

Vanguard's economic and investment outlook

Vanguard Research

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- Global growth will remain frustratingly fragile in 2016. Global trade and manufacturing activity are likely to struggle, and additional "growth scares" should be expected.
- 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 US 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 resilience. We believe that those who see an even weaker future of US secular stagnation are too pessimistic and overlook the benefits of an unleveraged expansion.
- As we have discussed in Vanguard's past outlooks, policymakers are likely to continue struggling to achieve 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 US Federal Reserve, with 1% as a potential high watermark for the federal funds rate. We continue to view the global low-rate environment as secular, not cyclical.
- Although not bearish, Vanguard's outlook for global equities and bonds is the most guarded since 2006, given the low-interest-rate and low-earnings-yield environment. Despite our muted return outlook, and barring an unforeseen setback, the ongoing US equity bull market should continue to persist for some time.

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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 and risk

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 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. Distributions of return outcomes from the VCMM are derived from 10,000 simulations for each modelled asset class. Simulations are as at 30 September 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 UK investor with a sterling-denominated portfolio.

Global market outlook summary

Global economy: *Structural convergence*

World economic growth will remain frustratingly fragile. As in Vanguard's past *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 towards a more balanced, unleveraged 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. Indeed, 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.

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 US 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 *resilience*. Indeed, our long-held estimate of 2% US trend growth is neither "new" nor "subpar" when one both accounts for structurally lower population growth and removes the consumer-debt-fuelled boost to growth between 1980 and the global financial crisis that began in 2007. Our interpretation fully explains the persistent drop in US 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% inflation over the medium term. As of December 2015, however, some of the most pernicious deflationary forces (commodity prices, labour "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 US 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 normalisation and leaves the inflation-adjusted federal funds rate negative through to 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 (QE) 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 this year in an attempt to stabilise below-target growth.

Investment outlook: *Still conservative*

Vanguard’s outlook for global equities and bonds remains the most guarded since 2006, given fairly compressed risk premiums 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. The expected long-run median return of the broad fixed income market is centred in the 1.5% to 2.5% range. It is important to note that we expect the diversification benefits of investment-grade fixed income in a balanced portfolio to persist under most scenarios. 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 of monetary policy.

Equities. 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 7% to 9% 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 cross-currents 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.

Indices used in our historical calculations

The long-term returns for our hypothetical portfolios are based on data for the appropriate market indices to 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.

Inflation: Consumer Price Indices – RPI all items long run series: 1900 to 2014: Jan 1974=100.
Source: Office of National Statistics.

UK Equity: Barclays Equity Gilt Study from 1900 to 1964, Thomson Reuters Datastream UK Market Index 1965–1969; MSCI UK thereafter

UK Bonds: Barclays Equity Gilt Study 1900–1976; FTSE UK Government Index from 1976 to 1999, and Barclays Sterling Aggregate Index thereafter.

Global Ex UK Equity: S&P 90 Index from January 1926 to 3 March 1957; S&P 500 Index from 4 March 1957 to 1969; MSCI World ex UK from 1970 to 1987; MSCI AC World ex UK from 1988 onwards.

Global Ex UK Bonds: Standard & Poor’s High Grade Corporate Index from 1926 to 1968, Citigroup High Grade Index from 1969 to 1972, Lehman Brothers U.S. Long Credit A A Index from 1973 to 1975, Barclays U.S. Aggregate Bond Index from 1976 to 1990, Barclays Global Aggregate Index from 1990 to 2001; Barclays Global Aggregate ex GBP Index from 2001 onwards.

Global Equity: 25% UK Equity and 75% Global Ex-UK Equity as defined above.

Global Bonds: 35% UK Bonds and 65% Global Ex-UK Bonds as defined above.

¹ “Dot plots” refer to charts published by the US Federal Open Market Committee (FOMC) in the Summary of Economic Projections that show where the FOMC participants, who are kept anonymous, think the federal funds rate should be over the next few years.

I. Global economic perspectives

Global economic outlook: Sustained fragility, structural convergence

Global growth will remain frustratingly fragile in 2016. As in Vanguard's past *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, *unleveraged* 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 unleveraged expansion.

Based on unfavourable 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, a drag to long-term growth affecting both developed and emerging market economies.

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

A scorecard for growth convergence

	United States	Euro area	China	Japan	United Kingdom	Canada	Australia
% of world GDP	22.4%	17.1%	13.3%	6.2%	3.7%	2.3%	1.9%
Estimated trend growth rates (%)							
Pre-Recession Average (1990–2007)	3.0	2.0	10.0	1.4	2.9	2.5	3.4
Projected Future (2016–2020)	2.1	1.1	6.3	0.5	2.1	2.0	2.8
Growth headwinds							
Slowing growth of labour force <i>Slower population growth and aging of population</i>	Highly significant factor	Highly significant factor	Highly significant factor	Highly significant factor	Moderately significant factor	Highly significant factor	Highly significant factor
Private sector debt deleveraging <i>Debt-deleveraging cycle, constraining willingness to spend</i>	Moderately significant factor	Moderately significant factor	Highly significant factor	Moderately significant factor	Moderately significant factor	Highly significant factor	Highly significant factor
Sluggish capital investment <i>Falling cost of technology and demographic effects on businesses growth</i>	Highly significant factor	Highly significant factor	Moderately significant factor	Highly significant factor	Highly significant factor	Moderately significant factor	Moderately significant factor
Fiscal sustainability and committed fiscal austerity <i>Unsustainable debt dynamics may result in suboptimal policies and uncertainty</i>	Moderately significant factor	Moderately significant factor	Moderately significant factor	Highly significant factor	Moderately significant factor	Moderately significant factor	Moderately significant factor
Commodity exports dependency <i>Weak commodity price outlook</i>	Moderately significant factor	Moderately significant factor	Moderately significant factor	Moderately significant factor	Moderately significant factor	Highly significant factor	Highly significant factor
Currency strength <i>Tighter financial conditions, weaker manufacturing and exports</i>	Highly significant factor	Moderately significant factor	Highly significant factor	Moderately significant factor	Highly significant factor	Moderately significant factor	Moderately significant factor
Rising income inequality <i>Falling purchasing power of highest-propensity to spend consumers</i>	Highly significant factor	Moderately significant factor	Highly significant factor	Moderately significant factor	Highly significant factor	Highly significant factor	Highly significant factor

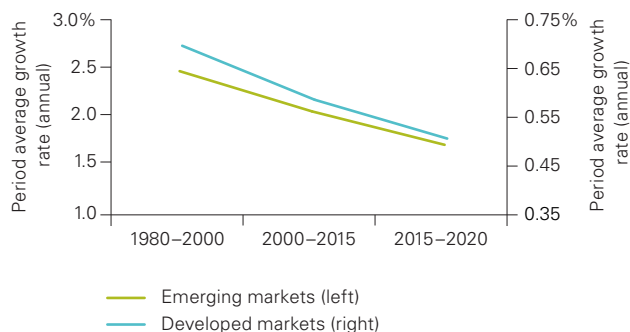
■ Highly significant factor ■ Moderately significant factor ■ Factor not present

Notes: Indicator list – Birth rates minus mortality rates, (slope of the trend line 1960–present); Percent increase in household debt (% GDP) from 2008 to present; Difference between average fixed capital formation as percent of GDP from 2000–2007 and 2008–latest; Fiscal space estimates based on Moody's Economy.com model, as of February 2015 and difference in structural balance over next 2 years (2016–2017); Commodity export dependent; Level of real EER trade as of September 2015 (>100, overvalued / <100, undervalued); Average percentage point change in the income share of the top 1% of income (1980–2010). For China, we factor local government debt into our debt deleveraging rating.

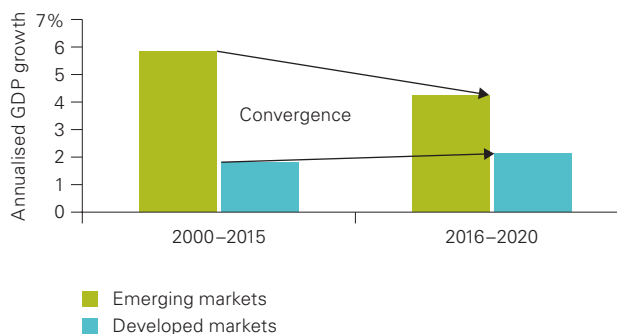
Sources: Vanguard calculations, based on data from International Monetary Fund (IMF)-World Economic Outlook, Organisation for Economic Co-operation and Development, United Nations, US Bureau of Economic Analysis, US Federal Reserve System, Moody's Analytics, Thomson Reuters Datastream.

Figure I-2. Structural deceleration = growth convergence

a. Period average growth rate of population (annual)



b. Period average potential GDP growth (annual)



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 International Monetary Fund – World Economic Outlook, Autumn 2015.

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.

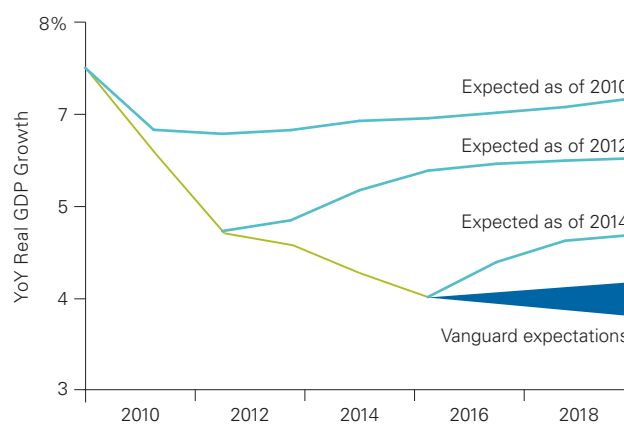
The growth outlook for developed markets, on the other hand, remains modest, but steady. As a result, the developed economies of the United States and Europe should contribute their highest relative percentage to global growth in nearly two decades.

At full employment, the US 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 *resilience*. Indeed, our long-held estimate of 2% US trend growth as neither “new” nor “subpar” when one both accounts for structurally-lower population growth *and* removes the consumer debt-fuelled boost to growth between 1980 and the global financial crisis that began in 2007.

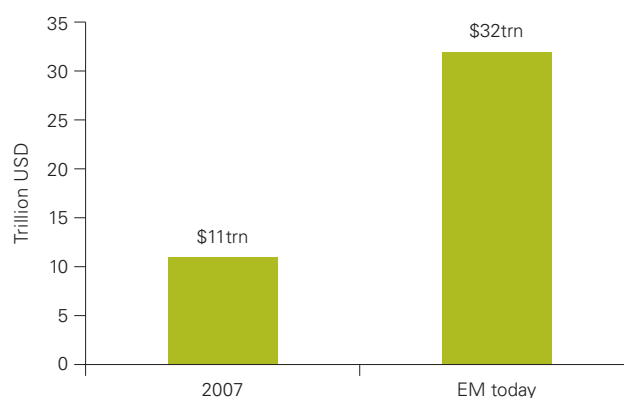
Our interpretation (unlike those who subscribe to secular stagnation) fully explains the persistent drop in US unemployment despite below-average economic growth.

