

2020 MIDYEAR UPDATE

Vanguard economic and market outlook: Forecasting in the time of coronavirus

Vanguard Research

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- The global COVID-19 pandemic has caused the sharpest and deepest short-term economic contraction in modern history. Even as some countries succeed in controlling the outbreak, the case count continues to grow globally. The twin crises of health and economics are far from over.
- The main economic impact has been driven by a combination of necessary government-mandated lockdowns and social distancing measures. As these ease, and barring outbreaks that necessitate widespread renewal of restrictions, we expect economic activity will initially recover as productive potential is brought back onstream. But we foresee a slow recovery thereafter, with consumers reluctant to resume face-to-face interactions. And the eventual return of activity to the new normal, likely involving permanent scarring relative to the previrus trajectory, might not happen until late 2021 or beyond.
- The policy response has been impressively bold and swift, as Vanguard has advocated. We see monetary policy staying loose well into 2021, and further fiscal support seems likely. The burden of the resulting increase in public debt should be lessened by current extremely low financing costs. Inflation will likely remain subdued given the prolonged period of excess capacity.
- The risks around our forecast relate mainly to health outcomes and are skewed to the downside. Although our baseline forecast sees a gradual return to work alongside episodes of virus spread requiring localized lockdowns, our downside scenario sees further waves of COVID-19 and renewed nationwide restrictions.
- Financial market return expectations have improved, with equity market valuations looking more attractive. But considerable uncertainty remains, with further market corrections possible. We advise investors to focus on long-run expected returns, embrace global diversification, and avoid the temptation to time such turbulent markets.

Lead authors



Joseph Davis, Ph.D.
Global Chief Economist



Roger A. Aliaga-Díaz, Ph.D.
Chief Economist, Americas



Peter Westaway, Ph.D.
Chief Economist, Europe



Qian Wang, Ph.D.
Chief Economist, Asia-Pacific



Andrew J. Patterson, CFA
Senior Economist



Kevin DiCiurcio, CFA
Senior Investment Strategist



Alexis Gray, M.Sc.
Senior Economist



Jonathan Lemco, Ph.D.
Senior Investment Strategist

Editorial note

This publication is an update of Vanguard's annual economic and market outlook for 2020 for key economies around the globe. Aided by Vanguard Capital Markets Model® simulations and other research, we also forecast future performance for a broad array of fixed income and equity asset classes.

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.

Vanguard Investment Strategy Group

Vanguard Global Economics and Capital Markets Outlook Team

Joseph Davis, Ph.D., Global Chief Economist

Americas

Roger A. Aliaga-Díaz, Ph.D., Chief Economist, Americas

Kevin DiCiurcio, CFA

Kelly Farley

Joshua M. Hirt, CFA

Jonathan Lemco, Ph.D.

Olga Lepigina

Vytautas Maciulis, CFA

Andrew J. Patterson, CFA

Jonathan Petersen, M.Sc.

Asawari Sathe, M.Sc.

Maximilian Wieland

Europe

Peter Westaway, Ph.D., Chief Economist, Europe

Edoardo Cilla, M.Sc.

Alexis Gray, M.Sc.

Shaan Raithatha, CFA

Nathan Thomas

Asia-Pacific

Qian Wang, Ph.D., Chief Economist, Asia-Pacific

Alex Qu

Adam J. Schickling, CFA

Beatrice Yeo, CFA

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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 June 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."

I. Introduction

In Vanguard's economic and market outlook at the end of 2019, *The New Age of Uncertainty*, we characterized the global outlook as one in which growth was slowing to rates below trend, with activity weighed down by continuing geopolitical uncertainty and unpredictable policymaking. Concerns about the continuation or escalation of trade wars, especially between the U.S. and China; the uncertain impact of Brexit on prospects in the U.K. and Europe; and the possibility that known unknowns (such as civil unrest in Hong Kong, populism in emerging markets, and market instability) had the potential to throw different parts of the global economy off course.

With inflation remaining subdued if not too low, monetary policy looked set to remain accommodative for the foreseeable future, with minimal contribution expected from fiscal policy to bolster the policy stimulus. But with central banks possibly reaching the limits of their effectiveness, and with possible damage to productive potential from prolonged uncertainty, we saw a meaningful risk that the global economy could gravitate to a lower-growth equilibrium.

Even in our gloomiest downside predictions, however, we did not foresee the devastating shock of a global pandemic that would wreak havoc across the global economy in terms of human cost, curtailed economic activity, and disrupted financial markets.

The damaging impact of greater economic uncertainty that we highlighted has undoubtedly been exacerbated. Businesses, households, and market participants have needed to change plans in response to unprecedently large swings in economic activity, significant monetary and fiscal policy measures, and asset-price gyrations. Perhaps even more challenging has been the need to respond to government-mandated shutdowns of economic activity and restrictions on people's movements, as well as the need to factor in enormous uncertainty about the unfolding medical situation.

Figure I-1 shows how uncertainty, which was already elevated because of geopolitical tensions, has been further exacerbated by increased COVID-19-related uncertainty. Academic evidence suggests that about half the decline in economic activity during the pandemic may have been driven by this recent upsurge.¹

As of the end of June 2020, more than 10 million cases of COVID-19 have been confirmed and over a half-million people worldwide have died from it.² In modern historical terms, this pandemic is not set to be as deadly as the HIV-AIDS epidemic that began about 1980, the Spanish flu pandemic (1918–19), the Modern Plague of the late 19th century, or even the Asian flu (1957–58) and Hong Kong flu (1968–70) outbreaks. **Figure I-2** shows the corresponding death tolls.

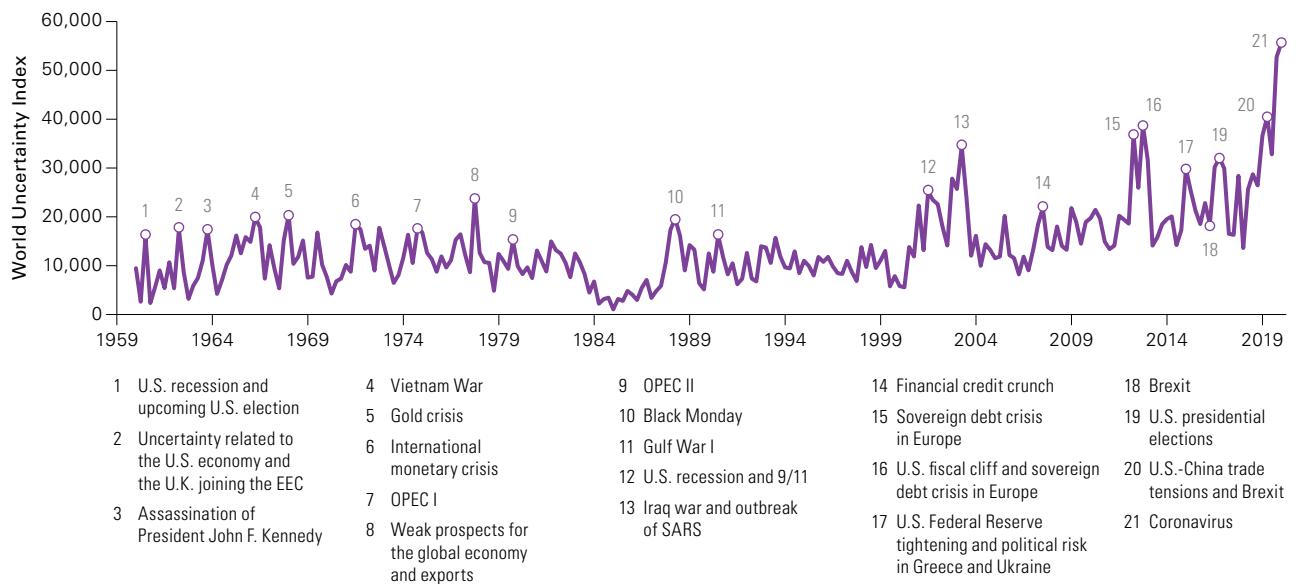
But it is estimated that without mitigation measures, up to 40 million deaths worldwide could have occurred.³

¹ See Baker, Bloom, Davis, and Terry (2020).

² Data, as of the end of June, from the Johns Hopkins University COVID-19 dashboard, available at coronavirus.jhu.edu/map.html.

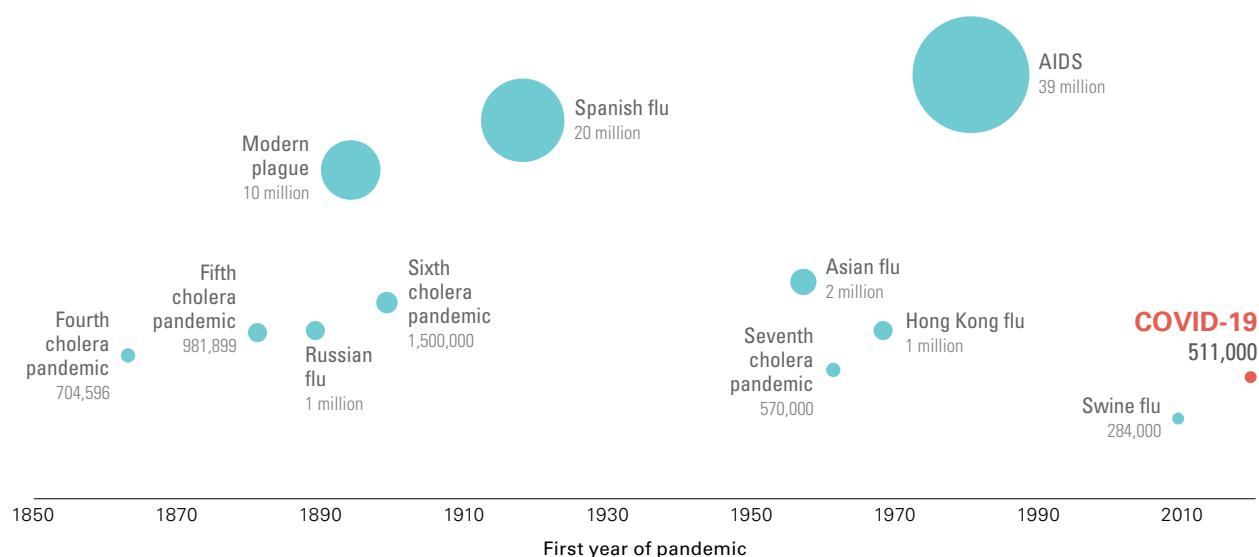
³ See Walker et al. (2020). This more damaging potential is due to a number of factors, for example: the lack of an available vaccine so far; the high inherent infection rate (R_0) of 2.65 (the mean of 16 published studies in which the range is 1.99 to 3.09, see Aronson, Brassey and Mahtani (2020)); and a high infection fatality rate (the probability of dying if the virus is caught) of between 0.1% and 0.4%, about ten times higher than for seasonal flu (see Oke and Honoghan (2020)).

FIGURE I-1
COVID-19 has exacerbated uncertainty



Notes: The World Uncertainty Index tracks uncertainty across the globe by text mining the country reports of the Economist Intelligence Unit.
Source: World Uncertainty Index, available at <https://worlduncertaintyindex.com/>.

FIGURE I-2
Comparison of modern pandemics by death toll



Sources: Vanguard calculations, using data from National Geographic and Johns Hopkins University as of June 30, 2020.

There is still much about COVID-19 that medical professionals and epidemiologists do not understand, and this has added to the global uncertainty.

The first major outbreak of the newly discovered SARS-CoV-2 coronavirus occurred in Wuhan, in China's Hubei province.^{4,5} The first confirmed case of COVID-19, the illness caused by the virus, was recorded in December 2019.^{6,7} By January 12, 2020, scientists in China had shared the virus's genetic code and the case count was increasing. By early February, deaths were in the hundreds and confirmed cases were in the thousands. On March 11, 2020, the World Health Organization declared a global pandemic.

For some time, COVID-19 was mostly seen as an epidemic mainly affecting China, with possibly important spillover effects in Southeast Asia. This explains why consensus forecasts, including ours, saw fairly large downgrades to forecasts for China's growth at the start of March. But the impact beyond China was not expected to be substantial, with global trade slightly depressed by the drop in demand from China and productive capacity compromised by the disruption of supply chains there.

By the middle of March, however, as Figure I-3 shows, the epicenter of the virus was shifting away from Asia and toward pockets of Europe and the Middle East, namely northern Italy and Iran. Perceptions about the likely scale of the outbreak began to change quickly, too, mainly prompted by a rising global case and death count and especially by images from Italy of overwhelmed hospital emergency rooms. By early to mid-March, other European countries, such as Spain and France, also had a sharp rise in confirmed cases. The United Kingdom, Australia, and the U.S. (especially New York) followed suit in subsequent weeks. Throughout April, new infections slowed in both Europe and the U.S., but by mid-May, the virus was spreading the fastest in developing economies, with Brazil and Russia hit particularly hard.

Indeed, despite widespread mitigation measures around the world, the virus's impact continues to grow, as Figure I-3 illustrates for deaths and the equivalent data show for new confirmed cases. It took 72 days for health officials to diagnose one million cases, but only 38 days to go from five million cases to ten million. Although more available testing can account for some of the increase, positive test rates (most notably in the U.S.) are growing. In short, the pandemic is far from over.

⁴ Specifically, it is thought to have originated in a wet market, where live animals are sold for human consumption. Allegations that the pathogen may have originated in a Wuhan-based laboratory have not been substantiated.

