



Investment Advisory Committee (IAC) Meeting

[VRS Board Room](#)
[Pavilion Bldg., 3rd Floor](#)

Wednesday, 11/30/2022
9:00 AM - 12:30 PM ET

1. Approval of Minutes (August 17, 2022 Meeting)

IAC Meeting Minutes 081822 - Final - Page 2

2. CIO Report

Asset Allocation Report - September 2022 - Page 5

Daily Asset Allocation Report 11-21-2022 - Page 6

Performance Summary 9-30-2022 - Page 7

Plan Tracking Error - Page 8

New Investments and Terminations 11-30-2022 - Page 9

3. Private Markets Program Reviews

Consolidated Private Markets Presentation Deck IAC Nov 30 2022 FINAL - Page 10

4. Benchmarks Review: Real Assets & Risk Based Investing (RBI)

Real Assets Benchmarks Review IAC Nov 30 2022 FINAL - Page 65

RBI Benchmarks Review IAC Nov 30 2022 FINAL - Page 70

5. Asset Liability Management (ALM) Discussion

Asset Liability Management (ALM) - IAC - Nov 30 2022 FINAL - Page 76

6. Private Markets Reading Deck

This deck has been included here as it will not be used during the meeting. As a reminder, selected slides from this deck will be used during the program review ('presentation deck').

Consolidated Private Markets Reading Deck IAC Nov 30 2022 FINAL - Page 97

Minutes

A meeting of the Investment Advisory Committee of the Virginia Retirement System was held on August 18, 2022 with the following members present:

Larry Kochard, Chairperson
Michael Beasley
Theodore Economou
Deborah Allen Hewitt
Nancy Leake
Bryan Lewis
Rod Smyth

The following Board members were present:

A. Scott Andrews
Brandon Bell
John Bennett
Michael Disharoon
Brett Hayes
Troilen Seward

The following staff members were in attendance:

Trish Bishop, Ron Schmitz, Jennifer Schreck, Andrew Junkin, Stephen Adelaar, John Alouf, Rory Badura, Daniel Ball, Parham Behrooz, Kevin Bliss, Tom Coleman, Michael Cooper, Sara Denson, Jon Farmer, Laurie Fennell, Katherine Grawe, JT Grier, Dane Honrado, K.C. Howell, Kristina Koutrakos, Chung Ma, Curt Mattson, Jennifer MacKnight, Peter Murphy, Walker Noland, Greg Oliff, Steven Peterson, Vera Pleasants, Steven Ramirez, Michael Scott, Viet Tran, Larry Tentor, Lisa Turner, Leslie Weldon, Daniel Whitlock, Cindy Wilkinson, Steve Woodall, and Nick Zizzo.

Also in attendance was Francis Albanese of Financial Investment News; John Kevin Balaod and Adam Rees of With Intelligence; David Barry and Mario Marroquin of Markets Group; Marianna Fazylova; Gary Gammon and Erin Rodriguez of the Virginia Auditor of Public Accounts; Gregg Gethard of PEI Media; Zack Hester; Madeline Katz of Mandate Wire; Mitchell King and Brigid Schutsky of BlackRock; Alex Meyer of Goldman Sachs; Mary Schultz; and Loc Vukhac of Pretium.

Mr. Kochard called the meeting to order at 9:00 a.m.

Minutes

A motion was made by Mr. Beasley and seconded by Mr. Lewis to approve the minutes for the April 13, 2022 Committee meeting. The motion was unanimously approved.

CIO Report

Mr. Schmitz opened his CIO report commenting on market conditions for the first half of the year. Then Mr. Schmitz presented the Asset Allocation Report, Performance Summary, and Total Fund Tracking Error Report as of June 30, 2022. Mr. Schmitz then informed the Committee that Public Equity was below its lower policy limit due to market action as of June 30, 2022. The Board approved new policy weights for the new fiscal year, and, as of July 1, 2022, the portfolio was within its allowable range. Mr. Schmitz again shared with the Committee his view of looking at equity (public and private) exposure and positioning within the applicable ranges on a combined basis for the total fund. As a result, Mr. Schmitz stated he would not recommend any action if equity portfolios exceeded their respective allowable ranges if the breach was caused by market action. The Committee agreed with Mr. Schmitz's approach. Last, Mr. Schmitz reviewed the New Investments and Terminations Report.

Forward Returns & Scenario Analysis

Dr. Peterson and Mr. Badura led the Forward Returns and Stress Test Scenarios discussion. Dr. Peterson discussed the different types of factor attribution on return in calculating the 20-year forward return estimates for the total fund and the individual asset classes. Mr. Badura then discussed liabilities and presented four prospective scenarios and the possible impact on funded status on contributions.

Portfolio Solutions Group Program Reviews

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

Ms. Koutrakos provided a review of the Dynamic Strategies program. Review topics included an overview of the team, program objectives, mandates, performance, and FY2023 plans and priorities.

Mr. Ma provided a review of the Risk Based Investments program. Review topics included an overview of the team, program objectives, mandates, performance, and FY2023 plans and priorities.

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

Ms. Leake made a motion to adjourn the meeting. Mr. Beasley seconded the motion. Mr. Kochard asked for the Committee members to vote on the motion, and the motion passed unanimously.

Adjournment

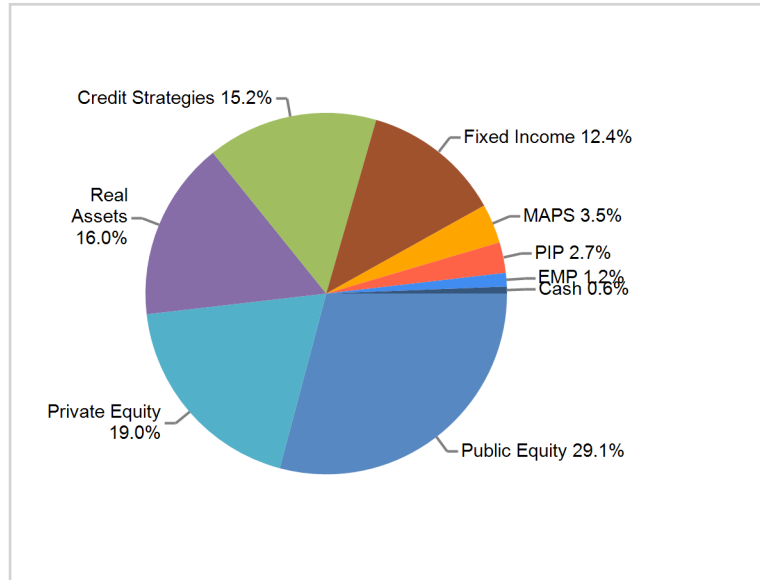
The meeting was adjourned at 11:30 a.m.

Larry Kochard, Chairperson

Asset Allocation Report

September 30, 2022

For Internal Investment Purposes Only



Tracking Error	
3Yr-Total Fund:	2.05%
3Yr-Total Public:	1.71%
5Yr-Total Fund:	1.94%
5Yr-Total Public:	1.41%

	Current \$Bil	Current Weight	Policy Weight	Variance	Allowable Range		Internal %
Total Fund	96.8						26.5%
Public Equity	28.2	29.1%	34.0%	-4.9%	-5%	+5%	45.4%
Fixed Income	12.0	12.4%	15.0%	-2.6%	-3%	+5%	96.3%
Credit Strategies	14.8	15.2%	14.0%	1.2%	-5%	+5%	
RS Credit	4.3	4.5%	5.6%	-1.1%			
NRS Credit	10.4	10.8%	8.4%	2.4%			
Real Assets	15.5	16.0%	14.0%	2.0%	-5%	+5%	8.1%
Public RE	1.3	1.3%					99.9%
Private RE	9.6	9.9%					
Other RA	4.7	4.8%					
Private Equity	18.4	19.0%	16.0%	3.0%	-5%	+5%	
MAPS	3.4	3.5%	4.0%	-0.5%	-2%	+2%	
DSTRAT	1.7	1.7%					
RBI	1.8	1.8%					0.4%
PIP	2.7	2.7%	2.0%	0.7%	-2%	+2%	
EMP	1.2	1.2%	0.0%	1.2%		+3%	
Cash	0.6	0.6%	1.0%	-0.4%	-1%	+4%	

High-Level Exposure	Current \$Bil	Current Weight	Policy Weight	Variance	Allowable Range	
Total Equity	46.6	48.2%	50.0%	-1.8%	-10%	10%
Fixed Income + Cash	12.6	13.1%	16.0%	-2.9%	-4%	9%

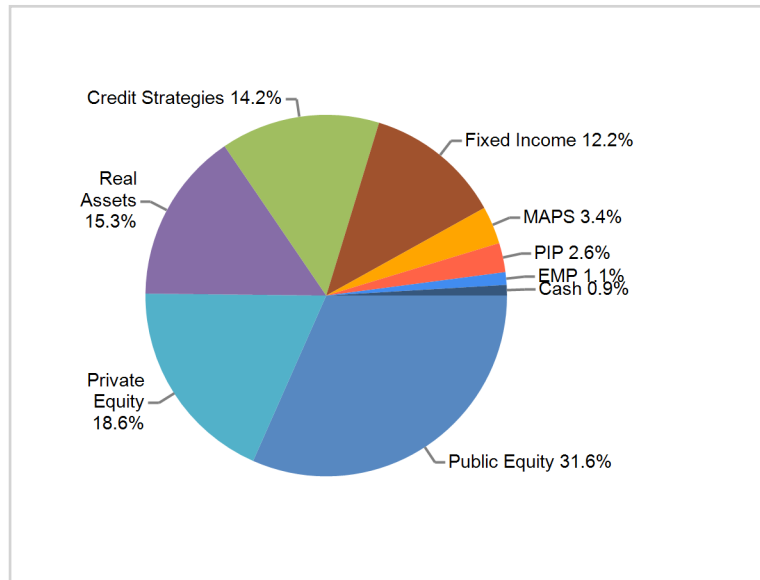
	Current \$Bil	Current Weight	Policy Limit
Hedge Funds	9.4	9.7%	15.0%

* Total Fund includes the following amt held by the Treasurer of VA: \$ 62 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.(5 adjustments applied)

*Total Fund and Total Public annualized tracking error is calculated using compounded quarterly returns as of 9/30/2022

* Differences in totals are due to rounding.



Tracking Error	
3Yr-Total Fund:	2.05%
3Yr-Total Public:	1.71%
5Yr-Total Fund:	1.94%
5Yr-Total Public:	1.41%

	Current \$Bil	Current Weight	Policy Weight	Variance	Allowable Range		Internal %
Total Fund	100.4						28.3%
Public Equity	31.8	31.6%	34.0%	-2.4%	-5%	+5%	47.7%
Fixed Income	12.3	12.2%	15.0%	-2.8%	-3%	+5%	96.4%
Credit Strategies	14.3	14.2%	14.0%	0.2%	-5%	+5%	
RS Credit	3.5	3.5%	5.6%	-2.1%			
NRS Credit	10.7	10.7%	8.4%	2.3%			
Real Assets	15.4	15.3%	14.0%	1.3%	-5%	+5%	8.9%
Public RE	1.4	1.4%					99.9%
Private RE	9.5	9.4%					
Other RA	4.6	4.5%					
Private Equity	18.6	18.6%	16.0%	2.6%	-5%	+5%	
MAPS	3.4	3.4%	4.0%	-0.6%	-2%	+2%	
DSTRAT	1.6	1.5%					6.0%
RBI	1.8	1.8%					0.4%
PIP	2.6	2.6%	2.0%	0.6%	-2%	+2%	
EMP	1.1	1.1%	0.0%	1.1%		+3%	
Cash	1.0	0.9%	1.0%	-0.1%	-1%	+4%	

High-Level Exposure	Current \$Bil	Current Weight	Policy Weight	Variance	Allowable Range	
Total Equity	50.4	50.2%	50.0%	0.2%	-10%	10%
Fixed Income + Cash	13.2	13.2%	16.0%	-2.8%	-4%	9%

	Current \$Bil	Current Weight	Policy Limit
Hedge Funds	9.7	9.6%	15.0%

* Total Fund includes the following amt held by the Treasurer of VA: \$ 338 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 (6 adjustments applied)

*Total Fund and Total Public annualized tracking error is calculated using compounded quarterly returns as of 9/30/2022

* Differences in totals are due to rounding.

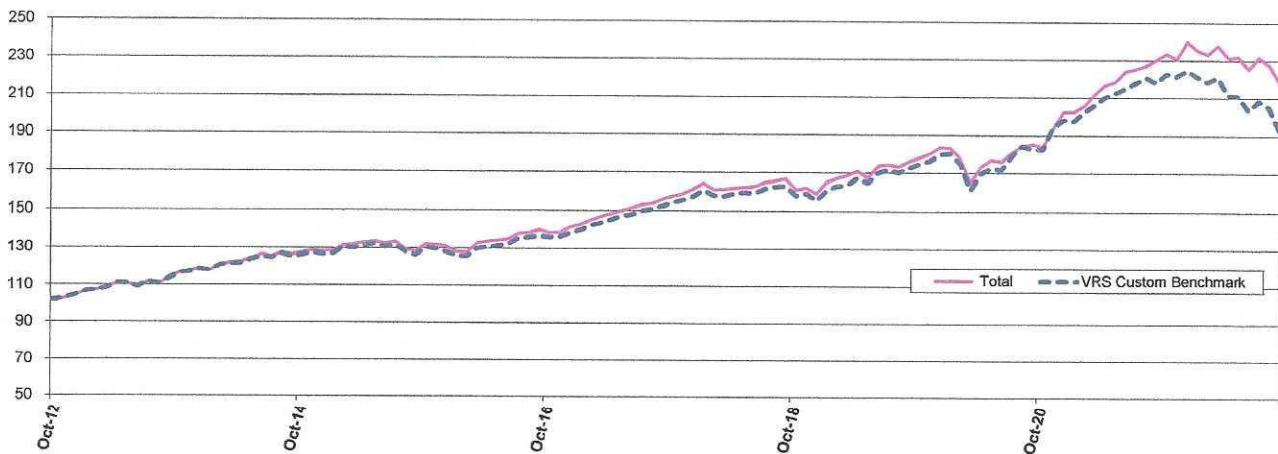
PERFORMANCE SUMMARY
Rolling Periods Ending
September 30, 2022



TOTAL FUND PERFORMANCE

	10 Yr	5 Yr	3 Yr	1 Yr	Qtr	Month	Fiscal YTD	Cal YTD	Market Value (\$MM)
Total Public Equity Strategies	7.6	4.1	3.9	-19.4	-6.0	-8.4	-6.0	-23.3	27,600
<i>Benchmark</i>	7.5	4.5	3.8	-20.9	-6.5	-9.6	-6.5	-25.5	
Total Fixed Income	1.6	0.6	-2.0	-14.9	-4.6	-4.6	-4.6	-14.9	12,047
<i>Benchmark</i>	0.9	-0.3	-3.3	-15.1	-4.6	-4.4	-4.6	-15.1	
Total Credit Strategies	6.1	5.6	6.0	-1.4	-0.6	-1.9	-0.6	-3.2	14,756
<i>Benchmark</i>	4.3	2.9	1.5	-7.2	0.2	-3.0	0.2	-7.9	
Total Real Assets	10.8	10.0	10.9	20.0	1.9	1.7	1.9	12.7	15,527
<i>Benchmark</i>	9.1	8.3	9.2	17.5	2.7	0.1	2.7	11.5	
Total Private Equity	16.9	19.2	22.1	8.7	-4.1	-3.8	-4.1	0.9	18,427
<i>Benchmark</i>	12.1	9.6	7.9	-16.2	-15.7	-8.6	-15.7	-15.3	
Total Private Investment Partnerships	n/a	9.7	11.2	8.2	-1.2	-1.2	-1.2	3.5	2,652
<i>Benchmark</i>	n/a	7.3	7.2	-1.1	-3.8	-3.4	-3.8	-2.7	
Total Multi-Asset Public Strategies	n/a	n/a	2.6	-7.0	-2.2	-3.9	-2.2	-9.2	3,408
<i>Benchmark</i>	n/a	n/a	1.9	-11.4	-3.4	-4.9	-3.4	-13.8	
Total Fund	7.9	7.0	7.5	-5.0	-3.1	-4.0	-3.1	-8.9	96,795
<i>VRS Custom Benchmark</i>	6.6	4.8	3.8	-11.6	-5.2	-6.0	-5.2	-14.3	

10-Year Performance
Indexed to 100



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

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



Total Fund Tracking Error

Figure 1: Policy Tracking Error Rolling Three Year - Plan (as of 9/30/2022)

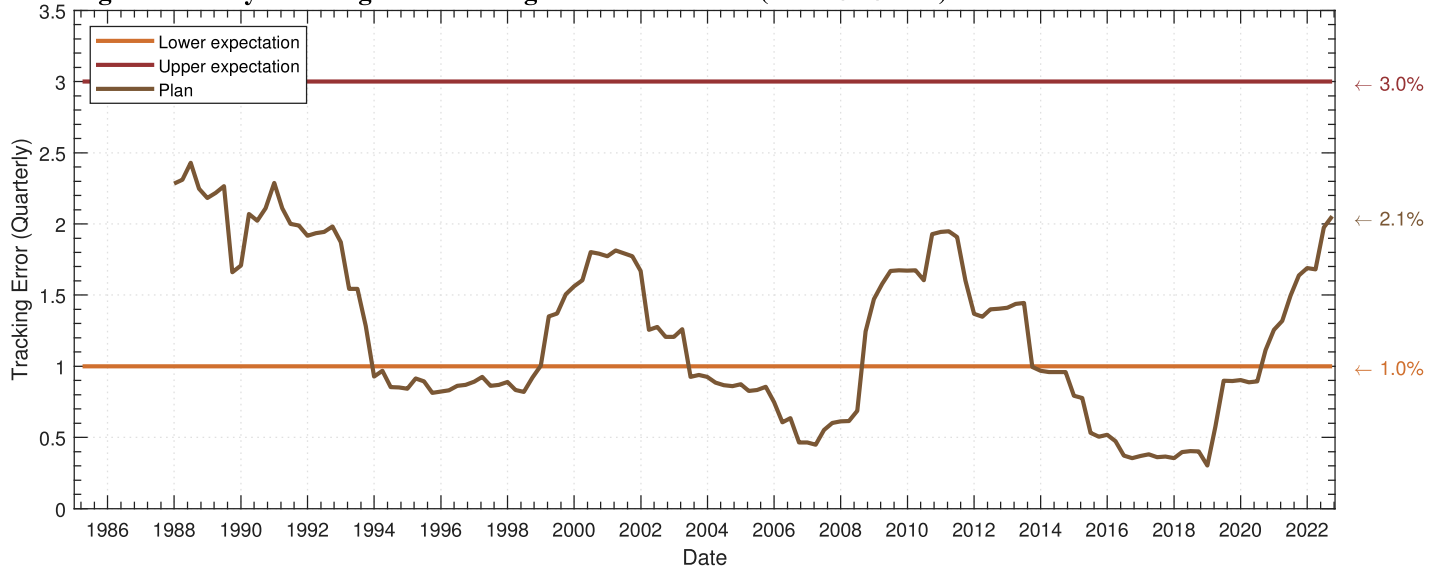
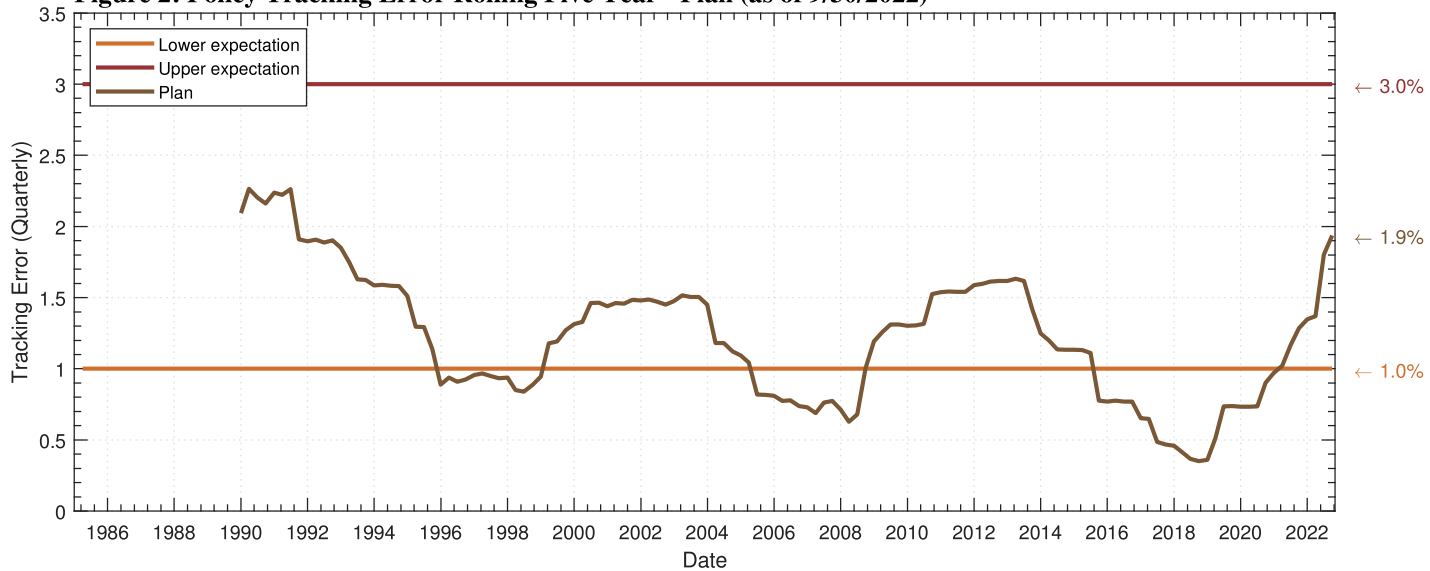


Figure 2: Policy Tracking Error Rolling Five Year - Plan (as of 9/30/2022)



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

VRS Investment Department
 Recap of New Investments/Terminations
 Time Period: 08/18/2022 – 11/30/2022



Program	Action	Effective Date	Commitment/ Current Value	Funding/ Defunding Period	Description
Public Equities	Opened	09/01/2022	\$750 Million	Immediate	Rivanna – An internally managed active global equity strategy.
Credit Strategies	Terminated	09/30/2022	\$510 Million	Immediate	PIMCO HY – A separate account invested in high yield bonds.
Credit Strategies	Hired	10/04/2022	\$250 Million	3 Years	Apollo EPF IV – A special situations strategy targeting asset-backed investment opportunities in the European market.
Real Assets	Hired	08/30/2022	\$150 Million	5 Years	Sprott Structured Opportunities Fund I – A closed-end fund providing loans to mine developers.
Real Assets	Hired	09/30/2022	€100 Million	5 Years	Antin Infrastructure Partners V – A closed-end fund investing in diversified infrastructure deals in Europe as well as the United States.
Real Assets	Terminated	10/14/2022	\$88 Million	Immediate	Brookfield Global Listed Infrastructure – A separate account to invest in publicly listed infrastructure companies.
Real Assets	Hired	11/16/2022	\$100 Million	5 Years	Stonepeak Opportunities Fund LP – A closed-end fund investing in mid-market diversified infrastructure deals in North America as well as Europe.
Dynamic Strategies	Terminated	10/25/2022	\$370 Million	Immediate	MSIM Dynamic Strategies – A global asset allocation portfolio investing across public markets.



Virginia
Retirement
System

Investment Advisory Committee Private Market Assets Program Reviews November 30, 2022

Presentation Deck



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)

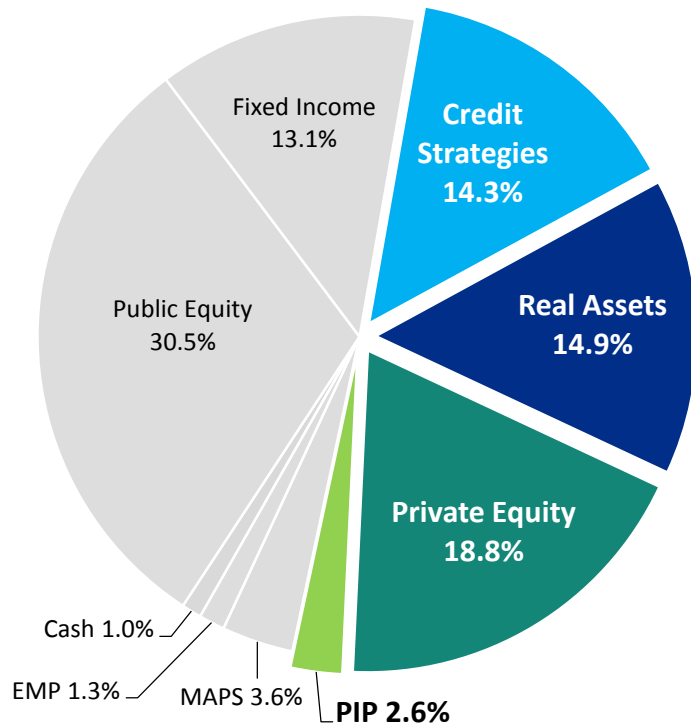
Program Reviews

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

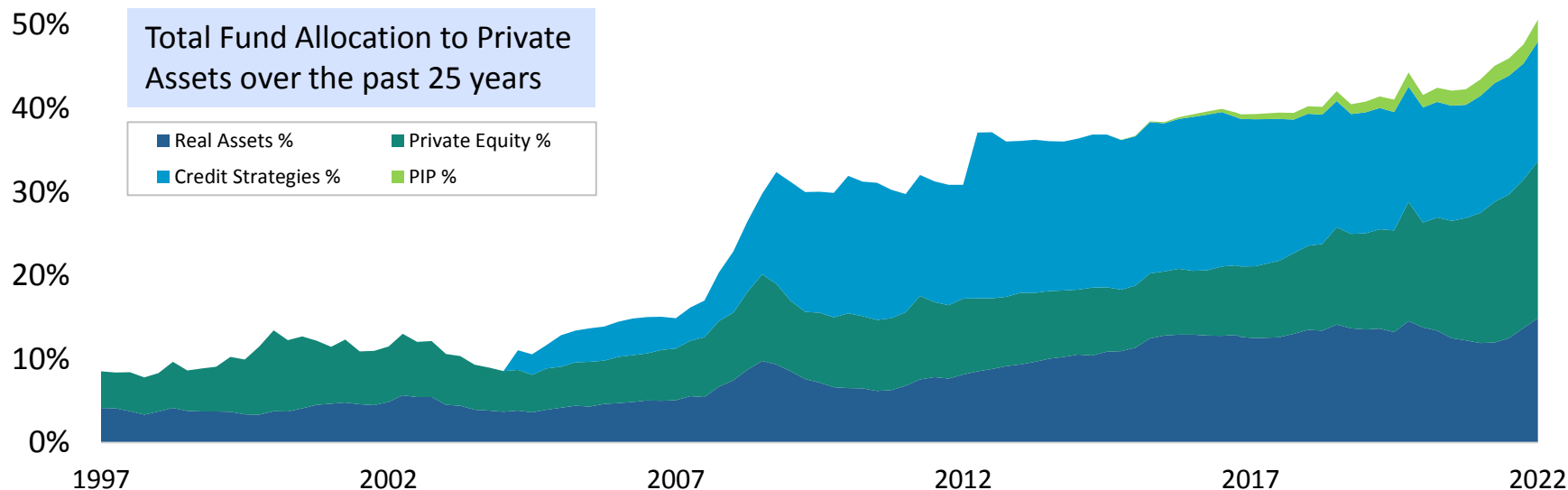
Private Market Assets: 50.6%

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 6/30/22; source: BNY Mellon data

Overview: Preview Of Agenda Items



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



Real Assets

Walker Noland
Director, Real Assets

Presentation Deck



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	Infra-structure Equities	Global Equities	IG Corp Bonds	CPI
Global REITs	1.00										
Commercial Real Estate	0.40	1.00									
Timberland	0.05	(0.10)	1.00								
Farmland	0.24	(0.01)	0.27	1.00							
Energy Equities	0.51	0.19	0.34	0.21	1.00						
Mining Equities	0.63	0.24	0.27	0.19	0.75	1.00					
Gold	0.16	(0.05)	0.18	0.33	0.06	0.26	1.00				
Infrastructure Equities	0.84	0.38	0.18	0.33	0.69	0.71	0.18	1.00			
Global Equities	0.77	0.31	0.25	0.16	0.62	0.74	0.13	0.85	1.00		
IG Corp Bonds	0.06	(0.22)	0.23	(0.22)	(0.27)	(0.25)	0.38	0.05	(0.10)	1.00	
U.S. CPI	0.11	0.29	0.41	0.25	0.29	0.22	0.14	0.18	0.06	(0.22)	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

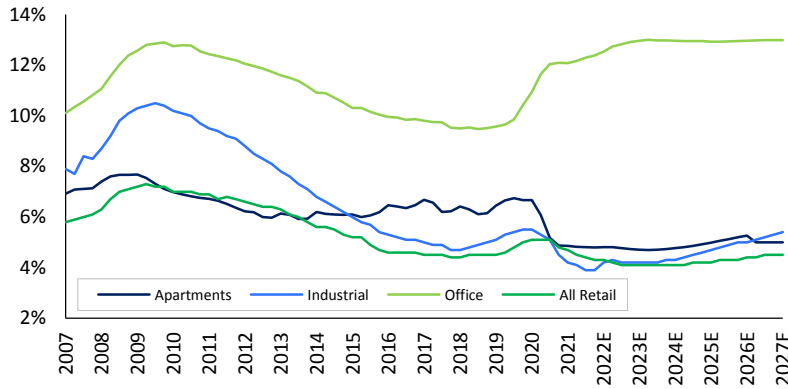


Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Walker Noland	Director	MBA	CFA	22	12
Warren Chang	Portfolio Manager	MBA, MS	CFA	25	7
Tom Coleman	Portfolio Manager	BS	CFA, CAIA	22	11
Jummai Sarki-Hurd	Portfolio Manager	MBA, MS	-	16	9
Tom Mulvin	Senior Investment Officer	BS	-	29	29
Daniel Ball	Investment Analyst	BA	-	0	0
Carol Timpano	Portfolio Assistant	BS	-	7	7

Markets: Fundamentals

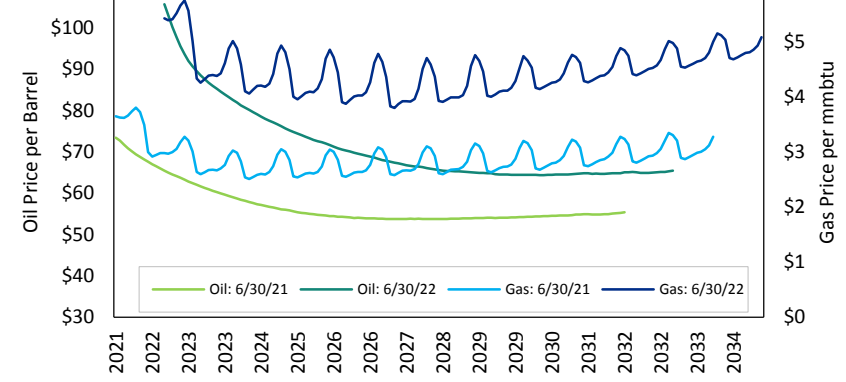


U.S. Property Vacancy Rates 2007-2027



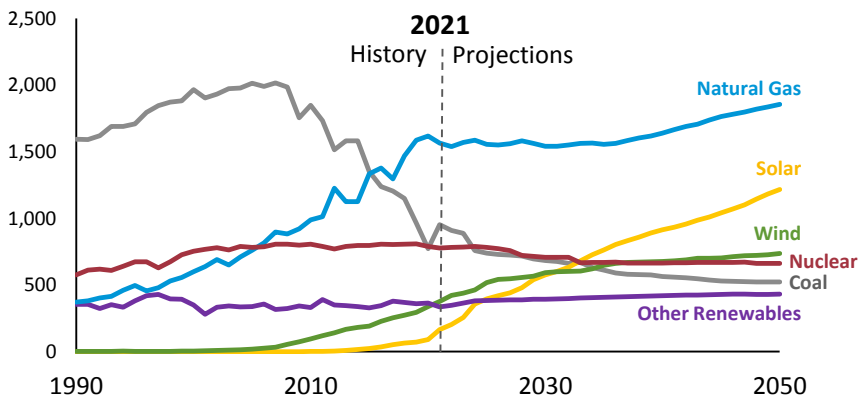
Source: Costar

Oil & Gas Forward Curves



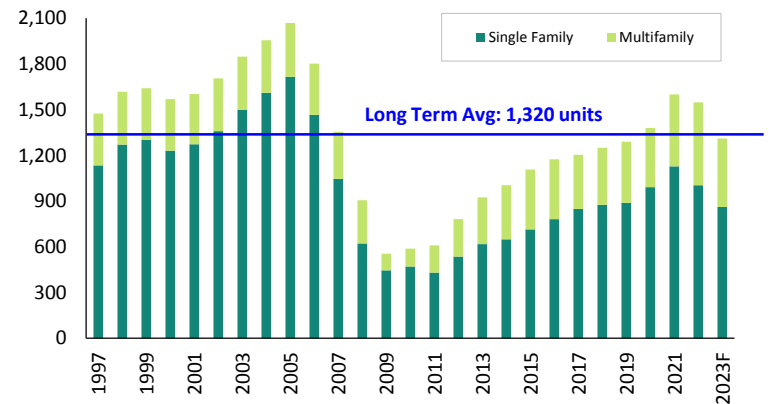
Source: Bloomberg

U.S. Electricity Generation (billion kilowatt-hour)



Source: EIA Energy AEO2022 Reference Case

Housing Starts 1997-2023 (000)

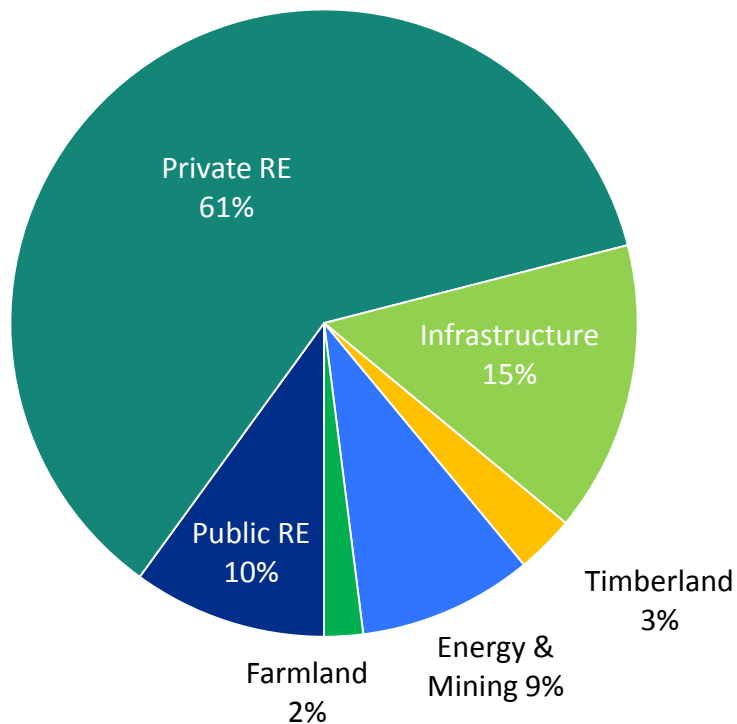


Source: U.S. Census Bureau, NAHB, FannieMae

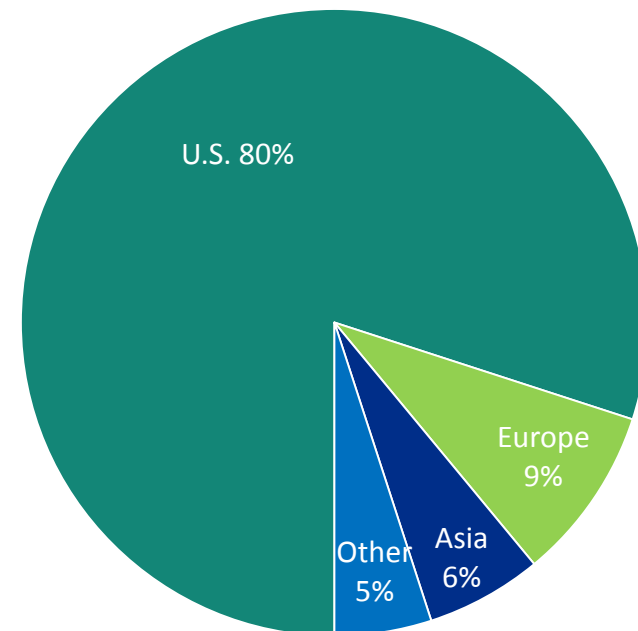
Exposures: Sectors & Geography – 6/30/22

Current Market Value: \$15.1 Billion

Sectors



Geography



Results: Portfolio Returns – 6/30/22



	10 Year	5 year	3 Year	1 Year	MV (\$MM)
Total Real Assets	10.9	10.1	11.0	21.7	15,091
Strategic Benchmark	9.1	8.1	8.7	18.0	
Excess Return	1.8	2.0	2.3	3.7	
Private Real Estate	12.1	11.2	12.8	28.6	9,146
Benchmark	9.9	8.9	10.3	27.3	
Excess Return	2.2	2.3	2.5	1.3	
REITs	5.2	2.2	-1.4	-12.9	1,427
Benchmark	5.6	2.9	-0.2	-12.7	
Excess Return	-0.4	-0.7	-1.2	-0.2	
Infrastructure	n/a	11.8	10.9	17.9	2,322
Benchmark	n/a	7.4	8.2	12.5	
Excess Return	n/a	4.4	2.7	5.4	
Total Natural Resources	6.3	7.8	10.8	25.6	2,196
Benchmark	6.4	7.4	8.2	12.5	
Excess Return	-0.1	0.4	2.6	13.1	

Source: BNY Mellon

Headwinds/Tailwinds

- +** **Tailwinds:** Upstream energy, private real estate, especially industrial & multifamily real estate; renewable infrastructure
- **Headwinds:** Office real estate, publicly traded assets

Largest Absolute Return Contributors:

- +** Private energy +52.4% (7.9% of program)
- +** Private real estate +28.6% (60.6% of program)
- +** Private infrastructure +18.4% (14.5% of program)
- International REITs -20.7% (3.3% of program)

Largest Relative Return Contributors:

- +** Natural Resources: +13.1% excess return.
- +** Infrastructure: +5.4% excess return. Renewable energy; strong recovery from Covid hit sectors
- +** Private Real Estate: +1.3% excess return (60.6% of program)
- REITs: -0.2% (9.5% of program – slightly underweight)

Managers: Top 10 Investment Managers



Manager	# of Mandates	% of Program
PGIM	2	13.8%
VRS Internal Equity Mgmt.	2	9.5%
Blackstone	13	8.3%
Morgan Stanley	3	6.9%
Clarion Partners	1	6.7%
Industry Funds Mgmt.	3	4.1%
Pritzker Realty Group*	2	3.9%
JP Morgan	2	3.6%
Pantheon Ventures	3	3.0%
Global Infrastructure Partners	4	2.8%

*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 15 new DIME managers across 15 mandates in 12 months ending 6/30/22

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	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
Tristan Curzon	Real Estate	2017	180
		Total	1,262

Managers: Investment Commitments (\$MM)



