NEPC 2019 INVESTMENT OUTLOOK

ASSET CLASS ASSUMPTIONS

January 16, 2019

NEPC Research

ASSET CLASS ASSUMPTIONS

INTRODUCTION

2019 ASSET CLASS OVERVIEW

NEPC asset class assumptions offer both an intermediate (5-7 years) and long term (30 years) forecast horizon

November 30th replaced by December 31st market data for inputs to asset class models

Return expectations for credit asset classes are broadly higher relative to last year due to interest rate increases and wider credit spreads

Despite the increase in return expectations, we encourage caution when investing in lower-quality credit exposure as we expect default rates to trend higher in the current late-cycle market environment

US equity return expectations increased relative to last year following a sizable correction in the fourth quarter of 2018

Our outlook for international developed equities is less optimistic than prior years, resulting in a significantly lower 5-7 year return expectation

We continue to refine and enhance our process where appropriate

New asset class assumptions were added this year to provide greater differentiation in credit, including investment and speculative grade corporate ratings (AAA-CCC)

Private equity and private debt sub-strategies were added to offer a distinction among private market implementation options with different volatility and return profiles

Asset class correlation and volatility assumptions were adjusted to integrate private markets and new asset classes, to improve risk modeling and scenario analysis

ASSUMPTION DEVELOPMENT

Capital market assumptions are published for over 60 asset classes

- Assumptions include 5-7 year and 30 year return forecasts, average annual volatility expectations, and correlations

The 5-7 year forecast is designed to capture the return outlook for the current investment cycle

- 30 year return assumptions reflect a long-term outlook and are informed by the historical relationships among asset classes

Assumptions are published annually in December and use market data as of November 30

- 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 Committee	
September	Asset Allocation Committee Assumptions Kickoff Finalize List of New Asset Class Assumptions
October	Review Draft of Asset Class Return Assumptions Discuss Outlook with NEPC Research Beta Groups
November	Finalize Volatility and Correlation Assumptions Final Update of Asset Class Models (As of 11/30)
December	Review Model Output and Create Return Assumptions Present Draft to the PRC Publish Assumptions on December 14th

MODIFIED ASSUMPTIONS AS OF DECEMBER 31

Significant market movements during the month of December caused the Asset Allocation Committee to update the capital market return assumptions created as of November 30th

Volatility and correlation assumptions were unchanged from the November 30th figures

Asset Class	12/31 5-7 Year Return Assumption	11/30 5-7 Year Return Assumption	Rationale
US Inflation	2.25%	2.50%	5-Year, 5-Year forward inflation expectations fell to 2%
Cash	2.50%	2.75%	The market no longer expects any Fed rate increases in 2019; our US inflation assumption declined 25 basis points
Large Cap US Equities	6.00%	5.00%	The S&P 500 Index fell 9% during December
Treasuries	2.50%	3.00%	The 10-year US Treasury yield fell 30 basis points during December; lower inflation
US High Yield	5.25%	4.75%	Spreads increased 108 bps during December; lower rates

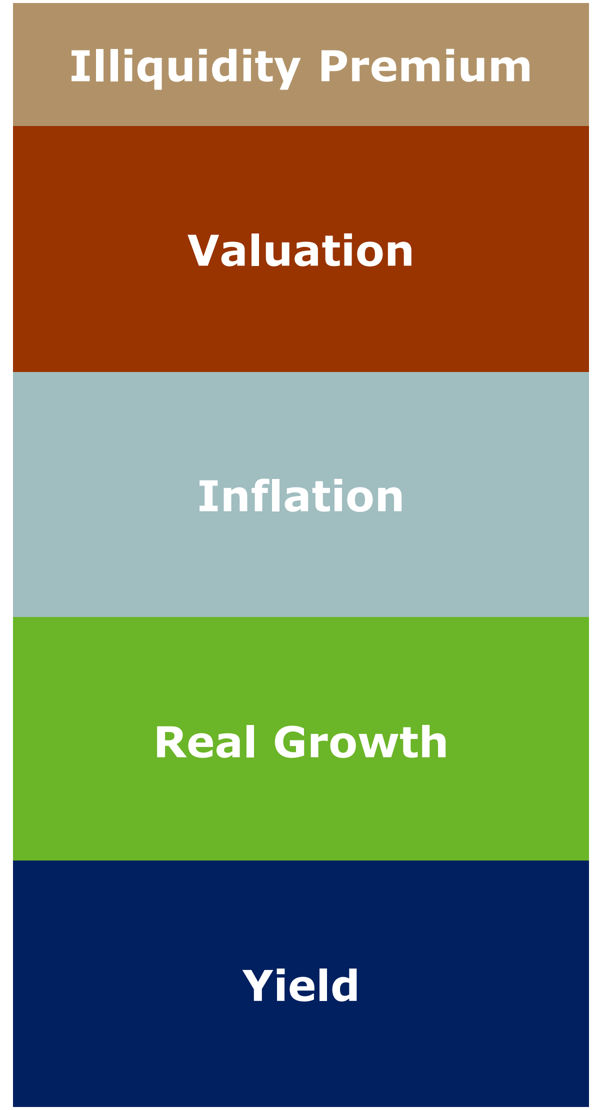
BUILDING BLOCKS METHODOLOGY

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

Quantitative inputs combined with qualitative factors and investor sentiment (capital flows, etc.) drive the 5-7 year return outlook

Components are combined to capture core drivers of return across asset classes – forming the foundation of our building blocks framework

Building blocks will vary across equity, credit, and real assets

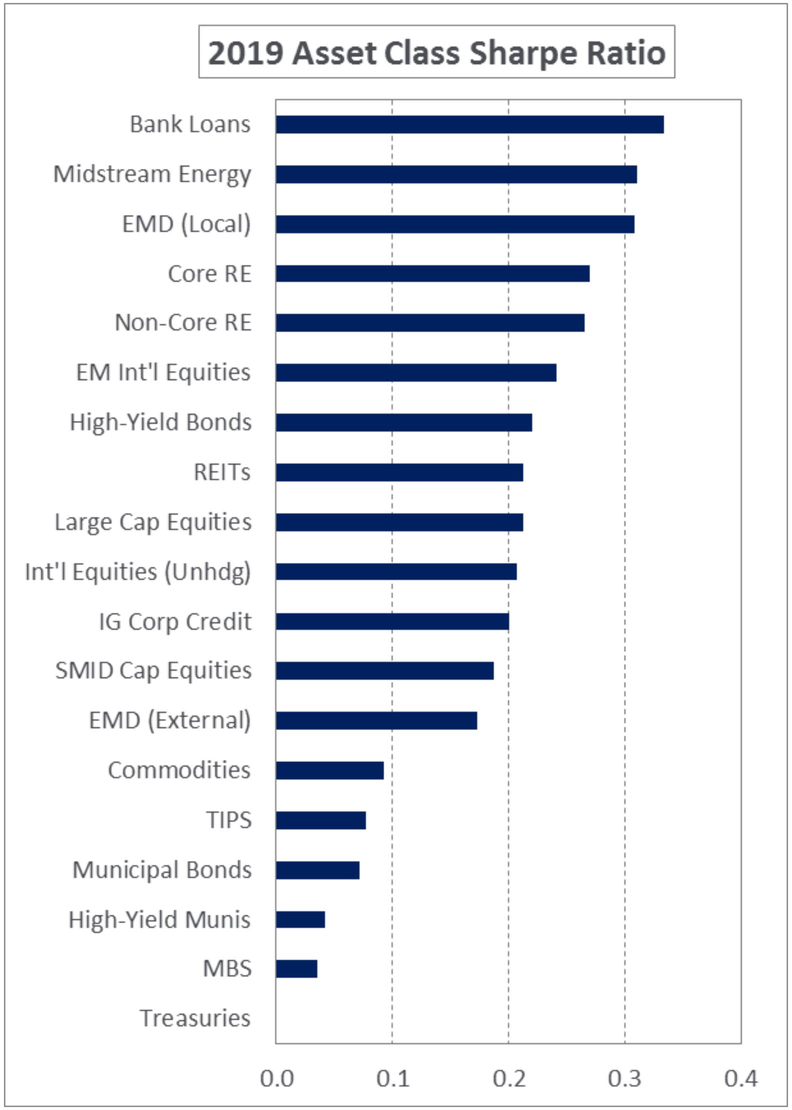


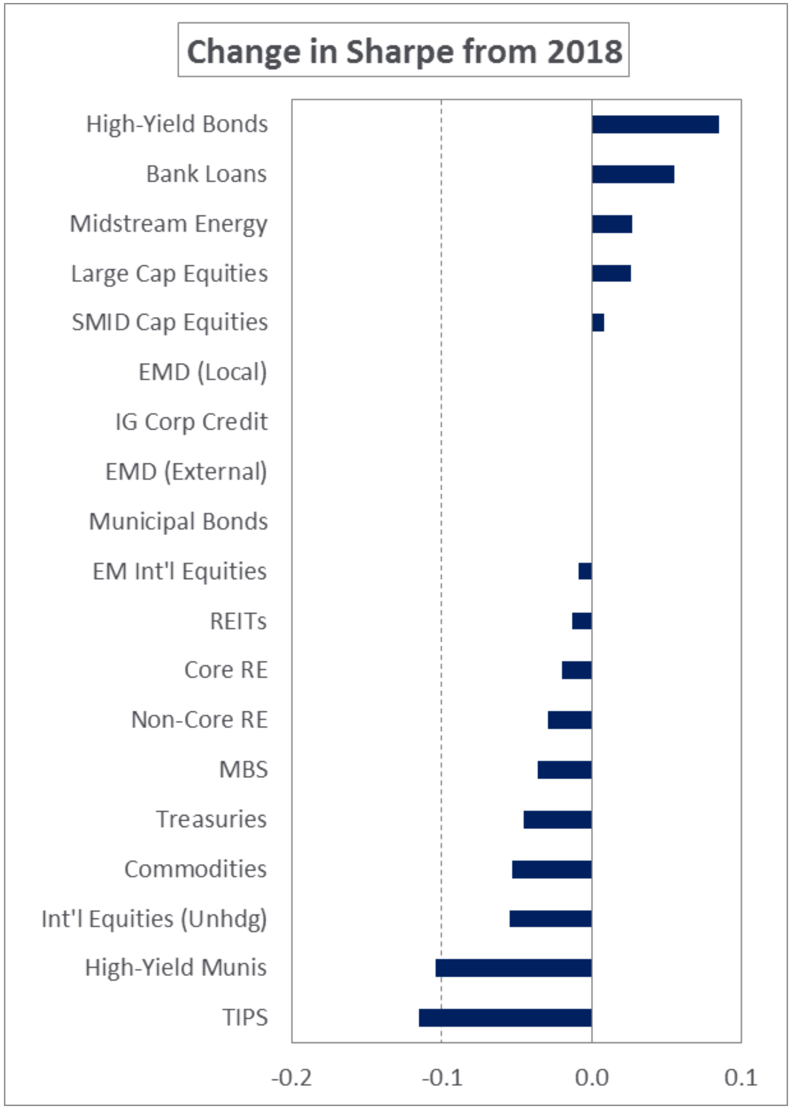
CORE RETURN ASSUMPTIONS

	Asset Class	5-7 Year Return	Change 2019-2018	Volatility
	Cash	2.50%	**+.50%**	1.00%
	US Inflation	2.25%	**-0.25%**	-
Equity	Large Cap Equities	6.00%	**+0.75%**	16.50%
Equity	International Equities (Unhedged)	6.75%	**-0.75%**	20.50%
Equity	Emerging International Equities	9.25%	**+0.25%**	28.00%
Equity	*Private Equity**	*10.01%*	***+2.01%***	*24.16%*
Rates/Credit	Treasuries	2.50%	**+0.25%**	5.50%
Rates/Credit	*Core Bonds**	*3.04%*	***+0.29%***	*6.10%*
Rates/Credit	Municipal Bonds (1-10 Year)	3.00%	**+0.50%**	5.50%
Rates/Credit	High Yield Bonds	5.25%	**+1.50%**	12.50%
Rates/Credit	*Private Debt**	*7.60%*	***+1.10%***	*11.97%*
Real Assets	Commodities	4.25%	**-0.50%**	19.00%
Real Assets	Midstream Energy	8.25%	**+1.00%**	18.50%
Real Assets	REITs	6.75%	**+0.25%**	20.00%
Real Assets	Core Real Estate	6.00%	**+0.25%**	13.00%
Multi-Asset	*US 60/40**	*5.07%*	***+0.53%***	*10.45%*
Multi-Asset	*Global 60/40**	*5.08%*	***+0.17%***	*10.95%*
Multi-Asset	*Hedge Funds**	*5.74%*	***-0.09%***	*8.15%*

