

STATE OF RHODE ISLAND

ASSET ALLOCATION ANALYSIS: INTRODUCTION

June, 2019

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INTRODUCTION

NEPC, LLC

ASSET ALLOCATION INTRODUCTION

As part of the asset allocation review, NEPC is tasked with evaluating your existing asset allocation framework

- Define SIC objectives and core philosophies
- Is the current portfolio structure designed to meet these objectives?
 - If no – what needs to be changed?
 - If yes – identify opportunities to improve the portfolio’s ability to meet objectives

The observations and findings of the first phase will guide our thinking around potential asset allocation changes to consider

NEPC’s tools and resources will help navigate the multi-phased asset allocation review

- ✓ Asset allocation modeling using NEPC’s 5-7 year assumptions
- ✓ Scenario analysis
- ✓ Risk Budgeting
- ✓ Deep dive by NEPC Research on areas of focus within the portfolio



ASSET ALLOCATION TIMELINE: SIC MEETINGS

June SIC Meeting

Asset Allocation Intro & Timeline

- NEPC to provide SIC with perspective on the work to be done around the upcoming asset allocation review
- Identify SIC objectives and philosophies
- NEPC assumptions applied to current portfolio
- Peer comparison – realized and forward looking given NEPC assumptions

July SIC Meeting

Initial Findings

- Fiscal Year End performance review
- Review the performance of asset class buckets relative to expectations
- Identify specific concerns in the current portfolio that the SIC would like to explore
- Work with SIC to identify risk tolerance and constraints for modeling process

September SIC Meeting

Formal Presentation of Asset Allocation Recommendation (Part I)

- Asset allocation modeling – model various portfolios
- Scenario analysis on model portfolio
- SIC feedback

October SIC Meeting

Formal Presentation of Asset Allocation Recommendation (Part II)

- The final phase of the asset allocation review
- SIC chooses portfolio
- Risk budgeting and implementation discussion



ASSET ALLOCATION OVERVIEW

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SIC GOALS & OBJECTIVES

- **Asset Allocation Review process should incorporate philosophy expressed in current IPS document**
 - Desire to maintain a diversified portfolio
 - Use of active and passive management
 - Passive management in the most liquid markets, active management primarily in less liquid markets
 - Consideration of inflation sensitivity and hedging
- **Understanding of risk tolerance should incorporate liabilities**
- **Continue progress towards full funding of plan liabilities**
 - Preference to mitigate potential declines in funded status
 - Staff, NEPC and GRS to evaluate appropriate thresholds vs. down market scenarios
- **Evaluate impact of any changes in assumptions or Policy portfolio on required plan contributions**

ASSET ALLOCATION REVIEW

		Current Target
Growth	US Equities	22%
	Int'l Equities	13%
	Emerging Int'l Equities	5%
	Global Equity	40%
	Private Equity	11%
	Non-Core Real Estate	2%
	Opp. Private Credit	2%
Private Growth	15%	
Income	Liquid Credit	2.8%
	HY Infrastructure	1.0%
	REITs	1.0%
	Private Credit	3.2%
	Income	8%
Stability	Long Treasuries	4%
	Systematic Trend	4%
	CPC	8%
	Core Real Estate	3.6%
	Private Infrastructure	2.4%
	TIPS	1%
	Commodities	1%
	Inflation Protection	8%
	Core Bonds	11.5%
	Absolute Return	6.5%
	Strategic Cash	3.0%
Volatility Protection	21%	
Other	Short-Term Cash	0%
	Russell Overlay	0%
	Total Cash	0%
	Expected Return 5-7 yrs*	6.70%
	Expected Return 30 yrs*	7.81%
	Standard Dev	11.9%
	Sharpe Ratio (5-7 years)	0.35