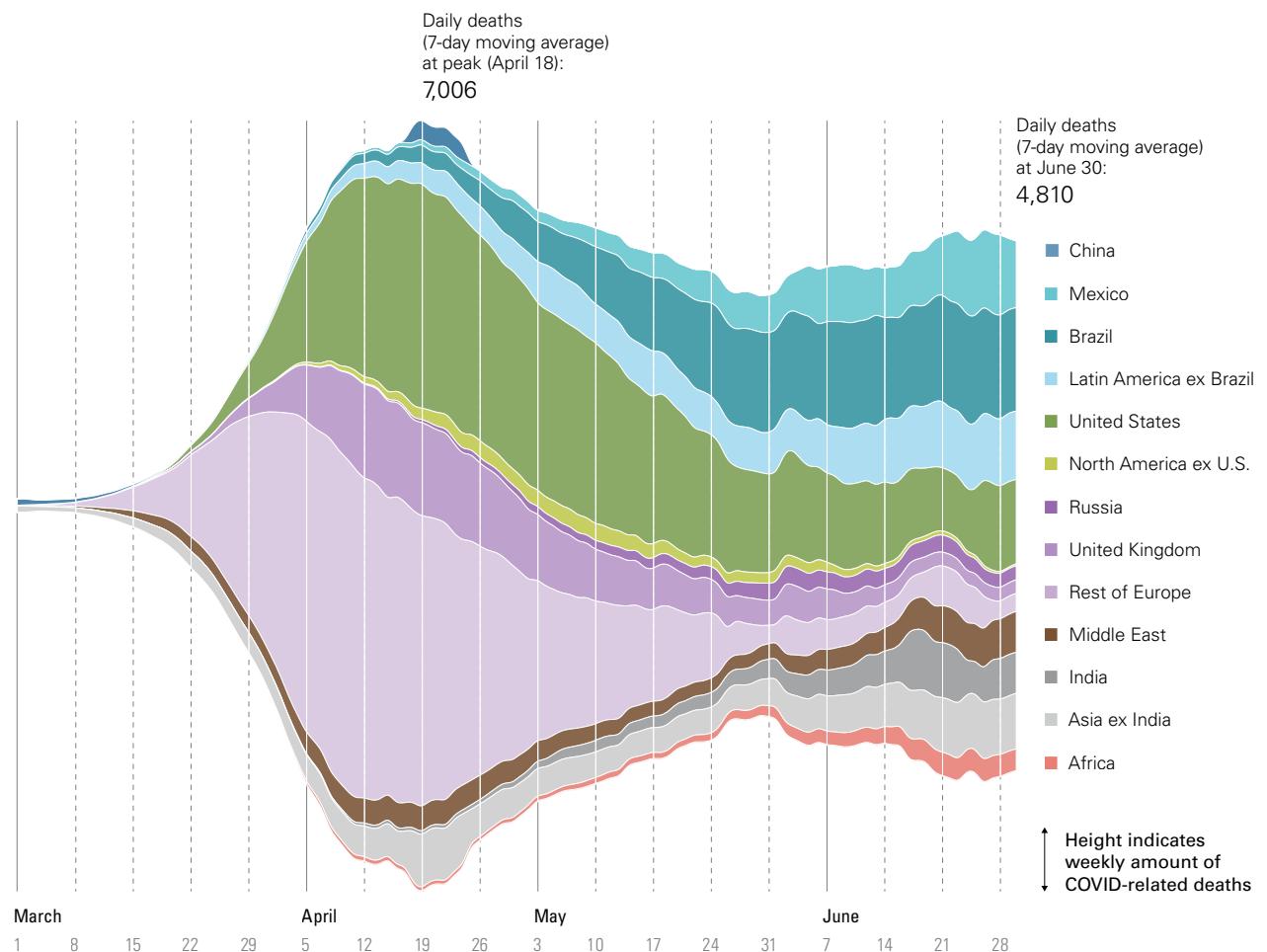
⁵ Seven coronaviruses have now been identified: SARS-CoV-2, SARS, MERS, and four viruses that cause the common cold.

⁶ This is thought likely to have occurred among people processing bat carcasses in the production of Chinese medicines.

⁷ The "19" refers to the virus's emergence in 2019, not that there have been 18 previous versions.

FIGURE I-3

Evolution of the weekly number of confirmed COVID-19-related deaths by region



II. The pandemic shock

The pandemic shock that spread globally in the early months of 2020 caused the deepest short-term shock to economic activity in modern history. Yet strikingly, its initial economic impact has not primarily been caused by COVID-19 itself, notwithstanding the negative effect of illness and deaths on the labor supply. Rather, almost all the initial adverse economic impact has come from the implications of the lockdown measures that governments around the world put in place. And as we discuss in Section III ("The economic recovery begins"), the speed of the recovery from the pandemic shock will, importantly, be determined by decisions about how quickly lockdown measures are lifted as well as how quickly demand picks up.

To understand the impact on the global economy, it is necessary to understand the rationale for these unusual policy measures.

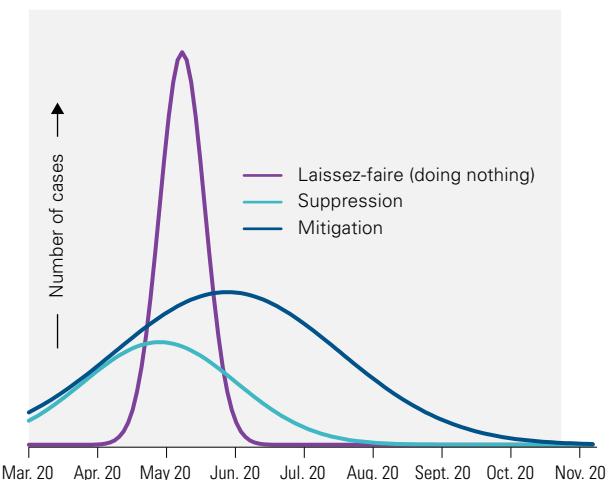
Health measures to address the virus

From a health policy perspective, with no vaccine to stop the virus or even a proven treatment to ameliorate its worst effects on people who contract it, policymakers have had three broad approaches to choose from in dealing with COVID-19: laissez-faire, mitigation, and suppression. Figure II-1 depicts the impact of these different strategies on the population.

(a) The laissez-faire approach

The most extreme laissez-faire approach is to allow the virus to spread through the population. From an economic perspective, this would reduce the damage in the near term, but in practice, this strategy is infeasible. If COVID-19 is left unchecked, it would overwhelm health facilities, leading to an estimated 40 million fatalities worldwide, including two million in the U.S. and a similar number in Europe.⁸

FIGURE II-1
Effect of different approaches to tackling the virus



Sources: Vanguard calculations, using data from Imperial College London COVID-19 Response Team. See also Pueyo (2020).

Estimates of how a virus spreads through a population are determined by its assumed infection rate, designated R . The initial infection rate, or R_0 , is the average propensity of the virus to spread from person to person in an otherwise uninfected population. For COVID-19, R_0 has been estimated at 2.5–3.⁹

As more people are infected—and assuming that those infected develop the necessary antibodies and will no longer be able to pass on the virus—the effective infection rate, R_e , will gradually fall. Once R_e is below 1, the virus will eventually die away. The point at which this happens is known as herd immunity, estimated to occur for COVID-19 at between 60% and 70% of the population.¹⁰

⁸ See Walker et al. (2020).

⁹ See Aronson, Brassey, and Mahtani (2020). COVID-19's inherent infection rate is higher than that of seasonal flu, which has an R_0 of about 1, but much lower than the R_0 of diseases such as chickenpox, which is about 10.

(b) The mitigation approach

Mitigation involves putting in place social distancing measures to reduce the effective infection rate. The goal is to lessen the total number of cases and fatalities and ensure that hospital intensive care units, needed to treat the most seriously affected patients, are not overwhelmed. Importantly, mitigation still allows the virus to gradually spread through the population, eventually achieving herd immunity.

The U.K. government initially adopted this strategy in mid- to late March, then subsequently pivoted to an outright suppression strategy when the high health costs of mitigation were estimated.¹¹ The only other country to fully adopt a mitigation strategy was Sweden; its approach was initially lauded but was later criticized for a higher death toll than that of peers and a not obviously lower economic cost.¹²

(c) The suppression approach

By far the most common approach taken to lessen the medical effects of COVID-19 has been the suppression strategy. Severe social distancing and national lockdown measures were implemented to minimize people's movements and interactions, sharply reducing the effective R_e and bearing down on the virus's spread, albeit with higher immediate cost in terms of lower economic activity.

The degree to which these policies suppressed the virus depended on a range of factors: the speed of implementing lockdowns, the severity and degree of compliance with those measures, and luck in the severity of the initial outbreak in a particular country.

Containment measures as the primary driver of the shock

Unsurprisingly, China was the first to implement strict containment measures, in late January. Countries situated close to China, or with strong economic links to it, imposed restrictions next. These included South Korea, Singapore, Japan, and Australia. By late February, confirmed COVID-19 cases were rising sharply in pockets of Europe and the Middle East, namely northern Italy and Iran, prompting the imposition of strict containment measures in these areas. And by mid- to late March, the virus had spread to such an extent that most countries were enacting quite strict measures as well.

The Oxford COVID-19 Government Response Stringency Index illustrates the timing and strictness of these containment measures across countries (Figure II-2). This index combines various metrics—including the extent to which schools and workplaces were forced to close and movements within and outside a country were restricted—to rank the severity over time of each government's containment measures. It shows how, depending on the timing of the emergence of outbreaks, different countries ramped up their lockdown measures to different degrees.

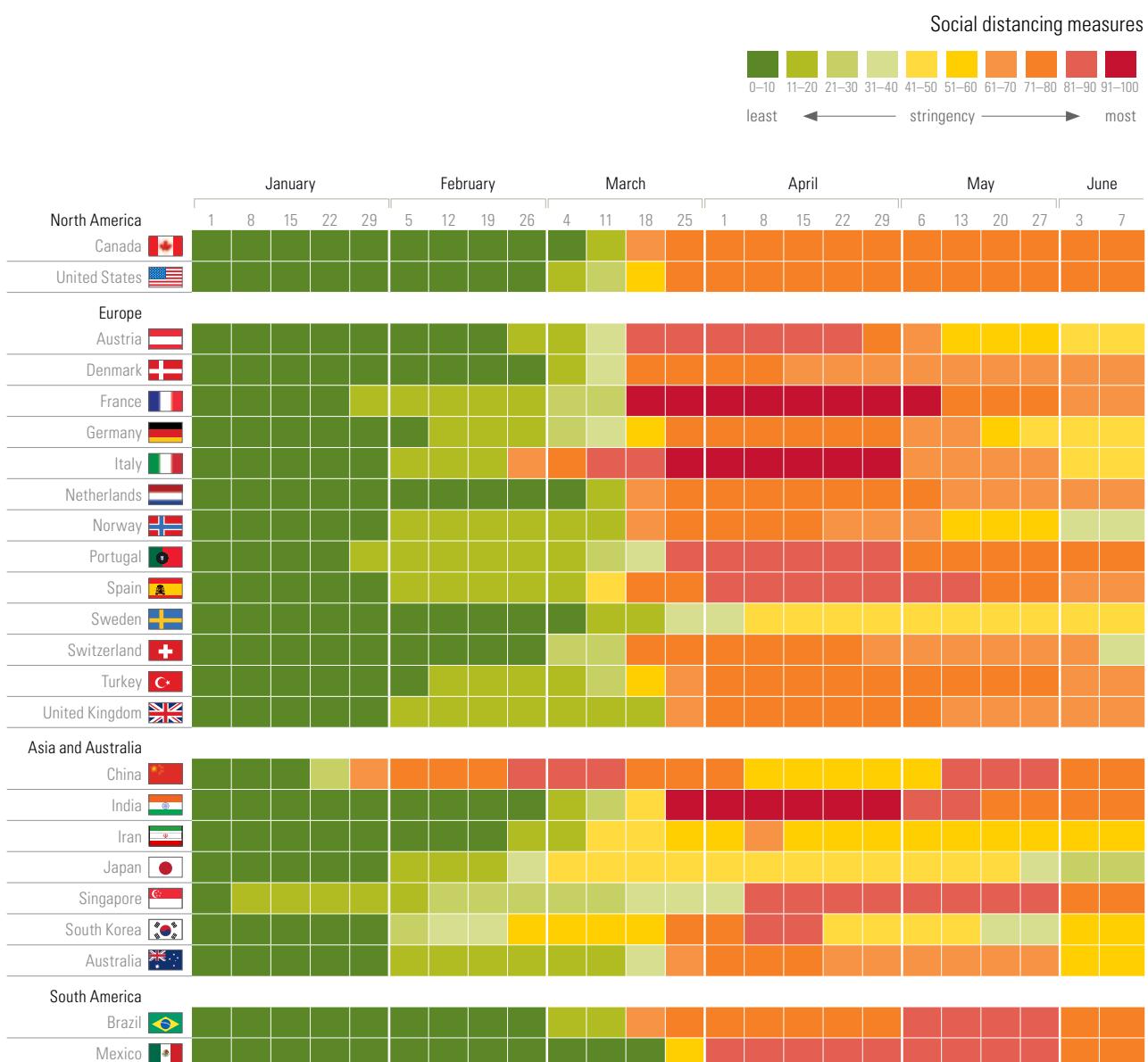
Some reached what the index would characterize as close to full lockdown (China, France, Italy, and India), while other countries adopted widespread measures but not quite as stringent (notably the U.K., the U.S., and more recently Brazil and other South American countries). Least stringent of all has been Sweden, which, as noted earlier, initially chose a mitigation rather than a suppression strategy.

¹¹ Research by Walker et al. (2020) suggested that this approach would still lead to about 250,000 deaths in the U.K. and 1.2 million in the U.S.

¹² Other countries—not least of them the United States, which enacted less severe forms of lockdown—might also be said to be following a quasimitigation strategy.

FIGURE II-2

The Oxford COVID-19 Government Response Stringency Index measures the global extent and timing of social distancing measures



Notes: The Oxford Stringency Index is a composite measure calculated by attributing a score to eight indicators measured on an ordinal scale, rescaled to vary from 0 to 100. Indicators include the closure of schools, workplaces, public events, and public transport, plus public information campaigns and internal and external travel restrictions. Data show the "display" index, which smooths over any gaps in the last seven days, populating each date with the last available "good" data point. Last updated on June 30, 2020. Individual country data may be several days older.

Source: Hale et al. (2020).

The immediate economic consequences of the shock

The estimated maximum impact on economic activity relative to the previrus trajectory (shown in Figure II-7 on page 15) was very closely related to the severity of the lockdown measures, as Figure II-3 illustrates.

Of course, the relationship is not one-to-one for a range of reasons, not least the local details of how lockdowns were adhered to and how much companies' and households' reluctance to spend exaggerated the lockdowns' direct effect. But the fact remains that the shock from the fear and uncertainty caused by COVID-19 and by the lockdowns' impact has resulted in an enormous shock to economic activity. We are seeing most countries experience their quickest and deepest declines in

economic activity ever recorded (Figure II-4), with an unprecedentedly rapid peak-to-trough drop in global GDP of about 9% in the first half of 2020.

