



FD

FINANCE and DEVELOPMENT

March 2017

Growth Conundrum

in glenwood

I N T E R N A T I O N A L M O N E T A R Y F U N D

EDITOR-IN-CHIEF: Camilla Lund Andersen

MANAGING EDITOR: Marina Primorac

SENIOR EDITORS

Gita Bhatt Natalie Ramirez-Djumena
Jacqueline Deslauriers Rani Vedurumudi
James L. Rowe, Jr. Chris Wellisz

ONLINE EDITOR: Marie Boursiquot

ASSISTANT EDITORS

Babar Ahmed Bruce Edwards
Eszter Balázs Maria Jovanović
Niccole Braynen-Kimani Nadya Saber
Maureen Burke

PRINT/WEB PRODUCTION SPECIALIST

Lijun Li

EDITORIAL ASSISTANT: Robert Newman

COPY EDITOR: Lucy Morales

CREATIVE DIRECTOR: Luisa Menjivar

SENIOR GRAPHIC ARTIST: Michelle Martin

ADVISORS TO THE EDITOR

Bernardin Akitoby Laura Kodres
Celine Allard Tommaso Mancini Griffoli
Bas Bakker Gian Maria Milesi-Ferretti
Steven Barnett Inci Otker-Robe
Nicoletta Batini Laura Papi
Helge Berger Catriona Purfield
Paul Cashin Uma Ramakrishnan
Adrienne Cheasty Abdelhak Senhadji
Luis Cubeddu Janet Stotsky
Alfredo Cuevas Alison Stuart
Thomas Helbling

© 2017 by the International Monetary Fund. All rights reserved. For permission to reproduce any *F&D* content, submit a request via online form (www.imf.org/external/terms.htm) or by e-mail to copyright@imf.org. Permission for **commercial** purposes also available from the **Copyright Clearance Center** (www.copyright.com) for a nominal fee.

Opinions expressed in articles and other materials are those of the authors; they do not necessarily reflect IMF policy.

Subscriber services, Changes of address, and Advertising inquiries

IMF Publication Services
Finance & Development
PO Box 92780
Washington, DC, 20090, USA
Telephone: (202) 623-7430
Fax: (202) 623-7201
E-mail: publications@imf.org

Finance & Development

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

Postmaster: send changes of address to *Finance & Development*, International Monetary Fund, PO Box 92780, Washington, DC, 20090, USA. Periodicals postage is paid at Washington, DC, and at additional mailing offices. The English edition is printed at Dartmouth Printing Company, Hanover, NH.



FINANCE & DEVELOPMENT A QUARTERLY PUBLICATION OF THE INTERNATIONAL MONETARY FUND
March 2017 • Volume 54 • Number 1

FEATURES

GROWTH CONUNDRUM

2 **Whither Economic Growth?**

The global optimism at the turn of the century has been replaced by fear of long-term stagnation
Nicholas Crafts

7 **Cost of Aging**

As populations in richer nations get older, GDP growth slows, support costs rise, and government budgets feel pressure
Ronald Lee and Andrew Mason

10 **Stuck in a Rut**

To revive global productivity, start by addressing the legacies of the financial crisis
Gustavo Adler and Romain Duval

14 **Getting It Right**

Well-designed fiscal incentives can help spur innovation and ultimately growth
Ruud De Mooij

16 **Rethinking GDP**

It may be time to devise a new measure of economic welfare with fewer flaws
Diane Coyle

20 **Can Money Buy Happiness?**

People around the world share their thoughts on what sparks this elusive feeling

24 **Point-Counterpoint: Secular Stagnation**

Sluggish Future
J. Bradford DeLong
Policy Is the Problem
John B. Taylor

26 **Straight Talk: The Case for Inclusive Growth**

Emerging economies should share the fruits of their growth more equitably
Tao Zhang

ALSO IN THIS ISSUE

30 **A Middle Ground**

The renminbi is rising, but will not rule
Eswar Prasad

34 **A Broader Reach**

When more people and more firms have access to financial services, the whole society can benefit
Adolfo Barajas, Martin Čihák, and Ratna Sahay

37 **In Equality We Trust**

Inequality in the United States and Europe erodes trust among people—and can stifle economic growth
Eric D. Gould and Alexander Hijzen



2



14



20



30

What to Do about Growth

DEEP unease about rising inequality and stagnating living standards in advanced economies was at the heart of the 2016 political upheaval. Globalization and trade have been blamed, but entrenched slow growth—what economists call secular stagnation—may be the real culprit. Parents who took for granted that their children would enjoy a brighter future had their dreams dashed by the global financial crisis of 2008. Nine years later, rising populism and a return to nationalist, inward-looking policies threaten to unravel the postwar economic order.

As Nicholas Crafts of the University of Warwick argues in our overview story, declining productivity growth—the main reason for slow growth and falling incomes—was evident long before the crisis struck. This issue of *F&D* looks at why and asks whether the world's advanced economies should resign themselves to secular stagnation or hope that the right policies can revive productivity and lasting economic growth.

Diving into the causes of slow productivity growth, IMF economists Gustavo Adler and Romain Duval find roots in the global financial crisis—tight credit undermined not only firms' productivity but also the economy's ability to redirect capital. Other factors were also in play, especially aging populations. Ronald Lee of the University of California, Berkeley, and Andrew Mason of the University of Hawaii, Manoa, argue convincingly that slower population growth will almost certainly mean slower national income and GDP growth. But they also show that the effect on individuals—in per capita income and consumption—will depend on economic policies.

We wonder what to do. Can policy choices calm fears about redistribution and fairness without shutting down trade, the main engine of postwar economic growth? What drives higher productivity and innovation? How can advanced economies adapt to an aging workforce?

First we must measure the right thing. Diane Coyle of the University of Manchester discusses the pros and cons of GDP to measure economic welfare.

Second, we should not forget that two-thirds of the world's population—namely, those in developing and emerging market economies—face a different reality. Younger populations and still-vibrant productivity in many of these countries are driving higher economic growth at home and in the global economy.

Third, we shouldn't go overboard. Global trade has been a leading force behind productivity growth, and barriers against it would hurt all economies, large and small. Instead of reaching for easy answers, economists and policymakers must probe their own economies' challenges. As Berkeley economist Bradford DeLong argues, "Only if we do something about it, is it likely that in nine years we will no longer be talking about secular stagnation."

Camilla Lund Andersen
Editor-in-Chief

- 40 Forests for Growth**
Forests are a key asset for climate stability; Brazil has shown protecting them is compatible with development
Frances Seymour and Jonah Busch



- 43 Risky Mix**
If financial institutions combine banking and nonbanking business there is potential for danger
Ralph Chami, Connel Fullenkamp, Thomas Cosimano, and Céline Rochon

- 46 Unburnable Wealth of Nations**
Successful action to address climate change would diminish the value of fossil fuel resources in many of the world's poorest countries
James Cust, David Manley, and Giorgia Cecchinato

DEPARTMENTS

- 28 Picture This**
Girl Power
Policies that help integrate women into the workforce benefit everyone
Maria Jovanović



- 50 Currency Notes**
Fifty Marks the Spot
Trinidad and Tobago's new \$50 bill is dressed for a celebration
Marie Boursiquot



- 52 People in Economics**
Parallel Paths
Atish Rex Ghosh profiles Kristin Forbes, who straddles academia and policymaking




- 55 Book Reviews**
The Man Who Knew: The Life and Times of Alan Greenspan, Sebastian Mallaby
The Vanishing Middle Class: Prejudice and Power in a Dual Economy, Peter Temin
A Culture of Growth: The Origins of the Modern Economy, Joel Mokyr

Illustration: cover: Michael Glenwood; pp. 28–29, David Hunt, ThinkStock, Freepik; pp. 30, 32, iStock via Getty Images.

Photography: pp. 2–3, Christof Stache/Getty Images; p. 5, Michael H/Getty Images; p. 7, Tuul & Bruno Morandi/Getty Images; p. 10, Orjan F. Ellingvag/Corbis via Getty Images; p. 14, Toru Yamanaka/Getty Images; p. 16, Christopher Jue/Getty Images; p. 24, courtesy of University of California, Berkeley; p. 25, courtesy of Stanford University; p. 26, IMF photo; p. 34, Money Sharma/AFP/Getty Images; p. 37, Mike Kemp/In Pictures Ltd./Corbis via Getty Images; p. 40, Ricardo Siqueira/Brazil Photos/LightRocket via Getty Images, ThinkStock; p. 42, ThinkStock; p. 43, Ryan McVay/Getty Images; p. 46, Andrey Rudakov/Bloomberg via Getty Images; pp. 50–51, Central Bank of Trinidad and Tobago; Carole Ann Ferris; p. 52, IMF photo; pp. 55–57, IMF photo.

Read online at www.imf.org/fandd

Visit *F&D*'s Facebook page:
www.facebook.com/FinanceandDevelopment



Whither **ECONOMIC GROWTH?**

**The global optimism at the turn of the century
has been replaced by fear of long-term stagnation**



A man stands on scaffolding by construction works near Munich, Germany.



Nicholas Crafts

It seems like only yesterday that the so-called new economy was ascendant and growth expectations were buoyant. But today there is a widespread fear of a future of secular stagnation, in which very slow growth will be the new normal—especially in advanced economies. While it is clear that the turn-of-the-century optimism was not justified, it is also possible that today's pessimism is excessive.

Current mainstream growth projections for the United States and the European Union over the medium term represent a marked slowdown from growth rates in the decades prior to the global financial crisis that began in 2008 (see table). Compared with 1995 to 2007, future US and European growth of real (after-inflation) GDP per person is expected to diminish by half, or worse. In each case, a serious weakening of growth in labor productivity (output

per hour worked) is expected. Compared with the golden age of the 1950s and 1960s, the slowdown is even more pronounced, especially for Europe.

Slower growth in Europe and the United States has mixed implications for growth prospects in developing economies. Most obviously, on the negative side, it means less demand for these countries' exports, so models of development based on export-led growth may need to be rethought. The slowdown may also reduce the availability of new technology across the world. On the other hand, it may imply a lengthy period of low real interest rates and redirection of capital flows away from advanced economies toward emerging markets with more promising investment opportunities. That could mean a continuation of rapid catch-up growth and a faster rise in their share of world GDP.

Dimming horizon

Near-term projections of growth in both real GDP per person and productivity (real GDP per hour worked) are not promising for either the United States or Europe.

(annual growth rate, percent)

	United States		EU15	
	Real GDP per person	Real GDP per hour worked	Real GDP per person	Real GDP per hour worked
1950-73	2.5	2.6	4.0	4.9
1973-95	1.7	1.3	1.9	2.5
1995-2007	2.2	2.2	2.0	1.5
2014-23			1.0	0.8
2016-26	1.0	1.4		

Sources: Conference Board 2016; Havik and others 2014; and US Congressional Budget Office 2016.

Note: The EU15 are the countries that were members of the European Union prior to 2004: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom. Periods after 2016 are projections.

Inaccurate predictions

It is, of course, not unknown for economists to make inaccurate predictions about future growth or to be slow to appreciate the scope for improved performance of productivity. Alvin Hansen, the founding father of the idea of secular stagnation, is a spectacular example. In his 1938 presidential address to the American Economic Association, he said technological progress was too weak to generate economic growth at a rate that would encourage investment and avert a future of sustained high unemployment. In fact, the halcyon period of US economic growth during the postwar economic boom was on the horizon. Even as Hansen was wringing his hands the economy was experiencing very rapid growth in total factor productivity—the portion of economic growth not explained by increases in capital and labor inputs and that reflects such underlying societal factors as technology and efficiency. Nearly half a century later, in 1987, on the eve of the revolution in information and communication technology, another leading US economist, Robert M. Solow (see “Residual Brilliance” in the March 2011 issue of *F&D*), lamented that “you can see the computer age everywhere but in the productivity statistics.”

Today’s pessimism, including a revival of Hansen’s secular stagnation thesis (see “Sluggish Future” in this issue of *F&D*) is based on the recent history of growth performance. For both the United States and Europe, empirical economic analyses show that before the global economic crisis there was a marked decrease in the trend of productivity growth. Productivity growth is crucial to increasing economic output per capita and the overall standard of living. Although there are reasons to think that some of the gains from digital technology are not captured well by GDP and other national income accounts, there is clear agreement among experts that slower growth in the United States is not a statistical artifact but a real phenomenon—more than a temporary symptom of the recent global economic crisis. This is largely because the output that is missing—the

gap between today’s GDP and predictions of what it should be based on earlier estimates of trend growth—is at least 20 times greater than most estimates of the consumer welfare gains that conventional national income accounting fails to identify. Still, there is a glimmer of hope. The precedent of the Great Depression years—when total factor productivity growth of 1.9 percent a year underpinned labor productivity growth of 2.5 percent a year between 1929 and 1941—shows that severe banking crises do not necessarily preclude rapid increases in productivity when the national innovation system is strong.

The future of income growth in the United States looks even less promising than that of labor productivity. Whereas growth of real GDP per person in the 40 years before the recent global crisis typically exceeded that of labor productivity, in the future the opposite will likely be the case. This outcome is predicted on the basis of an aging population (which usually presages declining productivity), limited potential for more people in the workforce, and a significant slowing in the rate of improvement of labor quality that arises from increases in educational attainment.

Innovation is the foundation of rapid growth in labor productivity. From the 1920s through the 1960s, well-known inventions such as electricity and the internal combustion engine had a major impact, but the key characteristic of the US economy was that productivity growth based on better technology was widespread, including major changes in office work and retailing as well as the mechanization of factories. In the recent past, information and communication technology made a stellar contribution to productivity growth in a relatively short time span—but it did not match the combined effect of the earlier advances. Indeed, a key message from empirical analyses of US growth performance is that the impact of technological progress on productivity growth has not disappeared but is now much weaker than at its zenith in the mid-20th century. For example, the growth in total factor productivity for the next 10 years projected by the US Congressional Budget Office is about half the rate achieved in the 1930s.

US growth could exceed expectations

This type of empirical analysis, however, is inherently backward looking. It is possible that a forward-looking approach could give a more optimistic view of future US growth prospects. There are at least three reasons to think so. First, in a world where artificial intelligence is progressing rapidly and robots will be able to replace humans in many tasks—including in low-wage service sector jobs that once seemed out of the reach of technological advances—another surge of labor productivity growth may be possible. If, as some estimates claim, about 40 percent of work is amenable to computerization within 20 to 25 years (Frey and Osborne 2013), this could underpin a return to labor productivity growth above 2 percent a year. Second, the rise of China could boost world research and development intensity considerably. Britain switched from its 19th century role as the leading exporter of new technology to 20th century reliance on technology

transfer from the rest of the world, especially the United States. A similar transition of roles between China and the United States does not seem beyond the realm of possibility within the next few decades. Third, the information and communication technology revolution—by reducing the cost of accessing knowledge and greatly enhancing the scope for data analysis, which is the cornerstone of scientific advancement—paves the way for discovery of useful new technology. There has, in fact, been significant technological progress in the research and development sector.

In contrast, for Western Europe the narrative is about catch-up growth rather than the rate of cutting-edge technological progress. From the middle of the 20th century to the recent global crisis, this experience comprised three distinct phases. The first, which ended in the early 1970s, saw rapid catch-up growth, and Europe quickly narrowed the gap with the United States both in income and productivity. During the second phase, from the early 1970s to the mid-1990s, European growth slowed markedly, and catch-up in terms of real GDP per person ground to a halt. That was the result of a decline in work hours and employment despite strong growth in labor productivity and an ever smaller gap with the United States in real GDP per hour worked. However, in the third phase, from the mid-1990s to the crisis, European productivity growth did not keep up with the United States and, rather than catching up, Europe steadily fell behind. The upshot is that in 2007 the income level of the original 15 members of the European Union (the so-called EU15—Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom) was slightly lower relative to that of the United States than it had been in 1973.

Social capability is key

European medium-term growth prospects depend both on how fast productivity grows in the United States and whether catch-up growth can resume after a long hiatus. Economic historians see social capability as a key determinant of success or failure in catch-up growth. Social capability can be thought of as the incentive structures, such as

regulation and taxation, that influence the investment and innovation decisions that allow businesses to effectively assimilate the technology developed by leaders (such as the United States) and to eliminate inefficiency. To sustain social capability as development progresses generally entails reforms of institutions and policies, such as capital-market rules and barriers to new entry in markets, which may prove politically challenging. Moreover, social capability varies with the technological epoch—institutional and policy settings that worked perfectly well for the transfer of assembly-line manufacturing technology may fall short when it comes to diffusing information and technology advances in market services.

Innovation is the foundation of rapid growth in labor productivity.

Rapid growth during the European golden age of the 1950s and 1960s benefited from postwar reconstruction, the movement of labor from agriculture to manufacturing, European economic integration, and patient capitalism, that is, placing a large weight on long-term real returns rather than tomorrow's share price. Each of these had disappeared, or at least been greatly weakened, by the late 20th century. The postwar political agreements and corporatist structures that underpinned the reconstruction of the European economy implied not only much larger social transfers—which eventually generated substantially higher direct taxes that distorted economic behavior—but also bequeathed a legacy of high regulation for most EU countries.

In the years before the 2008 crisis, when Europe was no longer catching up but falling behind the United States, an American diagnosis of the reasons for this turn of events gained wide currency. Put simply, it said that Europe suffered from too little competition, too much taxation, and too much regulation—which impaired social capability. This was hardly a new turn of events—many European countries had arguably been in this position for some time, which had not prevented (but may have slowed) them from catching up. However, with the arrival of disruptive new information and communication technology—whose productivity gains depended on businesses' reorganization—employment protection and product market regulation were bigger handicaps. It was not that Europe became more heavily regulated, but that the existing regulation was more costly. In service-oriented economies, even more critical were the forces of creative destruction, which replace less efficient firms and old technology with those that are new and more efficient. These forces were weaker in Europe than in the United States. Much of the remaining productivity gap, especially in southern Europe, stemmed from less efficient allocation of resources—in particular, from a surviving long tail of low-productivity businesses.



Aerial view of city overpass at dusk, Los Angeles, California, United States.

Mixed prognosis

The prognosis for growth in the EU15 is mixed. The good news is that productivity is still rising in the United States, even though it has slowed, and that catch-up growth is still possible. When the Organisation for Economic Co-operation and Development (OECD) made long-term potential growth projections in 2014 (using a forward-looking approach that embodied a catch-up growth model rather than extrapolating recent trends), it envisioned potential EU15 labor productivity and real GDP per person growth of 1.6 percent and 1.5 percent a year, respectively, between 2014 and 2030. This is clearly much more bullish than the extrapolation of recent trends by the European Commission.

However, the bad news is that to achieve the outcome projected by the OECD, significant supply-side (structural) reform would be required. It is not difficult to construct a list of reforms that could be expected to deliver the projected result. Both the OECD and the European Commission have undertaken such exercises. Strengthening competition, reforming taxation, and reducing regulation could play a big part—together with full implementation of the European Union's declared intention to create a single European market in services by eliminating the trade costs associated with different regulations and other barriers to entry for EU suppliers. But the very bad news is that the already difficult politics of such reforms have been further complicated by rising populism and ebbing support for the market economy throughout Europe. The British vote to exit the European Union is a good example.

In summary, the productivity slowdown in the United States is real and predates the crisis, but it is not necessarily permanent. Technological progress is central to future productivity growth but is, as always, unpredictable. With significant supply-side reform, Europe could grow faster than the United States, but this seems unlikely under current circumstances. Indeed, as with information and communication technology, Europe may well struggle to exploit the potential of new technology on the horizon and fall further behind the United States.

Nicholas Crafts is Professor of Economics and Economic History at the University of Warwick.

References:

Conference Board. 2016. *The Conference Board Total Economy Database*, May.

Frey, Carl Benedikt, and Michael A. Osborne. 2013. "The Future of Employment: How Susceptible Are Jobs to Computerisation?" Unpublished, Oxford Martin School, Oxford, United Kingdom.

Havik, Karel, Kieran McMorrow, Fabrice Orlandi, Christophe Planas, Rafal Raciborski, Werner Röger, Alessandro Rossi, Anna Thum-Thysen, and Valerie Vandermeulen. 2014. "The Production Function Methodology for Calculating Potential Growth Rates and Output Gaps." *European Economy Economic Papers* 535, European Commission, Brussels.

US Congressional Budget Office. 2016. "An Update to the Budget and Economic Outlook, 2016 to 2026." Washington, DC, August. www.cbo.gov/publication/51908.



**Listening can
tell us a great
deal about
the world**

Listen to **IMF PODCASTS**
featuring the **brightest minds** in
economics and development.

Found at **IMF.org/podcasts**
or on your favorite podcast app.

Cost of Aging



Card players in Naples, Italy.

Ronald Lee and Andrew Mason

AN aging population and slower labor force growth affect economies in many ways—the growth of GDP slows, working-age people pay more to support the elderly, and public budgets strain under the burden of the higher total cost of health and retirement programs for old people.

Yet an aging population may raise the amount of capital per worker, which would boost wages and output per hour worked (productivity) and reduce interest rates as higher wages lower the return on capital. Alternatively, population aging and slowing labor force growth could lead to secular stagnation if firms are discouraged from investing abundant loanable funds.

Economic growth is slowing in advanced economies at least in part because the end of the baby boom led to a decline in population and labor force growth—despite immigration. Many empirical studies have found that GDP growth slows roughly one to one with declines in labor force and population growth—a disquieting prospect for both the United States and Europe.

In the United States, during the 40 years from 1975 to 2015, the 20- to 64-year-old population grew 1.24 percent a year, but is projected at only 0.29 percent for the next 40 years. That should lead to a corresponding decline in the growth

rate of GDP and aggregate consumption. Many advanced economies already have a declining working-age population—in Europe it will fall more than 20 percent between 2015 and 2055, with an attendant decline in GDP growth.

Per capita output matters

But individual well-being depends not on aggregate, but on per capita, growth. Standard growth models predict that slower population growth also leads to rising output and wages per worker. The underlying question is whether this higher output per worker will translate into higher per capita income. That will depend on how much, as the population ages, increased productivity offsets the rise in the number of dependents (old and young) per worker.

To answer that question, we look more closely at how economic activity varies by age, drawing on national transfer accounts, which measure how people at various ages produce, consume, and save resources (NTAccounts.org; Lee and Mason 2011; United Nations 2013).

Children consume more than they produce, and the same is true on average for the elderly. Consumption by children and to some degree by the old is covered by prime-age adults—those roughly 25 to 59—who

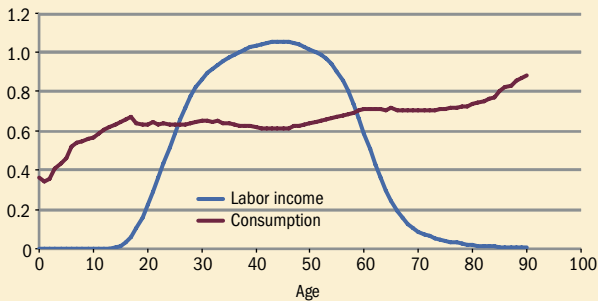
As populations in richer nations get older, GDP growth slows, support costs rise, and government budgets feel pressure

Chart 1

Earning and eating

Prime-age adults, ages 25 to 59, earn more than they consume, while the young and elderly do the opposite.

(average per capita value, index, 1 = average labor income of ages 30-49)



Source: Mason, Lee, and others, forthcoming.

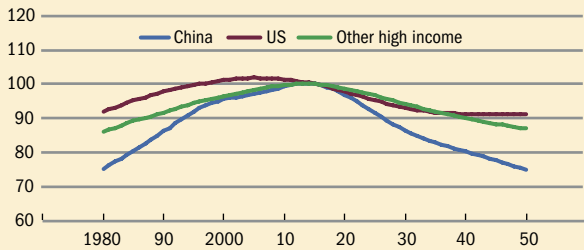
Note: The data cover the 24 countries classified as high income by the World Bank. Labor income includes earnings, benefits, labor income of the self-employed, and an estimate of the value of labor supplied by unpaid family workers. Consumption is based on household expenditures imputed to individuals plus in-kind public transfers received by people at each age.

Chart 2

Burden sharing

The number of workers supporting consumers (young, prime age, and elderly) will decline between now and 2050.

(support ratio, 2015 = 100)



Source: Mason, Lee, and others, forthcoming.

Note: Other high income = the 24 countries classified as high income by the World Bank, excluding the United States. The support ratio is the number of workers divided by the total number of consumers (that is, everyone).

produce more than they consume (see Chart 1). As a population ages, the proportion of workers declines, while the proportion of high-consuming elderly rises. In some countries, such as Japan, Sweden, and the United States, relative consumption by old people is much higher than the average depicted in Chart 1; in others, such as Austria and Spain, the relative increase is much smaller. Greater consumption by the elderly may be partially offset by a smaller proportion of children in the population. But if fertility rates begin to recover from current low levels, the proportion of children and old people in the population may increase, boosting pressure on prime-age workers.

An aging population puts budgetary pressure on society as a whole because the number of workers declines relative to the number of consumers. This phenomenon is quantified by the support ratio of the total number of workers to consumers (which includes everyone—young, prime age, and elderly).