**Calculated as a blend of other asset classes – see page 39 for additional details*

RELATIVE ASSET CLASS ATTRACTIVENESS





Source: NEPC

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

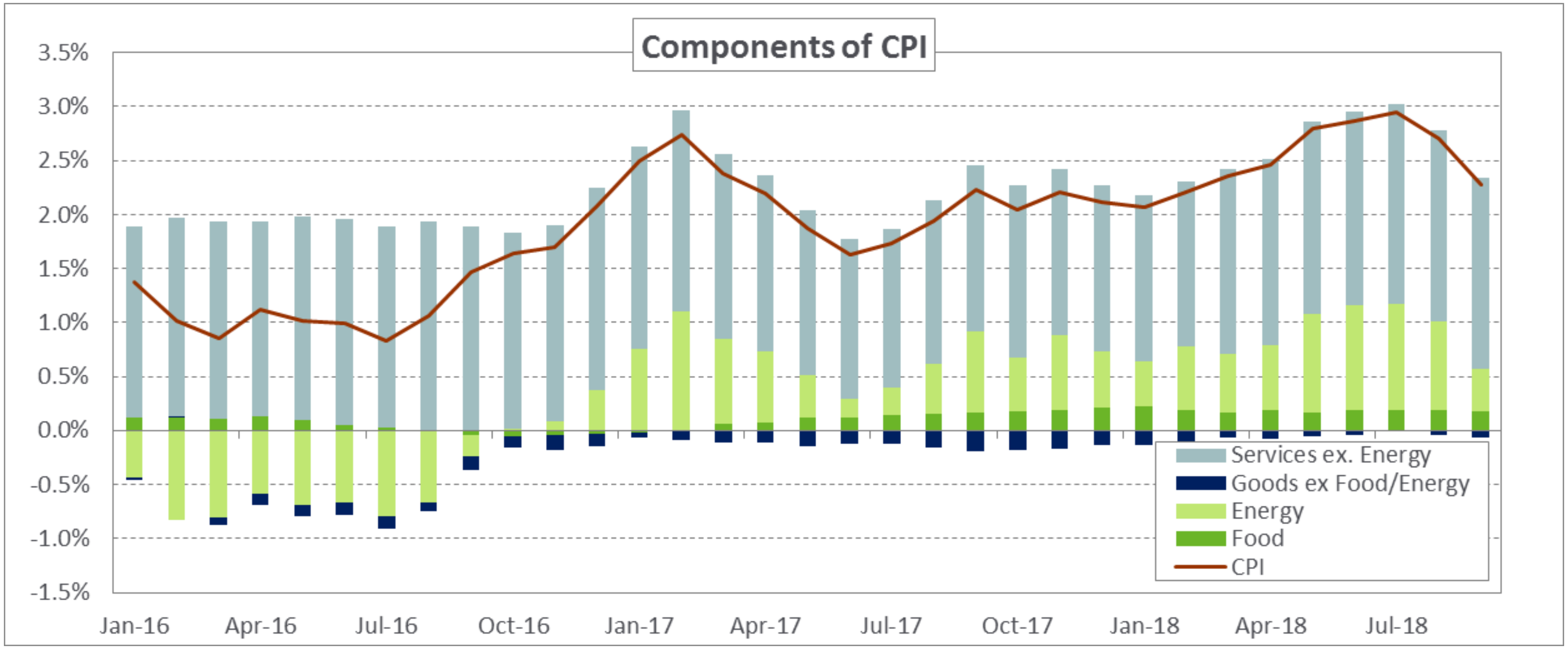
US inflation is based upon the TIPS breakeven inflation curve adjusted for expectations of economic activity, employment, and capacity levels

Global inflation expectations are informed by consensus forecasts across countries along with implied inputs from global bond curves

The 30 year global inflation forecast assumes purchase power parity holds across the globe and country specific inflation levels converge to a terminal value

Region	5-7 Year Inflation Assumption	30-Year Inflation Assumption
United States	2.25%	2.75%
Global	3.00%	3.25%

US INFLATION



Source: Bloomberg, NEPC

US inflation has increased, but has yet to materially accelerate despite strong economic growth and a tight labor market

Underlying inflation has risen with a modest increase in wages due to the tightening labor market but market-based inflation expectations have declined considerably this year

A significant decline in energy prices in the latter half of 2018 has minimized overall price pressures

Energy is historically the most volatile component of CPI and a sustained decline in prices can cause inflation to remain muted

GLOBAL INFLATION

In most developed economies, core inflation has failed to reach or exceed central bank targets

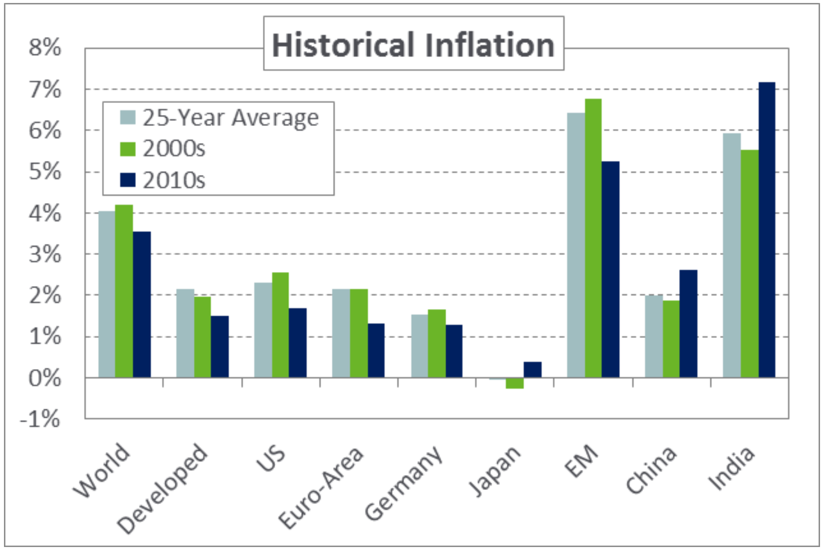
The European Central Bank is expected to end the expansion of its quantitative easing program at the end of the year despite a weakening economic outlook

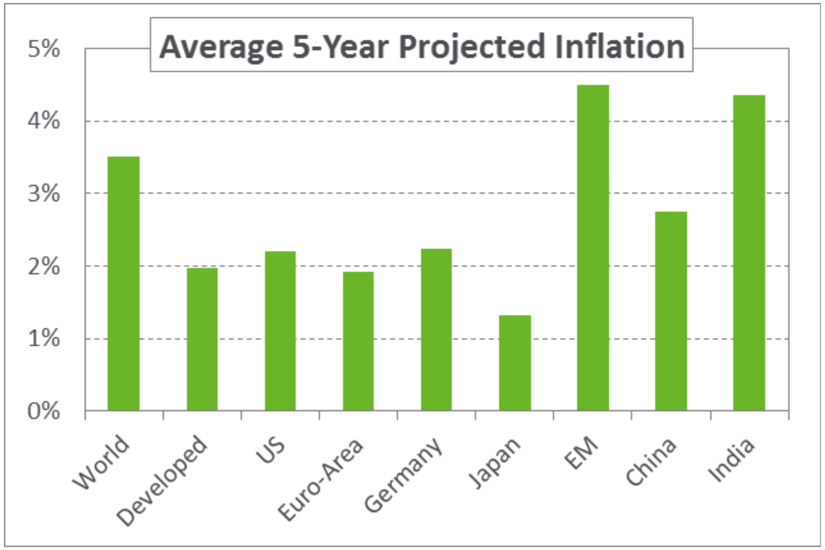
Japan has been the only developed economy to drive inflation above historical levels, although still less than other countries

Emerging market inflation remains significantly lower than long-term averages in most economies

Turkey and Argentina remain notable outliers as idiosyncratic risks and inconsistent monetary policy have fueled rising prices

Lower inflation is likely to give select countries room to ease monetary policy, as needed, to bolster economic growth





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

NEPC

US CASH EXPECTATIONS

Cash is a foundation for all asset classes

The assumption flows through as a direct building block component or as a relative value adjustment (cash + risk premia)

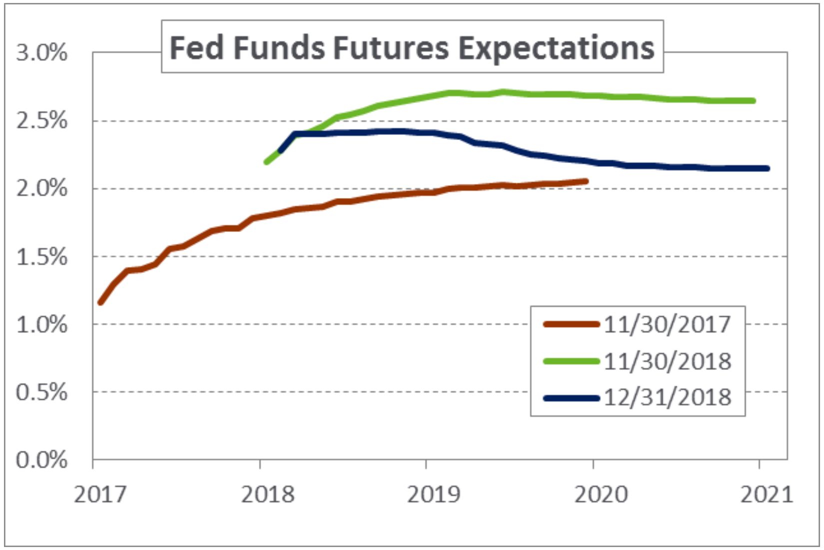
The longer-term cash assumption is a result of the inflation assumption in conjunction with our forecasted real interest rate path

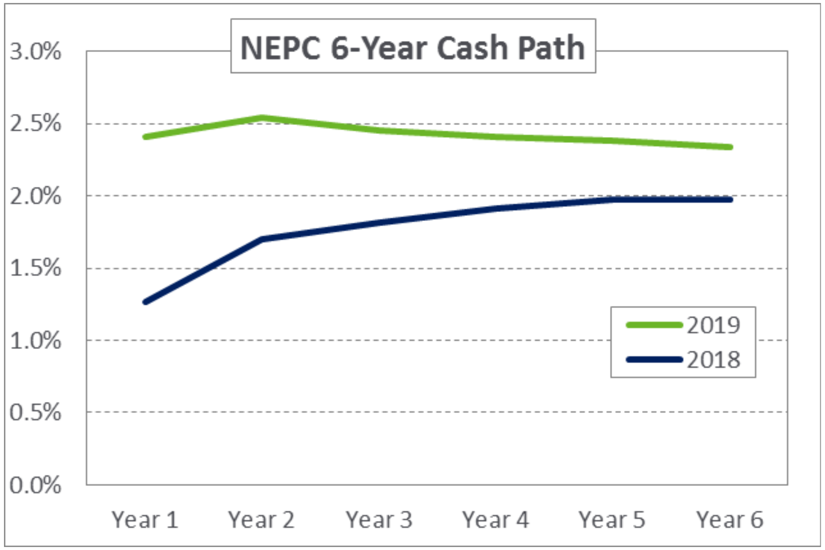
The Fed has shifted from a "lower for longer" policy to a more balanced posture of raising rates relative to changes in inflation

With Fed action impacting the front-end of the yield curve, a progressively flatter yield curve has formed as longer-term rate expectations remain muted

Markets are discounting a more muted pace of rate hikes relative to Fed projections, especially after December markets

Key risks to our overall investment outlook are an increased pace in Fed rate hikes or a Fed misstep disrupting capital markets





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

US INTEREST RATE EXPECTATIONS

Real yields moved materially higher relative to last year with continued Fed rate hikes and subdued inflation

The real yield curve flattened relative to last year, with an inversion at the 2 year point

Late-cycle expectations of growth and continued Fed rate hikes increase market forward-looking expectations

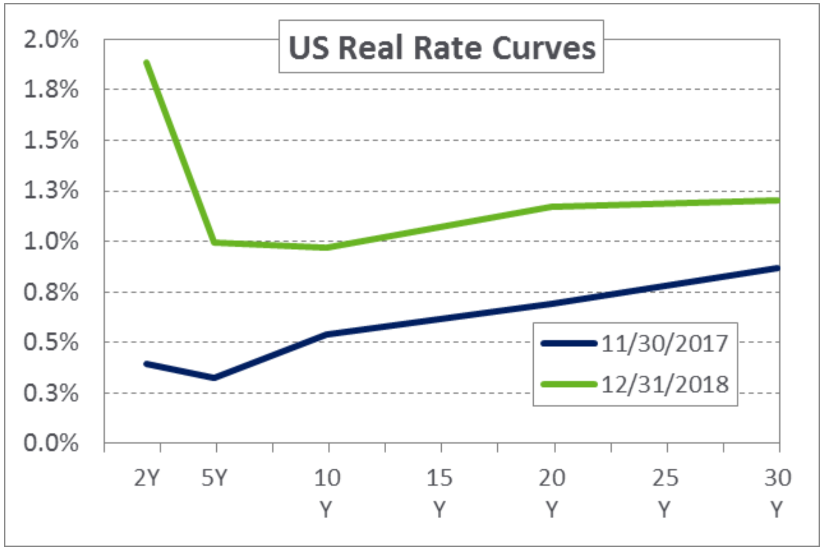
Long-term yields continue to rise but remain low relative to history in the US