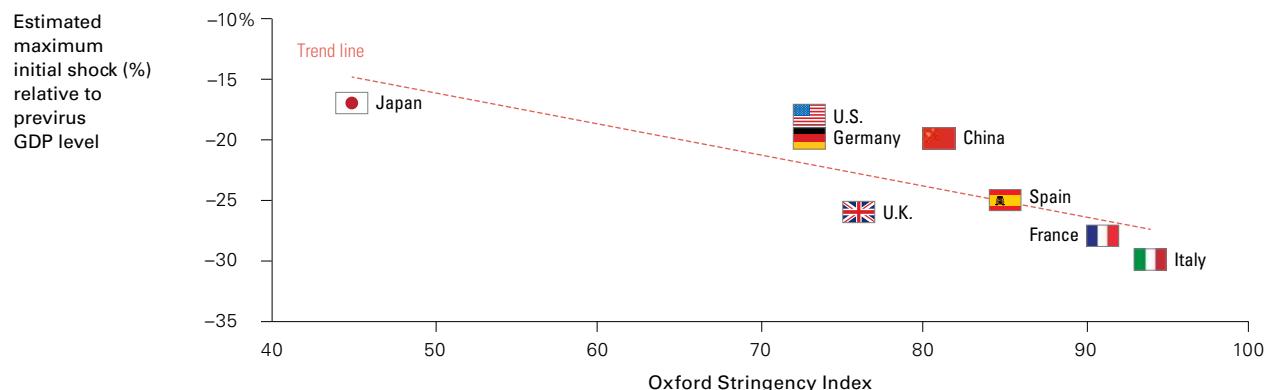
Comparable collapses in economic activity are difficult to find outside wartime. In particular:

- The global financial crisis saw global GDP fall by 6.0% peak to trough.¹³
- The Great Depression of the 1930s saw global GDP fall by 12.1% peak to trough.¹⁴
- The global recession that followed the oil price shock of 1973 saw global GDP fall by 1.8% peak to trough.¹⁵

To calibrate how far economic activity might have fallen at its point of greatest weakness in the absence of weekly or monthly statistics, and in advance of

FIGURE II-3

The Oxford COVID-19 Government Response Stringency Index correlates well with economic impact



Notes: The y-axis denotes the estimated maximum impact on economic activity relative to the previrus trajectory, estimated by Vanguard. The Oxford Stringency Index is a composite measure calculated by attributing a score to eight indicators measured on an ordinal scale, rescaled to vary from 0 to 100. Indicators include the closure of schools, workplaces, public events, and public transport, plus public information campaigns and internal and external travel restrictions. Data show the "display" index, which smooths over any gaps in the last seven days, populating each date with the last available "good" data point. Values used in this chart reflect the stringency index for each country at April 2020, except for China, where the highest stringency value has been used to reflect the worst point of lockdown. Individual country data may be several days older. The dotted line indicates the linear trend line.

Sources: Vanguard and Hale et al. (2020).

¹³ See Llaudes, Salman, and Chivakul (2010).

¹⁴ See Maddison (1991).

¹⁵ See Maddison (1991).

official statistics for the period concerned, we have analyzed the economic impact of COVID-19 across three distinct dimensions:

- **Sectoral variation.** Because the impact of the virus, along with the containment measures put in place, affects each economic sector differently, a bottom-up sectoral approach is required. Sectors that require more face-to-face interaction will be hit harder than those that can operate well with social distancing measures in place.
- **Supply and demand.** Supply will ultimately be a function of each government's or state's containment strategy. Typically, sectors that require more face-to-face interaction will take longer to bounce back than others. Demand will be driven by lower aggregate incomes, the response by monetary and fiscal policymakers, and the "fear factor." We expect that consumer reluctance to engage in higher-risk activities will be heavily driven by the degree of progress toward an effective vaccine or therapeutic treatment. Consequently, we expect that the demand shock will persist much longer than the supply shock.

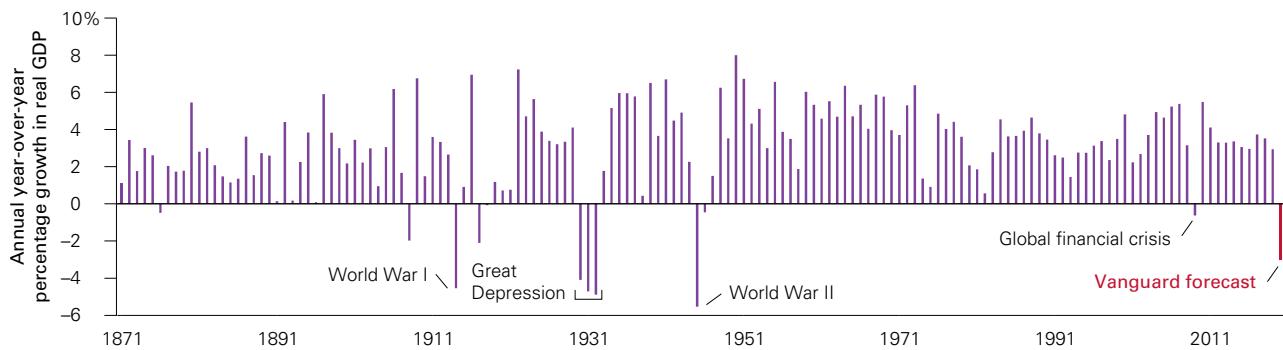
- **Country/regional variation.** We reflect differences in economic impacts across countries and regions. Variation in the timing and severity of outbreaks, government containment strategies, and monetary/fiscal policy responses, among others, account for these differences.

We calibrate the magnitude of the initial shock along these dimensions using high-frequency data. These include real-time indicators such as box office revenue, mobility indexes, restaurant bookings, and flight activity (Figure II-5).

We then combine this data with information provided by governments on the rules and restrictions imposed on different sectors during lockdown, as summarized by the Oxford stringency index.

The impact of containment measures is not equal across industries. Sectors that rely heavily on face-to-face interaction—such as retail trade, hospitality, and transportation—experience a large shock to activity. Sectors that can operate relatively well with social

FIGURE II-4
Global growth over the last 150 years



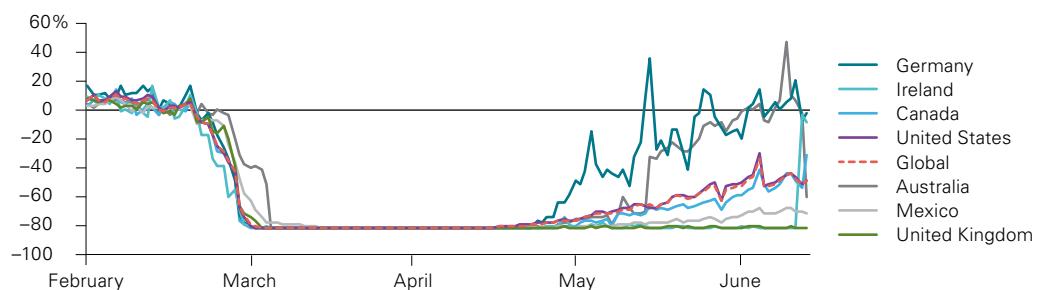
Note: Vanguard forecast begins after 2019. Data are as of June 30, 2020.

Sources: Capital Economics, Maddison Project Database, International Monetary Fund (IMF), Refinitiv, CEIC Data, and Bureau of Labor Statistics Consumer Expenditure Index.

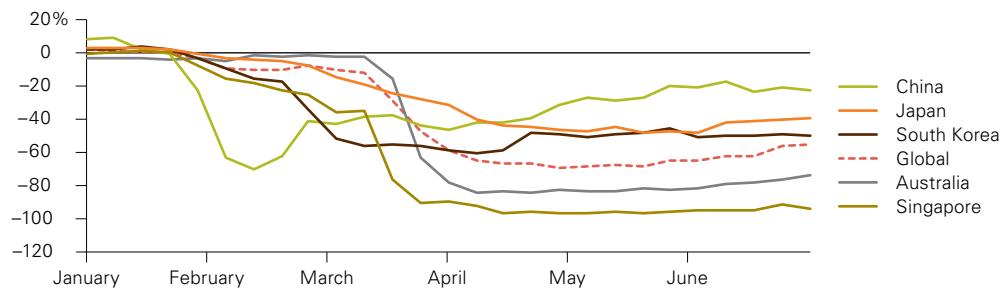
FIGURE II-5

High-frequency indicators have helped track the extent of the fall in activity

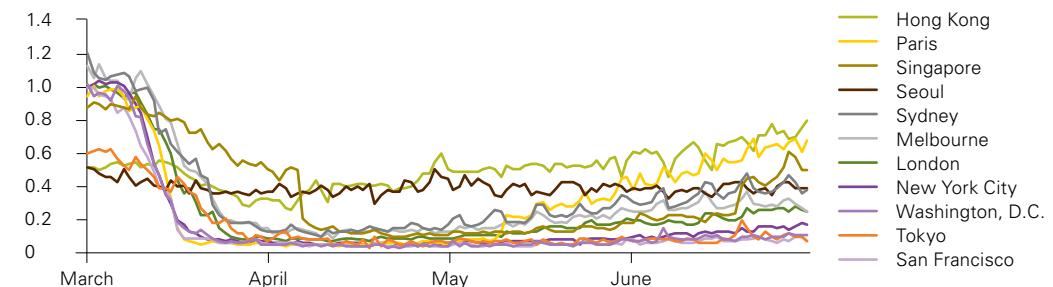
a. Restaurant bookings



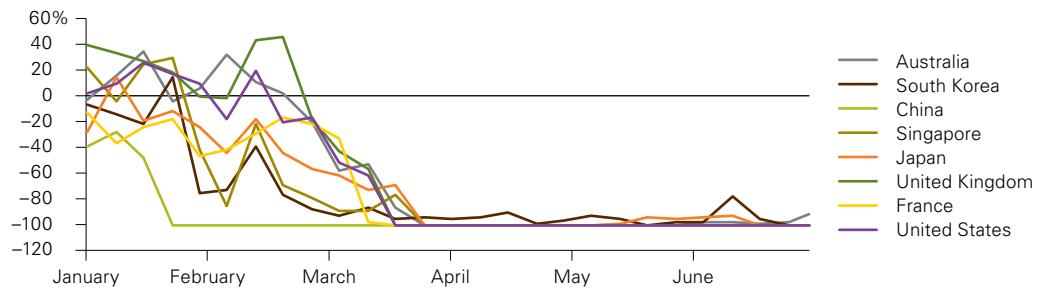
b. Scheduled flights



c. Global mobility



d. Box office weekend revenues



Notes: Part a: Year-over-year change in seated diners at restaurants on the Open Table network across all channels: online reservations, phone reservations, and walk-ins. Part b: Year-over-year change in the number of global flights and flights departing from various countries since January 2020 versus the same period in the previous year. The data have been extracted for each week this year, starting on January 6. Data for January through May are cumulative for the weeks starting in each of those months, while June flights are displayed as the weekly variance from the same week in 2019. Part c: Data are based on the Citymapper Mobility Index, which is calculated by comparing trips planned in the Citymapper app to a recent typical usage period. Trips planned ("Get Me Somewhere" and related) are correlated to trips taken (GO mode). Typical usage period is defined as four weeks between January 6 and February 2, 2020. Part d: Percentage change from the year before in gross revenue in domestic box office. Data are as of June 30, 2020.

Sources: Open Table, OAG, Citymapper, and Box Office Mojo.

distancing in place, such as construction and manufacturing, are less affected. **Figure II-6** shows the results of this analysis, using as an example the key sectors of the U.S. economy.

Figure II-7 shows our estimates of the maximum impact on GDP across all the major countries that we examine. For China, the brunt of this impact showed up in first-quarter figures for GDP growth, but for Europe and the U.S., the largest negative impact to growth is still to come in second-quarter figures. Details of our quarterly forecasts for 2020 are shown in Section III.

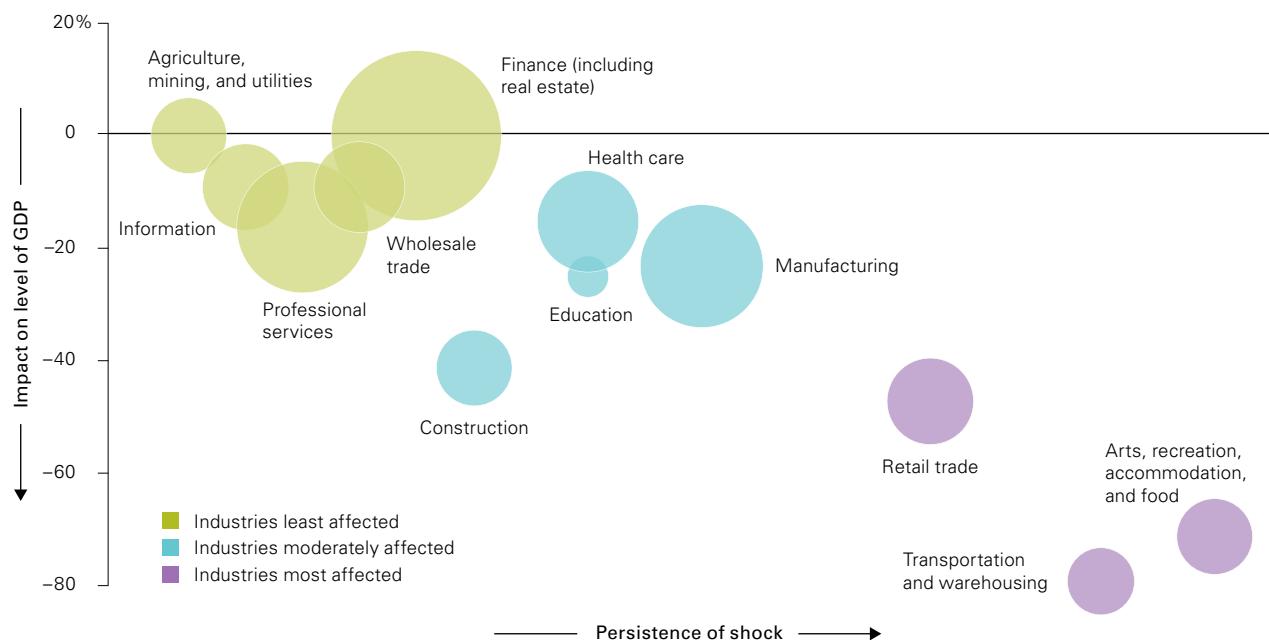
The pandemic has hurt emerging-market economies, too, as GDP growth has slowed and debt loads have rapidly increased. But there are important differences across regions. We suspect that the worst may be over in North Asia (South Korea, Taiwan, and Hong Kong) and Southeast Asia (Malaysia, Thailand, and Singapore). By contrast,

Latin America remains in the throes of the pandemic, particularly Brazil, Mexico, Chile, and Peru. The case is mixed for Central Europe, the Middle East, and Africa, with Russia and Turkey particularly hard hit but other countries doing slightly better. Data from Africa are relatively sparse, but we know the virus has significantly affected that continent as well.

