



NEPC 2022 INVESTMENT OUTLOOK

ASSET ALLOCATION REVIEW AND
RECOMMENDATION

JUNE 9, 2022

NEPC Research



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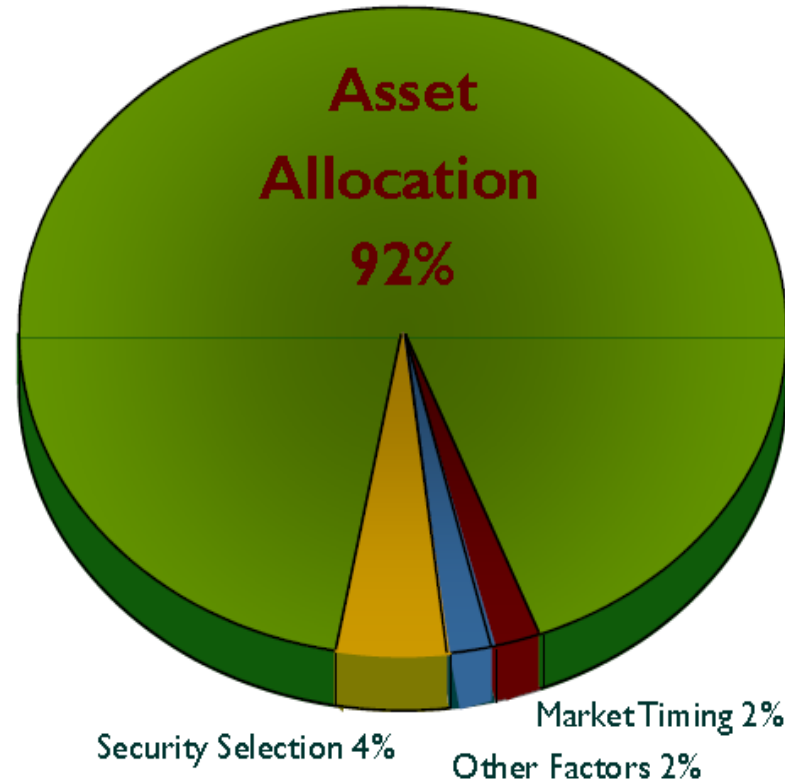
2022 CAPITAL MARKET ASSUMPTIONS



ASSET ALLOCATION: THE KEY INVESTMENT DECISION

Exhibit A: Page 4

Determinants of Portfolio Performance



Source: *Determinants of Portfolio Performance II: An Update*, Brinson, et al, *Financial Analysts Journal*, May/June 1991, pp 40-48.

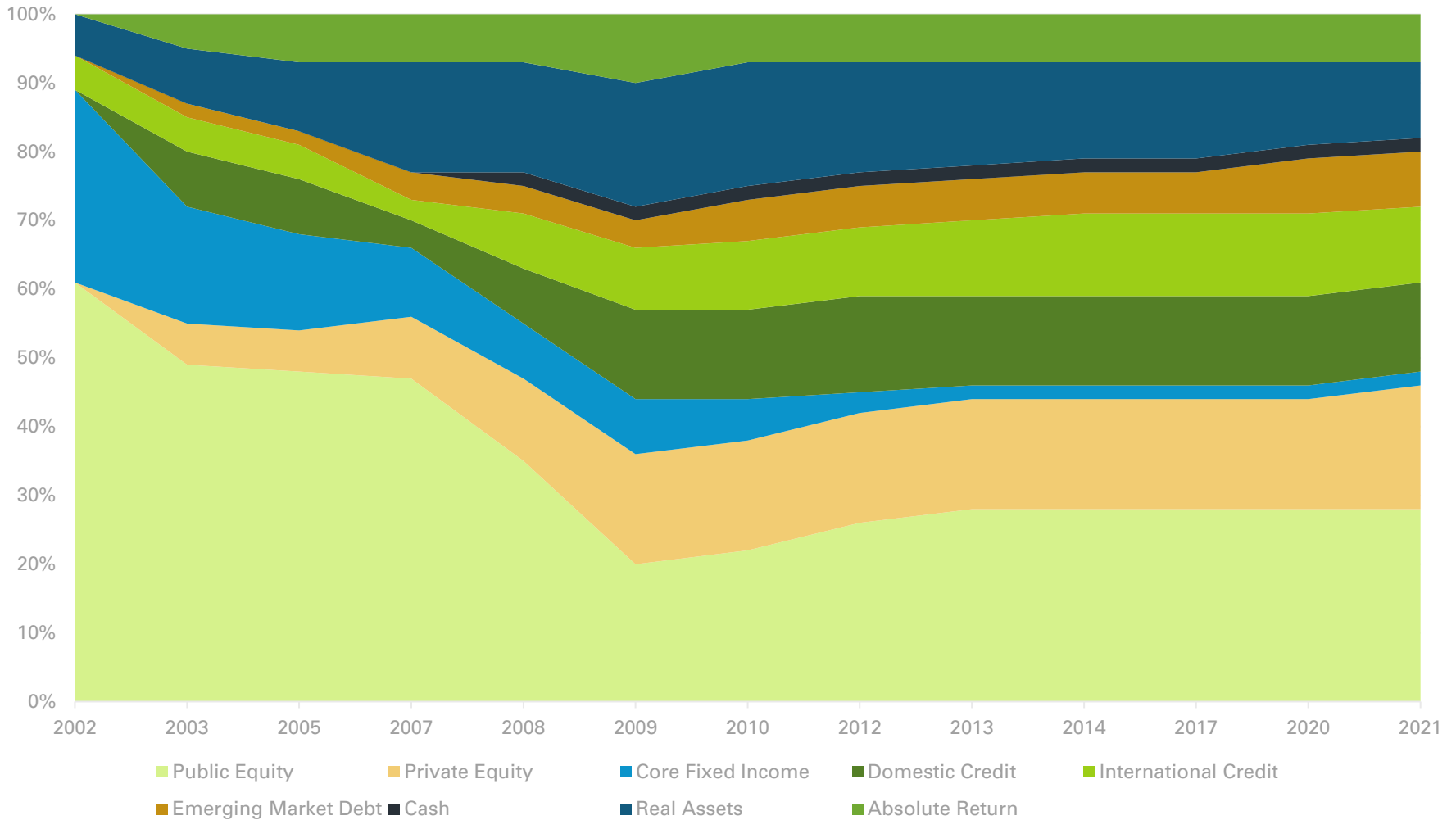
ASSET ALLOCATION

POLICY TARGETS, POLICY RANGES AND BENCHMARKS

Asset Class	Policy Target	Range	Benchmark
Domestic Equities			Russell 3000 Index
Passive Large Cap	8.00%	0% – 11%	
Passive Small Cap	2.00%	-3% – 7%	
Volatility	3.00%	0% – 8%	
Subtotal*	13.00%	8% – 18%	
International Equities			MSCI ACWI ex USA Index
Developed Market	6.00%	1% – 11%	
Volatility	3.00%	0% – 8%	
Emerging Market Equity	6.00%	1% – 11%	
Subtotal*	15.00%	10% – 20%	
US Fixed Income			Bloomberg Barclays US Aggregate Bond Index
Core*	2.00%	-3% – 7%	
High Yield/Credit Strategies*	13.00%	8% – 18%	
Subtotal	15.00%	10% – 20%	
Global Fixed Income			Bloomberg Barclays Global Aggregate Bond ex US Index
International Core*	0.00%	-5% – 5%	
International Credit*	11.00%	6% – 16%	
Emerging Market Debt*	8.00%	1% – 12%	
Subtotal	19.00%	13% – 23%	
Real Estate			NCREIF Property Index
Core	2.50%	0% – 5%	
Non-Core	2.50%	0% – 5%	
Subtotal*	5.00%	0% – 10%	
Real Assets			67% Bloomberg Commodities Index 33% BBG US TIPS Index
Commodities	4.00%	-1% – 7%	
Infrastructure	2.00%	0% – 6%	
Subtotal*	6.00%	0% – 10%	
Private Equity*	18.00%	6% – 23%	Russell 3000 Index
Absolute Return*	7.00%	0% – 12%	Bloomberg Barclays US Aggregate Bond Index
Cash*	2.00%	0% – 10%	91 Day T-Bill Index

* Monitored on a quarterly basis in NEPC reporting

SBCERA ASSET ALLOCATION POLICY HISTORY

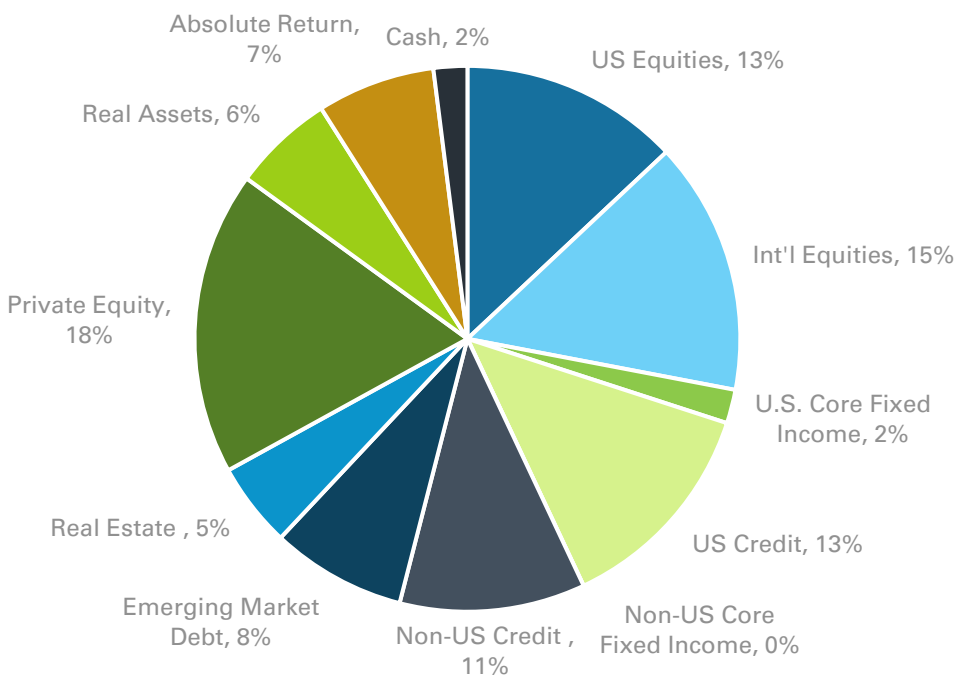


CHANGES TO SBCERA ASSUMPTIONS



SBCERA RETURN AND RISK EXPECTATIONS

USING DEC. 31, 2021 CAPITAL MARKET ASSUMPTIONS



	10 Year		30 Year	
	2022	2021	2022	2021
<i>Expected Return</i>	6.9%	7.1%	8.0%	8.1%
<i>Expected Volatility</i>	11.3%	12.2%	11.3%	12.2%
<i>Sharpe Ratio</i>	0.48	0.47	0.51	0.46
<i>Sortino Ratio</i>	0.78	0.73	0.92	0.85

Probabilities using 2022 Assumptions	
Probability of 1-Year Return Under 0.00%	26.3%
Probability of 10 Year Return Under 0.00%	2.3%
Probability of 10 Year Return Under 7.25%	50.7%
Probability of 30-Year Return Under 7.25%	29.3%

Note: 2022 Expected Volatility assumption is based on smoothed volatilities in private markets asset classes

CORE ASSET CLASS RETURN ASSUMPTIONS

	Asset Class	12/31/2021 10-Year Return	12/31/2020 10-Year Return	Delta	12/31/2021 30-Year Return	12/31/2020 30-Year Return	Delta	12/31/2021 Volatility	12/31/2020 Volatility	Delta
	Cash	1.5%	0.8%	0.7%	1.5%	0.8%	0.7%	0.6%	0.6%	0.0%
	U.S. Inflation	2.4%	2.0%	0.4%	2.4%	2.0%	0.4%			
Equity	U.S. Large-Cap Equity	4.3%	5.4%	-1.1%	6.1%	6.3%	-0.2%	16.6%	16.6%	0.0%
	U.S. SMID-Cap Equity	5.6%	5.7%	-0.1%	6.6%	6.6%	0.0%	20.7%	20.7%	-0.1%
	Non-U.S. Developed Equity	5.2%	5.9%	-0.7%	6.2%	6.5%	-0.3%	19.6%	19.7%	-0.1%
	Emerging Market Equity	8.3%	7.5%	0.8%	8.7%	8.4%	0.3%	28.3%	28.7%	-0.3%
	Global Equity*	5.4%	6.2%	-0.8%	6.8%	7.0%	-0.2%	17.9%	18.0%	-0.1%
	Private Equity*	9.0%	9.3%	-0.3%	10.0%	10.1%	0.0%	13.3%	12.8%	0.5%
Fixed Income	U.S. Aggregate Bond*	2.0%	1.4%	0.6%	3.1%	2.7%	0.5%	5.7%	5.7%	0.0%
	US Leveraged Loans	4.7%	3.9%	0.8%	5.6%	4.8%	0.8%	9.1%	9.2%	-0.1%
	U.S. High Yield Corporate Bond	3.2%	2.9%	0.3%	5.4%	5.0%	0.4%	11.2%	11.5%	-0.3%
	Private Debt*	6.6%	6.1%	0.5%	7.9%	7.5%	0.4%	6.9%	11.2%	-4.3%
	International Fixed Income	1.2%	0.7%	0.5%	2.2%	1.8%	0.3%	9.3%	7.9%	1.4%
	Emerging Market Debt	5.7%	5.0%	0.7%	5.3%	5.1%	0.2%	13.0%	13.0%	0.0%
Real Estate	Real Estate - Core	4.7%	4.4%	0.3%	5.6%	5.6%	0.0%	5.7%	5.2%	0.5%
	Real Estate - Non-Core	5.9%	5.5%	0.4%	6.9%	7.0%	-0.1%	8.8%	8.7%	0.0%
Real Assets	Private Real Assets - Natural Resources	7.1%	8.0%	-0.9%	8.2%	8.5%	-0.3%	15.6%	15.2%	0.3%
	Private Real Assets - Infrastructure	5.3%	5.4%	-0.1%	6.6%	6.6%	0.0%	8.1%	7.8%	0.3%
	Absolute Return*	6.6%	6.1%	0.5%	7.9%	7.5%	0.4%	6.9%	11.2%	-4.3%

*Calculated as a blend of other asset classes

Private asset classes are calculated using smoothed volatility



ASSET CLASS ASSUMPTIONS

NEPC VS HORIZON ACTUARIAL SERVICES, LLC SURVEY

	Asset Class	12/31/2021 10-Year Return	2021 Horizon 39 Survey Respondents	Delta
	Cash	1.5%	1.2%	0.3%
Equity	U.S. Large-Cap Equity	4.3%	5.8%	-1.5%
	U.S. SMID-Cap Equity	5.6%	6.3%	-0.7%
	Non-U.S. Developed Equity	5.2%	6.4%	-1.2%
	Emerging Market Equity	8.3%	7.2%	1.1%
	Private Equity*	9.0%	8.8%	0.2%
Fixed Income	U.S. Aggregate Bond*	2.0%	2.1%	-0.1%
	U.S. High Yield Corporate Bond	3.2%	3.8%	-0.6%
	Private Debt*	6.6%	6.5%	0.1%
	International Fixed Income	1.2%	1.4%	-0.2%
	Emerging Market Debt	5.7%	4.2%	1.5%
Real Assets	Real Estate - Core	4.7%	5.5%	-0.8%
	Private Real Assets - Infrastructure	5.3%	6.2%	-0.9%

Source: Horizon Actuarial Services, LLC Survey of Capital Market Assumptions 2021 Edition

ASSET ALLOCATION

COMPARISON VS OTHER NEPC PUBLIC FUND CLIENTS

	SBCERA	PF 1	PF 2	PF 3	PF 4	PF 5	PF 6	PF 7
Public Equity	28	31	37	40	40	52	40	37
Private Equity	18	15	23	10	27	16	10	13
Core Fixed Income (Rate Sensitive)	2	6	8	10	2	10	10	11
Domestic Credit	13	16	15	20	20	6	20	13
International Credit	11							
Emerging Market Debt	8	2						
Cash	2	1	-3		1	2		
Real Estate	5	8	10	20		8	10	9
Real Assets	6	9					6	10
Absolute Return (Diversifying Assets)	7	12	10		10			6
Risk and Return Measures								
10 Yr Expected Return	6.9%	6.5%	6.6%	6.9%	6.5%	6.2%	5.7%	5.5%
30 Yr Expected Return	8.0%	7.7%	7.9%	8.0%	7.8%	7.2%	6.9%	6.8%
Expected Volatility	11.3%	14.1%	11.9%	10.3%	11.5%	14.6%	12.3%	12.6%