Sector	Commitment
Public REITs	None
Private RE Equity	Crow Holdings Realty Partners Fund IX - \$150 Quad CP Fund I - \$200 Blackstone Real Estate Partners Asia III, L.P. - \$200 Artemis Real Estate Partners Fund IV, L.P. - \$125 Blackstone Real Estate Partners X, L.P. - \$250 One Co-investment - \$35
Infrastructure	True Green Capital Fund IV, L.P. - \$75 iCON Infrastructure Partners VI, L.P. - \$150 Three Co-investments - \$72
Natural Resources	EIG River Energy Partners, L.P. - \$200 Two Co-investments - \$50

Period Ending 6/30/22

- Continue active portfolio management
- Focus on objectives & risk
- Prudently work to manage around targeted allocation

Private Equity

John Alouf
Program Director

Presentation Deck



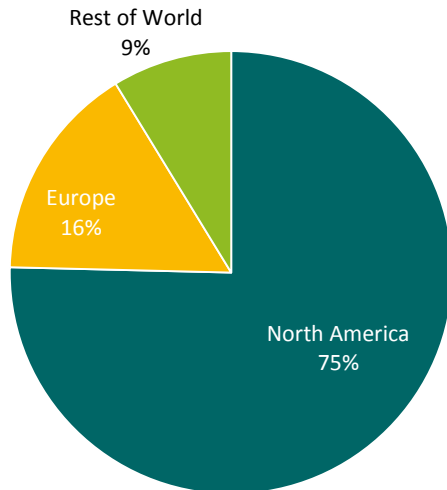
Overview: Team Members



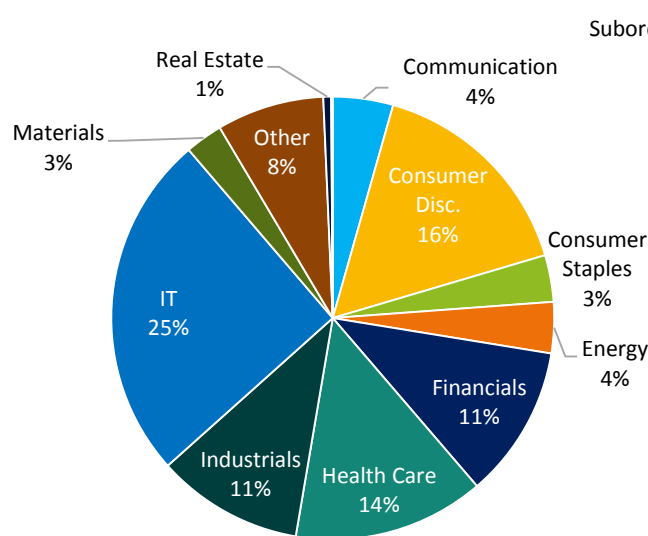
Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
John Alouf	Director	MBA	CFA	28	22
Jay Gentry	Portfolio Manager	BBA	CFA, CPA	28	28
Peter Murphy	Portfolio Manager	BBA	CFA, CPA	22	11
Rob Voeks	Portfolio Manager	PhD		25	8
De'Von Jones	Investment Officer	BBA	CFA	12	3
Viet Tran	Investment Analyst	MS		2	1
Carol Timpano	Portfolio Assistant	BS		7	7

Exposures: Position Weighting

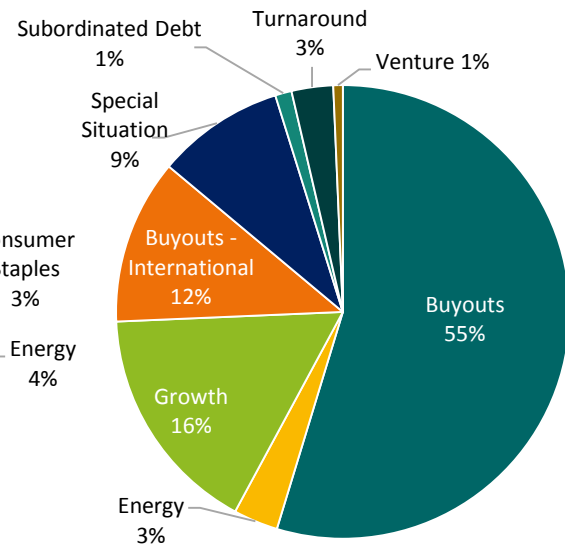
Geography



Industry



Sector



Geography and Industry charts based on 3/31/22 manager information.
Sector chart based on 6/30/22 BNY Mellon information

Results: Time-Weighted Performance – 6/30/22



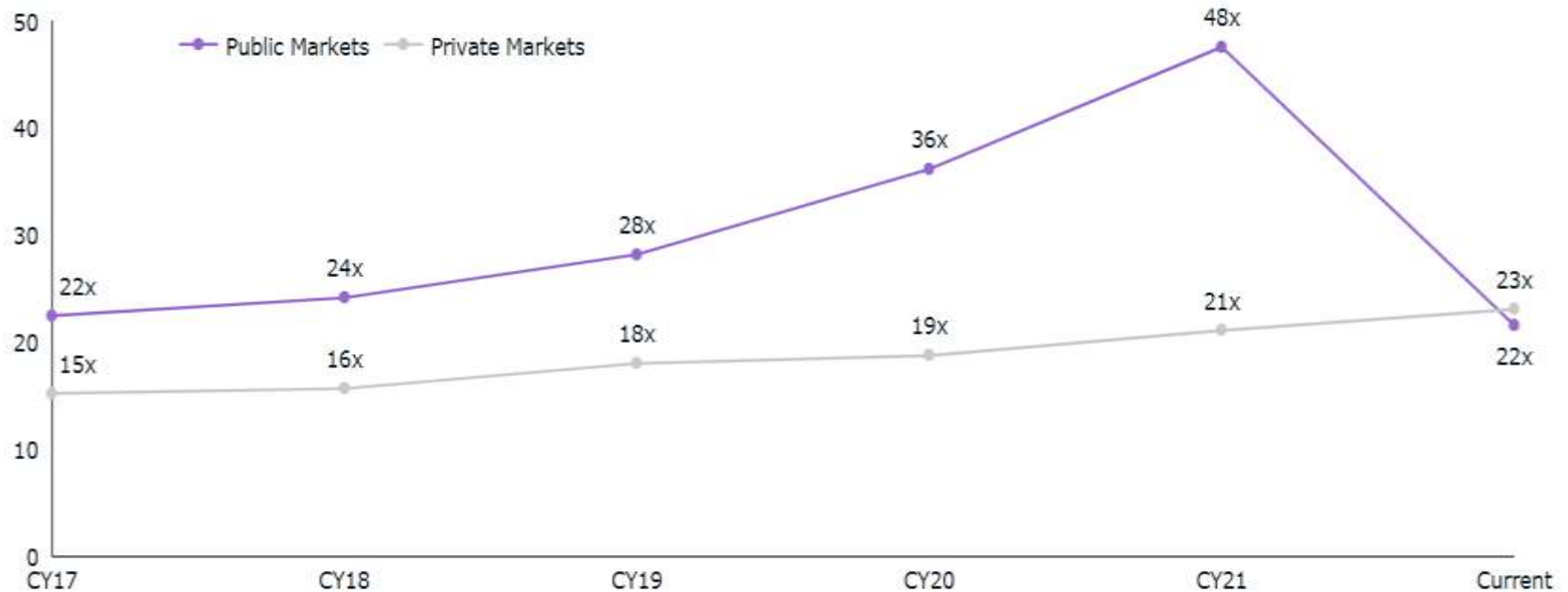
	10 Year	5 year	3 Year	1 Year	MV (\$MM)
Total Private Equity	17.5	21.2	25.5	27.4	19,049
Strategic Benchmark*	13.7	14.4	15.7	6.7	
Excess Return	3.8	6.8	9.8	20.7	
Buyouts	20.6	22.0	26.8	27.2	10,419
Energy	-1.5	0.1	-3.6	37.8	605
Growth	26.1	34.3	42.3	29.1	3,131
Int'l Buyout	15.0	20.2	23.5	18.3	2,240
Special Situations	16.2	18.6	21.2	31.5	1,734
Sub Debt	13.7	16.3	14.0	18.4	223
Turnaround	17.2	17.9	21.4	36.3	564
Venture	18.0	29.1	43.7	87.4	129

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

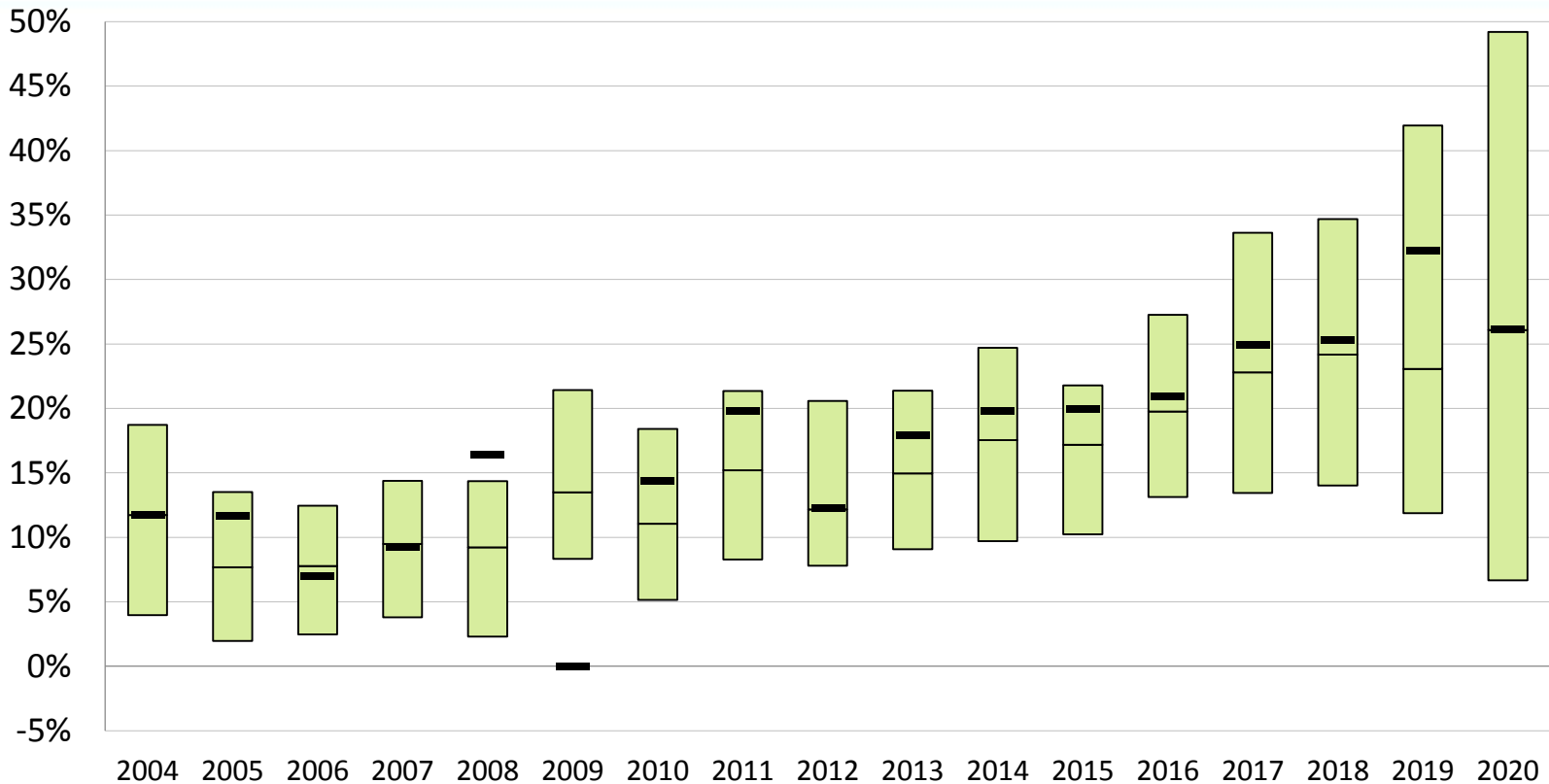
Markets: Private vs. Public Markets (Digital Tech Services)



EV/LTM EBITDA



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; all data as of 3/31/2022

Managers: Top Ten Investment Managers



Manager	Exposure
VRS Co-Investments	7.8%
Grosvenor	6.9%
Hellman & Friedman	5.5%
TA Associates	5.0%
Apax Partners	4.7%
Audax Group	3.9%
General Atlantic	3.7%
CVC	3.7%
Bain	3.5%
Veritas	3.4%
Total	48.1%

Exposure as of 3/31/2022; figures may not sum due to rounding

Diverse Investment Management Engagement (DIME)



Nine existing in-house relationships

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

17 potential manager meetings & 2 conferences in FY 2022

Five relationships through Grosvenor

Quarterly reports from Grosvenor

- Maintain commitment pace
- Continue with strategic separate accounts
- Co-investments on pace
- Selectively add new managers

Credit Strategies

Steve Woodall

Program Director, Credit Strategies

Presentation Deck



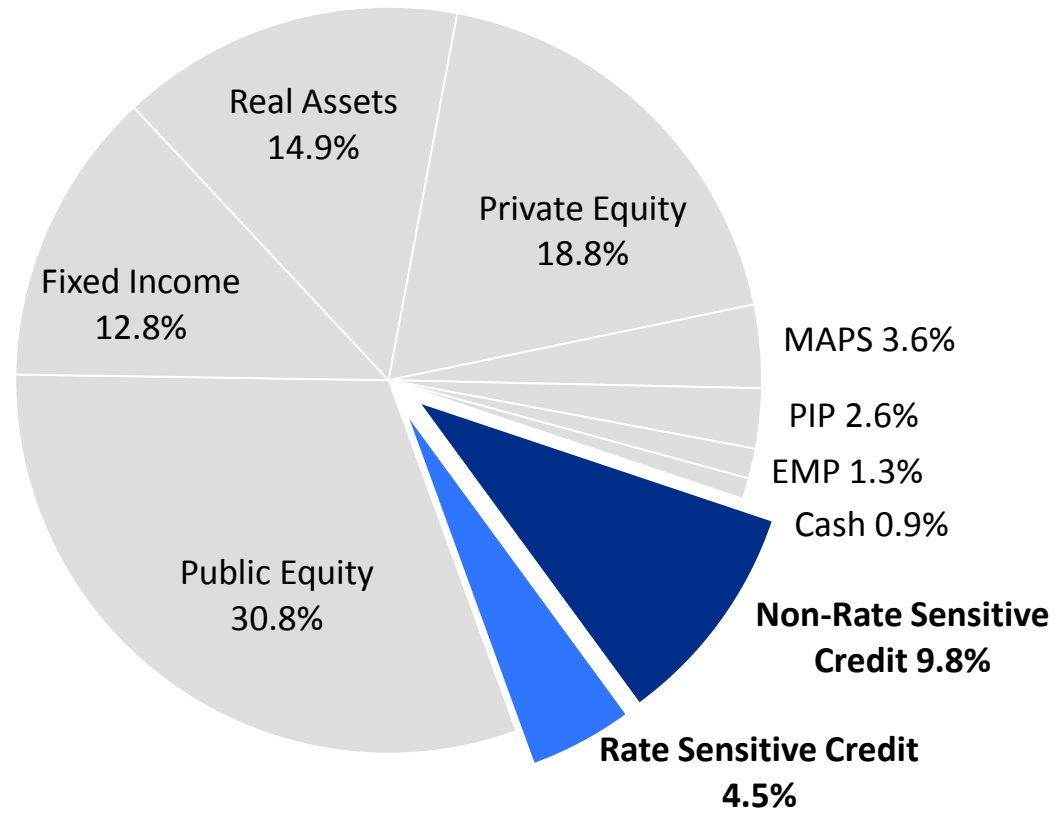
Overview: Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Steve Woodall	Program Director	MBA	CFA, CAIA	18	17
Perry Corsello	Portfolio Manager	MBA	CFA	25	11
Matt Bennett	Investment Officer	MBA		14	14
Erica Billingslea	Investment Officer	MA	CFA Candidate	10	10
Kevin Bliss	Investment Officer	Bcom		8	1
Kelly Baker	Portfolio Assistant	AAS		12	7

Overview: Asset Allocation – 6/30/22

**Total Credit Strategies
14.3%**

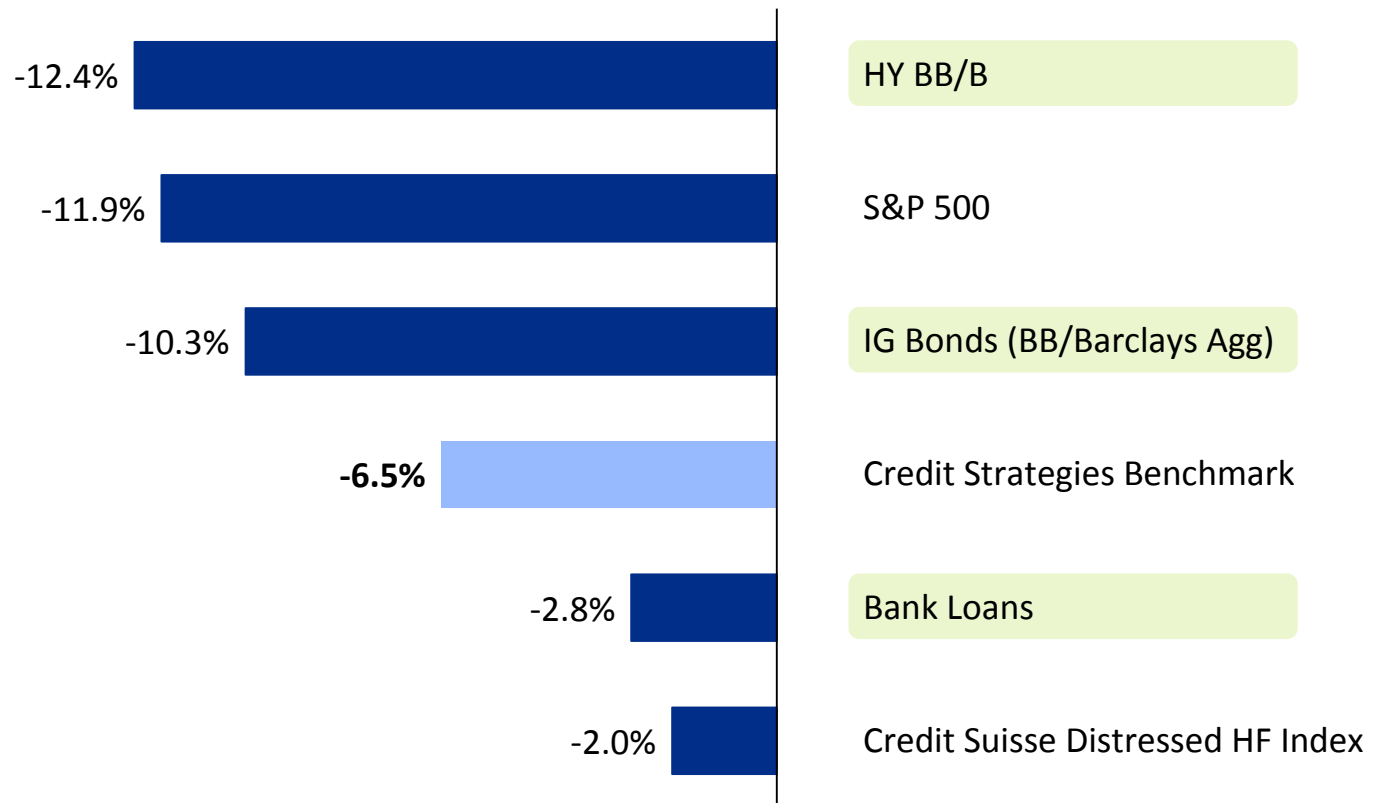


Source: BNY Mellon

Markets: Update – Index Returns



FY 2022 Returns

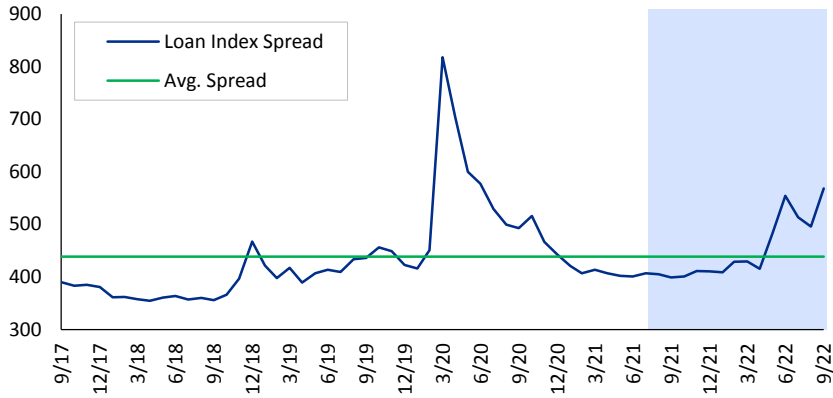


Source: VRS, Bloomberg, Credit Suisse

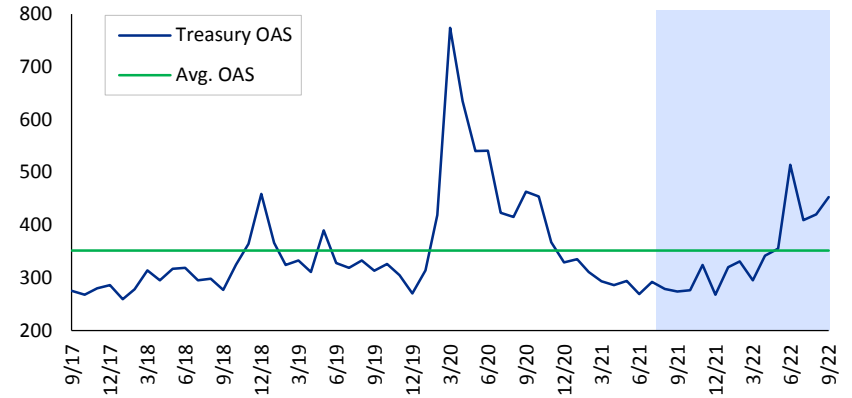
Markets: Update – Index Spreads and Yields



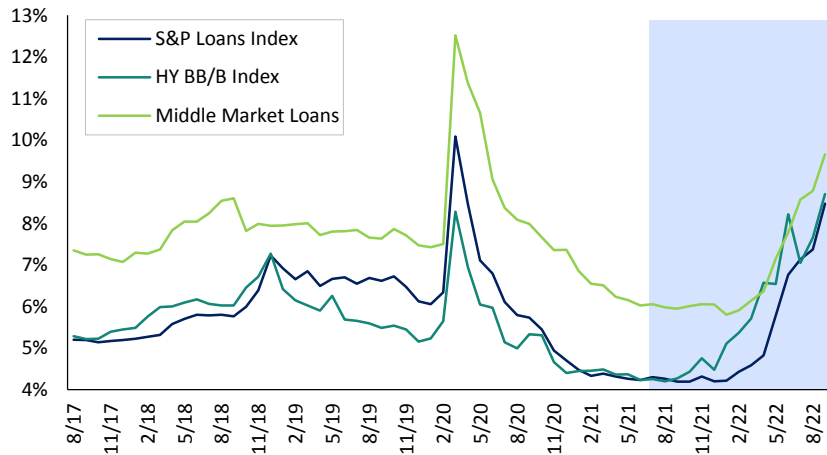
Loan Index Spread



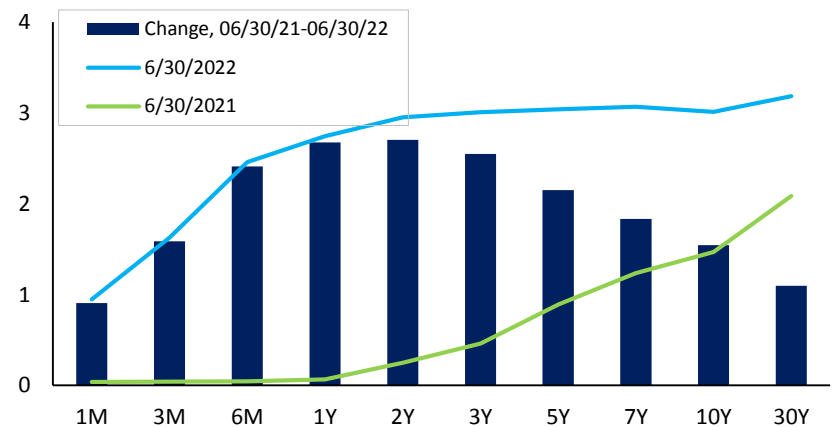
HY BB/B Index Spread



Yields



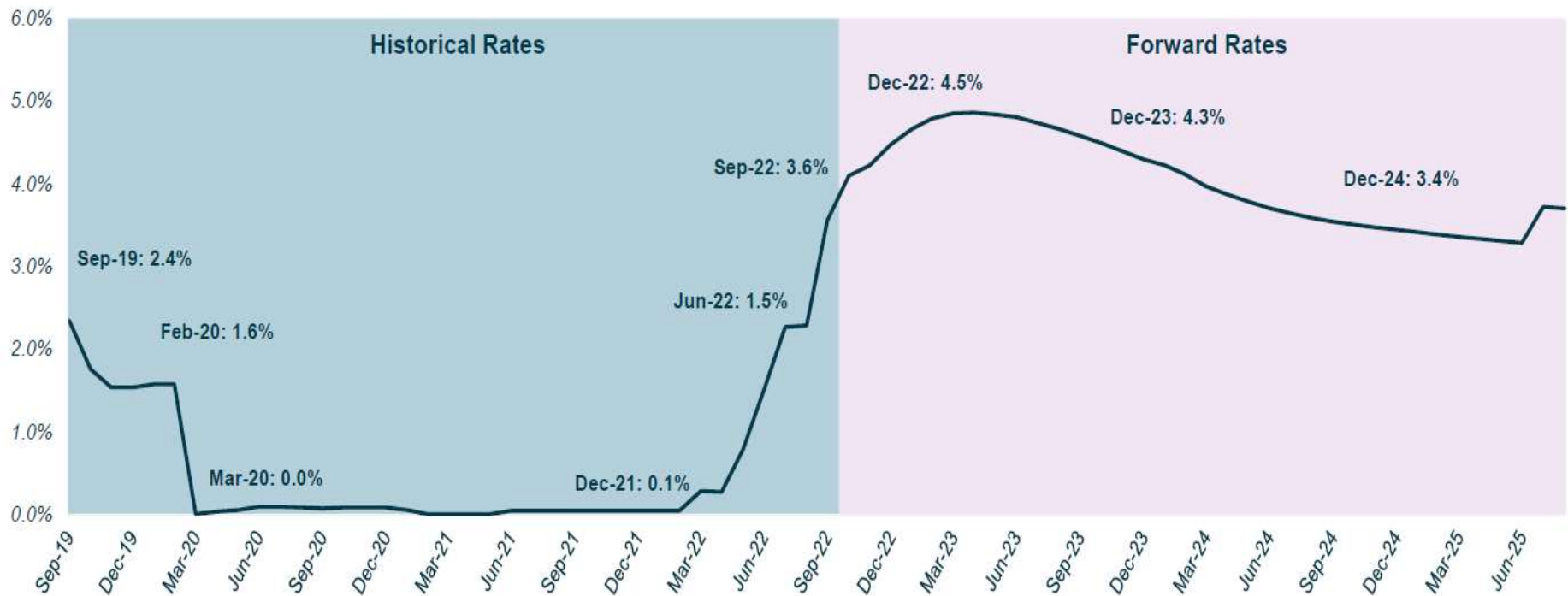
U.S. Treasury Yields



Markets: Recent Increase in SOFR Expected to Continue



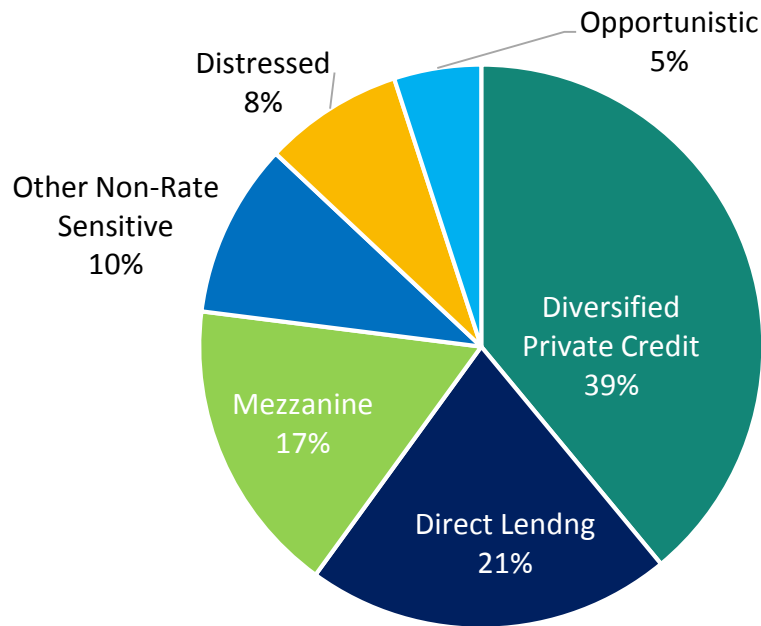
Three-Month SOFR Rate



Source: Lincoln Proprietary Database

Markets: Update – Program Activity

Recent Capital Calls



Private Credit Pricing Increases:

Strategy	9/30/21	9/30/22
Direct Lending	7.0%	10.0%
Mezzanine	12.7%	15.1%
Opportunistic	11.3%	15.7%

Exposures: Sub Strategies



Sub Strategies	% Allocation 6/30/21	% Allocation 6/30/22	Change
Rate Sensitive			
High Yield	16.7%	13.0%	-3.8%
Investment Grade	8.9%	8.0%	-1.0%
Mezzanine	5.3%	7.5%	2.1%
Other Rate Sensitive	7.4%	2.9%	-4.5%
Total Rate Sensitive	38.5%	31.4%	-7.1%
Non-Rate Sensitive			
Bank Loans	14.0%	7.9%	-6.1%
Direct Lending	13.8%	21.9%	8.1%
Hedge Fund	1.1%	1.0%	-0.1%
Opportunistic	15.7%	15.0%	-0.8%
Distressed	7.2%	9.3%	2.1%
Other Non-Rate Sensitive	9.7%	13.5%	3.9%
Total Non-Rate Sensitive	61.5%	68.6%	7.1%
Total	100.0%	100.0%	0.0%
Asset Value	\$14,224,607,404	\$14,464,438,411	\$239,831,007

Exposures: Positioning



Continuing Shift To Less Liquid/Private Assets

- More Liquid Investments 18%
- Less Liquid investments 82%

Growth Areas For Coming Year

- Diversified Private Credit
- Asset-backed Strategies
- Mezzanine
- Co-investments

Sources Of Funds

- High Yield
- Bank Loans

Results: Total Credit Strategies – 6/30/22



	Inception	10 Year	5 year	3 Year	1 Year
Total Credit Strategies	6.37	6.58	6.25	6.43	1.48
Benchmark	5.10	4.71	3.32	1.76	-6.49
Excess Return	1.27	1.87	2.94	4.67	7.97
Portfolio Risk	6.46	4.75	5.61	6.63	3.48
Benchmark Risk	7.04	5.65	6.88	8.22	4.03
Active Risk	2.18	1.89	2.45	2.98	2.40

Source: BNY Mellon

Headwinds/Tailwinds

- ⊕ Asset performance within distressed, mezzanine, direct lending, and Other NRS; underweight to rate sensitive credit
- ⊖ Headwinds: Rising UST yields; increasing risk premiums

Largest Absolute Return Contributors:

- ⊕ Distressed: +21.6% (9.3% of program)
- ⊕ Mezzanine: +16% (7.5% of program)

Largest Relative Return Contributors:

- ⊕ Distressed: +2%
- ⊕ Mezzanine: +1.8%
- ⊖ Syndicated Bank Loans: -0.1% (7.9% of program)
- ⊖ Hedge Funds: -0.005% (1% of program)

Managers: Top 10 Investment Managers



Manager	Mandates	# Mandates	% Program
Beach Point	Bank Loan, Distressed, Opportunistic	5	13.68%
Ares	Direct Lending, Distressed, Mezzanine, Opportunistic	10	8.59%
PGIM	Investment Grade, Mezzanine	5	8.58%
JPM	High Yield	1	7.55%
Solus	Bank Loan, Hedge Fund, Opportunistic	3	6.42%
BlackRock	Direct Lending	1	6.25%
HPS	Direct Lending, Mezzanine	4	6.24%
PIMCO	High Yield	2	5.49%
Anchorage	Opportunistic, Other Rate Sensitive	4	4.02%
Sixth Street	Distressed, Opportunistic	6	3.92%

Continued To Execute On CS2020 During FY22

- Hired or upsized 12 mandates representing over \$3B in commitments
- Program shifted from 31%/69% liquid/illiquid to 23%/77% liquid/illiquid during FY22
- Largest growth experienced in Direct Lending, Diversified Private Credit, Mezzanine, and Distressed strategies.
- Broadened strategies pursued in order to capture market opportunities: additional investments in specialty finance, portfolio finance, NPL, and real estate debt strategies.

- We will manage the final stages in the transition from a program mostly made up of traded credit investments toward one predominantly private credit.
- We remain focused on strategies that deliver high contractual returns while having downside protection.
- Areas of higher growth within the program are expected to include Diversified Private Credit, Mezzanine Debt, and in fee-advantaged co-investments.

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	18	17
Erica Billingslea	Investment Officer	MA	CFA Candidate	10	10
Matt Bennett	Investment Officer	MBA		14	14
Kelly Baker	Portfolio Assistant	AAS		12	7

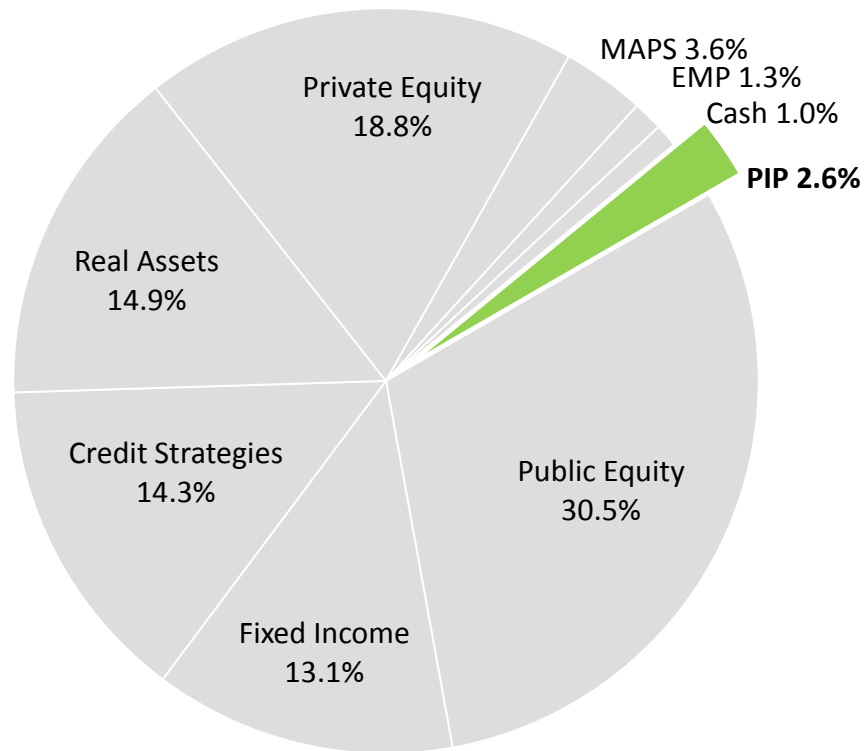
Overview: What Are Private Investment Partnerships?



- A diversified investment platform dedicated to private and illiquid investments
- 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

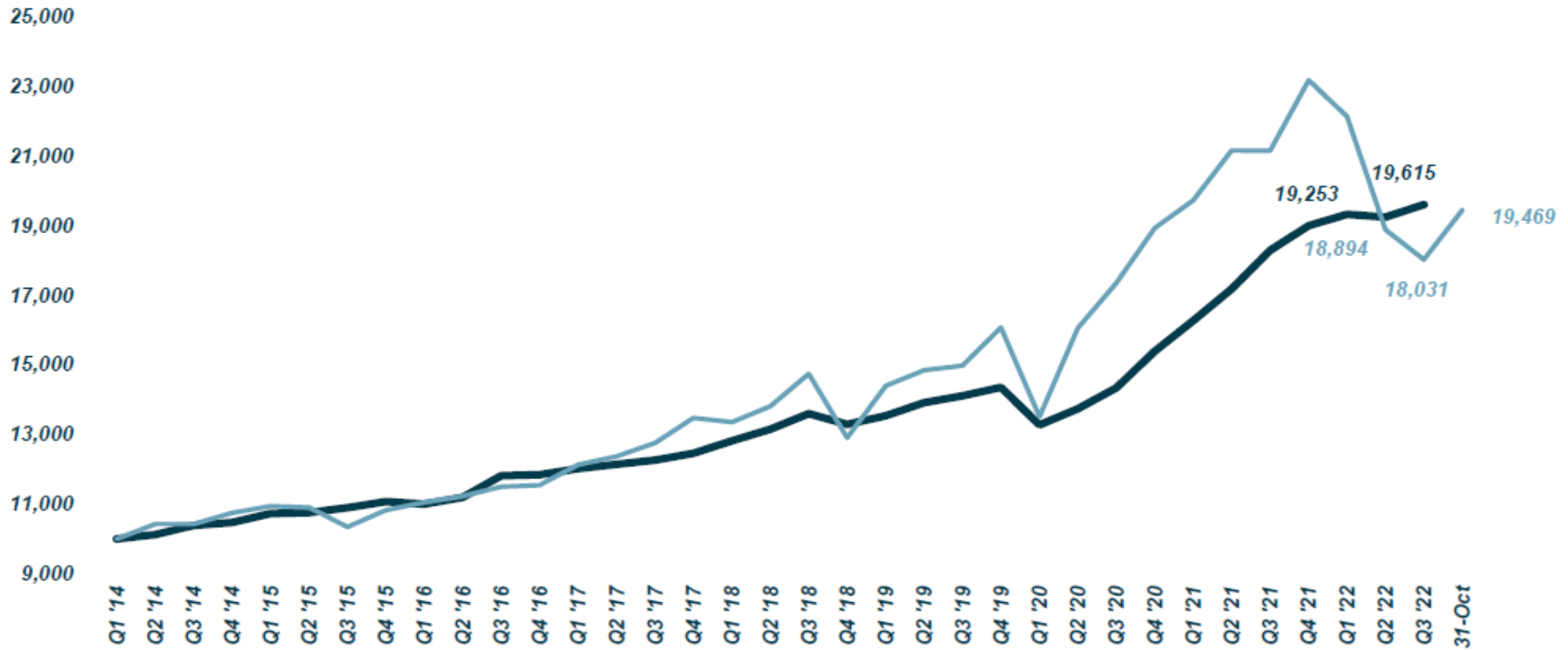
Overview: Total Fund Pie With PIP Allocation

**Total PIP
2.6%**



Markets:

Lincoln Private Market Index vs. S&P 500 Enterprise Values



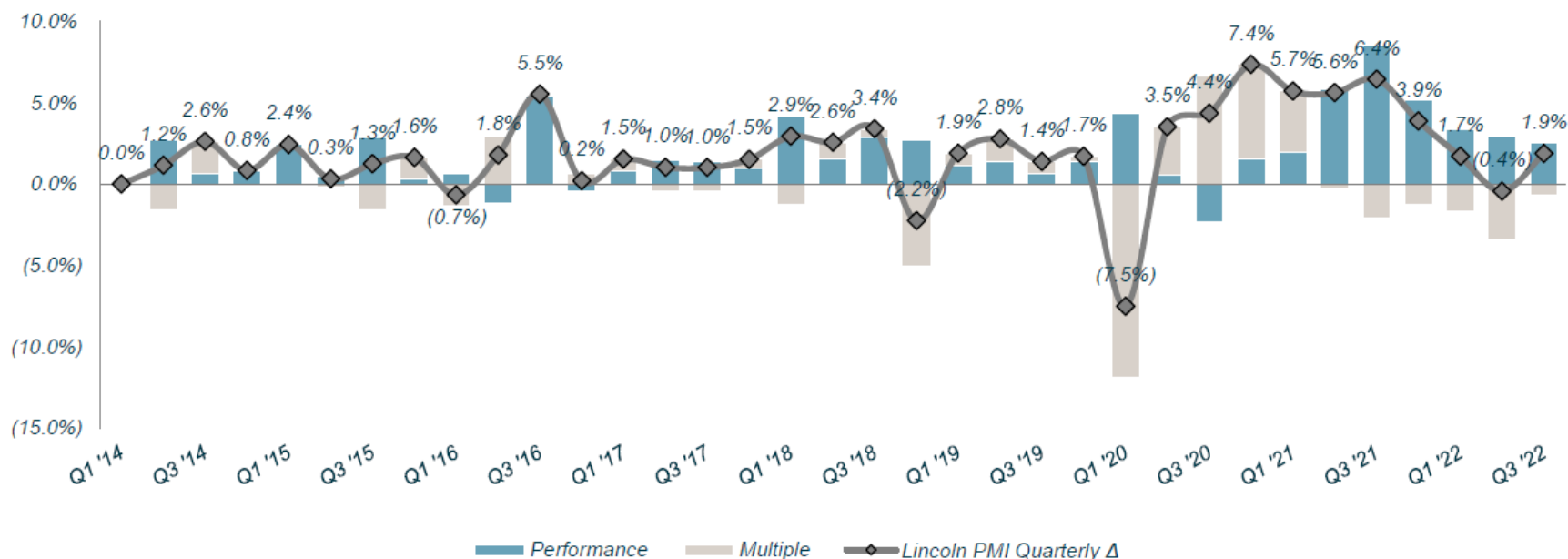
	Q1 '22	Q2 '22	Q3 '22	31-Oct	YTD
LPMI	1.7%	(0.4%)	1.9%	NA	3.2%
S&P 500 EV	(4.5%)	(14.7%)	(4.6%)	8.0%	(16.1%)

Source: Lincoln Proprietary Database. Note: Note: S&P data is as of October 31, 2022 and excludes financials.

