



Bloomberg
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Special Report • Bloomberg Economics

Getting Well,
Sticking Together,
Owning the Future
Covid Shock, U.S.–
China Rupture, and
The World in 2050

BLOOMBERG NEW ECONOMY FORUM

SPECIAL REPORT • BLOOMBERG ECONOMICS
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Introduction

2

Getting Well

Seeing the pandemic through an alternative data lens

4

History points to an L-shaped recovery—think “loss”

7

The risks and rewards of printing stimulus money

10

New role, new rules for central banks

13

Americas 2021 forecast heatmap

15

Black jobs matter: How the Fed can target Black unemployment

16

Europe, Middle East and Africa 2021 forecast heatmap

18

Owning the Future

How China won the Cold War: A guide to the world in 2050

42

The costs of climate change: GDP forecasts for a hot planet

46

Winners and losers if globalization spins into reverse

49

The \$31 trillion question: Supercharged tech or pummeled productivity?

51

Older, hotter, slower: Emerging markets’ growing pains

55

Sticking Together

Xi’s nightmare: A U.S. vise on growth

20

Mutually assured destruction: The risks of financial decoupling

23

An alphabet soup of regional trade deals spells growth

26

Asia 2021 forecast heatmap

30

Herding unicorns: How U.S. tensions boost China’s markets

31

What happens to tech if the Silicon Curtain comes down?

34

As relations deteriorate, so will the search for sustainability

38

Getting Well, Sticking Together, Owning the Future, the title of this year's Bloomberg Economics report for the New Economy Forum, speaks to the three biggest challenges facing the world today.

First, getting well by spurring recovery from the Covid-19 recession. We've built high-frequency alternative indicators to track the depth of the downturn and pace of recovery, analyzed the risks and returns from stimulus, and thought through what it all means for the role of central banks. As the world absorbs the lessons of the Black Lives Matter movement, we've also considered how the Federal Reserve could set policy with a focus on the gap between Black and White unemployment.

Second, sticking together by guarding against the risk of the U.S. and China decoupling. We explore the costs to growth if the world's two biggest economies go their separate ways. Teaming up with analysts at Bloomberg Intelligence and BloombergNEF, we examine the finance, trade, technology, and sustainable energy dimensions of the relationship, and what happens in each of those areas if it breaks down.

Third, owning the future. We model GDP growth out to 2050 for the world's major advanced, emerging, and frontier economies. Starting from that baseline, we explore scenarios for geopolitics, climate change, globalization, and technology, and what megatrends in those areas mean for the size of the global economic pie and how it's divided up.

Taken together, we believe the research gathered in this volume represents the best of Bloomberg Economics. We hope it can shed light and fresh perspective on global debates on these vital issues and on the conversation among leaders and opinion formers at this year's very special online New Economy Forum.

Stephanie Flanders and Tom Orlik

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Getting Well

A look at the Covid crisis, alternative data, recoveries past as prologue, the role of central banks, and Fed tools for targeting Black unemployment

Nowcasting the Covid Economy: Alternative Indicators Get Respect

By BJÖRN VAN ROYE and TOM ORLIK

WHAT ELEMENTS OF PANDEMIC LIFE will remain after a vaccine has been found? One contender is alternative data. High-frequency indicators on everything from electricity demand to traffic congestion provided a valuable guide to the depths of the downturn and, now, to the pace of the recovery:

- Bloomberg Economics has used the high-frequency data to create daily activity gauges for 26 of the world's major economies.
- A back test on the performance of the indicators relative to second-quarter gross domestic product readings shows they did a decent job, anticipating 76% of the variation across countries.
- That's substantially better than widely watched purchasing managers' indexes and similar business surveys, which anticipated 60% of the variation.

- The latest readings for our daily activity indicators show activity edging higher, though at a tepid pace, with substantial variation among countries and few approaching pre-virus levels.

This hasn't been a normal year for the global economy. Intensifying lockdowns drove a deep drop in activity, and easing them began a speedy rebound. Conventional data, often based on surveys conducted weeks before release, have been unable to keep up. "This is the stalest jobs report in a decade," the Bloomberg Economics U.S. team said in a preview of the February report.

High-frequency alternative data have moved in to fill the gap. Markets are keeping track of everything from Google's mobility indexes to Moovit numbers on public transport usage and BNEF data on electricity consumption. The new series provide a high-frequency—often daily—read on different aspects of activity.

The problem is, with so many new series, many of them with only a short history, the signal-to-noise ratio is low, and it's difficult to know what to watch and what to disregard.

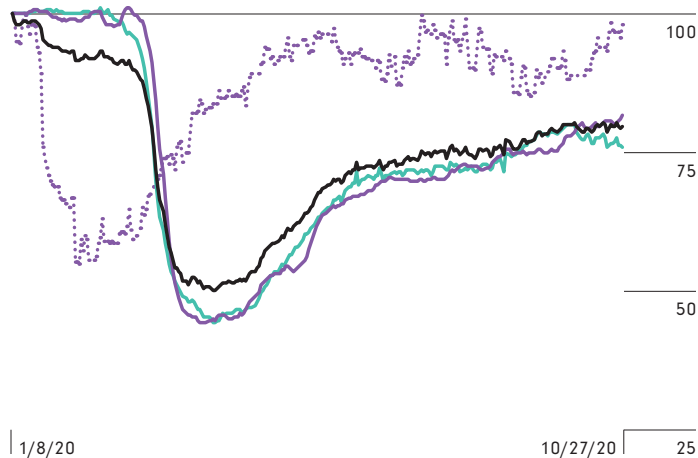
With that in mind, Bloomberg Economics has developed a set of daily activity indicators. We use a statistical filter that identifies components with a high degree of co-movement. Those components are assumed to do a better job of capturing changes in activity, and so are given a higher weight in the indexes. We've produced daily indicators for 26 countries, and added them up using 2019 GDP weights to produce global, advanced, and emerging-economy aggregates.

Looking at the global aggregate, the daily index shows a 50% plummet in output in March, the beginning of a rapid recovery in May, and then a stall, with activity plateauing at about 75% of

Daily Activity Indicators: Global Aggregates

Index value

— Advanced economies — Emerging markets (excluding China) ··· China — Global



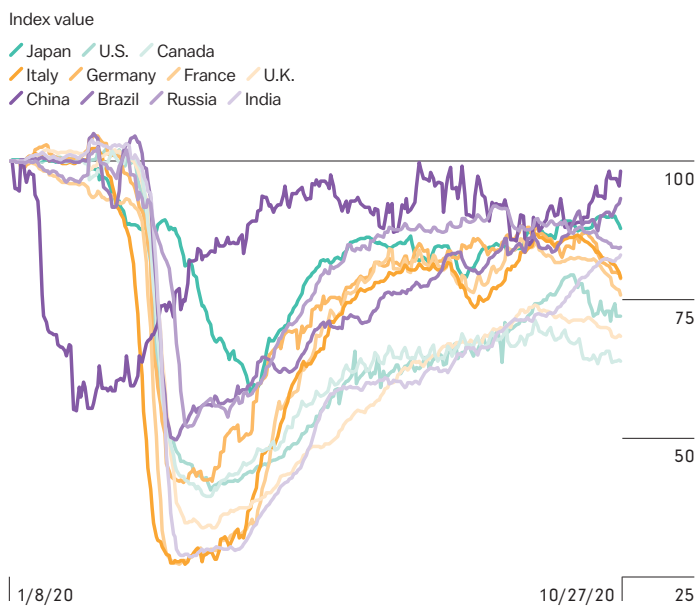
Aggregate indexes are weighted using 2019 GDP weights. Advanced economies include the U.S., Canada, Japan, Germany, France, Italy, Spain, and Australia. Emerging markets include Brazil, Mexico, Argentina, Colombia, Chile, Turkey, India, South Africa, Russia, Indonesia, Saudi Arabia, Taiwan, and Hong Kong. Source: Bloomberg Economics

normal, in July. The most recent data show activity climbing again, though at a slower pace. Excluding China, emerging markets initially suffered a deeper fall and slower recovery, but the latest readings show them catching up with advanced economies (chart above).

Breaking down the country detail, the indexes show that while the downturn affected most economies the same, the recovery has looked rather different. In China, Germany, and Japan, activity has come back to roughly 90% of pre-Covid levels. Italy and France are in the middle of the pack, with activity at 85%. The U.S. and U.K. are the worst-performing advanced economies, with activity at just above 72% of normal in each country. Reflecting the additional challenges faced by emerging markets, India is also in the chasing pack.

While there's scope for further gains, especially if the U.S. gets the coronavirus under control and provides more fiscal

Daily Activity Indicators: Country Level



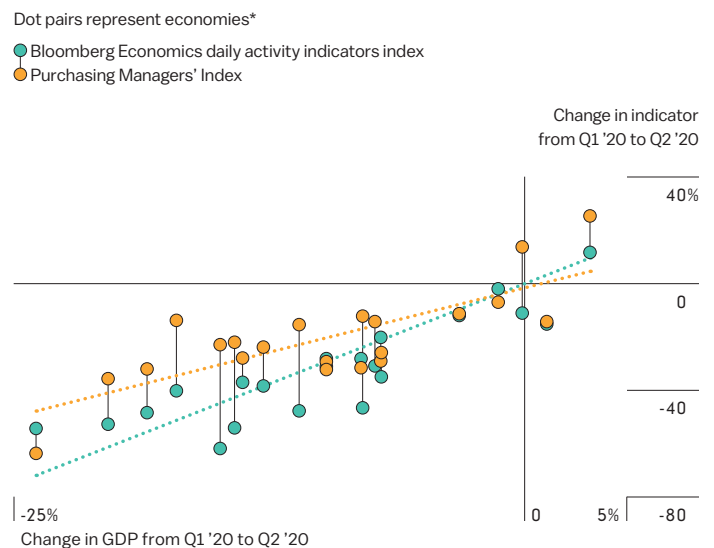
See the table at the end of this article for additional details.
Source: Bloomberg Economics

stimulus, Bloomberg Economics anticipates that activity will continue to bump around below where it was before the pandemic until there's reliable news that a vaccine is widely available.

How do our daily activity indicators do relative to other widely watched measures of growth? In normal times, business surveys such as the U.S. ISM, German Ifo, and Chinese PMI command a significant degree of attention as the best early guide to the pace of growth. In the Covid-19 era, they're facing challenges. Like other traditional surveys, their monthly readings have been rapidly overtaken by events and they may be distorted by sentiment, which tends to be more volatile in times of economic distress.

We back-tested our own daily activity indicators against second-quarter GDP readings across all countries where data were available. A simple linear fit shows that about 76% of variation

Goodness-of-Fit for GDP: Alternative Indicators vs. PMIs



*From left to right: India, U.K., Spain, Mexico, Colombia, South Africa, France, Italy, Turkey, Germany, Brazil, Russia, U.S., Sweden, Japan, Australia, South Korea, Norway, Hong Kong, Taiwan, and China
Sources: Bloomberg Economics, IHS Markit

in second-quarter GDP was anticipated by the alternative indicators. The same exercise with widely watched business surveys showed them capturing 60% variation. On the strength of the early evidence, for the duration of the pandemic and after it fades, alternative data should command a larger share of the market's attention.

Methodology and Caveats

The activity indexes are estimated using a dynamic factor model. This methodology extracts an unobservable latent common factor of the underlying high-frequency data in the spirit of Stock and Watson. The model is estimated with daily figures from Jan. 1, 2020, to Sept. 15, 2020.

The high-frequency data we're using have some obvious ►

advantages—providing a more timely read than traditional data series. They also come with some caveats:

- The high weight of travel and mobility indicators may lead to overweighting this type of activity in the index.
- The index isn't fully comparable across countries because we partly use different indicators for different countries. A complete set of sources is shown in the table below.

• We're aware that the goodness-of-fit with only one observation has its statistical limits. When more data points become available, we will test the nowcasting and forecasting performance of the alternative data indicators in a more formal way.

- Also, the cross-sectional fit doesn't tell us that the alternative indicators are more accurate for each individual country, but rather give us an overall cross-country picture. ●

High-Frequency Indicators Included in Factor Model

Components of national daily activity indexes

Advanced economies	Mobility						Power	Markets	Retail
	Grocery and pharmacy	Transit stations	Retail and recreation	Workplaces	Public transit demand	Truck toll mileage	Electricity demand	Stock market index	Retail footfall
U.S.	●	●	●	●	●		●	●	
Germany	●	●	●	●	●	●	●	●	●
France	●	●	●	●	●		●	●	●
Italy	●	●	●	●	●		●	●	●
Spain	●	●	●	●	●		●	●	●
Japan	●	●	●	●	●		●	●	
U.K.	●	●	●	●	●		●	●	●
Canada	●	●	●	●	●		●	●	
Sweden	●	●	●	●	●		●	●	
Norway	●	●	●	●	●		●	●	
South Korea	●	●	●	●	●			●	

Emerging markets	Mobility					Power	Markets and finance		Retail
	Grocery and pharmacy	Transit stations	Retail and recreation	Workplaces	Public transit demand	Electricity demand	Stock market index	Credit card payments	Retail footfall
Brazil	●	●	●	●	●	●	●		
Russia	●	●	●	●			●		●
India	●	●	●	●	●		●		
Indonesia	●	●	●	●	●		●		
South Africa	●	●	●	●	●		●		
Turkey	●	●	●	●	●		●	●	
Saudi Arabia	●	●	●	●			●		
Mexico	●	●	●	●	●		●		
Argentina	●	●	●	●	●		●		
Chile	●	●	●	●	●		●		
Colombia	●	●	●	●	●		●		

	Forex turnover	Steel bar inventories	Refinery run rate	Electricity demand	Stock market index
China	●	●	●	●	●

Sources: Bloomberg Economics, Google, moovitapp.com, Germany Federal Statistical Office, BloombergNEF, ShopperTrak, Central Bank of the Republic of Turkey, Yandex

'L' Is for 'Lesson of History'— Why Hopes For a V-Shaped Recovery Are Misplaced

By DAN HANSON and YELENA SHULYATYEVA

THE IDEA OF A V-SHAPED RECOVERY, where an economy returns to its pre-crisis path following a recession, is embedded in the thinking of many central banks and the model many investors have in mind. It's also wrong. And that's bad news as the global economy claws its way up from the depths of the Covid-19 trough. The recovery will likely be weaker, and the blow to output more permanent, than most forecasts based on hopes for a V-shaped rebound suggest.

- A look at 36 recessions since 1965 across the Group of Seven countries suggests economies have suffered permanent damage—economic scars—after a downturn, failing 90% of the time to return to their pre-crisis path.

- The depth of the shock is a good guide to the degree of long-term damage. In our analysis, output drops 4.7% on average relative to its pre-recession path, a gap that remains in place for three years. In other words, recessions can be thought of as permanent shocks to the level of output.

- Applying that result to the expected third-quarter shortfall in output after economies reopen would imply a permanent 8% shortfall in global gross domestic product on average across the

G-7 by the end of 2022. The consensus forecast implies a gap of 4%. Either the historical experience isn't relevant this time around or the consensus view is much too optimistic.

Goodbye V, Hello L

During the Covid-19 crisis, letters have become a common shorthand for describing the likely shape of any economic recovery, with a V-shaped rebound the ideal etched in the consciousness of the markets. But it's also possible for economic shocks to lead to permanent losses in GDP—an L-shaped recovery—or, worse still, lower an economy's trend rate of growth.

Our analysis of previous G-7 downturns provides support for this latter view and suggests that hopes for a rapid recovery could prove too optimistic.

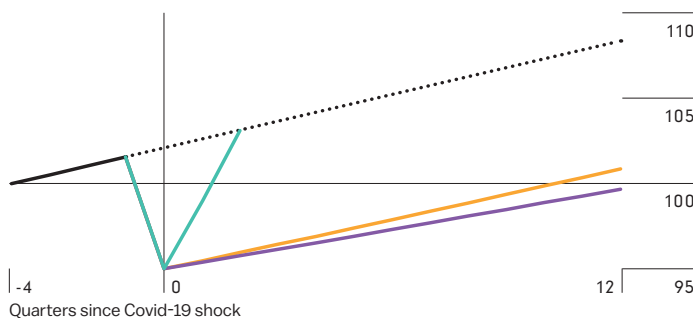
Of the 36 recessions identified, we find only three where output returned to its pre-shock path. For the remainder, there was some degree of lasting damage.

The scale of the hit can vary considerably (chart below), reflecting the differing nature of the shocks and country ▶

Recoveries Take Different Shapes

Level of global GDP (index, 4 quarters before shock = 100)

Actual Pre-virus trend
 V-shaped recovery Level hit Level and growth hit

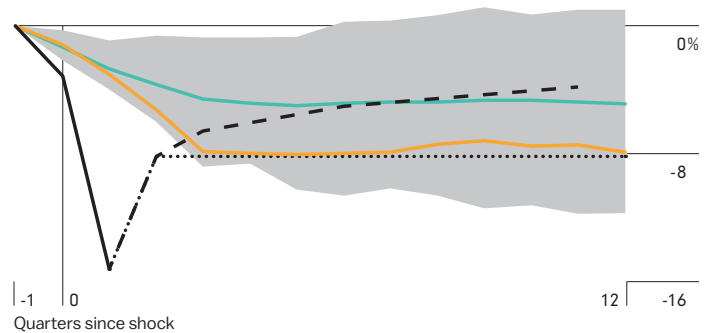


Source: Bloomberg Economics

Recessions Lead to Permanent Losses

Average G-7 GDP, percentage deviation from pre-recession trend

Actual (Covid-19) Estimate based on past recessions Consensus forecast
 Range of past G-7 recessions Average of past recessions Global financial crisis



Source: Bloomberg Economics

characteristics. But the analysis suggests that on average, a recession takes an economy 4.7% below its pre-downturn path and, three years later, the gap remains. In other words, recessions tend to deliver permanent shocks to the level, not growth, of GDP. Our results offer a useful reference point for assessing the degree of permanent damage likely to follow a downturn in an advanced economy.

How the Covid-19 Recession Diverges

Directly applying that result to the Covid-19 recession makes for some depressing reading. With all the economies in the G-7 experiencing record drops in GDP, it would suggest a double-digit loss in output over the next three years. But that ignores the nature of the Covid shock. Record drops in GDP during the pandemic have generally been followed by record increases as restrictions are lifted. That makes the shortfall in third-quarter output a better starting point for assessing the long-term damage than the second quarter.

Using consensus forecasts from the Bloomberg terminal, the average shortfall among the G-7 in the third quarter will be 8%. Based on our analysis of past recessions, GDP could still be 8% below its pre-crisis path three years later—the global financial crisis dealt a similar blow. The estimate is significantly greater than the consensus forecast for the end of 2022, where the shortfall is 4%. In other words, historical experience suggests the long-term damage from the Covid shock could be twice as severe as consensus forecasts—and the markets—are penciling in.

Among the G-7 countries, the U.K., Italy, and France face the biggest hit in the third quarter, and so the greatest danger of significant long-term damage.

Reasons for Optimism

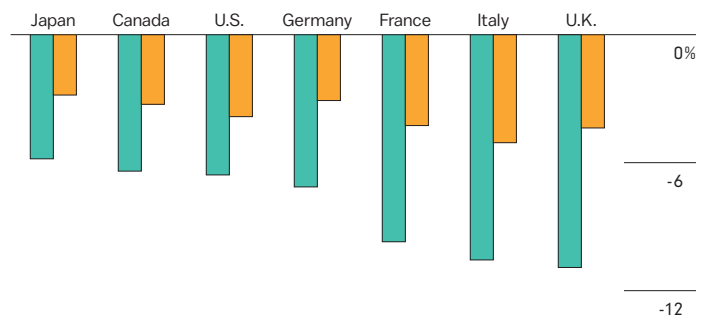
How to explain the optimism of current forecasts relative to what's suggested by the lessons of experience? A number of factors are at work.

For starters, the downturn wasn't brought about by a buildup of imbalances in the preceding years. Recessions following periods of excess leverage, such as the 2008 financial crisis, tend to leave the biggest scars, so their absence this time is a positive. Current weakness also reflects the ongoing constraint of the pandemic—once a vaccine is found and distributed, activity will have another leg up.

Scarring May be Greater in U.K., France, and Italy

GDP, deviation from pre-recession trend

■ Q3 2020 ■ Q4 2022 forecast



Source: Bloomberg Economics

Incomes have been protected thanks to an enormous fiscal stimulus. That helped create a sharp rise in savings while economies were shut down and consumers had far fewer opportunities to spend. As reopening occurs, that pent-up demand could go some way toward mitigating the risk of a protracted period of anemic growth.

Stronger demand would reduce the risk of a long period of elevated unemployment that leads to atrophied skills and long-term joblessness. Such a scenario would cap the growth in wage income and weigh on consumption.

Enhanced work-from-home capabilities are among a number of examples of investment in new technologies during the pandemic, with many companies forced to make services available digitally to survive. Those new technologies are likely to increase efficiency.

The Labor Market Is a Big Risk

But things could easily turn out much worse. With many jobs gone forever as a result of the pandemic, long-term damage to the labor market may be the biggest risk among advanced economies. That's true even in the U.S., where greater business dynamism has meant

that sharp increases in joblessness have typically been followed by rapid gains, leaving the natural rate of unemployment largely unchanged.

With the Covid-19 crisis crossing the six-month mark, many of those who've lost their jobs have already been defined as long-term unemployed. Analysis of flows in and out of U.S. labor markets suggests about 30% of job losses may be permanent. The effects of shadow joblessness—people leaving the labor force either to take care of family members or because they've given up on finding a job—may also persist for an extended period. New entrants into the labor market during a downturn are more likely to accept lower wages, exacerbating the negative impact on aggregate income and spending.

Hit to Productivity

There are also headwinds to investment that could outweigh the boost to productivity brought by technological advancement. Uncertainty surrounding the recovery, supply interruptions, and higher operating costs due to new safety measures will all affect capital spending. The deterioration in corporate and bank balance sheets also poses risks to investment through lower credit availability and higher debt-servicing costs. Permanently weaker demand in some industries is also likely to mean capital is scrapped.

As of now, many of the bad outcomes associated with productivity and the labor market remain risks. Still, analysis of equity market returns shows investors are already betting on a substantial reallocation of profits between companies and sectors—a transition that can only come through a painful series of business failures and redundancies.

With the world facing a second wave of Covid-19 infections this winter, it's not very hard to imagine how the pandemic could inflict significantly more long-term damage than forecasters currently envisage.

Methodology

To generate a counterfactual in each recession episode, we use a one-sided Kalman Filter. The model gives an estimate of trend growth in each quarter (through a “drift” parameter). We use the estimate of potential growth in the quarter prior to the recession to roll the level of GDP forward and create the counterfactual.

Scarring is defined as the percent difference between the counterfactual and the level of actual GDP.

The sample for all countries starts in 1965, with the exception of Germany, where we use data from 1970. A recession is defined as two consecutive quarters of negative growth. We've looked only three years ahead. That choice reflects the trade-off between giving economies enough time to recover and the possibility that the path of the economy is affected by a subsequent recession. If two recessions occur less than three years apart, we discard the earlier downturn, because it would likely overstate any scarring. ●

Was It Worth It? An Early Take On Covid Stimulus

By JAMIE RUSH and DAVID POWELL

THE COVID-19 CRISIS PLUNGED economies into recession and drew a policy response without precedent. As fiscal floodgates swung open, central banks stepped in to smooth the delivery of support to households and businesses. Was it worth putting government balance sheets and monetary credibility on the line?

Early evidence suggests it was. But with a potential price to pay in higher inflation, central banks need to tackle threats to their credibility early.

- Evidence from a Bloomberg Economics model of fiscal and monetary interaction in four major advanced economies suggests that fiscal policy has generally been effective in supporting growth as Covid restrictions were lifted.

- In many advanced economies, fiscal stimulus has been financed by central banks. Right now, that's not a problem—inflation pressure is extremely weak. But should pandemic-era asset purchases prove hard or impossible to reverse, inflation could move higher in years to come, perhaps uncomfortably so.

