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

Vanguard Research

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

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

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

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

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Editorial note

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

Acknowledgments

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

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Notes on asset-return distributions

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

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

Vanguard's distinct approach to forecasting

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

Global outlook summary

Global economy: *Tight labour markets become tighter*

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

Inflation: *Secularly low, but not dead*

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

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

Monetary policy: *Tighter and trickier from here*

The risk in 2018 is that a higher-than-expected bounce in wages—at a point when 80% of major economies (weighted by output) are at full employment—may lead markets to price in a more aggressive path or pace of global monetary policy normalisation. The most likely candidate is in the United States, where the Federal Reserve is increasingly likely to raise rates to 2% by the end of 2018, a more rapid pace than anticipated by the bond market. The RBA is also looking to raise rates, but given the dilemma posed by low inflation and financial stability risks, may wait until late 2018 to make its next move. Overall, the chance of unexpected shocks to the economy as global monetary policy becomes more restrictive is high, particularly when considering that it involves unprecedented balance-sheet shrinkage.

Investment outlook: *A lower orbit*

The sky is not falling, but our market outlook has dimmed. Since the depths of the 2008–2009 Global Financial Crisis, Vanguard's long-term outlook for the global stock and bond markets has gradually become more cautious—evolving from bullish in 2010 to

constructive in 2012 to guarded in 2017—as market returns have risen with (and even exceeded) improving fundamentals. Although we are hard-pressed to find compelling evidence of financial bubbles, risk premiums for many asset classes appear slim. The market's efficient frontier of expected returns for a unit of portfolio risk now hovers in a lower orbit.

Based on our "fair-value" stock valuation metrics, the ten-year outlook for global equities has deteriorated a bit and is now centred in the 4.5%–6.5% range.

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

Indexes used in our historical calculations

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

Australian bonds: Bloomberg Ausbond Composite Index from 1989 through 2004, and Bloomberg Barclays Australian Aggregate Bond Index thereafter.

Global ex-Australia bonds: Standard & Poor's High Grade Corporate Index from 1958 through 1968, Citigroup High Grade Index from 1969 through 1972, Lehman Brothers U.S. Long Credit AA Index from 1973 through 1975, and Bloomberg Barclays U.S. Aggregate Bond Index from 1975 through 1989, Bloomberg Barclays Global Aggregate from 1990 through 2001 and Bloomberg Barclays Global Aggregate Ex AUD Index thereafter.

Global bonds: 50% Australian bonds and 50% Global Ex-Australian bonds.

Australian equities: ASX All Ordinaries Index from 1958 through 1969; MSCI Australia Index thereafter.

Global ex-Australia equities: S&P 500 Index from 1958 through 1969; MSCI World Ex Australia Index from 1970 through 1987; MSCI ACWI Ex Australia Index thereafter.

Global equities: 50% Australian equities and 50% Global Ex-Australian equities.

I. Global economic perspectives

Global economic outlook: Rising risks to the status quo

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

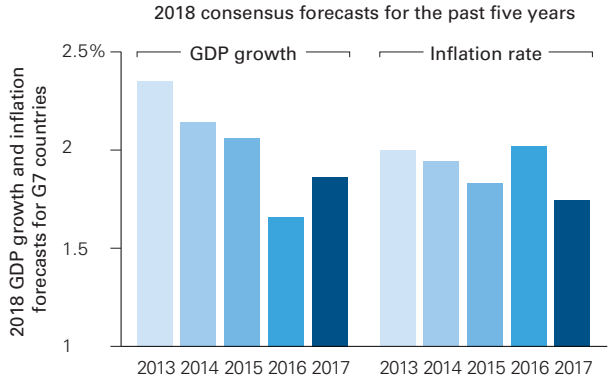
Markets and policymakers have been slow to recognise these trends, as most continued to expect a slow yet full recovery to pre-2008 norms. For the past few years, economists and investors started each year holding high hopes for a cyclical bounce, just to correct their forecasts downward a few months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

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

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

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

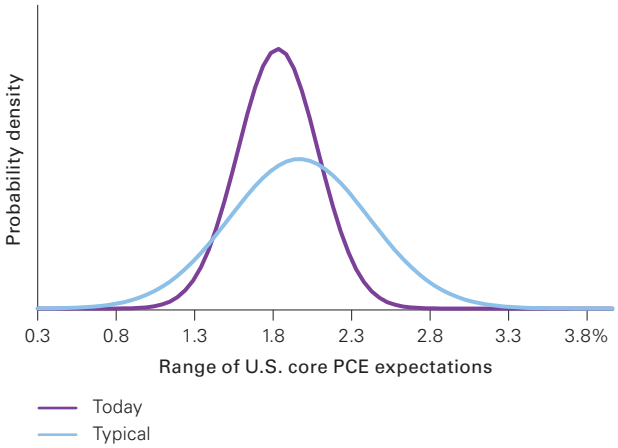
Figure I-1. Market consensus has finally embraced the low secular trends



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

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

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



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

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

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

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

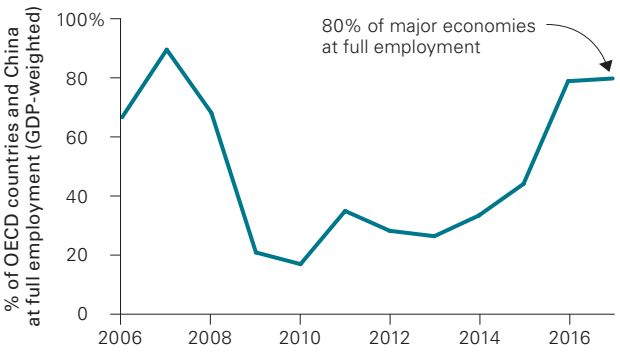
Based on historical experience, periods of tightness in global labour markets such as the current one can lead to one of three outcomes:

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

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

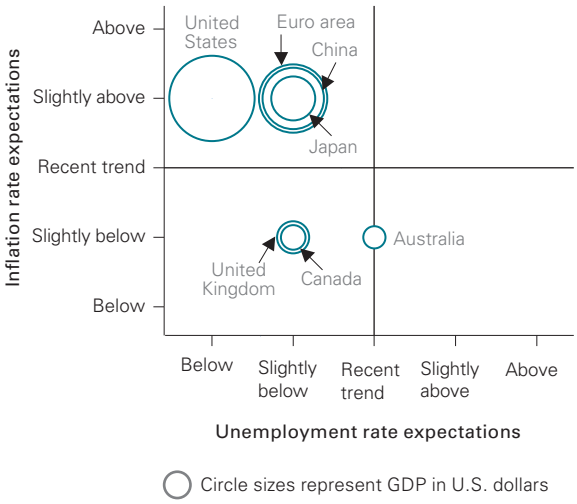
Just as the response to the financial crisis was unprecedented, the banks' path to normalisation is not well-marked. The path ahead covers uncharted territory, so the chance of unexpected shocks to markets is high.

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



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

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



Source: Vanguard.

Global growth outlook: Proprietary signals point to continued expansion

Against the backdrop of weak household consumption, high leverage and fading dwelling investments, we expect the Australian economy to grow around 2-2.5% in 2018, below its long-term trend. As **Figure I-5** illustrates, our proprietary leading indicator dashboard points toward to a slightly subdued outlook, with notable downside risks. The most positive indicators, the "green signals", are those associated with commodities and business sentiment. Any material pickup in confidence or infrastructure investment would support the economy and would be surprises to the upside. The "yellow signals" derive from the financial market and trade. The more negative indicators (red signals) are associated with consumption and housing, largely reflecting the households' stretched balance sheet. On top of this dynamic, the labour market sends us mixed signals, with unemployment looking healthy (a green indicator, in fact), but underemployment remaining elevated.

Between the state of the labour market and the household sector in Australia, we have increased our downside risk from what we wrote last year. Using regression analysis, we mapped our proprietary indicators to a distribution of potential scenarios for Australian economic growth in 2017 (**Figure-b**). The odds of a slowdown (27%) are markedly higher than the potential for the economy to accelerate (9%). Our base case is that the economy centres on growth below trend (2-2.5%) given the factors we use for our proprietary index.

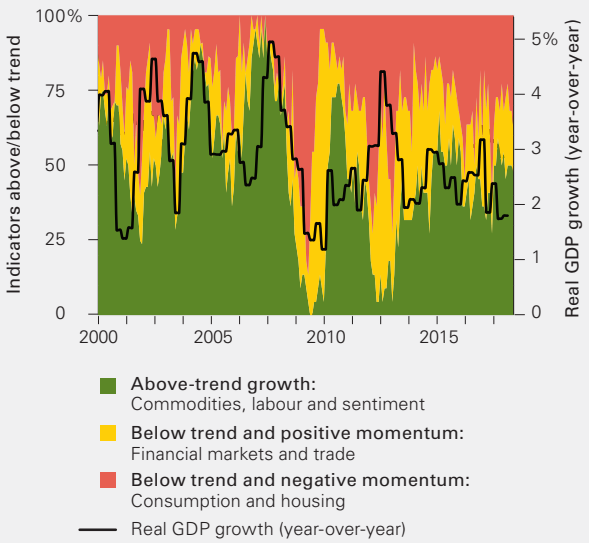
We expect the U.S. economy to once again break above its long-term potential growth of about 2% in 2018 in spite of long-term structural challenges, including slowing productivity growth and demographic headwinds. Our proprietary U.S. leading indicators dashboard is a statistical model based on more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

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

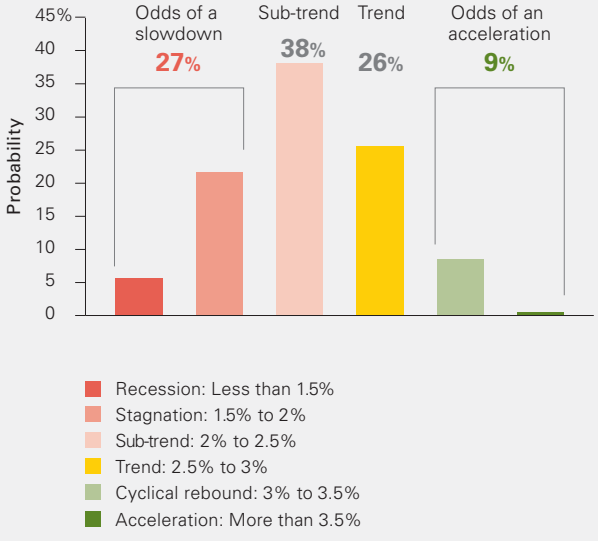
Figure I-5. Vanguard dashboards of leading economic indicators and implied economic growth for 2018

Australia: Slightly below consensus

a. Economic indicators



b. Vanguard's 2018 Australian economic outlook



Notes: The distribution of growth outcomes is generated by bootstrapping the residuals from a regression based on a proprietary set of leading economic indicators and historical data, estimated from 1980 to 2017 and adjusting for the time-varying trend growth rate. Trend growth represents projected future estimated trend growth.

