	Terminated	05/31/2023	\$628 million	Immediate	<b>Beach Point Credit</b> – A separate account investing in broadly syndicated bank loans.

Program	Action	Effective Date	Commitment/ Current Value	Funding/ Defunding Period	Description
Risk-Based Investments	Hired	06/30/2023	\$250 million	Immediate	<b>Aksia Totsumen</b> – A fund that will invest in convex and defensive strategies.



Virginia  
Retirement  
System

# Asset Liability Management Update

Andrew Junkin  
Chief Investment Officer

Matt Lacy  
Program Director, Portfolio Integration

August 23, 2023



- ALM update
- Timeline
- Implementation progress
- Liquidity stress testing platform
- Takeaways

## Includes leverage in two types

### Rebalancing Leverage

- 3% approved
- To be used only in rare circumstances where expected costs to rebalance or opportunities are large
- Do not want to be a forced seller

### Asset Allocation Leverage

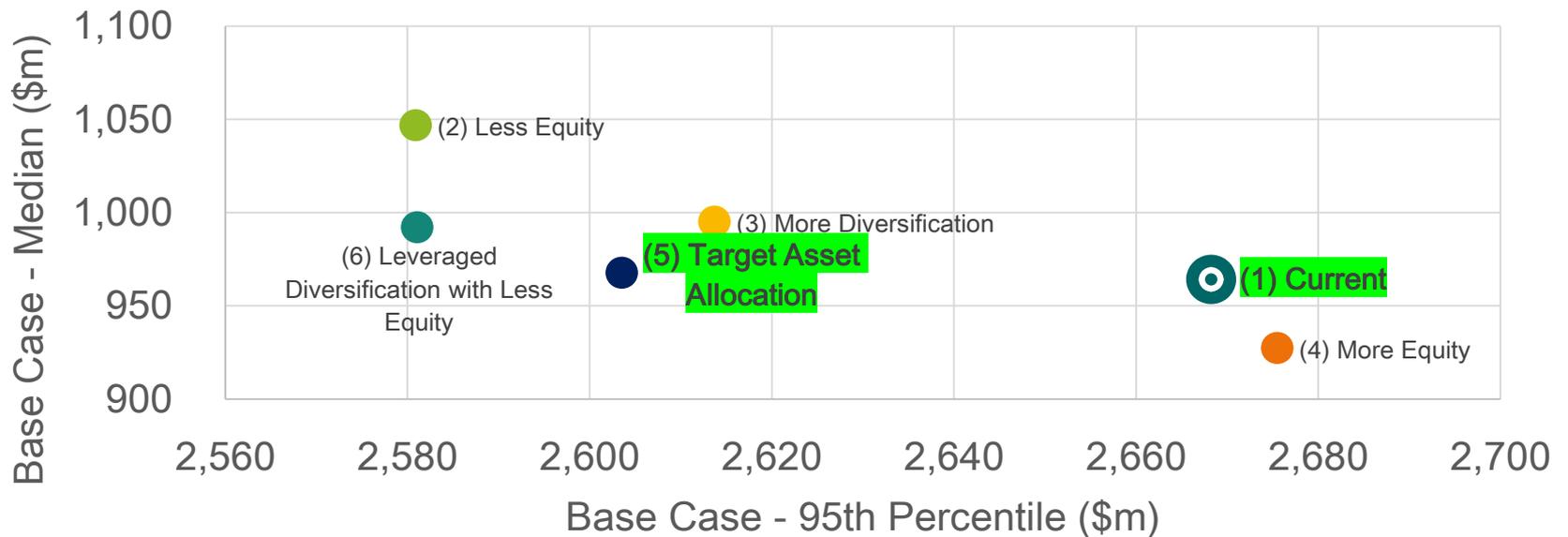
- 3% approved
- Used to increase diversification for portfolio
- Glide path to SAA expected to be 3 years, with continuous feedback and evaluation of process
- Regular communication with stakeholders

# Strategic Asset Allocation (SAA)

Asset Class	Current SAA	Target SAA
Public Equity	34%	32%
Fixed Income	15%	16%
Credit Strategies	14%	16%
Real Assets	14%	15%
Private Equity	16%	15%
PIP	2%	1%
MAPS	4%	6%
Cash	1%	2%
Leverage	0%	3%
<b>Total</b>	<b>100%</b>	<b>100%</b>
Expected Return	7.1%	7.1%
Expected Volatility	12.6%	12.0%
CF Yield	2.5%	2.5%
Ret/Vol	0.57	0.60

# Contribution Efficient Frontier 20 Years

Contributions (annualized, millions)  
20 Years - State Plan



*Projections shown under 'Baseline' economic scenario. Asset class returns are stochastically generated, such that the median return and volatility is consistent with those presented on page 8. Asset class returns and results generated by VRS and reviewed by Agilis.*

# Roadmap to Launch



Jun 2023

Choose policy portfolio

Aug 2023

Staff update to IAC

Sep 2023

Update IPC/Board

- Glide path details
- Discuss IPS/new policies

2023/24

Updates on progress

Finalize new policies ahead of Day 1 launch

H1 2024

Begin Phase 1 of glide path

- Leverage should be managed holistically, at the fund level
- Much of the new activities associated with leverage to be completed by PSG
- Acquisition of best practices knowledge from asset owners and buy-side
- Determine and set-up liquidity sources
  - Synthetic exposure to assets
  - Securities lending
  - Repos
- Work on appropriate reporting and communication tools

## Today Launch

- |  |                                     |   |
|--|-------------------------------------|---|
|    | <input checked="" type="checkbox"/> | • Update Investment Policy Statement and Investment Beliefs       |
|    | <input checked="" type="checkbox"/> | • Draft Leverage Policy   |
| <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> | • Identify options for funding – finalize for first stage         |
| <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> | • Ability to trade futures, swaps, borrow from securities lending |
| <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> | • Liquidity reporting and management tools                        |
| <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> | • Financing dashboard   |
|    | <input checked="" type="checkbox"/> | • Counterparty risk dashboard                                     |
| <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> | • Other risk management dashboards                                |
| <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> | • Enhanced portfolio management tools                             |
|  | <input checked="" type="checkbox"/> | • Enhanced rebalancing and cash flow monitors                     |
|  | <input checked="" type="checkbox"/> | • Complete documentation for financing options                    |
|  | <input checked="" type="checkbox"/> | • Dynamic scenario and stress testing tools                       |