The lower the support ratio, the fewer workers there are to finance consumers, so either consumption must be reduced or labor supply increased—for example, through later retirement. Between 2015 and 2050 the support ratio will drop 0.26 percent a year in the United States, 0.40 percent in other high-income nations, and 0.82 percent in China (see Chart 2). This means that by 2050, unless the labor supply increases, consumption must drop by 25 percent in China, 9 percent in the United States, and 13 percent in other high-income countries. The age patterns of consumption and earning, like those shown in Chart 1, will have to be adjusted to accommodate new demographic realities.

Paying for elderly consumption

The elderly pay for consumption in a variety of ways. Besides what they may earn from continuing to work, older consumers rely in part on their assets—including farms and businesses, housing, and savings and investments. Another part comes from the government in the form of cash such as pensions and in-kind public transfers such as health care and long-term care. These public transfers are paid for by taxes, mostly those paid by the prime-age adult population. Some consumption may come through net support (support received minus support given) from younger family members. The elderly in east Asia get more support from their families than they give. But in much of the rest of Asia (including Japan and Korea), Europe, and the Americas, older people on average give more to their younger family members than they receive.

An aging population puts budgetary pressure on society as a whole.

In general, the higher the proportion of consumption the elderly pay for themselves, the less cost falls on prime-age adults as higher taxes (see Chart 3). Europe stands out for its heavy reliance on public sector transfers to pay for elder consumption. When older people contribute little to their own consumption—either through asset income or continuing to work—it is a recipe for heavy costs as the population ages. The reverse is true in the United States, where people generally retire later and rely more on their own assets in old age. Latin America is between the two, and Asia resembles the United States.

Public sector transfers for pensions, health care, and long-term care are a particular problem as populations age, because these payments, even after subtracting the portion funded by tax payments from the elderly, absorb a large portion of public budgets. Projections indicate that typically these programs will be unsustainable unless taxes are raised or benefits reduced or both.

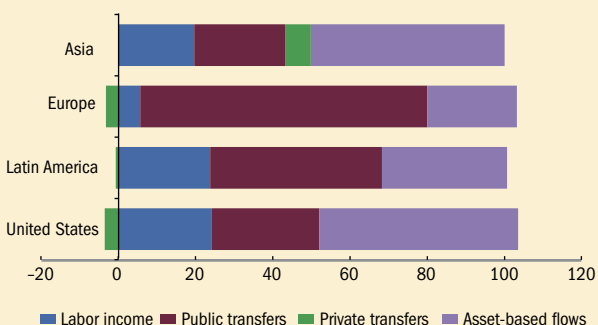
Fiscal support ratios are a way to look at the problem. They are constructed like support ratios, except they relate taxpayers to beneficiaries rather than workers to consumers. In the United States, the fiscal support ratio will drop 11 percent

Chart 3

Old-age wallets

The sources of support for elderly consumption vary by region.

(percent of consumption)

Source: National Transfer Accounts: www.ntaccounts.org.

Note: Asia = Australia, Cambodia, China, India, Japan, Korea, Lao P.D.R., the Philippines, Taiwan Province of China, Thailand. Europe = Austria, Finland, France, Germany, Hungary, Italy, Slovenia, Spain, Sweden, the United Kingdom. Latin America = Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Jamaica, Mexico, Uruguay. Labor income includes earnings, benefits, labor income of the self-employed, and an estimate of the value of labor supplied by unpaid family workers. Public and private transfers are net (transfers received minus transfers provided). Asset-based flows are defined as asset income minus interest expense minus saving.

between 2010 and 2050 from population aging. This means that to balance tax revenues and expenditures in the public budget (federal, state, and local combined) in 2050, tax revenues will have to be 11 percent higher or expenditures 11 percent lower, or some combination of the two, just to offset the increased costs from the aging population. For European countries, the corresponding number is between 14 percent and 28 percent, and for Japan it is 26 percent. These figures refer to the total government budget, not just the social welfare component. Some governments are attempting the politically difficult task of restructuring their public transfer programs to address these issues—such as by raising the retirement age and linking the level of benefits more closely to the availability of tax revenues.

Productivity gains

If the overall saving rate remains the same while growth of the labor force slows, then the per capita amount of capital (such as machines, roads, and office equipment involved in the production of goods and services) would rise, boosting productivity and wages and reducing interest rates. In the United States, the 1 percent a year decline in productivity during 2015–55 compared with 1975–2015 implies a substantial increase in capital per worker. In the United States and most other countries, the elderly are net savers (Lee and Mason 2011) and hold more assets than younger adults. Longer lives and lower fertility raise saving rates, reinforcing private saving.

But in some scenarios capital per worker may not increase. If population aging forces governments to borrow more to pay benefits, funds for private capital investment may be crowded out. Or if capital per worker does begin to rise and push down interest rates, adults may choose to save less, ultimately reducing the increase in capital. A third possibility is that those with money to invest will seek higher returns in foreign capi-

tal markets, particularly in developing regions and emerging economies, where populations are younger and rates of return may be higher. In this case, domestic workers will not benefit through rising wages and higher productivity, although returns on the foreign investments would still raise national income.

A long-term slowdown

Firms may choose to cut investment in the domestic economy substantially, even as interest rates fall, if they think output and consumption growth will slow in response to a declining population and labor force, and perhaps lower total factor productivity (the portion of economic growth not explained by increases in capital and labor inputs and that reflects such underlying factors as technology). Should firms become pessimistic, even if central banks drive interest rates below zero, the economy could remain stagnant, with high unemployment for many years—a condition some call secular stagnation (see “Sluggish Future” and “Whither Economic Growth?” both in this issue of *F&D*). Some economists interpret Japan’s virtually flat economic growth in recent decades and Europe’s failure to recover from the global financial crisis in these terms (Teulings and Baldwin 2014).

As populations age and grow more slowly, GDP and national income growth will most certainly slow down, but the effect on individuals—as measured by per capita income and consumption—may be quite different. A graying population will mean more old-age dependency, to the extent that these people do not support themselves by relying on assets or their own labor. But it may also bring more capital per worker and rising productivity and wages, particularly if government debt does not crowd out investment in capital (Lee 2016). Whether population aging is good or bad for the economy defies simple answers. The extent of the problem will depend on the severity of population aging and how well public policy adjusts to new demographic realities. ■

Ronald Lee is a Professor of the Graduate School of the University of California, Berkeley, and Andrew Mason is a Professor of Economics at the University of Hawaii, Manoa, and a Senior Fellow at the East-West Center.

References:

- Lee, Ronald. 2016. “Macroeconomics, Aging and Growth.” In *Handbook of the Economics of Population Aging*, edited by John Piggott and Alan Woodland. Amsterdam: Elsevier, 59–118.
- , and Andrew Mason. 2011. *Population Aging and the Generational Economy: A Global Perspective*. Cheltenham, United Kingdom: Edward Elgar.
- Mason, Andrew, Ronald Lee, and others. Forthcoming. “Support Ratios and Demographic Dividends: Estimates for the World.” *United Nations Population Division Technical Report*, New York.
- Teulings, Coen, and Richard Baldwin, eds. 2014. *Secular Stagnation: Facts, Causes and Cures*. *VoxEU.org eBook*, London: Centre for Economic Policy Research.
- United Nations. 2013. *National Transfer Accounts Manual: Measuring and Analysing the Generational Economy*. Department of Economic and Social Affairs, Population Division, New York.

Stuck in a Rut

Gustavo Adler and Romain Duval

To revive global productivity, start by addressing the legacies of the financial crisis

TECHNOLOGICAL change seems to be happening faster than ever. The prospect of such inventions as driverless cars, robot lawyers, and 3D-printed human organs becoming commonplace suggests a new wave of technological progress. These advances should raise our standard of living by allowing us to produce more goods and services with less capital and fewer hours of work—that is, to be more productive. But, to paraphrase Nobel laureate Robert Solow, we can see it everywhere but in the productivity statistics.

The vexing truth is that output per worker and total factor productivity—which measures the overall productivity of both labor and capital and reflects such elements as technology—have slowed sharply over the past decade, and especially since the 2008–09 global financial crisis. This phenomenon is evident in advanced economies and seems to extend to many developing economies as

well (see Chart 1).

Of course, productivity is inherently difficult to measure, but there is no good reason to suspect that measurement error has increased over the past decade—and even if it has, it would hardly account for the bulk of the slowdown, as recent studies show (Sverson 2016).

If sustained, sluggish productivity growth will seriously threaten progress in raising global living standards, the sustainability of private and public debt, the viability of social protection systems, and economic policy's ability to respond to future shocks. It would be unwise to sit around and wait for artificial intelligence and other cutting-edge technologies to spawn a hypothetical productivity revival. But, to cure the affliction, we must first diagnose its root causes.

Lasting scars

Productivity growth comes from technological innovation and diffusion, and there is no





Chart 1

Easing off

Productivity growth has slowed dramatically around the world in recent years, especially since the global financial crisis.

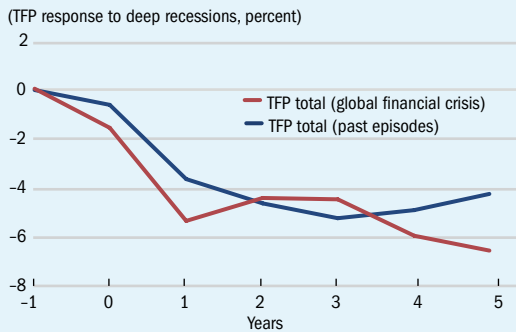


Sources: Penn World Tables 9.0; IMF, *World Economic Outlook*; and IMF staff calculations.
 Note: Group averages are weighted using gross domestic product (purchasing power parity).

Chart 2

Lasting effects

The output decline seen during deep recessions, such as the global financial crisis, reflects a long-lasting drop in total factor productivity.



Sources: Blanchard, Cerutti, and Summers 2015; Penn World Tables 9.0; KLEMS; and IMF staff calculations.
 Note: TFP = total factor productivity (deviation from pre-recession trend) in advanced economies. TFP is the portion of economic growth not explained by increased inputs of capital and labor.

shortage of explanations for why either or both may have slowed. Some blame a fading information and communication technology boom (Fernald 2015; Gordon 2016); lethargic businesses and insufficient labor and product market reforms (Andrews, Criscuolo, and Gal 2015; Cetto, Fernald, and Mojon 2016); the rise of specific-knowledge-based capital and winner-take-all market dynamics; mismatched and deficient skills; demographic factors such as aging populations; or slowing global trade integration (IMF 2016).

Many of these factors have played a significant role and may well remain a drag on productivity. But the abruptness, magnitude, and persistence of the productivity slowdown in the aftermath of the global financial crisis suggest that these slow-moving forces are not the only, or even the main, culprits. The crisis itself is a first-order factor.

Unlike typical economic slowdowns, deep recessions—often associated with financial crises—involve large and

persistent declines in output. Such output losses reflect not only continuing declines in employment and investment but also a permanent drop in productivity (see Chart 2). The dynamics following the global financial crisis were no different.

How could a major—but seemingly temporary—financial shock have such large and persistent effects on productivity?

Much can be attributed to the interplay of weak corporate balance sheets, along with tight credit conditions, weak aggregate demand, and the economic and policy uncertainty that characterize the postcrisis environment. These factors appear to

have fed a vicious circle between weak investment, total factor productivity, and potential growth. We focused primarily on advanced economies, and although some of our findings apply to developing economies, factors behind their productivity slowdown are less clear and warrant more research.

In advanced economies, firms with weaker balance sheets—that is, those with high debt or substantial expiring loans—before the crisis experienced a more abrupt productivity drop than their counterparts with stronger balance sheets (Chart 3). This was not good news. If these firms had been doing badly before the crisis, their downsizing or outright market exit would have led to higher aggregate productivity—allowing the so-called cleansing effect of recessions to play out. But this was not the case. Firms with more vulnerable balance sheets enjoyed productivity dynamics similar to those with lower vulnerability until 2008, which suggests that the persistent sluggish performance of more vulnerable firms after 2008 resulted from the crisis shock, not from intrinsically poor performance.

Balance sheet vulnerabilities were compounded by hardening financial conditions. In fact, the sharp drying up of credit that followed the Lehman Brothers failure, and later the euro area crisis, sets the global financial crisis apart from past recessions. The combination of two factors visibly affected productivity—particularly in countries where financial conditions tightened the most. In those economies, the postcrisis divergence in productivity between firms that entered the crisis with sizable maturing loans and those with low refinancing needs was most striking. A simple calculation suggests that the interplay between preexisting firm-level vulnerability and tighter credit may account, on average, for up to a third of the total slowdown in productivity after the crisis in advanced economy firms.

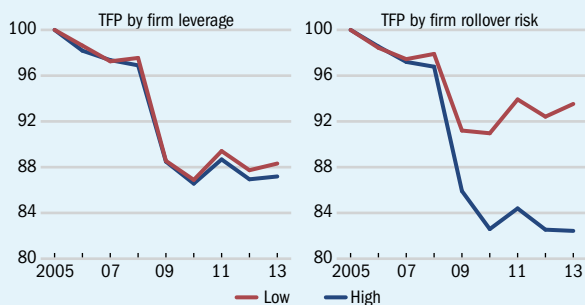
Why did the credit crunch wreak such enduring harm on productivity of existing firms? Our evidence suggests that the sudden liquidity squeeze and the associated difficulty in financing working capital may have forced distressed firms into asset fire sales, layoffs, intangible investment cuts, or bankruptcy, with lingering adverse effects on productivity. Immediately following the Lehman failure, firms with pre-

Chart 3

Divergent paths

Firms that were highly indebted or had substantial expiring loans before the crisis saw a bigger drop in productivity than those with stronger balance sheets.

(total factor productivity index, 2005 = 100)



Source: Duval, Hong, and Timmer, forthcoming.

Note: High/low leverage and high/low rollover risk correspond to the 75th and 25th percentiles of the cross-country cross-firm distribution of leverage and rollover risk in a large sample of firms in advanced economies. Rollover risk is measured as debt maturing within a year in 2007, as a percent of total sales. Leverage is measured as total debt to total assets.

existing balance sheet weakness invested substantially less in intangible assets than their less vulnerable counterparts (Duval, Hong, and Timmer, forthcoming). More broadly, tight access to credit induces firms to shift their investment spending toward shorter-term, lower-risk, lower-return projects (Aghion and others 2012).

Tight credit conditions seem to have undermined not only productivity growth within firms but also the economy's ability to shift capital to areas where it is most productive. Indeed, capital misallocation (measured by the dispersion in the return of capital across firms and sectors) increased following the crisis.

Although the causes are not yet fully understood, tighter credit conditions during the crisis may have played a role by impeding the growth of financially constrained firms vis-à-vis their less constrained counterparts. Insofar as some firms in the former group offered strong return prospects while some in the latter group offered weak prospects, any failure to reallocate capital between them would show up at the aggregate level as an increase in resource misallocation and weaker productivity.

It is also possible that some banks routinely renewed loans—without requiring that the principal be paid off—to weak (so-called zombie) firms to delay recognizing losses from bad loans and the need to raise capital. To the extent that such routine renewals benefited highly profitable firms as well as those that were not profitable, it may have weakened the usual process of resource reallocation away from the latter toward the former, as is typical in a well-functioning market economy.

Persistent weak demand and investment are also distinctive features of the postcrisis era, especially in advanced economies. Arguably, this phenomenon also helped erode productivity gains by slowing the adoption of new technologies, which are often embodied in capital. In the late

1990s and early 2000s, for example, technological change such as Internet use was embodied in new and increasingly powerful computers. Estimates suggest that falling investment may have lowered total factor productivity growth in advanced economies by nearly 0.2 percentage point a year following the crisis.

Elevated policy uncertainty since the crisis also appears to have played a significant role in driving down investment and productivity in important economies. Higher uncertainty leads firms, especially those dependent on external financing, not only to cut investment but also to concentrate what it does invest on shorter-term, lower-risk, lower-return projects. According to new IMF findings, greater uncertainty weakened productivity disproportionately in industries (for example, construction) that relied more on external financing. Weaker investment in information and communication technology were a contributing factor. Higher uncertainty overall may have aggravated the post-crisis productivity slowdown by as much as 0.2 percent a year, on average, in Europe, 0.1 percent in Japan, and 0.07 percent in the United States.

Structural forces

The effects of the crisis have held back productivity growth since the late 2000s, but other adverse longer-term forces were already at play.

Not long after the information and communication technology revolution of the late 1990s, productivity growth in sectors most reliant on this technology slowed significantly, especially in the most technologically advanced countries. This also affected lagging economies, where adoption of leading technologies had been an important driver of productivity.

Persistent weak demand and investment are also distinctive features of the postcrisis era.

Population aging in advanced economies also appears to have gradually become a drag on productivity. Worker skills tend to increase until a certain age and then start to decline—with attendant effects on innovation and productivity. Analysis of the relationship between the age structure of the workforce and aggregate productivity suggests that rapid aging during the 2000s may have lowered total factor productivity growth in advanced economies more than 0.2 percentage point a year on average relative to the 1990s.

The global trade slowdown is another long-term drag on productivity. Rapidly increasing international trade flows in the late 1990s and early 2000s supported productivity growth by strengthening domestic firms' incentives and ability to

produce efficiently, innovate, and use more or better inputs. Learning from exposure to foreign markets, as well as economies' reallocation of resources toward activities with international comparative advantage, also helped raise productivity. We estimate, for example, that increased trade solely from China's global trade integration may account for as much as 10 percent of the average overall productivity increase in advanced economies between 1995 and 2007.

Since 2012, however, trade has barely kept pace with global GDP. This reflects primarily weak economic activity, but also to a lesser extent waning trade liberalization efforts and maturing global supply chains, which contributed to slower productivity (IMF 2015). As global trade integration matures it could also mean lower productivity gains in the future—and, of course, new outright trade restrictions would mean a reversal of earlier productivity gains.

Another global headwind is a decline in the level of educational attainment that made an important contribution to aggregate labor productivity growth in past decades. This slowdown may have contributed about 0.3 percentage point to weaker annual labor productivity growth since the turn of the century.

Healing productivity

To address these long-term issues, policymakers should strive to advance structural reforms, strengthen innovation and education, and continue to reap the gains from open trade and migration, ensuring that these benefits are shared widely within countries as well. But because much of the slowdown reflects scars of the global financial crisis, reviving productivity growth—and its key role in boosting living standards—requires action targeted to crisis legacies, primarily in continental Europe.

- **Boost demand where it remains weak, particularly investment**—through carefully selected public investment projects and removal of obstacles to private investment—to support capital accumulation and the adoption of new technologies and help reverse the downward spiral of weak investment and productivity.

- **Help firms restructure debt and strengthen bank balance sheets** to ease their access to credit and stimulate investment in physical and intangible capital. Aggregate productivity will benefit as well—especially in Europe, where balance sheet repair has been slower than in the United States and is likely a persistent drag on productivity growth. Facilitating corporate restructuring and stepping up banking supervision will also improve capital allocation across firms.

- **Give clear signals about future economic policy**, in particular regarding fiscal, regulatory, and trade policies. This will support investment and its shift toward higher risk and higher returns.

Policies aimed at addressing crisis legacies and longer-term issues can be mutually supportive. Lifting future potential growth—for instance, through research and development tax incentives, infrastructure spending, or migration and trade policies—would raise expectations of future

demand and investment returns. Such measures would help support current investment and technological innovation.

Policies geared toward boosting domestic demand and investment in the short term—including through balance sheet repair—would pave the way for structural reforms with high long-term productivity payoffs. All in all, a comprehensive approach is the best way to break the vicious circle of low output and productivity growth.

The debate on the future of productivity has yet to be settled. A new leap in innovation, driven by major breakthroughs in artificial intelligence or other general purpose technologies, may be around the corner—or not. But without some major innovation, the prospects for a return to a healthy pace of productivity growth look dim, unless we tackle the crisis legacies up front and the longer-term challenges, such as aging populations, at least gradually. Otherwise, growth may be stuck in a rut for years to come. ■

Gustavo Adler is Deputy Division Chief and Romain Duval an Advisor in the IMF's Research Department.

This article is based on the IMF Staff Discussion Note "Gone with the Headwinds: Global Productivity."

References:

- Aghion, Philippe, and others. 2012. "Credit Constraints and the Cyclicity of R&D Investment: Evidence from France." *Journal of the European Economic Association* 10 (5): 1001–24.
- Andrews, Dan, Chiara Criscuolo, and Peter N. Gal. 2015. "Frontier Firms, Technology Diffusion and Public Policy: Micro Evidence from OECD Countries." *OECD Productivity Working Paper 2, Organisation for Economic Co-operation and Development, Paris.*
- Blanchard, Olivier, Eugenio Cerutti, and Lawrence Summers. 2015. "Inflation and Activity—Two Explorations and their Monetary Policy Implications." *NBER Working Paper 21726, National Bureau of Economic Research, Cambridge, MA.*
- Cette, Gilbert, John Fernald, and Benoît Mojon. 2016. "The Pre-Great Recession Slowdown in Productivity." *European Economic Review* (88): 3–20.
- Duval, Romain, Gee Hee Hong, and Yannick Timmer. Forthcoming. "Financial Frictions and The Great Productivity Slowdown." *IMF Working Paper, International Monetary Fund, Washington, DC.*
- Fernald, John G. 2015. "Productivity and Potential Output before, during, and after the Great Recession." In *NBER Macroeconomics Annual 2014, Volume 29*, edited by Jonathan A. Parker and Michael Woodford. Cambridge, MA: National Bureau of Economic Research, 1–51.
- Gordon, Robert. 2016. *The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War.* Princeton, NJ: Princeton University Press.
- International Monetary Fund (IMF). 2015. "Private Investment: What's the Holdup?" *World Economic Outlook, Chapter 4, Washington, DC, April.*
- . 2016. "Global Trade: What's behind the Slowdown?" *World Economic Outlook, Chapter 2, Washington, DC, October.*
- Syerson, Chad. 2016. "Challenges to Mismeasurement Explanations for the U.S. Productivity Slowdown." Unpublished.



Getting It Right

Ruud De Mooij

Well-designed fiscal incentives can help spur innovation and ultimately growth

THERE is considerable debate over how countries can increase their potential economic growth in the coming years. Many will rely on productivity growth, driven by innovation.

Just as inventions such as electricity and the internal combustion engine in the late 19th century laid the foundation for high growth in the mid-20th century, so too could three-dimensional printing, driverless cars, and artificial intelligence pave the way for growth during the coming decades. Some observers, such as Erik Brynjolfsson and Andrew McAfee of the Massachusetts Institute of Technology, believe a major growth surge is in the offing. Others, such as Northwestern University's Robert Gordon, are less optimistic.

Whatever your view of the future, one thing is clear: policy matters. Governments generally pursue a wide variety of policies to make a welcoming environment for innovation—through the protection of intellectual property rights, competition policies, labor market regulation, and effective bankruptcy laws. Tax and spending policies do much to stimulate innovation and growth—provided they are well designed.

Inspiration, perspiration, incentives

Research and development help drive innovation. Governments play an important role in funding higher education and basic research at universities and public laboratories, which helps advance innovation at private companies. But fiscal policies can also play a direct role in fostering innovation by businesses.

Private firms typically do not invest enough in research and development, in part because they lack adequate incentives. These investments tend to benefit the broader economy in addition to what the firm itself can appropriate. Others may imitate the technology in new products, which often inspires follow-up innovations. As a result, research by one firm usually ends up being beneficial to others. Private companies are not interested in giving

anything away, so they will not spend enough on research and development.

This underinvestment can be addressed by fiscal incentives such as tax credits and direct subsidies, which lower the cost of innovation and encourage firms to invest more. Empirical studies suggest that fiscal incentives must reduce a firm's research and development costs by approximately 50 percent to factor in the spillover benefits that others gain.

During the past decade, fiscal support for private research and development has increased in most countries. Yet differences remain large, and support is generally well below the 50 percent desirable level. If advanced economies were to increase their support in the form of tax credits or other incentives to meet this target level, estimates suggest that research and development would increase by approximately 40 percent. Such expansion could lift GDP in these economies by as much as 5 to 8 percent over the long term.

But it is not just the size of fiscal incentives that matters: good design and implementation are also critical. Countries vary widely in this regard. In Australia and Korea, for instance, relatively generous tax credits effectively reduce the cost of extra research and development investment by nearly 50 percent—that is, they approach the theoretical ideal. Germany offers targeted subsidies to encourage collaboration between universities and private firms. Other countries grant tax relief for the wages of researchers. Most of these fiscal incentives have worked well, studies suggest, when they were implemented effectively.

However, not all fiscal incentive policies are equally effective at nurturing innovation.

Take, for example, the so-called patent box regimes many European countries have introduced recently. These programs significantly reduce the corporate tax burden on income from innovation (such as from patents), but they have not worked. Although they reward success, they do not reduce the



cost of experimentation, which often leads to failure. And knowledge spillovers thrive on trial and error. In some countries, patent box regimes appear to have had no measurable impact on research and development. Elsewhere, such as in the Netherlands, they have. For every euro spent by the Dutch government on the patent box, research and development expanded by 56 cents, one study reports. However, another study found that the Dutch tax credit plan yielded an impact of €1.77 for every euro spent. In other words, innovation could be spurred considerably by shifting funds from the ill-designed patent box toward the well-designed tax credit.