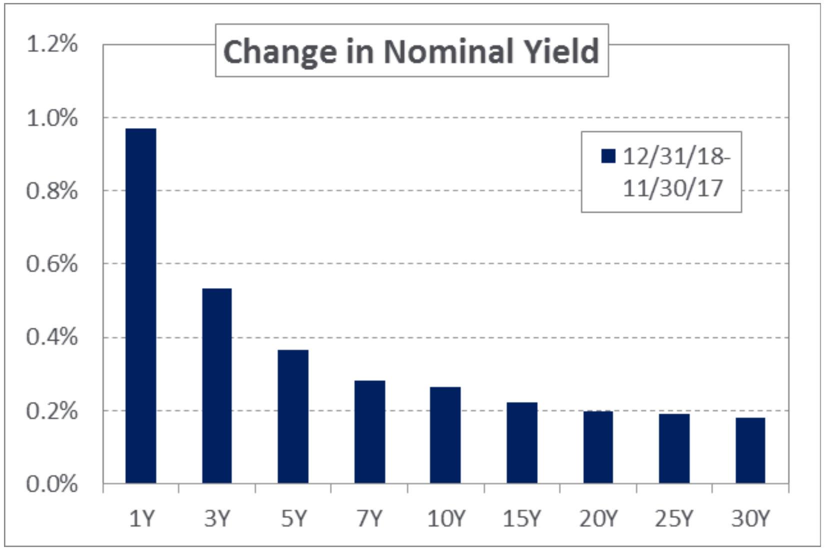
Low real rates depress the return outlook for risk assets over the long-term

The flatter nominal curve is likely to invert during the late cycle

Uncertainty has surfaced surrounding the path of rates for 2019 and beyond

The Fed has recently expressed a willingness to slow the pace via a wait-and-see approach should material risks to the US economy develop





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

GLOBAL INTEREST RATE EXPECTATIONS

Government bond yields remain low across much of the developed world

European sovereign yields have increased relative to Germany due to political and economic concerns

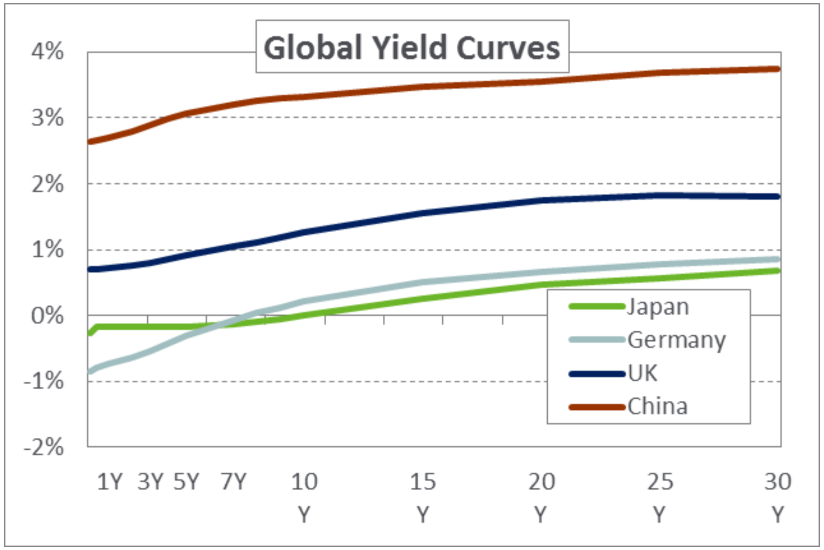
Ongoing political turmoil in the UK and budget concerns in Italy caused periphery yields to increase during the year

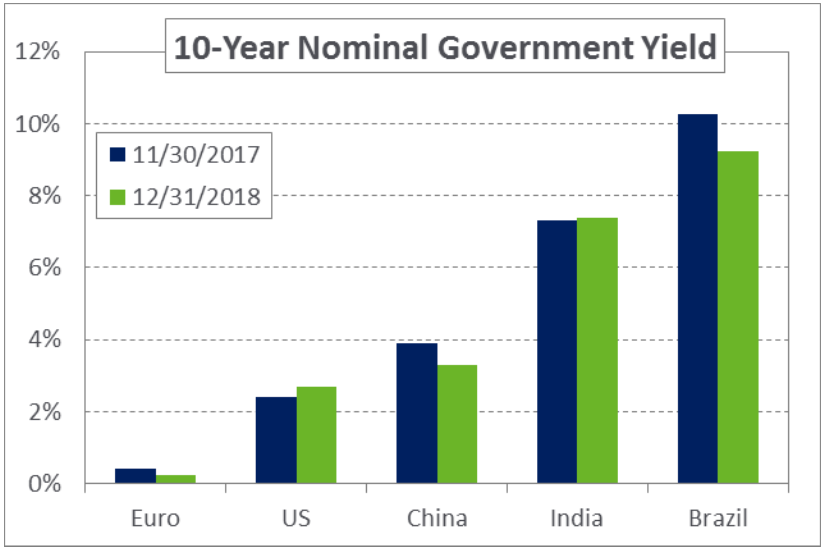
German bund yields are lower due to heightened demand for safe-haven assets in Europe

Emerging market local interest rates are attractively priced as real yields remain elevated

Emerging market yields continue to retain a healthy premia over developed world rates

Additionally, positive real rates provide a larger cushion for EM central banks to cut interest rates and ease monetary conditions





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

EQUITY ASSUMPTIONS

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	5-7 Year Return	Change 2019-2018
US Large Cap	**6.00%**	**+0.75%**
US Small/Mid-Cap	**6.25%**	**+0.50%**
US Micro Cap	**7.25%**	**N/A**
International (Unhedged)	**6.75%**	**-0.75%**
International Small Cap	**7.25%**	**-0.50%**
Emerging International	**9.25%**	**+0.25%**
Emerging Intl. Small Cap	**9.50%**	**+0.25%**
China Local	**9.50%**	**N/A**
Hedge Funds – Long/Short	**5.50%**	**-0.75%**
Global Equity	***6.99%***	***+0.11%***
Private Equity	***10.01%***	***+2.01%***

EQUITY: REAL EARNINGS GROWTH

US growth accelerated relative to the rest of the world during 2018

Strong earnings growth fueled by corporate tax cuts helped support US equities

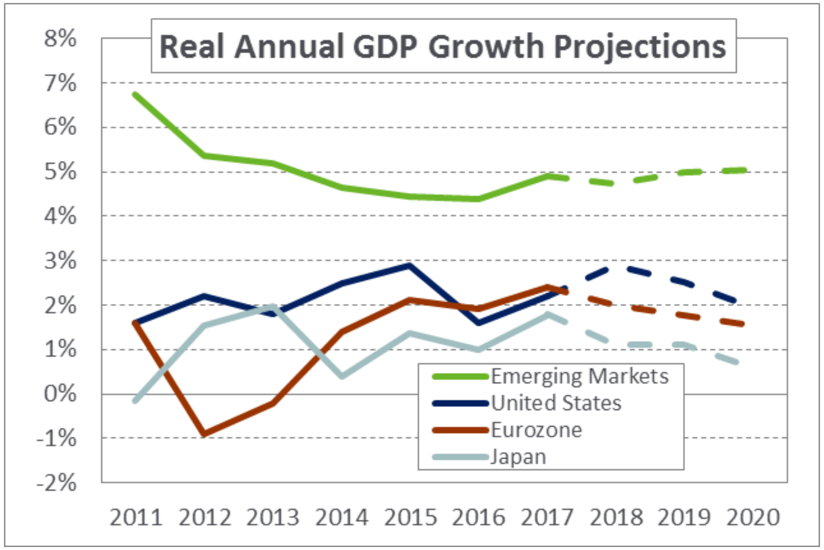
Additionally, fiscal stimulus and pre-purchases from China for tariffed goods fueled above-trend GDP growth

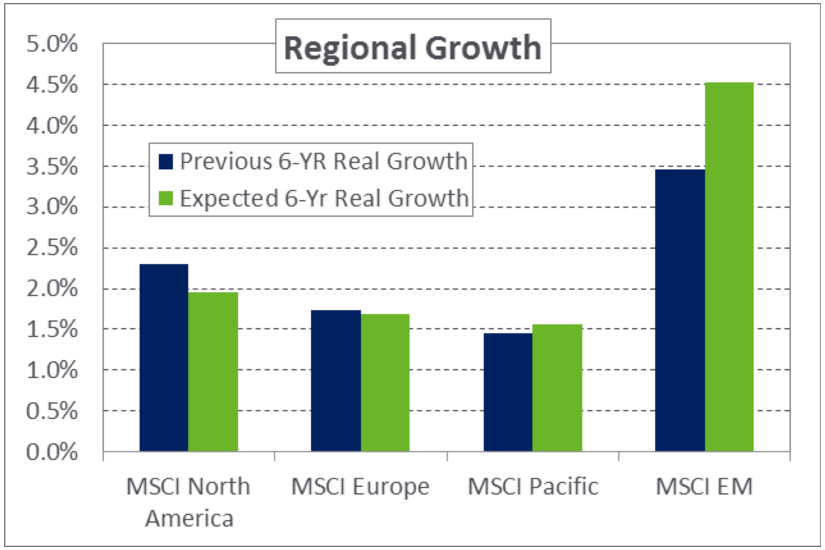
Global trade tensions and political-economic concerns regarding Europe have led to a weaker growth outlook for international developed economies

Strong economic growth is expected to continue in the emerging markets

However, China's real growth is expected to slow in future years as the country transitions to a consumption based model

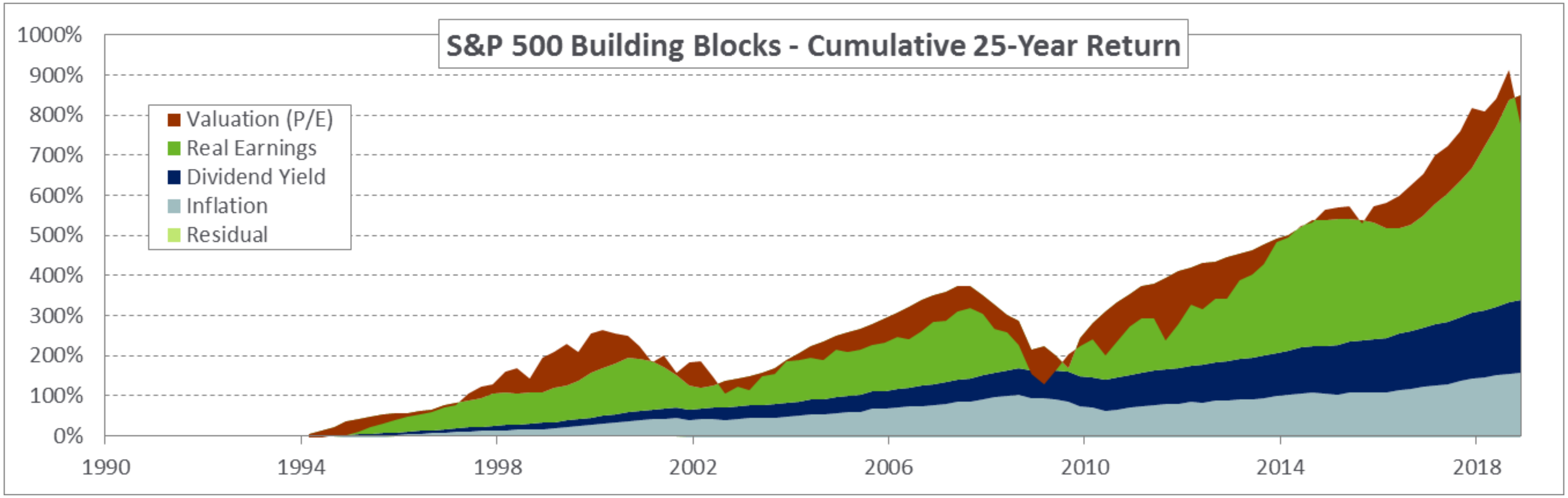
Ongoing reforms in southeast Asia and India are expected to boost investment, productivity, and per-capita growth





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

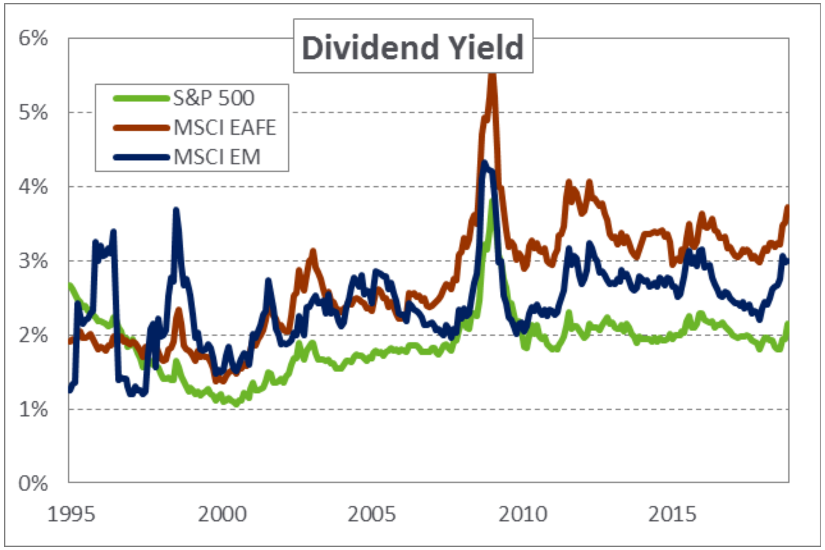
EQUITY: DIVIDEND YIELD



Global dividend payouts hit record levels this year

- Much of the growth came from emerging markets following years of declining dividend yields
- Corporate tax cuts in the US helped increase dividend payout rates

