



Investment Policy Committee (IPC) Meeting

[VRS Boardroom - 3rd Floor](#)
[Pavilion Building](#)

Thursday, 4/20/2023
11:45 AM - 12:45 PM ET

- 1. Welcome & Introductions**
- 2. Approval of Minutes (February 9, 2023 Meeting)**
IPC BBL Minutes 020923 - Final - Page 2
- 3. Discussion on Portfolio Diversification**
04-20-23 IPC Meeting - Risk Profile Enhancement Presentation - Page 4

Minutes

The Investment Policy Committee (IPC) of the Virginia Retirement System held an informal meeting ("Brown Bag Lunch Session") for the purpose of member education on February 9, 2023 at the Bank of America Building, 1111 East Main Street, Richmond, Virginia with the following members present:

A. Scott Andrews
Joe Montgomery
John Bennett
Michael Disharoon
William Garrett
Dr. Susan Gooden

The following Investment Advisory Committee members were present:

Michael Beasley
Palmer Garson
Nancy Leake
Bryan Lewis

Also present were Trish Bishop, Andrew Junkin, Jennifer Schreck, Advait Apte, Rory Badura, Jeanne Chenault, Michael Cooper, Perry Corsello, Sara Denson, Laura Fields, Laurie Fennell, Josh Fox, Brian Goodman, Katie Grawe, JT Grier, KC Howell, LaShaunda King, Kristina Koutrakos, Crystal Lipscombe, Chung Ma, Kim Mackey, Jennifer MacKnight, Curt Mattson, Steven Peterson, Laura Pugliese, Steven Ramirez, Kristy Scott, Dan Whitlock, and Cindy Wilkinson of the VRS staff.

Also in attendance was Ira Astin, a member retiree; Jamie Bitz of the Joint Legislative Audit and Review Commission; John Kevin Balaod of With Intelligence; Will Crooks of Hamilton Lane; Gary Gammon of the Virginia Auditor of Public Accounts; Greg Gethard of PEI Media; and Madeline Katz of Financial Times.

The informal meeting convened at 11:52 p.m.

Attendance

Mr. Andrews announced that Ms. Pantele will be joining remotely today, participating in accordance with § 2.2-3708.3(B)(4) of the Code of Virginia and the VRS Remote Meeting Attendance Policy.

Mr. Andrews took a roll call of each IPC member for attendance purposes:

Mr. Bell – not present
Mr. Bennett – present
Mr. Disharoon – present
Mr. Garrett – present
Dr. Gooden – present
Mr. Hayes – not present
Mr. Montgomery – present
Ms. Pantele – not present
Mr. Andrews – present

Minutes

A motion was made by Mr. Montgomery and seconded by Mr. Garrett to approve the minutes for the March 24, 2021 Committee meeting. The motion was unanimously approved via roll call:

Mr. Bennett – aye
Mr. Disharoon – aye
Mr. Garrett – aye
Dr. Gooden – aye
Mr. Montgomery – aye
Mr. Andrews – aye

Meeting Contents

An informal education session, led primarily by Steven Peterson and Andrew Junkin, was conducted for the purpose of providing general education information regarding the Asset Liability Management (ALM) process and the VRS Investment Beliefs' impact on asset allocation decisions. A general discussion was held throughout the presentation.

Adjournment

A motion was made by Mr. Montgomery and seconded by Mr. Garrett to adjourn the meeting. The motion was unanimously approved via roll call:

Mr. Bennett – aye
Mr. Disharoon – aye
Mr. Garrett – aye
Dr. Gooden – aye
Mr. Montgomery – aye
Mr. Andrews – aye

The meeting was adjourned at 12:36 p.m.

A. Scott Andrews, Chairperson



Virginia
Retirement
System

Risk Profile Enhancement *Using Leverage for Diversification*

Andrew Junkin and Chung Ma

April 20, 2023



- Motivation
- Definitions
- Portfolio diversification using asset allocation leverage
- Implementation options
- Pre-implementation Checklist
- Takeaways

