Vanguard economic and market outlook for 2020: The new age of uncertainty

- An increasingly unpredictable policy environment is undermining economic activity globally through postponed investments and declines in production. In the year ahead, we do not foresee a significant reversal of trade tensions or expect that policymaking will become more predictable. This new age of uncertainty will act as a drag on demand, and if it persists, long run potential growth will be lower.

- Inflation is likely to remain soft in 2020. While labor markets are expected to remain tight, secular forces and widening output gaps continue to put downward pressure on prices. These forces support our outlook for subdued inflation trends across major economies, consistent with the inflation expectations held by consumers and financial markets.

- The pivot to looser policy by central banks around the world will persist in this environment of low growth and low inflation. Despite increased doubts about the effectiveness of monetary policy, we expect central banks to continue to adopt unconventional measures, while significant fiscal stimulus remains unlikely unless there is a more severe downturn.

- Slowing global growth and elevated uncertainty create a fragile backdrop for markets in 2020 and beyond. More favorable valuations have led to a modest upgrade in our equity outlook over the next decade, while fixed income returns are expected to be lower given declining policy rates and lower long-term bond yields. The risk of a large drawdown for equities and other high-beta assets remains elevated.

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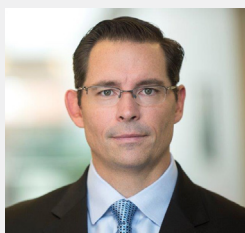
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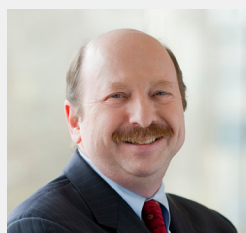Qian Wang, Ph.D.
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Editorial note

This publication is an update of Vanguard's annual economic and market outlook for 2020 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.

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Notes on asset-return distributions

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

IMPORTANT: The projections and other information generated by the VCMM regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from the VCMM are derived from 10,000 simulations for each modeled asset class. Simulations are as of September 30, 2019. 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."

Global outlook summary

Global economy: *Trade tensions and broader uncertainty drag on demand and supply*

The continued slowdown in global growth foreseen a year ago has been accentuated during 2019 by a deterioration in the global industrial cycle. A broad escalation of policy uncertainty, especially tensions between the U.S. and China, has largely driven this downturn through postponed investments and declines in production.

In the year ahead, we do not foresee a significant reversal of the trade tensions that have occurred so far. And with continued geopolitical uncertainty and unpredictable policymaking becoming the new normal, we expect that these influences will weigh negatively on demand in 2020 and on supply in the long run. A continuing contraction of world trade relative to GDP and a persistent state of high uncertainty both tend to undermine potential output. This happens by restricting investment and hampering the propagation of technologies and ideas that stimulate growth in productivity. As such, we expect growth to remain subdued for much of the next year.

We see U.S. growth falling below trend to around 1%[1] in 2020, with the risk of recession still elevated. China, too, has seen its growth fall short of target this year and will likely slow to a below-trend pace of 5.8% in 2020. The euro area economy has continued to slow because of the importance of industrial trade to its economy and some drag from Brexit-related uncertainty. Growth in the euro area is likely to stay weak at around 1%. Emerging markets will continue facing challenges linked to the trade disputes in 2020, particularly in the Asia region.

Global inflation: *Full (symmetric) credibility remains elusive for central banks*

Recent years have been characterized by a continuing failure of major central banks to achieve their inflation targets. This can partly be explained by a combination of persistent structural factors—including technology advancement and globalization—pushing down some prices, and by a seeming failure of product and labor markets to respond to falling unemployment and rising capacity utilization.

As these secular forces endure and output gaps widen in the current downturn, inflation will likely remain soft. We expect inflation to barely reach 2% in the U.S., with the Federal Reserve's core inflation gauge staying below its 2% policy target. Similarly, inflation will likely undershoot central banks' targets in the euro area and Japan.

Policy credibility is a critical determinant of inflation. For years the inflation expectations held by consumers and financial markets have consistently fallen short of most policy targets, implying increasing doubts about the effectiveness of monetary policy for a variety of reasons, some technical, others political. These low inflation expectations support our outlook for subdued inflation trends.

Monetary policy: *The pivot to looser policy continues*

In 2019, global central banks turned on respective dimes, cents, and sixpences, reversing from actual and expected policy tightening to additional policy stimulus in the face of the deteriorating growth outlook and consistent inflation shortfalls. With the Fed having cut rates by 75 basis points so far in 2019, we expect it to further reduce the federal funds rate by 25 to 50 basis points before the end of 2020. The European Central Bank has cut its policy rate further into negative territory, by 10 basis points, to –0.5%. In 2020 we expect the ECB to leave policy broadly unchanged, with risks skewed toward further easing.

Despite the doubts relating to the effectiveness of further monetary policy stimulus, we do not expect that fiscal policy measures will be forthcoming at sufficient scale to materially boost activity. China, for example, has already halted its active encouragement of deleveraging and will probably step up both monetary and fiscal stimulus amid growing headwinds. These efforts would be calibrated to engineer a soft landing rather than a sharp rebound in growth, given policymakers' financial stability concerns.

Increasing downside risks to growth and subdued inflation may prompt the Bank of Japan to marginally adjust its policy, with offsetting measures to cushion the negative impact on financial institutions. Emerging-market countries are likely to loosen policy along with the Fed.

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[1] Economic growth rates throughout this paper are expressed in annual terms defined as the percentage change between the final quarter of consecutive years, unless otherwise noted.

Global investment outlook: *Subdued returns are here to stay*

As global growth slows further in 2020, investors should expect periodic bouts of volatility in the financial markets, given heightened policy uncertainties, late-cycle risks, and stretched valuations. Our near-term outlook for global equity markets remains guarded, and the chance of a large drawdown for equities and other high-beta assets remains elevated and significantly higher than it would be in a normal market environment. High-quality fixed income assets, whose expected returns are positive only in nominal terms, remain a key diversifier in a portfolio.

Returns over the next decade are anticipated to be modest at best. Our expectation for fixed income returns has fallen because of declining policy rates, lower yields across maturities, and compressed corporate spreads. The outlook for equities has improved slightly from our forecast last year, thanks to mildly more favorable valuations, as earnings growth has outpaced market price returns since early 2018. Annualized returns for U.S. fixed income are likely to be between 2% and 3% over the next decade, compared with a forecast of 2.5%–4.5% last year. The outlook for global ex-U.S. fixed income returns is centered in the range of 1.5%–2.5%, annualized. For the U.S. equity market, the annualized return over the next ten years is in the 3.5%–5.5% range, while returns in global ex-U.S. equity markets are likely to be about 6.5%–8.5% for U.S. investors, because of more reasonable valuations.

Over the medium term, we expect that central banks will eventually resume the normalization of monetary policy, thereby lifting risk-free rates from the depressed levels seen today. This will lead to more attractive valuations for financial assets. Nonetheless, the return outlook is likely to remain much lower than in previous decades and the post-crisis years, when global equities have risen over 10% a year, on average, since the trough of the market downturn. Given our outlook for lower global economic growth and subdued inflation expectations, risk-free rates and asset returns are likely to remain lower for longer compared with historical levels.

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 2019. We chose these benchmarks to provide the best history possible, and we split the global allocations to align with Vanguard's guidance in constructing diversified portfolios.

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

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

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

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

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

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

I. Global economic perspectives

Global economic outlook: The new age of uncertainty

We expect growth in 2020 to be lower than we had previously expected and to stay lower for longer. As a result, policy rates will also stay lower for longer. For this deterioration in prospects, we identify the main culprit as an emerging era of elevated uncertainty caused by increasingly unpredictable policymaking that is undermining decision-making in the real economy. This, above all else, is depressing activity.

Our global economic outlook, described in more detail in the regional outlooks that follow, is designed to:

- explain the global industrial downturn and emphasize the role of increased uncertainty in propagating the shock;

- elaborate on the likelihood of recessions, and on why a more appropriate focus may be on the likelihood and propagation of serious growth slowdowns;

- consider the extent to which policymakers will be able to mitigate the effects of the downturn; and

- surmise that the current bout of deglobalization may have persistent effects on sustainable growth rates.

## Uncertainty is dampening activity

The deterioration in global growth throughout the course of 2019 was more severe than expected, led by the manufacturing sector (**Figure I-1**). We believe that increasing policy uncertainty was the primary driver of this deterioration—specifically, trade tensions related to tariffs, especially between the United States and China, and Brexit negotiations. In the year ahead, despite oscillating headlines, we do not foresee any immediate reversal of the tariff escalation or a meaningful resolution to broader trade and geopolitical tensions. With continued geopolitical uncertainty and unpredictable policymaking defining a new age of uncertainty, we believe these influences will weigh negatively on activity during the coming year and likely beyond.

Figure I-2 confirms how global policy uncertainty, along with trade policy uncertainty, has remained elevated and more erratic since the global financial crisis, particularly in the last two years given the escalation in trade tensions and persistence of populist policymaking, including Brexit. We have previously argued that an increase in uncertainty acts like a tax, effectively causing firms and households to discount the future more heavily and thereby dampening spending.[2] In fact, our analysis shows that the current environment of persistently elevated policy uncertainty is holding back economic activity more than ever. Firms and households perceive that there has been a change in the rules of the game—for example, in global norms of international cooperation and in the stability of future trading arrangements; Federal Reserve Chair Jerome Powell's saying that the Fed has "no playbook" echoes
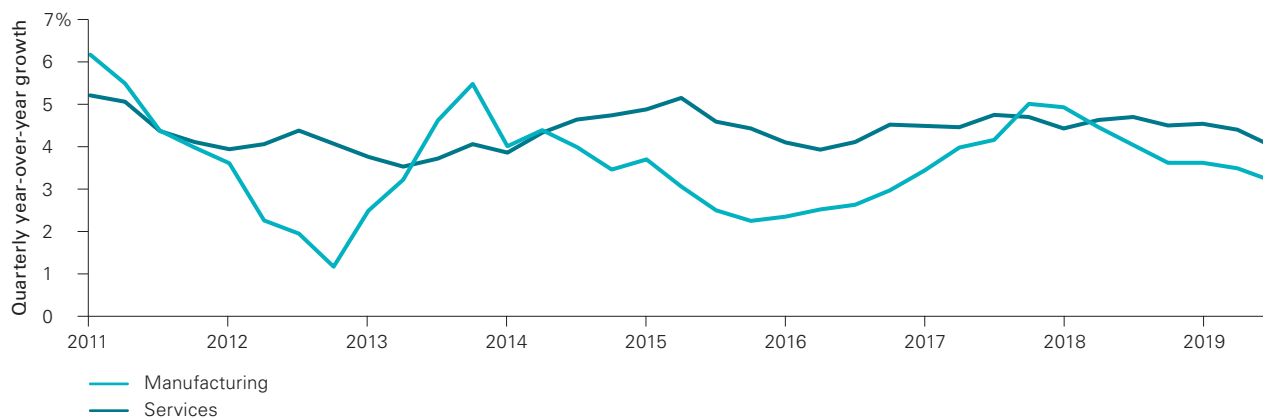
FIGURE I-1

A maturing global business cycle

a. Global growth is expected to continue falling in 2020
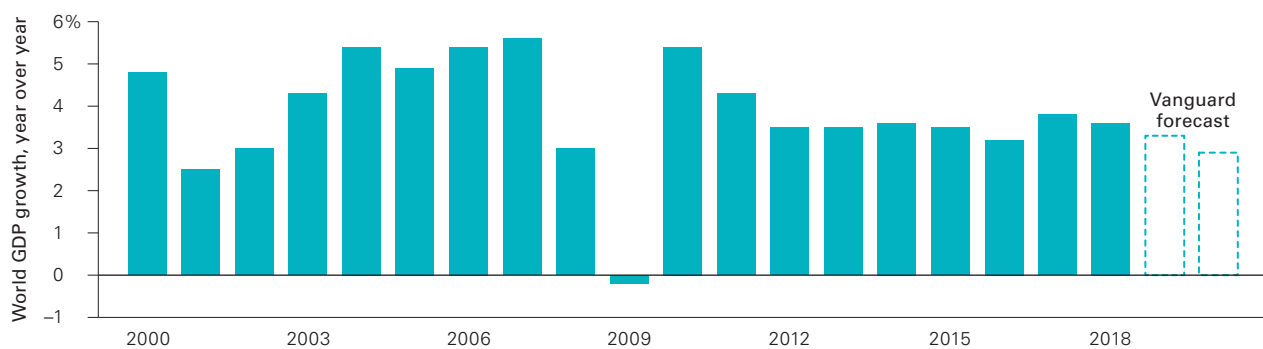
Sources: International Monetary Fund and Vanguard forecasts.

b. The global economic slowdown is largely driven by a decline in global manufacturing growth

Note: Data show the weighted average of annual growth in each sector in the United States, China, France, Italy, Canada, and the United Kingdom as of September 30, 2019.
Sources: National accounts data and Bloomberg.

this view.[3] This has introduced an element of uncertainty into decision-making that hinders long-term planning and hampers economic activity. And in cases where a spending decision hinges on a particular event happening—think here of Brexit, trade deals, or an election result—it is rational for firms and households to postpone expenditures, exploiting the so-called option value of waiting. In our view, this mechanism explains why global activity has slowed more than an analysis of the underlying shocks might otherwise predict.

FIGURE I-2

Global policy uncertainty is on the rise

a. Global policy uncertainty
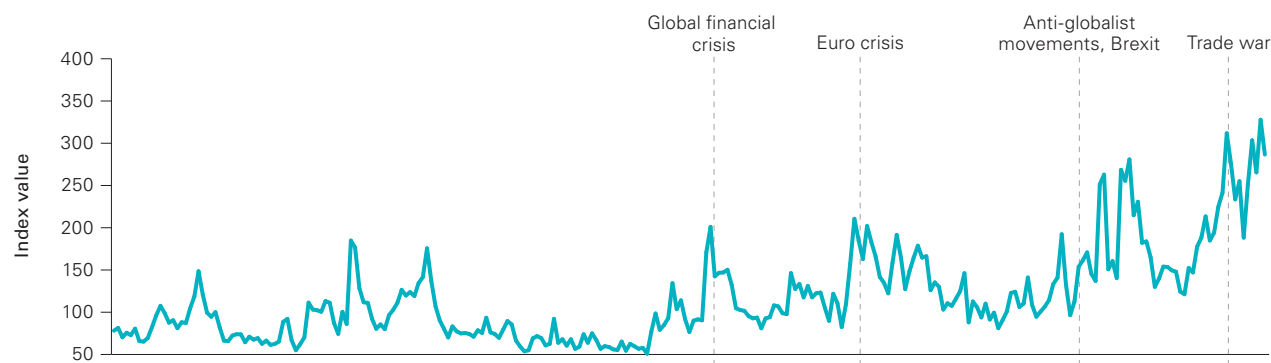
b. U.S. trade policy uncertainty
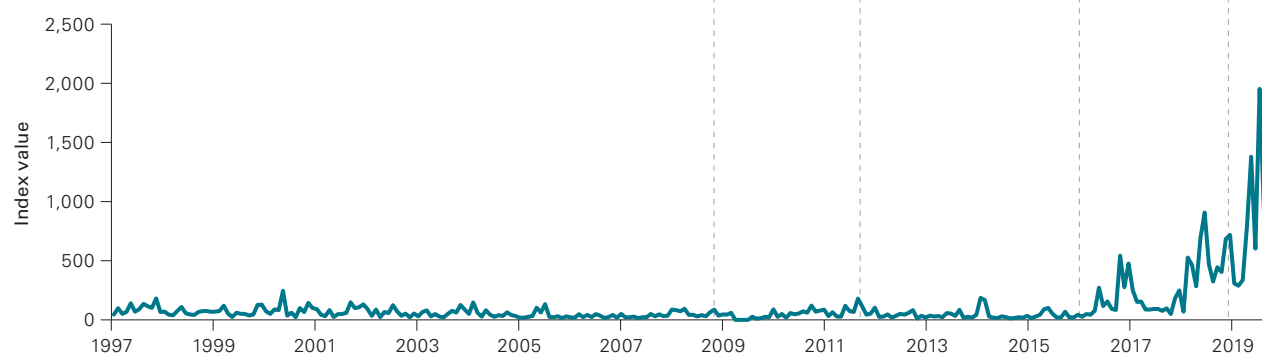
Source: Index values are based on the Economic Policy Uncertainty Index. Data and methodology are available at http://www.policyuncertainty.com.

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[3] Mr. Powell made his remarks in August 2019 in Jackson Hole, Wyoming, at the Federal Reserve Bank of Kansas City's annual economic policy symposium. See *Challenges for Monetary Policy*, available at https://www.federalreserve.gov/newsevents/speech/powell20190823a.htm.

Figure I-3 shows our estimate of how policy uncertainty affects economic fundamentals and markets by separating historical periods into high- and low-uncertainty phases. We estimate that in periods of high uncertainty, year-over-year global growth averages around 4%, whereas in periods of low uncertainty, it averages close to 7%. This difference is apparent in other measures of economic activity, such as oil production, steel production, and financial conditions.

