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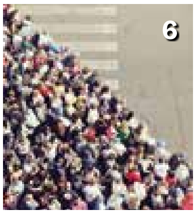
POPULATION SHIFTS



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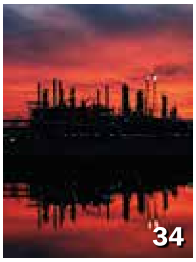

DEPARTMENTS

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FROM THE **EDITOR**

Population Pressures

SAY "population growth" and many people immediately think of resources under stress. The mind jumps to 19th century scholar Thomas Malthus, who saw population outstripping the food supply, or to Paul Ehrlich, whose 1968 book *The Population Bomb* warned of global catastrophe from overpopulation.

Visions of a world depleted by humanity are embedded in popular culture, and in some corners of the world, population surges are a top concern, placing severe pressure on land, labor markets, and government budgets. But this notion of population growth speaks to only part of the story. Multiple forces—aging, migration, urbanization, and longevity—are creating a more diverse and complex global demographic landscape.

The full story offers surprises—some countries face a problem of too few people, not too many—and potential: some countries are positioned to realize a "demographic dividend" based on an expected boom in working-age adults while others can seize big economic gains if they are able to boost female participation in the workforce.

These crosscutting dynamics define population change today and are the focus of this issue of *F&D*.

David E. Bloom, Harvard professor of economics and demographics, opens our special feature with a survey of the forces shaping population growth today and proposes a range of options for managing what he calls "the most significant demographic transformation in human history."

Other articles in our feature package focus on the fiscal consequences of shrinking and aging populations; the role of women in offsetting the problems of an aging population and shrinking workforce; linkages between age and inflation; and how sub-Saharan Africa can reap the benefits of its growing population.

Elsewhere in the issue, we tackle topics dominating news headlines, with articles by IMF First Deputy Managing Director David Lipton on China's need for bold fiscal reforms, IMF economists Paul Cashin and Mehdi Raissi on the economics of El Niño, and IMF Middle East Chief Masood Ahmed on plunging oil prices.

Rabah Arezki, Frederick van der Ploeg, and Frederik Toscani break new ground in their article on the latest trend in natural resource finds. For those readers fascinated by the subtleties of central bank communications, former Reserve Bank of India governor Duvvuri Subbarao reflects on the power of words in a first-person account of his years at the reserve bank. Peter J. Walker profiles economist David Card, whose work on minimum wages, immigration, and education challenged conventional wisdom.

Finally, we included a tribute to pop icon David Bowie, who passed away in January and inspired millions with his music. *F&D* Managing Editor Marina Primorac tells us how the musician's face came to grace the front of the "Brixton pound"—a local currency that circulates in that south London neighborhood where Bowie was born.

Jeffrey Hayden
Editor-in-Chief

The Challenger

Peter J. Walker profiles **David Card,** the economist who has questioned conventional wisdom on minimum wages, immigration, and education

A piece of paper: dog-eared and taped—somewhat haphazardly—to the wall. The makeshift faculty listing at the University of California, Berkeley's Economics Department symbolizes a humility that flies in the face of its towering academic reputation. One of Berkeley's economists—also esteemed but modest—is David Card.

Card rose to prominence in 1995 when he won the coveted John Bates Clark Medal, then awarded every two years by the American Economic Association (AEA) to the leading economist under the age of 40 who is working in the United States. It is considered to be the top award in economics barring the Nobel Prize. Through empirical research into a series of "natural experiments"—real-life situations underpinned by robust data—Card challenged conventional economic thinking in several important areas.

Challenging convention

He found that, unlike in classical models, raising the minimum wage does not necessarily increase unemployment, and even has the potential to reduce it. More than 15 years of research led to a landmark 1993 paper and subsequent book—coauthored with Princeton professor Alan B. Krueger—that analyzed the impact of the minimum wage on the New Jersey fast-food industry. In April 1992, the U.S. state of New Jersey increased the minimum wage from $4.25 to $5.05 an hour, while neighboring Pennsylvania kept it unchanged. It was the ideal natural experiment. Card and Krueger found that, relative to those in Pennsylvania, fast-food restaurants in New Jersey actually increased employment by 13 percent—evidence that the rise in the minimum wage did not have the adverse effect feared by so many.

The study made a lot of noise, but it almost didn't happen, coauthor Krueger recalls: "Our natural experiment almost didn't come to pass, as the [New Jersey] state legislature changed and voted to repeal the minimum wage increase before it took effect. The governor vetoed the repeal and had just enough votes to avoid being overridden. . . . In a way," Krueger notes, "this made our comparison more compelling because the minimum wage increase partly came as a surprise, so employers wouldn't have fully adjusted to it in advance."

Another study by Card that also challenged conventional wisdom found that accepting more migrants does not necessarily cost native workers their jobs or lower their wages. Card's 1989 study on the Mariel Boatlift examined the impact of the sudden arrival of 125,000 Cuban immigrants to the Miami labor market between 1980 and 1985. Many contemporary observers had argued that the influx—representing a 7 percent increase in Miami's labor force—would harm the job prospects of low-skilled native workers already in the city. But Card found it had virtually no effect on the wages and unemployment rate of low-skilled natives. Even among the Cuban population, wages and employment rates of earlier immigrants were not substantially reduced by the arrival of the Mariels.

On these fronts and others, Card's research rocked the boat, generating a degree of excitement but also significant skepticism. If Card and his critics could agree on one thing, however, it was that bucking the trend—even if just a little too much—was, at that time, far from a surefire route to mainstream acclaim.

Speaking in his office at Berkeley—a nondescript view outside on a damp and dreary January morning—Card explains that he was on vacation with his wife when he learned of the Bates Clark award: "They were trying to reach me and tell me that I had won the prize. In all honesty, no one ever would have thought that someone like me would win, and I certainly would never have thought that," Card recalls, with a personal modesty that belies his reputation as a pioneering academic.

Card challenged conventional economic thinking in several important areas.

That shock, however, paled in comparison with the hostility he felt when he received the prize. Furious about his findings and temerity in challenging established economic thinking, many economists at the AEA conference protested and organized their own seminars bashing his work: "My belief was that this was purposefully to try and defend the AEA from criticism that we were a bunch of left-wing nuts."

To say Card was not immediately embraced by the wider economics community is an understatement. As he noted in a later defense of the New Jersey paper: "Replication and reanalysis are important endeavors in economics, especially when new findings run counter to conventional wisdom." Being challenged as an academic is normal and healthy, but in this particular case, he felt, things got very personal very fast. "I would have extremely awkward conversations at dinner, or my students would be grilled because people thought I was crazy. It left an extremely bad taste in my mouth."

The accidental economist

In a sense, economics has always been personal for Card. Growing up in rural Ontario, Canada, his family "was not, and is not, particularly rich," and very few of his friends went to university. Living on a dairy farm—which his elderly father keeps to this day—Card became fascinated by the science surrounding the care of cows—for example, how to treat cows so that they produce nutrient-rich milk for the optimal amount of time.

His scientific interest led him to study physics at Queen's University in Kingston, Ontario—funded in part by a short stint working at a steel plant.

Then, at university, a revelation came to him—by accident. Helping out his then-girlfriend with her economics assignment, Card read a textbook chapter about demand and supply in agriculture. Producing more grain, or milk, would lower prices across the industry. Drawing on his experience helping his family keep a dairy farm afloat, this excited Card: "It was an unbelievably useful insight. When I saw that, I thought, 'Wow, this is really awesome stuff.' I read the rest of the book over the next few weeks, just for fun." He switched to economics, and never looked back.

Because he initially lacked the prerequisites for some of the most popular courses, he had to take the less-desired ones, such as income distribution and labor economics. Card gives these courses credit as "the reason I became a labor economist." These classes were taught by two young professors who had recently completed their doctorates at Princeton and embraced an empirical style of research. So struck were they by Card's ability that they put him in touch with their own thesis advisor at Princeton, Orley Ashenfelter, who in turn persuaded Card to attend the New Jersey school for his PhD.

Card would make his big splash at Princeton, pioneering his trademark empirical research in a range of natural experiments that eventually led to the aforementioned John Bates Clark Medal. "David has made empirical research more influential by making it more credible," Ashenfelter said at the time of the award. "Many people who are considered for this prize write papers you could never read."

Princeton and Card were a match made in heaven, but it was fated not to last. "My wife was an assistant professor at Columbia's music department, and she did not get tenure. She really wanted to move out of academia and move to California," he explains.

So they moved west, with Card joining the faculty at the University of California, Berkeley. They bought a house in nearby Sonoma and built a woodworking shop to support his hobby making Mission style furniture. At high school in Canada, boys were required to take either Latin or woodworking. He chose the latter, something that has been a lifelong interest. "It's fairly precise, it can be frustrating, but I like it—it's similar to empirical work, in a way."

A foggy discipline

His empirical work has always been shaped by a degree of uncertainty. "Our basic state of knowledge in economics is way below where you would think it was," he says, adding that "the thing that annoys noneconomists about economists is their unbelievable certainty that they know what they are talking about, when the actual reality is they do not really know."

Card describes this uncertainty as a "fog." When asked about one dimension of labor economics—specifically, the role of trust between workers, employers, and governments in creating efficient and effective labor markets, he expands on his fog analogy: "It might be true, but it's extremely hard as a scientific matter to prove, because you don't have a treatment group and a control group in the same place. I'm not aware of anybody that's ever got rid of that fog."

Despite the uncertainty surrounding labor economics, Card's research on minimum wages has frequently been cited by campaigners who seem fairly certain about the benefits of increasing it. This makes Card uncomfortable. "I don't go around saying you should raise the minimum wage—yet advocates point to my work to say they should raise minimum wages. That's one reason why I don't work on that topic

anymore, because everyone just assumes I'm advocating for raising the minimum wage, and therefore everything I do will be discredited."

"It's the same with immigration," he continues. "There is no point in me writing another paper on that, because everyone just assumes that I must be advocating raising immigration."

Card's frustration is palpable—he is tired of seeing his research oversimplified and used as lobby fodder, despite all the caveats attached to his work.

In the aforementioned Mariel Boatlift study, for example, he emphasized that the observations could not be generalized. Specifically, Miami's labor market is not typical in its track record of successfully absorbing immigrants, not least thanks to the city's myriad opportunities for low-skilled workers and its vast Spanish-speaking population.

In a 2001 paper he acknowledged that increases in unskilled immigration—if massive—could actually reduce employment rates for younger and less-educated natives by 1 to 3 percentage points in traditional gateway cities such as Los Angeles.

And in 2009 he even identified a link—albeit very small—between immigration and inequality, with immigration accounting for 5 percent of the increase in U.S. wage inequality between 1980 and 2000.

More recently, when looking at individual attitudes toward immigration in Europe, Card found that fears about immigration are not primarily job concerns; they are mostly about culture. In fact, personal concerns over the "compositional effects" of migration—such as on language and culture—are between two and five times more important to people than economic concerns such as jobs.

But Card is also eager to point out that his research extends well beyond minimum wages and immigration. Moving on to other areas, he appears more animated, more excited.

Finding talent

Card has been a prolific researcher on education policy, for example. In 1992, he found that the quality of schooling affected future earnings. An obvious conclusion, one might think, but at the time there was support for an alternative view that, given a lack of association between school quality and standardized test scores, increases in public school funding had few important benefits for students. Card found that reducing the pupil-teacher ratio by five students was associated with a 0.4 percentage point increase in the rate of return on schooling. And a 10 percent increase in teachers' pay was associated with a 0.1 percentage point increase in schooling's rate of return.

Many of Card's research findings have practical policy implications.

Only last year, Card made another important contribution on the education front, examining the impact of universal screening on the representation of low-income and minority students in gifted programs. Gifted programs in schools, he explains, are "targeted to very high ability children as measured by IQ"—but IQ is a poor indicator of raw talent because it tends to favor more affluent children who are more likely to receive educational support at home than their poorer counterparts. Furthermore, getting into a gifted program can depend to a certain degree on a parental push—more likely in an affluent household. Both dimensions mean that low-income and minority students are less likely to enter a gifted program.