Equity Markets Have Run

U.S. Equities - S&P 500 Index



Global Equities – MSCI ACWI



Partly Driven by Stimulative Policy

M2 Money Supply



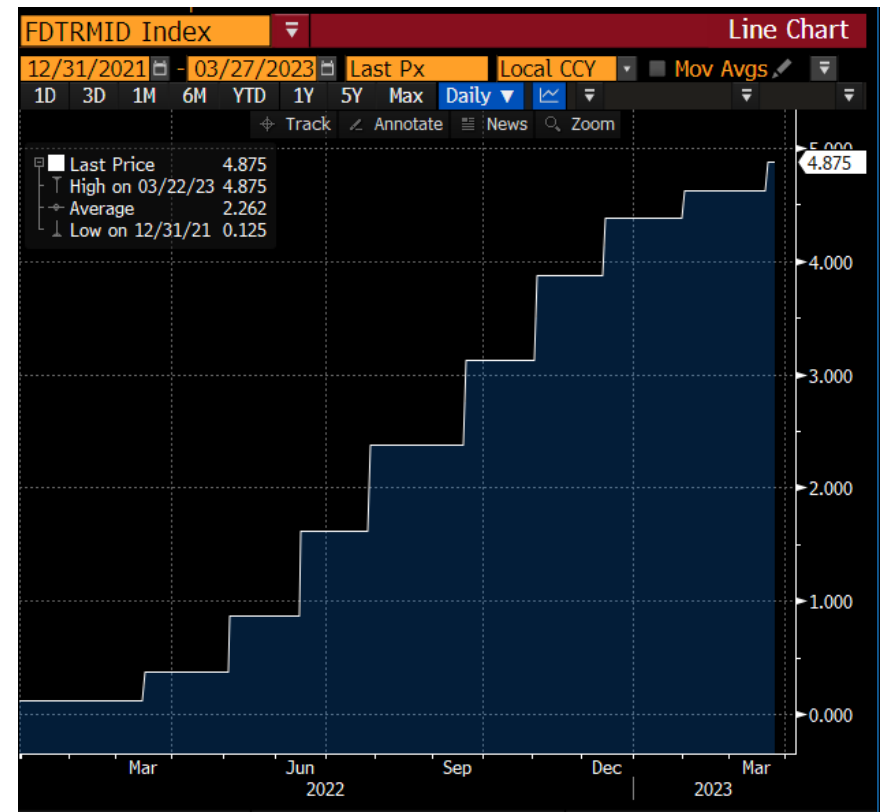
M2 is Federal Reserve's estimate of the total money supply including all of the cash people have on hand plus all of the money deposited in checking accounts, savings accounts, and other short-term saving vehicles such as certificates of deposit

But Liquidity Conditions Have Tightened

M2 Money Supply



Federal Funds Rate (mid)

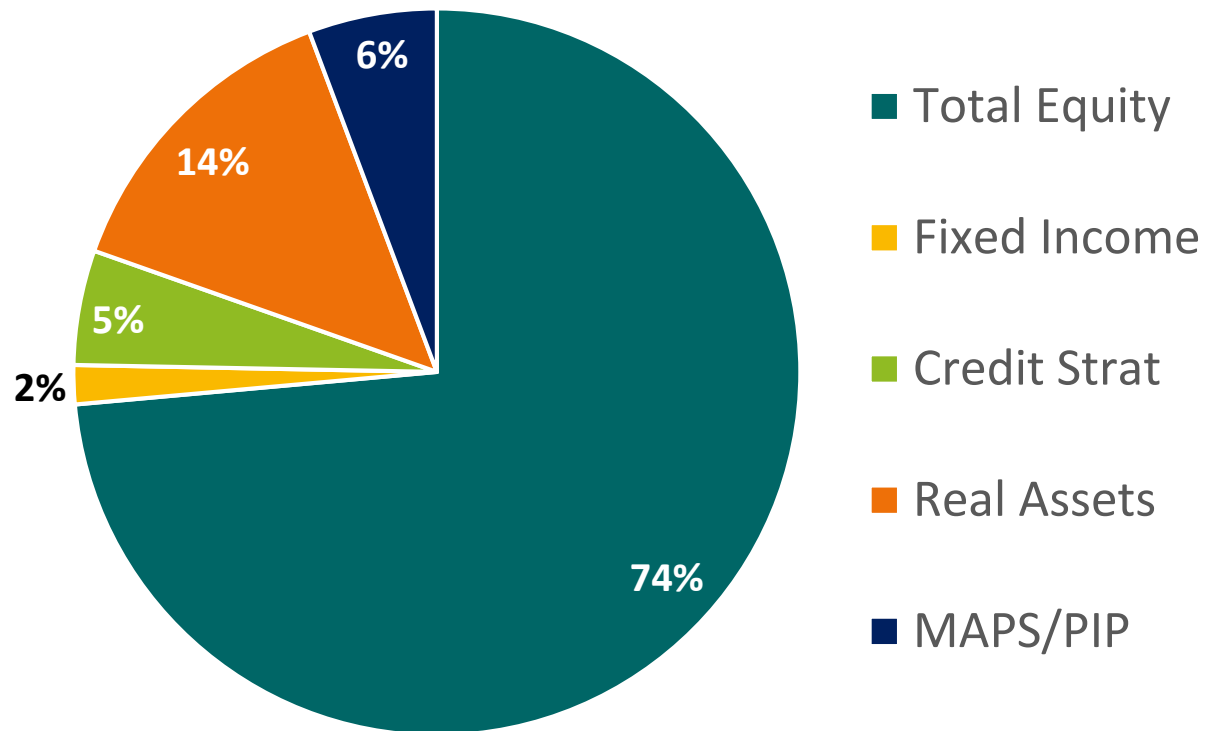


M2 is Federal Reserve's estimate of the total money supply including all of the cash people have on hand plus all of the money deposited in checking accounts, savings accounts, and other short-term saving vehicles such as certificates of deposit

