

2019 CAPITAL MARKETS EXPECTATIONS:

# Supportive environment for asset returns

FRANKLIN TEMPLETON THINKS™

CAPITAL MARKET EXPECTATIONS



FRANKLIN TEMPLETON  
INVESTMENTS

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## About Capital Market Expectations

Every year we review the data that drive capital markets—current valuation measures, historical risk premia, economic growth and inflation prospects—to help refine our forecasts. We update the models that we use and review their continued appropriateness. Crucially, our models are based on first-principle economic relationships, and reflect seasoned practitioner judgement.

This year we have included as part of every capital market forecast a measure of the expected volatility of that asset class, driven by long-term observed standard deviation of returns and correlations. Global central banks quantitative easing policies may have repressed both equity and bond market volatility over recent years. Our approach to modeling volatility avoids the recency bias of some alternative approaches and is particularly appropriate at a time when leading central banks are ending or reversing their asset purchase programs.

Our capital market expectations (CME) are designed to provide annualized return expectation over a longer-term horizon, typically viewed as being five to 10 years. Specifically, we calculate geometric mean return expectations over a seven-year period, which approximates the average length of a US business cycle.<sup>1</sup> This length of horizon is especially relevant as we proceed towards the latter part of an unusually long economic expansion in the United States.

Our modelling approach is based on a blend of objective inputs, quantitative analysis and fundamental research. We call it “quantamental.” Underpinning these inputs are assumptions on the sustained growth rates that developed and emerging economies can expect to achieve and the level of price inflation that they will likely experience. This approach is forward-looking, rather than being based on historical average returns. This is especially important in an evolving macro-economic environment.

1. Since 1945, the National Bureau of Economic Research has defined 11 US business cycles, with an average duration of 69.5 months.

# Summary

We believe global stocks have greater performance potential than global bonds, supported by continued global growth. Within both bonds and equities, we continue to forecast stronger return potential for emerging markets, over a seven-year investment horizon. With short-term interest rates and government bond term-premia remaining below historical averages, we see a lower performance potential from government bonds.

## Our strongest convictions:

- Moderate inflation helps sustain global growth
- Global equities outperform global bonds
- Emerging markets outperform developed markets

# Our capital market expectations

Our 2019 Capital Market Expectations are that the expected returns of global equities will be more attractive than the expected returns of global government bonds.

Our geometric mean return expectation over a seven-year period for global equities is fairly close to the historical return; overall, we expect global equities to return 6.3% annualized over the seven-year period, with developed markets returning 6.0% and emerging markets 7.2%.

By comparison, we expect global government bonds to return only 1.3%.

## EQUITY EXPECTATIONS

### Seven-Year Annualized Return Expectation

Data as at Sep 30, 2018

Asset Class Name	Expected Return (Geometric)	Expected Risk (Std. Dev.)	Past 20 Yr Annualized Return
<b>GLOBAL EQUITY</b>	<b>6.3%</b>	<b>13.7%</b>	<b>6.5%</b>
<b>Developed Market Equity</b>	<b>6.0%</b>	<b>13.6%</b>	<b>6.4%</b>
US Large Cap	5.7%	15.0%	7.4%
Canada (IMI)	5.7%	16.0%	7.5%
Europe ex UK (IMI)	5.4%	15.5%	5.8%
UK (IMI)	5.5%	18.9%	5.7%
Japan (IMI)	5.2%	18.3%	2.9%
Pacific ex Japan (IMI)	6.2%	21.9%	7.5%
Australia (IMI)	6.7%	18.6%	9.5%
US Small Cap	6.3%	19.2%	8.2%
<b>Emerging Market Equity</b>	<b>7.2%</b>	<b>22.1%</b>	<b>9.4%</b>
EM EMEA	5.8%	21.8%	8.3%
EM LatAm	8.4%	25.7%	11.2%
EM Asia	7.6%	19.4%	4.9%
China	4.9%	28.9%	7.5%
<b>Specialty Equity</b>			
Global Listed Infrastructure	5.8%	14.8%	2.5%
Global REITs	3.7%	19.4%	8.6%

## FIXED INCOME EXPECTATIONS

### Seven-Year Annualized Return Expectation

Data as at Sep 30, 2018

#### GLOBAL GOVERNMENTS

<b>Global Developed Governments</b>	<b>1.3%</b>	<b>3.6%</b>	<b>3.9%</b>
U.S. Government	2.8%	4.8%	4.3%
Canadian Government	2.0%	5.3%	4.7%
Europe ex UK Government	0.9%	4.1%	4.3%
UK Government	1.4%	6.5%	5.8%
Japan Government	-0.1%	3.6%	2.0%
Australia Government	2.1%	5.2%	5.7%

**FIXED INCOME EXPECTATIONS** Continued

Asset Class Name	Expected Return (Geometric)	Expected Risk (Std. Dev.)	Past 20 Yr Annlized Return
<b>Emerging Market Governments</b>			
Emerging Market Debt-Gov (Hard)	5.2%	13.1%	8.0%
Emerging Market Debt-Gov (Local)	6.4%	4.7%	8.2%
<b>US Securitized</b>			
US MBS	2.7%	6.2%	4.6%
<b>GLOBAL CREDIT</b>			
<b>Global Investment Grade Credit</b>	<b>3.4%</b>	<b>6.6%</b>	<b>5.1%</b>
USD	3.8%	6.9%	5.4%
GBP	3.2%	6.2%	5.5%
JPY	0.5%	1.2%	1.0%
EUR	2.5%	3.7%	4.5%
CAD	3.2%	3.0%	5.2%
AUD	3.5%	2.1%	6.3%
<b>Global Corporate High Yield</b>			
US	4.3%	8.4%	6.6%
Pan-European EUR	2.7%	11.7%	5.8%
Pan-European GBP	4.3%	10.6%	10.5%
<b>Emerging Market Corporate Hard</b>			
	<b>3.5%</b>	<b>12.4%</b>	<b>6.3%</b>
<b>US Bank Loans</b>			
	<b>4.6%</b>	<b>7.2%</b>	<b>4.8%</b>

