

Vanguard economic and market outlook for 2021: Approaching the dawn

Vanguard Research

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- While the global economy continues to recover as we head into 2021, the battle between the virus and humanity's efforts to stanch it continues. Our outlook for the global economy hinges critically on health outcomes. The recovery's path is likely to prove uneven and varied across industries and countries, even with an effective vaccine in sight.
- In China, we see the robust recovery extending in 2021 with growth of 9%. Elsewhere, we expect growth of 5% in the U.S. and 5% in the euro area, with those economies making meaningful progress toward full employment levels in 2021. In emerging markets, we expect a more uneven and challenging recovery, with growth of 6%.
- When we peek beyond the long shadow of COVID-19, we see the pandemic irreversibly accelerating trends such as work automation and digitization of economies. However, other more profound setbacks brought about by the lockdowns and recession will ultimately prove temporary. Assuming a reasonable path for health outcomes, the scarring effect of permanent job losses is likely to be limited.
- Our fair-value stock projections continue to reveal a global equity market that is neither grossly overvalued nor likely to produce outsized returns going forward. This suggests, however, that there may be opportunities to invest broadly around the world and across the value spectrum. Given a lower-for-longer rate outlook, we find it hard to see a material uptick in fixed income returns in the foreseeable future.

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Editorial note

This publication is an update of Vanguard's annual economic and market outlook for 2021 for key economies around the globe. Aided by Vanguard Capital Markets Model® simulations and other research, we also forecast future performance for a broad array of fixed income and equity asset classes.

Acknowledgments

We thank Corporate Communications, Strategic Communications, and the Global Economics and Capital Markets Outlook teams for their significant contributions to this piece. Further, we would like to acknowledge the work of Vanguard's broader Investment Strategy Group, without whose tireless research efforts this piece would not be possible.

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Notes on asset-return distributions

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

IMPORTANT: The projections and other information generated by the VCMM regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from the VCMM are derived from 10,000 simulations for each modeled asset class. Simulations are as of September 30, 2020. 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 in 2021: *Closing the immunity gap*

The COVID-19 pandemic has produced the most pronounced economic shock in nearly a century. In 2020, recessions around the world were sharp and deep, with significant supply-chain disruptions. That said, more than in previous recessions, policymakers were aggressive in supporting financial markets and their economies. While the global economy continues to recover as we head into 2021, the battle between the virus and humanity's efforts to stanch it continues.

For 2021, our outlook for the global economy hinges critically on health outcomes. Specifically, our baseline forecast assumes that an effective combination of vaccine and therapeutic treatments should ultimately emerge to gradually allow an easing of government restrictions on social interaction and a lessening of consumers' economic hesitancy. But the recovery's path is likely to prove uneven and varied across industries and countries, even with an effective vaccine in sight. As we said in our midyear 2020 outlook, it will be some time before many economies return to their pre-COVID levels of employment and output.

The unevenness of our cyclical growth outlook is reflected in the world's major economies. China, where control of the pandemic has been more effective, has swiftly returned to near pre-pandemic levels of activity, and we see that extending in 2021 with growth of 9%. Elsewhere, the virus's prevalence has been less well-controlled. We expect growth of 5% in the U.S. and 5% in the euro area, with those economies still falling short of full employment levels in 2021. In emerging markets, we expect a more uneven recovery, with aggregate growth of 6%.

Risks to our baseline growth forecast are biased to the upside, reflecting the chance of further breakthroughs in vaccine development. Both monetary and fiscal policy will remain supportive in 2021, but the primary risk factor is the pandemic's fate and path.

COVID-19's long shadow: *A pivotal moment in history*

When we peek beyond the long shadow of COVID-19, our research and read of history suggest that the pandemic will have certain effects on the economy, markets, and policy. We can split these effects into four categories:

- 1. A profound yet ultimately temporary setback.** Social activities and the industries most reliant on them will rebound, as they have following past pandemics. Consumer reluctance from fear of catching COVID-19 will determine the path, but eventually social activities ranging from concert-going to traveling will resume. While the immediate pain of job losses is great for many families and industries, we believe that, assuming a reasonable path for health outcomes and additional policy support, the scarring effect of permanent job losses is likely to be limited.
- 2. An accelerated future.** Trends that Vanguard and others have previously discussed, ranging from work automation to digital technologies to certain business-model disruptions, have only been accelerated by the shock of COVID-19. This outlook lays out how pervasive the future of virtual work could be and what broader macroeconomic effects may result.
- 3. Pivots in policy.** This crisis has seemingly altered the expectations of, and preferences for, certain government policies, ranging from more forceful efforts by central banks to drive up inflation to more aggressive spending by fiscal authorities amid economic headwinds. These intentions are unlikely to be reversed quickly, producing potential new risks on the investment horizon.
- 4. Unaltered reality.** Despite the extraordinary events of 2020, some aspects of the global economy may ultimately stay as they are. In our view, these would include the multifaceted U.S.-China relationship and the likelihood of increasing innovation in the years ahead, as suggested by Vanguard's "Idea Multiplier."

Global inflation: *Modest reflation "yes"; a return to high inflation "no"*

In 2021, we anticipate a cyclical bounce in consumer inflation from pandemic lows near 1% to rates closer to 2% as spare capacity is used up and the recovery continues. However, as growth and inflation firm, and as the immunity gap closes, an "inflation scare" is possible. A risk is that markets could confuse this modest reflationary bounce with a more severe but unlikely episode.

Our baseline projections reflect our belief that inflation rates persistently above 3% are difficult to generate across many developed markets. Mounting debt loads, high fiscal spending, and extraordinarily easy monetary policy all have the potential to feed inflation psychology,

but any such influence would have to more than counteract high levels of unemployment as well as important structural deflationary forces at work in developed markets since before the pandemic.

The bond market: *Interest rates staying low in 2021*

Interest rates and government bond yields that were low before the pandemic are now even lower. We expect interest rates globally to remain low despite our constructive outlook for firming global economic growth and inflation as 2021 progresses. While yield curves may steepen, short-term rates are unlikely to rise in any major developed market as monetary policy remains highly accommodative. Vanguard expects bond portfolios, of all types and maturities, to earn returns close to their current yield levels. As 2021 unfolds, the greatest risk factor would appear to be higher-than-expected inflation.

Global equities: *Challenges and opportunities*

Yet again, disciplined investors were rewarded in 2020 by remaining invested in the stock market despite troubling headlines. The dramatic repricing of global equity risk

during the initial shock of the pandemic was fairly uniform across global markets, with the steep drop in discount rates explaining some (but not all) of this past year's rebound in equity prices. Our fair-value stock projections, which explicitly incorporate such effects, continue to reveal a global equity market that is neither grossly overvalued nor likely to produce such outsized returns going forward.

The outlook for the global equity risk premium is positive and modest, with total returns expected to be 3 to 5 percentage points higher than bond returns. This modest return outlook, however, belies opportunities for investors to invest broadly around the world and across the value spectrum.

And while this range is below recent returns based on valuations and interest rates, global equities are anticipated to continue to outperform most other investments and the rate of inflation.

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 2020. We chose these benchmarks to provide the best history possible, and we split the global allocations to align with Vanguard's guidance in constructing diversified portfolios.

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

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

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

U.S. equities: S&P 90 Index from January 1926 through March 1957; S&P 500 Index from March 1957 through 1974; Dow Jones Wilshire 5000 Index from 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. January 1970 onward, 60% U.S. equities and 40% ex-U.S. equities, rebalanced monthly.

I. Global economic perspectives

Global economic outlook: Approaching the dawn

The COVID-19 pandemic has produced the most pronounced economic shock in multiple generations. In 2020, recessions around the world were deep, supply chains disrupted, and policymakers of all types aggressive in supporting financial markets and their economies. While the global economic recovery continues as we head into 2021, so does the battle between the virus and humanity's efforts to stanch it.

Our global economic outlook, along with more detailed regional outlooks that follow, is designed to:

- Emphasize the outsized role that health policy and outcomes have played and will play in the global economy and financial markets.
- Articulate a recovery path that will remain uneven and is likely to extend beyond 2021.

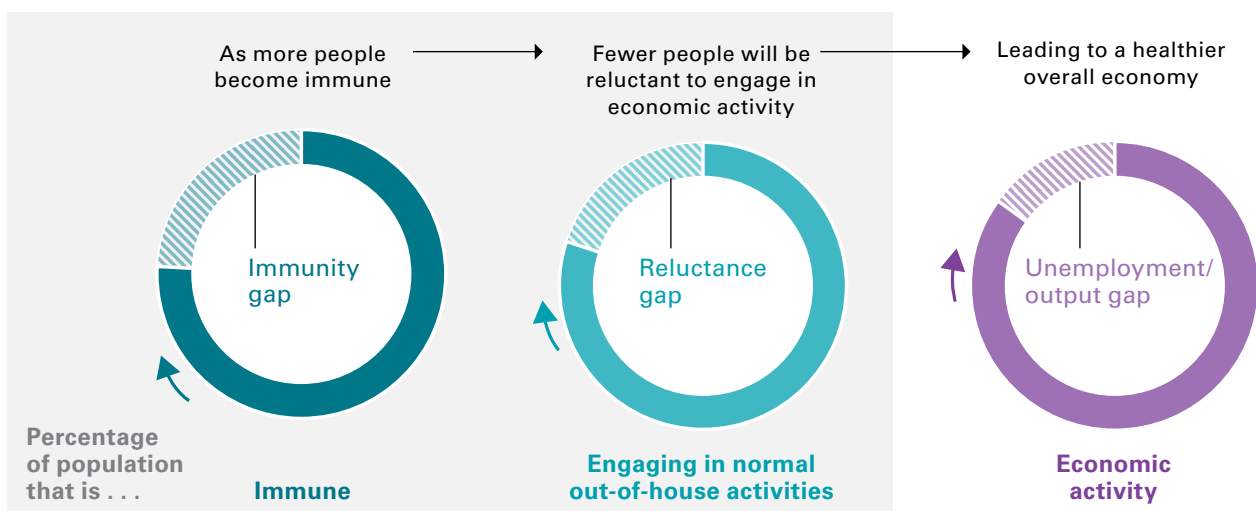
- Explain how the unprecedented support of central banks and policymakers is likely to continue beyond the pandemic, and how risks surrounding these intentions are low for now.
- Surmise that when the dust settles, lasting effects will be multifaceted, yet the global economic trajectory will be broadly similar to that of the pre-COVID world.

A healthy economy begins with health

The global recovery stands at a critical stage as economic factors continue to take a back seat to public health policy and the path of the virus. We view the next phase of economic advances as more challenging than the sharp bounce-backs experienced in the third quarter of 2020, but ultimately a combination of effective vaccines and therapeutic treatments will emerge and become widely available in 2021. To that end, we believe the pace of the recovery will be driven by what we have termed the immunity gap (the percentage of the population lacking immunity to the virus) and the reluctance gap (the reluctance of a percentage of the population to engage in economic activity), as shown in Figure I-1.

FIGURE I-1

Health outcomes drive consumer behavior and, in turn, recovery



Notes: The immunity gap is the proportion of the population that remains susceptible to COVID-19, and it's calculated as the difference between herd immunity threshold (around 65% of the population) and the percentage of population with acquired immunity. The reluctance gap is the proportion of the population that continues to refrain from normal out-of-house activities in fear of catching the virus. This is directly related to the immunity gap. The higher the immunity gap, the higher the proportion of the population that is fearful of engaging in normal activities. The unemployment/output gap is the gap between what economic activity was before COVID-19 and what economic activity is today. That is directly related to the reluctance gap. The bigger the reluctance gap, the lower economic activity is. That translates to a bigger economic activity gap and a bigger output gap.

Source: Vanguard.

Closing the immunity gap will hinge most critically on the combination of the population willing to be vaccinated and the vaccine’s effectiveness. Another key element is the degree of immunity acquired by people who have already had the virus. **Figure I-2** illustrates how all these factors are combined in our estimation of the odds for achieving population immunity in 2021.

The immunity gap in turn affects the reluctance gap. As long as the population is not immune, a portion of consumers will be fearful of engaging in normal activities, and that will leave economic activity below potential.

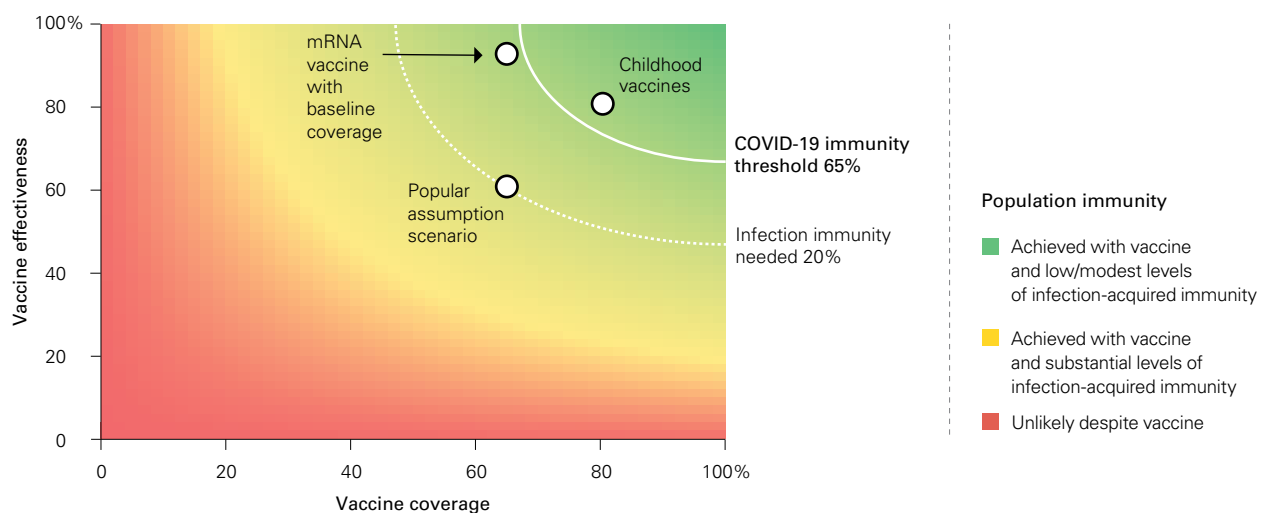
Along with health policy restricting economic activity in the name of virus suppression, the reluctance gap has had an outsized impact on economic sectors that heavily depend on face-to-face interaction, and it explains most of the

remaining economic gaps in regions where the virus is still circulating widely. **Figure I-3** (on page 8) shows this pronounced effect on global labor markets as the consumer services sector—including restaurants, entertainment, and transportation—remains in deep stress.

The pace of the next phase of recovery, then, is a function of immunity and reluctance. Greater immunity and reduced reluctance will drive a sharper recovery. Under our more optimistic scenarios for vaccine effectiveness, much of the economic loss stemming from the pandemic could be recovered in the next year, while a persistently large immunity gap—possibly a result of a less effective vaccine or an elongated distribution cycle—leaves economies with only marginal progress from current levels. Our central case projects a positive recovery path that will extend beyond 2021 before approaching the pre-pandemic trend

FIGURE I-2

How close a vaccine gets a population to the immunity threshold depends on effectiveness and coverage

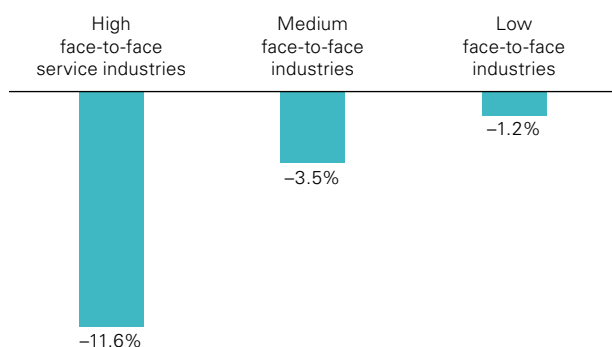


Notes: Immunity threshold is the percentage of the population immune to a pathogen at which point the pathogen runs out of susceptible hosts, thereby providing indirect protection to those who aren’t immune. Depending on how contagious a pathogen is, anywhere from 50% to 90% of the population needs immunity to reach the immunity threshold. Vaccine effectiveness is defined as the percentage of vaccinated people that are protected from infection. Vaccine coverage is the percentage of the population that chooses to be vaccinated. Our baseline vaccine scenario was for a 60% effective vaccine with 65% coverage estimate. At the time of writing, in early Phase 3 trial results, the Pfizer/BioNTech vaccine had shown 90%+ effectiveness and the Moderna vaccine had shown better than 94% effectiveness.

Sources: Vanguard and McKinsey, as of November 11, 2020.

FIGURE I-3

Face-to-face intensive sectors have experienced outsized stress



Global employment levels 3Q 2020 relative to 4Q 2019

Notes: Employment levels are represented by a Gross Domestic Product (GDP)-weighted average of the U.S., euro area, United Kingdom, and Japan. Euro area employment data is a Vanguard estimate based on available data at time of publication. High face-to-face industries include accommodations, arts and entertainment, food services, and transportation. Medium industries include manufacturing, construction, retail and wholesale trade, and health care. Low industries include professional services, information, financial activities, real estate, and government.

Sources: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis, European Central Bank, Statistics Bureau of Japan, Office for National Statistics, and Moody's Data Buffet, as of September 30, 2020.

of output. **Figure I-4** shows our estimated recovery paths for the global economy, and **Figure I-5** shows downside, baseline, and upside scenarios for 2021. (See page 9.)

The unevenness of our cyclical growth outlook is reflected in the world's major economies and our outlook for the year ahead (**Figure I-6**, on page 10). China has been an outlier in its swift return to near pre-pandemic output, and we see that extending in 2021 with growth of 9%.¹ We expect growth of 5% in the U.S. and 5% in the euro area, with those economies ending at or marginally below their pre-pandemic output levels. In emerging markets, we expect an uneven and challenged recovery, aggregating to growth of 6%.

Policy-supported recovery to continue; modest reflation expected

In response to the COVID-19 crisis, 2020 has witnessed one of the swiftest and most decisive sets of policy responses ever implemented by central banks and fiscal policymakers in major developed economies (**Figure I-7**, on page 11). By cutting interest rates, restarting (or expanding) asset purchases, and providing additional liquidity support measures, central bankers were able to ensure that global financial conditions remained loose. By keeping borrowing costs low, central banks have facilitated highly expansionary fiscal stances.