The monetary and fiscal policy response

One particularly striking aspect of the shock to economic activity is that fiscal and monetary policy was relatively powerless to prevent it. It's not that policymakers stood idly by as the shock hit. Far from it: The global economy witnessed one of the swiftest and most decisive sets of policy responses ever implemented by central banks and governments in the major developed economies, a policy approach that Vanguard advocated.

FIGURE II-6
The hit to U.S. economic activity varies by sector



Notes: The figure shows the estimated maximum impact on U.S. GDP in April 2020. Size of bubbles indicates the relative weight of each sector in U.S. GDP. Initial impact on the level of GDP and the persistence of shock estimated are based on a range of high-frequency indicators (such as mobility indexes, fuel consumption, retail foot traffic, and restaurant and hotel occupancy) and traditional economic indicators.

Sources: Google, Apple, Johnson Redbook Index, American Iron and Steel Institute, U.S. Department of Energy, Association of American Railroads, U.S. Bureau of Labor Statistics, Prodata Analytics, Smith Travel Research, OpenTable, Transportation Security Administration, and SimilarWeb.

FIGURE II-7

Multiple factors have influenced the size of the initial shock to economic activity



Notes: Start of outbreak indicates when the number of recorded new daily cases reaches 100 or more. Duration of strict lockdown phase indicates the number of weeks between the start of a lockdown and when the lockdown measures begin to ease. Severity of lockdown is measured on a scale of 1 to 10 by the Oxford COVID-19 Government Response Stringency Index. Initial policy response is measured on a monetary and fiscal scale of 1 to 10, based on Vanguard analysis of global monetary and fiscal policy (reflecting relative percentage of GDP). Composition of economy measures shares of the economy for agriculture, manufacturing, and services. Size of initial shock measures the peak-to-trough fall in GDP relative to its pre-COVID-19 level. This is estimated to have occurred in February for China and April for all the other countries listed.

Sources: Vanguard and Oxford Government Response Team.

What was so different about the policy responses from what is typical in a “standard” economic downturn is that they were not designed to encourage firms or households to go out and spend immediately. The focus instead was to keep the financial system functioning effectively and, most important, to provide support in the form of fiscal transfers to support the incomes of people who could not work or run their businesses during the lockdown. Policymakers talked about providing “bridging finance” to ensure that companies and small businesses could resume operating once the lockdown measures were removed.¹⁶

Specifically, the policy measures enacted took several forms (Figure II-8):

- Loosening of monetary policy by cutting interest rates where possible (for example, U.S. interest rates went down 150 basis points, U.K. rates decreased 65 basis points, and Australian interest rates decreased 50 basis points) or ramping up quantitative easing (QE) measures (U.S. purchases of Treasuries, mortgage-backed securities, and corporate bonds; over €1 trillion in Pandemic Emergency Purchase Programme purchases in the euro area; £300 billion in U.K. gilt purchases;

increased ETF purchases with unlimited QE by the Bank of Japan; and yield-curve control measures amounting to AUD40 billion of government purchases so far in Australia).

- The provision of liquidity to financial markets to ensure the free functioning of markets and to prevent credit concerns leading to a tightening of monetary conditions in central banks’ capacity as lender of last resort (lending facilities in the U.S., new targeted longer-term refinancing operations to support euro-area banks, open market operations liquidity injections by the People’s Bank of China, and a global dollar liquidity line agreement between the U.S. Federal Reserve and other major central banks).
- Direct fiscal policy support in the form of income support to furloughed employees, more generous unemployment benefits, job retention schemes, and tax waivers, plus infrastructure investment in China.

What stands out from these measures is the sheer scale of the increase in public sector borrowing. The more than \$9 trillion in spending, loans, and loan guarantees that the world’s largest economies have committed toward countering the negative effects

FIGURE II-8

Monetary and fiscal responses in major developed countries/regions

						
Monetary	Rates at effective lower bound	✓	✓	✓	✓	—
	Quantitative easing	USD2,800bn	EUR1,350bn	GBP300bn	Yield curve control (AUD40bn)	—
	Lender of last resort	✓	✓	✓	✓	✓
Fiscal	Transfers and grants	✓	✓	✓	✓	✓
	Loans and guarantees	✓	✓	✓	✓	✓
	Tax incentives	✓	✓	✓	✓	✓

Note: Data as of June 30, 2020.

Sources: International Monetary Fund, Bloomberg, U.S. Federal Reserve, European Central Bank, Bank of England, Reserve Bank of Australia, People’s Bank of China, and Bank of Japan.

¹⁶ For example, in one of Mark Carney’s last news conferences as governor of the Bank of England, when he announced the central bank’s initial raft of policy measures, he said they would “help economies to bridge the disruption from an economic shock that could prove sharp and large, but should be temporary.” See www.bankofengland.co.uk/news/2020/march/statement-from-the-governor-of-the-boe-mark-carney-and-incoming-governor-andrew-bailey.

of the pandemic—while extraordinary—speaks to the unprecedented nature of the challenge. Since the pandemic began, Vanguard has supported a bold, swift, and efficient approach to mitigating the economic fallout from this unprecedented shock.

Figure II-9 breaks down the increase in government borrowing by the G20 countries, amounting to about 10% of G20 GDP. This emphasizes the crucial role played by monetary policy measures to keep interest rates low, not to stimulate immediate spending but rather to keep down the borrowing cost for governments and hence minimize the eventual drag on activity caused by the elevated debt position (to be discussed in Section III).

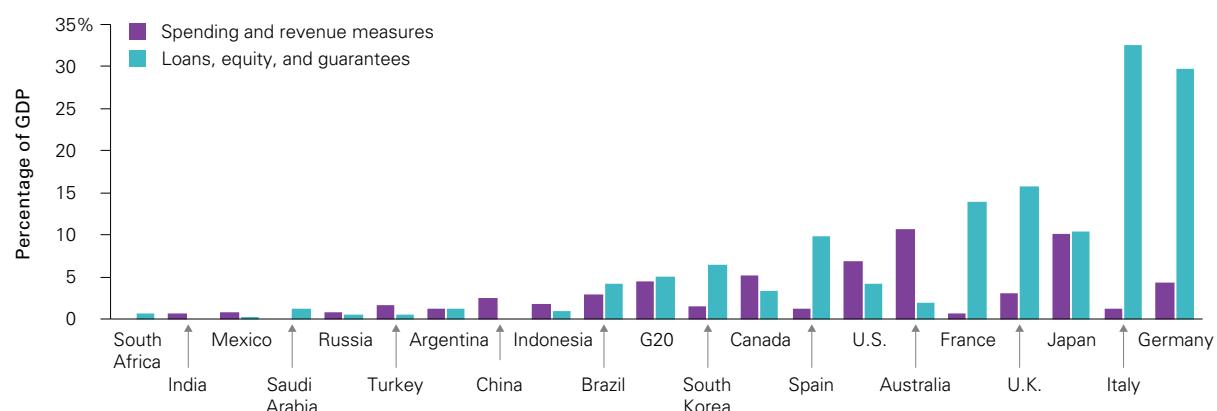
The huge fiscal interventions have been very effective in keeping unemployment rates from rising sharply in Europe and Asia, as furlough and short-term working schemes have insulated the labor market. For example, in the euro area and the U.K., the unemployment rate is only expected to rise by 2 to 3 percentage points in 2020. Without these schemes, the unemployment rate in both these regions would have likely soared to close to 30% at its worst point in April 2020 (**Figure II-10**). The major exception to this is in the United States,

where furloughed workers count as unemployed; here the unemployed rate surged by +11 percentage points to 15% before dropping down again as these workers were called upon as lockdown restrictions eased.

If furloughed workers move straight back into work once the lockdown ends, this type of unemployment will not be so costly. But for the officially unemployed, and for some of the furloughed who may not easily move back into work, the risk is that this high unemployment rate will persist. Typically, during deep recessions, unemployment might stay higher for up to five years as displaced workers struggle to find work. We return to this issue in Section III.

The impact of this huge shock to the real economy is ambiguous for inflation. The relative prices of some goods and services will rise as shortages emerge, while the prices of others will fall as demand collapses. Perhaps even more complicated is the challenge of obtaining an accurate read on the usual basket of goods used in common price indexes when goods and services are not available. Taking all this into account, the impact so far has been to lower headline price inflation.

FIGURE II-9
Comparison of global policy responses

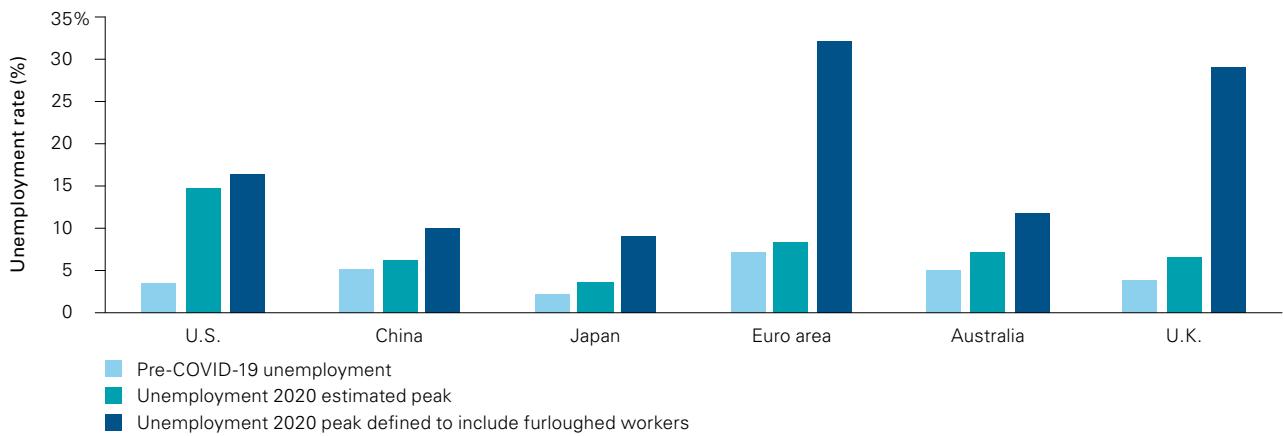


Note: G20 members include the European Union, Argentina, Australia, Brazil, Canada, China, Germany, France, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, the United Kingdom, and the United States. G20 aggregates are calculated using purchasing power parity-adjusted GDP weights. Estimates focus on government discretionary measures that supplement existing automatic stabilizers, which differ among countries in their breadth and scope.

Sources: National authorities and IMF staff estimates as of May 13, 2020.

FIGURE II-10

Impact of the pandemic on unemployment



Notes: Figures for unemployment and for our wider definition including furloughed workers are calculated based on data and on Vanguard estimates. The pre-COVID-19 unemployment rate is based on unemployment rates observed in early 2020 for each region. The unemployment 2020 peak represents a forecast in cases where we believe the peak has yet to be realized. Data are through June 30, 2020.

Sources: U.S. Bureau of Labor Statistics, Australian Bureau of Statistics, Reuters, National Bureau of Statistics of China, and Moody's Analytics Data Buffet.

The financial market impact

Unsurprisingly, such a large shock to global economic activity, combined with highly elevated uncertainty about future prospects, has had correspondingly large impacts on financial markets.

Mirroring the economic shock, the global equity market initially experienced a sharp and deep decline driven by investors' lower risk appetite and by higher macroeconomic risk. The global equity market lost more than 30 percentage points in about one month, and volatility spiked to record levels. The speed and magnitude of the market decline has no precedent, as all previous major bear markets lasted at least one year.

For example, during the global financial crisis of 2008–09, the global equity market dropped more than 50%, but that happened over about 350 business days (Figure II-11a).

Another unique characteristic of the global equity market's recent performance has been the quick recovery, though still not to the precrisis level. In about two months, the global equity market recovered almost all the losses registered since the start of the year (see Figure II-11(b)). Thanks to this rebound and to diversification's positive contribution, a globally diversified portfolio with 60% exposure to equity and 40% exposure to currency-hedged global fixed income recovered almost all its losses (before costs). It is true that over a few days, the correlation between the global equity and bond markets has been

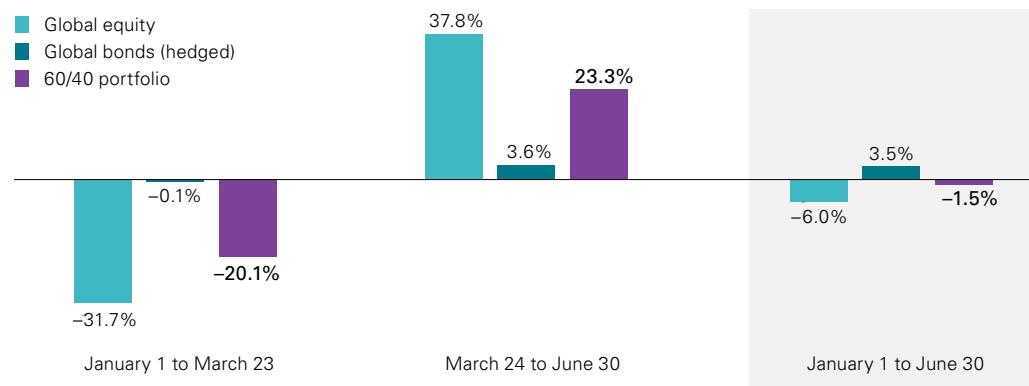
FIGURE II-11

The effect on equity and bond prices

a. The shock to equity was the fastest but not the largest in history



b. Bonds have acted to diversify portfolios



Notes: In Part a, 1.0 on the y-axis signifies the start of each crisis. Returns are then indexed to this value. Returns are based on the MSCI All Country World Index in USD. Solid lines indicate the return of the index since the peak of the crisis; dotted lines indicate recovery since the trough. Data are through June 30, 2020. In Part b, global equity is represented by the MSCI All Country World Index, global bonds are represented by the Bloomberg Barclays Global Aggregate Bond Index Hedged to USD, and the 60/40 portfolio is made up of 60% global equity and 40% global bonds.