- A potential regime change
- Expectation of wider range of return outcomes, potentially lower returns
- Macro risks abound, volatility ahead
- Potential solutions
 - Active management
 - Tactical opportunities
 - Rebalance policy to more diversifying assets
 - Prudent use of leverage to diversify

Portfolio Risk Dominated by Growth

Total Risk Contribution*



* BarraOne, as of December 31, 2022

MAPS – Multi-asset Public Strategies, Private Investment Partnership

Two main types for VRS

Implementation Leverage

- Within and specific to certain asset classes
- Leverage on commercial real estate, for example
- Non-recourse to VRS
- No cross collateralization

Asset Allocation Leverage

- The sum of the target weights of the strategic asset allocation is greater than 100%
- Successful use requires that *total fund* return exceeds cost of leverage over the long term

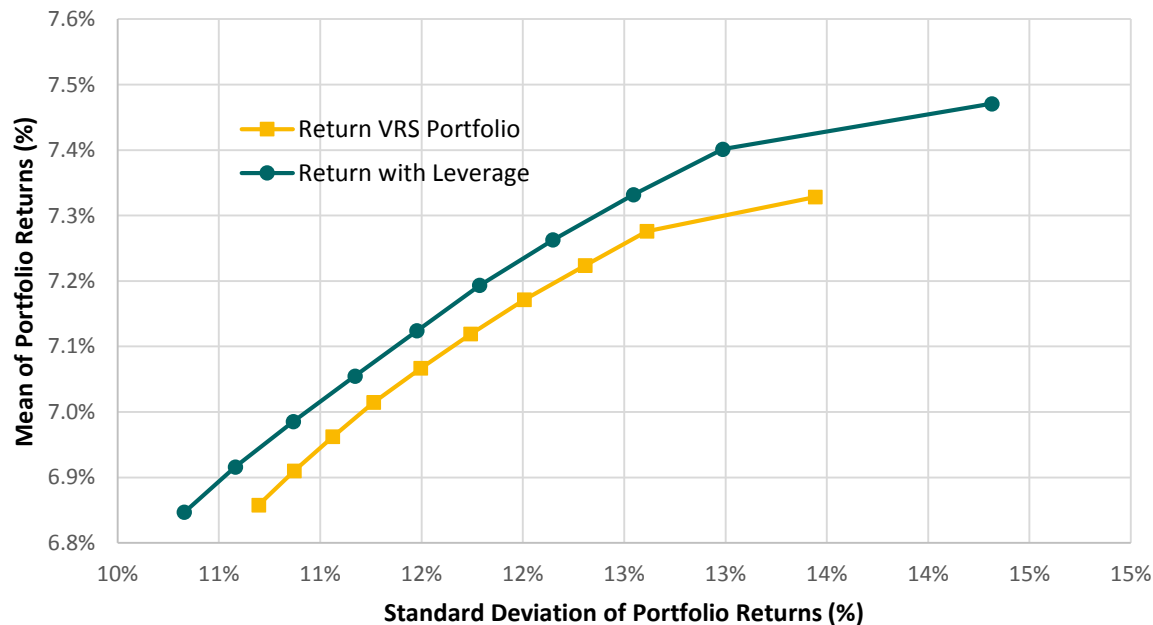
- Don't use leverage to increase public equity exposure

- Use leverage to defend the fund
 - Better risk balance
 - Help mitigate drawdown risk
 - Ability to hold positions – don't be a forced seller of assets

- Liquidity management is critical

Higher Efficient Frontier

- Can be thought of as a new asset
- More diversification
- Creates more efficient portfolios



Illustrative

What is Asset Allocation Leverage?

- Leverage – strategic asset allocation weights adding to over 100%
- Would take time to implement, likely 3 years

	Current Target	Unlevered	Modestly Diversifying	Less Liquid	More Diversifying
Public Equity	34%	33%	33%	29%	29%
Private Equity	16%	15%	15%	16%	15%
Total Equity	50%	48%	48%	45%	44%
Real Assets	14%	15%	15%	16%	16%
Credit Strategies	14%	15%	15%	16%	16%
Private Inv Partnership	2%	1%	1%	1%	1%
Risk-Based Investment:	2%	3%	5%	3%	5%
Dynamic Strategies	2%	1%	1%	2%	1%
Total MAPS	4%	4%	6%	5%	6%
Fixed Income	15%	15%	16%	18%	18%
Cash	1%	2%	2%	2%	2%
Total Cash+FI	16%	17%	18%	20%	20%
Total Fund	100%	100%	103%	103%	103%
Leverage	0%	0%	-3%	-3%	-3%
Total Fund (lev)	100%	100%	100%	100%	100%

