Asset Allocation

JUNE 13, 2024

The Council's Role in Asset Allocation

- The primary investment objective for SDRS assets is to achieve and exceed the return of the Council's Capital Markets Benchmark over the long term

- The key investment policy decision relates to asset allocation

- The Council establishes:
  - Benchmark asset allocation which considers expected long-term returns and risk
  - Minimum and maximum for each asset category

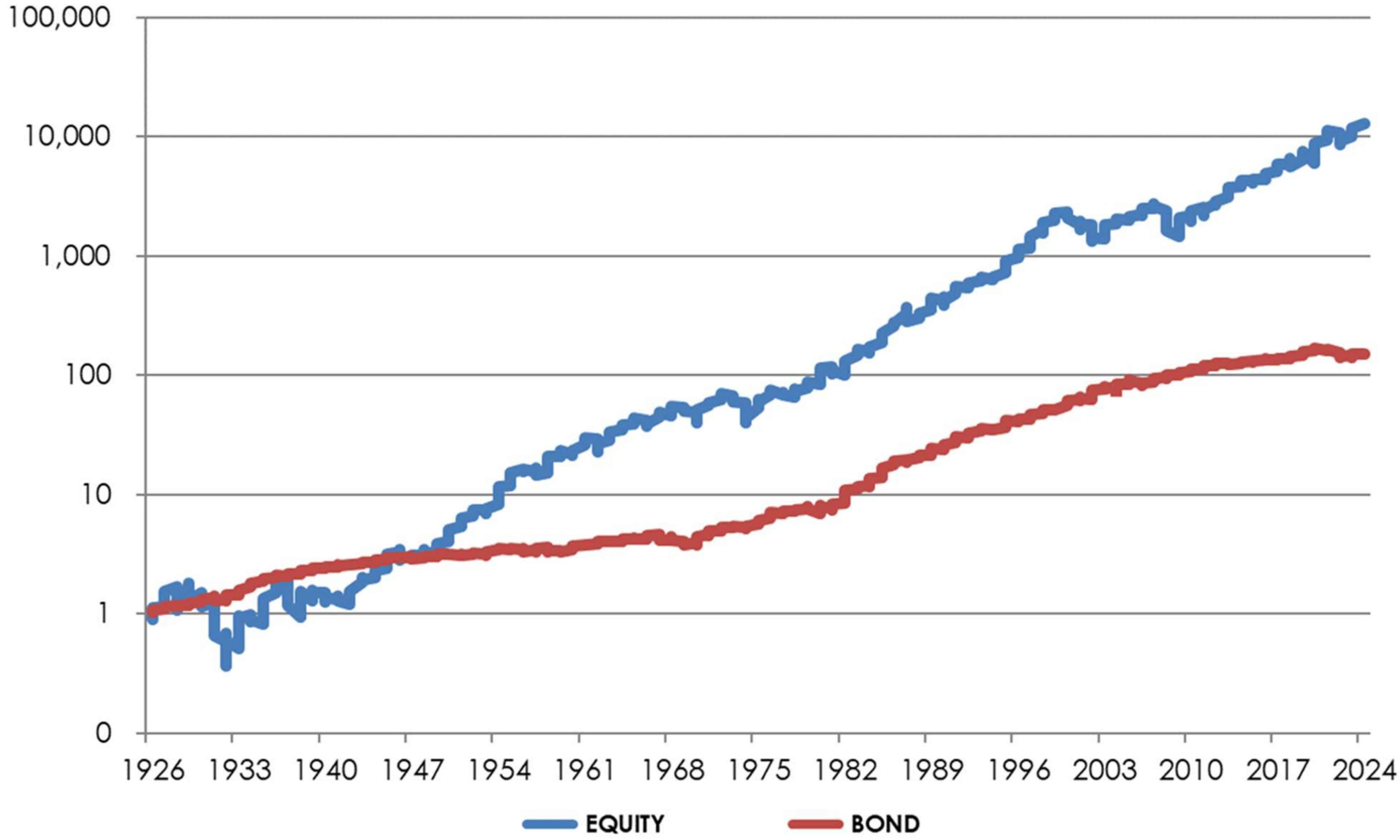
Discussion Topics

- Return and Risk Assessment
- Benchmark Recommendation
- Expected Return
- Valuation Analysis
- Asset Allocation Implementation

Return and Risk Assessment
Equity and Bonds

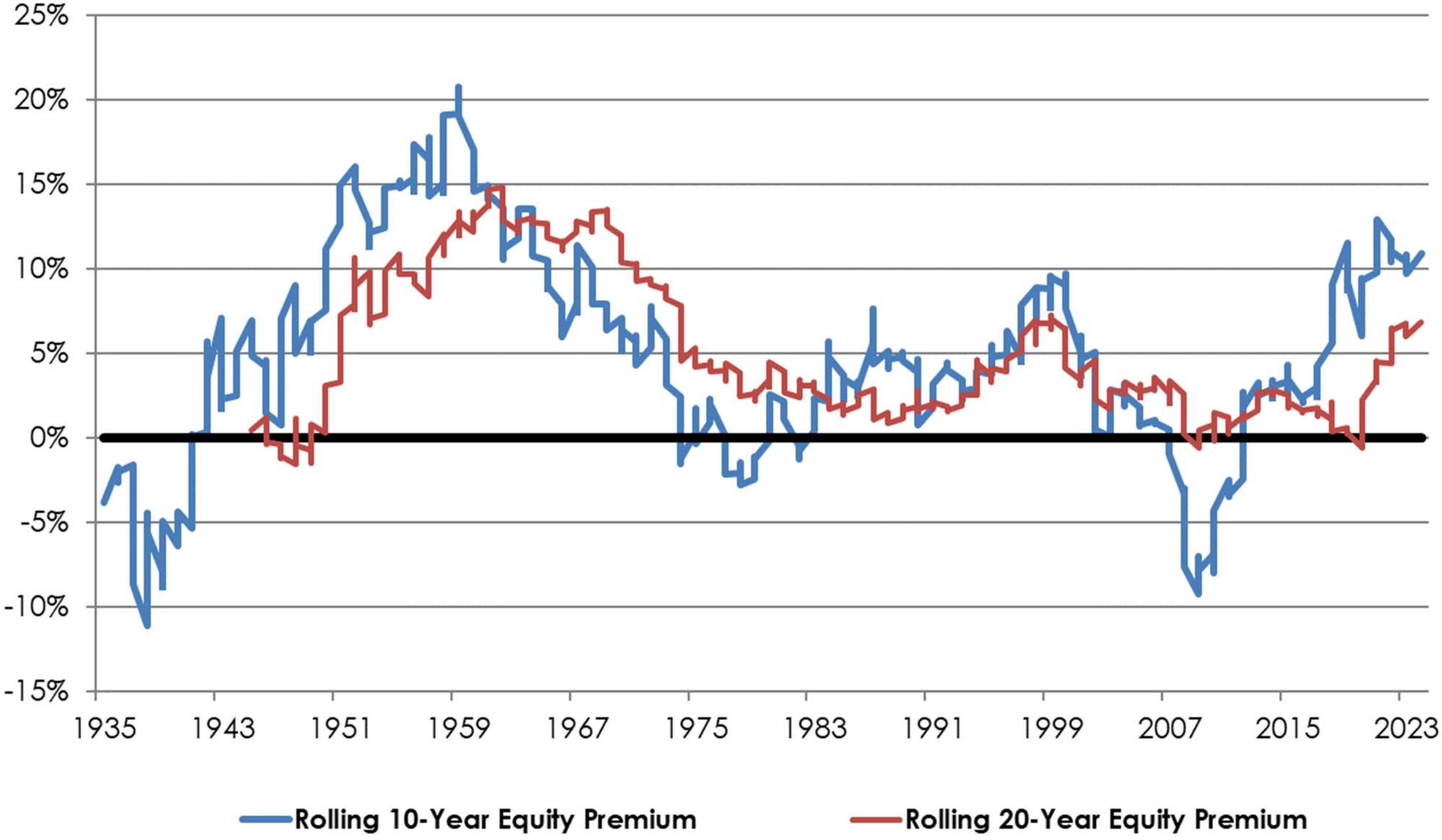
- Long-term return history is available only for equity, bonds, and cash
- Equity returns
  - Best over the very long term, but are volatile
- Bond returns
  - Lower over the long term compared to equities
  - Provide diversification
- Return/risk tradeoff depends on willingness to endure volatility

Long-Term Equity Returns Exceed Bond Returns



Equity Less Bond Return

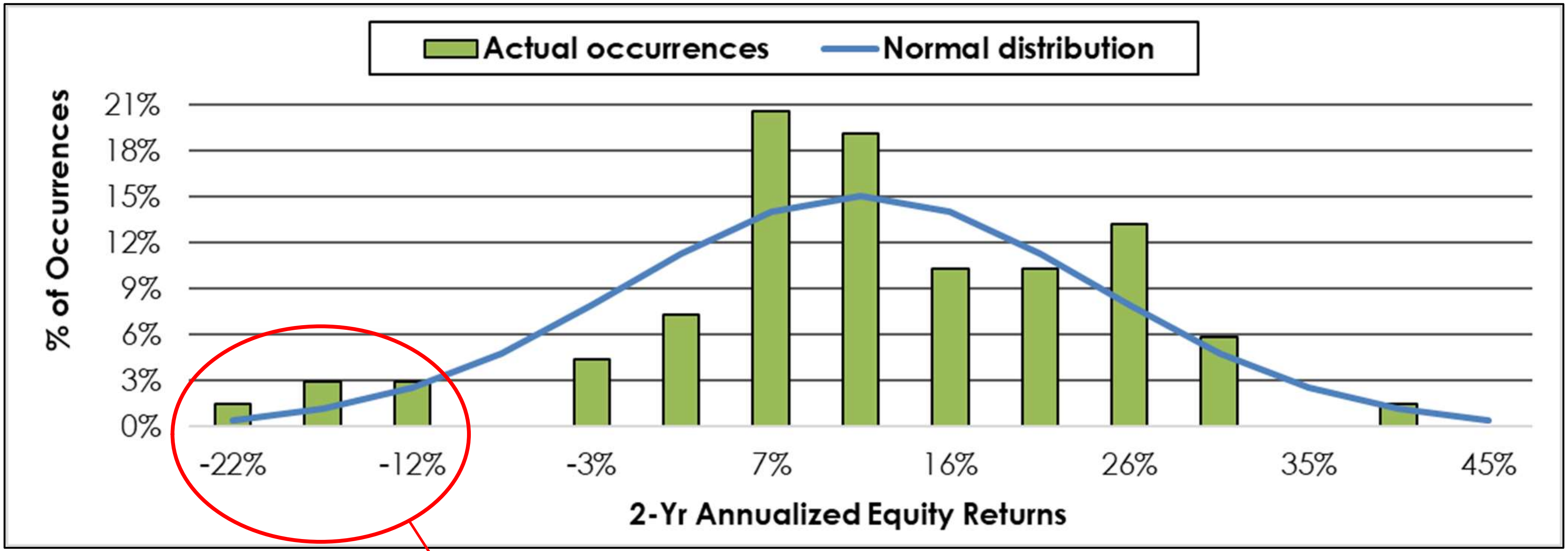
Historical Rolling Periods



Risk Measurement

Example: Actual vs Expected Equity Returns

- Conventional statistical measures of risk
  - Standard deviation and correlations are calculated

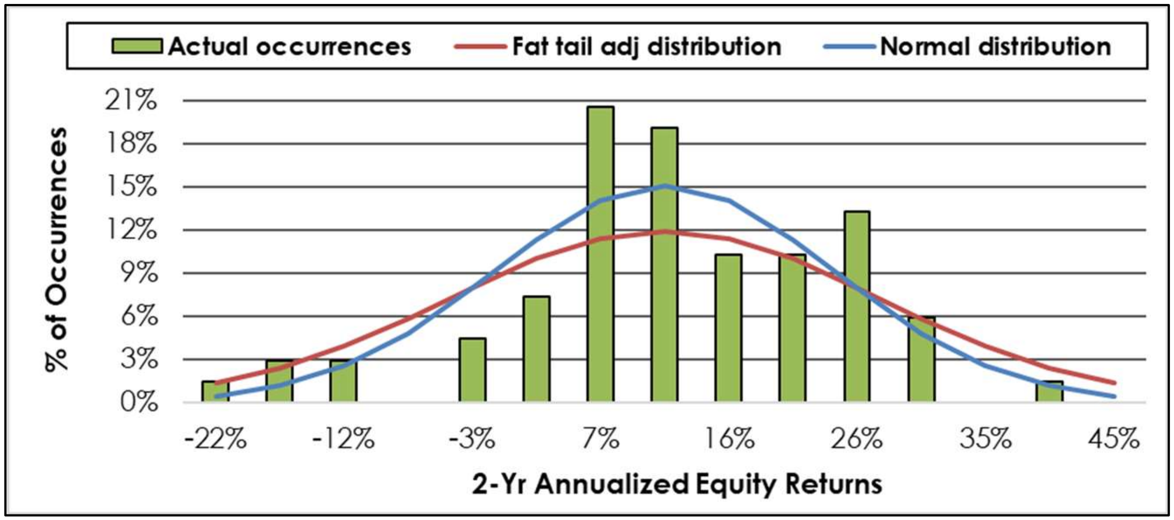


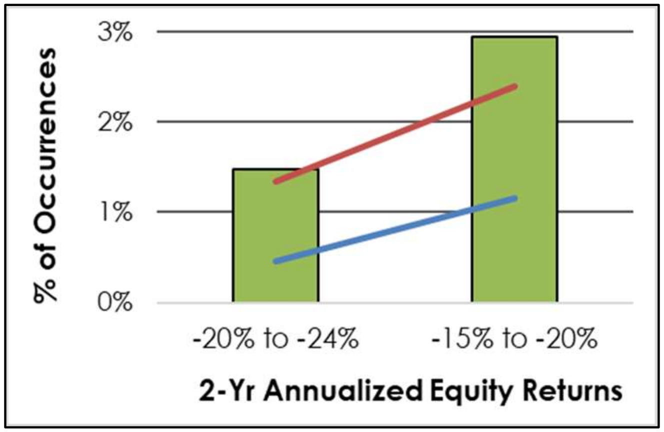
Risk is focused on severe adverse outcomes which are not represented well by conventional statistics

Risk Measurement

Example: Actual vs Expected Equity Returns

- SDIC adjustment to conventional risk measures
  - SDIC volatility
  - SDIC correlations