Sincerest form of flattery

Imitation of technology from abroad is another critical component of innovation, especially in emerging market and developing economies. These technology transfers increasingly originate in multinational corporations that disseminate their advances across the world through foreign direct investment. Foreign investment inflows can bring important productivity gains to an economy if local firms learn about the new technology or copy new management and organizational practices. To boost productivity, many governments therefore try to attract foreign investment, including through tax and spending policies.

Some of these policies, however, are highly ineffective and inefficient. For example, many countries offer generous tax incentives to multinational investors, such as tax holidays or tax exemptions in special economic zones. But investors report when surveyed that such incentives have relatively little effect on their choice of investment location—a view supported by empirical evidence.

What really matters are good institutions and a predictable legal system. Moreover, domestic firms benefit from foreign investment only if there is a solid human capital base in the country—in other words, people able to absorb the imported knowledge. There is a significant positive association between productivity gains from foreign investment and human capital indices, which measure countries' ability to nurture, develop, and deploy talent for economic growth.

In light of this, governments would do better to redirect revenue currently spent on ill-designed tax incentives to education. China understood this well when it phased out several tax incentives for foreign direct investment in 2008 as part of broader corporate income tax reform and instead plowed money into education and research to create a strong human capital base capable of absorbing foreign knowledge.

Banishing “success” taxes

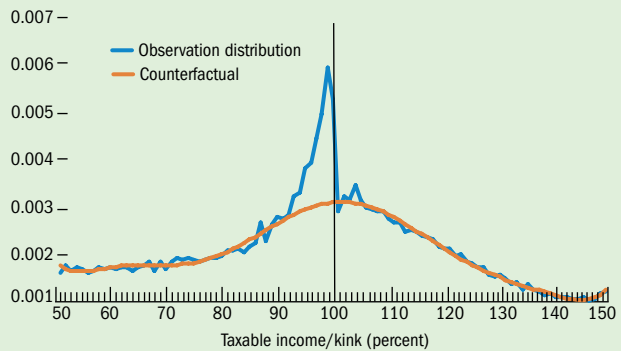
Many radical innovations arise from new entrepreneurial ventures, which have no vested interest in existing technologies. The pace of innovation therefore depends critically on an efficient process of entrepreneurial entry, growth, and exit—a process that in many countries is hampered by red tape, financial constraints, and tax barriers.

Evidence indeed suggests that high corporate income taxes are a drag on entrepreneurship and thus deter productivity growth. Governments in some countries try to offset this tax

Arrested development

Costa Rica's tax incentive for small businesses has led many firms to remain small to benefit from a lower tax rate.

(share of firms with different taxable incomes)



Source: Brockmeyer A., and M. Hernandez. 2016. "Taxation, Information, and Withholding: Theory and Evidence from Costa Rica." Policy Research Working Paper 7600, World Bank, Washington, DC.
Note: The kink refers to the income level at the exemption threshold for self-employed taxpayers for the years 2006–13. A value of 100 on the horizontal axis means taxable income is equal to the threshold. The tax rate above the threshold is 10 percent.

distortion by offering special tax incentives for small companies—for example, by granting them a reduced corporate income tax rate. Despite good intentions, however, such incentives are not cost-effective. In fact, they tend to hamper productivity growth by discouraging firms from expanding and losing the small business tax incentive. This small business trap is evident in data for Costa Rica that show bunching of small firms as they try to stay just below the income threshold for preferential treatment (see chart).

Not all fiscal incentive policies are equally effective at nurturing innovation.

To foster entrepreneurship, governments should target fiscal support to new firms instead of small ones. Countries such as Chile and France, for instance, have developed effective policy initiatives to support innovative start-ups. Such incentives are by definition temporary. Support is granted when the start-up does not yet generate much income. Many new firms incur losses early on and do not benefit from simple relief of income taxation. Generous loss-offset rules are also critical for entrepreneurs whose endeavors have a significant risk of failure.

While no one really knows what will happen to productivity growth over the long term, one thing is certain: appropriate fiscal incentives for research and development and entrepreneurship matter for the pace of innovation. Ultimately, such well-designed and well-implemented incentives at the micro level are critical to sustained growth at the macro level. ■

Ruud De Mooij is Chief of the Tax Policy Division of the IMF's Fiscal Affairs Department.

This article is based on the April 2016 issue of the IMF's Fiscal Monitor.

Rethinking GDP

It may be time to devise a new measure of economic welfare with fewer flaws





Diane Coyle

WHY does economic growth matter? The answer for economists is that it measures an important component of social progress—namely, economic welfare, or how much benefit members of society get from the way resources are used and allocated. A look at GDP per capita over the long haul tells the story of innovation and escape from the Malthusian trap of improvement in living standards that is inevitably limited by population growth.

GDP growth is instrumentally important as well. It is closely correlated with the availability of jobs and income, which are in themselves vital to people's standard of living and underpin their ability to achieve the kind of life they value (Sen 1999).

However, GDP is not a natural object, although it is now everyday shorthand for economic performance. It cannot be measured in any precise way, unlike phenomena in the physical world. Economists and statisticians understand, when they stop to think about it, that it is an imperfect measure of economic welfare, with well-known drawbacks. Indeed, early pioneers of national accounting, such as Simon Kuznets and Colin Clark, would have preferred to measure economic welfare. But GDP prevailed because the demands of wartime called for a measure of total activity. So from the very start, the concept of GDP has long had its critics. But coming up with a better gauge of welfare is easier said than done.

Short-term measure

GDP measures the monetary value of final goods and services—that is, those that are bought by the final user—produced and consumed in a country in a given period of time. The limit of GDP as a measure of economic welfare is that it records, largely, monetary transactions at their market prices. This measure does not include, for example, environmental externalities such as pollution or damage to species, since nobody pays a price for them. Nor does it incorporate changes in the value of assets, such as the depletion of resources or loss of biodiversity: GDP does not net these off the flow of transactions during the period it covers.

The environmental price of economic growth is becoming clearer—and higher. The smog over Beijing or New Delhi, the impact of pollution on public health and productivity in any major city, and the costs of more frequent flooding for which countries are still ill-prepared are all illustrations of the gap between GDP growth and economic welfare. This is why economists and statisticians have been working to introduce estimates of natural capital and its rate of loss (World Bank 2016). When they do, it will be clear that sustainable GDP growth (that enables future generations to consume at least as much as people today) is lower than GDP growth recorded over many years. Getting these new measurements into the mainstream policy debate and reflected in political choices, however, is another matter.

Indeed, GDP ignores capital assets of all kinds, including infrastructure and human capital; it is an inherently short-

term measure. Economic policies aimed at delivering growth have demonstrated the validity of the famous comment of their intellectual architect, John Maynard Keynes: “In the long run we are all dead.”

Seventy years on, the long run is upon us. A broad measure of the sustainability of economic growth, and thus long-term economic welfare, would take account of economic assets as well as the flows counted in GDP: the need to maintain infrastructure or record its depreciation as bridges crumble and roads develop potholes. A true national balance sheet would account for future financial liabilities, such as state pensions. It would also include increases in human capital as more people attain greater education and skill. Economic welfare must be calculated net of such changes in the value of national assets.

Household work

A long-standing criticism of reliance on GDP as the measure of economic success is that it excludes much unpaid work by households. There must be an accepted definition of what is part of the economy and measurable and what is not. Economists call this a “production boundary.” What is within that boundary and what is not inevitably involve matters of judgment. One early debate was whether government spending should be included—on the grounds that it is collective consumption—or excluded—on the grounds that the government is paying for things like roads and security that are inputs into the economy (just like a business expense) rather than consumption or investment goods.

Another key debate concerned how to define goods and services produced—and often also consumed—by households. Home-produced goods such as food were included, because in many countries these can just as easily be bought and sold in the market, but home-provided services such as cleaning and child care were not. Not surprisingly, feminist scholars have always decried the fact that work done mainly by women is literally not valued. Many economists agreed in principle, but the line was drawn partly for reasons of practicality: surveying household services was a daunting task, and these services were seldom purchased in the marketplace.

This of course has changed dramatically in the economies of the Organisation for Economic Co-operation and Development (OECD) since the 1940s and 50s, when the production boundary decisions were made. As more women work for pay, the market for services such as cleaning and child care has grown, and households can and often do switch between performing and buying these services. There is no logical reason not to treat household work like any other work.

The evolution of the digital economy has reignited this old debate, as it is starting to change the way many people work. National accountants have treated government and business as the productive part of the economy and households as non-productive, but the previously relatively clear border between home and work is eroding. More and more people are self-employed or freelance through digital platforms. Their hours

Measuring up

GDP is the monetary value of the total output of goods and services in an economy during a specific period.

Although the definition seems straightforward, deriving GDP is not. First, collecting the data is immensely complicated. There are millions of producers, products, services, and prices.

Moreover, figuring out how much a change in GDP, which is measured in current dollars (or other national currencies), represents a real change in the amount of goods and services available to consumers and how much is due to changes in prices adds another layer of complexity.

If the price of shoes, say, is 5 percent higher than a year ago and GDP registers a 5 percent increase in the value of shoe output, the nominal increase in the shoe component of GDP is an illusion, due to inflation. The actual output of shoes was constant. To determine how much of any, say, year-to-year change in GDP reflects more final output (volume) and how much reflects higher prices (inflation), economists use a technique called deflation.

GDP is a measure of the final goods and services produced in an economy, those that are consumed by people or businesses. **Intermediate goods and services** are netted out in GDP because they are used to produce another good or service. An automobile is a final good. The steel, plastic, and glass, for example, that are used to make it are intermediate products (or inputs).

Three measures

There are three ways to measure GDP. The **expenditure** approach adds up the market value of all spending on final products by consumers, businesses, and government plus exports minus imports. The **production** approach adds up the value of everything that is produced, gross output, then deducts the value of the intermediate products to get net output. The **income** approach adds up everything earned by people and firms—mainly wages, profits, rents, and interest income.

may be flexible, and work can overlap with other activities. In many cases they are using household assets, from computers and smartphones to their homes and cars, for paid work. Many people contribute free digital work such as writing open-source software that can substitute for marketed equivalents, and it clearly has great economic value despite a price of zero.

These developments underline the need for a much better statistical understanding of household activity, yet few countries collect any suitable information on household assets.

Ever-evolving technology

The blurring of boundaries between home and work is not the only way in which technology is making GDP calculation difficult. Many in the technology sector argue that conventional GDP statistics understate the importance of the digital revolution. The pace of innovation has not slowed in areas such as telecommunications, biotechnology, materials, and green energy, they rightly point out—making the lackluster growth and productivity performance of so many advanced economies even more of a puzzle.

For instance, compression technology allows wireless networks to carry more data faster than ever at high quality, and

All three measures theoretically come up with the same value for GDP. But because of difficulties in collecting the source data, the three approaches never give the same value. In many countries, the official GDP is based on the production approach because source data from producers are more comprehensive and accurate.

Price effects

Because the prices of goods and services are collected in current dollars, the so-called nominal GDP is affected by changes in prices and does not necessarily reflect whether or by how much the volume of those goods and services has increased—which is what interests most people and businesses. To see the effects of inflation on the prices of goods and services, economists construct a statistic called an index, which takes account of changes in the price of a good or a service between a base year and the current year. That index is applied to prices to take out the inflation component (or deflate) in current prices.

To return to the shoe example, if the nominal value of shoes rose 10 percent over a year, the nominal GDP for that year would reflect a 10 percent increase in shoe output. If the price of shoes rose 8 percent, then a deflator applied to the shoe price part of GDP would turn that 10 percent nominal increase into a 2 percent real increase (in statistical lingo, the volume of shoes produced rose 2 percent).

Deflators present their own difficulties. The more precise the deflator, the more accurate the real GDP calculation. But there is a sizable drawback. The more precise the deflator, the more information about prices is needed, and collecting price data is costly.

This box draws in part on “Measure Up: A Better Way to Calculate GDP” (IMF Staff Discussion Note 17/02), by Thomas Alexander, Claudia Dziobek, Marco Marini, Eric Metreau, and Michael Stanger.

the price of such innovations as solar energy and genome sequencing has been falling rapidly. Could it be that the statistics are not properly adjusting for quality improvements arising from technology and therefore overstate inflation and understate productivity and growth in real terms?

Official figures in practice incorporate very little quality adjustment to calculate “hedonic” price indices—that is, those that take into account quality improvements. Researchers who have tried to extend hedonic adjustment to a broader range of prices in the information and communication technology sector in the United States have concluded that it makes little difference to the picture of slow productivity growth, in part because there is little US-based information and communications technology manufacturing (Byrne, Fernald, and Reinsdorf 2016).

However, this research has not been extended to the far wider range of goods and services affected by digital transformation, and there are some conceptual questions that need to be resolved. For example, is a streamed music service equivalent to a digital download or buying compact discs, or is it a new good? In other words, is the consumer buying a specific format or simply the ability to listen to music? If the former,

ideally there would need to be a quality-adjusted music price index. In principle, price indices calculate what people have to pay to attain the same level of “utility” or satisfaction from all their purchases, but putting this calculation into practice is not straightforward.

GDP’s shortcomings have become especially obvious in its failure to account for inequality.

Indeed, economists argue that it is impossible to capture all the economic welfare benefits of innovations in GDP, which measures transactions at market prices; there will always be some utility above and beyond that price, labeled “consumer surplus.” Digital goods are no different from previous waves of innovation in this regard. Those who use GDP growth as a measure of economic performance must keep in mind that it has never been a complete measure of economic welfare. For example, the consumer benefits of an important new medicine will eventually always far exceed the market price. This argument, while correct, plays down the possibility of a particularly wide wedge between welfare and GDP today, given digital technology’s effects on business models and consumer behavior.

Inequality matters

GDP’s shortcomings have become especially obvious recently in its failure to account for inequality. The aggregation of individual incomes or expenditures into GDP ignores distributional questions, and equating GDP growth with an improvement in economic welfare assumes that there is no reason for anything other than the status quo distribution. When income distribution did not change much—until the mid-1980s in most OECD countries—ignoring the issue did not matter much. However, thanks in part to Thomas Piketty’s bestselling *Capital in the Twenty-First Century* and in part to the populist movements springing up in many countries, nobody is ignoring distributional questions anymore.

It is possible to adjust GDP to take account of distribution and other nonmarket aspects of economic welfare. Economists have started to debate (once again) specific adjustments. Dale Jorgenson of Harvard University proposes combining distributional information from household surveys with the national accounts (Jorgenson, forthcoming). Charles Jones and Peter Klenow have proposed a single measure incorporating consumption, leisure, mortality, and inequality; their calculations show that this approach closes much of the apparent gap in living standards between the United States and other OECD countries when this is assessed on the basis of GDP per capita (Jones and Klenow 2016).

These measures, extending the standard national accounts approach in a way that at least takes inequality into account, address some of the challenges to gauging GDP, but not all. The debate about how best to measure economic welfare is

intensifying for several reasons. The 2008 global financial crisis and its aftermath are casting a long shadow. Although inequality has begun to diminish in some countries, sluggish growth, debt overhang, and high unemployment in some cases have made for a lackluster recovery and simmering discontent with economic policy that follows business as usual. At the same time, it is hard to ignore the evidence of the environmental cost of past economic growth. The digital revolution and debate about the links between technology and productivity growth—and technology and future jobs—add a subtle twist.

It is easier to express dissatisfaction with current measures than to reach consensus on what should replace GDP. The landmark Stiglitz-Sen-Fitoussi Commission in 2009 recommended the publication of a “dashboard” of economic welfare measures, arguing that its multiple dimensions could not sensibly be reduced to one number. Others argue that a single indicator is essential to have traction in the media and political debate. GDP is set by a slow and rather low-profile international consensus process, so it is hard to imagine any clean break with the current standard unless economic researchers can come up with an approach as compelling in theory and as feasible in practice as GDP, the best-known measure in the framework System of National Accounts.

This might happen. The question is on economists’ research agenda for the first time since the 1940s and 50s. In the United Kingdom, the Office for National Statistics has set up a new research center on economic statistics, launched in February 2017. It is a vitally important debate, given the widespread belief that—as calculated by GDP—recent economic progress has not measured up. Public conversation about economic policy is largely conducted in terms of GDP growth, so the erosion of GDP’s status as a reasonable measure of economic welfare is a serious matter indeed. ■

Diane Coyle is Professor of Economics, University of Manchester, and author of GDP: A Brief but Affectionate History.

References:

- Byrne, David M., John G. Fernald, and Marshall B. Reinsdorf. 2016. “Does the United States Have a Productivity Problem or a Measurement Problem?” BPEA Conference Draft, Brookings Institution, Washington, DC.
- Coyle, Diane. 2015. “Modernising Economic Statistics: Why It Matters.” National Institute Economic Review 234 (November): F4–F8.
- . Forthcoming. “The Political Economy of National Statistics.” In *National Wealth*, edited by K. Hamilton and C. Hepburn. Oxford: Oxford University Press. Working paper version available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2850061
- Jones, Charles I., and Peter J. Klenow. 2016. “Beyond GDP? Welfare across Countries and Time.” *American Economic Review* 106 (9): 2426–57.
- Jorgenson, Dale. Forthcoming. “Within and Beyond the GDP: Progress in Economic Measurement.” *Journal of Economic Literature*.
- Sen, Amartya. 1999. *Development as Freedom*. Oxford: Oxford University Press.
- Stiglitz, Joseph E., Amartya Sen, and Jean-Paul Fitoussi. 2009. *Report by the Commission on the Measurement of Economic Performance and Social Progress*. Paris.
- World Bank. 2016. “Natural Capital Accounting.” Brief, Washington, DC.

ANNA TERESHINA

**Assistant Product Manager
Moscow, Russia**

Can Money Buy **HAPPINESS?**

People around the world share their thoughts on what sparks this elusive feeling

ECONOMISTS generally measure a country's success in terms of its GDP. But GDP doesn't always accurately measure well-being. And even high per capita income doesn't necessarily guarantee a happy population, economist Richard Easterlin discovered in the 1970s.

While rich people are generally happier than poor people in a given country, Easterlin found, richer countries aren't always happier than poorer ones.

And for individuals, higher income fails to increase happiness beyond a certain level, some believe. According to Nobel laureates Angus Deaton and Daniel Kahneman, that threshold for the United States is \$75,000—though in some countries this figure might be lower or higher.

So can money buy happiness? Just for fun, *F&D* asked a cross section of people in five countries that question and what they'd do if they suddenly got a big chunk of money.

JASPREET SETHI

**Independent Financial Consultant
New Delhi, India**

"Can money buy happiness? It certainly doesn't make one sad. If it comes my way, I'll be happy.

If I had money, I'd buy a bigger car, a bigger house, a better education for my child, and a better holiday for my family. I think the economy is much better these days. I'm investing more than my parents did right now, though they worked harder, I believe."





PAT WALL

Retiree, London, United Kingdom

“Money cannot buy happiness. It doesn’t solve your problems. It’s all inside you, isn’t it? I walk miles every day around London and it’s all free, and I’m really happy doing that.

If I had some extra money, I’d pay off my children’s mortgages. At my age, I don’t need anything.”

“Can money buy happiness? It certainly doesn’t make one sad. If it comes my way, I’ll be happy.”



ADAM HASSAN

Self-employed, Abuja, Nigeria

“I think money can buy happiness, and here’s why. Money, they say, is any item that is generally accepted for payment for goods and services. That means if you have to pay school fees, you need money. If you need a home for yourself, you need money. If you want to buy yourself something to eat, you need money. So if you don’t have money to get these things, there won’t be happiness.

If I were blessed with money, I’d get myself a home, a very good car, and a wife. Right now, I have to pay double what I used to pay for goods and services. And it’s really affecting my daily life.”



JAIME OSPINA

Doctor, Bogotá, Colombia

“Yes, money can buy happiness. There’s a feeling in this country that if you have problems and at the same time you have some resources, it helps. Most of the problems of this country and the world are solved with money. If I had money to spare, I would buy a house facing the sea.”



NATALIA BALYBERDINA

Retired Nurse, Moscow, Russia

“I think that money is evil. Money can’t buy happiness. As long as there’s happiness in the family, everyone gets along, relatives and close ones are healthy—for me, that’s happiness.

When I have extra money I try to take my grandchildren to see places like Moscow, St. Petersburg, Kazan, or Abkhazia. Of course I wish my pension were higher, my kids had bigger salaries, utility prices were lower, and the prices in the shops were less outrageous. I used to buy decent salami a lot—now I buy it when I get my pension payment, savor it, and then wait until the next month’s payment.”



BLESSING ADISA

Graduate Trainee, Abuja, Nigeria

“I don’t think money can buy happiness. The best things in life are free, like the air we breathe, friends, and family. Money is not happiness.

If I came into a big sum of money, I would save it and think about investing. I’m not sure I would just buy things.”



MOHAMMAD ADNAN

Automobile Mechanic, New Delhi, India

“Money can’t buy happiness. Happiness bought with money is only temporary—like when you go out to dinner or attend a wedding. Real happiness that you feel deep in your heart is only found through other people.

If I had some extra money, I’d buy a better education for my two kids and perhaps expand my business. Or I’d buy a better house and then fill it with all the material things that have now become necessities.”



ARSENY YATSECHKO

**Graduate Student in Graphic Design
Moscow, Russia**

“Money can buy anything. If you have enough money, you can make yourself happy. Family can change, people can change, but money won’t change.

If I had money, I’d probably spend it on a trip. I’d go to Paris or Berlin. I’m not so worried about the economy. We Russians know that we can survive any crisis—we’ve lived through hard times before.”



RICHARD WICKS

Market Vendor, London, United Kingdom

“I’ve seen people with untold wealth. They never seemed happy to me. But what is happiness? You know, at the end of the day, as long as you’ve got your health and can get up, brush your teeth, get dressed in the morning, and talk to one another, you’re the richest person in the world.

If I had some extra money to play with, I’d like to have a small holding where I’d keep horses at my back door and go riding at 6:00 every morning before starting my day.”



MIGUEL JOSUE MOLANO

Librarian, Bogotá, Colombia

“You can have lots of money, but if you don’t have happiness in your heart, you won’t be able to share it.

If I suddenly found myself with lots of money, I would invest it and try to help people, because that’s the way to become happy. I would help the displaced in our country, single mothers, and children who have been subject to violence and war. I’d help people try to achieve a different type of happiness, a happiness that has nothing to do with material things.” ■

Sluggish Future

J. Bradford DeLong



J. Bradford DeLong is Professor of Economics at the University of California, Berkeley.

YOU are reading this because of the long, steady decline in nominal and real interest rates on all kinds of safe investments, such as US Treasury securities. The decline has created a world in which, as economist Alvin Hansen put it when he saw a similar situation in 1938, we see “sick recoveries... die in their infancy and depressions... feed on themselves and leave a hard and seemingly immovable

core of unemployment...” In other words, a world of secular stagnation. Harvard Professor Kenneth Rogoff thinks this is a passing phase—that nobody will talk about secular stagnation in nine years. Perhaps. But the balance of probabilities is the other way. Financial markets do not expect this problem to go away for at least a generation.

Eight reinforcing factors have driven and continue to drive this long-term reduction in safe interest rates:

1. Higher income inequality, which boosts saving too much because the rich can't think of other things to do with their money;

2. Technological and demographic stagnation that lowers the return on investment and pushes desired investment spending down too far;

3. Nonmarket actors whose strong demand for safe, liquid assets is driven not by assessments of market risk and return, but by political factors;

4. A collapse of risk-bearing capacity as a broken financial sector finds itself overleveraged and failing to mobilize savings, thus driving a large wedge between the returns on risky investments and the returns on safe government debt;

5. Very low actual and expected inflation, which means that even a zero safe nominal rate of interest is too high to balance desired investment and planned saving at full employment;

6. Limited demand for investment goods, coupled with rapid declines in the prices of those goods, which puts too much downward pressure on the potential profitability of the investment-goods sector;

7. Market failure in the information economy—which means markets cannot properly reward those who invest in new technologies, even when the technologies have enormous social returns—which lowers the private rate of return on investment and pushes desired investment spending down too far;

8. Increasing technology- and rent-seeking-driven obstacles to competition, which make investment unprofitable for entrants, and market cannibalization possible for incumbents.

The result is that with rates so close to zero, central banks can no longer easily and effectively act to maintain full employment by cutting interest rates in recessions. Central banks typically—and powerfully—operate by buying and selling bonds for cash to encourage investment spending by leading the value of assets in the future to be higher and encourage consumption spending by making people feel richer. But when there is little room for cutting rates central banks are reduced to using novel, uncertain, and much weaker tools to try to guide the economy.

The magnitude of this decline in safe rates since 1990 is demonstrated by US Treasury securities. The short-term annual interest rate has fallen from 4 percent to 1.2 percent in real (inflation-adjusted) terms and from 8 to 0.5 percent in nominal terms, with long-term rates following them down.

