# RECOMMENDED ASSET ALLOCATION TARGETS

## SAN BERNARDINO COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

San Bernardino County Employees' Retirement Association

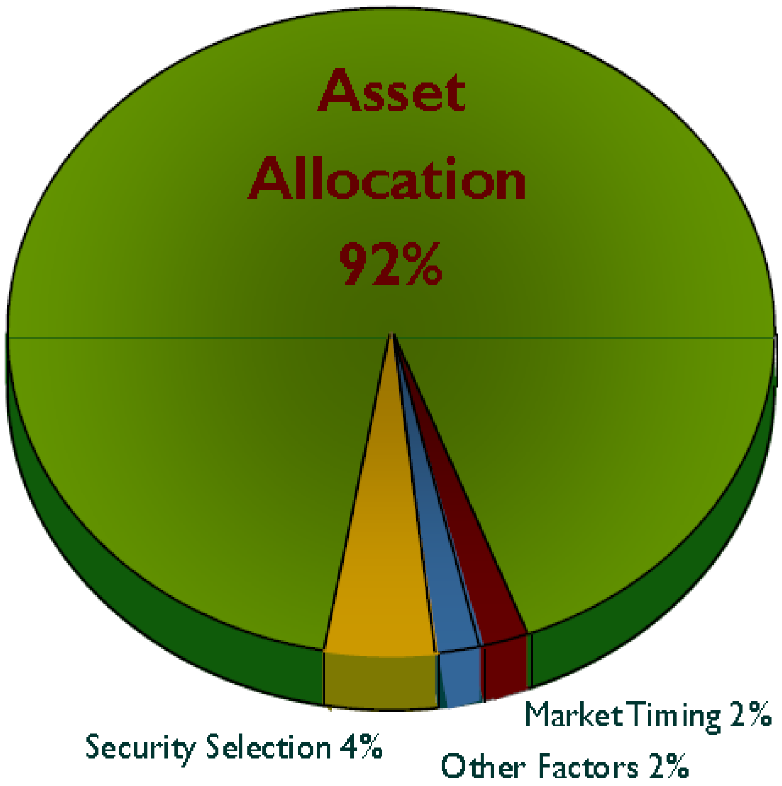
**June, 2020**

**NEPC Research**

BOSTON | ATLANTA | CHARLOTTE | CHICAGO | DETROIT | LAS VEGAS | PORTLAND | SAN FRANCISCO

# ASSET ALLOCATION: THE KEY INVESTMENT DECISION

## Determinants of Portfolio Performance




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

# OVERVIEW / RECOMMENDATION

On an annual basis (and more frequently based on developments), NEPC spends a significant amount of time reviewing capital markets, including evolving capital market themes globally. This year, due to the impact of COVID-19 , we updated the forecasts as of 3/31/2020.

We publish intermediate and long term capital market projections for over 40 asset classes. Starting in 2020, we are utilizing a 10 year time horizon for the intermediate term. We provide these forecasts to the actuary to assist in their actuarial experience studies.

We then apply the forecasts to SBCERA's current strategic targets as well as alternate mixes to develop a profile of potential returns and risks associated with each mix, allowing the Board to evaluate and determine if a change in strategic targets (as well as ranges and benchmarks) is warranted

At the May IC meeting, staff/NEPC recommended no change to the current asset allocation targets. Targets, Ranges, Benchmark recommendations are contained on next page

Exhibit A: Page 4

# PROPOSED ASSET ALLOCATION POLICY & RANGES

| Asset Class | 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 | 1.00% | -4% – 6% | |
| International Credit | 11.00% | 6% – 16% | |
| Emerging Market Debt | 8.00% | 1% – 12% | |
| **Subtotal** | **20.00%** | **13% – 23%** | |
| **Real Estate** | | | **NCREIF Property Index** |
| Core | 3.50% | 0% – 5% | |
| Non-Core | 3.50% | 0% – 5% | |
| **Subtotal** | **7.00%** | **0% – 14%** | |
| **Real Assets** | | | **67% Bloomberg Commodities Index 33% BBG US TIPS Index** |
| Timber | 2.00% | 0% – 7% | |
| Commodities | 2.00% | -1% – 7% | |
| Infrastructure | 1.00% | 0% – 6% | |
| **Subtotal** | **5.00%** | **0% – 10%** | |
| **Private Equity** | **16.00%** | **6% – 21%** | **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** |
| **Total** | **100.00%** | | |

# ASSET ALLOCATION POLICY HISTORY

| Asset Class | 2002 | 2003 | 2005 | 2007 | 2008 | 2009 | 2010 | 2012 | 2013 | 2014 | 2017 | 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Domestic Equity | 43% | 33% | 32% | 29% | 20% | 10% | 11% | 13% | 13% | 13% | 13% | 13% |
| International Equity | 18% | 13% | 13% | 14% | 11% | 7% | 7% | 8% | 9% | 9% | 9% | 9% |
| Emerging Market Equity | | 3% | 3% | 4% | 4% | 3% | 4% | 5% | 6% | 6% | 6% | 6% |
| Private Equity | | 6% | 6% | 9% | 12% | 16% | 16% | 16% | 16% | 16% | 16% | 16% |
| **Total Equity** | **61%** | **55%** | **54%** | **56%** | **47%** | **36%** | **38%** | **42%** | **44%** | **44%** | **44%** | **44%** |
| | | | | | | | | | | | | |
| Domestic Fixed | 28% | 17% | 14% | 10% | 8% | 8% | 6% | 3% | 2% | 2% | 2% | 2% |
| Domestic Credit | | 8% | 8% | 4% | 8% | 13% | 13% | 14% | 13% | 13% | 13% | 13% |
| International Core/Credit | 5% | 5% | 5% | 3% | 8% | 9% | 10% | 10% | 11% | 12% | 12% | 12% |
| Emerging Market Debt | | 2% | 2% | 4% | 4% | 4% | 6% | 6% | 6% | 6% | 6% | 8% |
| Cash | | | | | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| **Total Debt** | **33%** | **32%** | **29%** | **21%** | **30%** | **36%** | **37%** | **35%** | **34%** | **35%** | **35%** | **37%** |
| | | | | | | | | | | | | |
| Real Estate | 6% | 8% | 8% | 8% | 8% | 10% | 9% | 9% | 9% | 9% | 9% | 7% |
| Timber | | | 2% | 4% | 3% | 3% | 3.5% | 3% | 3% | 2% | 2% | 2% |
| Infrastructure & Energy | | | | 2% | 2% | 2% | 2% | 1% | 1% | 1% | 1% | 1% |
| Commodities | | | | 2% | 3% | 3% | 3.5% | 3% | 2% | 2% | 2% | 2% |
| **Total Real Assets** | **6%** | **8%** | **10%** | **16%** | **16%** | **18%** | **18%** | **16%** | **15%** | **14%** | **14%** | **12%** |
| | | | | | | | | | | | | |
| Absolute Return | | 5% | 7% | 7% | 7% | 10% | 7% | 7% | 7% | 7% | 7% | 7% |
| | | | | | | | | | | | | |
| **Total** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** |

# 2020 SBCERA ASSET ALLOCATION PROCESS

# FORECAST TIME HORIZON ADJUSTMENT

## NEPC has adopted a 10-year return horizon and shifted from a 5-7 year outlook for capital market assumptions

The 5-7 year time horizon was intended to correspond to the approximate length of the market cycle; recent structural changes in the economic environment signal longer cycles

Themes and valuation shifts are likely to play out over a more extended time frame

This adjustment allows clients to more easily reconcile forecasts from multiple sources

## The 10-year horizon is representative of a long-term strategic view and should not be conflated with shorter-term market views

Forecasts are influenced by the path of key inputs such as growth, rates, and inflation, as well as terminal values of valuations, spreads, and profit margins

## This change in methodology introduces nuances relative to prior years:

The change in assumptions over time should be muted as convergence toward a terminal value is incorporated over a longer time frame

For 2020, 10-year forecasts would be slightly higher than a 5-7 year forecast as capital markets are assumed to normalize over time

The decline in 2020 capital market expectations is predominantly driven by changes from the 2019 market environment rather than longer time horizon

# ASSET CLASS ASSUMPTIONS OVERVIEW

**This report details NEPC 3/31/2020 Capital Market Assumptions**

Assumptions are published quarterly reflecting quarter-end market data

**Forward-looking asset class returns are higher and materially differ from the prior quarter in terms of the range of potential outcomes**

Embrace diversification to navigate the wide paths of potential economic scenarios

**We recommend investors consider increasing strategic targets to equity and credit as the long-term return differential over Treasuries is wider**

We encourage a focus on strategic asset allocation as a 10-year horizon is representative of a long-term strategic view and should not be conflated with shorter-term market views

**The use of quarterly capital market assumptions should be aligned with clients' fiscal year or planning cycle and many will use 12/31**

We expect clients will use one set of assumptions for asset allocation projects but given recent market activity, we anticipate greater use of 3/31 assumptions

We recommend using 3/31 assumptions to examine pending asset allocation changes based on last quarter's capital market assumptions and current opportunities. In addition, clients in the process of resetting expected return assumptions should use 3/31 data

**The availability of quarterly assumptions carry practical considerations**

Quarterly assumptions should be used in conjunction with quarterly asset values but private markets are a complication where losses have yet to be reflected

Clients needing a calendar year assumption before January can use 9/30 assumptions

# SBCERA INVESTMENT OBJECTIVES

- **SBCERA investment objectives (should be stated in its Investment Policy Statement):**
  - To provide participants with required retirement benefits by earning returns sufficient to fund liabilities consistently
  - Manage assets on a total return basis
  - Exceed the assumed actuarial rate of return (7.25% currently)
  - Exceed the weighted index based on SBCERA's asset allocation policy and respective asset class component benchmarks
  - To set asset allocation policy in a manner that encompasses a strategic, long-term perspective of capital markets as well as the nature and structure of SBCERA's liabilities

- **Important Risks to the Plan:**
  - Volatility of returns/drawdown risk
  - Volatility of funded status
  - Volatility of contributions

# ALLOWABLE ASSET CLASSES

| Capital Appreciation | Comment |
| --- | --- |
| Domestic Equity | Included |
| International Equity | Included |
| Emerging Market Equity | Included |
| Private Equity | Included |
| **Capital Preservation** | |
| Domestic Core Fixed Income | Included |
| International Core Fixed Income | Included |
| Cash | Included |
| **Contractual Income** | |
| Domestic Credit Fixed Income | Included |
| International Credit Fixed Income | Included |
| Emerging Market Debt | Included |
| **Inflation Participation** | |
| Real Estate | Included |
| Timber | Included |
| Infrastructure & Energy | Included |
| Commodities | Included |
| **Absolute Return/Alpha** | |
| Absolute Return | Included |

# ASSET ALLOCATION FRAMEWORK

**NEPC utilizes a diversified range of asset classes to support the portfolio in a variety of economic conditions:**

***Inflation Environment***

*Deflation* — *Low Inflation* — *Moderate Inflation* — *High Inflation*

## CAPITAL PRESERVATION

CORE (NOMINAL) BONDS
CASH, PRIVATE CREDIT

**Role:** Nominal capital preservation

**Pros:** Maintains value during economic weakness
Maintains value during periods of deflation and low inflation
Low volatility

**Cons:** Limited long-term growth
Value eroded by inflation

## CAPITAL APPRECIATION

EQUITIES
(PUBLIC AND PRIVATE, GLOBAL, US AND INTERNATIONAL)
CONVERTIBILES

**Role:** Long-term growth

**Pros:** Expected to perform well in periods of rising growth and low-moderate inflation

**Cons:** Higher volatility
Suffers during economic weakness
Suffers during periods of high inflation or deflation

## REAL ASSETS

*REAL ESTATE*
*TIPS*
*TIMBER, COMMODITIES, ENERGY, INFRASTRUCTURE*

**Role:** Inflation protection

**Pros:** Diversification Inflation hedge

**Cons:** Moderate volatility
Moderate long-term growth
Underperforms in periods of deflation Sensitive to leverage

## DIVERSIFYING ASSETS

*RISK PARITY*
*GAA*
*OTHER DIVERSIFYING ASSETS*

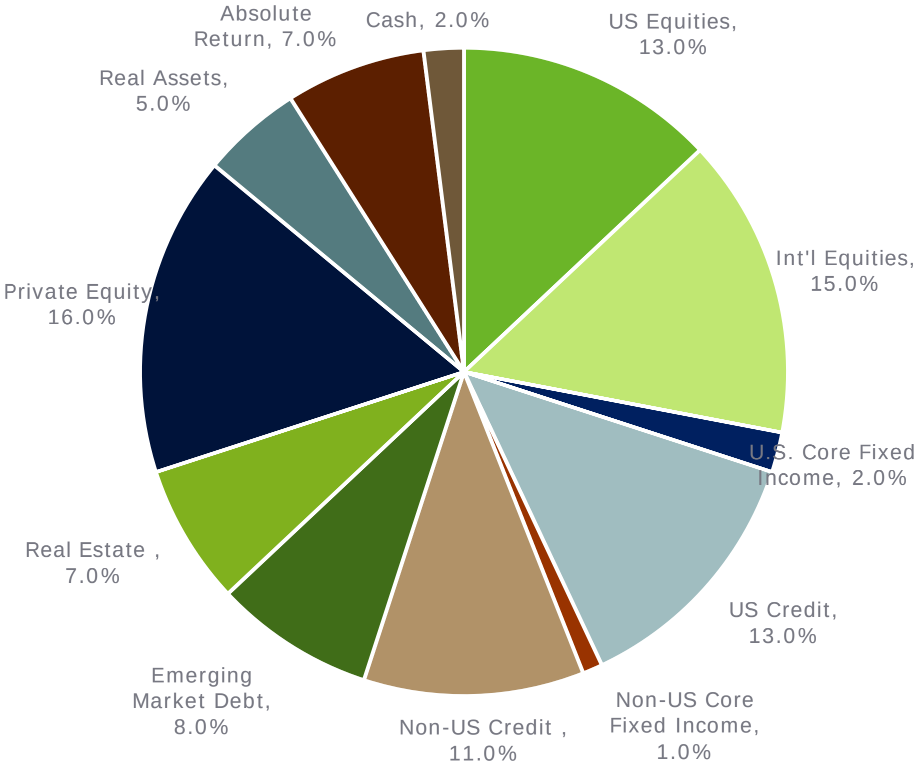
**Role:** Stable returns, low correlation and beta to growth, rates

**Pros:** Add diversified source of alpha to core portfolio, generate positive returns in most environments

**Cons:** Execution risk
Moderate long-term growth

Exhibit A: Page 12

# POLICY ASSET ALLOCATION: 2020 CAPITAL MARKET EXPECTATIONS




| | 5-7 Year | 10 Year | 30 Year | |
|---|---|---|---|---|
| | *2019* | *2020* | *2019* | *2020* |
| *Expected Return* | 7.8% | 8.1% | 8.6% | 8.4% |
| *Expected Volatility* | 12.0% | 11.6% | 12.0% | 11.6% |
| *Sharpe Ratio* | 0.39 | 0.64 | 0.42 | 0.57 |
| *Sortino Ratio* | 0.84 | 0.78 | 0.98 | 0.92 |

| Probabilities using 2019 Assumptions | |
|---|---|
| Probability of 1-Year Return Under 0% | 27.8% |
| Probability of 10-Year Return Under 0% | 3.1% |
| Probability of 10-Year Return Under 7.25% | 42.5% |
| Probability of 30-Year Return Under 7.25% | 32.5% |

Expected volatility is based on accounting volatility.

