



Investment Advisory Committee (IAC) Meeting

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

Wednesday, 11/15/2023
9:00 AM - 12:30 PM ET

1. Approval of Minutes (August 23, 2023)

08-23-23 - IAC Meeting Minutes - Page 2

2. CIO Report

CIO Report - November 2023 - Page 6

Asset Allocation Report - September 2023, 111321 - Page 14

Daily Asset Allocation Report 11-07-2023 - Page 15

Performance Summary 09-30-2023 - Page 16

Plan Tracking Error - Page 17

New Investments and Terminations 11-15-2023 - Page 18

3. Asset Liability Management Update

ALM Update - November 2023 - Page 19

4. Investment Policy and Statement Review

a. Defined Benefit Plan Investment Policy Statement

VRS Defined Benefit Plan Investment Policy Statement - Red Line - Page 40

VRS Defined Benefit Plan Investment Policy Statement - Black Line - Page 44

VRS Defined Benefit Plan Investment Policy Statement - Appendix 1, as of July 1 2023 - 111323 - Page 48

VRS Defined Benefit Plan Investment Policy Statement - Appendix 1, as of January 1 2024, 111323 - Page 50

b. Investment Belief Statements

VRS Investment Belief Statements - Red Line - Page 52

VRS Investment Belief Statements - Black Line - Page 55

c. Investment Leverage Policy

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5. Private Markets Program Reviews

a. Private Markets - Presentation Version

Private Markets Overview, November 2023, 111323 - Page 61

Real Assets, November 2023 - Presentation Version - Page 74

Private Equity, November 2023 - Presentation Version, 111323 - Page 86

Credit Strategies, November 2023 - Presentation Version, 111323 - Page 98

PIP, November 2023 - Presentation Version - Page 120

b. Private Markets - Reading Version

Real Assets, November 2023 - Reading Version - Page 130

Private Equity, November 2023 - Reading Version, 111323 - Page 154

Credit Strategies, November 2023 - Reading Version, 111323 - Page 177

PIP, November 2023 - Reading Version - Page 200

Minutes

A meeting of the Investment Advisory Committee of the Virginia Retirement System was held on August 23, 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

The following Board members were present:

A. Scott Andrews
Joseph Montgomery
Brandon Bell
John Bennett
Michael Disharoon

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, Erica Billingslea, Jeanne Chenault, Michael Cooper, Sara Denson, Michael Desai, Laurie Fennell, Laura Fields, Josh Fox, Jay Gentry, Holly Glass, Katherine Grawe, JT Grier, Mehtab Haleem, Greg Hines, Dane Honrado, K.C. Howell, Ross Kasarda, Jeannie Kim, Kristina Koutrakos, Matt Lacy, Chung Ma, Jennifer MacKnight, Curt Mattson, Moses Maxfield, Kidus Molla, Peter Murphy, Teresa Nguyen, Walker Noland, Greg Oliff, Steven Peterson, Vera Pleasants, Jummai Sarki-Hurd, Daniel Schlussler, Jenny Schoeller, Michael Scott, Viet Tran, Korey Turner, Scott Weaver, Leslie Weldon, Daniel Whitlock, and Steve Woodall.

Also in attendance was Lauren Albanese of Financial Investment News; Harrison Bader and Brigid Schutsky of BlackRock; Jamie Bitz with Joint Legislative Audit and Review Commission; Doston Bradley of Cerberus; Tom Cosmer of Pinebridge; McCyril Espanol of Pageant Media; Gary Gammon of the Virginia Auditor of Public Accounts; Emily Grimes of the Virginia Department of Planning and Budget; Rod James of WSJ; Madeline Katz of Financial Times; Gabriel Simkin, virtual attendee affiliation

unknown; Spencer Witherspoon of Schenkman Capital; and Nicholas Zizzo of SEI.

Mr. Kochard called the meeting to order at 9:03 a.m.

Mr. Kochard announced that Mr. Smyth is unable to attend the meeting and 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. Beasley – present
Mr. Economou – present
Ms. Garson – present
Mr. Gayner – present
Ms. Leake – not present (entered at 9:12)
Mr. Lewis - present
Mr. Smyth – not present
Mr. West - present
Mr. Kochard – present

Minutes

A motion was made by Mr. Kochard and seconded by Mr. Beasley to approve the minutes for the April 12, 2023 Committee meeting. The motion was unanimously approved via roll call:

Mr. Beasley – aye
Mr. Economou – aye
Ms. Garson – aye
Mr. Gayner – aye
Ms. Leake – not present (entered at 9:12)
Mr. Lewis - aye
Mr. Smyth – not present
Mr. West – aye
Mr. Kochard – aye

CIO Report

Mr. Junkin opened his CIO report by commenting on market conditions, including inflation and employment, rate moves, consumer activity, and business activity 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 June 30, 2023. Last, Mr. Junkin reviewed the New Investments and Terminations Report.

Asset Liability Management Update

Mr. Junkin and Mr. Lacy provided an Asset Liability Management update. Mr. Junkin began the discussion by informing the Committee that the Board of Trustees had approved the use of leverage and the proposed Strategic Asset Allocation will include leverage in two ways, rebalancing leverage and asset allocation leverage. This discussion included a projection of what contribution returns could look like with the new Strategic Asset Allocation; and concluded this portion of the discussion with a summary of the implementation plan.

Mr. Junkin turned the discussion over to Mr. Lacy who led a discussion of possible leverage options. This discussion included types of funding and the pros and cons associated with each type of funding. Also discussed was the use of liquidity stress testing to simulate how the types of leverage will impact the asset classes and the total fund.

Mr. Lacy then summarized the key takeaways from the use of leverage and stated that implementation planning is underway.

The Committee members engaged in general discussion throughout the review of leverage.

Portfolio Solutions Group Program Reviews

Mr. Ma provided a general overview of the Portfolio Solutions Group and introduced each program to be covered in the review.

Mr. Kasarda provided a review of Risk Management and the Risk-Based Investments (RBI) program. Mr. Kasarda's review topics included an overview of the team, Risk and RBI objectives, RBI mandates, performance, and forward-looking plans and priorities.

Ms. Koutrakos then provided a review of Portfolio Strategy and the Dynamic Strategies program. Review topics included an overview of the team, objectives, mandates, performance, and forward-looking plans and priorities.

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

Mr. Beasley made a motion to adjourn the meeting. Mr. Gayner 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. West – aye
Mr. Kochard – aye

Adjournment

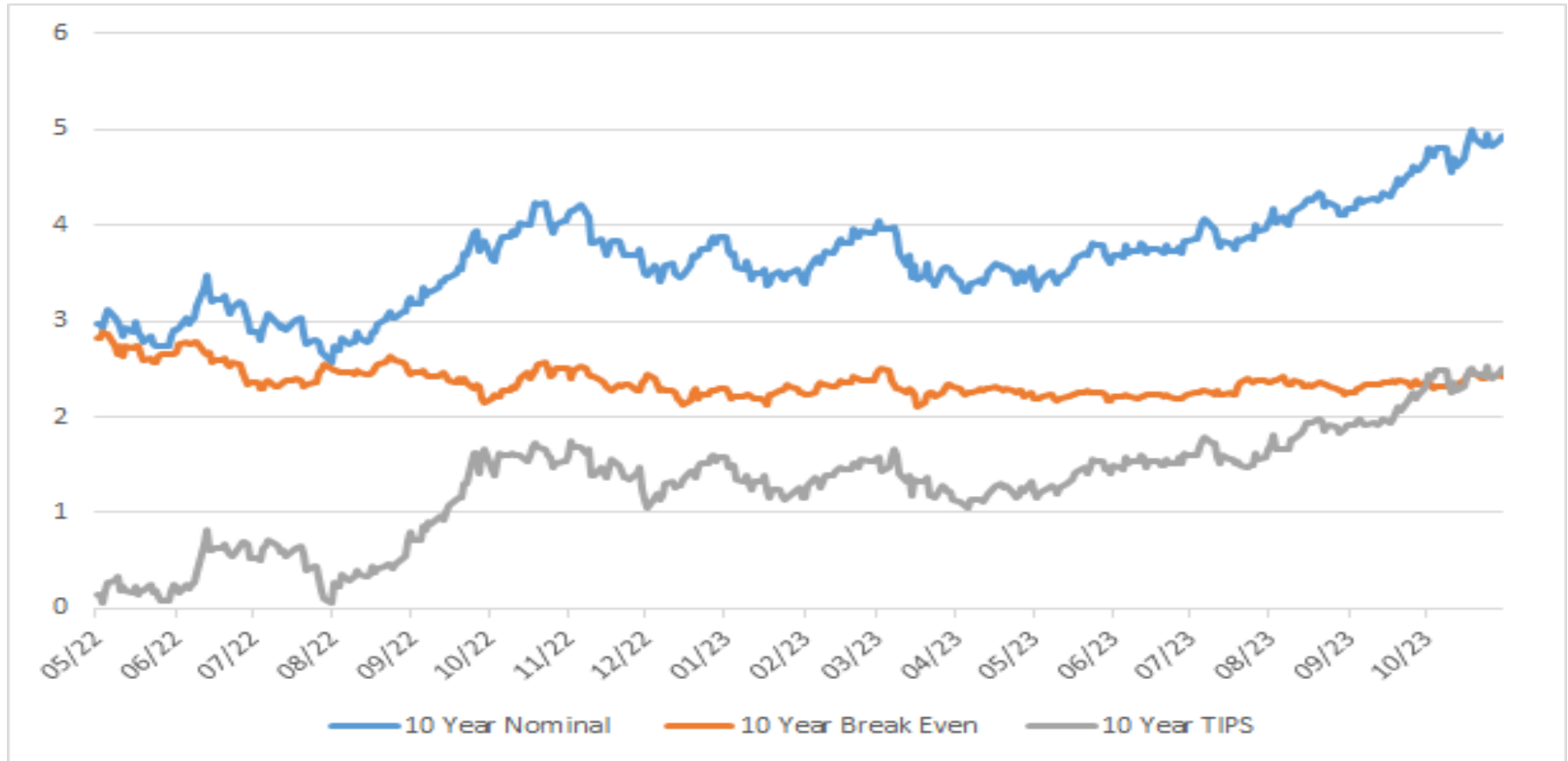
The meeting was adjourned at 10:57 a.m.

Larry Kochard, Chairperson

Chief Investment Officer Report Market Review – November 2023 Andrew Junkin

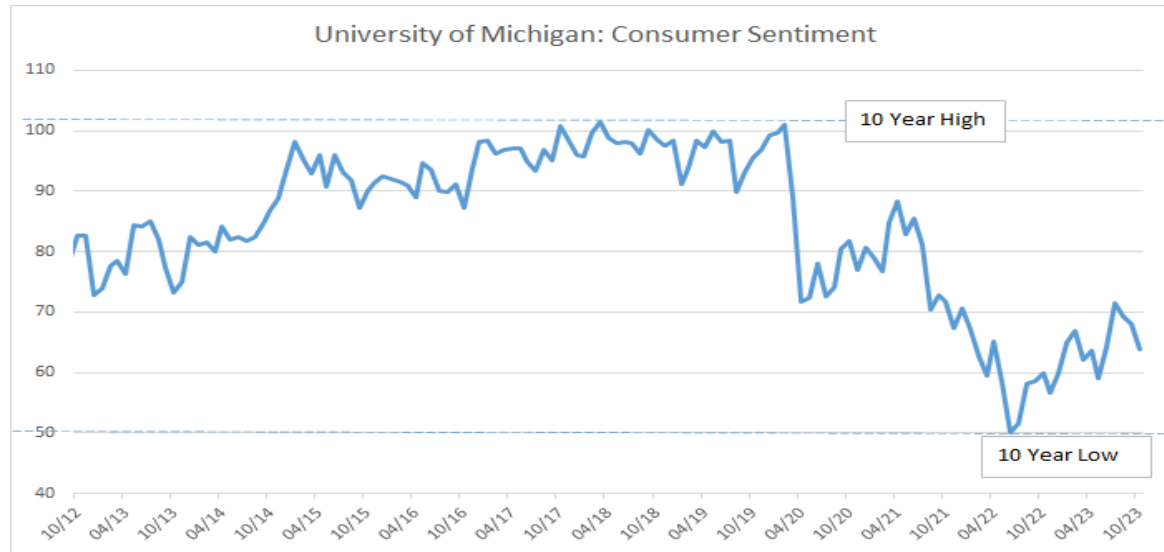


Rate Moves (10Y Nominal, Real & BEI)



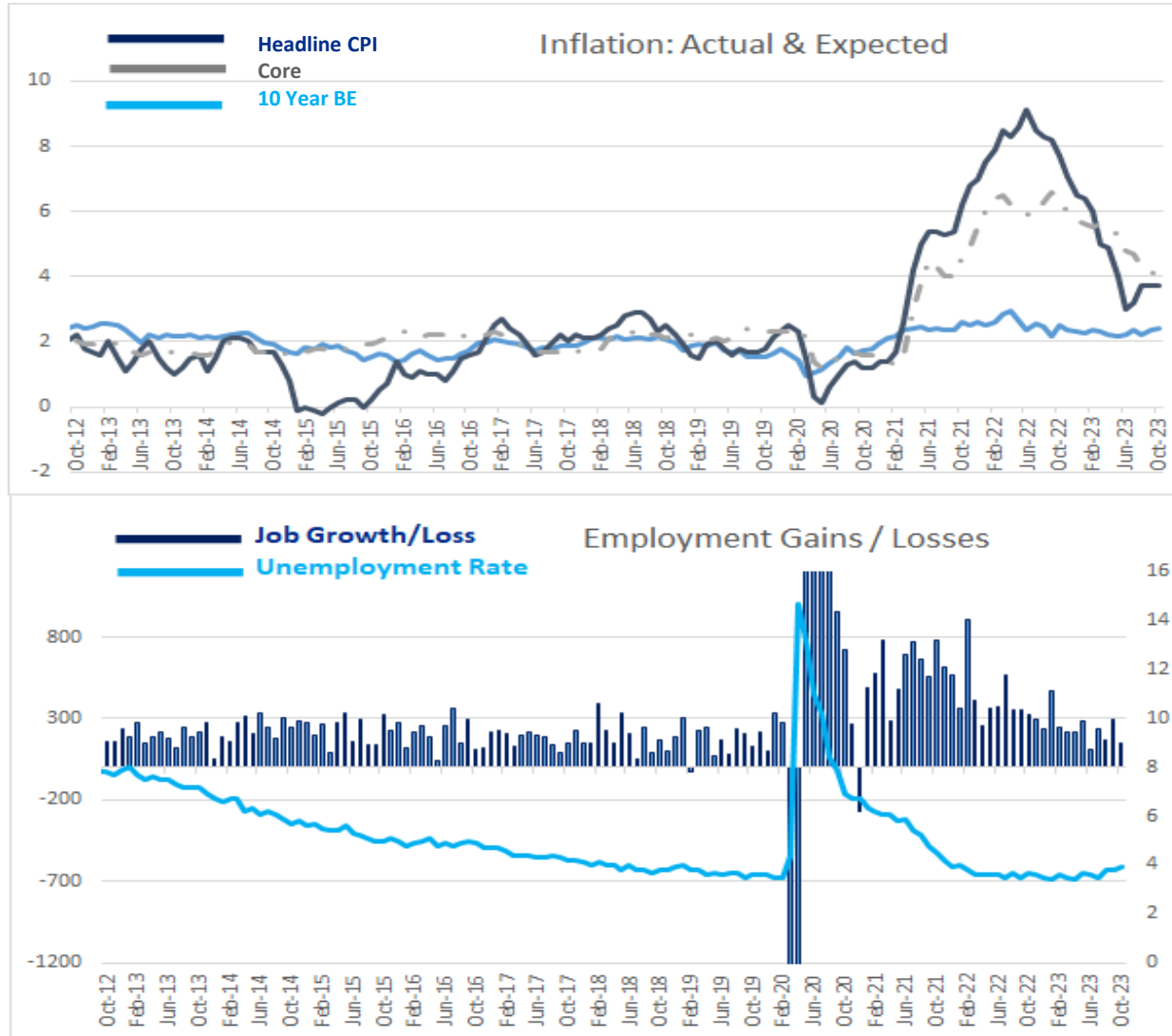
Data Source: Bloomberg

Consumer Activity



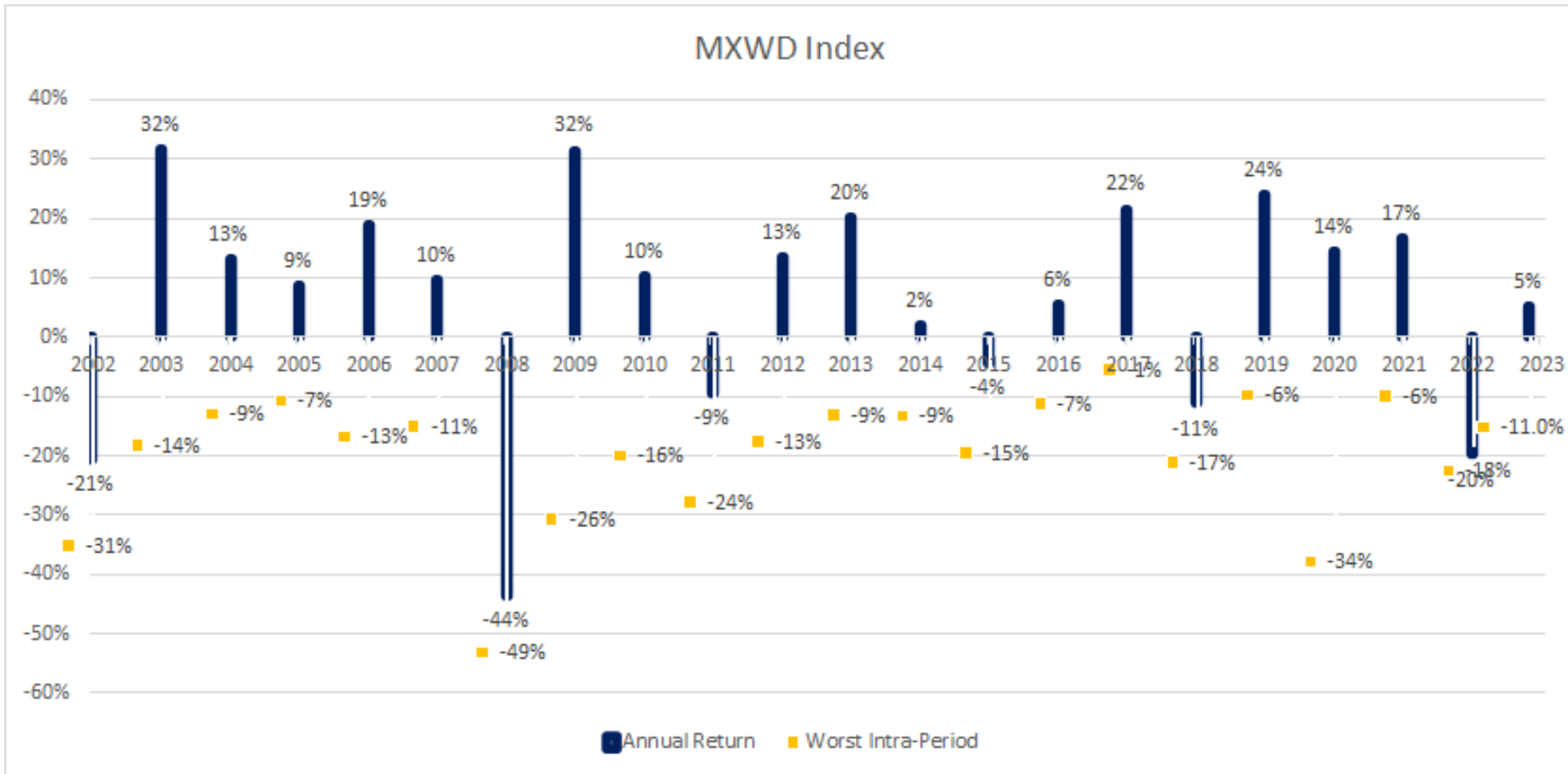
Data Source: Bloomberg

Inflation and Employment



Data Source: Bloomberg

Annual Equity Market Selloffs

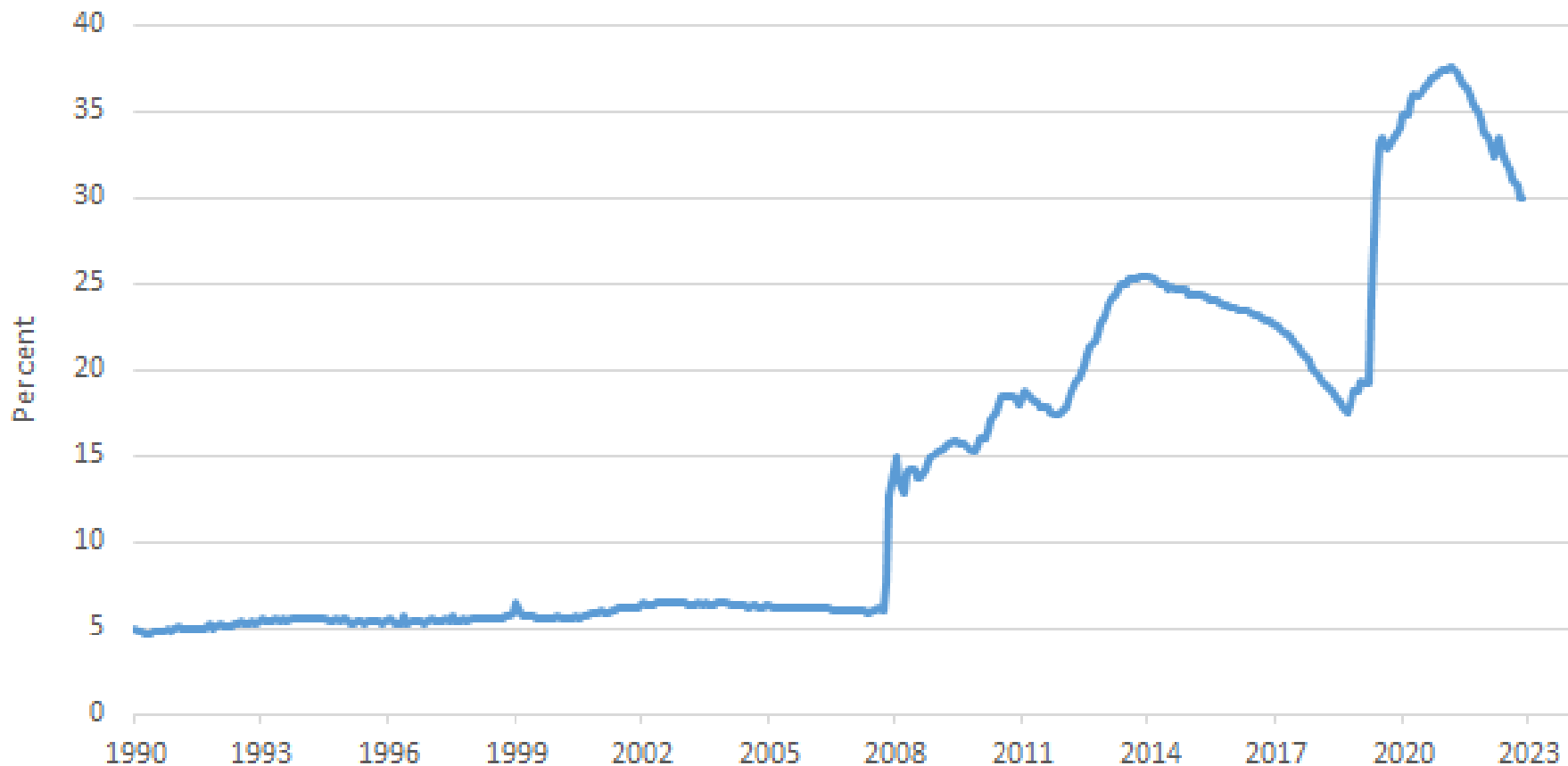


** 2023 is as of 10/31/2023

** Max draw down experienced on the 27th of October this year (-10.98%)

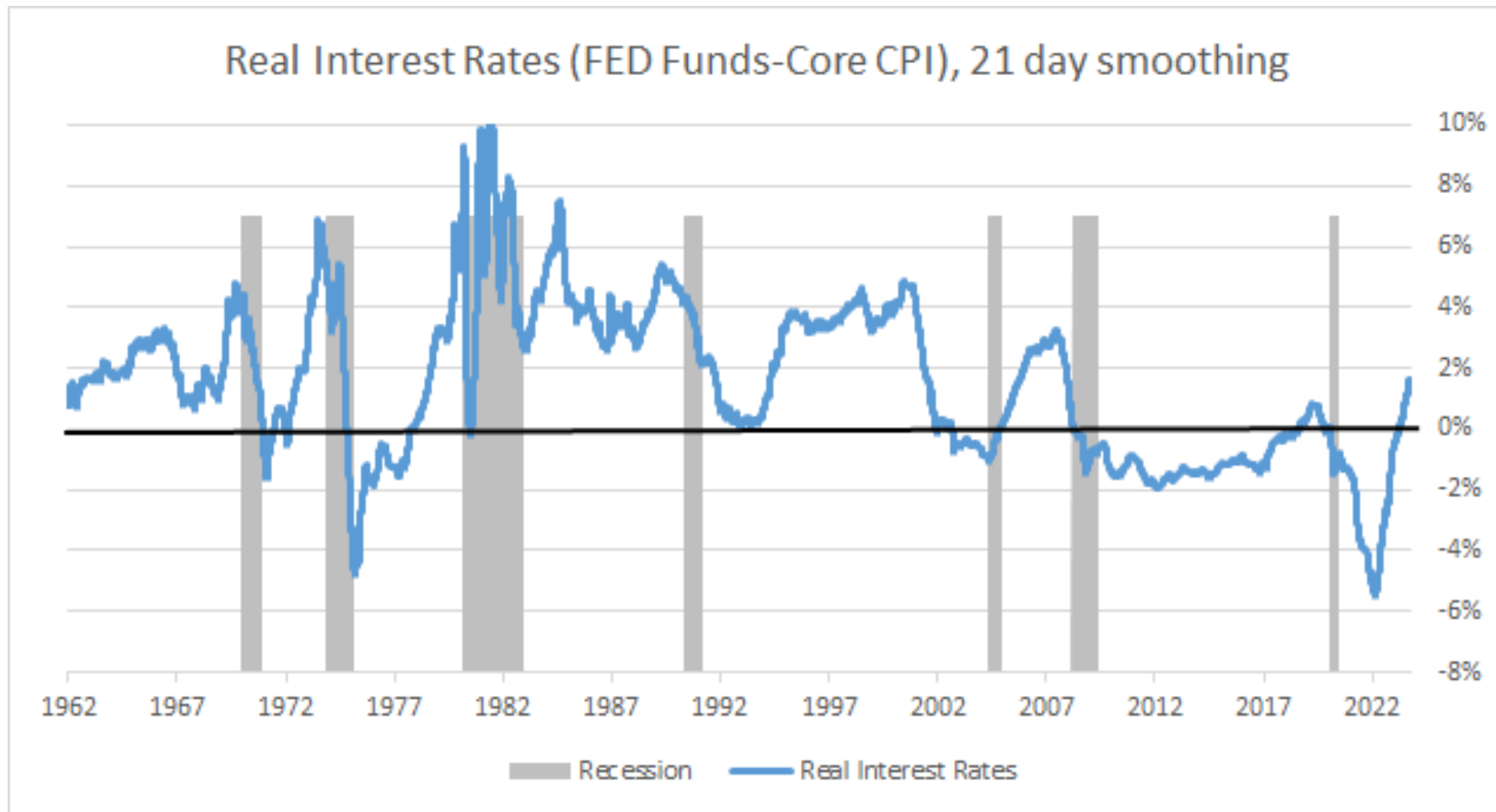
Data Source: Bloomberg

Federal Reserve Balance Sheet as a % of GDP



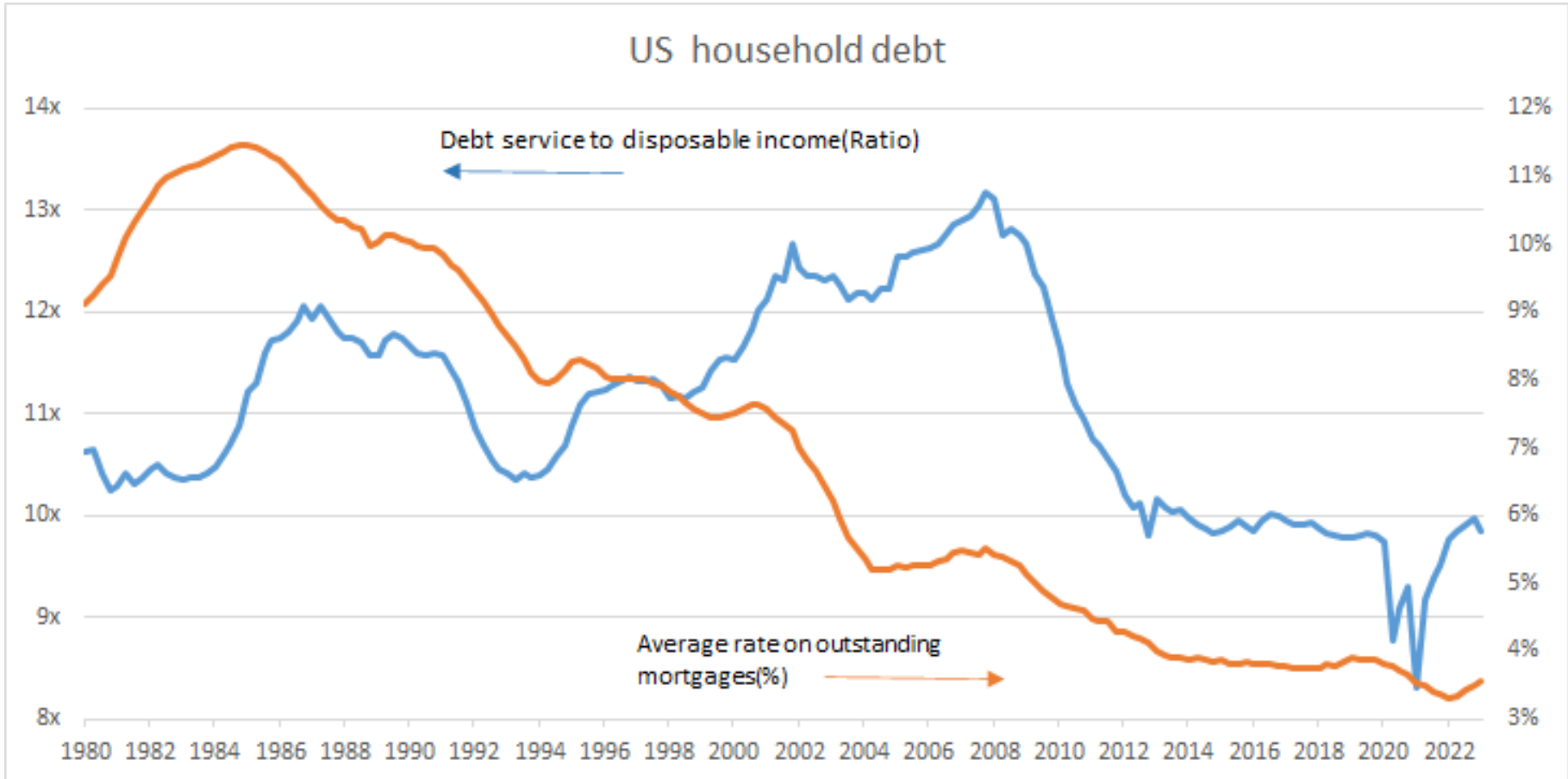
Data Source: Bloomberg

Higher Real Cost of Money



Data Source: Bloomberg

U.S. Household Debt

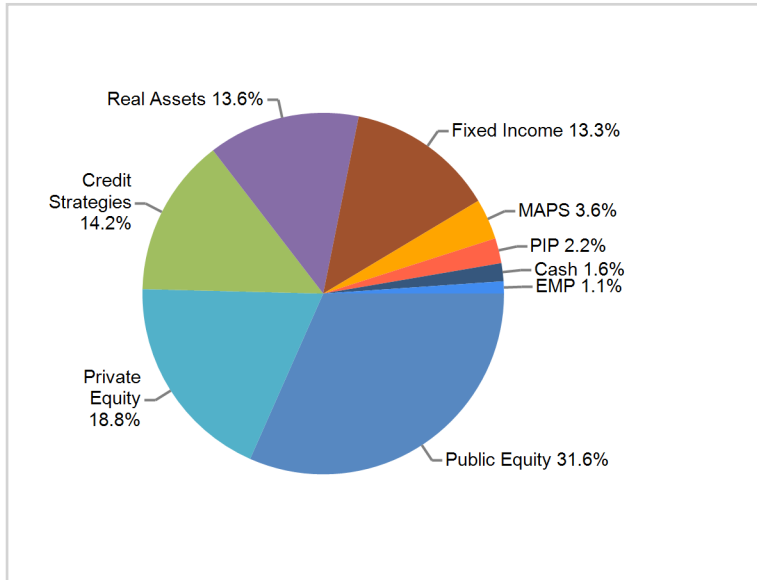


Data Source: Bloomberg

Asset Allocation Report

September 30, 2023

For Internal Investment Purposes Only



Tracking Error	
3Yr-Total Fund:	2.54%
3Yr-Total Public:	1.67%
5Yr-Total Fund:	2.28%
5Yr-Total Public:	1.53%

	<u>Current \$Bil</u>	<u>Current Weight</u>	<u>Policy Weight</u>	<u>Variance</u>	<u>Allowable Range</u>		<u>Internal %</u>
Total Fund	104.0						27.6%
Public Equity	32.9	31.6%	34.0%	-2.4%	-5%	+5%	47.6%
Fixed Income	13.8	13.3%	15.0%	-1.7%	-3%	+5%	94.9%
Credit Strategies	14.7	14.2%	14.0%	0.2%	-5%	+5%	
Real Assets	14.1	13.6%	14.0%	-0.4%	-5%	+5%	
Private RE	9.3	9.0%					
Other RA	0.0	0.0%					
Private Equity	19.5	18.8%	16.0%	2.8%	-5%	+5%	
MAPS	3.8	3.6%	4.0%	-0.4%	-2%	+2%	
DSTRAT	1.7	1.6%					
RBI	2.1	2.0%					0.1%
PIP	2.3	2.2%	2.0%	0.2%	-2%	+2%	
EMP	1.1	1.1%	0.0%	1.1%		+3%	
Cash	1.7	1.6%	1.0%	0.6%	-1%	+4%	

<u>High-Level Exposure</u>	<u>Current \$Bil</u>	<u>Current Weight</u>	<u>Policy Weight</u>	<u>Variance</u>	<u>Allowable Range</u>	
Total Equity	52.4	50.4%	50.0%	0.4%	-10%	10%
Fixed Income + Cash	15.5	14.9%	16.0%	-1.1%	-4%	9%

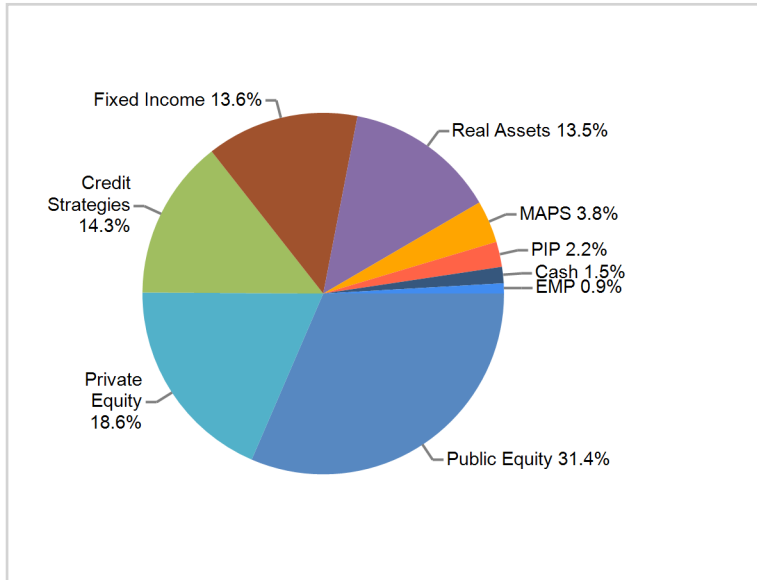
	<u>Current \$Bil</u>	<u>Current Weight</u>	<u>Policy Limit</u>
Hedge Funds	9.6	9.2%	15.0%

* Total Fund includes the following amt held by the Treasurer of VA: \$ 54 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.(6 adjustments applied)

*Total Fund and Total Public annualized tracking error is calculated using compounded quarterly returns as of 9/30/2023

* Differences in totals are due to rounding.



Tracking Error	
3Yr-Total Fund:	2.54%
3Yr-Total Public:	1.67%
5Yr-Total Fund:	2.28%
5Yr-Total Public:	1.53%

	Current \$Bil	Current Weight	Policy Weight	Variance	Allowable Range	Internal %
Total Fund	103.9					28.4%
Public Equity	32.7	31.4%	34.0%	-2.6%	-5% +5%	48.7%
Fixed Income	14.1	13.6%	15.0%	-1.4%	-3% +5%	95.4%
Credit Strategies	14.9	14.3%	14.0%	0.3%	-5% +5%	
Real Assets	14.1	13.5%	14.0%	-0.5%	-5% +5%	
Private RE	9.3	9.0%				
Other RA	4.8	4.6%				
Private Equity	19.3	18.6%	16.0%	2.6%	-5% +5%	
MAPS	3.9	3.8%	4.0%	-0.2%	-2% +2%	
DSTRAT	1.7	1.6%				6.5%
RBI	2.3	2.2%				0.1%
PIP	2.3	2.2%	2.0%	0.2%	-2% +2%	
EMP	0.9	0.9%	0.0%	0.9%	+3%	
Cash	1.5	1.5%	1.0%	0.5%	-1% +4%	

High-Level Exposure	Current \$Bil	Current Weight	Policy Weight	Variance	Allowable Range
Total Equity	52.0	50.0%	50.0%	0.0%	-10% 10%
Fixed Income + Cash	15.7	15.1%	16.0%	-0.9%	-4% 9%

	Current \$Bil	Current Weight	Policy Limit
Hedge Funds	9.2	8.9%	15.0%

* Total Fund includes the following amt held by the Treasurer of VA: \$ 129 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 (5 adjustments applied)

*Total Fund and Total Public annualized tracking error is calculated using compounded quarterly returns as of 9/30/2023

* Differences in totals are due to rounding.

PERFORMANCE SUMMARY

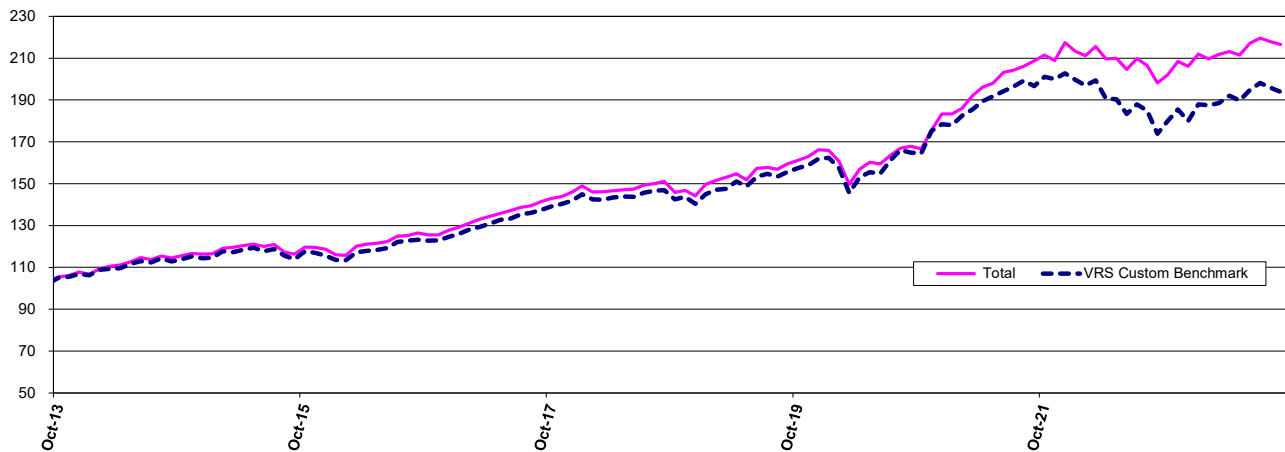
**Rolling Periods Ending
September 30, 2023**



TOTAL FUND PERFORMANCE

	10 Yr	5 Yr	3 Yr	1 Yr	Qtr	Month	Fiscal YTD	Cal YTD	Market Value (\$MM)
Total Public Equity Strategies	7.7	6.2	8.2	19.9	-2.5	-3.2	-2.5	8.5	32,892
<i>Benchmark</i>	7.7	6.5	7.3	20.7	-3.3	-4.2	-3.3	9.8	
Total Fixed Income	2.0	1.3	-3.9	2.3	-2.9	-2.4	-2.9	-0.4	13,797
<i>Benchmark</i>	1.2	0.2	-4.9	1.5	-3.0	-2.5	-3.0	-0.8	
Total Credit Strategies	6.1	6.6	7.9	9.7	3.1	2.2	3.1	8.3	14,521
<i>Benchmark</i>	4.8	4.3	3.6	11.1	1.9	-0.1	1.9	7.6	
Total Real Assets	9.6	7.9	10.6	-1.0	-0.8	-0.7	-0.8	-2.5	14,133
<i>Benchmark</i>	7.5	5.8	7.3	-4.5	-1.2	-0.4	-1.2	-5.7	
Total Private Equity	15.9	17.0	21.4	5.8	2.2	2.3	2.2	6.7	19,528
<i>Benchmark</i>	11.7	10.0	11.5	16.7	6.0	5.9	6.0	24.8	
Total Private Investment Partnerships	n/a	9.2	14.0	4.9	1.7	1.7	1.7	4.9	2,337
<i>Benchmark</i>	n/a	7.2	8.4	7.2	2.1	1.7	2.1	7.9	
Total Multi-Asset Public Strategies	n/a	4.1	6.2	11.0	0.8	0.0	0.8	6.0	3,787
<i>Benchmark</i>	n/a	4.5	3.5	10.9	-0.2	-1.2	-0.2	6.0	
Total Fund	7.7	7.5	8.9	9.3	-0.2	-0.6	-0.2	5.1	104,010
<i>VRS Custom Benchmark</i>	6.6	5.7	5.6	11.6	-0.5	-0.9	-0.5	7.8	

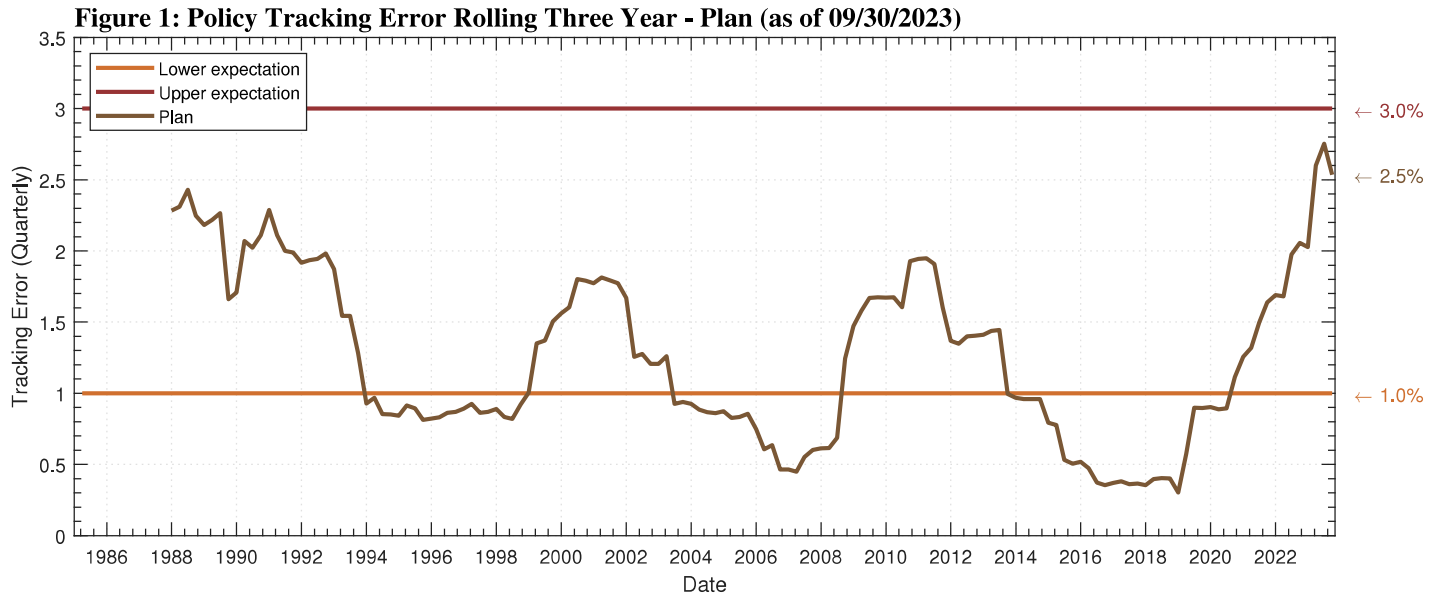
**10-Year Performance
Indexed to 100**



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



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.