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 JPMorgan.

2016 global growth outlook: Just decent

Economic growth in the United States in 2016 is expected to converge toward its long-term trend of about 2% per year, as the modest cyclical thrust experienced over the last few years fades away. As Figure I-4a shows, our proprietary US leading indicators dashboard points toward a slight deceleration from the above-trend pace experienced in 2014 and 2015. The convergence path may not be uniform, as the economy continues to undergo post-financial crisis adjustments and monetary policy starts to normalise through the year. The most positive indicators are those associated with housing, consumer and business confidence, the service sector and the labour market. The “red signals” associated with manufacturing and trade, reflect, in part, a drag associated with a stronger dollar. The ebbs and flows of red, yellow and green in the figure do a reasonable job of leading the GDP growth line, and thus the dashboard helps inform our projected growth distributions.

Using regression analysis, we mapped our proprietary indicators to a distribution of potential scenarios for US economic growth in 2016, as shown in Figure I-4b. The odds of growth at or exceeding 2.5% in 2016 (29%) are lower than they had been in 2015, and are now more balanced with the potential for growth to stagnate and fall

below 1% (33%). Our base case indicates convergence to 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.²

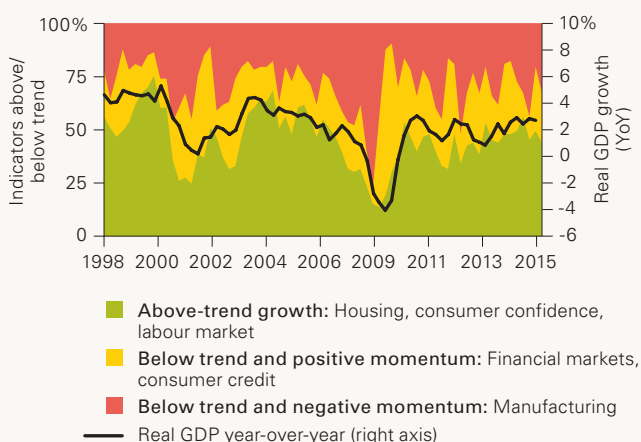
As was the case in 2015, our euro-area dashboard of leading indicators (Figure I-4c) anticipates a moderate growth acceleration in 2016. The significant decline in “red indicators” throughout 2015, as shown in the figure, is indicative of abating cyclical risks (yellow) and slight upward pressure on trend growth (green). This translates into substantially higher odds that 2016 will see above-trend growth rather than stagnation (47% versus 25%) (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, housing and financial conditions. 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 non-trivial odds of a “hard landing” estimated at 14% (real GDP growth of 5% or less is forecast in 2016).

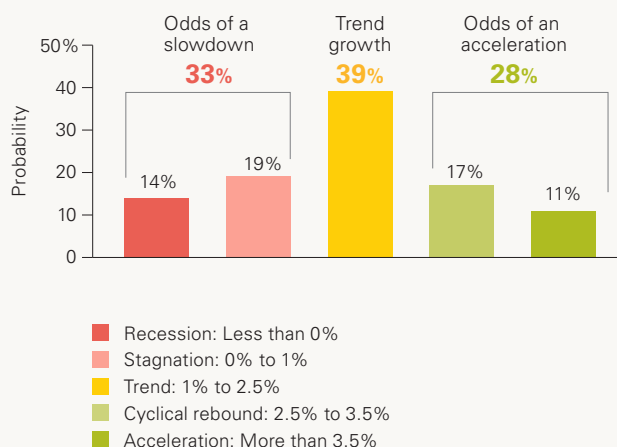
Figure I-4. Vanguard global dashboard of leading economic indicators and implied economic growth for 2016

United States: Slightly below consensus

a. US economic indicators



b. Estimated distribution of US growth outcomes, 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 2014 and adjusting for the time-varying trend growth rate.

Sources: Vanguard calculations, based on data from US Bureau of Economic Analysis, Federal Reserve, and Moody’s Analytics DataBuffet.

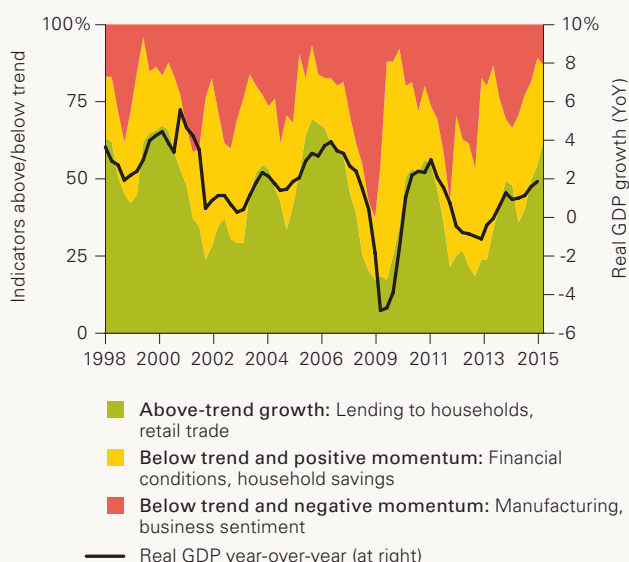
² The Federal Reserve Bank of Philadelphia, Survey of Professional Forecasters estimates real GDP averaging 2.6% for 2016 (as of 13 November 2015). The Federal Reserve, Summary of Economic Projections, median projection of real GDP is 2.3% for 2016 (as of 17 September 2015).

Figure I-4 (continued).

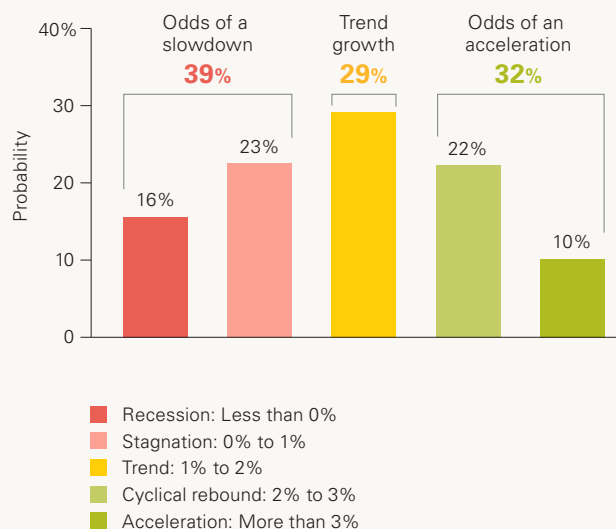
Vanguard global dashboard of leading economic indicators and implied economic growth for 2016

Euro area: Slightly above consensus

c. Economic indicators



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

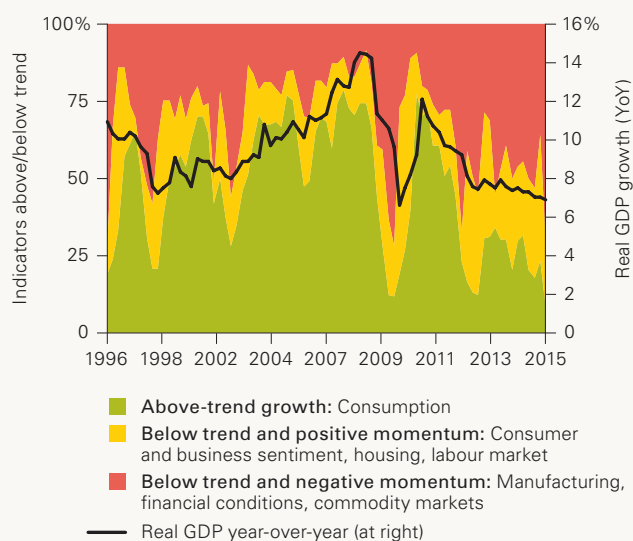


Notes: Distribution of growth outcomes generated by bootstrapping the residuals from a regression based on a proprietary set of leading economic indicators and historical data, estimated from 1960 to 2014 and adjusting for the time-varying trend growth rate.

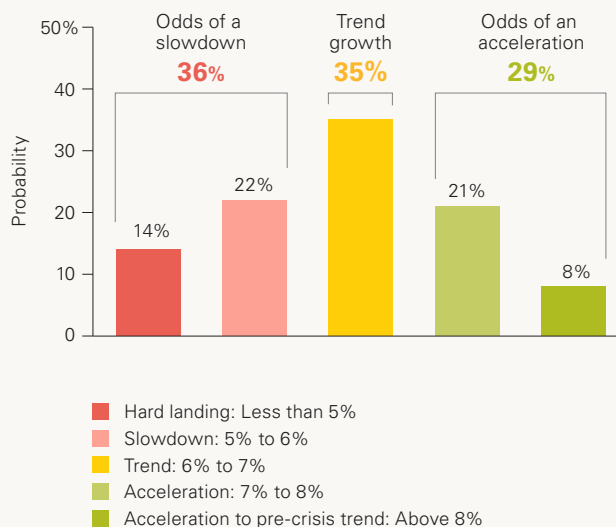
Sources: Vanguard calculations, based on data from Eurostat, Destatis (Federal Statistical Office of Germany), French National Institute of Statistics and Economic Studies (INSEE), Italian National Institute of Statistics (ISTAT), Instituto Nacional de Estadística (INE, Spanish Statistical Office), Statistics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

China: Slightly below consensus

e. Economic indicators



f. Estimated distribution of China's growth outcomes, 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 1990 to September 2014 and adjusting for the time-varying trend growth rate. "Target growth" is the 2015 growth target set by Chinese officials.

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

Euro area: Passing of political storm allows focus on economic issues

2015 has been a year of renewed turmoil in the euro area which, for a while, again raised the possibility of Greece leaving the euro area, but as in earlier flare-ups of the crisis, political compromises allowed further emergency funding to be agreed. And with that, the focus of attention has more recently moved back to conventional macroeconomic issues relating to inflation and growth, in particular relating to the effectiveness of the ECB's quantitative easing introduced at the start of the year.