# TARGET MIX USING 2020 ASSUMPTIONS

| | Policy Target | Median Public Fund > $1B | Global 60/40 | Domestic 60/40 | Mix A | Mix B |
|---|---|---|---|---|---|---|
| **Cash** | **2%** | **2%** | **0%** | **0%** | **2%** | **2%** |
| Large Cap Equities | 11% | 24% | 0% | 51% | 9% | 13% |
| Small/Mid Cap Equities | 2% | 4% | 0% | 9% | 2% | 2% |
| Int'l Equities (Unhedged) | 9% | 17% | 0% | 0% | 9% | 9% |
| Emerging Int'l Equities | 6% | 3% | 0% | 0% | 8% | 7% |
| Global Equity | 0% | 0% | 60% | 0% | 0% | 0% |
| Private Equity | 16% | 11% | 0% | 0% | 16% | 16% |
| **Total Equity** | **44%** | **60%** | **60%** | **60%** | **44%** | **47%** |
| Core Bonds | 2% | 20% | 0% | 40% | 2% | 0% |
| Emerging Market Debt | 8% | 2% | 0% | 0% | 8% | 8% |
| Non-US Bonds (Unhedged) | 1% | 3% | 0% | 0% | 1% | 0% |
| Global Bonds (Unhedged) | 0% | 0% | 40% | 0% | 0% | 0% |
| Private Debt | 24% | 0% | 0% | 0% | 24% | 24% |
| **Total Fixed Income** | **35%** | **24%** | **40%** | **40%** | **35%** | **32%** |
| Commodities | 0% | 2% | 0% | 0% | 0% | 0% |
| Core Real Estate | 3.5% | 6% | 0% | 0% | 4% | 4% |
| Non-Core Real Estate | 3.5% | 0% | 0% | 0% | 4% | 4% |
| Private Real Assets | 5% | 0% | 0% | 0% | 5% | 5% |
| **Total Real Assets** | **12%** | **8%** | **0%** | **0%** | **12%** | **12%** |
| Absolute Return | 7% | 5% | 0% | 0% | 7% | 7% |
| Global Asset Allocation | 0% | 3% | 0% | 0% | 0% | 0% |
| **Total Multi Asset** | **7%** | **8%** | **0%** | **0%** | **7%** | **7%** |

| | | | | | | |
|---|---|---|---|---|---|---|
| ***Expected Return 10 yrs*** | **8.1%** | **6.3%** | **5.3%** | **5.0%** | **8.2%** | **8.3%** |
| ***Expected Return 30 yrs*** | **8.4%** | **7.0%** | **5.8%** | **5.8%** | **8.4%** | **8.6%** |
| ***Standard Deviation*** | **11.6%** | **11.1%** | **11.6%** | **10.5%** | **11.8%** | **12.1%** |
| ***Sharpe Ratio (10 years)*** | **0.64** | **0.45** | **0.39** | **0.41** | **0.54** | **0.53** |
| ***Sharpe Ratio (30 years)*** | **0.57** | **0.42** | **0.34** | **0.39** | **0.48** | **0.48** |
| ***Probability of 1-Year Return Under 0%*** | **27.8%** | **30.5%** | **32.5%** | **31.7%** | **27.9%** | **28.1%** |
| ***Probability of 10-Year Return Under 0%*** | **3.1%** | **5.4%** | **7.6%** | **6.6%** | **3.2%** | **3.3%** |
| ***Probability of 10-Year Return Under 7.25%*** | **42.5%** | **59.5%** | **70.6%** | **75.5%** | **41.8%** | **41.1%** |
| ***Probability of 30-Year Return Under 7.25%*** | **32.5%** | **55.2%** | **75.6%** | **76.9%** | **31.9%** | **30.8%** |

# CAPITAL MARKET EXPECTATIONS

# ASSUMPTION DEVELOPMENT

**Capital market assumptions are published for over 65 asset classes**

Assumptions include 10-year and 30-year return forecasts, volatility expectations, and correlations

**NEPC publishes both 10- and 30-year return forecasts**

10-year forecasts are appropriate for strategic asset allocation analysis and are influenced by global forecasts/pricing of growth, inflation, and yield, with spreads and valuations converging to NEPC-defined terminal values

30-year forecasts are appropriate for actuarial inputs and long-term planning

**Based on data as of March 31, 2020**

Assumptions are developed by the Asset Allocation Committee and approved by the Partners Research Committee (PRC)

**Assumptions are developed with proprietary valuation models and rely on a core building block methodology**

## Asset Allocation Process

Finalize List of New Asset Classes

Discuss Outlook with NEPC Beta Groups

Calculate Asset Class Volatility and Correlation Assumptions

Set Model Terminal Values, Reflecting Long-Term Views on Key Inputs

Update Asset Models as of Quarter-End

Review Model Output and Produce Updated Return Assumptions

Present Draft Assumptions to the PRC

Assumptions published on the 15th calendar day following quarter-end

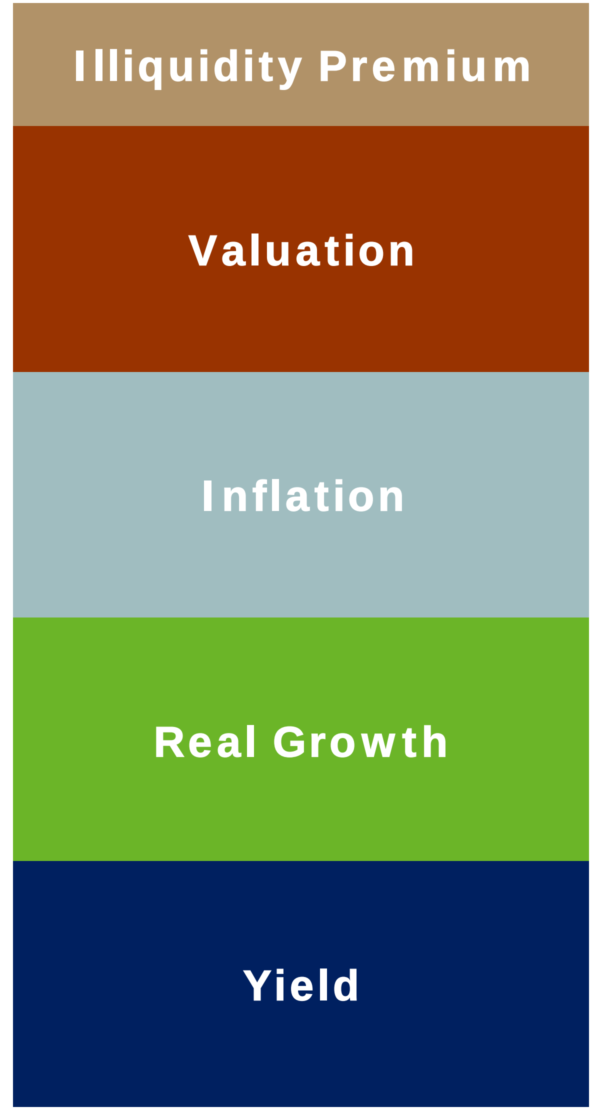
# BUILDING BLOCKS METHODOLOGY

Forward-looking asset class models incorporate current and forecasted market and economic data to inform expected returns

Quantitative inputs combined with a conversion to long-term terminal values drive the 10-year outlook

Asset components are aggregated to capture core drivers of return across asset classes – forming the foundation of our building blocks framework

Building block components will differ for equity, fixed income, and real assets



# CORE GEOMETRIC RETURN ASSUMPTIONS

| | Asset Class | 10-Year Return | 30-Year Return | Volatility |
|---|---|---|---|---|
| | Cash | 0.7% | 1.8% | 1.00% |
| | US Inflation | 1.7% | 2.4% | - |
| Equity | Large Cap Equities | 6.6% | 7.4% | 16.50% |
| Equity | International Equities (Unhedged) | 7.5% | 7.6% | 20.50% |
| Equity | Emerging International Equities | 10.2% | 9.5% | 28.00% |
| Equity | *Global Equity** | 7.7% | 8.1% | 17.79% |
| Equity | *Private Equity** | *10.9%* | *11.2%* | *24.58%* |
| Fixed Income | Treasuries | 0.6% | 1.9% | 5.50% |
| Fixed Income | *Core Bonds** | *1.6%* | *2.6%* | *6.01%* |
| Fixed Income | TIPS | 1.2% | 2.0% | 6.50% |
| Fixed Income | High Yield Bonds | 5.6% | 5.8% | 12.50% |
| Fixed Income | *Private Debt** | *8.0%* | *7.8%* | *11.54%* |
| Real Assets | Commodities | 1.4% | 4.0% | 19.00% |
| Real Assets | REITs | 7.0% | 7.6% | 20.00% |
| Real Assets | Core Real Estate | 4.5% | 5.7% | 13.00% |
| Real Assets | Private Real Assets: Infrastructure/Land | 6.2% | 7.2% | 12.00% |
| Multi-Asset | *US 60/40** | *4.9%* | 5.8% | *10.35%* |
| Multi-Asset | *Global 60/40** | *5.3%* | 5.8% | *11.61%* |
| Multi-Asset | *Absolute Return** | *5.0%* | 5.8% | *8.18%* |

*Calculated as a blend of other asset classes

# KEY MARKET THEMES

# KEY MARKET THEMES OVERVIEW

**Key Market Themes are factors that define global markets and can be expected to both evolve and remain relevant without a clear timeline of conclusion. At times, themes may be challenged or disrupted and generate market volatility. The conclusion of a theme likely alters both market dynamics and our market outlook. Our intent is for clients to be aware of these themes and understand their implications for asset allocation and portfolio implementation.**

**NEPC currently has four Key Market Themes:**

| | | | |
|---|---|---|---|
| Virus Trajectory | Permanent Interventions | China Transitions | Globalization Backlash |

# ASSESSING THE KEY MARKET THEMES

## 3/31/20 Assessment

Dominant

Emerging

Neutral

Fading

Dormant

### Virus Trajectory

Change in Status: -

Virus Trajectory is the dominant force driving market and economic outcomes. The theme looks to reflect the unknown path of a pandemic but also the timing of how economies recover. The duration of social distancing policies is a key unknown as increased COVID-19 testing is needed to define an exposure baseline.

### Permanent Interventions

Change in Status: ⬆

Globally, significant monetary and fiscal stimulus has been aimed at lessening the economic impact of COVID-19.

In the US, the Fed cut rates by 150 bps and broadly expanded the balance sheet with unlimited QE purchases and vast lending facilities to aid market liquidity. Congress also passed a $2T relief package.

### Globalization Backlash

Change in Status: -

Trade tensions have waned as COVID-19 concerns take on a greater focus.

The influence and temperature of the theme will likely increase in coming quarters as countries reassess supply chains and consider locally sourced medical supplies .

### China Transitions

Change in Status: -

China's economy was at a standstill for much of the quarter as the country attempted to contain the virus.

Manufacturing PMI fell into deep contractionary territory to 35.7 in February.

China's total exports contracted 17.2% for the first two months of the year.

# VIRUS AND ECONOMIC PATHS ARE ALIGNED

**The COVID-19 pandemic has brought global economic activity to a halt**

Economic data releases in the US and globally will be historically poor over the next quarter with levels of contraction in GDP not seen since the late 1940s

The intensity of social distancing policies has significantly disrupted consumer spending patterns and the labor market with US unemployment rate likely near 15%

**Virus Trajectory looks to reflect the unknown path of a pandemic but also the timing and ability of economies to restart throughout the world**

The duration and scope of social distancing policies is the key unknown as the market struggles to discount the potential scale of short and long-term economic costs

**Investor focus likely to shift along a continuum of health risks and economic costs should we see COVID-19 infection rates escalate**

Increased COVID-19 testing is needed to define an exposure baseline to inform potential trajectory of health risks vs economic costs

| Continuum of Virus and Economic Paths | | |
|---|---|---|
| **Health Risk:** Localizing Infections, Managing Healthcare Capacity, and Limiting Waves of Outbreaks | Striking Balance Between Health Risk and Economic Cost of Social Distancing Policies | **Economic Cost:** Restart economic activity by opening schools, healing the labor market, stimulating consumer spending levels |

**Represents an incredibly wide range of outcomes and a swift movement through the continuum could accelerate a "V-shaped recovery"**

A lengthy economic shutdown or harmful second virus wave could inhibit transition along the continuum leading to self-reinforcing downward economic spiral

Exhibit A: Page 22

# POTENTIAL OUTCOMES AND IMPLICATIONS

| | Description | Market Implications |
|---|---|---|
| **Base Case** | Virus containment efforts aimed at slowing the spread of COVID-19 will result in a global recession, but the shape and trajectory of a recovery is unknown. Increased monetary and fiscal stimulus offset some of the economic disruption, but economic growth and labor markets are likely to take longer to normalize than historical recessions may suggest. | Market volatility remains at elevated levels for the next 6+ months. Low interest rates are here to stay but likely increased volatility around the path of inflation with large deflationary pressures paired with a potentially stimulative fiscal response. While uncertainty remains high, long-term opportunities may be available for investors willing to take on greater equity and credit risk. Market impact of Virus Trajectory looks to recede within 12 months. |
| **Economic Depression** | 2 year period of extreme economic disruption characterized by unemployment levels greater than 20% and falling consumer spending levels. Waves of intense social distancing periods damage consumer confidence, limiting economic activity during times of less restrictive social distancing measures. Massive government fiscal relief measures look to plug holes in GDP but lack of economic dynamism reduces productivity and “creative destruction”. | Combined fiscal and monetary policies are MMT-like and impact global currency regimes with outsized volatility with relative benefits to the yuan and dollar. Extreme deflationary pressures offer value for nominal government debt for local currency investors (e.g. US Treasuries). Overall represents the largest economic disruption of our lifetime across industries and countries. Patience is required as equity markets reprice and credit default cycle is elevated. Maintaining liquidity is a first order priority, but look to allocate surplus liquidity levels to distressed investments and large-cap equities following extreme market repricing. |
| **V is for Victory…not Virus** | Combination of targeted social distancing, summer lull, better testing, and human resilience lead to a quick path of economic recovery, even before vaccine availability. Unprecedented policy action is enough to fill the economic gap during shutdown and by late summer the world economy restarts as economic activity normalizes. | Strongly positive for all cyclical assets. Provides path for moderately higher inflation in medium- and long-term and fiscal policy is stimulative. The world turns back to worries of populism, political friction, and developed world demographics. The relative brevity of the shutdown limits moves to shift away from globalization. |

Exhibit A: Page 23

# ELEVATED PERMANENT INTERVENTIONS

**The developed world is undergoing a regime shift defined by central bank market interventions and permanent fiscal support by governments to support economic growth rates and address deflationary pressures**

Recent actions by global central banks and governments aimed at lessening the economic impact of COVID-19 have increased the dominance of the theme

The unprecedented level of monetary and fiscal stimulus is supportive for risk assets, though likely encourages debt issuance - increasing the fragility of the system as a whole

| Federal Reserve | | |
|---|---|---|
| **Traditional Actions** | **Liquidity Actions/Facilities** | **Lending Actions/Facilities** |
| Interest Rate Cuts (150 bps) | Currency Swap Agreements | Cut Discount Window (0.25%) and Reserve Requirement (0.0%) |
| Unlimited Quantitative Easing | Money Market Mutual Fund Liquidity Facility (MMLF) | Repo Operations |
| | FIMA Repo Facility | Commercial Paper Funding Facility (CPFF) |
| | | Credit Facilities (PMCCF, SMCCF, PDCF) |
| | | Main Street Lending Facilities (MSNLF, MSELF) |
| | | Term Asset-Backed Securities Loan Facility (TALF), Municipal Liquidity Facility |
| | | Paycheck Protection Program Liquidity Facility (PPPLF) |

~9% of US nominal GDP

| US Government Actions |
|---|
| Emergency Coronavirus Response Bill |
| Families First Coronavirus Response Act |
| CARES Act |

~11.5% of US nominal GDP

Exhibit A: Page 24

# THE END OF LATE CYCLE DYNAMICS

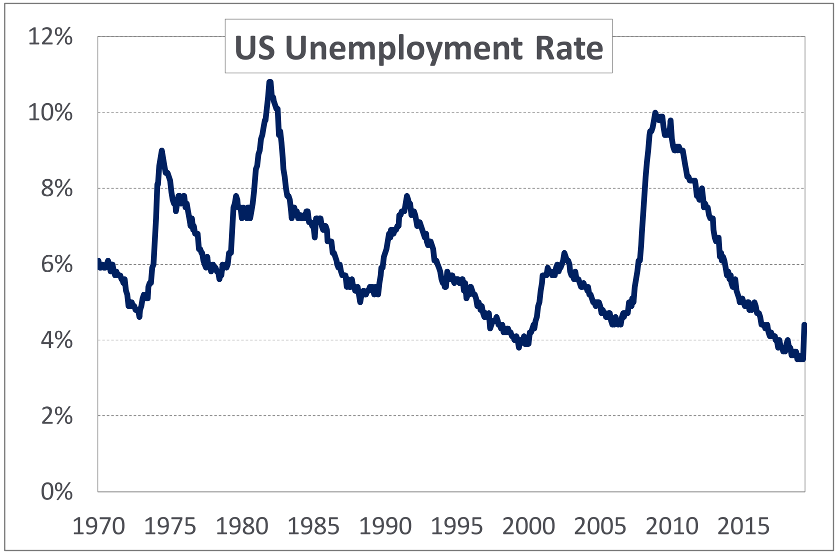
## Key Market Themes Change

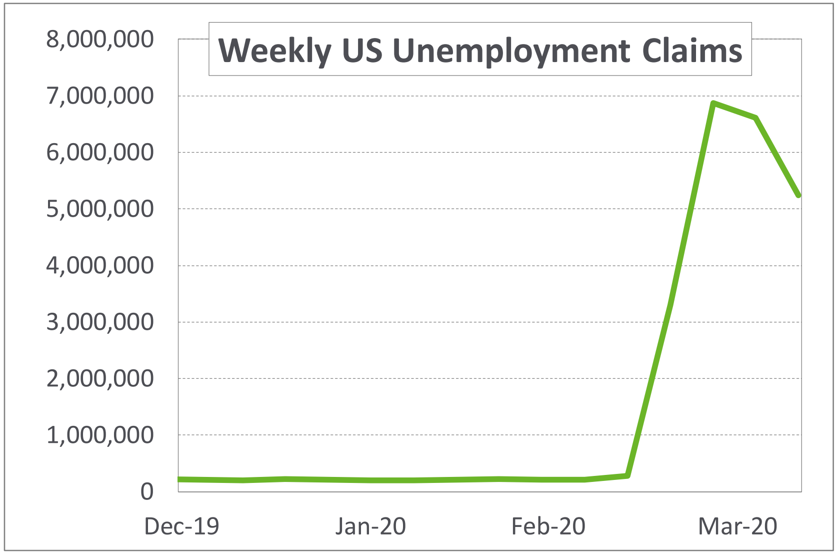
### The dominance of the Virus Trajectory and Permanent Interventions themes have disrupted the extended economic expansion in the US

Economic cycles can end due to several factors, often as a result of a build-up of excesses in some part of the financial system, but sometimes due to an exogenous factor – such as COVID-19

The virus has already created significant stress in financial and economic data, as evidenced by preliminary labor market data. The impact of COVID-19 will also result in severe declines in key economic indicators, such as economic growth and profit margins.