- As a thought experiment, we look to the quantity theory of money to estimate the potential long-run implications for the price level. We find that prices could be up by about a third or more if debt accumulated during the pandemic is monetized.

- A framework in which the central bank telegraphs what it's willing to finance during a crisis might help square the circle, allowing coordination between monetary and fiscal policy without sacrificing central bank credibility.

Fiscal Policy Has Done a Job

We may never know with precision what impact fiscal stimulus has had on the pace of recovery in advanced economies. Still, we can get an initial impression by asking how fast economies might recover from a hit as big as that posed by Covid-19 without discretionary fiscal stimulus, and comparing that with how fast they have actually bounced back.

To this end, we estimate a Bayesian Panel Vector Autoregression model for the U.S., the euro area, Japan, and the U.K. Central banks, finance ministries, and academics often use this method to analyze the impact of shocks on growth. We take our inspiration for the

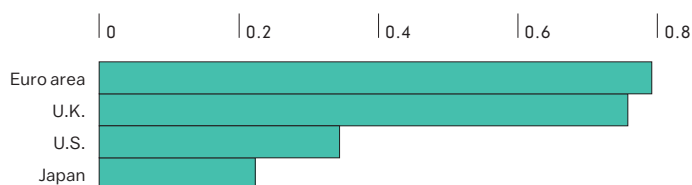
model from an ECB working paper on fiscal and monetary policy shocks.

What we find is that the model forecasts for gross domestic product growth are significantly below what economists expect for the third quarter. The differences are consistent with fiscal policy having had a material, immediate, and positive impact on recoveries in each country.

If we compare the unexpected boosts to growth with measures of discretionary fiscal stimulus, we get an early impression of how effective government spending was in different countries. That exercise suggests fiscal policy has been especially successful in supporting recoveries in Europe, but less so in the U.S. and Japan.

Estimates of Fiscal Impact Multipliers

Pandemic fiscal multiplier (impact on GDP of a one-unit increase in stimulus)



Source: Bloomberg Economics estimates

These findings fit with the narrative. In most European countries, comprehensive fiscal support was delivered swiftly. Furlough schemes—keeping workers attached to their employers—provided highly targeted support, preventing substantial disruption and creating a springboard for recovery.

In the U.S., the first wave of fiscal stimulus came earlier and stronger than expected, but perhaps still too slowly given the speed with which the crisis struck. Stimulus landed after the economy

cratered and relied heavily on outdated state unemployment systems for delivery.

Time limits on the support also created worry about what would happen heading into the third quarter, concerns that proved well founded as stimulus dried up and Congress wrangled about an extension. The U.S. also took longer to get the first wave of the virus under control, another reason fiscal stimulus may have gained less traction.

For Japan, the impact of stimulus looks smaller than elsewhere. That's not hugely surprising given Japanese households' tendency to save money and limit spending in times of heightened uncertainty. As in the U.S., logistical snarl-ups slowed the delivery of support.

Our analysis offers important lessons for fiscal policy in responding to major shocks: move early, go all in, deliver effectively, and tie the continuity of support to economic reality, not political wrangling.

With this kind of close-to-real-time analysis, there are necessarily caveats around the conclusions. The model we've used can't capture everything. Still, the main takeaway is clear: Fiscal stimulus was necessary and effective. Without it, the global economy would be in a deeper hole.

Monetary Financing Was Essential

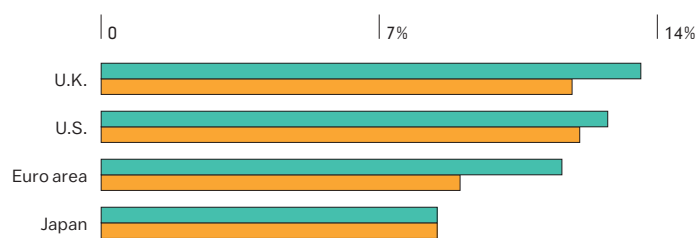
Fiscal policy helped to restore demand. It wouldn't have been possible without central bank financing. Governments entered the crisis with high debt burdens and limited fiscal space. That became abundantly clear as the pandemic took its toll and financing needs grew:

- The U.K. government "would have struggled to fund itself" in March without central bank support. Not our words, but those of Andrew Bailey, governor of the Bank of England.
- A misstep by European Central Bank chief Christine Lagarde sent Italian bond yields rocketing. It took an emergency asset purchase program to bring them back down.
- Dislocations in the U.S. Treasury market had to be addressed with a substantial liquidity injection from the Fed.

Net Asset Purchases and New Borrowing

Metric as a share of GDP

■ Central bank asset purchases ■ 2020 budget deficit increase



Source: Bloomberg Economics

- In Japan, the reality of Abenomics has been coordination between fiscal and monetary policy, with the Bank of Japan a major purchaser of government debt in the secondary market.

As the chart above shows, central banks accommodated the widening of budget deficits in all four economies.

Not Without Risk

At the height of the pandemic, the British government was paying the wages of about one-third of the workforce with printed money. The picture was similar elsewhere. History suggests this can't continue indefinitely without creating inflation and undermining central bank credibility.

Runaway inflation in the current environment is hard to imagine. As a thought exercise, inspired by an analysis of the euro area by Paul De Grauwe and Sebastian Diessner, we use the quantity theory of money to estimate the long-run impact of pandemic-era measures on prices.

Assuming debts accumulated in response to the pandemic are permanently monetized and money multipliers return to ►

Inflationary Risk of Monetary Financing

	2020 Budget balance change (% of GDP)	Money multiplier, 2017-19	Velocity of money, 2017-19	Change to price level
U.S.	-12.0%	4.0	1.4	62.8%
U.K.	-11.8	5.2	0.8	43.0
Euro area	-9.0	4.0	0.9	30.2
Japan	-8.4	2.7	0.4	8.7

Source: Bloomberg Economics

the average of rates seen from 2017-19, pandemic stimulus could raise the price level in the euro area by about 30%, and more than 40% in the U.K. In the U.S., where money circulation has historically been more lively, the impact could be prices rising more than 60%. A moribund monetary system in Japan, with new funds sitting in the bank rather than contributing to demand, points to a long-run increase of less than 10%.

Will monetary financing ultimately pass through to high prices? With output gaps wide, that's a problem for the medium rather than short term. When inflation does appear, the big question is whether pandemic-era programs can be unwound before the velocity of money returns to more normal levels. To the extent that market tremors during the pandemic reflected irrational fear, selling government bonds at a time of calm should be doable. But there's a risk—as we saw during the 2013 taper tantrum, when plans to slow asset purchases in the U.S. prompted turmoil in markets—that it won't be so simple.

Any unwind is likely to be slow, if it happens at all. By moving to an average inflation target, the U.S. Federal Reserve has signaled it will be patient before draining liquidity from markets. The ECB is also mulling strategy, though attitudes in Germany and elsewhere toward inflation make a wholesale rethink of the target less likely.

In either case, strategic tweaks can only buy time. Central

banks will ultimately face a moment when inflation has picked up and liquidity remains plentiful. Once it does, they will have to hope their financial systems can survive a balance sheet wind-down, or learn to live with faster price gains.

Monetary Financing Needs to Be Formalized

Central bank bond purchases keep borrowing costs low when governments need extra fiscal space. That amplifies the impact of fiscal stimulus, and a swifter recovery makes government balance sheets more sustainable as a result. In short, monetary financing is useful and it ought to be in the policy toolbox.

But there are also risks to be managed. A tacit arrangement, with central banks buying as much debt as needed to maintain financial stability, invites fiscal dominance. That erodes the credibility of the central bank, from which the benefits of monetary financing stem.

When central banks need to step in again—a real possibility as virus cases rise—a formal mechanism could help secure the benefits while managing the costs. One option is to have a central bank propose an envelope for purchases during a crisis, which their government can then decide to make use of—or not. Another is simply to be more explicit about possible exit strategies.

Both approaches would help central banks square the circle by financing fiscal stimulus without losing the credibility they need to exit from those arrangements. Of course, containing the risk might kill the magic. ●

Central Banks' Role Needs a Bigger Rethink

By STEPHANIE FLANDERS

THE BASIC MODEL OF CENTRAL BANKS that we have had since the 1990s needs a rethink—that much is widely agreed. In reviewing their policies, both the U.S. Federal Reserve and the European Central Bank have tended to focus on a single pressing concern: how to target inflation successfully in a world where rates seem to be nailed to the floor. But it's not only the central banks' toolkit that needs fixing. In the aftermath of the Covid crisis, they—and we—also need to revisit our understanding of what central banks were put on Earth to do.

Mohamed El-Erian famously dubbed central banks “the only game in town.” They emerged out of the global financial crisis of 2008-09 as seemingly the world's only effective bulwark against economic disaster. We can see how the world has come to rely on the banks by the recent discussion of their potential role in combating climate change. If you want to get something done these days, you ask a central bank.

The global economy's growing reliance and focus on monetary policy has had two related side effects: It's tested central bankers' policy repertoire to the limit, and it's focused more attention on the distributional and efficiency consequences. Most of the official discussion of the future direction of monetary policy in the U.S. and Europe has centered on the first of these issues. But the second is at least as important, and potentially as urgent.

To see why, take a look at what the Fed's recently completed review has—and hasn't—achieved.

It set out to confront a number of interrelated facts about the current environment that have made it more difficult for many central banks to do their job: first, extremely low real long-term interest rates, which predate the global financial crisis and relate to structural shifts in the demand and supply of investment funds which central banks can't directly control; second, a much weaker relationship between rates of unemployment and wage inflation in advanced economies, so that even when unemployment has fallen very far, inflation hasn't picked up.

The upshot of these two is that central banks have found themselves operating more and more at the “zero lower bound”—unable to cut policy rates further and struggling to push real short-term interest rates down.

In such an environment, the Fed has rightly been concerned that a symmetrical 2% inflation target will tend to have an asymmetrical outcome. Knowing that the central bank has more capacity to bring prices down from above target than they have to lift them

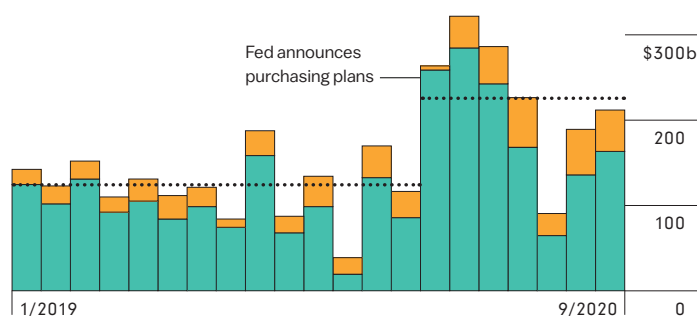
up from below target, businesses and consumers will rightly expect inflation to average somewhat below where it's meant to be. The risk is that these sub-2% expectations become self-fulfilling and inflation over time will chronically undershoot.

But if you asked a reasonably engaged citizen of Europe or the U.S. what they found worrying in their central bank's recent policies, I doubt that failing to prevent a downward shift in long-term inflationary expectations would be top of the list. More likely, they would point in one way or another to the collateral impact on financial markets of

A Surge in Bond Sales

Corporate bond issuance

■ Investment grade ■ High yield . . . Average over period



Source: Bloomberg

superloose monetary policy: how it had contributed to excessive risk-taking in many asset markets, for example, and possibly underwritten a big increase in the wealth of the already well-off.

Public comments by Federal Reserve Chair Jerome Powell and other senior Fed policymakers this summer, in the wake of the Black Lives Matter protests, suggest they understand how costly it could be for the central bank if large chunks of the population come to believe that the Fed isn't making policy on their behalf.

When they began raising interest rates in 2015 to guard against the possibility of inflation, White unemployment was 4.4% and Black unemployment was 8.5%. The Fed can't directly ►

control racial disparities in wages and unemployment. But, as Andrew Husby has shown (page 16), the amended rule that has come out of the policy review would give it more scope to take these differences into account.

Although most have focused on the move to flexible inflation targeting, the change in the Fed's messaging around the employment part of its mandate is arguably more important. By promising to avoid not deviations from full employment, but persistent shortfalls relative to full employment, the Fed is telegraphing that it won't in the future consider very low unemployment, by itself, to be a problem. To many outside the Fed, this will seem a statement of the obvious, but it's welcome all the same.

So the U.S. central bank has made some progress in 2020, not only in updating its approach to inflation but also in strengthening its claim to serve all Americans. But the reality is that its reliance on quantitative easing and forward guidance of interest rates will still leave it extremely dependent on asset markets to transmit future policy.

In effect, all that new language implies is that the U.S. central bank will continue stoking asset prices—and wealth inequality—as long as it takes for the poorest in society to benefit, too. That might seem a very modest step in the right direction for many critics, and one with significant costs attached. It would, however, be a revolution for central banks such as the ECB, which has traditionally defined its mandate narrowly around the single goal of stable prices.

One could argue that Covid-19 has produced a partial antidote to the overreliance on central banks, in the form of extreme fiscal policy. The International Monetary Fund expects gross public debt ratios to rise by more than 20 percentage points between 2019 and 2021 in the U.S. and U.K. and by about 16 percentage points, on average, across the euro zone.

But as Jamie Rush and David Powell point out (page 10), this surge in public borrowing wouldn't have been possible without central banks' printing money. Bank of England Governor Andrew Bailey has said the U.K. government "would have struggled to fund itself" in March without central bank support. Central bank liquidity was equally crucial to maintaining calm in U.S. and continental European bond markets. In that sense, fiscal policy didn't replace extreme monetary policy support—it just spent it.

How you feel about this development will depend largely on what you least like about monetary policy at the zero lower bound.

If it's the distributional consequences that concern you, you might tentatively welcome the fact that central banks are now bankrolling fiscal stimulus, along with higher stock prices and cheap corporate borrowing.

In theory at least, government fiscal stimulus to households and businesses ought to be more equitably distributed than the gains from asset price rises. Although, if the counterpart of the increased government borrowing (and increased central bank liquidity) has been a dramatic rise in private savings, even that result isn't entirely clear. Federal Reserve data suggest that the wealth of the top 10% of U.S. households rose by an extraordinary \$5.6 trillion in the second quarter of 2020 as a result of the buoyant stock market.

If, on the other hand, threats to central banks' independence keep you up at night, you may think the Covid crisis has taken them several more steps down the road to hell. If and when inflation reappears, it's reasonable to ask whether central banks will be quite as keen to raise interest rates if it puts the fiscal sustainability of national governments at risk. Understandably, central banks are keen to maintain "constructive ambiguity" on the question of how they would make these future trade-offs. In a sense, they want the benefits of fiscal dominance—a willing partner in the battle to support the economy—without the reputational costs. But it isn't clear this is going to be sustainable in a world where ambiguous positions by policymakers tend to receive short shrift.

Quite likely, the world would be better off long term if central banks hold on to their independence. To make this middle ground sustainable, however, these institutions probably need to sign up to a broader conception of what they're here for. This would be not only achieving low inflation but also enabling the state—broadly conceived—to deliver better outcomes for people in a world where productivity and rates seem structurally low.

It may feel like a big conceptual leap. But whether it's the ECB's negative rates, or the Fed's purchases of junk bonds, the day-to-day practice of monetary policy has changed beyond recognition in most major advanced economies over the past 10 to 15 years. Recasting their broader mandate to better reflect the complex challenges and pressures of this new environment won't be easy. But now would be a very good time to start. ●

Economic Forecasts

2021 GDP growth forecast

- Above 5%
- 4% to 5%
- 3% to 4%
- Below 3%

1 Canada

2020/21 GDP growth: -5.8%/4.9%
 Central bank rate at yearend:
 0.25%/0.25%

Canada's recovery from lockdowns has been strong. Consumers should keep leading the charge, aided by fiscal firepower and the government's commitment to provide it well into 2021. Scars will linger in energy investment. Export recovery will be tied to U.S. performance.

2 U.S.

2020/21 GDP growth: -3.6%/3.1%
 Central bank rate at yearend:
 0.00%-0.25%/0.00%-0.25%

The delay in the next round of fiscal stimulus will likely weigh heavily on growth at yearend and, to an even larger degree, into 2021. The main risk: a compounding impact from a second wave of infections, a disorderly election, and inadequate policy support.

3 Mexico

2020/21 GDP growth: -9.1%/2.7%
 Central bank rate at yearend:
 3.75%/3.00%

Headwinds from the virus outbreak explain most of the contraction this year and projected slow recovery in 2021. Tight fiscal policy and populist rhetoric from the government aren't helping either. Monetary stimulus and the USMCA trade deal should provide some support.

4 Colombia

2020/21 GDP growth: -7.0%/4.6%
 Central bank rate at yearend:
 1.50%/1.50%

The virus outbreak and low oil prices have conspired to hammer 2020 growth. Expansionary monetary and fiscal policies prevented a sharper drop and helped kick-start the recovery. Immigration from Venezuela is a source of social stress, but also a contributor to higher growth potential.

5 Peru

2020/21 GDP growth: -13.6%/6.8%
 Central bank rate at yearend:
 0.25%/0.25%

Expansionary fiscal and monetary policies helped limit the downside from the virus hit and support the recovery. Ongoing political instability points to risks ahead, imperiling budget responsibility and capping spending by business.

6 Chile

2020/21 GDP growth: -6.4%/3.4%
 Central bank rate at yearend:
 0.50%/0.50%

Lockdown measures account for most of the drop in 2020 GDP, with political uncertainty around the general election next year and the ongoing constitutional amendment process adding additional drag. Fiscal and monetary support has helped limit the downside and support the recovery.

7 Brazil

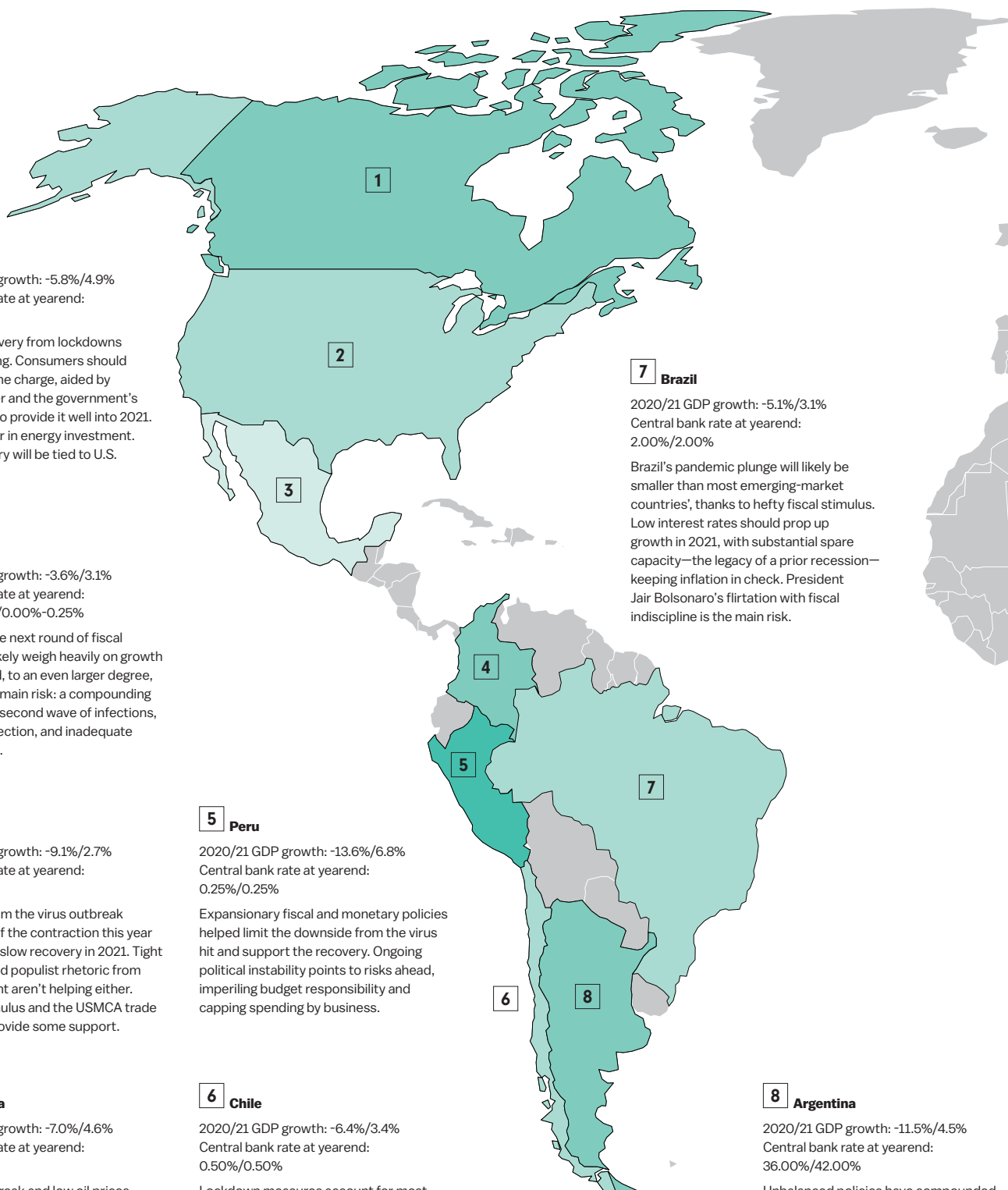
2020/21 GDP growth: -5.1%/3.1%
 Central bank rate at yearend:
 2.00%/2.00%

Brazil's pandemic plunge will likely be smaller than most emerging-market countries', thanks to hefty fiscal stimulus. Low interest rates should prop up growth in 2021, with substantial spare capacity—the legacy of a prior recession—keeping inflation in check. President Jair Bolsonaro's flirtation with fiscal indiscipline is the main risk.

8 Argentina

2020/21 GDP growth: -11.5%/4.5%
 Central bank rate at yearend:
 36.00%/42.00%

Unbalanced policies have compounded with the painful pandemic hit, producing a deep recession and increasing structural stress. Argentina will need to work with the IMF on a strategy to gradually rebalance the economy without increasing poverty. Failure to reach a deal—or comply with it—is the key risk.



How Fed Policy Could Create More Jobs for Black Americans

By ANDREW HUSBY

BLACK HOUSEHOLDS HAVE SUFFERED more than 10% unemployment in 70% of the months since 1972. That's a fire-alarm level that would have triggered massive stimulus had joblessness been that high in the nation as a whole.

Bloomberg Economics explored how the Federal Reserve could help alleviate those racial disparities in the job market. We looked at what interest rates might have looked like had the Fed added Black joblessness to its unemployment target, keeping an eye on that number, too, when deciding where rates should be set.

We used the Taylor rule, outlined in 1993 by economist John Taylor, which suggests policymakers should adjust rates when unemployment and inflation deviate from their targets, augmenting the standard rule by adding a measure of Black unemployment.

The results show the federal funds rate would have stayed lower for longer, with liftoff beginning in 2016 and rates reaching a peak of only 2%, not 2.5%. With the central bank's pivot in 2019—cutting interest rates after hiking them in 2018—Black unemployment fell sharply relative to the national average and inflation was tamed, illustrating the benefits of more aggressive Fed policy.

The bank's new operating framework, which uses a broader definition of maximum employment, also could help redress the inequality in the years ahead. (An important caveat: Our analysis

doesn't estimate the counterfactual path of inflation and other macro variables under lower borrowing costs.)

Benefits (and Limits) of the Taylor Rule

The Taylor rule is a simple way to describe how the Federal Open Market Committee sets the federal funds rate. Policymakers adjust the rate when unemployment and inflation deviate from their targets. We use a version of the Taylor rule in line with the "balanced approach" presented in the Fed's 2020 *Monetary Policy Report*. As inputs, we use: the Laubach-Williams estimate of the real neutral rate of interest; core inflation as measured by the personal consumption expenditures price index; the unemployment rate; and the Congressional Budget Office's estimate of the natural rate of unemployment.

In the chart (below left), we show the Taylor rule prescription under a traditional framework, as well as two alternative ways to incorporate the jobless rate for Black households:

- An augmented measure of the unemployment gap, which adds the population-weighted deviation of Black unemployment from the natural rate to the deviation for the workforce as a whole. There's an element of double-counting, but this formulation explicitly makes the situation of Black households matter without losing sight of the overall macro situation.

