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# Vanguard economic and market outlook for 2018: Rising risks to the status quo

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- Strong market returns and low financial volatility underscore investors' conviction that the current global environment of modest growth and tepid inflation is here to stay. We agree with this long-term economic prognosis but argue that the chances of a short-term cyclical rebound are underappreciated. So the risks lie in mistaking persistent trends for the 2018 cycle.

- The most pronounced risk to the status quo resides in the United States, where an already tight labor market will grow tighter, driving the unemployment rate well below 4%. This, followed by a cyclical uptick in wages and inflation, should justify the Federal Reserve's raising rates to at least 2% by the end of 2018. Expectations of additional rate hikes would inevitably follow, ending an era of extraordinary monetary support in the United States and possibly leading markets to price in more aggressive normalization plans elsewhere. None of this is status quo.

- For 2018 and beyond, our investment outlook is one of higher risks and lower returns. Elevated valuations, low volatility, and secularly low bond yields are unlikely to be allies for robust financial market returns over the next five years. Downside risks are more elevated in the equity market than in the bond market, even with higher-than-expected inflation.

- In our view, the solution to this challenge is not shiny new objects or aggressive tactical shifts. Rather, our market outlook underscores the need for investors to remain disciplined and globally diversified, armed with realistic return expectations and low-cost strategies.

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## Editorial note

This publication is an update of Vanguard's annual economic and market outlook for 2018 for key economies around the globe. Aided by Vanguard Capital Markets Model® simulations and other research, we also forecast future performance for a broad array of fixed income and equity asset classes.


## Acknowledgments

We thank Kristen M. Storti and Andrew S. Clarke, CFA, for their significant contributions to this piece and acknowledge the work of the Global Economics and Capital Markets Outlook Team. Further, we would like to acknowledge the work of Vanguard's broader Investment Strategy Group, without whose tireless research efforts this piece would not be possible.


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*Notes on asset-return distributions*

The asset-return distributions shown here represent Vanguard's view on the potential range of risk premiums that may occur over the next ten years; such long-term projections are not intended to be extrapolated into a short-term view. These potential outcomes for long-term investment returns are generated by the Vanguard Capital Markets Model® (VCMM) and reflect the collective perspective of our Investment Strategy Group. The expected risk premiums—and the uncertainty surrounding those expectations—are among a number of qualitative and quantitative inputs used in Vanguard's investment methodology and portfolio construction process.

**IMPORTANT: The projections and other information generated by the VCMM regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from the VCMM are derived from 10,000 simulations for each modeled asset class. Simulations are as of September 30, 2017. Results from the model may vary with each use and over time. For more information, see the Appendix section "About the Vanguard Capital Markets Model."**

# Vanguard's distinct approach to forecasting

To treat the future with the deference it deserves, Vanguard has long believed that market forecasts are best viewed in a probabilistic framework. This annual publication's primary objectives are to describe the projected long-term return distributions that contribute to strategic asset allocation decisions and to present the rationale for the ranges and probabilities of potential outcomes. This analysis discusses our global outlook from the perspective of a U.S. investor with a dollar-denominated portfolio.

## Global outlook summary

### Global economy: *Tight labor markets become tighter*

We expect economic growth in developed markets to remain moderate in 2018, while strong emerging-market growth should soften a bit. Yet investors should pay more attention to low unemployment rates than GDP growth at this stage of the cycle for prospects of either higher spending for capital expenditures or wage pressures. We see low unemployment rates across many economies declining further, in some instances to multi-decade lows. Improving fundamentals in the United States, Europe, and Japan should help offset weakness in the United Kingdom. China's ongoing effort to rebalance from a capital-intensive exporter to a more consumer-based economy remains a risk, as does the need for structural business-model adjustments across emerging-market economies. We do not anticipate a Chinese "hard landing" in 2018, but the Chinese economy should cool.

### Inflation: *Secularly low, but not dead*

Previous Vanguard outlooks have rightly anticipated that the secular forces of globalization and technological disruption would make achieving 2% inflation in the United States, Europe, Japan, and elsewhere more difficult. Our trend view holds, but the cycle may differ. In 2018, we think that the influences recently bearing down on inflation will subside, increasing the probability of higher-than-trend inflation.

Specifically, the growing impact of cyclical factors such as tightening labor markets, stable and broader global growth, and a potential nadir in commodity prices is likely to push global inflation higher from cyclical lows. The relationship between lower unemployment rates and higher wages, pronounced dead by some, should begin to re-emerge in 2018, beginning in the United States.

### Monetary policy: *Tighter and trickier from here*

The risk in 2018 is that a higher-than-expected bounce in wages—at a point when 80% of major economies (weighted by output) are at full employment—may lead markets to price in a more aggressive path or pace of global monetary policy normalization. The most likely candidate is in the United States, where the Federal Reserve is increasingly likely to raise rates to 2% by the end of 2018, a more rapid pace than anticipated by the bond market. The European Central Bank is probably two years away from raising rates and is unlikely to taper the assets on its balance sheet until next decade, although a cyclical bounce in inflation may lead to a market surprise. Overall, the chance of unexpected shocks to the economy as global monetary policy becomes more restrictive is high, particularly when considering that it involves unprecedented balance-sheet shrinkage.

### Investment outlook: *A lower orbit*

The sky is not falling, but our market outlook has dimmed. Since the depths of the 2008–2009 Global Financial Crisis, Vanguard's long-term outlook for the global stock and bond markets has gradually become more cautious—evolving from bullish in 2010 to constructive in 2012 to guarded in 2017—as market returns have risen with (and even exceeded) improving fundamentals. Although we are hard-pressed to find compelling evidence of financial bubbles, risk premiums for many asset classes appear slim. The market's efficient frontier of expected returns for a unit of portfolio risk now hovers in a lower orbit.

Based on our "fair-value" stock valuation metrics, the ten-year outlook for global equities has deteriorated a bit and is now centered in the 4.5%–6.5% range. Expected returns for the U.S. stock market are lower than those for international markets, underscoring the benefits of global equity strategies in the face of lower expected returns. The projected odds of a U.S. market correction are higher than they have been historically.

And despite the risk for a short-term acceleration in the pace of monetary policy normalization, the risk of a material rise in long-term interest rates remains modest. For example, our fair-value estimate for the benchmark 10-year U.S. Treasury yield remains centered near 2.5% in 2018, in part because we believe the chances of the Federal funds rate heading back toward zero or reaching its long-term neutral level in coming years are balanced. Overall, the risk of a correction for equities and other high-beta assets is projected to be considerably higher than for high-quality fixed income portfolios, whose expected returns are only positive in nominal terms over the next five years.

### Indexes used in our historical calculations

The long-term returns for our hypothetical portfolios are based on data for the appropriate market indexes through September 2017. We chose these benchmarks to provide the best history possible, and we split the global allocations to align with Vanguard's guidance in constructing diversified portfolios.

**U.S. bonds:** Standard & Poor's High Grade Corporate Index from 1926 through 1968; Citigroup High Grade Index from 1969 through 1972; Lehman Brothers U.S. Long Credit AA Index from 1973 through 1975; and Bloomberg Barclays U.S. Aggregate Bond Index thereafter.

**Ex-U.S. bonds:** Citigroup World Government Bond Ex-U.S. Index from 1985 through January 1989 and Bloomberg Barclays Global Aggregate ex-USD Index thereafter.

**Global bonds:** Before January 1990, 100% U.S. bonds, as defined above. January 1990 onward, 70% U.S. bonds and 30% ex-U.S. bonds, rebalanced monthly.

**U.S. equities:** S&P 90 Index from January 1926 through March 1957; S&P 500 Index from March 1957 through 1974; Dow Jones Wilshire 5000 Index from 1975 through April 2005; and MSCI US Broad Market Index thereafter.

**Ex-U.S. equities:** MSCI World ex USA Index from January 1970 through 1987 and MSCI All Country World ex USA Index thereafter.

**Global equities:** Before January 1970, 100% U.S. equities, as defined above. January 1970 onward, 60% U.S. equities and 40% ex-U.S. equities, rebalanced monthly.

# I. Global economic perspectives

Financial markets have finally come to grips with this reality, and they anticipate little deviation from this long-term outlook in 2018. Simply put, status quo is the consensus baseline for the major economies, justifying the trinity of low global real interest rates, elevated stock valuations, and easy financial conditions.

Low market volatility underscores markets' high conviction on this status quo and more narrow range of expectations of market fundamentals, including inflation (see **Figure I-2**). However, we fear that markets may be mistaking the secular trend for the cycle, as it's very plausible that we will see a short-term deviation from this trend.

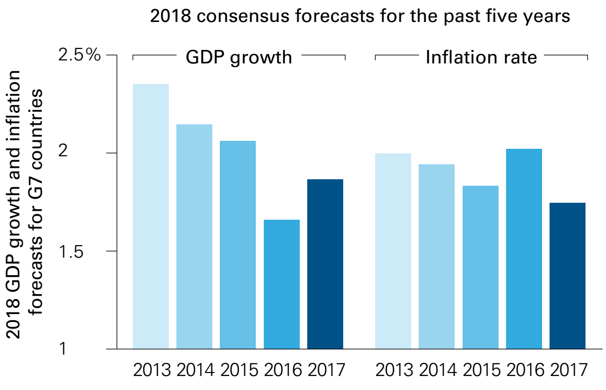
Although inflation is still slow to respond, labor markets continue to tighten beyond expectations. Almost all major economies are at or below estimates of their full-employment benchmark (see **Figure I-3**). The most pronounced risk in our 2018 outlook is that tightness in global labor markets will grow tighter, leading to generational lows in unemployment rates

## Global economic outlook: Rising risks to the status quo

The secular forces of globalization, demographics, and technological disruption have for years served as the foundation of Vanguard's long-term global economic outlook for modest secular growth, tepid inflation, and yet full employment in most major developed economies (Davis et al., 2014, 2015, and 2016).

Markets and policymakers have been slow to recognize these trends, as most continued to expect a slow yet full recovery to pre-2008 norms. For the past few years, economists and investors started each year holding high hopes for a cyclical bounce, just to correct their forecasts downward a few months later, bringing them back in line with the stubbornly low trends (see **Figure I-1**).

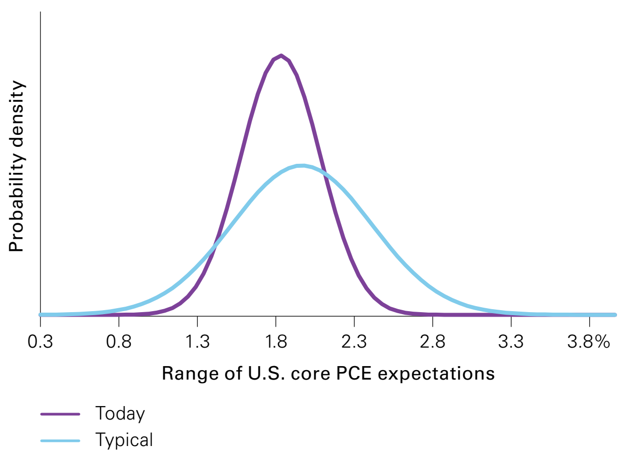
**Figure I-1. Market consensus has finally embraced the low secular trends**




**Note:** The Group of Seven (G7) countries are the industrialized democracies Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States.

**Source:** Vanguard, based on data from the International Monetary Fund.

**Figure I-2. A too-narrow range of inflation expectations**




**Note:** Distributions represent bell curves created by using the standard deviation of survey respondents' forecasts for U.S core Personal Consumption Expenditures (PCE) under the assumption of normal distribution.

**Source:** Vanguard, based on data from the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters.

despite still-modest growth. In an environment where long-term trend growth is unlikely to return to pre-crisis averages, a short-term acceleration combined with lower unemployment could finally lead to a cyclical uptick from low inflation.

Just when consensus has settled around a contained inflation scenario, any upside movement could surprise markets (see **Figure I-4**). And although inflation is not expected to surpass central banks' 2% targets in 2018 in regions including the United States, the euro zone, and Japan, the movement toward that target may be faster and more abrupt than recent trends imply.

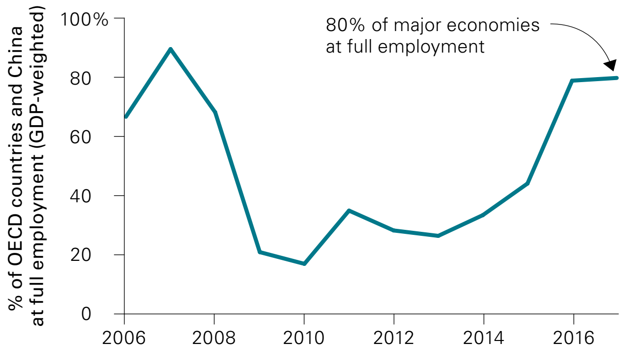
Based on historical experience, periods of tightness in global labor markets such as the current one can lead to one of three outcomes:

- An acceleration of wage growth and inflation pressures (not currently priced by markets).
- A spur of business capital spending and productivity growth (not currently expected).
- No impact on inflation, wages, or productivity (status quo, which is unlikely in our view).

Although they are at very different stages of their rate-hiking cycles, the Fed and the Bank of England have accelerated their normalization steps ahead of any expectations priced into the markets at the beginning of 2017. The European Central Bank (ECB) presses on with asset purchases, albeit at a slower pace. A cyclical recovery in inflation may finally happen just as global central banks enter the normalization phase of the easing cycle.