Spillover effects of uncertainty on fundamentals
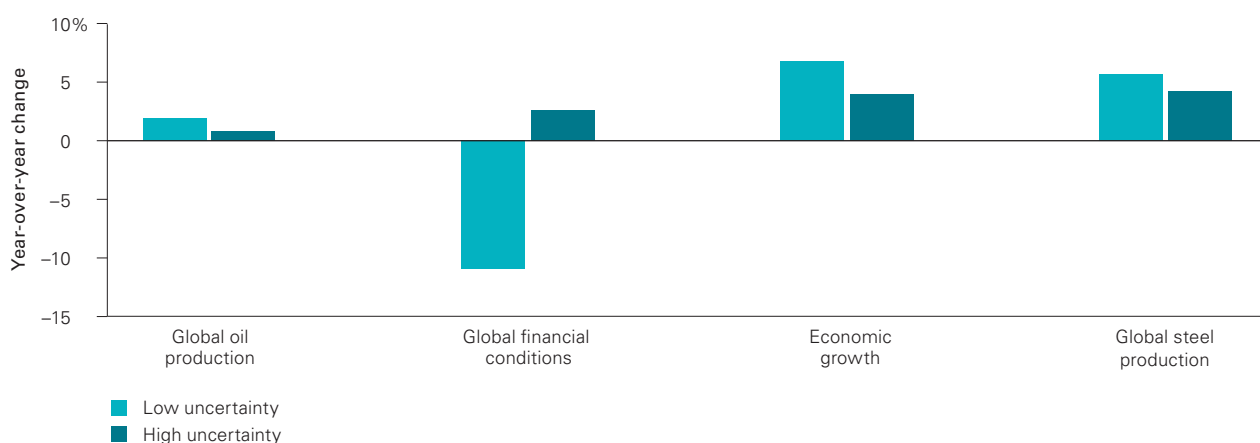
Notes: The bars represent the average year-over-year change in each of the indicators in high- versus low-uncertainty periods. Periods of low versus high uncertainty are obtained through a Markov-switching model for global growth. Global financial conditions are an aggregate measure of risk sentiment and include variables such as equity returns, credit spreads, and lending behavior. Lower values denote easier financial conditions and risk-on attitudes. Z-scores measure how far a value differs from the historical average, accounting for the measure's typical fluctuations.

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

We expect this high-uncertainty regime to persist as a drag on global growth through 2020. Although there may be some progress in the various global trade talks, we do not foresee a timely and comprehensive resolution to the U.S.-China trade tensions or the Brexit negotiations, which remain the two primary sources of policy uncertainty. **Figure I-4** displays the upside and downside risks we see for each of these policy areas.

Worrying about recessions and downturns

If any of our downside risks materialize, it is possible that this will be characterized by a recession in one or more countries. There is strong historical evidence to suggest that an inverted yield curve in the U.S. is a reliable harbinger of a recession. And yield curves have inverted in 2019 across many developed economies. Based on these signals, the risk of a recession in some major developed economies remains elevated. At the

FIGURE I-4

Sources of policy uncertainty are likely to persist

2020 global risks	Vanguard assessment of risks		
	Downside scenario	Base case	Upside scenario
U.S./China trade tensions	**50%** The trade truce ends because of a lack of common ground, and the U.S. implements tariffs on remaining Chinese imports.	**40%** China and the U.S. sign a "phase one" deal but fail to agree on structural issues.	**10%** China and the U.S. sign a series of trade deals, roll back tariffs, and continue negotiations on structural issues.
Brexit	**30%** The U.K. Parliament fails to approve the Withdrawal Agreement Bill in early 2020. This is followed either by a disorderly exit or by a series of Brexit extensions.	**60%** The U.K. Parliament approves the Withdrawal Agreement Bill in early 2020 and enters a one- to two-year transition period of trade negotiations, but with little prospect of early clarity emerging.	**10%** The U.K. holds a new Brexit referendum in early 2020 and decides on a softer Brexit or even to remain in the European Union.
U.S./EU trade tensions	**35%** The U.S. imposes tariffs on EU products and continues to threaten further tariffs.	**50%** The U.S. continues to threaten tariffs on EU products (e.g., autos) but does not follow through in 2020.	**15%** The U.S. promises not to impose tariffs on EU products.
U.S.-Mexico-Canada Agreement (USMCA)	**10%** The Trump administration moves to withdraw from NAFTA to expedite ratification of USMCA.	**30%** U.S. policymakers are unable to compromise, and ratification is delayed until after the 2020 election.	**60%** U.S. policymakers complete revisions and ratify the agreement.

Note: The odds for each scenario are based on the judgment of members of Vanguard's Global Economics and Capital Markets Outlook Team.
Source: Vanguard.

same time, there are factors that cause us to place less weight on these signals now, in particular the distortions to government debt markets caused by central bank balance-sheet operations.

In any case, placing excessive focus on episodes of economic contraction may be inappropriate. For some countries such as China or Australia where average growth is high, sustained falls in GDP are much less likely. And as cross-country average growth rates have

tended to fall in recent decades, then a higher frequency of negative growth rates is inevitable but may not be informative about economic welfare. A measure of how far a country's activity falls below productive potential may be a better gauge of costly episodes of economic weakness.

Figure I-5 adopts this alternative approach by comparing the current shortfall in GDP relative to productive potential with the depth of the downturns across different

FIGURE I-5

Regional downturns are no guarantee of global recession

		United States	European Union	U.K.	China	Japan	Australia	Global
Iran/energy crisis	1981–1982	−5.2%	−0.6%	−1.7%	−0.7%	−0.4%	−1.7%	−1.5%
Gulf War	1990–1991	−3.5%	−0.9%	−1.3%	−2.3%	−0.8%	−1.1%	−1.0%
Asian financial crisis	1997–1999	1.7%	−0.7%	0.1%	−4.8%	−1.8%	0.7%	0.2%
Dot-com bubble	2001–2002	−2.5%	0.8%	−0.3%	−0.8%	−2.0%	0.1%	−0.7%
Global financial crisis	2008–2009	−4.6%	−1.3%	−2.2%	−3.6%	−2.4%	−0.8%	−2.0%
European sovereign crisis/ China liquidity crisis	2011–2013	−2.5%	−1.9%	−0.5%	−0.5%	−0.5%	−0.5%	−0.2%
China slowdown	2015–2016	−1.2%	−1.1%	0.4%	−2.6%	−0.2%	−0.7%	−0.3%
The present (last four quarters)		0.8%	−0.2%	−0.3%	−1.1%	1.5%	−0.3%	0.1%
2020		−0.3%	−0.6%	−1.1%	−2.0%	0.2%	−0.2%	−0.3%

- 🟥 > 2-standard-deviation deterioration from trend
- 🟨 < 1-standard-deviation deterioration from trend
- 🟧 > 1-standard-deviation deterioration from trend
- 🟩 > Above trend

Notes: Numbers reflect the output gap as a percentage of potential GDP, where the output gap is the difference between the level of actual GDP and of potential GDP. Historical global recession dates are those identified by the International Monetary Fund.
Source: Vanguard.

episodes in major countries. It shows how global downturns involving one to two standard deviation hits to output tend to be synchronized across countries, as in the global financial crisis, the oil shocks through the early 1980s, and the Gulf War in the early 1990s. Strikingly, by this definition, the current environment is still a long way from a serious global contraction, with most large developed countries operating close to or above estimates of full capacity. Even after factoring in the expected slowdown in 2020 in the U.S. and China, the extent of the global downturn is by no means unprecedented, with most major economies expected to be less than one standard deviation from trend.

What is also unusual about the current global slowdown is the synchronous nature of the weakness in the industrial sectors of the world's largest economies. None of the previous global slowdowns identified have been characterized by a trade-led slowing in growth. A broader analysis of over 100 recessions globally suggests that such "external demand" shocks contribute as a primary driver less than 20% of the time.

Although the industrial sector is a valuable bellwether of the overall economy, it represents a small minority of economic activity (roughly 16% globally). As **Figure I-6** depicts, this results in a directionally consistent but muted direct impact on the much larger services sector, similar to that shown in Figure I-1b—on average 25 basis points, given a 1 percentage point change in manufacturing.[4] Rather, we find that a much deeper industrial contraction is necessary to cause weakness in the more resilient services sector. Based on the expected severity of the current slowdown, this is not our main case.

Can policymakers save the day?

One important consequence of the global slowdown in 2019 has been the marked pivot by central banks around the world from gradual policy normalization to increased policy accommodation. There is increased skepticism, however, that monetary policy is still capable of playing

Manufacturing sector's direct impact on services is low
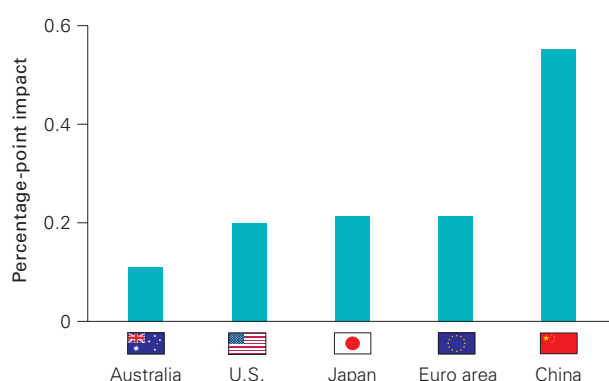
Note: The chart shows the estimated percentage-point impact on a region's service sector, given a 1% change to its manufacturing sector. China's beta is higher because its economy is more heavily oriented toward manufacturing relative to other developed countries.

Sources: Vanguard calculations, based on data from Refinitiv Datastream and the Organisation for Economic Co-operation and Development.

the cyclical stabilization role being demanded of it. As a result, inflation expectations, both survey-based and derived from financial market instruments, remain relatively unresponsive to policy measures. This lack of credibility largely explains why major central banks have failed to achieve their stated inflation targets and are not expected to any time soon; the European Central Bank and the Bank of Japan are the prime offenders in this regard.

Given this outcome, there is increasing debate about whether central banks should change their operating frameworks, perhaps by introducing new policies such as price-level targeting or by revising their numerical targets. In our view, these mechanisms are unlikely to move the dial enough.

4 A basis point is one-hundredth of a percentage point.

An alternative much-advocated approach—one we support—is for fiscal policy to take more of the burden of cyclical adjustment. **Figure I-7** shows our forecast for the expected fiscal impulse in a range of major economies for 2020, using the commonly adopted convention of measuring fiscal impulse by the change in the cyclically adjusted fiscal balance. On this basis, fiscal policy is likely to contribute only a neutral impulse to global growth, with policy set to be mildly supportive in China, the euro area, and the U.K.; contractionary in Australia, and neutral in the U.S. and Japan.

These forecasts beg the question of whether certain countries ought to do more to promote growth. One frequently cited criterion for judging how easy it might be for countries to relax fiscal policy is based on the concept of "fiscal space," defined for example by the International Monetary Fund as "the room for undertaking discretionary fiscal policy relative to existing plans without endangering market access and debt sustainability" (International Monetary Fund, 2018). In practice, providing precise estimates of this measure

of appropriate fiscal policy can be rather subjective, and in any case, political willingness to use fiscal policy actively is more often the relevant constraint (as discussed in the regional section on Europe, in the case of Germany).

A lower growth equilibrium?

We have already emphasized that policy uncertainty is likely to be acting as a drag on current and near-term global growth. But there is ample theoretical and empirical evidence that these influences can be longer-lasting, causing productive potential to be lower and even resulting in slower economic growth into the medium term. Lower investment spending is one of the important channels through which the global slowdown has progressed, and if the lost investment is not recovered, supply-side potential will be permanently lower.

The retreat of globalization since the global financial crisis is explained by a range of forces, including increased protectionism ranging from U.S.-China trade wars to Brexit and geopolitical uncertainty, which makes

Fiscal stimulus in 2020 is expected to be broadly neutral
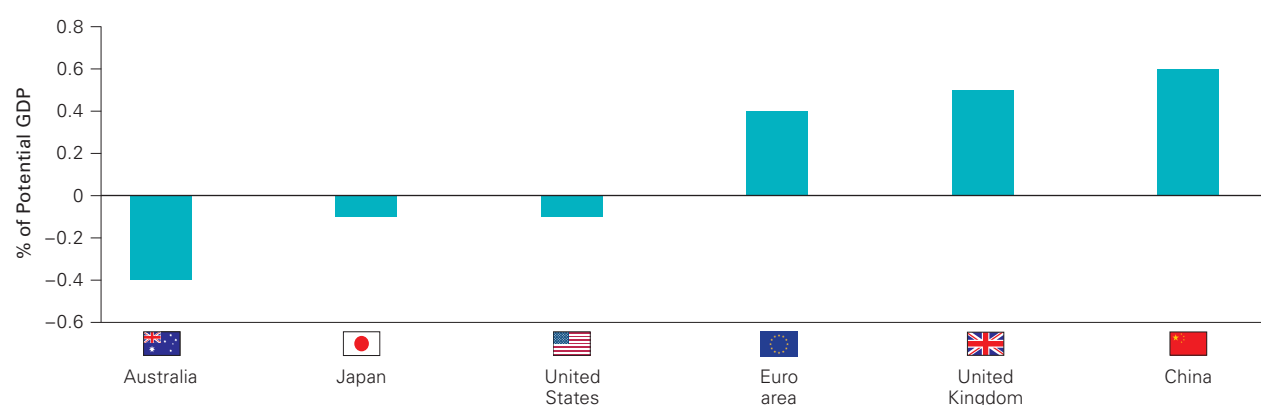
Notes: Fiscal impulse is defined as the change in the cyclically adjusted fiscal balance as a percentage of GDP.
Sources: Vanguard calculations.

investors less confident about global expansion plans. Less trade and less foreign direct investment lead to less exploitation of potential productivity gains through comparative advantage.

These effects are difficult to calibrate accurately, not least because they filter through slowly (as shown, for example, in many of the empirical estimates of the long-run costs of the United Kingdom leaving the European Union; see the U.K. outlook that begins on page 22). Similar effects are in part contributing to slower worldwide productivity growth since the financial crisis. It shows that disruptive policymaking and uncertainty can have a pervasive and persistent impact on global growth prospects for some time to come.

A less visible but equally consequential side effect of deglobalization is the potential reduction in global knowledge sharing. Forthcoming Vanguard research finds that knowledge sharing, or the generation and global expansion of ideas (which we refer to in our research as the "Idea Multiplier"), is a leading indicator of productivity growth and is resurging after a decades-long hiatus (**Figure I-8**). But this resurgence, and any associated productivity impacts, may be short-lived if physical and digital barriers are enacted and impede this sharing. Based on our calculations, new idea creation would be 67% lower if ideas were confined to geographical borders. As the current slowdown highlights, a stall or reversal in the globalization process will have varied consequences for both short- and long-term growth prospects globally and for individual countries.

FIGURE I-8

A higher Idea Multiplier = higher future growth
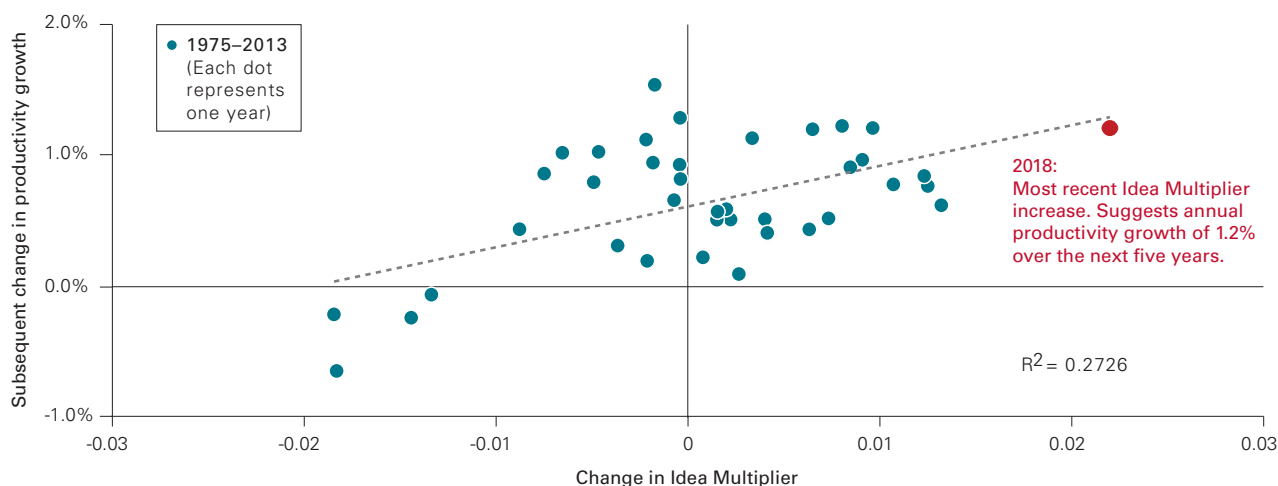
Notes: The Idea Multiplier is a proprietary metric that tracks the flow and growth of academic citations. It has been shown to be a leading indicator of productivity growth. For more information, see the forthcoming Vanguard paper *The Idea Multiplier: An Acceleration in Innovation Is Coming*. The horizontal axis is the five-year change in the Idea Multiplier. The vertical axis is the productivity growth over the subsequent five-year period minus the growth in the lagging five-year period. The date range is 1975–2018. Productivity growth is represented by total factor productivity at constant national prices for the United States.

Sources: Vanguard calculations, based on data from Clarivate Web of Science and the Federal Reserve Bank of St. Louis.

United States: Downshifting for an uncertain road ahead

As the temporary boost from the tax cuts of 2017 waned, 2019 saw a return to trendlike growth of 2% amid a strong labor market and associated support from consumption. Noticeably absent in 2019 was a contribution from business investment, which grew less in the past 12 months and detracted from growth in consecutive quarters for the first time since the 2015–2016 global manufacturing slowdown (**Figure I-9a**). Much as in our global outlook, we believe this was due in large part to elevated levels of uncertainty that we expect to persist through at least 2020 and continue to weigh on business sentiment (**Figure I-9b**), leading to a growth rate centered on 1% (between 0.5% and 1.5%).