To address this disparity, a school district in Florida decided to screen all children and to introduce a nonverbal ability test to complement the standard IQ test. In his study, Card found that the gifted rate among disadvantaged students increased by 180 percent thanks to these innovations. Despite this success, however, universal screening proved too costly and was discontinued in the context of other spending pressures.

Another recent natural experiment that stands out as both innovative and socially valuable looks at unexpected emotional outbursts and domestic violence. Though professing to be "the two people in the world who know the least about sports," Card and coauthor Gordon Dahl looked at domestic violence increases after "shock losses"—that is, when a strongly favored team loses—in the National Football League (NFL). An inspiration for the study was frustration with a classical theory about domestic violence—that it is largely a combination of premeditated control and mutual dependency. "There is just something completely screwed up about that," says Card. "Sometimes," Card continues, "the papers I have written are motivated by 'That can't be right; let's challenge it.'" So Card and Dahl challenged the assumption and found convincing evidence to support their case that much family violence is not premeditated, but sudden and irrational. Specifically, they found that when a home NFL team suffered a shock loss, there was an 8 percent increase in local police reports of domestic violence—suggesting that spontaneous outbursts often play a key role.

Returning to more familiar territory—and looking ahead to the future—Card intends to explore further a recent finding on wage inequality. In 2015 he published a study about Portugal, where women were found to be earning just 90 percent of what men earned at equivalent firms. Not only were women less likely to work at firms paying high wages, but even if they did their wages were still below those of their male counterparts. "Women should try and be a bit more aggressive in wage negotiations—there's no question that's true," Card notes, adding that "they don't quite benefit as much from working at high-wage employers, and that contributes to the overall gender gap." Card suspects, however, that wage gaps are not just a matter of gender. He also plans to explore the racial dimensions of wage inequality—using data from Brazil.

Many of Card's research findings have practical policy implications. So has he considered becoming a policymaker? "No," he responds, before explaining. "This is a sad statement, but my favorite thing is to start a new project and play around with data sets." "Moreover," he adds, "I'm a terrible manager."

Later that day, Berkeley's charismatic chair of economics, Shachar Kariv, refuses to describe Card's management skills as a weakness, pointing instead to his lack of appetite for such tasks. It may be true, however, that management is "not his area of comparative advantage. The curse of very smart people is that they are not as smart as they think they are," Kariv adds with a flourish: "This is not Dave—he knows what his comparative advantages are, and he's using them."

Kariv describes Card as "someone who not only steers the department intellectually, but in many other ways." He is "an ego-free person" who "does more than his fair share of undergraduate teaching" while "going above and beyond at the graduate level." He also has "a very quiet type of leadership."

Card is also notable for working late into the night. It is an observation that his longtime collaborator, Krueger, has made: "He had the work ethic of a dairy farmer as a Princeton professor—he would often work until the library closed, around midnight. We worked long hours together, discussed many research issues around making cups of coffee." Kariv shares a similar experience at Berkeley: "At 10 p.m. at night, my assumption is that Dave's in his office with his graduate students. . . . That's my assumption, and you know my assumption is based on data because this is the case."

As the conversation with Kariv winds down he bats away praise for his panoramic view of San Francisco Bay, with the Golden Gate Bridge on the horizon—spectacular, even on this misty gray, overcast day. "But we all have an amazing view," he shrugs, "Dave's office is also . . . ah, you cannot see it there because of the way his office is arranged," recalling the gloomy view from Card's window. "He needs to rearrange his furniture so you can see the Bay," Kariv asserts. "If you're looking for a weakness in Dave, that's it—he is not a good interior designer; he needs to work on his feng shui." ■

Peter J. Walker is a Senior Communications Officer in the IMF's Communications Department.

Demographic Upheaval

David E. Bloom

The world will struggle with population growth, aging, migration, and urbanization

HUMANKIND is being buffeted by the forces of demographic change.

The most prominent changes are rapid population growth in some developing economies and shifting shares of adolescents and young adults in others, increasing longevity and population aging throughout the world, and urbanization and international migration.

All pose formidable challenges—threatening economic growth, fiscal stability, environmental quality, and human security and welfare.

But none are insurmountable. They will be best dealt with if public and private policymakers act decisively, collaboratively, and soon. That includes reform of retirement policy, development of global immigration policy, provision of contraception to many millions of women, and further improvements in child survival and treatment of chronic disease.

World population grows

Population growth was extremely slow throughout most of human history. It took until the early 19th century for world population to hit 1 billion and until the 1920s to reach 2 billion. But during the past century, world population has grown significantly faster. It reached 3 billion in 1960 and jumped to 7 billion in 2011.

At the beginning of 2016, world population was 7.4 billion, and it is projected to increase another 83 million this year—representing the difference between 140 million births and 57 million deaths. Medium-variant projections by the United Nations Population Division (UNPD), which assume that fertility behavior evolves consistently with past trends and patterns, indicate that world population will surpass 8 billion in 2024, 9 billion in 2038, and 10 billion in 2056. Reaching 10 billion would be the equivalent of adding China and India to the current world population.

Admittedly, there is some uncertainty about these projections. For example, under the UNPD's low-variant projection (which assumes fertility is half a child lower), world population will not reach 8 billion until 2026; under the high-variant projection (fertility half a child higher), it will reach that level in 2022. But under almost any circumstances, the world is on a historically unprecedented population trajectory (see Chart 1).

Ninety-nine percent of projected growth over the next four decades will occur in countries that are classified as less developed—Africa, Asia (excluding Japan), Latin America and the Caribbean, Melanesia, Micronesia, and Polynesia. Africa is currently home to one-sixth of the world's population, but between now and 2050, it will account for 54 percent of global population growth. Africa's population is projected to catch up to that of the more-developed regions (Australia, Europe, Japan, New Zealand, and northern America—mainly Canada and the United States) by 2018; by 2050, it will be nearly double their size.

Between now and mid-2050, other notable projected shifts in population include:

• India surpassing China in 2022 to have the largest national population;

• Nigeria reaching nearly 400 million people, more than double its current level, moving it ahead of Brazil, Indonesia, Pakistan, and the United States to become the world's third-largest population;

• Russia's population declining 10 percent and Mexico's growing slightly below the 32 percent world rate to drop both countries from the top 10 list of national populations, while the Democratic Republic of the Congo (153 percent increase) and Ethiopia (90 percent) join the top 10; and

• Eighteen countries—mostly in eastern Europe (and including Russia)—experiencing population declines of 10 percent or more, while 30 countries (mostly in sub-Saharan Africa) at least double their populations.

Rapid population growth poses significant challenges. Among them is the need to provide jobs for large numbers of people and give them the human capital (quality education, training, and health) they need to be productive. Nations must also lay down the requisite physical capital and infrastructure to support higher employment; otherwise mass suffering and political, social, and economic instability and conflict could become ever more common. Increased inequality across countries could also deter international cooperation, stalling or even reversing the globalization process, which has great potential to elevate standards of living around the world. In addition, rapid population growth tends to impose pressure on ecosystems and natural resources, undermining food, energy, and water security—promoting the degradation of local and global environmental quality and diminishing the prospects for remediation and adaptation.

It has been estimated that a daunting 734 million new jobs are needed globally between 2010 and 2030 to accommodate projected increases in population, account for plausible changes in labor force participation rates, and achieve target unemployment rates of 4 percent or lower for adults and 8 percent or lower for youth.

Where people live

As the number of people grew over the second half of the 20th century, so did population density, with considerable variation across geographic regions and countries. In 1950, population density ranged from 1.5 people a square kilometer in Oceania to 45 in Asia. Today, it ranges from 5 to 142 across those same regions.

The center of gravity for world population continues to shift to the less-developed regions. It is also shifting from rural to urban areas as a result of migration, rising birth and declining mortality rates in urban areas, and rural settings growing into urban areas. More than half the world's population now lives in urban areas, up from 30 percent in 1950, and the proportion is projected to reach two-thirds by 2050 (see Chart 2). Africa's population is the least urbanized, with 40 percent of its people living in urban settings—just half the proportion of Latin America and the Caribbean, which is the most urbanized developing region. Fifty percent of Asia's population is projected to be living in urban areas in the next few years.

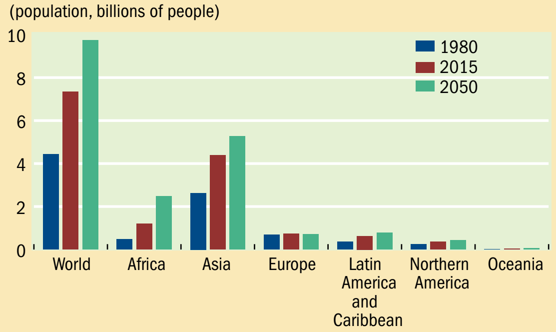
The number of megacities—urban areas with populations greater than 10 million—grew from 4 in 1975 to 29 today. Megacities are home to 471 million people—12 percent of the

Chart 1

Growing apace

World population is projected to increase steadily through 2050, led by Africa and Asia. Other regions will grow slowly, if at all.

(population, billions of people)



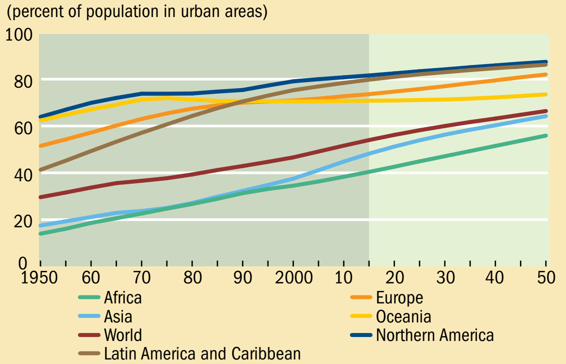
Source: United Nations, Department of Economic and Social Affairs, Population Division (2015).

Chart 2

Fleeing the farm

More than half the world's people live in urban areas, and by 2050 two-thirds will.

(percent of population in urban areas)



Source: United Nations, Department of Economic and Social Affairs, Population Division (2014).

Note: Period after 2015 is a projection.

world's urban population and 6 percent of the world's total population. The United Nations recently introduced the concept of metacities, which are urban areas with 20 million or more residents. Eight cities had reached "meta" status in 2015. Tokyo heads the list, with 38 million residents—more than the population of Canada. No. 2 Delhi's 26 million exceeds Australia's population. Other metacities are Shanghai, São Paulo, Mumbai, Mexico City, Beijing, and Osaka. By 2025, Dhaka, Karachi, Lagos, and Cairo are projected to grow into metacities.

There is an intense debate about the implications of these spatial distributions of people. Some stress the economic benefits that accompany urban concentrations, such as large pools of labor and markets for selling goods and services. Others highlight the pressure that dense urban populations place on land, air, and water resources; urban dwellers' disproportionate consumption of fossil fuels and corresponding contribution to greenhouse gas emissions; and the fact that more than 1 billion of the world's population live in squalid urban slums.

Population dynamics

Notwithstanding the expanding numbers, the pace of population growth has recently begun to slow. Currently, world population is growing at 1.08 percent a year, which means a population doubling every 64 years. That rate is down from a high of 2.06 percent during 1965–70, or a doubling every 34 years. Africa has the highest growth rate at 2.44 percent (doubling every 28 years), and Europe's 0.04 percent is the lowest (a doubling time of 173 years). In fact, the overall rate of population growth is falling, and projected to continue falling, in every geographic region. For the world as a whole, the rate of population growth is projected to decline by half between now and 2050.

Demographers often describe the dynamic process of population growth using a "demographic transition" model, which reflects a shift from a regime of high birth and death rates to low birth and death rates. A key feature of the transition is that the mortality decline precedes the fertility decline, resulting in a period of population growth.

