Global growth will remain *frustratingly fragile* in 2016. Global trade and manufacturing activity will likely struggle, and additional “growth scares” should be expected. Nevertheless, Vanguard’s non-consensus view is that the world’s ongoing structural deceleration is converging toward a more balanced growth equilibrium. This *structural convergence* is not yet complete, given the need for debt deleveraging in China and other emerging markets.

At full employment, the U.S. economy is unlikely to accelerate in 2016, yet is on course to experience its longest expansion in nearly a century, underscoring our long-held view of its *resiliency*. We believe that those who see an even weaker future of U.S. secular stagnation are too pessimistic and overlook the benefits of an unlevered expansion.

As we have discussed in Vanguard’s past outlooks, policymakers are likely to continue to face difficulties achieving 2% inflation over the medium term. As of December 2015, however, some of the most pernicious long-term deflationary forces are beginning to moderate cyclically for the first time since 2006.

We anticipate a “*dovish tightening*” cycle by the U.S. Federal Reserve, and we continue to view the global low-rate environment as secular, not cyclical.

Although not bearish, Vanguard’s outlook for global stocks and bonds is the most *guarded* since 2006, given the low-interest-rate and low-earnings-yield environment.
 Editorial note

This publication is an update of Vanguard’s annual Economic and Investment Outlook. We present our economic and market perspectives for 2016 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 Lara de la Iglesia for her significant contributions to this piece and the work of the Global Economics 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—see also the description in the appendix) 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 or 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, 2015. Results from the model may vary with each use and over time. For more information, see the appendix.
Vanguard’s distinct approach to forecasting

To treat the future with the deference it deserves, Vanguard believes that market forecasts are best viewed in a probabilistic framework. This 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: Structural convergence

World economic growth will remain frustratingly fragile. As in past versions of Vanguard’s Economic and Investment Outlooks, we view a world not in secular stagnation but, rather, in the midst of structural deceleration. Vanguard’s non-consensus view is that the global economy will ultimately converge over time toward a more balanced, unlevered, and healthier equilibrium, once the debt-deleveraging cycle in the global private sector is complete.

Most significantly, the high-growth “Goldilocks” era enjoyed by many emerging markets over the past 15 years is over. We anticipate “sustained fragility” for global trade and manufacturing, given China’s ongoing rebalancing and until structural, business-model adjustment occurs across emerging markets. We do not anticipate a Chinese recession in the near term, but China’s investment slowdown represents the greatest downside risk to the global economy.

The growth outlook for developed markets, on the other hand, remains modest, but steady. As a result, the developed economies of the United States and Europe should contribute their highest relative percentage to global growth in nearly two decades. Now at full employment, the U.S. economy is unlikely to accelerate in 2016, yet is on course to experience its longest expansion in nearly a century, underscoring our continuing view of its resiliency. Indeed, our long-held estimate of 2% U.S. trend growth is neither “new” nor “subpar” when one both accounts for structurally lower population growth and removes the consumer-debt-fueled boost to growth between 1980 and the global financial crisis that began in 2007. Our interpretation fully explains the persistent drop in U.S. unemployment despite below-average economic growth.

Inflation: Secular deflationary bias waning

As we have discussed in past outlooks, policymakers are likely to continue struggling to achieve 2% core inflation over the medium term. As of December 2015, however, some of the most pernicious deflationary forces (commodity prices, labor “slack”) are beginning to moderate cyclically. Inflation trends in the developed markets should firm, and even begin to turn, in 2016. That said, achieving more than 2% core inflation across developed markets could take several years and will ultimately require a more vibrant global rebound.

Monetary policy and interest rates:

A ‘dovish tightening’ by a lonely Fed

Convergence in global growth dynamics will continue to necessitate and generate divergence in policy responses.

The U.S. Federal Reserve is likely to pursue a “dovish tightening” cycle that removes some of the unprecedented accommodation exercised due to the “exigent circumstances” of the global financial crisis. In our view, there is a high likelihood of an extended pause in interest rates at, say, 1%, that opens the door for balance-sheet normalization and leaves the inflation-adjusted federal funds rate negative through 2017.

Elsewhere, further monetary stimulus is highly likely. The European Central Bank (ECB) and Bank of Japan (BoJ) are both likely to pursue additional quantitative easing and, as we noted in our 2015 outlook, are unlikely to raise rates this decade. This view is another potential factor that could result in a pause for the federal funds rate this business cycle.
Chinese policymakers have arguably the most difficult task of engineering a “soft landing” by lowering real borrowing costs and the real exchange rate without accelerating capital outflows. The margin of error is fairly slim, and policymakers should aggressively stimulate the economy this year in an attempt to stabilize below-target growth.

Investment outlook: Still conservative
Vanguard’s outlook for global stocks and bonds remains the most guarded since 2006, given fairly high equity valuations and the low-interest-rate environment. We continue to view the global low-rate environment as secular, not cyclical.

Bonds. The return outlook for fixed income remains positive, yet muted. In line with our past outlooks, our long-term estimate of the equilibrium federal funds rate remains anchored near 2.5% and below that of the Fed’s “dot plots.” As a result, our “fair value” estimate for the benchmark 10-year U.S. Treasury yield still resides at about 2.5%, even with a Fed liftoff. As we stated in our 2015 outlook, even in a rising-rate environment, duration tilts are not without risks, given global inflation dynamics and our expectations for monetary policy.

Stocks. After several years of suggesting that low economic growth need not equate with poor equity returns, our medium-run outlook for global equities remains guarded, in the 6%–8% range. That said, our long-term outlook is not bearish and can even be viewed as constructive when adjusted for the low-rate environment. Our long-standing concern over “froth” in certain past high-performing segments of the capital markets has been marginally tempered by the general relative underperformance of those market segments in 2015.

Asset allocation. Going forward, the global crosscurrents of not-cheap valuations, structural deceleration, and the exiting from or insufficiency of near-0% short-term rates imply that the investment environment is likely to be more challenging and volatile. Even so, Vanguard firmly believes that the principles of portfolio construction remain unchanged, given the expected risk–return trade-off among asset classes. Investors with an appropriate level of discipline, diversification, and patience are likely to be rewarded over the next decade with fair inflation-adjusted returns.

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 2015. 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 Barclays U.S. Aggregate Bond Index thereafter.


Global bonds: Before 1985, 100% U.S. bonds, as defined above. After 1985, 80% U.S. bonds and 20% 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.


1 “Dot plots” refers to charts published by the Federal Open Market Committee (FOMC), in the Fed’s Summary of Economic Projections, showing points where FOMC participants, who are kept anonymous, believe the federal funds rate should be over the next few years, in the absence of economic shocks.
I. Global economic perspectives

Global economic outlook: Sustained fragility, structural convergence

Global growth will remain frustratingly fragile in 2016. As in past versions of Vanguard’s Economic and Investment Outlooks, we view a world economy in the midst of structural deceleration (see Figure I-1). Indeed, Vanguard’s non-consensus view is that the global economy will ultimately converge over time toward a more balanced, unlevered, and healthier equilibrium, once the debt-deleveraging cycle in the global private sector is complete (this will not occur in 2016). We believe that those who see an even weaker future of secular stagnation are too pessimistic with respect to future productivity growth (which is cyclically depressed) and are overlooking the benefits of an unlevered expansion.