CORRELATIONS

Asset Class	Cash	US Leverage Cost	US Large- Cap Equity	US Small/Mid- Cap Equity	Non-US Developed Equity	Emerging Market Equity	Global Equity	Absolute Return - Equity	PE - Buyout	PE - Growth	PE - Early Stage Venture	PE - Non- US	US Treasury Bond	US Corporate Bond	US Aggregate Bond	US High Yield Corporate Bond	EMD External	EMD Local	Absolute Return - Credit	PC - Credit Opps	PC - Distressed	PC - Direct Lending	Short- Term Treasury Bond	Real Estate - Core	Real Estate - Non-Core	Natural Resources	Infra	Absolute Return - Macro
Cash	1.00	0.92	0.00	-0.03	-0.03	-0.04	-0.02	0.02	-0.01	-0.03	-0.03	-0.03	0.16	0.04	0.16	-0.06	-0.01	0.00	-0.02	-0.06	-0.05	-0.04	0.45	-0.02	-0.04	0.03	0.01	0.03
US Leverage Cost	0.92	1.00	0.06	0.03	0.05	0.03	0.05	0.08	0.05	0.04	0.04	0.04	0.28	0.27	0.33	0.09	0.17	0.13	0.11	0.09	0.08	0.06	0.54	0.05	0.06	0.09	0.09	0.13
US Large-Cap Equity	0.00	0.06	1.00	0.87	0.80	0.71	0.95	0.81	0.94	0.80	0.80	0.74	-0.17	0.30	0.04	0.63	0.64	0.64	0.69	0.59	0.70	0.45	-0.17	0.41	0.48	0.39	0.48	0.35
US Small/Mid-Cap Equity	-0.03	0.03	0.87	1.00	0.76	0.73	0.90	0.73	0.88	0.92	0.92	0.72	-0.25	0.27	-0.03	0.67	0.64	0.64	0.70	0.63	0.77	0.52	-0.25	0.45	0.52	0.44	0.55	0.35
Non-US Developed Equity	-0.03	0.05	0.80	0.76	1.00	0.76	0.92	0.73	0.77	0.71	0.71	0.89	-0.19	0.31	0.04	0.63	0.66	0.75	0.66	0.59	0.68	0.46	-0.19	0.39	0.47	0.46	0.52	0.47
Emerging Market Equity	-0.04	0.03	0.71	0.73	0.76	1.00	0.84	0.67	0.69	0.68	0.68	0.79	-0.20	0.28	0.01	0.64	0.76	0.85	0.65	0.60	0.68	0.50	-0.20	0.36	0.45	0.44	0.48	0.46
Global Equity	-0.02	0.05	0.95	0.90	0.92	0.84	1.00	0.82	0.92	0.83	0.83	0.86	-0.21	0.32	0.03	0.69	0.72	0.77	0.73	0.65	0.76	0.51	-0.20	0.43	0.52	0.46	0.55	0.44
Absolute Return - Equity	0.02	0.08	0.81	0.73	0.73	0.67	0.82	1.00	0.77	0.67	0.67	0.68	-0.15	0.27	0.04	0.56	0.58	0.61	0.60	0.52	0.61	0.40	-0.14	0.35	0.42	0.36	0.43	0.34
PE - Buyout	-0.01	0.05	0.94	0.88	0.77	0.69	0.92	0.77	1.00	0.81	0.81	0.72	-0.19	0.28	0.02	0.63	0.62	0.62	0.68	0.59	0.70	0.46	-0.19	0.41	0.48	0.39	0.49	0.34
PE - Growth	-0.03	0.04	0.80	0.92	0.71	0.68	0.83	0.67	0.81	1.00	0.88	0.67	-0.23	0.27	-0.02	0.66	0.62	0.61	0.68	0.62	0.75	0.54	-0.23	0.43	0.51	0.41	0.52	0.34
PE - Early Stage Venture	-0.03	0.04	0.80	0.92	0.71	0.68	0.83	0.67	0.81	0.88	1.00	0.67	-0.23	0.28	-0.01	0.68	0.63	0.62	0.69	0.63	0.76	0.56	-0.23	0.44	0.52	0.42	0.52	0.34
PE - Non-US	-0.03	0.04	0.74	0.72	0.89	0.79	0.86	0.68	0.72	0.67	0.67	1.00	-0.18	0.29	0.03	0.61	0.66	0.75	0.63	0.57	0.65	0.45	-0.18	0.36	0.44	0.43	0.49	0.45
US Treasury Bond	0.16	0.28	-0.17	-0.25	-0.19	-0.20	-0.21	-0.15	-0.19	-0.23	-0.23	-0.18	1.00	0.63	0.92	-0.11	0.21	0.06	-0.11	-0.10	-0.18	-0.24	0.81	-0.02	-0.05	-0.09	-0.07	0.12
US Corporate Bond	0.04	0.27	0.30	0.27	0.31	0.28	0.32	0.27	0.28	0.27	0.28	0.29	0.63	1.00	0.85	0.56	0.75	0.52	0.52	0.53	0.48	0.32	0.43	0.30	0.39	0.23	0.31	0.39
US Aggregate Bond	0.16	0.33	0.04	-0.03	0.04	0.01	0.03	0.04	0.02	-0.02	-0.01	0.03	0.92	0.85	1.00	0.20	0.48	0.28	0.18	0.19	0.12	0.00	0.75	0.12	0.15	0.05	0.10	0.25
US High Yield Corporate Bond	-0.06	0.09	0.63	0.67	0.63	0.64	0.69	0.56	0.63	0.66	0.68	0.61	-0.11	0.56	0.20	1.00	0.85	0.69	0.94	0.94	0.95	0.80	-0.15	0.49	0.66	0.43	0.53	0.41
EMD External	-0.01	0.17	0.64	0.64	0.66	0.76	0.72	0.58	0.62	0.62	0.63	0.66	0.21	0.75	0.48	0.85	1.00	0.83	0.81	0.80	0.81	0.62	0.10	0.45	0.58	0.43	0.52	0.51
EMD Local	0.00	0.13	0.64	0.64	0.75	0.85	0.77	0.61	0.62	0.61	0.62	0.75	0.06	0.52	0.28	0.69	0.83	1.00	0.68	0.65	0.70	0.53	0.04	0.39	0.49	0.48	0.53	0.62
Absolute Return - Credit	-0.02	0.11	0.69	0.70	0.66	0.65	0.73	0.60	0.68	0.68	0.69	0.63	-0.11	0.52	0.18	0.94	0.81	0.68	1.00	0.88	0.91	0.74	-0.14	0.48	0.63	0.42	0.52	0.40
PC - Credit Opps	-0.06	0.09	0.59	0.63	0.59	0.60	0.65	0.52	0.59	0.62	0.63	0.57	-0.10	0.53	0.19	0.94	0.80	0.65	0.88	1.00	0.89	0.75	-0.14	0.46	0.62	0.40	0.49	0.38
PC - Distressed	-0.05	0.08	0.70	0.77	0.68	0.68	0.76	0.61	0.70	0.75	0.76	0.65	-0.18	0.48	0.12	0.95	0.81	0.70	0.91	0.89	1.00	0.81	-0.19	0.50	0.65	0.45	0.55	0.40
PC - Direct Lending	-0.04	0.06	0.45	0.52	0.46	0.50	0.51	0.40	0.46	0.54	0.56	0.45	-0.24	0.32	0.00	0.80	0.62	0.53	0.74	0.75	0.81	1.00	-0.21	0.41	0.54	0.34	0.43	0.30
Short-Term Treasury Bond	0.45	0.54	-0.17	-0.25	-0.19	-0.20	-0.20	-0.14	-0.19	-0.23	-0.23	-0.18	0.81	0.43	0.75	-0.15	0.10	0.04	-0.14	-0.14	-0.19	-0.21	1.00	-0.06	-0.09	-0.07	-0.07	0.12
Real Estate - Core	-0.02	0.05	0.41	0.45	0.39	0.36	0.43	0.35	0.41	0.43	0.44	0.36	-0.02	0.30	0.12	0.49	0.45	0.39	0.48	0.46	0.50	0.41	-0.06	1.00	0.85	0.30	0.44	0.23
Real Estate - Non-Core	-0.04	0.06	0.48	0.52	0.47	0.45	0.52	0.42	0.48	0.51	0.52	0.44	-0.05	0.39	0.15	0.66	0.58	0.49	0.63	0.62	0.65	0.54	-0.09	0.85	1.00	0.35	0.47	0.29
Natural Resources	0.03	0.09	0.39	0.44	0.46	0.44	0.46	0.36	0.39	0.41	0.42	0.43	-0.09	0.23	0.05	0.43	0.43	0.48	0.42	0.40	0.45	0.34	-0.07	0.30	0.35	1.00	0.64	0.52
Infra	0.01	0.09	0.48	0.55	0.52	0.48	0.55	0.43	0.49	0.52	0.52	0.49	-0.07	0.31	0.10	0.53	0.52	0.53	0.52	0.49	0.55	0.43	-0.07	0.44	0.47	0.64	1.00	0.48
Absolute Return - Macro	0.03	0.13	0.35	0.35	0.47	0.46	0.44	0.34	0.34	0.34	0.34	0.45	0.12	0.39	0.25	0.41	0.51	0.62	0.40	0.38	0.40	0.30	0.12	0.23	0.29	0.52	0.48	1.00



ASSET ALLOCATION RECOMMENDATION



PROPOSED ASSET ALLOCATION

TARGET ASSET ALLOCATION, RANGES AND BENCHMARKS

The goals of the proposed allocation is to achieve:

- Modestly higher expected returns
- Maintain portfolio efficiency (Sharpe Ratio), while reducing probability of falling below the current assumed rate

▪ **Current Policy**

- Represents the current Investment Policy, which is a well-diversified allocation based on SBCERA's risk tolerance, investment beliefs and investment objectives

▪ **Recommended Mix**

- Makes adjustments to the allocation by shifting 2% from Emerging Market Debt and 2% from Developed Market International Equities and allocating 4% to US Equities

▪ **Index component change in Real Assets from Bloomberg Commodity Index to S&P GSCI**

- Cost sensitivity around use of the Bloomberg index

▪ **Recommended changes to the current policy asset allocation include changes to Policy Targets, Asset Class Allocation Ranges and Benchmark recommendations are contained on next page**

ASSET ALLOCATION RECOMMENDATION

Current Policy			
Asset Class	Policy Target	Range	Benchmark
Domestic Equities			
			Russell 3000 Index
Passive Large Cap	8.0%	0% – 11%	
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Recommendation			
Asset Class	Policy Target	Range	Benchmark
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			Russell 3000 Index
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Absolute Return*	7.0%	0% – 12%	Bloomberg Barclays US Aggregate Bond Index
Cash*	2.0%	0% – 10%	91 Day T-Bill Index

Red shading denotes recommended decrease/ change

Green shading denotes recommended increase/ change



ASSET ALLOCATION RECOMMENDATION

Exhibit A: Page 16

ASSET ALLOCATION COMPARISON SUMMARY

	Current Policy	Recommended Mix	Alternative Mix	70/30	Median Public Fund > \$1B
Total Cash	2%	2%	2%	0%	2%
US Large-Cap Equity	11%	14.5%	13%	35%	0%
US Small/Mid-Cap Equity	2%	2.5%	2%	7%	0%
Non-US Developed Equity	9%	7%	7%	17%	0%
Non-US Developed Small-Cap Equity	0%	0%	0%	3%	0%
Emerging Market Equity	6%	6%	8%	7%	0%
Emerging Market Small-Cap Equity	0%	0%	0%	1%	0%
Global Equity	0%	0%	0%	0%	49%
Non-US Private Equity	2%	2%	2%	0%	0%
Private Equity	16%	16%	16%	0%	13%
Total Equity	46%	48%	48%	70%	62%
US Treasury Bond	2%	2%	2%	0%	0%
US Aggregate Bond	2%	2%	2%	30%	17%
Emerging Market External Debt	8%	6%	6%	0%	2%
Non-US Government Bond	0%	0%	0%	0%	2%
Private Debt	22%	22%	22%	0%	0%
Total Fixed Income	34%	32%	32%	30%	20%
Commodity Futures	0%	0%	0%	0%	2%
Real Estate - Core	3%	3%	3%	0%	6%
Real Estate - Non-Core	3%	3%	3%	0%	0%
Private Real Assets - Natural Resources	6%	6%	6%	0%	0%
Total Real Assets	11%	11%	11%	0%	8%
Absolute Return	7%	7%	7%	0%	5%
Global Asset Allocation Strategy	0%	0%	0%	0%	3%
Total Multi Asset	7%	7%	7%	0%	8%

Expected Return 10 yrs	6.8%	6.8%	6.9%	4.7%	5.3%
Expected Return 30 yrs	8.0%	8.1%	8.1%	6.0%	6.5%
Standard Dev	11.3%	11.4%	11.5%	12.6%	11.8%
Sharpe Ratio (10 years)	0.48	0.47	0.47	0.25	0.32
Sharpe Ratio (30 years)	0.51	0.50	0.50	0.29	0.36
Probability of 1-Year Return Under 0%	27.3%	27.4%	27.4%	35.5%	32.8%
Probability of 10-Year Return Under 0%	2.8%	2.9%	2.9%	12.1%	7.9%
Probability of 10-Year Return Under 7.25%	54.5%	54.6%	53.5%	73.8%	70.2%
Probability of 30-Year Return Under 7.25%	35.6%	35.4%	34.4%	70.6%	62.8%

Red shading denotes recommended decrease

Green shading denotes recommended increase

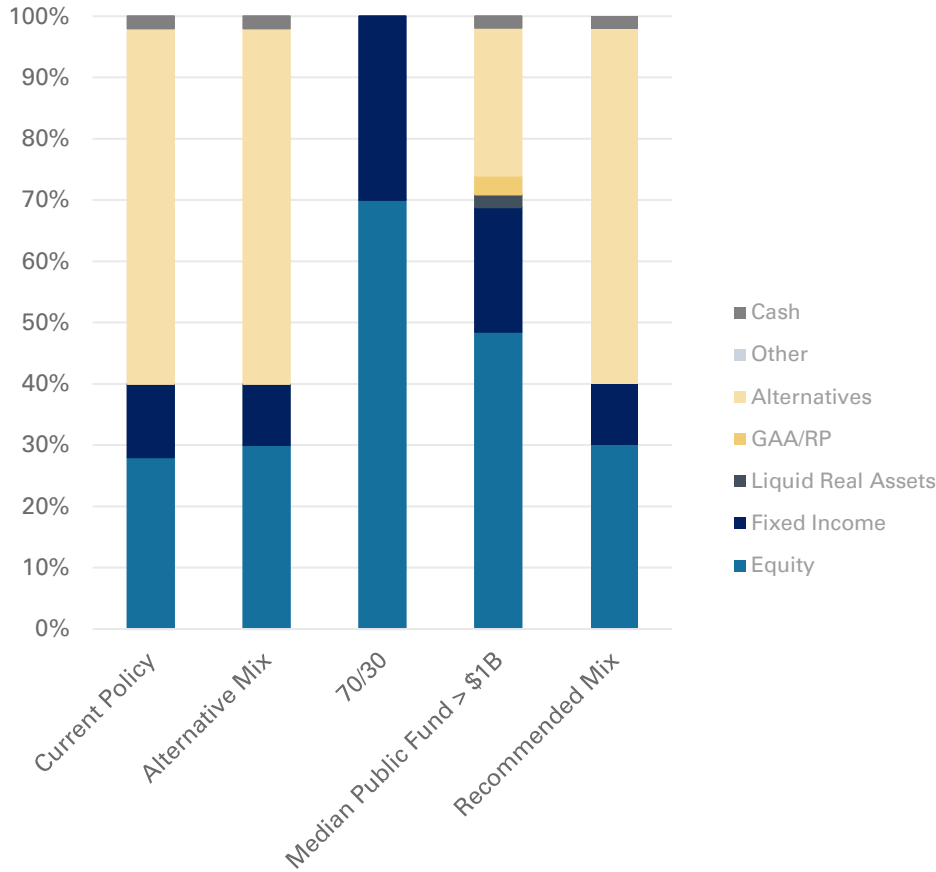
Note: Modeling used smoothed volatility



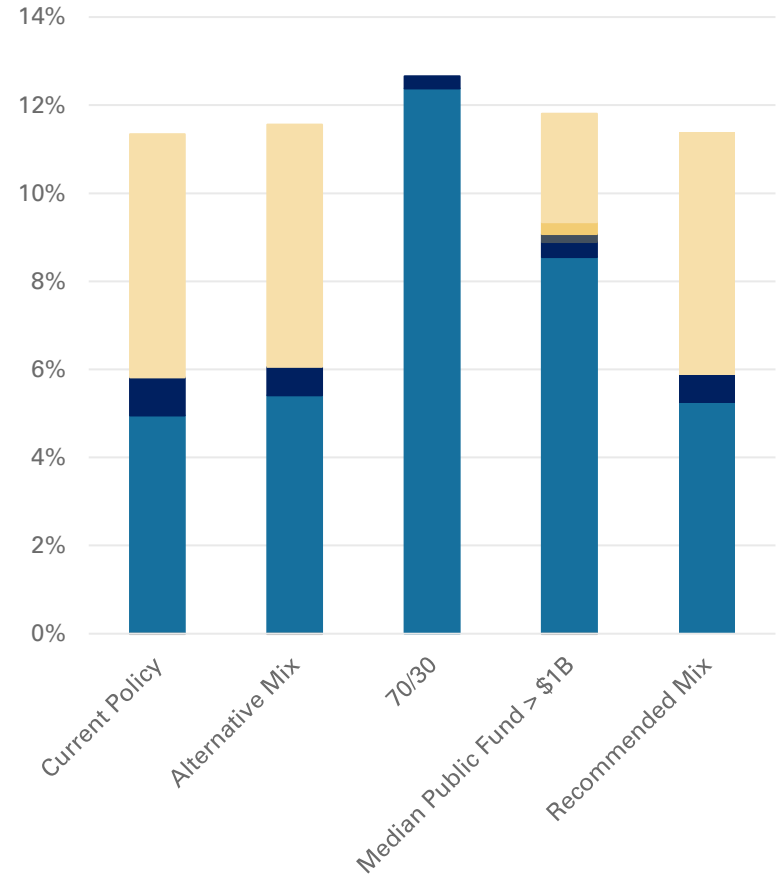
ASSET ALLOCATION

CAPITAL ALLOCATION VS RISK ALLOCATION

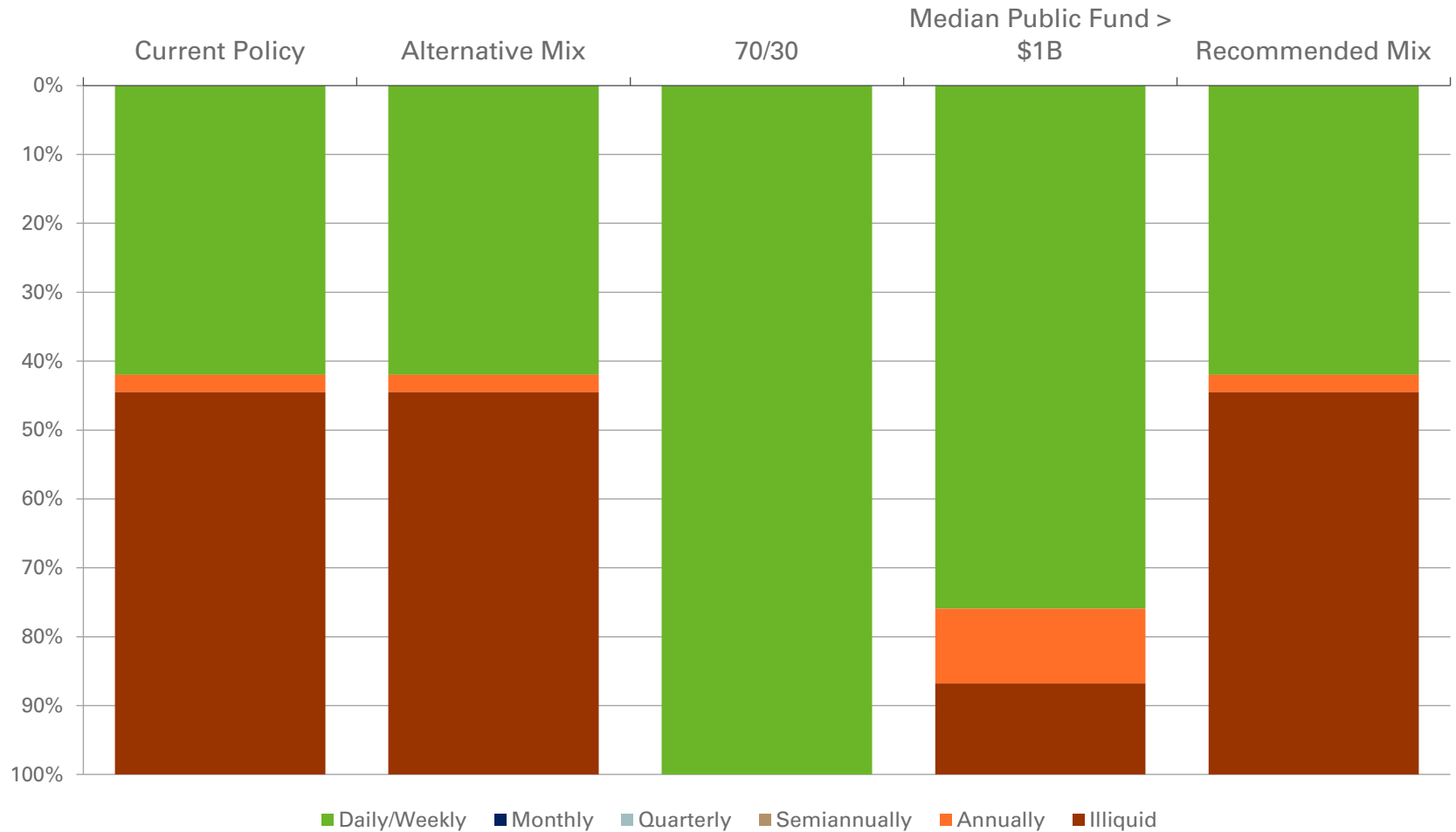
Asset Allocation By Asset Class



Asset Risk By Asset Class



LIQUIDITY PROFILES

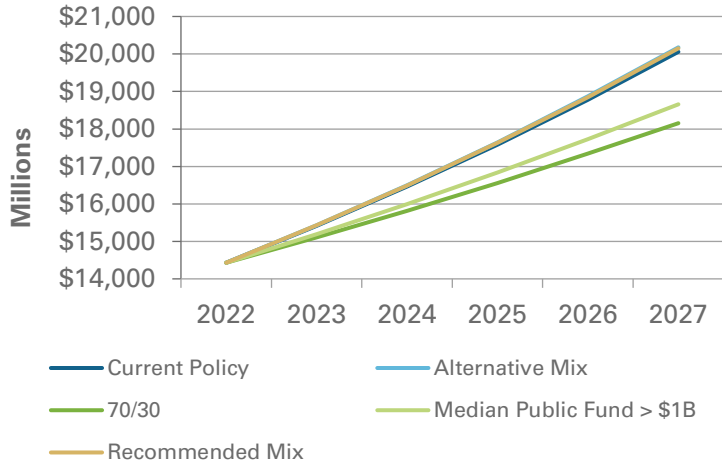


Note: Liquidity is assigned at the asset class level.