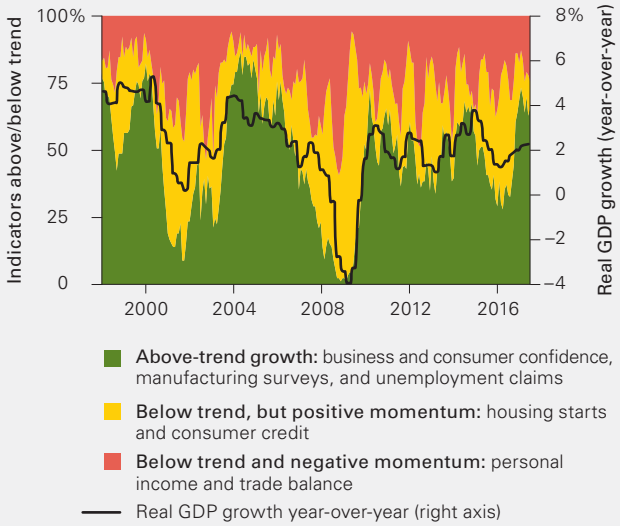
Source: Vanguard calculations, based on data from CEIC, RBA and Thomson Reuters Datastream.

credit extension), continued progress in the transformation of China's growth model (as suggested by rising consumer confidence and a tight labour market) could mitigate downside pressures from a slowdown in the highly leveraged industrial sector.

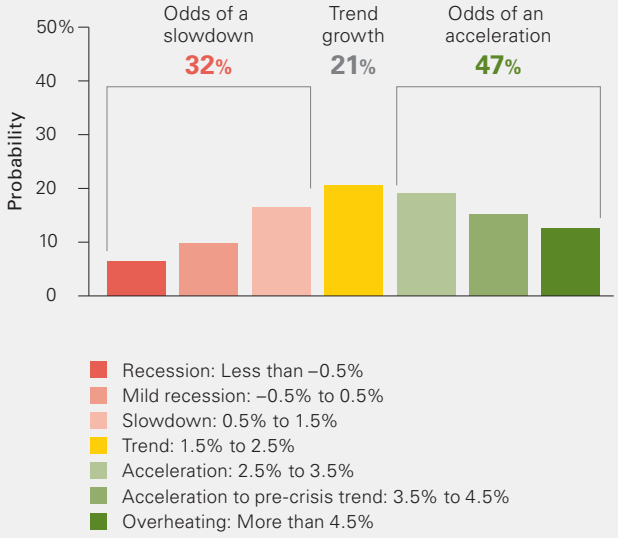
Against this backdrop, the Chinese economy is expected to grow by around 6%–6.5% next year (see **Figure I-5f**), with the risks of an upside surprise greater than those of a more pronounced slowdown.

United States: Slightly above consensus

c. Economic indicators



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

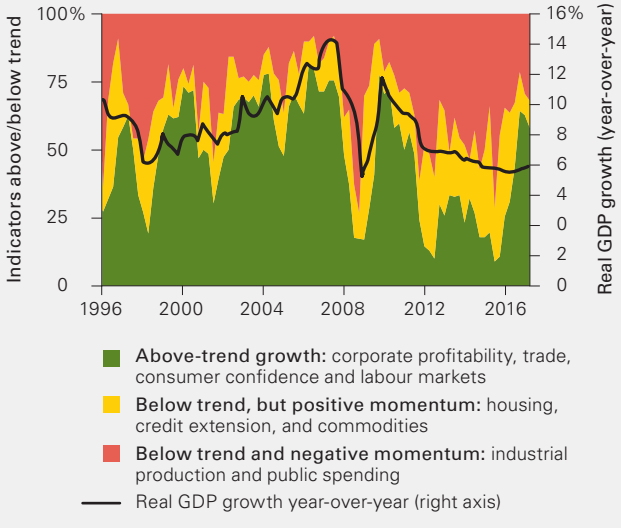


Notes: The distribution of growth outcomes is generated by bootstrapping the residuals from a regression based on a proprietary set of leading economic indicators and historical data, estimated from 1960 to 2017 and adjusting for the time-varying trend growth rate. Trend growth represents projected future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

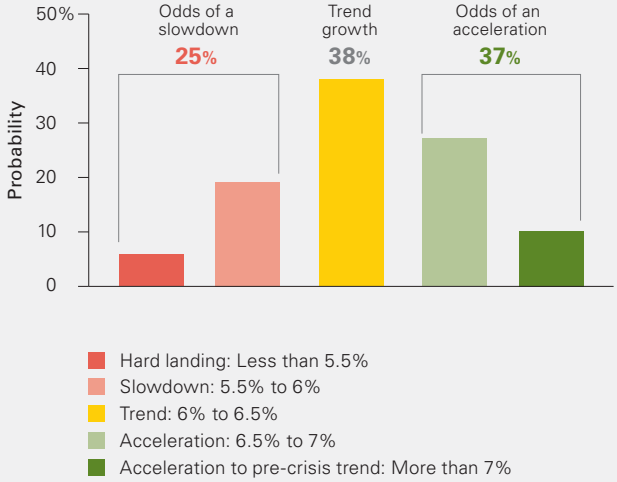
Source: Vanguard calculations, based on data from Moody's Analytics Data Buffet and Thomson Reuters Datastream.

China: Slightly above consensus

e. Economic indicators



f. Estimated distribution of China growth outcomes, 2018



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

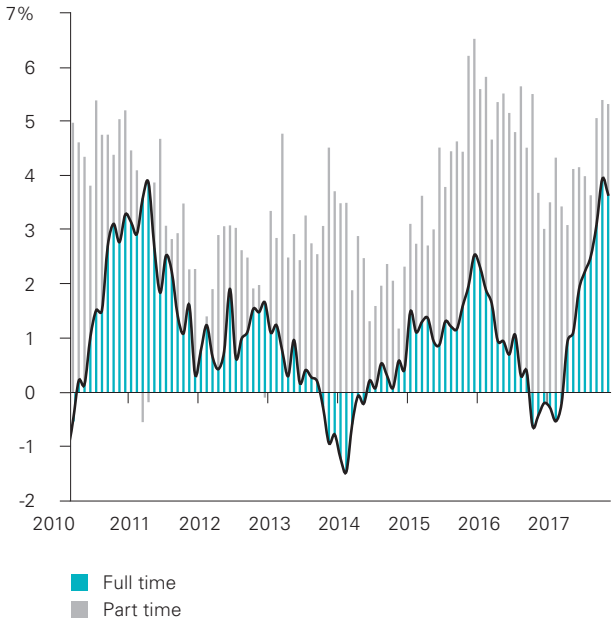
Source: Vanguard calculations, based on data from Thomson Reuters Datastream and CEIC.

Australia: All eyes on households

Australia will struggle to achieve a stronger bounce in growth next year. Weak household consumption, high leverage, and fading dwelling investments will hold growth below trend. The odds of a slowdown are markedly higher than the odds of an acceleration, but our base case is that the economy centres on growth below trend (2-2.5%). Although retail sales picked up in the past few months, it was largely due to a sharp drop in the personal saving rate, which we view as unsustainable. In the same vein, households face record debt levels (192% of disposable income), low wage growth (1.9% average 2017) and rising energy bills.

Part of our lower-than-trend view on growth comes from our analysis of Australia's labour market, which, in line with other developed markets, appears tight…but only on the surface. Employment has surged by just under 300,000 jobs since the start of the year, and the jobless rate has hovered between 5.5% and 5.8% most of the year, but broader measures than these temper our optimism. As illustrated in **Figure I-6**, part-time jobs constituted most of the growth in this cycle. The Australian labour market has undergone structural changes over recent decades, as the economy continues transitioning from mining and manufacturing to the service sector. Firms are shifting to more flexible working arrangements, which represents both a response to technology and a strategy for more effective cost management. At the same time, the demographic shift, including the ageing population, means the supply of labour is leaning toward part-time work. According to the RBA, the share of part-time work has risen to one-third of total employment, making Australia one of the OECD countries with the highest share (RBA, 2017).

Figure I-6. Year on year growth of employment

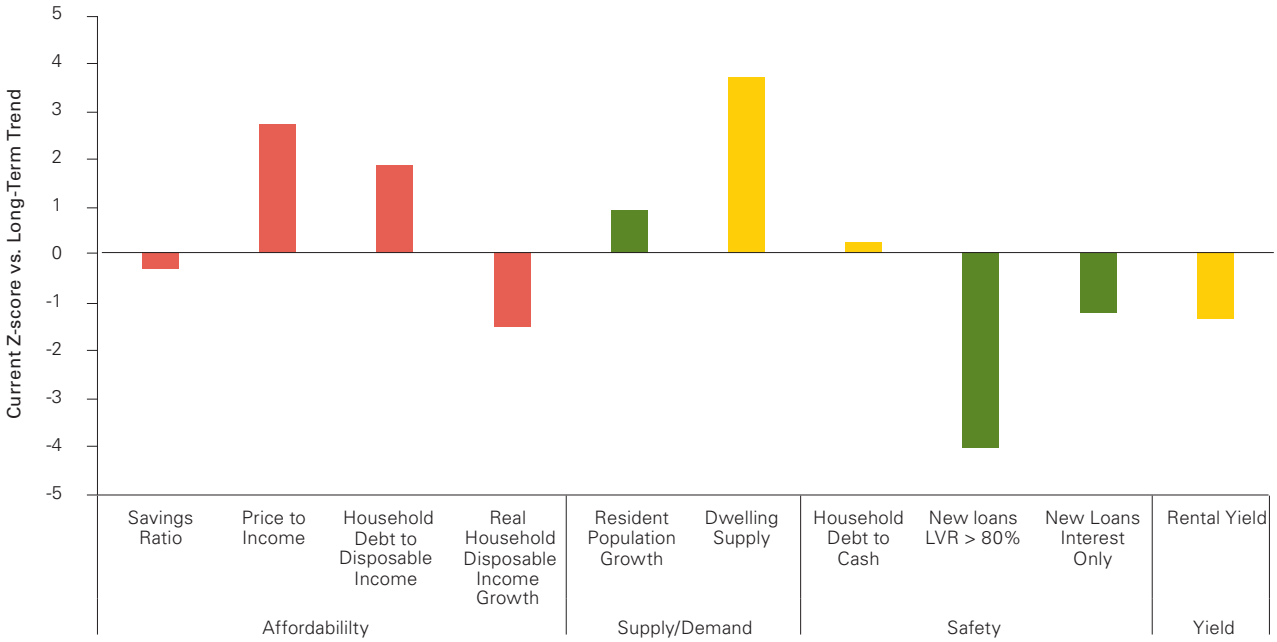


Sources: Vanguard calculations based on data from the ABS and Thomson Reuters Datastream.