Program	Action	Effective Date	Commitment/Current Value	Funding/Defunding Period	Description
Real Assets	Hired	08/23/2023	\$125 Million	4 Years	Meadow Real Estate Fund VI - A closed-end commingled fund investing in opportunistic real estate in select global gateway cities.
Real Assets	Hired	10/12/2023	\$50 Million	Immediate	Realterm Logistics Income Fund – An open-end fund investing in transportation related industrial properties in North America.
Credit Strategies	Terminated	07/14/2023	\$140 Million	3 Years	Schroders mandate - An account investing in both securitized and direct real estate debt investments.
Credit Strategies	Hired	08/18/2023	\$150 Million	3 Years	Orchard Global EleanTree III – A closed-end fund investing in regulatory capital relief transactions.
Credit Strategies	Hired	09/11/2023	\$230 million	5 years	Park Square Capital Partners V – A closed-end fund focused on Europe mezzanine debt investments.
Credit Strategies	Hired	10/18/2023	\$250 Million	3 years	Whitehorse Liquidity Partners VI - A closed-end fund targeting portfolio finance investments backed by interests in private asset portfolios.
Public Equity	Terminated	08/17/2023	\$195 Million	Immediate	*Advent Global Convertibles – An account investing in global convertible securities.
Exposure Management Portfolio	Hired	11/01/2023	\$200 Million	Immediate	Saba Arcadia Fund – An account investing in publicly traded closed-end funds.

* The manager is considered Diverse Investment Management Engagement (DIME) under the Commonwealth of Virginia definition, which defines ownership threshold of 51% or more.

Asset Liability Management Update

Andrew Junkin
Chief Investment Officer

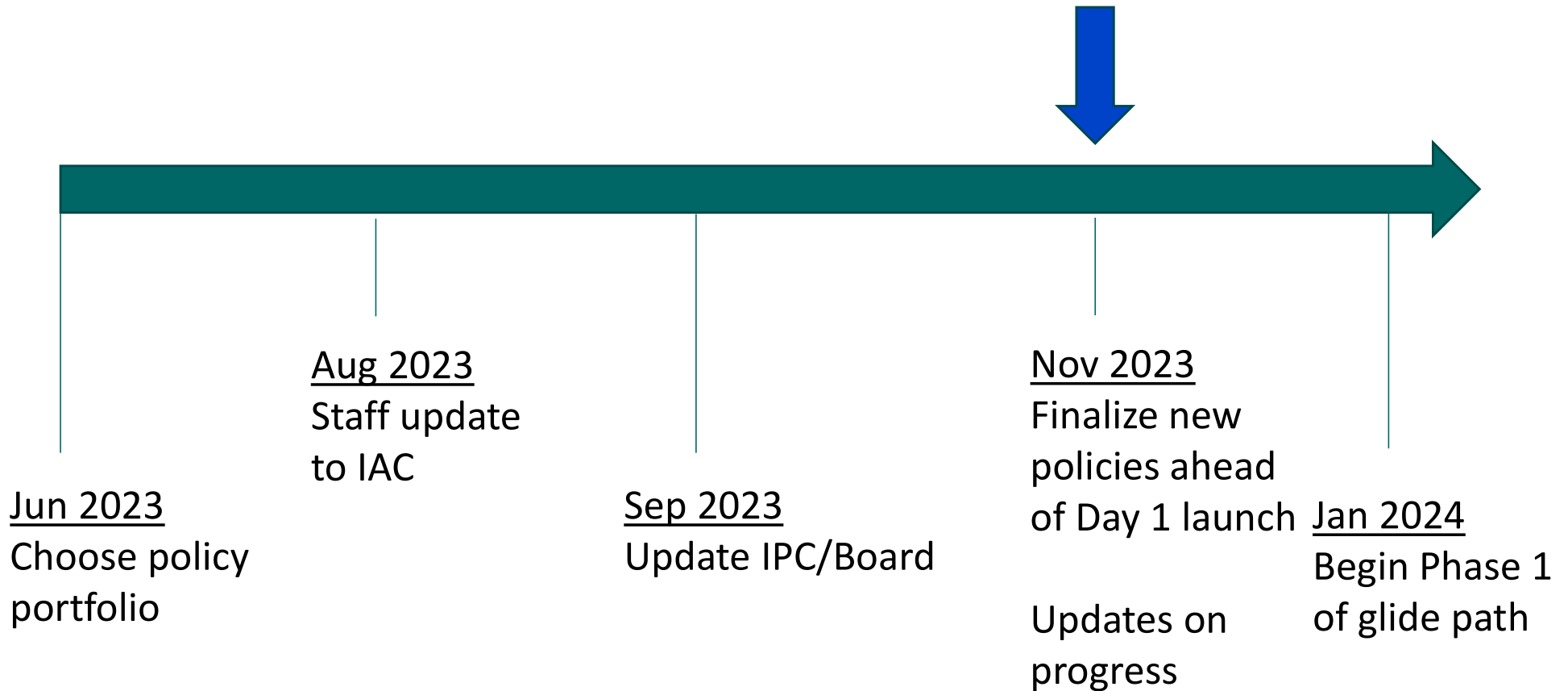
Chung Ma
Managing Director, Portfolio Solutions Group

November 2023



- Roadmap
- Expected glide path
- Implementation progress
- Takeaways

Roadmap to Launch



Expected Glide Path



Policy Weights

<u>Program</u>	<u>Dates</u>				
	<u>Current</u>	<u>Jan 2024</u>	<u>Jul 2024</u>	<u>CY 2025</u>	<u>CY 2026</u>
Public Equity	34	33	32	32	32
Fixed Income	15	16	16	16	16
Credit	14	14	14	15	16
Real Assets	14	14	14	14	15
Private Equity	16	16	16	16	15
MAPS	4	4	5	5	6
PIP	2	2	2	2	1
EMP	0	0	0	0	0
Cash	1	2	2	2	2
Leverage	0	1	1	2	3
Total	100	101	101	102	103

Implementation Plan Summary

- Proposed asset allocation with modest defensive shifts, including 1% leverage for January 2024
- Updated and new policies drafted for review
- Initial set of funding sources chosen. Weighting will be determined by market conditions
- Continued communication and education for incorporation of asset allocation leverage into portfolio

Today

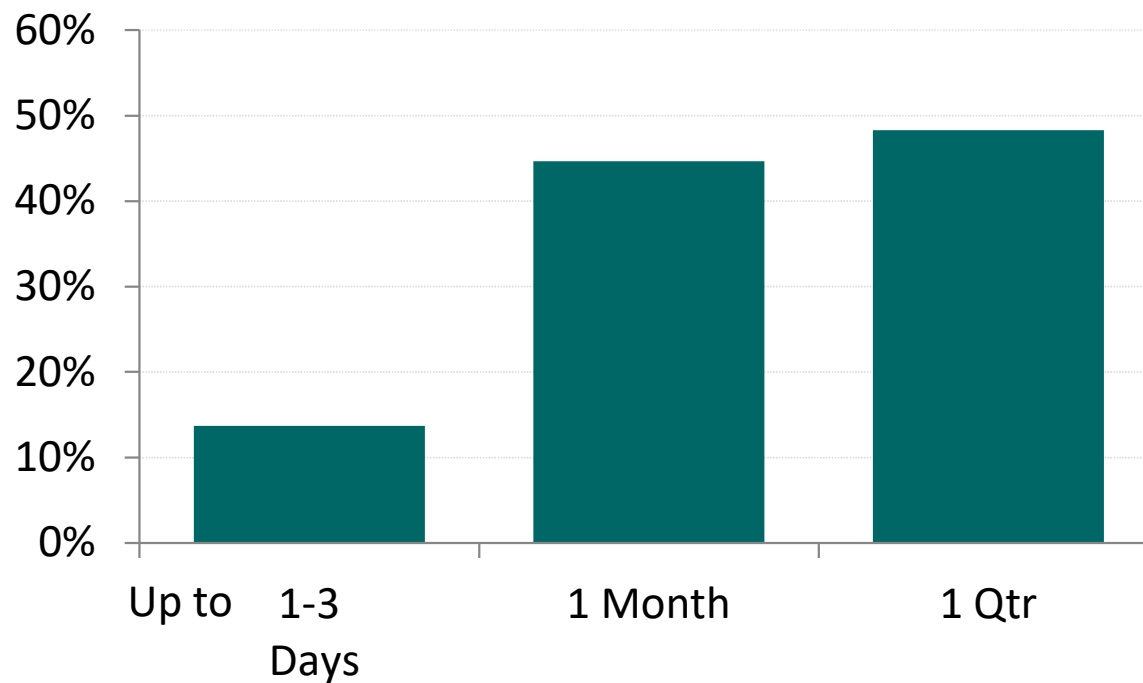
- • Update Investment Policy Statement and Investment Beliefs
- • Draft Leverage Policy
- • Identify options for funding
- • Ability to trade futures, swaps, borrow from securities lending
- • Liquidity reporting and management tools
- • Financing dashboard
- • Counterparty risk dashboard
- • Other risk management dashboards
- • Enhanced portfolio management tools – rebalance, cash flow
- • Discussion with peers on best practices
- • Complete documentation for financing options
- • Dynamic scenario and stress testing tools

- Add more diversification to defend the fund
- Implementation on target, including completion of policies that govern the asset allocation leverage process
- Glide path takes a measured pace in getting to the long-term strategic asset allocation

Appendix



Liquidity Schedule – As Percent of Fund (Cumulative)



As of September 30, 2023

ALM Update – November 2023

Financing

Regions ▾		Settings ▾		16:18:13						🔗 Swaps Markets: US RFR			
GV Ask/Chg		SOFR/GV		SOFR OIS		SOFR/FF		FOMC Forward FF		Dow Jones			
2Y	4.909 -0.024	-15.5200 -0.7900	4.7548 -0.0332	-2.3750 -0.0630	11/09/23	5.3642	DJIA	34152.60	+56.74				
3Y	4.684 -0.040	-21.8300 -0.2700	4.4660 -0.0425	-3.2500 -0.1125	11/09/23	5.3777	S&P 500 Index						
4Y	4.596 -0.051	-28.8800 -0.3800	4.3203 -0.0519	-3.6250 -0.0270	11/09/23	5.3090	S&P 500	4378.38	+12.40				
5Y	4.531 -0.057	-28.2500 -0.3700	4.2502 -0.0602	-3.9000 -0.0090	11/09/23	5.1875	NASDAQ Composite Index						
7Y	4.576 -0.066	-37.4800 -0.4800	4.2019 -0.0706	-4.2500	11/09/23	5.0400	CCMP	13639.86	+121.08				
10Y	4.569 -0.074	-37.0400 -0.4100	4.1995 -0.0799	-4.5000	11/09/23	4.8902	Bloomberg European 500						
20Y	4.911 -0.080	-69.8700 +0.3200	4.2132 -0.0763	-4.9000 -0.0250	11/09/23	4.7200	BE500	284.98	-0.47				
30Y	4.734 -0.075	-70.7500 +0.2700	4.0268 -0.0730	-5.8000 -0.0500	11/09/23	4.5557							
CME Term SOFR		BSBY Fix		AMERIBOR Fix		SOFR LCH/CME		Active Futures					
0/N	5.32000 +0.00000	5.41742 0.01416	5.46860 -0.01139	2Y	-0.2500	2 Year	101-16 ¹ / ₈	+0-01 ³ / ₄					
			5.32596 -0.06224	3Y	-0.2500	5 Year	105-18 ¹ / ₄	+0-09+					
1M	5.32197 -0.00147	5.37814 -0.00088	5.30388 -0.02865	4Y	-0.3000	10 Year	108-04+	+0-17+					
3M	5.36567 -0.00239	5.63004 0.00073	5.36241 -0.00586	5Y	-0.4000	US 10yr Ultra	111-15+	+0-27					
6M	5.39322 -0.00497	5.76556 -0.01593	4.95347 -0.03381	7Y	-0.3000	LONG BOND	113-30	+1-15					
1Y	5.26162 -0.00116	5.83958 -0.03614	4.09765 -0.01528	10Y	-0.3500	ULTRA LONG	117-25	+1-28					
3M Libor/SOFR OIS Spread													
LB/SFR		26.27800	-0.23900										
Cash Market		Generic SOFR Futures		SOFR Swaption 1Y		5Y	10Y	SOFR Futures					
ICAP FF	5.31000 +0.00000	SFR1 94.653 +0.003	1Y 147.609	130.538	116.869	1M SOFR	94.6900	+0.0000					
Fed Funds Eff	5.33000 +0.00000	SFR2 94.620 +0.005	2Y 139.698	125.552	112.916	3M SOFR	94.6200	+0.0050					
0/N Repo	5.39700 +0.06700	SFR3 94.745 +0.010	5Y 118.601	108.623	100.579								
		SFR4 95.000 +0.025	10Y 95.854	89.105	83.076								
		SFR5 95.295 +0.035											
		SFR6 95.595 +0.055											

Financing

Fed Funds FOMC »			Fed O/N Repo		US T-Bill				USD Deposit Rates		Rev Repo (Bid/Ask)				
DFD	5.3100	5.3300	TGCR	5.30	4W	5.38	-0.01	5.29	5.27	O/N	5.2800	5.4100	O/N	5.35	5.31
OBFR01		5.32	BGCR	5.30	2M	5.42	+0.00	5.29	5.29	1W	5.2850	5.4250	1W	5.41	5.37
Commercial Paper					3M	5.42	+0.00	5.28	5.26	2W	5.2900	5.4500	2W	5.42	5.38
30D		5.320	AFX O/N Rate		6M	5.49	+0.00	5.27	5.25	1M	5.3333	5.5201	1M	5.44	5.40
90D		5.520	AMERIBOR	5.47	1Y	5.32	-0.01	5.05	5.03						
Dow Jones			S&P 500 E-Mini Future		NASDAQ Composite Index				CRB Commodity Index						
DJIA	34152.60	+56.74	SPX Fut	4395.75	+11.50	CCMP	13639.86	+121.08					CRB	275.72	-6.17
US Bonds FIT »			S&P 500		SOFR FUT		LIBOR		BSBY Fix		SOFR Fix				
T 5 10/31/25	4.909	100-05 ¹ / ₄	100-05 ³ / ₈	+ 01+	SPX	4378.38	SFR1	94.653	1M	5.44	O/N	5.42	5.32		
T 4 ⁵ / ₈ 10/15/26	4.684	99-26+	99-26 ³ / ₄	+ 03+	FRA		SFR2	94.620	3M	5.63					
T 4 ⁷ / ₈ 10/31/28	4.533	101-16	101-16 ¹ / ₄	+ 07 ³ / ₄	1x4		SFR3	94.745	6M	5.82	1M	5.38	5.32		
T 4 ⁷ / ₈ 10/31/30	4.576	101-24	101-24+	+ 12+	2x5		SFR4	94.995							
T 3 ⁷ / ₈ 08/15/33	4.571	94-17+	94-18	+ 17+	3x6		SFR5	95.295			3M	5.63	5.37		
T 4 ³ / ₈ 08/15/43	4.912	93-07+	93-08	+ 30	4x7		SFR6	95.590			6M	5.77	5.39		
T 4 ¹ / ₈ 08/15/53	4.734	90-09	90-10+	+1-03	5x8	5.519					1Y	5.84	5.26		
Spot FX FXC »			Key Rates		SOFR OIS Swaps		10Y Note Future		Funds Future		Fed Repo				
JPY	150.4100	Prime	8.50	3Y	4.4674	CBT	108-04	+ 17	NOV	94.673	G/C ON	5.39			
EUR	1.0696	BLR	7.25	5Y	4.2510	Commodities			30Y MBS BBTM »						
GBP	1.2295	FDTR	5.50	10Y	4.2008	NYM WTI	77.41	-3.41	FNCL 5	94-15+	94-21+	+ 12+			
CAD	1.3765	Discount	5.50	30Y	4.0282	GOLD	1968.68	-9.46	G2SF 5	95-08	95-17+	+ 10			
									Current Coupon			6.251			
Economic Releases ECO »															
	Date	Time	C	A	M	R	Event	Period	Surv(M)	Actual	Prior	Revised			
1)	11/07	08:30	US				Trade Balance	Sep	-\$59.8b	-\$61.5b	-\$58.3b	-\$58.7b			
2)	11/07	15:00	US				Consumer Credit	Sep	\$9.500b	\$9.057b	-\$15.628	-\$15.788			

Collateral



VRS Collateral for Non-Cleared Derivatives

Balances as of m/d/yyyy

Counterparty Name	Type	Asset Type	Quantity	VRS Collateral - Posted	Counterparty - Collateral Held
Counterparty 1	Posted	Cash	(\$12,754,000)		
Counterparty 2	Posted	Debt	(26,113,000)		
Counterparty 3	Posted	Debt	(27,832,000)		
Counterparty 4	Posted	Debt	(9,432,000)		
Counterparty 5	Posted	Debt	(18,763,000)		
Counterparty 6	Posted	Debt	(13,915,800)		
Counterparty 7	Posted	Debt	(61,931,000)		
Total Collateral Posted				(\$170,740,800)	
Counterparty 8	Held	Cash	290,000		
Counterparty 9	Held	Debt	4,908,000		
Counterparty 10	Held	Debt	38,051,000		
Counterparty 11	Held	Cash	3,400,000		
Counterparty 12	Held	Debt	145,643,360		
Total Collateral Held					\$192,292,360
VRS Collateral Inventory Account Balance				419,791,324	
VRS Collateral Available (unposted)				\$249,050,524	

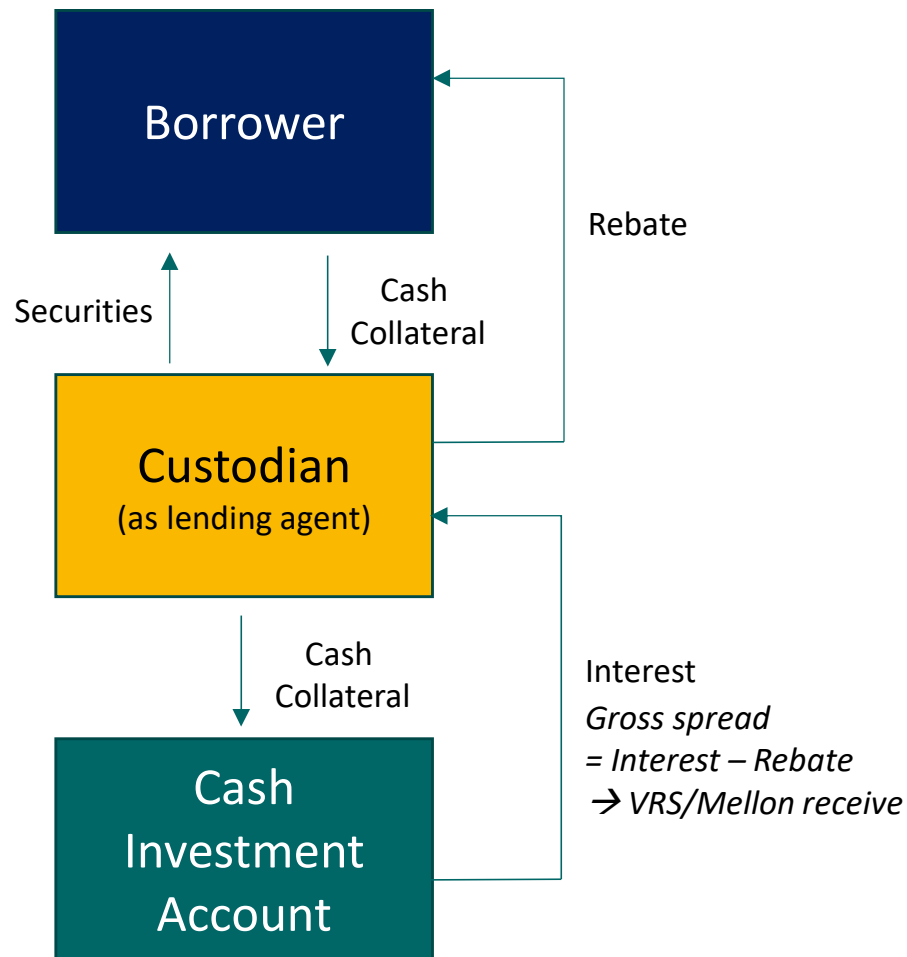
Broker Runs: Sample Indications



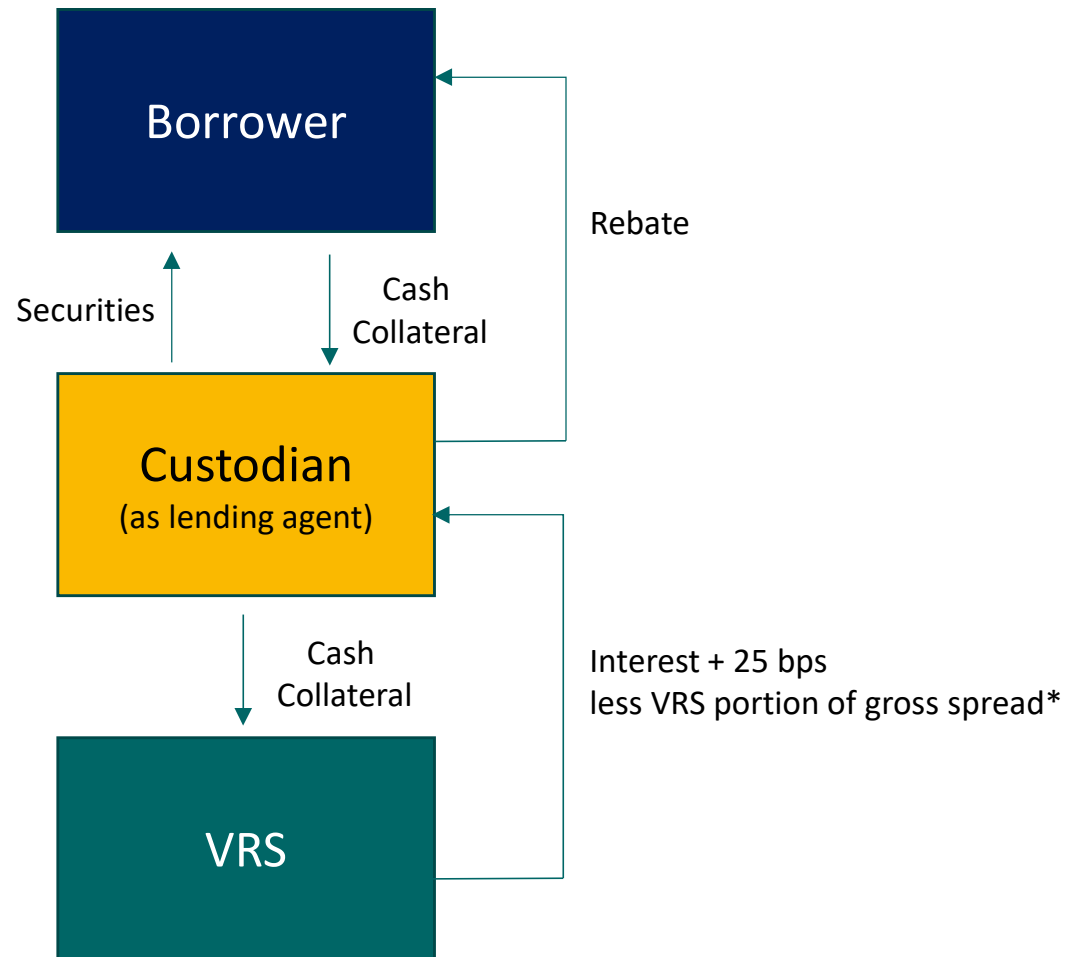
Description	Benchmark	Indic. Size (USD, mlns)	3m Tenor		6m Tenor		1y Tenor	
			Bid	Offer	Bid	Offer	Bid	Offer
MSCI Daily TR Gross USA USD	Fed Funds	50	45	50	40	45	40	45
MSCI Brazil NTR USD	SOFR	50	(25)	45	(25)	50	(25)	65
MSCI Emerging Latin America NTR USD	SOFR	50	(25)	52	(25)	55	(25)	70
Russell 2000 TR	Fed Funds	50	0	20	(5)	15	(10)	10
Russell Midcap TR	Fed Funds	50	20	35	20	30	15	30
S&P 500 TR	Fed Funds	50	45	50	40	45	40	45
MSCI JAPAN NR	TONA	50	(20)	2	(36)	(16)	(40)	(20)
MSCI EUROPE NR	ESTRON	50	0	20	(20)	0	(25)	(5)
EURO STOXX 50 NRt	€STR	50	(20)	2	(25)	(5)	(45)	(25)
FTSE 100 Net Tax Index	SONIA	50	35	45	30	40	30	40
FTSE 100 Total Return Index GBP	SONIA	50	35	45	30	40	30	40
MSCI Daily TR Gross EAFE USD	SOFR	50	45	60	70	80	50	60
MSCI Daily TR Gross World USD	SOFR	50	50	65	50	60	45	55
MSCI EAFE NTR USD	SOFR	50	30	40	(5)	10	5	10
MSCIEM Europe & Middle East & Africa NTR	SOFR	50	(15)	80	(25)	30	(20)	10
MSCI World NTR USD	SOFR	50	10	25	(2)	8	(5)	5
MSCI ACWI NTR USD	SOFR	50	10	30	(5)	10	(5)	5
MSCI Emerging NTR USD	SOFR	50	25	60	10	30	0	15

* Hypothetical indications from broker

Securities Lending Cash Release - Current



Securities Lending Cash Release - Funding

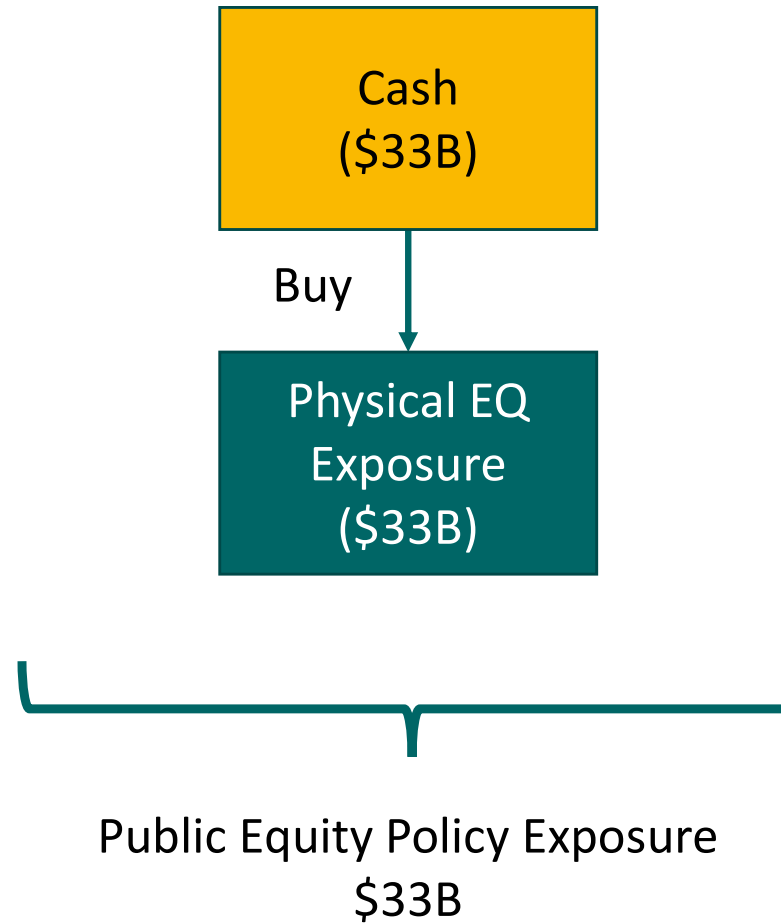


* VRS normally receives pre-determined portion of gross spread

Use of Synthetics - Current

33% Policy Allocation to Public Equity (EQ)

Economic Exposure

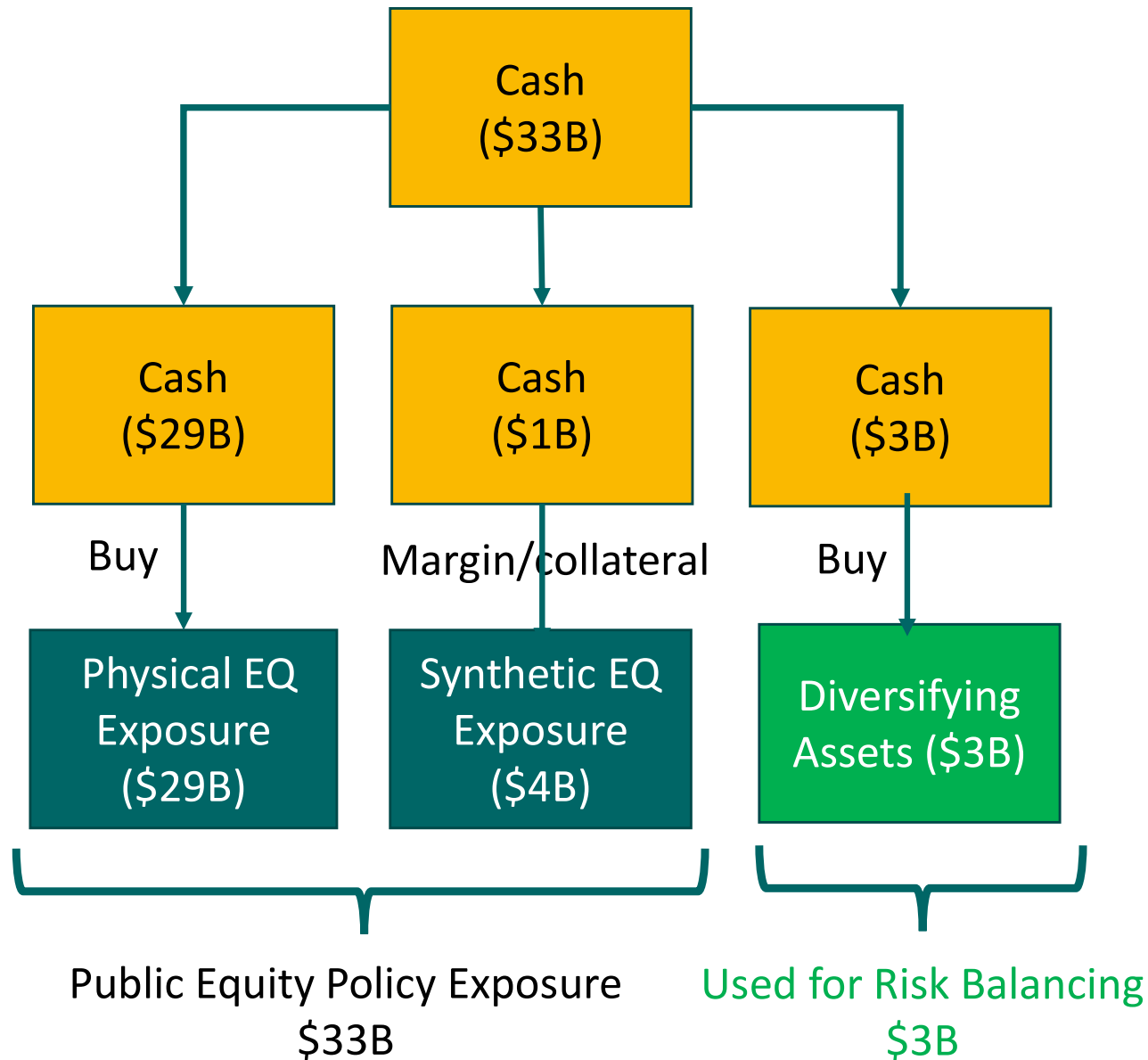


Use of Synthetics – Funding

33% Policy Allocation to Public Equity (EQ)

Allocate Cash to Exposures (\$33B)

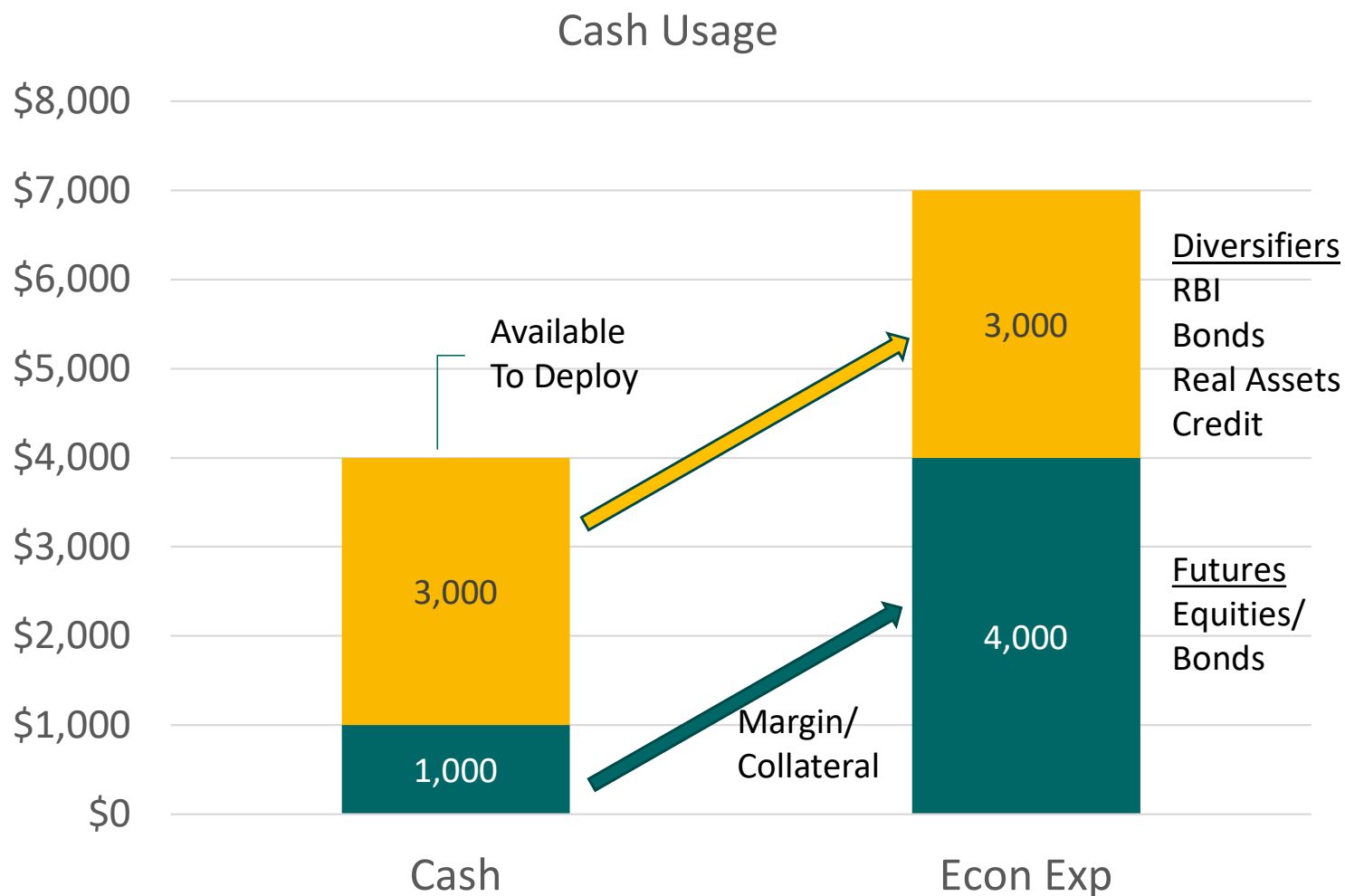
Economic Exposures* (\$36B)



18 * Synthetic exposure is passive exposure to benchmark. ALM Update – November 2023

Cash Management - Synthetic Case Study

Synthetic exposure allows for re-allocation to other assets

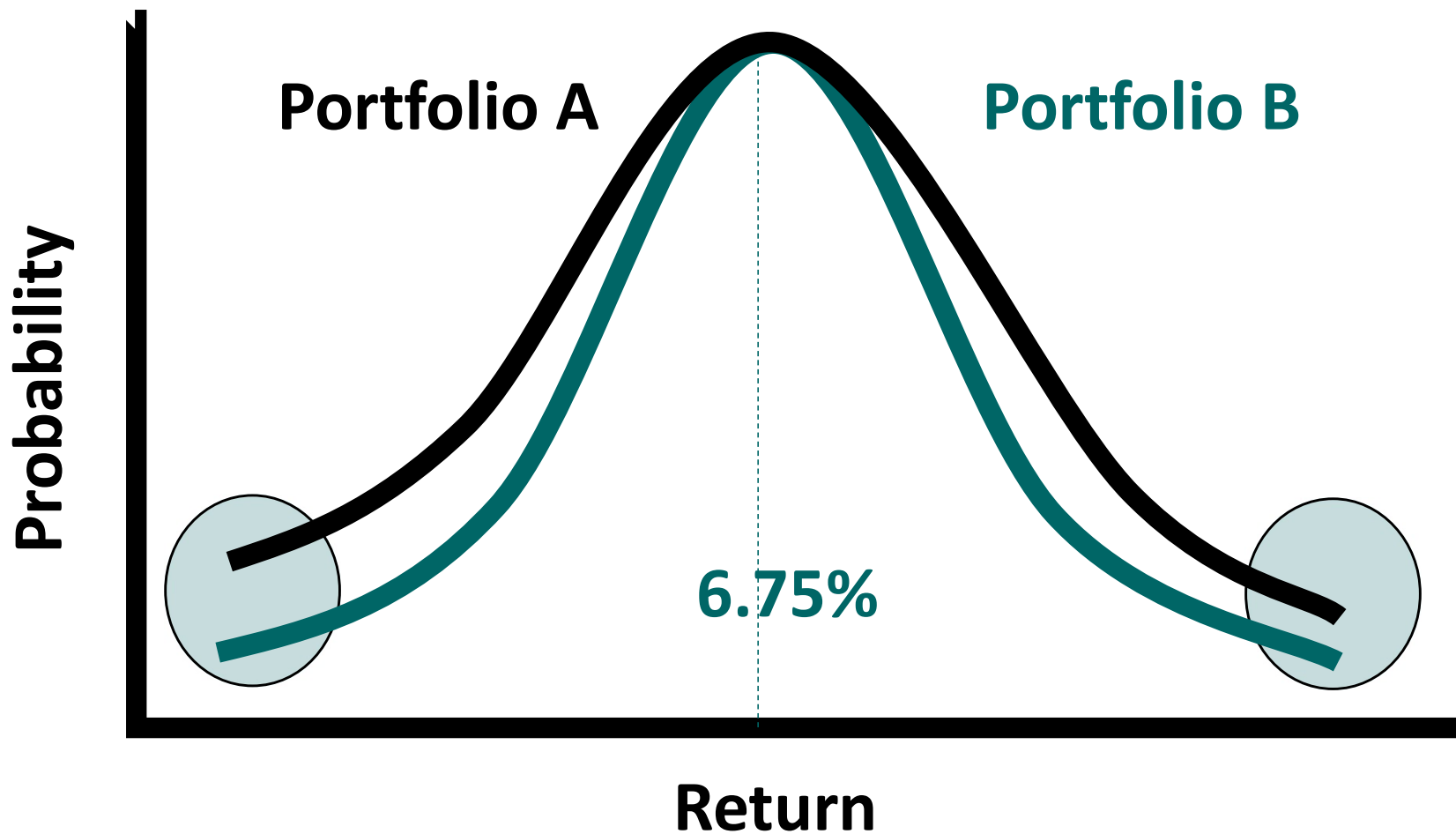


Illustrative, numbers are in US dollars, millions

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

Illustrative



APPROVED BY THE BOARD OF TRUSTEES: JUNE 15, 2006
UPDATED NOVEMBER 1614, 202318

1. Investment Objective

The investment objective of the VRS defined benefit plan portfolio is to maximize return while managing risk within an acceptable range. Because of the long-term nature of the plan's liabilities, the horizon for investment decisions is generally defined as 10 years or longer. Risk is assessed in an asset-liability framework, and primary risk measures are volatility in the plan's assets, funded status and contribution rates.

The objective of the investment staff is to execute the asset allocation policy established by the Board of Trustees and to attempt to add value relative to the policy benchmarks.

The *Code of Virginia* § 51.1-124.30 requires that "the Board shall...invest the assets of the Retirement System with the care, skill, prudence and diligence under the circumstances prevailing that a prudent person acting in a like capacity and familiar with such matters would use in the conduct of an enterprise of like character and with like aims. The Board shall also diversify such investments so as to minimize the risk of large losses unless under the circumstances it is clearly prudent not to do so."

2. Decision Making

The Board is responsible for establishing broad policy guidelines and benchmarks that will enable the VRS Trust Fund to achieve its investment objective. Board decisions are required in the following areas:

1. Asset Allocation Targets (Policy Risk/Reward Parameters)
2. Allowable Ranges Around the Policy Targets
3. Total Fund and Program Level Benchmarks
4. Active Risk Ranges Relative to Policy
5. Strategic Asset Allocation Leverage Target (Asset Allocation Leverage and Rebalancing Leverage)

Beyond these broad policy decisions, the Board delegates to the Chief Investment Officer (CIO) all other decisions relating to the investment of VRS assets, subject to the guidelines presented in this document.

In carrying out its fiduciary duty to oversee the investments of the fund, the Board will consider advice and recommendations provided by the VRS Investment Advisory Committee (IAC). The specific duties and responsibilities of the IAC are described in the IAC Charter.

3. Asset Allocation/Rebalancing

The Board has an Investment Policy Committee (IPC). Its membership is the entire Board of Trustees. The IPC is a forum for the Board to discuss the fund's mission, objectives, risk tolerance and asset allocation, and strategic asset allocation leverage. (continued)

3. Asset Allocation/Rebalancing (*continued*)

The fund's strategic asset allocation mix will be set by the Board and reviewed periodically. Annually, the Board will review the capital market return projections. In setting the strategic asset allocation mix, the Board will give consideration to the recommendations of the CIO and the IAC. A significant change in capital market conditions, pension program demographics or benefit formula could trigger a fresh asset/liability study.

In developing policy parameters, the Board will work on an asset-liability analysis with an outside expert on such issues. Normally an analysis will be made every two to three years to coincide with the contribution rate-setting cycle. This project is designed to assist the Board in determining an acceptable volatility target for the fund and an optimal asset allocation policy mix. The Board will also establish an allowable range around each asset class target weight within which the CIO is granted discretion.

Appendix 1 shows the fund's current strategic asset allocation mix and the allowable range for each asset class.

4. Total Fund Performance Benchmark

The Board will establish the total fund performance benchmark. In analyzing the performance of the fund and the investment staff, the Board will use a VRS Custom Benchmark. The VRS Custom Benchmark represents the strategic asset allocation mix and the program level benchmarks established by the Board during the asset allocation process. The VRS Custom Benchmark is rebalanced monthly. See Appendix 1 for details.

Assets involved in transition from one mandate to another may be temporarily managed within "Transition Accounts" and such individual accounts might not be benchmarked during the transition period. The CIO will ensure that such transitions are completed on a timely basis, consistent with market conditions.

5. Active Risk Allocation

The Board will establish a total fund active risk range that describes the degree of tolerance for yearly variation in the fund's performance relative to the Total Fund Custom Benchmark. The primary risk measure used for this purpose is Tracking Error, calculated as the standard deviation of the difference between the fund's return and the benchmark's return. From this measure, probability estimates can be derived to help the Board estimate the risk of underperforming the benchmark by certain margins. It is recognized that statistical measures, such as tracking error, are in fact just estimates and do not guarantee that observed performance will occur as expected.

Appendix 1 shows the current tracking error range for the total fund.