Diversification Can Mitigate Drawdowns

	Current Target	Unlevered	Modestly Diversifying	Less Liquid	More Diversifying
Return	7.0%	7.0%	7.2%	7.2%	7.1%
Volatility	12.6%	12.1%	12.2%	12.0%	11.7%
Return/Volatility	0.56	0.58	0.59	0.60	0.61
Worst Cases					
25th Percentile	-1.5%	-1.2%	-1.0%	-1.0%	-0.8%
5th Percentile	-13.7%	-13.0%	-12.9%	-12.6%	-12.1%
Largest Drawdown	-40.8%	-38.9%	-38.7%	-37.8%	-36.5%

- Asset Allocation Leverage is used to better balance portfolio risks
- Drawdown risk is mitigated through prudent use of Asset Allocation Leverage

Data based on Monte Carlo simulations using VRS capital market assumptions

Portfolio construction allows for drawdown mitigation

Scenario	Current Target	Unlevered	Modestly Diversifying	Less Liquid	More Diversifying
Global Financial Crisis (2007-09)	-28.9	-28.1	-28.1	-26.9	-26.3
Tech Crash	-18.2	-17.5	-17.3	-15.7	-15.3
1987 Market Crash (Aug-Nov)	-7.2	-6.9	-6.9	-6.6	-6.4
2011 US Debt Ceiling Act	-7.8	-7.5	-7.5	-7.0	-6.8

Benefits

- Can be used to improve diversification and create better risk balance
- Increase odds of achieving investment goal
- Potential to have a more efficient portfolio (e.g., better Sharpe Ratio)
- Potential to increase return (especially if used for public equity-not in consideration)

Considerations

- Increase operational complexity
- Will not always outperform, depending on market environment
- Potential to increase volatility versus an unlevered portfolio, amplify gains and losses
- Increases importance on risk management, especially with liquidity considerations
- Communication to all stakeholders

Plan *	Role of Asset Allocation Leverage
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SWIB (15%)	Increase fixed income
TRS (4%)	Increase fixed income and diversifiers
CalPERS (5%)	Increase diversifiers and alternatives
PSERS (10%)	Increase fixed income and real assets
MOSERS (40%)	Increase fixed income and alternatives
OP&F (25%)	Increase fixed income and diversifiers

*State of Wisconsin Investment Board, Teacher Retirement System of Texas, California Public Employees' Retirement System, Pennsylvania Public Schools Employees' Retirement System, Missouri State Employees' Retirement System, Ohio Police and Fire Pension Fund

Higher Cost/Lower Complexity

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

Lower Cost/Higher Complexity

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

- Over time, hire additional FTEs (1-3) and design for efficiency
- Risk management oversight is essential
 - Liquidity
 - Funding/financing
 - Collateral
 - Rebalancing
- Need external and internal tools to monitor
- Communicate regularly to management and stakeholders

Pre-Implementation Checklist

- Governance
 - Update Investment Policy Statement and Investment Beliefs
 - Draft Leverage Policy (including constraints at Fund and asset class/program levels)
- Determine appropriate options for funding
- Ability to trade futures, swaps, borrow from securities lending collateral
- Liquidity reporting
- Financing dashboard
- Counterparty risk dashboard
- Other risk management dashboards
- Enhanced portfolio management tools
- Enhanced rebalancing and cash flow monitors
- Complete documentation for financing options
- Dynamic scenario and stress testing tools

- Aligning portfolio priorities - use leverage to create a better risk balance
 - More predictable contribution rates, protect funded ratio, defend the fund, and to not be a forced seller
- Increase odds of achieving assumed rate of return over time, by targeting drawdown risk
- Glide path to 3%, starting small to stress test process and systems with continuous re-evaluation
- Critical success factors
 - Strong governance
 - Risk management
 - Implementation capabilities and tools
 - Communication - appreciation of pitfalls
- *Desire to consider **strategic asset allocation** and **rebalancing leverage***

Counterparty Risk

Counterparty Risk Dashboard

Highlight Counterparty Name



Choose an Effective Date:

4/11/2023

Counterparty Name	Risk Ranking	CDS	CDS Rates and Implied Default Probabilities					Equity Price Performance					
			%Ch 1Day	%Ch 1Week	%Ch 1Mth	%Ch YTD	1 Yr DP	5 Yr DP	Equity Price	%Ch 1D	%Ch 1W	%Ch 1M	%Ch 52wH
JPMorgan Chase & Co	1	86.5	0.50%	16.79%	7.82%	8.57%	0.0%	1.5%	128.52	0.7%	0.1%	2.1%	10.6%
Bank of New York Mellon	2						0.1%	3.3%	45.74	1.1%	2.4%	3.7%	-11.9%
Goldman Sachs Group Inc/The	3						0.0%	1.5%	327.37	0.7%	1.5%	3.8%	-15.8%
BNP Paribas SA	4	70.0	-2.00%	4.20%	26.11%	11.07%	0.1%	1.0%	57.20	1.0%	1.0%	-0.7%	-13.2%
Citigroup Inc	4	105.2	-1.02%	11.09%	11.70%	9.63%	0.2%	2.2%	47.20	1.5%	2.4%	5.6%	-13.2%
Morgan Stanley	6						0.0%	1.7%	65.09	1.3%	0.3%	3.3%	15.6%
UBS AG	7	110.5	-0.73%	3.91%	50.70%	43.18%	0.2%	2.5%	18.98	0.1%	0.1%	3.3%	-8.8%
Bank of America Corp	8	122.6	1.82%	25.47%	37.72%	41.08%	0.1%	1.9%	28.71	2.8%	2.6%	0.7%	-27.6%
Societe Generale SA	9	81.7	-2.50%	0.31%	25.34%	18.99%	0.4%	1.2%	21.54	0.0%	0.0%	-12.0%	-23.1%
Deutsche Bank AG	10	151.0	-1.29%	3.58%	59.03%	22.69%	0.4%	1.3%	9.50	0.5%	0.5%	-6.4%	-22.4%
Credit Suisse Group AG	11	195.4	2.99%	5.53%	54.29%	40.00%	9.2%	11.0%	0.81	0.1%	0.1%	64.2%	88.7%