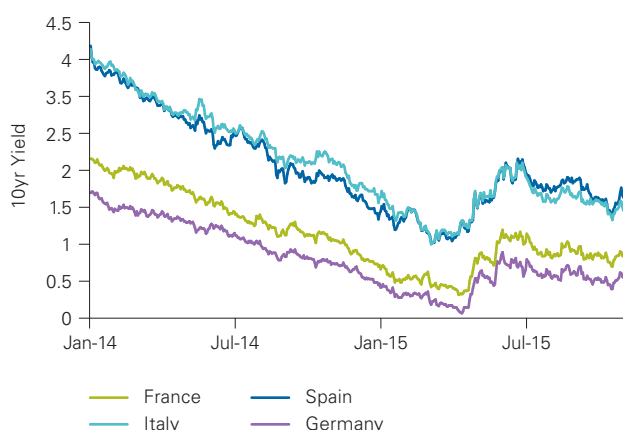
The political crisis in Greece began in January with the election of a radical Syriza government committed to rejecting previously imposed demands on fiscal austerity and structural reform by European creditors. The situation had deteriorated further by July when a referendum in Greece rejected the terms offered by European creditors for a financial assistance package. But by August, the Greek government made significant compromises, largely accepting the original terms, thus clearing the way for a US\$95bn bailout. For now, it is unclear whether Greece will be able to meet the necessary financing conditions and it is possible that in due course, Greek sovereign debt will be written down further to enhance its sustainability, a measure urged by the IMF among others. But in terms of global macroeconomic significance, the most significant feature of this latest Greek crisis has been the muted reaction in bond markets with a lack of contagion to other periphery sovereigns. This is largely explained by the lower exposure of European banks and better peripheral fundamentals. It is also recognised that the policy framework is now more robust, probably enough to survive a Greek exit if it occurred, and other periphery

countries have made continuing progress in their own fiscal and structural reform agenda, in particular Ireland and Spain. Of course, it is important to emphasise that there are still considerable challenges for the euro-area policy framework which need to take place in terms of increasing the degree of more fiscal integration, greater moves to banking union and in the longer term probably more moves towards political union. But for the immediate future, the focus of financial markets has moved back to a more conventional analysis of macroeconomic developments.

Euro-area growth has been uneven this year, starting strongly following the ECB's QE announcement in January and the effects of falling commodity prices, but falling back as political risks overshadowed the outlook. Most recently, as the Greek crisis has receded, growth again looks to accelerate into year-end. Overall growth in 2015 should be about 1.5%, around trend, before accelerating slightly for the next two years, likely stimulated by further QE stimulus. Even so, the fact remains that this growth will only be enough to return euro-area levels of GDP back to its pre-crisis peak by 2016 (see Figure I-6).

The ECB's original decision to implement quantitative easing in January had been foreshadowed by earlier policy statements in 2014, and a significant compression in sovereign and corporate credit yields had already begun by September and continued despite a bout of mid-year market volatility. Spanish and Italian 10-year yields now stand around 75bps lower than their mid-year peak while German 10-year bund yields have fallen to around 0.5% (having briefly fallen to as low as 0.42%). This marked easing in monetary conditions has fed through into lower bank lending rates for households and companies, especially in the periphery. This is slowly beginning to benefit bank lending (see Figure I-6).

Figure I-5. Sovereign yields have tended to fall in the face of QE



Source: Macrobond Financial AB, Macrobond

Figure I-6. Euro-area GDP is approaching its previous peak but bank lending struggles to recover



Notes: Both indices are rebased as of 3 January 2008.

Source: Eurostat, ECB (European Central Bank), Macrobond.

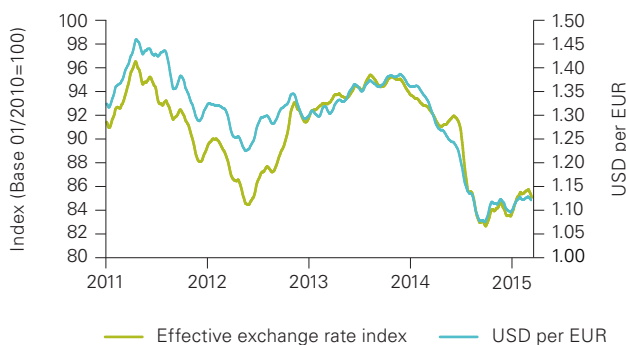
Given the euro-area's dependence on bank-based financing, this is significant but so far has not been enough to have a meaningful impact on growth. Nor, despite an initial 20% surge in euro-area equity prices following QE's announcement, has euro-area growth been able to benefit from significant wealth effects. This is partly explained by the weakness of that transmission channel and partly by the more recent financial market volatility which has roughly halved those initial capital gains in equities.

Perhaps the most significant channel of QE transmission has been from the exchange rate, which depreciated in both dollar and effective terms by around 10% from September 2014 to March 2015 (Figure I-7). According to model-based elasticity estimates, this could stimulate euro-area GDP by around 0.5%. This stimulus was likely reinforced by sharp falls in oil and commodity prices around the same period (for example, Brent crude oil fell from around US\$70 in early May to around US\$50 by August and has remained around that level since).

For much of this year, ECB policymakers have maintained a stance that the announced amount of quantitative easing (a cumulative €1.2 trn of asset purchases until September 2016) would be sufficient to bring euro-area inflation back to its target level by the end of their two-to-three-year forecast horizon. More recent financial market volatility and equity market weakness, however, as well as a strengthening euro caused by market anticipation of an imminent Fed lift-off, has caused the consensus forecast for headline inflation (as well as our own and the ECB's) to fall back so that it now undershoots target even at the three-year horizon (Figure I-8). For that reason, the ECB has sent a strong signal that it will expand its quantity of asset purchases to further stimulate the economy by the end of 2015. It may even implement further cuts in the already central bank deposit lending rate, a policy which could likely exacerbate the downward pressures on interest rates in other non-euro area countries such as Switzerland, Denmark and Sweden.

For all the focus on monetary policy, fiscal policy in the euro area has also tended to provide a net stimulus to growth in the last year. This is not because countries are suddenly running deficits again but because the speed of the fiscal tightening is slowing down, or in some countries the fiscal contraction is complete, and it is the change of the structural balance that provides the best indication of fiscal impetus (see Figure I-9). Given the uncertainty around the effects of QE and the still-weak growth outlook there is a respectable economic case for further fiscal stimulus, certainly at the aggregate level, and especially for those countries where spare capacity still exists or for countries in stronger fiscal condition. Certainly aggregate public sector debt is not excessively high, compared for example to the US or Japan. Politically,

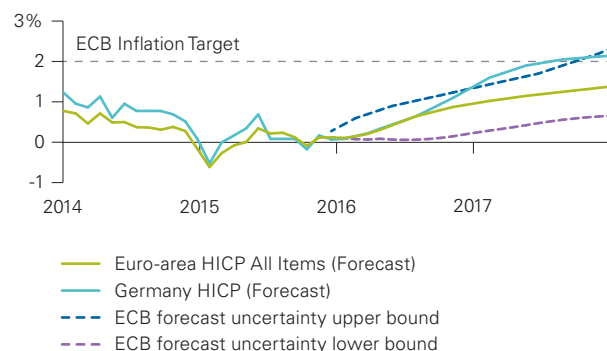
Figure I-7. The weakening euro has been an important transmission channel of QE in the euro area



Notes: Both series are smoothed by using a one-month moving average. The effective exchange rate index is rebased to 1 January 2010.

Source: Bank of England, ECB (European Central Bank), Macrobond.

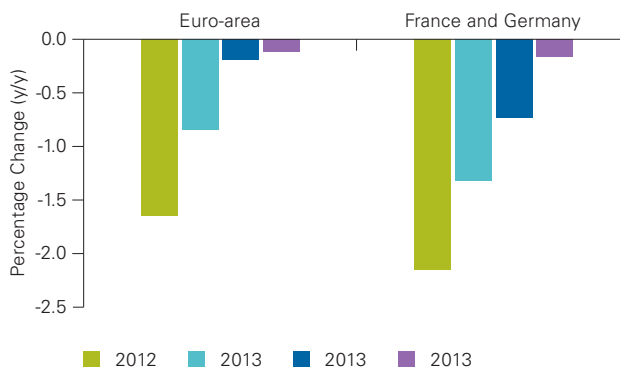
Figure I-8. Euro-area inflation is expected to fall short of target unless the ECB expands QE



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.

Source: Eurostat, German Federal Statistical Office (Statistisches Bundesamt), Bloomberg, Bundesbank, ECB, Macrobond.

Figure I-9. The fiscal drag on growth in the euro area is fading



Notes: Data represents estimates released in the IMF WEO.

Sources: International Monetary Fund (IMF), Macrobond.

however, given the resistance to fiscal stimulus in the largest creditor country, Germany, the likelihood of significant growth from fiscal policy seems unlikely, with the exception of relatively small select EU-sponsored spending.

In the medium to long term, the best prospect for growth in the euro area continues to be in the area of structural reform. Good progress has been made in a number of periphery countries, notably Spain, where flexibility in goods and labour markets has improved the capacity of those countries to respond to shocks, a necessity for countries within a monetary union without the capacity to use country-specific monetary policy. But progress in other countries, both core and periphery, has been disappointingly slow, and considerable divergences between them remain in terms of growth and labour market performance (see Figure I-10). And more generally, there is little concrete evidence that policies to boost long-run productivity growth are yielding significant benefits.

UK: Normalisation is near but productivity puzzle, fiscal hairshirt and Brexit present risks

Driven by buoyant private domestic demand, UK economic growth has proved resilient to external weakness and an appreciating exchange rate. Real GDP grew above trend by 2.8% in 2014, notably more than its 1.7% rise in 2013, but is expected to return to around trend this year and in 2016. The private sector continues to be supported by the fall in oil prices, rising employment, low borrowing costs and household disposable income growth. As result of strong private domestic demand, the UK compares favourably with its largest trading partner and neighbour, the euro area, and the US (Figure I-11).

The historical low Bank rate of 0.5%, which has now remained unchanged for more than six years, continues to be a welcome support for firms and households. Indeed, credit conditions for the private sector have continued to improve, feeding through into the real economy. Low mortgage rates are providing support to the housing market, while business investment has made a substantial contribution to growth in recent years.

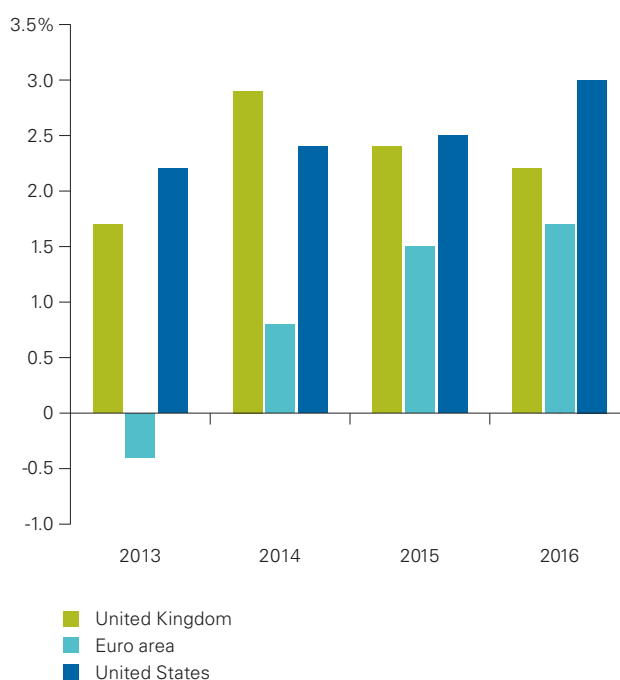
Going forward, growth is expected to continue at a slightly slower pace this year, closer to trend growth of 2.5%. Forward expectations of business activity in the major business surveys point towards continued growth momentum in 2016. Business investment is set to remain an important contributor to growth. Investment should be sustained by solid fundamentals including strong corporate balance sheets, low borrowing costs, robust household demand and an increasingly resilient financial sector.