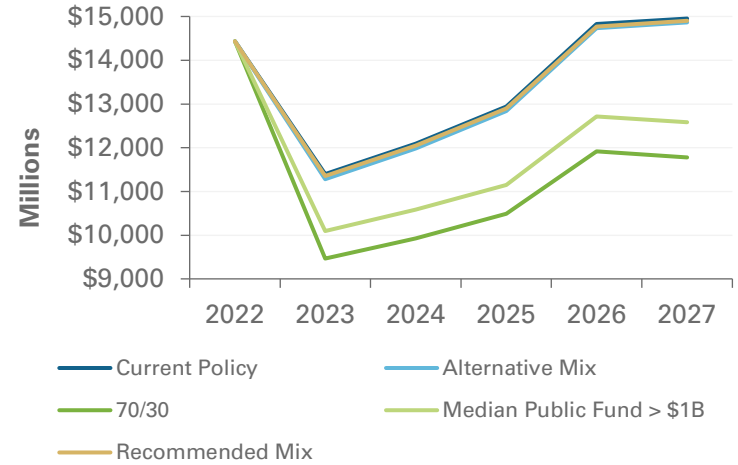


SCENARIO ANALYSIS

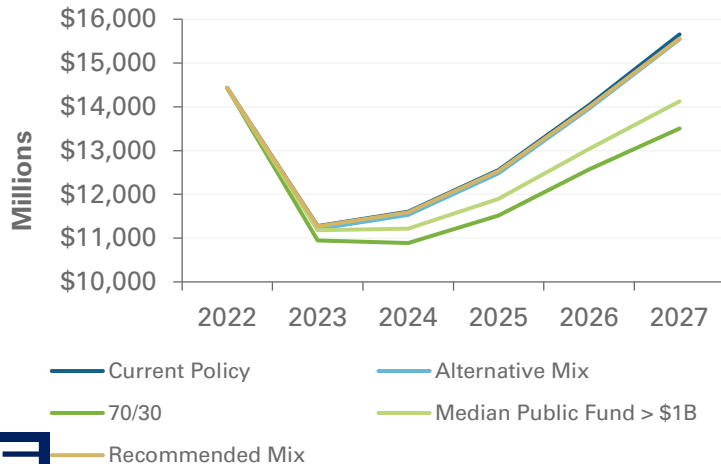
Base Case



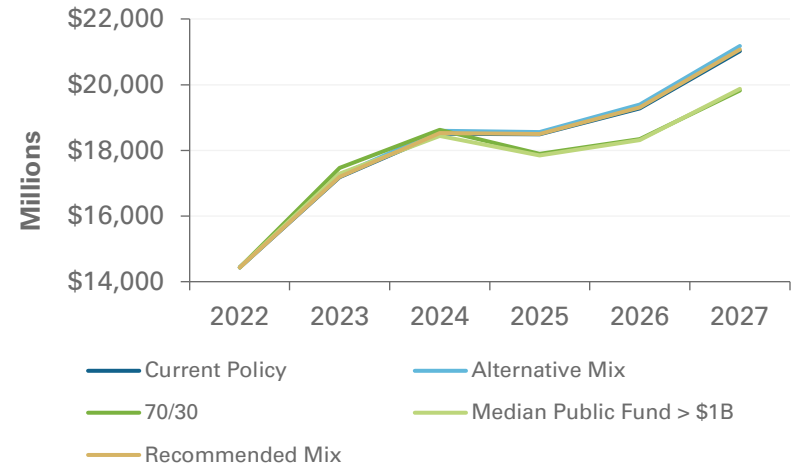
Stagflation



Recession



Expansion



KEY MARKET THEMES



NEPC KEY MARKET THEMES

- **Key Market Themes influence global markets and may remain relevant for an extended period with significant implications for capital markets**
- **Themes can be disrupted and incite outsized market volatility**
- **The introduction of a theme looks to identify the unique implications for asset allocation and portfolio implementation**
- **The conclusion of a theme alters market dynamics and NEPC's outlook**

NEPC CURRENTLY HAS FOUR KEY MARKET THEMES:

1

**Economic
Crossroads**

2

**Permanent
Interventions**

3

**Globalization
Backlash**

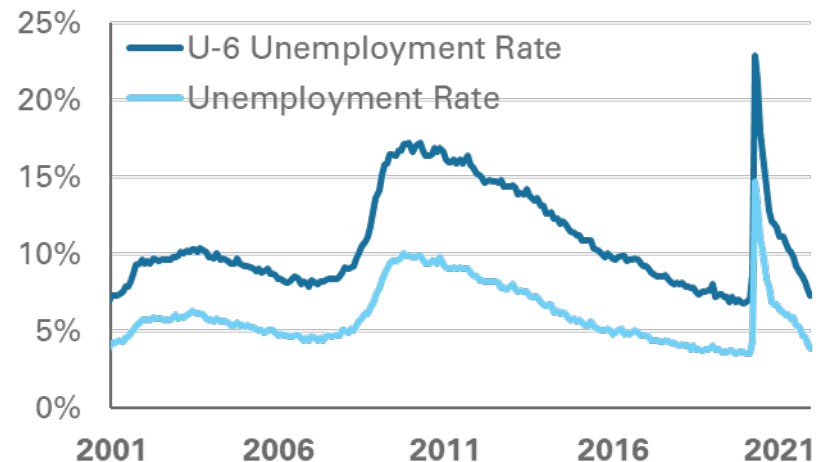
4

**China
Transitions**

CONCLUSION OF A KEY MARKET THEME

VIRUS TRAJECTORY

- **The Virus Trajectory theme sought to identify how the path of the COVID-19 pandemic and global economic activity would interact**
 - The core of the theme assessed the impact and scope of virus containment efforts relative to economic and capital market disruption
 - The distribution of COVID-19 vaccines shortened the timeline of the theme
- **The improvement in economic data, labor markets, and risk assets highlights the diminishing impact of Virus Trajectory on capital markets**



Sources: U.S. Department of Labor, OECD, FactSet

ASSESSING THE KEY MARKET THEMES

AS OF 12/31/21

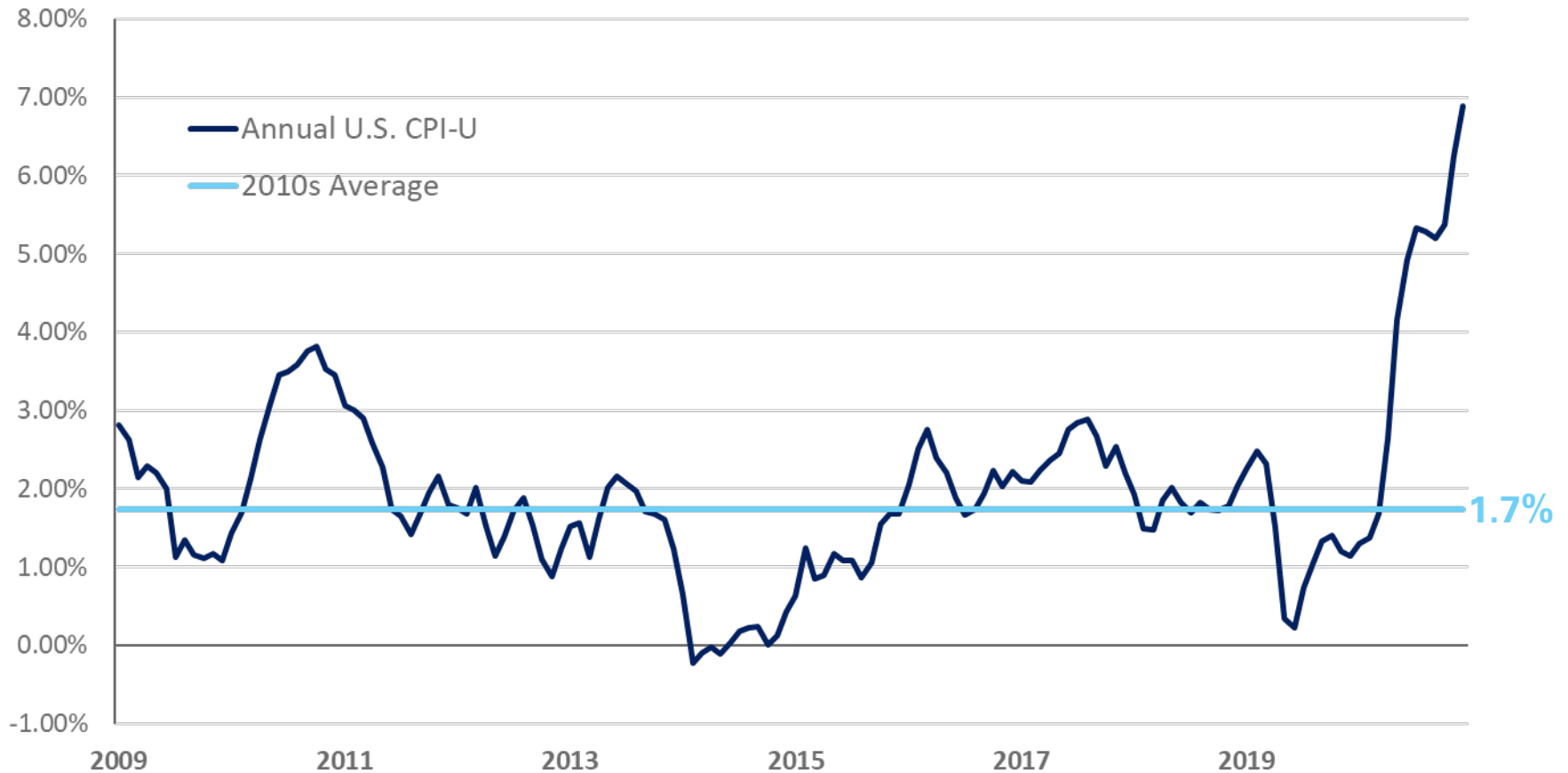
<p>Economic Crossroads</p> <p>Change in Status: -</p>	DORMANT	FADED	NEUTRAL	PREVALENT	DOMINANT
<p>Permanent Interventions</p> <p>Change in Status: <i>Prevalent to Faded</i></p>	DORMANT	FADED	NEUTRAL	PREVALENT	DOMINANT
<p>Globalization Backlash</p> <p>Change in Status: <i>Prevalent to Neutral</i></p>	DORMANT	FADED	NEUTRAL	PREVALENT	DOMINANT
<p>China Transitions</p> <p>Change in Status: -</p>	DORMANT	FADED	NEUTRAL	PREVALENT	DOMINANT

MACROECONOMIC



HEADLINE INFLATION INCREASED DURING 2021

ANNUAL U.S. CPI-U

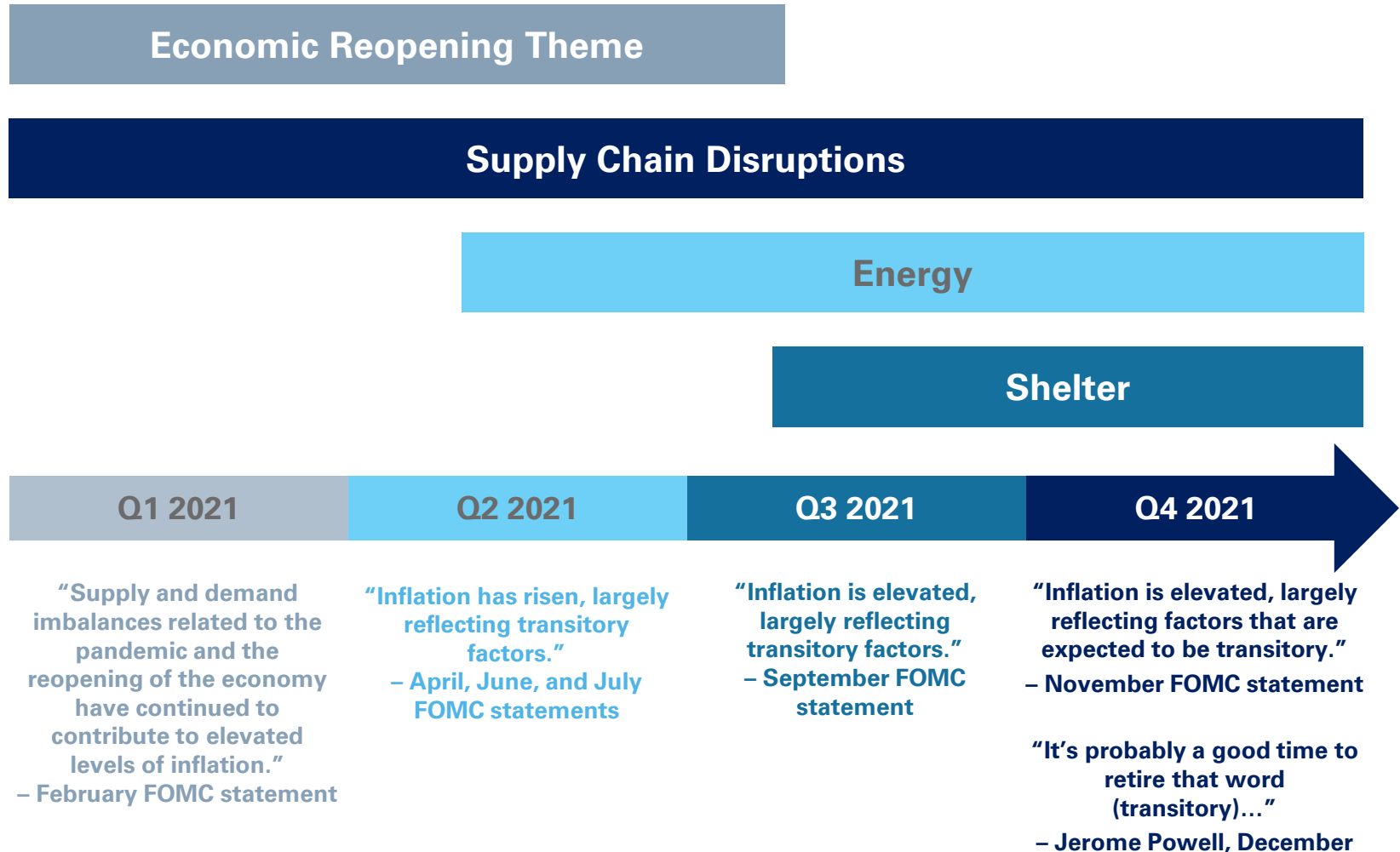


Notes: Data as of 11/30/2021
Sources: Bureau of Labor Statistics, FactSet



WHAT HAS CAUSED THE UPTICK IN INFLATION?

THE INFLATION NARRATIVE HAS EVOLVED THROUGHOUT 2021

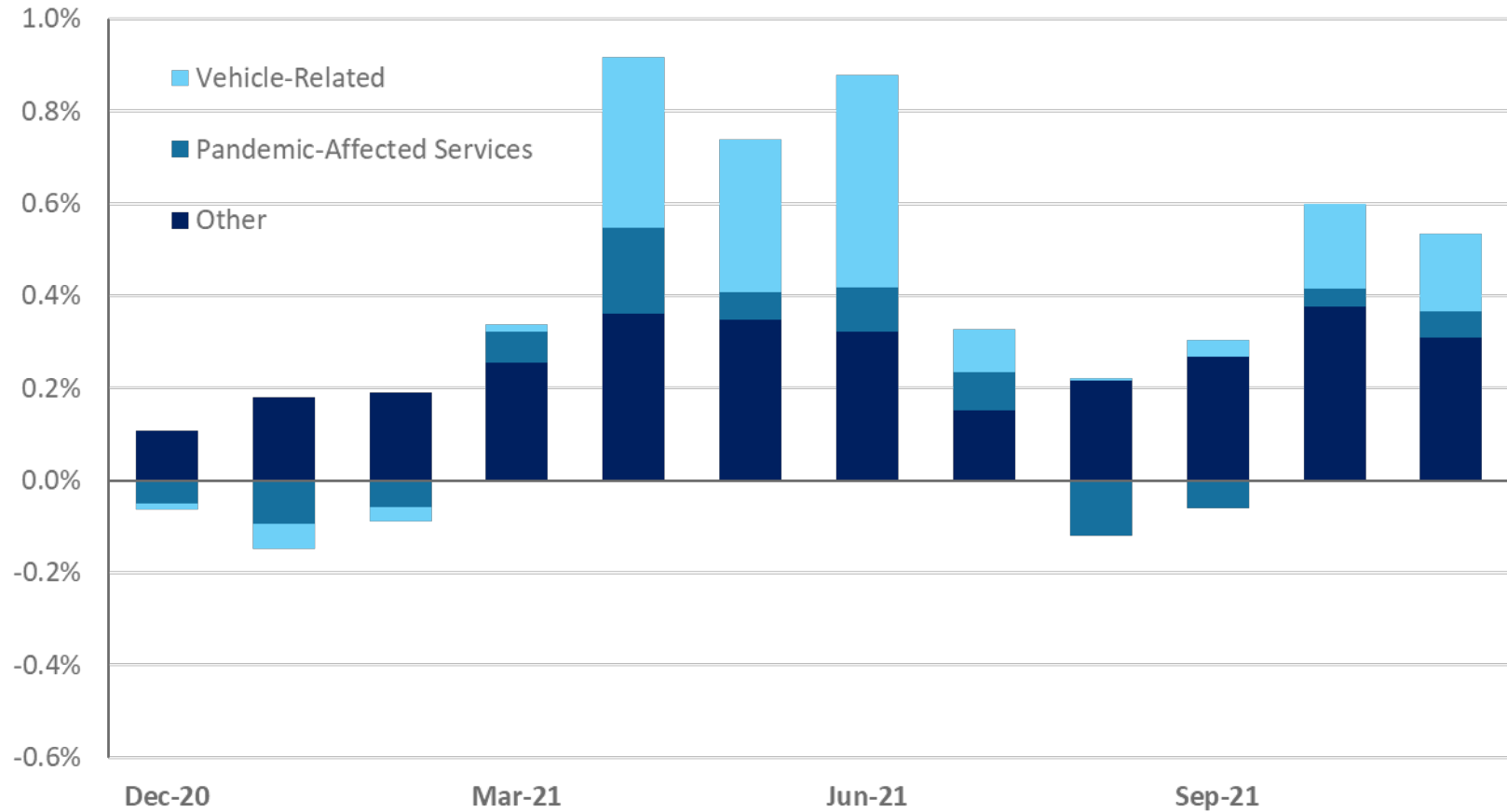


Source: Federal Reserve



SOME TRANSITORY FACTORS HAVE WANED...