Based on unfavorable demographics worldwide and a lower or negative contribution from private-sector debt and credit expansion, the gap in gross domestic product (GDP) growth between emerging markets and developed economies should converge, a structural theme that is a reversal of the past 15 years (see Figure I-2). Adverse demographic projections have been anticipated for years, and are a drag on long-term growth affecting both developed and emerging market economies.²

Figure I-1. Most of the world is in structural deceleration

A scorecard for growth convergence

<table>
<thead>
<tr>
<th>Percentage of world GDP</th>
<th>United States</th>
<th>Euro area</th>
<th>China</th>
<th>Japan</th>
<th>United Kingdom</th>
<th>Canada</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22.4%</td>
<td>17.1%</td>
<td>13.3%</td>
<td>6.2%</td>
<td>3.7%</td>
<td>2.3%</td>
<td>1.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated trend growth rates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-recession average (1990–2007)</td>
</tr>
<tr>
<td>Projected future (2016–2020)</td>
</tr>
</tbody>
</table>

Growth headwinds

- Slowing growth of labor force
  - Slower population growth and aging of population

- Private-sector debt deleveraging
  - Debt-deleveraging cycle, constraining willingness to spend

- Sluggish capital investment
  - Falling cost of technology and demographic effects on businesses’ growth plans

- Fiscal sustainability and committed fiscal austerity
  - Unsustainable debt dynamics may result in suboptimal policies and uncertainty

- Commodity exports dependency
  - Weak commodity price outlook

- Currency strength
  - Tighter financial conditions, weaker manufacturing and exports

- Rising income inequality
  - Falling purchasing power of consumers with highest propensity to spend

Notes: Slowing growth of labor force: Birth rates minus mortality rates (slope of the trend line, 1960–present); Private-sector debt deleveraging: Percentage increase in household debt (% of GDP) from 2008 to December 2015; Sluggish capital investment: Difference between average fixed capital formation as percentage of GDP, 2000–2007 and 2008–latest; Fiscal sustainability and committed fiscal austerity: Fiscal space estimates based on Moody’s Economy.com model, as of February 2015 and difference in structural government budget balance over next two years (2016–2017); Commodity exports dependency: Qualitative assessment of commodity export dependence; Currency strength: Level of real effective exchange rate as of September 2015 (>100, overvalued; <100, undervalued); Rising income inequality: Average percentage point change in the income share of top 1% of income (1980–2010). Also, for China, we factor local government debt into our debt deleveraging rating.


² Much less certain are long-term projections for future productivity growth, particularly regarding the pace of technological innovation in countries closer to the technological frontier. For developed economies, a reasonable expectation for productivity growth is that they will get back to the modest levels of the 2000s (before the global financial crisis of 2007), somewhat lower than in previous decades.
The ongoing and, in our view, persistent slowdown in emerging markets is a critical feature of structural convergence (Figure I-3). Most significantly, the high-growth “Goldilocks” era enjoyed by many emerging markets over the past 15 years is over. Indeed, we anticipate “sustained fragility” for the global export and manufacturing sectors, which at present are in or close to recession. Such weakness should linger for a time, given China’s ongoing rebalancing and until structural, business-model adjustment occurs across emerging markets. We do not anticipate a Chinese recession in the near term, but China’s investment slowdown represents the greatest downside risk.

Our base case holds that the six-year-old global recovery continues in 2016 at a modest pace, marked by occasional “growth scares” in an environment of lower trend growth. The growth outlook for developed markets, on the other hand, remains modest, but steady. As a result, the developed economies of the United States and Europe should contribute their highest relative percentage to global growth in nearly two decades.

Figure I-2. Structural deceleration = growth convergence

a. Demographic headwinds

b. Narrowing growth gap

Notes: Population growth and potential GDP data and projections based on IMF estimates of output gap and real GDP growth by country. Developed and emerging market group totals estimated as GDP-weighted average of individual countries. Groupings follow IMF designation.

Sources: Vanguard, based on data from International Monetary Fund—World Economic Outlook, October 2015.

Figure I-3. Emerging market adjustment continues

a. Growth has consistently disappointed

b. Pace of debt accumulation raises concerns

Sources: Vanguard calculations, based on data from IMF, Organisation for Economic Co-operation and Development, and J.P. Morgan.
2016 global growth outlook: Just decent

Economic growth in the United States is expected to converge toward its long-term trend of about 2% per year, as the modest cyclical thrust of the last year fades. As Figure I-4a shows, our proprietary U.S. leading indicators dashboard points toward a slight deceleration from 2014 and 2015. The most positive (green) indicators are those associated with housing, consumer and business confidence, the service sector, and the labor market. The “red signals,” associated with manufacturing and trade, reflect, in part, a drag associated with a stronger dollar.

Using regression analysis, we mapped our proprietary indicators to a distribution of potential scenarios for U.S. economic growth in 2016, as shown in Figure I-4b. The odds of growth at or exceeding 2.5% in 2016 (28%) are lower than they had been for 2015, and are now more balanced with the potential for growth to stagnate and fall below 1% (33%). Our base case indicates convergence to the long-term trend (39%) in 2016, with growth in real GDP averaging about 2% for the year.

Notably, our forecast growth distribution for the United States in 2016 is slightly weaker than that of either the Federal Reserve or a consensus survey of economists.3

As was the case in 2015, our euro-area dashboard of leading indicators (Figure I-4c) anticipates a moderate growth acceleration in 2016. The significant decline in “red indicators” throughout 2015, as shown in the figure, is indicative of abating cyclical risks (yellow) and slight upward pressure on trend growth (green). This translates to more balanced risks around trend, with a reduction in downside risks relative to 2015 (Figure I-4d).

Our 2016 outlook for China points to a continued slowdown, notably slower than the pre-global financial crisis level of 10%. Vanguard’s proprietary economic indicators dashboard for China, shown in Figure I-4e, suggests that still-remaining areas of concern for 2016 are manufacturing, financial conditions, and housing. Figure I-4f estimates a high (71%) probability that the country’s real GDP growth will fall below 7% (these are much higher odds than our 2015 projection of 37%), with low but nontrivial odds of a “hard landing” estimated at 14% (real GDP growth of 5% or less is forecast in 2016).

Figure I-4. Vanguard global dashboard of leading economic indicators and implied economic growth for 2016

Notes: Distribution of growth outcomes generated by bootstrapping the residuals from a regression based on a proprietary set of leading economic indicators and historical data, estimated from 1960 to 2015 and adjusting for the time-varying trend growth rate.

Sources: Vanguard calculations, based on data from Moody’s Analytics Data Buffet, U.S. Bureau of Economic Analysis, and Federal Reserve.

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3 The Federal Reserve Bank of Philadelphia, Survey of Professional Forecasters, estimated real GDP averaging 2.6% for 2016 (as of November 13, 2015). The Federal Reserve, Summary of Economic Projections, median projection of real GDP was 2.3% for 2016 (as of September 17, 2015).
Figure I-4 (continued): Vanguard global dashboard of leading economic indicators and implied economic growth for 2016

**Euro area: Slightly above consensus**

c. Euro area: Economic indicators

d. Estimated distribution of euro area’s growth outcomes, 2016

![Euro Area Economic Indicators Chart](image)

**Notes:** Distribution of growth outcomes generated by bootstrapping the residuals from a regression based on a proprietary set of leading economic indicators and historical data, estimated from 1990 to 2015 and adjusting for time-varying trend growth rate.

**Sources:** Vanguard calculations, based on data from Eurostat, Destatis (Federal Statistical Office of Germany), French National Institute of Statistics and Economic Studies (INSEE), Italian National Institute of Statistics (ISTAT), Instituto Nacional de Estadística (INE, Spanish Statistical Office), Statistics Netherlands (CBS), and Thomson Reuters Datastream.

**China: Slightly below consensus**

e. China: Economic indicators

f. Estimated distribution of China’s growth outcomes, 2016

![China Economic Indicators Chart](image)

**Notes:** Distribution of growth outcomes generated by bootstrapping the residuals from a regression based on a proprietary set of leading economic indicators and historical data, estimated from 1990 to September 2015 and adjusting for the time-varying trend growth rate. “Target growth” is the 2016 growth target set by Chinese officials.

