



NEPC 2022 INVESTMENT OUTLOOK

ASSET ALLOCATION EDUCATION &
CAPITAL MARKET ASSUMPTIONS

APRIL 14, 2022

NEPC Research



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ASSET ALLOCATION OVERVIEW & EDUCATION



ASSET ALLOCATION DEFINED

- **The process of allocating assets across a spectrum of investments to achieve an expected return at an expected level of risk**
 - “Expected” is a statistics term, which is different from the common use of the word.
 - Expected return is the weighted average of all possible returns, where the weights are the probabilities that each return will occur.

- **Asset allocation decisions include, but are not limited to a choice between:**
 - Higher risk versus higher return
 - Equity/Bonds/Cash/RE/PE/HF/Commodities etc...
 - Domestic/International/Global
 - Liquid vs. illiquid or public vs. private assets
 - Ease of implementation (Simplicity vs. Complexity)

ASSET ALLOCATION CONSIDERATIONS

- **An appropriate asset mix will consider a Plan's**
 - Actuarial Return Assumption
 - Liability Awareness
 - Funded Status
 - Liquidity Needs
 - Time Horizon
 - Risk Tolerance
 - Peer Risk
 - Plan Provisions and Specifics
 - Staff Size and Expertise

ASSET ALLOCATION PROCESS

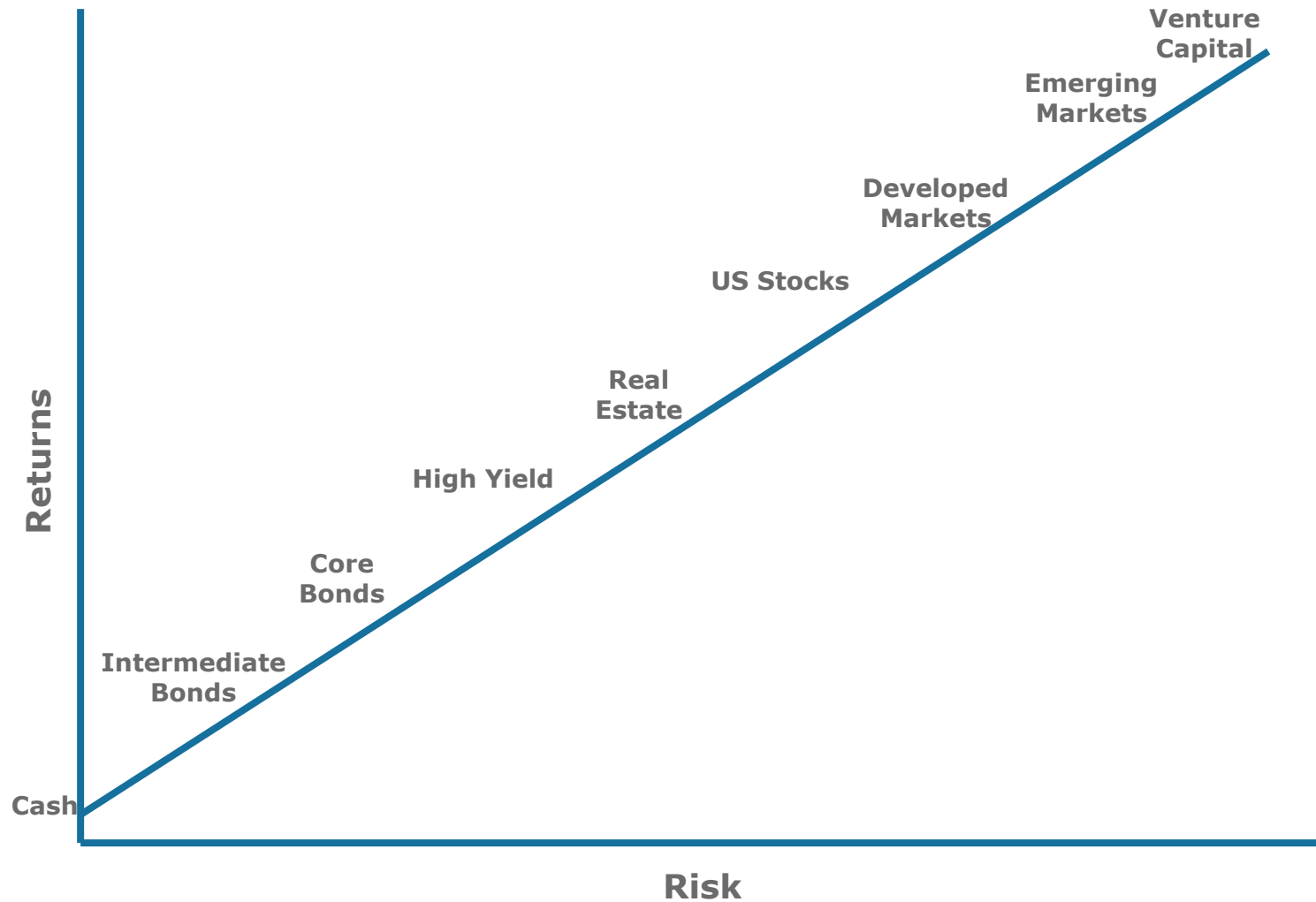
MEETING YOUR OBJECTIVES

- **Capital markets assumption**
 - Expected Return
 - Expected Risk (Volatility, Standard Deviation)
 - Expected Correlation
- **Project cash flow needs (Contributions – Expenses & Benefits)**
- **Integrate assets and liabilities/spending**
- **Risk Budgeting**
- **Scenario Analysis**
- **Liquidity Analysis**
- **Compare allocation to other programs**

ASSET ALLOCATION IMPLEMENTATION

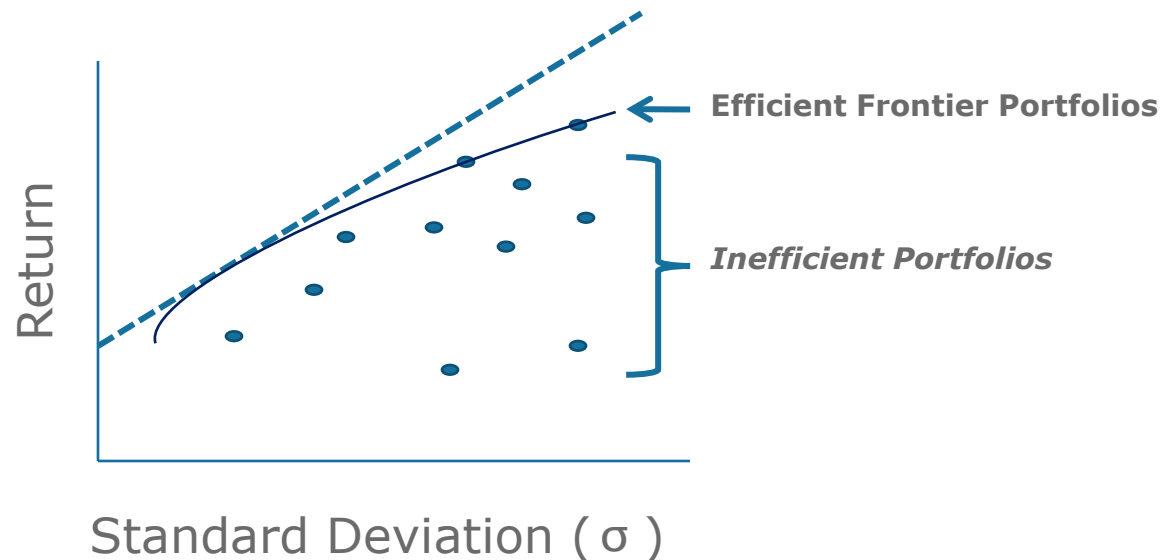
- **Establish Targets and Ranges**
 - Ranges should trigger rebalancing
 - Helps plans sell high (expensive assets) and buy low (cheap assets)
- **Establish Active versus Passive Mix**
 - Should reflect net of fee return contribution
 - Inefficient asset classes should be managed actively
- **Style Bias: *Should generally be avoided in efficient markets***
 - Efficient Market Example: Large Cap US Stocks

CAPITAL MARKET LINE



ASSET ALLOCATION MODEL: MEAN-VARIANCE OPTIMIZATION

- **Mean-Variance Optimization:** Asset allocation model based on Nobel-Prize winning theory
- **Mathematical solution to determine the “best” mix of assets that will create an efficient frontier**
 - Highest return for expected risk (volatility), or
 - Lowest expected risk (volatility) for expected return
 - Stated another way, it builds portfolios with the highest expected risk-adjusted returns – Efficient Frontier:



ASSET ALLOCATION – ASSET LIABILITY MATCHING

- **Asset Liability Matching versus the “Horse Race”**

- Many Pension Funds spend a lot of time comparing their performance to their peers’
 - Almost always ignores liabilities
 - Disaggregates returns from risk
 - Assumes everyone should be getting the highest possible return
 - Should instead be focused on the ability to meet liability needs
- Diversification makes it harder to be the best performing fund in certain bull market periods

MODEL INPUTS

▪ **Permissible Asset Classes and Weighting Constraints**

- Constraints reflect liquidity, time horizon and marginal benefit analyses
 - Example: RE is constrained to 5-15%
- Not all asset classes may be permissible by some plans
(e.g. Private Equity, Peruvian Llama Futures)

▪ **Return and Risk Assumptions**

- Based on historic data, academic theory, and NEPC's assessment of current and future market conditions
- Risk measured by Standard Deviation (volatility)

▪ **Correlation Assumptions**

- Measure of similarity/dissimilarity between asset class returns
- Based on historic data

RETURNS (ARITHMETIC & GEOMETRIC)

- **Arithmetic – simple average of annual returns**

- Example

- Year 1: 10%
 - Year 2: -4%
 - Year 3: 15%
 - Average (arithmetic) return is 7% (21% cumulative divided by 3 years)

- **Geometric – Our reports reflect compounding of annual returns**

- Example

- Year 1: 10%
 - Year 2: -4%
 - Year 3: 15%
 - Compounded annualized (geometric) return is 6.69%

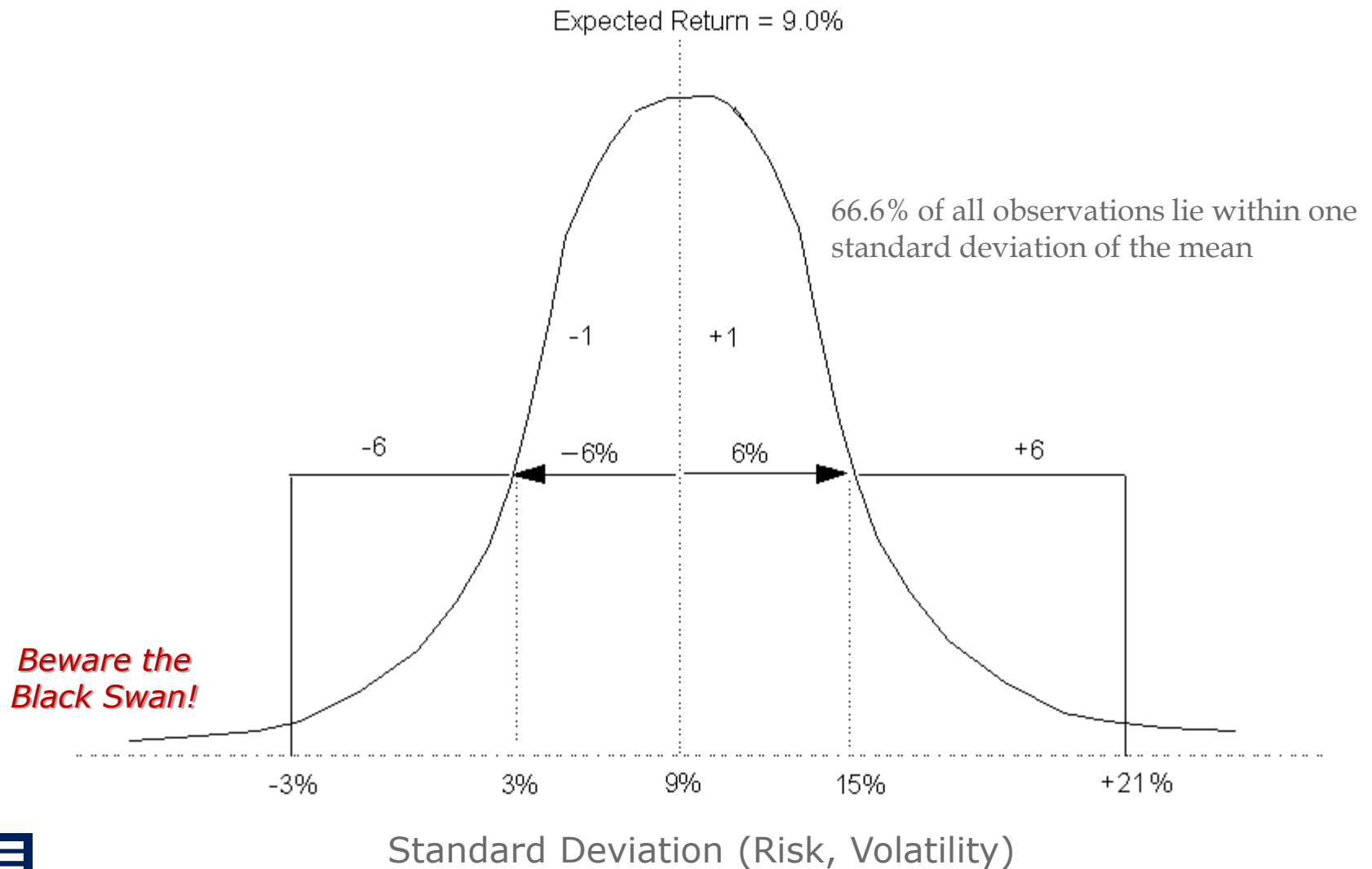
- **Geometric returns are always less than arithmetic returns**

- Reflects the fact that a given loss (say 10%) is worse than it's equivalent gain
 - For example, you start with \$100 and lose 50%. You now have \$50. To get back to \$100, you will need to earn 100%

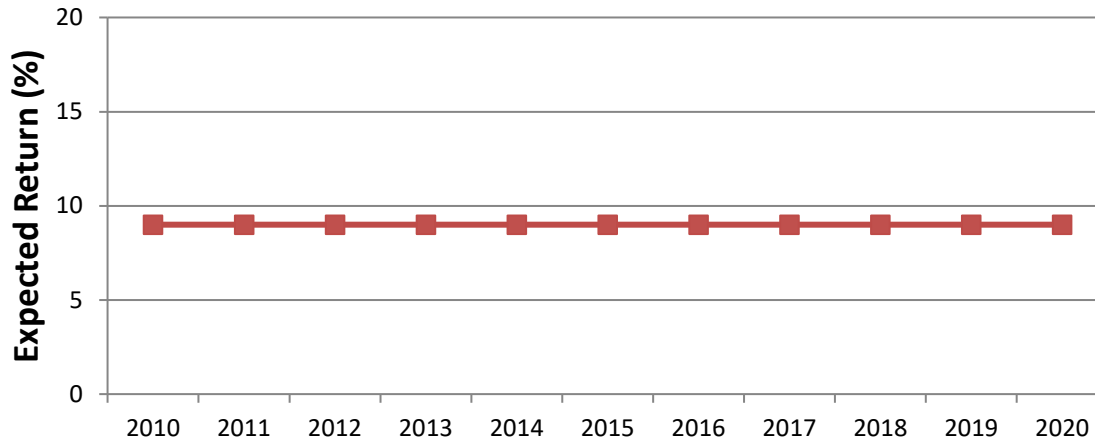
VOLATILITY

Exhibit A: Page 13

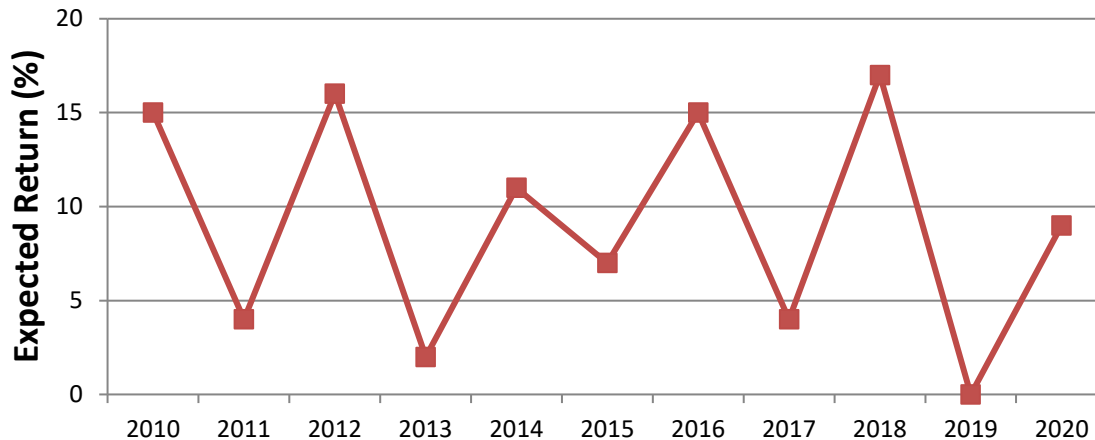
THE BELL CURVE - ONE STANDARD DEVIATION



WHICH PATTERN WOULD YOU CHOOSE?