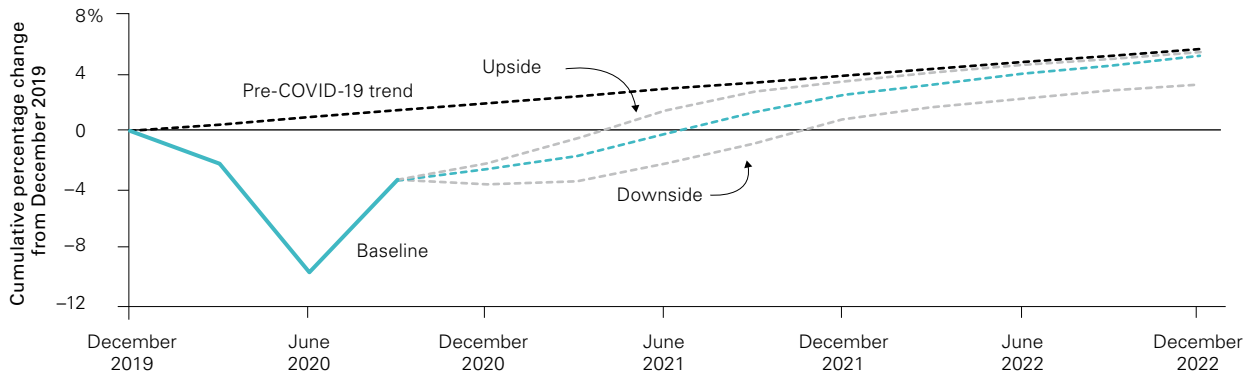
The substantial increase in public debt inevitably raises concerns about the debt's sustainability, but we view developed-market governments' fiscal positions as broadly sustainable in the near term. This is centered on our view that, in all likelihood, nominal economic growth rates will exceed the cost of servicing this public debt over the medium term (**Figure I-8**, on page 11).

Although the pandemic is still affecting economic activity, we expect the supportive monetary and fiscal stance to persist. Compared with their pre-COVID trajectory, interest rates will be lower for longer, and central-bank balance sheets will be larger. We expect fiscal policy to play a bigger role in sustaining the recovery over the next year than it did in previous recessions, including those that followed the global financial crisis.

Mounting debt loads, extraordinarily easy monetary policy, and, in the United States, an explicit assurance that policy will remain accommodative longer than in the past have all led to concerns about resurgent inflation. Our projections show that such concerns are premature and unlikely to materialize in 2021. High fiscal spending has the potential to influence inflation psychology, but any such influence would have to more than counteract high levels of unemployment as well as important structural deflationary forces at work in developed markets since before the pandemic. We maintain our long-held assessment that sustainable inflation rates above 3% or more are difficult to generate across many developed markets.

FIGURE I-4

Health outcomes drive next phase of recovery



Notes: The y-axis represents the GDP-weighted level impact from the baseline, which is December 2019 for major global economies. The blue and gray dotted lines represent three forecasts: our base case and upside and downside scenarios. The downside scenario is characterized by a failure to significantly reduce virus transmission in the short term, which would cause a slower recovery. Potential problems with the efficacy, adoption, distribution, or safety of a vaccine could also surface. The upside scenario is characterized by a speedy large-scale distribution of an effective vaccine, which will see the economy return to normal more quickly than we currently expect.

Sources: Vanguard and Refinitiv, as of November 30, 2020.

FIGURE I-5

Economic scenarios for 2021

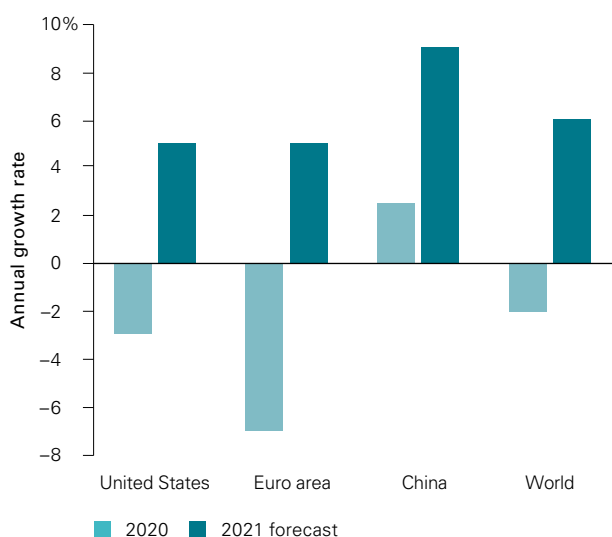
Vanguard assessment of risks			
	Downside risk	Base case	Upside surprise
	10%	60%	30%
Immunity gap	Little progress on infection immunity by end of 2021	Major economies achieve infection immunity by end of 2021	Major economies achieve infection immunity by mid-2021
Reluctance gap	Social and business activity hampered through 2021	Social and business activity normalizes by the second half of 2021	Social and business activity normalizes in the first half of 2021
Economic recovery	Labor market scarring possible given persistently high and long-term unemployment Inflation persistently below target Pre-pandemic level of output not achieved in 2021	Unemployment rate falls through year-end 2021 Inflation moves toward target in 2021 Pre-pandemic level of output reached by end of 2021	Unemployment rate falls and full employment is achieved by end of 2021 Inflation overshoots in 2021 Pre-pandemic level of output reached mid-2021

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

Source: Vanguard, as of November 30, 2020.

FIGURE I-6

Global growth: Better in 2021



Notes: Growth for 2020 includes Vanguard estimates for the fourth quarter. Growth figures are rounded.

Sources: Vanguard and Refinitiv, as of September 30, 2020.

In 2021, we anticipate a cyclical bounce in consumer inflation from pandemic lows near 1% to rates closer to 2% for a time—though not persistently—as the uneven recovery continues. A risk is that markets could confuse this modest reflationary bounce with a return to a sustained period of above-target inflation.

When the dust settles: Structural trajectory resembles pre-COVID

When we look beyond the long shadow of COVID-19, we expect history to show multifaceted effects from the pandemic on macroeconomic trends (Figure I-9, on page 12). The economic damage may prove temporary for consumers and labor markets if the race against time to defeat the pandemic is effective.

However, the balance of long-term risks will shift, as the pandemic has permanently altered the landscape by accelerating such trends as the digitalization of economies and deglobalization and has influenced pivots in policy frameworks and the role of the state.

Some aspects of the global economy may ultimately stay as they are. In our view, these would include the contentious U.S.-China relationship, Vanguard’s “Idea Multiplier,” and the likelihood of increasing innovation acting to boost productivity in the years ahead.²

One widely recognized trend that COVID has accelerated is increased work-location flexibility. Given that most businesses were forced to reorganize around remote working, the pros and cons of the shift will be under greater scrutiny than ever.

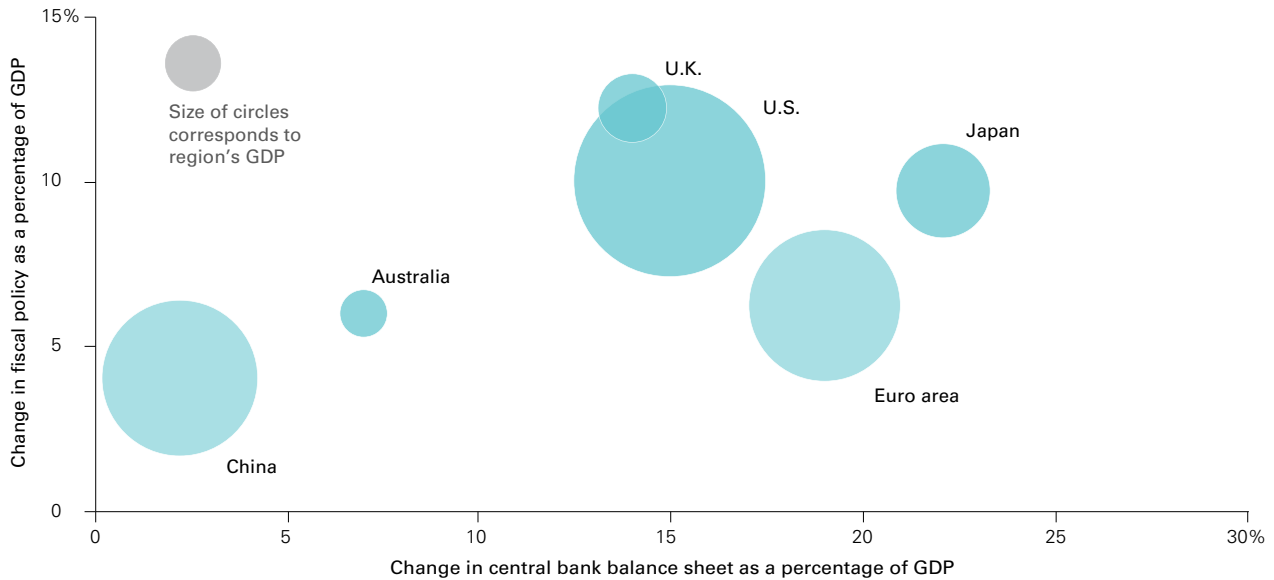
Our analysis finds that across developed economies, occupations in which a majority of labor is employed are well-suited for remote work. Thus, as shown in Figure I-10 (on page 12), globally the upper threshold for the population able to work remotely going forward appears quite high, and we would expect this trend to prove more enduring even after the pandemic has passed.

Although some have called for a rapid deglobalization effort in the pandemic’s aftermath, we think such a view is overly pessimistic. Rather, the current wide extent of economic and financial linkages poses challenges to a widespread reshoring back home, suggesting that the more likely path forward is a gradual slowdown in trade (“slowbalization”), alongside a recalibration and moderate shortening of supply chains. Figure I-11 (on page 13) estimates the future change in trade volume globally. While this trajectory would suggest negative implications for near-term growth activity because of inefficient allocation of resources and rising uncertainty, it would put aside fears of a more significant supply shock.

² 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 Davis, Wang, and Patterson et al., 2019, and Davis, Patterson, and Sathe et al., 2020.)

FIGURE I-7

Unprecedented support from central banks and fiscal policy



Notes: Change in fiscal policy is represented by the change in the cyclically adjusted primary balance from 2019 through September 30, 2020. Sources: Vanguard, Congressional Budget Office, Board of Governors of the U.S. Federal Reserve System, and International Monetary Fund, as of September 30 2020.

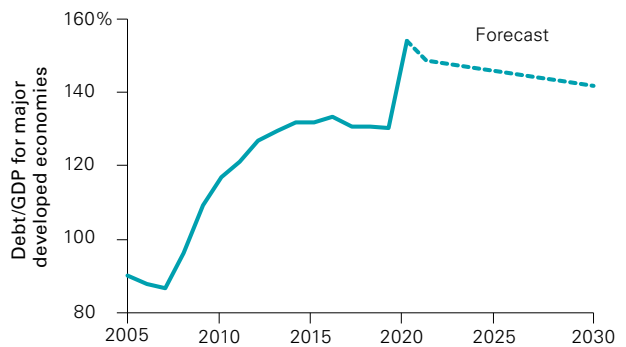
Perhaps most notably from a policy perspective, this crisis has seemingly caused a pivot in the expectations of, and preferences for, certain government policies, such as more aggressive spending by fiscal authorities amid economic headwinds. These intentions are unlikely to wane in the years ahead, in our view, and we expect fiscal policy to play a larger role not only in sustaining the recovery but beyond as well.

We do not expect a return to fiscal austerity, which has been a common approach in the years immediately following previous crises. Instead, our assessment of the balance of risks leans toward governments tolerating higher levels of government debt for longer.

The rapid scientific advances related to a vaccine have been welcome news to the global economy. In fact, we're not surprised that this point was reached so quickly. The

FIGURE I-8

Fiscal sustainability likely even without aggressive austerity

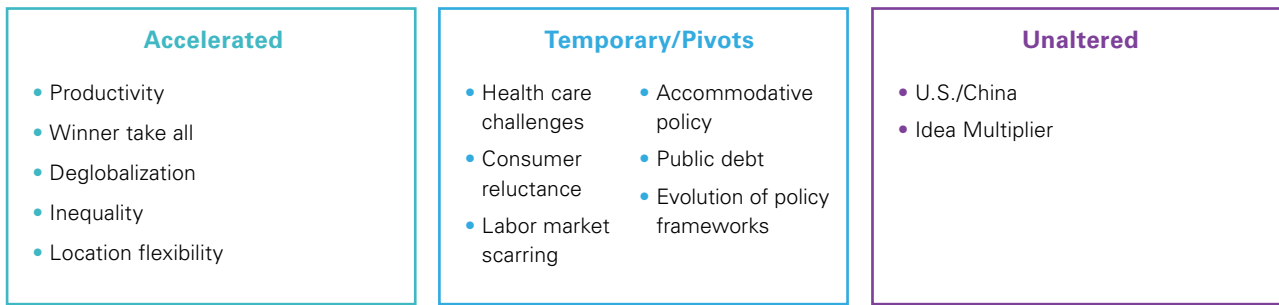


Note: The forecast represents 3.5% nominal GDP growth, an average debt interest cost of 1.2%, and a 2.5% budget deficit.

Sources: Vanguard calculations, based on data from Refinitiv and the International Monetary Fund, as of September 30 2020.

FIGURE I-9

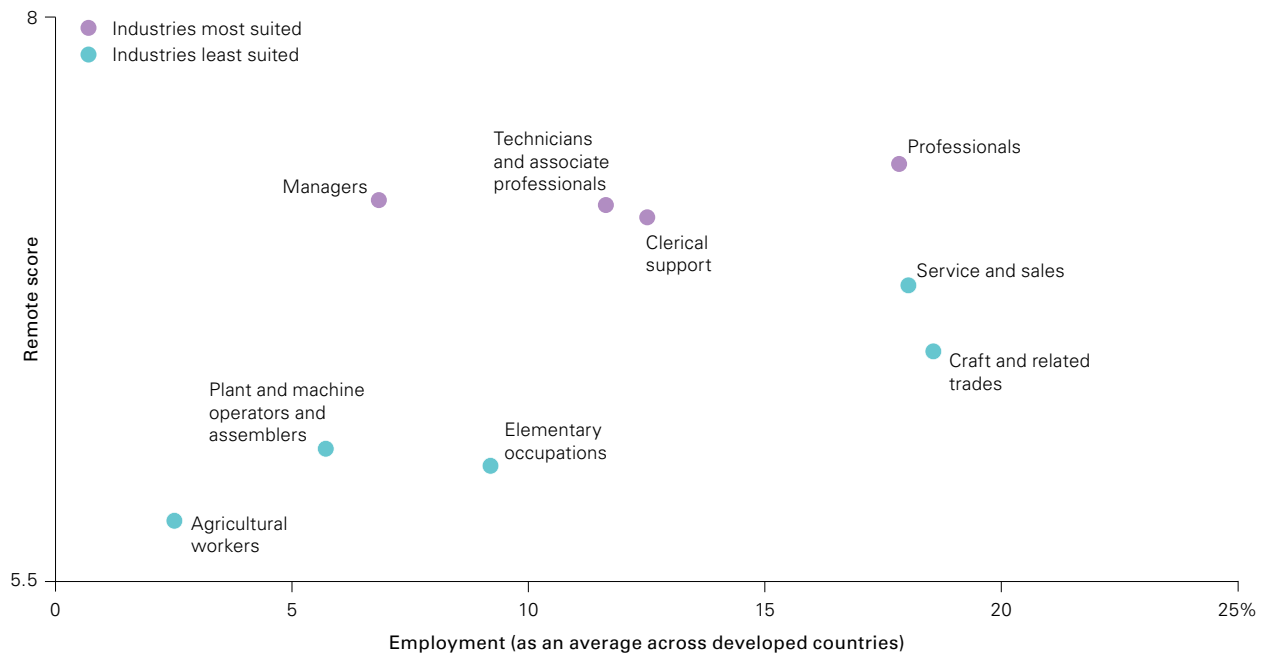
History to show varying effects from COVID-19



Source: Vanguard, as of November 30, 2020.

FIGURE I-10

Occupations most suited to remote work are nearly half of total developed-market employment



Notes: Data are limited to developed economies, namely the U.S., the U.K., the European Union, and Japan. The x-axis represents the percentage of total individuals globally employed. The y-axis represents our estimated remote score index and marks the remote score associated with an occupation. A score of 0 would represent occupations least suited for remote work and 8 would represent occupations most suited for remote work. The occupations indicated by blue dots are those with low remote scores, or less suited to be completely done remotely. Purple dots indicate occupations that have a high remote score or are better suited to remote work.

Sources: Office for National Statistics, Eurostat, and Moody's Data Buffet, as of September 30, 2020.

FIGURE I-11

‘Slowbalization’ scenario expected



Notes: We estimate trade growth as a function of an import-adjusted demand measure, Fraser Institute’s trade liberalization index, and changes in global value chains. The import-adjusted demand measure uses the OECD input-output tables to account for the import content of each expenditure component in each of the economies we track. Under the slowbalization scenario, future trade growth is estimated by assuming our independent variables change at a pace lower than seen during the pre-global financial crisis globalization wave, but above the pace seen during the post-global financial crisis trade slowdown.

Sources: Vanguard calculations, using data from the International Monetary Fund, OECD input-output tables, and the Fraser Institute. Actual data as of December 2017, and the forecast ends December 2025.

fields of genetics and biomedicine have been rife with innovative ideas in the last decade, and successes seem poised to have a cascading effect on productivity in the decade ahead.

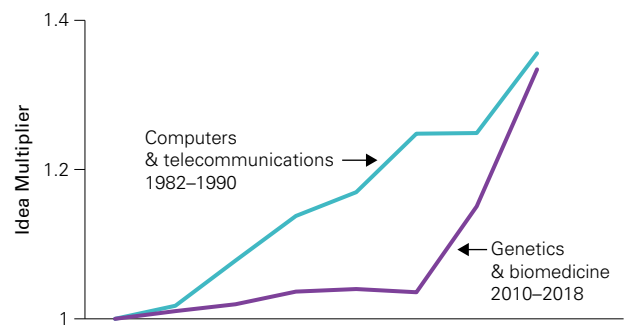
We identified this phenomenon in *The Idea Multiplier*, our 2019 research that found that future productivity is fundamentally driven by the generation, dissemination, and further expansion of ideas (Davis, Wang, and Patterson et al., 2019).

Figure I-12 shows how the Idea Multiplier, as it relates to genetics and biomedicine, has recently accelerated at a pace similar to that of computers and telecommunications nearly four decades ago. But rather than fears about computers replacing certain categories of workers, such gains are likely to result in benefits enjoyed across incomes and regions, with the development and distribution of a COVID-19 vaccine a case in point (Tufano et al., 2018).

Having developed our views on these trends, we take stock holistically of the effect on economic fundamentals over the medium term.

FIGURE I-12

The Idea Multiplier in genetics and biomedicine has started to grow faster than it did in computers and telecom in the 1980s



Notes: The vertical axis plots the Idea Multiplier index for the research fields of genetics and biomedicine and computers and telecommunications. 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 Davis, Wang, and Patterson et al., 2019, and Davis, Patterson, and Sathe et al., 2020.) The horizontal line plots the timeline for each Idea Multiplier index.