- A version where the unemployment rate for Black households replaces the national average. This illustrates the extreme policy response that high Black unemployment would warrant, but it would have been impossible to implement: The zero-bound on interest rates prevents that inordinate policy setting.

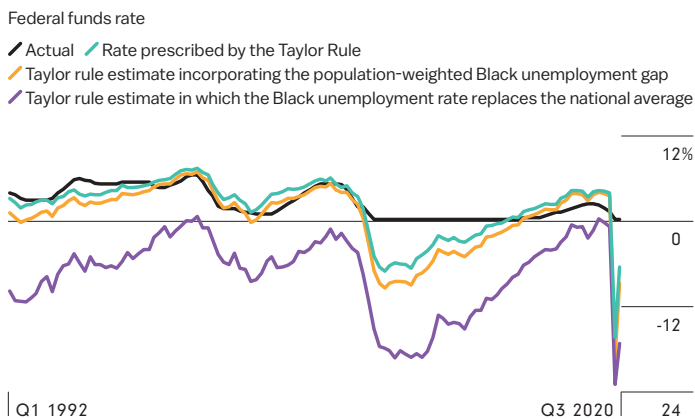
In both versions, the message to the Fed is to be more resolute in providing stimulus during recessions and less quick to pull support during expansions. The most important among our caveats to the analysis is that it leaves out how the economy might have responded in real time to a dramatically different policy prescription.

We haven't examined the counterfactual of how inflation might have reacted to systematically lower rates. Yet the story of the last decade has been one of too-low inflation, in part reflecting more labor market slack than is evident in the traditional unemployment rate. A broader accounting—factoring in higher unemployment for Black households—might have led to more successful policy outcomes.

Labor Market Pain Will Remain Severe

During the coronavirus pandemic, it's even more urgent to use macro policy to address racial inequality in the workforce.

Lower or Much Lower: Taylor Rule and Black Unemployment



Source: Bloomberg Economics

Lockdowns and ongoing public-health concerns have disproportionately hurt the service sector, where Black, Hispanic and Latino workers make up a larger share of the labor force. A familiar historical pattern is playing out as unemployment among non-White groups rises faster than among Whites. Without additional support, it will very likely stay high longer.

The Fed has limited tools for providing direct support to specific racial or ethnic groups—interest rates are a blunt instrument. Even so, the later years of the last expansion showed the potential for Chair Jerome Powell and his team to have a positive impact. The national unemployment rate fell to 3.5% without generating unwanted upward pressure on inflation; among Black households, it dropped to 5.4%, the narrowest margin above the national average on record. Median usual weekly earnings for Black households rose an annualized 3.9% in the three years through 2019, compared with 3.1% for White households. A more hawkish policy stance would likely have trimmed those gains.

Congress May Codify the Fed's Changing Framework

Policy is already moving in this direction. In August, the Fed altered its framework to say its definition of maximum employment is

“broad-based and inclusive.” Congress may codify those changes with an amendment to the 1913 Federal Reserve Act.

Congressional Democrats have proposed legislation that modifies the law so the central bank acts in a way that “fosters the elimination of disparities across racial and ethnic groups with respect to employment, income, wealth, and access to affordable credit” in the conduct of monetary policy, regulation, and enforcement. It would also require the Fed to regularly report to Congress on trends and developments in racial and ethnic disparities. The amendment requires simple majority approval by the House and Senate before going to the president for his signature. The current Congress is unlikely to take up the bill; it would likely require a Democratic Congress and president to pass.

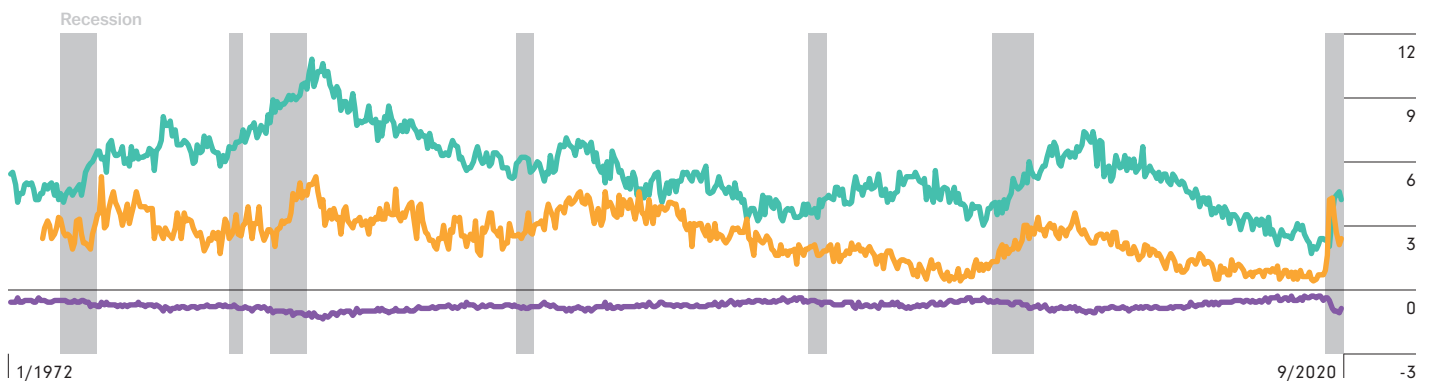
The proposed legislation doesn't prescribe a specific economic rule. Similarly, any analysis using a Taylor rule framework is intended only as a guide to decisions, not something to be mechanically applied. Yet an augmented version, taking into account differences in Black unemployment, could inform policy setting ahead.

Bloomberg Economics expects the next rate hike could be as many as five years away. That timeline could be even longer as racial disparities figure more explicitly in the FOMC's deliberations. ●

U.S. Downturns Disproportionately Impact Minorities

Percentage-point difference between group's unemployment rate in the U.S. and the national rate

Black Hispanic or Latino White



Sources: Bloomberg Economics, Bureau of Labor Statistics

Economic Forecasts

2021 GDP growth forecast

- Above 7%
- 5% to 7%
- 3% to 5%
- Below 3%

Euro area

2020/21 GDP growth: -7.7%/5.4%
Central bank rate at yearend: 0.00%/0.00%

Massive fiscal and monetary stimulus has helped the region recover from the virus plunge. There's a long way to go, and the struggle to contain the virus means growth will likely slow into winter. If local outbreaks spread and intensify, a renewed contraction is likely. The European Central Bank is expected to unveil fresh stimulus before a vaccine emerges. Progress thereafter will be slower.

1 U.K.

2020/21 GDP growth: -9.9%/5.4%
Central bank rate at yearend: 0.10%/0.10%

After a blistering summer, the clouds have started to gather over the U.K.'s recovery. A rising caseload, tightening lockdown restrictions, and a spike in unemployment suggest the recovery will run out of steam in the last months of the year. The Bank of England is likely to expand its asset purchase program in response.

2 Norway

2020/21 GDP: -3.5%/3.4%
Central bank rate at yearend: 0.00%/0.25%

Norway is already on the way back from the Covid-19 shock and the slump in crude prices earlier this year. Virus flareups remain the main short-term risk, but abundant fiscal support provides a cushion for domestic demand and lessens the risk of scarring. We expect a return to the pre-pandemic level of GDP in the second half of 2021.

3 Sweden

2020/21 GDP: -3.5%/2.9%
Central bank rate at yearend: 0.00%/0.00%

Sweden suffered a lesser blow from the pandemic than its peers and is on track for a quicker recovery than initially feared. Although risks remain to the export-oriented economy, resilience of domestic demand will help Sweden return to its pre-pandemic level of output in the second half of 2021.

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4 France

2020/21 GDP growth: -10.1%/7.1%
The economy contracted by a record 19% in the first half of the year. A sharp bounce in May and June began a promising rebound, but the respite was short-lived. A fresh outbreak will likely cause activity to contract into the end of the year—before a vaccine allows for a stronger recovery in 2021.

6 Germany

2020/21 GDP: -5.9%/3.8%
Germany has won plaudits for its handling of the pandemic, taking a smaller hit to growth than European peers. The recovery began with a rapid bounce, due partly to massive fiscal support. Further progress will be slower, with external demand weighing on growth. The danger is that outbreaks escalate, as they have elsewhere in Europe. The reversal of a cut to sales taxes could also act as a drag.

7 Spain

2020/21 GDP growth: -12.0%/6.8%
The country suffered one of the worst shocks from the Covid-19 lockdown, and heavy reliance on tourism weighed on the recovery through the summer. A rapid rise in the virus caseload will likely cause another contraction in the fourth quarter. Government support to the hardest-hit sectors should help most businesses and households get back on their feet quickly once a vaccine is deployed, but risks of more permanent damage remain high.

5 Italy

2020/21 GDP: -9.9%/5.6%
Italy's recovery from the euro crisis had been one of the weakest in the monetary union before the spread of Covid-19, and its economy has been one of the hardest hit in the bloc by the pandemic. After a big expansion in the third quarter, growth in subsequent quarters will be above trend. Italy faces a long, hard slog ahead.

8 Russia

2020/21 GDP: -3.8%/2.9%
Central bank rate at yearend: 4.00%/4.25%
The economy has fared better than expected amid the pandemic and collapse in oil prices, but risks are stacking up. The virus is resurgent, and a spike in political uncertainty has destabilized the ruble. Progress looks set to slow, and backsliding is possible. There's some room for optimism—a head start on a vaccine might deliver a boost by early next year.

9 Nigeria

2020/21 GDP: -3.0%/2.5%
Central bank rate at yearend: 11.50%/13.50%
The nation has been hard hit by the dual shock of the pandemic and lower oil prices. OPEC production cuts, devaluation of the naira, and ongoing foreign exchange restrictions are preventing a swift rebound. The central bank has cut rates to strengthen the recovery, a move that is likely to be reversed next year when the focus shifts back to inflation.

10 South Africa

2020/21 GDP: -8.5%/2.9%
Central bank rate at yearend: 3.50%/3.50%
The country was already in recession going into the crisis. Government stimulus wasn't enough to catalyze a recovery, and long-standing structural constraints continue to hamper growth. Although the central bank has signaled an end to the current easing cycle, the subdued outlook allows for monetary policy to remain accommodative for an extended period.

Sticking Together

A look at the economic, financial, trade, technology, and energy dimensions of U.S.-China decoupling

Xi's Nightmare: How U.S. Containment Could Crush China's Growth

By TOM ORLIK and BJÖRN VAN ROYE

WHAT'S THE COST TO LONG-TERM growth if the U.S. and China decouple? Bloomberg Economics' estimates suggest a bilateral breakdown would be more expensive for China than the U.S., but not a complete catastrophe for either side. The real nightmare for President Xi Jinping would be if the U.S. convinced its allies they should move together to break off relations.

- Decoupling between China and the U.S.—ending the flow of trade and technology that boosts growth potential—would lower China's GDP expansion to 3.5% a year in 2030, down from a forecast of 4.5% if relations remain broadly unchanged.

- For the U.S., potential growth would drop to 1.4% in 2030 because of a breakup, from an expected 1.6% that year without one. The larger impact on China reflects that it's playing catch-up on technology, and so has more to gain from continued cross-border exchanges of ideas and innovations.

- What happens if a second-term President Donald Trump or first-term President Joe Biden convinces Germany, Japan, the U.K., and other allies that China's rise is a threat? Coordinated decoupling by the U.S. and other major economies would be a disaster for China, taking annual potential growth down to 1.6%.

Relations between the U.S. and China have rarely been worse. The trade war that started in 2018 jacked tariffs up from 3% to 20%. Companies and officials have been sanctioned. Consulates have been closed. U.S. Secretary of State Michael Pompeo accused China's top leaders of seeking "global hegemony." President Xi initiated a "dual circulation" policy aimed at isolating China from the risk of U.S. containment.

There are three ways to think about the economic costs: the company level, where corporations facing tariffs and sanctions lose profits; short-run GDP, where tariffs and uncertainty drag on output; and potential growth, where broken trade and technology ties dent long-term potential.

Company-level and short-run GDP costs have been extensively examined. The cost to long-term growth potential, while widely recognized, hasn't benefited from substantial attempts to quantify the impact. Aiming to fill the gap, Bloomberg Economics has made some initial calculations.

We take a three-step approach:

- First, using globalization indexes from the KOF Swiss Economic

Institute and our own measures of potential growth for China, the U.S., and other major economies, we use a small empirical model to estimate the contribution globalization makes to growth.

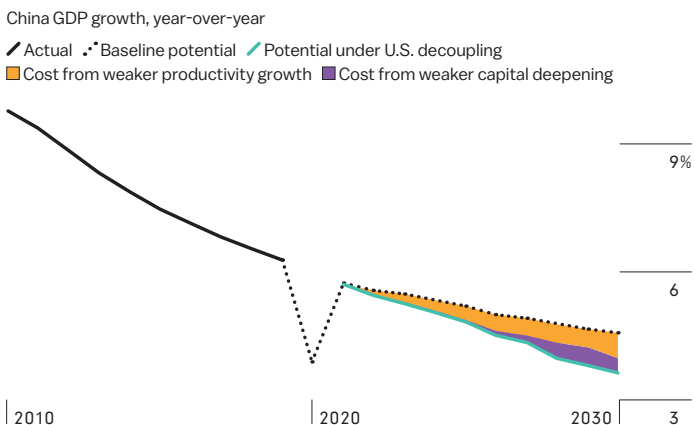
- Second, we assume that the share of gains from globalization attributable to bilateral relations is proportionate to the trade share. For example, about 13% of China's trade is with the U.S., and so we assume that a proportionate share of gains from globalization flows from the bilateral relationship.

- Finally, we explore two scenarios. In the first, there's decoupling between China and the U.S. In the second, the U.S. and other major economies—Japan, Korea, Germany, France, Italy, Spain, the U.K., and Canada—all decouple from China.

In our model, decoupling doesn't require all ties between China, the U.S., and its American allies to be broken. It requires all ties that contribute to potential growth be broken. Trade in soybeans and textiles, where future productivity gains are probably minimal, could continue. Trade in leading-edge technologies would come to an end.

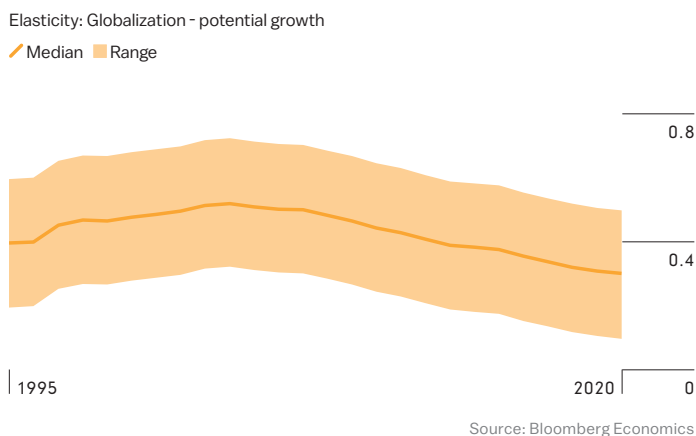
Complete decoupling (chart below) would lower China's

China's Potential Growth: Baseline vs. U.S. Decoupling



Source: Bloomberg Economics

For China, Benefits of Globalization Peaked in 2005



potential growth from 4.5% to 3.5% at the end of the decade—a significant blow but not an unredeemable disaster.

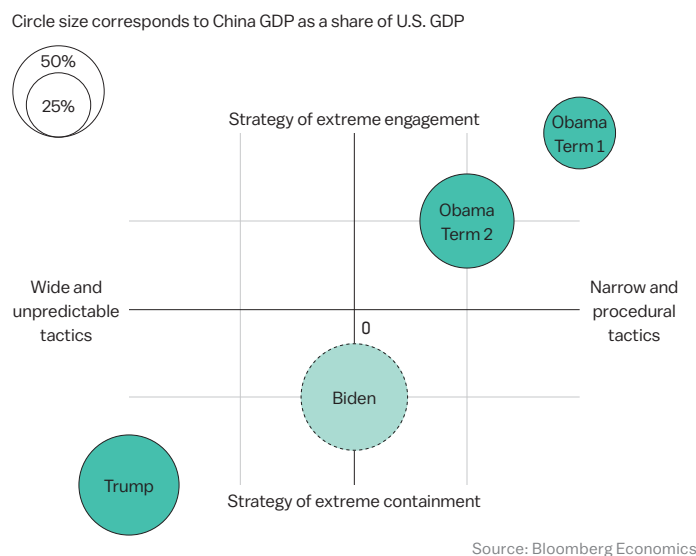
The majority of the drag comes from weaker productivity growth as technology transfer comes to an end. Weaker capital spending, perhaps because Chinese companies find themselves facing a shrunken export market, is a smaller but still significant part of the picture.

For China, Benefits of Globalization Peaked in 2005

An important point to note is that in the last 20 years, China has substantially narrowed its technology gap with the U.S. and other global leaders. As a result (chart above), the benefits it derives from globalization have been reduced. Decoupling in 2000 would have been disastrous for China. Decoupling in 2020 would be costly but not catastrophic. If China moved to increase domestic funding for research and development and expanded its ties with other advanced economies, it could hope to offset a significant amount of the drag.

Bloomberg Economics’ assumption (following chart) is that a Biden presidency would result in at least a partial restoration of

U.S. Approach to China



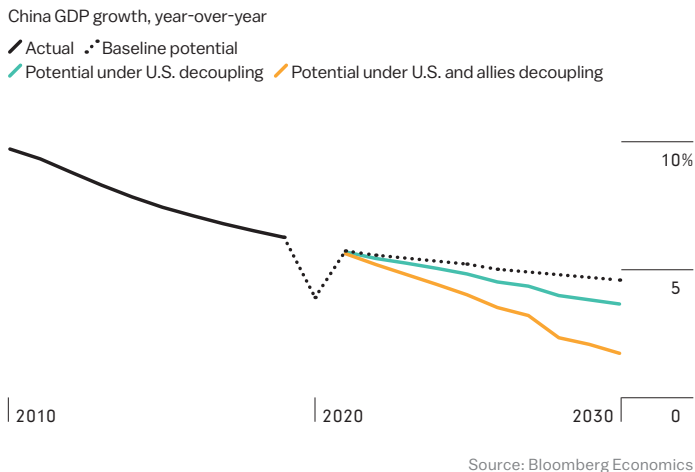
stability to the U.S.-China relationship. That’s not necessarily how things will play out.

What if a second-term Trump, or a first-term Biden, maintains an adversarial approach but does more to bring U.S. allies along with the strategy? In a scenario of coordinated decoupling from the U.S. and its allies (chart, page 22), China’s potential annual growth would fall to 1.6%, a significantly larger blow and one that would be harder for Beijing to offset with countervailing policies.

There’s a lot this analysis leaves out:

- A sudden and disorderly decoupling would almost certainly trigger a collapse in global trade and a severe adverse reaction from financial markets, deepening and extending the Covid-19 recession. Scars from that downturn would intensify the pressure on growth.
- We’ve assumed that decoupling takes place over the course of the next decade, with the impacts distributed equally across years. The reality could be decoupling that’s more or less sudden, ►

China's Potential Growth



with starts, stops, and reversals, which could mean the impact is distributed unevenly over time.

- We consider the extreme possibilities of maintaining existing relations or complete decoupling. The reality is more likely to be a partial decoupling, with ties maintained in some areas and severed in others.

We also don't account for the likely policy reaction to decoupling. If China decided to massively increase spending on R&D and infrastructure investment, for example, it might offset some of the losses from its reduced participation in the global economy. In this respect, the experience of Mao-era China and the Soviet Union, both of which made massive efforts to raise their growth potential but—isolated in autarky—realized few gains, is a cautionary tale.

Methodology

To quantify the relationship between globalization and potential growth in the U.S. and China, we employ trivariate VAR models with time-varying parameters and stochastic volatility (TVP-VAR)

in the spirit of Del Negro and Primiceri et al. (2015). We interact the KOF Institute's aggregate globalization index with Bloomberg Economics' estimates for capital deepening and total factor productivity for the U.S. and China. The point estimate, as well as the uncertainty bands for the elasticity over time, are estimated with Bayesian methods: The uncertainty bands represent 68% of the posterior probability distribution. The model is estimated over a time span from 1980-2019. Structural shocks are identified by means of a lower triangular factorization.

For the scenarios, we run shock-specific, conditional forecast exercises with our model's posterior median point estimates as in Antolin-Diaz et al. (2020). We assume that the globalization index declines below the unconditional forecast by the degree of trade relations between the U.S. and China. For the conditional forecasting exercise, the most recent elasticity estimates from the TVP-VAR are used. All estimates are carried out with the new version of the BEAR toolbox. ●

Mutually Assured Destruction: The Futility of Financial Decoupling

By CHANG SHU

“KILL ONE THOUSAND ENEMY SOLDIERS by killing eight hundred of my own”—an old Chinese saying capturing the futility of self-harming hostilities—provides a clue to understanding the outlook for U.S.-China financial ties. Confrontations in trade, technology, and geopolitics are threatening to spill over into financial markets, with the U.S. pondering sanctions against Chinese banks and China weighing the possibility of selling down its U.S. Treasury holdings. Tensions might be high, but our mapping of China’s financial links with the rest of the world suggests the chances of decoupling are low. For a China keen to strengthen its links to the world, there’s no alternative to the dollar system. For the U.S., hitting China’s banks would also harm its own financial sector and corporations.

China’s global financial linkages have increased over the last decade but remain small relative to the U.S. and tiny relative to China’s economic size and footprint in global trade. In the first

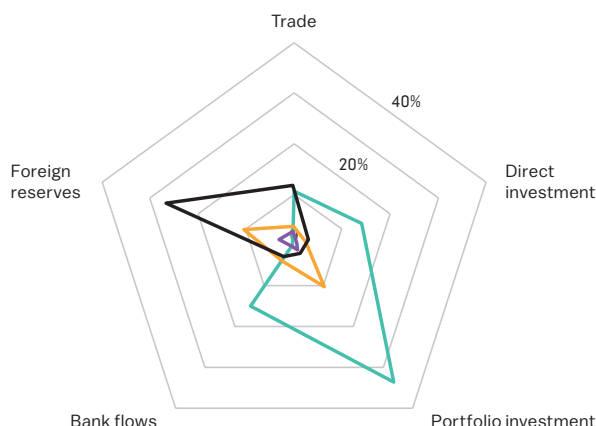
chart (below left), we show flows of trade, foreign direct investment (payment for factories and other physical capital), portfolio investment (stocks, bonds, and other financial assets), bank loans, and holdings of foreign exchange reserves for China, the U.S., Japan, and Korea.

As the chart show, with the exception of FX reserves, China’s role in global financial flows is limited. International linkages of China’s private sector—including direct and portfolio investment and bank flows—accounted for just 2%-3% of the global total in 2018, far less than the U.S. In terms of portfolio flows, China also lagged behind Japan, a much smaller economy but one with a more developed financial system and open capital account.