Average Return = 9.0%
Standard Deviation = 0%



Average Return = 9.0%
Standard Deviation = 6.0%

STANDARD DEVIATION NOTES

- **Concept: Average deviation from the mean**
- **Standard Deviation is not all risk**
- **Most asset class returns approximate a Bell Curve (normal distribution)**
 - But not a perfect fit.
 - Expected Pension Returns (Q2 2020 Assumptions)

Return = 6.5%

Volatility = 12.4%

1StDev: 68% of the observations will be between -5.6% and 19.6%

2StDev: 95% of the observations will be between -18.2% and 32.2%

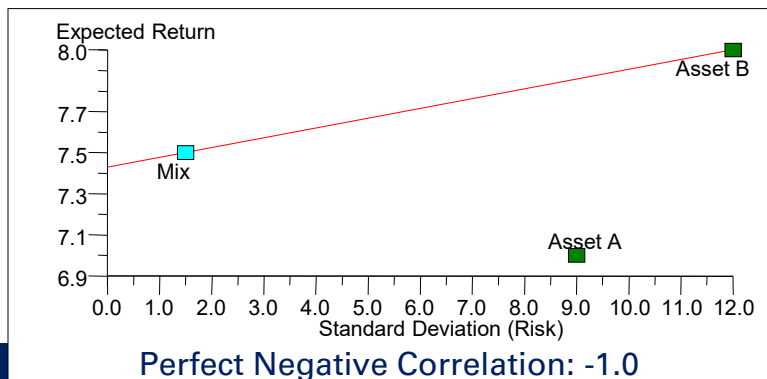
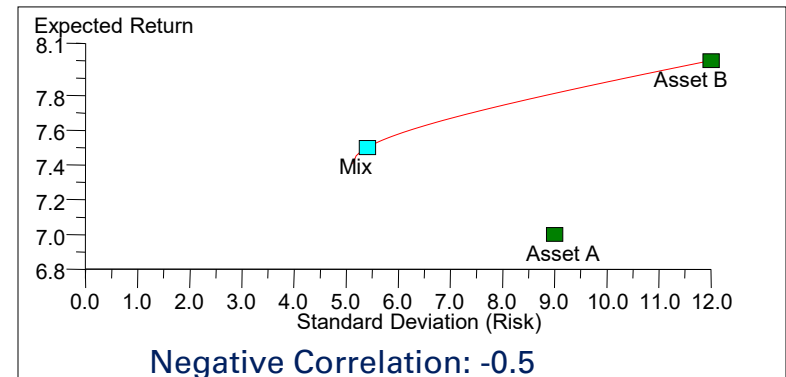
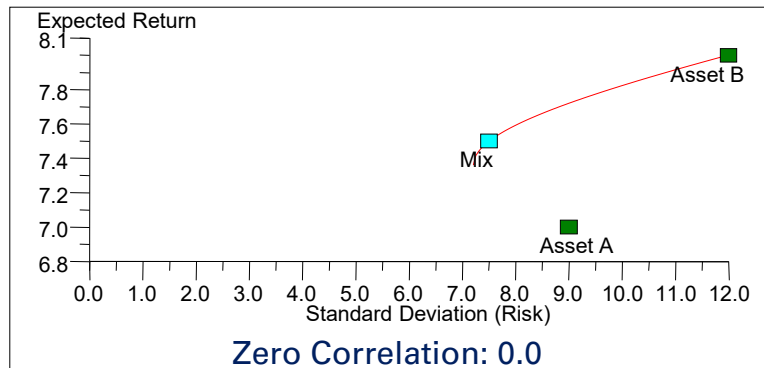
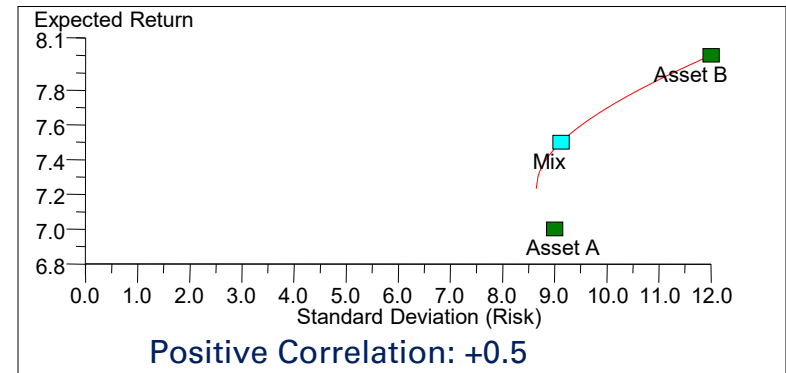
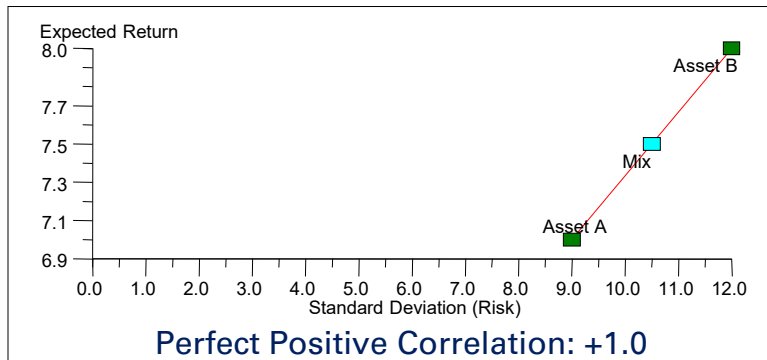
3StDev: 99% of the observations will be between -30.8% and 44.8%

CORRELATION

- Measures how two things vary relative to each other
- Scale is from **-1.0 to 1.0**
 - +1.0 is perfect correlation
 - The two things behave exactly alike
 - 0.0 indicates no correlation
 - 1.0 is perfect negative correlation
 - The two things behave exactly opposite of each other
 - One goes up while the other goes down
- Partial Correlation is common
- Correlations between assets are very important in the asset allocation process
 - Combining unlike assets lessens portfolio volatility

| | Year 1 | Year 2 | Year 3 |
|------------------|--------|--------|--------|
| A | 20% | -5% | 0% |
| B | -10% | 15% | 10% |
| Portfolio | 10% | 10% | 10% |

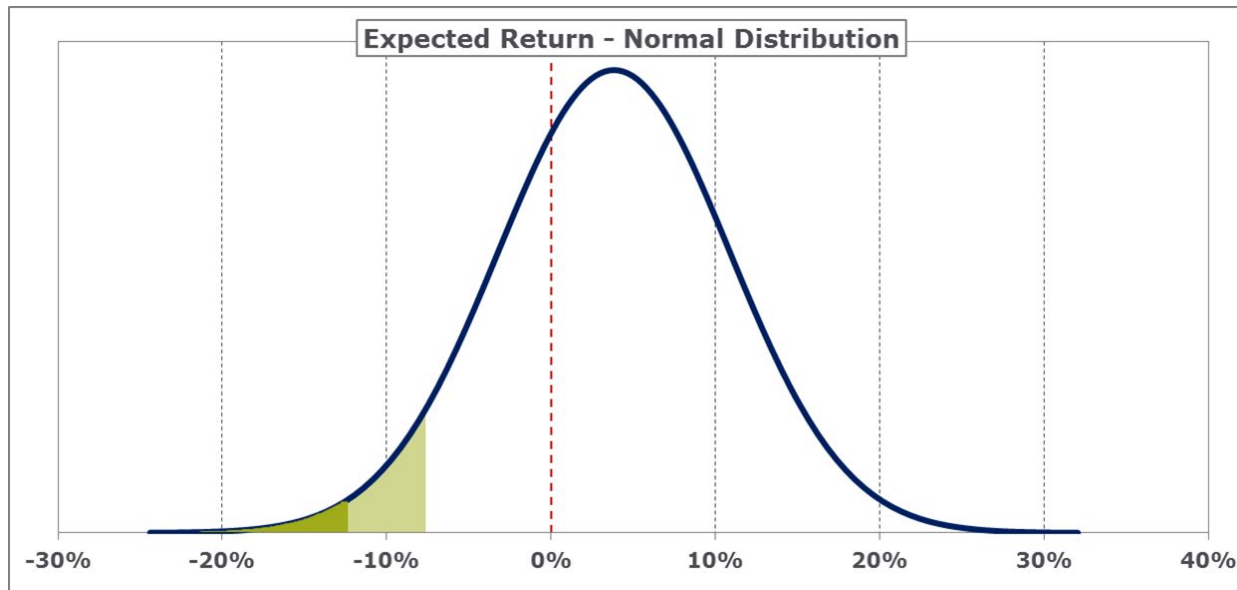
CORRELATION ILLUSTRATIONS



- The lower the correlation, the greater the risk reduction

CORRELATION NOTES

- Correlations are normally fairly stable
- **Market crisis: Correlations move toward 1**
 - Diversification fails when you need it most; tail risk



SBCERA ASSET ALLOCATION

Q4 2021 CAPITAL MARKET ASSUMPTIONS

| Asset Class | Target |
|-------------------------------------|------------|
| Total Cash | 2% |
| Large Cap Equities | 11% |
| Small/Mid Cap Equities | 2% |
| Int'l Equities (Unhedged) | 9% |
| Emerging Int'l Equities | 6% |
| Private Equity | 18% |
| Total Equity | 46% |
| Core Bonds | 2% |
| Emerging Market Debt | 8% |
| Private Debt | 24% |
| Total Fixed Income | 34% |
| Core Real Estate | 2.5% |
| Non-Core Real Estate | 2.5% |
| Private Real Assets - Energy/Metals | 6% |
| Total Real Assets | 11% |
| Absolute Return | 7% |

| | |
|--|--------------|
| Expected Return 10 yrs | 6.9% |
| Expected Return 30 yrs | 8.0% |
| Standard Dev | 11.3% |
| Sharpe Ratio (10 years) | 0.50 |
| Sharpe Ratio (30 years) | 0.54 |
| Probability of 1-Year Return Under 0% | 26.3% |
| Probability of 10-Year Return Under 0% | 2.3% |
| Probability of 10-Year Return Under 7.25% | 50.7% |
| Probability of 30-Year Return Under 7.25% | 29.3% |

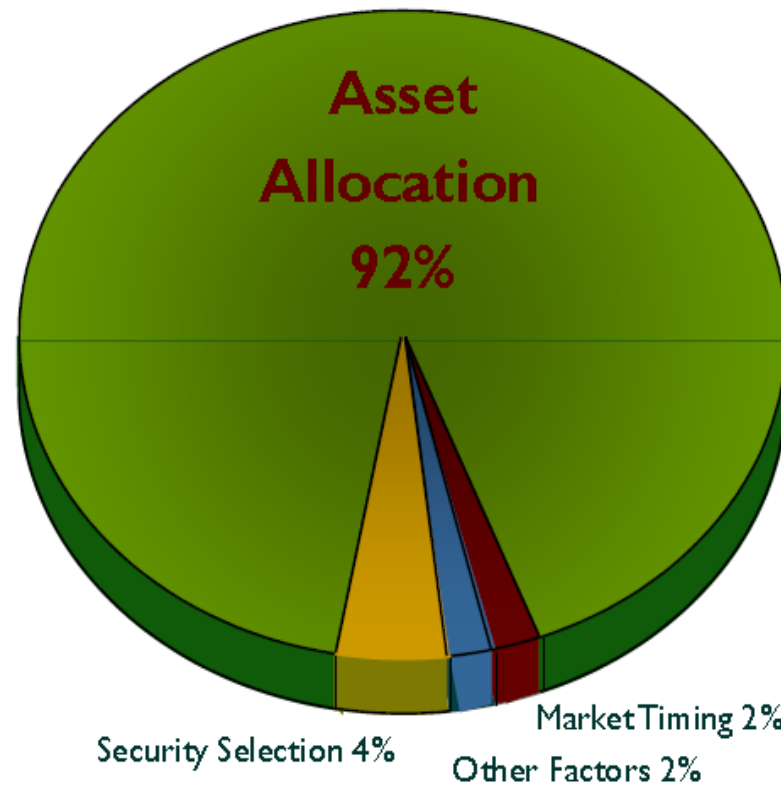
2022 CAPITAL MARKET ASSUMPTIONS



ASSET ALLOCATION: THE KEY INVESTMENT DECISION

Exhibit A: Page 21

Determinants of Portfolio Performance



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

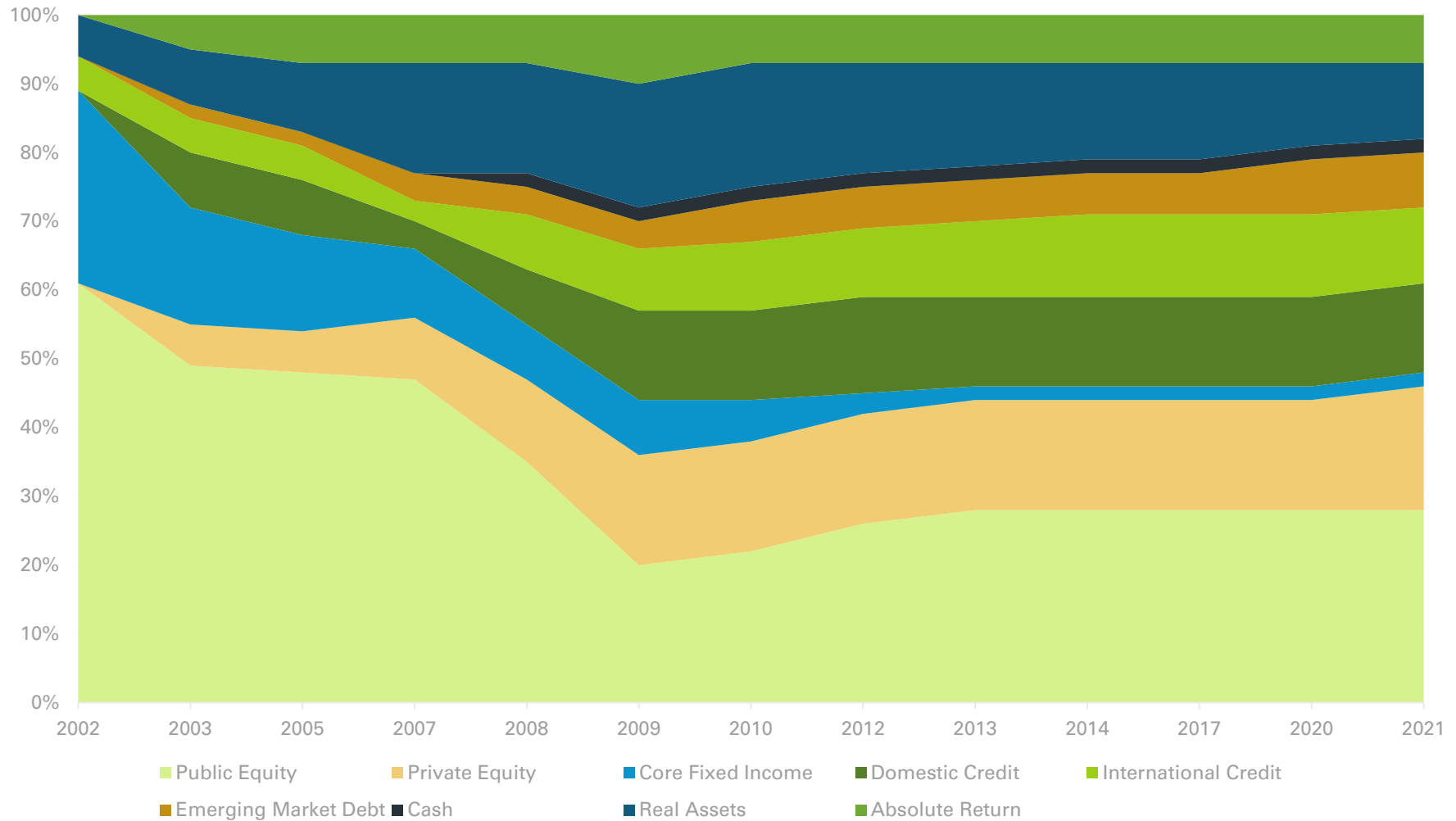
ASSET ALLOCATION

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



NEPC PROCESS



ASSET CLASS ASSUMPTIONS

OVERVIEW

- **NEPC's capital market assumptions are available each quarter and currently reflect December 31, 2021 market data**
- **Risk-asset return assumptions are broadly lower and reflect the tremendous market rally over the last 12 months**

ASSET CLASS ASSUMPTIONS

DEVELOPMENT

- **Assumptions are published for over 70 asset classes**
 - NEPC publishes return forecasts for 10-year and 30-year periods
- **Market data as of 12/31/2021**
 - Assumptions are developed with NEPC valuations models and rely on a building block approach
- **The 10-year return outlook is intended to support strategic asset allocation analysis**
- **30-year return assumptions are used for actuarial inputs and long-term planning**

Asset Allocation Process

1. Finalize list of new asset classes
2. Calculate asset class volatility and correlation assumptions
3. Set model terminal values, growth, and inflation inputs
4. Model data updated at quarter-end
5. Review model outputs and produce asset class return assumptions
6. Assumptions released on the 15th calendar day after quarter-end

