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FINANCE & DEVELOPMENT

INTERNATIONAL MONETARY FUND

**FINANCE**

*Old laws,  
new machines*

**SHIPPING ECONOMIST**

*Myrto Kalouptsidi  
and maritime trade*

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*A macro not just  
moral problem*

MARCH 2026

## THE DEBT RECKONING





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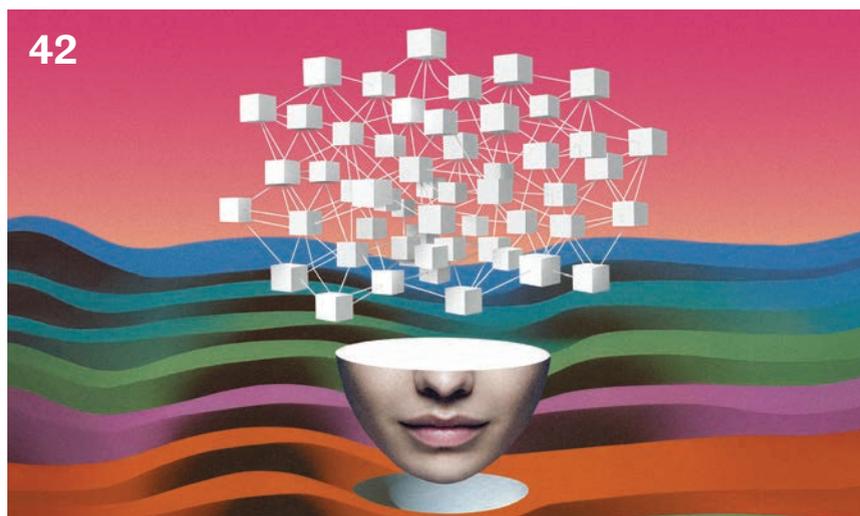
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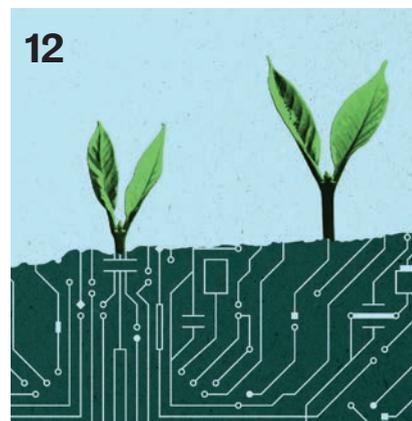
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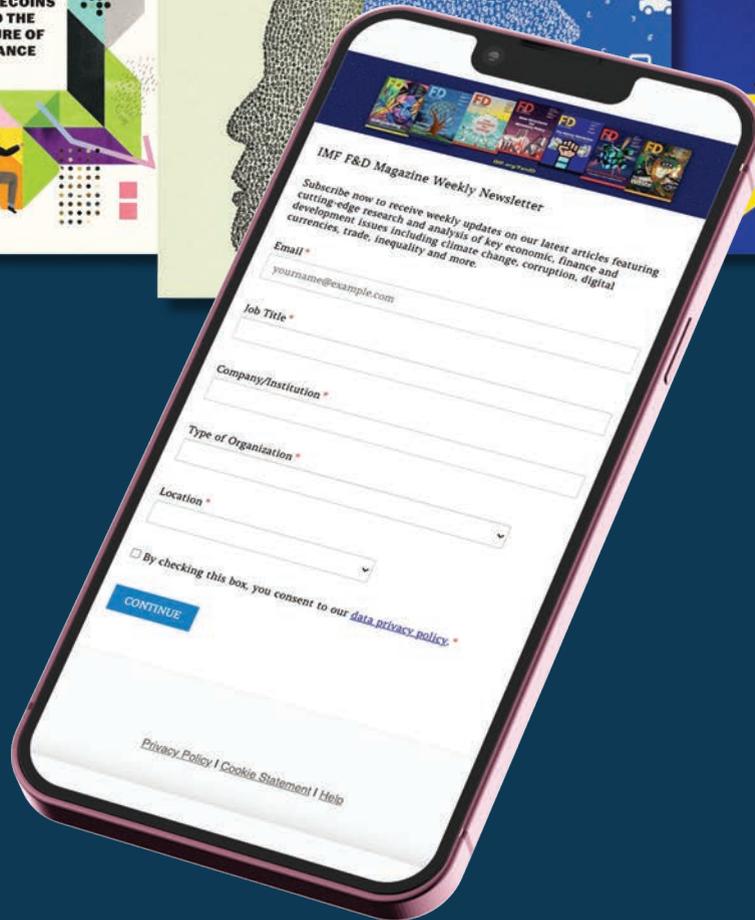
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**On the Cover**  
 Cover artist *Joey Guidone* depicts a figure peering into a debt chasm that has opened up in the world economy as government bills fall due.

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**FSC FPO**

## Editor's Letter

# Testing Debt Limits

**FOR YEARS**, policymakers have treated government debt like an elastic band that could be stretched without ever snapping. They stretched during the global financial crisis and again during the COVID-19 pandemic. Today, with public debt exceeding annual economic output in several major advanced economies, the question is: How much stretch is left for the next crisis?

Mounting debt is causing concern across the world, and with good reason, as we explore in this issue. Debt levels in several advanced economies are the highest ever reached in peacetime, driving up borrowing costs for governments and consumers alike. Rising debt and high interest rates present policymakers with difficult choices: Raise taxes, cut spending on essential services and benefits, stoke inflation—or delay the reckoning by borrowing even more and praying markets won't impose too high a premium.

All this is making the trade-offs inherent in fiscal policy increasingly tough to manage, write the IMF's Era Dabla-Norris and Rodrigo Valdes. As societies age and economies slow, pension and health care costs are rising faster than tax receipts. In many of the advanced and emerging parts of the world, these costs are borne by a shrinking workforce.

How did debt reach such dizzying levels? Considering the United States, Alan Auerbach points to growing political polarization, which blocks the bipartisan consensus required for unpopular but needed steps, like tax increases or spending cuts. In a similar vein, Alan Blinder laments the clash between economists, with their focus on efficiency, and politicians, who can't see beyond the next elections. Politicians and economists must learn to speak each other's language, he says.

Excess saving—by the rich in advanced economies and by China overall—is fueling debts and deficits to sustain economic growth, Atif Mian says. But this “indebted demand” growth model is inherently fragile, he writes.

Fixing public finances will be difficult but not impossible, write Zsolt Darvas and Jeromin Zettelmeyer. They estimate the size of the adjustment needed in advanced European economies, including France and Germany, and conclude that well-calibrated steps, such as reforms to enhance economic growth and entrench fiscal discipline, can put debt on a sustainable path without sacrificing



**“There are few elegant, easy, or politically attractive ways to reduce debt.”**

investment for the future. Greece, Ireland, and Portugal all faced severe fiscal crises 15 years ago—and are now paragons of discipline, they note.

Those are positive examples. And yet today's fraught geopolitics heightens the risk of supply disruptions that threaten stagflation and ultimately put more pressure on government finances, write Giancarlo Corsetti and Leonardo Melosi. Focusing on the relationship between fiscal and monetary authorities, they advance the provocative view that sustainable adjustment will likely require pragmatic tolerance of periods of above-target inflation.

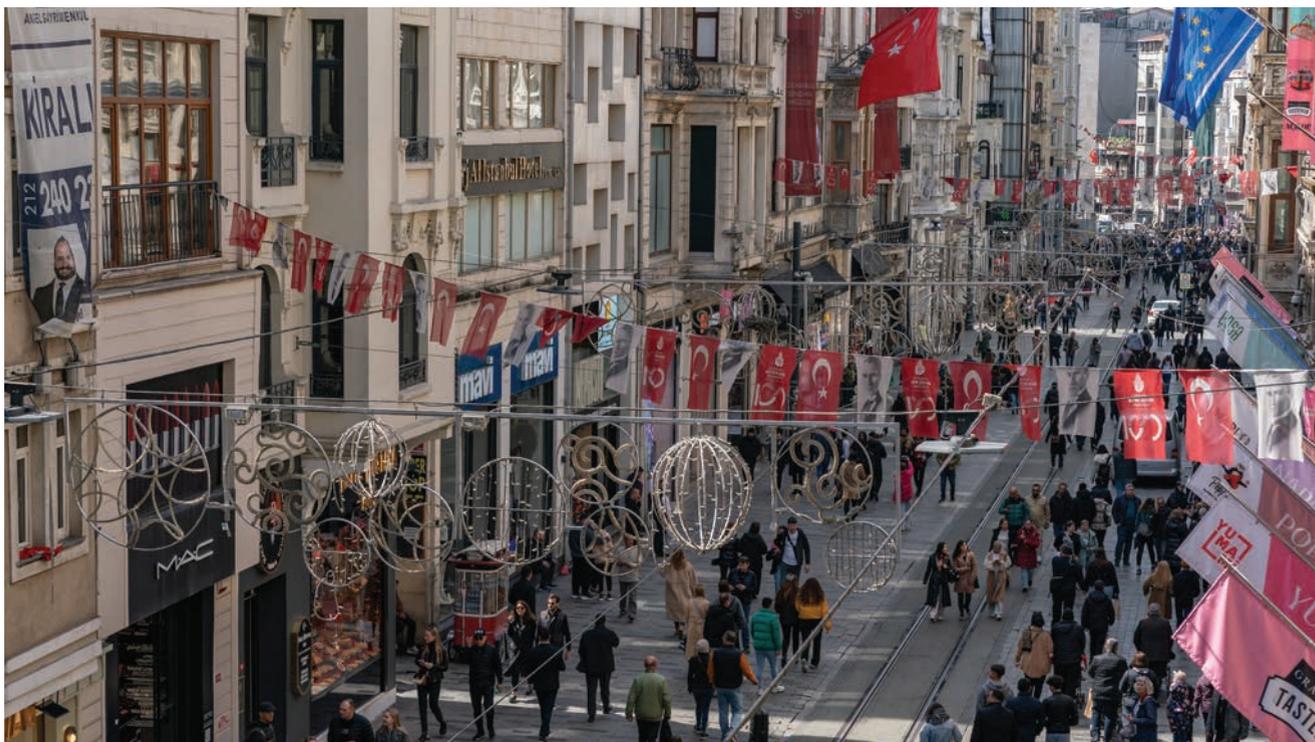
While that may not appeal, neither do the alternatives. There are few elegant, easy, or politically attractive ways to reduce debt. At the same time, “fixing public finances is not about indiscriminate austerity,” write Dabla-Norris and Valdes. History shows that people are more likely to accept painful reforms if they believe the burden is shared fairly. In that spirit, they suggest measures to make government finances more transparent, which would in turn build public trust and bridge gaps between what's politically possible and technically feasible.

Daunting as all this is, hope can be found in innovation—the next wave of technological advances could revive global growth and shrink debt burdens. Still, we cannot wait for that day to begin managing debt wisely. Discipline is urgently required. The alternative, as our contributors show, is a growing risk of economic turmoil and erosion of faith in government. **F&D**

**Gita Bhatt**, editor-in-chief

# Kaleidoscope

A global view, in brief



**THE BIG PICTURE:** Türkiye's economic prospects have been boosted by prudent policies, including a reduced budget deficit, which has slowed inflation. In January, the IMF revised up its projection for growth this year to 4.2 percent, a 0.5 percentage point increase, one of the largest upgrades among the world's major economies. Above, a view of the Istiklal Avenue shopping area in Istanbul. IMF Photo/ David Lombeida.

## Tech rewards and risks

**THE GLOBAL ECONOMY** continues to show resilience despite significant trade disruptions and heightened uncertainty, according to the IMF's latest update to its *World Economic Outlook*. Growth will hold steady at 3.3 percent this year, as artificial intelligence (AI) investment boosts US growth and benefits the rest of the world, notably Asia's tech exporters, the January report says.

Stock prices have soared since late 2022, when the first widely used generative AI tools were launched, promising greater productivity and profits. But the IMF

warns of risks to the global economy from souring sentiment if AI companies fail to deliver earnings commensurate with their lofty valuations. "Reevaluation of productivity growth expectations about AI could lead to a decline in investment and trigger an abrupt financial market correction, spreading from AI-linked companies to other segments and eroding household wealth," the report says.

Any reassessment of AI-related productivity growth and repricing of asset valuations could interact with intensifying geopolitical strains and threats to institutional frameworks to hinder the implementation of effective policies, it adds.

"The challenge for policymakers and investors alike is to balance optimism with prudence, ensuring that today's tech surge translates into sustainable, inclusive

growth rather than another boom-bust cycle," IMF chief economist Pierre-Olivier Gourinchas and financial counsellor Tobias Adrian wrote in a blog that accompanied the report.

“  
Trade and  
geopolitical tensions  
can quickly resurface  
and threaten global  
economic stability.”

—Pierre-Olivier Gourinchas,  
IMF chief economist



Overheard



“Usually in countries like mine, in countries of the Global South, the son of a poor peasant will be a poor peasant. I am determined to break the cycle of poverty. I’m determined that the son of the poorest should not be poor. They must be given equal opportunity.”

—Indonesia’s President Prabowo Subianto, speaking at the World Economic Forum in Davos.



“To realize the benefits of stablecoins you need to have effective interoperability. That’s the next regulatory frontier.”

—Dan Katz, IMF first deputy managing director, speaking at Davos.



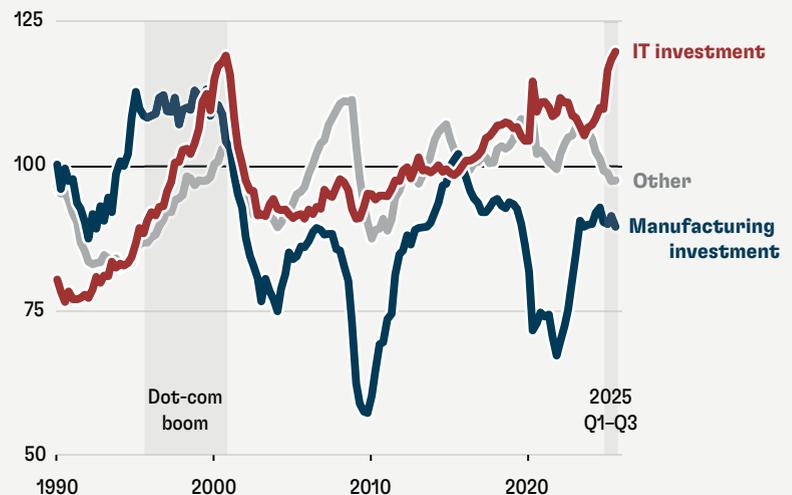
**AROUND AND ABOUT:** IMF Managing Director Kristalina Georgieva met Ukraine’s President Volodymyr Zelensky and other senior officials on a January visit to Kyiv to discuss IMF support and witness people’s resilience after almost four years of war. Above, Georgieva visits a remembrance wall for fallen soldiers. IMF Photo/Julia Kochetova.



By the numbers

US tech investment has returned to historic highs last seen in 2001

US INVESTMENT BY SECTOR IN PERCENT OF GDP, 2015:Q1 = 100



SOURCES: Haver Analytics; and IMF staff calculations. NOTE: IT investment includes information processing equipment and software. Manufacturing investment includes manufacturing structures, industrial equipment, and transportation equipment.

## Back to Basics



# The Art of Taxation

*Why raising revenue is central to development*

**Katherine Baer and Ruud de Mooij**

**ALL GOVERNMENTS** need money. Roads must be built, schools staffed, hospitals supplied, courts funded, and public safety ensured. These public goods and services form the backbone of every well-functioning economy and society. Governments can borrow or accept foreign aid, but the most sustainable source of financing is taxation.

Raising tax revenue, however, is not simply a technical exercise. Governments must strike a careful balance. On one hand, revenues must be sufficient to finance public services and fulfill public obligations. On the other hand, taxes that are too high, poorly designed, or badly administered can stifle investment, innovation, and economic growth.

This balancing act has become more difficult. Today public debt and fiscal deficits are high in many countries, even as spending needs are rising. Populations are aging, poverty remains a concern, and governments face growing pressure to invest in education, health care, digital infrastructure, and climate resilience. This requires more public resources—yet raising revenue

without snuffing out growth is a formidable challenge.

The process by which countries seek to raise public resources through taxation in a sustainable, efficient, and equitable manner is known as *domestic revenue mobilization*. It lies at the heart of development because it determines whether governments can finance their priorities, reduce dependence on external aid, and respond to shocks effectively.

Revenue mobilization is deeply political. Decisions about who pays taxes, how much, and in what form go to the core of the social contract between the state and its citizens. Since few people like paying taxes, reform requires not only sound economic design but also careful political management. Ultimately, success depends on trust—trust that the tax system is fair and that government will use revenue wisely for the public good. That is the art of taxation.

Research suggests that a useful benchmark for countries is to generate tax revenue of at least 15 percent of GDP. Below this level, government effectiveness, financial development, and economic

growth stagnate. Yet today more than 70 developing economies still collect less than 15 percent of GDP in taxes. This constrains development and leaves governments vulnerable to economic shocks.

The good news is that many developing economies have untapped revenue potential. They could raise an additional 4 to 5 percent of GDP through well-designed tax reforms, estimates suggest. Countries including Jamaica, Maldives, Morocco, Nepal, Rwanda, and Uzbekistan have demonstrated recently that meaningful gains are possible, even in challenging contexts.

### Types of tax

Over time, countries tend to move away from narrow and distortionary taxes toward those that are broader and more efficient. Historically, trade taxes such as tariffs were an important revenue source for developing economies because they were relatively easy to collect at borders. Since the mid-20th century, trade taxes have declined worldwide thanks to globalization and trade liberalization, but they still account for about one-quarter of tax revenue in many developing economies. Overreliance on tariffs, however, can discourage trade, raise consumer prices, and slow economic integration.

Modern tax systems rely more heavily on taxes on consumption, income, and wealth. Value-added tax (VAT) has become the workhorse of revenue systems around the world, generating more than one-third of total tax revenue, even in many low- and middle-income countries. VAT is relatively efficient because it taxes consumption broadly while allowing firms to deduct taxes paid on inputs, which reduces cascading effects along supply chains.

VAT is often complemented by excise taxes on goods that impose social costs, such as tobacco and alcohol, or on environmentally harmful activities, such as burning fossil fuels. These taxes can both raise revenue and improve public health or environmental outcomes.

Corporate income taxes also play an important role in developing economies, particularly as a way to tax profits of large companies and multinational corpora-

## “Even the best tax policy fails without effective implementation.”

tions. However, corporate taxation has come under pressure from international tax competition and profit shifting, where firms move profits to low-tax jurisdictions. This has made corporate tax reform increasingly complex and underscores the need for international coordination.

Personal income taxes, by contrast, typically raise relatively little revenue in developing economies. This reflects several structural factors: a small middle class, large informal sectors, widespread self-employment, and a limited formal financial sector. Still, progress is possible. In Africa, for example, personal income tax revenue has roughly doubled as a share of GDP since 2000. Strengthening these taxes is important not only for revenue but also for progressivity, as higher-income individuals pay a larger share of their income in taxes.

Finally, property taxes on land and real estate remain significantly underused in most developing economies. These taxes are difficult to avoid and can be particularly effective in raising revenue for local governments. However, they often face political resistance and administrative challenges, such as outdated property registries.

### Tax design

Good tax design aims to raise revenue while minimizing economic distortions and inequities. A central principle is neutrality: Taxes should interfere as little as possible with economic decisions about work, saving, investment, and consumption. In practice, this usually means a broad tax base combined with moderate rates.

Yet most tax systems deviate from this ideal. Governments frequently introduce exemptions, deductions, reduced rates, and special regimes—collectively known as *tax expenditures*.

While some of these provisions serve legitimate policy goals, their cumulative cost is often large, amounting to 3 to 4 percent of GDP in many countries (about a quarter of tax collections).

Not all tax expenditures are harmful. Simplified tax regimes for small businesses can reduce compliance costs; targeted tax relief for low-skilled workers may help boost employment. Problems arise when tax preferences proliferate without careful evaluation. Poorly designed exemptions can create distortions, undermine fairness, and add complexity—making it harder for governments to administer taxes and easier for taxpayers to avoid them.

Regular review and transparency are essential. Governments must ask whether each tax preference achieves its intended goal and whether it is the most effective tool available.

### From policy to practice

Even the best tax policy fails without effective implementation. Weak administration can erode revenues, undermine fairness, harm investment, and damage trust in the system.

Many developing economies struggle with limited administrative capacity and large informal sectors, where businesses and workers operate outside the tax net. Noncompliance is a major challenge, with lost VAT revenue alone costing developing economies about 3 percent of GDP on average.

Yet expanding the taxpayer registry indiscriminately is often ineffective, as many informal operators earn too little to owe tax. More successful strategies include withholding taxes collected at the source by large intermediaries, such as employers or banks; risk-based audits that focus enforcement on higher-risk taxpayers; and digitalization, including electronic filing and payment, real-time invoicing, and data analytics. Advances in digital technology, including the use of artificial intelligence, offer powerful tools to improve compliance and reduce administrative costs.

Clear and simple tax laws also matter. Complexity and frequent legal changes create uncertainty and open the door to corruption. Many countries

still need to strengthen the basics of tax administration: investing in skilled staff, modern organizational structures, and strong governance.

Experience across countries offers three broad lessons.

*First, think in systems.* The tax level, mix, design, and administration are closely linked. Isolated reforms—such as introducing a new tax without strengthening administration—rarely deliver lasting results.

*Second, be patient.* Building tax capacity takes time. Quick gains are possible through measures like withholding or inflation indexation, but sustainable improvements often require years of consistent effort. Countries that have succeeded have done so gradually, maintaining reform momentum across political cycles. Progress can easily be reversed by policy instability or crises.

*Third, international cooperation helps—but it’s not enough.* Information exchange, tax treaties, and global agreements on corporate taxation are valuable, especially in an increasingly integrated world. But they cannot substitute for strong domestic institutions. Overly high expectations of international solutions risk diverting attention from essential domestic reforms.

### Politics and trust

At its core, domestic revenue mobilization is about trust. When people see taxes as arbitrary or corrupt, compliance suffers. When they see them as a contribution to shared prosperity—financing schools, hospitals, infrastructure, and social protection—support grows. Strengthening this trust is perhaps the hardest part of domestic revenue mobilization, but also the most important.

Transparency, accountability, and clear communication are essential. In the end, paying taxes should not feel like losing private wealth, but like investing in a shared future. Only then can domestic revenue mobilization fulfill its promise as a foundation for sustainable development. **F&D**

**KATHERINE BAER** and **RUUD DE MOOIJ** are deputy directors in the IMF’s Fiscal Affairs Department.

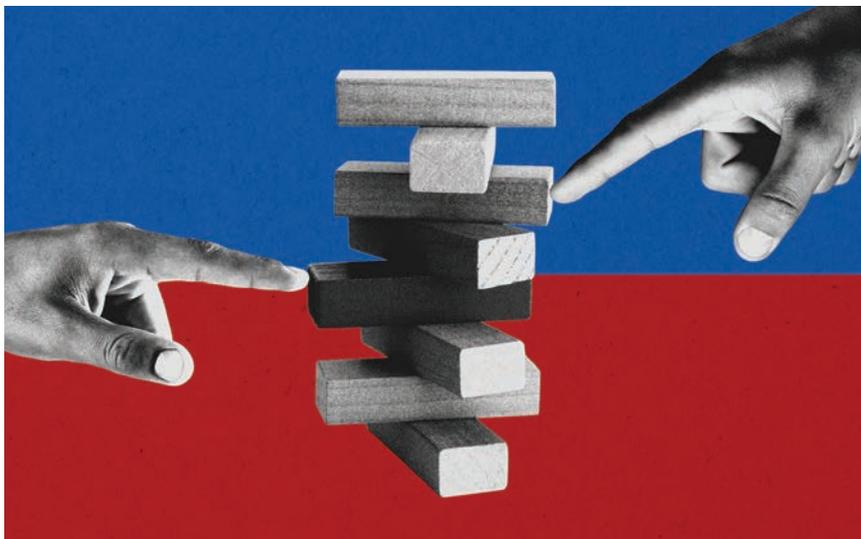
## Point of View

# America's Perilous Fiscal Path

**Alan J. Auerbach**



*It's easier to explain how the US got into its fiscal difficulties than how it will get out of them*



In 1990, US public debt stood at 43 percent of gross national product (GNP). The economy was growing only slowly, the unemployment rate exceeded 5 percent, and the Congressional Budget Office forecast that deficits would fall over the following five years, from 4.0 percent to 1.8 percent of GNP.