In the second chart (below right), we show flows of trade, foreign direct investment, portfolio investment, bank loans, and holdings of FX reserves as a percentage of each countries’ own

External Links in Global Context

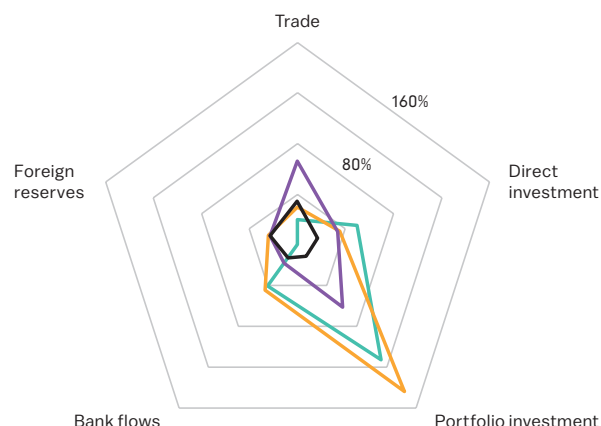
Global share of metric
 China U.S. Japan South Korea



Sources: IMF, Bank for International Settlements, Bloomberg Economics

External Links and Economic Size

Metric as a share of GDP
 China U.S. Japan South Korea



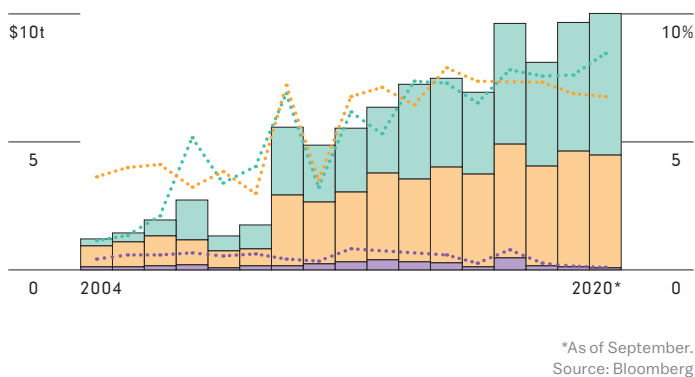
Sources: IMF, Bank for International Settlements, Bloomberg Economics

More Ties to the U.S. Market

Market capitalization of U.S.-listed companies, by nation of domicile, at yearend (left axis)

■ China ■ Japan ■ South Korea

••• Respective share of the U.S. market (right axis)



GDP. China also cuts a low financial profile relative to its economic size. For the U.S. and Japan, the sum of inward and outward portfolio investment exceeds the size of their economies. Even South Korea, at about 60% of GDP, is well ahead of China, at just 11%. China also lags in direct and bank flows.

An Unbalanced U.S.-China Financial Relationship

The U.S. is by far China's single biggest financial partner. The sum of bilateral portfolio investment flows in 2018 accounted for around 30% of China's global positions. Bilateral foreign direct investment accounted for about 14% of China's global position, down from almost 20% a decade ago as trade tensions weigh on the relationship. From the U.S. perspective, financial ties with China are a smaller share of the total. China-related direct, portfolio, and bank flows were only 2%-3% of the U.S. total.

China might need financial ties with the U.S. more than the U.S. needs ties with China, but the dependency runs in both directions:

- Precisely because China is so big and so insular, its financial opening presents a significant growth opportunity for the U.S. The rapid increase in U.S.-listed Chinese companies illustrates the potential: In 2005 there were 36 U.S.-listed Chinese companies, with a total \$260 billion in market capitalization, just a little more than 1% of the U.S. market. Today, 600 Chinese companies valued at a total \$5.9 trillion represent 8.7% of the U.S. market.

- China's \$1 trillion stockpile of U.S. Treasuries—representing 15% of total foreign holdings of U.S. treasuries by foreigners and nonresidents—is a particularly strong linkage. U.S. policymakers and markets have long feared a doomsday scenario, where a collapse in bilateral relations prompts China into a fire sale of its Treasury holdings, potentially triggering a sharp rise in borrowing costs and plunging global markets into chaos.

China's Limited Options

What would financial decoupling look like? A drastic split could see the U.S. slapping sanctions on Chinese and Hong Kong banks—blocking U.S. companies from doing business with them, forcing the delisting of Chinese companies from U.S. markets, and banning U.S. investment flows into China. For China, the nuclear option would be a fire sale of its U.S. Treasury holdings. That's not a possibility China is well equipped to deal with, for two reasons:

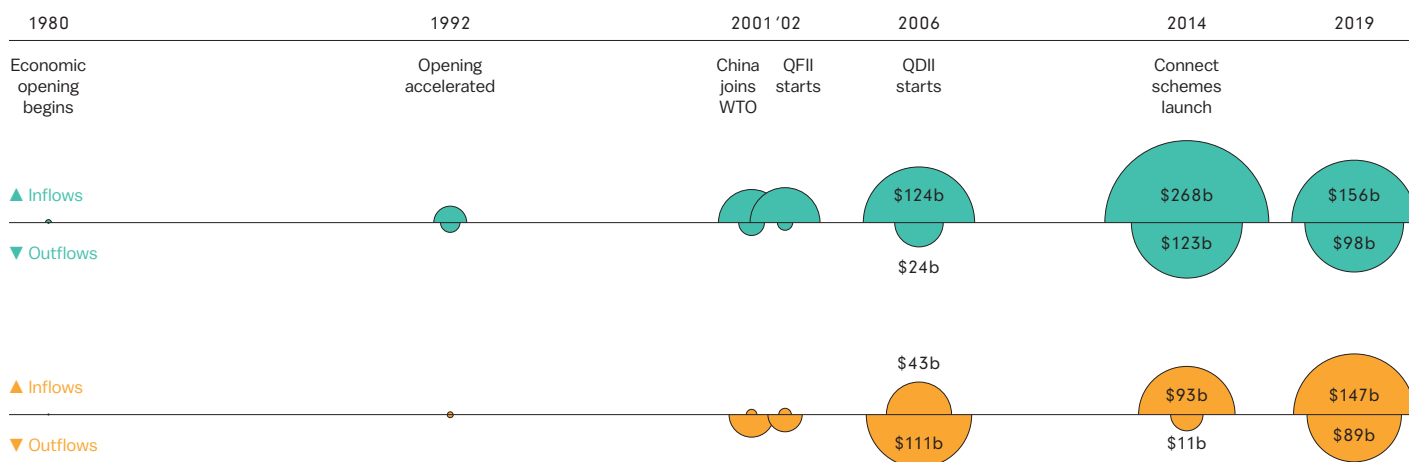
- First, China's vast trade flows lock in dependence on the dollar payment system. True, China has made some strides in internationalizing the yuan. In 2019, 38% of its cross-border transactions were denominated in the yuan. Yet progress has slowed. The adoption of the yuan for payments and for reserves has been slower in recent years than it was from 2010 to 2015. Without more financial opening, which itself requires maintaining ties with the U.S., the yuan is unlikely to make genuine progress toward becoming a viable alternative to the dollar.

- Second, China's reform program requires increasing engagement with global financial markets. Former People's Bank of China Governor Zhou Xiaochuan spoke of the "three-horse chariot" of financial reforms—interest rate liberalization, exchange rate liberalization, and capital account opening. Taken together, the three shifts would take China from a crude, state-controlled financial system to a modern, market-based one—a crucial

Timeline of Investment Flows Into and Out of China

Semicircles sized by value

● Direct investment ● Portfolio flows



Source: State Administration of Foreign Exchange

underpinning of long-term growth ambitions. Financial decoupling would kill one of the horses and likely crash the chariot.

The Case for the U.S. to Sever Links Is Weak

For China hawks in the U.S., the use of influence in global finance to check China's rise is considered a real option. Breaking relations might well cause more problems for China than for the U.S. It would also come at a cost to the U.S.:

- Restricting China's access to dollar trade financing would deal a blow to global trade, hurting U.S. corporations and consumers along the way.

- U.S. financial companies would lose the opportunity to tap the Chinese market, a fast-growth area where Wall Street banks have long sought a foothold.

- The U.S. is more reliant on Chinese savings than China is on U.S. savings, notably through China's holdings of U.S. Treasuries. Conversely, China's high savings rate means it has little need for U.S. funds.

- The deeply interconnected global financial system means that hitting a major Chinese or Hong Kong bank could have systemic consequences. The top Chinese banks are significantly larger than, for example, Lehman Brothers was when it collapsed in 2008.

- Blocking China would create a strong incentive for China (and other countries) to look for alternatives to the dollar system, eroding U.S. financial dominance over the long run.

For the U.S., influence over the global financial system might well prove to be a weapon it can't use without breaking. Strengthening—not severing—financial linkages might be the better bet. ●

Asia's Regional Trade Deals Could Yet Spell Opportunity

By YUKI MASUJIMA

ASIA'S REMARKABLE RISE HAS BEEN driven by trade. The decoupling of the Chinese and American economies—and all that could mean for the region's interconnected electronics supply chain—is a significant risk. There are also opportunities. The Regional Comprehensive Economic Partnership (RCEP) promises to reduce trade barriers among China, Japan, South Korea, and other members. The Comprehensive and Progressive Agreement for Trans-Pacific Partnership (TPP11), a pact that links 11 economies including Japan and Vietnam, could yet prove a vehicle for reintegrating the U.S. with the region.

Bloomberg Economics explores four scenarios, from a worst case of RCEP failure and the U.S. sticking with its 2017 decision to quit the original TPP (TPP12), to a best case of RCEP success and the U.S. returning to the TPP fold. We build a simple model to estimate the future path of productivity growth for the U.S. and major Asian economies under each scenario based on the stock of intellectual property and the impact of lower tariffs on technology transfer. The key findings:

- The biggest swing factor is the U.S. decision on TPP. Plugging the U.S. knowledge stock, measured by how many patents the country has, into the high-quality TPP deal would lead to significant transfers of technology, boosting productivity for other members.
- Formation of RCEP has significant benefits for the participants, but TPP expansion has a greater impact on technology transfers due to its lower barriers to goods and services trade and cross-border investment flows.
- In the best-case scenario—RCEP succeeds and the U.S. joins TPP—the U.S. and China both benefit from a 0.3 percentage-point bump to productivity growth relative to our baseline view. With more still to gain from technology transfer, Vietnam benefits even more, with productivity up 0.6 ppt.
- In the worst-case scenario—RCEP fails and the U.S. stays out of TPP—Japan suffers a -0.2 ppt drag on productivity growth, with China, Korea, and Vietnam suffering a smaller -0.1 ppt drag.

TPP started as a small regional trade agreement among Brunei, Chile, New Zealand, and Singapore in 2005 and expanded to cover 11 countries including Japan and Vietnam. Reflecting growing skepticism about the benefits of multilateral trade, President Trump withdrew the U.S. from the final deal in 2017. China and South Korea, which aren't participants, are working with 13 other economies including Japan to create RCEP and are aiming for an agreement by December 2020. Successful completion of this trade bloc would drive a bigger wedge between Asia and the U.S.

In our model, countries have a stock of knowledge measured by their number of patents. That knowledge is shared with other

Trade Agreement Participants

Nations, by trade pact

- Comprehensive and Progressive Agreement for Trans-Pacific Partnership (TPP11)
- Regional Comprehensive Economic Partnership (RCEP)
- Both



Source: Bloomberg Economics

countries through trade in high-tech goods, which lifts productivity growth. By lowering tariffs, trade deals boost high-tech trade, resulting in more knowledge transfer and faster productivity growth. At one extreme, membership in the TPP—which significantly lowers barriers to trade—by the U.S., with its massive stock of knowledge, would fuel major gains for other members. At the other, membership in the RCEP—which modestly lowers barriers to trade—by Vietnam, with its limited stock of knowledge, would result in smaller gains.

Bloomberg Economics explored four scenarios for the RCEP and TPP. The results below begin with the most likely scenario and end with the least.

Baseline: RCEP succeeds, the U.S. stays out of TPP

In our baseline scenario, China benefits from the formation of a new trade bloc, which opens up more regional trade and facilitates technology transfers from Japan and South Korea. In turn, Japan and South Korea gain from increased trade with Asia's biggest economy. China's greater role in Asian trade, and the TPP excluding the U.S., leads to continued erosion of the U.S.'s economic relationship with Asia.

Scenario One: RCEP fails, the U.S. stays out of TPP

This is the worst-case scenario. Existing barriers to trade stay in place and potential gains from liberalization are forgone. This is a big missed opportunity for China and the rest of Asia, which undercuts growth prospects in the longer term. South Korea is the worst off, followed by Vietnam and Japan. Without RCEP, South Korea could miss some of large trade surplus against China, the biggest hit in GDP, while Japan could lose some benefits from highly developed supply chains in Asia, the largest impacts on the total factor productivity (TFP). The U.S., on the other hand, is better off, reflecting increased trade as the failure of RCEP prompts Asian economies to look west.

Scenario Two: RCEP fails, the U.S. joins TPP

The main implications of this scenario stem from the U.S. re-engaging with Asia, opening up growth opportunities for Japan and, to an even greater extent, Vietnam. South Korea is worse off, however, as the failure of RCEP means lost trade opportunities with China and it isn't currently part of TPP. The U.S. benefits from more integration with the Asian region.

Scenario Three: RCEP succeeds, the U.S. joins TPP, and U.S.-China tensions abate

This an upside scenario, which leads to the lowest barriers to trade. We assume the smaller tensions could boost the total trade volume of U.S. and China by about 10%. It's also the least likely. This is the

best outcome for the U.S., which gains from freer trade with Asia and de-escalation of tensions with China. Vietnam gains the most, tapping opportunities in other parts of Asia and in the U.S. For South Korea, the effect is neutral because it doesn't belong to TPP and our baseline scenario is for RCEP to proceed.

Domestic Knowledge Accumulation

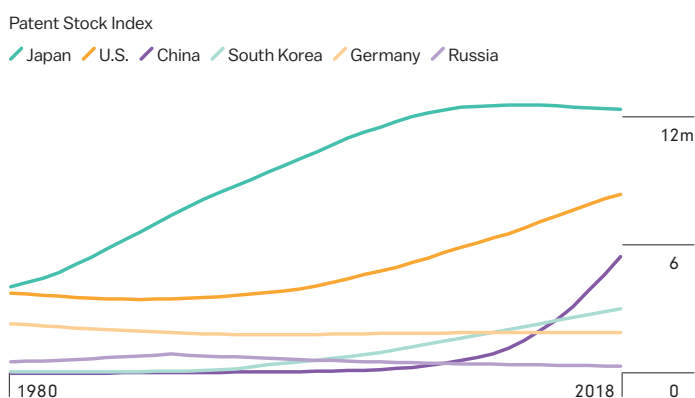
In our model, the domestic stock of knowledge is measured using domestic patent application data back to 1870. New patent applications are added to knowledge stocks every year, with 5% depreciation of existing stocks and a patent quality adjustment for developing countries.

- Japan has led in technology stock accumulation over the past four decades, though the pace of accumulation has slowed in the latest decade—dragging on TFP growth.
- U.S. technology accumulation has increased steadily, accelerating in recent years.
- South Korea has been making headway, but was overtaken by China in 2014.
- China has been accumulating high-tech knowledge by increasing domestic funding for R&D under its Made in China 2025 plan.

Technology Transfers Via Trade

Accumulated domestic knowledge is transferred to other economies via high-tech trade: ▶

China's Rapid Catch-Up in the High-Tech Knowledge Pool



Sources: World Intellectual Property Organization, Bloomberg Economics

Asia-Pacific Trade Agreements: Four Scenarios

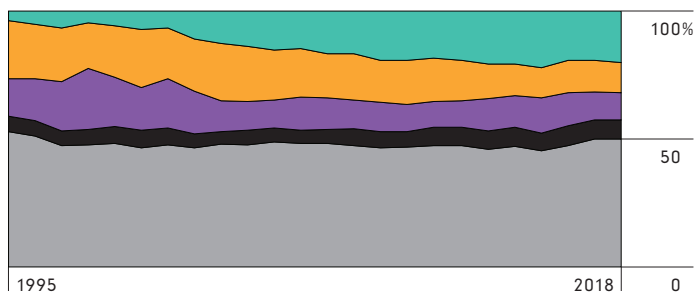
Scenario	Baseline	2		3		4	
	RCEP succeeds; U.S. not in TPP	RCEP fails; U.S. not in TPP		RCEP fails; U.S. joins TPP		RCEP succeeds; U.S. joins TPP	
	GDP in 2030	Deviation	Change in TFP*	Deviation	Change in TFP*	Deviation	Change in TFP*
China	\$24.6t	-0.5%	-0.1	-0.5%	-0.1	1.4%	0.3
U.S.	25.0	0.2	0.0	0.7	0.1	0.9	0.3
Japan	5.1	-1.3	-0.2	0.7	0.1	2.1	0.2
S. Korea	2.1	-1.4	-0.1	-1.4	-0.1	0.0	0.0
Vietnam	0.5	-1.4	-0.1	6.0	-0.5	6.4	0.6

*Percentage-point difference in total factor productivity from baseline. Source: Bloomberg Economics

China Relies on Four Nations for High-Tech Products

Share of China's high-tech imports

■ South Korea ■ Japan ■ U.S. ■ Germany ■ Other



Sources: Bloomberg Economics, BACI trade database

- China's dependence on U.S. high-tech imports has been decreasing.

- China sourced 10.8% of its high-tech imports from the U.S. in 2018, down from 16.8% in 2000. The share from Japan also fell, dropping to 11.8% from 22.8% over the same period.

- At the same time, China's dependence on South Korea for high-tech imports has increased, with the share it sources rising to 20.2% from 6.6%.

- One implication of the trends: China is more resilient to U.S. technology decoupling than it would have been two decades ago.

High-tech trade has a bigger impact on productivity growth than domestic knowledge accumulation because of catch-up—faster knowledge accumulation for less advanced economies—and the wider range of technologies that become accessible.

- A 1% increase in technology transfers boosts TFP growth by 0.8 ppt, while a 1% increase in domestic knowledge stocks buoys TFP growth by just 0.5 ppt, according to our model.

- As for the implications, consider China's ambitions to gain strength in biopharmacy and medical devices, part of its 2025 plan. The U.S. currently has a stronger position in these fields. China could get a bigger boost to TFP growth by importing technology in these areas from the U.S. than by developing its own patent pool.

Free-Trade Agreements Lower Tariffs, Tariff Cuts Raise Economic Prospects

Regional trade agreements increase technology transfers by low-

ering tariffs and allowing the development of more efficient supply chains, boosting productivity growth:

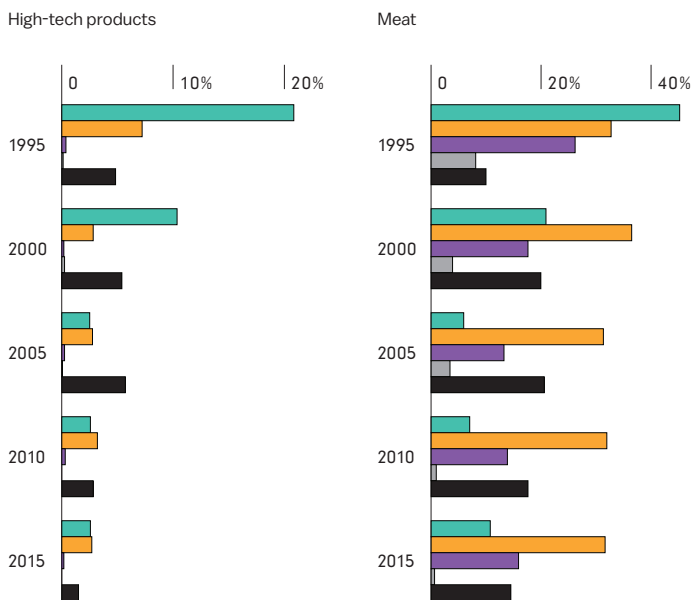
- Japan stands to reap significant benefits from forging trade pacts. TPP could increase the country's real national income by 0.9% by 2030 relative to an absence of a deal, according to research by Brandeis University Professor Peter Petri and others.

- An RCEP deal may increase growth in Asia, but its impact on technology transfer, service trade, and investment could be limited—because the bloc has a lower standard of trade openness (no tariffs on 90% of all products, vs. 99% in TPP). What's more, stipulations related to the environment, labor, state-owned enterprises, and investor-state dispute settlement (ISDS) are limited, probably to avoid unfavorable outcomes for China. ●

China and South Korea Have Room to Lower Tariffs

Import-weighted most-favored-nation tariff rate

■ China ■ South Korea ■ Japan ■ U.S. ■ Vietnam



Source: Computed by Kazunobu Hayakawa, Institute of Developing Economics at the Japan External Trade Organization (IDE-JETRO), using the WITS

U.S. Strong in Biopharma, Medical Device Technologies

Global share of patent publications

■ Share increasing ■ Share stalling or declining



Sources: World Intellectual Property Organization, Japan Ministry of Economy, Trade and Industry, Bloomberg Economics

Economic Forecasts

2021 GDP growth forecast

- Above 9%
- 7% to 9%
- 5% to 7%
- 3% to 5%
- Below 3%

2 India

FY 2021/22 GDP growth: -7.2%/12.7%
Central bank rate at fiscal yearend: 3.50%/3.00%

Stringent lockdown restrictions, a pullback on fiscal support, and a long struggle to flatten the virus curve mean India's GDP is likely to record one of the sharpest slumps globally in fiscal 2021. Easing restrictions, pent-up domestic demand, and a buoyant rural sector should lift GDP over pre-pandemic levels in fiscal 2022.

3 Thailand

2020/21 GDP growth: -8.2%/3.5%
Central bank rate at yearend: 0.50%/0.50%

Thailand's economy was already in recession in the first quarter, before lockdowns intensified across the globe. Even after the virus is under control and borders have fully reopened, consumers may remain wary of travel and cost-conscious businesses may prefer virtual meetings. The government doesn't expect its key tourism sector to recover to pre-virus levels for many years.

4 Malaysia

2020/21 GDP growth: -6.6%/5.7%
Central bank rate at yearend: 1.75%/1.75%

Malaysia recorded a staggering 17.1% year-on-year plunge in second-quarter GDP, the worst in Southeast Asia. Nevertheless, the central bank is focused on indicators of recovery from reopening and the three-pronged fiscal-monetary-financial policy supports already in place. That suggests Bank Negara Malaysia has finished easing, absent a resurgence in the virus.

5 Singapore

2020/21 GDP growth: -5.8%/4.2%
Central bank rate at yearend: NA/NA

Economic activity has steadily recovered from the low in late April—midway through the government's intense "circuit breaker" period. The continued decline in new Covid-19 cases since then and the low death rate have paved the way for a gradual reopening that is seen persisting through the end of 2021.

1 Mainland China

2020/21 GDP growth: 2.0%/8.2%
Central bank rate at yearend: 3.75%/3.65%

China was the first to enter the Covid-19 shock and the first to exit. The economy should grow in 2020—unique among major economies—and faces limited recession scars. The main risk: setbacks to exports and technology transfer as relations with the U.S. deteriorate.

8 Japan

2020/21 GDP growth: -5.5%/2.6%
Central bank rate at yearend: -0.10%/-0.10%

Taking the reins of Abenomics, Japan's new prime minister, Yoshihide Suga, is making a fresh push on structural reforms and appears prepared to boost already-massive government spending if the recovery falters. That's looking more likely, with the rebound from a deep contraction this year already losing momentum.

9 Philippines

2020/21 GDP growth: -7.6%/8.0%
Central bank rate at yearend: 2.25%/2.25%

The economy faces lasting scars from the pandemic. A lockdown—among the world's longest—has triggered widespread bankruptcies and double-digit unemployment. Limited fiscal support added to the problems. An infrastructure investment plan should aid the recovery but will hinge on successful implementation.

6 South Korea

2020/21 GDP growth: -1.0%/4.0%
Central bank rate at yearend: 0.50%/0.50%

South Korea has fared better than most in the pandemic. Its widely praised public-health response has so far limited the human toll, while aggressive fiscal and monetary stimulus has softened the economic blow. The global slump will drag the trade-oriented economy into contraction this year, but relatively limited scarring should help position it for a rebound in 2021.

7 Indonesia

2020/21 GDP growth: -1.9%/3.0%
Central bank rate at yearend: 4.00%/3.50%

Indonesia is struggling to contain the virus. Renewed tightening of social distancing restrictions in the capital and surrounding areas in September suggests the economy will continue to contract through early 2021. Even when cases abate, the recovery will be hampered by restricted travel, income losses, and higher debt burdens.

10 Australia

2020/21 GDP growth: -3.3%/2.6%
Central bank rate at yearend: 0.10%/0.10%

The economy has suffered a second virus hit, which has damped, rather than derailed, the recovery. With border closures still in force, policymakers now face a multi-speed domestic recovery. Further easing is likely to be required. Mining and agricultural sectors are likely to provide a boost in 2021.

11 New Zealand

2020/21 GDP growth: -5.7%/4.2%
Central bank rate at yearend: 0.25%/0.00%

A severe lockdown nearly eliminated the virus, enabling a full reopening of the domestic economy. International travel restrictions will limit tourism, restraining growth until a vaccine is available. Substantial fiscal support is in place. Further easing is likely, but we see negative rates as a risk, rather than a reality.