ASSET CLASS BUILDING BLOCKS

METHODOLOGY

- **Asset models reflect current and forecasted market data to inform expected returns**
- **Systematic inputs are paired with a long-term trend to terminal values**
- **Model inputs are aggregated to capture key return drivers for each asset class**
- **Building block inputs will differ across asset class categories**

Illiquidity Premium

Valuation

Inflation

Real Growth

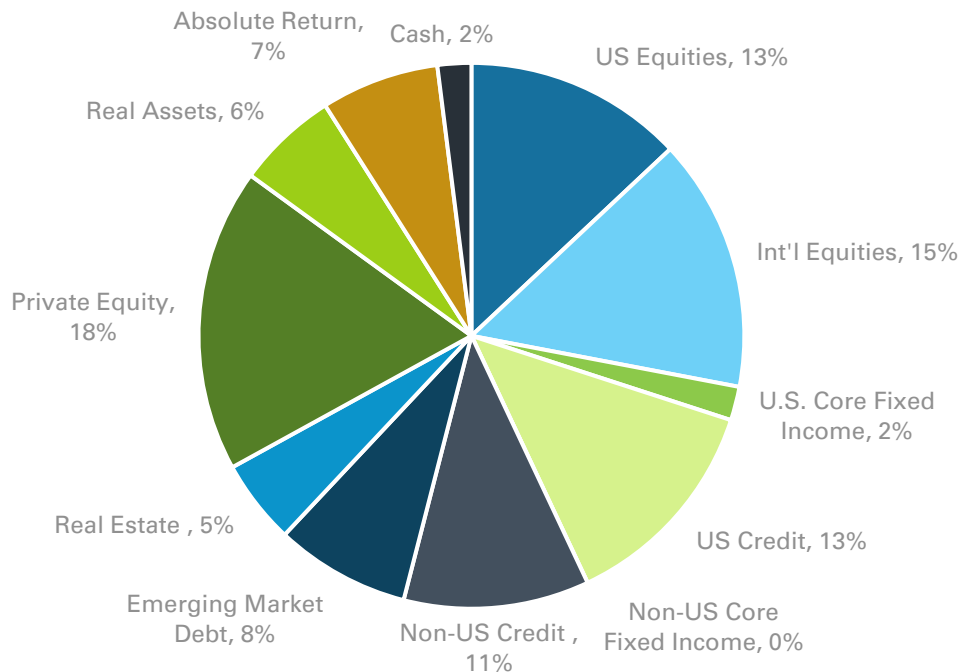
Yield

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 |
|--------------|--------------------------------------|------------------------------|---|-------|
| Equity | Cash | 1.5% | 1.2% | 0.3% |
| | 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 | | 1 |
| Real Estate | 5 | 8 | 10 | 20 | | 8 | 10 | 9 |
| Real Assets | 6 | 9 | | | | 6 | 10 | 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



ASSET ALLOCATION RECOMMENDATION

Exhibit A: Page 35

| Asset Class | Current Policy Target | Range |
|-------------------------------|-----------------------|------------------|
| Domestic Equities | | |
| Passive Large Cap | 8.0% | 0% – 11% |
| Passive Small Cap | 2.0% | -3% – 7% |
| Volatility | 3.0% | 0% – 8% |
| Subtotal* | 13.0% | 8% – 18% |
| International Equities | | |
| Developed Market | 6.0% | 1% – 11% |
| Volatility | 3.0% | 0% – 8% |
| Emerging Market Equity | 6.0% | 1% – 11% |
| Subtotal* | 15.0% | 10% – 20% |
| US Fixed Income | | |
| Core* | 2.0% | -3% – 7% |
| High Yield/Credit Strategies* | 13.0% | 8% – 18% |
| Subtotal | 15.0% | 10% – 20% |
| Global Fixed Income | | |
| International Core* | 0.0% | -5% – 5% |
| International Credit* | 11.0% | 6% – 16% |
| Emerging Market Debt* | 8.0% | 1% – 12% |
| Subtotal | 19.0% | 13% – 23% |
| Real Estate | | |
| Core | 2.5% | 0% – 5% |
| Non-Core | 2.5% | 0% – 5% |
| Subtotal* | 5.0% | 0% – 10% |
| Real Assets | | |
| Commodities | 4.0% | -1% – 7% |
| Infrastructure | 2.0% | 0% – 6% |
| Subtotal* | 6.0% | 0% – 10% |
| Private Equity* | 18.0% | 6% – 23% |
| Absolute Return* | 7.0% | 0% – 12% |
| Cash* | 2.0% | 0% – 10% |

| Asset Class | Recommended Policy Target | Recommended Range | Benchmark |
|-------------------------------|---------------------------|-------------------|---|
| | | | Russell 3000 Index |
| Domestic Equities | | | |
| Passive Large Cap | 10.0% | 0% – 13% | |
| Passive Small Cap | 2.0% | -3% – 7% | |
| Volatility | 3.0% | 0% – 8% | |
| Subtotal* | 15.0% | 10% – 20% | |
| | | | MSCI ACWI ex USA Index |
| International Equities | | | |
| Developed Market | 4.0% | -1% – 9% | |
| Volatility | 3.0% | 0% – 8% | |
| Emerging Market Equity | 8.0% | 0% – 13% | |
| Subtotal* | 15.0% | 10% – 20% | |
| | | | Bloomberg Barclays US Aggregate Bond Index |
| US Fixed Income | | | |
| Core* | 2.0% | -3% – 7% | |
| High Yield/Credit Strategies* | 13.0% | 8% – 18% | |
| Subtotal | 15.0% | 10% – 20% | |
| | | | Bloomberg Barclays Global Aggregate Bond ex US Index |
| Global Fixed Income | | | |
| International Core* | 0.0% | -5% – 5% | |
| International Credit* | 11.0% | 6% – 16% | |
| Emerging Market Debt* | 6.0% | 1% – 11% | |
| Subtotal | 17.0% | 12% – 22% | |
| | | | NCREIF Property Index |
| Real Estate | | | |
| Core | 2.5% | 0% – 5% | |
| Non-Core | 2.5% | 0% – 5% | |
| Subtotal* | 5.0% | 0% – 10% | |
| | | | 67% Bloomberg Commodities Index 33% BBG US TIPS Index |
| Real Assets | | | |
| Commodities | 4.0% | -1% – 7% | |
| Infrastructure | 2.0% | 0% – 6% | |
| Subtotal* | 6.0% | 0% – 10% | |
| Private Equity* | 18.0% | 6% – 23% | Russell 3000 Index |
| 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