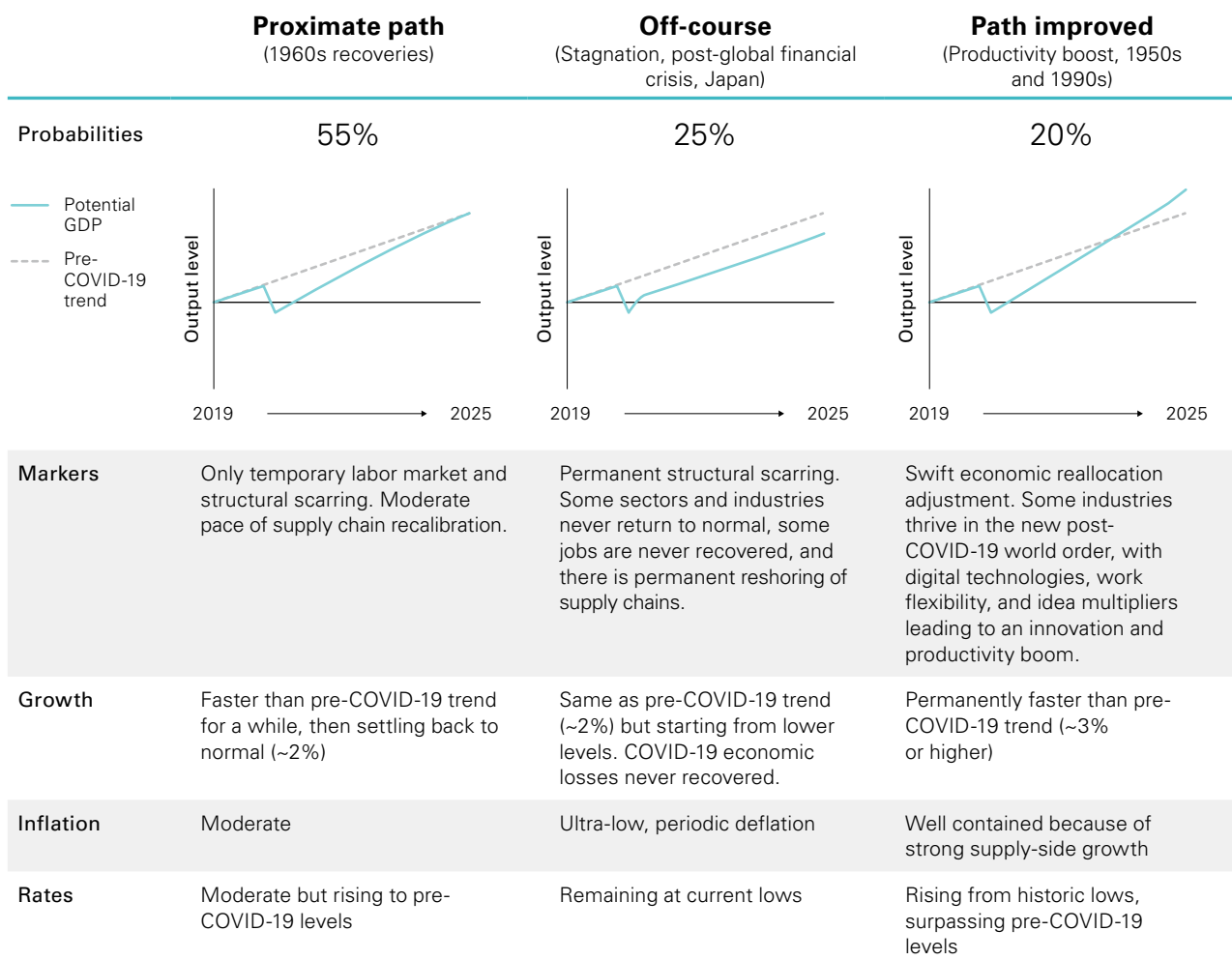
Sources: Vanguard calculations, based on data from Clarivate Web of Science and the Federal Reserve Bank of St. Louis, as of December 30, 2019.

Overall, the largest single risk to markets and the global economy remains health-related outcomes and the timeline for effective therapeutics. Under assumptions about near-term solutions providing significant aid in battling the pandemic, our central case projects a longer-run structural path for the economy that looks similar to its pre-pandemic one (Figure I-13).

Compared with falling into a prolonged stagnation (“off-course”) or a rapid reflation and surge in productivity gains (“path improved”), we see a global economy that will regain much of the footing it lost during the pandemic. We see a return to steady but still moderate growth, and interest rates normalizing gradually from historic lows, though remaining low and supportive for some time.

FIGURE I-13

Post-COVID secular states of the world



Source: Vanguard, as of November 30, 2020.

United States: Improvement ahead

As discussed earlier in relation to the global economy, our near-term views for the U.S. also are most heavily influenced by health outcomes at this stage of the recovery. As of this writing, prospects for an effective vaccine have improved, leading to a more optimistic timeline to close the immunity and reluctance gaps (as discussed earlier with regard to Figure I-1 on page 6).

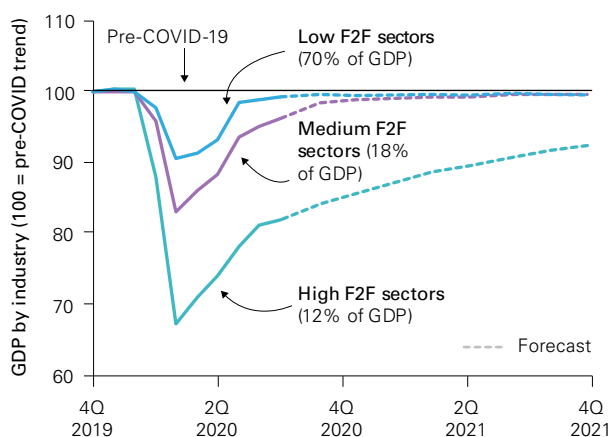
To that end, the reluctance gap has had an outsized impact on economic sectors that heavily depend on high degrees of face-to-face interaction, for production or output. These sectors, however, make up a relatively small portion of output (about 12%), yet they have lagged and will continue to lag in recovery behind those sectors involving less personal contact (Figure I-14).

The pace of the next phase of recovery, then, is a function of immunity and reluctance. Reflecting this relationship and our assessment of likely vaccine effectiveness and distribution outcomes, our central case projects a positive recovery path in which the immunity and reluctance gaps will be effectively closed within the second half of the year, achieving an annual growth rate of 5% and leaving an output gap to the pre-virus trend of roughly 1% at the end of 2021 (Figure I-15, on page 16).

Risks to this scenario are present, however, reflecting the uncertainty and fluidity of both the state of virus transmission and developments involved with the distribution of a vaccine, yet we currently view them as skewed to the upside. Under our most optimistic scenarios for vaccine effectiveness and distribution, much of the economic losses stemming from the pandemic could be recovered in the next year by closing the immunity and reluctance gaps in the first half of 2021. Downside risks would reflect a more severe winter season related to virus transmission and a persistently large immunity gap—related to a more prolonged vaccine distribution cycle—throughout the year, which leaves the U.S. economy with only marginal progress from current levels.

FIGURE I-14

Sectors with less human contact will reach pre-virus trends quicker than others



Notes: “F2F” refers to face-to-face contact. High F2F sectors include retail, transportation, and arts and entertainment. Medium includes professional services, health care, education, and other services. Low comprises the remaining sectors such as agriculture, utilities, and manufacturing. 100 is the pre-virus trend for each of the sector groupings.

Source: Vanguard, as of November 30, 2020.

The uniqueness of this recession and the outsized effects on many service sectors of the economy have resulted in uneven labor market outcomes wherein those that have been better able to operate at near full capacity in this environment—such as professional service and goods-producing industries—have experienced only a fraction of the job losses that consumer service industries have. In the pandemic’s early months, these job losses in the services sector were considered temporary, as both employees and employers expected to recouple after the pandemic. However, as the pandemic persisted and consumers were slow to return to these sectors, this temporary unemployment relationship became permanent.

This is a challenge for the labor market recovery ahead, as it lengthens the expected time for displaced workers to find new employment and is one of the reasons we believe additional fiscal support will prove necessary. At this stage of the recovery, we're paying less attention to the official unemployment rate and instead are closely monitoring broader measures of labor market participation and underemployment, most of which have experienced a more gradual recovery.

We expect the pace of monthly job growth to continue to moderate in the near term, leaving the unemployment rate centered near 6.5% as 2020 closes. As the winter fades and progress toward closing the immunity gap ramps up in the second half of 2021, we anticipate a sharp acceleration in job growth, and an unemployment rate near 5% at the end of 2021.

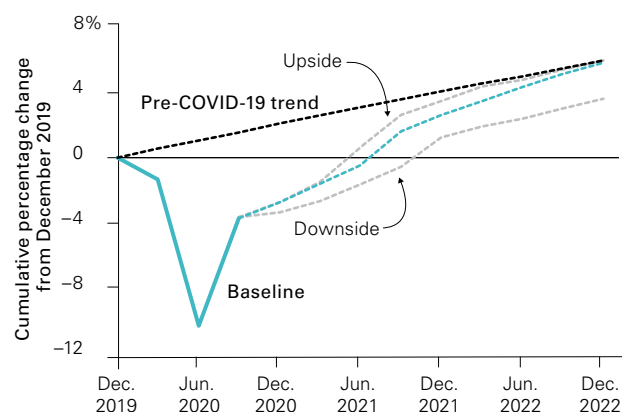
Business restrictions and the accompanying collapse in demand during the initial stages of the pandemic were a large negative shock for inflation, driving prices to historical lows across various sectors—most notably in the apparel, vehicles, and transportation industries. In the subsequent months, we have seen a gradual normalization, and we expect the core Personal Consumption Expenditures (PCE) Price Index to trend higher in early 2021 and produce a cyclical bounce as the economy continues to recover and the immunity gap closes. A weaker U.S. dollar, the possibility of further fiscal stimulus, and positive base effects will be additional factors firming the path of inflation.

Should our most optimistic economic and vaccine scenario unfold, these factors could produce an inflation scare, wherein the overshooting of Fed targets is viewed as more persistent, influencing investor expectations, which could introduce market volatility.

However, our base case assumes that these cyclical effects will prove transient, as more structural forces such as technology and unemployment continue to

FIGURE I-15

Recovery path to extend beyond 2021



Notes: The y-axis represents the level impact from the baseline, which is December 2019. The blue and gray dotted lines represent three forecasts: our base case and upside and downside scenarios. The downside scenario is characterized by a failure of the current restrictions to significantly reduce virus transmission in the short term, which would cause a slower recovery. Potential problems with the efficacy, adoption, distribution, or safety of a vaccine could also surface. The upside scenario is characterized by a speedy large-scale distribution of an effective vaccine, which will see the economy return to normal more quickly than we currently expect.

Sources: Vanguard and Refinitiv, as of November 30, 2020.

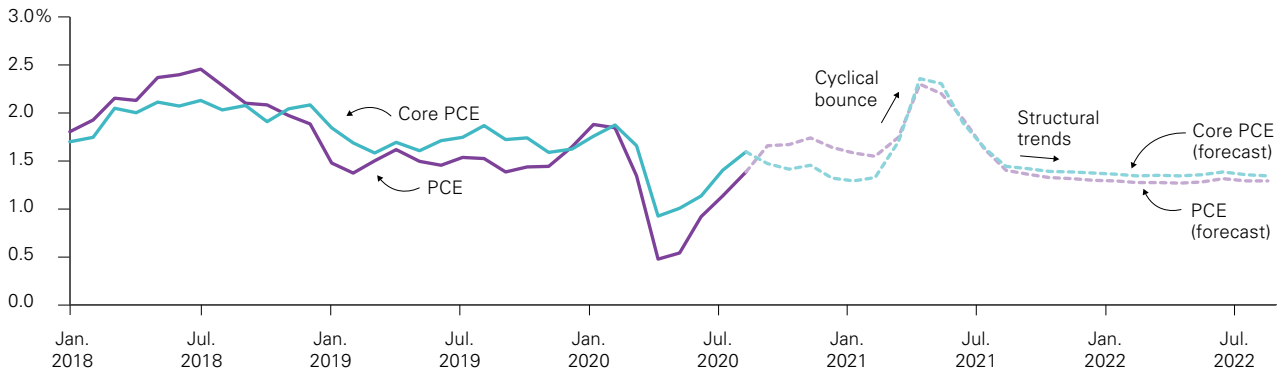
drive inflation lower. These factors contribute to our expectations that inflation will trend lower in the second half of the year, bringing PCE for 2021 in the range of 1.6%–1.8% year over year (Figure I-16, on page 17).

As with most countries, particularly developed markets, all eyes will be on policymakers in the U.S. in 2021. The impact of the largest shock to economic conditions in multiple generations was mitigated by the fast, focused, and significant efforts of policymakers. Absent these, the downturn would no doubt have been more severe, the rebound less robust, and the financial market impact more significant.

FIGURE I-16

After midyear cyclical bounce, outlook for inflation remains subdued

PCE and core PCE forecast



Notes: The dotted lines represent our forecast for the inflation index, which is indicated by solid lines. The forecast is obtained from Vanguard proprietary inflation forecasting models. Core PCE removes the more volatile food and energy components of inflation.

Sources: Vanguard calculations, based on data from Moody's Data Buffet and Refinitiv, as of November 30 2020.

One reason the recovery from the global financial crisis was so prolonged was its impact on businesses' and households' balance sheets. **Figure I-17** (on page 18) shows that without monetary and fiscal policymakers helping businesses remain solvent through loan, grant, interest rate, and other policies, they could not have retained nearly as many workers or, in many cases, continued to operate. Instead, we have seen business and personal bankruptcies appear more limited than many would have anticipated, remaining close to pre-virus levels. However, this is an area we will be keenly monitoring in the months ahead for lagged effects that are not currently visible.

Going forward, countercyclical fiscal and monetary policy will be essential in our view to keep households and businesses from suffering more lasting economic scarring. Fiscal policy aimed at supporting and, eventually, stimulating output would be critical to the success of accommodative monetary policy, including low policy rates and credible forward guidance, particularly with interest rates near the zero lower bound.

Our baseline outlook assumes that a targeted fiscal package of at least \$1 trillion, aimed at supporting the income losses of households and businesses, will be necessary and may be passed in 2021.

In regard to monetary policy, we believe the Fed will continue to use the tools at its disposal, including increasing the pace of asset purchases when needed and keeping interest rates at the zero lower bound. While we would not expect policy rates to move from

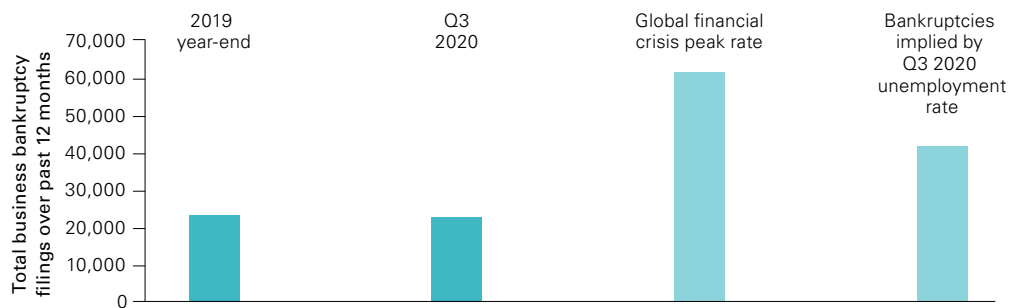
current levels until at least 2023 under our base case economic outcomes, credible forward guidance and Fed communication would prove critical to influencing market behavior should an “inflation scare” scenario unfold in mid-2021 as articulated above.

FIGURE I-17

Bankruptcies remain contained for now

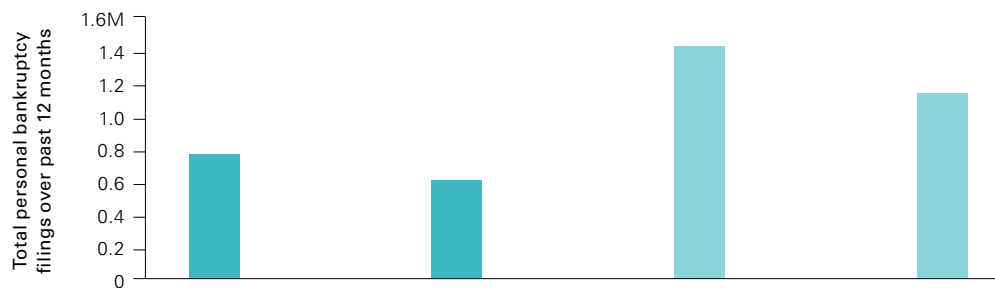
a. Business

bankruptcies show no major change from last year and are below where the unemployment rate might suggest



b. Personal

bankruptcies are also down from last year and from what the unemployment rate might suggest



Notes: Bankruptcy filings are on a 12-month trailing basis. The implied bankruptcy rates are based on a regression measuring the historical relationship between the unemployment rate and bankruptcy filings, as well as adjusting for the ratio of temporarily to permanently unemployed in another regression.

Sources: U.S. Bureau of Labor Statistics and Administrative Office of the U.S. Courts, as of September 30, 2020.

Euro area: Pandemic accelerates fiscal integration

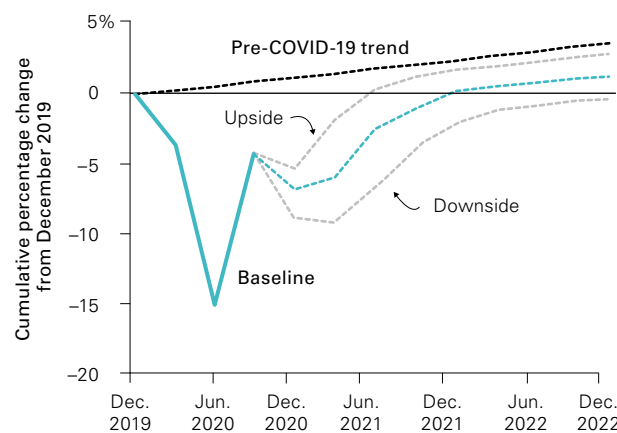
The COVID-19 outbreak, and the measures put in place to contain it, led the euro zone's economy to experience its deepest recession since its formation in 1999. In the second quarter of 2020, the output level was 15% below the level attained at the end of 2019 (Figure I-18). Supply was severely constrained by national lockdowns, while demand softened amid reluctance to engage in social activities, along with lower aggregate incomes and higher uncertainty about the near-term economic outlook.

A moderate easing of government restrictions, plus a partial switch away from services toward goods consumption, led to an encouraging rebound in activity in the third quarter. This recovery, however, looks set to be short-lived, with another spike in virus transmission forcing authorities to retighten restrictions. We expect another contraction in GDP in the fourth quarter of 2020, though it will be much less severe than earlier in the year. Overall, the euro area economy is anticipated to have fallen by 6% to 8% in 2020 relative to 2019.

Looking ahead to 2021, we expect economic activity to gradually recover as governments gain control over the virus and as an effective vaccine becomes widely available and distributed. In our base case, we expect that growth will be about 5% in 2021 and that GDP will return to its pre-virus level by the end of the year—though still 2% below the trajectory we expected a year ago. The risks to this view are skewed to the upside. A better-than-expected clampdown of the renewed spike in infections and a speedy large-scale distribution of an effective vaccine will see a return to normal more quickly than we currently expect. The downside risk is predominantly the inverse of these upside risks. A failure of the current restrictions to significantly reduce virus transmission in the short term would mean a slower recovery. Potential problems with the efficacy, adoption, distribution, or safety of a vaccine could also surface.

FIGURE I-18

In our central scenario, we expect a gradual recovery in 2021



Notes: The y-axis represents the level impact from the baseline, which is December 2019. The blue and gray dotted lines represent three forecasts: our base case and upside and downside scenarios. The downside scenario is characterized by a failure of the current restrictions to significantly reduce virus transmission in the short term, which would cause a slower recovery. Potential problems with the efficacy, adoption, distribution, or safety of a vaccine could also surface. The upside scenario is characterized by a better-than-expected clampdown of the second virus wave and a speedy large-scale distribution of an effective vaccine, which will see the economy return to normal more quickly than we currently expect.