And yet President George H.W. Bush was so concerned about mounting national debt that he hammered out a deal with a Democratic-controlled Congress to shore up public finances. The president had campaigned on a promise to impose no new taxes, so the agreement, which comprised tax increases and spending cuts projected to save nearly \$500 billion over five years, posed a clear political risk. Voters threw him out of office two years later.

In July 2025, with US debt approaching 100 percent of gross domestic product (now the preferred measure of the economy's overall size and only slightly smaller than GNP), unemployment just over 4 percent, and deficits pro-

jected to rise from 5.5 percent to 5.9 percent of GDP by 2030, President Donald J. Trump and a Republican-controlled Congress pushed through the One Big Beautiful Bill Act, at a cost of about \$2 trillion over the next five years.

The contrast between these two episodes, 35 years apart, spotlights a remarkable shift in US attitudes toward national debt. The world's largest economy is in a precarious fiscal position, with a debt-GDP ratio poised to breach its historic post-World War II high. But unlike in 1946, there is no large peace dividend from reduced defense spending to rescue public finances. Demographic factors are pushing spending even higher through the continuing expansion of old-age entitlements, and there seems little prospect of avoiding large deficits and higher debt, even if economic conditions remain favorable.

### Major economic shocks

How did we get here? First, national debt has increased sharply because of two major economic shocks, the global financial crisis and the COVID-19 pandemic. Revenues went down and spending went up automatically as the economy weakened and government sought to offset declining incomes with large fiscal stimulus packages. Two very large shocks in little more than a decade are highly unusual. It's almost a century since the US last experienced a shock as large as the global financial crisis, during the Great Depression. But the US government then was a fraction of its current size, and its capacity to incur debt was much smaller.

A second explanation for the perilous US fiscal position is political polarization. Cutting deficits does not provide tangible short-term benefits. Politicians do not become popular by asking voters to pay higher taxes or put up with reduced transfer payments or government services. As in 1990, the key to fiscal consolidation is bipartisan agreement: Neither party can then blame the other for short-term outcomes voters may not like. Indeed,

this was the philosophy behind the 2010 establishment of the National Commission on Fiscal Responsibility and Reform, more commonly known as the Simpson-Bowles Commission, cochaired by a Republican and a Democrat.

With the parties now further apart, it's more difficult for them to come to an agreement. The tax increases that Democrats want are unacceptable to Republicans, and Democrats are just as opposed to the spending cuts that Republicans want. Even though the fiscal picture is much worse than in 2010, when policymakers ultimately ignored the Simpson-Bowles Commission's recommendations, today there is no prospect of another bipartisan attempt to solve the fiscal problem.

### No observable damage

Another explanation for the loss of concern about deficits is the lack of observable damage. Policymakers traditionally make the case to voters for fiscal consolidation by arguing that higher national debt raises interest rates. This imposes a heavier debt-service burden on the government itself but also raises costs for households when they borrow to buy a home or a car. Empirical evidence confirms that higher national debt does indeed increase interest rates, but other factors have until very recently pushed interest rates steadily lower, continually defying predictions.

In the two decades from 2001 to 2021, as the US debt-GDP ratio more than tripled, debt service actually fell as a share of GDP, from 2.0 percent to 1.5 percent. The decline in interest rates was so pronounced that it more than offset the huge debt increase. Today politicians rarely warn of the effects of debt on interest rates—just as debt service has begun growing sharply again. And even without higher interest rates, the sharp rise in debt has already caused economic damage, notably by increasing the US external imbalance and potentially crowding out productive domestic private investment. But these costs are more subtle and harder to communicate.

Unfortunately, it's easier to explain how we got into the present fiscal situation than how we will get out of it. Some

**“Some project that the US debt-GDP ratio will nearly double in size over the next three decades.”**

project that the US debt-GDP ratio will nearly double in size over the next three decades. This may compromise access to capital markets—even for a traditional safe haven economy. Before then, the ability of the government to incur massive debt over a short period of time, as it did during the global financial crisis and the COVID pandemic, is questionable. We don't know if we will still have the fiscal space to act forcefully.

### Distinct fiscal futures

In Ernest Hemingway's novel *The Sun Also Rises*, a character is asked how he went bankrupt. “Two ways,” he answers. “Gradually, then suddenly.” One can imagine two distinct scenarios in which the US follows similar fiscal paths.

On the gradual path, national debt and interest rates continue to rise and debt service accounts for an ever-increasing share of government revenues. As this squeezes out other spending, the political opposition to fiscal reform might eventually weaken so that a compromise can be found. But the government could also simply speed up borrowing to stave off budget cuts.

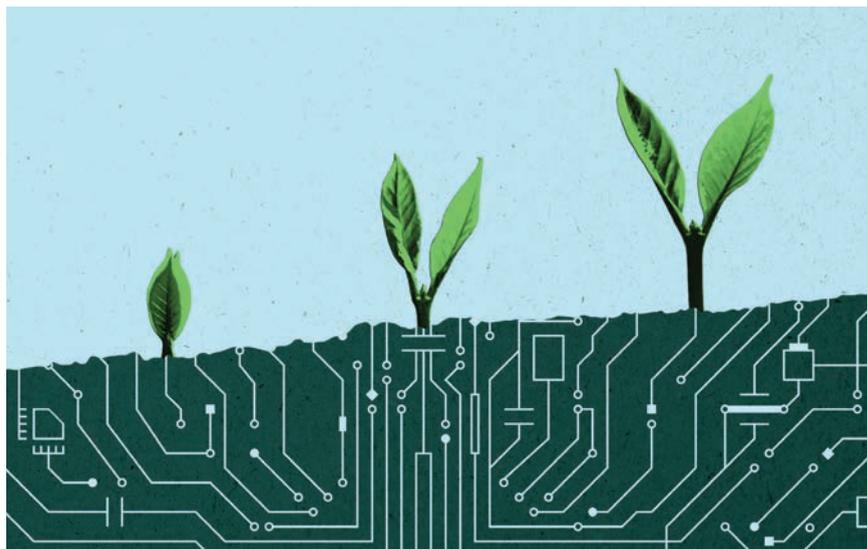
Further impetus to act might come from the impending exhaustion of the Social Security and Medicare trust funds, projected to occur within the next decade, which will require some sort of action to avoid large, legally mandated benefit

reductions. The response could include tax increases, benefit cuts, or both, as happened in 1983, the last time trust fund exhaustion was imminent. But the trust funds could also be bailed out simply through additional borrowing. The latter may be more likely this time, given the change in political climate.

Unless an agreement to act is reached in the coming years, the sudden path would follow the current trajectory until it is simply too expensive to borrow. Such an outcome seems far away at this point. The problem of unsustainable debt currently plagues many leading economies, and in this environment, the US may remain a safer haven for some time, providing an ever-larger supply of the assets world investors demand.

The US has a strong economy that could accommodate reforms to taxes and spending to achieve fiscal sustainability. There is no shortage of ideas to help shape such reforms. For the immediate future, though, it's hard to bet against a long, steady worsening of fiscal problems without a political realignment and restoration of the possibility of bipartisan action. **F&D**

**ALAN J. AUERBACH** is Professor of the Graduate School, Robert D. Burch Professor of Economics and Law, Emeritus, and former director of the Burch Center for Tax Policy and Public Finance, at the University of California, Berkeley.



# AI Can Lift Global Growth

**Marcello Estevão**



*But lasting productivity benefits depend on how fast we learn to measure, finance, and govern it*

Artificial intelligence is the defining driver of global economic conversation—and, increasingly, of economic growth itself. In the United States, AI-related investment now accounts for a large share of GDP growth, fueling new demand for servers, data centers, software, and power infrastructure. Policymakers are scrambling to understand what this means: Is the world witnessing a short-lived investment bubble or a lasting productivity boom comparable to the IT revolution of the 1990s?

The US economy, the world's largest and still at the center of the global business cycle, has entered a two-speed expansion. AI-intensive sectors are racing ahead, while construction, manufacturing, and industries that are sensitive to interest rates are falling behind. According to the Bureau of Economic Analysis, investment in information-processing equipment and software grew by 16.5 percent from a year earlier in the third quarter of 2025. Stripped of AI, GDP would have been markedly weaker.

This pattern has global echoes. Growth in Europe and Japan has stabilized but remains dependent on loose monetary policy. Emerging markets have benefited from lower

yields and a weaker dollar, but their growth impulses increasingly depend on technology-related investment and capital inflows. Global growth has not collapsed—but it's increasingly concentrated in narrow sectors and regions.

What makes the current AI wave unusual is its capital intensity. Training large language models and deploying generative systems require vast computing power and physical infrastructure. AI is more like electricity—an enabling technology that requires continuous investment in grids, hardware, and complementary assets—than other recent innovations such as social media or digital commerce, which grew on preexisting networks. To match global demand, data centers worldwide may require \$6.7 trillion in capital expenditure by 2030, estimates suggest.

## Measuring immeasurables

This investment boom is transforming the structure of the economy—but also revealing how poorly our measurement systems capture intangible capital. National accounts were designed for an industrial age when factories and machinery dominated. Today, value increasingly resides in data, algorithms, proprietary models, and cloud infrastructure.

Official statistics record part of this shift—software and R&D, for example—but miss much of what drives productivity. The costs of training large models, refining datasets, and creating new applications are often expensed rather than capitalized. Even semiconductors, central to the AI ecosystem, are treated as intermediate goods rather than as carriers of embedded intellectual property.

As a result, GDP data simultaneously overstate the immediate contribution of AI (by counting massive capital outlays) and understate its broader economic impact (by missing the productivity spillovers). This is the same statistical paradox that masked the early productivity gains of the IT revolution. When measurement lags reality, policymakers risk misreading the economy—tightening too much because apparent slack seems small or easing too soon because

## “Data centers worldwide may require \$6.7 trillion in capital expenditure by 2030.”

inflation looks demand-driven, when it may reflect structural change.

The Federal Reserve, for example, now faces a more complex policy landscape. If AI adoption quietly raises potential output, the economy may be running less hot than headline data imply. Conversely, the surge in electricity demand and infrastructure bottlenecks could set a new floor for inflation. Misjudging either side could mean policy errors in both directions.

### New geographies

AI's rise is also redrawing trade and capital-flow patterns. Imports and exports of computers, servers, and semiconductors have surged, signaling a global reallocation of supply chains. Manufacturing and assembly are shifting toward Southeast Asia, India, and specialized US hubs such as Texas and the Gulf Coast.

This re-regionalization is not de-globalization; it's a new geography of interdependence. The US and China remain dominant players, with Europe seeking to catch up through industrial policy and investment incentives. For many emerging markets, AI demand is already translating into exports and foreign direct investment—particularly in energy and component manufacturing—but also into vulnerability to technological and geopolitical shocks.

Capital flows increasingly follow the map of AI infrastructure. Equity markets have rewarded hyperscalers—the handful of firms building and financing the global computing backbone—with valuations and cash flows unseen since the dot-com era. As a result, a small group of tech giants now accounts for a disproportionate share of global AI-related capital expenditure and productivity expectations.

Research by the Institute of International Finance reveals a distinction between digital participation (the use of imported digital tools) and digital depth (the ability to produce and export

digital goods and services and embed them in domestic value chains). Emerging markets with digital depth—China, India, Korea, and a smaller group of specialized hubs—are attracting more stable foreign direct investment linked to AI-era production. Their export profiles show rising shares of information and communications technology services, royalties, and digital content. Others remain primarily consumers of imported technologies and therefore rely more heavily on volatile portfolio flows driven by global liquidity cycles.

As AI becomes central to economic activity, digital depth may play a role in capital flow dynamics comparable to fiscal credibility or exchange-rate regimes—an underappreciated channel that global policymakers will need to monitor closely.

The scale of computing power required for AI training and inference has made electricity generation and grid capacity critical macroeconomic variables.

The macroeconomic implications are profound. Energy bottlenecks could delay AI diffusion, anchor a higher level of core inflation, and generate localized overheating even as other sectors remain weak. Grid investment is becoming a central supply-side constraint, blurring the line between industrial and macroeconomic policy.

### Diffusion or concentration?

The deeper question is whether the AI boom will translate into broad-based productivity growth or remain confined to a narrow set of businesses and industries. History suggests that the payoff from general purpose technologies comes only after years of complementary investment—in skills, management practices, and institutional adaptation. Electricity and IT took decades to diffuse widely enough to raise aggregate productivity.

If AI adoption remains concentrated among hyperscalers and specialized ser-

vice providers, the returns may plateau quickly, leaving the economy vulnerable once the investment cycle peaks. But if AI applications spread across industries, the potential for a sustained lift in potential output becomes real. Corporate surveys suggest diffusion is underway but uneven. While many firms are experimenting with AI, only a smaller group is implementing it at scale.

The risk is that diffusion will collide with inadequate infrastructure and outdated statistics. The mismatch between rapid technological change and slow policy adaptation could make the next few years unusually volatile. Growth could oscillate between bursts of investment and pauses for adjustment while policymakers struggle to interpret what the numbers mean.

### Behind the numbers

The AI boom is unfolding against a backdrop of global uncertainty. Tariff wars, immigration restrictions, and fiscal imbalances have left the world economy more fragmented and less predictable. In this environment, AI stands out not just as a technological story but as a macroeconomic stabilizer—one of the few genuine sources of incremental demand and optimism.

Yet this narrow engine cannot carry the entire global economy indefinitely. The US expansion remains capital-heavy and employment-light. Europe risks missing out unless it retools its industrial and digital policy. Emerging markets must balance opportunity with prudence, ensuring that cheap energy or favorable regulation does not substitute for long-term competitiveness.

Policymakers and statisticians must move faster. Measurement frameworks must evolve to capture intangible capital; fiscal and monetary tools must account for sectoral divergence and new supply constraints; and international cooperation must ensure that the benefits of AI diffusion are not confined to a few economies. **F&D**

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# Worlds Apart

Alan S. Blinder



*There are ways to narrow the gap between economics and politics*



The chronic clash between sound economics and good politics frustrates economists who venture near the political world. Much more important, it often blocks the road to better policy. The chasm is wide and won't be fully bridged. But with much effort and a modicum of goodwill, we may be able to shrink it.

Let me start by dispelling a myth. Perhaps because economists are frequently trotted out to support or oppose policies, perhaps because we have a Council of Economic Advisers right in the White House, perhaps because most powerful central banks are dominated by economic thinking, many people believe that economists have enormous influence on public policy. In truth, they don't.

In a book seven years ago, I argue that economic policymaking often adheres to the Lamppost Theory: Politicians use economics the way a drunk uses a lamppost—for support, not illumination. Economists and politicians—by which I mean not only politicians, but the entourage of advisors and message meisters who surround them—hail from different civilizations. They speak different languages. They define success differently. They have dramatically different time horizons. They even employ different logic.

## Political logic

I once thought “political logic” was an oxymoron. Many economists still do. But I've learned there is a logic in politics that I'll illustrate with a trivially simple arithmetic example.

Imagine a tax break that would yield \$1 million in gains for each of 10 people but cost 20 million people \$1 apiece. Economic logic clearly counts this as bad policy. To pursue it, there would have to be some persuasive non-economic reason.

But political logic is different. The 20 million people who lose \$1 apiece will barely notice. The 10 million-dollar winners, by contrast, will not only notice this newfound largesse but will be grateful to the politicians who bestowed it. To the politicians, the gains in terms of support, campaign contributions, and the like will dwarf any political losses. Only the most highly principled politician would resist such a trade-off.

This illustrates why so many policy decisions seem so wrong to economists, not just in tax policy, but also in trade policy, regulation, antitrust, and many other areas. It would not help much, by the way, if the politicians understood economics better. Economic and political logic often point in opposite directions, and politicians will follow the latter.

## A suggestion for politicians

Can we at least narrow the gap between the two worlds? Can we get politicians to put a bit more weight on the economic merits? Can we get economists to understand the political world a bit better? I think—or hope—we can. I am not naive about this. I realize that economists must do most of the changing. So I'll suggest one change for politicians and two for economists.

Politicians often can't see past the next election, but the truth is far worse. The political pros who advise politicians often can't see past the next opinion poll, or even the next tweet. Their time horizon extends only until that evening's news broadcasts, if that long.

But getting politicians to think longer term may not be hopeless. After all, politicians are adaptable. If they can be persuaded that current political habits are

counterproductive, they may change their ways—not because of a sudden burst of idealism, but because they want to win elections.

One fortunate fact is that a US president's four-year term is long enough for the major effects of most economic policies to be felt. So sound economic policies enacted during, say, the president's first year or two in office are likely to show major benefits before the next presidential election. Within that window, good economics can also be good politics.

Of course, this happy coincidence in time shrinks as the president's term progresses. But that's where the crazy US electoral calendar comes to the rescue. By the 18th month of a new presidency, attention turns to midterm congressional elections. After that, midterm losses typically make it hard for the president's party to push major initiatives through Congress. Instead, political minds turn away from policy and toward the next presidential election. Put all that together, and you see that the policy phase of a new presidential term rarely lasts more than 12–18 months. During that brief period, economic and political time horizons arguably dovetail reasonably well.

### And two for economists

What about the minority of economists who wish to get involved in policy? I have two suggestions to offer here. Both cut deeply against the grain. They are *not* what we teach in graduate school.

The first pertains to time horizons again. Political time horizons are too short for sound economic policy. But it's also true that economists' time horizons are often too long for politics.

Economists typically focus on the “equilibrium” or “steady-state” effects of a policy change. What will happen *eventually* after households and businesses adjust to a change in the tax code or a trade agreement? Those questions are important and pertinent to policymaking, but they are close to irrelevant in the political world because people don't live in equilibrium states. We spend most of our lives in one *transition* or another. Economists often brush off “transition costs” as fleeting details of little importance. They shouldn't.

## “Economists should pay more attention to fairness rather than doting almost exclusively on efficiency.”

Trade agreements are a good example. With some exceptions, trade theory compares one full-employment steady-state equilibrium with another. David Ricardo taught us over 200 years ago that the free-trade equilibrium is better for society as a whole (although not necessarily better for every person in society) than the equilibrium with trade protection. He was right, which is why almost all economists are free traders at heart.

But adjustment to the superior free-trade equilibrium may be lengthy and painful, involving job losses, reduced incomes for some, decimated communities, and more. Economists know all this but don't pay it sufficient heed. Politicians, by contrast, live in the real world of ever-present transition costs. They may not be in office long enough to enjoy the equilibrium benefits.

Should economists therefore embrace protectionism and the stasis that goes with it? Far from it. I use the trade example to argue a general point: Economists should spend a lot more time and effort thinking about possibly painful transition costs, and how to mitigate them, and think more about what happens before the vaunted steady-state effects arrive.

My second suggestion is that economists should pay more attention to fairness rather than doting almost exclusively on efficiency. In politics, perceived fairness almost always trumps efficiency. Politicos understand that, which is one reason economic policy is often so manifestly inefficient.

In writing this, I risk losing my economist's license. We do, after all, worship at the altar of efficiency for a good reason: Greater efficiency enlarges the economic pie. It's as close as we can get to a free lunch. So I am *not* recommending abandoning efficiency as a guidepost, only that we temper our worship of efficiency with more respect for political feasibility—which often hinges on perceived fairness.

Think of debates over the tax code, which are hardy perennials in legislatures around the world. Economists' beautiful theory of optimal taxation is built around maximum efficiency. But that theory plays no role in legislative debates. Discussions of fairness, on the other hand, dominate the debates. And we get the tax mess that we have.

### Nibbling at the edges

So here's my advice to economists interested in actual—as opposed to theoretical—policymaking. Don't forget about efficiency. It matters. We are right about that. But we may have to content ourselves with nibbling around the edges, below the political headline level, to make the details of a complex policy package less inefficient. Call it the theory of the third or fourth best. We may have to settle for that. **F&D**

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# THE RACE FOR AI-READY WORKERS

*National success in the AI age isn't just about technology, it's about workforces ready to use it*

**AS AI TRANSFORMS WORK**, countries aren't just rushing to build data centers and better algorithms, they're racing to build smarter labor markets. Demand for new and digital skills is accelerating: One in ten job postings in advanced economies, and one in twenty in emerging markets, now requires at least one new skill. Employers are willing to pay for it: US and UK job postings seeking new skills tend to offer wage premiums of about 3 percent, and up to 15 percent for those listing multiple new capabilities. That payoff underscores the value of staying ahead of the skill curve.

But some countries are better prepared than others. The IMF's Skill Readiness Index reveals which economies are best positioned for the future. Of the 23 countries with available data, Ireland, Finland, and Denmark lead the pack, combining high shares of tech graduates with strong adult literacy and retraining systems. Their challenge now is not just to produce talent, but to absorb it. These countries must foster innovation and expand high-skill job creation so that their investments in education translate into broad opportunity.