**OTHER EXPECTATIONS**
**Seven-Year Annualized Return Expectation**

Data as at Sep 30, 2018

**COMMODITIES**

Commodities	2.5%	16.9%	0.6%
Oil	2.4%	28.9%	4.9%
Precious Metal	7.1%	21.4%	6.0%
Agriculture	4.7%	19.9%	-3.4%

**OTHER EXPECTATIONS** Continued

Asset Class Name	Expected Return (Geometric)	Expected Risk (Std. Dev.)	Past 20 Yr Annlized Return
<b>ALTERNATIVES</b>			
Hedge Fund	6.3%	9.1%	6.4%
US Private Equity	7.0%	19.2%	12.9%
US Private Real Estate	6.2%	19.4%	9.1%
US Private Infrastructure	7.4%	14.8%	8.2%

**LINKERS**

	1.8%	7.5%	5.7%
US TIPS	2.9%	5.8%	5.3%
Canada RRB	2.3%	7.7%	6.7%
Eurozone	1.4%	4.1%	3.1%
UK Index-Linked Gilt	0.5%	7.7%	7.2%
Japan	0.6%	5.1%	1.6%
Australia	2.5%	5.3%	6.6%

**CME**
**Spot as of 9/28/2018**
**EXCHANGE RATES**

USDCAD	1.26	1.29
EURUSD	1.11	1.16
GBPUSD	1.31	1.30
USDJPY	113.98	113.70
AUDUSD	0.72	0.72

**CME**
**Policy Rate as of 9/28/2018**
**CASH**
**Short Term (3 month) Cash Rate**

USD Cash	2.4%	2.25
CAD Cash	2.5%	1.50
EUR Cash	1.4%	0.00
GBP Cash	2.0%	0.75
JPY Cash	0.5%	-0.10
AUD Cash	2.7%	1.50

Source: Franklin Templeton Multi-Asset Solutions

# Our strongest convictions

## Moderate Inflation Helps Sustain Long-Term Global Growth

We expect continued global growth and moderate inflation over the long-term, but anticipate a volatility regime change in the shorter run. With few imbalances, and signs of a favourable cyclical environment, this is likely to result in less extreme swings in output. We anticipate a gradual, measured, interest rate tightening cycle and an environment of moderate inflation over the next seven years. As a result, we expect global gross domestic product (GDP) to expand at a 3.0% annual rate, with developed markets growing more slowly, at 1.9%. Inflation across the key developed and emerging economies is expected to remain subdued, at 1.9% and 4.2% respectively (See Exhibit A).

The importance of emerging markets is expected to continue to increase, in terms of Gross Domestic Product (GDP) share and contribution to growth (see Exhibit B).

## Global Equities Outperform Global Bonds

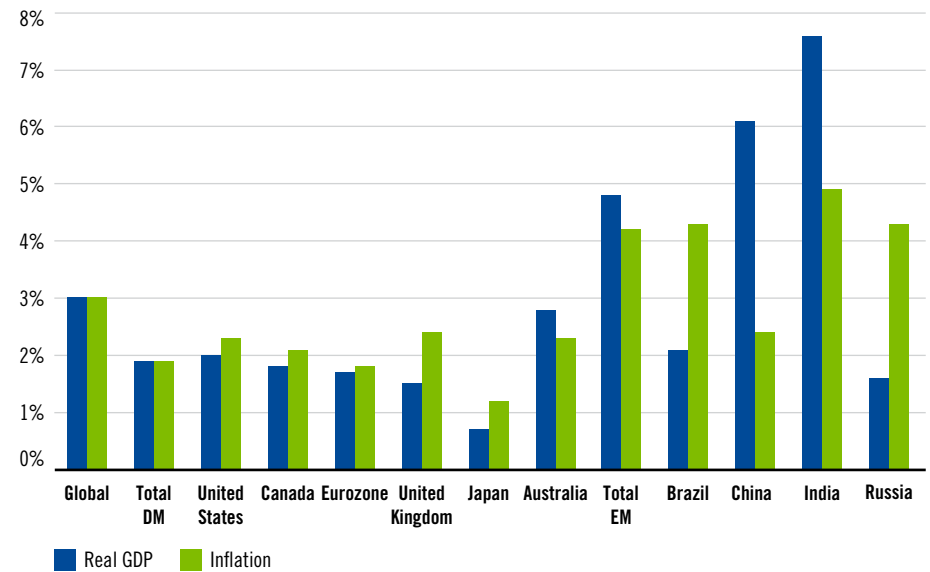
The economic environment that we describe above is supportive of asset returns generally. We believe global stocks have greater performance potential than global bonds in an environment of continued global expansion and stimulative fiscal policy, thereby earning the equity risk premium.