International and emerging markets continue to offer higher dividend yields relative to the US equity market



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

EQUITY: VALUATION

US equities were an outlier relative to global equities this year

US equities benefited from an extended US economic cycle and added fuel from the fiscal stimulus package

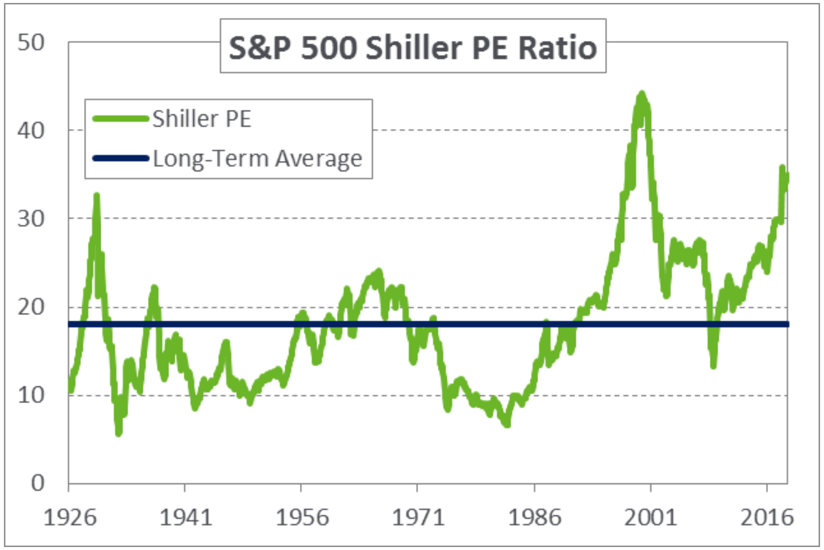
Strong earnings growth fueled by corporate tax cuts pushed valuations lower for large-cap US equities

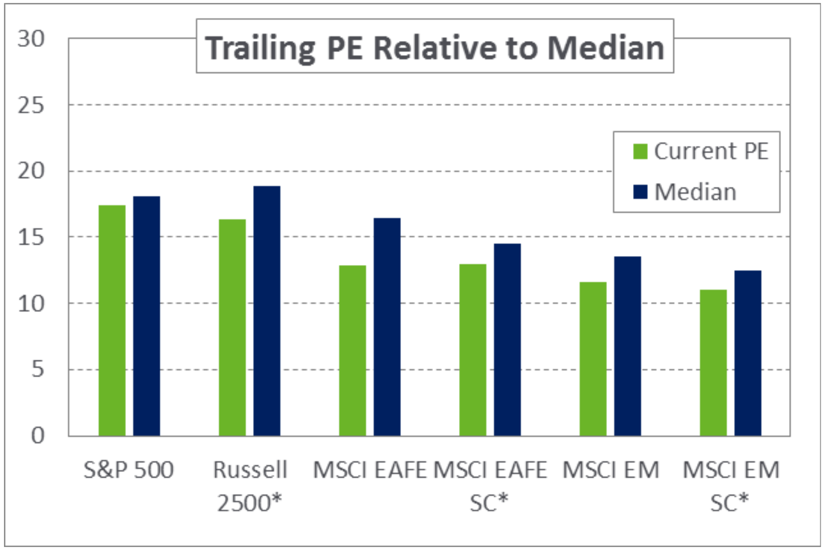
Increased volatility in December resulting from fears of a global slowdown erased gains made throughout the year

International and emerging market valuations fell despite strong earnings growth as price declines were fueled by negative sentiment and US-China trade tensions

We anticipate the negative sentiment and macro concerns weighing on emerging markets to moderate

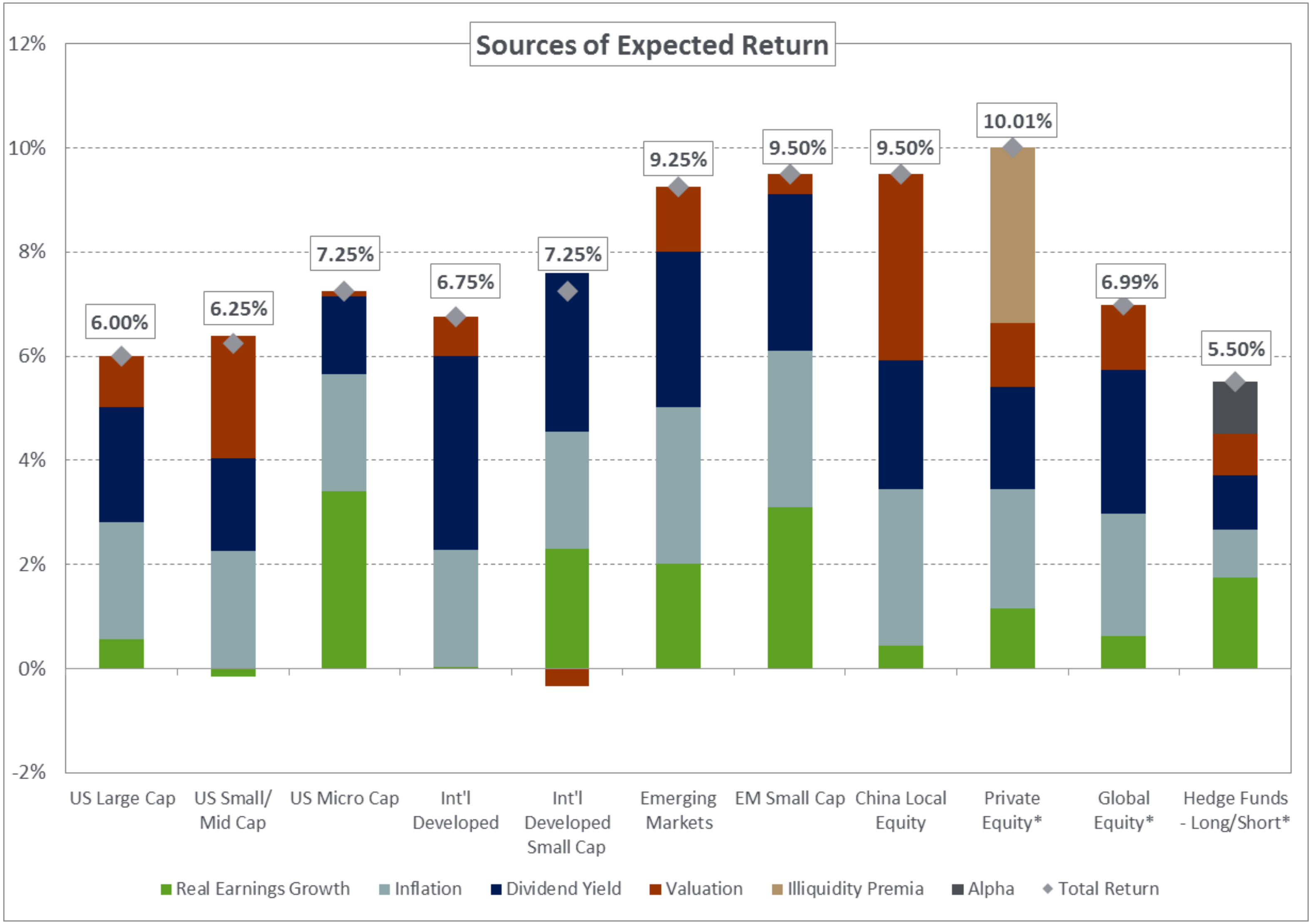
Attractive equity and currency valuations support an overweight to emerging markets due to the high total-return potential





Source: (Top) S&P, Shiller, NEPC; long-term average beginning in 1926
Source: (Bottom) S&P, Russell, MSCI, Bloomberg, NEPC
**Small cap indices use index positive-adjusted earnings*

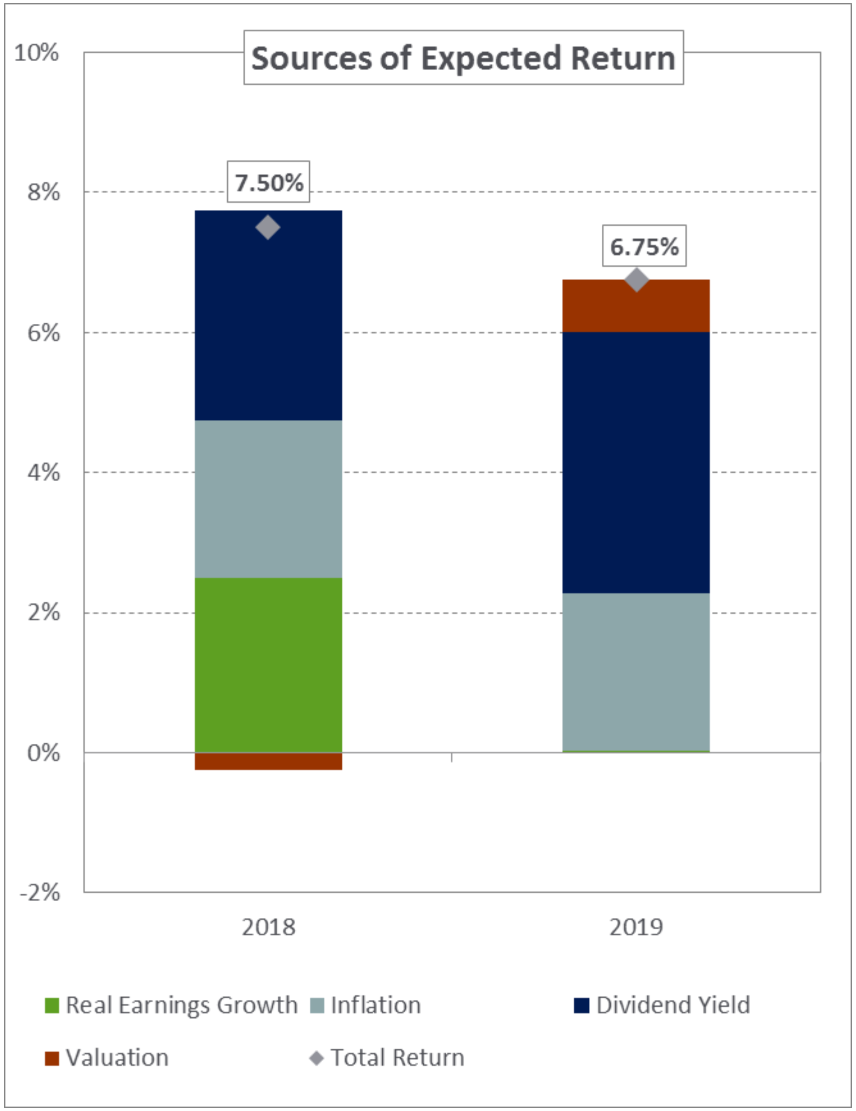
EQUITY: BUILDING BLOCKS (5-7 YEARS)



Source: NEPC

**Calculated as a blend of other classes – see page 39 for additional details*

EQUITY FOCUS: INTERNATIONAL EQUITY



Source: NEPC

2019 building blocks incorporate a weakening growth outlook for Europe and a downward adjustment to profit margins

Our thesis of improving fundamentals has come to fruition, but negative sentiment continues to weigh on valuations

- Globalization backlash, slowing growth, trade policy, and a constrained central bank have negatively impacted Europe
- This has been reflected in no P/E expansion, even though the equity risk premia warrants a higher multiple
- As a result, the bifurcation between Europe and Japan has become more pronounced as Japan remains an attractive opportunity

On a pure valuation basis, EAFE could still offer attractive returns should these underlying issues resolve, but we now believe that to be less likely

- We encourage investors to reduce any overweight to non-US developed equities

RATES & CREDIT ASSUMPTIONS

RATES & CREDIT: ASSUMPTIONS

Rate & Credit 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
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 Deterioration	The average loss for credit securities associated with an expected default cycle and recovery rates
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	5-7 Year Return	Change 2019-2018
TIPS	**3.00%**	**-0.25%**
Treasuries	**2.50%**	**+0.25%**
Investment-Grade Corporate Credit	**4.00%**	**+0.50%**
MBS	**2.75%**	**+0.25%**
High-Yield Bonds	**5.25%**	**+1.50%**
Bank Loans	**5.00%**	**+1.00%**
EMD (External)	**4.75%**	**+0.50%**
EMD (Local Currency)	**6.50%**	**+0.50%**
Non-US Bonds (Unhedged)	**0.75%**	**+0.25%**
Municipal Bonds (1-10 Year)	**3.00%**	**+0.50%**
High-Yield Municipal Bonds	**3.00%**	**-0.75%**
Hedge Funds – Credit	**5.50%**	**+0.50%**
Core Bonds	***3.04%***	***+0.29%***
Private Debt	***7.60%***	***+1.10%***

RATES & CREDIT: CREDIT SPREAD

Credit spreads rose across investment and speculative grade debt relative to 2018's below average spread levels

The later stages of an economic cycle often see an increase in credit spreads as the probability of defaults trend upward