* Monitored on a quarterly basis in NEPC reporting



ASSET ALLOCATION RECOMMENDATION

Exhibit A: Page 36

ASSET ALLOCATION COMPARISON SUMMARY

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

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

Red shading denotes recommended decrease

Green shading denotes recommended increase

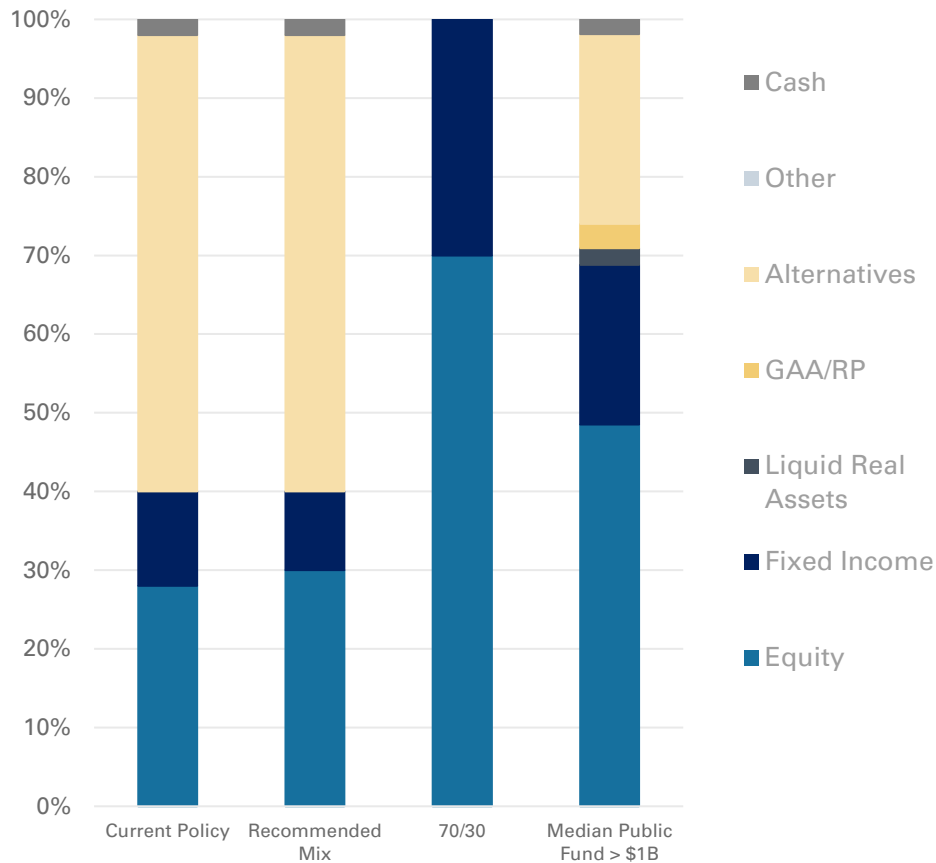


Note: Modeling used smoothed volatility

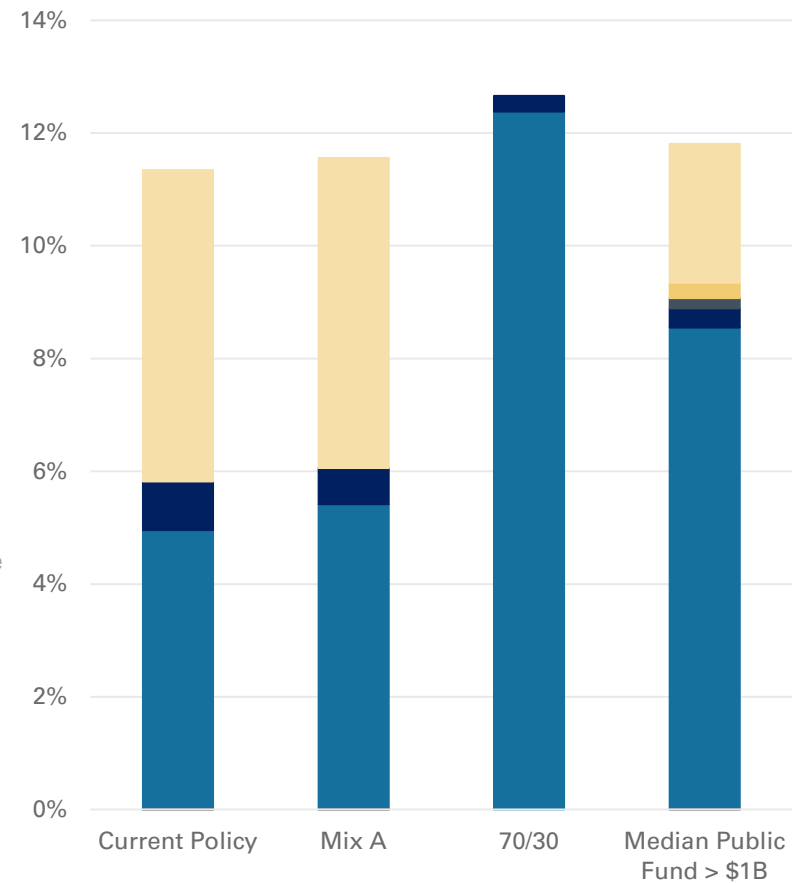
ASSET ALLOCATION

CAPITAL ALLOCATION VS RISK ALLOCATION

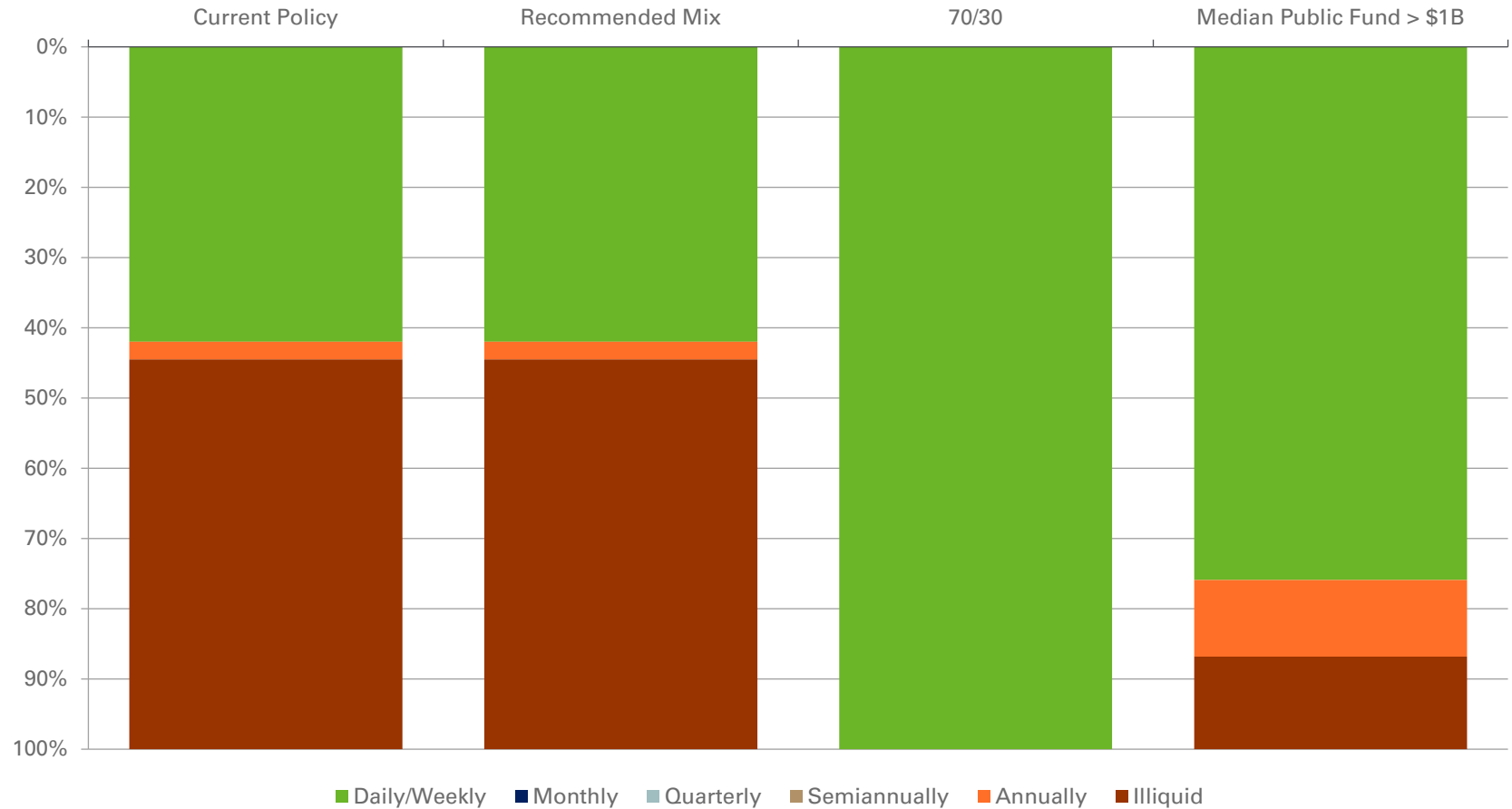
Asset Allocation By Asset Class



Asset Risk By Asset Class

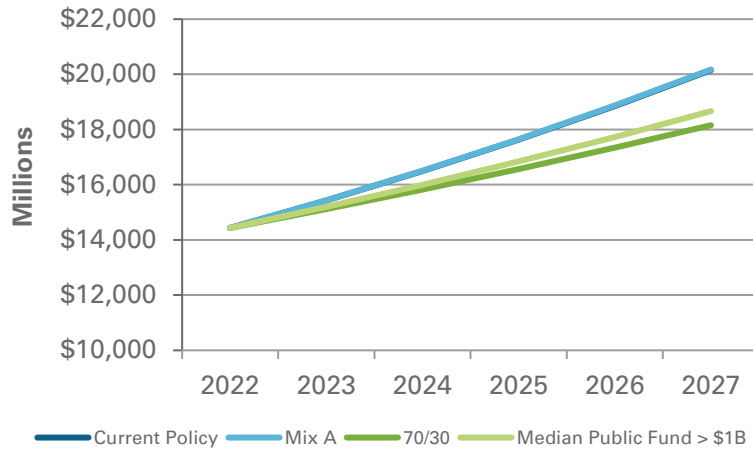


LIQUIDITY PROFILES

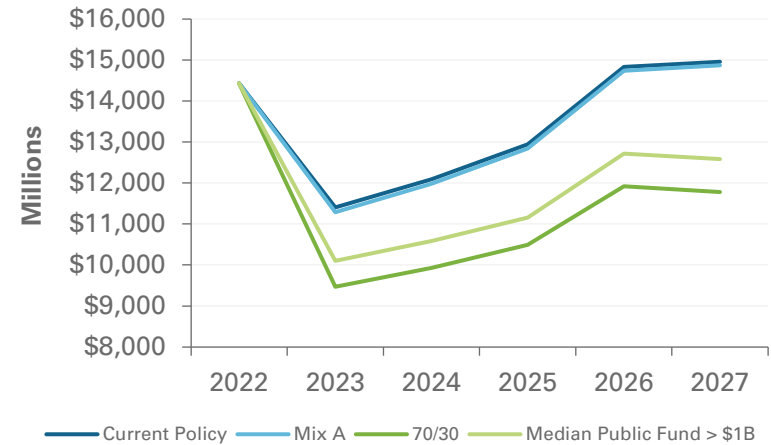


SCENARIO ANALYSIS

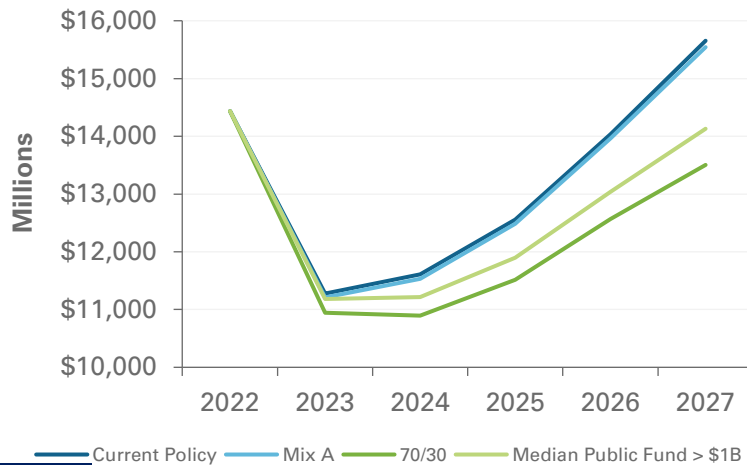
Base Case



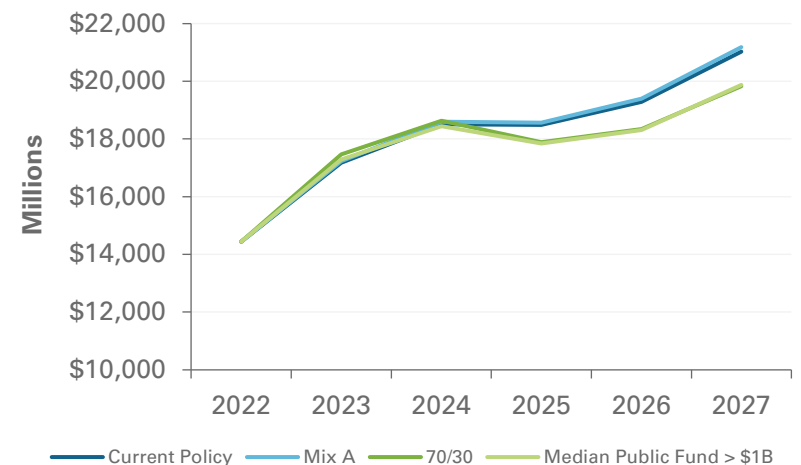
Stagflation



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**

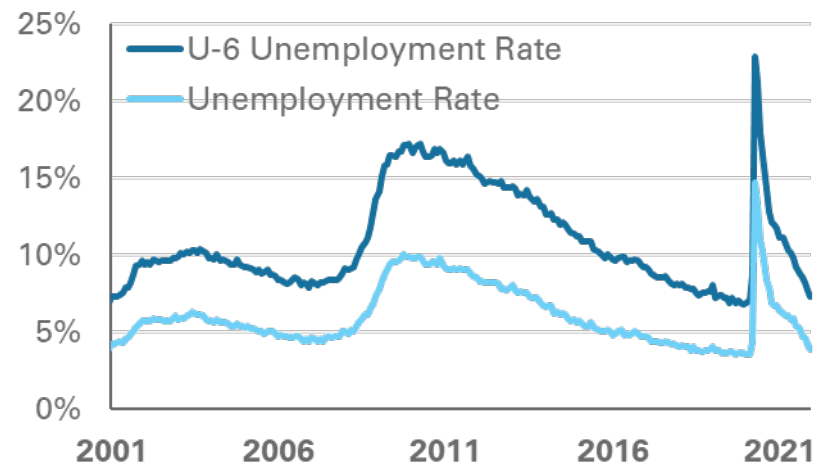
4

**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

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

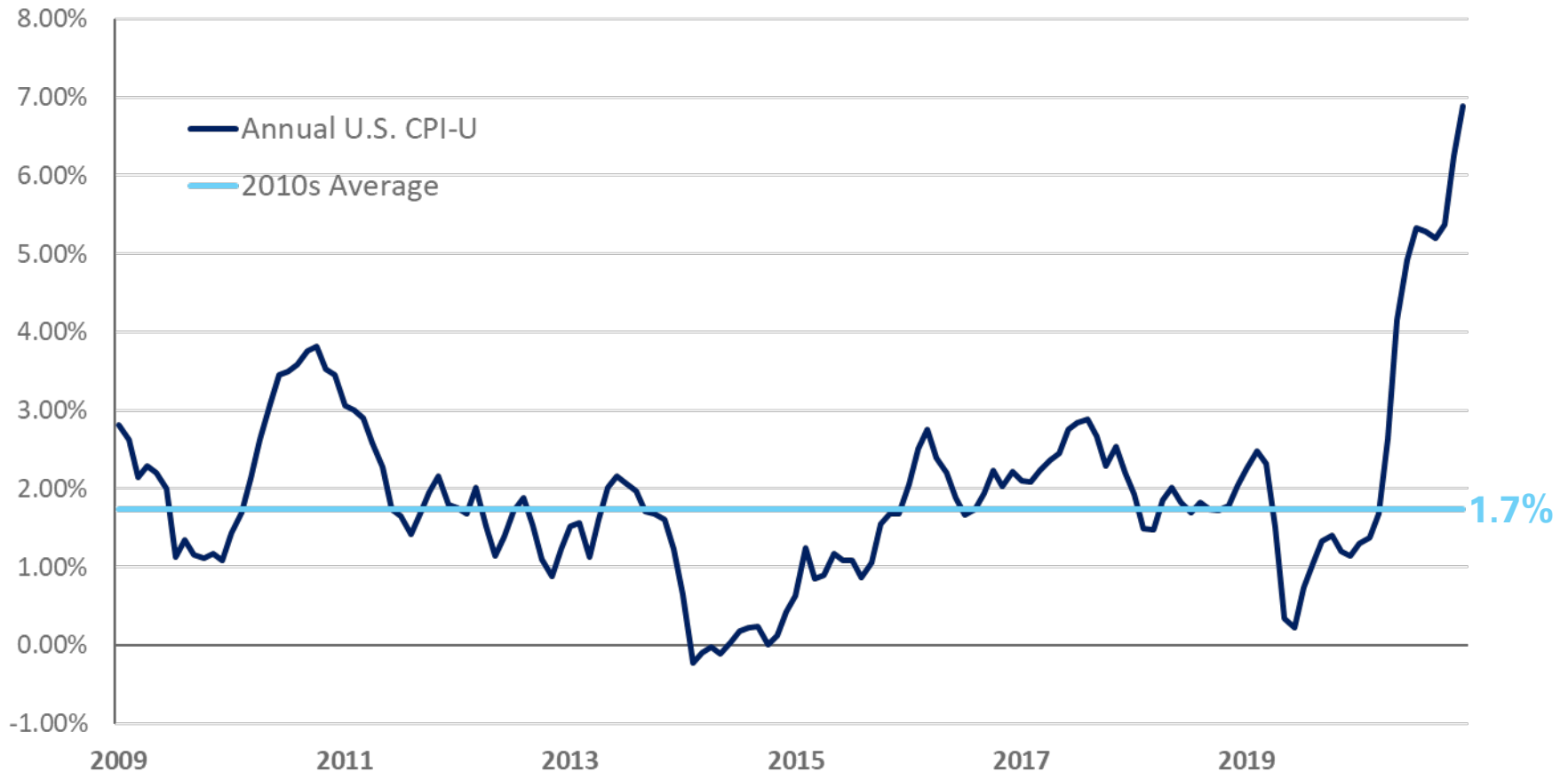
- Diminishing policy support and higher levels of inflation/growth are driving a transition from Fed policy as the dominant input for capital markets to economic fundamentals
 - This transition will dramatically influence the pricing of risk premia across capital markets and the economic outcome may track a wide regime spectrum
- Permanent Interventions enhances investor sentiment but is cyclically fading as monetary policy shifts to a less accommodative stance
 - The Federal Reserve has begun tapering asset purchases and recent commentary suggests rate liftoff may happen sooner than anticipated given the economic and inflation backdrop
- The importance of this theme may increase as supply-chain disruptions and inflationary pressures strain the electorate and geopolitical relationships
 - The world will likely be faced with an amplified wealth divide given economic and labor market conditions, which has historically driven more volatile political outcomes
- The “regulatory reset” highlights the potential for economic and capital market volatility on the country’s long transition path
 - While in-line with the longer-term economic goals, these regulations have negatively impacted market sentiment; creating a tail-risk for market and economic contagion

MACROECONOMIC



HEADLINE INFLATION INCREASED DURING 2021

ANNUAL U.S. CPI-U

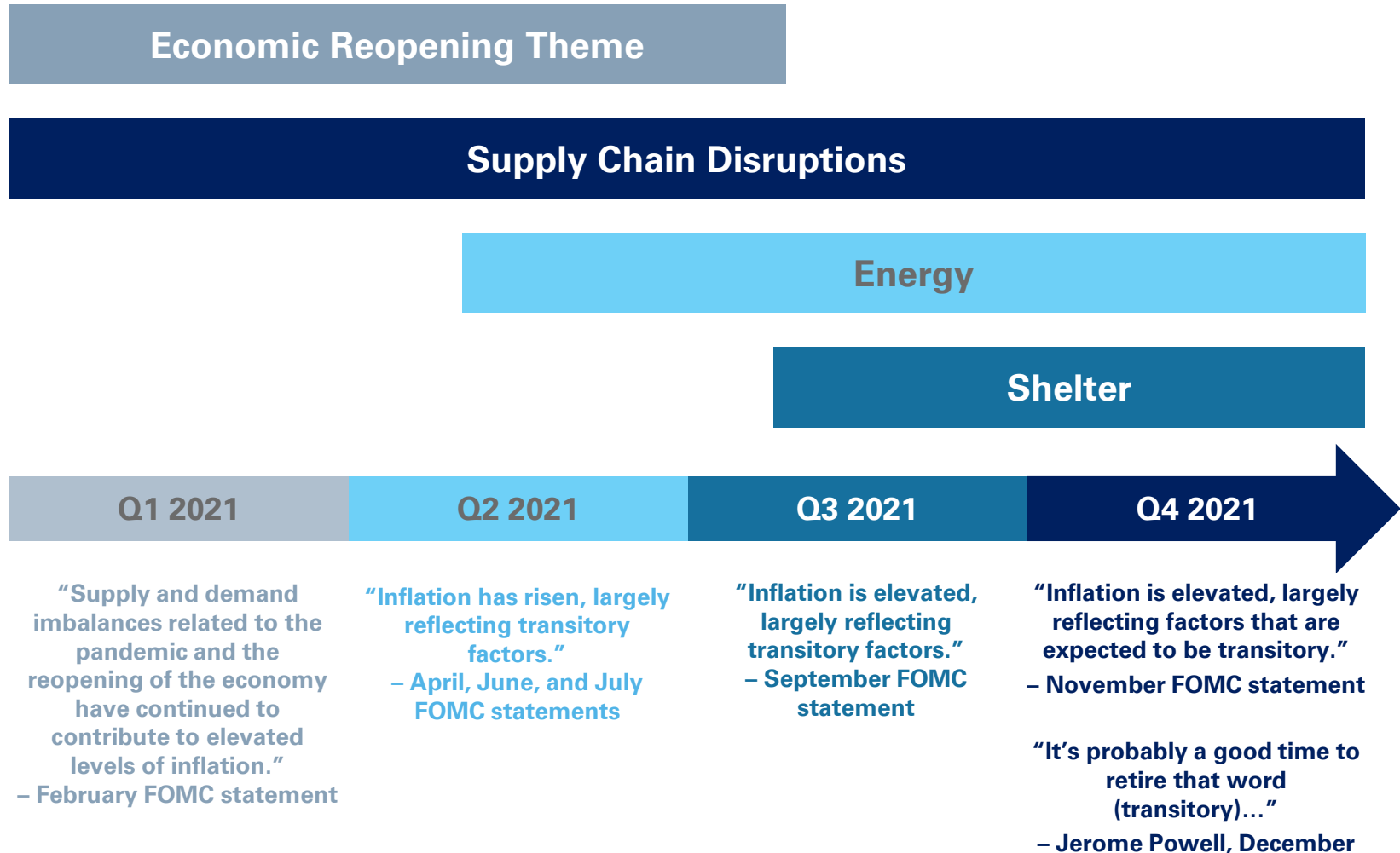


Notes: Data as of 11/30/2021

Sources: Bureau of Labor Statistics, FactSet

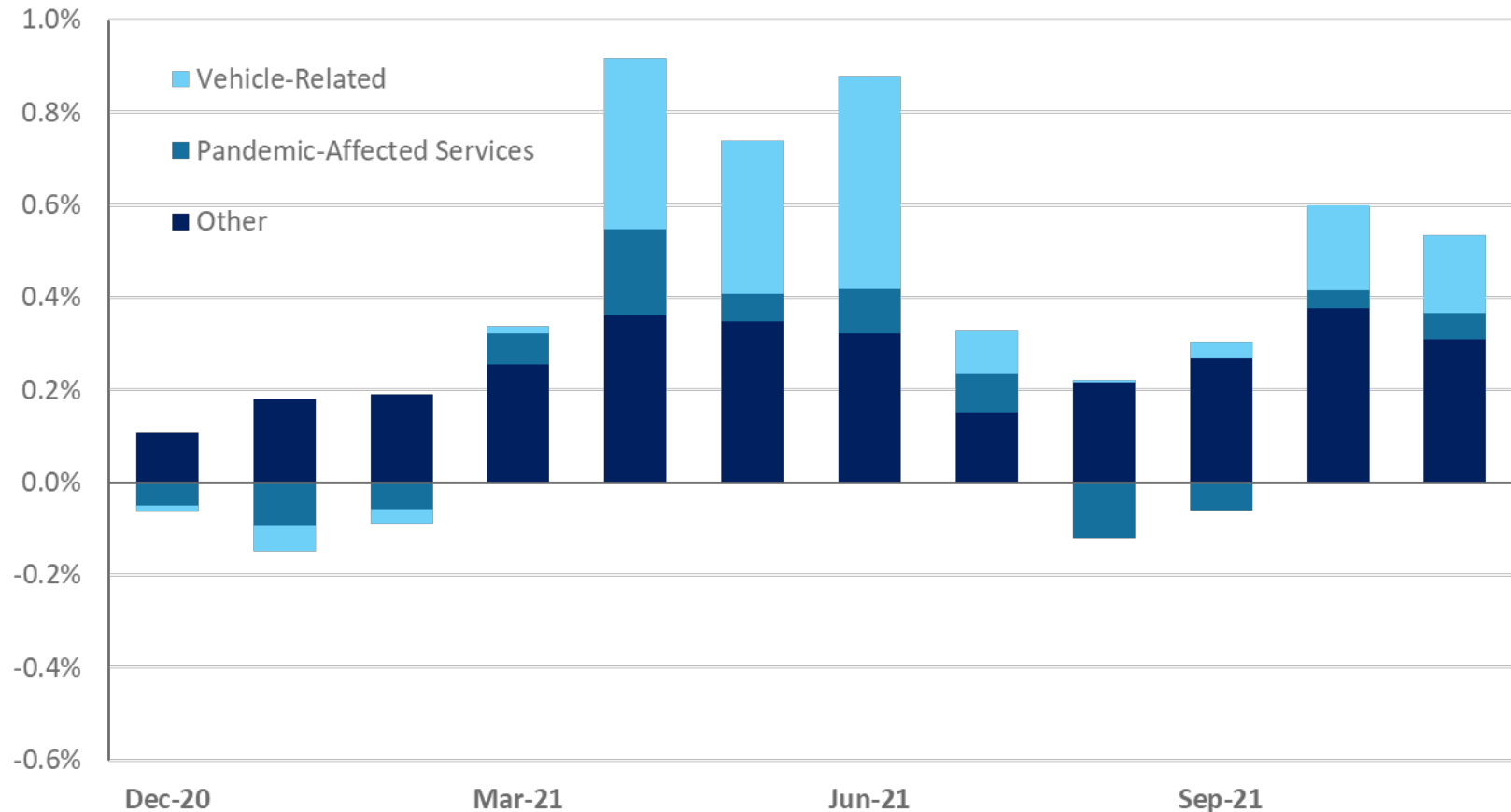
WHAT HAS CAUSED THE UPTICK IN INFLATION?