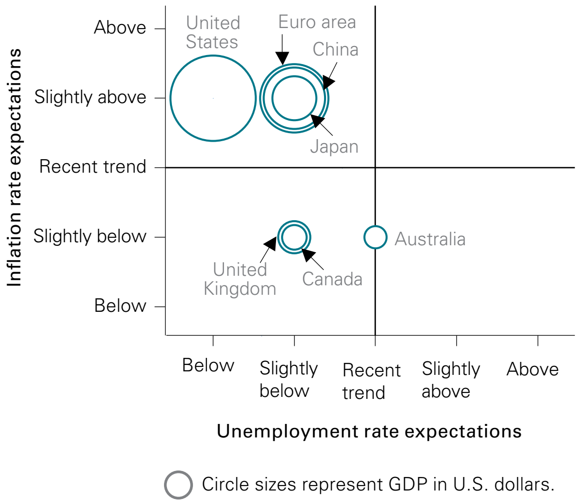
Just as the response to the financial crisis was unprecedented, the banks' path to normalization is not well-marked. The path ahead covers uncharted territory, so the chance of unexpected shocks to markets is high.

**Figure I-3. Help wanted: 80% of major economies at full employment**




**Source:** Vanguard, using data from the Organization for Economic Cooperation and Development and the International Monetary Fund.

**Figure I-4. The inflation-unemployment link may surprise markets in 2018**




**Source:** Vanguard.

## Global growth outlook: Proprietary signals point to continued expansion

We expect the U.S. economy to once again break above its long-term potential growth of about 2% in 2018 in spite of long-term structural challenges, including slowing productivity growth and demographic headwinds. Our proprietary U.S. leading indicators dashboard is a statistical model based on more than 80 leading economic indicators from major sectors of the U.S. economy. As **Figure I-5a** shows, the pickup in green indicators (above-trend readings) in the dashboard points to an increased likelihood of a cyclical pickup in growth versus a slowdown. The most positive (green) indicators are those associated with increased business and consumer confidence, a tightening labor market, and a stronger manufacturing sector. The negative (red) indicators are associated with the trade balance and wages. Housing market indicators and consumer credit remain below trend but show positive momentum (yellow indicators). The most prominent risks to our cyclically strong growth outlook include geopolitical concerns and policy uncertainty, including trade negotiations.

Using simple regression analysis, we mapped our proprietary indicators to a distribution of potential scenarios for U.S. economic growth in 2018, as shown in **Figure I-5b**. The odds of growth at or exceeding 3% in 2018 (47%) are higher than they were last year and outweigh the potential for growth to stagnate and fall below 1.5% (32%). Our base case is for growth of around 2.5% in 2018, toward the high end of the range of 1.5%–2.5% experienced over the last three years.

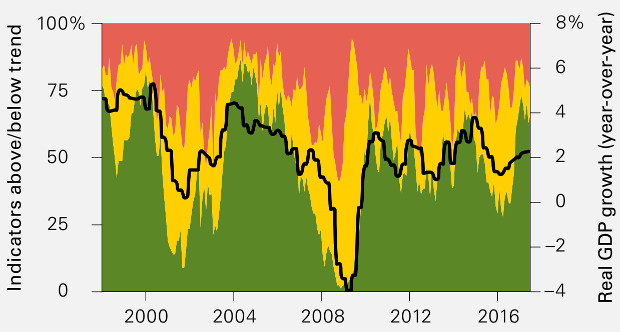
The euro area is expected to perform strongly again in 2018, with GDP growth of close to 2%. We base this view on strong momentum in the economy, as shown in our euro-area leading indicators dashboard (see **Figure I-5c**). Over the last several years, there has been a significant increase in the green indicators, which represent manufacturing, trade, labor markets, financial markets, and sentiment. There are several factors behind this momentum. First, the fiscal austerity imposed by governments in the early years after the financial crisis—a significant drag on the economy in the early part of this decade—has ended. In addition, the ECB has provided a vast amount of monetary stimulus, which has helped revive bank lending and consumption and pushed down the exchange rate; this in turn has boosted net exports. Finally, political risk and the threat of a euro breakup have faded. The increase in green indicators translates into substantially higher odds that 2018 will see growth above the potential rate, which is 1.2% (see **Figure I-5d**).

China is expected to continue its modest deceleration in 2018, although risks to the outlook are tilted to the upside according to our proprietary China leading indicators dashboard (see **Figure I-5e**). Specifically, while ongoing policy efforts to contain leverage and reduce overcapacity are likely to weigh on growth (as is evident by the number of yellow and red indicators associated with weaker industrial production and slower credit extension), continued progress in the transformation

**Figure I-5. Vanguard dashboards of leading economic indicators and implied economic growth for 2018**

United States: Slightly above consensus

a. Economic indicators



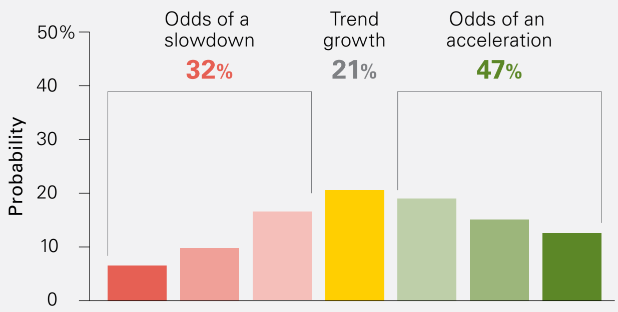

**Above-trend growth:** business and consumer confidence, manufacturing surveys, and unemployment claims

**Below trend, but positive momentum:** housing starts and consumer credit

**Below trend and negative momentum:** personal income and trade balance

Real GDP growth year-over-year (right axis)

b. Estimated distribution of U.S. growth outcomes, 2018




Recession: Less than –0.5%
Mild recession: –0.5% to 0.5%
Slowdown: 0.5% to 1.5%
Trend: 1.5% to 2.5%
Acceleration: 2.5% to 3.5%
Acceleration to pre-crisis trend: 3.5% to 4.5%
Overheating: More than 4.5%

**Notes:** The distribution of growth outcomes is generated by bootstrapping the residuals from a regression based on a proprietary set of leading economic indicators and historical data, estimated from 1960 to 2017 and adjusting for the time-varying trend growth rate. Trend growth represents projected future estimated trend growth.

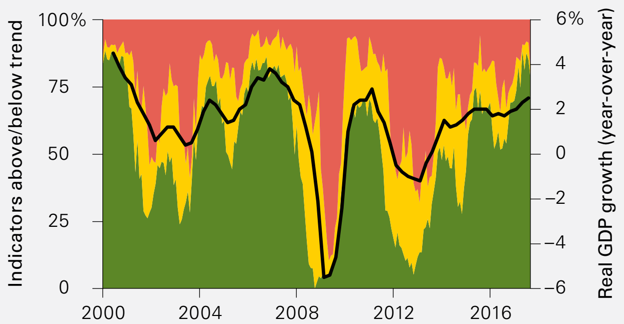
**Source:** Vanguard calculations, based on data from Moody's Analytics Data Buffet and Thomson Reuters Datastream.

of China's growth model (as suggested by rising consumer confidence and a tight labor market) could mitigate downside pressures from a slowdown in the highly leveraged industrial sector.

Against this backdrop, the Chinese economy is expected to grow by around 6%–6.5% next year (see **Figure I-5f**), with the risks of an upside surprise greater than those of a more pronounced slowdown.

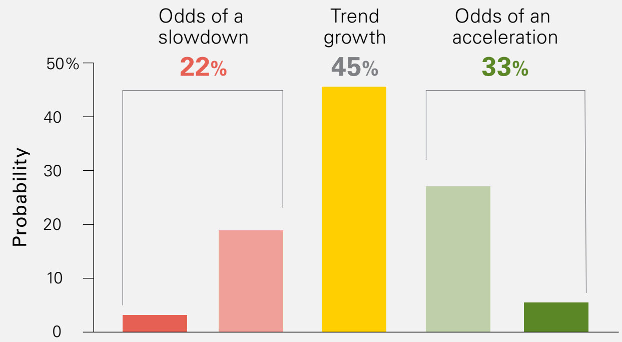
Euro area: Above consensus

c. Economic indicators




- **Above-trend growth:** manufacturing, trade, labor markets, financial markets, and sentiment
- **Below trend, but positive momentum:** housing
- **Below trend and negative momentum:** retail sales
- Real GDP growth year-over-year (right axis)

d. Estimated distribution of euro-area growth outcomes, 2018

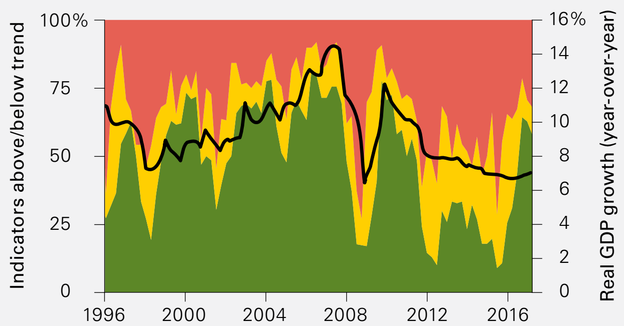



- Recession: Less than 0%
- Slow growth: 0% to 1%
- Trend: 1% to 2%
- Acceleration: 2% to 3%
- High growth: More than 3%

**Notes:** The distribution of growth outcomes is generated by bootstrapping the residuals from a regression based on a proprietary set of leading economic indicators and historical data, estimated from 1960 to 2017 and adjusting for the time-varying trend growth rate. Trend growth represents projected future estimated trend growth.
**Source:** Vanguard calculations, based on data from Thomson Reuters Datastream.

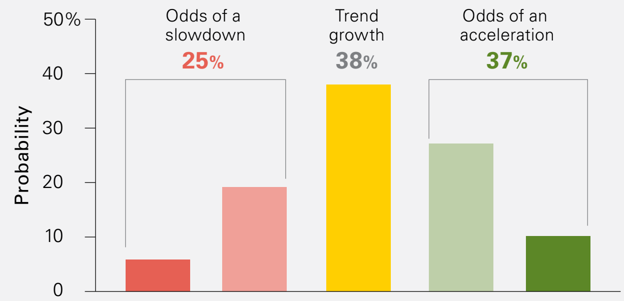
China: Slightly above consensus

e. Economic indicators




- **Above-trend growth:** corporate profitability, trade, consumer confidence and labor markets
- **Below trend, but positive momentum:** housing, credit extension, and commodities
- **Below trend and negative momentum:** industrial production and public spending
- Real GDP growth year-over-year (right axis)

f. Estimated distribution of China growth outcomes, 2018




- Hard landing: Less than 5.5%
- Slowdown: 5.5% to 6%
- Trend: 6% to 6.5%
- Acceleration: 6.5% to 7%
- Acceleration to pre-crisis trend: More than 7%

**Notes:** The distribution of growth outcomes is generated by bootstrapping the residuals from a regression based on a proprietary set of leading economic indicators and historical data, estimated from 1960 to 2017 and adjusting for the time-varying trend growth rate. Trend growth represents projected future estimated trend growth.
**Source:** Vanguard calculations, based on data from Thomson Reuters Datastream and CEIC.

## United States: Tightening labor markets hold the key

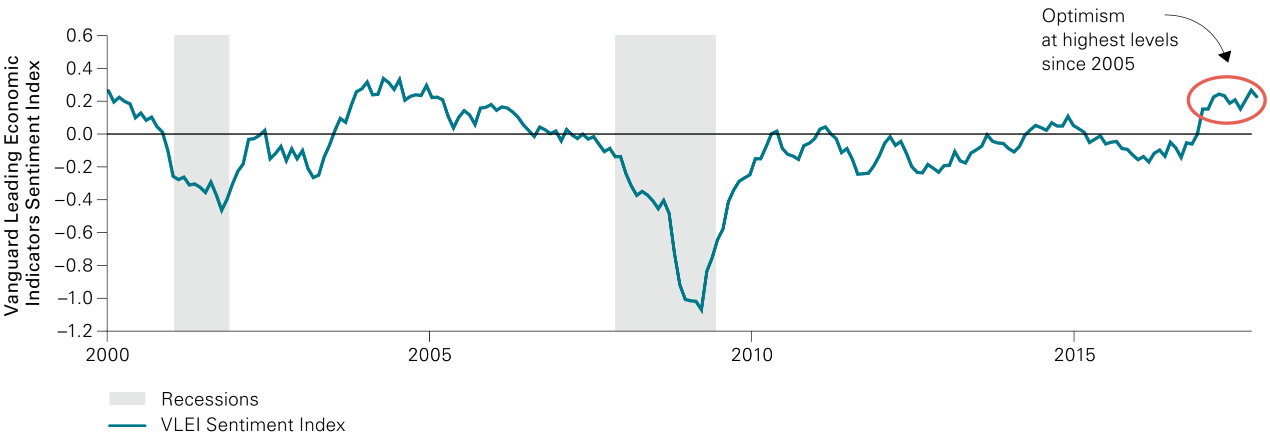
In 2017, U.S. economic growth is on pace to surpass its long-term trend of 2% a year for the first time in three years. Strong domestic economic fundamentals have propelled consumer confidence and business optimism to levels not seen since before the financial crisis (see **Figure I-6**). A powerful combination of extremely tight labor markets, strong financial market returns, increasing housing values, improving access to credit, and the end of the household deleveraging cycle are supporting both the consumer and business investment engines of economic growth. Private-sector optimism has remained immune to the uncertainties of domestic policy debates and geopolitical developments abroad.

As in previous editions of Vanguard's economic and investment outlook (Davis et al., 2014, 2015, and 2016), we believe that it is important to disentangle the structurally lower trend growth of 2% (compared with 3.25% average growth since 1950) from these shorter-term cyclical developments. The structural drivers of growth—namely, weak productivity growth and unfavorable demographics—have been at work since before the 2008–2009 financial crisis; they will continue to restrain the growth potential of the U.S. economy (and most other developed markets) into the foreseeable future. Not only do these structural forces provide a coherent explanation for the slowdown in growth trends and lower interest rates, but they also reconcile apparent paradoxes, such as low economic growth with full employment and tight labor markets with low wage growth.