FIGURE I-9

Business investment is again trending lower

a. Metrics point to continued slowdown
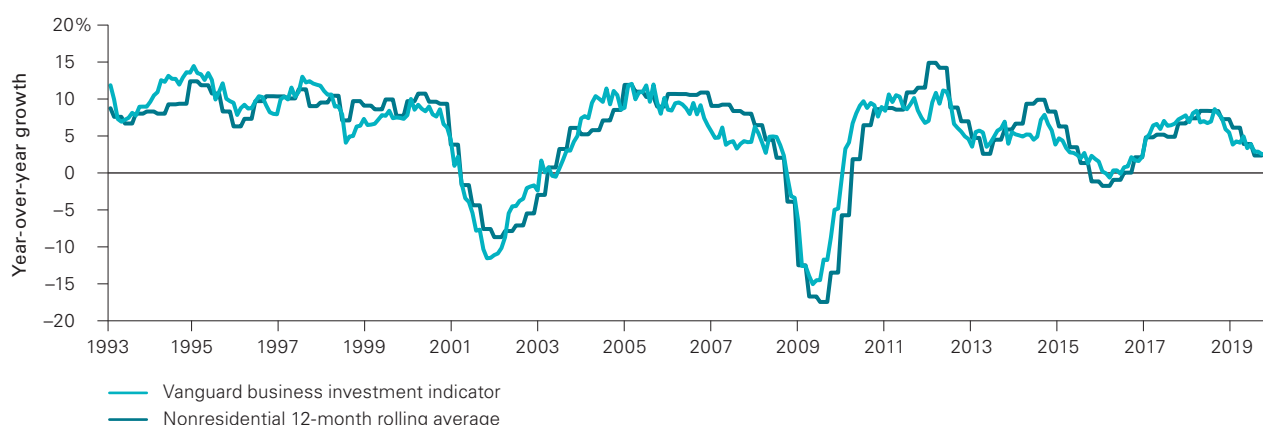
Notes: The leading business investment indicator models investment activity in the nonresidential sector in order to produce a forward-looking signal of capital expenditures by U.S. businesses. It is a principal-component-weighted index of activity related to business equipment and capital goods, business capital expenditure plans, demand for commercial and industrial loans, and energy prices.
Sources: Vanguard and Moody's Analytics Data Buffet.

b. Sentiment weighs on investment
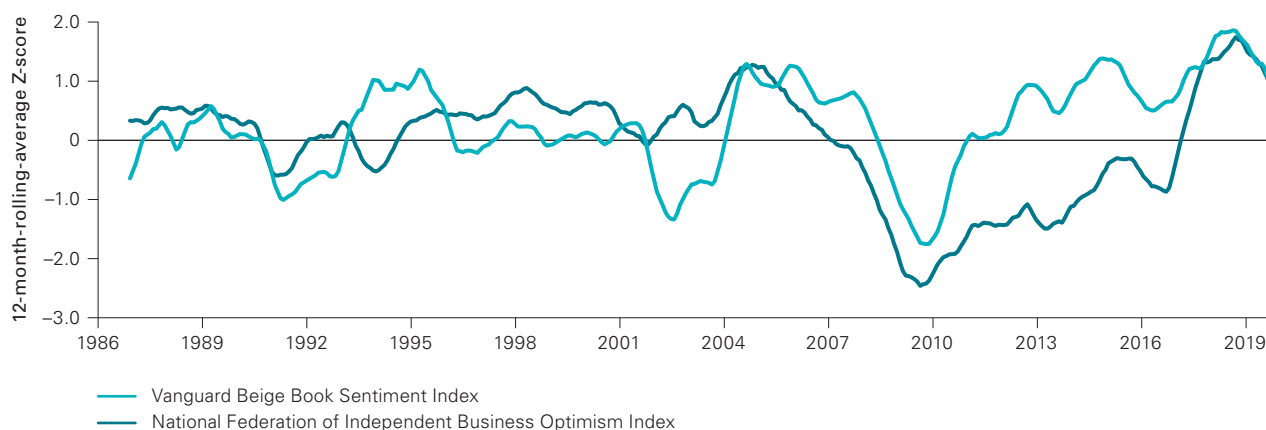
Note: The Vanguard Beige Book Sentiment Index uses Natural Language Processing techniques in order to monitor the polarity in language used in the Federal Reserve Beige Book.
Sources: Vanguard, Moody's Analytics Data Buffet, and the Federal Reserve Bank of New York.

Past Vanguard research has highlighted the drag that shocks to uncertainty can have on economic fundamentals, including growth and inflation, and how the persistence of such shocks amplifies the drag.[5,6] Given that we expect elevated levels of uncertainty to persist through 2020 and beyond, a historical assessment of the impact on economic conditions of prolonged periods of high uncertainty—as opposed to one-off shocks—can lend further support to our view. As introduced in the Global Economic Outlook section, we have also estimated a Markov-switching model for the U.S. economy that identifies regimes of high and low uncertainty. **Figure I-10** shows clearly that periods of high uncertainty are associated with lower growth, tighter financial conditions, and lower asset prices.

Labor markets also tend to weaken in periods of high uncertainty, with average monthly new jobs during such periods being 85,000 lower than in low-uncertainty regimes. This makes intuitive sense, since demand for workers is likely to fall as uncertainty about the future economic environment rises. Business surveys, including those featured in Figure I-9b, point to a slowdown in the pace of hiring in 2020. Even without this drag, we had expected the pace of monthly job creation to continue falling in 2020, from 170,000 jobs per month to closer to 100,000 per month, as the current pace of job growth is unsustainable in a tight labor market. **Figure I-11** shows the current labor force participation rate relative to a proprietary estimate of the expected participation rate accounting for changes in demographics, education,

FIGURE I-10

A new regime: Implications of persistently high uncertainty
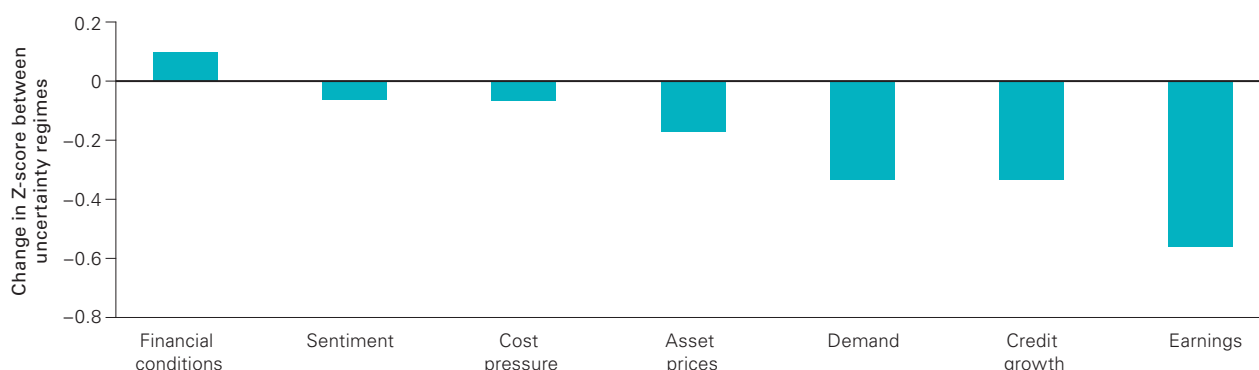
Notes: Periods of low versus high uncertainty are obtained through a Markov-switching model for U.S. growth. The cyclical index values displayed are shown as Z-scores weighted by the first principal components of the underlying indicators: Financial conditions = Vanguard financial conditions index, yield curve (measured as the 10-year–3-month Treasury yield). Sentiment = business optimism, consumer sentiment, and consumer confidence. Cost pressure = personal consumption expenditures (PCE), core PCE, average hourly earnings, and unit labor costs. Asset prices = Vanguard's fair-value CAPE, corporate option-adjusted spread (OAS), and high-yield OAS. Demand = housing starts, residential investment, nonresidential investment, and durable goods consumption. Credit growth = household financial obligations ratio, nonfinancial corporate debt, and FRB Senior Loan Officer Opinion Survey for consumer, commercial, and industrial credit terms. Earnings = corporate profits. The data range is the 1980 first quarter to the present.

Sources: Vanguard, Moody's Analytics Data Buffet, the Federal Reserve Bank of St. Louis, and Laubach-Williams (2003).

5 See the April 28, 2013, *Wall Street Journal* opinion piece by then-Vanguard Chairman and CEO Bill McNabb on the "uncertainty tax," available at www.wsj.com/articles/SB10001424127887323789704578443431277889520.

6 See the 2019 Vanguard Global Macro Matters paper *Known Unknowns: Uncertainty, Volatility, and the Odds of Recession.*

and generational behavioral tendencies (that is, how likely a given generation is to participate in the labor market at any age and educational level).[7] For the first time since the global financial crisis, the U.S. labor market appears somewhat tight, meaning the pace of new entrants to the labor force is likely to slow.

Were participation rates to fall, as our model suggests, there is a risk that unemployment rates could fall as well even as the number of new jobs created each month declined. In such an environment, inflationary concerns could heat up, as predicted by the Phillips curve; however, this relationship between unemployment and inflation is far from stationary over time.[8] We do not mean to imply that persistently low and falling unemployment rates

would never lead to inflation. Instead, we caution against assuming that high inflation is a foregone conclusion in an economy with low unemployment rates.

Despite the likelihood of persistently low unemployment rates, not much has changed in our inflation outlook. Inflation below the Fed's target, in our view, remains the most likely outcome. Breaking inflation components into those affected by the business cycle and those less sensitive to measures of slack (**Figure I-12**) suggests that with growth expected to slow below potential, the Fed would likely find it even more difficult to achieve its 2% target.[9] This, in turn, leads to our expectation that inflation will remain below that target in 2020.

FIGURE I-11
Structural factors put downward pressure on labor markets
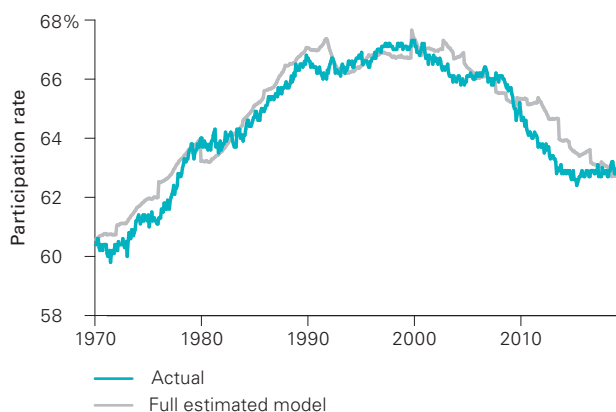
Notes: Model estimates for participation are obtained from our proprietary models. For more details please refer to the Vanguard Global Macro Matters paper *Labor Force Participation: Is the Labor Market Too Hot, Too Cold, or Just Right?* (2019).
Sources: Model estimates are based on data from the U.S. Bureau of Labor Statistics, the Integrated Public Use Microdata Series Current Population Survey, and the U.S. Census Bureau's American Community Survey.

FIGURE I-12
Low inflation remains the risk

Cyclical components have been driving inflation
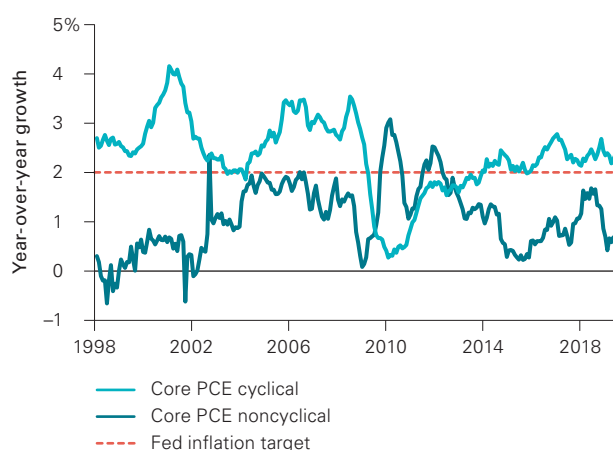
Note: Core PCE is broken down into 53 granular components. We estimate the sensitivity of each component to economic slack (the difference between U3 and NAIRU) by regressing the year-over-year component rate on constant and slack. Cyclical components are responsive to slack (coefficient is statistically significant) and noncyclical components are not responsive to slack.
Sources: Vanguard calculations and Refinitiv Datastream.

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7 See the 2019 Vanguard Global Macro Matters paper *Labor Force Participation: Is the Labor Market Too Hot, Too Cold, or Just Right?*

8 The Phillips curve suggests that as unemployment falls, relative to its natural rate, inflationary pressure builds as employers compete for a dwindling supply of labor. The natural rate of unemployment is the rate at which it puts neither upward nor downward pressure on inflation. That is often aptly referred to as the non-accelerating inflation rate of unemployment, or NAIRU. Please see the Vanguard Global Macro Matters papers *Why Is Inflation So Low? The Growing Deflationary Effects of Moore's Law* and *From Reflation to Inflation: What's the Tipping Point for Portfolios?*

9 Growth rates below potential would represent "slack."

As the pace of job growth slows, the consumer sector's support for growth may begin to wane. Although consumption has not historically been as responsive to downturns (**Figure I-13a**) or uncertainty (**Figure I-13b**) as business and residential investment are, signs are pointing to a slowdown. Should job growth slow further than we expect and, in turn, if income gains lose momentum, we see a strong case for GDP growth in 2020 near 0.5%, the lower end of our forecast range.

The consumer typically remains resilient through recessions and periods of uncertainty

a. Consumption persists through downturns

b. Impact of uncertainty shock on GDP components
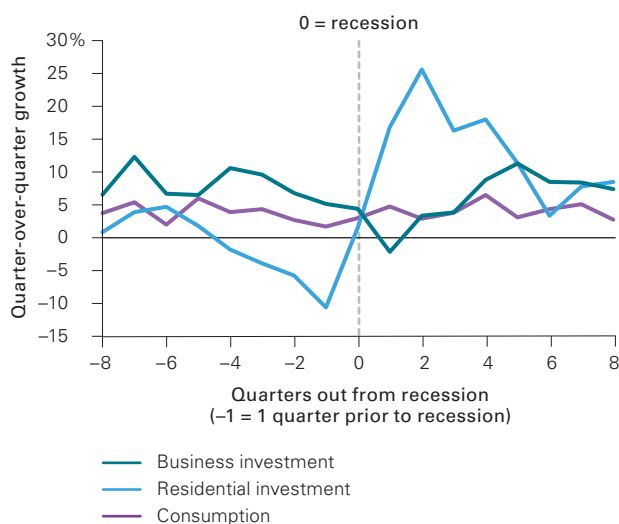
Note: These are the growth trajectories of various GDP components in the quarters preceding and following a recession.

Sources: Vanguard calculations, based on data from Moody's Analytics Data Buffet and the National Bureau of Economic Research.
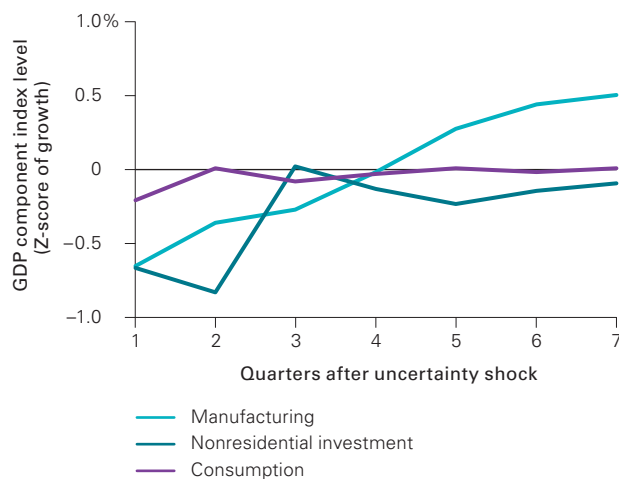
Note: This is the quarterly impulse response function of GDP components to an uncertainty shock at time 0 (instant increase in uncertainty).

Sources: Vanguard calculations, based on data from Moody's Analytics Data Buffet and www.policyuncertainty.com.

Given support from the consumer and persistently elevated uncertainty, we believe the Fed will cut interest rates one or two more times before the end of 2020. And should our baseline expectations play out in 2020, models leveraged by the Fed in its policy discussions also imply additional support in the coming year (**Figure I-14**). We believe that the U.S. economy, and in turn the Fed, will shift into a lower gear in 2020 as policymakers, businesses, and consumers navigate a more uncertain road ahead.

Fed models imply more cuts in the event of slow growth and low inflation in 2020
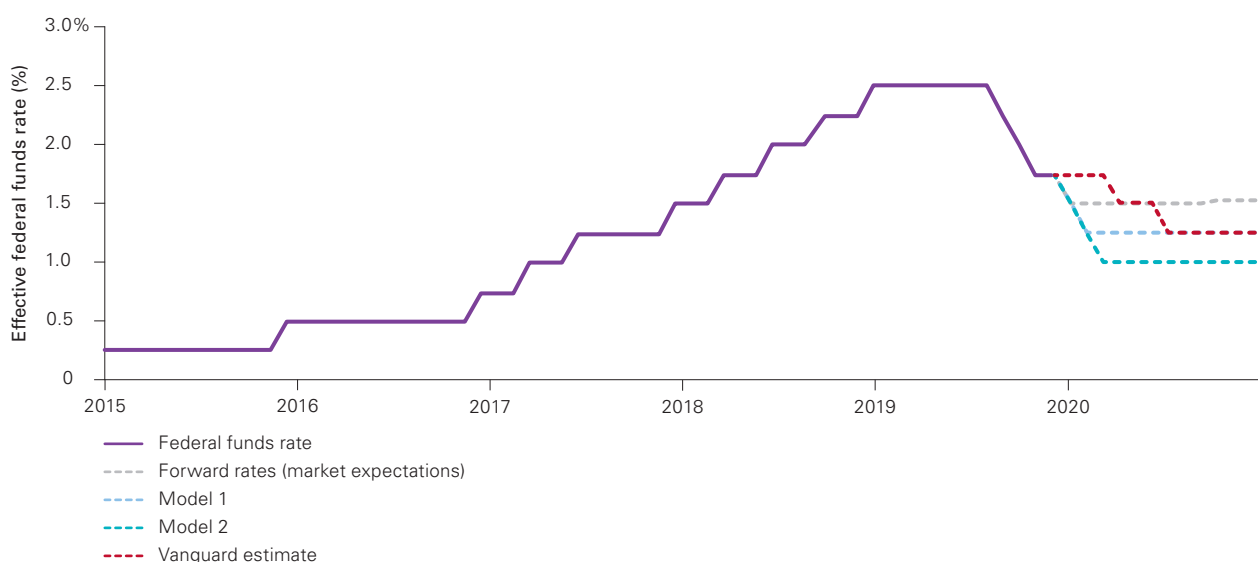
Notes: Model 1 is a first-difference Taylor Rule model wherein changes in the output and inflation gaps drive changes in the federal funds rate (FFR). Model 2 is the Fed's proprietary macroeconomic model (FRB/US), which represents model-based changes in the FFR when growth and inflation are shocked for one year with Vanguard's base case expectations for 2020 (0.5%–1.5% GDP growth, 1.8% core PCE, and 100,000 new non-farm payroll jobs per month for the duration of 2020). Vanguard estimate includes model-based expectations and those of Vanguard's Investment Strategy Group.