**Sources:** Vanguard calculations, based on data from Moody’s Analytics Data Buffet, Thomson Reuters Datastream, and CEIC.
At full employment, the U.S. economy is unlikely to accelerate in 2016, yet is on course to experience its longest expansion in nearly a century, underscoring our continuing view of its resiliency. Indeed, our long-held estimate of 2% U.S. trend growth is neither “new” nor “subpar” when one both accounts for structurally lower population growth and removes the consumer debt-fueled boost to growth between 1980 and the global financial crisis that began in 2007.

Our interpretation (unlike those who subscribe to secular stagnation) fully explains the persistent drop in U.S. unemployment despite below-average economic growth.

China: Sharp slowdown, but no recession

Despite recent signs of stabilization, the long-running downshift in China’s economic growth is likely to persist in coming years. As we discussed in past outlooks, the overcapacity and oversupply in China’s real estate and manufacturing sectors that built up over the past decade will continue to weigh on domestic investment for the foreseeable future (Figure I-5). We estimate that as much as 75% of the slowdown in China headline GDP growth since 2008 can be explained by the housing downturn, and that a further 10% decline in the growth rate of housing investment (our baseline expectation) could shed as much as an additional 2% from China’s official 7% growth pace.

This, combined with other structural headwinds, suggests that China’s growth could fall quickly toward 5%, absent meaningful progress on structural reforms.

During this transitional period of rebalancing its economy, China’s investment slowdown represents the greatest downside risk to the global economy. As Figure I-6 illustrates, our simulations reveal that a deep Chinese recession would be sufficient to drag down other economies. Nevertheless, we do not anticipate an outright Chinese recession (i.e., negative GDP growth) in the near term, since such an event would require a 2006 U.S.-style housing crash, an outcome we assign a probability of only about 10%.

Our somewhat sanguine assessment, however, is contingent upon more aggressive reforms and targeted stimulus by Chinese policymakers. A primary challenge for Chinese authorities is to strike a subtle balance between maintaining a relatively steady pace of growth and rebalancing the growth drivers away from investment and exports, while keeping financial risks under control. The key to rebalancing is to ensure that investment spending flows toward the most efficient uses of capital, avoiding misallocation and overinvestment in certain sectors. Normal swings in market-driven investment and credit flows coupled with the current high weight of investment spending in GDP growth could trigger

Figure I-5. Investment growth unsustainable, but capital per employee remains low

Notes: Investment as percentage of GDP is from IMF WEO, April 2015. “Today” is defined as the average for 2014. “Asian Tigers” comprise South Korea, Hong Kong, Taiwan, and Singapore when each was at China’s 2014 nominal per capita GDP level ($7,500 in 2014 U.S. dollars). “Capital per employee” data are from Penn World Tables (version 8.1) in 2005 U.S. dollars, with “today” defined as the average for 2011.

Sources: Vanguard calculations, based on data from IMF and Penn World Tables.

4 For details, see Vanguard’s Global Macro Matters—China’s Key Risk: It’s Housing, Not Stocks (2015a).
Figure I-6. The global ‘tail risk’ would be an outright Chinese economic recession

![GDP growth impact graph](image)

Sources: Vanguard calculations, based on data from CEIC, Thomson Reuters Datastream, and Bloomberg.

a sharp economic slowdown. Hence, macro policies hold the key to China’s growth stability. The margin of error is fairly slim.

Although a large-scale stimulus plan appears unlikely, we expect the Chinese authorities to provide further monetary and fiscal support in 2016, in a bid to cushion against the downside risks and stabilize growth. In particular, we would anticipate further monetary easing by the People’s Bank of China in 2016 that would lower the required reserve ratio (RRR), currently at 17%, closer to the pre-crisis levels of 6%. Chinese monetary policymakers have arguably the most difficult task of engineering a soft landing by lowering real borrowing costs and the real exchange rate without accelerating capital outflows.

Japan: Monetary policy can’t act alone

In Japan, the outlook is similarly not encouraging, despite aggressive monetary easing. Although the economy should be able to sustain higher levels of inflation at around 1%, given the tightening labor market and stabilization in energy prices, real GDP growth should remain modest, as domestic investment and consumption have yet to gather momentum. This outlook is consistent with our view that monetary policy alone could be insufficient to achieve sustainable growth and inflation (see Figure I-7).

Despite falling energy prices, core inflation in Japan is rising on the trend of the closing output gap and weaker currency. However, the pace remains weak. Despite the tightening labor market, the strength of wage growth has
been constrained by structural headwinds in the labor market. The rigidity in Japan’s labor market, especially the “job for life” model, has encouraged a secular expansion of part-time workers since the mid-1990s who suffer from lower incomes, less job security, and less welfare compared with full-time employees. This shift in the workforce composition is weighing down wage growth. As such, inflation pressures may not be strong enough to reach and sustain the Bank of Japan’s 2% core consumer price inflation target by the end of the 2016 fiscal year (March 2017).

The Japanese economy is struggling for stronger growth against structural headwinds, including a declining and aging population, weakening productivity, low return on capital, and high debt levels. There are positive signs, but a more solid pickup in private-sector activity is crucial for a sustained growth recovery. In the near term, policymakers will try to support the recovery with highly accommodative monetary policy, while fiscal policy will be constrained as a result of very high levels of public debt. Unless the reform outlook improves, we don’t expect to see a significant improvement in the growth outlook over the medium term.

**Euro area: Some bright spots emerging**

Despite renewed threats of the euro area’s breakup in connection with Greece’s debt crisis in 2015, the European economy grew modestly stronger than some expected. Looking ahead, we anticipate similarly modest growth in 2016. Overall expansion could potentially average a trend-like 1.5% before accelerating slightly for the two years following, in part because of further quantitative-easing (QE) stimulus.

The European Central Bank’s QE program continues to markedly ease financial conditions via lower bank lending rates for households and companies, especially in the periphery. This measure is slowly beginning to stimulate credit growth. One significant channel of QE transmission has been the exchange rate, which depreciated in both U.S. dollar and effective terms by about 10% from September 2014 through March 2015 (Figure I-8). According to model-based elasticity estimates, this could boost euro-area GDP by around 0.5%, a stimulus likely reinforced by the sharp falls in oil and commodity prices.

**Figure I-8. Europe is growing, and QE has helped**

a. The weakening euro has been an important transmission channel of QE in the euro area

b. Euro-area inflation will take some time to reach its target

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**Notes:** Forecast lines are constructed using ECB and Bundesbank forecast data at annual intervals over the next two years. All forecasts are smoothed over a six-month period. HICP = harmonised index of consumer prices.

**Sources:** Vanguard calculations, based on data from Bank of England, ECB (European Central Bank), Eurostat, German Federal Statistical Office (Statistisches Bundesamt), Bloomberg, Bundesbank, Bank for International Settlements, Macrobond, and Moody’s Analytics.

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5 For details, see Vanguard Global Macro Matters—Japan: The Long Road Back to Inflation (2015b).
Granted, considerable challenges remain in terms of fiscal, banking, and structural policy, and in political structures, to make the euro area a well-functioning monetary union. But in 2016, attention should continue to focus on conventional macroeconomic issues related to inflation and growth, and particularly on the effectiveness of the ECB’s quantitative-easing program.

Fiscal policy in the euro area has also tended to provide a net stimulus to growth in 2015 because the fiscal tightening is slowing down. Given the uncertainty surrounding the effects of QE and the still-weak growth outlook, additional fiscal stimulus is probably warranted. Politically, however, this is unlikely to happen, because of the resistance to fiscal stimulus by Germany, the largest creditor country.

Given the very low level of inflation in the euro area, we still anticipate further QE stimulus, but we do not expect the ECB to raise rates for several years, perhaps waiting as late as 2020.