While in the past our focus has been on tempering investors' expectations, the risk now is that investors will mistake this long-term structural view for a short-term expectation of the economy and markets in 2018. A lower unemployment rate, rather than subdued GDP growth, is the key metric for investors to watch in 2018.

Further tightening in labor markets is likely, even as the pace of job growth continues to moderate. As we anticipated in early 2017, employment growth has gradually declined toward 150,000 jobs a month, and the moderation is expected to continue into 2018. A decrease in job growth is not abnormal at this stage of the business cycle and should not be mistaken for an economic slowdown. However, as long as job creation

Figure I-6. A more optimistic outlook




**Notes:** The chart depicts consumer and business sentiment indicators from the Vanguard Leading Economic Indicators Index, an aggregation of the signals of a proprietary set of leading economic indicators that is further filtered to include only sentiment and survey measures.

**Source:** Vanguard calculations, based on data from Moody's Data Buffet.

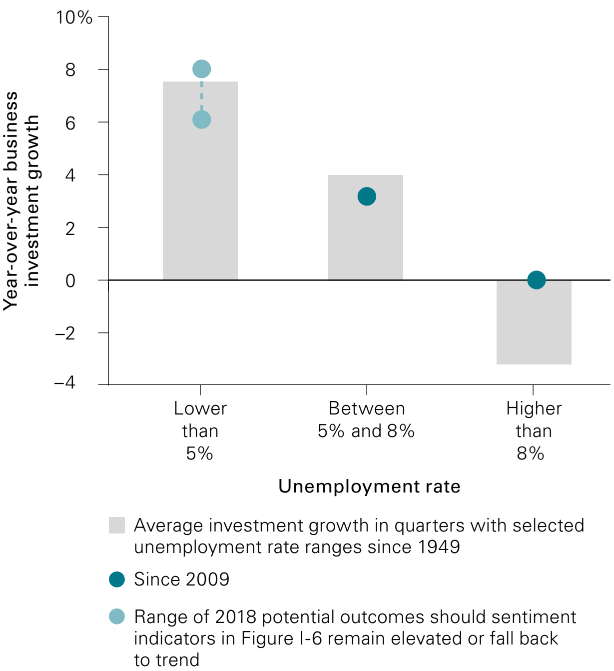
continues to exceed the flow of entrants to the labor market (80,000 to 100,000 a month), the unemployment rate is very likely to fall into the 3%–4% range; at the time of this paper's writing, the rate was 4.1%. Slower population growth and aging of the population will continue to exert downward pressure on labor force participation rates and will restrain labor force growth.

With unemployment rate levels below 4%, the potential for an upside surprise in either business capital expenditures or inflationary wage pressures is increasingly likely. Historically, periods of labor market tightness have resulted in labor shortages in certain industries, rising unit labor costs in others, or a combination of both. Typically, companies see labor market tightness as an indication of robust demand prospects but also of more expensive labor input, and they respond by ramping up investment in new technologies that are less labor-intensive when possible. Thus, this is the stage of the cycle where we see the fastest pace of business capital investment (see **Figure I-7**). Although business investment has been the missing component of this recovery cycle, our estimations for 2018, based on unemployment trends as well as high business sentiment measures, is for an acceleration roughly in line with that of previous business cycles.

The relationship between lower unemployment rates and higher wages (the so-called wage inflation Phillips curve)—pronounced dead by some—should also begin to re-emerge in 2018 (see **Figure I-8**). Many explanations for persistently low inflation have been put forth, including structural forces such as demographics, technology, and globalization. Despite the struggles policymakers will face in hitting their inflation targets in the medium term, we believe that in 2018, the growing impact of cyclical factors such as tightening labor markets and stable and broader global growth may lead to wage and price inflation stronger than currently anticipated by financial markets.

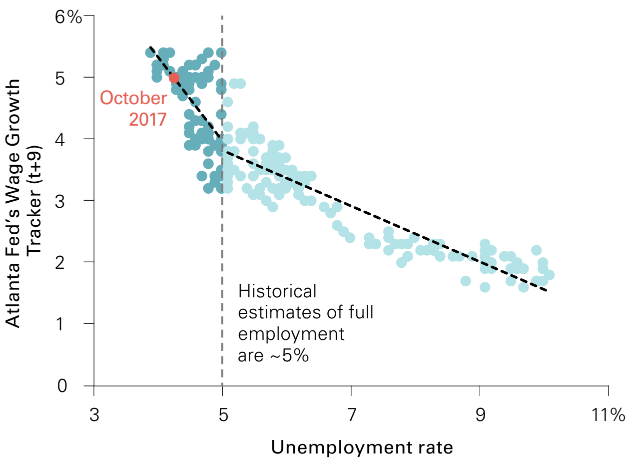
The risk in 2018 is that a higher-than-expected bounce in wages may lead markets to reprice a more aggressive path of monetary policy normalization than currently expected. In particular, the Fed is projecting to raise rates to 2% by the end of 2018, a more rapid pace than anticipated by the bond market. An "inflation surprise" would embolden the

Figure I-7. Lower unemployment rates = higher business capital spending




**Source:** Vanguard, based on data from Moody's Data Buffet, the U.S. Bureau of Economic Analysis, and the Bureau of Labor Statistics.

Figure I-8. Back from hibernation: Sub-4% unemployment rates should boost wage growth




**Notes:** The y-axis represents the Atlanta Fed's Wage Growth Tracker nine months from the date of a specific unemployment rate. This captures the potential lag with which wages may react to changes in unemployment.

**Source:** Vanguard, based on data from the Federal Reserve Bank of Atlanta.

Fed to press on with its policy normalization program while the bond market hastily reassesses both interest rate and break-even inflation expectations. If that is the case, the odds of a bumpy adjustment in financial markets would be significantly elevated, given the currently low levels of asset price volatility and high valuation metrics in various risk asset classes.

At the same time, such a response from the Fed to an "inflation surprise" would prevent a larger and more persistent inflation acceleration in the economy. In fact, our long-term inflation outlook remains unchanged from 2017. For 2019 and beyond, the effects of the long-term structural forces of technology and globalization on consumer prices are likely to regain control and keep inflation contained in spite of ongoing reflation efforts by the Fed and other major central banks. In our research, we have estimated that falling prices for technology inputs in the U.S. economy have restrained overall core inflation metrics by 50 basis points on average over the last 20 years.[1] This drag is close to the current inflation shortfall from target levels. As Figure I-9 shows, the impact of these forces may have been in play since well before the financial crisis, with inflation systematically falling short of the Fed's 2% target even during periods of strong growth and full employment.

In addition to uncertainties about the number of rate hikes in 2018, there are uncertainties surrounding the Fed's unwinding of its balance sheet. Just as the response to the crisis was unprecedented in terms of balance sheet expansion, the Fed's path to normalization is not well-marked. The path ahead covers uncharted territory, with the market impact of policy decisions unknown. Paradoxically, in the face of such uncertainty, market volatility remains placidly subdued. (See the text box on page 14, "Quantitative easing unwind and market volatility: Is there anything abnormal about this normalization?")

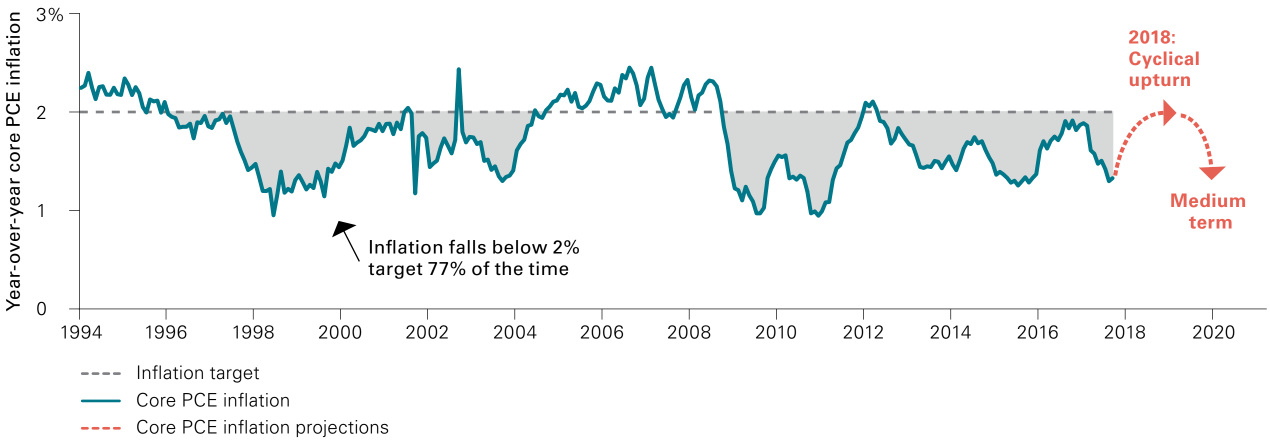
The early stages of the unwinding process have shown little market reaction, but we still have further to go (see Figure I-10). Studies on the potential effects of the Fed's balance-sheet policies on asset prices are divided. Some find evidence of *symmetric effects* of increases and decreases in the size of the balance sheet on asset prices. For instance, according to these studies, long-term interest rates could see a jump of 40 to 100 basis points during the unwinding (although most of this effect may have already happened when the normalization plans were announced earlier in 2017). Other research finds strong support for *asymmetric effects,* in which market prices respond only to quantitative easing purchases, not to a decrease in the Fed's balance sheet. According to these studies, a buildup of the Fed's balance sheet may affect markets insofar as it signals the Fed's intentions regarding the future path of interest rates (that is, the commitment to keep rates low for a long period).[2]

While we lean slightly toward the latter studies, none would predict at this point a tight link between Fed normalization actions in 2018 and long-term rate responses. As such, the chance of unexpected shocks to the economy during this unprecedented normalization is high.

1 See *Global Macro Matters—Why Is Inflation So Low? The Growing Deflationary Effects of Moore's Law,* (The Vanguard Group, 2017), available at https://personal.vanguard.com/pdf/ISGMMEML.pdf.

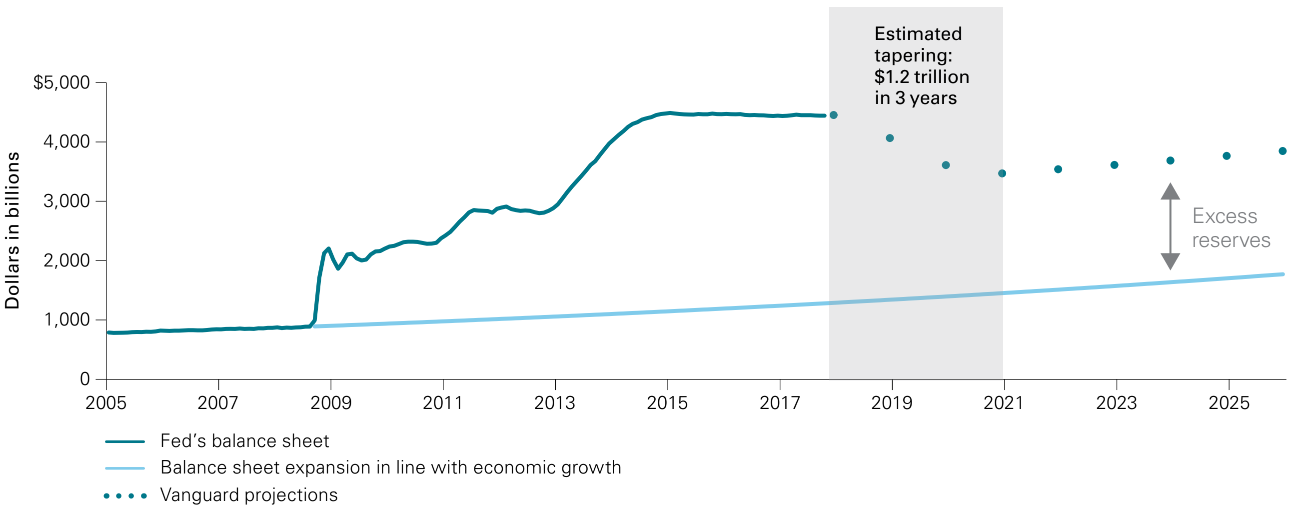
2 For a review of the literature on the various schools of thought, see Borio and Zabai (2016) and Haldane, et al. (2016).

Figure I-9. U.S. inflation: Secularly low, but cyclically rising




**Source:** Vanguard, based on data from the U.S. Bureau of Economic Analysis.

Figure I-10. The unwind is expected to be more measured than the buildup




**Notes:** Excess reserves represent the amount of reserves held at the Federal Reserve Bank in excess of the amount required based on the deposits held at banks. Vanguard projections based on Fed stated caps and mortgage pre-payment model as described in Syron Ferris, et al. (2017).