CONTRIBUTION TO MONTHLY CORE CPI-U

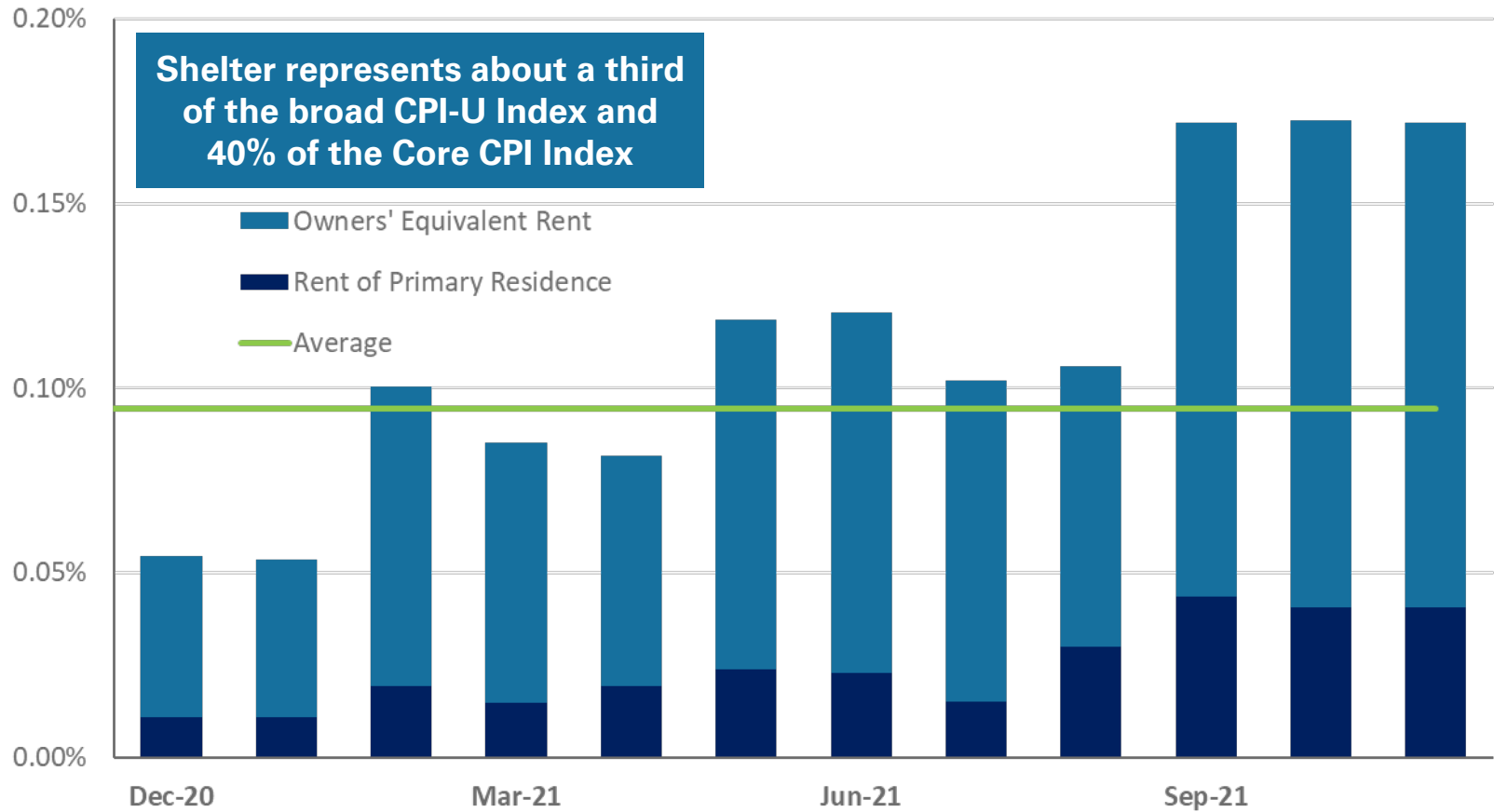


Notes: Vehicle-Related includes New Vehicles, Used Cars & Trucks, and Motor Vehicle Parts. Pandemic-Affected Services includes Airfare, Hotels, and Admissions to Events. As of 11/30/2021
 Source: Bureau of Labor Statistics, FactSet, NEPC



...WHILE STICKIER FACTORS MAY BE ON THE RISE

CONTRIBUTION OF SHELTER TO MONTHLY CORE CPI-U



Notes: Average calculated 12/31/2019-11/30/2021
 Sources: Bureau of Labor Statistics, FactSet, NEPC



SUPPLY CONSTRAINTS ARE IMPACTFUL

RETAILERS: INVENTORY-TO-SALES RATIO

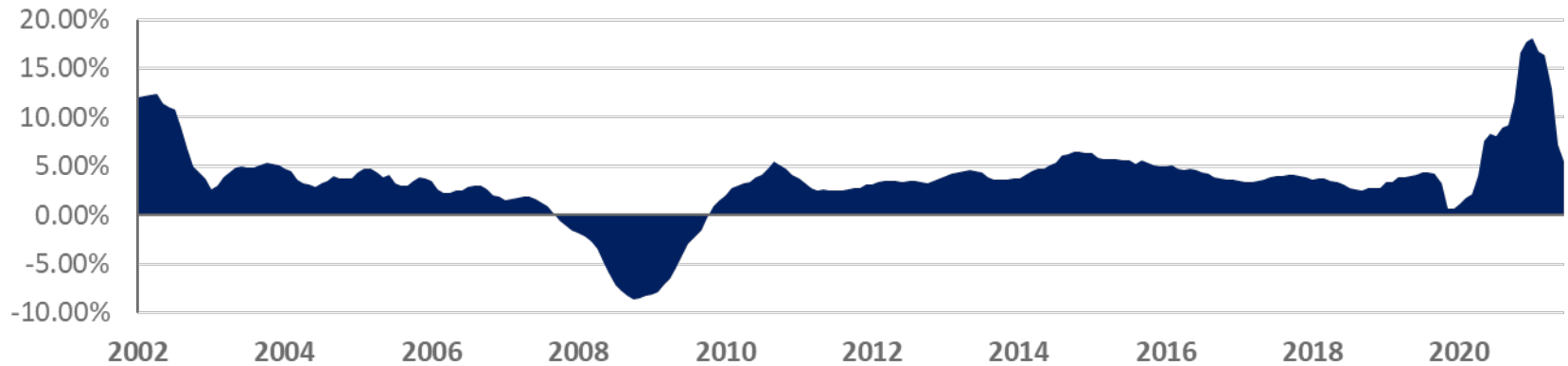


Sources: U.S. Census Bureau, FactSet

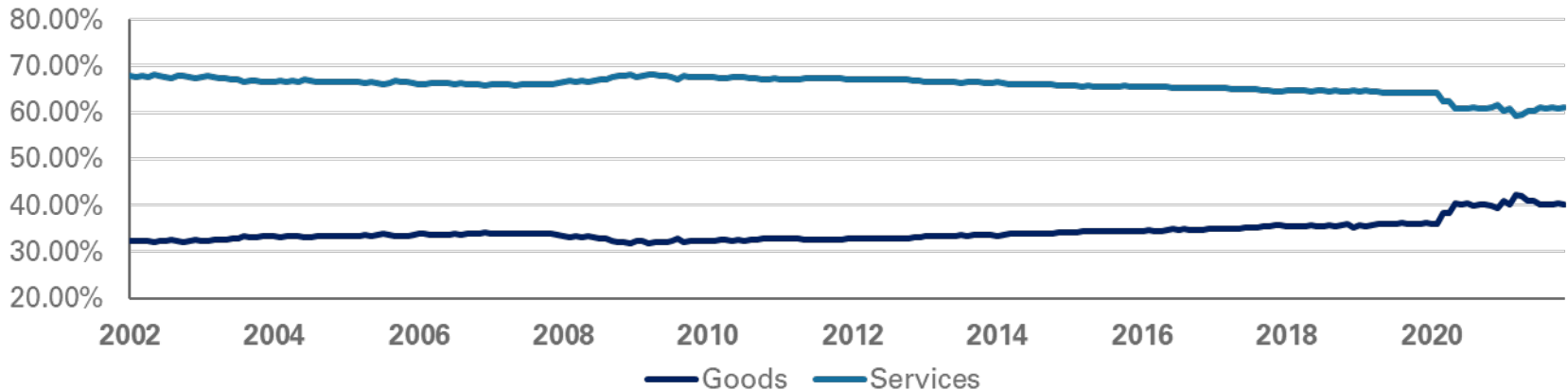


BUT A SURGE IN DEMAND IS ALSO CONTRIBUTING

ANNUAL CHANGE IN U.S. RETAIL SALES (6-MONTH AVERAGE)

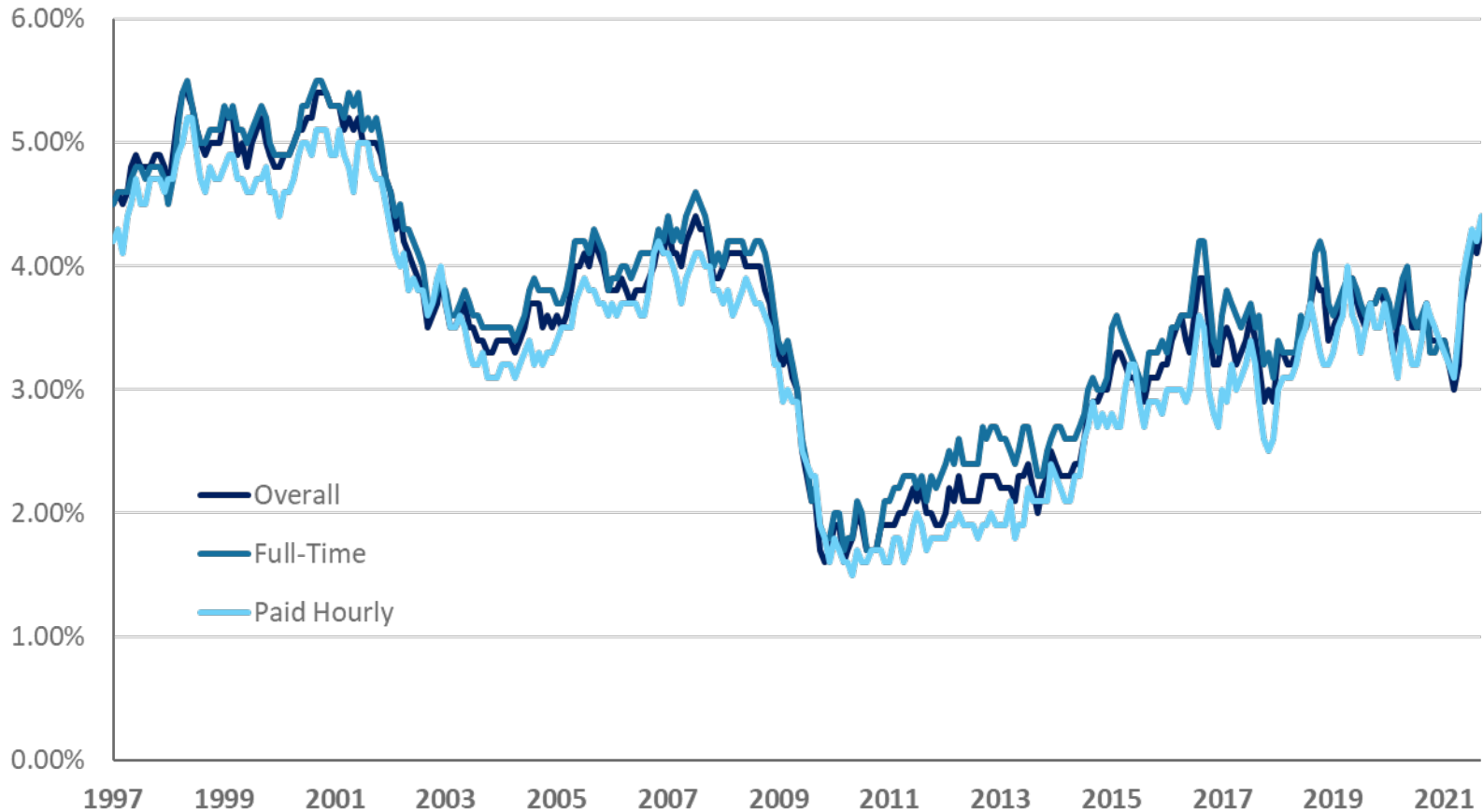


REAL PERSONAL CONSUMPTION EXPENDITURES



WAGES ARE AN OUTSTANDING QUESTION

THREE-MONTH MOVING AVERAGE OF MEDIAN WAGE GROWTH



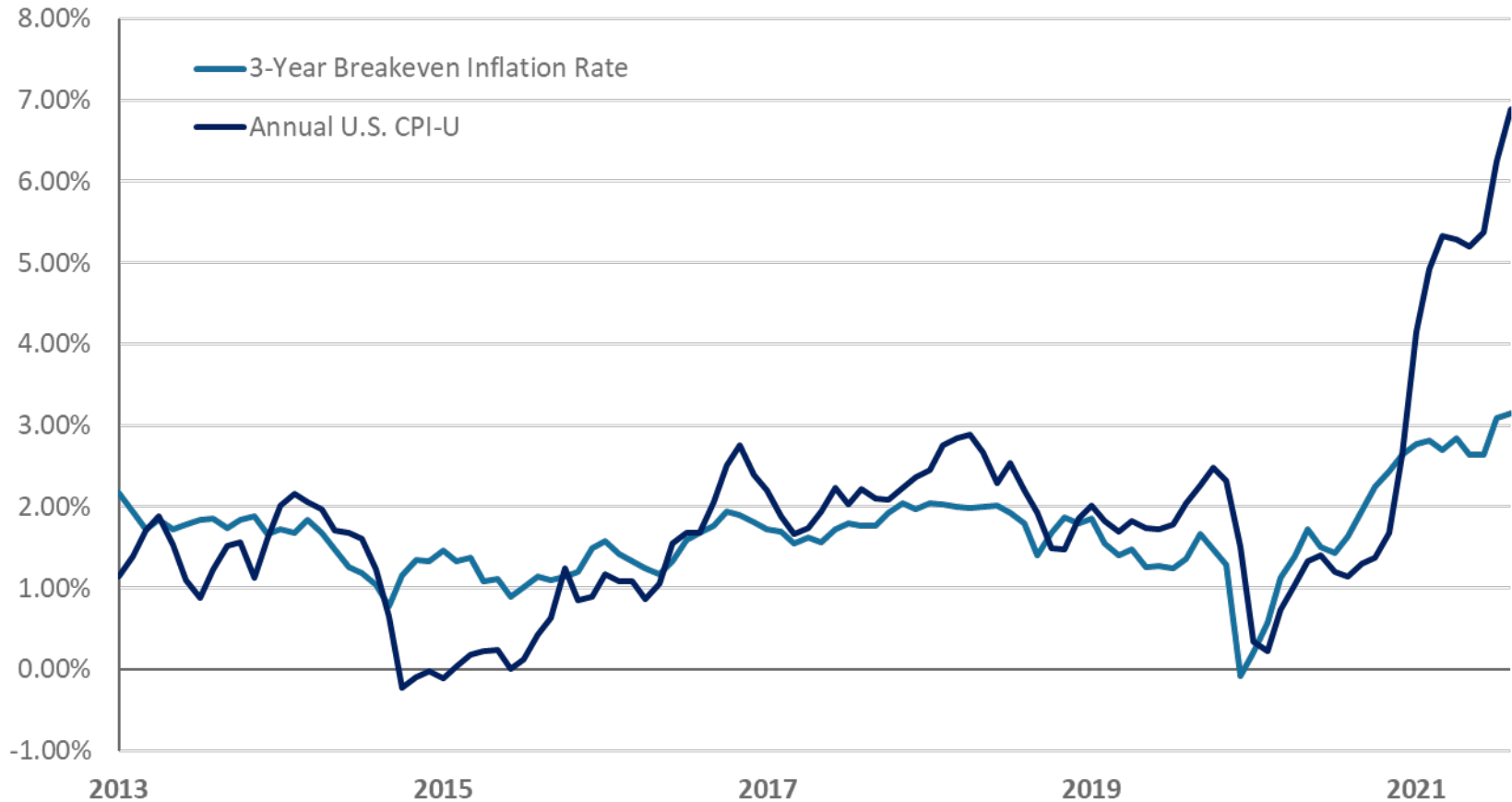
Notes: Represents hourly data; <https://www.atlantafed.org/chcs/wage-growth-tracker>; As of 11/30/2021

Sources: Current Population Survey, Bureau of Labor Statistics, and Federal Reserve Bank of Atlanta Calculations



MARKETS HAVE NOT PRICED IN HIGHER INFLATION

U.S. BREAKEVEN INFLATION RATES VERSUS REALIZED INFLATION



Sources: U.S. Department of Labor, FactSet



INFLATION ASSUMPTIONS

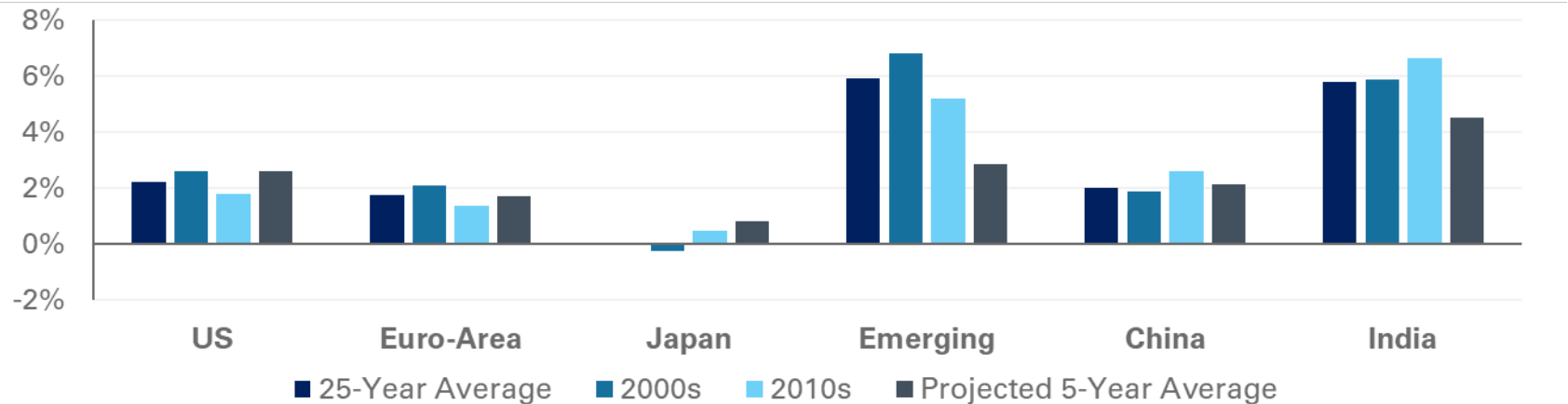
OVERVIEW

- **Inflation is a key building block to develop asset class assumptions**
- **Inflation assumptions are model-driven and informed by multiple inputs for both the U.S. and global assets**
 - Includes forecasts from international organizations (e.g. IMF), local consumer and producer price indices, global interest rate curves, and break-even inflation expectations
- **NEPC's U.S. expectations reflect stickier inflation over the near-term, but more muted inflation pressures over the long-term**
 - We anticipate continued volatility among inflation measures as market-based inflation expectations diverge from current consumer inflation metrics

Region	10-Year Inflation Assumption	30-Year Inflation Assumption
United States	2.4%	2.6%