Figure I-7. Wage growth and underemployment rate

Sources: Vanguard calculations based on data from the ABS and Thomson Reuters Datastream.

Figure I-8. Property owners are betting on higher income growth or continued house price appreciation



Notes: Z-Score calculated over the period 1990-2012 except for Price to Income (1996-2012) and percentage of new loans that are interest-only and with LVR above 80% (2008-2012). Dwelling supply is defined as the sum of dwelling approvals, commencements, and completions. Cash is defined as currency plus deposits on the balance sheet of households (assets). Colour represents our assessment of whether current value of indicator is positive (green) or negative (red) for households. Data as of Q2 2017.

Sources: Vanguard calculations, using data from the ABS, RBA, REIA, APRA, CEIC, and Thomson Reuters Datastream.

The underutilisation of the labour force has become a key component of our forecast for mild wage growth. The relationship between the unemployment rate and wage growth has changed significantly since 2015 (the trough of the mining bust). Underemployment has proved itself to be a better indicator of wage pressure, moving in lock-step over the history of the series (**Figure I-7**). The high share of part-time work represents increased flexibility, but possibly decreased bargaining power that could constrain future wage growth.

While underemployment is elevated by historical standards, measuring unemployment against the OECD's non-accelerating inflation rate of employment (NAIRU) indicates Australia is at "full employment," indicating that the labour market is fraught with structural issues, such as a skill mismatch between firms and available workers. Consumption growth will be an important indicator in 2018, as greater job gains could fuel more spending, even though most of these jobs will probably not see wage growth accelerate significantly.

Barring healthy labour market growth, or a material, sustained rise in commodity prices, it is difficult for us to see many scenarios where inflation accelerates much past 2% in 2018. The increases in underemployment and part-time work are enough of a signal that the "real economy" will not place much pressure on prices (or rates) in the near future. The path of wages and underemployment needs to change before we see any pressure from the labour market.

On top of these developments, the trends of technology, demographics, and globalisation continue to intensify, riptides off the shoreline we know are present but cannot locate precisely. Some of the changes we observe in the labour market can be attributed to these forces: routine tasks being replaced by non-routine "uniquely human" tasks, the ageing Baby Boom cohort reducing the supply of labour, and offshoring jobs to trading partners with lower labour costs. It significantly reduces production costs in every industry – companies built for "digital" scale, for example, can quickly disrupt seemingly invincible incumbents.

Figure I-9. RBA's dilemma

	Post-crisis Average	2017 Average	Effect of Rate Hike
House Price Growth, YoY%	6.2%	11.3%	↓
Household Debt to Disposable Income	174%	192%	↓
Headline Inflation, YoY%	2.2%	1.9%	↓
Wage Growth, YoY%	2.9%	2.0%	↓
Consumption Growth, YoY%	2.4%	2.4%	↓
Output Gap	-1.1%	-1.8%	↑
Unemployment Gap	0.1%	-0.3%	↑
Underemployment Rate	7.7%	8.7%	↑

Notes: For 2017 Average column, colour reflects whether current conditions are positive (green) or negative (red) compared to history. For Effect of Rate Hike column, colour reflects our assessment of whether rate hike would be constructive (green) or challenging (red) on the specified factor. Arrows reflect likely direction of factor after a rate hike.

Sources: Vanguard calculations based on data from the ABS, RBA, OECD, and Thomson Reuters Datastream.

As we noted, we do not think it is likely that underlying inflation will move beyond 2% in the next year – and it is hard to pinpoint exactly where it will end given these trends hardly have straightforward effects on the economy.

Failing to acknowledge these dynamics can result in more "surprises" to the downside; unlike the other economies we cover, where markets may mistake the cycle for the trends, Australia's biggest risk is that markets mistake these trends for the current cycle.

Our outlook for Australia in 2018 would be mild, modest, and on the whole, benign – yet the spectacular growth in household leverage (as measured by debt to disposable income) that accompanied a strong period of property price and investment growth cannot be underplayed. Aggregate statistics for the household sector (and property owners, in particular) do not offer strong warnings, but conceal that many households are essentially taking the view that their income growth or the value of their property will increase materially over the coming years. Figure I-8 evaluates indicators of health for households and housing against their long-term average. Softness in property prices – or, slower income and labour market growth – could ripple through the economy given the leverage carried by many households. The challenge is assessing from where the pressure would come.

Fending off the "low for long" inflation malaise only makes matters more difficult for the RBA, who already face a major dilemma over the next few years: hike "in the name of financial stability," or cut "in the name of inflation and wages." Figure I-9 highlights the source of the dilemma: household leverage is at an all-time high and grew rapidly, housing prices show no sign of slowing, but inflation and the labour market continue to disappoint. There are equally compelling cases to raise or lower the cash rate. Commentary from the RBA focuses more and more on financial stability, so we may see more guidance from policymakers around managing stability and leverage-induced risks in the coming months. Against this backdrop, the RBA will probably "drag their feet" and wait until late 2018 at the earliest to raise the cash rate.

United States: Tightening labour markets hold the key

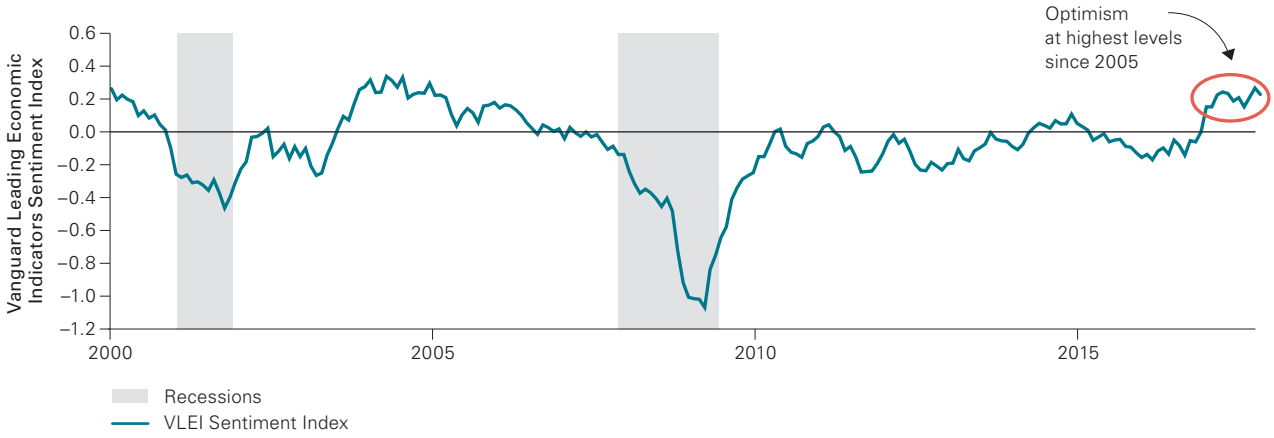
In 2017, U.S. economic growth is on pace to surpass its long-term trend of 2% a year for the first time in three years. Strong domestic economic fundamentals have propelled consumer confidence and business optimism to levels not seen since before the financial crisis (see **Figure I-10**). A powerful combination of extremely tight labour markets, strong financial market returns, increasing housing values, improving access to credit, and the end of the household deleveraging cycle are supporting both the consumer and business investment engines of economic growth. Private-sector optimism has remained immune to the uncertainties of domestic policy debates and geopolitical developments abroad.

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

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

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

Figure I-10. A more optimistic outlook



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

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

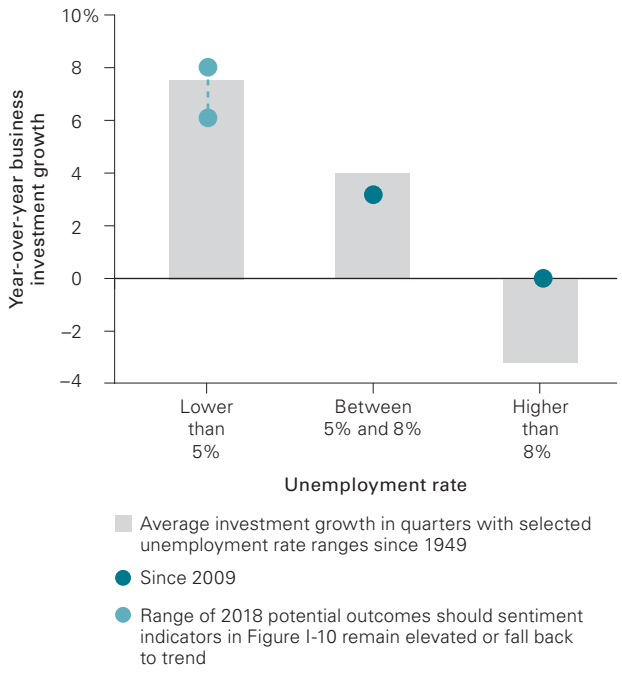
market (80,000 to 100,000 a month), the unemployment rate is very likely to fall into the 3%–4% range; at the time of this paper's writing, the rate was 4.1%. Slower population growth and ageing of the population will continue to exert downward pressure on labour force participation rates and will restrain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

With unemployment rate levels below 4%, the potential for an upside surprise in either business capital expenditures or inflationary wage pressures is increasingly likely. Historically, periods of labour market tightness have resulted in labour shortages in certain industries, rising unit labour costs in others, or a combination of both. Typically, companies see labour market tightness as an indication of robust demand prospects but also of more expensive labour input, and they respond by ramping up investment in new technologies that are less labour-intensive when possible. Thus, this is the stage of the cycle where we see the fastest pace of business capital investment (see **Figure I-11**). Although business investment has been the missing component of this recovery cycle, our estimations for 2018, based on unemployment trends as well as high business sentiment measures, is for an acceleration roughly in line with that of previous business cycles.

The relationship between lower unemployment rates and higher wages (the so-called wage inflation Phillips curve)—pronounced dead by some—should also begin to re-emerge in 2018 (see **Figure I-12**). Many explanations for persistently low inflation have been put forth, including structural forces such as demographics, technology, and globalisation. Despite the struggles policymakers will face in hitting their inflation targets in the medium term, we believe that in 2018, the growing impact of cyclical factors such as tightening labour markets and stable and broader global growth may lead to wage and price inflation stronger than currently anticipated by financial markets.