Characteristics	Objective/Purpose
<ul style="list-style-type: none"> -Liquid -Passive management -Earns return through both capital appreciation and dividend yield 	-Drive portfolio performance and risk
<ul style="list-style-type: none"> -Illiquid -Closed-end vehicles -Predominantly accessed through primary fund commitments (20% of exposure of each asset class may be achieved through secondaries) 	<ul style="list-style-type: none"> -Return generation -Idiosyncratic performance -Access to value creation not accessible in public markets -Capture of illiquidity premium
<ul style="list-style-type: none"> -Blend of liquid and illiquid asset classes -Active management 	<ul style="list-style-type: none"> -Produce high and stable income return stream to help mitigate system's negative cashflow and reduce the need to sell portfolio assets to meet required benefit payments -Principal appreciation
<ul style="list-style-type: none"> -Liquid -Active management 	-Protect the portfolio during a significant and sustained market crisis by appreciating in value during periods of significant equity market declines
<ul style="list-style-type: none"> -Blend of liquid and illiquid asset classes -Active management 	<ul style="list-style-type: none"> -Protect against unanticipated spikes in inflation -Produce ~3% real return across a full market cycle -Diversification -Principal appreciation
<ul style="list-style-type: none"> -Blend of asset classes with high to moderate liquidity -Active management 	<ul style="list-style-type: none"> -Protect against unanticipated spikes in volatility -Diversification -Capital Preservation