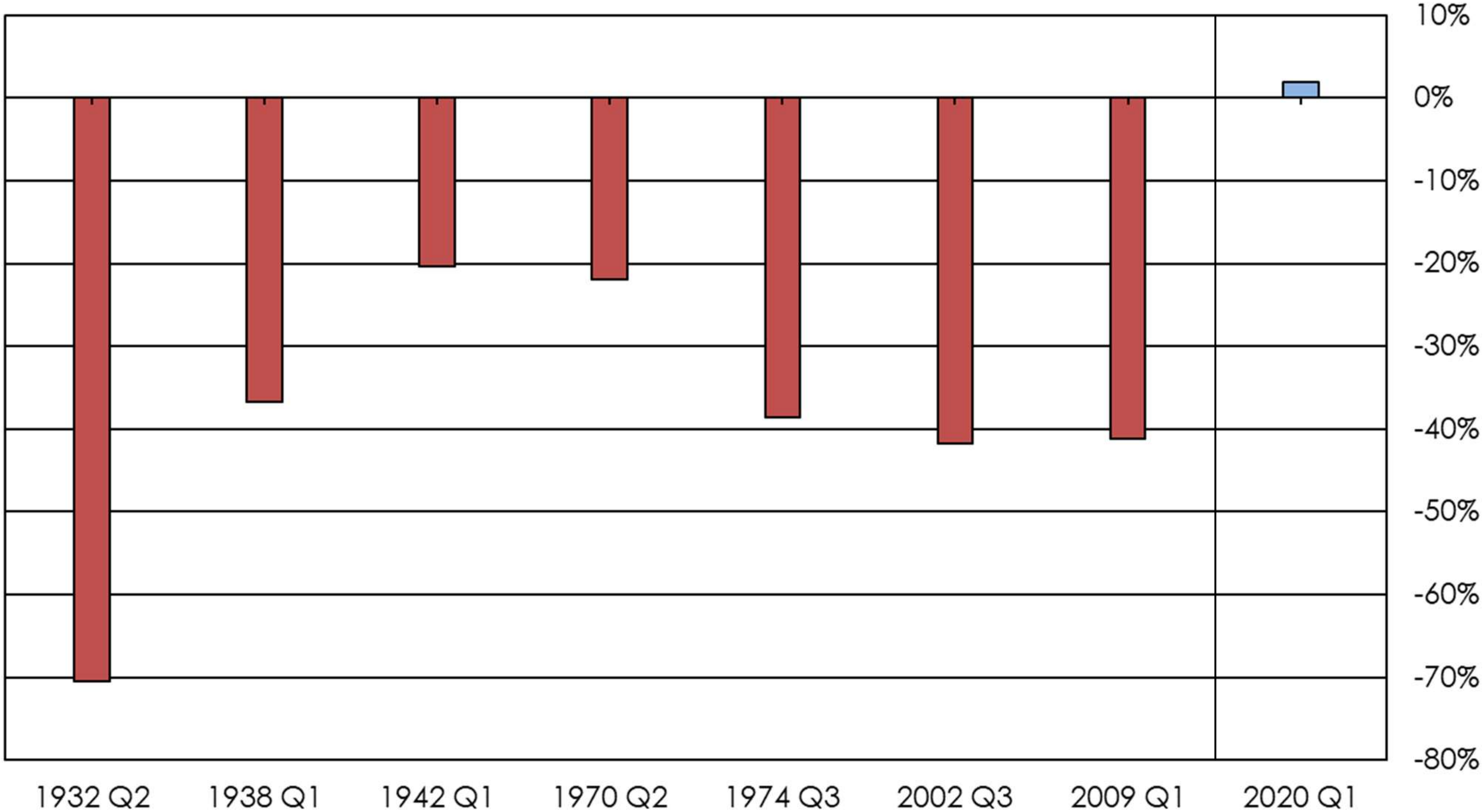




- Focus on equity-like and bond-like risk
  - Withstanding a two-year adverse outlier event

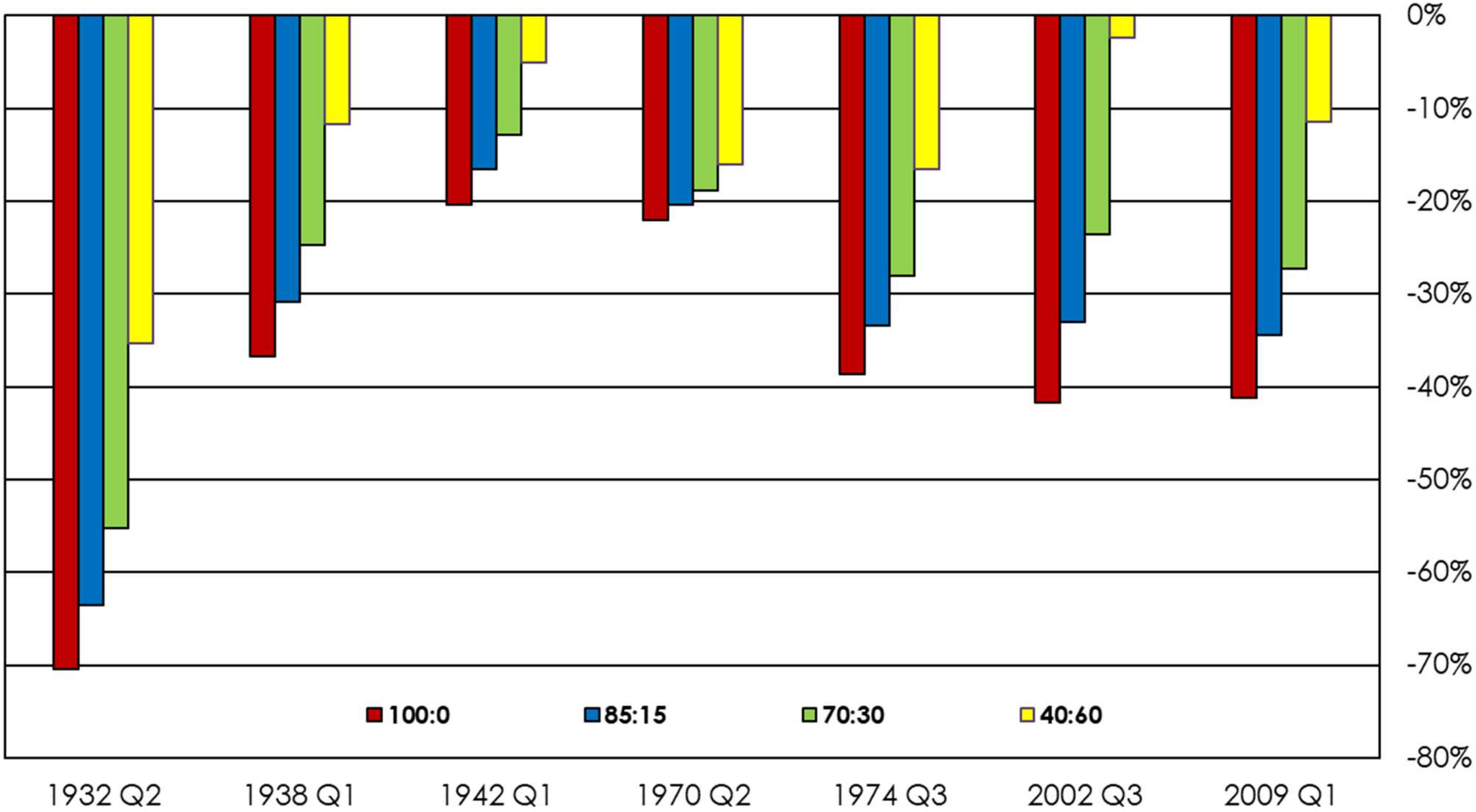
Equity Downturns Can Be Severe

Two-year periods with equity returns below negative 20%



Risk of Various Equity Allocations

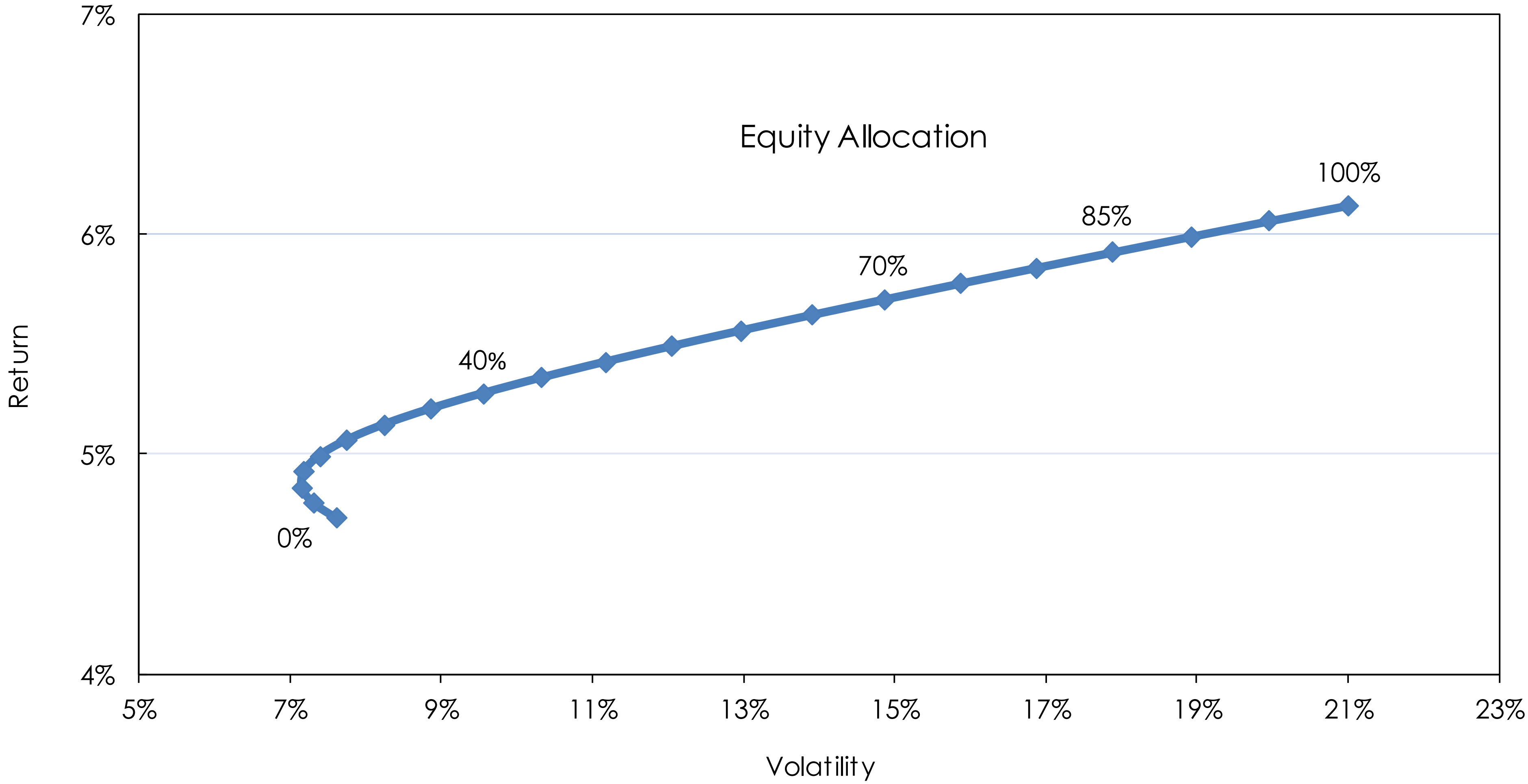
Two-year periods with equity returns below negative 20%



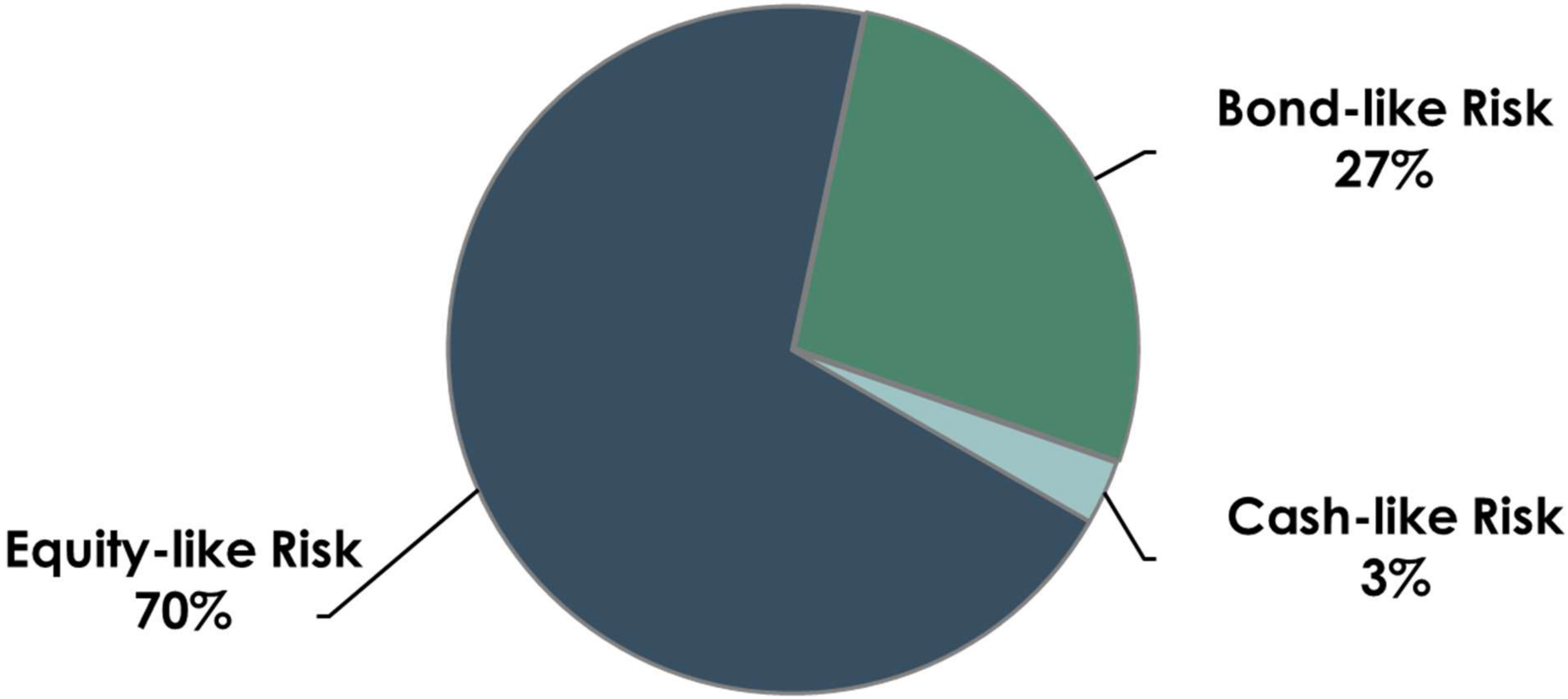
The information presented is to be used solely for management of State of South Dakota financial assets.
Any others should conduct their own research and consider their own circumstances.