Figure I-10. Divergences persist in euro-area economic performance



Source: Eurostat, German Federal Statistical Office (Statistisches Bundesamt), French National Institute of Statistics & Economic Studies (INSEE), Italian National Institute of Statistics (Istat), Spanish National Statistics Institute (INE), Greek National Statistical Service, Macrobond.

Figure I-11. UK growth was second to none in 2014 and is set to stay strong



Source: International Monetary Fund (IMF), Macrobond.

The growth impetus from robust private domestic demand is likely to be weakened somewhat by upcoming fiscal consolidation. Due to the passing of the Charter for Budget Responsibility, fiscal austerity will likely weigh on growth as the government works to turn public sector net borrowing into a surplus by 2019/20. In addition, the external sector will continue to weigh on growth; although global demand is expected to improve, global growth is set to remain modest. And, any improvements will be counterbalanced by the strengthening of sterling.

CPI inflation fell to -0.1% in September. Headline inflation has been mostly flat this year, with inflation dipping twice into negative territory. In the Governor's open letter to the Chancellor, he stated the lion's share of the deviation away from the Bank of England's 2% target reflects falls in retail energy prices and food costs, sterling appreciation and poor wage growth.

Not only has UK growth been strong but the composition of growth has been almost completely accounted for by strong employment growth in recent years, resulting in sharp falls in unemployment to its end-2015 level of 5.4%, down from a peak of 8.5% at the height of the financial crisis. The other side of the coin to this strong employment growth is surprising weakness in productivity, defined as output per hour worked, which has only just reached its pre-2008 level. Historically, this is very unusual compared to previous recovery periods after recessions (Figure I-12).

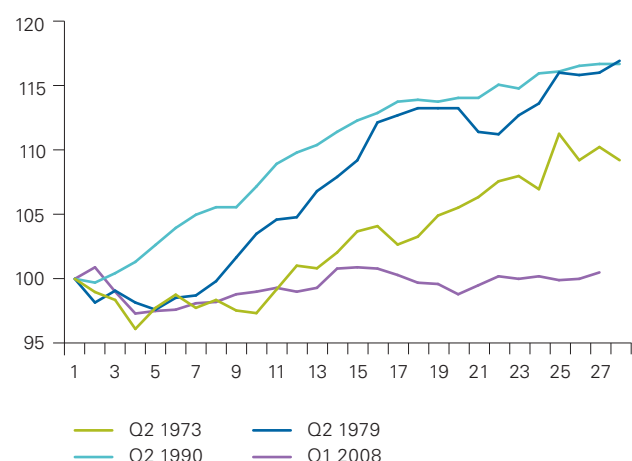
The various possible explanations for the unusual sluggishness of productivity have a bearing on spare capacity and growth going forward. Although, we cannot

be too sure of the future evolution productivity, our base case is that UK productivity has suffered a one-off slippage in the level and will eventually return to around or probably slightly below its former growth rate.

One consequence of this slow productivity growth is that wage growth has been correspondingly weak. As productivity gradually recovers, as it is starting to do in recent quarters, so wage growth should prompt a pick-up in underlying inflation and the Bank of England will be inclined to raise interest rates. Currently, markets are seeing this happening very slowly and are not expecting to see rates increase until the end of 2016. Our view would be that this first increase happens sooner, probably around May 2016.

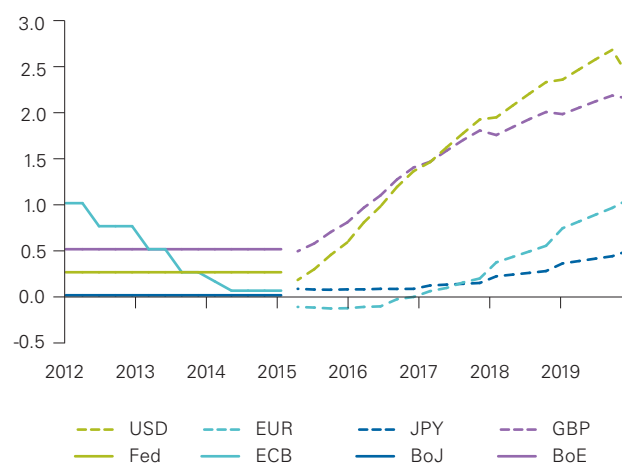
One additional risk to the UK outlook relates to the impending referendum on Britain's membership of the European Union, scheduled to occur before the end of 2017, but now likely to happen in 2016. In our view, the economic consequences of leaving the EU would likely be negative for the UK, mainly due to an adverse impact on future trade with the remaining EU members. And it could likely also have an adverse impact on inward investment to the UK from firms who are keen to gain access to European markets, something that may be more difficult from outside. More immediately, uncertainty around this impending decision may be causing some firms to delay their investment decisions until more clarity is achieved, so this too could present an additional source of downside risk to UK growth.

Figure I-12. UK productivity has flatlined since the financial crisis, unlike after previous downturns



Notes: Series are all rebased to their value at the start of the given recession.
Source: Office for National Statistics, Macrobond.

Figure I-13. UK rates should rise next year, but only gradually



Notes: Shaded area is forecast period. Dotted lines are forward curves estimated using overnight index swap rates available on 20 October 2015
Source: Vanguard calculations based on data from Bloomberg.

United States: At full employment, trend-like growth

At full employment, the US 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 resilience. As in past outlooks, we maintain that US 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 labour productivity growth.

However, we see our 2% US 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-fuelled boost to growth between 1980 and the global financial crisis that began in 2007. Specifically, US real GDP growth between 1980 and 2006 would have averaged nearly 2% (as opposed to the 3% measured in the data) had consumer

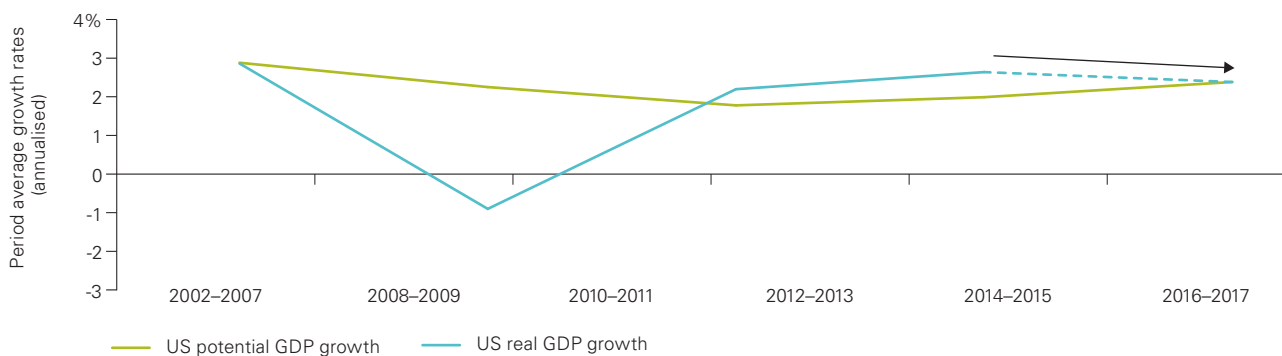
debt (and hence the share of the economy dictated by consumer spending) not risen to drastic levels over time. We believe this calculus is underappreciated by many, and provides another justification for the Federal Reserve to initiate a gradual normalisation in monetary policy.

Vanguard’s outlook for leading US 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-14). The average pace of US job growth has been at more than 200,000 net new jobs per month for 2014–15, while the labour force by only about 70,000 new entrants per month during the same period.

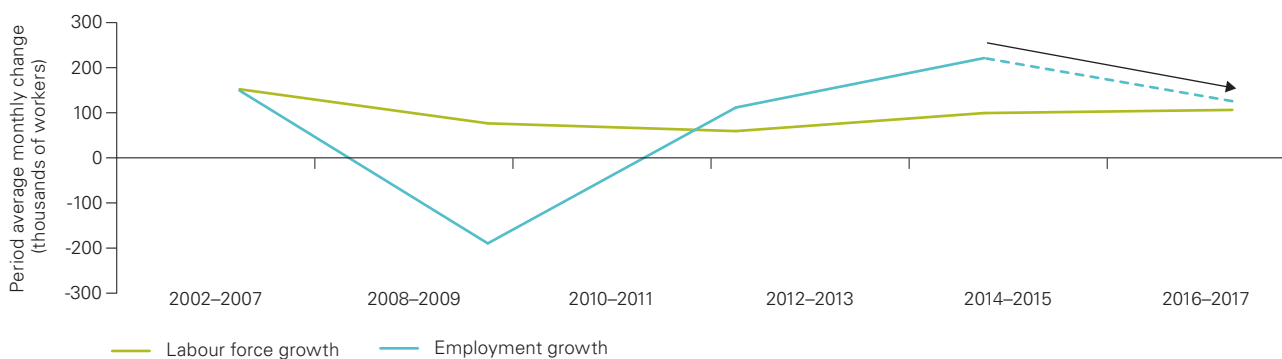
The resilience of both the US consumer and of domestic demand through 2015 stands in contrast to the weakness of US domestic manufacturing and export-related sectors (Figure I-15). The significant strengthening

Figure I-14. From cyclical thrust back to trend growth

a. Convergence in real GDP growth



b. Convergence in real GDP growth



Notes: Potential GDP growth represents Congressional Budget Office (CBO) estimates for potential in time periods listed while real growth is that provided by Bureau of Economic Analysis through Q3 2015. US real GDP growth projected to return to potential over the 2016–2017 period. Labour force growth represents average monthly change in labour force historically while projections for 2016–2017 period are estimated using official population growth projections and an assumption of no change in age-cohort specific participation rates. Employment growth is projected to approach labour force growth over the 2016–2017 period.

Sources: Vanguard calculations based on data from CBO, BEA, Bureau of Labor Statistics and Moody’s DataBuffet.

of the US 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 US dollar is that domestic production of goods accounts for just 12% of total US final production and only 16% of all jobs in the country.

Moreover, a stronger US dollar means lower import prices for US consumers. Not only are imported goods and services cheaper in dollar-terms (i.e. imported cars, or trips overseas), but also, similar to the effect of lower gas prices, households can afford to spend more in other domestically-provided services such as entertainment, hospitality, healthcare or education (see service components in Figure I-15b). More generally, non-tradable sectors of the economy, such as construction, are also expected to receive support from a strong US dollar.