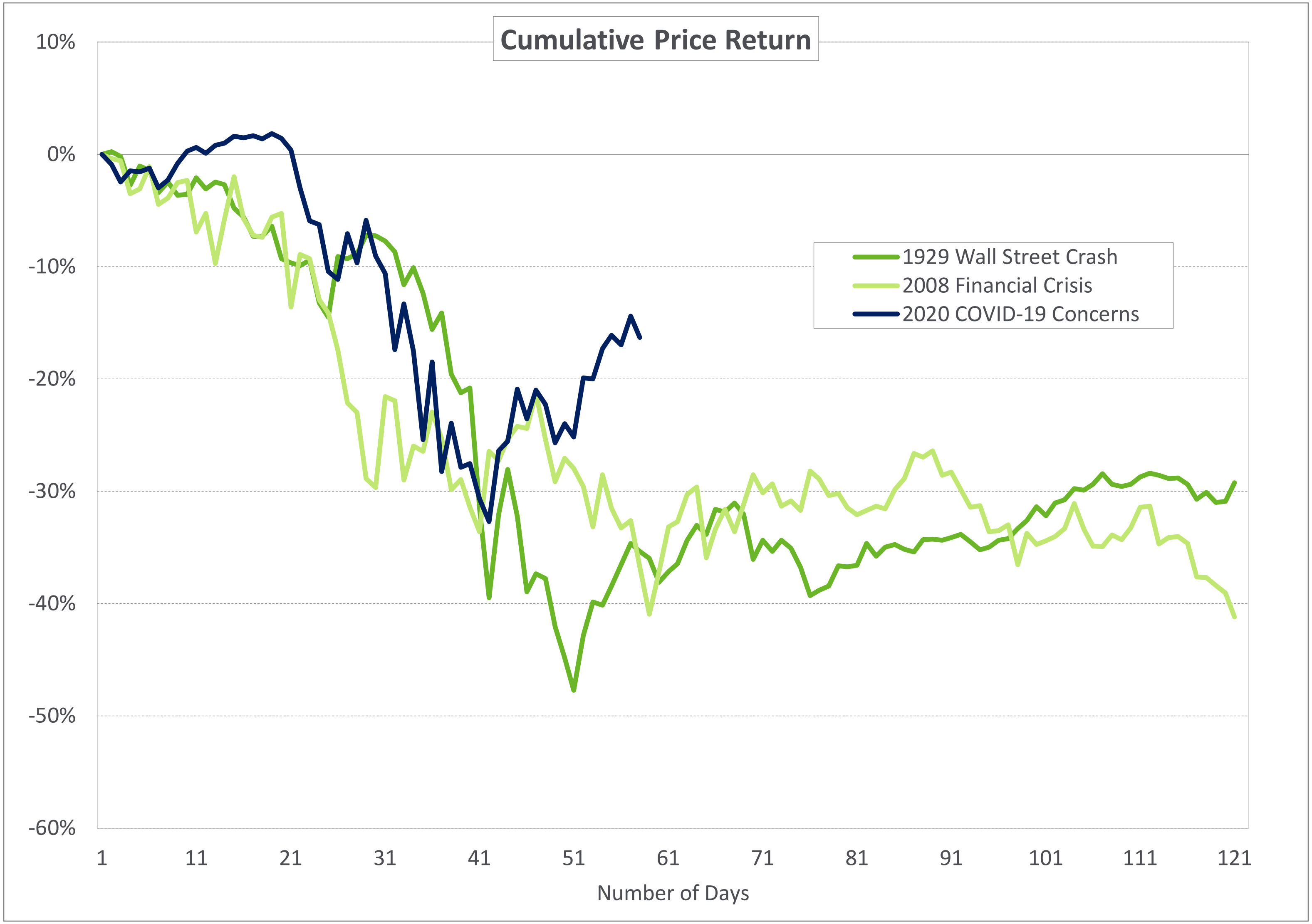
This trend is likely to tip the US economy into a recession, even as significant monetary and fiscal responses aimed at lessening the economic impact have already been implemented




Source: (Left) US Department of Labor, FactSet
Source: (Right) US Department of Labor, FactSet

# US EQUITY MARKET PATH IN A DOWNTURN




Source: S&P, Dow Jones, FactSet

Financial Crisis represents S&P returns from 9/1/2008 – 3/9/2009; Wall Street Crash represents Dow Jones returns from 8/30/1929 – 2/26/1930; COVID-19 represents S&P returns from 1/23/2020 (representing the start of the Wuhan, China lockdown) – 4/15/2020

# POTENTIAL ACTIONS FOR INVESTORS

**Maintain discipline with a rebalancing approach aimed at preserving long-term strategic targets to risk assets**

**Maintain one quarter of spending needs in cash**

- A focus on liquidity remains paramount

**Consider increasing targets to risky assets from a strategic viewpoint**

- Ensure higher risk targets fit within organizational risk tolerance
- Market recovery from bottom has been significant…better timing may become available
- Long-term expected difference between safe and risky assets is attractive

**Favor US and EM over EAFE among public market equity**

- Strong virus response and massive Fed/Fiscal intervention support quicker US recovery
- Virus response and long-term expected return (over 10%) support EM equity

**Within betas, look to rotate the risk profile and increase risk posture**

- Carve out fixed income allocations to Credit Opportunities and Distressed Investments
- Consider a shift to lower quality credit like high yield and EMD
- Shift hedged equity exposure to higher beta strategies
- Investigate high conviction, capacity-constrained strategies for access

# MACRO ASSUMPTIONS

# INFLATION OVERVIEW

**Inflation is an integral component of our asset allocation assumptions**

Represents an essential building block for developing asset class returns

**Inflation building blocks are model-driven and informed by multiple sources for both the US and global asset classes**

Includes forecasts from international organizations (e.g. IMF), local consumer and producer price indices, break-even inflation expectations, and global interest rate curves

**NEPC's US inflation expectation has come down and incorporates the material decline of inflation break-even rates due to COVID-19**

We anticipate meaningful volatility from quarter to quarter in our inflation assumption as market-based inflation expectations discount the potential economic scenarios

**Market-based inflation expectations reflect little to no inflation pressure**

Inflation break-evens (difference between Treasury and TIPS yields) suggest inflation will be near current levels for the next twenty years

NEPC's return assumptions incorporate higher inflation expectations than break-evens, but are in line with IMF forecasts and are well below long-term averages

| Region | 10-Year Inflation Assumption | 30-Year Inflation Assumption |
|---|---|---|
| United States | 1.7% | 2.4% |

# US CASH EXPECTATIONS

## Cash is a foundation for all asset classes

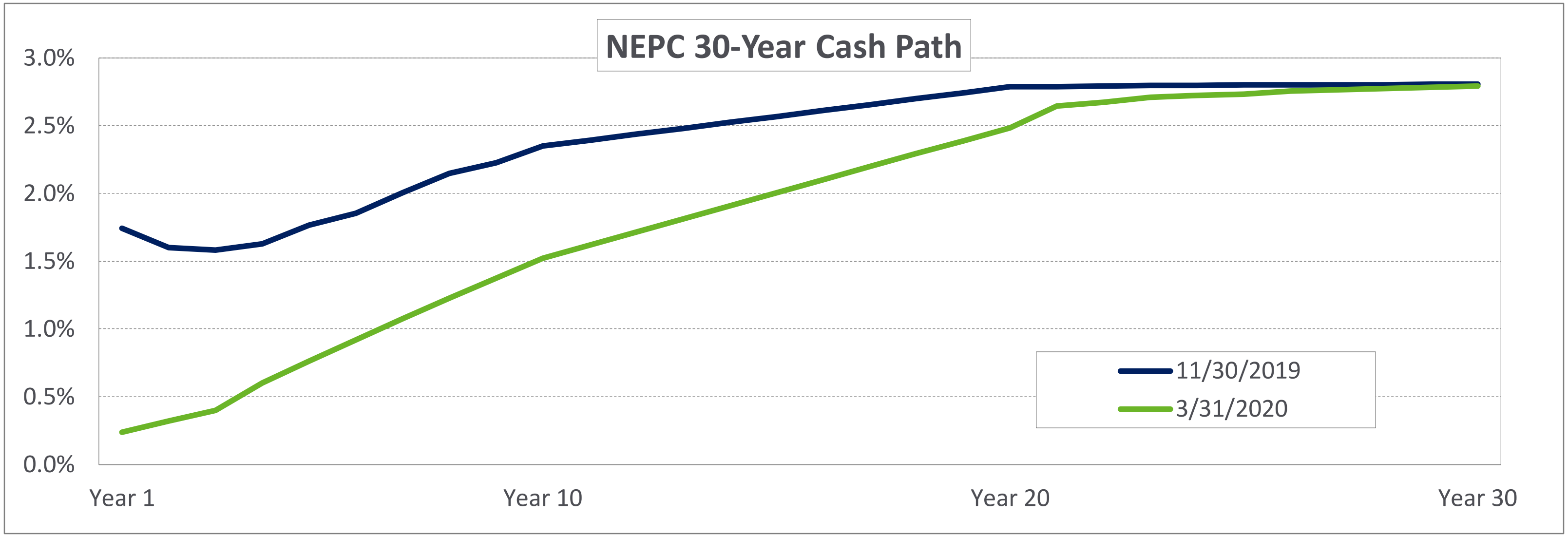
The assumption flows through as a direct building block component and as a relative value adjustment (cash + risk premia) in long-term return projections

Long-term cash assumption is a result of forecasted inflation plus a real interest rate path

## US nominal rates are at a historically low point for NEPC's forecasts

This level reflects recent rate cuts by the Federal Reserve and muted inflation pressures

Market expectations for a relatively flat curve and negligible inflation expectations create a slow and muted trend for cash to reach terminal value assumptions




Source: Bloomberg, FactSet, NEPC

# GLOBAL INTEREST RATE EXPECTATIONS

## US real yields moved materially lower with recent Fed rate cuts

The real yield curve shifted down across the curve, reflecting lower growth expectations

Low real rates depress the return outlook for all assets in the long-term

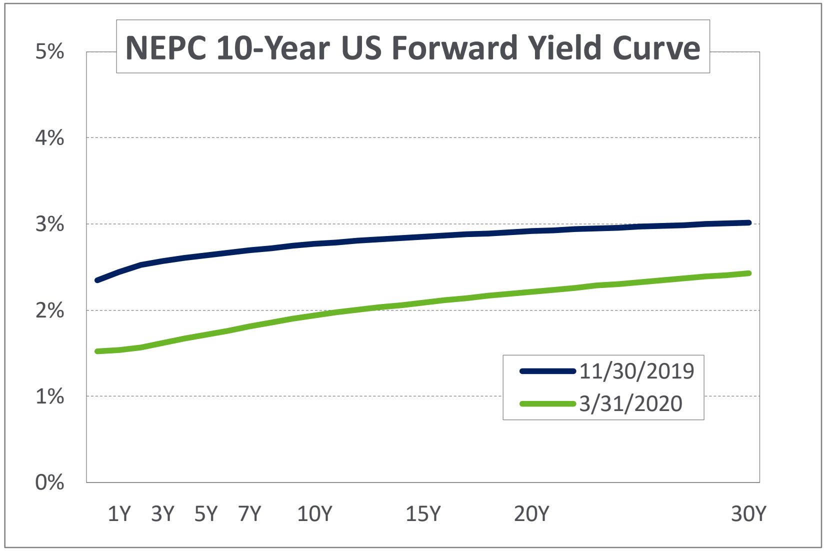
The Fed’s shift to a prolonged easing environment and lower inflation expectations have suppressed yield forecasts

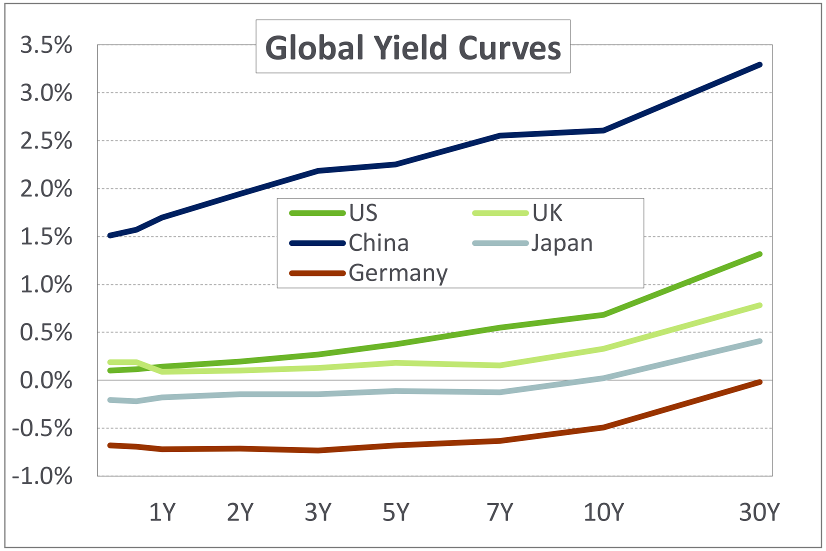
## Government bond yields remain low across much of the world

Several developed country yield curves outside the US are in negative territory with weak growth, continued monetary stimulus, and muted inflation

## The outlook for non-US developed fixed income is poor given negative real and nominal yields

However, emerging market local interest rates are elevated relative to the developed world




Source: (Top) FactSet, NEPC
Source: (Bottom) FactSet, NEPC

# EQUITY ASSUMPTIONS

# EQUITY ASSUMPTIONS OVERVIEW

**Equity return assumptions are materially higher from the prior quarter due to depressed valuation levels following the recent equity downturn**

The discounting of future cash flows with lower interest rates and inflation levels also support higher equity valuation multiples over the long-term

**We recommend investors consider increasing strategic targets to equity as the equity risk premia is elevated relative to cash and Treasuries**

The higher relative return assumption of equities vs Treasuries is amidst unprecedented uncertainty and the sizing of higher strategic equity targets should be calibrated carefully

**The return assumption for emerging market equity remains elevated and we continue to believe a modest strategic overweight is appropriate**

We encourage the use of EAFE exposure as a funding source for an EM equity overweight

**NEPC encourages maintaining a strategic bias to US and international small cap relative to the exposure in MSCI ACWI IMI**

The overweight should be considered relative to total equity beta exposure. For example, investors with large private equity allocations might adopt an index weight to small caps