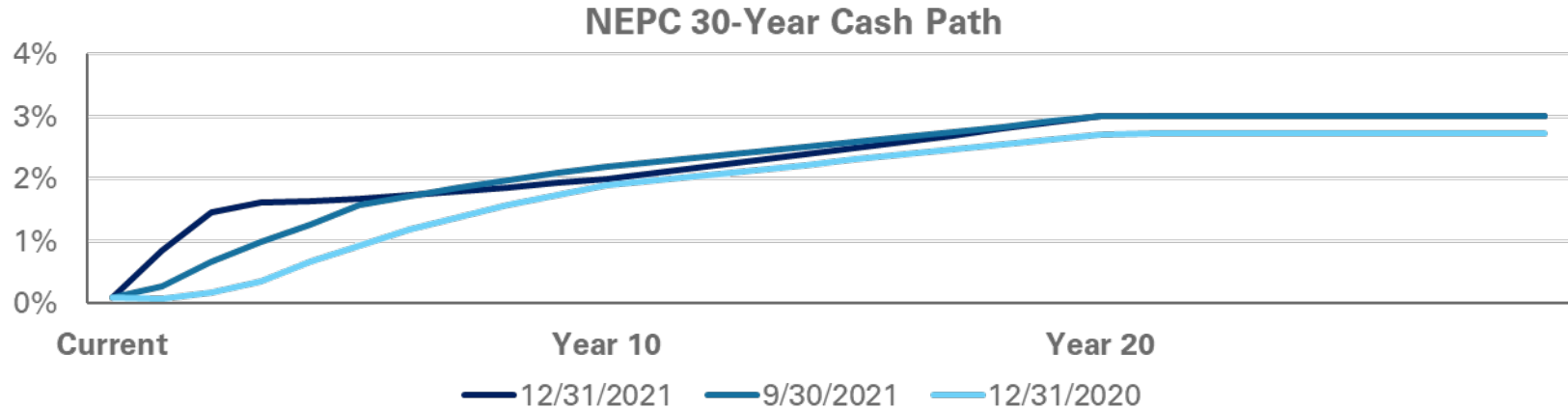
GLOBAL INFLATION

HISTORICAL INFLATION



- **Near-term inflation levels are likely to be elevated relative to central bank inflation targets**
 - Long-term inflation assumptions are subdued and reflect market-based break-even inflation expectations
- **Emerging market inflation levels are diverging but generally remain above the developed world**

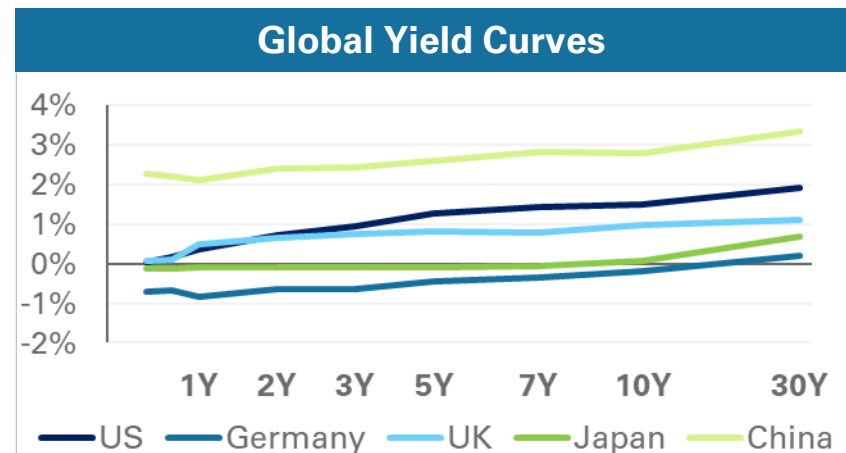
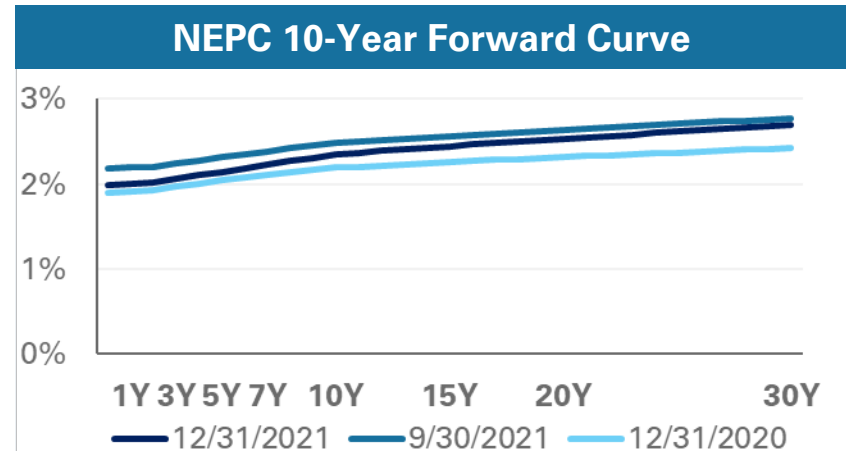
U.S. CASH EXPECTATIONS



- **Cash is a foundational input for all asset class return expectations**
 - Cash + risk premia is an input for long-term asset class return projections
- **Cash assumptions reflect inflation and real interest rates**
- **U.S. nominal rate forecasts reflect a more aggressive rate hike path in the near-term, though long-term expectations remain subdued relative to history**

GLOBAL INTEREST RATE EXPECTATIONS

- **Negative real yields reflect easy monetary policy conditions**
 - Low real rates depress returns for all assets in the long-term
- **The Fed’s easy policy and muted long-term inflation expectations suppress bond yield forecasts**
- **The outlook remains poor for bonds in Japan and Europe due to negative nominal yields**
- **Emerging market real rates and nominal interest rates are higher relative to the developed world**



Sources: FactSet, NEPC

PUBLIC EQUITY



PUBLIC EQUITY ASSUMPTIONS

OVERVIEW

- **A cyclical upswing in growth and inflation continues to support risk asset sentiment and equity valuations in the face of rising interest rates**
- **Equity valuation multiples are sensitive to higher nominal rates, though inflation can positively impact nominal revenues and earnings**
- **Look to maintain strategic equity targets as positive cyclical factors continue to support elevated valuations**
- **We recommend that strategic asset allocation targets for emerging market equity reflect an overweight compared to the MSCI ACWI IMI**
 - The return assumption for emerging equity is highest among public equity and we recommend using non-U.S. developed equity as the funding source
- **NEPC encourages a bias to small-cap with the use of active investment managers relative to small-cap exposure in the MSCI ACWI IMI**

PUBLIC EQUITY ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Valuation	Represents P/E multiple contraction or expansion relative to long-term trend
Inflation	Market-specific inflation based on country-level revenue exposure
Real Earnings Growth	Market-specific real growth based on a weighted-average of country revenue exposure and GDP growth
Dividend Yield	Income distributed to shareholders adjusted to reflect market trends

Asset Class	12/31/21 10-Yr Return	12-Month Change
U.S. Large-Cap Equity	4.3%	-1.1%
U.S. Small/Mid-Cap Equity	5.6%	-0.1%
U.S. Microcap Equity	6.5%	-0.1%
Non-U.S. Developed Equity	5.2%	-0.7%
Non-U.S. Developed Small-Cap Equity	5.9%	-0.2%
Emerging Market Equity	8.3%	+0.8%
Emerging Market Small-Cap Equity	7.6%	-0.5%
China Equity	8.8%	+1.8%
Absolute Return - Equity	4.1%	+0.1%
Global Equity*	5.4%	-0.8%
Private Equity*	9.8%	-0.4%

Source: NEPC

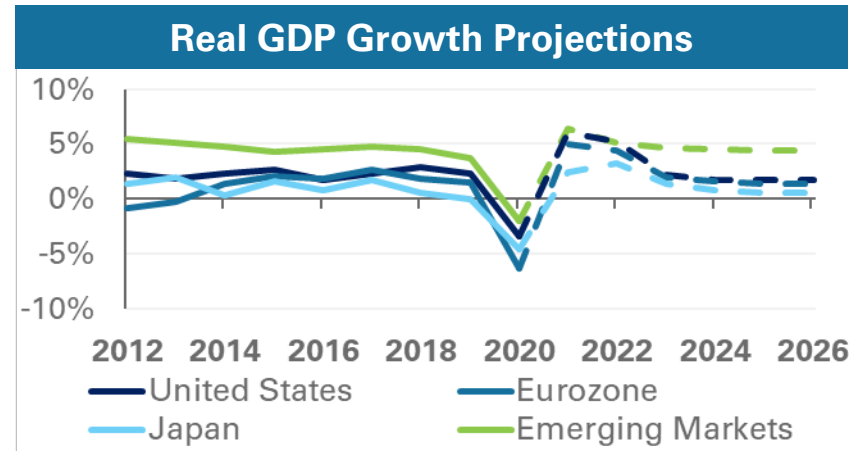
*Calculated as a blend of other asset classes



PUBLIC EQUITY

REAL EARNINGS GROWTH

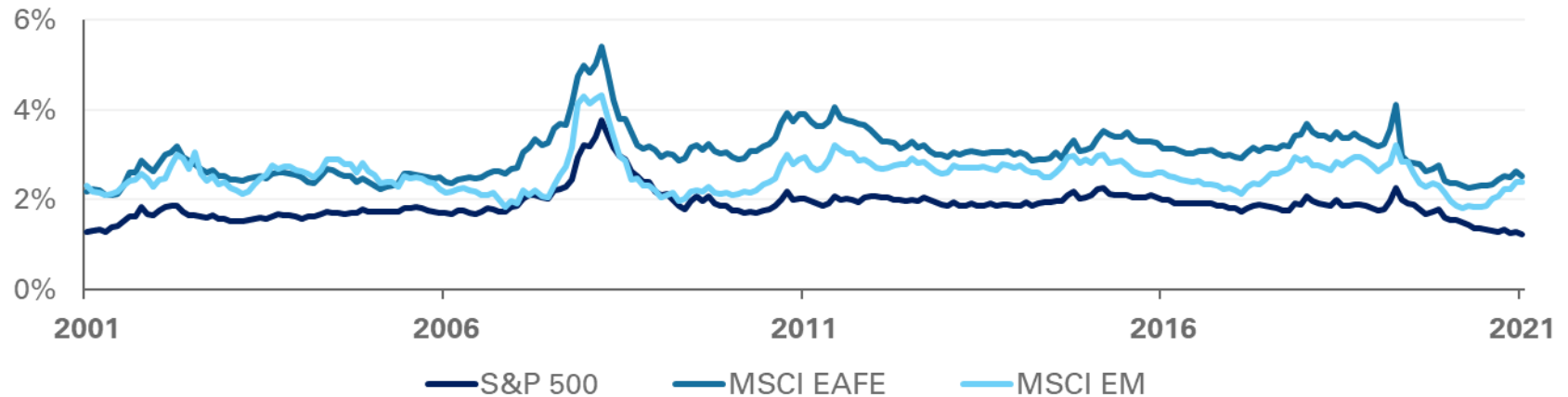
- **Global growth rates reflect the continued impact of COVID-19**
- **Regions reliant on revenue from emerging markets are forecasted to enjoy higher earnings growth**
 - Non-U.S. stocks benefit from a greater portion of revenue from EM than U.S. stocks
- **We expect elevated real earnings growth for small-caps over the long-term relative to large-cap**
 - Over the long-term we expect a forward-looking risk premium for small-cap and mid-cap equities relative to large-cap stocks



Sources: IMF, MSCI, FactSet, NEPC

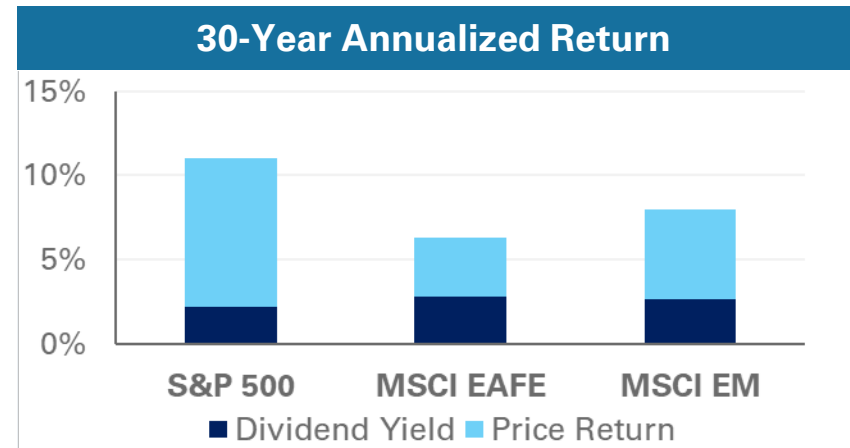
PUBLIC EQUITY

DIVIDEND YIELD



- Non-U.S. equities provide higher dividend yields relative to the U.S. over the long-term**

- Terminal value dividend yield inputs for MSCI EM and EAFE are 2.5% and 3.0%
 - Terminal value dividend yield input for S&P 500 is 2.50%



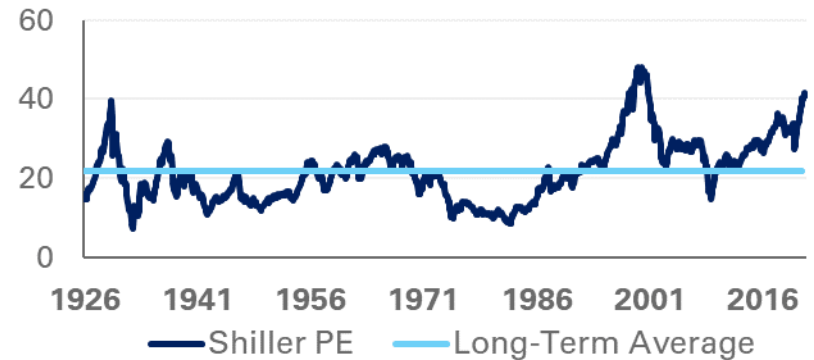
Sources: S&P, MSCI, FactSet

PUBLIC EQUITY

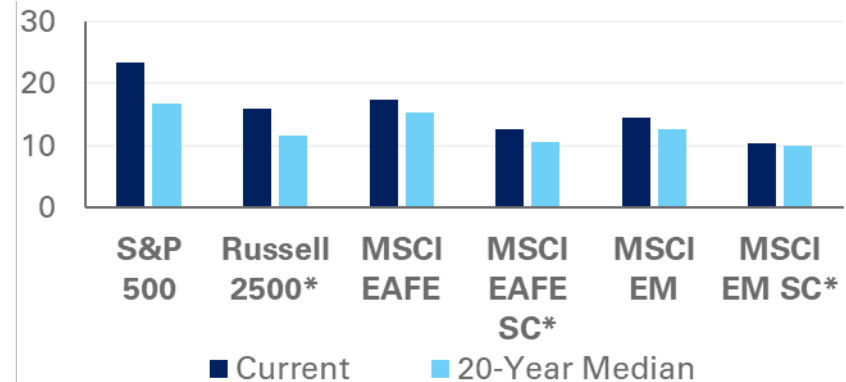
VALUATION

- **U.S. stock valuations are high relative to long-term averages**
- **P/E terminal value inputs are elevated for the U.S. and reflect a positive macroeconomic backdrop**
- **EAFE P/E inputs reflect more subdued market sentiment levels**
- **Emerging market stocks offer an elevated total return opportunity relative to developed markets**

S&P 500 Shiller PE Ratio



Trailing PE Relative Median



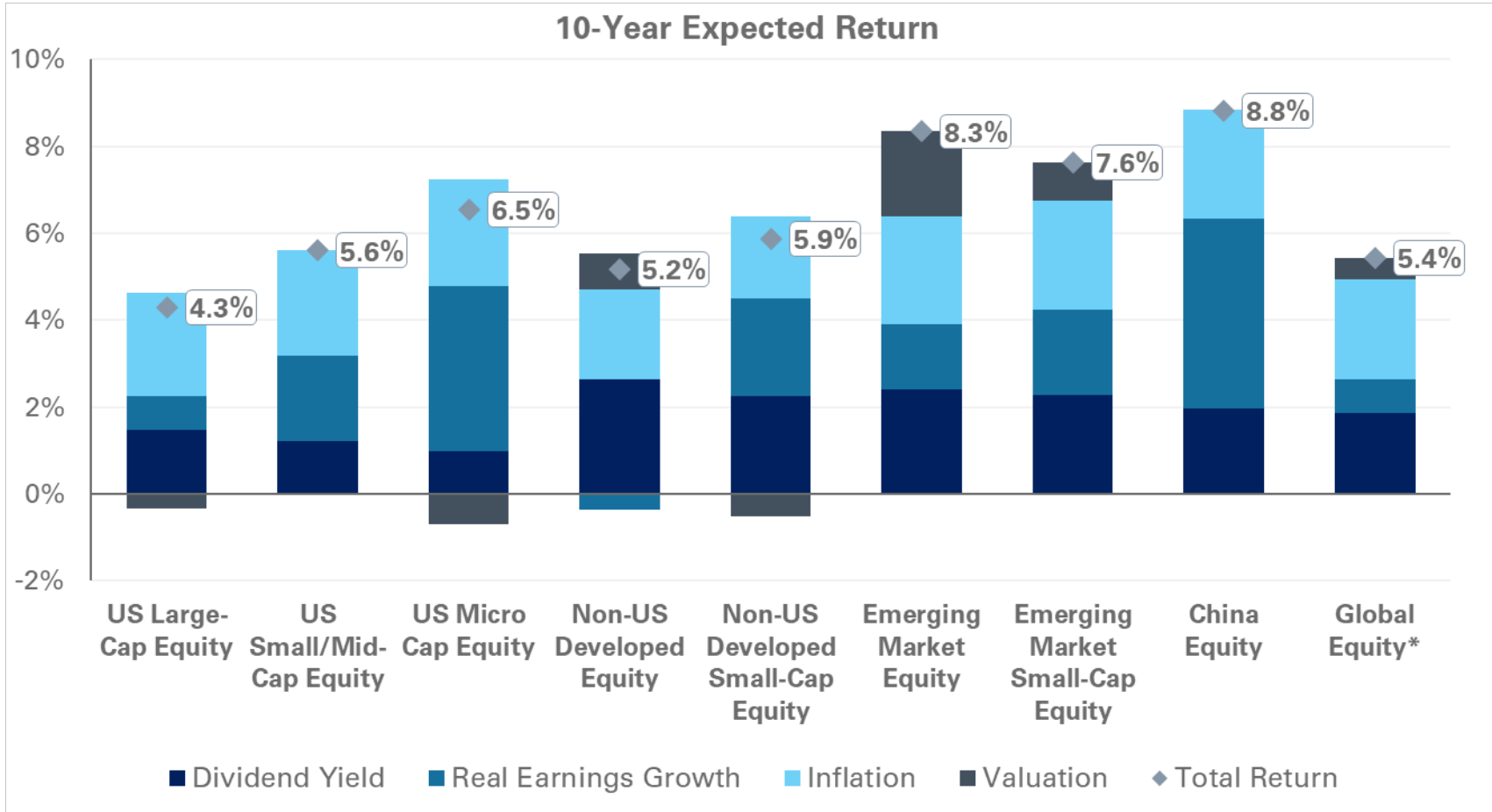
Sources: S&P, Shiller, Russell, MSCI, FactSet, NEPC; Shiller PE long-term average beginning in 1926

Note: *Small cap indices valuations based on EV/EBITDA multiples; MSCI EM Small Cap median calculated since 3/31/2003



PUBLIC EQUITY

BUILDING BLOCKS



Source: NEPC
 *Calculated as a blend of other classes



FIXED INCOME



FIXED INCOME ASSUMPTIONS

OVERVIEW

- **Fixed income return assumptions reflect a transition to tighter monetary policy in the near-term to offset recent inflationary pressures**
- **We endorse a dedicated Treasury allocation for liquidity, downside protection, and fee savings, despite the low return expectations**
- **Safe-haven fixed income exposure will differ by investor objective**
 - The fixed income asset-type and duration profile should reflect portfolio objectives, asset-liability glide path, and desire for capital efficiency
- **The use of return-seeking credit investments requires a more dynamic posture to manage shifts in credit spreads and market cycles**
 - A strategic blend of 50% high yield, 25% levered loans, and 25% blended EMD offers an improved strategic beta profile for return-seeking credit

FIXED INCOME ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Government Rates Price Change	Change due to shifts in current yields relative to forecasted rates
Credit Deterioration	The average loss for credit assets due to defaults and recovery rates
Spread Price Change	Valuation change due to changes in credit spreads relative to long-term targets
Credit Spread	Yield premium provided by securities with credit risk
Government Rates	The yield attributed to sovereign bonds that do not have credit risk