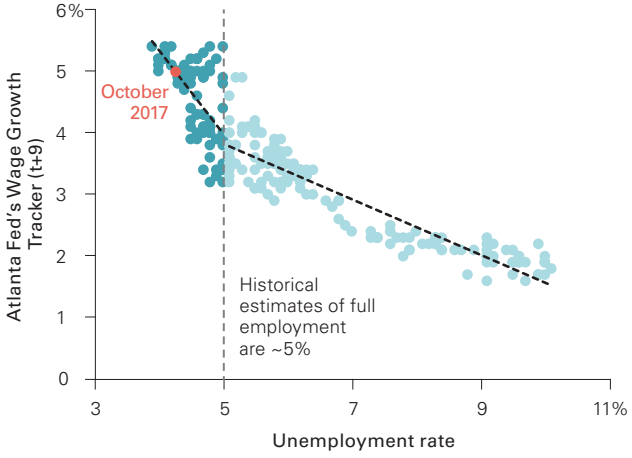
The risk in 2018 is that a higher-than-expected bounce in wages may lead markets to reprice a more aggressive path of monetary policy normalisation than currently expected. In particular, the Fed is projecting to raise rates to 2% by the end of 2018, a more rapid pace than anticipated by the bond market.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

Figure I-11. Lower unemployment rates = higher business capital spending



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

Figure I-12. Back from hibernation: Sub-4% unemployment rates should boost wage growth



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

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

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

At the same time, such a response from the Fed to an "inflation surprise" would prevent a larger and more persistent inflation acceleration in the economy. In fact, our long-term inflation outlook remains unchanged from 2017. For 2019 and beyond, the effects of the long-term structural forces of technology and globalisation on consumer prices are likely to regain control and keep inflation contained in spite of ongoing reflation efforts by the Fed and other major central banks. In our research, we have estimated that falling prices for technology inputs in the U.S. economy have restrained overall core inflation metrics by 50 basis points on average over the last 20 years.[1] This drag is close to the current inflation shortfall from target levels. As Figure I-13 shows, the impact of these forces may have been in play since well before the financial crisis, with inflation systematically falling short of the Fed's 2% target even during periods of strong growth and full employment.

In addition to uncertainties about the number of rate hikes in 2018, there are uncertainties surrounding the Fed's unwinding of its balance sheet. Just as the response to the crisis was unprecedented in terms of balance sheet expansion, the Fed's path to normalisation is not well-marked. The path ahead covers uncharted territory, with the market impact of policy decisions unknown.

Paradoxically, in the face of such uncertainty, market volatility remains placidly subdued. (See the text box on page 14, "Quantitative easing unwind and market volatility: Is there anything abnormal about this normalisation?")

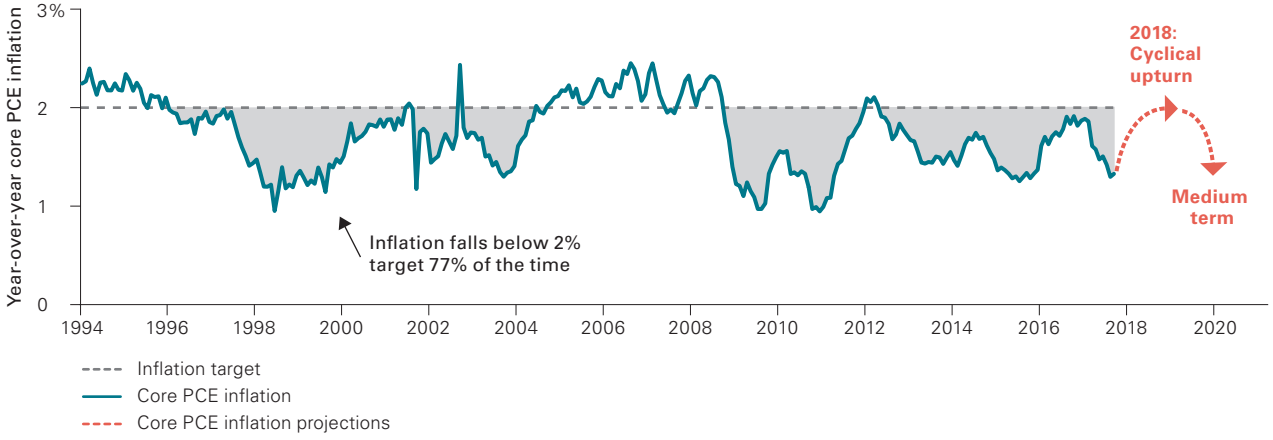
The early stages of the unwinding process have shown little market reaction, but we still have further to go (see Figure I-14). Studies on the potential effects of the Fed's balance-sheet policies on asset prices are divided. Some find evidence of *symmetric effects* of increases and decreases in the size of the balance sheet on asset prices. For instance, according to these studies, long-term interest rates could see a jump of 40 to 100 basis points during the unwinding (although most of this effect may have already happened when the normalisation plans were announced earlier in 2017). Other research finds strong support for *asymmetric effects,* in which market prices respond only to quantitative easing purchases, not to a decrease in the Fed's balance sheet. According to these studies, a buildup of the Fed's balance sheet may affect markets insofar as they signal the Fed's intentions regarding the future path of interest rates (that is, the commitment to keep rates low for a long period).[2]

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

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

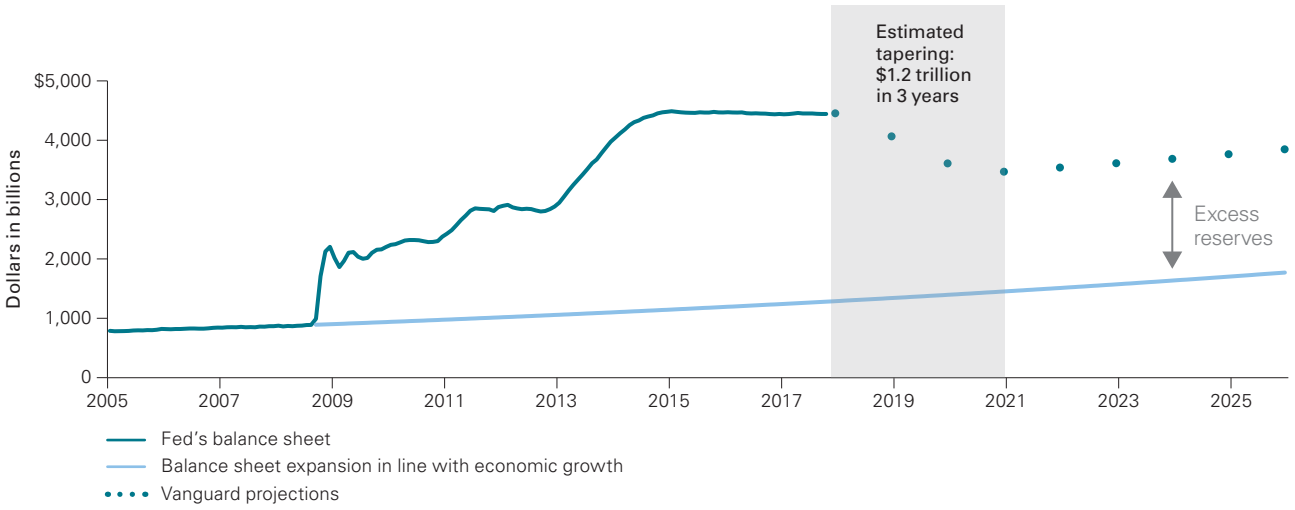
2 For a review of the literature on the various schools of thought, see Borio and Zabai (2016) and Haldane, et al. (2016).

Figure I-13. U.S. inflation: Secularly low, but cyclically rising



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

Figure I-14. The unwind is expected to be more measured than the buildup



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

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

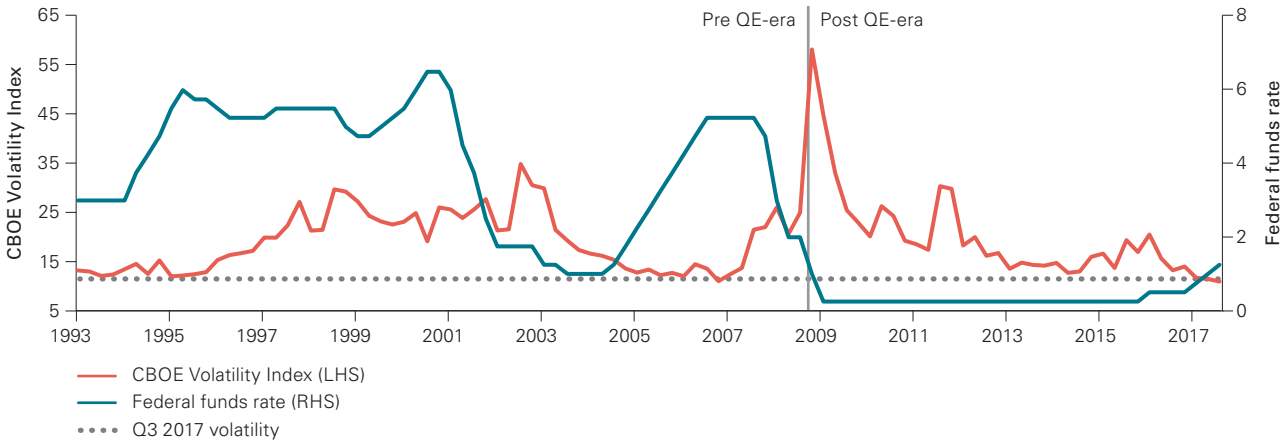
Quantitative easing unwind and market volatility: Is there anything abnormal about this normalisation?

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

Our research indicates that today's low levels of volatility are not, in fact, unprecedented. **Figure I-15** shows that the S&P 500 VIX is near all-time lows, but it also hit similarly low levels before the Global Financial Crisis, when there were no quantitative easing or zero-interest-rate policies.

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

Figure I-15. Low-volatility environment is not unprecedented



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

Figure I-16a compares this sensitivity of markets to economic surprises and shows that the cycle is not far removed from prior periods of easy monetary policy, extraordinary or otherwise. Similarly, **Figure I-16b** displays extremely narrow forecast dispersion among economists at present, but again, current levels do not stand out as extraordinary relative to similar historical episodes.

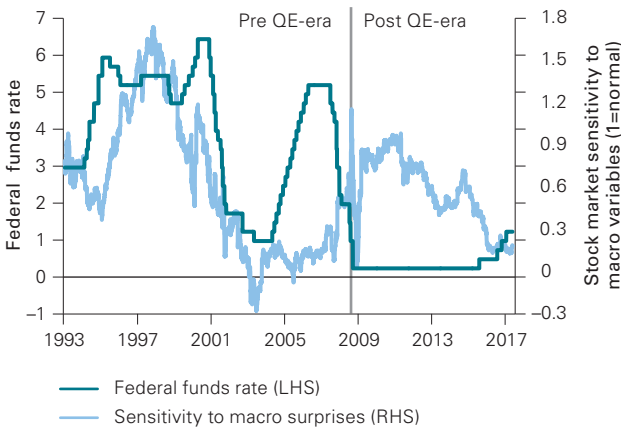
Although the current environment is admittedly one of low volatility, low forecast dispersion, decreased sensitivity to macro fundamentals, and looming policy tightening, these conditions do not represent a departure from historical norms.