We should adopt appropriate fiscal policies that provide for expansionary investment.

The natural response to this secular stagnation is for governments to adopt much more expansionary tax and spending (fiscal) policies. When interest rates are low and expected to remain low, all kinds of government investments—from bridges to basic research—become extraordinarily attractive in benefit-cost terms, and government debt levels should rise to take advantage of low borrowing costs and provide investors the safe saving vehicles (government bonds) they value. Harvard's Lawrence Summers argues that interest rates are so low that the inability of central banks to conduct effective monetary policy has become a chronic condition. He says that there is no sign we will emerge from this state for a generation, and so we should adopt appropriate fiscal policies that provide for expansionary investment the private sector is reluctant to undertake.

Critics of Summers's secular stagnation thesis miss the point. Each seems to focus on one of the eight factors driving the decline in interest rates and then say that factor either will end soon or is healthy for some contrarian reason.

Since the turn of the century, the North Atlantic economies have lost a decade of what we used to think of as normal economic growth, with secular stagnation the major contributor. Only if we do something about it is it likely that in nine years we will no longer be talking about secular stagnation. ■



Policy Is the Problem

John B. Taylor



John B. Taylor is the Mary and Robert Raymond Professor of Economics at Stanford University.

SECULAR stagnation has been the subject of much debate ever since 2013, when Lawrence Summers proposed the hypothesis “that the economy as currently structured is not capable of achieving satisfactory growth and stable financial conditions simultaneously.”

Speaking at a recent conference, Summers posited that for the past decade and a half, the economy had been constrained by a “substantial increase in the propensity to save and a substantial reduction

in the propensity to spend and invest,” which were keeping equilibrium interest rates and economic growth low.

Few dispute that the economy has grown slowly in recent years, especially when the financial crisis is taken into account. But secular stagnation as an explanation for this phenomenon raises inconsistencies and doubts.

Low policy interest rates set by monetary authorities, such as the US Federal Reserve, before the financial crisis were associated with a boom characterized by rising inflation and declining unemployment—not by the slack economic conditions and high unemployment of secular stagnation. The evidence runs contrary to the view that the equilibrium real interest rate—that is, the real rate of return required to keep the economy’s output equal to potential output—was low prior to the crisis. And the fact that central banks have chosen low policy rates since the crisis casts doubt on the notion that the equilibrium real interest rate just happened to be low. Indeed, in recent months, long-term interest rates have increased with expectations of normalization of monetary policy.

For a number of years going back to the financial crisis, I and others have seen a more plausible reason for the poor economic growth—namely, the recent shift in government economic policy. Consider the growth in productivity (output per hour worked), which along with employment growth is the driver of economic growth. Productivity growth is depressingly low now—actually negative for the past four quarters. But there is nothing secular about this. Indeed, there have been huge swings in productivity in the past: the slump of the 1970s, the rebound of the 1980s and 1990s, and the current decline.

These shifts are closely related to changes in economic policy—mainly supply-side or structural policies: in other words, those that raise the economy’s productive potential and its ability to produce. During the 1980s and 1990s, tax reform, regulatory reform, monetary reform, and budget reform proved successful at boosting productivity growth in the United States. In contrast, the stagnation of the 1970s and recent years is associated with a departure from tax reform principles, such as low marginal tax rates with a broad base, and with increased regulations, as well as with erratic fiscal and monetary policy. During the past 50 years, structural policy and economic performance have swung back and forth together in a marked policy-performance cycle.

To see the great potential for a change in policy now, consider the most recent swing in productivity growth: from 2011 to 2015 productivity grew only 0.4 percent a year compared with 3.0 percent from 1996 to 2005.

Why the recent slowdown? Growth accounting points to insufficient investment—amazingly, capital per worker declined at a 0.2 percent a year clip from 2011 to 2015 compared with a 1.2 percent a year increase from 1996 to 2005—and to a decline in the application of new ideas, or total factor productivity, which was only 0.6 percent during 2011–15 compared with 1.8 percent during 1996–2005.

Productivity growth is depressingly low now—actually negative—but there is nothing secular about this.

To reverse this trend and reap the benefits of a large boost to growth, the United States needs another dose of structural reform—including regulatory, tax, budget, and monetary—to provide incentives to increase capital investment and bring new ideas into practice. Such reforms would also help increase labor force participation and thus raise employment, further boosting economic growth.

While the view that policy is the problem stands up to the secular stagnation view, the ongoing debate suggests a need for more empirical work. The recent US election has raised the chances for tax, regulatory, monetary, and perhaps even budget reform, so there is hope for yet another convincing swing in the policy-performance cycle to add to the empirical database. ■

Toward Inclusive Growth

Emerging markets should share the fruits of their growth more equitably

Tao Zhang



Tao Zhang is Deputy Managing Director at the IMF.

GROWTH rates in emerging market countries have significantly outpaced those of more developed economies in recent years. Poverty has fallen; standards of living have improved. But with this rapid expansion comes the danger that the gap between the rich and the poor in those countries will widen. Pew Research polls show that most people are optimistic about the future in emerging markets such as India, Nigeria, and other countries that are progressing toward advanced economy status. But we must ensure that growth remains inclusive in these economies so that this optimism is justified.

By inclusive growth, I mean a more equitable sharing of the benefits of increased prosperity, decent-paying jobs, equal employment and education opportunities, and improved access to and provision of health care and financial services. In comparison to advanced economies, emerging markets experience greater income disparity and higher poverty, and lag behind in access to key social services like health care and finance.

We need to make growth inclusive not only because it is the morally right thing to do, but also because it is critical for achieving sustainable strong growth. Research inside and outside the IMF has shown that high levels of inequality tend to reduce the pace and durability of growth and that policymakers should not be afraid to adopt measures that ensure shared prosperity, including ones that redistribute wealth.

So it will be important for policymakers to ensure that growth's benefits are shared equitably. Failure to do so risks increasing political and social instability, stifling investment in human and physical capital, and eroding support for structural reforms—which would impede the sustained growth that emerging

markets need to achieve high-income status. Addressing these issues today is all the more important in light of the prospect of less favorable global economic conditions.

More progress needed

Over the past few years, emerging markets have made progress in fostering inclusive growth—thanks, in part, to favorable global conditions, such as low interest rates and rebounding international trade. Growth in these countries has averaged about 4 percent a year since the early 2000s, accounting for over half of global growth. And income inequality has declined, with the Gini coefficient—the most common indicator of inequality—falling to about .40 from .45. (The Gini coefficient ranges from zero, when everyone has the same income, to 1, when a single individual receives all the income.) Poverty has also fallen, employment has risen, education levels have gone up, and access to financial services and health care has improved.

But sustaining this progress can be challenging. To begin with, we cannot be complacent. In many emerging markets, income inequality remains high and too many people still live in absolute poverty. More important, these countries are facing a new global economic landscape, with increasing uncertainties. As emerging markets strive to attain the same level of development as advanced economies—a process that entails accumulating capital and raising productivity—these challenges will tend to worsen.

I see five priority areas where IMF policy advice can support country authorities in addressing these challenges.

Productivity: A rising tide lifts all boats, the saying goes. Raising productivity (output per hour worked) will help create the



GROWTH

widespread increase in income and wealth needed to reduce inequality and poverty. Achieving this goal won't be easy. Countries will have to promote competition in product markets and trade, encourage foreign direct investment, finance infrastructure projects, and improve business environments. These reforms are high on policymakers' agendas in such countries as Brazil, China, India, and South Africa.

Education and health care: Improving the quality of education and health care will enhance workers' employability and help break the vicious cycle of poverty and lack of education. In some cases, increased spending will be needed—think of programs like Brazil's Bolsa Familia, which provides cash transfers to low-income families to encourage attendance at primary schools, or Mexico's Oportunidades, which provides subsidies to enhance schools' performance and better align curricula with the job market.

Access to employment opportunities: Ensuring that women and men have equal opportunities would help boost growth and reduce inequality. In many countries, getting a job is more difficult for women. For example, only about a quarter of women in Egypt, Jordan, and Morocco are employed. Reasons include rigid labor regulations and large disparities in educational attainment. It is critical, then, for governments to reduce barriers to hiring while still protecting workers, remove restrictions on labor mobility, and eliminate tax provisions that discriminate against second earners in a family.

Financial inclusion: Greater access to financial services will help improve livelihoods, reduce poverty, and promote growth. This could be achieved, for example, by easing access to ATMs, promoting access to banking services, especially among low-income households, putting in place financial literacy programs, and promoting mobile banking (see "A Broader Reach" in this issue of *F&D*). Such measures are used extensively in India and Peru. Still, financial inclusion efforts should be accompanied by strengthened supervision and regulation to avoid the financial instability that might result from an expansion of credit.

Safety nets and redistribution policies: With rapid growth and improved productivity, inevitably there are winners and losers, as less competitive firms shut down and workers lose their jobs. It will be important for governments to adopt measures to ease that transition, including skills upgrading, training programs, and well-targeted social safety nets. More generally, better redistribution policies can promote equity without undermining efficiency. Examples of such policies include replacing general price subsidies with cash transfers to the poor, reducing tax loopholes that benefit the rich, making tax systems more progressive (including in some cases expanding the personal income tax base), and combating tax evasion.

Stepped-up engagement

We have recently stepped up our work in many of these areas—in large part because it is critical to the IMF's mission of promoting economic stability. Below are a few examples.

- On **productivity**, we are devoting more resources to understanding the sources of productivity and long-run

growth and fully integrating structural reform analysis into our dialogue with member countries (see "Stuck in a Rut," in this issue of *F&D*). This means not only understanding which reforms enhance growth but also being aware of the short-term economic and social costs of those reforms.

- On **inequality**, there are several examples. In Bolivia, we have been working with the government to figure out how best to counter the rise in inequality that will likely result from the collapse in commodity prices. In countries such as Colombia, we are trying to tackle what economists call labor market "duality"—that is, a situation in which some workers have well-paying protected jobs and others have poorly paying jobs with little protection and few benefits.

Better redistribution policies can promote equity without undermining efficiency.

- On **promoting equal access to employment opportunities**, we have engaged the authorities in Japan and Saudi Arabia in frank discussions on female labor force participation. In particular, our analysis of labor market disparities in Saudi Arabia highlighted possible measures to address the gender balance through more widespread remote work practices and encouraging female employment in retail settings that target female customers.

- On **financial inclusion**, our **Financial Access Survey**, launched in 2009, is a key source of data on access to financial services around the world. This helped us learn, for example, that deposit accounts at commercial banks in India have grown by half a billion over the past five years, thanks to the government's efforts to make financial inclusion a priority.

- On **safety nets and redistribution policies**, we continue to protect social spending when designing IMF-supported programs because the poor typically feel the effects of economic and financial crises more acutely. For example, over the course of Pakistan's economic program under the Extended Fund Facility—which helps countries facing serious balance of payments problems—more than 1½ million recipients were added to the Benazir Income Support Program, a well-established cash transfer program, and stipends were raised by more than 50 percent. We also help countries adopt tax systems that improve the balance between equity and efficiency.

In addition, we are working hard to strengthen the global financial safety net, which would allow countries to put their limited resources toward achieving better economic and social outcomes.

Putting it all together, I would say the time is ripe for emerging markets to make inclusive growth a centerpiece of their development strategies. This will not only enable the sustainable strong growth these countries need to achieve higher living standards, it will also help put the global economy on a stronger footing. ■

GIRL POWER

Policies that help integrate women into the workforce benefit everyone

EQUALITY between men and women is important for both moral and economic reasons. If half of the world's population cannot reach its full potential, the whole global economy suffers. Despite much progress in recent decades, inequity across gender lines persists in the workforce. Female labor force participation continues to be lower than that of men due to many factors, including wage gaps, unequal access to opportunity, health and education disparities, and legal obstacles.

Equal access to jobs and economic opportunities benefits all people—not just women. For example, countries facing

shrinking workforces because of an aging population can expand their labor force by including women.

In most countries, however, at least one legal hurdle prevents women from finding work. In addition to reforming institutions, regulations, and laws that promote discrimination against women, governments can implement family-friendly policies like parental leave and affordable child care.

Especially in low-income countries and emerging markets, additional investments in infrastructure, health, and education would help women join the workforce.

THERE ARE LARGE REGIONAL DISPARITIES IN FEMALE LABOR FORCE PARTICIPATION

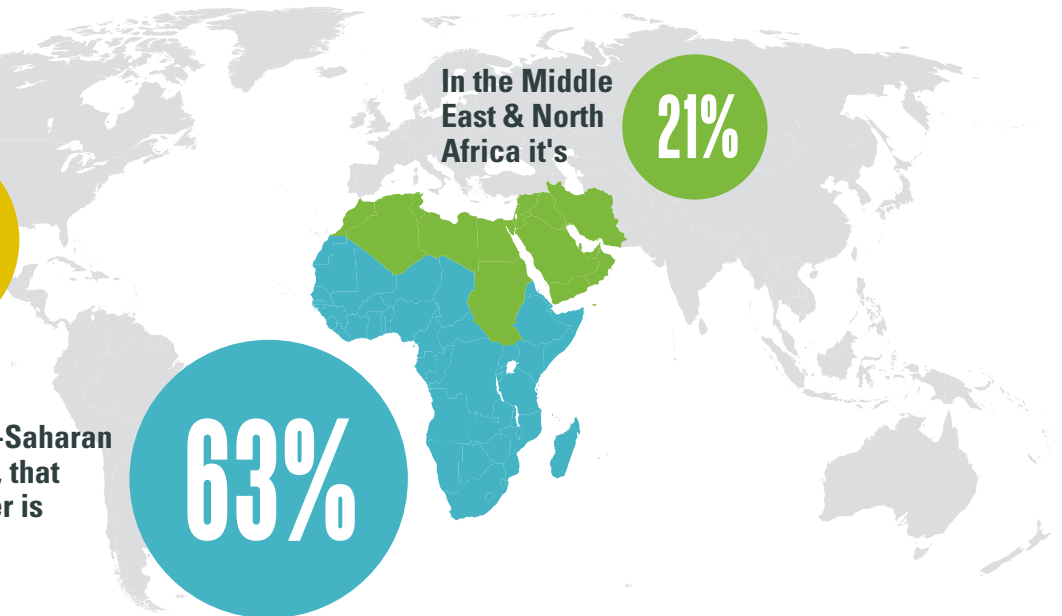
Globally, women make up 40% of the labor force.



In sub-Saharan Africa, that number is

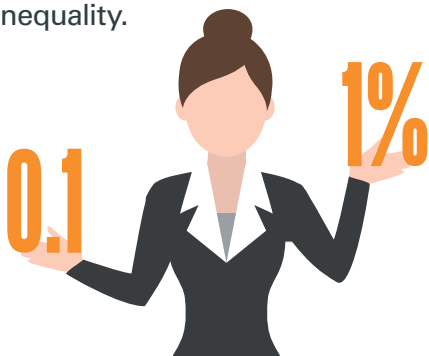


In the Middle East & North Africa it's



The UN Gender Inequality Index (GII) measures inequality in both opportunities and outcomes, and is closely linked with overall income inequality.

Reducing inequality by 0.1 on the GII leads to a 1% increase in economic growth.



ALMOST 90% OF COUNTRIES HAVE AT LEAST ONE GENDER-BASED LEGAL RESTRICTION

In Europe, **2 out of 10** senior corporate positions are held by women. Increasing that number to **3 out of 10** would result in a **3–8%** increase in a company's return on assets.



THE GENDER WAGE GAP IS ROUGHLY **16%** IN OECD COUNTRIES.

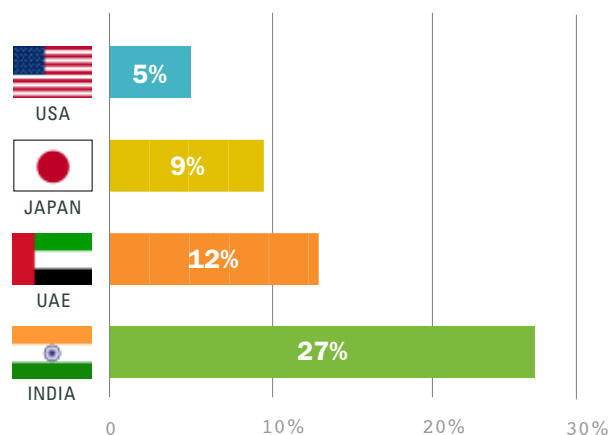


MEN=\$1.00



WOMEN=\$0.84

How much would a country's GDP increase if women's labor force participation were increased to match men's?



REDUCING THE GENDER GAP IN LABOR FORCE PARTICIPATION BY 25% BY THE YEAR 2025 WOULD POTENTIALLY CREATE

100 MILLION JOBS FOR WOMEN

FISCAL POLICIES THAT SUPPORT INCREASED FEMALE LABOR FORCE PARTICIPATION:



Greater equality between maternity and paternity leave policies



Social benefits linked to labor force participation



Access to affordable child and elder care



Taxes on individual rather than family income



Investing in infrastructure, education, and health

Prepared by Maria Jovanović. Text and charts are based on the IMF's ongoing gender research, available at imf.org/gender and drawing on other institutions' knowledge and data.

A Middle Ground

**The renminbi is rising,
but will not rule**



Eswar Prasad

IN November 2015, the IMF made an announcement that was symbolically momentous in the annals of international finance. It decided to anoint the Chinese renminbi an elite global reserve currency. The renminbi was to join the select basket of currencies (previously comprising the US dollar, euro, Japanese yen, and British pound sterling) that constitute the IMF's artificial currency unit, the special drawing right (SDR). The renminbi appeared to be on its way to taking the world by storm and reshaping global finance.

Since then, much has changed. The renminbi has lost value relative to the dollar, and China is dealing with a spate of capital outflows, partly reflecting loss of confidence in the economy and the currency. The renminbi's inclusion in the SDR basket, which took effect in October 2016, has not stanchd this erosion of confidence.

The earlier hype predicting the renminbi's inevitable rise to dominance, perhaps even rivaling the dollar, has proved overblown. But the same is likely to be true for doomsday

scenarios now predicting a plunge in the renminbi's value and prominence as financial capital surges out of China. Reality likely lies somewhere between these two extremes.

In the long run, what the renminbi's ascendance means for the global financial system depends, to a large extent, on how China's economy itself changes in the process of elevating its currency. Transforming the domestic economy may in fact have been a hidden agenda behind China's aggressive promotion of its currency.

Size counts but not for all

China's economy is now the second largest in the world (based on market exchange rates). In 2016, its annual GDP was \$11 trillion, accounting for 15 percent of world GDP, second only to the United States, whose annual GDP is \$19 trillion. China is also an important player in international trade, accounting for 13 percent of global trade in goods. China's impact on the world economy is even greater when measured

along other dimensions. The country holds about 30 percent of global foreign exchange reserves and accounts for a third of global GDP growth since the financial crisis.

Despite China's economic might, the international stature of its currency, the renminbi, does not quite match that of its economy. Among the currencies of the world's six largest economies, the renminbi is only now beginning to emerge as a factor in the global economy. The others—the dollar, euro (used by two of the six largest economies—Germany and France), yen, and British pound—all have, to different degrees, well-established roles in global finance.

Unique playbook

In recent years, the Chinese government has taken a number of steps to elevate the renminbi to this group of elite currencies by increasing its international use. The renminbi's adoption in global markets is constrained, however, since the Chinese government seems unwilling to condone a fully market-determined exchange rate and an open capital account that allows for free cross-border capital flows. This may reflect a conservative approach to giving market forces freer rein as well as prudence dictated by the risks of rapid economic liberalization.

China has therefore adopted a unique playbook for promoting the renminbi while trying only gradually to free up capital flows and the exchange rate. Given China's sheer size and its rising shares of global GDP and trade, the government's steps quickly gained traction.

In the mid-2000s, the government started removing restrictions on capital inflows and outflows, but in a controlled and gradual manner. This process continued even after the global financial crisis. For instance, the government has set up a number of systems to allow foreigners to invest in China's stock and bond markets. At the same time, there are now many channels for Chinese households, corporations, and institutions to place some portion of their investments in foreign markets. But the government continues to keep a tight grip on each of these channels.

China has promoted the availability of renminbi outside its borders, including sanctioning 15 offshore trading centers for transactions between renminbi and other currencies. The government also set up the Cross-Border International Payment System to facilitate commercial transactions between domestic and foreign companies using renminbi rather than more widely used currencies such as the dollar and the euro.

These measures led to rising internationalization of the renminbi, its greater use in denominating and settling cross-border trade and financial transactions—that is, as an international medium of exchange. By the latter half of 2014, about a third of China's international trade was denominated and settled in renminbi. Furthermore, the renminbi accounted for about 2 percent of cross-border payments around the world, which—although a low share—already placed the renminbi among the top six payment currencies in the world.

But then the currency's progress stalled, as China grappled with a growth slowdown, a sharp boom and bust cycle in the stock market, and concern about rising debt and financial

instability. Over the past year, the renminbi's progress as an international medium of exchange has gone into reverse. The quantitative indicators of its use in international finance all point to signs of a sharp retreat, and the liberalization of capital flows has come to a grinding halt.

Still, it is important to keep both the upswings and downswings in proper perspective. Despite the constraints on capital flowing in and out of China, the renminbi has begun playing a larger, although still modest, role in international finance over a relatively short period. The trajectory of the renminbi's progress in this dimension was impressive initially, but these developments are still at a nascent stage and should not be blown out of proportion. And clearly the path will be bumpy and involve many detours.

Reserve currency

Another aspect of a currency's role in international finance is its status as a reserve currency, one held by foreign central banks as protection against balance of payments crises. This status is often seen as a mixed blessing—a reserve currency economy can borrow more cheaply from foreign investors by issuing debt denominated in its own currency, but higher demand can sometimes make it harder to manage the currency's value. Indeed, in the 1980s and 1990s, Germany and Japan attempted to resist their currencies' gaining this status because they did not want stronger demand, and ensuing currency appreciation, to damage their export sectors.

In any event, this topic may seem premature given that China has neither a flexible exchange rate nor an open capital account—once considered prerequisites for a reserve currency. Even though the IMF has, for all practical purposes, anointed the renminbi a reserve currency, financial market participants' views do more to determine a currency's status. After all, foreign investors must be able to acquire and easily trade financial instruments denominated in that currency without major restrictions on cross-border financial flows. And they must be reasonably confident that the currency's value will not be controlled by a government with scant regard for market forces. As in many other economic matters, here, too, China appears to have broken the traditional mold.

Remarkably, the renminbi has already become a de facto reserve currency even though China does not meet some of the prerequisites once seen as essential. China's sheer economic size and the strength of its trade and financial linkages with economies around the world seem to have overridden the other limitations.

Many central banks around the world are gradually acquiring at least a modest amount of renminbi assets for their foreign exchange reserve portfolios. The list comprises a geographically and economically diverse group of countries, including Australia, Austria, Chile, Japan, Korea, Malaysia, Nigeria, and South Africa. According to IMF estimates, about 2 percent of global foreign exchange reserves are now held in renminbi-denominated financial assets. Some 35 central banks around the world have signed bilateral local currency swap arrangements with China's central bank. These arrangements give them access

to renminbi liquidity that they can tap to defend their currencies or maintain stable imports even if foreign capital inflows dry up.

Although the renminbi has managed to attain the status of a reserve currency, its progress along this dimension is likely to be limited by its lack of well-developed financial markets. Foreign official investors, such as central banks and sovereign wealth funds, typically seek to invest in highly liquid and relatively safe fixed-income debt securities, even if such securities have a relatively low rate of return. China's government and corporate debt securities markets are quite large but are still seen as having limited trading volume and weak regulatory frameworks.

Thus, strengthening its financial markets is important both for China's own economic development and for promoting the international role of its currency.

Trojan horse

Indeed, it is possible to make a broader case that China has tried to use elevation of the status of its currency mainly as a cudgel against opposition to domestic reforms. Many of the reforms necessary to enhance the currency's international role will ultimately benefit China, regardless of what happens with the currency. For instance, a more flexible exchange rate will allow for more independent monetary policy that can target domestic policy objectives without the constraint of having to maintain a particular exchange rate. Similarly, a broader and better-regulated financial system can do a better job of allocating China's copious domestic savings to more productive investments that generate more stable output and employment growth.

However, many of these reforms have traditionally run into stiff opposition from powerful interest groups that stand to lose from any changes to the existing system. For instance, Chinese exporters for a long time opposed a market-determined exchange rate, fearing that it would lead to currency appreciation and make their exports less competitive in foreign markets. The large state-owned banks resisted more competitively determined interest rates on deposits (rather than rates fixed by the government), which would allow smaller banks to compete with them for household and corporate deposits by offering better rates. Some government officials have also resisted certain economic reforms that could pose short-term risks, preferring stability and control to the inherent volatility of market forces. By casting these reforms as essential to promoting the status of the currency, reform-minded officials have in effect used a Trojan horse strategy to push economic liberalization measures that would otherwise have floundered.

