



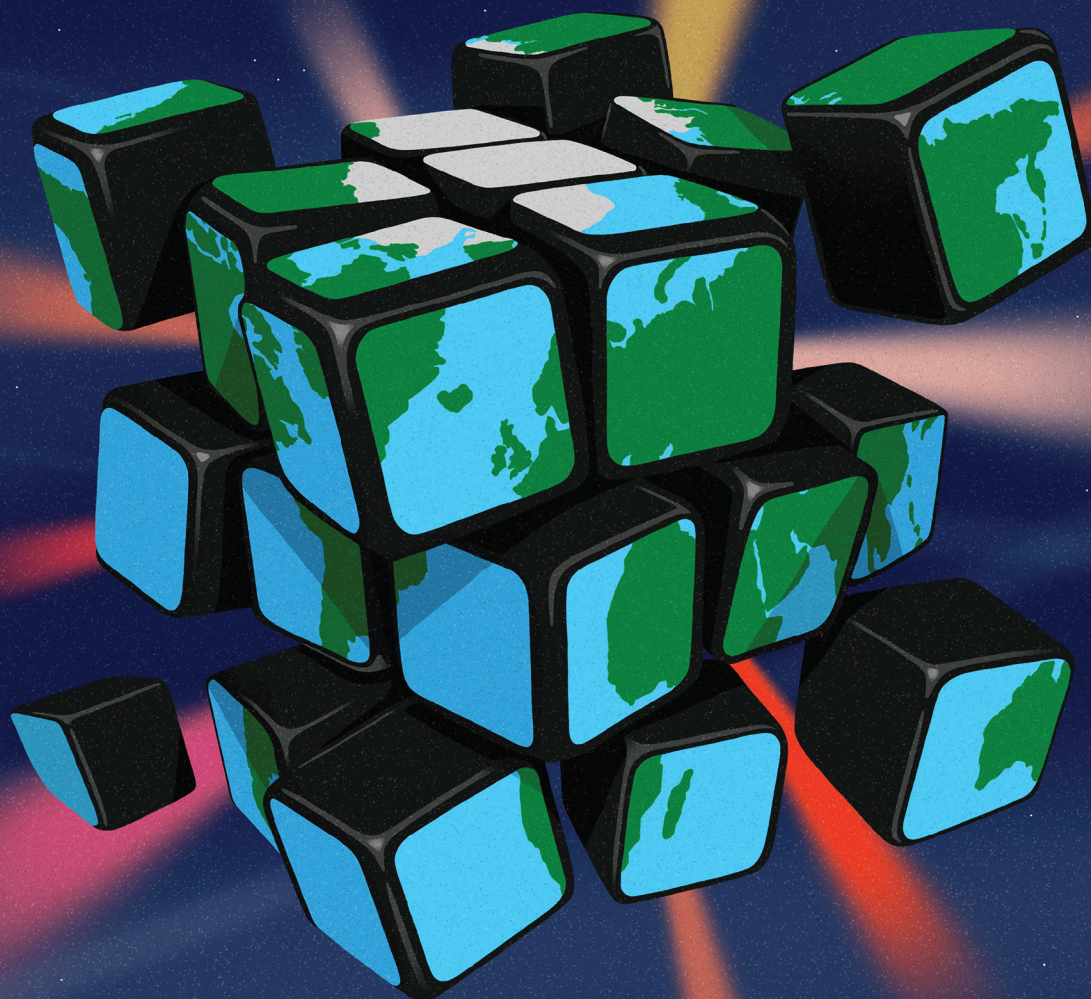
FINANCE AND DEVELOPMENT

JUNE 2022

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Geo-economic Puzzle

Policymaking in a More Fragmented World

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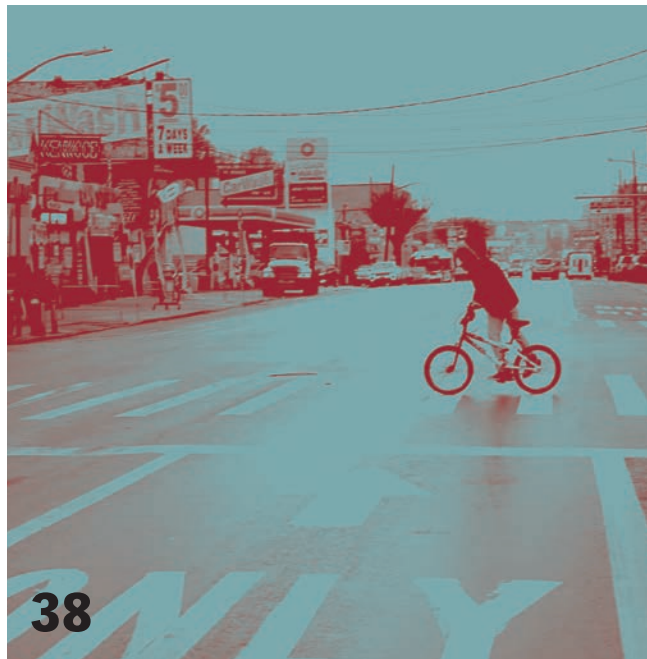
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A More Fragmented World

THE RARE CONFLUENCE of geopolitical, economic, and technological forces now confronting the world may reverberate for generations. The war is thrusting us into a fraught period of geopolitical realignment, supply disruptions, food and energy insecurity, and more volatile financial markets. These shocks could shake social and political stability in some countries while weakening the world's ability to confront its foremost long-term challenge, climate change.

The IMF's Pierre-Olivier Gourinchas describes a sudden geopolitical shift that reveals hidden fault lines. He warns of a world fragmenting into "distinct economic blocs with different ideologies, political systems, technology standards, cross-border payment and trade systems, and reserve currencies."

With this issue we convene respected thought leaders to help us understand these trends—all playing out amid a slowing global recovery, rising inflation, and shrinking policymaking space—and how we can best respond.

The war in Ukraine poses the most immediate risk. Nicholas Mulder argues that sanctions against Russia have unprecedented consequences that should prompt a rethink of their use as a weapon of economic warfare. Giovanni Peri discusses the economic impact of refugees fleeing Ukraine. "Picture This" depicts the food crisis that threatens millions with hunger. Other contributors see soaring war-induced energy prices as a chance to spur the transition to green energy. And while some predict that geopolitical competition and new technologies will end the dollar's dominance of international finance, Eswar Prasad argues the opposite: it will become more entrenched as the global go-to currency.

A more fragmented world, says Singapore's Tharman Shanmugaratnam, makes greater investment in global public goods even more urgent—and will require unprecedented public-private collaboration and a stronger, more effective multilateralism.

There is hope. As historian Patricia Clavin reminds us, turbulent times can energize actors and ideas that can lead to better modes of cooperation. The overriding priority, says Shanmugaratnam, is to "accommodate a multipolar world without becoming more polarized." **FD**

GITA BHATT, editor-in-chief



ON THE COVER

Illustrator Peter Reynolds' cover calls to mind the complexity of policymaking in today's more polarized and fragmented world—a topic that our June 2022 issue explores in depth.



FINANCE & DEVELOPMENT

A Quarterly Publication of the
International Monetary Fund

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IMF Publication Services

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E-mail: publications@imf.org

Postmaster: send changes of address to *Finance & Development*, International Monetary Fund, PO Box 92780, Washington, DC 20090, USA.

The English edition is printed at
Dartmouth Printing Company,
Hanover, NH.

Finance & Development is
published quarterly by the
International Monetary Fund, 700
19th Street NW, Washington, DC
20431, in English, Arabic, Chinese,
French, Russian, and Spanish.
English edition ISSN 0145-1707



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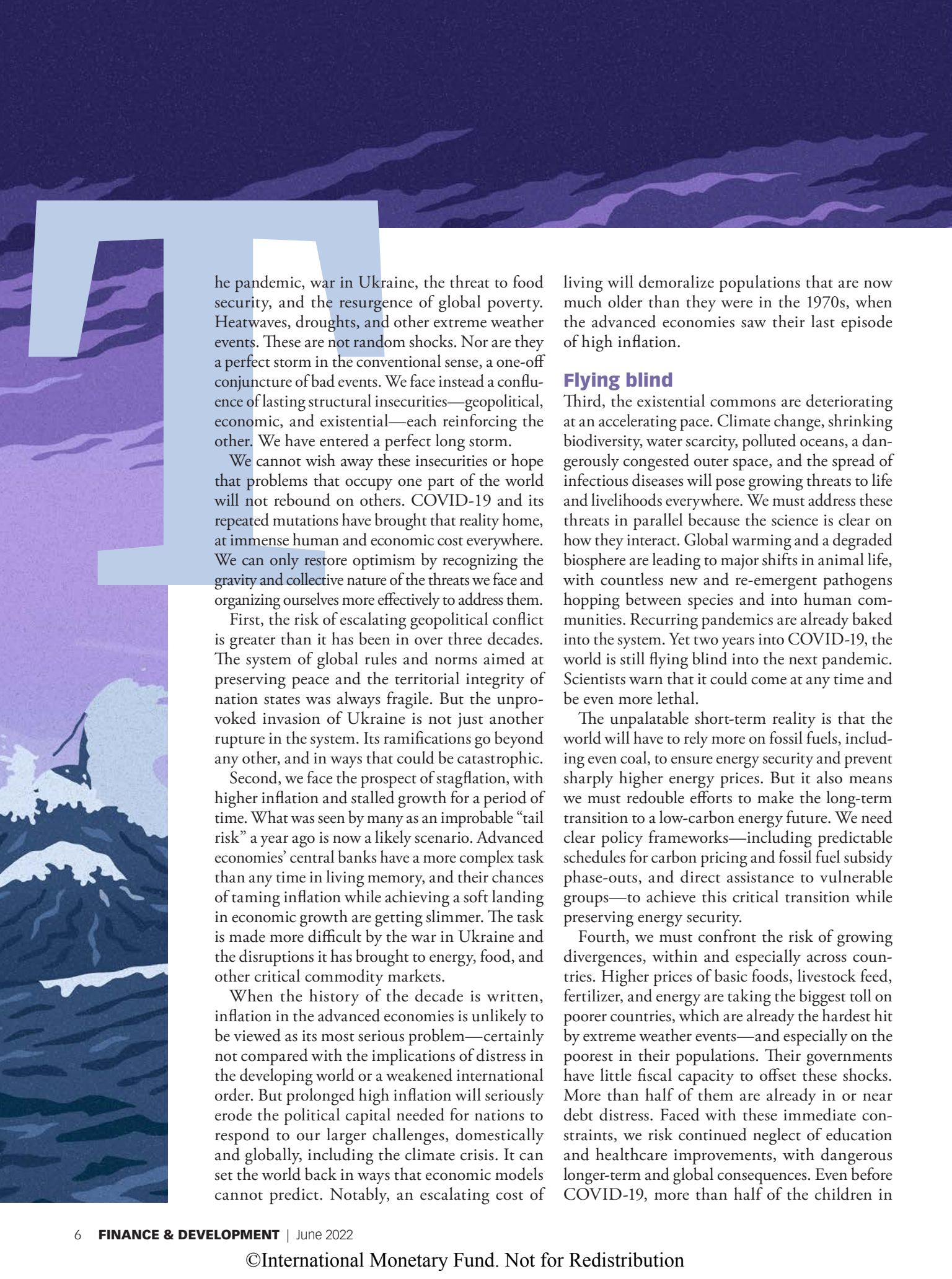
CONTINGENT STORM

We must bridge growing divides and rewire multilateralism to serve both collective and national interests more effectively

Tharman Shanmugaratnam



ART: PETER REYNOLDS



The pandemic, war in Ukraine, the threat to food security, and the resurgence of global poverty. Heatwaves, droughts, and other extreme weather events. These are not random shocks. Nor are they a perfect storm in the conventional sense, a one-off conjuncture of bad events. We face instead a confluence of lasting structural insecurities—geopolitical, economic, and existential—each reinforcing the other. We have entered a perfect long storm.

We cannot wish away these insecurities or hope that problems that occupy one part of the world will not rebound on others. COVID-19 and its repeated mutations have brought that reality home, at immense human and economic cost everywhere. We can only restore optimism by recognizing the gravity and collective nature of the threats we face and organizing ourselves more effectively to address them.

First, the risk of escalating geopolitical conflict is greater than it has been in over three decades. The system of global rules and norms aimed at preserving peace and the territorial integrity of nation states was always fragile. But the unprovoked invasion of Ukraine is not just another rupture in the system. Its ramifications go beyond any other, and in ways that could be catastrophic.

Second, we face the prospect of stagflation, with higher inflation and stalled growth for a period of time. What was seen by many as an improbable “tail risk” a year ago is now a likely scenario. Advanced economies’ central banks have a more complex task than any time in living memory, and their chances of taming inflation while achieving a soft landing in economic growth are getting slimmer. The task is made more difficult by the war in Ukraine and the disruptions it has brought to energy, food, and other critical commodity markets.

When the history of the decade is written, inflation in the advanced economies is unlikely to be viewed as its most serious problem—certainly not compared with the implications of distress in the developing world or a weakened international order. But prolonged high inflation will seriously erode the political capital needed for nations to respond to our larger challenges, domestically and globally, including the climate crisis. It can set the world back in ways that economic models cannot predict. Notably, an escalating cost of

living will demoralize populations that are now much older than they were in the 1970s, when the advanced economies saw their last episode of high inflation.

Flying blind

Third, the existential commons are deteriorating at an accelerating pace. Climate change, shrinking biodiversity, water scarcity, polluted oceans, a dangerously congested outer space, and the spread of infectious diseases will pose growing threats to life and livelihoods everywhere. We must address these threats in parallel because the science is clear on how they interact. Global warming and a degraded biosphere are leading to major shifts in animal life, with countless new and re-emergent pathogens hopping between species and into human communities. Recurring pandemics are already baked into the system. Yet two years into COVID-19, the world is still flying blind into the next pandemic. Scientists warn that it could come at any time and be even more lethal.

The unpalatable short-term reality is that the world will have to rely more on fossil fuels, including even coal, to ensure energy security and prevent sharply higher energy prices. But it also means we must redouble efforts to make the long-term transition to a low-carbon energy future. We need clear policy frameworks—including predictable schedules for carbon pricing and fossil fuel subsidy phase-outs, and direct assistance to vulnerable groups—to achieve this critical transition while preserving energy security.

Fourth, we must confront the risk of growing divergences, within and especially across countries. Higher prices of basic foods, livestock feed, fertilizer, and energy are taking the biggest toll on poorer countries, which are already the hardest hit by extreme weather events—and especially on the poorest in their populations. Their governments have little fiscal capacity to offset these shocks. More than half of them are already in or near debt distress. Faced with these immediate constraints, we risk continued neglect of education and healthcare improvements, with dangerous longer-term and global consequences. Even before COVID-19, more than half of the children in

low- and middle-income countries had not achieved basic literacy by age 10; the figure is now estimated to be as high as 70 percent. Girls especially have suffered large learning losses during the pandemic, with many not returning to school and millions being pushed into early marriage.

There is now a real prospect of rollback of the hard-earned economic and social gains that many of these developing countries made in the last two decades. It will risk permanent scarring of the young, further disempowerment of women, civil wars, and conflicts between neighboring states. Each of these would make it harder to address the world's most pressing challenges.

Financing global public goods

We must address these threats, not on the basis of scenarios that reflect our hopes but through a realistic appraisal of what could plausibly go wrong. COVID-19 and the Ukraine war were not black swan events. The full scale of these tragedies may not have been foreseen, but the risks had been blinking visibly on the radar for some time.

We must bring preparedness for threats, known or unknown, into the mainstream of public policy and collective thinking, just as regulators learned from the global financial crisis and sought to fortify financial buffers in advance of the next crisis.

We have to invest at significantly higher levels, over a sustained period, in the public goods needed to address the world's most pressing problems. We must make up for many years of underinvestment in a wide range of critical areas—from clean water and trained teachers in developing economies to upgrades of an aging logistics infrastructure in some of the most advanced economies. But we also have the opportunity now to spur a new wave of innovations to tackle the challenges of the global commons, from low-carbon construction materials, to advanced batteries and hydrogen electrolyzers, to combination vaccines aimed at protecting simultaneously against a range of pathogens.

To fund these investments we must embark on public-private collaboration on a scale never before adopted. Public sector finances will not be able to meet these needs on their own. As it is, debt-servicing costs will take an increasing

share of government revenues. Governments in the advanced world have also declared the end of the “peace dividend” that had prompted many of them to spend less on defense over several decades.

We must now reorient public finance, in partnership with philanthropic capital where possible, toward mobilizing private investment to meet the needs of the global commons. The world will need to invest an estimated \$100 to \$150 trillion

We must bring preparedness for threats, known or unknown, into the mainstream of public policy and collective thinking.

over the next 30 years to achieve net zero carbon emissions. That may sound daunting. But the \$3 to \$5 trillion annual cost is not a large percentage of the world's \$100 trillion capital markets, which grow by about that amount each year.

There is no lack of private and market finance. But channeling it to meet the needs of the commons requires a proactive public sector and well-designed frameworks for risk-sharing with the private sector. Policies and standards to rapidly scale up the deployment of clean energy technologies that are already proven, and to incentivize large scale infrastructural investments such as in smart transmission and distribution grids, will be critical to achieving significant cuts in emissions by 2030. However, almost half the technologies needed to reach net zero by mid-century are still being prototyped. Governments must put skin in the game to leverage private sector R&D, and promote demonstration projects, to accelerate the development of these technologies and bring them to market. Besides getting to net zero on time, they should aim to spur major new industries and job opportunities.

The social returns to protecting the global commons will typically be far in excess of the



We cannot address the challenges of this new era without a more effective multilateralism.

private returns, which makes a strong case for the public sector to share risks with private investors. Developing and producing vaccines at scale for the next pandemic is a strong illustration of the point. A project to immunize the world's population even six months earlier will save trillions of dollars and countless lives.

Making multilateralism work

However, we cannot address the challenges of this new era without a more effective multilateralism. UN Secretary-General António Guterres' report, *Our Common Agenda*, sets out a bold and credible vision of multilateralism: one that is more inclusive of different voices, more tightly networked, as well as more effective in delivering outcomes and hence more trusted.

It does not require a root and branch reconstruction of multilateralism or building entirely new institutions. But we have to move with urgency to reorient existing institutions for a new era, devise new mechanisms for networked cooperation among the multilaterals and other institutions including non-state players, and pool resources in ways that can meet both nations' collective interests and self-interests more effectively.

First, we need new thinking on the global commons. We must view money spent on strengthening them not as aid to the rest of the world but as an investment that benefits nations both rich and poor many times over. As the G20 High Level Independent Panel on financing pandemic security showed, the additional international investment required to plug major global gaps in preparedness, with contributions fairly distributed across countries, will not only be affordable for all but also enable us to avoid costs that would be several hundred times larger if we fail to act together to prevent another pandemic. The longstanding aversion to collective investment in pandemic preparedness

reflects political myopia and financial imprudence, which we must overcome urgently.

Updating Bretton Woods

Second, we must repurpose the Bretton Woods institutions. The IMF and World Bank were set up almost 80 years ago to help with problems faced by countries individually, at a time when financial markets were mostly small and not interconnected. Their missions must be brought up to date for an era where financial crises are often global in nature, and where the deterioration of the global commons will pose an increasing economic challenge to all countries, most especially in the developing world.

The IMF and World Bank must be better resourced and empowered by their shareholders to make larger and swifter interventions in this new global era. The IMF must be given the mandate to manage a stronger and more effective global financial safety net, more akin to how the leading central banks inject stability at home when a crisis hits. The global commons must be placed at the core of the World Bank's mandate, together with poverty alleviation. It must also play a much bolder role as a multiplier of development finance. It must pivot more boldly toward mobilizing private capital, using risk guarantees and other credit-enhancement tools rather than direct lending on its own balance sheet. The World Bank and IMF must also work to join up operations with other international financial institutions and development partners to overcome today's fragmented efforts, build convergence around core standards such as on debt sustainability and procurement, and achieve greater development impact.

Third, we have to safeguard the digital commons. The positive agenda is clear. We must build the infrastructure and policy frameworks needed to close the digital divide and make serious efforts to close digital literacy gaps in every society. But we

must also build guardrails to make the internet safe for democracy and align online platforms with the public interest. We do not yet have global rules or norms to counter industrial-scale disinformation or systematic efforts to spread distrust. The European Union's new Digital Services Act, aimed at forcing online platforms to remove misinformation and hate, is a major step forward. Similar approaches are being taken in nations like the United Kingdom, Singapore and Australia.

We must also address the growing challenge of cyberattacks and its impact on international peace and security. Countries have adopted a set of norms and rules for responsible state behavior in cyberspace. The challenge is to implement them in a sustained manner, even during moments of geopolitical tension.

Avoiding polarization

Fourth, a more effective multilateral system will require fresh strategic understanding between major nations, most important, between the United States and China, as the world shifts irreversibly toward multipolarity. This new understanding must be shaped by their overarching common interests—in climate and pandemic security, peace, and the avoidance of global financial crises. It will require considerable geostrategic skill, as well as more active strategies to create good jobs and broad-based opportunities at home, so as to rebuild the domestic political foundations for economic openness.

We must update the rules of the game to ensure fair competition and resilient supply chains without retreating from an open and integrated order that is vital to each nation's rate of innovation, growth, and long-term security. COVID-19 is accelerating the move by businesses toward more diversified global supply chains, in fact to the benefit of several developing economies, but global sourcing remains as important today as it was before the pandemic. Trade between the United States and China remains hugely beneficial to both.

We can be under no illusion that an integrated global order, with its deep economic interconnections between nations, will on its own assure us of peace. But economic interdependence between the major powers, save for sectors impinging on

national security implications, will make conflict far less likely than in a world of increasingly decoupled markets, technologies, payment systems, or data.

We must take the long view. Our overriding priority must be to accommodate a multipolar world without becoming more polarized. A more polarized and fragmented world will ultimately weaken all nations, including the largest ones, and make it difficult if not impossible to meet the interests that all of humanity shares: in a safe, sustainable, and prosperous world, inclusive and equitable for all. [FD](#)

THARMAN SHANMUGARATNAM is senior minister, Singapore. He is a member of the UN Secretary-General's High-Level Advisory Board on Effective Multilateralism and co-chairs the recently launched Global Commission on the Economics of Water. He chaired the G20 Eminent Persons Group on Global Financial Governance and co-chaired the G20 High Level Independent Panel on financing pandemic security.





Shifting Geopolitical Tectonic Plates

A more fragmented world will need the IMF more, not less

Pierre-Olivier Gourinchas

THE RUSSIAN INVASION of Ukraine has opened a new chapter in international relations, with important implications for the global economic order.

The outbreak of large-scale warfare on European soil, with its associated human tragedies, brings back memories of the continent's darkest times. Within three days of the invasion, the Group of Seven, consisting of Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States, soon followed by other countries, deployed a range of economic sanctions against the aggressor.