**United States: At full employment, trend-like growth**

At full employment, the U.S. economy is unlikely to accelerate this year, yet is on course to experience its longest expansion in nearly a century, underscoring our long-held view of its *resiliency*. As in past outlooks, we maintain that U.S. long-term (potential) GDP growth is near 2%, versus its historical average of 3.25% since 1950. This lowered projection is based on demographic headwinds and, to a lesser extent, on a more subdued expectation for labor productivity growth.

However, we see our 2% U.S. trend growth estimation as neither “new” nor “subpar” relative to pre-crisis levels, if one both accounts for structurally lower population growth *and* removes the consumer debt-fueled boost to growth between 1980 and the global financial crisis that began in 2007. Specifically, U.S. real GDP growth between 1980 and 2006 would have averaged nearly 2% (as opposed to the 3% measured in the data) had consumer debt (and hence the share of the economy dictated by consumer spending) not risen to drastic levels over time. We believe this calculus is underappreciated by many, and provides another justification for the Federal Reserve to initiate a gradual normalization in monetary policy.

Vanguard’s outlook for leading U.S. economic indicators suggests that the cyclical thrust enjoyed over the last two years seems to have peaked in 2015 and may start to fade in 2016. We expect this also to be the case for employment growth (see **Figure I-9**). The average pace of U.S. job growth has been more than 200,000 net new jobs per month for 2014–15, while the labor force has grown by only about 70,000 new entrants per month during the same period.

**Figure I-9. From cyclical thrust back to trend growth**

a. Convergence in real GDP growth

b. Convergence in employment growth


**Sources:** Vanguard calculations, based on data from Congressional Budget Office, U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics, and Moody’s Analytics Data Buffet.
With the U.S. headline unemployment rate likely to soon fall below 5%, a moderation in job growth toward 150,000 jobs or fewer can be expected for 2016. And since the labor-force participation rate is unlikely to rise materially, given our analysis of the labor market, U.S. unemployment is likely to stay in the 4.5%–5% range through 2016. Despite areas of underemployment, the continued tightening of the broad U.S. labor market is clearly evident in Figure I-10, a factor we have cited in the past as a key requirement for the Federal Reserve to initiate interest rate liftoff.

The resiliency of both the U.S. consumer and domestic demand through 2015 stands in contrast to the weakness of U.S. domestic manufacturing and export-related sectors (Figure I-11). The significant strengthening of the U.S. dollar since mid-2014 (a 12% real appreciation) has imposed a heavy toll on goods-producing sectors of the economy. However, similar to what has been the case in 2015, we don’t expect the slowdown in manufacturing to spill over to the broader economy in 2016. One reason to be less pessimistic about a strong U.S. dollar is that domestic production of goods accounts for just 12% of total U.S. final production and only 16% of all jobs in the country.

Moreover, a stronger U.S. dollar means lower import prices for U.S. consumers. Not only are imported goods and services cheaper in dollar terms (e.g., imported cars or trips overseas), but also, similar to the effect of lower gas prices, households can afford to spend more on other domestically provided services such as entertainment, hospitality, health care, or education (see service components in Figure I-11b). More generally, nontradable sectors of the economy, such as construction, are also expected to receive support from a strong U.S. dollar.

Figure I-10. U.S. labor market has tightened by nearly any measure

<table>
<thead>
<tr>
<th>Percentage-point deviation from average for 1994–2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>U6 unemployment</td>
</tr>
<tr>
<td>Part-time for economic reasons</td>
</tr>
<tr>
<td>Long-term unemployed</td>
</tr>
<tr>
<td>Marginally attached workers</td>
</tr>
<tr>
<td>Discouraged workers</td>
</tr>
<tr>
<td>Headline unemployment</td>
</tr>
<tr>
<td>Short-term unemployed</td>
</tr>
<tr>
<td>Current</td>
</tr>
<tr>
<td>Before the 2004 rate hike</td>
</tr>
<tr>
<td>Before the 1994 rate hike</td>
</tr>
</tbody>
</table>

Notes: Data are for the period January 1994 to December 2006, and show the percentage-point difference between a given value and the average.

Sources: Vanguard calculations, based on data from U.S. Bureau of Labor Statistics and Moody’s Analytics.

6 For details, see Vanguard Global Macro Matters—U.S. Labor Market: Tight (Enough) for Liftoff (2015d).
7 For details, see Vanguard Global Macro Matters—Rate Liftoff: It’s Not ‘Easy’ Being the Fed (2014).
Figure I-11. Effects of stronger U.S. dollar are not one-sided

a. Impact on employment growth

b. Impact on real GDP growth and components

Notes: Estimated impacts based on regressions of macro variables (components of employment growth and real GDP growth) on Real Broad Dollar Index. Estimated effects arise from applying cumulative real appreciation since third-quarter 2014 (12%) to corresponding regression coefficients. Results are weighted by components as follows: service-providing employment (84%), goods-producing employment (16%), consumer services (46% of GDP), durable goods (7%), nondurable goods (15%), imports (15%), and exports (13%). U.S. government sector not included in this analysis.

Sources: Vanguard calculations, based on data from Moody’s Analytics Data Buffet.

Inflation in the United States has remained persistently below the Fed’s 2% target, even as unemployment gaps have closed at a fairly fast pace over the last three years. Similarly, wage growth has remained subdued, even as more anecdotal reports of labor market shortages in certain sectors confirm the top-down data on job openings outpacing job hires. As the labor market continues to tighten, we expect wage growth to gradually pick up above 2% through 2016 and beyond, and eventually for broader price inflation to return closer to the Fed’s official 2% target (see Figure I-12). Long-term inflation expectations are anchored around that inflation target.

Figure I-12. U.S. inflation outlook is near 2%

Notes: Forecast corresponds to distribution of 10,000 VCMM simulations for five and ten-year annualized inflation projections as of September 2015. Orange dots on box-plot represent latest values (October 2015) of Federal Reserve’s five-year and ten-year breakeven inflation indexes. Green dots represent latest Q4 2015 median values of five-year and ten-year annualized CPI inflation forecasts in Federal Reserve Bank of Philadelphia’s Survey of Professional Forecasters.

Monetary policy and interest rates:
A ‘dovish tightening’ by a lonely Fed

Convergence in global growth dynamics will continue to necessitate and generate divergence in policy responses. The U.S. Federal Reserve is likely to pursue a “dovish tightening” cycle that removes some of the unprecedented accommodation exercised due to the “exigent circumstances” of the global financial crisis. In our view, there is a high likelihood of an extended pause in interest rates at, say, 1% that opens the door for balance-sheet normalization and leaves the inflation-adjusted federal funds rate negative through 2017 (see Figure I-13). In line with our past outlooks, our long-term estimate of the equilibrium federal funds rate remains anchored near 2.5% and below that of the Fed’s “long-term dot.” Based on this, we expect the median estimate for the neutral interest rate communicated by the Fed to continue being revised downward toward this level.

Emerging markets: Structural slowdown, although systemic crisis unlikely in 2016

Emerging market economies have become a large and growing share of the global economy, rising from 28% in 2007 to 39% in 2014 as emerging markets’ real GDP growth has persistently outpaced that of developed markets for the past two decades. However, the growth differential will probably narrow as the fundamentals of emerging markets are likely to remain daunting, given lingering concerns about a potential Fed liftoff, a frustratingly fragile global economy, a further slowdown in China, and low commodity prices. Meanwhile, a forced unwinding of excess leverage in a rising-rate environment, as well as the long and painful adjustments needed to recalibrate to a new business model, will continue to weigh on emerging economies in the foreseeable future. Given improved fundamentals and healthier sovereign balance sheets now versus the 1990s (see Figure I-14), we do not believe a 1990s-style emerging market crisis is likely. However, in a world in which emerging economies are increasingly differentiated, the idiosyncratic risks remain high.