How Decoupling Risk Could Give China's Markets a Boost

By PATRICK WONG, SHARNIE WONG, and FRANCIS CHAN

BLOOMBERG INTELLIGENCE

DECOUPLING FROM THE U.S. COULD CREATE a windfall for China's financial sector as it gains a larger share of the global initial public offering market, attracts overseas investors to its derivatives market, and fuels the world's fastest-growing pool of wealth. On the other hand, if relations with the U.S. worsen, foreign companies might opt to pull out of the country or delay plans for expansion there. And the country's move to lower borrowing costs to sustain growth could come at the expense of its banks.

Thanks to a strong IPO pipeline of domestic unicorns—startups worth more than \$1 billion—and Chinese companies shunned by American exchanges, China's share of the global IPO market could rise to 45% during 2021-25, from 30% now. And with the country on track to become the world's fastest-growing creator of wealth—investable assets could reach \$39 trillion by 2025—global private banks may be keen to tap that vast client base.

China's IPO Pipeline Could Top the Global Market

China could top the global IPO market over the next five years because of reforms to its domestic capital markets, a strong pipeline of unicorns, and U.S. threats to delist Chinese tech giants, which could prompt those companies to shift to their home exchanges.

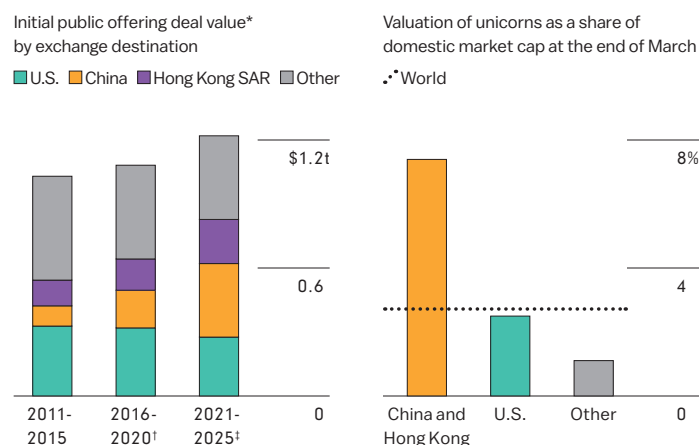
The capital market reforms include easier listing rules and procedures for Shanghai's Star Market and ChiNext, a Nasdaq-type arm of the Shenzhen exchange, all of which should benefit unicorns. We estimate Chinese unicorns are worth 7.4% of China's domestic stock market capitalization, almost triple the 2.5% share of U.S. markets that big American startups represent, playing a much larger role in Chinese markets than American unicorns do in the U.S.

The Shanghai, Shenzhen, and Hong Kong exchanges' combined share of the global IPO market may reach 45% in 2021-25, up from 30% in 2016-20, we calculate, assuming all Chinese companies listed in the U.S. move home, which is likely to happen unless they're willing to comply with U.S. audit requirements. Ongoing financial market reforms and greater mutual market access between China and overseas could also favor domestic listings.

A key risk to China's robust pipeline of IPOs would be a delay by the U.S. House of Representatives of a Senate bill that could result in the delisting of Chinese companies from U.S. exchanges, or the House's failure to pass the bill. Under the Holding Foreign Companies Accountable Act, the Securities and Exchange Commission would require U.S. national exchanges to keep companies from listing if they don't allow Public Company Accounting Oversight Board inspections. Also, a stock market downturn in China could weigh on the valuation of unicorns.

Chinese brokerages are expected to reap benefits as the country continues to open up its markets. Greater revenue from a growing number of domestic listings should benefit such brokerages as CSC Financial, CICC, and Citic Securities, which have strong institutional client bases and dominate the initial offerings of China's A-shares. After restrictions on foreign ownership of brokerages are further lifted on Dec. 1, global companies such as Goldman Sachs, J.P. Morgan, Morgan Stanley, Nomura, and UBS are expected to expand their investment banking presence in mainland China by raising their stakes in Chinese securities joint ventures to as much as 100% from the current cap of 51%.

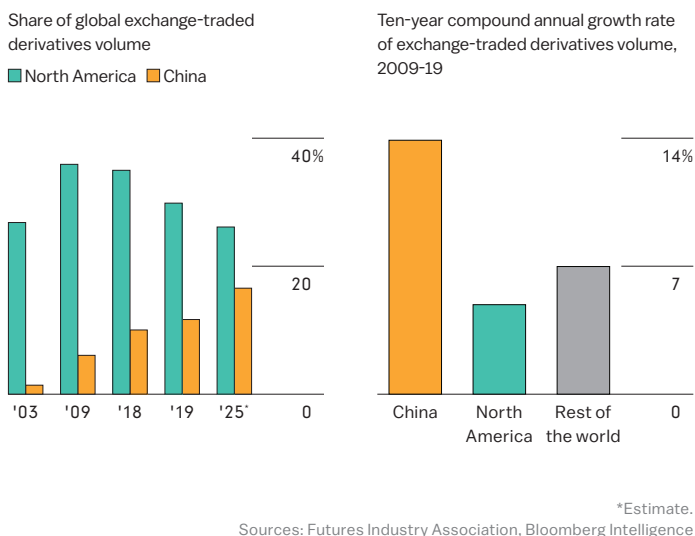
China Could Dominate Global IPO Market Share



China to Gain More Global Derivatives Volume

China's five commodity exchanges could grow quickly, as policymakers move away from global pricing benchmarks amid heightened tensions with the U.S. and allow foreign investors to participate in a wider range of commodity futures. Chinese exchanges could gain market share from established bourses, including the CME and ICE, Hong Kong's HKEX, and SGX in Singapore. China's crude oil futures on Shanghai's International ▶

China to Play a Larger Role in the Derivatives Market



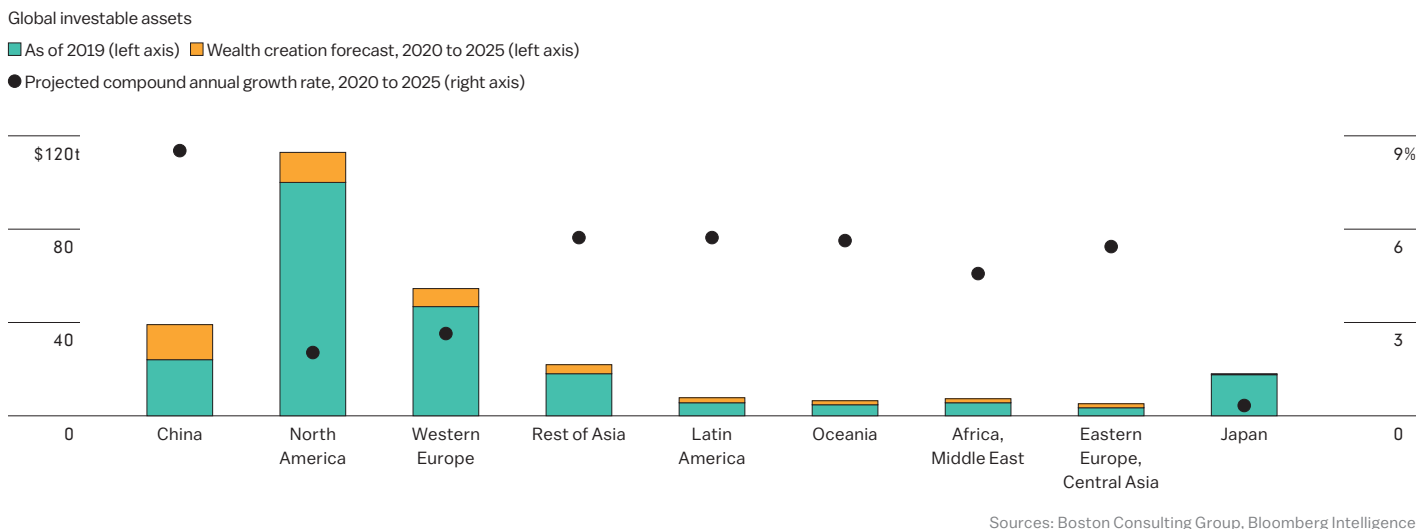
Energy Exchange, launched in 2018, have eroded some trading volume share at CME and ICE. London Metal Exchange, owned by Hong Kong Exchanges, could be threatened when foreign participation in China is expanded to nonferrous metals.

China's share of the global exchange-traded derivatives volume could surge to 16% by 2025, from 11% in 2019, led by commodities, based on our scenario analysis. The country plans to become a price setter for key global resources, reducing the dominance of overseas exchanges, especially if it further decouples from the U.S. and its allies. Following the opening to foreign participants of futures for crude oil, iron ore, and other commodities, regulators may prioritize China's other sizable imports, including soybean and palm oil futures.

Global Managers Aim for Chinese Wealth

Global private banks may expand their operations in China and Hong Kong unless a complete Sino-U.S. decoupling unfolds. China could be the world's fastest-growing wealth creator, boosted by rising economic prosperity, more high-net-worth and affluent individuals, and a high savings rate. Its investable assets could rise 8.5% annually over the next five years, to \$39 trillion, by 2025,

China Could Lead Global Wealth Creation



outpacing emerging and developed markets, based on our calculations. Overseas banks are dedicating more resources to their operations in China as authorities ease limits on foreign ownership and grant more licenses for fund custody, among other reforms. Credit Suisse Group AG expects to double its head count in mainland China in five years, while HSBC Group plans to hire 2,000 to 3,000 wealth planners within four years.

The Greater Bay Area (GBA), which consists of Hong Kong, Macau, and nine cities in Guangdong province, could more than double the domestic private wealth market of Hong Kong-based managers in the next decade. The coming Wealth Management Connect, unveiled in June, will allow cross-border investment in financial products within the GBA.

Mainland Chinese clients could fuel Hong Kong’s wealth-management business, even if some shift capital away because of tensions caused by the city’s national security law. Assets under management from mainland and local investors could rise more than 10% annually, to HK\$10.8 trillion, by 2025, making up 70% of Hong Kong’s total, based on our scenario analysis. The city has long been a preferred destination for mainland wealth because of its close proximity, low tax rate, cultural similarities, and global access.

Global Banks’ China Business Could Outpace—or Halve—Depending on U.S. Ties

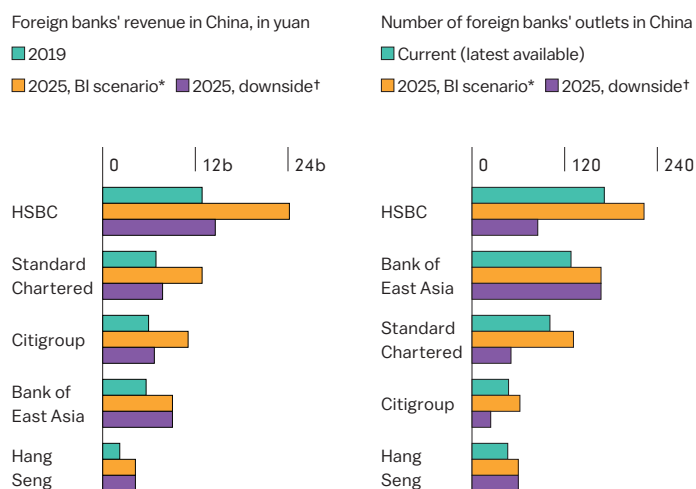
Foreign banks’ profit could outpace the Chinese banking sector if ties don’t break down, based on our decoupling scenario, or their asset share in China could be halved by 2025. China eased rules on custodian services and bond underwriting this year, after earlier allowing overseas banks payment and bank-card clearing. Restrictions on branches, local incorporation, ownership, and capital were scrapped in 2019.

Foreign banks may pursue retail deposits and lower funding costs via more branches, while fund and insurance sales could fuel fee growth. In a scenario of sustained Sino-U.S. business ties, HSBC could double its Chinese revenue in five years and expand its branch network by 30% given the Greater Bay Area’s potential. The same could apply to Citigroup and Standard Chartered.

Financial Reform Push Could Exact a Price From China’s Banks

China’s growing push for financial reform, partly driven by the threat of decoupling, may come at the expense of its banks. Its interest-rate reform could deliver a hit to banks’ margins and

For Foreign Banks in China, a Wide Range of Outcomes



*China’s relations with the U.S. and its allies remain unchanged. Foreign banks maintain their current pace of expansion in China. †China decouples from the U.S. on major economic issues within five years. Some foreign banks may pull out of China. Sources: Company filings and websites, Bloomberg Intelligence

returns, echoing the earlier blow dealt by loan and deposit-rate liberalization through 2015. The country seeks to improve the transmission of monetary policy, or how changes to the interest rate affect economic activity and inflation, while trimming borrowing costs for private companies, especially in the aftermath of Covid-19. Banks are being asked to tie their lending rates to funding costs, with the Loan Prime Rate (LPR) as their new benchmark, reducing loan yields. The banking sector’s return on equity may drop to 10% in 2025, vs. about 11% in this year’s first half, based on our scenario analysis, with margins possibly losing 15 basis points on a 65-bp drop of the one-year LPR.

China’s financial reforms may include more capital market or direct financing as the country pares its reliance on bank loans over the long haul, part of a shift to use more fluid funding to keep economic growth humming under the new five-year plan. Lending growth may be limited as the role of banks in China’s economy shrinks. ●

The U.S.-China Tech Cold War: Advantage, U.S.

By ANAND SRINIVASAN, MASAHIRO WAKASUGI, JULIE CHARIELL, AND ANURAG RANA

BLOOMBERG INTELLIGENCE

CHINA'S DOMINANCE IN ELECTRONICS assembly won't be enough for it to thrive in the escalating U.S.-China technology cold war, a conflict that could weaken global technology advancement. Without a strong, vertically integrated industry, the country is unlikely to overtake the U.S. in its tech dominance. From semiconductors to chip equipment to design software, the building blocks needed to make the tech devices the world depends on are largely built in the U.S., Taiwan, and Europe—not in China.

China certainly has its strengths—its scale in hardware assembly, as well as its powerful e-commerce, online payments, and electronic banking systems—and the increasing demand for ultrafast wireless during the pandemic could spur its growth in 5G technology. But to thrive, it will need capital, time, effort, talent, and a global buy-in of its design and supply chain initiatives. With a push by government to use China-made products, the country could make inroads in the highly fragmented analog-semiconductor industry, which makes ubiquitous chips for electronic devices. Even if demand for 5G grows in China, the country remains at a disadvantage in this key battleground for tech dominance: the production of cellular connectivity chips for 5G and high-performing advanced processors for smart devices.

The U.S.'s hurdles are daunting—its reliance on China's efficient manufacturing ecosystem for complex products with volatile demand patterns has developed over decades. Yet they're easier to manage and mostly involve the cost of re-creating or finding other sources for complex hardware now made in China.

Critical Tech Building Blocks Aren't Made in China

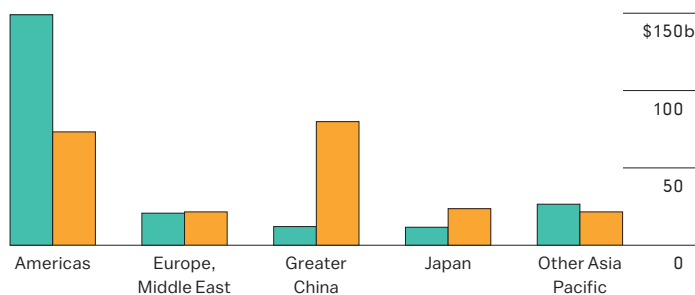
A broad universe of non-Chinese companies supplies the building blocks of the tech industry, and China depends on them. In semiconductors, it needs processor design skills and intellectual property (IP) from Arm Holdings, Intel, Nvidia, and Qualcomm; chip equipment from the likes of Applied Materials, Tokyo Electron, ASML Holding, and KLA; foundry services such as those from Taiwan Semiconductor Manufacturing; and software like that from Cadence Design Systems.

Cellular connectivity chips for 5G and high-performing advanced processors for smartphones are critical and would take years to reproduce without U.S.- and U.K.-based expertise. China will be handicapped if it doesn't have access to the processor IP of U.K.-based Arm, which is being acquired by Nvidia Corp. of Santa Clara, Calif.

A Regional Split in the Chip Business

Value of logic and application chip* commerce in 2019

■ Revenue ■ Spending†



*Includes microcomponents, general-purpose logic and application-specific chips.

†Includes design total addressable market of the top OEM and ODM companies.

Source: Gartner

Advanced Micro Devices, Arm, Broadcom, Intel, Marvell Technology Group, and Qualcomm possess key IP and decades of experience in iterating these technologies across devices. It could take China years to re-create such expertise without that IP.

U.S. Companies Dominate Electronic-Design Software

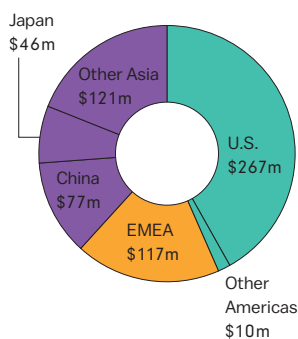
Software for electronic-design automation, or EDA, dramatically reduces semiconductor design-cycle times by converting chip circuit behavior into code. U.S.-based Synopsys, Cadence, and Siemens' Mentor Graphics unit are market leaders. Developing proprietary software to design IP blocks and transferring these to the manufacturing stage would be a high hurdle for Chinese advanced chip design.

Where China Is Behind

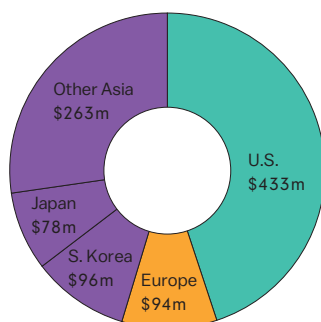
High capital spending and operating expenses are a big barrier for Chinese companies like ChangXin Memory Technologies Inc. and Yangtze Memory Technologies Co. if they're going to be viable in the memory chip business, even with government subsidies. In relatively commoditized memory chip markets, weaker companies faced with those hurdles have exited and market share has consolidated. Chinese

Cadence and Synopsys's Revenue Mix by Region

Cadence revenue, fiscal 2Q '20



Synopsys revenue, fiscal 3Q '20



Sources: Bloomberg, company filings

companies may struggle to keep up with experienced foreign companies like Kioxia Holdings, Micron Technology, Samsung Electronics, SK Hynix, and Western Digital in memory output and costs.

China will have to expand its chipmaking equipment and services, which are dominated by U.S., Taiwanese, and Japanese companies, if it's going to compete globally in tech. In outsourced chipmaking services, China's largest foundry, Semiconductor Manufacturing International Corp. (SMIC), is well behind peers in transistor shrinkage, which is key to advancement. The outsourced chipmaking business is led by Taiwan's TSMC and United Microelectronics. Taiwan Semiconductor Manufacturing Co. (TSMC) counts Apple, AMD, Nvidia, and Qualcomm as customers and is so dominant in the high-priced segment that it had 56% of overall outsourced foundry market share.

China's status in equipment used to make semiconductors is even weaker than for chip-foundry services. Applied Materials, KLA, and Lam Research, all of California; ASML of the Netherlands; and Tokyo Electron lead in chipmaking equipment. Japan's Advantest and Disco, ASM International of the Netherlands, and ►

NAND Memory Chip Pipeline and Financials

3D NAND technology roadmap, by period of production start for chip with given number of layers

Company	2018	2019				2020				2021				2022
		1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
Samsung	96			128				128				192		244
SK Hynix		96						128					176	256 [†]
Micron						128						176		192 [†]
Flash Alliance	96						112							164 [*] 200 ^{+†}
Intel				96				144						192 [†]
Yangtze Memory	32			64					128					196

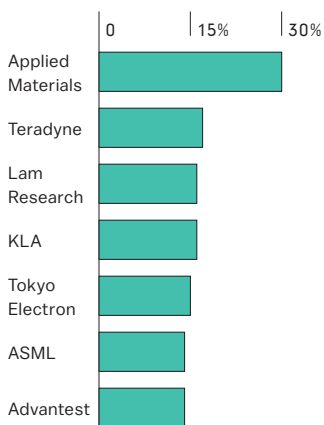
NAND memory chip business in 2019

Company	NAND revenue	3D NAND fab equip. spending	Total capex
Samsung	\$15.7b	\$2.6b	\$21.8b
Micron	5.1	0.9	9.0
SK Hynix	4.9	2.6	11.9
Intel	3.1	0.5	16.2
Flash Alliance		1.9	
Western Digital	4.6		0.6
Kioxia	6.0		
Toshiba	0.1		1.0
Yangtze Memory		1.1	
Others	0.0		

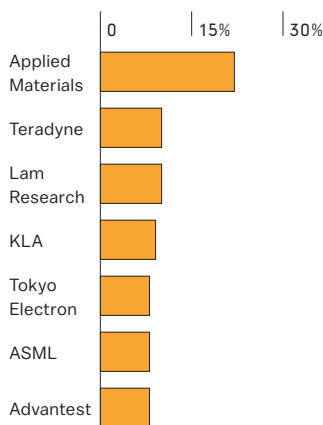
*15X layers. †1XX layers. ‡2XX layers. Sources: SEMI, IDC, company filings

Chip Equipment Sales

Share of sales from China in 2019



Necessary sales growth outside of China



Source: Bloomberg Intelligence estimates

U.S.-based Teradyne make advanced gear for chip assembly and testing. Should there be a broader technology rift between the U.S. and China, Chinese foundries such as SMIC would still need to buy equipment from these companies to continue to manufacture chips. The country's hardware giants such as Huawei Technologies Co. now use services from TSMC, which in turn buys such equipment.

Android Is a Critical, Yet Wobbly, Piece in China's Smartphone Ambitions

Any viable, inexpensive alternative to Apple Inc.'s iPhone is heavily subsidized by Google's Android operating system. It will take time and damage users' experience if Huawei, which was cut off from updated Android versions when it was put on the U.S.'s blacklist in 2019, and others have to increasingly rely on a homegrown system such as Huawei's Harmony, especially for a common operating system to be adopted by multiple smartphone providers. This may also clash with the IP of Google and Apple.

Apple could be an invincible competitor. Its costs trend lower thanks to its tight silicon, hardware, and software integration and

Hardware Shipments

Units shipped in 2019

China Rest of the world



Source: IDC

large scale. It has tweaked the offerings to ensure a consistent user experience, which Huawei would have to reestablish from scratch.

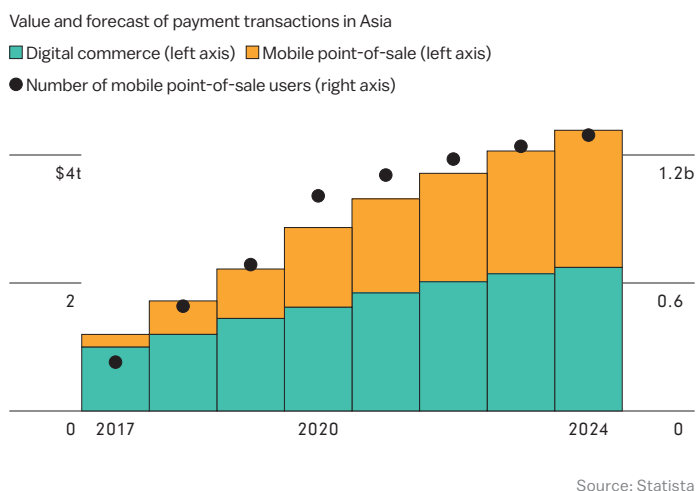
Where China Can Gain Ground

The \$65 billion analog-semiconductor industry, about 15% of the global chip market in 2019, is highly fragmented, with market leader Texas Instruments Inc. having about a 20% share. Chinese companies don't figure in the top 10.

Differences between U.S. and Chinese companies in design of hardware for servers, smartphones, and PCs are small enough that the two quickly could become competitive. If there are no U.S. restrictions on exports to China of vital parts such as ARM cores, cellular modems, processors, memory, and chip design software, Chinese companies will continue to be able to design, manufacture, and assemble attractive systems and likely at a lower cost. Designs for cloud computing infrastructure can already be licensed via the Facebook-created Open Compute Project. Inspur Electronic Information Industry, Huawei, and New H3C Technologies are China-based server leaders, and their volume alone accounted for 19% of server units shipped in the second quarter of 2020.