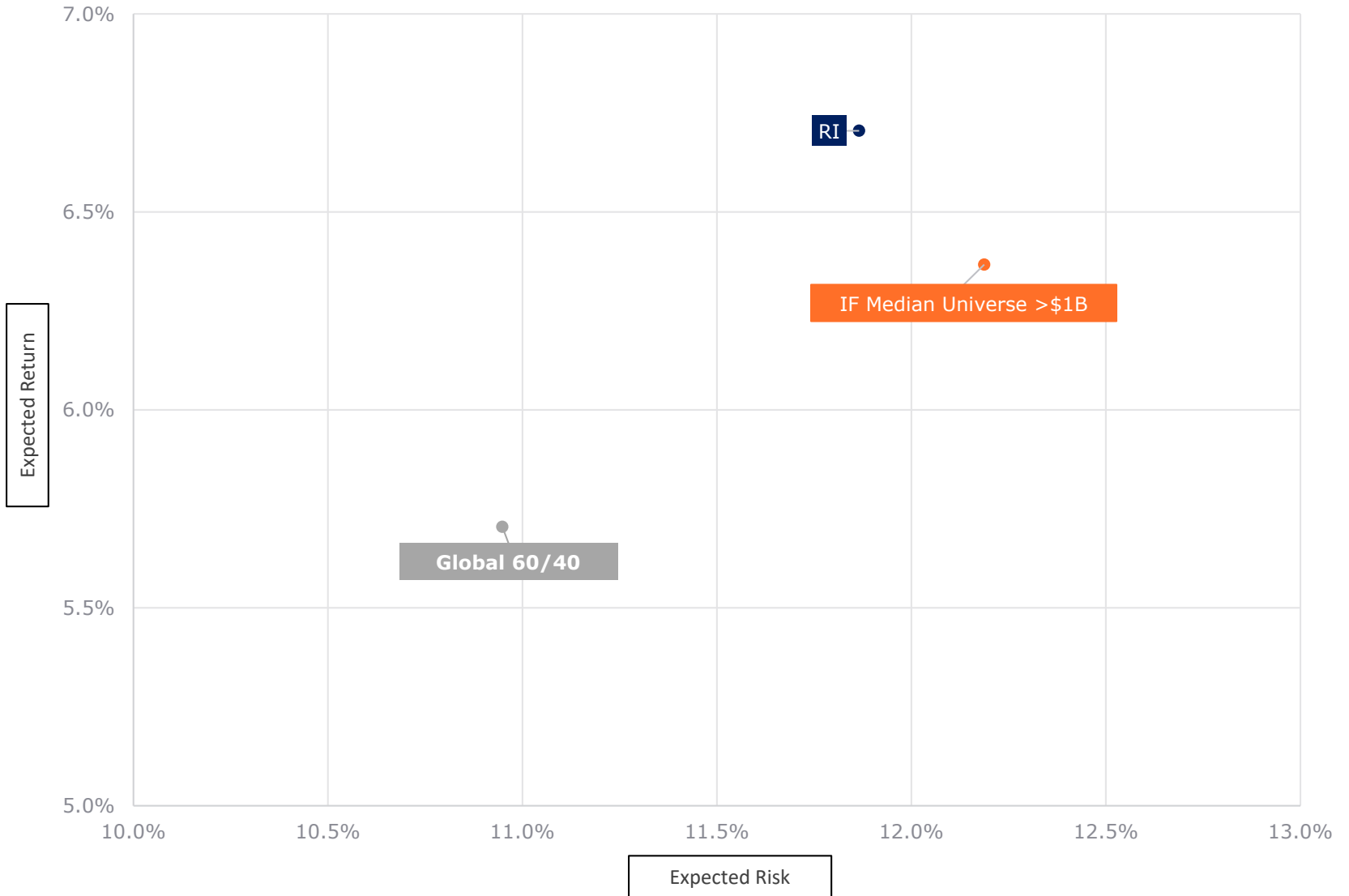
ASSET ALLOCATION REVIEW: RISK/RETURN

		Current Target	Individual Asset Classes		Functional Buckets		
			Expected Return 5-7 Year*	Expected Risk	Expected Return 5-7 Year*	Expected Risk	
Growth	US Equities	22%	6.1%	17.6%	Growth	7.4%	20.4%
	Int'l Equities	13%	6.8%	20.5%			
	Emerging Int'l Equities	5%	9.3%	28.0%			
	Global Equity	40%	6.7%	19.8%			
	Private Equity	11%	10.0%	24.2%			
	Non-Core Real Estate	2%	7.0%	17.0%			
	Opp. Private Credit	2%	8.5%	16.0%			
	Private Growth	15%	9.4%	22.3%			
Income	Liquid Credit	2.8%	5.4%	10.8%	Income	7.0%	13.7%
	HY Infrastructure	1.0%	9.5%	21.0%			
	REITs	1.0%	6.8%	20.0%			
	Private Credit	3.2%	7.6%	12.0%			
	Income	8%	7.0%	13.7%			
Stability	Long Treasuries	4%	1.8%	12.0%	Stability	4.2%	8.5%
	Systematic Trend	4%	6.0%	9.5%			
	CPC	8%	3.9%	10.8%			
	Core Real Estate	3.6%	6.0%	13.0%			
	Private Infrastructure	2.4%	6.3%	12.0%			
	TIPS	1%	3.0%	6.5%			
	Commodities	1%	4.3%	19.0%			
	Inflation Protection	8%	5.5%	12.6%			
	Core Bonds	11.5%	3.0%	6.1%			
	Absolute Return	6.5%	5.7%	8.1%			
	Strategic Cash	3.0%	2.5%	1.0%			
	Volatility Protection	21%	3.8%	6.0%			
Other	Short-Term Cash	0%	2.8%	1.0%	Total	6.7%	11.9%
	Russell Overlay	0%	0.5%	1.0%			
	Total Cash	0%					
Expected Return 5-7 yrs*		6.70%					
Expected Return 30 yrs*		7.81%					
Standard Dev		11.9%					
Sharpe Ratio (5-7 years)		0.35					