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

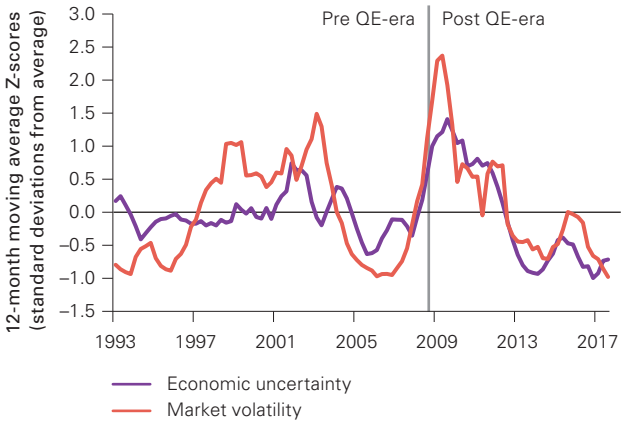
Our intent is not to imply that the forthcoming removal of extraordinarily easy monetary policies will be without volatility but rather to show that it may be overly pessimistic to assume that the degree of volatility has to be equally extraordinary.

Figure I-16. No evidence of QE's effect on...

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



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



Notes: For Figure I-16a: We used a process in which a time-varying coefficient is attached to an index of macro variables so that deviations above (or below) 1 represent heightened (or dampened) sensitivity of the S&P 500 Index to surprises in macro variables. The index for macro surprises was developed using daily data from the following U.S. macro announcements: retail sales, Institute for Supply Management (ISM) Non-Manufacturing Index, ISM Manufacturing Index, Philadelphia Federal Reserve Survey, industrial production, construction spending, capacity utilisation, consumer credit, core Consumer Price Index, Treasury budget deficit, Empire State Manufacturing Survey, and wholesale sales. For Figure I-16b: "Economic uncertainty" represents the 12-month moving average equally weighted standardised cross-sectional dispersion metric of survey respondents' projections for U.S. real GDP growth, the unemployment rate, inflation, and the 3-month Treasury bill rate one year into the future over time. "Market volatility" represents the 12-month moving average standardised value of the CBOE Volatility Index, which measures the 30-day implied volatility from options activity for the S&P 500 Index.

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

China: Two steps forward, one step back

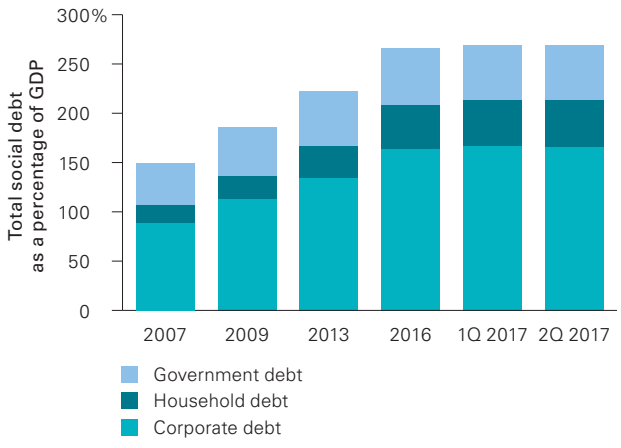
Following a decade of aggressive credit expansion, China's credit profile has stabilised recently, as tighter financial controls and a rebound in nominal growth helped stunt a rise in corporate liabilities—the crux of China's debt fears (see **Figure I-17**). Although this bodes well for China's medium-term goal of maintaining financial stability, we are conscious of the negative impact it will have on growth in the near term. Alongside tighter property regulations and supply-side adjustments, the financial tightening is likely to cause China to decelerate modestly in 2018, reaching about 6.0%–6.5%.

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

First, the oversupply and overcapacity drags in the real estate and heavy industrial sectors, which have weighed on China's investment growth for years, are likely to be less intense going forward. In the property market, for example, a combination of strong demand and a sharp contraction in investment from the middle of 2013 to 2015 has reduced the extent of inventory overhang (see **Figure I-18a**). Additionally, it appears that the peak of the industrial capacity reduction is behind us.

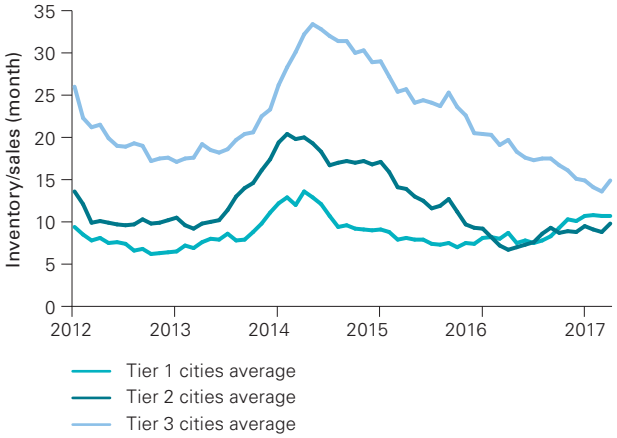
As **Figure I-18b** illustrates, in the last 18 months, 50% of the five-year capacity reduction target has been achieved in the coal sector, and nearly 90% has been achieved in the steel sector.

Figure I-17. China's debt-to-GDP ratio has stabilised on financial tightening and better growth



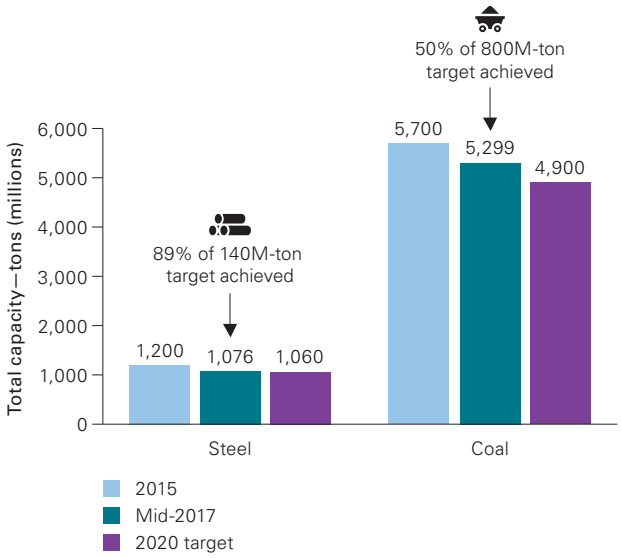
Source: Vanguard, using data from the People's Bank of China (PBoC) and the National Bureau of Statistics of China (NBS).

Figure I-18a. Rapid destocking has taken place in smaller cities



Source: Vanguard, using data from CEIC.

Figure I-18b. The peak of industrial capacity reduction has passed



Source: Vanguard, using data from NBS.

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

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

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

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

Figure I-19. Priority and progress of structural reforms to date

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

Source: Vanguard.

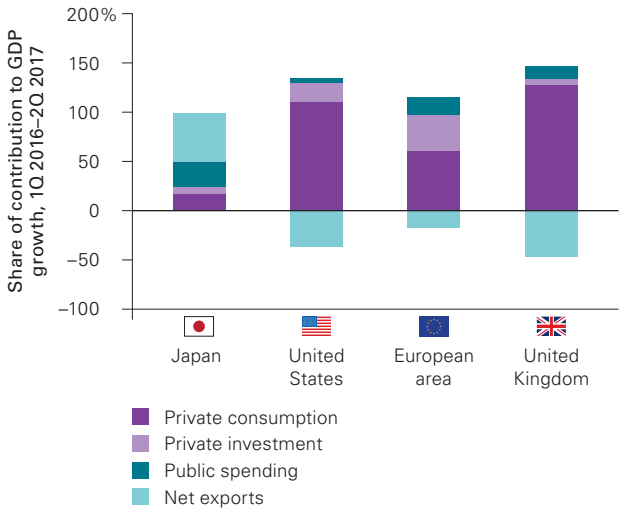
Japan: Rising with the tide … for now

After nearly two decades of low growth and persistent deflation, Japan's economy is showing signs of recovery. Unlike in other developed countries where monetary easing has partly succeeded in shoring up private demand, Japan's latest expansion cycle has come primarily from an acceleration in the export cycle and a mildly expansionary fiscal policy, while household and business spending remains modest (see **Figure I-20**).

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

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

Figure I-20. Expansion has yet to extend into private demand in Japan



Source: Vanguard, using data from Thomson Reuters Datastream.

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

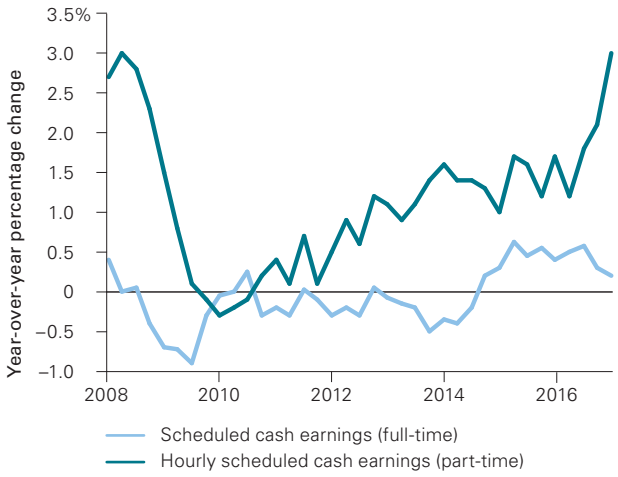
As demographic headwinds begin to bite, the labour market in Japan could tighten further and lead to an acceleration in part-time wages (see **Figure I-21**). Together with a widening positive output gap and weakening currency, core inflation is likely to pick up gradually toward 1% in 2018. However, without further progress in labour market reforms and an acceleration in full-time wages, Japan is unlikely to achieve and sustain its 2% inflation target in the near term.

Against this backdrop, the Bank of Japan, unlike most developed central banks, is expected to maintain easy policy, anchoring the country's 10-year government bond yield at about 0% in 2018. By targeting price over quantity, however, the Bank of Japan has effectively started to taper its asset purchases (see **Figure I-22**). It should be clear, though, that this is not an attempt to reverse stimulus but rather an indirect consequence of moving the policy goalposts.

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

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

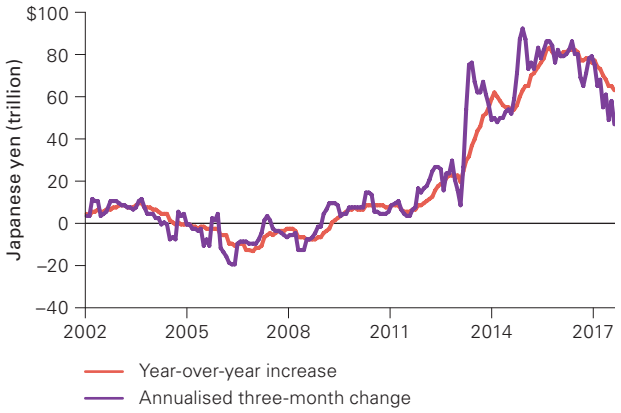
Figure I-21. Part-time wages to accelerate, although full-time wage growth remains subdued



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

Figure I-22. The Bank of Japan's 'tapering' is not 'tightening'

Change in Bank of Japan holdings



Source: Vanguard, using data from CEIC.