# EQUITY: ASSUMPTIONS

| Equity Building Blocks | |
|---|---|
| **Illiquidity Premium** | The additional return expected for investments carrying liquidity risk |
| **Valuation** | An input representing P/E multiple contraction or expansion relative to long-term trend |
| **Inflation** | Represents market-specific inflation derived from index country revenue contribution and region-specific forecasted inflation |
| **Real Earnings Growth** | Reflects market-specific real growth for each equity asset class as a weighted-average derived from index country revenue contribution and forecasted GDP growth |
| **Dividend Yield** | Informed by current income distributed to shareholders with adjustments made to reflect market conditions and trends |

| Asset Class | 2020 Q1 10-Year Return | Change from 11/30/19 |
|---|---|---|
| US Large Cap | 6.6% | +1.6% |
| US Small/Mid-Cap | 7.3% | +1.8% |
| US Micro Cap | 8.4% | +1.4% |
| International (Unhedged) | 7.5% | +1.5% |
| International Small Cap | 7.8% | +1.4% |
| Emerging Markets | 10.2% | +1.2% |
| Emerging Markets Small Cap | 10.2% | +1.0% |
| China Equity | 8.9% | +0.1% |
| Hedge Funds – Long/Short | 4.8% | - |
| *Global Equity* | *7.7%* | *+1.5%* |
| *Private Equity* | *10.9%* | *+1.5%* |

Source: NEPC

# EQUITY: REAL EARNINGS GROWTH

**Global growth rates are subdued reflecting the economic impact of COVID-19, demographic trends, and US-China trade tensions**

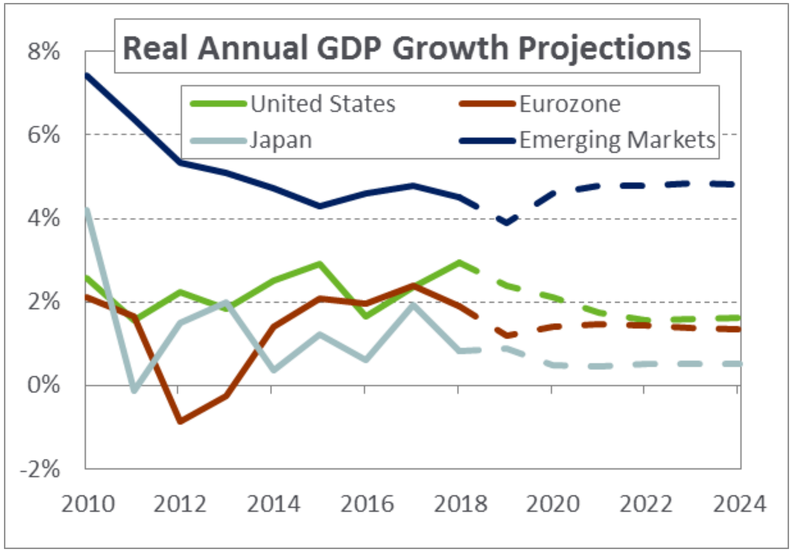
**Regions more reliant on emerging markets for revenue generation are forecasted to enjoy higher expected real earnings growth**

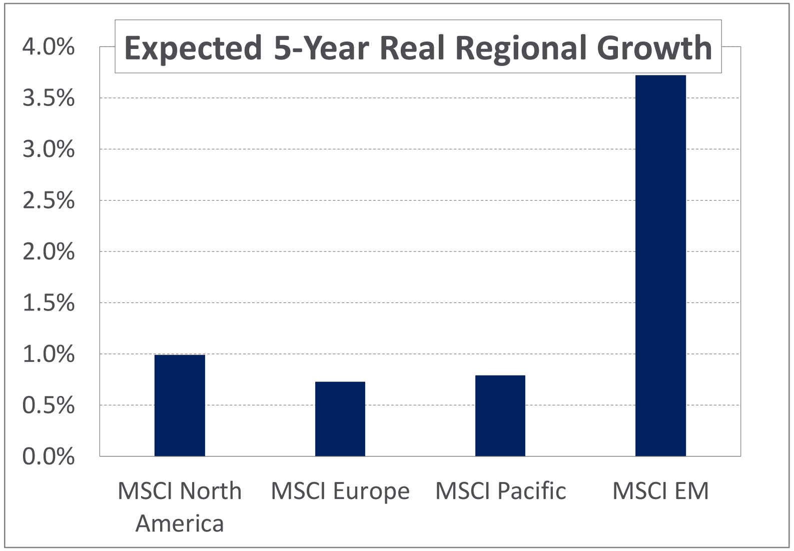
International and emerging markets benefit from generating a much larger portion of revenues from this region than the US

**Small caps have higher terminal values for real earnings growth relative to large caps**

This premium reflects a risk premium for small over large cap, which has existed historically

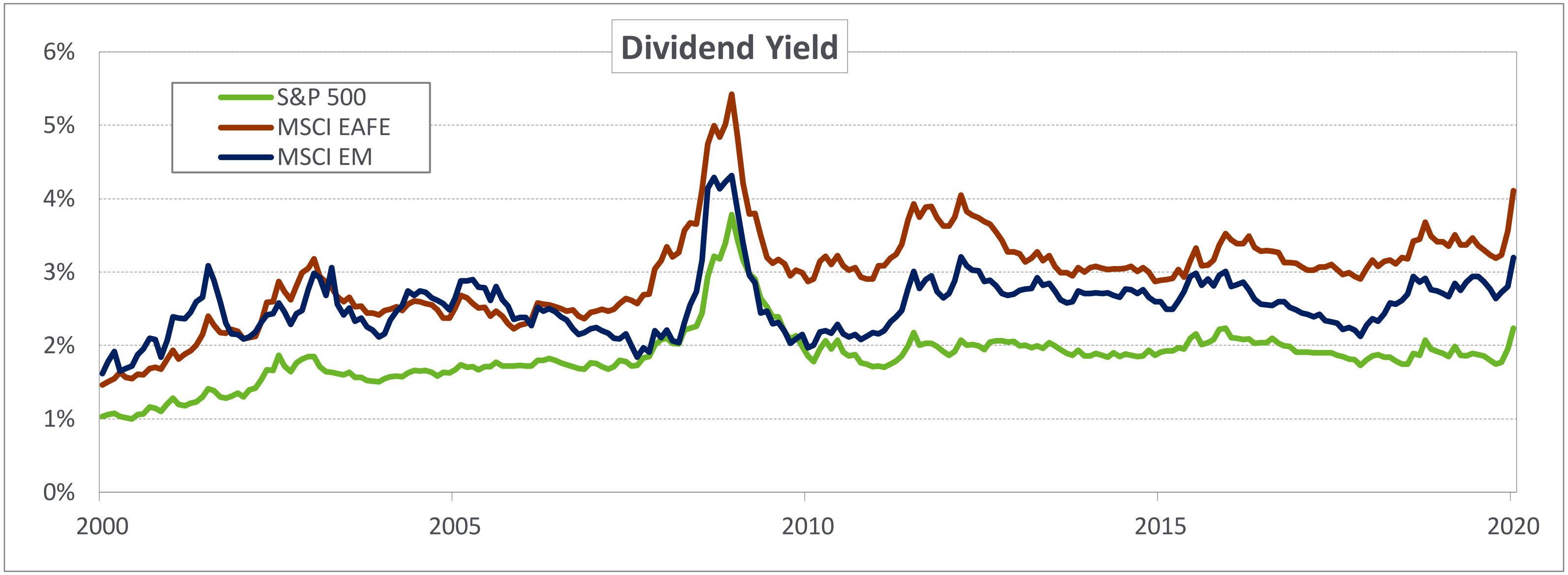
In US markets, this represents a 50 basis point premium over large cap




Source: (Top) FactSet, NEPC
Source: (Bottom) IMF, MSCI, FactSet, NEPC

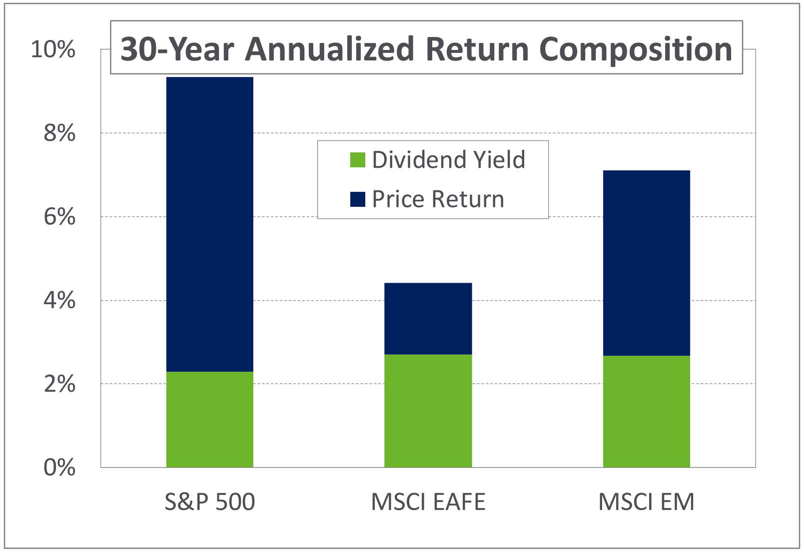
# EQUITY: DIVIDEND YIELD




**NEPC's long-term terminal value assumption for the S&P 500 dividend yield is 2.50%**

**EAFE and emerging markets offer structurally higher dividend yields relative to the US equity market**

Long-term terminal value assumptions for the MSCI EAFE and MSCI Emerging Market dividend yields are 3.00% and 2.50%




Source: (Top) S&P, MSCI, FactSet, NEPC
Source: (Bottom) S&P, MSCI, FactSet, NEPC

# EQUITY: VALUATION

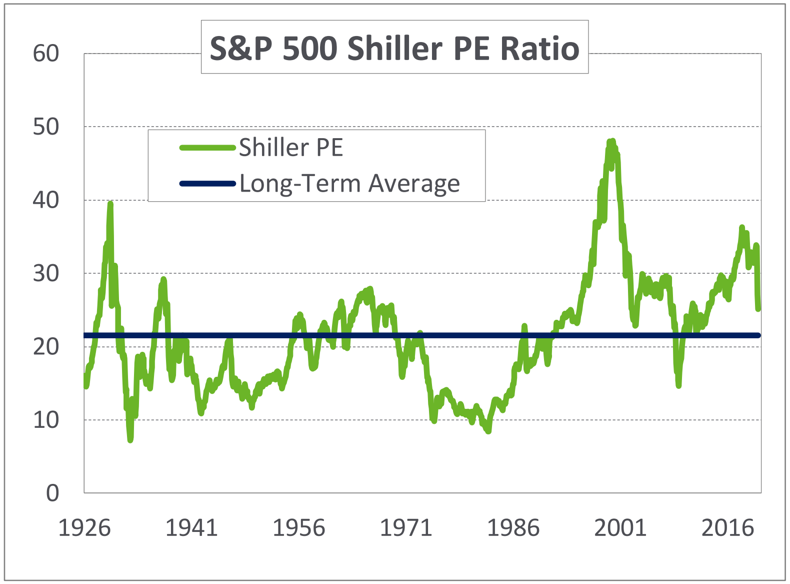
Exhibit A: Page 36

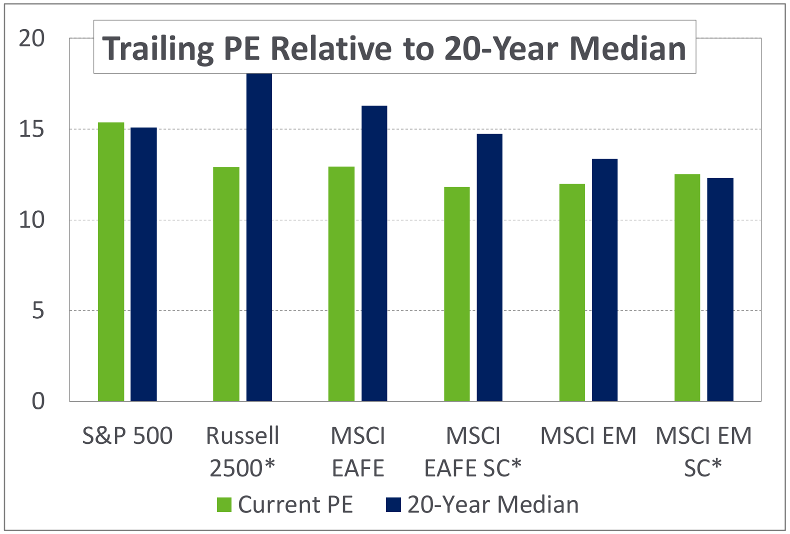
**Despite the recent correction, US equities remain slightly overvalued relative to long-term averages**

**Terminal P/E values for the US are higher than historical averages to reflect expected low interest rates and higher discounting of future cashflows**

**Terminal values for EAFE are above current for investing in these regions, however they are reflective of a less constructive market environment**

**In emerging markets, equity and currency valuations remain near long-term averages, suggesting an attractive total return opportunity**



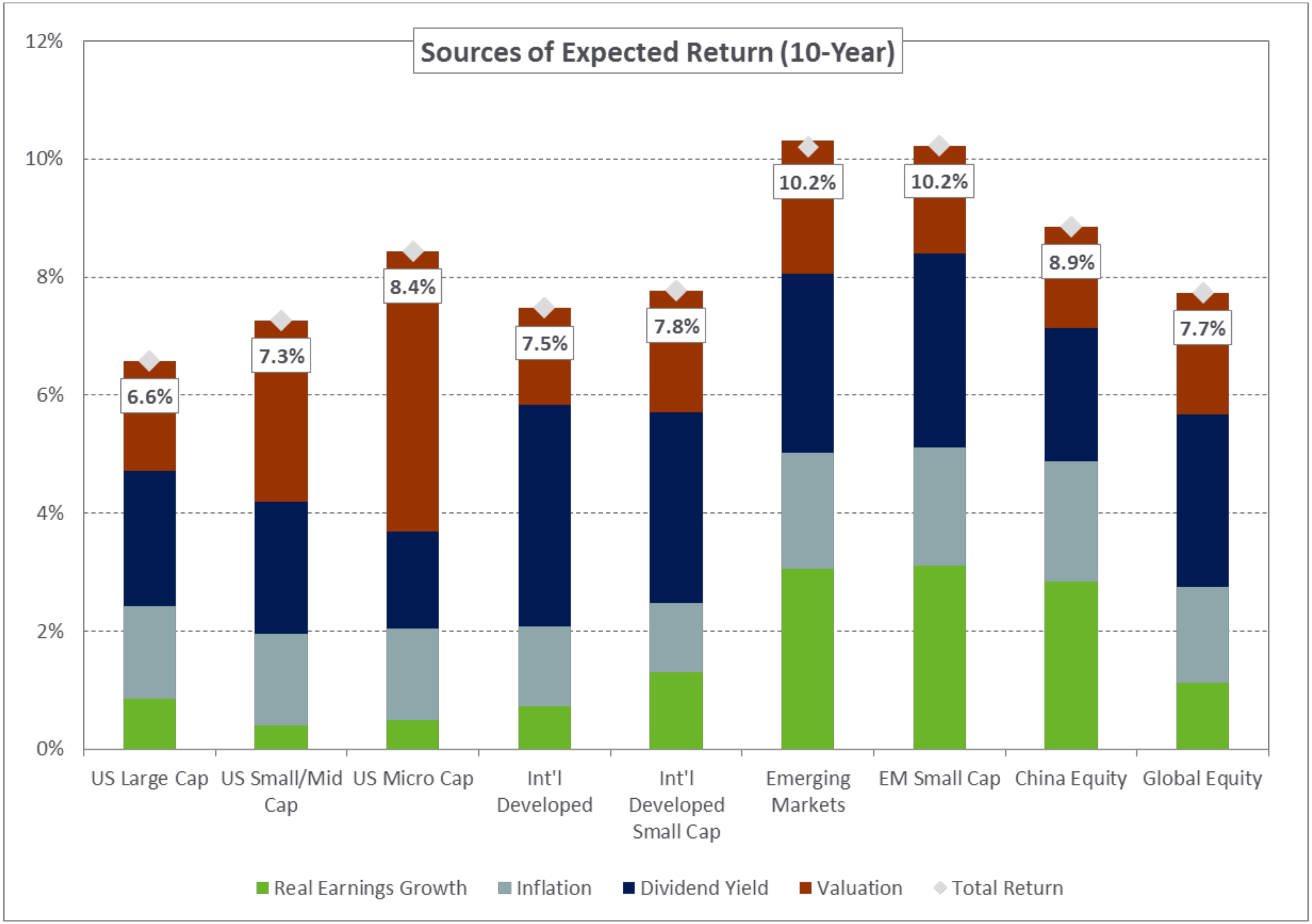




Source: (Top) S&P, Shiller, NEPC; long-term average beginning in 1926

Source: (Bottom) S&P, Russell, MSCI, FactSet, NEPC; *Small cap indices use index positive-adjusted earnings; MSCI EM Small Cap median calculated since 12/31/2008