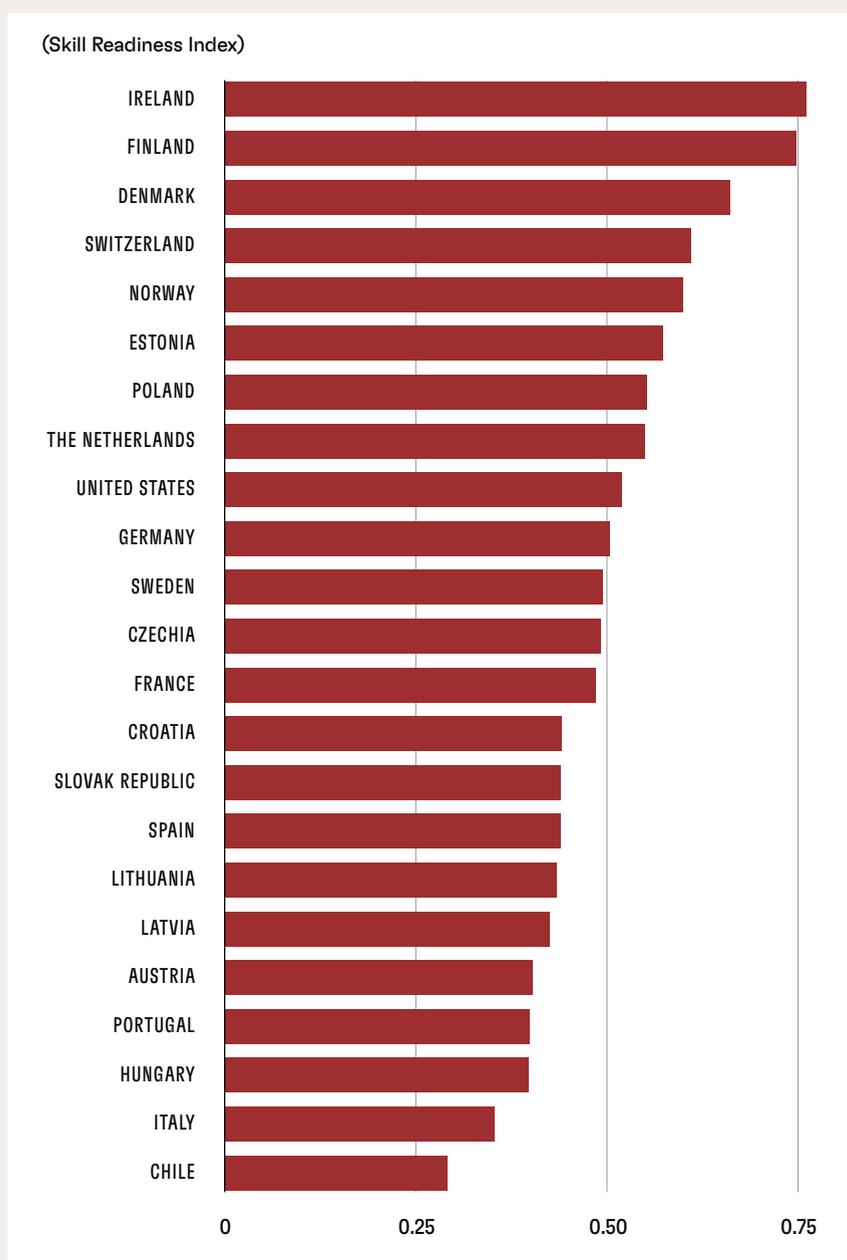
Others face the opposite obstacle. Countries like Sweden and The Netherlands show robust demand for new skills but lack trained workers to meet that demand. Policies must focus on boosting talent pipelines, through expanded education and reskilling.

Ultimately, the countries that both prepare workers and create the necessary conditions for business to absorb those skills will be best placed to thrive in the AI economy. **F&D**

*This article draws on the IMF Staff Discussion Note Bridging Skill Gaps for the Future: New Jobs Creation in the AI Age (January 2026).*

## Prepared to compete

Northern Europe leads in preparing workers with emerging skills.



SOURCES: International Labour Organization; Lightcast; Organisation for Economic Co-operation and Development; and IMF staff calculations.

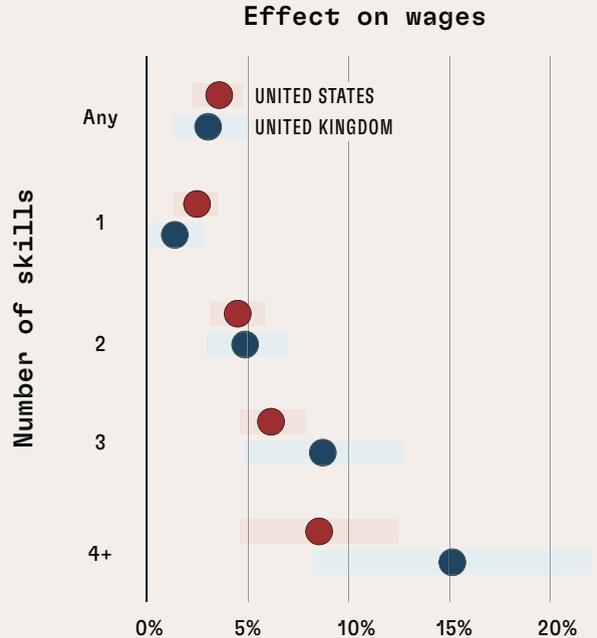
NOTE: Index reflects countries' capacity to train and equip workers with new skills.

## Charting readiness

The scatterplot below shows that many northern and western European countries combine strong demand for new skills with a solid supply of graduates trained in emerging fields, placing them in the chart's upper-right quadrant. These countries are among the best positioned to compete in an AI-driven economy.

The pink and white shading reflects the relative balance between supply and demand, benchmarked to the United States. This balance highlights different policy priorities: Some must absorb surplus talent (white); others need to expand training pipelines (pink).

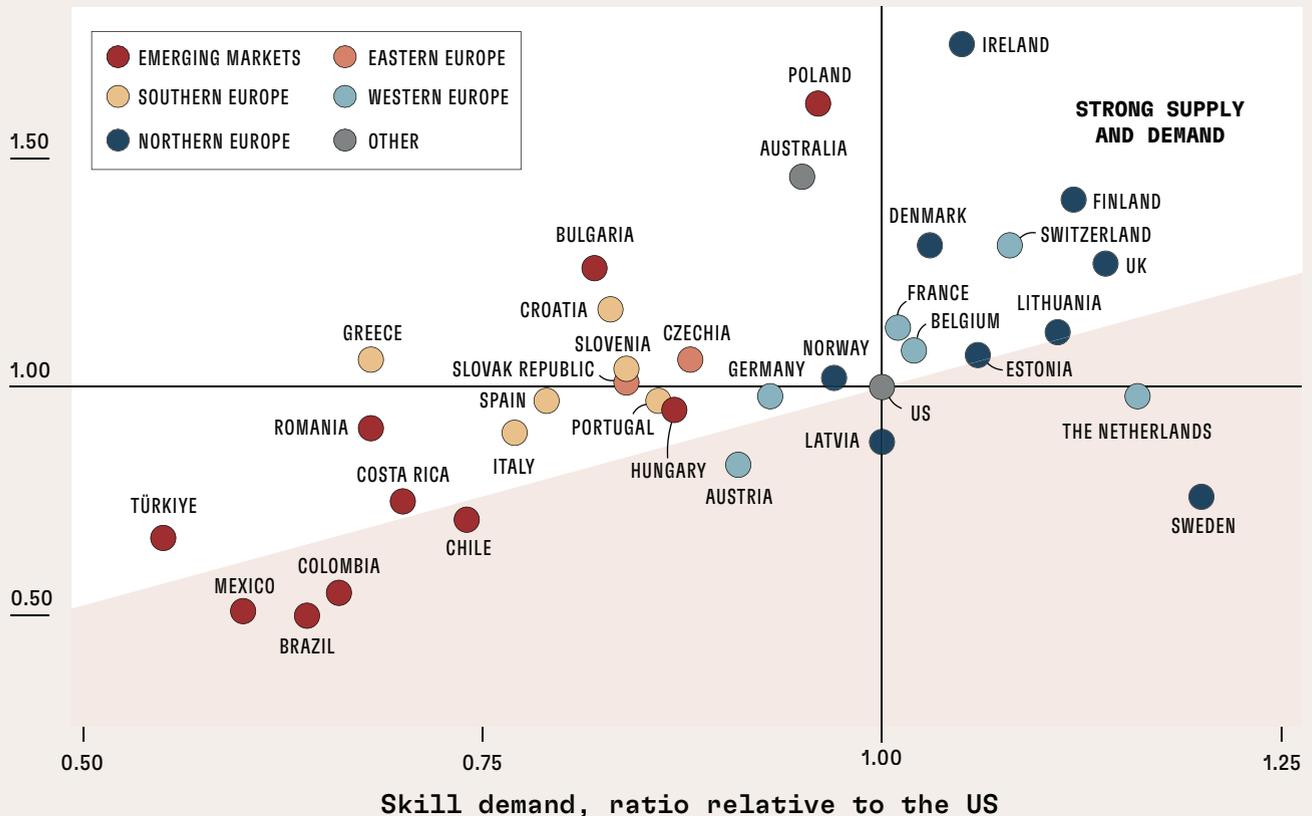
On the right, UK and US wage data show that jobs listing new skills can pay up to 15 percent more.



## New skill supply vs. demand

□ HIGHER SKILL SUPPLY RELATIVE TO DEMAND    □ HIGHER SKILL DEMAND RELATIVE TO SUPPLY

### Share of graduates with new skills, ratio relative to the US



**SOURCES:** International Labour Organization; Lightcast; Organisation for Economic Co-operation and Development; and IMF staff calculations. **NOTE:** Wage data reflect 2020–24 regressions for job postings. Shading shows 95% confidence intervals. Scatterplot compares projected share of vacancies listing new skills (projected demand) with share of graduates trained in fields associated with new skills (projected supply), using the United States as a benchmark. Excluded from view: Luxembourg (1.51; 0.32).

# HIGH DEBT, HARD CHOICES





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Mounting public debt and rising interest rates are stretching finances and forcing difficult decisions

**Era Dabla-Norris and Rodrigo Valdes**

**F**iscal policy has always involved trade-offs. Whose priorities will be financed? Whose burdens will be deferred? Under what conditions? Until recently, governments could postpone these choices by borrowing on convenient terms. But now, unprecedented debt levels and higher borrowing costs have raised the stakes. At the same time, demand for public funds is growing even as resources are stretched thin. Societies can reconcile competing priorities successfully only if they depend on something often overlooked and currently in short supply: public trust.

Even before the COVID-19 pandemic, public debt was climbing steadily. In many democracies, political platforms favored higher spending and deficits while deferring structural reforms (Cao, Dabla-Norris, and Di Grigorio 2024). Modest economic growth, spending to care for a swelling elderly population, and reluctance to raise taxes just made things worse. Hard choices were put off, and debt accumulated, sustained by the unusually low interest rates of the past two decades.

Then, in 2020, faced with the worst economic collapse since the Great Depression, governments began to borrow extensively. Advanced economy debt jumped by tens of percentage points of GDP; in some countries it exceeded 120 percent (see Chart 1). Emerging market and low-income countries, though more constrained, also borrowed heavily. The response averted a deeper catastrophe, and while debt levels have since stabilized in many cases, countries now face a world where borrowing is no longer cheap.

Today, policymakers face the fiscal version of long COVID—higher interest rates and rising debt costs. Global public debt climbed to 93.9 percent of GDP in 2025 and is on track to breach 100 percent by 2028—levels never seen in peacetime—marking a turning point for economic policy and politics. Meanwhile, long-term structural forces—aging populations, climate change, rising social demands, and, for low-income countries, declining aid flows and persistently high borrowing costs—continue to bear down on budgets even as emerging geopolitical tensions exert pressure to spend on defense and industrial policy.

## Debt burden

The era of ultra-low interest rates has ended, but economic growth trends have not changed appreciably. Within a short span, borrowing costs have doubled or tripled. Interest bills now take a larger bite out of budgets, crowding out other priorities. In the US, for example, net interest payments climbed

from about 2 percent of GDP before the pandemic to 4.2 percent in 2025—surpassing defense spending—and are set to rise further. In low-income countries, interest payments consume 21 percent of tax revenues on average.

High debt means less room to respond to shocks, interferes with the broader economy by raising the cost of capital, and complicates monetary policy-making while motivating financial repression. It can also threaten financial stability, especially in emerging markets, if yields rise as investors begin to doubt government's ability to make good on its obligations. As financing conditions tighten, adjustments can become sharper and more sudden—recalling German 20th century economist Rudi Dornbusch's insight that "crises take much longer to happen than you think, and then they happen faster than you thought they could." And high debt shifts national income toward creditors at the expense of other needs.

In a low-debt, low-rate world, governments could sidestep hard choices by borrowing more and hoping economic growth would generate enough additional tax revenue to service and eventually repay the debt. But today, the era of easy choices is over. Every dollar a government borrows without matching revenue implies higher taxes or lower spending in the future, at least to cover the additional interest the new debt generates. Beyond a certain point, more borrowing forces painful decisions—through austerity, inflation, financial repression, or even default. The question becomes unavoidable: With limited fiscal space, what will be the trade-offs, and who will bear the cost?

## Fiscal predicament

One enduring trade-off centers on the size of government. Rising living standards have led citizens to expect reliable social safety nets, affordable education and health care, robust public investment, and protection against a growing range of risks, including extreme weather and pandemics. Advanced economies greatly expanded their welfare states following World War II; many did so again after the global financial crisis of 2008 and in response to COVID-19. Emerging market economies face strong pressure to strengthen their more modest safety nets as citizens demand growth with equity. The problem is that the appetite for benefits usually exceeds societies' willingness to mobilize revenue. And decisions to lower taxes are not always followed by spending restraint. Governments cannot provide Nordic-level benefits without Nordic-level taxation, and even with such taxes,

aging and other pressures challenge the arithmetic.

Balancing credibility and flexibility poses another dilemma. Governments need room to respond to shocks, yet they must also reassure markets and citizens that debt will remain under control. Rigid fiscal rules—such as an overly binding debt ceiling—or cutting spending and raising taxes too quickly can deepen recessions, and ignoring deficits can trigger a market backlash, as happened during the euro area debt crisis. The challenge is solid commitment to sustainability without straitjacketing policy. This calls for credible medium-term fiscal anchors with escape clauses for rare shocks; transparent plans that prioritize investment while protecting the vulnerable; and institutional frameworks that build confidence without undermining the government’s capacity to respond to severe downturns. Getting this balance right has never been more important—or more difficult.

A third conundrum is whether to invest now or conserve firepower for later. Pressing needs—national security, resilience to shocks, climate transition, social inclusion, and development—demand resources. But every dollar spent today means a thinner cushion for the next crisis. In a world of frequent shocks, the trade-off is harsh. Countries that exhaust borrowing capacity in good times will find themselves dangerously exposed when the next recession or disaster strikes. It’s not about planning around best-case scenarios but designing fiscal strategies that are workable when surprises hit: It pays to hold something back when the next crisis may be just around the corner.

Each budget decision now has explicit winners, losers, and timing—and the political economy of those choices has grown more complicated. Who or what gets priority? Which taxes will fund it, and which programs must give way? These questions can no longer be papered over with new debt. They must be answered clearly, and that is proving to be a formidable challenge.

### Intergenerational challenges

High public debt is more than a macroeconomic concern; it is also a question of fairness across generations. In the words of the 18th century statesman Edmund Burke, “Society is a partnership... between those who are living, those who are dead, and those who are to be born.” Debt makes it possible to finance growth-enhancing projects, cushion a shock, or spread costs more evenly over time. But persistent deficits are financed with debt that tomorrow’s workers and taxpayers must service. When the debt is large and interest rates rise, more

“Countries that exhaust borrowing capacity in good times will find themselves dangerously exposed when the next recession or disaster strikes.”

public resources flow to bondholders than to public goods. That transfer continues as long as the debt remains—and grows larger if borrowing continues.

Demographics intensify the challenge in two ways. As societies age, the cost of providing pensions and health care begins to grow faster than tax revenue. And where birth rates collapse, these costs are borne by a shrinking workforce. Advanced economies now have about three workers per retiree, down from roughly four in 2000, and the number is heading toward two workers by 2050 (OECD 2025). Moreover, many pension and health care obligations remain off the government’s balance sheet, and as populations age, these implicit liabilities surface in budgets, often with destabilizing force. That poses difficult choices: Raise taxes, lower benefits, or keep borrowing and simply delay the reckoning.

The longer tough decisions are postponed, the more abrupt and onerous the adjustment when creditors or fiscal reality finally forces action. And worse, the bill falls to fewer people. Meanwhile, transfers and other current spending and debt service can crowd out investment in education, technology, and infrastructure, eroding the prosperity of the next generation. The political economy magnifies the challenge. Current voters resist cuts to earned or promised benefits, and older voters can form an especially powerful electoral bloc.

Politicians, tempted to avoid unpopular measures like raising retirement ages, trimming benefits, or broadening the tax base, let debt take the strain instead. This bias toward the present raises significant fairness issues. Younger people see governments running up debt and suspect that they will be handed the check through higher taxes and leaner public services when they retire. Trust erodes, and the social contract between generations frays. Financial markets also take notice, demanding higher risk premiums or pulling back when they perceive that fiscal adjustment is being postponed indefinitely.

But borrowing is not inherently bad for the

young. Debt can help build a better future if it fuels growth or averts deep recessions. Debt-financed investments in infrastructure, education, and climate resilience can yield benefits for future citizens. What is worrisome is that too much recent debt has financed current consumption or avoidance of tough choices, effectively transferring more of the burden to future taxpayers rather than to those benefiting today. The key question is whether we are leaving a better and more prosperous world for the next generation—or simply leaving them the bill.

If fiscal policy is about distributing costs across time and social groups, then trust is the currency that makes this distribution politically feasible. Without trust, even the most sensible and well-designed reforms can falter as citizens doubt motives and outcomes. With trust, societies are more willing to accept difficult trade-offs and sustain them over time.

### Citizens' fears

Trust is a belief that something is safe and reliable, or that a person is good and honest. Each of these elements has a fiscal counterpart: Arrangements must be understood, fair, transparent, and competent; otherwise, they will not be trusted.

Many societies are suffering from a trust deficit (Chart 2). Recent research, based on a survey of 27,000 people in 13 countries conducted in 2024, sheds light on the gaps in perception that feed this distrust (Bianchi, Dabla-Norris, and Khalid 2025). Many people—across both advanced and emerging market economies—do not understand basic fiscal issues. For example, only about 42 percent of respondents to the survey understood that raising taxes or cutting spending would reduce a government deficit. Similarly, more than 60 percent underestimated their country's debt-to-GDP level, especially in high-debt countries. If people believe debt isn't that high or harmful, they will naturally view calls for fiscal reform as overblown or politically motivated. Such misperceptions blunt the sense of urgency and make it harder to build support for timely corrective action.

Without trust, pessimism about government policies rises. Respondents who report more trust in their government are 20 percent more likely to believe that its policies will help stabilize or reduce public debt. Although respondents overall tend to doubt that current policies to reduce debt will leave them better off, those with greater trust in government are 17 percent more likely to expect a positive impact on their own welfare.

The survey also revealed concerns that cut across income and demographic lines. Many people fear losing pensions or essential services they depend on. And they doubt whether the burden of

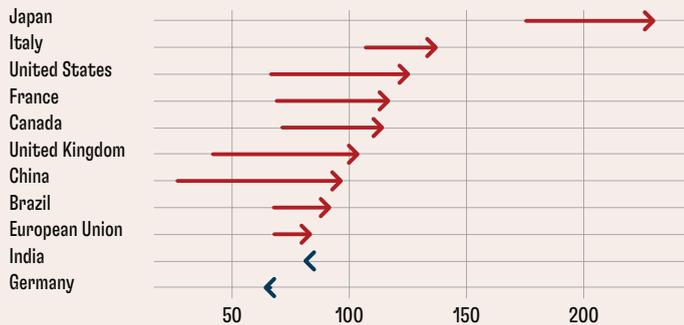
fixing fiscal problems will be shared fairly. These anxieties shape how citizens vote and protest. People who expect to be hurt by fiscal reforms are far less likely to support them, regardless of the economic rationale. For instance, if middle-class workers assume that deficit reduction means a higher retirement age or a smaller pension, they will oppose it. If wealthy taxpayers suspect reform means a wealth tax aimed at them, they too will push back. And if the public thinks new taxes will be squandered through corruption or mismanage-

CHART 1

## A heavier debt burden

Two decades on, most major economies carry substantially more public debt, narrowing fiscal room.

(public debt, percent of GDP, 2005 → 2025)



SOURCE: IMF, *World Economic Outlook*.

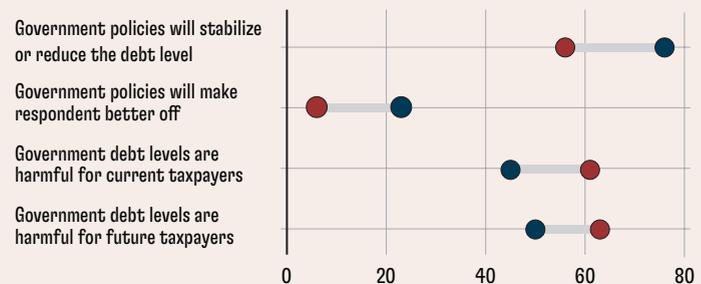
CHART 2

## Trust shifts optimism

Trust increases confidence in debt management, but concern about high debt remains broad across all groups.

Percent agreeing with each statement within each group

● Trust in government ● Do not trust in government



SOURCE: Bianchi, Dabla-Norris, and Khalid 2025. NOTE: Trust based on agreement with "government can be trusted to do the right thing"; neutral responses grouped with "do not trust."

ment, they will see little reason to pay them.

Experience also shapes trust. In countries that have endured repeated rounds of austerity with little to show for it, people become cynical about any new fiscal plan. If harsh cuts fail to reduce the debt, citizens understandably ask, “Why believe this next round of spending cuts or higher taxes will solve anything?” Similarly, corruption or misuse of stimulus funds undermines public confidence in government competence. In this environment, even mild reform proposals can provoke outrage, because people assume ulterior motives or unfair effects. Mention pension reform, and protests erupt when people fear their hard-earned security will vanish. Talk of tax reform, and many immediately suspect that their hard-earned income will be misused. The experience with fuel subsidy reforms is telling: The fiscal costs, poor targeting, and economic distortions are well understood, but implementation has repeatedly proved politically and socially complex.

Mistrust can spark a vicious cycle. Leaders, fearing backlash, postpone tough measures; debt problems worsen, further eroding confidence. But when citizens believe sacrifices are shared fairly and will lead to a better future, they have proved willing to accept even painful reforms—such as adjustments to pension systems (IMF 2024, 2025). Only trust will persuade voters to accept near-term sacrifices for longer-term stability.

## Building trust

Today’s high public debt is testing governments and societies in unprecedented ways, and the urgent need for action is clear. Each year of drift leaves countries more exposed to interest rate shocks and shifts in market confidence. But fixing public finances is not about indiscriminate austerity. It’s about taking gradual, well-calibrated steps to put debt on a sustainable path while continuing to invest in the future. This demands honesty about trade-offs and willingness to compromise: Policymakers must level with people about hard choices, and people must recognize that some cherished programs cannot continue without additional resources or reforms.

Trust is central to this equation. People need to believe that sacrifices will be shared justly and that reforms will lead to tangible benefits. People are more likely to support difficult measures if they perceive fiscal policy as competent, transparent, and fair. But trust cannot be summoned overnight. It must be earned and sustained.

There is no single blueprint for building trust, but certain institutions and practices can help. Budget transparency and well-structured public financial management lay the groundwork. Independent fiscal councils—with clear mandates, real autonomy,

and strong technical expertise, as in The Netherlands—offer impartial assessments and hold governments accountable for their fiscal plans. Spending evaluations, tax expenditure reports, and impact assessments, produced by governments or independent bodies, help both policymakers and the public understand where money is going and what it delivers. Prudent management of the public wage bill and efficient procurement can reduce perceptions of waste. Reducing special tax regimes and pension privileges enhances fairness, while strong oversight of state-owned enterprises signals responsibility and competence. Such measures are not cure-alls, but they help bridge the gap between the technically possible and the politically feasible. They create space for reform by strengthening the credibility of fiscal policy and demonstrating that governments are serious about delivering value for money.

Balancing realism about constraints with ambitions for change is essential. If we manage the debt challenge wisely, we can secure a stable foundation for long-term prosperity and preserve the social contract between generations. If we fail or wait too long, we risk economic turmoil and further erosion of faith in institutions. The fiscal path we choose today will define prosperity and fairness tomorrow. **F&D**

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# STABILIZING DEBT IN ADVANCED ECONOMIES

Zsolt Darvas and Jeromin Zettelmeyer

Countries must shift toward fiscal discipline and reforms that raise long-term growth

**M**any highly indebted advanced economies face a grim fiscal outlook. Under current policies, the public debt ratios of countries including Belgium, France, the United Kingdom, and the United States are set to deteriorate over the next two decades. They still have room to borrow, but there are limits.