Sources: Vanguard and Bloomberg.

Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

positive, but year to date, a globally diversified bond exposure again played the important role of portfolio ballast, as we stressed in our outlook at the end of 2019.

On the face of it, this sharp recovery in global equity markets represents a disconnect between the economy and the equity market. It is important to remember, though, that the equity market represents only a subset of the economy, predominantly larger publicly traded companies. Additionally, market prices reflect the discounted sum of present and future information. Despite the negative macroeconomic outlook in the short term, investors are likely anticipating a return to more normal economic conditions in the medium and long term. Based on our analysis in Section III, we question whether the market is right to do this. Even so, we urge investors not to try to time short-term

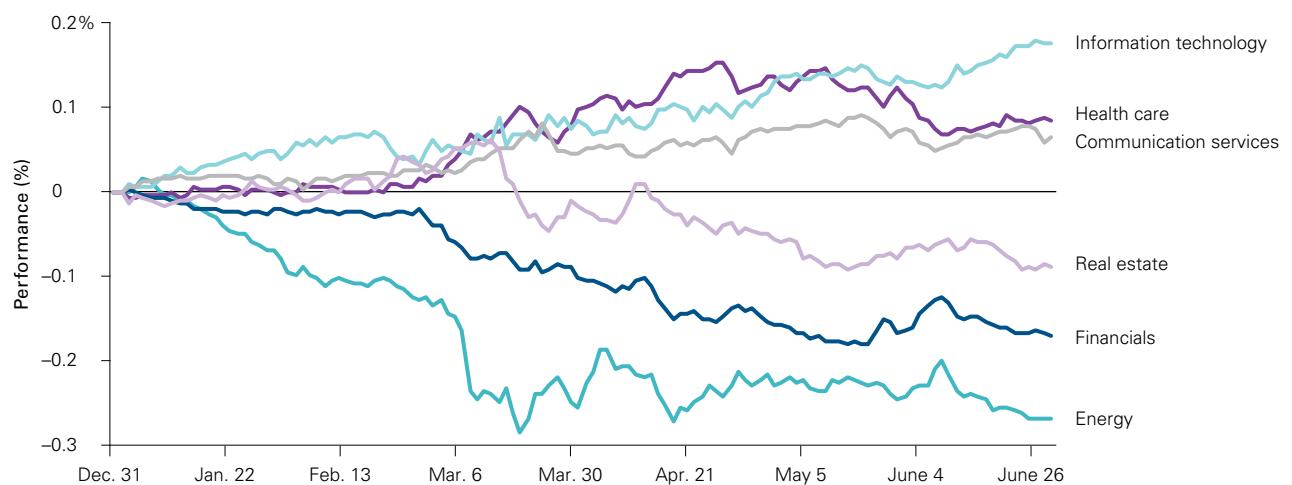
market movements but rather to focus on longer-term risk-and-return expectations, making sure their portfolios are in line with their risk profile and long-term goals.

Not all equity sectors and regions have responded in the same way. **Figure II-12** summarizes the excess performance (with respect to the broad market) year to date of the global equity market's best- and worst-performing sectors. Sectors such as information technology, communication services, and health care have experienced positive relative performance during both the market drop and the recovery so far.

Various factors may have driven sector performance, but it is possible the sectors that performed better did so because market participants believe that these businesses

FIGURE II-12

On a relative basis, some sectors have gained from the crisis



Note: Performance is measured by the MSCI All Country World Index (USD). Data are from January 1, 2020, through June 30, 2020.

Source: Vanguard.

Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

(technology companies above all) can quickly adapt to new economic conditions without major disruptions to the supply chain.

More cyclical sectors such as financials and real estate have sustained losses year to date given their sensitivity to market and macroeconomic conditions. The energy sector also normally suffers in periods of economic downturn because of lower energy demand from firms and households. Moreover, this year that sector has taken a hit from the oil-price drop, caused by geopolitical reasons, that has driven down most oil companies' expected cash flows.

Given global sectors' performance, it is probably no surprise that the U.S. equity market has been one of the best performers on a relative basis since the

beginning of the year. Most likely, in addition to the sector tilt, the U.S. market rally so far has been fueled by prompt central-bank intervention in response to the economic shock and thus optimism about a fast recovery for the U.S. economy.

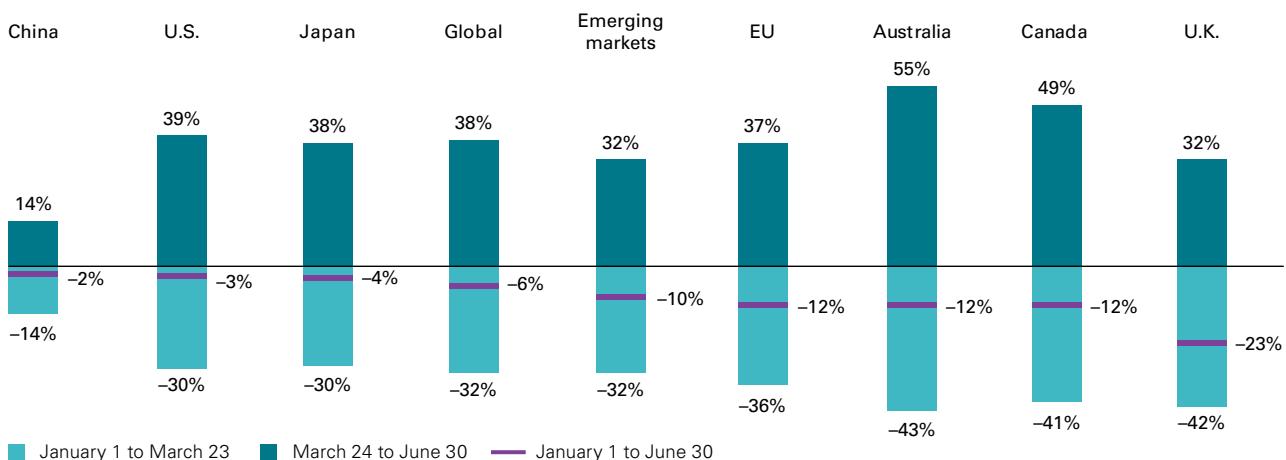
China's earlier experience with the epidemic and its relative success in containing the second wave of the virus to date has seen the A-share market outperform most other developed markets (from January 1, 2020, through June 30, 2020). The U.K. equity market, on the other hand, has performed the worst.

Overall, the recent market turmoil has reminded us of the importance of holding a diversified portfolio across different sectors, asset classes, and regions (Figure II-13).

FIGURE II-13

The crisis has shown the value of global diversification

Equity performance in 2020



Notes: Country and regional stock performance is measured by the following indexes: Japan: Nikkei 225 Index; U.S.: S&P 500 Index; China: Shanghai Stock Exchange Composite Index; Global: MSCI All Country World Index; emerging markets: MSCI Emerging Markets Index; European Union: MSCI EMU Index; Australia: S&P ASX 200 Index; Canada: S&P/TSX Composite Index; U.K.: MSCI United Kingdom Index; and Global ex U.S.: MSCI World ex USA Index. Total returns are gross of dividends. Data are from January 1, 2020, through June 30, 2020, in USD.

Source: Vanguard.

Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

III. The economic recovery begins

Initially, there were hopes that the sharp economic downturn would be followed by an equally sharp V-shaped recovery in the second half of the year. But it quickly became apparent that the global economic recovery would be slow and protracted. The explanation lies in the deep uncertainty about how quickly the virus can be eliminated and life can get back to normal.

In **Figure III-1** we define our baseline economic outlook and our upside and downside scenarios, focusing on health factors.

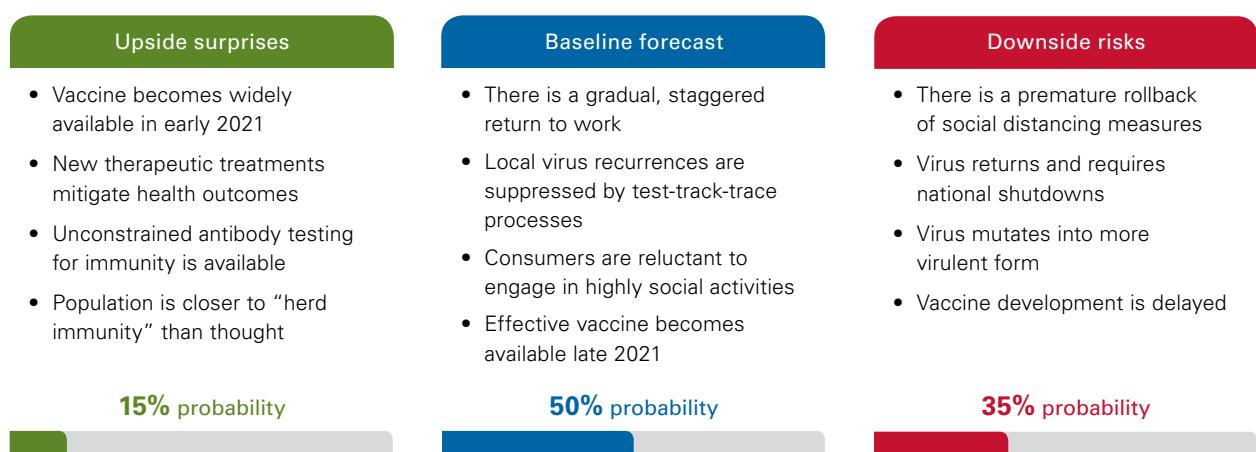
- Our baseline scenario is one in which global economies are regularly dealing with sporadic virus flare-ups through the second half of 2020, but we assume these

are contained by localized lockdown measures and test-track-trace procedures. Even so, these flare-ups are likely to keep consumers on their toes and wary of high-risk social activities. However, in this scenario, a vaccine becomes widely available in the latter half of 2021, which inspires more confidence and a return to normal.¹⁷

- In our upside scenario, the power of idea-sharing and new technology results in novel treatment, prevention, and detection measures that reduce fears more rapidly than we anticipate. Significant unknowns related to the virus make this a low-probability outcome.
- Our view is that the risks are skewed toward the downside. Early experiments in fast reopenings have not gone well for some parts of India and the United States. Also, vaccine development is historically a multiyear process, and viruses are known to mutate.

FIGURE III-1

Health developments are the biggest risk factors defining the recovery



Source: Vanguard.

To understand our forecast for economic recovery, we must understand the progress of the virus and how policymakers have responded to the evolving situation by lifting lockdown measures.

As countries in Europe and North America locked down in earnest during April, the focus quickly turned to China, where lockdown measures were beginning to be lifted, and to the question of what criteria local countries would use to enable this to happen. Perhaps the most important indicator monitored by global public health officials has been the curve showing new cases or new deaths that public health measures are designed to “flatten.”

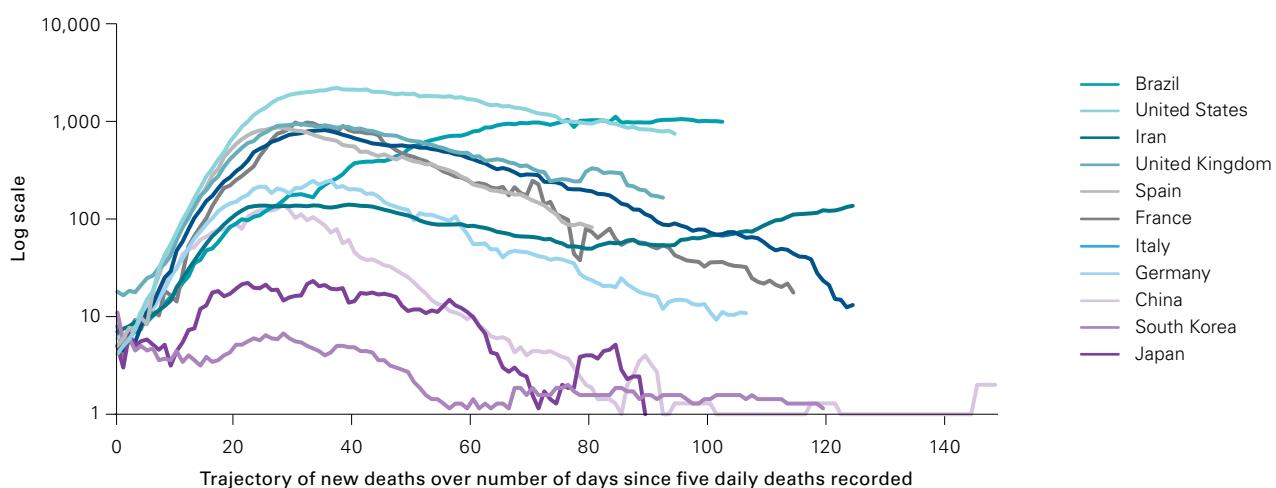
Figure III-2 shows on a log scale the evolution of new deaths since the start of each country’s outbreak.¹⁸ This chart has been a powerful tool for monitoring and comparing the progress of outbreaks in different countries; as the R number has come down because of public health measures, the number of cases and deaths

has grown more slowly and the curve is “flattened.”¹⁹ There is a striking contrast between the experience of Asia-Pacific countries where the outbreak was controlled quickly and a high death toll largely prevented, including China, South Korea, Australia, and Japan, and countries in Europe and the Americas where it took longer to get deaths under control and, even in June (some three months after the outbreak began), a high number of new cases and deaths were being recorded.

Measurement of the true incidence of COVID-19 is fraught with difficulty, so it is not straightforward to draw inferences about how well different governments have managed the crisis. For example, many cases are not reported—perhaps as many as four times the actual number of confirmed cases.²⁰ And countries that have more extensive testing procedures will tend to record higher counts for a given outbreak severity. Death rates are also subject to measurement difficulties, especially in countries where testing capabilities are less advanced,

FIGURE III-2

The new-death curves are flattening globally, but slowly in some countries



Note: The chart represents the seven-day rolling average of daily deaths from coronavirus. A log scale allows exponential growth to be shown as a straight line. Data are as of June 30, 2020.

Sources: Vanguard and Johns Hopkins University.

¹⁸ Typically, when outbreaks are emerging, cases or deaths are growing exponentially, so the use of a log scale allows exponential growth to be portrayed as a straight line. New deaths are plotted for each country from when five daily deaths were first recorded. Because of this, the line showing the China outbreak, which started first, extends across the chart further than for other countries.

¹⁹ The “R number” is the shorthand way used in public discussion to refer to the effective reproduction rate of the virus, R_e .