Asset Class	12/31/21 10-Yr Return	12-Month Change
U.S. TIPS	1.4%	+0.4%
U.S. Treasury Bond	1.5%	+0.6%
U.S. Corporate Bond	2.8%	+0.6%
U.S. MBS	1.8%	+0.6%
U.S. High Yield Corporate	3.2%	+0.3%
U.S. Leveraged Loan	4.7%	+0.8%
EMD External Debt	4.1%	+1.1%
EMD Local Currency Debt	5.7%	+0.7%
Non-U.S. Govt. Bond	1.1%	+0.5%
Absolute Return – Credit	4.2%	+0.3%
U.S. Aggregate Bond*	2.0%	+0.6%
Private Credit*	6.5%	+0.5%

Source: NEPC

*Calculated as a blend of other asset classes

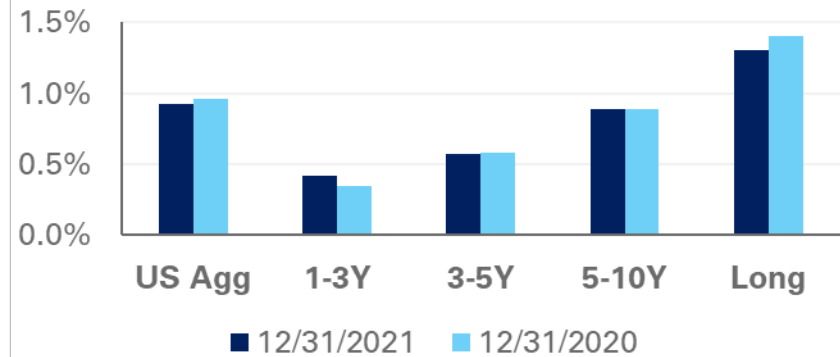


FIXED INCOME

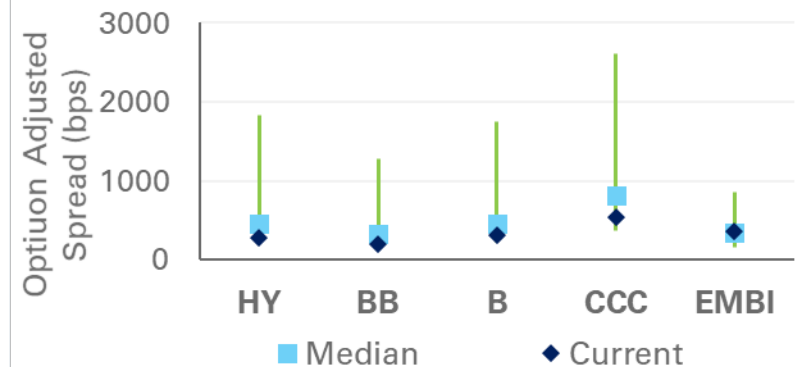
CREDIT SPREADS

- **Credit spreads are broadly below long-term medians**
- **Lower credit spread levels reduce future return expectations**
- **Credit spread assumptions reflect potential disruption**
 - With a record number of BBB rated corporates, fallen angel downgrades are a greater risk
- **Default and recovery rates are informed by long-term history**

U.S. Corporate OAS by Maturity



Return-Seeking Credit Spreads



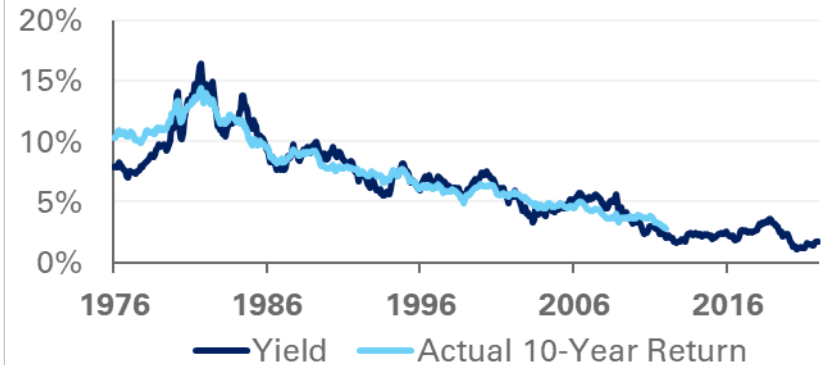
Sources: Barclays, JPM, FactSet, NEPC; Spread medians as of 12/31/2000

FIXED INCOME

GOVERNMENT RATES

- **Government rates price change reflects shifts in interest rates, the yield curve, and roll down**
 - Roll down refers to the price change due to the aging of a bond along the yield curve
- **Expectations for rising rates are a headwind for return expectations**
 - However, higher interest rates boost the long-term return due to the increased yield benefit
- **A steep yield curve relative to forward interest rates can offer relief from rising rates**

Barclays U.S. Aggregate Bond



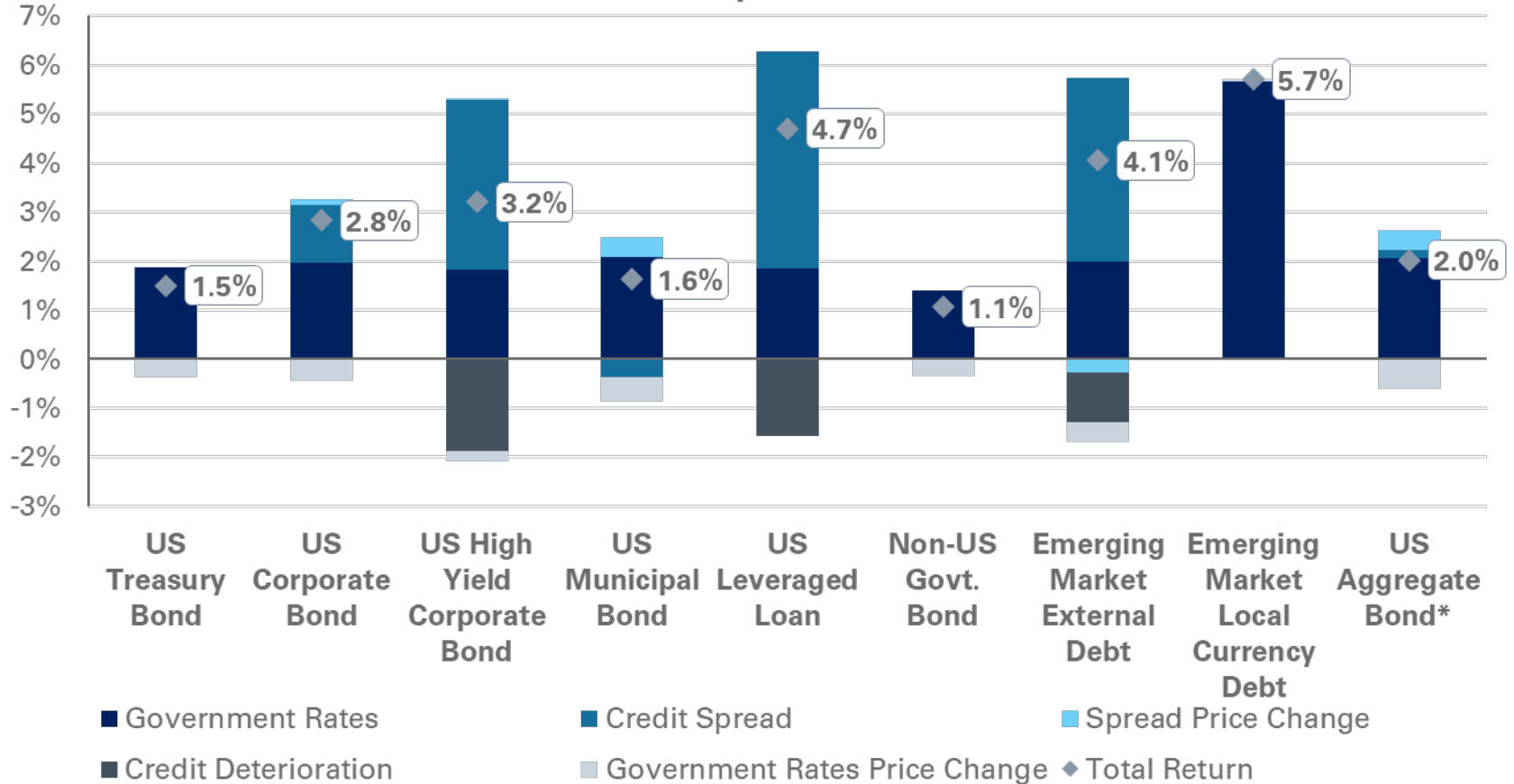
Annual Change in Treasury Yields



FIXED INCOME

BUILDING BLOCKS

10-Year Expected Return



Source: NEPC

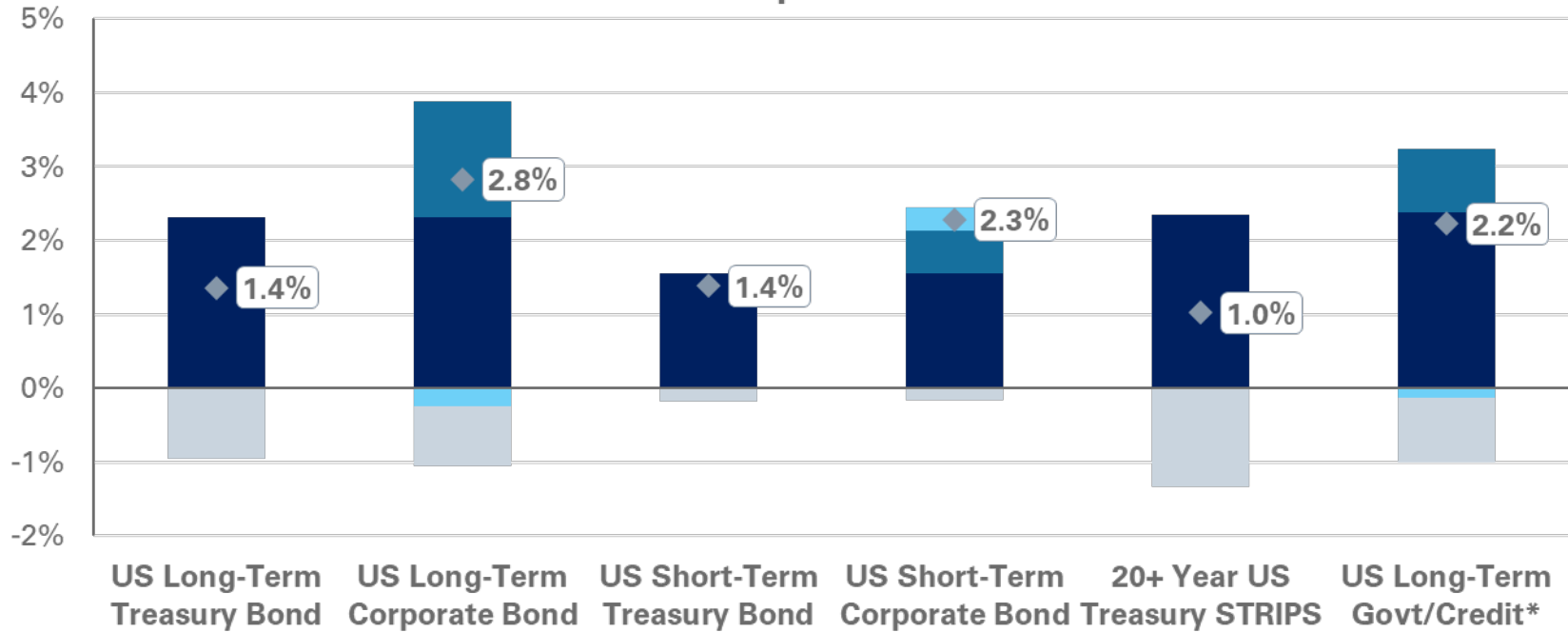
*Calculated as a blend of other classes



FIXED INCOME

BUILDING BLOCKS

10-Year Expected Return



- Government Rates
- Credit Deterioration
- Credit Spread
- Government Rates Price Change
- Spread Price Change
- ◆ Total Return

Source: NEPC
 *Calculated as a blend of other classes



ALTERNATIVE ASSETS



ALTERNATIVE ASSETS

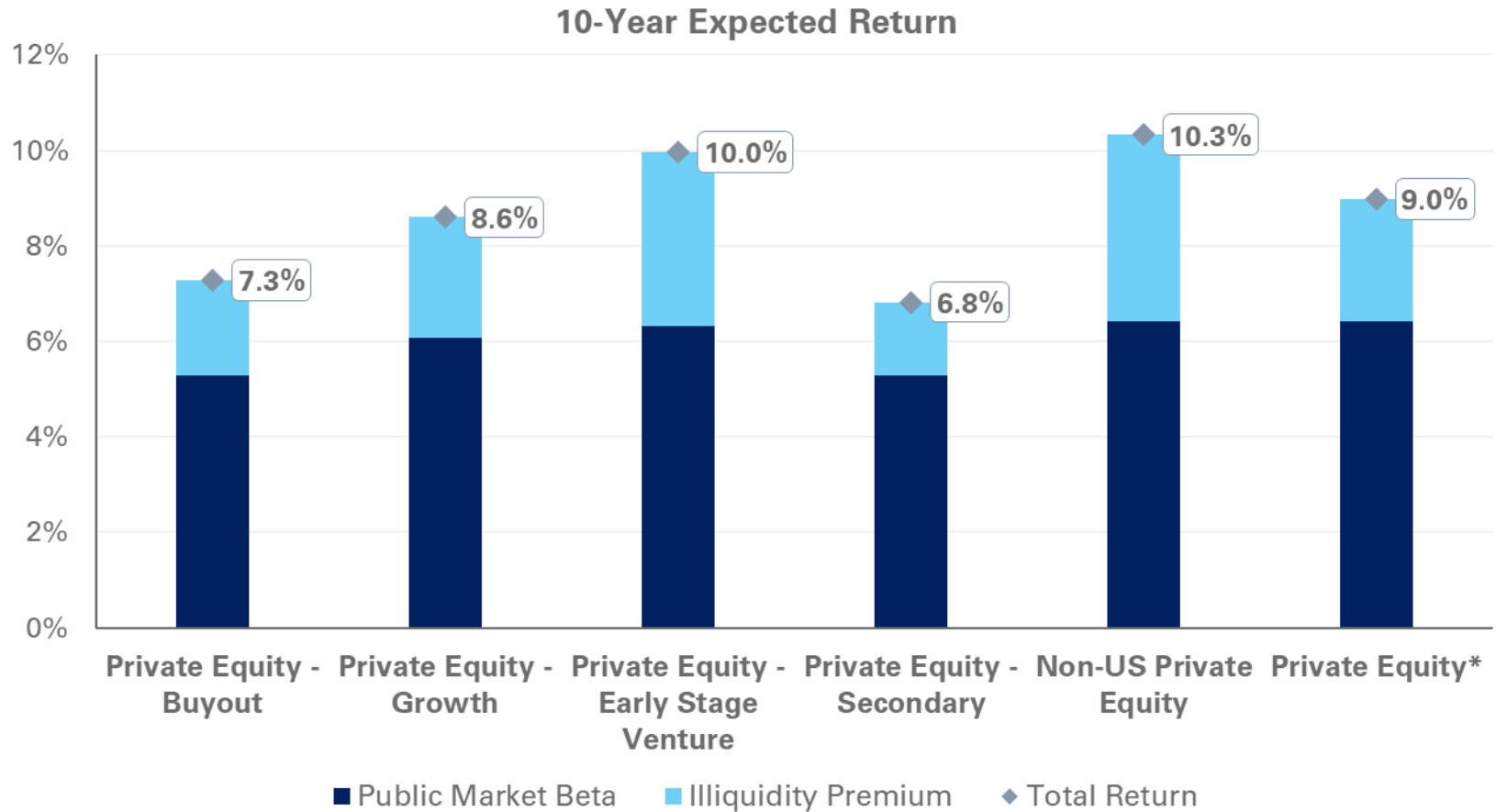
METHODOLOGY



- **Private market assumptions are constructed from betas to public markets with an added illiquidity premia**
 - Historically, the observed illiquidity premium has been a significant component driving private market returns
- **Absolute Return assumptions are constructed from betas to public markets with an added alpha assumption**

PRIVATE EQUITY

BUILDING BLOCKS



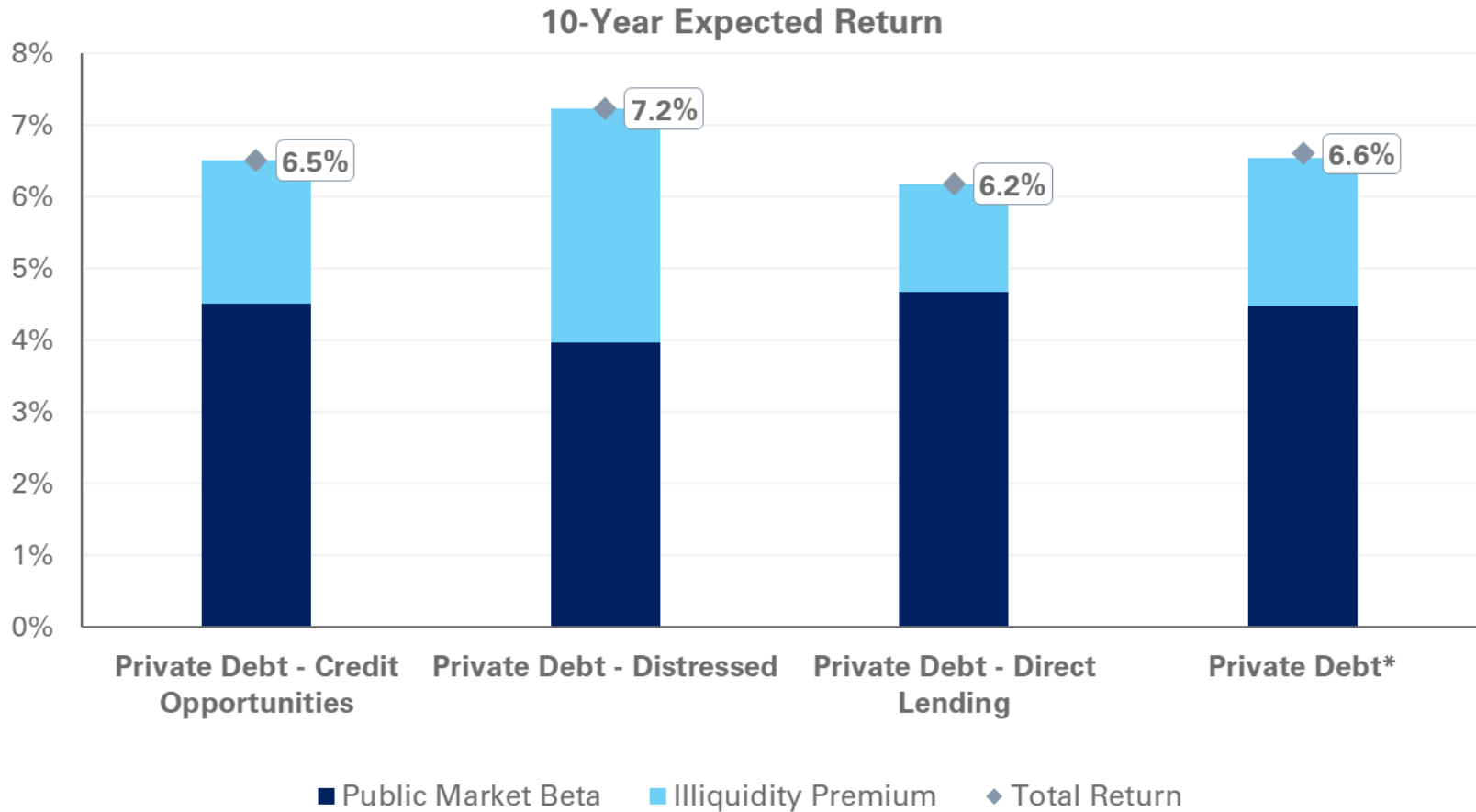
Source: NEPC

*Private Equity is a derived composite of 34% U.S. Buyout, 34% U.S. Growth, 8.5% U.S. Secondary, 8.5% U.S. Venture, 15% Non-U.S. PE