Counterparty Name	Risk Ranking	Ratings Outlook		Volatility Metrics		
		Fitch	Fitch Outlo.	Rv 30D	Rv 60D	Rv 360D
JPMorgan Chase & Co	1	N.A.	N.A.	34.6	27.4	28.7
Bank of New York Mellon	2	N.A.		39.9	29.8	30.7
Goldman Sachs Group Inc/The	3	N.A.	N.A.	31.3	23.8	29.4
BNP Paribas SA	4	N.A.	N.A.	52.6	40.3	35.5
Citigroup Inc	4	N.A.	N.A.	43.9	34.1	32.3
Morgan Stanley	6	N.A.	N.A.	33.9	23.4	31.2
UBS AG	7	N.A.	N.A.	62.7	45.3	36.5
Bank of America Corp	8	N.A.	N.A.	41.0	31.5	31.6
Societe Generale SA	9	N.A.	N.A.	55.2	45.0	42.4
Deutsche Bank AG	10	N.A.	N.A.	50.8	40.7	44.1
Credit Suisse Group AG	11	N.A.	N.A.	267.3	193.7	90.7

* Lower numerical risk ranking is better; Rank 1 is considered lowest risk

Risk ranking is a derived value based on CDS (lower is better), EP %Ch 1M (higher is better), EP %Ch 52wH (higher is better), and RV 60D (lower is better)

Financial Conditions

Risk Dashboard Daily Summary & Trends



Daily Snapshot as of 4/12/2023

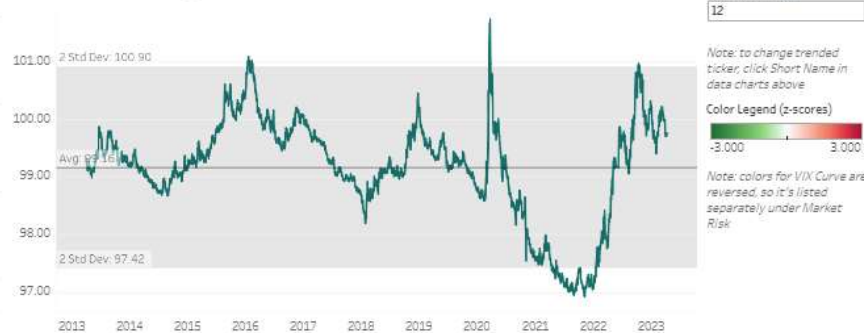
Risk Category	Short Name	Date	Level	WoW change	z-score	z-score - 1 wk ago
Market Risk	CSFB Index	4/11/2023	20.11	0.05	1.35	1.36
	Financial Cond. - Asia ex. Japan	4/11/2023	103.17	0.05	0.13	0.07
	Financial Cond. - Europe	4/11/2023	101.39	0.01	2.78	2.76
	Financial Cond. - UK	4/11/2023	100.31	-0.04	1.51	1.56
	Financial Cond. - US	4/11/2023	99.75	0.04	0.68	0.63
	GFSI	4/11/2023	0.39	-0.01	0.67	0.90
	GFSI Equity	4/11/2023	0.56	0.14	-0.16	-0.33
	GFSI Flow	4/11/2023	0.14	-0.08	0.41	0.65
	GFSI Fund Flow	4/11/2023	0.02	-0.06	-0.51	-0.32
	GFSI Market	4/11/2023	0.43	-0.09	1.30	1.45
	GFSI Risk	4/11/2023	0.43	-0.02	1.18	1.23
	GFSI Skew	4/11/2023	0.45	0.02	0.21	0.18
	GFSI Volume	4/11/2023	0.51	-0.21	0.43	0.68
	Gold VIX	4/11/2023	18.33	-1.40	0.36	0.69
	Oil VIX	4/11/2023	34.23	-5.19	-0.71	0.04
	US Treasury VIX	5/15/2020	4.71	-0.44	-0.53	-0.21
	VIX Index	4/12/2023	19.23	-0.37	0.14	0.19
Vol of Vol	4/11/2023	85.92	1.20	-0.64	0.70	
Market Risk	VIX Curve	4/12/2023	2.97	-0.48	0.30	0.43