²⁰ An estimated 80% of infections are mild or asymptomatic, 15% are severe, and 5% are critical, requiring ventilation. See Poletti et al. (2020).

so COVID-19 deaths may go undiagnosed. In response, increased focus has been placed on the concept of excess deaths relative to an average year. **Figure III-3** uses the United Kingdom as an example. The chart shows that some three-quarters of the excess deaths can be attributed to confirmed COVID-19 cases. The rest would appear to be highly correlated with the COVID-19 fatalities, suggesting that these are undiagnosed cases. But it is also possible that extra deaths may be occurring because health care resources are being diverted from people with other life-threatening illnesses or because individuals are more reluctant to visit health care facilities during the pandemic.

Apart from measurement difficulties, the impact of COVID-19 on different countries will vary for reasons relating to demographic composition, population density (since viruses spread more readily in large cities, especially transport hubs), and, perhaps most important, the country's total population. So while it is true that the

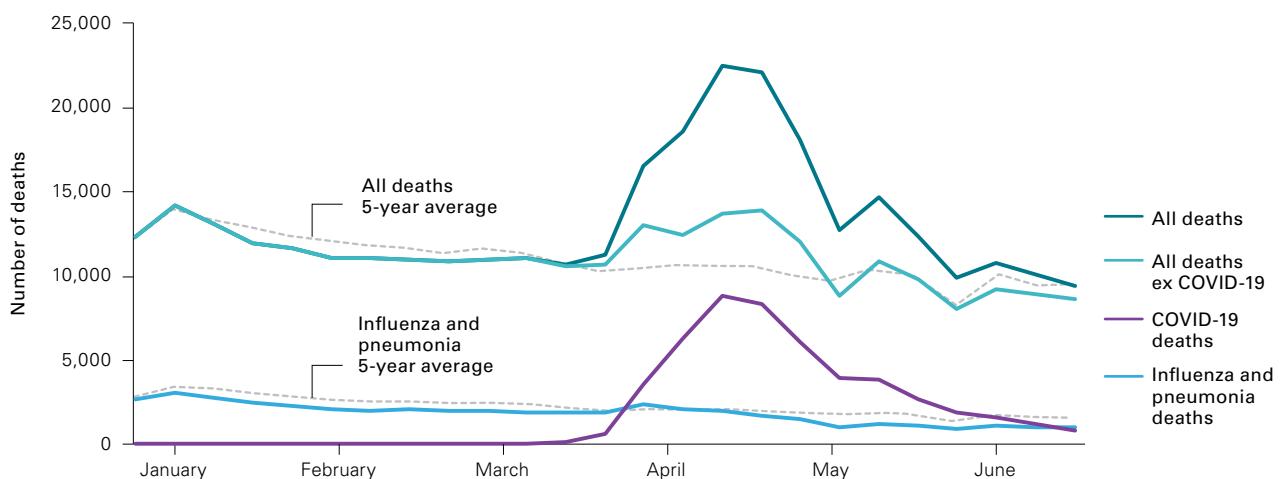
United States has seen the most deaths, it also has a much larger population. In fact, on the basis of excess deaths per million of population, the "worst-performing" countries at the time of publication were Spain, Italy, and the U.K.

These considerations of how well the virus has been controlled in different countries are important both politically and for determining when lockdown restrictions can be lifted and, hence, how quickly economies might begin to recover. Policymakers face difficult choices between trading off health outcomes with the negative economic impacts (which, as Figure III-3 suggests, may themselves entail negative health consequences because of heightened mental health problems associated with unemployment).²¹

Moreover, the trade-off between health and economic costs may be reversed over the longer term. Countries that were most successful in controlling the outbreak

FIGURE III-3

COVID-19 explains many but not all excess deaths in the United Kingdom



Note: The chart shows the number of deaths registered by week, in England and Wales, from December 28, 2019, to June 13, 2020. Data are available at <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsregisteredweeklyinenglandandwalesprovisional/weekending15may2020>.

Source: U.K. Office for National Statistics.

²¹ It is sometimes argued that it is impossible to put a price on saving human lives, but this is done all the time by policymakers and individuals; for example, we could prevent deaths on the road by requiring that cars be safer, but they would be more expensive.

with prompt and early lockdown measures and effective tracking and tracing procedures have emerged from lockdown more quickly, facilitating a potentially quicker recovery. China, South Korea, Australia, and New Zealand stand out in this regard. By contrast, cases and death counts have tended to come down more slowly in countries where lockdown measures were deliberately made less severe to avoid the economic costs. Yet if further lockdown measures are needed for future waves of the virus, those economic gains may not be sustained.

This delicate balance of risks is illustrated in **Figure III-4**, which shows how Asian countries lifted their lockdowns when the number of new cases in their populations was at lower levels compared with the numbers when many European countries lifted their lockdowns. The number of new cases in the U.K. and U.S. was higher still, suggesting that the risk of further growth in infections and their associated economic disruption also may be higher.²²

This debate about health risks versus economic costs emphasizes how the usual uncertainty about the path of recovery for the global economy is amplified by the range of possible health outcomes as defined in our baseline, upside, and downside scenarios.

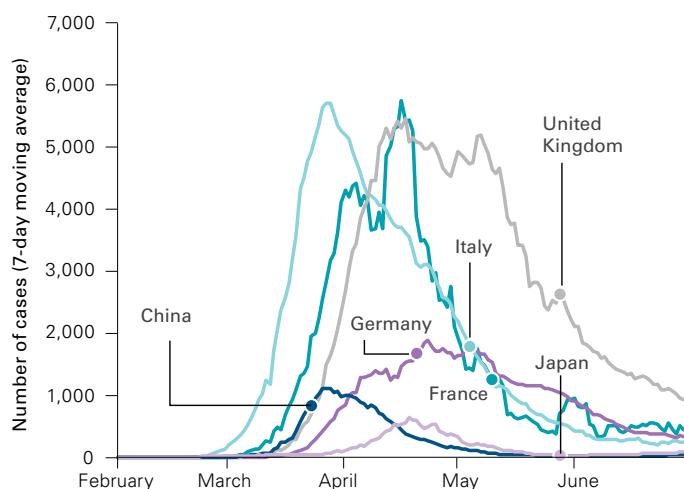
The shape of the economic recovery

To calibrate our forecasts for how the economy might recover, we use the same sectoral demand-supply framework that we used to calibrate the size of the initial shock (as described in Section II).

To model the persistence of the COVID-19 shock, we model GDP as an autoregressive process, with an assumed persistence factor determining how quickly sectors in countries revert to normal, defined as the previrus equilibrium adjusted for an assumed degree of long-run scarring to each sector.

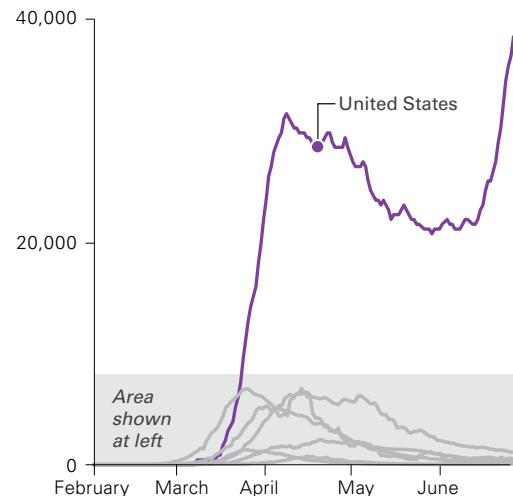
FIGURE III-4

The timing of the lifting of lockdowns may affect the risks of further outbreaks



Note: Dots indicate when a country started to ease containment measures.

Source: Johns Hopkins University Coronavirus Dashboard, as of June 30, 2020.



²² By the end of June 2020, some U.S. states were seeing continued increases in infections and an increasing R number. Local outbreaks also have been seen in some U.K. towns.

Assessing the recovery of the supply side of the economy first, we classify sectors into low, medium, and high risk based on the feasibility to work from home and/or the proximity of workers in the production of the good or service. Examples of low-risk sectors, which have a lower shock persistence, include agriculture (where production is socially distanced by nature) and professional services (where teleworking has proven rather effective with only minor productivity drags). By contrast, examples of high-risk sectors, which have higher shock persistence, include transportation and indoor recreational activities, where social distancing is more difficult.

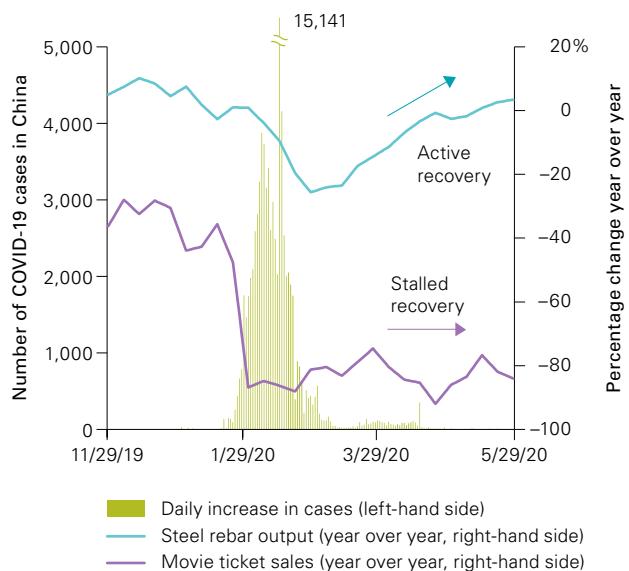
We expect the recovery in aggregate demand will take longer than that of supply. The persistence of the demand shock will depend on both the recovery of incomes and the fear factor associated with engaging in face-to-face activities. The latter may not fully dissipate until a vaccine or therapeutic treatment is found, or until the virus has been eliminated by suppression or herd immunity. This will likely extend a full recovery well beyond 2021.

We can also use the experience of economies that are further ahead in tackling the virus, such as China, to help us calibrate what to expect in regions that are further behind, such as the U.S. and Europe. As Figure III-5 shows, China's manufacturing sector, as proxied by steel output, has recovered much more quickly than social activities such as going to the cinema, where consumer reluctance is still elevated.

Aggregating this, Figure III-6 shows our baseline forecasts for the level of GDP for the U.S., the euro area, China, and the U.K. and how they have changed since we made them at the end of 2019 in *The New Age of Uncertainty*.

Just as we showed how the depth of the shock varied across regions, the trajectory of recovery also will vary according to the speed of lockdown exit across sectors, the industrial composition, and the monetary and fiscal policy responses.

FIGURE III-5
China as a leading economic-recovery indicator



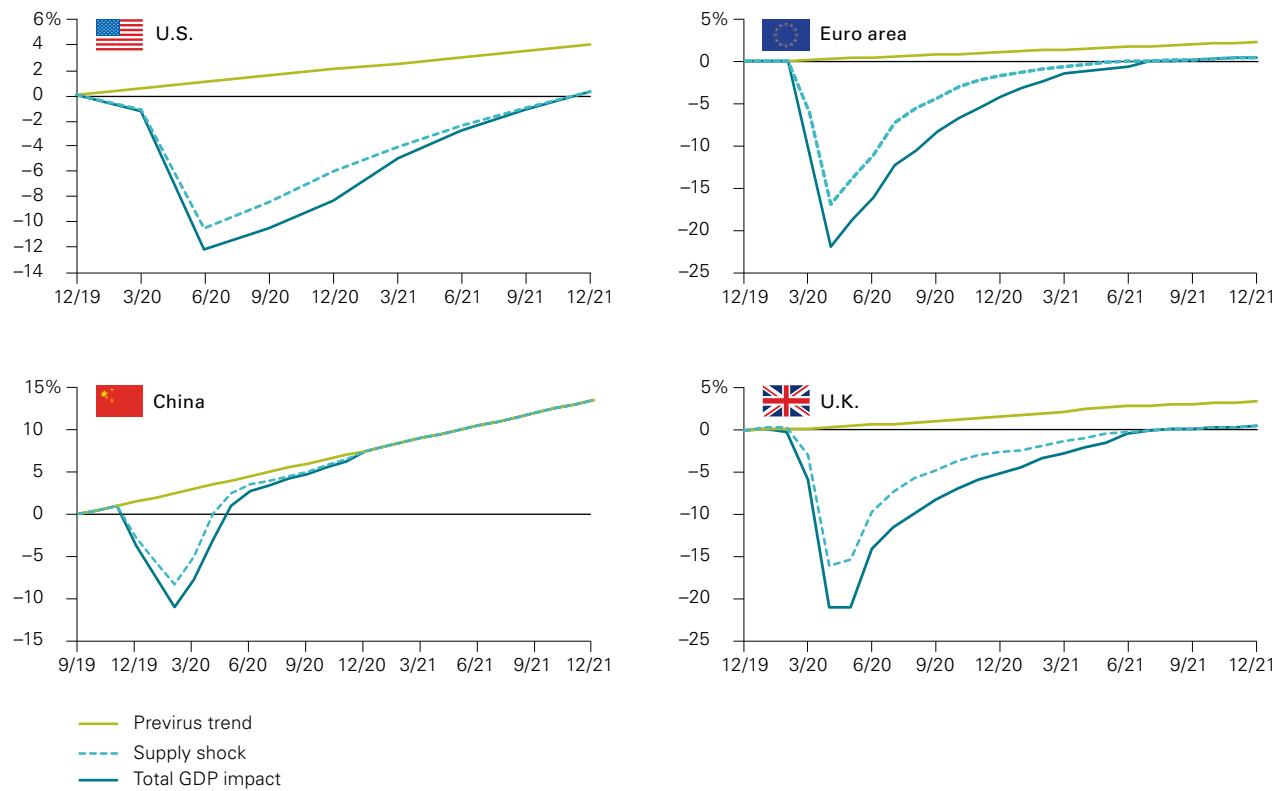
Sources: Vanguard, using data from Our World in Data, WIND, and Baidu.

For example, China has so far managed to contain the virus more quickly than the U.S. or Europe, and its economy has a smaller share dedicated to services, which rely more heavily on face-to-face interaction. Also, based on the most recent data (Figure III-4 on page 25), many industries are not only recovering but clawing back lost output not produced during the lockdown, so growth may even temporarily rise above its trend rate. As a result, China is expected to recover more quickly to previrus levels.

In both the euro area and the U.K., the recovery is expected to take longer than in the U.S. because the initial shock to output is anticipated to be larger (primarily

FIGURE III-6

Expected path of GDP broken down by demand and supply for major countries/regions



Notes: The charts show our expectation for the level of impact on real GDP in each country/region in its local currency. Total GDP impact signifies the percentage point change in the level of GDP.