Sources: Vanguard estimates and Bloomberg, as of November 12, 2020.

Inflation in the euro area dropped sharply in 2020. This drop was driven by sharply lower energy prices, short-term tax cuts, and a widening output gap as the recession took hold. As all three factors are set to unwind in 2021, we expect both the core and headline Consumer Price Index (CPI) rate to rise (Figure I-19, on page 20). However, inflation is still expected to remain subdued and well below the European Central Bank's (ECB's) 2% target throughout 2021 amid weak labor bargaining power, a flat Phillips curve, and subdued medium- to long-term inflation expectations. Even in our upside scenario, we do not expect inflation to surge sustainably above 2%.

In response to the pandemic and rapidly tightening financial conditions, the ECB acted swiftly and aggressively in restoring calm in 2020. It bought 500 billion euros of assets, primarily euro area government bonds, through its Pandemic Emergency Purchase Programme (PEPP). By ensuring that borrowing costs remained low, the central bank partly facilitated highly expansionary fiscal stances by national governments. France, Italy, and Spain will all record budget deficits over 10% in 2020, while Germany's deficit will be closer to 5%.

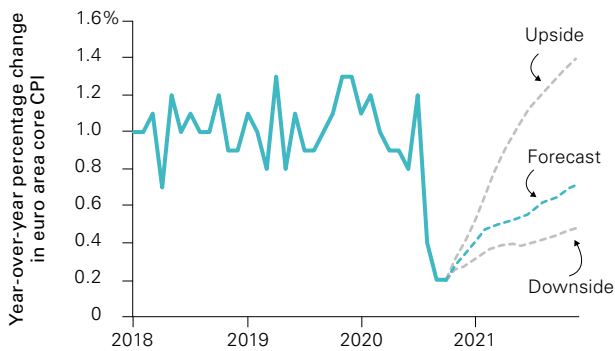
This coordinated response has kept unemployment in check through furloughs and wage-support efforts. As Figure I-20 shows, unemployment rates in most major

euro zone countries have so far remained below the peaks observed following the global financial crisis, despite the economy's being in a deeper recession this time. The outlook for the labor market, though, varies substantially across countries; Italy and Spain are particularly exposed, as a relatively large share of their economies is skewed toward sectors that are most vulnerable to the pandemic (Figure I-21, on page 21).

We expect the ECB to expand the PEPP by 500 billion euros at its December meeting and to continue these emergency purchases until at least mid-2021. Monetary

FIGURE I-19

Euro area inflation will recover from its 2020 low but will remain well below the ECB's target

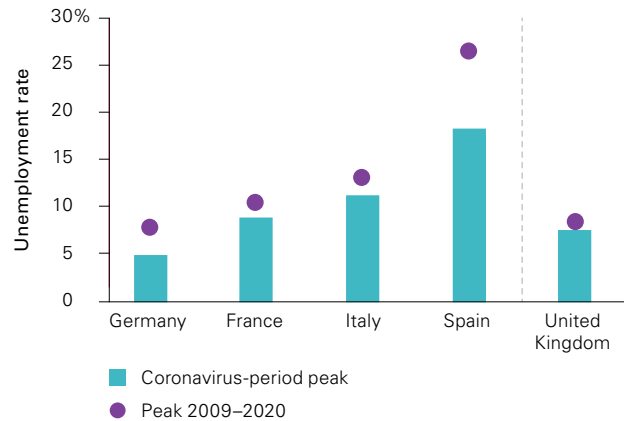


Notes: The downside scenario is characterized by a failure of the current restrictions to significantly reduce virus transmission in the short term, which would cause a slower recovery. Potential problems with the efficacy, adoption, distribution, or safety of a vaccine could also surface. The upside scenario is characterized by a better-than-expected clampdown of the second virus wave and a speedy large-scale distribution of an effective vaccine, which will see the economy return to normal more quickly than we currently expect.

Sources: Vanguard estimates and Bloomberg, as of November 12, 2020.

FIGURE I-20

Most euro area unemployment rates have remained lower than the peak since the global financial crisis



Notes: The purple dots show the unemployment rate peak during 2009–2020. The blue bars show the expected peak because of the coronavirus pandemic. The U.K., which is not part of the euro area, is included for comparison.

Sources: Vanguard estimates and Bloomberg, as of November 12, 2020.































conditions will remain highly accommodative, and the deposit rate will stay below zero for at least the next 12 months.

On the fiscal side, one unexpected benefit from the pandemic has been the approval of the “Next Generation EU” package, which is a significant step toward greater European fiscal integration. The stimulus, in the form of 390 billion euros in grants and 360 billion euros in loans, is expected to boost output by about 2% per year over the coming years. Even with the added support from this package, however, the fiscal impulse in 2021 will go into reverse as governments restore their budget deficits to more sustainable levels.

Despite the substantial increase in public debt in 2020, we see the fiscal positions of major euro area economies as being sustainable. This view is primarily based on the assumption that, in all likelihood, nominal economic growth rates will exceed the cost of servicing this debt over the medium term, while budget deficits will normalize. A major risk to this view would be if the economy were subjected to a series of further negative growth and inflation shocks in the coming years, particularly in countries such as Italy, where the gap between expected growth and interest cost is narrow.

FIGURE I-21

Spain’s and Italy’s labor markets are particularly exposed because of their outsized share of sectors that are vulnerable to the pandemic

	Furlough scheme generosity	Furlough scheme duration	Percentage of total employment			
			Wholesale and retail trade	Accommodation and food	Transport and storage	Arts, entertainment, and recreation
Germany	 1	 Dec. 2021	 13%	 4%	 5%	 2%
France	 2	 Jun. 2021	 14%	 5%	 5%	 2%
Italy	 3	 Apr. 2021	 15%	 7%	 5%	 1%
Spain	 4	 Jan. 2021	 17%	 8%	 5%	 2%
U.K.	 1	 Mar. 2021	 14%	 7%	 5%	 3%

Notes: Furlough scheme generosity is indicated by a scale ranging from 1 to 5 and is based on factors including a firm’s contribution to employee salaries. Furlough scheme duration is based on the termination date. For the four columns on the right, the most vulnerable sectors, the share ranges from 2% to 17% of total employment. The colors represent conditional formatting of each column individually, except the last three columns, which are considered together given similar magnitude.

Sources: Vanguard estimates, Eurostat, Office for National Statistics, and Bloomberg, as of November 12, 2020.

United Kingdom: Brexit risks continue to weigh on outlook

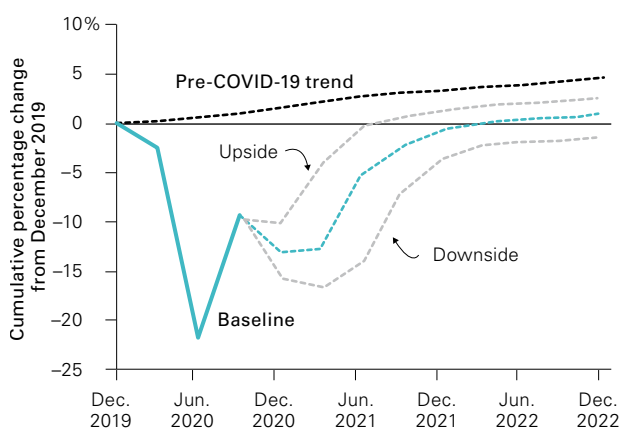
The path of U.K. economic output in 2020 was similar in shape to that of the euro area. A very deep contraction in the first half of the year was followed by a sizable recovery in the third quarter as virus restrictions were partially eased. The government's "Eat Out to Help Out" program to support the hospitality industry, coupled with cuts in the value-added tax (VAT) for the most vulnerable sectors, provided additional support in the summer. However, as with the rest of Europe, the economy was expected to contract again in the fourth quarter as countries imposed tighter restrictions to tackle a spike in infections.

The main difference between the euro area and the U.K. is that the U.K. will suffer a deeper recession in 2020 (Figure I-22). This is primarily because sectors that are most reliant on social activities, such as leisure, hospitality, and tourism, account for a larger share of the economy than they do in most other European countries. A slightly longer lockdown during the spring and tighter-than-average restrictions in the winter are also partly to blame. The U.K. economy is expected to have fallen by 10% to 12% in 2020 relative to 2019.

In 2021, we expect the U.K. economy to gradually recover as restrictions ease and life returns closer to normal. Our central scenario pencils in U.K. growth of between 7% and 9%, which is slightly higher than the euro area, primarily because output is starting from a lower base. We expect output to return to its pre-pandemic level by the first quarter of 2022. Risks are again skewed to the upside, reflecting ongoing breakthroughs in vaccine development.

FIGURE I-22

The U.K. economy experiences a deeper recession than its European counterparts



Note: The y-axis represents the level impact from the baseline, which is December 2019. The blue and gray dotted lines represent three forecasts: our base case and upside and downside scenarios. The downside scenario is characterized by a failure of the current restrictions to significantly reduce virus transmission in the short term, which would cause a slower recovery. Potential problems with the efficacy, adoption, distribution, or safety of a vaccine could also surface. The upside scenario is characterized by a better-than-expected clampdown of the second virus wave and a speedy large-scale distribution of an effective vaccine, which will see the economy return to normal more quickly than we currently expect.

Sources: Vanguard estimates and Bloomberg, as of November 12, 2020.

The rate of consumer price inflation slowed materially throughout 2020, driven by lower energy prices, a VAT cut, and weakening demand relative to supply. As with the euro area, we expect aggregate prices to gradually rise as these factors unwind in 2021. Both survey- and market-based measures of inflation expectations remain well-anchored in the U.K. As a consequence, we expect inflation will approach the Bank of England's target of 2% over the next year.

On the policy front, the Bank of England eased monetary conditions considerably this year. The Bank Rate was slashed from 0.75% to 0.10%, and the target stock of bond purchases was increased from 445 billion pounds to 895 billion pounds.³ As part of the expansion of this quantitative easing (QE) program, the BoE bought over 50% of the government-issued new debt between March and September, which helped keep borrowing costs low for the U.K. government. The U.K.'s primary deficit is set to exceed 10% of GDP in 2020 amid a very expansionary fiscal stance and, as with the euro area, the government's many support packages (including a program to pay a portion of furloughed workers' wages) have limited the rise in unemployment so far.

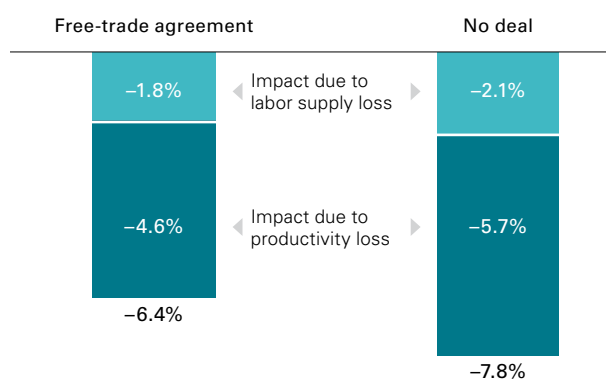
We expect the BoE's policy stance to remain highly accommodative and for its QE program to last until at least mid-2021. Although the Monetary Policy Committee has warmed to the idea of implementing a negative interest rate policy, we do not expect this to be executed unless economic conditions substantially deteriorate. The furlough program will likely taper off after March 2021, and this should mark the beginning of a normalization of the government's deficit spending.

A key risk to the U.K. economic outlook remains a no-deal Brexit. As of this writing, the U.K. and European Union were still negotiating in an attempt to strike a bare-bones free trade agreement by the end of the transition period on December 31, 2020. In our central scenario, we expect a deal to be reached, albeit at the last minute. Departing the E.U. will likely cause significant disruption to many U.K. firms that have to adapt and change the way they do business. This is part of the reason we expect the U.K. economy to return to its pre-pandemic level of output slightly later than the rest of the euro area (though some euro-area firms will also suffer, just to a lesser extent than in the U.K.).

However, as **Figure I-23** illustrates, the long-term economic implications of a Brexit deal compared with no Brexit deal are not too far apart. Both scenarios would restrict the free movement of people and therefore the growth of the labor supply, and both scenarios would lead to a customs border and likely hamper productivity growth through less foreign direct investment and reduced innovation. Furthermore, even if no deal is reached with the E.U. in the short run, it could still happen. After all, the E.U. accounts for about half of the U.K.'s trade, so a deal of some form is likely to be made eventually.

FIGURE I-23

Deal or no deal, Brexit will hurt the U.K. economy



Notes: The figure examines the cumulative impact of Brexit on GDP by 2030. The productivity impact has been estimated using a vector error correction (VEC) model that incorporates a proxy for trade openness and foreign direct investment. We assume human capital growth is unaffected by Brexit. Labor supply growth is assumed to grow at a rate similar to that of total population growth.

Sources: Vanguard calculations, Macrobond, and Office for National Statistics, as of November 12, 2020.

China: First in, first out, and first to normalize

In early 2020, COVID-19 and its economic effects were mostly seen as problems affecting China alone. Now China has emerged as one of the few countries to successfully contain the virus and the only economy expected to return to pre-COVID trend levels by the end of 2020 (Figure I-24). We expect the Chinese economy to rise 9% in 2021, supported by the continued recovery in domestic consumption and service sectors, as well as an improving external environment.

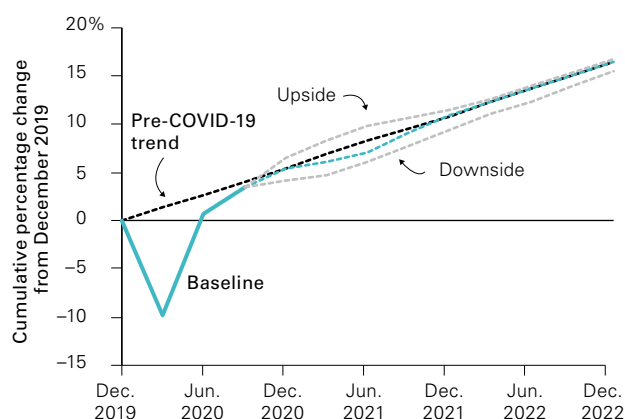
While the pace of recovery in 2020 has exceeded most expectations, its unevenness, as shown in Figure I-25 (on page 25), is as we expected in our earliest COVID economic research (Patterson et al., 2020). Specifically, export-driven manufacturing sectors have outperformed service and consumption, given consumer reluctance and the absence of developed-market-like household transfers in the government's COVID-19 relief package. Infrastructure and real estate investment have also rebounded sharply, owing to policymakers' choice of stimulating production and construction over consumption.

As we suggest in a forthcoming research paper, *In Search of Fluctuations: Dissecting China's True Growth Picture and Its Implications*, the use of infrastructure and real estate investment, as well as state-owned enterprises (SOEs), as cyclical backstoppers during slowdowns is not unique to the COVID pandemic; what is different is the size of the stimulus package delivered (Schickling, Yeo, and Wang, 2021). As Figure I-26 (on page 26) illustrates, the fiscal and monetary packages have paled in comparison to Chinese policymakers' response during the global financial crisis, while the extent of credit easing is lower than that delivered during the 2013 and 2015–2016 economic slowdowns. By contrast, most world governments and central banks have rallied to push through an unprecedented level of policy support, with the U.S. delivering a fiscal package twice that of the global financial crisis. China's desire to balance near-term growth stability with medium-term financial stability will lead it to calibrate its policy response more prudently than its developed-market peers, making a replay of its role as a global savior during 2009 unlikely.

Growing concerns about an overheated property market and a robust economic recovery create the risk of premature policy tightening in 2021. While further aggressive easing doesn't seem necessary and

FIGURE I-24

China's V-shaped recovery



Notes: The y-axis represents the level impact from the baseline, which is December 2019. The blue and gray dotted lines represent three forecasts: our base case and upside and downside scenarios. The downside scenario is characterized by premature policy tightening and supply chain decoupling. A potential COVID resurgence leading to additional containment measures also poses a downside risk, although at this stage that seems unlikely. The upside scenario would entail surging global demand from a better-than-expected recovery in developed markets and China maintaining its elevated global export market share.

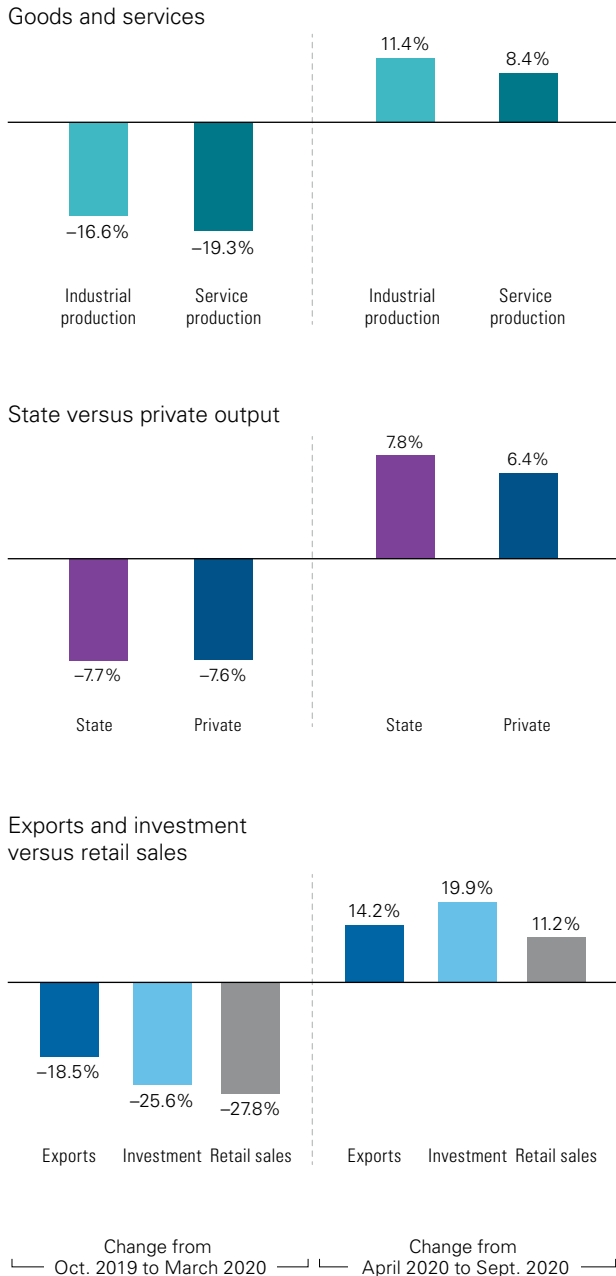
Source: Vanguard, as of November 30, 2020.

emergency policy measures will inevitably be phased out over time, broad tightening also appears unlikely given subdued inflation and uncertainties associated with COVID-19. Instead, policymakers will likely take a more data-dependent and targeted approach, such as providing funding support to small and medium-sized private enterprises and high-end manufacturers while restricting real estate developers' financing. Overall, we expect fiscal policy and broad credit growth to gradually normalize in 2021, resulting in slowing property and infrastructure investment.

On the currency side, strong fundamentals will keep the renminbi well supported in the near term, especially as the positive development of a vaccine could boost the potential for a stronger global recovery and a weaker U.S. dollar. However, we also expect more two-way volatility, as long-term U.S.-China relations remain contentious and the current account surplus may gradually fade amid the resumption in global production and increased domestic consumption of foreign services, such as international travel.