Figure I-13. Deconstructing Vanguard’s view of a ‘dovish tightening’ in interest rates

Notes: Purple dots represent median expectation at stated year-end from Federal Reserve Board’s September 2015 Summary of Economic Projections. Green line represents Vanguard’s estimate of appropriate Fed policy adjusted for probability of recession in any one year beginning in 2018. Blue dashed lines represent binary outcomes of recession (line approaching and remaining at zero) or no recession (line approaching and remaining at 3%). FFR = federal funds rate.

Sources: Vanguard calculations, based on data from Federal Reserve Board.

8 The Fed’s “long-term dot” refers to the last set of dots estimated by the FOMC participants on where they think the federal funds rate should be in the “longer run” (beyond 2018), as presented in the Fed’s Summary of Economic Projections. Currently the dots range from 3% to 4%. See notes in Figure I-13 for more information on the “dot plots.”

9 For more details, see Vanguard Global Macro Matters—Remember the ’90s? Emerging Markets Then and Now (2015c).
Figure I-14. Emerging markets’ financial systems are much different today

<table>
<thead>
<tr>
<th>Crisis years</th>
<th>External debt stocks (percentage of GDP)</th>
<th>Total reserves (percentage of total external debt)</th>
<th>External debt service (percentage of exports)</th>
<th>Total reserves/current account deficit</th>
<th>Currency peg in place (Yes or No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil 2002</td>
<td>48</td>
<td>16</td>
<td>71</td>
<td>5</td>
<td>No</td>
</tr>
<tr>
<td>Hungary 1997</td>
<td>52</td>
<td>36</td>
<td>33</td>
<td>Less than 1</td>
<td>Yes</td>
</tr>
<tr>
<td>Malaysia 1997</td>
<td>36</td>
<td>44</td>
<td>7</td>
<td>4</td>
<td>Yes</td>
</tr>
<tr>
<td>Mexico 1994</td>
<td>34</td>
<td>5</td>
<td>27</td>
<td>Less than 1</td>
<td>Yes</td>
</tr>
<tr>
<td>South Africa 1997</td>
<td>20</td>
<td>16</td>
<td>17</td>
<td>2</td>
<td>No</td>
</tr>
<tr>
<td>Turkey 1997</td>
<td>32</td>
<td>22</td>
<td>22</td>
<td>7</td>
<td>No</td>
</tr>
<tr>
<td>Argentina 2001</td>
<td>57</td>
<td>10</td>
<td>49</td>
<td>4</td>
<td>Yes</td>
</tr>
<tr>
<td>Indonesia 1997</td>
<td>52</td>
<td>12</td>
<td>30</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>Russia 1998</td>
<td>65</td>
<td>6</td>
<td>29</td>
<td>56</td>
<td>Yes</td>
</tr>
<tr>
<td>South Korea 1997</td>
<td>32</td>
<td>13</td>
<td>–</td>
<td>8</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Today</th>
<th>External debt stocks (percentage of GDP)</th>
<th>Total reserves (percentage of total external debt)</th>
<th>External debt service (percentage of exports)</th>
<th>Total reserves/current account deficit</th>
<th>Currency peg in place (Yes or No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>21</td>
<td>74</td>
<td>29</td>
<td>4</td>
<td>No</td>
</tr>
<tr>
<td>Hungary</td>
<td>147</td>
<td>24</td>
<td>97</td>
<td>8</td>
<td>No</td>
</tr>
<tr>
<td>Malaysia</td>
<td>68</td>
<td>63</td>
<td>4</td>
<td>4</td>
<td>No</td>
</tr>
<tr>
<td>Mexico</td>
<td>35</td>
<td>40</td>
<td>10</td>
<td>7</td>
<td>No</td>
</tr>
<tr>
<td>South Africa</td>
<td>38</td>
<td>32</td>
<td>8</td>
<td>2</td>
<td>No</td>
</tr>
<tr>
<td>Turkey</td>
<td>47</td>
<td>29</td>
<td>29</td>
<td>2</td>
<td>No</td>
</tr>
<tr>
<td>Argentina</td>
<td>22</td>
<td>21</td>
<td>14</td>
<td>6</td>
<td>No</td>
</tr>
<tr>
<td>Indonesia</td>
<td>30</td>
<td>37</td>
<td>19</td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td>Russia</td>
<td>35</td>
<td>70</td>
<td>32</td>
<td>15</td>
<td>No</td>
</tr>
<tr>
<td>South Korea</td>
<td>32</td>
<td>83</td>
<td>–</td>
<td>53</td>
<td>No</td>
</tr>
</tbody>
</table>

Notes: Data for external debt service as percentage of exports for Hungary and Russia begin in 2005. Data for total reserves as percentage of exports for Hungary begin in 2000.

II. Global capital markets outlook

Vanguard’s outlook for global stocks and bonds remains the most guarded since 2006, given the low-interest-rate and low-earnings-yield environment. We continue to view the global low-rate environment as secular, not cyclical.

Global fixed income markets

As in our past outlooks, the return forecast for fixed income is positive, but muted. As displayed in Figure II-1, the expected ten-year median return of the global fixed income market is centered in the 2.0%–2.5% range. This result is near current benchmark yields and thus most closely resembles the historical bond returns of the 1950s and 1960s, lower than our return expectations just five years ago. However, we encourage investors to evaluate the role of fixed income from a perspective of balance and diversification rather than outright return. High-grade or investment-grade bonds act as ballast in a portfolio, buffering losses from riskier assets such as equities. Several segments of the U.S. bond market, such as credits and U.S. Treasuries, have ten-year median expected returns centered in the 2%–4% range (Figure II-2). In addition, Figure II-3 provides an overview of current levels of fixed income risk factors relative to their historical median.

Figure II-1. Projected global fixed income ten-year return outlook

VCMM-simulated distribution of expected average annualized nominal return of total fixed income market as of September 2015 and June 2010

<table>
<thead>
<tr>
<th>Probability</th>
<th>Ten-year annualized return</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>Less than 1%</td>
</tr>
<tr>
<td>5%</td>
<td>1% to 1.5%</td>
</tr>
<tr>
<td>10%</td>
<td>1.5% to 2%</td>
</tr>
<tr>
<td>15%</td>
<td>2% to 2.5%</td>
</tr>
<tr>
<td>20%</td>
<td>2.5% to 3%</td>
</tr>
<tr>
<td>25%</td>
<td>3% to 3.5%</td>
</tr>
<tr>
<td>30%</td>
<td>3.5% to 4%</td>
</tr>
<tr>
<td>0%</td>
<td>4% to 4.5%</td>
</tr>
<tr>
<td>5%</td>
<td>More than 4.5%</td>
</tr>
</tbody>
</table>

Global bond returns

<table>
<thead>
<tr>
<th>Period</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>1926–2015</td>
<td>5.4%</td>
</tr>
<tr>
<td>1926–1969</td>
<td>3.1%</td>
</tr>
<tr>
<td>1970–2015</td>
<td>7.7%</td>
</tr>
<tr>
<td>2000–2015</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

Notes: Figure displays projected range of potential returns for portfolios of 70% U.S. bonds/30% ex-U.S. bonds, rebalanced quarterly, from 10,000 VCMM simulations as of September 2015. (See “Indexes used in our historical calculations,” on page 5, for details of benchmarks used for historical returns; see appendix section titled “Index benchmarks,” for further details on asset classes shown here.)

Source: Vanguard.
Figure II-2. Bond market ten-year-return outlook: Setting reasonable expectations

**Notes:** Forecast corresponds to distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of September 2015 in USD for asset classes highlighted here. See appendix section titled “Index benchmarks,” for further details on asset classes.