Return and Risk for Stock/Bond Allocations

Using SDIC long-term expected returns and fat tail adjusted volatility



Benchmark Recommendation



- Balances long-term returns and drawdown risk

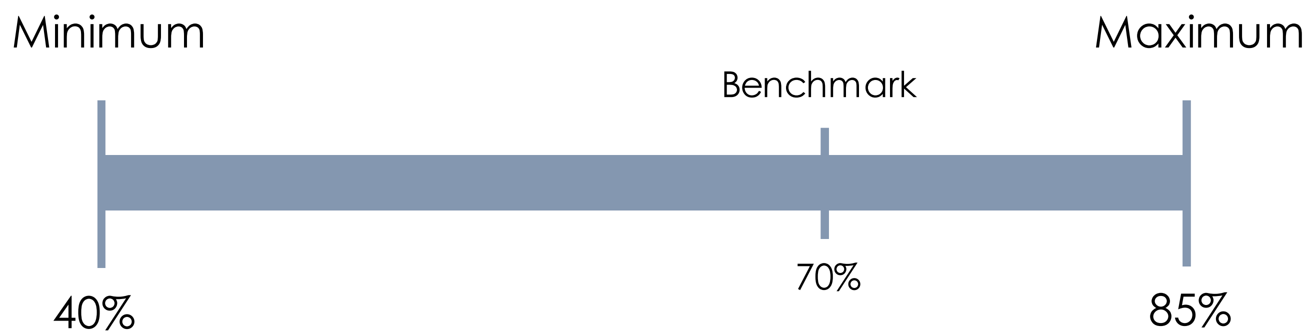
Benchmark Ranges

- Goal
  - Enter market downturns with near minimum equity-like risk
  - Increase equity-like risk toward maximum during equity downturns to benefit from an eventual rebound

- The Importance of Patience
  - Markets typically continue to rise or fall further after reaching minimum or maximum risk thresholds
    - Essential to be patient for 5 years or more

Benchmark Range Recommendation

Equity-like Risk



Minimum

- Increases underperformance risk but also reduces absolute risk when markets are extremely expensive
- Still provides meaningful exposure if wrong or early

Maximum

- For when markets are very cheap (on our valuation measures)
- Cheapness would suggest much of a potential decline had already occurred
- Weathered this maximum during the financial crisis

Benchmark Range Recommendation

Bond-like Risk

Minimum

- Provides diversification

Maximum

- For when bonds are very cheap (on our valuation measures)

Risk of Other Asset Categories

- Other categories are mapped to equivalent equity-like / bond-like / cash-like risk
  - REITS mapped primarily to equity with remainder mapped to short duration bonds
  - High yield debt mapped to equity and short duration bonds depending on credit quality
  - Private equity treated as leveraged equity
  - Opportunistic Real Estate treated as leveraged REITs
- Exposures embedded in other categories are accounted for when targeting overall equity-like / bond-like / cash-like risk

Benchmark Construction

- Categories in the benchmark are significant and passively implementable
  - Public Equity, Investment Grade Debt, Cash, High Yield Debt, REITs
- Secondary categories are excluded from the benchmark, but have permitted ranges
  - Private Equity, Opportunistic Real Estate, Aggressive Absolute Return Strategies, High Yield Real Estate Debt
- Equivalent stock/bond/cash risk is accounted for and offset when investing in other asset categories
- Benchmark constructed to achieve 70% equity-like, 27% bond-like, and 3% cash-like risk exposures

SDRS Capital Markets Benchmark

Proposed FY 25

	Primary Asset Categories						Secondary Asset Categories[4]				Other Categories[5]
	Equity-Like Risk	Public Equity[1]	Real Estate REIT/Core[2]	HY Corp Debt	Investment Grade Debt[1]	Cash[3]	Private Equity	Opportunistic Real Estate[2]	HY Real Estate Debt	Aggressive Absolute Return	
Minimum	40%	20%	0%	0%	13%	0%	0%	0%	0%	0%	0%
Maximum	85%	75%	20%	15%	60%	45%	12%	15%	10%	5%	5%
Proposed 2025 BM	**70%**	**56.3%**	**12%**	**7%**	**22.8%**	**1.9%**					
Benchmark Index		(3/4) custom MSCI ACWI IMI ex Real Estate + (1/4) custom MSCI USA IMI ex Real Estate	MSCI US REIT	FTSE US High Yield Market	FTSE US BIG Bond	FTSE US 3-mo. Treasury Bill					
Benchmark History											
2023-2024		56.3%	12%	7%	22.8%	1.9%					
2016-2022		58%	10%	7%	23%	2%					

1. Buffer for market drift of 1% for public equity and 1/2% for debt (example: Investment Grade debt minimum of 13% can drift to 12.5%)
2. Real Estate(RE) min/max applies to REITS/Core RE and Opportunistic combined. Opportunistic RE counts 1.3x against RE max. Projected base case allocation used for partnerships
3. Cash to provide liquidity for benefits payments and rebalancing
4. Since 2015, secondary asset categories have not been included in the BM. This change allowed the BM to consist solely of well fitting, investable indexes. These categories continue to have a permitted range to invest in opportunistically.
5. Other categories, such as TIPS, commodities, and arbitrage have been considered or used in the past. They are not in the BM. Future use would be limited to 5% or less.

SDRS Return and Volatility Analysis

Using JP Morgan inputs

	Expected Return	Standard Deviation*	Correlation Matrix: Public Equity	Hedge Funds	IG Debt	Cash	HY Debt	REITs	Private Equity	RE Opp
Public Equity	7.0%	17%	100%							
Hedge Funds	5.0%	8%	18%	100%						
Investment Grade Debt	5.1%	4%	21%	-5%	100%					
Cash	2.9%	1%	-4%	-5%	10%	100%				
High Yield Debt	6.5%	8%	74%	11%	35%	-7%	100%			
REITs	8.2%	16%	77%	12%	35%	-6%	67%	100%		
Private Equity	9.7%	20%	79%	27%	-3%	0%	73%	54%	100%	
Real Estate Opportunistic	9.7%	18%	38%	0%	-8%	-17%	38%	52%	36%	100%

	Public Equity	Hedge Funds	IG Debt	Cash	HY Debt	REITs	Private Equity	RE Opp	Expected Return	Standard Deviation (1yr)*
100:0 Equity/Debt	100%								7.00%	16.91%
70:27:3 Equity/Debt/Cash	70%		27%	3%					6.36%	12.13%
add REITs						12%			6.55%	11.97%
add High Yield Debt					7%				6.60%	11.80%
Benchmark FY25 (proposed)	56.3%	0.0%	22.8%	1.9%	7.0%	12.0%	0.0%	0.0%	6.60%	11.80%
Actual 3/31/24	22.9%	0.9%	12.6%	36.0%	4.6%	0.0%	11.0%	12.1%	5.87%	7.27%

* Standard deviation is a measure of volatility. There is a 68% chance of being within +/-1 standard deviation and a 95% chance of being within +/-2 standard deviations.

SDRS Return and Volatility Analysis

Using South Dakota Inputs

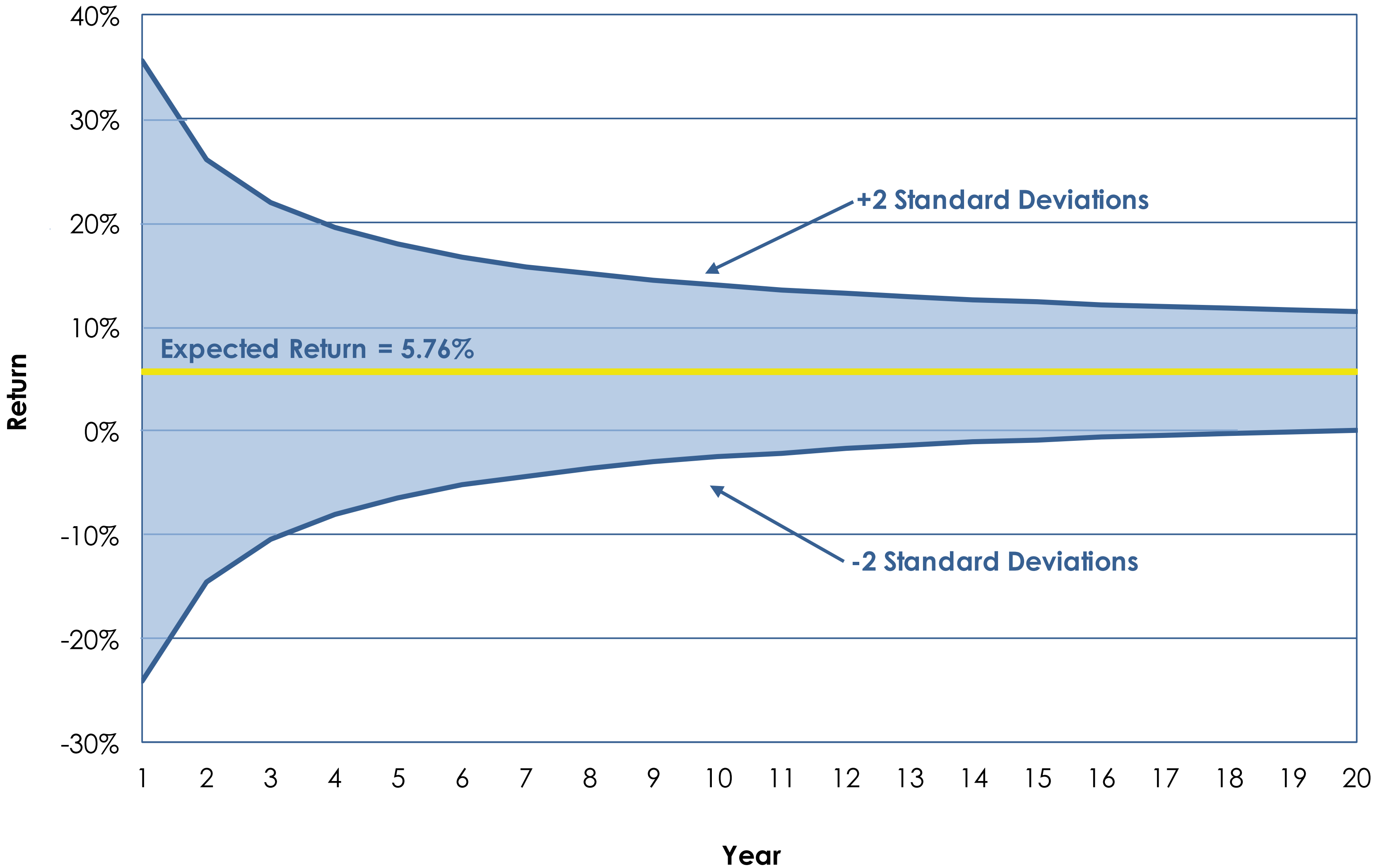
	Expected Return	Est. Volatility*
Public Equity	6.1%	21%
Hedge Funds	4.0%	11%
Investment Grade Debt	4.7%	8%
Cash	3.3%	2%
High Yield Debt	5.3%	12%
REITs	6.7%	25%
Private Equity	6.6%	30%
Real Estate Opportunistic	8.3%	33%

	Public Equity	Hedge Funds	IG Debt	Cash	HY Debt	REITs	Private Equity	RE Opp	Expected Return	Est. Volatility (1yr)*
100:0 Equity/Debt	100%								6.13%	21.00%
70:27:3 Equity/Debt/Cash	70%		27%	3%					5.66%	14.84%
add REITs						12%			5.76%	14.97%
add High Yield Debt					7%				5.76%	14.95%
Benchmark FY25 (proposed)	56.3%	0.0%	22.8%	1.9%	7.0%	12.0%	0.0%	0.0%	5.76%	14.95%
Actual 3/31/24	22.9%	0.9%	12.6%	36.0%	4.6%	0.0%	11.0%	12.1%	5.19%	11.43%

* Standard dev iation is a measure of v olatility. There is a 68% chance of being within +/-1 standard dev iation and a 95% chance of being within +/-2 standard dev iations. This measure has been adjusted to better reflect frequency and magnitude of adv erse ev ents.

SDRS Return and Volatility Analysis

Using South Dakota Inputs



SDRS Expected Long-Term Return Recap

- Benchmark asset allocation expected return is 5.76%
  - Uses SDRS inflation assumption which can vary from SDIC inflation assumption
  - Does not incorporate any negative dollar cost averaging effect nor added value from the long-term contrarian investment approach
- Expected returns are the midpoint of a wide distribution with a 50% chance of being higher and a 50% chance of being lower
- Standard deviation is 15.0% and is adjusted to reflect real-world frequency of severe negative returns and correlations during severe periods
  - Conventionally measured standard deviation is 11% to 12%

Asset Category Valuation

- Equity-like and bond-like risk
  - Equity and bond valuation processes
- Real estate (REITS)
  - REIT valuation versus underlying equity and bond components
- High yield debt
  - High yield valuation versus underlying equity and bond components
- Private equity
  - Subjective and data assessment of risk-adjusted added value versus equity
- Opportunistic real estate
  - Subjective and data assessment of risk-adjusted added value versus REITS
- Arbitrage and other strategies
  - Monitor for signs of distress and bottom-up underwriting of proxy transactions

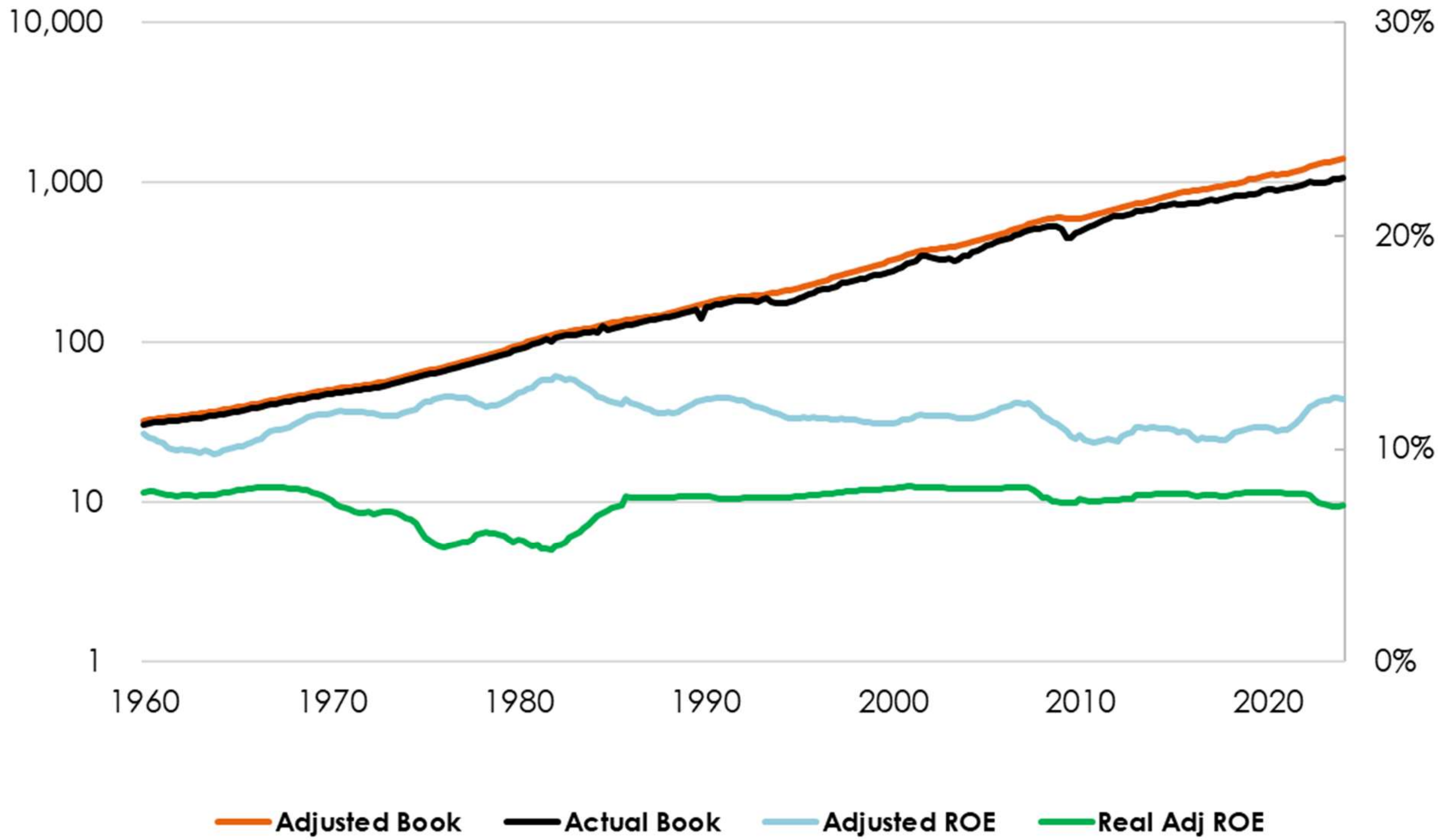
Equity Valuation

- Estimated future cash flows
  - Normal earnings
  - Growth rate
- Discount rate comprised of
  - Inflation + real cash yield + term premium + risk premium
- Value is discounted value of future cash flows
- Adjustments to value
  - Monetary stimulus/restraint
  - Earnings strength