6. Program and Manager Level Policies

The Board delegates to the CIO the authority to establish and modify as necessary the program level investment policy statements. Individual manager investment policy statements can be approved by the respective Program Managers provided they work in concert with the overarching program level investment policy statements. Each program and investment manager policy statement (both internal and external) should clearly define the investment objectives, allowable strategies, limits, risks and performance benchmarks applicable to the program or account in question. In the case of commingled investments or where VRS is a limited partner, the appropriate fund documents (i.e., Limited Partnership Agreement, Offering Memorandum, etc.) may be used in lieu of the investment manager policy statement. The program level policy statement should also include due diligence procedures for hiring, monitoring and terminating investment managers. The CIO is responsible for ensuring that adequate due diligence is being performed in the evaluation of potential and existing investments, and that all investment activity will be legal and in compliance with appropriate regulatory bodies.

7. Investment Manager Selection and Termination

The CIO has full authority to hire and fire investment managers and negotiate or renegotiate fees at any time using processes deemed likely to achieve the best investment results for the fund. The CIO will report any hirings or terminations at the next Board meeting.

8. Risk Management

Risk management is a primary objective for the investment staff, and investment results will be reviewed in the context of risk-adjusted returns. The primary risk objectives for the fund are to (1) manage the volatility of the fund within a reasonable range around the targeted volatility as established in the asset allocation process, and (2) manage the tracking error of the fund within the tracking error range as established by the total fund risk budget. Should the total fund experience active risk outside of the tracking error range, the CIO is responsible for communicating the variance to the Board on a timely basis. In addition, the CIO is responsible for obtaining and/or developing appropriate systems, models, tools and reports necessary to monitor the risks of the fund and effectively communicate such risks on a regular basis to the Board.

9. Authority to Execute Contracts

The CIO and the Chief Administrative Officer (CAO) have full authority to execute contracts on behalf of VRS, provided that any contract relating directly to an investment decision must be approved by the CIO. Such contracts may include, but not be limited to, investment management contracts, partnership agreements, subscription agreements, service agreements, consulting contracts and contracts for derivative investment instruments consistent with the fund's investment policy and strategies.

10. Best Execution

Generally, all investment transactions executed on behalf of the fund will be made on the basis of best execution. VRS defines best execution as the process and price that results in the best overall performance impact, as judged by the portfolio manager, taking into account current market conditions. VRS will generally discourage the use of soft dollar arrangements, and where such arrangements are utilized, staff will review this usage for reasonableness.

11. Corporate Governance Policy

All investment activity will be consistent with the Board's Corporate Governance Policy, which outlines procedures for proxy voting, securities litigation and involvement in investor groups.

12. Use of Consultants/Service Providers

The CIO has authority to hire consultants, research providers and other service providers, provided that such expenditures are in alignment with the Board-approved investment department operating budget.

13. Reporting

The CIO is responsible for reporting on a timely basis the significant activity and results of the fund. Such reports will include regular performance reports and commentary and updates as needed in each Board meeting. The CIO will respond in a timely manner to requests for information from the Board.

14. Code of Ethics

The investment staff will conduct its affairs in a manner that reflects the highest standards of ethical conduct. The staff is expected to comply with the [CFA Institute Code of Ethics and Standards of Professional Conduct](#).

**APPROVED BY THE BOARD OF TRUSTEES: JUNE 15, 2006
UPDATED NOVEMBER 16, 2023**

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Generally, all investment transactions executed on behalf of the fund will be made on the basis of best execution. VRS defines best execution as the process and price that results in the best overall performance impact, as judged by the portfolio manager, taking into account current market conditions. VRS will generally discourage the use of soft dollar arrangements, and where such arrangements are utilized, staff will review this usage for reasonableness.

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All investment activity will be consistent with the Board's Corporate Governance Policy, which outlines procedures for proxy voting, securities litigation and involvement in investor groups.

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The CIO has authority to hire consultants, research providers and other service providers, provided that such expenditures are in alignment with the Board-approved investment department operating budget.

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The CIO is responsible for reporting on a timely basis the significant activity and results of the fund. Such reports will include regular performance reports and commentary and updates as needed in each Board meeting. The CIO will respond in a timely manner to requests for information from the Board.

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VRS Defined Benefit Plan Investment Policy Statement
as of July 1, 2023**
Appendix 1

Asset Class (Strategies)	Policy Target %	Allowable Range	Benchmark	Tracking Error Range
Global Public Equity	34.0%	29% - 39%	MSCI ACWI IMI Index Net*	
Global Equity	-	-		
Equity Hedge Funds	-	-		
Fixed Income	15.0%	12% - 20%	Fixed Income Custom	
Core	-		Bloomberg US Aggregate Bond Index	
High Yield	-		Bloomberg US HY Ba/B 2% Issuer Cap Index	
Emerging Market Debt	-		JP Morgan EMBI Global Core Index	
Credit Strategies	14.0%	9% - 19%	Credit Strategies Custom	
Real Assets	14.0%	9% - 19%	Real Assets Custom	
Private Real Estate	-	-	NCREIF ODCE Index Net	
Other Real Assets	-	-	CPI-U + 400 bps	
Private Equity	16.0%	11% - 21%	Private Equity Custom	
Multi-Asset Public Strategies	4.0%	2% - 6%	MAPS Custom	
Dynamic Strategies	-		DStrat Custom	
Risk-Based Investments	-		RBI Custom	
Private Investment Partnerships	2.0%	0% - 4%	PIP Custom	
Exposure Management	0.0%	0% - 3%		
Cash	1.0%	0% - 5%	ICE BofA US 3-Month Treasury Bill Index (FKA Merrill Lynch 91-day T-Bill Index)	
Total Fund	100.0%		VRS Custom Benchmark	100 - 300 bps
High-Level Exposure				
Total Equity	50.0%	40% - 60%		
Fixed Income + Cash	16.0%	12% - 25%		
Hedge Funds (Strategies)	≤ 15.0%	n/a	varies by program	

* "Net" means net of VRS foreign tax withholding.

** Previous date was January 1, 2023.

Notes:

The Board establishes and reviews the total fund tracking error range. The total fund tracking error range is the allowable observed tracking error calculated quarterly using 5 years of history. Should the plan experience active risk outside of the tracking error range, the CIO is responsible for communicating the variance to the Board on a timely basis. The total fund tracking error range is the amount of expected tracking error based on the total fund's current mix and strategies. The CIO establishes individual program tracking error ranges. (continued)

VRS Defined Benefit Plan Investment Policy Statement
as of July 1, 2023**
Appendix 1

Notes (continued):

Staff will not, by its tactical actions, underweight or overweight any individual asset class beyond the minimum and maximum allowable ranges. However, market action or Fund liquidity needs could cause an individual asset class to be temporarily below the minimum allowable range or above the maximum allowable range. In such rare cases, using the high-level rebalancing ranges, the CIO will have the flexibility to exceed the individual allowable ranges if the deviation is related to market actions or Fund liquidity needs, if the CIO believes bringing an individual asset class back within its allowable range would not be economically prudent. If, however, the CIO determines an individual asset class needs to be brought back into its allowable range, staff will establish an action plan. In any event, the CIO will communicate the deviation to the Board on a timely basis.

The Fixed Income Custom Benchmark is a blend of the Bloomberg US Aggregate Bond Index (90%), Bloomberg US High Yield Ba/B 2% Issuer Cap Index (5%) and JP Morgan EMBI Global Core Index (5%).

The Credit Strategies Custom Benchmark is blend of the Morningstar LSTA Performing Loan Index (50%) and the Bloomberg US High Yield Ba/B 2% Issuer Cap Index (50%).

The Real Assets Custom Benchmark is the market value weighted blend of the NCREIF Private Real Estate Benchmark (ODCE Index (net lagged by three months) and the Other Real Assets Custom Benchmark (the CPI-U Index plus 400 basis points per annum lagged by three months).

The Private Equity Custom Benchmark is the MSCI ACWI IMI (net VRS tax rates) lagged by three months.

The Multi-Asset Public Strategies (MAPS) Custom Benchmark is the market value weighted average of the benchmarks of the mandates (Dynamic Strategies and Risk-Based Investments) within the program.

The Dynamic Strategies (DStrat) Custom Benchmark is a blend of the MSCI ACWI IMI Index (net VRS tax rates) (60%), the Bloomberg US Aggregate Bond Index (20%), the Bloomberg US HY Ba/B 2% Issuer Cap Index (10%) and the JP Morgan EMBI Global Core Index (10%).

The Risk-Based Investments (RBI) Custom Benchmark is the Bloomberg US Treasury Bellwethers: 3 month plus 250 basis points per annum.

The Private Investment Partnerships (PIP) Custom Benchmark is a weighted average of the custom Private Equity Benchmark (MSCI ACWI IMI Index (net VRS tax rates) lagged by three months) (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 HY Ba/B 2% Issuer Cap Index (17%), and the Morningstar LSTA Performing Loan Index (17%).

The VRS Custom Benchmark is a blend of the Asset Class Benchmarks at policy weights.

Hedge Funds are a collection of active strategies that may be used in any VRS investment program that fits the underlying assets.

VRS Defined Benefit Plan Investment Policy Statement as of January 1, 2024** Appendix 1

Asset Class (Strategies)	Policy Target %	Allowable Range	Benchmark	Tracking Error Range
Global Public Equity	33.0%	26% – 40%	Public Equity Custom	
Global Equity	-	-		
Equity Hedge Funds	-	-		
Fixed Income	16.0%	12% – 23%	Fixed Income Custom	
Core	-		Bloomberg US Aggregate Bond Index	
High Yield	-		Bloomberg US HY Ba/B 2% Issuer Cap Index	
Emerging Market Debt	-		JP Morgan EMBI Global Core Index	
Credit Strategies	14.0%	7% – 21%	Credit Strategies Custom	
Real Assets	14.0%	7% – 21%	Real Assets Custom	
Private Real Estate	-	-	NCREIF ODCE Index Net	
Other Real Assets	-	-	CPI-U + 400 bps	
Private Equity	16.0%	9% – 23%	Private Equity Custom	
Multi-Asset Public Strategies	4.0%	1% – 9%	MAPS Custom	
Dynamic Strategies	-		DStrat Custom	
Risk-Based Investments	-		RBI Custom	
Private Investment Partnerships	2.0%	0% – 4%	PIP Custom	
Exposure Management	0.0%	0% – 6%		
Cash	2.0%	0% – 7%	ICE BofA US 3-Month Treasury Bill Index	
Total Fund with Asset Allocation Leverage	101.0%		VRS Custom Benchmark	100 – 300 bps
Leverage	1.0%	0% – 3%		
Total Fund	100.0%			
High-Level Exposure				
Total Equity	49.0%	39% – 59%		
Fixed Income + Cash	18.0%	12% – 27%		
Rebalancing Leverage	3.0%			

** Previous date was July 1, 2023.

Notes:

The Board establishes and reviews the total fund tracking error range. The total fund tracking error range is the allowable observed tracking error calculated quarterly using 5 years of history. Should the plan experience active risk outside of the tracking error range, the CIO is responsible for communicating the variance to the Board on a timely basis. The total fund tracking error range is the amount of expected tracking error based on the total fund's current mix and strategies. The CIO establishes individual program tracking error ranges. (continued)

These changes were approved by the Board at the June 15, 2023 meeting with an effective date of January 1, 2024.

These changes are described in RBA – Approve FY 2024 Defined Benefit Plan Strategic Asset Allocation and Allowable Ranges.

These changes are described in RBA – Approve Public Equity, MAPS, Dynamic Strategies, Risk-Based Investments, and Leverage Benchmarks.

**VRS Defined Benefit Plan Investment Policy Statement
as of January 1, 2024**
Appendix 1**

Notes (continued):

Staff will not, by its tactical actions, underweight or overweight any individual asset class beyond the minimum and maximum allowable ranges. However, market action or Fund liquidity needs could cause an individual asset class to be temporarily below the minimum allowable range or above the maximum allowable range. In such rare cases, using the high-level rebalancing ranges, the CIO will have the flexibility to exceed the individual allowable ranges if the deviation is related to market actions or Fund liquidity needs, if the CIO believes bringing an individual asset class back within its allowable range would not be economically prudent. If, however, the CIO determines an individual asset class needs to be brought back into its allowable range, staff will establish an action plan. In any event, the CIO will communicate the deviation to the Board on a timely basis.

Staff will not, by its tactical actions, cause the Strategic Asset Allocation Leverage (comprised of Asset Allocation Leverage and Rebalancing Leverage) to surpass its limit. However, market action or Fund liquidity needs could cause the Strategic Asset Allocation Leverage to be temporarily above the limit. In such rare cases, the CIO will have the flexibility to exceed the maximum limit if the deviation is related to market actions or Fund liquidity needs, if the CIO believes bringing the Strategic Asset Allocation Leverage back within its limit would not be economically prudent. If, however, the CIO determines the Strategic Asset Allocation Leverage needs to be brought back within its limit, staff will establish an action plan. In any event, the CIO will communicate the deviation to the Board on a timely basis.

The Public Equity Custom Benchmark is a weighted average of the MSCI ACWI IMI Index (net VRS taxes) (85%) and the MSCI World Min Vol Index (net VRS taxes) (15%).

The Fixed Income Custom Benchmark is a blend of the Bloomberg US Aggregate Bond Index (90%), Bloomberg US High Yield Ba/B 2% Issuer Cap Index (5%) and JP Morgan EMBI Global Core Index (5%).

The Credit Strategies Custom Benchmark is a blend of the Morningstar LSTA Performing Loan Index (50%) and the Bloomberg US High Yield Ba/B 2% Issuer Cap Index (50%).

The Real Assets Custom Benchmark is the market value weighted blend of the NCREIF Private Real Estate Benchmark (ODCE Index (net) lagged by three months) and the Other Real Assets Custom Benchmark (the CPI-U Index plus 400 basis points per annum lagged by three months).

The Private Equity Custom Benchmark is the regional benchmarks of the MSCI ACWI IMI Index (net VRS taxes) lagged by three months, weighted to reflect the Private Equity opportunity set (currently 75% North America, 20% Europe, and 5% Asia and Emerging Markets).

The Multi-Asset Public Strategies (MAPS) Custom Benchmark is the ICE BofA US 3-Month Treasury Bill Index plus 250 basis points per annum.

The Dynamic Strategies (DStrat) Custom Benchmark is the ICE BofA US 3-Month Treasury Bill Index plus 250 basis points per annum.

The Risk-Based Investments (RBI) Custom Benchmark is the ICE BofA US 3-Month Treasury Bill Index plus 250 basis points per annum.

The Private Investment Partnerships (PIP) Custom Benchmark is the weighted average of the Private Equity Custom Benchmark (33%), the NCREIF Private Real Estate Benchmark (25%), the Other Real Assets Custom Benchmark (8%), the Bloomberg US HY Ba/B 2% Issuer Cap Index (17%), and the Morningstar LSTA Performing Loan Index (17%).

The Leverage Custom Benchmark is the Secured Overnight Financing Rate (SOFR) plus 50 basis points per annum.

The VRS Custom Benchmark is a blend of the Asset Class Benchmarks at policy weights.

These changes were approved by the Board at the June 15, 2023 meeting with an effective date of January 1, 2024.

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These changes are described in RBA – Approve Public Equity, MAPS, Dynamic Strategies, Risk-Based Investments, and Leverage Benchmarks.



APPROVED BY THE BOARD OF TRUSTEES: SEPTEMBER 8, 2015
UPDATED: ~~NOVEMBER 16, 2023~~ APRIL 20, 2021

I. Introduction

VRS strives to be consistent with the fiduciary obligations outlined in the *Code of Virginia*, which require the Virginia Retirement System Board of Trustees (Board) to invest the assets of the VRS Trust Fund with care, skill, prudence and diligence, while diversifying investments to minimize the risk of large losses. The Board, therefore, developed these Investment Beliefs to guide the strategic management of the VRS investment portfolio. These Investment Beliefs represent a high-level framework for making decisions that require balancing multiple and competing factors. In addition, the Investment Beliefs provide context for VRS actions and reflect VRS values, with a focus on maintaining the long-term commitment to provide benefits to participants.

II. VRS Investment Belief Statements

The Board developed the following Investment Belief Statements to guide its decisions and provide an anchor to the stated goals and objectives.

Goals and Objectives

1. The primary objective of the VRS investment portfolio is to achieve the highest level of return for a given level of risk over the long term.
2. With respect to VRS' investments, the VRS Board has two key roles:
 - a. Establish the overall level of investment risk for the fund:
 - I. **Total Risk** (range of outcomes that the VRS total portfolio is likely to experience). Total risk is determined largely by the Strategic Allocation Policy as set by the Board. Total risk is the larger of the two risks.
 - II. **Relative Risk** (range of outcomes in relation to Strategic Allocation Policy benchmark). Once the Board establishes this range, staff is expected to add value over the investment performance policy benchmark by an amount commensurate with that amount of relative risk allowed. While material, relative risk is typically a fraction of total risk.
 - b. Establish and monitor investment guidelines that are then delegated to staff to implement consistent with the risks above.

3. As VRS conducts its investment activities, it seeks to strike a balance among three competing objectives:
 - a. **Achieving Long-Term Funding Progress** – In order to achieve long-term funding goals, VRS must allocate to asset classes and strategies that take advantage of equity and illiquidity risk factors. Such allocations introduce volatility into the fund.
 - b. **Avoiding Short-Term Drawdown Risk** – Higher exposures to equity and liquidity risk increase the probability of large short-term mark-to-market declines in the fund's value. However, investment strategies to avoid shortfall risk may lead to a reduced long-term investment return, increasing the likelihood of falling short of long-term funding goals.
 - c. **Avoiding Contribution Volatility** – Short-term mark-to-market declines in the fund's value can cause intermediate term increases in required contribution rates. However, investment strategies that seek to reduce volatility may lead to a reduced long-term investment return, thus requiring higher overall contribution rates and raising long-term costs for employers.

VRS Access and Structural Advantages

4. In order to achieve the necessary long-term returns, VRS focuses on two premiums that typically reward long-term investors: the equity risk premium and the illiquidity risk premium. Both risk premiums vary over short to intermediate periods; however, over longer horizons, both risk premiums have historically produced positive returns.
5. VRS has the size and capabilities to pursue global opportunities, which offer a vast array of investments across a wide spectrum of domestic and international markets.
6. Diversification can take the form of exposure or time:
 - a. Multiple asset classes/risk premiums enhance the return-risk tradeoff of VRS' investment portfolio, particularly over short-to-intermediate horizons.
 - b. Vintage year diversification, as well as dollar-cost averaging, in and out of investments helps mitigate the impact of market volatility.
7. Portfolio management is an active and dynamic process. Market inefficiencies exist in varying degrees across and within all asset classes in which VRS invests. Using both internal and external management capabilities, VRS can add value exploiting these inefficiencies.

Staff Implementation Parameters

8. VRS has the governance structure, staffing and resources to leverage the cost savings associated with managing assets in-house. Given these attributes, staff should continue to explore further expansion of internal capabilities in areas that leverage staff's expertise in a cost-effective manner.
9. VRS has a long history of investment innovation and the Board encourages staff to continue to explore, access and implement creative investment approaches and strategies. Staff is expected to monitor new initiatives closely, and the Board recognizes that not all may develop into permanent strategies.
10. Costs (management fees, commissions, transaction costs, etc.) related to managing the VRS investment program are significant and have a material impact upon long-term performance. As an experienced, large-scale investor, VRS will seek to maximize its negotiating leverage to manage its assets in a cost-effective manner.
11. VRS believes it is difficult to successfully add value by making frequent, large-scale shifts between major asset classes; however, smaller-scale shifts and tilts across asset class segments can add incremental value when based on sound relative value judgments.
12. Portfolio leverage is a financial tool that can be utilized in a prudent and thoughtful manner to help balance risk exposures, and, in turn, enhance the risk/return profile of a portfolio. Plan leverage can also help balance risk exposures and appear in multiple forms, including asset allocation leverage and rebalancing leverage.
13. VRS' Investment Staff develops, strengthens and retains its intellectual capital, so that it can remain successful through industry leadership and innovation. This is primarily advanced by collaboration among asset class and functional area teams. Secondly, external relationships with like-minded global partners are identified and cultivated to broaden investment reach. With both internal and external personnel, success is based on cooperation, trust and transparency.



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Virginia Retirement System Investment Leverage Policy

I. Scope

This Policy applies to the utilization of leverage within the Virginia Retirement System ("VRS") Defined Benefit Fund ("Fund").

II. Purpose

The primary objective of this policy is to establish a framework for the prudent management of leverage for the VRS Fund.

III. Philosophy

Leverage can be defined in multiple ways. From an investment standpoint, leverage arises when the economic or market exposure of an investment surpasses the total capital deployed. The use of leverage has the potential to magnify gains or losses on a given capital amount, potentially increasing the volatility of returns. The Fund presently incorporates strategies that employ Implementation Leverage (defined below), such as borrowing capital for real estate investments.

The purpose of this policy is to focus on leverage at the Strategic Asset Allocation level. In 2023, the VRS Board of Trustees approved two forms of leverage for the execution of asset allocation, namely Asset Allocation Leverage and Rebalancing Leverage (defined below). Leverage is strategically employed to enhance the efficiency of the investment portfolio from a return and risk perspective, relative to alternative choices that do not employ leverage. Furthermore, leverage is employed to enhance portfolio diversification and mitigate portfolio concentration.

IV. Permissible Deployment of Leverage

The utilization of leverage by staff is permissible through the following mechanisms:

1. **Derivatives:** include futures, forwards, swaps and options
2. **Reinvestment or re-use of collateral:** includes, but is not limited to, securities lending, repurchase agreements/reverse repurchase agreements, and other external funding mechanisms
3. **Implementation Leverage:** includes the use of financing terms embedded within program level investment structures, such as leverage on real estate

Any other deployment of leverage shall be done pursuant to the prudent investor standard given in § 51.1-124.30(C) of the Code of Virginia, namely "with the care, skill, prudence, and diligence under the circumstances then prevailing that a prudent person acting in a like capacity and familiar with such matters would use in the conduct of an enterprise of a like character and with like aims."

V. Leverage Parameters and Assessment

Various approaches are employed to assess and manage the risks associated with leverage, contingent upon the source and resultant risk exposures. These approaches encompass a combination of controls outlined in policies, portfolio guidelines, procedures, and legally binding documents. The key elements of this section include:

1. **Management and Monitoring:** Leverage will be managed and monitored at the Total Fund level.
2. **Asset Allocation Leverage:** This will be executed as part of the Strategic Asset Allocation in alignment with the targets stipulated in the VRS Defined Benefit Plan Investment Policy Statement. Asset Allocation Leverage exists when the total policy weights in the Strategic Asset Allocation exceed 100% and represents economic exposure surpassing the capital at the Total Fund level. Policy weights are documented in the VRS Defined Benefit Plan Investment Policy Statement.
3. **Explicit Leverage:** Denotes the excess amount of economic exposure beyond the 100% composed of the total of all program weights within the Strategic Asset Allocation.
4. **Calculation of Explicit Asset Allocation Leverage Exposure:** Explicit Leverage exposure will be calculated by aggregating the weights of each program within the Strategic Asset Allocation minus 100%.
5. **Rebalancing Leverage:** Staff possesses the authority to utilize leverage in addition to the Asset Allocation Leverage. This is expected to be infrequent and contingent upon attractive opportunities. Limits are detailed in the VRS Defined Benefit Plan Investment Policy Statement.
6. **Additional points in the methodology encompass:**
 - a. The use of currency derivatives for hedging or risk management purposes does not constitute leverage.
 - b. The use of derivatives within a program for hedging, risk management, or portfolio management is not counted as leverage.
 - c. Capital commitments are not categorized as leverage.
7. **Breach of Asset Allocation Leverage:** Staff will not, by its tactical actions, cause Asset Allocation Leverage to surpass the maximum limit. However, market action or Fund liquidity needs could cause Asset Allocation Leverage to be temporarily above the limit. In such rare cases, the Chief Investment Officer (CIO) will have the flexibility to exceed the limit if the deviation is related to market actions or Fund liquidity needs, if the CIO believes bringing the Asset Allocation Leverage back within its limit would not be economically prudent. If, however, the CIO determines Asset Allocation Leverage needs to be brought back within its limit, staff will establish an action plan. In any event, the CIO will communicate the deviation to the Board on a timely basis.
8. **Breach of Rebalancing Leverage:** Staff will not, by its tactical actions, cause Rebalancing Leverage to surpass the maximum limit. However, market action or Fund liquidity needs could cause Rebalancing Leverage to be temporarily above the limit. In such rare cases, the CIO will have the flexibility to exceed the limit if the

deviation is related to market actions or Fund liquidity needs, if the CIO believes bringing the Rebalancing Leverage back within its limit would not be economically prudent. If, however, the CIO determines Rebalancing Leverage needs to be brought back within its limit, staff will establish an action plan. In any event, the CIO will communicate the deviation to the Board on a timely basis.

9. **Program Level Leverage:** Leverage may be used in strategies within programs. The risk monitoring process is multi-faceted and is addressed using a variety of approaches both at the individual portfolio level and the program level. For example, measures of volatility, tracking error, and returns are captured at both the individual portfolio and program levels, and monitored as part of VRS' risk management framework. Borrowing is not permitted at the Program level.
10. **Leverage monitoring and reporting:**
 - a. Reporting is regularly generated by VRS to provide insights into leverage exposures for staff review. Dashboards may also provide information on the various facets of the leverage process.
 - b. Leverage use exposure risk metrics will be reported at least annually to the Investment Advisory Committee. The Investment Advisory Committee will review leverage with an emphasis on diversifying counterparties, maturities, and sources.
 - c. Periodic reports on leverage will be presented by the CIO to the Board. The CIO will respond in a timely manner to requests for information from the Board.

Investment Advisory Committee Private Market Assets Program Reviews November 15, 2023



Overview (K.C. Howell, Managing Director)

5 min

Program Reviews

● Real Assets

(Walker Noland, Program Director)

30 min

● Private Equity

(John Alouf, Program Director)

30 min

● Credit Strategies

(Steve Woodall, Program Director)

30 min

● Private Investment Partnership (PIP)

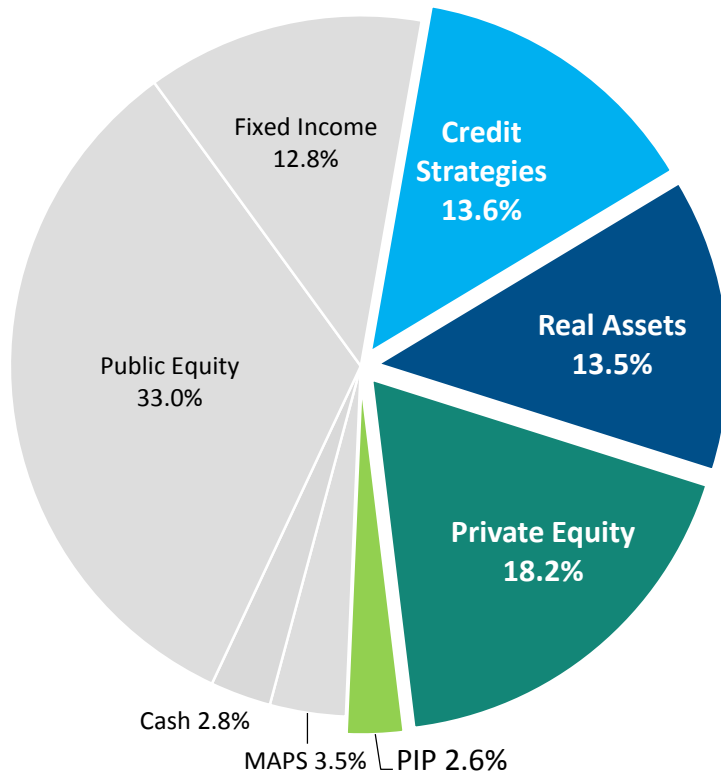
(Steve Woodall, Program Director)

Program Reviews

K.C. Howell
Managing Director, Private Assets



Overview: What Does VRS Classify As Private Assets?



- **Real Assets**
Real estate, infrastructure, natural resources, etc.
- **Private Equity**
Buyouts, growth, turnaround, etc.
- **Credit Strategies**
Distressed, opportunistic, niche, etc.
- **Private Investment Partnerships (PIP)**
Multi-asset class

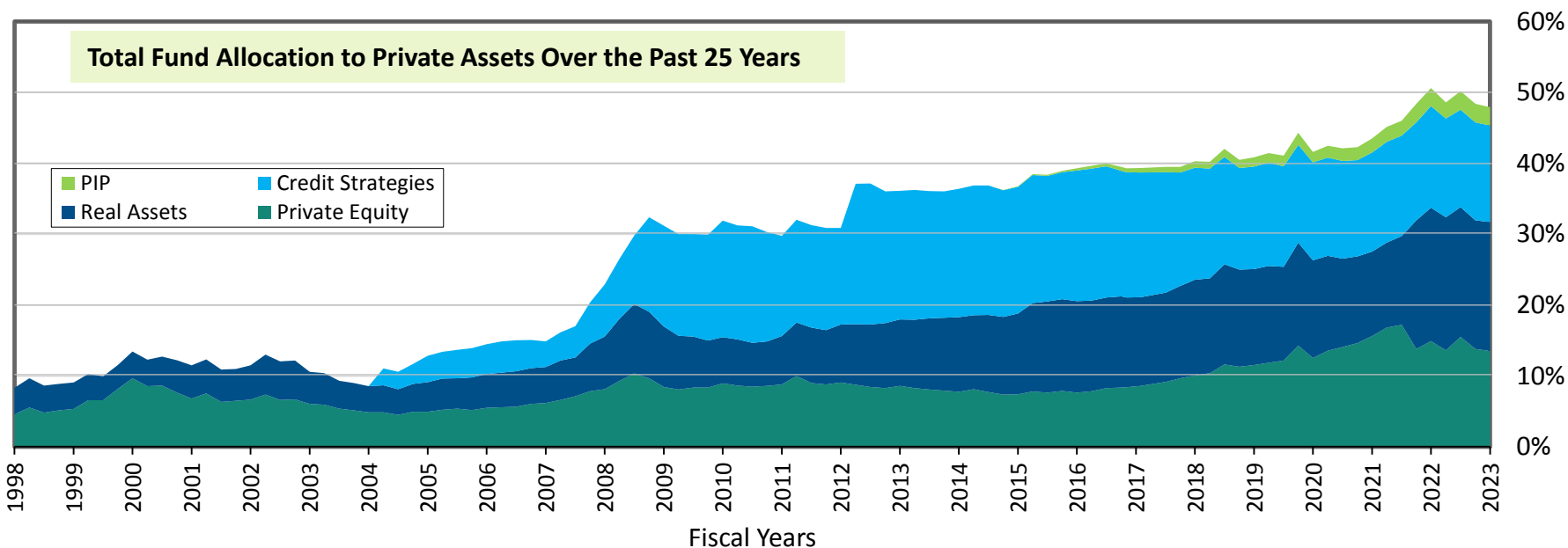
Private Market Assets: 47.9%

Market values as of 6/30/22; source: BNY Mellon data

Overview: Why Does VRS Invest In Private Assets?



- Enhance absolute & relative returns
- Capture illiquidity premium
- Reduced risk via diversification
- Migration from public to private



Market values as of 6/30/23; source: BNY Mellon data

Overview: Preview Of Agenda Items



- Overview
- Markets
- Exposures
- Results
- Co-investments
- Managers
- Looking Forward

Overview: Private Markets Perspectives



APOLLO

Outlook for private markets

Torsten Slok, Jyoti Agarwal, and Rajvi Shah

Apollo Global Management

October 2023

Unless otherwise noted, information as of October 2023.

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It should not be assumed that investments made in the future will be profitable or will equal the performance of the investments shown in this document.

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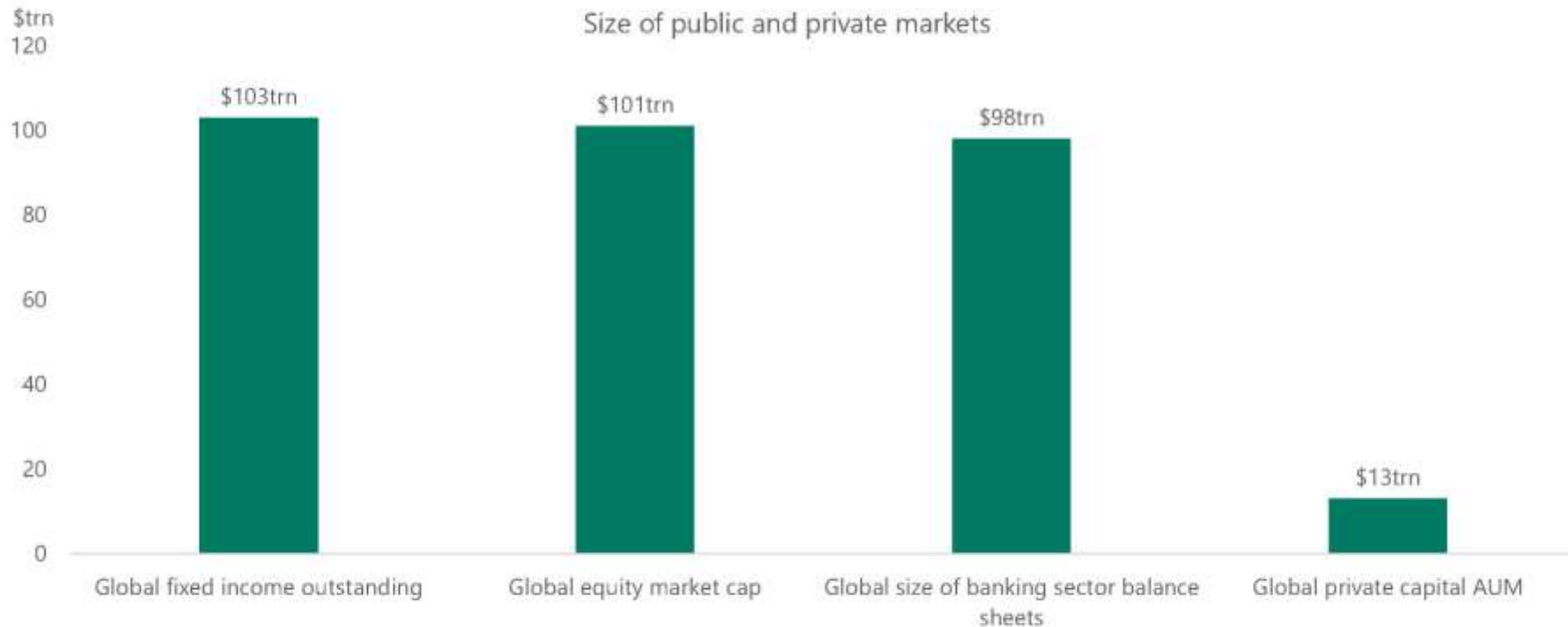
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Overview: Private Markets Perspectives

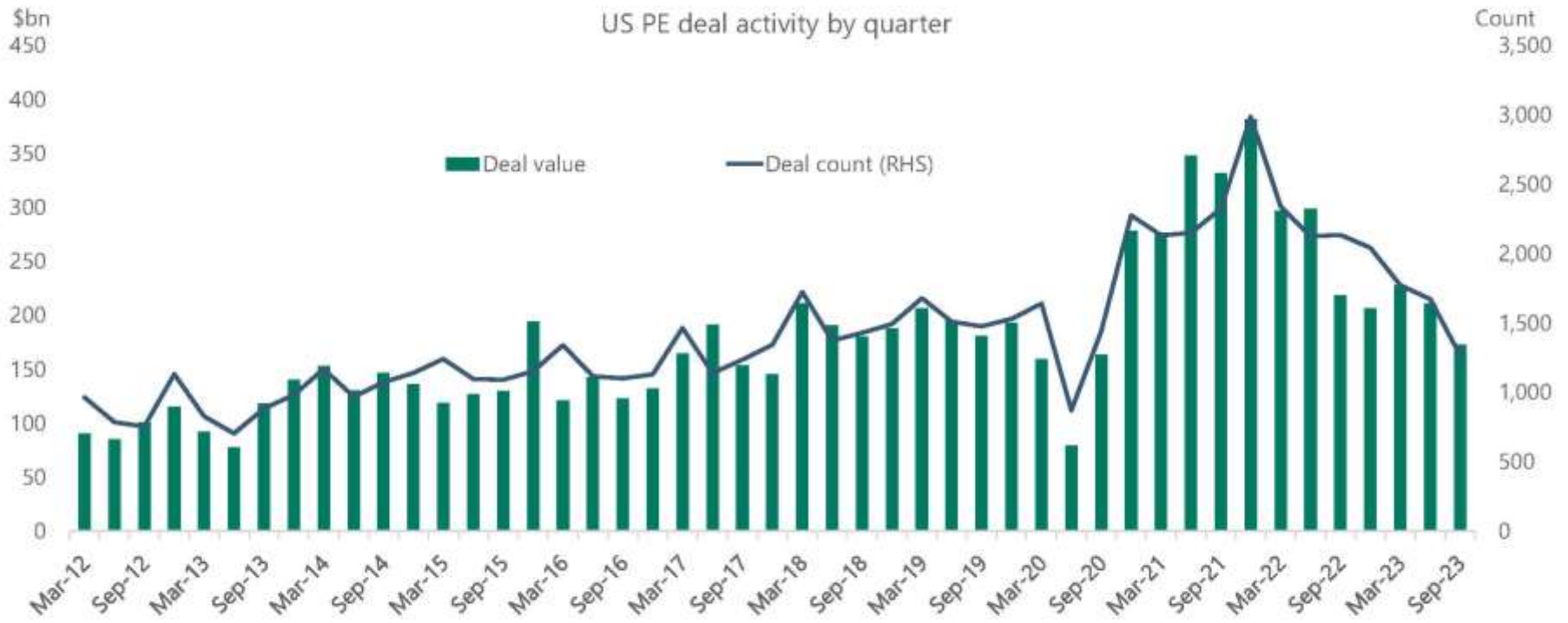
Comparing public and private markets



Source: SIFMA, BIS, Pitchbook, Apollo Chief Economist. Note: Data as of 2022 and 2023Q2 (BIS data).

Overview: Private Markets Perspectives

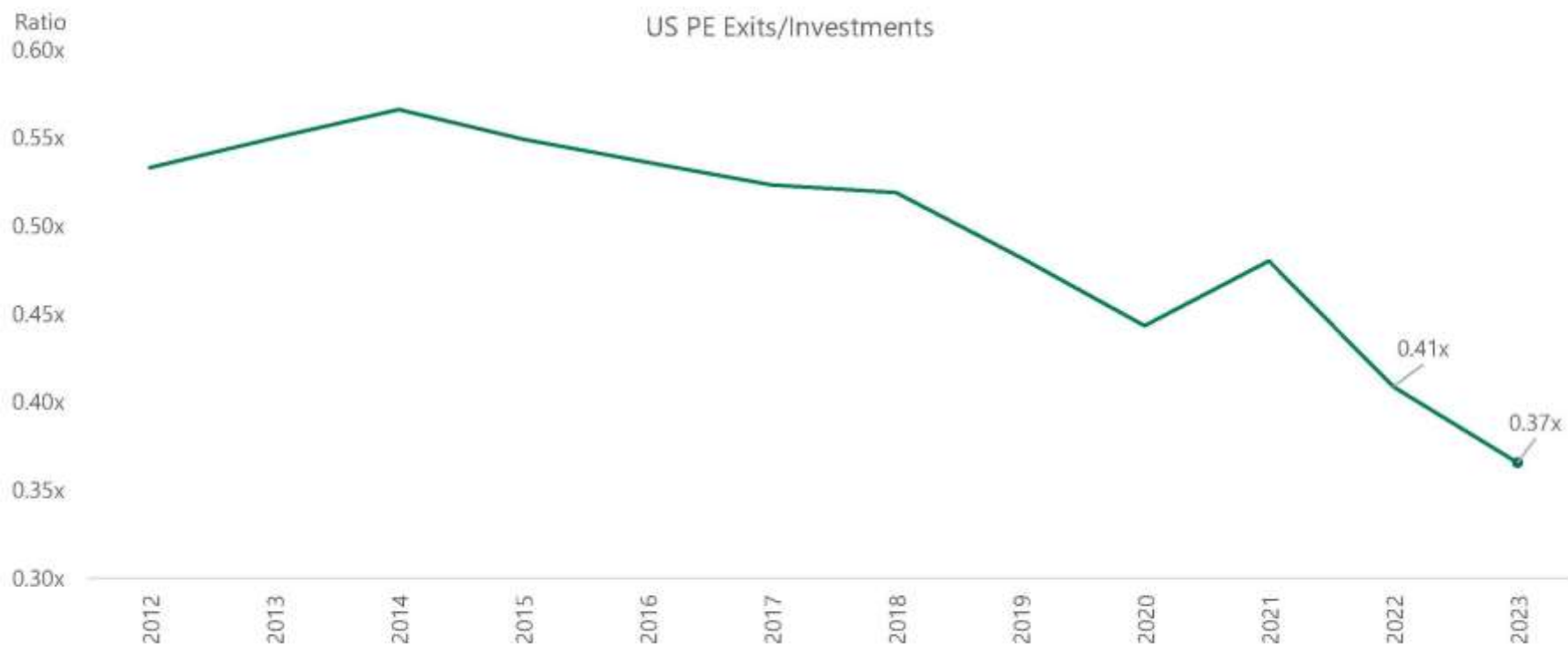
US PE deal activity



Source: Pitchbook, Apollo Chief Economist. Note: Data as of 30th September 2023

Overview: Private Markets Perspectives

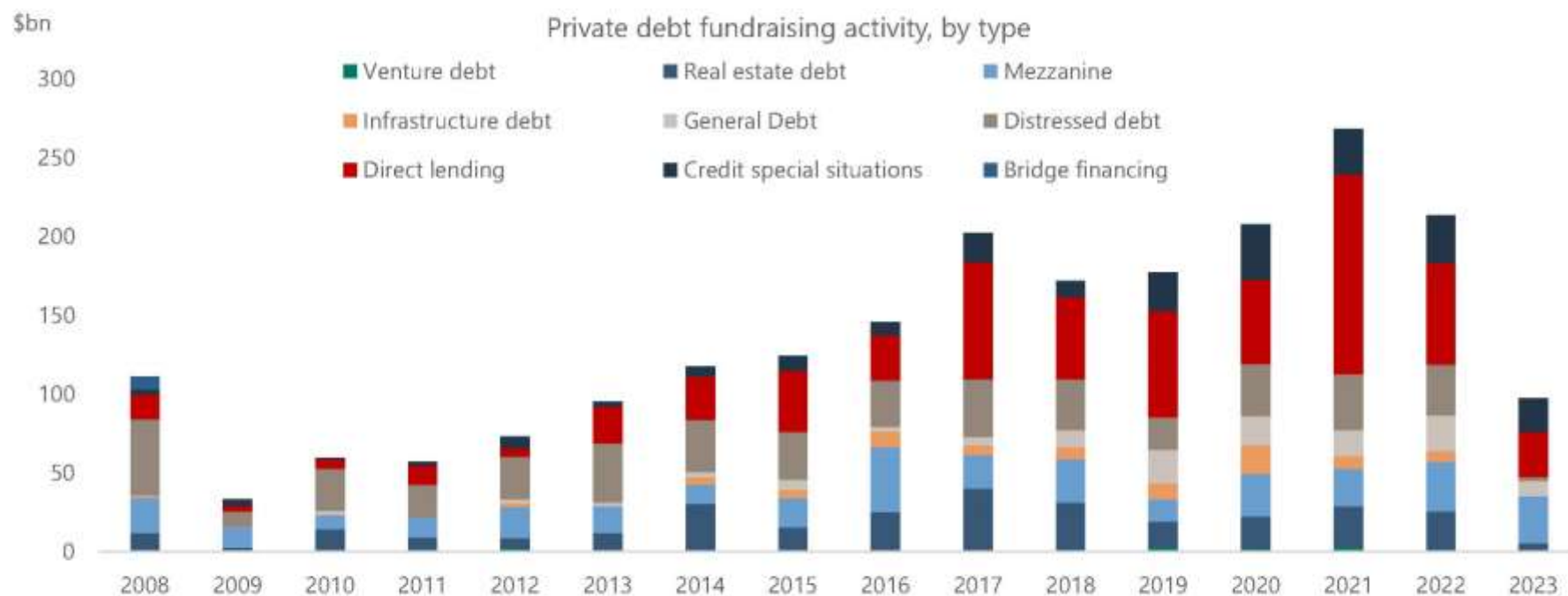
The exits to investments ratio is declining



Source: Pitchbook, Apollo Chief Economist. Note: Data as of 30th September 2023

Overview: Private Markets Perspectives

Private debt fundraising activity, by type



Source: Pitchbook, Apollo Chief Economist. Note: Data as of 30th June 2023.