*Expected returns are shown compound



SIC'S 5 YR. EXPECTED RISK & RETURN: **LOOKING FORWARD**

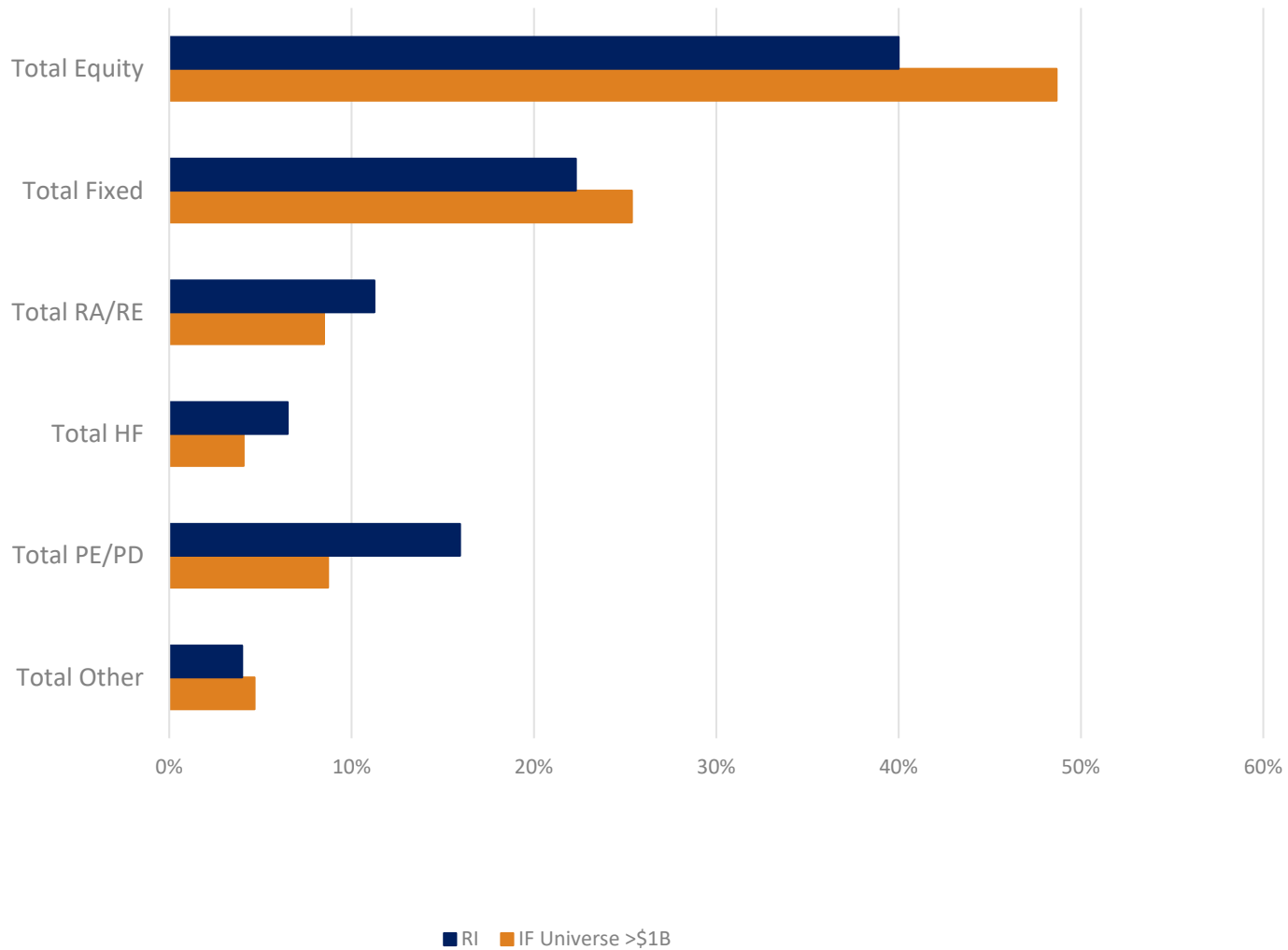


*The IF Universe represents a collection of defined benefit pension public funds with assets greater than \$1 billion. NEPC return & risk assumptions applied to median universe allocation.

ASSET ALLOCATION: PEER COMPARISON

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TARGET ASSET ALLOCATION: **VERSUS PEERS**