Gulf between reserve and safe haven

Since the global financial crisis, a new concept has gained traction in international finance: the "safe haven" currency. Such a currency is more than just a plain vanilla reserve currency; it is one that investors turn to for safety in times of global turmoil and not just to diversify their assets or seek higher yields.

China may be gaining economic clout, but whether it will ever gain the trust of foreign investors is an open question. Such trust is crucial for a currency to be seen as a safe haven.

A country seeking this status for its currency must have a sound institutional framework—including an independent judiciary, an open and democratic government, and robust public institutions (especially a credible central bank). These elements have traditionally been seen as vital for earning the trust of foreign investors, both private and official, including central banks and sovereign wealth funds.

Foreign investors typically want to know they will be treated fairly according to well-established legal procedures, rather than subject to the whims of the government. They also tend to value independence of institutions such as the central bank from government interference—important for maintaining the credibility and value of the currency.



The renminbi's rise to prominence will change international finance.

Chinese leaders are pursuing, no doubt in a slow and often meandering manner, financial liberalization and limited market-oriented economic reforms. But they have unequivocally repudiated political, legal, and institutional reforms. China's government has, if anything, rolled back freedom of expression, the rule of law, and the independence of key institutions from government interference. In short, while the renminbi has the potential to become a significant reserve currency, it will not attain safe haven status without far-reaching reforms to China's institutional and political structure. Such reforms are apparently not in the cards. Thus, the notion that the renminbi will one day rival the US dollar for dominance as the global reserve currency is far-fetched.

Risks ahead

The renminbi's path to global prominence depends to a significant extent on China's growing economic and financial power. A major growth slowdown or, worse, a collapse of the financial system could alter this trajectory and derail the renminbi's rise. In fact, some of the policies related to enhancing the renminbi's international stature—including capital account opening and allowing the exchange rate to be determined more freely by market forces—could themselves expose China's economic and financial stability to a number of risks if these policy changes are mishandled.

The Trojan horse strategy has indirectly helped to advance at least a limited set of financial sector reforms and capital account liberalization. For instance, to meet the conditions and deadline set by the IMF for the renminbi to be considered for inclusion in the SDR basket, during 2015 China had to liberalize bank deposit interest rates, remove some restrictions on capital flows, and, at least in principle, reduce its intervention in foreign exchange markets.

These changes have not, however, been accompanied by reforms to the real side of the economy. When it comes to state-owned enterprises and much-needed improvements to

corporate governance and the urgent need to remove perverse incentives for bankers to lend to government enterprises, there is still a long way to go. Loans to state-owned companies, many of which are unprofitable and inefficient but still undertake large investments, are still implicitly guaranteed by the government, and they have powerful patrons.

China is thus facing complications from haphazard and unbalanced reforms. The limited financial market reforms and capital account opening have not been supported by reforms in other areas, which has generated more volatility rather than yielding the benefits of well-functioning markets.

Concern about the economy's growth prospects and high volatility in domestic stock markets helped fuel a surge in capital outflows over the past couple of years. This put downward pressure on the currency and, as the central bank has tried to continue managing the currency's value relative to the US dollar, resulted in a loss of about \$1 trillion in foreign exchange reserves (relative to the peak level of nearly \$4 trillion in June 2014). Clearly, the state of China's economy and the status of the renminbi are closely linked.

End game

Despite some fits and starts in the process, the renminbi is on its way to becoming a significant international currency, although this will take many years and will hardly be a linear process. If China plays its cards right, with suitable financial sector and other market-oriented reforms, the renminbi could one day be an important reserve currency and could

eventually account for as much as 10 percent of global foreign exchange reserves. (For comparison, the US dollar and the euro now account for 64 percent and 21 percent, respectively, of global foreign exchange reserves.)

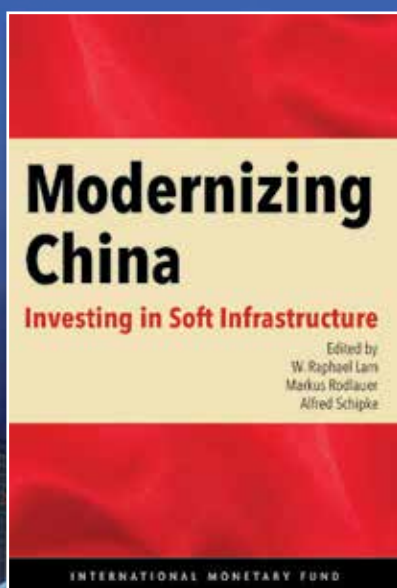
While the currency has made remarkable progress in a relatively short period, it is far from assured that it will continue along the same impressive trajectory it has followed for the past few years. And its full potential may remain unrealized unless the Chinese government undertakes a broad range of economic and financial system reforms.

For the renminbi to become a safe haven currency, however, China would have to initiate even more far-reaching reforms of its institutional framework, which would ultimately alter its political, legal, and public institutions. Such changes are currently not in the cards.

Still, the renminbi's rise to international prominence will change international finance, and even China itself, in many ways. Over the next few years, the renminbi's rising importance in international finance could well serve as a catalyst for domestic reforms and perhaps even promote a more stable international financial system.

The renminbi will continue to rise in global finance, but don't expect it to rule. ■

Eswar Prasad is a professor in the Dyson School at Cornell University and senior fellow at the Brookings Institution. This article is based on his new book, Gaining Currency: The Rise of the Renminbi.



Policies that support well-functioning markets and economic management — or “soft infrastructure” — play a key role in China's economic transformation. This book explores the country's changing economy and suggests ways to further strengthen policy frameworks.

“...essential reading to understand China's challenges...”
—David Dollar, Senior Fellow, Brookings Institution

\$38. English. ©2017. 288pp. Paperback.
ISBN 978-1-51353-994-2. Stock #MCISIEA

Order now at bookstore.imf.org/fd317

I N T E R N A T I O N A L M O N E T A R Y F U N D



Man outside an ATM in New Delhi, India.

A Broader Reach

Adolfo Barajas, Martin Čihák, and Ratna Sahay

When more people and more firms have access to financial services, the whole society can benefit

MANY households and small-scale entrepreneurs—mainly in developing and emerging market economies—find that lack of access to financial services prevents them from saving for a rainy day, borrowing funds to expand their businesses, or purchasing a house, a refrigerator, or other consumer durable goods. Their financial transactions, whether for personal or business purposes, can be costly and sometimes dangerous, because they almost always involve cash. With limited ability to save or to buy insurance, their financial condition is vulnerable to an extended illness or a natural disaster.

The lives of a vast number of people, including many poor in advanced economies, might be improved if they had access to and used a secure and affordable formal financial system and did not, for example, have to rely on extended family for emergency funds. Similarly, their savings would increase if they could deposit any funds they can accumulate in an interest-earning bank account rather than having to hide the money in their homes and if they learned how to assess and buy the products and services that banks, insurance companies, and even securities firms offer.

In other words, people who have limited or no access to financial services could be better off if they did. So might society. The benefits of financial services could lift many people out of poverty, reduce inequality, and encourage entrepreneurship and investment. Furthermore, if it makes credit available to previously excluded individuals with entrepreneurial talent, broader access to financial services might help productivity and economic growth. Promoting financial inclusion, as the process of broadening access to and use of financial services is called, has become a mantra of many central banks and finance ministries, particularly in developing economies and emerging markets. In almost 60 countries, there are national strategies and even explicit quantitative targets for financial inclusion.

Several aspects

The notion of financial inclusion has several dimensions, but key is access to financial services such as banking and insurance at an affordable cost—particularly for the poorest—and effective and responsible use of these services.

Researchers and policymakers rely mainly on indicators from three global sources to gauge the spread of financial services and its effect on people, firms, and the economy:

- The IMF's **Financial Access Survey**, based on data collected annually since 2004 by central banks from providers of financial services in 189 countries: The survey shows a great expansion in financial inclusion over the past decade. Worldwide, the number of bank accounts per 1,000 adults increased from 180 to 654 between 2004 and 2014, while the number of bank branches per 100,000 adults increased from 11 to 16. There are considerable differences across countries and regions. For example, in 2014, there were 1,081 accounts per 1,000 adults in high-income countries, compared with 88 in low-income countries. Among developing economies and emerging markets, bank branches per 100,000 adults ranged from 978 in Europe and central Asia to 158 in sub-Saharan Africa.

- The World Bank's triennial **Global Findex**, constructed from a worldwide survey of individuals' access to and use of financial services: It started in 2011, and despite only two surveys so far, its more than 100 indicators—which differentiate by age, gender, and income level—provide rich detail. The Global Findex estimates that in 2014, 2 billion adults, or almost 40 percent of the worldwide adult population, were unbanked, that is, had no account with a formal financial institution. The level varies from less than 10 percent in high-income countries to 86 percent in low-income countries. The survey also shows opportunities for increasing the use of financial services by those who bank with an institution. Only three-quarters of account holders use their account to save, to make at least three withdrawals a month, or to make or receive electronic payments. The survey also shows that despite an increase in access to and usage of formal financial services by women, about 7 percent fewer women than men are financially included.

- The World Bank **Enterprise Survey**, which has irregularly collected data on firms' usage of financial services since 2002: In 2014, 36 percent of firms worldwide said lack of access to finance was a substantial impediment to their expansion, compared with 3 percent in high-income countries and 42 percent in low-income countries. Among developing economies and emerging markets, 21 percent of firms in east Asia and the Pacific said they felt constrained, and 37 percent did in sub-Saharan Africa.

Effects of inclusion

It has been clear for a while that financial inclusion is good for individuals and firms—what economists call the micro level:

- Poor people benefit from basic payment services, such as checking and savings accounts, as well as from insurance services. Field experiments show that providing individuals with access to savings accounts increases savings, income, consumption, productivity, women's empowerment, business investment, and investment in preventive health care.

- Improved access to credit and other types of funding also helps firms, especially small and new ones, which often face difficulties in obtaining bank credit, because they lack an

established reputation, track record, or collateral. Their access to credit is associated with innovation, job creation, and economic growth. But one form of lending that has gained much attention, so-called micro-credit, has had mixed success.

New data sources now make it possible to demonstrate that financial inclusion affects the overall economy—the so-called macro level. Financial inclusion was not on most macroeconomists' radar until the early 2000s, when the problems that originated in large part in the United States due to growth in subprime mortgages (made mostly to poorer people and those with bad credit ratings who had largely been excluded) morphed into the global financial meltdown of 2008.

Sahay and others (2015), using data on access to and use of financial services in more than 100 countries, provided some evidence on macroeconomic effects of financial inclusion:

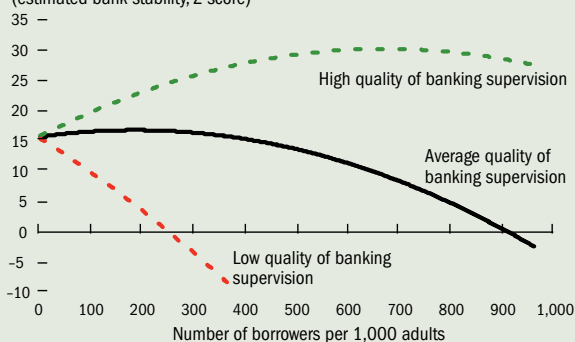
- Increased access to financial services by firms and individuals substantially benefits economic growth. A country with the median level of financial depth—the total amount of funds mobilized by financial institutions—can increase its annual long-term GDP growth by 3 to 5 percentage points by boosting people's access to ATMs or firms' access to credit. Moreover, sectors that rely heavily on external sources to finance investment grow more rapidly in countries with greater financial inclusion. However, the marginal benefits for growth wane as inclusion and financial depth increase. At very high levels, financial inclusion can hurt growth by encouraging such behavior as irresponsible lending by financial institutions that make loans without duly considering risks.

- But risks to financial stability, which can set back a country's economic growth by several years, increase when access to credit is expanded without proper supervision. In countries with weaker supervision, there is a stark trade-off between inclusion and stability: the buffers (capital) banks should hold to guard against adverse shocks are allowed to erode, mainly because of a failure to take proper account of a rapid increase

Safe inclusion

In countries with strong supervision, financial inclusion goes hand in hand with financial stability. In those with weaker supervision, greater inclusion can prompt financial instability.

(estimated bank stability, Z-score)



Source: Authors' calculations.

Note: The Z-score measures the stability of financial institutions by comparing buffers (capital and earnings) to the risk of a negative shock to earnings. The higher the Z-score the more stable the institutions and implicitly the financial system. The chart covers 64 emerging market and developing economies from 1980 to 2014.

in loans that are not being paid on time. But in countries with strong supervision, financial inclusion goes hand in hand with financial stability; greater access to credit is accompanied by an increase in banks' loss absorption buffers (see chart). Moreover, efforts to improve loan repayment can also conflict with inclusion. For example, introducing limits on the fraction of their income borrowers may pay in order to reduce the risk to financial and economic stability from housing booms and busts—as Australia, Hong Kong SAR, and the United Kingdom have done—will also limit access to credit.

- Increasing access to noncredit financial services such as payment and savings accounts—for example via ATMs, bank branches, and smartphones—does not hurt financial stability. Nor does increased access to insurance services, although there has been limited research on insurance.
- Increasing the share of women who have accounts helps raise growth without impairing financial stability, in part by enhancing diversity in the depositor base.

Raising financial literacy

Recent research shows that the financial literacy of individuals and businesses is a key element of successful financial inclusion. In advanced economies, where much of the population has access to financial services, the focus should be on educating potential customers to make sound financial decisions; in developing economies and emerging markets, the goal of increasing financial literacy should be to increase awareness of and the ability to use available services.

A more financially literate populace should enhance overall economic and financial stability. In the Netherlands, for example, a comprehensive nationwide financial literacy program that involves the government, the private sector, consumer groups, and educational institutions has undertaken projects to teach primary school children how to deal with money and to raise pension awareness among the elderly. In Pakistan, a program supported by the central bank and the private sector informs the public about basic financial concepts such as budgeting, savings, investments, debt management, financial products, and branchless banking. School-based projects in India and Brazil use family and social networks to spread the literacy effort beyond students.

Generally, financial inclusion increases with financial depth. For example, there is a positive relationship between a proxy for financial depth—the volume of credit—and a measure of financial inclusion, the percentage of firms with loans. (Of course, unlimited access to credit is not desirable, but the percentage of firms with loans illustrates the overall positive relationship between inclusion and financial depth.) The link to financial depth, however, is only part of the story. Countries with similar financial depth can have very different levels of inclusion. For example, in Mongolia, Nepal, Slovenia, and Ukraine private sector credit is about 60 percent of GDP. Yet the share of firms with loans is different—about 65 percent in Slovenia, 50 percent in Mongolia, 35 percent in Nepal, and 18 percent in Ukraine.

This suggests that other factors are also at play. For example, Love and Martínez Pería (2012) found that greater competition in the banking sector boosts access to credit—which

could help explain why Slovenia has higher credit access than Mongolia (whose level of bank competition is less than half that of Slovenia). But competition cannot explain the large differences between Slovenia and Nepal or Ukraine. Love and Martínez Pería also found that the quality and availability of financial information on potential borrowers are factors. Among these four countries, Slovenia has the highest level of credit information, with a credit bureau that covers the country's entire adult population.

A more financially literate populace should enhance overall economic and financial stability.

Other research shows that establishing registries of movable collateral, such as vehicles—often the only types of assets owned by many potential borrowers in developing economies—helps expand firms' access to finance.

The spread of technology can also enhance inclusion. One avenue is mobile banking, in which mobile phones provide the only contact between the customer and a financial institution. Only 2 percent of the world's adults use mobile banking, but use is expanding rapidly in sub-Saharan Africa. About 20 percent of adults in Kenya, Tanzania, and Uganda get financial services through mobile phones. Peruvian policymakers are exploring how to increase inclusion using mobile payment platforms. Mobile accounts are still used mostly for transactions; whether they can foster saving, borrowing, and insurance is unclear.

As a broad principle, inclusion efforts are best aimed at addressing the underlying market and government failures that keep people out of the financial system. For example, when red tape makes opening accounts too costly, policymakers can take steps to make account opening simpler. Because overall financial stability can be undermined by a general increase in bank credit or by setting up goals for rapid credit growth, policymakers should consider other policies aimed at helping the poor, such as direct and targeted transfers to people in need. Policies that make financial inclusion economically viable for banks and other institutions—rather than schemes that direct lending to certain sectors—are more likely to achieve macroeconomic goals. ■

Adolfo Barajas is a Senior Economist in the IMF's Institute for Capacity Development. Martin Čihák is an Advisor and Ratna Sahay is Deputy Director, both in the IMF's Monetary and Capital Markets Department.

References:

- Love, Inessa, and María Soledad Martínez Pería. 2012. "How Bank Competition Affects Firms' Access to Finance." *Policy Research Working Paper 6163*, World Bank, Washington, DC.
- Sahay, Ratna, and others. 2015. "Financial Inclusion: Can It Meet Multiple Macroeconomic Goals?" *IMF Staff Discussion Note 15/17*, International Monetary Fund, Washington, DC.



In Equality We Trust

A hustler's shell game being played on the streets of London, United Kingdom.

Eric D. Gould and Alexander Hijzen

“**T**RUST me”—it’s a common phrase that often arouses suspicion. Trust is a commodity that’s in short supply lately, in the United States and around the world, with potentially serious implications. Take the example of the three-card monte or shell game played on streets around the world. Most people are reluctant to take part because they don’t trust the fairness of the game or the person playing it. Similarly, when conventional economic and political activities are perceived as unfair or their actors as untrustworthy, people want extra reassurance before they participate. Rising economic inequality is one reason people may be less likely to perceive economic and political activity as fair.

Our research examines whether the downward trend in trust and social capital is a response to increased income inequality.

Social glue

Trust is a key component of the social capital that “enables participants to act together more effectively to pursue shared objectives” (Putnam 1995). In survey data, trust is measured by so-called generalized trust—how much a person trusts unspecified people rather than friends or family. Typically, this is gauged by a question such as “Generally speaking, would you say that most people can be trusted or that you can’t be too careful when dealing with others?”

During the past 40 years, generalized trust in the United States has declined

Inequality in the United States and Europe erodes trust among people—and can stifle economic growth

markedly. Since the early 1970s, the share of those who respond that most people can be trusted has declined from about 50 percent to 33 percent (see chart). Changes in the composition of the US population, moreover, tend to mask the true extent of the decline. When controlling for changes in US demographics, the decline in generalized trust is even more pronounced, mainly because the population has become more educated, and more educated people tend to trust more. Trust in government shows a similar downward trend. These trends may threaten the effectiveness of public policy and reduce popular support for mainstream political parties.

Evidence on trends in social capital in other advanced economies is limited and does not reveal consistent patterns. But recent anecdotal evidence and electoral results suggest that discontent is brewing in many European countries. Whether this translates into less trust and lower social capital is open to question but often assumed to be true.

Fair play

At the same time, economic inequality has increased in the United States and in many advanced economies. Rising economic inequality is typically regarded as an important reason for the decline in trust and may render economic outcomes less fair or drive a wedge between socioeconomic groups.

If economic disparity stems from family background, personal connections, or mere luck rather than individual merit, it may seem particularly unfair and, therefore, undermine trust in others and in government. When this is the case, disparity is highly persistent and social mobility limited, resulting in high *inequality of opportunity* (Putnam 2015).

Economic outcomes also determine socioeconomic status. If socioeconomic status is associated with shared values that foster trust, a large income gap will erode a general sense of trust when people's values clash—in other words, “familiarity breeds trust” (Coleman 1990). According to this argument, *unequal outcomes* indicate the degree of social stratification in society.

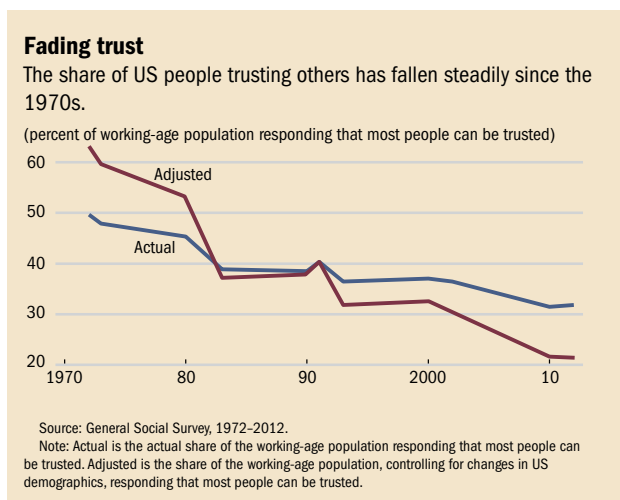
Indeed, many studies have noted a strong correlation between generalized trust and economic inequality. For example, data from the General Social Survey for the United States show that trust is lower in states where inequality is high (for example, Alesina and La Ferrara 2002; Rothstein and Uslaner 2005). The World Values Survey shows that trust is higher in more equal societies (for example, Zak and Knack 2001). These correlations do not necessarily mean that differences in trust between regions or countries are *caused* by differences in inequality. Both trust and inequality may be the result of some third factor. However, establishing causality is crucial because of the widely different policy implications. If the relationship is causal, government measures that seek to reduce economic inequality—such as raising the minimum wage, making taxation more progressive, or strengthening public income support for the poor—could be the solution. But if the correlation between inequality and trust is driven by a third factor, such measures may not do much to restore trust. Systematic evidence on the causal relationship between inequality and trust at this point is rather limited.

In the United States wide-ranging inequality substantially lowers people's trust in each other.

Our research examines whether the downward trend in trust and social capital is a response to the increasing gaps in income. The analysis uses data from the American National Election Survey for the United States and the European Social Survey for Europe. Our analysis for the United States exploits the variation across states and over time (1980–2010), while that for Europe utilizes the variation across European countries and over time (2002–12).

The results show clear evidence that in the United States wide-ranging inequality substantially lowers people's trust in each other. The results for the United States indicate that the increase in inequality explains 44 percent of the observed decline in trust. Findings were qualitatively similar for “trust in government.” However, the findings also reveal that different sources of inequality account for significant differences in inequality's impact on trust and social capital.

Inequality *within* socioeconomic groups as defined by education, age, and economic activity weakens trust and social capital, but inequality *between* education groups does not. When people see a rising income gap among people like themselves in terms of age, education, and type of work, trust declines. But if the gap involves people who made different educational and career choices trust is not affected. One explanation is that inequality that stems from differences in human capital decisions and investments is



easier to understand and seems fair. However, if luck or unexplained factors drive incomes apart, people lose faith in other people and in government.

Moreover, the impact of inequality on trust and social capital in the United States is driven largely by rising wage differences at the bottom of the earnings distribution. However, inequality does not appear to foster a greater demand for redistribution. So policies that seek to restore trust by reducing market wage dispersion before taking into account taxes and benefits—regarding the minimum wage or collective bargaining, for example—appear more promising than redistribution in the form of more progressive income tax or increased social spending. In other words, a quality job with dignity and a decent salary means more than just a good income.

We found similar results for European countries, suggesting that inequality's damage to trust extends beyond the United States to advanced economies with different institutional settings. However, in contrast to the United States, the impact of inequality on trust in Europe is more general. Inequality both at the top and at the bottom of the distribution are found to eat away at trust and social capital. But in contrast to the United States, inequality in Europe does seem to increase the demand for more redistributive policies in the form of more progressive taxation policies or stronger social protection.

Who cares?

The decline in trust and social capital is troubling not only because of its effects on social cohesion; it may also have economic implications. A substantial body of literature in cultural economics shows that trust is a key ingredient for good economic performance.

This literature highlights two key ways trust influences the economy. First, it smooths the way for economic interaction in the private sphere by replacing transaction costs, such as legal and insurance fees, with less expensive, informal ways of forming and maintaining agreements. In addition, greater trust can mean fewer problems and costs when it comes to monitoring employees and determining appropriate rewards.

Second, trust can promote cooperation in the public sphere by reducing collective-action problems related to the provision of public goods and by enhancing the overall quality of public institutions. Governments may not be able to solve pressing socioeconomic challenges in a society that is distrustful, intolerant, and divided—especially when it comes to constitutional reforms and international treaties, which often require healthy popular support. Distrust also reduces the credibility of public policy, which undermines its ability to effectively change economic incentives and shape the economic behavior of citizens and business. In this case, distrust prevents policies from being effectively implemented.

There is also growing empirical evidence that trust promotes economic growth generally, via specific drivers such as international trade, financial development, innovation,

entrepreneurship, and firm productivity. For example, a lack of trust in the financial system may prevent people from investing in the stock market. Similarly, wary companies may shy away from outsourcing or offshoring and thereby miss out on potentially profitable opportunities.

Given rising inequality in many advanced economies and the role of trust in economic performance, our results suggest that this growing disparity could be affecting growth and development in an important, albeit indirect, way. This study, therefore, complements other recent empirical work showing that inequality reduces growth (Dabla-Norris and others 2015; Cingano 2014; Ostry, Berg, and Tsangarides 2014) by providing evidence of a particular channel for some of the ill effects of inequality on growth.