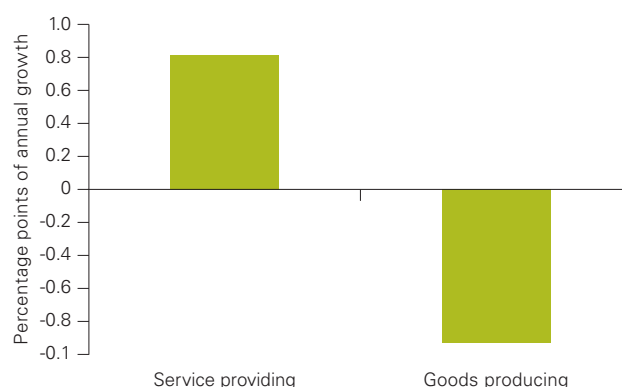
Inflation in the United States has remained persistently below the Fed's 2% target, even as unemployment gaps have closed at a fairly fast pace over the last three years. Similarly, wage growth has remained subdued, even as more anecdotal reports of labour market shortages in certain sectors confirm the top-down data on job openings outpacing job hires. As the labour 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. Long-term inflation expectations are well-anchored around that inflation target.

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

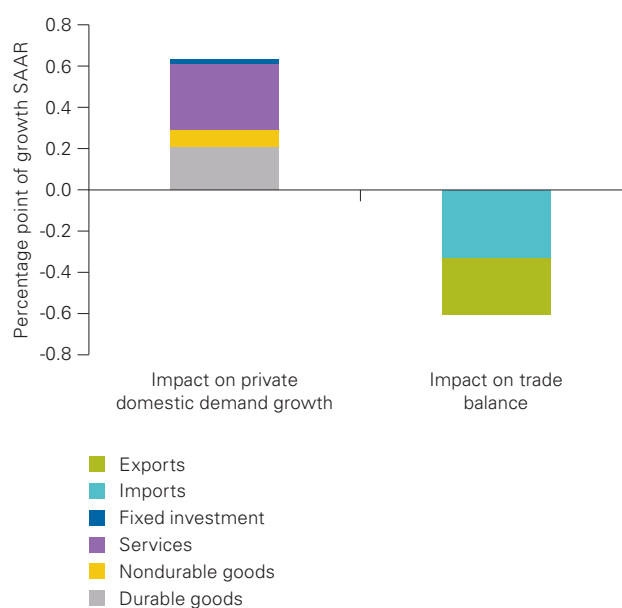
Convergence in global growth dynamics will continue to necessitate and generate divergence in policy responses. The US Federal Reserve is likely to pursue a "dovish tightening" cycle that removes some of the unprecedented accommodation exercised due to the "exigent circumstances" of the global financial 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 normalisation and leaves the inflation-adjusted federal funds rate negative through 2017 (see Figure I-16). 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."³ 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.

Figure I-15. Strong US dollar effects are not one-sided

a. Impact on employment growth



b. Impact on real GDP growth and components

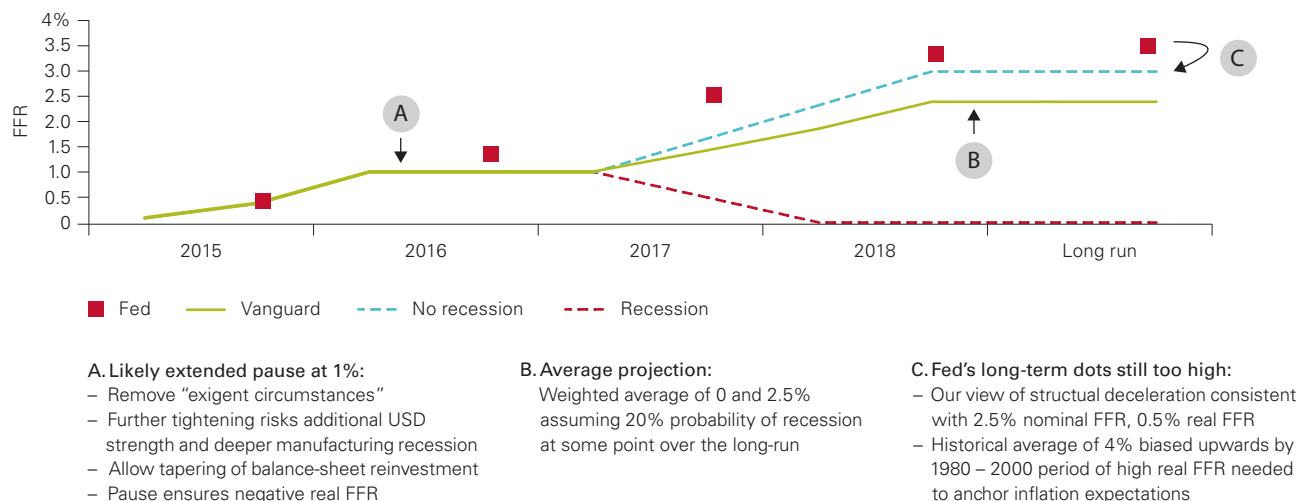


Notes: Estimated impacts based on regressions of macro variables (components of employment growth and real GDP growth) on Real Broad Dollar Index. Estimated effects arise from applying cumulative real appreciation since 2014 Q3 (12%) to corresponding regression coefficients. Estimation results are sized by weights of components in the respective totals as follows: Service employment (84%), goods producing employment (16%), Consumer services (46% of GDP), Durable goods (7%), non-durable goods (15%), Imports (15%) and Exports (13%).

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

³ 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 Summary of Economic Projections. Currently the dots range from 3% to 4%. See notes on page 5 for more information on the "dot plots."

Figure I-16. Deconstructing our view of a “dovish tightening”



Notes: Red dots represent median expectation at stated year end from September 2015 Summary of Economic Projections from Federal Reserve Board. Green line represents Vanguard's estimate of appropriate Fed policy adjusted for probability of recession in any one year beginning in 2018. Dashed lines represent binary outcomes of recession (red, line approaching and remaining at zero) or no recession (blue, line approaching and remaining at 3).

Sources: Vanguard calculations based on Federal Reserve Board.

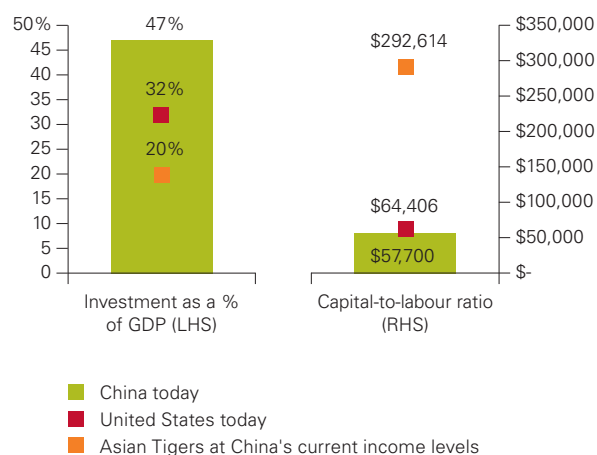
China: Sharp slowdown, but no recession

Despite recent signs of stabilisation, 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-17). 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-18 illustrates, our simulations reveal that a deep Chinese recession would be sufficient to drag other economies along with it. 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 US-style housing crash, an outcome we assign a probability of roughly 10%.⁴

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

Figure I-17. Investment growth unsustainable, but capital-to-labour ratio remains low

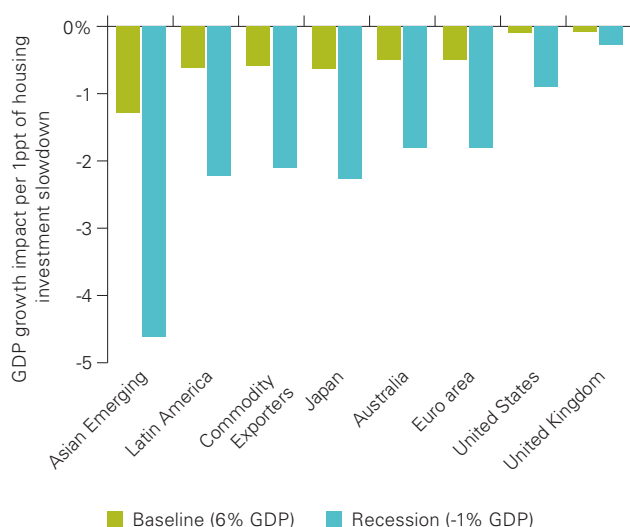


Notes: Investment as a percentage of GDP is from the IMF’s April 2015 World Economic Outlook. “Today” is defined as the average for 2014. Asian Tigers comprise South Korea, Hong Kong, Taiwan, and Singapore when each was at China’s 2014 nominal per capita GDP level (\$7,500 in 2014 US dollars). The capital-to-labour ratio is from the Penn World Tables 8.1, in 2005 US dollars, with “today” defined as the average for 2011.

Sources: Vanguard calculations using data from the IMF and Penn World Tables.

⁴ For details, see Vanguard’s *Global Macro Matters – China’s key risk: It’s housing not stocks* (2015).

Figure I-18. The global ‘tail risk’ would be an outright Chinese economic recession



Source: Vanguard calculations based on data from CEIC, Thomson Reuters Datastream, Bloomberg

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 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 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 stabilise growth. In particular, we would anticipate further interest rate cuts 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

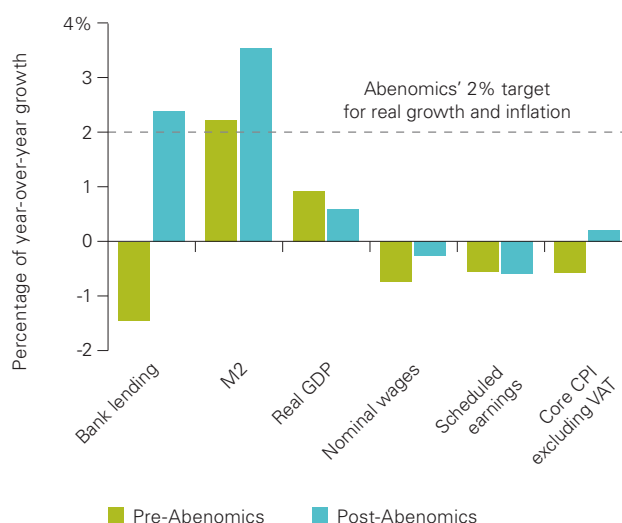
In Japan, the outlook is similarly not encouraging, despite aggressive monetary easing. Although the economy should be able to sustain higher levels of inflation around 1%, given the tightening labour market and stabilisation in energy

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 overburdened to achieve sustainable growth and inflation (see Figure I-19).

Despite falling energy prices, core inflation is rising on the trend of the closing output gap and weaker currency. However, the pace remains weak. Despite the tightening labour market, the strength of wage growth has been constrained by structural headwinds in the labour market. The rigidity in Japan's labour market, especially the "job for life" model, has encouraged a secular expansion of part-time workers since the mid-1990's, who suffer from lower incomes, less job security and less welfare compared to full-time employees.⁵ A secular shift of the workforce composition is weighing down wage growth. As such, inflation pressures may not be strong enough to reach and sustain the BoJ's 2% core CPI target in end-FY2016 (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.