Sources: Vanguard calculations, based on data from the U.S. Bureau of Economic Analysis, the Federal Open Market Committee, Bloomberg, and Moody's Analytics Data Buffet.

Euro area: No strong rebound in sight given limited fiscal stimulus

The euro area economy slowed significantly in 2019, driven by a sharp contraction in manufacturing activity. Global trade tensions, Brexit uncertainty, and struggles in the auto sector have all contributed. Germany and Italy have been affected most given the openness of their economies and their relatively large manufacturing bases.

Services activity has remained relatively robust so far. However, there are tentative signs that the manufacturing weakness is feeding into supply chains and the services sector, especially in Germany (Figure I-15). A more significant spillover into services, which accounts for about 75% of the euro area economy, is a key risk as we look ahead to next year.

Based on our economic leading indicators and supplementary analysis, we expect the euro area economy to grow by 1% in 2020, slightly below our assessment of potential. In our base case, we anticipate that the region will avoid slipping into recession, supported by easier global financial conditions and a modest fiscal impulse. The relative strength of the French and Spanish economies, which are more domestically oriented than those of Germany and Italy, is also encouraging. Nevertheless, the risk of recession remains elevated, and we attach a 35% probability to this outcome occurring in 2020.

Underlying inflationary pressures in the euro area remain subdued, and we expect the European Central Bank to continue to fall well short of its 2% inflation target in 2020. What will worry the ECB most is that, despite its cutting rates further below zero and restarting quantitative easing in September 2019, market-based measures of inflation expectations remain at multiyear lows (Figure I-16).

German manufacturing activity has diverged from services in 2019

Germany manufacturing PMI
Germany services PMI
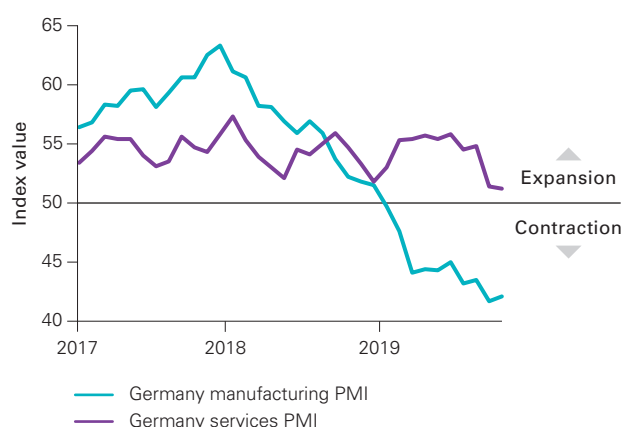
Notes: The purchasing managers' index (PMI) is an economic indicator that surveys purchasing managers at businesses that make up a given sector. A value above 50 represents growth, a value below 50 represents contraction.
Source: Bloomberg (Markit).

One of the biggest challenges that new ECB President Christine Lagarde will face is convincing investors that monetary policy in the euro area is still an effective and credible tool in supporting growth and inflation. We expect that the ECB will adopt a wait-and-see approach to analyze the full impact of its September stimulus package and will keep policy largely unchanged for the first six months of 2020.

If inflation expectations fail to rise meaningfully, however, the ECB may be forced to consider easing further. There is a limit to cutting interest rates deeper into negative

FIGURE I-16

Market-based measures of medium-term inflation expectations failed to rise following the ECB's latest monetary stimulus package
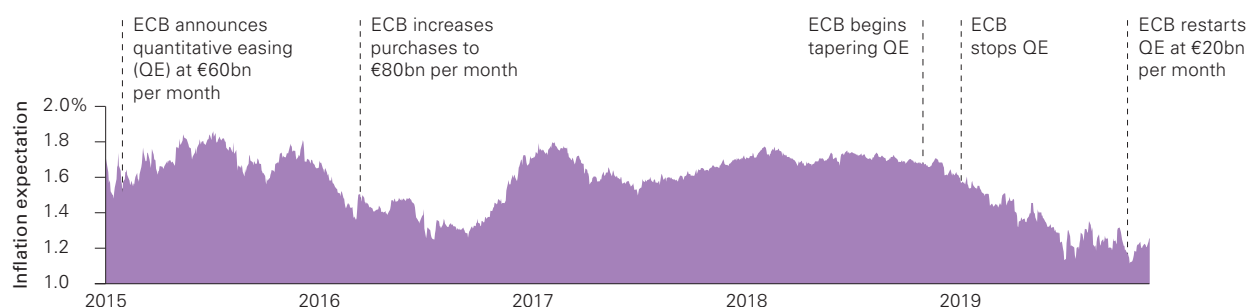
Notes: Medium-term inflation expectations have been proxied using the euro 5-year, 5-year inflation swap forward. Data are as of November 6, 2019.
Sources: Vanguard and Bloomberg.

territory given the impact on bank profitability. But there may be more room on asset purchases. If the ECB raises the issue and issuer limits on eligible securities from 33% to 50%, we calculate that this will increase the universe of bonds available to purchase by 1 trillion to 1.5 trillion euros. In our view, this will enable asset purchases to run at a pace of 60 billion euros a month for about two years.

With monetary policy struggling to boost growth and inflation on its own, the burden is increasingly falling on fiscal authorities to provide an additional boost. The draft budgets submitted to the European Commission in October, however, imply only a modest fiscal impulse in 2020 of about 0.3% to 0.5% of GDP for the euro area as a whole.

Much of the focus is on Germany, the only major euro area economy with significant fiscal space to act. As Figure I-17 illustrates, we estimate that Germany could provide a fiscal boost of around 2% of GDP without causing its debt-to-GDP ratio to rise. However, there is little appetite among the fiscal authorities to actually use this space. As a base case, we expect German fiscal stimulus of around 0.5% of GDP in 2020, with an additional 0.5% of upside should the growth outlook deteriorate even further.

FIGURE I-17

Germany has the ability to provide meaningful fiscal stimulus, but not the willingness
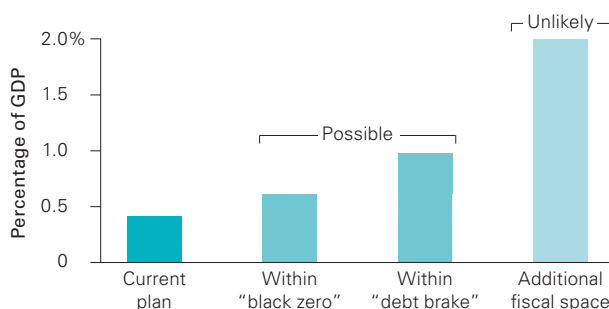
Notes: Germany's total fiscal space is calculated as the maximum change in the primary balance that can be implemented without the debt-to-GDP ratio rising, based on assumptions of future growth and interest financing costs. Germany currently abides by two fiscal rules: (1) the "black zero" and (2) the "debt brake." The black zero is a commitment to avoid running a budget deficit in any given year. The debt brake permits a cyclically adjusted federal deficit of 0.35% of GDP only.
Source: Vanguard.

United Kingdom: Brexit uncertainty slowly taking its toll

The outlook for the U.K. economy in 2020 hinges once more on progress toward Brexit. Under our base case, we assume that by early 2020 the U.K. Parliament will approve and legislate the Withdrawal Agreement Bill (WAB) negotiated by Boris Johnson. That approval will confirm that the U.K. will pay a divorce bill to the European Union, protect EU citizens' rights in the U.K., commit to a dual customs zone for Northern Ireland with no hard border on the island of Ireland, and enter a transition period that concludes in December 2020. The U.K. will then need to negotiate future trading arrangements with the EU by the end of that period.

At this stage, the U.K. seems very likely to leave the European Single Market and the EU Customs Union, which means that free movement of people, services, and capital will end. The U.K. has expressed a strong desire to negotiate a free-trade deal on goods, but the EU will apply strict conditions to such a deal, including regulatory alignment on goods, which the U.K. may be unwilling to accept. This makes it likely that the transition period will need to be extended by agreement with the EU, although it is possible that the U.K. could leave the EU without a trade deal, a potentially damaging outcome for economic prospects.

Given these assumptions, we forecast the U.K. to achieve trend growth of 1.2% in 2020. On the one hand, we believe that approval of the WAB will relieve uncertainty and provide a modest short-term tailwind to growth. Moreover, the U.K. government is expected to provide additional fiscal stimulus that will contribute roughly 0.5% to GDP. On the other hand, the likely ongoing lack of clarity about future trading relationships with the EU is likely to continue to act as a drag on activity. And growth among the U.K.'s trading partners in Europe, Asia, and North America is expected to be relatively soft, which will reduce demand for U.K. exports and serve as a further

headwind. In this environment, we expect unemployment to remain relatively stable at about 4%, with wage pressures muted. This implies that inflation pressures will be contained and that the Bank of England will leave interest rates on hold throughout 2020.

The key risks to our view are a continued drag on growth from an even weaker global backdrop and more prolonged Brexit uncertainty. Since the 2016 referendum on EU membership, U.K. business investment has lagged that of the rest of the Group of Seven (G7) economies by a total of 9% (see **Figure I-18**). The Bank of England's own assessment is that Brexit has generated a long-lasting increase in uncertainty and may have thus far

U.K. business investment has stalled since the 2016 EU referendum
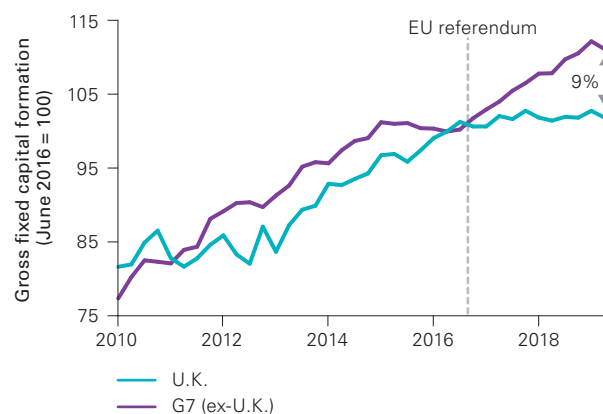
Notes: The G7 (ex-U.K.) countries are Canada, France, Germany, Italy, Japan, and the United States. Data are weighted by nominal GDP using purchasing power parity (PPP) and rebased on June 2016 to equal 100. Data are as of November 6, 2019.

Sources: National accounts, Bloomberg, and the International Monetary Fund.

reduced U.K. productivity by 2%–5%.[10] A continued period of heightened uncertainty in 2020 would be likely to reduce growth and increase the probability of rate cuts.

Looking beyond 2020, based on our modeling, the U.K. economy is expected to be about 8% smaller by 2030 in the event of a no-deal Brexit than if Brexit had never happened (**Figure I-19**).[11] It will be roughly 7% smaller if the U.K. enters a Canada-style free-trade agreement with the EU. These estimates fall to 3% under a Customs Union arrangement and 1% under the Common Market 2.0 proposal. Finally, given our assumptions that U.K. GDP returns to its pre-referendum trend if the Brexit decision is reversed, there is no difference in this no-Brexit scenario.

FIGURE I-19

The estimated impact of Brexit on the U.K. economy
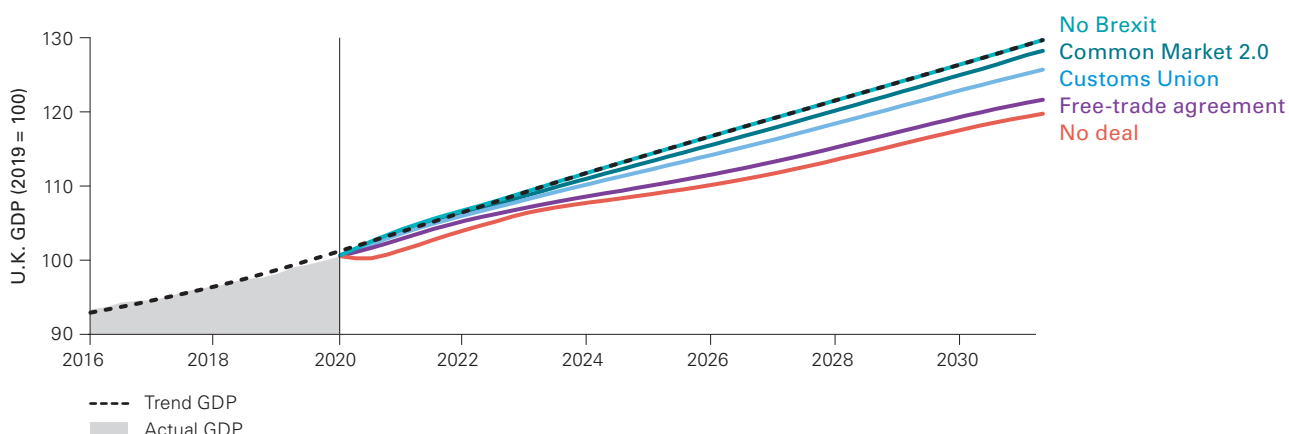
Notes: This is an estimation of both long- and short-run impacts of Brexit on U.K. GDP. Long-run growth estimates were used for the trend level of GDP, with percentage deviation from trend GDP (calculated in short-run estimates) overlaid on top.

Sources: Vanguard calculations, based on data from Bloomberg, Macrobond, and the Office of National Statistics.

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10 See Bloom et al., 2019, *The Impact of Brexit on UK Firms*, Bank of England Staff Working Paper No. 818.
11 See the 2019 Vanguard research paper *It's Not EU, It's Me: Estimating the Impact of Brexit on the U.K. Economy.*

China: No hard landing, uncertainty impedes stimulus

China's economy faced threats on multiple fronts in 2019 as economic consequences of the multiyear escalation in U.S. trade tensions became evident and stimulus measures struggled to rejuvenate a fraught private sector. Although policymakers have modestly shifted the balance of their focus toward protecting short-term economic stability, slowing global economic growth and expectations for persistent U.S.-China tensions place China's economy in an environment of perpetual high policy uncertainty. These factors constitute a sizable headwind for both immediate and medium-term growth prospects.

We expect this uncertainty to drag down China's near-term growth by 0.8%, with the effects magnified when examining the new economy—private enterprise industries reflecting domestic consumption, high-skill manufacturing, and service industries (**Figure I-20**).

The impact of this uncertainty against a backdrop of continued structural deceleration in the economy leads us to lower our 2020 growth forecast to 5.8%. This is a noticeable decline from the high-6% growth China experienced over the past three years and represents a continued slowdown from 2019's expected 6% growth. On a positive note, the expectation for policymakers to continue implementing targeted stimulus measures and a dovish turn from global central banks place the odds of a hard landing, or growth below 5%, as relatively low (about 10%) (**Figure I-21**).

Policy efforts to stabilize growth will continue, but concerns about medium-term financial stability risks will keep these measures in moderation relative to prior

Uncertainty is a significant drag on the new economy
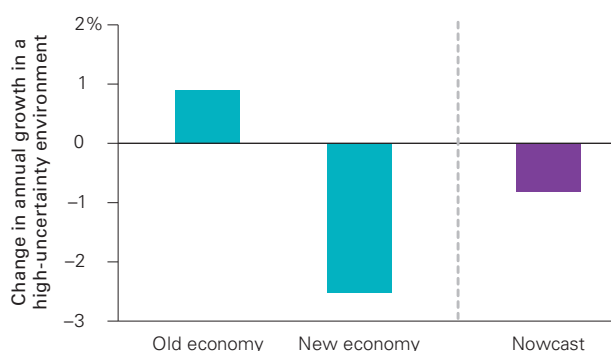
Notes: Vanguard's Nowcast Index is designed to track China's economic growth in real time using a dynamic factor approach to weight economic and financial market indicators, accounting for co-movement between the factors. The Nowcast comprises two distinct economies. The old economy is based on state-owned enterprises; low-end and heavy manufacturing industries such as textile, coal, steel, and concrete production; and real estate. The new, consumer-driven economy is led by private enterprises and based on domestic consumption, high-skill manufacturing, and service industries.
Sources: Vanguard calculations, based on data from Thomson Reuters Datastream, CEIC, Bloomberg, and the National Bureau of Statistics of China.

easing cycles, reducing the tailwinds for global growth prospects in 2020 (**Figure I-22**). Wide-scale stimulus measures that might propagate property bubbles will rightfully be avoided, and policymakers will instead focus more on boosting infrastructure spending and providing targeted monetary easing to small and midsize private enterprises that have faced funding pressures since the shadow banking crackdown of 2016–2017.

FIGURE I-21

Further slowdown is likely, but the odds of a sharp downturn are low
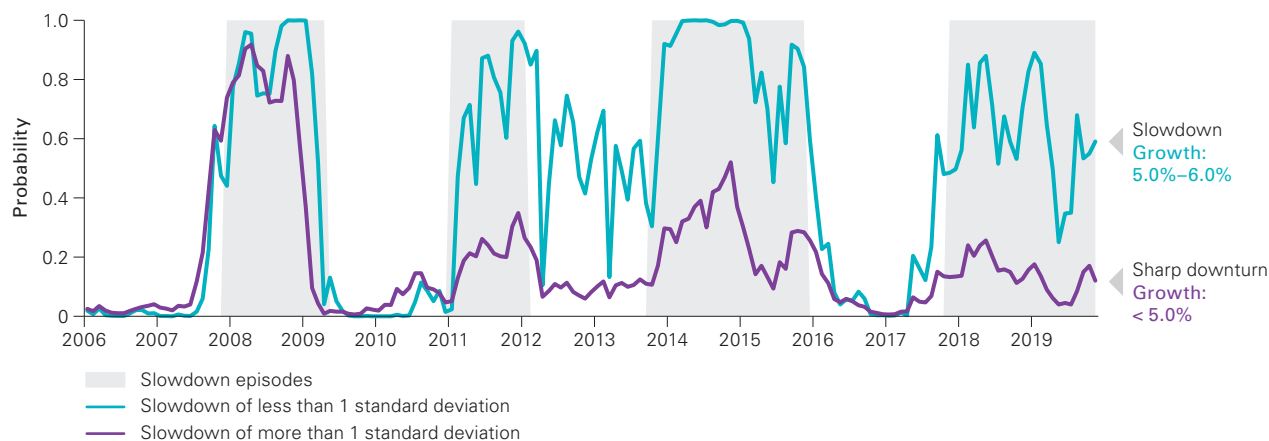
Slowdown
Growth:
5.0%–6.0%

Sharp downturn
Growth:
< 5.0%

Slowdown episodes
Slowdown of less than 1 standard deviation
Slowdown of more than 1 standard deviation

Notes: Implied probabilities are derived using a probit regression model that uses Vanguard's Leading Economic Indicator (VLEI) for China and other financial market variables. The model was estimated using monthly data from January 2000 to September 2019. A 1-standard-deviation slowdown is defined as the deviation from trend output level.
Sources: Vanguard calculations, using data from Bloomberg and Thomson Reuters Datastream.