Overview: Private Markets Perspectives

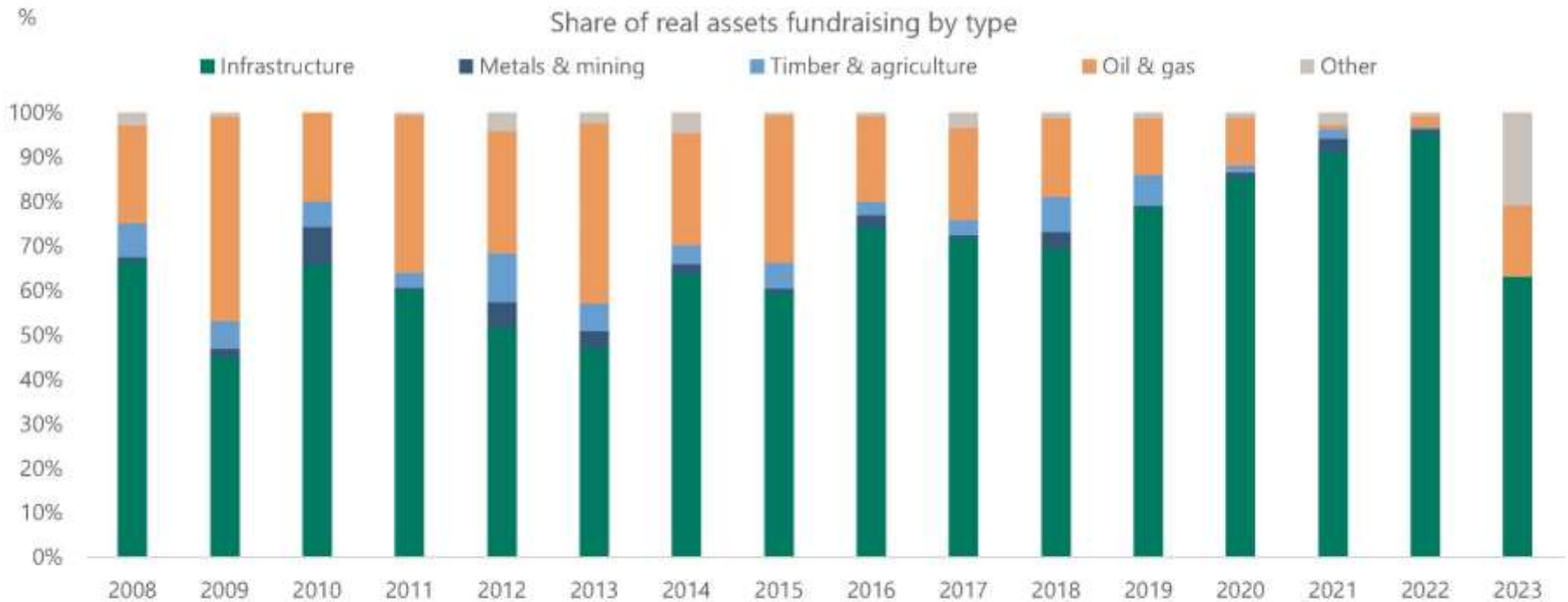
Real estate fundraising activity



Source: Pitchbook, Apollo Chief Economist. Note: Data as of 30th June 2023.

Overview: Private Markets Perspectives

Real assets is mainly infrastructure



Source: Pitchbook, Apollo Chief Economist. Note: Data as of 30th June 2023.



Virginia
Retirement
System

Real Assets

Walker Noland

Program Director, Real Assets



Overview: Objectives



Diversification – historically low correlation to global equities as shown below

Competitive Returns – strong historical returns

Cash Flow – investments tend to distribute cash quarterly

Inflation Linkages – varies by sector & asset type, but some ability to pass through inflation

Correlations

	Global REITs	U.S. Commercial Real Estate	Timberland	Farmland	Energy Equities	Mining Equities (ex. Gold & Silver)	Gold	Infrastructure Equities	Global Equities	IG Corp Bonds	CPI
Global REITs	1.00										
Commercial Real Estate	0.38	1.00									
Timberland	0.04	(0.08)	1.00								
Farmland	0.24	0.06	0.27	1.00							
Energy Equities	0.50	0.15	0.34	0.22	1.00						
Mining Equities	0.62	0.20	0.26	0.18	0.74	1.00					
Gold	0.18	(0.04)	0.15	0.35	0.06	0.27	1.00				
Infrastructure Equities	0.84	0.34	0.15	0.35	0.67	0.71	0.22	1.00			
Global Equities	0.77	0.27	0.23	0.13	0.61	0.73	0.15	0.85	1.00		
IG Corp Bonds	0.09	(0.15)	0.21	(0.21)	(0.26)	(0.22)	0.42	0.12	(0.07)	1.00	
U.S. CPI	0.09	0.17	0.31	0.12	0.25	0.21	0.13	0.15	0.09	(0.21)	1.00

Notes: Private Commercial Real Estate returns de-smoothed. Correlations based on quarterly data, except Timberland and Farmland, which are based on annual data since those assets are generally appraised only once per year.

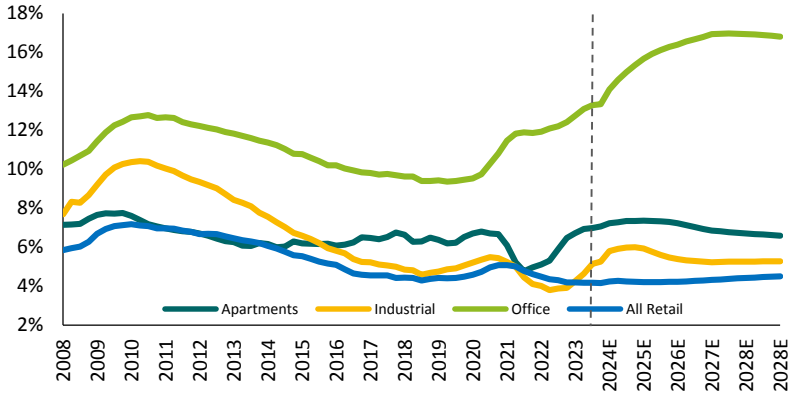
Overview: Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Walker Noland	Program Director	MBA	CFA	23	13
Warren Chang	Portfolio Manager	MBA, MS	CFA	26	8
Tom Coleman	Portfolio Manager	BS	CFA, CAIA	23	12
Jummai Sarki-Hurd	Portfolio Manager	MBA, MS	-	17	10
Tom Mulvin	Senior Investment Officer	BS	-	30	30
Daniel Ball	Investment Analyst	BA	CAIA Level I - Pass	1	1
Carol Timpano	Portfolio Assistant	BS	-	8	8

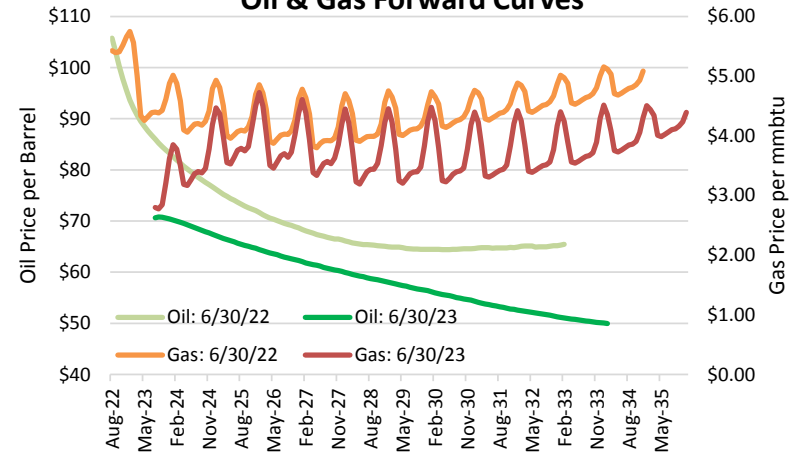
Markets: Fundamentals

U.S. Property Vacancy Rates 2008-2028



Source: Costar

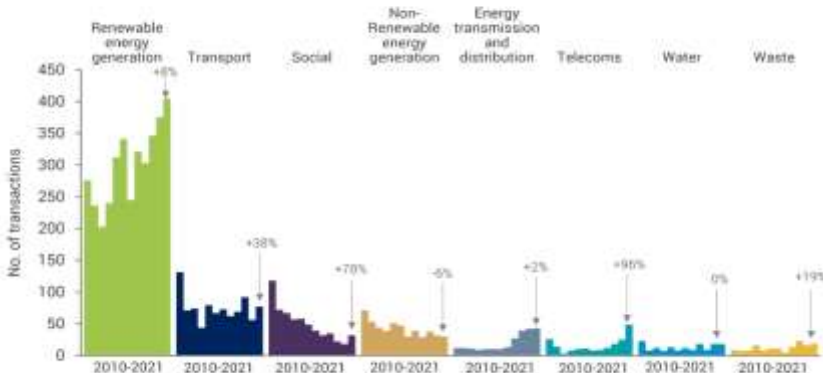
Oil & Gas Forward Curves



Source: Bloomberg

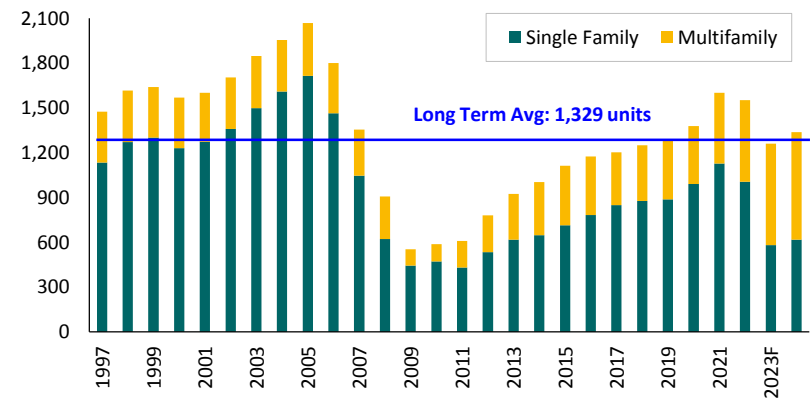
Private investment in infrastructure projects by sector

(Number of transactions and growth in 2023)



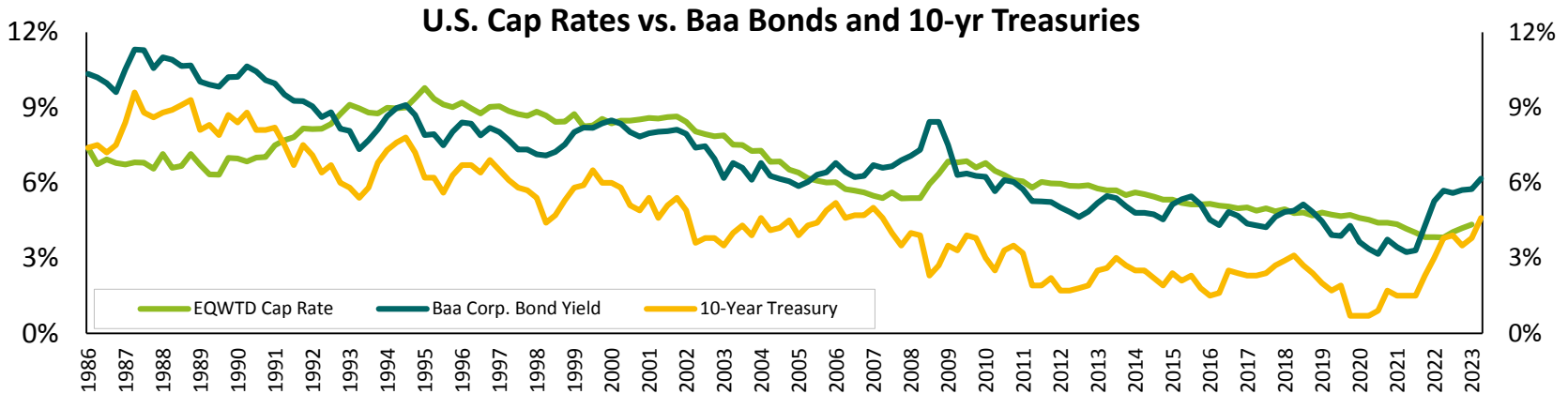
Source: GI Hub Infrastructure Insights 2023

Housing Starts 1997-2024 (000)

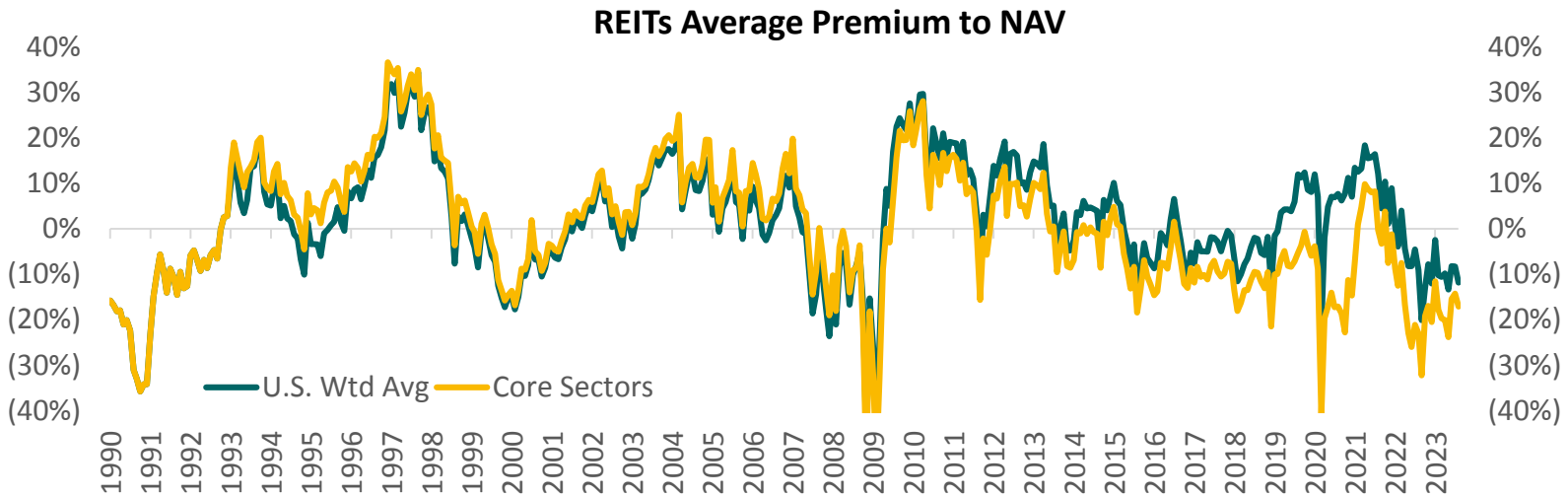


Sources: U.S. Census Bureau, NAHB, Wells Fargo, MBA, Forisk

Markets: U.S. Cap Rates & REIT NAV Premiums



Sources: Federal Reserve, NCREIF

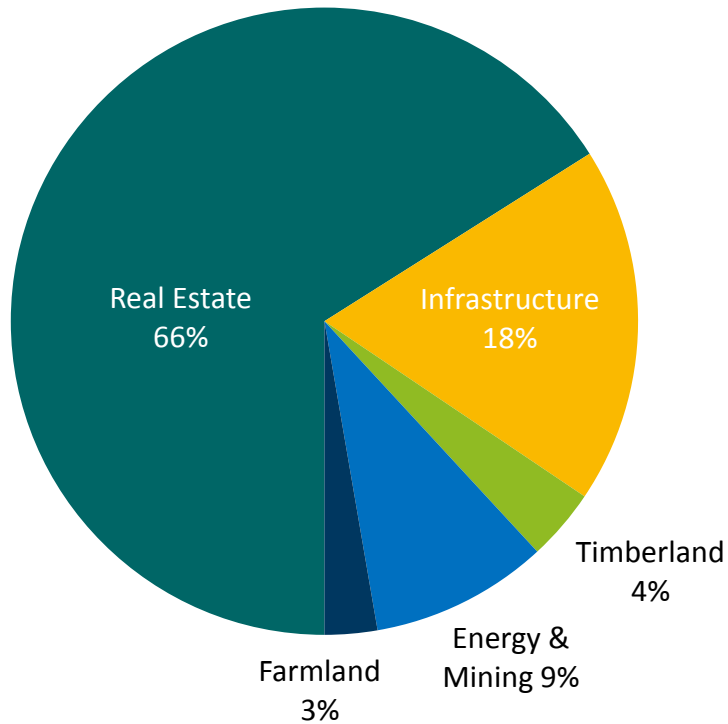


Sources: Green Street Advisors

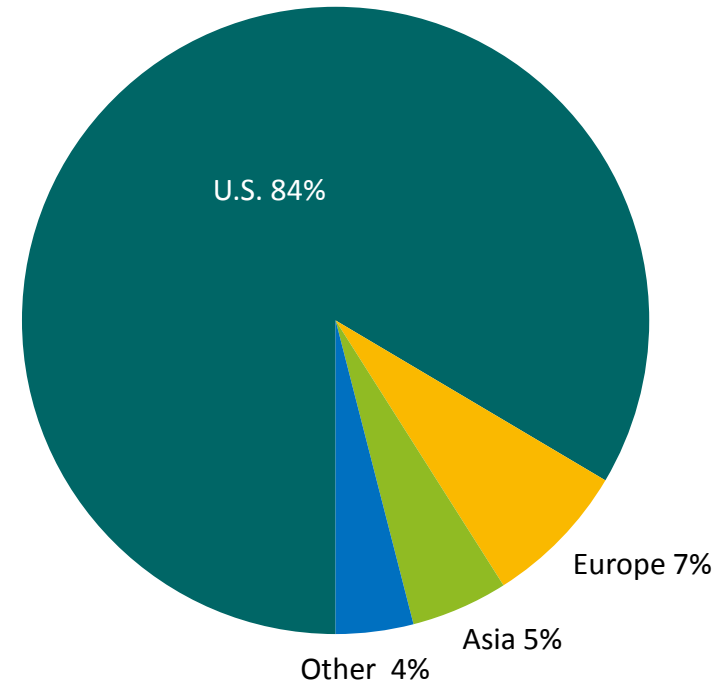
Exposures: Sectors & Geography – 6/30/23

Current Market Value: \$14.2 Billion

Sectors



Geography



Results: Portfolio Returns – 6/30/23



	10 Year	5 year	3 Year	1 Year	MV (\$MM)
Total Real Assets	10.0	8.4	11.2	1.7	14,196
Strategic Benchmark	8.0	6.4	7.6	-0.7	
Excess Return	2.0	2.0	3.6	2.4	
Private Real Estate	11.1	9.5	11.2	1.6	9,375
Benchmark	8.5	6.6	7.5	-3.9	
Excess Return	2.6	2.9	3.7	5.5	
Infrastructure	11.3	10.4	12.4	5.5	2,612
Benchmark	6.6	7.9	9.4	9.0	
Excess Return	4.7	2.5	3.0	-3.5	
Natural Resources	5.9	6.9	14.6	2.7	2,209
Benchmark	6.6	7.9	9.4	9.0	
Excess Return	-0.7	-1.0	5.2	-6.3	

Source: BNY Mellon

Headwinds/Tailwinds

- + Tailwinds:** Diversity of the Real Assets portfolio. On a relative basis, positioning within Private Real Estate (geographic and property type) was a strong tailwind.
- Headwinds:** Higher interest rates pressured private market valuations. Public REITs and Infrastructure held for part of the FY (Infra - 4.6% for 1Q FY'23, REITs - 5.1% FYTD 12/31).

Largest Absolute Return Contributors

- + Timberland:** +6.5% (3.7% of program)
- + Private Infrastructure:** +5.7% (18.4% of program)
- + Natural Resources:** +2.7% (15.6% of program)
- + Private Real Estate:** +1.6% (66.0% of program)

Largest Relative Return Contributors

- + Private Real Estate:** +5.5% excess return. (ODCE benchmark)
- Private Infrastructure:** -3.3% excess return. (CPI-U + 400 bps)
- Natural Resources:** -6.3% excess return. (CPI-U + 400 bps)

Managers: Top 10 Investment Managers



Manager	# of Mandates	% of Program
PGIM	2	14.7%
Blackstone	13	8.9%
Clarion Partners	1	7.4%
Morgan Stanley	3	7.0%
Industry Funds Mgmt.	3	4.9%
Pritzker Realty Group*	2	4.1%
Pantheon Ventures	4	4.0%
JP Morgan	2	3.6%
Carson Companies	4	3.5%
Global Infrastructure Partners	4	3.3%

*DIME (Diverse Investment Management Engagement) firm

Managers: Diverse Investment Management Engagement (DIME)



Resources		
Townsend	Pantheon	Aksia
<ul style="list-style-type: none"> • Real Estate • Infrastructure 	<ul style="list-style-type: none"> • Infrastructure • Natural Resources 	<ul style="list-style-type: none"> • Infrastructure • Natural Resources

Conversations with 18 new DIME managers across 18 mandates in 12 months ending 6/30/2023

Manager	Sector	Vintage	Comm./Alloc. (\$MM)
Artemis RE Partners Fund III	Real Estate	2018	75
Artemis RE Partners Fund IV	Real Estate	2021	125
Artemis Income & Growth Sidecar	Real Estate	2020	75
Capri/EGM JV	Real Estate	2014	300
Grain Infra	Infrastructure	2012	75
Pritzker JV	Real Estate	2012	232
Pritzker JV II	Real Estate	2015	200
		Total	1,082

Managers: Investment Commitments (\$MM)



Sector	Commitment
Public REITs	None
Private RE Equity	Penwood Select Industrial Partners Fund VII - \$125 Westbrook Real Estate Fund XII - \$125 Carson-VA Joint Venture IV - \$200 Two Co-investments - \$75
Infrastructure	Antin Infrastructure Partners V - €100 Stonepeak Opportunities Fund - \$100 VA-Pantheon Infrastructure SA III - \$350 One Co-investment - \$5
Natural Resources	Sprott Structured Opportunities Fund I - \$150 Lime Rock Resources Fund VI - \$50

Period Ending 6/30/2023

- Continue active portfolio management – especially given more turbulent market conditions
- Focus on objectives & risk
- Prudently work to manage around targeted allocation

Private Equity

John Alouf
Program Director

Presentation Deck

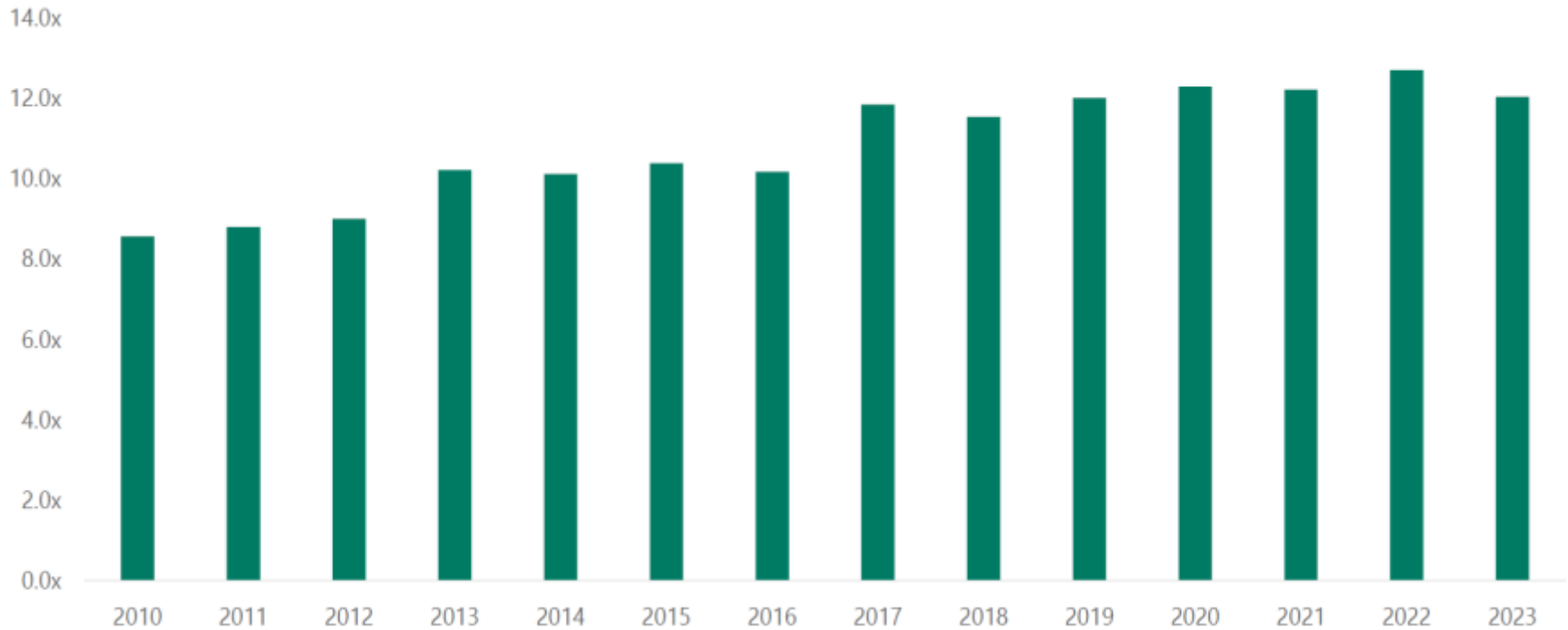


Overview: Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
John Alouf	Director	MBA	CFA	29	23
Jay Gentry	Portfolio Manager	BBA	CFA, CPA	29	29
Peter Murphy	Portfolio Manager	BBA	CFA, CPA	23	12
Rob Voeks	Portfolio Manager	PhD		26	9
De'Von Jones	Investment Officer	BBA	CFA	13	4
Viet Tran	Investment Analyst	MS		3	2
Carol Timpano	Portfolio Assistant	BS		8	8

Markets: Private Equity Median EV/EBITDA Multiples

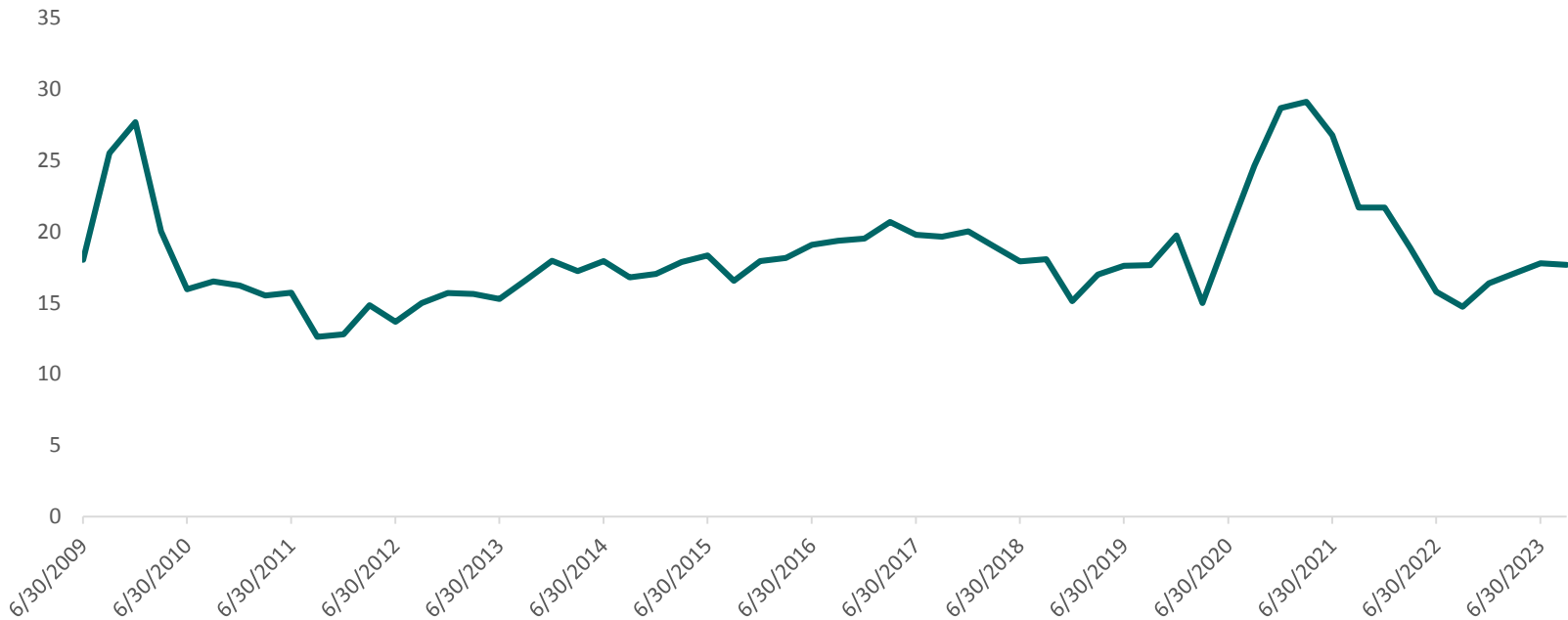


Source: Pitchbook

Note: As of 9/30/2023

Markets: P/E Multiples (MSCI ACWI IMI)

Price Earning Multiples (MSCI ACWI IMI)



Source: Bloomberg
Note: As of 9/30/2023

Markets: Public Software Industry Forward Revenue Multiples

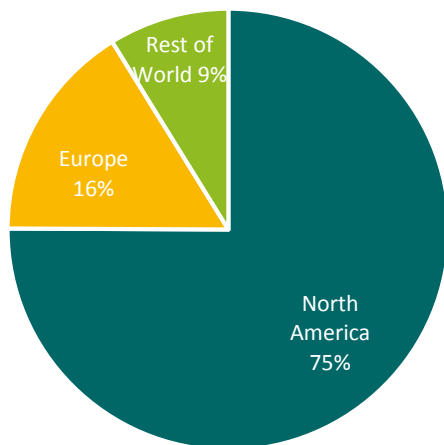


Source: Morgan Stanley Research and Refinitiv

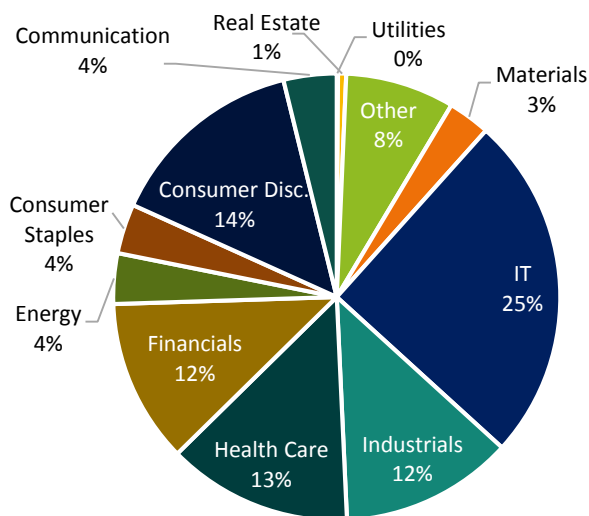
Note: As of 8/4/2023

Exposures: Position Weighting

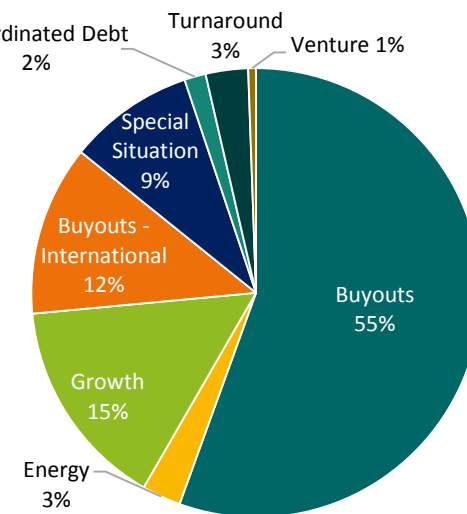
Geography



Industry

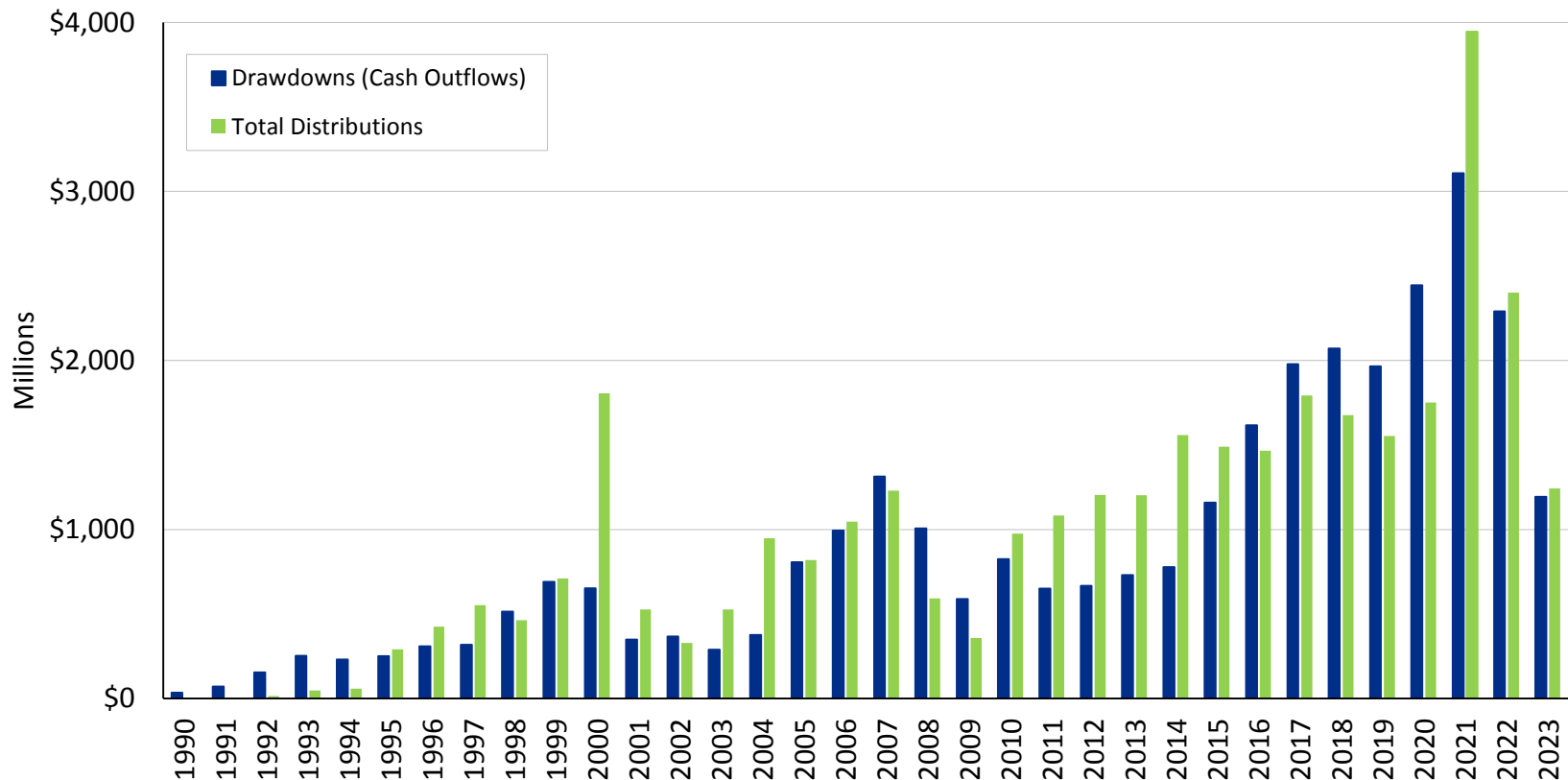


Sector



Geography and Industry charts based on 3/31/2023 manager information
Sector chart based on 6/30/2023 BNY Mellon information

Results: Annual Cash Flows (\$MM)



Since inception net cash flow to VRS of \$3.0 billion

Note: 2023 is through the first eight months of the year

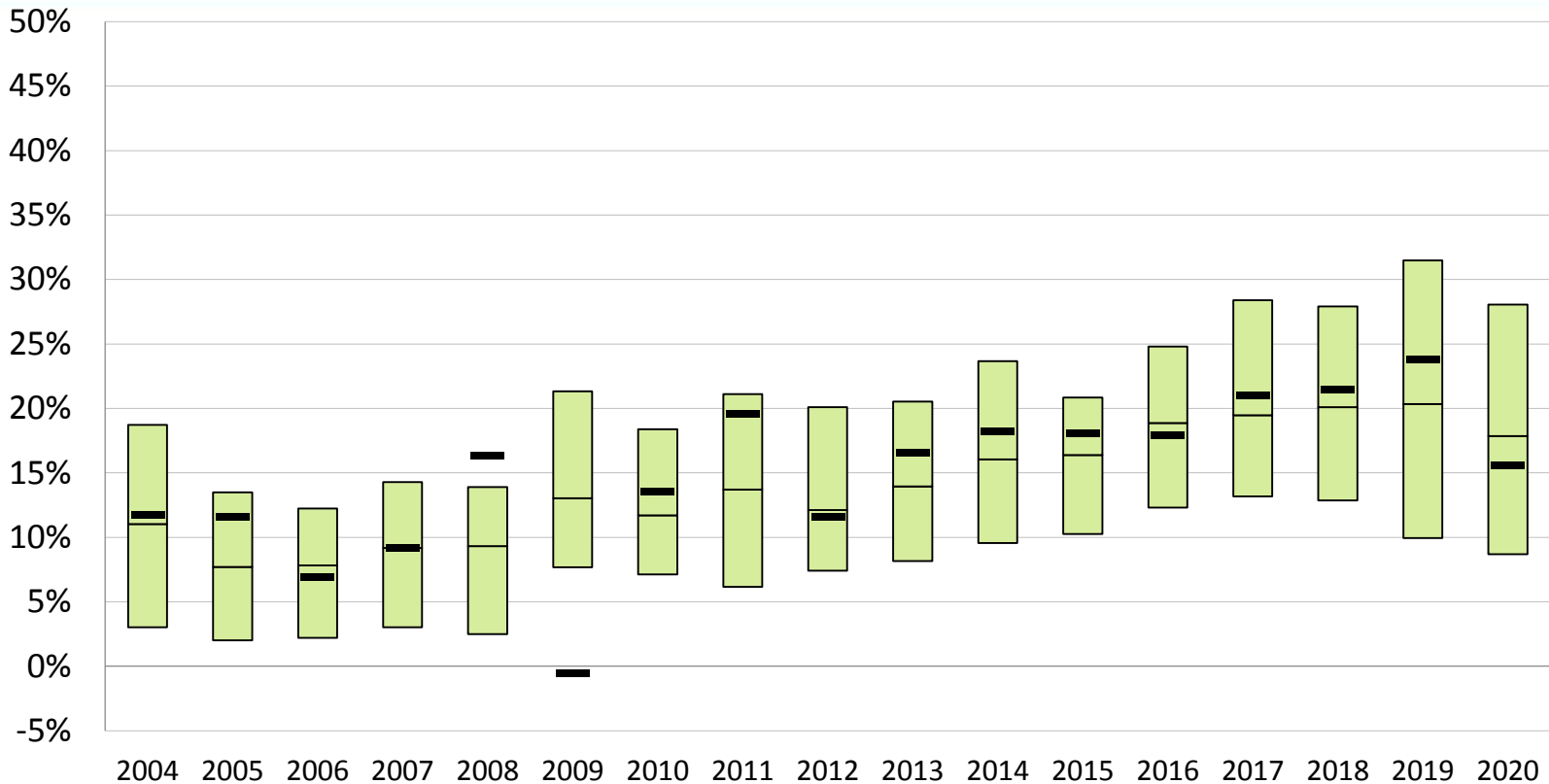
Results: Time-Weighted Performance – 6/30/23



	10 Year	5 year	3 Year	1 Year	MV (\$MM)
Total Private Equity	16.1	17.5	24.9	-0.7	19,077
Strategic Benchmark*	11.1	9.2	16.0	-7.3	
Excess Return	5.0	8.3	8.9	6.6	
Buyouts	18.8	18.4	26.1	-0.2	10,592
Energy	-0.7	0.9	16.8	13.6	534
Growth	23.6	24.6	29.4	-10.6	2,897
Int'l Buyout	14.0	18.0	21.9	0.9	2,339
Special Situations	15.6	16.4	21.0	5.3	1,730
Sub Debt	14.1	13.6	15.8	10.8	294
Turnaround	13.5	15.1	28.8	3.4	582
Venture	14.8	21.0	33.9	-20.6	106

Note: *Benchmark: Russell 3000 + 250 basis points through 6/30/2013; MSCI ACWI 50% hedged + 250 basis points through 6/30/2020; MSCI ACWI thereafter

Results: VRS Relative IRR By Vintage Year



- Floating bars represent quartile return spreads by vintage year. Line in floating bar is the median return.
- VRS vintage year returns marked by “—”.