THE INFLATION NARRATIVE HAS EVOLVED THROUGHOUT 2021



SOME TRANSITORY FACTORS HAVE WANED...

CONTRIBUTION TO MONTHLY CORE CPI-U

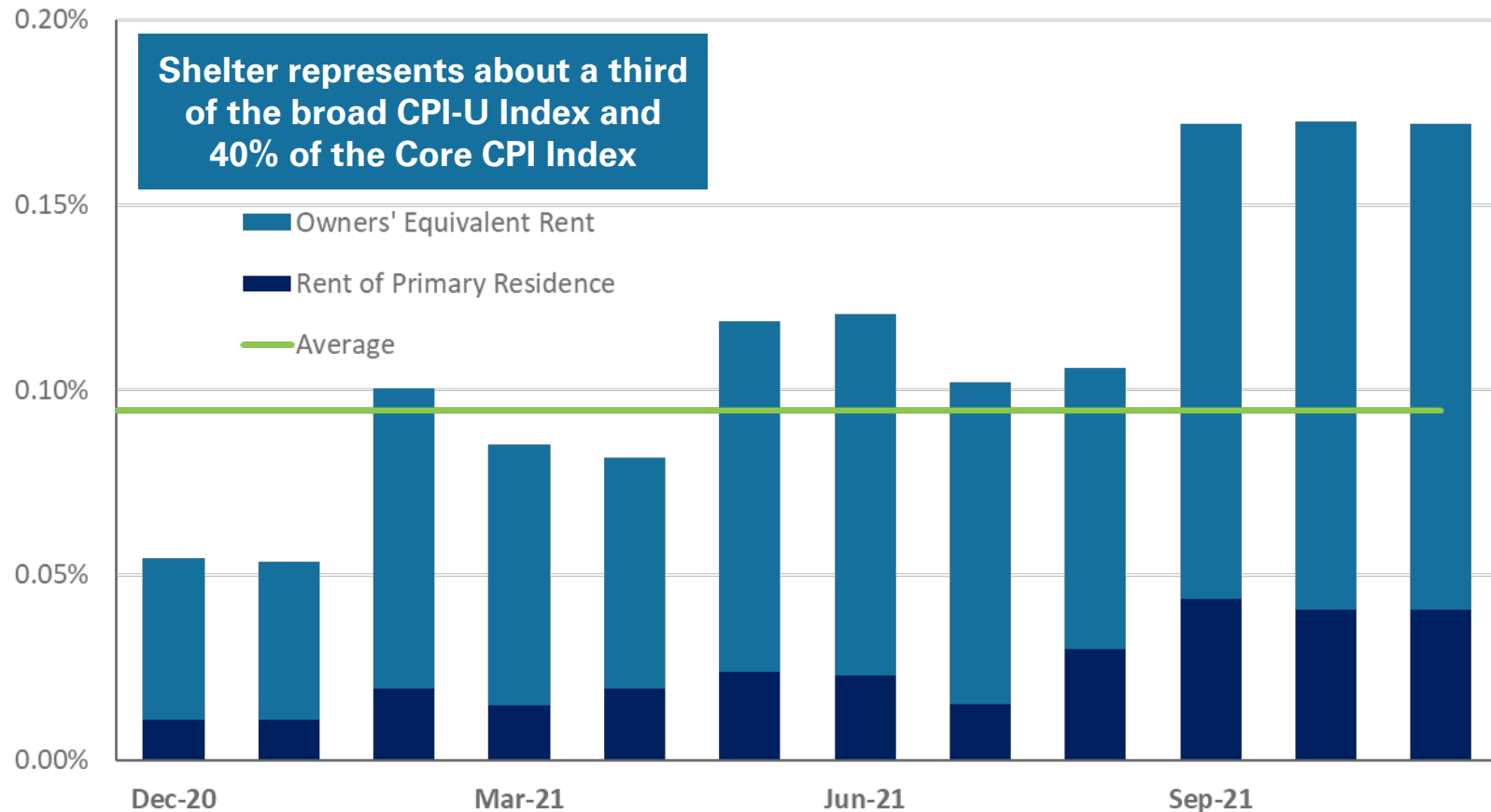


Notes: Vehicle-Related includes New Vehicles, Used Cars & Trucks, and Motor Vehicle Parts. Pandemic-Affected Services includes Airfare, Hotels, and Admissions to Events. As of 11/30/2021

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

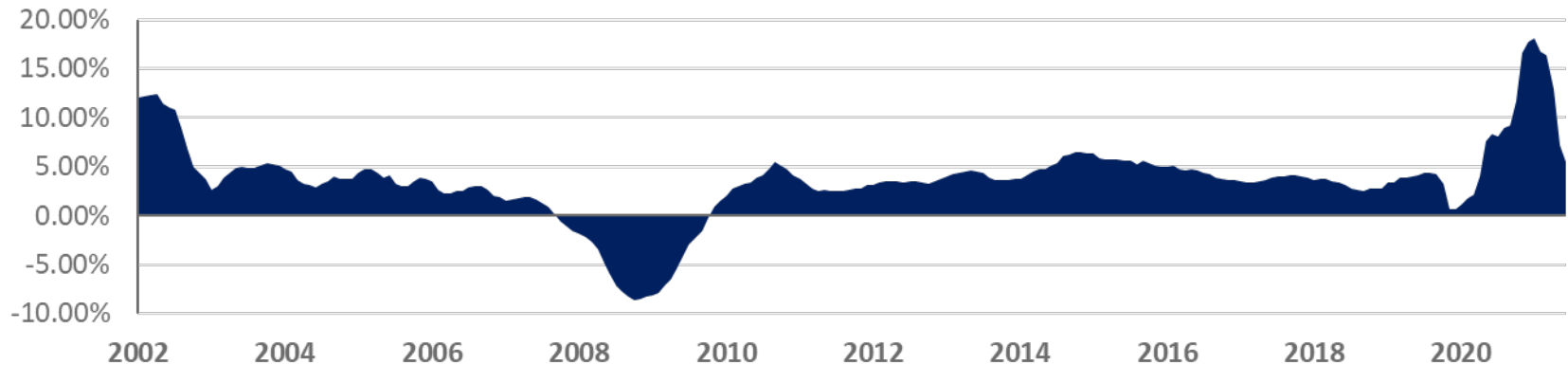
SUPPLY CONSTRAINTS ARE IMPACTFUL

RETAILERS: INVENTORY-TO-SALES RATIO

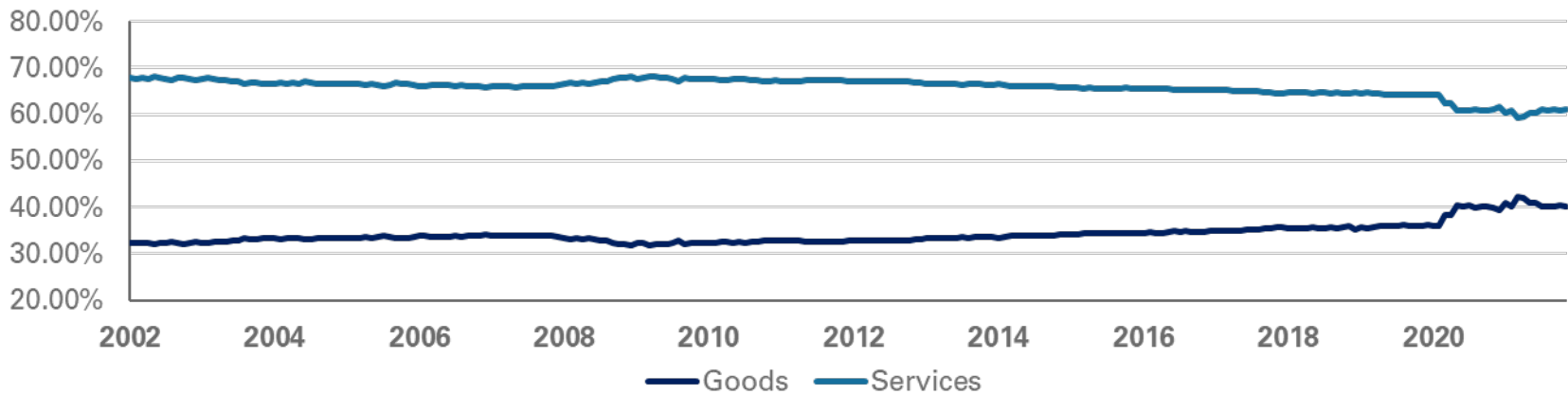


BUT A SURGE IN DEMAND IS ALSO CONTRIBUTING

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

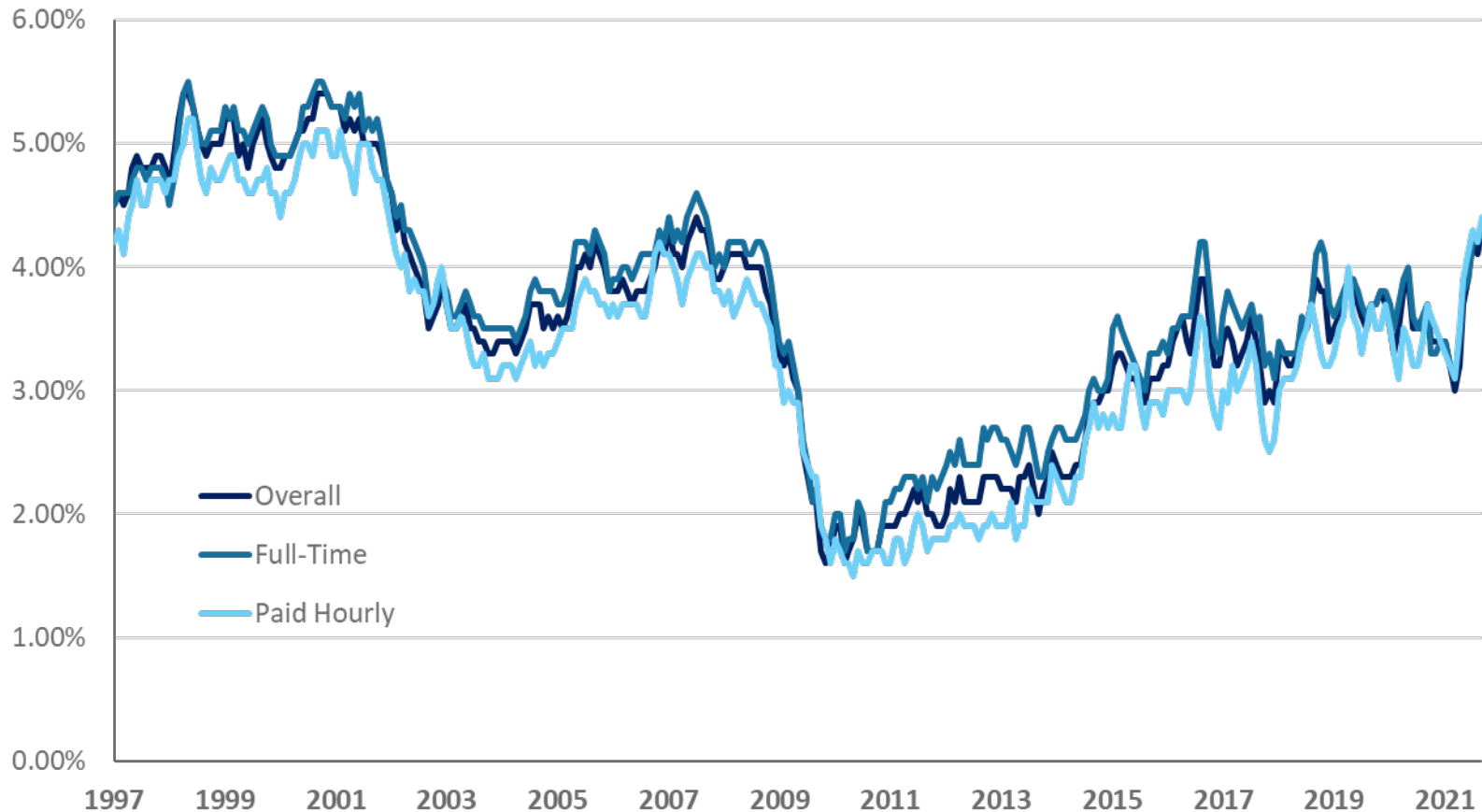


REAL PERSONAL CONSUMPTION EXPENDITURES



WAGES ARE AN OUTSTANDING QUESTION

THREE-MONTH MOVING AVERAGE OF MEDIAN WAGE GROWTH

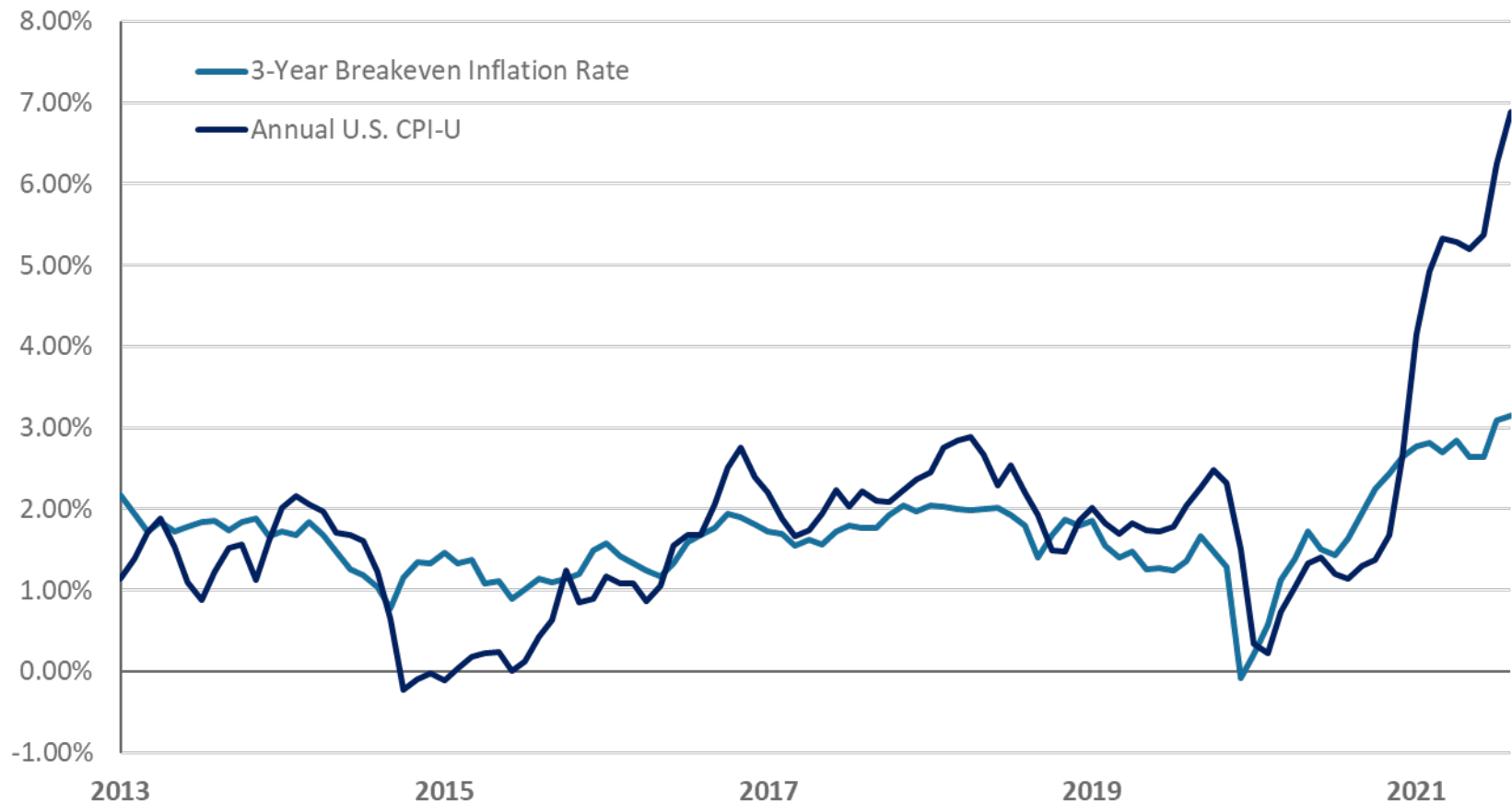


Notes: Represents hourly data; <https://www.atlantafed.org/chcs/wage-growth-tracker>; As of 11/30/2021