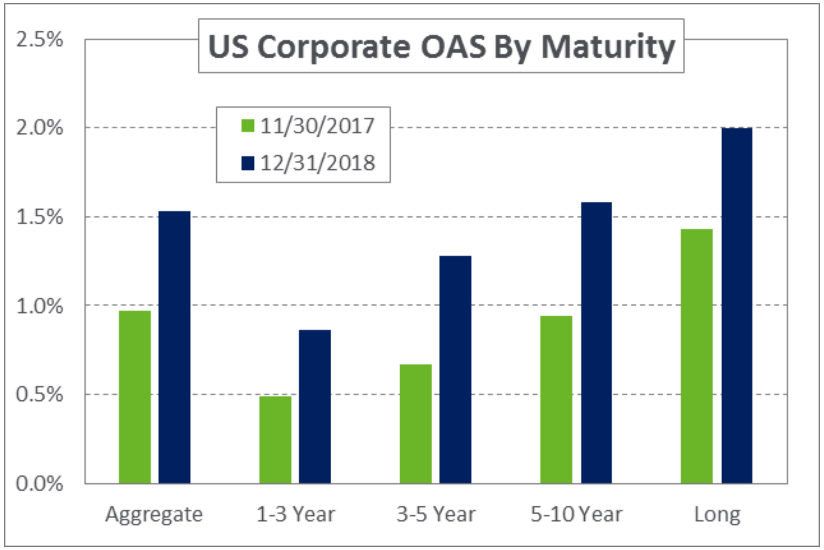
Lower-quality credit spreads increased most significantly during the year, partially due to the fall in the price of oil

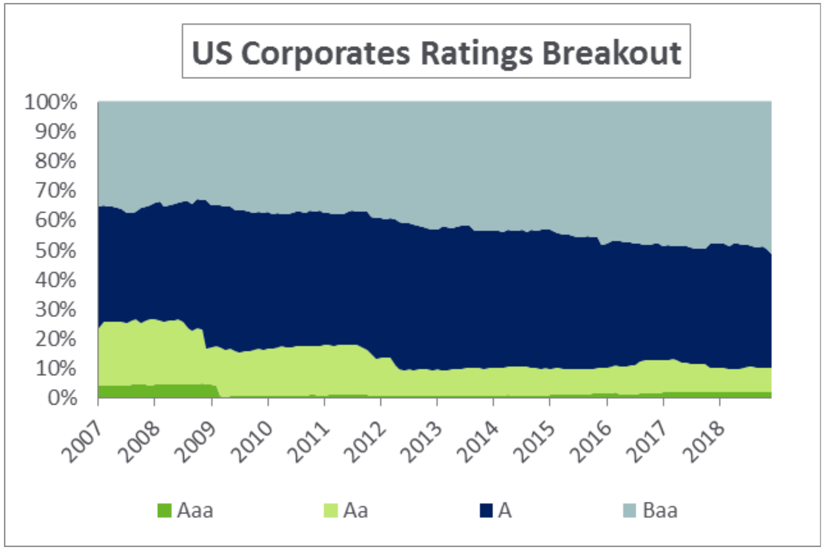
Higher credit spreads partially reflect the risk in investment grade credit

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

As such, we advocate for a reduction in lower-quality credit that does not provide adequate compensation for the associated risk





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

RATES & CREDIT: 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

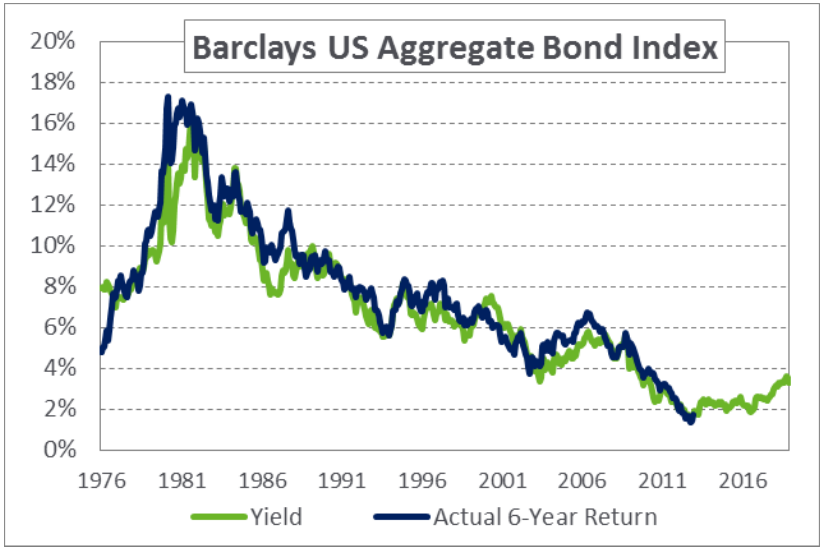
Roll down refers to the price change due to the aging of a bond along the yield curve

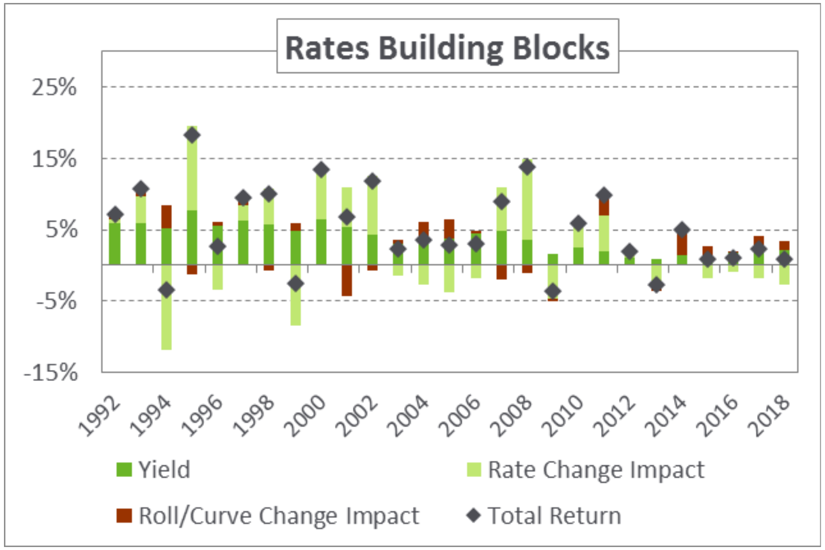
The rate price change is a significant component of total return and expectations of higher rates can drag on future year returns

The path of interest rates for each market is tied to both central bank actions and inflation expectations

Roll down offers some relief to rising rates when yield curves are steep

As the yield curve flattens the benefit of the roll down is muted, often pushing investors to shorter duration bonds





Source: (Top) Barclays, Bloomberg, NEPC
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RATES & CREDIT: SPREAD PRICE CHANGE

Credit spreads broadly remain near historic medians

Above-average credit spreads are generally associated with a late-cycle environment as credit default risks increase

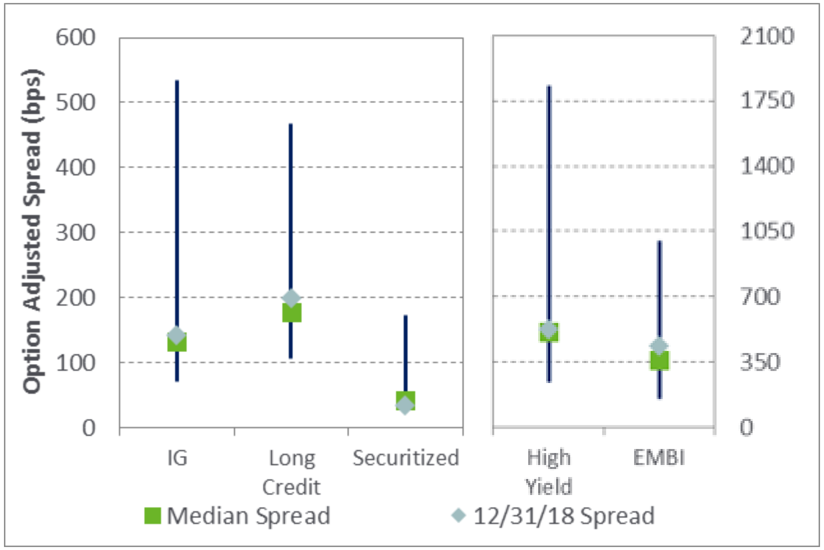
Despite the spread increase relative to 2018, we do not believe lower-quality credit exposure compensates investors for the risk relative to safer alternatives

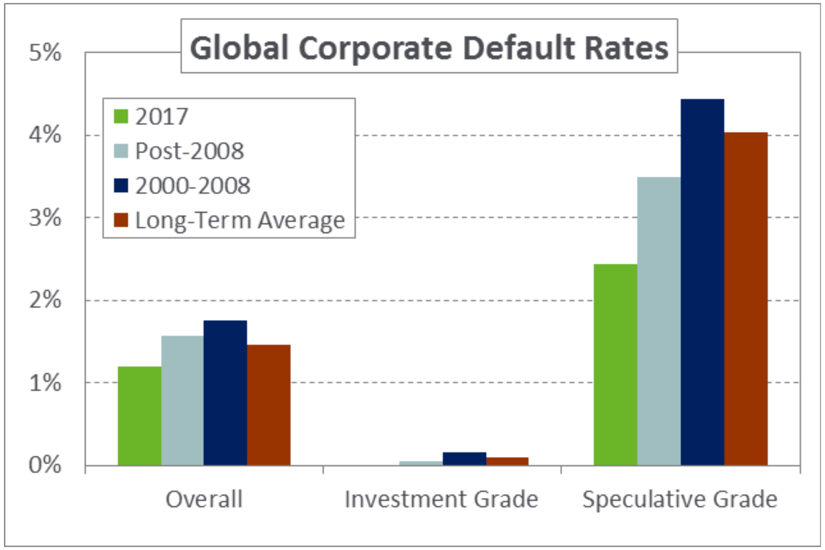
The number of defaults decreased last year to a three-year low despite residual stress from the energy sector and an uptick in retail defaults

Higher expected default rates were incorporated in our building blocks

This can be attributed to the increase in lower-quality (BBB) credit as a percentage of the investment grade universe

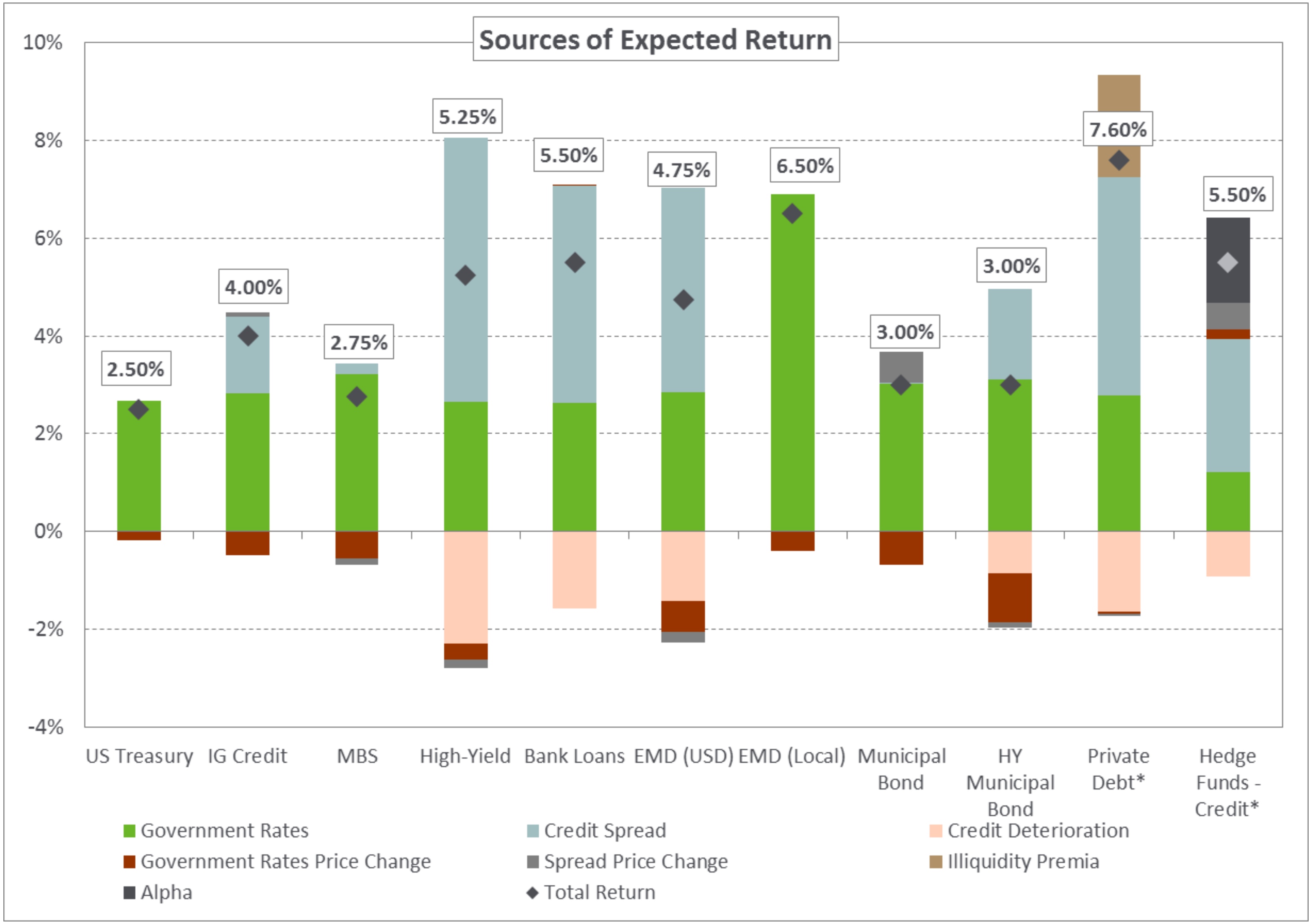
This is also a reflection of the late cycle environment and the stress generally seen within the high yield market during these periods