Figure I-19. Mixed success for 'Abenomics' thus far



Source: Vanguard calculations based on data from Ministry of Finance, Japan and JP Morgan

⁵ For details, see Vanguard *Global Macro Matters – Japan: The long road back to inflation* (2015).

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

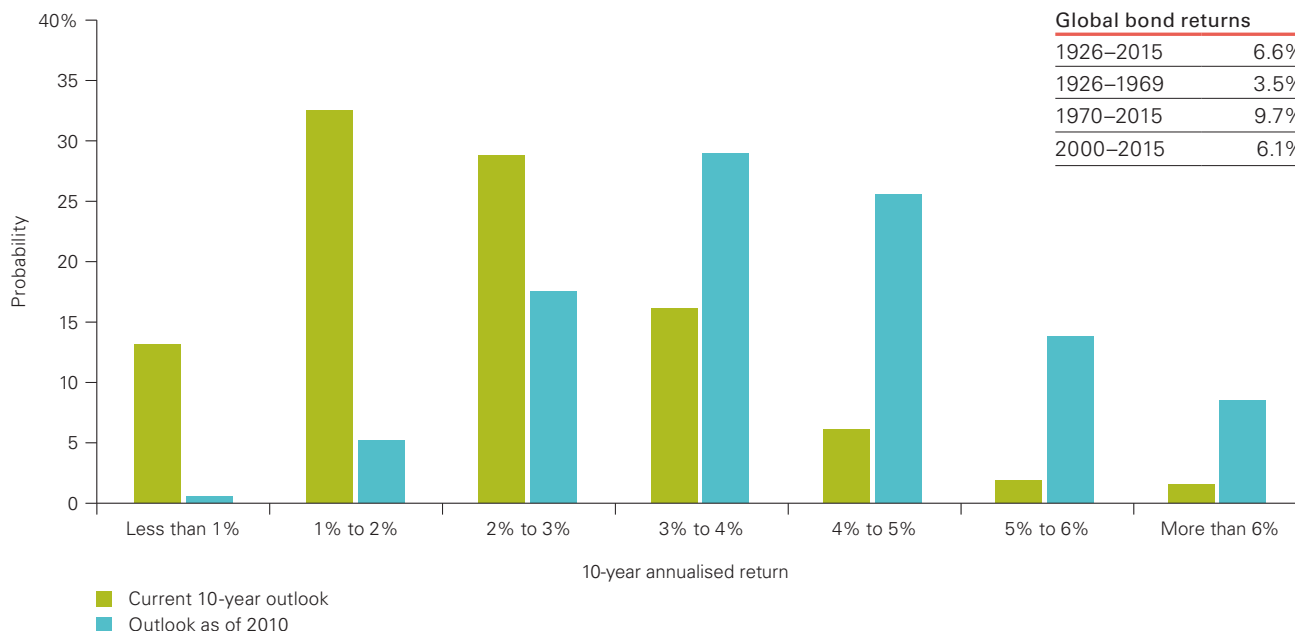
As in our past outlooks, the return forecast for fixed income is positive, but muted. As displayed in Figure II-1, the expected ten-year median return of the global fixed income market is centred in the 1.5%–2.5% range. This result is lower than our return expectations just five years ago. However, we 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 UK bond market,

such as UK Sterling Aggregate Bonds and non-Gilts, have ten-year median expected returns centered in the 2%–3% range (Figure II-2).

UK interest rates

Compared with Vanguard's 2015 outlook, our estimates of the fair-value range for 10-year gilts have fallen, with the current macroeconomic environment justifying a 10-year yield in the range of 1.5%–2.5%. Based on our estimates of the fundamental drivers of gilt 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 Bank of England policy rate gets revised downwards, and with it all other rates across the maturity spectrum. This is because fair-value estimates of long-term bond yields are determined by the expected average short-term rate over the maturity of the bond (plus a term premium).

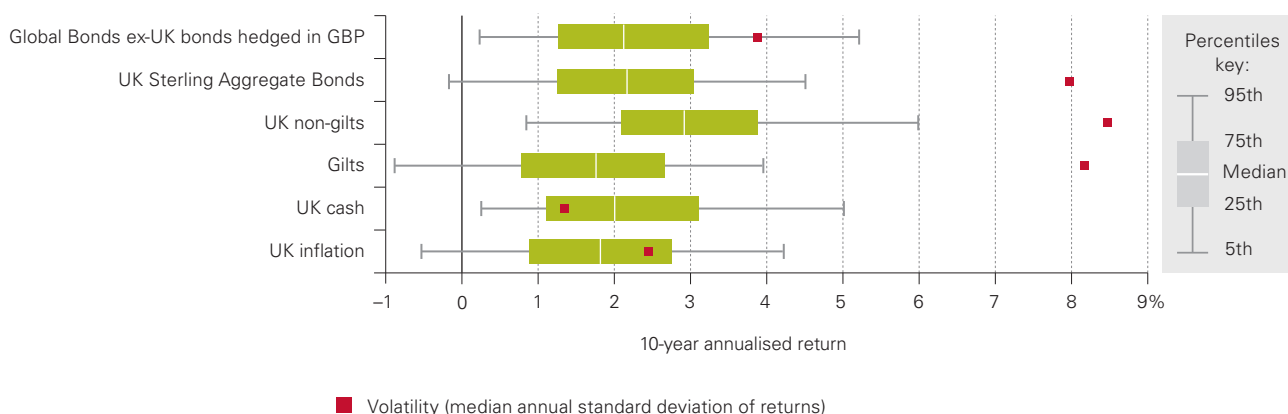
Figure II-1. Projected global fixed income 10-year outlook



Note: Figure displays projected range of returns for a portfolio of 35% UK bonds and 65% ex-UK bonds, rebalanced quarterly from 10,000 simulations from VCMM as of September 2015 in GBP. See page 27 for details of indices used for historical returns and simulations.

Source: Vanguard.

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



Note: Forecast corresponds to distribution of 10,000 simulations from VCMM for the 10-year annualised returns as of September 2015 in GBP for asset classes shown above. See page 27 for details of indices used.

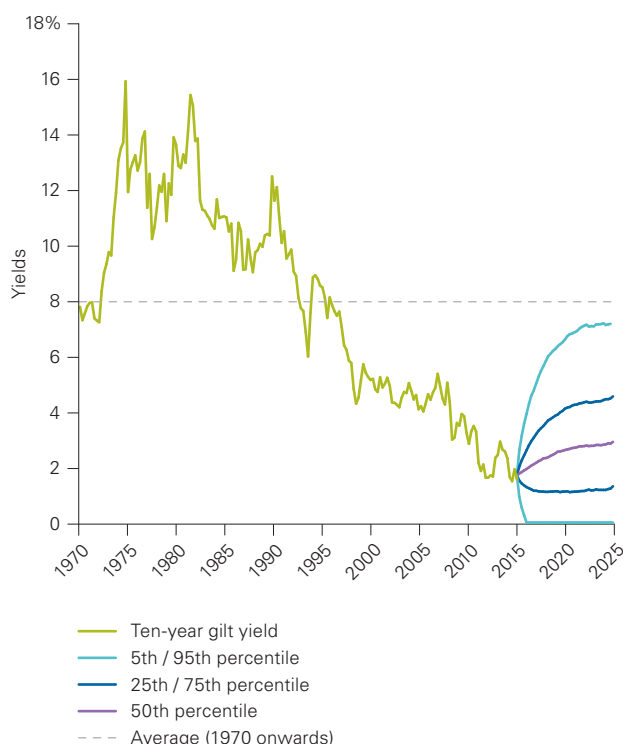
Source: Vanguard.

The lower than long-term historical average forward-looking view for 10-year gilts repeats for interest rates, as illustrated in Figure II-3. Based on Vanguard Capital Markets Model® (VCMM) projections, the 10-year yield should rise slowly over the next few years, with the central tendency at the end of five years at about 3%, well below the recent average (1970 onwards) of 7.9%.

Cash and gilts

The bond market continues to expect gilt yields to rise, particularly at the short end of the yield-maturity curve and around its medium-term range, as the UK rate lift off seems to be likely at some point in 2016. 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 gilts (see Figure II-2), with the medians appearing to be fairly similar, but with the median volatility projection for cash being lower than that of the gilt index. This might make the return outlook for cash appear more attractive than that of gilts on a risk-adjusted basis. However, cash will likely yield a negative real return over the next few years, while the term premium of gilts is likely to generate a low, yet positive, 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 the yield slope was 1.32%), produces significant income differences among duration strategies. A second benefit of holding high-quality fixed income (as represented by gilts) in a portfolio is that the bonds act as ballast, buffering losses from riskier assets such as equities.

Figure II-3. Low rates are secular, not cyclical



Notes: Ten-year gilt yield projections based on 10,000 simulations from VCMM as of September 2015.

Source: Vanguard calculations, based on data from Thomson Reuters Datastream

Credit bonds

The central tendency for UK credit (specifically, the Barclays Sterling Non-Gilt Index) is in the 2%–4% range, slightly higher than that of gilts. This reflects the accumulation of liquidity and default risk premia that accompanies the higher risk of credit bonds (Figure II-2 shows a median volatility of 8.5%). The credit spread for the UK credit bond index is above the historical median which points toward some attractiveness at present. However, one must keep in mind that spreads tend to widen in times of equity market stress.