As discussed in our latest *World Economic Outlook*, the war and the associated economic sanctions will have a major impact on the world economy, slowing down activity and increasing price pressures.

Like an earthquake, the war has an epicenter, located in Russia and Ukraine. The economic toll on these two countries is extremely large. According to our projections, Ukraine's economy

will shrink by 35 percent and Russia's by 8.5 percent in 2022.

The war has also caused seismic waves, radiating from the epicenter, and impacting economies far and wide. The first impact is on the price of commodities. Because Russia and Ukraine are major producers and exporters of oil, gas, metals, and grains the price of these commodities has soared, causing hardship around the world and contributing to a significant increase in inflation. Second, trade flows have been heavily disrupted, with a major impact on Russia's and Ukraine's close trading partners, especially in the Caucasus, central Asia, eastern Europe, and the Baltics, but also more broadly via supply chain disruptions. The war has also caused a major refugee crisis in Europe, with close to 6 million people fleeing Ukraine in less than three months. Third, the war caused financial conditions to tighten, through the weakening of many economies and indirectly via a faster-than-expected tightening of monetary policy in advanced economies.

The earthquake analogy is perhaps most apt because the war reveals a sudden shift in underlying "geopolitical tectonic plates." The danger is that these plates will drift further apart, fragmenting the global economy into distinct economic blocs with different ideologies, political systems, technology standards, cross border payment and trade systems, and reserve currencies. The war has made manifest deeper divergent processes. We need to focus on and understand these if we want to prevent the ultimate unraveling of our global economic order.

In that respect, the earthquake analogy has its limits, offering some reason to be moderately hopeful. These "geopolitical plates" are man-made reflecting history, institutions and people. While each plate or bloc may carry tremendous inertia, ultimately people—and their governments—can chart their own course. Reason and mutual economic interest can prevail.

In this context, the deeper economic force at play is the rising power of emerging market economies, especially China. The economic rise of China and other emerging market economies is a direct consequence of their integration into the world economy: international trade and economic growth surged in the past 40 years precisely because the world was not segmented. Yet the rise in these countries' economic might was not matched by a similar rise in their financial and global institutional firepower.

Nowhere is this more evident than when we look at the importance of the US dollar in the international monetary and financial system. Scholars of the system, like myself, have long pointed out that the dominance of the US dollar is absolute and organic but ultimately fragile. It is absolute because no other international currency comes close to challenging the role of the dollar as an international means of payment, unit of account and store of value. It is organic because this dominance does not derive from organized rules. Dollar-gold convertibility ended in 1971, and yet the dominance of the dollar has, if anything, increased due to interlocking and self-reinforcing network effects, and the unquestioned liquidity and safety of US Treasuries. It is also ultimately fragile because the US share of global output, and therefore the share of global output it can safely pledge through its official debt instruments, is bound to decline as emerging market economies rise. With a shrinking share of world output, the United States cannot indefinitely remain the sole supplier of safe assets to the world. This is what Helene Rey and I have dubbed the “new Triffin Dilemma.”

No one can reasonably predict when or how the current absolute dominance of the dollar will be supplanted by a multipolar system. This is one of the fault lines in the current economic order. How this transition is implemented could have a major effect on the global economy and the future of multilateralism. At one end of the spectrum, we could end up with separate blocs. This would solve the Triffin dilemma by making the world smaller, but also less efficient. On the other end, the world economic system could remain integrated, but the interactions and possible coordination between multiple reserve currencies, including the US dollar, remain undefined.

In this vacuum, the war, and the unprecedented and coordinated freezing of the international reserves of the Central Bank of Russia represent major new developments. Powerful centrifugal forces have been set in motion, which, if not carefully checked, could lead to further economic fragmentation.

By design, the freezing of central bank reserves represents a major strike to the heart of “Fortress Russia,” the economic and financial bulwarks the Russian authorities have put in place since the invasion of Crimea in 2014. A large war chest of international reserves—37 percent of Russian

GDP—was supposed to insulate Russia against financial sanctions. With much of the reserves frozen, Russia is now highly dependent on continued energy exports to fund its war effort—a major vulnerability.

But sanctions on central banks call into question the broader usefulness of dollar international reserves in the first place, especially if the conditions under which restrictions on their use appear arbitrary, at least from the perspective of the countries holding them. This poses a “geopolitical Triffin dilemma” where the expectation of future restrictions on the use of reserves, instead of insufficient fiscal space, could trigger a move away from dollar assets.

In that respect, the war has brought the potential instability of the current global economic order into sharp relief. In this new environment, the IMF is being confronted with some serious existential questions. As a global institution

The war has brought the potential instability of the current global economic order into sharp relief.

whose objective is to promote global economic integration, it may become increasingly difficult to operate in a geopolitically polarized environment. The path of convenience would be to scale ambitions down and focus on the bloc historically aligned with the original signatories of the Bretton Woods Agreement. But that would fail to rise to the historical challenge.

Instead, we must recognize that a fragmented world is a more volatile and vulnerable world, where access to safe assets is more restricted and the global financial safety net is less comprehensive. This is a world that needs the IMF more, not less. As an institution, we must find ways to deliver on our mission to provide financial assistance and expertise when needed and to maintain and represent all our members, even if the political environment makes it more challenging. If geopolitical tectonic plates start drifting apart, we’ll need more bridges, not fewer. [FD](#)

PIERRE-OLIVIER GOURINCHAS is the IMF’s economic counsellor and director of the Research Department.

ENDURING PREEMINENCE

The US dollar might slip, but it will continue to rule

Eswar Prasad

The international monetary system may be at the threshold of significant change from a combination of economic, geopolitical, and technological forces. But it is an open question whether these forces will knock the US dollar off its pedestal as the dominant international currency, which it has been for much of the post–World War II period. How these forces play out will have major ramifications for the evolution of the world order, because financial power is a key element of soft power.

The dollar dominates every aspect of global finance. Nearly 60 percent of the world's central banks' foreign exchange reserves, essentially their rainy-day funds, are invested in dollar-denominated assets. Almost all commodity contracts, including those for oil, are priced and settled in dollars. The dollar is used to denominate and settle a majority of international financial transactions (see chart).

The preeminence of the dollar gives the United States considerable power and influence. Because transactions entailing use of the dollar invariably involve the US banking system, the US government can severely punish countries, such as Iran and Russia, by imposing sanctions that limit their access to global finance. It also means that the fiscal and monetary policies of the US government affect the rest of the world because they influence the value of the dollar. And it allows the United States to punch well above its weight in global GDP and trade, which has long rankled US rivals and allies alike.

Changes afoot

Changes are underway that could undermine this supremacy.

Raw US economic dominance is shrinking. The US economy now accounts for about 25 percent of global GDP (at market exchange rates), down from 30 percent in 2000. Indeed, the locus of economic power, as measured by the share of global output and trade, has been shifting toward emerging market economies, led by China, for more than two decades.

The emergence of digital currencies, both private and official, is shaking up domestic and international finance. Consider international payments. They involve multiple currencies, payment systems operating on diverse protocols, and institutions governed by varying regulations. As a result, cross-border payments have tended to be slow, expensive, and difficult to track in real time. New technologies spawned by the cryptocurrency revolution now make for cheaper and practically instantaneous payment and settlement of transactions.

Even central banks are getting into the game, using the new technologies to increase the efficiency of payment and settlement mechanisms for cross-border transactions by their domestic financial institutions. The central banks of China, Hong Kong SAR, Thailand, and the United Arab Emirates are collaborating on one such effort, and other central bank consortia are engaged in similar exercises.

These developments will alleviate payment-related frictions in international trade, because quicker settlement reduces risks from exchange rate volatility. Exporters and importers will enjoy less need to hedge against the risks of exchange rate volatility that stem from long delays in processing and finalizing payments. Economic migrants sending remittances home, a key source of revenue for many developing economies, will also benefit from lower fees.



Changes are also afoot in foreign exchange markets. For example, transactions between pairs of emerging market currencies are becoming easier as financial markets and payment systems mature. Typically, converting such currencies to dollars, and vice versa, has been easier and cheaper than exchanging them for one another. But China and India, for example, will soon no longer need to exchange their respective currencies for dollars to conduct trade cheaply. Rather, exchanging renminbi for rupees directly will become cheaper. Consequently, the reliance on “vehicle currencies,” particularly the dollar, will decline.

In short, as international payments become easier and perhaps even increase in volume as frictions recede, the role of the dollar in intermediating such payments could decline. In tandem with these changes, the dollar’s primacy in the denomination of various transactions will decline. Pricing of oil contracts in dollars is less important, for example, if China can use renminbi to pay for its oil purchases from Russia or Saudi Arabia.

Digital currencies

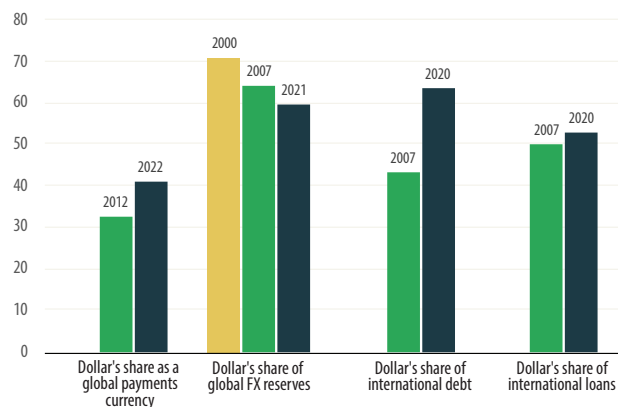
Digital technologies affect other aspects of money. With the rapid decline in the use of cash, many central banks are moving forward—or at least experimenting—with central bank digital currencies

(CBDCs). China, among major economies, is well into advanced trials of its CBDC.

The prospect of a digital renminbi available worldwide has intensified speculation that China’s currency could gain in prominence and perhaps even rival the dollar. But a digital renminbi by itself will not shift the balance of power among

Dollar dominance

Whether as a reserve currency, a payment vehicle, or a denominator of debts and contracts, the dollar has by far the most important role in global finance. (evolution of the dollar’s role in global finance, percent)



Sources: Bank for International Settlements; European Central Bank; International Monetary Fund; and SWIFT.

Note: Data are from the end of 2021, except for payments, which are from March 2022. FX = foreign exchange.

major currencies. After all, most international payments are already digital. Rather, it is China's Cross-Border Interbank System (CIPS), which can communicate directly with other countries' payment systems, that will enhance the renminbi's role as an international payment currency.

Even so, the renminbi still lacks some key attributes that reserve currencies typically need to be considered reliable stores of value. China has made some progress in this area—removing restrictions on cross-border capital flows, leaving its currency's value to market forces, and broadening foreign investors' access to its bond markets. But the government has rejected institutional changes essential to garnering the trust of foreign investors, including an independent central bank and the rule of law. Indeed, China is alone among reserve currency economies in not sharing these characteristics.

Still, the renminbi has made some progress as an international currency. By some measures, it is used for about 3 percent of international payment transactions, and about 3 percent of global foreign exchange reserves are held in renminbi. Such measures of renminbi prominence will almost certainly increase as the Chinese economy and its financial markets grow and foreign investors, including central banks, allocate a greater portion of their portfolios to renminbi-denominated assets—if for no reason other than diversification. But it is unlikely that the renminbi will pose a serious threat to the dollar's dominance unless the Chinese government embraces both market-oriented economic reforms and upgrades to its institutional framework.

A mixed blessing

The new technologies will both help and hinder emerging market economies, with collateral effects that—coupled with other developments—in the end may enhance dollar dominance rather than erode it.

On one hand, as mentioned earlier, new financial technologies will improve access to global financial markets for firms and households in emerging market and developing economies. Reduced frictions in international payments will

enable these economies' firms to gain access to global pools of capital and give their households easier access to opportunities for international portfolio diversification—permitting better returns on their savings while managing risk.

On the other hand, the proliferation of conduits for money to flow across national borders will intensify developing economies' vulnerability to the vagaries of major central banks' policies and the whims of domestic and international investors. It is also likely to render capital controls less effective. Even cryptocurrencies such as Bitcoin have been channels for capital flight when a country's currency is collapsing and domestic investors lose faith in their country's banking system. In short, greater capital flow and exchange rate volatility will further complicate domestic policy management, with deleterious consequences for economic and financial stability in these economies.

The natural response of policymakers in emerging markets is to protect their economies against such outcomes by further expanding their stocks of hard currency foreign exchange reserves. But Russia's loss of access to the bulk of its foreign exchange reserves—the result of Western sanctions imposed in response to its invasion of Ukraine—shows that such buffers might be unavailable in times of dire need. This has generated speculation that emerging market economies will look to other reserve assets—such as gold, cryptocurrencies, or the renminbi—as alternatives to government bonds issued by advanced economies.

The reality, though, is that assets such as gold are not viable alternatives because their markets are not liquid enough; it would be difficult to sell a large stock of gold within a short period without setting off a plunge in gold prices. Cryptocurrencies such as Bitcoin have the additional problem of being highly unstable in value. Even renminbi reserves might be of limited help because that currency is not fully convertible.

For the foreseeable future, there is likely to be strong and perhaps even rising demand for “safe assets” that are liquid, available in large quantities, and backed by countries with trusted financial systems. There are limited supplies of such assets, and the US dollar—which represents a powerful

combination of the world's largest economy and financial system, backed by a strong institutional framework—remains the dominant supplier. The desire for diversification has led to recent modest increases in the shares of Australian, Canadian, and New Zealand dollars in global foreign exchange reserves, but these—and other leading reserve currencies, such as the euro, the British pound, and the Japanese yen—have only marginally dented the US dollar's share.

Innocent bystanders

Changes coming to the international monetary system pose additional threats to the currencies of smaller and less developed economies. Some of these countries—especially those with central banks or currencies that lack credibility—could be overrun by nonnative digital currencies.

It is possible that national currencies issued by their central banks, particularly currencies seen as less convenient to use or volatile in value, could be displaced by stablecoins—private cryptocurrencies issued by multinational corporations or global banks and usually backed by US dollars to maintain stability—or by CBDCs issued by major economies. Even a volatile cryptocurrency such as Bitcoin might, in addition to enabling capital flight, be preferred to the local currency during economic turmoil.

But it is more likely that economic turmoil would result in further dollarization of economies, particularly if digital versions of such well-known currencies as the dollar become easily available worldwide.

Although digital technologies enable new forms of money that could challenge fiat currencies and set off a new era of domestic and international currency competition, it is equally likely that these new forces will create more centralization, with some currencies accreting even more power and influence. In other words, many of these changes might reinforce rather than weaken the dollar's dominance.

The dollar trap

There are other forces that sustain the dollar's dominance, especially the prospect of losses were

the dollar to falter. Foreign investors, including central banks, hold nearly \$8 trillion in US government debt. Overall US financial obligations to the rest of the world total \$53 trillion. Because these liabilities are denominated in dollars, a plunge in the value of the dollar would make no difference to the amount the United States owes but would reduce the value of those assets in terms of the currencies of the countries that own them. China's holdings of US government bonds, for instance, would be worth less in renminbi.

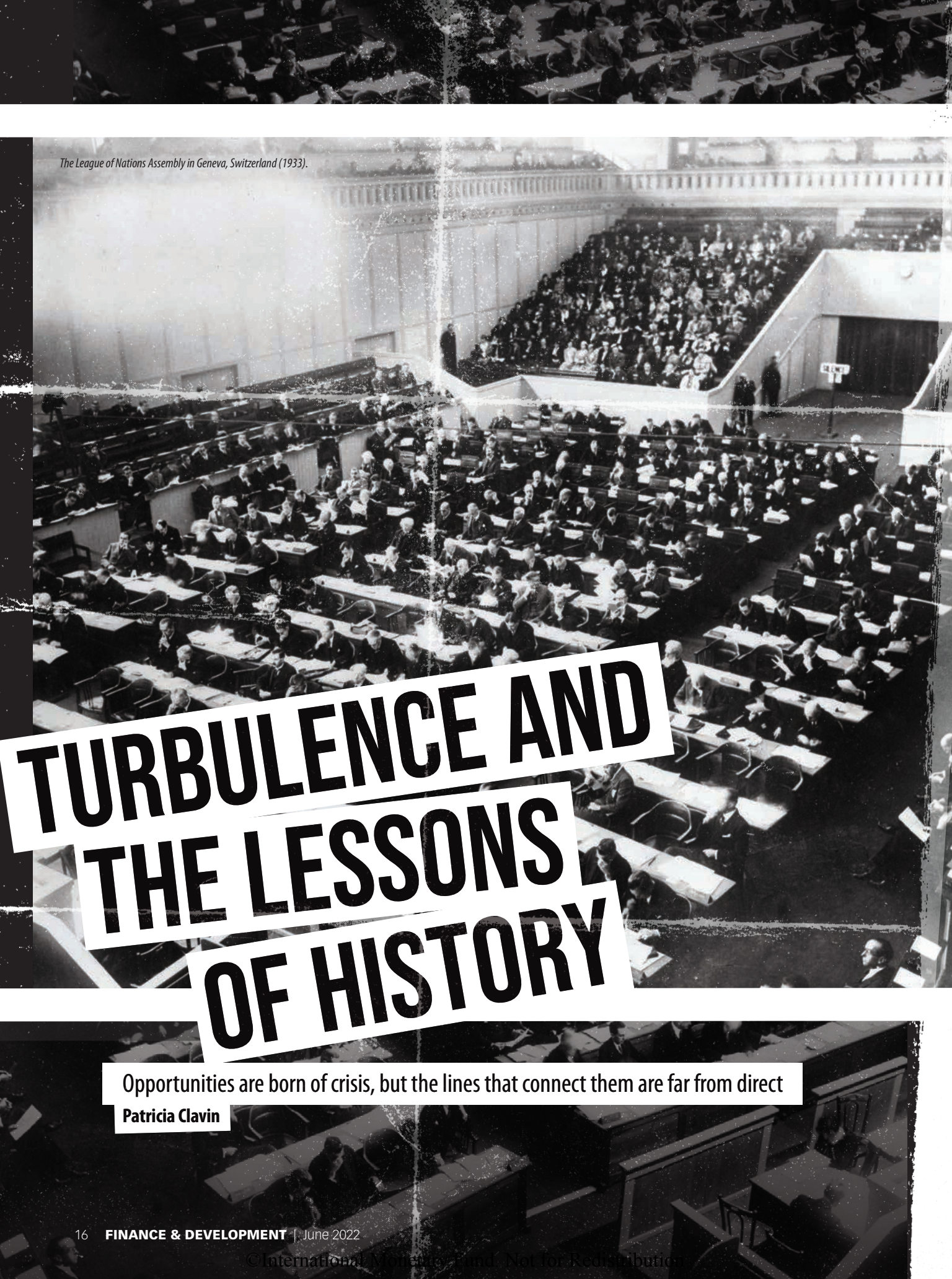
The dollar's role as the dominant reserve currency will likely persist, even if its status as a payment currency erodes.

On the flip side, US investors' holdings of foreign assets, about \$35 trillion, are denominated almost entirely in foreign currencies. Hence, an increase in the value of those currencies relative to the dollar would mean that they are worth more when converted into dollars. Thus, although the United States is a net debtor to the rest of the world, a fall in the value of its currency would result in a windfall to the United States and a big loss to the rest of the world. For the foreseeable future, then, even dollar detractors might fear a sharp fall in its value, leaving the world stuck in a “dollar trap.”

The upshot is that the dollar's role as the dominant reserve currency will likely persist, even if its status as a payment currency erodes, which itself is uncertain.

A likelier prospect is a reshuffling of the relative importance of other currencies while the dollar retains its primacy. Rather than knocking the dollar off its pedestal, new technologies and geopolitical developments might entrench its position. [FD](#)

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The League of Nations Assembly in Geneva, Switzerland (1933).

TURBULENCE AND THE LESSONS OF HISTORY

Opportunities are born of crisis, but the lines that connect them are far from direct

Patricia Clavin



THE LONG VIEW OF HISTORY SHOWS US IT IS BETTER NOT TO THINK OF PERIODS OF HISTORICAL TIME AS ERAS OF STABILITY OR CRISIS, EQUILIBRIUM OR SHOCK.

Events of recent years, and most recently the COVID-19 pandemic and the war in Ukraine, have forced all of us to confront some of the hazards inherent in our interconnected world.

In the 21st century, the gravest threat to international stability appears to lie in our societies' greater interdependence, reinforcing the power of a shock from anywhere in the world to become systemic.

History counters society's perception that the challenge presented by this increasingly interconnected world is new. In the first half of the 20th century, the world reeled from one shock to another: World War I, the Spanish flu, communist revolutions, a Great Depression characterized by rival trade blocs, and a global geopolitical crisis generated by the Axis powers that resulted in World War II.

After 1940, efforts ensued to build a new world order, centered around the United Nations (UN). Over time, the continued proliferation and specialization of multilateral organizations appeared to signal their success, and by the early 2000s the benefits of institutionalized multilateralism were self-evident and went largely uncontested.

The 21st century has put an end to the notion that international institutions can anticipate and manage shocks. Charges that the World Health Organization is partisan and that the UN has failed in its response to the war in Ukraine have spawned the revival and reassertion of Cold War battle lines, with talk of democratic versus authoritarian powers. As the world turns its gaze to Turkey and China as possible mediators to end the war, the global order established in 1945—and the liberal institutions that embody it—seems at greater risk than ever before. This comes as we face the real possibility of more shocks, which will severely threaten political stability, social cohesion, economic prospects, and the natural systems that support us.

Managing future shocks

These tribulations come after more than 20 years of challenges to the UN system. Problems with the UN organization are sometimes conflated with the operations of its many specialized agencies. These pose the risk of the UN system going the way of the League of Nations, the world's

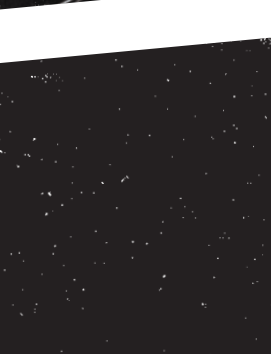
first intergovernmental body, which was in many ways the forerunner and foundational cornerstone of the UN institutions that succeeded it. With history mobilized by actors on all sides in the Ukrainian war, are there any lessons this history of failure can teach us as we face the challenge of future shocks?

First, and most immediately, the long view of history shows us it is better not to think of periods of historical time as eras of stability or crisis, equilibrium or shock. The first half of the 20th century was not a period of unending shocks any more than the Cold War era was stable—a world order apparently determined by two superpowers, the United States and the Union of Soviet Socialist Republics, and harmoniously overseen and managed by global institutions. The US unipolar moment, which followed the end of the Cold War, similarly masked deeper complexities. A new power shift is underway, but it is not just in China's favor. China is no more likely to be the sole dominant power in the 21st century than the United States was in the 20th century. The debate about managing future shocks needs to focus on the challenge of multipolarity and the uneven distribution of global resources and power.