# EQUITY: BUILDING BLOCKS






Source: NEPC

# FIXED INCOME ASSUMPTIONS

# FIXED INCOME ASSUMPTIONS OVERVIEW

**Credit return assumptions are higher from the prior quarter due to elevated credit spread levels following the recent market downturn**

Safe-haven fixed income return assumptions are materially lower due to falling interest rates and market-based inflation expectations

**While return assumptions are low for safe-haven assets, we encourage maintaining an allocation to Treasuries to provide portfolio balance**

For investors without a natural hedge, NEPC suggests a strategic safe-haven allocation of 50% Treasuries and 50% TIPS to provide a balanced portfolio diversification benefit

**We recommend investors consider increasing strategic targets to return-seeking credit as elevated spreads tend to lead to higher returns**

A strategic allocation to return-seeking credit can enhance risk-adjusted returns with additional yield and diversification benefits

**NEPC recommends an equal weight target to bank loans, blended emerging market debt, and high-yield for return-seeking public credit**

In this framework, investors should consider sourcing capital calls for private debt from bank loans and high yield but only in a “normal” market environment

# FIXED INCOME: ASSUMPTIONS



| Fixed Income Building Blocks | |
|---|---|
| **Illiquidity Premium** | The additional return expected for investments carrying liquidity risk |
| **Government Rates Price Change** | The valuation change resulting from a change in the current yield curve to forecasted rates |
| **Credit Deterioration** | The average loss for credit securities associated with an expected default cycle and recovery rates |
| **Spread Price Change** | The valuation change resulting from a change in credit spreads over the duration of the investment and highly sensitive to economic cycles |
| **Credit Spread** | Additional yield premium provided by securities with credit risk |
| **Government Rates** | The yield attributed to sovereign bonds that do not have credit risk associated with their valuation |

| Asset Class | 2020 Q1 10-Year Return | Change from 11/30/19 |
|---|---|---|
| TIPS | 1.2% | -1.0% |
| Treasuries | 0.6% | -1.3% |
| Investment-Grade Corporate Credit | 3.9% | +0.5% |
| MBS | 0.9% | -1.6% |
| High-Yield Bonds | 5.6% | +1.5% |
| Bank Loans | 5.5% | +0.7% |
| EMD (External) | 5.7% | +1.6% |
| EMD (Local Currency) | 5.9% | +0.5% |
| Non-US Bonds (Unhedged) | 0.7% | +0.5% |
| Municipal Bonds (1-10 Year) | 1.5% | -0.4% |
| High-Yield Municipal Bonds | 4.4% | +1.2% |
| Hedge Funds – Credit | 5.0% | +0.2% |
| *Core Bonds* | 1.6% | -0.9% |
| *Private Debt* | 8.0% | +1.3% |

Source: NEPC

# FIXED INCOME: CREDIT SPREADS

**Credit spreads broadly are above long-term median spread levels**

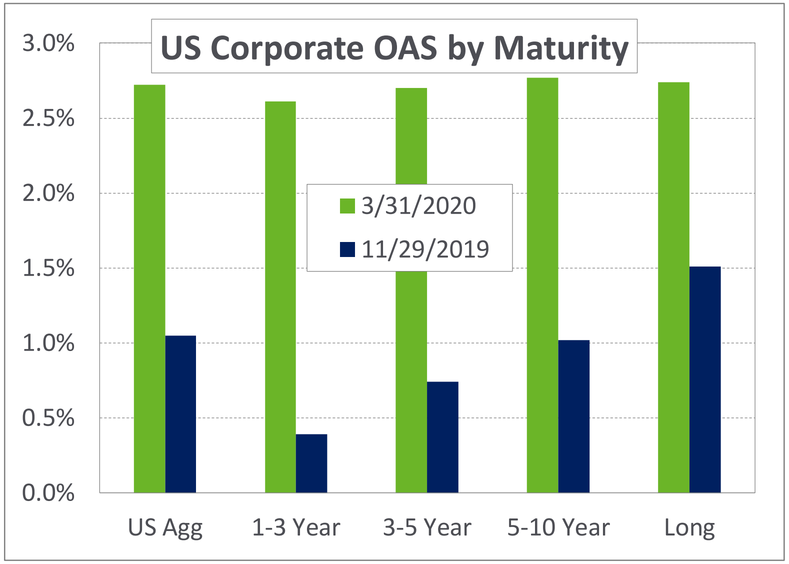
**Higher spreads positively impact expected returns, reflecting the higher anticipated spread yield and gains as spreads converge down to long-term medians**

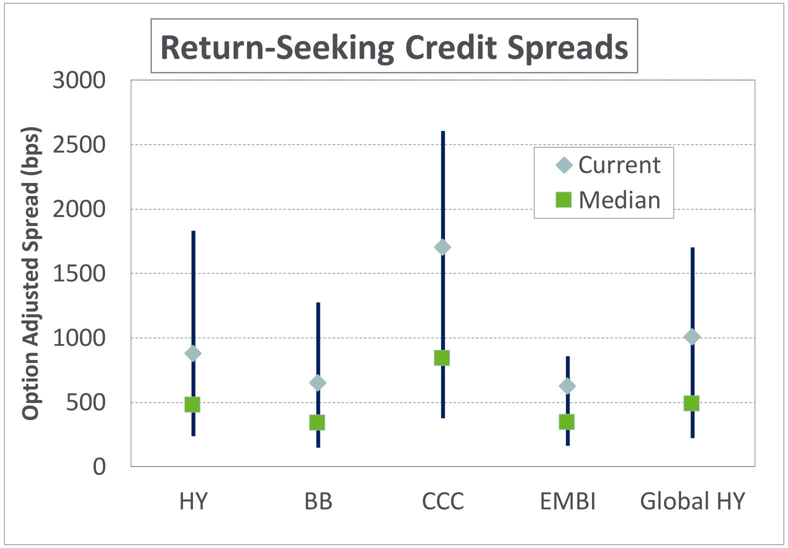
**Credit spread assumptions reflect a heightened risk environment**

There are a record number of BBB rated corporates – suggesting a greater risk of fallen angel downgrades

Corporate debt issuance has expanded rapidly in recent years with the majority of new debt rated BBB

**Default and recovery rates across the credit complex are modeled using historical averages**




Source: (Top) Barclays, FactSet, NEPC
Source: (Bottom) Barclays, JPM, FactSet, NEPC; as of 01/31/2000

# FIXED INCOME: RATES PRICE CHANGE

**Government Rates Price Change: The change in the level of interest rates, shape of the curve, and roll down that impact the price of a bond**

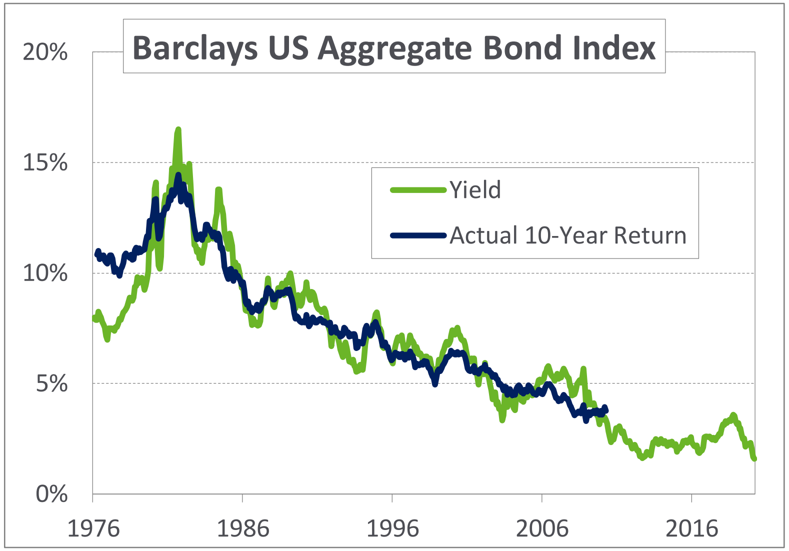
- Roll down refers to the price change due to the aging of a bond along the yield curve

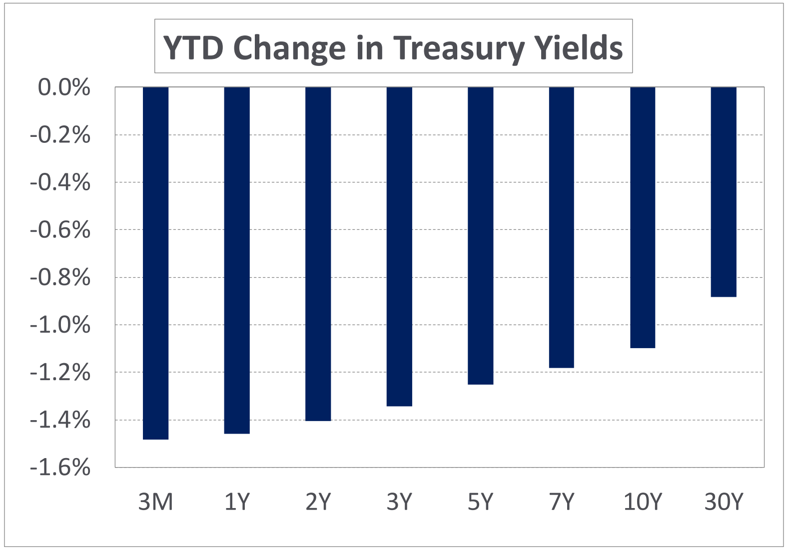
**The rate price change is a large component of total return and rate increases drag on future returns**

- The path of interest rates for each market is tied to both real rates and inflation expectations

**Roll down offers relief to rising rates when yield curves are steep, but the relative flatness of the current curve suggests this benefit is muted**

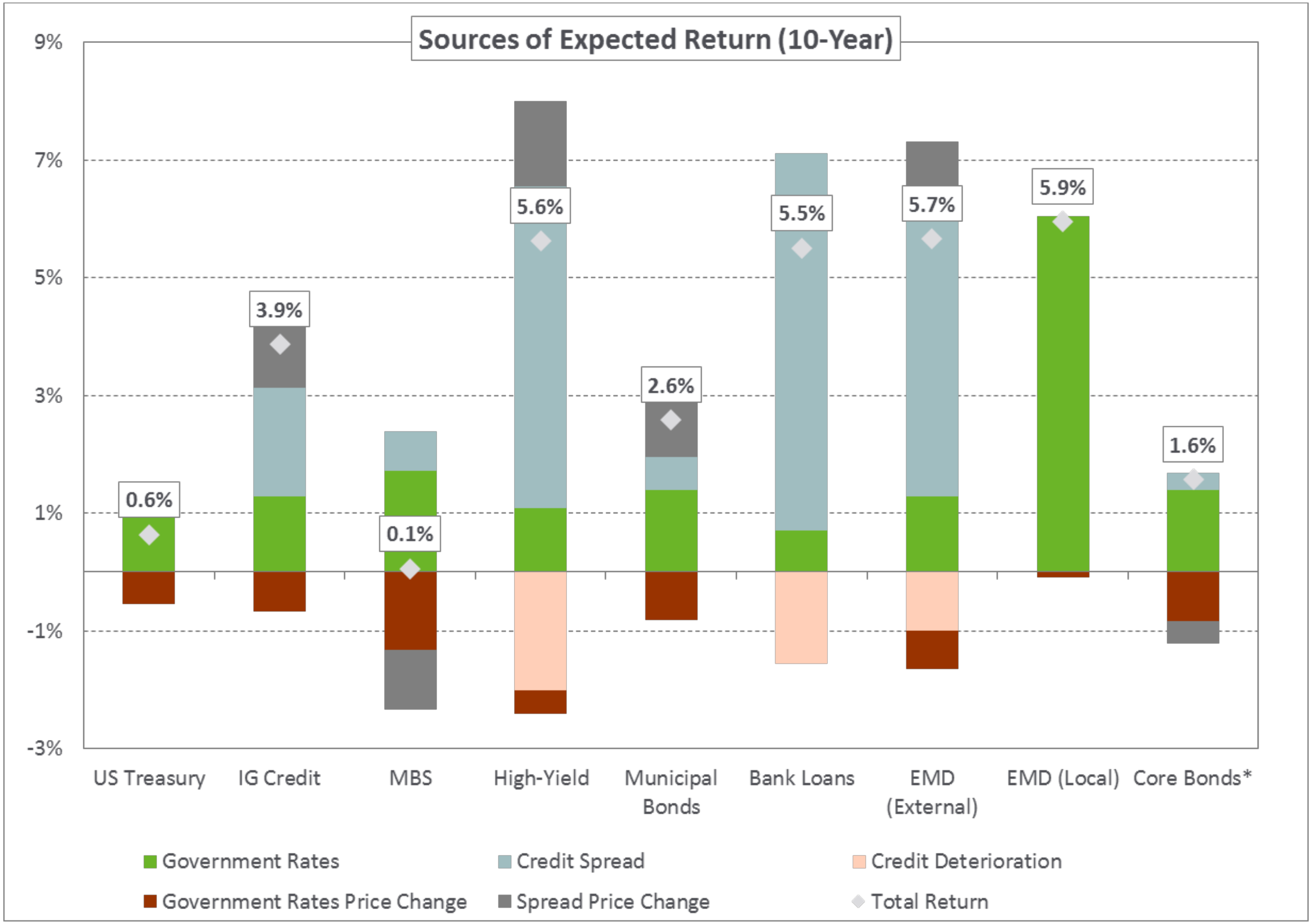
- This dynamic often pushes investors to shorter duration bonds




Source: (Top) Barclays, FactSet, NEPC
Source: (Bottom) FactSet, NEPC

# FIXED INCOME: BUILDING BLOCKS




Source: NEPC
*Calculated as a blend of other classes

# REAL ASSETS ASSUMPTIONS

# REAL ASSET ASSUMPTIONS OVERVIEW

**The strategic outlook for real assets reflects a high level of uncertainty due to the dislocation in energy prices and market-based inflation levels**

Real assets offer a meaningful portfolio diversification benefit but are exposed to the wide range of potential inflation scenarios in the current economic environment

**Energy-related asset class returns are higher but dividend and growth inputs are heavily discounted to reflect the economic distress**

For most clients, we recommend that no new energy investments be made at this time but also do not recommend selling liquid exposure at distressed prices

In addition, NEPC's Real Asset team has formed a Distressed Energy Working Group to detail current market views and assess near-term investment opportunities

**Real assets exhibit different betas to inflation and inflation-sensitive objectives should influence an investor's strategic allocation decision**

Within real asset exposures, NEPC recommends a strategic allocation to infrastructure and real estate, which offer inflation-sensitive income. For total return-focused investors, private real assets are preferred over public market proxies.