Complete  
 In-progress  
Page 25 of 67

# Sources of Funding – Pros and Cons

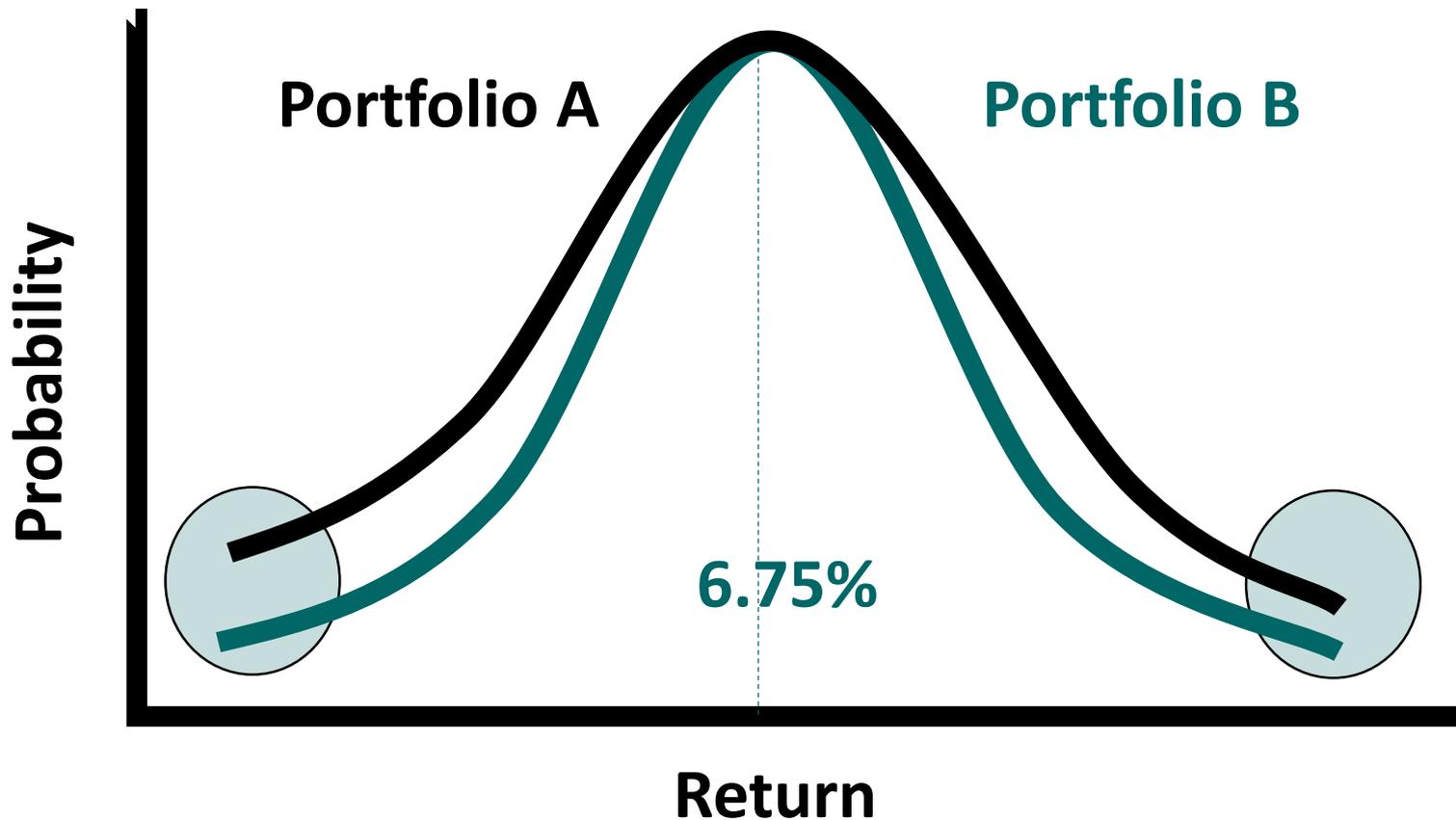
Sources	Pros	Cons
Synthetics (futures, swaps)	Already in use	Higher cost
	Liquid	Disruptive to programs
	Lock in funding spreads	High margin requirements
	High capacity	Forgo alpha in programs
Security Lending Cash Release	Lowest cost	Limited capacity
	Minimal disruption	Small reduction in income from security lending
Sponsored Cleared Repo	Low cost	Limited capacity
	Fewer legal docs than bilateral repo	Shares inventory with security lending
	Low counterparty risk	Only government securities used as collateral

- Asset-class level return simulation model
- Key features
  - Cash flow sub-models for private assets and beneficiary payments
  - Accommodates strategic and tactical leverage testing
  - Tracking of collateral use and capacity
  - Can accept variety of return matrices
    - Historical
    - Monte-Carlo
    - Ad-hoc user-defined scenarios
- Can apply a variety of decision rules for plan rebalancing
- Can analyze the impact of private asset commitment strategies and their impact on liquidity

- Add more diversification to the portfolio to defend the fund
- Trading off diversification for operational complexity
- Implementation planning is underway
- Glide path will be presented to Board with an expected start date during the first half of 2024. Exact date based on progress of “Checklist”

# Appendix

## Illustrative



# Current Situation – An Example

34% Policy Allocation to Public Equity (EQ)

Cash (\$34B)

Buy

Physical EQ Exposure (\$34B)

Economic Exposure



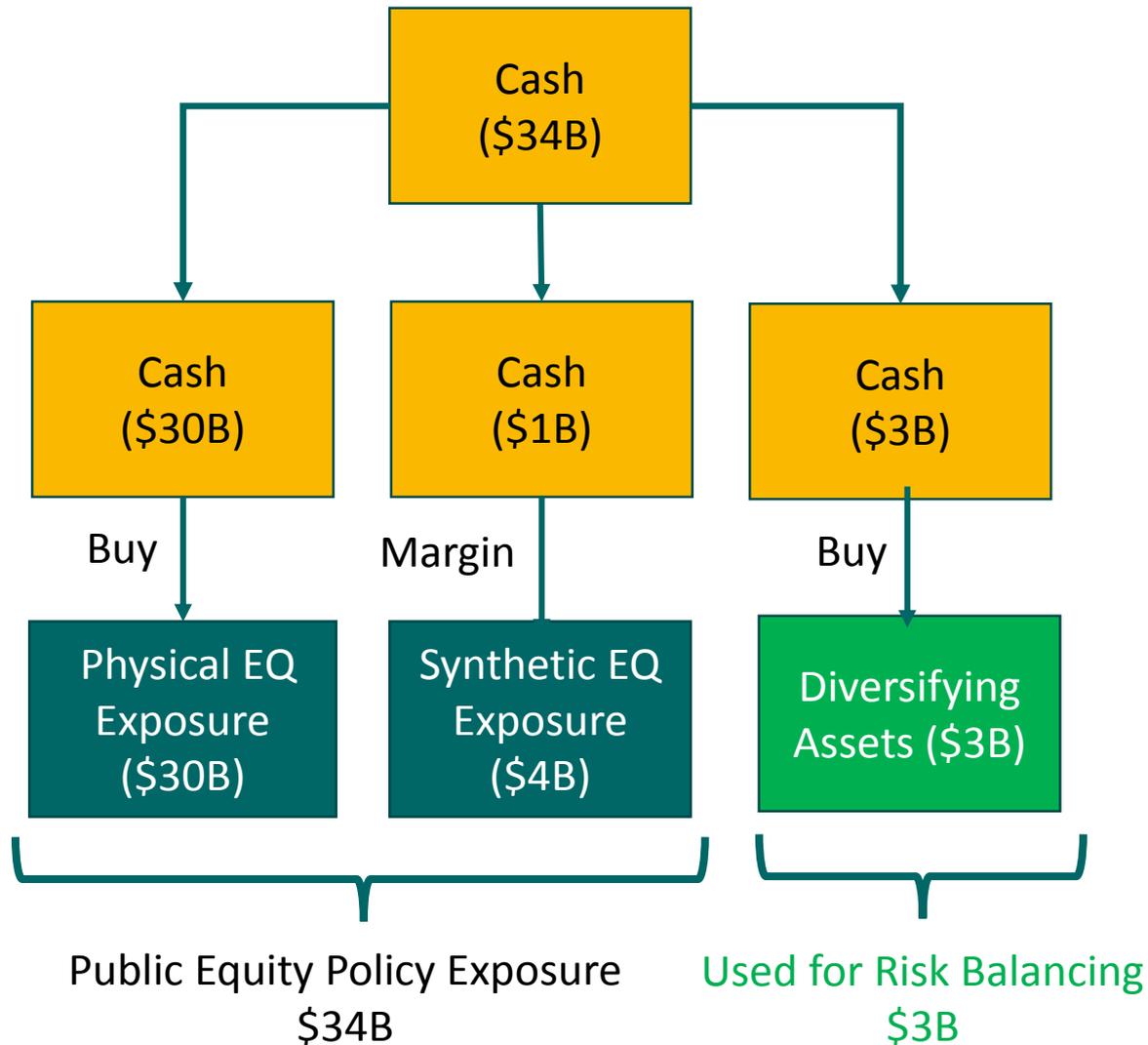
Public Equity Policy Exposure \$34B

# Use of Synthetics – An Example

34% Policy Allocation to Public Equity (EQ)