**Source:** Vanguard, based on data from the Federal Reserve.

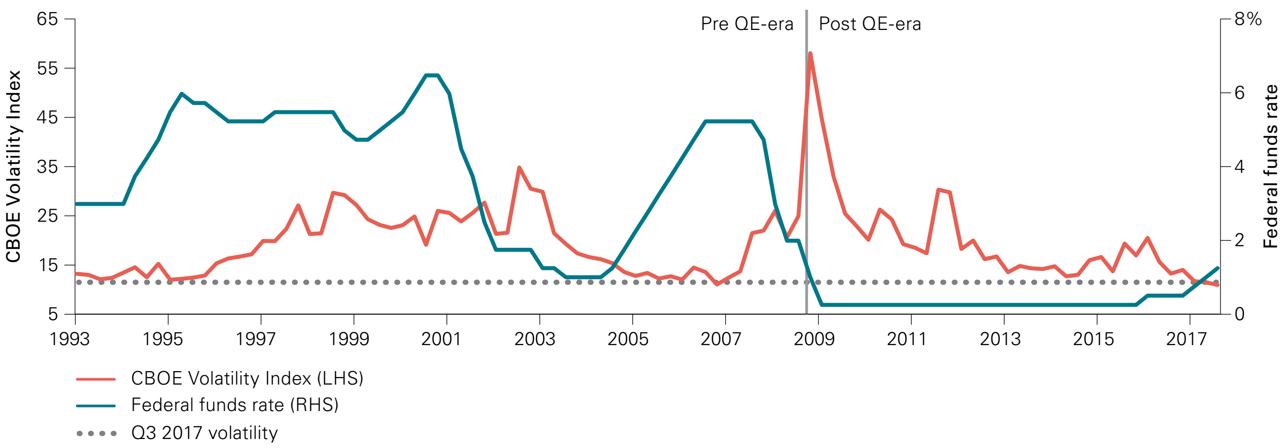
## Quantitative easing unwind and market volatility: Is there anything abnormal about this normalization?

With the onset of its balance-sheet roll-off in October 2017, the Federal Reserve has officially taken the first steps toward the reversal of quantitative easing measures (central bank asset purchases) enacted in response to the Global Financial Crisis nearly a decade ago. Although central bank balance sheets in Europe and Japan will continue to grow, the pace of asset accumulation has begun to slow. The pivot raises questions about the potential impact on the financial markets. Is low volatility in today's financial markets a reflection of complacency induced by these unprecedented policy measures? And if so, could volatility pick up as easy monetary policy is rolled back?

Our research indicates that today's low levels of volatility are not, in fact, unprecedented. **Figure I-11** shows that the S&P 500 VIX is near all-time lows, but it also hit similarly low levels before the Global Financial Crisis, when there were no quantitative easing or zero-interest-rate policies.

We also found that quantitative easing has made no fundamental change to the relationship between financial markets and two commonly cited drivers of volatility: the sensitivity of asset prices to macroeconomic fundamental shocks or surprises (how strongly markets react as macro data releases surpass or disappoint consensus expectations) and the uncertainty of market participants about the economic outlook (economic uncertainty as measured by the dispersion of individual professional forecasts of growth, unemployment, inflation, and others).

**Figure I-11. Low-volatility environment is not unprecedented**




**Note:** The CBOE Volatility Index, or VIX, is a key measure of equity market volatility, specifically the 30-day implied volatility from options activity for the S&P 500 Index.
**Source:** Vanguard, using data from Thomson Reuters Datastream, the Chicago Board Options Exchange (CBOE), and the Federal Reserve Board.

**Figure I-12a** compares this sensitivity of markets to economic surprises and shows that the cycle is not far removed from prior periods of easy monetary policy, extraordinary or otherwise. Similarly, **Figure I-12b** displays extremely narrow forecast dispersion among economists at present, but again, current levels do not stand out as extraordinary relative to similar historical episodes.

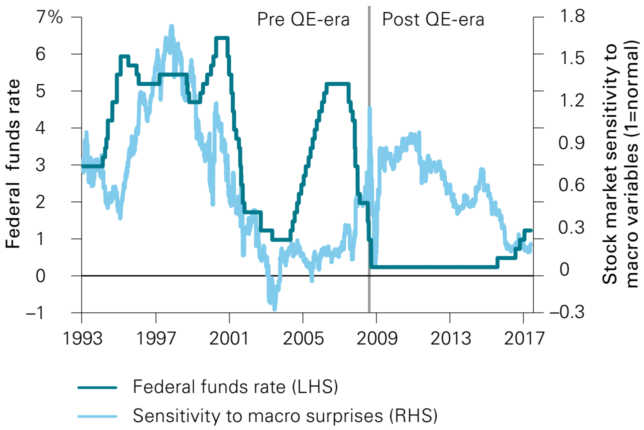
Although the current environment is admittedly one of low volatility, low forecast dispersion, decreased sensitivity to macro fundamentals, and looming policy tightening, these conditions do not represent a departure from historical norms.

But we are in a period of tightening and policy normalization. So what might we expect in terms of future market volatility? As the figures demonstrate, the relationship between policy changes and volatility could be characterized as countercyclical: tightening when economic conditions are strong (and volatility is low) and easing when conditions deteriorate (and volatility is high). The risks we point out in our cyclical economic outlook would suggest that volatility will rise in 2018 in lockstep with economic surprises and potential turning points in monetary policy, although assuming that the degree of volatility has to be extraordinary may be overly pessimistic.

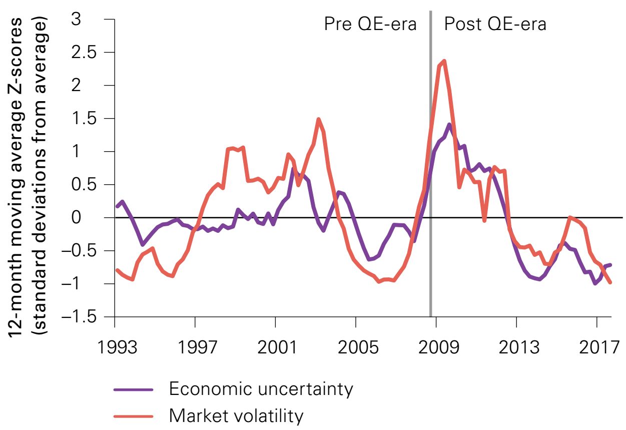
Our intent is not to imply that the forthcoming removal of extraordinarily easy monetary policies will be without volatility but rather to show that it may be overly pessimistic to assume that the degree of volatility has to be equally extraordinary.

Figure I-12. No evidence of QE's effect on...

a. ... Market prices' sensitivity to economic surprises




b. ... Lower market volatility; higher conviction is the status quo




**Notes:** For Figure I-12a: We used a process in which a time-varying coefficient is attached to an index of macro variables so that deviations above (or below) 1 represent heightened (or dampened) sensitivity of the S&P 500 Index to surprises in macro variables. The index for macro surprises was developed using daily data from the following U.S. macro announcements: retail sales, Institute for Supply Management (ISM) Non-Manufacturing Index, ISM Manufacturing Index, Philadelphia Federal Reserve Survey, industrial production, construction spending, capacity utilization, consumer credit, core Consumer Price Index, Treasury budget deficit, Empire State Manufacturing Survey, and wholesale sales. For Figure I-12b: "Economic uncertainty" represents the 12-month moving average equally weighted standardized cross-sectional dispersion metric of survey respondents' projections for U.S. real GDP growth, the unemployment rate, inflation, and the 3-month Treasury bill rate one year into the future over time. "Market volatility" represents the 12-month moving average standardized value of the CBOE Volatility Index, which measures the 30-day implied volatility from options activity for the S&P 500 Index.

**Source:** Vanguard, based on data from Thomson Reuters Datastream, Moody's Data Buffet, the Chicago Board Options Exchange, and the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters.

## China: Two steps forward, one step back

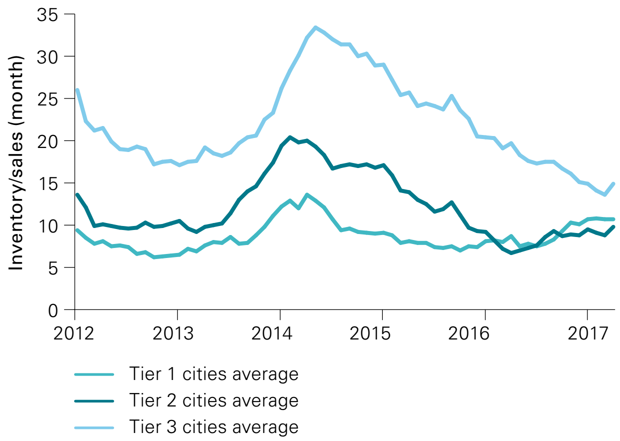
Following a decade of aggressive credit expansion, China's credit profile has stabilized recently, as tighter financial controls and a rebound in nominal growth helped stunt a rise in corporate liabilities—the crux of China's debt fears (see **Figure I-13**). Although this bodes well for China's medium-term goal of maintaining financial stability, we are conscious of the negative impact it will have on growth in the near term. Alongside tighter property regulations and supply-side adjustments, the financial tightening is likely to cause China to decelerate modestly in 2018, reaching about 6.0%–6.5%.

Nonetheless, the chance of a significant deceleration in the near term—that is, a hard-landing scenario—is low for several reasons.

First, the oversupply and overcapacity drags in the real estate and heavy industrial sectors, which have weighed on China's investment growth for years, are likely to be less intense going forward. In the property market, for example, a combination of strong demand and a sharp contraction in investment from the middle of 2013 to 2015 has reduced the extent of inventory overhang (see **Figure I-14a**). Additionally, it appears that the peak of the industrial capacity reduction is behind us.

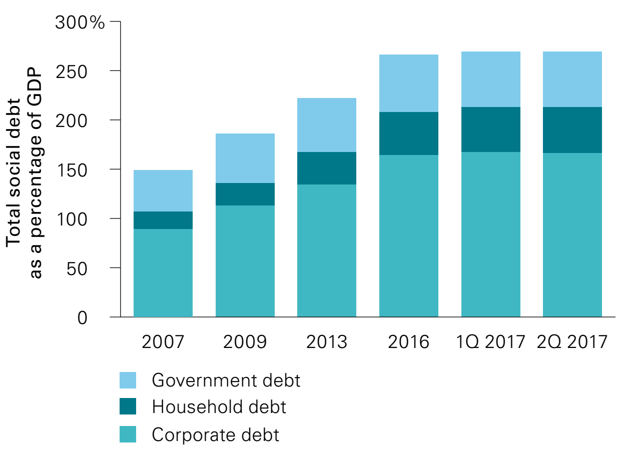
As **Figure I-14b** illustrates, in the last 18 months, 50% of the five-year capacity reduction target has been achieved in the coal sector, and nearly 90% has been achieved in the steel sector.

**Figure I-14a. Rapid destocking has taken place in smaller cities**



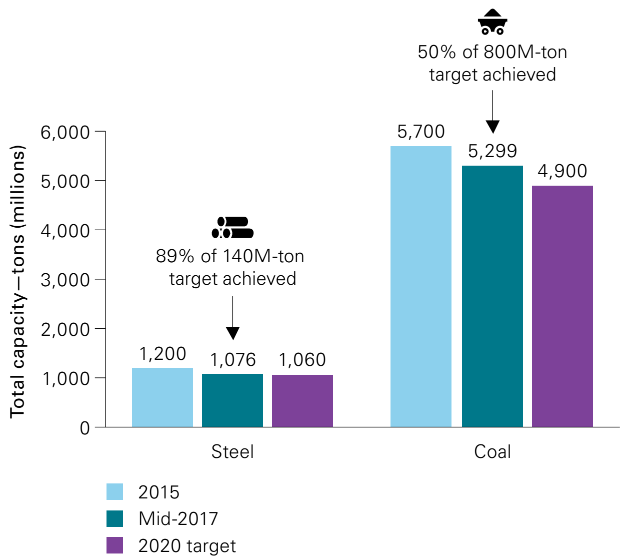

**Source:** Vanguard, using data from CEIC.

**Figure I-13. China's debt-to-GDP ratio has stabilized on financial tightening and better growth**




**Source:** Vanguard, using data from the People's Bank of China (PBoC) and the National Bureau of Statistics of China (NBS).

**Figure I-14b. The peak of industrial capacity reduction has passed**




**Source:** Vanguard, using data from NBS.

Second, Chinese policymakers possess the toolkit and flexibility to cushion downturns. Policymakers remain in a "fight and retreat" mode, with the recent easing of capital outflow pressures temporarily providing them with some operational independence to achieve this internal objective. While Fed normalization in 2018 could trigger renewed capital outflow pressure, the tighter enforcement of capital flow management measures could limit the negative feedback loop between a weakening currency and capital outflows.

Third, positive developments in the transformation of China's growth model could mitigate downside pressures coming from a slowdown in fixed investment and the highly leveraged industrial sector. Growth in household consumption remains resilient and has outpaced that of investment and exports. With disposable income growing faster than headline GDP growth, Chinese consumers have experienced a consumption upgrade, which, in turn, has provided a boost to the tertiary sector even as the secondary industrial sector has dwindled in recent years.

Our worry lies in the longer term. While many market observers are concerned that aggressive pursuit of economic and financial reforms could trigger a hard landing, overly focusing on near-term growth stability without instituting necessary market reforms to correct distortion in resource allocation will eventually lead to further slowdown in productivity growth.

On that front, it is encouraging that President Xi Jinping, during his political report in the 19th National Party Congress, prioritized the quality of growth over the speed. This suggests that policymakers could have a slightly higher tolerance for a lower growth rate in coming years. In **Figure I-15**, we explore the areas in which policymakers will most likely focus their reform efforts. The key will be to relax government control to allow market forces to play a bigger role in the economy and address the inefficiencies created by state-owned enterprises (SOEs). Whether China can successfully transition to a productivity-led growth model will ultimately shape its future as a global growth driver or as the next Japan.