Source: PrivateIQ/Burgiss – Global Private Equity
 Note: As of 3/31/2023

Managers: Top Ten Investment Managers

Manager	Exposure
VRS Co-Investments	9.0%
Grosvenor	6.6%
Hellman & Friedman	6.3%
TA Associates	5.6%
CVC	4.2%
Apax Partners	4.1%
Audax Group	3.8%
Bain	3.7%
GTCR	3.7%
Stone Point	3.4%
Total	50.4%

Note: As of 3/31/2023; figures may not sum due to rounding

Diverse Investment Management Engagement (DIME)

Ten existing in-house relationships

- Asia Alternatives
- Clearlake
- ICV
- MBK Partners
- Siris
- Sycamore
- TSG
- Thoma Bravo
- Veritas
- Vista Equity

40 potential manager meetings & 2 conferences in FY 2023

Five relationships through Grosvenor

Quarterly reports from Grosvenor

Looking Forward

- Maintain modeled commitment pace
- Review strategic separate accounts
- Co-investments on pace
- Selectively add new managers

Credit Strategies

Steve Woodall

Program Director, Credit Strategies

Presentation Deck



Agenda: Credit Strategies Annual Review Topics



- Overview
- Markets
- Exposures
- Results
- Co-investments
- Managers
- Looking Forward

Overview: Credit Strategies



Primary Focus

- Income generation and attractive total returns from investments in private debt and opportunistic credit strategies

Program Objective

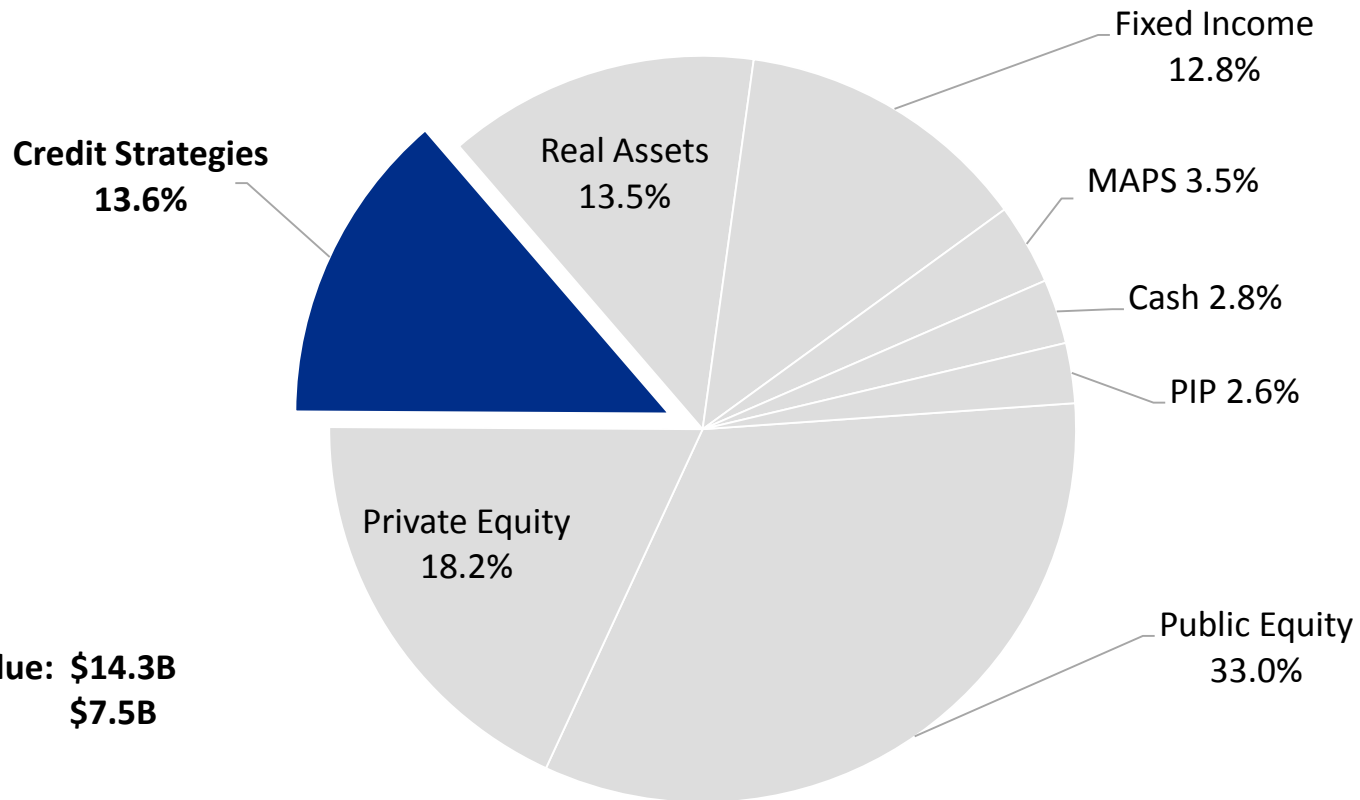
- Generate an attractive risk adjusted return relative to the program benchmark (a 50/50 blend of senior secured term loans and high yield bonds)

Overview: Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Steve Woodall	Program Director	MBA	CFA, CAIA	19	18
Perry Corsello	Portfolio Manager	MBA	CFA	26	12
Matt Bennett	Investment Officer	MBA		15	15
Erica Billingslea	Investment Officer	MA		11	11
Kevin Bliss	Investment Officer	Bcom		9	2
Kelly Baker	Portfolio Assistant	AAS		13	8

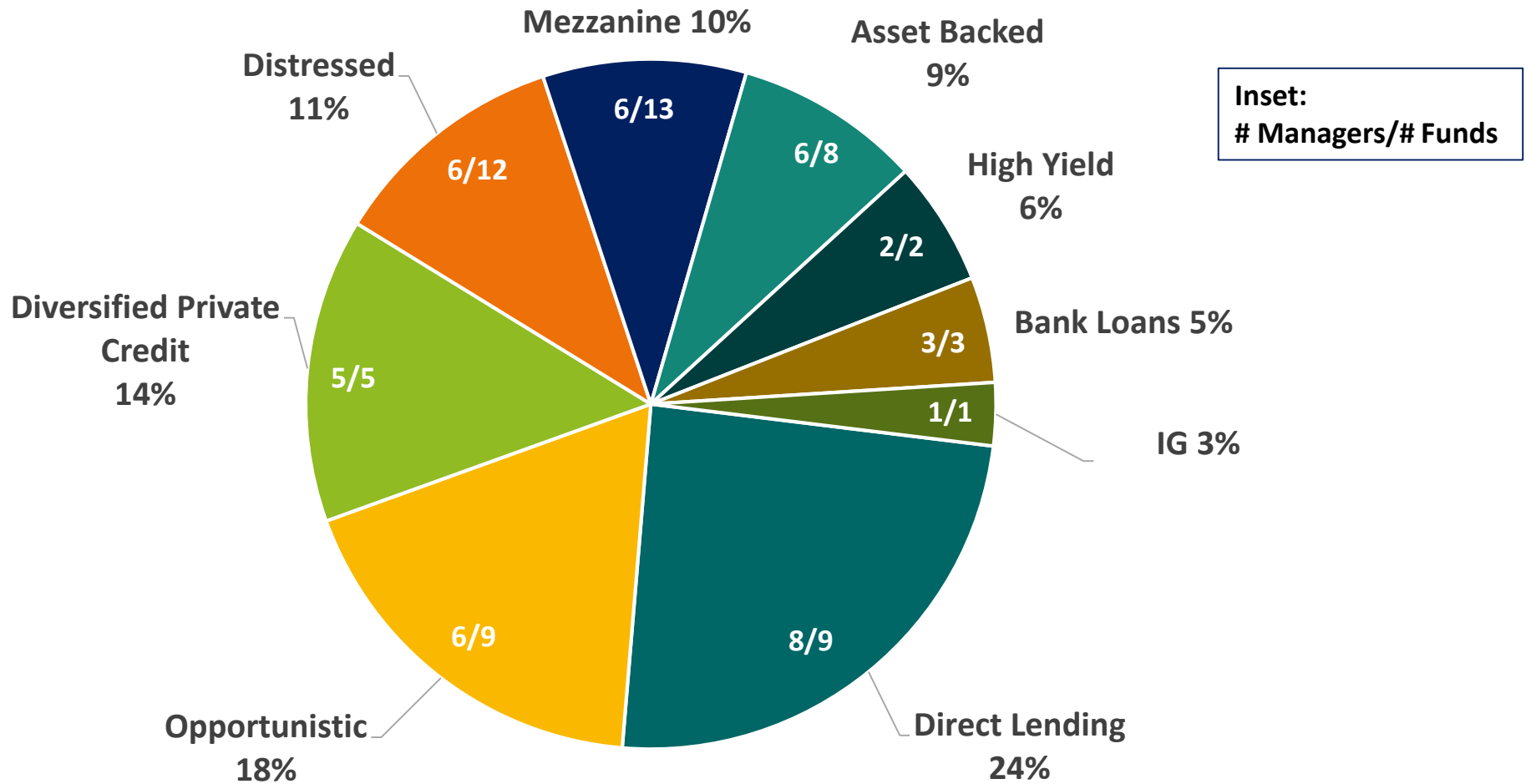
Overview: Asset Allocation – 6/30/23



Market Value: \$14.3B
Uncalled: \$7.5B

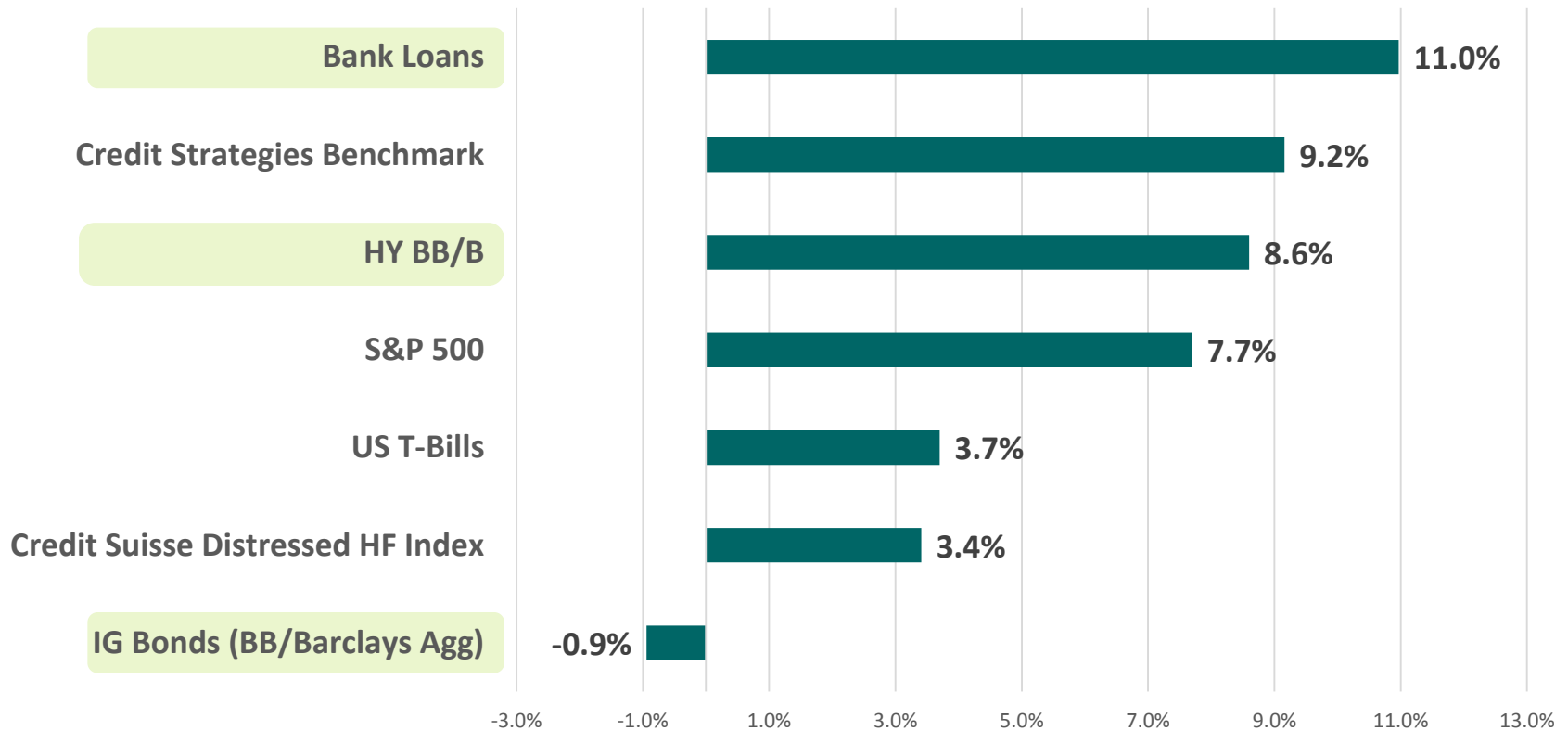
Source: BNY Mellon

Overview: Asset Allocation – 6/30/23



Source: BNY Mellon

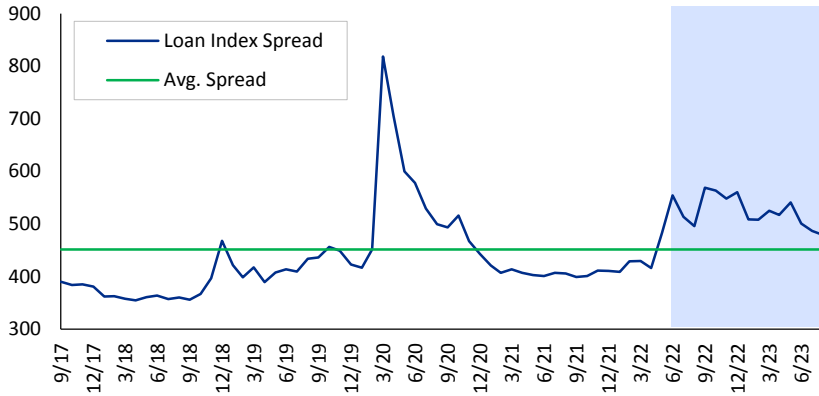
Markets: FY23 Index Returns



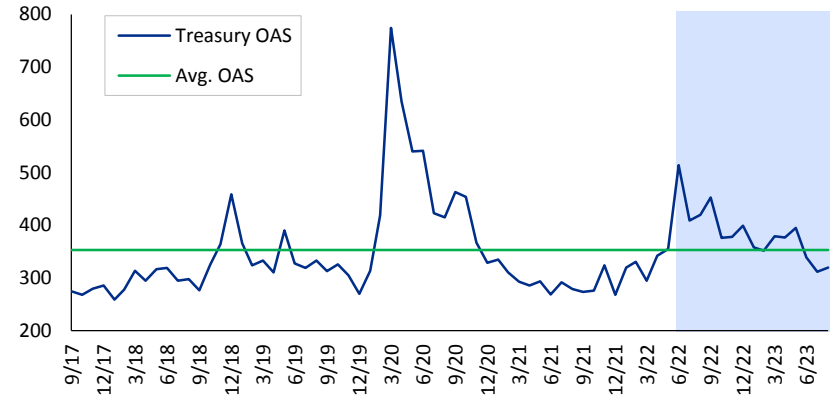
Source: VRS, Bloomberg, Credit Suisse

Markets: Index Spreads and Yields

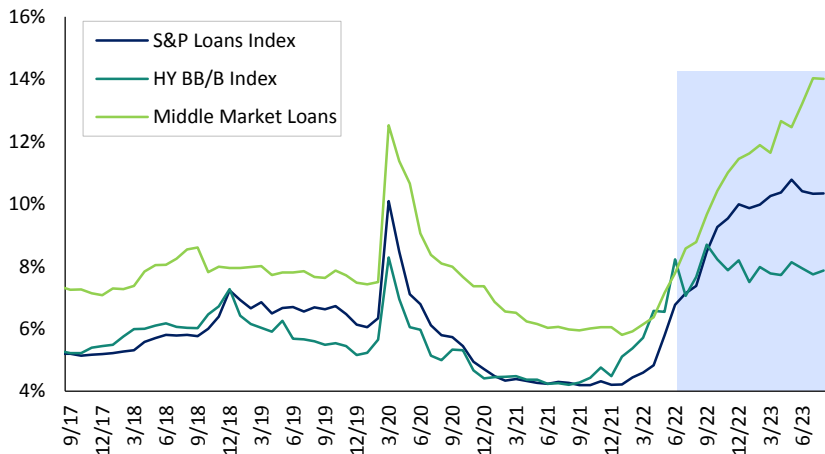
Loan Index Spread



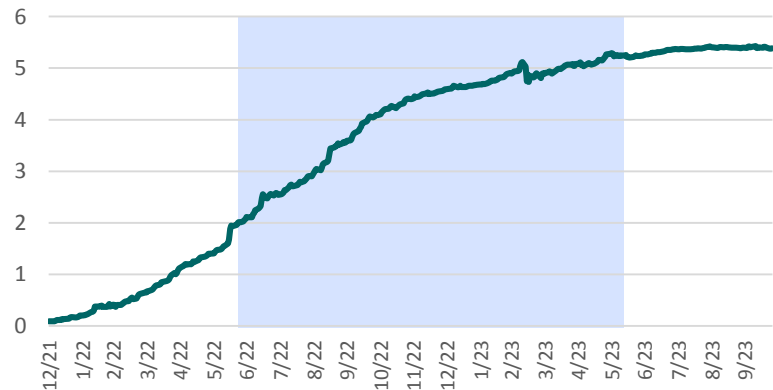
HY BB/B Index Spread



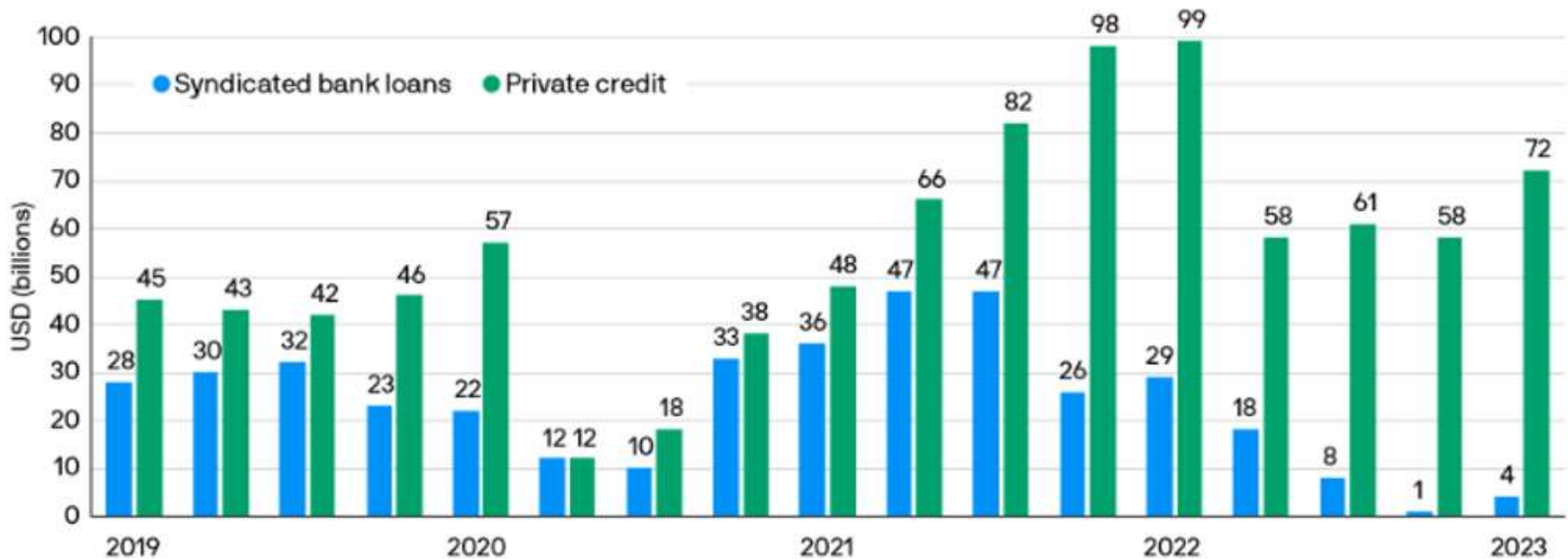
Yields



SOFR 3-month



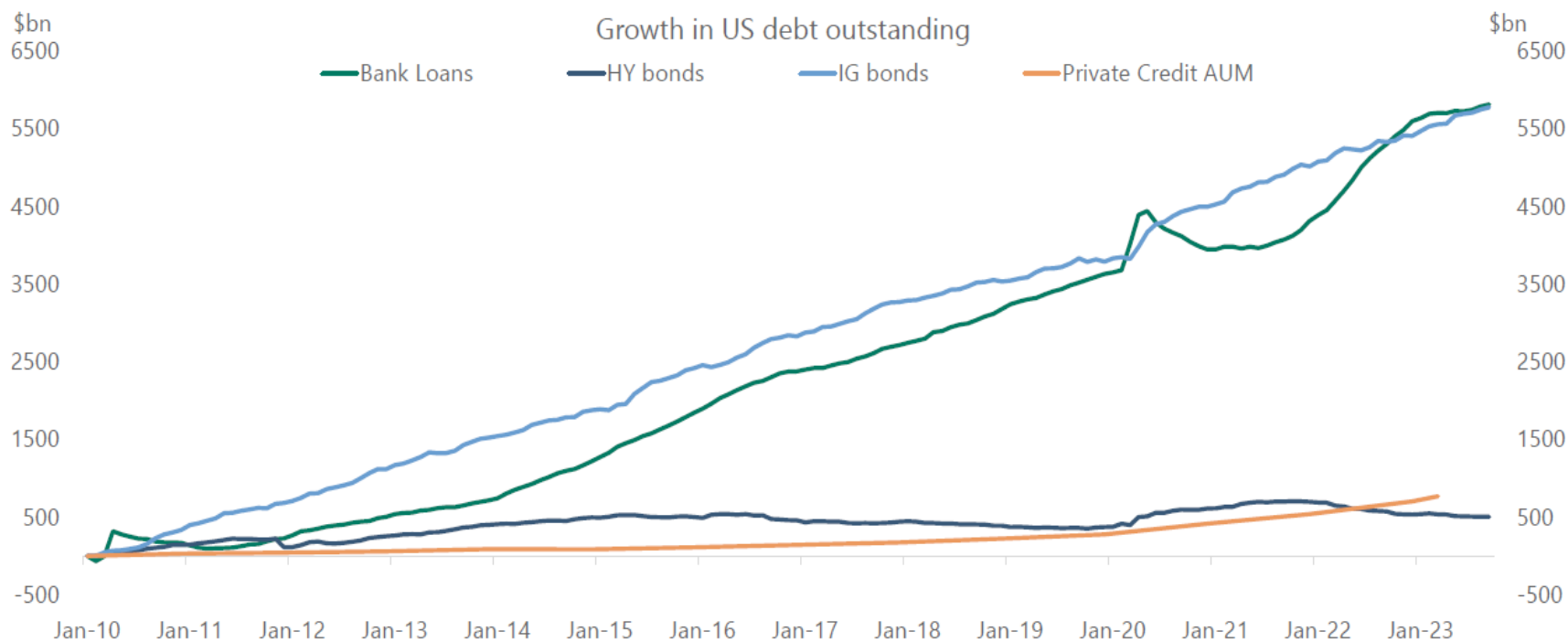
Markets: Private vs Public Credit Markets



Source: Morningstar, PitchBook LCD, J.P. Morgan Asset Management Guide to the Markets

Markets: Private Credit Markets

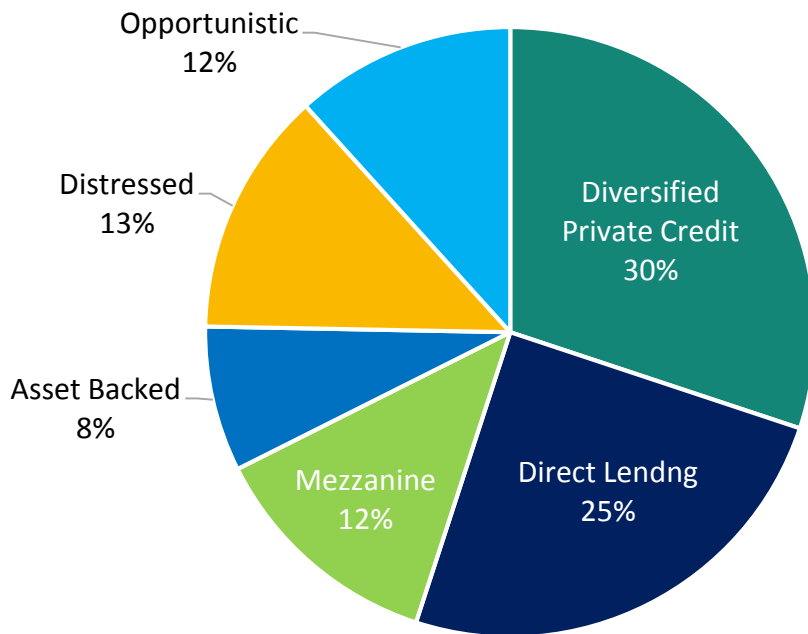
Since 2010, lending by banks has increased by \$5.5trn, IG markets have grown \$5.5trn, HY markets have grown \$500bn, and private credit AUM has increased by \$1trn



Source: FRB, ICE BofA, Bloomberg, Apollo Chief Economist. *Note Legal Disclaimer at end of presentation.

Markets: Update – Program Opportunities

FY23 Capital Calls

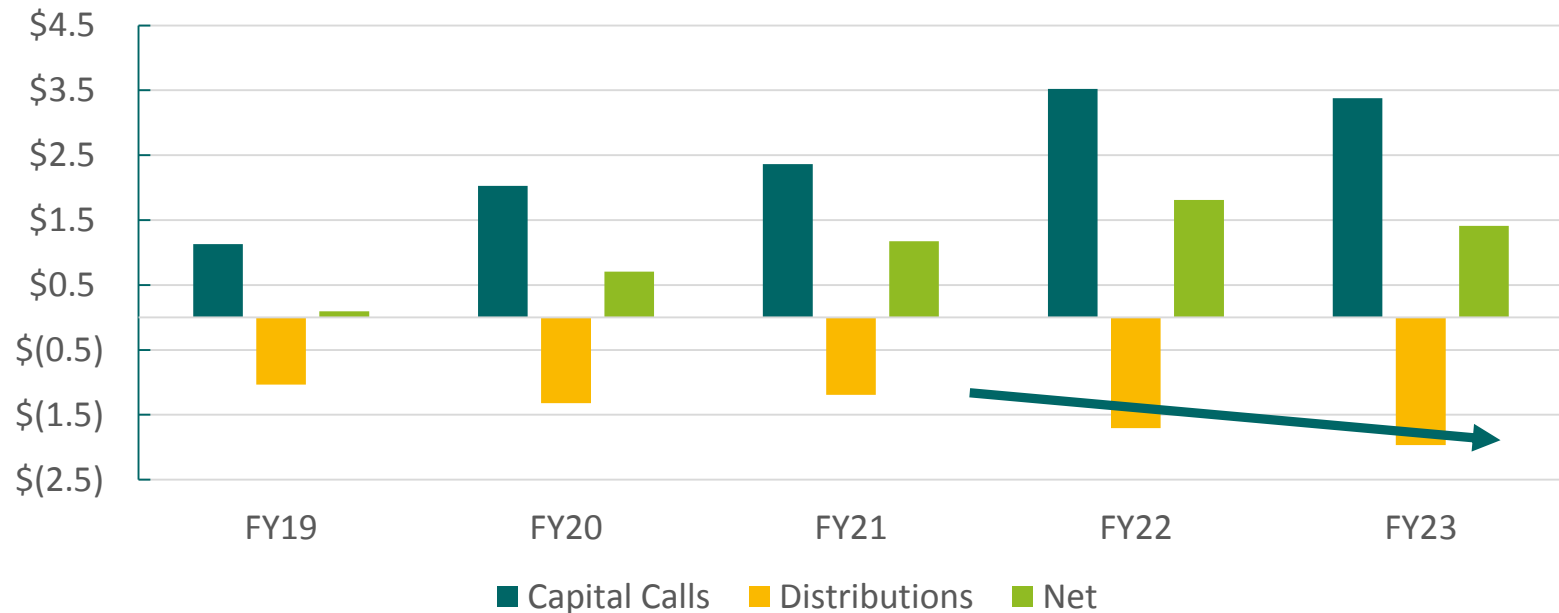


Private Credit Pricing/Yield:

Strategy	9/30/22	9/30/23
Direct Lending	10.0%	11-13%
Mezzanine	15.1%	14.0%
Asset Backed	8-10%	9-11%
Opportunistic	15.7%	14.4%

Exposures: Program Activity

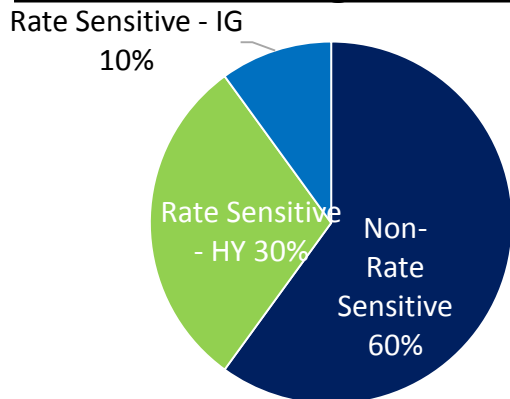
Capital Calls & Distributions



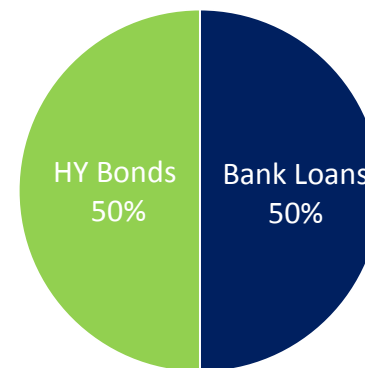
% Liquid:	51%	39%	32%	23%	10%
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Exposures: Allocation Of Benchmark & Program

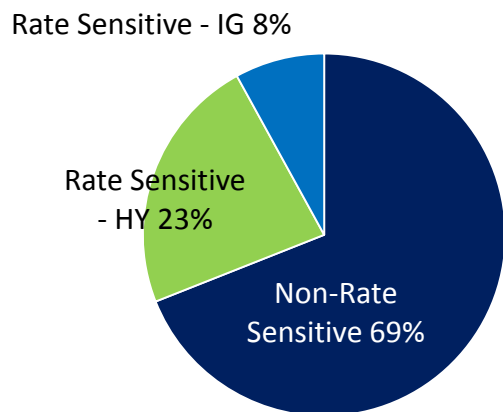
Benchmark Weights – 6/30/23



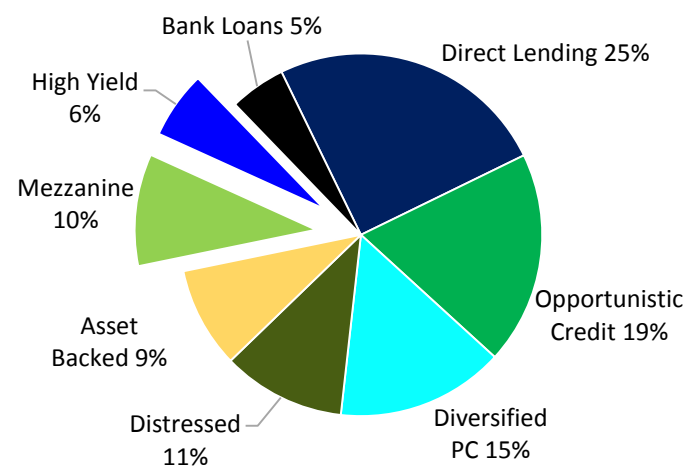
Benchmark Weights – 7/1/23



Program Weights – 6/30/23



Program Weights – 7/1/23



Source: VRS, BNY Mellon; as of 6/30/23

Exposures: Change in Sub Strategy Exposures



Sub Strategies	% Allocation 6/30/22	% Allocation 6/30/23	Change
Asset Backed	8.0%	8.7%	0.7%
Bank Loans	7.9%	5.0%	-2.9%
Direct Lending	21.0%	24.4%	3.4%
Distressed	9.3%	11.2%	1.8%
Diversified Private Credit	7.1%	14.3%	7.2%
High Yield	15.4%	5.8%	-9.6%
Investment Grade	8.0%	2.9%	-5.0%
Mezzanine	7.5%	9.5%	2.1%
Opportunistic Credit	15.9%	18.2%	2.2%
Total	100.0%	100.0%	0.0%

Results: Total Credit Strategies – 6/30/23



	Inception	10 Year	5 year	3 Year	1 Year
Total Credit Strategies	6.34	6.11	6.36	8.31	5.72
Benchmark Return	5.31	4.85	4.39	4.33	9.16
Excess Return	1.03	1.26	1.97	3.98	-3.44
Program Risk	6.33	4.74	5.74	3.86	3.42
Benchmark Risk	6.98	5.83	7.33	4.97	5.96
Active Risk	2.26	2.15	2.91	3.04	3.28

Source: BNY Mellon

Results: FY 2023

Headwinds/Tailwinds

- + Asset performance within direct lending, high yield, and bank loans; along with underweight to IG.
- Headwinds: Abnormally strong public market returns while valuations are lagged on the majority of the portfolio. Distressed, opportunistic were the largest drivers of the program's underperformance in FY23 while all categories except for high yield experienced underperformance vs the benchmark.

Largest Absolute Return Contribution:

	% Contribution	% of Program
Direct Lending	2.2%	26%
Opportunistic Credit	0.9%	18%
Diversified PC	0.8%	14%
Mezzanine	0.5%	10%
Bank Loans	0.5%	5%

Largest Relative Return Contribution:

	% Contribution	% of Program
Distressed	-0.9%	11%
Opportunistic Credit	-0.7%	18%
Diversified PC	-0.5%	14%
Asset Backed	-0.5%	6%
Mezzanine	-0.4%	10%

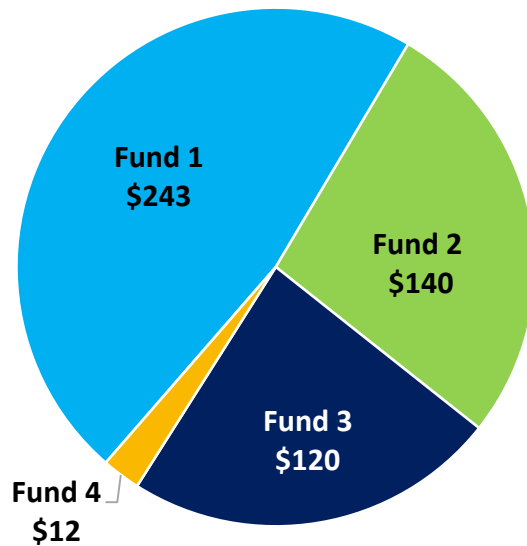
Co-investments: Credit Strategies Approach



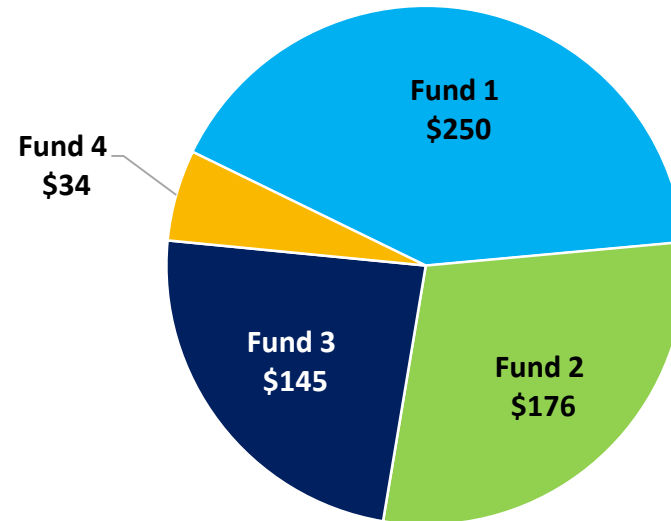
- Objective is to invest additional funds alongside existing strategies through a lower fee arrangement
- Separate accounts
- The manager remains fiduciary
- VRS reviews all potential investments prior to moving forward

Co-investment: Dedicated Separate Account Market Values

June 2022 (\$516mm)



June 2023 (\$605mm)



Performance (%):	ITD	4 Years	3 Years	1 Year
CS Co-investment	7.69	8.19	11.34	6.40
Benchmark Return	4.09	3.56	4.33	9.16
Excess Return	3.60	4.62	7.01	(2.76)

Managers: Top 10 Investment Managers

Manager Name	Mandates	# Mandates	% Program
Beach Point	Bank Loan, Distressed, Opportunistic	5	13.35%
Ares	Direct Lending, Distressed, Mezzanine, Opportunistic	10	11.44%
HPS	Direct Lending, Mezzanine	4	7.18%
Blackrock	Direct Lending	1	6.26%
Carlyle	Diversified Private Credit	1	5.49%
Solus	Bank Loan, Hedge Fund, Opportunistic	3	5.02%
JPMorgan	High Yield	1	4.77%
Sixth Street	Distressed, Opportunistic	5	4.40%
KKR	Direct Lending, Distressed, Other Rate Sensitive	3	4.39%
PGIM	Investment Grade, Mezzanine	5	4.13%

Managers: Hires & Terminations - FY 2023



Action	Effective Date	Commitment/Current Value	Funding/Defunding Period	Description
Terminated	9/30/2022	\$520 million	Immediate	PIMCO HY – A separate account invested in high yield bonds.
Hired	10/4/2022	\$250 million	3 years	Apollo EPF IV – A special situations strategy targeting asset-backed investment opportunities in the European market.
Hired	3/17/2023	\$150 million	4 years	Ares Capital Europe VI – A closed-end fund that will directly originate and provide one-stop, flexible and scaled debt capital to European middle market companies.
Hired	3/31/2023	\$250 million	3 years	Ares Pathfinder II – An alternative credit fund investing in performing assets that have predictable cash flows and are directly originated by the manager.
Hired	3/31/2023	\$150 million	3 years	Oaktree Opportunities Fund XII – A closed-end fund focused on investing in both private and public corporate distressed debt opportunities.
Hired	3/31/2023	\$250 million	3 years	Oak Street Real Estate Capital VI – A closed-end fund seeking income generation through sale-leasebacks with investment grade tenants.
Terminated	5/31/2023	\$628 million	Immediate	Beach Point Credit – A separate account investing in broadly syndicated bank loans
Hired	6/21/2023	\$585 million	Immediate	OHA Oak Hill Syndicated Loan – A fund of one mandate investing primarily in leveraged loans and high yield bonds.

- VRS hired or upsized 8 mandates representing \$1.9B in commitments
- VRS funded attractive investments with double-digit yields over the course of the year and as a result the program shifted from approximately 20%/80% liquid/illiquid to 10%/90% liquid/illiquid during FY23.
- Largest growth in market value experienced in Diversified Private Credit, Direct Lending, Opportunistic, and Mezzanine strategies.
- Committed to strategies to take advantage of developing market opportunities including investments in: US Distressed, European Distressed, and Asset Backed opportunities.

- The evolution of the CS program towards private markets has positioned it well to take advantage of changes in the broader credit markets. CS has maintained a consistent deployment of capital even as banks have slowed issuance, allowing the program to take advantage of opportunities to lend with stronger covenants and at higher yields.
- Today there are compelling investment opportunities in private credit, the expected returns of which exceed the actuarial return of the total fund as well as the asset class benchmark over a multi-year time frame.
- We remain focused on strategies that deliver high contractual returns while having structural downside protection.
- Areas of higher growth within the program are expected to include Direct Lending, Mezzanine Debt, Asset Backed, Distressed, and Diversified Private Credit.

Private Investment Partnership (PIP)

Steve Woodall

Program Director

Presentation Deck



Agenda: PIP Annual Review Topics



- Overview
- Exposures
- Results
- Looking Forward

Overview: Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Steve Woodall	Program Director	MBA	CFA, CAIA	19	18
Erica Billingslea	Investment Officer	MA		11	11
Matt Bennett	Investment Officer	MBA		15	15
Kelly Baker	Portfolio Assistant	AAS		13	8

Overview: Private Investment Partnerships



- A diversified investment platform dedicated to private and illiquid investments that invests across private equity, real assets, and credit strategies.
- Portfolios that emphasize opportunistic asset allocation, co-investments and reduced investment management fees/carry
- A close relationship between partner organizations that allows for expanded access and an elevated level of inclusion

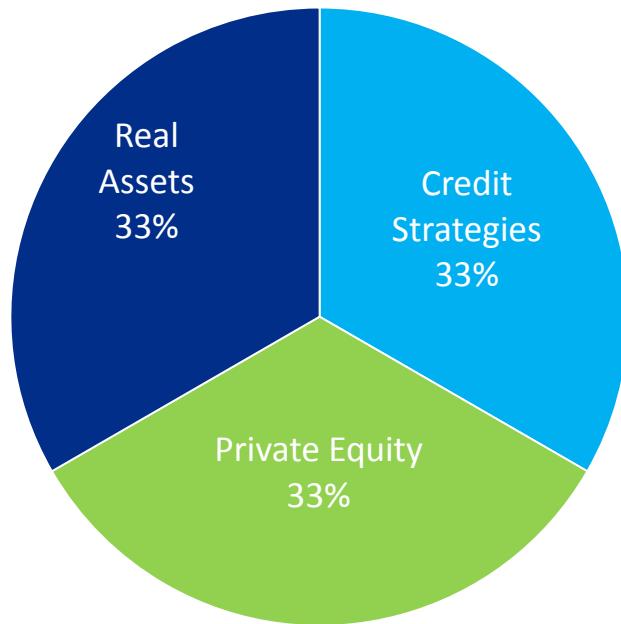
Exposures: Portfolio Update



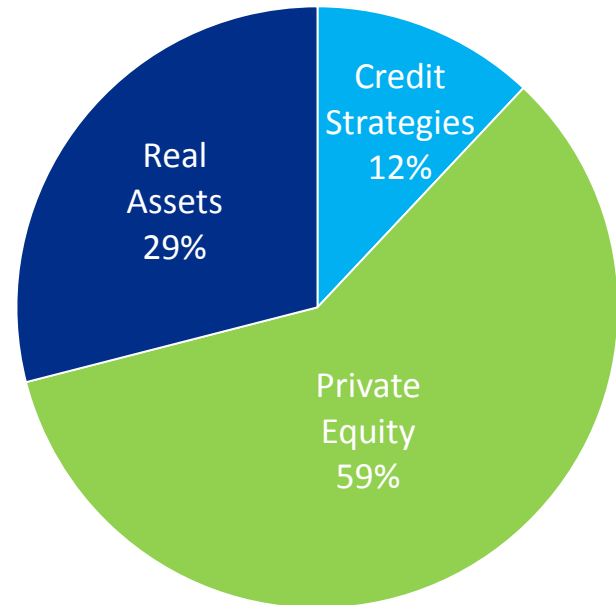
- Asset allocation
- Commitments

Exposures: Asset Allocation

Benchmark – June 30, 2023



PIP Actual – June 30, 2023



Exposures: Overall Strategy Mix Ended FY23 Unchanged



	6/30/22	6/30/23	Change %
Private Equity	59%	59%	-
Real Assets	18%	18%	-
Real Estate	11%	11%	-
Credit	12%	12%	-
Total (MM)	\$2,588	\$2,862	+\$274

Exposures: Fund vs Coinvestment Commitments (\$mm)



	6/30/22	6/30/23	Change \$	Change %
Fund	2,094.5	1,799.3	-295.2	-14
Co-investment	1,791.8	1,758.4	-33.4	-2
Total	3,886.3	3,557.6	-328.7	-8

Results: Performance – 6/30/23



	Inception (2015)	5 Year	3 Year	1 Year	MV (\$MM)
Total PIP	8.56	9.25	15.96	1.93	2,737
Benchmark	7.36	7.18	10.51	1.06	
Excess Return	1.20	2.07	5.45	0.87	

Total Program IRR 9.9%

Source: Time-weighted returns: BNY Mellon; 6/30/23 market value and performance are lagged and based on 3/31/23 market values that are adjusted for interim cashflows. IRR: VRS Private as of 6/30/23.

- Using re-investment rate to manage overall size of program.
- Return expectation remains to exceed benchmark and be competitive with individual programs.



Virginia Retirement System

Real Assets

Walker Noland

Program Director, Real Assets



Agenda: Real Assets Annual Review Topics



- Overview
- Markets
- Exposures
- Results
- Co-investments
- Managers
- Looking Forward

Overview: Objectives



Diversification – historically low correlation to global equities as shown below

Competitive Returns – strong historical returns

Cash Flow – investments tend to distribute cash quarterly

Inflation Linkages – varies by sector & asset type, but some ability to pass through inflation

Correlations

	Global REITs	U.S. Commercial Real Estate	Timberland	Farmland	Energy Equities	Mining Equities (ex. Gold & Silver)	Gold	Infrastructure Equities	Global Equities	IG Corp Bonds	CPI
Global REITs	1.00										
Commercial Real Estate	0.38	1.00									
Timberland	0.04	(0.08)	1.00								
Farmland	0.24	0.06	0.27	1.00							
Energy Equities	0.50	0.15	0.34	0.22	1.00						
Mining Equities	0.62	0.20	0.26	0.18	0.74	1.00					
Gold	0.18	(0.04)	0.15	0.35	0.06	0.27	1.00				
Infrastructure Equities	0.84	0.34	0.15	0.35	0.67	0.71	0.22	1.00			
Global Equities	0.77	0.27	0.23	0.13	0.61	0.73	0.15	0.85	1.00		
IG Corp Bonds	0.09	(0.15)	0.21	(0.21)	(0.26)	(0.22)	0.42	0.12	(0.07)	1.00	
U.S. CPI	0.09	0.17	0.31	0.12	0.25	0.21	0.13	0.15	0.09	(0.21)	1.00

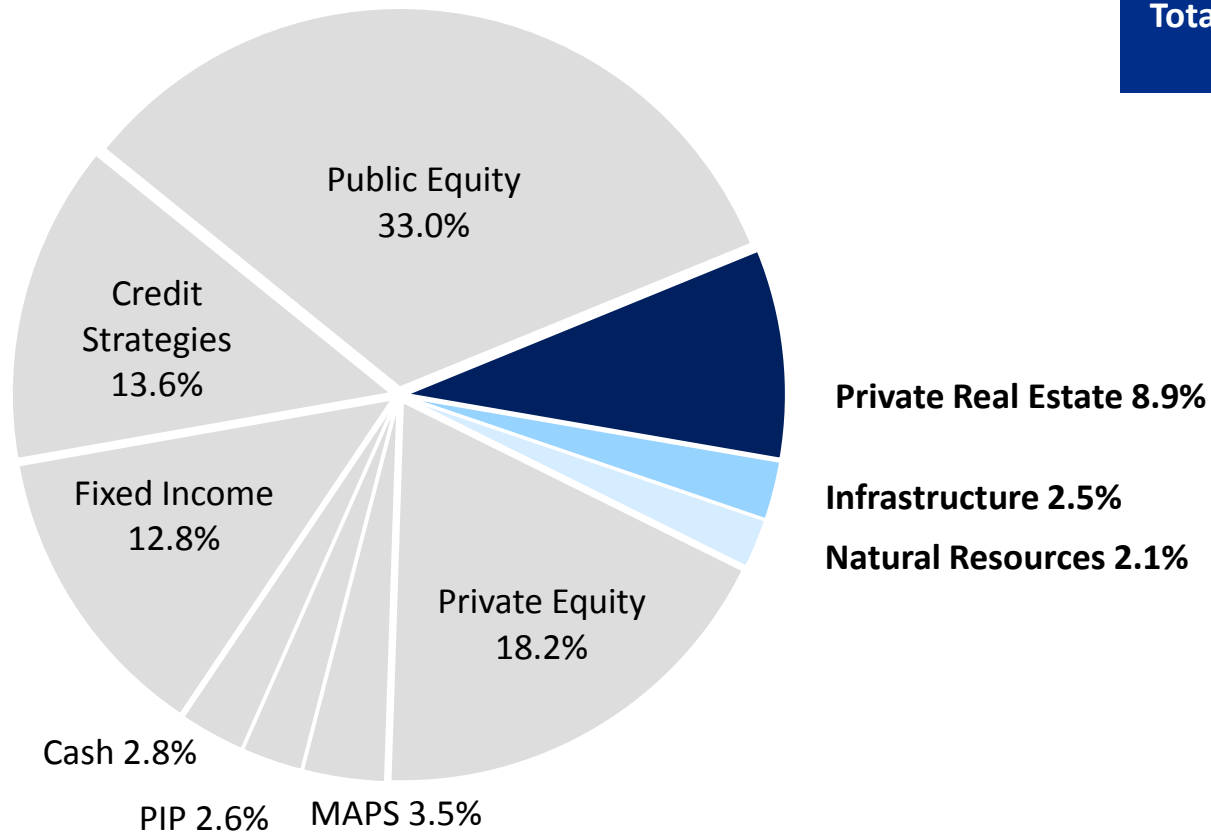
Notes: Private Commercial Real Estate returns de-smoothed. Correlations based on quarterly data, except Timberland and Farmland, which are based on annual data since those assets are generally appraised only once per year.