It is better to anticipate the problem before us as one of managing turbulence rather than to see each shock as separate. This encourages us to avoid the dichotomy between stability and change, to confront their different chronologies, and to recognize the relationship between different types of shocks. For example, it will help us recognize that the current disruption to food and fertilizer supplies in Ukraine will have consequences that outlast the war. This is what happened after 1918, when the rapid development of overseas markets for the United States turned from boom to bust, with lasting effects on North American wheat prices that had consequences for US trade policy and diplomacy. Similarly long-lasting were the effects of population displacement after both



PHOTO: GETTY/BETTMANN



world wars. In the decade or more after these wars ended, the West largely forgot about the large numbers of displaced central and eastern Europeans who still lived in temporary camps. The risks to European solidarity will be considerable if countries such as Poland are left to deal alone with a socioeconomic challenge that will endure for some time to come.

One of the core lessons—if not the key lesson—of the failure of international cooperation and global governance on the road to World War II was the absolute centrality of the political economy. There were persistent efforts to promote new international norms and practices that would facilitate coordination and cooperation throughout the 1920s and the 1930s among liberal democracies. This shared history—and the intelligence it generated—was the cornerstone on which a new order was built. And planning for it began as early as 1940. This should not be forgotten by 21st century diplomats, even as geopolitical issues necessarily take center stage in the short term.

Ukrainian artists are mining the history of their cultural resistance to Joseph Stalin in the late 1920s and 1930s as they resist Russian imperialism once more. It is a stark reminder that global order is not forged by political leaders from on high. The 1920s, more than any previous decade, was characterized by waves of social mobilization around international questions relating to war and peace across the political spectrum. Many of the nongovernmental organizations currently supporting displaced Ukrainian civilians grew out of local, grass-roots activism. Recent events signal a strong shift akin to that of the 1920s, with claims for justice emerging across many parts of the world, providing an opportunity to reengage public interest in international organizations (not just activism). There is now a new generation of self-starting aid entrepreneurs, who have found an authoritative voice and can help set the framework and determine the language for broader conversations about reforms needed to produce better solutions to our shared challenges.

From local to global

And what should those solutions look like? The global pandemic has underscored the significance

of the local to the global. The fight against epidemics of typhus, cholera, and tuberculosis in the 1920s established international mechanisms of scientific and humanitarian collaboration that continued even as countries went to war with one another. These practices recognized the need for a global commitment to supporting local, community-based programs that includes economic and financial support as well as better health care. In 1945, this history gave rise to new institutions of global governance in the field of health and economics—the World Health Organization, the Food and Agriculture Organization, the International Monetary Fund, and the World Bank—highlighting one of many moments when the practices and institutionalization of global governance were challenged, disassembled, and reassembled in the wake of new shocks.

It is extremely difficult to create cooperative institutions of global governance from scratch. In 1945, the multipurpose League of Nations gave way to single-purpose UN institutions, suggesting that strands and forms of governance are discrete from one another—health, food, finance, trade, geopolitics, displaced peoples, climate change. Events of the past few years, and notably the COVID-19 pandemic and the war in Ukraine, make it clear that they are not. Recognizing how economic and social issues are connected should be central to future efforts to stem escalating geopolitical tensions. When planning for the future—and we need to plan—we must give just as much attention to how shocks such as population displacement, disease, geopolitical conflict, disruptive technological innovation, and climate change interact and how to effect and coordinate multiagency and state engagement. Managing these shocks cannot be left to individual institutions, such as the North Atlantic Treaty Organization (NATO) or the IMF.

Crucially, the war in Ukraine has underscored the importance of regional institutions to global governance. Decades-old, apparently moribund, questions about how NATO, the European Union, and the UN Security Council and General Assembly should relate to one another in regard to human security are now alive and kicking. If regional governance is key, the global

implications of new regional institutions, such as the Asian Infrastructure Investment Bank, are far from clear. Global governance, as the history of the United Nations itself shows, is strongly path-dependent. If this presents a new reform agenda and possibility for action, the challenges of the return of geopolitics, if sometimes frightening, should be familiar. While many commentators dwell on the bitter lessons of the 1930s and the early Cold War years, in reality power politics shaped and limited the prospects of global governance for the entire 20th century. Recognizing this presents an opportunity because it is a reminder that arguments for, or against, international cooperation and organization are rival attempts to find solutions to common dilemmas. The war in Ukraine makes it clear that for all state leaders the realm of international relations is where they have the least control. Paradoxically, although war signals the failure of dialogue, it is also a lesson in the importance of effective institutionalized collaboration and diplomacy.

Diplomacy necessarily must focus on the immediate challenge of securing a peace that respects Ukrainian sovereignty while addressing its—and Russia's—need for security, but the implications for the reputation of international law and institutions must not be ignored. The prosecution of war crimes is understandably at the forefront of public debate. But one of the thorniest problems after World War I was how to reopen international trade after prolonged sanctions. The Allied blockade of the central powers facilitated the rise of protectionist legal instruments that impeded the recovery of world trade until the 1960s. Protectionism proved persistent not just because of the boom and bust in the 1920s and 1930s but because the norms and practices of free trade—drafted by the victorious powers, notably Britain and the United States—were deemed wildly unfair. Although the terms of the peace demanded that Germany and Austria become entirely free trading, the same most-favored-nation legal clause in the Paris Peace Treaties included provisions for Britain and the United States to enhance their own protection legally. Over time, the public perception in Germany and Austria that the Allies had cut

themselves a special deal damaged the legitimacy of the settlement, as well as the reputation of the democratically elected statesmen who signed it in 1919. It reminds us that while the need for cooperation may be self-evident, the meaning of cooperation is not. We must constantly be open to alternative views about order and governance.

UKRAINIAN ARTISTS ARE MINING THE HISTORY OF THEIR CULTURAL RESISTANCE TO JOSEPH STALIN IN THE LATE 1920s AND 1930s AS THEY RESIST RUSSIAN IMPERIALISM ONCE MORE.

Finally, it's worth remembering that while Austrian and German critics of the international system that emerged after 1919 were unhappy about the terms of the peace, these states challenged it through the mechanisms of the League of Nations. The institution, and global order, faced an existential challenge only when the National Socialist government—a fringe group throughout the 1920s—opted to challenge the League, joining forces with Japan and Italy, and Britain and France, hoping to avoid another war, colluded with the strategy. Allies seeking to aid Ukraine must refer to and deploy international law and the organizations that embody it while recognizing the need for reform. Working outside these organizations, in scrambled efforts for a speedy resolution, as Neville Chamberlain sought to do in Munich in 1938, risks delivering a fatal blow to global order as well as to prospects for peace.

Turbulence can push individuals, institutions, and states to their limits. History shows that it simultaneously fosters creative, pluralistic, and dynamic advocacy that leads to new modes of cooperation, often in history's darkest hours. Let's remain purposeful—if not always optimistic—as we face the challenge of turbulence in our world for some time to come. **FD**

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Economic sanctions deliver bigger global shocks than ever before and are easier to evade

Nicholas Mulder

Not since the 1930s has an economy the size of Russia's been placed under such a wide array of commercial restrictions as those imposed in response to its invasion of Ukraine. But in contrast to Italy and Japan in the 1930s, Russia today is a major exporter of oil, grain, and other key commodities, and the global economy is far more integrated. As a result, today's sanctions have global economic effects far greater than anything seen before. Their magnitude should prompt reconsideration of sanctions as a powerful policy instrument with major global economic implications.

Sanctions are not the only source of turmoil in the global economy. Energy prices have been rising since last year as the economic recovery from the pandemic encountered overburdened supply chains. Global food prices rose 28 percent in 2020 and 23 percent in 2021, and they surged 17 percent this year between February and March alone. The war has also harmed Ukraine directly as fighting has closed the country's Black Sea ports, blocking its exports of wheat, corn, sunflower oil, and other goods.

The effects of the loss of Ukrainian supply have been amplified by two even larger shocks:

the sanctions imposed on Russia by 38 North American, European, and Asian governments and the responses to those measures by global firms and banks. This barrage of legal, commercial, financial, and technological restrictions has drastically impeded Russia's access to the world economy. It has also vastly increased the range of commodities from both countries that are no longer finding their way onto world markets. Sweeping sanctions against Russia have combined with the worldwide supply chain crisis and the wartime disruption of Ukrainian trade to deliver a uniquely powerful economic shock. Additional sanctions on Russian oil and gas exports would magnify these effects further.

A different category

A look at the past century of economic history makes the significance of the sanctions against Russia even clearer. Even the strongest sanctions regimes of the Cold War period, such as UN and Western sanctions against Rhodesia (now Zimbabwe) and apartheid-era South Africa, or US sanctions on Cuba and Iran, did not target large economies. Some of the sanctions regimes currently in place are more stringent than those aimed at Russia—especially those on Iran, North Korea, and Venezuela. But these countries have much less weight in the global economy and international trade.

The impact of the sanctions on Russia belongs to an altogether different category. Russia is the world's 11th largest economy, and its role as the prime commodity exporter among emerging markets gives it a structurally significant position. Among advanced economies, only the United States, Canada, and Australia have a comparable footprint in global energy, agriculture, and metals markets. Moreover, since the end of the Cold War, more than two decades of advancing integration have made Russia a very open economy, with a trade-to-GDP ratio of 46 percent, according to World Bank data. Among the seven largest emerging markets, only Mexico and Turkey had higher shares in 2020 (78 percent and 61 percent).

In the past century, the 1930s is the only decade that offers a precedent for sanctions against states with a similar weight in the world economy. Within six weeks of Benito Mussolini's invasion of Ethiopia in October 1935, the League of Nations crafted a sanctions package against Italy, the world's

eighth-largest economy. It was implemented by 52 of the roughly 60 sovereign states in the world at that time (Baer 1976). The measures included an arms embargo, a freeze on financial transactions, and export prohibitions on a number of raw materials vital for war production. But the most significant measure was a ban on all imports from Italy. This was possible because the Italian economy's structural current account deficit meant that such a ban hurt Italy more than it did the sanctioning states.

Wars of conquest

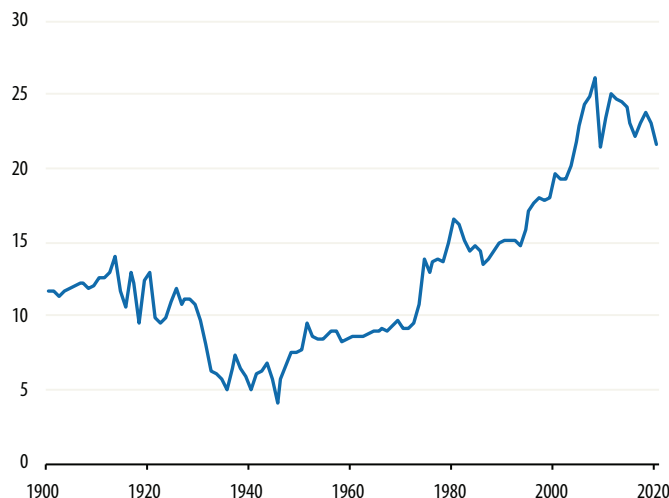
From October 1935 to June 1936, Italian industrial production fell by 21.2 percent, while in the first five months of sanctions, exports plummeted by 47 percent before stabilizing at roughly two-thirds of their pre-sanctions level. The League's ban on imports from Italy drove up international prices for foodstuffs such as meat, fruit, and butter as well as raw materials and manufactures such as wool, textiles, and leather goods. Crucially, the sanctions failed to stop the Italian conquest of Ethiopia, in large part because the United States and Germany, the world's largest and third-largest economies, were not League members and did not join the sanctions. As a result, Italy continued to import coal and oil (Ristuccia 2000) and managed to withstand eight months of serious hardship.

Japan was the world's seventh-largest economy in the late 1930s and a trading state even more open than Italy. Between the summer of 1939 and August 1941, a growing coalition of Western states seeking to restrain the Japanese war of conquest in China imposed sanctions that gradually diminished the number of available trading partners (Maddison 2006). The onset of World War II caused the British Empire and its colonies and dominions in Asia and the Pacific (India, Australia, New Zealand, and Canada) to restrict exports of strategic raw materials and prioritize them for intra-imperial use.

By the end of the decade, Japan was thus even more dependent than before on imports of raw materials (especially oil, iron ore, copper, and scrap metal) from the largest Pacific economy that remained neutral: the United States. In response to Japanese conquests in 1940 and 1941, the United States gradually escalated its economic measures until it finally imposed a full oil embargo, together with the British Empire

Trading up

The share of trade in world output is much higher today than it was in the 1930s.
(merchandise exports as a percent of world GDP)



Sources: Ortiz-Ospina, Esteban, and Diana Beltekian. 2018. "Trade and Globalization." Our World in Data; and World Bank. 2020. "Exports of Goods and Services." World Bank and Organisation for Economic Co-operation and Development data, Washington, DC.

and The Netherlands. It also froze yen reserves held in the United States (Miller 2007). By late 1941, Japan's trade had fallen by 20 to 25 percent in just 18 months. Faced with a collapse of its access to key imports, Japan attacked the United States and European colonies in Southeast Asia to secure the raw materials it needed to sustain its war machine. Whereas Italy had borne the brunt of embargoes against its exports, which reduced its ability to earn foreign exchange, Japan was hit more severely by a foreign asset freeze and a ban on its capacity to obtain vital imports from its one remaining large trade partner.

Global environment

The shock of the Great Depression had undermined much of the trust and cooperation that underpinned international political stability. Trade wars escalated into diplomatic disputes, initiating a trend toward the formation of political and economic blocs. As the guardian of the post-World War I order, it fell to the League of Nations to enforce sanctions against states that threatened world peace. The sanctions showed that Western powers retained considerable heft in the world economy. But the unpropitious circumstances of

the Depression and lack of international fiscal and monetary cooperation meant that sanctions created further tensions and were ultimately incapable of preserving peace.

What this interwar history shows is that the global economic environment determines the form that sanctions can take and shapes their effects. The Depression was marked by an agrarian crisis, monetary collapse, and a downturn in trade. These developments diminished world exports, fragmented currency blocs, and drove global price deflation for much of the period between 1928 and 1939. On the one hand, this meant that export earnings were lower, as was the cost of decoupling. On the other, it made imports cheaper, ensuring a basic level of continued access to metals, foodstuffs, and energy. Sanctions were deployed in a world of growing autarky, where interdependence between national economies had fallen to its absolutely vital minimum. In the 1930s sanctions thus did only moderate damage to an already battered world economy. But they threatened national livelihoods enough to prompt military escalation.

By contrast, the global trade-to-GDP ratio is much higher today (see chart), and it is sustained by a highly integrated dollar-based global financial system. Instead of deflation, markets worldwide are experiencing strong inflation pressure. High commodity prices generate windfalls for exporters while encouraging energy-importing economies to transition to renewables. Meanwhile, increased financial market integration makes capital flows from advanced economies crucial to growth and investment in emerging market and developing economies. Today's world economy enjoys substantial gains as a result of this interdependence, as trade employs larger workforces and imports can be sourced from more places. But it also contains greater vulnerabilities, as nodal points in flows of commodities, financial transactions, and technology can be choked by supply chain issues or targeted by government sanctions.

Costs versus risks

The result of these changes is that today's sanctions can cause graver commercial losses than ever before, but they can also be weakened in new ways through trade diversion and evasion. At the same time, modern sanctions are less direct a threat than in the 1930s, lowering risks of military escalation.

Yet more broad-based market integration has widened the avenues through which sanction shocks spill over into the world economy. Twenty-first century globalization has thereby increased the economic costs of using sanctions against large, highly integrated economies. It has also multiplied the ability of these countries to engage in economic and technological rather than military retaliation. On the whole, the nature of the risks and costs of sanctions have changed, but the transmission channels through which they operate—higher commodity prices and transaction costs and bigger supply bottlenecks and trade losses—have remained the same, and they affect more people around the world.

It is rapidly becoming clear just how significant the spillover effects are of sanctions against countries in the top stratum of the global economy. As sanctions remove Russian commodity exports from world markets, prices are driven higher, putting pressure on the import bills and constrained public finances of net-commodity-importing emerging market and developing economies. Unsurprisingly, these are precisely the countries that have not joined the sanctions against Russia, since they are most at risk of a balance of payments crisis if sanctions on Russian exports are tightened over an extended period.

Policymakers today possess everything they need to avoid a repetition of the 1930s. Because the level of economic integration is far greater today, it will take much more disruption for fears of deglobalization to materialize. There are more economies rich enough to provide alternative sources of supply as well as export markets for countries forced to stop trading with Russia. Advanced economies have better fiscal policy tools than they did in the early 20th century and benefit from greater fiscal space than emerging market and developing economies. Whether they use these strengths to compensate for the massive stress that sanctions put on the world economy is ultimately a political choice. Many emerging market and developing economies face an acute combination of woes: high debt, the high cost of a transition to renewable energy, rising interest rates, and global stagflation. Sanctions-imposing Group of Seven and EU governments must take seriously the task of providing them with economic support.

It is in the interest of the well-being of the world population and the stability of the world economy to take concerted action to counteract

the spillovers of sanctions on Russia. A number of policy adjustments could help. First, advanced economies should focus on long-term infrastructure investment to ease supply chain pressures, while emerging market and developing economies should make income support a priority. Second, advanced economy central banks should avoid rapidly tightening monetary policy to prevent capital flight from emerging markets.

More broad-based market integration has widened the avenues through which sanction shocks spill over into the world economy.

Third, looming debt and balance of payments problems in developing economies can be tackled through debt restructuring and increases in their allotments of the IMF's Special Drawing Rights, a type of international reserve currency. Fourth, humanitarian relief should be extended to distressed economies, especially in the form of food and medicine. Fifth, the world's major economic blocs should do more to organize their demand for food and energy to reduce price pressures caused by hoarding and competitive overbidding.

Unless such policies are put in place in the next few months, grave concerns about the world economic outlook for 2022 and beyond will be justified. It is high time for our thinking about the global economic stability implications of sanctions to catch up with the new realities of economic coercion. **FD**

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WILL INFLATION REMAIN *HIGH*?

The answer depends on the distribution of shocks to the economy and how central banks respond

Ruchir Agarwal and Miles Kimball

The recent increase in inflation worldwide took many by surprise. As of mid-2022, both headline inflation (price of all goods and services) and core inflation (excluding food and energy) were significantly above target in most countries. Standard economic theory states that inflation will get out of control under a prolonged mix of certain monetary and fiscal policies, but whether inflation will persist toward that end warrants further examination. The answer depends both on the distribution of shocks to the economy and how central banks (and finance ministries) react.

Inflation persistence

Why inflation is high and whether it will persist is a topic of active debate. We see five key drivers of the current inflation surge, with implications for this debate.

First, supply chain bottlenecks: The pandemic has had two separate effects on global supply chains. In the early phase, lockdowns and mobility restrictions led to severe disruptions in various supply chains, causing short-term supply shortages. Many of these disruptions have eased, although the recent surge in Omicron in China and elsewhere has renewed pressure on some supply chains. In the

later stage of the pandemic, however, various supply chain bottlenecks have emerged. According to a recent assessment by Rees and Rungcharoenkitkul (2021), the most severe bottlenecks affect raw materials, intermediate manufactured goods, and freight transport. Will these persist? One measure of the state of global supply chains is how long it takes to ship goods by sea, as captured by the Flexport Ocean Timeliness Indicator. As of the end of April 2022, indicators remained close to their all-time highs, suggesting pressure may persist at least a bit longer.

Second, a shift in demand toward goods and away from services: The pandemic brought about an initial significant shift in what consumers buy; spending on goods rose dramatically. Consequently, much of the initial rise in inflation reflected inflation in durable goods (including used cars), while service inflation increased only moderately. Such shifts may persist only during the active phase of the pandemic, but at least part of the shift in demand toward goods and away from services may persist given how the pandemic has reshaped society. While the shift toward durable goods occurred globally, the impact may have been greater in some countries (for example, thanks to the boom in used cars in the United States).

Third, aggregate stimulus and post-pandemic recovery: About \$16.9 trillion in fiscal measures was announced globally to fight the pandemic, with relatively larger support in advanced economies. In the United States alone, a \$1.9 trillion fiscal stimulus (the American Rescue Plan) was introduced. A warning that the large fiscal stimulus, combined with easy monetary conditions, would lead to high and persistent inflation came from a group known as “Team Persistent.” The name can be traced to inflation warnings in early 2021 from Larry Summers and Olivier Blanchard, among others (Summers 2021). Observers who came to be known as “Team Transitory” opposed this view and argued that inflationary consequences of the government stimulus would likely be temporary or mild. By the end of the year, the evidence had shifted in favor of Team Persistent across several countries. Households were running down the savings they had accumulated earlier in the pandemic (including from the stimulus and transfers), which led to a surge in aggregate demand and a stronger-than-expected economic recovery. Whether the strong aggregate demand will persist

is ultimately a question of how the central bank responds. This remains a hotly debated question, which we return to in a later section.

Fourth, a shock to labor supply: Labor market disruptions from the pandemic continue even two years after it began. Labor supply participation remains below pre-pandemic levels in several countries. Among advanced economies, the impact has been relatively larger in the United States, where participation is about 1.5 percent lower than before the pandemic (about 4 million fewer workers). Will this shock persist? Views differ. In

If history is any guide, we will not experience an out-of-control surge in inflation beyond a couple of years into the future.

a recent paper, Alex Domash and Larry Summers (2022) examine different labor market indicators and argue that “even under optimistic COVID-19 outcomes, the majority of the employment shortfall will likely persist moving forward” and “contribute significantly to inflationary pressure in the United States for some time to come.”

Fifth, supply shocks to energy and food because of the Russian invasion of Ukraine: The invasion has led to rising energy and food prices, which have contributed to higher inflation globally. Both Russia and Ukraine are exporters of major commodities, and the disruptions from the war and sanctions have caused global prices to soar, especially for oil and natural gas. Food prices have also jumped. Wheat prices are at record highs—Ukraine and Russia account for 30 percent of global wheat exports. These effects may lead inflation to persist longer than previously expected. The impact will likely be bigger for low-income countries and emerging market economies, where food and energy are a larger share of consumption (as high as 50 percent in Africa).

We summarize these five effects using textbook aggregate supply and demand (AS-AD) curves (see Chart 1). The AS-AD framework is old-school but still useful for analyzing the current situation. The effects of the five drivers of inflation are depicted separately for the goods markets and the services markets.