**Figure I-15. Priority and progress of structural reforms to date**

| Priority | Reform | Target | Progress |
|---|---|---|---|
| High | Overcapacity and environmental protection | Improve the quality of growth by reducing excess capacity and highly polluting investment. | Supply-side reforms have played a key role in reducing overcapacity. |
| | Financial | Foster development of domestic capital markets and improve the resilience of the financial system. | A proposal for a registration-based IPO system was recently approved; regulation and financial tightening have restricted shadow banking activity. |
| | Fiscal | Redefine central/local government responsibilities and centralize spending on basic pension and public security. | "Lifelong accountability" for local government officials will help control financial risk. |
| | State-owned enterprises (SOEs) | Finish restructuring and deleverage. | Trials are ongoing in mergers and acquisitions and mixed ownership, but nonperforming loan disclosure is still low as banks support SOE debt rollover. |
| | Urbanization | Loosen household registration restrictions and even out the urbanization process. | Quality lags quantitative improvement: Most new urban residents are still not legally allowed to access services. |
| | Service sector | Lower entry barriers to introduce competition. | Barriers are lower, but further deregulation is needed for fair competition. |
| Low | Capital account | Achieve IMF classification of capital account transactions, expand cross-border portfolio investment schemes, and relax rules on cross-border financing. | Special Drawing Right inclusion, stock and bond connection, a Shanghai free-trade zone, a wider yuan daily trading band, and one-way asymmetric capital account liberalization have been implemented. More must be done to allow two-way capital flows. |

**Source:** Vanguard.

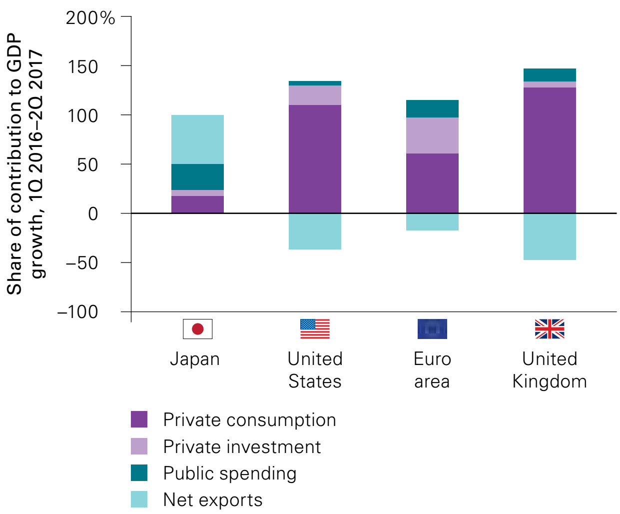
## Japan: Rising with the tide ... for now

After nearly two decades of low growth and persistent deflation, Japan's economy is showing signs of recovery. Unlike in other developed countries where monetary easing has partly succeeded in shoring up private demand, Japan's latest expansion cycle has come primarily from an acceleration in the export cycle and a mildly expansionary fiscal policy, while household and business spending remains modest (see **Figure I-16**).

In 2018, we expect the recovery to become more broad-based, as rising confidence, a gradual increase in real wages, and solid profitability leave room for domestic demand to pick up in coming quarters. Although this is unlikely to fully offset the drag from the fading 2016 fiscal stimulus, the more diversified pool of growth drivers suggests Japan is likely to record another year of above-trend growth in 2018.

The cyclical upturn is likely to lead to a further tightening in labor market conditions. In fact, Japan's market is already as tight as it was during the early to mid-1990s, with the unemployment rate at the lower bound of its 3%–3.5% natural rate.

**Figure I-16. Expansion has yet to extend into private demand in Japan**




**Source:** Vanguard, using data from Thomson Reuters Datastream.

Wage inflation remains anemic, though, and skepticism about Japan's reflation efforts still runs deep. In our view, this partly reflects the recent rise in labor supply and the shift in workforce composition toward low-income part-time workers. In particular, the recent increase in labor supply is largely concentrated in two population segments, namely women and the elderly; both tend to work part-time jobs and therefore earn only a third to half of that of a full-time employee.

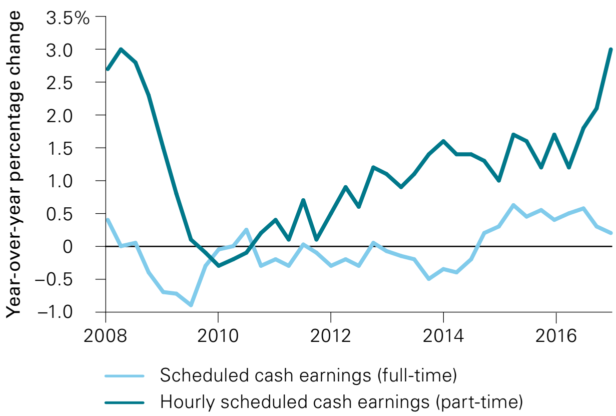
As demographic headwinds begin to bite, the labor market in Japan could tighten further and lead to an acceleration in part-time wages (see **Figure I-17**). Together with a widening positive output gap and weakening currency, core inflation is likely to pick up gradually toward 1% in 2018. However, without further progress in labor market reforms and an acceleration in full-time wages, Japan is unlikely to achieve and sustain its 2% inflation target in the near term.

Against this backdrop, the Bank of Japan, unlike most developed central banks, is expected to maintain easy policy, anchoring the country's 10-year government bond yield at about 0% in 2018. By targeting price over quantity, however, the Bank of Japan has effectively started to taper its asset purchases (see **Figure I-18**). It should be clear, though, that this is not an attempt to reverse stimulus but rather an indirect consequence of moving the policy goalposts.

Importantly, monetary policy alone cannot lift up Japan's long-term growth potential, which ultimately influences wage-setting and business investment decisions. More structural reforms, from equalizing the wage gap between full- and part-timers to raising medium-term growth and inflation expectations, are needed to improve the effectiveness of such cyclical policies.

With Prime Minister Shinzo Abe securing a solid mandate in the October 2017 snap election and expected to stay in power until 2021, Japan's future now depends on whether Abe focuses his political capital on economic reforms to lift productivity and long-term growth potential.

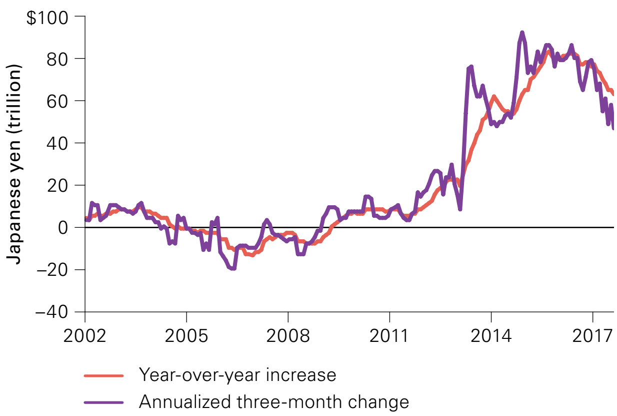
Figure I-17. Part-time wages to accelerate, although full-time wage growth remains subdued




**Source:** Vanguard, using data from the Ministry of Health, Labour and Welfare.

Figure I-18. The Bank of Japan's 'tapering' is not 'tightening'

Change in Bank of Japan holdings




**Source:** Vanguard, using data from CEIC.

## Europe: A brighter horizon

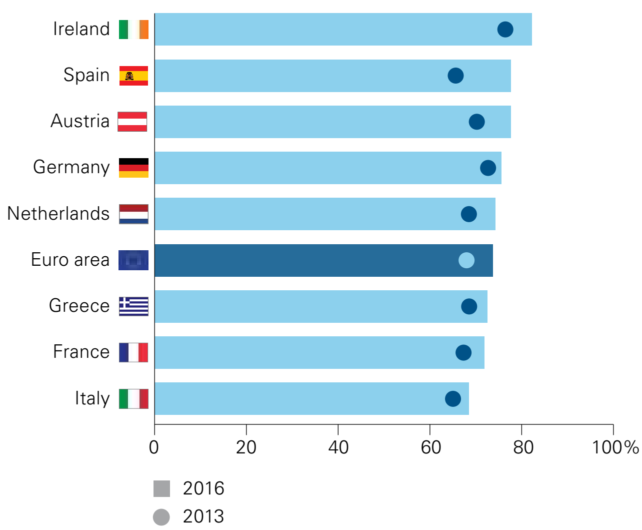
In the context of an increasingly synchronized global recovery, the outlook for the euro-area economy over the next 12 months is as bright as it has been since the 2008–2009 financial crisis. After years of recession, crises, and political uncertainty, the clouds are starting to clear. This is not to say that all the underlying issues have been resolved. Nonetheless, all countries are growing again, and unemployment is steadily falling.

We anticipate that growth in the euro area will be just below 2% in 2018, with risks tilted to the upside for the first time since the 2008–2009 crisis. Political risk, in the form of a rise in anti-European Union parties, was dominant during 2017. The risk has not disappeared, but it has diminished (see **Figure I-19**).

In the United Kingdom, by contrast, the economic outlook is much more uncertain given the lack of clarity over Brexit. Our base case is for growth in the 1.5%–2.5% range. Ultimately, the major effects of Brexit will be felt only once the country actually leaves the

Figure I-19. Anti-euro sentiment: Is the tide turning?

Percentage of population in favor of a single currency—the euro




**Source:** Eurobarometer.

European Union (EU), which won't happen until 2019 and possibly later if a transition is agreed to. We anticipate four possible exit scenarios (see **Figure I-20**). We still believe that no Brexit is a possible outcome, with roughly a 10% probability.[3]

Despite the positive growth picture, euro-area core inflation has remained stubbornly low, at 1.2%. The U.K. situation looks different superficially, given that U.K. Consumer Price Index inflation, at 3%, is about 1% above target, but much of this was caused by rising import prices prompted by the falling value of sterling. Abstracting from that, domestically generated inflation in the United Kingdom has similarly been more subdued than expected.

As with other developed economies, this inflation puzzle has a number of potential explanations:

- Measured unemployment possibly disguising underemployment of workers (see **Figure I-21a**).
- Decreasing bargaining power of labor because of continued declines in unionization (see **Figure I-21b**).
- Increasing influence of global rather than local measures of slack (globalization).
- New technology reducing production costs and putting downward pressure on profit margins.

Notwithstanding these influences, which are leading the inflation response to be slower than in previous upturns, our view is that inflation will eventually reawaken as unemployment continues to fall toward the equilibrium rate, which is assumed to be 8.5%–9% in the euro area and as low as 4% in the United Kingdom.

Given this environment of gradually tightening product and labor markets in the euro area, we expect the European Central Bank, under our base-case scenario,

Figure I-20. Four Brexit scenarios

Our probabilities

**35% Crash Brexit**
The U.K. fails to reach a deal and effectively falls out of the EU with no backstop. The U.K. moves to World Trade Organization rules.

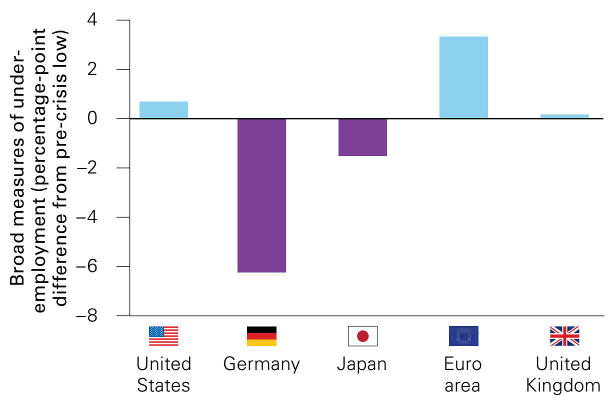
**35% Hard Brexit**
The U.K. leaves the EU Single Market and the Customs Union and reintroduces immigration controls.

**20% Soft Brexit**
The U.K. joins the European Economic Area and retains access to the EU Single Market and the Customs Union.

**10% No Brexit**
Article 50 is revoked and Brexit does not take place.

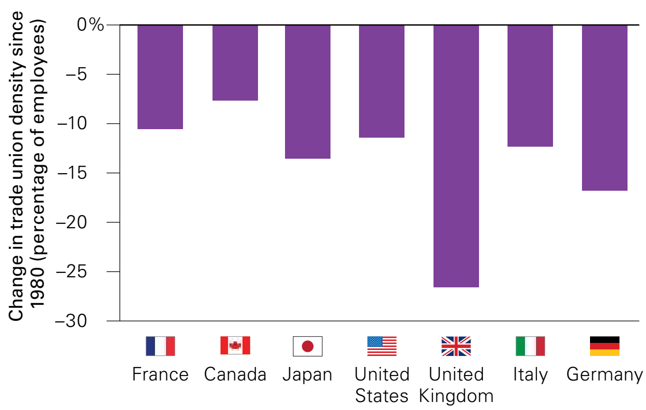
**Source:** Vanguard.

Figure I-21a. Underemployment is still very high in the euro area




**Source:** Capital Economics.

Figure I-21b: Trade union membership has declined across developed markets




**Source:** Macrobond.

3 Recent surveys suggest that 45% of Britons think the country was wrong to vote to leave the EU, versus 42% who think it was right. Reversing the decision would certainly be difficult, but it cannot be ruled out.

to terminate its asset purchases at the end of 2018, slightly beyond the ECB's existing commitment to purchase assets until September 2018. We do not anticipate rate increases until at least 2019, and possibly not until the next decade, given the ECB's commitment to keep rates on hold until well past the end of its quantitative easing.

In the United Kingdom, given Brexit uncertainty, the policy outlook for the Bank of England over the coming years is challenging. The U.K. recovery has continued since the 2016 Brexit referendum, with unemployment falling to a 42-year low, although estimates of trend productivity growth have been revised down, partly because of the weakness of the supply side since the financial crisis and, looking forward, because of the likely shock to productive potential caused by Brexit. And headline inflation has been pushed well above target by the sharp fall in sterling following the EU referendum. For these reasons, the Bank of England has now removed the emergency rate hike made in the summer of 2016 and signaled that rates may need to rise further, albeit gradually.