FIGURE I-22

China will stimulate but won't reflate the global economy

Change in total social finance as a % of GDP

Year-over-year growth

Year-over-year growth

Change in total social finance

China imports

G7 industrial production

2008–2009

2011–2013

2015–2016

Present
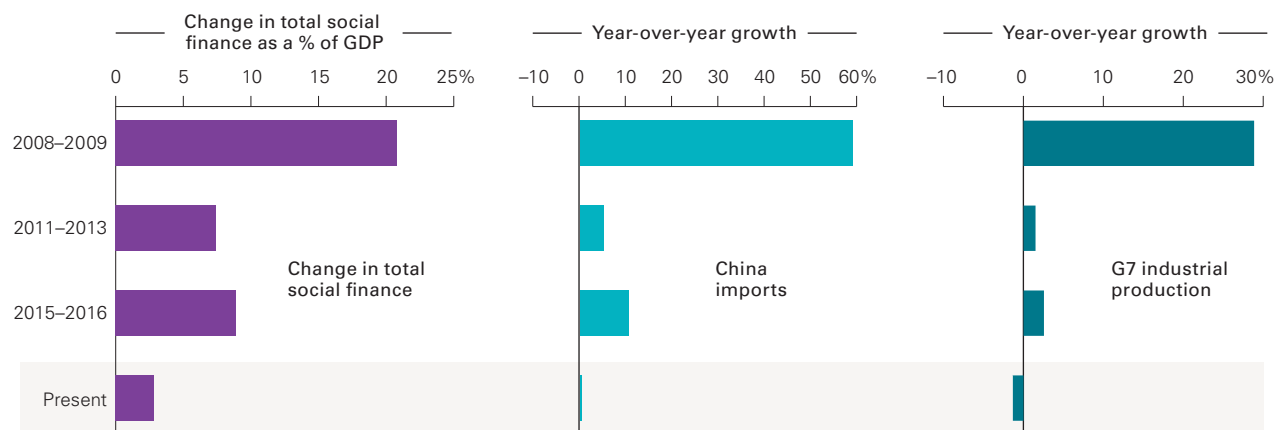
Note: Total social finance is the volume of financing provided by the financial system to the real economy (domestic nonfinancial enterprises and households).
Sources: Vanguard calculations, using data from Bloomberg and Thomson Reuters Datastream.

Questions remain as to how effective these policies will be in stabilizing growth. The new economy has historically been less responsive to stimulus measures, and the old economy, which historically has responded more strongly, is likely to be less responsive this time because of the elevated uncertainty (**Figure I-23**). Under these circumstances, policymakers may have to concentrate more efforts on improving the policy transmission effects on the real economy, as they did with recent reforms to China's loan prime rate mechanism.

The ability to push forward domestic structural reforms while maneuvering a more complex and hostile global political environment holds the key to China's medium-term outlook. As **Figure I-24** illustrates, regime changes in trading relationships, as well as politics and governance, have complicated China's transition to a developed economy. Rising uncertainty externally may increase the temptation for Chinese policymakers to kick the can down the road by emphasizing short-term growth stability to the detriment of longer-term financial stability and structural reforms. The result over time will be an increase in the risks of a "Japan-style stagnation" or an "emerging-market-style instability" scenario, in which falling productivity growth and lower capital investment eventually lead to a much lower growth environment.

Stimulus measures are less effective in a high-uncertainty environment

New economy
— Low uncertainty
— High uncertainty

Old economy
— Low uncertainty
— High uncertainty
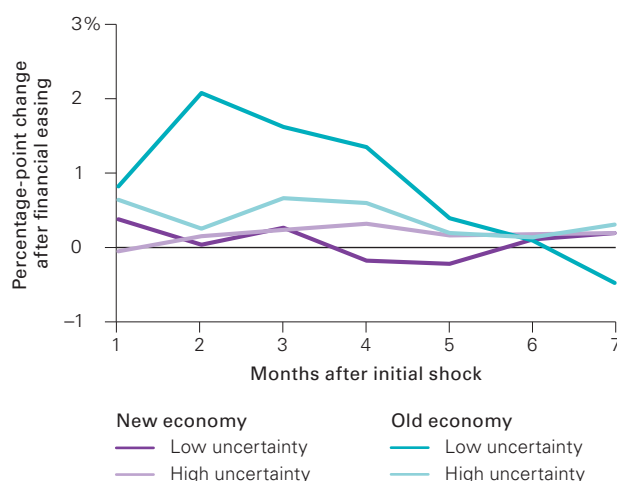
Notes: Data represent the responsiveness of the new and old economies in high- and low-uncertainty environments. Financial easing is defined as a 1-standard-deviation easing of financial conditions.

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

China's medium-term outlook is complicated by external tensions

— Continued U.S.-China tensions
— Restored U.S.-China relations
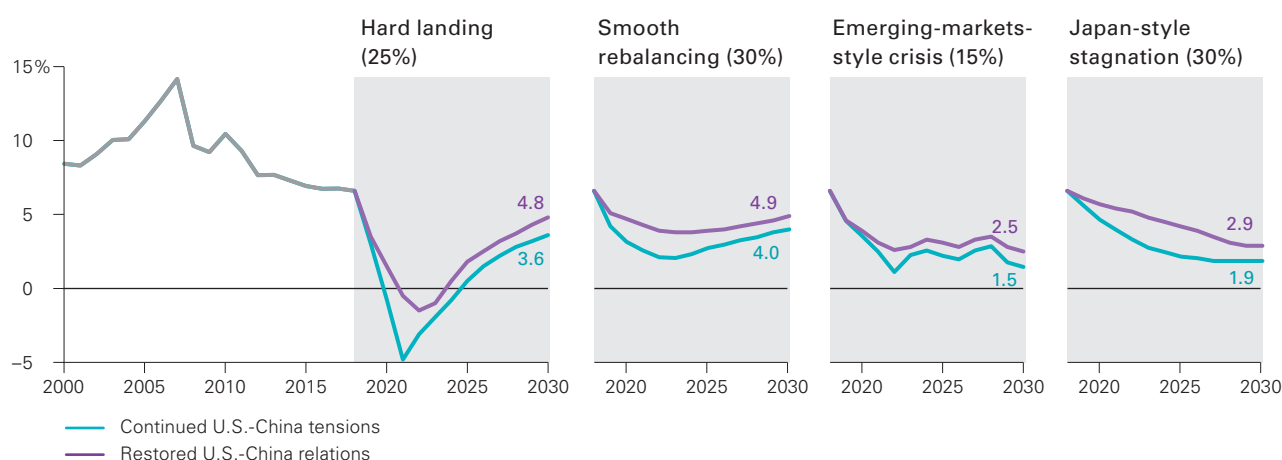
Notes: The scenarios show year-over-year GDP growth. The percentages for the likelihood of a scenario occurring are based on Vanguard estimates.

Sources: Vanguard calculations, based on data from the International Monetary Fund, World Bank, and CEIC.

On the other hand, we recognize that recent U.S.–China tensions can also be seen as a double-edged sword, with external pressure incentivizing China's government to resume its reform agenda and increase productivity gains. Under such circumstances, the chance of a smooth-rebalancing or hard-landing scenario will increase, with smooth rebalancing more likely at this point given adequate macroeconomic policy cushions and recent progress on overcapacity issues.

Clearly, policymakers must strike the right balance among China's economic, financial, and social stability agendas in this increasingly uncertain environment.

As China becomes more integrated with the global economy, domestic growth outcomes will have more of a tendency to spill over to other economies. Actions to boost private-sector sentiment and propel the new economy will be a positive development for global growth given the world's growing sensitivity to these industries (**Figure I-25**). We remain optimistic about China in the long term, but its economic outlook will be a consequence of many complex, deeply rooted factors that will become clearer with time. Close monitoring of its economic, financial, policy, social, and political development is warranted.

FIGURE I-25

China's new economy is important to many developed nations
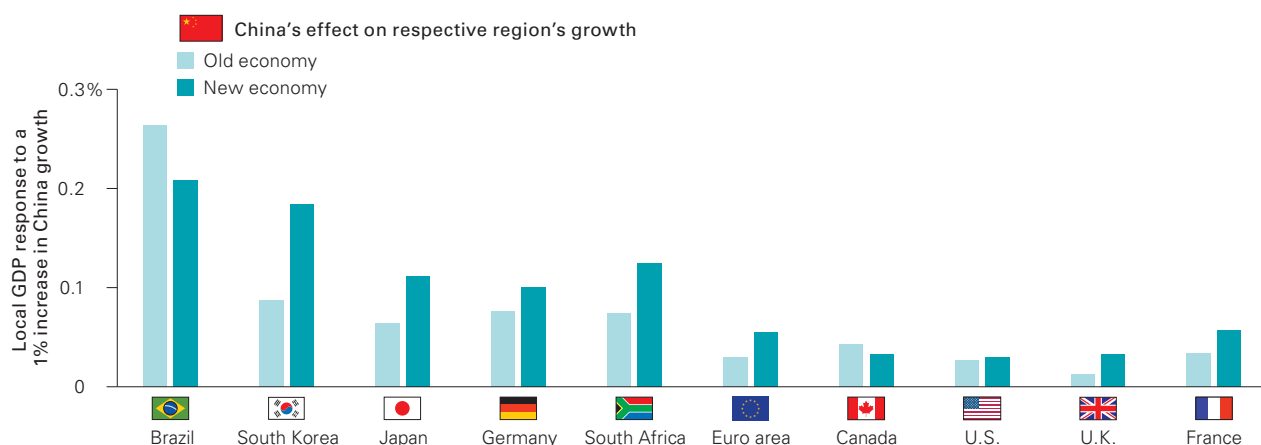
Notes: A vector autoregression (VAR) model was used to measure the effects of China's old and new economy growth momentum on the respective regions' growth. The sample period covers the years 2006 to 2018.

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

Japan: Bank of Japan stuck in a tough spot

Japan has been decoupled from the 2017 tightening party and now is late to the easing cycle that began with the U.S. Federal Reserve in July 2019. Although economic and financial factors have been supportive of the Bank of Japan's (BOJ) keeping monetary policy steady, potential global growth scares and domestic risk factors in 2020 may increase pressure to loosen policy. We expect 2019 fourth-quarter GDP to modestly contract as October's value-added-tax hike slows consumption; however, the pass-through of additional funding to social programs should mitigate downside risk. Historically, developed nations have enjoyed a 25-basis-point stimulus from pre-Olympic investment and consumption expenditures (see **Figure I-26**), but this will fade in 2020, when the Summer Olympics are held in Tokyo, and is one reason we expect average GDP growth to slow to 0.6%.

A trade pact finalized in October bolstered the U.S.-Japan trading relationship, but Japanese firms are highly susceptible to the uncertainty surrounding U.S.-China trade, as well as the slowdown in China's economy (Figure I-25). With more than 13,000 Japanese companies operating in China as of May 2019,[12] Japan's medium-term economic outlook is clouded by expectations of continued U.S.-China tensions. A recent *Nikkei* survey of 1,000 Japanese companies with operations in China revealed that only 10% of them expect the U.S.-China trade conflict to be resolved in under three years.[13]

Tailwinds from the 2020 Olympics will fade
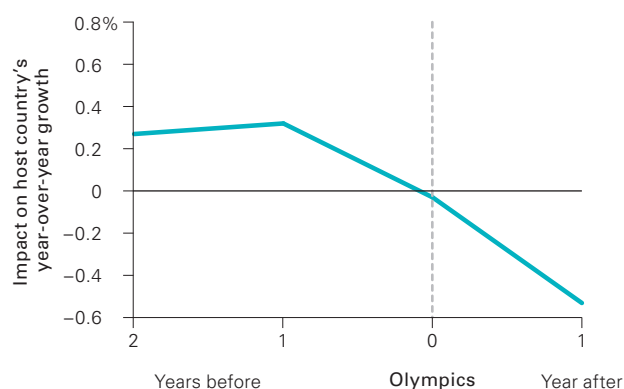
Notes: Data show the impact on a developed country's GDP growth relative to its potential GDP two years prior to, the year of, and one year after hosting the Olympics. Global growth is used as a control variable to minimize the global business cycle.
Sources: Vanguard calculations, based on data from the World Bank.

Indications of the downturn have started to appear in our recession probability indicator, which captures the likelihood of both a "true recession" as defined by Japan's Cabinet Office and a "sharp downturn" as defined by a 2-standard-deviation slowdown from trend (see **Figure I-27**). Although a true recession appears unlikely, the risks of a sharp downturn are

12 See *China Appeal Fading for Japanese Companies*, available at www.nippon.com/en/japan-data/h00483/china-appeal-fading-for-japanese-companies.html.
13 See *Quarter of Japanese Companies Ready to Reduce China Footprint*, available at https://asia.nikkei.com/Economy/Trade-war/Quarter-of-Japanese-companies-ready-to-reduce-China-footprint.

FIGURE I-27

Recession is unlikely, but the risk of a sharp downturn is rising
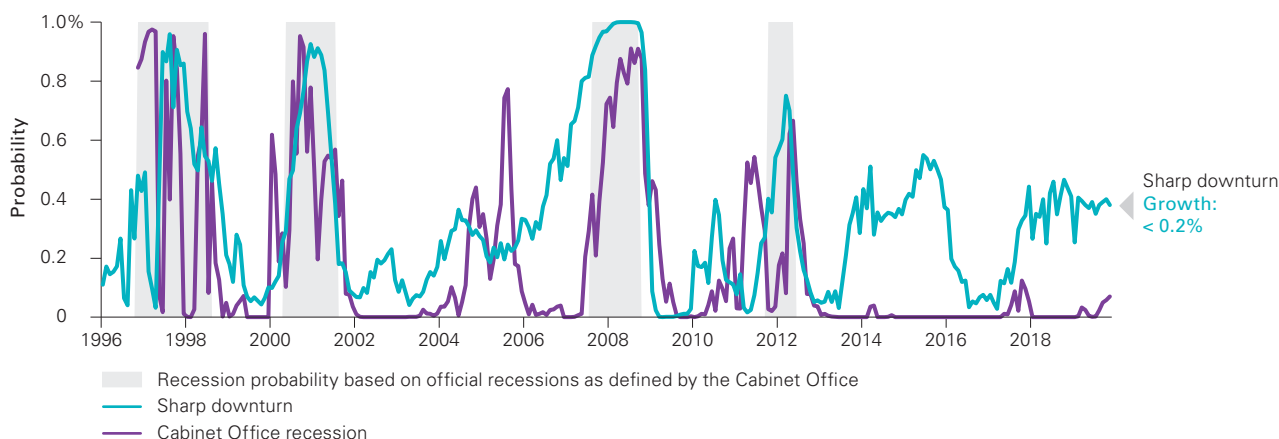
Notes: Implied probabilities are derived using a probit regression model that uses Vanguard's Leading Economic Indicator (VLEI) for Japan and other financial market variables. The model has been estimated using monthly data from January 1990 to July 2019. A sharp downturn is defined as a 2-standard-deviation slowdown from trend.

Sources: Vanguard calculations, using data from Bloomberg and Thomson Reuters Datastream.

material, owing to weakening domestic growth momentum exacerbated by declining business and consumer sentiment. Alongside still-weak inflation (see **Figure I-28**), the increased downside risks to growth may encourage additional economic support by policymakers.

We find there are few options in the BOJ's toolkit that would be effective in achieving growth and inflation mandates without negative consequences to the financial system (see **Figure I-29**). The most feasible tools would be lowering interest rates and increasing asset purchases, but these moves would inevitably raise concerns about side effects, such as dampening financial profitability and shrinking market liquidity. It's also questionable whether further monetary accommodation alone would be effective, given that inflation is still below 1% even after more than five years of the BOJ's quantitative and qualitative easing program. It is becoming clear that monetary policy is racing toward its limit.

On the fiscal side, public infrastructure spending has a higher economic growth multiplier than monetary policy, but such spending is less feasible in Japan given the concerns that it would add to already high government debt. However, continuation of yield-curve control measures may be able to keep interest rates lower, which can provide some room for looser fiscal policy.

Most likely, we think the BOJ will again be left to shoulder a disproportionate share of supporting the economy. Although reducing the short-term interest rate further is still an option, the bank will likely resort to strengthening its forward guidance before taking more concrete policy actions, given the negative side effects.