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



INFLATION ASSUMPTIONS

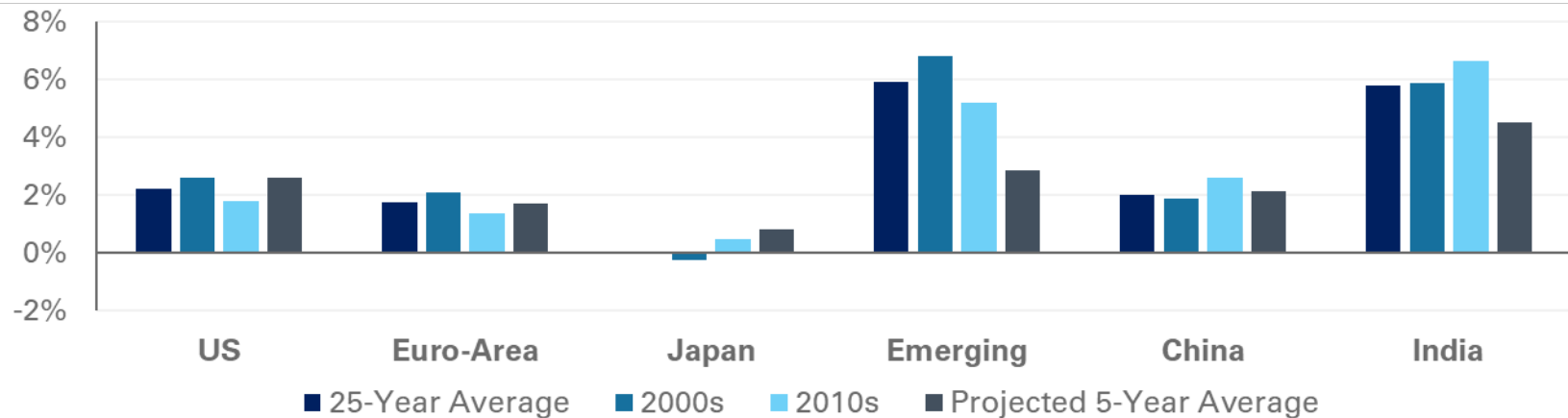
OVERVIEW

- **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

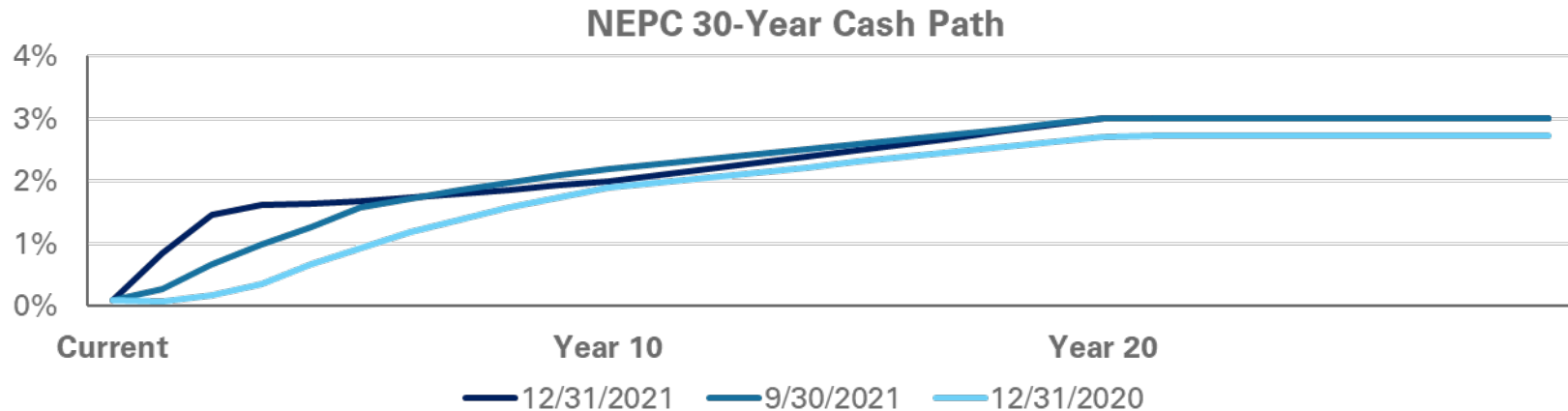
HISTORICAL INFLATION



- **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

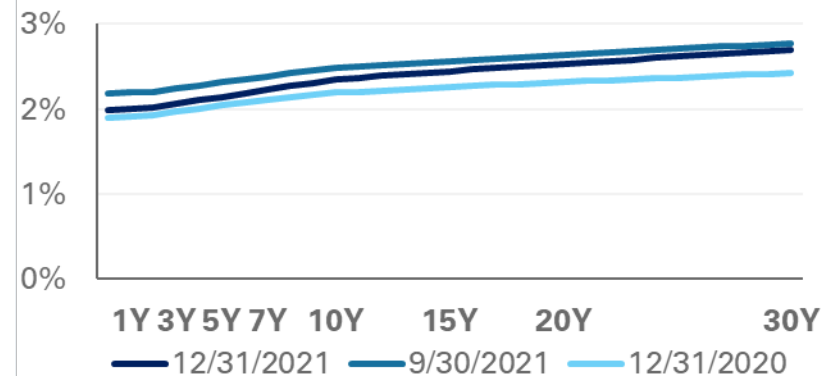


- **Cash is a foundational input for all asset class return expectations**
 - Cash + risk premia is an input for long-term asset class return projections
- **Cash assumptions reflect inflation and real interest rates**
- **U.S. nominal rate forecasts reflect a more aggressive rate hike path in the near-term,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

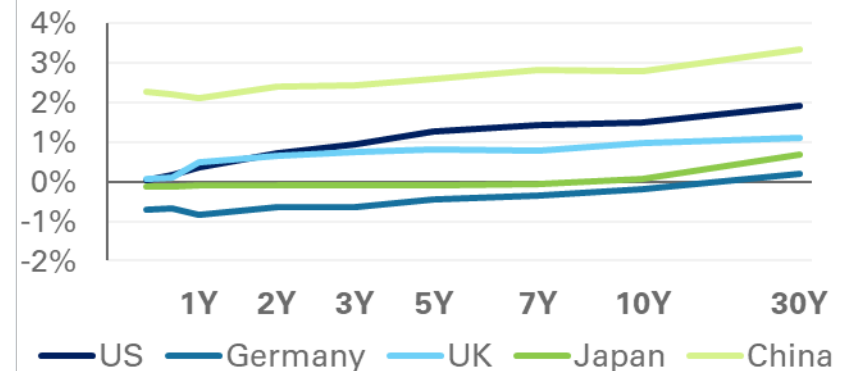
GLOBAL INTEREST RATE EXPECTATIONS

- **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**

NEPC 10-Year Forward Curve



Global Yield Curves



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

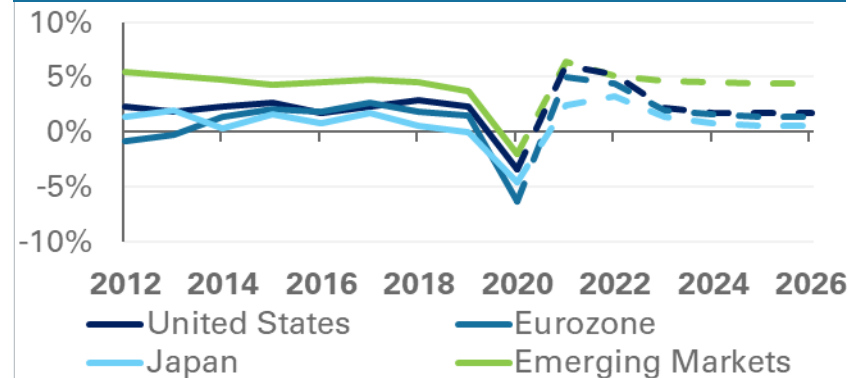
*Calculated as a blend of other asset classes

PUBLIC EQUITY

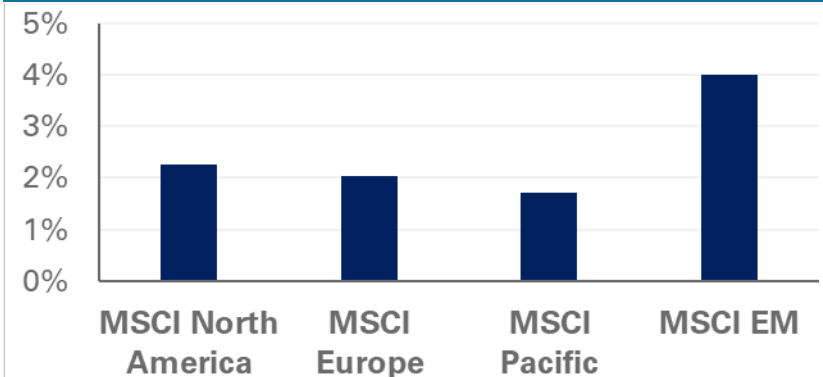
REAL EARNINGS GROWTH

- **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

Real GDP Growth Projections

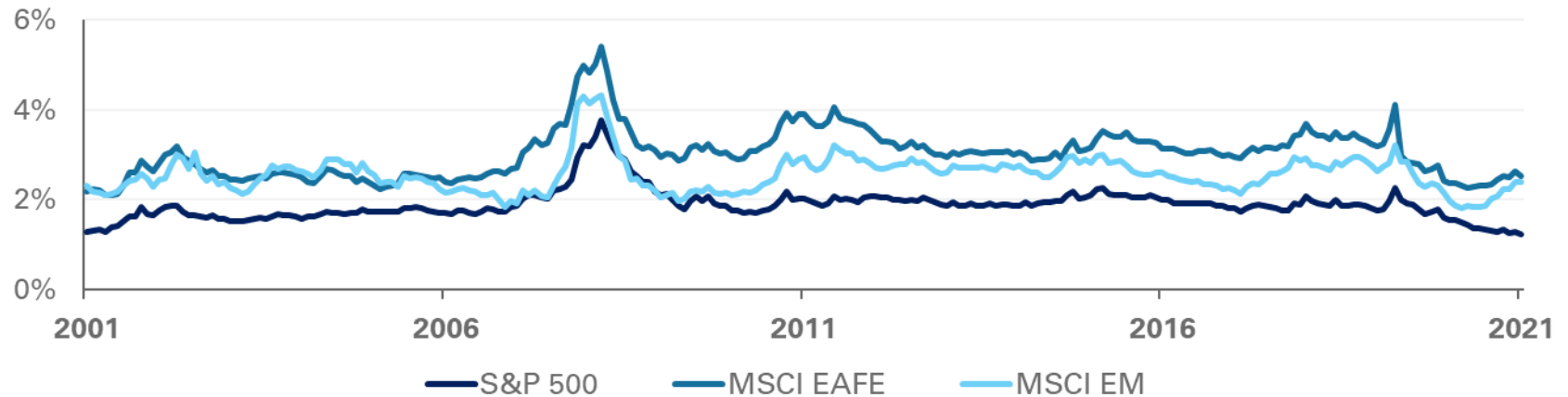


Expected 5-Year Real Growth



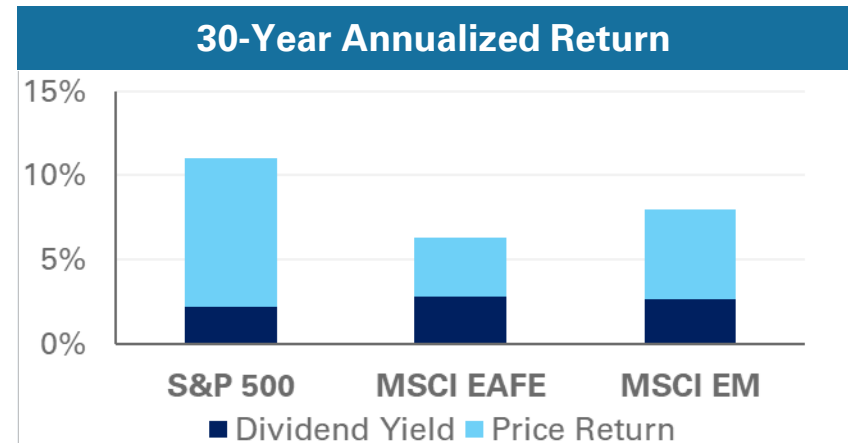
PUBLIC EQUITY

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%

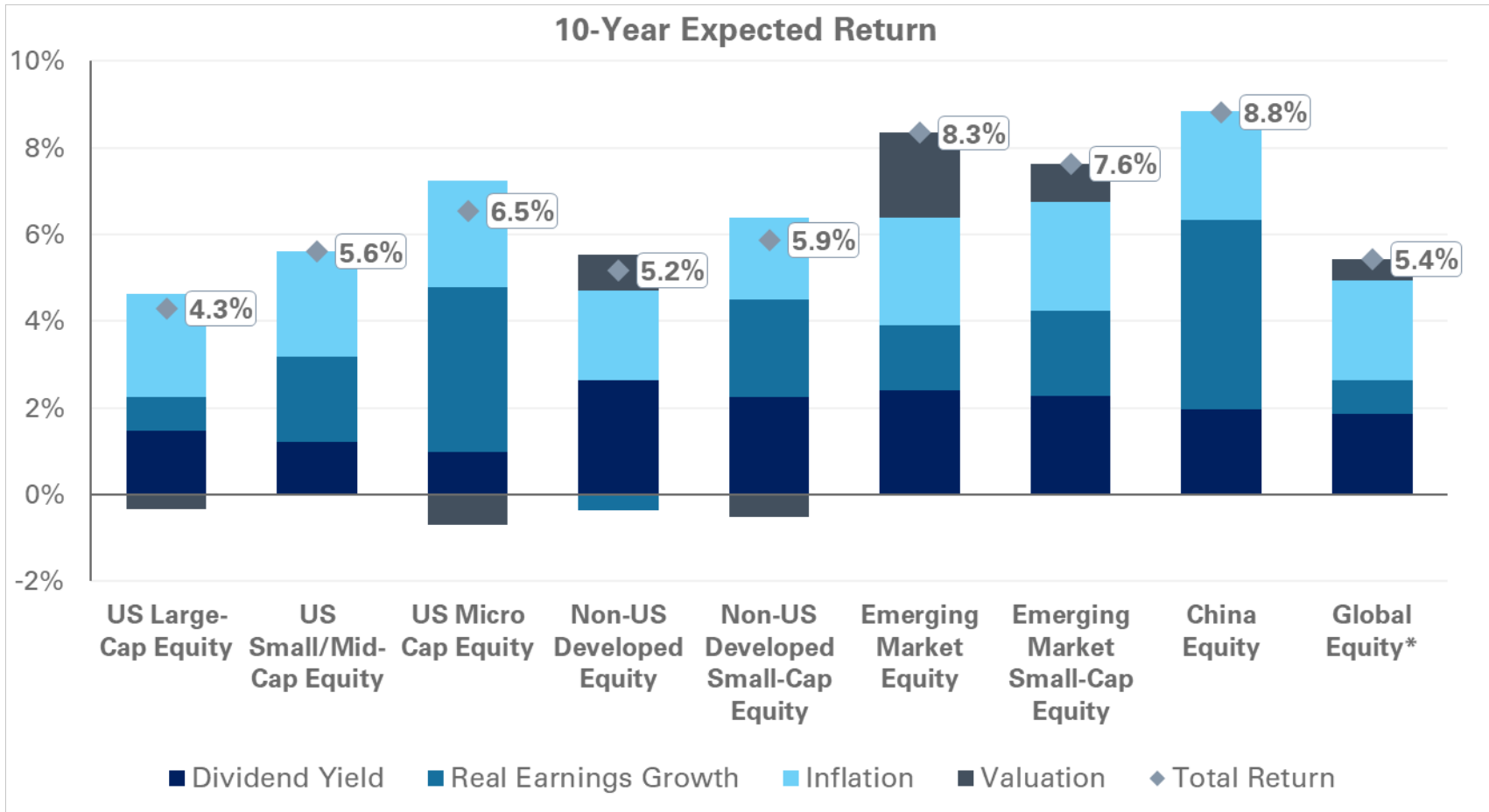


- ### S&P 500 Shiller PE Ratio
-
- The chart displays the S&P 500 Shiller PE Ratio from 1926 to 2016. The y-axis represents the ratio, ranging from 0 to 60. The x-axis shows years from 1926 to 2016. A dark blue line represents the Shiller PE ratio, which fluctuates over time, with a notable peak around 2000 and a low around 1932. A light blue horizontal line represents the long-term average, which is approximately 22.
- | Year | Shiller PE | Long-Term Average |
|------|------------|-------------------|
| 1926 | ~15 | ~22 |
| 1941 | ~15 | ~22 |
| 1956 | ~20 | ~22 |
| 1971 | ~20 | ~22 |
| 1986 | ~15 | ~22 |
| 2001 | ~45 | ~22 |
| 2016 | ~40 | ~22 |
- ### Trailing PE Relative Median
-
- The chart compares the Current Trailing PE Ratio (dark blue bars) and the 20-Year Median (light blue bars) for various market indices. The y-axis represents the ratio, ranging from 0 to 30. The x-axis lists the indices: S&P 500, Russell 2500*, MSCI EAFE, MSCI EAFE SC*, MSCI EM, and MSCI EM SC*.
- | Index | Current | 20-Year Median |
|---------------|---------|----------------|
| S&P 500 | ~23 | ~17 |
| Russell 2500* | ~16 | ~12 |
| MSCI EAFE | ~17 | ~15 |
| MSCI EAFE SC* | ~13 | ~11 |
| MSCI EM | ~14 | ~13 |
| MSCI EM SC* | ~10 | ~10 |