Overview: Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Walker Noland	Program Director	MBA	CFA	23	13
Warren Chang	Portfolio Manager	MBA, MS	CFA	26	8
Tom Coleman	Portfolio Manager	BS	CFA, CAIA	23	12
Jummai Sarki-Hurd	Portfolio Manager	MBA, MS	-	17	10
Tom Mulvin	Senior Investment Officer	BS	-	30	30
Daniel Ball	Investment Analyst	BA	CAIA Level I - Pass	1	1
Carol Timpano	Portfolio Assistant	BS	-	8	8

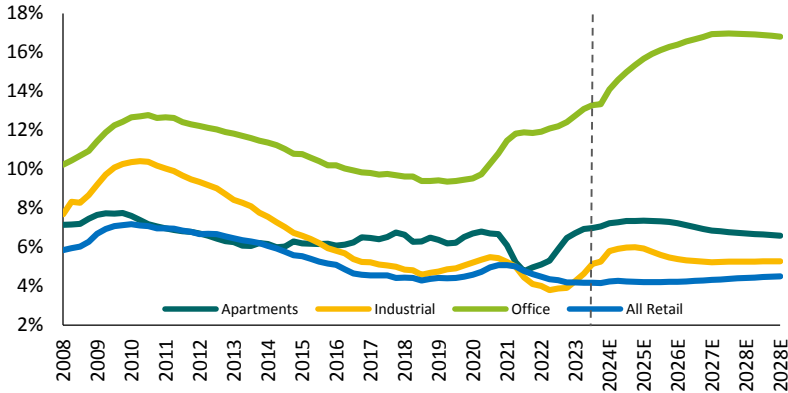
Overview: Asset Allocation – 6/30/23



Source: BNY Mellon

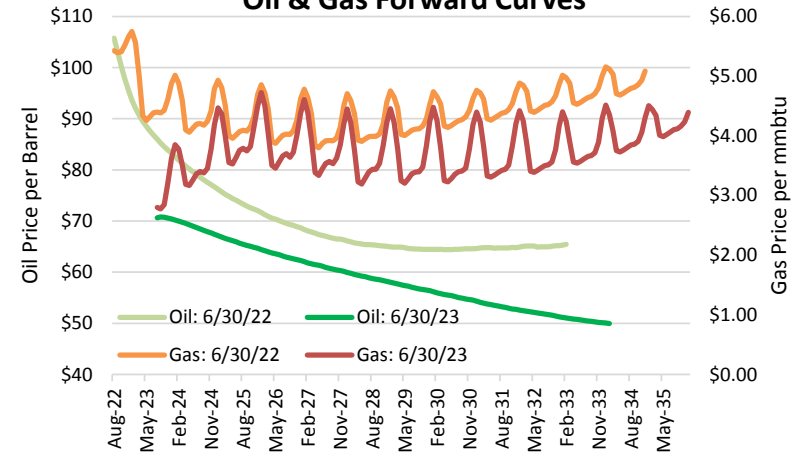
Markets: Fundamentals

U.S. Property Vacancy Rates 2008-2028



Source: Costar

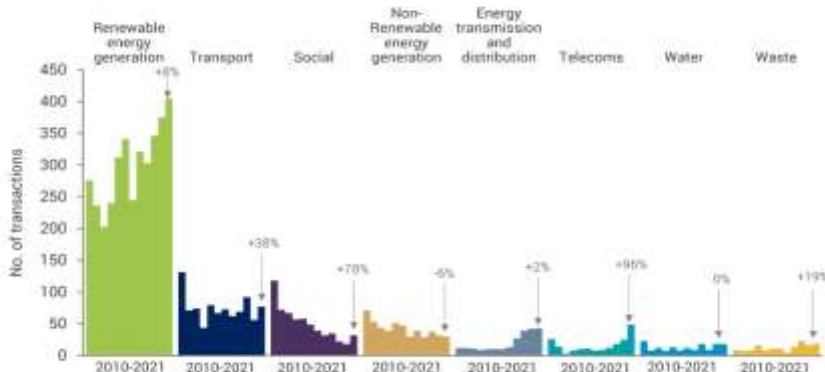
Oil & Gas Forward Curves



Source: Bloomberg

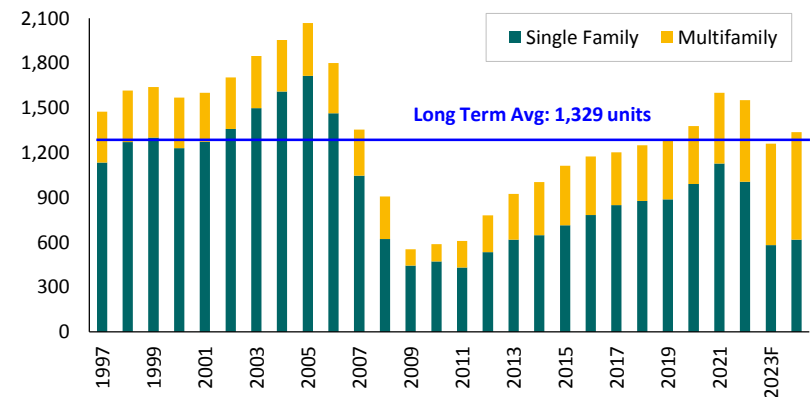
Private investment in infrastructure projects by sector

(Number of transactions and growth in 2023)



Source: GI Hub Infrastructure Insights 2023

Housing Starts 1997-2024 (000)

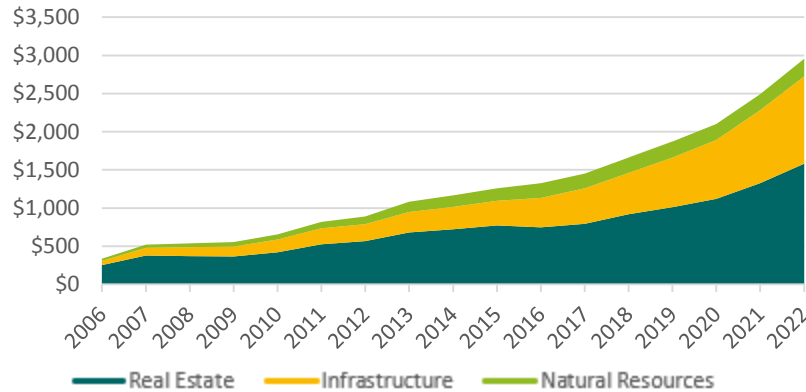


Sources: U.S. Census Bureau, NAHB, Wells Fargo, MBA, Forisk

Markets: Capital Markets

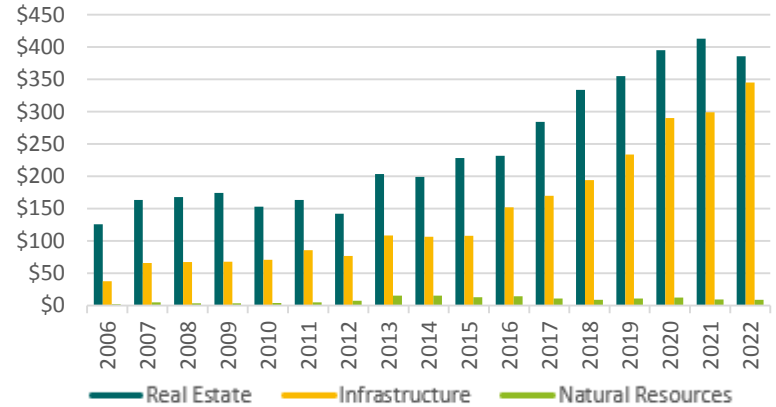


Real Assets Under Management (\$Billion)



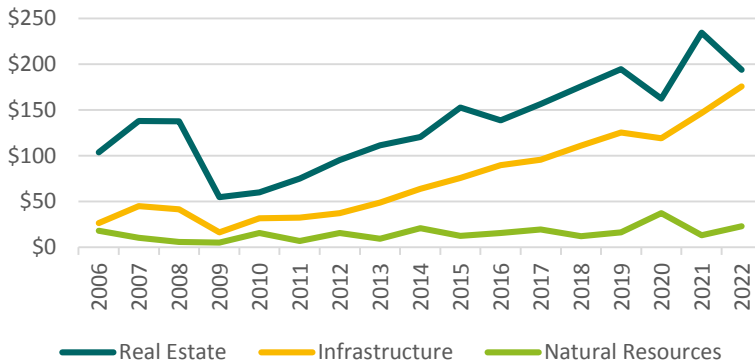
Source: Preqin Oct 2023

Dry Powder (\$Billion)



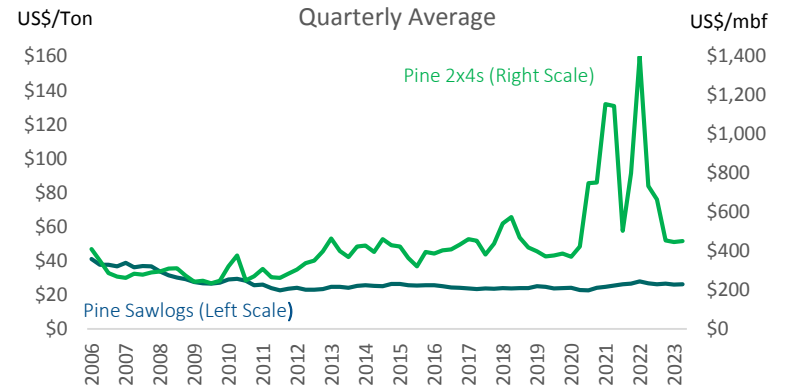
Source: Preqin Oct 2023

Real Assets Annual Fund Raising (\$Billion)



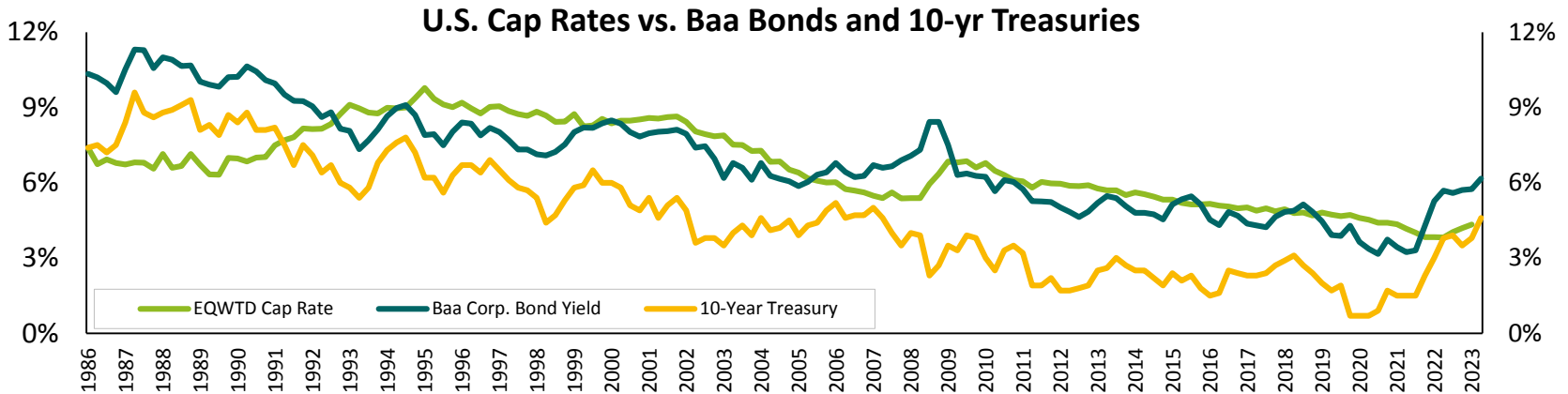
Source: Preqin Oct 2023

U.S. South Lumber vs. Stumpage Prices

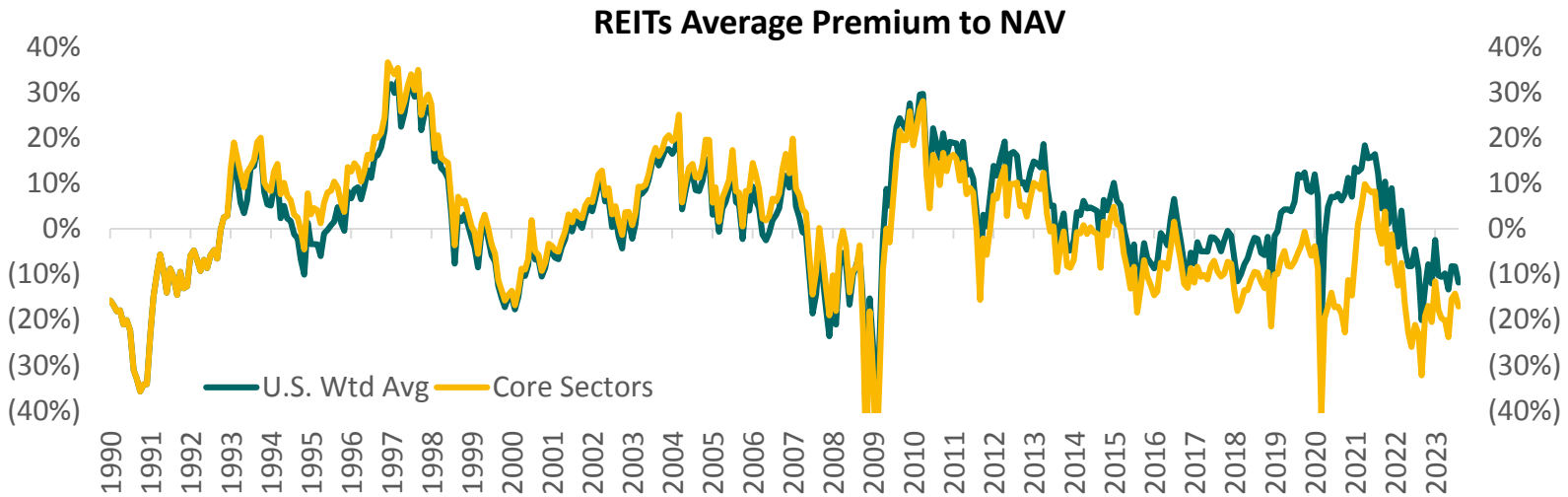


Sources: Timber Mart-South; Random Lengths; ERA

Markets: U.S. Cap Rates & REIT NAV Premiums



Sources: Federal Reserve, NCREIF

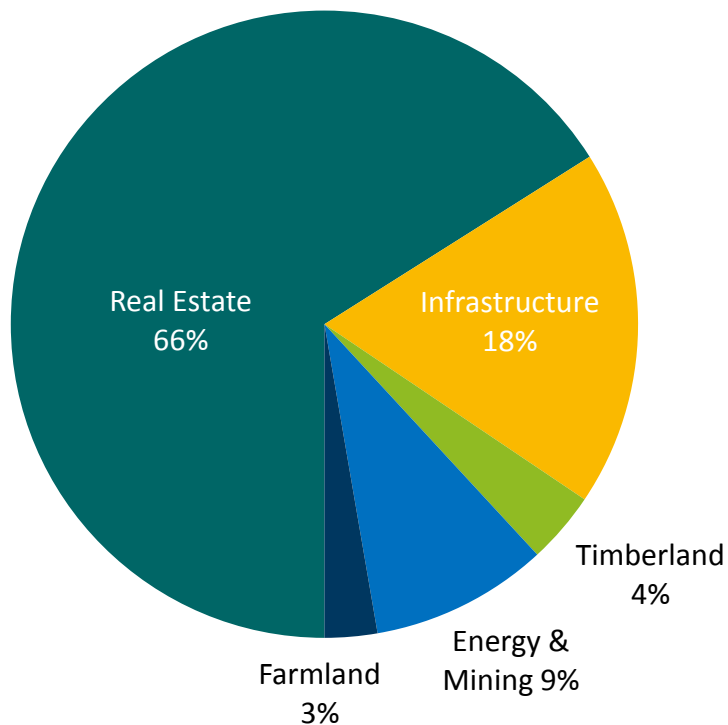


Sources: Green Street Advisors

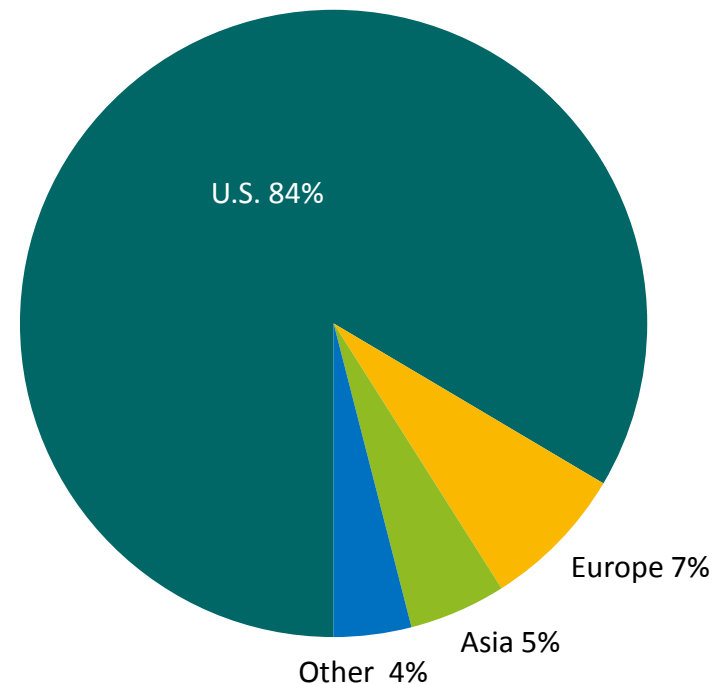
Exposures: Sectors & Geography – 6/30/23

Current Market Value: \$14.2 Billion

Sectors



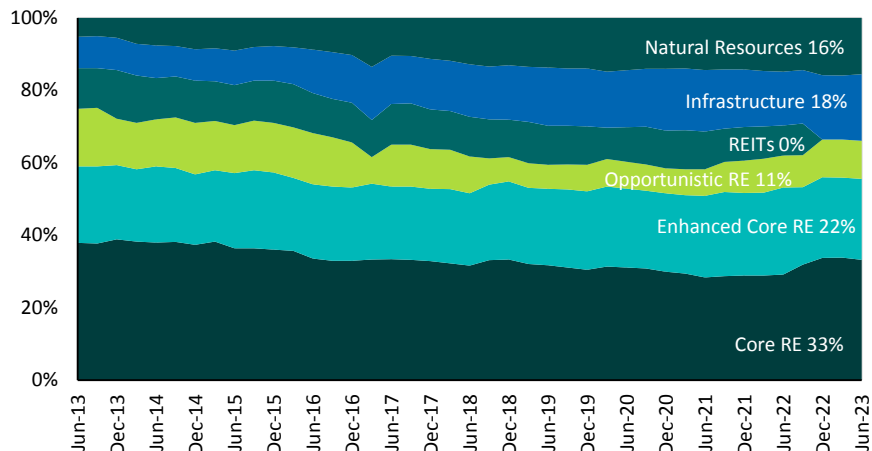
Geography



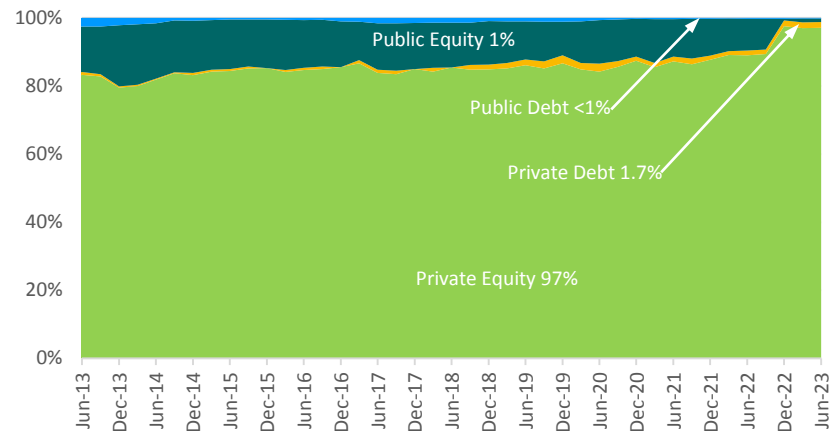
Exposures: Risk Metrics – 6/30/23



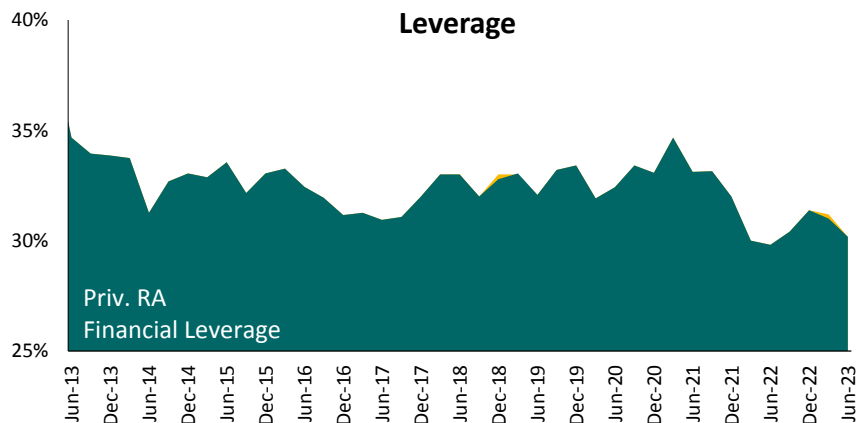
Risk/Sector Categories



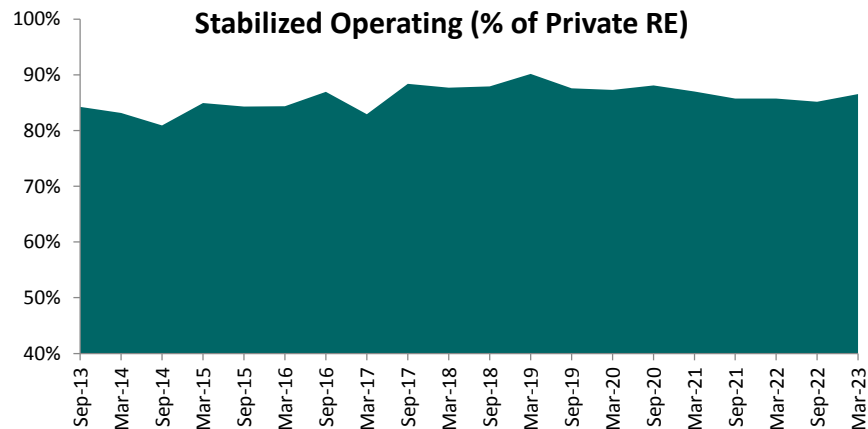
Four Quadrants



Leverage



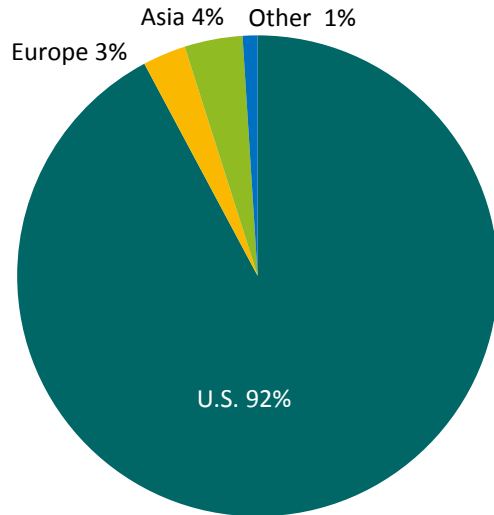
Stabilized Operating (% of Private RE)



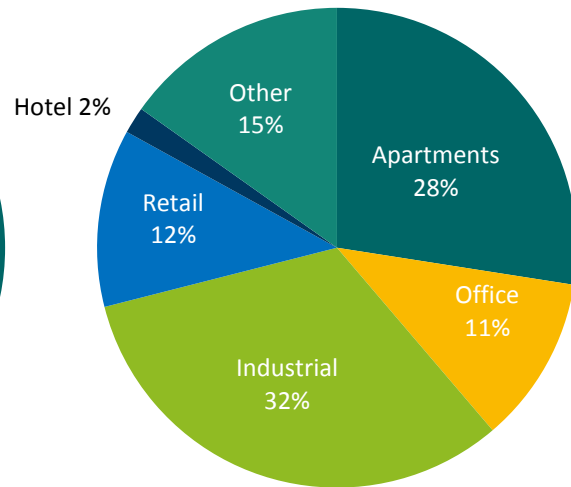
Source: BNY Mellon

Exposures: Real Estate – 6/30/23

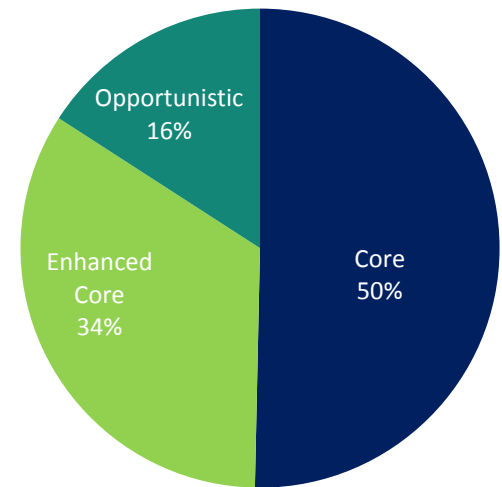
Geography



Property Type



Category

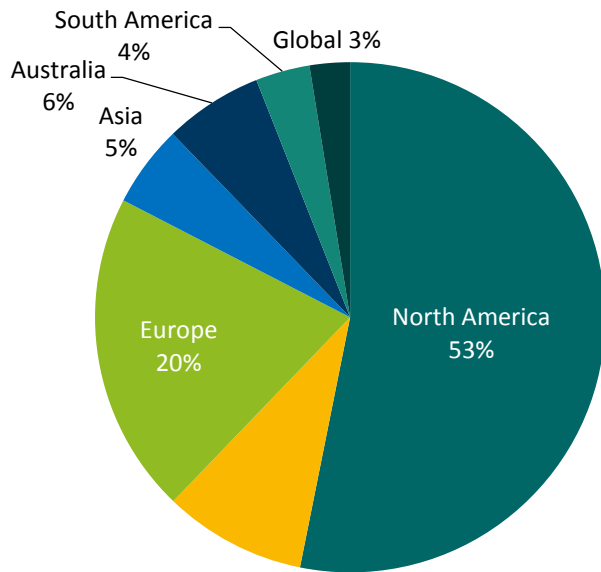


Market	# Accts.	Market Value (\$MM)	Market Value %	Unfunded Commitment/Allocation (\$MM)
Private	62	9,375	100	2,703

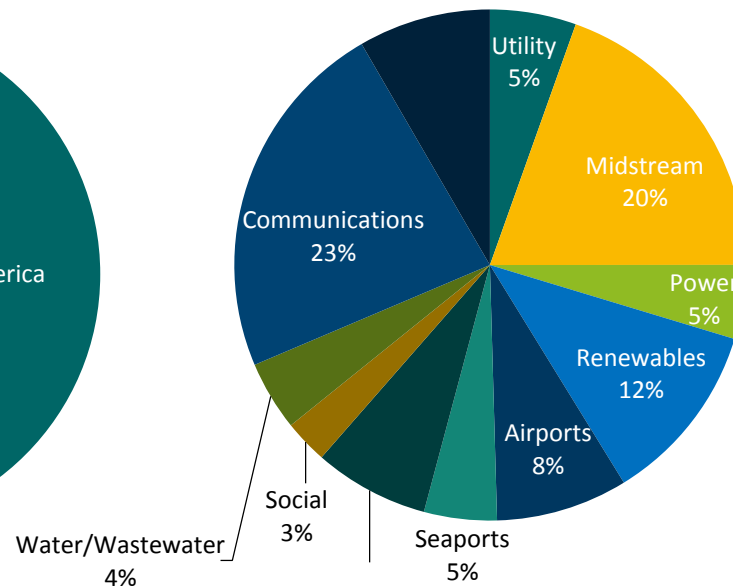
Source: BNY Mellon

Exposures: Infrastructure – 6/30/23

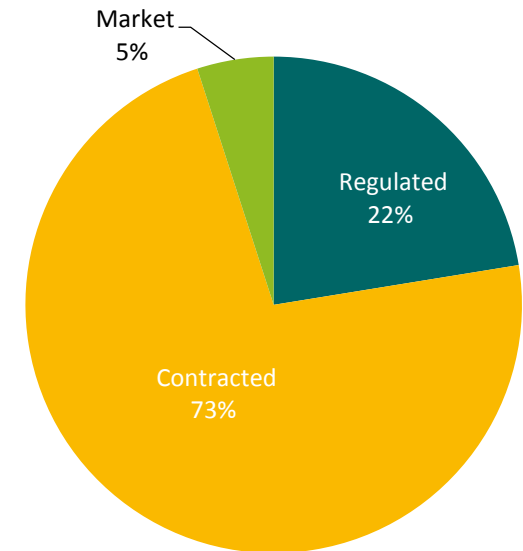
Geography



Sector



Revenue Source

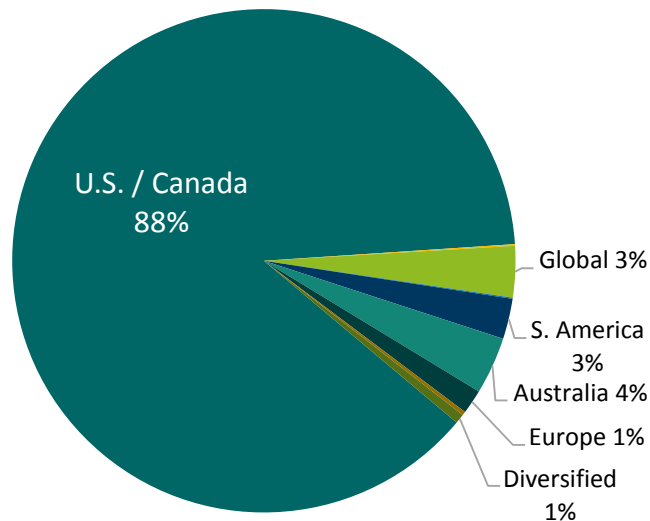


Market	# Accts.	Market Value (\$MM)	Market Value %	Unfunded Commitment/Allocation (\$MM)
Private	37	2,511	100	1,132

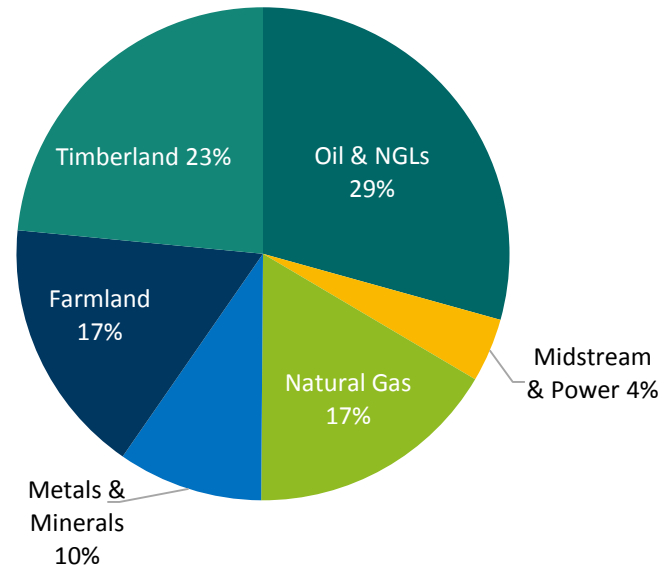
Source: BNY Mellon

Exposures: Natural Resources – 6/30/23

Geography



Sector

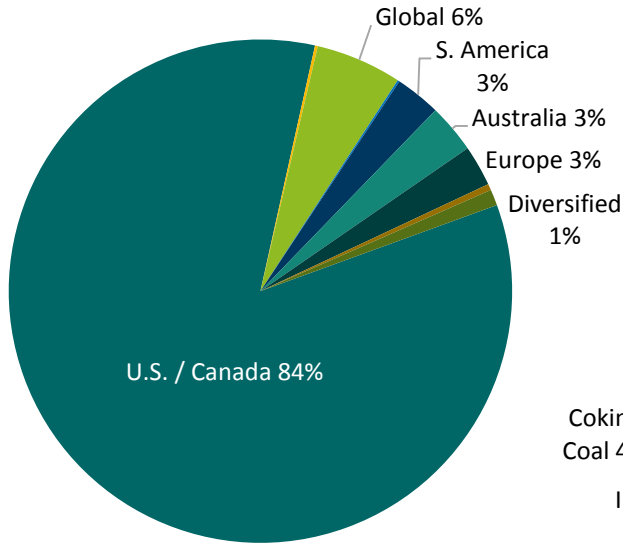


Market	# Accts.	Market Value (\$MM)	Market Value %	Unfunded Commitment/Allocation (\$MM)
Private	25	2,123	97	922
Public	1	74	3	25
Total	26	2,197	100	947

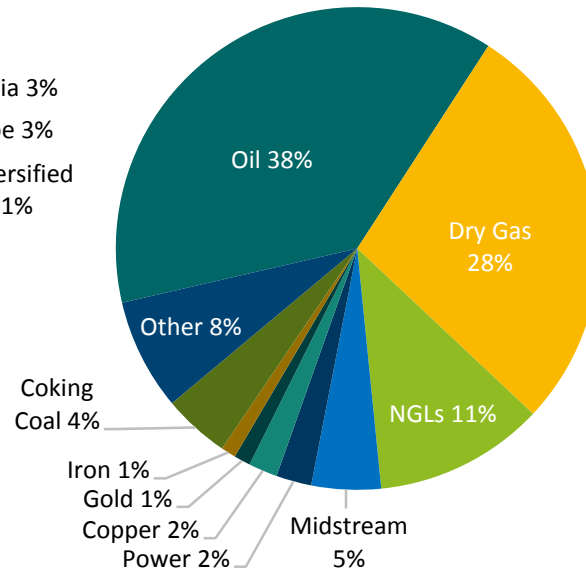
Source: BNY Mellon

Exposures: Energy & Mining – 6/30/23

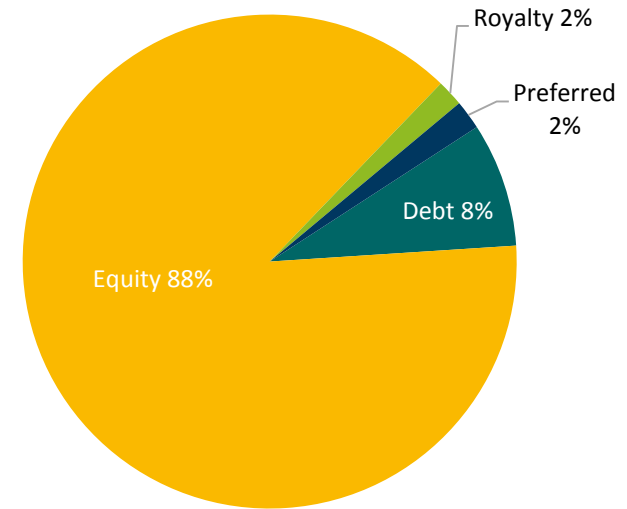
Geography



Commodity



Structure

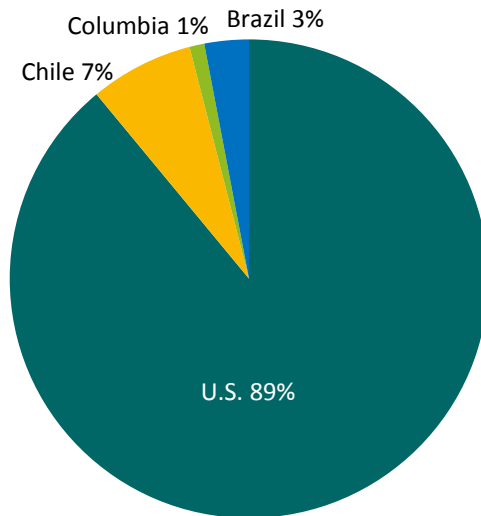


Market	# Accts.	Market Value (\$MM)	Market Value %	Unfunded Commitment/Allocation (\$MM)
Private	20	1,213	94	682
Public	1	74	6	25
Total	21	1,287	100	707

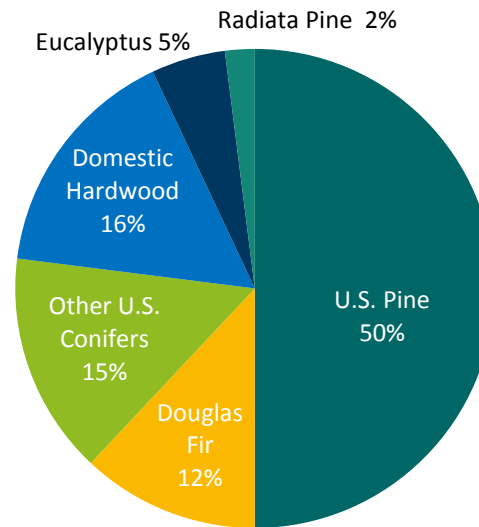
Source: BNY Mellon

Exposures: Timberland – 6/30/23

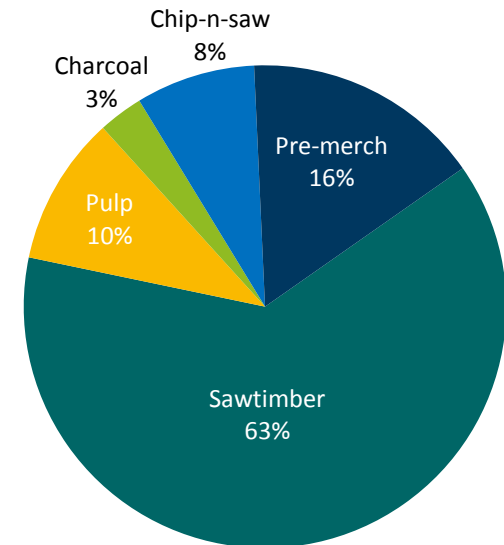
Region



Species



Product Type

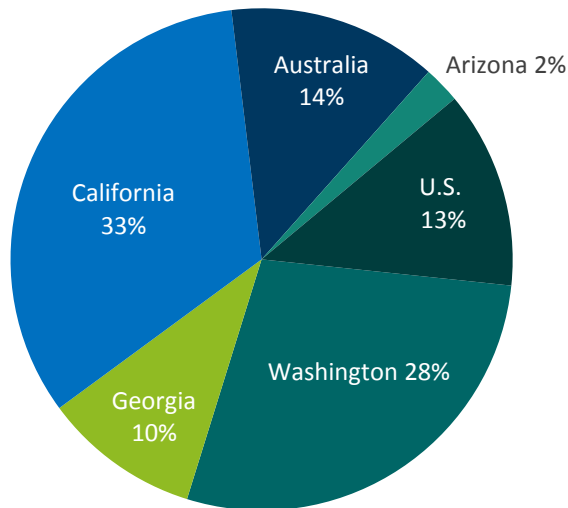


Market	# Accts.	Market Value (\$MM)	Market Value %	Unfunded Commitment/Allocation (\$MM)
Private	3	525	100	218

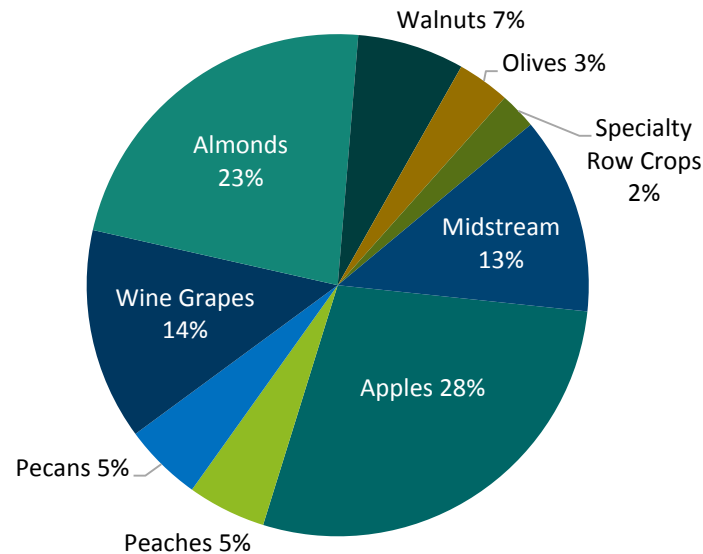
Source: BNY Mellon

Exposures: Farmland – 6/30/23

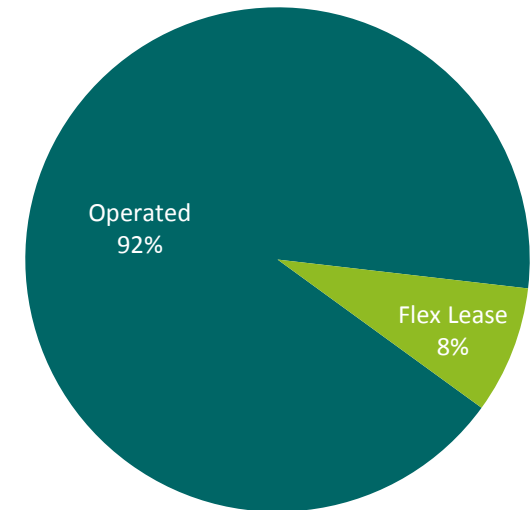
Geography



Crop



Revenue Source



Market	# Accts.	Market Value (\$MM)	Market Value %	Unfunded Commitment/Allocation (\$MM)
Private	2	385	100	22

Source: BNY Mellon

Results: Portfolio Returns – 6/30/23



	10 Year	5 year	3 Year	1 Year	MV (\$MM)
Total Real Assets	10.0	8.4	11.2	1.7	14,196
Strategic Benchmark	8.0	6.4	7.6	-0.7	
Excess Return	2.0	2.0	3.6	2.4	
Private Real Estate	11.1	9.5	11.2	1.6	9,375
Benchmark	8.5	6.6	7.5	-3.9	
Excess Return	2.6	2.9	3.7	5.5	
Infrastructure	11.3	10.4	12.4	5.5	2,612
Benchmark	6.6	7.9	9.4	9.0	
Excess Return	4.7	2.5	3.0	-3.5	
Natural Resources	5.9	6.9	14.6	2.7	2,209
Benchmark	6.6	7.9	9.4	9.0	
Excess Return	-0.7	-1.0	5.2	-6.3	

Source: BNY Mellon

Headwinds/Tailwinds

- +** **Tailwinds:** Diversity of the Real Assets portfolio. On a relative basis, positioning within Private Real Estate (geographic and property type) was a strong tailwind.
- **Headwinds:** Higher interest rates pressured private market valuations. Public REITs and Infrastructure held for part of the FY (Infra - 4.6% for 1Q FY'23, REITs - 5.1% FYTD 12/31).