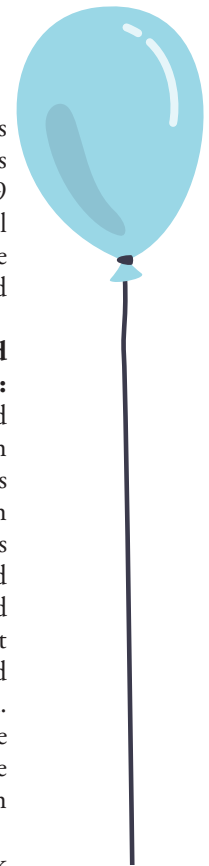
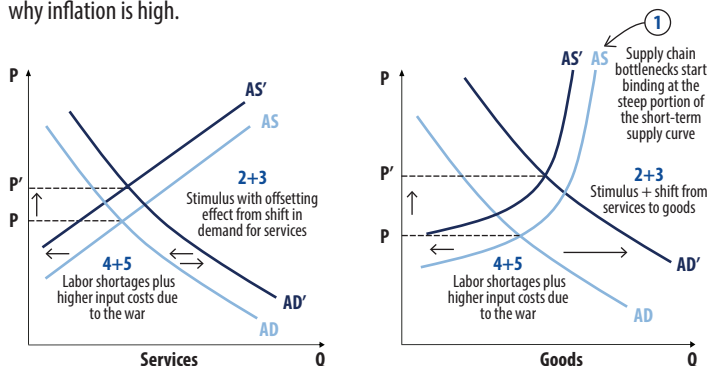


Chart 1

Why is inflation high?

An old-school aggregate supply–aggregate demand (AS-AD) curve illustration of why inflation is high.



Five factors behind high inflation now

1. Supply chain bottlenecks are binding for various products
2. Shift in demand for goods from services; opposite effects on demand for services and goods
3. Stimulus + recovery shifts out demand curve
4. Labor shortages lead to leftward shift in supply curve
5. Supply shocks effect energy and food due to the war in Ukraine

Source: Authors.

Overall, while there are important cross-country differences, inflation has risen almost everywhere in the world. The key uncertainties now are about the duration of labor market tightness and supply chain bottlenecks and about how central banks will respond to high inflation.

Central bank responses

How will central banks respond to inflation? If the past is any indication of the future, it is helpful to first examine how central banks acted before the pandemic. Until the late 1970s, central banks were more tolerant of inflation. But the dramatic disinflation in the United Kingdom under Margaret Thatcher (before Bank of England operational independence) and by the Federal Reserve under Paul Volcker brought about a revolution in how central banks respond to inflation. Soon after, many other central banks followed these two salient examples, bringing about a decline in inflation in much of the world by the mid-1980s. This required significant institutional reform toward central bank independence and the ability of some central banks to navigate political headwinds and successfully establish de facto independence.

In addition, various reforms made it possible to staff central banks with economists and others trained in the causes of the Great Inflation of the 1970s and ways to bring inflation back down, which plausibly also played a role in this central banking revolution.

Our analysis shows that, of all the countries that brought inflation under control, very few later experienced a surge in out-of-control persistent inflation. That is, very few countries have fallen off the wagon after sobering up from high inflation (or after staying sober into the early 1990s). This was also supported by institutional reforms that empowered central banks to withstand political pressure to generate growth by cranking up inflation at opportune moments.

In saying this, we use specific definitions for some of our empirical exercises. “Having brought inflation under control” is defined as a three-year stretch of quarterly inflation remaining below 4 percent since 1990. The first time a central bank achieves this, we call it their Blue Chip Month. Members of Alcoholics Anonymous and other 12-step groups receive a sobriety coin or “chip” marking how long they have remained sober. The chips are meant to motivate holders to stay the course. Similarly, the Blue Chip Month marks three years of inflation sobriety for central banks.

We do not study emerging markets or low-income countries since only a few have attained Blue Chip status. To date, the only Organisation for Economic Co-operation and Development (OECD) country that has not yet achieved this milestone is Turkey. By “a surge of out-of-control inflation” we mean a 36-month period of inflation above 4 percent. Among OECD countries overall, once a central bank earns a Blue Chip, it rarely returns to out-of-control persistent inflation—unless it experiences a mammoth financial crisis (for example, Iceland and the Baltic states during the global financial crisis). This can be seen in Chart 2, which plots the worst three-year inflation episode in each OECD country after its Blue Chip month.

One indication of firmly entrenched anti-inflation attitudes is the relative infrequency of central bank employees calling for an increase in the inflation target. More generally, in our view, barring a major crisis, a central bank would have to abandon its dislike of inflation for inflation to get out of control.

In addition, a consequence of the zero lower bound is that central banks’ actual response has

been highly asymmetric above and below the 2 percent target. Central banks tolerate inflation lower than 2 percent but act as if the welfare costs of inflation above 2 percent are high. An implication of this asymmetric bias is that over time inflation expectations have gradually shifted down (even below 2 percent in several countries) and become relatively entrenched, making it harder for short-term high inflation to unanchor them.

Looking ahead

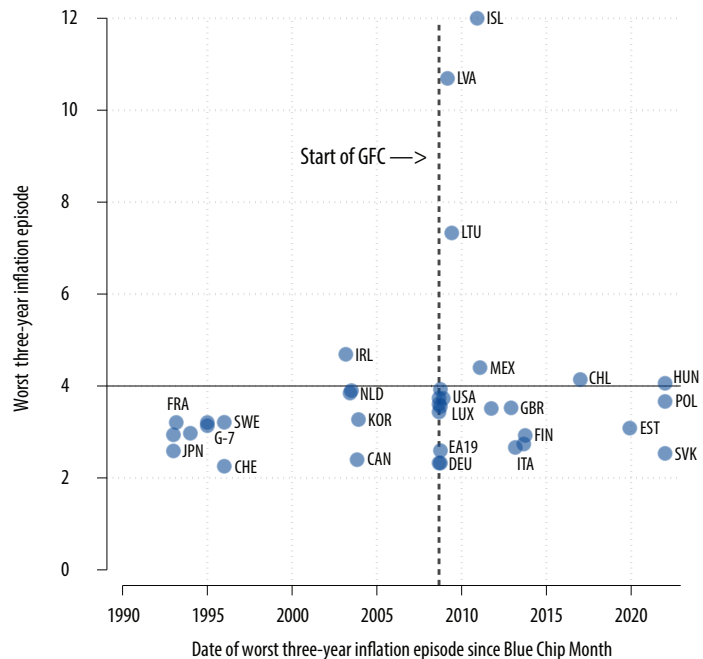
The duration of the current inflation episode will depend, first, on the interplay between the persistence of labor market tightness and supply chain bottlenecks and the central bank response and, second, on the duration of the war in Ukraine and its impact on energy prices, food prices, and global growth. If history is any guide, we will not experience an out-of-control surge in inflation beyond a couple of years into the future. (However, some countries are likely to lose their Blue Chips, in large part because of inflation that has already taken place during the pandemic.) Still, there are a few ways in which this assessment can go wrong.

First, central banks' dislike for inflation may be suppressed given the enduring long-term impact of the pandemic, uncertainty about the recovery, and the temptation to inflate away higher debt burdens globally. Calls to refrain from ending the recovery prematurely cite lower labor force participation compared with pre-pandemic levels. An open question is whether the reaction function has changed post-pandemic. While advanced economy central banks may continue to dislike inflation, their current apparent plans—according to their current dot plots (or the equivalent)—may be behind the curve when it comes to what would be required to bring inflation back down. Standard Taylor rule calculations suggest that it could easily take interest rates as high as 7 percent in several countries to bring inflation down.

Second, John Cochrane (Varadarajan 2022) argues that raising rates to fight inflation is a crude tool, especially when the source is fiscal policy. He compares keeping fiscal policy loose and using higher interest rates to control inflation to a driver accelerating and braking at the same time. He argues in effect that if people start to doubt the government's commitment to repaying its debt without a discount from inflation, inflation could get much worse.

Chart 2

Worst OECD three-year inflation episode since Blue Chip Month
After earning a Blue Chip, countries rarely return to episodes of out-of-control persistent inflation—barring a mammoth financial crisis.



Source: Authors' calculations using Organisation for Economic Co-operation and Development (OECD) and Bank for International Settlements data.

Note: Data labels use International Organization for Standardization (ISO) country codes. EA19 = euro area; G-7 = Group of Seven; GFC = global financial crisis.

Despite the shocks to the world economy, the behavior of inflation beyond 2025 depends primarily on two things: how determined central banks are to rein in inflation and the bond market's confidence that governments are willing to pay their debts without inflating them away. **FD**

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WAR FUELS FOOD CRISIS

Three compounding crises—conflict, COVID, and climate change—are giving rise to another: hunger.

FOOD PRICES ROSE 23 percent in 2021, ending several years of relative price stability, in part because extreme weather hurt harvests and energy costs climbed. Then came Russia's invasion of Ukraine in late February, sending prices to an all-time high by disrupting commodity flows from two of the world's largest exporters of wheat and other staples.

The invasion idled Ukraine's once-busy Black Sea ports and left fields untended, while curbing Russia's ability to export. The two countries account for a quarter of global exports of wheat and a fifth of barley and maize, and more than half of sunflower oil. They provide about an eighth of all calories traded in the world.

Importantly, food prices are rising along with, and because of, other major global economic challenges. Inflation is on the rise, and the pandemic continues to snarl supply chains, while climate change threatens production across many of the world's agricultural regions, with more drought, flooding, heat, and wildfires.

Beyond disrupting food production and shipments, primarily from Ukraine, war also dents global food output through its effects on fertilizers, which already cost more because of rising energy prices. Russia and Ukraine are large producers of potash-based crop nutrients, and war has sent costs soaring.

What's more, prices for natural gas, key to making fertilizer, have also jumped because of the war. Together, these factors are likely to keep food prices elevated into next year because crop yields will be reduced if less fertilizer is used and what's grown will cost more to produce.

Protectionism, too, is a major concern. Many countries are halting shipments of grains and cooking oils, possibly in response to fears of social unrest. Nearly two dozen have turned to export restrictions so far, according to the International Food Policy Research Institute. This combination of conditions contributes to a grave outlook for global hunger.

All-time high

Global food prices had been relatively stable for several years, before shooting up on account of extreme weather and pandemic-related disruptions and surging further to reach a new record in March 2022 following Russia's invasion of Ukraine.

(real food price index; 2014–16=100)

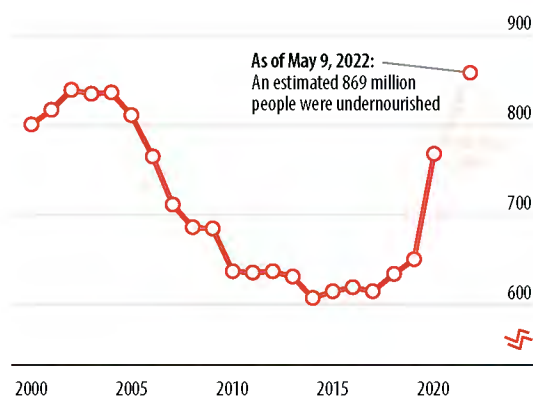


Source: United Nations Food and Agriculture Organization (FAO).

Undernourishment levels—the number of people who can't meet long-term food consumption requirements—rose dramatically by about 118 million people in 2020 after remaining largely unchanged for several years.

Two decades undone

The number of people without sufficient food consumption is back to where it was in the early 2000s. (undernourishment, millions of people)

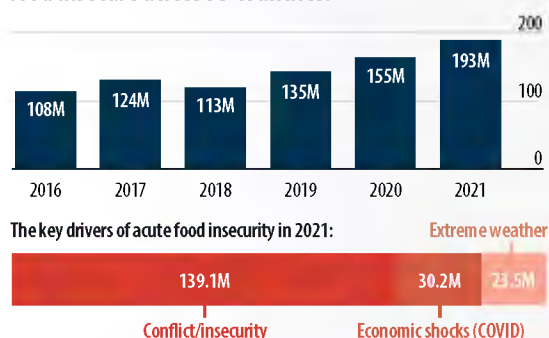


Source: UN FAOSTAT and World Food Program.

Note: 2000–2020 is annual data from FAOSTAT. The dot for May 9, 2022 is an estimate from the World Food Program's HungerMapLIVE.

Acute hunger levels—the number of people unable to meet short-term food consumption needs—rose by nearly 40 million last year. Conflict was the primary driver of this, with 139 million people facing food crisis levels or worse across 24 countries in 2021. Now, Russia's war in Europe's breadbasket is adding to the risk of hunger and starvation for many millions more. **FD**

Before the war, 193 million people were already acutely food insecure across 53 countries.



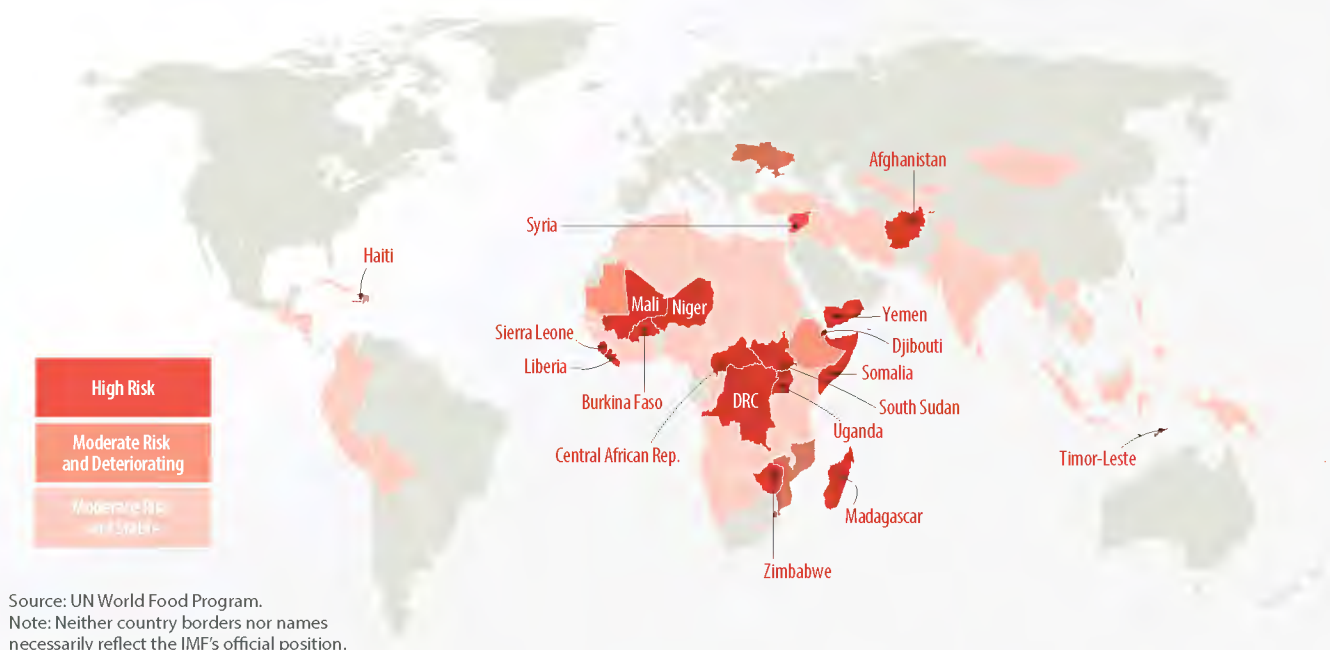
Source: UN World Food Program.

Note: Factors can overlap. Data are based on the predominant driver.

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Hunger hotspots

As of May 9, 2022, there were 24 countries considered at high risk or moderate risk and deteriorating according to the World Food Program's HungerMapLIVE. (risk tiers based on the prevalence of insufficient food consumption and households using crisis-level food-based coping strategies)



Investing in Refugees

Giovanni Peri says that Ukrainian migrants can potentially be assets, not burdens, to their new home bases

IN AN INTERVIEW with F&D's Bruce Edwards, economist Giovanni Peri argues that refugees from Ukraine may be a human capital windfall for receiving countries like Poland, Romania, Moldova, and Hungary. He also suggests that the war is further sapping Russia's human capital. Peri, a native of Italy, a professor of economics at the University of California, Davis, and director of its Global Migration Center. In his 15 years of studying the economics of migration and migrants, Peri says he has learned "what incredible assets these people are both from a personal and from an economic point of view."

F&D: At this point, more than 4.5 million people have fled the war in Ukraine. Can the neighboring countries afford to host all these people?

PERI: The ability of countries in Europe to deal with this type of emergency will certainly be tested. Poland, Romania, Moldova, Hungary—the closest countries—are receiving at least 3 million of the 4.5 million and they could be strained. There is a potentially significant short-term cost.

F&D: At least some of Europe's past migration flows were economic migrants. How does that compare with these Ukrainian refugees?

PERI: A refugee leaves in a situation of emergency with much less planning. At first, they will need accommodations they have not planned for, and they will have basic needs that economic migrants normally plan ahead for and have covered.

A second important difference is that they come from trauma, which could affect their physical and mental health in the short run.

Third is a large amount of uncertainty. They don't know how long the war will last. They don't know their final destination.

And finally, refugees come in all of a sudden in relatively large groups.

F&D: A lot of your work has been looking at the economic drivers of migration. A big factor is wages. Was that happening in Ukraine to any great extent before the war?

PERI: Definitely there had been a significant migration of Ukrainians. In Europe, the largest numbers are in Poland and then in Germany, Italy, France. In Poland, we're talking more than 1 million Ukrainians who migrated. The numbers in Germany, Italy, France were in the hundreds of thousands. There is actually a significant diaspora of Ukrainians in Canada and in the US, over 1 million.

Particularly in Italy and France and, in part, Germany, there is a very significant migration of women, sometimes 70 percent. They have worked largely in hospitality, assistance for the elderly and disabled, personal services sectors that employ a large number of women.

F&D: Do the host countries simply provide shelter while the war plays itself out? Or do they help refugees integrate?

PERI: One remarkable thing about this crisis is the very decisive and coordinated response of the European Union. Certainly in the shorter run, shelter and primary assistance are a need that some of these countries will have to deal with.

But immediately—and this is very unusual—the Ukrainian refugees have been allowed to move freely in the European Union to access jobs. Their children are allowed in schools. This approach is certainly dealing with the emergency in the short run, but also learning from the past and recognizing the importance of integration of refugees from an economic point of view. Which then turns refugees from a cost to an investment, to an asset.

Many Ukrainian refugees are extremely uncertain about their futures and not very willing to go too far. But countries such as Germany, France, Italy, Switzerland are starting to encourage refugees to come to these countries. I think this is encouraging. And as economists think in the long run, this could be a valuable approach to integrating refugees.

F&D: What are the fiscal implications of supporting refugees at that level? There's also a political

aspect: a public perception that immigrants pose a burden on public finances.

PERI: In the short run there will be costs. It's not super easy to quantify them, but for the European Union, refugees may have a cost of \$8,000 to \$10,000 per person in the first year in terms of housing and support. That's not trivial. However, all the studies show that in the second, third, fourth years—especially if the refugees access the labor market, especially if in the first year they have also been supported and assisted with some policies to find a job, to learn the language—they become productive assets. They can be employed, and the income they generate is much larger than the cost.

There is an opportunity to invest in the human capital of refugees. Many economists argue that these refugees are an opportunity for several European countries because they come at a point when there are significant shortages of workers for many of the jobs they would take. For example, in personal assistance, in hospitality, in food industries—the right policies can match some of these refugees to these jobs and turn the short-term cost into a return for the receiving economy—very soon, in fact.

F&D: What happens if the investment is not made to help the refugees?

PERI: The difference between investing early and with this type of policy support and not investing could be large in the long run. Many of these people could remain at the margin of employment and have a harder time integrating; their kids' future could be much riskier. So clearly for those who stay, there will be a long-run cost without this investment—in terms of unemployment, lower employability, maybe even higher probability of marginalization, of crime, of addiction.

F&D: Does it risk increasing competition for jobs and even lowering wages?

PERI: It will depend on how many of these people really look for a job, but also what types of jobs they take. There is a way this contribution of refugees can really be more positive than negative. Some very interesting policies for refugees have been adopted, for instance in Denmark, in the last five to six years: one of the services matches refugees with sectors experiencing hiring shortages. This would increase the probability for them to find a job and minimize the competition because clearly these jobs don't have people available to do them.

Immigrants tend to do somewhat different types of jobs than natives. So the competition with natives is not so strong. Instead, they have a stimulating effect at the local level, allowing companies to hire, to grow. They spend, and they grow the economy.

F&D: The war will end at some point, and Ukraine will be faced with rebuilding the country. What will it mean to have lost so many people to migration if they decide to stay in these host countries?

PERI: One scenario is that the war ends and Ukraine maintains a level of independence, a level of economic activity that will encourage a lot of people to return. The time they've spent abroad may not be a bad thing. They can help their local economy through trade, investment, higher skills, and entrepreneurship.

But there is also a scenario in which the war lasts a long time, and people won't go back. In this case, the drain of people would be even bigger because split families will reunify in the country where their migrants are.

The professionals will continue to leave. This clearly will generate brain drain. This diaspora could be an asset if they go back and the situation is right, or it could generate even more of a drain if things continue to go badly in Ukraine.

F&D: I assume that Russia will be suffering the same consequences. Will Russia also have lost some valuable human capital by the end of all this?

PERI: Russia comes into this war already with some remarkable brain drain and flight. Everybody knows that during the collapse of the Soviet Union a lot of scientists and engineers left for the West, but fewer know that this brain drain has continued. In the early 2010s, when Russia invaded Crimea and became a particularly strong authoritarian state, a lot of Russians left. And now there is news that hundreds of thousands of Russians want to leave. This is very worrying for Russia: on one hand, those more likely to leave are those with skills who can be easily employed in the West—the engineer, the mathematician, the scientist. These people are crucial to building an economy. Also likely to leave are those particularly averse to the regime, who would be the critical voices. In the longer term, this war could be very damaging to their economy. **FD**

This interview has been edited for length and clarity.

Economics of Persuasion in Peace and War

The rise of mobile broadband and advances in social media are reshaping how war is fought

Sergei Guriev



PHOTO: IVAN KUZMIN

RUSSIAN AGGRESSION AGAINST Ukraine is the first major interstate war of the smartphone era. New information and communication technologies are reshaping how the war is fought. The Russian government is fighting on three fronts: a kinetic war in Ukraine; a war within Russia, where antiwar protesters want to force Russian President Vladimir Putin to withdraw from Ukraine; and a war for global public opinion.

On all three, information technology matters. Within Ukraine, smartphones record both war crimes and movements of Russian troops. Within Russia, remaining social networks help organize protests and coordinate sending lawyers to support the detained. In the global information battleground, videos from both sides try to persuade third countries to accelerate or decelerate the delivery of weapons and to introduce (or help circumvent) unprecedented economic sanctions.

The idea that information and the lack of it matter in war is not new. In his posthumously published treatise *On War*, the famous military theorist Carl

von Clausewitz emphasized the importance of the “fog of war.” War disrupts normal media reporting, greatly increasing uncertainty; thus, information that reduces—or augments—this uncertainty may substantially affect a war’s outcome.