**We encourage investors to remove commodity futures from strategic asset allocation targets due to the low expected return assumption**

While commodities provide a pure market beta to inflation, a persistently negative roll yield reduces expected long-term returns

# REAL ASSETS: ASSUMPTIONS

| Real Assets Building Blocks | |
|---|---|
| **Illiquidity Premium** | The additional return expected for investments carrying liquidity risk |
| **Valuation** | The expected change in price of the underlying asset reverting to a long-term real average or terminal value assumption |
| **Inflation** | Incorporates the inflation paths as defined by TIPS breakeven expectations and NEPC expected inflation assumptions |
| **Growth** | Reflects market-specific growth for each equity asset class as a weighted-average derived from index country revenue contribution and forecasted GDP growth |
| **Real Income** | Represents the inflation-adjusted income produced by the underlying tangible or physical asset |

| Asset Class | 2020 10-Year Return | Change from 11/30/19 |
|---|---|---|
| Commodities | 1.4% | -2.6% |
| Midstream Energy | 8.1% | +0.7% |
| REITs | 7.0% | +1.6% |
| Public Infrastructure | 6.8% | +1.5% |
| Public Resource Equity | 8.2% | +0.9% |
| Core Real Estate | 4.5% | -0.7% |
| Non-Core Real Estate | 5.4% | -1.0% |
| Private RE Debt | 4.6% | -0.4% |
| Private Real Assets: Energy/ Metals | 8.9% | -0.2% |
| Private Real Assets: Infra/Land | 6.2% | +0.3% |

Source: NEPC

# REAL ASSETS: REAL INCOME

## Equity-Like: Real income is the inflation-adjusted dividend yield

Includes midstream energy, REITS, public infrastructure, natural resource and global infrastructure equities

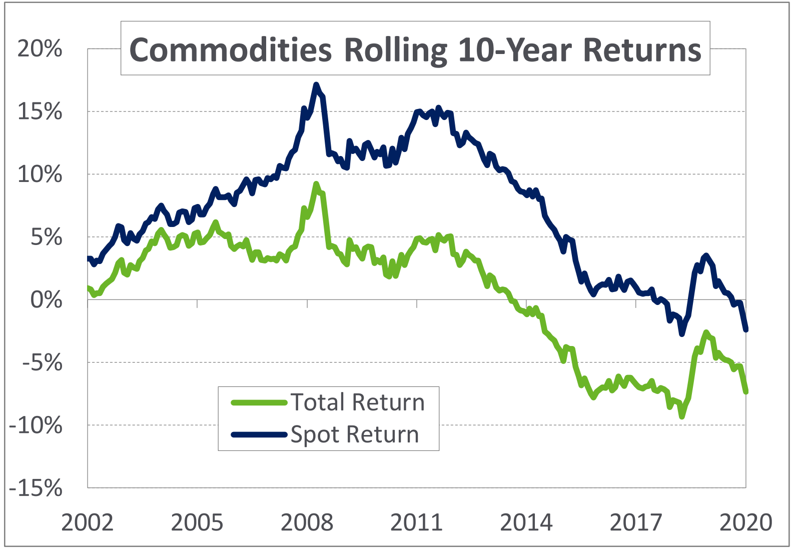
These publicly-traded real assets tend to have lucrative dividend yields relative to traditional global equities

## Real Estate: Real income is a function of Net Operating Income

NOI growth exhibits a cyclical economic pattern and appears to have retreated off cyclical highs

## Commodities: Real income includes the collateral return

A cash proxy is used to represent the collateral and represents the return on cash over the investment horizon




| Real Assets Yields | 11/30/19 | 3/31/20 |
|---|---|---|
| Midstream Energy | 6.7% | 12.0% |
| Core Real Estate | 4.4% | 4.5% |
| US REITs | 3.5% | 4.7% |
| Global REITs | 4.1% | 5.7% |
| Global Infra Equities | 4.1% | 4.3% |
| Natural Resource Equities | 4.1% | 4.8% |
| US 10-Yr Breakeven Inflation | 1.6% | 0.9% |
| Commodity Index Roll Yield | 0.5% | -14.3% |

Source: (Top) Bloomberg, FactSet, NEPC

Source: (Bottom) NCREIF, Alerian, NAREIT, S&P, FactSet, NEPC

*Commodity Index Roll Yield represents a proprietary calculation methodology

# REAL ASSETS: VALUATION

## Commodity valuations represent spot price relative to the long-term real average of spot prices

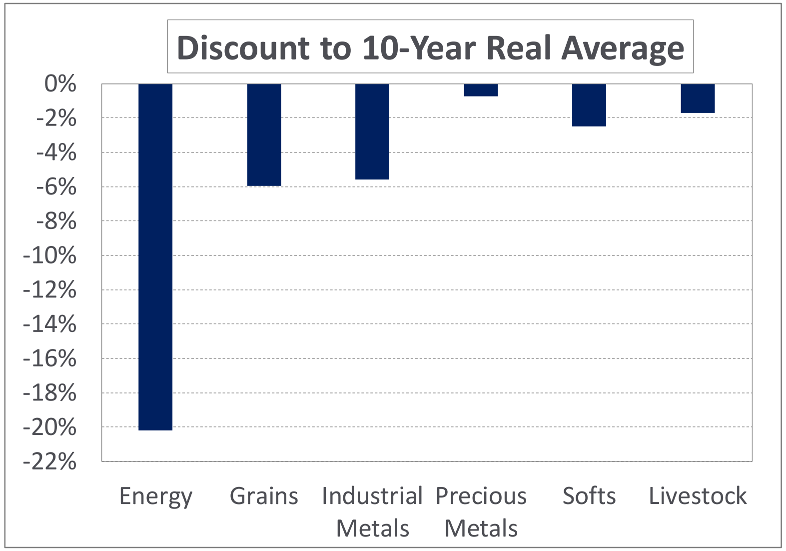
Commodity prices continue to trade below their long-term real averages, particularly in the energy sector

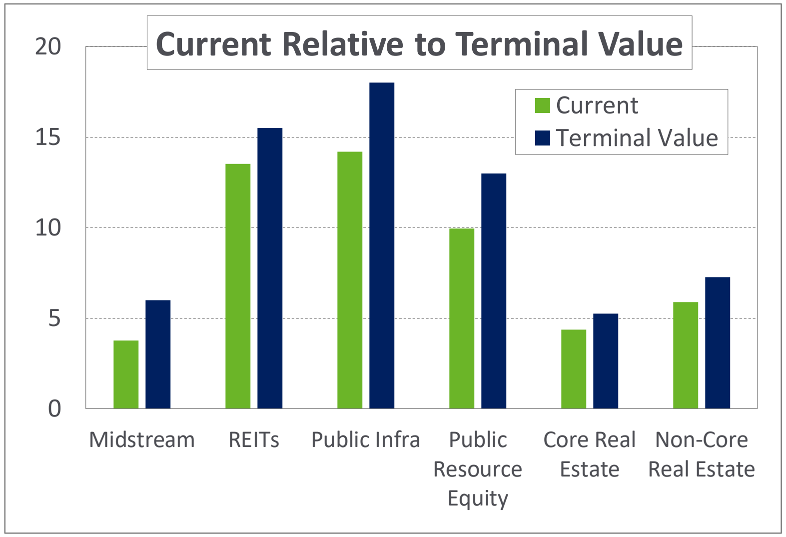
The potential for higher spot prices is additive to future expected returns

## Valuation adjustments for other real assets reflect a terminal value with the relevant valuation metrics

For example, Price over Cashflow from Operations is used for midstream energy to reflect the cash flow intense nature of the business, whereas Cap Rates are used for real estate

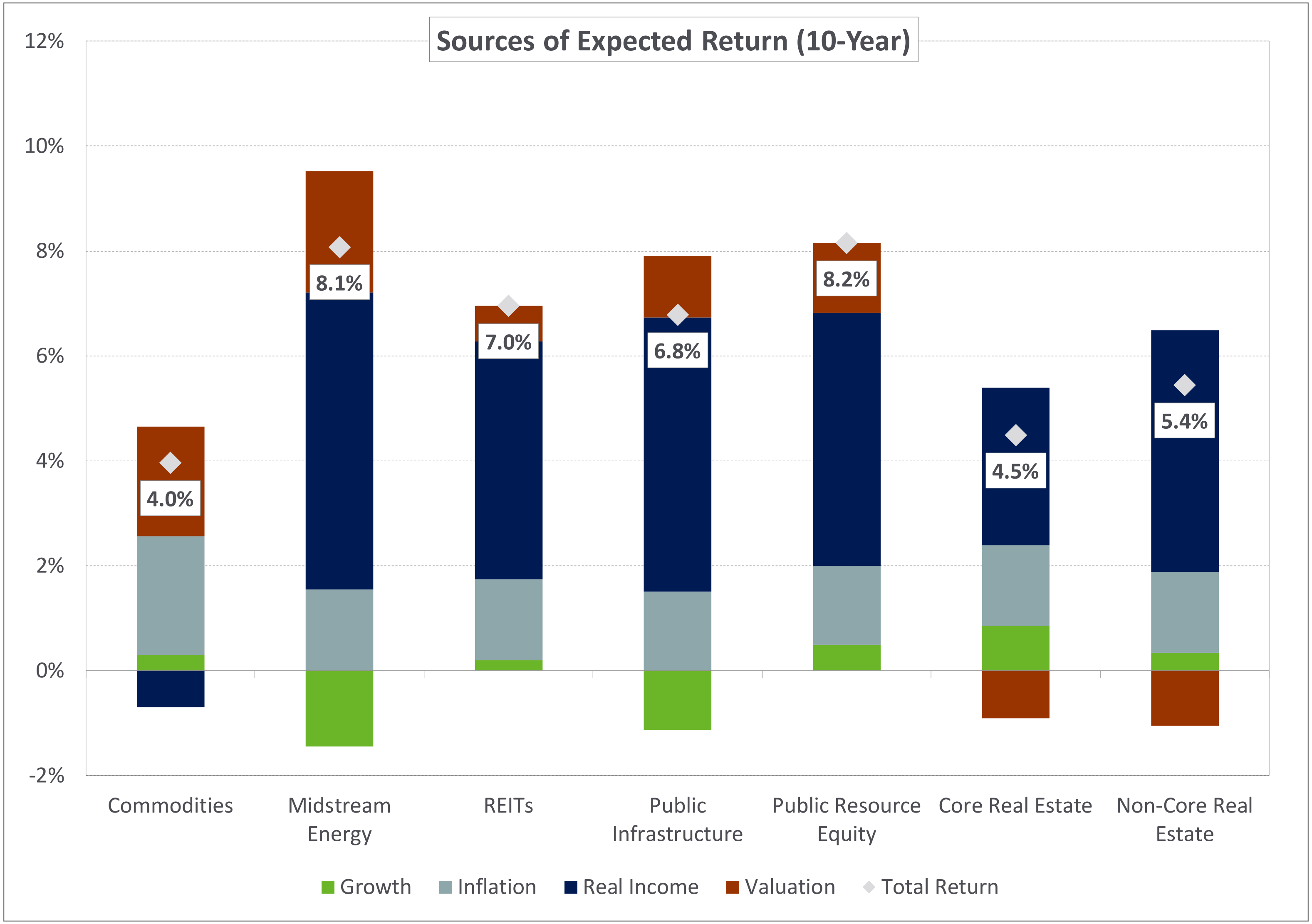
Elevated valuations in REITs are expected to detract from future returns as valuations trend downward toward long-term averages




Source: (Top) FactSet, NEPC
Source: (Bottom) Alerian, FTSE, S&P, FactSet, NEPC

# REAL ASSETS: BUILDING BLOCKS




Source: NEPC

# APPENDIX

# GLOBAL INFLATION

## In most developed economies, core inflation is below central bank targets

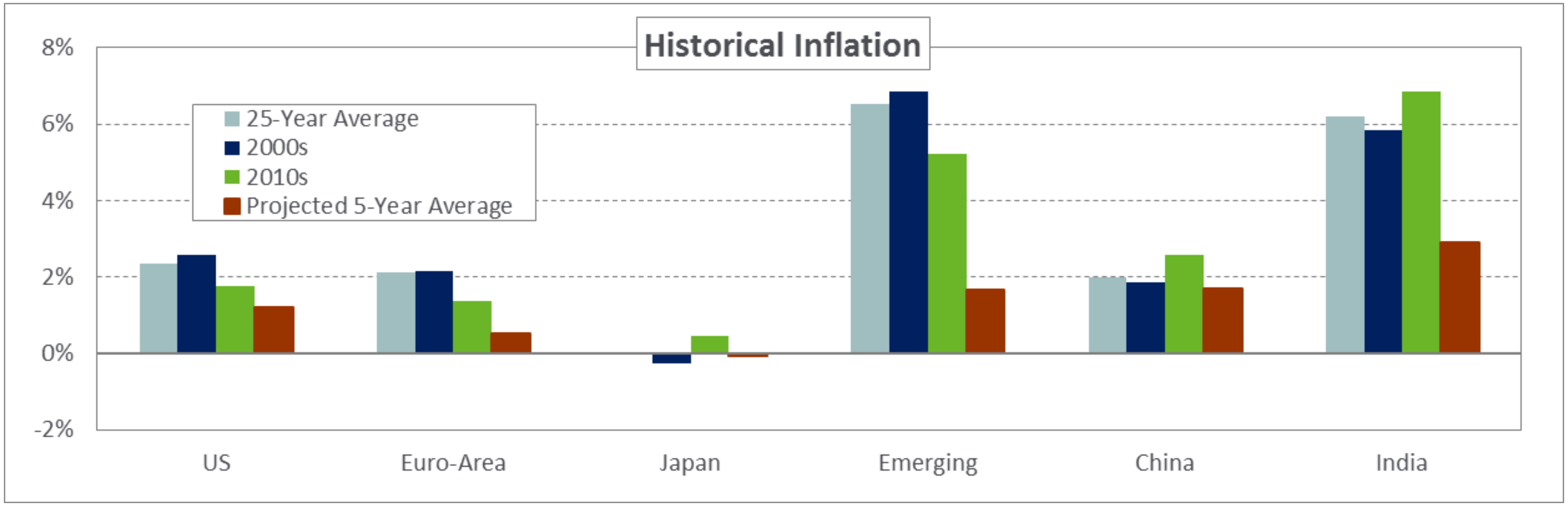
Globalization, deflationary technology, aging demographics and a decade of deleveraging are all deflationary headwinds

This trend will likely continue as global central banks rely on expansive monetary policy programs to mitigate deflationary headwinds

A shift toward sustained expansion of fiscal spending may be a source for potential inflation, but would require significant agreement across political spectrums

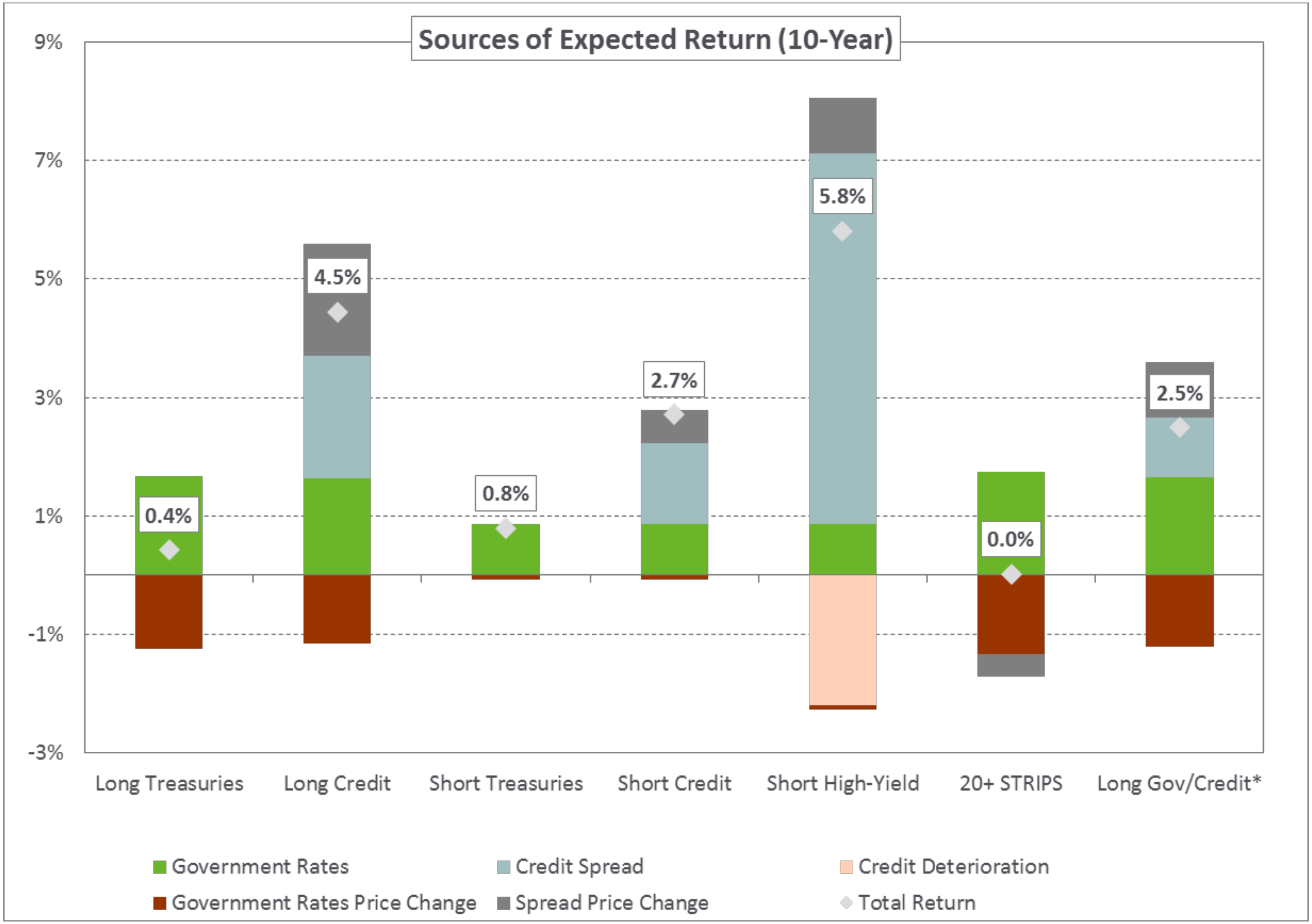
This may be an especially difficult prospect in the European Union given constitutional constraints and differences in opinion among member countries