So far, financial markets have been forgiving. But recent tremors suggest that they may become more sensitive to negative news about the fiscal or economic outlook. They may demand higher interest rates even from countries with highly liquid government bond markets, making the job of reducing debt that much harder.

AI-driven productivity growth may slow the increase in debt ratios and reduce the needed adjustment. But the magnitude and timing of this effect are unclear. Population aging and growth declines linked to trade fragmentation and political uncertainty pull in the opposite direction.

What will it take to stabilize debt ratios? In a recent paper with Gonzalo Huertas and Lennard Welslau, we assessed the fiscal adjustment needed in EU countries, the UK, and the US. Using official growth forecasts and market-based projections for

interest rates, exchange rates, and inflation, combined with simulated shocks, we generated probability distributions for future debt ratios under different scenarios for the primary balance, which excludes interest payments on the debt.

We considered a 20-year horizon starting in 2024 and divided it into two periods. In the first, a seven-year period, governments raise the primary balance to a level that ensures debt sustainability. In the following, 13-year, period, governments keep the primary balance constant, excluding spending changes driven by an aging society. We aimed to ensure a 70 percent probability that the fiscal adjustment in the first period was large enough to stabilize the debt ratio over the final five years of the 20-year horizon.

## Mixed findings

On the positive side, the required long-term primary balance does not look dramatically high in many cases. For example, it is 1.3 percent of GDP for France and the US, 1.8 percent for Belgium and the UK, and 2.5 percent for Italy. On the negative side, however, given large deficits in 2024, substantial adjustments are likely to be needed. About a dozen countries require adjustments of more than 3 percent

of GDP; five of those—France, Poland, Romania, the Slovak Republic, and the US—need adjustments of 5 percent relative to 2024.

On paper, almost all EU countries plan adjustments to stabilize the debt ratio. However, several use macroeconomic assumptions that are more optimistic than the EU's common methodology. Germany's plan, for example, assumes higher inflation and growth than expert forecasts. If actual growth and inflation turn out lower, Germany's deficit and debt will end up much higher than it projects.

Moreover, forecasts by the European Commission and the IMF suggest that countries with the biggest adjustment needs are unlikely to deliver the measures needed to stabilize their debt levels. This reinforces doubts about the likelihood of these adjustments.

### Historical precedents

While the US and several other advanced economies are unlikely to make fiscal adjustments needed to stabilize debt in the medium term, they may try later. To see how likely this is, we looked at historical precedents: how often countries achieved the required primary balance, the longest period balance was maintained, and how often they made the needed adjustment within seven years.

Our results show that primary balances at the level needed to stabilize debt in several high-debt advanced economies—and the large adjustments needed to get there from current fiscal positions—are rare. France, for example, would need a primary surplus of 1.3 percent of GDP to stabilize its debt, which has happened only six times in five decades. This does not mean such adjustments are impossible, but history suggests it will be difficult and likely to take longer than the seven years EU fiscal rules envisage.

Policymakers in these economies can take heart from the transformation of what were once considered the euro area's weakest links. In 2024, Greece posted a primary balance of 4.0 percent, adjusted for swings in the business cycle—well above what is needed to stabilize debt. Portugal needs only a minor adjustment of 0.5 percent of GDP; Ireland's required adjustment of 1.9 percent is modest, and the country's debt ratio is exceptionally low, at 39 percent of GDP, far below 122 percent in the US and the UK's 101 percent.

How did countries that faced severe fiscal crises 15 years ago become examples of discipline today? After the 2008 global financial crisis, financial markets drove them to the edge of collapse, forcing them to accept EU/IMF lending programs. Despite design flaws, these programs' essential fiscal tightening and structural reforms put their economies back on track for sustainable growth. The

adjustment was painful and, in the case of Greece, very long-lasting, but it was eventually effective.

The results speak for themselves. With average annual growth between 3.1 percent and 4.2 percent in 2022–25, all three countries exceeded the US pace of 2.6 percent.

The lesson: Fiscal discipline and structural reforms—along with public and private debt restructuring when debt is unsustainable—pay off eventually. Not surprisingly, these reforms and restructurings did not stem from domestic political momentum but were forced on them by market pressure.

### Recognize the risks

The question is, How will countries adjust this time? We see several possibilities.

The best outcome would combine growth-enhancing reform—including by implementing the Draghi report's single-market agenda in the EU—with deep reforms to social security and pension systems. It could also include overhaul of tax systems to raise revenue without discouraging growth. The latter is particularly true for the US—the only Organisation for Economic Co-operation and Development country without a value-added tax.

Unfortunately, this outcome is also politically the most difficult. A more likely path to fiscal consolidation involves a shift in domestic political leadership that prioritize fiscal discipline but not necessarily deep reform. Italy offers an example. Scarred by near disaster in the early 2010s, Italian governments across the political spectrum have kept budgets broadly under control. Italy's debt ratio of roughly 135 percent of GDP is still high, but its cyclically adjusted primary balance of 0.3 percent of GDP looks far healthier than those of Belgium, France, or the UK.

A hard-landing scenario could be triggered by a sudden spike in borrowing costs, leading to debt distress. As debt rises, interest rates could also climb, and markets might become more sensitive to news that calls fiscal sustainability into question. Governments might attempt forms of financial repression—for example, encouraging domestic banks or institutions to absorb additional government debt—but such measures have limits. Surprise inflation could temporarily ease fiscal pressures, but persistently higher inflation would eventually drive up nominal interest rates.

Let's hope that policymakers recognize these risks and act early enough to prevent such an outcome. **F&D**

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# POLICY COORDINATION FOR FRACTURED TIMES

Giancarlo Corsetti and Leonardo Melosi

Unstable geopolitics complicates effective coordination of fiscal and monetary policy

**A**dvanced economies are grappling with a pernicious mix of high and rising public debt and persistent inflation. The textbook remedy for this twin challenge is a mix of monetary and fiscal policies: central bank commitment to lower inflation backed by credible fiscal adjustment to stabilize debt. But geopolitical fragmentation today augurs a world where rising risks of supply disturbances threaten stagflation pressures and demands on fiscal policy exacerbate outstanding imbalances. The new global equilibrium is not yet defined, but fiscal sustainability and macroeconomic stability during a rocky transition will likely require policymakers across advanced and emerging market economies to accept moderate—if temporary—higher-than-desired inflation.

After the global financial crisis, the monetary-fiscal policy mix was the key to preventing a more severe and persistent downturn. Two conditions determined its success. First, both policies pushed in the same direction, stimulating aggregate

demand without destabilizing the fiscal outlook, while countering deflationary pressure. Second, international relations still largely echoed the postwar cooperation of Bretton Woods. This may no longer be true (Corsetti 2025). The policy mix model doesn't work as well given today's frequent and large supply disturbances, which stem from, or are amplified by, policy decisions that deepen trade fragmentation and geopolitical imbalances and challenge the postwar global economic and monetary order.

In such an environment, monetary-fiscal coordination may weaken central bank independence and thus threaten macroeconomic stability. Counteracting this risk requires geopolitical stability upheld by enhanced international cooperation, widespread adherence to accepted legal norms, and effective international institutions. An integrated policy framework, capable of containing the disruption of economic fragmentation and rising geopolitical tension, will lay the foundation of fiscal sustainability alongside stable control of inflation

fluctuations. When geopolitical tensions escalate without backstops, supply disruptions and adverse supply shocks put fiscal and monetary policy into conflict.

### Fiscal sustainability

Why should we expect inflation to play a significant role in fiscal sustainability? Theoretically, all monetary models embed, if only implicitly, coordination of monetary and fiscal policies. The argument is straightforward: When a central bank tightens policy to reduce inflation, real interest rates rise and growth slows. This widens the primary deficit (the deficit excluding interest payments on debt) and raises the real burden of debt. Unless the government cuts spending or hikes taxes to balance the books, rising interest on government bonds will give households more money, feeding aggregate demand. Inflation then rises until the real value of outstanding nominal debt aligns with expected future taxation or spending reductions. Correcting the imbalance without fiscal consolidation thus directly opposes the central bank's goal of controlling inflation. If central banks try to enforce price stability without a credible fiscal framework, an uncontrolled inflationary spiral may arise: Aggressive tightening raises debt-service costs, intensifying inflation pressure, and further tightening and worse fiscal imbalances ensue (Bianchi and Melosi 2019).

The success of a monetary contraction in reducing inflation depends on government's commitment to adjusting primary surpluses—known as *fiscal backing*. But there's more. A key and often underappreciated point is that the effectiveness of monetary-fiscal coordination historically rests on a relatively stable geopolitical environment and a widely accepted international order.

### Historical evidence

Academics and policymakers increasingly recognize that fiscal imbalances are typically resolved through a combination of fiscal adjustment and inflation surprises. Bianchi, Faccini, and Melosi (2023) show that US policymakers have long relied on monetary-fiscal coordination to stabilize government debt and inflation, albeit to varying degrees. In the 1970s, this coordination collided with disruptions in oil markets, sparking a period of heightened inflation. Yet in the following decades and through the 2010 years of below-target inflation, monetary-fiscal coordination offset persistent deflationary forces without unmooring inflation expectations. Globalization and international cooperation contributed to the geopolitical stability that ensured the success of monetary-fiscal coordination.

After the pandemic, however, unprecedented coordination of monetary and fiscal policies to support economic recovery contributed to persistently high inflation because it occurred against a backdrop of disruptions to global supply chains and Russia's invasion of Ukraine.

As Smets and Wouters (2024) have shown, supply disruptions complicate monetary-fiscal coordination: Fiscal backing weakens more in response to supply shocks than to demand shocks. This asymmetry helps explain why monetary-fiscal coordination tends to be more successful during demand-driven expansions accompanied by favorable supply conditions—as in the 2010s—than when large fiscal imbalances coincide with persistent adverse supply shocks. In the former scenario, moderate fiscally induced inflation can protect against deflationary pressure without undermining the inflation target, even when the interest rate is stuck at zero. In the latter case, however, central banks confront a difficult dilemma. Do they tighten policy to defend price stability risks at the cost of a deeper recession and worse fiscal position? Or do they accommodate the inflationary consequences of supply disruptions to mitigate the downturn and ease the fiscal burden, at the cost of abandoning price stability?

### Controlled inflation

Today, geopolitical tensions, rising defense spending, trade fragmentation, and weaker growth prospects are eroding fiscal positions across advanced economies. This comes atop population aging, low productivity growth, and heightened exposure to climate and geopolitical risks. In this environment, fiscal backing is inherently weaker, increasing the risk of persistent and sizable inflationary pressures. Debt is already high, so fiscal adjustment must be gradual—and *sustainable* adjustment will likely require pragmatic tolerance for some *controlled* inflation. Such “fiscal inflation” works when temporary and moderate and without causing a disruptive and ultimately counterproductive loss of inflation-fighting credibility.

If government bonds are not indexed to inflation, the central bank can smooth or delay price adjustment. The rationale rests on the possibility of significant fiscal corrections in the future and on markets' continuous revision of their fiscal outlook. For instance, markets may expect an AI-driven productivity boom to raise growth enough to reduce the debt burden at lower tax rates. In this case, smoothing price adjustment amounts to a gamble on price and fiscal stability: The central bank buys time, keeping inflation relatively stable today vis-à-vis rising debt, in the hope that raising it substan-

tially won't be necessary in the future if growth fails to accelerate (Corsetti and Maćkowiak 2024). Success calls for effective communication. Authorities must assure the public of their ability to stabilize public debt—via reforms and policies to contain supply-side disturbances—while delivering plausible broad-based productivity gains.

### Broader approach

How might this sustainable adjustment play out across the world? Historical experience suggests that countries such as the US and the UK have mechanisms that stabilize debt, in part through inflation. Much of this ability is rooted in a mix of explicit rules and unwritten guidelines structuring the institutional balance of power. Institutional equilibrium is more complex, however, in the euro area, which lacks a meaningful federal budget and debt.

Stabilizing forces may originate in anticipation of productivity growth from new technologies and improved public spending: Both could boost growth and strengthen long-term fiscal sustainability. Governments now face the challenge of scaling up defense outlays while also investing in R&D and innovation—priorities sharply different from those of the globalization era—but some types of defense spending could also feed expectations of growth-enhancing innovations.

Yet with high debt, successful unconventional policy collaboration may not be achievable. In response to the disruption of geopolitical fragmentation and the dismantling of economic networks, governments may give in to the temptation to raise revenue by taxing trade or embrace financial repression—in the form of tighter regulation and capital controls—in the hope of lower borrowing costs. Adding to trade tensions, these measures are likely to raise vulnerability to stagflationary shocks, spurring disruptive two-way feedback between domestic and uncoordinated international policies. Extended unconventional collaboration that integrates a wide range of internal and cross-border policies would stave off this risk by helping keep the world economy on a path to sustainable fiscal adjustment.

Emerging markets face particular challenges as geopolitical developments send shock waves through financial and real markets. These could redefine the magnitude and geography of global imbalances and the costs and benefits of exported policies, capital account liberalization, and exchange rate arrangements with limited flexibility. Many governments will have to defend the hard-won credibility of policy regimes that allowed them to develop significant markets for local-cur-

rency-denominated debt. While this enhances the potential contribution of controlled inflation to address fiscal imbalances, it also raises the temptation to respond to shocks by engineering large inflation surprises—at the risk of undermining prior progress.

### A global public good

Large fiscal imbalances, adverse demographic trends, and geopolitical developments require closer coordination between monetary and fiscal authorities. Enhanced coordination is not necessarily undesirable and may, in fact, help boost the credibility of fiscal stabilization, but it calls for a balancing act. Across advanced and emerging market economies, governments may overestimate the scope for reasonable fiscal inflation, downplay the benefits of a credible inflation-targeting regime, and exaggerate the advantages of lack of cooperation in international economic relations. Had advanced economies been able to neutralize the geopolitical forces underlying the oil shocks—most notably the Organization of the Petroleum Exporting Countries' leverage over oil prices—the great inflation of the late 1960s and 1970s might arguably have been less severe. By the mid-1960s, as is the case today, fiscal imbalances were already elevated, and governments' inability to resolve disputes with major oil-producing countries helped set the stage for one of the most disruptive inflationary episodes on record.

The combination of high public debt across advanced economies and today's geopolitical realignment feels uncomfortably familiar, and it reminds us that macroeconomic stability is first and foremost a global public good. **F&D**

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# SAFEGUARDING THE TREASURY MARKET

Anil K Kashyap and Jeremy C. Stein

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The Federal Reserve needs new tools to intervene during future stress

**F**or decades, the US Treasury market has been the most liquid and resilient financial market in the world. Even in times of stress, Treasury securities were assumed to be tradable in large quantities, rapidly, and with little friction—a reliable anchor for the broader financial system. In recent years, however, this assumption has come under question. Severe market dysfunction, most notably in March 2020 but also in April 2025, shows that even the world’s safest securities market can seize up abruptly, with consequences far beyond government bond trading.

These concerns arise in the context of a Treasury market that has grown dramatically. The ratio of publicly held federal debt to GDP is now about 100 percent, and given the current US fiscal stance, this ratio will keep rising (see Chart 1). With expanded issuance, the private financial system’s ability to

intermediate Treasury securities smoothly has not kept up.

In a recent paper with Jonathan Wallen and Joshua Younger, we analyze the trading dynamics that can lead to Treasury market fragility and propose a new way for the Federal Reserve to intervene more surgically when market functioning breaks down. Here we provide a summary of the arguments in that paper.

Recent history suggests that episodes of extreme Treasury market stress are not driven primarily by macroeconomic factors such as changes in interest rates. Instead, they arise from the delicate interplay between the asset managers, hedge funds, and broker-dealers that dominate Treasury trading.

Our central policy recommendation is not more frequent intervention by the Federal Reserve, but rather better-designed intervention when it



FRANCESCO CARTA FOTOGRAFO/GETTY IMAGES

becomes unavoidable. The experience of March 2020 demonstrates both the necessity of a central bank backstop and the cost of relying on blunt tools—particularly large-scale, unhedged bond purchases—that blur the line between market-function support and monetary policy. A more targeted approach would be just as effective and would stabilize markets at lower cost and with fewer side effects.

### **The modern market**

Although the supply of Treasuries has expanded rapidly, traditional intermediaries, especially bank-affiliated broker-dealers, have not expanded their balance sheets to the same degree. Post-2008 financial crisis regulations such as the supplementary leverage ratio, along with heightened risk management standards, make it costly for dealers to hold large inventories of even the safest assets.

Meanwhile, various types of institutional asset managers, including pension funds, insurance companies, mutual funds, and exchange-traded funds, increasingly play a central role in the Treasury market. Although these institutions typically have strong incentives to maintain exposure to long-term interest rates, they face balance sheet constraints and portfolio objectives that discourage them from holding that entire exposure in cash bonds. Instead, they often choose to load up on credit risk to increase their returns while targeting a relatively long overall duration (interest rate exposure) for their portfolios.

To obtain the desired duration exposure, these asset managers increasingly use long positions in derivatives, such as Treasury futures and interest rate swaps, while conserving balance sheet capacity to hold other higher-yielding assets, such as corpo-

rate bonds. This demand for long positions drives derivative prices up relative to cash bonds and creates a natural role for hedge funds and dealers to arbitrage the two markets. By taking the opposite side of asset managers' derivative positions and hedging with cash Treasuries, these intermediaries help align prices across markets and keep spreads small in normal times.

This arrangement works under stable conditions. However, it rests on a fragile foundation: Much of this arbitrage occurs with highly leveraged borrowing. Hedge funds finance their long positions in cash Treasuries by borrowing as much as 99 percent of the overall position in the repurchase (repo) market.

### Who holds risk?

Treasury market fragility can be understood by making a distinction between who bears interest rate risk and who has the balance sheet capacity to arbitrage between cash Treasuries and derivatives, such as futures. In the current market structure, asset managers are the ultimate holders of unhedged duration risk. Their preferences and constraints thus determine the risk premium required to hold long-term Treasuries, known as the "term premium."

Hedge funds and broker-dealers play a different role. They generally do not seek exposure to raw interest rate movements and tend to stay roughly duration-neutral. Instead, they connect the cash and derivative markets via hedged arbitrage positions. The leading example is the cash-futures "basis trade," whereby a hedge fund buys cash Treasuries, sells Treasury futures, and finances the cash side of the purchase in the repo market. Because the price differential between cash bonds and futures is small, profitability depends crucially on the ability to borrow aggressively to fund the position, as also described by Barth and Kahn (2025).

This structure has two important implications. First, given their high leverage, hedge funds are vulnerable to shocks affecting their ability to stay in the trade. This depends on several factors: capital, funding conditions, margin requirements, and risk tolerance. Changes in any of these can lead them to scale back sharply. Second, dealers' limited balance sheet capacity constrains their ability to absorb large flows during stress periods. When hedge funds unwind positions rapidly, dealers can step in only so much. And critically, doing so crowds out their ability to provide other core functions—namely, as market makers in Treasury securities or repo market intermediation.

This system appears stable in normal times but is prone to sudden bouts of dysfunction. One such stress is rapid forced unwinding of hedge-

CHART 1

## More treasuries

Federal government debt could exceed 170 percent of GDP by the mid-2050s, according to the Congressional Budget Office. (US federal government debt held by the public, percent of GDP)



SOURCE: Congressional Budget Office.

fund basis trade positions. This leads to fire sales of cash Treasuries and a rush to cover short derivative positions, causing prices in cash and derivatives to diverge. As constrained dealers struggle to absorb the large flows from fire sales, bid-ask spreads widen, liquidity evaporates, and funding conditions in the repo market deteriorate.

### A stress test

The March 2020 turmoil paints a stark picture of these dynamics. As the COVID-19 shock intensified, investors sought to raise cash, selling Treasuries alongside riskier assets. With market volatility rising, hedge funds faced margin calls on their short futures positions and rapidly pulled back from the basis trade. The selling pressure blew up dealers' balance sheets, forcing them to cut back on market making and repo intermediation.

The Fed intervened to an unprecedented degree, purchasing roughly \$1.6 trillion in Treasury securities in a few weeks. This extraordinary action restored market functioning. But by relying on large unhedged bond purchases that looked like another massive round of quantitative easing, it blurred the line between intervention for market-functioning and monetary-policy purposes. Large-scale Treasury purchases by the Fed continued well after mar-

ket functioning had stabilized, which raises questions about whether the intervention should have been narrower.

The March 2020 episode led to a range of reform proposals: adjustments to leverage regulations, expansion of standing repo facilities, minimum margin requirements for futures, and broader central clearing of Treasury trading. Each proposal has merit and would improve market resilience, but none is a panacea. For instance, broad-access repo facilities can help ensure stable funding conditions even during stress, but fire sales are still likely if hedge funds are forced to exit a trade because of losses on unrelated trades or because of margin calls on futures positions.

These limitations highlight the need for a more direct, yet more targeted, role for central banks in extreme circumstances.

### Narrower interventions

If the Fed is again forced to purchase Treasury bonds during extreme market stress, we propose an alternative approach. It should hedge these purchases against interest rate risk, buying cash Treasuries while simultaneously selling Treasury futures or entering into equivalent derivative positions. This would address the root source of the stress: the need for someone to take the other side of the trade as leveraged intermediaries unwind hedged positions. While this approach may raise legal issues, it is important to recognize that in economic terms it is essentially identical to a standard central bank operation—namely, a repurchase transaction, with the one difference being that the counterparties to the two sides of the trade are different actors.

This strategy has several advantages. First, it relieves pressure on dealer balance sheets more effectively than unhedged purchases since dealers never have significant unhedged exposure to interest rate risk. Second, by remaining duration-neutral, the intervention clearly separates support for market functioning from monetary policy and avoids signaling an unintended monetary policy easing—something that is all the more crucial if market dysfunction occurs during periods of higher inflation.

Third, while unhedged purchases can be cast as market-function-motivated if accompanied by a commitment to quickly unwind the purchases, hedged purchases obviate the need for such potentially dicey commitments. Since the duration-neutrality of the policy is built in up front, it does not require a commitment to future bond sales. Finally, limiting the Fed's interest rate exposure reduces the risk of large ex post losses, which are costly to taxpayers and complicated to explain.

### Moral hazard

Central bank backstops always raise moral hazard concerns. If arbitrageurs expect intervention whenever basis trades move against them, they may take on more leverage. While this legitimate worry should raise the bar for any type of central bank intervention, it is arguably less severe for hedged than for unhedged bond purchases, as the latter do more to establish an absolute floor, a “Fed put,” for bond prices.

A “penalty-rate” approach can further mitigate moral hazard: The Fed could allow basis spreads to widen beyond normal levels and seek to cap only extreme dislocations. By intervening only at clearly dysfunctional thresholds and allowing some private sector losses, the central bank can mitigate worst-case outcomes without fully insulating hedge funds from risk.

### Policy lesson

Episodes of Treasury market dysfunction are not a random bolt from the blue. Rather, they are a consequence of a market structure that relies on leveraged balance sheet intermediation to absorb a rapidly growing supply of government debt. When stress hits, this structure amplifies shocks and overwhelms traditional broker-dealers.