Normal Earnings

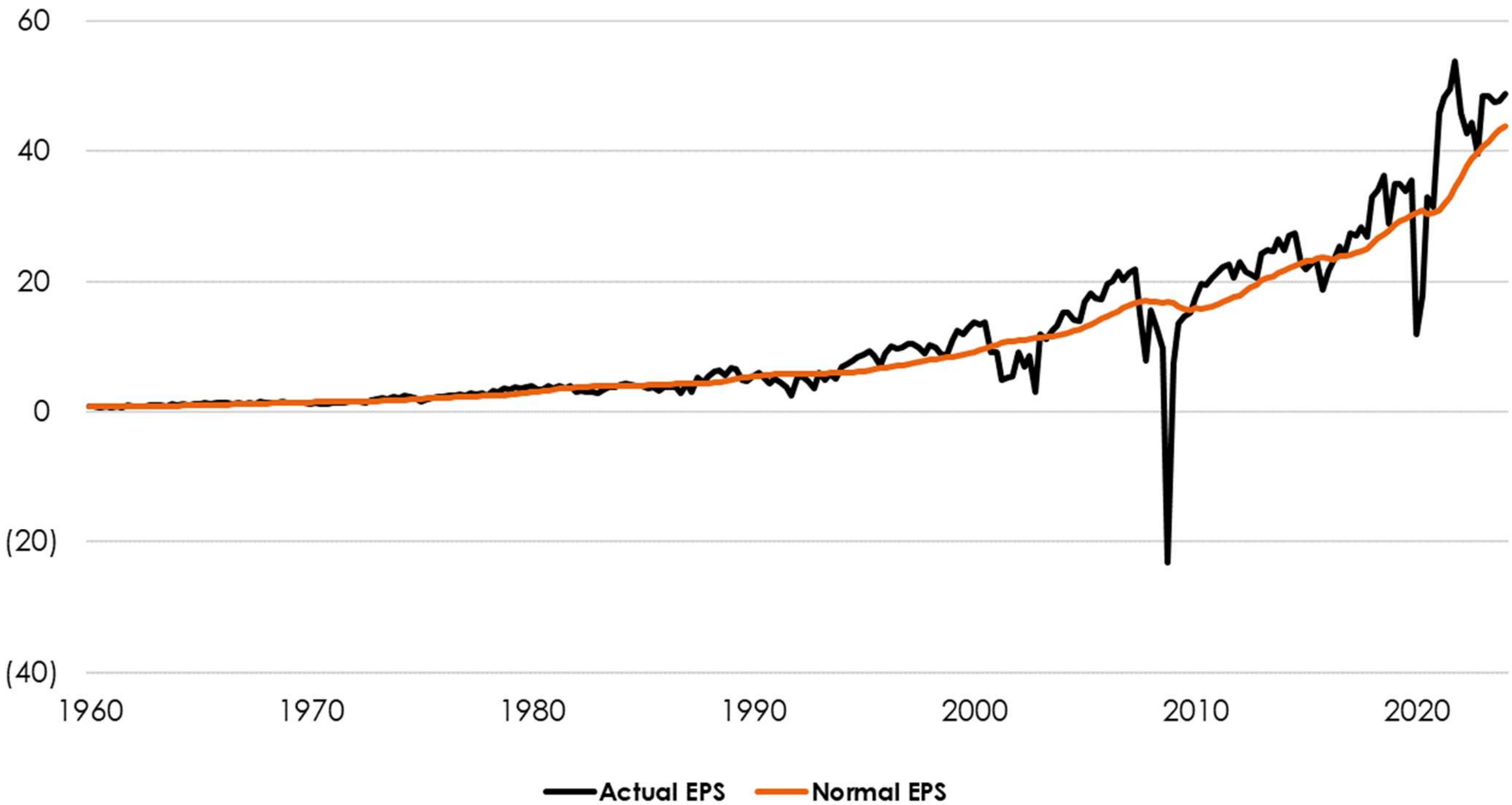
- Normal earnings
  - Adjusted book value multiplied by normal return on equity
- Adjusted book value
  - Book value is balance sheet reported value of assets net of liabilities
  - Book value may not track retained earnings due to index changes, mergers, and buybacks. These leakages must be addressed.
  - Book value write-downs are smoothed
- Normal return on equity = Historic Real ROE + Expected Inflation + ROE Adjustments
  - Return on equity is earnings divided by adjusted book value
  - Real ROE is return on equity less inflation
  - Historic Real ROE is the historic average Real ROE
  - Expected inflation is drawn from long term and recent history
- ROE Adjustments
  - Inflation can impact the level of real ROE
  - Governance can also impact real ROE

Book Value and Return on Equity
Incorporates book value adjustments



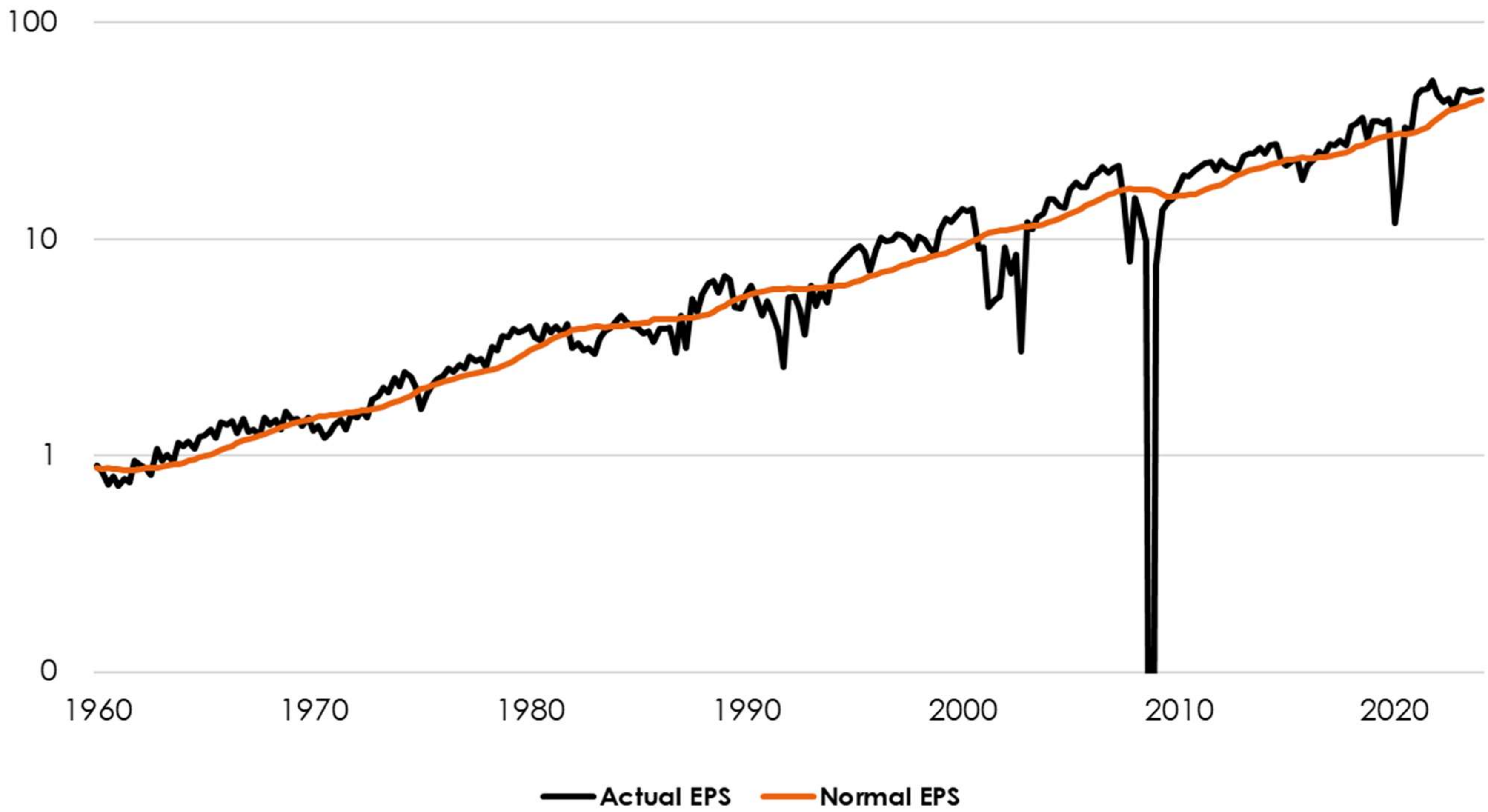
Normal EPS

Book value multiplied by adjusted ROE



Normal EPS

Book value multiplied by adjusted ROE (log scale)

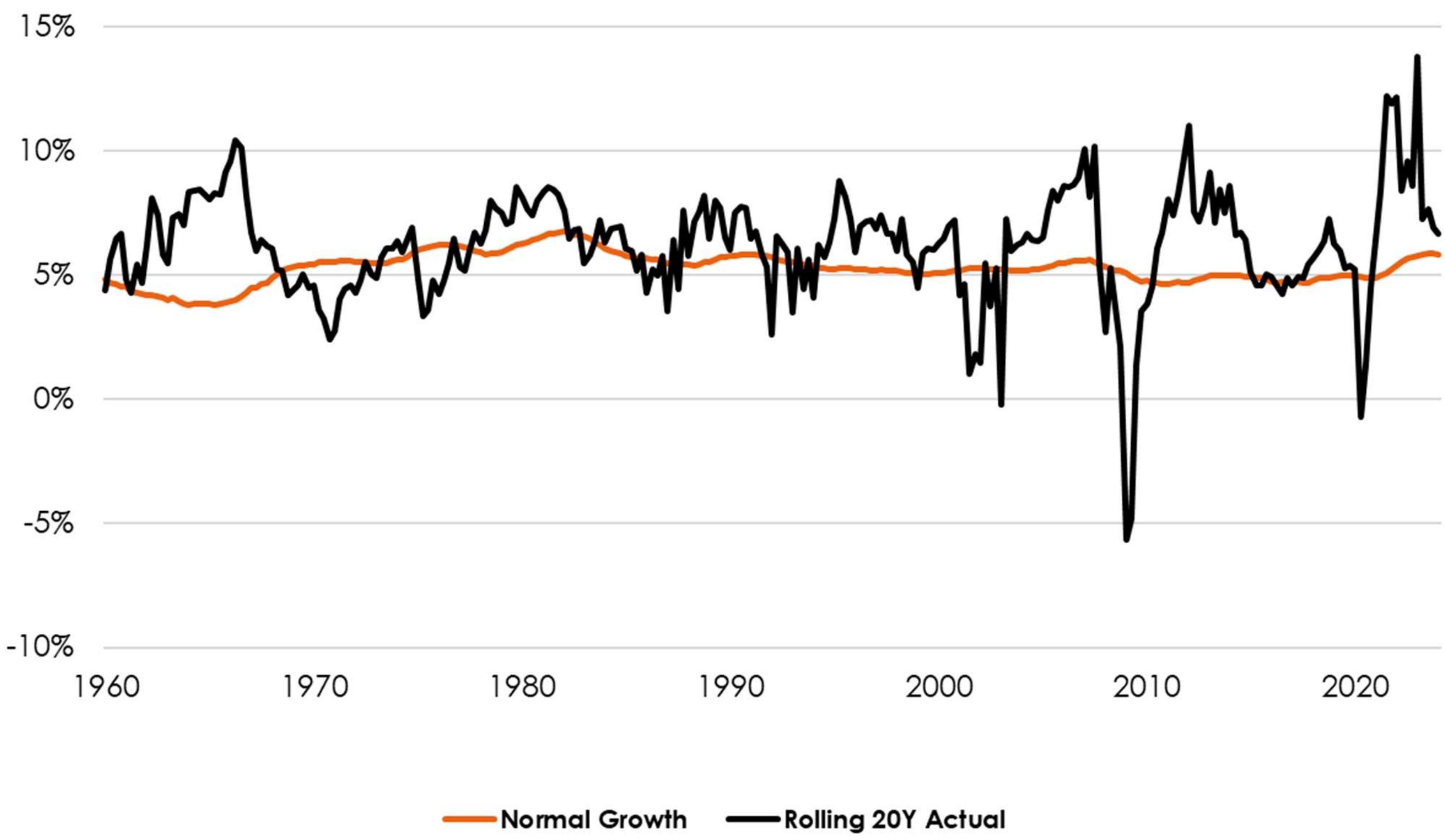


Normal Growth

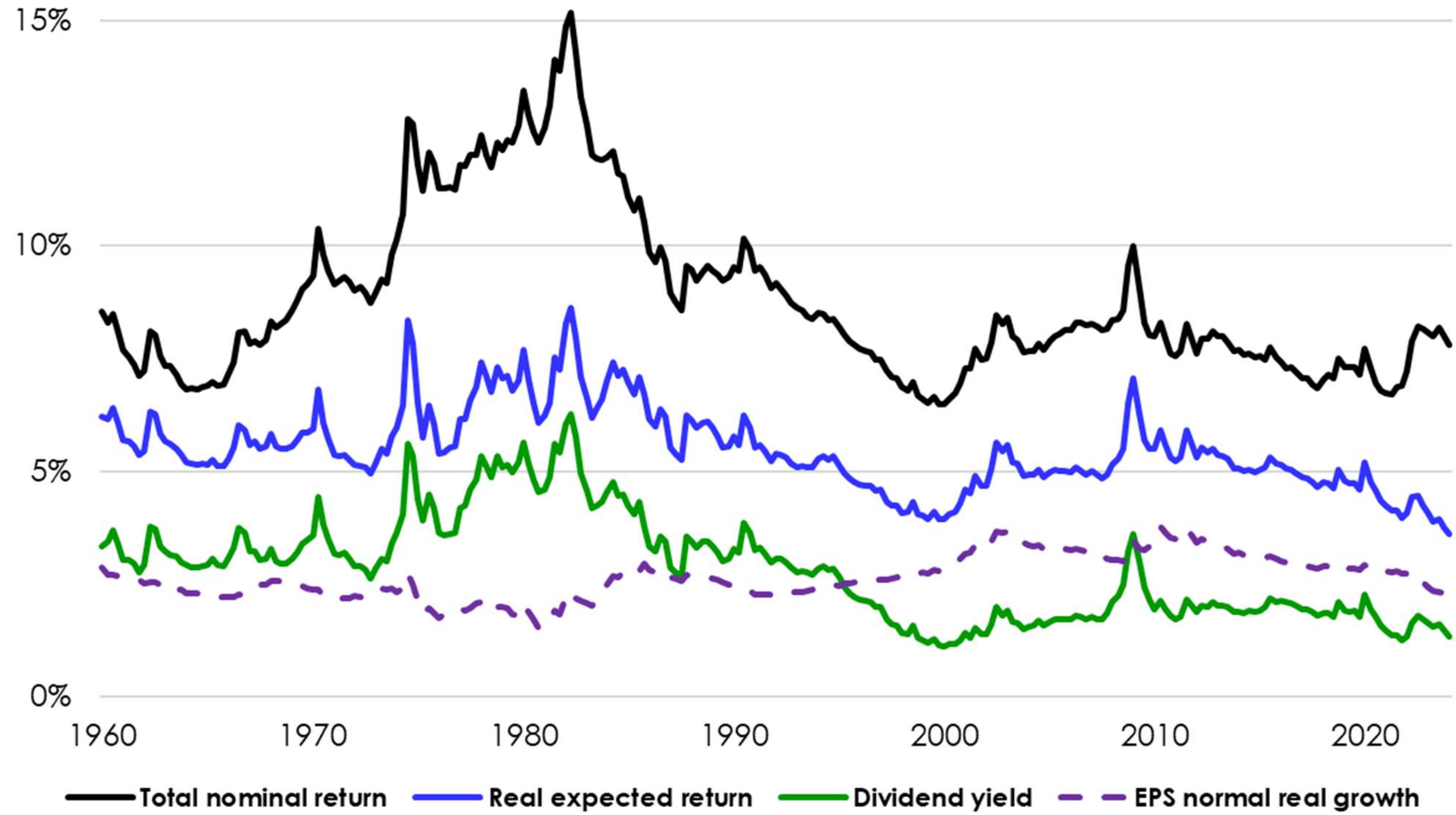
- Normal Growth = organic + acquisition + inflation pass-through – attrition
  - Organic growth = organic reinvestment times normal ROE
    - Organic reinvestment = portion of earnings reinvested excluding acquisitions
    - Normal ROE adjusted to avoid double counting of inflation pass-through effect
  - Acquisition growth = acquisition investment times cost of capital
    - Acquisition investment = portion of earnings invested in acquisitions
    - Return of acquisitions based on cost of capital
  - Inflation pass-through = expected inflation × pass-through percentage
    - Expected Inflation = same as used for Normal ROE
    - Pass-through percentage = percent of expected inflation estimated to pass through as an increase in normal earnings
  - Attrition = estimated mortality rate of normal earnings
    - Adjust for bias of earnings power (absent further investment) to be at risk of erosion
    - Attrition rate helps reconcile historic actual growth with the growth otherwise expected