While the importance of information for war has always been understood, the recent dramatic rise of mobile broadband internet and advances in social media have radically transformed how information is collected and disseminated. According to the International Telecommunications Union, in 2007 the world had only 0.04 active mobile broadband subscriptions per capita. In 2021, there were 0.83, 20 times more. This growth took place in both developed and developing economies. Developing economy rates were 0.006 in 2007 and 0.73 in 2021. In Russia, the figure today is more than 1, meaning just about everyone is connected. Mobile broadband crowded out fixed broadband as the main source of access to high-speed internet. Fixed broadband subscriptions in the world only grew from 0.05 per capita in 2007 to 0.17 in 2021.

The third and fourth generations of mobile broadband technology, known as 3G and 4G, made a qualitative leap over earlier generations by enabling users to take photos, record videos, and immediately distribute them globally. The spread of 3G and 4G consequently became a key driver in the growth of social networks. Today the world has almost 3 billion people on Facebook, 2.5 billion on YouTube, and 1.5 billion on Instagram. The vast majority of social media use takes place on mobile devices.

As Martin Gurri argues in his prophetic book *The Revolt of the Public and the Crisis of Authority in the New Millennium*, this technological shift has major political implications. The self-immolation of Tunisian street vendor Mohamed Bouazizi in December 2010 triggered the Arab Spring as it was recorded on a smartphone and went viral. A similar self-immolation by another street vendor,

Abdessellem Trimech, took place a few months earlier but was not recorded and went largely unnoticed. The Arab Spring demonstrated the dramatic change in the way media reporting works. Most coverage of the Arab Spring by Qatar-based broadcaster Al Jazeera came from cell phone videos disseminated on social media, not from professional camera operators.

The same is true of today's war in Ukraine, the first major conflict in this era of radical transparency. Civilians and soldiers alike hold smartphones, take photos, record videos, and post them on social media. And yet this has not cleared the fog of war. The problem is not a lack of information; the challenge is an excess of information—much of it not fact-checked. Broadband internet and social media lend themselves well to dissemination of exciting and outrageous content, not necessarily true information. In the past decade, we have already seen the skillful use of social media by populist politicians. In our paper “3G Internet and Confidence in Government,” Nikita Melnikov, Ekaterina Zhuravskaya, and I show that the spread of mobile broadband explains about half of the recent rise of populism in Europe.

But social media is not a favorite only of populists. It is also the tool of choice for a new generation of nondemocratic leaders—Daniel Treisman and I call them “spin dictators.” In our new book of the same name, we argue that most of today's nondemocracies no longer rely on fear and mass repression. Instead, they manipulate information. They deceive the public into believing that they are competent leaders. They pretend to be democratically elected. While admitting imperfections of their electoral procedures, they claim that these imperfections are no different from those in the West.

For such so-called spin dictators, social media provide a great platform. Not surprisingly, Putin, one of the main inspirations for our book, has invested heavily in internet-based informational warfare over the past 10 years. Troll factories, social media bots, anonymous Telegram channels, and Facebook advertising campaigns have all played a key role in his political strategy at home and abroad. Now he is applying these tools to the war with Ukraine. This time around, his job is much harder: as we see firsthand evidence of war crimes in Ukraine, he is definitely losing the information war in the West. But this only raises the stakes for him at home. He must convince at least a substantial

part of the Russian public that he is waging a just war. This is why just a week after starting the war he closed down all remaining independent media, blocked most Western social media, and introduced military censorship. Public statements contradicting the official version of events are now punishable by up to 15 years in prison.

Has this worked? Yes and no. The polls registered rapid growth in Putin's approval ratings, from 60 percent to 80 percent. On the other hand, given the dramatic increase in repression, the polls are no longer reliable. First, there was a huge drop in response rates. Second, list experiments—a special technique used by political scientists to infer average level of support without asking people direct questions—suggest that many Russians went back to the Soviet practice of “preference falsification.” Yet even in list experiments, 53 percent of Russians support the war, according to Philipp Chapkovski

The spread of mobile broadband explains about half of the recent rise of populism in Europe.

and Max Schaub in their paper “Do Russians Tell the Truth when They Say They Support the War in Ukraine? Evidence from a List Experiment.” Russian government propaganda works.

In addition to supporting the Ukrainian army with weapons and imposing further sanctions on Russia, the West should accordingly commit more resources to the information battle for Russians' minds. This is not impossible. Russia is not China, and there is no Great Firewall. Some social media—most important, YouTube and Telegram—are not blocked. VPNs are not outlawed. Relative to Cold War times, when the West used Russian-language radio programming by Radio Free Europe, Radio Liberty, the BBC, and Deutsche Welle, today there are many more opportunities to reach the Russian audience, providing facts about the war and fact-checking of Russian propaganda. Winning the information war within Russia will help win it on other fronts—and prevent future invasions by Putin's regime. [FD](#)

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GOING THE DISTANCE

*Chris Wellisz profiles Harvard's **Melissa Dell**, who pioneers new ways of unmasking legacies of the past*

PHOTO: PORTER GIFFORD

Melissa Dell needed a break from the archives in Cusco, Peru. So she climbed onto a bus to visit the remote mountainous area she was studying and spent a few weeks talking to the descendants of the people who had toiled in the silver mines under Spanish rule. They wore traditional Quechua garb and lived in wooden dwellings with dirt floors and no windows.

“I would ask people, ‘Are these places here different than those places over there?’” Dell recalled, indicating some villages a few miles away. “They would say, ‘Those places over there, they have a road. And because they have a road, when they grow corn, they can take it to the market. If I try to take my corn to the market, it’s going to be destroyed en route because there aren’t any paved roads.’”

Those conversations confirmed Dell’s thesis that a colonial-era system of forced labor, known as the “mita,” had left an imprint on the indigenous population that could still be felt two centuries later. When Dell visited, the mita area had few paved roads, and its inhabitants tended to be poorer, and more likely to be subsistence farmers, than those who lived beyond its boundaries.

Dell’s research was published in *Econometrica*, a prestigious scholarly journal, in 2010, when she was still a graduate student at the Massachusetts Institute of Technology (MIT). One of her most cited articles, “The Persistent Effects of Peru’s Mining Mita,” continues to be taught in undergraduate economics courses at her alma mater, Harvard College, and it figured prominently in the American Economic Association’s decision in 2020 to give her the John Bates Clark Medal, awarded each year to an outstanding economist under the age of 40.

Secrets of success

Scholars have long wondered why some places prosper, while others do not. How do societies climb the development ladder to greater prosperity? What is the secret sauce of economic success? Why is GDP per capita in South Korea so much higher today than it is in Cambodia, which had a similar standard of living in 1960?

Questions like that have inspired sweeping, almost epic books that span centuries and continents, like *Guns, Germs, and Steel*, by Jared Diamond, which looks at environmental factors, and *Why Nations Fail*, by Daron Acemoglu and James A. Robinson, which focuses on the role of institutions.

These questions fascinated Dell, but she wanted to follow a different path. She took a microscope to the subject, looking not at the diverging fortunes of continents and nations but of neighboring towns and villages.

“To be able to really delve into things, it helps to have that kind of local perspective,” Dell says in an interview with F&D. “By focusing on the micro level, you can get a lot more detail and granularity about what’s going on.”

One of Dell’s big contributions to the literature of development economics—and the advantage of her micro approach—has been to identify what she calls channels of persistence. In the case of the mita, the channel was the lack of infrastructure in the catchment area from which Spanish colonists drew forced labor.

Outside the mita, owners of haciendas, or big farming estates, used their political clout to have roads built to carry their produce to market. Within the mita, there were fewer haciendas, because the Spanish colonial administration didn’t want competition for labor, and so there were fewer roads.

Another major contribution was Dell’s refinement of an econometric tool known as a discontinuity regression. In its classic application, it is used to study the effects of a social service, such as the American health insurance program Medicare, on its recipients. The discontinuity occurs when people turn 65. Before that age, you aren’t eligible; at 65, you become eligible. Scholars exploit this discontinuity to compare people who are just older and just younger than 65 to draw conclusions about the impact of Medicare.

Dell took the approach a step further, applying it to geographic spaces, like the villages on either side of the border of the mining mita. This involves many more variables and more complicated calculations. While Dell wasn’t the first to deploy geographic regression analysis, she refined it and helped popularize its use among academic economists, her colleagues say.

“Her mita paper introduced for many people the geographic regression discontinuity design that then allowed other people to go and write dozens of papers” using the tool, says Pablo Querubin, an associate professor of politics and economics at New York University.

For the mita study, Dell taught herself how to use geographic information systems (GIS) mapping software to precisely locate the villages she studied in relation to each other and to the boundary of the mita. She ended up teaching classes on the use of the software.

Mastering GIS is an example of what Dell's admirers call her thoroughness and persistence. Those qualities can also be seen in her diligent archival work and her command of the literature on an array of subjects, from the Spanish colonies to the operations of drug gangs in modern Mexico.

"One thing you recognize with Melissa, she never cuts corners," says Acemoglu, a professor at MIT who was one of her PhD thesis advisors.

Enidite to economist

Dell grew up in Enid, Oklahoma, a city of about 50,000 on the edge of the Great Plains known as "Queen Wheat City" for its immense grain storage capacity. Her mother taught preschool, and her father worked as a civilian contractor in the auto parts shop at an air force base.

At Harvard, she ran long distance competitively, majored in economics, and initially figured she might attend law school. She studied Spanish and spent a summer as an intern for a women's micro-finance organization in Peru. It was her first trip outside the United States.

"It was pretty eye-opening in terms of being able to see that kind of developing economy context for myself and have a chance to talk to the people there and learn about their perspectives," she says.

She didn't decide to pursue a PhD in economics until her senior year, when she read papers including "The Colonial Origins of Comparative Development," cowritten by Acemoglu, Simon Johnson, and Robinson. It argues that "extractive" colonial regimes that exploited primarily natural resources left a legacy of underdevelopment across the modern world.

"That made me think of the mita and think, you know, well, this is the quintessential example of an extractive institution," Dell says.

The mita became the subject of her senior thesis, and she continued to work on it during a two-year fellowship at the University of Oxford. By the time she enrolled in MIT, she had another summer of research in Peru behind her and a foundation for her PhD dissertation.

Her work on the drivers of economic development led her to pursue a long-standing interest in the divergent paths of Asia and Latin America. Reading about Asian economies led her to think about the divergence between northeast Asian economies, like South Korea and Taiwan Province of China, and those of Southeast Asia, like Indonesia and the Philippines.

Vietnam indictment

Vietnam, she realized, lay at the intersection of these two regions. In "The Historical State, Local Collective Action, and Economic Development in Vietnam," Dell and her coauthors, Nathan Lane and Querubin, used a geographic regression discontinuity to study the persistent effects of two administrative models: in the North, Dai Viet, a strong, centralized state in the Chinese mold, in which the village was the basic administrative unit, and in the southern former-Khmer region, a patron-client model, with landlords exacting tribute from peasants and offering protection in return.

Dell and her coauthors found that centuries later, household consumption in the former Dai Viet lands was about one-third higher than in the former Khmer region. Citizens of former Dai Viet villages were twice as likely to participate in local civic institutions, were better educated, and had better access to health care.

Through their research on contemporary living standards in Vietnam, Dell and Querubin stumbled on a remarkable set of documents: results of surveys of 18,000 hamlets conducted by US and South Vietnamese authorities from 1969 to 1973. These monthly and quarterly surveys gathered responses to 169 questions on local politics, economics, and security. It was a gold mine of information on attitudes and living standards.

The people who conducted the study used an algorithm to aggregate the answers and generate a security score for each village. Villages with lower security scores were significantly more likely to be bombed, on the theory that overwhelming firepower would reduce insurgent forces, disrupt their operations, and crush morale.

The scores ranged continuously from 1 to 5, but because computing power at the time was limited, they were rounded to the nearest integer. This meant that two villages with very similar results—say, 2.49 and 2.51—would generate different scores, creating a discontinuity at the dividing line.

"When I started digging into the data, I realized that it was a regression discontinuity," Dell recalls.

Before Dell and Querubin could proceed, they needed the unrounded security scores, which no longer existed. But there was a workaround: if they could get their hands on the so-called conditional probability matrices used to compute the unrounded scores, they could rerun the calculations and recreate the raw data.

So they sifted through thousands of boxes of documents at the US National Archives in College Park, Maryland, in search of the matrices but came up empty-handed. A search of the online Vietnam War archives at Texas Tech University also proved fruitless.

Dell decided to travel from Cambridge, Massachusetts, to Washington, DC, to scour the archives of the US Army Center of Military History at Fort McNair. At first she found nothing. Then a historian working nearby said he had seen some boxes in the basement. After checking there, Dell went outside to send Querubin a two-word text message: “Found them.”

“I probably would have given up much earlier, but she was so incredibly committed that she went all the way to hunt those conditional probability matrices,” Querubin recalls.

After recreating the raw scores and applying discontinuity regressions, Dell and Querubin concluded that the US strategy of overwhelming force had backfired: Bombing made it more, not less, likely that villagers would support the communist insurgency, and it weakened noncommunist civic activities.

Parts of their paper read like an indictment of US military strategy in Vietnam, which was guided largely by Ivy League whiz kids under Presidents John F. Kennedy and Lyndon B. Johnson. Among them were McGeorge Bundy, a Harvard political scientist, and Walt Rostow, author of *The Stages of Economic Growth*, an influential work that claimed to identify the conditions countries had to meet to climb the development ladder.

Dell criticized advisors like Bundy and Rostow for proposing flashy theories that weren’t grounded in data, and she said they had given social science a bad name. Their failures “really illustrate the importance of bringing a range of perspectives to policy questions, which are just incredibly complex, and really testing things with data.”

Acemoglu says Dell succeeds in bridging the gap between theory and empirical work. “She is a perfect specimen of the excellent way of combining academic rigor and a nose for really first-order questions for humanity,” he says.

Benjamin Olken, another of Dell’s thesis advisors, says her work on Vietnam shows how “Melissa is willing to make very big investments that have these long-run payoffs.”

Lately, Dell has been researching how the Japanese colonial administration in Taiwan Province of China

I do think that distance running reinforces valuable life lessons about persistence.

influenced the island’s development. In the course of her research, she found a treasure trove of early 20th century Japanese company records. They were hard to digitize because they used thousands of characters that are no longer in use and had unusual layouts.

So, using her self-taught programming skills, she developed a package called Layout Parser based on open-source software that allows scholars to scan documents with unusual formats. She’s also working on an alternative to commercially available optical character recognition software that would be simpler, more accurate, and better suited to reading the kinds of documents historians use.

“It opens the door to so much rich information,” Dell said. “I felt it was a good pandemic project as well, because the archives are closed.”

Querubin is less reticent, noting that a year after starting work on the project, Dell was teaching a course on deep learning methods for data curation.

“The breakthrough in methods that she is developing, they are going to unlock many other projects by other economic historians, economists, political scientists—you name it,” he says. “This is going to become very important.”

Life lessons

Querubin and others see a parallel between Dell’s persistence in research and her experience as a long-distance runner. Querubin recalls seeing Dell at a discussion group for MIT graduate students and thinking she looked tired. It turned out she was in the midst of training for an ultramarathon.

Dell has given up ultramarathons for now. She is married to Austin Huang, who works at Fidelity Investments, and they have three children ranging in age from four months to four years.

“I do enjoy recreational running but currently have the challenge that not all of my kids will fit into a double jogger,” she says.

“Hopefully once the oldest is big enough to join on a bicycle I can get back into it. I do think distance running reinforces valuable life lessons about persistence.” **FD**

CHRIS WELLISZ is a freelance writer and editor.



ENSURING THE AMERICAN DREAM

Targeting programs during childhood is the best way to increase upward economic mobility
Raj Chetty and Nathaniel Hendren

The Brownsville neighborhood of Brooklyn, New York, in 2019.



A defining feature of the American Dream is upward mobility—the ability of all children to have a chance at economic success, no matter their background. Unfortunately, children’s chances of earning more than their parents have declined in recent decades. Whereas 90 percent of children born in 1940 grew up to earn more than their parents, only half of today’s young adults earn more than their parents did at the same age. Our research group focuses on understanding which policies can help expand economic opportunity—both in the United States and elsewhere.

The key lesson from our work to date is the importance of targeting policy interventions during childhood. Childhood matters for two reasons. First, children’s environment growing up profoundly shapes their outcomes in adulthood. Second, policies that directly expand investment in children—especially low-income children—are often the most cost-effective way to reduce intergenerational inequality.

The launch point for our analysis is the source material in the Opportunity Atlas, an interactive data set we developed that uses census and tax records to measure upward mobility for every neighborhood in the United States. Using the Opportunity Atlas, we can see that in some neighborhoods low-income children are highly upwardly mobile, while in others, children from comparable backgrounds tend to remain trapped in poverty across generations. For example, Chart 1 shows the wide range of average adult incomes for low-income children growing up across New York City. Chart 2 shows that the income in adulthood of low-income children in the Brownsville neighborhood in Brooklyn depended significantly on which

side of Dumont Avenue they grew up.

To better understand how neighborhoods *shape* children’s outcomes, we studied the life trajectories of more than 5 million children whose families moved while they were growing up. Our main finding is that children who moved to more upwardly mobile neighborhoods—those with higher-quality schools, for instance—tended to have better outcomes as adults. In other words, neighborhoods have substantial causal effects on a child’s outcome as an adult.

Chart 3 illustrates the estimated income gain for hypothetical children who move from the Van Dyke Houses north of Dumont Avenue in Brownsville to the nearby Nehemiah Houses in a rebuilt area just south of Dumont. We predict that children who make this move at age two will earn roughly \$25,000 a year as adults, compared with \$17,000 a year, on average, had they remained in the Van Dyke Houses. This gain is lower the older children are when they move. Each additional year children spend in a higher-opportunity neighborhood improves how they fare later in life.

Importantly, improvements in environment matter into adolescence and beyond; moving to a better neighborhood at 15 instead of 20 is still quite valuable. It is only after age 23 that there are no longer observable effects on income from a move to a higher-opportunity neighborhood. Similar patterns are observed using experimental evidence covering families randomly assigned to move from high- to low-poverty neighborhoods. In short, childhood neighborhoods shape economic outcomes in adulthood.

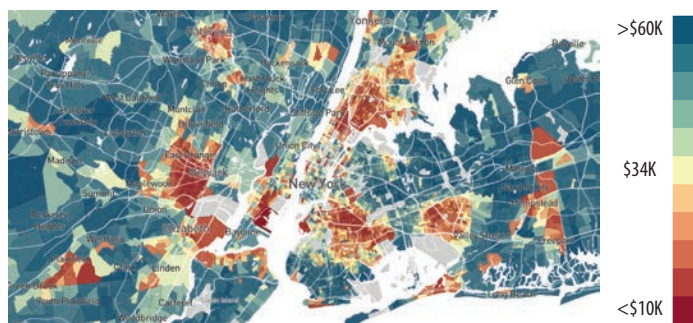
The second key aspect of our analysis is determining which types of policies most improve economic opportunity and societal well-being. To find out, we studied 133 policies implemented over the

Childhood neighborhoods shape economic outcomes in adulthood.

Chart 1

Income spread

The average income at age 35 of New Yorkers whose parents earned \$27,000 annually varies widely.



Source: Opportunity Atlas.

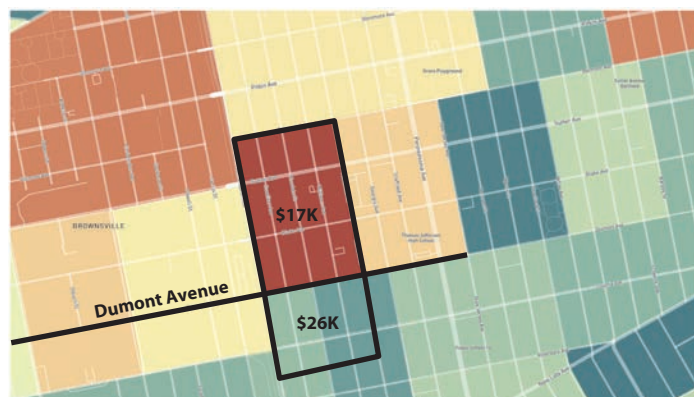
Chart 2

Earnings divide

How much low-income children from a New York neighborhood earned as adults depended significantly on the side of Dumont Avenue where they grew up.

Household income for Black children of low-income parents

<\$10K \$24K >\$45K



Source: Opportunity Atlas.

past 50 years. We compared each policy using a standardized metric called the marginal value of public funds (MVPF). A policy's MVPF is the ratio of the benefit it provides its recipients relative to its net cost to the government—including long-term effects on the budget, such as reduced social expenditures or increased tax revenue. This metric allows us to compare the effectiveness of different types of policies—such as social insurance, taxes, cash transfers, education, job training, and in-kind transfers—to determine which have had the greatest effect on social well-being per dollar of net government spending.

Chart 4 illustrates our main result. We divide the set of 133 policies into 12 programmatic categories and, for each category, plot the average MVPF against the average age of the policies' beneficiaries. The three points in the upper left reveal that investments in *children* have historically yielded the highest MVPFs. These policies included expanded health insurance for children, investments in preschool and K–12 education, and policies to increase college attendance.

The pattern in Chart 4 displays a striking similarity to that in Chart 3. In both cases, we find high returns to improving *conditions* throughout childhood. Each year of exposure to a more upwardly mobile neighborhood improves upward mobility. Likewise, not only do public investments that target *young* children in preschool yield high returns, but programs aimed at helping older, high-school, and college-age children tend to offer large payoffs to taxpayers as well.

In many cases, we find that these policies end up paying for themselves, saving taxpayers money in the long run. We assign such policies an MVPF of infinity, as illustrated by the three category averages plotted along the top of Chart 4. For example, policies that expanded health care insurance coverage for children, on average yielded \$1.80 for every \$1.00 in up-front spending. Historically, many policies that expand intergenerational economic opportunity have also benefited taxpayers.

In addition to analyzing historical policies, our research group seeks to use big data to help tailor the next generation of policies to improving economic mobility. A core motivation is the stark geographic variation in mobility revealed by the Opportunity Atlas. The dramatic differences in outcomes depending on where children grow up raise the question of why more families with children don't

move to more upwardly mobile neighborhoods. Surprisingly, we find that even low-income families receiving housing choice vouchers that subsidize rental costs tend to concentrate in neighborhoods characterized by low levels of upward mobility, suggesting that the effect of housing vouchers on reducing residential segregation and expanding economic opportunity has been limited.