## Emerging market inflation remains well above the developed world, but is significantly lower than long-term averages




Source: IMF, FactSet, NEPC

# FIXED INCOME: BUILDING BLOCKS




Source: NEPC
*Calculated as a blend of other classes

# ALTERNATIVE ASSET ASSUMPTIONS

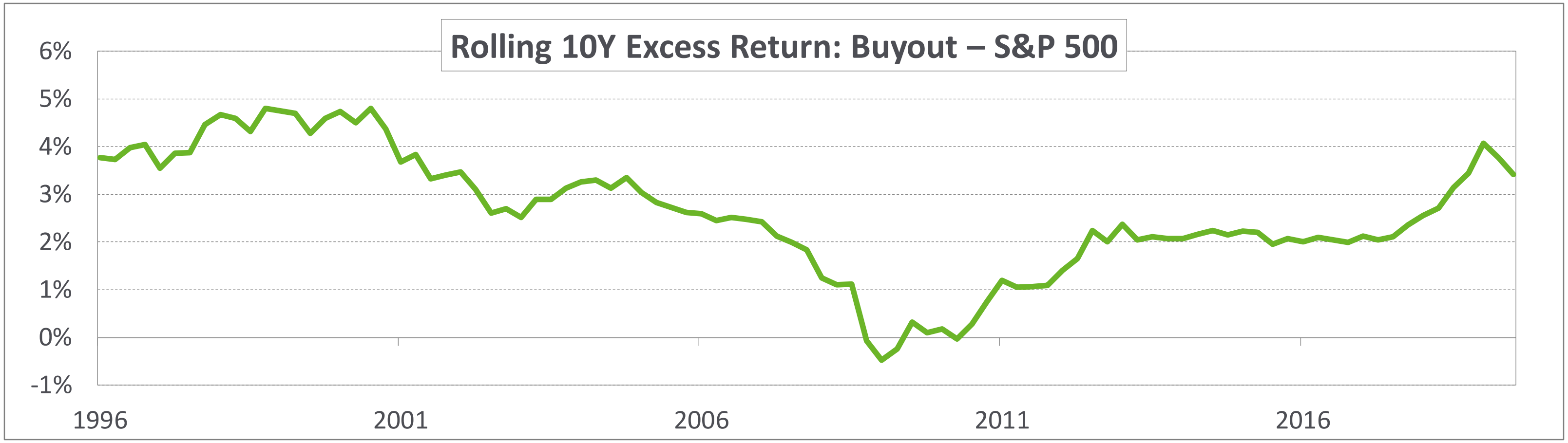
# ALTERNATIVES METHODOLOGY

**Private market assumptions are constructed using betas to public market assumptions with an added illiquidity premia based on historical return analysis relative to appropriate public market equivalents**

Historically, the observed illiquidity premium has been a significant component to private market returns. The assumed premium can be adjusted to reflect the current market environment and forward-looking views by strategy

**Hedge fund assumptions are constructed using betas to public market assumptions with an added alpha assumption based on historical manager universe performance relative to a relevant market benchmark**

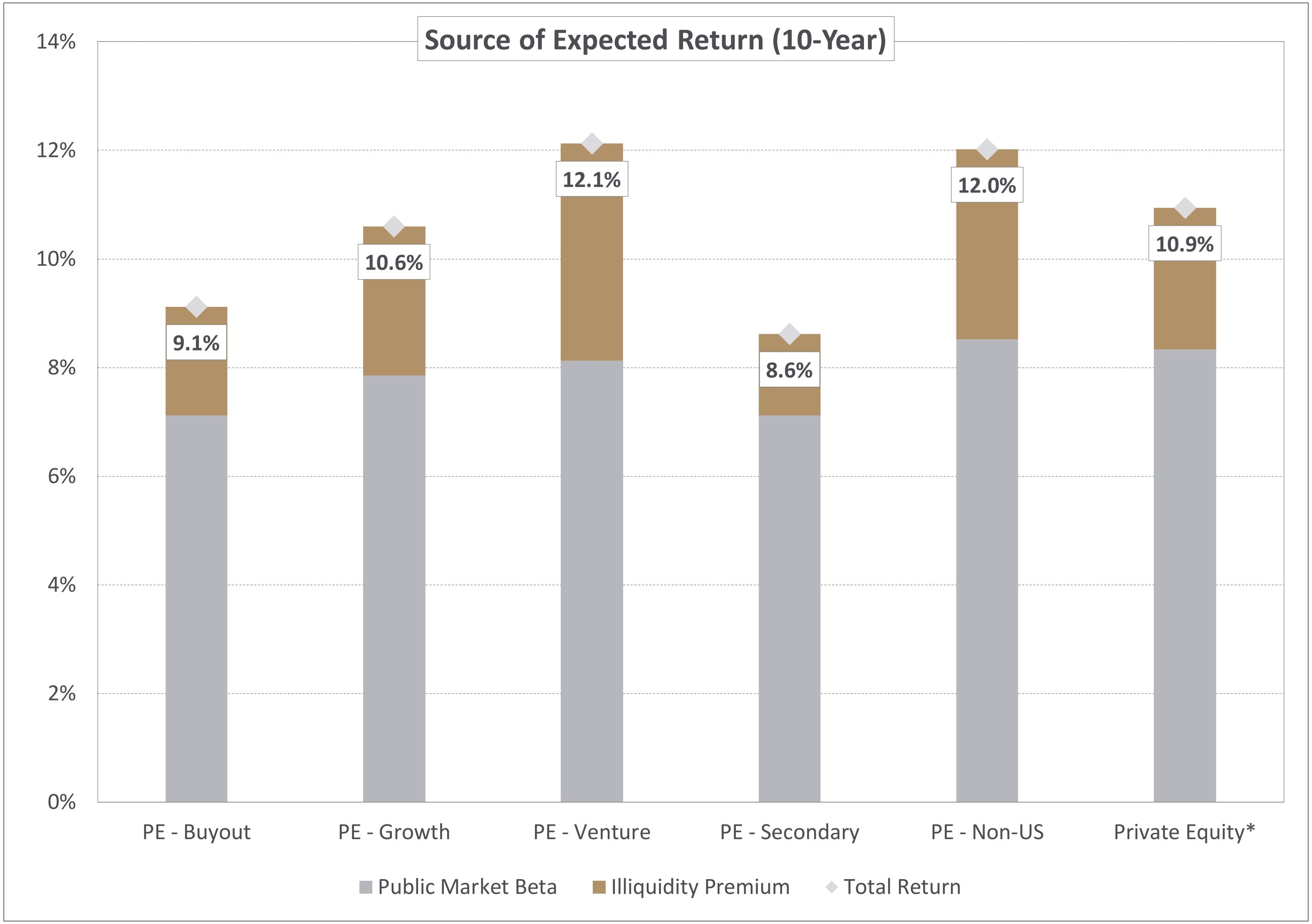
**Changes to the alternative asset return assumptions reflect changes to the underlying public market assumptions and qualitative adjustments to the illiquidity premia and alpha assumptions**