FIGURE I-25

An uneven recovery between . . .



Note: State output is measured as the output of state-owned enterprises.
Sources: Vanguard, using data from Bloomberg, as of September 30, 2020.

The pandemic has accelerated many trends, including a shift toward less globalization, as nations seek to promote domestic manufacturing or diversify supply chain risk across other developing economies. Although plans to recalibrate supply chains will take years to play out, Chinese policymakers have nonetheless expressed greater strategic emphasis on the rebalancing toward domestic demand as the driver of future growth, preparing for potential “slowbalization,” or slowing in the rate of globalization.⁴ Against the backdrop of a less globalized world, we analyze three potential paths that China can take over the next decade (Figure I-27, on page 26). The context for evaluating these paths lies in two primary goals that policymakers announced at China’s fifth plenary session: reaching the threshold of a high-income country (~\$13,500 USD GDP per capita, based on World Bank standards) by 2025, and doubling real GDP per capita (~\$20,500 USD) by 2035. This would effectively elevate China to the status of a moderately developed economy by 2035.

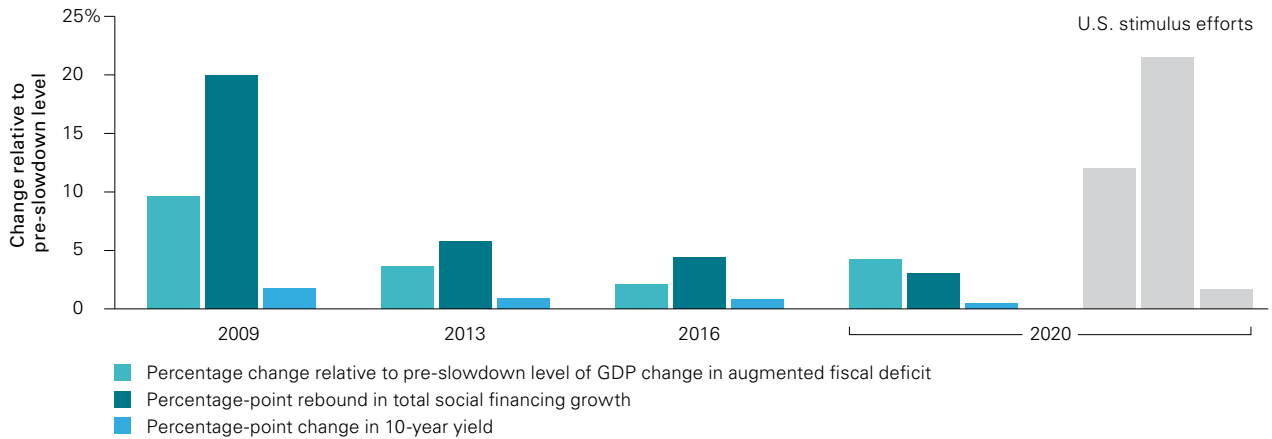
In assessing our three potential growth scenarios, the 2025 goal appears attainable, while the 2035 aspiration appears to be loftier, with only a restoration of a pre-global financial crisis globalization wave, along with effective structural reforms and an adequate policy cushion (the “smooth rebalancing under reglobalization” scenario), likely to lead to a doubling of China’s GDP per capita by 2035. Under the other scenarios, however, it will be challenging to achieve this target within the same timeline, given a more hostile and complex global environment. Under our assumption of successful structural reforms in a slowbalized world, the Chinese economy will only double its income several years post-2035. Should China fail to enact structural reforms, however, this goal will prove to be even more elusive, with a Japan-style scenario suggesting that China is unlikely to reach its 2035 target in the next two decades.

As nations throughout the world begin envisioning life post-COVID, China is entering the next decade at a critical junction where, in the past, middle-income countries have flourished or floundered. Amid significant external and demographic headwinds, productivity growth via market reforms and promoting innovation will be key in determining whether China escapes this middle-income trap and achieves the status of a moderately developed economy within the next decade.

⁴ See reference to President Xi Jinping’s speech on the “dual circulation” strategy: http://www.xinhuanet.com/english/2020-09/02/c_139337727.htm.

FIGURE I-26

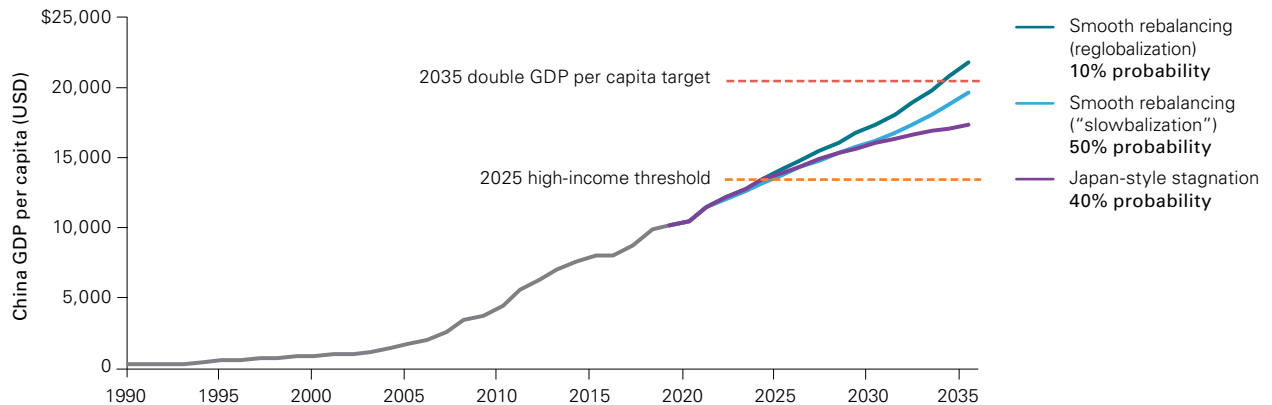
China's stimulus is neither unprecedented nor 'whatever it takes'



Note: Total social financing is proxied by credit growth for the U.S. comparison.
Sources: Vanguard, using data from Bloomberg and WIND, as of October 30, 2020.

FIGURE I-27

Mapping out the path to high income



	Smooth rebalancing (reglobalization)	Smooth rebalancing (slowbalization)	Japan-style stagnation
Average real GDP growth (2021 to 2035)	5.0%	4.3%	3.8%
Average real GDP growth (2025 to 2030)	4.3%	3.4%	2.2%
Average real GDP growth (2030 to 2035)	4.5%	3.9%	3.6%
Year China will reach 2025 high-income threshold	2024	2025	2025
Year China will double GDP per capita	2034	2037	2040

Notes: To convert our real GDP growth forecasts to nominal GDP per-capita growth, we assumed a roughly stable population growth of 0.5%. For simplicity, we also assumed a constant GDP deflator of 0.5% throughout.

Source: Vanguard, as of November 30, 2020.

Japan: A new leader faces familiar challenges

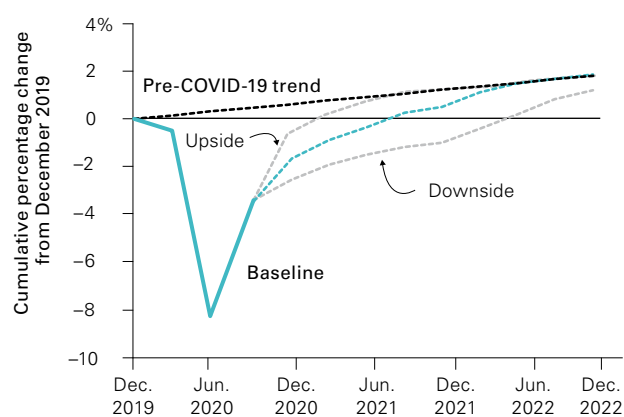
Japan was the first developed economy to officially enter a recession in 2020. This was triggered by China's first-quarter lockdown and the associated effects on Japan's tourism sectors, which rely heavily on Chinese Lunar New Year tourists, following the fourth-quarter 2019 VAT hike that stifled domestic consumption. Although Japan's close geographic ties to China and its aging population raised concerns the country would be hit hard by the virus, so far it has managed to avoid widespread outbreaks and its deaths per capita are among the lowest in the developed world. Accordingly, the government's containment measures have been more lax, and overall mobility indexes indicated a much smaller decline than in the U.S. or Europe. We expect the Japanese recovery to take a path similar to that of other developed economies, returning to pre-COVID trend around the second half of 2022 (Figure I-28). This recovery will exhibit similar uneven characteristics, with strength in export/manufacturing sectors offsetting weakness in domestic service sector activity.

Another notable development in 2020 was the resignation of Japan's longest-serving prime minister, Shinzo Abe. Known for the eponymous Abenomics, Abe's tenure was associated with aggressive monetary easing and fiscal stimulus, with less robust success on the platform's "third arrow," structural reforms. Public debt levels surpassed 200% of GDP, while de facto debt monetization in the form of the Bank of Japan's buying a large percentage of government bond issuance kept interest rates near zero and provided a much-needed, albeit still underwhelming, boost to inflation, as shown in Figure I-29 (on page 28). This playbook is being adopted by other developed economies that view Japan as evidence that sustainable debt levels are higher than previously thought. Although structural factors such as demographics, technology, and rigid inflation expectations have thus far kept a lid on inflation, in the long term, Japan's debt levels pose a financial stability risk and constrain fiscal options for the next downturn. In the near term, we expect a pause in monetary policy as the Bank of Japan eyes post-COVID normalcy.

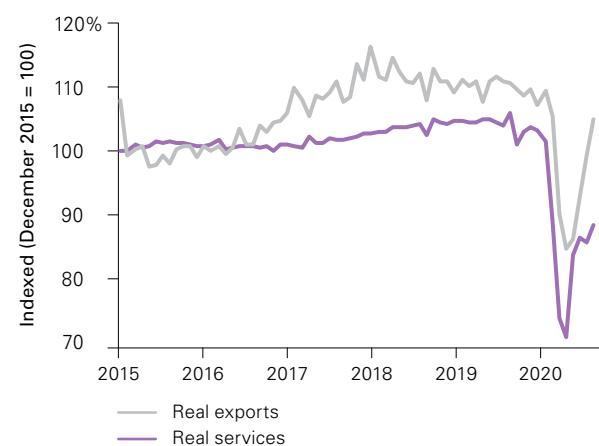
FIGURE I-28

An uneven and gradual recovery

a. GDP expected to reach pre-COVID trend in 2022



b. External demand industries have driven the recovery



Notes: In Figure a, the y-axis represents the level impact from the baseline, which is December 2019. The blue and gray dotted lines represent three forecasts: our base case and upside and downside scenarios. The downside scenario is characterized by a resurgence of cases depressing consumer sentiment and a softening of global durable goods demand. The upside scenario entails accelerated virus abatement boosting consumer confidence, propelling service consumption, and restoring tourism industries in early 2021.

Sources: Figure a: Vanguard, as of November 30, 2020. Figure b: Vanguard calculations, based on data from Bank of Japan, as of September 30, 2020.

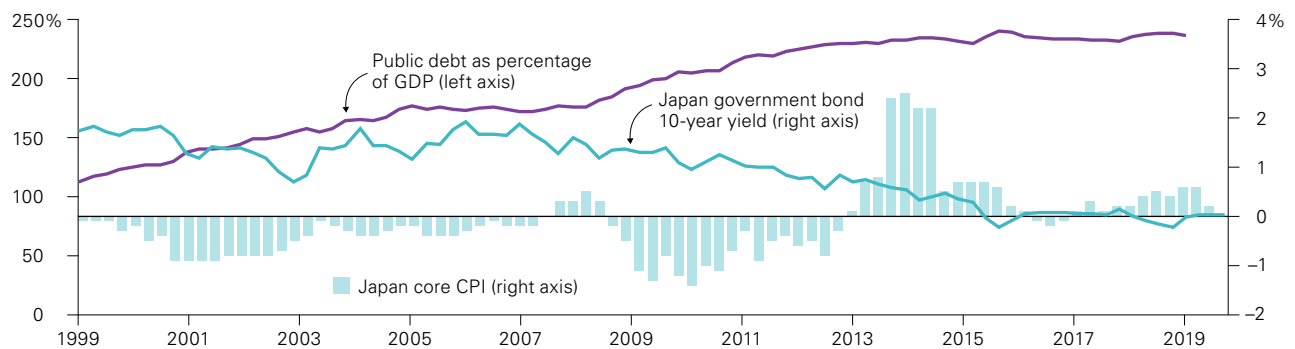
Abe's successor, Yoshihide Suga, largely represents a continuation of these policies but with renewed focus on the structural reform component. In recent years, Japan's growth has stemmed from rising labor force participation by women and the elderly, but further gains in these areas are unlikely, as they're already high compared with the average of other Organisation for Economic Co-operation and Development member countries. Therefore, structural reform in other areas is key.

One particular area of focus is the increasing need for digitalization of the Japanese economy, which according to the 2020 IMD World Digital Competitiveness ranking

is 27th in the world.⁵ Investment in digital infrastructure is perhaps the country's best hope to escape the low productivity growth realm it has been mired in for several decades. As Figure I-30 shows, Japan's GDP per hour worked is well below that of its peers, and business creation and employment in digitally intensive sectors is a fraction of other developed economies'. Digitalizing the economy will require conquering some of the same cultural barriers that preempted Abe's attempts at boosting immigration and foreign workers.

FIGURE I-29

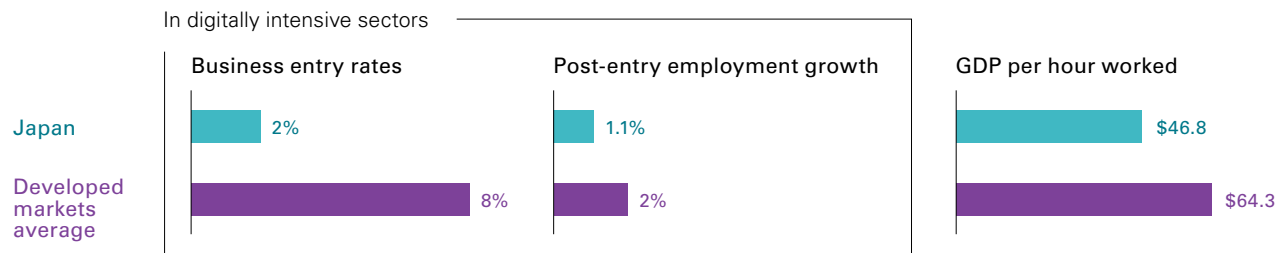
Inflation remains below target even after years of expansionary fiscal and monetary policy



Note: Core CPI measures the change in the price of goods and services purchased by consumers, excluding fresh food.
Sources: Vanguard calculations, based on data from Moody's Data Buffet and Refinitiv, as of December 31, 2019.

FIGURE I-30

Digitalization may provide a needed productivity boost



Notes: Employment and entry rates data are from 1998 to 2015. Business entry rates and post-entry employment growth are for highly digitally intensive sectors. GDP per hour worked is in U.S. dollars.
Sources: Vanguard calculations, based on data from the Organisation for Economic Co-operation and Development and World Bank, as of December 31, 2019.

Emerging markets: Health care challenges but economic opportunities globally

As with developed economies, 2020 has brought severe challenges to emerging markets. Hardest hit have been Latin America, Africa, and West Asia. Emerging markets have been particularly vulnerable to the economic and medical consequences of the pandemic, and we expect this to continue until a vaccine is widely available. This will take longer for many emerging-market countries, which lack sufficient roads to rapidly transport the vaccine or the facilities to keep vaccine supplies refrigerated at extremely cold temperatures. As of this writing, the apparent success of the Pfizer vaccine trial and others has buoyed hopes worldwide that there is a path to normalcy. But the poorest emerging-market countries may be last in line to receive this potential cure. However, should other vaccine candidates prove easier to distribute with little or no excess refrigeration, emerging markets may benefit from vaccines sooner than expected. Generally speaking, emerging-market countries have lagged developed-market economies when it comes to pandemic management, specifically in controlling the spread by testing widely for the coronavirus (Figure I-31).

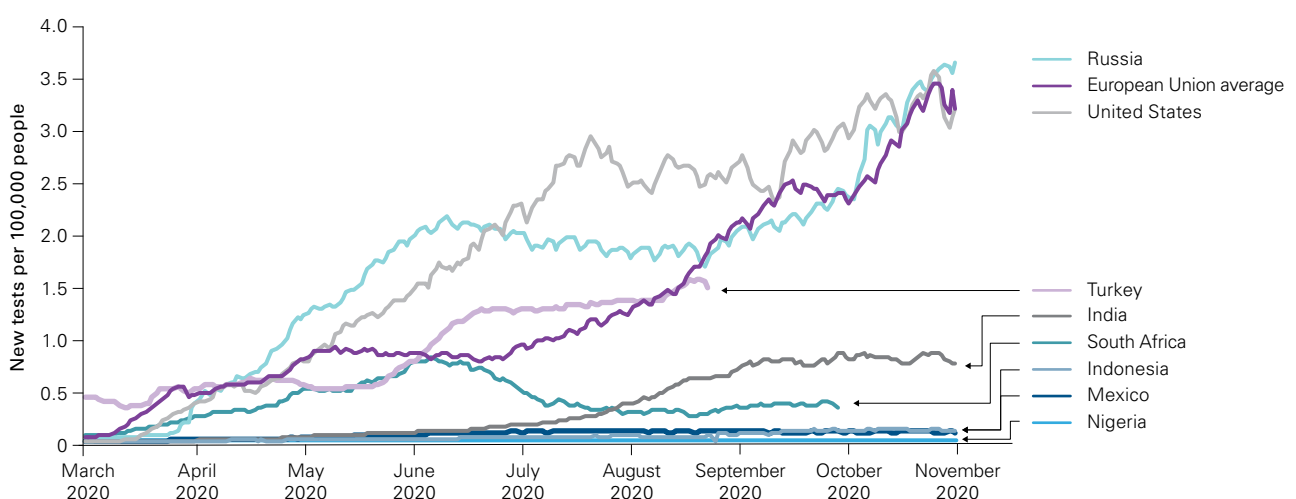
The exception to this is Southeast Asia. We would not be surprised if emerging markets in aggregate do not attain their pre-COVID early 2020 growth levels until mid-2023. However, much of developing Asia, including South Korea and Indonesia, may well buck this trend and return to early 2020 growth levels by mid-2021 (Figure I-32, on page 30). Broadly, the emerging market complex stands to gain from a global economic recovery in 2021, aided by positive vaccine developments in developed markets.

Ongoing risks

Thus far in 2020, the commodity-dependent emerging-market economies have seen depressed export levels as China and the developed world buy less of their petroleum and minerals. Most important, U.S.-China trade tensions may well continue to disrupt global value chains. And in some countries, including Brazil and the Philippines, political leaders have been slow to impose pandemic-related lockdowns, thereby postponing the recovery process. Further, many emerging-market countries are dependent on remittances from migrant workers, which have declined substantially. In addition, throughout emerging markets, as in developed economies, tourism

FIGURE I-31

Developed markets conduct more COVID-19 tests than emerging economies do



Notes: Data are reported by national authorities. When a series ends it is because that national authority stopped reporting the number of tests it was conducting. Some countries, such as Brazil, never reported testing. Testing data were smoothed using a seven-day moving average.