EPS Growth

Normal versus 20-year actual

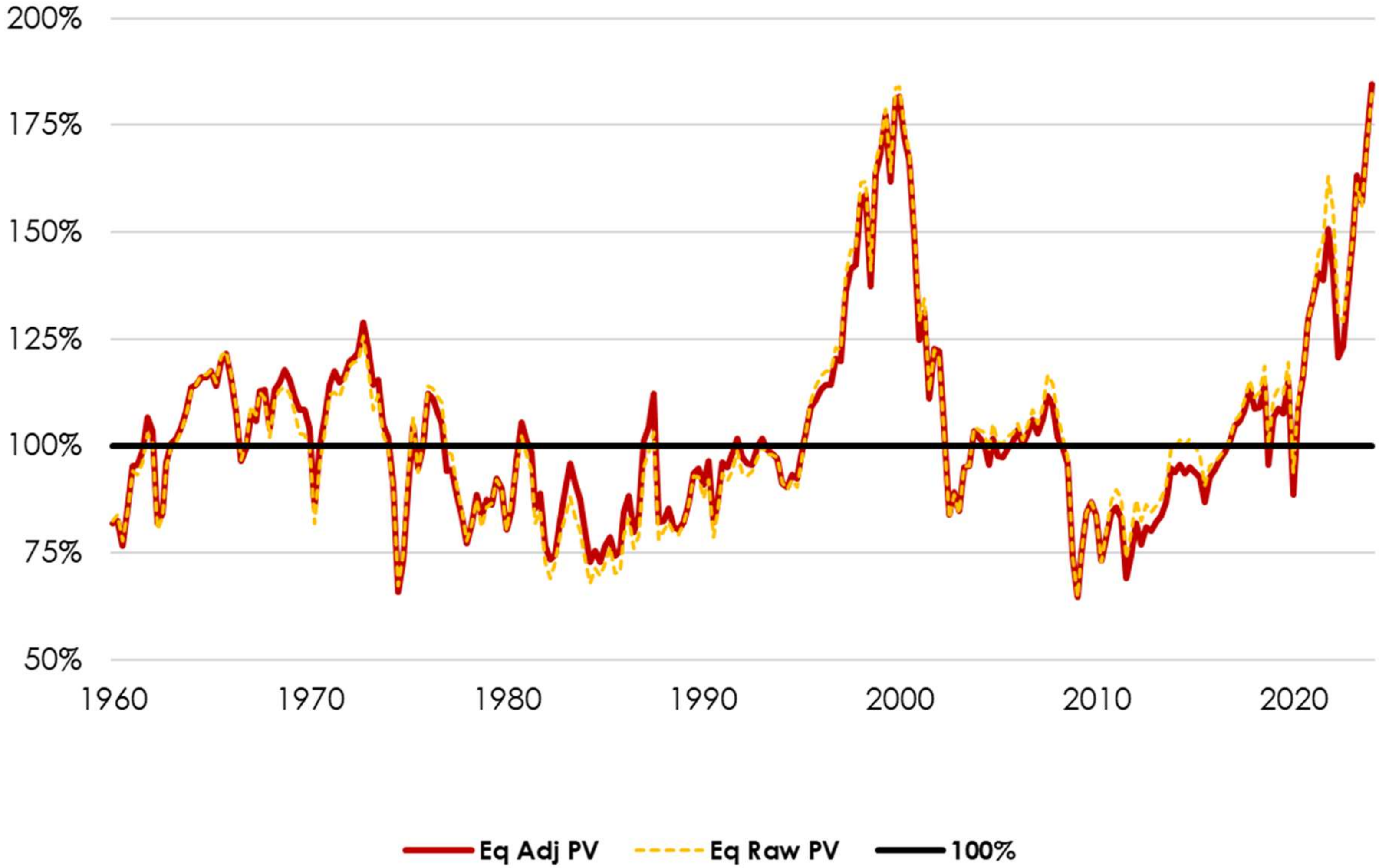


Equity Expected Return



Equity Price to Value

Raw and with monetary and earnings adjustments



Bond Valuation

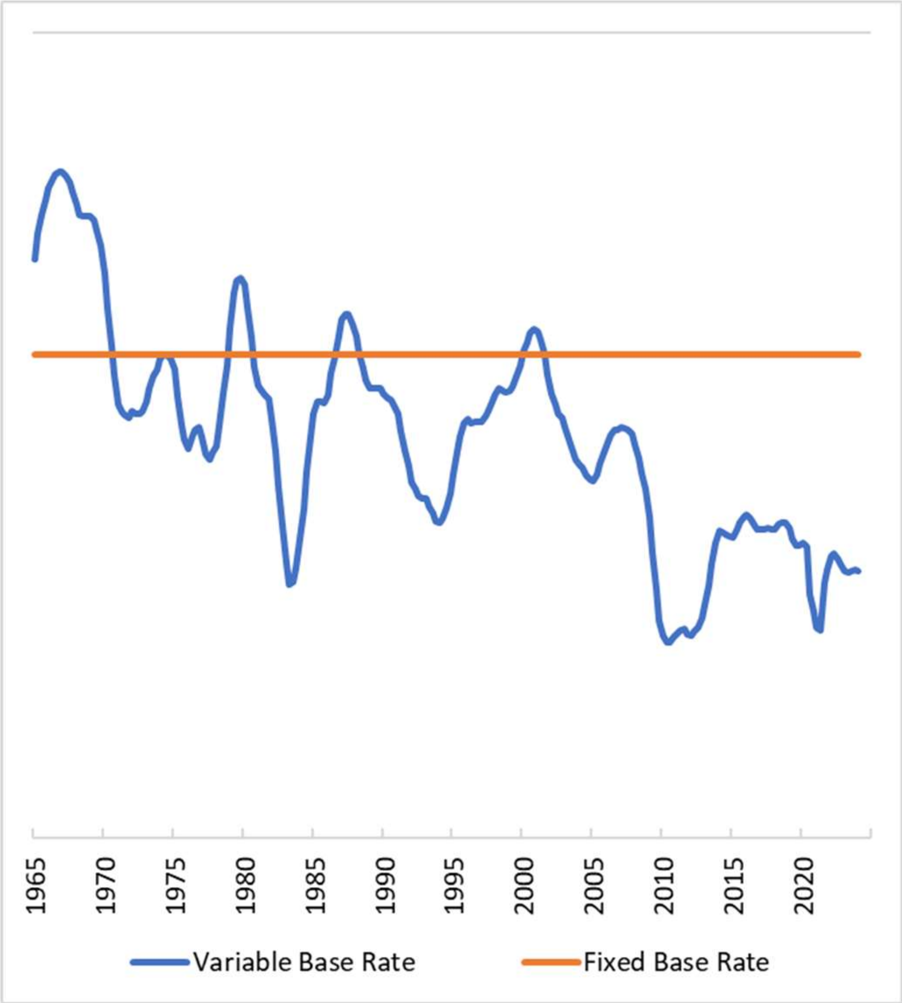
- Equilibrium yield components include
  - Inflation
  - Real cash yield
  - Term premium

- Bond value based on equilibrium yield

- Adjustments to value
  - Monetary stimulus/restraint
  - Earnings strength

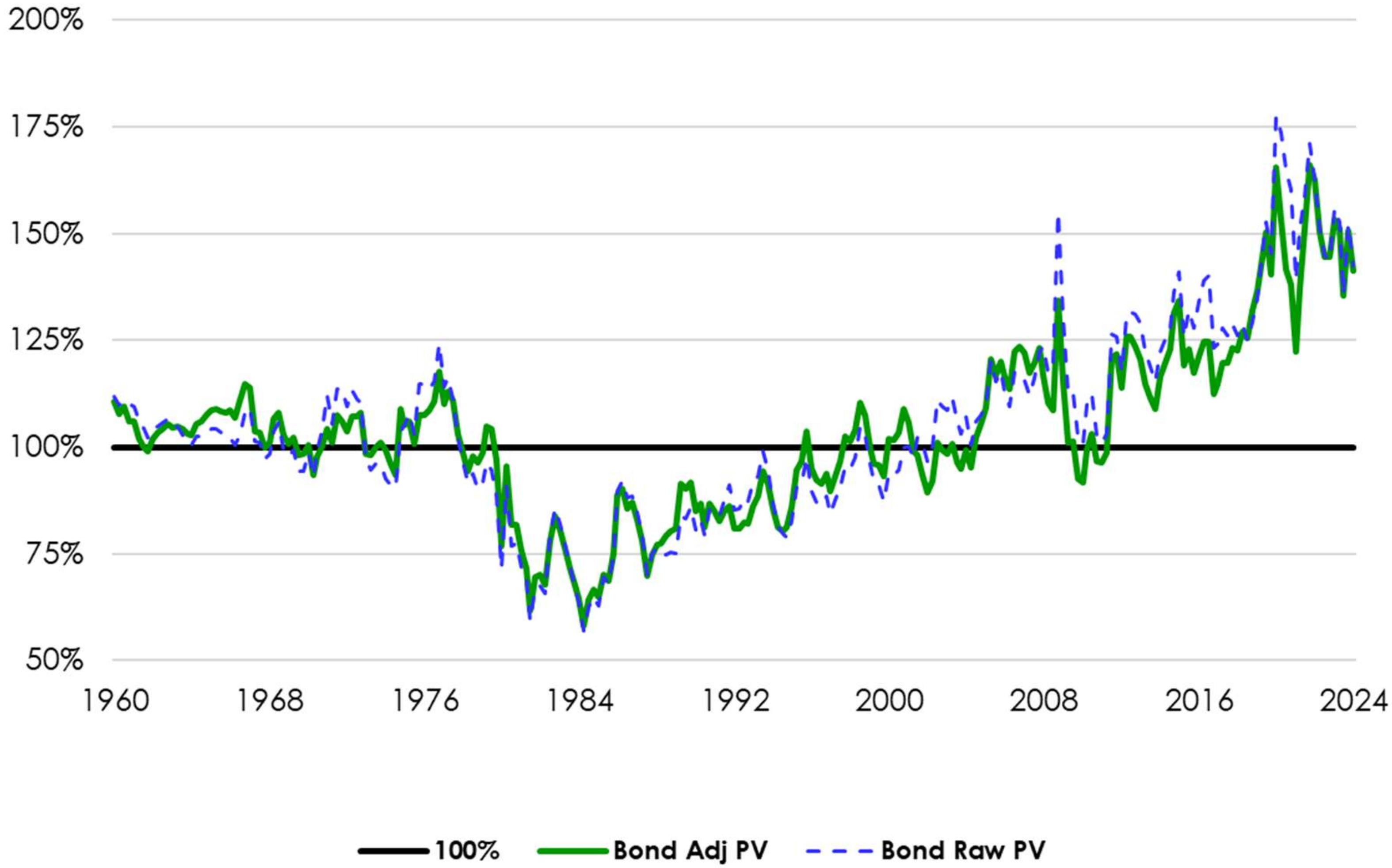
Discount Rate Revisions

- Recent work includes changes to the real rate, term premium, and equity risk premium
- Real rate varies with real GDP growth
- Increased term premium between T-bills and 10yr, reduced from 10yr to 30yr resulting in slight total increase
- Equity risk premium adjusted to offset above adjustment



Bond Price to Value

Raw and with monetary and earnings adjustments



Real Estate Valuation

- Real estate capitalization rate is adjusted to a typical equity/debt structure
- Discount rate is linked to the equity discount rate
- Difference between leverage-adjusted cap rate and discount rate is converted into price to value

High Yield Spread Model

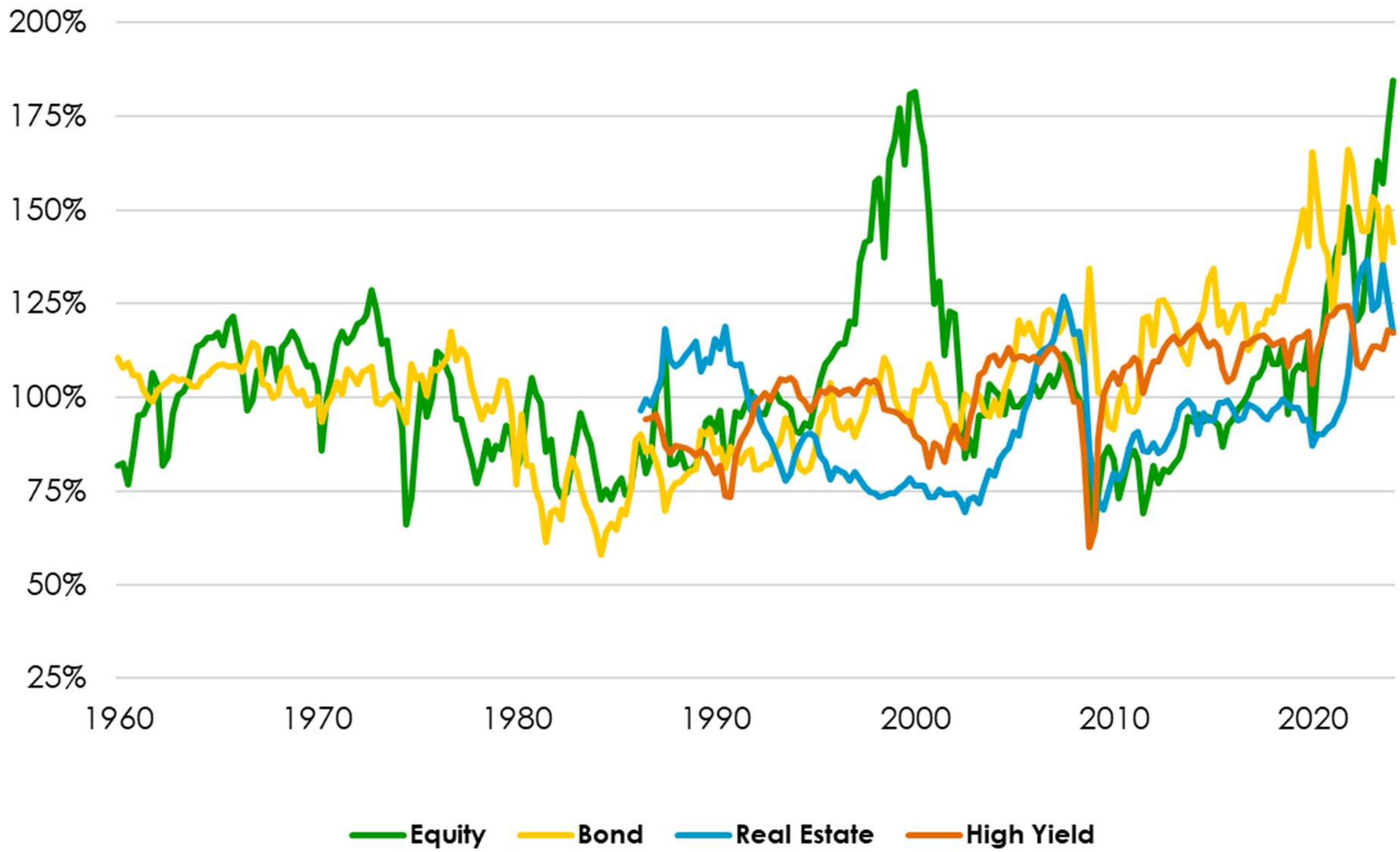
- Fair spread to treasuries based on long-term average spread and internal credit modeling research