Equity markets have appreciated sharply in recent years and valuations, based on price-to-earnings (P/E) ratios, in devel-

### MODERATE INFLATION WITH STEADY GLOBAL GROWTH

#### Exhibit A: Table of Economic Assumptions for Seven Years

Data as at September 30, 2018

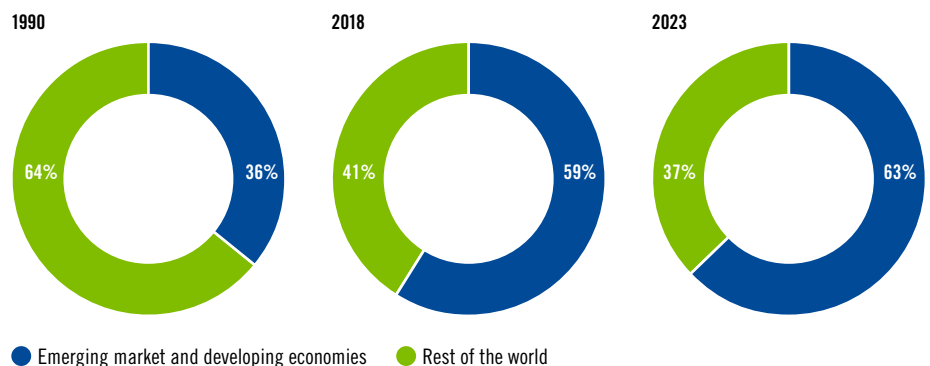


Source: Franklin Templeton Multi-Asset Solutions

### INCREASING IMPORTANCE OF EMERGING MARKET GROWTH

#### Exhibit B: Share of Total GDP: Emerging and Developed Markets vs. Rest of World

As of September 30, 2018



Source: Calculations by Franklin Templeton Capital Market Insights Group using data sourced from International Monetary Fund World Economic Outlook.

oped markets, are not cheap relative to their historical averages. In an environment of moderate inflation and subdued real equilibrium interest rates, we believe that equities can continue to trade at significantly higher multiples than was the case in the

1970's and 1980's. A comparison with the dotcom era (late 1990s) shows that valuations are not as stretched as was the case at the turn of the millennium (see Exhibit C).

Our view is that earnings growth supports the outlook for stocks. Monetary policy remains stimulative globally, and the relative balance of power remains with corporations. The flip side of modest wage growth and the weakness of labor’s bargaining power has been to support the profit share of GDP, which helps favor the return potential of stocks. This in turn reinforces the importance of closely monitoring future wage trends, which could put downward pressure on record-high profit margins if wage growth were to accelerate.

Global bonds—especially high credit quality and long-duration issues—appear vulnerable due to low current yields and the desire of developed-market central banks to unwind unconventional policies and normalize interest rates.

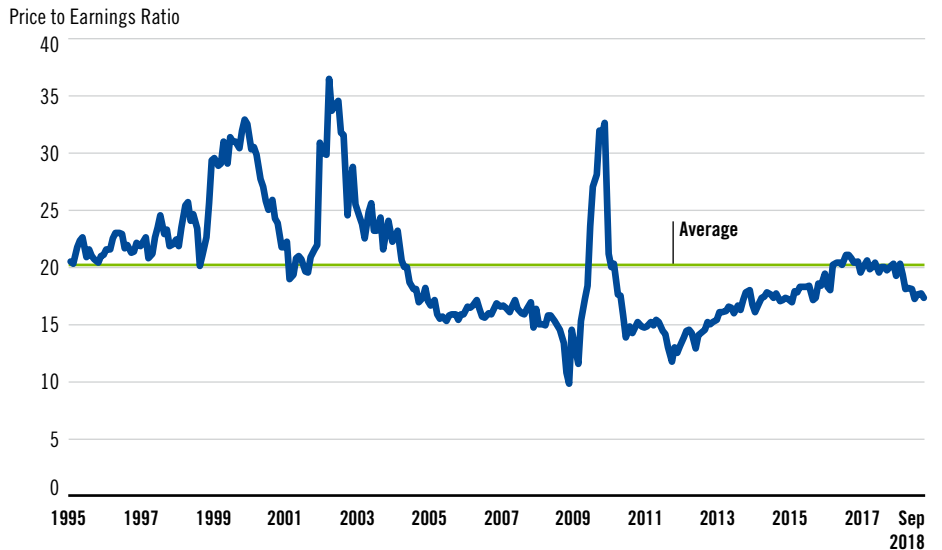
The term premia in developed-market government-bond yields are depressed in relation to averages over the last 50 years. The term premium is a measure of the extra yield that owners of bonds demand, in excess of the anticipated average level of short-term interest rates for the life of the bond, to compensate for making a longer-term investment (see Exhibit D). This premium reflects supply and demand factors, including central banks’ quantitative easing policies (which have started to reverse) but also the investment behavior of an aging population which will persist. It also likely reflects the re-regulation of financial institutions, which has boosted demand for assets perceived as safe (Basel II). This may result in bond yields remaining lower than our historical experience even at the end of this cycle.

Subdued productivity growth has weighed negatively on aggregate demand, even despite improved labor

## LONG TERM EQUITY VALUATIONS ARE BELOW HISTORICAL AVERAGES

### Exhibit C: MSCI ACWI P/E Ratio

As of September 30, 2018



Source: Calculations by Franklin Templeton Capital Market Insights Group using data sourced from Bloomberg, MSCI. The MSCI ACWI is a market capitalization weighted index designed to provide a broad measure of equity-market performance throughout the world. The MSCI ACWI is maintained by Morgan Stanley Capital International (MSCI), and is comprised of stocks from both developed and emerging markets

## BOND TERM PREMIA DEPRESSED IN RELATION TO HISTORICAL RANGE

### Exhibit D: Term Premium on 10-Year Zero Coupon Bond

As of September 30, 2018



Source: Calculations by Franklin Templeton Capital Markets Insights Group using data sourced from Bloomberg, Adrian Crump & Moench 10-Year Treasury Term Premium (ACMTP10 Index).