Largest Absolute Return Contributors

- +** Timberland: +6.5% (3.7% of program)
- +** Private Infrastructure: +5.7% (18.4% of program)
- +** Natural Resources: +2.7% (15.6% of program)
- +** Private Real Estate: +1.6% (66.0% of program)

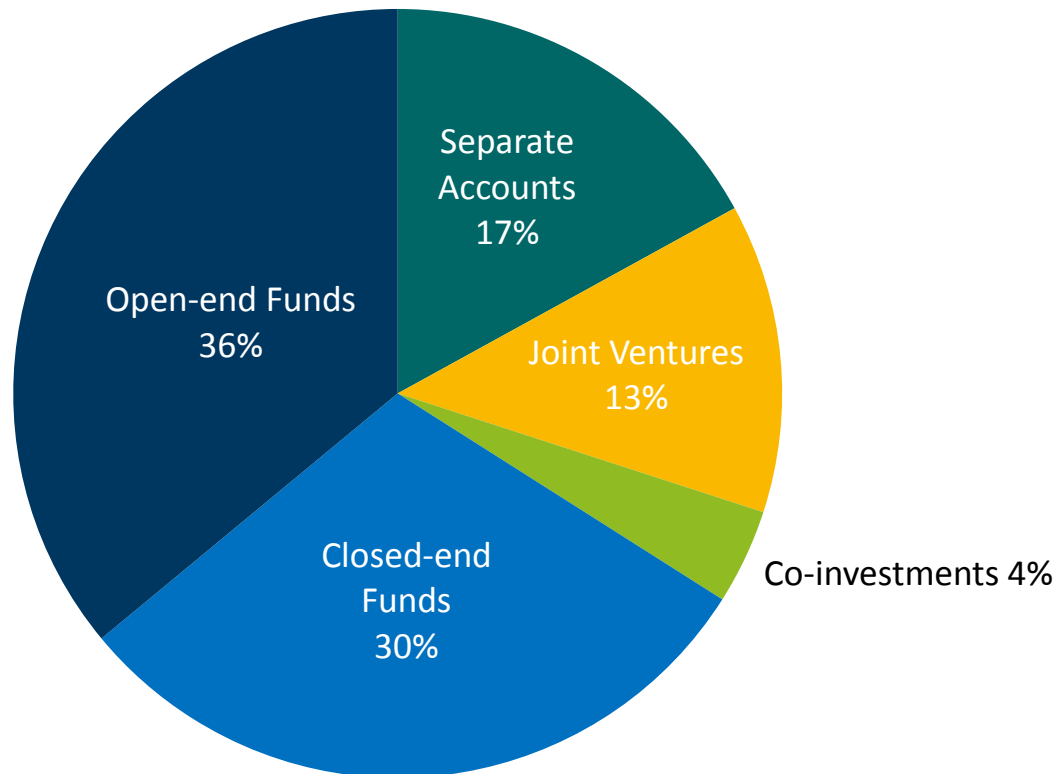
Largest Relative Return Contributors

- +** Private Real Estate: +5.5% excess return. (ODCE benchmark)
- Private Infrastructure: -3.3% excess return. (CPI-U + 400 bps)
- Natural Resources: -6.3% excess return. (CPI-U + 400 bps)

Co-investments: Real Assets Approach

- Objective is to invest additional funds alongside existing managers to fine tune portfolio exposures with incremental capital, generally with lower (or no) fees
- Target investment size of +/- \$25MM per co-investment
- Real Assets team member responsible for manager relationship runs point on co-investment activity from that manager; SWAT teams formed accordingly
- VRS staff makes the go/no-go call on investments in consultation with CIO and Director of Private Markets
- Manager remains fiduciary
- Evaluating co-investment processes across Private Assets for more consistency within VRS

Co-investments: Structure – 6/30/23



Source: BNY Mellon

Managers: Top 10 Investment Managers

Manager	# of Mandates	% of Program
PGIM	2	14.7%
Blackstone	13	8.9%
Clarion Partners	1	7.4%
Morgan Stanley	3	7.0%
Industry Funds Mgmt.	3	4.9%
Pritzker Realty Group*	2	4.1%
Pantheon Ventures	4	4.0%
JP Morgan	2	3.6%
Carson Companies	4	3.5%
Global Infrastructure Partners	4	3.3%

*DIME (Diverse Investment Management Engagement) firm

Managers: Diverse Investment Management Engagement (DIME)



Resources		
Townsend	Pantheon	Aksia
<ul style="list-style-type: none"> • Real Estate • Infrastructure 	<ul style="list-style-type: none"> • Infrastructure • Natural Resources 	<ul style="list-style-type: none"> • Infrastructure • Natural Resources

Conversations with 18 new DIME managers across 18 mandates in 12 months ending 6/30/2023

Manager	Sector	Vintage	Comm./Alloc. (\$MM)
Artemis RE Partners Fund III	Real Estate	2018	75
Artemis RE Partners Fund IV	Real Estate	2021	125
Artemis Income & Growth Sidecar	Real Estate	2020	75
Capri/EGM JV	Real Estate	2014	300
Grain Infra	Infrastructure	2012	75
Pritzker JV	Real Estate	2012	232
Pritzker JV II	Real Estate	2015	200
		Total	1,082

Managers: Investment Commitments (\$MM)



Sector	Commitment
Public REITs	None
Private RE Equity	Penwood Select Industrial Partners Fund VII - \$125 Westbrook Real Estate Fund XII - \$125 Carson-VA Joint Venture IV - \$200 Two Co-investments - \$75
Infrastructure	Antin Infrastructure Partners V - €100 Stonepeak Opportunities Fund - \$100 VA-Pantheon Infrastructure SA III - \$350 One Co-investment - \$5
Natural Resources	Sprott Structured Opportunities Fund I - \$150 Lime Rock Resources Fund VI - \$50

Period Ending 6/30/2023

- Continue active portfolio management – especially given more turbulent market conditions
- Focus on objectives & risk
- Prudently work to manage around targeted allocation

Private Equity

John Alouf
Program Director

Reading Deck



Agenda: Private Equity Annual Review Topics



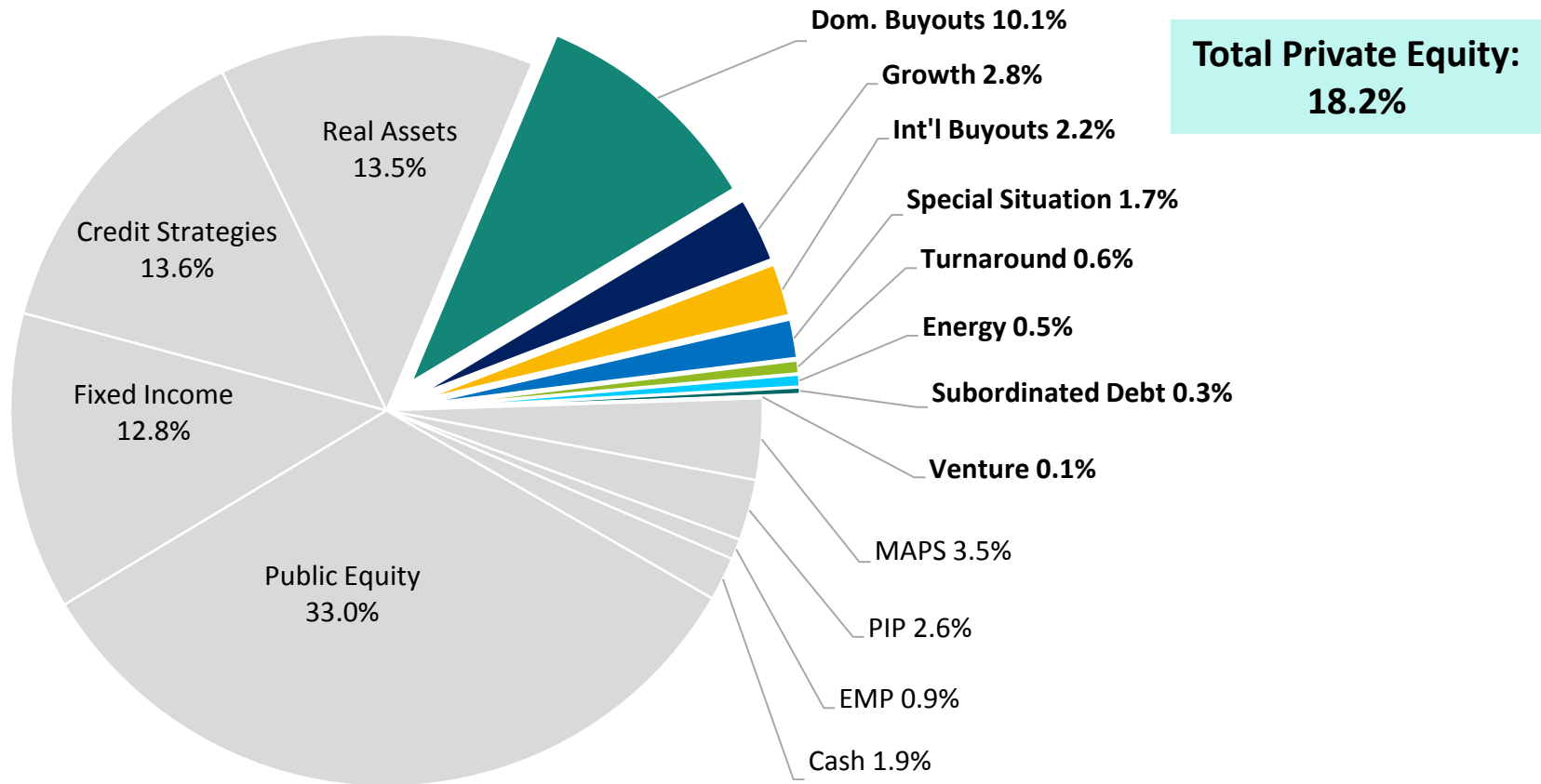
- Overview
- Markets
- Exposures
- Results
- Managers
- Co-investments
- Looking Forward

Overview: Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
John Alouf	Director	MBA	CFA	29	23
Jay Gentry	Portfolio Manager	BBA	CFA, CPA	29	29
Peter Murphy	Portfolio Manager	BBA	CFA, CPA	23	12
Rob Voeks	Portfolio Manager	PhD		26	9
De'Von Jones	Investment Officer	BBA	CFA	13	4
Viet Tran	Investment Analyst	MS		3	2
Carol Timpano	Portfolio Assistant	BS		8	8

Overview: Asset Allocation – 6/30/23

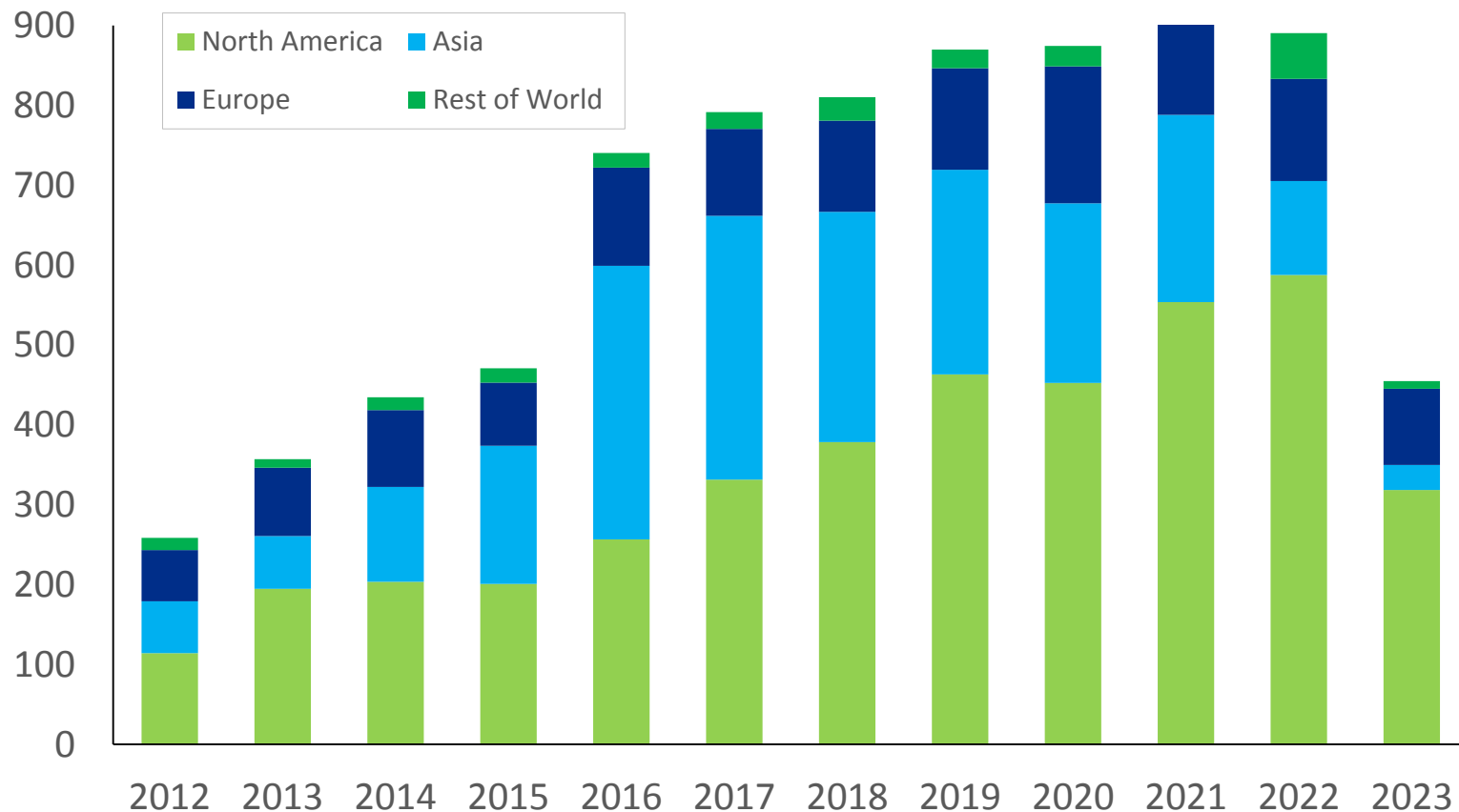


Overview: Philosophy



- Private equity is an opportunistic substitute for public equity. We should earn a meaningful return premium.
- Allocate capital to managers & strategies in which we have a high degree of confidence, not necessarily to the asset class.

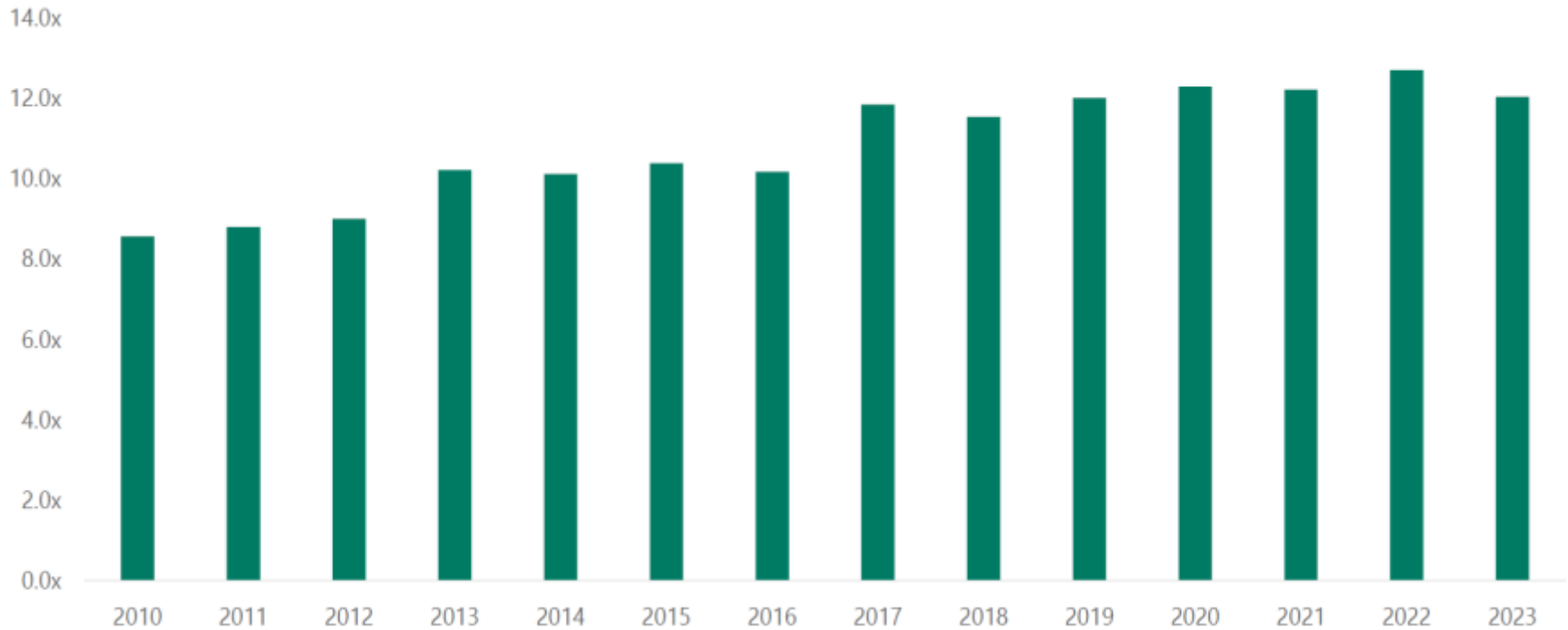
Markets: Global Private Equity Fundraising (\$B)



Source: Preqin

Note: *2023 is through the first six months of the year

Markets: Private Equity Median EV/EBITDA Multiples

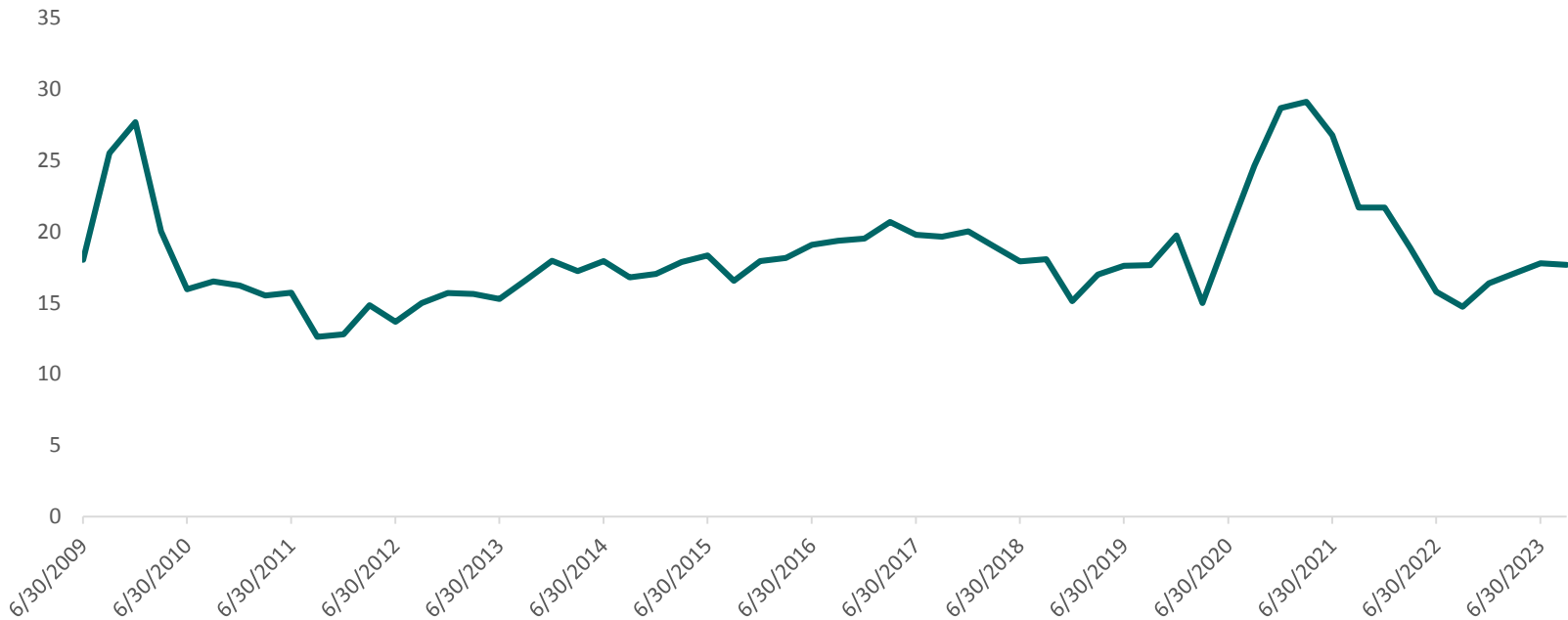


Source: Pitchbook

Note: As of 9/30/2023

Markets: P/E Multiples (MSCI ACWI IMI)

Price Earning Multiples (MSCI ACWI IMI)



Source: Bloomberg
Note: As of 9/30/2023

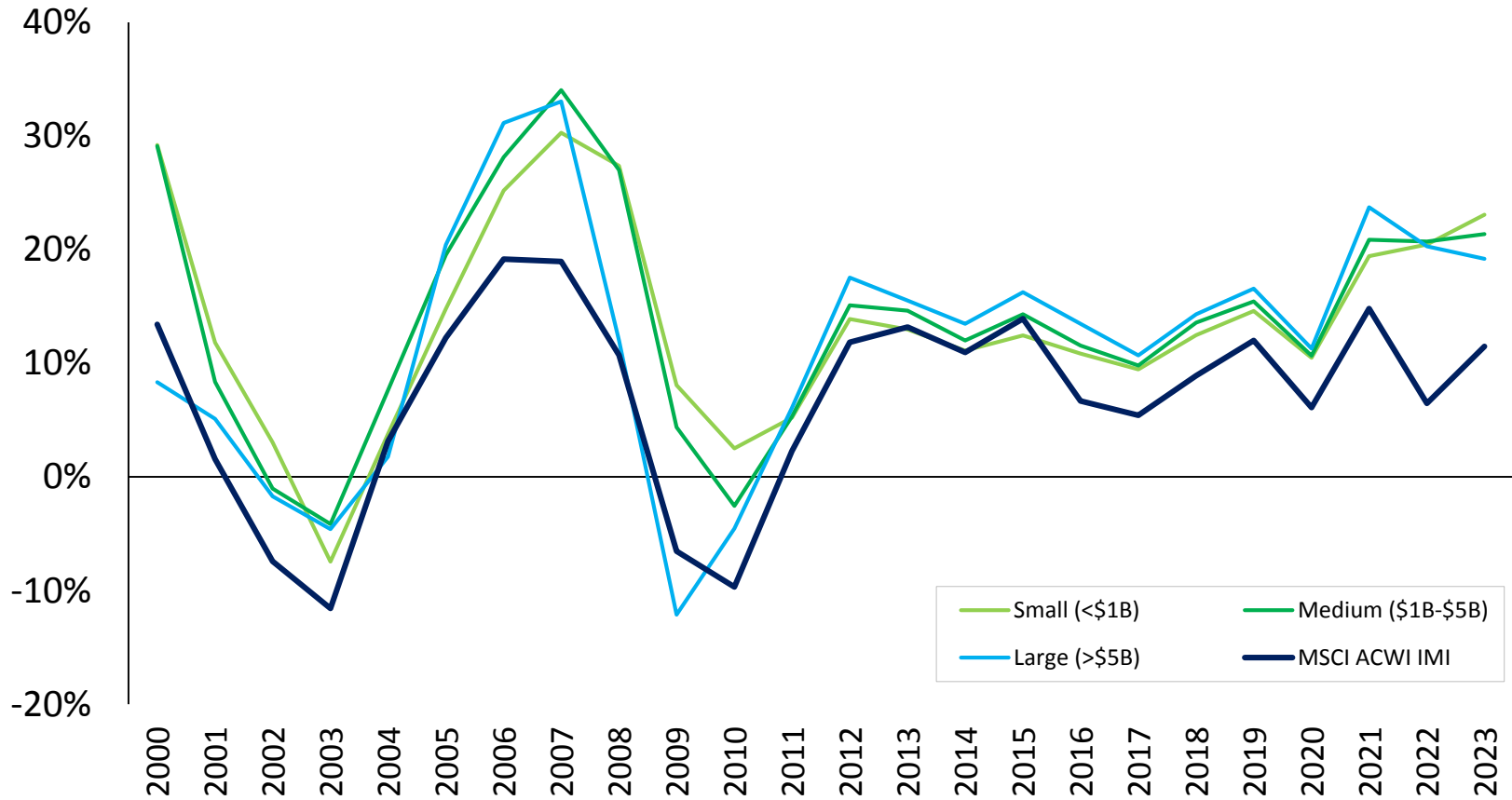
Markets: Public Software Industry Forward Revenue Multiples



Source: Morgan Stanley Research and Refinitiv

Note: As of 8/4/2023

Markets: Rolling 3-Year Returns By Fund Size



Source: PrivateIQ/Burgiss – Global Private Equity and MSCI information

Note: 2023 is through the first six months of the year

Markets: Existing Investments & Liquidity

Existing Investments

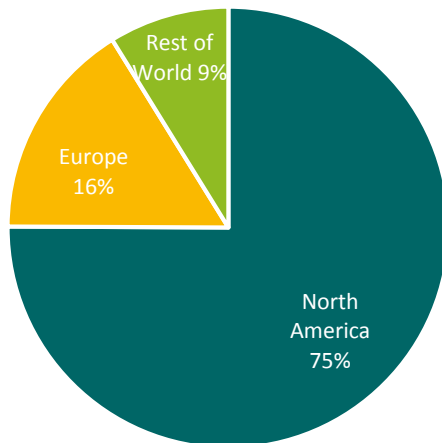
- Majority of companies meeting underwriting expectations
- Utilize operational expertise
- Covenant-lite debt refinanced before rates increased
- Add-ons
- Strategic repositioning
- Expansion: product line or geographic

Liquidity

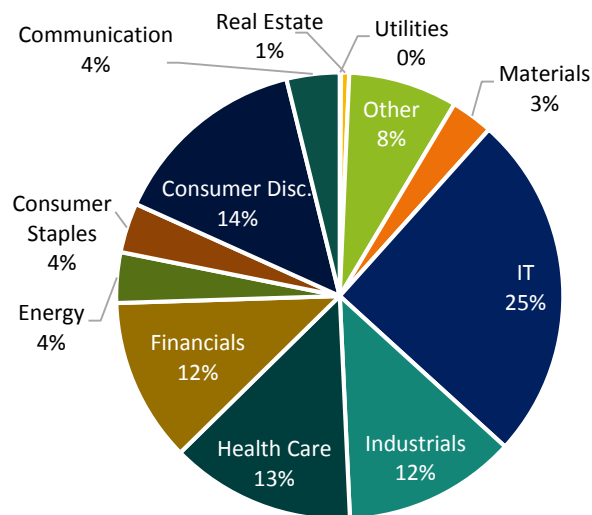
- Limited
- Premier assets are the most actionable

Exposures: Position Weighting

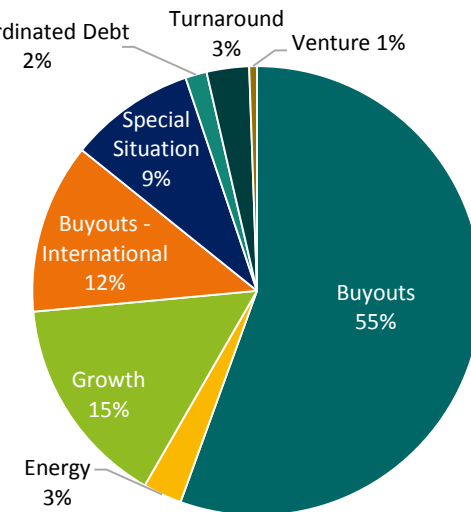
Geography



Industry

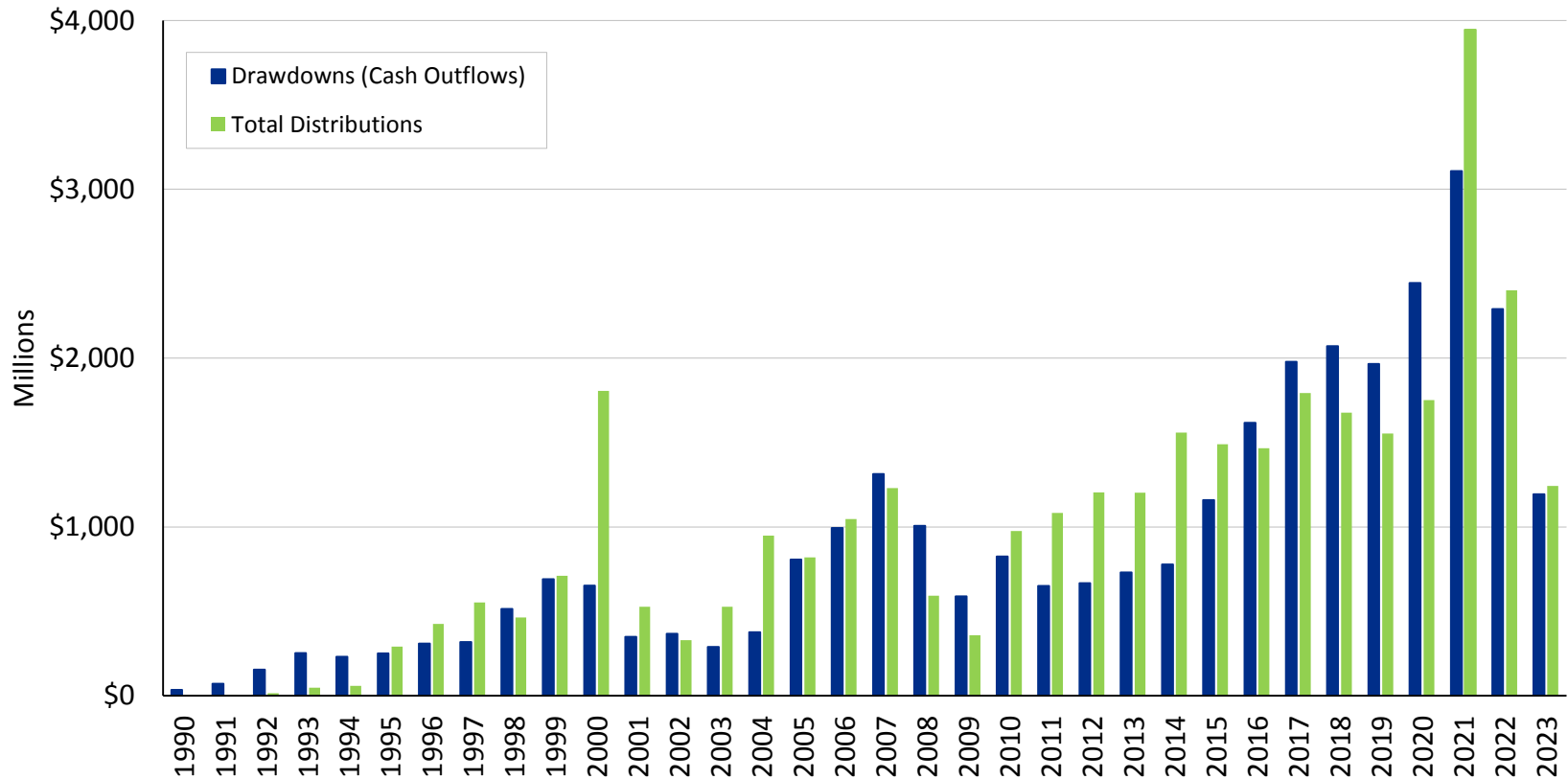


Sector



Geography and Industry charts based on 3/31/2023 manager information
Sector chart based on 6/30/2023 BNY Mellon information

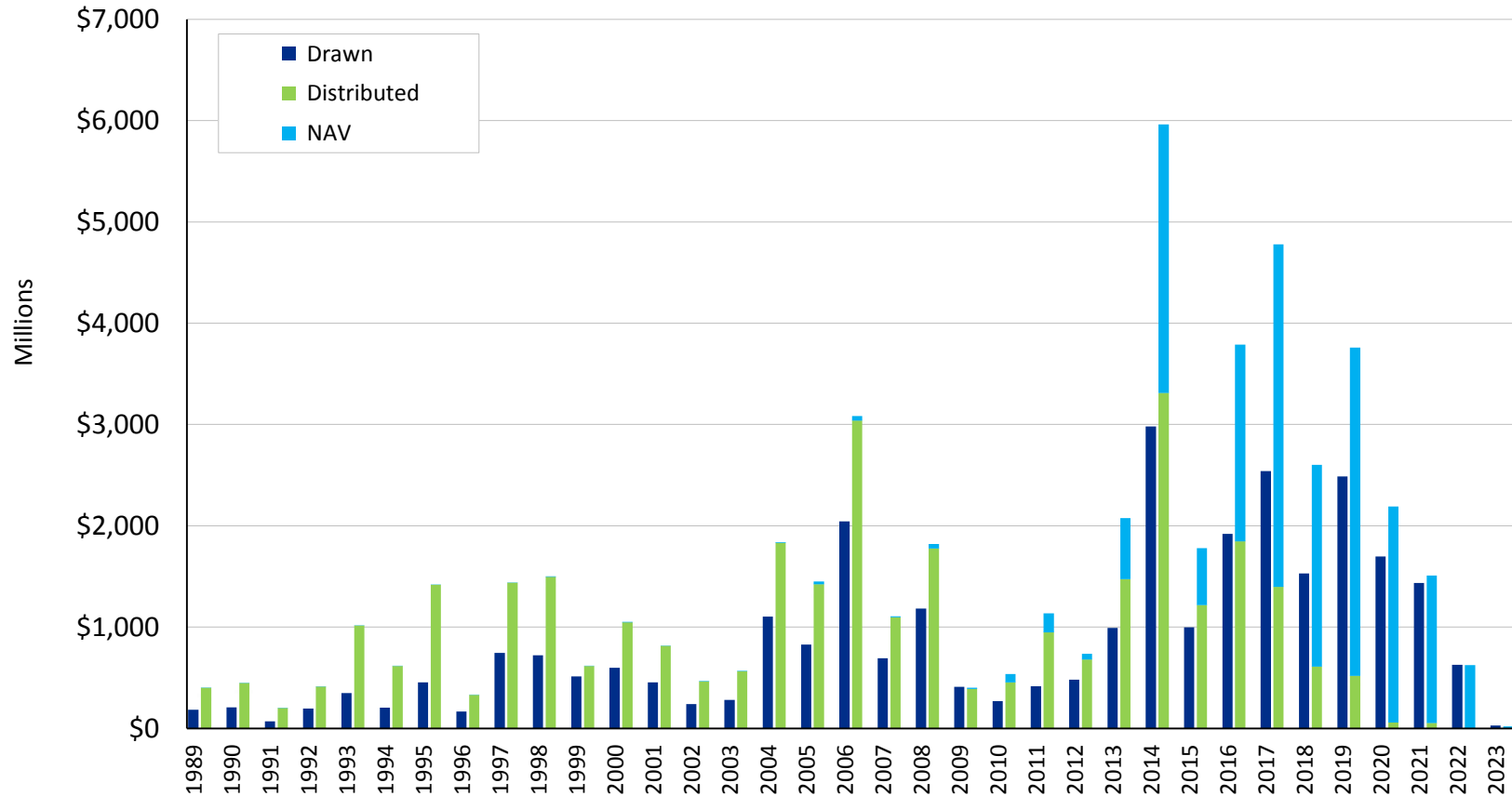
Results: Annual Cash Flows (\$MM)



Since inception net cash flow to VRS of \$3.0 billion

Note: 2023 is through the first eight months of the year

Results: Cash Flows & NAV By Vintage Year (\$MM)



Note: Valuations as of 3/31/2023 adjusted for cash flows through 6/30/2023

Results: Time-Weighted Performance – 6/30/23



	10 Year	5 year	3 Year	1 Year	MV (\$MM)
Total Private Equity	16.1	17.5	24.9	-0.7	19,077
Strategic Benchmark*	11.1	9.2	16.0	-7.3	
Excess Return	5.0	8.3	8.9	6.6	
Buyouts	18.8	18.4	26.1	-0.2	10,592
Energy	-0.7	0.9	16.8	13.6	534
Growth	23.6	24.6	29.4	-10.6	2,897
Int'l Buyout	14.0	18.0	21.9	0.9	2,339
Special Situations	15.6	16.4	21.0	5.3	1,730
Sub Debt	14.1	13.6	15.8	10.8	294
Turnaround	13.5	15.1	28.8	3.4	582
Venture	14.8	21.0	33.9	-20.6	106

Note: *Benchmark: Russell 3000 + 250 basis points through 6/30/2013; MSCI ACWI 50% hedged + 250 basis points through 6/30/2020; MSCI ACWI thereafter

Results: Headwinds/Tailwinds



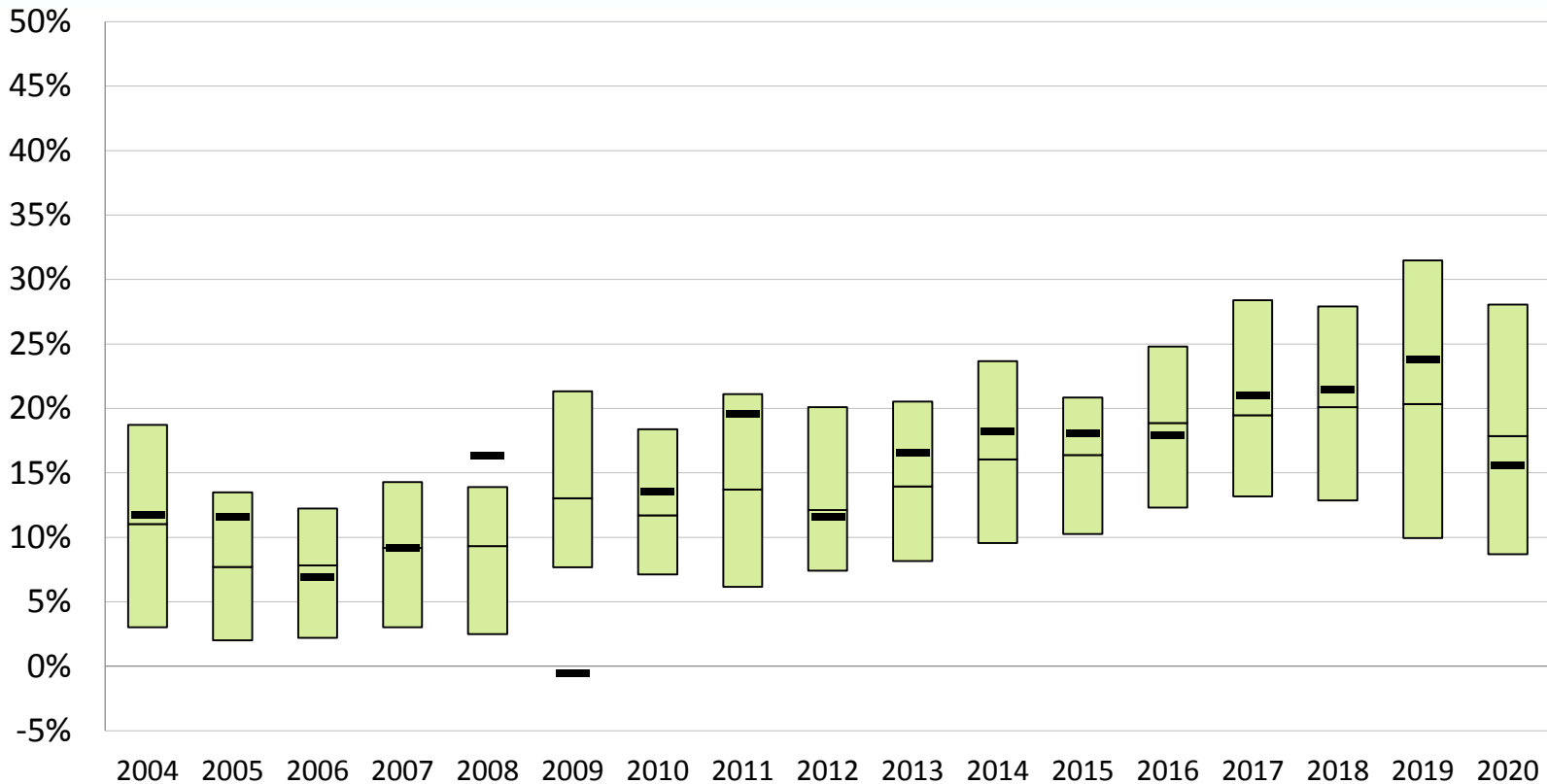
Tailwinds

- Portfolio company operating performance
- Companies with recurring revenue
- Public to Private opportunities
- Overallocated LPs

Headwinds

- Macro backdrop (inflation, cost of debt, geopolitical factors)
- Closed IPO market
- Buyer/seller disconnect
- High prices

Results: VRS Relative IRR By Vintage Year



- Floating bars represent quartile return spreads by vintage year. Line in floating bar is the median return.
- VRS vintage year returns marked by “—”.