- Difference between current spread and fair spread is converted into price to value

High Yield Valuation Model

- Fair yield
  - Fair yield of similar duration treasuries plus
  - Fair yield spread to treasuries
- Current yield is compared to fair yield
- Yield difference is converted to price to value

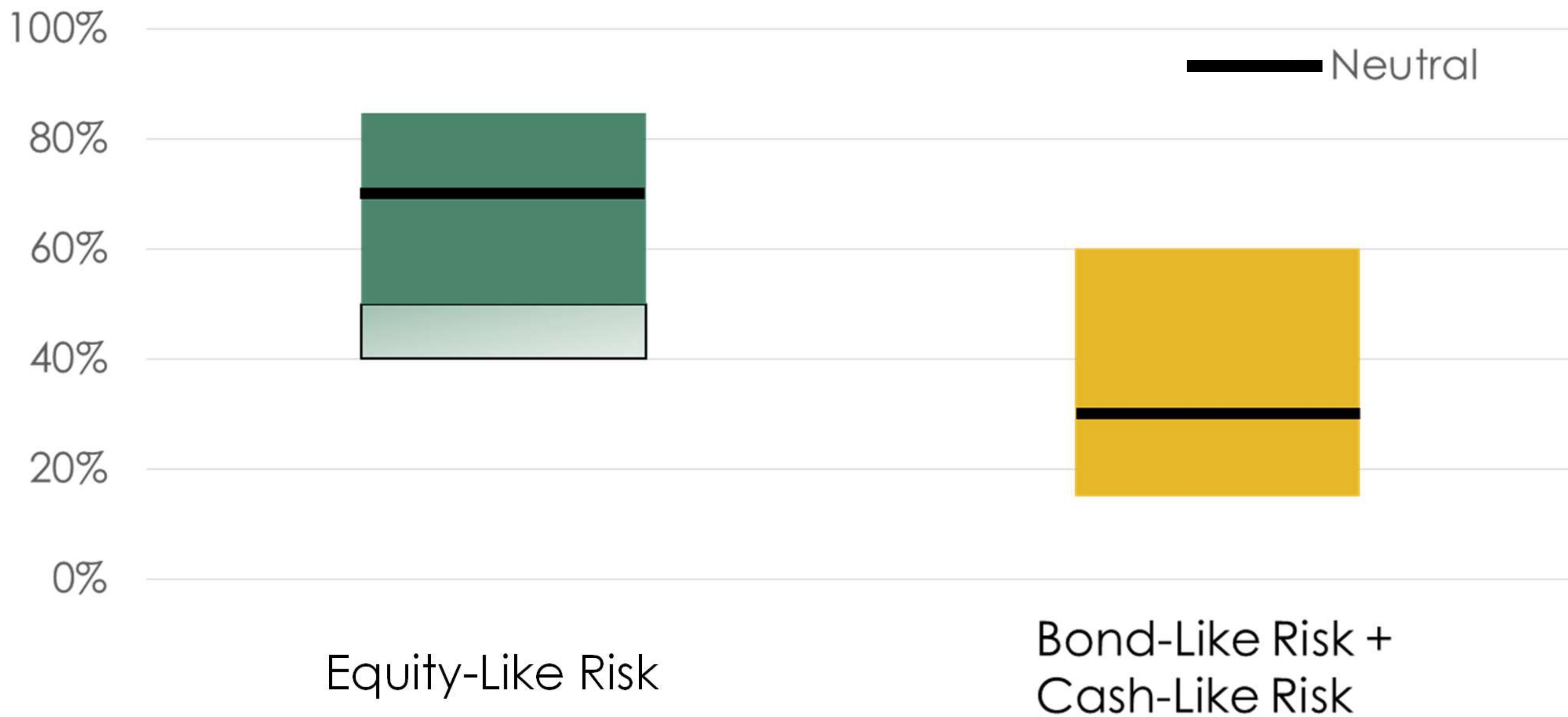
Price to Value
Equity, Bond, Real Estate, High Yield



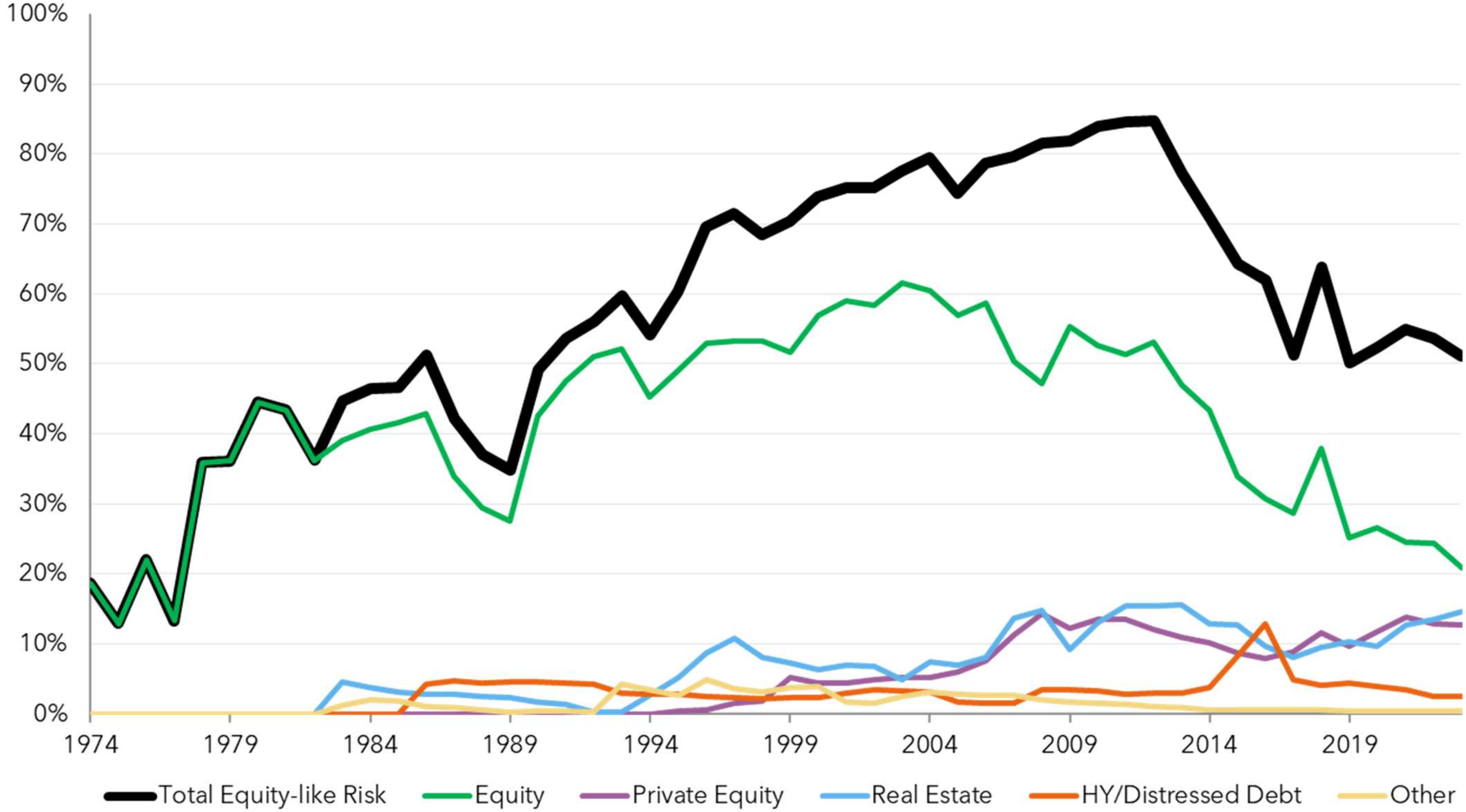
Asset Allocation Implementation

- Equity-like and bond-like risk
  - Meaningfully cheap or expensive to initiate over- or under-weight
  - Move back toward fair value to remove over- or under-weight
  - Several steps between the benchmark and minimum and maximum levels
- Other category over- and under-weights depend on valuation relative to risk mapping
  - Equity-like, bond-like, and cash-like risk is offset by adjusting weight of stocks, bonds, or cash

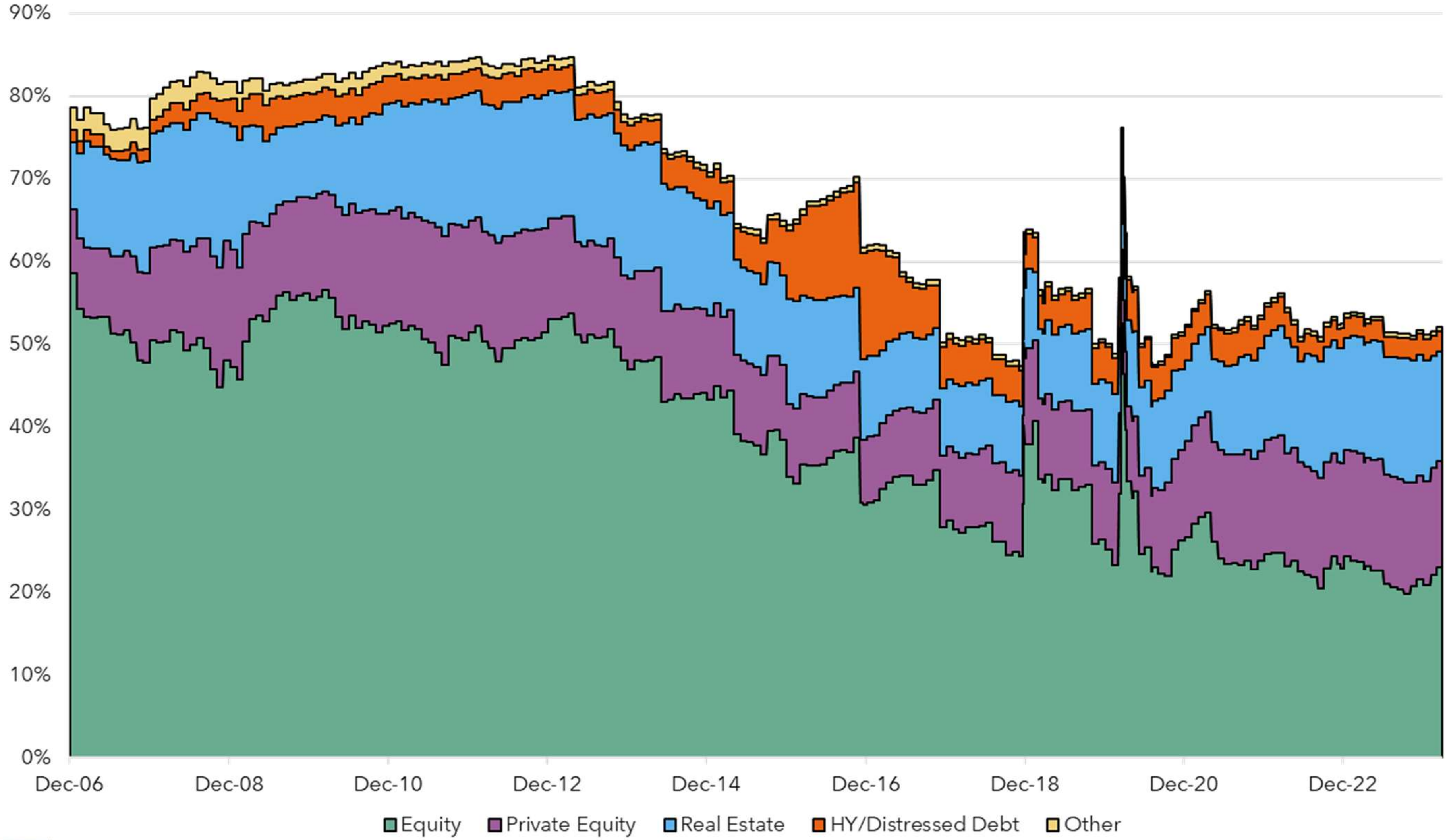
Risk Allocation Ranges



Equity-Like Risk Contribution



Equity-Like Risk Contribution



Asset Allocation Exposure Monitor

Risk Category	Policy Details				Current Estimated Wgts	Compliance Check
		Absolute Policy Minimum	Absolute Policy Maximum	FY24 Benchmark	4/30/24 Est Risk Wgt	
Equity Like Risk (ELR)		40%	85%	70%		Pass
Bond Like Risk (BLR)		15%	60%	27%		Pass
Cash Like Risk (CLR)		0%	45%	3%		Pass
Asset Category	**Benchmark Index**	**Absolute Policy Minimum**	**Absolute Policy Maximum**	**FY24 Benchmark**	**4/30/24 Est Port. Wgt**	
Public Equity[1]	MSCI ACWI IMI exEM exRE (3/4) + MSCI USA IMI exEM exRE	20%	75%	56.3%		Pass
Real Estate REIT/Core	MSCI US REIT	0%	20%	12%		Pass
Opportunistic Real Estate	-	0%	15%	0%		Pass
Combined Real Estate Exposure[5]	MSCI US REIT	0%	20%	12%		Pass
HY Corp Debt	FTSE High Yield	0%	15%	7%		Pass
Investment Grade Debt	FTSE US BIG	13%	60%	22.8%		Pass
Cash	FTSE 3mo TSY Bill	0%	45%	1.9%		Pass
Private Equity	-	0%	12%	0%		Pass
HY Real Estate Debt Aggressive	-	0%	10%	0%		Pass
Aggressive Absolute Return	-	0%	5%	0%		Pass

1. Public Equity Minimum will be the lower of 25% or 50% of the model suggested target for ELR (if achievable, if not, 50% of the achievable target), which can be as low as 40%
2. Achievable Minimum reflects subjective assumptions on asset category weight preferences, liquidity issues, and / or acceptable levels of disruption to overall investment process which may cause p
3. Target @ Minimum and Target @ Maximum are used to go further out of bounds/in the buffer. Otherwise use All Other Targets (for example if at 20% Public Equity, only allow drift to 19.0%; but allow
4. ELR and BLR rebalance depends on room available in the primary asset categories, first driven by Public Equity for ELR and Investment Grade Debt for BLR; and then by considering room available, r
5. ELR impact from combined Opp RE and Core RE exposures. Opp RE is 130% the ELR of Core RE

Risk Category	Current Estimated Wgts	Target Ex Buffer		Drift Rebalance Thresholds[3]		Rebalance Trigger		Rebalance Suggested?[4]
	4/30/24 Est Risk Wgt	4/30/24 Est Risk Wgt	Model Suggested Risk Wgt	When Below Min / Above Max	All Other Targets	Increase Position at	Decrease Position at	
Equity Like Risk (ELR)				1%	2%			No
Bond Like Risk (BLR)				0.5%	1%			No
Cash Like Risk (CLR)								
Asset Category	**4/30/24 Est Port. Wgt**	**Target Ex Buffer**	**Achievable Minimum[2]**	**When Below Min / Above Max**	**All Other Targets**	**Increase Position at**	**Decrease Position at**	**Rebalance?**
Public Equity[1]				1%	2%			No
Real Estate REIT/Core								
Opportunistic Real Estate								
Combined Real Estate Exposure[5]								
HY Corp Debt								
Investment Grade Debt				0.5%	1%			No
Cash								
Private Equity								
HY Real Estate Debt Aggressive								
Aggressive Absolute Return								