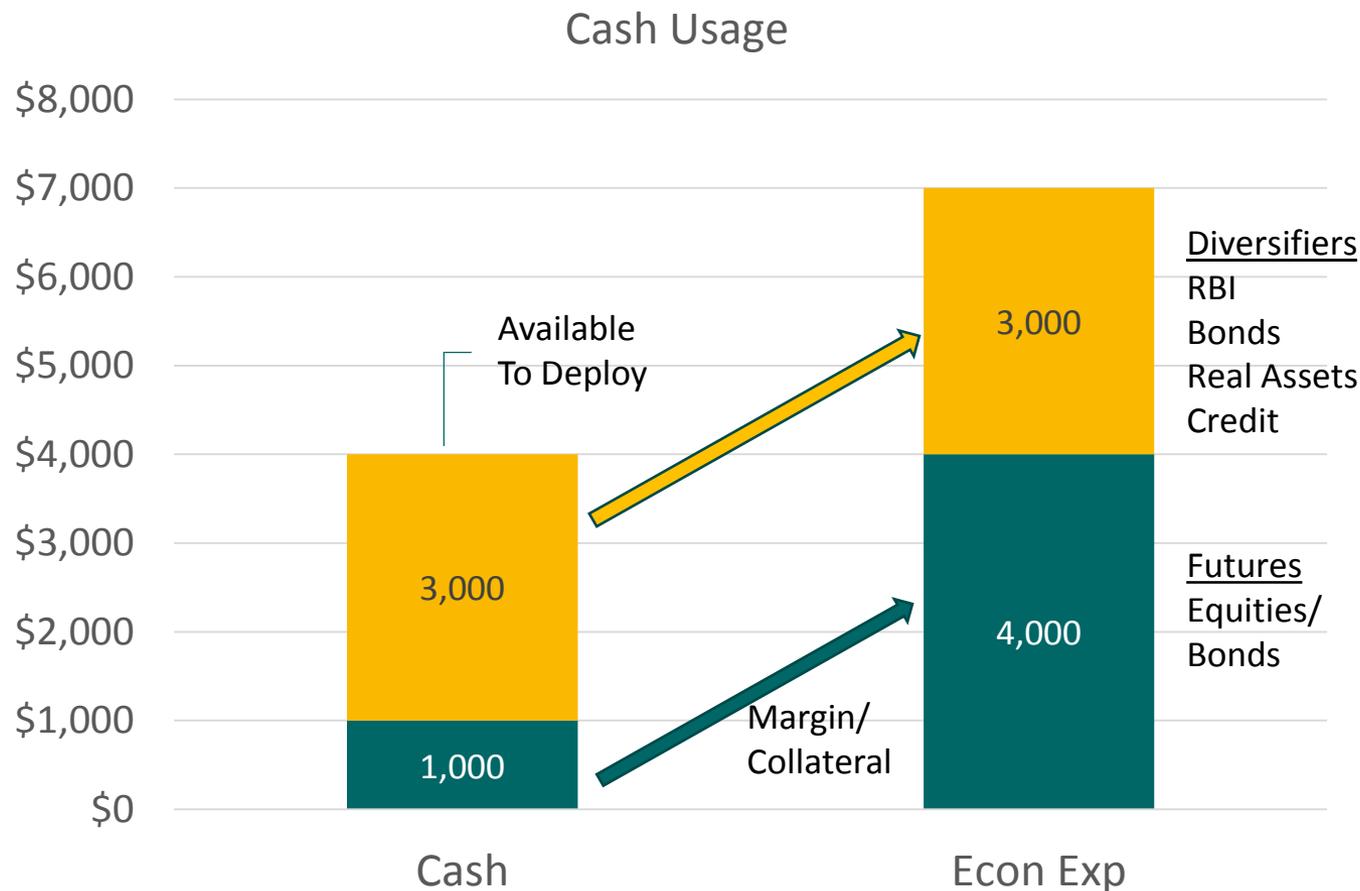
Allocate Cash to Exposures (\$34B)

Economic Exposures\* (\$37B)



# Cash Management - Synthetic Case Study

Synthetic exposure allows for re-allocation to other assets



Illustrative, numbers are in US dollars, millions

## Higher Cost/Lower Complexity

- Line of credit
- Private notes
- Bank loans
- Pension obligation bonds – not allowed under statute

## Lower Cost/Higher Complexity

- Repurchase agreements
- Securities lending program
- Futures
- Total return swaps

**Portfolio Solutions Group (PSG)**  
**Chung Ma**  
Managing Director



# Overview: PSG Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
<b>Chung Ma</b>	<b>Managing Director</b>	<b>MA</b>	<b>CFA</b>	<b>27</b>	<b>9</b>
Audrey Manley	PT Portfolio Assistant	AD		1	1
<b>Matt Lacy</b>	<b>Program Director, Port. Integration</b>	<b>MA</b>	<b>CFA</b>	<b>24</b>	<b>24</b>
<b>Kristina Koutrakos</b>	<b>Director, Portfolio Strategy</b>	<b>MBA</b>	<b>CAIA</b>	<b>24</b>	<b>7</b>
Katie Grawe	Portfolio Manager	MBA		24	5
<b>Steven Peterson</b>	<b>Program Director, Research</b>	<b>PhD</b>		<b>40</b>	<b>16</b>
Advait Apte	Sr. Investment Officer	PhD	CFA	6	6
<b>Dane Honrado</b>	<b>Research Director, IDS</b>	<b>MS/MBA</b>	<b>FRM</b>	<b>20</b>	<b>7</b>
Lisa Davis	Decisions Systems Manager	BS	PMP, CSM CFA Foundations	7	7
Quynh Phuong	Decision Systems Principal	BS	CFA Foundations	4	3
Demory Williamson	Decision Data Analyst I	BS	CFA Foundations	2	2
Melanie Zarembo	Decision Systems Analyst II	BS	Microsoft SQL	4	4
Allison Dunaway	Decision Systems Analyst II	MS		1	1
<b>Ross Kasarda</b>	<b>Director, Risk Management</b>	<b>MA</b>	<b>CFA</b>	<b>19</b>	<b>19</b>
Greg Hines	Sr. Investment Officer	MA	CFA	11	10
Moses Maxfield	Investment Officer	MBA	CFA, CAIA	17	17