## CURRENT LEVEL OF NOMINAL YIELDS PROVIDES LIMITED CUSHION

**Exhibit E: ICE BofAML Global Government Bond Index Yield to Maturity**  
As of September 30, 2018

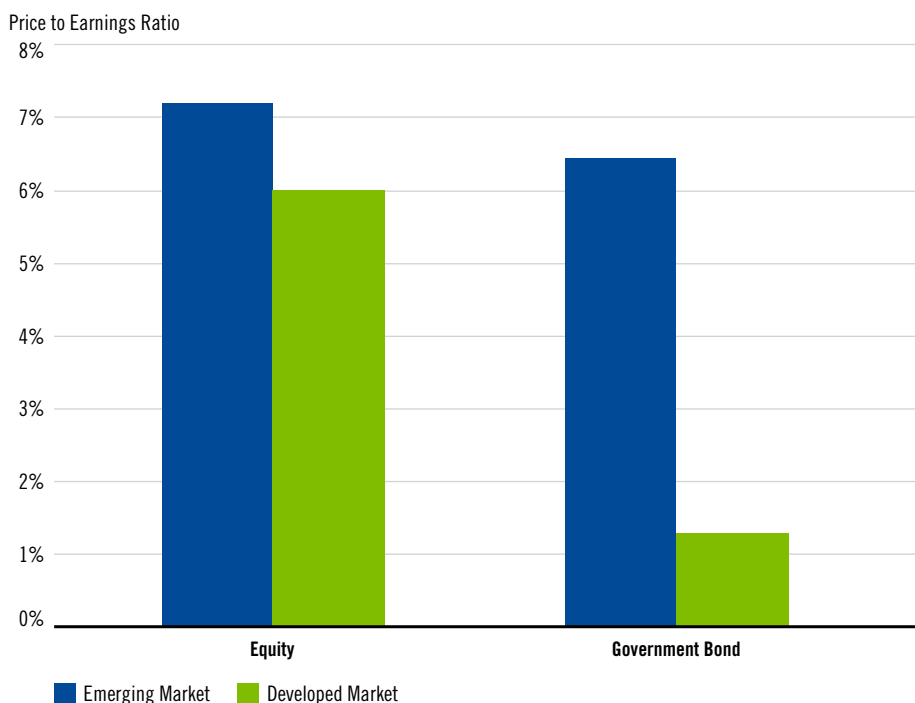


Source: Calculations by Franklin Templeton Capital Market Insights Group using data sourced from FactSet, Bank of America Merrill Lynch. Important data provider notices and terms available at [www.franklintempletondatasources.com](http://www.franklintempletondatasources.com).

markets. The prospect of continued subdued inflation could potentially keep world government bond yields lower than we have seen over the last 30 years (see Exhibit E). Meanwhile, the current level of nominal yields provides a limited cushion for even modest interest rate increases. Furthermore, given the very large scale and unconventional nature of global monetary policy during and following the 2008–2009 financial crisis, it remains extremely difficult to forecast how these reversals of policy will play out in financial markets. Over the next seven years, the return potential from developed-market government bonds is likely to be less favorable than for stocks, when starting from current depressed yields.

## EXPECTED RETURNS OF EMERGING MARKETS AND DEVELOPED MARKETS (EQUITY & BOND)

**Exhibit F: Projected Annualized Returns (7 years forward)**  
As of September 30, 2018



Source: Franklin Templeton Multi-Asset Solutions

## Emerging markets outperform Developed markets

In both stocks and bonds, we believe the performance potential in emerging markets will exceed that of developed markets (see Exhibit F).

As discussed earlier in this paper, emerging economies have demonstrated a much higher growth potential, notably in China and India. As these countries grow to comprise a larger part of the global economy and contribute a still larger share of global growth, we believe the structural tail-wind is likely to persist over the next seven years. In a world where equity return potential is mainly driven by the growth of earnings, this should see emerging-market stocks outperform.