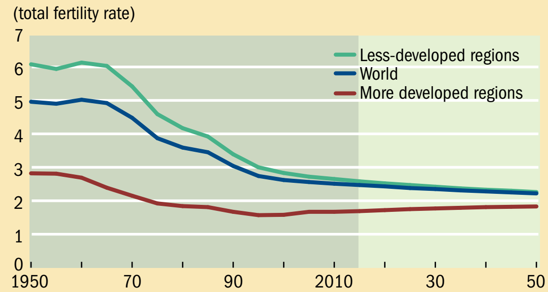
Mortality—The number of global deaths annually per 1,000 people has declined steadily from 19.2 in 1950–55, to 7.8 today. That decline reflects such factors as the development and widespread delivery of vaccines; other medical advances, such as the introduction of antibiotics and oral rehydration therapy; dietary improvements; public health interventions, including improved sanitation, safer drinking water, and insecticide-treated bed nets; expanded education (especially of mothers); and improvements in health system and other infrastructure. It corresponds to a 24-year gain in global life expectancy—from 47 in 1950–55 to 71 now. Given that the average newborn lived to about age 30 during most of human history, this 24-year increase, an average of nine hours of life expectancy a day for 65 years, is a truly astonishing human achievement—and one that has yet to run its course. Global life expectancy is projected to increase to 78 by 2050–55.

Life expectancy varies considerably across regions, from a low of 61 in Africa to a high of 80 in northern America.

Chart 3

Fewer kids

In 1950 the average woman bore five children. The average is now 2.5.



Source: United Nations, Department of Economic and Social Affairs, Population Division (2015).

Note: The United Nations defines the total fertility rate as the "average number of children a hypothetical cohort of women would have at the end of their reproductive period if they were subject during their whole lives to the fertility rates of a given period and if they were not subject to mortality." More-developed regions comprise Australia, Japan, New Zealand, and Northern America. Less-developed regions comprise Africa, Asia (except Japan), Latin America and the Caribbean, Melanesia, Micronesia, and Polynesia. Period after 2015 is a projection.

That nearly two-decade gap is projected to narrow somewhat in the coming years. Africa is expected to outperform all other regions in terms of both relative and absolute population health gains, reflecting, among other factors, economic catch-up and the diffusion of technology.

Improvements in child survival are a significant driver of life expectancy increases. Deaths of children under age 5 declined globally by more than 50 percent from 1990 to 2015, with improvements in every region, though proportionately less in sub-Saharan Africa and Oceania. The largest absolute numbers of child deaths occurred in India and Nigeria, which together account for 20 percent of world population and 23 percent of births—but 33 percent of child deaths. Preterm birth, pneumonia, complications associated with labor and delivery, diarrhea, and malaria are the leading causes of child mortality, with undernutrition a significant cofactor.

Despite major improvements in child survival, more than 16,000 children under age 5 died every day in 2015. Most of these deaths resulted from diseases and causes that are preventable or treatable using existing and affordable interventions.

Fertility—A decline in fertility is another major facet of the global demographic scene. In 1950, the average woman bore 5 children; today, she has 2.5 children (see Chart 3). Fertility rates vary widely across regions—from 1.6 in Europe to 4.6 in Africa. Across countries, fertility rates vary even more. They are 7.6 in Niger, 6.4 in Somalia, 6.1 in Mali and Chad, and 6.0 in Angola, but 1.2 in Singapore and 1.3 in Moldova, Bosnia and Herzegovina, Portugal, South Korea, Greece, and Spain. Roughly half the world's population lives in countries with fertility rates below the long-term replacement rate of approximately 2.1 children a woman.

In developing economies, improvements in child survival are a fundamental driver of fertility decline, which follows from the realization that fewer births are needed to reach target family size. Desired fertility also shrinks with educational progress and income growth. Lower fertility, in turn, promotes improvements in child survival, both through better maternal health and by allowing more family resources to be devoted to each child.

Access to contraception is also a key to fertility decline. Among 15- to 49-year-old women living with a male partner (married or otherwise), the overall rate of modern contraceptive use is 57 percent, with the main methods being female sterilization (used by 19 percent of the age group worldwide), intrauterine devices (14 percent), oral contraceptives (9 percent), male condoms (8 percent), and injectables (5 percent). Of the remaining 43 percent of women in this demographic, roughly two-fifths have an unmet need for family planning—meaning they are fecund, sexually active, and want to delay or forgo child bearing but are not using modern methods of contraception. The fraction drops to about one-fourth when traditional methods such as rhythm or withdrawal are included. In Africa the unmet need for contraception and fertility rates are both well above the global average.

International migration—Besides births and deaths, movements of people across borders represent the final channel through which national population size changes. Only 3.3 percent of the world's population, or 244 million people, live in countries other than the one in which they were born. Europe and northern America comprise 15 percent of world population, but are home to more than half of the world's international migrants. Nearly 20 percent of them are in the United States, followed by Germany and Russia with 5 percent each. The countries with the greatest numbers of emigrants are India (16 million), Mexico (12 million), Russia (11 million), and China (10 million). International migrants are mostly working age and evenly distributed by sex.

In 1950, the average woman bore 5 children; today, she has 2.5 children.

Although one of the greatest cross-continent mass migrations in recent history occurred in 2015—the exodus of more than 1 million Syrians to Europe—economic and institutional barriers to immigration remain significant, as does staunch social and political opposition in many advanced economies. However, migration has considerable potential to benefit not only those leaving their home countries but others in their origin and destination countries as well. Realization of that potential, however, depends on a variety of factors, including policies to support the migrants' integration into local economies. Many countries from which migrants leave oppose migration because it drains them of critical human resources such as physicians, engineers, and educators. Remittances are, however, a significant countervailing force: an estimated $441 billion was sent to the developing world by migrants in 2015, more than three times the amount of official development assistance and roughly two-thirds the level of direct foreign investment to developing nations. Remittances can significantly mitigate poverty and promote economic and social development through the accumulation of human and physical capital.

Age structure

Perhaps the most important of the global demographic developments is the changing population age structure. Three highly predictable sets of changes stand out: falling youth dependency (the ratio of children under 15 to the working-age population, 15 to 64), shifting numbers of adolescents and young adults (15- to 24-year-olds), and the rising proportion of older people (ages 60 and over or 65 and over). All these changes are linked to trends in the numbers of births and deaths. For example, falling death rates in the early phases of the demographic transition occur disproportionately among infants and children, which effectively launches a baby boom that lasts until fertility declines. As the baby-boomers get older, an age wave works its way through the population pyramid (see Chart 4), from the base (infants and children) to the midsections (15–24 and 25–59), to the peaks (60-plus and 80-plus). Similar changes in age structure occur as a result of sharply rising birthrates, such as the baby booms in many countries after World War II.

Because people's needs and capacities vary considerably over the life cycle, the consequences of changes in age structure can be significant. Children consume more output than they produce; they require lots of resources for food, clothing, housing, medical care, and schooling; and they typically do not work. By contrast, adults tend to contribute more than they consume—both through work and through their saving, which supports capital accumulation. The net contribution of the elderly is typically somewhere in between. People tend to work less as they reach advanced age and either save less or dip into savings to finance their consumption in retirement.

Demographic dividends—Changes in age structure can promote economic growth by creating the potential for what is known as a demographic dividend—a boost to income per capita associated with fertility decline, which reduces the burden of youth dependency, increases the proportion of workers and savers in the population, and allows resources to be reallocated from supporting children to building factories, laying down infrastructure, and investing in education and research and development.

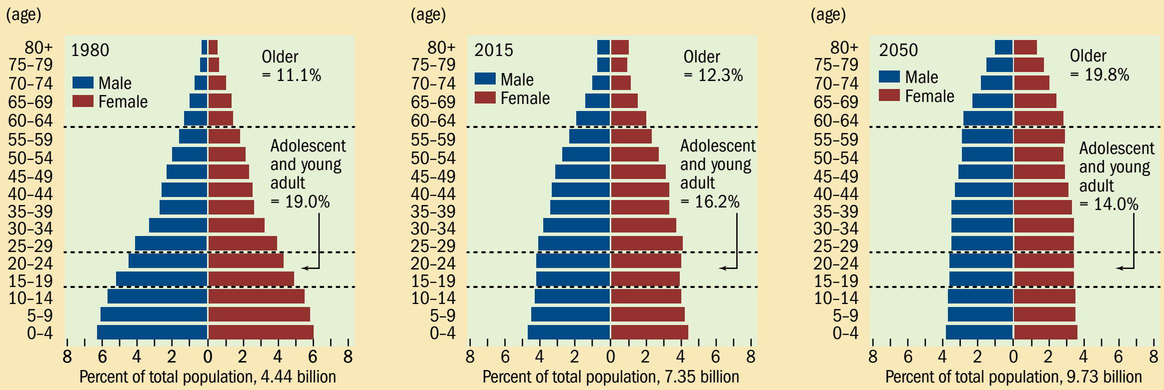
Declining fertility also tends to free women from childbearing and child rearing, further boosting the labor supply. Similarly, saving rates tend to rise with increases in adult survival and the anticipation of longer periods of retirement, especially in countries where policies and institutions deter people from working past their early or mid-60s.

The demographic dividend is a window of opportunity for rapid growth of income and poverty reduction. It can be catalyzed through policies and programs that lower infant and child mortality and accelerated by encouraging lower

Chart 4

Moving on up

As a large youth cohort gets older, its age wave works its way through the population pyramid from the young base to the middle and ultimately to the peak ages.



Source: United Nations, Department of Economic and Social Affairs, Population Division (2014).

fertility—for example, by broadening access to primary and reproductive health services and to girls' education. But a demographic dividend is not automatic. Its realization depends on key aspects of the economic and legal environment such as the quality of governance, macroeconomic management, trade policy, and infrastructure; the efficiency of labor and financial markets; and rates of public and private investment in health, education, and training.

Demographic dividends have been enjoyed by a number of countries in recent decades, most notably the east Asian tigers (Hong Kong SAR, South Korea, Singapore, and Taiwan Province of China), which cut their birthrates precipitously in the 1960s and 1970s and used the economic breathing room to stunning advantage through judicious education and health policies, sound macroeconomic management, and careful engagement with regional and world economies. In these countries, more than 2 percentage points of annual growth in income per capita (roughly one-third of the total) is attributable to falling fertility and the corresponding sharp rise in the working-age share of the population between 1965 and 2000.

At the other end of the spectrum, countries in sub-Saharan Africa have fared much worse developmentally because they have been unable to escape the crushing burden of youth dependency and rapid population growth. High dependency ratios throughout much of Africa suggest that lower fertility has much potential to spur higher rates of economic growth.

In south Asia, where fertility rates have already fallen substantially, demographic dividends are a more near-term prospect and will depend importantly on human capital investments and job creation.

Ebb and flow in the youth bulge—Long-term economic well-being is powerfully connected to the near-term experience of adolescents and young adults. Along with their sheer number, the skills, habits, energy, and expectations of young people make them a potent agent of social and economic progress. The persistence of high unemployment rates—especially among the young—continues to undermine the formation of fruitful and stable connections between young people and the world of work. The Arab Spring at the beginning of this decade serves as a sobering reminder that populations with large numbers of adolescents and young adults pose great risk to social and political stability in societies that fail to satisfy people's expectations for standards of living, especially in nondemocratic settings.

These demographic pressures, however, may soon be relaxed. Adolescents and young adults currently represent 16 percent of world population—ranging from lows of 9 percent in Spain and 10 percent in Bulgaria, Italy, Japan, and Slovenia to 24 percent in Micronesia and 23 percent in Lesotho and Swaziland.

But the share is falling in every region, and in some countries even the absolute number of 15- to 24-year-olds is shrinking. By 2020, the largest absolute declines will occur in China (32 million), Vietnam (2.3 million), Russia (1.8 million), Iran (1.7 million), and the United States (1.4 million). The largest percent declines will be in Armenia (–25 percent), Moldova (–24 percent), and Georgia (–23 percent). Other notable cases include South Korea (–15 percent), Cuba (–8 percent), Germany (–7 percent), the United Kingdom (–6 percent), Japan (–4 percent), and South Africa (–3 percent).