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

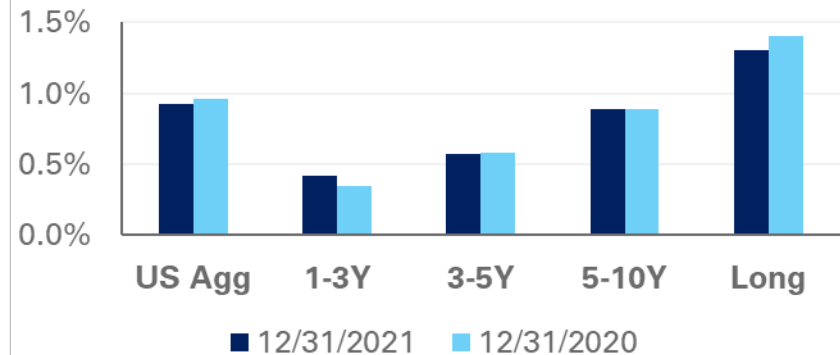
*Calculated as a blend of other asset classes

FIXED INCOME

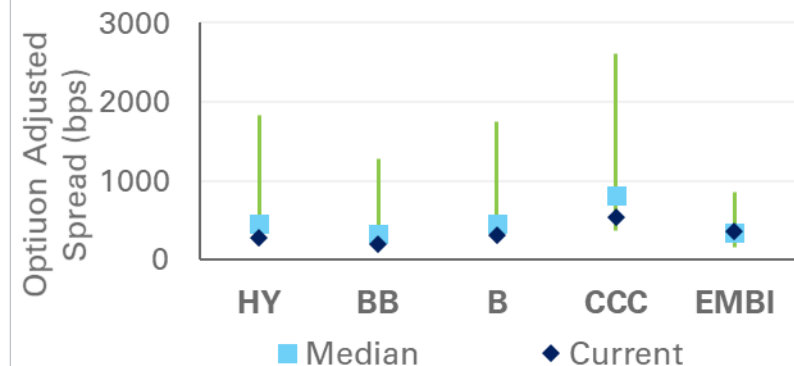
CREDIT SPREADS

- 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

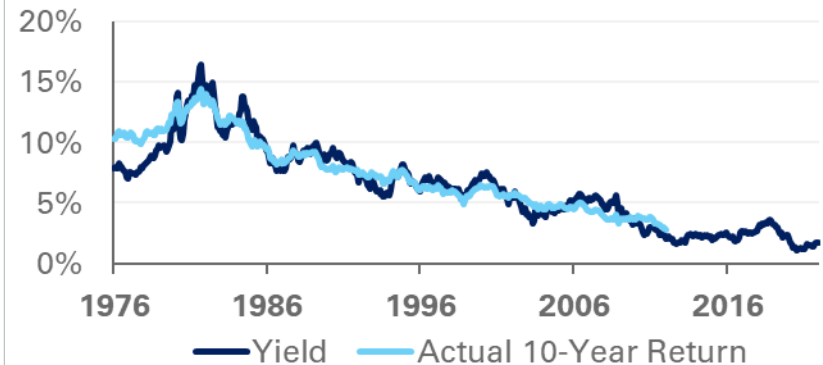


FIXED INCOME

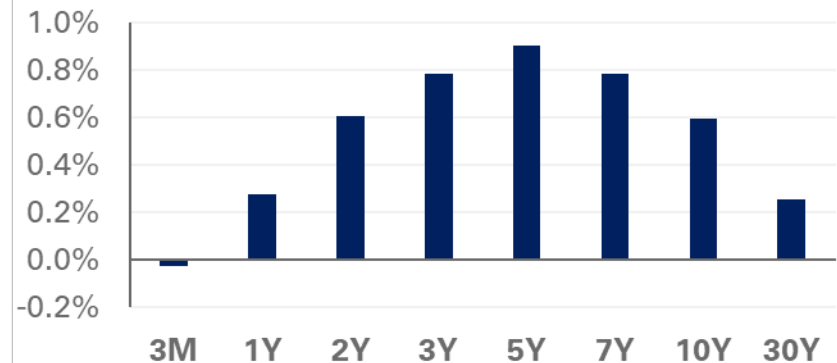
GOVERNMENT RATES

- **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

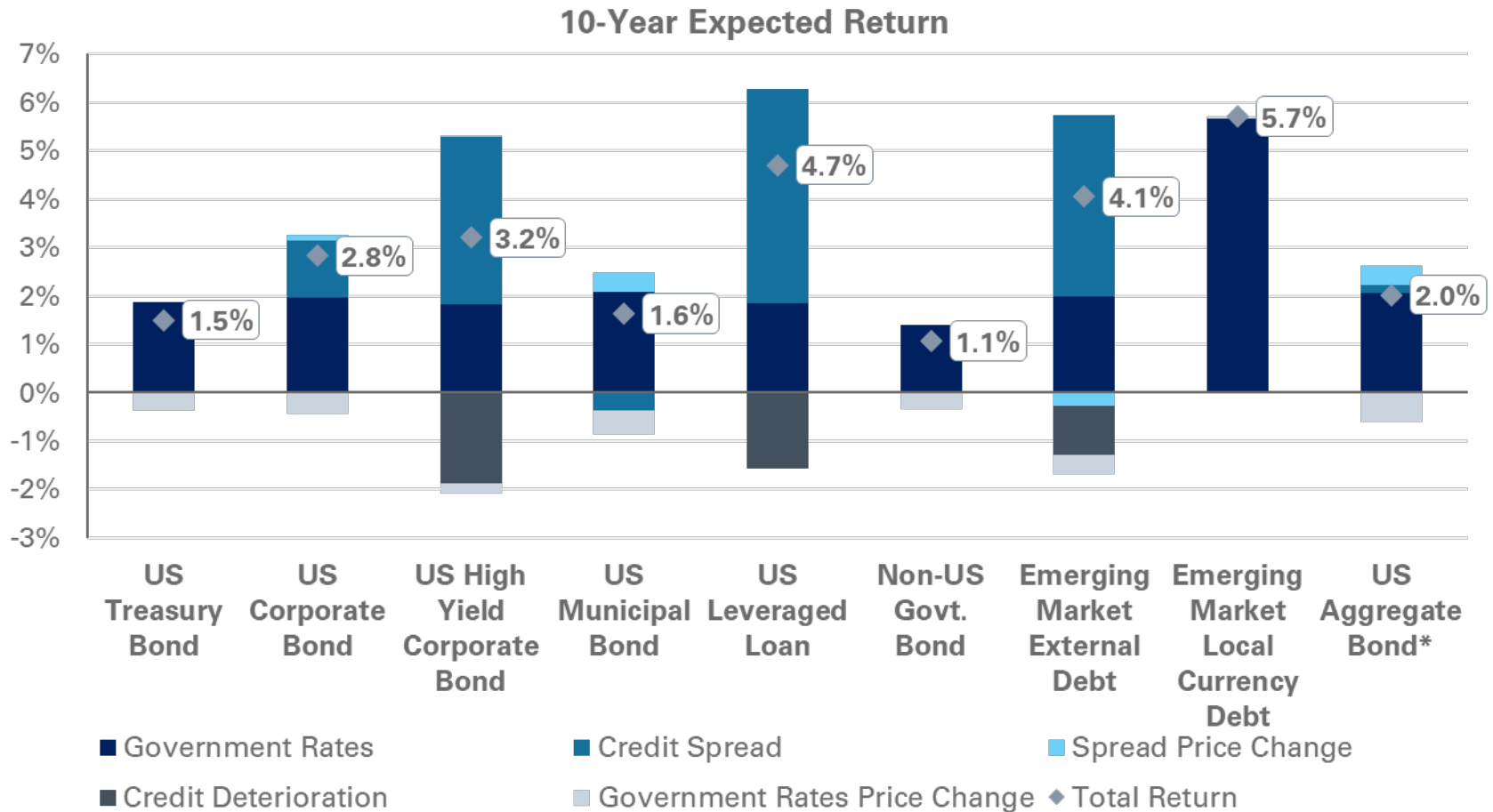


Annual Change in Treasury Yields



FIXED INCOME

BUILDING BLOCKS

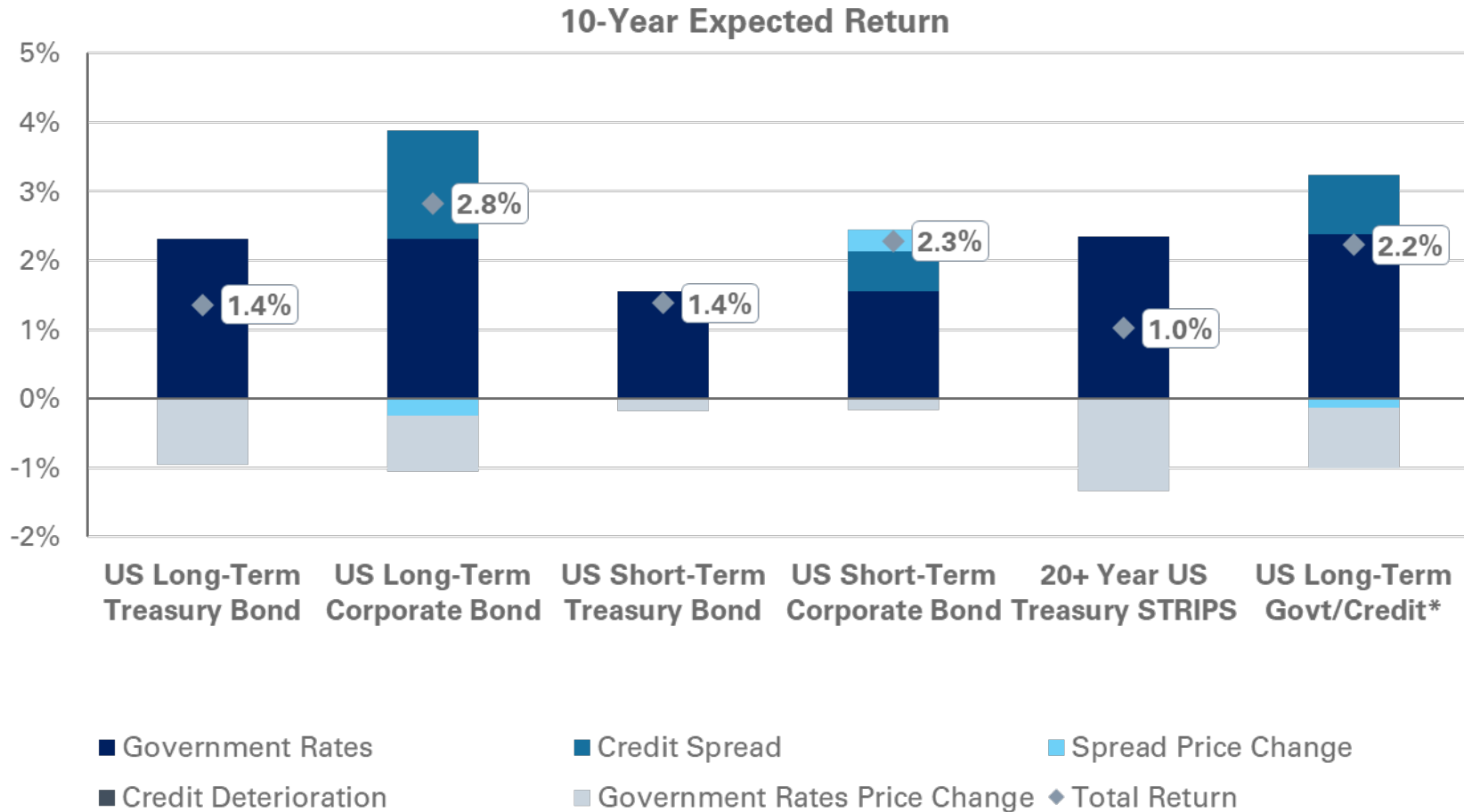


Source: NEPC

*Calculated as a blend of other classes

FIXED INCOME

BUILDING BLOCKS



Source: NEPC

*Calculated as a blend of other classes

ALTERNATIVE ASSETS



ALTERNATIVE ASSETS

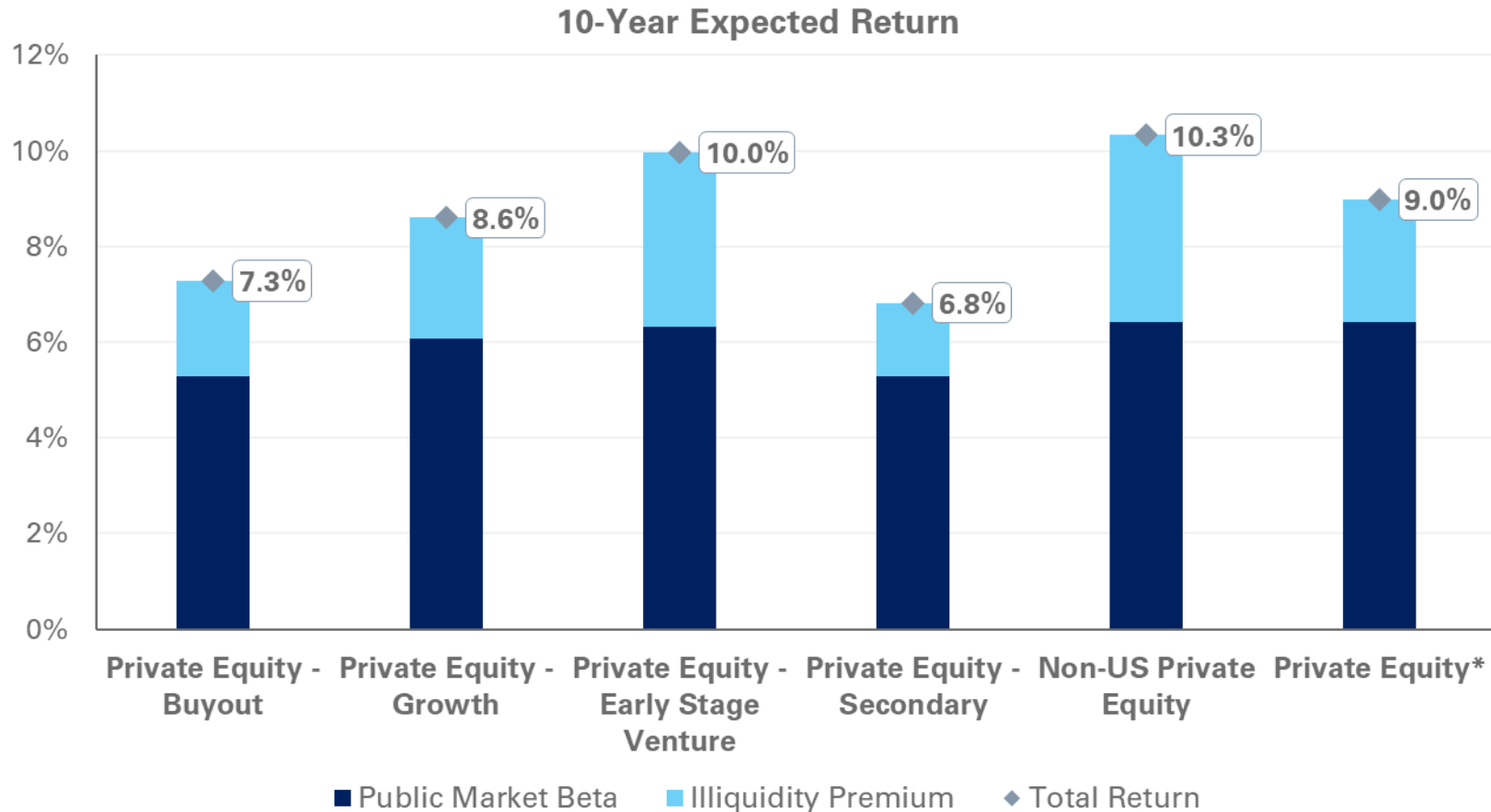
METHODOLOGY



- **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

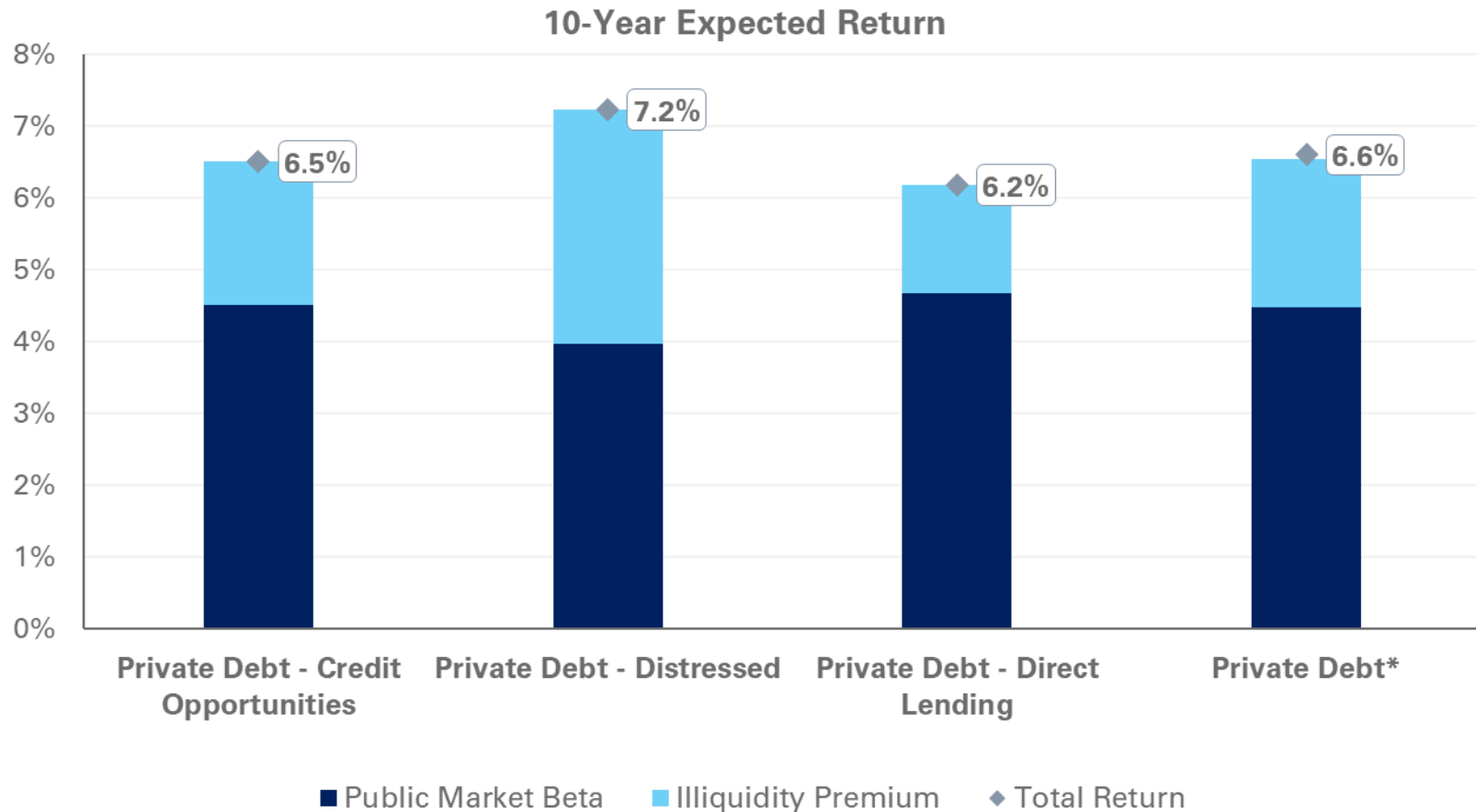


Source: NEPC

*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

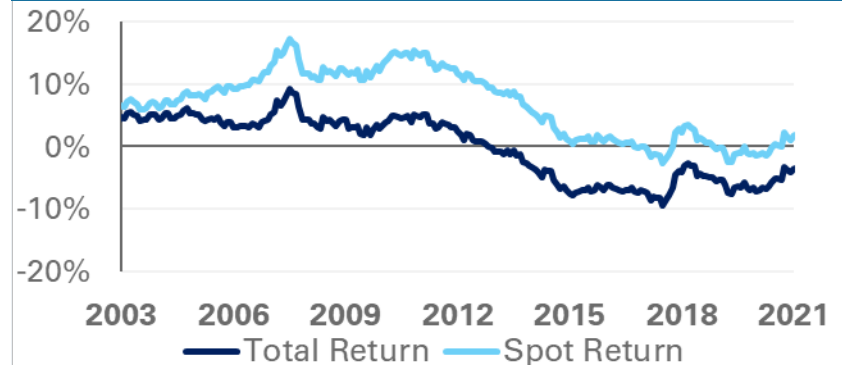
*Calculated as a blend of other asset classes

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% |

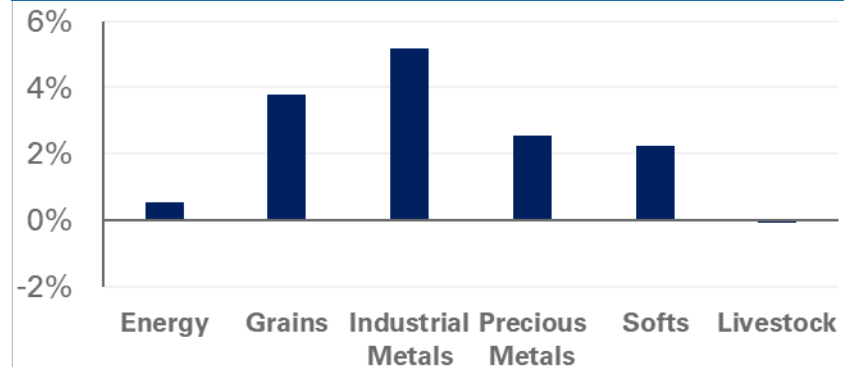