The lesson from March 2020 is not that it was wrong for the Fed to intervene, but that it intervened with a tool that was too blunt and difficult to disentangle from monetary policy. Preparing more surgical, duration-neutral tools in advance will allow future interventions to stabilize markets more effectively and with fewer undesirable side effects.

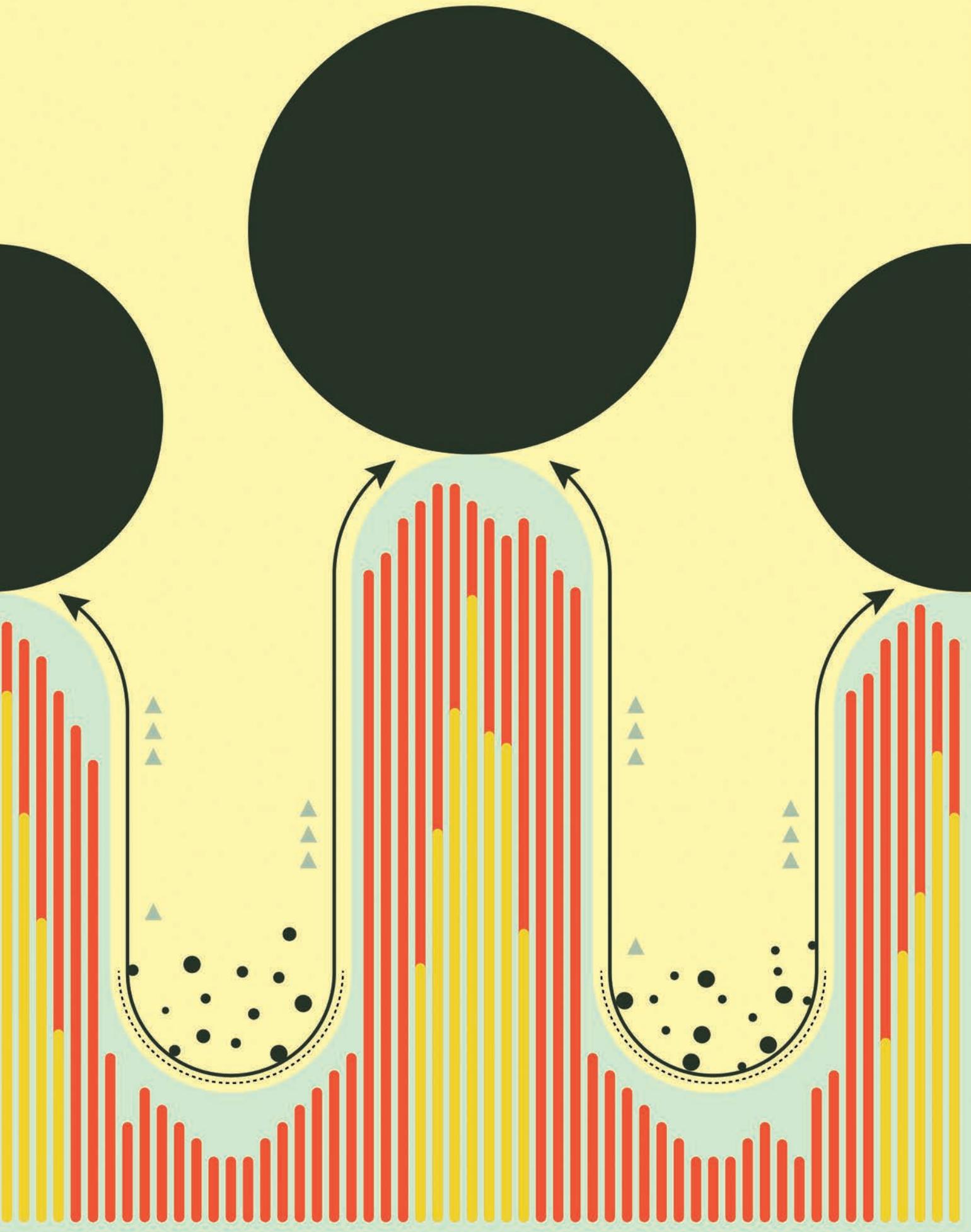
As the Treasury market continues to grow, the question is not whether the central bank will be called to action again but whether it will be ready with the right tools when the need arises. **F&D**

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# THE DEBT- INEQUALITY CYCLE

Atif Mian

Extreme inequality is fueling a global debt crisis

**D**uring the Great Depression, as he saw ordinary people's purchasing power collapse, Federal Reserve Chairman Marriner Eccles warned that excessive saving by the rich was draining demand and deepening the downturn. "To protect them from the results of their own folly," Eccles told the Senate in 1933 testimony, "we should take from them a sufficient amount of their surplus to enable consumers to consume and business to operate at a profit."

Inequality in the US was then extremely high: The top 1 percent held roughly 42 percent of all wealth. Within a decade, however, the landscape changed dramatically. World War II mobilization and progressive taxation reduced inequality and restored balance between spending and production. The underlying problem that Eccles emphasized faded from public memory as the US economy entered a long period of sustained and more equitable growth.

However, beginning in the 1980s, inequality climbed again: The top 1 percent's wealth share rose from about 22 percent in 1980 to roughly 35 percent in 2010. As more income concentrated at the top, the forces Eccles warned against reemerged—high saving by the wealthy weakened overall purchasing power. Yet the expected demand shortfall did not appear immediately: Spending was funded by ris-

ing private debt of households below the top. From the mid-1980s through the early 2000s, the rapid buildup of household debt absorbed the excess saving of the rich and sustained aggregate demand.

The global financial crisis of 2008 ended the long run of debt-financed household spending. With deleveraging of private balance sheets, the underlying imbalance Eccles warned about returned with a vengeance: excess saving at the top and insufficient broad-based demand at the bottom. The Fed cut rates to zero, but monetary policy could not close the gap. Fiscal policy was left to carry the load—accept a deep, prolonged slump or run large primary deficits to stabilize incomes and employment. The US chose the latter.

In the Keynesian view, deficits help the economy recover faster in downturns, but the need for them is temporary. When the demand shortfall is structural—driven by persistently high saving of top-income households that capture a large share of total income—the need for deficits is more persistent. In a recent paper, "A Goldilocks Theory of Fiscal Deficits," Amir Sufi, Ludwig Straub, and I show that rising inequality can force governments to run larger, ongoing deficits. Deficits must be large enough to keep the economy away from the zero lower bound (when nominal interest rates reach zero and monetary

policy ceases to be effective) and to prevent recessions.

A rising saving glut—excess saving among higher-income households—forces the economy to rely increasingly on debt-financed spending to sustain aggregate demand. Before 2008, the financial system did this by expanding household credit, which supported consumption even as inequality rose. When private credit expansion abruptly ended during the financial crisis, the burden of credit creation shifted to the public sector, as evidence from the US shows.

Chart 1 shows that total credit (public plus private) rises sharply starting in the early 1980s. The blue and red lines decompose the total into private and public credit, separating the precrisis (1980–2008) and postcrisis (2008 onward) periods. From 1980 to 2008, nearly all of the increase in total credit reflects a surge in private borrowing; public debt is comparatively stable.

After 2008, the pattern reverses. Even with the federal funds rate near zero, the private sector could not—or would not—raise leverage further, so sustaining demand required credit growth from the public sector. This is the logic of the “Goldilocks” view of fiscal deficits: When private balance sheets are constrained, public borrowing can offset the demand shortfall and help avoid a prolonged slump. Consistent with that prediction, total credit to GDP continues to rise after 2008 at roughly the earlier pace, but almost entirely because public debt increases, while private credit remains broadly flat relative to GDP.

A saving glut in the presence of a zero-lower-bound constraint forces government to increase debt and deficits, but the government also faces a dynamic budget constraint. Push the deficit too far and, over time, interest rates on public debt can rise, making the debt path unsustainable. High inequality and resulting excess saving by the rich present a Goldilocks conundrum for fiscal policy: Deficits cannot be “too cold” (too small to offset the demand shortfall) or “too hot” (so large that they destabilize debt dynamics). The data suggest that the US was operating near this upper bound in 2019—close to the largest deficit sustainable in the long term.

The larger, persistent fiscal deficits since then may be leading US debt dynamics down a less sustainable path. US fiscal strain is unlike anything seen in its modern history: Federal debt and net interest costs as shares of GDP are near all-time highs. The fiscal deficit is projected to be about 6 percent of GDP, which would keep debt rising relative to the economy and threaten sustainability.

### Global evidence

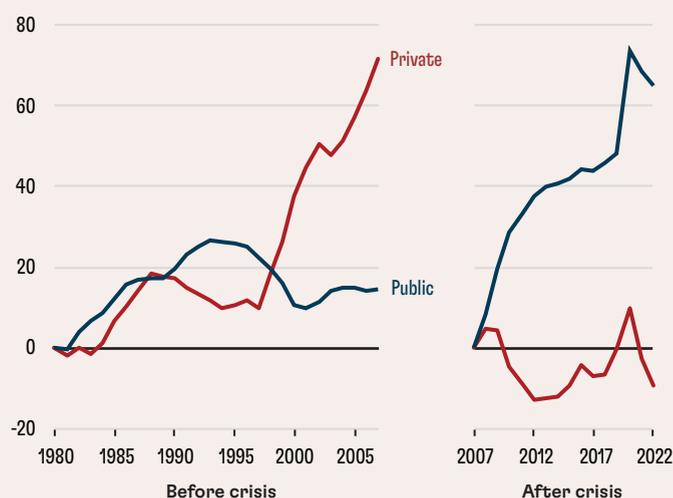
Saving gluts are rising everywhere. The share of income accruing to the top 1 percent has increased worldwide. Corporations are a tax-advantaged

CHART 1

## Private, public debt

After the global financial crisis, the US public sector overtook the private sector as the main driver of credit growth for economic expansion.

(change in US credit to GDP, percent)

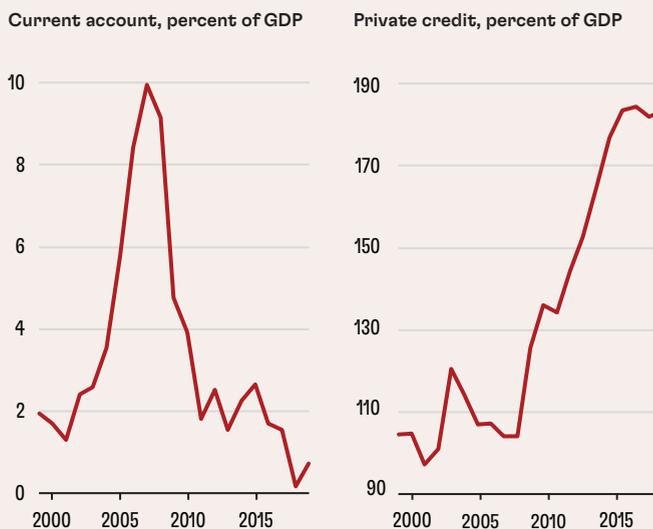


SOURCES: IMF, Global Debt Database; and author's calculations.

CHART 2

## China's domestic debt surge

As its external surplus fell after 2008, debt rose sharply in one of the fastest leverage buildups among major economies.



SOURCES: IMF, Balance of Payments Manual; World Bank; and author's calculations.

vehicle for the rich to save, so global corporate saving has risen significantly over the past few decades. Wealthy sovereigns are fueling higher saving through central banks and sovereign wealth funds. But global investment has not kept up, leading to a saving glut that needs new unproductive credit to sustain consumption demand. Many major economies mirror the US predicament: increased reliance on debt to generate demand, first through private household debt and later through government debt.

Total debt in the UK, for example, began to rise rapidly in the 1980s, driven primarily by private borrowing until 2008, and by public debt thereafter. Japan followed a similar track but started earlier. Its private credit boom ended in the early 1990s, and public debt subsequently absorbed the adjustment. In the euro area, the launch of the euro in 1999 coincided with a rapid buildup in private credit that culminated in the 2008 crisis; since then, private deleveraging has been accompanied by a shift toward higher public debt.

## China

China also came to rely increasingly on debt to support demand. But unlike most large economies, it initially did so by exporting its excess saving abroad—running large current account surpluses that increased the rest of the world's net debt to China. Those external liabilities, in turn, helped finance spending on Chinese goods.

For much of the 2000s, China's current account surplus rose sharply as a share of GDP, even as GDP itself expanded at an extraordinary pace (Chart 2). On the eve of the 2008 financial crisis, the surplus approached 10 percent of GDP—exceptionally high for a major economy. Such a large external imbalance was unlikely to be sustainable.

As advanced economies could no longer sustain demand through ever-rising private credit—especially after 2008—China's earlier strategy of exporting excess saving abroad faced limits. Continued expansion of net lending abroad that could sustain very large trade surpluses became increasingly difficult. Both sides adjusted by shifting debt creation to new sources: Advanced economies relied more on fiscal deficits, and China turned to domestic credit expansion to support demand in the face of its own saving glut.

As China's external surplus receded to more moderate levels after 2008, domestic debt to GDP rose sharply. The increase was broad-based—extending beyond corporate and local government borrowing to include rapid growth in household debt—and represents one of the fastest domestic leverage buildups observed among major economies.

## Why does investment not rise?

Why didn't financial markets channel abundant funds into productive investment? Despite rising total debt to GDP, investment to GDP in major economies has remained broadly flat and sometimes has even edged down. Is this because the financial system is not conducive to long-term, patient financing? Or do regulatory and other supply-side constraints inhibit investment?

When excess saving is channeled into unproductive debt that finances consumption rather than investment, borrowers do not generate additional income that can repay the new debt in the aggregate. The result is persistently rising debt to GDP and downward pressure on interest rates to keep the debt sustainable. In earlier work, we refer to this dynamic as "indebted demand": growth sustained by borrowing because underlying spending power is insufficient.

## The ultimate fragility

The central risk of relying on indebted demand is that it's inherently fragile. Once private borrowers reach their limits—as they did in 2008—maintaining demand requires a larger and more persistent fiscal backstop, which is the reason for rising postcrisis public deficits and debt. It's why today's global fiscal fragility is not an isolated policy choice but the downstream result of an economic system's failure to convert abundant saving into productive investment.

The question today is whether the US government can rein in fiscal spending if markets get nervous. Political polarization and legislative gridlock mean that confidence is limited. The more profound lesson, though, is that structural imbalances—rooted in excess saving by the rich—create the very conditions that expose the economy to such risks. Expecting policymakers to keep deficits in a perpetual Goldilocks range is unrealistic: When inequality suppresses demand, they may err on the side of too little support, as in Eccles's era; at other times, they may leave deficits too large for too long, as many fear is happening now.

We often frame inequality in moral terms, but the macro lesson is starker: When too much income pools at the top, demand weakens, deficits persist, and dependence on debt weakens us all. Eccles captured that collective logic in 1933. His advice to take some of the surplus from the wealthiest so that consumers can consume and businesses can make profits is as relevant today as then. As Eccles remarked, "This is not 'soaking the rich'; it is saving the rich." **F&D**

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# THE NEW FACE OF AFRICAN DEBT

Amadou Sy and Athene Laws

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Shifts from external to domestic debt come with rewards and risks

**A** major transformation is underway in sub-Saharan Africa: Governments are increasingly shifting borrowing away from external debt and toward domestic debt. This trend brings fresh opportunities to build resilience and support development—but also introduces new challenges that must be managed carefully.

At the turn of the millennium, sub-Saharan African governments relied heavily on external loans, particularly concessional lending in foreign currencies from bilateral and multilateral institutions (see Chart 1). After the Heavily Indebted Poor Countries Initiative reduced the stock of foreign debt, strong growth in African economies, combined with a global search for yield by international investors, led many countries to issue Eurobonds—loans issued in overseas markets and typically denominated in dollars or euros. While these instruments broadened access to financing, they also increased exposure to currency swings and sudden shifts in foreign investor sentiment. When international interest rates

surged and global financial conditions tightened in 2022, many countries were shut out of global markets.

Over time, countries increasingly pivoted toward borrowing at home, issuing debt in local markets and in their own currency. Some countries did so as a firefighting response to high funding needs and the loss of international market access. Others gradually increased domestic borrowing as part of a broader push to develop financial markets. As a result of this transition in how debt is composed, most of sub-Saharan Africa's public debt is now domestic.

## Many benefits

Tapping into domestic debt markets brings a host of advantages. Governments can borrow in their own currencies, sidestepping the risks of exchange rate shocks and the need to dip into foreign reserves for repayments. Local laws govern these debts, making management simpler and more predictable. Crucially, countries are less exposed to swings in international investor senti-



ment or global interest rates. The recent freeze in Eurobond issuance for the region—no countries in sub-Saharan Africa issued between spring 2022 and January 2024—underscores the danger of relying too heavily on a single source of financing.

The benefits go beyond government balance sheets. Flourishing domestic debt markets can also support broader macroeconomic growth and provide buffers against economic shocks. Regular issuance of domestic debt enhances central banks' tool kits for monetary policy operations, making it easier to steer the economy and keep inflation in check. In addition, as governments issue more debt at different maturities, they generate a “yield curve”—a vital tool for pricing risk and fostering financial market development. This lays the foundation for a thriving private sector, which is essential for job creation and economic growth. In a region where access to financing is often a major hurdle for business growth, building robust capital markets is more important than ever.

### New risks

Alongside the benefits, domestic debt markets bring a swath of new risks that need to be carefully managed. Domestic debt is typically issued for much shorter periods than external loans, sometimes just days or months, rather than years or decades (Chart 2). Some countries, like Mauritius and Tanzania, have managed to lengthen these maturities, generating positive benefits for monetary policy and capital markets. Others, with less developed debt frameworks, shallow markets, or high macroeconomic vulnerabilities, are forced to rely on short-term borrowing. Since its 2023 domestic debt restructuring, Ghana has issued only T-Bills maturing in under a year, with an average outstanding maturity of less than three months as of November 30, 2025. Shorter maturities expose countries to rollover risk—the danger that, when old debt comes due, governments may have to pay higher interest rates or struggle to find new buyers. Building trust through transparent and credible debt management is essential in

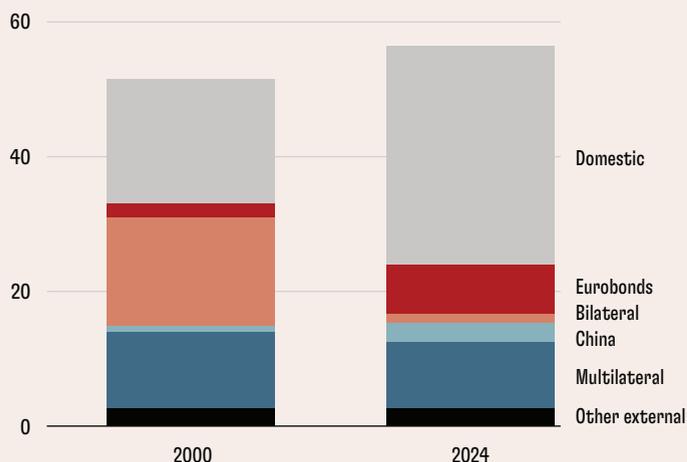
Traders arrive at the Nairobi Stock Exchange.

CHART 1

## Toward domestic debt

Sub-Saharan African governments have pivoted away from external loans in favor of domestic borrowing.

(percent of GDP)



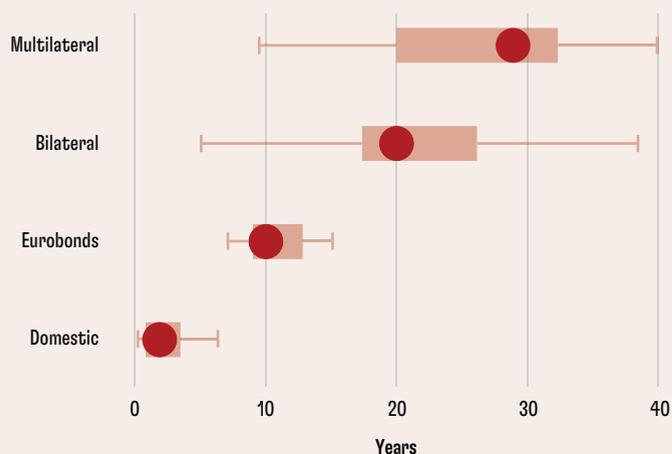
SOURCES: World Bank, International Debt Statistics; and IMF, World Economic Outlook Database. NOTE: Excludes Equatorial Guinea, Namibia, Seychelles, and South Sudan due to data availability.

CHART 2

## Shorter maturities

Domestic debt is often issued for brief durations—sometimes only days or months—unlike external loans.

(distribution of debt maturity by instrument, 2015–24)



SOURCES: African Debt Database; and IMF staff calculations. NOTE: Maturities are calculated as the weighted average maturity at issuance, by country and instrument.

order to gradually extend maturities and reduce these risks.

Another hurdle is cost, at a time when governments are already facing expensive debt servicing. Domestic debt often carries interest rates higher than the concessional loans available from international partners, and sometimes higher than market rate Eurobonds. The median country in sub-Saharan Africa issued domestic debt at an average of 8.8 percent interest in 2024. For many countries, this makes borrowing at home more expensive. However, because inflation is also higher in much of the region, the real cost of debt (after adjusting for inflation) can vary widely—and in some cases may even be negative. Ultimately, the price governments pay reflects how much confidence investors have in their management of the economy. A strong track record of sound fiscal policies and transparent debt practices helps keep borrowing costs in check.

There’s also a risk of overwhelming small local financial systems. In many countries, banks hold large amounts of government debt, which can push up interest rates and make it harder for businesses to get loans. Without access to loans, firms—and therefore the economy—struggle to grow. It presents a chicken-and-egg problem: Banks often buy government debt because there are not enough opportunities to lend to the private sector, but their large holdings of such debt then limit credit for businesses. If governments pressure banks—directly or indirectly—to buy even more debt, it can make the problem even worse.

A related concern is the growing sovereign-bank nexus. As banks hold more government debt, their fortunes become intertwined and can create a vicious feedback loop. A loss in a government’s creditworthiness can wipe out bank assets and trigger a banking crisis. A banking crisis in turn can lead to bank bailouts, reduced private credit and growth, capital outflows, and a deeper fiscal crisis. Sub-Saharan Africa is seeing this nexus grow faster than anywhere else in the world, and the growth is driven primarily by low-income countries (Chart 3). Expanding the pool of investors beyond banks and strengthening financial oversight are key steps to reducing these risks.

One way to expand the pool of investors is to allow foreign investors to purchase domestic debt. Evidence shows that higher nonresident ownership of domestic debt is associated with lower yields and greater liquidity, which reduces debt-servicing costs (Alter and others 2025). However, greater foreign ownership introduces new risks. Nonresident flows can be more volatile, responding more strongly to investment condi-

tions and causing large swings in yields and sales: These are known as “hot money” problems. In general, the more indebted a country is, the greater the challenges. While smart regulation can help mitigate the risks, a lack of data on ownership can complicate policymaking.

### The bottom line

After weathering years of successive shocks, overall government debt in sub-Saharan Africa has stabilized, albeit at a high level. Yet the cost of servicing this debt has continued to climb, squeezing government budgets and leaving less room for vital investments in health, education, and infrastructure. Today, a typical government in the region spends about one-seventh of its revenue on interest payments alone. It is in this context that domestic debt is assuming a greater role.

Countries that approach domestic debt market development as part of a broader economic strategy are best positioned to harness its benefits and manage its risks. When domestic borrowing is a deliberate, well-planned component of a country’s financial tool kit, it can support resilience and sustainable growth. In contrast, countries that turn to domestic debt mainly as a crisis response—after losing access to external markets—often find themselves in a more vulnerable position.