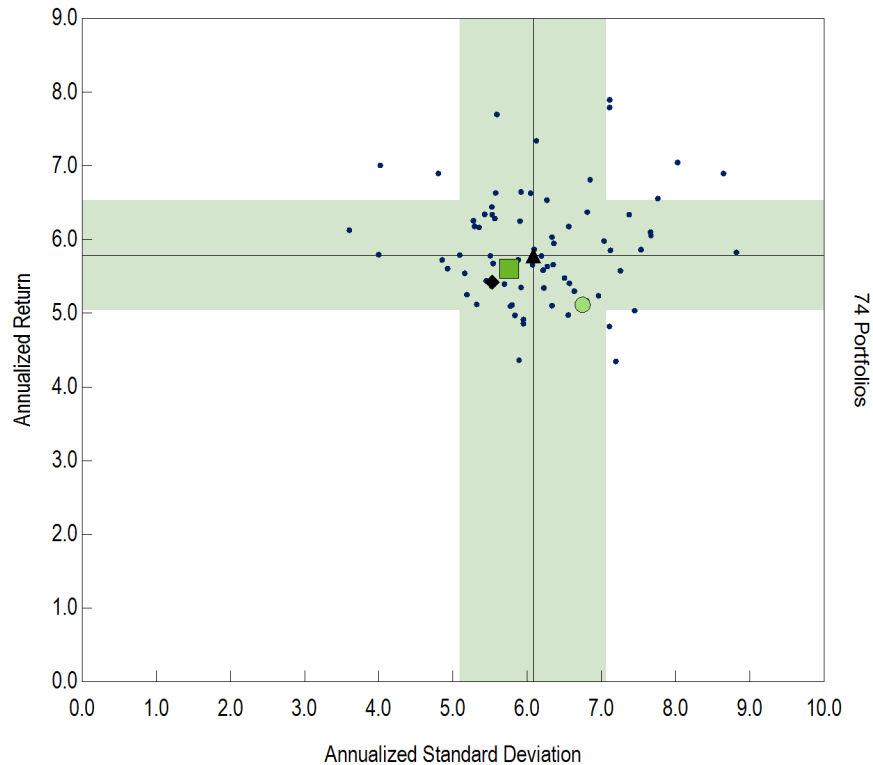
*The IF Universe represents a collection of defined benefit pension public funds with assets greater than \$1 billion

**Total fixed includes cash allocations; Total private equity includes private equity and private credit; Total Other includes unassigned allocations and GAA/Multi-Asset

State of Rhode Island Pension Plan

TOTAL FUND RISK/RETURN - 5 YEARS

5 Years Ending March 31, 2019



- State of Rhode Island Total Plan
- ◆ Strategic Benchmark Allocation
- 60% MSCI ACWI (Net) / 40% BBgBarc Aggregate
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1B Net

5 Years Ending March 31, 2019

	Anlzd Ret	Rank	Anlzd Std Dev	Rank
State of Rhode Island Total Plan	5.6%	64	5.8%	34
Strategic Benchmark Allocation	5.4%	71	5.5%	25
60% MSCI ACWI (Net) / 40% BBgBarc Aggregate	5.1%	85	6.7%	73
InvestorForce Public DB > \$1B Net Median	5.8%	--	6.1%	--

5 Years Ending March 31, 2019

	Sharpe Ratio	Rank	Sortino Ratio RF	Rank
State of Rhode Island Total Plan	0.8	42	1.1	37
Strategic Benchmark Allocation	0.8	42	1.1	40
60% MSCI ACWI (Net) / 40% BBgBarc Aggregate	0.6	90	0.9	81
InvestorForce Public DB > \$1B Net Median	0.8	--	1.0	--



APPENDIX

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2019 5-7 YEAR RETURN FORECASTS

Geometric Expected Return			
Asset Class	2019	2018	2019-2018
Cash	2.50%	2.00%	+0.50%
Large Cap Equities	6.00%	5.25%	+0.75%
Small/Mid Cap Equities	6.25%	5.75%	+0.50%
Int'l Equities (Unhedged)	6.75%	7.50%	-0.75%
Int'l Sm Cap Equities (Unhedged)	7.25%	7.75%	-0.50%
Emerging Int'l Equities	9.25%	9.00%	+0.25%
Emerging Int'l Sm Cap Equities	9.50%	9.25%	+0.25%
Hedge Funds - Long/Short	5.50%	6.25%	-0.75%
TIPS	3.00%	3.25%	-0.25%
Treasuries	2.50%	2.25%	+0.25%
IG Corp Credit	4.00%	3.50%	+0.50%
MBS	2.75%	2.50%	+0.25%
High-Yield Bonds	5.25%	3.75%	+1.50%
Bank Loans	5.50%	4.50%	+1.00%
EMD (External)	4.75%	4.25%	+0.50%
EMD (Local Currency)	6.50%	6.00%	+0.50%
Municipal Bonds	3.00%	2.50%	+0.50%
High-Yield Municipal Bonds	3.00%	3.75%	-0.75%
Hedge Funds – Credit	5.50%	5.00%	+0.50%