Europe: A brighter horizon

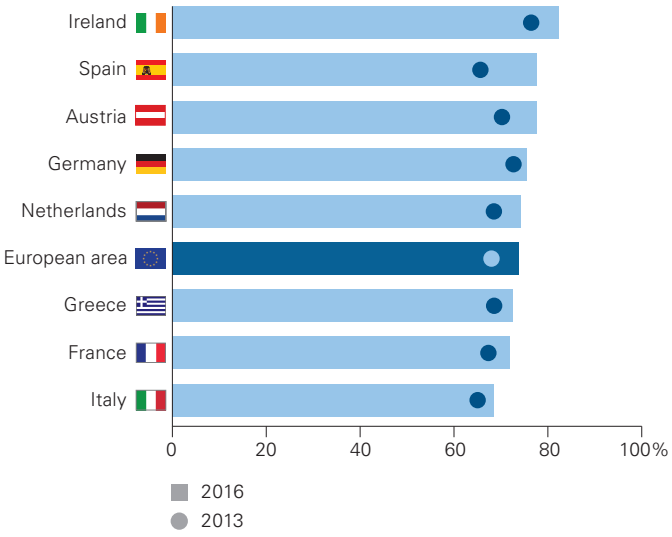
In the context of an increasingly synchronised global recovery, the outlook for the euro-area economy over the next 12 months is as bright as it has been since the 2008–2009 financial crisis. After years of recession, crises, and political uncertainty, the clouds are starting to clear. This is not to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

We anticipate that growth in the euro area will be just below 2% in 2018, with risks tilted to the upside for the first time since the 2008–2009 crisis. Political risk, in the form of a rise in anti-European Union parties, was dominant during 2017. The risk has not disappeared, but it has diminished (see **Figure I-23**).

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

Figure I-23. Anti-euro sentiment: Is the tide turning?

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



Source: Eurobarometer.

European Union (EU), which won't happen until 2019 and possibly later if a transition is agreed to. We anticipate four possible exit scenarios (see **Figure I-24**). We still believe that no Brexit is a possible outcome, with roughly a 15% probability.[3]

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

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

- Measured unemployment possibly disguising underemployment of workers (see **Figure I-25a**).
- Decreasing bargaining power of labour because of continued declines in unionisation (see **Figure I-25b**).
- Increasing influence of global rather than local measures of slack (globalisation).
- New technology reducing production costs and putting downward pressure on profit margins.

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

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

Figure I-24. Four Brexit scenarios

Our probabilities

15% Crash Brexit
The U.K. fails to reach a deal and effectively falls out of the EU with no backstop. The U.K. moves to World Trade Organisation rules.

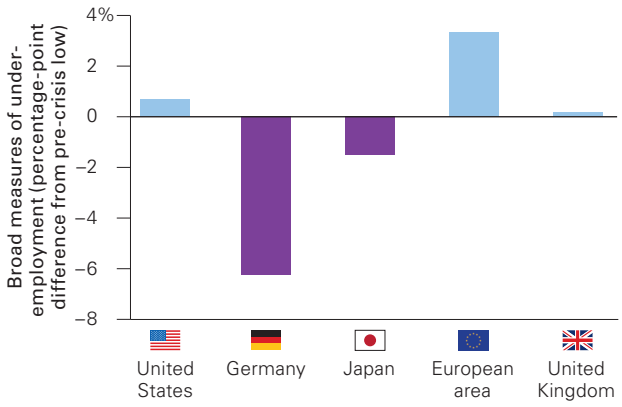
35% Hard Brexit
The U.K. leaves the EU Single Market and the Customs Union and reintroduces immigration controls.

35% Soft Brexit
The U.K. joins the European Economic Area and retains access to the EU Single Market and the Customs Union.

15% No Brexit
Article 50 is revoked and Brexit does not take place.

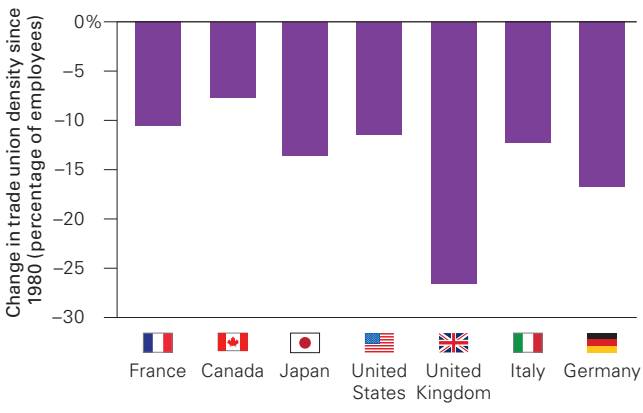
Source: Vanguard.

Figure I-25a. Underemployment is still very high in the euro area



Source: Capital Economics.

Figure I-25b: Trade union membership has declined across developed markets



Source: Macrobond.

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

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

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

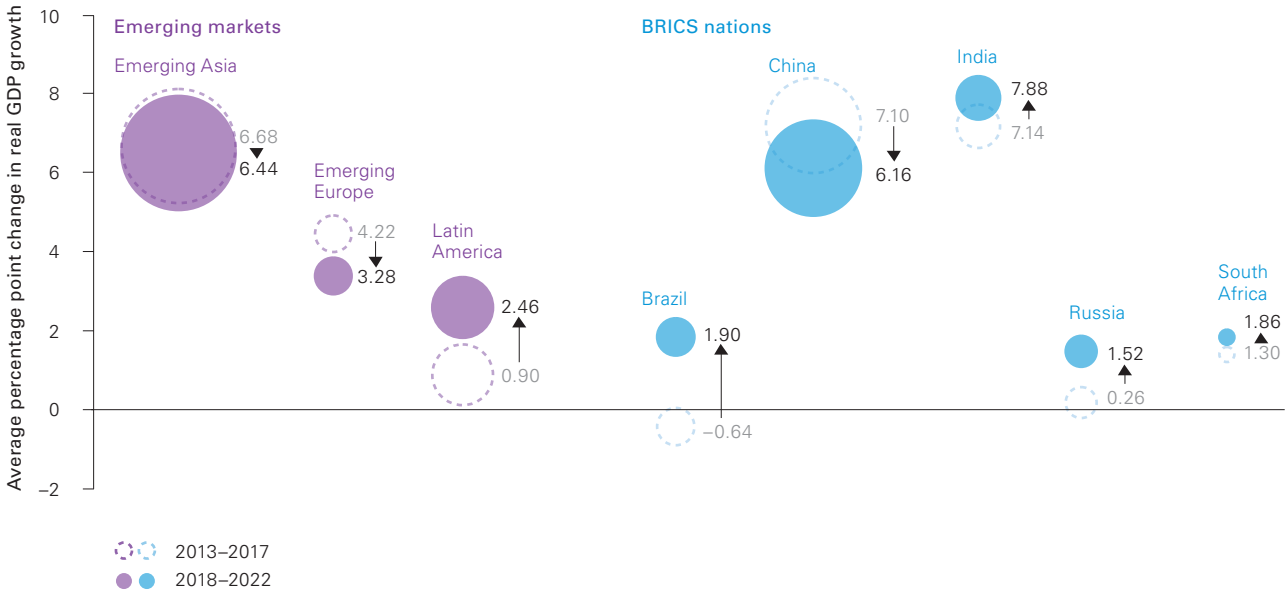
Emerging markets: A varied outlook

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

However, the emerging-market grouping hides vast heterogeneity across regions and countries (see **Figure I-26**). In Latin America, growth will continue improving in 2018, but it will remain below potential trend levels for the region over the medium term. Forecasts for emerging Asia remain robust, with an average growth rate of 6.2% for 2018–2022.

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

Figure I-26. Economic growth prospects



Source: IMF World Economic Outlook.

II. Global capital markets outlook

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

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

Global equity markets: Higher risk, lower return

Global equity has rewarded patient investors with a 11.9% annualised return over the 8½ years since the lows of the global financial crisis. As part of this strong performance, valuations have risen gradually. For instance, valuations in the global emerging markets appear stretched and those for ex-Australia developed market equities appear to be approaching over-valued territory relative to our proprietary fair-value benchmark, making our global equity outlook highly guarded. The ten-year outlook for global equities has deteriorated since last year and is now centred in the 4.5%–6.5% range, based on our Vanguard Capital Markets Model® (VCMM) projections.

Equity valuations and Vanguard's "fair value" CAPE

Our equity market outlook for the stock market is based primarily on market valuations, such as price/earnings (P/E) ratios. Another popular P/E ratio is the cyclically adjusted price earnings ratio (CAPE). Practitioners typically compare these valuation metrics with their long-run averages to assess whether the market is over or under-valued. However, a straight comparison of CAPE (and any other valuation multiple) with its historical average can be misleading, failing to account for today's low inflation and interest rates.

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

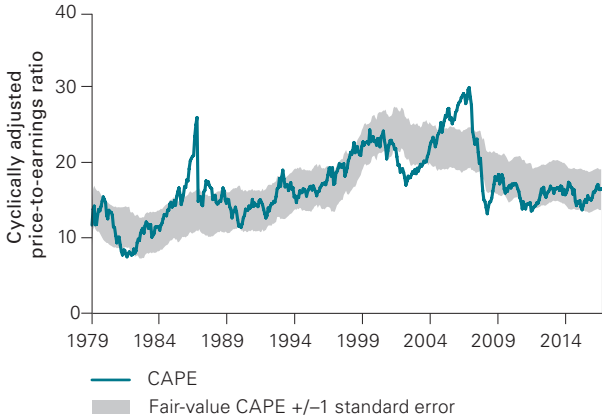
Vanguard's fair-value CAPE accounts for current interest rates and inflation levels and provides a more useful time-varying benchmark against which the traditional CAPE ratio can be compared, instead of the popular use of historical average benchmarks.

Figure II-1a plots Shiller's CAPE versus our fair-value model. Today, the CAPE for the MSCI Australia Index appears fairly valued.

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

Figure II-1. Divergence in global equity valuations

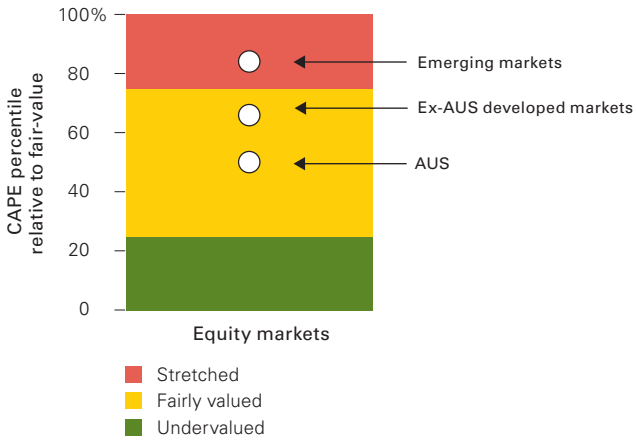
a. Domestic market appears fairly valued



Notes: "Fair-value CAPE" is based on 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 Australia index), Australian ten-year trailing inflation, ten-year Govt. bond yield, 10 year trailing equity and bond volatility estimated over the period January 1970 – September 2017.