Aggregate fixed income markets:

Domestic versus international

Although the central tendency of expected return for global ex-UK bonds appears to be more or less the same as that of UK 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 UK 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.⁶

Global equity markets

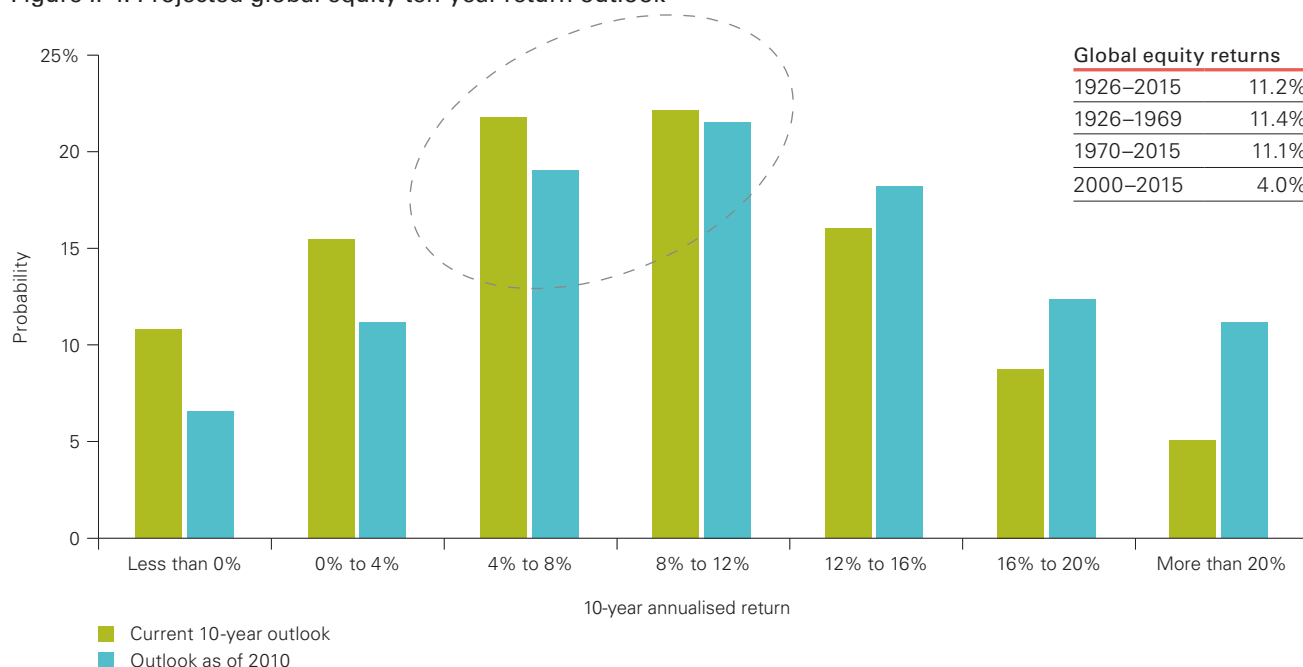
Equity market outlook:

Not bearish, but still guarded

Over the past several years, some investors have hypothesised 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 7%–9% range. As shown in Figure II-4, the central

Figure II-4. Projected global equity ten-year-return outlook



Notes: Figure displays the projected range of returns for 25% UK equity, 75% ex-UK equity portfolio in GBP, rebalanced quarterly from 10,000 simulations from VCMM as of September 2015. See page 27 for details of indices used in the simulations.

Source: Vanguard.

⁶ See Philips and Thomas (2013).

tendency of our VCMM simulations for ten-year expected returns on a global equity portfolio is below both the long-run historical annualised average return (11.2%) 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.

Equity valuations:

Vanguard's proprietary 'fair-value' CAPE

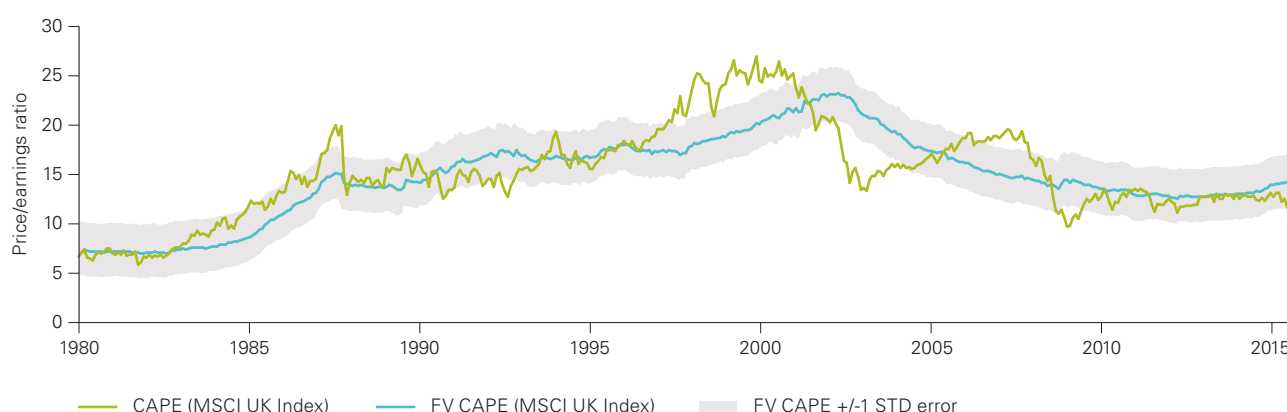
Our conservative outlook for the global stock market is based primarily on market valuations, such as price/earnings (P/E) ratios. Some may wonder why our outlook is not more bearish, based on certain market valuation metrics. A key question is whether traditional P/E ratios – such as the popular Shiller (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-5 compares Shiller's (2000) CAPE multiple (for the MSCI UK 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 slightly below that of Vanguard's model that adjusts for inflation expectations and low interest rates.

Opportunities within global equities?

The expected return outlook for non-UK equity markets is modestly lower from a UK investor's perspective. A closer look at the long-term median expected return for UK equity versus global ex-UK equity (see Figure II-6) suggests that the expected UK equity market return may undercut its own historical average, while exceeding expected global ex-UK equity return. This result is a function of the current starting level of valuations (as shown in Figures II-5 and II-7), that show emerging market valuations holding up without yet looking cheap, following the recent equity market rout. Furthermore, with the long term trends of the US dollar being priced in by markets, European and UK equity are likely to perform relatively well.

Figure II-5. Equity market does *not* appear grossly 'overvalued' when adjusted for low rates



Notes: “Fair-value CAPE” 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 five-variable vector error correction (VEC), including equity earnings-yield (MSCI UK index), UK ten-year trailing inflation, ten-year gilt yield, ten-year equity volatility and ten-year bond volatility estimated over the period January 1970 – September 2015.

Source: Vanguard calculations, based on data from Thomson Reuters Datastream and Factset.

Figure II-6. Setting reasonable expectations, being aware of widely dispersed potential returns



Note: Forecast corresponds to distribution of 10,000 simulations from VCMM for the ten-year annualised returns as of September 2015 in GBP for asset classes shown above. See page 27 for details of indices used for historical returns and simulations.

Source: Vanguard.

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-4 and Figure II-6 display wide and fat tails. As discussed in Davis, Aliaga-Díaz, and Thomas (2012b), 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-UK exposures, despite expectations of outperformance.

As mentioned, emerging-market valuations are low, especially given their weak 2015 returns. That said, we caution investors against characterising emerging market equities as “cheap.” Rather, we would encourage stock investors to stake their case for emerging markets in long-term portfolios on the diversification benefits of emerging markets.

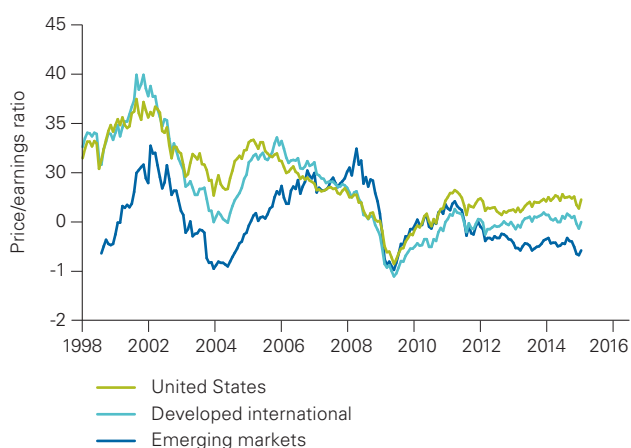
Alternative asset classes

Figure II-6 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 only a good diversifier of UK equity risk 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.

Figure II-7. Emerging market valuations holding up, but not yet “cheap”



Notes: Figure displays price/earnings ratio with 36-month trailing average earnings. US equities represented by MSCI US Index, “Developed international” represented by MSCI World ex USA Index and “Emerging markets” represented by MSCI Emerging Markets Index.

Source: Vanguard calculations based on data from Thomson Reuters Datastream

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-cap-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.

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-8 (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

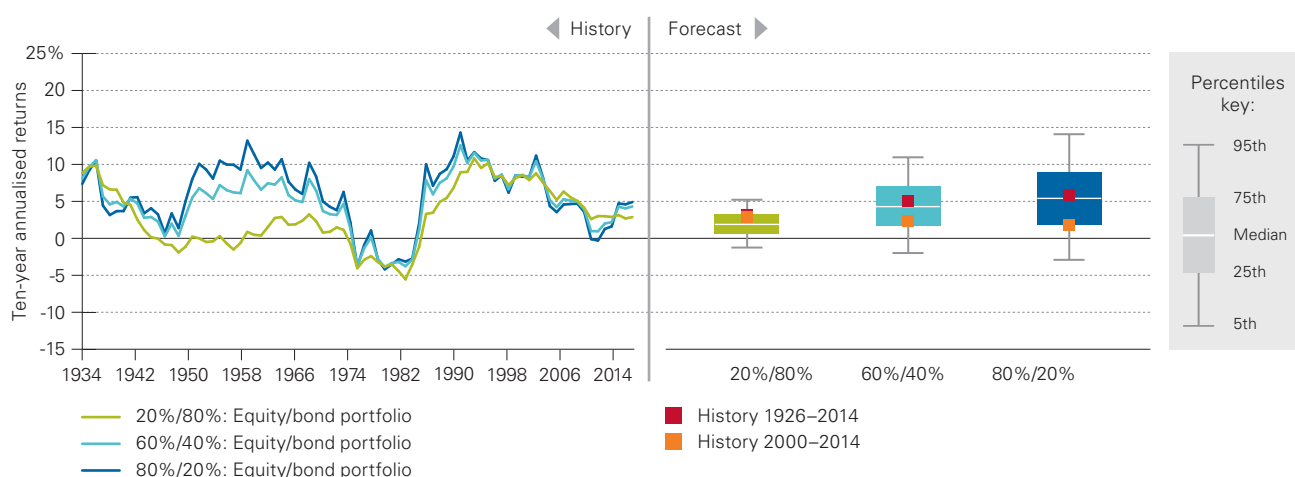
Amid widespread concern over the current low level of dividend and long-term gilt yields, Figure II-8’s real

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 gilt yields are, in part, associated with lower expected inflation than was the case 20 or 30 years ago.

Figure II-8 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 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 annualised returns of a 60% equity/40% bond portfolio for the decade ending 2025 are expected to centre in the 3%–5% real-return range, below the actual average real return of 5.0% 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 (2.3%) are near 65%.

Figure II.8. Historical and projected ten-year real-return outlook for balanced portfolios



Equity/bond portfolios	Bottom 5th percentile	25th percentile	50th percentile	75th percentile	95th percentile	History 1926–2014	History 2000–2014
20%/80%	-1.3%	0.5%	1.8%	3.2%	5.2%	3.0%	3.0%
60%/40%	-2.1%	1.7%	4.4%	7.0%	10.9%	5.0%	2.3%
80%/20%	-2.9%	1.9%	5.5%	9.0%	14.2%	5.8%	1.7%

Note: Forecast displays the 5th/25th/75th/95th percentile range of 10,000 simulations from VCMM for projected real returns for balanced portfolios in GBP as of September 2015. See page 27 for details of indices used for historical returns and simulations. For ex-UK Bonds, hedging commences in 1955. Prior to 1955, no hedging/currency conversion is used because 3-month bill yields are unavailable, and the exchange rate between USD and GBP is fixed; thus, there is no forward rate to calculate. GBP/USD Exchange Rate calculated using history of fixed rate changes until 1957, when time series becomes available within Datastream.