This suggests the possibility of better educational and economic opportunities. But the shrinking number of young people also has other implications, including the prospect of fewer workers to support swelling numbers of older people. The younger workers will face growing physical and financial responsibilities to support the elderly, including higher taxes to fund health care and pension spending in pay-as-you go systems. The situation will be further complicated by a swing in electoral power, from increasingly burdened young and prime-age adults to growing numbers of elderly dependents.

Global graying—In a 2009 survey, professional demographers said that aging is the greatest population issue the world will face in the next 20 years (except for African-based demographers, who ranked HIV/AIDS higher).

In 1950, 8 percent of the world's population was classified as old (that is, age 60 or over). Since then, the old-age share of world population has risen gradually to 12 percent today, about 900 million people. But a sharp change is afoot. By 2050 about 2.1 billion people, 22 percent of global population, will be older than 60. The United Nations projects that the global median age will increase from about 30 years today to 36 years in 2050 and that, with the exception of Niger, the proportion of elderly will grow in every country.

Japan's median age of 47 is the world's highest and is projected to rise to 53 by 2050. But by then South Korea's median age will be 54. In 2050, 34 countries will have median ages at or above Japan's current 47. The world's 15- to 24-year-olds now outnumber those ages 60 and above by 32 percent. But by 2026 these two groups will be equal in size. After that, those over age 60 will rapidly come to outnumber adolescents and young adults. This crossover already took place in 1984 among advanced economies and is projected to occur in 2035 in less-developed regions.

Undesirable effects

There is great concern over rapid population aging, which has been crudely linked to many undesirable phenomena, such as workforce shortages, economic growth slowdowns, asset market meltdowns, fiscal stress, the financial collapse of pension and health care systems, and the dissipation of demographic dividends.

There is great concern over rapid population aging.

But demographic change often spurs offsetting behavioral adjustments and technological and institutional innovations. Dire predictions abounded when world population was doubling from 3 to 6 billion between 1960 and 2000. But global income per capita more than doubled during those four decades, life expectancy increased by more than 15 years, and primary school enrollment rates approached universality in many countries.

Population aging is likely to provoke similar adjustments. Myriad strategies are available to realize the potential that increased longevity creates for gains in welfare and to deflect the burdens.

One set of strategies relies on the increased savings and greater female labor force participation that follow lower fertility, possibly abetted by the adoption of policies that make it easier to combine work and family. Another involves magnifying the effective size of the labor force through strong investments in child health and in educational attainment and quality. Businesses can also help by reforming human resources practices to make workplaces friendlier for older workers and by expanding opportunities for workers of all ages to augment and sharpen skill sets. Other buffers against the effects of an elderly population are likely to include the development of technology such as "social robots" that assist people with vital physical and cognitive activities and the redesign of cities to foster more active and healthier aging. Adjusting coverage and contribution rates and benefit payouts from public health care and pension systems is also a natural response to the fiscal pressures associated with population aging, although it risks provoking intergenerational tensions.

Increasing the statutory retirement age can be a potent response to labor-market tightening associated with population aging. Retirement ages have been remarkably stable for decades, even in the face of dramatic increases in longevity. Projected declines in the ratio of the working-age to non-working-age populations are much less sharp if the upper bound of the working age is increased to 70 over the next quarter century.

Of course, adding older adults to the workforce is useful only if they are healthy enough to be productive. A heightened focus on disease prevention could play an important role in adapting to population aging. That involves a commitment to healthier diets, more physical activity, reduction of tobacco and harmful alcohol consumption, and increased adult vaccinations against diseases such as influenza, pneumococcal pneumonia, and shingles.

Some have also proposed fostering increased rates of international migration from countries with "young" populations, such as those in Africa, to those with "old" populations, such as in Europe, as another adaptation to population aging. Turning on the international migration tap as a response to population aging is possible, but is unlikely to offer appreciable relief given social and political opposition to sustained mass immigration in most high-income countries

A way forward

The world continues to experience the most significant demographic transformation in human history. Changes in longevity and fertility, together with urbanization and migration, are powerful shapers of our demographic future, and they presage significant social, political, economic, and environmental consequences. The challenges are formidable, though likely surmountable. Behavioral adjustments, technological innovations, and policy and institutional changes have significant potential to offset negative consequences and realize promising opportunities, but their implementation will require financial resources and strong national and global leadership. It is unlikely that the worst fears associated with rapid population growth and graying populations will be realized. But a great deal of analysis, debate, behavioral adaptation, and policy reform—in both the public and private spheres—must occur before we can be sure. ■

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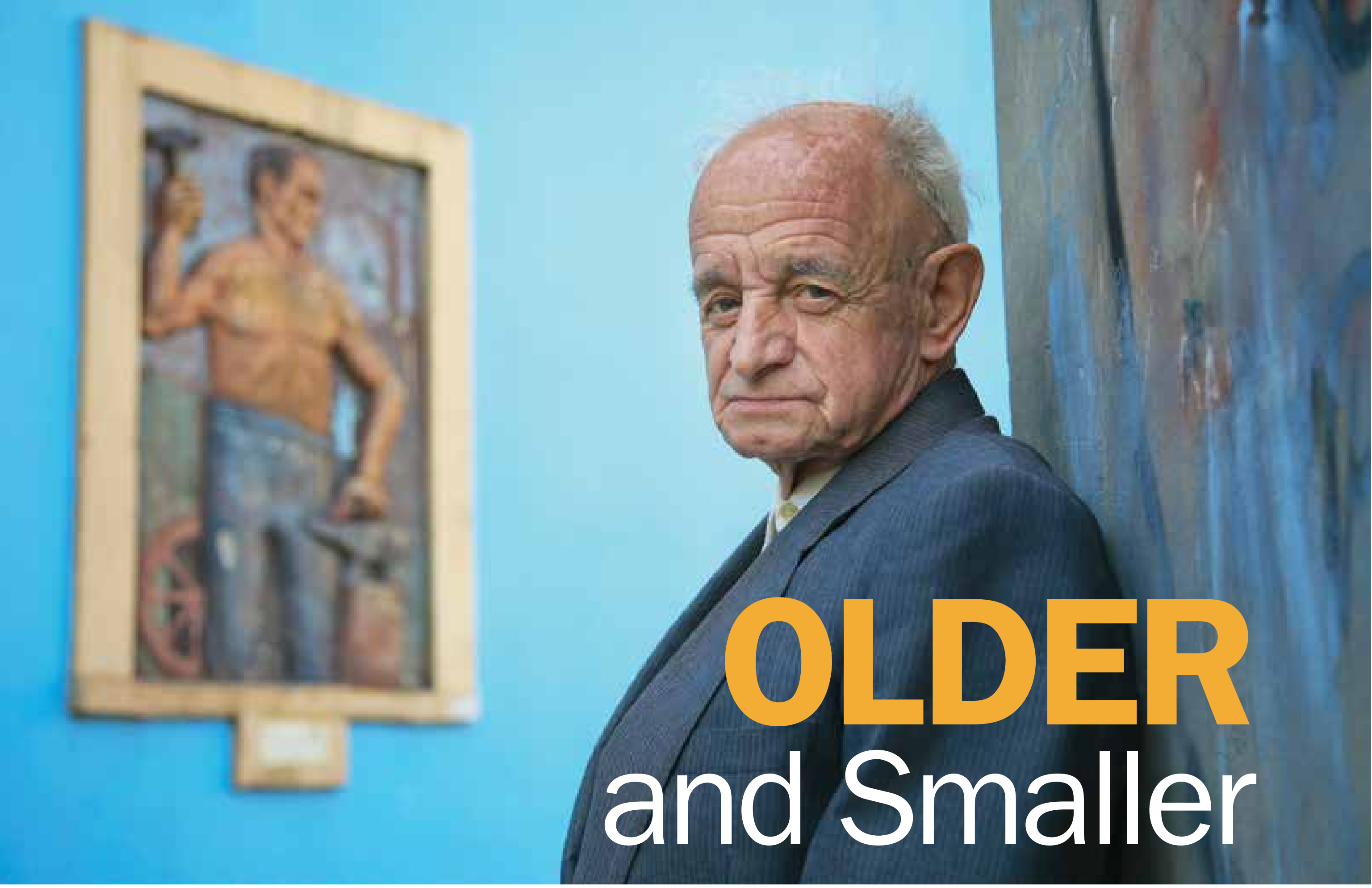


OLDER and Smaller

Benedict Clements, Kamil Dybczak, and Mauricio Soto

The fiscal consequences of shrinking and aging populations threaten advanced and emerging market economies alike

WITH fertility rates falling across the globe, population declines will become more widespread over the next few decades. According to the latest projections from the United Nations (2015), the world's population will peak around 2100 and begin to shrink soon thereafter. Populations are already shrinking in several countries, and by the end of the century, nearly 70 percent of more-developed and 65 percent of less-developed countries will have shrinking populations (see Chart 1).

As a result there will be a gradual increase in the ratio of old individuals to young. The global old-age dependency ratio (the number of people ages 65 and older divided by the population ages 15 to 64) will triple over the next 85 years, driven by rapid aging in less-developed countries (see Chart 2). In China and Kenya, for example, the United Nations (UN) projects that the old-age dependency ratio will increase fivefold between 2015 and the end of the century. In more-developed countries, the ratio will double over this period, which is in line with the expected developments in the European Union, Japan, and the United States. The United Nations defines more-developed countries to include all of Europe, Australia, Canada, Japan, New Zealand, and the United States.

The combination of declining and aging populations portends large and growing fiscal burdens for both more- and less-developed countries. Unless steps are taken to deal with the issue, age-related spending as a percentage of GDP could rise to unmanageable levels—to a quarter of all economic output in more-developed countries. Less-developed countries would also experience a sharp rise in spending.

Unprecedented spending pressure

To assess the long-term implications of this shrinking and aging of the global population, we projected spending for age-related programs (pensions and health) for more than 100 countries between 2015 and 2100. Many studies have looked at long-term spending increases in selected countries through the middle of the century. We were one of the first to look at spending increases for such a large number of countries and extend the analysis to the end of the century. Such a long period is necessary to capture the full effects of the demographic transitions, including shrinking populations, expected in many countries.

Population aging increases government spending because it usually leads to a higher share of the population receiving public pensions and to more use of health care services. The methodology we use incorporates expected changes in the size and age structure of the populations based on recently updated UN demographic projections, the expected evolution of pension benefits under current law, health care spending patterns of various age groups, and growth projections for health care costs.

Our results suggest that countries around the world will face a tremendous fiscal challenge. Under current policies, age-related spending in more-developed countries will reach 25 percent of GDP by the end of the century, representing an increase of 8½ percentage points over today's levels. In the United States, the expected increase is projected to be more than 11 percentage points, to 32 percent of GDP. In the European Union and Japan, spending increases in the neighborhood of 7 to 7½ percentage points of GDP (to 24 percent and 28 percent, respectively) are expected. These increases will be driven mainly by health care costs. Pension spending will remain relatively contained as a result of pension reforms that have lowered the expected rise in these outlays.

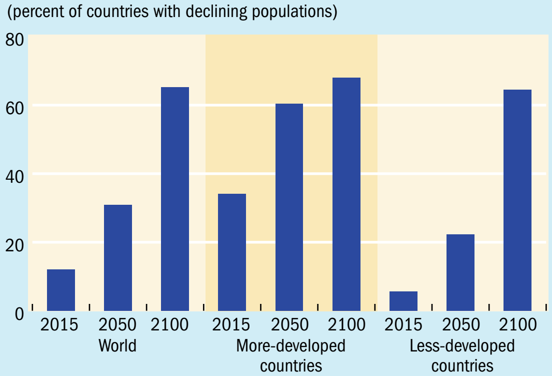
The fiscal consequences of this upward spike in age-related outlays are potentially dire. Such spending increases could lead to unsustainable public debt, require sharp cuts in other spending, or necessitate large tax increases that could stifle economic growth. In less-developed countries, spending is expected to rise to 16 percent of GDP from about 5½ percent today (see Chart 3), but with substantial variation across countries. In China, for example, age-related spending is projected to increase by 13 percentage points of GDP, rising to 20 percent of GDP. In Africa, spending increases will be lower, reflecting a younger population. In Kenya, for instance, these outlays will climb to 9 percent of GDP, an increase of 6 percentage points of GDP over today's rate.