# Risk Management & Risk Based Investments (RBI)

Ross Kasarda  
Director, Risk



# Annual Review Topics

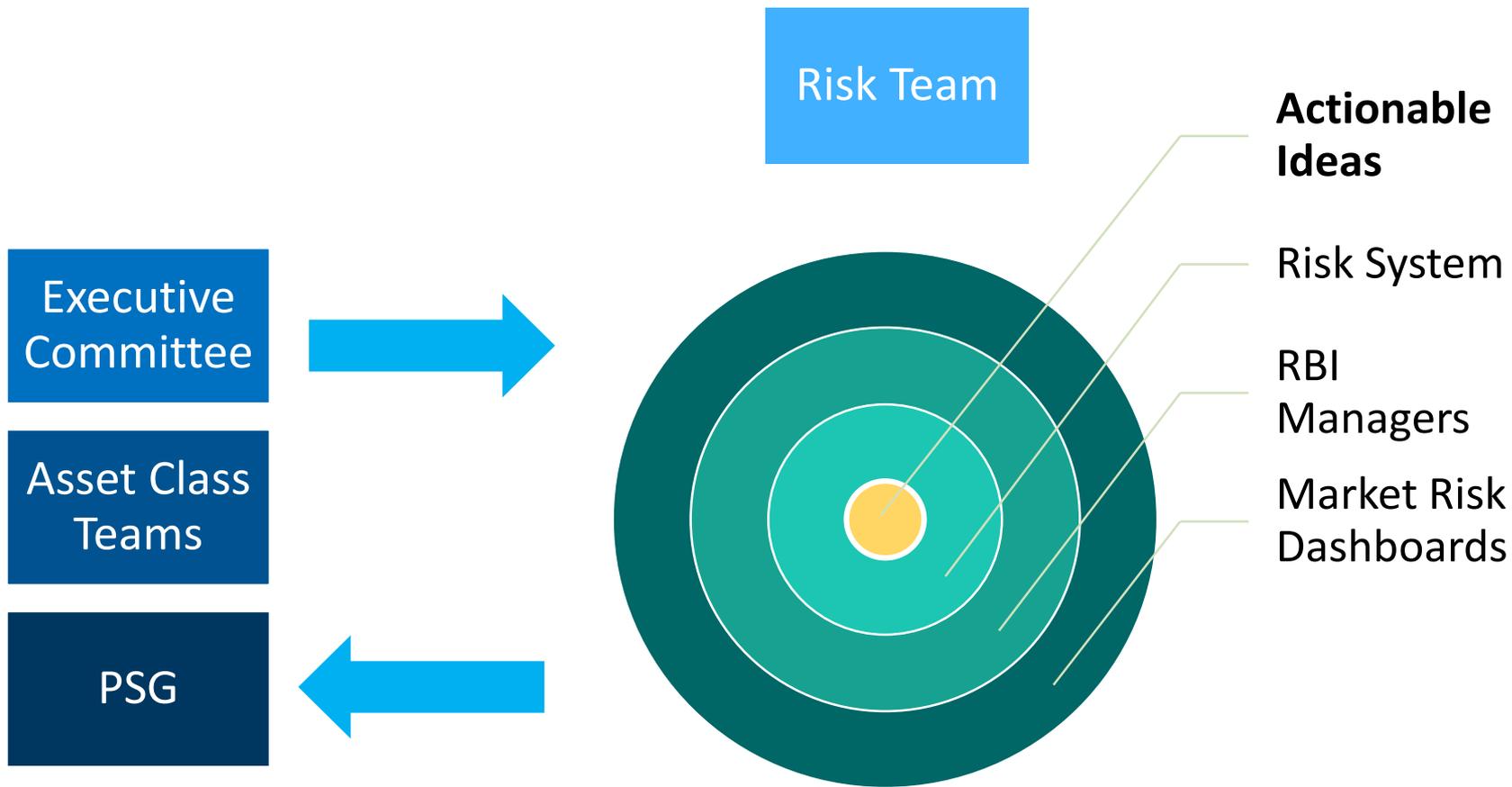


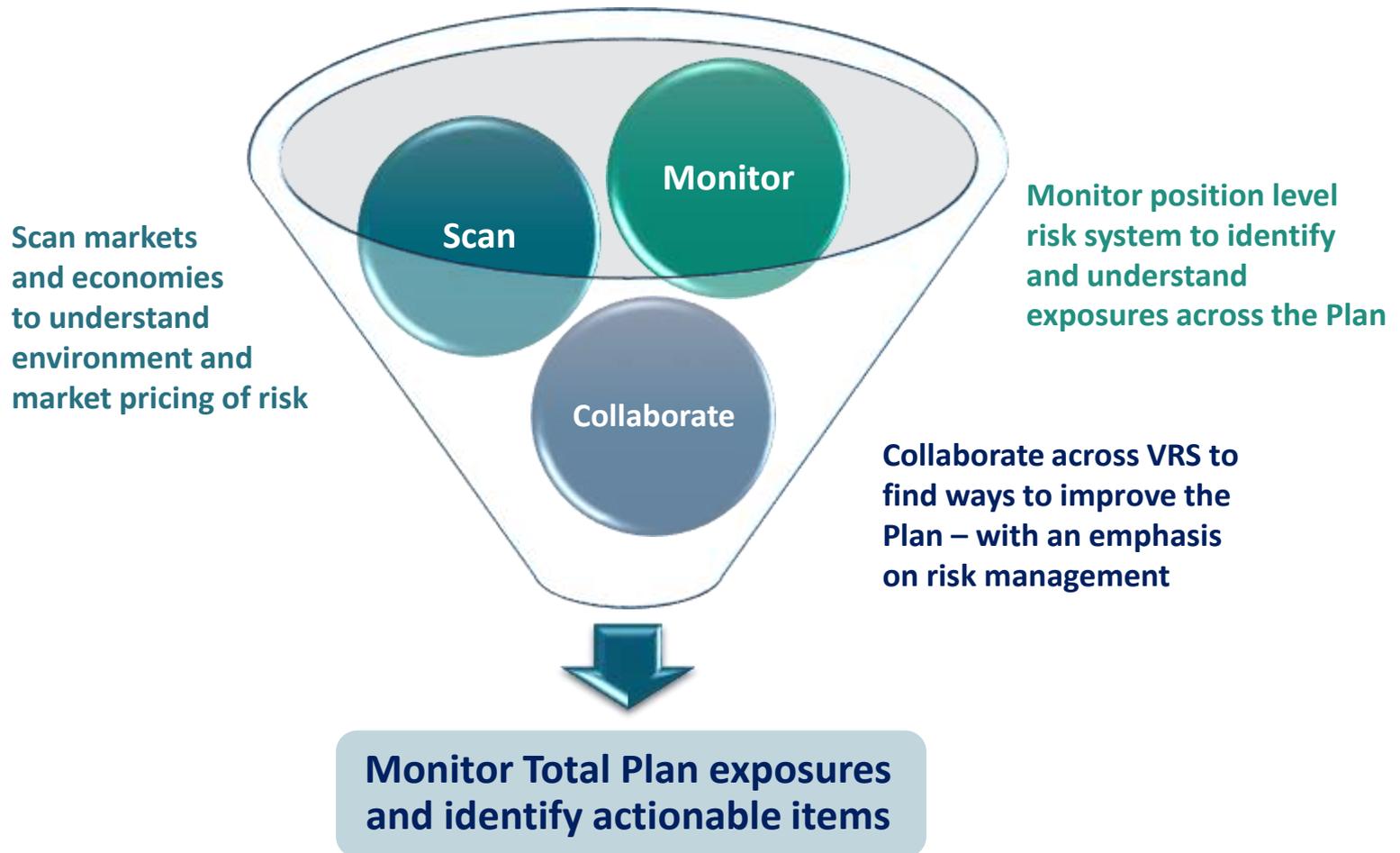
# Team Members

Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Ross Kasarda	Director	MA	CFA	19	19
Greg Hines	Sr. Investment Officer	MA	CFA	12	10
Moses Maxfield	Investment Officer	MBA	CFA, CAIA	18	18



# Risk Team Synergies

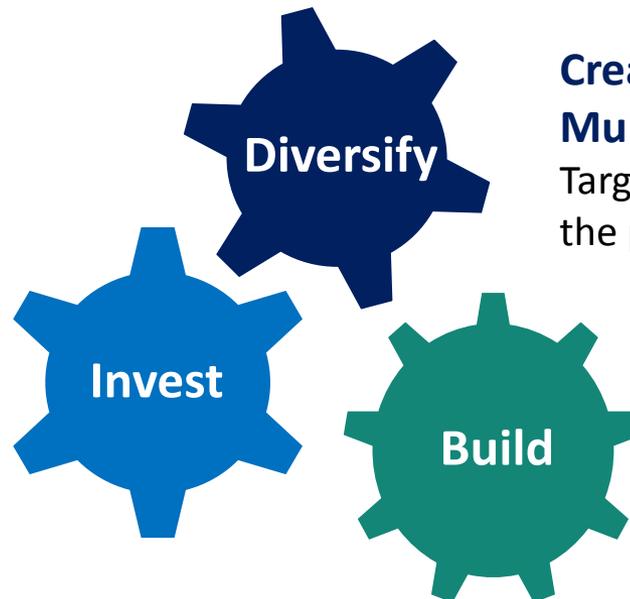




# Risk Management Deliverables

- ✓ Build and monitor Plan-level position risk management system; generate reports to ensure risk controls are in place
  - Key metrics: tracking error, volatility, sectors, country, currency, factor exposures
  - Stress testing and scenario analysis
  - Monitoring changes and trends over time
- ✓ Produce a monthly risk report for the Management Committee identifying key Plan risks and exposures
- ✓ Discussing current trends at Management Committee meetings
- ✓ Work with PSG on portfolio analysis, trade ideas and implementation
- ✓ Manage the Rebalance Account to help facilitate cash flows between asset classes
- ✓ Oversee external active FX program