Markets: Index Drivers: Multiples vs Earnings



EV increased in Q3 2022 as a result of stronger-than-expected fundamental performance led by top-line growth.

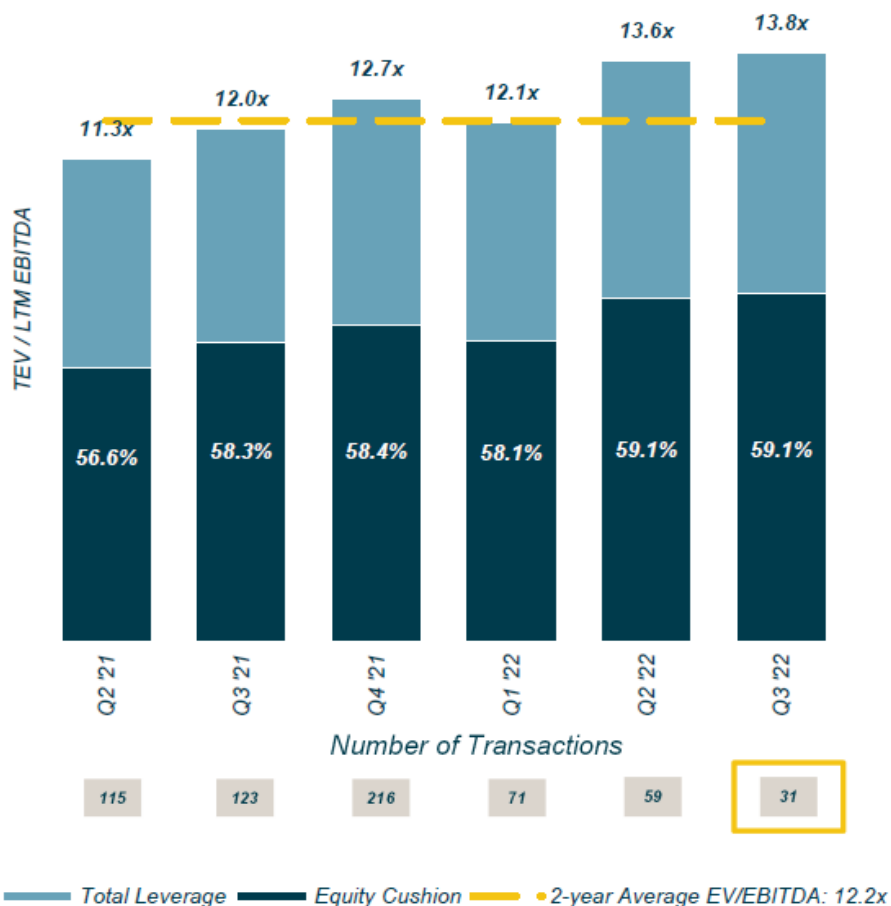


	EBITDA Performance			EBITDA Multiples			EV Growth		
	Q1 '22	Q2 '22	Q3 '22	Q1 '22	Q2 '22	Q3 '22	Q1 '22	Q2 '22	Q3 '22
LPMI	3.3%	2.9%	2.6%	(1.6%)	(3.4%)	(0.7%)	1.7%	(0.4%)	1.9%
S&P 500	4.4%	1.3%	2.3%	(8.9%)	(16.0%)	(6.8%)	(4.5%)	(14.7%)	(4.6%)

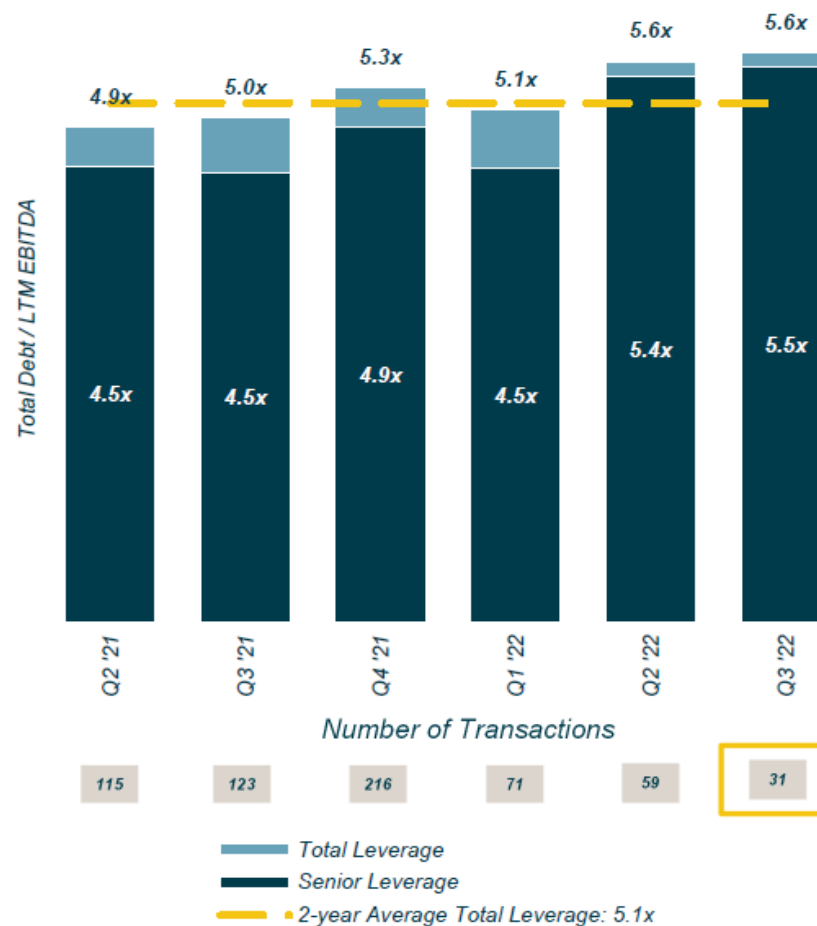
Source: Lincoln Proprietary Database.

Markets: Observed Third-Party M&A Buyouts

EV Transaction Multiples



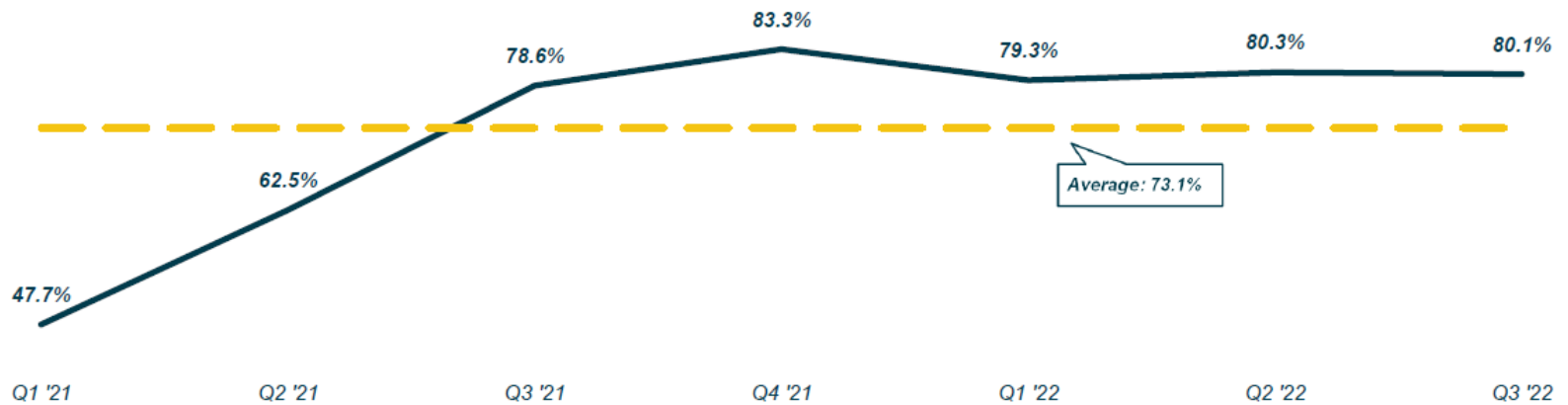
Leverage Transaction Multiples



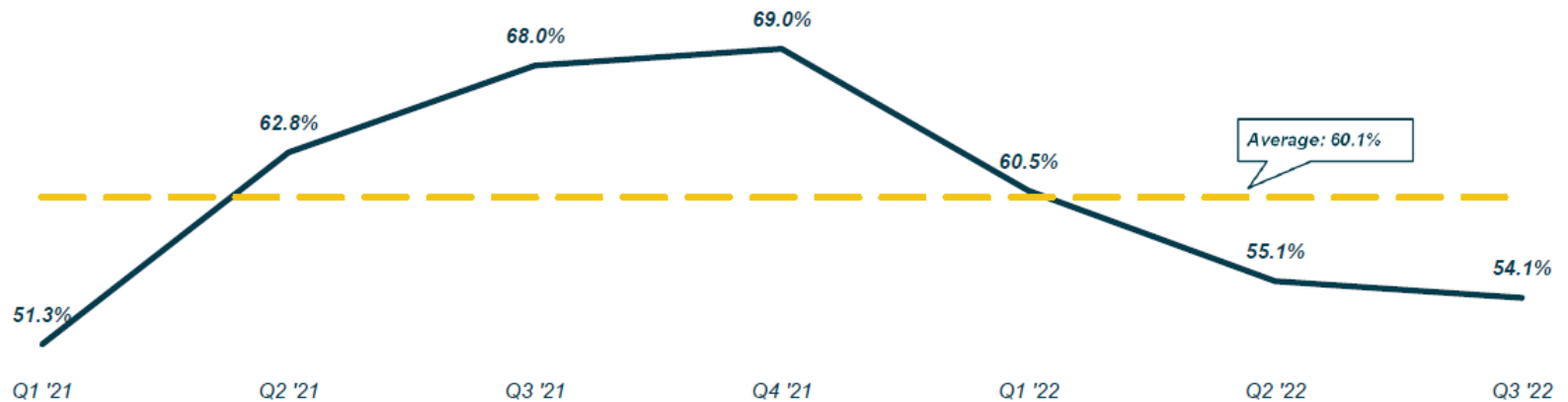
Company Performance Trends: Portfolio Company Gainers and Decliners



Percentage of Companies Reporting YoY Q3 2022 YTD Revenue Growth



Percentage of Companies Reporting YoY Q3 2022 YTD EBITDA Growth

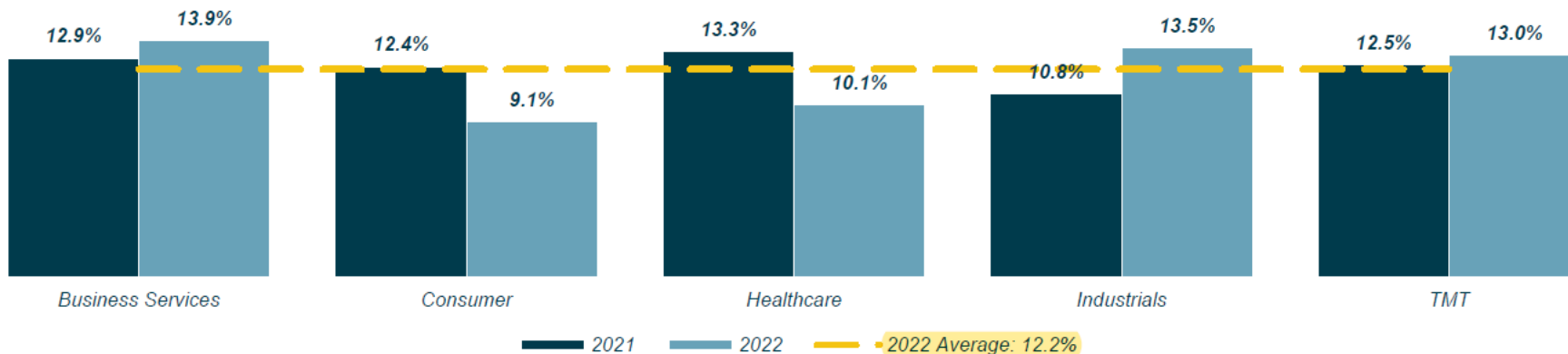


Company Performance Trends :

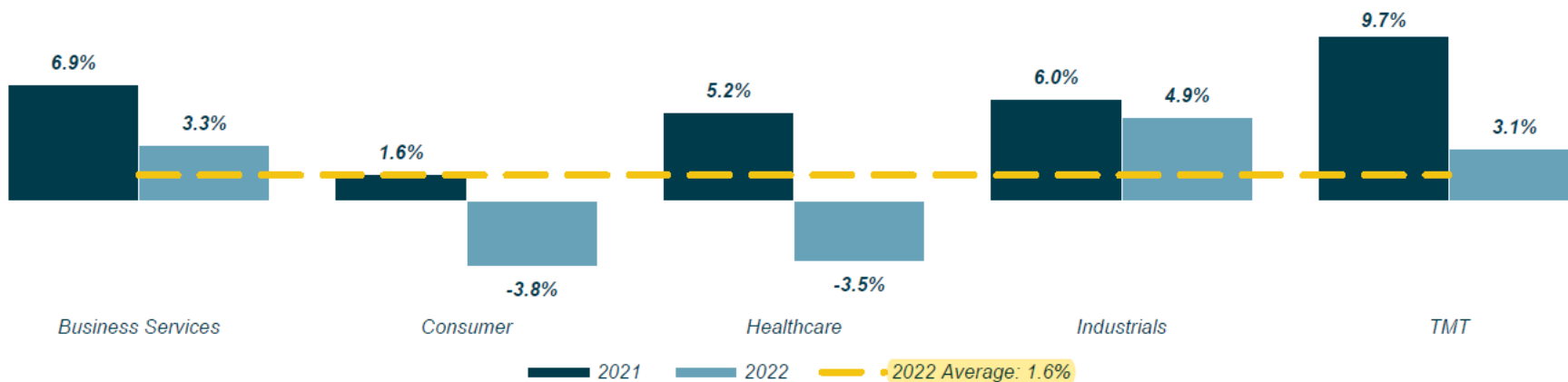
Q3 2022 YoY YTD Magnitude of Revenue & EBITDA Growth



YoY Revenue Growth



YoY EBITDA Growth



Markets: Pressure on Valuations & Returns



Baseline Key Inputs and Assumptions

	Base
EBITDA @ Close	40,000
Terminal EBITDA	61,383
EBITDA 5 Year CAGR	9.0%
Minimum Hurdle IRR	20.00%

Sensitivity Analysis - Financing Assumptions

	Old World (As of Dec 21)	New World (As of Nov 22)
SOFR	0.08%	3.95%
Floor	1.00%	1.00%
Spread	5.50%	6.25%
Total interest rate	6.50%	10.20%
Equity Cushion	~45%	~50%
Implied Leverage	7.50x	6.00x

Impact on Valuation / Purchase Price

	Old World (As of Dec 21)	New World (As of Nov 22)
Purchase Price @ Close	550,000	470,000
Implied Entry and Exit Multiple	13.75x	11.75x

% Change in EV @ Close

Implied Change in EV multiple to maintain IRR with unchanged growth assumption

Purchase Price lever	~15%-20%
IRR lever	~1.5x-2.5x
Growth lever	17.00%
	~20-30%

Implied IRR to Maintain Base EV with unchanged growth assumption

Implied required growth in Terminal EBITDA to maintain Old World Purchase Price and IRR

Source: Lincoln International

Market Value Change: FY 2022

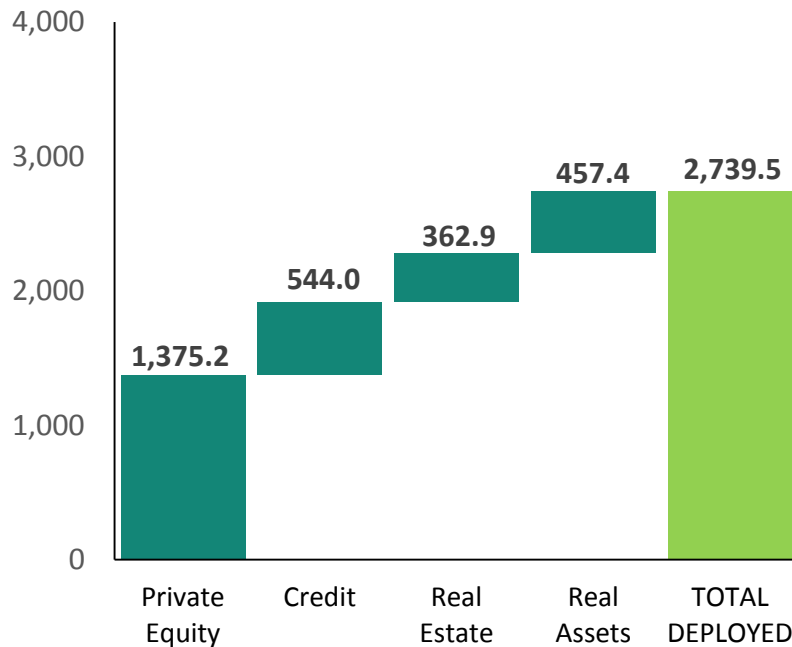


	6/30/21	6/30/22	Change %
Private Equity	63%	59%	-4%
Real Assets	16%	18%	+2%
Real Estate	8%	11%	+3%
Credit	13%	12%	-1%
Total (MM)	\$2,031	\$2,588	+\$557

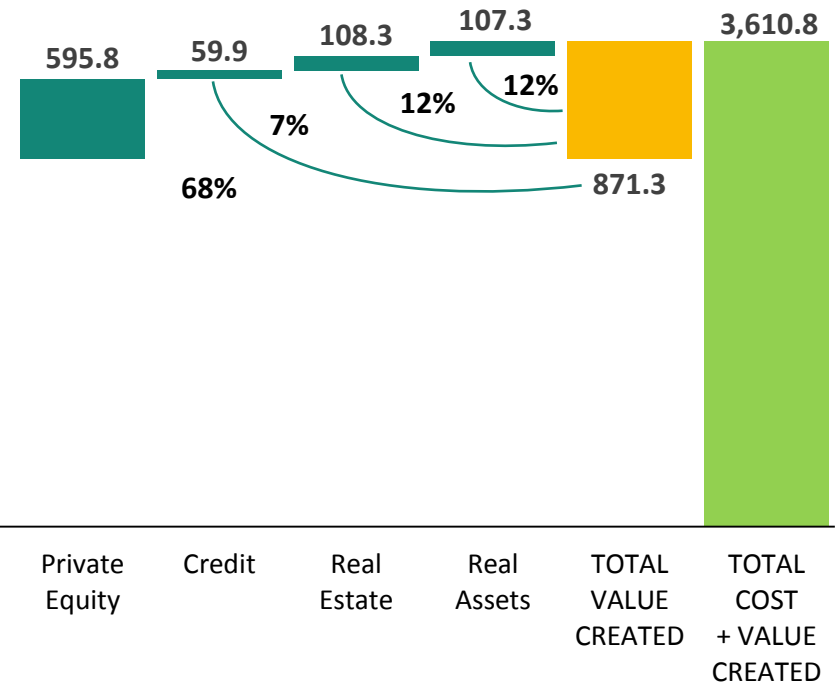
Portfolio Growth: Value Drivers (\$MM)



PIP: Total Capital Deployed (\$mm)



PIP: Value Created (\$mm)



Results: Performance – 6/30/22



	Inception (2015)	5 Year	3 Year	1 Year	MV (\$MM)
Total PIP	9.48	11.10	12.70	16.97	2,588
Benchmark	8.23	9.20	9.51	6.86	
Excess Return	1.25	1.90	3.20	10.11	

Total Program IRR 12.2%

Source: BNY Mellon

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

Eliminate REITs Within Real Assets

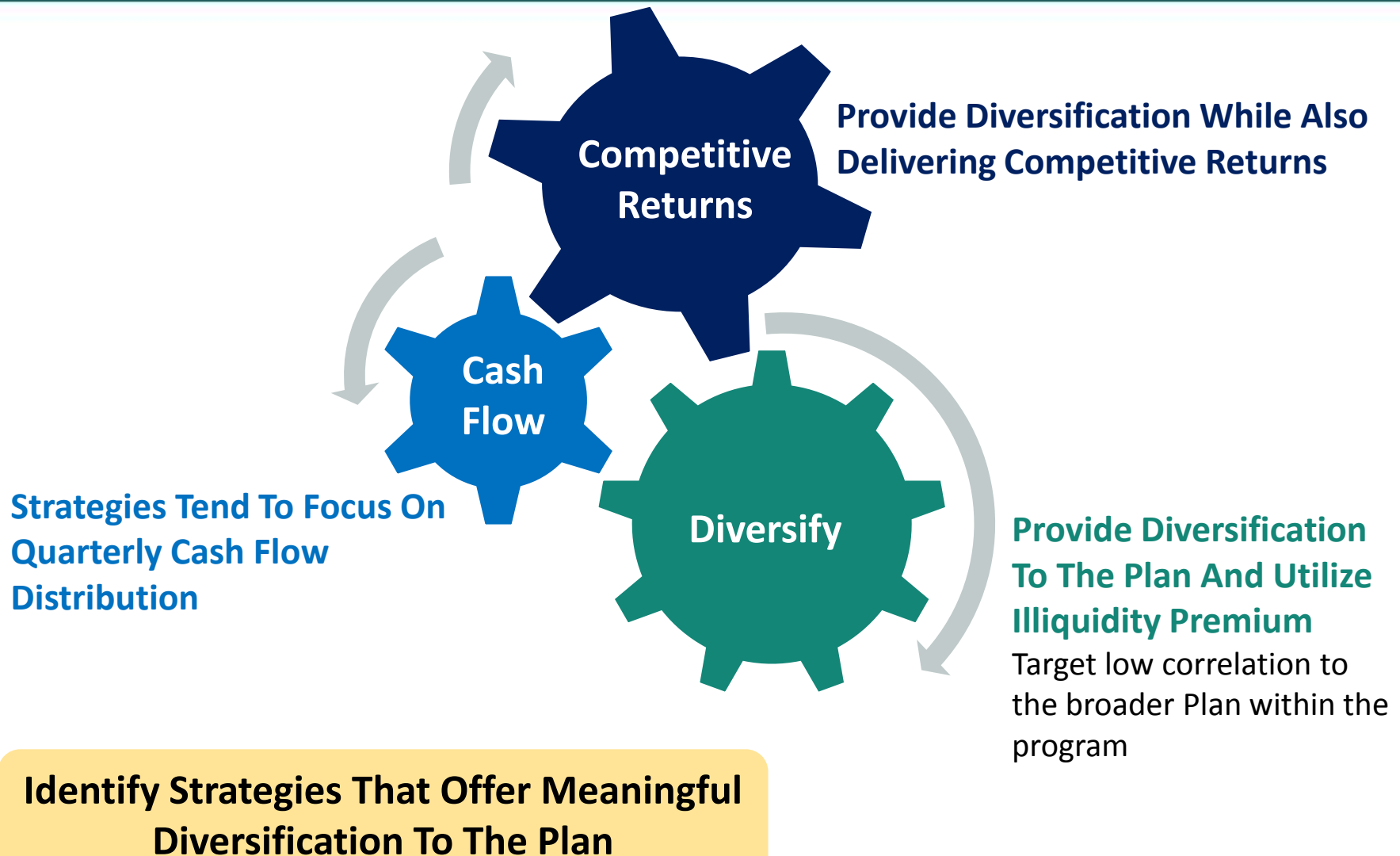
Ron Schmitz
Chief Investment Officer



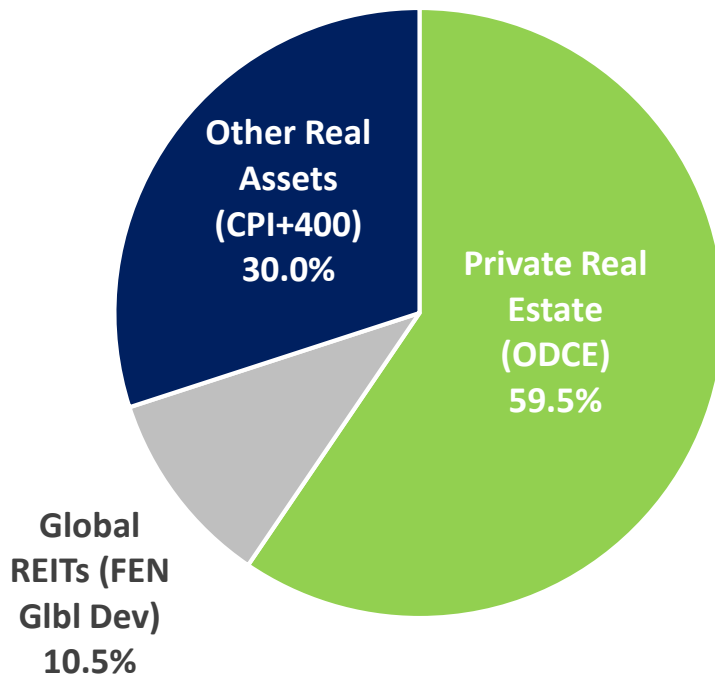
Proposal:

- Eliminate Global REITs from the Real Estate portfolio and benchmark.
- Change Real Estate benchmark to 100% ODCE. This change will roll up through the Real Assets and Total Fund benchmarks
- Redeploy the REIT proceeds to elsewhere in the Plan.

Real Asset Program Objectives



Real Assets Portfolio Composition



Approx. 70% Real Estate: 85% ODCE, 15% FTSE EPRA NAREIT Global Developed

Approx. 30% Other Real Assets: CPI-U + 400 bps

Eliminating REITs: Pros / Cons

Pros

- REITs are much less diversifying to the total portfolio than Private Real Estate
- Provides liquidity to the Plan
- Relative outperformance has been more muted compared to Private Real Estate

Cons

- Reduces International Real Estate exposure, currently less than 0.51% of the total fund
- Reduces potential for excess return by underweighting REITs when trading at premiums to private real estate values

Removing REITs better aligns Real Assets with its main objective of providing meaningful diversification to the Plan

Risk Parity in Risk Based Investment (RBI) Program

Ron Schmitz
Chief Investment Officer



RBI Benchmark Change Proposal



Eliminate Risk Parity from Risk Based Investments

Current Benchmark

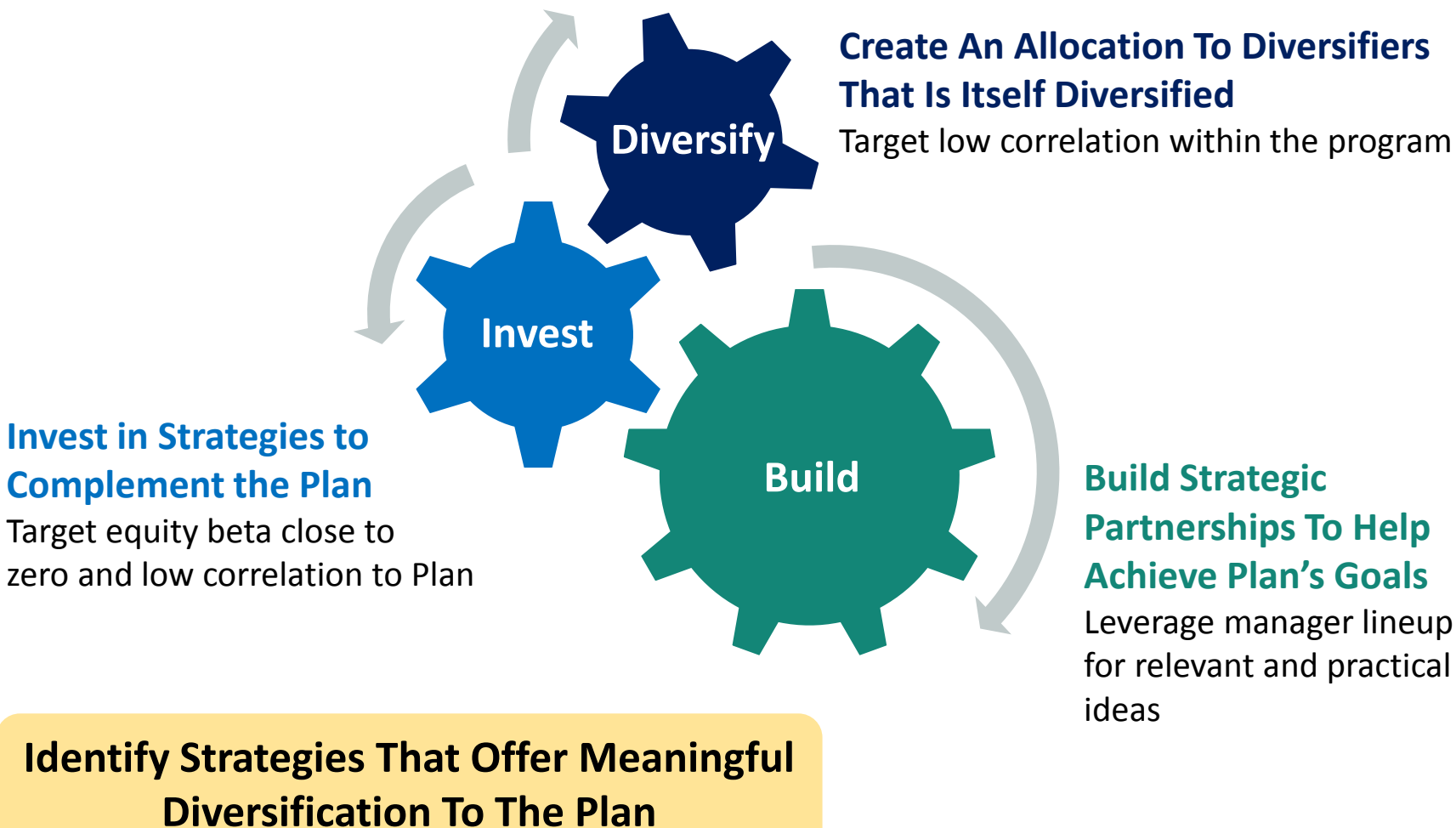
- 80% US 3 Month T-Bills* + 250 bps
- 20% S&P Risk Parity Index

Proposed Benchmark

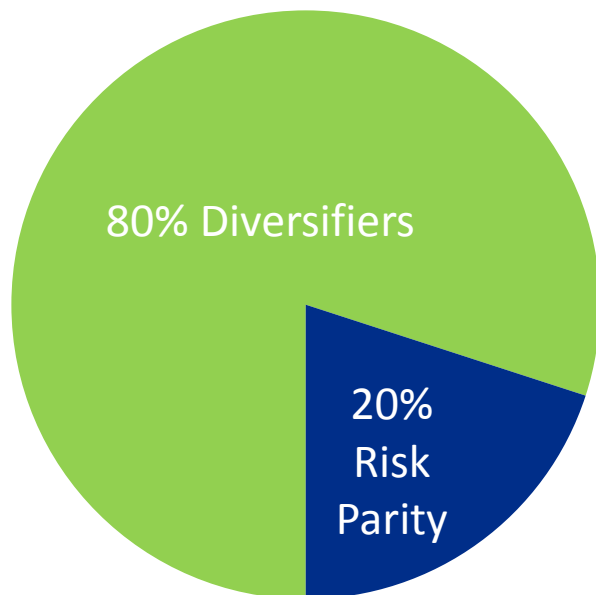
- 100% US 3 Month T-Bills* + 250 bps

*Bloomberg

RBI Program Objectives



RBI Portfolio Composition



80% Diversifiers – Strategies that are uncorrelated to the rest of the Plan

20% Risk Parity – Alternative approach to asset allocation

What is Risk Parity

- Risk Parity focuses on the allocation of risk rather than capital
- Each asset class investment is managed to have equal contribution to risk
- Leverage can be used to target any risk level
- Invested in 2013

Risk Parity Pros / Cons for RBI

Pros

- Less Growth risk than Plan
- Knowledge transfer

Cons

- Much less diversifying to the Plan than other 80% of RBI
- Risk Parity is ~ 0.7 correlation with the Plan

Removing Risk Parity better aligns RBI with its main objective of providing meaningful diversification to the Plan

Asset Liability Management

Andrew Junkin & Steve Peterson

Investment Advisory Committee

November 30, 2022



- VRS conducts formal Asset Liability Management (ALM) studies on a three-year cycle, with annual reviews.
- The purpose of the ALM study is to integrate our knowledge about the current and future benefit payments of the plan (the “Liabilities”) with the ability to pay those benefit payments from the investment portfolio and expected contributions (the “Assets”).
- The Board will select a target long term asset allocation at the end of this process.
- The ALM exercise is about understanding and managing risks, not about eliminating all risks.

Financial Condition: Asset Allocation Helps Drive Income

Balance Sheet

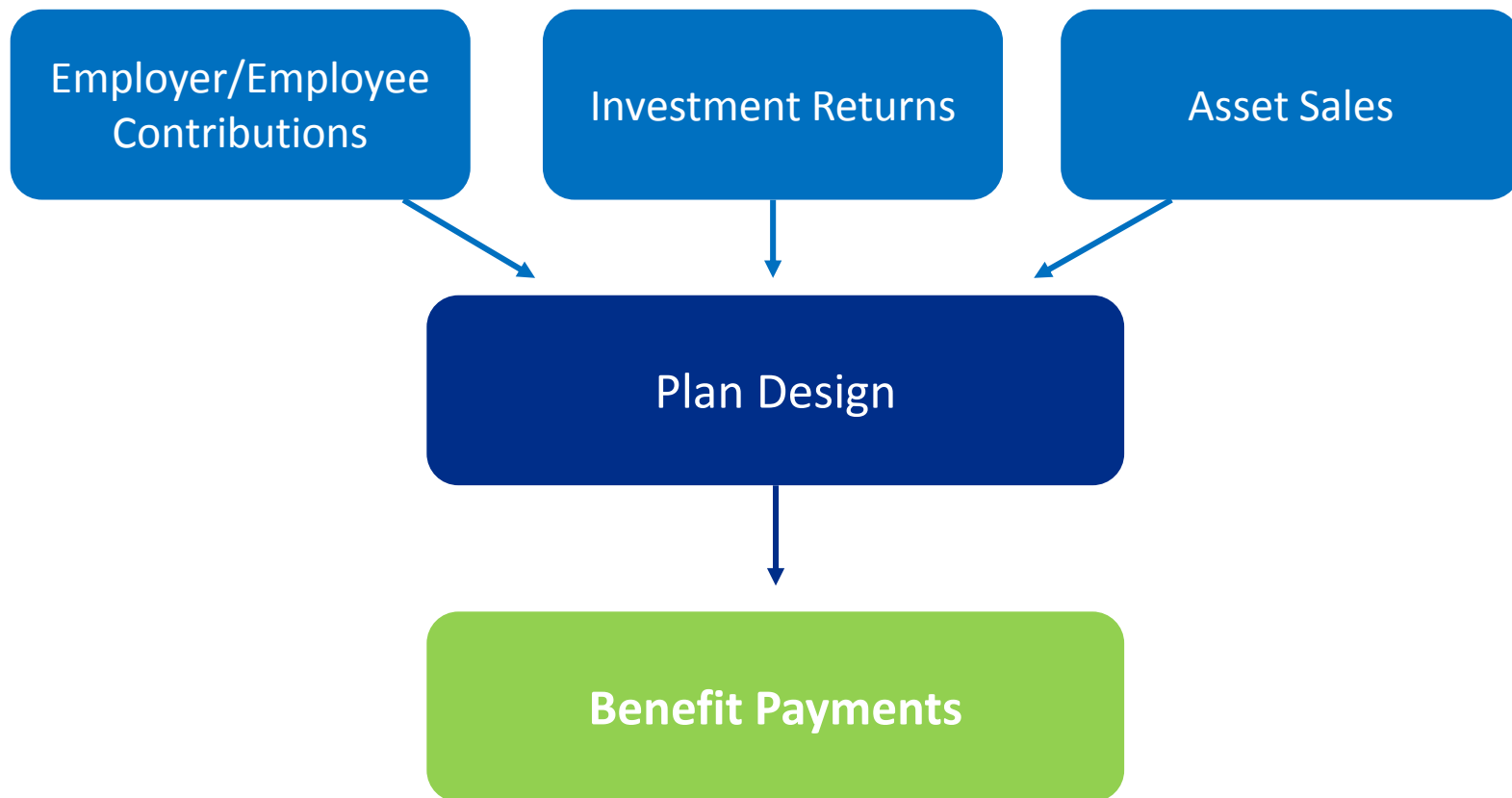
Assets	Liabilities
Investments	PV Projected Benefits

Income Statement

Income	Expenses
Contributions Investment returns	Benefit Payments Admin Expenses



Cash Flow Waterfall



Staff & Consultant

Staff sets objectives and deliverables working closely with consultant on empirical modeling and actuarial methods. Consultant is responsible for reviewing staff's modeling assumptions and methods in accordance with best practices and experience with other similar plans. Presents final report with recommendations to the Board.