Source: Vanguard calculations, based on data from Thomson Reuters Datastream and the Reserve Bank of Australia

b. Other developed markets approaching over-valued territory



Notes: Australia valuation measure is the current CAPE percentile relative to "fair-value CAPE" for the MSCI AUS Australia index from estimated over the period December 1969 – September 2017. Developed markets valuation measure is the weighted average of each region's (U.S., U.K., Euro-area, Japan and Canada) current CAPE percentile relative to each region's own "fair-value CAPE" from estimated over the period January 1970– September 2017, except for the U.S. which is estimated over the period January 1940 – September 2017. Emerging Markets valuation measure is a composite valuation measure of EM to U.S. relative valuations and current U.S. CAPE percentile relative to its fair value CAPE. The relative valuation is the current ratio of EM to U.S. P/E metrics relative to its historical average, using 3 year trailing average earnings from January 1990 to September 2017.

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

Global equities and the diversification of domestic risks

As shown in **Figure II-2b,** our expected return outlook for Australian equities over the next decade is centred in the 5%–7% range, in stark contrast to the 9.4% annualised return generated over the last 30 years.

Although valuation expansion proved to be a tailwind to returns, we expect valuations to contract as interest rates gradually rise over the next decade. An expected valuation contraction of about 2.6% is the primary reason behind our muted ten-year outlook for Australian equity.

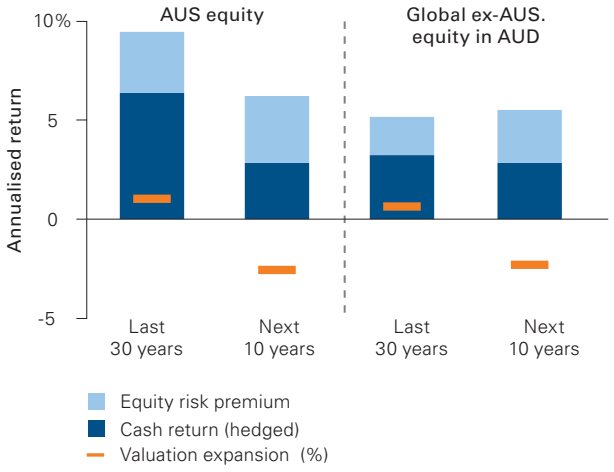
From an Australian investor's perspective, the expected return outlook for ex-Australia equity markets is in the 4.5%–6.5% range, modestly lower than that of Australian equity (see **Figures II-2a and b**). A closer look at the long-term median expected return for ex-Australia equity versus its 3 decade historical average, as illustrated in **Figure II-2a**, suggests that two total returns may not be that different.

This result is a function of the high level of valuations as well as long-term expectations for the Australian dollar to decline priced in by the markets, especially with respect to other major currencies such as the euro and yen. As illustrated in **Figure II-5**, an asset-return-centric strategy, which focuses primarily on higher return expectations of Australian equity by eliminating a portfolio's exposure to ex-Australian equities, has lower expected risk-adjusted returns because it ignores the diversification benefits of international equities.

Our 10-year outlook for global equity (in AUD) is in the 4.5%-6.5% range, as shown in **Figure II-2b**. For the purposes of asset allocation, we caution investors against implementing tactical tilts based on just the median expected return—that is, ignoring the entire distribution of asset returns and their correlations.

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

a. Ex-Australia equity exposure may provide returns that are similar to domestic market



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

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

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

Notes: Forecast corresponds to distribution of 10,000 VCMM simulations for ten-year annualised nominal returns as of September 30, 2017 in AUD for asset classes highlighted here. Median volatility is the 50th percentile of an asset class's distribution of annualised standard deviation of returns. See appendix section title Index benchmarks for further details on asset classes.

Source: Vanguard.

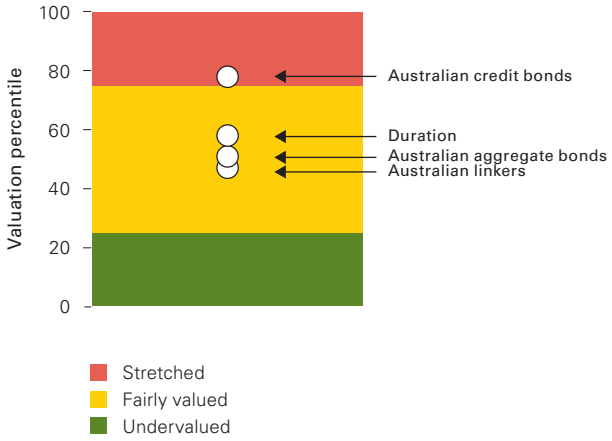
Global fixed income markets: Positive but muted

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

Australian interest rates: Higher long-term rates than last year

Compared to Vanguard's 2017 outlook, our expectation for the rise in 10-year government bond yields have increased by about 70 basis for the decade ahead, thereby resulting in an increase in the outlook for the Australian government bond index, as shown in **Figure II-3**. The central tendency of our forecast for the 10-year yield is around 3%, higher than last year's estimate, but still well below its long-run average. Our 2.5% - 3.5% outlook for cash over the next decade is also modestly higher than last year.

Figure II-4. Frothy credit valuations



Notes: Valuation percentile are relative to year 30 projections from VCMM . Australian credit bond and Australian aggregate bond valuations are current spreads relative to year 30 from VCMM. Duration valuation is the expected return differential over the next decade between long-term government bond index and short-term government bond index, to that of year 21-30. Australian linkers is the 10-year ahead annualised inflation expectation relative to year 21-30 from VCMM.

Source: Vanguard.

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

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

Source: Vanguard.

Credit Bonds: Risk premium still comes with equity correlation

The central tendency for Australian credit bonds is in the 2.5% - 4.5% range, slightly higher than that of the government bond index. This reflects the accumulation of credit and default risk premia that accompanies the higher risk of credit bonds. As illustrated in **Fig II-4**, the Australian credit bonds spreads are stretched and indicate signs of froth in the credit market. One must keep in mind that the credit spreads tend to widen in times of equity market stress, thereby reducing diversification benefits. As shown in **Figure II-5,** a 20% overweight or tilt to credit increases a portfolio's volatility excessively relative to a marginal increase in return.

Inflation-Linked bonds:

Markets don't see inflation coming

Break-even inflation expectations for Australian inflation linked bonds currently at 1.9% remain near historical lows and at the same level as our inflation expectation for the next decade. Markets are placing extremely low odds for higher inflation outcomes. While not as attractive in terms of return, linkers could be a valuable inflation hedge for some institutions and investors sensitive to inflation risk.

Domestic versus international:

Benefits of diversification remain

The central tendency of expected return for ex-Australian aggregate bonds appears to be similar to that of Australian aggregate bonds (**Figure II-3**). We expect the diversification benefits of global fixed income in a balanced portfolio to persist under most scenarios. Yields in most developed markets are at historically low levels, particularly in Europe and Japan, yet diversification through exposure to hedged ex-Australian bonds should help offset some risk specific to the Australian fixed income market (Philips et al., 2014).

Less-than-perfect correlation between two of the main drivers of bond returns—interest rates and inflation—is expected as global central bank policies are likely to diverge in the near term.

Portfolio implications: A low return orbit

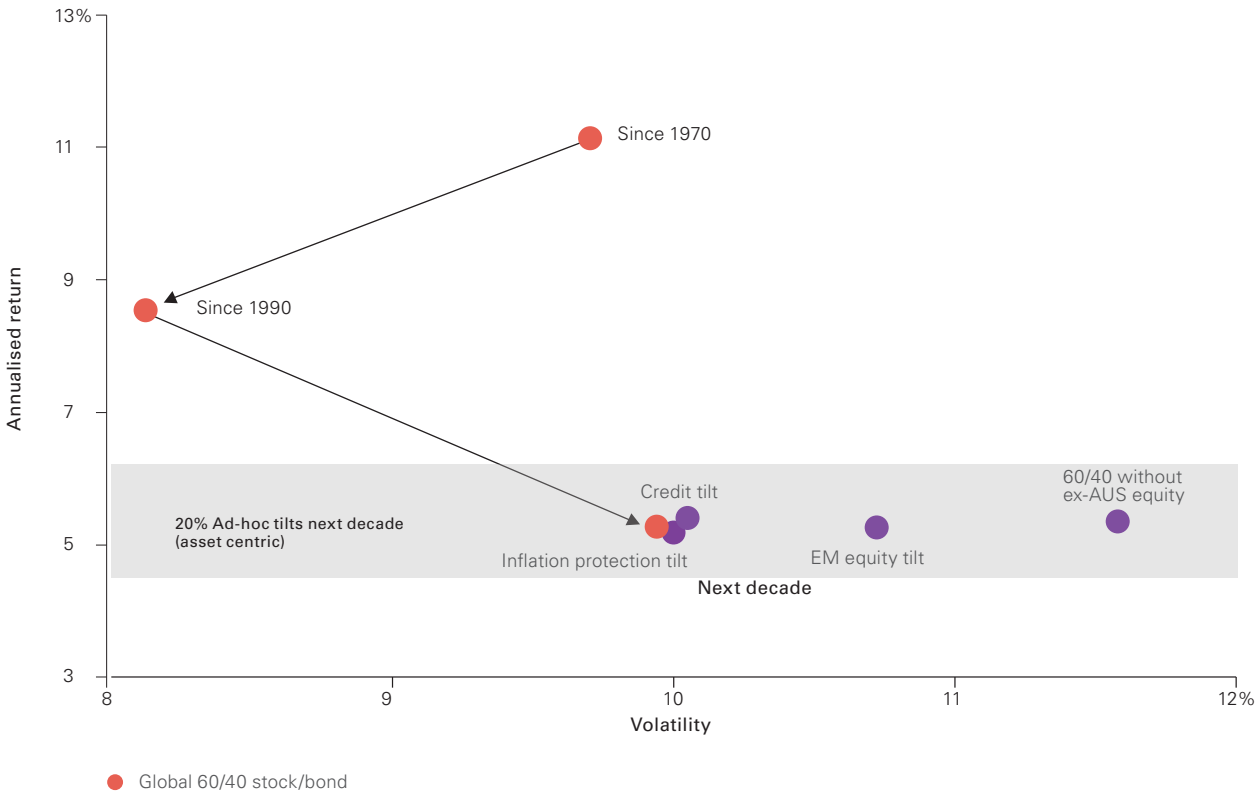
Investors have experienced spectacular returns over the last few decades. **Figure II-5a** contrasts our 4.5%–6.5% outlook for a global 60% equity/40% bond portfolio for the next decade against the extraordinary 11.1% return since 1970 and 8.5% since 1990. As highlighted in previous sections, elevated equity international valuations, low rates, and compressed spreads have pulled the expected returns into a lower orbit. The efficient frontier is also flatter (that is, with less return per unit of risk), as seen from the return and volatility expectations of balanced portfolios, as shown in **Figure II-5b**.