The Bank of Japan has multiple mandates to balance
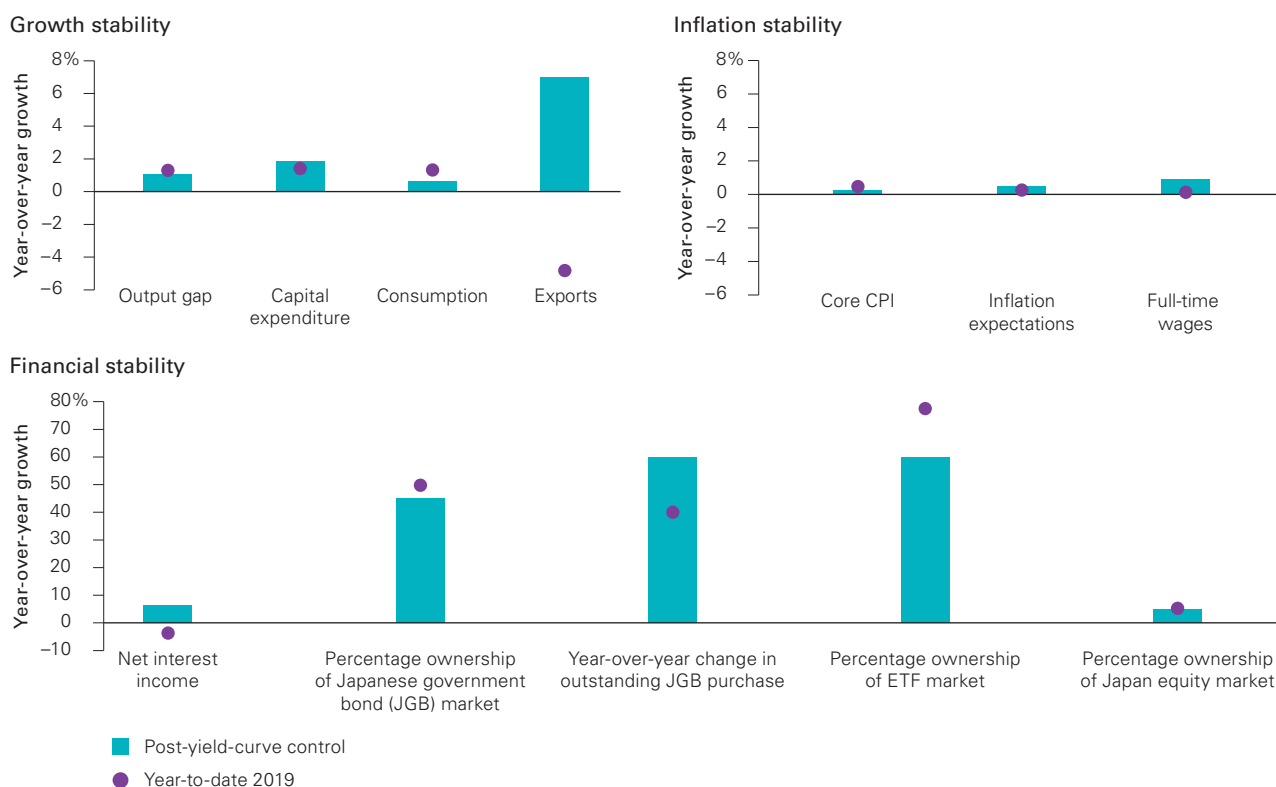
Sources: Vanguard, using data from Thomson Reuters Datastream.

Over the long term, Japan will continue growing in the sub-1% range, well below expectations for other G7 economies. But the divergence may not last all that long, as the developed world faces the same structural issues that have plagued Japan over the past several decades: demographics, elevated inequality, weak inflation, and narrowing fiscal space. Abenomics has gradually made progress on needed structural reforms—value-added taxes, corporate governance, and labor market equality—but demographic challenges are unlikely to materially change given the lack of appetite for immigration reform.

There is limited room for further effective monetary easing
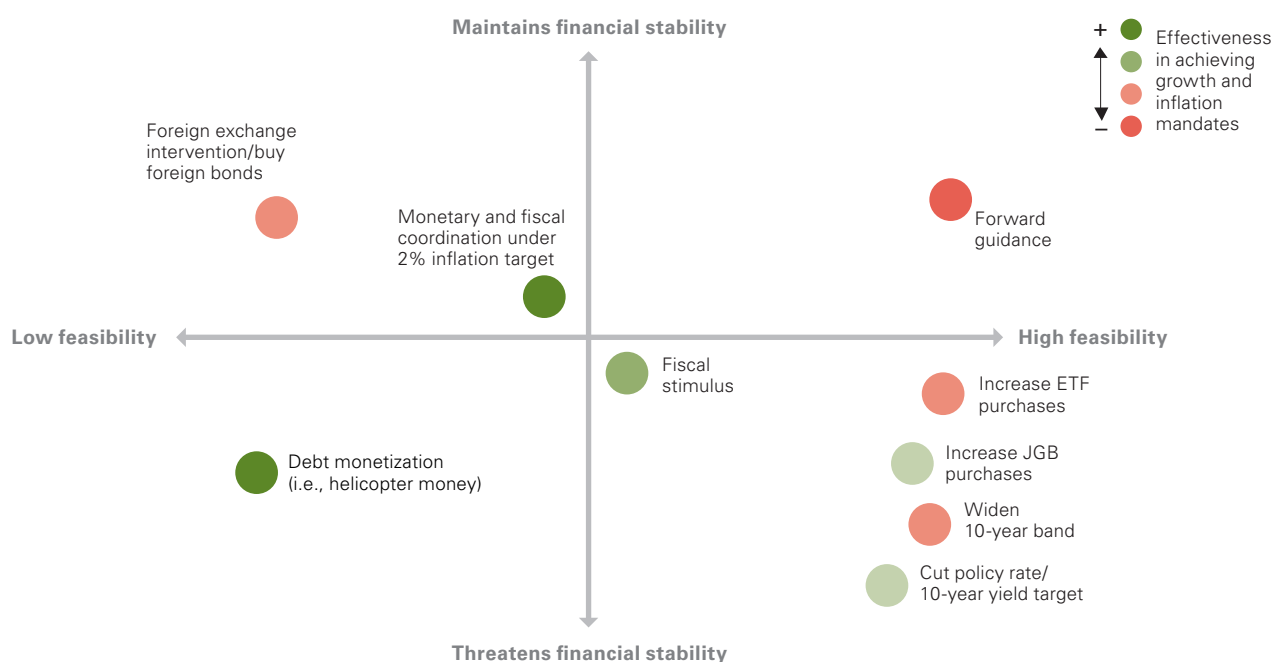
Source: Vanguard.

Emerging markets: Headwinds loom amid global trade slowdown

Economic growth for emerging markets in the aggregate is expected to be 4.6% in 2020. However, we expect there to be vast heterogeneity both within and among regions. In the Latin American region, the growth projection is 1.8% (see **Figure I-30**). Emerging European growth is expected to increase moderately, at a 2.5% pace. Forecasts for emerging Asia, though slightly downgraded, remain robust, at an average of 6%. In general, emerging markets' inflationary pressures are subdued, with most countries' inflation rates at or below target.

Some of the recent slowdown across emerging markets reflects the spillover effects of a slowing China, policy tightening by the U.S. Federal Reserve in 2018, and a decline in global trade. The global trade reduction stems mostly from uncertainty surrounding the U.S.-China trade dispute and the proposed United States-Mexico-Canada Agreement. This heightened uncertainty has led to a decline in manufacturing sectors across emerging markets (see **Figure I-31**). In aggregate, purchasing managers' indexes (PMIs) have fallen 3.3% from April 2018 to September 2019, with industrial production across regions showing a similar decline.

In addition, populism and geopolitical risks present challenges. Across most emerging markets, fiscal policy and monetary policy have turned expansionary to counter slowing consumer demand (see **Figure I-32**). Developed-world monetary policy has turned dovish, which should prevent global financial conditions from tightening further, thereby spurring consumer demand. Corporate leverage has increased in the emerging markets since the financial crisis, with high levels of corporate debt issuance in nonlocal currencies. Sudden movements of the dollar in either direction could severely damage corporate balance sheets.

FIGURE I-30

Emerging markets growth is projected to stabilize
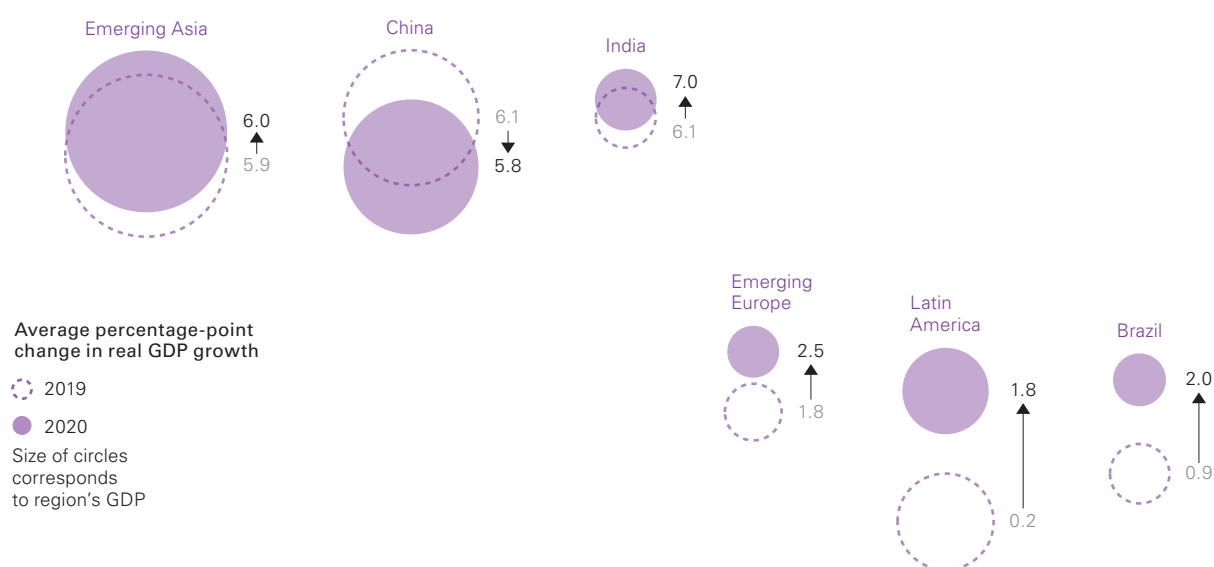
Notes: Regional growth forecasts are inclusive of country forecasts displayed here. For a full list of countries included in each regional forecast, please refer to the IMF World Economic Outlook (https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/groups.htm).

Source: International Monetary Fund.

FIGURE I-31

Industrial production has slowed down since late 2017
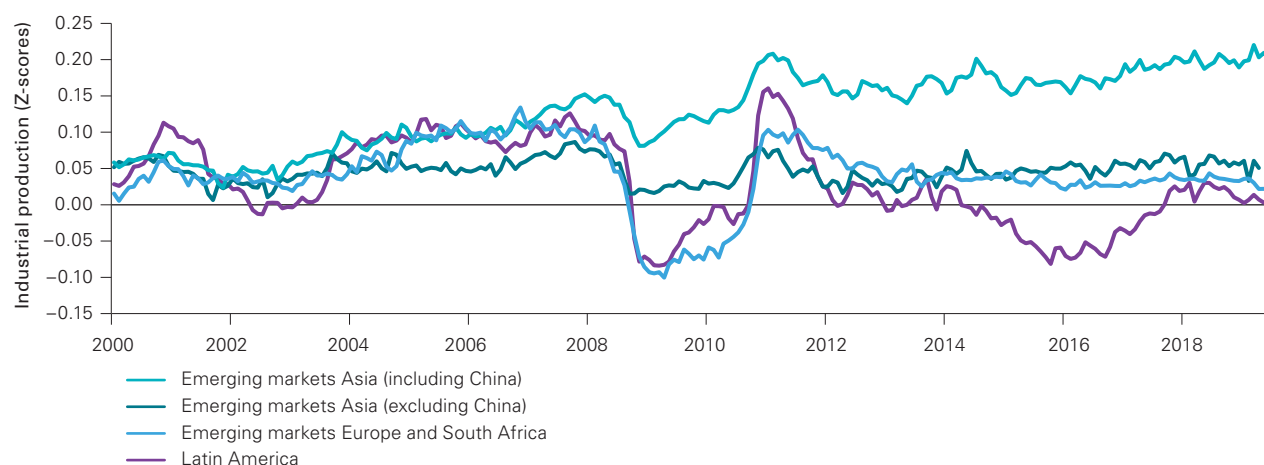
Notes: Regional industrial production (IP) indexes are GDP-weighted aggregates of individual country IP indexes. Emerging markets Asia includes India, Indonesia, Malaysia, and the Philippines. Latin America includes Brazil, Chile, Colombia, Mexico, and Peru. Emerging markets Europe and South Africa includes Poland, Turkey, Hungary, and South Africa.

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

FIGURE I-32

Monetary policy across emerging markets has turned expansionary
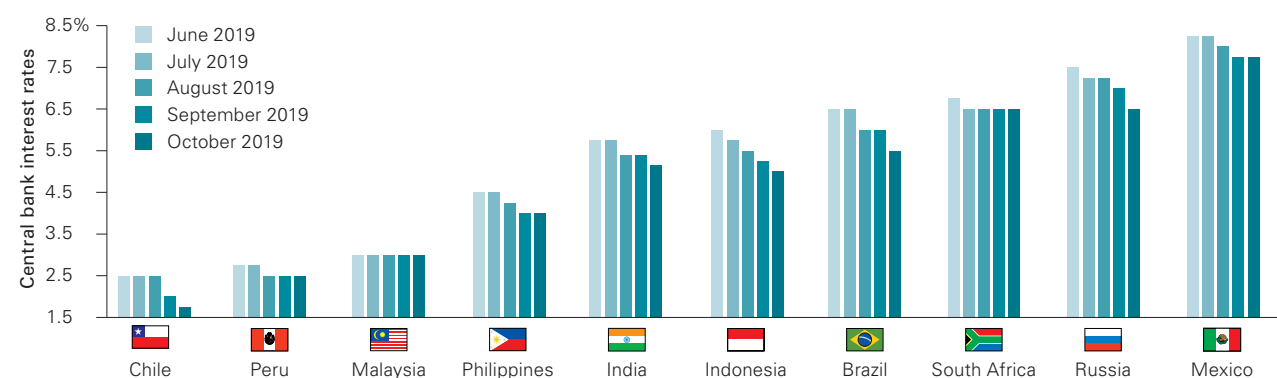
Sources: Moody's Analytics Data Buffet and Thomson Reuters Datastream.

II. Global capital markets outlook

The confluence of slowing global growth and persistent geopolitical uncertainty creates a fragile backdrop for markets in 2020 and beyond. Although more favorable valuations have led to a modest upgrade in our equity outlook over the next decade, the likelihood of a large drawdown for equities and other risky assets remains elevated. Fixed income returns are also expected to be subdued at best, with our lower projections factoring in declining policy rates, sharply lower long-term bond yields, and compressed credit spreads globally. Nonetheless, the time-tested principles of portfolio construction are expected to hold, with high-quality bonds retaining their risk-reduction and diversification properties in portfolios.

Importantly, the market's efficient frontier of expected returns for a unit of portfolio risk is still in a lower return orbit. Common asset-return-centric portfolio tilts, seeking higher return or yield, are unlikely to escape the strong gravity of low return forces in play. In addition, a relatively flat efficient frontier suggests that increases in expected portfolio returns for taking marginal equity risk are not as well-compensated when compared with historical precedent.

Global equity markets: High risk, low return

In the face of elevated uncertainty and a synchronized global slowdown, equity markets have remained surprisingly robust; year to date, global equities have returned more than 16% in USD terms as of the end of September 2019. However, investors should caution themselves against extrapolating present gains into the future. In fact, if one takes into account fourth-quarter 2018 declines, global equities would have returned only 3.8% when annualized over the 13 months ending September 30, 2019. This represents an underperformance compared with global aggregate bonds, which returned almost 8% annualized over the same period.

Upon factoring in our expectations for even-lower-for-longer global growth, inflation, and interest rates, the outlook over the next decade for global equities remains guarded, at 4.5%–6.5%. This is similar to last year's outlook and significantly lower than the experience of post-global financial crisis years. Expected returns for the U.S. stock market remain lower than those for markets outside the U.S., underscoring the benefits of global equity strategies in this environment.

More reasonable valuations to support modestly higher returns, yet downside risks and volatility likely to stay elevated

The strong recovery in equity markets following the losses of 2018 explains why valuations are only modestly lower than this time last year. Although the recent pare-back in equity prices somewhat reduces the risk of a sharp market downturn (defined as a >20% drop) over the next three years, as indicated by the probabilities in **Figure II-1**, valuations of U.S. and emerging markets and the growth factor still stand above our estimates of fair value, implying that downside risks remain elevated relative to more normal market environments.

Probability of equity market correction remains elevated
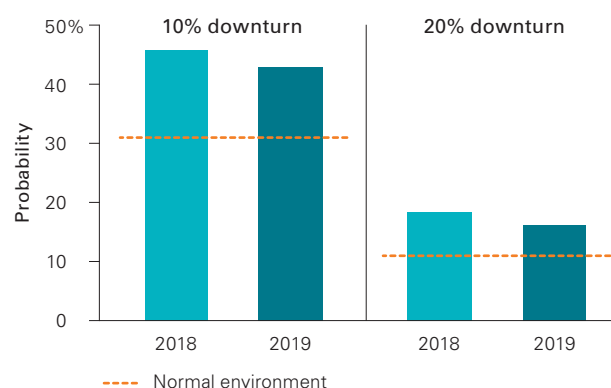
Note: Probability corresponds to the percentage of global equity in USD VCMM simulations that declines over the next three years.
Source: Vanguard.

Vanguard's distinct approach to forecasting

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

Figure II-2a plots Robert Shiller's cyclically adjusted price/earnings ratio (CAPE) for the Standard & Poor's 500 Index versus our "fair-value" model. Vanguard's fair-value CAPE accounts for current interest rates and inflation levels. It also provides a more useful time-varying benchmark that accounts for changes in economic and financial market conditions against which the traditional CAPE ratios can be compared, instead of the popularly used historical average as a benchmark. Hence, a high CAPE is justified by today's low inflation and interest rates. Although the CAPE is approaching historical highs, it is not considered a bubble like the dot-com boom of the late 1990s and early 2000s

when compared with its fair value.[14] Nonetheless, valuation in the U.S. equity market still appears to be stretched, as it stands above our estimate of fair value.

When we extend this fair-value concept to other regions, we find that non-U.S. developed markets appear to be fairly valued, after adjusting valuations for lower rates and inflation. Emerging markets, on the other hand, are slightly overvalued after adjusting for their higher risk and higher earning yields required by investors (see **Figure II-2b**). Meanwhile, valuation of U.S. growth equities, compared with value and small-capitalization equities, appears to be more stretched after many years of strong performance.