PRIVATE DEBT

BUILDING BLOCKS



Source: NEPC

*Private Debt is a derived composite of 25% Mezzanine, 25% Distressed, 50% Direct Lending



REAL ASSET ASSUMPTIONS

OVERVIEW

- **The strategic outlook for real assets reflects a high level of uncertainty due to the potential for near-term inflation volatility and subdued long-term inflation expectations**
- **Real assets offer a meaningful portfolio diversification benefit, but are sensitive to a wide range of potential inflation scenarios**
- **Real assets exhibit different betas to inflation and each asset class is exposed to various economic factors**
 - Diversification and correlation benefits are helpful to a portfolio but must be carefully considered relative to the expected risk premium
- **Inflation-sensitivity and portfolio objectives influence an investor's strategic allocation to real assets**
 - We encourage investors to remove commodity futures from strategic targets as we expect negative roll yields will persist over the long-term

REAL ASSET ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Valuation	The change in price of the asset moving to a terminal value or real average level
Inflation	Based on the inflation path as defined by breakeven-inflation rates and NEPC assumptions
Growth	Market-specific real growth based on a weighted-average of country-level revenue exposure and GDP growth
Real Income	The inflation-adjusted income produced by the asset

Asset Class	12/31/21 10-Yr Return	12-Month Change
Commodity Futures	0.4%	-0.5%
Midstream Energy	6.7%	-0.7%
U.S. REIT	4.5%	-1.0%
Global Infrastructure Equity	5.6%	-0.3%
Global Natural Resources Equity	5.5%	-1.2%
Gold	3.3%	0.4%
Real Estate - Core	4.7%	0.3%
Real Estate - Non-Core	5.9%	0.4%
Private Debt - Real Estate	4.6%	0.5%
Private Real Assets - Natural Resources	7.1%	-0.9%
Private Real Assets - Infrastructure	5.3%	-0.1%

Source: NEPC

*Calculated as a blend of other asset classes



REAL ASSET

REAL INCOME

- **Equity: Real income is inflation-adjusted dividend yield**

 - Includes public infrastructure, REITS, midstream energy, and natural resource equity

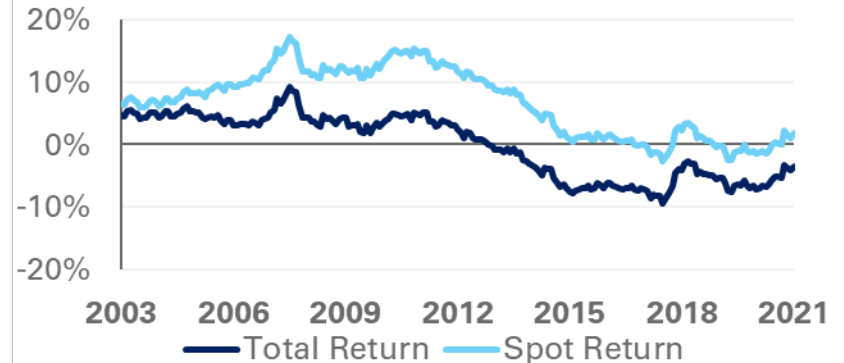
- **Real Estate: Real income is net operating income (NOI)**

 - NOI growth tracks the business cycle and economic regimes

- **Commodity Futures: Real income reflects collateral return and the futures roll yield**

 - Collateral is based on a cash proxy over the time horizon

Commodities Rolling 10-Year Returns



Real Assets Yields

	12/31/21	12/31/20
Midstream Energy	5.9%	8.7%
Core Real Estate	3.0%	3.0%
U.S. REIT	2.9%	3.8%
Global Infrastructure Equity	2.8%	3.4%
Global Nat Resource Equity	3.7%	3.4%
U.S. 10-Yr Breakeven Inflation	2.6%	2.0%
Commodity Index Roll Yield*	2.4%	-0.1%

Sources: Bloomberg, NCREIF, Alerian, NAREIT, S&P, FactSet, NEPC

*Commodity Index Roll Yield represents a proprietary calculation methodology

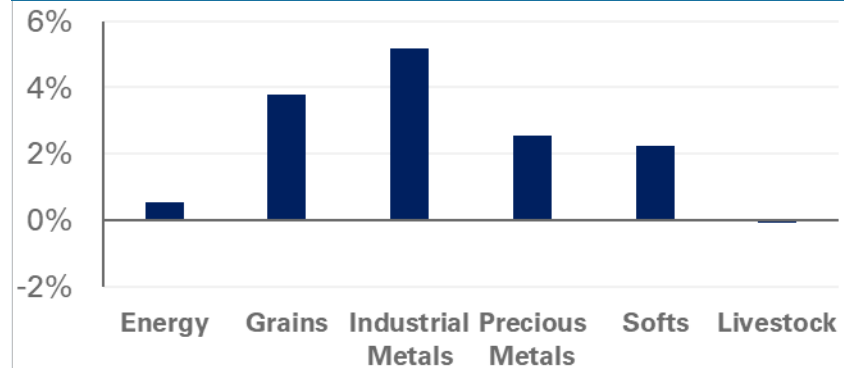


REAL ASSET VALUATION

- **Commodity valuations reflect the long-term average of spot prices**
 - Most areas of the commodity index are trading at a premium to long-term real averages

- **Valuation assumptions for other real assets are based on asset-specific valuation inputs**
 - Capitalization rates are used for core real estate, price-to-earnings for global infrastructure and global natural resources equity
 - Gold’s valuation incorporates the asset’s historical risk premia and the impact of the macroeconomic market regime

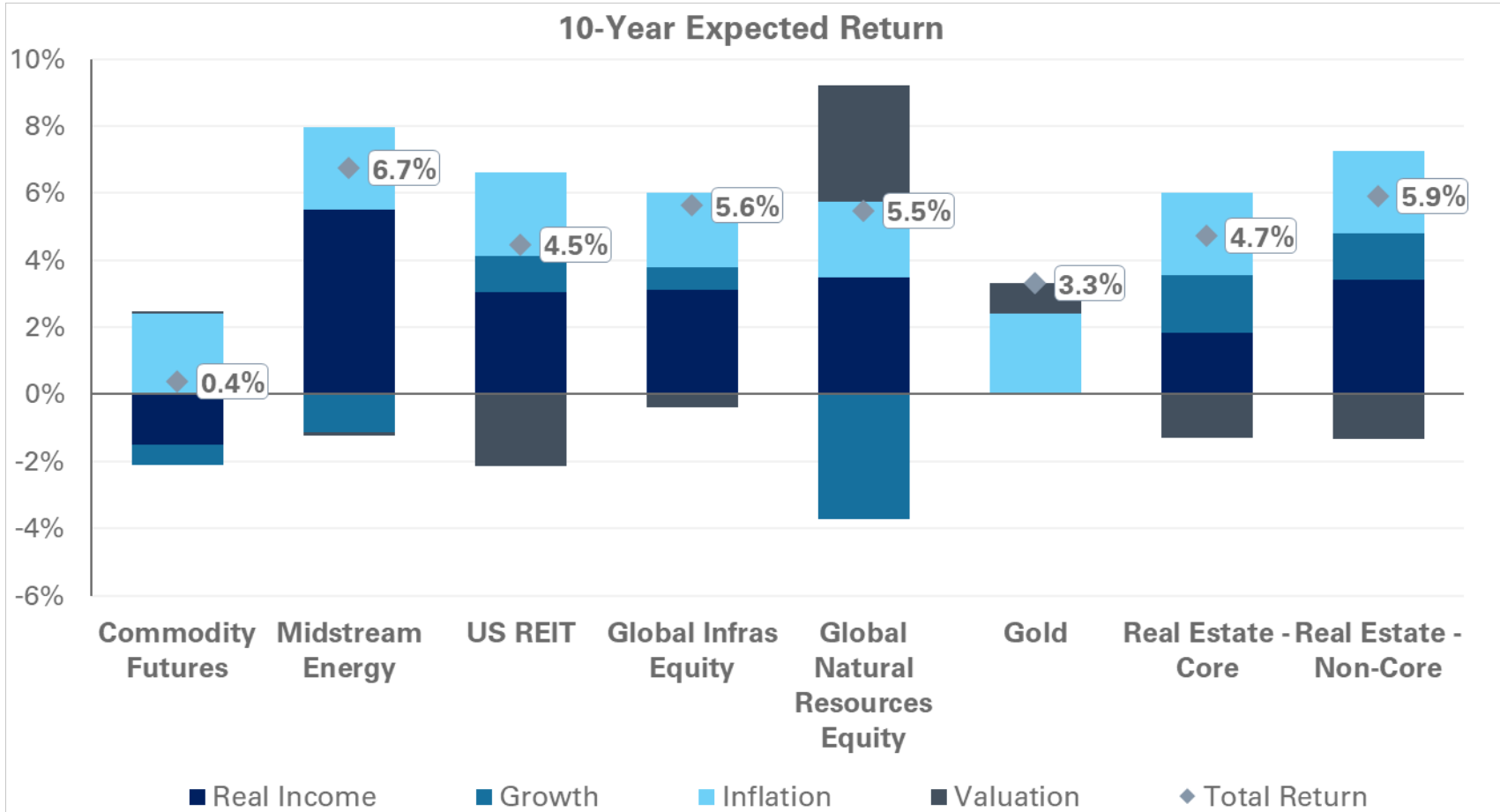
Discount/Premium to 10-Year Real Average



Real Price of Gold

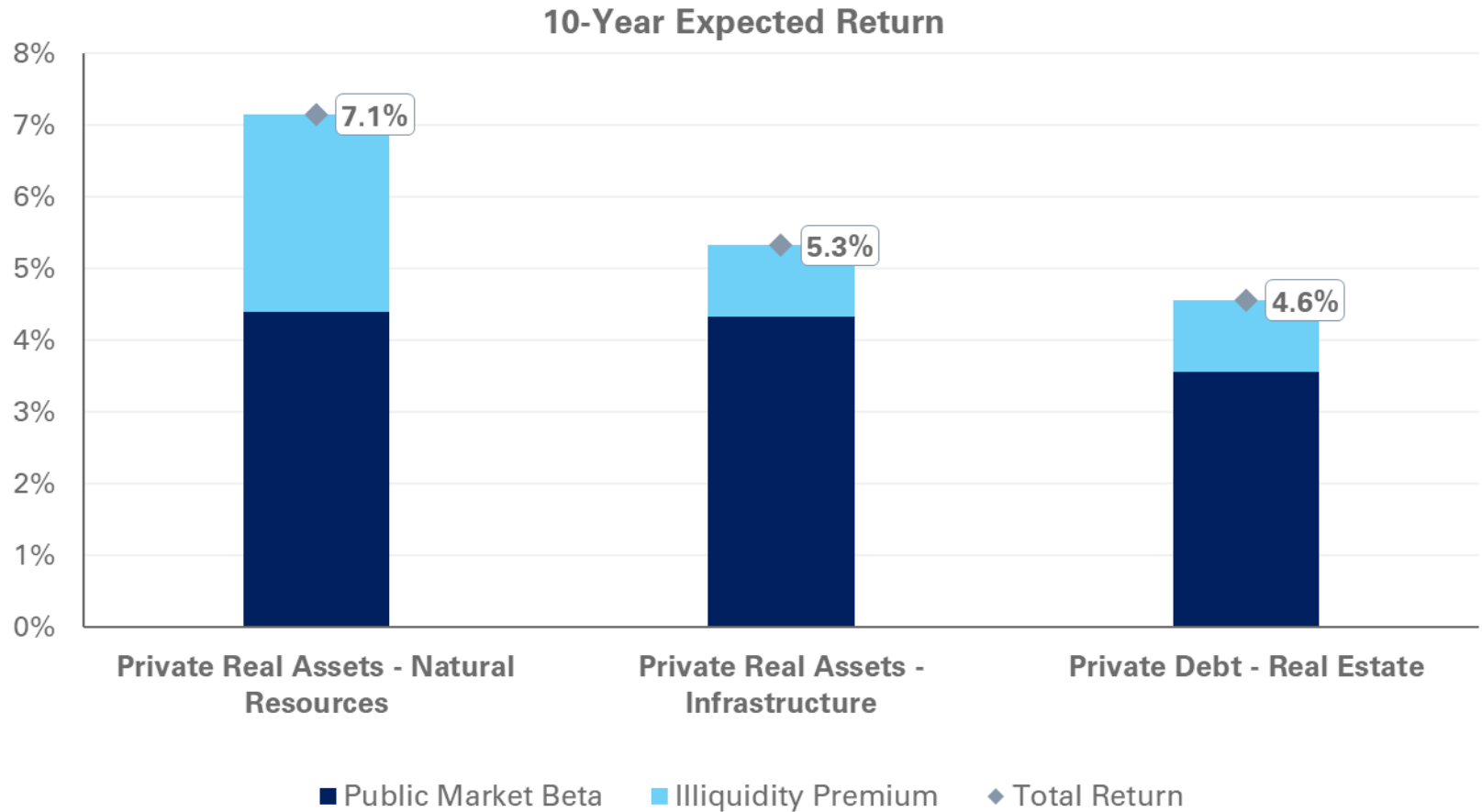


REAL ASSET BUILDING BLOCKS



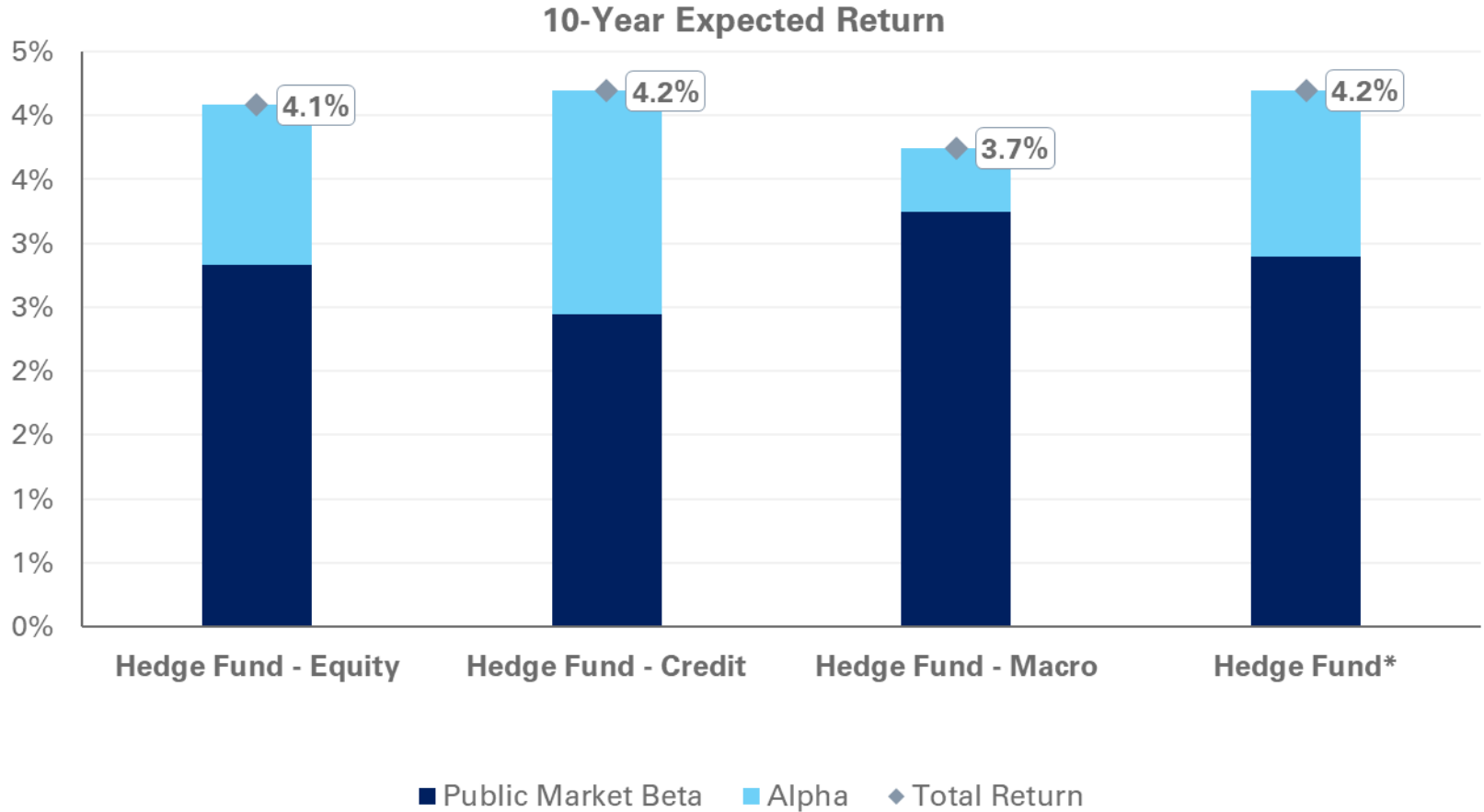
Source: NEPC

PRIVATE REAL ASSET BUILDING BLOCKS



Source: NEPC

HEDGE FUND BUILDING BLOCKS



Source: NEPC

*Hedge Funds is a derived composite of 40% Long/Short, 40% Credit, 20% Macro



APPENDIX



ASSET ALLOCATION

ALTERNATIVE MIXES CONTEMPLATED

	Mix A	Mix B	Mix C	Mix D	Mix E	Mix F	Mix G
Total Cash	2%	2%	2%	2%	2%	2%	2%
US Large-Cap Equity	10%	10%	11%	10%	11%	11%	11%
US Small/Mid-Cap Equity	2%	2%	2%	2%	2%	2%	2%
Non-US Developed Equity	8%	8%	9%	9%	9%	9%	9%
Non-US Developed Small-Cap Equity	0%	2%	0%	0%	0%	0%	0%
Emerging Market Equity	6%	6%	6%	6%	6%	6%	4%
Non-US Private Equity	2%	2%	2%	3%	3%	3%	2%
Private Equity	16%	16%	16%	16%	16%	16%	16%
China Equity	0%	0%	0%	0%	0%	0%	2%
Total Equity	43%	46%	46%	46%	47%	47%	46%
US Treasury Bond	2%	2%	2%	2%	2%	2%	2%
US Aggregate Bond	2%	2%	0%	2%	1%	0%	2%
Emerging Market External Debt	8%	8%	8%	8%	8%	8%	8%
Private Debt	22%	22%	22%	22%	22%	22%	22%
Total Fixed Income	34%	34%	32%	34%	33%	32%	34%
Global Infrastructure Equity	3%	0%	0%	0%	0%	0%	0%
Real Estate - Core	3%	3%	3%	3%	3%	3%	3%
Real Estate - Non-Core	3%	3%	3%	3%	3%	3%	3%
Private Debt - Real Estate	0%	0%	2%	0%	0%	1%	0%
Private Real Assets - Natural Resources	6%	6%	6%	6%	6%	6%	6%
Total Real Assets	14%	11%	13%	11%	11%	12%	11%
Absolute Return	7%	7%	7%	7%	7%	7%	7%

<i>Expected Return 10 yrs</i>	6.87%	6.88%	6.90%	6.92%	6.93%	6.96%	6.85%
<i>Expected Return 30 yrs</i>	8.02%	8.04%	8.06%	8.07%	8.10%	8.12%	8.01%
<i>Standard Dev</i>	11.2%	11.4%	11.4%	11.3%	11.4%	11.5%	11.4%
<i>Sharpe Ratio (10 years)</i>	0.48	0.47	0.48	0.48	0.48	0.48	0.47
<i>Sharpe Ratio (30 years)</i>	0.51	0.50	0.50	0.51	0.51	0.51	0.50

Note – standard deviation calculated using smoothed volatility.