**Source:** Vanguard.

Figure II-3. Historical dashboard: U.S. fixed income risk factors

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Current value (as of September 2015)</th>
<th>Historical median</th>
<th>Historical percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakeven inflation</td>
<td>1.6%</td>
<td>2.6%</td>
<td>99</td>
</tr>
<tr>
<td>Yield slope (10-year to 3-month)</td>
<td>2.1%</td>
<td>2.1%</td>
<td>50</td>
</tr>
<tr>
<td>U.S. aggregate bond spread</td>
<td>0.6%</td>
<td>0.5%</td>
<td>56</td>
</tr>
<tr>
<td>U.S. credit spread</td>
<td>1.6%</td>
<td>1.1%</td>
<td>78</td>
</tr>
<tr>
<td>U.S. high-yield corporate spread</td>
<td>6.7%</td>
<td>5.3%</td>
<td>73</td>
</tr>
<tr>
<td>Emerging market bonds spread</td>
<td>4.2%</td>
<td>3.2%</td>
<td>86</td>
</tr>
</tbody>
</table>

**Notes:** Historical data for risk factors start in 1990, except for data for BEI (breakeven inflation), which start in 1999, and data for emerging market bonds, which start in 2003. Current values for risk factors as of September 2015. Yield slope is 10-year U.S. Treasury yield minus the 3-month Treasury yield. U.S. aggregate bond spread is the spread between yield to worst of Barclays U.S. Aggregate Bond Index and the 7-year Treasury yield. U.S. credit spread is the spread between yield to worst of Barclays U.S. Credit Bond Index and the 7-year Treasury yield. U.S. high-yield corporate spread is the spread between yield to worst of Barclays U.S. High Yield Corporate Bond Index and the 5-year Treasury yield. Emerging market bond spread is the option-adjusted spread provided by Barclays.

**Sources:** Vanguard calculations, based on data from Thomson Reuters Datastream, Federal Reserve Board, Bloomberg, and Barclays Live.
U.S. interest rates

Compared with Vanguard’s 2015 outlook, our estimates of the fair-value range for the 10-year U.S. Treasury bond remain unchanged, with the current macroeconomic environment justifying a 10-year yield in the range of 2.5%–3.0%. Based on our estimates of the fundamental drivers of Treasury bond yields, the main factor behind this lowered expectation for longer-term rates is the structural deceleration scenario discussed throughout this paper. As the markets price in the lower trend growth and inflation, the terminal level for the federal funds rate gets revised downward, and with it all other rates across the maturity spectrum. This is because fair-value estimates of long-term Treasury bond yields are determined by the expected average short-term rate over the maturity of the bond (plus a term premium).

The lower-than-long-term historical average forward-looking view for 10-year Treasuries repeats for interest rates, as illustrated in Figure II-4. Based on Vanguard Capital Markets Model (VCMM) projections, the 10-year Treasury yield should rise slowly over the next few years, with the central tendency at the end of five years at about 3%, well below both the long-term average (since 1871) of 4.6% and the recent average (1970 onward) of 6.7%. This central tendency appears comparable to the pre-1970s average of about 3.7% (see orange line in Figure II-4).

Cash and U.S. Treasury bonds

The bond market continues to expect U.S. Treasury yields to rise, particularly at the short end of the yield–maturity curve and around its medium-term range, as the Fed liftoff appears imminent. The long end of the yield curve is typically anchored to long-term inflation expectations, and hence the long-term rates are not expected to rise nearly as much as the short-term rates. Our VCMM simulations show the 10-year return distribution of cash and Treasury bonds (specifically, Barclays U.S. Treasury Bond Index) (see Figure II-2), with the medians appearing to be very similar, but with the median volatility projection for cash being lower than that for the Treasury index. This might make the return outlook for cash appear more attractive than that of Treasury bonds on a risk-adjusted basis. However, cash will likely yield a negative real return over the next few years, while the term premium of Treasury bonds is likely to generate a low, yet positive,

Figure II-4. Low rates are secular, not cyclical
real return. In general, a short-duration strategy entails substantial forgone income. Focusing solely on avoiding capital losses on long-term bonds ignores the fact that a steep yield curve (as of September 2015, a yield slope of 2.1%, as shown in Figure II-3) produces significant income differences among duration strategies, as shown in appendix Figure III-3. A second benefit of holding high-quality fixed income (as represented by the Treasury bonds) in a portfolio is that the bonds act as ballast, buffering losses from riskier assets such as equities.

U.S. credit bonds
The central tendency for U.S. credit bonds (specifically, Barclays U.S. Credit Bond Index) is in the 2.5%–4.0% range, slightly higher than that of Treasury bonds. This reflects the accumulation of liquidity and default risk premiums that accompanies the higher risk of credit bonds (Figure II-2 shows a median volatility of 6.3%). The credit spread for the U.S. credit bond index (as of September 2015) was 1.6% (78th percentile of historical distribution), relative to the historical median of 1.1%, which points toward some attractiveness at present. However, one must keep in mind that spreads tend to widen in times of equity market stress.

U.S. high-yield bonds
The central tendency for high-yield corporate bonds (specifically, the Barclays U.S. High Yield Corporate Bond Index) is in the 4.0%–6.5% range (see Figure II-2), which is higher than the central tendency of the domestic credit bonds. We urge investors to be cautious in reaching for yield in segments like high-yield corporates, not only because of the higher expected volatility that accompanies the higher yield but also because of the correlation to the equity markets. The current spread of high-yield corporate bonds is 6.7% (73rd percentile), as illustrated in Figure II-3, compared with a historical median of 5.3%, which also points to no relative spread compression. However, the sensitivity of spreads to the economic environment is much larger for high-yield corporate bonds than for other higher-quality segments of the U.S. fixed income market, which also contributes to an increased investment risk. From a strategic asset allocation point of view, credit and high-yield bond spreads tend to widen along with spikes in equity volatility and reduce the diversification benefit with equities when compared to Treasury bonds.

Treasury Inflation-Protected Securities (TIPS)
In the inflation-linked segment of the bond market, the distribution in our VCMM scenarios of TIPS returns is wider than that of nominal Treasury bonds. The expected median long-term return of a U.S. TIPS portfolio is lower than that of a similar-duration nominal Treasury portfolio by a modest amount that represents the estimated inflation-risk premium. As expected, TIPS generally outperform nominal Treasuries in scenarios featuring higher-than-average inflation rates over a ten-year outlook. The current BEI (breakeven inflation rate) is near its lowest historical level of about 1.6%, while the historical median is at 2.6%, reflecting potentially inexpensive inflation protection for the portfolio. In addition, more BEI exposure adds diversification to the duration risk of the bond portfolio. Periods of rising nominal rates are usually periods of faster than expected inflation, and vice versa. On a more cautionary note, TIPS have displayed a higher probability of negative returns over shorter investment horizons because of their sensitivity to a rise in real rates. Given these considerations, investors should continue to evaluate the role of TIPS in their portfolios by balancing the bonds’ inflation-risk protection quality against the inflation-risk premium “given up” relative to nominal bonds.10

Aggregate fixed income markets: Domestic versus international
Although the central tendency of expected return for global ex-U.S. bonds appears to be slightly lower than that of U.S. aggregate bonds (Figure II-2), we expect the diversification benefits of global fixed income in a balanced portfolio to persist under most scenarios. Yields in most developed markets are at historically low levels, particularly in Europe and Japan, yet the diversification through exposure to hedged international bonds should help offset some risk specific to the U.S. fixed income market. 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.11

10 See Davis et al. (2012).
11 See Philips and Thomas (2013).
Global equity markets

Equity market outlook: Not bearish, but still guarded

Over the past several years, some investors have hypothesized that low economic growth would equate with poor equity returns. Vanguard’s past outlooks have taken issue with this hypothesis, which we have referred to as an investment fallacy of the economic new normal, based on our research showing that market valuations were more important than economic growth to future expected stock returns. To be sure, global equity returns over the five years through September 2015 have been robust, despite tepid global growth, and recent market performance has rewarded long-term investors who remained invested in the global equity market.