Source: (Top) JPM, Bloomberg, NEPC. As of 01/31/2000
Source: (Bottom) S&P, NEPC

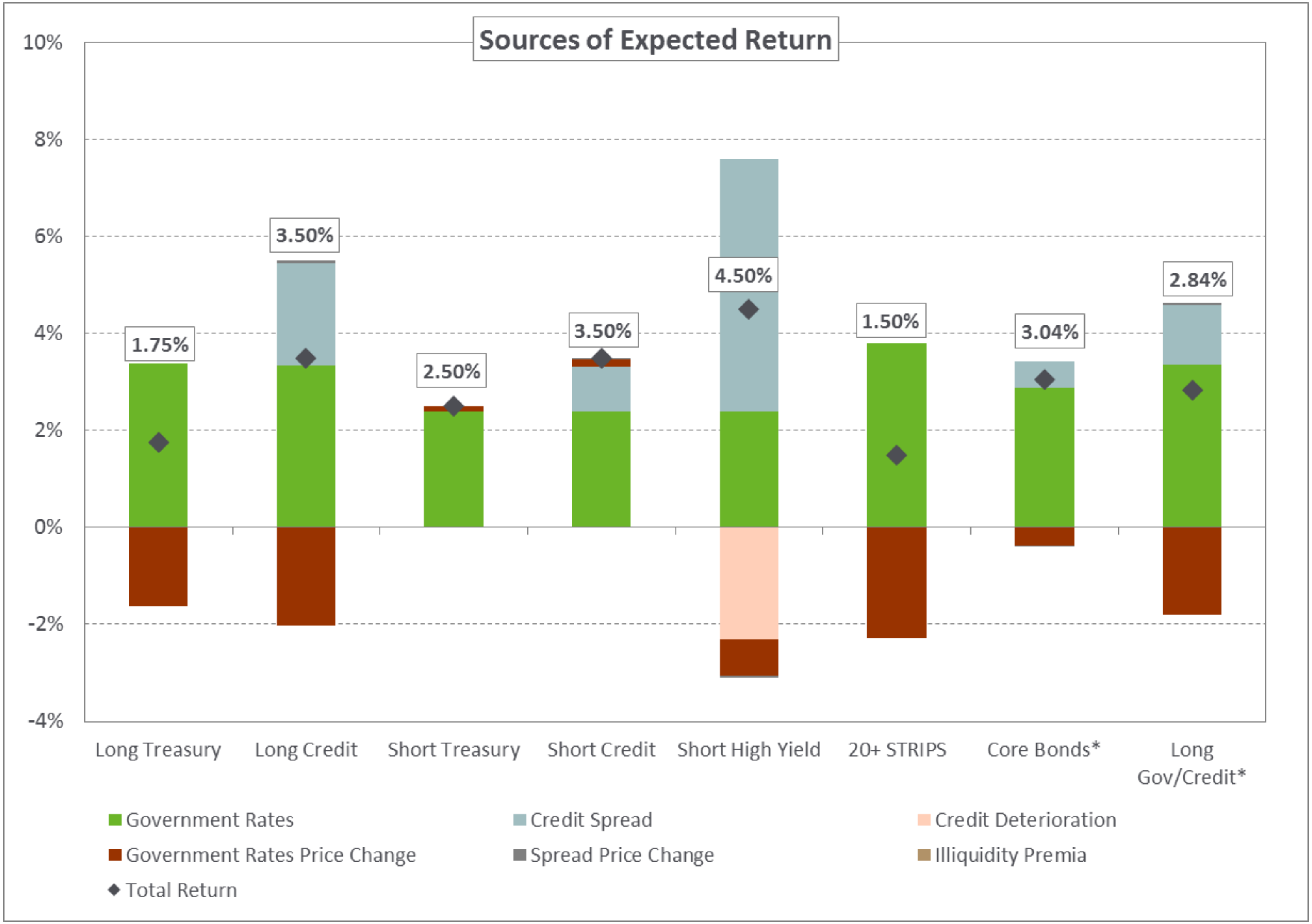
CREDIT: BUILDING BLOCKS (5-7 YEARS)



Source: NEPC

**Calculated as a blend of other classes – see page 39 for additional details*

CREDIT: BUILDING BLOCKS (5-7 YEARS)



Source: NEPC

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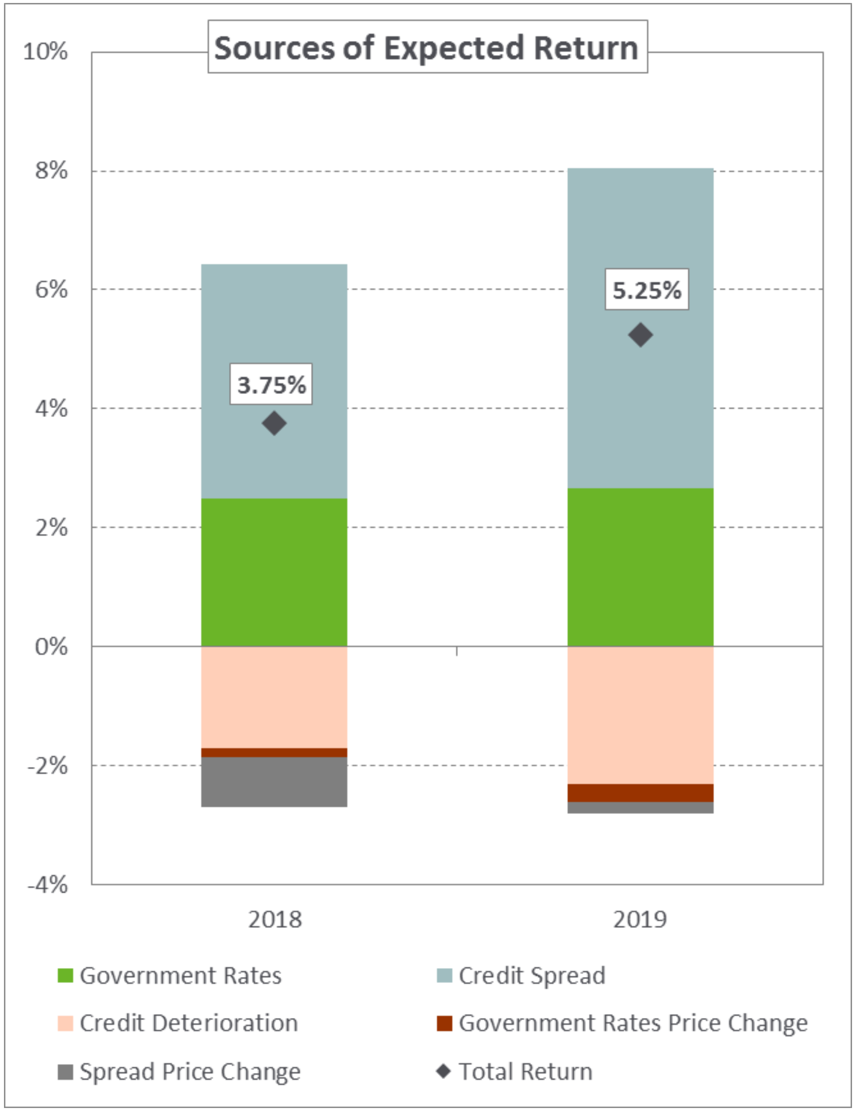
CREDIT FOCUS: US HIGH YIELD



Source: NEPC

2019 building blocks reflect higher interest rates, credit spreads, and default rates relative to last year

Higher default rates were incorporated to account for the late cycle

While the return assumption increased significantly, we are not constructive on lower-quality credit

Despite higher interest rates, with credit spreads near medians we encourage moving away from lower quality credit to safe-haven options

Lower-rated credit exposure is not adequately compensating for the added risk relative to safer alternative

We encourage reducing exposure to credit segments that have performed well over a prolonged period, such as high yield and bank loans

REAL ASSETS ASSUMPTIONS

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
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
Real Income	Represents the inflation-adjusted income produced by the underlying tangible or physical asset

Asset Class	5-7 Year Return	Change 2019-2018
Commodities	**4.25%**	**-0.50%**
Midstream Energy	**8.25%**	**+1.00%**
REITs	**6.75%**	**+0.25%**
Core Real Estate	**6.00%**	**+0.25%**
Non-Core Real Estate	**7.00%**	**-**
Private RE Debt	**5.75%**	**N/A**
Private Real Assets: Energy/Metals	**9.50%**	**+1.50%**
Private Real Assets: Infrastructure/Land	**6.25%**	**+0.25%**

REAL ASSETS: REAL INCOME

Equity-like real assets: Real income represents the inflation-adjusted dividend yield

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

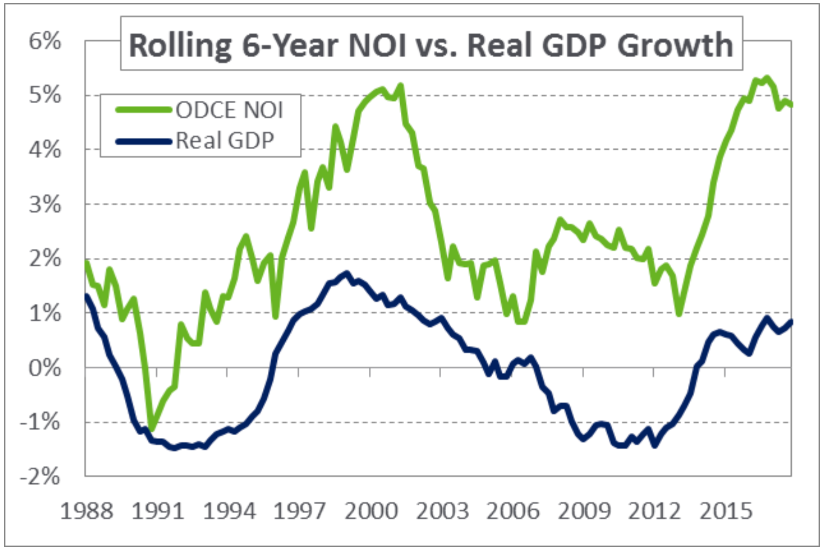
Midstream energy continues to offer an attractive yield relative to most other risk assets despite the downward trend in yields resulting from MLP industry simplification

Real Estate: Real income is a function of Net Operating Income (NOI)

NOI growth exhibits a cyclical economic pattern and appears to have peaked

Commodities: Real income is represented by collateral return

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



Real Asset Yields	11/30/17	12/31/18
Midstream Energy	8.1%*	6.8%
Core Real Estate	4.7%	4.6%
US REITs	4.3%	4.8%
Global REITs	3.4%	3.9%
Global Infrastructure Equities	3.9%	4.4%
Natural Resource Equities	3.2%	4.1%
US 10-Yr Breakeven Inflation	1.9%	1.7%
Commodity Index Roll Yield	-1.4%	-6.1%

Source: (Top) Alerian, NAREIT, NCREIF, Bloomberg, NEPC;
**Represents Alerian MLP Index Dividend Yield*
Source: (Bottom) NCREIF, Alerian, NAREIT, S&P, Bloomberg, NEPC

REAL ASSETS: VALUATION

Commodity valuations are measured relative to the long-term real average of spot prices

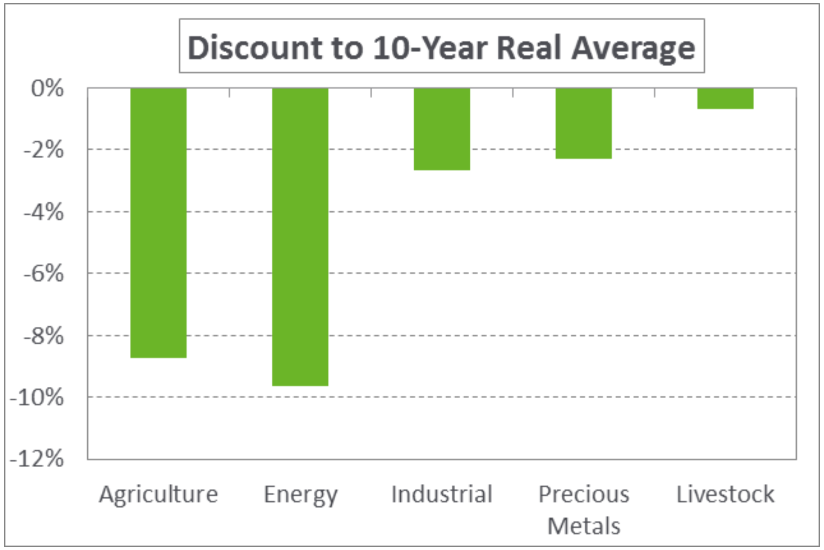
- Commodity prices continue to trade below their long-term real averages, particularly in the energy and agriculture sectors