Source: PrivateIQ/Burgiss – Global Private Equity
 Note: As of 3/31/2023

Managers: Top Ten Investment Managers

Manager	Exposure
VRS Co-Investments	9.0%
Grosvenor	6.6%
Hellman & Friedman	6.3%
TA Associates	5.6%
CVC	4.2%
Apax Partners	4.1%
Audax Group	3.8%
Bain	3.7%
GTCR	3.7%
Stone Point	3.4%
Total	50.4%

Note: As of 3/31/2023; figures may not sum due to rounding

Managers: Manager Hires LTM – 6/30/23



Effective Date	Commitment (MM)	Funding Period	Description
7/1/2022	\$175	6 years	Leonard Green IX
7/1/2022	\$150	5 years	Veritas VIII
7/1/2022	\$200	6 years	Advent X
7/1/2022	\$200	5 years	Apax XI
7/1/2022	\$100	6 years	Thoma Bravo XV
7/1/2022	\$200	5 years	Audax VII
7/5/2022	\$200	6 years	Apollo X
7/20/2022	\$100	5 years	Vista VIII
7/20/2022	\$150	6 years	HIG Advantage II
7/21/2022	€120	5 years	Bain Europe VI
3/30/2023	\$300	6 years	Hellman and Friedman XI

Diverse Investment Management Engagement (DIME)

Ten existing in-house relationships

- Asia Alternatives
- Clearlake
- ICV
- MBK Partners
- Siris
- Sycamore
- TSG
- Thoma Bravo
- Veritas
- Vista Equity

40 potential manager meetings & 2 conferences in FY 2023

Five relationships through Grosvenor

Quarterly reports from Grosvenor

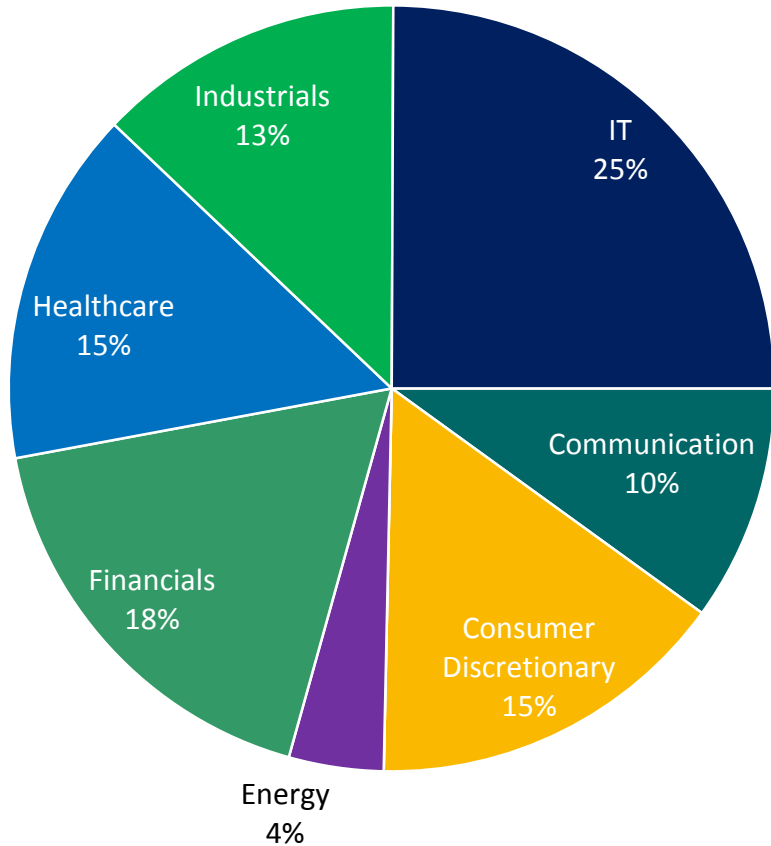
Co-investments: VRS Co-investment Program



- Dedicated professional to manage the initiative with support from the remaining private equity staff
- Anticipated annual commitments of \$200-300 million
- Target investment size of \$25-50 million per investment
- VRS has reviewed approximately 185 potential opportunities & has made 67 investments
- Increased company allocations typically with no fees or carry

Focused on sourcing & executing opportunities alongside high conviction GPs in which VRS has a commitment

Co-investments: Portfolio Exposures By Sectors



- 67 investments totaling \$1.8 billion cost since April 2013
- Investments made with 25 existing GPs
- Size range: \$7-50 million (\$26 million average size)

Note: As of 3/31/2023

Looking Forward

- Maintain modeled commitment pace
- Review strategic separate accounts
- Co-investments on pace
- Selectively add new managers

Credit Strategies

Steve Woodall

Program Director, Credit Strategies

Reading Deck



Agenda: Credit Strategies Annual Review Topics



- Overview
- Markets
- Exposures
- Results
- Co-investments
- Managers
- Looking Forward

Overview: Credit Strategies



Primary Focus

- Income generation and attractive total returns from investments in private debt and opportunistic credit strategies

Program Objective

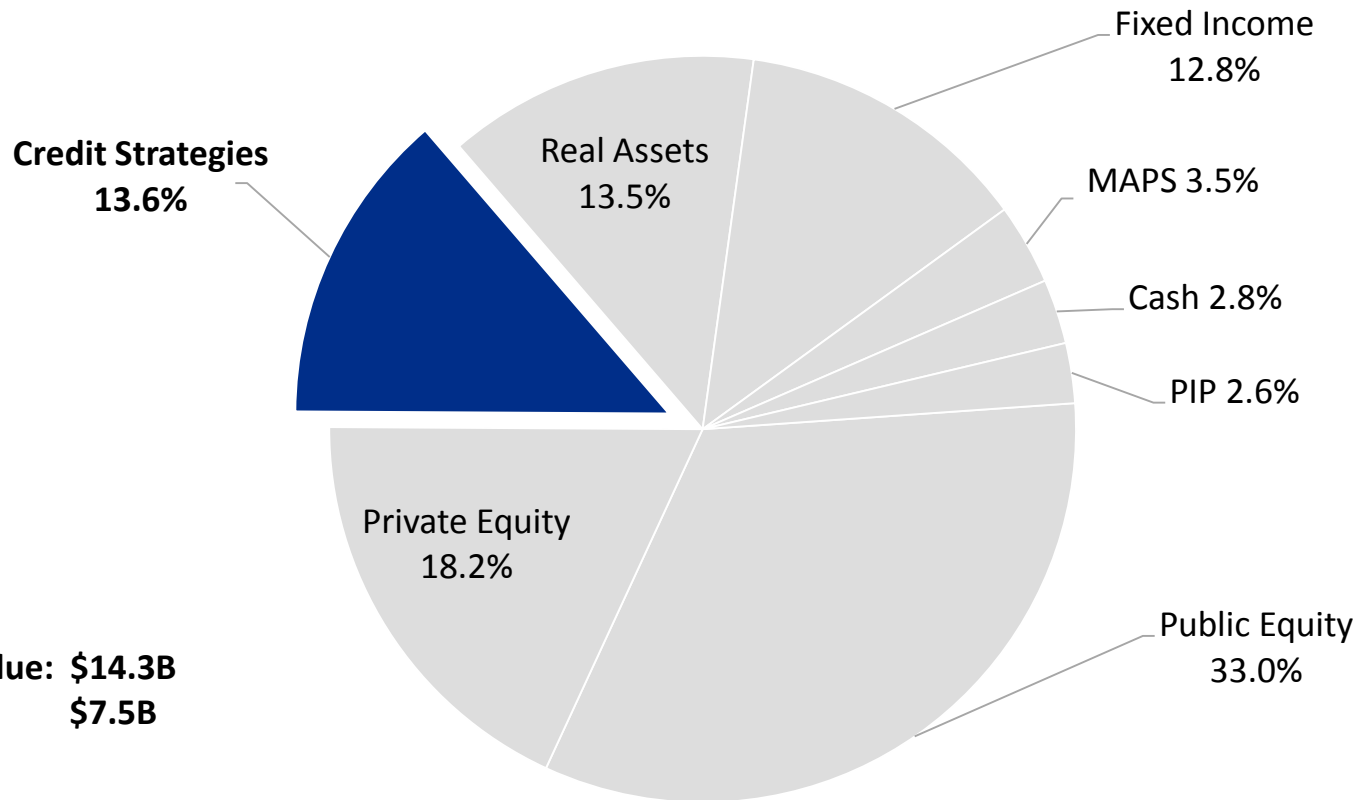
- Generate an attractive risk adjusted return relative to the program benchmark (a 50/50 blend of senior secured term loans and high yield bonds)

Overview: Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Steve Woodall	Program Director	MBA	CFA, CAIA	19	18
Perry Corsello	Portfolio Manager	MBA	CFA	26	12
Matt Bennett	Investment Officer	MBA		15	15
Erica Billingslea	Investment Officer	MA		11	11
Kevin Bliss	Investment Officer	Bcom		9	2
Kelly Baker	Portfolio Assistant	AAS		13	8

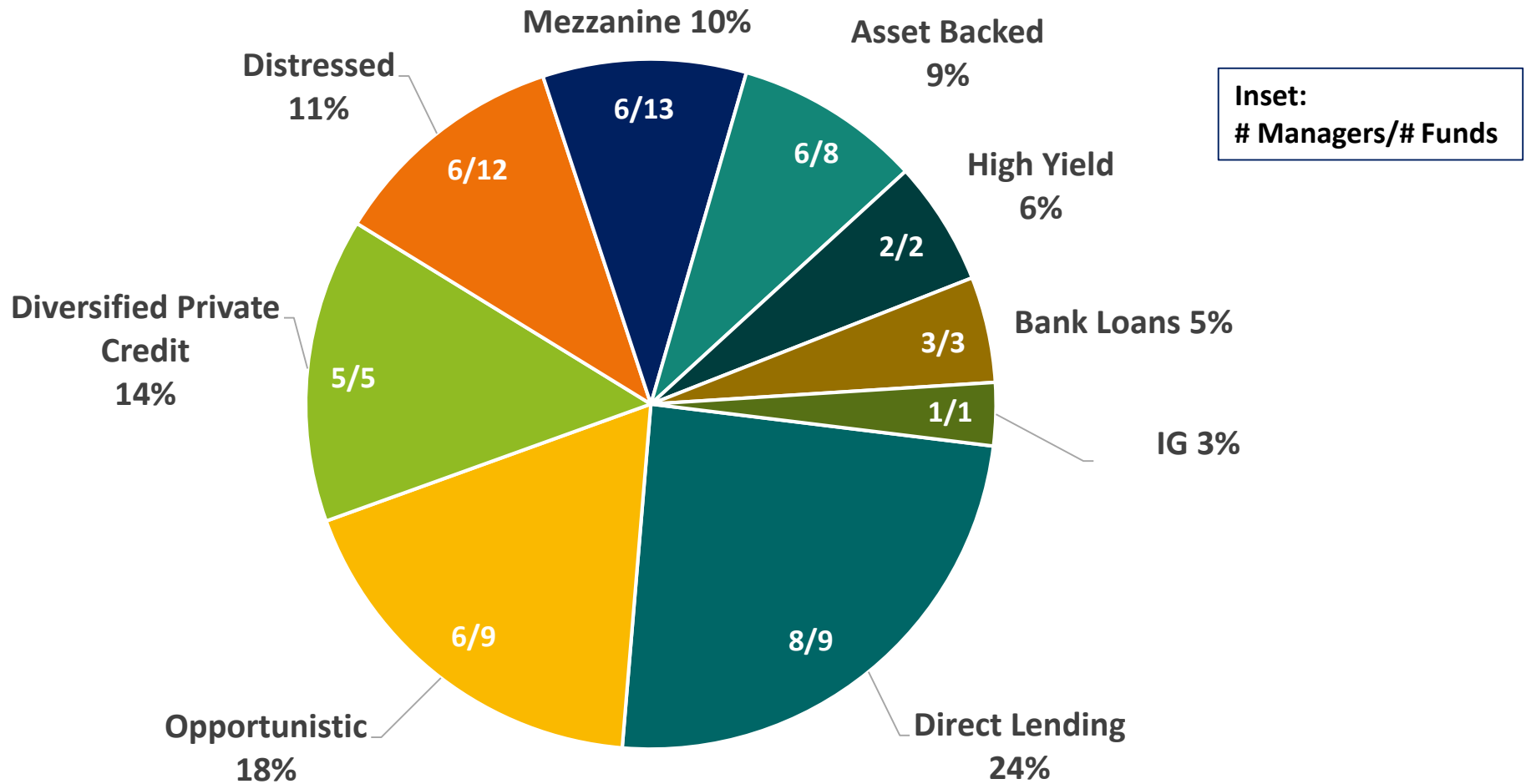
Overview: Asset Allocation – 6/30/23



Market Value: \$14.3B
Uncalled: \$7.5B

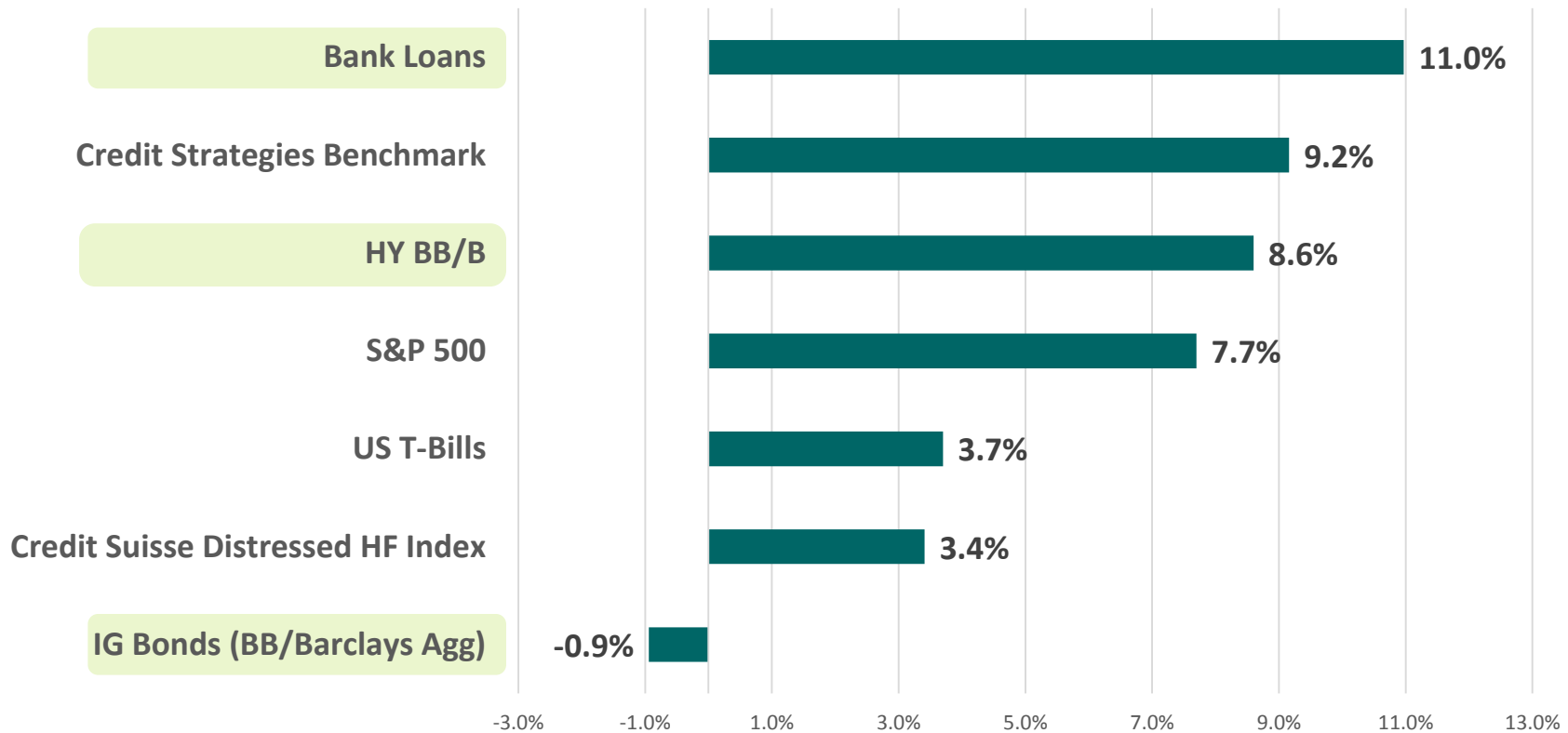
Source: BNY Mellon

Overview: Asset Allocation – 6/30/23



Source: BNY Mellon

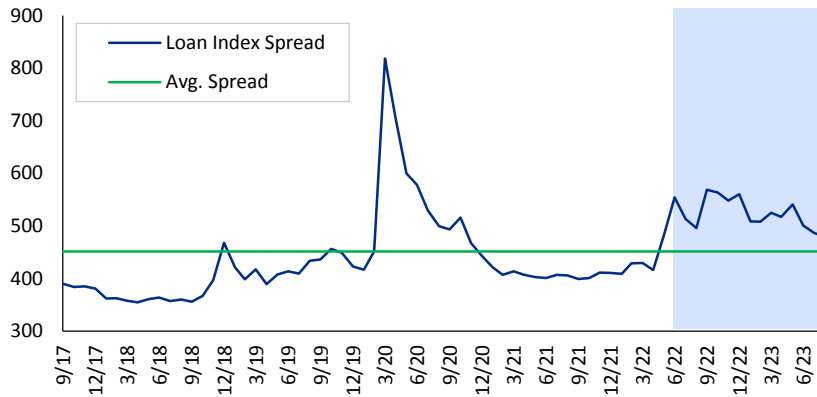
Markets: FY23 Index Returns



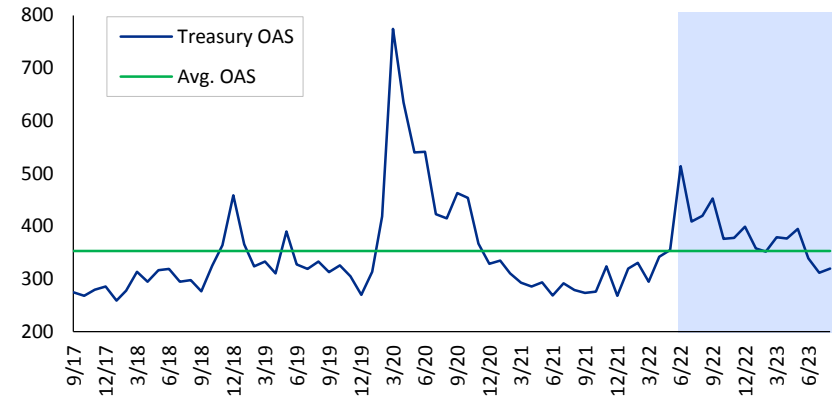
Source: VRS, Bloomberg, Credit Suisse

Markets: Index Spreads and Yields

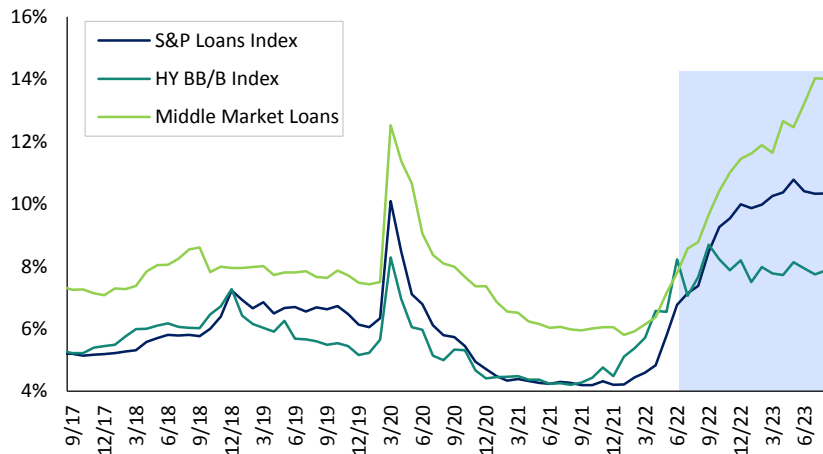
Loan Index Spread



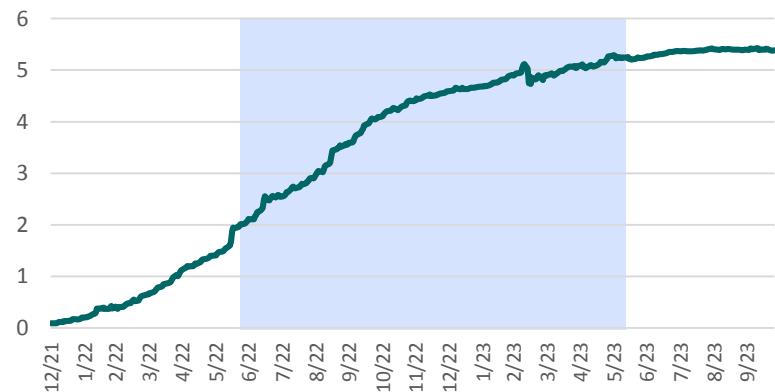
HY BB/B Index Spread



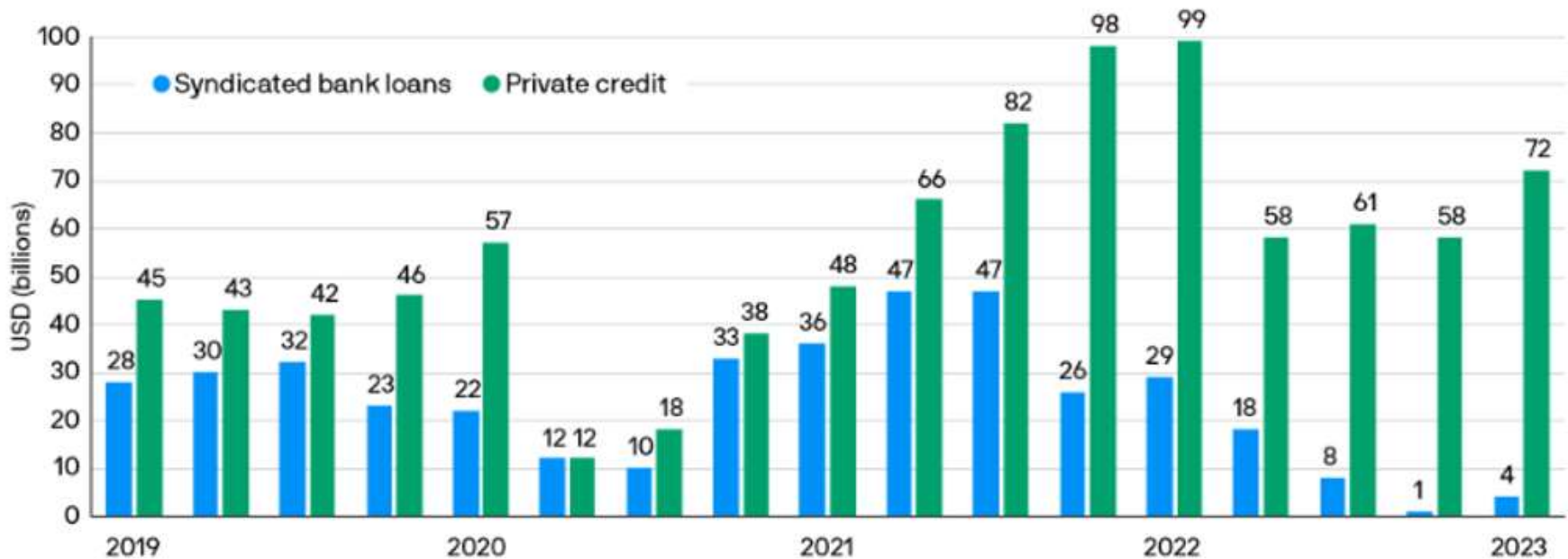
Yields



SOFR 3-month



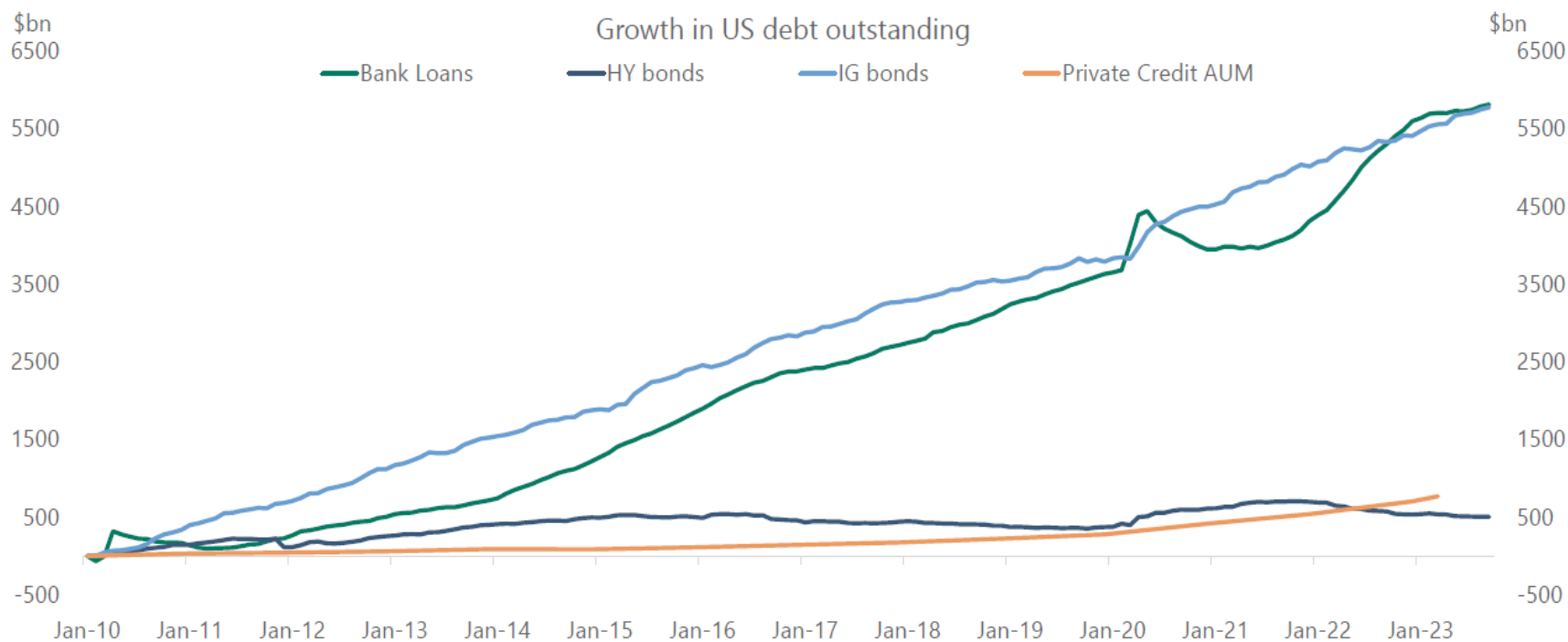
Markets: Private vs Public Credit Markets



Source: Morningstar, PitchBook LCD, J.P. Morgan Asset Management Guide to the Markets

Markets: Private Credit Markets

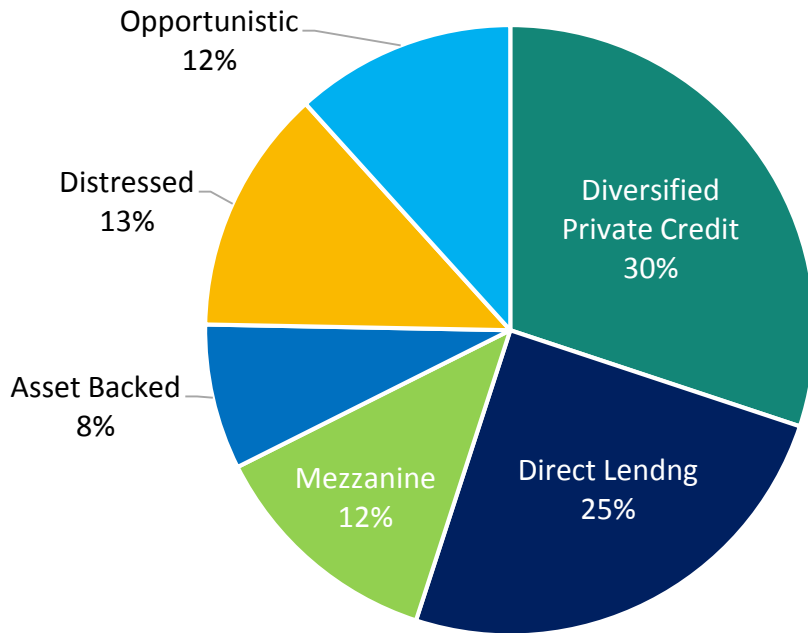
Since 2010, lending by banks has increased by \$5.5trn, IG markets have grown \$5.5trn, HY markets have grown \$500bn, and private credit AUM has increased by \$1trn



Source: FRB, ICE BofA, Bloomberg, Apollo Chief Economist. *Note Legal Disclaimer at end of presentation.

Markets: Update – Program Opportunities

FY23 Capital Calls

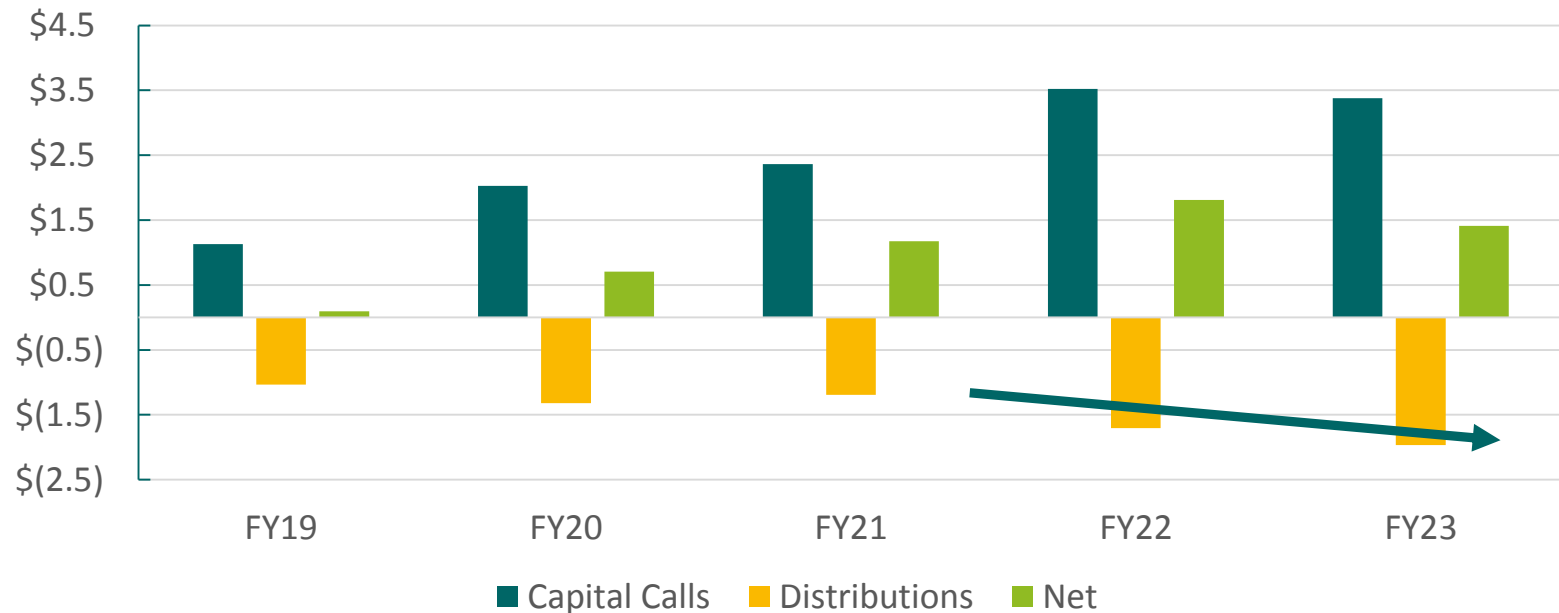


Private Credit Pricing/Yield:

Strategy	9/30/22	9/30/23
Direct Lending	10.0%	11-13%
Mezzanine	15.1%	14.0%
Asset Backed	8-10%	9-11%
Opportunistic	15.7%	14.4%

Exposures: Program Activity

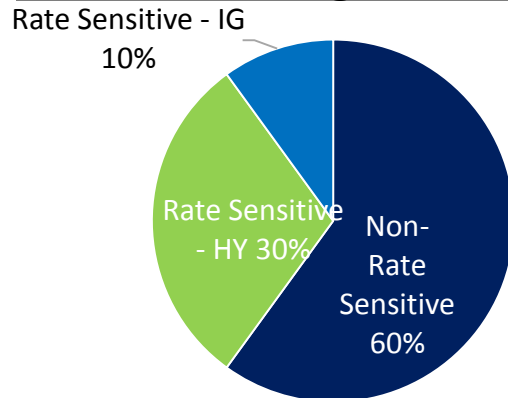
Capital Calls & Distributions



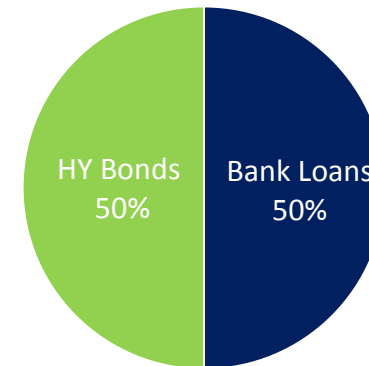
% Liquid:	51%	39%	32%	23%	10%
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Exposures: Allocation Of Benchmark & Program

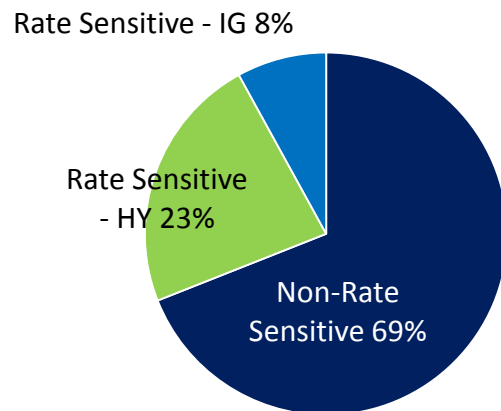
Benchmark Weights – 6/30/23



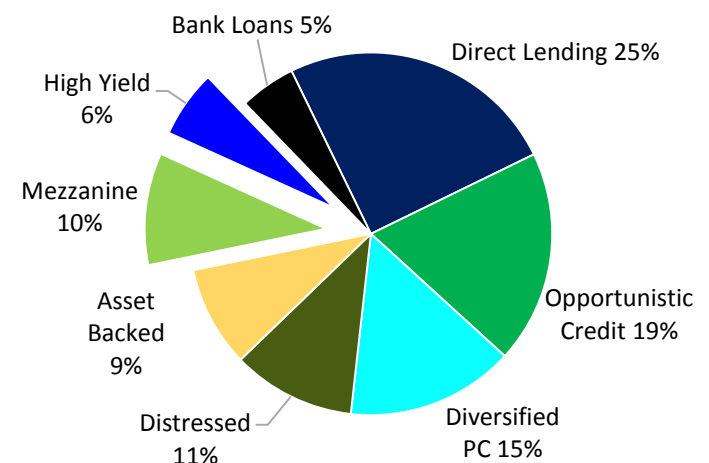
Benchmark Weights – 7/1/23



Program Weights – 6/30/23



Program Weights – 7/1/23



Source: VRS, BNY Mellon; as of 6/30/23

Exposures: Change in Sub Strategy Exposures



Sub Strategies	% Allocation 6/30/22	% Allocation 6/30/23	Change
Asset Backed	8.0%	8.7%	0.7%
Bank Loans	7.9%	5.0%	-2.9%
Direct Lending	21.0%	24.4%	3.4%
Distressed	9.3%	11.2%	1.8%
Diversified Private Credit	7.1%	14.3%	7.2%
High Yield	15.4%	5.8%	-9.6%
Investment Grade	8.0%	2.9%	-5.0%
Mezzanine	7.5%	9.5%	2.1%
Opportunistic Credit	15.9%	18.2%	2.2%
Total	100.0%	100.0%	0.0%

Results: Total Credit Strategies – 6/30/23



	Inception	10 Year	5 year	3 Year	1 Year
Total Credit Strategies	6.34	6.11	6.36	8.31	5.72
Benchmark Return	5.31	4.85	4.39	4.33	9.16
Excess Return	1.03	1.26	1.97	3.98	-3.44
Program Risk	6.33	4.74	5.74	3.86	3.42
Benchmark Risk	6.98	5.83	7.33	4.97	5.96
Active Risk	2.26	2.15	2.91	3.04	3.28

Source: BNY Mellon

Results: FY 2023

Headwinds/Tailwinds

- + Asset performance within direct lending, high yield, and bank loans; along with underweight to IG.
- Headwinds: Abnormally strong public market returns while valuations are lagged on the majority of the portfolio. Distressed, opportunistic were the largest drivers of the program's underperformance in FY23 while all categories except for high yield experienced underperformance vs the benchmark.

Largest Absolute Return Contribution:

	% Contribution	% of Program
Direct Lending	2.2%	26%
Opportunistic Credit	0.9%	18%
Diversified PC	0.8%	14%
Mezzanine	0.5%	10%
Bank Loans	0.5%	5%

Largest Relative Return Contribution:

	% Contribution	% of Program
Distressed	-0.9%	11%
Opportunistic Credit	-0.7%	18%
Diversified PC	-0.5%	14%
Asset Backed	-0.5%	6%
Mezzanine	-0.4%	10%

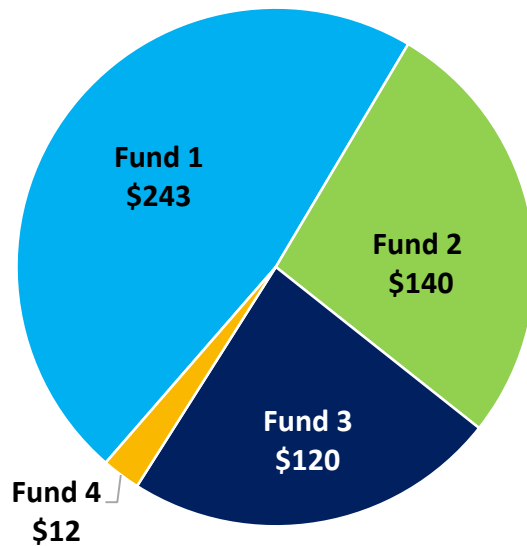
Co-investments: Credit Strategies Approach



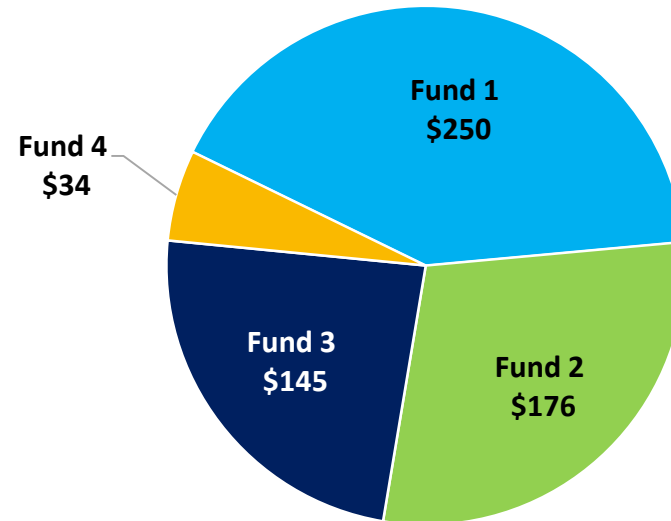
- Objective is to invest additional funds alongside existing strategies through a lower fee arrangement
- Separate accounts
- The manager remains fiduciary
- VRS reviews all potential investments prior to moving forward

Co-investment: Dedicated Separate Account Market Values

June 2022 (\$516mm)



June 2023 (\$605mm)



Performance (%):	ITD	4 Years	3 Years	1 Year
CS Co-investment	7.69	8.19	11.34	6.40
Benchmark Return	4.09	3.56	4.33	9.16
Excess Return	3.60	4.62	7.01	(2.76)

Managers: Top 10 Investment Managers

Manager Name	Mandates	# Mandates	% Program
Beach Point	Bank Loan, Distressed, Opportunistic	5	13.35%
Ares	Direct Lending, Distressed, Mezzanine, Opportunistic	10	11.44%
HPS	Direct Lending, Mezzanine	4	7.18%
Blackrock	Direct Lending	1	6.26%
Carlyle	Diversified Private Credit	1	5.49%
Solus	Bank Loan, Hedge Fund, Opportunistic	3	5.02%
JPMorgan	High Yield	1	4.77%
Sixth Street	Distressed, Opportunistic	5	4.40%
KKR	Direct Lending, Distressed, Other Rate Sensitive	3	4.39%
PGIM	Investment Grade, Mezzanine	5	4.13%

Managers: DIME Investments

- 15 potential manager meetings/calls/reviews in FY 2023
- Quarterly reports from Aon Hewitt on DIME managers in the asset class
- Aksia relationship (FY 2020 inception) has provided more visibility of smaller credit managers
- Four relationships through Aksia

Managers: Hires & Terminations - FY 2023



Action	Effective Date	Commitment/Current Value	Funding/Defunding Period	Description
Terminated	9/30/2022	\$520 million	Immediate	PIMCO HY – A separate account invested in high yield bonds.
Hired	10/4/2022	\$250 million	3 years	Apollo EPF IV – A special situations strategy targeting asset-backed investment opportunities in the European market.
Hired	3/17/2023	\$150 million	4 years	Ares Capital Europe VI – A closed-end fund that will directly originate and provide one-stop, flexible and scaled debt capital to European middle market companies.
Hired	3/31/2023	\$250 million	3 years	Ares Pathfinder II – An alternative credit fund investing in performing assets that have predictable cash flows and are directly originated by the manager.
Hired	3/31/2023	\$150 million	3 years	Oaktree Opportunities Fund XII – A closed-end fund focused on investing in both private and public corporate distressed debt opportunities.
Hired	3/31/2023	\$250 million	3 years	Oak Street Real Estate Capital VI – A closed-end fund seeking income generation through sale-leasebacks with investment grade tenants.
Terminated	5/31/2023	\$628 million	Immediate	Beach Point Credit – A separate account investing in broadly syndicated bank loans
Hired	6/21/2023	\$585 million	Immediate	OHA Oak Hill Syndicated Loan – A fund of one mandate investing primarily in leveraged loans and high yield bonds.

- VRS hired or upsized 8 mandates representing \$1.9B in commitments
- VRS funded attractive investments with double-digit yields over the course of the year and as a result the program shifted from approximately 20%/80% liquid/illiquid to 10%/90% liquid/illiquid during FY23.
- Largest growth in market value experienced in Diversified Private Credit, Direct Lending, Opportunistic, and Mezzanine strategies.
- Committed to strategies to take advantage of developing market opportunities including investments in: US Distressed, European Distressed, and Asset Backed opportunities.

- The evolution of the CS program towards private markets has positioned it well to take advantage of changes in the broader credit markets. CS has maintained a consistent deployment of capital even as banks have slowed issuance, allowing the program to take advantage of opportunities to lend with stronger covenants and at higher yields.
- Today there are compelling investment opportunities in private credit, the expected returns of which exceed the actuarial return of the total fund as well as the asset class benchmark over a multi-year time frame.
- We remain focused on strategies that deliver high contractual returns while having structural downside protection.
- Areas of higher growth within the program are expected to include Direct Lending, Mezzanine Debt, Asset Backed, Distressed, and Diversified Private Credit.

Private Investment Partnership (PIP)

Steve Woodall

Program Director

Reading Deck



Agenda: PIP Annual Review Topics



- Overview
- Exposures
- Results
- Looking Forward

Overview: Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Steve Woodall	Program Director	MBA	CFA, CAIA	19	18
Erica Billingslea	Investment Officer	MA		11	11
Matt Bennett	Investment Officer	MBA		15	15
Kelly Baker	Portfolio Assistant	AAS		13	8

Overview: Private Investment Partnerships



- A diversified investment platform dedicated to private and illiquid investments that invests across private equity, real assets, and credit strategies.
- Portfolios that emphasize opportunistic asset allocation, co-investments and reduced investment management fees/carry
- A close relationship between partner organizations that allows for expanded access and an elevated level of inclusion

Overview: Why Have Private Investment Partnerships?



- Created a new avenue for growing VRS private investment exposure
- Limits the costs of private investing through its structure & leveraging the size of the commitments
- Provides exposure/access to two global private investment managers that were not broadly utilized by VRS
- Opens the door to their global investment expertise & creates an operating partnership benefiting both organizations

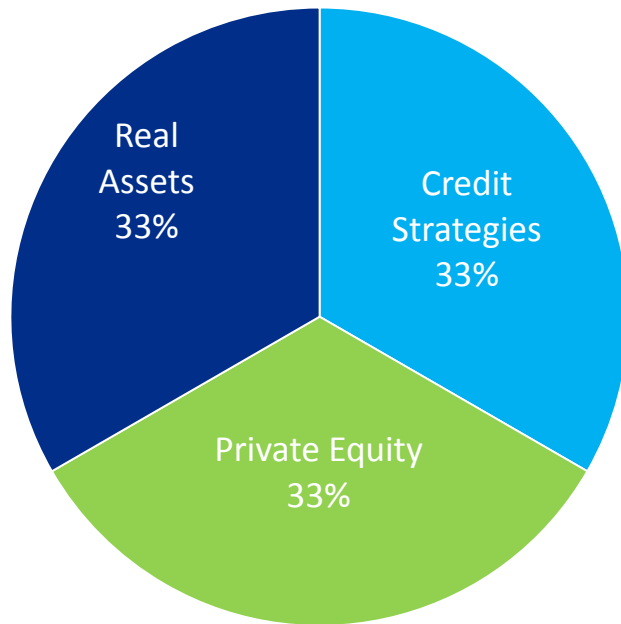
Exposures: Portfolio Update



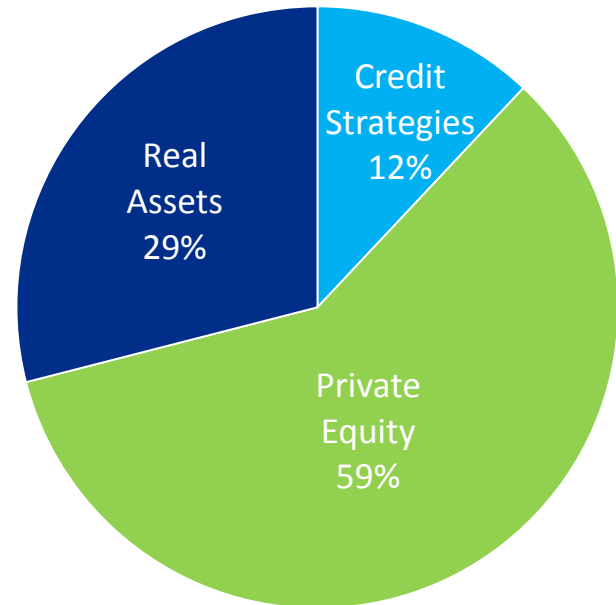
- Asset allocation
- Commitments

Exposures: Asset Allocation

Benchmark – June 30, 2023



PIP Actual – June 30, 2023



Exposures: Overall Strategy Mix Ended FY23 Unchanged



	6/30/22	6/30/23	Change %
Private Equity	59%	59%	-
Real Assets	18%	18%	-
Real Estate	11%	11%	-
Credit	12%	12%	-
Total (MM)	\$2,588	\$2,862	+\$274

Exposures: Fund vs Coinvestment Commitments (\$mm)



	6/30/22	6/30/23	Change \$	Change %
Fund	2,094.5	1,799.3	-295.2	-14
Co-investment	1,791.8	1,758.4	-33.4	-2
Total	3,886.3	3,557.6	-328.7	-8

Results: Performance – 6/30/23



	Inception (2015)	5 Year	3 Year	1 Year	MV (\$MM)
Total PIP	8.56	9.25	15.96	1.93	2,737
Benchmark	7.36	7.18	10.51	1.06	
Excess Return	1.20	2.07	5.45	0.87	

Total Program IRR 9.9%

Source: Time-weighted returns: BNY Mellon; 6/30/23 market value and performance are lagged and based on 3/31/23 market values that are adjusted for interim cashflows. IRR: VRS Private as of 6/30/23.

- Using re-investment rate to manage overall size of program.
- Return expectation remains to exceed benchmark and be competitive with individual programs.