Sources: Bloomberg, NCREIF, Alerian, NAREIT, S&P, FactSet, NEPC

*Commodity Index Roll Yield represents a proprietary calculation methodology

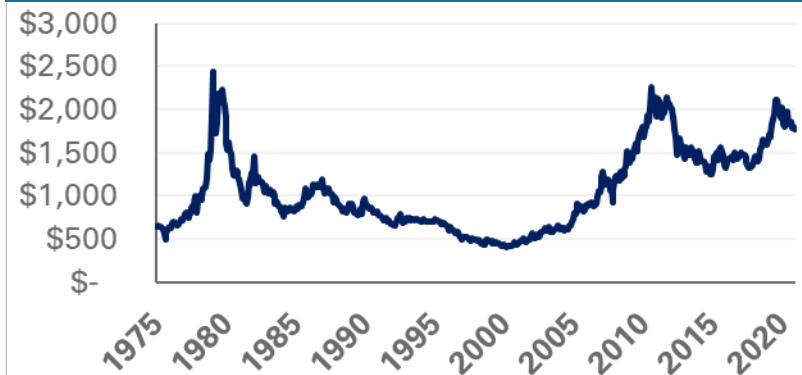
REAL ASSET VALUATION

- **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

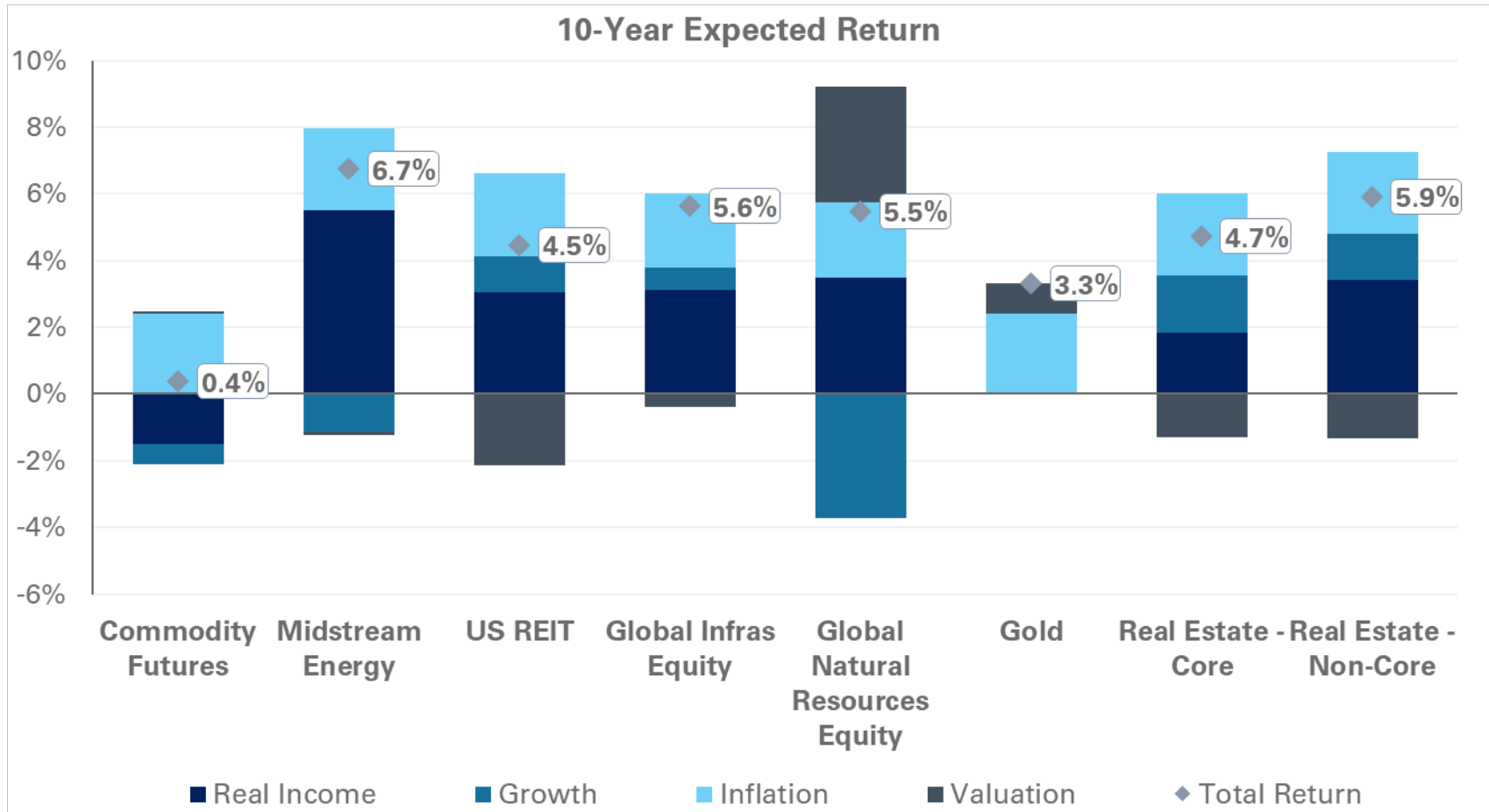


Real Price of Gold



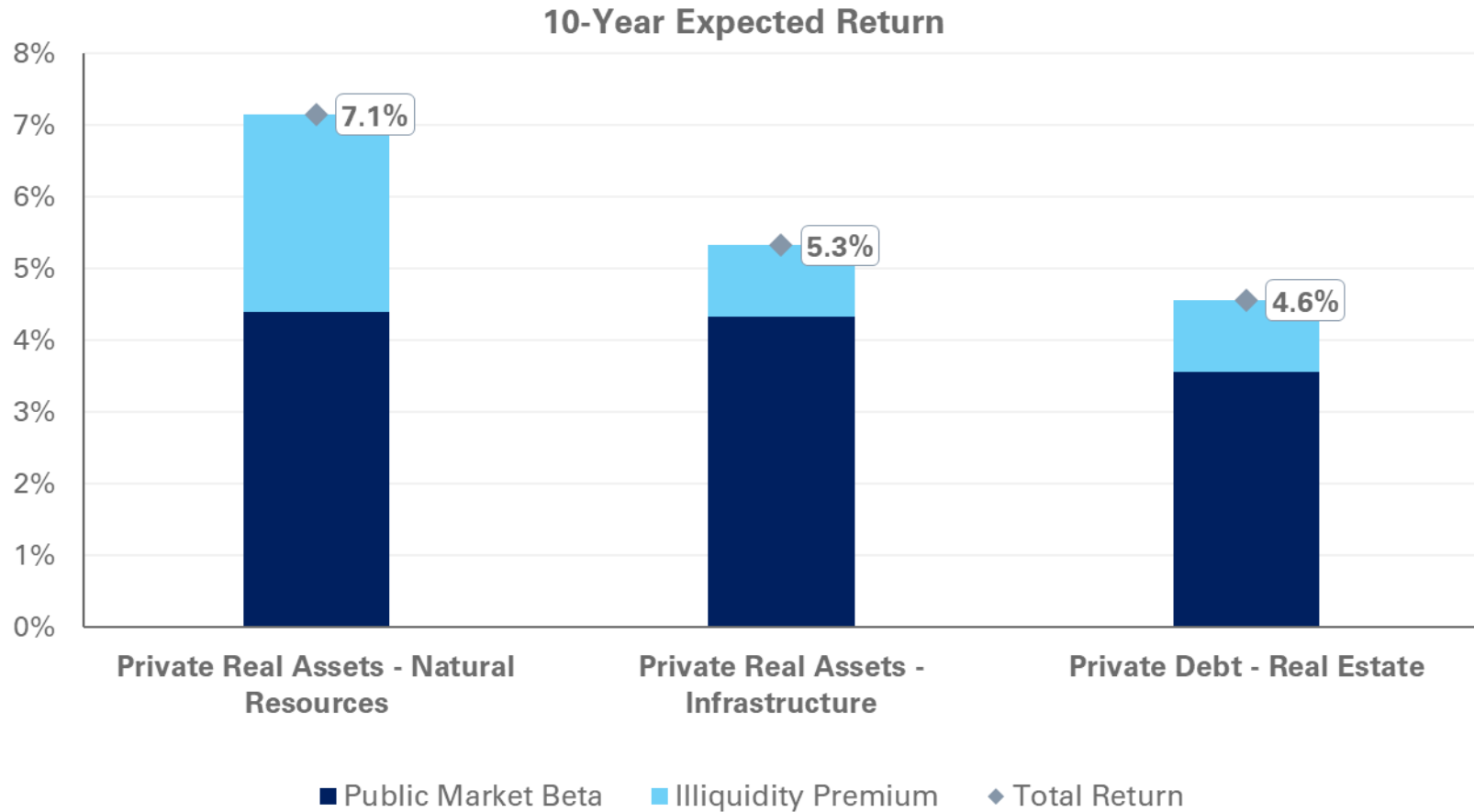
REAL ASSET

BUILDING BLOCKS



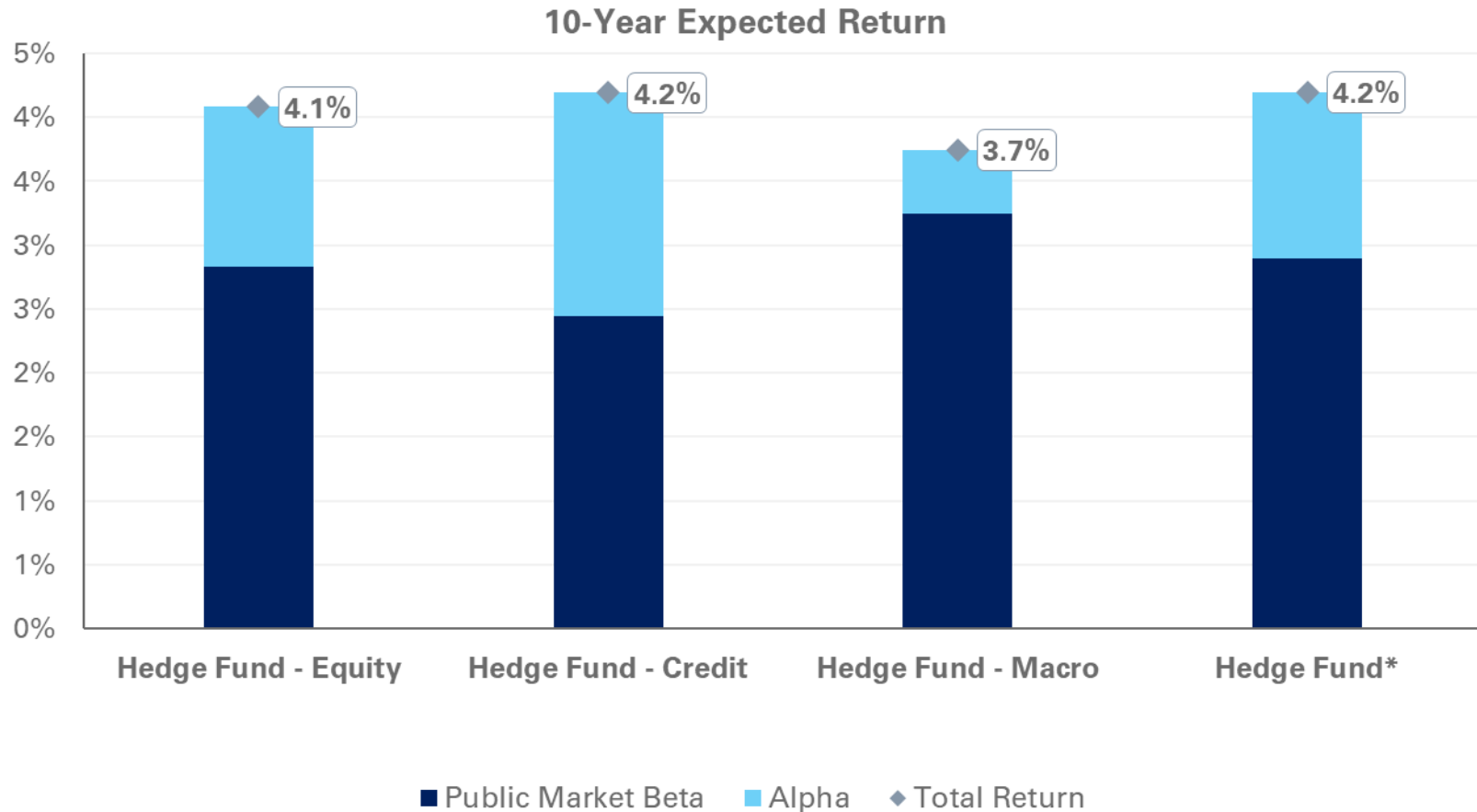
PRIVATE REAL ASSET

BUILDING BLOCKS



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% |

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

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% |

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% |

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% |

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% |

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% |

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% |

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% |

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% |

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.

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