10-YEAR RETURN FORECASTS

EQUITY

Geometric Expected Return			
Asset Class	12/31/2021	12/31/2020	Delta
U.S. Large-Cap Equity	4.3%	5.4%	-1.1%
U.S. Small/Mid-Cap Equity	5.6%	5.7%	-0.1%
Non-U.S. Developed Equity	5.2%	5.9%	-0.7%
Non-U.S. Developed Equity (USD Hedge)	5.4%	6.1%	-0.7%
Non-U.S. Developed Small-Cap Equity	5.9%	6.1%	-0.2%
Emerging Market Equity	8.3%	7.5%	+0.8%
Emerging Market Small-Cap Equity	7.6%	8.1%	-0.5%
Absolute Return - Equity	4.1%	4.0%	+0.1%
Private Equity - Buyout	7.3%	7.6%	-0.3%
Private Equity - Growth	8.6%	8.9%	-0.3%
Private Equity - Early Stage Venture	10.0%	10.4%	-0.4%
Private Equity - Secondary	6.8%	7.1%	-0.3%
Non-U.S. Private Equity	10.3%	10.7%	-0.4%
China Equity	8.8%	7.0%	+1.8%
U.S. Microcap Equity	6.5%	6.6%	-0.1%
Global Equity*	5.4%	6.2%	-0.8%
Private Equity*	9.8%	10.2%	-0.4%

*Calculated as a blend of other asset classes



10-YEAR RETURN FORECASTS

SAFE-HAVEN FIXED INCOME

Geometric Expected Return			
Asset Class	12/31/2021	12/31/2020	Delta
Cash	1.5%	0.8%	+0.7%
U.S. TIPS	1.4%	1.0%	+0.4%
U.S. Treasury Bond	1.5%	0.9%	+0.6%
U.S. Corporate Bond	2.8%	2.2%	+0.6%
U.S. Corporate Bond - AAA	2.2%	1.5%	+0.7%
U.S. Corporate Bond - AA	2.2%	1.6%	+0.6%
U.S. Corporate Bond - A	2.6%	1.9%	+0.7%
U.S. Corporate Bond - BBB	3.1%	2.5%	+0.6%
U.S. Mortgage-Backed Securities	1.8%	1.2%	+0.6%
U.S. Securitized Bond	2.3%	1.8%	+0.5%
U.S. Collateralized Loan Obligation	3.1%	2.3%	+0.8%
U.S. Municipal Bond	1.6%	2.0%	-0.4%
U.S. Municipal Bond (1-10 Year)	1.2%	1.1%	+0.1%
U.S. Taxable Municipal Bond	2.7%	2.5%	+0.2%

10-YEAR RETURN FORECASTS

SAFE-HAVEN FIXED INCOME

Geometric Expected Return			
Asset Class	12/31/2021	12/31/2020	Delta
Non-US Government Bond	1.1%	0.6%	+0.5%
Non-US Government Bond (USD Hedge)	1.3%	0.8%	+0.5%
Non-US Inflation-Linked Bond (USD Hedge)	0.7%	0.1%	+0.6%
U.S. Short-Term TIPS (1-3 Year)	1.2%	1.1%	+0.1%
U.S. Short-Term Treasury Bond (1-3 Year)	1.4%	1.0%	+0.4%
U.S. Short-Term Corporate Bond (1-3 Year)	2.3%	1.8%	+0.5%
U.S. Intermediate-Term TIPS (3-10 Year)	1.5%	1.0%	+0.5%
U.S. Intermediate-Term Treasury Bond (3-10 Year)	1.6%	0.9%	+0.7%
U.S. Intermediate-Term Corporate Bond (3-10 Year)	3.0%	2.3%	+0.7%
U.S. Long-Term Treasury Bond (10-30 Year)	1.4%	0.7%	+0.7%
U.S. Long-Term TIPS (10-30 Year)	1.3%	1.0%	+0.3%
U.S. Long-Term Corporate Bond (10-30 Year)	2.8%	2.3%	+0.5%
20+ Year U.S. Treasury STRIPS	1.0%	0.4%	+0.6%
10 Year U.S. Treasury Bond	1.8%	0.9%	+0.9%
10 Year Non-U.S. Government Bond (USD Hedge)	0.3%	-0.1%	+0.4%
U.S. Aggregate Bond*	2.0%	1.4%	+0.6%

*Calculated as a blend of other asset classes



10-YEAR RETURN FORECASTS

RETURN-SEEKING CREDIT

Geometric Expected Return			
Asset Class	12/31/2021	12/31/2020	Delta
U.S. High Yield Corporate Bond	3.2%	2.9%	+0.3%
U.S. Corporate Bond - BB	4.0%	3.9%	+0.1%
U.S. Corporate Bond - B	3.6%	3.0%	+0.6%
U.S. Corporate Bond - CCC/Below	-3.8%	-3.4%	-0.4%
U.S. Short-Term High Yield Corp Bond (1-3 Year)	2.3%	2.5%	-0.2%
U.S. Leveraged Loan	4.7%	3.9%	+0.8%
Emerging Market External Debt	4.1%	3.0%	+1.1%
Emerging Market Local Currency Debt	5.7%	5.0%	+0.7%
U.S. High Yield Securitized Bond	3.4%	2.3%	+1.1%
U.S. High Yield Collateralized Loan Obligation	5.5%	4.6%	+0.9%
U.S. High Yield Municipal Bond	2.1%	2.8%	-0.7%
Absolute Return - Credit	4.2%	3.9%	+0.3%
Private Credit - Credit Opportunities	6.5%	6.2%	+0.3%
Private Credit - Distressed	7.2%	7.2%	-
Private Credit - Direct Lending	6.2%	5.4%	+0.8%
Private Credit*	6.5%	6.0%	+0.5%

*Calculated as a blend of other asset classes



10-YEAR RETURN FORECASTS

REAL ASSETS

Geometric Expected Return			
Asset Class	12/31/2021	12/31/2020	Delta
Commodity Futures	0.4%	0.9%	-0.5%
Midstream Energy	6.7%	7.4%	-0.7%
U.S. REIT	4.5%	5.5%	-1.0%
Global Infrastructure Equity	5.6%	5.9%	-0.3%
Global Natural Resources Equity	5.5%	6.7%	-1.2%
Gold	3.3%	2.9%	+0.4%
Real Estate - Core	4.7%	4.4%	+0.3%
Real Estate - Non-Core	5.9%	5.5%	+0.4%
Private Debt - Real Estate	4.6%	4.1%	+0.5%
Private Real Assets - Natural Resources	7.1%	8.0%	-0.9%
Private Real Assets - Infrastructure	5.3%	5.4%	-0.1%

30-YEAR RETURN FORECASTS

EQUITY

Geometric Expected Return			
Asset Class	12/31/2021	12/31/2020	Delta
U.S. Large-Cap Equity	6.1%	6.3%	-0.2%
U.S. Small/Mid-Cap Equity	6.6%	6.6%	-
Non-U.S. Developed Equity	6.2%	6.5%	-0.3%
Non-U.S. Developed Equity (USD Hedge)	6.4%	6.7%	-0.3%
Non-U.S. Developed Small-Cap Equity	6.8%	6.8%	-
Emerging Market Equity	8.7%	8.4%	+0.3%
Emerging Market Small-Cap Equity	8.7%	8.6%	+0.1%
Absolute Return - Equity	5.2%	5.0%	+0.2%
Private Equity - Buyout	8.5%	8.5%	-
Private Equity - Growth	9.7%	9.8%	-0.1%
Private Equity - Early Stage Venture	10.7%	10.7%	-
Private Equity - Secondary	7.9%	8.0%	-0.1%
Non-U.S. Private Equity	10.7%	10.7%	-
China Equity	8.8%	7.8%	+1.0%
U.S. Microcap Equity	7.5%	7.4%	+0.1%
Global Equity*	6.8%	7.0%	-0.2%
Private Equity*	10.7%	10.8%	-0.0%

*Calculated as a blend of other asset classes



30-YEAR RETURN FORECASTS

SAFE-HAVEN FIXED INCOME

Geometric Expected Return			
Asset Class	12/31/2021	12/31/2020	Delta
Cash	2.3%	1.9%	+0.4%
U.S. TIPS	2.6%	2.1%	+0.5%
U.S. Treasury Bond	2.5%	2.0%	+0.5%
U.S. Corporate Bond	4.2%	3.7%	+0.5%
U.S. Corporate Bond - AAA	3.3%	2.8%	+0.5%
U.S. Corporate Bond - AA	3.4%	2.9%	+0.5%
U.S. Corporate Bond - A	3.8%	3.3%	+0.5%
U.S. Corporate Bond - BBB	4.4%	3.9%	+0.5%
U.S. Mortgage-Backed Securities	2.8%	2.3%	+0.5%
U.S. Securitized Bond	3.6%	3.1%	+0.5%
U.S. Collateralized Loan Obligation	4.0%	3.3%	+0.7%
U.S. Municipal Bond	2.5%	2.3%	+0.2%
U.S. Municipal Bond (1-10 Year)	2.3%	1.9%	+0.4%
U.S. Taxable Municipal Bond	4.3%	3.9%	+0.4%

30-YEAR RETURN FORECASTS

SAFE-HAVEN FIXED INCOME

Geometric Expected Return			
Asset Class	12/31/2021	12/31/2020	Delta
Non-US Government Bond	1.9%	1.7%	+0.2%
Non-US Government Bond (USD Hedge)	2.2%	1.9%	+0.3%
Non-US Inflation-Linked Bond (USD Hedge)	1.4%	1.1%	+0.3%
U.S. Short-Term TIPS (1-3 Year)	2.4%	2.0%	+0.4%
U.S. Short-Term Treasury Bond (1-3 Year)	2.4%	2.0%	+0.4%
U.S. Short-Term Corporate Bond (1-3 Year)	3.4%	3.7%	-0.3%
U.S. Intermediate-Term TIPS (3-10 Year)	2.8%	2.1%	+0.7%
U.S. Intermediate-Term Treasury Bond (3-10 Year)	2.7%	2.1%	+0.6%
U.S. Intermediate-Term Corporate Bond (3-10 Year)	4.4%	3.8%	+0.6%
U.S. Long-Term Treasury Bond (10-30 Year)	2.4%	1.9%	+0.5%
U.S. Long-Term TIPS (10-30 Year)	2.3%	2.0%	+0.3%
U.S. Long-Term Corporate Bond (10-30 Year)	4.2%	3.8%	+0.4%
20+ Year U.S. Treasury STRIPS	2.1%	1.7%	+0.4%
10 Year U.S. Treasury Bond	3.0%	2.3%	+0.7%
10 Year Non-U.S. Government Bond (USD Hedge)	1.4%	1.1%	+0.3%
U.S. Aggregate Bond*	3.1%	2.7%	+0.4%

*Calculated as a blend of other asset classes



30-YEAR RETURN FORECASTS

RETURN-SEEKING CREDIT

Geometric Expected Return			
Asset Class	12/31/2021	12/31/2020	Delta
U.S. High Yield Corporate Bond	5.4%	5.0%	+0.4%
U.S. Corporate Bond - BB	6.0%	5.6%	+0.4%
U.S. Corporate Bond - B	5.4%	4.9%	+0.5%
U.S. Corporate Bond - CCC/Below	-0.6%	-0.8%	+0.2%
U.S. Short-Term High Yield Corp Bond (1-3 Year)	3.7%	3.5%	+0.2%
U.S. Leveraged Loan	5.6%	4.8%	+0.8%
Emerging Market External Debt	5.1%	4.5%	+0.6%
Emerging Market Local Currency Debt	5.3%	5.1%	+0.2%
U.S. High Yield Securitized Bond	5.4%	4.5%	+0.9%
U.S. High Yield Collateralized Loan Obligation	6.4%	5.7%	+0.7%
U.S. High Yield Municipal Bond	3.9%	3.9%	-
Hedge Fund - Credit	5.7%	5.3%	+0.4%
Private Credit - Credit Opportunities	7.4%	7.0%	+0.4%
Private Credit – Distressed	8.2%	7.8%	+0.4%
Private Credit - Direct Lending	7.8%	7.4%	+0.4%
Private Credit*	7.9%	7.5%	+0.4%

*Calculated as a blend of other asset classes



30-YEAR RETURN FORECASTS

REAL ASSETS

Geometric Expected Return			
Asset Class	12/31/2021	12/31/2020	Delta
Commodity Futures	3.3%	3.3%	-
Midstream Energy	6.7%	7.3%	-0.6%
U.S. REIT	6.3%	6.7%	-0.4%
Global Infrastructure Equity	6.3%	6.6%	-0.3%
Global Natural Resources Equity	6.7%	7.0%	-0.3%
Gold	4.0%	3.7%	+0.3%
Real Estate - Core	5.6%	5.6%	-
Real Estate - Non-Core	6.9%	7.0%	-0.1%
Private Debt - Real Estate	5.4%	5.2%	+0.2%
Private Real Assets - Natural Resources	8.2%	8.5%	-0.3%
Private Real Assets - Infrastructure	6.6%	6.6%	-

VOLATILITY FORECASTS

EQUITY

Volatility			
Asset Class	12/31/2021	12/31/2020	Delta
U.S. Large-Cap Equity	16.6%	16.6%	-
U.S. Small/Mid-Cap Equity	20.7%	20.7%	-
Non-U.S. Developed Equity	19.6%	19.7%	-0.1%
Non-U.S. Developed Equity (USD Hedge)	17.6%	17.7%	-0.1%
Non-U.S. Developed Small-Cap Equity	24.2%	22.5%	+1.7%
Emerging Market Equity	28.3%	28.7%	-0.4%
Emerging Market Small-Cap Equity	34.4%	31.5%	+2.9%
Absolute Return - Equity	11.4%	11.5%	-0.1%
Private Equity - Buyout	19.0%	18.5%	+0.5%
Private Equity - Growth	31.5%	31.0%	+0.5%
Private Equity - Early Stage Venture	45.0%	45.0%	-
Private Equity - Secondary	20.0%	19.5%	+0.5%
Non-U.S. Private Equity	32.0%	32.0%	-
China Equity	28.6%	29.5%	-0.9%
U.S. Microcap Equity	25.8%	25.0%	+0.8%
Global Equity*	17.9%	18.0%	-0.1%
Private Equity*	27.6%	27.3%	+0.3%



*Calculated as a blend of other asset classes

VOLATILITY FORECASTS

SAFE-HAVEN FIXED INCOME

Volatility			
Asset Class	12/31/2021	12/31/2020	Delta
Cash	0.6%	0.6%	-
U.S. TIPS	5.8%	5.8%	-
U.S. Treasury Bond	5.3%	5.3%	-
U.S. Corporate Bond	7.3%	7.3%	-
U.S. Corporate Bond - AAA	6.0%	5.9%	+0.1%
U.S. Corporate Bond - AA	5.9%	5.9%	-
U.S. Corporate Bond - A	7.2%	7.2%	-
U.S. Corporate Bond - BBB	8.0%	8.0%	-
U.S. Mortgage-Backed Securities	6.5%	6.5%	-
U.S. Securitized Bond	8.4%	9.0%	-0.6%
U.S. Collateralized Loan Obligation	7.3%	7.5%	-0.2%
U.S. Municipal Bond	6.0%	6.0%	-
U.S. Municipal Bond (1-10 Year)	4.5%	4.5%	-
U.S. Taxable Municipal Bond	7.5%	7.5%	-

VOLATILITY FORECASTS

SAFE-HAVEN FIXED INCOME

Volatility			
Asset Class	12/31/2021	12/31/2020	Delta
Non-US Government Bond	9.3%	9.5%	-0.2%
Non-US Government Bond (USD Hedge)	4.0%	3.9%	+0.1%
Non-US Inflation-Linked Bond (USD Hedge)	5.9%	5.9%	-
U.S. Short-Term TIPS (1-3 Year)	3.2%	3.2%	-
U.S. Short-Term Treasury Bond (1-3 Year)	2.1%	2.1%	-
U.S. Short-Term Corporate Bond (1-3 Year)	3.0%	3.0%	-
U.S. Intermediate-Term TIPS (3-10 Year)	5.4%	5.4%	-
U.S. Intermediate-Term Treasury Bond (3-10 Year)	5.5%	5.4%	+0.1%
U.S. Intermediate-Term Corporate Bond (3-10 Year)	6.5%	7.6%	-1.1%
U.S. Long-Term Treasury Bond (10-30 Year)	11.6%	11.5%	+0.1%
U.S. Long-Term TIPS (10-30 Year)	10.9%	10.9%	-
U.S. Long-Term Corporate Bond (10-30 Year)	10.7%	11.5%	-0.8%
20+ Year U.S. Treasury STRIPS	20.9%	21.2%	-0.3%
10 Year U.S. Treasury Bond	7.4%	7.4%	-
10 Year Non-U.S. Government Bond (USD Hedge)	5.1%	5.1%	-
U.S. Aggregate Bond*	5.6%	5.7%	-0.1%

*Calculated as a blend of other asset classes



VOLATILITY FORECASTS

RETURN-SEEKING CREDIT

Volatility			
Asset Class	12/31/2021	12/31/2020	Delta
U.S. High Yield Corporate Bond	11.2%	11.5%	-0.3%
U.S. Corporate Bond - BB	9.8%	9.9%	-0.1%
U.S. Corporate Bond - B	11.7%	12.1%	-0.4%
U.S. Corporate Bond - CCC/Below	20.6%	21.7%	-1.1%
U.S. Short-Term High Yield Corp Bond (1-3 Year)	8.5%	8.6%	-0.1%
U.S. Leveraged Loan	9.1%	9.2%	-0.1%
Emerging Market External Debt	13.0%	13.0%	-
Emerging Market Local Currency Debt	13.0%	13.0%	-
U.S. High Yield Securitized Bond	11.2%	11.0%	+0.2%
U.S. High Yield Collateralized Loan Obligation	10.8%	11.0%	-0.2%
U.S. High Yield Municipal Bond	12.0%	12.0%	-
Absolute Return - Credit	10.2%	10.4%	-0.2%
Private Credit - Credit Opportunities	14.4%	14.0%	+0.4%
Private Credit – Distressed	14.3%	14.0%	+0.3%
Private Credit - Direct Lending	10.5%	11.5%	-1.0%
Private Credit*	11.3%	11.7%	-0.4%

*Calculated as a blend of other asset classes



VOLATILITY FORECASTS

REAL ASSETS

Volatility			
Asset Class	12/31/2021	12/31/2020	Delta
Commodity Futures	18.5%	18.5%	-
Midstream Energy	28.6%	27.0%	+1.6%
U.S. REIT	21.4%	21.4%	-
Global Infrastructure Equity	20.3%	20.4%	-0.1%
Global Natural Resources Equity	23.2%	22.8%	+0.4%
Gold	16.3%	16.4%	-0.1%
Real Estate - Core	15.0%	15.0%	-
Real Estate - Non-Core	17.5%	21.0%	-3.5%
Private Debt - Real Estate	11.4%	11.0%	+0.4%
Private Real Assets - Natural Resources	32.5%	32.0%	+0.5%
Private Real Assets - Infrastructure	12.6%	12.5%	+0.1%

INFORMATION DISCLAIMER

Past performance is no guarantee of future results.

The goal of this report is to provide a basis for substantiating asset allocation recommendations. The opinions presented herein represent the good faith views of NEPC as of the date of this report and are subject to change at any time.

Information on market indices was provided by sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.

All investments carry some level of risk. Diversification and other asset allocation techniques do not ensure profit or protect against losses.

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