The rise in economic inequality in the United States and in other advanced economies may have shattered hope in economic processes, societal dynamics, and political practices that deliver fair outcomes. Lower economic participation, social polarization, and withdrawal from mainstream politics may be the fallout. ■

Eric D. Gould is a Professor of Economics at Hebrew University and a Research Fellow at the Centre for Economic Policy Research, and Alexander Hijzen is a Senior Economist at the Organisation for Economic Co-operation and Development.

This article is based on the authors' 2016 IMF Working Paper, No. 16/176, "Growing Apart, Losing Trust? The Impact of Inequality on Social Capital." It does not necessarily reflect the views of the OECD or its member states.

References:

- Alesina A., and E. La Ferrara. 2002. "Who Trusts Others?" *Journal of Public Economics* 85: 207–34.
- Cingano, Federico. 2014. "Trends in Income Inequality and Its Impact on Economic Growth." *OECD Social, Employment and Migration Working Paper 163, Organisation for Economic Co-operation and Development, Paris.*
- Coleman, James S. 1990. *Foundations of Social Theory.* Cambridge, MA: Harvard University Press.
- Dabla-Norris, Era, Kalpana Kochhar, Nujin Suphaphiphat, Frantisek Ricka, and Evridiki Tsounta. 2015. "Causes and Consequences of Income Inequality: A Global Perspective." *IMF Staff Discussion Note 15/13, International Monetary Fund, Washington, DC.*
- Ostry, Jonathan D., Andrew Berg, and Charalambos G. Tsangarides. 2014. "Redistribution, Inequality, and Growth." *IMF Staff Discussion Note 14/02, International Monetary Fund, Washington, DC.*
- Putnam, R. D. 1995. "Tuning In, Tuning Out: The Strange Disappearance of Social Capital in America." *Political Science and Politics* 28 (4): 664–65.
- . 2015. *Our Kids: The American Dream in Crisis.* New York: Simon & Schuster.
- Rothstein, B., and E. M. Uslaner. 2005. "All for All: Equality, Corruption, and Social Trust." *World Politics* 58: 41–72.
- Zak, P. J., and S. Knack. 2001. "Trust and Growth." *Economic Journal* 111 (470): 291–321.



Forests for **GROWTH**

Forests are a key asset for climate stability; Brazil has shown protecting them is compatible with development

Atlantic Forest, Brazil.

Frances Seymour and Jonah Busch

TROPICAL forests are places of wonder and beauty in the popular imagination, rich in cultural and biological diversity. Development planners view them more practically—as a source of timber revenue or a land bank for agricultural expansion. But evidence to support a third view is growing rapidly—tropical forests provide essential services that underpin both global climate stability and development goals.

Protecting tropical forests need not be a drag on development, nor a zero-sum trade-off with growth and poverty reduction. Brazil has demonstrated that many of the steps to protect forests are feasible, affordable, “no regrets” measures in tune with more equitable and inclusive growth. Paying developing economies to keep carbon, a major source of global warming, in forests can help overcome incentives for deforestation as usual.

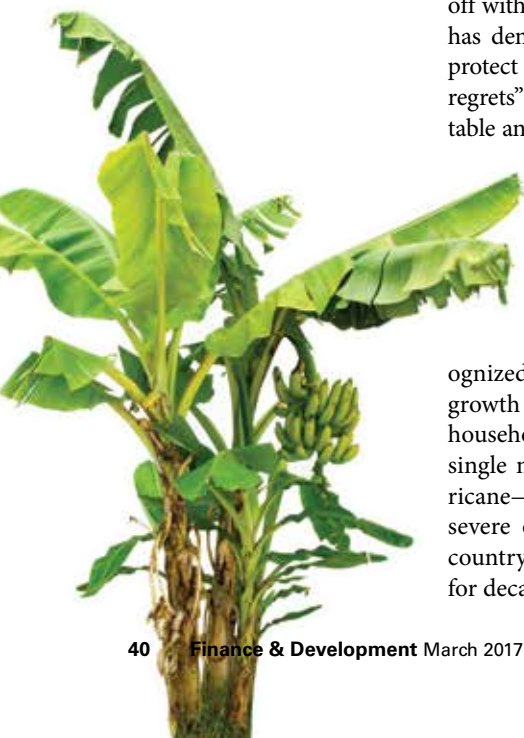
From problem to solution

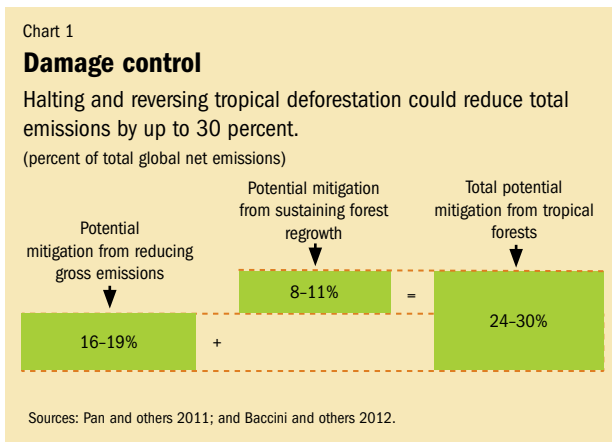
Climate change is increasingly recognized as a key threat to global economic growth and development, especially to poor households and countries. Exposure to a single major natural disaster such as a hurricane—expected to be more frequent and severe on a warming planet—can knock a country off its economic growth trajectory for decades (Hsiang and Jina 2014).

While everyone knows that burning fossil fuels generates the emissions that cause climate change, deforestation’s role is less well known, and forest protection is an undervalued solution to the problem. Every time an area of forest is cleared or burned, the carbon stored in tree trunks, branches, and leaves is released to the atmosphere. The total contribution of emissions from deforestation exceeds that of the European Union, trailing only China and the United States. Halting tropical deforestation—which currently denudes an area the size of Austria every year—would make a significant dent in global annual emissions.

And because forests recapture carbon as they grow back, they can also mitigate emissions from other sources. In other words, as a natural carbon-capture-and-storage technology, forests can produce net negative emissions, essential to the long-term goal of the 2015 Paris Agreement on mitigating climate change for balance between emissions and removals. Stopping tropical deforestation and allowing damaged forests to recover could deliver reductions of up to 30 percent of current emissions (see Chart 1).

The potential of forests to contribute to mitigation was one reason the Paris Agreement singled out forest conservation as an important opportunity for international cooperation. The Agreement endorses





a framework for reducing emissions from deforestation and forest degradation (REDD+): rich countries provide performance-based financing to developing economies in exchange for lower forest-based emissions. Such revenue streams can at least partially compensate forest-rich countries for the foregone benefits of forest exploitation.

And unlike logging and conversion of forests to export-oriented crops—associated with corruption, conflict, and violence in many countries—paying forest-rich countries for successful forest protection can improve forest governance. Results-based financing requires governments to monitor and report progress according to agreed performance indicators, which leads to more transparent and accountable forest management. Further, results-based payments reduce opportunities for corruption.

Invisible contributions

Efforts to reduce deforestation go hand in hand with inclusive growth, and not just through climate protection and better governance. Communities in and around forests collect wood for fuel and charcoal; wild fruits, nuts, mushrooms, insects, and bushmeat for food; and a wide variety of plant materials for medicine and ornamentation. Surveys conducted in 24 countries revealed that on average such forest products constituted 21 percent of household income in these communities (Angelsen and others 2014).

But forests' economic contributions go far beyond goods to include ecosystem services that are enjoyed locally and on a broader scale. At the scale of farms and villages, forests provide habitat for the birds, bats, and insects that pollinate crops; help stabilize landslide-prone hillsides; and protect coastal communities from storms. Forested watersheds provide freshwater for reservoirs that power hydroelectric dams, support irrigation systems, and maintain municipal water supplies. Recent research suggests that forests play a key role generating the rainfall necessary to sustain agricultural productivity across continents (Lawrence and Vandecar 2015).

Yet forests' many and varied contributions to achieving the UN Sustainable Development Goals related to hunger and poverty, health, clean energy, clean water, and safety

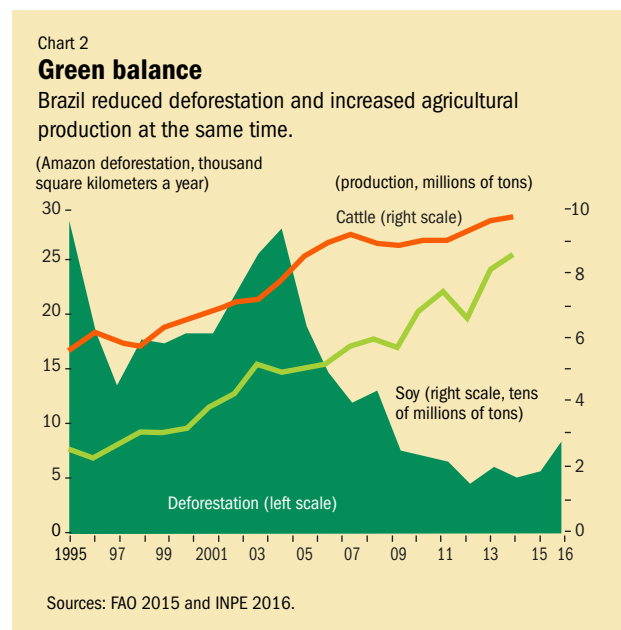
from disasters are mostly invisible to economic decision makers. Typical national statistical surveys and accounts fail to capture forest-based income, and forest-based ecosystem services are effectively assigned a value of zero in economic analyses. Such flawed accounting leads to a bias in favor of clearing forests for other uses.

Yet economic valuation shows that the losses from forest destruction can be substantial. The massive fires in Indonesia in 2015, which burned an area the size of the US state of New Jersey, are a good example. The World Bank estimates losses from those fires at \$16 billion, double the potential revenue from planting the burned land with oil palm, whose cultivation has driven much deforestation (World Bank 2015). Putting a price tag on forest services has proven methodologically challenging, but measuring the value of forests for storing carbon is feasible and increasingly accurate.

Feasible and affordable

Brazil has demonstrated that it is possible to decouple agricultural sector growth from forest loss. Over a decade starting in 2004, Brazil reduced the rate of deforestation in the Amazon by some 80 percent. The decline was accompanied by increasing production of soy and beef, which are key drivers of forest clearing (see Chart 2). Brazil's achievement undermines the frequent assertion by timber and agribusiness interests and their government allies that forest resource exploitation and conversion to other uses are essential to economic growth and the reduction of rural poverty.

How did Brazil do it? Responding to domestic constituencies and negative international attention generated by forest destruction and lawlessness in the Amazon, Brazil marshalled the political will to implement a suite of policies to tame deforestation. These included the establishment of



protected areas and indigenous territories, enhanced law enforcement against illegal logging and forest clearing, and restricted credit to high-deforestation municipalities. In addition, under pressure from activists, the soy industry imposed a moratorium on sourcing from recently deforested land. Satellite-based technology for monitoring deforestation was a powerful new tool for effective policy implementation and allowed the authorities to catch unauthorized deforesters in the act. Data from satellites stoked public awareness of the problem and strengthened political will.

Efforts to reduce deforestation go hand in hand with inclusive growth.

The Brazil example also exposed myths about the causes of deforestation. In the Amazon, it was wealthy soy farmers and cattle ranchers who benefited most from deforestation—not the indigenous and other local communities who depended most on forest goods and services for income and well-being. Indeed, across the tropics the presence of indigenous peoples is associated with maintaining forest cover, while the leading driver of tropical forest loss is the commercial-scale conversion of forests to produce globally traded commodities such as palm oil, soy, beef, and pulp and paper. Poorly defined and enforced property rights mean that forest frontiers are often the focus of conflict among competitors for forest resources.

Recognizing the rights of indigenous peoples, strengthening the rule of law, and making land-use planning and management more transparent and accountable are all consistent with more equitable and inclusive growth. And they are affordable: Brazil's out-of-pocket implementation costs by federal, state, and municipal governments have been estimated at about \$2 billion, or less than \$4 a ton of avoided carbon dioxide emissions (Fogliano de Souza Cunha and others 2016), far less than the social cost of such emissions or the cost of reducing emissions in other sectors.

Indeed, reducing deforestation is one of the most cost-effective ways to mitigate the emissions that cause climate change, allowing less expensive and more rapid progress toward achieving the goals of the Paris Agreement. And this bargain does not even include the value of the domestic benefits of noncarbon forest services. In Brazil, these benefits include maintaining rainfall that waters southern agricultural breadbaskets, attenuating drought, and reducing sediment behind dams in the world's second largest producer of hydropower.

The missing piece

The science linking deforestation to climate change, the economics of forest-based mitigation and valuation of forests' development benefits, and the politics of the Paris Agreement are all aligned to support international cooperation to protect forests in ways compatible with inclusive growth. The missing piece is performance-based financing.

Brazil has received more than \$1 billion in REDD+ funds, but that is only a fraction of the value of emissions avoided from reduced deforestation. And in the past two years, partly because of austerity-driven cuts in law enforcement budgets, Brazil's deforestation rate has begun to creep back up.

There are a number of possible sources of REDD+ financing beyond limited aid budgets. The Green Climate Fund is developing a REDD+ funding mechanism. The US state of California and the International Civil Aviation Organization are considering international forest offsets as part of their emission-reduction programs. But these initiatives are still nascent and have not yet translated into tangible incentives for decision makers in forest-rich countries.

With appropriate financial instruments, guaranteed public or private payments for performance in reducing forest-based emissions could transform the future flow of carbon sequestration services into a bankable asset. Repurposing the funds that now subsidize fossil fuels would be a particularly appropriate source of funding for both domestic and international payments. Rather than aid, REDD+ payments should be viewed as purchases of a service that the world needs urgently.

Without a significant increase in the availability of results-based finance, REDD+ will remain a great idea that's hardly been tried. And that would be a missed opportunity for a win-win for climate and development. ■

Frances Seymour and Jonah Busch are Senior Fellows at the Center for Global Development and the authors of Why Forests? Why Now? The Science, Economics, and Politics of Tropical Forests and Climate Change.

References:

- Angelsen, Arild, and others. 2014. "Environmental Income and Rural Livelihoods: A Global-Comparative Analysis." *World Development* 64: S12–28.
- Baccini, A., and others. 2012. "Estimated Carbon Dioxide Emissions from Tropical Deforestation Improved by Carbon-Density Maps." *Nature Climate Change* 2 (3): 182–85.
- Fogliano de Souza Cunha, Felipe A., and others. 2016. "The Implementation Costs of Forest Conservation Policies in Brazil." *Ecological Economics* 130: 209–20.
- Food and Agriculture Organization of the United Nations (FAO), Statistics Division, "Production quantities by country," updated 2015, http://faostat3.fao.org/browse/O*/E
- Hsiang, S. M., and A. S. Jina. 2014. "The Causal Effect of Environmental Catastrophe on Long-Run Economic Growth: Evidence from 6,700 Cyclones." *NBER Working Paper 20352*, National Bureau of Economic Research, Cambridge, MA.
- Lawrence, D., and K. Vandecar. 2015. "Effects of Tropical Deforestation on Climate and Agriculture." *Nature Climate Change* 5 (1): 27–36.
- National Institute for Space Research (INPE). 2016. "Projeto Prodes: Monitoramento da Floresta Amazônica Brasileira Por Satelite." <http://www.obt.inpe.br/prodes/index.php>
- Pan, Yude, and others. 2011. "A Large and Persistent Carbon Sink in the World's Forests." *Science* 333 (6045): 988–93.
- World Bank. 2015. "Reforming amid Uncertainty." *Indonesia Economic Quarterly* (December).

Risky Mix

If financial institutions combine banking and nonbanking business there is potential for danger

Ralph Chami, Connel Fullenkamp, Thomas Cosimano, and Céline Rochon

THE biggest banks in the world are not just banks—they're financial supermarkets that can underwrite securities, manage mutual funds, and act as brokers in addition to lending money. Offering many different kinds of financial services increases the profits of these institutions—whether they are universal banks, in which the functions are all part of the bank, or are holding companies that own separate bank and nonbank providers.

But when all these activities are under one roof, many regulators believe that new risks are added that could endanger both the institution and the financial system. After the global financial crisis of 2008, regulators in a number of countries proposed rules to insulate traditional banking (taking deposits and making loans) from the risks associated with other financial services. For example, in the United States, the so-called Volcker Rule, which prohibits banks from engaging in

proprietary trading (using their own money rather than trading for a client), was enacted as part of the Dodd-Frank Act in 2010. In Europe, regulators in both the United Kingdom and the European Union have proposed various types of ring-fencing—separating banks' traditional functions from the rest of their operations.

These actions, however, are based more on a fear that something bad could happen than on experience. Poor lending decisions by banks and many nonbank lenders appear to have been the main cause of the crisis, rather than nontraditional activities such as proprietary trading. Nonetheless, it may be necessary to protect traditional banking from potential damage caused by banks' other financial activities. This decision should be based on careful consideration of the risks involved in combining banking with other financial services in a single company.



Differing risks

We found an important distinction between the risks involved in traditional banking and the risks of other financial activities that helps explain why nontraditional activities may be dangerous for banks based on two categories of financial risk: slow moving and fast moving.

Slow-moving financial risks take time to build up and cause losses over long periods, possibly months or even years. Because they accumulate relatively slowly, these risks often give advance warning that a future loss may occur. *Credit, or default, risk* is the leading example of a slow-moving financial risk. Often, borrowers go through periods of declining sales or other income that indicate they will have trouble repaying their loans. This longish process gives a bank time to take steps to mitigate or even prevent damage from default. For example, banks can work with their customers to prevent default by temporarily reducing

or postponing payments. And even if a borrower defaults, a bank has time to work with the customer to restructure the loan to minimize the loss.

Fast-moving risks evolve quickly and inflict damage over very short periods of time. They generally do not give reliable warning signals, so it is very difficult to predict when fast-moving risks will become loss-causing events. *Market risk*—the potential loss from changes in market prices of assets—is the leading example of a fast-moving risk. In these days of 24-hour markets, computerized trading, and electronic communication networks, market prices can change dramatically within minutes or even seconds. For example, both stock and bond markets around the world have experienced flash crashes in recent years, in which market prices within minutes fell by large multiples of their typical daily price changes.

Because they are unpredictable, fast-moving risks pose special challenges for financial managers who try to profit from taking on exposures to these risks. If managers underestimate a fast-moving risk—and it causes a much larger loss event than anticipated—a firm's capital can immediately be reduced by a large amount. And mitigating the damage from a loss event as (or after) it occurs is generally not possible in the case of fast-moving risks.

Thus, slow-moving and fast-moving risks must be managed differently. In addition, the firms that take on these risks may need to be structured and regulated very differently. This is why the mixing of these very different types of risk in the same institution may be dangerous—the two types of risk are not necessarily compatible.

For example, think about a universal bank (or bank holding company) that takes deposits and makes loans, but also operates a division that invests in government securities. The banking division takes on the slow-moving credit risk of lending, while the investment division takes on the fast-moving market risk of investing and trading. The banking division makes relatively few new loans on any given day, but the investment division is constantly adjusting its portfolio by buying and selling government securities (see table).

Banking and trading

The banking division's risk changes slowly because only a small amount of the total credit risk exposure changes daily, and credit risk is a slow-moving financial risk to begin with. But the risk of the investment division can change dramatically from day to day and even minute to minute. Not only is market risk a fast-moving risk—the market could conceivably crash at any time—but the continual trading by the investment division can rapidly alter the exposure of the investment division to market risks. In fact, because investment managers can adjust a bank's exposure to fast-moving risks virtually instantaneously, they are in a position to effectively determine the overall riskiness of the bank.

There are two sides to this combination. On one hand, both the banking division and the overall institution can benefit:

- The investment division's expected profits will help diversify the entire institution's earnings. In addition, part of the investment division's profits can be retained to increase

Safety first

Key financial ratios for the five biggest bank holding companies in the United States have improved since the global financial crisis that started in 2008.

(percentage of total assets or risk-weighted assets)

Date	Tier 1 Capital	Leverage	Loans	Securities	Deposits
March 2016	10.28	11.98	44.80	22.93	70.08
March 2008	6.72	8.92	42.44	24.24	54.74

Source: Authors' calculations.

Note: The five largest US bank holding companies (in descending order in terms of total assets) are JPMorgan Chase, Bank of America, Citigroup, Wells Fargo, and Goldman Sachs. Tier 1 capital is mainly common stock and retained earnings. The ratio is expressed in terms of risk-weighted assets. Leverage is Tier 1 capital plus longer-term bonds such as subordinate debt. The ratio is also expressed in terms of risk-weighted assets. Loans, securities, and deposits are expressed as a percentage of total assets.

the bank's overall capital cushion—which helps protect both the banking and the investment divisions against losses. Moreover, given the fast-moving nature of trading, the investment division's profits are probably realized more frequently than the banking division's profits, which should smooth out the firm's accumulation of capital.

- The investment division can also help the entire institution, including the banking division, hedge against interest rate risk. The business of banking faces significant interest rate risk because banks tend to borrow for short periods of time and lend for longer periods. This means that changes in interest rates, especially increases, can not only decrease bank income, but also reduce the value of bank capital. Banks have limited ways of hedging against interest rate risk, and it is costly to do so. The investment division of the bank, however, may be able to help by generating trading profits from changes in interest rates that offset the banking division's losses from these changes.

But there are also downsides, potentially severe. The managers of the investment division can take advantage of the banking division's slower pace. If the investment division takes on excessive risks, it will earn larger profits as long as these exposures do not go bad. But if they do, the investment division has recourse to an additional buffer to absorb its losses—the capital that has been set aside for the banking division. Because the investment division is taking on fast-moving risks, this effectively gives them a first-mover advantage, subjecting the lending arm to the risk from investment decisions. The managers of the investment division will therefore have a strong incentive to take on higher risks inside a universal bank than they would if the investment division were an independent company. And these higher risks could bankrupt the entire institution, even if the banking division is doing a good job managing credit risk.

Therefore, banks that mix slow-moving credit risks and fast-moving market risks could experience distress more often than banks that do not mix these risks. It's up to the top managers of a universal bank to act in the best interests of the overall institution by ensuring that both the banking division and the investment division managers take on only prudent risks. The chief executive officers of these banks could mitigate the problem

somewhat by choosing the right type of manager for the investment division. As the incentive in the investment division to take on exposure to more fast-moving risk increases, investment division managers become less risk averse. Therefore, the more prudent the manager of the investment division, the lower the likelihood of taking on excessive fast-moving risks.

Prudent managers

But there is also an important role for regulators. Bank regulators around the world follow some type of uniform system for rating financial institutions, which, among other things emphasizes not only the technical ability but also the character of bank managers. This focus on the quality of management in the bank supervision process gives regulators influence over the choice of the management team at the bank. Therefore, it is possible that bank supervisors could require CEOs of universal banks to choose investment division managers who are sufficiently prudent. Finding an objective supervisory standard to judge the prudence of investment managers, however, is likely to be difficult and controversial.

Alternatively, to limit the possibility that the investment division's activities will plunge the entire financial institution into distress, bank supervisors could strictly limit the risk exposures the investment division of a universal bank can assume. This is also likely to be very difficult for regulators to implement, because fast-moving risks are much harder to predict than slow-moving ones. A current strategy is to include provisions in traders' and managers' compensation contracts, in which a large part of performance-based pay is deferred and is forfeited if trading positions lead to losses during subsequent years. Such so-called clawback provisions could reduce the incentive to take certain types of risks that are spread over longer periods, but it is unclear whether they will reduce the overall incentive to take on risk.

This regulatory dilemma is not a new one, however. Lagging behind industry changes is a fact of life for regulators and is typically called the regulatory cycle—in which a crisis spawns new laws, rules, and agencies, but the new regulation offers some unforeseen opportunities for mischief.

The new feature in today's markets is the speed and exposure to fast-moving risks, such as investment portfolios or trading positions. In addition, it is unclear whether bank supervisors—or any financial regulator, for that matter—can monitor and enforce restrictions they place on the investment divisions of universal banks. This means that an investment division that is well behaved one day could rearrange its positions, and bankrupt the bank, the next day. Because supervisory reviews take place only periodically, fast-moving risks could cause financial distress between reviews.

Separating risks

But increasing the frequency of supervision is not the answer. Continuous monitoring and supervision would not only be extremely costly, but the process also resembles interference in the day-to-day operations of a bank. And none of this extra expense and interference is needed to improve the safety and soundness of the banking division anyway.

It may seem at first glance that the best policy would be to separate slow-moving risks from fast-moving ones, as the proponents of policies like ring-fencing argue. Such a policy, however, would not only deprive banks of the hedging benefits from managing fast-moving risks, it could also hurt financial stability. For example, losing the investment arm's ability to sell assets short (that is, ones they don't possess at the time of the sales agreement) would allow banks to buy (and hold) securities only. This could constrain market liquidity, which in turn could reduce confidence in the markets and damage overall financial stability.

Lagging behind industry changes is a fact of life for regulators.