In an attempt to try to increase portfolio returns, a popular strategy is to overweight higher-expected-return assets or higher-yield assets. A common "reach for yield" strategy includes overweighting higher-yielding credit bonds. Similarly, "reach for return" strategies involve tilting the portfolio toward emerging markets equities to take advantage of higher growth prospects. Home bias leads some to shy away from ex-Australian equities.

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

Figure II-5. Asset allocation for a challenging decade

a. A lower return orbit



b. Common asset centric tilts seem sub-par

	Portfolios	5th percentile	25th percentile	Median	75th percentile	95th percentile	Median volatility	Risk-adjusted return
Global balanced portfolios	100% bonds	1.5%	2.3%	2.9%	3.6%	4.6%	3.9%	0.75
	20/80 stock/bond	2.2%	3.2%	3.8%	4.6%	5.7%	4.2%	0.91
	60/40 stock/bond	1.9%	3.8%	5.3%	6.8%	9.0%	9.9%	0.52
	80/20 stock/bond	1.3%	3.9%	5.8%	7.8%	10.7%	13.3%	0.43
	100% equity	0.6%	3.8%	6.2%	8.7%	12.4%	16.8%	0.36
	60/40 stock/bond	**1.9%**	**3.8%**	**5.3%**	**6.8%**	**9.0%**	**9.9%**	**0.53**
Portfolios with common 20% tilts	TIPS tilt	1.7%	3.7%	5.2%	6.7%	9.0%	10.0%	0.51
	EM equity tilt	2.0%	3.9%	5.3%	6.7%	8.8%	10.7%	0.49
	AUS credit tilt	2.0%	4.0%	5.4%	6.9%	9.2%	10.1%	0.53
	60/40 without ex-AUS equity	1.6%	3.8%	5.3%	7.0%	9.3%	11.5%	0.46

Lower risk-adjusted return

Same or higher risk-adjusted return

Notes: Summary statistics of 10,000 VCMM simulations for projected ten-year annualised nominal returns as of September 2017 in AUD before costs. Historical returns are computed using indexes defined in "Indexes used in our historical calculations" on page 5. The global equity is 50% AUS equity and 50% global ex-AUS equity. The global bond portfolio is 40% AUS bonds and 60% global ex-AUS bonds. Portfolios with tilts include a 20% tilt to the asset specified funded from fixed income allocation for the fixed income tilt and equity allocation for the equity tilt.

Source: Vanguard.

Portfolio strategies for three potential economic scenarios

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

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

A slowdown-scenario portfolio would underweight equity and overweight long duration. Surprisingly, the allocation to Australian equity remains rather large, as the portfolio that is also heavy on long-term government bonds derives a larger diversification benefit from lower-returning Australian equity (especially in a recession). The portfolio strategy in our baseline/trend scenario is well diversified.

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

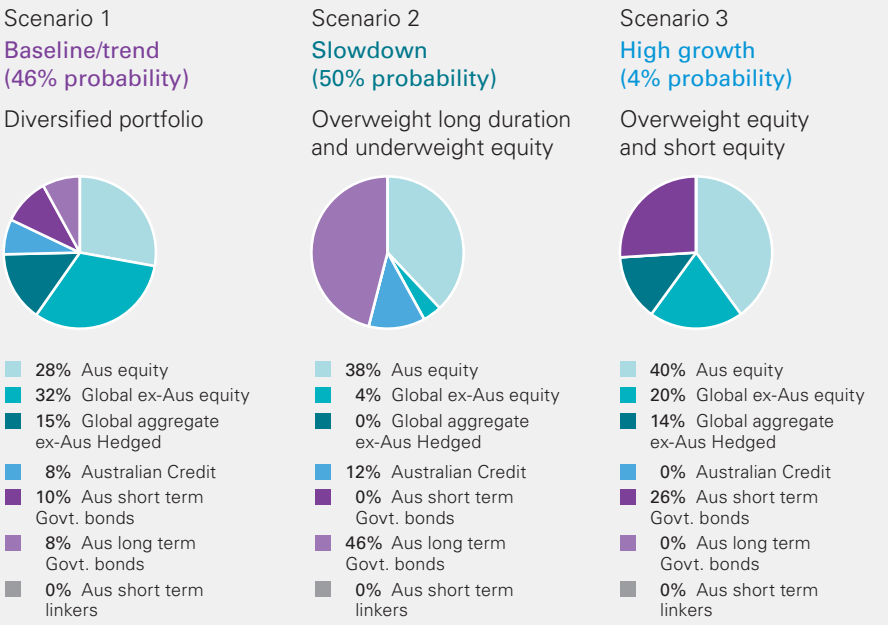
1. Portfolios designed for specific macroeconomic scenarios entail important trade-offs: If the scenario for which the portfolio was designed does not take place, then the portfolio performance is the worst of all the options.

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

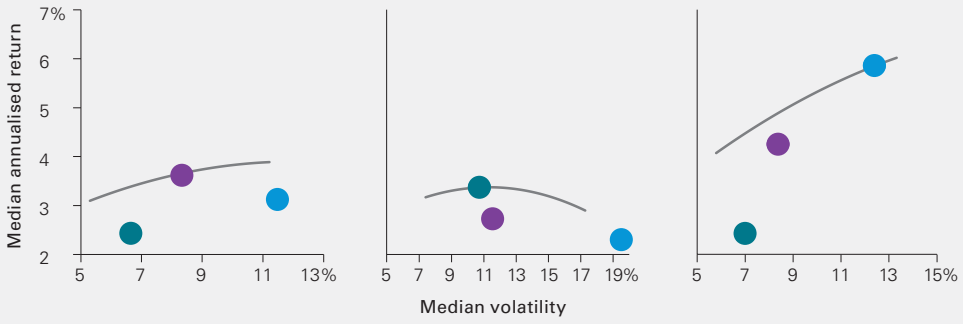
3. Portfolio tilts should be done within a mean-variance optimisation framework: Ad hoc tilts ignore correlations among assets and lead to inefficient portfolios. For instance, in a recession-scenario strategy, equities can be overweighted (as opposed to underweighted) because of the added diversification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

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

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



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



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

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

Strategy **upside** relative to balanced portfolio	**0.6% higher annualised return** with 0.8% lower volatility in a slowdown scenario	**1.6% higher annualised return** with 4.0% higher volatility in a high growth scenario
Strategy **downside** relative to balanced portfolio	**1.8% lower annualised return** with 1.4% lower volatility in a high growth scenario	**0.4% lower annualised return** with 8.0% higher volatility in a slowdown scenario

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

Source: Vanguard.

Portfolio construction strategies: Time-tested principles apply

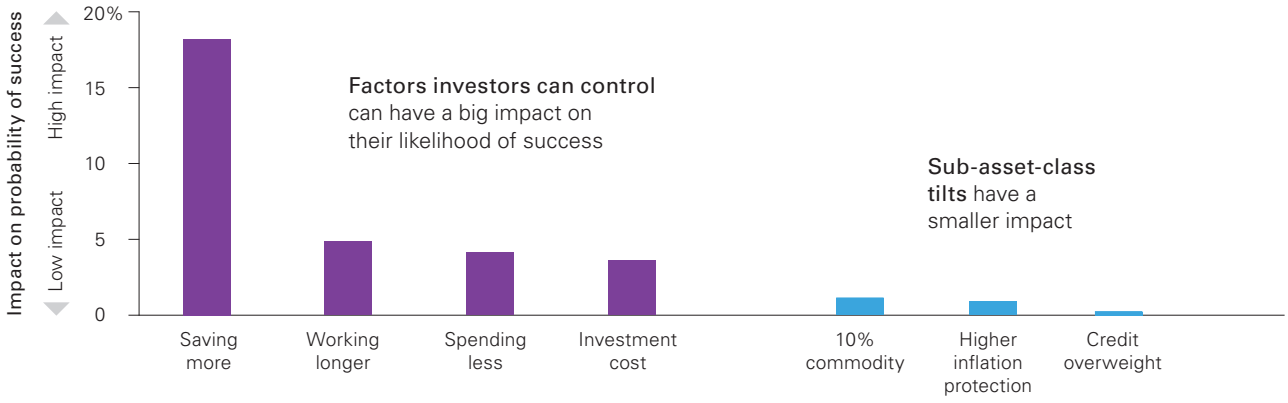
Contrary to suggestions that an environment of low rates and credit-risk premia warrants some radically new investment strategy, Figure II-5 reveals that the diversification benefits of global fixed income and global equity are particularly compelling, given the simulated ranges of portfolio returns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

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

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

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

Figure II-7. Taking control



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

Source: Vanguard.

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III. Appendix

About the Vanguard Capital Markets Model

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

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

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

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

Index simulations

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

- Australian equities: ASX All Ordinaries Index from 1958 through 1969; MSCI Australia Index thereafter.
- Global ex-Australia equities: S&P 500 Index from 1958 through 1969; MSCI World Ex Australia Index from 1970 through 1987; MSCI ACWI Ex Australia Index thereafter.
- Australian REITs: FTSE EPRA/NAREIT Australian Index.
- Commodity futures: Bloomberg Commodity Index in AUD (unhedged).
- Australian cash: Australian 1-Month Government Bond.
- Australian Government Bonds / Treasury Index: Bloomberg Barclays Australian Aggregate Treasury Bond Index.
- Australian credit bonds: Bloomberg Barclays Australian Credit Index.
- Australian bonds: Bloomberg Ausbond Composite Index from 1989 through 2004, and Bloomberg Barclays Australian Aggregate Bond Index thereafter.
- Global ex-Australia bonds: Standard & Poor's High Grade Corporate Index from 1958 through 1968, Citigroup High Grade Index from 1969 through 1972, Lehman Brothers U.S. Long Credit AA Index from 1973 through 1975, and Bloomberg Barclays U.S. Aggregate Bond Index from 1975 through 1989, Bloomberg Barclays Global Aggregate from 1990 through 2001 and Bloomberg Barclays Global Aggregate Ex AUD Index thereafter.
- Australian Linkers: Bloomberg Barclays Australia Inflation Linked Treasury Index.
- Short-term Treasury index: Bloomberg Barclays Australian Aggregate Treasury 1-5 Year Bond Index.
- Long-term Treasury index: Bloomberg Barclays Australian Aggregate Treasury 10+ Year Bond Index.

Notes on risk

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

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

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

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