To explore why, we developed and tested a program in 2018 in the Seattle Metropolitan Area in collaboration with the Seattle and King County Housing Authority, called Creating Moves to Opportunity (CMTO). To test whether there were barriers preventing voucher recipients from moving to higher-opportunity neighborhoods, we provided a randomly selected group of voucher recipients with a set of services that included housing search assistance, connections to landlords, and financial support. A striking 53 percent of the families receiving assistance moved to higher-opportunity neighborhoods, while only 15 percent of families with no help found housing in high-upward-mobility neighborhoods.

These findings reveal the degree to which *barriers* (as opposed to *preferences*) limit the ability of low-income families to secure housing in high-opportunity neighborhoods. Reducing such barriers can increase opportunity for children in low-income families. We estimate that children who move at birth to a high-opportunity neighborhood as part of the CMTO program and stay there until adulthood will have lifetime earnings that are \$200,000 higher than if they remained in a lower-opportunity neighborhood.

This research is cause for optimism. The data may reveal that the United States is falling short in providing children with equal access to opportunity. But we also show that investments that have historically generated significant benefits to children simultaneously pay dividends to society more broadly, which should increase society's incentive to enhance upward mobility for all. There is tremendous potential to revive intergenerational mobility—in the United States and elsewhere—through a data-driven policy agenda that expands investments in and opportunities for low-income children. **FD**

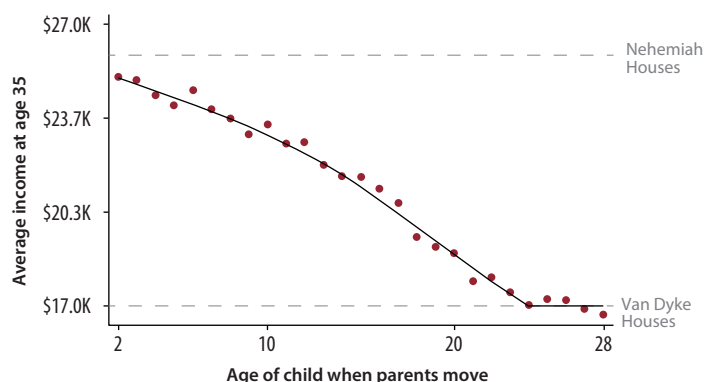
RAJ CHETTY is a professor of economics at Harvard University and founding director of Opportunity Insights.

NATHANIEL HENDREN is a professor of economics at Harvard University and founding codirector of Opportunity Insights and Policy Impacts

Chart 3

Location, location, location

Children who moved to more upwardly mobile neighborhoods tended to have better outcomes as adults, illustrated by children who moved within Brooklyn, New York.



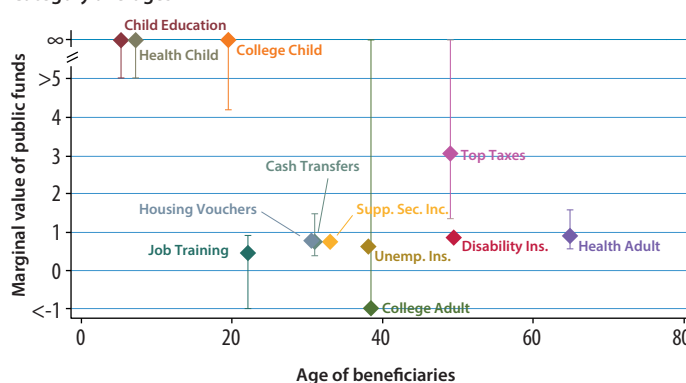
Source: Chetty and Hendren (2022).

Chart 4

Good for all

Policies aimed at improving outcomes for children also yield the biggest benefits to society as a whole.

Category averages



Source: Opportunity Insights.

Note: "Marginal value of public funds" is the ratio of the benefit to recipients relative to net cost to the government. Disability Ins. = Social Security Disability Insurance; Supp. Sec. Inc. = Supplemental Security Income; Unemp. Ins. = unemployment insurance; ∞ = policies that pay for themselves.

Reference:

Chetty, Raj, and Nathaniel Hendren. 2022. "Replication Data for: The Impacts of Neighborhoods on Intergenerational Mobility: (I) Childhood Exposure Effects, and (II) County-Level Estimates." Opportunity Insights, Harvard Dataverse, Cambridge, MA.

COVID-19 AND TRUST AMONG **THE YOUNG**

Mishandled public health and other disasters erode young people's trust in politicians for years

Cevat Aksoy, Barry Eichengreen, and Orkun Saka



Without trust, politicians struggle to convince people to follow their advice and instructions. From COVID-19 to climate change and now the Russian invasion of Ukraine, governments are asking or telling people to alter their behavior and make sacrifices—great sacrifices in the case of war. Yet in an environment rife with conspiracy theories, trust is becoming much harder to establish and sustain. Public responses to the pandemic have underscored the importance of trust, among the

young especially, and may hold lessons for other areas of public life.

Governments and modern medical science have played important roles in mitigating the pandemic. Public officials and agencies have offered advice and issued rules on social distancing, mask wearing, and vaccination. Scientists, in their capacity as advisors, have informed those rules and policies, and as researchers have developed mRNA vaccines and now prophylactic and therapeutic drugs that promise to lessen spread of the disease.

Recent research and casual observation both suggest that, in order for such efforts to succeed, members of the public must trust government officials and scientists, together with their associated institutions. Only if people believe that government is trustworthy—that it will adopt unbiased and well-informed measures—are they likely to follow its advice and instructions. A study published in the British medical journal *Lancet* in early 2022 looked at the incidence of COVID-19 in 177 countries and found that higher levels of trust in government and society had “large, statistically significant associations with fewer infections for the entire study period.” Similarly, multiple studies comparing across countries and individuals have found that trust in science is positively correlated with adherence to pandemic measures. Evidently, only if people think that scientists are trustworthy are they likely to follow their advice and instructions. Questions about the motivations, competence, and honesty of scientists are frequently expressed by vaccine skeptics, to take a prominent case in point.

But trust is not a given: it is shaped by events. And among the events that prominently affect individuals’ trust in government and scientists, recent research suggests, is exposure to epidemics. Trust in both governments and scientists is negatively affected by epidemic exposure. Importantly, however, not everyone’s expressed and displayed level of trust is affected equally. As we report in a series of papers, the largest effect of epidemic exposure is on trust among the young—more specifically, on young adults aged 18 to 25.

The impressionable years

A long list of studies has found sharp perceptual and behavioral changes among young adults, and that such changes persist for years thereafter. A classic study initiated in the 1930s by the sociologist Theodore Newcomb of students at Bennington College found that social and political beliefs adopted by his subjects in their undergraduate years persisted long after; they became part of individuals’ enduring ideological identity. The psychologist Jon Krosnick and sociologist Duane Alwin showed that political attitudes and affiliations acquired in the 18- to 25-year-old period tend to persist durably for many years. Economists Paola Giuliano and Antonio Spilimbergo found that experiencing

a recession between the ages of 18 and 25 had a significant, enduring impact on beliefs about the economy. All this has led investigators to refer to the 18- to 25-year-old phase of the life cycle as the “impressionable years.”

The singular importance of the impressionable years has been rationalized in various ways. Some scholars draw on the concept of the “fresh encounter” described by the early 20th century philosopher Karl Mannheim, who suggested that views were durably formed when late adolescents, on leaving the household, are first exposed to new ideas or

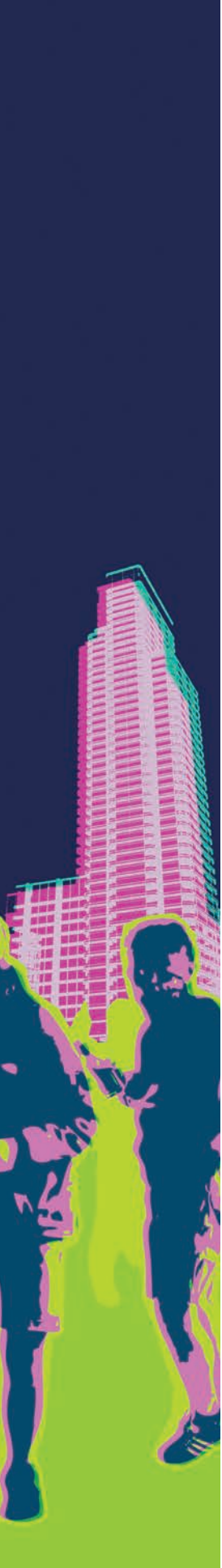
Trust is not a given: it is shaped by events.

events. Others invoke the psychologist Erik Erikson, whose work suggests that late adolescents and young adults are open to new influences because this is the age at which they form their sense of self and identity. Cognitive scientists link the persistence of attitudes adopted in the impressionable years to increased cognitive capacity starting in late adolescence. Others point to work in neurology suggesting that neurochemical and anatomical changes between the adolescent and adult brain are associated with durable attitude formation. But whatever the rationalization for the impressionable years, their importance is clear.

Epidemics and political trust

Our own work provides the first large-scale evidence on the effects of epidemics on political trust for individuals in their impressionable years. We use data on trust and confidence in governments, elections, and national leaders from Gallup World Polls fielded in 140 countries annually between 2006 and 2018, together with data on the incidence of epidemics since 1970, as tabulated in the International Disaster Database maintained by the nongovernmental organization EM-DAT. Given that the sample period ends in 2018, it predates COVID. But a number of tests support the external validity of our results.

We show that exposure to epidemics, specifically during the impressionable years, durably shapes confidence in government, elections, and leaders. We do so by asking whether cohorts of individuals exposed to an epidemic during their impressionable years display lower political trust



than other cohorts surveyed in the *same country* and *same year*, while at the same time controlling for a variety of other social, economic, and personal characteristics.

The impact of epidemic exposure is substantial: someone who is highly exposed to an epidemic throughout his or her impressionable years, compared with someone with no such exposure, is 5.1 percentage points less likely to have confidence in the government, 7.2 percentage points less likely to have confidence in the honesty of elections, and 6.2 percentage points less likely to approve of the performance of the national leader (where the mean outcomes for these variables are 50 percent, 51 percent, and 51 percent, respectively).

Strikingly, there is no analogous effect for individuals who have not yet reached their impressionable years or who have aged beyond them when the epidemic erupts. These effects decay only gradually as the exposed individual ages. On average, they persist for nearly two decades.

Importance of the health policy response

Moreover, the effect is specific to political institutions and leaders. We find no analogous impact on other societal institutions such as the police, military, banks, and financial institutions. An important exception is the relationship between individuals' impressionable-year exposure to epidemics and their trust in their country's health care system, where again we find a pronounced negative effect. This suggests that loss of trust in political institutions is related to the adequacy of governments' health-care-related policy responses to the public health threat.

Governments with limited legislative strength, unity, and popular support are typically least able to mount effective policy responses to epidemics. We document this fact by comparing national responses to COVID-19. Evidence from 2020 confirms that weaker governments took longer to respond to the emergency with their first non-pharmaceutical intervention. If they are indeed prone to disappointing their constituents, one would expect the negative effects on trust to be strongest when the government in office at the time of the epidemic is weak and unstable, all else equal. In fact, we find that the effect of epidemic exposure on trust is twice as large when that epidemic is experienced under a weak government.

Finally, it is possible to show that the strongest impact on trust in government for young adults is driven by persons living in democracies. This finding is robust to controlling for country characteristics, such as the level of income, and a wide range of personal and family attributes. An interpretation is that the young expect democratically elected governments to be responsive to their needs and are disappointed when such governments do not respond so as to prevent or contain an epidemic. In addition, democratic regimes may have more difficulty with consistent messaging. Because such regimes are open, they may allow for a cacophony of conflicting official views, resulting in greater erosion of confidence and trust.

Trust in scientists

We use this same comparative approach and a 2018 Wellcome Trust survey of some 75,000 individuals in 138 countries to explore how epidemic exposure affects trust in science and scientists. Again, the analysis points to persistent negative effects of epidemic exposure on trust, once more specific to young adults. People who experience an epidemic when they are between 18 and 25 years old place significantly less trust in scientists and in the benefits of their work, compared with otherwise comparable individuals not so exposed at this stage of life. Those with the highest exposure to epidemics during their impressionable years are on average 11 percentage points less likely to trust scientists than those not so exposed. Individuals who were either younger or older than this at the time of their epidemic exposure display no such change in trust.

One can also distinguish survey respondents who learned about science only in primary school from respondents whose science education continued through at least secondary school. Here we find that the decline in trust is driven by individuals with less background in science-related subjects.

Lower, epidemic-induced, trust among the young translates into negative views of vaccines as well. It affects actual behavior as well as attitudes. Specifically, analysis of survey responses shows that impressionable-year epidemic exposure reduces the likelihood that people will have their children vaccinated against childhood diseases.

Implications

At one level, these findings are alarming. We know that trust in government and scientific experts

If a contagious disease outbreak diminishes trust in government and scientists, it raises the specter of a vicious spiral.

matters hugely for public acceptance of recommendations and policies. It has been important specifically, recent experience suggests, for acceptance of advice and policies for mitigating the spread and effects of COVID-19. But if a contagious disease outbreak diminishes trust in government and scientists, it raises the specter of a vicious spiral in which the outbreak of an epidemic diminishes trust, which in turn makes the epidemic—and its successors—still more difficult to contain.

Indeed, the effects may not be limited to the realm of public health. Other research suggests that trust is an important determinant of how societies respond to natural disasters such as earthquakes and floods. It shows that trust is a factor in long-term economic development. But if a disease outbreak diminishes trust among the young, this in turn may weaken and delay the societal response to other emergencies and create headwinds for economic development. Insofar as these attitudinal changes are enduring and the youth of today are the adults of tomorrow, those headwinds become even more difficult to surmount.

All is not lost, however. As we have seen, governments that respond poorly to a public health emergency are most vulnerable to erosion of trust. Thus, governments conscious of epidemic risk, that build up the response capability of their public health systems in advance, will be less susceptible to this problem. The success with which certain African countries responded to COVID-19 can be attributed in part to efforts to invest in this capacity in the wake of earlier public health emergencies such as SARS and HIV. And when it comes to trust in science and scientists, scientific education can help.

Our results point to an important difference, moreover, in how young people, when exposed to an epidemic, revise their views of science and scientists. Despite negative revisions of views of scientists' honesty, the accuracy of their findings, and the benefits of their work for the public, views of science as an endeavor (whether people trust science as an enterprise and believe that science and technology will help improve life) are unchanged. This distinction is consistent with the literature in psychology and cognitive

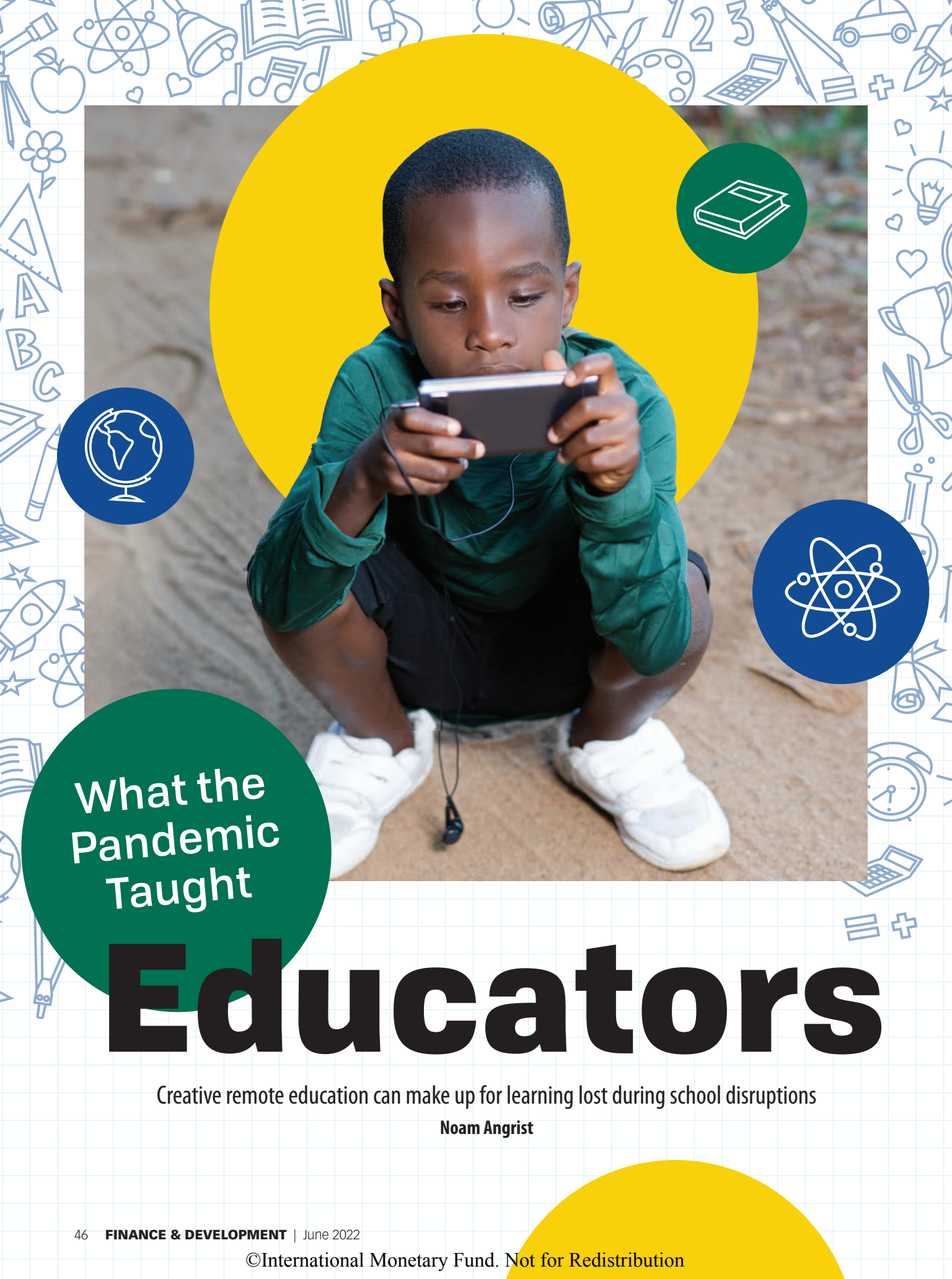
science on how people assign blame in complex, high-stakes social settings and with the tendency to blame individuals rather than institutions. It is consistent with the tendency during the COVID-19 pandemic of politicians and commentators to question the value of the public policy recommendations of individual scientists while at the same time seeking to mobilize all available scientific resources to develop a vaccine.

It thus may be that the problem—and its solution—has to do with how scientists present themselves and communicate their findings. People worry that scientists, being self-interested and human, can be unduly influenced by government and corporate agendas. They may worry that scientists' conclusions are based on personal beliefs rather than hard evidence. Surveys find that a significant share of respondents take disagreements among scientists, which are not uncommon in the context of a swiftly unfolding pandemic, as evidence that their conclusions are based on personal belief, or as indicating that the investigators in question are less than competent.

Addressing concerns about corporate agendas and personal bias is important in this light. Scientists need to explain that disagreements and new evidence contradicting the findings of earlier studies are part of the process by which advances in the scientific endeavor take place. The public policy response to the COVID-19 pandemic has underscored the importance of effective communication. Our analysis suggests that it is especially important to tailor such communication to the concerns of young adults in their impressionable years to strengthen trust so that societies can prepare for future pandemics and other emergencies. **FD**

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What the
Pandemic
Taught

Educators

Creative remote education can make up for learning lost during school disruptions
Noam Angrist



The COVID-19 pandemic was a historic shock to education systems. In many low- and middle-income countries, it dramatically set back learning levels.

Even before the pandemic, educators were talking about a global “learning crisis.” For example, in Kenya, Tanzania, and Uganda, three-quarters of grade 3 students cannot read a sentence such as “The name of the dog is Puppy,” according to an assessment by Uwezo, a regional initiative to measure education quality.

Enrollment in school has risen to record highs. The average adult had completed 7.6 years of school in 2010, more than double the average of 3.2 years in 1950, based on an analysis of data from 164 countries. In the past decade, primary school enrollment rates in sub-Saharan Africa have risen from 80 percent to 92.3 percent. Yet in many countries, learning levels have not improved much (see Chart 1).

The COVID-19 pandemic has further arrested learning progress. More than 1.6 billion children across 180 countries were out of school at the height of the pandemic. Using past disruptions as a benchmark, the cost of school disruptions is likely to be massive and have long-term consequences. For example, in 2005 an earthquake in Pakistan disrupted schooling for 14 weeks; four years later, young children most affected by the earthquake performed significantly worse on learning assessments, according to research published in the *Journal of Human Resources* (Andrabi, Daniels, and Das 2021). Some countries, such as Sierra Leone, closed schools during COVID-19 for a similar 14 weeks, but many school closures have been much longer. In Uganda and the Philippines school disruptions lasted nearly a full two years.

While many governments launched ambitious remote learning efforts, such as radio and TV campaigns, emerging evidence suggests that substantial learning was lost during the pandemic. Research in Brazil, India, The Netherlands, and South Africa, for example, revealed learning losses so large it appears that very little was learned during school closures. A few randomized evaluations in Kenya and Sierra Leone have found limited effects of various remote learning interventions.

But not all remote learning was ineffective. In an experiment in Botswana, weekly text messages coupled with phone call tutorials to parents and their primary school children improved learning (see Chart 2). The program covered foundational numeracy concepts and comprised weekly 20-minute tutorials over the course of eight weeks. Results provided some of the first experimental evidence during the pandemic on approaches to mitigating learning loss. Not only did it work, the intervention was also cheap and cost-effective, yielding the equivalent of over one year of high-quality instruction for every \$100 spent. Text messages alone were not effective—some level of live, direct instruction via the phone was essential.

The experiment in Botswana showed that phone call tutorials, targeted to students’ level of learning, improved primary school students’ grasp of math concepts while schools were shut down during the pandemic.

One reason the phone call approach to remote learning in Botswana was effective is people’s broad access to mobile phones at low cost. In low- and middle-income countries, 70 to 90 percent of households own at least one mobile phone, while only 15 to 60 percent of households have internet access. Relying on technology that requires internet access may not work in many low- and middle-income settings. Low-tech approaches can reach the most marginalized and do so at scale.