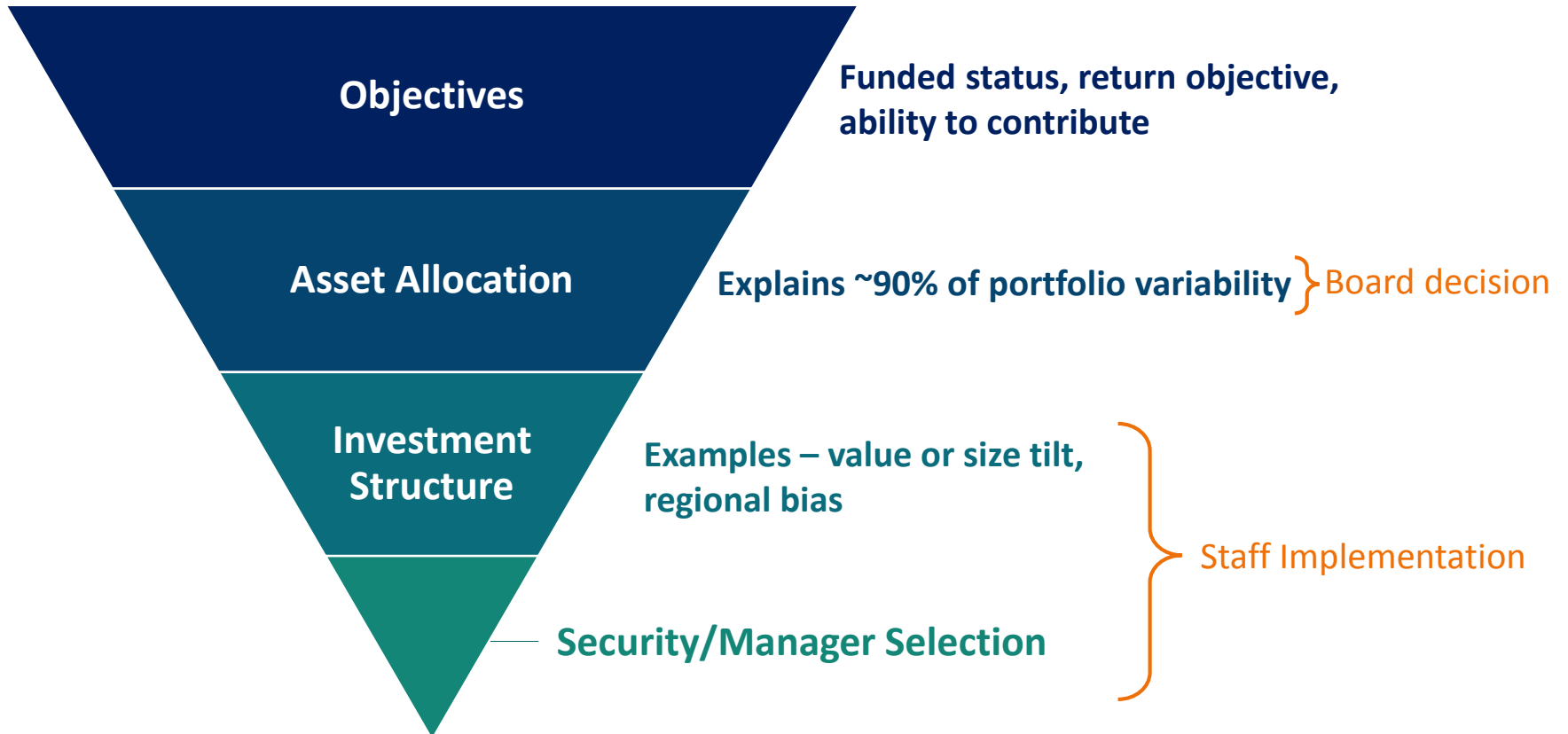
Investment Advisory Committee

The Investment Advisory Committee advises on staff's capital market assumptions (forward returns and risks at the asset class and total fund level) and guides scenario analysis and stress tests to help determine sensitivity of board's decision factors such as funded status and contribution rates to selected market events.

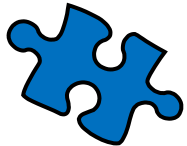
Board of Trustees

Primary responsibilities include setting the Fund's asset allocation (program level target weights and ranges) and, with the assistance of the plan actuary, recommends changes in contribution rates. The Investment Policy Statement and Investment Beliefs will be reviewed and updated as appropriate.

Focus On Decisions That Matter



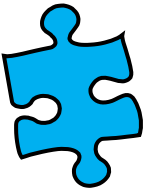
Risk Assessment Framework



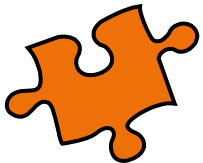
Shortfall: Support distributions and long-term growth



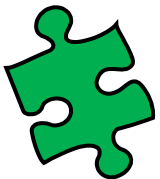
Inflation: Preserve long-term purchasing power



Liquidity: Balance near-term needs, long-term opportunities



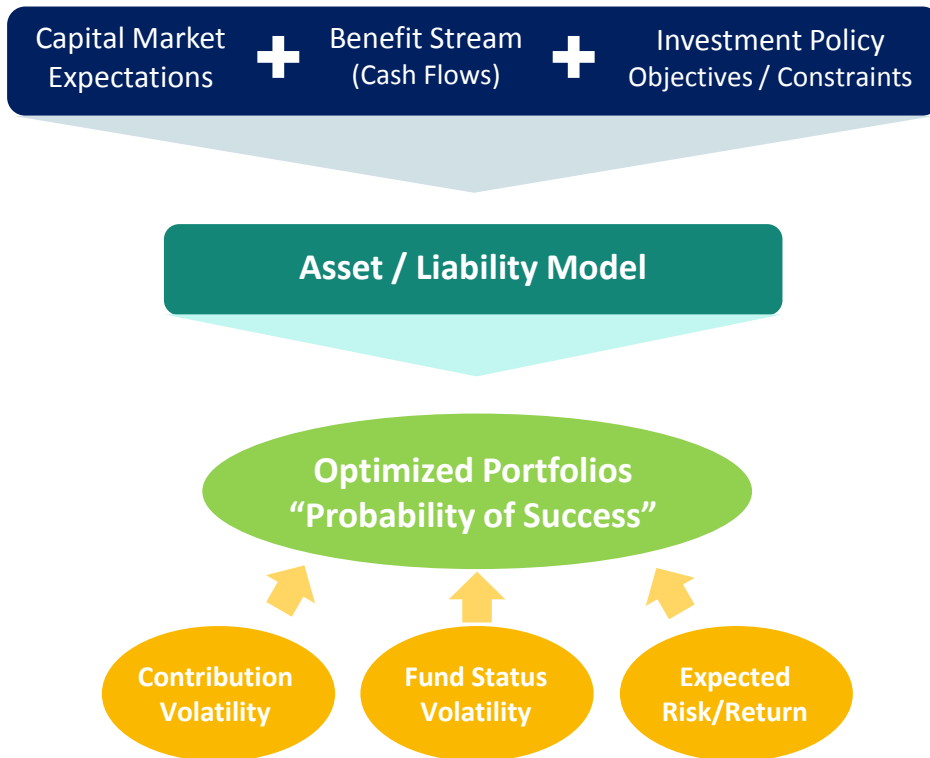
Drawdown: Limit large portfolio losses



Active: Ensure unique exposures

A multi-dimensional view of risk integrates organizational and investment considerations into a comprehensive framework for evaluating strategic decisions.

Asset Allocation Process

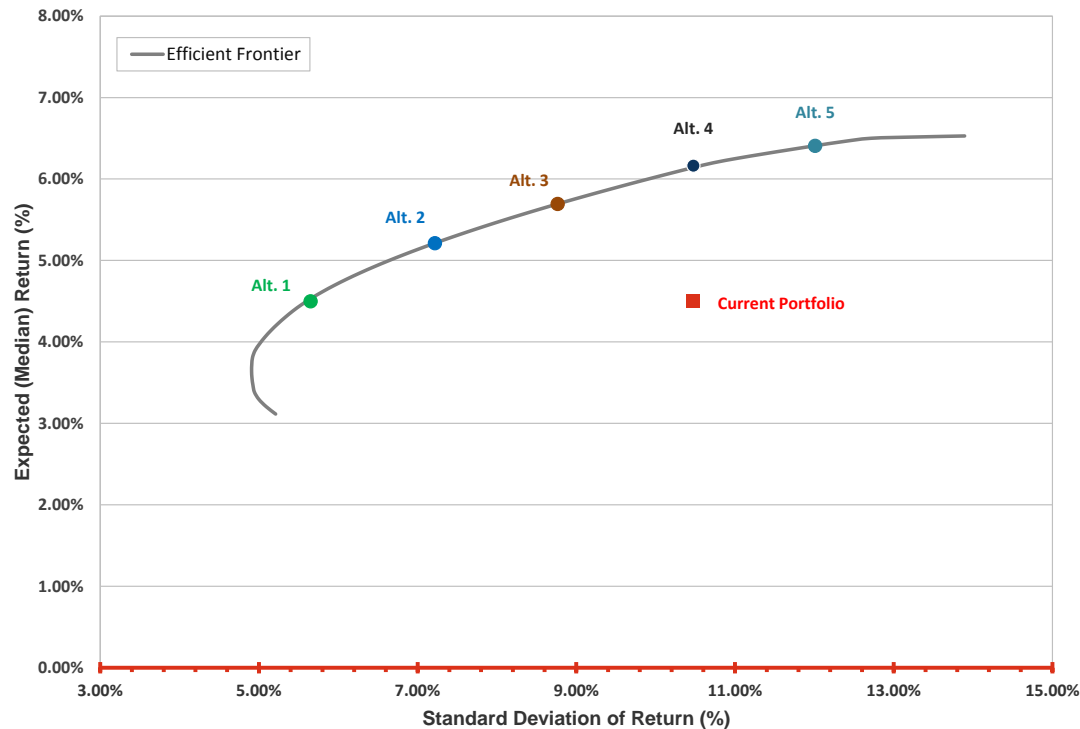


- The VRS core mission is to fund benefits promised to participants
- The role of asset allocation is to manage risk in order to fulfill that core mission
 - **Maximize safety** of promised benefits
 - **Minimize cost** of funding these benefits
- The VRS's Asset Liability Model provides methodology for selecting a target portfolio that considers both goals
- Rigorously developed capital market assumptions for risk and return
- Given that short-term volatility is also important, the impact of the asset allocation decision on funded ratios, annual contribution requirements, and other metrics must be considered
- Strategic asset allocation is not a guide to outperforming in every market ... but it should provide a roadmap for success over a market cycle

Modern Portfolio Theory Overview

Portfolio Theory Primer

- According to Modern Portfolio Theory, investments can be combined so that the portfolio maximizes expected return for a given level of expected return volatility.
- Volatility can help us better understand Shortfall Risk and Drawdown Risk

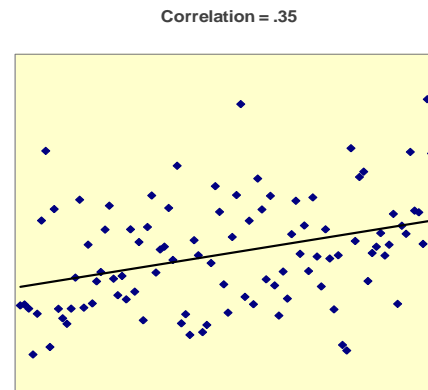
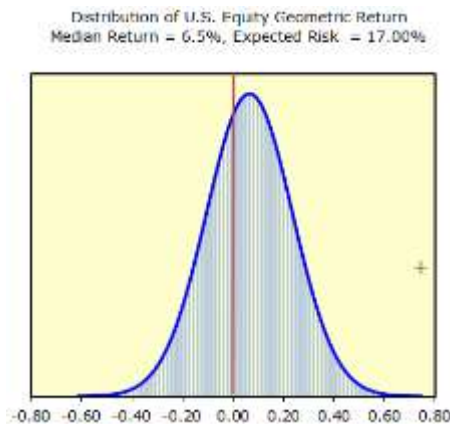


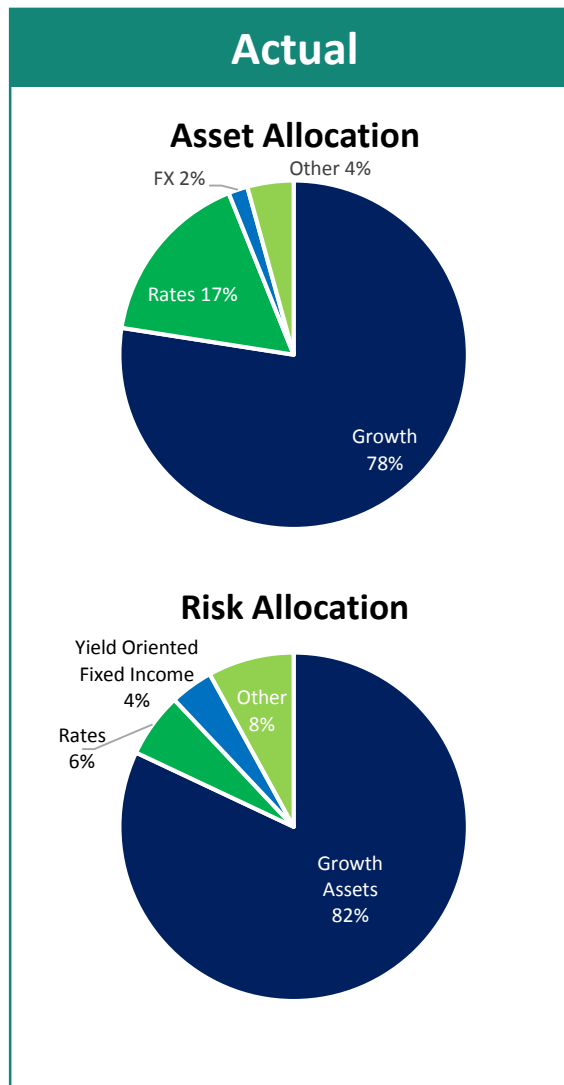
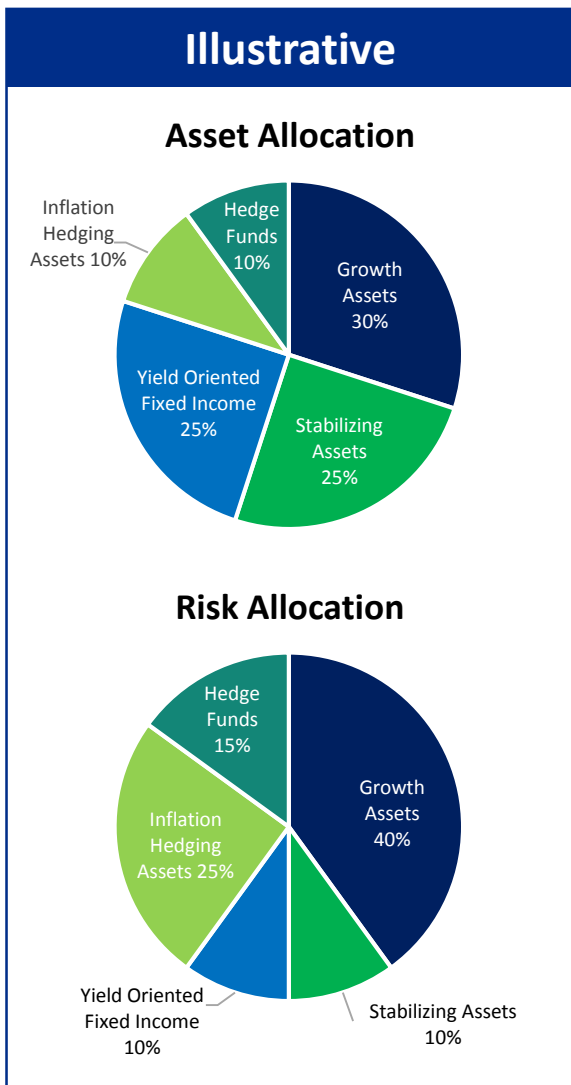
Illustrative Only

Modern Portfolio Theory Overview

Asset Class Expectations

Expected Return	Median Return <ul style="list-style-type: none">• 50% probability that the return will be greater than the expected return• 50% probability that it will be less than the expected return
Standard Deviation	Measures the the dispersion of asset class returns around the expected return.
Correlation	Movement of asset class returns in relation to one another.

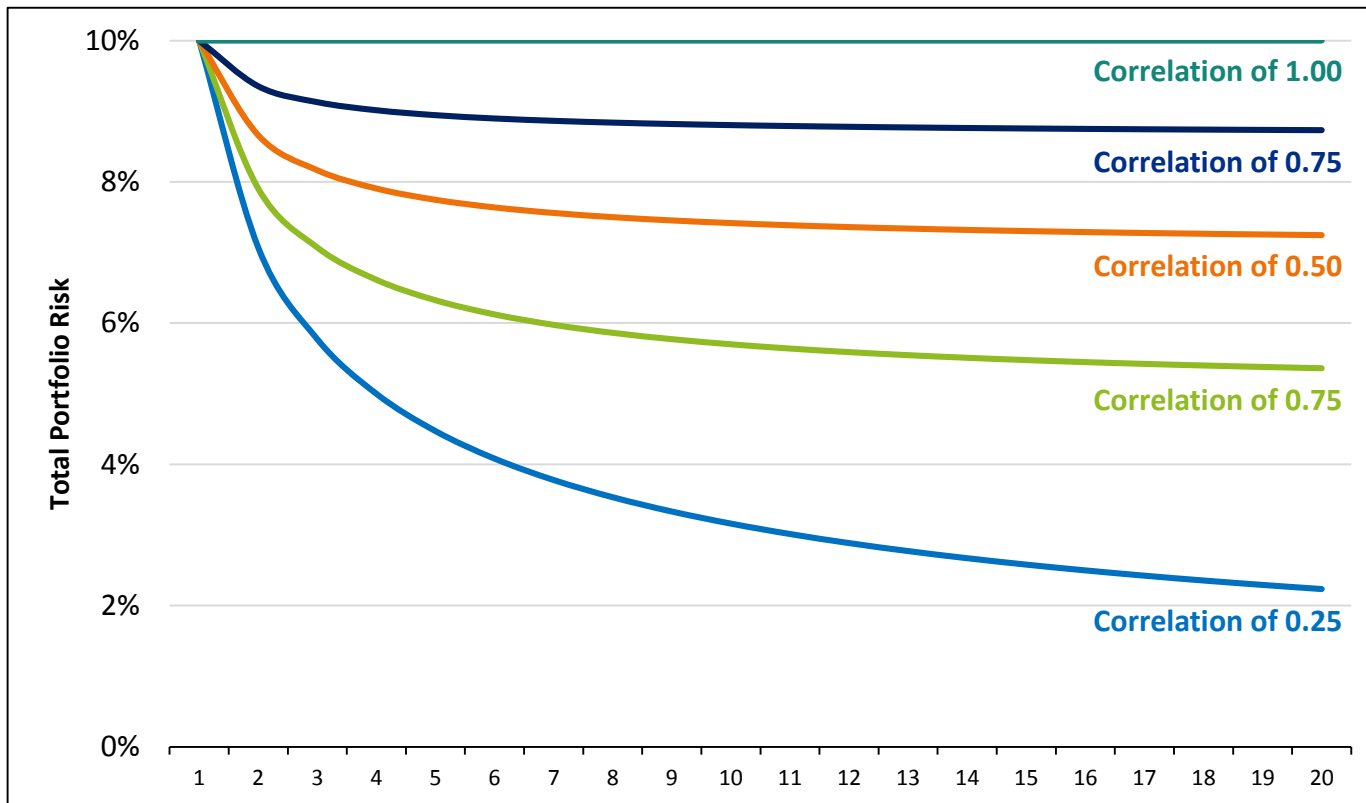




- The goal of asset allocation is to select a diversified mix of suitable asset classes that minimizes risk for a given level of expected return.
- Capital allocation and risk allocation are often meaningfully different

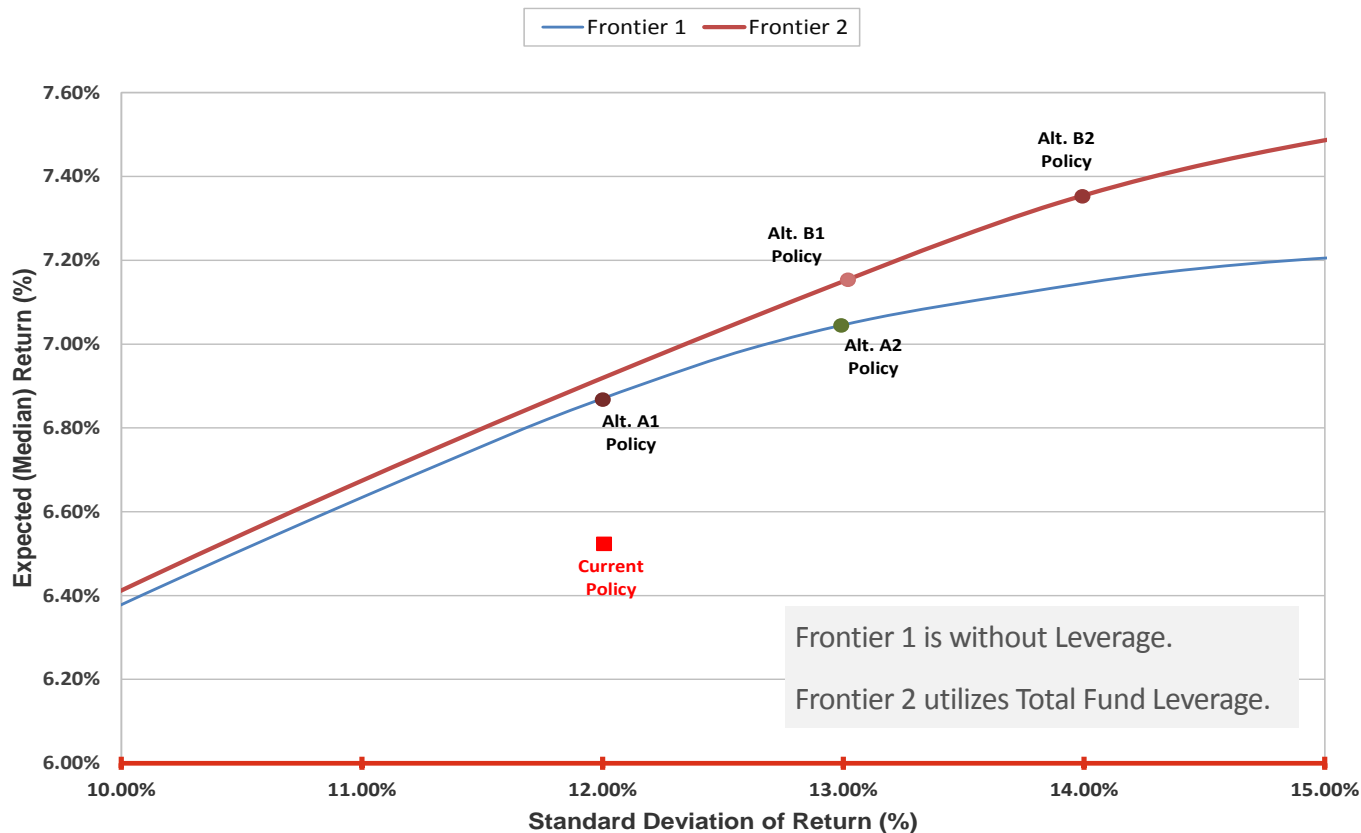
The Arithmetic of Correlations

Simply adding more asset classes with high correlation does not provide meaningful risk reduction.



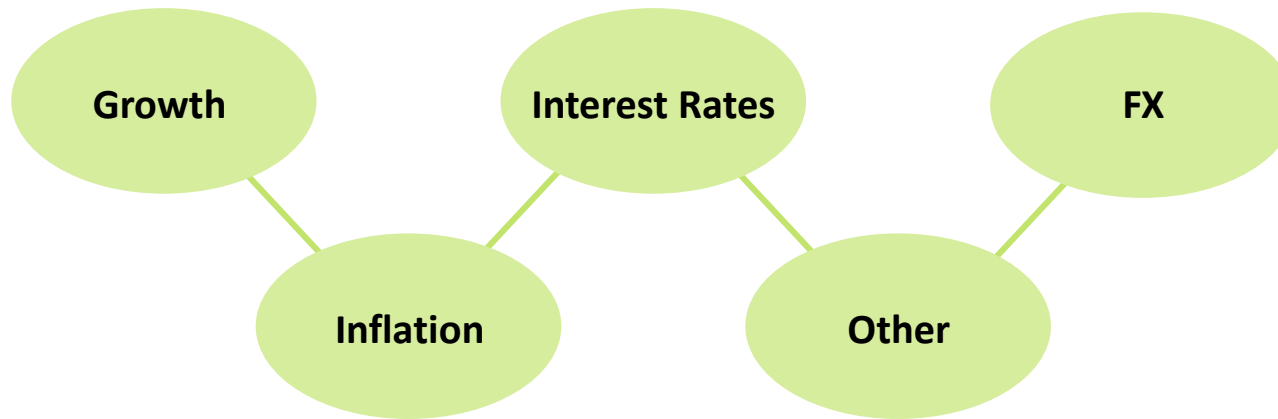
An Additional Lever?

The use of leverage can create more efficient combinations without magnifying volatility, but certainly increases complexity.



Illustrative Only

Why Introduce Factors?



- Including factors within the asset allocation process provides an opportunity to measure asset class and portfolio exposures to key economic factors.
- If the underlying economic activity that drives asset performance can be identified, perhaps it can be used to assist in building economically-efficient portfolios.
- Macroeconomic risk factors – when separated from the valuation component inherent in investment pricing – may exhibit more stable correlations and, therefore, can better inform the allocation process.

Liquidity: Evaluation & Reporting to the Board



Previously

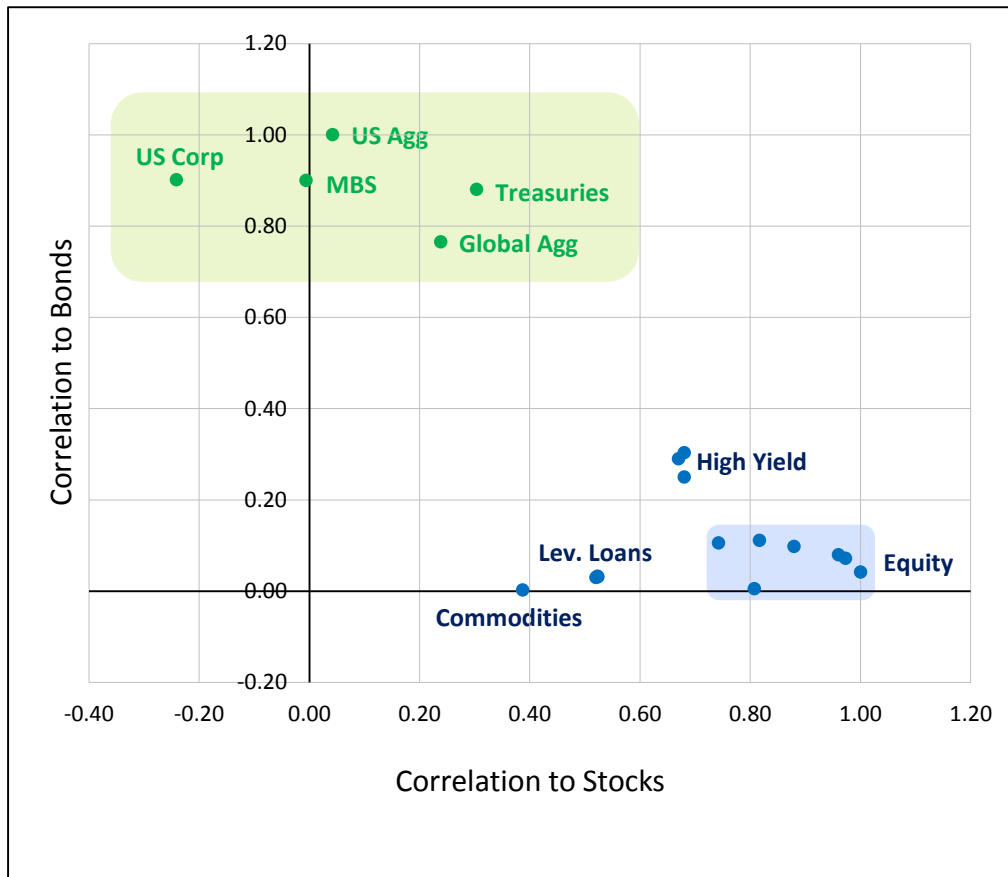
Staff provided an aggregate summary on liquidity needs net of total contributions: when benefits and costs exceed contributions, excess benefit payments are paid from the investment fund directly.

Going Forward

Staff will expand this summary, reporting on how various scenarios and stress events impact liquidity at the asset class level.

Provide the Board with deeper insights into potential risks that certain asset classes may need to be tapped to pay benefits

Diversification



Growth Macro-Asset Class	
Asset	Correlation
US Stocks	1.00
Global Stocks	0.96
Developed ex-US	0.88
Developed World	0.97
Emerging Markets	0.74
PrivEq Buyout	0.82
Venture Capital	0.81

Income/Safety Macro Asset Class	
Asset	Correlation
U.S. Aggregate	1.00
U.S. Credit	0.88
Global Aggregate	0.76
U.S. Treasury	0.06
U.S. MBS	0.03
U.S. Corporate High Yield	0.90

Forward Returns and Volatilities By Asset Class (20 year) as of 8/1/2022

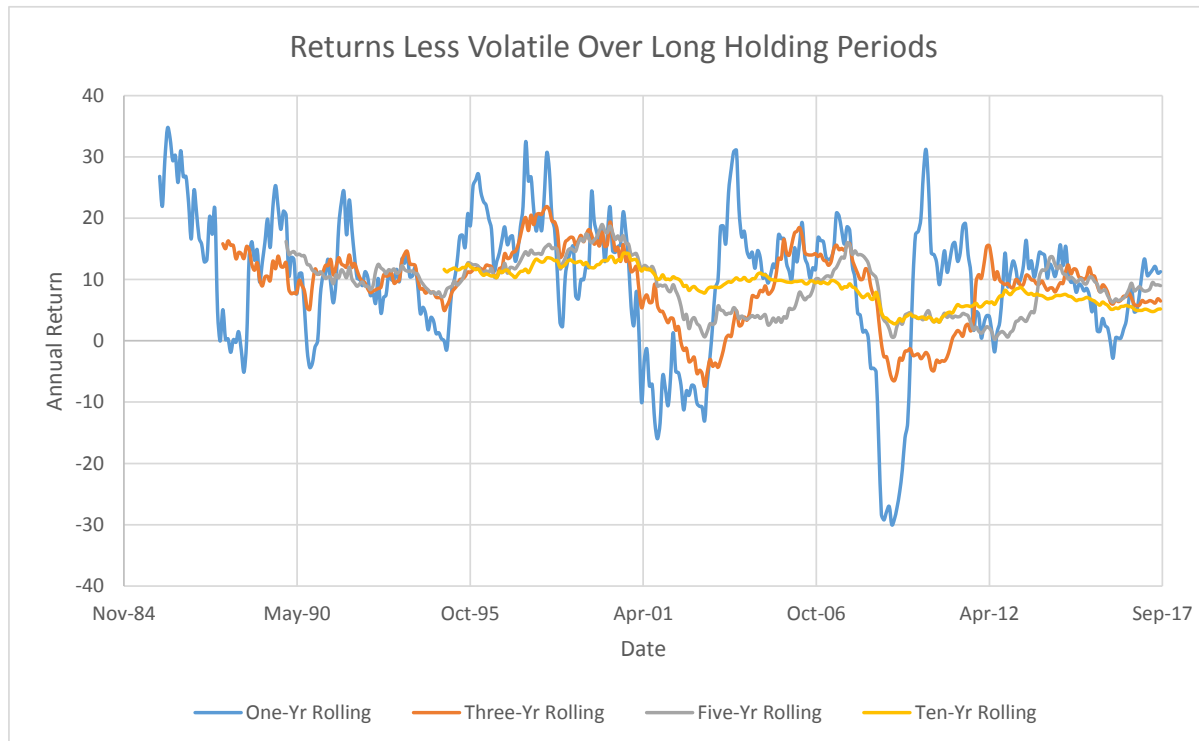


Asset Class	Current			Allowable	
	Wt.	E(r)	E(σ)	Min	Max
Public Equity	34.0%	6.8%	16.8%	-5.0%	5.0%
Fixed Income	15.0%	4.4%	4.7%	-3.0%	5.0%
Credit Strategies	14.0%	7.1%	5.4%	-5.0%	5.0%
Real Assets	14.0%	6.0%	14.0%	-5.0%	5.0%
Private Equity	14.0%	8.8%	26.2%	-5.0%	5.0%
MAPS	6.0%	5.9%	7.9%	-2.0%	2.0%
PIP	3.0%	7.3%	18.9%	-2.0%	2.0%
Cash	0.0%	0.0%	0.5%	0.0%	5.0%
Currency Return Addition		0.1%			
Total Fund		6.7%	13.8%		

	Public Equity	Fixed Income	Credit Strategies	Real Assets	Private Equity	MAPS	PIP
Public Equity	1.00	0.08	0.70	0.82	0.84	0.95	0.87
Fixed Income	0.08	1.00	0.27	0.13	0.07	0.05	0.12
Credit Strategies	0.70	0.27	1.00	0.59	0.71	0.71	0.75
Real Assets	0.82	0.13	0.59	1.00	0.69	0.81	0.75
Private Equity	0.84	0.07	0.71	0.69	1.00	0.77	0.97
MAPS	0.95	0.05	0.71	0.81	0.77	1.00	0.82
PIP	0.87	0.12	0.75	0.75	0.97	0.82	1.00

Asset Class and Strategy	Current		
	Wt.	E(r)	E(σ)
Public Equity	34.0%	6.8%	16.8%
Fixed Income	15.0%	4.4%	4.7%
Treasury	6.1%	3.2%	
Agency	0.1%	3.6%	
MBS	3.3%	4.5%	
CMBS	0.2%	4.9%	
ABS	0.2%	4.8%	
IG	3.4%	4.8%	
HY	0.6%	8.1%	
JPM EMBI Core	1.0%	8.6%	
Credit Strategies	14.0%	7.1%	5.4%
Rate Sensitive HY	4.2%	6.0%	
Rate Sensitive IG	1.4%	3.7%	
Non-Rate Sensitive	8.4%	7.8%	
Real Assets	14.0%	6.0%	14.0%
Private Real Estate	7.7%	5.6%	
Public Real Estate	2.1%	7.2%	
Other Real Assets	4.2%	6.5%	
Private Equity	14.0%	8.8%	26.2%
MAPS	6.0%	5.9%	7.9%
PIP	3.0%	7.3%	18.9%
Cash	0.0%	0.0%	0.5%
Currency Return Addition		0.1%	
Total Fund		6.7%	13.8%

Focus On Longer Run, Less Volatile Return Horizons



Our focus on a long run investment horizon helps mitigate distractions surrounding short run ups and downs.

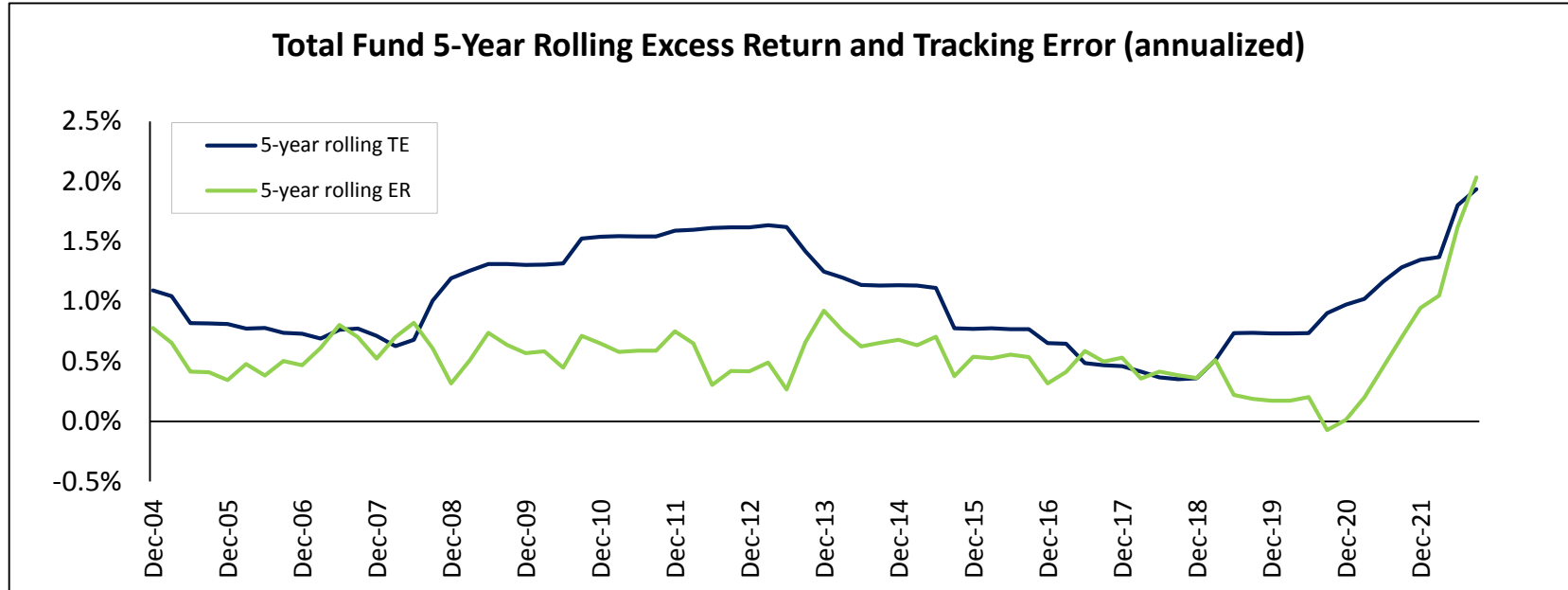
But, as markets change, even short run volatility needs to be managed more vigilantly in order to preserve fund value over time.