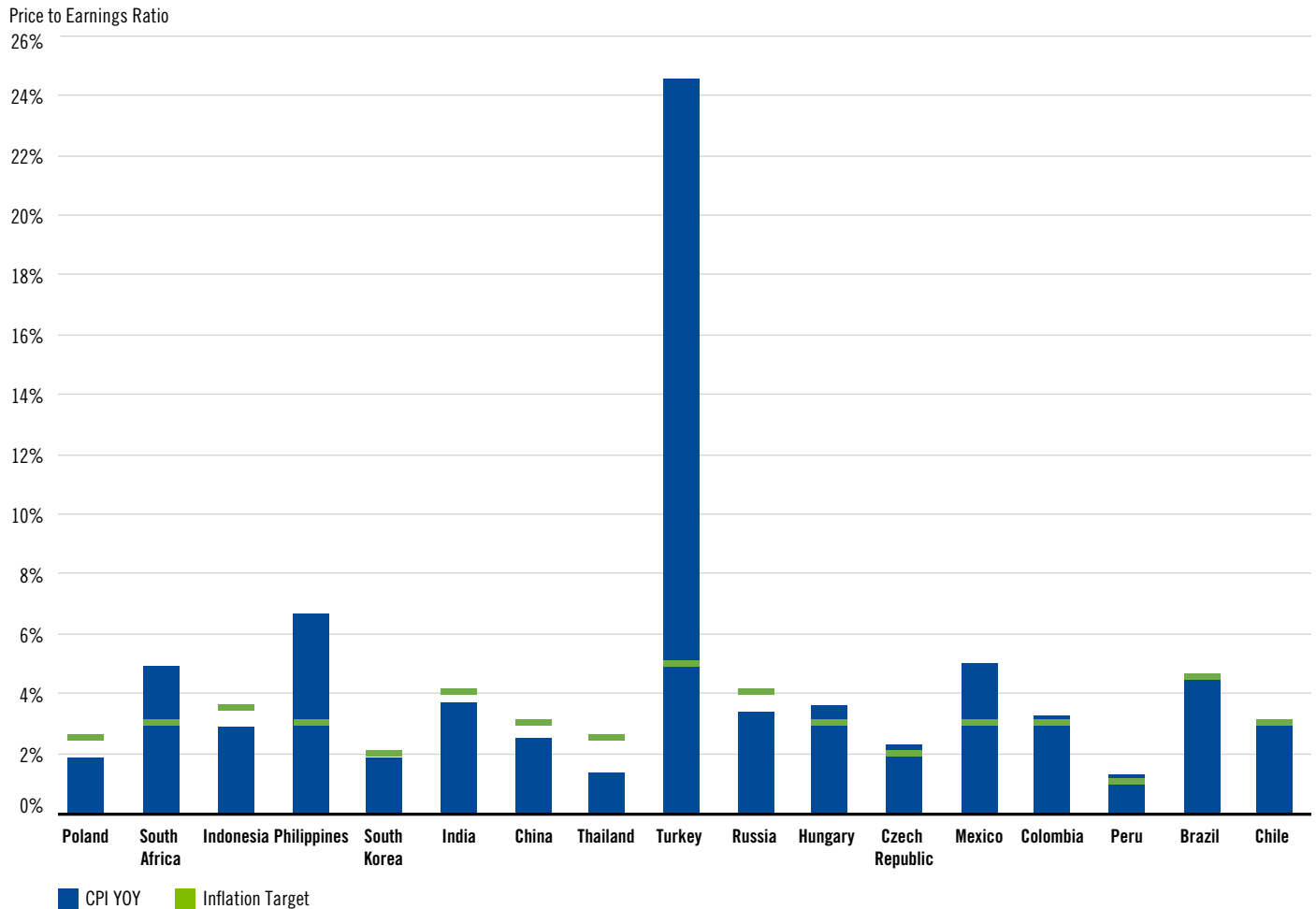
Emerging market central banks appear to have more flexibility in monetary policy, despite the strains seen during 2018 in certain prominent but idiosyncratic cases. Disciplined monetary policy and central bank independence appear to be driving inflation downwards



## INFLATION IN EMERGING-MARKET ECONOMIES IS GENERALLY UNDER CONTROL

### Exhibit G: Percent Change in CPI for Emerging Markets

As of September 30, 2018



Source: Calculations by Franklin Templeton Capital Market Insights Group using data sourced from Bloomberg, Central Bank News.

and supporting moves towards market-determined exchange rates and more fully developed domestic capital markets (see Exhibit G). These trends are likely to see both emerging market bonds and currencies benefit from assets flows into these investments from developed markets over the longer term.

Emerging-market currencies do not appear to be overvalued against most developed-market currencies at the moment. Indeed, over the longer term, we would expect that the Balassa-Samuelson effect, which links increasing productivity with an

appreciating real exchange rate, should result in a broad appreciation in emerging-market currencies. This trend supports the return potential of unhedged positions to both bonds and stocks in emerging markets.

Emerging-market bond yields are closer to historical averages than are depressed developed markets yields. Similarly, valuations for emerging market equities are still attractive across a range of measures.

In the longer term, we believe that emerging economies appear better equipped to survive two key global

dynamics: the commodity cycle and the Fed tightening cycle. In the past, excessive dependence on US dollar financing left emerging economies vulnerable to higher rates and dollar strength. This factor has been used to explain weakness in recent months, but we believe emerging markets will display resilience to this and to the inevitable volatility that commodity prices will exhibit over a longer-term horizon.

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# Appendix

## Historical correlations

Long Term Correlation Between Major Asset Classes. Estimated using 20 year historical data. Expected correlations help quantify the relationships among asset classes. Expected correlation is as important as expected return and risk estimates when constructing portfolios.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>1 Global Equity</b>	1.0														
<b>2 Developed Market Equity</b>	1.0	1.0													
3 US Large Cap	1.0	1.0	1.0												
4 Canada (IMI)	0.8	0.8	0.8	1.0											
5 Europe ex UK (IMI)	0.9	0.9	0.8	0.7	1.0										
6 UK (IMI)	0.9	0.9	0.8	0.7	0.9	1.0									
7 Japan (IMI)	0.3	0.4	0.3	0.2	0.4	0.2	1.0								
8 Pacific ex Japan (IMI)	0.8	0.8	0.7	0.7	0.6	0.7	0.3	1.0							
9 Australia (IMI)	0.8	0.8	0.7	0.7	0.7	0.7	0.3	0.7	1.0						
10 US Small Cap	0.8	0.8	0.8	0.7	0.7	0.6	0.3	0.7	0.7	1.0					
<b>11 Emerging Market Equity</b>	0.8	0.8	0.7	0.8	0.7	0.7	0.2	0.8	0.7	0.7	1.0				
12 EM EMEA	0.7	0.7	0.7	0.7	0.6	0.6	0.2	0.8	0.6	0.6	0.9	1.0			
13 EM Latam	0.7	0.7	0.7	0.7	0.6	0.6	0.1	0.7	0.6	0.6	0.9	0.7	1.0		
14 EM Asia	0.8	0.7	0.7	0.8	0.7	0.6	0.3	0.7	0.6	0.7	0.9	0.7	0.8	1.0	
<b>15 Global Bond Broad Multiverse</b>	0.1	0.1	0.2	0.1	-0.1	0.1	-0.2	0.3	0.1	0.1	0.2	0.2	0.2	0.2	1.0
<b>16 Global Developed Governments</b>	-0.3	-0.3	-0.3	-0.2	-0.3	-0.2	-0.4	-0.2	-0.2	-0.3	-0.2	-0.2	-0.2	-0.2	0.5
17 U.S. Government	-0.4	-0.4	-0.3	-0.3	-0.4	-0.3	-0.4	-0.2	-0.3	-0.3	-0.3	-0.3	-0.2	-0.2	0.6
18 Canadian Government	-0.2	-0.2	-0.2	-0.1	-0.2	-0.1	-0.4	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	0.5
19 Europe ex UK Government	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.2	0.4
20 UK Government	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.4	-0.2	-0.1	-0.2	-0.2	-0.1	-0.2	-0.2	0.4
21 Japan Government	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.2	-0.1	-0.1	-0.2	-0.1	-0.2	-0.1	-0.1	0.3
22 Australia Government	-0.3	-0.3	-0.3	-0.2	-0.3	-0.3	-0.5	-0.3	-0.2	-0.2	-0.3	-0.3	-0.2	-0.2	0.4
<b>23 Emerging Market Debt-Gov (Hard)</b>	0.5	0.5	0.5	0.5	0.4	0.5	-0.1	0.6	0.4	0.5	0.6	0.5	0.7	0.6	0.4
<b>24 US Securitized</b>	-0.1	-0.1	-0.1	0.0	-0.1	0.0	-0.3	0.0	0.0	-0.1	0.0	-0.1	0.0	0.0	0.6
25 US MBS	-0.2	-0.2	-0.2	-0.1	-0.2	-0.1	-0.4	-0.1	-0.1	-0.2	-0.1	-0.1	0.0	-0.1	0.6
<b>26 Global Investment Grade Credit</b>	0.3	0.3	0.3	0.3	0.1	0.3	0.0	0.4	0.3	0.2	0.3	0.3	0.3	0.3	0.9
<b>27 Global Corporate High Yield</b>	0.7	0.7	0.6	0.6	0.6	0.6	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.4
<b>28 US Bank Loans</b>	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.1
<b>29 Linkers</b>	0.2	0.2	0.3	0.3	0.1	0.1	0.1	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.8
<b>30 Commodities</b>	0.3	0.3	0.3	0.5	0.2	0.3	0.1	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4