Source: Our World in Data, Oxford University, as of October 31, 2020.

revenues have plummeted. Of course, for the foreseeable future both emerging and developed markets will remain vulnerable to volatile financial market sentiment and its implications for global capital flows.

Inflation

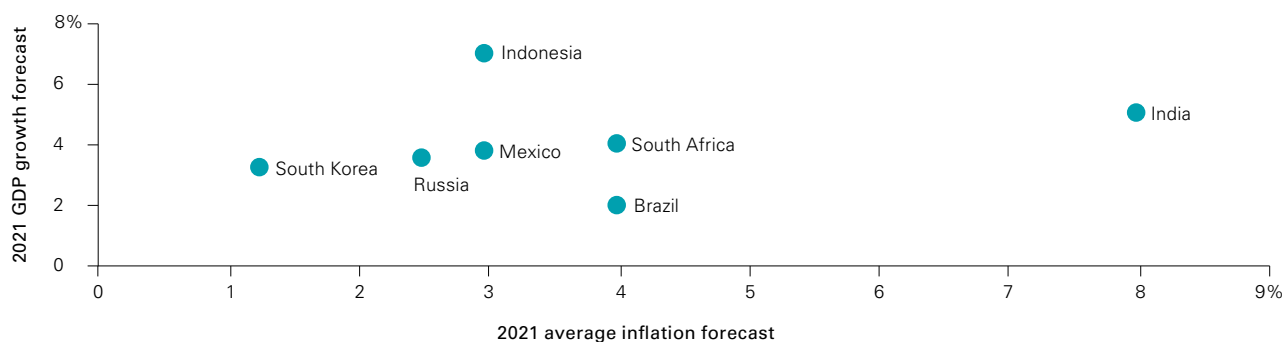
Modest pre-pandemic inflation gave way to disinflation as emerging-market economies contended with weak global demand as a result of COVID-19 lockdowns across the globe in March and April. Since then, the inflation picture has diverged across emerging-market regions. Disinflationary pressures abated in Latin America and Emerging Europe as global demand recovered after economies emerged from lockdown. By contrast, much of Emerging Asia continues to see disinflationary trends. We expect inflation to approach its pre-pandemic pace across emerging markets in 2021, though it may possibly fall short in Emerging Asia given higher-than-average pre-pandemic inflationary pressures.

Across the globe in the first half of 2020, supply and demand pushed inflation in opposite directions. Supply shortages in the tradable goods sector, such as food and medical equipment, exerted upward pressure on prices. In turn, cratering demand because of the deep global recession put downward pressure on prices. Ultimately, the force of weaker demand prevailed, and pre-pandemic inflation gave way to disinflation across emerging markets in the first half of 2020.

Since then, we have seen recoveries in inflation rates through the second half of 2020 in Latin America and Emerging Europe (Figure I-33, on page 31). Brazilian and Mexican central banks, for example, are monitoring resurgent inflation closely and will tailor monetary policy appropriately in 2021. In Emerging Asia, however, inflation, led by food price inflation, had spiked before the pandemic. After briefly abating, disinflationary pressures appear to have resumed across Emerging Asia in the second half of 2020, a development we will watch closely in 2021.

FIGURE I-32

Global growth rebound a tailwind for emerging-market growth in 2021

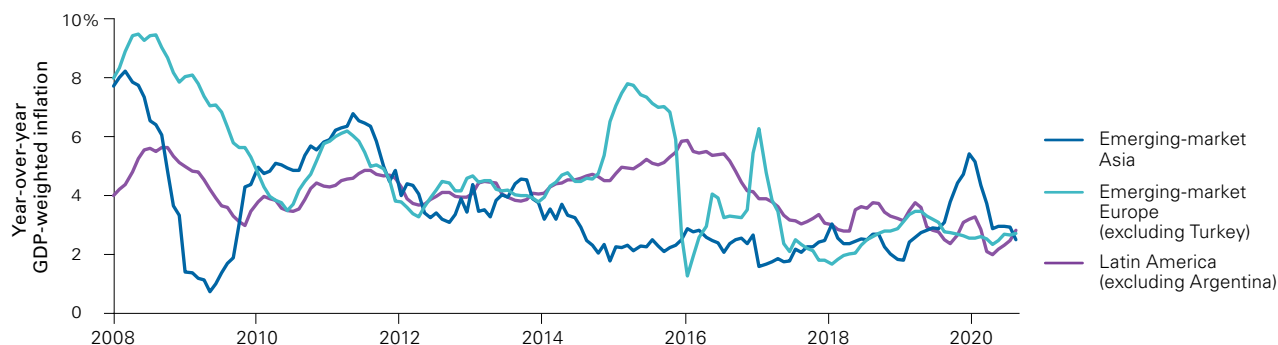


Notes: Inflation is measured as the average headline CPI measure. Dots represent central projections for GDP growth.

Source: Vanguard, as of November 30, 2020.

FIGURE I-33

Disinflation in emerging-market Asia contrasts with return to pre-pandemic inflation in Latin America and emerging-market Europe



Notes: Inflation is measured as the year-over-year percentage change in CPI indexes. The series shown are GDP-weighted CPI series for a number of countries in each region. We exclude Argentina from Latin America and Turkey from emerging-market Europe because of their idiosyncratically high inflation rates.

Sources: National statistical bureaus via Moody’s Data Buffet, as of October 31, 2020.

Overall, we expect demand to follow the recovery in supply through 2021, and we expect to see modest increases in inflation across emerging markets. We do not expect inflation to stage another pre-pandemic spike in Emerging Asia and instead see inflation settling around the longer-run average of 2%–3%. An exception to this trend may be India, where the inflationary pressures of 2019 and 2020 could continue to build in 2021.

Monetary policy

Emerging-market central banks cut interest rates in the first half of 2020 to keep financial conditions as accommodative as possible to support the economy as countries entered lockdowns. We expect these banks to continue this accommodative policy via low interest rates in 2021 (Figure I-34, on page 32). A surprise inflation spike has the potential to derail central bank plans for accommodative monetary policy in 2021, as we saw in Turkey in the second half of 2020. The September and November 2020 rate hikes in Turkey to contain inflation are evidence of this. Stubbornly high inflation in Mexico may prevent further monetary policy easing, while we would not be surprised to see rate hikes in Brazil in 2021 to combat inflation.

Debt burden

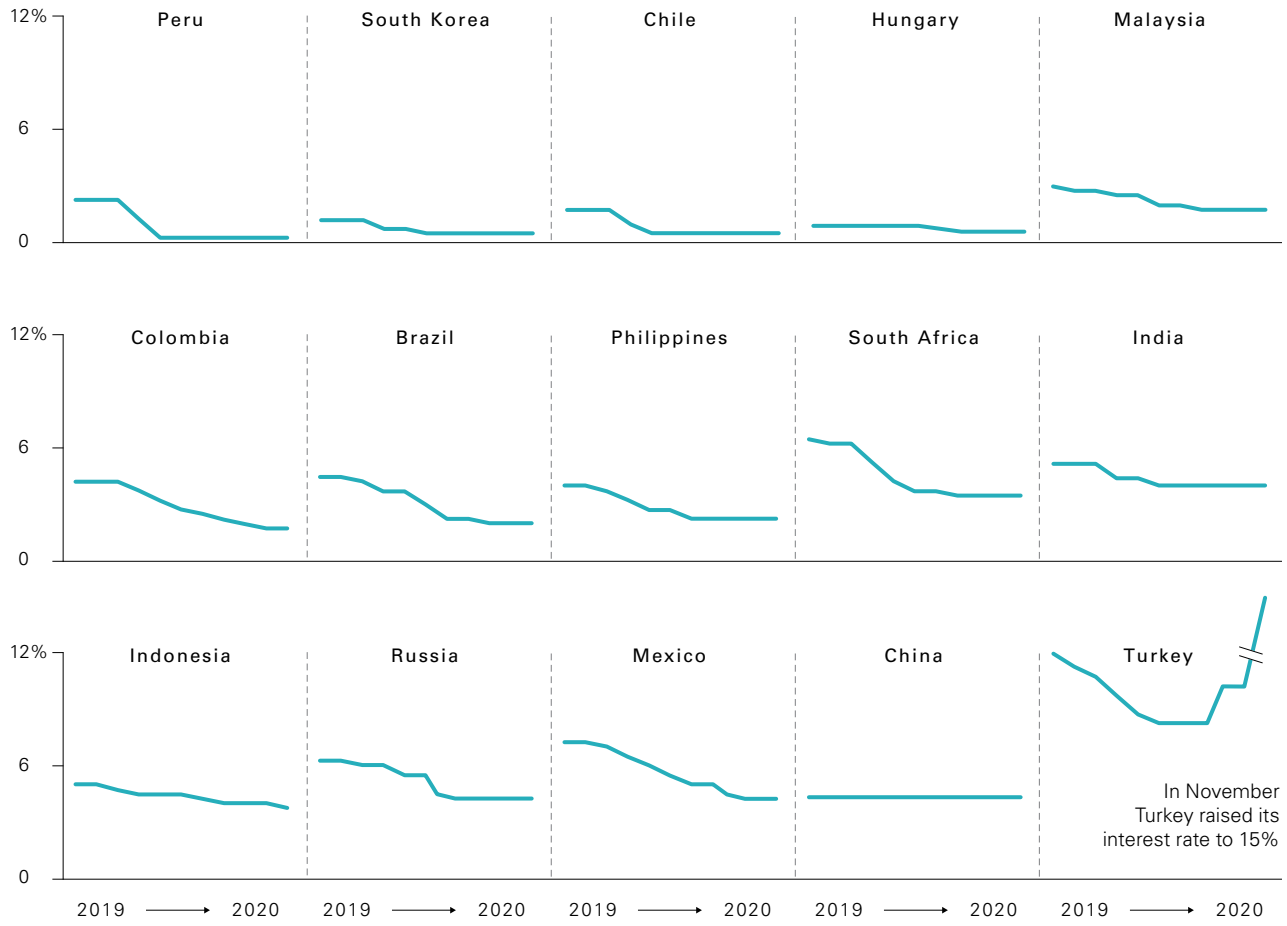
Combating the coronavirus pandemic has been an expensive undertaking for economies around the world, including emerging markets. Countries have paid for furlough programs, medical supplies, and stimulative fiscal measures by issuing more debt. This in turn has increased debt levels as a proportion of GDP across emerging-market economies in 2020. We expect those debt burdens to remain high in 2021, as governments continue to support their economies through subsequent flare-ups in COVID infection rates (Figure I-35, on page 33). The saving grace is that interest rates on emerging-market debt remain low, presenting relatively cheap refinancing opportunities for indebted governments.

Countries that can grow their economies faster than the interest they are paying on their debt will be able to reduce their debt burdens in 2021. For example, China and India might begin reducing their debt load. As we have seen in the past, Brazil continues to have difficulty reining in its spending. As a consequence, debt sustainability will remain a focus as debt looks set to increase further as a proportion of GDP.

FIGURE I-34

Emerging-market central banks will look to keep interest rates low in 2021

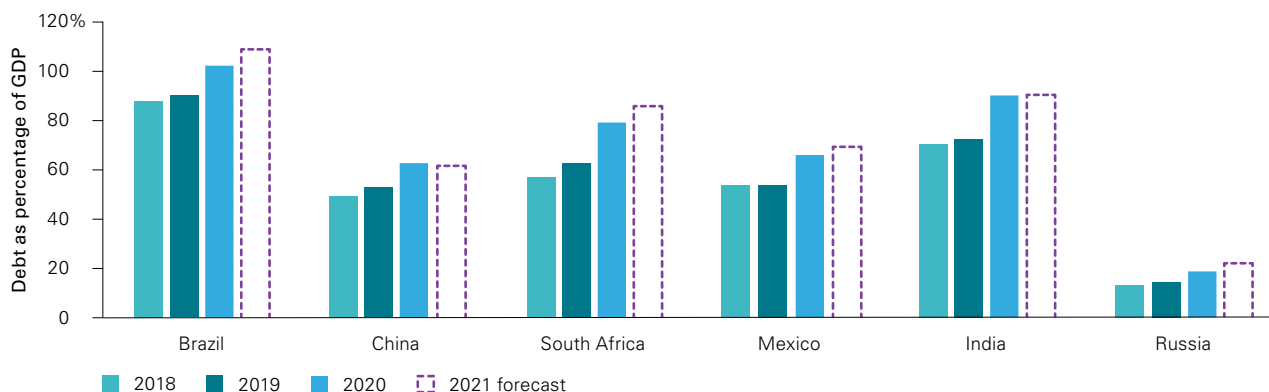
Central bank policy rates (December 2019 to November 2020)



Sources: National central banks via Refinitiv, as of November 30, 2020.

FIGURE I-35

Debt burdens will remain stubbornly high unless emerging-market economic growth surprises on the upside



Notes: Debt figures are gross government debt annual totals. The figure uses forecasted 2021 growth rates and assumes constant government debt yields and small fiscal deficits persisting through 2021.

Sources: National government sources via Refinitiv, as of November 30, 2020.

Foreign exchange

As often happens with the foreign exchange market, exchange rates between emerging-market currencies and the U.S. dollar have reflected a number of different themes in 2020 that we think will continue to play a role in 2021 (Figure I-36, on page 34).

March and April 2020 saw emerging-market currencies depreciate dramatically against the U.S. dollar as investors sought the safety of U.S. assets. Most emerging-market currencies have strengthened against the USD in the second half of the year. The extent of that strengthening, or indeed further weakening, as was the case for the Brazilian real and the Turkish lira, reflects themes that we will continue to see in 2021.

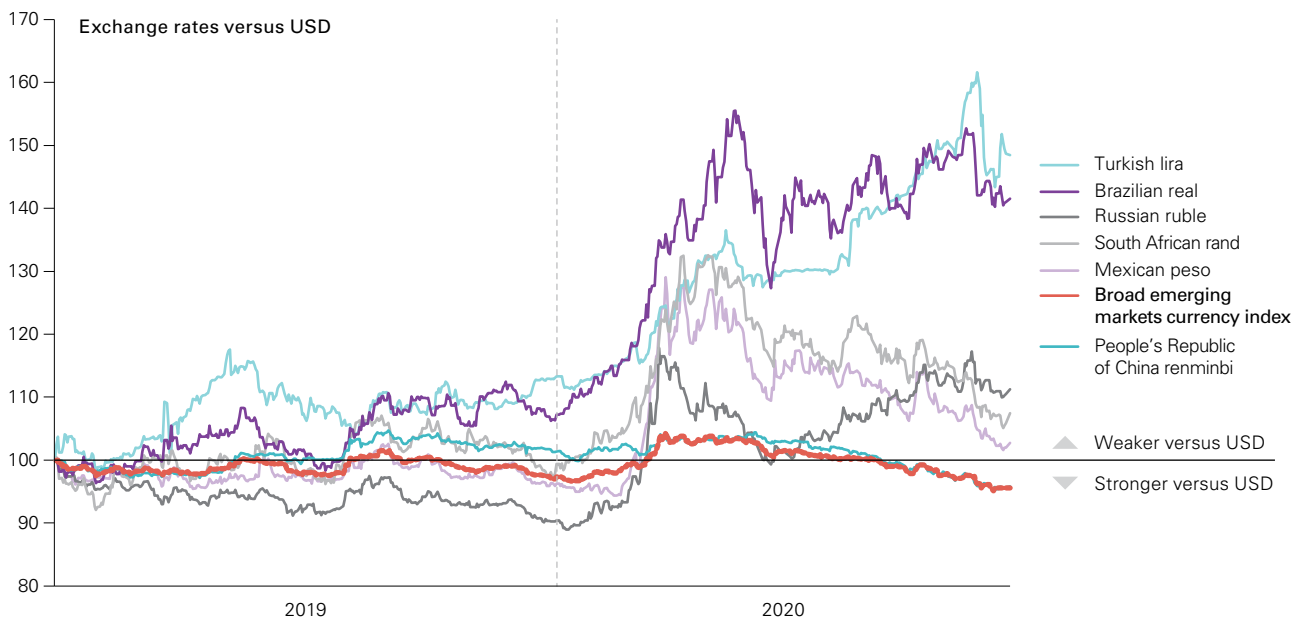
The strengthening South African rand and Mexican peso reflect hopes of a global growth rebound as countries exit lockdown. Both of those currencies of trade-dependent countries are still a bit weaker than they were going into the pandemic, reflecting a continued uncertainty about trade growth in 2021. Global trade recovery will be a key theme for emerging markets in 2021 and will be reflected in their exchange rates.

A continually weakening Turkish lira reflects another important theme for 2021: inflation risk. Spiraling inflation has forced a currency depreciation against the dollar. Although we think Turkey's inflation woes are idiosyncratic, inflation risk is a theme to watch in 2021 with currency implications.

Finally, pandemic management is another important theme for 2021; this has been reflected in currency movements so far in 2020. Emerging-market governments have

adopted different strategies regarding pandemic mitigation, including fiscal expenditures. These differences will continue to be reflected in currencies in 2021.

FIGURE I-36
Emerging markets currency movements



Notes: The broad emerging markets currency index is proxied by the MSCI Emerging Markets Currency Index. For each emerging-market currency pairing with the U.S. dollar, a value above 100 is a strengthening of the USD versus that emerging-market currency.

Source: Bloomberg data, as of November 30 2020.

II. Global capital markets outlook

The path of global capital markets in 2020 can largely be described in three phases. The first phase occurred during the first month-and-a-half of the year and generally involved rising equity prices as lower rates and a reduction in trade uncertainty bolstered risk assets. The second phase occurred as the realities of the pandemic and related lockdowns set in during mid-February and March. Equity markets plummeted, credit spreads widened, central banks quickly cut interest rates and employed novel tools to stabilize markets, and fiscal policymakers unleashed a wave of support. The third phase began in April and has seen a more pronounced recovery in some regions than others.

As we look to 2021 and beyond, our outlook for global asset returns is guarded. This is most true for equities, as high valuations and lower economic growth rates mean we expect lower returns over the next decade. For fixed income, lower interest rates and flatter yield curves are expected to weigh on returns for the foreseeable future.

A consistent theme of persistent low inflation and low interest rates across developed-market economies emerging from our economic outlook supports our view of a lower-return environment. This theme affects our outlook for bond yields and therefore future bond returns, equity valuations, and earnings growth rates, and even the growth versus value debate. We view the prospects for higher inflation and higher rates over the foreseeable future as unlikely because of the secular factors described in the economic section.

All of these factors serve to reaffirm the lower return orbit we have been writing about for the past few years. Common asset-return-centric portfolio tilts that seek higher return or yield are still unlikely to escape the strong gravity of low returns. However, a modest steepening in the efficient frontier suggests an increase in expected return for taking on equity risk relative to this time last year.

Global equity markets: A wild ride back to where we started

Despite the rapid fall in equity prices that saw global equity markets lose almost a third of their value in March, markets rebounded sharply over the next eight months. In USD terms, global equities, as measured by the FTSE All-World Index, returned -1.03% for the year as of the end of October. The recovery also saw a continuation of trends from the past decade. U.S. equities have outperformed their international peers, and large-capitalization growth stocks have dominated their value counterparts.