2019 5-7 YEAR RETURN FORECASTS

Geometric Expected Return			
Asset Class	2019	2018	2019-2018
Long Treasuries	1.75%	2.00%	-0.25%
Long Credit	3.50%	4.00%	-0.50%
IG CLO	4.00%	N/A	N/A
HY CLO	6.00%	N/A	N/A
Commodities	4.25%	4.75%	-0.50%
Midstream Energy	8.25%	7.25%	+1.00%
REITs	6.75%	6.50%	+0.25%
Core Real Estate	6.00%	5.75%	+0.25%
Non-Core Real Estate	7.00%	7.00%	-
Private RE Debt	5.75%	N/A	N/A
Private Real Assets - Energy/Metals	9.50%	8.00%	+1.50%
Private Real Assets - Infra/Land	6.25%	6.00%	+0.25%
Hedge Funds - Macro	6.00%	6.25%	-0.25%
<i>Global Equity*</i>	<i>6.99%</i>	<i>6.88%</i>	<i>+0.11%</i>
<i>Private Equity*</i>	<i>10.01%</i>	<i>8.00%</i>	<i>+2.01%</i>
<i>Core Bonds*</i>	<i>3.04%</i>	<i>2.75%</i>	<i>+0.29%</i>
<i>Private Debt*</i>	<i>7.60%</i>	<i>6.50%</i>	<i>+1.10%</i>
<i>Long Govt/Credit*</i>	<i>2.84%</i>	<i>3.26%</i>	<i>-0.42%</i>
<i>Hedge Funds*</i>	<i>5.74%</i>	<i>5.83%</i>	<i>-0.09%</i>

*Multi-asset assumptions derived from the sum of underlying equity, credit, and real asset building blocks



2019 VOLATILITY FORECASTS

Volatility			
Asset Class	2019	2018	2019-2018
Cash	1.00%	1.00%	-
Large Cap Equities	16.50%	17.50%	-1.00%
Small/Mid Cap Equities	20.00%	21.00%	-1.00%
Int'l Equities (Unhedged)	20.50%	21.00%	-0.50%
Int'l Sm Cap Equities (Unhedged)	22.00%	22.00%	-
Emerging Int'l Equities	28.00%	28.00%	-
Emerging Int'l Sm Cap Equities	31.00%	31.00%	-
Hedge Funds - Long/Short	11.00%	11.00%	-
TIPS	6.50%	6.50%	-
Treasuries	5.50%	5.50%	-
IG Corp Credit	7.50%	7.50%	-
MBS	7.00%	7.00%	-
High-Yield Bonds	12.50%	13.00%	-0.50%
Bank Loans	9.00%	9.00%	-
EMD (External)	13.00%	13.00%	-
EMD (Local Currency)	13.00%	13.00%	-
Municipal Bonds	7.00%	7.00%	-
High-Yield Municipal Bonds	12.00%	12.00%	-
Hedge Funds - Credit	9.50%	9.50%	-