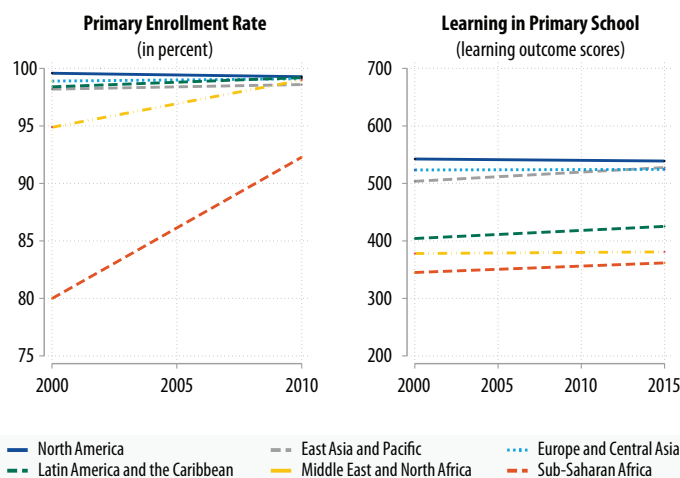
Another reason for the Botswana approach’s success: it customized and targeted instruction to each child’s level rather than relying on a one-size-fits-all curriculum. A weekly problem was posed at the end of each session to assess children’s levels; for example, whether they could do single-digit addition (4+5). If they could, the instructor would move on to more difficult problems, such as subtraction (7–3). If they couldn’t, the instructor would continue teaching addition. This approach built on a large body of literature showing that targeting instruction to a child’s learning level is one of the most cost-effective approaches to improving education outcomes.

To understand why targeting instruction is so effective, consider the status quo. Most education systems are structured by grade and follow a strict grade-level curriculum. For example, children are expected to know two-digit division by grade 5. But in practice,

Chart 1

Enrollment vs learning

While enrollment in school has risen to record highs, learning levels have improved little in most parts of the world.



Source: Primary enrollment rates are from Lee and Lee (2016). Learning estimates are from the Harmonized Learning Outcomes database (Angrist and others 2021)

Note: Learning outcome scores in the chart on the right translate into a high-performance benchmark of 625 and a low-performance benchmark of 300, based on thresholds set for international and regional learning assessments. The chart shows regional averages.

students are promoted to the next grade whether or not they grasp the core concepts. Instruction that prioritizes curriculum over competence, coupled with automatic promotion policies, is common in many low- and middle-income countries: as a result, many children fall behind grade level, and stay behind. In this context, assessing learning levels, regrouping children by level rather than grade, and targeting instruction can be transformational.

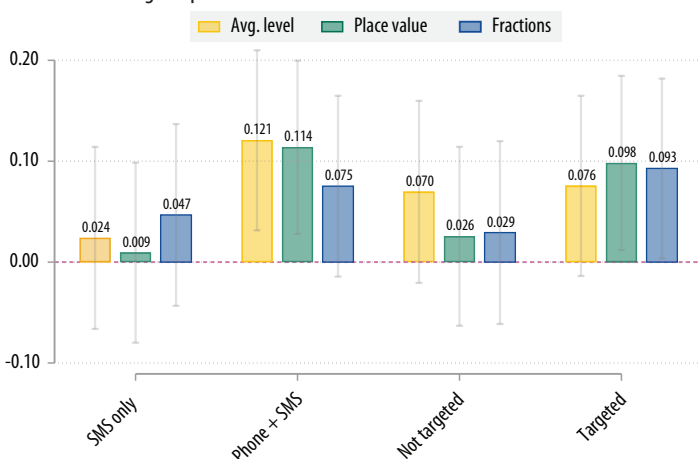
A particular model of this approach, called “teaching at the right level,” has been gaining ground in schools across sub-Saharan Africa, as well as in India, where it was pioneered by the education organization Pratham and evaluated by J-PAL, the Abdul Latif Jameel Poverty Action Lab (Banerjee and others 2017). Customizing instruction to children’s learning level might seem challenging, but with a few structures, such as frequent diagnostic testing and a menu of activities for each level, this approach has been adapted for over 60 million children. In Botswana, a coalition of the Ministry of Basic Education, the Ministry of Youth Sports and Culture Development, the US Agency for International Development, UNICEF, Teaching at the Right Level (TaRL) Africa, and Youth Impact, one of the largest nongovernmental organizations (NGOs) in the country, had delivered teaching at the right level to more than 20 percent of primary schools right before the pandemic. (The author is a cofounder and executive director of Youth Impact.)

When the pandemic struck and shuttered schools, Youth Impact pivoted to provide targeted instruction on foundational numeracy using the low-tech mobile phone approach. Both the platform (mobile phones) and pedagogy (targeted instruction focused on foundational numeracy) were crucial for the approach to work. In addition to targeting instruction through weekly assessments, the phone call from instructor to student was conducted one-on-one rather than in a group classroom setting. This one-on-one interaction enabled even more targeted instruction, an innovation that can be carried forward beyond the pandemic. This approach also ties in with a great deal of literature on the striking effectiveness of tutoring. However, the tutoring literature is often focused on high-income settings, and tutoring can be expensive. New, cheaper models have emerged during COVID-19 in Italy, where university student volunteers provided free online tutoring to disadvantaged middle-school students,

Chart 2

Pick up the phone

The experiment in Botswana showed that phone call tutorials, targeted to learning levels, improved primary school students’ grasp of math concepts while schools were shut down during the pandemic.



Source: Angrist, Bergman, and Matsheng (2020).

Note: Students’ performance in solving math problems involving place value and fractions is shown in terms of standard deviation gains.

most children do not. Data from Botswana, for example, show that fewer than 10 percent of grade 5 students have mastered two-digit division. Yet teachers often still teach the grade curriculum, and

We cannot just go back to business as usual or we will wind up back where we started: with a learning crisis.

and Spain, where math teachers offered online tutoring after school hours. The Botswana study provides a model of inexpensive tutoring at scale in low- and middle-income settings.

Since the Botswana study was released, similar approaches have been tested and shown to be effective in Bangladesh and Nepal. Moreover, an ongoing randomized trial across five countries (India, Kenya, Nepal, Philippines, Uganda) is testing the adaptability and scalability of this approach across contexts. For example, the multicountry study includes delivery by NGOs as well as government teachers.

Although the pandemic has stymied the progress of education, and many efforts to provide remote instruction during school closures have failed, those that have worked combine evidence from the past with contextually grounded innovation. The Botswana study is one such example, building on decades of evidence on teaching at the right level and tutoring, while innovating to reach people where they are—which dramatically changed during the pandemic, with children at home and using phones, rather than sitting in a classroom.

A recent review of prior evidence, as well as innovations tested during COVID-19, can guide the way (Angrist and others 2020). The Global Education Evidence Advisory Panel—an independent academic advisory group convened by the World Bank, the UK Foreign, Commonwealth and Development Office, and UNICEF—has done just that in a new report, “Prioritizing Learning during COVID-19: The Most Effective Ways to Keep Children Learning during and Post-Pandemic.”

The report highlights multiple cost-effective approaches to improving learning. The most important one is to keep schools fully open. Other reforms include assessing student learning to guide and track learning progress and to enable teaching at the right level, structured pedagogy, and provision of additional instructional support, such as tutors. Notable lessons learned during the pandemic include leveraging existing technology, such as adaptive software, to target instruction where such infrastructure exists, and where it doesn't,

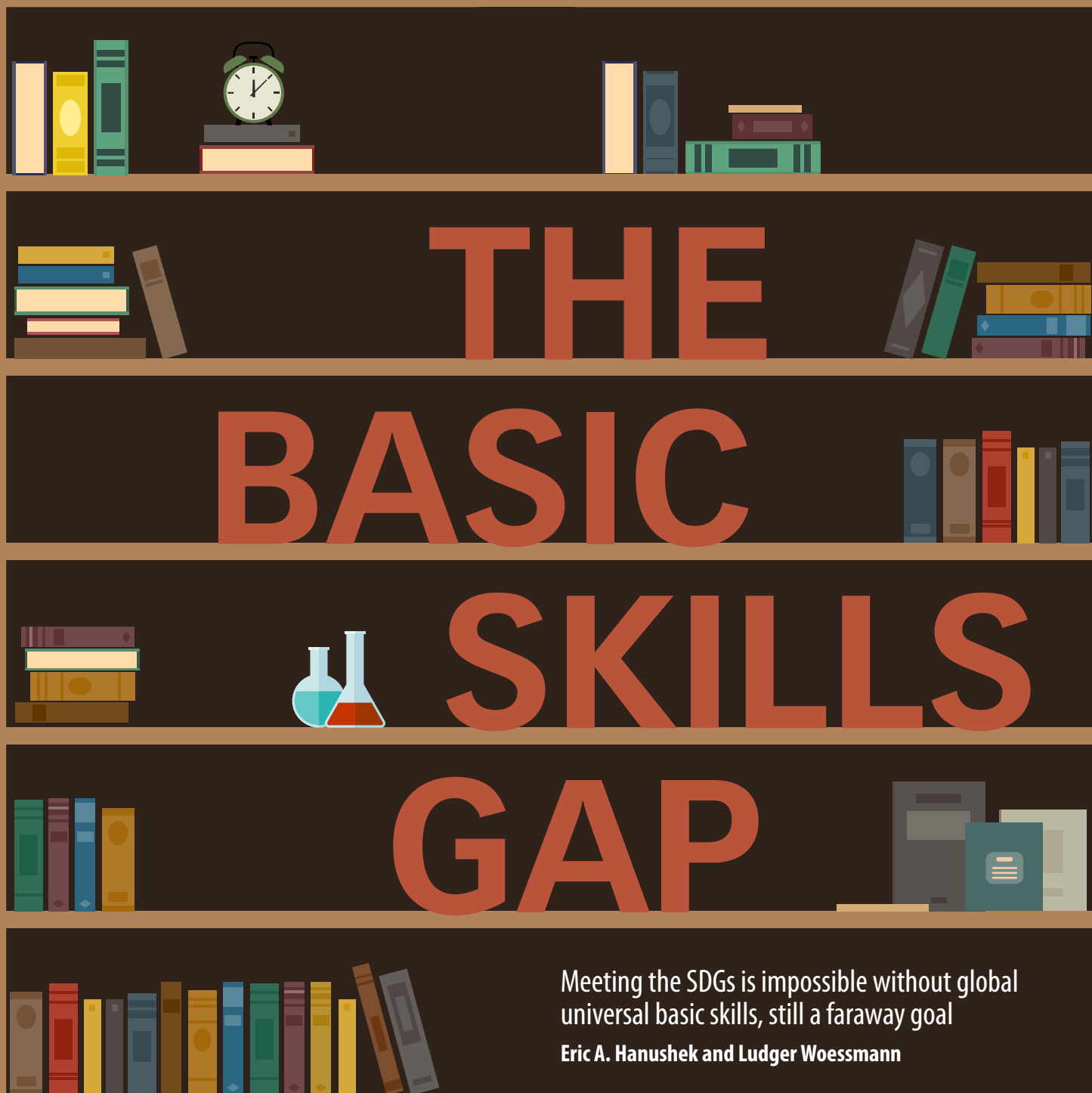
leveraging high-access mobile-phone-based instruction. Another lesson involves engaging parents directly in instruction. Before the pandemic, parental engagement was focused more on informational interventions, such as report cards. During the pandemic parents became frontline instructors, and emerging evidence suggests that in some cases they were quite effective. This was true especially when interventions focused on foundational skills, enabling parents from low- and middle-literacy settings to engage. A point to consider in designing effective parent support interventions is to keep them brief to enable high engagement and to avoid crowding out employment.

COVID-19 devastated education systems worldwide. While the window to recover learning losses is closing, it is still possible to do so if we act now. But we cannot just go back to business as usual or we will wind up back where we started: with a learning crisis. This is the moment to take stock of what hasn't worked and what has, and to reform education systems to prioritize and enable learning for all. **FD**

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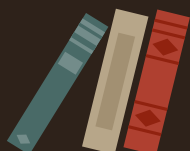
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The United Nations Sustainable Development Goals (SDGs) have received considerable attention since their adoption in 2015. But halfway through their implementation period there is little indication that the ambitious agenda will be accomplished by 2030. The key to bringing about the 17 SDGs is enhanced world development that provides the resources needed to move forward on the goals, but there is a fundamental challenge. Economic development depends on the skills of each society, which means that high-quality, equitable education is paramount.

On this score, it is hard to be optimistic, because the deficits are large, and recent events have not improved the chances for success.

Based on the available evidence, we highlight three key issues. First, skill differences account for three-quarters of cross-country variations in long-term growth. Second, the global skill deficit is immense, as two-thirds or more of the world's youth do not reach even basic skill levels. Third, reaching the goal of global universal basic skills would raise future world GDP by \$700 trillion over the remainder of the century.



Achievement and growth

Understanding the determinants of economic growth has been the subject of considerable research. Our interpretation of the pattern of economic growth and development is straightforward: although a number of factors enter into short-term growth, in the long run growth depends primarily on the skills of the people (Hanushek and Woessmann 2015). In addition, our analysis indicates that the relevant economic skills are captured quite well by international student achievement tests in math and science.

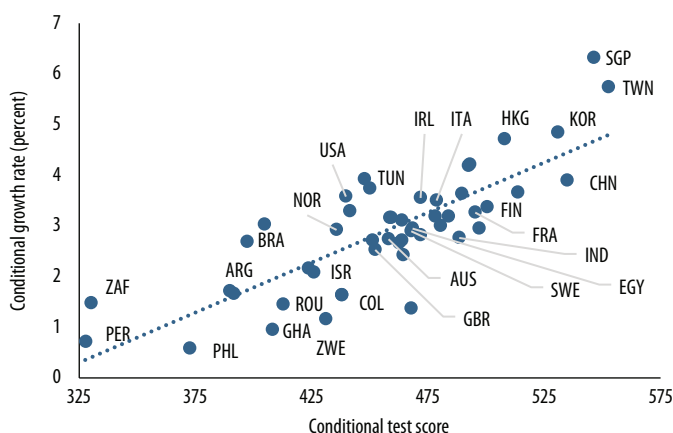
The relationship between long-term growth and achievement is easiest to see in Chart 1. The skills of the population are measured by scores on international student assessments (for example, the Programme for International Student Assessment [PISA], the Trends in International Mathematics and Science Study [TIMSS], and their predecessors). The plot shows growth in GDP per capita during 1960–2000 after filtering out variation as a result of each country's starting income level (since it is easier to imitate technology developed elsewhere than to innovate). Growth and achievement are closely linked: countries with high-achieving populations grew fast; those whose people lag in achievement hardly grew at all. Achievement explains three-quarters of the variation in growth rates across countries. Moreover, years of schooling have no bearing on growth after accounting for what has actually been learned.

The standard concern about such a picture is that it might not represent a causal relationship because other factors may be more important and are simply correlated with achievement. We have investigated other possible explanations in depth (Hanushek and Woessmann 2015), and—while it is impossible to remove all doubt—we show a credible case that lifting achievement has a powerful impact on growth. We find, for example, that achievement tests up to the early 1980s predict subsequent growth (which rules out simple reverse causation) and that greater spending (which may come from faster growth) does not consistently raise achievement. Furthermore, if we use only part of the achievement variation that emerged from good institutions of the school system, such as strong accountability measures or more school choice, we find the same link to faster growth, which rules out the notion that higher achievement simply

Chart 1

Knowledge capital and economic growth

Differences in people's skills account for most of the differences in long-term growth rates across countries.



Source: Hanushek and Woessmann (2015).

Note: Association between growth in real GDP per capita in 1960–2000 and average scores on international student achievement tests (average of math and science scores 1964–2003 from Trends in International Mathematics and Science Study, Programme for International Student Assessment, and predecessor studies), after accounting for differences in initial levels of GDP per capita and years of schooling (added-variable plot).

captures omitted factors from outside the school system. And we find that countries with *increased* achievement over time have subsequently shown *increased* growth rates, thus dealing with potential omitted cultural or institutional factors.

The world picture of education

Tracking success in the area of education has historically been difficult. International achievement tests were first developed in the 1960s—and all rich countries are now participating regularly—but a majority of poor countries have never participated. A series of parallel regional tests have been developed, but they lack direct linkages to the broader-scale international assessments. And many countries, including the two most populous, have not produced student outcome data in a consistent manner.

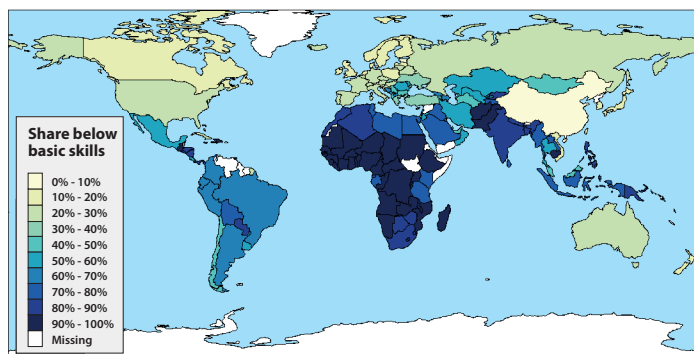
In our most recent research, we bring the different international and regional assessments of student achievement together (Gust, Hanushek, and Woessmann, forthcoming). While some uncertainty remains, we characterize the world pattern of achievement and skills with sufficient accuracy to permit addressing the state of the world with respect to the SDGs.

We define basic skills as the skills necessary to participate productively in modern economies. Pragmatically, we assume these to be represented by mastering at least the lowest of the six skill levels of the international PISA test—that is, PISA

Chart 2

World map of lack of basic skills

In many countries, over 90 percent of children do not reach basic skill levels.



Source: Gust, Hanushek, and Woessmann (forthcoming).

Note: Estimated share of children who do not reach at least basic skill levels (equivalent to Programme for International Student Assessment Level 1) in math and science.

Economic gains from achieving universal basic skills

Achieving global universal basic skills would add \$700 trillion to world GDP.

	Value of Reform (trillions of US dollars)	In Percent of Current GDP
World	706	524
By Region		
Sub-Saharan Africa	124	2,798
South Asia	258	2,160
Middle East & North Africa	67	886
Latin America & Caribbean	76	749
Europe & Central Asia	66	197
East Asia & Pacific	75	173
North America	41	177

Source: Gust, Hanushek, and Woessmann (forthcoming).

Note: Discounted value of future increases in GDP until 2100 as a result of young people's universal achievement of at least basic skills (equivalent to Programme for International Student Assessment Level 1).

Level 1 skills. Students at this level are able to carry out obvious routine procedures according to direct instructions, but they cannot draw direct inferences or reliably employ basic conventions to solve simple problems involving whole numbers. Such basic skills are a key foundation not only for participating in modern societies, but also for engaging in lifelong learning as is necessary in an ever changing world.

The picture that emerges from our analysis is disturbing. Two-thirds or more of the world's young people fail to reach the minimum skill levels required to compete in the international

economy. These deficits are found worldwide, but are most severe in the poorest countries—as shown in Chart 2.

Six stylized facts summarize the development challenges presented by global deficits in basic skills:

- At least two-thirds of the world's youth do not obtain basic skills.
- The share of young people who do not reach basic skills exceeds half in 101 countries and rises above 90 percent in 37 of these.
- Even in high-income countries, a quarter of young people lack basic skills.
- Skill deficits reach 94 percent in sub-Saharan Africa and 90 percent in south Asia, but they also hit 70 percent in the Middle East and North Africa and 66 percent in Latin America.
- While skill gaps are most apparent for the third of global youth not attending secondary school, fully 62 percent of the world's secondary school students fail to reach basic skills.
- Half of the world's young people live in the 35 countries that do not participate in international testing, resulting in a lack of regular foundational performance information.

The implication of the current state of achievement is that true world development will require major changes in the schools available to a majority of current and future students. It is not enough for all young people to be in school (as emphasized by the SDG for education), because the key issue is the low quality of education in most developing economies. This message is not a complete surprise, as seen from the policy discussions leading up to the SDGs. The urgency of this message is, however, heightened by the pandemic, which has impeded holding onto past outcomes, let alone moving forward.

The economics of meeting the SDGs

The primary development goal should be to endow all children (universal) in all countries (global) with at least basic skills. Global universal basic skills would lead to dramatic increases in world income. People with greater skills would see improved lifetime incomes. The aggregate impact would be even more dramatic.

Developed economies and international aid organizations have worked to improve developing economies. In 2020, more than \$161 billion was



disbursed under official development assistance. The effectiveness of these efforts has been frequently criticized, largely on empirical grounds that development in general had been slow.

We have calculated the economic value of erasing the learning deficits through actions to bring all youth up to basic skill levels (see table). This calls for secondary schooling for all young people that is good enough to equip them with basic skills. We use the growth relationship in Chart 1 to simulate the impact of this effort, allowing for time to improve the schools and discounting gains that are far in the future (Gust, Hanushek, and Woessmann, forthcoming).

The results are staggering. As the table indicates, the present value of added world GDP that would accrue over the remainder of the century is \$700 trillion, or five times current annual world GDP. The gain is equivalent to 11 percent of the discounted future GDP over the same horizon. The impact on the concentrated developing regions of the world—sub-Saharan Africa, south Asia, the Middle East and North Africa, and Latin America—would be multiples of their current GDP.

Clearly such improvements in schools would be difficult to achieve, and it would take time for the economies to assimilate the newly skilled workforces. But the enormous gains show the imperative of attention to building a first-rate labor force. In terms of the larger picture, education-led development offers the possibility of meeting the various SDGs.

The new urgency

The previous picture considers the pre-pandemic world. The pandemic has universally changed the educational outcomes of the current cohorts of students. Losses as a result of school closures and reluctance to return to the classroom will not disappear simply by restoring schools to their January 2020 performance (Hanushek and Woessmann 2020).

What's even worse, there is mounting evidence that the learning losses from the pandemic have been disproportionately severe for poor children—those in developed economies and the large number in developing economies. Consistent with the prior analysis, however, the disruptions were greatest in a broad set of developing economies. Not only were schools closed for longer periods in those regions—up to a record-breaking two years in Uganda—but

options to replace traditional in-person classes were more limited. Schools must be better than they were at the beginning of 2020 if they are to recover from the setbacks of the pandemic.

The key to improvement is an unwavering focus on the policy goal: improving student achievement. There is no obvious panacea, and effective policies may differ according to context. But the evidence points to the importance of focusing on incentives related to educational outcomes, which is best achieved through the institutional structures of the school system. Notably, education policies that develop effective accountability systems, promote choice, emphasize teacher quality, and provide direct rewards for good performance offer promise, supported by evidence.

People with greater skills would see improved lifetime incomes. The aggregate impact would be even more dramatic.

Most obviously, the neediest countries are flying blind, with no information about their current achievement status. International development organizations should institute a regular, internationally standardized test in all countries of the global South, with tested content that is relevant for children who struggle to reach basic levels. Such a globally comparative test would give policymakers much better information so that they can focus their energy and devise suitable policies—and know if they are succeeding. **FD**

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The Stretch of Supply Chains

The pandemic has reignited debate over global assembly lines that stretch around the world

Diego A. Cerdeiro and Niels-Jakob H. Hansen



HAVE YOU EVER visited a store only to find empty shelves rather than the product you wanted to buy? This might have been because of disrupted supply chains. Usually, these chains operate seamlessly in the background to bring you the goods you need. However, when supply chains break down we all notice. So what are these vital parts of the global economy?