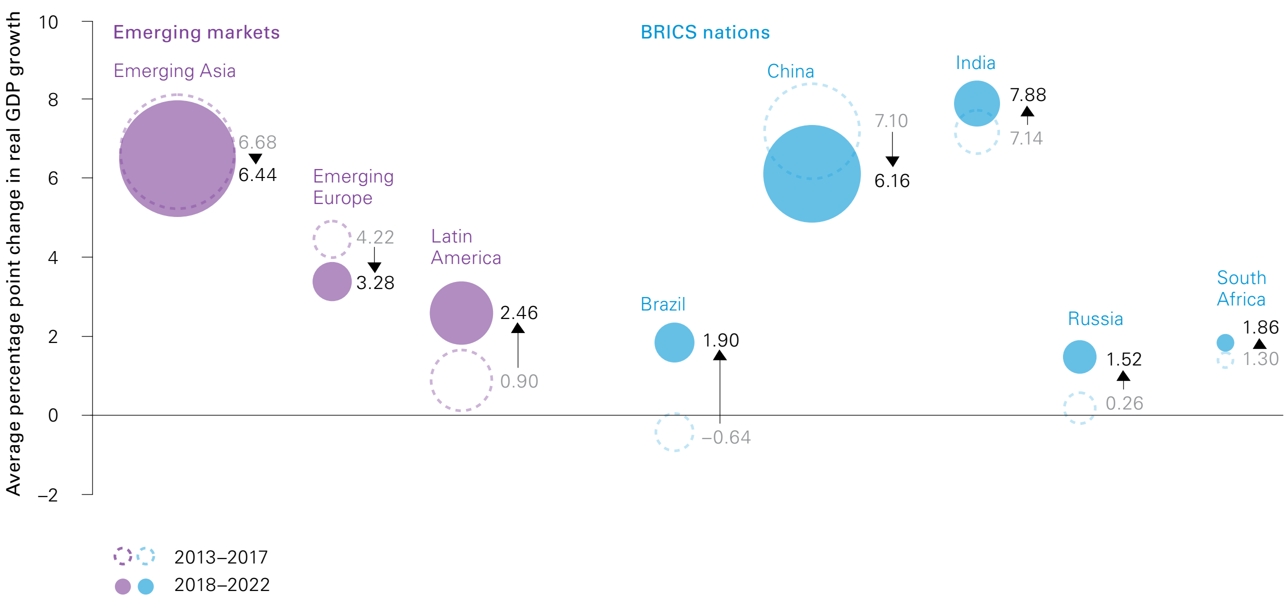
## Emerging markets: A varied outlook

Growth in emerging markets in aggregate is expected to be 4.9% in 2018, in line with a lower structural trend post-GFC. We maintain that emerging markets are unlikely to go back to the pre-recession levels of economic growth.

However, the emerging-market grouping hides vast heterogeneity across regions and countries (see **Figure I-22**). In Latin America, growth will continue improving in 2018, but it will remain below potential trend levels for the region over the medium term. Forecasts for emerging Asia remain robust, with an average growth rate of 6.2% for 2018–2022.

The main risks for emerging markets are externally based; the most notable are the impact of a slowing China on world commodity markets and a potential faster pace of monetary policy normalization in the United States and other developed economies. In particular, central banks in emerging markets will be alert to any news coming out of the U.S. Federal Reserve, which could create disruptions in foreign exchange and domestic financial markets. Corporate leverage also poses a key risk, since it has increased continuously since the GFC, with high levels of debt issuance in hard currencies (U.S. dollars or euros). Sudden movement of the U.S. dollar could severely damage the balance sheets of local corporations.

Figure I-22. Economic growth prospects




**Source:** IMF World Economic Outlook.

# II. Global capital markets outlook

Vanguard's outlook for global stocks and bonds is subdued at best given stretched equity valuations and low interest rates. Downside risks are particularly elevated in the equity market. Although we are hard-pressed to find compelling evidence of financial bubbles, risk premiums for many asset classes appear slim.

The market's efficient frontier of expected returns for a unit of portfolio risk now hovers in a lower orbit. More important, common return-centric portfolio tilts, seeking higher return or yield, are unlikely to escape the strong gravitational pull of low-return forces in play.

## Global equity markets: Higher risk, lower return

Global equity has rewarded patient investors with a 15.5% annualized return over the 8½ years since the lows of the financial crisis. As part of this strong performance, valuations have risen gradually. For instance, valuations in the United States and in emerging markets currently appear stretched relative to our proprietary fair-value benchmark, making our global equity outlook highly guarded.

The ten-year outlook for global equities has deteriorated since last year and is now centered in the 4.5%–6.5% range, based on our Vanguard Capital Markets Model® (VCMM) projections. Expected returns for the U.S. stock market are lower than those for international markets, underscoring the benefits of global equity strategies in this environment.

### Equity valuations and Vanguard's "fair value" CAPE

As discussed in a new Vanguard Global Macro Matters piece titled *As U.S. Stock Prices Rise, the Risk-Return Trade-Off Gets Tricky,* price/earnings ratios—including Robert Shiller's cyclically adjusted P/E ratio (CAPE)—are at alarming levels. The current CAPE level corresponds to the 95th percentile of its historical range of values, approaching highs seen during the dot-com era. However, a straight comparison of CAPE (and any other valuation multiple) with its historical average can be misleading, failing to account for today's low inflation and interest rates.

Because a secular decline in interest rates and inflation depresses the discount rates used in asset-pricing models, investors are willing to pay a higher price for future earnings, thus inflating P/E ratios. Therefore, a high CAPE may not be indicating overvalued stock prices, but rather may be an outcome of low interest rates.

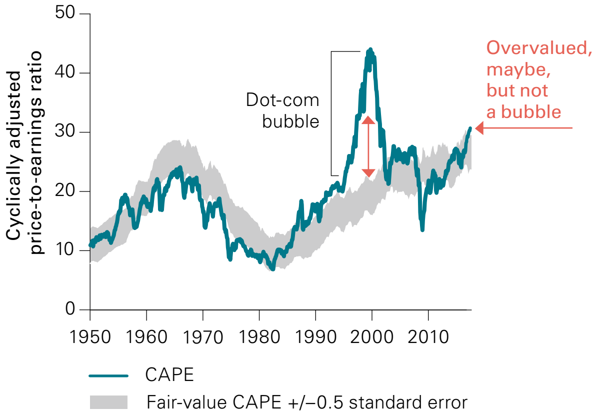
Vanguard's fair-value CAPE accounts for current interest rates and inflation levels and provides a more useful time-varying benchmark against which the traditional CAPE ratio can be compared, instead of the popular use of historical average benchmarks.

**Figure II-1a** plots Shiller's CAPE versus our fair-value model. For instance, in the late 1990s, the difference between CAPE and our fair-value estimate would have suggested a bubble. Today, although CAPE is approaching historical highs, it is not grossly overvalued, as it would be in a bubble, when compared with its fair value.

We have extended this fair-value concept to other regions. As illustrated in **Figure II-1b**, our equity valuation dashboard indicates that non-U.S. developed markets are fairly valued, even after adjusting valuations for rates and inflation. For emerging markets, it is important to note that their stocks typically trade at lower multiples than stocks in developed markets because of the higher risk and higher earning yields required by investors. Even after adjusting for higher risk, emerging markets are above their fair-value levels and slightly overvalued.

Figure II-1. Divergence in global equity valuations

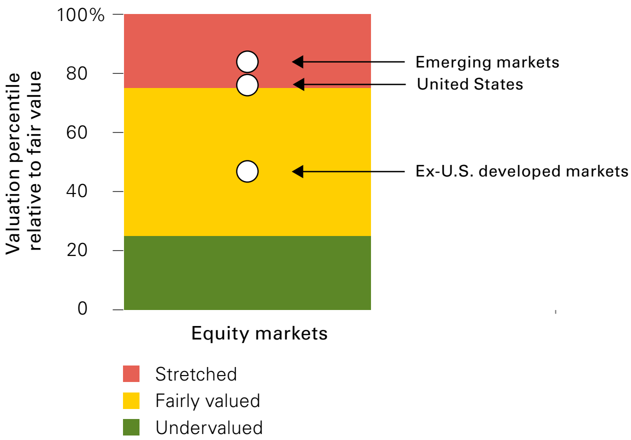
a. CAPE for the U.S. S&P 500 Index is approaching overvalued territory




Notes: Fair-value CAPE is based on a statistical model that corrects CAPE measures for the level of inflation expectations and for lower interest rates. The statistical model specification is a three-variable vector error correction (VEC), including equity-earnings yields, ten-year trailing inflation, and ten-year U.S. Treasury yields estimated over the period January 1940–September 2017.

Source: Vanguard calculations, based on data from Robert Shiller Online Data, the U.S. Bureau of Labor Statistics, and the Federal Reserve Board.

b. Other developed markets appear to be fairly priced




Notes: The U.S. valuation measure is the current CAPE percentile relative to fair-value CAPE for the S&P 500 Index estimated over the period January 1940 to September 2017. The developed markets valuation measure is the weighted average of each region's (Australia, United Kingdom, Euro-area, Japan, and Canada) current CAPE percentile relative to each region's own fair-value CAPE. The fair value CAPE for Australia, the U.K., the Euro area, Japan, and Canada is a five variable vector error correction (VEC) model with equity earnings yield (MSCI index), ten-year trailing inflation, ten-year government bond yield, equity volatility, and bond volatility estimated over the period January 1970 to September 2017. The emerging markets valuation measure is a composite valuation measure of EM to U.S. relative valuations and current U.S. CAPE percentile relative to its fair value CAPE. The relative valuation is the current ratio of EM to U.S. P/E metrics relative to its historical average, using three-year trailing average earnings from January 1990 to September 2017.

Source: Vanguard calculations, based on data from Robert Shiller Online Data, the U.S. Bureau of Labor Statistics, the Federal Reserve Board, and Thomson Reuters Datastream.

**Global equities and the diversification of domestic risks**

As shown in **Figure II-2,** our expected return outlook for U.S. equities over the next decade is centered in the 3%–5% range, in stark contrast to the 10% annualized return generated over the last 30 years. Although valuation expansion proved to be a tailwind to returns over those 30 years, we expect valuations to contract as interest rates gradually rise over the next decade. The expected equity risk premium (over cash) for the U.S. market appears compressed, primarily because of elevated valuations today.

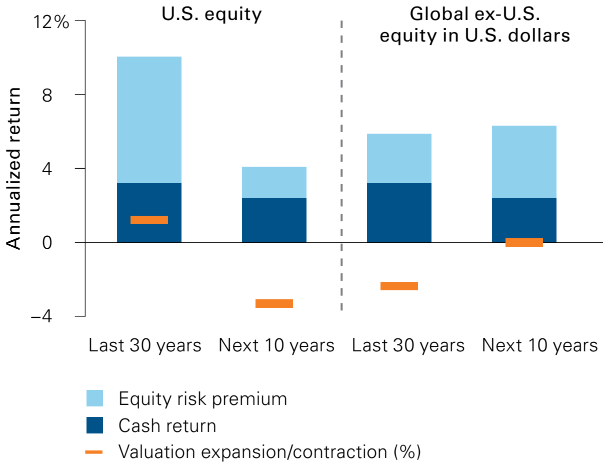
From a U.S. investor's perspective, the expected return outlook for non-U.S. equity markets is in the 5.5%–7.5% range, modestly higher than that of U.S. equity (see **Figures II-2a and b**). The equity risk premium for non-U.S. equity markets, however, may be slightly higher going forward, as the valuation contraction may not be as drastic as that experienced over the last three decades.

This result is a function of the currently moderate level of valuations as well as long-term expectations for the U.S. dollar decline priced in by the markets, especially with respect to other major currencies such as the euro and yen.

Our ten-year outlook for global equity is in the 4.5%–6.5% range, as seen in Figure II-2b. While the case for global diversification is particularly strong now, for the purposes of asset allocation, we caution investors against implementing tactical tilts based on just the median expected return—that is, ignoring the entire distribution of asset returns and their correlations.

**Figure II-2. The outlook for equity markets is subdued**

**a. Exposure to non-U.S. equities may be beneficial**




**Notes:** Data for the last 30 years are from January 1987–December 2016, in U.S. dollars. Next-ten-year data are based on the median of 10,000 simulations from VCMM as of September 30, 2017, in U.S. dollars. Historical returns are computed using indexes defined in "Indexes used in our historical calculations" on page 5. Historical cash returns are from Dimson-Marsh-Staunton data. See Appendix section "Index simulations" for further details on the asset classes shown.

**Sources:** Vanguard, Dimson-Marsh-Staunton Dataset, FactSet, Morningstar Direct, and Thomson Reuters Datastream.

**b. Equity market ten-year return outlook: Setting reasonable expectations**


**Notes:** This forecast corresponds to the distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of September 30, 2017, in U.S. dollars. Median volatility is the 50th percentile of an asset class's distribution of annual standardized deviation of returns. See Appendix section "Index simulations" for further details on the asset classes shown.

**Source:** Vanguard.

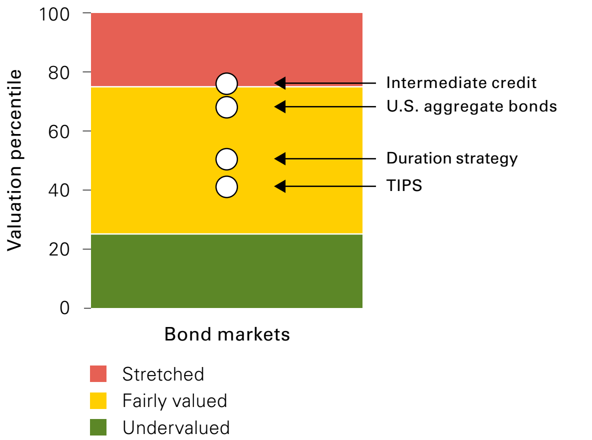
## Global fixed income markets: Positive but muted

The return forecast for global fixed income is positive but muted, given our long-term outlook of restrained growth and inflation, as outlined in Section I. As shown in **Figure II-3**, it is in the 2%–3% range for the next decade, slightly higher than projected at this time last year. Expected returns for many fixed income sub-asset classes appear more similar than differentiated compared with previous years, in part because of compressed credit spreads (see **Figure II-4**). Elevated equity market risk points to credit risk being higher than duration risk in this environment.