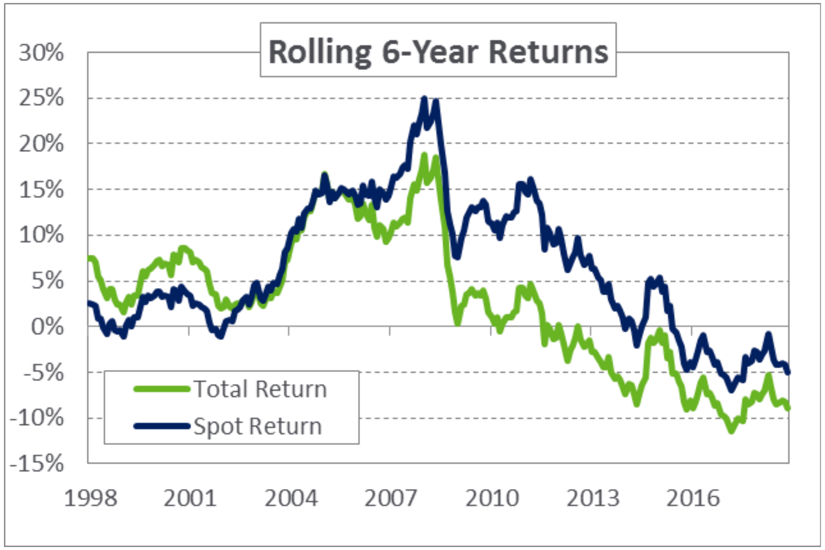
Roll yield continues to be a hurdle for investing in commodity futures

- Post-2008, spot returns have had consistently higher returns than total return indices – demonstrating the impact of negative roll yield on overall investments

In the latter half of 2018, crude oil declined significantly from a glut of global supply

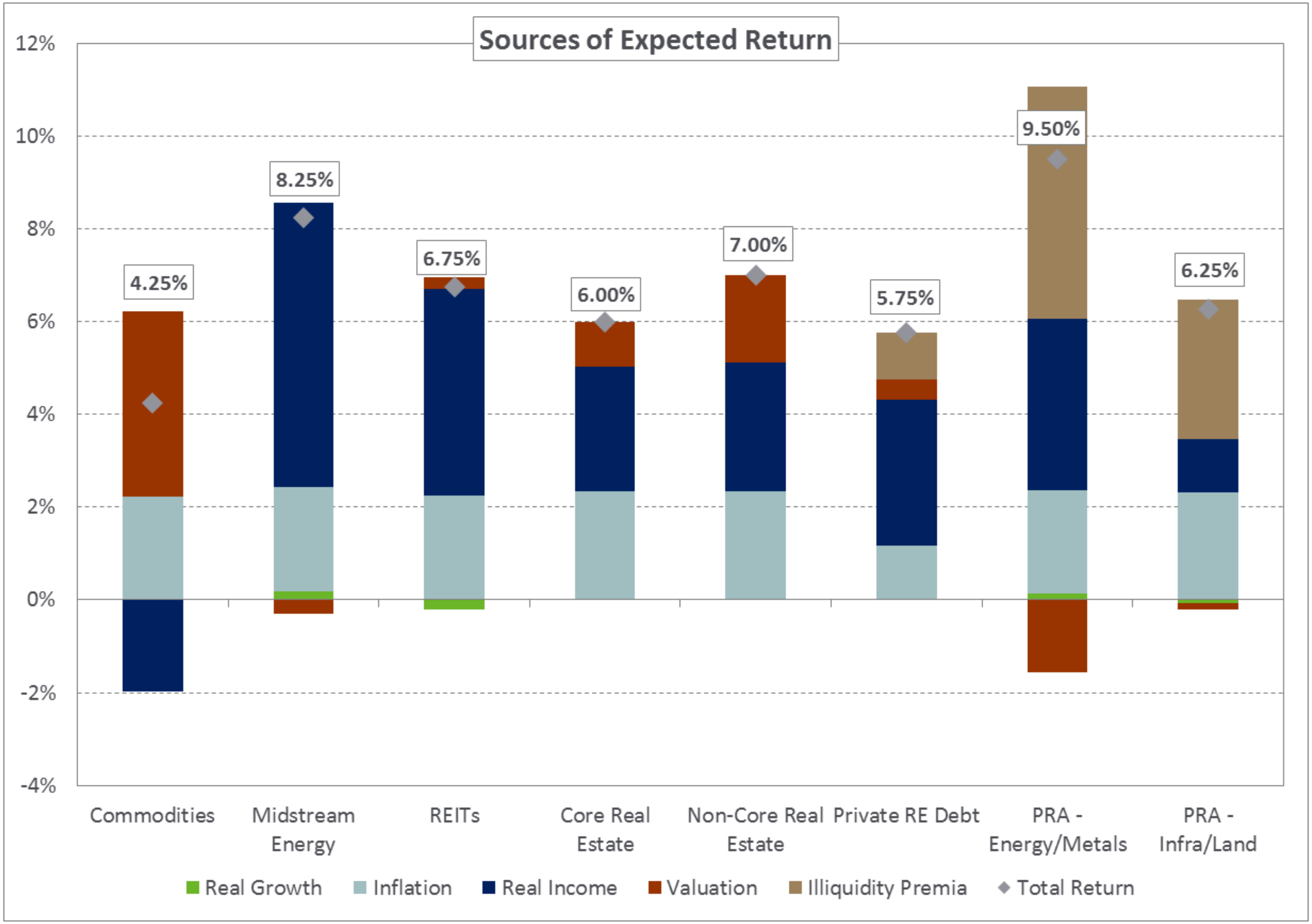
- Natural gas represents the largest component of the Bloomberg Commodity index – the significant increase in natural gas prices during 2018 distorted the index roll yield relative to last year





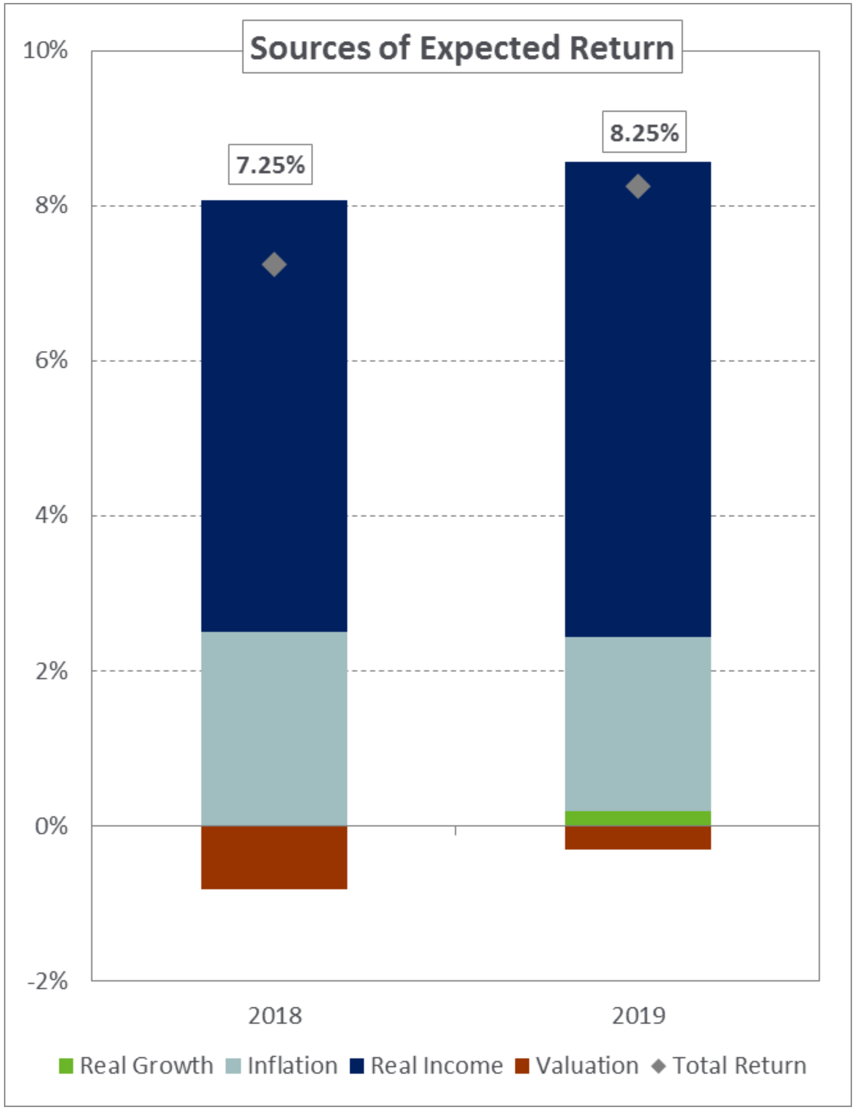
Source: (Top) Bloomberg, NEPC
Source: (Bottom) Bloomberg, NEPC

REAL ASSETS: BUILDING BLOCKS (5-7 YEARS)



Source: NEPC

REAL ASSETS FOCUS: MIDSTREAM ENERGY



Source: NEPC

The assumption was constructed using the Alerian Midstream Energy Index as a reference, rather than the Alerian MLP Index, which was used in prior years

Shifting away from an exclusive MLP assumption reflects the full opportunity set for the midstream space as industry consolidation has reduced the number of MLPs relative to C-corporations

The Alerian MLP Index is now reflects a higher percentage of lower quality, higher yielding companies that have yet to simplify their operating structures

Distribution yields are likely to decline over time as MLPs transition to a corporate structure, but we believe midstream energy continues to offer a compelling total return

DERIVED COMPOSITES

DERIVED COMPOSITES

Derived composites are the result of the sum of equity, credit, and real asset building blocks

Global 60/40: 60% global equity and 40% global bonds

US 60/40: 60% US equity and 40% core bonds

Risk Parity: Average of AQR GRP EL 10%, Bridgewater All Weather, Panagora Multi-Asset

Global Equity: Market-weighted blend of MSCI ACWI IMI (US, Non-US Developed, Emerging)

Private Equity: 34% US Buyout, 34% US Growth, 8.5% US Secondary, 8.5% US Venture, 15% Non-US PE

Core Bonds: Market weighted blend of Bloomberg Barclays US Aggregate Bond Index (Treasuries, IG Credit, MBS)

Private Debt: 50% Direct Lending, 25% Mezzanine, 25% Distressed

Real Assets (Liquid): Weighted blend of TIPS, global equities, REITs, and commodities

Hedge Funds: Weighted blend of 40% HF equity, 40% HF credit, and 20% HF macro

Asset Class	5-7 Year Return	Change 2019-2018
Global 60/40	5.08%	**+0.17%**
US 60/40	5.07%	**+0.53%**
Risk Parity	4.67%	**-0.44%**
Global Asset Allocation	5.73%	**+0.29%**
Global Equity	*6.99%*	***+0.11%***
Private Equity	10.01%	**+2.01%**
Core Bonds	*3.04%*	***+0.29%***
Private Debt	7.60%	**+1.10%**
Real Assets (Liquid)	5.79%	***-0.08%***
Hedge Funds	*5.74%*	***-0.09%***

PRIVATE MARKETS METHODOLOGY

In previous years, private equity and private debt assumptions were constructed using betas to public market assumptions with an added illiquidity premia

For 2019, sub-strategies were incorporated to offer a distinction among private market implementation options with different risk/return profiles