1. Public Equity Minimum will be the lower of 25% or 50% of the model suggested target for ELR (if achievable, if not, 50% of the achievable target), which can be as low as 40%
2. Achievable Minimum reflects subjective assumptions on asset category weight preferences, liquidity issues, and / or acceptable levels of disruption to overall investment proce
3. Target @ Minimum and Target @ Maximum are used to go further out of bounds/in the buffer. Otherwise use All Other Targets (for example if at 20% Public Equity, only allow dr
4. ELR and BLR rebalance depends on room available in the primary asset categories, first driven by Public Equity for ELR and Investment Grade Debt for BLR; and then by consi
5. ELR impact from combined Opp RE and Core RE exposures. Opp RE is 130% the ELR of Core RE

Private Partnership Checks are only used at times when new investment is being considered. Confirm base case #s

	Projected 5 yr Base Case Allocation (provided by LPs)			Curr FV + All Uncalled Commitments		
Private Real Estate Risk Check	12/31/2023[6]	Limit	Risk Check	12/31/2023	Limit	Risk Check
Opportunistic Real Estate Partnerships		15.00%	PASS			
Uncalled Commitments						
Opp RE Wgt + Uncalled Commitments					22.5%	PASS
Private Equity Risk Check	12/31/2023	Limit	Risk Check	12/31/2023	Limit	Risk Check
Private Eq Wgt		12.00%	PASS			
Uncalled Commitments						
Total PE Wgt + Uncalled Commitments					18.00%	PASS

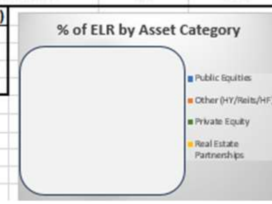
6. Partnership FV are as of date shown. No estimates to FV are used for these calculations. Uncalled Comm is from Qtry LP summary. #s use current month FV for denominator

Equity Like Risk Details	ELR Impact Using Pub Eq Target	ELR Impact if Pub Eq Hits Buy Trigger	ELR Impact if Pub Eq Hits Sell Trigger
Model Suggested ELR			
Public Equity			
Current HY (+ Core REIT)			
Current Hedge Fund Wgts			
Current Partnership Wgts			
ELR Total			

Bond Like Risk Details	Using Model Suggested ELR	Adj for Achievable ELR	IG Rebalance Range
Model Suggested BLR			
IG Debt			
HY Debt			
Core REIT + Opp RE			
HY RE Debt Aggr			
BLR Total			

ELR Buildup (Curr Wgt * ELR of each category)	
Public Equities	
Other (HY/Reits/HF)	
Private Equity (120%)	
Real Estate Partnerships (110%)	
Total Equity Like Risk	

Equity Like Risk Mix (as % of total ELR)	
Public Equities	
Other (HY/Reits/HF)	
Private Equity	
Real Estate Partnerships	



Asset Allocation Exposure Monitor

Policy Details & Compliance Check

Risk Category		Policy Details			Current Estimated Wgts	Compliance Check
		Absolute Policy Minimum	Absolute Policy Maximum	FY24 Benchmark	4/30/24 Est Risk Wgt	
Equity Like Risk (ELR)		40%	85%	70%		Pass
Bond Like Risk (BLR)		15%	60%	27%		Pass
Cash Like Risk (CLR)		0%	45%	3%		Pass

Asset Category	Benchmark Index	Absolute Policy Minimum	Absolute Policy Maximum	FY24 Benchmark	4/30/24 Est Port. Wgt	
Public Equity[1]	MSCI ACWI IMI exEM exRE (3/4) + MSCI USA IMI exEM exRE (1/4)	20%	75%	56.3%		Pass
Real Estate REIT/Core	MSCI US REIT	0%	20%	12%		Pass
Opportunistic Real Estate	-	0%	15%	0%		Pass
Combined Real Estate Exposure[5]	*MSCI US REIT*	*0%*	*20%*	*12%*		Pass
HY Corp Debt	FTSE High Yield	0%	15%	7%		Pass
Investment Grade Debt	FTSE US BIG	13%	60%	22.8%		Pass
Cash	FTSE 3mo TSY Bill	0%	45%	1.9%		Pass
Private Equity	-	0%	12%	0%		Pass
HY Real Estate Debt Aggressive	-	0%	10%	0%		Pass
Aggressive Absolute Return	-	0%	5%	0%		Pass

1. Public Equity Minimum will be the lower of 25% or 50% of the model suggested target for ELR (if achievable, if not, 50% of the achievable target), which can be as low as 40%
2. Achievable Minimum reflects subjective assumptions on asset category weight preferences, liquidity issues, and / or acceptable levels of disruption to overall investment process which may cause
3. Target @ Minimum and Target @ Maximum are used to go further out of bounds/in the buffer. Otherwise use All Other Targets (for example if at 20% Public Equity, only allow drift to 19.0%; but allow
4. ELR and BLR rebalance depends on room available in the primary asset categories, first driven by Public Equity for ELR and Investment Grade Debt for BLR; and then by considering room available
5. ELR impact from combined Opp RE and Core RE exposures. Opp RE is 130% the ELR of Core RE

Asset Allocation Exposure Monitor

Rebalance Threshold Monitor

Risk Category	Current Estimated Wgts	Target Ex Buffer		Drift Rebalance Thresholds[3]		Rebalance Trigger		Rebalance Suggested?[4]
	4/30/24 Est Risk Wgt	4/30/24 Est Risk Wgt	Model Suggested Risk Wgt	When Below Min / Above Max	All Other Targets	Increase Position at	Decrease Position at	
Equity Like Risk (ELR)				1%	2%			No
Bond Like Risk (BLR)				0.5%	1%			No
Cash Like Risk (CLR)								

Asset Category	4/30/24 Est Port. Wgt	Target Ex Buffer	Achievable Minimum[2]	When Below Min / Above Max	All Other Targets	Increase Position at	Decrease Position at	Rebalance?
Public Equity[1]				1%	2%			No
Real Estate REIT/Core								
Opportunistic Real Estate								
Combined Real Estate Exposure[5]								
HY Corp Debt								
Investment Grade Debt				0.5%	1%			No
Cash								
Private Equity								
HY Real Estate Debt Aggressive								
Aggressive Absolute Return								

1. Public Equity Minimum will be the lower of 25% or 50% of the model suggested target for ELR (if achievable, if not, 50% of the achievable target), which can be as low as 40
2. Achievable Minimum reflects subjective assumptions on asset category weight preferences, liquidity issues, and / or acceptable levels of disruption to overall investment proc
3. Target @ Minimum and Target @ Maximum are used to go further out of bounds/in the buffer. Otherwise use All Other Targets (for example if at 20% Public Equity, only allo
4. ELR and BLR rebalance depends on room available in the primary asset categories, first driven by Public Equity for ELR and Investment Grade Debt for BLR; and then by co
5. ELR impact from combined Opp RE and Core RE exposures. Opp RE is 130% the ELR of Core RE

Asset Allocation Exposure Monitor

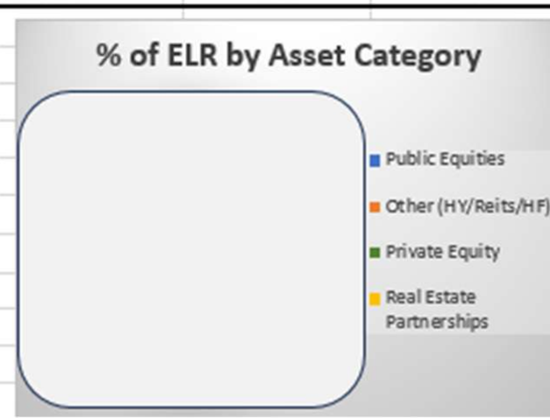
Rebalance Threshold Monitor (cont'd)

Equity Like Risk Details	ELR Impact Using Pub Eq Target	ELR Impact if Pub Eq Hits Buy Trigger	ELR Impact if Pub Eq Hits Sell Trigger
Model Suggested ELR			
Public Equity			
Current HY (+ Core REIT)			
Current Hedge Fund Wgts			
Current Partnership Wgts			
ELR Total			
Drift relative to Stretch Ref Pt	0.71%	1.71%	-1.29%

Bond Like Risk Details	Using Model Suggested ELR	Adj for Achievable ELR	IG Rebalance Range
Model Suggested BLR			
IG Debt			
HY Debt			
Core REIT + Opp RE			
HY RE Debt Aggr			
BLR Total			
Drift relative to Stretch Ref Pt	N/A	-0.25%	

ELR Buildup (Curr Wgt * ELR of each category)	
Public Equities	
Other (HY/Reits/HF)	
Private Equity (120%)	
Real Estate Partnerships (110%)	
Total Equity Like Risk	

Equity Like Risk Mix (as % of total ELR)	
Public Equities	
Other (HY/Reits/HF)	
Private Equity	
Real Estate Partnerships	



Asset Allocation Exposure Monitor

Private Partnerships

	Projected 5 yr Base Case Allocation (provided by LPs)			Curr FV + All Uncalled Commitments		
Private Real Estate Risk Check	12/31/2023[6]	Limit	Risk Check	12/31/2023	Limit	Risk Check
Opportunistic Real Estate Partnerships		15.00%	PASS			
Uncalled Commitments						
Opp RE Wgt + Uncalled Commitments					22.5%	PASS
Private Equity Risk Check	12/31/2023	Limit	Risk Check	12/31/2023	Limit	Risk Check
Private Eq Wgt		12.00%	PASS			
Uncalled Commitments						
Total PE Wgt + Uncalled Commitments					18.00%	PASS

6. Partnership FV are as of date shown. No estimates to FV are used for these calculations. Uncalled Comm is from Qtry LP summary. #s use current month FV for denominator

Model Suggested Positioning

Asset Allocation Weights Matrix

Equity Position	max	steps	neutral	steps	regular min	steps	absolute min
Equity Wgt	85%		70%		50%		40%

Bond Position	Bond Weights
max	
steps	
neutral	
steps	
min	

Equity Position	Equity Entry	Equity Exit	Equity Weight
max			85%
steps			
neutral			70%
steps			
regular min			50%
steps			
absolute min			40%

Bond Position	Bond Entry	Bond Exit	Bond Weight
max			
steps			
neutral			
steps			
min			

Input Table

Date:	31-Mar-24
Equity Position	
Target Equity Wgt	
Bond Position	
Target Bond Wgt	
Target Cash Wgt	
Equity Fair Value	
Bond FV Yld	