Regulatory alternatives to ring-fencing, however, must deal with the temptation to exploit fast-moving risks in a way that is dangerous to the institution and to society. Our research suggests that such regulation should focus on strengthening oversight of bank governance, holding management accountable for identifying, measuring, monitoring, and managing risks. US banks, for example, receive a rating that emphasizes governance; it is based on capital, asset quality, management, earnings, liquidity, and market sensitivity. But even closer collaboration between regulators and bank management may be necessary if banks are allowed to mix fast- and slow-moving risks. For example, bank supervisors may need to review the banks' choices of division and lower-level managers to ensure that they reflect the values of the banks' top management, including risk and leverage tolerance. The latest version of international capital standards endorsed by the Basel group of financial regulators moves in this direction, by requiring supervisors to review banks' compensation packages. The Financial Stability Board, the international monitor of the global financial system, in its set of principles and standards for good compensation practices noted bank supervisors' increasing emphasis on "building a culture of good conduct" among bank employees, which suggests that many regulators are already prompting banks to improve the "softer" side of their risk management practices. ■

Ralph Chami is an Assistant Director in the IMF's Institute for Capacity Development, Connel Fullenkamp is Professor of the Practice of Economics at Duke University, Thomas Cosimano is retired Professor of Finance at the University of Notre Dame, and Céline Rochon is a Senior Economist in the IMF's Strategy, Policy, and Review Department.

This article is based on a forthcoming paper, "Financial Regulation and the Speed of Financial Risks," by Ralph Chami, Connel Fullenkamp, Thomas Cosimano, and Céline Rochon; and a 2017 IMF Working Paper, "What's Different about Bank Holding Companies?" by Ralph Chami, Thomas Cosimano, Jun Ma, and Céline Rochon.

Unburnable Wealth of Nations

Successful action to address climate change would diminish the value of fossil fuel resources in many of the world's poorest countries

James Cust, David Manley, and Giorgia Cecchinato

TO achieve climate change goals, the world must cut consumption of fossil fuels dramatically. But climate change success may put developing countries rich in fossil fuels in an almost no-win situation.

If there is no progress in combating climate change, poor countries are likely to be disproportionately harmed by the floods, droughts, and other weather-related problems spawned by a warming planet. But if there are successful global actions to address climate change, poorer countries that are rich in fossil fuels will likely face a precipitous fall in the value of their coal, gas, and oil deposits. If the world makes a permanent move away from using fossil fuels, the likely result will be a huge reduction in the value of their national and natural wealth.

These nations face three special challenges. First, they have a higher proportion of their national wealth at risk than do wealthier countries and on average more years of reserves than major oil and gas companies. Second, they have limited

ability to diversify their economies and sources of government revenues—and it would take them longer to do so than countries less dependent on fossil fuel deposits.

Last, economic and political forces in many of these countries create pressure to invest in industries, national companies, and projects based on fossil fuels—in essence doubling down on the risk and exacerbating the ultimate consequences of a decline in demand for their natural resources (see map).

Carbon risk

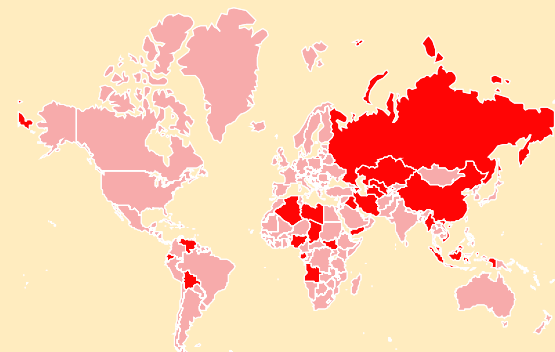
What seems clear to virtually all scientists who study the issue is that the world cannot consume all of its oil, gas, and coal reserves without catastrophic climate consequences. To limit the increase in global temperature to 2 degrees Celsius—the more conservative of the goals agreed to by governments at the 2015 climate change talks in Paris—more than two-thirds of current known reserves, let alone those yet to be discovered (see Table 1), must remain in the ground (IEA 2012).

Workers perform maintenance on oil pumping unit in Akkystau, Kazakhstan.



Wealth at risk

Fossil-fuel-rich developing countries face a drop in demand for their oil, gas, and coal reserves if the world succeeds in reducing use of carbon-emitting products.



Sources: BP Statistical Review 2015; and authors' calculations.
 Note: Fossil-fuel-rich developing countries are in red. These are developing countries in which the value of fossil fuel production is 10 percent or more of GDP or the value of fossil fuel reserves is 25 percent or more of a country's national wealth.

Table 1

Left in the ground

To keep the average global temperature from rising more than 2 degrees Celsius, a large portion of the world's fossil fuels must remain unburned.

Country/Region	Oil		Natural Gas		Coal	
	Billions of barrels	Percent of total reserves	Trillions of cubic feet	Percent of total reserves	Giga-tonnes	Percent of total reserves
Africa	28	26	4.4	34	30	90
Canada	40	75	0.3	24	5.4	82
China and India	9	25	2.5	53	207	77
Former Soviet Union	28	19	36	59	209	97
Central and South America	63	42	5	56	11	73
Europe	5.3	21	0.3	6	74	89
Middle East	264	38	47	61	3.4	99
OECD Pacific	2.7	46	2	51	85	95
Other developing Asia	2.8	12	2.1	22	17	60
United States	4.6	9	0.5	6	245	95
Global	449	35	100	52	887	88

Sources: McGlade and Ekins 2015; and authors' calculations.

Note: Percentages represent the estimated reserves that must remain unburned before 2050 as a portion of total reserves in the country or region. OECD = Organisation for Economic Co-operation and Development; other developing Asia = all Asian countries except advanced economies (Japan, Korea, Singapore), the Middle East, China, and India.

They are the indirect target of climate policies that seek to limit carbon emissions—probably through taxes and quotas on carbon and the fostering of new low-carbon technologies. At some point, therefore, it is likely that the market for fossil fuels, especially highly polluting coal, will dramatically shrink, and with it their value to exporting countries. Reserves—that is, so-called proven reserves, which are estimated to be extracted profitably at current prices—may also remain undeveloped if governments impose policies to limit the market supply of fossil fuel resources. For example, Collier and Venables propose a sequenced closing of the global coal industry (2014). Furthermore, unless there are

major—and unlikely—breakthroughs in technology to capture the carbon emitted by fossil fuels, the sharply reduced demand for oil, gas, and coal will be permanent.

Such a “carbon market risk” is potentially catastrophic for the economies of low- and middle-income countries rich in fossil fuels. While many of them have enjoyed the benefits of fossil fuel extraction, including the significant excess profits sometimes associated with oil and gas exports, they have typically failed to diversify their economies. Those that discovered their fossil fuels more recently may find themselves arriving “too late to the party.”

For these countries, carbon market risk highlights three vulnerabilities:

- **Fossil-fuel-rich developing countries are generally highly exposed to a shrinking market for oil, natural gas, and coal.** A fall in fossil fuel prices for producers significantly reduces the excess profits available from fossil fuel extraction on existing investments and makes further development of reserves less profitable. If those reserves stay in the ground, future government revenues from fossil fuel extraction will be reduced as will other benefits to the domestic economy, such as job creation. Because fuel reserves are such a significant portion of their national wealth, these countries are more at risk if there is a permanent decline in prices than their richer counterparts and those less endowed with fossil fuel wealth. These countries have a median ratio of fossil fuel reserves to GDP of 3.6—which means the national wealth held in these reserves is valued at more than three-and-a-half times their total economic output. Lower demand for oil and gas would drain critical revenues that governments could spend on investments in health, education, and infrastructure. Further, fossil fuel exports are often a key source of government cash—accounting for over 50 percent of government budgets in the top 15 oil- and gas-producing countries between 2006 and 2010 (Venables 2016).

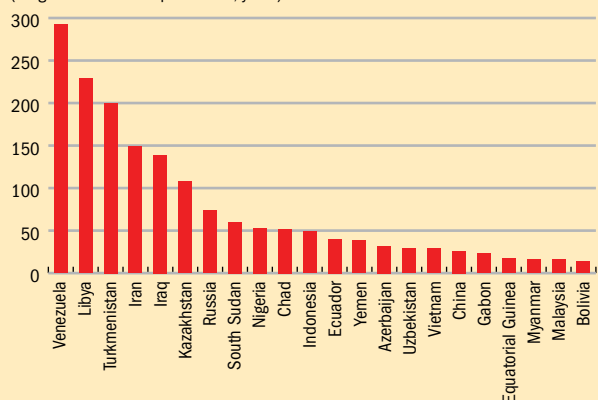
- **Fossil-fuel-rich developing countries may be less able to diversify their assets** away from this exposure than developed economies or fossil fuel companies. Whether they can diversify or reduce their wealth exposure to carbon market risk depends on how long it takes and how much it costs to convert fossil-fuel-related assets into other nonrelated assets and whether the economy can develop other strong productive sectors.

Analysts have warned that carbon market risk could strand the assets of fossil fuel companies (Leaton 2013), but countries are more vulnerable than private companies. Not only is it more difficult for countries to shift capital and capabilities into renewable energy technologies or other activities than it is for companies, countries are tied, geographically and constitutionally, to ownership of reserves, which cannot be sold outright but only licensed to companies for development. Unlike many fossil-fuel-rich developing countries, companies hold the development rights to relatively few reserves—and those have relatively high production rates. For example, in 2013, the reserve-to-production ratios for all oil and gas companies were 12.8 years and 13.9 years, respectively (EY 2013). Companies could, if they wanted, run down their existing reserves in less than 15 years.

Cashing in on fossil fuels

Under current levels of annual production as a percentage of reserves, it would take most countries 45 years or more to liquidate their fossil fuel wealth.

(weighted reserves to production, years)



Sources: BP Statistical Review 2015; and authors' calculations.

Fossil-fuel-rich developing countries hold oil, gas, and coal assets that are harder to turn into cash—typically they can be converted into other assets only after the countries develop, produce, and sell fuel. Using past reserve-to-production ratios as a guide, we found that, unless they can find ways to significantly increase their rates of production, most countries must wait 45 years on average to liquidate their fossil fuel wealth (see chart).

Because it is difficult to develop new sources of national wealth, few resource-rich governments have successfully diversified their revenue streams. Moreover, their ability to use fossil fuel revenue to invest in foreign nonfuel assets—for example, through sovereign wealth funds—has been limited by the rate at which they can extract their reserves and the pressure to spend rather than save revenues. Consequently, the assets of sovereign wealth funds owned by governments of fossil-fuel-rich developing countries represent on average only 3 percent of the value of their fossil fuel reserves.

• **Domestic political pressure to develop fossil fuel reserves pushes these countries into choices that might increase their exposure to carbon market risk.** First, national oil companies, common in oil-rich countries, often involve state investment in fossil fuel assets for reasons other than maximizing revenue. If the expected life of these assets is so long that declining oil, gas, or coal prices will affect returns, or a government cannot liquidate them at a reasonable value, then governments that invest now in a national oil company—especially one intended to operate abroad—may be exposing national wealth and public assets to carbon market risk. For example, Table 2 shows the significant amount of state ownership in some of the largest national oil companies of fossil-fuel-rich developing countries. Second, policies to promote domestic participation in supply chains that process and/or transport fossil fuels may expose a country to carbon market risk by increasing the total share of a country's assets vulnerable to a decline in fossil fuel demand. Finally,

fossil-fuel-rich countries have tended to develop economies that use a lot of carbon-based products. Research shows that petroleum and coal producers emit a significantly larger amount of carbon per dollar of GDP than countries that produce neither petroleum nor coal. A major reason is that the fossil-fuel-rich countries tend to subsidize consumption of fuels, such as gasoline (Friedrichs and Inderwildi 2013).

Policy prospects

There are four policy implications arising from this carbon market risk that governments of fossil-fuel-rich developing countries should consider.

The first is that diversification of the economy is more important than ever. This means countries should expand nonfuel sectors of the economy, especially alternative export sectors, such as manufacturing and agricultural processing, and certain services, such as information and communication technology. But it also means the tax base must be widened to wean the government off dependence on fossil fuel revenues.

Moreover, because it is not only reserves that become endangered by falling prices and demand, governments need to reconsider all their energy-related investments. State-owned companies and energy-related infrastructure and investments to enable the country to participate in supply chains may also fail to provide a sufficient return to the country if the world reduces its use of fossil fuels. Governments may wish to limit investment in these areas.

Some value of local businesses may decline, and a workforce specialized in fossil fuel extraction may become obsolescent. If local suppliers and labor can relatively easily adapt to changed

Table 2

State owned

Most of the national oil companies in fossil-fuel-rich developing countries are fully controlled by the state.

(assets in billions of dollars)

Country	State-Owned Company	Total Assets	State Share
China	China National Petroleum Corporation	576.0	576.0
China	Sinopec Group	321.0	321.0
Russia	Gazprom	319.2	319.2
Russia	Rosneft	227.6	227.6
Venezuela	Petroleos de Venezuela	226.8	226.8
Iran	National Iranian Oil	200.0	200.0
China	China National Offshore Oil Corporation	167.0	167.0
Malaysia	Petronas	164.5	164.5
Bolivia	Yacimientos Petroliferos Fiscales Bolivianos	103.8	85.1
Angola	Sociedade Nacional de Combustiveis de Angola Unidade Empresarial Estatal	54.5	54.5
Indonesia	Pertamina	50.7	50.7
Kazakhstan	Kazmunaigaz	49.3	32.7
Azerbaijan	State Oil Company of the Azerbaijan Republic	30.7	30.7
Ecuador	Petroecuador	9.3	9.3
Timor-Leste	TIMOR GAP	0.004	0.004

Sources: Most recent annual reports of companies (2014 or 2015); National Resource Governance Institute; and authors' calculations.

Note: The table does not include a number of smaller national oil companies in fossil-fuel-rich developing countries for which data are not available: Sonatrach, Algeria; Société des Hydrocarbures du Tchad, Chad; Petroamazonas, Ecuador; Sociedad Nacional de Gas, Equatorial Guinea; Gabon Oil Company, Gabon; Myanmar Oil and Gas Enterprise, Myanmar; Nigeria National Petroleum Corporation, Nigeria; Turkmenengaz, Turkmenistan; and Uzbekneftegaz, Uzbekistan.

circumstances and participate in supply chains outside the fossil fuel sector without protection or subsidies, a country may be able to benefit from educating workers in the fossil fuel sector. However, if training workers or building company capability to supply the fossil fuel sector takes decades—and if these skills and products are not transferable to other industries—not only will state capital invested in this effort be wasted, but so may the human capital that the workers and firms represent.

Fossil-fuel-rich countries tend to subsidize consumption of fuels.

Second, governments should continue to promote the competitiveness of their fossil fuel sectors so long as they moderate public investment in these sectors. This may seem counterintuitive, but by reducing the costs investors face, it may be possible to mitigate the stranding of reserves by remaining an attractive destination for production. Studies suggest that oil and gas development is determined not only by geography but also by the quality of a country's political institutions, such as openness to foreign investors, the fairness of its judicial system (which reduces the threat of expropriation), and the ease of doing business (Cust and Harding 2015; Arezki, Toscani, and van der Ploeg 2016).

Although the world may have more reserves than can be safely burned, it does not follow that exploration should stop entirely in the lowest-income countries. Development and extraction are costly, but costs vary significantly across different geology, so it may be worthwhile for certain countries to allow exploration for reserves that may be less expensive to extract, even after a carbon tax is factored in.

Third, governments should avoid subsidizing fossil fuel use and the fossil fuel sector. Subsidies on the production side—either explicit, such as tax breaks, or implicit, such as poorly negotiated deals that reduce the tax burden of companies—may encourage too much exploration or extraction and keep the country dependent on fossil fuels for too long.

Consumption subsidies, such as on gasoline, might make other sectors of the economy (transportation, for example) more dependent on fossil fuels, reduce consumer incentives to drive less and use more-efficient forms of transportation—such as railroads or mass transit—or encourage investment related to fossil fuel consumption, such as highways.

Fourth, governments and citizens should carefully consider whether to extract faster, slower, or not at all. The right answer may be different for different countries, but the danger of being “last to the party” may encourage some countries to promote exploration in the hope of realizing extraction revenues before climate policies or new technologies fully kick in.

However, Stevens, Lahn, and Kooroshy (2015) argue that for low-income countries, a slower pace of licensing may give the government time to upgrade institutions and potentially earn more future income by reducing investor risk and improving negotiating capacity. Further, even if faster development is an

optimum strategy for one country, if all producers do the same thing, supply may rise and prices fall, a result known as the “green paradox” (van der Ploeg and Withagen 2015).

While still highly uncertain, there is a growing likelihood that fossil fuel consumption overall will decline. This is indicated not only by the outcome of the Paris climate change talks, but by emerging evidence that global economic activity is using less carbon per dollar of GDP and by the promise of technological breakthroughs in alternative energy sources such as solar and wind power. This creates the risk of “stranded nations” whose vast fossil fuel reserves are no longer worth extracting. It is unclear when, or by how much, this stranding will occur. But for policymakers in fossil-fuel-rich developing economies, stuck between the effects of a warming planet and global action to prevent such warming, how to deal with declining demand for their resources will be an ever more critical question and will call for new policy approaches. These countries should seek to harness the moment to develop other sectors of the economy rather than wait for the next commodity price boom. ■

James Cust is an Economist in the Office of the Chief Economist for Africa at the World Bank, and David Manley is a Senior Economic Analyst and Giorgia Cecchinato a former Research Associate, both at the Natural Resource Governance Institute.

This article is based on the authors' paper “Stranded Nations? The Climate Policy Implications for Fossil Fuel-Rich Developing Countries” from the Oxford Centre for the Analysis of Resource Rich Countries at the University of Oxford.

References:

- Arezki, Rabah, Frederik G. Toscani, and Frederick van der Ploeg. 2016. “Shifting Frontiers in Global Resource Wealth.” CEPR Discussion Paper DP11553, Centre for Economic Policy Research, London.
- Collier, Paul, and Anthony J. Venables. 2014. “Closing Coal: Economic and Moral Incentives.” *Oxford Review of Economic Policy* 30 (3): 492–512.
- Cust, James, and Torfinn Harding. 2015. “Institutions and the Location of Oil Exploration.” *OxCarre Research Paper Series 127*, Oxford University Centre for the Analysis of Resource Rich Countries, Oxford, United Kingdom.
- EY. 2013. “Global Oil and Gas Reserves Study.” London.
- Friedrichs, Jörg, and Oliver Inderwildi. 2013. “The Carbon Curse: Are Fuel Rich Countries Doomed to High CO₂ Intensities?” *Energy Policy* 62: 1356–65.
- International Energy Agency (IEA). 2012. *World Energy Outlook*. Paris.
- Leaton, James. 2013. “Unburnable Carbon 2013—Wasted Capital and Stranded Assets.” *Carbon Tracker Initiative*, London.
- McGlade, Christopher, and Paul Ekins. 2015. “The Geographical Distribution of Fossil Fuels Unused When Limiting Global Warming to 2 °C.” *Nature* 517 (7533): 187–90.
- Stevens, Paul, Glada Lahn, and Jaakko Kooroshy. 2015. “The Resource Curse Revisited.” *Chatham House Research Paper*, London.
- van der Ploeg, Frederick, and Cees Withagen. 2015. “Global Warming and the Green Paradox: A Review of Adverse Effects of Climate Policies.” *Review of Environmental Economics and Policy* 9 (2): 285–303.
- Venables, Anthony J. 2016. “Using Natural Resources for Development: Why Has It Proven So Difficult?” *Journal of Economic Perspectives* 30 (1): 161–84.

Fifty Marks the Spot

Marie Boursiquot



Carnival masquerader featured on the newest \$50 bill.



An oil rig was featured on the 1964 \$1 note.



Front of the 2012 commemorative \$50 note.

TRINIDAD AND TOBAGO got its first national currency in 1964, two years after obtaining independence from Great Britain. In denominations of \$1, \$5, \$10, and \$20, each a different color, the bills featured Queen Elizabeth II, Trinidad and Tobago's coat of arms, its central bank, and an illustration representing a local industry—an offshore oil rig, for example.

Introducing the fifty

In 1977, a year after becoming a republic, the country's coat of arms took center stage on the notes, replacing Queen Elizabeth, and \$50 and \$100 notes entered the scene. But the fifty was pulled from circulation just two years later, after a shipment of unissued bills was stolen.

To mark Trinidad and Tobago's 50th year of independence in 2012, the central bank reintroduced the \$50 bill. But it wasn't readily accepted by the public. Senior citizens had

Trinidad and Tobago's new \$50 bill is dressed for a celebration

trouble distinguishing the new olive-green bill from the green \$5 and gray \$10 bills. Some people considered the banknotes collector's items and were reluctant to spend them. And banks and stores were not prepared for the change: cash drawers had no slot for the new bill. People weren't using the fifty.

But they were using the \$20 and \$100 notes, both to save and to make payments—so much so that the central bank had to print more of them. According to the central bank, Trinidad and Tobago had more banknotes in circulation per capita than any other country in the years after the olive-green bills came out. The central bank decided it was time for a new and improved \$50 banknote.

Crowning glory

In December 2014 the new note debuted. It was produced by the central bank of Trinidad and Tobago and UK currency printer De La Rue. Part of the reason for problems with the \$50 note issued in 2012 was insufficient consultation with stakeholders; the central bank in 2014 engaged in strong consultation with such key stakeholders as banks, businesses, and experts in history and art.

The new \$50 note is rich in color and highlights the country's natural beauty and cultural heritage. The bill's golden color celebrates the central bank's 50-year jubilee. Its dramatic design includes a red hibiscus flower, a young woman in carnival attire, and a red-capped cardinal. The bird, whose colors are those of the country's flag, is poised for flight against a transparent polymer plastic window.

The \$50 also has enhanced security features. A small gold-green iridescent hibiscus flower changes color as you move the bill around, and the micro text of the number 50 can be seen only under a magnifier.

The design won the country the International Bank Note Society's Banknote of the Year award. Because many older cash-counting machines weren't prepared to handle the new polymer notes, the central bank teamed up with commercial banks to upgrade technology vital to the processing



Front of the newest \$50 note.



Back of the newest \$50 note.

and handling of the polymer notes, so that citizens would be able to withdraw the new \$50 bill from ATMs.

In November 2015, the central bank issued an updated \$50 polymer note that removed the commemorative text "Celebrating 50 years of Trinidad and Tobago's Central Bank, 1962–2012" and added raised dots to help those who are visually impaired. And a red banner was added across the tail of the red-capped cardinal as an additional security feature.

The \$50 bill has a checkered history, much like the small industrial and high-income economy, which has been colonized by the Spanish, British, French, Dutch, and even the tiny Duchy of Courland. But the country is now leading the way with an ultramodern currency that is striking in its beauty, welcoming to those who cannot see it, and protected from those who would dare compromise it. ■

Marie Boursiquot is F&D's Online Editor.

PARALLEL PATHS

Atish Rex Ghosh profiles **Kristin Forbes**, who straddles academia and policymaking

DEWORMING children seems an unlikely interest for economist Kristin Forbes, who has spent most of her professional career straddling academia and policymaking. But the professor at the Massachusetts Institute of Technology's (MIT's) Sloan School of Management has been willing to tread unlikely paths as well.

Forbes, who is also an external member of the Bank of England's Monetary Policy Committee, has focused on such international issues as financial contagion—that is, how economic problems spread from country to country—cross-border capital flows, capital controls, and how economic policies in one country have spillover effects in others.

But when presented with evidence by colleagues that one of the most cost-effective ways to keep children in developing economies in school was to rid them of parasitic worms, she helped form a charity aimed at deworming kids.

Still, academic research and policymaking absorb most of Forbes's time—whether at MIT, the World Bank, the Bank of England, or the US Treasury Department, among other places.

Yet her path was not predestined—and more than once, luck or coincidence played a crucial role. Growing up in Concord, New Hampshire, she developed a passion for the outdoors and attended a public high school. Though it was hardly a low-performing school (about half of the class would go on to college), most of her classmates set their sights on the University of New Hampshire. Forbes's counselors were bemused when she aspired to more prestigious colleges, such as Amherst or Williams. But in an early instance of forging her own path, Forbes did indeed end up going to Williams College.

A wealth of choices

At Williams, Forbes was confronted by a wealth of choices and wound up in courses on astrophysics, religion, psychology—and economics. She credits her Econ 101 professor, Morton (“Marty”) Schapiro (later, president of Williams College) with inspiring her interest in the subject—mostly by applying basic economic concepts to everyday life. He spoke of the diminishing, and eventually negative, marginal utility of consuming too much beer (not an irrelevant example on college campuses). Still, she dithered between economics, history, and political science (enjoying the interplay between the subjects), but finally majored in economics and graduated *summa cum laude*.



After graduation, Forbes pondered what to do next—vacillating between law or following in her father's footsteps and becoming a doctor—but ended up in Morgan Stanley's investment banking program. Though she learned about markets (knowledge that would later come in handy for her economics research), Forbes soon realized that investment banking was not for her. And then she caught a lucky break—Richard Sabot, one of her professors at Williams, put her in touch with Nancy Birdsall, who was finishing up the World Bank's 1993 study of how nations in East Asia achieved economic success and was looking for a researcher to help apply its insights to Latin America.