Illustrative Only

Correlation Convergence

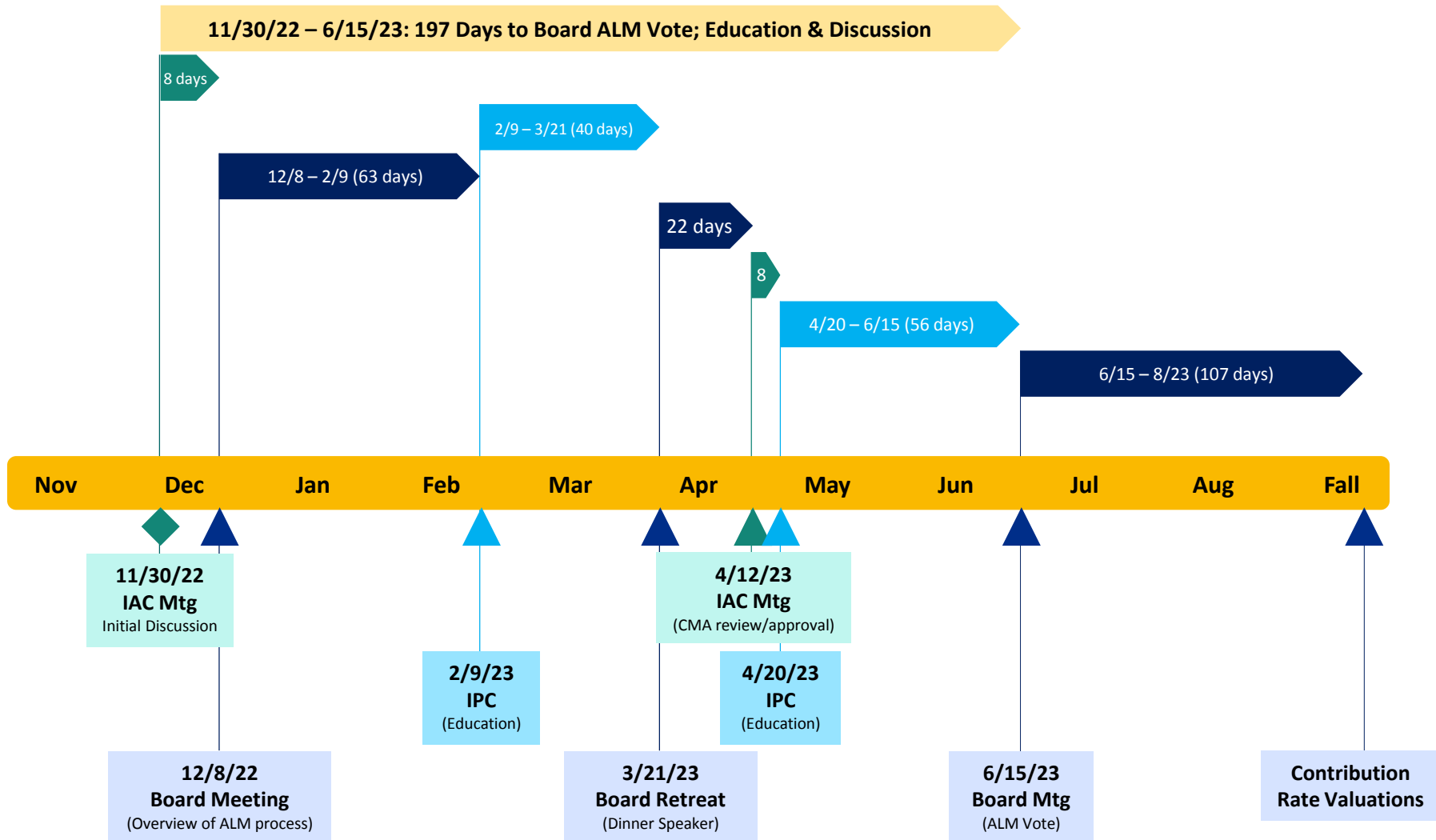
The theoretical underpinning of diversification is presumed low correlations among asset classes

	Allocation	Correlation to Public Equity		Difference
		Expected	Expected (Covid Onset)	
Fixed Income	15%	0.22	0.17	-0.05
Credit Strategies	14%	0.69	0.76	0.07
Real Assets	14%	0.84	0.90	0.06
Private Equity	16%	0.82	0.88	0.06
PIP	2%	0.86	0.93	0.07
DStrat	2%	0.99	0.99	0.00
RBI	2%	-0.06	0.68	0.74
Risk (volatility)		13.07%	15.30%	



- The active return is the difference between the portfolio return and the benchmark return. It is what we earn by tilting away from the benchmark.
- Active risk is the volatility (standard deviation) of the active return over time.
- The Board will allocate to staff an active risk budget. Staff aims to generate sufficient alpha to compensate for use of active risk.
- The Information Ratio is the amount of active return (alpha) the portfolio generates per unit active risk: $IR = (\text{active return})/(\text{active risk})$.
- Active management is the process of managing the tradeoff between generating alpha and the risks associated with investing to earn alpha.

Timeline



Investment Advisory Committee

Private Market Assets Program Reviews

November 30, 2022

Reading Deck



Overview (K.C. Howell, Managing Director)

5 min

Program Reviews

- **Real Assets** 30 min
(Walker Noland, Program Director)

- **Private Equity** 30 min
(John Alouf, Program Director)

- **Credit Strategies** 30 min
(Steve Woodall, Program Director)

- **Private Investment Partnership (PIP)**
(Steve Woodall, Program Director)

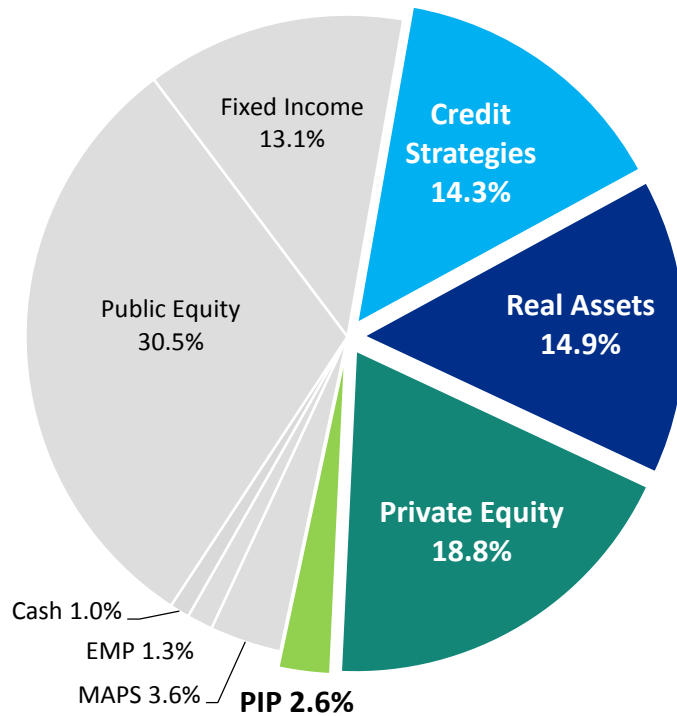
Program Reviews

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

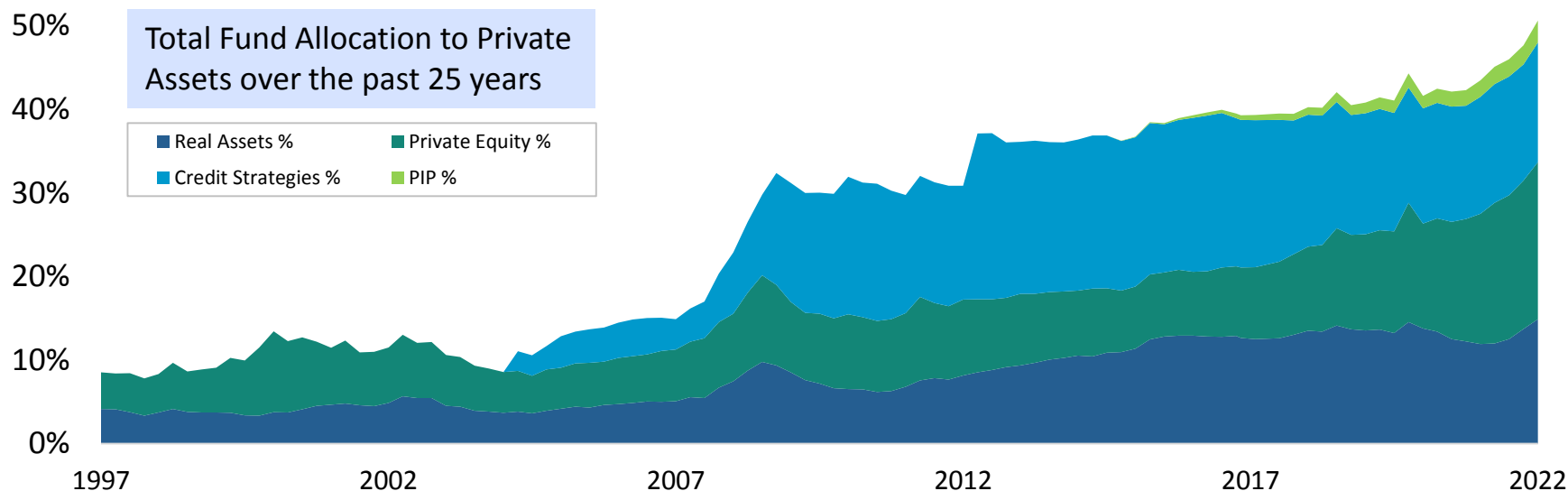
Private Market Assets: 50.6%

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 6/30/22; source: BNY Mellon data

Overview: Preview Of Agenda Items



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

Real Assets

Walker Noland
Director, Real Assets

Reading Deck



Agenda: Real Assets Annual Review Topics



- Overview
- Markets
- Exposures
- Results
- Managers
- Co-investments
- 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	Infra-structure Equities	Global Equities	IG Corp Bonds	CPI
Global REITs	1.00										
Commercial Real Estate	0.40	1.00									
Timberland	0.05	(0.10)	1.00								
Farmland	0.24	(0.01)	0.27	1.00							
Energy Equities	0.51	0.19	0.34	0.21	1.00						
Mining Equities	0.63	0.24	0.27	0.19	0.75	1.00					
Gold	0.16	(0.05)	0.18	0.33	0.06	0.26	1.00				
Infrastructure Equities	0.84	0.38	0.18	0.33	0.69	0.71	0.18	1.00			
Global Equities	0.77	0.31	0.25	0.16	0.62	0.74	0.13	0.85	1.00		
IG Corp Bonds	0.06	(0.22)	0.23	(0.22)	(0.27)	(0.25)	0.38	0.05	(0.10)	1.00	
U.S. CPI	0.11	0.29	0.41	0.25	0.29	0.22	0.14	0.18	0.06	(0.22)	1.00

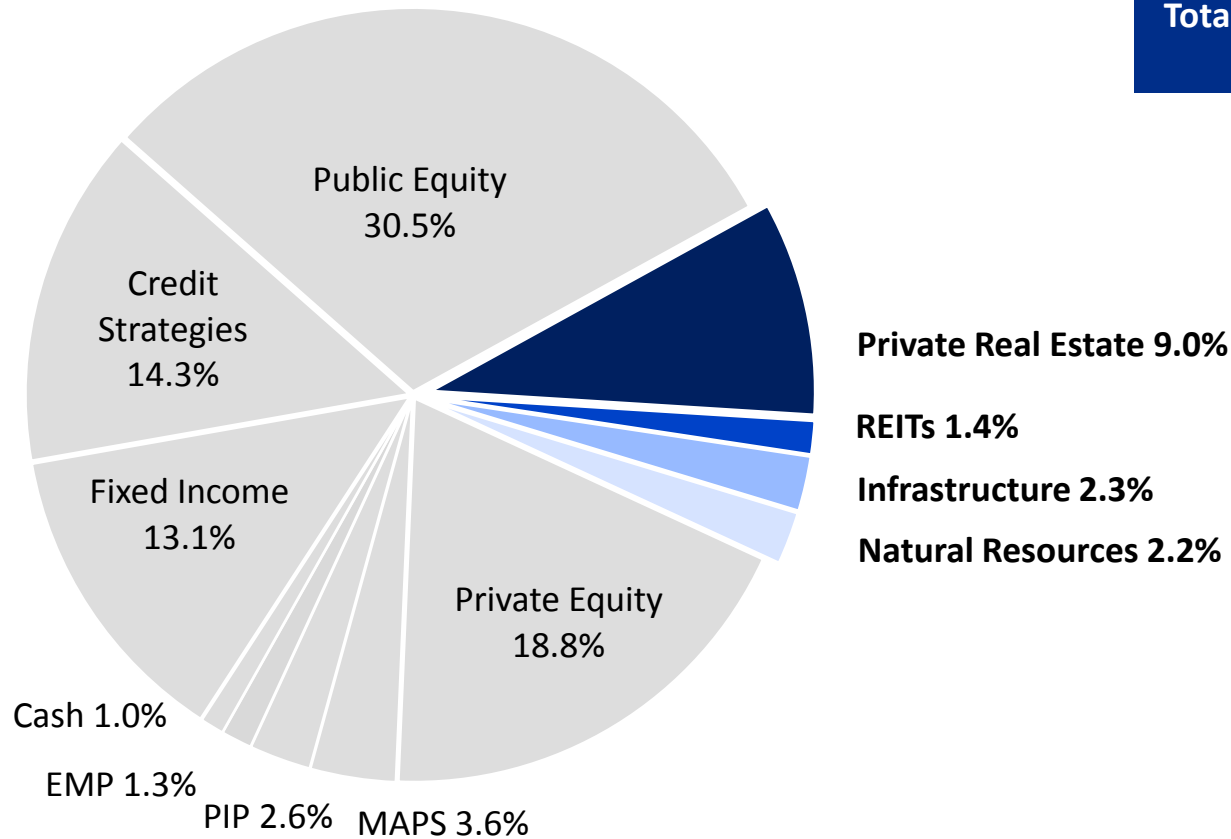
Notes: Private Commercial Real Estate returns de-smoothed. Correlations based on quarterly data, except Timberland and Farmland, which are based on annual data since those assets are generally appraised only once per year.

Overview: Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Walker Noland	Director	MBA	CFA	22	12
Warren Chang	Portfolio Manager	MBA, MS	CFA	25	7
Tom Coleman	Portfolio Manager	BS	CFA, CAIA	22	11
Jummai Sarki-Hurd	Portfolio Manager	MBA, MS	-	16	9
Tom Mulvin	Senior Investment Officer	BS	-	29	29
Daniel Ball	Investment Analyst	BA	-	0	0
Carol Timpano	Portfolio Assistant	BS	-	7	7

Overview: Asset Allocation – 6/30/22

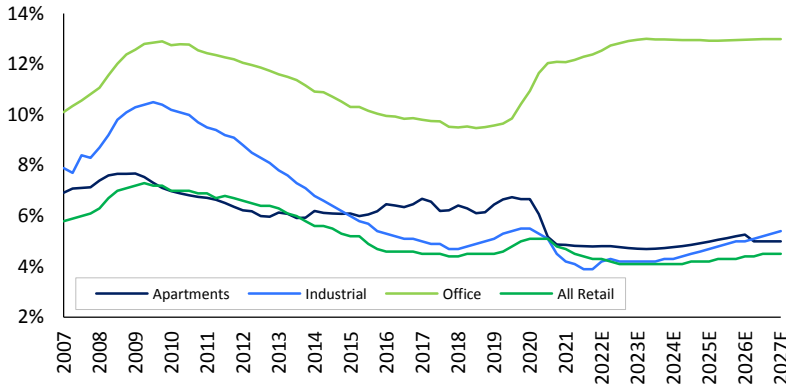


Source: BNY Mellon

Markets: Fundamentals

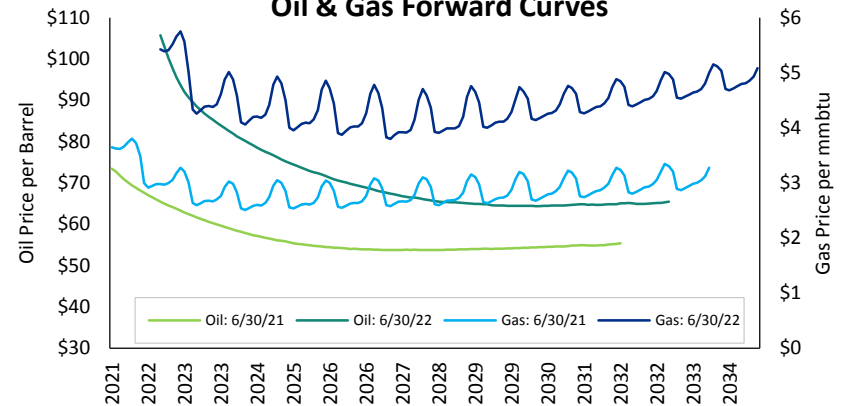


U.S. Property Vacancy Rates 2007-2027



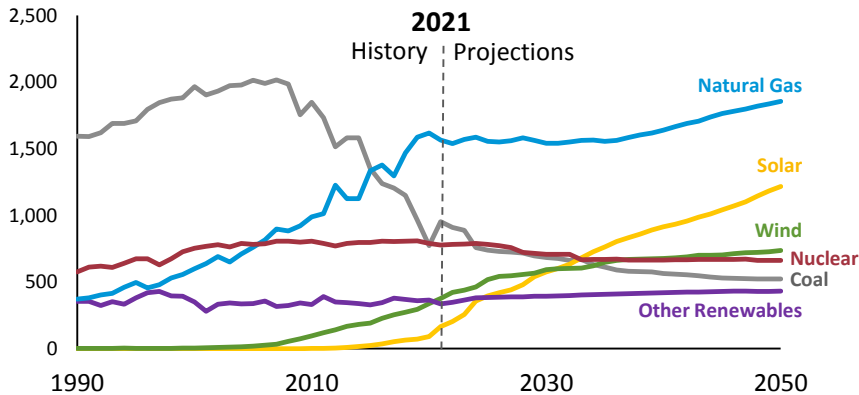
Source: Costar

Oil & Gas Forward Curves



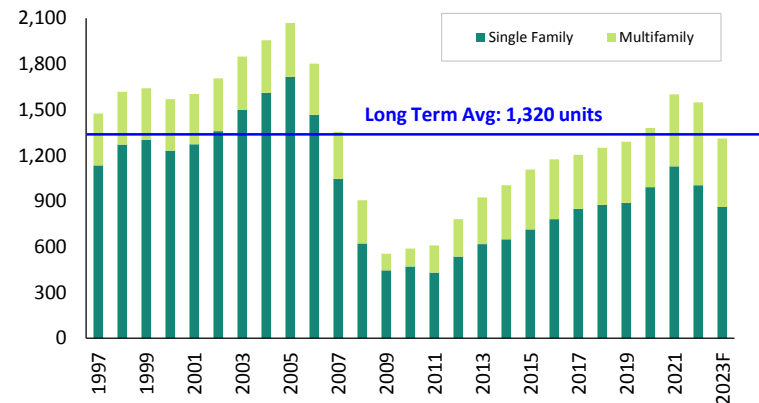
Source: Bloomberg

U.S. Electricity Generation (billion kilowatt-hour)



Source: EIA Energy AEO2022 Reference Case

Housing Starts 1997-2023 (000)

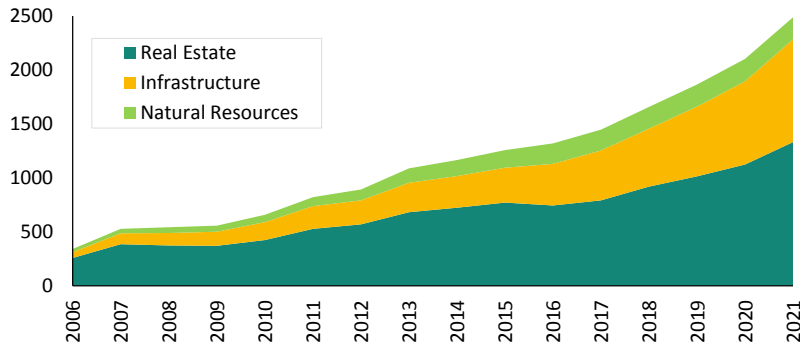


Source: U.S. Census Bureau, NAHB, FannieMae

Markets: Capital Markets

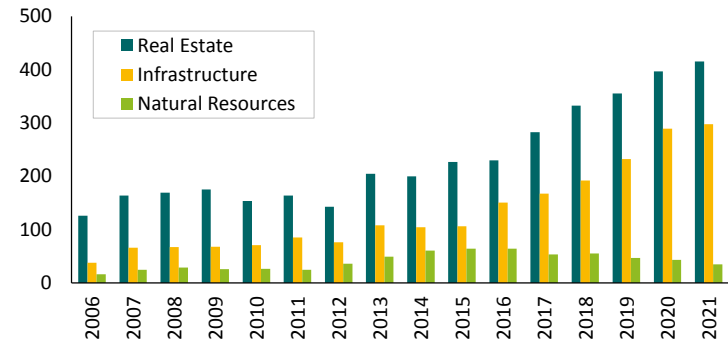


Real Assets Under Management (\$ Billion)



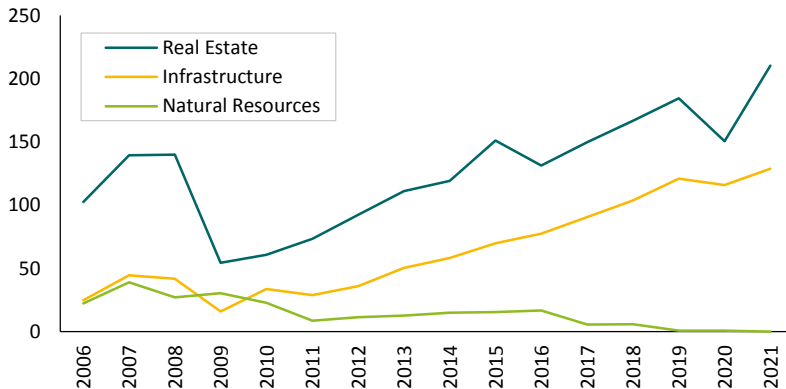
Source: Preqin Aug 2022

Dry Powder (\$Billion)



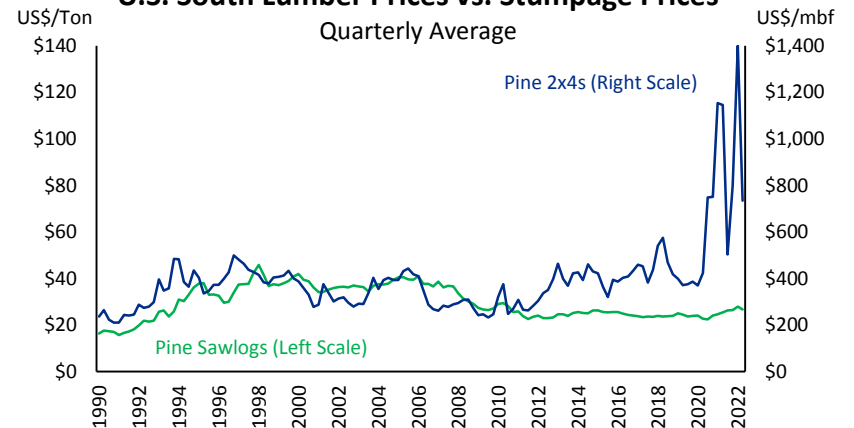
Source: Preqin Aug 2022

Real Assets Annual Fund Raising (\$Billion)



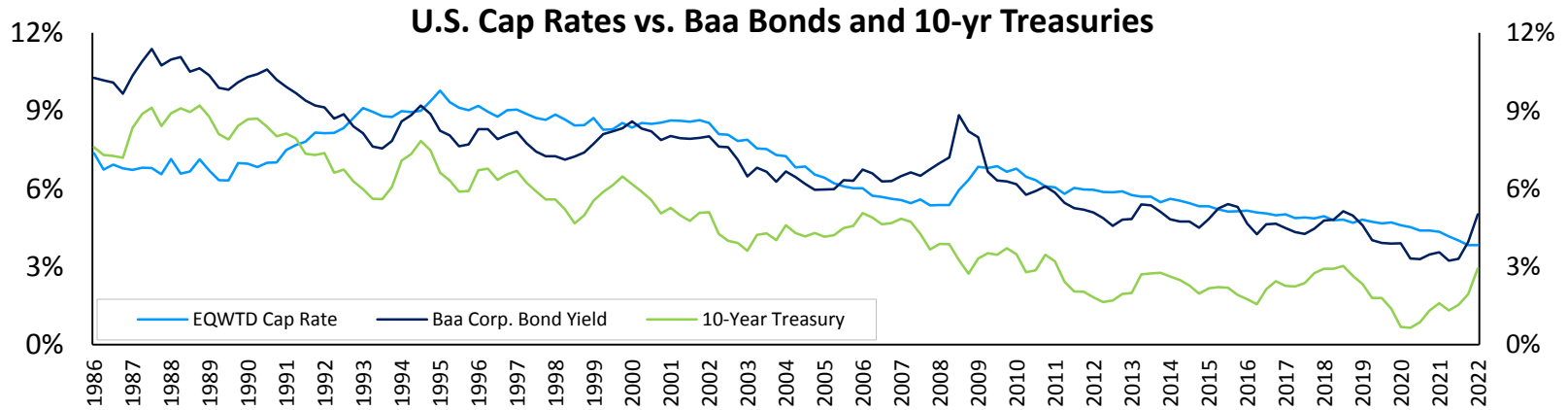
Source: Preqin Aug 2021

U.S. South Lumber Prices vs. Stumpage Prices
Quarterly Average

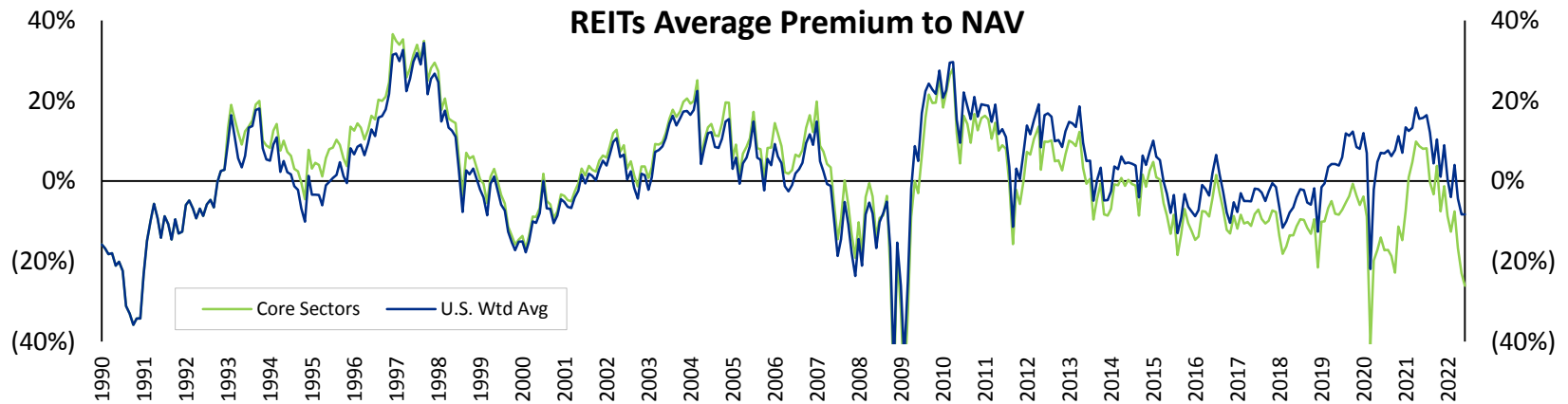


Sources: Timber Mart-South; Random Lengths; ERA

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



Sources: Bloomberg, NCREIF

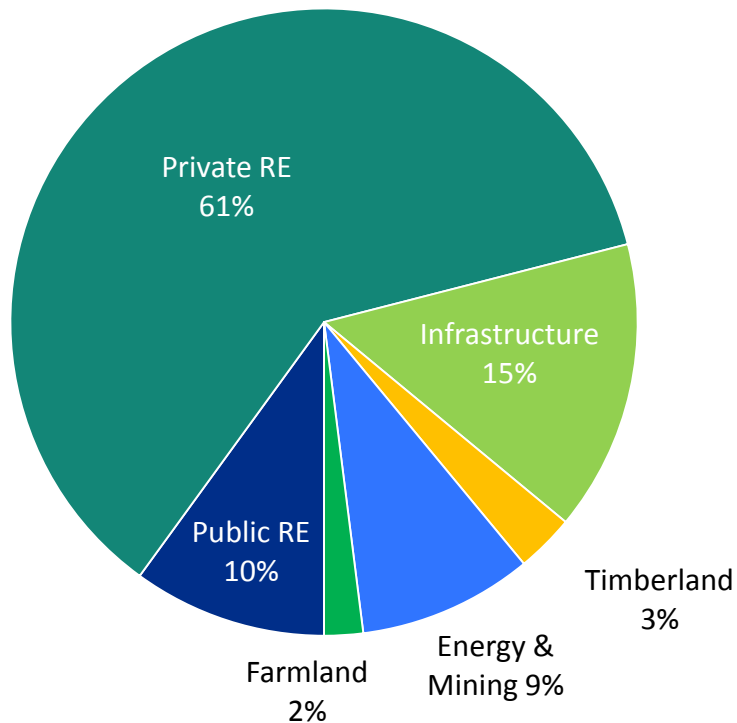


Sources: Green Street Advisors

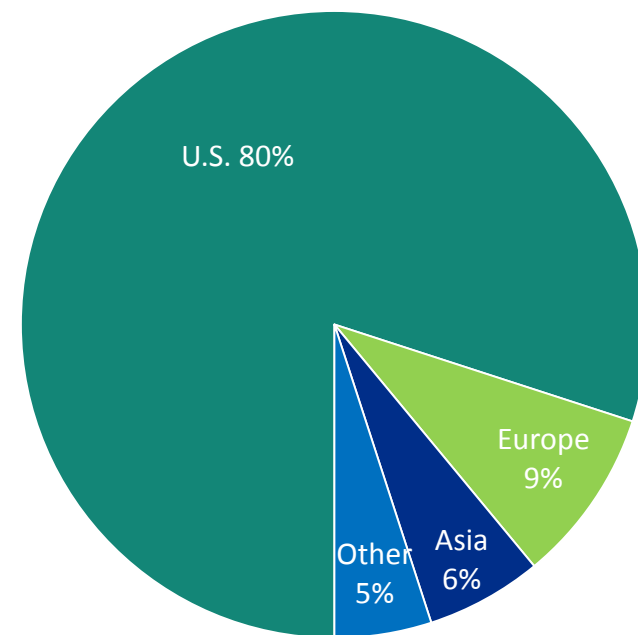
Exposures: Sectors & Geography – 6/30/22

Current Market Value: \$15.1 Billion

Sectors



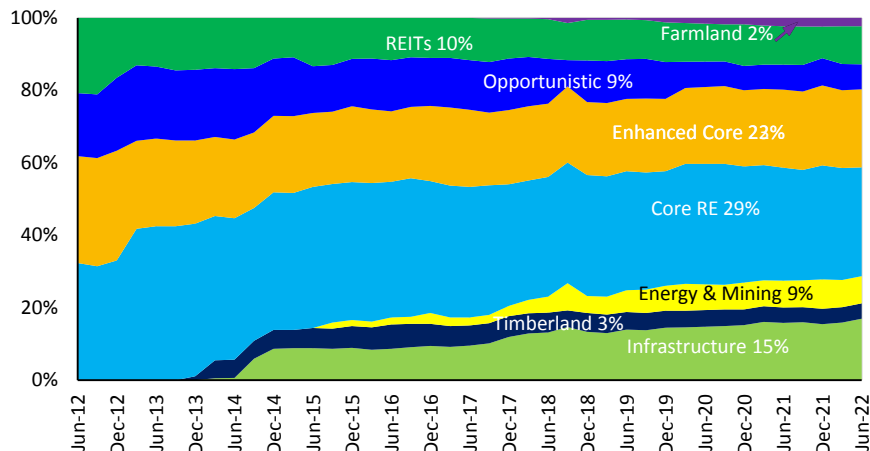
Geography



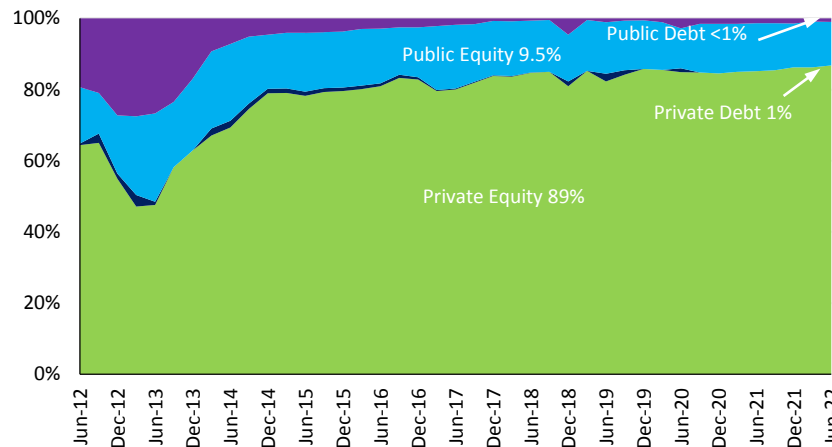
Exposures: Risk Metrics



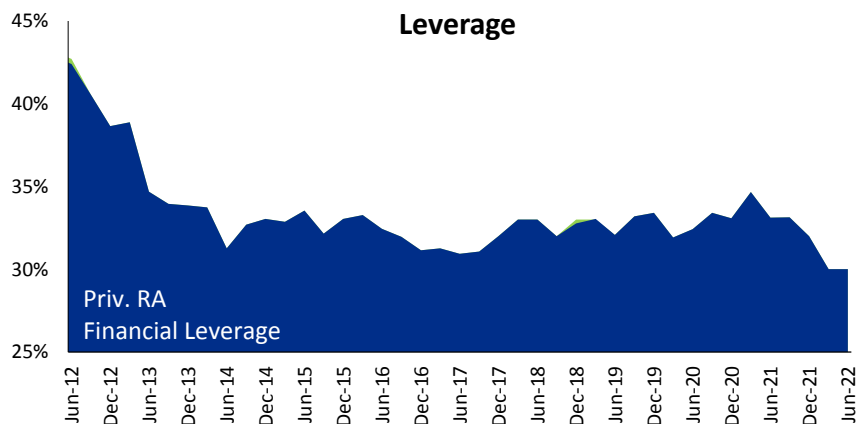
Risk/Sector Categories



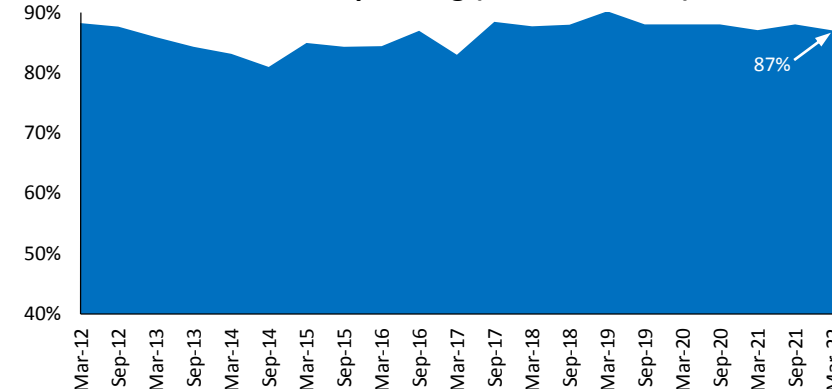
Four Quadrants



Leverage



Stabilized Operating (% of Private RE)

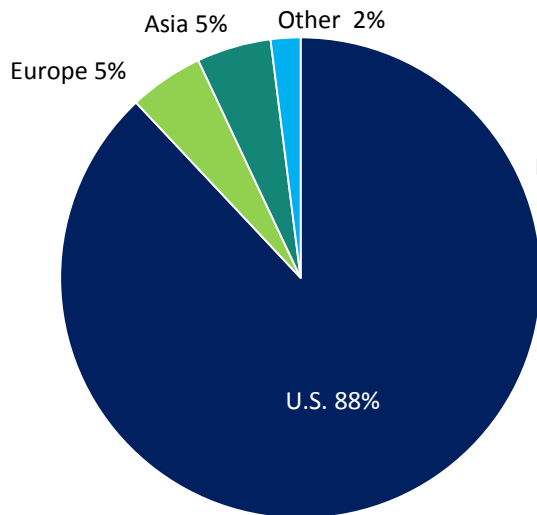


Source: BNY Mellon

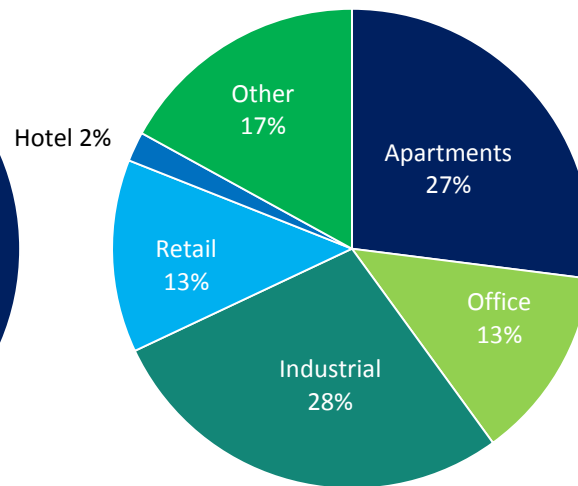
Exposures: Real Estate – 6/30/22



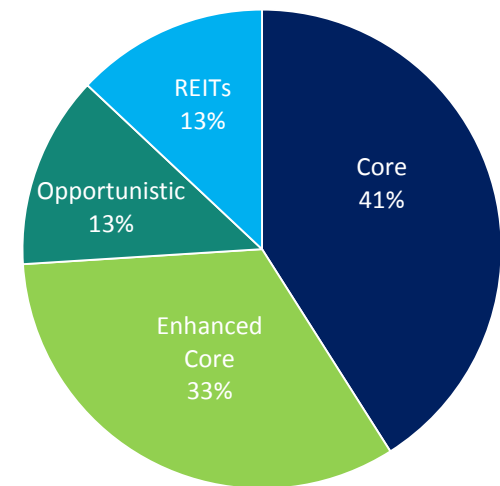
Geography



Property Type



Category

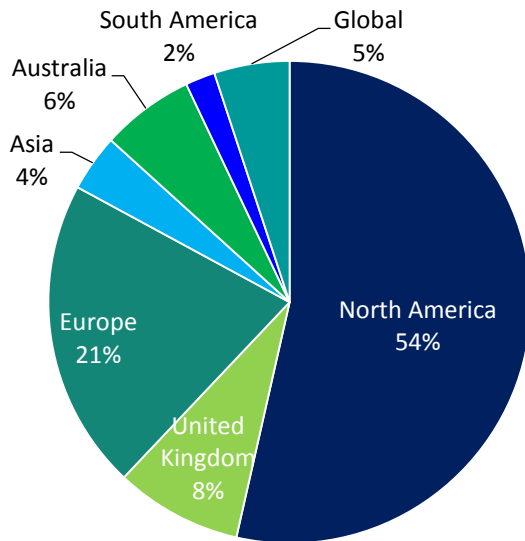


Market	# Accts.	Market Value (\$MM)	Market Value %	Unfunded Commitment/Allocation (\$MM)
Private	58	9,146	87	2,717
Public	2	1,427	13	0
Total	60	10,573	100	2,717