# RBI Program Objectives



## Create A Program That Has Multiple Ways to Win

Target low correlation within the program

## Invest in Strategies to Complement the Plan

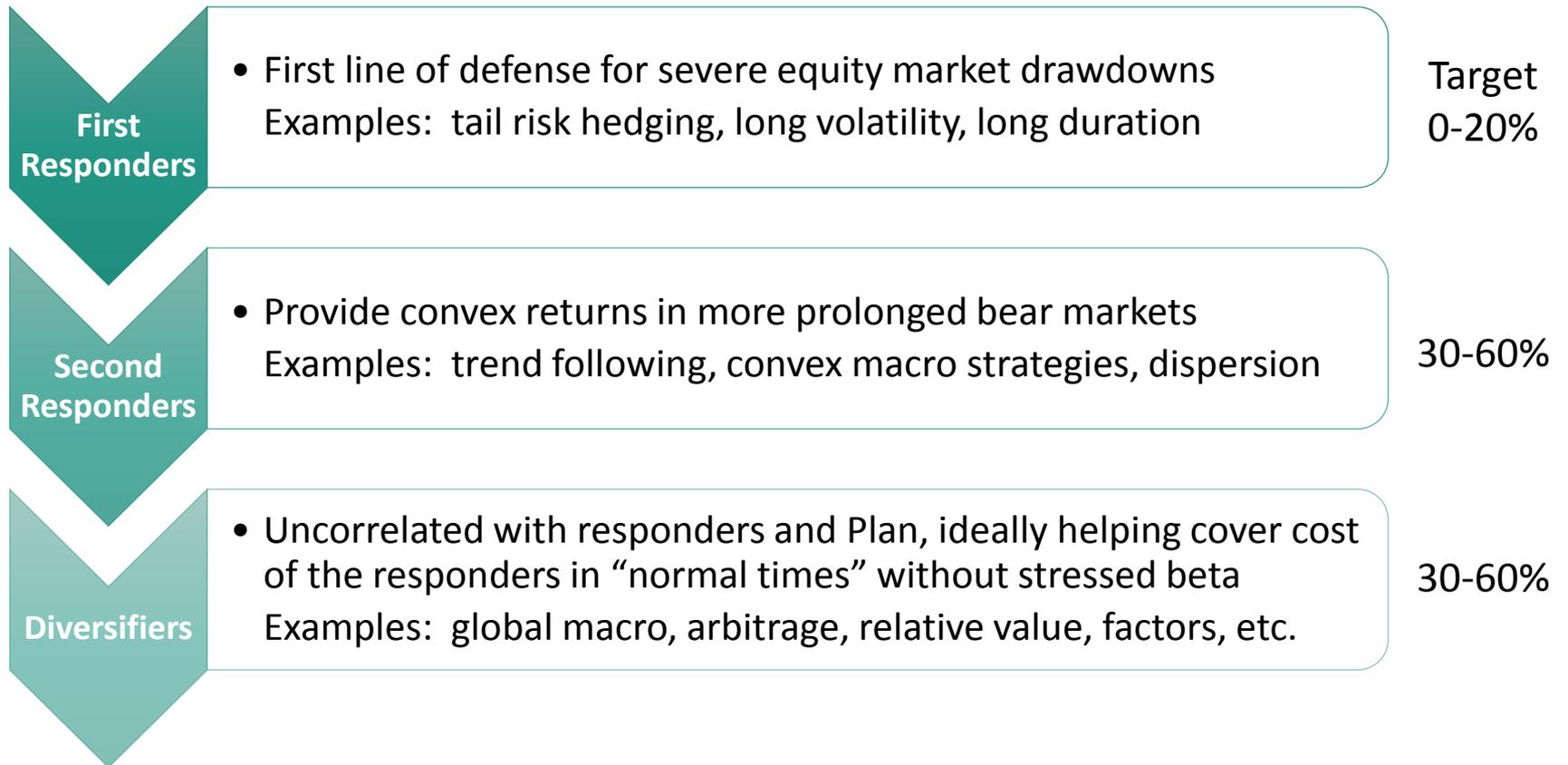
Target equity beta close to zero and low correlation to Plan

## Build Strategic Partnerships To Help Achieve Plan's Goals

Leverage manager lineup for relevant and practical ideas

**Identify Strategies That Offer Meaningful Diversification To The Plan**

# RBI Program Framework



**Build a Diversified Portfolio That Has Many Ways to Win**

- Volatility over a cycle of 5-7%
- Equity beta over a cycle of zero or lower
- Return over a full cycle of at least cash + 250 bps

**Returns That Are Additive to the Plan When Most Needed**

# Strategies as of June 30, 2023

## AQR Capital

- 7 strategies
- Uncorrelated, factor and trend-based approaches
- Invested since 2013

## Capstone Investment Advisors

- 5 strategies
- Multi strategy volatility mandates
- Invested since 2019

## Internal Fixed Income

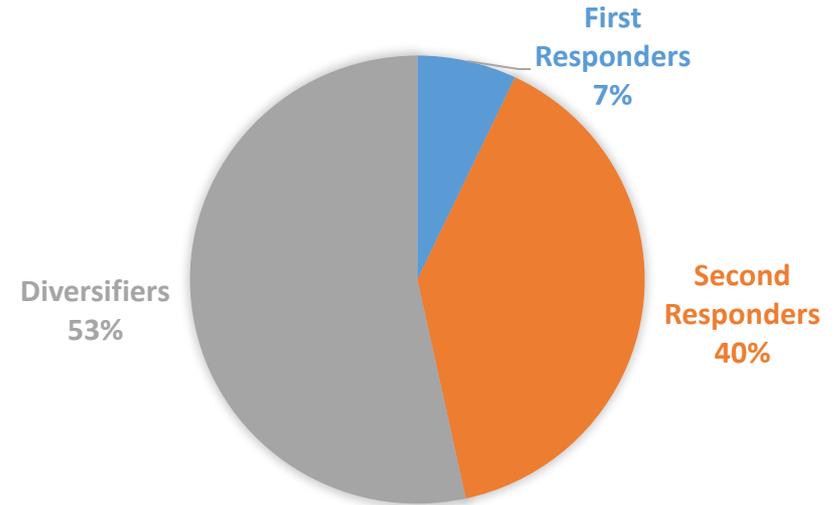
- 1 strategy
- Long duration treasury
- Invested since 2018

## Orchard Global

- 1 strategy
- Long credit volatility
- Invested since Sep 2021

## Man AHL

- 4 strategies
- Trend following
- Invested since March 2023



## RBI Market Values as of 6/30/2023

	\$MM	%
AQR	\$918	47%
Capstone	\$801	41%
Orchard	\$130	7%
Man AHL	\$98	5%
Internal Fixed	\$8	0.4%
<b>Total RBI</b>	<b>\$1,955</b>	

# Returns & Risk as of June 30, 2023

Returns	5 Year	3 Year	1 Year
<b>Risk Based Investments</b>	<b>3.9%</b>	<b>9.1%</b>	<b>5.2%</b>
Benchmark	4.4%	4.3%	4.2%
Excess Return	-0.5%	4.7%	0.9%

Fiscal Year Returns	FY19	FY20	FY21	FY22	FY23
<b>Risk Based Investments</b>	-0.8%	-5.8%	12.3%	9.8%	5.2%
Benchmark	5.0%	4.1%	8.0%	0.8%	4.2%
Excess	-5.8%	-9.9%	4.3%	9.0%	0.9%

Risk Metrics	Since Inception	3 Year	1 Year
Volatility	5.6%	5.4%	6.6%
Tracking Error	5.6%	5.7%	7.5%
Beta to MSCI ACWI	0.10	0.02	-0.02