### U.S. interest rates: A slightly higher, slightly flatter yield curve

Despite the risk of a short-term acceleration in the pace of monetary policy normalization, the risk of a material rise in long-term interest rates remains modest. For example, our fair-value estimate for the benchmark 10-year U.S. Treasury yield remains centered near 2.5% in 2018. As illustrated in Figure II-4, duration strategies are less risky than investors may believe in a rising rate environment. This is because we expect the short end of the curve to rise more than the long end over the next decade, as the long rates are anchored by inflation expectations.

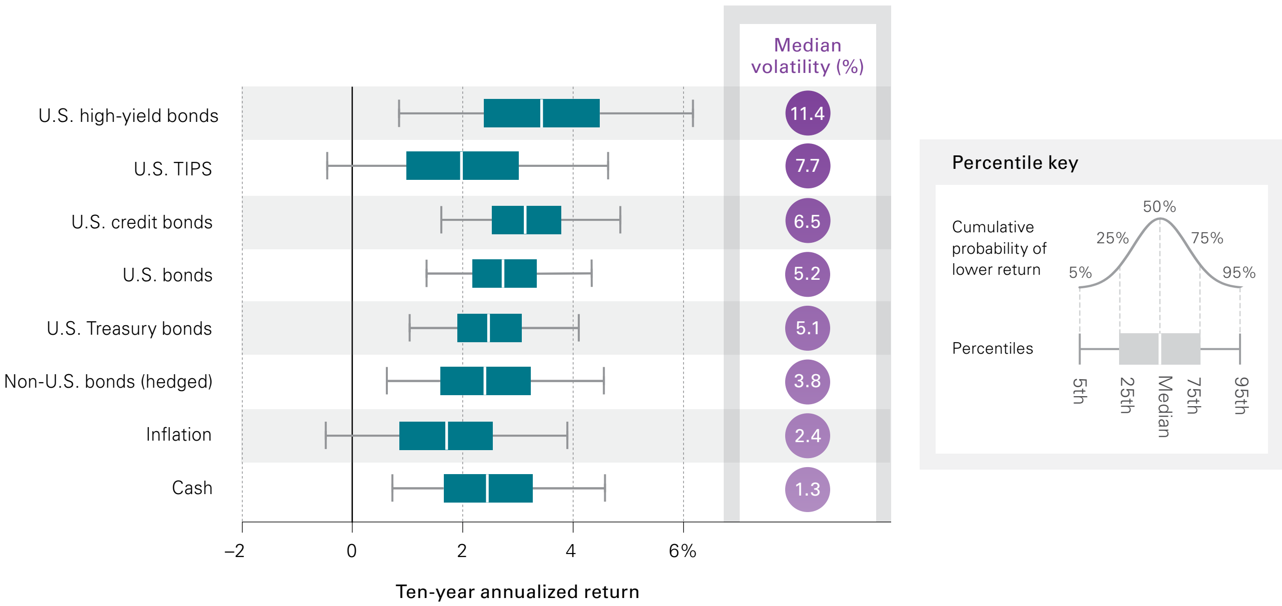
Figure II-4. Frothy credit valuations




**Notes:** Valuation percentiles are relative to 30-year VCMM projections. Intermediate credit and U.S. aggregate bond valuations are current credit spreads relative to Year 30. Duration valuation is the expected return differential over the next decade between the long-term Treasury index and short-term Treasury index, relative to that of Years 21–30. TIPS valuation is the ten-year-ahead annualized inflation expectation relative to Years 21–30.

**Source:** Vanguard.

Figure II-3. Rates and risk premiums add up to modest returns




**Notes:** This forecast corresponds to the distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of September 30, 2017, in U.S. dollars. Median volatility is the 50th percentile of an asset class's distribution of annual standardized deviation of returns. See Appendix section "Index simulations" for further details on the asset classes shown.

**Source:** Vanguard.

### Corporate bonds: Less upside than before

The central tendency for U.S. credit bonds (specifically, the Bloomberg Barclays U.S. Credit Bond Index) is in the 2.5%–3.5% range, slightly higher than for Treasury bonds. The premium, however, has been narrowed relative to last year, because of compressed spreads that indicate froth in the credit markets (Figure II-4). Historically, spreads tend to widen in times of equity market stress, resulting in capital losses for credit bonds.

The central tendency for high-yield corporate bonds (specifically, the Bloomberg Barclays U.S. High Yield Corporate Bond Index) is in the 2.5%–4.5% range, lower than projected at this time last year because of compressed spreads. We urge investors to be cautious in reaching for yield in segments such as high-yield corporates, not only because of the higher expected volatility that accompanies the higher yield, but also because of the segment's correlation to the equity markets.

As shown in **Figure II-5**, a 20% overweight or tilt to high-yield corporates increases a portfolio's volatility excessively relative to a marginal increase in return. The sensitivity of spreads to the economic environment is much larger for high-yield corporate bonds than for higher-quality segments of the U.S. fixed income market, which also contributes to an increased investment risk.

### Treasury Inflation-Protected Securities (TIPS): Markets don't see inflation coming

Break-even inflation expectations inferred from the U.S. TIPS market remain below the Fed's 2% inflation target and slightly lower than the VCMM long-term median levels. Markets are placing extremely low odds for higher inflation outcomes. While not attractive in terms of return, TIPS could be a valuable inflation hedge for some institutions and investors sensitive to inflation risk.

### Domestic versus international: Benefits of diversification remain

Although the central tendency of expected return for non-U.S. aggregate bonds appears to be marginally lower than that of U.S. aggregate bonds (Figure II-3), we expect the diversification benefits of global fixed income in a balanced portfolio to persist under most scenarios. Yields in most developed markets are historically low, particularly in Europe and Japan, yet diversification through exposure to hedged non-U.S. bonds should help offset some risk specific to the U.S. fixed income market (Philips et al., 2014).

Less-than-perfect correlation between two of the main drivers of bond returns—interest rates and inflation—is expected as global central bank policies are likely to diverge in the near term. Diversification with non-U.S. bonds also helps to mitigate the risk of a policy mistake by central banks.

## Portfolio implications: A low return orbit

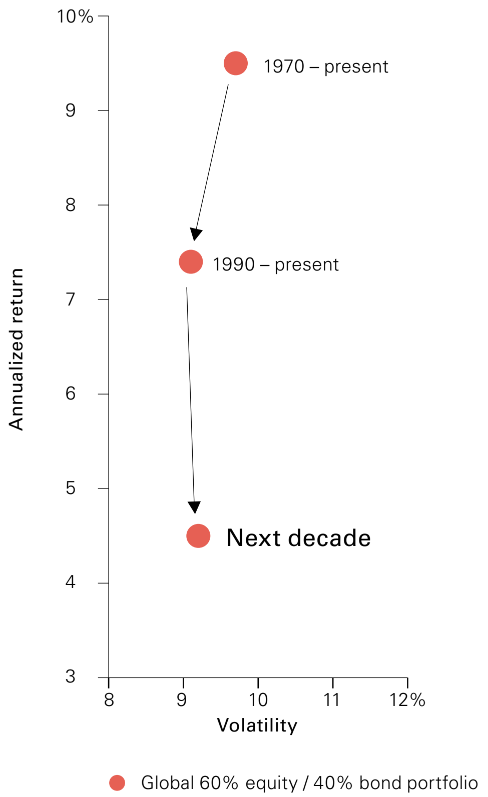
Investors have experienced spectacular returns over the last few decades because of two of the strongest equity bull markets in U.S. history in addition to a secular decline in interest rates from 1980s highs. **Figure II-5a** contrasts our 3.5%–5.5% outlook for a global 60% equity/40% bond portfolio for the next decade against the extraordinary 9.5% return since 1970 and 7.4% since 1990. As highlighted in previous sections, elevated equity valuations, low rates, and compressed spreads have pulled the market's efficient frontier of expected returns into a lower orbit. The efficient frontier is also flatter (that is, with less return per unit of risk), as seen from the return and volatility expectations of balanced portfolios, as shown in **Figure II-5c**.

To try to increase portfolio returns, a popular strategy is to overweight higher-expected-return assets or higher-yield assets. A few common "reach for yield" strategies include overweighting real estate investment trusts (REITs) and high-yield corporates. Similarly, "reach for return" strategies involve tilting the portfolio toward emerging markets equities to take advantage of higher growth prospects. Home bias leads some to shy away from non-U.S. equities.

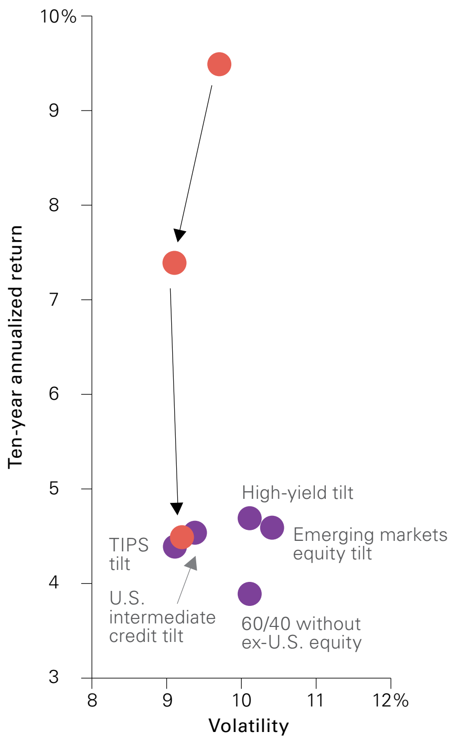
**Figure II-5b** illustrates that these common return-centric strategies are unlikely, by themselves, to restore portfolios to the higher orbits of historical returns.

Figure II-5. Asset allocation for a challenging decade

a. A lower return orbit ...




b. ... that popular "active tilts" will likely fail to escape




c. Projected ten-year annualized nominal returns as of September 2017

| | Portfolios | 5th percentile | 25th percentile | Median | 75th percentile | 95th percentile | Median volatility | Risk-adjusted return |
|---|---|---|---|---|---|---|---|---|
| Global balanced portfolios | 100% bonds | 1.3% | 2.0% | 2.6% | 3.3% | 4.3% | 4.5% | 0.59 |
| | 20/80 stock/bond | 1.8% | 2.7% | 3.3% | 4.0% | 5.1% | 4.2% | 0.80 |
| | 60/40 stock/bond | 1.3% | 3.2% | 4.5% | 5.8% | 7.8% | 9.2% | 0.48 |
| | 80/20 stock/bond | 0.7% | 3.2% | 4.9% | 6.6% | 9.1% | 12.4% | 0.39 |
| | 100% equity | 0.0% | 3.0% | 5.2% | 7.2% | 10.5% | 15.7% | 0.32 |
| | **60/40 stock/bond** | **1.3%** | **3.2%** | **4.5%** | **5.8%** | **7.8%** | **9.2%** | **0.48** |
| Portfolios with common 20% tilts relative to 60/40 stock/bond | High-yield tilt | 1.4% | 3.4% | 4.7% | 6.0% | 8.0% | 10.1% | 0.46 |
| | Inflation protection tilt | 1.3% | 3.1% | 4.4% | 5.7% | 7.7% | 9.1% | 0.48 |
| | Emerging markets equity tilt | 1.4% | 3.3% | 4.6% | 5.9% | 7.9% | 10.4% | 0.44 |
| | U.S. intermediate credit tilt | 1.4% | 3.3% | 4.6% | 5.9% | 7.9% | 9.3% | 0.48 |
| | 60/40 without ex-U.S. equity | 0.1% | 2.4% | 3.9% | 5.6% | 8.0% | 10.1% | 0.38 |

■ Lower risk-adjusted return
■ Same or higher risk-adjusted return

**Notes:** Summary statistics of 10,000 VCMM simulations for projected ten-year annualized nominal returns are as of September 2017 in U.S. dollars before costs. Historical returns are computed using indexes defined in "Indexes used in our historical calculations" on page 5. The global equity portfolio is 60% U.S. equity and 40% global ex-U.S. equity. The global bond portfolio is 70% U.S. bonds and 30% global ex-U.S. bonds. Portfolios with tilts include a 20% tilt to the asset specified funded from the fixed income allocation for the fixed income tilt and the equity allocation for the equity tilt.

**Source:** Vanguard.

## Portfolio strategies for three potential economic scenarios

Based on our global economic perspective on the cyclically rising risks to inflation and policy normalization imposed by tight global labor markets, we examine in **Figure II-6** three possible economic scenarios occurring over the next three years. The high-growth scenario illustrates an upside risk scenario of sustained economic growth with a tighter labor market and a moderate pickup in wages and inflation. The two others are a status quo scenario driven by continued low volatility with positive financial conditions and a recessionary scenario caused by a turn in the business cycle and a correction in the equity markets.

Figure II-6 shows optimal portfolios for each scenario that vary their exposures to the following four risk premiums: (1) equity-risk premium, (2) term premium, (3) credit premium, and (4) inflation-risk premium. In a high-growth scenario, expected global equity returns would be high, causing the efficient frontier to be steep. Long and short rates would also rise faster than expected, resulting in an optimal portfolio loading on equity and short duration.