So Forbes went to the World Bank for a year—and got her first taste of policy-oriented research. Working with Birdsall and Sabot inspired Forbes to become a career economist like

them and made her realize that she needed a PhD to do so and to affect the world the way they did.

At MIT Forbes's perspective was, therefore, not quite like that of most grad students, who tend to be enthralled more by the models and theories themselves than by their application to real-world problems. It was just that perspective that earned Forbes prestige when her examination of the impact of income inequality on growth was published in the *American Economic Review* in 2000. The study was part of an assignment for Jerry A. Hausman's econometrics course at MIT.

In the mid-1990s, income inequality was hardly a hot topic. But Birdsall and Sabot had found that income inequality was bad for growth, and—at least in policy circles—that finding had made somewhat of a splash. Forbes reexamined the question, using newer data and more sophisticated (and recently developed) techniques, and found that the sign had flipped! Comparing across countries, income inequality is bad for growth, but looking within a country, she found that growth and rising inequality are positively related.

Beyond getting her published in a distinguished journal, the experience taught Forbes the importance of careful analytical work in policy conclusions. Forbes is perhaps best known for her work on financial contagion. This is a defining theme of her life's work. She was writing in the aftermath of the financial crises in Asian and other emerging market countries when “contagion” seemed rife.

Her papers dissected what was meant by contagion—a term hitherto used very loosely—and thereby helped clarify when and why it occurs. As Roberto Rigobon, a co-author and fellow professor at MIT once remarked, “Kristin is one of the leaders in the empirical analysis of contagion. Her papers are a tour de force for anyone interested in measuring its importance, existence, and extent.” Stijn Claessens, senior advisor at the Federal Reserve Board, the US central bank, who has also done research with Forbes on the topic, says: “She sets the academic bar very high, yet keeps the policy relevance of the work always in mind and motivates others by pointing out big gaps in our understanding. And she delivers her insights in an easy digestible way.”

In another oft-cited paper, Forbes looked at the impact of imposing capital controls, going beyond traditional analyses of their macroeconomic effects to study how controls affected small and medium-sized enterprises' access to financing—previously ignored by academics and policymakers alike.

Such analysis has earned Forbes a well-deserved reputation for policy-oriented academic research. Yet an overly narrow focus on analytical work for policy purposes is not without risks—particularly of misinterpretation by others. For example, Forbes's findings on the impact of capital controls on financing for small and medium-sized enterprises are often taken to mean that governments should avoid controls on capital inflows because of the burden on smaller compared with larger firms. That may be true, but the main policy alternative for a country facing a capital-inflow-fueled credit boom is a prudential measure. Such a measure would likely have an even greater disproportion-

ate impact on small enterprises, which tend to rely more on bank financing than do larger firms.

Similarly, Forbes's paper on income inequality and growth should not be interpreted as implying that inequality is good for growth. Subsequent research shows that results depend on the sample chosen, and estimates based solely on how variables changes over time, the technique Forbes used, typically pick up only the short-term positive association between inequality and growth. The negative impact is identified by analyzing how a variable changes both over time and across countries.

Prank call?

Forbes, who has spent a considerable part of her career in official circles, is well aware of the subtleties of applying academic research to draw policy conclusions. After her stint at the World Bank, Forbes's next opportunity to be involved directly in policy work came when she returned from a run one day in 2001 to find a message on her answering machine from someone named John Taylor. He was inviting her to come down to the Treasury Department in Washington, DC, for a chat. At first, she thought it was a joke. Of course she knew who Taylor was—the Stanford University professor who had just been appointed Under Secretary of the Treasury for International Affairs in the new George W. Bush administration. But why would he want to talk to her? She very nearly erased the message.

In the end, she returned Taylor's call, and it turned out that he wanted her to set up a new Treasury division to monitor vulnerability around the world in the aftermath of the Asian and Russian crises. Forbes was undecided. Ever since her World Bank days, she had felt the pull of both the academic and policy worlds and believed the two did not interact enough. But as an aspiring assistant professor at MIT, her priority was to publish in leading academic journals—not gallivant in the corridors of power in Washington.

She turned down the offer twice, until the late Rudiger Dornbusch, her former advisor at MIT and a leading international economist who had made his name in both academic and policy circles, called to admonish her. He refused to let her off the phone until she had started to pack her suitcase. “This is why we do the academic research we do . . . to actually affect policy and affect the world. You need to go and do this,” he told her.

Real-world data

So Forbes went back to Washington in 2001. It was, she says, “a fascinating experience to try to apply academic research to the real world with real-world data, where you're not telling everyone that contagion will happen nine months after the fact. You actually have to do it ahead of time. And it does introduce a whole new set of issues of how we can take what we write about and make it applicable in real time.” Her time at Treasury also pulled Forbes into a host of other issues that she had never thought about before. One was working on the US Millennium Challenge Account—a program to help make US foreign aid more

effective by developing criteria to determine which countries would be eligible.

Back at MIT the following year, Forbes began writing academic papers on some of the issues she had encountered in the policy context—including financial contagion—until the phone rang again. This time it was an invitation to join the US President’s Council of Economic Advisers. There, Forbes worked on many hot topics in international economics, including possible currency manipulation by major trading partners and international taxation.

On an issue that was then in the headlines—the huge sums of money parked abroad by US multinational corporations to avoid high corporate taxes—Forbes was again able to bring her analytical skills to bear in debunking popular myths. These corporations commonly complained that they could not finance investment in the United States because it would cost so much to repatriate the funds. The natural implication was that they should receive, at least, a one-time tax holiday to help spur investment in the United States.

To Forbes and her colleagues on the economic council, that did not ring true—but without solid evidence, they had no way of refuting this claim. The corporations seemed to have a compelling case, which was quashed only by Forbes’s subsequent research, which showed that when firms do repatriate funds, they typically use them to pay dividends rather than investing in physical plants or employing more workers.

An open mind

This interplay between academia and policy—research informing policy decisions, policy questions inspiring research—has become a hallmark of Forbes’s work. Unlike many, however, she is also willing to keep an open mind and to shift her views in light of new studies and evidence. Her early work on capital controls, for instance, tended to emphasize their costs. But recent studies on capital controls’ role in mitigating financial stability risks and the growing awareness that in financially open economies there is little practical distinction between prudential measures and capital controls, have persuaded Forbes of their potential to bolster financial resilience.

Her advice to young researchers is very much in the same vein: choose topics that are important and that you care about; ask yourself why you are doing this work; be intellectually inquisitive; explore all angles of the issue; then base your conclusions on solid analytics.

Forbes will not discuss current policy issues because she is a member of the Bank of England’s Monetary Policy Committee, although she recently announced she is returning to MIT and will be unable to seek another term on the committee. But consistent with her theme that policy decisions should be based on firm empirical evidence, she is obviously perturbed by the anti-expert, anti-elite, facts-don’t-matter attitude that seems to have crept into popular discourse. Through her research, she continues to try to explain basic economic facts—to the public and to policymakers—in the hope of positively influencing how important decisions are made. At the same time, she urges academics to spend more time talking to people outside their ivory towers: “we really need to—all of us, policymakers and

academics—get out and talk to businesses, and talk to the man on the street, and talk to people and better understand what they are worried about and what they are thinking about.”

Much of Forbes’s professional life has been devoted to international economics—she even got married in Bretton Woods, New Hampshire, where the IMF and World Bank were conceived in 1944 (though she hastens to explain that she chose the hotel more for its convenient location than for its historical associations). Not surprisingly, therefore, she is concerned about the current backlash against globalization. Part of the problem, she believes, is economists’ inability to communicate to the general public in ways that are understandable and applicable to people’s lives.

She is willing to keep an open mind and shift her views in light of new evidence.

While some of the antiglobalization sentiment stems from concerns about extreme income and wealth inequality, she also believes that the impact of globalization on inequality should not be exaggerated. In the United Kingdom, she notes, income inequality in recent years has fallen, or at least not increased, as wages in lower brackets have risen faster than in some higher brackets. Yet, among many, there is incredible frustration and fear about change—eventually manifested in the British vote to leave the European Union, or Brexit. Economists—academics and policymakers—must better understand and better explain how globalization can benefit all.

Deworming children

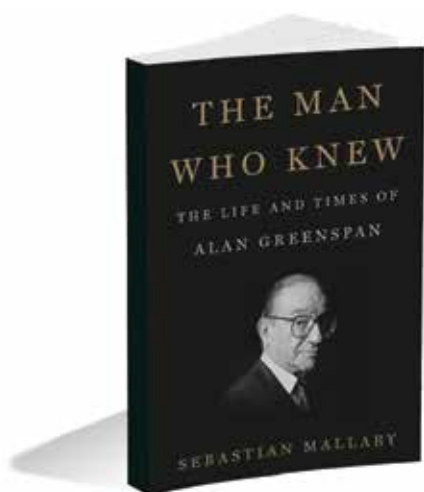
As elevated as academic research can be, sometimes it has an impact on the personal, which is why Forbes became involved in the deworming project. It is an example of how she has applied her skills broadly, taking many different, sometimes unexpected, but often rewarding paths.

A few years ago, academic research by fellow MIT professors Rachel Glennerster and Esther Duflo, together with Michael Kremer of Harvard University, found that one of the most cost-effective ways of ensuring that children in developing economies stay in school is to rid them of parasitic worms that often make them too ill to attend school. The findings prompted them to form a charity dedicated to deworming children in developing economies, and Forbes volunteered her business school savvy to help establish the organization.

“It’s amazing,” the proud mother of three says enthusiastically, “how the power of good economic research can raise significant amounts of money in donations. Just give children one pill a year, and it gets rid of their worms and they can learn more. They are not as lethargic, they absorb more minerals in food, they are healthier. So—incredibly easy, incredibly effective. By now, some 25 to 30 million children have been dewormed—all thanks to good academic research!” ■

Atish Rex Ghosh is the IMF’s historian.

Judging Greenspan



Sebastian Mallaby

The Man Who Knew The Life and Times of Alan Greenspan

Penguin Press, 2016, 800 pp., \$40.00 (hardcover)

Too much success can be a dangerous thing. That is perhaps the key takeaway from Sebastian Mallaby's epic new biography of former US Federal Reserve chair Alan Greenspan, *The Man Who Knew*. The central and (to this reviewer at least) somewhat shocking revelation of the book is that far from being a blind follower of "markets know best" efficiency theory, Greenspan was well aware that easy monetary policy and stock prices could create bubbles in the market—terribly damaging ones (he did a seminal paper on the topic in 1959). And yet he allowed them to inflate anyway, believing this preferable to more dramatic government interference in the market. The great irony is that thanks in large part to Greenspan, central bankers themselves have become the major player in global markets—something that has introduced huge, unknown risks into our economy. Clearly, the man who knew didn't know everything.

Despite this, many lessons in Greenspan's legacy are relevant to

today's economic problems. For one, economics should move toward the empirical. Greenspan had what was arguably his biggest insight when he was deep in the weeds, tallying numbers rather than relying on ivory tower models. In the summer of 1996, there was a debate at the Fed about whether interest rates should be hiked to ward off overheating in the economy. Wages were rising, and the stock market was up 45 percent over the course of a year. Yet productivity figures seemed oddly weak, given the efficiency gains that businesses were seeing from globalization and new technologies. Solving the conundrum was crucial—if productivity was actually rising, then there was no reason to hike interest rates, since workers making more widgets could also be paid more without triggering inflation. Nearly every economic guru at the time—from Larry Summers to Janet Yellen—worried about inflation. But Greenspan insisted that Fed researchers go back and re-tally the numbers across 155 industries and four decades. The result? The maestro was right; low productivity in services was artificially lowering the overall rate.

The times that Greenspan—and as a result, the economy—flattered were usually when there was too little data and too much ego in the room. The praise and political power that came with his many lucky hunches—and some well-deserved policy home runs—made him less willing to rock the boat and raise interest rates, even when it was clear that this really was what was needed to derail a potential crash and recession. Once a staunch opponent of government bailouts he later supported bailouts of emerging markets like Mexico (whose debt was held by big US banks—a crucial fact that the book underplays). He dismissed warnings by US Commodity Futures Trading Commission chair Brooksley Born on derivatives, believing incorrectly that they weren't

as potentially damaging as she thought they might be, but also that it would be too politically tricky to push through regulation. He made sideways references to "irrational exuberance" by the late 1990s, but backed off on curbing it when the markets stabilized. Like most finance-friendly regulators, Greenspan didn't want the music to stop. When it did, to his great credit, he issued a mea culpa, admitting there had been a "flaw" in his thinking. Mallaby—who wrote this book over five years with Greenspan's cooperation while working as a senior fellow at the Council on Foreign Relations—believes it was a mistake for him to do so, since ideologically, he had never bought totally into "rational" markets.

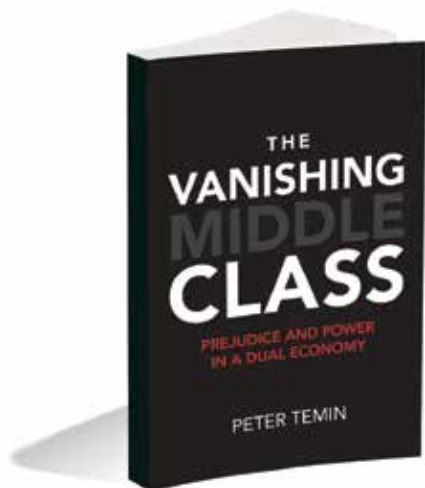
The man who knew didn't know everything.

I disagree. Actions matter, and Greenspan took responsibility for his. While his "flaw" was less an intellectual one than a moral one, the fact that he admitted to making a mistake of any kind is one of the things that redeems him. Many others who played a part in the events leading up to the 2008 crisis and Great Recession failed to do so. What's more, Greenspan's admission marked an important departure from the fiction of the omniscient central banker (one that he helped craft). The world has come to depend far too much on central bankers being those "who know." It's time to demand more from the politicians we elect to run the real economy itself.

Rana Foroohar

Assistant Managing Editor
Time magazine

Reinventing the Past



Peter Temin

The Vanishing Middle Class Prejudice and Power in a Dual Economy

MIT Press, Cambridge, Massachusetts, 2017,
208 pp., \$26.95 (hardcover)

Americans tend to assume that history marches forward and that their children will do better than they did. This is a fundamental tenet of the American Dream and a core deliverable of the economy over most of the course of the 20th century.

Sometimes, though, there are detours.

Even though over the past 40 years, the United States grew ever richer, the gains from this growth have not been shared. The US economy produced \$18 trillion worth of goods and services in 2016, more than any other country that year—or any year on record. Data show that between 1980 and 2014 pretax income grew, on average, by 61 percent, yet most of these gains went to those at the very top. For the bottom 50 percent of the US population incomes grew only 1 percent; those in the top 1 percent snagged 205 percent income growth.

This is not the way the American Dream was expected to play out.

Explaining rising inequality in the United States is the aim of Peter Temin's new book, *The Vanishing Middle Class*. Temin argues that the distribution of gains from economic growth

today make the United States look like a developing economy. He builds on the dual sector model developed in the 1950s by W. Arthur Lewis. Looking at developing economies, Lewis proposed that economic growth and development did not conform to national boundaries. Within countries, he saw that “economic progress was not uniform, but spotty.” His model explains how development and lack of development progress side by side. One sector, which Lewis calls “capitalist,” is the home of modern production, where development is limited only by the amount of capital. The other sector, which he calls “subsistence,” is composed of poor farmers who supply a vast surplus of labor. In these two sectors’ symbiotic relationship the capitalist sector seeks to keep wages down to maintain an ongoing source of cheap labor.

Temin applies this framework to the United States today. He argues that “the vanishing middle class has left behind a dual economy.” His dual sectors are finance, technology, and electronics, or FTE—akin to Lewis’s capitalist sector—and low-skill work, akin to the subsistence sector, whose workers bear the brunt of the vagaries of globalization. The book lays out how members of the FTE sector seek to keep their own taxes low and suppress the wages they pay so as to maximize their profits. Mass incarceration, housing segregation, and disenfranchisement all serve—among other things—to keep the low-skill sector in a subservient labor market position. These developments play out along racial lines set by the nation’s history of slavery.

The bridge between these two sides of the economy is education. There are paths for children of low-wage families to get into the richer FTE capitalist group, but Temin argues that there are many more obstacles, especially for children from African-American families. This is why Temin’s top policy recommendation is universal access to high-quality preschool and greater financial support for public universities.

His second recommendation is to reverse policies that repress poor folk of any race. He advises an end to mass incarceration and housing discrimination so that families can escape the low-skill trap and more coherently integrate into the broader economy and society.

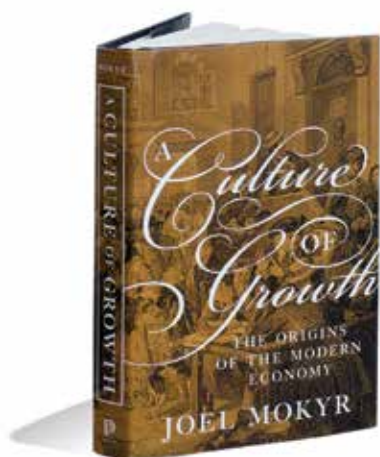
This is not the way the American Dream was expected to play out.

Alas, neither of these recommendations is potent enough to overcome the fundamental problems Temin identifies. The US path of natural progression toward greater equality has been detoured for decades now. The idea that the US economy is on a trend more like that of a developing economy than of a rich, developed nation may seem jarring, but that is exactly the nature of the distributional structure of the world’s richest economy.

The steps that brought the United States more equality in the middle of the 20th century certainly included attention to education—the United States was among the first to provide universal access to primary education nationwide, and the GI bill after World War II opened college doors to generations of students—but that was not the only policy. Among other things, the middle decades of that century also boasted high taxation on estates and top incomes—money that could be invested in broader economic growth—yet both have been seriously eroded over the past four decades. If we want to revive our vanishing middle class, which Temin so eloquently describes, we’ll need to do more to undermine the dual economy structures he so accurately details.

Heather Boushey
*Executive Director and
Chief Economist,
Washington Center for
Equitable Growth*

Culture at the Roots of Growth



Joel Mokyr

A Culture of Growth

The Origins of the Modern Economy

Princeton University Press, Princeton, New Jersey, 2017, 400 pp., \$35 (hardcover)

Joel Mokyr's *A Culture of Growth: The Origins of the Modern Economy* gives culture center stage in the rapid economic growth and industrialization brought about by the first Industrial Revolution and ongoing and self-reinforcing in Western Europe ever since. It is a certain type of culture that is the reason growth-inducing change occurred in Europe and not, say, in China, the author insists. What this culture means, and what made it different in Europe, is the topic of this provocative analysis.

Mokyr proposes that the Enlightenment and the Industrial Revolution were not exogenous developments, but were a consequence of a change in attitudes (which he sums up as “culture”) in Western Europe. This occurred over roughly two centuries, between 1500 and 1700, a period that brought about a change in beliefs about people's ability to use science to control their destiny and, especially, the natural world.

The Enlightenment, taking off in the late 17th century and lasting through the 18th, encouraged a quest for “useful knowledge”—that is, science and technology—that resulted in permanent and sustained command

over the forces of nature.

Nudging this process were two prominent figures, Francis Bacon and Isaac Newton, who changed thinking in Western Europe and then the world. “The true and legitimate goal of the sciences is to endow human life with new discoveries and resources,” wrote Bacon. His and his followers' impact on the Enlightenment was instrumental in bringing about the conviction that “natural inquiry” through experimentation is essential for economic growth and human well-being. Newton's contribution was to demonstrate that the “rules”—the mathematical regularities—of nature could be identified, thereby unlocking the mysteries of the natural world. Both Bacon and Newton altered thinking in their time because competition in the marketplace of ideas allowed their ideas “to be distributed and shared, and hence challenged, corrected and supplemented,” says Mokyr.

But how did these cultural changes come about and spread in the period of fundamental change in Europe? How did the Enlightenment turn into the Industrial Revolution, which in turn was the starting point of sustained growth? Mokyr paints a backdrop of improved navigation and shipbuilding that opened Europe to new products and new ideas (early globalization), and the printing press, which lowered the cost of communication and increased the benefits of literacy. These developments opened minds to new ideas and new ways of thinking elsewhere and reduced attachment to old ideas. These changes were also helped by the absence of a single central authority in Europe, individual freedom, the enforcement of property rights, and competition in the marketplace for both material goods and ideas. Among other things, the new ideas led to advances in science and technology that we now call the Industrial Revolution. And all of that led to sustained economic growth.

Mokyr then shows that although looking at why something happened is useful, so is analyzing why

it did not. He uses the example of China as a counterpoint to Europe's rapid development of a culture of growth. Although China had previously been at least as technologically advanced as Europe, if not more so—and certainly more literate—it had produced nothing like the Industrial Revolution. Mokyr attributes slow progress in China to factors such as veneration of classical Chinese literature, a centralized government that discouraged competition among regions, the selection of administrators for plum government positions based on knowledge of Chinese literature rather than of science and technology, and the relative unimportance of competition compared with Europe. These provided incentives that fostered success in other areas of Chinese culture but did not stimulate the ideas and actions associated with an industrial revolution. Mokyr concludes, “It seems wrong to dub the Chinese experience a ‘failure.’ What is exceptional, indeed unique, is what happened in eighteenth-century Europe.”

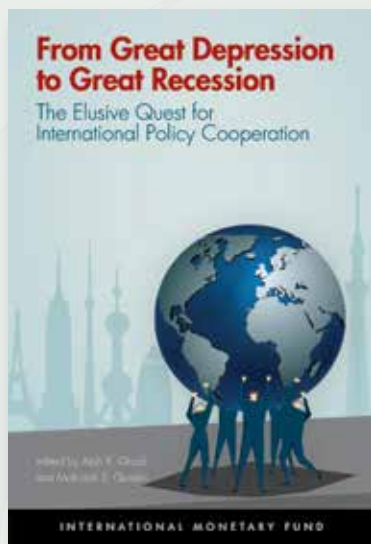
These developments reduced attachment to old ideas.

This book is the latest example of Mokyr's ability to explicate complex issues, illustrating his big-picture thesis with a myriad of fascinating details. He writes with clarity—enjoyable for the general reader as well as for the specialist in economic history. *A Culture of Growth* is a must-read for anyone interested in how Western society got where it is today and what this implies for the spread of technology in the global economy of the future.

Barry R. Chiswick

Professor of Economics and International Affairs, The George Washington University

New releases from IMF

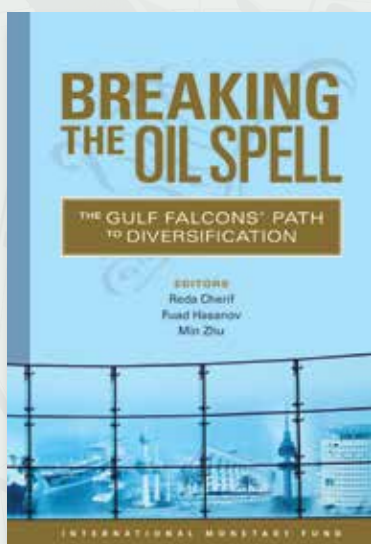
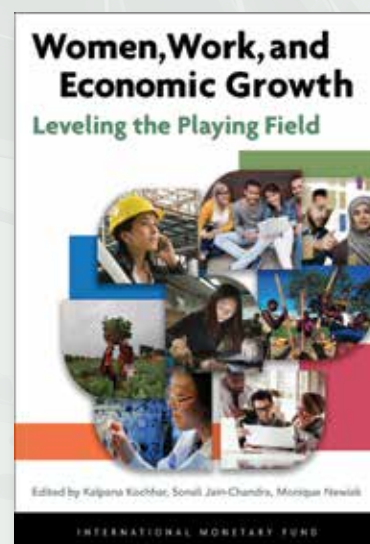


From Great Depression to Great Recession: The Elusive Quest for International Policy Cooperation

\$27. ISBN 978-1-51351-427-7.
Paperback. 229pp.

Women, Work, and Economic Growth: Leveling the Playing Field

\$30. ISBN 978-1-51351-610-3.
Paperback. 180pp.

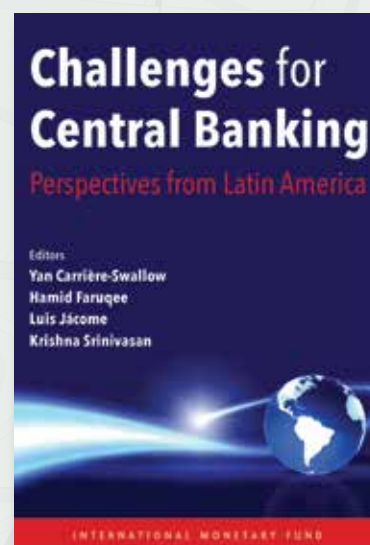


Breaking the Oil Spell: The Gulf Falcons' Path to Diversification

\$40. ISBN 978-1-51353-786-3.
Paperback. 212pp.

Challenges for Central Banking: Perspectives from Latin America

\$30. ISBN 978-1-51359-176-6.
Paperback. 272pp.



Visit bookstore.imf.org/fd3117

Finance & Development, March 2017



MF1EA2017001