Source: Vanguard calculations, using data from Thomson Reuters Datastream, Barclays Live, Federal Reserve, Bank of England, Office of National Statistics, Moody’s Analytics Databuffet, OECD

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-8 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-5 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, both for 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 behaviour, 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 cross-currents 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.

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III. Appendix: VCMM and index simulations

About the Vanguard Capital Markets Model

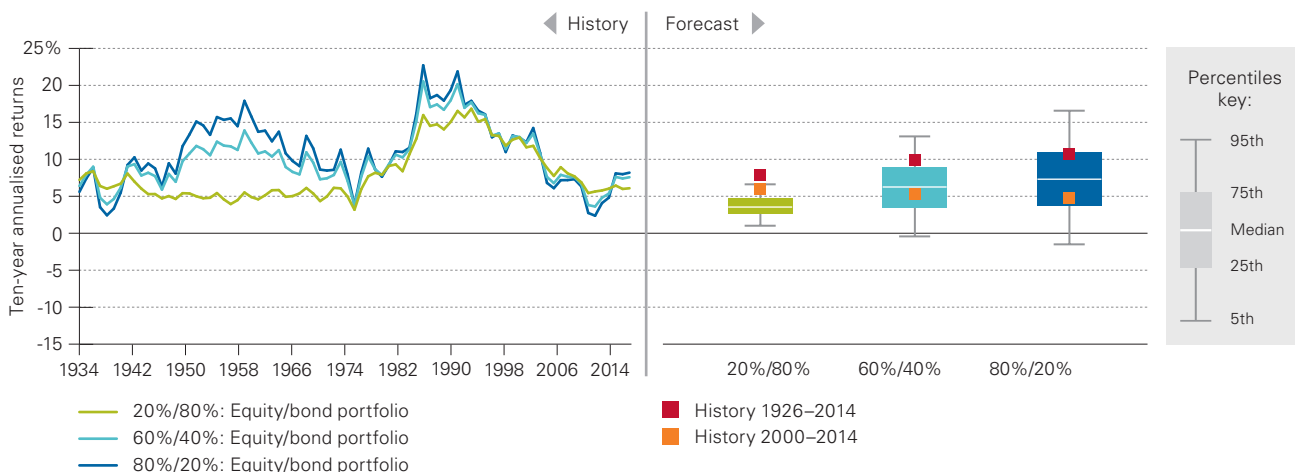
IMPORTANT: the projections or other information generated by the Vanguard Capital Markets Model regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. VCMM results will vary with each use 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 UK and international equity markets, several maturities of the UK gilt and corporate fixed income markets, international fixed income markets, UK 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.

Figure III-1. Historical and projected ten-year real-return outlook for balanced portfolios



Equity/bond portfolios	Bottom 5th percentile	25th percentile	50th percentile	75th percentile	95th percentile	History 1926 – 2014	History 2000 – 2014
20%/80%	1.0%	2.6%	3.6%	4.8%	6.6%	7.8%	5.9%
60%/40%	-0.4%	3.5%	6.2%	9.0%	13.1%	9.8%	5.2%
80%/20%	-1.5%	3.7%	7.3%	11.0%	16.6%	10.6%	4.7%

Note: Forecast displays the 5th/25th/75th/95th percentile range of 10,000 simulations from VCMM for projected nominal returns for balanced portfolios in GBP as of September 2015. See page 27 for details of indices used for historical returns and simulations. For ex-UK Bonds, hedging commences in 1955. Prior to 1955, no hedging/currency conversion is used because 3-month bill yields are unavailable, and the exchange rate between USD and GBP is fixed; thus, there is no forward rate to calculate. GBP/USD Exchange Rate calculated using history of fixed rate changes until 1957, when time series becomes available within Datastream.

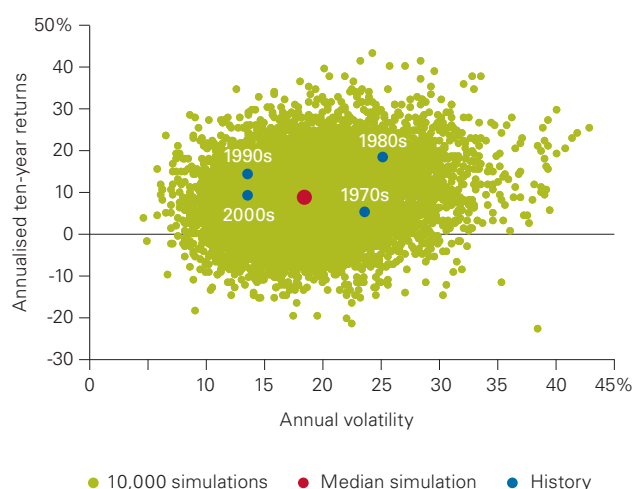
Source: Vanguard calculations, using data from Thomson Reuters Datastream, Barclays Live, Federal Reserve, Bank of England, Office of National Statistics, Moody's Analytics Databuffet, OECD

The primary value of the VCMM is in its application to analysing 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 (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 recognise 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 modelled 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 25, which highlights balanced portfolio returns before adjusting for inflation.

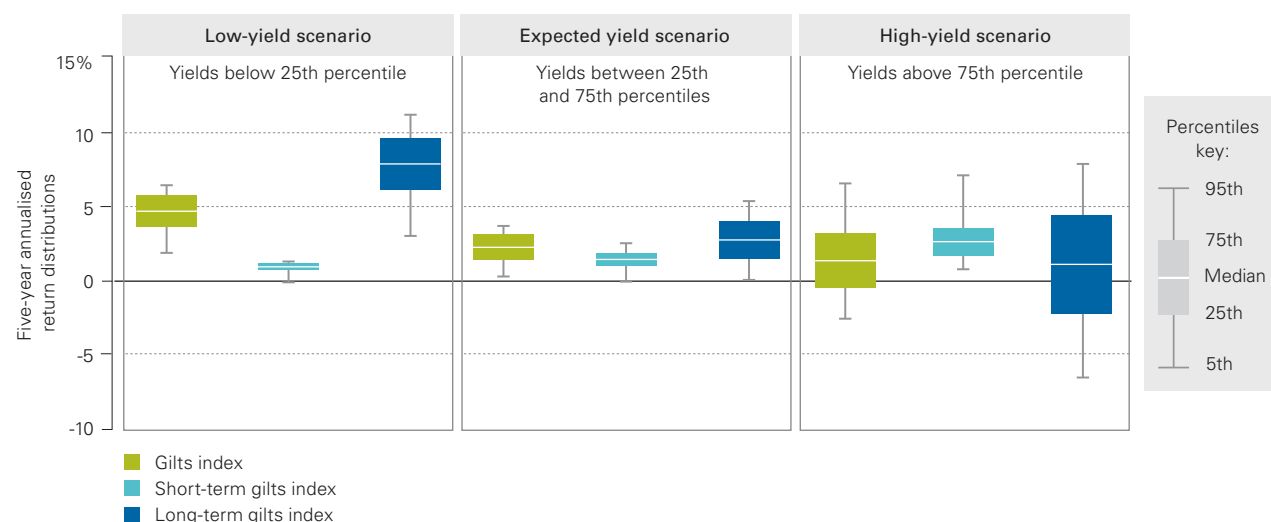
Figure III-2 further illustrates this point by showing the full range of scenarios created by the model. The scatter plot displays 10,000 geometric average ten-year returns and standard deviations for UK equities. The dispersion in returns and volatilities is wide enough to encompass historical market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

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



Notes: Historical returns are computed using indices defined on page 27.
Source: Vanguard.

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



Note: Forecast displays the distribution of 10,000 simulations of VCMM for 5 year annualised returns of the asset classes shown as of September 2015 in GBP. The scenarios are obtained based on sorting the three-month and 30-year gilt yield at the end of every year from VCMM. The three scenarios combined are a subset of the 10,000 simulations from VCMM. See page 27 for details of indices used for historical returns and simulations.

Source: Vanguard.

Index simulations

The long-term returns of our hypothetical portfolios are based on data for the appropriate market indices to 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 indices are as follows:

- UK Bonds: Barclays Sterling Aggregate
- Global Ex-UK Bonds: Standard & Poor's High Grade Corporate Index from 1926 through 1968, Citigroup High Grade Index from 1969 through 1972, Lehman Brothers US Long Credit A A Index from 1973 through 1975, Barclays US Aggregate from 1976 to 1990, Barclays Global Aggregate from 1990 to 2001; Barclays Global Aggregate ex GBP Index from 2001 onward.
- UK Equity: Barclays Equity Gilt Study from 1900 to 1964, Thomson Reuters Datastream UK Market Index 1965–1969; MSCI UK thereafter.
- Global Ex-UK Equity: S&P 90 Index from January 1926 through March 3, 1957; S&P 500 Index from March 4, 1957, through 1969; MSCI World ex UK from 1970 to 1987; MSCI AC World ex UK from 1988 onward.
- Global Equity: 25% UK Equity and 75% Global Ex-UK Equity.
- Global Bonds: 35% UK Bonds and 65% Global Ex-UK Bonds.
- UK Government: Barclays Sterling Gilts.
- UK Credit: Barclays Sterling Non-Gilt.
- UK Sterling Aggregate Bonds: Barclays Sterling Aggregate.
- UK Inflation: Consumer Price Indices – RPI all items long run series: 1900 to 2014: Jan 1974=100. Source: Office of National Statistics.

Indices used in historical calculations

Inflation: Consumer Price Indices – RPI all items long run series: 1900 to 2014: Jan 1974=100. Source: Office of National Statistics.

UK Equity: Barclays Equity Gilt Study from 1900 to 1964, Thomson Reuters Datastream UK Market Index 1965–1969; MSCI UK thereafter

UK Bonds: Barclays Equity Gilt Study 1900–1976; FTSE UK Government Index from 1976 to 1999, and Barclays Sterling Aggregate Index thereafter.

Global ex-UK Equity: S&P 90 Index from January 1926 to 3 March 1957; S&P 500 Index from 4 March 1957 to 1969; MSCI World ex UK from 1970 to 1987; MSCI AC World ex UK from 1988 onwards.

Global ex-UK Bonds: Standard & Poor's High Grade Corporate Index from 1926 to 1968, Citigroup High Grade Index from 1969 to 1972, Lehman Brothers U.S. Long Credit A A Index from 1973 to 1975, Barclays U.S. Aggregate Bond Index from 1976 to 1990, Barclays Global Aggregate Index from 1990 to 2001; Barclays Global Aggregate ex GBP Index from 2001 onwards.

Global Equity: 25% UK Equity and 75% Global ex-UK Equity as defined above.

Global Bonds: 35% UK Bonds and 65% Global ex-UK Bonds as defined above.

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