In part based on such strong past performance, our medium-run outlook for global equities remains guarded, in the 6%–8% range. As shown in Figure II-5, the central tendency of our VCMM simulations for ten-year expected returns for a global equity portfolio is below both the long-run historical annualized average return (10.0%) and our own VCMM forecasts from just five years ago (based on the June 2010 distribution, in the figure).

When returns are adjusted for future inflation, we estimate a 55% likelihood that a global equity portfolio will produce a 5% average real return over the decade ending 2025. As such, our long-term outlook is not bearish, and can even be viewed as constructive, when adjusted for the low-interest-rate environment. Barring an unforeseen setback, a sharp equity market correction is not warranted based on our proprietary valuation analysis.

Figure II-5. Projected global equity ten-year-return outlook

VCMM-simulated distribution of expected average annualized nominal return of global equity market, estimated as of September 2015 and June 2010

<table>
<thead>
<tr>
<th>Global equity returns</th>
<th>1926–2015 10.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1926–1969 9.7%</td>
<td></td>
</tr>
<tr>
<td>1970–2015 10.2%</td>
<td></td>
</tr>
<tr>
<td>2000–2015 4.0%</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Figure displays projected range of potential returns for portfolios of 60% U.S./40% ex-U.S. equities, rebalanced quarterly, from 10,000 VCMM simulations as of September 2015. (See “Indexes used in our historical calculations,” on page 5, for details of benchmarks used for historical returns; see appendix section titled “Index benchmarks,” for further details on asset classes shown here.)

Source: Vanguard.
Equity valuations:
Vanguard’s proprietary ‘fair-value’ CAPE

Our conservative outlook for the global stock market is based primarily on market valuations, such as price/earnings (P/E) ratios. Some may wonder why our outlook is not more bearish, based on certain market valuation metrics. A key question is whether traditional P/E ratios—such as the popular Shiller (2000) cyclically adjusted price/earnings, or “CAPE”—are significantly higher than historical levels when one adjusts for a world with lower expected growth and low interest rates. In a world of lower interest rates and inflation, we would expect slightly higher equilibrium P/E ratios that would determine how over- or undervalued the stock market is today.

Figure II-6 compares Shiller’s (2000) CAPE multiple (for the Standard & Poor’s 500 Index) with Vanguard’s proprietary fair-value CAPE estimate, which is based on the fundamental drivers of equity-market earning yields, namely, interest rates and inflation expectations. In the late 1990s, for instance, the spread between our fair-value model and Shiller’s CAPE estimate would have suggested a “bubble,” in the same way that comparing Shiller’s CAPE to its own long-term average would have. Today, on the other hand, we find that the traditional CAPE estimate is only very slightly above that of Vanguard’s model that adjusts for inflation expectations and low interest rates. This suggests that high conventional P/E ratios may be slightly exaggerating signals of extreme stock market overvaluation; rather, our framework suggests a central tendency for just below-average nominal returns.

Figure II-6. Equity market does not appear grossly ‘overvalued’ when adjusted for low rates

Shiller CAPE versus estimated fair-value CAPE

Notes: Fair-value CAPE (cyclically adjusted price/earnings) is based on a statistical model that corrects CAPE measures for the level of inflation expectations and for interest rates. The statistical model specification is a three-variable vector error correction (VEC), including equity earnings-yield (S&P 500 Index), U.S. ten-year trailing inflation, and 10-year U.S. Treasury yield estimated over the period January 1940–September 2015.

Opportunities within global equities?
The expected return outlook for non-U.S. equity markets is modestly higher from a U.S. investor’s perspective. A closer look at the long-term median expected return for U.S. equity versus global ex-U.S. equity (see Figure II-7) suggests that the expected U.S. equity market return may undercut both its own historical average and the expected global ex-U.S. equity return. This result is a function of the current starting level of valuations (as shown in Figures II-6 and II-8) as well as long-term trends of the U.S. dollar priced in by the markets, especially with respect to other developed markets such as Europe and Japan.

However, for the purposes of asset allocation, we caution investors against implementing either tactical tilts based on just the median expected return—that is, ignoring the entire distribution of outcomes and their correlations. This is especially true given that the projected distributions of long-term returns shown in Figure II-5 and Figure II-7 display wide and fat tails. As discussed in Davis, Aliaga-Díaz, and Thomas (2012), although valuations are useful in predicting stock returns over the long term, they still leave more than half the volatility of long-run returns unexplained. Rather than focusing on short-term tilts, Vanguard suggests that investors who currently own equity portfolios with a high degree of home bias take advantage of global diversification benefits by rebalancing toward non-U.S. exposures.

Emerging market valuations are low, especially given their weak 2015 returns. That said, we caution investors against characterizing emerging market equities as “cheap.”

Alternative asset classes
We do not forecast expected returns for commercial real estate, although anecdotal reports and capitalization rates suggest that “froth” remains in selected markets. For U.S. REITs (which we view as a poor short-term proxy for commercial real estate exposure, given the correlation to the equity market), our long-term return simulations indicate that the median return expectation is below that of the broad U.S. equity market, based on relative valuations, and reflects slightly higher volatility. REITs are a subsector of the equity market, so all of REITs’ potential diversification benefits should already be captured in a broad-market portfolio.

Figure II-7. Setting reasonable expectations, being aware of widely dispersed potential returns

Notes: Forecast corresponds to distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of September 2015 in USD for asset classes highlighted here. See appendix section titled “Index benchmarks,” for further details on asset classes shown here.

Source: Vanguard.

12 See Wallick et al. (2015).
Figure II-7 also includes simulations for commodity futures returns. As in past outlooks, our simulated returns show a wide distribution, with lower median returns and slightly lower median volatility than equities. Because commodity futures markets are forward-looking, futures contracts are already pricing in the weak outlook for spot commodity prices. Thus, futures return expectations may be normal, even if investors have a directional outlook for spot prices.

From a portfolio construction viewpoint, commodities are a better diversifier of U.S. equity risk only in the presence of supply-side shocks—such as adverse weather for agricultural commodities, or geopolitical events affecting world oil production. When commodity returns are driven by global demand considerations (such as a global economic slowdown), correlations to equity markets tend to increase (in some cases, sharply), and the diversification value may be very low. For these reasons, we urge investors who are trying to determine an adequate exposure to commodities to keep in mind that correlations vary over time.

We do not produce expected returns for private equity as an asset class, given the need for investors to access the private equity market via an individual investment manager or fund exposure (as opposed to a market-capitalization-weighted index). However, as is the case for commercial real estate, anecdotal evidence points to considerable “froth” in the private equity market, and thus would suggest below-average future returns.

Figure II-8. Emerging market valuations holding up, but not yet cheap

Prices over 36-month trailing earnings for selected equity indexes

Notes: Figure displays price/earnings ratio with 36-month trailing average earnings. U.S. equities represented by MSCI USA Index, “Developed international” represented by MSCI World ex USA Index, and “Emerging markets” represented by MSCI Emerging Markets Index. Sources: Vanguard calculations, based on data from Thomson Reuters Datastream.
Implications for balanced portfolios and asset allocation

To examine the potential portfolio construction implications of Vanguard’s range of expected long-run returns, Figure II-9 (right-hand side) presents simulated real (inflation-adjusted) return distributions for 2015−2025 for three hypothetical multi-asset-class portfolios ranging from more conservative to more aggressive: 20% equities/80% bonds; 60% equities/40% bonds; and 80% equities/20% bonds. The historical performance of these portfolios is shown on the left-hand side of the figure. The results have several important implications for strategic asset allocation, as discussed next.