Supply chains are the assembly lines that deliver goods for final consumption. Think about the laptop, desktop, tablet, or phone on which you are reading this article. These products came to be thanks to a multitude of different inputs that traveled through a complicated supply chain before arriving in your hands as a finished good. This journey involved product development, sourcing the raw materials, assembling the parts, testing the end product, and shipping it to you. That way, you can think of the supply chain as an assembly line that makes possible the product that you, the consumer, want to buy.

Worldwide inputs

Historically, supply chains were simple and operated within confined geographic areas. National producers would make simple products such as wine, cloth, or bread. By and large, all the components to put together such products could be found near where the end product was consumed. However, in our modern economy, supply chains are highly complex and involve numerous producers around the globe. Think again about your phone. It could include aluminum mined in Africa, silicon produced in South America, and microchips made in Asia. The design may have been developed in North America, and it could all have been put together at a factory in Asia before it was delivered via a European shipping company.

Today firms source their inputs from all over the world to tap the most suitable components to put together their products. Several factors contributed to this development. First, technological leaps have

allowed firms to communicate seamlessly with other firms on the other side of the globe and have reduced transport costs. Second, international agreements have made trade more predictable by making it easier to enforce contracts and cheaper by reducing trade costs through lower tariffs and nontariff barriers. Third, structural reforms have allowed businesses to invest more easily in foreign factories.

These technological, institutional, and policy advances have allowed to fragment their production processes, causing a boom in the international trade of inputs for production (so-called intermediate goods). These profound changes have affected virtually every country, with both advanced and emerging market economies becoming more integrated into global supply chains as a result. The change was dramatic in the 1990s and 2000s before integration leveled off somewhat in the 2010s.

Pressure from the pandemic

In its acute phase, the pandemic caused widespread factory closures that reverberated through supply chains as intermediate inputs from closed factories became scarce elsewhere on these global assembly lines. While supply was being constrained, demand for goods rose above pre-pandemic trends as consumers stuck at home shifted their spending away from contact-intensive services (such as eating out and traveling) and toward goods allowing them to work, learn, and play at home. In other words, the pandemic caused an extraordinarily high demand for goods at a time when the world's ability to supply these goods was facing unprecedented challenges. Few links in the global supply chain were spared, and some became a regular fixture in media reports, such as widespread scarcity of semiconductors. Even ports emerged as choke points for global trade, with lines of container ships waiting outside major harbors.

For countries, participation in global supply chains during the pandemic thus came with costs and benefits. On the one hand, participation exposed countries to lockdowns and factory closures in other countries. On the other hand, participation allowed for supply of foreign goods at times when the domestic economy was hit hard by the pandemic. On balance, the evidence suggests that global supply chains adapted well during the pandemic, with countries relatively less affected filling in for countries hit harder.

What is the future of supply chains?

The supply chain disruptions in the wake of the pandemic have brought to light the importance of resilience—that is, the ability of supply chains to continue to operate even when hit by shocks. More recently, the surge of the Omicron variant and the war in Ukraine have added to uncertainty surrounding supply chains. In the wake of all this, policymakers and firms are discussing several options that could reshape supply chains:

- First, some have called for “reshoring”—that is, disintegration from global supply chains by moving foreign production back home.
- Second, some have argued for greater diversification—in other words, increasing the number of foreign suppliers for any given input, even if it entails higher costs. Unless all supplying countries are hit at the same time, this would allow producers to better withstand supply shocks.
- Third, companies could decide to hold excess inventory. A higher level of inventory would allow firms to better weather temporary supply shocks.

The shock waves from the pandemic on global supply chains have yet to settle, but the economic evidence available so far does not favor the reshoring approach. The pursuit of self-reliance would yield less efficient production, and available evidence does not suggest that it will improve resilience. The strategy is akin to putting all your supply-chain eggs in the same domestic basket. Diversification and overstocking are essentially insurance strategies. Countries and companies have to decide how high an insurance premium they are willing to pay. Indeed, having spare suppliers or carrying excess inventory is not free.

Policymakers and firms therefore face the difficult task of weighing their need for resilience against their willingness to pay for insurance. The optimal choice depends on country-specific circumstances and risk tolerance. All the same, the debate over how much or how little to integrate into global supply chains looks set to persist. Ultimately it could determine whether you are met with products or empty shelves the next time you go to the store. **FD**

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New Energy Imperative

Russia's invasion of Ukraine highlights the crisis and opportunity of the energy transition

Gernot Wagner



PHOTO: KATHARINA ROSSBOTH/DIE PRESSE

IT IS HARD TO LOOK AT A CRISIS like Russia's invasion of Ukraine and see a moment of opportunity. We—to say nothing of Ukrainians—are still very much in a crisis, and a compounding one at that, with potential long-lasting economic and political consequences.

It is similarly clear that talk of “opportunity” cuts both ways. Vested interests are often the ones that benefit the most from swift political action,

further cementing the status quo. Witness many lawmakers' tendency to respond to high energy prices with misguided attempts to lower them directly, dampening any incentives to cut fossil fuel use that high prices might provide.

Affordable energy

One big difference between the present energy price surge and previous such episodes is the availability of cheap and accessible alternatives to the current, largely fossil-fueled, infrastructure. The International Energy Agency was right to declare in 2020 that “for projects with low-cost financing that tap high-quality resources, solar [photovoltaic (PV)] is now the cheapest source of electricity in history.” That is still the case.

Solar PV prices have risen in the past two years, leading to “greenflation” entering the financial lexicon. Yet “fossilflation” dominates the picture. Prices for fossil-based power sources have risen by more than the relatively small price increases in solar PV, in turn further lowering relative solar prices per kilowatt of capacity and actual electricity produced. Overall, systems prices have come down dramatically over the years, declining by a factor of two within a decade, three within four. And solar PV, of course, is not alone.

Crucially, batteries and electric vehicle (EV) prices have similarly declined fast, leading to rapid increases in adoption. In 2016, the BP *Energy Outlook* projected that the world would surpass 70 million plug-in vehicles globally by 2035. That number now looks achievable for 2025, 10 years earlier than expected on a 20-year time horizon. Of course, any such numbers show how far there is still to go. Global PV market share stands at about 3 percent; for EVs it's not yet 2 percent. Even 70 million EVs would be less than 6 percent of today's global vehicle fleet of some 1.2 billion cars.

No serious analysis published before Vladimir Putin's invasion of Ukraine even imagined that Russia would cut off gas deliveries to the European Union altogether.

Neither PV nor EVs will make much of a difference in addressing the challenges posed by the current fossil-fueled war. Short-term measures to disentangle EU dependence on Russian oil and gas ought to focus on decreasing demand and finding alternatives to Russian supplies. That implies increasing the production of both oil and gas elsewhere. It also means short-term measures, such as avoiding the German nuclear exit scheduled for December 2022, and some other hard trade-offs—a short-term increase in European coal power production, for example. (Ironically, a good portion of coal used in the European Union also comes from Russia, compounding the challenge.)

Assessing risk

Russia's unprovoked war, and the world's reaction to it, also lays bare another, much more fundamental, issue: economic and broader energy policy analyses' inherent limited ability to inform policymakers' decisions in tackling crises such as those we now face, especially crises that overlap.

To begin with, no serious analysis published before Russian President Vladimir Putin's invasion of Ukraine even imagined that Russia would cut off gas deliveries to the European Union altogether. A deliberate EU break from Russian gas imports was considered all but impossible. For example, the European Network of Transmission System Operators for Gas (ENTSOG), charged with stress-testing the European gas network, never even considered the possibility. ENTSOG's latest stress test imagines what might happen if no Russian gas flowed through Belarus or none through Ukraine. No Russian gas at all was not part of the set of modeled scenarios. The very idea was apparently unimaginable, or so radical that

it belied any stress test. The stress on the system would simply be too large.

Economic models at the time were similarly limited. A widely cited analysis by European Central Bank economists has the promising title "Natural Gas Dependence and Risks to Euro Area Activity." Its headline conclusion: a 10 percent gas supply shock would cut euro area GDP by 0.7 percent. The hardest-hit sector? Electricity, gas, steam, and air-conditioning supply, the sector most dependent on gas as a direct input. The sector's output, thus, would fall by almost 10 percent due to a 10 percent gas supply shock. That conclusion seems reasonable at first blush. The methodology, relying on standard input-output methods, is well-established. The problem is the static nature of the analysis and the resulting status quo bias.

Benefits and costs

Heat pumps represent one of the most promising low-carbon energy technologies. They replace oil and gas furnaces and do so much more efficiently. In fact, heat pumps are so efficient that even if all electricity comes from natural gas, the resulting emissions are still lower than if natural gas were burned directly in a home's gas furnace. Heat pumps are also essentially air-conditioners run in reverse. Why then would the air-conditioning sector suffer in a scenario with less gas? Demand for heat pumps would skyrocket, something apparent all over Europe right now, with a clogged supply chain adding to inflation pressure.

That does not mean that cutting off Russian gas somehow portends an economic boom. To the contrary, there are real costs. Change is hard. But costs also imply opportunity. McKinsey's report on the net-zero transition has the promising subtitle "What It Would Cost, What It Could Bring." In short, its analysis shows costs of about

Politicians are often more interested in cementing the status quo than in bringing about necessary changes.

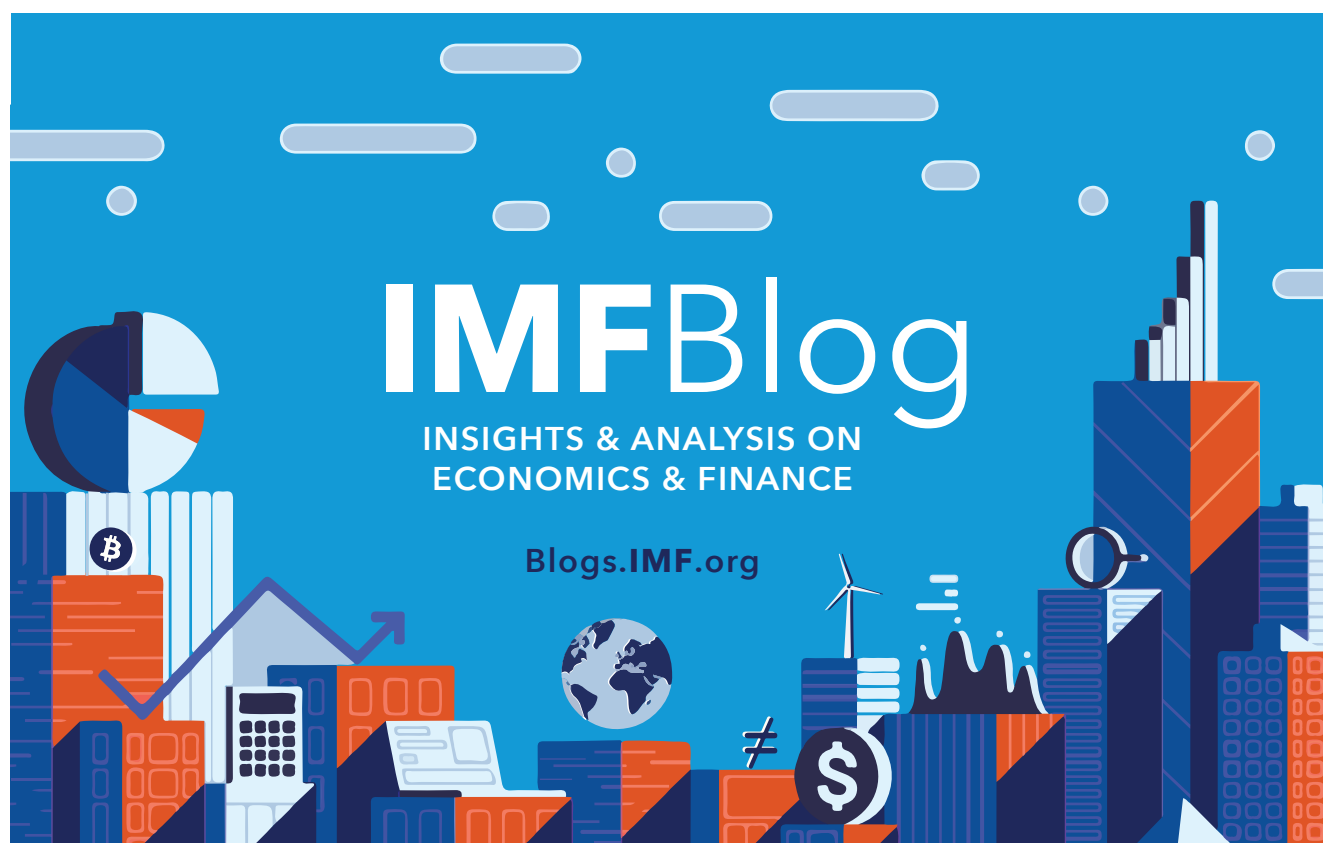
\$25 trillion over 30 years to convert the world economy from its current path to one that achieves net-zero carbon emissions by midcentury.

Establishing who should pay for these \$25 trillion investments will engender some difficult political fights. But there will indeed be plenty of winners from these additional investments, including in purely economic terms. Measured from a societal perspective, these investments pay for themselves many times over, given that fossil energy use costs more in external damages than it adds value to GDP.

Policy, thus, is key. The most important aspect: a true net-zero transition implies both the rapid deployment of new low-carbon technologies and

more significant systemic changes. The war in Ukraine has already revealed lots of missed opportunities on the policy front. Politicians are often more interested in cementing the status quo than in bringing about necessary changes, for the same reason that Niccolò Machiavelli wrote five centuries ago: “The innovator has for enemies all those who have done well under the old conditions, and lukewarm defenders in those who may do well under the new.” **FD**

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War, Peace, and Wheat

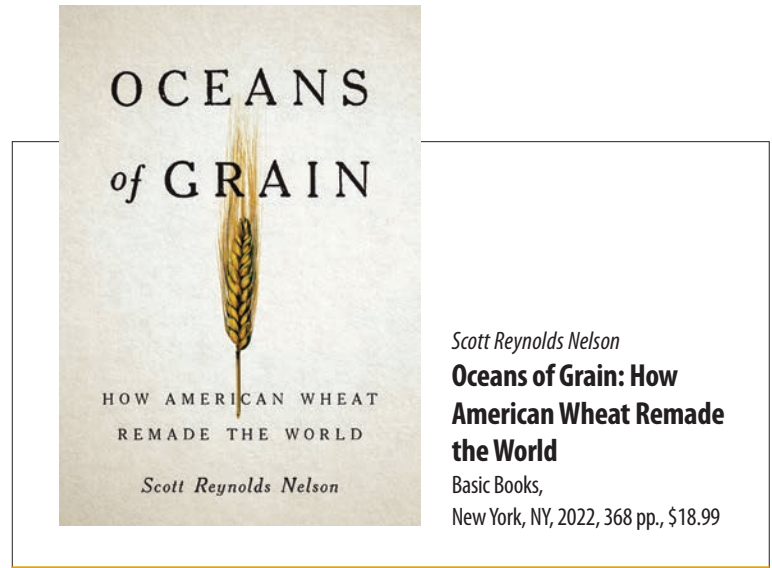
THIS PERSUASIVE ARGUMENT that wheat plays a key role in the rise and fall of empires was published two days before Russia's invasion of Ukraine sent prices for the grain soaring to a record and stirred supply fears.

War and hunger are key themes throughout Scott Reynolds Nelson's history of how wheat feeds the world. From Nelson's first research visit to Odesa in 2011, just as bread riots sparked the Arab Spring that toppled governments from Tunisia to Egypt, he pivots back 12,000 years to the genesis of Europe's breadbasket, in what are now Ukraine and Russia, and the ancient grain trade routes that later fed the continent's cities and armies.

Dense with history, politics, economics, the University of Georgia humanities professor's fifth book still remains light and engaging as it cycles through centuries of grain. Its storage and shipment weave through Athens and Constantinople and Moscow, and the founding of the Black Sea port of Odesa, with ties to other milestones, like the first quarantines and the creation of hamburgers and commercial investment banking.

This trade concentrates labor and capital in cities where food is cheap and ports are deep. Immigration, industrialization, and urbanization follow, doubling the residents of London, Paris, and Amsterdam in 1845–60. The United States rises in the 1860s, when the Civil War spurs the embrace of wheat exports to gain needed foreign exchange to fight secession, and the Union Army's struggle to feed soldiers and horses helps birth modern futures markets on the Chicago Board of Trade.

These new financial tools help create a more global food market just as US shipments boom, with thousands of ships flooding Europe with grain and bearing millions of immigrants back across the Atlantic. Meanwhile, faster travel between the world's ports, shortened by explosives used to deepen harbors and carve canals and railroads, helps end Russia's sway over global grain by giving Europe's cities cheaper food. Nelson further argues that most scholars don't recognize how much the rise of Germany and Italy, the decline of Austria



Scott Reynolds Nelson

Oceans of Grain: How American Wheat Remade the World

Basic Books,
New York, NY, 2022, 368 pp., \$18.99

and Turkey, and Europe's scramble for empire all really have to do with inexpensive foreign grain.

The book is a financial history, and the best passages chronicle international commodity markets bound increasingly together by wheat. Nelson, who notes on page 1 his obsession with the Panic of 1873, traces that agrarian crisis turned financial panic and economic slump from falling food prices and outmoded financial tools to European bank failures, a Bank of England interest rate shock, and a crisis reaching Wall Street.

The book pivots back 12,000 years to the genesis of Europe's breadbasket, in what are now Ukraine and Russia.

"Oceans of grain had flooded Europe, and the flush times in Odessa and much of central Europe had ended, sending shockwaves around the world," Nelson writes.

The story concludes a century ago, in the aftermath of Russia's revolution, but still feels comprehensively modern as it pushes readers to think more like grain traders, and to see the world not as clearly mapped nations but rather the crucial journeys of our food across oceans, rivers, and ports that really write history. **FD**

JEFF KEARNS is on the staff of *Finance & Development*.

Empowering Creators

NFTs have opened up a potentially lucrative new world for artists in developing economies

Analisa R. Bala

RICH ALLELA, like so many other artists, had his career upended by the pandemic. The Nairobi-based photographer's income quickly dried up during Kenya's partial lockdowns in 2020. He tried alternatives—affiliate marketing, YouTube videos. Nothing stuck. And then a friend introduced him to nonfungible tokens (NFTs). "It was a total game changer," says Allela. "It enabled me to have the freedom to create work again without having to think constantly about making art for money and to pay bills."

Unlike physical money and cryptocurrencies, NFTs are not interchangeable. They're like physical collector's items—only digital—of artwork, videos, music, and in-game purchases. And they've taken the art and collectibles world by storm. Crypto millionaires with Ethereum to spend can now invest directly in NFTs, keeping money within the

cryptocurrency ecosystem. Rapidly rising prices and the prospect of big returns have contributed to the boom.

Trading in NFTs hit \$17.6 billion last year, according to a report from NFT data company Nonfungible.com. Chainalysis puts the figure at more than \$40 billion.

The prices can be staggering. One of Larva Labs' CryptoPunks—a collection of 10,000 uniquely generated "punk" characters dreamt up by two creative technologists—last year sold for a whopping \$23.7 million to the CEO of Chain, a blockchain-based tech company. Commonly credited with starting the NFT craze, CryptoPunks could originally be claimed for free by anybody with a digital Ethereum wallet. Just four years later, the cheapest available is ETH 60.95 (about \$128,000 as of May 14).

However, for creators like Allela, NFTs are growing in popularity because they solve a long-standing problem: how to monetize digital artwork. For artists, photographers, animators, and others, potentially lucrative opportunities are opening up—particularly in developing economies, where content creators previously had difficulty marketing and selling in the multibillion-dollar traditional art market.

Shaking up the art world

When people create, or "mint," an NFT, they execute code stored in smart contracts that assign ownership through a unique ID and metadata. Because the information is recorded in the blockchain—a public distributed ledger—ownership can be easily verified. So even though an NFT can be copied or forged, ownership of the metadata associated with the work cannot. This is a radically important concept.

Prior to the blockchain, digital artists struggled to prove that they were the original creator of a work. The advent of NFTs changed that, upending the commercial gallery business model, which has traditionally taken the lion's share of art market profits. Artists trade directly online, typically via



PHOTO: COURTESY OF OSINACHI

Nigeria's most bankable crypto-artist, Osinachi, was one of the first from Africa to find big success in the digital art space.



NFTs displayed in a crypto virtual museum in the metaverse (a virtual or augmented reality accessed via special headsets, game consoles, etc.)

marketplaces like OpenSea or Nifty Gateway, cutting out the need for a dealer. Rather than sacrificing a hefty 40 to 50 percent to a gallery owner, they pay a small transaction fee.

Crucially, in contrast to the traditional art world, flipping is rampant. A no-no in the industry, flipping artwork is usually quashed by galleries' vetting of collectors and dealers. But with NFTs, anyone can buy, often anonymously, tempting investors to quickly resell at a profit rather than hold, as true collectors would.

Osinachi, Nigeria's most bankable digital artist, who creates his work using Microsoft Word, doesn't think this is all that bad. "In the traditional art space most times the artist doesn't even know that ownership of the work has changed," he says. "But in the NFT space, you get your royalties in real time as people are reselling and flipping."

NFTs enable artists to get a cut of any future sales, providing a degree of financial security most traditional artists don't have. When artists sell work on the blockchain they sign a self-executing agreement with the buyer that ensures royalties—often between 10 and 30 percent. For artists, "that is really big," says Osinachi. "Even when you pass on, if someone who is a relative has access to your wallet, they get royalties that would come through your work."

NFTs are not without their challenges, however. Crypto's environmental track record is dismal,

NFTs enable artists to get a cut of any future sales, providing a degree of financial security most traditional artists don't have.

and scams are rife. The most notorious is the "rug pull": creators quickly cash out after launching what appears to be a legitimate crypto project and then abscond with investors' funds. Crypto investors lost over \$2.8 billion to rug pulls last year, according to a report by Chainalysis. Cybercrime is also a real risk, ranging from account takeovers to fake marketplaces.

Allela was concerned about security when he minted his first work and encourages those thinking about entering the space to do their own research and seek out a community. He thinks there are still too few African artists in the NFT space—its complexity, difficulties building a following, and the gas fees (the cost of a transaction on the blockchain) are a hindrance. But he remains an optimist and has big ambitions for the future. In addition to digitizing his work, he now runs a company working with 157 artists across Africa to "revolutionize the African digital space," he says. "We're looking at generating \$2–\$5 million from sales this year. Just to show people it's possible." **FD**

ANALISA R. BALA is on the staff of *Finance & Development*.

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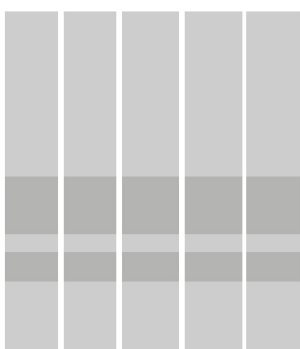


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