China's e-commerce capabilities, online payments, and electronic banking systems may be ahead of those in the U.S. despite their limited ability to exchange and make use of information. Alibaba Group Holding, Baidu, Tencent Holdings, and JD.com are key platform innovators in China, with their technology proliferating into

Digital Payments Market Projected to Grow



other parts of Asia and Europe. Operability among the platforms may suffer if the U.S. further restricts those companies.

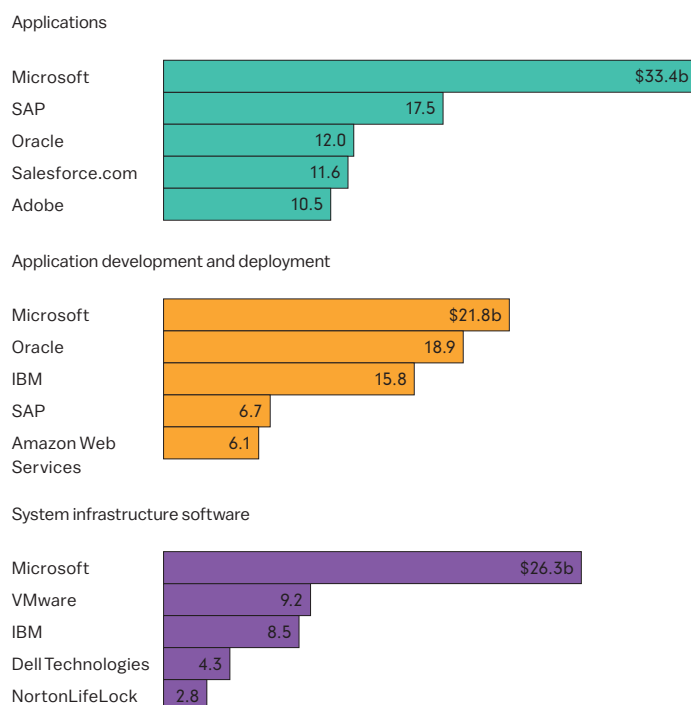
Specialty Infrastructure Software Is Easier To Replicate Than Services

Chinese companies are likely to develop specific application-based software with in-house packages or using China-domiciled cloud or licensed-software providers. Commonly used infrastructure tools for system management and operating systems such as Linux may be easily adapted or modified for wide local use. Issues may arise when systems equipped with in-country software are shipped overseas, where hardware or software may violate IP or destination norms.

Offshore IT development and support remain skewed toward the Indian subcontinent, Eastern Europe, and the Philippines, rather than China, probably because of language differences and the availability of software talent. These regional differences are unlikely to change in the near term and may even be exacerbated if the trade chasm between the U.S. and China widens. ●

Software Revenue by Segment

Top five vendors by 2019 revenue



Source: IDC

The High Risk to a Low-Carbon Future From a U.S.-China Breakup

By JUSTIN WU
BLOOMBERGNEF

CHINA AND THE U.S. ARE THE WORLD'S largest and second-largest emitters of carbon dioxide, and cleaning up their emissions while ensuring economic growth will be key to solving the climate problem. Below we look at five technologies crucial for a low-carbon economy, examine how the U.S. and China stack up against each other in each one, and explore what might happen if U.S.-China relations continue to deteriorate.

- A U.S.-China decoupling would cut America off from low-cost clean energy equipment from China and cut Chinese clean energy companies off from key technologies and a large export market.

- China invested heavily in several key decarbonization technologies in the past decade, such as solar and batteries, and now has a decisive edge over the U.S. The U.S. retains an advantage in advanced materials and software.

- A further decoupling between China and U.S. allies such as Australia, Europe, or Japan would be extremely damaging to Chinese companies and the global effort to combat climate change.

Solar power

Solar energy is the cornerstone of the transition to low-carbon energy and the fastest-growing renewable electricity technology. Since 2009 the cost of generating electricity from solar has fallen more than 86% and the world has added more solar generation capacity than any other technology. By 2050 we expect solar to generate 22% of the world's electricity, from only about 2% today.

Solar is also one technology where we already have an undeniable winner: China. The country dominates the manufacturing of solar photovoltaic equipment, accounting for 73% of the world's module capacity. Nine of 10 of the largest solar manufacturing companies in the world are Chinese and they control the entire supply chain, from the processing of silicon to the inverters that connect modules to the grid. In contrast, the U.S. has only 3% the solar module production capacity of China, and many of these factories are owned by Chinese companies.

Solar is no stranger to trade wars. Since 2012 the U.S., EU, and India have all implemented a series of tariffs against Chinese-made solar equipment in a bid to protect their domestic manufacturers. Each time they've failed, as Chinese companies

have improved their manufacturing techniques, cutting costs faster than tariffs could keep up. Given surging demand, it's unlikely other countries will stop buying Chinese solar equipment anytime soon.

Lithium-ion batteries

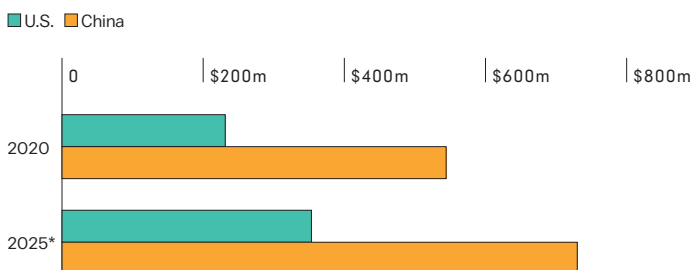
Lithium-ion batteries have been widely used in consumer electronics since the 1990s. Growing deployment in electric vehicles and grid applications has turned them into a critical technology for the transition to low-carbon energy. Unsurprisingly, countries around the world are eager to benefit from the battery supply chain, and competition is growing.

China was an early mover, enacting a robust set of national and regional policies to support electric vehicle sales, building domestic manufacturing capacity, and investing heavily into raw materials and mining at home and abroad. The country currently holds the top spot in BNEF's global lithium-ion battery supply chain rankings, thanks to its large domestic battery demand, control of 80% of the world's raw material refining, and production of 72% of the world's cell capacity (chart, page 40).

In contrast, the U.S. is currently sixth, with its key strengths being its large and robust automotive market and consumer electric

A Disparity in Investment

Smart-grid software spending



*BloombergNEF Forecast.
Source: BloombergNEF

vehicle favorite, Tesla. But a lack of clear policy direction, especially at the federal level, on electric vehicle adoption and battery supply chains is threatening American competitiveness. The U.S. also lacks supplies of key raw materials and the refining capacity to produce battery-grade materials. Companies such as Albemarle, Rio Tinto, and Tesla, as well as regulators, are starting to shore up this weakness by investing in and boosting critical materials production.

China will retain its top spot in battery supply chains and technology over the next five years as it continues to lead the world in electric vehicle sales and battery manufacturing. However, the U.S. will remain competitive thanks to its large auto market, which will attract investment from battery manufacturers. The U.S. is also forming a critical materials alliance with Australia, Canada, Europe, Japan, and Korea, which will help boost its access to raw materials.

Hydrogen

While renewable energy and batteries can decarbonize large parts of the economy, other sources of greenhouse gases can't easily be cleaned up. The manufacturing of steel, cement, and chemicals, for instance, requires fossil fuels, both as a catalyst for chemical reactions and as a fuel to create the extreme temperatures needed. Hydrogen, a clean-burning molecule that can be produced carbon-free from water and renewable electricity by using electrolyzers, is a promising solution for these hard-to-abate sectors. The process is expensive, but costs will fall as electrolyzers and renewable generation become cheaper with scale.

China currently produces 60% of the world's electrolyzers at about one-fifth the cost of those made in North America or Europe. But the industry is small; increased competition in the field and could drive down costs and lead to significant expansion.

Scaling up cheap, renewable hydrogen production will require a significant long-term policy commitment and investment by companies and governments. Many countries, including the U.S. and China, have shown an interest in supporting hydrogen but few have set clear policies to expand the technology or put money toward subsidies to encourage investment. The most promising developments come from the European Union, where five member states have set their own hydrogen strategies and put funding on

the table. Despite this, no one has a significant head start on hydrogen technologies yet.

Smart-grid software

A smart grid, which is run by advanced software systems, can help improve the sustainability of a country's power system by allowing more clean electricity to be transmitted, and integrating decentralized energy sources such as rooftop solar or electric vehicles. Smart-grid software includes programs that can remotely monitor power assets, analyze performance data, or run drones to automatically conduct inspections.

The U.S. and China are both investing heavily in smart-grid software over the next five years, with China outspending the U.S. (chart, page 38). China's main advantage is that more than 80% of its grid is controlled by one large state-owned company, the State Grid, which is implementing an aggressive plan to digitize its operations. This includes spending \$3.5 billion on digital infrastructure and forming partnerships with 41 Chinese technology companies, specializing in everything from blockchain to robotics. In contrast, the U.S. grid is ailing; many utilities lack coherent plans to digitize their operations because they're unable to recoup any of their investment on software from their paying customers.

However, U.S. companies still hold a decisive edge in the technologies needed to run a smart grid, and many, such as General Electric Co., are the world's leading vendors in grid software. The U.S. also has more experience with distributed energy resources and has a competitive market for software vendors, which encourages learning and innovation.

Digital technologies are already a flashpoint in U.S.-China relations. With collaboration less likely, China won't be buying software from U.S. vendors and will instead have to develop its own code.

Carbon fiber

Carbon-fiber-reinforced plastics is a high-performance composite material used in everything from fighter jets to sports equipment. As an alternative to structural materials such as steel, carbon fibers can make everything lighter and stronger, allowing products from electric cars to wind turbines to become more energy-efficient. ►

Improved recycling technologies can further improve their sustainability benefits, as material is reused and spared from energy-intensive manufacturing processes.

China views carbon fibers as a strategically important material and is investing heavily to build a domestic carbon-fiber industry. Its strategy includes ramping up production capacity to lower costs and stimulating demand by developing the domestic automotive and aerospace industries.

But the U.S. has a strong technological advantage when it comes to carbon fibers, with companies able to produce far higher-quality materials. It's also one of the biggest producers and

markets for carbon fibers and has attracted investment from European and Japanese companies.

An escalating U.S.-China trade dispute could potentially cut China off from this strategically important material, especially the technological know-how of producing more advanced composites. China's best hope is to rely on Japan, the world leader in composites manufacturing, for high-quality supplies and technology. ●

Global Battery Supply Chain Country Rankings

Country	2020						2025					
	Overall	Raw materials	Cell and components	Environment	RII*	Demand	Overall	Raw materials	Cell and components	Environment	RII*	Demand
China	1	1	1	16	11	1	1	1	1	15 ▲1	11	1
Japan	2	12	2	6	7	6	2	8 ▲4	3 ▼1	7 ▼1	7	8 ▼2
S. Korea	3	17	2	9	5	2	8 ▼5	16 ▲1	2	13 ▼4	5	9 ▼7
Canada	4	4	10	4	10	11	5 ▼1	3 ▲1	12 ▼2	4	10	6 ▲5
Germany	4	17	6	12	2	2	6 ▼2	22 ▼5	6	9 ▲3	2	3 ▼1
U.S.	6	15	4	13	6	2	3 ▲3	13 ▲2	3 ▲1	7 ▲6	6	2
U.K.	7	17	6	9	4	6	8 ▼1	17	8 ▼2	10 ▼1	4	4 ▲2
Finland	8	11	13	5	3	13	7 ▲1	10 ▲1	8 ▲5	6 ▼1	3	17 ▼4
France	8	17	13	1	9	5	10 ▼2	17	12 ▲1	1	9	5
Sweden	10	22	13	3	1	8	4 ▲6	17 ▲5	7 ▲6	3	1	7 ▲1
Australia	11	2	13	21	12	8	11	2	12 ▲1	19 ▲2	12	11 ▼3
Brazil	12	3	13	2	24	23	12	7 ▼4	18 ▼5	2	24	15 ▲8
Poland	12	22	5	11	13	14	13 ▼1	22	5	12 ▼1	13	19 ▼5
Hungary	12	22	6	8	14	15	15 ▼3	22	8 ▼2	11 ▼3	14	18 ▼3
Czech Rep.	15	17	10	17	8	17	16 ▼1	17	12 ▼2	17	8	21 ▼4

*Regulations, innovations, and infrastructure. Due to the inability to forecast these metrics, the RII score is assumed static from 2020-25 for all countries. Source: BloombergNEF

Owning The Future

A look at the Asian Century, the impact of climate change, the risks of deglobalization, flying cars and 140 characters, and the broken BRICS

Power Is Shifting From West to East

By TOM ORLIK and BJÖRN VAN ROYE

WHO REALLY WON THE COLD WAR between the U.S. and the Soviet Union? Maybe China.

In 1972, Cold War logic pushed President Richard Nixon into an unlikely alliance with Mao Zedong—paving the way for China to reenter the global community. In 1991 the collapse of the Soviet Union amplified the West’s “end of history” hubris, blinding Washington, London, and Berlin to the significance of China’s rise.

Fast-forward to 2020, and China has emerged as a major global power, its single-party state and state-dominated economy the subject of consternation in foreign capitals and pride in Beijing. By 2035, based on Bloomberg Economics’ forecasts, China will have overtaken the U.S., emerging as the world’s biggest economy and most potent geopolitical force.

China’s rise is emblematic of a larger shift, one that’s already under way and will accelerate in the decades ahead.

Bloomberg Economics has used a growth accounting framework—adding up contributions of labor, capital, and technology—to forecast gross domestic product out to 2050 for 39 economies, from the advanced U.S. to frontier Ghana. Using that data, we’ve charted the future path of global GDP based on geographic, political, and economic configurations.

The results show a remarkable period of stability, stretching from the end of World War II to the turn of the century, is coming to an end. The center of economic gravity is shifting from West to East, from advanced economies to emerging markets, from free markets to state controls, and from established democracies to authoritarian and populist rulers. That transition is already upending global politics, economics, and markets. This is only the beginning.

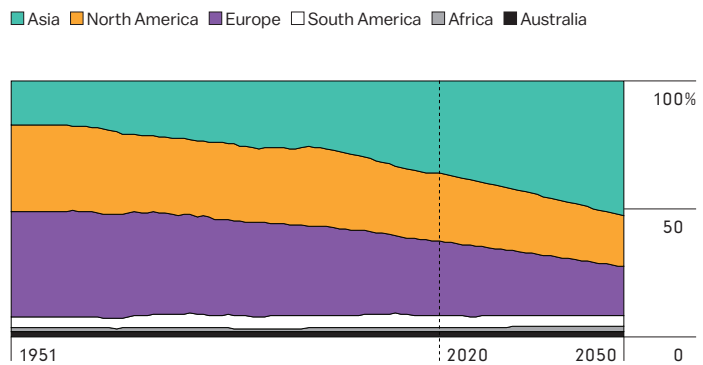
There is, of course, a lot that could happen to throw our projections off track. Wars, natural disasters, financial crises, and—as the Covid-19 crisis demonstrates—pandemics could all reconfigure the global economic map. Still, absent a crystal ball, forecasts of potential growth provide the most reliable basis for thinking about the long term.

Asia’s Century

Asia is returning to its position as the center of the global economy. At the turn of the century, with China yet to join the World Trade Organization and India’s potential buried beneath the Licence Raj,

Asia on Pace to Account for Half of Global Economic Output

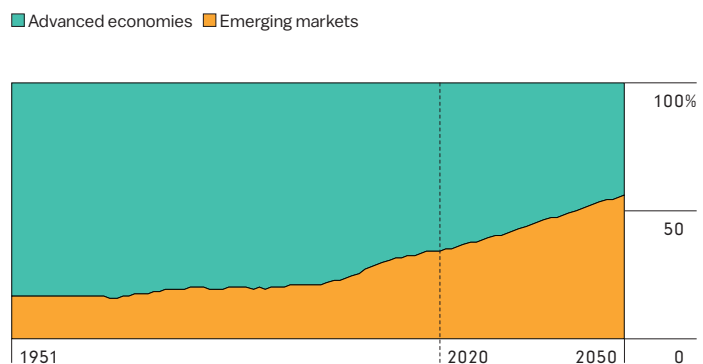
Global GDP shares and forecasts, by continent



Source: Bloomberg Economics

Emerging Markets to Make Up Most of World GDP

Global GDP shares and forecasts, by classification of economy



Source: Bloomberg Economics

Asia accounted for 25% of global output, substantially less than North America (31%) and Europe (35%). By 2050 the continent that already accounts for more than 50% of global population will also command more than half of global output. North America and Europe will be in retreat.

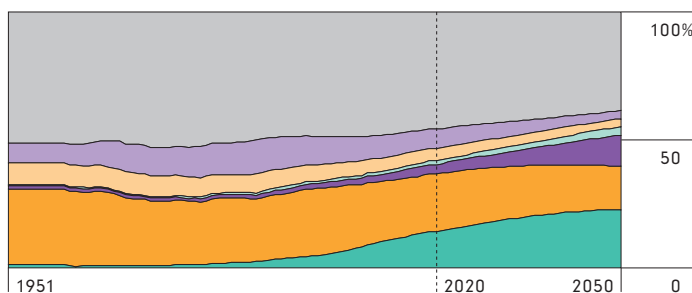
Substantially driven by the rise of China and India, the emerging-market share of global GDP is also set to accelerate upward. In 2000 emerging markets accounted for 21% of global output, with advanced economies producing the bulk of the rest. In 2042 emerging markets will overtake advanced economies as the biggest contributors to global GDP. By 2050 they will account for 56% of the total.

More viscerally felt will be the shift in relative power between countries. In 2033, according to our projections, India will overtake an age-hobbled Japan to become the world's third-biggest economy. In 2035, China will outstrip the U.S. to become the biggest. By 2050, Indonesia—home to the world's biggest Muslim population—may have moved into the top group. Three of the world's biggest economies could be Asian emerging markets.

China to Gain Economic Influence as the U.S. Wanes

Global GDP shares and forecasts, by nation

China U.S. India Indonesia Germany Japan Other



Source: Bloomberg Economics

China as Challenger, Then Challenged

The idea that these transitions will occur smoothly appears fanciful. The inevitability of war between rising and ruling powers—“Thucydides’ Trap,” as Harvard political scientist Graham Allison puts it—is a subject of contention among international relations scholars. Still, the intuition is compelling, and you don’t need to believe in the certainty of conflict to agree that a shift in the balance between great powers will be a process fraught with risks and difficulties.

The looming transition from the U.S. to China has already heightened tensions. A fight that started over trade has spilled over to technology, human rights, and territorial claims. The Trump administration might mark a low ebb in diplomatic due process, exacerbating tensions. But the underlying dynamic as China’s relative strength waxes and that of the U.S. wanes isn’t going to change.

U.S.-China tensions aren’t the only geopolitical risk on the horizon. By the 2040s the combination of an aging workforce and development fatigue is set to drag China’s annual GDP growth down toward 3%. India, with its young population and significant catching-up space, will likely still be clocking a 6% pace. The scope for tensions between the world’s most populous authoritarian and democratic states, with militaries that in 2020 engaged in a bloody border skirmish, is already significant. As India’s rise challenges China’s status as Asian hegemon, it can only increase.

The State Strikes Back

For the last 40 years, with the Reagan and Thatcher revolutions as the spark, the free-market ideal has been the organizing principle around which the global economy operates. In the next 30 years, the balance between the market and the state is set to change, with the economies that operate with a high degree of state ownership and control in the ascendancy.

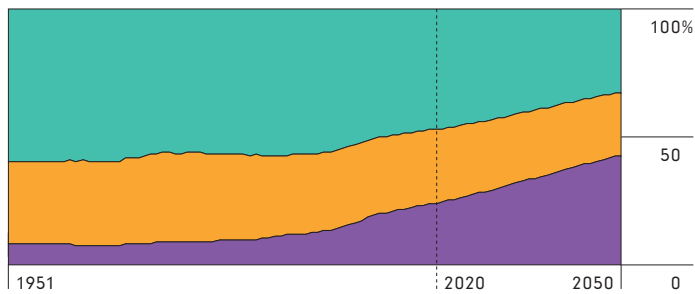
Combining Bloomberg Economics’ long-term GDP forecasts and the Heritage Foundation’s classification system, the share of global output coming from economies that are “free” or “mostly free” is set to slide from 57% in 2000 to 33% in 2050. Conversely, the share from those classed as “mostly unfree”—economies with a high degree of state control—is set to rise from 12% to 43%.

It is, of course, possible that currently state-dominated economies will reform, transitioning toward a greater role for the ►

Free-Market Nations Ceding Clout to Interventionists

Global GDP shares and forecasts, by type of economy

Free and mostly free Moderately free Mostly unfree

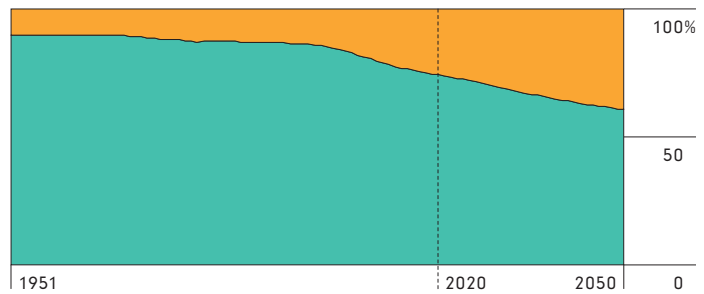


Sources: Heritage Foundation, Bloomberg Economics

More Restrictive Societies to Account for More Output

Global GDP shares and forecasts, by type of society

Free Partly free and not free



Sources: Freedom House, Bloomberg Economics

market. Possible, but far from guaranteed. India is liberalizing. China isn't. Indeed, Communist Party General Secretary Xi Jinping has called for state companies that are "stronger, better, and bigger."

For free-market economies, maintaining the benefits of openness and dynamism in the face of competition from state-centered rivals is proving tough to do. Since 2016 the U.S. has imposed tariffs on hundreds of billions of dollars in Chinese imports, signed a trade agreement that dictates what quantities of what goods China should buy, required U.S. companies to obtain a license before selling certain technologies to China, and attempted to force the breakup of a major Chinese internet firm.

In other words, the fear of China's rise has already begun to turn the U.S. away from free-market principles.

It would be easy to dismiss those shifts as idiosyncrasies of the Trump administration. The reality is that the rise of state-centered economies, pursuing mercantilist trade policies and a free-rider approach to acquiring intellectual property, makes the free-market system look less like the best approach to driving growth and more like a fast track to giving away competitive advantage and—ultimately—geopolitical power. Not just the U.S.,

but also Europe and advanced Asian economies, face a tough choice between openness and dynamism on the one hand and protecting core technologies and national security on the other.

A similar trend is evident in politics. A combination of Bloomberg Economics' GDP forecasts and Freedom House's classifications shows that, in 2000, "free" societies—shorthand for functioning democracies—accounted for 86% of global output. "Partly free" societies (with incomplete political rights and civil liberties) and "unfree" societies (with draconian controls) accounted for a combined 14%. Fast-forward to 2050, and the share of free societies is set to shrink to 61%, with partly free and unfree societies rising to 39%.

As in economics, so also in governance: The rise of alternative models creates a challenge the West has so far proved unable to address. The Trump administration has shaken the world out of complacency on the rise of China. Rather than providing the catalyst for a needed rethink of state capacity, though, the reaction has been a combination of nationalist chest-thumping, barricades at the border, and an appeal to strongman rulers. Identifying the challenge was an important first step. Formulating an effective

response—one that includes building strength at home as well as challenging norm-breaking behavior abroad—is a task that will be left for future administrations.