Chart 1

Shrinking

By the end of the century more than 65 percent of the world's countries will have declining populations.

(percent of countries with declining populations)



Source: United Nations (2015).
Note: More-developed countries comprise all of Europe, Australia, Canada, Japan, New Zealand, and the United States.

Additional risks

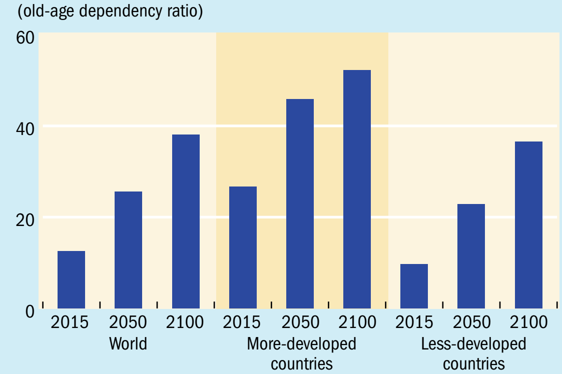
There is a considerable chance that spending increases could be even higher if demographic developments are less favorable than UN projections. Demographic forecasts are uncertain. In making projections, the United Nations takes into account past demographic trends and country-specific characteristics, relying on state-of-the-art statistical techniques, expert judgment, and all available information.

Chart 2

Growing old

As societies age, the ratio of old individuals to young, the so-called old-age dependency ratio, will grow.

(old-age dependency ratio)



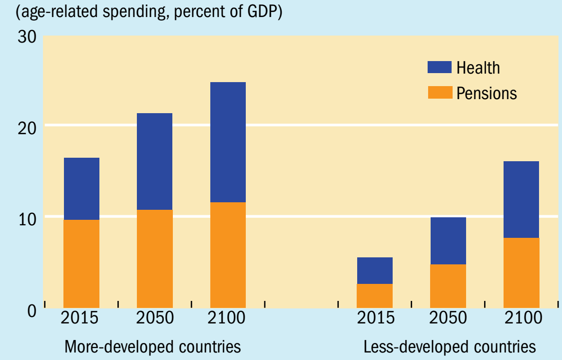
Source: United Nations (2015).
Note: The old-age dependency ratio is the number of people ages 65 and older divided by the population ages 15 to 64. More-developed countries comprise all of Europe, Australia, Canada, Japan, New Zealand, and the United States.

Chart 3

Daunting costs

Unless steps are taken to reduce age-related outlays, by 2100 they will rise to 25 percent of GDP in more-developed countries and to 16 percent of GDP in less-developed countries.

(age-related spending, percent of GDP)

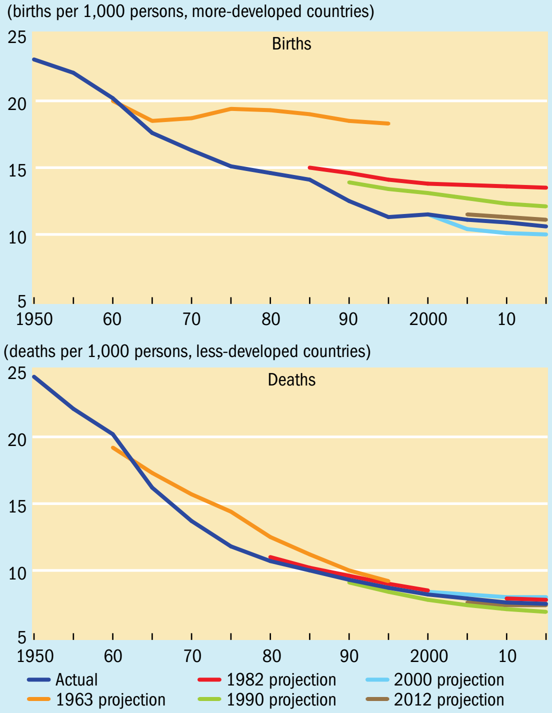


Sources: United Nations (2015); and authors' calculations.
Note: Age-related spending is composed of public expenditures for pensions and health. More-developed countries comprise all of Europe, Australia, Canada, Japan, New Zealand, and the United States.

Chart 4

Unforeseen changes

Both birthrates in more-developed countries and mortality rates in less-developed countries have declined more rapidly than projected.



Source: Authors' calculations based on United Nations (2015 and earlier editions).
Note: More-developed countries comprise all of Europe, Australia, Canada, Japan, New Zealand, and the United States.

Nevertheless, these projections must be viewed with caution—future fertility, mortality, and migration could differ substantially from predicted levels, and the experts do not all agree. For example, Lutz and others (2014) suggest that world population could peak as early as 2070, reflecting steeper declines in fertility than envisaged by the United Nations, particularly in Africa. Under this scenario, the world population might be significantly lower and older than the United Nations projects.

Comparing past projections and actual outcomes serves to illustrate the difficulties involved in forecasting demographic variables. Past "medium" variants of the UN population projections (the median of thousands of country projections using different trajectories of fertility, mortality, and migration assumptions) have proved to be upwardly biased, mainly because fertility rates declined faster than expected (Gros and Alcidi, 2013). For example, the projections from the 1960s to the 1990s assumed a more gradual decline in birthrates than occurred. In contrast, the 2000 projection seems to have overestimated the recent decline (see Chart 4). To some extent, the rapid decline in mortality rates was also not foreseen. For example, for the less-developed countries, the 1963 projection failed to predict the rapid drop in mortality rates observed between 1960 and 1980. Death rates are affected by a diverse set of factors, such as innovations in agriculture, advances in medicine, and improvements in public health management. All in all, birth and mortality rates are affected by factors that can be difficult to predict.

If fertility and mortality turn out to be lower than forecast, the impact on fiscal variables could be dramatic. For example, lower fertility alone could (by increasing dependency rates) raise age-related spending by 8 percentage points of GDP in more-developed countries and 4½ percentage points in less-developed countries by the end of the century. Any larger-than-forecast increases in longevity would further aggravate fiscal problems. With lower fertility, there would be some offsetting reduction in education spending—but its magnitude would be modest: in the more-developed countries, for example, the decline would be about 1½ percent of GDP, and in the less-developed countries, ½ percent of GDP.

Policy reforms

The stark magnitude of the challenges posed by rising age-related expenditures calls for a multipronged approach to mitigate the impact on government budgets. That approach could encompass entitlement reform (which results in direct savings in pension and health spending); policies that affect demographics—for example on immigration and labor markets (which can help increase the share of the population that is working); and efforts to improve tax systems and enhance the efficiency of public spending (which leads to offsetting savings in other areas of the government budget).

Entitlement reform: If changes in eligibility and benefits are to succeed, they should be implemented soon to help spread the burden across generations and reduce the risk of policy reversals.

Containing the growth of health care spending is an urgent priority. For example, if growth in health care costs per capita are kept in line with growth in GDP per capita, we estimate a decline in public health care spending of 4½ percentage points of GDP by 2100 in more-developed countries and of 3 percentage points of GDP in less-developed countries. Countries could pursue health care spending reforms in a number of ways: by increasing competition among insurers and service providers, improving the provider payment system to control costs, paying more attention to primary and preventive health care, and making more effective use of health information technology (Clements, Coady, and Gupta, 2012).

Another important reform is increasing retirement ages to match longevity gains. Many countries have enacted public pension reforms over the last decade, including some increases in retirement ages; however, these may not prove sufficient to sustain pension systems over the long run (Clements, Eich, and Gupta, 2014). We estimate that increasing the retirement age by five years by 2100 has the potential to yield savings on pension spending of about 2 percentage points of GDP in both more- and less-developed countries. Increases in retirement ages should be accompanied by adequate provisions for the poor (Clements and others, 2015), whose life expectancy tends to be shorter than that of the average population (Chetty and others, 2015).

Policies that affect demographics and labor markets—including migration: Higher fertility rates could offset the effects of population aging, but experience shows that public policies have a limited ability to influence birthrates. Still, public policies may have a positive impact on the willingness of mothers to return to paid work or enter the job market. This suggests the need for policies that encourage mothers to rejoin the labor force (for example, through tax credits or subsidized access to child care) and to avoid untargeted child allowances, which have little effect on the birthrate but are costly.

Increasing migration from younger, less-developed countries to older, more-developed ones would relieve spending pressures.

Increasing migration from younger, less-developed countries to older, more-developed ones would relieve spending pressures—at least until migrants age and retire. For example, we estimate that the continuation of historic migration trends from less- to more-developed countries would reduce age-related expenditures by about ½ percentage point of GDP by 2050 and by 2 percentage points of GDP by 2100 in more-developed countries. Increasing migration should not, however, be seen as a substitute for more fundamental reforms of entitlements—migration alone does not alter the balance between public benefits received and taxes paid by individuals over their lifetime. Nevertheless, migration can give countries time to implement needed age-related reforms.

Countries could also consider measures that raise labor force participation rates—especially of women and older workers—to help mitigate the impact of aging. These include addressing gender differences in property rights, inheritance claims, and property titling; enhancing women's ability to pursue a profession, obtain a job, and open a bank account; and enacting laws that give women the right to initiate legal proceedings, sign a contract, and head a household (Gonzales and others, 2015). In addition, it is crucial to eliminate fiscal disincentives that might deter women from participating in the labor market, such as taxation of household (rather than individual) income, which can raise marginal rates for second earners (Boz and others, 2015). Japan has lately embarked on such a policy reform.

Better tax systems and more efficient public expenditure: Many countries will find it impossible to offset fully the effect of demographics on age-related spending. These countries will have to strengthen their tax systems and generate efficiencies in public spending programs outside of pensions and health.

On the tax side, this could include broadening the base for value-added taxes, strengthening taxation of multinational corporations, greater use of energy taxation to get energy prices right and account for environmental and other costs of energy use, better use of opportunities for recurrent property taxation, and strengthening tax compliance (IMF, 2013).

On the spending side, countries could improve efficiency by reducing energy subsidies, improving public investment management, and rationalizing public sector wage bills, including in education (IMF, 2014).

Addressing the fiscal challenges of shrinking populations will require bold reforms. Countries are likely to choose different solutions depending on their social preferences and vision of the role of government. Nevertheless, countries must urgently rethink, in a fundamental way, what they can and cannot afford when it comes to age-related spending over the longer term. By undertaking reforms now, countries can address these issues in a more gradual and more politically palatable way. ■

Benedict Clements is a Division Chief, and Kamil Dybczak and Mauricio Soto are Economists, all in the IMF's Fiscal Affairs Department.

This article is based on 2015 IMF Staff Discussion Note 15/21, "The Fiscal Consequences of Shrinking Populations," by Benedict Clements, Kamil Dybczak, Vitor Gaspar, Sanjeev Gupta, and Mauricio Soto.

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SHE Is the ANSWER

Working mother picks daughter up from Shisheido nursery, Tokyo, Japan.

Yuko Kinoshita and Kalpana Kochhar

Women can help offset the problems of an aging population and a shrinking workforce

THE aging of populations around the world has profound implications for economic growth. When the working-age population shrinks, in many cases so does the labor force, and the potential for economic growth diminishes. In many advanced and emerging market economies, the number of working-age people is falling, which puts pressure on government revenue just as the need for spending on pensions and health care is rising.

Women play a critical role in this demographic transition. They make up over half the world's population. Because women generally outlive men, the share of women in the over-65 age group is notably higher. Yet the percentage of working-age women who actually participate in an economy's workforce (known as the female labor force participation rate) has hovered around 50 percent over the past two decades. The global average masks significant cross-regional differences in levels and trends. Rates vary from 21 percent in the Middle East and North Africa to more than 60 percent in east Asia, sub-Saharan Africa, the United States, and northern Europe. Although Latin America and the Caribbean have experienced strong increases of some 13 percentage points during this period, rates have been declining in south Asia. Despite the stagnation in female participation, the average gender participation gap—the difference between male and female labor force participation—has been declining since 1990, but only because male labor force participation has fallen more than women's has risen.