Risk Category	Short Name	Date	Level	WoW change	z-score	z-score - 1 wk ago
Currency Risk	EURUSD CCB	12/31/2021	-7.38	Null	1.00	
	GFSI FX Skew	4/11/2023	0.34	-0.09	0.60	0.99
Liquidity Risk	GFSI Liquidity	4/11/2023	0.42	0.05	0.69	0.54
	GFSI Solvency	4/11/2023	0.46	-0.03	1.07	1.15
	LIBOR-OIS	4/6/2023	0.29	0.02	0.53	0.37
	TED Spread	4/11/2023	0.12	-0.22	0.96	0.40
Policy Risk	China Political Uncertainty	3/31/2023	756.76	Null	1.19	
	CNH/CNY Spread	4/12/2023	0.01	Null	0.09	
	Europe Political Uncertainty	3/31/2023	322.94	Null	1.45	
	Japan Political Uncertainty	3/31/2023	126.58	Null	0.58	
	U.S. Daily Political Uncertainty	4/11/2023	233.95	-16.22	1.00	1.14
	U.S. Political Uncertainty	3/31/2023	202.75	Null	0.49	

1-Year Trend - Bloomberg Financial Condition US



10-Year Trend - Bloomberg Financial Condition US



Select prior months for 1-year trend
12

Note: to change trended ticker, click Short Name in data charts above

Color Legend (z-scores)
-3.000 3.000

Note: colors for VIX Curve are reversed, so it's listed separately under Market Risk

Funding Rates

Regions ▾		Settings ▾		17:18:05		🔗 Swaps Markets: US Libor Alternatives					
GV Ask/Chg		SOFR/GV		SOFR OIS		Dow Jones					
2Y	3.958	-0.064	2.3000	+0.1700	3.9815	-0.0005	DJIA	33646.50	-38.29		
3Y	3.689	-0.089	-10.0800	-0.1400	3.5920	+0.0005	S&P 500 Index				
4Y	3.574	-0.077	-20.6300	-0.3800	3.3717	-0.0043	S&P 500	4091.95	-16.99		
5Y	3.462	-0.065	-21.2500		3.2417	-0.0103	NASDAQ Composite Index				
7Y	3.419	-0.054	-28.8800	+0.0200	3.1245	-0.0109	CCMP	11929.34	-102.54		
10Y	3.391	-0.035	-29.8800		3.0840	-0.0110	Bloomberg European 500				
20Y	3.736	-0.007	-65.2500	+0.0600	3.0770	-0.0090	BE500	300.65	+0.07		
30Y	3.625	+0.006	-72.1500	-0.0200	2.9005	-0.0038					
CME Term SOFR		BSBY Fix		AMERIBOR Fix		3M BSBY/SOFR Spread		Active Futures			
O/N	4.80000	-0.03000	4.89507	0.00869	5.06987	-0.00321	3M	5 Year	110-03 ³ / ₄ +0-11 ¹ / ₄		
					4.88570	-0.00965	6M	10 Year	115-22+ +0-10+		
1M	4.88117	+0.00500	4.90659	0.00560	4.97865	+0.00724	1Y	25.2500	+0.2500		
3M	4.98987	+0.01326	5.15320	0.02162	5.05500	+0.00271	2Y	25.7500			
6M	4.98536	+0.01401	5.29138	0.05963	4.89063	-0.00624	5Y	27.2500			
1Y	4.76552	+0.01275	5.28580	0.11464	4.60095	-0.00485	10Y	27.5000	+0.1250		
3M Libor/SOFR OIS Spread								Alternative Rate Futures			
LB/SFR	26.97900	+0.98200					20Y	28.1250	+0.1250		
							30Y	28.3750			
Cash Market		Generic SOFR Futures		SOFR Swaption 1Y		5Y		10Y			
ICAP FF	4.82000	+0.00000	SFR1	95.088	+0.000	1Y	151.356	119.348	105.169		
Fed Funds Eff	4.83000	+0.00000	SFR2	95.055	+0.030	2Y	132.865	111.010	99.124		
O/N Repo	4.83000	-0.00800	SFR3	95.375	+0.070	5Y	104.644	95.408	87.289		
			SFR4	95.740	+0.075	10Y	83.759	77.639	72.546		
			SFR5	96.195	+0.085						
			SFR6	96.595	+0.110						
								Generic BSBY Futures			
									BSB1	94.7600	+0.0300
									BSB2	95.1450	+0.0700
									BSB3	95.4550	+0.0750
									BSB4	95.9400	+0.0750
									BSB5	96.3350	+0.0850
									BSB6	96.6500	+0.1100

Economic Releases | ECO »