Facing the Future

Will they have time? A Goldilocks scenario isn't out of reach. For the U.S. and Europe, that would mean less time fending off foreign threats with tariffs and sanctions and more time boosting domestic potential with investment in education, research and development, and infrastructure. For China, it would mean a move back onto the

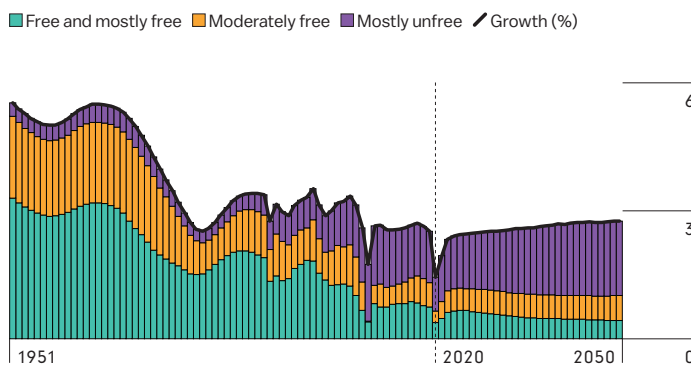
and their technology. Rapid growth and, for China, the near-term prospect of claiming the No.1 spot in the global economic rankings will provide a halo effect, obscuring the inefficiencies of the system. History is written by the winners; economic rules will be, too.

For the free-market economies, the dynamic will operate in the other direction. The attempt to manage risks from the rise of state-dominated rivals has already resulted in the sacrifice of some aspects of openness and dynamism. Facing a changing and unfamiliar world, voters have been more receptive to the siren song of populism than the farsighted strategies required to put their own house in order. A turn away from market dynamism in economics, and toward nostalgic nationalism in politics, isn't a recipe for long-term success.

The end of the Cold War was the end of one chapter of history. It was also the beginning of another. The world is in the midst of a messy transition as the balance of economic and political power shifts from West to East, from free markets to the state, and from centrist democracies to the extremes of authoritarianism and populism. For businesses, investors, and policymakers, history isn't over. It's just getting started. ●

Global Growth to Be Driven by State-Dominated Economies

Contribution to global GDP growth by free and unfree economies, in percentage points



Sources: Heritage Foundation, Bloomberg Economics

market-reform path followed so successfully in the 1980s and '90s but lost in the confusion of a rolling series of 21st century crises. For India, it would mean accelerating the pro-market reforms launched by the Narendra Modi government.

More likely, on the current evidence, is that a self-reinforcing dynamic kicks in. As they grow, China and India will benefit from a massive domestic market—providing national champions with enormous economies of scale and acting as a lure for foreign companies

The Costs of Climate Change

By MAEVA COUSIN, JOHANNA JEANSSON, and JAMIE RUSH

WILDFIRES IN CALIFORNIA, DROUGHT IN Africa, and floods in South Asia hammer home the looming danger of climate change. With investors, executives, and policymakers scrambling to assess the risk, Bloomberg Economics has built long-term forecasts of gross domestic product in major economies for different scenarios:

- **Hot planet.** By 2050, without serious steps toward mitigation, temperatures will rise 2C and physical damage could raise the cost of climate change to 3% of global GDP, from an estimated 1% now.

- For some countries at higher latitudes, it's possible the benefits of global heating may initially exceed the damages—Canada is in that group. Poor and populous countries in Africa and Asia face GDP losses well above the global average.

- **Smooth mitigation.** Start an orderly transition to a low-carbon economy now, and the cost of mitigation would take about 2% from global GDP in 2050. The biggest transition costs would fall on the Middle East and less developed parts of Asia, including India.

- **Bumpy mitigation.** Wait too long, and the cost increases. In a scenario in which emissions have to be cut hastily, without the aid of advances in technology, the price of mitigation rises to more than 6% of global output in 2050. Again, the global south feels it most.

- With the biggest costs of climate change still decades away, incentives for shortsighted governments to act remain weak. For the world as a whole, the benefits of avoiding chronic damage don't exceed the costs of mitigation till the late 2060s.

- Our analysis draws on scenarios outlined by the Network for Greening the Financial System (NGFS), a global group of central banks. To provide more detailed, country-level breakdowns, we have incorporated analysis from the Organization for Economic Cooperation and Development (OECD) and run simulations using the climate change module of the National Institute Global Econometric Model (NiGEM), a structural model of the global economy augmented with energy costs.

- We believe these are reasonable scenarios providing a baseline for evaluating economic costs in a consistent way over time and across countries. We don't capture the huge uncertainties around the impact of greenhouse gas emissions on global temperatures, the range of possible economic damages, and the myriad strategies available to address them.

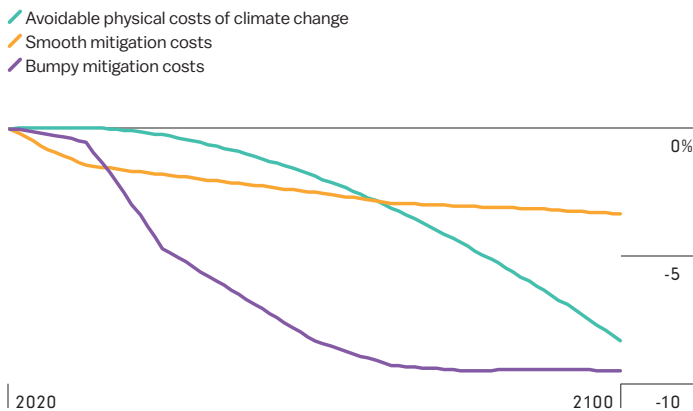
- The models we depend on also miss low-probability, high-cost risks such as ice sheet collapse, mass migrations, or conflict. The hope of avoiding these catastrophic tail risks might end up being the biggest force behind needed policy changes.

The Cost of a Hotter World

The costs of warmer temperatures, rising sea levels, and extreme weather events build gradually over time, making them hard to distinguish in short- and medium-range economic forecasts. In

Costs of Climate Change: Three Scenarios

Cumulative impact on GDP level (% change from baseline scenario)



Source: Bloomberg Economics, based on data from the Network for Greening the Financial System, the National Institute Global Econometric Model, and the OECD

the long term, they're all too clear.

The physical costs associated with climate change are already estimated at 1% of global GDP. Forecasts drawing on climate impact models aligned with the NGFS hothouse scenario suggest they will rise by an additional 2 percentage points through 2050. By 2100 the additional hit to global output will be about 9%.

To assess country-level impacts, we've taken the NGFS scenarios and combined them with evidence from an OECD analysis based on similar assumptions of limited mitigation. As the map on page 47 illustrates, the costs of climate change land unevenly.

Rising temperatures crimp productivity as labor swelters. They also divert capital from needed infrastructure and industrial projects to less productive uses, such as flood defenses, dragging on growth. Developing economies near the equator are most exposed to the risks.

In sub-Saharan Africa, a substantial negative impact comes from crop yield losses, health effects from a hotter climate, increased energy use for cooling, and lower tourism revenue. In the Middle East and Asia, the negative effect from sea level rise in populous and productive areas raises the costs. Losses in these regions are five to six times larger as a share of GDP than those projected for the European Union or U.S.

India and China are among the biggest losers, facing a drag on 2050 GDP of almost 4%. Germany, Canada, and Russia are among the Northern Hemisphere countries that see almost zero, or even a

mild positive, impact from the physical effects of climate change.

The estimates for physical costs focus on chronic impacts from warmer temperatures. What’s not included are risks associated with mass migration, conflict, or other acute crises that could crystallize if parts of the world become unlivable.

The Costs of Mitigation

It’s too late to prevent climate change from doing more economic harm, but the world has a shot at avoiding costs of 1% of GDP by 2050 and 8% of GDP by 2100 if the process of cutting emissions begins immediately.

To avoid the worst consequences of global warming, the world should limit the rise in temperatures to well below 2C, according to the United Nations’ Intergovernmental Panel on Climate Change. This would mean reaching net zero CO₂ emissions by 2050-70, a shift that requires sweeping changes to the way economies operate.

To assess the costs of transitioning to a low-carbon world, we look to integrated assessment models. These combine economic, energy, land use, and climate modules to give regional estimates. We fill in country-level gaps in the data using NiGEM. The analysis shows that the longer the world waits before making the shift, the greater the economic costs.

Smooth Mitigation

In our orderly adjustment scenario, action to address climate

change is taken immediately, with the cost of a ton of carbon rising \$10 a year from 2020. As prices gradually increase, development of new technologies accelerates. Greater efficiency, electrification, more renewables in the energy mix, and—crucially—carbon capture help economies switch from increasingly expensive fossil sources to cheaper green alternatives while capping the impact on overall output.

These technological adjustments would greatly reduce the economic costs of transitioning. While some regions will still suffer more than others, the global impact would be manageable—only about 2% of GDP by 2050, according to the integrated assessment models available through the NGFS.

Bumpy Mitigation

Our second scenario considers the impact of a delayed response requiring a more abrupt pace of adjustment. Recognizing belatedly that not enough is being done to cap temperature increases, governments around the world ramp up the cost of carbon substantially—by \$35 per ton each year from 2030.

This raises the risk that technological development doesn’t happen fast enough to soften the impact. Carbon capture technology in particular may not be mature enough to help compensate for the rapid increase in carbon prices, and more of the required decrease in emissions would have to be achieved at the expense of production, raising the cost to 6% of world GDP by 2050.

In both scenarios, oil and gas producers and heavy carbon users will suffer as the world moves away from fossil fuels. Those able to switch more rapidly to green energy production and consumption, as well as those able to counter climate change through a change in land use (for example, delivering reforestation), suffer less.

As the chart on the following page shows, economies with stronger investment capacities (richer countries with stronger governance and well-functioning financial intermediation) also fare better. The U.S., Japan, Germany, and the U.K. are all in the group that faces relatively low transition costs, with a hit to 2050 GDP below 1% in the smooth mitigation scenario.

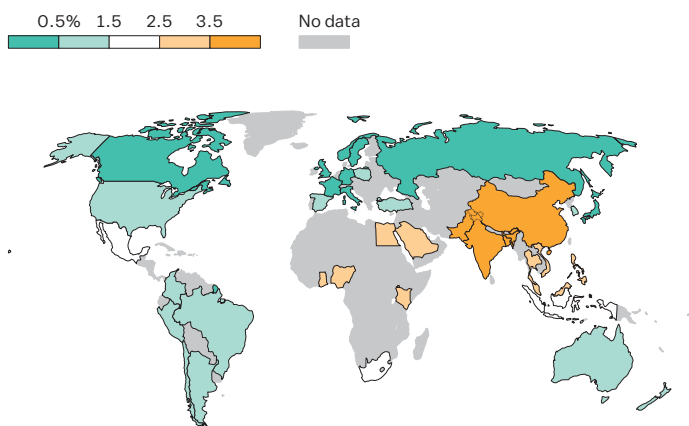
India, Saudi Arabia, and China are among the group that face larger costs. In the smooth mitigation scenario, they face a shortfall in 2050 GDP of almost 3%. In the case of bumpy mitigation, those costs rise to an eye-watering 12%, 10%, and 7%, respectively.

Incentives Aren’t Aligned

If there were such a thing as a global central planner, there’s no doubt it would choose to start reducing emissions immediately. Cutting global carbon usage in an orderly way would leave time for technologies to mature, meaning more of the reductions could be achieved by increasing net energy efficiency rather than reducing output. ▶

Costs of Climate Change

Forecast costs associated with climate change in 2050 as a share of GDP



Source: Bloomberg Economics, based on global estimates from models by the Network for Greening the Financial System and national and regional estimates from the OECD

Without a global planner, coordinated action on climate change needs all countries to pull in the same direction—a unified approach that’s currently conspicuous by its absence.

Political dynamics encompass a lot more than climate change, but for some rich countries, the fact that the cost of damage from higher temperatures remains relatively small and a long way off is a clear barrier to action. For the U.S., the benefits of avoiding damage from rising temperatures wouldn’t outweigh the costs of mitigation efforts till the 2080s. That cost-benefit calculation is reason for pessimism about the outlook.

At the global level, an orderly adjustment starting now would pay for itself in terms of annual GDP by the late 2060s. Cutting now would also reduce the risk of an escalating series of floods, wildfires,

and other catastrophes such as mass migration from parts of the world that become uninhabitable. The impact of such events is too complex to model, and so isn’t included in the numerical analysis.

The risk of catastrophic outcomes should in itself be a catalyst for the needed policy change. After all, most human decisions are not driven by estimates of GDP losses. People watching devastating wildfires in Australia and California aren’t relying on integrated assessment models to judge whether it’s time for action.

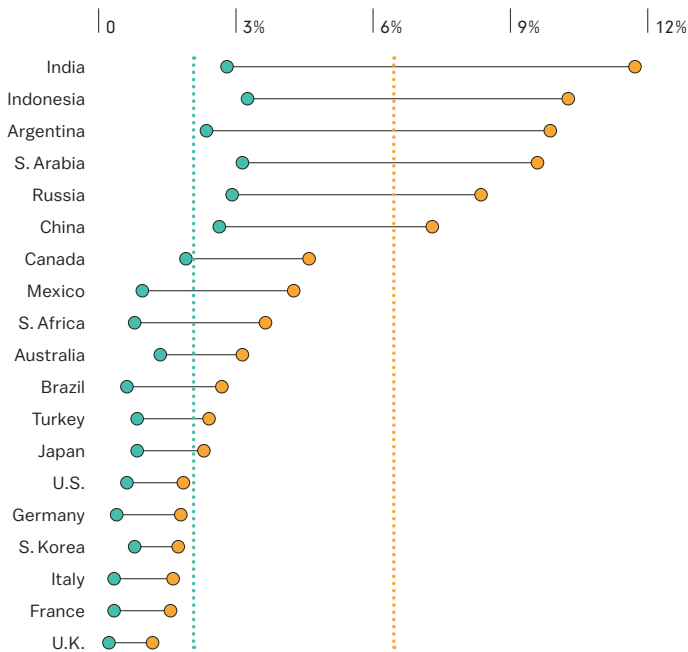
The EU is responding forcefully, even though the economic costs may outweigh the benefits for decades to come, and China has announced a target for reaching carbon neutrality by 2060. The U.S. stands out as the most important laggard. There’s still time to do what’s needed, but the clock is ticking. ●

Costs Unevenly Spread Across the Group of 20

Estimated cost by 2050 of limiting temperature rises to well below 2C (as a share of GDP)

● Smooth mitigation ● Bumpy mitigation

••• World

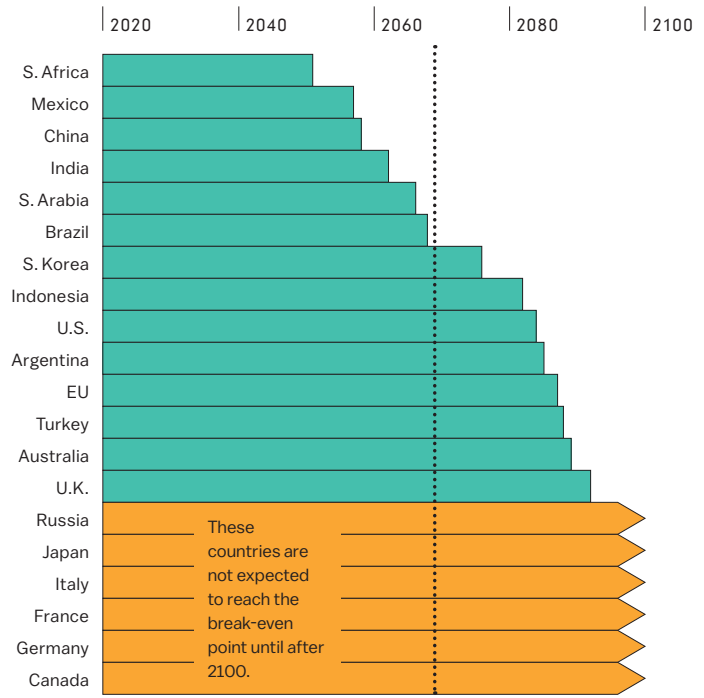


Source: Bloomberg Economics, based on data from the NGFS, NiGEM, and OECD

When Cutting Carbon Starts Paying for Itself

Year when estimated benefits of smooth mitigation start to outweigh costs in terms of GDP

••• World



Source: Bloomberg Economics, based on data from the NGFS, NiGEM, and OECD

Who Loses Most If Globalization Spins Into Reverse?

By TOM ORLIK and BJÖRN VAN ROYE

DRIVEN BY A HUMAN IMPULSE, accelerated by trends in technology, globalization has delivered enormous gains, helping lift hundreds of millions out of poverty and adding to prosperity for hundreds of millions more. It has also come at significant costs. Global competition means losers as well as winners. Greater integration across borders can come at the cost of control within them. As China moves up the global economic rankings, win-win economic thinking is being edged out by the zero-sum analysis of national security hawks.

Greater recognition of those costs is prompting a rethink. From President Donald Trump's tariffs, to attempts by China's Xi Jinping to bolster domestic innovation, to the Brexiteers' vision for Britain, major economies are shifting from unquestioned support for global engagement toward a greater focus on national self-determination. What happens if globalization stalls, or even spins into reverse?

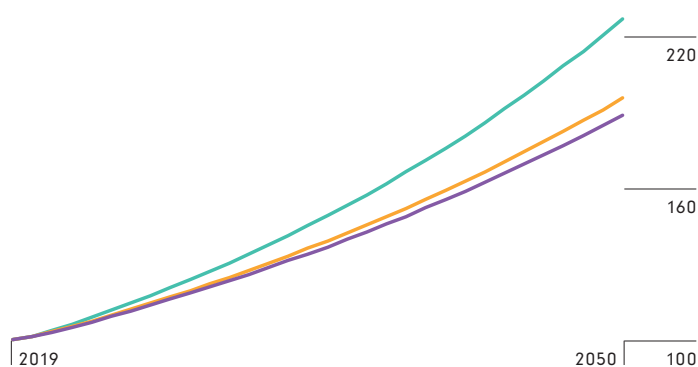
- Bloomberg Economics has used the KOF Swiss Economic Institute's globalization indexes and our own calculations on potential growth to estimate the relationship between globalization and growth across major economies.

- Using that information, we model three scenarios: an optimistic case with globalization staying on trend; a stall scenario where engagement sticks at the current level; and a pessimistic case where openness rolls back to the level seen in 2000, just before China joined the World Trade Organization.

Globalization's Impact on Growth

Global GDP, by globalization scenario (index, 2019 = 100)

Optimistic Stall Rollback



Source: Bloomberg Economics

- For global income, the difference between the best and worst outcomes is vast. By 2050 global gross domestic product under the pessimistic scenario would be \$34 trillion smaller than under the optimistic. That's the equivalent of giving up the entire annual output of the U.S. and China.

- The majority of the costs would be faced by emerging and frontier economies. Among the biggest potential losers: South Korea, China, and Vietnam—three generations of rising Asian nations that have gained as globalization opens markets and diffuses ideas.

U.S.-China relations at their lowest ebb in a generation, the looming British exit from the European Union, and Covid-era concerns about cross-border supply chains all speak to rising concern about the costs of globalization.

That's understandable. Increasing trade flows, as well as higher levels of immigration, have created losers as well as winners—many of whom have started to make their voices heard in elections. Closer cross-border integration has come at the expense of the loss of national sovereignty, with local businesses and households chafing against diktats from unaccountable bureaucrats. China's rapid rise has reshuffled the global GDP rankings and shifted the geopolitical balance, to the consternation of many in the U.S. and the rising concern of some in Europe.

It's also a problem. Global trade increases the efficiency of resource allocation, boosting productivity. Cross-border capital flows support investment, adding further to growth potential. Both support the free flow of ideas and innovations, pushing back the technology frontier for advanced economies and allowing emerging and frontier economies to catch up more quickly.

A stall in globalization, or even a reverse, would block those benefits.

Drawing on the past relationship between global engagement and growth, it's possible to estimate what the costs would be. Bloomberg Economics explored three scenarios:

- **Optimistic.** We assume globalization continues at the same pace seen in the last 10 years. If that happens, global growth after the Covid shock passes settles at about a 2.6% pace.

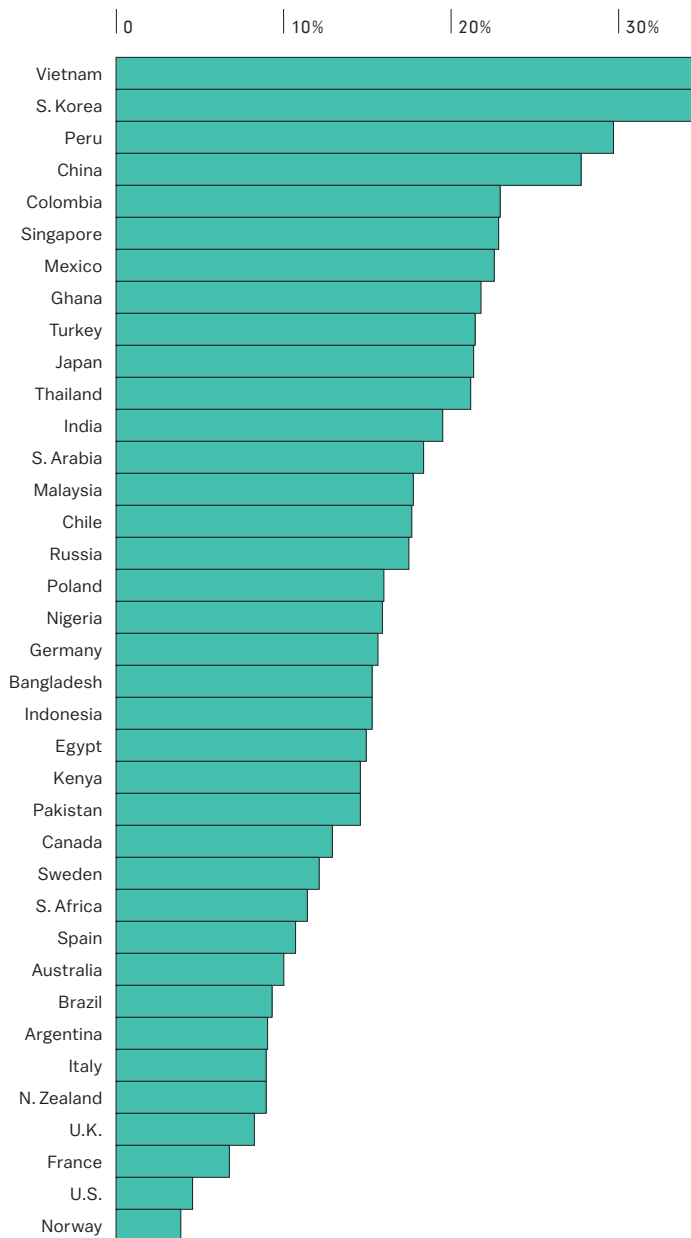
- **Stall.** We assume globalization stalls at the current level. Global growth slows to about a 2.2% pace. By 2050 global income is \$28 trillion lower, relative to the optimistic scenario.

- **Unraveling.** We assume globalization rolls back to 2000 levels. Global growth slows to 2%. By 2050 there's a \$34 trillion shortfall in income, again relative to the optimistic scenario.

Those headline numbers mask wide variation at the country level. In general, countries that have enjoyed the biggest recent ►

How Globalization Will Impact Selected Economies

Percentage difference in 2050 GDP level between optimistic and rollback scenarios



Source: Bloomberg Economics

benefits from globalization—typically emerging markets that are shifting from closed to open systems—would see the biggest costs if the process slides into reverse.

- Among the biggest losers: Vietnam, South Korea, and China.

All three major exporters have seen greater participation in the global economy drive a rapid advance toward the technology frontier. For that group, a rollback of globalization would shave an eye-watering 30% off 2050 GDP, relative to the optimistic scenario where globalization continues on trend.

- Among the countries that see little adverse impact: the U.S., France, and the U.K. All three are mature economies operating close to the technology frontier, limiting their gains from global engagement. A rollback in globalization would shave about 5%-10% off 2050 GDP, again relative to the optimistic scenario.

Those results are a function of the relationship between globalization and growth potential at the country level. They're also a function of the assumptions in our model on future trends, which we impose uniformly across countries.

The reality, of course, could well be that country experiences differ. It's possible to imagine a future where some countries pursue a higher degree of integration but others become increasingly closed—as is happening today as the EU and U.K. part ways.