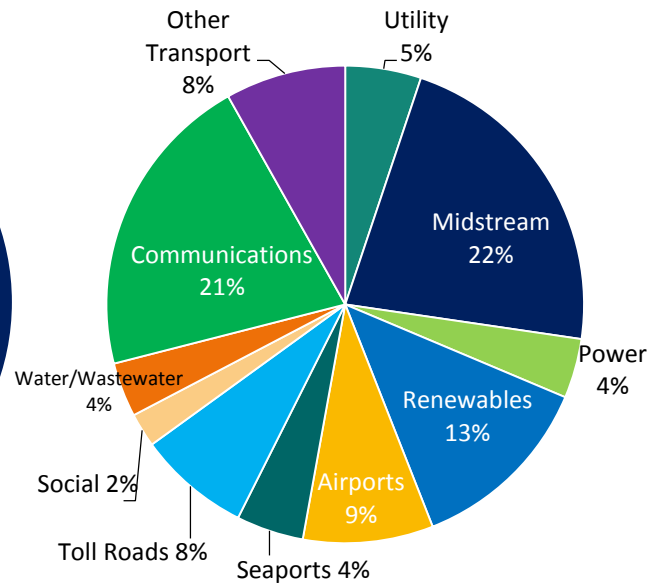
Source: BNY Mellon

Exposures: Infrastructure – 6/30/22

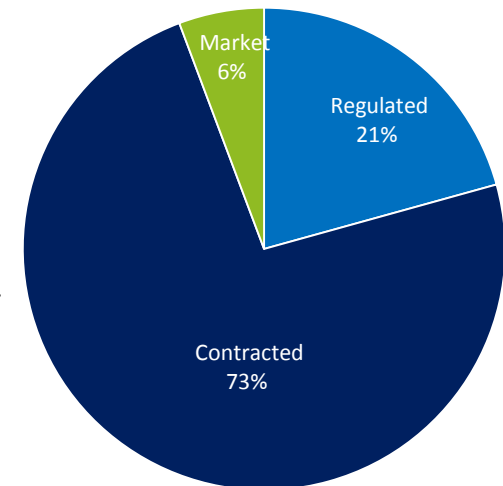
Geography



Sector



Revenue Source



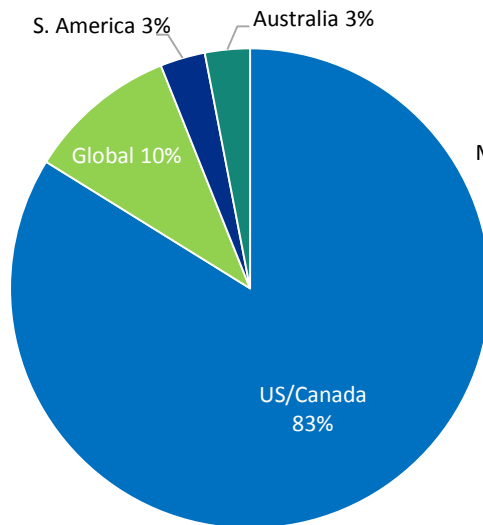
Market	# Accts.	Market Value (\$MM)	Market Value %	Unfunded Commitment/Allocation (\$MM)
Private	24	2,043	96	1,005
Public	1	91	4	-
Total	25	2,134	100	1,005

Source: BNY Mellon

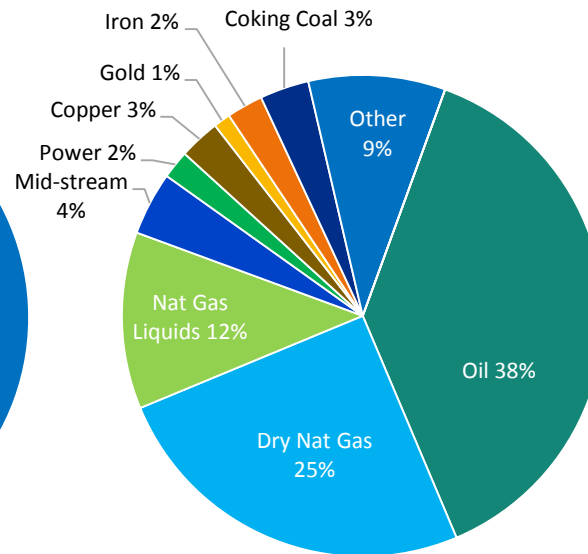
Exposures: Energy & Mining – 6/30/22



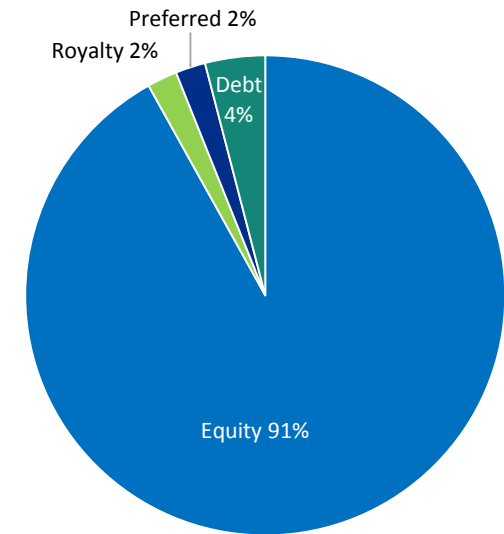
Geography



Commodity



Structure

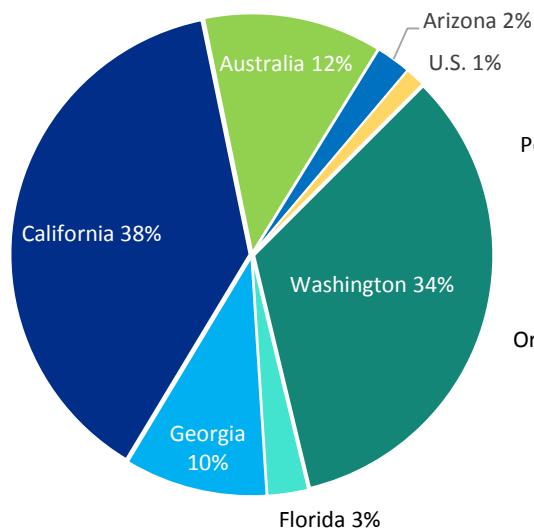


Market	# Accts.	Market Value (\$MM)	Market Value %	Unfunded Commitment/Allocation (\$MM)
Private	20	1,191	89	656
Public	1	144	11	25
Total	21	1,335	100	681

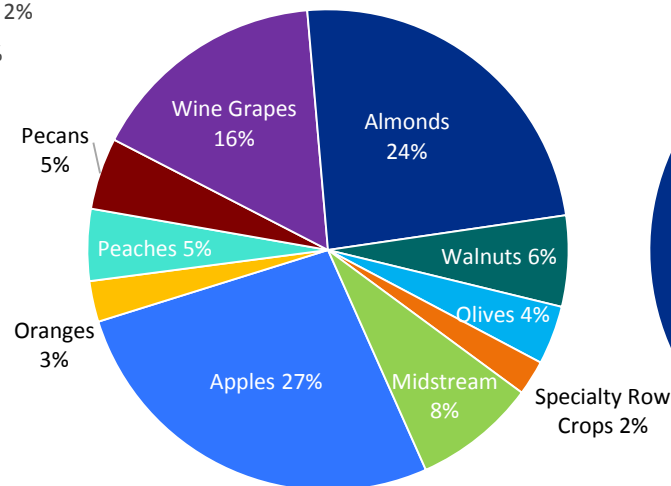
Source: BNY Mellon

Exposures: Farmland – 6/30/22

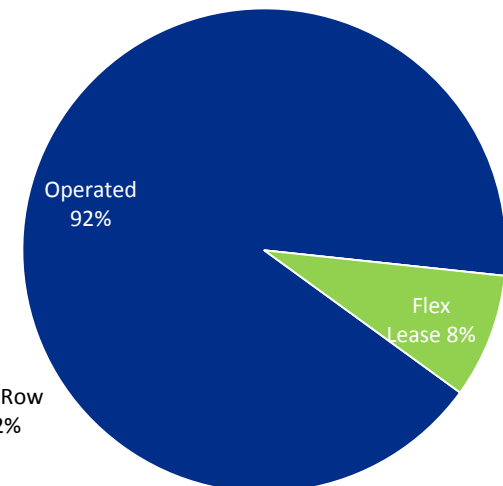
Geography



Crop



Revenue Source

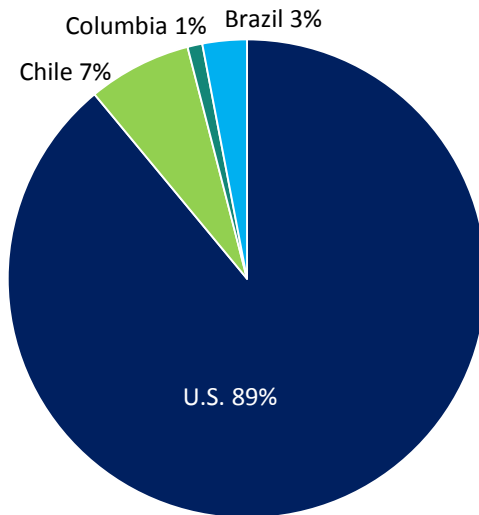


Market	# Accts.	Market Value (\$MM)	Market Value %	Unfunded Commitment/Allocation (\$MM)
Private	2	354	100	47

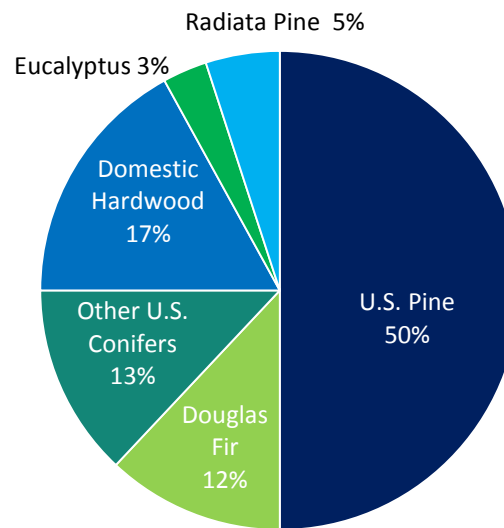
Source: BNY Mellon

Exposures: Timberland – 6/30/22

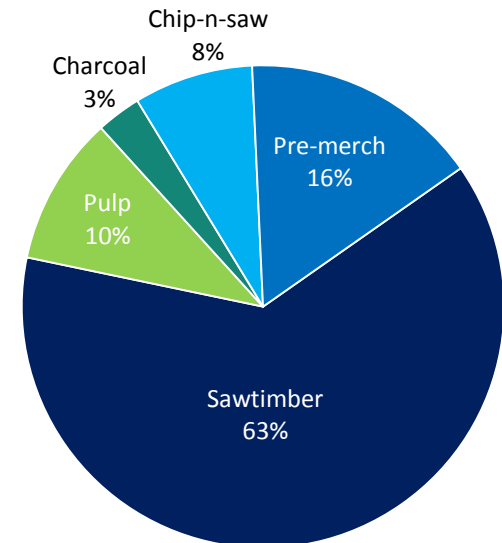
Region



Species



Product Type



Market	# Accts.	Market Value (\$MM)	Market Value %	Unfunded Commitment/Allocation (\$MM)
Private	3	477	100	218

Source: BNY Mellon

Results: Portfolio Returns – 6/30/22



	10 Year	5 year	3 Year	1 Year	MV (\$MM)
Total Real Assets	10.9	10.1	11.0	21.7	15,091
Strategic Benchmark	9.1	8.1	8.7	18.0	
Excess Return	1.8	2.0	2.3	3.7	
Private Real Estate	12.1	11.2	12.8	28.6	9,146
Benchmark	9.9	8.9	10.3	27.3	
Excess Return	2.2	2.3	2.5	1.3	
REITs	5.2	2.2	-1.4	-12.9	1,427
Benchmark	5.6	2.9	-0.2	-12.7	
Excess Return	-0.4	-0.7	-1.2	-0.2	
Infrastructure	n/a	11.8	10.9	17.9	2,322
Benchmark	n/a	7.4	8.2	12.5	
Excess Return	n/a	4.4	2.7	5.4	
Total Natural Resources	6.3	7.8	10.8	25.6	2,196
Benchmark	6.4	7.4	8.2	12.5	
Excess Return	-0.1	0.4	2.6	13.1	

Source: BNY Mellon

Headwinds/Tailwinds

- +** **Tailwinds:** Upstream energy, private real estate, especially industrial & multifamily real estate; renewable infrastructure
- **Headwinds:** Office real estate, publicly traded assets

Largest Absolute Return Contributors:

- +** Private energy +52.4% (7.9% of program)
- +** Private real estate +28.6% (60.6% of program)
- +** Private infrastructure +18.4% (14.5% of program)
- International REITs -20.7% (3.3% of program)

Largest Relative Return Contributors:

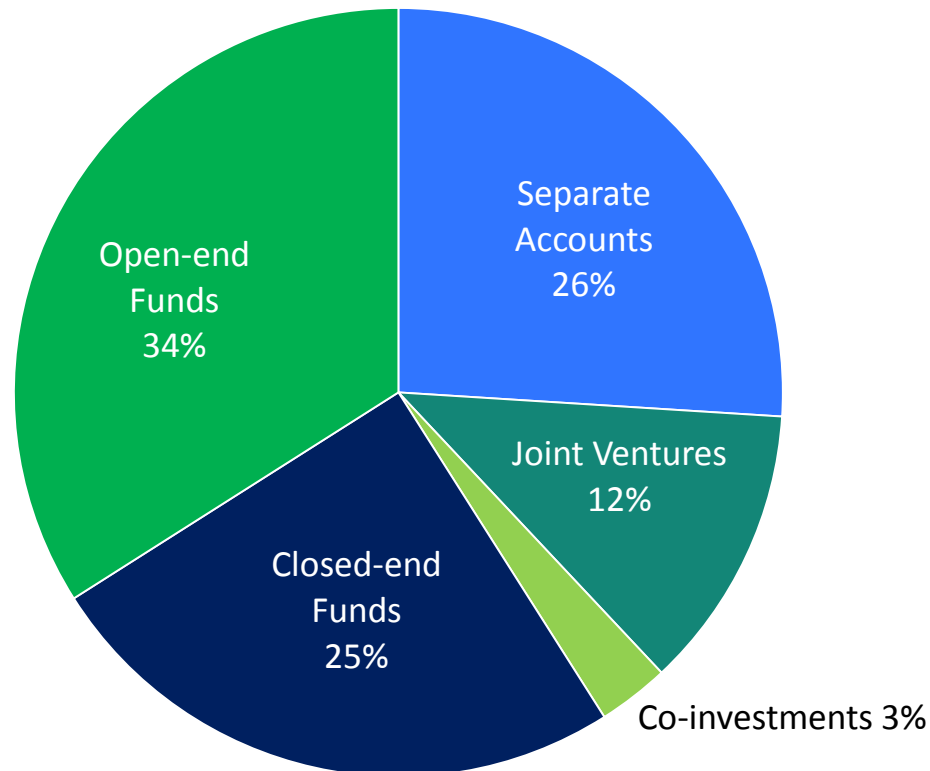
- +** Natural Resources: +13.1% excess return.
- +** Infrastructure: +5.4% excess return. Renewable energy; strong recovery from Covid hit sectors
- +** Private Real Estate: +1.3% excess return (60.6% of program)
- REITs: -0.2% (9.5% of program – slightly underweight)

Co-investments: Real Assets Approach



- Objective is to invest additional funds alongside existing managers to fine tune portfolio exposures, 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

Co-investments: Structure – 6/30/22



Source: BNY Mellon

Managers: Top 10 Investment Managers



Manager	# of Mandates	% of Program
PGIM	2	13.8%
VRS Internal Equity Mgmt.	2	9.5%
Blackstone	13	8.3%
Morgan Stanley	3	6.9%
Clarion Partners	1	6.7%
Industry Funds Mgmt.	3	4.1%
Pritzker Realty Group*	2	3.9%
JP Morgan	2	3.6%
Pantheon Ventures	3	3.0%
Global Infrastructure Partners	4	2.8%

*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 15 new DIME managers across 15 mandates in 12 months ending 6/30/22

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	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
Tristan Curzon	Real Estate	2017	180
		Total	1,262

Managers: Investment Commitments (\$MM)



Sector	Commitment
Public REITs	None
Private RE Equity	Crow Holdings Realty Partners Fund IX - \$150 Quad CP Fund I - \$200 Blackstone Real Estate Partners Asia III, L.P. - \$200 Artemis Real Estate Partners Fund IV, L.P. - \$125 Blackstone Real Estate Partners X, L.P. - \$250 One Co-investment - \$35
Infrastructure	True Green Capital Fund IV, L.P. - \$75 iCON Infrastructure Partners VI, L.P. - \$150 Three Co-investments - \$72
Natural Resources	EIG River Energy Partners, L.P. - \$200 Two Co-investments - \$50

Period Ending 6/30/22

- Continue active portfolio management
- 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



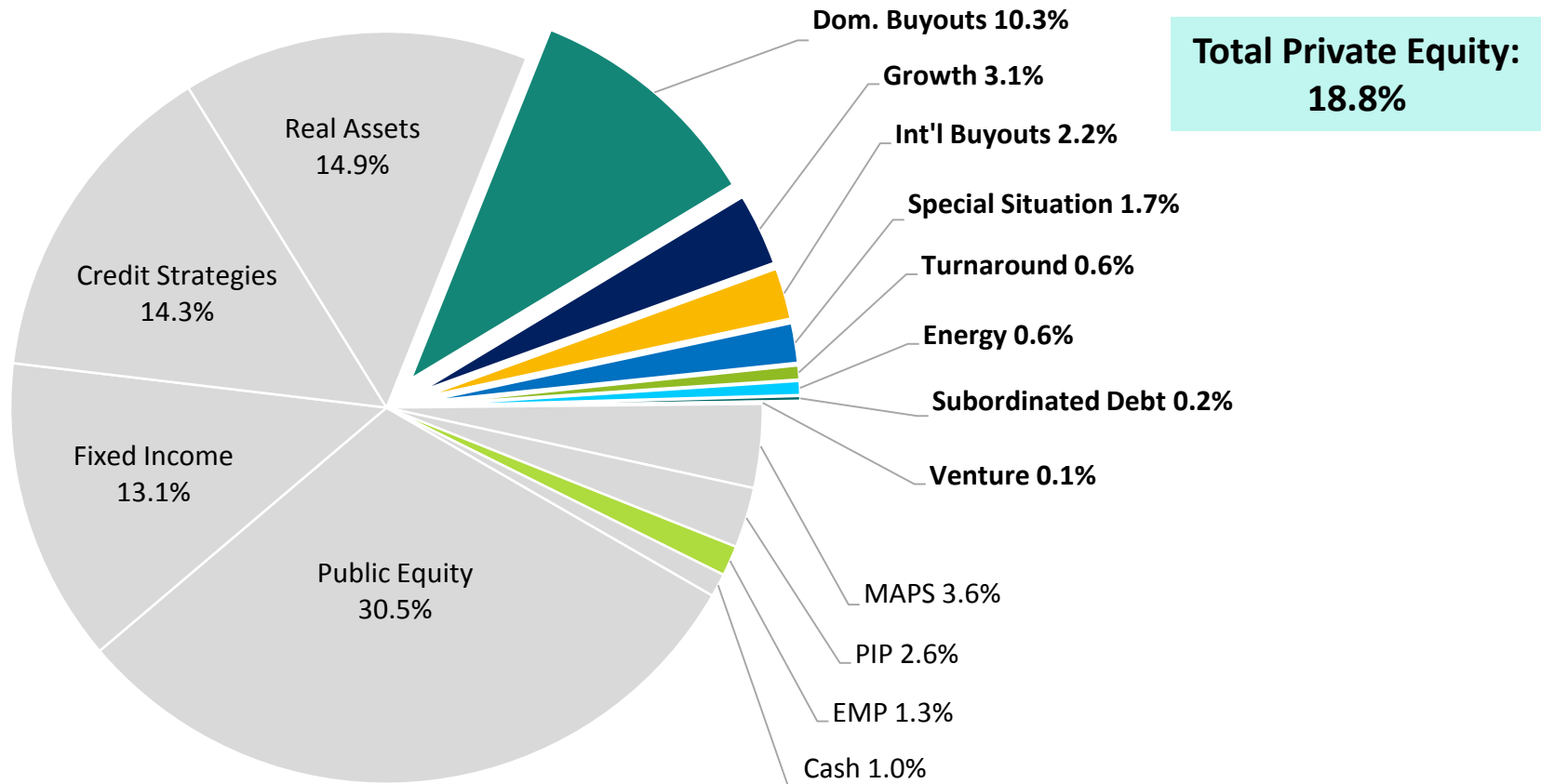
- Overview
- Markets
- Exposures
- Results
- Managers
- Co-investments
- Looking Forward

Overview: Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
John Alouf	Director	MBA	CFA	28	22
Jay Gentry	Portfolio Manager	BBA	CFA, CPA	28	28
Peter Murphy	Portfolio Manager	BBA	CFA, CPA	22	11
Rob Voeks	Portfolio Manager	PhD		25	8
De'Von Jones	Investment Officer	BBA	CFA	12	3
Viet Tran	Investment Analyst	MS		2	1
Carol Timpano	Portfolio Assistant	BS		7	7

Overview: Asset Allocation – 6/30/22



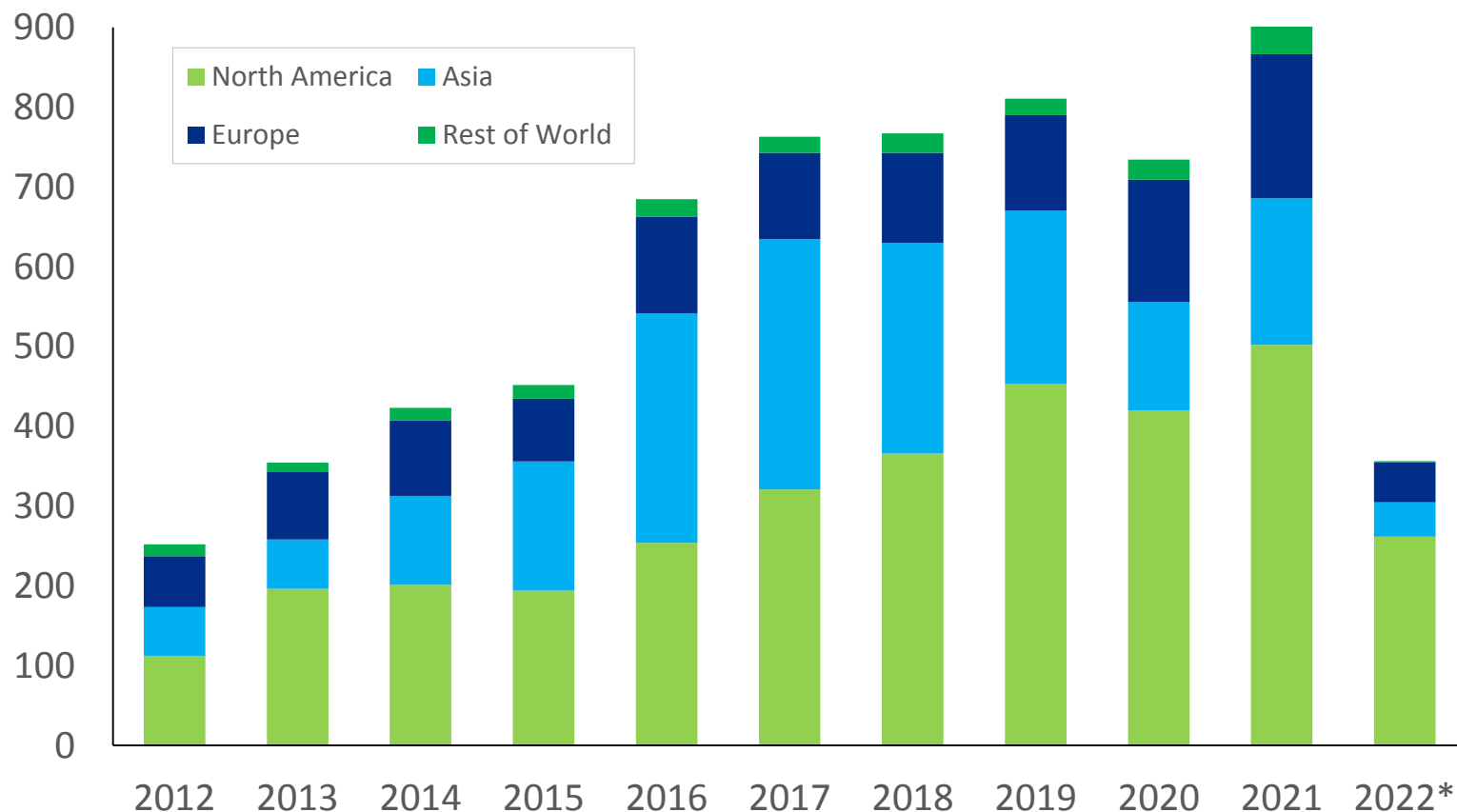
**Total Private Equity:
18.8%**

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.

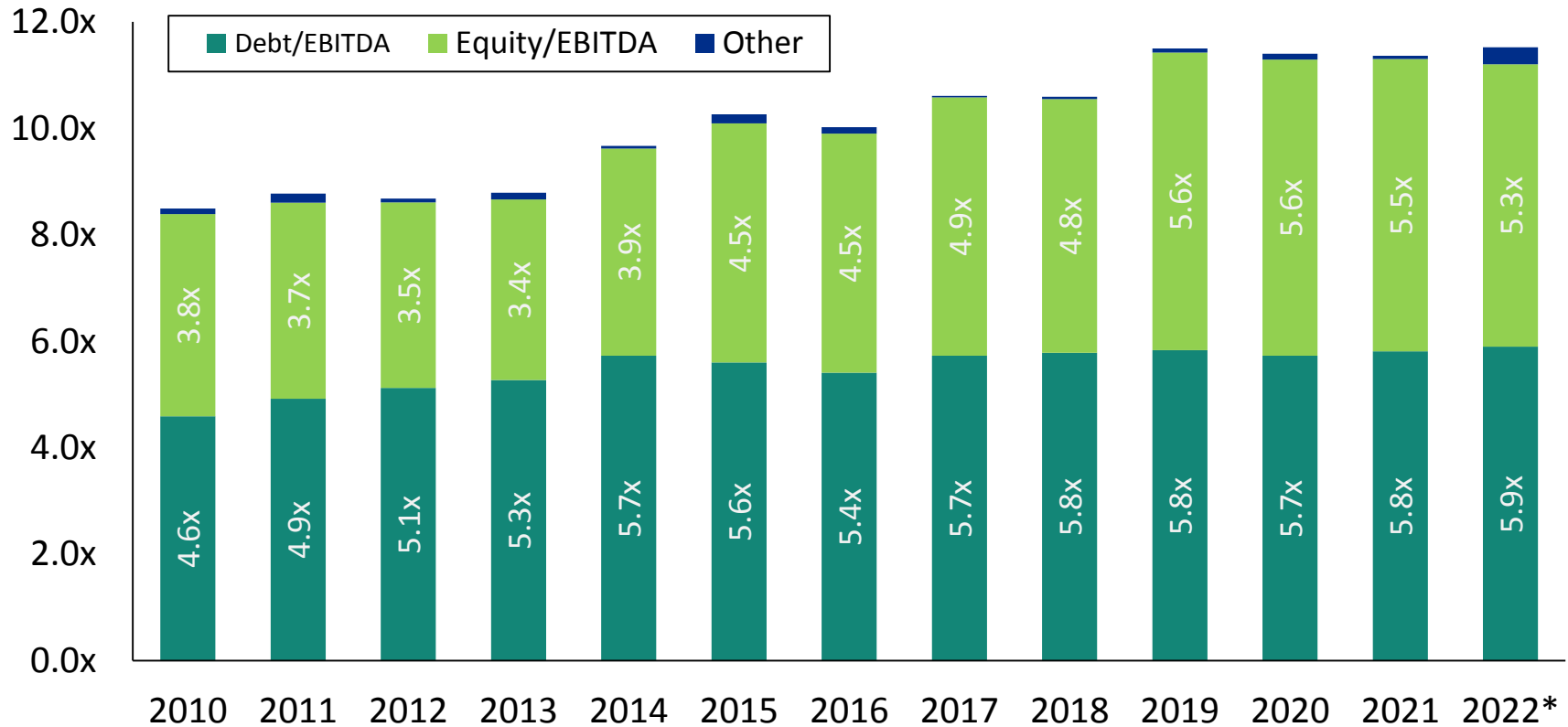
Markets: Global Private Equity Fundraising (\$M)



Source: Preqin

*2022 is through the first six months of the year

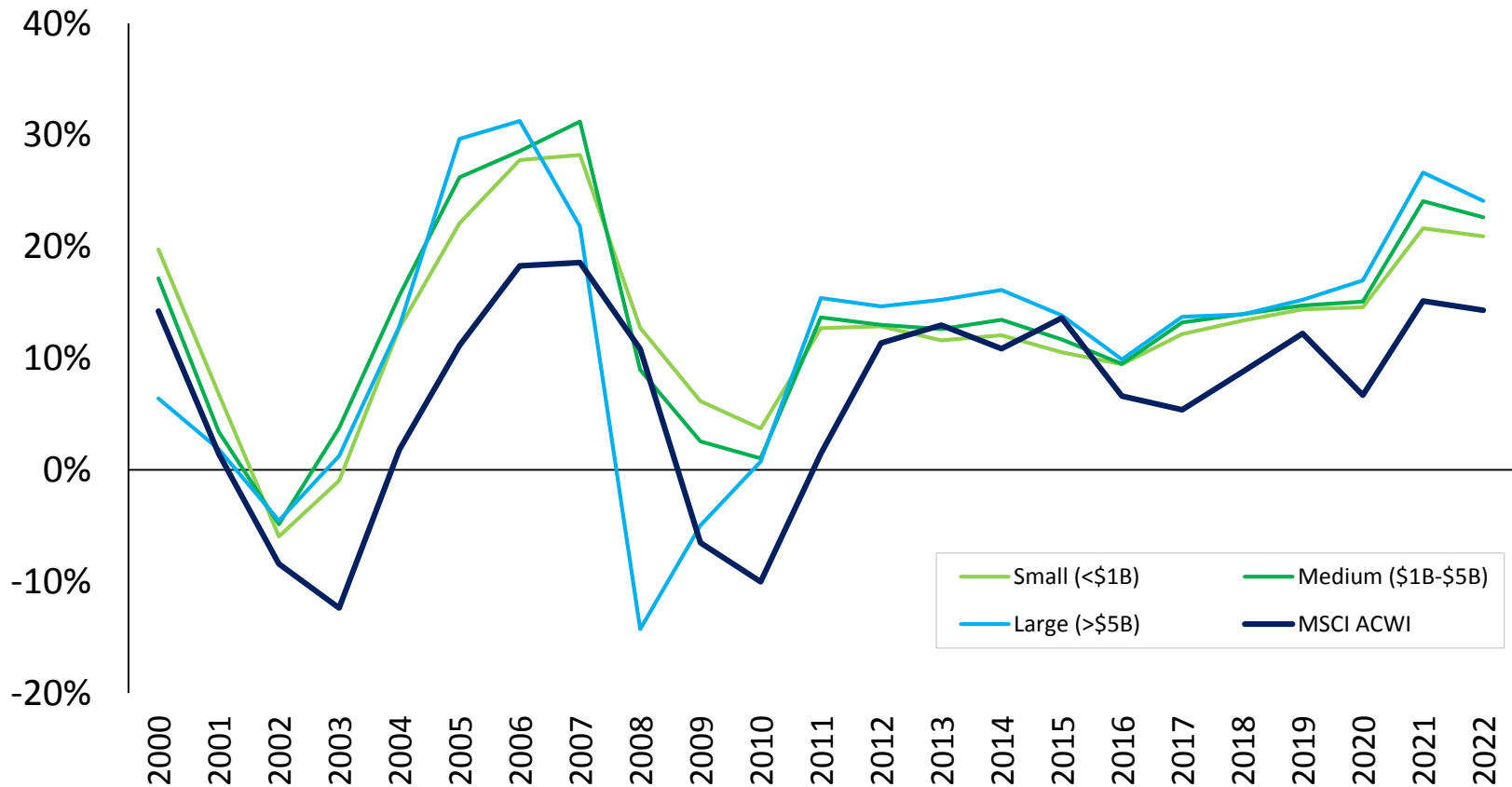
Markets: Purchase Price Multiples (U.S. Buyouts)



Source: LCD Leveraged Buyout Review

*2022 is through the first six months of the year

Markets: Rolling 3-Year Returns By Fund Size



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

Note: 2022 is through the first three months of the year.

Markets: Existing Investments & Liquidity



Existing Investments

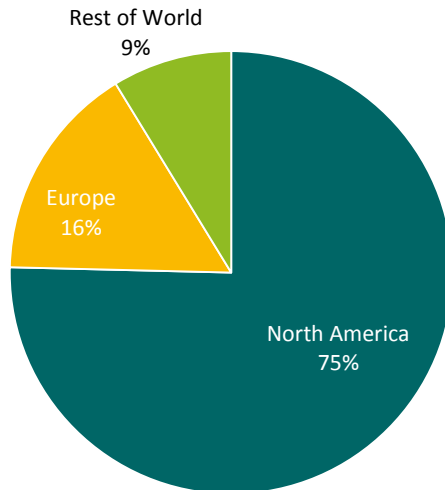
- Closely monitoring company performance
- Utilize operational expertise
- Covenant-lite debt
- Add-ons
- Strategic repositioning
- Expansion: product line or geographic

Liquidity

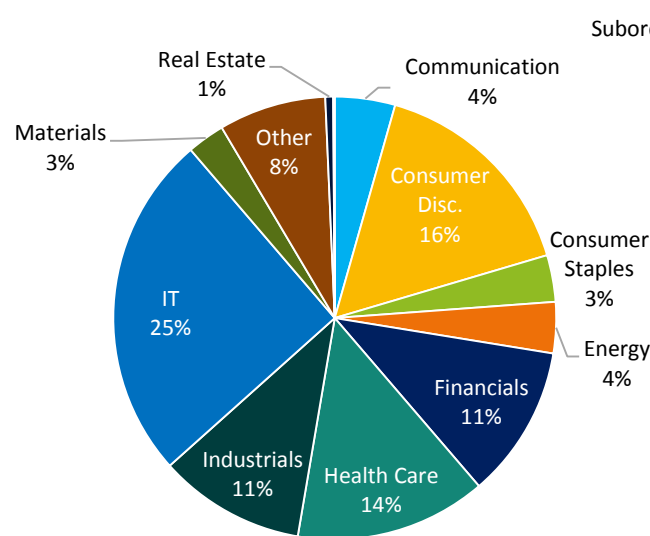
- Limited
- Premier assets are the most actionable

Exposures: Position Weighting

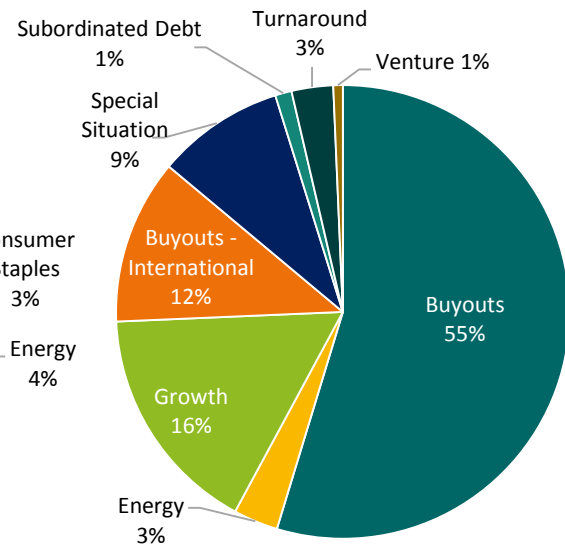
Geography



Industry



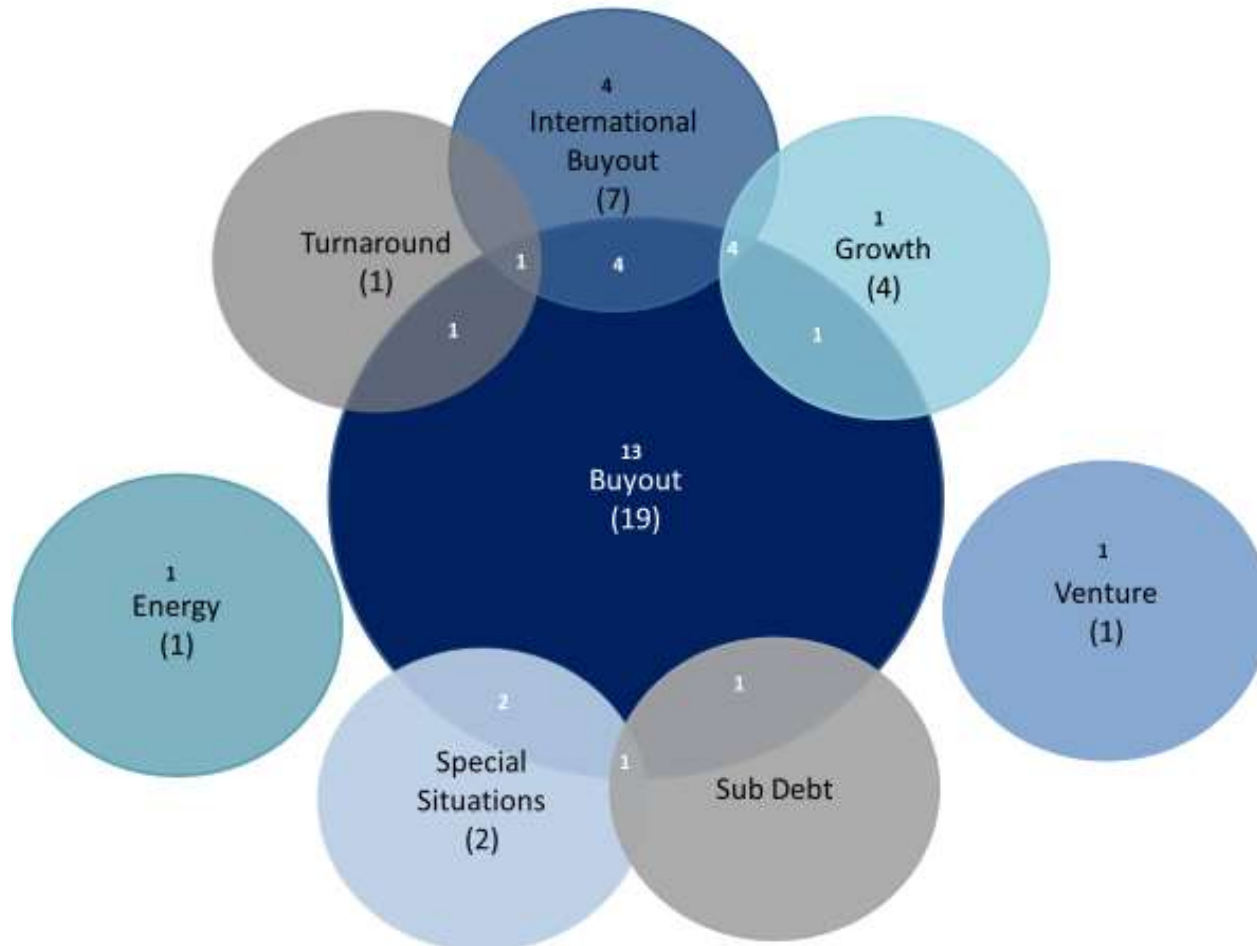
Sector



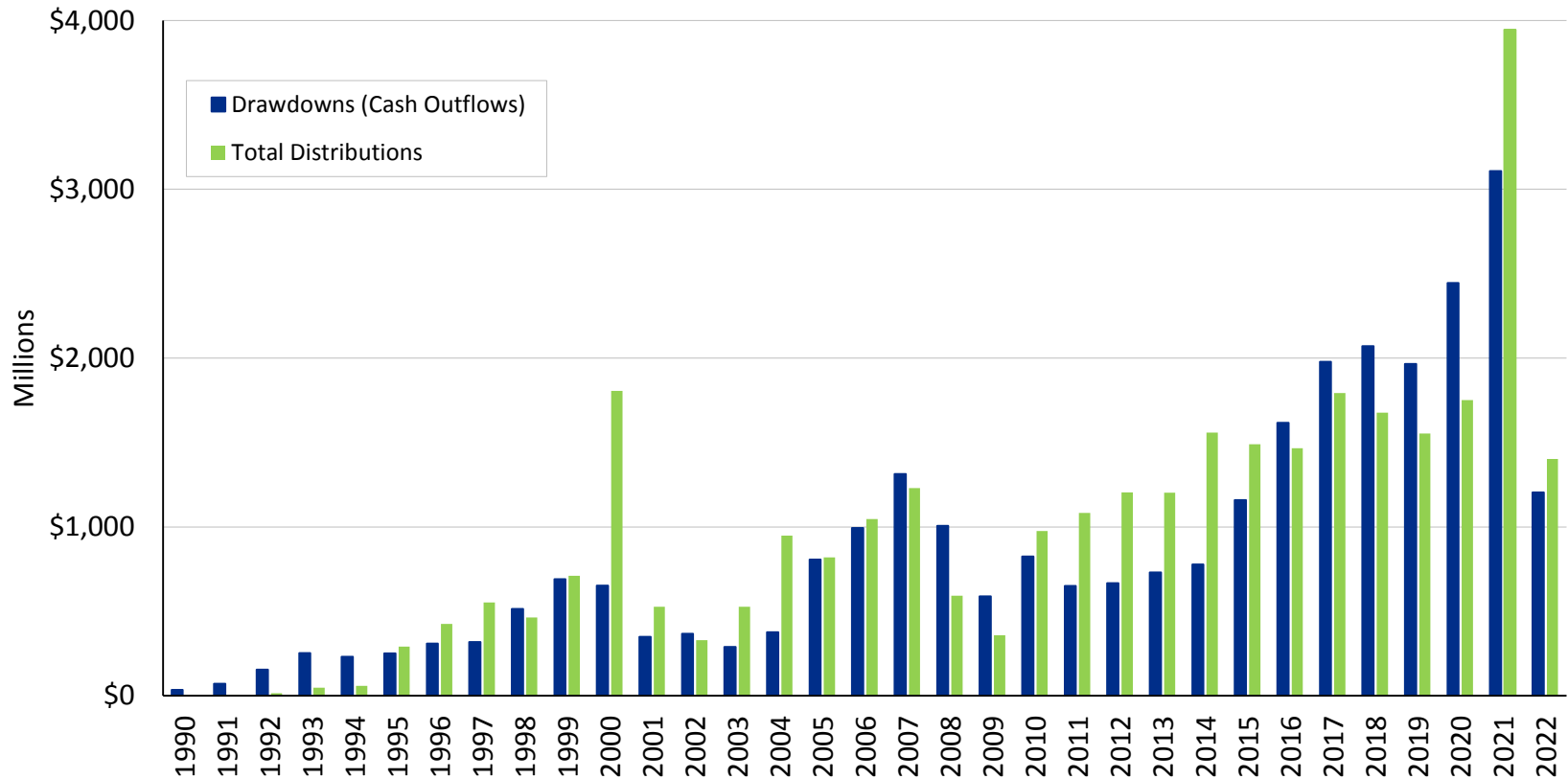
Geography and Industry charts based on 3/31/22 manager information.
Sector chart based on 6/30/22 BNY Mellon information