Good debt-management practices remain the bedrock of continued market access and contained borrowing costs—whether borrowing at home or abroad. Transparency is essential: Issuing timely, accurate, and comprehensive debt statistics, and communicating effectively with investors and the public, helps build trust. Strong legal and regulatory frameworks, prudent debt portfolio management, and a clear debt sustainability strategy are equally fundamental. Addressing weaknesses in public financial management—through empowered auditors, robust governance, careful oversight of state-owned enterprises, and sound cash management—further strengthens the foundation. And last, public investment management must be efficient and effective to ensure that public resources (including debt) are directed toward growth-enhancing investments.

Crucially, debt market development must go hand in hand with broader financial and private sector reforms. Expanding the domestic investor base to include pension funds, insurance companies, and other long-term private capital providers can help diversify demand for government debt and reduce risks. Strengthening banks and nonbank financial institutions through smart regulation and supervision is vital. Ultimately, a thriving financial sector both supports and depends on a dynamic private sector. Unlocking barriers to business growth and economic diversification—through reforms in the business environment, education, skill development, and infrastructure—completes the bigger picture.

Stable macroeconomic conditions are an essential precondition for success. No amount of innovation in domestic debt markets can compensate for poor fiscal management, high inflation, or unsustainable debt burdens. In fact, these weaknesses can reinforce each other, amplifying risks. Used wisely, domestic debt can be a powerful tool for resilience and sustainable development—but only as part of a comprehensive, well-managed economic strategy. **F&D**

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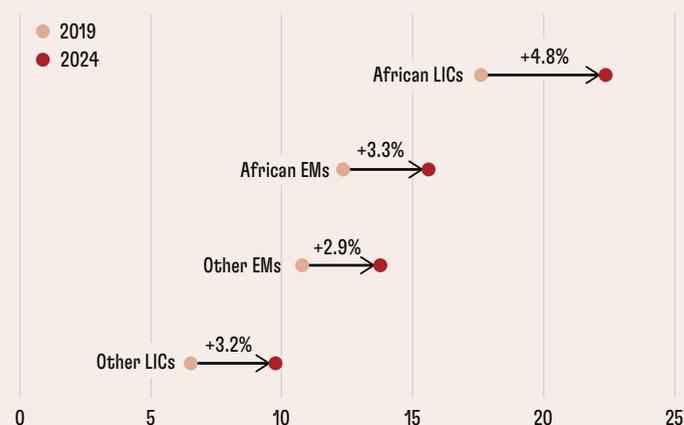
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#### CHART 3

## Sovereign-bank nexus

Banks in sub-Saharan Africa’s low-income countries with high exposure to government debt are especially susceptible to damaging feedback loops between sovereigns and banks.

(government debt as percent of bank assets)



SOURCES: Barrail, Dehmej, and Wezel, forthcoming; and IMF staff calculations. NOTE: EMs = emerging market economies; LICs = low-income countries.



# Old Laws for New Machines

Biagio Bossone

## SCIENCE FICTION WRITER ISAAC ASIMOV'S ROBOT PRINCIPLES OFFER AN ETHICS GUIDE FOR AI IN FINANCE

It's 7:45 a.m. in a central bank's operations room. Screens glow with color-coded maps of the financial system. Overnight data from thousands of banks, brokers, and payment processors have been analyzed by an AI model that monitors liquidity conditions. A small red dot flashes beside a bank whose payment activity has suddenly dropped. The analysts glance up. The machine has detected something unusual—perhaps a transient error, or perhaps the first signal of stress.

Moments like this are now routine in financial centers around the world. AI is now the silent partner of global finance—embedded in credit scoring, fraud detection, algorithmic trading, and even monetary analysis. It sits in the background of every transaction, scanning vast oceans of data for patterns invisible to the human eye.

The promise is dazzling: faster insights, earlier warnings, and more efficient markets. Yet the perils are equally large. AI's rapid and coordinated responses can produce system-wide dynamics that have no human equivalent, including feedback loops that no one controls. The same systems that make finance more efficient can also make it more fragile.

How can we ensure that this new intelligence

serves the system rather than undermines it? Curiously, the answer may lie in an old idea from science fiction.

### Asimov's laws

In the 1940s, Isaac Asimov imagined intelligent robots governed by three simple principles: They should avoid harming humans, obey legitimate commands unless doing so causes harm, and protect their own functioning while respecting those two higher duties. He later added the "Zeroth Law," requiring robots to safeguard humanity as a whole.

Finance now faces a similar challenge. Machine learning models increasingly influence who receives credit, how portfolios adjust, and how supervisors detect risks. They affect how information flows and prices adjust across the economy.

Reinterpreted for financial oversight, Asimov's hierarchy becomes an ethic for AI in finance: It should first do no harm to financial stability or consumer integrity; it should obey institutional mandates without compromising fairness or safety; and it should preserve its own resilience without escaping accountability. Above all, it should serve the higher goal of maintaining the trust on which finance rests.

Yet any analogy to Asimov's laws requires cau-

tion. AI systems have no moral compass. Their generative nature makes it easy to circumvent broadly accepted principles. Real-world failures show that hard-coded constraints are fragile.

### Doing no harm

A large commercial bank never truly closes. Its systems work continuously across time zones, processing transactions, updating exposures, and scanning for anomalies that might signal fraud or stress. Yet errors happen. AI can misinterpret patterns, inherit historical biases, or reinforce market signals that accelerate volatility.

Asimov's injunction to do no harm has operational meaning: The obligation to prevent damage applies not only to consumers but to the stability of the system itself. That requires rigorous testing, sound data governance, and, crucially, explainability—because when an algorithm cannot justify its decision, neither can the institution that depends on it. Current AI models cannot explain their reasoning; they can generate post hoc narratives. This makes explainability an institutional—not a technical—requirement.

AI's macro-financial effects can be large. When algorithms react to new information at machine speed, price adjustments and liquidity shifts become sharper and more synchronized than in human-driven markets. Episodes such as the 2010 flash crash show how automated systems can impact markets long before policymakers can intervene.

Today's environment is even more complex. AI does not merely react faster; it reacts *differently*. Its internal logic not only accelerates the feedback loop between information and action, it *reshapes* it. AI-driven models influence credit pricing, asset allocation, and risk premiums in ways that reinforce each other. When they collectively adjust strategies—because they interpret signals similarly or their optimization routines converge—they can affect the transmission of economic shocks and the policy response of central banks.

### Obedience and judgment

Obedience is built into AI. It optimizes whatever goal it is given—profit, accuracy, compliance. But blind obedience is dangerous in finance, where trade-offs are moral as well as technical. A credit model designed to minimize default may respond by excluding entire high-risk groups, deepening inequality rather than managing it. A trading algorithm tasked with maximizing returns may exploit micro-price signals so efficiently that it destabilizes markets.

AI uses may be legitimate. However, they must remain tools, not decision-makers. They should

inform judgment, not replace it. Monetary policy, financial supervision, and crisis management require human discretion. Models cannot drive these functions, especially if they are trained on past data and cannot predict new shocks. And because AI alters expectations, it may weaken the traditional signaling channels through which policy operates. Humans fail too; as the saying goes, policymakers are always best prepared for the previous crisis. The lesson is not that machines fail or people do, but that both must learn together—each aware of the other's blind spots.

Despite all the code and computation, finance remains a human enterprise. Judgment, empathy, and responsibility cannot be automated. Central banks, regulators, and financial institutions must therefore cultivate not only data literacy but ethical literacy. AI can augment oversight, but governance remains a moral task.

### Resilience and accountability

The law of self-preservation translates into resilience. AI systems must function reliably under stress, and institutions must be accountable for their algorithms.

Technical resilience means redundancy, monitoring, and testing under extreme scenarios. Institutional resilience means openness: Regulators should be able to audit AI decisions, even when proprietary code is involved. This requires the skills and tools to validate and challenge companies' AI models.

The Bank for International Settlements (BIS) Innovation Hub has developed prototype tools to help supervisors analyze large datasets and detect anomalies. These efforts are promising, and their underlying principle is simple: If an algorithm affects financial stability, it should be open to supervisory scrutiny.

Secrecy breeds fragility. When models are black boxes, errors accumulate unseen. The global financial crisis of 2008 is a reminder that complexity without transparency leads to collapse. AI raises the same warning in digital form.

Accountability also extends to governance. Financial institutions should have AI risk officers, parallel to chief risk or compliance officers, ensuring that algorithms are explainable and auditable. Regulators, in turn, must develop AI literacy to interpret and challenge the outputs they receive. The goal is not to slow innovation but to make it safe, fair, and comprehensible.

### A higher law

The Zeroth Law—no harm to humanity—finds its real-world equivalent in the preservation of trust. Trust is the invisible infrastructure of finance.

If AI undermines that trust—by being biased, unstable, or unaccountable—it threatens the foundation of the system. But when aligned with the public interest, AI can enhance trust. It can detect fraud faster, make supervision more proactive, and extend financial access to those long excluded.

AI's higher law, then, is to serve the social contract of money—to reinforce confidence, fairness, and stability. Every institution that uses AI should be judged by whether it strengthens or weakens that contract.

AI's impact is particularly visible in emerging markets, where digital finance is evolving rapidly and data scarcity has long constrained access to credit and public services. Rather than replacing existing digital tools, AI magnifies what these systems can do by extracting patterns from large, unstructured datasets that traditional models cannot interpret.

In Kenya, for example, mobile-money ecosystems such as M-Pesa generate rich transaction footprints increasingly analyzed by AI-based scoring models. The behavioral patterns and cash-flow regularities that emerge allow lenders to assess risk for borrowers with no formal credit record. This has expanded credit access for small entrepreneurs and previously unbanked populations. In India, digital identity systems and real-time platforms are paired with machine learning tools that aim to better target government transfers and expand microloan access.

But AI can also entrench exclusion. Data poverty—limited or biased data—means entire communities remain invisible to algorithms. If women, rural populations, or informal workers are underrepresented in datasets, they will be underrepresented in outcomes.

International organizations are stepping in. The IMF and the World Bank are increasingly integrating digital finance and AI governance issues into their capacity-building programs.

## Global coordination

AI moves faster than regulation and across borders faster than money. Yet there is a lot policymakers can do within existing mandates and legal frameworks while the law catches up. Cross-border coordination is essential to prevent fragmentation and to ensure that a global regulatory approach to AI in finance emerges, building on evolving international best practices.

The Financial Stability Board, the BIS, and the IMF are exploring frameworks for responsible AI. A global set of principles—analogue to the Basel Core Principles for banking—could ensure consistency while allowing flexibility. Such a framework would emphasize fairness, explainability, account-

ability, and proportionality.

The IMF, through its surveillance and technical assistance, could help countries identify AI-related financial risks, share best practices, and avoid a digital divide in supervision. To this end, it should attract skilled professionals from the research and fintech communities. The BIS could host a repository of supervisory algorithms, allowing regulators to collaborate on open-source models.

The World Bank and regional development institutions can complement these efforts by building AI capacity and digital infrastructure in emerging markets. Through their technical assistance, policy dialogue, and financing instruments, they can help countries design responsible AI frameworks for financial inclusion, strengthen data governance, and integrate ethical AI standards into digital finance ecosystems.

Together, these institutions can ensure that the benefits of AI extend beyond advanced economies. The goal is digital multilateralism: ensuring that AI serves all economies. No country can manage these dynamics alone.

## AI financial laws

Asimov's laws distill moral complexity into clear priorities: Protect people, obey within limits, preserve responsibly, and serve humanity. In an age when technology outpaces law, such simplicity is priceless.

The choice is not between progress and prudence, but between intelligent governance and blind automation, remembering that even as machines learn, humans remain responsible. The future of finance will increasingly be written in code. Yet the principles behind it must remain human. A system governed by safety before obedience, transparency before secrecy, trust before profit would not eliminate risk, but it would make it manageable and moral.

If central banks, regulators, and financial institutions embrace these principles, AI could become a stabilizing force rather than a source of fragility. It could extend financial inclusion, enhance oversight, and strengthen the legitimacy of monetary systems.

These same principles must be reinforced through international cooperation—ensuring that AI supports a financial system that is not only safer and fairer, but also more coherent at the global level. The challenge, for supervision and policy alike, is to ensure that as intelligence becomes artificial, judgment remains real.

The machines are learning. So must we. **F&D**

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# Taxing Harmful Habits

Christoph B. Rosenberg and Marius van Oordt

## TAXES ON SMOKING, DRINKING, AND SUGAR SHOULD BETTER ALIGN WITH THE HARM THEY CAUSE

“Nothing can be said to be certain, except death and taxes,” Benjamin Franklin famously wrote in 1789. But what if the latter could at least delay the former? That’s one reason for excise taxes on unhealthy products like alcohol, tobacco, and sugar.

Such taxes are an attractive way to both mobilize much-needed domestic tax revenue and encourage healthier behavior, especially in low-income countries as aid budgets are drying up. Nudging people to smoke and drink less also helps reduce public health expenditures.

In fact, such “sin” or “behavioral” taxes have existed for millennia: Taxes on beer were recorded in ancient Egypt as early as 2400 BCE. They endure, in part, because they are relatively easy to collect. But in recent years, fresh challenges have arisen as a plethora of new products have entered the market. Think of e-cigarettes, nicotine pouches, and low-alcohol beer. To achieve health goals, policymakers must keep up with these developments and streamline their often-patchy taxation systems. Combining tax and health data makes this job easier.

### Steady revenue

When budgets are tight, excise taxes—including on tobacco, alcohol, and sugar—have proved a reliable and politically palatable source of government revenue, yielding on average about 2 percent of GDP in both advanced and developing economies. They are becoming more popular in developing economies but have recently declined in advanced and emerging market economies, mainly because of revenue erosion through inflation and changes in consumer behavior. Taxes on smoking yield the most revenue, followed by alcohol. Those on sugary drinks—still relatively uncommon—typically raise more modest revenue.

How can governments optimize both the tax intake and health benefits from such taxes? Simply raising rates won’t do the trick: Sooner or later, smokers and drinkers—rather than quitting—will shift to untaxed or illicit alternatives. A better understanding of health risks and of how consumers and producers respond to taxes can guide policy decisions. This calls for a comprehensive approach built on three principles: Capture *all* unhealthy products, align tax rates with the potential harm to health, and cooperate across borders to limit evasion and smuggling.



### Catch 'em all

Most countries impose some excises on unhealthy behavior, but examples of leaky tax nets abound. In Hong Kong SAR, for instance, wine is not taxed at all, but distilled spirits face rates exceeding 100 percent. In the African nation of São Tomé and Príncipe, palm wine, one of the country's most widely consumed beverages, is exempt; all other alcoholic drinks are taxed. And in Ethiopia, khat leaves, a popular recreational stimulant associated with oral, cardiovascular, and mental health problems, remain untaxed despite heavy taxes on alcohol and tobacco. Closing such loopholes could boost revenue and improve public health.

### Price the harm

But policymakers need to think more broadly about how to change unhealthy behavior. Ideally, the level of taxation should reflect the degree of harm a product is likely to cause while still safeguarding overall revenue.

The difficulty lies in defining that harm, both directly to the consumer and indirectly to others (for example, secondhand smoke or drunk driving). The

harm depends partly on what a product contains—such as ethanol in alcoholic drinks, added sugar in sweetened beverages, toxic chemicals in tobacco products—and partly on how these substances or their components are administered. It also depends on consumption patterns: how much people use, how frequently, and whether they combine them with other harmful consumption. Such behavior is impossible for policymakers to observe or account for when setting tax rates. So a workable approach is to tax products on the amount of the harmful substance and its mode of administration (such as burning versus heating tobacco), based on average consumption patterns.

This idea is not new. Spirits, for example, have long been taxed more heavily than beer or wine, reflecting their higher alcohol content. What has changed is the evidence base. Advances in medical research, together with better data on the relationship between substances, modes of administration, and health risks, now make it easier to link taxation and harm systematically and consistently.

Many countries already tax drinks based on sugar or alcohol per liter so that they can better capture the health risks associated with new prod-

ucts entering the market. This strategy aligns with broader societal trends as consumption patterns in many advanced economies shift: When baby boomer parents reach for a cocktail, their Gen Z children increasingly opt for a mocktail instead.

As part of a long-term strategy, such harm-based taxation also encourages suppliers to adjust their product portfolios. German brewers’ nonalcoholic beer, for example, already accounts for about 9 percent of sales, and research and development are focused on producing an expanded range of such varieties. Once the industry knows the direction of travel in taxation, it will adjust.

### Harm of smoking

Nicotine products present a particular challenge. As smoking bans take hold and preferences change, alternatives to traditional cigarettes—from e-cigarettes to heated tobacco products to nicotine pouches—cater to those who can’t kick the habit. The good news is that many of these new products, while still harmful, reduce exposure to toxicants (see Chart 1). It therefore makes sense to tax them at a lower rate, which can be adjusted as research becomes available and revenue needs evolve.

New Zealand is a good example of how taxation may help wean people off smoking. Over the past 15 years, successive governments have increased the

excise rates for combustible tobacco products by 10 percent or more a year, in a deliberate strategy to widen the tax differential with less harmful alternatives. Overall, the proportion of people smoking cigarettes dropped from 18 percent in 2012 to 8 percent in 2024; the uptake of less harmful e-cigarettes increased from near zero to 14 percent over the same period. Causality is hard to establish, but it seems plausible that rising price differentials in part caused this shift. Tax revenues rose until 2020 but have since declined somewhat.

The EU is encouraging members to pursue a similar strategy. Most already differentiate between combustible and noncombustible tobacco products in their excise tax regimes. The European Commission’s recently published draft Tobacco Excise Directive proposes minimum rates for 13 product categories; taxes cigarettes and loose tobacco at similar levels; and sets significantly lower rates for e-cigarettes, heated tobacco products, and nicotine pouches. No tobacco or nicotine product is exempt from taxation, and rates are set to keep pace with or exceed inflation.

### When pricing goes wrong

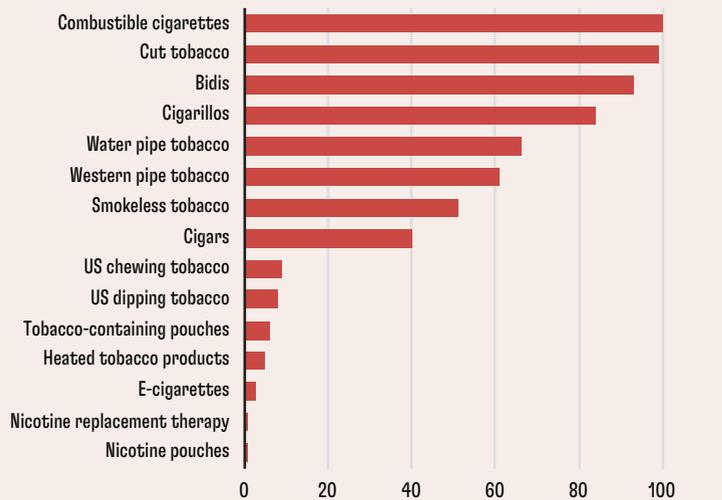
In many low-income countries and emerging market economies, however, tax rates provide perverse incentives. In particular, harmful smoking and drinking products, often locally produced, face low excises. In South Africa, for example, the tax on a unit of alcohol in traditional African beer is roughly one-fiftieth what it is on a unit of alcohol in other beer. Similarly, India taxes bidis, locally produced cigarettes made of unprocessed tobacco, significantly lower than filtered cigarettes, and smoke-free alternatives are banned. Such misalignment falsely signals lower health risks, sustains consumption in often more dangerous products, and diverts investment toward the wrong industries. While often justified on distributional grounds, such pricing is therefore counterproductive when it comes to protecting low-income groups, who often disproportionately consume traditional products.

Looking across Group of Twenty countries and product types, the picture for harm-based taxation is mixed (see Chart 2). Taxation is most comprehensive for tobacco, somewhat less so for alcohol, and very patchy for sugary drinks. Sometimes bans replace taxation—for example, for novel tobacco products in Argentina and Türkiye; Saudi Arabia doesn’t tax alcohol, because until recently it was outlawed altogether. Still, there has been much progress in just the past few years; previously, policymakers rarely set tax rates with health considerations in mind. But there is considerable scope to better align tax rates with the harm of the substances they are meant to target.

CHART 1

## Degrees of harm

Alternatives to traditional cigarettes reduce toxicant exposure, and it’s sensible to tax them at a lower rate. (relative spectrum of potential harm of 15 nicotine product categories)



SOURCE: Murkett, Rugh, and Ding 2022.

CHART 2

## Misaligned taxes

There is considerable scope to better align tax rates with the harmful substances they are meant to target.

(alignment of health taxes with potential harm across products in G20 countries)



SOURCE: Updated from van Oordt and Mensah 2024, with information from country authorities.

NOTE: **Misaligned:** Some products are untaxed and others misaligned. **Partial alignment:** All or most products are taxed, but relative rates distort incentives (e.g., noncombustible products are taxed like combustible products). **Strong alignment:** Tax rates are proportionate to relative health risk or harm across all or the majority of subproducts.

### Cooperation across borders

To get the most out of harm-based health taxes, countries must work together to account for regional market dynamics. Large tax differences across borders can motivate consumers to seek out cheaper options next door, reducing both health impact and revenue.

For example, when Finland substantially lowered its alcohol tax in 2004, sales of spirits surged to 150 percent in some towns on the border with Sweden. A recent study in Norway, another heavy taxer of alcohol, used COVID-era border closings and store-level data to identify similarly large cross-border shopping effects. EU-wide, annual cross-border alcohol purchases are estimated at 1.4 billion liters, resulting in excise duty losses of some €4 billion annually.

The problem is not limited to densely populated and border-free Europe. Paraguay’s very low tobacco taxes, for example, have turned it into a hub for cigarettes traveling to higher-tax neighbors: These cheap products now make up roughly 20 percent of Brazil’s cigarette market and cost that country about \$400 million in lost revenue each year.

Where such cross-border shopping is illegal, stricter enforcement can certainly help. But ultimately only a closer dialogue across countries and stronger consensus on the classification of ever-evolving new product lines will prevent the erosion of harm-based tax regimes.

### The way forward

Taxation is more than a fiscal instrument; it is a powerful lever for shaping healthier societies. Linking excise taxes to relative health risks can reduce preventable diseases while supporting sustainable revenues, particularly when applied comprehensively and consistently. Conversely, loopholes, misaligned incentives, and fragmented approaches lead to revenue losses and continued exposure to avoidable harm. Tax systems must therefore shift with evolving consumption patterns and product offerings.

That shift cannot happen in isolation. It requires internationally shared principles on how to curb cross-border arbitrage and illicit trade. Global institutions such as the IMF, and especially regional bodies like the EU and the African Union, are pivotal in advancing frameworks that align taxation with harm and promote innovation toward safer products. Such advances will strengthen both public health and fiscal resilience. **F&D**

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# Digital Infrastructure

Diane Coyle, David Eaves, and Beatriz Vasconcellos

## FINANCE MINISTRIES MUST THINK ABOUT DIGITAL PUBLIC INFRASTRUCTURE AS THEY DO ROADS AND POWER GRIDS

**A** government wouldn't build a dozen roads connecting the same two places. But this happens often with digital services. Countries allocate billions to IT spending without realizing the need to treat these systems as shared infrastructure. This siloed approach fragments systems, making it harder to share or leverage data among public agencies and with the private sector.