Source: Vanguard.

because containment measures put in place were more severe) and the policy response by both monetary and fiscal authorities has been weaker.

In the United States, the euro area, and the United Kingdom, we expect recovery to have hallmarks of both a V-shape—so called because of the letter it resembles

on a chart—and an elongated U-shape, with recovery in phases. We expect the first phase to be characterized by rapid signs of recovery as businesses reopen and restrictions are eased. The second phase is likely to take longer as demand, especially in sensitive face-to-face sectors, only gradually returns. Only in China is the recovery expected to be faster and more V-shaped.²³

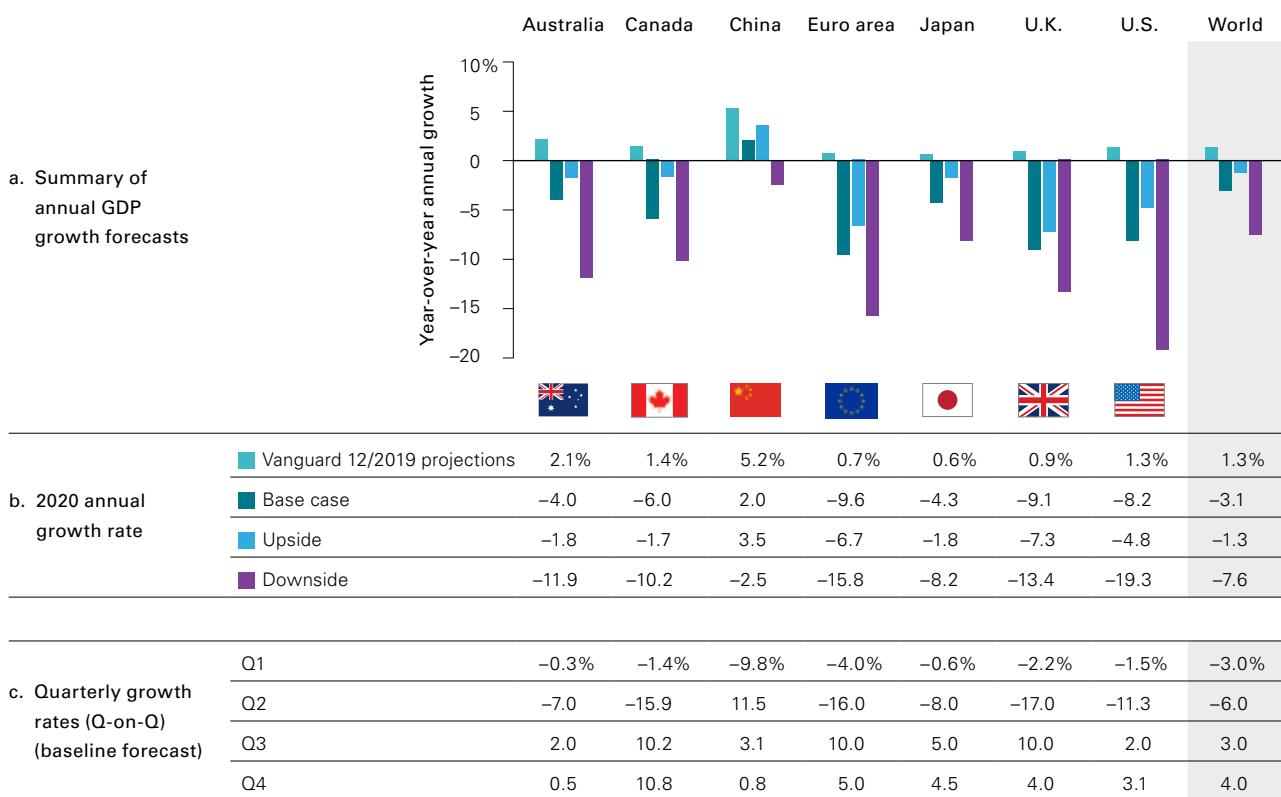
Figure III-7a–c shows how these forecasts for the level of GDP translate into our baseline 2020 GDP growth forecasts for the major regions we cover, together with our forecasts in a downside and upside scenario and a comparison to our forecasts made at the end of 2019.

Notably, global growth is expected to move into significant negative territory by 3% in 2020, the first time that has happened in modern economic history. A comparison of annual growth rates across countries largely reflects the size of the respective initial shock shown in Figure II-7 on page 15. On that basis, Europe and the U.K. show the largest annual falls of around 10%, with the U.S. not much smaller. In China, where the virus was better contained and where growth was higher to start, growth is expected to fall to only 2%, very low by Chinese standards but less

than half as large as the fall we expect in Europe and the U.S. Australia and Japan both fall into negative territory too, but again, the fall in growth is much smaller than for Europe and North America.

It is also interesting to examine our forecasts for quarter-on-quarter growth. By this measure, in all countries there will almost certainly be a strong rebound in headline quarterly growth rates in the second half of 2020, especially during the third quarter when the strongest part of the activity rebound occurs. These strong growth numbers will doubtless prompt positive headlines, even generating talk of a V-shaped recovery. Although this will be true in growth terms, in levels—the more relevant measure—we expect the recovery to be a protracted and slow U-shape.

FIGURE III-7
How the pandemic shaped GDP projections



Source: Vanguard.

Longer-run prospects for GDP and unemployment

In our baseline forecast, we do not expect GDP growth to return to normal until well into 2021 and quite possibly beyond. This will mainly depend on how quickly people will feel comfortable resuming their normal activities, which will likely only occur when the risk from the virus has been eliminated, whether by vaccine, herd immunity, or complete global suppression. But even when demand does recover and businesses are running at full capacity, it is possible that the productive potential of the economy will be permanently scarred by the large shock the pandemic caused. It has been well-documented that large financial crises or deep recessions can cause productive potential to ratchet down to a trajectory below its previous trend or even that the trend growth rate will be lower; for example, productivity growth in many developed economies still has not recovered from the 2008 global financial crisis.

Governments have injected considerable resources into preventing the pandemic from causing such permanent scarring. But we think it is likely that productive potential will be permanently lower, for three reasons:

- Companies, especially in the hospitality sector, may go out of business from bankruptcy or the inability to service loans because of impaired cash flow during the lockdown. This capacity may take many years to recover.
- Individuals who become unemployed because of the pandemic shock may lose skills or become permanently disconnected from the labor force.
- Certain industries such as airlines or commercial real estate may never recover to their former size, and as with any reallocation of activity in an economy, it may take a long time for resources to be redistributed to the sectors where demand has been reallocated.

Although it is beyond our normal forecast horizon, we believe that productive potential in 2022 will likely be some 3% lower in Europe, slightly less in the United States, and relatively unaffected in China and Japan.

Inflation and policy prospects and the implications of higher government debt

With supply permanently damaged, very accommodative monetary policy in place for the foreseeable future, and postponed expenditure poised to return, augmented by large fiscal transfers, it is not surprising that many commentators have talked up the prospect of a resurgence in inflation in 2021.

Given our expectation that the recovery in demand will lag the rebound in supply (Figure III-6 on page 27), we foresee negative output gaps for the rest of this year and into 2021 in all major economies. As a result, we would be surprised if inflation were to return strongly. In light of this prospect, we expect monetary policy to remain at its current loose setting well into next year. Only when spare capacity is eliminated do we expect policy rates to begin increasing again, with central bank asset purchases associated with quantitative easing likely to reverse only once that happens.²⁴ We expect forward guidance by central banks to play an increased role during this prolonged recovery phase, but major revisions to inflation-targeting regimes that were discussed before the pandemic are likely to be put on hold for now.

Regarding fiscal prospects, investors continue to express concerns about the high levels of debt, either because debt funded in many economies by quantitative easing might lead to inflation or because future attempts to bring debt levels back under control will lead to a sharp slowdown.

²⁴ One possible exception to this is at the Bank of England, where Governor Andrew Bailey has suggested that asset purchases might be reversed before policy rates rise.

In fact, the additional fiscal public sector debt incurred because of the pandemic response may not be as large as it initially appeared. According to the International Monetary Fund, more than half of the total fiscal response in the largest developed and emerging economies is in the form of loans and equity stakes that can be thought of as government investment in those assets, so they will not represent an increase in government net debt.²⁵ And any increase in debt from those disbursements could be reversed as the equities are sold or as the loans mature, except for a small percentage of possible bankruptcy losses. To be sure, instituting such policy in the face of blaring headlines about triple-digit debt-to-GDP ratios requires steely conviction.

Even so, for the group of major developed economies, the debt-to-GDP ratio jumped 24 percentage points in about two months. In comparison, a similar increase in global debt in response to the global financial crisis took two years to play out. The average debt level for these countries sits at 154% of GDP.

Four broad approaches could reduce high debt-to-GDP ratios:

- Via a prolonged period of austerity to bring the debt down by a period of public sector surpluses. Given the political environment and the experience during the decade since the financial crisis, especially in Europe, there is little appetite for this approach, although modest fiscal tightening might occur once the pandemic is truly over.
- Via a sustained increase in trend growth triggered by a strong rebound of productivity that has been subdued since the financial crisis, perhaps triggered by an accelerated exchange of knowledge, as explored in Vanguard's recent work on the "idea multiplier."²⁶ This seems unlikely to play a major role in the short term, but nominal growth can act to gradually bring down debt-to-GDP ratios over the longer term.

- Via funding the new higher levels of government debt at low interest rates, ideally by issuing long-duration bonds.²⁷ This broad approach is already happening to an extent, and this should allow the debt interest burden arising from the one-off pandemic shock to be spread gradually between current and future generations.
- Via monetization of the debt. Temporary monetization of public sector debt is already happening through quantitative easing, in which government bonds are bought, either directly or indirectly, by the national central banks. If these bonds are never sold back into the market, this would be outright monetization and it would cause inflation to be higher. In a potentially deflationary environment, and if the decision to monetize debt was left in the hands of the central bank, this might be a sensible way to lessen the debt burden and allow the central bank to hit its inflation target more effectively. Arguably, such an approach is already happening by stealth in Japan, and perhaps in the U.S. and Europe too, though for the European Central Bank it would eventually require legal changes given restrictions on monetary financing.²⁸ So for now, central banks and governments will tread carefully before this approach is explicitly carried out.

Financial market prospects

The turmoil caused by the pandemic has triggered a change in fundamental and macroeconomic variables that could affect future market performance, particularly on the equity side.

Current valuation levels are typically a good indicator of how the equity market will perform over the next ten years. Vanguard has developed a proprietary model to infer the equilibrium (or fair value) level for equity valuations. Over recent years, valuations in the U.S. equity market have been in the upper part of our fair-value range, signaling a stretched or overvalued market. However, the

²⁵ See Battersby, Lam, and Ture (2020).

²⁶ See Davis et al. (2019).

²⁷ In the U.K., the issuance of consols, a government security where the principal is never paid back, has been suggested; this has not been done since 1927, itself a partial refinancing of the consols that were issued in 1917 as part of the financing of World War I.

correction during the pandemic has determined a sharp decline in market valuations that reached undervalued territory at the end of March before reentering the fair-value range at the end of June (Figure III-8a). On the other hand, the international equity market appears closer to the undervalued region given more attractive valuations in Europe and the U.K. (Figure III-8b).

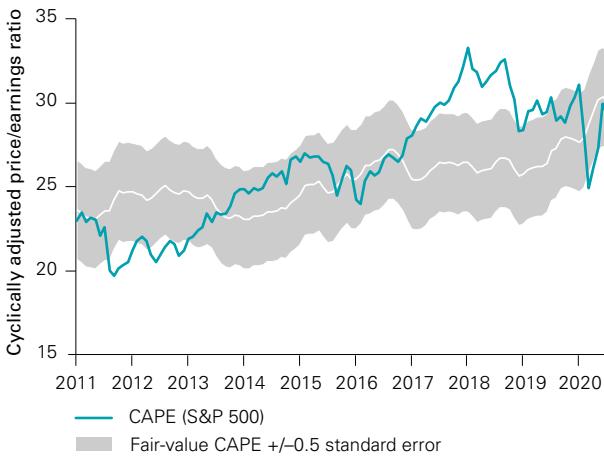
Given lower current valuations, especially in the international market, and a higher fair-value range because of lower interest rates, our outlook for U.S.

and international equity returns has improved compared with our expectations at the end of 2019. As shown in Figure III-9, over the next ten years we expect the average return to be between 4% and 6% for U.S. equities and between 7% and 9% for international equities—60 basis points higher for U.S. equities and 90 basis points higher for international equities than our median expectation at the time of our end-year outlook in December 2019. Therefore, U.S. investors will likely benefit from holding a globally diversified portfolio.

FIGURE III-8

Valuations underpin better outlook for equity returns

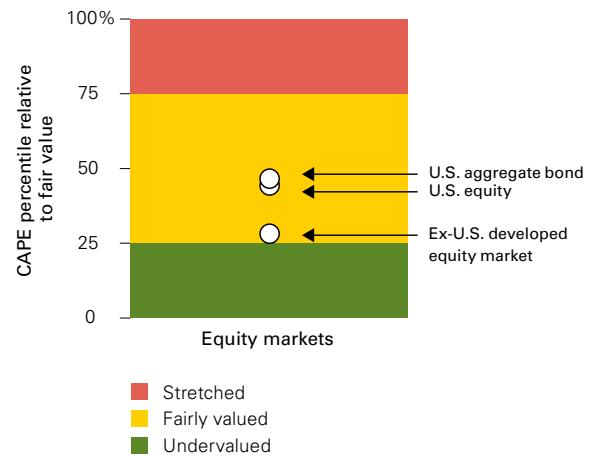
a. U.S. equity market seems fairly valued according to our fair-value CAPE model



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 June 2020. For more details, see Davis, Aliaga-Díaz, Ahluwalia, and Tolani (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.

b. Valuations in the international equity market are more attractive than those in the U.S. market



Notes: For equity asset classes, the U.S. valuation measure is the current CAPE percentile relative to fair-value CAPE for the S&P 500 Index from January 1940 to June 2020. The developed markets valuation measure is the weighted average of each region's (Australia, the United Kingdom, the euro area, Japan, and Canada) current CAPE percentile relative to each region's own fair-value CAPE. For fixed income asset classes, valuation percentiles are relative to 30-year VCMM projections. Intermediate credit and U.S. aggregate bond valuations are current credit spreads relative to Year 30.