A chasm remains

Although the gender gap in education is narrowing, a chasm remains when it comes to other opportunities, such as access to health care and financial services, wages, and legal rights. The ratio of female to male primary enrollment rates is up to 94 percent even in the least developed economies. In secondary education, the ratio of female to male enrollment averages 97 percent, and women are now more likely than men to be enrolled in tertiary studies (college or university). These are positive developments. However, with so many highly educated women, it is even more of a loss that such a large percentage are not in the labor force.

When women are able to develop their full labor market potential, significant macroeco-

The view from Asia

In Asia, the role women can and should play depends on where their country is along the aging spectrum. South Asian countries such as Bangladesh and India are at the early stages of the transition, when mortality drops sharply while fertility rates remain high. East Asian countries (those in the Association of Southeast Asian Nations) are in the middle stage, when birthrates begin to fall and population growth starts to level off. And advanced Asian economies such as Japan and Korea are at the later stage: birthrates have fallen below the replacement level, and the population has begun or will soon begin to shrink.

East Asia underwent a relatively rapid demographic transition between the 1960s and the 1990s, which contributed to its economic growth "miracle." Improvements in public health reduced infant mortality and spawned a baby boom, followed by a decline in fertility. In the late 1960s, when the first of the post-World War II boomers reached working age, their entry into the workforce increased the ratio of workers to dependents. This transition was generally beneficial to women: better health and less time spent caring for children freed them up for activities such as education and employment. That virtuous cycle allowed women to both contribute to and benefit from economic growth.

In south Asian countries such as Bangladesh and India that are at the early stage of demographic transition, women are essential. To fully benefit from the potential demographic dividend, south Asia must focus on better education and skills for women, building physical infrastructure such as roads, transportation, and electricity to support all workers, and increasing labor market flexibility (Das and others, 2015). These countries must remove regulatory, institutional, and social barriers to make the best use of their talent pool and reap the highest possible dividend.

It is most critical to raise female labor force participation in advanced Asian economies such as Japan and Korea. In these countries, women hold the key to maintaining growth and offsetting the drag from aging and even declining populations. For example, in Japan, life expectancy is now 84 years, the highest in the world, while fertility rates remain low. As the baby-boom generation started to retire, the old-age dependency ratio climbed to the highest in the world.

As the working-age population declines, Japan's GDP is likely to fall behind that of its neighbors unless output per worker rises faster than the decline in the labor force. The IMF has estimated that annual growth could rise by about ¼ percentage point if female labor force participation reached the G7 country average, resulting in a permanent rise in per capita GDP of 4 percent, compared with the baseline scenario. Higher female workforce participation would also mean a more skilled labor force, given women's higher education levels (see "Can Women Save Japan (and Asia Too)?" *F&D*, October 2012).

Making better use of well-educated women is low-hanging fruit for Japan, as Prime Minister Shinzo Abe knows well—an important platform of the "Abenomics" strategy for revitalizing Japan is getting more women on the job. Since the launch of Abenomics in 2013, the number of childbearing-age women in the labor force has increased markedly thanks to expanded parental leave benefits and other policies. Although greater participation by women is crucial for countries regardless of where they fall along the path of demographic transition, for those whose population is rapidly aging the female labor supply is indispensable.

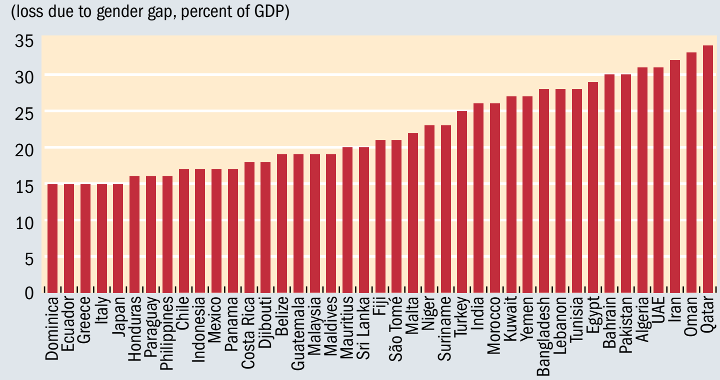
nomic gains are possible. For instance, Aguirre and others (2012) suggest that raising female labor force participation to country-specific male levels would boost GDP in the United States by 5 percent, in Japan by 9 percent, in the United Arab Emirates by 12 percent, and in Egypt by 34 percent. Cuberes and Teignier (forthcoming) estimate GDP per capita losses attributable to the gender gap in the labor market to average as high as 27 percent in certain regions (see Chart 1).

Chart 1

Losing out

Gender gaps in female labor participation lead to significant GDP losses in many countries.

(loss due to gender gap, percent of GDP)



Source: Estimates by Cuberes and Teignier (2015).
Note: São Tomé = São Tomé and Príncipe; UAE = United Arab Emirates.

How do better opportunities for women to participate in the labor force contribute to higher incomes and growth? When women get a fair shake economic development overall can benefit. School enrollment may increase because women are more likely than men to spend their earnings on their children's education. With equal access to inputs female-owned company productivity rises, and with fair hiring companies can make better use of the talent pool, with positive implications for potential growth. And in advanced and emerging markets with aging populations, boosting female labor force participation can mitigate the impact of a smaller workforce and spur growth.

To step up participation of women in the workforce, government and the private sector can play an important role. Government policies can target reduction in the gender gap in health, education, and infrastructure services as well as in access to financial services and can encourage provision of parental leave and child care facilities. Taxing individual incomes rather than family income has been shown to reduce the disincentive for the secondary income earner—typically the woman—to work. And in countries with gender-based legal restrictions such as constraints on female ownership of real estate or businesses, removing such limits can help lift female labor force participation (Gonzales and others, 2015). The private sector can play a role through flexibility in contracts and in the work environment and by adopting evaluation methods that reward performance rather than seniority or hours worked.

In addition to raising the number of female workers, improving the quality of jobs can boost productivity and economic growth. Women dominate nonregular and informal sector jobs. In most countries, these jobs offer fewer benefits and little job security relative to regular or full-time work. However, in Nordic countries and the Netherlands, for example, nonregular workers (including part-time workers) generally receive partial benefits and allowances. Such benefits can facilitate women's labor participation, raise their productivity, and narrow the gender wage gap in the medium term (Kinoshita and Guo, 2015).

Work and fertility

A common concern is that with more women in the workforce, fertility rates will fall and exacerbate the decline in population. Indeed, for individual countries, there is evidence of a drop in the number of births as the number of women in the labor force goes up. For instance, Bloom and others (2009) find that each birth on average decreases women's labor supply by almost two years during a woman's reproductive life.

While there is a negative relationship between these variables at the individual country level, there is a positive relationship between fertility and female labor force participation at the cross-country level. Researchers have explained this apparent contradiction by looking at the contribution that men make to their households (De Laat and Sevilla-Sanz, 2011). They find that women in countries where men participate more in housework and child care are better able to combine motherhood and a job, which leads to greater participation in the labor force at relatively high fertility levels.

Women in countries where men participate more in housework and child care are better able to combine motherhood and a job.

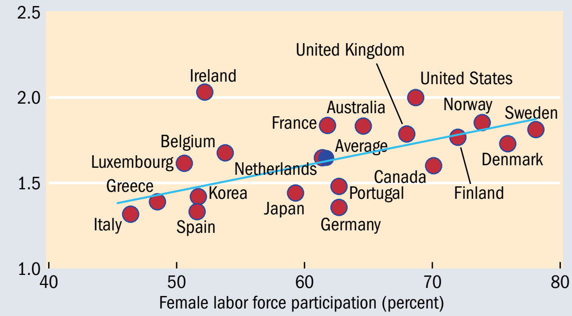
Moreover, the relationship between female labor participation and fertility seems to have shifted from negative to positive in Organisation for Economic Co-operation and Development advanced economies since 1985 (Brewster and Rindfuss, 2000). This shift implies that when more women work and bring home a paycheck households can support more children. This trend also reflects changes in social attitudes toward working mothers, fathers' involvement in child care, and advances in technology that allow more workplace flexibility. Public policies such as more generous parental leave and greater availability of child care also helped (see Chart 2).

Chart 2

More work, more babies

Countries with strong female labor force participation have a higher fertility rate, thanks to larger family incomes, changing social norms, and policies that support working mothers.

(fertility rate, total births per woman, 1985–2012)



Source: Kinoshita and Guo (2015).

In the early phase of a demographic transition, women who join the labor force may choose to have fewer children. As the population shrinks, a further decline in fertility is no longer desirable or sustainable over the medium term, so policies and society at large must help support conditions that enable more women to balance work and family. ■

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POPULATION PRESSURES

Age and Inflation

Mikael Juselius and Elöd Takáts

INFLATION was chronically high in the 1970s and seems to be chronically low now. Its shift coincided with the progress of the so-called baby-boom generation as it marched from adolescence through working age in many advanced economies.

Conventional economic wisdom says these two slow-moving trends are unconnected: the boomers should not affect inflation, because inflation is a monetary phenomenon that can be controlled by monetary policy. But our research found a strong link between trend inflation—the average rate at which prices increase over a several-year period—and the age structure of the population.

Specifically, we found that the larger the proportion of young and old in the total population, the higher inflation. Put another way, when the working-age population is larger, the effect is disinflationary. This link between age and inflation holds for a large number of countries across all time periods.

These effects are large enough to explain most of trend inflation. For instance, the baby boomers increased inflation by an estimated 6 percentage points in the United States between 1955 and 1975 and lowered it by 5 percentage points between 1975 and 1990, when they entered working life. Trend inflation is currently low and stable as the decreasing share of young people offsets the effects of the increasing share of old people in the population.

Given that inflation is a monetary phenomenon, why did central banks fail to offset the inflation pressure flowing from the changing age of the population? There are at least two natural explanations. First, political pressure may have impelled central banks to cater to the inflation preferences of dominant age groups. Alternatively, the inflation-age structure pattern could reflect the failure of central banks to anticipate movements in the equilibrium real interest rate—the rate that results in stable inflation. But neither of these two is a good explanation for what we see in the data.

It is not totally clear why an economy's age structure affects inflation, but the relationship is strong and has some striking practical implications. For one, it weakens the argument that expectations play a major role in inflation formation, a thesis that arose from the inflationary experience of the 1960s and 1970s. Furthermore, the relationship between age structure and the rate of price increases does permit prediction of underlying trend inflation. Our estimates suggest that unless baby boomers work much longer than their parents did, their retirement will ultimately be inflationary.

Exploring inflation trends

Inflation puzzles have prompted economic insights in the past. For example, when inflation began to increase in the 1960s without a justifying change in activity, economists

Baby boomers drove down inflation when they joined the workforce and will drive it up as they retire

searching for an explanation postulated that expectations play a role in inflation formation. Forward-looking consumers or producers wouldn't be forever fooled by monetary expansion designed to boost economic growth and would incorporate higher inflation expectations in, say, wage demands and loan contracts. Thus, a lasting monetary expansion would generate higher inflation but no lasting output gains. Overly lax monetary policy seemed to explain the increase in inflation, a view that was reaffirmed in the 1980s, when inflation began to fall after central banks started to combat it.

But inflation puzzles have a way of reappearing. Following the global financial crisis that began in 2008, inflation did not pick up when economies started to recover. Indeed, it seems that as early as the beginning of the century inflation was slowly falling below, rather than moving toward, central banks' inflation targets. This low inflation is one reason central banks held down rates in the first half of that decade. But it also suggests that something other than monetary policy was in the background suppressing inflation.