What if we treated a set of core digital systems—such as digital IDs, payments, data exchange platforms, credentials, and other shared services that drive core functions across government and the economy—the same way we treat roads or power grids? As essential, long-term, shared systems designed for repeated use.

This approach requires two significant conceptual shifts beyond the usual focus on technology. The first is economic. If roads connect places, digital public infrastructure (DPI) connects institutions and multiplies the potential for value. A digital

ID—India's Aadhaar system, for instance—delivers direct efficiency savings, reducing fraud and benefit claims. Its value grows with use, such as improving service targeting or enabling secure access to education and health care. Over time, it can reshape or grow markets. A digital ID system for universal identity verification can lower compliance costs for financial institutions, expand access to credit, and open the door to new business models across the economy. In India, Aadhaar dramatically lowered know-your-customer costs and fueled a dramatic increase in cell phone adoption.

DPI's largest economic impact, like that of other types of infrastructure, stems not from immediate effects but from the broad economic activities they enable, like a new railway line that spurs growth along its route. Malawi, for example, significantly improved credit markets by making it possible for lenders to verify borrowers' identities more accurately when it introduced biometric identification. This unlocked new economic opportunities by



reducing default risk and expanding credit access, particularly for marginalized groups.

These positive outcomes aren't guaranteed, however. Many countries have invested in DPI, but neither govern nor finance it as infrastructure. A global DPI mapping initiative, led by University College London, identifies over 64 national digital identity programs, 97 digital payment systems, and 103 data exchange platforms with infrastructure-like potential. Yet few are widely used. Only about half of national ID systems are used by more than two public services. South Africa has eight national data exchange platforms operating in isolation.

## State capacity

The second conceptual shift relates to state capacity. The advent of digital technologies has raised citizens' expectations of what constitutes good service—namely, speedy, effective, and frictionless. These outcomes depend on a range of underlying capabilities, especially the ability to connect and take advantage of different datasets. However, the siloed development of digital services, authentications, and applications—common across the public sector—not only increases costs and complexity but also hits smaller services harder and reduces the state's capacity to integrate data and respond effectively.

Collectively, without a broad view of digital infrastructure, state capacity diminishes. Governments' credibility, resources, and ability to adapt quickly and respond to emerging problems with new programs and policy responses decline. Failure to adopt a broad strategic framework for digital infrastructure will strain the economy and government efficiency, particularly in an era of growing geopolitical, economic, and environmental instability.

Finance ministries know this. Over the past year we've held a series of workshops with treasury and finance officials from over 50 countries, and many highlighted DPI's potential to reduce duplication, cut administrative costs, improve tax collection, and strengthen oversight. But across the board, officials emphasized a key concern: Value for money must be visible and visible quickly.

This partly explains the continued duplicative and fragmented efforts of many finance ministries when it comes to funding digital systems. These ministries acknowledge growing research showing that traditional appraisal methods, such as cost-benefit analysis, do a poor job of capturing the total value of infrastructure. These project-oriented tools tend to oversimplify complex system links, prioritize short-term results, overlook spillover effects, and fail to capture distributional

aspects. As one finance official put it, "There's no category in the budget for systems that benefit everyone but belong to no one."

## Government-wide change

Our workshops and a policy paper with Sumedha Deshmukh encapsulate the real challenge: Turning software into infrastructure takes more than good technical design. Digital ministries alone often struggle to drive government-wide change because they typically lack control over budgets, the authority to coordinate across ministries, or the institutional leverage to enforce shared standards. Finance ministries can fill these gaps, thanks to the critical fiscal and coordinating authority necessary for adoption and sustained support. The ability to steer the adoption of infrastructure—aligning ministries, setting standards, and mandating repurposing of existing resources—is also critical. These shifts are of course not straightforward, given three core issues that often stand in the way.

*The first is coordination.* Finance ministries recognize that digital infrastructure is necessary for interoperability and efficiency—but they're also expected to respect the autonomy of other ministries. In practice, they often play a reactive role, assessing proposals rather than shaping digital strategies from the outset. "We're goalkeepers, not strikers," as one official put it. In many cases, technical expertise lies elsewhere. Governments must implement a strategic approach that permits the finance ministry to support efficiency gains and innovations generated by shared platforms.

*The second is financing.* DPI needs long-term investment to build, maintain, and upgrade systems. Yet political and budgetary pressures usually favor quick wins. Several officials at our workshops were concerned that donor-driven projects were being launched without clear plans for long-term funding. Dispersion of DPI spending across many budget lines also makes it harder to plan and manage infrastructure as a coherent whole.

*The third is appraisal.* Most digital proposals are assessed using cost-benefit analysis tools that struggle to capture DPI's long-term, cross-sector spillovers. Officials noted the challenge of projecting returns from shared platforms, especially when value comes not from direct savings but from better services, less leakage, or brand-new capabilities. Many stressed the need for clear applications for the DPI and early success to build momentum, even when broader benefits may take years to materialize. The problems identified suggest that DPI considerations should be embedded in governments' public investment management frameworks and multiyear budgeting plans.

## From gatekeepers to stewards

Our research also reveals interesting patterns around the world about new ways ministries of finance are engaging in long-term investment and alternatives to cost-benefit analysis. Across countries, three roles are emerging—not as fixed models, but as a spectrum of ways authorities can engage.

Some ministries act as evaluators, assessing digital proposals with an eye toward infrastructural potential. In the UK, the shared notification system for the whole government, GOV.UK Notify, has quietly become a benchmark—prompting broader discussions about how to appraise shared digital systems. As the UK launches more digital infrastructure services, such as GOV.UK Pay and GOV.UK One Login, debate is stirring about how these services will be financed and assessed appropriately.

Other finance ministries are acting as coordinators and enforcers, using budget processes to align departmental investments, veto duplication, and promote shared use. In Uganda, the Ministry of Finance and the National Planning Authority introduced a programmatic budgeting model that requires agencies to submit IT needs collectively.

This way the ministry can flag overlapping proposals and promote existing infrastructure as a default option. Procurement policies now require clearance from the national information technology regulator, which reinforces technical standards and usability. As one official noted, “There’s no justification for an agency to procure a service we already have.”

In rare cases, finance ministries take on full implementation of core DPI components. For example, CamDX, in Cambodia, a data exchange platform, initially focused on business registration but now does much more.

These roles aren’t mutually exclusive. What they share is an understanding that DPI isn’t just a technical investment—it’s a public asset. Finance ministries don’t need to build it—they need to shape the logic, incentives, and conditions for its success. Strategic stewardship, not just fiscal oversight, is critical to unlock the full potential of digital systems as infrastructure.

Central to these roles is how finance ministries navigate the governance of this new digital infrastructure, particularly given their central responsibility for budgeting, managing fiscal risks, and ensuring value for money. As guardians of public resources, finance ministries are uniquely positioned to address critical challenges such as financial sustainability, effective long-term stewardship, and maintaining public trust.

## A digital state

As governments adopt AI and digital services, the cost of maintaining fragmented systems—from data storage to computing power—will rise sharply. Shared digital infrastructure provides a solution: scalable, integrated platforms generating lasting public value. This will require new state capacities, particularly around governance and trust. Digital identities, payment systems, and data exchanges that reinforce surveillance or fail to reduce administrative burdens risk rejection by citizens.

Ultimately, as digitalization continues, the risk of continued fragmentation, and its economic and societal costs, will only grow. These costs can be especially high during a crisis. During COVID, for example, the US allocated \$800 billion to its Paycheck Protection Program. At best, only between a quarter and a third of those resources reached the workers most in need, while the rest ended up with wealthier households, according to an analysis by David Autor and colleagues at the American Economic Association. “Harnessing modern administrative systems, other high-income countries were able to better target pandemic business aid to firms in financial distress,” they concluded.

As more governments and donor agencies eschew digital duplication in favor of shared infrastructure, finance ministries have an important role to play. Without their leadership, digital infrastructure risks becoming a graveyard of pilot projects too fragmented and expensive to sustain. Finance ministries must steer a critical shift: from funding isolated projects to launching shared infrastructure; from short-term savings to long-term public value; and from fragmented ownership to institutional stewardship. **F&D**

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# Gold's Lasting Luster

Pratik Ghansham Salvi

## WHY GOLD RETAINS ENDURING VALUE IN AN ERA OF DIGITAL ASSETS

For more than five millennia, humanity has been captivated by gold—the immutable metal that has illuminated temples, crowned emperors, and underpinned monetary systems. Its story is as much about economics as it is about psychology. Across the centuries, gold has functioned as currency, ornament, reserve, and metaphor—embodying the human desire for permanence in a world of change. In an age of cryptocurrencies, artificial intelligence, and central bank digital currencies, its persistence raises a question both ancient and modern: Why does gold still hold value?

Gold's legacy as a standard of value began long before modern finance. The Lydians were among the first to mint gold coins in the seventh century BCE, transforming trade through standardization. Ancient Egypt and Rome regarded it as divine, associating its incorruptible gleam with eternity. In economic terms, its durability, scarcity, and divisibility made it uniquely suitable for money. It did not rust, could be stored indefinitely, and existed in limited quantities—a perfect medium of exchange.

By the 19th century, gold had become the foundation of the global financial order. Under the classical gold standard, the British pound, the world's premier reserve currency, was directly convertible into a

fixed quantity of gold held in the Bank of England's vaults. This system, adopted by much of the industrial world, imposed fiscal discipline and constrained governments from printing excessive money. It fostered confidence in international trade and investment by guaranteeing stable exchange rates. Yet the same rigidity that ensured stability also bred fragility. During the Great Depression, adherence to the gold peg turned downturns into deflationary spirals, deepening unemployment and suffering.

The postwar world sought a compromise through the Bretton Woods system of 1944, which tied the US dollar to gold at \$35 per ounce, with other currencies pegged to the dollar (see Chart 1). This arrangement rested on faith in US economic might. But by the late 1960s, US deficits from the Vietnam War and domestic spending made the fixed rate unsustainable. When President Richard Nixon suspended official gold convertibility in 1971, the last vestige of the global gold standard disappeared. Currencies became fiat—backed not by metal, but by confidence alone. This marked not the end of gold's power, but its transformation.

### Investment refuge

In the decades since, gold has evolved from a monetary anchor to an investment refuge—the default



asset in times of fear. During the oil shocks and inflationary 1970s, its price rose 20-fold. In the 2008 financial crisis, as credit markets collapsed, it soared past \$1,000 per ounce. Again, during the pandemic turmoil of 2020, gold touched record highs near \$2,000. Even as central banks raised interest rates in 2023 and 2024, gold continued to attract buyers. China, India, Türkiye, and Poland led an unprecedented wave of central bank purchases exceeding 1,100 metric tons, reflecting efforts to diversify reserves away from the geopolitical vulnerability of the US dollar. In an increasingly fragmented world, gold's neutrality—it belongs to no nation and carries no counterparty risk—makes it the ultimate political hedge.

These central bank purchases helped drive another run-up in gold prices with the metal soaring above \$4,000 an ounce in late 2025. Worries about the direction of monetary policy, increasing government debt, and inflation also contributed to the gold rush, which saw prices leap about 40 percent, the biggest yearly increase since 1979. Gold holdings in US exchange-traded funds increased more than 40 percent, approaching \$200 billion. Prices rose above \$5,000 an ounce amid deepening geopolitical divisions in early 2026 before dropping back below \$4,700.

Economically, gold's enduring value rests on three traits: scarcity, durability, and trust. Global mining adds barely 1.5 percent to the total above-ground stock each year—far slower than the growth of money supply or digital liquidity. Every ounce ever mined, about 210,000 metric tons, still exists in some form, whether as bullion, coins, or jewelry. This physical near permanence is unmatched by any financial asset. Yet gold's worth cannot be reduced to geology. It derives from a shared social consensus: a collective belief that this particular metal, among all others, embodies safety and value. As economist Robert Mundell once observed, gold endures not because of intrinsic utility, but because of “the trust we place in its uselessness.”

Gold's role as an inflation hedge is both celebrated and misunderstood. Its price tends to rise not merely with inflation, but with the erosion of faith in monetary policy. When real interest rates turn negative—when holding cash or bonds yields less than inflation—gold becomes relatively more attractive. Its performance during the stagflation of the 1970s and the uncertainty of the 2010s reflected precisely this mechanism. However, during periods of stable inflation and robust economic growth, gold often languishes. It is not a vehicle of prosperity; it is insurance against prosperity's absence.

## Psychological anchor

For investors, gold functions as a psychological anchor. It promises nothing except permanence. A portfolio allocation of 5–10 percent to gold is often recommended not for returns but for balance—its inverse correlation with equities provides stability during market crises. Modern financial products like exchange-traded funds, sovereign gold bonds, and digital gold accounts have democratized access to the metal, especially in emerging market economies where trust in financial institutions remains uneven.

Culturally, gold remains embedded in societies far beyond the logic of markets. In India, households are estimated to hold more than 25,000 metric tons—more than the combined reserves of the top 10 central banks. It serves simultaneously as adornment, dowry, and saving instrument. Gold purchases peak during festivals and weddings, driven by both tradition and economic prudence. In China, gold’s symbolism is equally enduring: It represents virtue, luck, and stability. During financial downturns, retail investors flock to buy gold ornaments, blurring the line between emotion and investment.

The rise of crypto assets has revived old debates about what constitutes value. Bitcoin, often called “digital gold,” mimics its scarcity through algorithmic

design, with a fixed supply of 21 million coins. Yet the comparison is incomplete. Bitcoin is volatile, intangible, and dependent on digital infrastructure. Gold, by contrast, carries the weight of millennia of trust. It is a physical reality, immune to code failures or regulatory bans. If Bitcoin represents the future of speculative belief, gold embodies the memory of collective faith. Both reveal that money, at its core, is a social construct—a shared story we tell about what matters.

## Geopolitical buffer

In the political economy of the 21st century, gold is again becoming strategic. As Western sanctions have frozen foreign reserves and weaponized the dollar system, countries like China and Russia have turned to gold as a geopolitical buffer. It is the only asset that lies outside the control of any government or central bank network. The People’s Bank of China, for instance, has been steadily increasing its holdings, now surpassing 2,300 metric tons. The Reserve Bank of India, too, has expanded its reserves to about 880 metric tons. Gold has returned to the stage not as a standard of value, but as a sovereign shield in an era of contested multipolarity.

Philosophically, gold raises deeper questions about what we mean by “value.” Economists have long argued over whether value arises from labor, utility, or perception. Gold, while limited in utility, is labor-intensive to extract and immense in perceived worth. Its appeal endures precisely because it reconciles material and metaphysical needs—the tangible assurance of scarcity with the intangible comfort of faith. John Maynard Keynes derided it as a “barbarous relic,” yet even he could not erase its psychological hold. Humanity craves symbols of stability, and gold, impervious to decay, offers that illusion of eternity.

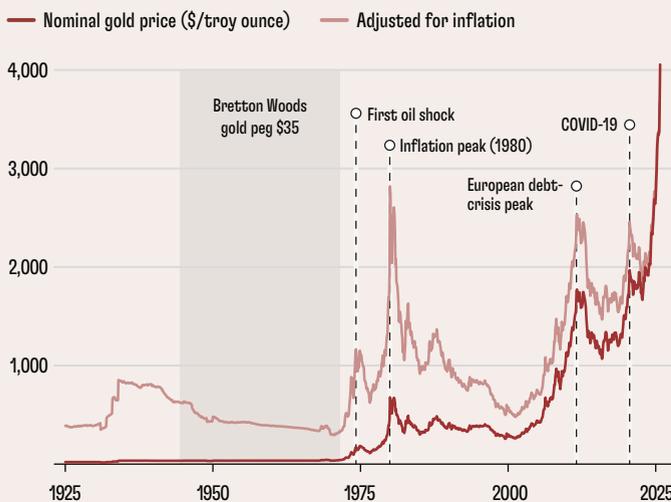
Financial innovation—from tokenized gold on a blockchain to AI-driven trading platforms—may redefine how gold is owned and exchanged. Yet beneath these technological layers, gold’s essence remains unchanged. Its price will continue to fluctuate, but its meaning will not. Gold endures because trust is fragile, and belief—not metal—remains the ultimate foundation of value. In a world awash in digital abstractions, the timeless weight of gold reminds us that real wealth is as much about memory as it is about money. **F&D**

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CHART 1

## A century of gold

Gold has tracked inflation, crises, and policy shifts, and its 2025 jump marks the strongest rise in decades.



SOURCES: Timothy Green (via World Gold Council); IMF; US Bureau of Labor Statistics/Federal Reserve Economic Data; and World Bank.

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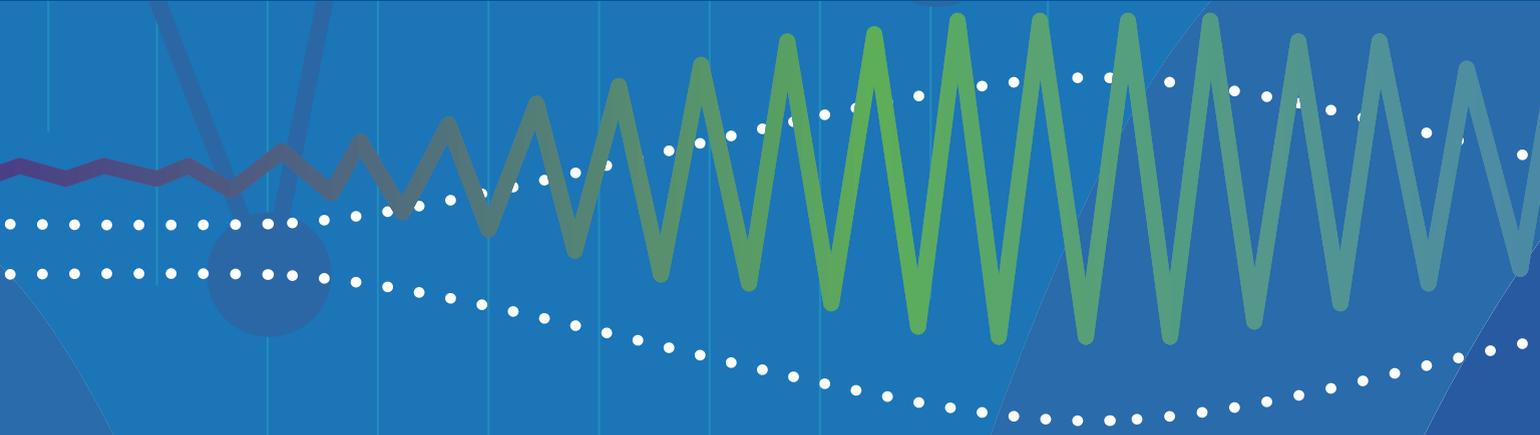
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## People in Economics

# A Maritime Mind

Jeff Kearns profiles Harvard's **Myrto Kalouptsidi**, who is decoding how shipping and industrial policy shape the global economy

**INTERNATIONAL TRADE HAS** long obsessed the world's economists, but thanks to Harvard's Myrto Kalouptsidi, they're better able to gauge the business of physically transporting billions of tons of merchandise around the world.

The shipping industry's importance came into sharp relief as this century's historic disruptions exposed the fragility of global supply chains. The industry nearly collapsed in 2008 amid the global financial crisis. Then came seemingly unending shocks—the pandemic, overwhelmed ports, container shortages, Red Sea attacks, paralyzing mishaps from Suez to Baltimore, and roiling trade wars.

For the past decade and a half, Kalouptsidi has explored the maritime shipping industry and how it enables \$20 trillion a year in international trade. Her work has reshaped trade economics, uncovering the hidden mechanics that influence everything from supply chains to public policy. She and her collaborators demonstrate how shipping costs shape world trade, shed light on distortions from industrial policy related to shipbuilding, and show the importance of specific waterways.

“Myrto's work exemplifies how state-of-the-art microeconomic research can inform major policy debates, including the detection and evaluation of industrial policies,” said Pinelopi Goldberg, an economics professor at Yale and former World Bank chief economist. “Her research is widely regarded as a model for policy-relevant scholarship.”

Born, raised, and educated in Athens—an iconic seafaring hub for millennia—Kalouptsidi has always loved the sea. Athens is the center of the world shipping industry. A fifth of the global fleet is Greek, including a quarter of bulk carriers and almost a third of oil tankers. But it was by chance that shipping became the defining focus of her research.

Inspiration struck two decades ago, when Kalouptsidi was a doctoral candidate at Yale focusing on industrial organization. As she searched for a thesis on how industries evolve, a childhood friend from Athens introduced her to the market for ships, fueling an academic focus on the business of maritime trade and how it affects the global economy.

Kalouptsidi explores how the shipping industry shapes global trade.

The friend, Danae Bati, was working as a ship broker when she reconnected with Kalouptsidi over coffee in mid-2007. Kalouptsidi was just beginning to think about container shipping.

“She had something in mind, and she needed data,” Bati said. Kalouptsidi was curious about everything from vessel routes and charter rates to fleet sizes and commercial databases. Bati gave her printouts that illuminated a new world.

“It was phenomenal data,” Kalouptsidi said. “I didn’t know for years what I was going to do with it.” More meetings followed with others at Bati’s office in Piraeus, Athens’ Mediterranean port.

Bati introduced Kalouptsidi to her mentor, George Banos, a veteran broker and consultant. He gave her data, anecdotes, and British economist Martin Stopford’s textbook: *Maritime Economics*.

“He knew the ins and outs of how things worked because he’d started as a sailor, then was a captain, then he moved up,” Kalouptsidi said. Banos died in 2015.

Kalouptsidi’s work focuses on two areas: industrial policy and how transportation and trade broadly affect economies. In both, she came early to subjects that later captured the world’s attention.

“I’ve been digging into, for 15 years, how shipping booms and busts happen, how they affect the world around us, and the dynamic path of an industry,” Kalouptsidi said. “What I like most about this is how it reflects the macro economy—studying a microcosm of the bigger system.”

## Industry introduction

Kalouptsidi, 43, says she grew up “between transportation and theory.” Her mother is a civil engineer whose work includes part of Athens International Airport, and her father is a mathematician and computer scientist.

As an undergraduate, Kalouptsidi studied economics at the University of Athens; in 2005 she earned a master’s in economics at Athens University of Economics and Business. She completed her doctorate at Yale in 2011. The *American Economic Review* published her thesis on how the time it takes to build bulk cargo ships affects investment in vessels.

“Myrto has a rare instinct for seeing importance long before the rest of the field does,” said Theodore Papageorgiou, Kalouptsidi’s husband, a fellow Athenian, an economics professor at Boston College, and a frequent research collaborator. Shipping wasn’t on economists’ radar, he said. “She’s drawn to problems nobody is working on but that matter enormously once you look closely.”

Shipping markets are much more volatile than stock markets, Kalouptsidi said. She learned that as she expanded her research just before the global financial crisis. “When I started interviewing ship owners, they were all ecstatic,” she said. “They thought it was the best time for shipping, and they were all buying ships—it was just exuberant.”

Then came the collapse. The global benchmark measure of bulk shipping rates, the Baltic Dry Index, quadrupled in two years—then plunged more than 90 percent in late 2008.

The ensuing upheaval “completely changed my interest” in research areas to focus on shipping, Kalouptsidi said. It was hard to watch her hometown during trips home as the crisis worsened. “Our favorite neighborhoods in downtown Athens were really just dying,” she said. “There was just this feeling of decay everywhere.”