Exposures: Active Relationships By Sector

Private equity manages a total of 35 active relationships



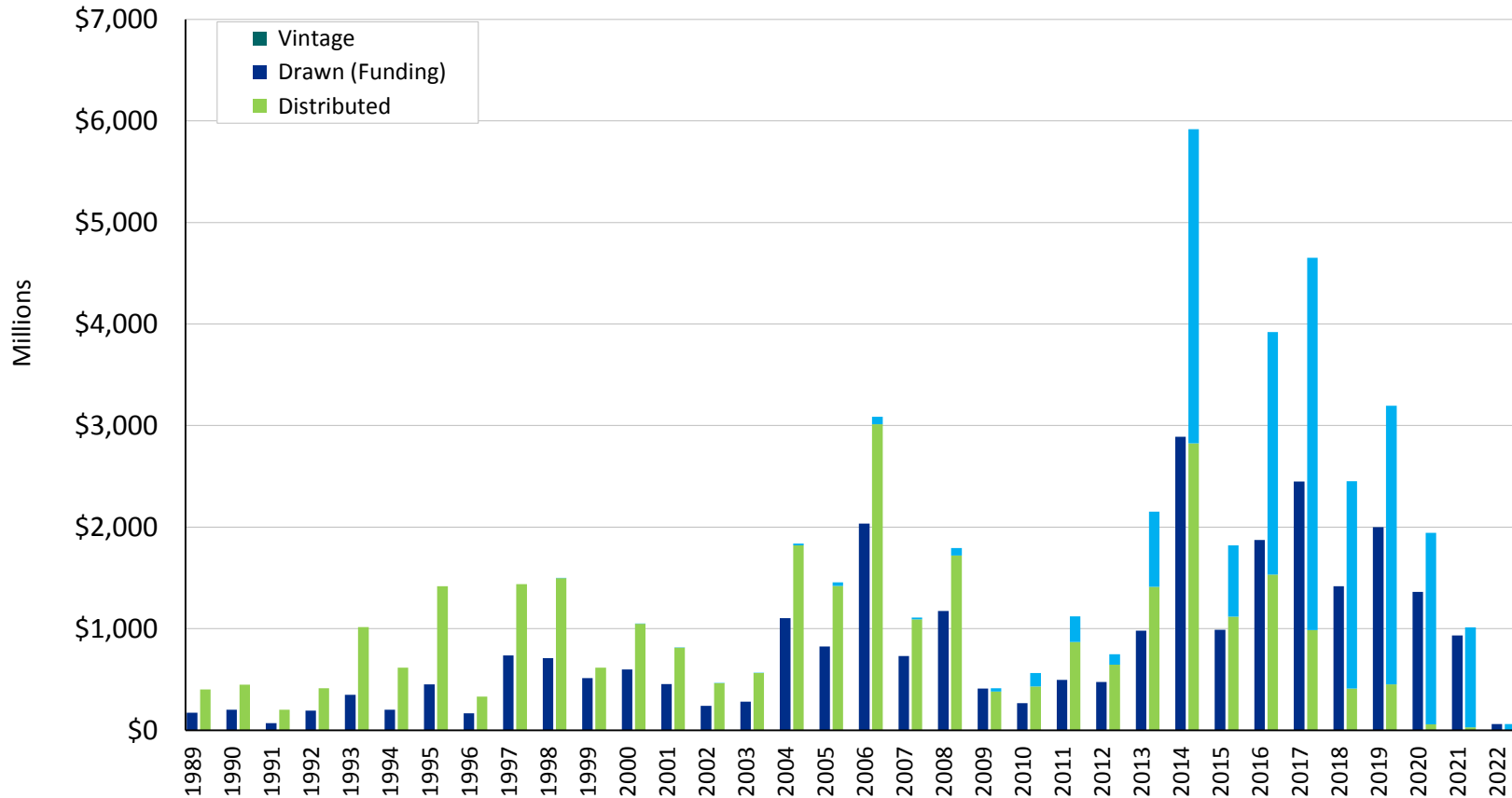
Results: Annual Cash Flows (\$MM)



Since inception net cash flow to VRS of \$3.1 billion

Note: 2022 is through the first seven months of the year.

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



Valuations as of 3/31/2022 adjusted for cash flows through 6/30/2022

Results: Time-Weighted Performance – 6/30/22



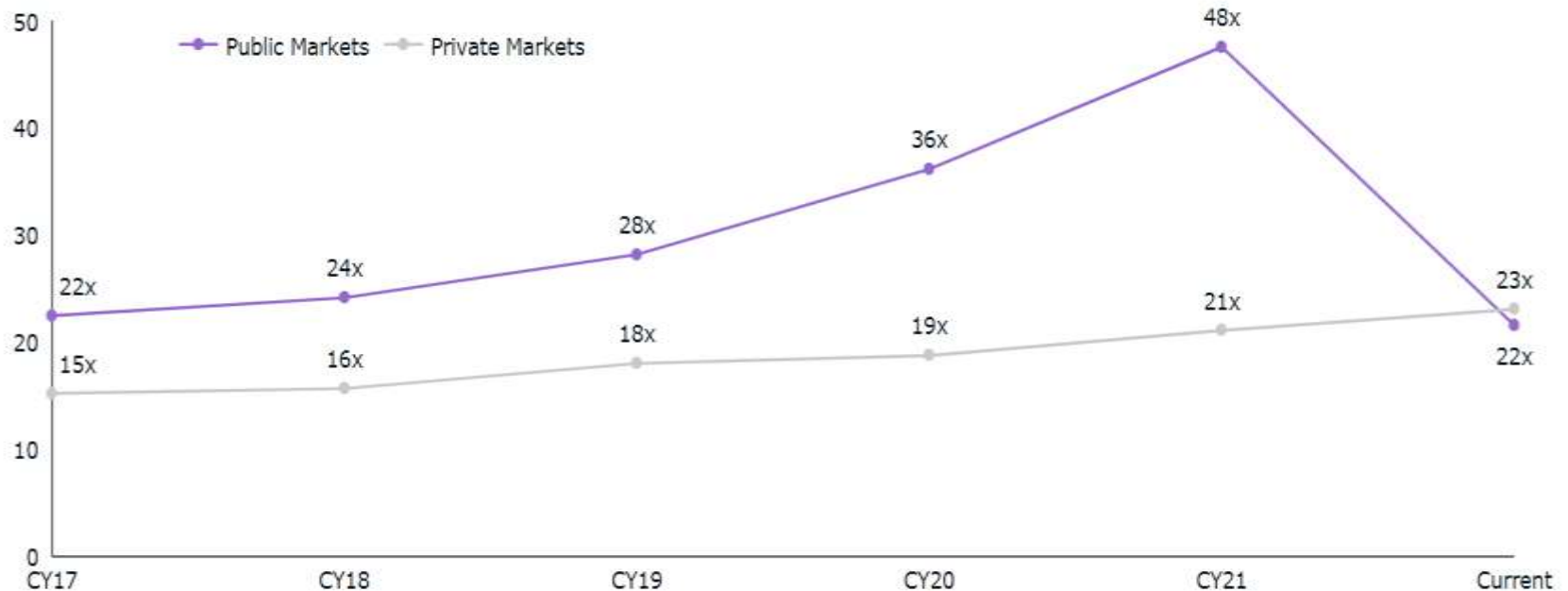
	10 Year	5 year	3 Year	1 Year	MV (\$MM)
Total Private Equity	17.5	21.2	25.5	27.4	19,049
Strategic Benchmark*	13.7	14.4	15.7	6.7	
Excess Return	3.8	6.8	9.8	20.7	
Buyouts	20.6	22.0	26.8	27.2	10,419
Energy	-1.5	0.1	-3.6	37.8	605
Growth	26.1	34.3	42.3	29.1	3,131
Int'l Buyout	15.0	20.2	23.5	18.3	2,240
Special Situations	16.2	18.6	21.2	31.5	1,734
Sub Debt	13.7	16.3	14.0	18.4	223
Turnaround	17.2	17.9	21.4	36.3	564
Venture	18.0	29.1	43.7	87.4	129

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

Markets: Private vs. Public Markets (Digital Tech Services)



EV/LTM EBITDA



Markets: Headwinds/Tailwinds



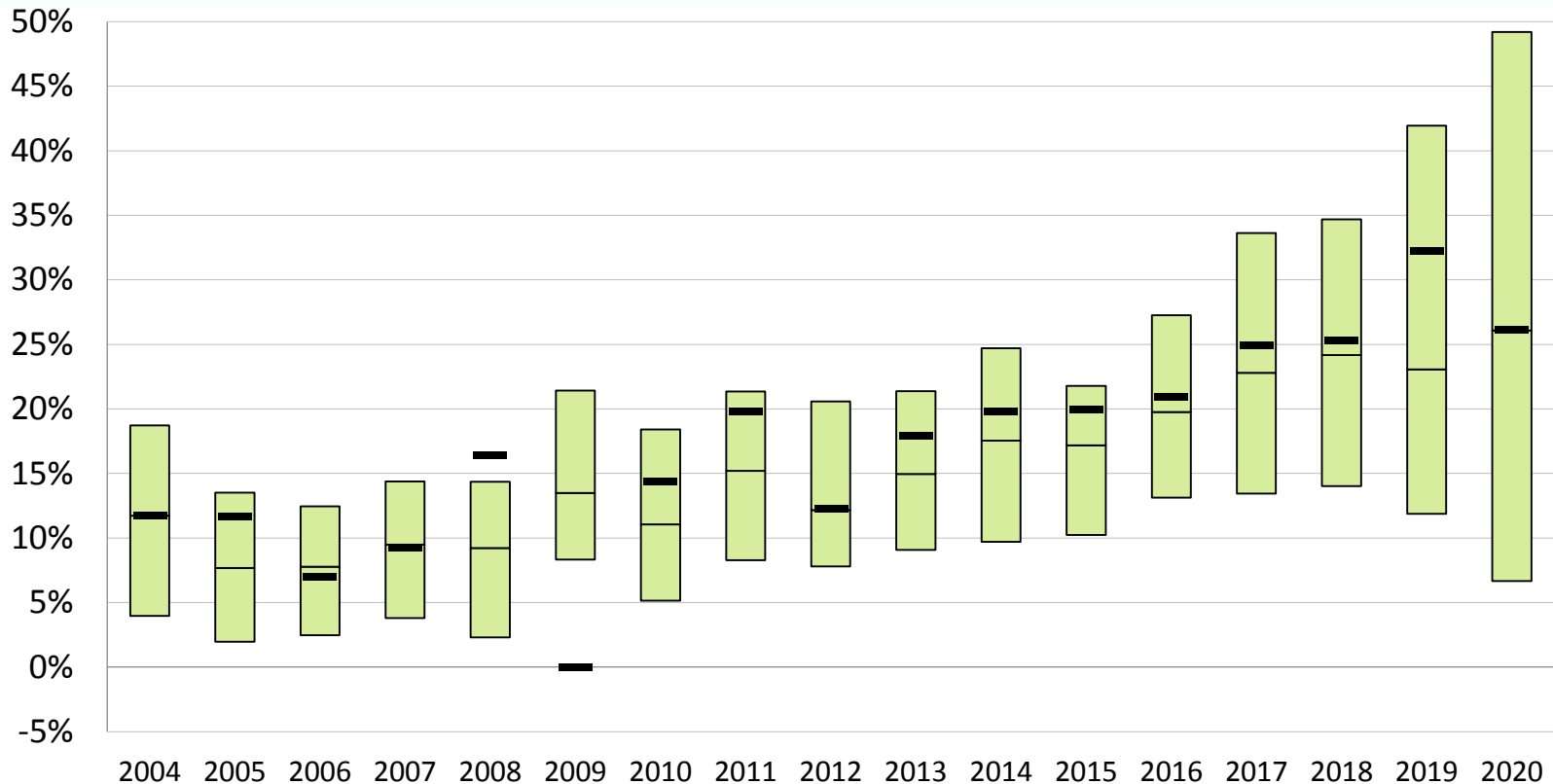
Tailwinds

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

Headwinds

- Macro backdrop
- Debt Markets
- 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; all data as of 3/31/2022

Managers: Top Ten Investment Managers



Manager	Exposure
VRS Co-Investments	7.8%
Grosvenor	6.9%
Hellman & Friedman	5.5%
TA Associates	5.0%
Apax Partners	4.7%
Audax Group	3.9%
General Atlantic	3.7%
CVC	3.7%
Bain	3.5%
Veritas	3.4%
Total	48.1%

Exposure as of 3/31/2022; figures may not sum due to rounding

Managers: Manager Hires LTM – 6/30/22



Effective Date	Commitment (MM)	Funding Period	Description
7/1/2021	\$300	6 years	TA XIV
7/1/2021	\$50	6 years	TA Select Opportunities II
7/1/2021	\$250	6 years	Hellman and Friedman X
7/1/2021	\$250	6 years	Audax DLS II
7/7/2021	\$100	5 years	Apax Digital II
7/9/2021	\$100	5 years	Insight XII
8/5/2021	\$100	5 years	HarbourVest Co-Invest VI
8/24/2021	\$20	6 years	Advent Global Technology II
8/31/2021	\$35	6 years	Spectrum Select Opportunities
9/13/2021	\$175	6 years	Trident IX (Stone Point IX)
11/12/2021	\$40	6 years	GTCR Strategic Growth Fund I
11/16/2021	\$200	6 years	TSG 9
6/21/2022	\$40	6 years	Matrix XII

Diverse Investment Management Engagement (DIME)



Nine existing in-house relationships

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

17 potential manager meetings & 2 conferences in FY 2022

Five relationships through Grosvenor

Quarterly reports from Grosvenor

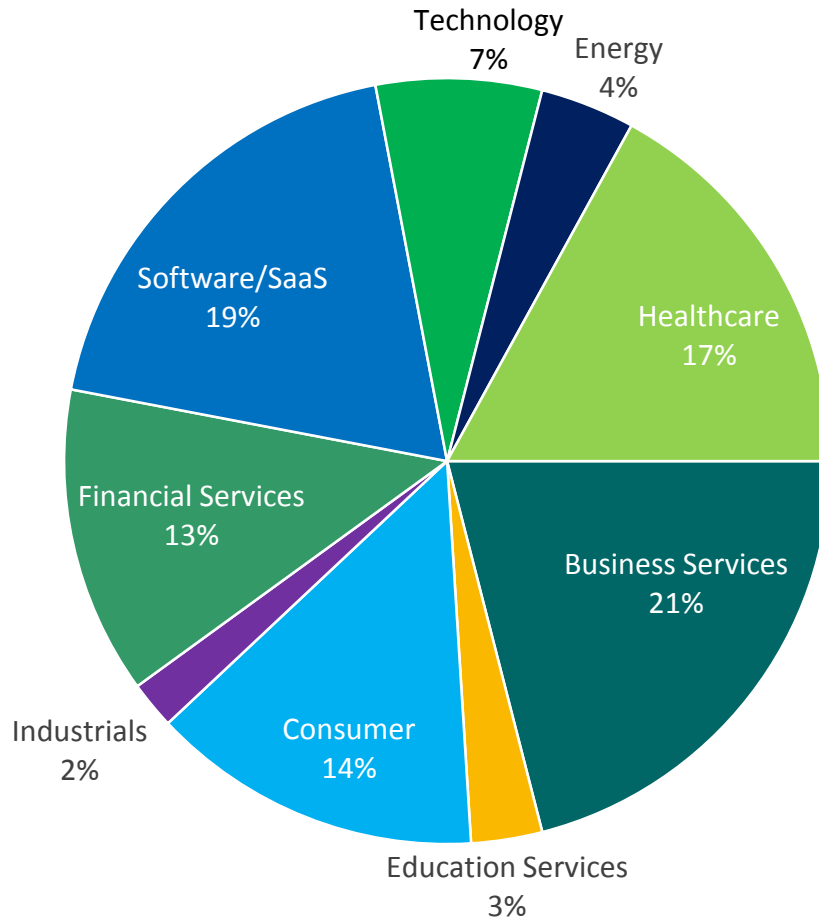
Co-investments: VRS Co-investment Program



- 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
- To date, VRS has reviewed approximately 185 potential opportunities & has made 64 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



- 64 investments totaling \$1.6 billion cost since April 2013
- Investments made with 23 existing GPs
- Size range: \$7-50 million (\$26 million average size)

- Maintain commitment pace
- Continue with 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: Team Members



Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Steve Woodall	Program Director	MBA	CFA, CAIA	18	17
Perry Corsello	Portfolio Manager	MBA	CFA	25	11
Matt Bennett	Investment Officer	MBA		14	14
Erica Billingslea	Investment Officer	MA	CFA Candidate	10	10
Kevin Bliss	Investment Officer	Bcom		8	1
Kelly Baker	Portfolio Assistant	AAS		12	7

Overview: Credit Strategies Is Evolving



Diversified Program

- Investing broadly across areas exposed to credit risk

Primary Focus

- Less liquidity, with focus on opportunistic & private credit solutions

Program Objective

- Outperform liquid representative benchmarks (blend of senior secured term loans, high yield bonds, and investment grade indices)

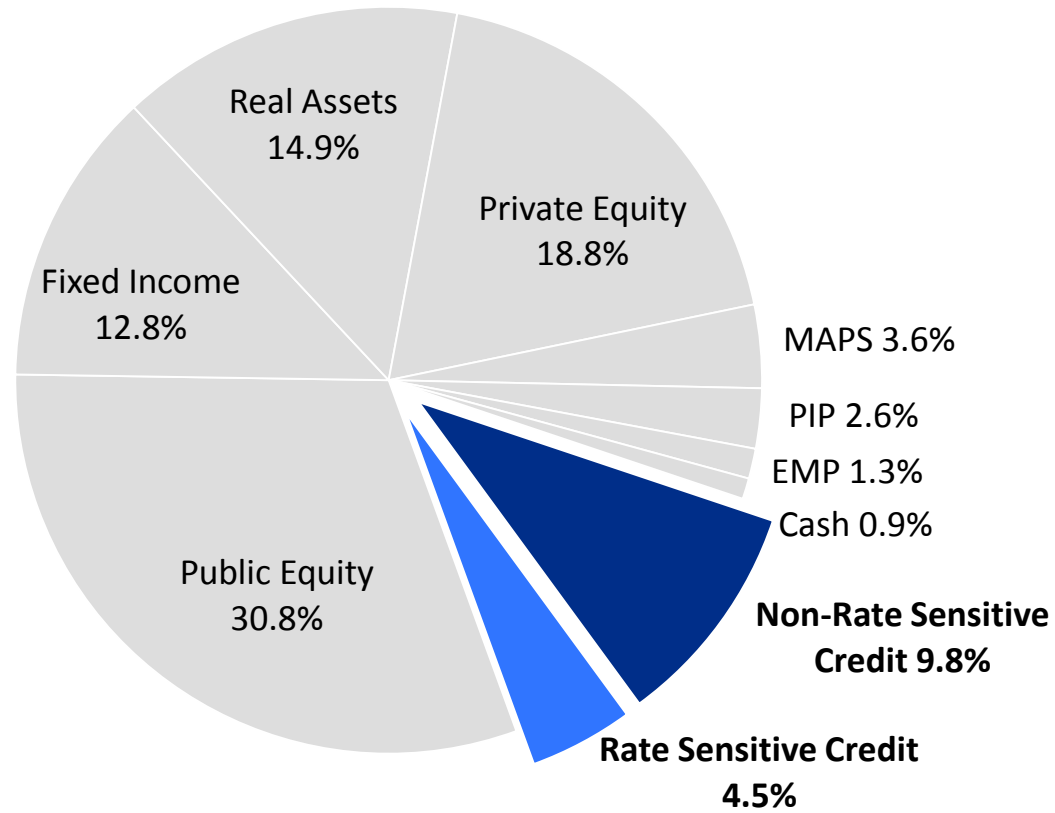
Overview: Why Credit Strategies?



- Credit provides a large, investible market space
- Non-investment grade debt, with its high level of return contribution from income & its positioning in the capital structure, has an attractive risk/reward profile across market cycles
- An experienced dedicated team affords VRS the opportunity to explore less traveled areas & invest (or dis-invest) more efficiently

Overview: Asset Allocation – 6/30/22

**Total Credit Strategies
14.3%**

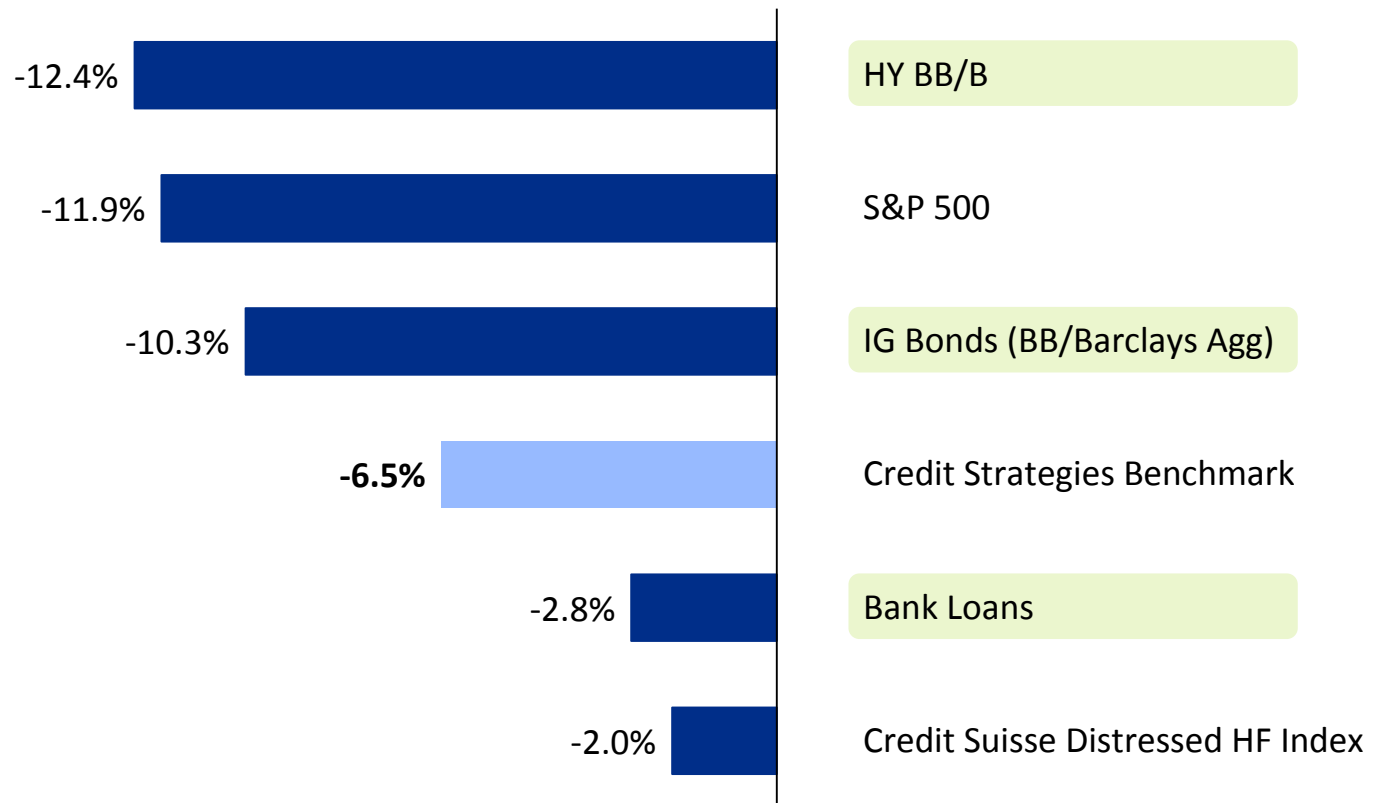


Source: BNY Mellon

Markets: Update – Index Returns



FY 2022 Returns

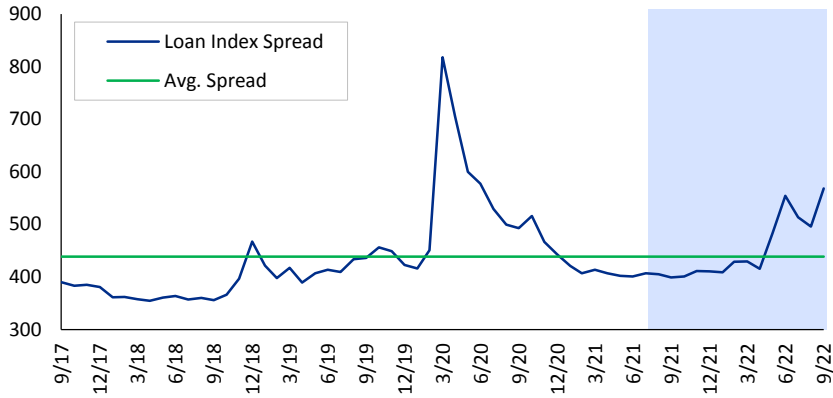


Source: VRS, Bloomberg, Credit Suisse

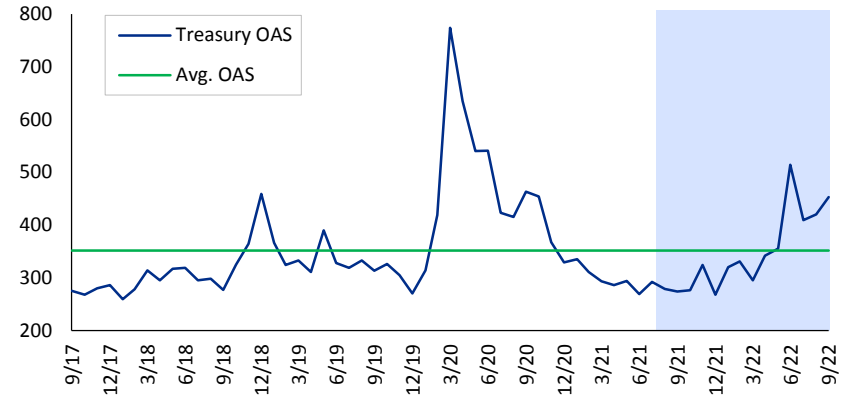
Markets: Update – Index Spreads and Yields



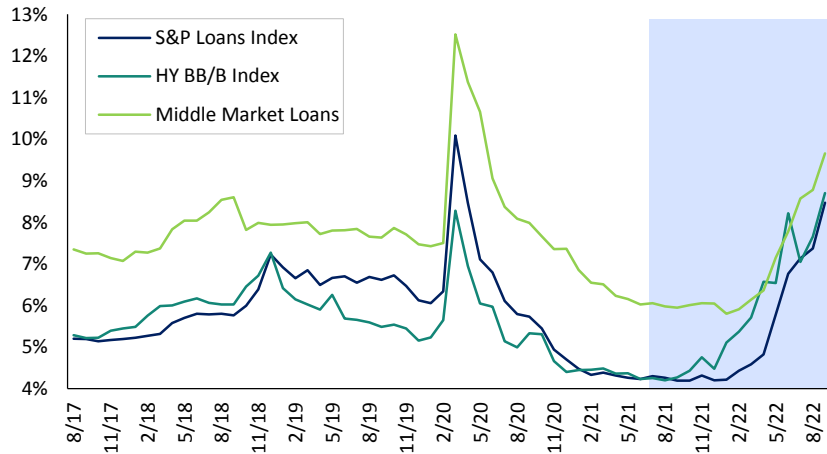
Loan Index Spread



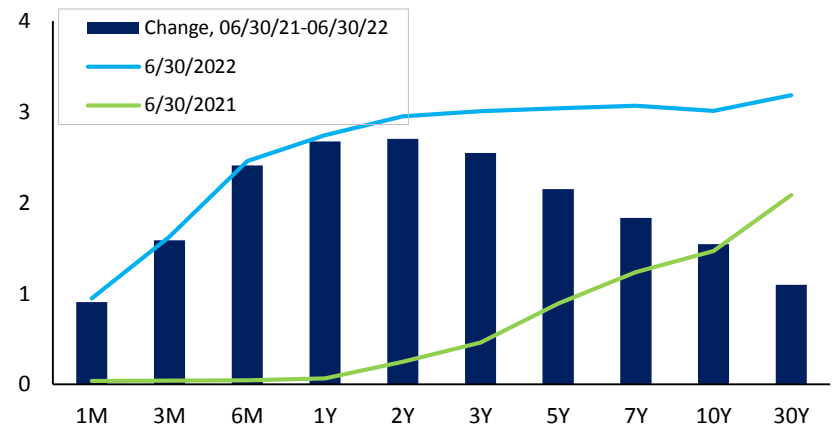
HY BB/B Index Spread



Yields



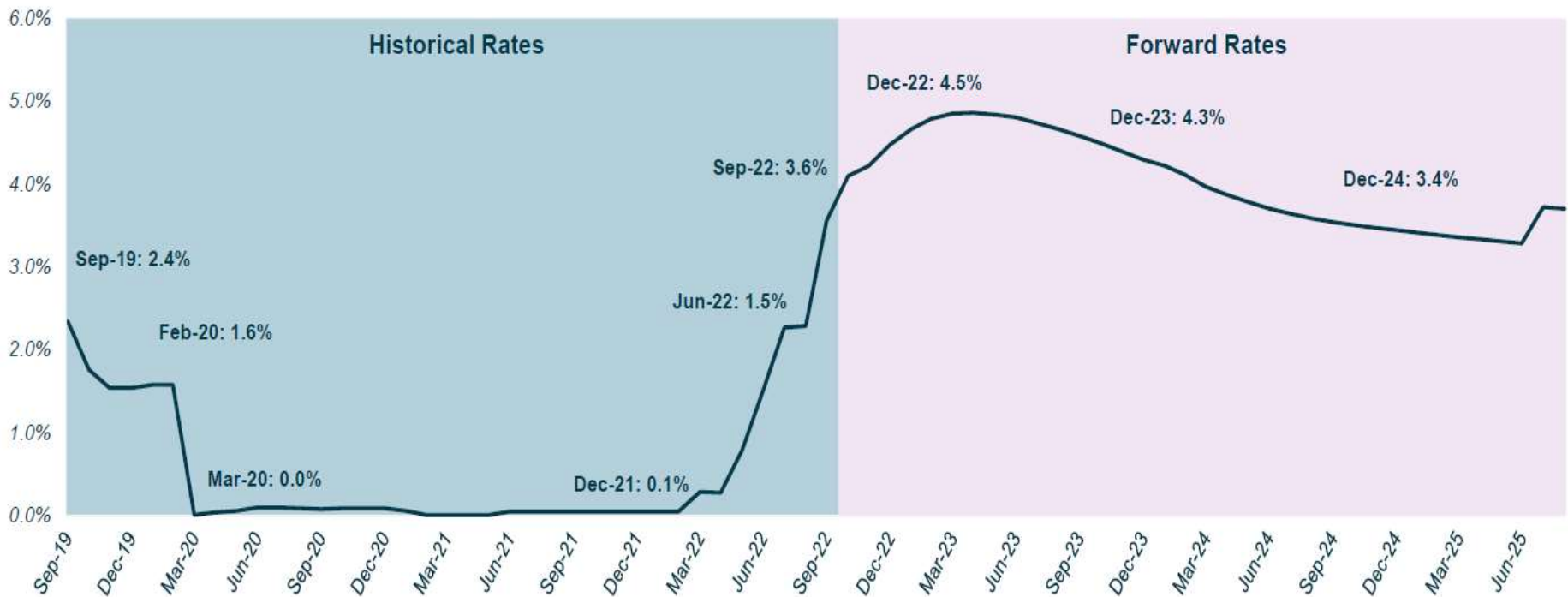
U.S. Treasury Yields



Markets: Recent Increase in SOFR Expected to Continue



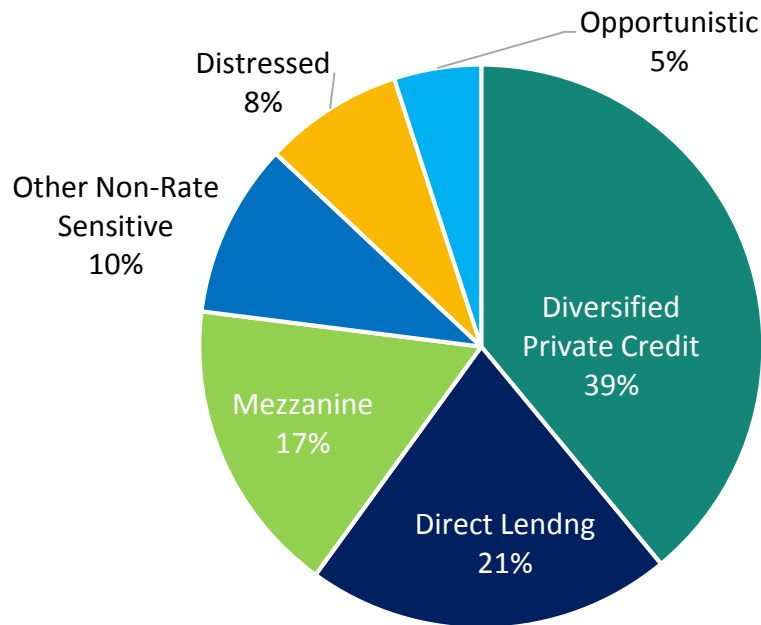
Three-Month SOFR Rate



Source: Lincoln Proprietary Database

Markets: Update – Program Activity

Recent Capital Calls



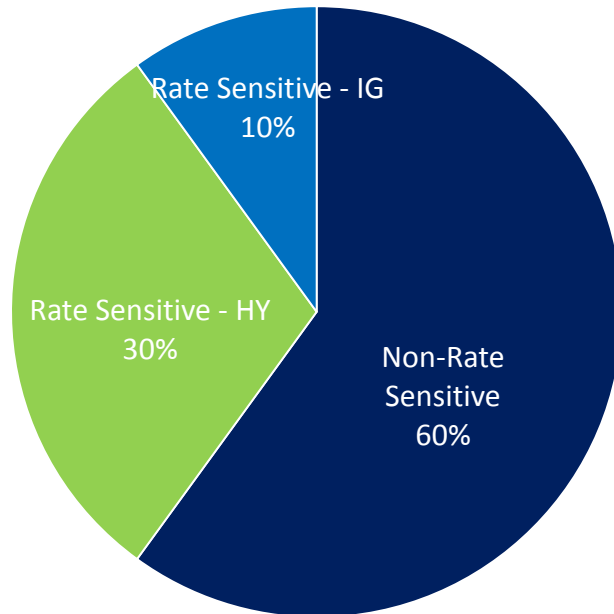
Private Credit Pricing Increases:

Strategy	9/30/21	9/30/22
Direct Lending	7.0%	10.0%
Mezzanine	12.7%	15.1%
Opportunistic	11.3%	15.7%

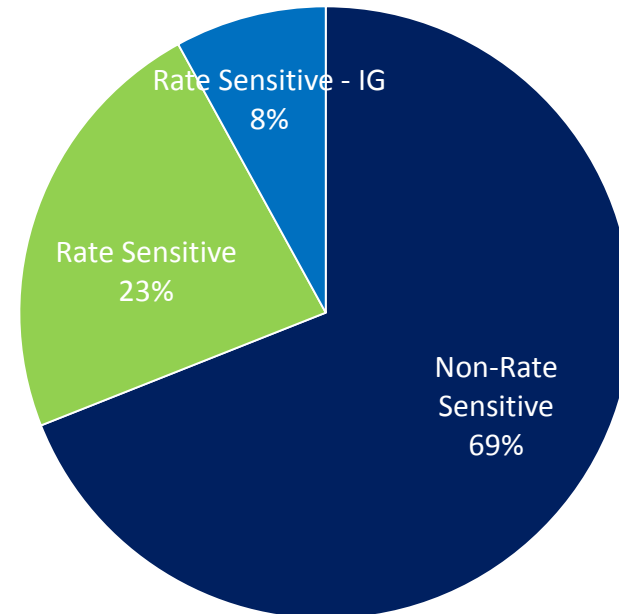
Exposures: Allocation Of Benchmark & Program



Benchmark Weights



Program Weights



Source: BNY Mellon

Exposures: Sub Strategies



Sub Strategies	% Allocation 6/30/21	% Allocation 6/30/22	Change
Rate Sensitive			
High Yield	16.7%	13.0%	-3.8%
Investment Grade	8.9%	8.0%	-1.0%
Mezzanine	5.3%	7.5%	2.1%
Other Rate Sensitive	7.4%	2.9%	-4.5%
Total Rate Sensitive	38.5%	31.4%	-7.1%
Non-Rate Sensitive			
Bank Loans	14.0%	7.9%	-6.1%
Direct Lending	13.8%	21.9%	8.1%
Hedge Fund	1.1%	1.0%	-0.1%
Opportunistic	15.7%	15.0%	-0.8%
Distressed	7.2%	9.3%	2.1%
Other Non-Rate Sensitive	9.7%	13.5%	3.9%
Total Non-Rate Sensitive	61.5%	68.6%	7.1%
Total	100.0%	100.0%	0.0%
Asset Value	\$14,224,607,404	\$14,464,438,411	\$239,831,007