Modest outlook for investment returns

Amid widespread concern over the current low level of dividend and long-term U.S. Treasury yields, Figure II-9’s real long-run return profile for balanced portfolios may seem better than expected. However, Vanguard believes it’s important for investors to consider real-return expectations when constructing portfolios, because today’s low dividend and Treasury yields are, in part, associated with lower expected inflation than was the case 20 or 30 years ago.

Figure II-9 does show that the inflation-adjusted returns of a balanced portfolio for the decade ending 2025 are likely to be moderately below long-run historical averages (indicated by the small orange boxes for 1926–September 2015). But the likelihood of achieving real returns in excess of those since 2000 for all but the most conservative portfolios is higher.

Specifically, our VCMM simulations indicate that the average annualized returns of a 60% equity/40% bond portfolio for the decade ending 2025 are expected to center in the 3%–5% real-return range, below the actual average real return of 5.5% for the same portfolio since 1926. Viewed from another angle, the likelihood that our portfolio would achieve at least the 1926–2015 average real return is estimated at approximately 35%, while the odds of attaining a higher real return than that achieved since 2000 (2.6%) are near 65%.

Figure II-9. Projected ten-year real return outlook for balanced portfolios

<table>
<thead>
<tr>
<th>Equity/bond portfolios</th>
<th>Bottom 5th percentile</th>
<th>25th percentile</th>
<th>50th percentile</th>
<th>75th percentile</th>
<th>95th percentile</th>
<th>History 1926–September 2015</th>
<th>History 2000–September 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%/80%</td>
<td>-0.8%</td>
<td>0.8%</td>
<td>1.9%</td>
<td>3.1%</td>
<td>4.8%</td>
<td>3.5%</td>
<td>2.9%</td>
</tr>
<tr>
<td>60%/40%</td>
<td>-2.1%</td>
<td>1.8%</td>
<td>4.3%</td>
<td>7.0%</td>
<td>10.9%</td>
<td>5.5%</td>
<td>2.6%</td>
</tr>
<tr>
<td>80%/20%</td>
<td>-3.0%</td>
<td>2.0%</td>
<td>5.3%</td>
<td>8.9%</td>
<td>14.2%</td>
<td>6.2%</td>
<td>2.2%</td>
</tr>
</tbody>
</table>

Notes: Forecast displays 5th/25th/50th/75th/95th percentile ranges of 10,000 VCMM simulations for projected ten-year annualized real returns as of September 2015 in USD. Historical returns are computed using indexes defined in “Indexes used in our historical calculations,” on page 5. The equity portion of the portfolios is 60% U.S. equity and 40% global ex-U.S. equity. The bond portion of the portfolios is 70% U.S. bonds and 30% global ex-U.S. bonds.

Source: Vanguard.
Portfolio construction strategies

Contrary to suggestions that an environment of structural deceleration, subdued inflation pressures, and permanently lower interest rates warrants some radically new investment strategy, Figure II-9 reveals that the simulated ranges of portfolio returns are upward sloping on risk. Simply put, higher portfolio risk accompanies higher (expected) return. Our analysis of equity valuations in Figure II-6 showed that the global equity risk premium endures, when one adjusts for the muted expectations for global inflation and interest rates. Thus, according to our VCMM simulations, the forward-looking equity risk premium expectation over bonds may not be meaningfully lower than it has been in the past.

Nevertheless, although risk–return trade-offs and equity risk premiums may not be different, portfolio return expectations themselves need to be lowered, based on the prospects for lower global trend growth and central banks’ lifting of policy rates very gradually over time. In this environment, we expect asset yields to be lower relative to historical norms across the board, for both equities and fixed income. Investment objectives based either on fixed spending requirements or on fixed portfolio return targets may require investors to consciously assess whether the extra risk needed to reach those goals is within reasonable risk-tolerance levels. A balanced approach may also include calibrating investment objectives against reasonable portfolio return expectations and adjusting investment behavior, such as savings and portfolio contributions.

We encourage investors to evaluate carefully the trade-offs involved in any shifts toward risky asset classes—that is, tilting a bond portfolio toward corporate and high-yield investments or making a wholesale move from bonds into equities. The global crosscurrents of valuations, structural deceleration, and divergent monetary policies imply that the investment environment is likely to be more challenging and volatile in the years ahead. Both a realistic expectation of the extra return to be gained in such an environment and an understanding of the implications for holistic portfolio risk are crucial to maintaining the discipline needed for long-term investment success.

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 next decade with fair inflation-adjusted returns.

References


III. Appendix: VCMM and index benchmarks

About the Vanguard Capital Markets Model

IMPORTANT: The projections or 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 Vanguard Capital Markets Model 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, as shown in Figure III-1, on page 29, which highlights balanced portfolio returns before adjusting for inflation.

Figure III-2 further illustrates this point by showing the full range of scenarios created by the model. The scatter plot displays 10,000 geometric average ten-year returns and standard deviations for U.S. equities. The dispersion in returns and volatilities is wide enough to encompass historical market performance for various decades.
Figure III-1. Projected ten-year nominal return outlook for balanced portfolios

Notes: Forecast displays 5th/25th/50th/75th/95th percentile ranges of 10,000 VCMM simulations for projected ten-year annualized nominal returns as of September 2015 in USD. Historical returns are computed using indexes defined in "Indexes used in our historical calculations," on page 5. The equity portion of the portfolios is 60% U.S. equity and 40% global ex-U.S. equity. The bond portion of the portfolios is 70% U.S. bonds and 30% global ex-U.S. bonds.

Source: Vanguard.

Figure III-2. VCMM simulation output for broad U.S. stock market (10,000 simulations)

Notes: Historical returns are computed using indexes defined in "Indexes used in our historical calculations," on page 5. The equity portion of the portfolios is 60% U.S. equity and 40% global ex-U.S. equity. The bond portion of the portfolios is 70% U.S. bonds and 30% global ex-U.S. bonds.

Source: Vanguard.
### Index benchmarks

The long-term returns of our hypothetical portfolios are based on data for the appropriate market indexes through September 2015. 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.
- **Commodity futures**: Bloomberg Commodity Index in USD.
- **U.S. cash**: U.S. 3-Month Treasury–constant maturity.
- **U.S. Treasury bonds**: Barclays U.S. Treasury Bond Index.
- **U.S. credit bonds**: Barclays U.S. Credit Bond Index.
- **U.S. high-yield corporates**: Barclays U.S. High Yield Corporate Bond Index.
- **U.S. bonds**: Barclays U.S. Aggregate Bond Index.
- **Global ex-U.S. bonds**: Barclays Global Aggregate ex-USD Index.
- **U.S. TIPS**: Barclays U.S. Treasury Inflation Protected Securities Index.
- **U.S. short-term Treasury index**: Barclays U.S. 1–5 Year Treasury Bond Index.
- **U.S. long-term Treasury index**: Barclays U.S. Long Treasury Bond Index.

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**Figure III-3. Duration tilts: Short-duration strategies are not without risks**

<table>
<thead>
<tr>
<th>Low-yield scenario</th>
<th>Expected yield scenario</th>
<th>High-yield scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yields below 25th percentile</td>
<td>Yields between 25th and 75th percentiles</td>
<td>Yields above 75th percentile</td>
</tr>
</tbody>
</table>

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**Notes:** Forecast displays distribution of 10,000 VCMM simulations for five-year annualized returns of asset classes shown as of September 2014. Scenarios are obtained based on sorting the 3-month and 30-year Treasury yields at the end of every year from the VCMM. The three scenarios combined are a subset of the 10,000 simulations from the VCMM. See appendix section below, titled “Index benchmarks,” for further details on asset classes shown here.

**Source:** Vanguard.
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.