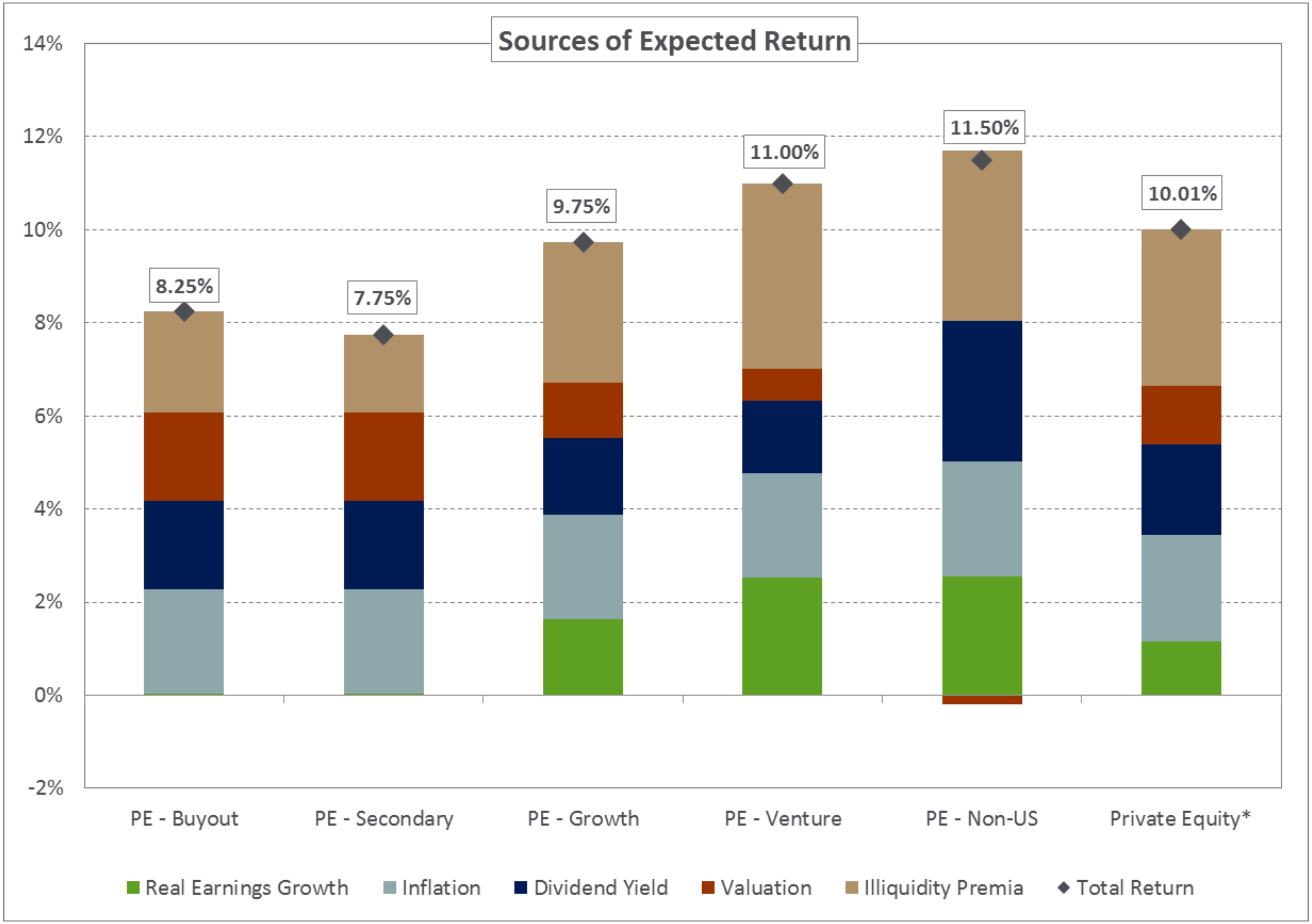
- The sub-strategies were constructed using the same build-up methodology using public market betas and an illiquidity premia based on historical returns analysis relative to appropriate public market equivalents

The composite Private Equity and Private Debt line items are derived from a custom blend of sub-strategies

- Private Equity: 34% Buyout, 34% Growth, 15 % Non-US, 8.5% Secondaries, 8.5% Venture
- Private Debt: 50% Direct Lending, 25% Mezzanine, 25% Distressed

The methodology change generally resulted in a higher return expectations from incorporating the granularity of the sub-strategies and including a non-US component

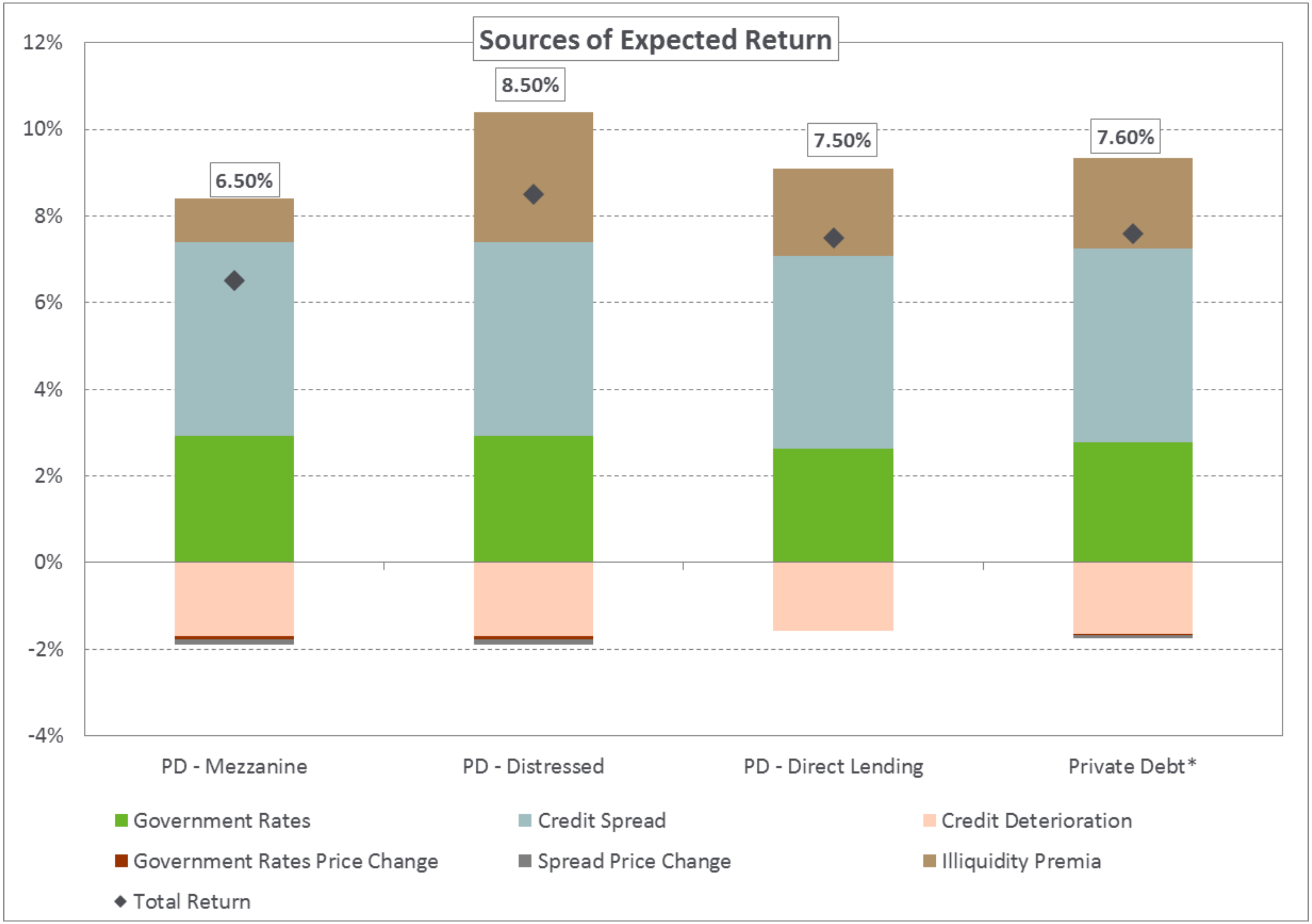
PRIVATE EQUITY: BUILDING BLOCKS (5-7 YEARS)



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

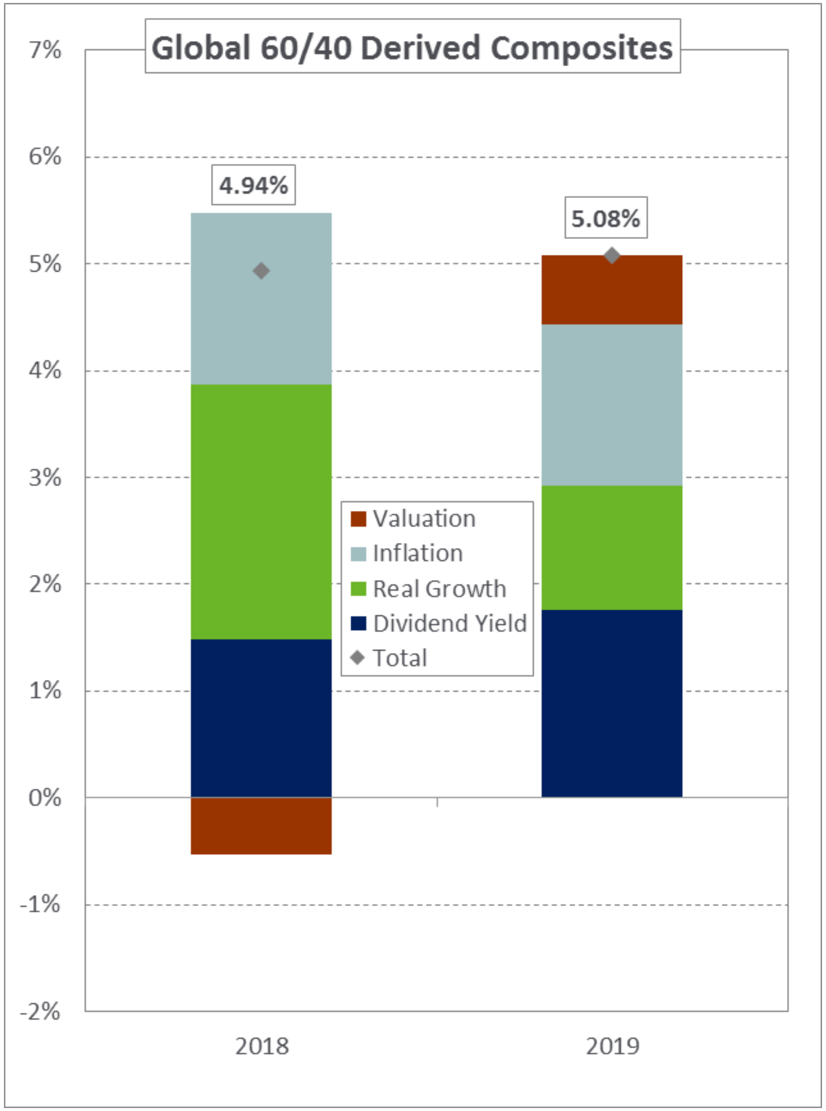
PRIVATE DEBT: BUILDING BLOCKS (5-7 YEARS)



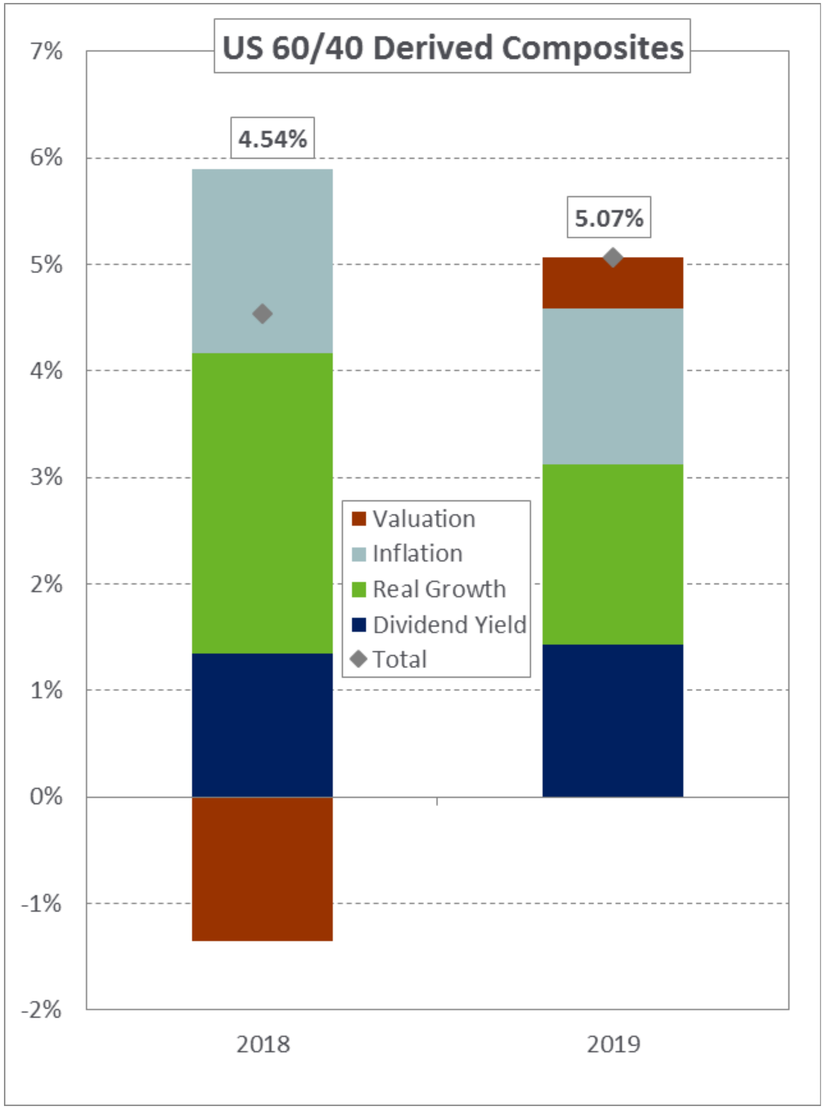
Source: NEPC

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

GLOBAL VS. US 60/40 DERIVED COMPOSITES



Source: NEPC



Source: NEPC

APPENDIX

2019 5-7 YEAR RETURN FORECASTS

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

2019 5-7 YEAR RETURN FORECASTS

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

*Multi-asset assumptions derived from the sum of underlying equity, credit, and real asset building blocks - see page 39 for additional detail.

2019 VOLATILITY FORECASTS

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

2019 VOLATILITY FORECASTS

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

*Multi-asset assumptions derived from the sum of underlying equity, credit, and real asset building blocks - see page 39 for additional detail.

2019 30 YEAR RETURN FORECASTS

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

2019 30 YEAR RETURN FORECASTS

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

*Multi-asset assumptions derived from the sum of underlying equity, credit, and real asset building blocks - see page 39 for additional detail.

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