Even with the roller-coaster ride equity markets have had this year, our outlook is remarkably similar to last year's. Our expectation for lower trend GDP growth and its impact on corporate revenue growth, along with contraction in valuations, has led to a guarded outlook for global equities, which we expect to return 5% – 7% over the next decade. Further, we do not expect the trends that have defined the last decade to persist. Namely, we expect equity markets outside of the U.S. to outperform, largely because of lower valuations and a higher dividend yield. Likewise, we are expecting value stocks to outperform growth over the next decade based on our fundamental assessment.

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.

Similar valuations support an outlook consistent with last year's; downside risks and volatility are likely to stay elevated

U.S. equity markets have more than made up their losses incurred in early 2020, which explains why valuations are modestly higher than they were a year ago. Internationally, valuations have recovered, but not to the same degree. Given the strong, if not uniform, recovery in global equity prices, the risk of a sharp downturn (defined as a >20% drop) over the next three years shown in **Figure II-1** remains elevated.

Although it is certainly possible that we could experience a macroeconomic shock that pushes markets lower, that is not the reason for our call. **Figure II-2a** (on page 37) 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. Although the CAPE dipped below the fair-value range in March, it has recovered to levels consistent with the upper part of our range.⁶

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

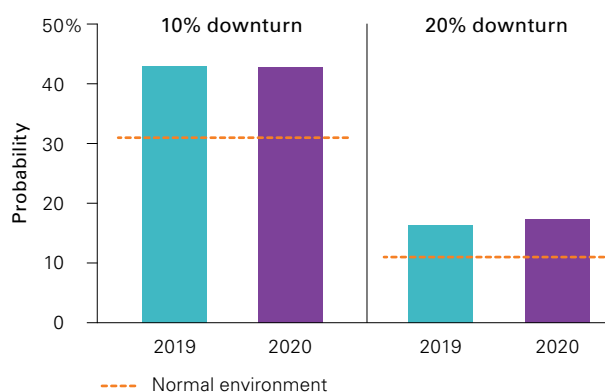
Outlook for global equities and the diversification of domestic risks

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

FIGURE II-1

Probability of equity market correction remains elevated

Global equity market drawdown in the next three years



Note: Probability corresponds to the percentage of global equity in USD VCMM simulations that experience declines over the next three years. Returns do not take into account management fees and expenses, nor do they reflect the effect of taxes. Returns do reflect reinvestment of dividends and capital gains. Indexes are unmanaged; therefore, direct investment is not possible.

Source: Vanguard, as of September 30, 2020.

The high valuations are an important input into our more conservative forecast for U.S. equity over the next ten years. Although valuation expansion benefited returns over the last 30 years, we expect valuations to contract 2% 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 growth rate close to 5%, our expected return outlook for U.S. equity for the next decade is centered in the modest 3.7%–5.7% range, not materially different from the 3.5%–5.5% returns forecasted last year (DiCiurcio et al., 2020). This is quite different from the 10.6% annualized return generated over the last 30 years.

From a U.S. investor's perspective, the expected return outlook for non-U.S. equity markets is in the 7%–9% range, higher than that of U.S. equity (**Figure II-3**, on page 38), thanks to relatively more reasonable valuations and a higher dividend yield.⁷

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.

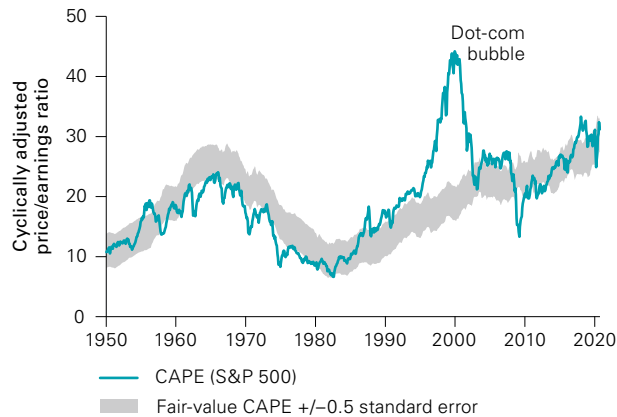
⁶ Because a recent decline in interest rates and inflation depresses the discount rates used in asset-pricing models, investors are willing to pay a higher price for future earnings, thus inflating price/earnings ratios.

⁷ For more information on our U.S. versus international equity outlook, see DiCiurcio et al. (2020).

FIGURE II-2

Divergence in global equity valuations

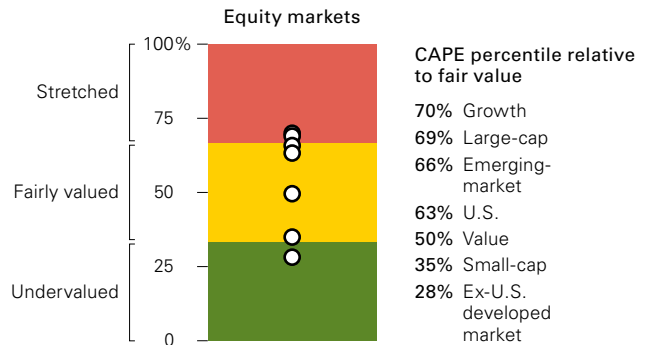
a. CAPE for the S&P 500 is approaching overvalued territory



Notes: Fair-value CAPE is based on a statistical model that corrects cyclically adjusted price/earnings (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 2020. (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, as of September 30, 2020.

b. Other developed markets are more fairly priced



Notes: The U.S. valuation measure is the current CAPE percentile relative to “fair-value CAPE” for the S&P Composite Index from January 1940 to September 2020. The developed-markets valuation measure is the weighted average of each region’s (Australia, United Kingdom, euro area, Japan, and Canada) current CAPE percentile relative to each region’s own fair-value CAPE. The fair-value CAPE for Australia, the U.K., the euro area, Japan, and Canada is a five-variable vector error correction (VEC) model, with equity earnings yield (from each MSCI country index), ten-year trailing inflation, ten-year government bond yield, equity volatility, and bond volatility estimated over the period January 1970 to September 2020. 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. P/E metrics relative to its historical average, using three-year trailing average earnings from January 1990 to September 2020.

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 Refinitiv, as of September 30, 2020.

Figure II-4 (on page 39) shows our sum-of-parts framework for U.S. and international equities and highlights the factors that we expect to drive international equity outperformance. Although our anticipation of a valuation contraction in the U.S. contributes to our call for international equities to outperform, our analysis suggests that even if interest rates remain low ten years from now—which would provide support for equity valuations—they will likely be associated with offsetting lower economic and earnings growth over the same period (DiCiurcio et al., 2020).

The higher return outlook for non-U.S. equity markets underscores the benefits of global equity 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 5%–7% range, as seen in Figure II-3. Though 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 risks in 2021 and beyond.

The end of the “value coma” is coming—we’re just not sure when

A key market theme of the post-global financial crisis era has been the outperformance of growth stocks (particularly large-caps) versus value in the U.S. Many explanations have been proposed, ranging from value definitions to industry concentration, and have even led some to question the existence of the value premium.

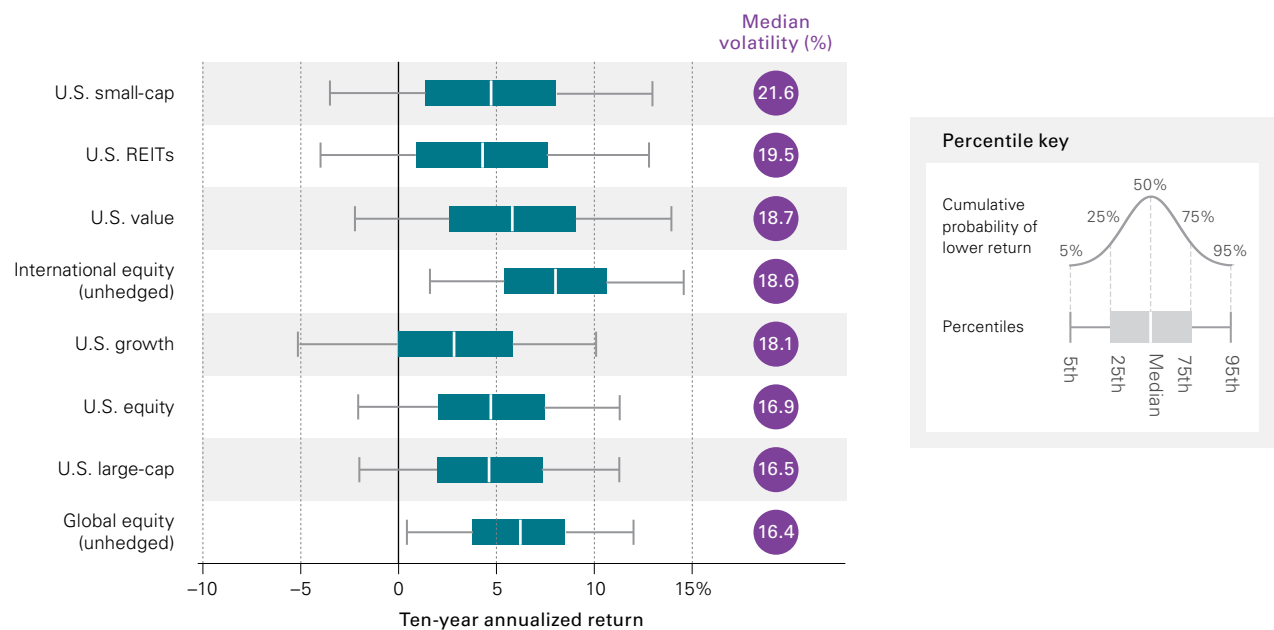
Our research indicates that a value premium does exist and that the recent outperformance of growth stocks can be partially explained by downward-trending long-term inflation levels and the lack of material acceleration in earnings growth over the last decade. Lower inflation levels are more beneficial to growth stocks because of the longer-term nature of their expected dividends. Value stocks pay out a larger share of their earnings as dividends today, whereas the promise of dividends from growth stocks is further in the future, marking their prices much more sensitive to changes in inflation. Though inflation levels have been moving lower since the 1980s,

value stocks have experienced prolonged periods of outperformance on a few occasions. We found that these style rotations into value stocks from growth have occurred during periods of accelerating earnings growth across the economy. **Figure II-5** (on page 39) shows our estimate of the “fair value of value” based on these variables, in addition to long-term real interest rates, short-term equity market volatility, and technology spending as a percentage of GDP.

Over the next decade, we do expect value stocks to outperform growth, although their total return will still be constrained by our outlook for broad U.S. equities. Our return expectations for value and growth stocks in excess of broad U.S. equities is 1.1% and –2.6% annualized, respectively. Given these differences and continued low inflation expectations, our view is that the outperformance will be primarily driven by the contraction in the valuations of growth stocks, rather than the valuations of value stocks returning to levels seen in prior decades.

FIGURE II-3

Equity markets’ ten-year return outlook: Setting reasonable expectations

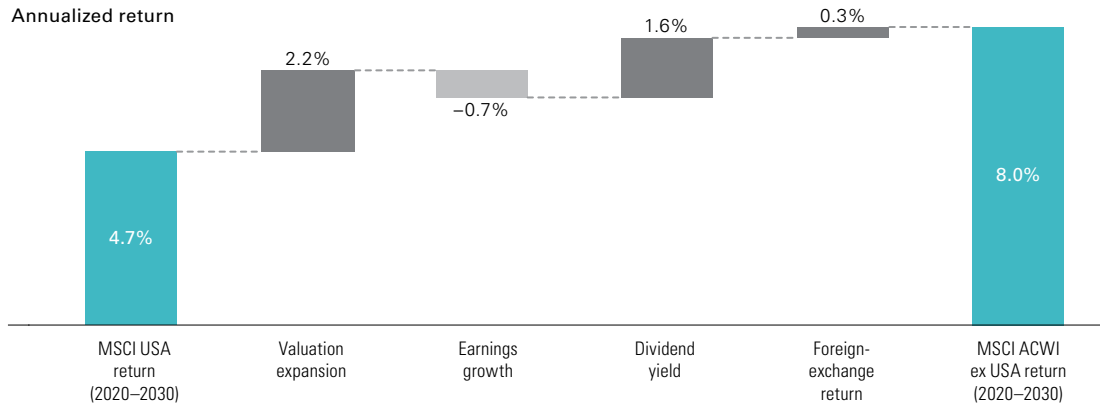


Notes: The forecast corresponds to distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of September 2020 in USD for asset classes highlighted here. Median volatility is the 50th percentile of an asset class’s distribution of annualized standard deviation of returns. Asset class returns do not take into account management fees and expenses, nor do they reflect the effect of taxes. Returns do reflect reinvestment of dividends and capital gains. Indexes are unmanaged; therefore, direct investment is not possible. See the Appendix section titled “Indexes for VCMM simulations” for further details on asset classes.

Source: Vanguard, as of September 30, 2020.

FIGURE II-4

Valuation contraction in the U.S. is expected to drive excess returns internationally over the next ten years



	Valuation expansion	Earnings growth	Dividend yield	Foreign-exchange return	Total return
MSCI USA Index	-2.1%	5.0%	1.8%	—	4.7%
MSCI ACWI ex USA Index	0.1%	4.3%	3.4%	0.3%	8.0%

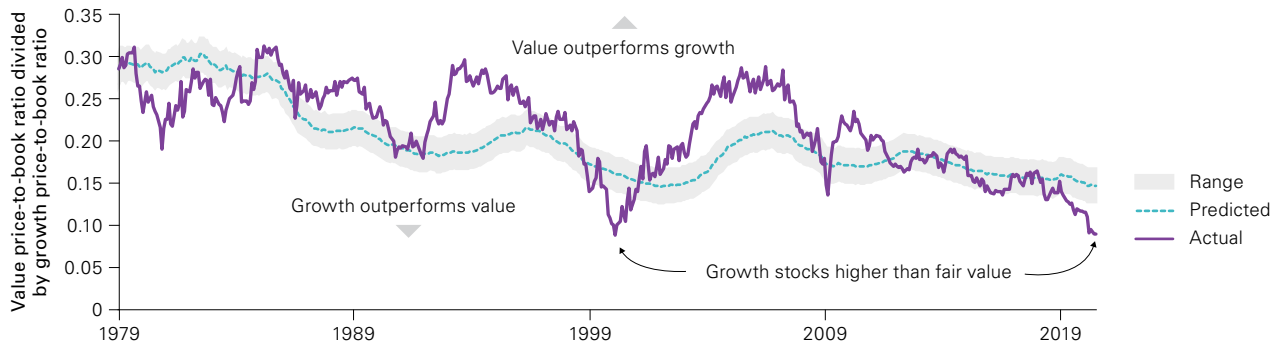
IMPORTANT: The projections and other information generated by the Vanguard Capital Markets Model regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results.

Note: Forward-looking return estimates are from VCMM, as of September 2020, for the period October 1, 2020, through September 30, 2030. Returns do not take into account management fees and expenses, nor do they reflect the effect of taxes. Returns do reflect reinvestment of dividends and capital gains. Indexes are unmanaged; therefore, direct investment is not possible.

Sources: Vanguard calculations, based on data from Refinitiv and Global Financial Data. Forward-looking return estimates are from the VCMM, as of September 30, 2020.

FIGURE II-5

‘Fair value of value’ has been trending lower because of lower long-term levels of inflation



Note: The statistical model specification is a seven-variable vector error correction (VEC), including value/growth basis-point ratio, ten-year trailing inflation, ten-year real Treasury yields, equity volatility, earnings growth, change in earnings growth, and IT spending estimated over the period January 1979 to September 2020.

Sources: Vanguard calculations, based on data from FactSet, the U.S. Bureau of Labor Statistics, the Federal Reserve Board, Refinitiv, and Global Financial Data, as of September 30, 2020.

Global fixed income markets: A gradually evolving curve

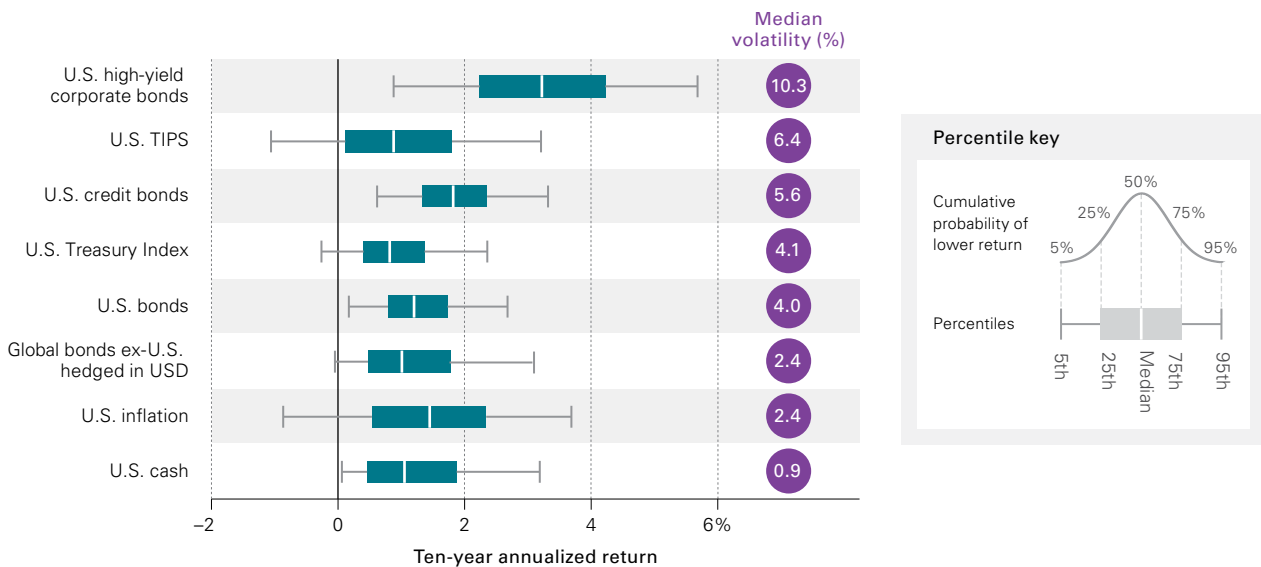
Against a backdrop of lower yields across the curve, the fixed income return outlook in the next decade has been revised downward from last year’s projections, to 0.75%–1.75%, as shown in **Figure II-6**. Expected returns for non-U.S. bonds are marginally lower than those of U.S. bonds, given the relatively 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 market, investors are still expected to be fairly compensated for assuming credit risk, which is consistent with our expectation for broad U.S. investment-grade bonds outperforming U.S. Treasury bonds by 1% on an annualized basis. Importantly, while future returns for fixed income look low, the recent crisis has reaffirmed the diversification role they play in a portfolio.

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

As the pandemic took hold globally in the spring, yields on developed-market government bonds plummeted and global central banks cut policy rates to zero (and in some cases below zero). These dynamics led to low and flat sovereign yield curves throughout the world. Given our view that the Fed and other developed-market central banks will keep policy rates low and that the risk of a material rise in long-term interest rates remains modest, we are projecting normal compensation for taking interest-rate risk. As illustrated in **Figure II-7** (on page 41), increases in expected returns for taking on longer-term interest rate risk (that is, duration) are fairly valued and less risky than investors may expect in a low-yield environment.

FIGURE II-6

Lower interest rates have pushed expected bond returns lower



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.