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<b>16</b>	<b>Global Developed Governments</b>	1.0																									
17	U.S. Government	0.9	1.0																								
18	Canadian Government	0.8	0.8	1.0																							
19	Europe ex UK Government	0.9	0.7	0.6	1.0																						
20	UK Government	0.8	0.7	0.7	0.6	1.0																					
21	Japan Government	0.5	0.3	0.3	0.3	0.3	1.0																				
22	Australia Government	0.7	0.7	0.7	0.6	0.6	0.3	1.0																			
<b>23</b>	<b>Emerging Market Debt-Gov (Hard)</b>	0.1	0.1	0.2	0.2	0.1	0.1	0.2	1.0																		
<b>24</b>	<b>US Securitized</b>	0.7	0.8	0.7	0.6	0.5	0.2	0.5	0.3	1.0																	
25	US MBS	0.7	0.8	0.7	0.6	0.6	0.3	0.6	0.3	1.0	1.0																
<b>26</b>	<b>Global Investment Grade Credit</b>	0.4	0.5	0.4	0.4	0.3	0.2	0.2	0.5	0.6	0.5	1.0															
<b>27</b>	<b>Global Corporate High Yield</b>	-0.1	-0.2	-0.1	-0.1	-0.2	-0.1	-0.2	0.6	0.2	0.0	0.6	1.0														
<b>28</b>	<b>US Bank Loans</b>	-0.3	-0.4	-0.3	-0.2	-0.3	-0.2	-0.4	0.3	0.1	-0.1	0.4	0.9	1.0													
<b>29</b>	<b>Linkers</b>	0.4	0.5	0.4	0.3	0.3	0.2	0.2	0.4	0.6	0.5	0.9	0.5	0.4	1.0												
<b>30</b>	<b>Commodities</b>	-0.1	-0.1	-0.1	-0.2	-0.2	0.0	-0.2	0.3	0.0	0.0	0.4	0.4	0.4	0.4	1.0											

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# Methodology and models

This section provides an overview of the methodology and models we use to develop long-term capital market expectations (CMEs) for various asset classes, including equities, fixed income, commodities and alternatives. In total our 2019 CMEs cover 52 asset classes and sub-asset classes including 14 in equity, 26 in fixed income, three in commodities, five within currency and four in the alternative space. In addition, we deliver expectations of three-month cash returns in six currencies.

Our long-term return expectations are driven by current valuations, analyst expectations, expected growth rates and expected economic environments.

## Equities

We use several models for our equity return expectations. The benefit of using several different models is that we take into account both the absolute and relative forecasts (as in the residual income model). To develop our 2019 CMEs within equities, we used the “residual income” model and the “building blocks” model.

### Residual income model

The residual income model uses the relationship between price-to-book (P/B) ratios, historical return of equity

(ROE), and forward-looking (one-year and two-year) ROE to determine expected returns. A higher forward ROE tends to contribute to a higher return expectation. A lower P/B ratio typically indicates a higher return expectation. In addition, we found that comparing expected returns relative to their own

histories provides insightful information. The percentile of current expected return in relation to historical expectations indicates bullishness or bearishness relative to history. Our analysis shows that rank-adjusted results provide strong guidance in forecasting returns.

### Building blocks model

The building blocks model forecasts returns by summing three forecasts:

1. Dividend yield sourced from Bloomberg analyst estimates
2. Earnings-per-share (EPS) growth rates, which are the average of bottom-up analyst forecasts from the I/B/E/S and top-down long-term GDP and inflation forecasts
3. P/E expansion, which assumes that P/E will converge to its long-term average

## Specialty equities

To develop our expectations for specialty equities, we use regression models. The models identify relevant equity and commodity factors that drive the expected returns for each asset class. Based on the historic betas and alphas we construct forward-looking views that determine our expectations. We believe that within the specialty equity category, the returns in listed infrastructure and real estate investment trusts (REITs) should be in line with traditional equity indexes. With regard to infrastructure, oil prices are a relevant explanatory factor. Therefore, a main input to our specialty equity long-term return models is the relationship between those factors and the asset class indexes.