Shipping suffered. Many vessels were scrapped. Kalouptsidi’s research took shape as she interviewed more experts. She focused on bulk shipping and the market for vessels. The container shipping work, however, would have to wait as she studied the intersection of industrial organization and international trade.

## Transport and trade

Kalouptsidi showed that, despite maritime trade’s ubiquity and 5,000 years of history, its research possibilities are far from exhausted. Little is still known about how markets for transportation interact with the global market for traded goods, she said.

Kalouptsidi teamed up on that question with Papageorgiou and Giulia Braccaccio, a friend and research partner from her time at Princeton. They built a dataset tracking 5,398 ships between

2012 and 2016, with price and route data based on 12,007 shipping contracts. This yielded a model of the interactions between transportation markets and the global goods trade, including the process for matching cargo to ships.

The resulting paper broke new ground by modeling the transportation market to show how shipping costs shape global trade.

The Econometric Society published the work in its journal and awarded the paper its biennial Frisch Medal in 2022, recognizing it as “an outstanding example of the use of theory and data to analyze a new mechanism and trace its general equilibrium implications for the economy as a whole.”

The data and the model enabled experiments, including on the effects of ships serving on routes with demand in only one direction, such as by big exporting nations. They linked asymmetrical transportation costs to bilateral trade imbalances. And they found that ships sail empty close to half the time.

The model also allowed them to simulate the effects of an economic slowdown in China. Fewer imports would mean fewer ships visiting the country, which would hurt China’s exports. The work can also help policymakers understand the impact of crucial waterways. Closing the Suez Canal, for example, would reduce world trade by 3.5 percent, and in the Middle East trade would fall by a quarter and welfare metrics plunge.

“This paper provides specific, very policy-relevant messages,” said Braccaccio, an assistant professor at New York University. Kalouptsidi embraces experimentation and is open to being wrong, she said. “She’s a real scientist,” she said. “She wants to learn from everyone.”

While the economics of industrial organization often focus on one main trade-off, this research was like building a general equilibrium model with many more variables—making it difficult to identify the most important mechanisms. “It took years of playing with the model and going through revisions,” Kalouptsidi said. “And we did surprise ourselves.”

## “Shipping is basically the spine of the economy. You want to trade? You need ships.”

### Industrial policy

At the start of the 20th century, the United Kingdom dominated global shipbuilding. In the early postwar years, Europe took the lead, then Japan. Around the turn of the century Korea produced the largest share of commercial ships.

China was only a small player in 2002, when it set a goal of becoming the world’s top shipbuilder by 2015. It did so thanks to state-subsidized shipyards, generous loans, and other support.

Kalouptsidi set out to understand how these policies affected the domestic industry as well as the global market. But subsidies are complicated and often opaque.

Kalouptsidi built a model to detect subsidies by identifying the deviations between the data and what standard economic theory would predict. She further developed this in joint work with Panle Jia Barwick, now at the University of Wisconsin–Madison, and Nahim Bin Zahur, now at Queen’s University in Ontario, that showed how China’s support reallocated global ship production and took market share from Japan.

The project took more than a decade and required integrating detailed industry knowledge with a structural framework to understand China’s industrial policy, Barwick said. She credits

Kalouptsidi with bringing “a combination of deep economic intuition and rigorous methodological creativity.”

They showed that subsidies propped up many weak shipyards, inflated prices, sidelined more efficient producers, and left governments paying heavily for ineffective industrial ambitions.

The research also quantified how the policies drew in inefficient producers and contributed to excess capacity. Domestic producers recorded only modest profit gains—and their long-term returns amounted to only 18 percent of the total of subsidies, the authors write.

“Myrto’s work on China’s shipbuilding subsidies is among the best in the new wave of research on industrial policies—and she did it before industrial policies became a hot topic of research,” said Dani Rodrik, a professor of international political economy at Harvard’s Kennedy School of Government. “It sets the benchmark in careful combination of theory and empirics.”

More recently, Kalouptsidi worked with Brancaccio and Papageorgiou to explore how best to invest in port infrastructure, looking at major US facilities. A surprising lesson for policy was how ports in a region function like a network: Investment in one port can reduce congestion elsewhere as more ships load cargo more efficiently and get sailing again. So capital investment should be coordinated and targeted.

### Incisive questions

Kalouptsidi has significantly influenced how economists and policymakers understand industry dynamics in global sectors, particularly shipping and shipbuilding, according to Laurent Daniel, head of the shipbuilding unit at the Organisation for Economic Co-operation and Development. “It has given policymakers a much clearer framework for assessing how subsidies and capacity expansions can reshape global competition and trade patterns,” he said.

At Harvard, Kalouptsidi’s students see her as a patient problem solver. “She has an exceptional ability to help you get unstuck—clarifying mechanisms, sharpening research questions, and

encouraging you not to shy away from ambitious ideas,” said Constanza Abuin, a former student of hers who will join Johns Hopkins University as an assistant professor.

Kalouptsidi asks incisive questions rather than giving direct answers, said Yixin Zhou, a Harvard doctoral candidate.

The next priority for Kalouptsidi is a return to what piqued her interest almost two decades ago: container shipping. The introduction of containerization more than a half century ago revolutionized trade by cutting costs, increasing efficiency, and enabling globalization. Much of her work has examined bulk carriers, which she said are more like taxis because they sail point to point on demand. Their ownership is decentralized. Container ship ownership is concentrated in a handful of companies, and they are more like buses, following fixed routes. Container pricing is harder to obtain, often set in private.

When she first started learning about container ships as a doctoral candidate, she looked for relevant data and never found it. This next step toward this new research—underway with Brancaccio, Papageorgiou and Nicola Rosaia of Columbia Business School—is possible because more data is now available.

Automatic identification system tracking of vessel names, locations, and other parameters is more complete now and the researchers have samples of some specific container rates and routes.

More broadly, Kalouptsidi has shown how shocks in one industry affect entire economies. Historically, it may have been easy to assume maritime trade’s dependability, but recent years have shown how serious the consequences are when trade is impaired, including for inflation.

“We’ve seen so much increase in trade, just-in-time production, and firms sourcing from farther and farther away—but for this to happen, you need the shipping industry working seamlessly,” Kalouptsidi said. “Shipping is basically the spine of the economy. You want to trade? You need ships.” **F&D**

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

## In the Trenches

# The Transformative Central Banker



Bank of Korea Governor **Chang Yong Rhee** explains the institution's evolving role amid broadening economic challenges

**C**hang Yong Rhee has long argued that central banks must adapt to new realities. He became Bank of Korea governor in April 2022, amid a global inflation surge and Russia's war on Ukraine, and saw the economy as on the cusp of a great transformation. Population aging, diminished globalization, a rapidly evolving digital economy, and other issues meant it was time for the central bank to study a broader range of subjects.

"Our responsibility cannot be confined to the boundaries of monetary policy alone," he said in his inaugural address. Rhee also noted the emotion of the moment for an economics major now at the policy forefront. After earning his degree from Seoul National University, he attended Harvard University for his doctorate, held academic posts in the United States and Korea, then served in government and international organizations.

The Bank of Korea must also serve as a kind of think tank for the country, Rhee says.

As governor, he has championed efforts to better identify structural economic issues and propose solutions—and to make the Bank of Korea more vibrant, less "temple-like."

Communications and greater public engagement are part of this push, including tailoring multiple channels to various audiences. The monetary authority has expanded focus on videos, visualizations, a new studio, staff media training—and even opened a gift shop.

Rhee discussed his vision for the central bank with F&D's Jeff Kearns.

**F&D:** You were Asian Development Bank (ADB) chief economist and director of the IMF Asia Pacific Department before becoming Bank of Korea governor in 2022. What was it like to go from offering policy advice to receiving it, and what did that teach you?

**CR:** I had several different careers, but luckily my career development is a natural continuation of what I like most, which is economic research and policy advice. My experience at the ADB and IMF taught me invaluable lessons, one of which is looking at the global perspective in understanding economic policies. And it also helps to build an international network, which now plays a very important part in my communication and in my cooperation with multilateral institutions and other countries. It also deepened my appreciation of financial stability by observation of many financial crises across countries. Now, I'm used to looking beyond the traditional inflation-growth trade-off and can see the importance of financial stability. But having said that, I think the nature of the responsibility has changed. Prior to my governorship, my major responsibility at the Fund was to provide policy advice. Now I'm responsible for making a final call, at least on monetary policy, and that carries a lot of weight.

**F&D:** In speeches, you've mentioned topics including aging and immigration and artificial intelligence. Do central banks need to evolve beyond traditional roles to better address, say, deeper structural forces to underpin long-term growth?

**CR:** This is a sensitive issue in Korea. Some believe I'm a weird governor because I talk not only about monetary policy but also about structural issues such as aging, education, and many issues related to the labor market. But that's not inconsistent with the central bank's mandate, which is price stability. To make proper monetary policy, you need a good understanding of the driving forces of change in the economic policy environment. For example, whether changes are due to cyclical or structural issues. The recent slowdown of economic growth in Korea is one example. I think structural issues such as aging, and the changing nature of the global supply chain, play as important a role as the cyclical factors. So, in some sense, to understand why our growth rate is going down and how much it is because of cyclical factors we need to offset, you really need a good understanding of the driving force for structural changes too. With that in mind, the Bank of Korea must be a leading think tank for Korea as a whole, not just a central bank.

**F&D:** When you compare your institution with other central banks, or talk to other governors, how do you think its role compares? Is your bank's scope narrower or broader?

**CR:** When I look at central banks in Europe and the United States and elsewhere, finance ministers and central bankers have always communicated with each other and talked about fiscal policy too. Monetary policy is made by the central bank, but talking and communicating about structural issues is a natural thing, and Korea has been an exception.

The structural factors driving our economy have become much more important. Korea has a rapidly aging population, and we have an export-dominated economy in a global environment that's changing quite sig-

**“The structural factors driving our economy have become much more important.”**

nificantly. So without touching on these issues, we can't make proper monetary policy. This changing environment means we must be more open to studying these structural issues.

**F&D:** Looking around the world, is central bank independence under pressure?

**CR:** Central bank independence is very important, especially in achieving price stability.

We had to raise the interest rate very rapidly in 2022. At the time, that wasn't popular. But I could explain to the public that my mandate is price stability, inflation targeting is our objective, and the central bank must independently make hard decisions.

Independence is key, but there is some misunderstanding. The central bank has many other functions, such as financial market stability, and sometimes we act as a lender of last resort. Sometimes we are involved in resolving bankrupt financial institutions. These are the areas in which you need to communicate and cooperate with the government. This job can't be done by the central bank alone. Central bank independence is key for price stability and other operations, but at the same time, the central bank must cooperate with the government.

**F&D:** Given the sensitivities, how do you communicate why the central bank should take a broader view of what it means to steer the economy, going beyond traditional concepts such as inflation and interest rates to more structural and societal factors?

**CR:** This isn't easy, because structural issues have no simple answer. They're quite complex. And when you address structural issues, there are always winners and losers.

When you recommend some policies, the evaluation is quite different, depending on whether they are winners or losers. Also, people's perception is very hard to change. For example, if you ask a man on the street what the proper economic growth rate in Korea should be, based on our high-growth period in the past couple of decades, many people will say that at least 3 percent, even over 4 percent, is a proper growth rate. But because of aging and other changes, our potential GDP growth rate is now about 2 percent or below.

It's very hard to tell people that the situation has changed. Now we need to change our behavior and perception. That's why communication is difficult, and why we need high-quality research. More importantly, research should be easy for people to read. That's the importance of communication—but that's not an easy task.

**F&D:** Public opinion surveys show more favorable responses and a higher assessment of the bank's credibility. Do you link that to your broader view of explaining the bank, what it does, and why it should change?

**CR:** Many people still believe that it's a virtue for the central bank to communicate in the traditional way, which is to focus on monetary policy and try to deliver the message in a way that is not very clear so as not to cause a market impact. We are in the process of changing that perception, but it may take time. **F&D**

*This interview has been edited for length and clarity. Visit [www.imf.org/podcasts](http://www.imf.org/podcasts) to hear the full interview.*



## Book Reviews

# A Chronicle of Currencies

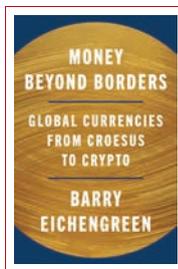
Catherine R. Schenk

**THE TURMOIL IN GLOBAL TRADE** sets the stage for *Money Beyond Borders*' timely reflection on the evolution of international currencies. Since 1960, the US dollar has greased the gears of global commerce and finance. Its deep and liquid markets and near universal acceptance as a means of exchange and unit of account helped launch the modern era of globalization. But many now fear that unpredictable US economic policy will so unsettle markets that the dollar will lose its grip as a common global anchor. Such predictions of the dollar's demise, however, have a long history.

In the 1960s and 1970s, inflation seemed poised to undermine its usefulness. In the mid-2000s, sustained dollar depreciation, liberalization in China, and the launch of the euro sparked speculation about potential successors to the dollar and how to manage such a transition. The global financial crisis of 2008, however, confirmed the resilience of the currency hierarchy.

Barry Eichengreen, professor of economics and political science at the University of California, Berkeley, is a leading protagonist in this debate, drawing on history to speculate about the future of the international monetary system. In his scholarly work, he argues that a multipolar currency system is feasible and sustainable and that the 1930s should be a stark warning of the perils of deglobalization.

His new book takes an even longer perspective, reaching back to the origins of Roman currency and looking ahead to the impact of the current geopolitical disruption. Accessible to a generalist audience, the book aims to elicit policy lessons from a long sweep of history. The author synthesizes a growing body of literature on classical economic history as well as the considerable research on 18th century financial history, notably that of Amsterdam. The chapters on the 20th century will be familiar to readers of Eichengreen's other research on this era, but the cycles of history are worth revisiting. US President Richard Nixon's confrontation with the chair of the Federal Reserve in the 1970s makes for particularly timely reading.



**MONEY BEYOND BORDERS: Global Currencies from Croesus to Crypto**

Barry Eichengreen

Princeton University Press

Princeton, NJ, 2026, 344 pp. \$29.95

*“Eichengreen argues that it is the absence of an alternative currency that has sustained dollar dominance so far.”*

Eichengreen argues that it is the absence of an alternative currency that has sustained dollar dominance so far. But the combined effects of the US retreat from commitment to open markets, internationalization of the renminbi, the evolution of the euro, and fintech innovation may upend things. He concludes that “none of these alternatives is ready for prime time” and is pessimistic about their future prospects. But more extreme geopolitical ruction since the book was written increases the likelihood of some of these outcomes. If EU members pull together more closely, US friction with China heats up, or fintech comes up with a viable stablecoin that is not tethered only to the dollar, we may yet see a seismic shift in the trajectory of the dollar. The shock to liquidity could still provoke a version of the 1930s Great Depression, and the book concludes by repeating this warning. **F&D**

**CATHERINE R. SCHENK** is professor of economic and social history at the University of Oxford.

# Human Stories behind an Era-Defining Crisis

Prakash Loungani

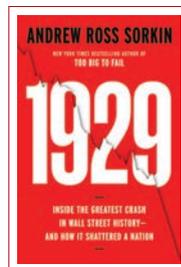
**ANDREW ROSS SORKIN'S** *1929* succeeds admirably in telling the story of that year's devastating stock market crash with great depth and granularity. It's less successful in its secondary goal of telling the story of 1929 to "better understand what we might learn from it."

The story is told through the eyes of Charles Mitchell, president of National City Bank, a precursor of Citibank. Mitchell was keen to get Americans to buy stock—and borrow to do so—with no more thought than they would give to buying a washing machine on credit. He succeeded in this endeavor, with demand from ordinary Americans sending stock prices soaring and eventually setting up the crash that wiped out Mitchell and millions of others. The detailed narrative is to be expected from the author of *Too Big to Fail*, Sorkin's best-selling account of the global financial crisis.

We learn, for instance, that the right-wing US President Herbert Hoover "liked to part his hair just slightly to the left of center" and that he was the first president to have a phone on his desk, partly to keep abreast of Wall Street action. Sorkin sketches memorable portraits of three US presidents (Warren G. Harding, Calvin Coolidge, and Hoover) and of Andrew Mellon, treasury secretary under all three. Winston Churchill is colorfully presented as dependent on US patrons and stock market winnings to help him live in the style to which he was accustomed. There are engaging descriptions, drawing on newly unearthed archival material, of tussles between the White House and the Federal Reserve, with the White House often worried that the Fed would snuff out the stock market boom by raising interest rates.

Senator Carter Glass plays a big role: His name graces a major piece of financial legislation passed after the 1929 crash. The Glass-Steagall Act brought about separation of commercial and investment banking.

Sorkin correctly writes that the characters, issues, and policy choices of 1929 "appear to echo our present moment." Yet even this rich account of a past crash offers no blueprint for the



**1929**  
Inside the  
Greatest Crash  
in Wall Street  
History—and How  
It Shattered a  
Nation

Andrew Ross  
Sorkin

Penguin  
Random House

New York, NY,  
2025, 592 pp., \$35

*"The characters, issues, and policy choices of 1929 appear to echo our present moment, Sorkin writes."*

widely predicted crash to come.

Each crisis is unique and spreads misery in its own way. The 1929 crash was followed by policy missteps—the Smoot-Hawley tariff and the abandonment of the gold standard—that triggered a worldwide depression. We learn from Sorkin that it was Hoover who coined the term "depression" to replace the word "panic," which was more prevalent at the time. The bursting of the dot-com bubble in the 2000s, by contrast, had a far more modest impact on the economy. We don't know if the collapse of the AI bubble will follow in the tracks of the 1929 or dot-com crash. Sorkin's book doesn't help us here. He concludes not with predictions but by writing simply that "the antidote to irrational exuberance is humility—the humility to know that no system is fool-proof, no market fully rational, and no generation exempt. The greater the heights of our certainty, the longer and harder we fall." **F&D**

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# How China Builds

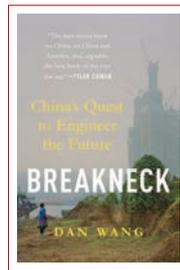
Melanie W. Sisson

**IN 1973**, Andrew W. “Andy” Marshall, an economist trained at the University of Chicago and little known outside a small circle of defense intellectuals, was appointed to lead an unconventional office inside the Pentagon: the Office of Net Assessment. At a moment when the Department of Defense was preoccupied with near-term military balances and annual budget battles, Marshall advanced a different way of thinking about strategy. Net assessment would ask how long-term competition actually unfolds—how the United States and its adversaries compare not just in numbers and types of weapons, but in national adaptability, institutional strengths and weaknesses, technological trajectories, and strategic culture.

Hoover History Lab research fellow Dan Wang’s very enjoyable first book, *Breakneck: China’s Quest to Engineer the Future*, fits neatly—if unexpectedly—into Marshall’s intellectual tradition. Advertised as a book about “China’s engineering mindset,” what Wang has actually produced is a blend of autobiography, travelogue, and sociopolitical observation interspersed with comparisons between China and the US. The effect is tantalizing. Wang walks (and sometimes bikes) readers through well-depicted landscapes and cityscapes; pauses to appreciate cultural scenes and to savor culinary delights; and offers statistics, bits of history, and personal anecdotes along the way.

Wang, who was born in China but raised in Canada, is equally evocative in his contemplation of attempts by the Chinese Communist Party (CCP) to use engineering principles to maintain what it defines as a healthy civil society. Here he brings a humanist’s eye to his exploration of the CCP’s efforts to manage the national economy; control population growth and then arrest its decline; accelerate technological innovation; and limit the damaging effects of the COVID-19 pandemic. Wang’s willingness to share personal details throughout makes his analysis warm and affecting. And he is unsparing but not ungenerous in his assessment of the successes and failures, benefits and harms, and comparative advantages of these engineered projects relative to those undertaken by what he characterizes as the “lawyerly” US.

Here, Wang hints at—but stops short of—a deeper analysis. He frequently notes the fundamental difference between



**BREAKNECK**  
China's Quest  
to Engineer the  
Future

Dan Wang

W. W. Norton  
& Company

New York, NY,  
2025, 288 pp.,  
\$31.99

*“Wang invites consideration of how governing philosophies lead China to engineer and the US to litigate.”*

the two systems, observing that the US prioritizes pluralism and the protection of individual rights, while China views its citizens in the aggregate. Yet he does not connect these governing philosophies to their logical consequences. Wang thus invites, but does not guide, consideration of how these orientations lead China to engineer and America to litigate, and why they direct the state’s gaze toward certain projects and away from others. As a result, his net assessment is implicit: a portrait of long-term competition between the CCP’s vision of national greatness as something citizens must be directed to sacrifice and strive for, and America’s vision of national greatness as the inevitable outcome of unleashing citizens to pursue individual achievement.

Wang finishes the book hopefully, wishing for both countries to adopt select attributes from the other. He is more optimistic that the US will do so, believing its citizens will embrace the tangible results the engineering mindset can produce but that the CCP will not tolerate the volatile energies of pluralism and individual rights the lawyerly mindset protects. If *Breakneck* is a study in anything, however, it is in the limited control that governments—whether composed of engineers or lawyers—ultimately can exercise over the unruly currents of large, complex, globally interconnected societies. **F&D**

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# Bhutan's Next Ngultrum

Jeff Kearns

*The only country with happiness as a formal government policy updates its currency*



The 500 note depicts the nation's fourth monarch.

**JIGME SINGYE WANGCHUCK** introduced his philosophy of gross national happiness, a more holistic measure of well-being than traditional economic and financial gauges, when he became the fourth king of Bhutan in 1972. His official coronation in 1974 coincided with another auspicious milestone: issuance of the kingdom's first paper money.

In January, the Himalayan nation of 800,000 circulated new banknotes in one of the most significant redesigns of the currency, the ngultrum, in the half-century since the first notes.

The redesigned 100, 500, and 1,000 notes, unveiled in November on Wangchuck's 70th birthday, feature designs "highlighting Bhutan's rich cultural traditions and royal heritage," Royal Monetary Authority Governor Yangchen Tshogyel wrote in the 2025 annual report.

The 1,000 bill features the country's founding ruler, King Ugyen Wangchuck, who aimed to unite Bhutan during his reign from 1907 to 1926. He's shown wearing his father's Raven Crown, signifying his family lineage and consolidation during the nation's early days.

The reverse shows Trongsa Dzong, the country's largest fortress and the dynasty's ancestral seat, overlooking the Mangde Chhu River. It also depicts the official state seal and two great hornbill birds, a symbol of the biodiversity of a country that rises from the low plains along the border with India to the

peaks topping 7,000 meters on China's southern edge.

The fourth king Wangchuck appears on the 500 bill, along with a vajra cross, a Buddhist symbol of stability that represents his legacy of national happiness and new governance. Jigme Singye Wangchuck also created Bhutan's modern financial system, including establishing the Royal Monetary Authority and the Bank of Bhutan, the first commercial lender.

"This new note, therefore, not only carries his image but also circulates the very economic stability he helped build," the central bank said in a statement announcing the banknotes.

After his 2006 abdication as part of a planned transition to a constitutional monarchy, his eldest son, Jigme Khesar Namgyel Wangchuck, became Bhutan's fifth king at 26, making him the world's youngest monarch at the time. His portrait appears on the new 100 note.

The industry group High Security Printing Asia named the notes best new series last year, citing their design and security features. The bills, designed by Basingstoke, England-based De La Rue, are printed on polymer substrate and use advanced security features, including a holographic security stripe on the 500 and 1,000 denominations that depicts a dragon grasping jewels. **F&D**

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

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