The prolonged episode of low inflation came when populations in most advanced economies were getting older and baby boomers were in their peak earning periods. Age groups differ with respect to their consumption-saving decisions, which can affect long-run inflation pressure. For instance, people tend to borrow when they are young (or their parents do it on their behalf), save during their working life, and live off accumulated assets when they are old. It follows that inflation pressure

Inflation puzzles have a way of reappearing.

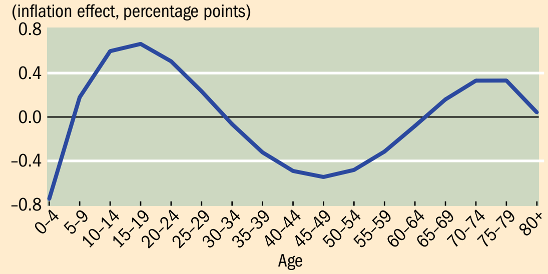
is high when the share of young and old people (who consume but largely do not produce) is large compared with the working-age population (which produces more than it consumes) and vice versa. But conventional analysis suggests that central banks could, in principle, offset such pressure by raising or lowering interest rates. In such a scenario, aging would affect the real (after-inflation) equilibrium interest rate, but not inflation.

Some veteran central bankers have recently proposed why aging might matter for inflation—because of its effect on the conduct of monetary policy. For example, voter preferences influence a central bank's inflation target, a position most forcefully argued by James B. Bullard, president of the St Louis Federal Reserve Bank (Bullard, Garriga, and Waller, 2012). Bullard says that the young, who are borrowers, prefer more inflation because it reduces the real burden of their debt, whereas the old prefer less inflation to preserve the value of their assets. If Bullard's thesis is right and central banks succumb to such political pressure, inflation will be higher when the younger population dominates and lower when the population is older. An alternative view is put forth by Goodhart, Pradhan, and Pardeshi (2015), who suggest that the age structure can change the equilibrium real interest rate. If central banks ignore such changes, inflation can ensue.

Chart 1

Inflation dependence

The young (ages 5 to 29) and the old (ages 65 to 79) raise inflation, while those ages 30 to 64 have the opposite effect over many time periods and countries.



Source: Authors' calculations.
Note: The results are based on data from 22 advanced economies, 1955–2014.

The link

We estimated the effects of the entire age structure—not just aging—on inflation, using data from 22 advanced economies between 1955 and 2014, and found a robust relationship between inflation and the age structure.

The effects of various age cohorts follow a U-shaped pattern: the young (ages 5 to 29) and the old (ages 65 to 79) are inflationary, whereas the prime-working-age cohorts are disinflationary (see Chart 1). This U-shaped pattern is robust and does not disappear when other variables that may be associated with inflation—such as output gaps, oil price inflation, real interest rates, population growth, and fiscal policy measures—are taken into account. The relationship also survives when global factors are controlled for, during different time periods and with different country samples. The effects of the small number of the very young (those under 5) and very old (those over 80), on the other hand, are less easy to pin down.

The age-structure effect explains the bulk of trend inflation and about a third of the overall variation in inflation. For each year, the effect is calculated by multiplying the values from the U-shaped pattern in Chart 1 by the share of population in the corresponding age groups. The effect is large: it explains, for example, about 5 percentage points of the reduction in the average rate of inflation across countries from the late 1970s to the early 2000s. This is most of the reduction in long-run inflation over the period (see Chart 2, left panel). Furthermore, demographic developments seem to explain country differences. For instance, the larger swings in trend inflation in the United States, compared with Germany, mostly reflect larger U.S. demographic changes (see Chart 2, middle and right panels).

Puzzle remains

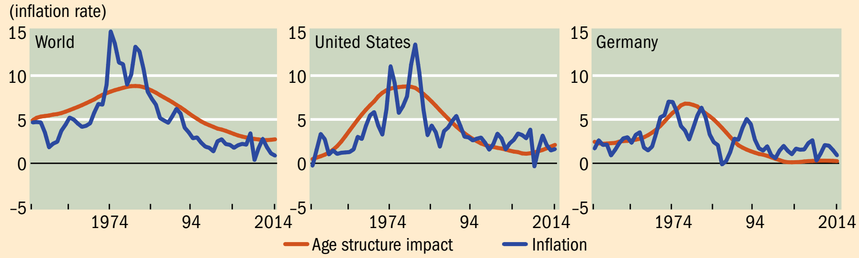
After we established a robust link between age structure and trend inflation, we looked for evidence to support either the life-cycle spending or voter-preference explanations.

We found little to support either. The U-shaped pattern undermines one of the main premises of the voter-driven explanation. Not only do the young, many of whom are well below voting age, have a strong impact, we found that the

Chart 2

Up and down

The age structure of the population, including that in the United States and Germany, accounted for most of the reduction in the average rate of inflation from the late 1970s to the early 2000s.

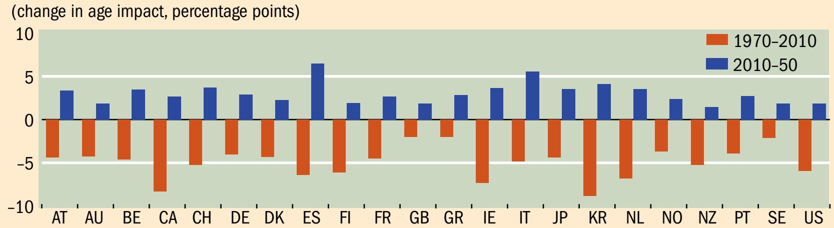


Source: Authors' calculations.

Chart 3

Switch

The age structure of the population tamped down inflation in many countries from 1970 to 2010 but is projected to boost inflation between 2010 and 2050.



Source: Authors' calculations.
Note: AT = Austria, AU = Australia, BE = Belgium, CA = Canada, CH = Switzerland, DE = Germany, DK = Denmark, ES = Spain, FI = Finland, FR = France, GB = United Kingdom, GR = Greece, IE = Ireland, IT = Italy, JP = Japan, KR = Korea, NL = Netherlands, NO = Norway, NZ = New Zealand, PT = Portugal, SE = Sweden, US = United States. The estimates are derived from the model that estimates the effect of age cohorts on inflation and UN human population projections. The orange bars reflect the percentage point difference in age structure inflation pressure in 2010, compared with the same pressure in 1970. The blue bars reflect the age effects between 2010 and 2050.

old have an inflationary effect. This runs counter to existing political economy models, which view the old as disinflationary. Empirical results that found the old to be disinflationary mistakenly omitted the young from the analysis. The demographic effect is also visible in small euro area countries, where voter preferences are unlikely to sway area-wide monetary policy.

If the age-structure effect on inflation is not the result of political pressure on monetary policy, it could reflect a failure of central banks to fully appreciate the effects of life-cycle spending decisions on the equilibrium real interest rate. For instance, the equilibrium real interest rate may have risen in the 1960s and 1970s with the increased demand from the baby boomers—and if central banks did not raise nominal rates enough, the high inflation rate at the time may have been the result. However, if the age structure is a proxy for the equilibrium real interest rate, it should not itself affect inflation; only its deviations from actual rates would have an impact. Yet the inflation–age structure effect is present even when actual rates are left out. In other words, equilibrium real interest rates do not appear to explain why a population's age structure is associated with periods of inflation and disinflation.

Practical implications

Although the origin of the age-structure effect is unclear, it is real and has direct practical implications. First, it reduces the importance of market-based expectations in inflation formation. Some of the inflation from the 1960s to the late 1970s and the disinflation that followed can be explained without reference to expectations. To put this finding to the test, we estimated the effects of the age structure on year-ahead inflation forecasts from Consensus Economics and found exactly the same U-shaped pattern as in Chart 1.

A second, related, implication is that trend inflation can be forecast just as the age structure itself can be forecast. Barring catastrophes, we know how many people will enter the labor market 20 years down the road, because these people have already been born. Our estimates, combined with demographic forecasts from the United Nations, imply that the age-structure effect will turn inflationary over the coming decades (see Chart 3) or that real interest rates must be higher to contain the pressure. We estimate that inflation will be about 3 percentage points higher on average 40 years from now due to the effects of aging, all else equal. While the magnitude differs from country to country, the change from disinflation pressure to inflation pressure is present in all of them.

The strong link between the age structure of the population and trend inflation presents a puzzle that no available theories can fully explain. Nevertheless, the puzzle must be solved. The earliest boomers have retired, and a big wave of them are nearing retirement. This could create a challenging inflationary environment in the coming years. ■

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Surf the Demographic Wave

Vimal Thakoor and John Wakeman-Linn

Sub-Saharan Africa could reap significant benefits from its growing population—if the transition is well managed

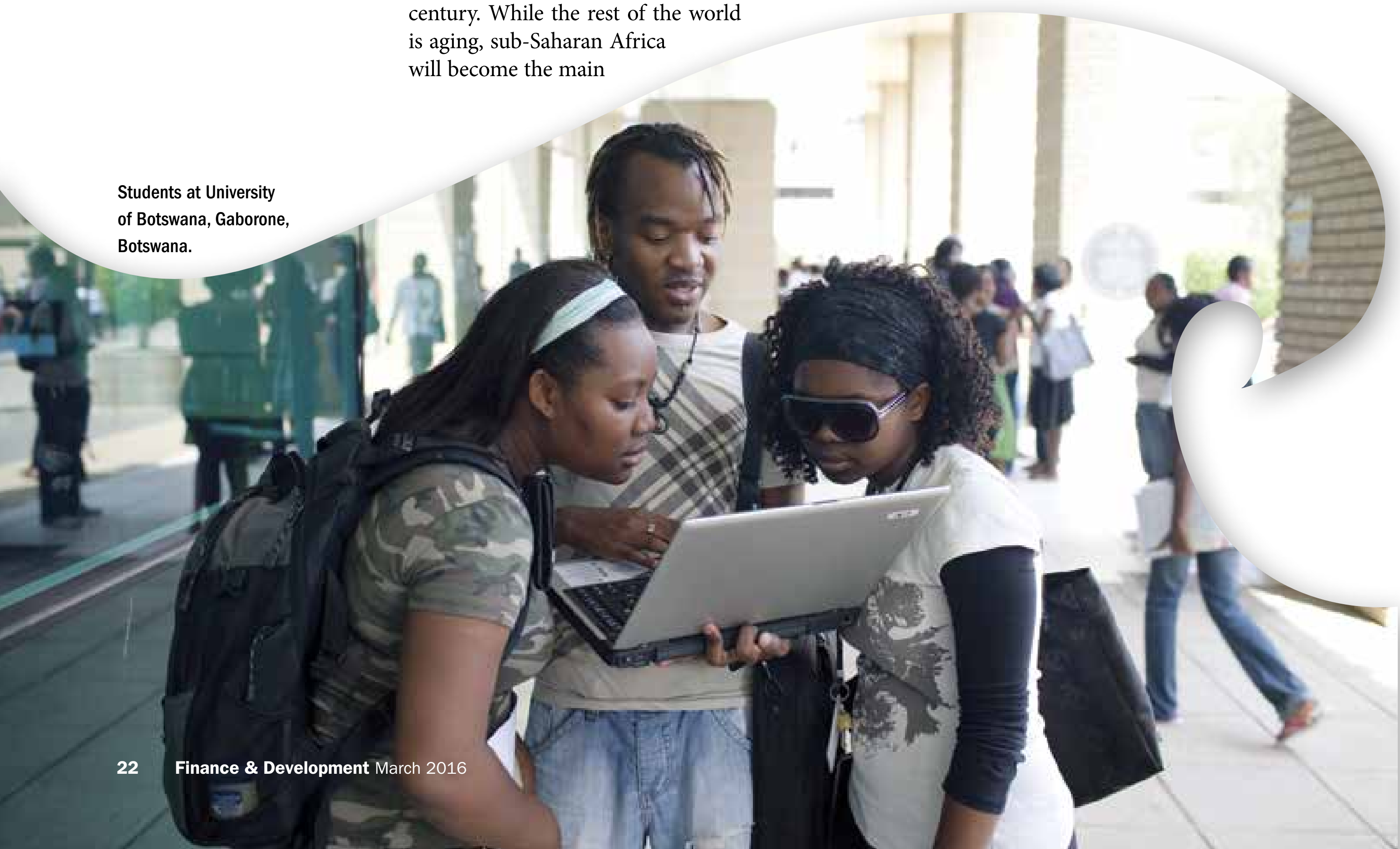
SUB-Saharan Africa's most formidable economic asset could soon be its people. As the region's demographics change, it can enjoy significant growth if policies are tailored to tap into this potential.