A recessionary-scenario portfolio would underweight equity and overweight long duration. Surprisingly, the allocation to U.S. equity remains rather large, as the portfolio that is also heavy on long-term Treasuries derives a larger diversification benefit from lower-returning U.S. equity (especially in a recession) than from including higher-returning non-U.S. equity assets. The portfolio strategy in a status quo scenario is well diversified.

Using our VCMM simulations, we can not only illustrate the effectiveness of various portfolio strategies designed for each scenario but also show the risks of such strategies. The following conclusions can be drawn from our analysis:

**1. Portfolios designed for specific macroeconomic scenarios entail important trade-offs:** If the scenario for which the portfolio was designed does not take place, then the portfolio performance is the worst of all the options.

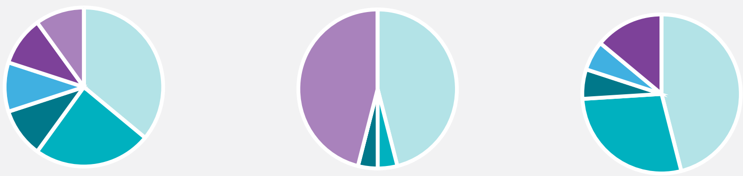
**2. A balanced portfolio works well for investors who are agnostic about the future state of the economy:** The 60/40 balanced portfolio is an "all-weather" strategy, with either top or middle-of-the-road performance in each scenario.

**3. Portfolio tilts should be done within a mean-variance optimization framework:** Ad hoc tilts ignore correlations among assets and lead to inefficient portfolios. For instance, in a recession-scenario strategy, equities can be overweighted (as opposed to underweighted) because of the added diversification benefits of long-term bonds.

Figure II-6. Cyclical surprises and asset allocation trade-offs

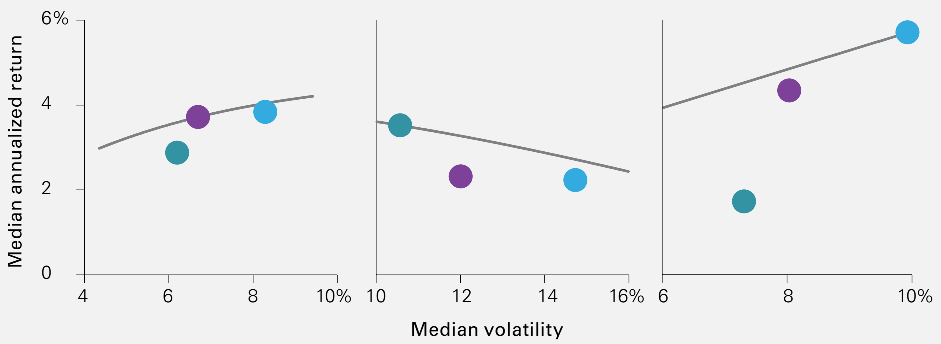
a. Mean-variance optimal portfolios vary for different economic environments

| | Scenario 1<br>Status quo/baseline<br>(50% probability) | Scenario 2<br>Recession<br>(19% probability) | Scenario 3<br>High growth<br>(31% probability) |
|---|---|---|---|
| | Diversified portfolio | Overweight long duration and underweight equity | Overweight equity and short duration |



| | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|
| U.S. equity | 36% | 46% | 46% |
| Global ex-U.S. equity | 24% | 4% | 28% |
| Global ex-U.S. bonds | 10% | 4% | 6% |
| Short-term credit | 10% | 0% | 6% |
| Short-term Treasury | 10% | 0% | 14% |
| Long-term Treasury | 10% | 46% | 0% |
| Short-term TIPS | 0% | 0% | 0% |

b. A diversified portfolio is not always the best, but it's never the worst




| | | | |
|---|---|---|---|
| Best | Diversified portfolio | Overweight long duration and underweight equity | Overweight equity and short duration |
| Second-best | Overweight equity and short duration | Diversified portfolio | Diversified portfolio |
| Worst | Overweight long duration and underweight equity | Overweight equity and short duration | Overweight long duration and underweight equity |

c. Portfolios designed for a single scenario are tempting but can be risky

| | | |
|---|---|---|
| Strategy **upside** relative to balanced portfolio | **1.3% higher annualized return** with 1.4% lower volatility in a recessionary scenario | **1.4% higher annualized return** with 1.9% higher volatility in a high-growth scenario |
| Strategy **downside** relative to balanced portfolio | **2.6% lower annualized return** with 0.7% lower volatility in a high-growth scenario | **Same return with 2.7% higher volatility** in a recessionary scenario |

**Notes:** Performance is relative to the efficient frontier. Portfolios are selected from the frontier based on a fixed risk-aversion level. The forecast displays simulations of three-year annualized returns as of September 2017. Scenarios are based on sorting the VCMM simulations by rates, growth, volatility, and equity return. The three scenarios are a subset of the 10,000 VCMM simulations. See Appendix section "Index simulations" for further details on the asset classes shown.

**Source:** Vanguard.

### Portfolio construction strategies: Time-tested principles apply

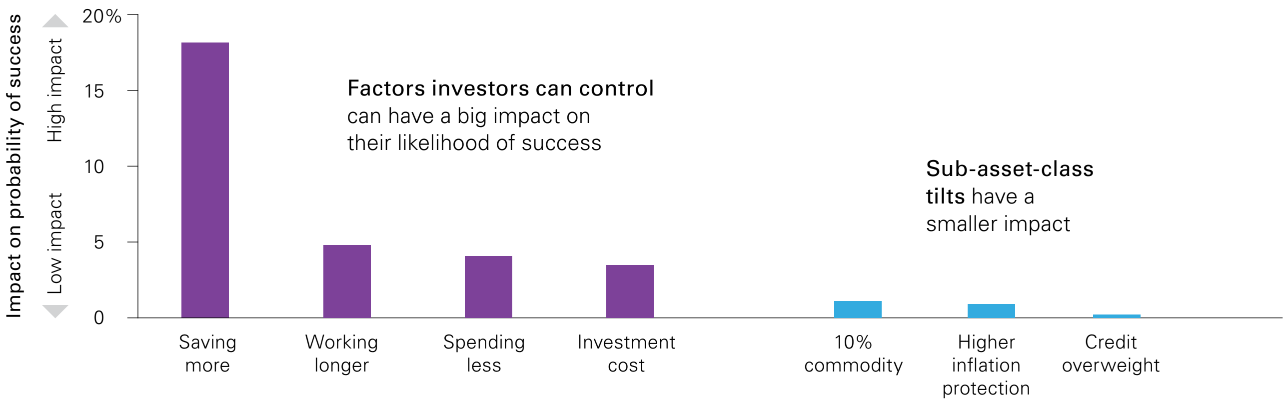
Contrary to suggestions that an environment of low rates and compressed equity and credit-risk premiums warrants some radically new investment strategy, Figure II-5 reveals that the diversification benefits of global fixed income and global equity are particularly compelling, given the simulated ranges of portfolio returns and volatility.

The market's efficient frontier of expected returns for a unit of portfolio risk now hovers in a lower orbit. More important, common asset-return-centric portfolio tilts, seeking higher return or yield, are unlikely to escape the strong gravity of low-return forces in play, as they ignore the benefits of diversification. Modestly outperforming asset-return-centric tilts requires a portfolio-centric approach that leverages the benefits of diversification by weighing risk, return, and correlation simultaneously.

Our prior research (Aliaga-Díaz, et al., 2016) shows that investment success is within the control of long-term investors. **Figure II-7** illustrates that factors within their control—such as saving more, working longer, spending less, and controlling investment costs—far outweigh the less reliable benefits of ad hoc asset-return-seeking tilts. Thus, decisions related to saving more, spending less, and controlling costs will be much more important than portfolio tilts.

Investment objectives based either on fixed spending requirements or on fixed portfolio-return targets may require that investors consciously weigh their options together with their risk-tolerance levels. Ultimately, our global market outlook suggests a somewhat more challenging and volatile environment ahead, yet one in which investors with an appropriate level of discipline, diversification, and patience are likely to be rewarded over the long term. Adhering to investment principles such as long-term focus, disciplined asset allocation, and periodic portfolio rebalancing will be more crucial than ever before.

Figure II-7. Taking control




**Notes:** Probability of success is defined as the probability of having a positive balance in a target-date fund at age 95, based on specific savings and spending assumptions. Data show the impact of each factor changing from low (the 25th percentile of broad population data) to medium (the 50th percentile). VCMM simulations are as of March 2016. Investment cost is the relative impact on the probability of success of a target-date fund with a 50-basis-point higher fee or investment cost. For details, see *Vanguard Life-Cycle Investing Model: A Framework for Building Target-Date Portfolios* (Aliaga-Díaz et al., 2016).

**Source:** Vanguard.

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# III. Appendix

## About the Vanguard Capital Markets Model

*IMPORTANT: The projections and other information generated by the Vanguard Capital Markets Model regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. VCMM results will vary with each use and over time.*

*The VCMM projections are based on a statistical analysis of historical data. Future returns may behave differently from the historical patterns captured in the VCMM. More important, the VCMM may be underestimating extreme negative scenarios unobserved in the historical period on which the model estimation is based.*

*The VCMM is a proprietary financial simulation tool developed and maintained by Vanguard's Investment Strategy Group. The model forecasts distributions of future returns for a wide array of broad asset classes. Those asset classes include U.S. and international equity markets, several maturities of the U.S. Treasury and corporate fixed income markets, international fixed income markets, U.S. money markets, commodities, and certain alternative investment strategies. The theoretical and empirical foundation for the VCMM is that the returns of various asset classes reflect the compensation investors require for bearing different types of systematic risk (beta). At the core of the model are estimates of the dynamic statistical relationship between risk factors and asset returns, obtained from statistical analysis based on available monthly financial and economic data. Using a system of estimated equations, the model then applies a Monte Carlo simulation method to project the estimated interrelationships among risk factors and asset classes as well as uncertainty and randomness over time. The model generates a large set of simulated outcomes for each asset class over several time horizons. Forecasts are obtained by computing measures of central tendency in these simulations. Results produced by the tool will vary with each use and over time.*

*The primary value of the VCMM is in its application to analyzing potential client portfolios. VCMM asset-class forecasts—comprising distributions of expected returns, volatilities, and correlations—are key to the evaluation of potential downside risks, various risk–return trade-offs, and the diversification benefits of various asset classes. Although central tendencies are generated in any return distribution, Vanguard stresses that focusing on the full range of potential outcomes for the assets considered, such as the data presented in this paper, is the most effective way to use VCMM output. We encourage readers interested in more details of the VCMM to read Vanguard's white paper titled Vanguard Global Capital Markets Model (Davis et al., 2014).*

*The VCMM seeks to represent the uncertainty in the forecast by generating a wide range of potential outcomes. It is important to recognize that the VCMM does not impose "normality" on the return distributions, but rather is influenced by the so-called fat tails and skewness in the empirical distribution of modeled asset-class returns. Within the range of outcomes, individual experiences can be quite different, underscoring the varied nature of potential future paths. Indeed, this is a key reason why we approach asset-return outlooks in a distributional framework.*

## Index simulations

The long-term returns of our hypothetical portfolios are based on data for the appropriate market indexes through September 2017. We chose these benchmarks to provide the most complete history possible, and we apportioned the global allocations to align with Vanguard's guidance in constructing diversified portfolios. Asset classes and their representative forecast indexes are as follows:

- U.S. equities: MSCI US Broad Market Index.
- Global ex-U.S. equities: MSCI All Country World ex USA Index.
- U.S. REITs: FTSE/NAREIT US Real Estate Index.
- U.S. cash: U.S. 3-Month Treasury–constant maturity.
- U.S. Treasury bonds: Bloomberg Barclays U.S. Treasury Bond Index.
- U.S. short-term Treasury bonds: Bloomberg Barclays U.S. 1–5 Year Treasury Bond Index.
- U.S. long-term Treasury bonds: Bloomberg Barclays U.S. Long Treasury Bond Index.
- U.S. credit bonds: Bloomberg Barclays U.S. Credit Bond Index.
- U.S. short-term credit bonds: Bloomberg Barclays U.S. 1–3 Year Credit Bond Index.
- U.S. high-yield corporate bonds: Bloomberg Barclays U.S. High Yield Corporate Bond Index.
- U.S. bonds: Bloomberg Barclays U.S. Aggregate Bond Index.
- Global ex-U.S. bonds: Bloomberg Barclays Global Aggregate ex-USD Index.
- U.S. TIPS: Bloomberg Barclays U.S. Treasury Inflation Protected Securities Index.
- U.S. short-term TIPS: Bloomberg Barclays U.S. 1–5 Year Treasury Inflation Protected Securities Index.

*Notes on risk*

*All investing is subject to risk, including the possible loss of the money you invest. Past performance is no guarantee of future returns. Investments in bond funds are subject to interest rate, credit, and inflation risk. Foreign investing involves additional risks, including currency fluctuations and political uncertainty. Diversification does not ensure a profit or protect against a loss in a declining market. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.*

*Stocks of companies in emerging markets are generally more risky than stocks of companies in developed countries. U.S. government backing of Treasury or agency securities applies only to the underlying securities and does not prevent price fluctuations. Investments that concentrate on a relatively narrow market sector face the risk of higher price volatility. Investments in stocks issued by non-U.S. companies are subject to risks including country/regional risk and currency risk.*

*Bond funds are subject to the risk that an issuer will fail to make payments on time, and that bond prices will decline because of rising interest rates or negative perceptions of an issuer's ability to make payments. High-yield bonds generally have medium- and lower-range credit-quality ratings and are therefore subject to a higher level of credit risk than bonds with higher credit-quality ratings. Although the income from U.S. Treasury obligations held in the fund is subject to federal income tax, some or all of that income may be exempt from state and local taxes.*

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