Divergence in global equity valuations

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

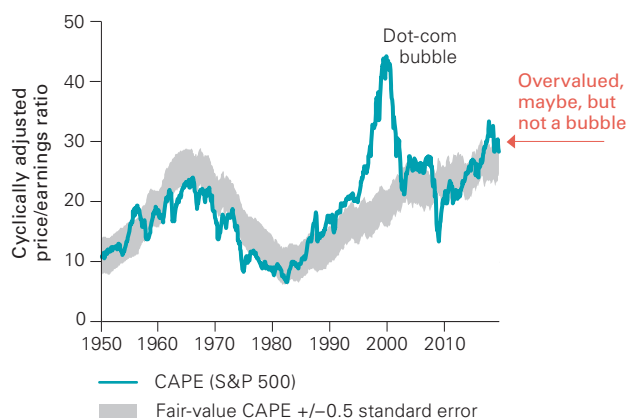b. Other developed markets appear to be fairly priced

Notes: "Fair-value CAPE" is based on a statistical model that corrects CAPE measures for the level of inflation expectations and for lower interest rates. The statistical model specification is a three-variable vector error correction (VEC), including equity-earnings yields, ten-year trailing inflation, and ten-year U.S. Treasury yields estimated over the period January 1940 to September 2019. For details, see Davis et al., 2018.

Sources: Vanguard calculations, based on Robert Shiller's website at aida.wss.yale.edu/~shiller/data.htm, the U.S. Bureau of Labor Statistics, and the Federal Reserve Board.

Notes: The U.S. valuation measure is the current CAPE percentile relative to fair-value CAPE for the S&P 500 Index from January 1940 to September 2019. The developed markets valuation measure is the weighted average of each region's (Australia, the United Kingdom, the euro area, Japan, and Canada) current CAPE percentile relative to each region's own fair-value CAPE. The fair-value CAPE for Australia, the U.K., the euro area, Japan, and Canada is a five-variable vector error correction model (VEC), with equity earnings yield (MSCI index), ten-year trailing inflation, ten-year government bond yield, equity volatility, and bond volatility estimated over the period January 1970 to September 2019. The emerging markets valuation measure is a composite valuation measure of emerging markets-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 emerging markets-to-U.S. price/earnings metrics relative to its historical average, using three-year trailing average earnings from January 1990 to September 2019.

Sources: Vanguard calculations, based on Robert Shiller's website at aida.wss.yale.edu/~shiller/data.htm, the U.S. Bureau of Labor Statistics, the Federal Reserve Board, and Thomson Reuters Datastream.

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14 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. For more information regarding Vanguard's fair-value CAPE model, see our 2017 Global Macro Matters paper *As U.S. Stock Prices Rise, the Risk-Return Trade-Off Gets Tricky.*

Elevated valuations in some markets, late-cycle risks, and persistent geopolitical uncertainty are likely to keep global financial market volatility elevated over the next year. We estimate a 47% increase in equity market volatility when moving from the middle stage of expansion to the late stage, as measured by the CBOE Market Volatility Index since 1990.[15]

We also find that the annualized standard deviation of equity returns, a measure of equity volatility, has a high positive correlation with the economic policy uncertainty level. As highlighted in the global economic outlook section, our Markov-switching model indicates that the global economy is currently operating in a high-uncertainty environment, and higher uncertainty coincides with, or often leads to, higher volatility. With this combination of late-cycle dynamics and high uncertainty, investors may well have to get used to more market noise in 2020 and beyond (see **Figure II-3**).

Outlook for global equities and the diversification of domestic risks

Given our outlook for lower global economic growth, subdued inflation expectations, lower interest rates, and elevated current market valuations, our long-term return outlook for equities remains guarded relative to the experience of previous decades and of postcrisis years, based on our Vanguard Capital Markets Model (VCMM) projections.

The still-stretched valuations are an important input into our more conservative forecast for U.S. equity over the next ten years. **Figure II-4a's** sum-of-parts framework illustrates this point, where equity returns are decomposed into return contributions from dividend yield, valuation expansion/contraction, and growth in corporate earnings. Although valuation expansion boosted returns over the last 30 years, we expect valuations to contract 2.5% on average annually as interest rates gradually rise over the next decade.

Alongside the decline in corporate earnings growth, which is projected to fall from its 5.8% historical average annual rate to a rate close to 5%, our expected return outlook for U.S. equity over the next decade is centered in the modest 3.5%–5.5% range. Although this improves upon the 3%–5% returns forecast last year, it still pales in comparison with the 10.6% annualized return generated over the last 30 years. With respect to equity styles and sizes, value looks to be more favorable than growth and small size more favorable than large because of more attractive valuations.

From a U.S. investor's perspective, the expected return outlook for non-U.S. equity markets is in the 6.5%–8.5% range, higher than that of U.S. equity (see Figure II-4a and **Figure II-4b**), thanks to relatively more reasonable valuations. This higher return outlook for non-U.S. equity markets underscores the benefits of global equity

FIGURE II-3

High uncertainty regimes often coincide with higher equity market volatility
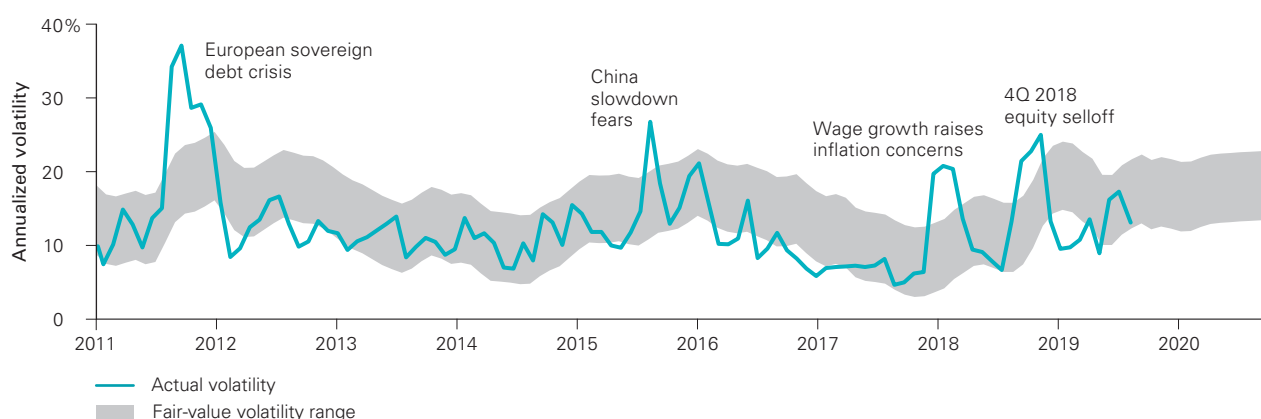
Notes: Fair-value volatility range is calculated with an OLS regression using Vanguard's leading economic indicator index (VLEI), financial conditions index (VFCI), and policy uncertainty index as independent variables. Volatility is measured as the standard deviation of daily returns of the S&P 500 index on a 30-day rolling time period, annualized. The forecasted range of volatility for 2020 is based on Vanguard's economic projections.

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

15 For more details, see the 2019 Vanguard Global Macro Matters paper *As the Cycle Turns: Late-Cycle Macro Risks and Asset Allocation.*

FIGURE II-4

The outlook for equity markets is subdued

a. Valuation contraction and lower growth as headwinds to expected returns

Total return —
  Earnings growth
  Valuation expansion
  Dividend yield
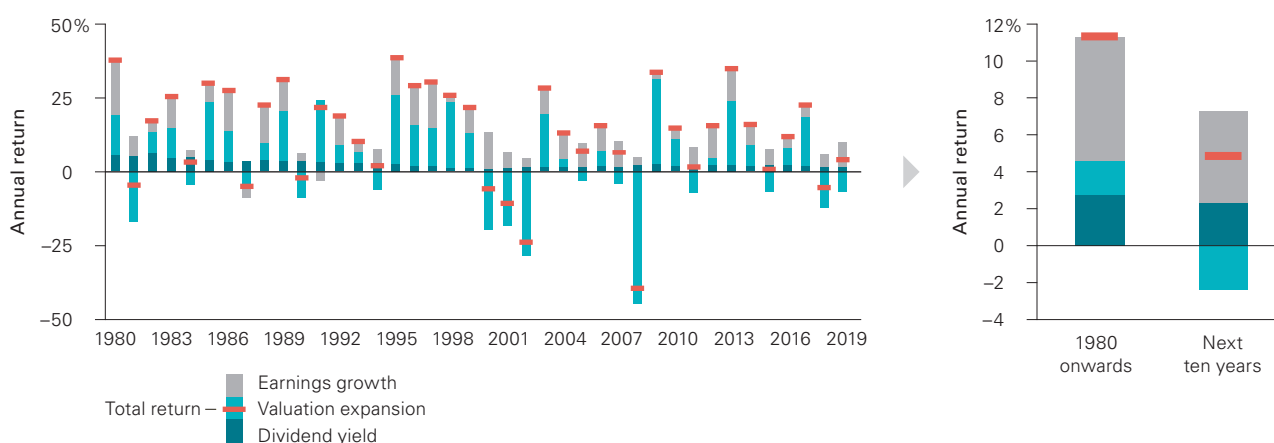
Notes: Valuation expansion is estimated as year-over-year percentage change in the CAPE ratio. Earnings growth is the total return ex dividend and ex valuation expansion.
Sources: Vanguard calculations, based on Robert Shiller's website at aida.wss.yale.edu/~shiller/data.htm, the U.S. Bureau of Labor Statistics, the Federal Reserve Board, and Global Financial Data. Forward-looking return estimates are from the VCMM, as of September 30, 2019.

b. Equity market ten-year return outlook: Setting reasonable expectations
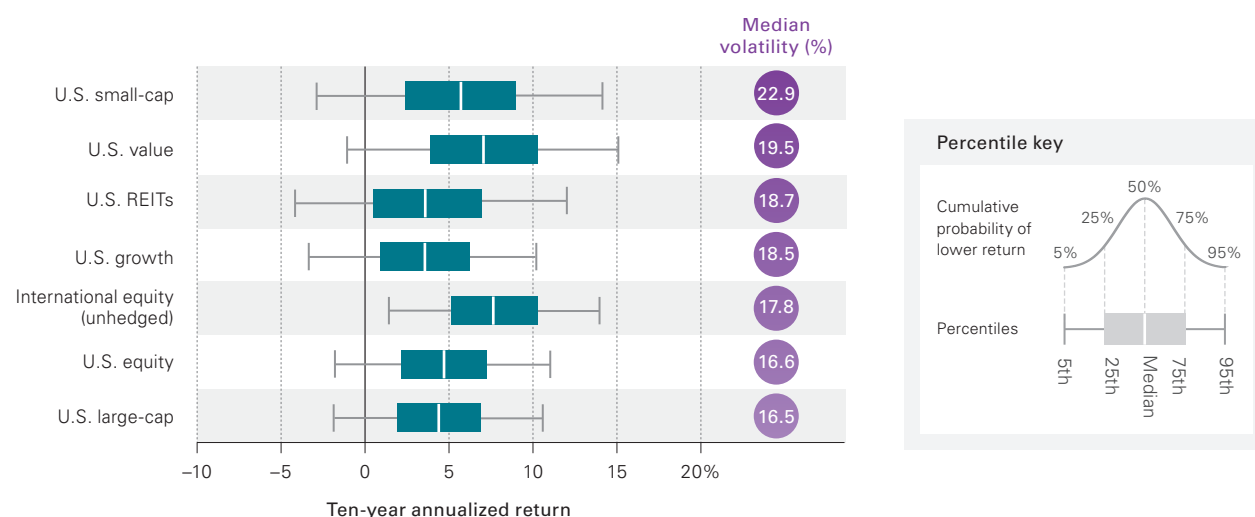
Notes: Forecast corresponds to distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of September 30, 2019, in USD for asset classes shown. Median volatility is the 50th percentile of an asset class's distribution of annual standardized deviation of returns. See the Appendix section titled "Index simulations" for further details on asset classes shown here.
Source: Vanguard.

strategies in this environment and provides a timely opportunity for U.S. investors to review areas of excessive concentration risk.

Our ten-year outlook for global equity (in USD) is in the 4.5%–6.5% range, as seen in Figure II-4b. While the case for global diversification is particularly strong now, for the purposes of asset allocation, we caution investors against implementing tactical tilts based on just the median expected return—that is, ignoring the entire distribution of asset returns and their correlations, particularly given our expectation for elevated levels of uncertainty and volatility in 2020 and beyond.

Global fixed income markets: Diversification properties hold in spite of lower return outlook

Global fixed income markets rallied in 2019, with most central banks revising down their assessment of long-run neutral policy rates. Additionally, most central banks reversed their tightening or expected tightening policies

by adding back policy stimulus in the face of a deteriorating growth outlook. As 2020 growth continues to downshift in a macroeconomic environment entrenched with uncertainty, central banks should remain in action. There is room for short-end rates to fall further in the near term. Long-end rates, having normalized somewhat on fading fears of an imminent recession, will continue to be well-anchored at lower-than-historical levels by structural factors such as long-term productivity growth and inflation expectations.

Against a backdrop of lower yields across the curve, the U.S. fixed income return outlook for the next decade has been revised downward from last year's projections, to 2%–3%, as shown in **Figure II-5**. Expected returns for non-U.S. bonds are marginally lower than those for U.S. bonds given the relatively lower yields in non-U.S. developed markets, yet the diversification through exposure to hedged non-U.S. bonds should help offset some risk specific to the U.S. fixed income markets (Philips et al., 2014). Within the U.S. aggregate bond

FIGURE II-5

Lower interest rates have reduced expected bond returns

Notes: Forecast corresponds to distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of September 30, 2019, in USD for asset classes shown. Median volatility is the 50th percentile of an asset class's distribution of annual standardized deviation of returns. See the Appendix section titled "Index simulations" for further details on asset classes shown here.

Source: Vanguard.

market, investors are still expected to be fairly compensated for assuming credit risk, with broad U.S. investment-grade bonds outperforming U.S. Treasury bonds by 1 percentage point on an annualized basis. Importantly, while future returns for fixed income look low, there's little reason to believe their fundamental role in a portfolio has changed, with high-quality bonds still expected to play a key role in risk reduction and stability.

U.S. interest rates: Despite low yields, duration fairly valued

Despite the reductions in the short-term policy rate, the risk of a material rise in long-term interest rates relative to short-term rates remains modest. As illustrated in **Figure II-6**, duration strategies are fairly valued and less risky than investors may believe in a low-yield environment.

### Corporate bonds: Higher risk, higher return

As with expected compensation for taking duration risk, the expected risk premium associated with credit bonds is fairly valued. Declines in long-term Treasury rates also make our central tendency for U.S. credit bonds (specifically, the Bloomberg Barclays U.S. Credit Bond Index) modestly lower than last year—around the 2%–3% range. The central tendency for high-yield corporate bonds (specifically, the Bloomberg Barclays U.S. High Yield Corporate Bond Index) is in the 3%–4% range, lower than this time last year because of a combination of lower Treasury yields and wider credit spreads.

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

Break-even inflation expectations inferred from the U.S. TIPS market remain below the Fed's 2% inflation target and slightly lower than the VCMM long-term median levels. This improves the attractiveness of inflation-linked bonds relative to nominal Treasuries, and we believe it could be a valuable inflation hedge for some institutions and investors

Fixed income appears to be fairly valued
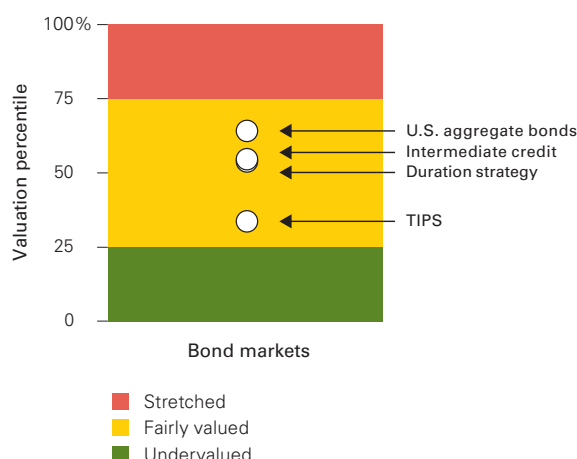
Notes: Valuation percentiles are relative to Year 30 projections from the VCMM as of September 30, 2019. Intermediate credit and U.S. aggregate bond valuations are current spreads relative to Year 30. Duration valuation is the expected return differential over the next decade between the long-term Treasury index and the short-term Treasury index relative to Years 21–30. TIPS valuation is the ten-year-ahead annualized inflation expectation relative to Years 21–30.

Source: Vanguard.

sensitive to inflation risk. This is especially so because one of the unexpected outcomes of continued monetary (and potential fiscal) stimulus, coupled with a trade war, could be the surprise reemergence of cyclical inflation. This is not our base case but nonetheless presents TIPS as a good hedge in the event this risk scenario unfolds.

Bonds as ballast in a multi-asset portfolio

With economic growth and inflation staying even lower for longer and the markets almost addicted to loose monetary policy, we find it hard to see any material uptick in fixed income returns in the foreseeable future.

Instead of viewing this asset class as a primary return-generating investment, investors are encouraged to view bonds from a risk-mitigating perspective. Based on VCMM projections over a ten-year horizon, **Figure II-7** plots the distribution of projected 10th percentile worst quarterly outcomes for global equity returns across 10,000 simulations along with the distribution of the same quarterly outcomes for other asset categories. This analysis suggests that bonds maintain their diversification benefits despite low-to-negative global yields.

## Portfolio implications: A lower return orbit

Investors have experienced spectacular returns over the last few decades because of two of the strongest equity bull markets in U.S. history and a secular decline in interest rates from 1980s highs. **Figure II-8a** contrasts our 4%–6% outlook for a global 60% equity/40% bond portfolio for the next decade against the extraordinary 9.4% return since 1970 and 7.3% return since 1990. As highlighted in previous sections, elevated equity valuations and low rates have pulled the market's efficient frontier of expected returns into a lower orbit. The efficient frontier is also flatter (that is, it shows smaller increases in expected return for increases in equity risk), as seen from the return and volatility expectations of balanced portfolios shown in **Figure II-8b**.