## Fixed income

*Yield Curve Shift Model* The main input to our fixed income return expectation is our yield curve shift (YCS) model. Principal component analysis of historical data has shown that the expected returns for bonds are mainly driven by current yield level and parallel shift scenarios. Given a parallel shift scenario, the YCS model assumes current yield curve will shift gradually to the target over seven years. The model also involves stressing the yield curve on a monthly basis using a random walk approach. The results include expected returns and the confidence intervals of the expected returns for the fixed income asset classes. Major inputs into the model include:

1. Term structure (the shape of the yield curve)
2. Yield volatilities
3. Market structures (weights for different durations)
4. Expected shift scenarios

For corporate bonds and emerging-market debt instruments, we assume credit spreads will revert to their own long-term averages over a seven-year horizon. We estimate corresponding default and recovery rates based on the averages of their long-term history.

## Commodities

*Spot Return and Roll Yield* We base our expected returns from commodities on two sources: spot return and roll yield. For spot return, we apply an inflation-adjusted model to forecast spot price. We first calculate historical real

commodity prices given their historical inflation rates, and forecast real commodity price targets given the macroeconomic outlook, then add back the inflation expectation to get the final target spot price. For roll yield, we estimate historical roll yield for each commodity and take the long-term average for our forecasts.

## Currency

We base our long-term foreign exchange assumptions on equal-weighting forecasts from three well-documented theories: purchasing power parity, interest-rate differential and real interest-rate parity.

*Purchasing Power Parity* Exchange rates should change to create equilibrium ensuring that the same set of goods will cost the same if purchased with two different currencies. Inputs include OECD purchasing power parity and IMF calculations.

*Interest-Rate Differential* Currencies in countries with high interest rates tend to appreciate relative to currencies in countries with lower interest rates. We use our own forecast short-term cash rates for given countries as inputs.

*Real Interest-Rate Parity* Real interest-rate differential between two countries drives the long-term exchange rate between them. We use our own forecasts for long-term inflation for given countries.

## Alternatives

We base our long-term forecasts for alternatives on efficiency and illiquidity premium assumptions. We consider the historical trend of the Sharpe ratio on risk premia and hedge funds.

To determine our expectation for private equity, we assumed an illiquidity premium of 200 basis points, which is generally in line with the average of a

sample of institutional private market forecast assumptions.

For our hedge fund return expectation, we combined our efficiency assumption and multi-factor models to forecast long run returns.

## Economic forecasts

We collected GDP and inflation rates from multiple sources, including the World Bank, OECD, IMF and other third parties. Our portfolio managers also make their own forecasts. Our final forecasts comprise all the external and internal forecasts. To determine the short-term (three-month) cash rate, we build out a forward rate model and use the Taylor rule based cash forecast model. We include the current government bond yield curve, current inflation and GDP, long-term GDP and inflation expectations as inputs.

# Indexes and proxies

Asset Class	Market Proxy	Asset Class	Market Proxy
<b>EQUITY</b>		<b>FIXED INCOME</b>	
<b>Global Equity</b>	MSCI All Country World Index TR	<b>Global Developed-Market Government</b>	Citigroup World Government Bond All
<b>Global Developed</b>	MSCI Daily TR Gross World Local	US Government	Bloomberg Barclays Capital US Aggregate Government
US Equity	MSCI Daily TR Gross USA Local	Canadian Government	IMF Canada LT Government Total Return (1/31/75–12/31/84) Canada Government Bond Index All Maturities (12/31/84–Present)
Canadian Equity	MSCI Daily TR Gross Canada Local (1/30/1970–3/31/2009) MSCI Canada IMI Index Local (3/31/2009–Present)	Europe ex UK Government	World Government Bond Index Europe All (1/31/85–1/31/99) Citigroup Economic and Monetary Union Government Bond Index All (1/31/99–Present)
UK Equity	MSCI Daily TR Gross UK Local (1/30/1970–3/31/2009) MSCI United Kingdom Index Local (3/31/2009–Present)	UK Government	Citi Government Bond Index UK Local
Europe ex UK Equity	MSCI Daily TR Gross Europe ex UK Local (1/29/1988–3/31/2009) MSCI Europe ex UK IMI Index Local (3/31/2009–Present)	Japanese Government	Citigroup Japan Government Bond Index All
Japanese Equity	MSCI Daily TR Gross Japan Local (1/30/1970–6/30/1994) MSCI Japan IMI Index Local (6/30/1994–Present)	Australian Government	Citi Government Bond Index Australia Local
Pacific ex Japan Equity	MSCI Daily TR Gross Pacific ex Japan Local (1/30/1970–4/30/2009) MSCI Pacific ex JP IMI Local (4/30/2009–Present)	<b>Global Investment-Grade Credit</b>	Bloomberg Barclays US Aggregate Corporate (1/31/90–12/31/96) Merrill Global Broad Market Corporate (12/31/96–9/29/00) Bloomberg Barclays Global Aggregate Credit (9/29/00–Present)
Australian Equity	MSCI Daily TR Gross Australia Local (1/30/1970–3/31/2009) MSCI Australia IMI Local (3/31/2009–Present)	Issued in USD	Bloomberg Barclays US Aggregate Corporate
US Small Cap	Russell 2000®	Issued in GBP	Bloomberg Barclays Aggregate Corporate GBP
<b>Emerging Markets</b>	MSCI Daily TR Gross Emerging Markets EM Local	Issued in JPY	Bloomberg Barclays Aggregate Corporate JPY
EM EMEA	MSCI Emerging Markets Europe Middle East Africa Local	Issued in EUR	Bloomberg Barclays Aggregate Corporate EUR
EM Latin America	MSCI Daily TR Gross Emerging Markets EM Latin America Local	Issued in CAD	Bloomberg Barclays Aggregate Corporate Canada
EM Asia	MSCI Daily TR Gross Emerging Markets EM Asia Local	Issued in AUD	Bloomberg Barclays Aggregate Corporate AUD
China	MSCI Daily TR Gross China Local (1/29/1999–Present)	<b>Global Corporate High Yield</b>	Bloomberg Barclays Capital US Corporate High Yield (12/31/25–12/31/00) Bloomberg Barclays Global High Yield Corporate (12/31/00–Present)
<b>Specialty Equity</b>		US High-Yield USD	Bloomberg Barclays Capital US Corporate High Yield
Global Listed Infrastructure	S&P Global Infrastructure Index (1/31/1999–Present)	Pan-European High-Yield in EUR	Bloomberg Barclays Pan-European High Yield EUR
Global REITs	S&P Global REIT	Pan-European High-Yield in GBP	Bloomberg Barclays Pan-European (Non-Euro) High Yield GBP