- Increase RBI's ability to help defend the fund
- Enhance the synergies between RBI, risk management, and the Total Fund
- Increase mindshare with RBI managers for rest of staff

# Appendix

**Challenging year as volatility increases**

## External FX Manager: 1, 3, 5 Year Performance

<u>Performance</u>	<u>Inception</u>	<u>5 Year</u>	<u>3 Year</u>	<u>1 Year</u>
Ret(ann)	0.52%	0.14%	-1.02%	-1.47%
Vol(ann)	2.03%	1.97%	1.69%	1.73%

**But low correlation of returns is desirable**

## Low Correlation to Fund

<u>Correlation</u>	<u>Inception</u>	<u>5 Year</u>	<u>3 Year</u>	<u>1 Year</u>
Absolute	-0.5	-0.4	-0.1	-0.3
Excess	-0.1	0.1	0.0	0.0

**Fund-level internal hedging**

## CMT: Collaborative Decisions

- Navigating macro environment and dollar reaction
- Sounding board for FX positioning

# Mindshare Examples – Beyond Returns

- Frequent dialog and color regarding volatility and options markets
- Customized total plan equity tail risk hedging mandate
- Launched two standalone strategies within RBI

- Manage EMP Value mandate for Plan
- Trend following “timing” indicators
- Frequent small group roundtable discussions with like minded investors
- Opportunistic Trade idea sharing

- Frequent discussions with Fixed Income and PSG teams on credit market dynamics
- Insights into high yield and macro environment

- Insights into systematic strategies
- Offered Hedge Fund bootcamp to any VRS staff
- Emerging Market Outlook discussion with PSG+ team
- Discussed low volatility strategies with Equity groups

- Frequent dialog and color regarding global foreign exchange markets
- Dialog and discussion on Plan level FX hedging decisions
- Insights into market risk regimes

Capstone



AQR Capital



Orchard



Man AHL



Systematica



**Identify Managers That Offer Actionable Knowledge Transfer**

# Risk as of June 30, 2023

Risk Metrics	Since Inception	3 Year	1 Year
Volatility	5.6%	5.4%	6.6%
Tracking Error	5.6%	5.7%	7.5%
Beta to MSCI ACWI	0.10	0.02	-0.02

Excluding Risk Parity	Since Inception	3Year	1 Year
Volatility	5.4%	5.7%	7.2%
Tracking Error	5.7%	5.8%	7.3%
Beta to MSCI ACWI	-0.01	-0.11	-0.18

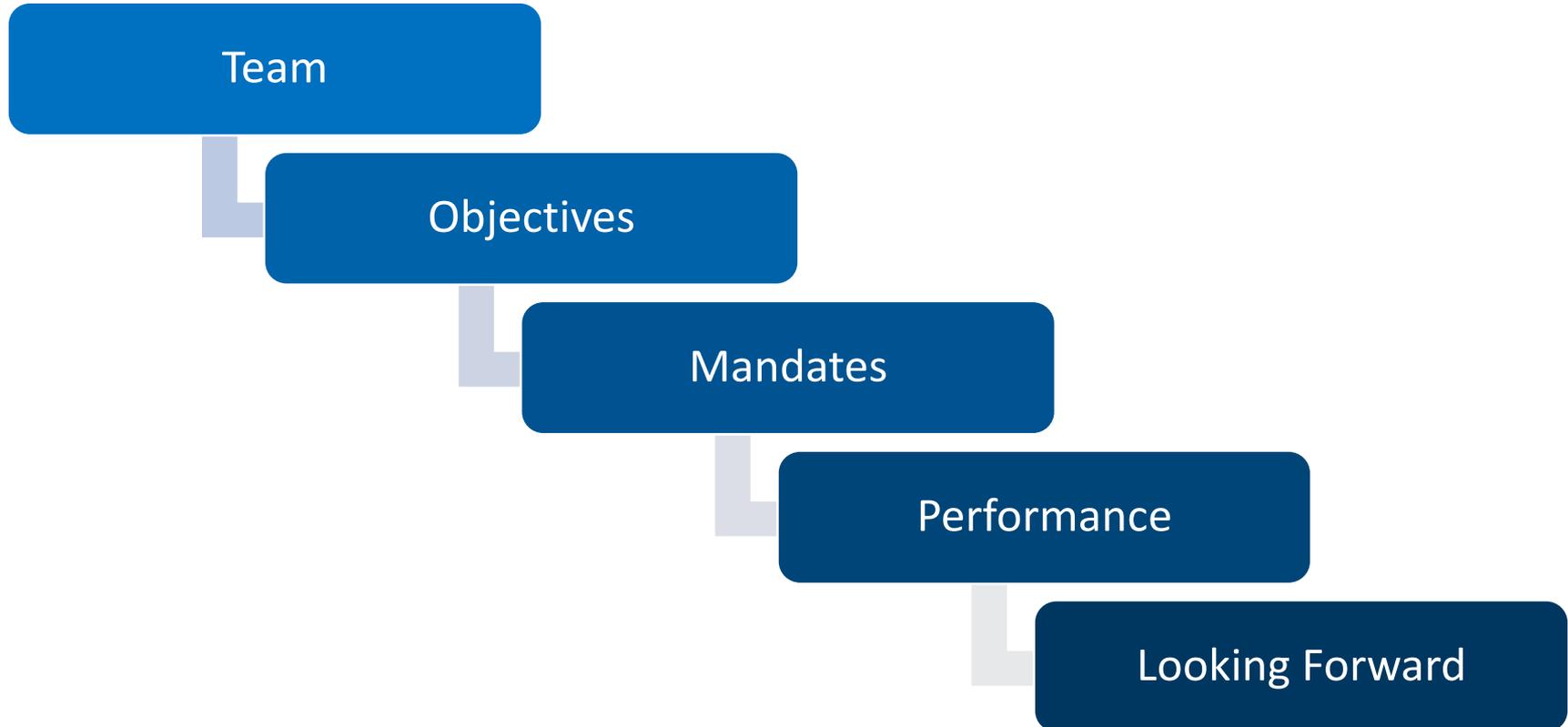
	AQR	CATS	CGM	DMF	STORM	Man AHL	OLCF	RHP
AQR	1.00							
CATS	0.20	1.00						
CGM	0.37	0.07	1.00					
DMF	0.17	-0.16	0.13	1.00				
STORM	-0.20	-0.14	-0.25	0.08	1.00			
Man AHL	0.53	0.58	0.02	-0.14	-0.30	1.00		
OLCF	-0.21	0.11	-0.21	0.03	-0.24	-0.11	1.00	
RHP	-0.70	-0.17	-0.19	-0.18	0.23	-0.39	-0.12	1.00

# Portfolio Strategy & Dynamic Strategies

**Kristina Koutrakos**  
Director, Portfolio Strategy



# Annual Review Topics



# Team Members



Professional	Position	Highest Degree / Credentials	Investment Experience	VRS Tenure
<b>Kristina Koutrakos</b>	<b>Director, Portfolio Strategy</b>	<b>MBA, CAIA</b>	<b>24</b>	<b>7</b>
Katherine Grawe	Portfolio Manager	MBA	24	5
Additional Resources	Portfolio Solutions Group VRS Investment Staff External Managers & Research Partners Investment Operations Department Portfolio Assistant			