Over the medium term, we expect central banks will eventually resume the normalization of monetary policy, thereby lifting risk-free rates from the depressed levels seen today. This will lead to more attractive valuations for financial assets and a higher return outlook compared with our forecasts. Nonetheless, the return outlook is still likely to remain much lower than the experience of previous decades and, in particular, of the postcrisis years. Given our outlook for lower global economic growth and subdued inflation expectations, risk-free rates and growth in corporate revenues and earnings mean that asset returns will remain lower for longer compared with historical levels.

To try to increase portfolio returns, a popular strategy is to overweight higher-expected-return assets or higher-yield assets. A few common "reach for yield" strategies include overweighting real estate investment trusts (REITs) and high-yield corporates. Similarly, "reach for return" strategies involve tilting the portfolio toward emerging-market equities to take advantage of higher growth prospects. Home bias causes some to shy away from non-U.S. equities. While some of these strategies could improve the risk-return profile marginally, they are unlikely, by themselves, to escape the strong gravitational pull of low-return forces in play and restore portfolios to the higher orbit of historical returns (see **Figure II-8c**).

FIGURE II-7

High-quality fixed income is expected to provide the most ballast from global equity losses
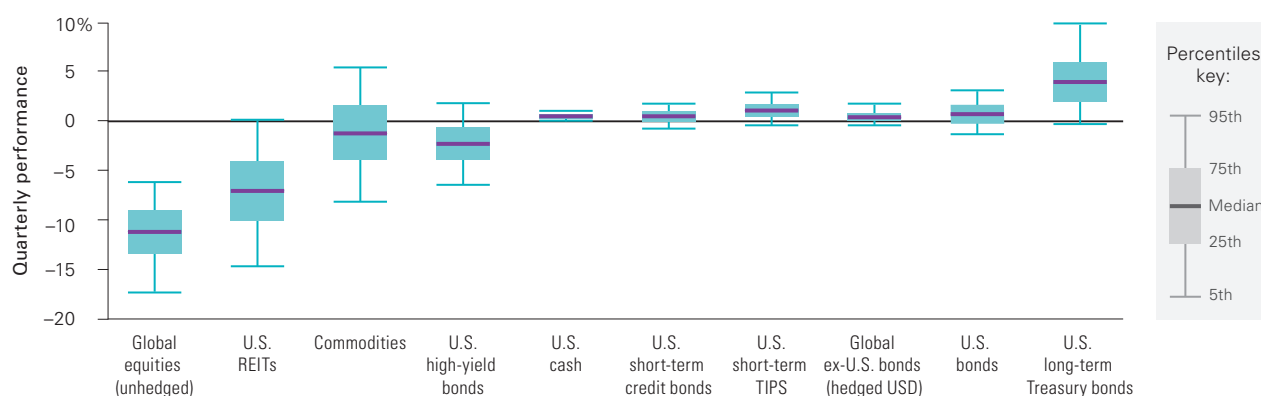
**Notes:** Forecast corresponds to distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of September 30, 2019, in USD for asset classes shown. VCMM asset-return forecast distributions coincide with bottom 10th percentile quarterly global equity projections. See the Appendix section titled "Index simulations" for further details on asset classes shown here.
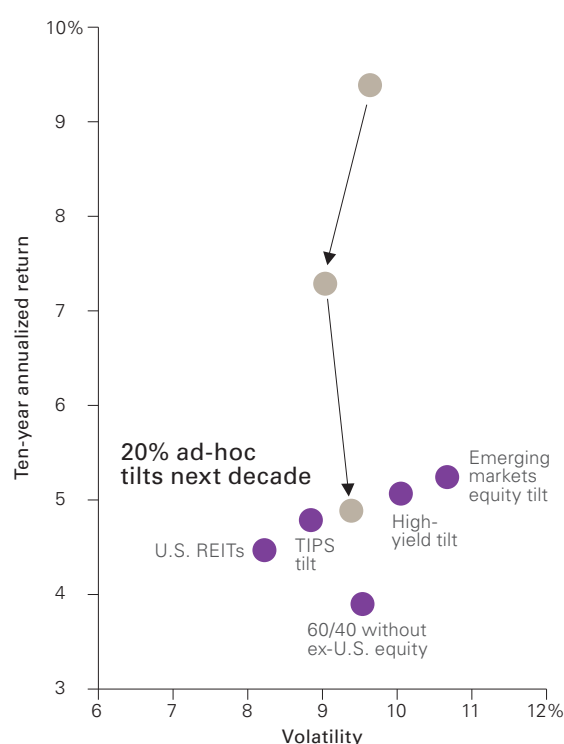
Source: Vanguard.

FIGURE II-8

Asset allocation for a challenging decade

a. A lower return orbit …
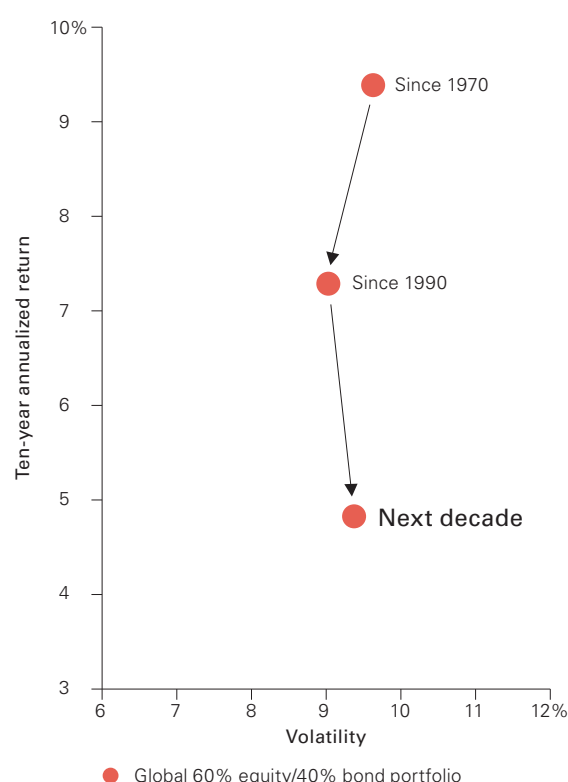
b. … that popular "active tilts" will likely fail to escape

● Global 60% equity/40% bond portfolio

c. Projected ten-year annualized nominal returns

	Portfolios	5th percentile	25th percentile	Median	75th percentile	95th percentile	Median volatility
Global balanced portfolios	100% bonds	1.0%	1.7%	2.2%	2.8%	3.9%	3.6%
	20/80 stock/bond	1.7%	2.6%	3.2%	3.9%	5.0%	4.1%
	60/40 stock/bond	1.5%	3.5%	4.9%	6.3%	8.4%	9.1%
	80/20 stock/bond	1.0%	3.7%	5.5%	7.3%	10.1%	12.0%
	100% equity	0.5%	3.8%	6.1%	8.3%	11.7%	15.1%
	60/40 stock/bond	**1.5%**	**3.5%**	**4.9%**	**6.3%**	**8.4%**	**9.1%**
Portfolios with common 20% tilts	High-yield tilt	1.7%	3.8%	5.1%	6.6%	8.7%	10.0%
	U.S. tilt	1.1%	3.2%	4.6%	6.0%	8.2%	9.1%
	EM equity tilt	1.5%	3.7%	5.2%	6.7%	8.9%	10.5%
	60/40 without ex-US equity	0.2%	2.5%	4.0%	5.6%	8.0%	9.5%
	REIT tilt	1.3%	3.2%	4.5%	5.9%	8.0%	8.5%
	TIPS tilt	1.5%	3.4%	4.8%	6.2%	8.2%	**8.8%**

Notes: Summary statistics of 10,000 VCMM simulations for projected ten-year annualized nominal returns as of September 30, 2019, in USD before costs. Historical returns are computed using indexes defined in "Indexes used in our historical calculations" on page 5. The global equity is 60% U.S. equity and 40% global ex-U.S. equity. The global bond portfolio is 70% U.S. bonds and 30% global ex-U.S. bonds. Portfolios with tilts include a 20% tilt to the asset specified, funded from fixed income allocation for the fixed income tilt and equity allocation for the equity tilt. The optimized frontier consists of U.S. equity, non-U.S. equity, U.S. bonds, non-U.S. bonds, U.S. intermediate credit, TIPS, and long-term Treasury. Non-U.S. equity is constrained to not exceed 60% of equity allocation. Non-U.S. bonds are constrained to not exceed 50% of bond allocation. Allocation to U.S. intermediate credit is constrained to not exceed 70% of U.S. bond allocation.

Source: Vanguard.

Portfolio construction strategies for three potential economic scenarios

Based on our global economic perspectives, we examine in **Figure II-9** three possible economic scenarios occurring over the next three years. The high-growth scenario illustrates an upside-risk scenario of above-trend economic growth with tighter labor markets, and a moderate pickup in wages and inflation. The two others are our slowdown scenario characterized by a further slowdown, but not a collapse, in global growth, accompanied by further central bank easing, and a recessionary scenario incorporating a sharp turn in the business cycle and a bear market.

Figure II-9 shows optimal portfolios for each scenario that vary their exposures to four factors, or risk premiums: equity risk premium, term premium, credit premium, and inflation risk premium. In a high-growth scenario, expected global equity returns would be high, steepening the efficient frontier. Long and short rates would also rise faster than expected, resulting in an optimal portfolio loading on equity and short duration bonds.

As asset return expectations materially change, the asset allocation in our economic scenarios also changes accordingly. These changing asset expectations drive what are known as time-varying portfolios, which use forward-looking asset return expectations as the basis for potential strategic allocation changes. Our research suggests that investors who have the willingness and ability to accept forecast model risk may be able to improve risk-adjusted returns over the long term relative to a static portfolio (see our forthcoming research paper *The Implications of Time-Varying Return on Portfolio Construction*). Compared with a baseline 60% equity/40% bond portfolio, our 2020 slowdown portfolio underweights risk assets by 8 percentage points because of a flatter efficient frontier relative to normal market environments and overweights long-duration Treasury securities. Compared with global equity market capitalization, we are overweight non-U.S. equities.

A recessionary-scenario portfolio would further underweight equity and further overweight long duration. A sizable allocation to equities remains as the portfolio that is also heavy on long-term Treasuries derives a larger diversification benefit from U.S. equities despite their lower returns (especially in a recession) than from including higher-returning non-U.S. equity assets.

Using our VCMM simulations, we are able not only to illustrate the effectiveness of various portfolio strategies designed for each scenario but also to 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 typically the worst of all the options.

2. **The slowdown portfolio, because it is closest to the central tendency of the VCMM, works well for investors who are agnostic about the future state of the economy.** The slowdown portfolio ranks as either top or middle-of-the-road performance in each scenario.

3. **Portfolio tilts should be done within an optimization framework.** Ad hoc tilts ignore correlations among assets and lead to inefficient portfolios. For instance, in the recession scenario, U.S. equities can still have a sizable allocation because of the added diversification benefits of long-term bonds.
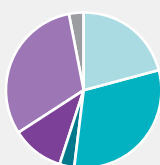
FIGURE II-9

Cyclical surprises and asset allocation trade-offs

a. Optimal portfolios vary for different economic environments.
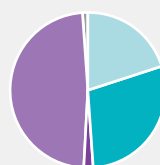
Scenario 1
Slowdown

Smaller overweight long duration and underweight equity

- 21% U.S. equity
- 31% Global ex-U.S. equity
- 3% Global ex-U.S. bonds
- 0% Short-term credit
- 11% Short-term Treasury
- 31% Long-term Treasury
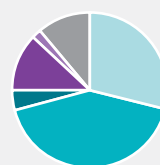- 3% Short-term TIPS

Scenario 2
Recession

Larger overweight long duration and underweight equity

- 20% U.S. equity
- 29% Global ex-U.S. equity
- 0% Global ex-U.S. bonds
- 0% Short-term credit
- 2% Short-term Treasury
- 48% Long-term Treasury
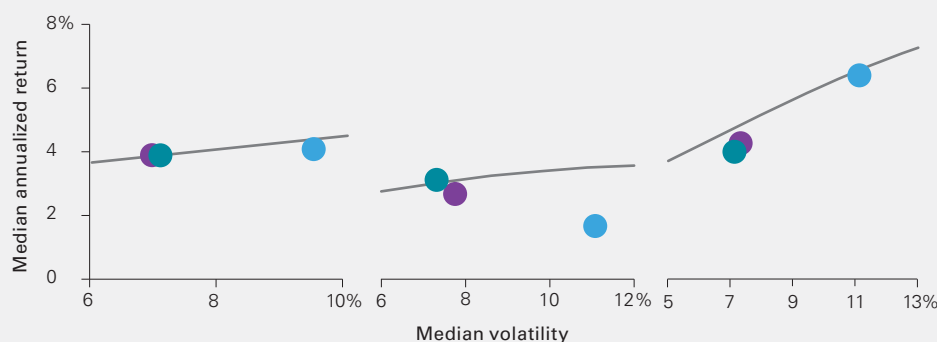- 1% Short-term TIPS

Scenario 3
High growth

Overweight equity, underweight long duration, and overweight break-even inflation

- 29% U.S. equity
- 42% Global ex-U.S. equity
- 4% Global ex-U.S. bonds
- 0% Short-term credit
- 12% Short-term Treasury
- 2% Long-term Treasury
- 11% Short-term TIPS

b. The slowdown portfolio is not always the best, but it's never the worst.

Best	Slowdown	Recession	High growth
Second-best	Recession	Slowdown	Slowdown
Worst	High growth	High growth	Recession

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

Strategy **upside** relative to slowdown portfolio	**0.2% higher annualized return** with 0.2% lower volatility in a recessionary scenario	**1.9% higher annualized return** with 3.8% higher volatility in a high-growth scenario
Strategy **downside** relative to slowdown portfolio	**0.1% lower annualized return** with no volatility difference in a high-growth scenario	**2.7% lower annualized return** with 3.3% higher volatility in a recessionary scenario

Notes: Performance is relative to the efficient frontier. Portfolios are selected from an efficient frontier based on a fixed risk aversion level using a utility-function-based optimization model. Forecast displays the simulation of three-year annualized returns of the asset classes shown as of September 30, 2019. Scenarios are based on sorting the VCMM simulations based on the rates, growth, volatility, and inflation. The three scenarios are a subset of the 10,000 VCMM simulations. See the Appendix section titled "Index simulations" for further details on the asset classes shown here.

Source: Vanguard.

Portfolio construction strategies: Time-tested principles apply

Our global market outlook suggests a somewhat more challenging environment ahead. The market's efficient frontier of expected returns for a unit of portfolio risk is now in a lower orbit, and the frontier's relatively flat shape suggests that increases in expected portfolio returns for taking marginal equity risk are not well-compensated by historical standards.

Based on simulated ranges of portfolio returns and volatility, the diversification benefits of global fixed income and global equity remain compelling. Investors who have conviction in a particular future scenario and have the willingness and ability to accept forecast model risk may be able to modestly improve risk-adjusted return over the long term with asset-return-centric tilts or time-varying portfolio strategies, but they are unlikely to escape the lower return orbit. For the best chance of success, these strategies require a portfolio-centric approach that leverages the benefits of diversification by simultaneously weighing risk, return, and correlation.

Our prior research shows that investment success is within the control of long-term investors. Factors within a long-term investor's control—such as saving more, working longer, spending less, and controlling investment costs—far outweigh the less reliable benefits of ad-hoc return-seeking portfolio tilts, market timing, and forecasting future scenarios. Thus, decisions around 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 investors to weigh their options in conjunction with their risk-tolerance levels. Ultimately, in this challenging investment environment, 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.

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III. Appendix

About the Vanguard Capital Markets Model

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

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

The VCMM is a proprietary financial simulation tool developed and maintained by Vanguard's Investment Strategy Group. The model forecasts distributions of future returns for a wide array of broad asset classes. Those asset classes include U.S. and international equity markets, several maturities of the U.S. Treasury and corporate fixed income markets, international fixed income markets, U.S. money markets, commodities, and certain alternative investment strategies. The theoretical and empirical foundation for the Vanguard Capital Markets Model is that the returns of various asset classes reflect the compensation investors require for bearing different types of systematic risk (beta). At the core of the model are estimates of the dynamic statistical relationship between risk factors and asset returns, obtained from statistical analysis based on available monthly financial and economic data. Using a system of estimated equations,

the model then applies a Monte Carlo simulation method to project the estimated interrelationships among risk factors and asset classes as well as uncertainty and randomness over time. The model generates a large set of simulated outcomes for each asset class over several time horizons. Forecasts are obtained by computing measures of central tendency in these simulations. Results produced by the tool will vary with each use and over time.

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

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

Index simulations

The long-term returns of our hypothetical portfolios are based on data for the appropriate market indexes through September 2019. We chose these benchmarks to provide the most complete history possible, and we apportioned the global allocations to align with Vanguard's guidance in constructing diversified portfolios. Asset classes and their representative forecast indexes are as follows:

- **U.S. equities:** MSCI US Broad Market Index.

- **Global ex-U.S. equities:** MSCI All Country World ex USA Index.

- **U.S. REITs:** FTSE/NAREIT US Real Estate Index.

- **U.S. cash:** U.S. 3-Month Treasury—constant maturity.

- **U.S. Treasury bonds:** Bloomberg Barclays U.S. Treasury Index.

- **U.S. short-term Treasury bonds:** Bloomberg Barclays U.S. 1–5 Year Treasury Bond Index.

- **U.S. long-term Treasury bonds:** Bloomberg Barclays U.S. Long Treasury Bond Index.

- **U.S. credit bonds:** Bloomberg Barclays U.S. Credit Bond Index.

- **U.S. short-term credit bonds:** Bloomberg Barclays U.S. 1–3 Year Credit Bond Index.

- **U.S. high-yield corporate bonds:** Bloomberg Barclays U.S. High Yield Corporate Bond Index.

- **U.S. bonds:** Bloomberg Barclays U.S. Aggregate Bond Index.

- **Global ex-U.S. bonds:** Bloomberg Barclays Global Aggregate ex-USD Index.

- **U.S. TIPS:** Bloomberg Barclays U.S. Treasury Inflation Protected Securities Index.

- **U.S. short-term TIPS:** Bloomberg Barclays U.S. 1–5 Year Treasury Inflation Protected Securities Index.

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