Source: Thomson One, S&P, FactSet

Exhibit A: Page 55

# PRIVATE EQUITY BUILDING BLOCKS

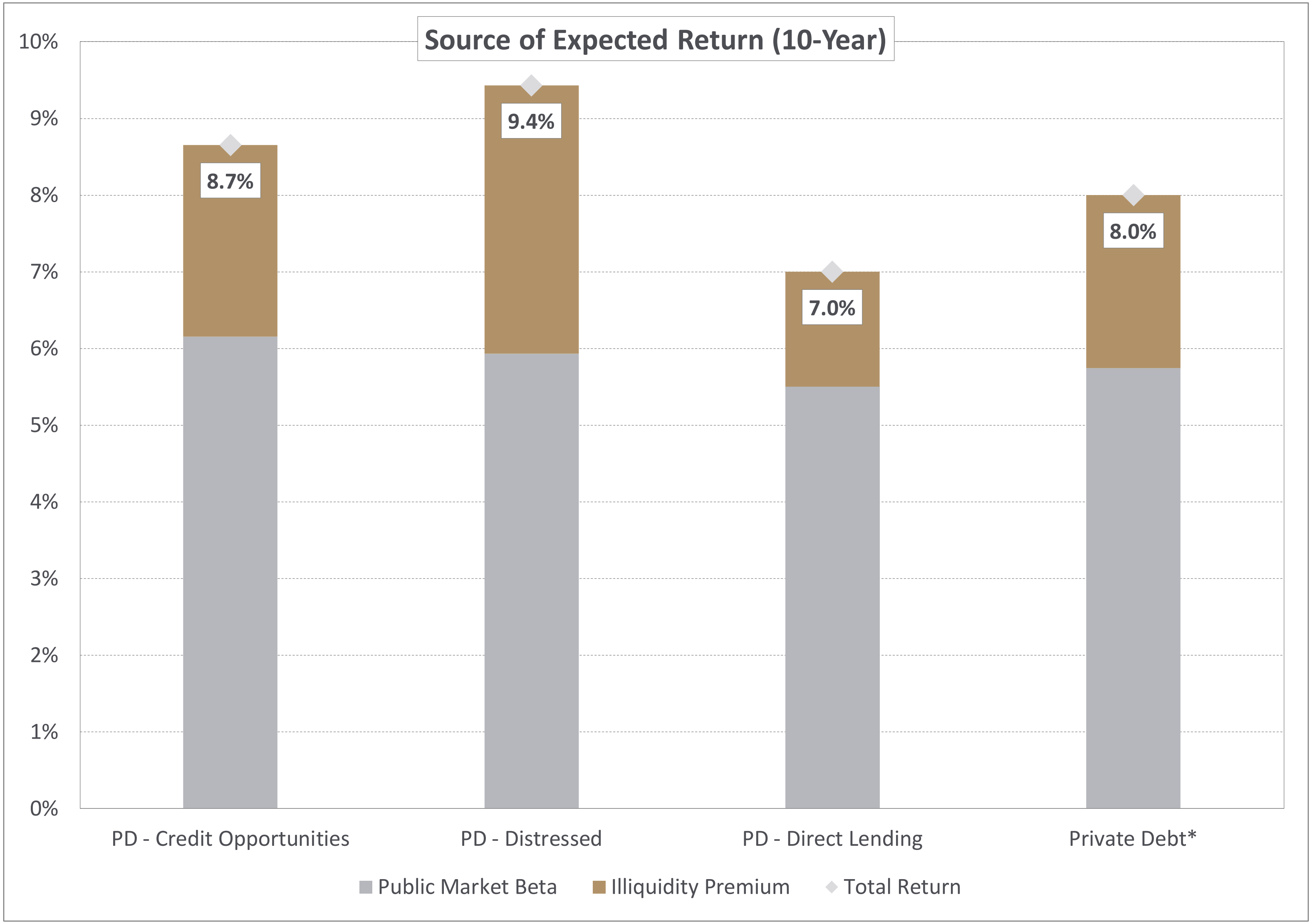



Source: NEPC

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

Exhibit A: Page 56

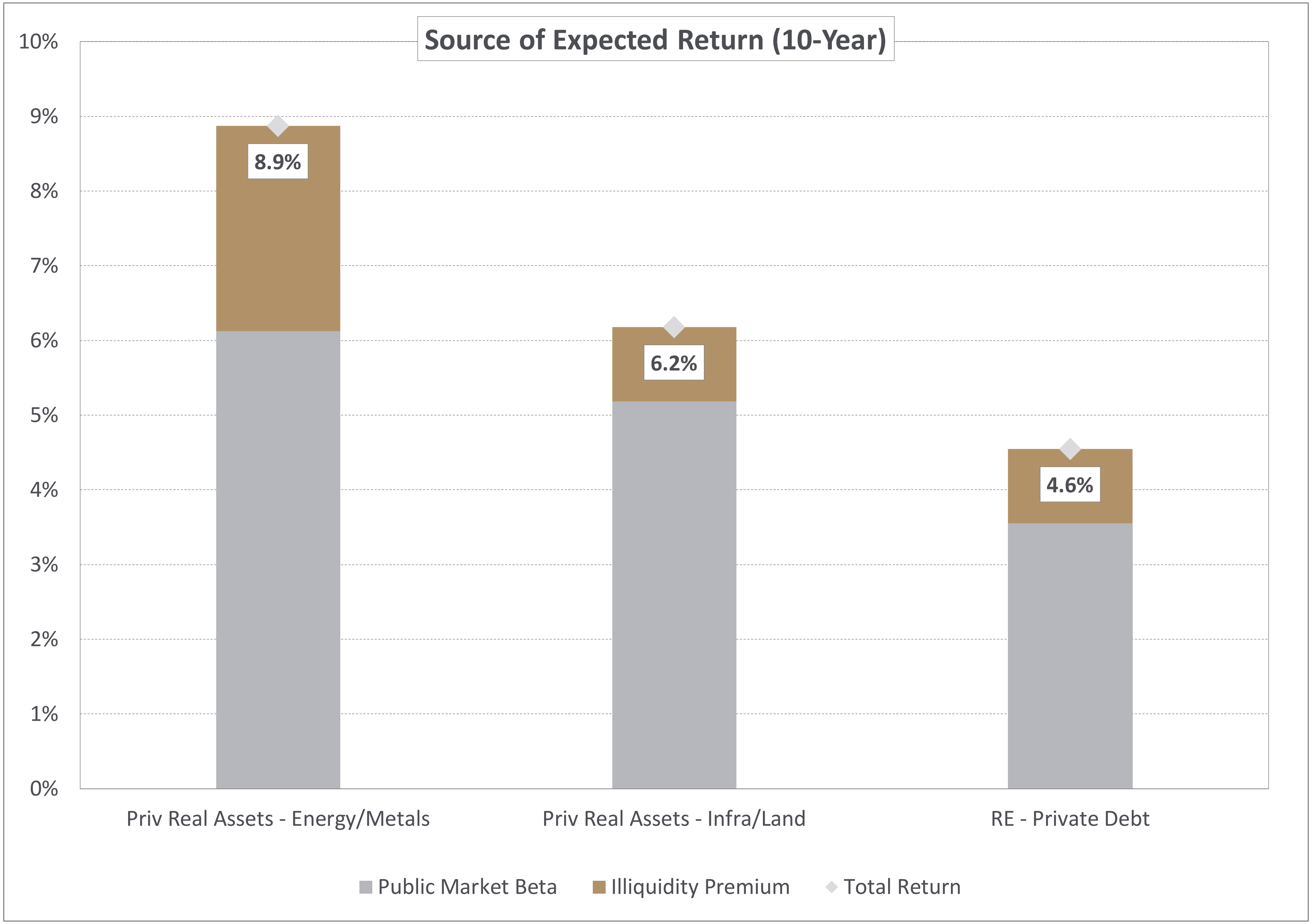
# PRIVATE DEBT BUILDING BLOCKS




Source: NEPC

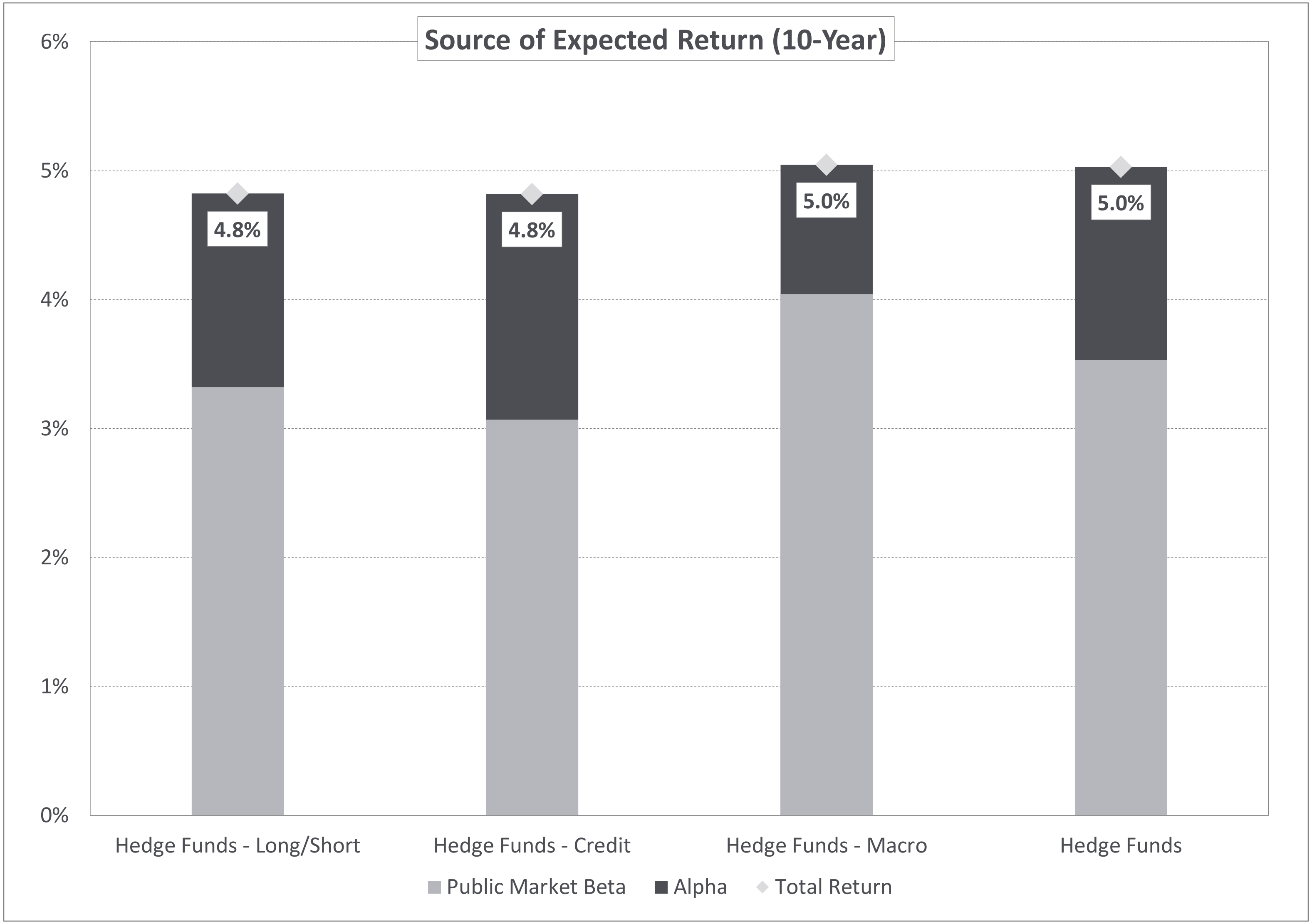
*Private Debt is a derived composite of 25% Mezzanine, 25% Distressed, 50% Direct Lending

# PRIVATE REAL ASSETS BUILDING BLOCKS




Source: NEPC

# HEDGE FUND BUILDING BLOCKS




Source: NEPC

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

# 10-YEAR RETURN FORECASTS

| Geometric Expected Return | | | |
|---|---|---|---|
| Asset Class | 3/31/2020 | 11/30/2019 | Delta |
| Inflation | 1.7% | 2.3% | -0.6% |
| Cash | 0.7% | 1.8% | -1.1% |
| US Leverage Cost | 1.0% | 2.1% | -1.1% |
| Non-US Cash | 0.5% | 0.4% | +0.1% |
| Large Cap Equities | 6.6% | 5.0% | +1.6% |
| Small/Mid Cap Equities | 7.3% | 5.5% | +1.8% |
| Int'l Equities (Unhedged) | 7.5% | 6.0% | +1.5% |
| Int'l Equities (Hedged) | 7.8% | 6.4% | +1.4% |
| Int'l Sm Cap Equities (Unhedged) | 7.8% | 6.4% | +1.4% |
| Emerging Int'l Equities | 10.2% | 9.0% | +1.2% |
| Emerging Int'l Sm Cap Equities | 10.2% | 9.2% | +1.0% |
| Hedge Funds - Long/Short | 4.8% | 4.8% | - |
| PE Buyout | 9.1% | 7.4% | +1.7% |
| PE Growth | 10.6% | 9.0% | +1.6% |
| PE Venture | 12.1% | 10.6% | +1.5% |
| PE Secondary | 8.6% | 6.9% | +1.7% |
| PE Non-US | 12.0% | 10.7% | +1.3% |
| China Equity | 8.9% | 8.8% | +0.1% |
| US Microcap Equity | 8.4% | 7.0% | +1.4% |

# 10-YEAR RETURN FORECASTS

| Geometric Expected Return | | | |
|---|---|---|---|
| **Asset Class** | **3/31/2020** | **11/30/2019** | **Delta** |
| TIPS | 1.2% | 2.2% | -1.0% |
| Treasuries | 0.6% | 1.9% | -1.3% |
| IG Corp Credit | 3.9% | 3.4% | +0.5% |
| MBS | 0.9% | 2.5% | -1.6% |
| High-Yield Bonds | 5.6% | 4.1% | +1.5% |
| Bank Loans | 5.5% | 4.8% | +0.7% |
| EMD (External) | 5.7% | 4.1% | +1.6% |
| EMD (Local Currency) | 5.9% | 5.4% | +0.5% |
| Non-US Bonds (Unhedged) | 0.7% | 0.2% | +0.5% |
| Non-US Bonds (Hedged) | 1.0% | 0.5% | +0.5% |
| Short TIPS (1-5 yr) | 1.2% | 2.2% | -1.0% |
| Short Treasuries (1-3 yr) | 0.8% | 2.1% | -1.3% |
| Short Credit (1-3 yr) | 2.7% | 2.9% | -0.2% |
| Short HY (1-3 yr) | 5.8% | 3.4% | +2.4% |
| Municipal Bonds | 2.6% | 1.9% | +0.7% |
| Municipal Bonds (1-10 Year) | 1.5% | 1.9% | -0.4% |
| High-Yield Municipal Bonds | 4.4% | 3.2% | +1.2% |
| Hedge Funds - Credit | 5.0% | 4.8% | +0.2% |
| PD Credit Opportunities | 8.2% | 6.3% | +1.9% |

# 10-YEAR RETURN FORECASTS

| Geometric Expected Return | | | |
|---|---|---|---|
| **Asset Class** | **3/31/2020** | **11/30/2019** | **Delta** |
| PD Distressed | 9.4% | 7.6% | +1.8% |
| PD Direct Lending | 7.0% | 6.3% | +0.7% |
| Long Treasuries | 0.4% | 1.7% | -1.3% |
| Long TIPS | 1.2% | 2.2% | -1.0% |
| Long Credit | 4.5% | 3.4% | +1.1% |
| 20+ YR STRIPS | 0.0% | 1.4% | -1.4% |
| Corp - AAA | 2.3% | 2.7% | -0.4% |
| Corp - AA | 2.5% | 2.7% | -0.2% |
| Corp - A | 3.1% | 3.0% | +0.1% |
| Corp - BBB | 4.6% | 3.7% | +0.9% |
| Corp - BB | 6.1% | 4.6% | +1.5% |
| Corp - B | 5.9% | 4.4% | +1.5% |
| Corp - CCC/Below | 1.5% | 0.7% | +0.8% |
| IG ABS/CMBS | 2.4% | 2.8% | -0.4% |
| IG CLO | 2.2% | 2.9% | -0.7% |
| HY Securitized | 2.3% | 4.2% | -1.9% |
| HY CLO | 5.3% | 5.3% | - |
| Taxable Muni Debt | 3.2% | 2.8% | +0.4% |
| US 10 yr Treasuries | 0.6% | 1.9% | -1.3% |

# 10-YEAR RETURN FORECASTS

| Geometric Expected Return | | | |
|---|---|---|---|
| **Asset Class** | **3/31/2020** | **11/30/2019** | **Delta** |
| Non-US 10-Year Sov (Hedged) | 0.9% | 0.5% | +0.4% |
| Commodities | 1.4% | 4.0% | -2.6% |
| Midstream Energy | 8.1% | 7.4% | +0.7% |
| REITs | 7.0% | 5.4% | +1.6% |
| Public Infrastructure | 6.8% | 5.3% | +1.5% |
| Public Resource Equity | 8.2% | 7.3% | +0.9% |
| Core Real Estate | 4.5% | 5.2% | -0.7% |
| Non-Core Real Estate | 5.4% | 6.4% | -1.0% |
| Private RE Debt | 4.6% | 5.0% | -0.4% |
| Private Real Assets - Energy/Metals | 8.9% | 9.1% | -0.2% |
| Private Real Assets - Infra/Land | 6.2% | 5.9% | +0.3% |
| Hedge Funds - Macro | 4.8% | 5.0% | -0.2% |
| Global Equity* | 7.7% | 6.2% | +1.5% |
| Private Equity* | 10.9% | 9.4% | +1.5% |
| Core Bonds* | 1.6% | 2.5% | -0.9% |
| Private Debt* | 8.0% | 6.7% | +1.3% |
| Long Govt/Credit* | 2.5% | 2.7% | -0.2% |
| Hedge Funds* | 5.0% | 4.8% | +0.2% |

*Calculated as a blend of other asset classes

# 30-YEAR RETURN FORECASTS

| Geometric Expected Return | | | |
|---|---|---|---|
| **Asset Class** | **3/31/2020** | **11/30/2019** | **Delta** |
| Inflation | 2.4% | 2.5% | -0.1% |
| Cash | 1.8% | 2.4% | -0.6% |
| US Leverage Cost | 2.1% | 2.7% | -0.6% |
| Non-US Cash | 0.5% | 2.1% | -1.6% |
| Large Cap Equities | 7.4% | 6.7% | +0.7% |
| Small/Mid Cap Equities | 7.6% | 7.2% | +0.4% |
| Int'l Equities (Unhedged) | 7.6% | 7.0% | +0.6% |
| Int'l Equities (Hedged) | 8.0% | 7.3% | +0.7% |
| Int'l Sm Cap Equities (Unhedged) | 8.0% | 7.5% | +0.5% |
| Emerging Int'l Equities | 9.5% | 9.2% | +0.3% |
| Emerging Int'l Sm Cap Equities | 10.0% | 9.2% | +0.8% |
| Hedge Funds - Long/Short | 5.6% | 5.7% | -0.1% |
| PE Buyout | 9.6% | 9.0% | +0.6% |
| PE Growth | 10.9% | 10.4% | +0.5% |
| PE Venture | 11.9% | 11.5% | +0.4% |
| PE Secondary | 9.1% | 8.5% | +0.6% |
| PE Non-US | 11.7% | 11.1% | +0.6% |
| China Equity | 8.8% | 9.1% | -0.3% |
| US Microcap Equity | 8.6% | 8.2% | +0.4% |

# 30-YEAR RETURN FORECASTS

| Geometric Expected Return | | | |
|---|---|---|---|
| Asset Class | 3/31/2020 | 11/30/2019 | Delta |
| TIPS | 2.0% | 2.7% | -0.7% |
| Treasuries | 1.9% | 2.7% | -0.8% |
| IG Corp Credit | 4.2% | 4.4% | -0.2% |
| MBS | 2.2% | 3.4% | -1.2% |
| High-Yield Bonds | 5.8% | 5.6% | +0.2% |
| Bank Loans | 5.1% | 5.2% | -0.1% |
| EMD (External) | 5.3% | 5.0% | +0.3% |
| EMD (Local Currency) | 5.6% | 5.3% | +0.3% |
| Non-US Bonds (Unhedged) | 1.2% | 2.1% | -0.9% |
| Non-US Bonds (Hedged) | 1.4% | 2.4% | -1.0% |
| Short TIPS (1-5 yr) | 2.0% | 2.8% | -0.8% |
| Short Treasuries (1-3 yr) | 1.9% | 2.7% | -0.8% |
| Short Credit (1-3 yr) | 3.1% | 3.6% | -0.5% |
| Short HY (1-3 yr) | 4.5% | 4.1% | +0.4% |
| Municipal Bonds | 2.6% | 2.6% | - |
| Municipal Bonds (1-10 Year) | 2.0% | 2.6% | -0.6% |
| High-Yield Municipal Bonds | 4.4% | 5.0% | -0.6% |
| Hedge Funds - Credit | 5.7% | 5.9% | -0.2% |
| PD Credit Opportunities | 7.7% | 7.5% | +0.2% |

# 30-YEAR RETURN FORECASTS

| Geometric Expected Return | | | |
|---|---|---|---|
| Asset Class | 3/31/2020 | 11/30/2019 | Delta |
| PD Distressed | 8.5% | 8.3% | +0.2% |
| PD Direct Lending | 7.4% | 7.5% | -0.1% |
| Long Treasuries | 1.8% | 2.7% | -0.9% |
| Long TIPS | 1.9% | 2.7% | -0.8% |
| Long Credit | 4.5% | 4.6% | -0.1% |
| 20+ YR STRIPS | 1.5% | 2.5% | -1.0% |
| Corp - AAA | 3.1% | 3.6% | -0.5% |
| Corp - AA | 3.2% | 3.6% | -0.4% |
| Corp - A | 3.6% | 4.0% | -0.4% |
| Corp - BBB | 4.6% | 4.6% | - |
| Corp - BB | 6.3% | 6.2% | +0.1% |
| Corp - B | 5.8% | 5.7% | +0.1% |
| Corp - CCC/Below | 0.6% | 0.8% | -0.2% |
| IG ABS/CMBS | 3.2% | 3.7% | -0.5% |
| IG CLO | 3.0% | 3.5% | -0.5% |
| HY Securitized | 4.4% | 5.6% | -1.2% |
| HY CLO | 5.7% | 5.8% | -0.1% |
| Taxable Muni Debt | 4.1% | 4.3% | -0.2% |
| US 10 yr Treasuries | 2.1% | 2.9% | -0.8% |

# 30-YEAR RETURN FORECASTS

| Geometric Expected Return | | | |
|---|---|---|---|
| **Asset Class** | **3/31/2020** | **11/30/2019** | **Delta** |
| Non-US 10-Year Sov (Hedged) | 1.8% | 2.8% | -1.0% |
| Commodities | 4.0% | 4.8% | -0.8% |
| Midstream Energy | 8.3% | 7.1% | +1.2% |
| REITs | 7.6% | 6.5% | +1.1% |
| Public Infrastructure | 7.1% | 6.1% | +1.0% |
| Public Resource Equity | 8.1% | 7.4% | +0.7% |
| Core Real Estate | 5.7% | 6.0% | -0.3% |
| Non-Core Real Estate | 7.1% | 7.4% | -0.3% |
| Private RE Debt | 5.3% | 5.7% | -0.4% |
| Private Real Assets - Energy/Metals | 9.4% | 9.0% | +0.4% |
| Private Real Assets - Infra/Land | 7.2% | 6.7% | +0.5% |
| Hedge Funds - Macro | 5.3% | 5.4% | -0.1% |
| Global Equity* | 8.1% | 7.5% | +0.6% |
| Private Equity* | 11.2% | 10.7% | +0.5% |
| Core Bonds* | 2.6% | 3.4% | -0.8% |
| Private Debt* | 7.8% | 7.8% | - |
| Long Govt/Credit* | 3.2% | 3.8% | -0.6% |
| Hedge Funds* | 5.8% | 5.7% | +0.1% |

*Calculated as a blend of other asset classes

# PRIVATE MARKETS COMPOSITES

**Assumed public market beta composites for private market return assumptions are detailed below:**

## Private Equity:

Private Equity – Buyout: 25% US Large Cap, 75% US Small/Mid Cap

Private Equity – Secondary: 25% US Large Cap, 75% US Small/Mid Cap

Private Equity – Growth: 50% US Small/Mid Cap, 50% US Microcap

Private Equity – Venture: 25% US Small/Mid Cap, 75% US Microcap

Private Equity – Non-US: 70% International Small Cap, 30% Emerging Small Cap

*PE Composite: 34% Buyout, 34% Growth, 15 % Non-US, 8.5% Secondary, 8.5% Venture*

## Private Debt:

Private Debt – Direct Lending: 100% Bank Loans

Private Debt – Distressed: 20% US Small/Mid Cap, 60% US High Yield, 20% Bank Loans

Private Debt – Credit Opportunities: 24% US SMID Cap, 33% US High Yield, 33% Bank Loans

*Private Debt Composite: 50% Direct Lending, 25% Credit Opportunities, 25% Distressed*

## Private Real Assets:

Private Real Assets – Energy: 30% Comm., 35% Midstream, 35% Public Resource Equity

Private Real Assets - Infra/Land: 30% Commodities, 70% Public Infrastructure

Private Real Estate Debt: 50% CMBS, 50% Core Real Estate

# 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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