## VRS Strategic Advantages

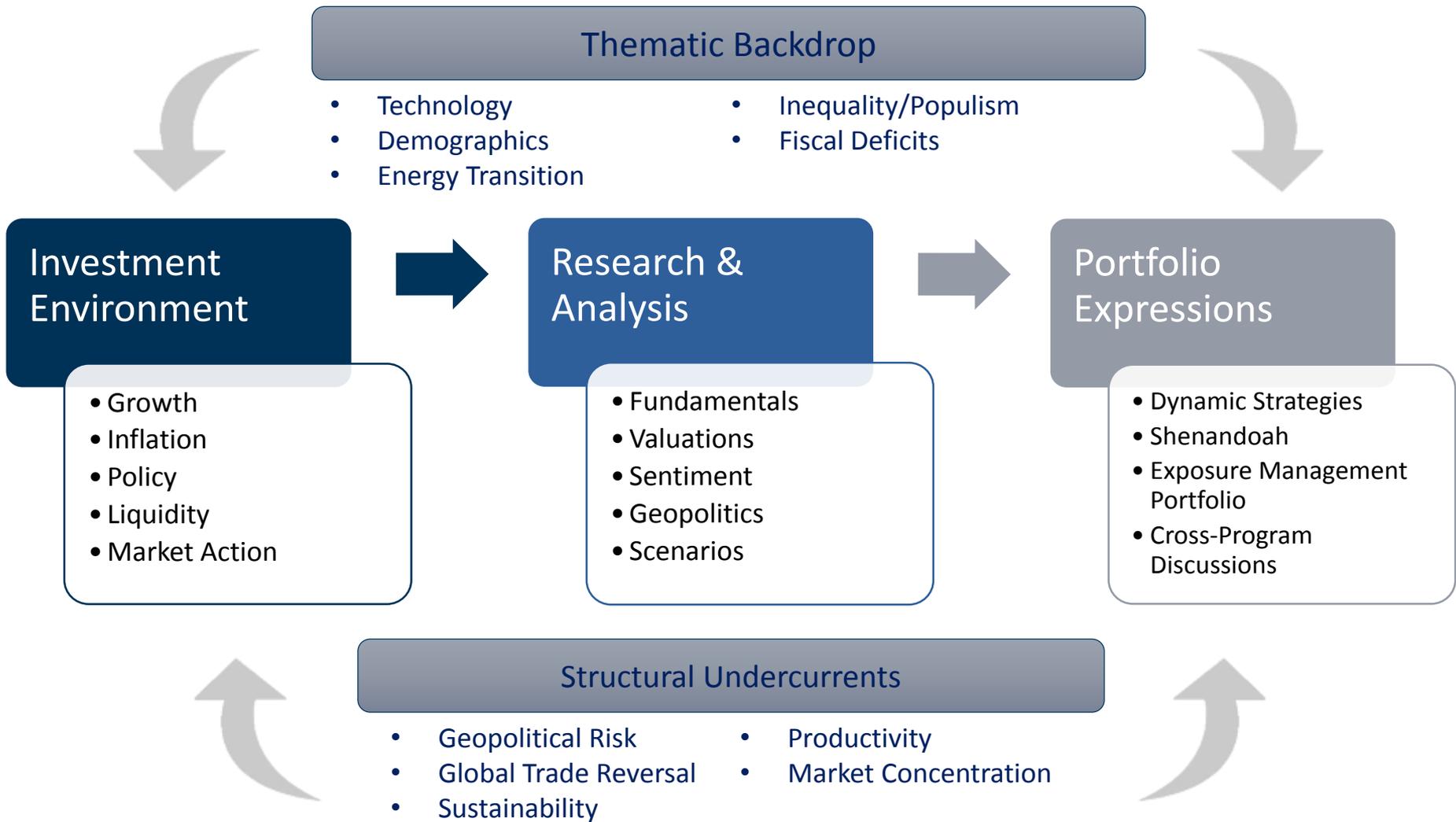
- Access to a broad and flexible set of **investment insights** across asset classes, geographies, and time frames
- **Long-term** time horizon

## Strategy Team Investment Objective

- Add **asset allocation alpha** and **diversify excess return** sources
- Identify long-term **thematic drivers** and consider ways to incorporate **structural change** into the portfolio
- Invest over **multiple time horizons** □

*The Strategy team seeks to add value through active asset allocation management and the identification of opportunities across the investment landscape.*

# Process Integration



# Dynamic Strategies Objectives

Generate returns that meet or exceed that of a broad, public market opportunity set with a similar risk profile focusing on active asset allocation and the consideration of structural drivers.



Diversify excess return sources

Asset allocation and thematic implementation

Tangible investment solutions

Knowledge transfer across the Plan

## Dynamic Strategies Program

### Asset Allocation Mandates

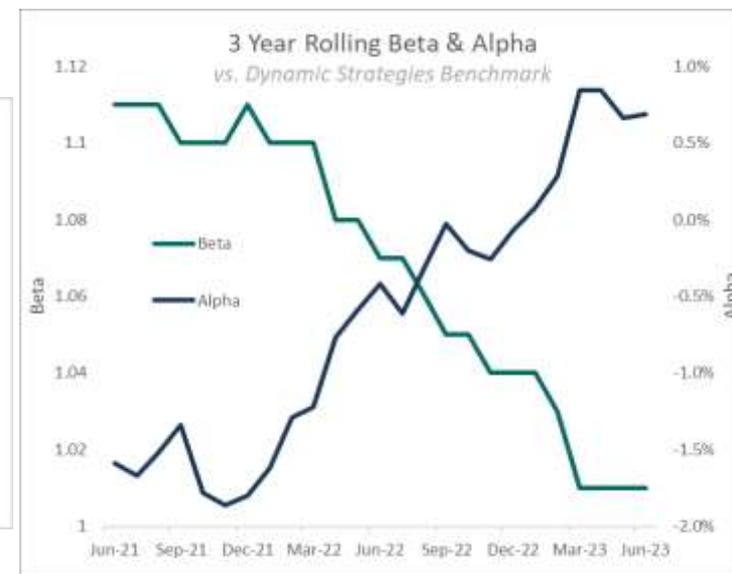
Shenandoah

### Thematic Mandates

- **Incepted July 2018**
- \$1.4 billion, currently 83% of the program
- Objective to add asset allocation alpha
- Current implementation through externally managed and fully funded mandates
- Two key strategic partnerships seeking asset management and knowledge transfer
  
- Paper launch July 2019; **Incepted Dec 2020**
- \$112 million, currently 7% of the program
- Internally directed opportunistic asset allocation tilts
  
- **Incepted July 2021**
- \$290 million, currently 17% of the program
- Objective to invest ahead of broad, structural themes and the opportunities they create within financial markets

# Program Performance

As of June 30, 2023	FY2023	3 Year (annualized)	5 Year (annualized)
Dynamic Strategies Mandate	10.7%	6.7%	5.3%
Dynamic Strategies Custom Benchmark	11.4%	6.0%	5.7%
Total Excess Return	-71 bps	+76 bps	-44 bps
Active Risk	113 bps	155 bps	162 bps
Information Ratio	-0.6	0.5	-0.3





## Total Plan Fit

- *As the total fund evolves, what are the best ways to add asset allocation and thematic alpha?*



## Idiosyncratic Opportunities

- *Where and how can we best deploy funds to capitalize on market dislocations?*



## Thematic

- *How can we better monetize the thematic work across the total fund?*

# Appendix

# Asset Allocation Mandates

BLACKROCK

J.P.Morgan



<i>As of June 30, 2023</i>	FY2023	3 Year (annualized)	5 Year (annualized)	<i>Long-term Expectations</i>
Asset Allocation Mandates	11.3%	7.3%	5.6%	
Asset Allocation Custom Benchmark	12.0%	6.3%	5.9%	
Total Excess Return	-71 bps	+97 bps	-32 bps	+100-120 bps
Active Risk	140 bps	173 bps	173 bps	200 bps
Information Ratio	-0.5	0.6	-0.2	0.5 - 0.6

<i>As of June 30, 2021</i>	FY2023	2 Year (annualized)	Since Inception (Nov 2020, annualized)	<i>Long-term Expectations</i>
Shenandoah	10.9%	-2.6%	2.2%	
Dynamic Strategies Custom Benchmark	11.4%	-2.8%	1.9%	
Total Excess Return	-52 bps	+20 bps	+25 bps	30-60 bps
Active Risk	59 bps	74 bps	75 bps	100 bps
Information Ratio	-0.9	0.3	0.3	0.3 - 0.6