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Asset Class	Market Proxy
<b>FIXED INCOME con'd</b>	
<b>Emerging-Market Debt Aggregate</b>	(36% EMD Hard Currency, 39% EMD Local, 25% EMD Corporate)
EM Debt-Gov't (Hard)	JP Morgan Emerging Market Bond Index+
EM Debt-Gov't (Local)	JP Morgan Gov't Bond Index—Emerging Markets Global Diversified Composite Local
EM Corporate Hard	Bloomberg Barclays Emerging Markets Corporates Total Return Index Value Unhedged USD
<b>Other Fixed Income</b>	
<b>Global Inflation-Linked Bonds</b>	Bloomberg Barclays Global Inflation-Linked Bonds (11/30/97–Present)
US TIPS	Bloomberg Barclays US Govt Inflation Linked Bonds Total Return Index(3/31/97–Present)
Canada RRB	Bloomberg Barclays Canada Govt Inflation Linked Bonds Total Return Index (1/31/97–Present)
Euro Linkers	Bloomberg Barclays Germany Govt Inflation Linked Bonds All Maturities TR (4/28/06–Present)
UK Index-Linked Gilt	Bloomberg Barclays UK Govt Inflation Linked Bonds Total Return Index(07/31/81–Present)
Japan Linkers	Bloomberg Barclays Japan Govt Inflation Linked Bonds All Maturities Total Return (4/30/04–Present)
Australia Linkers	Bloomberg Barclays Australia Govt Inflation Linked Bonds TR Index(1/31/97–Present)
US Securitized	Bloomberg Barclays US Securitized: MBS/ABS/CMBS Total Return Index Value Unhedged USD
US Mortgage-Backed Securities	Bloomberg Barclays US MBS Index Total Return Value Unhedged USD
<b>Commodities</b>	
Oil	(57% WTI + 43% Brent Oil)
Precious Metal	GSCI Precious Metals Total Return (1/31/73–1/31/91) Bloomberg Precious Metals Sub-index Total Return (2/1/91–Present)
Agriculture	Bloomberg Agriculture Sub-Index Total Return

Asset Class	Market Proxy
<b>ALTERNATIVES</b>	
<b>US Private Equity</b>	Cambridge Associates US Private Equity Index (1981 Q1–Present)
US Private Real Estate	NCREIF Property Index TR (1978 Q1–Present)
US Private Infrastructure	Cambridge Associates US Private Infrastructure Index (2006 Q2–Present)
Hedge Funds	HFRI Fund Weighted Composite Index
<b>ALTERNATIVES</b>	
USD	Encorr 90-Day T-Bill (12/31/74–1/31/97) JPM Cash Index USD 3-Month (1/31/97–Present)
CAD	Canada DEX 90-Day Bill (1/31/75–1/97) JPM CAD Cash Index 3-Month (2/97–Present)
EUR	IMF Germany Deposit Rate (De-Annualized) (to 12/31/95) Germany Cash Indexes—Libor Return 3-Month (1/31/96–1/31/99) JPM Cash Index Euro Currency 3-Month (2/28/99–Present)
GBP	JPM Cash Index GBP 3-Month
JPY	JPM Cash Index JPY 3-Month
AUD	Bloomberg AusBond Bank Index (3/31/87–1/31/97) JP Morgan 3-Month AUD Cash Index (1/31/97–Present)
US Securitized	Bloomberg Barclays US Securitized: MBS/ABS/CMBS Total Return Index Value Unhedged USD

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At Franklin Templeton Multi-Asset Solutions, we translate a wide variety of investor goals into portfolios powered by Franklin Templeton’s best thinking around the globe. We serve a variety of institutional clients, ranging from sovereign wealth funds to public and private pension plans in addition to retail multi-asset clients around the world.

The hallmark of our approach is a central forum—the Investment Strategy & Research Committee—which generates a top-down view across asset classes and regions, and connects and synthesizes the bottom-up sector and regional insights of the global investment teams at Franklin Templeton.

Within our team is a core group of highly specialized quantitative analysts—Franklin Systematic™—dedicated to the pursuit of new sources of return, strategic diversification and calibrated volatility management, allowing us to apply the highest level of innovation in our client portfolio solutions. In addition to the quantitative research behind this paper, the team is focused on volatility strategies, smart beta strategies and risk premia strategies.

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