Here we deal with broad-brush scenarios. Our work on U.S.-China decoupling (page 20) shows how the same approach could be used to take on more specific risks.

Methodology

To quantify the relationship between globalization and potential growth, we employ trivariate VAR models with time-varying parameters and stochastic volatility (TVP-VAR) in the spirit of Del Negro and Primiceri et al. (2015). We interact the KOF Institute's aggregate globalization index with Bloomberg Economics' estimates for capital deepening and total factor productivity. The point estimate as well as the uncertainty bands for the elasticity over time are estimated with Bayesian methods; the uncertainty bands represent 68% of the posterior probability distribution. The model is estimated over a span from 1980-2019. Structural shocks are identified by means of a lower triangular factorization.

For the scenarios, we run shock-specific, conditional forecast exercises with our model's posterior median point estimates as in Antolin-Diaz et al. (2020). For the conditional forecasting exercise, the most recent elasticity estimates from the TVP-VAR are used. All estimates are carried out with the new version of the BEAR toolbox. ●

A \$31 Trillion Question: Turbocharge Tech or Let Productivity Plummet?

By ZIAD DAOUD and SCOTT JOHNSON

IS THE WORLD ON THE verge of a productivity revolution, or are apparent advances a mirage obscuring a deepening slump? We've mapped both sides of the debate in a pair of stylized scenarios.

- In the optimistic case, advances in artificial intelligence and automation combine with existing technologies to push annual global growth to 3% in 2030, compared with a baseline of 2.5%.

- In a downside scenario—where the pandemic drags further on productivity, the information technology revolution runs out of bandwidth, and gains from education and urbanization are exhausted—global growth slips to a permanently lower trajectory of about 2% a year.

- By 2050, the difference to global growth between a techno-charged future or one of anemic productivity adds up to almost \$31 trillion, more than the combined 2019 gross domestic product of the U.S., Japan, and Germany.

How do economies grow? Partly from deploying more resources such as capital and labor, and partly from using them more intensively and efficiently. Labor, however, can be constrained

by population growth and people's decisions about work, and capital is subject to diminishing returns. The second engine of growth, known as total factor productivity (TFP), is the most sustainable way to lift living standards.

The trouble is, after rapid acceleration worldwide in the 1950s and 1960s, technological progress has slowed. Productivity surged briefly from 1996 to 2007, driven by advances in information and communication technology, as well as some catch-up in emerging markets. But growth ebbed again after that.

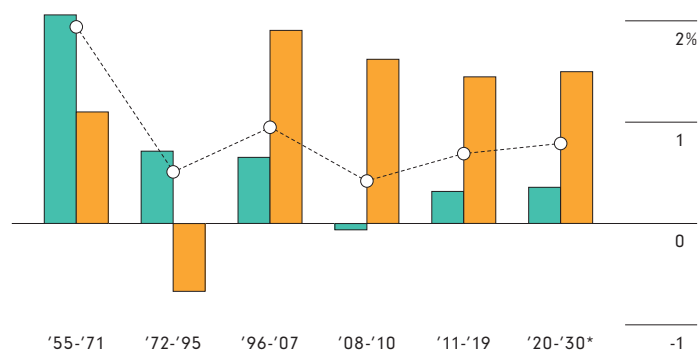
What's behind the slowdown in the last decade? Mismeasurement could explain some of it. Official statistics record market transactions but miss free goods and services like Wikipedia. They also underestimate the benefits of new products and improved quality, especially for services. With the proliferation of free and new products, mismeasurement is likely rising over time—weighing on growth rates.

But there are other, more convincing explanations. Economist Robert Gordon argues that one-time inventions such as indoor plumbing and air travel were more life-changing than, for example, social media. The computer and internet age has brought breakthroughs, but the productivity windfall may be fading.

A Shift in Productivity Growth

Weighted average annual total factor productivity growth during period

■ Advanced economies ■ Emerging markets ○ World



*Forecast
Sources: Penn World Tables, Bloomberg Economics

What's Next? The Base Case

In our baseline projections, we don't assume the statistical methods will improve enough to resolve the measurement issue. Even if they did, that would lead to a revision of the last two decades rather than a bump in future productivity growth.

Instead, we expect global productivity will grow about 0.8% a year from 2020 to 2030—a slight acceleration compared with the last decade. Built bottom-up from our forecasts for the world's biggest economies, this overall number hides significant variations. Countries fall into three categories:

- Those catching up with the technology frontier, such as China and India: Their annual productivity growth is expected to average 1.6% as they adopt existing innovations at a faster rate than new technologies are developed.

- Those advancing in line with the technology frontier: This includes some advanced economies that may be pushing the frontier forward, such as Germany, the U.K., and the U.S., and some emerging markets like Nigeria, Turkey, and Vietnam that ►

are keeping pace. Productivity growth is expected to range from 0.3% to 0.7% a year.

- Those falling behind the technology frontier: This includes Italy, Mexico, Saudi Arabia, South Africa, and Spain, which are expected to see productivity decline. It also includes other countries that will have positive but slow growth, such as Argentina, Brazil, and Peru.

How do countries like those in the last group experience technological regression—producing less with the same amount of capital and labor? They can employ cheap labor instead of automating, shift more production toward lower-productivity sectors, be disrupted by wars and political instability, and make less intensive use of labor and capital in times of crises.

Optimistic Case: A Second Wave of IT Gains

In our optimistic case, new technologies will boost annual total factor productivity growth by 0.5 percentage point a year for eight years, preceded by two years of ramp-up and succeeded by two years of deceleration.

Advances in automation and robotics would largely drive this surge. New technologies with wide applicability, such as driverless cars and 3D printing, don't typically yield their benefits in one go. Their impact arrives in waves.

Economist Chad Syverson compares the adoption of electricity (1890-1940) with advances in information technology since 1970. In the case of electrification, productivity grew initially, stagnated for a period, then surged later. We assume IT will follow the same path.

How much of a tailwind can we expect? Productivity growth in the U.S. accelerated by 0.5 ppt from 1996 to 2007. Our optimistic scenario reflects a second wave with a similar lift.

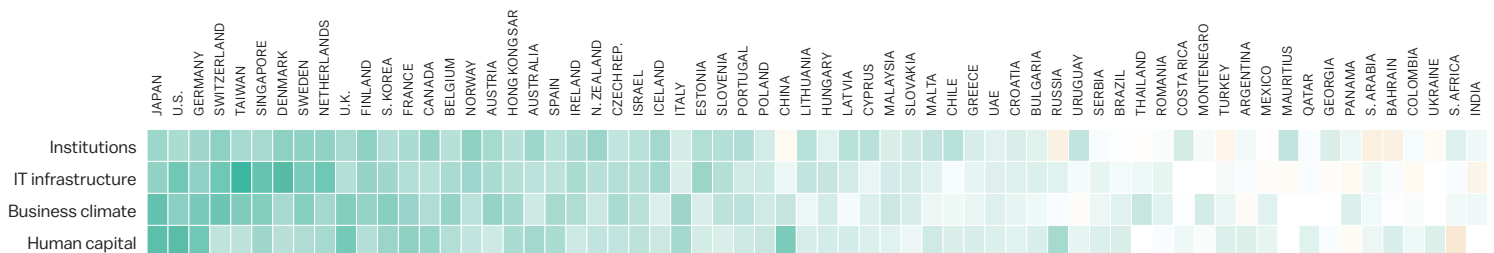
The size of the boost is the same for all countries, but the timing is different. To model a gradual diffusion of new technology worldwide, we built a scorecard to identify which countries were most likely to innovate, whether by advancing the frontier or catching up to it.

- We rank 135 economies on the quality of their institutions, IT infrastructure, business climate, and human capital, with even

Technology Scorecard

Innovation ranking*

Better Worse



weights across the four pillars.

- Advanced economies perform best on the metrics, but several major emerging markets—including China, Russia, and Brazil—make it into the second tier.

In applying the scorecard to our scenario, we divide the world into five groups and assume the leaders experience the surge first, beginning in 2022. The temporary acceleration in productivity then cascades to the second, third, fourth, and fifth cohorts, with the last group—mainly less developed African countries—starting to feel the benefits in the early 2030s.

The mapping of gains from TFP to GDP is 1 to 1. Aggregating across our country forecasts, our upside scenario implies a boost in annual growth to a peak of about 3% in 2030. That would leave the global economy almost \$10 trillion bigger by 2050. That’s an impact larger than the current output of Germany and Japan combined.

We’ve attempted to take account of the differences in countries’ abilities to innovate and absorb new technologies. At the same time, our results are essentially based on a stylized top-down

scenario. A bottom-up analysis starting from conditions in individual countries would find that some have larger potential gains than others and end up with different aggregate results.

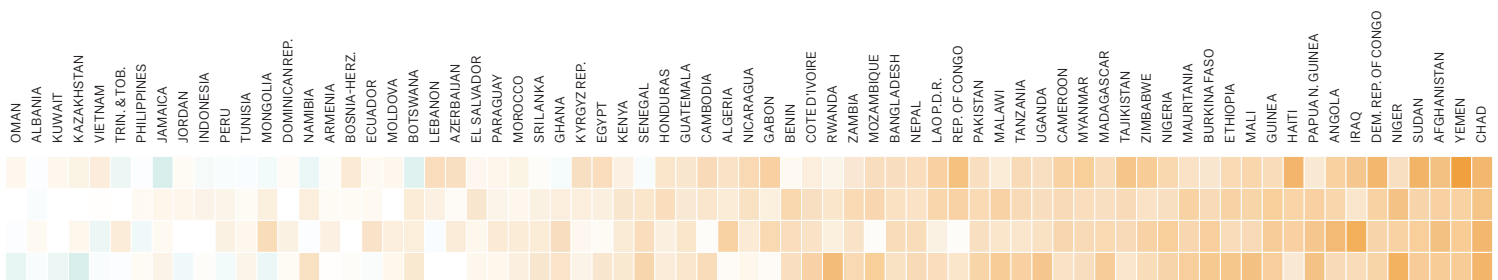
The Pessimistic Case: Productivity Plummetts

The pessimistic scenario is a combination of three factors:

- Covid-19 could hurt productivity through credit tightening, trade disruption, border closures, and sectoral reallocation. A World Bank study shows that epidemics have sustained negative effects on supply and demand. We assume Covid-19 will shave a further 0.1 ppt from annual productivity growth until 2030.

- The exhaustion of low-hanging fruits that have driven growth in the past, such as education and urbanization, could add a further drag. Economist Gordon estimates that this could cost the U.S. 0.2 ppt in annual per capita growth. We assume the same magnitude indefinitely for global growth.

- An IT revolution that’s already run its course adds to the malaise. Rather than a sustainable engine of growth, past advances may have been responsible for a one-time productivity surge ▶

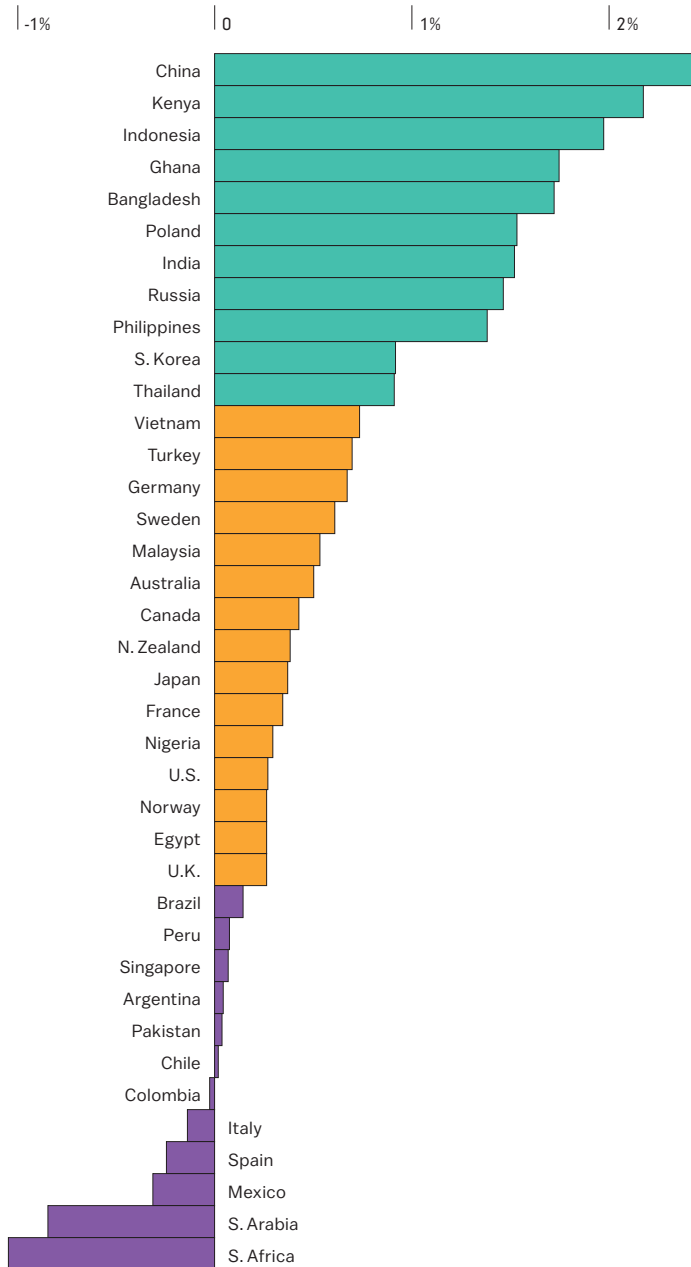


*Shading based on Z-scores, which can be found at {NSN QI7TB3T1UM1I <GO>} on the Bloomberg Terminal.
Sources: Bloomberg Economics, World Bank, Freedom House, Cable, International Telecommunication Union, UN, Netcraft, Observatory of Economic Complexity, IMF, SClmago

BE Baseline Forecasts for Productivity Growth

Average annual total factor productivity growth forecast from 2020 to 2030

■ Catching up ■ Keeping pace ■ Falling behind



Source: Bloomberg Economics

from 1996-2007, Gordon argues. We assume the fading of ripple effects could subtract 0.2 ppt a year, with the effect hitting technologically advanced economies first, and with a cascading effect reaching other countries later.

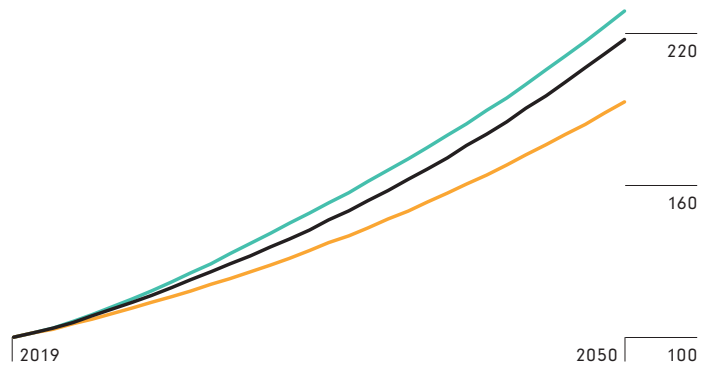
Because the downside scenario envisions a sustained drag on TFP growth, the cost over time would be huge—more than twice the benefits we expect in our upside scenario. We estimate annual GDP growth would slow to about 2% by 2030, and the effects would ultimately shave about \$22 trillion in global output from our baseline by 2050, more than the U.S. produced last year.

Our upside and downside scenarios represent two extremes of the technology debate. Compounded over time, the difference between them is immense—adding up to \$31 trillion by 2050. ●

Techno-Optimism vs. Productivity Pessimism

Global GDP, by technology scenario (index, 2019 = 100)

■ Baseline ■ Upside ■ Downside



Source: Bloomberg Economics

From Risk-Free Returns to Return-Free Risks: The Broken BRICS

By ZIAD DAOUD and BOINGOTLO GASEALAHWE

EMERGING MARKETS HAVE MOVED UP the income ladder by exporting more, riding the commodity boom, and employing workers in more productive sectors. But these forces have begun to stall or even reverse, resulting in a polarization of growth. In the decades ahead, China and India will dominate the global scene. Others may struggle to emerge at all.

- After a remarkable run in the early 2000s, growth in emerging markets has fallen considerably. Once-shining prospects are now growing at a slower pace than advanced economies or, worse, completely stagnating.

- After driving growth in the early part of the century, globalization, commodity demand, and demographics are now fading tailwinds.

- For China and India, massive domestic markets and significant space to catch up to technology leaders should propel growth. Demographics also continue to work in India's favor.

- To raise incomes, the rest will need domestic demand to take off and productivity to increase—a harder path to prosperity than export-led industrialization.

Return-Free Risk

For some emerging markets, notably in East Asia, the last 50 years have been a period of remarkable growth. Cheap exports and rapid industrialization have allowed South Korea, China, and Taiwan to raise their per capita income by 5%-8% a year for decades, resulting in significant advances in living standards and handsome returns to investors.

But recent performance has been less remarkable. Growth in the last five years has significantly lagged the previous 10. In some places—Saudi Arabia, Russia, and South Africa—the expansion has fallen behind advanced economies. Argentina and Brazil have completely stagnated, with output contracting. Instead of offering risk-free returns, these countries are now presenting investors and business with the unenticing proposition of return-free risks.

There are a number of factors at work:

- The decline in commodity prices reduced the income of exporter countries. Russia, Brazil, Mexico, and Colombia have seen their economies shrink in nominal terms from 2014.

- China's continued slowdown and the escalation of trade wars have contributed to the slowdown in commodity demand and hurt export-dependent economies, especially those in Southeast Asia.

- Slower population growth has put a cap on growth potential in Latin American countries including Chile and Peru.

- Repeated sudden stops in capital flows have bruised economies dependent on foreign funding. Turkey and Argentina are smaller in nominal dollar terms than six years ago.

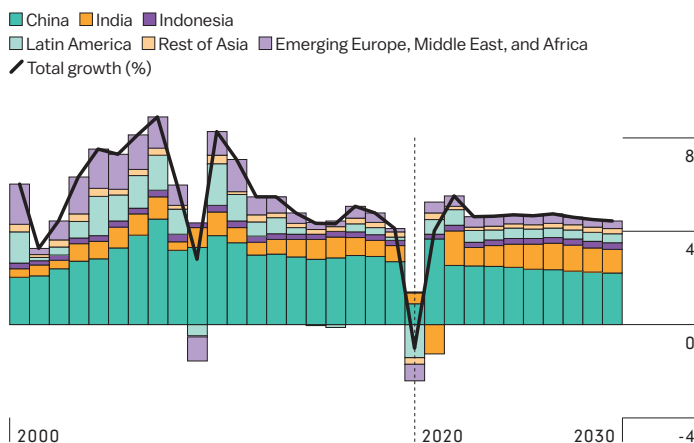
These forces are set to persist, with the Covid-19 pandemic likely to amplify them.

Commodity Peak

Commodity prices are expected to settle at a fraction of the level prevailing during the boom years before 2014, with the impact most visible in the oil market. Energy giant BP Plc recently said ►

China and India Will Keep Driving Emerging-Market Growth

Percentage-point contribution to emerging-market growth



Source: Bloomberg Economics

crude demand may have already peaked and may never return to pre-virus levels.

What's driving the downturn of the commodity cycle? Waning global growth, and therefore demand, is one reason. Technology is another. Efficiency gains mean less energy is needed to generate the same amount of economic output. Technology also makes alternative sources of energy more available and affordable. In addition, climate concerns are shifting energy consumption toward cleaner renewable sources such as wind and solar and away from hydrocarbons.

Deglobalization

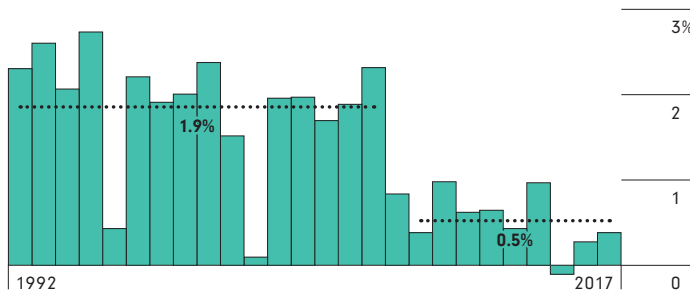
Increased integration of the world economy in the early part of the century benefited emerging markets. With China in the lead, they boosted their share of global trade to 41% in 2019, from about 25% in 2000.

Globalization opens up a larger market for exporters; allows the transfer of knowledge and know-how; brings much-needed capital; and helps job creation as companies in advanced economies outsource their production to countries with lower wages and costs.

A World Less Interested in Connection

KOF Globalization Index, year-over-year change

• Average over period



Source: KOF Swiss Economic Institute

But globalization is stalling. The 2008 financial crisis has slowed the pace of global integration, and this trend will probably continue. The U.S.-China trade war, Brexit, and the pandemic are intensifying isolationist policies.

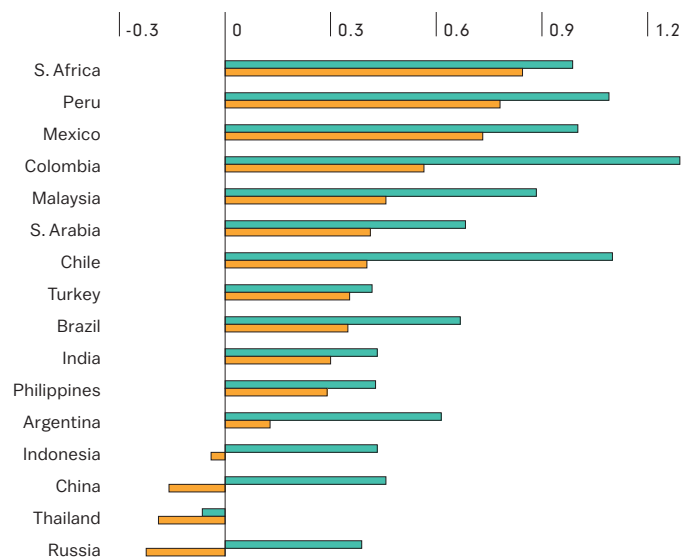
Offshoring can also come under threat from automation. Jobs most susceptible to offshoring are those that can be broken down into standardized routine tasks—the very same roles that are easiest to automate. As trade barriers are erected and cross-border disputes flare up, companies may find it easier to replace their workers with machines rather than foreigners.

Worldwide, we estimate that automation threatens 800 million

Where Labor Matters Most

Percentage-point contribution of labor to potential growth

■ 2000 to 2015 ■ 2016 to 2030, forecast



Source: Bloomberg Economics

jobs. Exposure is highest in middle-income countries, like those in the Middle East and Latin America, where a high share of workers are employed in routine roles. But even low-income countries could see the path up the development ladder from agriculture to manufacturing blocked as machines replace workers in low-end factory jobs.

Weaker Demographics

The contribution of labor to annual potential growth is also set to decline across all major emerging markets. Lower fertility rates and aging populations—a common phenomenon as countries get richer—are behind this smaller demographic dividend.

The countries most affected will be China, Russia, and Thailand. At the other end of the spectrum, South Africa will continue to benefit from the demographic dividend as more young people enter the labor market and life expectancy rises. India's youthful population will also continue to fuel growth.

Emerging Inequality

It's increasingly hard to speak of emerging markets as a homogeneous group. Some, such as China, India, and Indonesia, combine the benefits of a massive domestic market, development-focused policymakers, and significant space to catch up to global technology leaders. They will also face headwinds. But they're still likely to outgrow the rest of the world and play a progressively larger role in the global economy.

Other emerging markets may find it hard to escape the low- and middle-income trap. The standard development routes—exporting cheap manufactured goods and extracting commodities—are likely to yield lower returns in the future. In a more fragmented global economy, they'll need to rely on domestic demand and productivity improvements.

The path to development isn't closed. Emerging markets with strong institutions and macroeconomic stability will continue to outperform. The formation of new trade blocs such as Asia's Regional Comprehensive Economic Partnership and the Trans-Pacific Partnership show the continued opportunities for gains from opening to trade. China's sustainable energy boom shows how climate change can be a growth opportunity. It is, undeniably, getting harder to follow. ●

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