2019 VOLATILITY FORECASTS

Volatility			
Asset Class	2019	2018	2019-2018
Long Treasuries	12.00%	12.00%	-
Long Credit	12.00%	12.00%	-
IG CLO	7.50%	N/A	N/A
HY CLO	11.00%	N/A	N/A
Commodities	19.00%	19.00%	-
Midstream Energy	18.50%	19.00%	-0.50%
REITs	20.00%	21.00%	-1.00%
Core Real Estate	13.00%	13.00%	-
Non-Core Real Estate	17.00%	17.00%	-
Private RE Debt	11.00%	N/A	N/A
Private Real Assets - Energy/Metals	21.00%	21.00%	-
Private Real Assets - Infra/Land	12.00%	12.00%	-
Hedge Funds - Macro	9.50%	9.50%	-
<i>Global Equity*</i>	<i>17.57%</i>	<i>18.22%</i>	<i>-0.65%</i>
<i>Private Equity*</i>	<i>24.16%</i>	<i>23.00%</i>	<i>+1.16%</i>
<i>Core Bonds*</i>	<i>6.10%</i>	<i>5.99%</i>	<i>+0.11%</i>
<i>Private Debt*</i>	<i>11.97%</i>	<i>13.00%</i>	<i>-1.03%</i>
<i>Long Gov/Credit*</i>	<i>11.26%</i>	<i>11.25%</i>	<i>+0.01%</i>
<i>Hedge Funds*</i>	<i>8.15%</i>	<i>9.07%</i>	<i>-0.92%</i>

*Multi-asset assumptions derived from the sum of underlying equity, credit, and real asset building blocks



2019 30 YEAR RETURN FORECASTS

Geometric Expected Return			
Asset Class	2019	2018	2019-2018
Cash	3.00%	2.75%	+0.25%
Large Cap Equities	7.50%	7.50%	-
Small/Mid Cap Equities	7.75%	7.75%	-
Int'l Equities (Unhedged)	7.75%	7.75%	-
Int'l Sm Cap Equities (Unhedged)	8.00%	8.00%	-
Emerging Int'l Equities	9.25%	9.25%	-
Emerging Int'l Sm Cap Equities	9.50%	9.50%	-
Hedge Funds - Long/Short	6.50%	7.25%	-0.75%
TIPS	4.00%	3.75%	+0.25%
Treasuries	3.75%	3.25%	+0.50%
IG Corp Credit	5.75%	4.75%	+1.00%
MBS	3.75%	3.25%	+0.50%
High-Yield Bonds	6.50%	5.50%	+1.00%
Bank Loans	5.50%	5.50%	-
EMD (External)	6.25%	5.00%	+1.25%
EMD (Local Currency)	6.75%	6.50%	+0.25%
Municipal Bonds	3.75%	3.50%	+0.25%
High-Yield Municipal Bonds	5.25%	5.50%	-0.25%
Hedge Funds - Credit	6.75%	5.25%	+1.50%



2019 30 YEAR RETURN FORECASTS

Geometric Expected Return			
Asset Class	2019	2018	2019-2018
Long Treasuries	3.75%	3.50%	+0.25%
Long Credit	6.00%	5.25%	+0.75%
IG CLO	4.50%	N/A	N/A
HY CLO	6.25%	N/A	N/A
Commodities	5.50%	5.50%	-
Midstream Energy	7.50%	7.50%	-
REITs	7.00%	6.75%	+0.25%
Core Real Estate	6.25%	6.50%	-0.25%
Non-Core Real Estate	7.25%	7.50%	-0.25%
Private RE Debt	6.25%	N/A	N/A
Private Real Assets - Energy/Metals	9.50%	7.75%	+1.75%
Private Real Assets - Infra/Land	7.00%	6.25%	+0.75%
Hedge Funds - Macro	6.50%	6.25%	+0.25%
<i>Global Equity*</i>	<i>8.18%</i>	<i>8.24%</i>	<i>-0.06%</i>
<i>Private Equity*</i>	<i>11.15%</i>	<i>9.50%</i>	<i>+1.65%</i>
<i>Core Bonds*</i>	<i>4.37%</i>	<i>3.75%</i>	<i>+0.62%</i>
<i>Private Debt*</i>	<i>8.11%</i>	<i>7.50%</i>	<i>+0.61%</i>
<i>Long Gov/Credit*</i>	<i>5.14%</i>	<i>4.62%</i>	<i>+0.52%</i>
<i>Hedge Funds*</i>	<i>6.76%</i>	<i>6.34%</i>	<i>+0.42%</i>

*Multi-asset assumptions derived from the sum of underlying equity, credit, and real asset building blocks