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

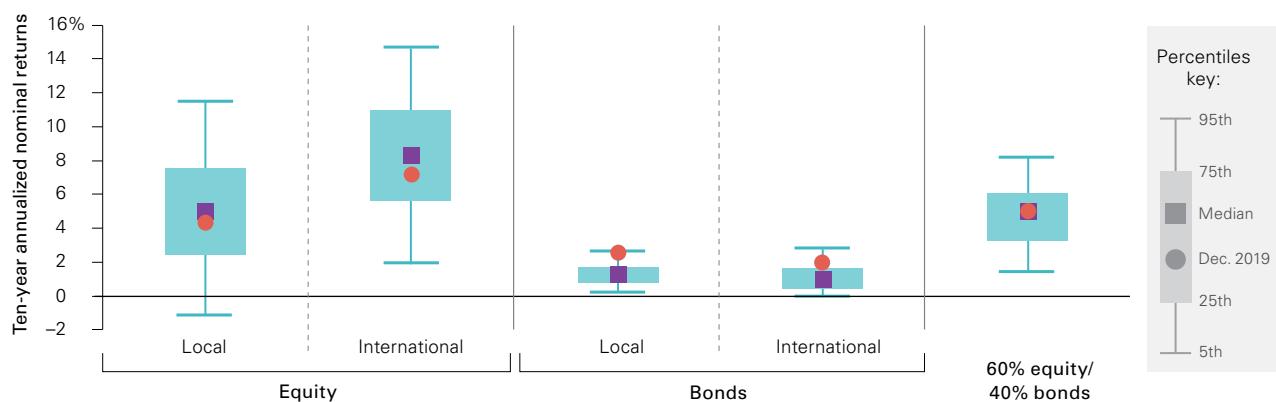
Moving on to the fixed income space, current yields normally provide a good indication of the level of return we could expect in the future. Global fixed income yields have been low in the last few years, and we expect that they will remain low given accommodative monetary policy in the U.S. and internationally. With low yields across maturities, our expectations for fixed income returns in the U.S. and abroad remain muted: between 0% and 2% (Figure III-9), about 100 basis points lower than our expectations at the end of 2019. It is important to stress that despite the low-yield environment and low forecast returns, we still expect high-quality globally diversified fixed income (hedged) to play the important role of a risk diversifier in a multi-asset portfolio.

Overall, the expectation for a globally diversified 60/40 portfolio is slightly below our view at the end of 2019, with an expected annualized return between 3.5% and 5.5% (before costs) over the next ten years.

Finally, despite a brighter outlook for average equity returns and the low return environment for fixed income over the medium and long term, economic and market conditions are continuously evolving as new data become available and market participants process information. As the full distribution of our forecasts suggests, there are still considerable upside or downside risks, such as a second wave of infection that might drive equity returns down or the discovery of a vaccine that will potentially help the economy recover sooner than expected, boosting market sentiment. Therefore, especially in this uncertain time, we urge investors to maintain their chosen asset allocation while carefully assessing the risk drivers of their portfolio and continuing to diversify the risk across asset classes, sectors, and regions in line with their preferences and long-term investment goals.

FIGURE III-9

Equity markets' prospects have improved since the market correction; fixed income expected returns remain subdued



Notes: Forecast corresponds to distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of June 30, 2020, in USD for asset classes shown. See the Appendix section titled "Index simulations" for further details on asset classes shown here. The 60/40 globally diversified portfolio includes home bias of 50% for the equity portion and 60% for the fixed income portion.

Source: Vanguard.

IV. Wider implications of the pandemic

When we released our market outlook in December 2019, we were aware that the “new age of uncertainty” was being significantly driven by important structural changes in the geopolitical environment. The shock of the pandemic has likely accentuated some of these trends and introduced new aspects that may change the way the global economy develops.

Has populism been strengthened by the pandemic or met its match?

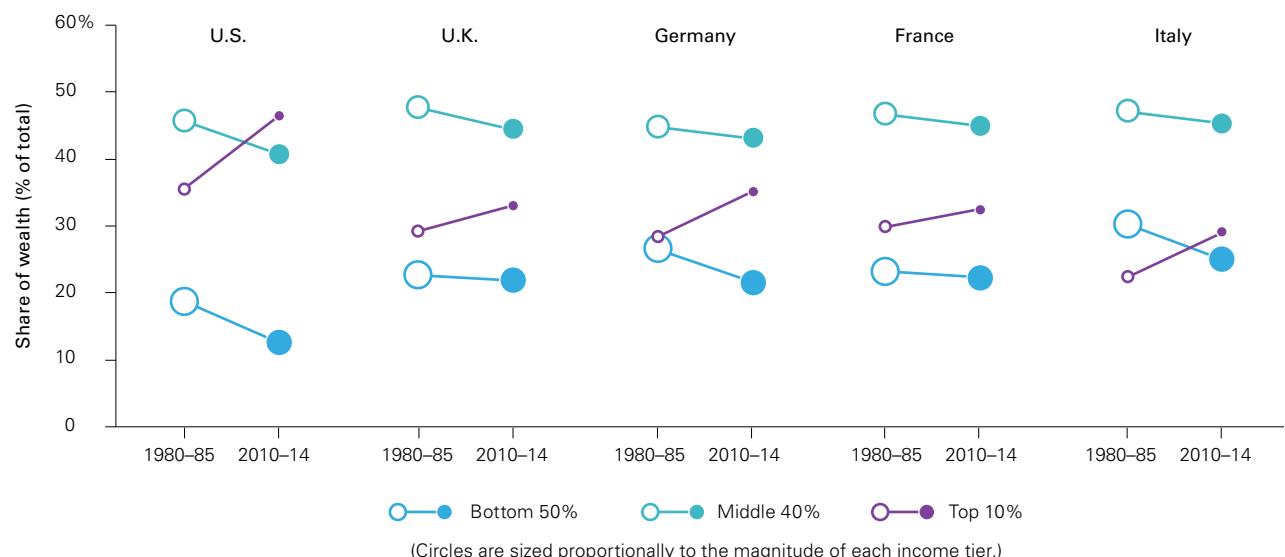
One important consequence of the COVID-19 outbreak is that it has aggravated the suffering of workers in traditional manufacturing industries and weakened the position of employees in the services sector on insecure contracts.

These workers tend to be most vulnerable to economic disruption, so one likely consequence of the pandemic is that economic inequality will increase.

Figure IV-1 shows how inequality has risen over the last 40 years. Across countries, on average, the top 10% of the population in terms of income has seen its share of wealth rise as a percentage of the total. The bottom 50% has seen its share of wealth decrease.

A common thread in populist rhetoric is a promise to improve the conditions of those shut out from technological change and globalization and a tendency to reject mainstream parties that support the status quo and the views of “experts.” From an investor perspective, such parties tend to be fragile electorally and policymaking becomes more unpredictable, resulting in a tendency for higher market volatility. It remains to be seen whether the economic hardship and increased inequality caused by the pandemic will strengthen or weaken the appeal of populist parties.

FIGURE IV-1
Global inequality has been growing



Notes: Wealth is the pre-tax national income share held by a given percentile group. Pre-tax national income is the sum of all pre-tax personal income flows accruing to the owners of the production factors, labor and capital, before taking into account the operation of the tax/transfer system, but after taking into account the operation of the pension system.

Source: World Inequality Database, available at <https://wid.world/>.

Is COVID-19 a defining blow to globalization or the catalyst for its recovery?

One important consequence of the move to populism has been a reverse in the process of globalization and a tendency for countries to favor more protectionist policies; multilateralism in policymaking has waned (for example, with criticisms and withdrawal of U.S. support for the World Trade Organization and the World Health Organization, and the withdrawal of the U.K. from the European Union). The trade wars that were dragging on economic activity before the pandemic are an obvious manifestation of this trend.

It would seem that the COVID-19 crisis also has the capacity to accentuate these developments. Although a pandemic is an archetypal version of a global problem requiring a global solution, the policy response has typically been piecemeal and nationalistic; an example is the coordination of quarantine procedures for intercountry travel. There have been some examples where cross-country cooperation has been more positive, notably in the way countries and pharmaceutical companies have shared information about potential drug research. And in Europe, governments have moved in the direction of more risk-sharing of shocks to activity and revenues between member states in a way that might have been surprising a few years ago.

What comes next for the global powers?

The pandemic is likely to have significant political consequences in the rest of 2020, both locally and globally.

In the United States, the result of the November 2020 general election will likely have a far-reaching global impact. Despite its gradual withdrawal from a global leadership role, the U.S. continues to be a critically important geopolitical player. Because domestic considerations exert a strong influence on the outcome of U.S. presidential elections, the weak U.S. economy

will likely feature as an important issue. If the U.S. administration were to change, we may see a return to more multilateral policymaking. But we would expect U.S.-China tensions to persist, so trade disputes may rumble on even if the Phase One U.S.-China trade deal were to remain in place. A move away from the current administration's market-friendly tax-cutting policies could cause markets to react negatively to a Democratic victory.

The bilateral relationship between the United States and China will continue to have a large bearing on the global economy, with the mutual recriminations relating to the origins of the coronavirus another aspect of that geopolitical rivalry. The U.S. and China are major trading partners. U.S. consumers are important purchasers of China's consumer and industrial products, and the People's Bank of China held \$1.07 trillion of U.S. Treasuries (5% of U.S. GDP) in its foreign currency reserves. But the scope of disagreement between the parties extends well beyond trade to such areas as investment, technology, intellectual property rights, market access, and industry policy. In summary, whatever the result of the U.S. election, we expect economic, financial, and strategic relations between the U.S. and China to remain difficult through the rest of this year and beyond.

In the U.K., the Brexit saga that so dominated the agenda since 2016 has taken a back seat during the pandemic, but the issue is still very much alive. The U.K. and the European Union are required to negotiate a trade deal by the end of this year or the U.K. will be required to exit the EU on highly disadvantageous WTO trade rules under a "no-deal Brexit." Although the pandemic presents a seemingly justifiable reason to delay the deadline, the U.K. government has made it clear it will not request an extension. This is partly because to do so might burden the U.K. with additional financial liabilities, but also because the large Parliamentary majority for the Conservative party was won on a "get Brexit done" ticket. We think an extension is unlikely. For now, the most likely outcome is that a Canada-like free trade deal will be

agreed on by the end of the year, with much scope for further negotiations to continue later. But the risk of a costly no-deal Brexit cannot be ruled out.

In Europe, apart from Brexit negotiations, the political focus has been on providing financial assistance to the hardest-hit countries in the EU. Since those countries tended to be some of the most heavily indebted ones, notably Italy and Spain, there were calls for the EU to establish a “coronabond” version of a euro bond, a form of mutualized debt financed at low German funding rates. In fact, there is still resistance to such an arrangement. Nevertheless, in a highly significant step, the €750 billion EU recovery fund was set up within the EU budget to facilitate fiscal transfers to hard-hit countries. Similar to previous crises like the sovereign debt crisis, the EU has used the pandemic to inch closer to a better-functioning monetary union.

A permanent shift to new ways of working?

Perhaps the most significant change to economic activity as a result of the pandemic is one that is not directly measured by statistics. This is the change to working patterns caused by the increased prevalence of remote working and virtual meetings. For many companies, arrangements such as working from home and virtual business meetings that had previously been the exception have become the rule. And although companies have incurred expense investing in new IT equipment (monitors, laptops, home office furniture, and improved internet connections), the long-run consequence may be for firms to improve productivity. Businesses could see additional savings if they downsize from expensive offices. If this were to happen, it could have significant implications for the prices of commercial property (negative) and residential property (perhaps pushing up prices for suburbs versus cities).

V. Conclusion

At this stage, we know that the global economy has suffered a huge fall in economic activity, and we are fairly certain that the recovery will be slow and protracted. Beyond that, whether our forecasts for economic activity will play out according to our baseline scenario, the upside, or the downside will depend on health outcomes and how policymakers choose to respond.

To reiterate, our baseline embeds an assumption that the emergence from lockdown across the globe occurs alongside a gradual shrinkage in the number of COVID-19 cases and deaths, and where new cases emerge, local lockdowns facilitated by tracking and tracing will keep these outbreaks in check until a vaccine is developed for widespread use. Our assumption is that the new vaccine will become available for widespread use in late 2021 and that life will return to normal, albeit the “new normal” we described in Sections III and IV. Our upside scenario makes similar assumptions, but the return to normal happens more quickly, probably because of quicker medical breakthroughs.

We are acutely aware, however, that the probability weighting on our downside scenario is uncomfortably large. Instances of renewed outbreaks are already occurring, either because original lockdowns were not strong enough (notably in the U.S., U.K., and multiple emerging-market economies where social living conditions make virus suppression challenging) or because new cases are imported from parts of the world further behind on their outbreak curves.

Furthermore, despite some early promising signs, proper testing and effective global distribution of a vaccine will take time. And it is conceivable that an effective vaccine is never developed; after all, vaccines have not been developed for other coronaviruses such as the common cold.

If that bleak scenario becomes apparent, global policymakers will face a choice. They either must put up with the economic disruption caused by social distancing, accepting that cases and deaths will continue to occur, perhaps at manageable levels or perhaps worse. Or else they will have to take on COVID-19 country by country, using appropriately coordinated travel restrictions to try to prevent further spread throughout the global population, and in the best case, eliminating it altogether. This could occur in the same way it did for the two most recent coronavirus outbreaks, SARS and MERS. But admittedly, these cases involved much smaller outbreaks, so it is possible that this strategy would not be feasible.

For now, the risk is that policymakers are placing a lot of weight on the arrival of a universally available effective vaccine, while investors are running the risk of pricing assets close to perfection, embedding assumptions that corporate profitability will be restored soon or that central bank support can maintain buoyant asset markets for the foreseeable future.

In such circumstances, investors will be well-advised, as always, to maintain appropriately diversified portfolios appropriate to their goals. Attempting to time the market during extreme market volatility is tempting but rarely profitable.

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VI. Appendix

About the Vanguard Capital Markets Model

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

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

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

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

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

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

Index simulations

The long-term returns of our hypothetical portfolios are based on data for the appropriate market indexes through June 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. Investments in bond funds are subject to interest rate, credit, and inflation risk. Foreign investing involves additional risks, including currency fluctuations and political uncertainty. Diversification does not ensure a profit or protect against a loss in a declining market. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

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

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

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