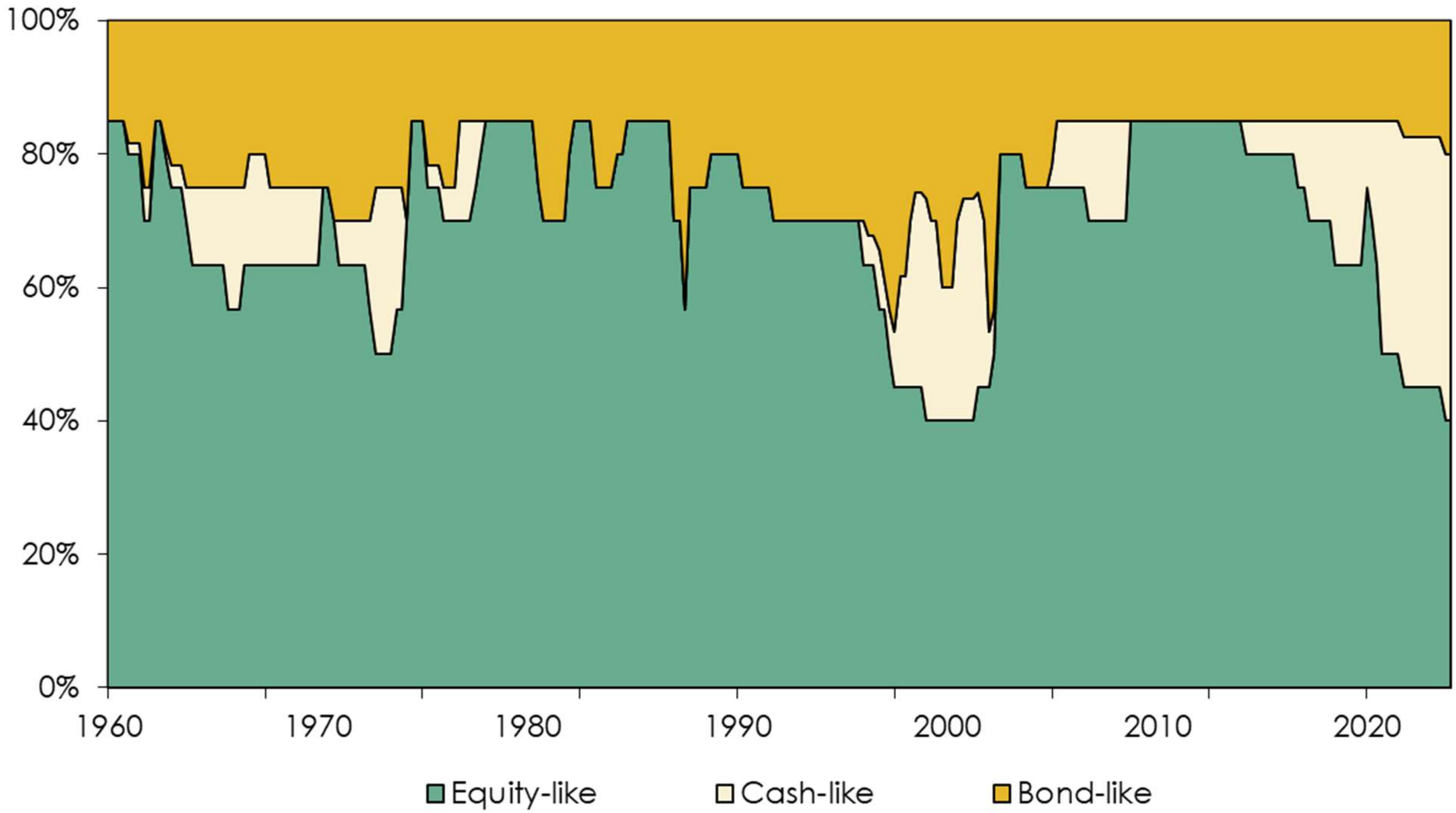
*

Allocation Triggers Summary

	Incr Wgt At	Target Wgt	Decr Wgt At	Target Wgt
Equity				
Bond				

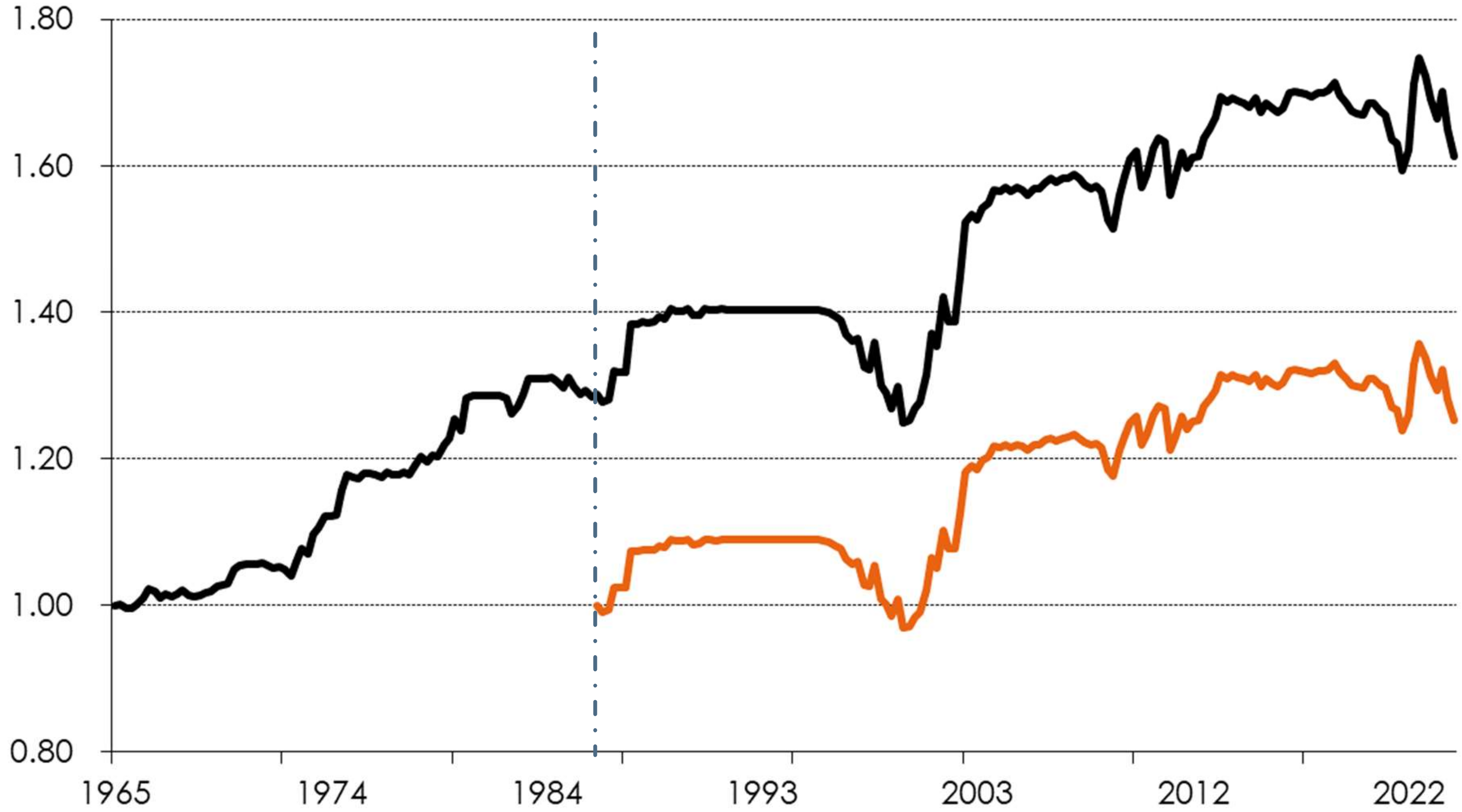
Model Suggested Allocations

Equity-like, bond-like, cash-like



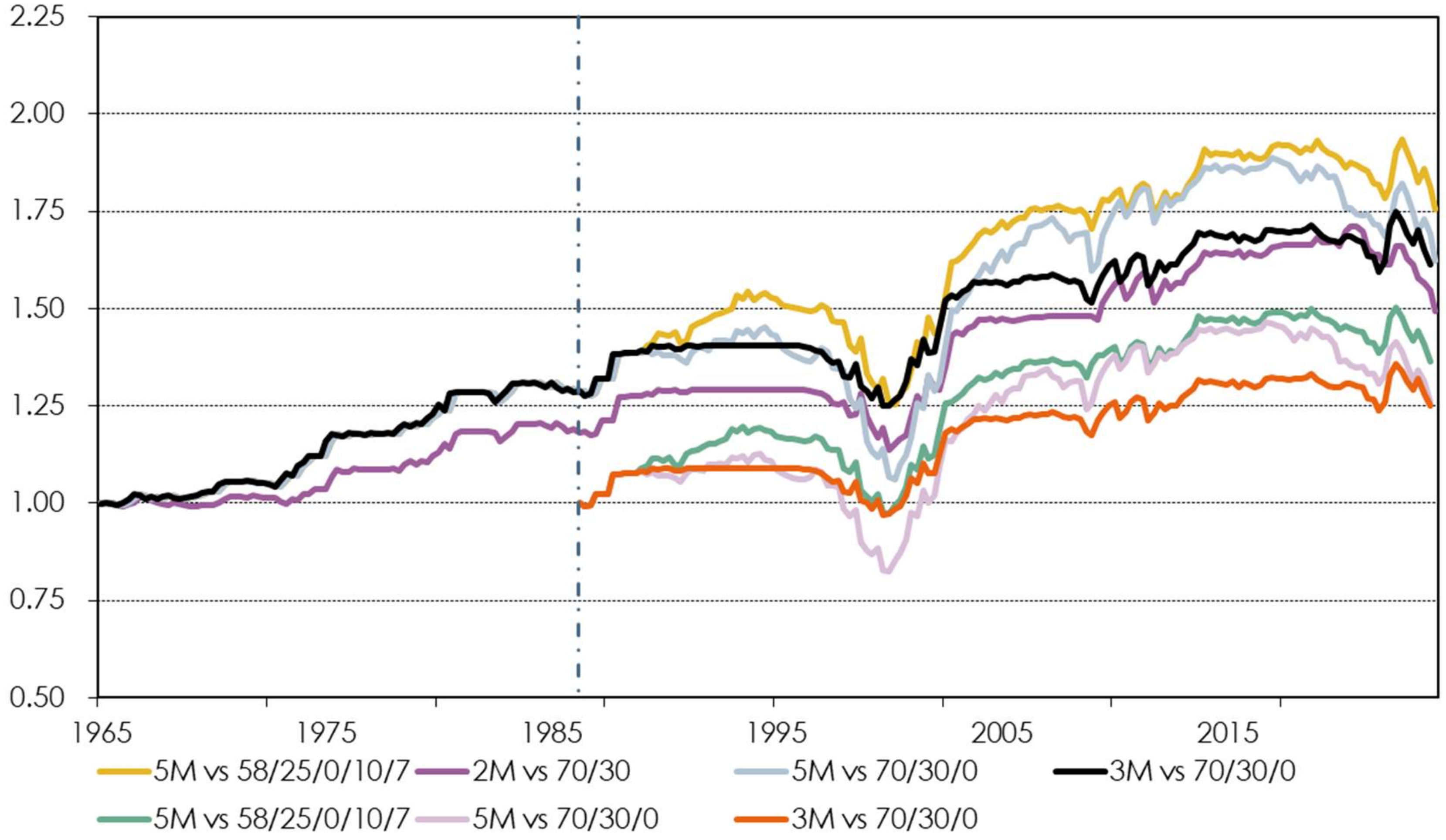
Model Return vs 70/30 Stock/Bond

From 1965 to now and from 1986 initial use



Model Return From 1965 and From 1986 Initial Use

Eq/Bd/Ca vs 70/30/0, Eq/Bd vs 70/30, and Eq/Bd/Ca/REIT/HY vs 58/25/0/10/7



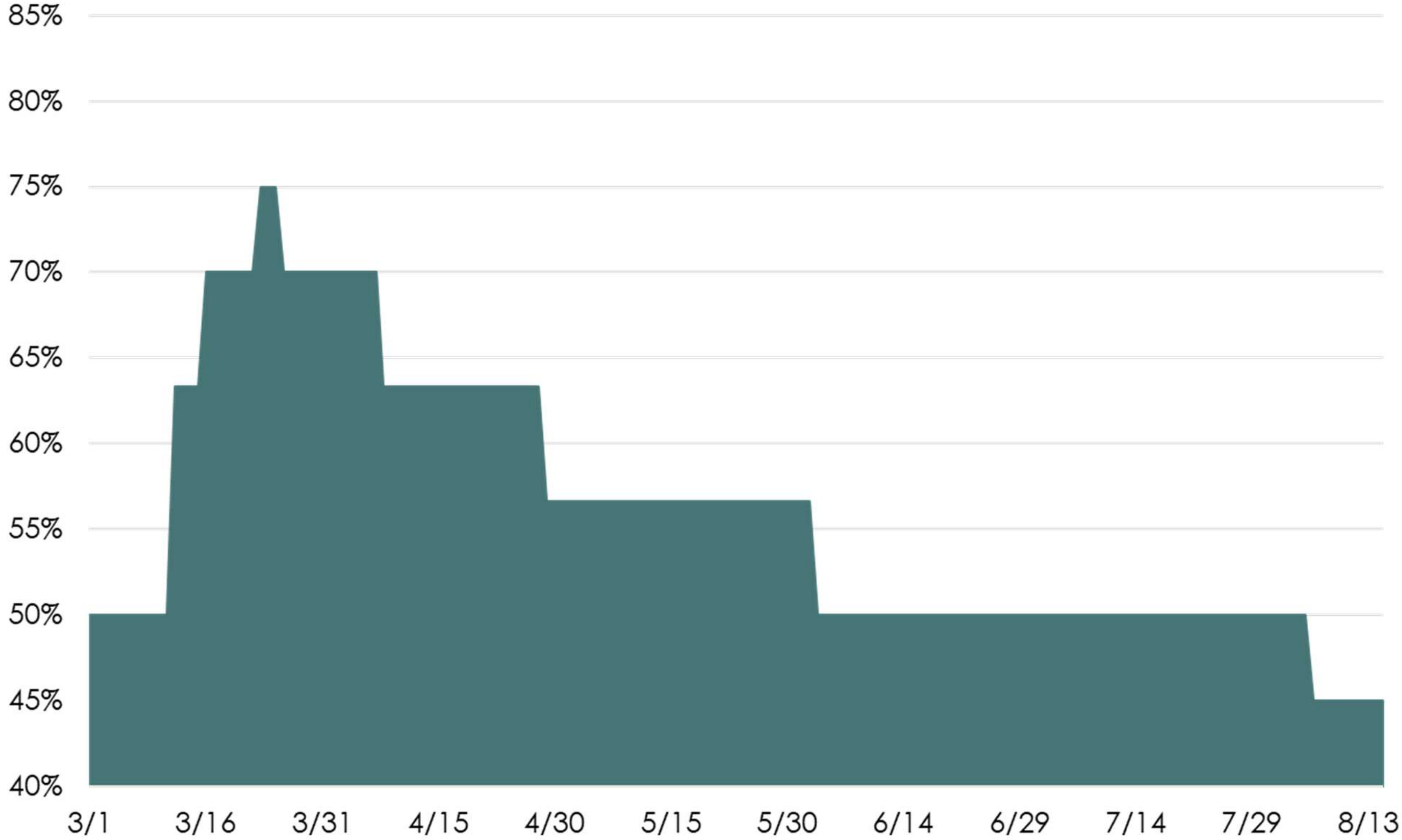
Equity Valuation and Thresholds

Daily Snapshot from March 2020

Date	S&P500 Price	Equity Position	Next Buy Price	Next Sell Price
8-Mar-20	2972.37	Min	2700	At Min
9-Mar-20	2746.56		2700	At Min
10-Mar-20	2882.23		2700	At Min
11-Mar-20	2741.38		2700	At Min
12-Mar-20	2480.64	Increased	2500	3100
13-Mar-20	2711.02		2500	3100
14-Mar-20	2711.02		2500	3100
15-Mar-20	2711.02		2500	3100
16-Mar-20	2386.13	Increased	2400	2900
17-Mar-20	2529.19		2200	2700
18-Mar-20	2398.10		2200	2700
19-Mar-20	2409.39		2200	2700
20-Mar-20	2304.92		2200	2700
21-Mar-20	2304.92		2200	2700
22-Mar-20	2304.92		2200	2700
23-Mar-20	2237.40	Increased	2100	2600
24-Mar-20	2447.33		2100	2600
25-Mar-20	2475.56		2100	2600
26-Mar-20	2630.07	Decreased	2200	2700
27-Mar-20	2541.47		2200	2700

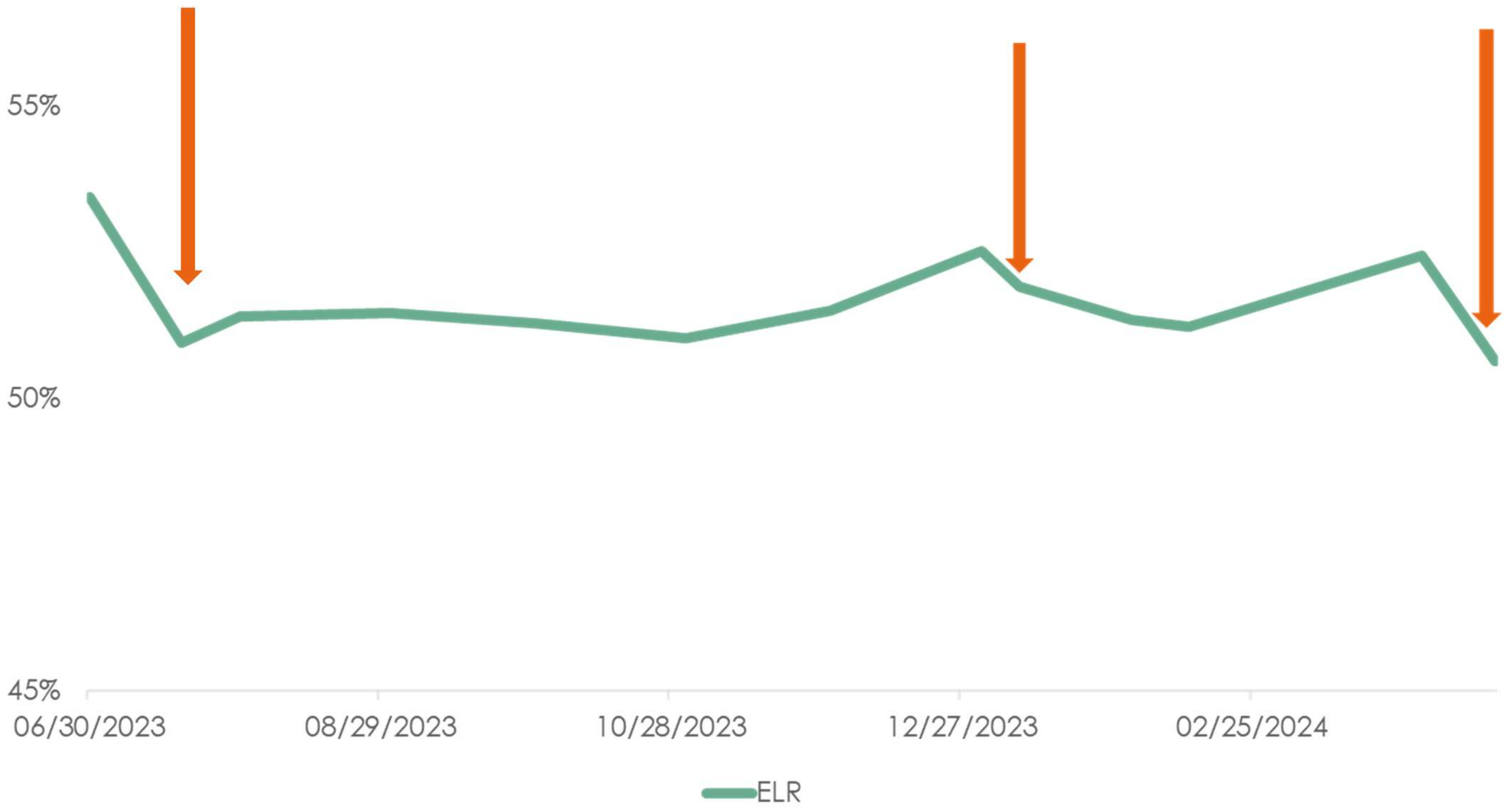
Model Suggested Equity-Like Risk

3/1/2020 through 8/15/2020



Implementation

SDRS Equity-Like Risk FYTD 2024



Risk Control Summary

- Risk control
  - Risk managed by broad diversification and reducing amounts in expensive assets
  - Adequate liquidity maintained to avoid liquidations of depressed assets and to allow rebalancing
- Strength and determination to handle tough markets
  - Participation in the free enterprise economic system provides highest long-term rewards but must endure short-term bumps in the road
- Strong funding and benefit design help manage downside volatility
  - In very difficult circumstances, benefits may require further adjustment to maintain funding

Evolution of Asset Allocation Process

- Ranges and asset categories have evolved over time
  - Initial implementation subjectively phased in
  - Highlighted importance of disciplined implementation
- Developed internal risk metrics for alternative asset categories to further quantify underlying risk of portfolio
- Good luck/ bad luck