Exposures: Positioning



Continuing Shift To Less Liquid/Private Assets

- More Liquid Investments 18%
- Less Liquid investments 82%

Growth Areas For Coming Year

- Diversified Private Credit
- Asset-backed Strategies
- Mezzanine
- Co-investments

Sources Of Funds

- High Yield
- Bank Loans

Results: Total Credit Strategies – 6/30/22



	Inception	10 Year	5 year	3 Year	1 Year
Total Credit Strategies	6.37	6.58	6.25	6.43	1.48
Benchmark	5.10	4.71	3.32	1.76	-6.49
Excess Return	1.27	1.87	2.94	4.67	7.97
Portfolio Risk	6.46	4.75	5.61	6.63	3.48
Benchmark Risk	7.04	5.65	6.88	8.22	4.03
Active Risk	2.18	1.89	2.45	2.98	2.40

Source: BNY Mellon

Results: Rate Sensitive – 6/30/22



	10 Year	5 year	3 Year	1 Year
Rate Sensitive	5.93	5.21	4.64	-6.21
Benchmark	3.54	1.91	0.09	-11.87
Excess Return	2.39	3.30	4.54	5.67
Portfolio Risk	4.59	5.88	7.35	4.96
Benchmark Risk	5.25	6.43	7.87	6.87
Active Risk	1.73	1.77	1.93	2.71

Source: BNY Mellon

Results: Non-Rate Sensitive – 6/30/22



	10 Year	5 Year	3 Year	1 Year
Non-Rate Sensitive	6.92	5.83	6.41	5.57
Benchmark	3.96	3.07	2.26	-2.82
Excess Return	2.96	2.77	4.15	8.39
Portfolio Risk	4.17	5.42	6.80	3.41
Benchmark Risk	5.43	7.30	9.10	3.73
Active Risk	2.84	3.70	4.53	3.03

Source: BNY Mellon

Headwinds/Tailwinds

- ⊕ Asset performance within distressed, mezzanine, direct lending, and Other NRS; underweight to rate sensitive credit
- ⊖ Headwinds: Rising UST yields; increasing risk premiums

Largest Absolute Return Contributors:

- ⊕ Distressed: +21.6% (9.3% of program)
- ⊕ Mezzanine: +16% (7.5% of program)

Largest Relative Return Contributors:

- ⊕ Distressed: +2%
- ⊕ Mezzanine: +1.8%
- ⊖ Syndicated Bank Loans: -0.1% (7.9% of program)
- ⊖ Hedge Funds: -0.005% (1% of program)

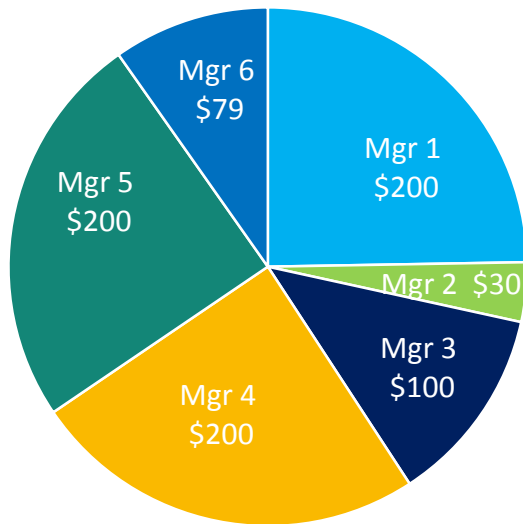
Co-investments: Credit Strategies Approach



- 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

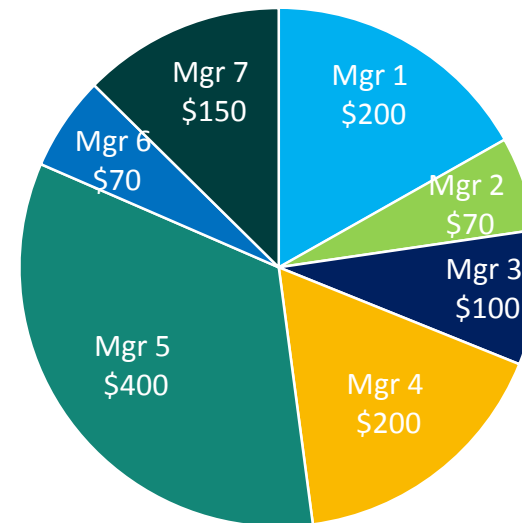
Co-investment: Manager Capacity

June 2021 (\$M)



- 6 accounts totaling \$809 million in commitments
- Commitment size range: \$30-\$200 million
- Market Value @ 6/30/2021: \$386 million

June 2022 (\$M)



- 7 accounts totaling \$1,190 million in commitments
- Commitment size range: \$70-\$400 million
- Market Value @ 6/30/2022: \$707 million

Increase in market value reflects both changes in market value
and increases in called commitments

Managers: Top 10 Investment Managers



Manager	Mandates	# Mandates	% Program
Beach Point	Bank Loan, Distressed, Opportunistic	5	13.68%
Ares	Direct Lending, Distressed, Mezzanine, Opportunistic	10	8.59%
PGIM	Investment Grade, Mezzanine	5	8.58%
JPM	High Yield	1	7.55%
Solus	Bank Loan, Hedge Fund, Opportunistic	3	6.42%
BlackRock	Direct Lending	1	6.25%
HPS	Direct Lending, Mezzanine	4	6.24%
PIMCO	High Yield	2	5.49%
Anchorage	Opportunistic, Other Rate Sensitive	4	4.02%
Sixth Street	Distressed, Opportunistic	6	3.92%

Managers: DIME Investments



- 22 potential manager meetings/calls/reviews in FY 2022
- 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.
- Three relationships through Aksia

Managers: Hires & Terminations (FY 2022)



Action	Effective Date	Commitment/ Current Value	Funding/ Defunding Period	Description
Hired	7/14/2021	€300 Million	5 Years	ICG Europe VIII –A closed-end fund targeting subordinated debt and equity investments in European mid-market companies.
Hired	9/27/2021	\$500 Million	3 Years	Oak Hill Diversified Credit – A fund that will invest opportunistically across credit markets, with a focus on private credit investments.
Hired	10/1/2021	\$250 Million	3 Years	Whitehorse Liquidity Partners V – A portfolio finance strategy.
Hired	10/26/2021	\$300 Million	4 Years	Ares Special Opportunities Fund II –A middle market stressed and distressed credit fund in both the private and public markets.
Hired	11/4/2021	\$215 Million	4 Years	Sixth Street Opportunities Partners V –A control-oriented distressed and opportunistic credit fund.
Hired	12/15/2021	\$350 Million	4 Years	HPS Strategic Investment Partners V –A private credit fund focused primarily on subordinated debt investments in larger companies.
Hired	12/21/2021	\$325 Million	4 Years	Ares SSG Capital Partners VI –A private credit fund targeting special situation and distressed debt investments in Asia.
Terminated	3/7/2022	\$148 million	< 1 Month	Allianz Global Investors –A separate account investing in convertible bonds.
Hired	5/26/2022	\$450 million	3 Years	Magnetar Diversified Credit – A fund that will invest opportunistically across credit markets, with a focus on private credit investments.
Hired	6/30/2022	\$450 million	3 Years	Varde Diversified Credit – A fund that will invest opportunistically across credit markets, with a focus on private credit investments.

Continued To Execute On CS2020 During FY22

- Hired or upsized 12 mandates representing over \$3B in commitments
- Program shifted from 31%/69% liquid/illiquid to 23%/77% liquid/illiquid during FY22
- Largest growth experienced in Direct Lending, Diversified Private Credit, Mezzanine, and Distressed strategies.
- Broadened strategies pursued in order to capture market opportunities: additional investments in specialty finance, portfolio finance, NPL, and real estate debt strategies.

- We will manage the final stages in the transition from a program mostly made up of traded credit investments toward one predominantly private credit.
- We remain focused on strategies that deliver high contractual returns while having downside protection.
- Areas of higher growth within the program are expected to include Diversified Private Credit, Mezzanine Debt, and in fee-advantaged co-investments.

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	18	17
Erica Billingslea	Investment Officer	MA	CFA Candidate	10	10
Matt Bennett	Investment Officer	MBA		14	14
Kelly Baker	Portfolio Assistant	AAS		12	7

Overview: What Are Private Investment Partnerships?



- A diversified investment platform dedicated to private and illiquid investments
- 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

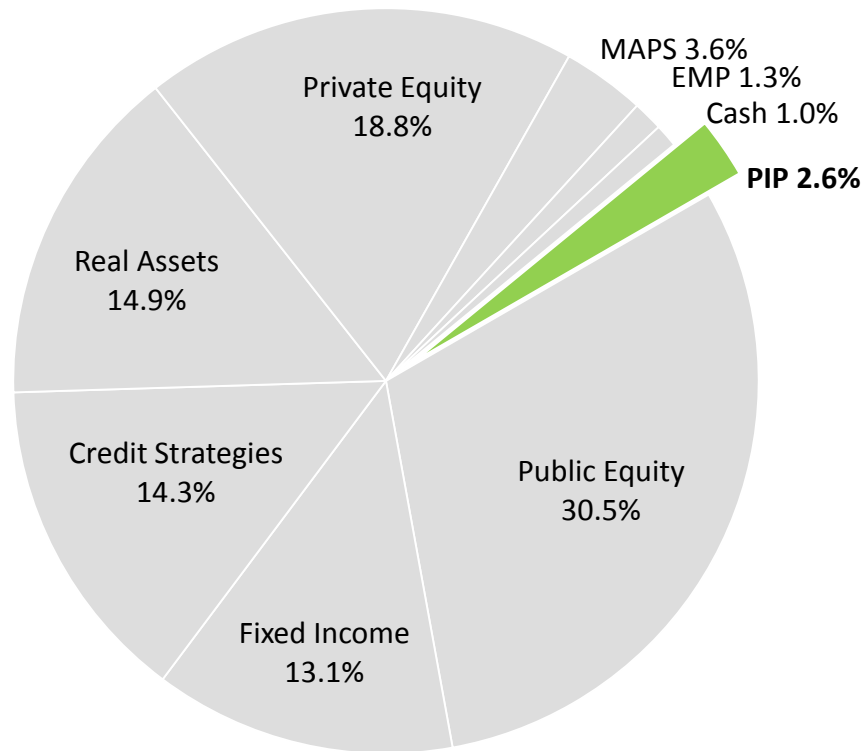
Overview: Why Have Private Investment Partnerships?



- Creates 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

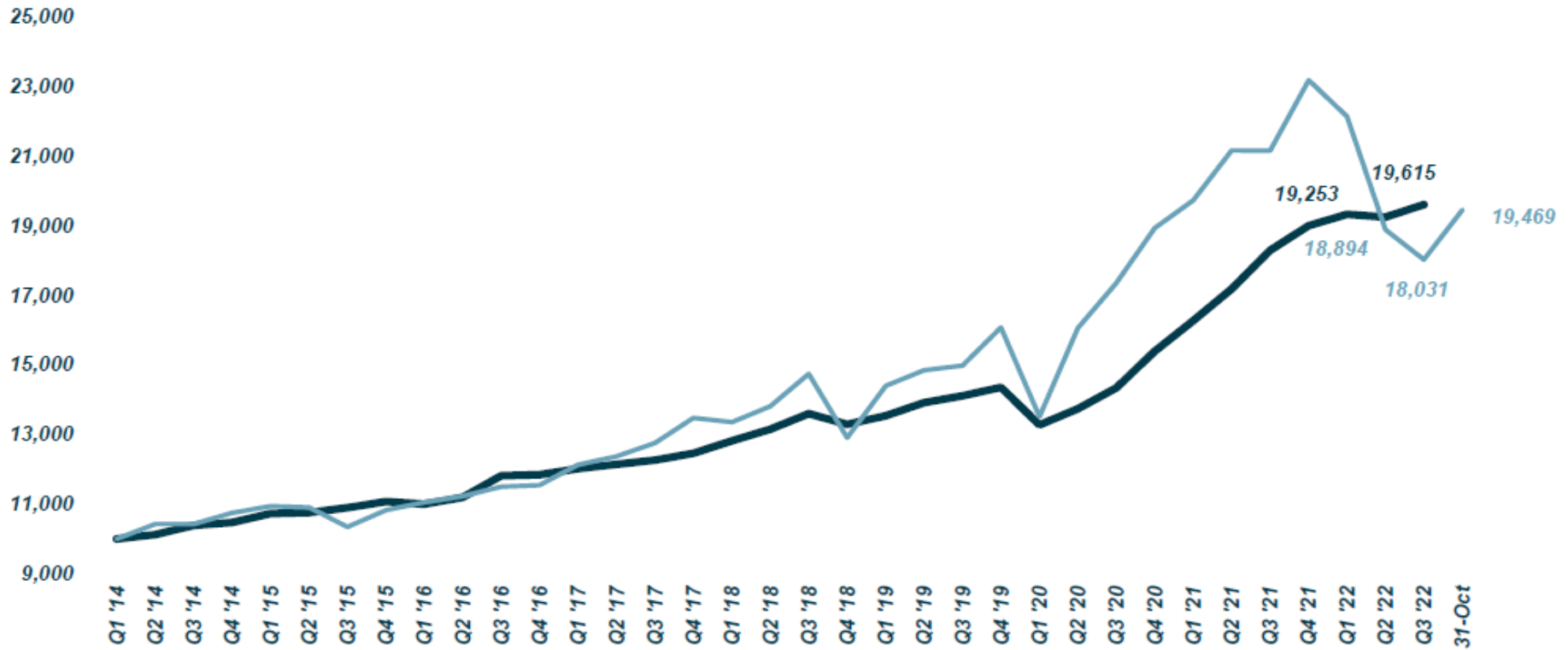
Overview: Total Fund Pie With PIP Allocation

Total PIP
2.6%



Markets:

Lincoln Private Market Index vs. S&P 500 Enterprise Values



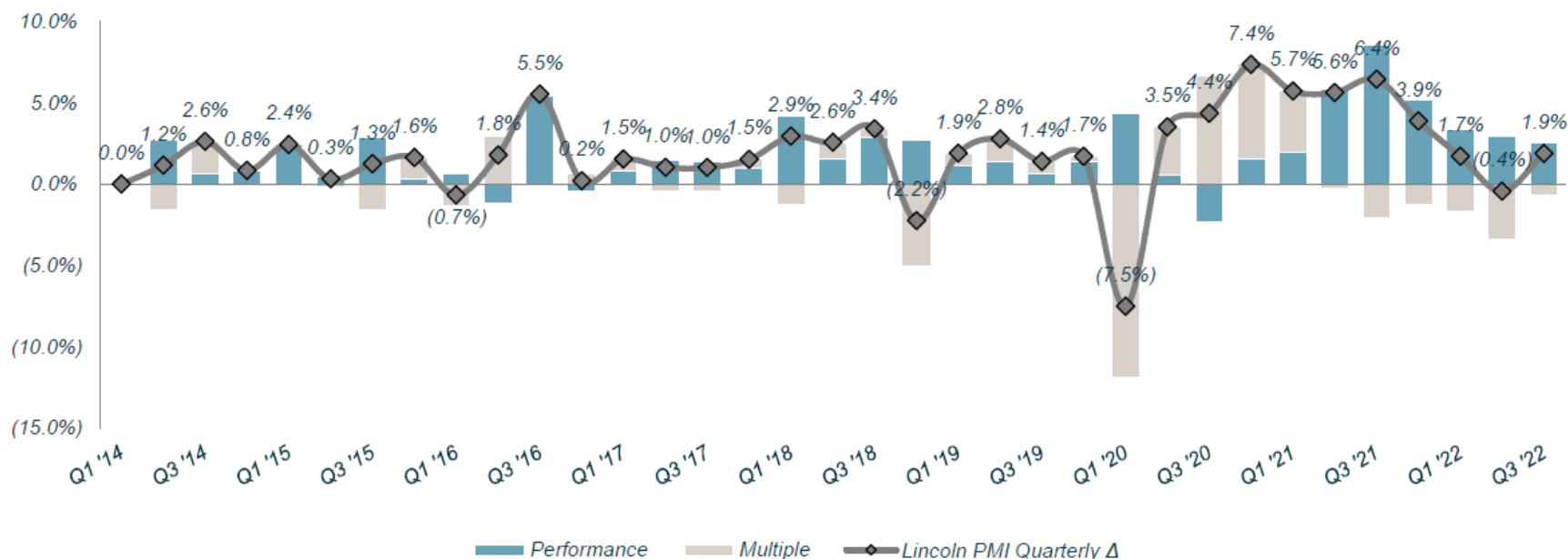
	Q1 '22	Q2 '22	Q3 '22	31-Oct	YTD
LPMI	1.7%	(0.4%)	1.9%	NA	3.2%
S&P 500 EV	(4.5%)	(14.7%)	(4.6%)	8.0%	(16.1%)

Source: Lincoln Proprietary Database. Note: Note: S&P data is as of October 31, 2022 and excludes financials.

Markets: Index Drivers: Multiples vs Earnings



EV increased in Q3 2022 as a result of stronger-than-expected fundamental performance led by top-line growth.

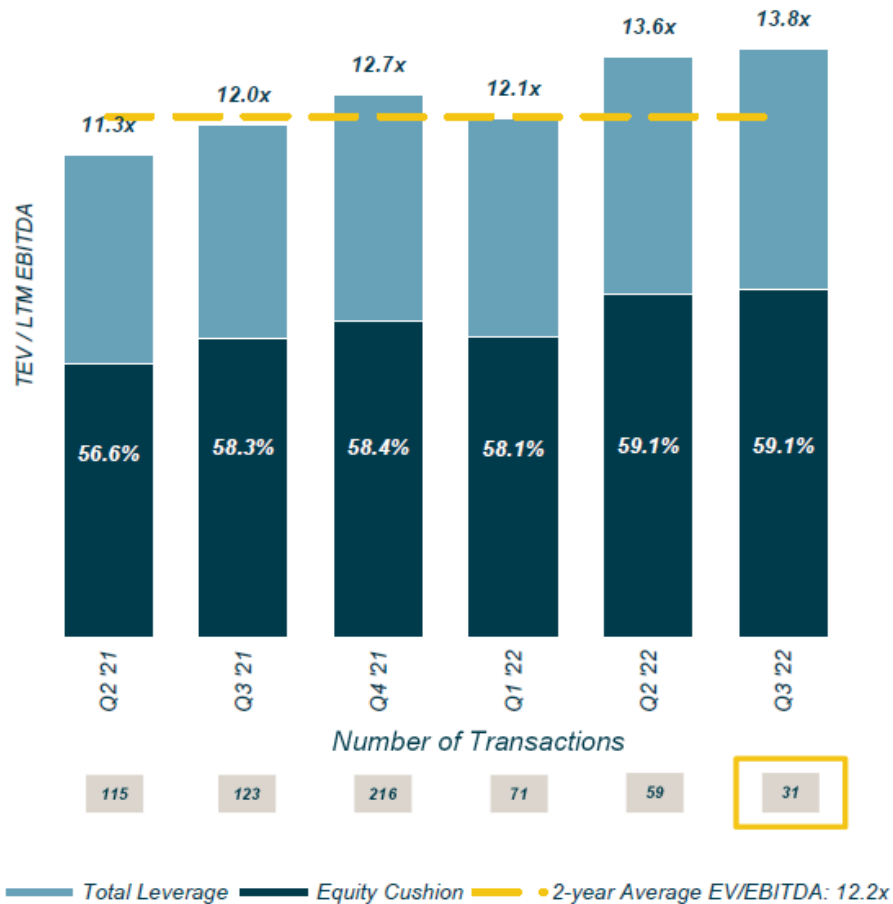


	EBITDA Performance			EBITDA Multiples			EV Growth		
	Q1 '22	Q2 '22	Q3 '22	Q1 '22	Q2 '22	Q3 '22	Q1 '22	Q2 '22	Q3 '22
LPMI	3.3%	2.9%	2.6%	(1.6%)	(3.4%)	(0.7%)	1.7%	(0.4%)	1.9%
S&P 500	4.4%	1.3%	2.3%	(8.9%)	(16.0%)	(6.8%)	(4.5%)	(14.7%)	(4.6%)

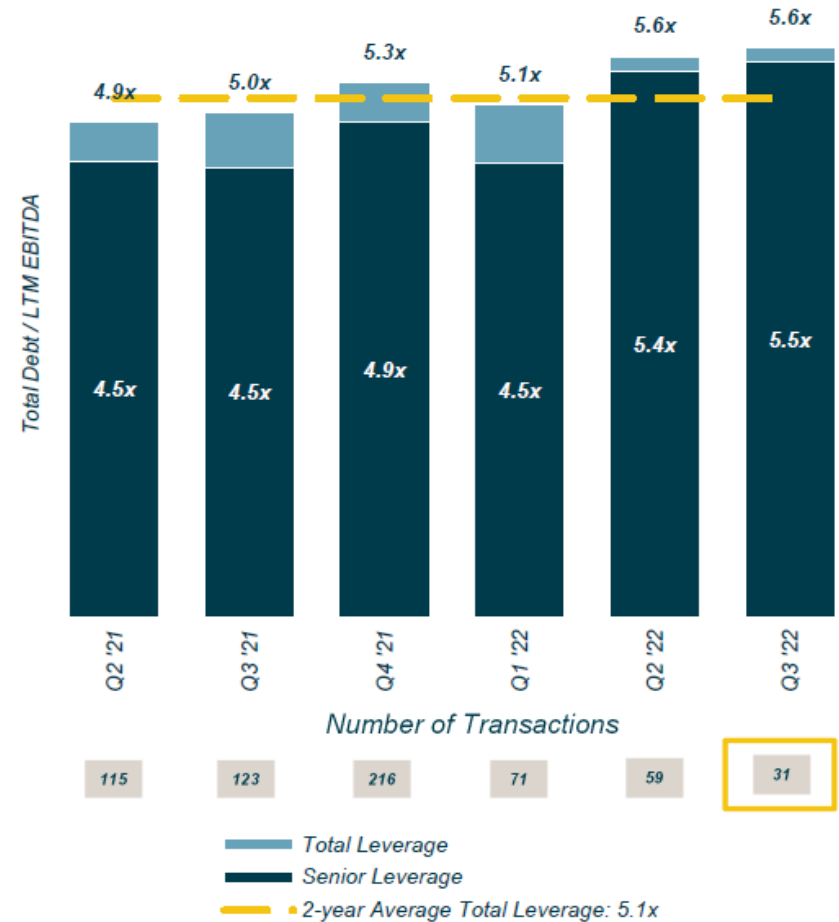
Source: Lincoln Proprietary Database.

Markets: Observed Third-Party M&A Buyouts

EV Transaction Multiples



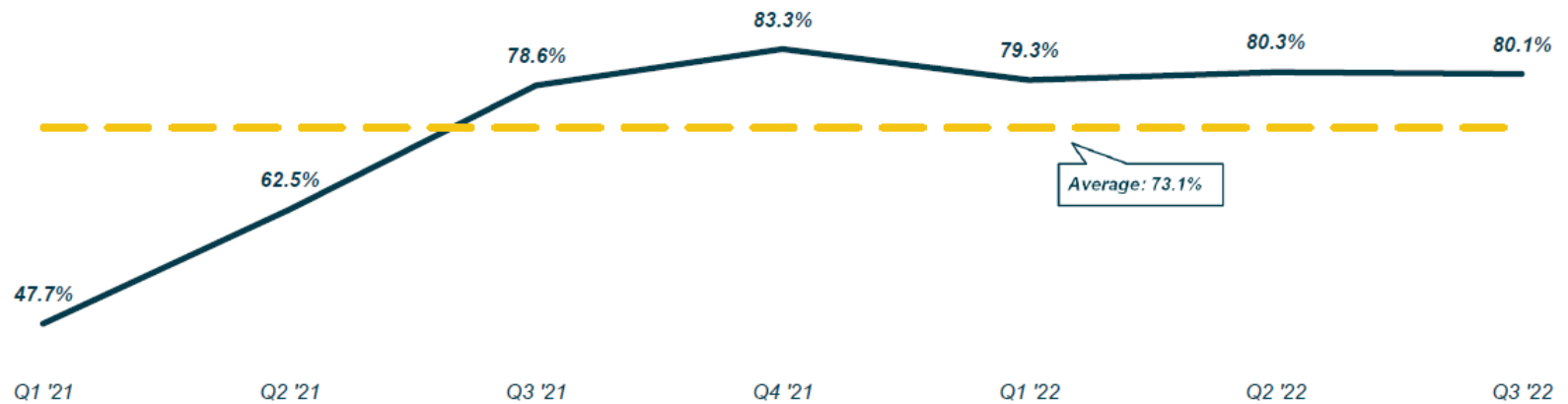
Leverage Transaction Multiples



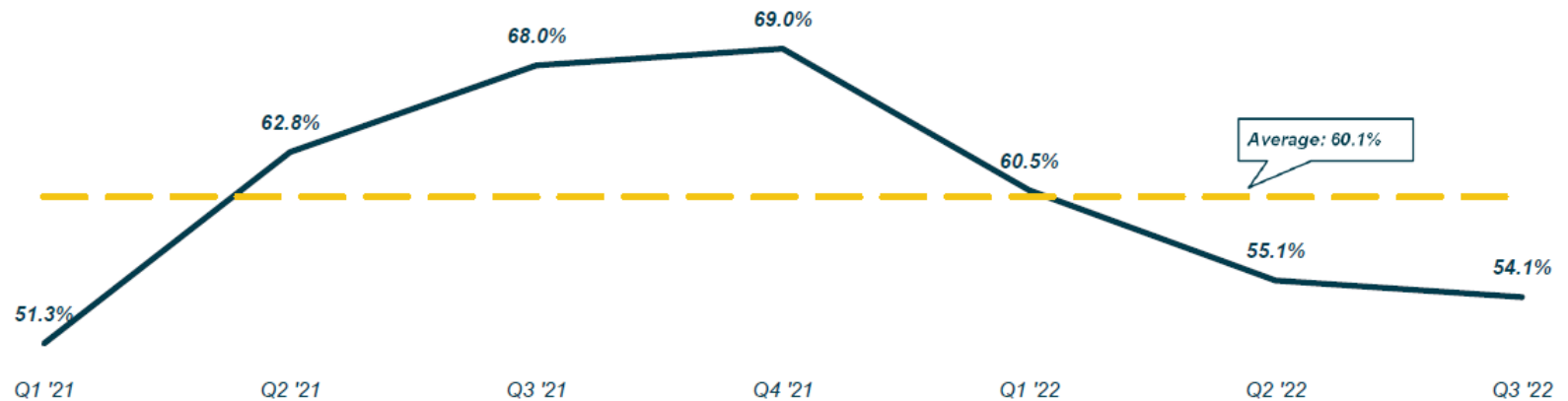
Company Performance Trends: Portfolio Company Gainers and Decliners



Percentage of Companies Reporting YoY Q3 2022 YTD Revenue Growth



Percentage of Companies Reporting YoY Q3 2022 YTD EBITDA Growth

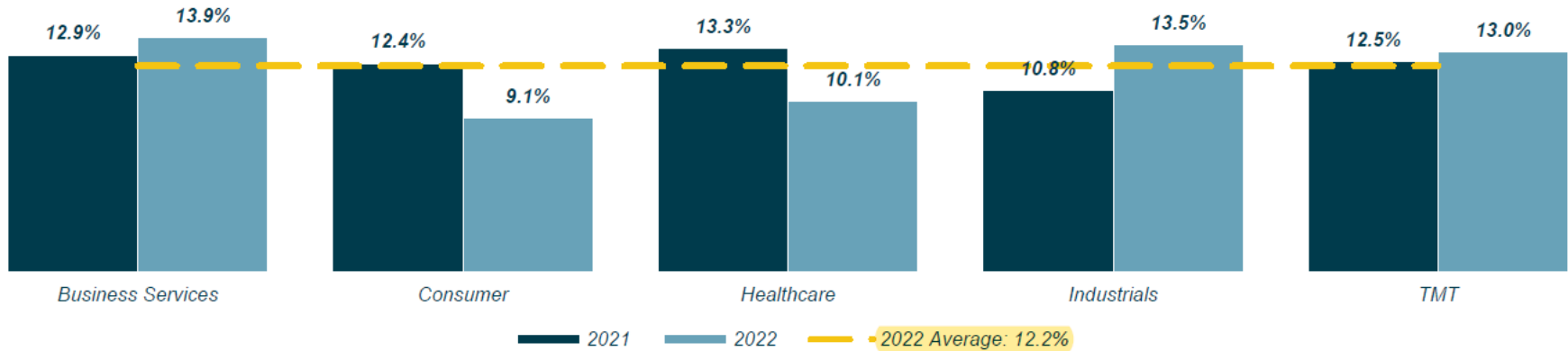


Company Performance Trends :

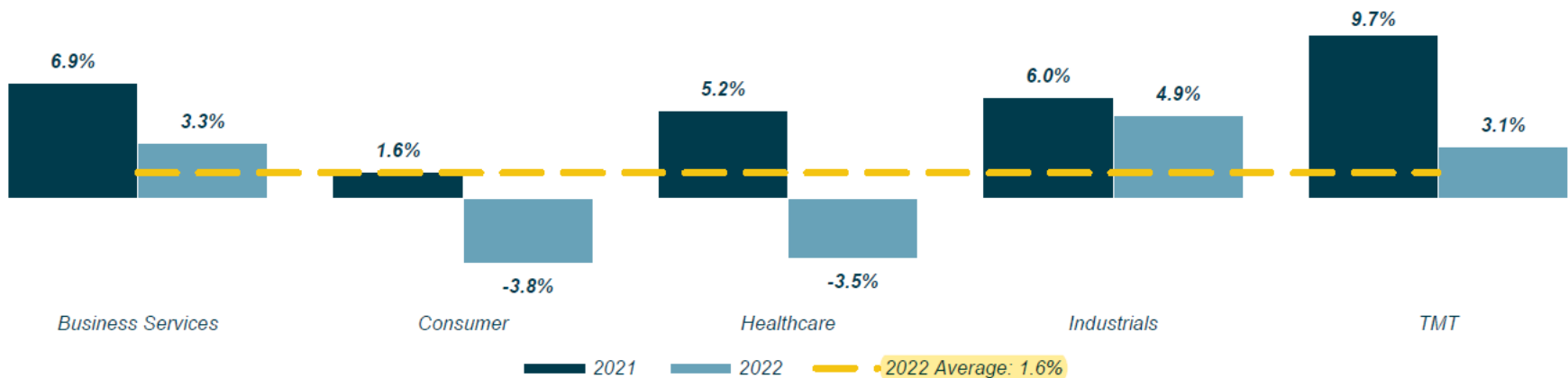
Q3 2022 YoY YTD Magnitude of Revenue & EBITDA Growth



YoY Revenue Growth



YoY EBITDA Growth



Markets: Pressure on Valuations & Returns



Baseline Key Inputs and Assumptions

	Base
EBITDA @ Close	40,000
Terminal EBITDA	61,383
EBITDA 5 Year CAGR	9.0%
Minimum Hurdle IRR	20.00%

Sensitivity Analysis - Financing Assumptions

	Old World (As of Dec 21)	New World (As of Nov 22)
SOFR	0.08%	3.95%
Floor	1.00%	1.00%
Spread	5.50%	6.25%
Total interest rate	6.50%	10.20%
Equity Cushion	~45%	~50%
Implied Leverage	7.50x	6.00x

Impact on Valuation / Purchase Price

	Old World (As of Dec 21)	New World (As of Nov 22)
Purchase Price @ Close	550,000	470,000
Implied Entry and Exit Multiple	13.75x	11.75x

% Change in EV @ Close

Implied Change in EV multiple to maintain IRR with unchanged growth assumption

Purchase Price lever	~15%-20%
IRR lever	~1.5x-2.5x
Growth lever	17.00%
	~20-30%

Implied IRR to Maintain Base EV with unchanged growth assumption

Implied required growth in Terminal EBITDA to maintain Old World Purchase Price and IRR

Source: Lincoln International

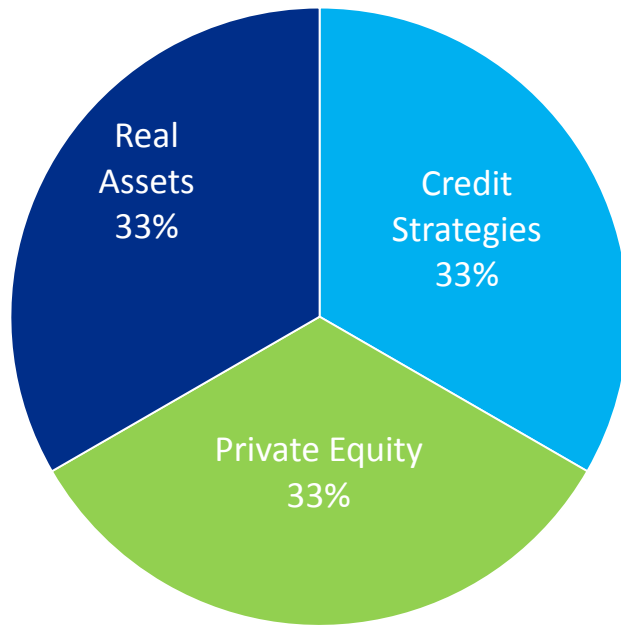
Exposures: Portfolio Update



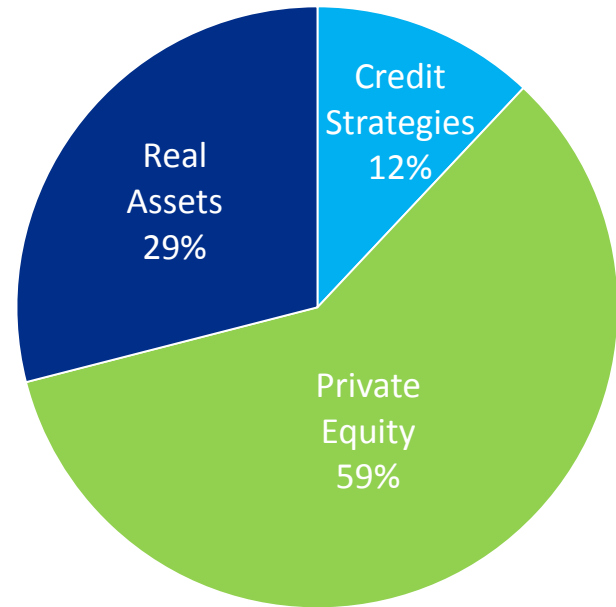
- Asset allocation
- Commitments
- Portfolio growth

Asset Allocation:

Benchmark – June 30, 2022



PIP Actual – June 30, 2022



Market Value Change: FY 2022



	6/30/21	6/30/22	Change %
Private Equity	63%	59%	-4%
Real Assets	16%	18%	+2%
Real Estate	8%	11%	+3%
Credit	13%	12%	-1%
Total (MM)	\$2,031	\$2,588	+\$557

Commitments (\$MM): FY 2022

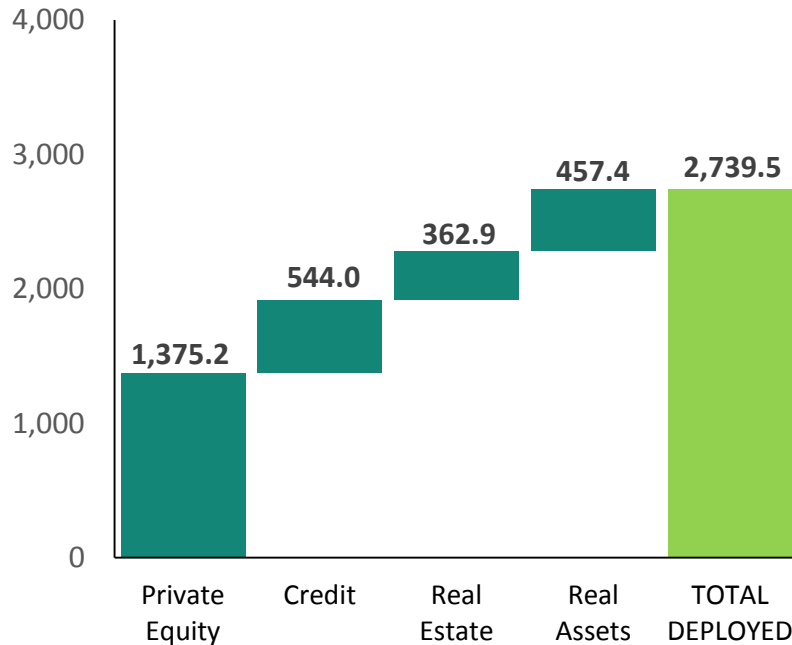


	6/30/21	6/30/22	Change \$	Change %
Fund	1,367.1	2,094.5	727.4	53
Co-investment	1,264.2	1,791.8	527.6	42
Total	2,631.3	3,886.3	1,255	48

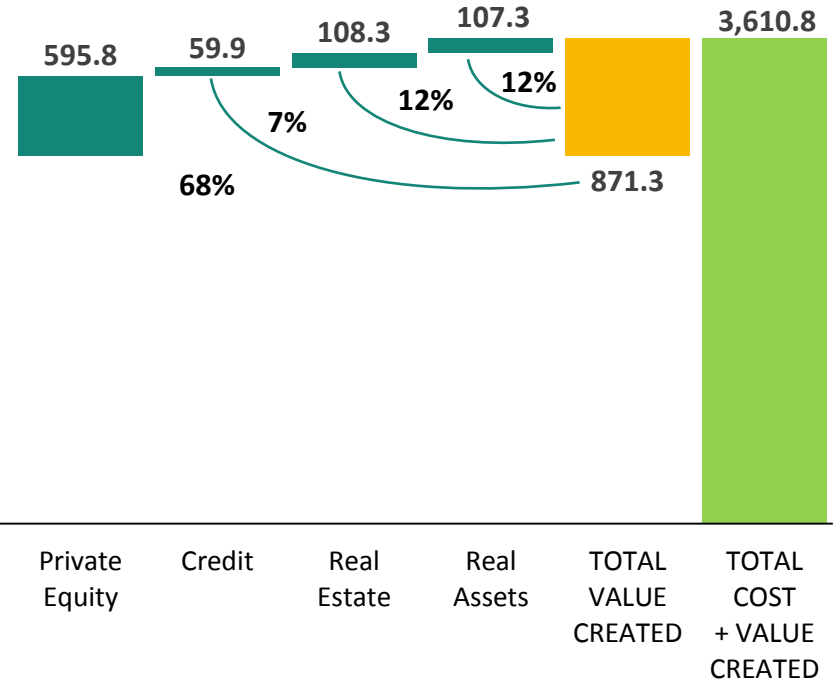
Portfolio Growth: Value Drivers (\$MM)



PIP: Total Capital Deployed (\$mm)



PIP: Value Created (\$mm)



Results: Performance – 6/30/22



	Inception (2015)	5 Year	3 Year	1 Year	MV (\$MM)
Total PIP	9.48	11.10	12.70	16.97	2,588
Benchmark	8.23	9.20	9.51	6.86	
Excess Return	1.25	1.90	3.20	10.11	

Total Program IRR 12.2%

Source: BNY Mellon

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