Risk Appetite

Short-Term Risk Appetite Index Summary



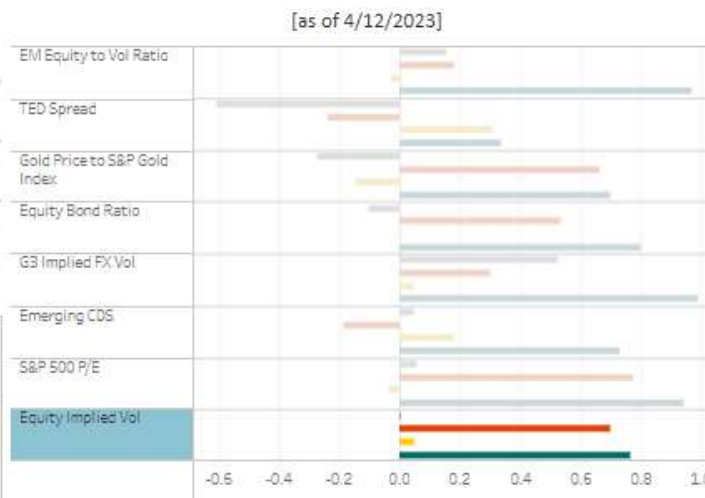
Short Term (months):
 Long Term (years):
 Rolling Window (days):
 Include Crude Oil Future:

Specify Start Date (m/d/yyyy):
 Specify End Date (m/d/yyyy):

Chg3Mon
 Chg1Mon
 Chg1Wk
 Current



z-scores [as of 4/12/2023]			Long Term Mean	Long Term Std Dev
	Index Value	z-score		
Current	75%	1.11	24%	22%
Prior Day	76%	1.02		
Prior Week	75%	0.95		



Current Situation – An Example

34% Policy Allocation to Public Equity (EQ)

Cash (\$34B)

Buy

Physical EQ Exposure (\$34B)