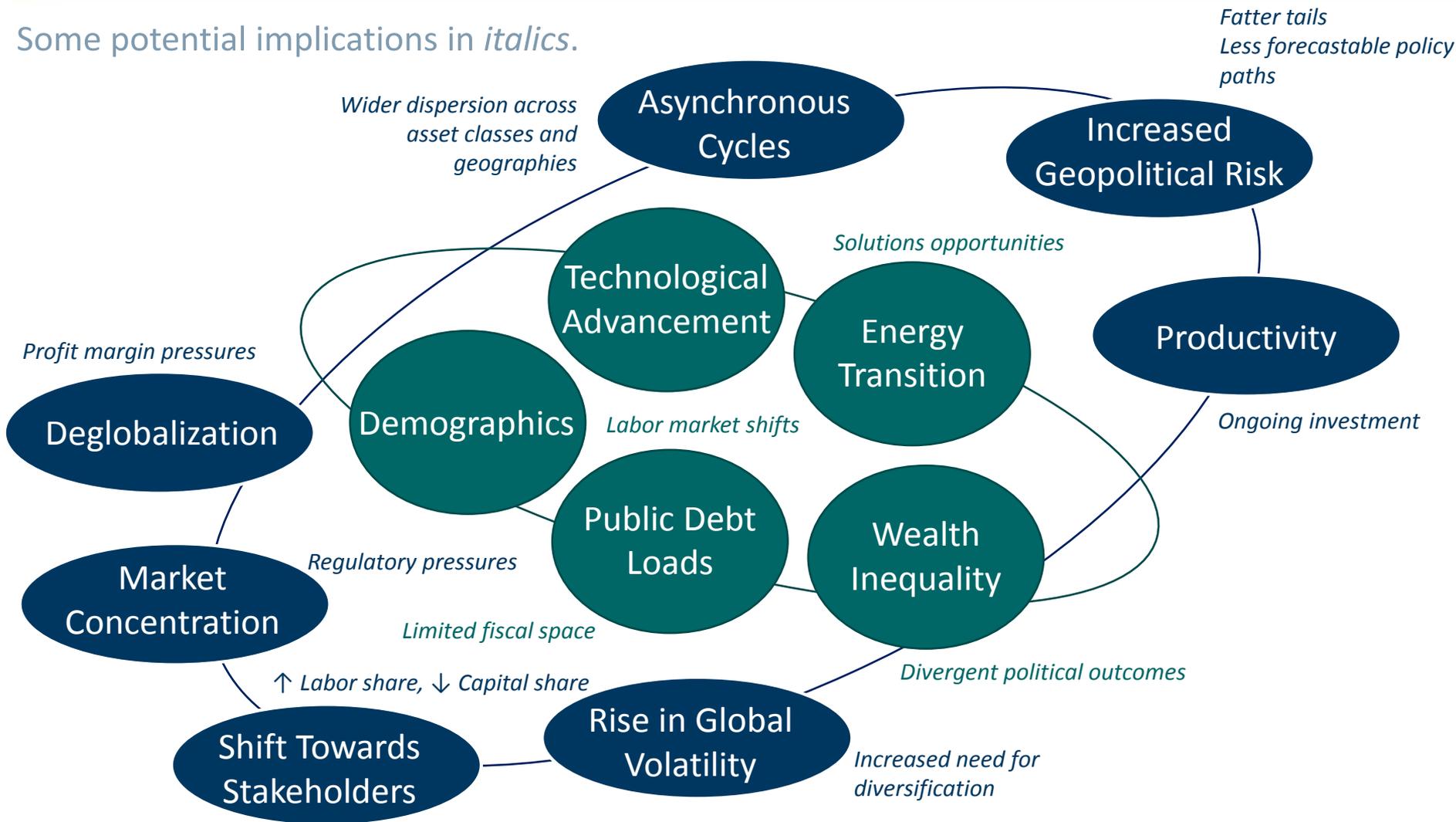
## Shenandoah Philosophy

- Add **asset allocation alpha** and **diversification of excess return** sources
- Identify long-term **thematic drivers** and consider ways to incorporate **structural change** into the portfolio
- Invest over **multiple time horizons** □
- **Flexible and adaptive approach** taking the investment environment and VRS opportunity set into account

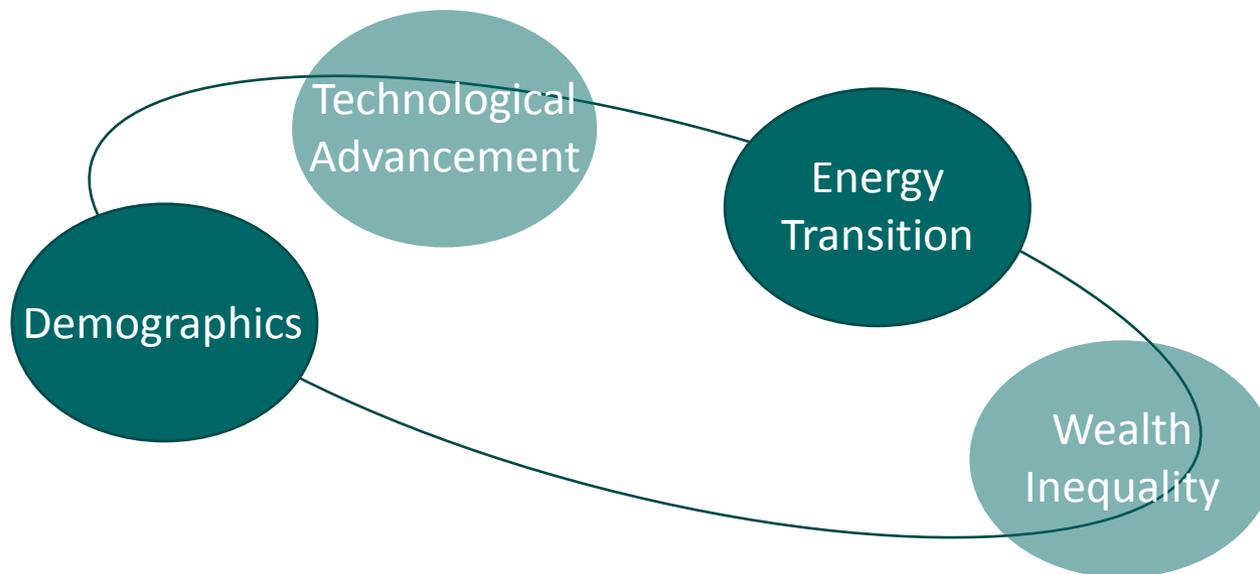


# Thematic Drivers

Some potential implications in *italics*.



# Thematic Mandates



<i>As of June 30, 2022</i>	FY2023	2 Years (annualized)
Thematic Mandates	6.8%	-7.2%
Thematic Custom Benchmark	7.9%	-5.2%
Total Excess Return	-114 bps	-203 bps
Active Risk	212 bps	443 bps

## Dynamic Strategies Benchmark

- 60% MSCI ACWI IMI Index (Net VRS taxes)
- 20% Bloomberg Barclays U.S. Aggregate Index
- 10% Bloomberg Barclays US High Yield Ba/B 2% Issuer Cap Index
- 10% JPMorgan EMBI Global Core (Bloomberg ticker JPEICORE)

## Asset Allocation Benchmark

- 57% MSCI World IMI Index (Net VRS taxes)
- 21% Bloomberg Barclays U.S. Aggregate Index
- 11% Bloomberg Barclays US High Yield Ba/B 2% Issuer Cap Index
- 11% JPMorgan EMBI Global Core

## Thematic Benchmark

*Component weighted based on underlying allocations to the following benchmarks*

- MSCI EM IMI Index (Net VRS taxes)
- MSCI World IMI Index (Net VRS taxes)
- Dynamic Strategies Fixed Income Custom Benchmark