Notes: The forecast corresponds to distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of September 30, 2020, in USD for asset classes highlighted here. Median volatility is the 50th percentile of an asset class’s distribution of annualized standard deviation of returns. Asset class returns do not take into account management fees and expenses, nor do they reflect the effect of taxes. Returns do reflect reinvestment of dividends and capital gains. Indexes are unmanaged; therefore, direct investment is not possible. See the Appendix section titled “Indexes for VCMM simulations” for further details on asset classes.

Source: Vanguard, as of September 30, 2020.

Corporate bonds: Higher risk, higher return

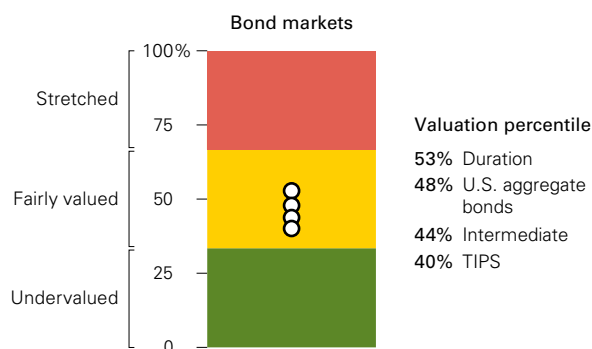
Fed policy support has similarly played an important role in supporting the corporate bond market. Central bank purchases of credit bonds (including “fallen angels,” bonds that have fallen from investment-grade to high-yield status) have supported the investment-grade and high-yield markets. As illustrated in Figure II-7, our outlook suggests that the expected risk premium above comparable-maturity Treasury bonds associated with credit bonds is within the fair-value range given the current level of credit spreads.⁸ 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) lower than last year, around the 1.25%–2.25% range. The central tendency for high-yield corporate bonds (specifically, the Bloomberg Barclays U.S. High Yield Corporate Bond Index) is in the 2.75%–3.75% range, lower than this time last year because of lower Treasury yields and modestly higher credit spreads.

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

Break-even inflation expectations inferred from the U.S. TIPS market have recovered from their pre-pandemic levels but remain below the Fed’s 2% inflation target and slightly lower than the VCMM long-term median levels. Although this may reduce the attractiveness of TIPS from a return perspective, we still believe they could be a valuable inflation hedge for some institutions and investors sensitive to inflation risk. Although our economic outlook suggests that persistent high inflation is unlikely over the medium term, growth/inflation surges are possible because of base effects or optimism driven by health outcomes. This is not our base case, but it nonetheless presents TIPS as a good hedge in the event this risk scenario unfolds.

FIGURE II-7

Fixed income appears to be fairly valued



Notes: Valuation percentiles are relative to Year 30 projections from VCMM. 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. Returns do not take into account management fees and expenses, nor do they reflect the effect of taxes. Returns do reflect reinvestment of dividends and capital gains. Indexes are unmanaged; therefore, direct investment is not possible.

Source: Vanguard, as of September 30, 2020.

Bonds as ballast in a multi-asset portfolio

With economic growth and inflation staying even lower for longer after the first phase of the economic recovery and with the markets expecting loose monetary policy to persist, 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. Our analysis in last year’s outlook suggested that bonds maintain their diversification benefits despite low-to-negative global yields; the events of 2020 only confirmed that.

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⁸ Credit spreads have continued to tighten since the date of this analysis, which has compressed the credit risk premium and moved valuations above their 50th percentile historically. Notably, they are still within the fair value range depicted here.

Portfolio implications: Low return environment persists, but marginal equity risk is better compensated

As highlighted in previous sections and previous years, elevated equity valuations and low rates have pulled the market’s efficient frontier of portfolio expected returns into a lower orbit. This year, however, the efficient frontier has steepened (that is, there are larger increases in expected return for increases in equity risk), as seen in **Figure II-8**. The steepening of the frontier is a result of lower valuations in international equity markets and lower yield curves throughout the world. Clients for whom a time-varying approach to asset allocation is appropriate are expected to be better compensated for taking equity risk (Wallick et al., 2020).

Over the medium term, we expect central banks to keep interest rates low and take measures to prevent a sharp steepening in the yield curve, thereby keeping risk-free rates close to current levels. Elevated valuations raise the probability of a correction that could lead to more attractive valuations for financial assets and a higher return outlook compared with our forecasts today. Nonetheless, the return outlook is still likely to remain much lower than the experience of previous decades and, in particular, of the post-global financial crisis years.

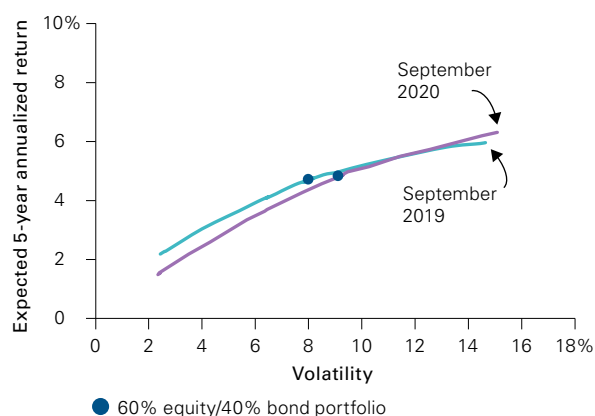
To try to increase portfolio returns, a popular strategy is to overweight higher-expected-return assets or higher-yield assets, as highlighted in **Figure II-9** (on page 43). A few common “reach for yield” strategies include overweighting real estate investment trusts (REITs) and high-yield corporates. 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.

Inflation-hedging: Focus on the betas, not the correlations

Although we expect secular forces, demand/supply imbalances, and a persistent output gap to keep a lid on inflation for the foreseeable future, the risk of

FIGURE II-8

The efficient frontier has steepened because of the increased expected equity risk premium



Note: Lines indicate the range of portfolios and dots indicate 60% equity/40% bond portfolios that achieve the highest expected return per unit of volatility across U.S. and non-U.S. equities, short-term U.S. credit bonds, short- and long-term Treasuries, short-term Treasury Inflation-Protected Securities, and non-U.S. aggregate bonds. Returns do not take into account management fees and expenses, nor do they reflect the effect of taxes. Returns do reflect reinvestment of dividends and capital gains. Indexes are unmanaged; therefore, direct investment is not possible. See the Appendix section titled “Indexes for VCMM simulations” for further details on asset classes shown here.

Source: Vanguard calculations, based on VCMM projections as of September 30, 2019, and September 30, 2020.

inflation shocks is real. For instance, higher growth rates and inflation could accompany a reopening of the economy that occurs after the successful distribution of a vaccine. While such an inflation impact is likely to be transient in our view, investors may wish to hedge such a risk.

For investors looking to hedge inflation risk, our research indicates that it is the sensitivity (that is, beta) of the hedge asset to inflation, not the correlation, that matters.⁹ Further, for long-only investors, volatility is also an important consideration. **Figure II-10** (on page 43) shows the inflation beta and volatility of popular inflation hedges. From an aggregate portfolio perspective, investors looking to hedge inflation risk should look to Treasury bills, TIPS, and commodities or gold over REITs and equities because of higher betas and/or lower volatilities.

IMPORTANT: The projections and other information generated by the Vanguard Capital Markets Model (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.

⁹ Inflation beta is defined as how much an asset’s return increases when inflation goes up by 1 percentage point, and it represents the true inflation-hedging property of the asset. Whereas correlation captures the direction of co-movement between the asset’s returns and inflation, inflation beta captures both the direction and the magnitude of the co-movement. (See Aliaga-Díaz et al., 2018.)

FIGURE II-9

Projected ten-year annualized nominal returns

	Portfolios	5th percentile	25th percentile	Median	75th percentile	95th percentile	Median volatility
Global balanced portfolios	100% bonds	0.2%	0.8%	1.2%	1.7%	2.7%	3.3%
	20/80 stock/bond	1.1%	1.9%	2.5%	3.1%	4.1%	3.8%
	60/40 stock/bond	1.3%	3.2%	4.6%	6.0%	8.2%	9.5%
	80/20 stock/bond	1.0%	3.6%	5.5%	7.3%	10.1%	12.9%
	100% equity	0.5%	3.9%	6.2%	8.5%	12.1%	16.4%
	60/40 stock/bond	1.3%	3.2%	4.6%	6.0%	8.2%	9.5%
Portfolios with common 20% tilts	High-yield tilt	1.6%	3.6%	5.0%	6.4%	8.6%	10.4%
	U.S. tilt	0.8%	2.8%	4.3%	5.8%	8.0%	9.5%
	Emerging markets equity tilt	1.3%	3.5%	4.9%	6.4%	8.6%	11.0%
	60/40 without ex-U.S. equity	-0.2%	2.1%	3.7%	5.4%	7.9%	9.8%
	REITs tilt	1.1%	3.0%	4.4%	5.8%	7.8%	9.1%
	TIPS tilt	1.3%	3.2%	4.6%	6.0%	8.1%	9.4%

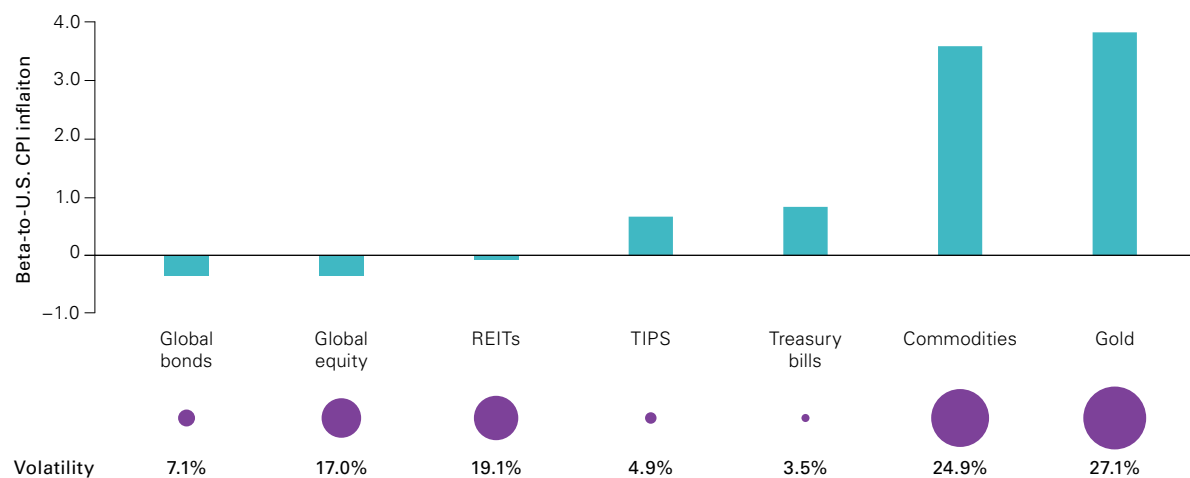
IMPORTANT: The projections and other information generated by the Vanguard Capital Markets Model (VCMM) regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results.

Notes: Summary statistics are from 10,000 VCMM simulations for projected ten-year annualized nominal returns as of September 30, 2020, 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 the fixed income allocation for the fixed income tilt and the equity allocation for the equity tilt. Returns do not take into account management fees and expenses, nor do they reflect the effect of taxes. Returns do reflect reinvestment of dividends and capital gains. Indexes are unmanaged; therefore, direct investment is not possible.

Source: Vanguard, as of September 30, 2020.

FIGURE II-10

How assets perform as hedges of short-term inflation



Notes: Correlations of CPI with asset classes are based on rolling one-year annualized returns. Volatility is calculated as the standard deviation of rolling one-year annualized returns. Data are from January 1970 to October 2020.

Sources: Vanguard calculations, based on data from Refinitiv, Moody's Analytics Data Buffet, the S&P GSCI, the Bloomberg Barclays Treasury Inflation Protected Securities Index, the S&P GSCI Gold Index, and the FTSE Nareit All Equity REITs Index, as of September 30, 2020.

Taking stock holistically of market and economic fundamentals

This year, more so than in the past, our outlook for both the economy and financial markets hinges on a number of factors. While health outcomes take preeminence as a near-term driver of outcomes, there are several other

considerations. In Figure II-11, we've aggregated our perspectives on the impact of these drivers on economic and financial market fundamentals, thus tying our macroeconomic perspectives to our views on asset returns and portfolio construction.

FIGURE II-11

Disparate fundamental effects from key drivers

- ▲ Directional impact: Higher
- Directional impact: Undetermined
- ▼ Directional impact: Lower

Drivers	Base case	Outcomes							
		Equity returns	Fixed income returns	Volatility	Asset correlations	Interest rates	Growth	Inflation	Productivity
Health/mitigation solutions	Effective near-term solution	▲	▼	▼	▼	●	▲	●	●
Fiscal policy/public debt	Increases	●	▼	▲	▼	▲	▲	▲	●
Monetary policy	Very accommodative	▲	●	▼	▲	▼	▲	▲	▲
Globalization	Slowbalization	▼	▲	▲	▲	▼	▼	▲	▼
Inequality	Increases	●	▲	▲	▲	▼	▼	▼	▼
Winner take all	Accelerates	▲	▲	▼	▲	▼	●	●	●
Labor market scarring	Moderate	▼	▼	▲	▼	▼	▼	●	▲
Consumer reluctance	Gradually eases	▼	▼	▲	▼	▼	▼	▼	●
Work from home	Higher permanence	▲	▼	▼	▼	●	▲	●	▲
Summary		●	▼	●	●	▼	●	▲	▲

Notes: Cells represent the directional impact on a given outcome indicator based on the Vanguard base case assessment for a given driver.

Source: Vanguard, as of November 30, 2020.

Portfolio construction strategies for three potential economic scenarios

Based on our global economic perspectives, we examine in **Figure II-12** three possible economic scenarios occurring over the next three years. The “proximate path” scenario depicts an economic environment of trend economic growth, low inflation, and low policy rates. The “off-course” scenario is defined by low growth and minimal productivity. The “path improved” scenario involves a strong surge in growth and inflation, as well as rising rates and a productivity boom that combine to push us above pre-pandemic trend growth.

Figure II-12 shows optimal portfolios for each scenario that vary their exposures to the following four factors, or risk premiums: equity risk premium, term premium, credit premium, and inflation risk premium. In a high-growth path improved scenario, expected global equity returns would be high, and steepening is seen in the efficient frontier. Long and short rates would also rise faster than expected, resulting in an optimal portfolio that is overweight equity and inflation-linked bonds.

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

The portfolio strategy in our baseline scenario is well-diversified but overweights risk assets by 4 percentage points compared with a 60/40 portfolio. As asset-return expectations materially change through time, the allocation in our baseline scenario 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 (Wallick et al., 2020). Compared with our baseline scenario for 2020, our 2021 baseline portfolio has increased equity exposure

of 12 percentage points because of a steeper efficient frontier. Also compared with last year’s baseline, we are still tilted to non-U.S. equities relative to U.S. exposure.

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. A balanced portfolio works well for investors who are agnostic about the future state of the economy.** The baseline balanced portfolio is an “all-weather” strategy, with either top or middle-of-the-road performance in each scenario.
- 3. Portfolio tilts should be done within an optimization framework.** Ad hoc tilts ignore correlations among assets and lead to inefficient portfolios. For instance, in an off-course scenario strategy, U.S. equities can be close to market-weighted (as opposed to underweighted) because of the added diversification benefits of long-term bonds.

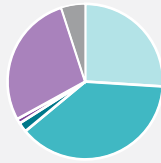
FIGURE II-12

Cyclical surprises and asset allocation trade-offs

a. Optimal portfolios vary for different economic environments.

Scenario 1 Proximate path

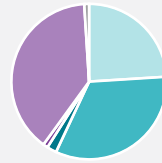
Small overweight equity and overweight long duration



- 26% U.S. equity
- 38% Global ex-U.S. equity
- 2% Global ex-U.S. bonds
- 0% Short-term credit
- 1% Short-term Treasury
- 28% Long-term Treasury
- 5% Short-term TIPS

Scenario 2 Off-course

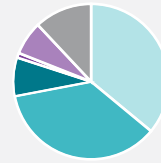
Small underweight equity and larger overweight long duration



- 24% U.S. equity
- 33% Global ex-U.S. equity
- 2% Global ex-U.S. bonds
- 0% Short-term credit
- 1% Short-term Treasury
- 39% Long-term Treasury
- 1% Short-term TIPS

Scenario 3 Path improved

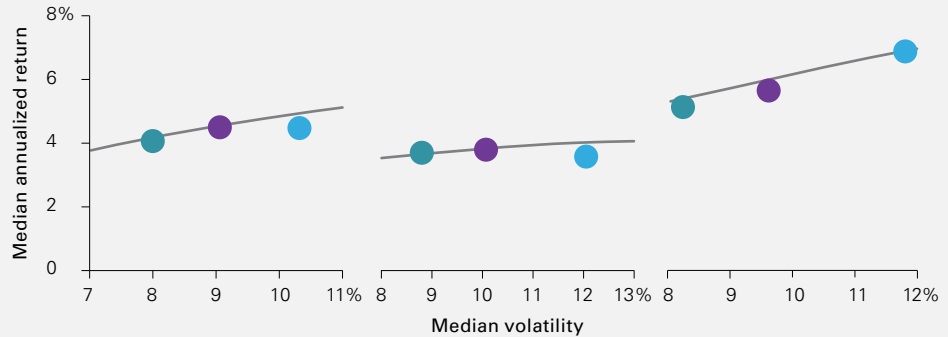
Overweight equity and overweight inflation-linked bonds



- 36% U.S. equity
- 36% Global ex-U.S. equity
- 8% Global ex-U.S. bonds
- 0% Short-term credit
- 1% Short-term Treasury
- 7% Long-term Treasury
- 12% Short-term TIPS

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

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.



	Scenario 1 (Proximate path)	Scenario 2 (Off-course)	Scenario 3 (Path improved)
Best	Proximate path	Off-course	Path improved
Second-best	Off-course	Proximate path	Proximate path
Worst	Path improved	Path improved	Off-course

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

Strategy upside relative to proximate path portfolio	0.1% lower annualized return with 1.2% lower volatility in an off-course scenario	1.2% higher annualized return with 2.2% higher volatility in a path improved scenario
Strategy downside relative to proximate path portfolio	0.5% lower annualized return with 1.4% lower volatility in a path improved scenario	0.25% lower annualized return with 2% higher volatility in an off-course 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. The forecast displays simulations of three-year annualized returns of asset classes shown as of September 30, 2020. Scenarios are based on sorting the VCMM simulations based on rates, growth, volatility, and inflation. The three scenarios are a subset of the 10,000 VCMM simulations. Returns do not take into account management fees and expenses, nor do they reflect the effect of taxes. Returns do reflect reinvestment of dividends and capital gains. Indexes are unmanaged; therefore, direct investment is not possible. See the Appendix section titled "Index simulations" for further details on asset classes shown here.

Source: Vanguard, as of September 30, 2020.

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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.

Indexes for VCMM simulations

The long-term returns of our hypothetical portfolios are based on data for the appropriate market indexes through September 30, 2020. 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.

Notes on risk

All investing is subject to risk, including the possible loss of the money you invest. Past performance is no guarantee of future returns. Diversification does not ensure a profit or protect against a loss in a declining market. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

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

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

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