Economic Exposure



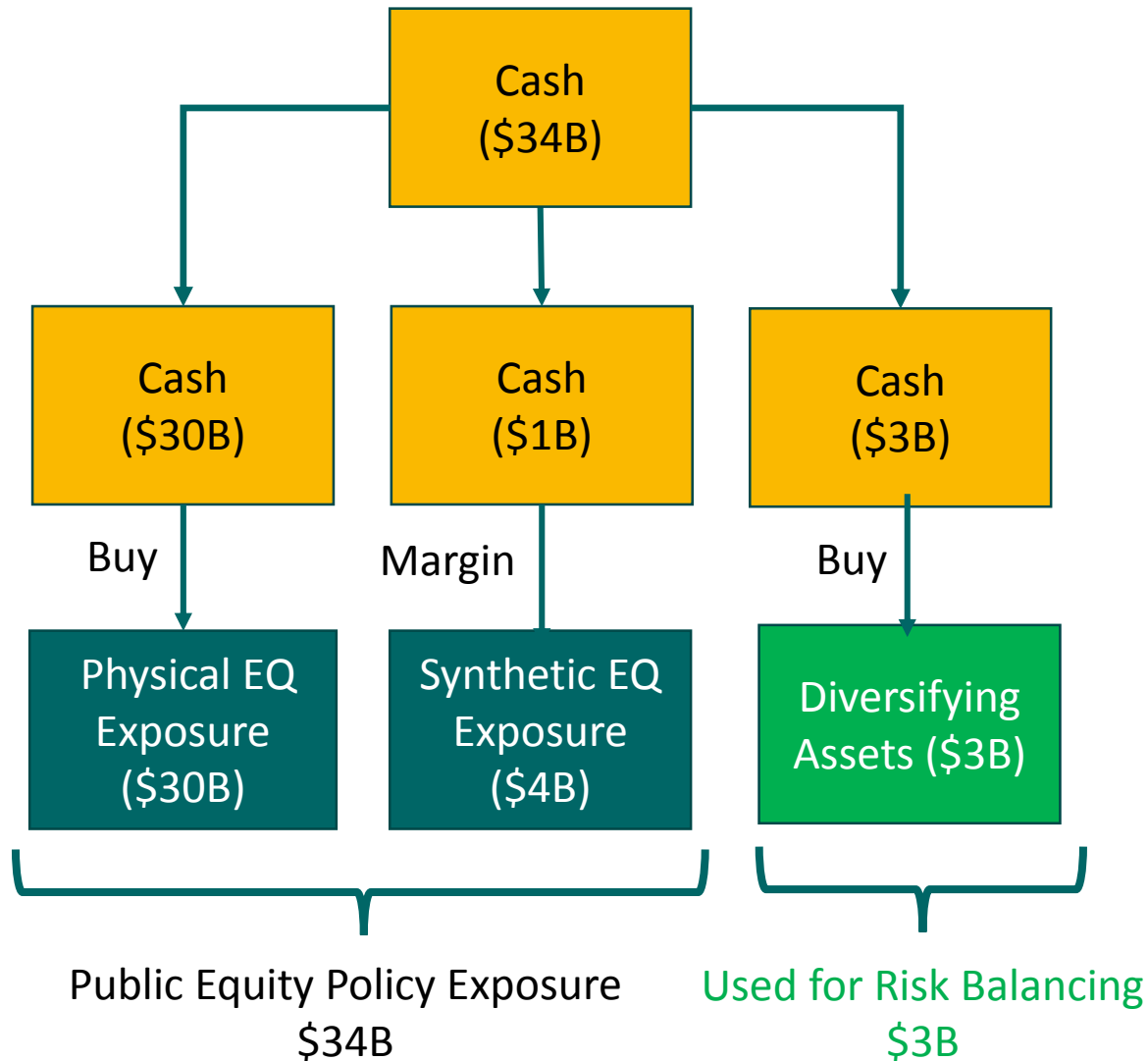
Public Equity Policy Exposure
\$34B

Use of Synthetics – An Example

34% Policy
Allocation to
Public Equity
(EQ)

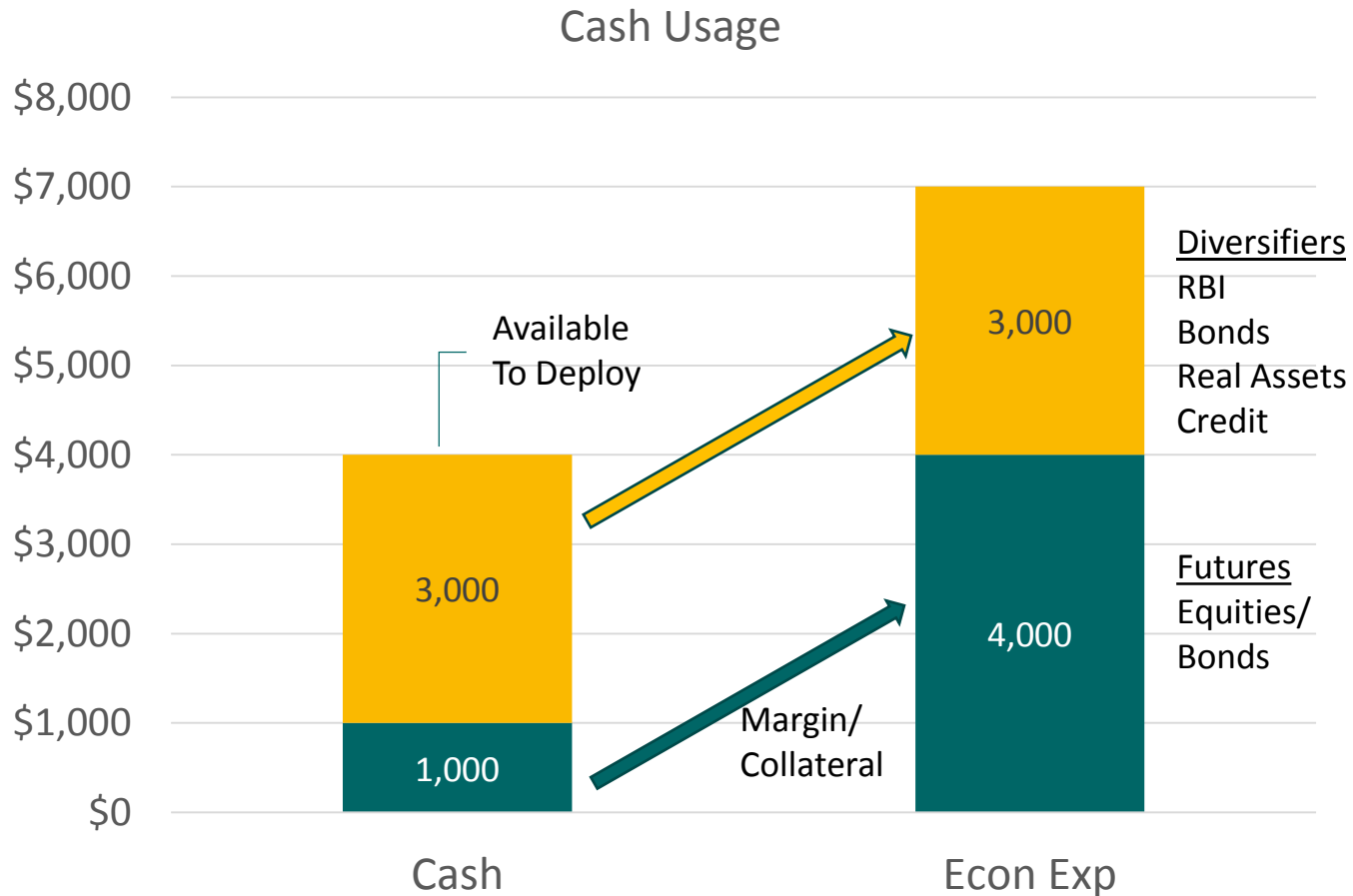
Allocate
Cash to
Exposures
(\$34B)

Economic
Exposures*
(\$37B)



Cash Management - Synthetic Case Study

Synthetic exposure allows for re-allocation to other assets



Illustrative, numbers are in US dollars, millions