Declines in infant mortality and longer life expectancy are contributing to an increase both in the overall population and, more important, in the share of the population that is of working age. This changing population structure—referred to as a demographic transition—has historically offered countries an opportunity for higher growth and prosperity. For sub-Saharan Africa, the opportunity is even bigger because the working-age population is rising when much of the rest of the world's workforce is set to decline.

The transition in numbers

The demographic developments are significant from every angle. Put simply, the region will be the world's key demographic player this century. While the rest of the world is aging, sub-Saharan Africa will become the main source of growth for the global labor force. The region's population of slightly more than 800 million in 2010 is projected to more than quadruple by 2100, to 3.7 billion (according to the United Nations' medium-fertility scenario). Its share of the global population will increase from less than 12 percent to about 35 percent. More striking is the fact that Africa will account for nearly 100 percent of the projected 2 billion increase in the global labor force over that period, raising its share of the global workforce from about 10 percent to 37 percent by 2100 (see Chart 1).

Beyond the simple increase in the number and share of working-age population, the policies accompanying the demographic transition in sub-Saharan Africa can contribute to a dividend. If policies support productive jobs for these new workers, the increase in the workforce will lead to higher growth and rising income per person—voilà: the demographic dividend.

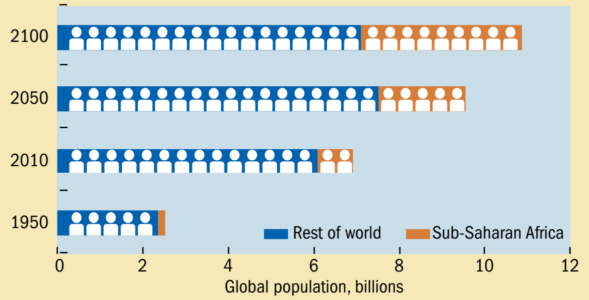


Students at University of Botswana, Gaborone, Botswana.

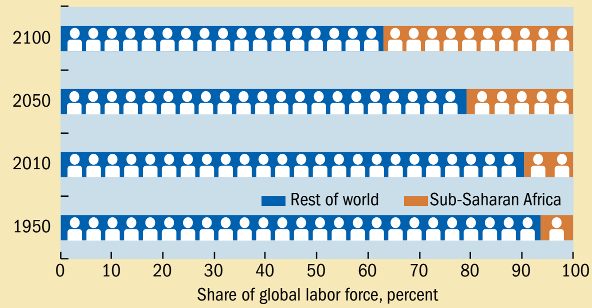
Chart 1

Driving the growth of world population

As the rest of the world ages, sub-Saharan Africa's population will grow.



More than a third of the global population and nearly 40 percent of the global workforce will come from sub-Saharan Africa.



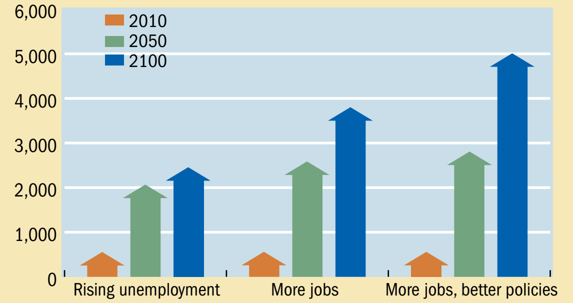
Sources: IMF, *Regional Economic Outlook: Sub-Saharan Africa*, April 2015; United Nations, *World Population Prospects*, 2012 revision.

Chart 2

Potential boost for growth

Properly harnessed, the demographic dividend could spur growth in sub-Saharan Africa.

(GDP per capita, 2005 U.S. dollars)



Source: IMF, *Regional Economic Outlook: Sub-Saharan Africa*, April 2015.
Note: Demographic dividend under various scenarios. Scenario 1: the economy is unable to create jobs on a significant scale. Scenario 2: all new entrants to the labor force find jobs at historical levels of productivity. Scenario 3: Policy changes translate into an increase in trade openness.

In Africa, the transition could produce a significant dividend through four additional channels (Galor and Weil, 2000; Bloom and others, 2009). First, the decline in fertility rates allows for greater female labor force participation, which increases the employable share of the working-age population. In addition, given that working-age adults tend to save more than other groups, overall saving increases, which allows for more investment financing and gives a further boost to growth. Moreover, evidence suggests that when people have fewer children and live longer, there is an increase in health care and education spending, which contributes to a healthier, more educated, and hence more productive labor force. Finally, an increase in the population could lead to greater domestic demand and spur both local and foreign investment.

Higher growth

Properly harnessed, the demographic dividend for sub-Saharan African countries can be significant. The size of this dividend, and when it materializes, will depend on the ability of economies to absorb the new entrants into the labor force, how supportive policies are in the demographic context, and the success of policies aimed at reducing fertility rates (Drummond, Thakoor, and Yu, 2014).

Assuming a scenario in which not all labor force entrants find a job and the share of employed people remains at 2010 levels sub-Saharan Africa's per capita GDP in 2050 would more than triple, to nearly \$2,000 (in real terms) relative to the median 2010 per capita GDP of \$600. This estimate reflects not only the larger workforce, but also a continuation of existing trends and catch-up opportunities unrelated to the demographic transition. If all new entrants were absorbed into the labor market, GDP per capita would increase a further 25 percent by 2050 and 54 percent by 2100 relative to the scenario described above. In a best-case scenario—job creation complemented by better policies and lower fertility—the dividend is estimated at nearly 50 percent by 2050 and 120 percent by 2100. The faster transition increases and speeds up the dividend (see Chart 2).

Global ramifications

Given most other regions' aging populations, the global economy would benefit from integrating Africa's growing labor force into global value chains, particularly if sub-Saharan Africa can seize a comparative advantage in labor-intensive production. Higher trade openness would aid job creation and allow the region to benefit from capital and technology transfers. From an economic perspective, migration could benefit both sub-Saharan Africa and the rest of the world. Higher remittances would benefit workers' home countries while employers elsewhere would profit from the influx of labor as they face stagnant or declining numbers of workers in their own countries. Of course, high levels of migration can also have social and economic effects on both source and destination countries, as Oxford professor Paul Collier spells out in *Exodus: How Migration Is Changing Our World*. Designing migration policies calls for proper balance of economic, political, and social considerations.

Furthermore, the relocation of low-cost production from China to other regions also creates an opportunity for sub-Saharan African countries. But countries can benefit from this flow of capital only if they improve the ease of doing business

A mixed picture

The pace and path of the demographic transition, which will ultimately determine whether a country benefits from a demographic dividend, vary greatly across sub-Saharan Africa (see chart).

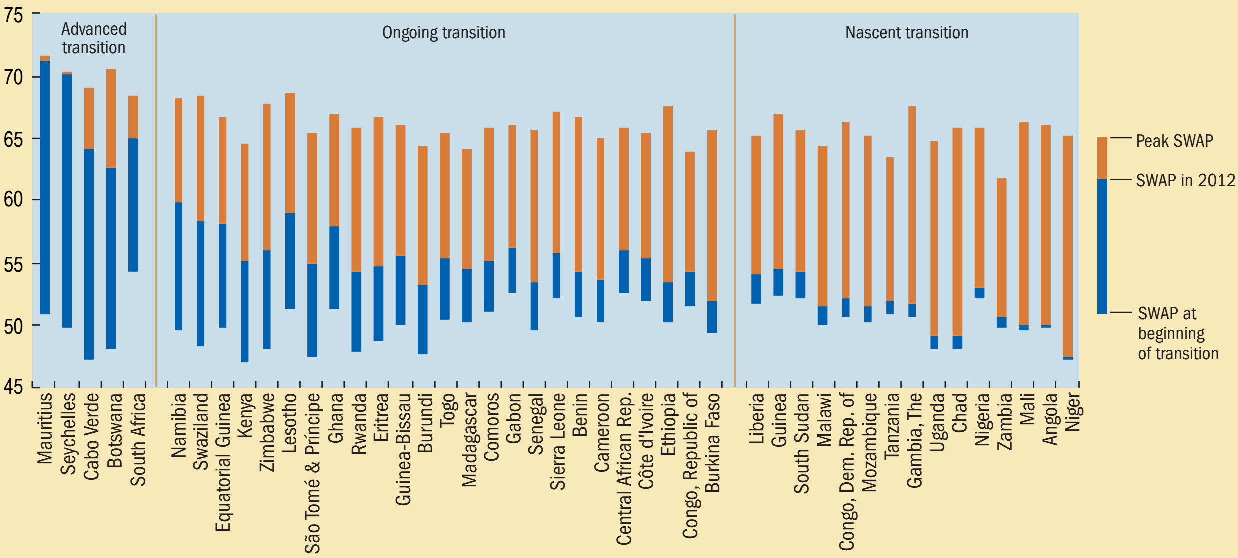
A first group of mostly small countries is fairly advanced in the process, aided by fast declines in infant mortality and fertility rates. Two of these—Mauritius and Seychelles—now face the challenges associated with an aging population. For a second group, the transition is ongoing but is not expected to peak before 2050, proceeding much more slowly than the transition in either Latin America or east Asia. Namibia and Swaziland are somewhat more advanced within this group, but the transition is still at an early stage for countries such as Ethiopia and Burkina Faso. Of concern is a third group whose transition has been much slower still, largely reflecting continuing high fertility rates, and indeed has stalled in a few cases. Two of the most populous countries on the continent—Nigeria and the Democratic Republic of the Congo—fall into that category.

On a regional basis, the eastern and western parts of sub-Saharan Africa will both see their population exceeding 1 billion by the end of the century. In the southern region population growth will remain largely flat, reflecting the near completion of the transition in South Africa. Nigeria's population is projected to increase from an estimated 182 million in 2015 to 752 million by 2100. An additional 11 countries in sub-Saharan Africa will have a population topping 100 million by the end of the century.

A tale of three transitions

Countries are at different stages of their demographic transitions.

(share of working age population as percent of population)



Sources: United Nations, World Population Prospects; and IMF staff calculations.
Note: SWAP = share of working-age population.

and reduce the cost—in particular, by removing infrastructure bottlenecks and providing reliable and cost-efficient electricity, water, roads, and access to global markets.

However, neither the demographic transition nor its dividend is guaranteed. To ensure the transition, some countries will have to reduce their persistently high fertility rates. And to seize the potential dividend governments must implement economic and social policies that enable new workers to find productive jobs. Failure to reduce fertility rates or generate jobs for new workers could result in a rapid increase in unemployment, with potentially severe social and economic consequences. In fact, several countries have struggled with rising unemployment as the transition has progressed, emphasizing the challenge of getting the economic and social policy mix right.

The experiences of east Asia and Latin America suggest that each transition is different. Those two regions started their demographic shift at about the same time in the 1960s. However, east Asian countries captured a much higher demographic dividend thanks to policies better tailored to the transition. For instance, improved access to education and family planning encouraged couples to have fewer children while increased investment in human capital upgraded the skills and productivity of the growing labor force. In addition, greater emphasis on manufacturing spurred increases in average productivity in the economy as a whole, as well as integration into global trade, and fostered foreign investment and technology transfers. Flexible labor market policies enabled efficient reallocation of workers toward labor-intensive and more highly productive manufacturing, which helped with the economic transformation. With more people working, financial development allowed for the channeling of the increased saving to investment. These policies complemented each other, so that the east Asian countries could make the most of their evolving demographics.

In sub-Saharan Africa, the demographic transition is taking place much later than in other regions, largely reflecting the delay in the decline in infant mortality as a result of medical advances.

The region will need to overcome three challenges to benefit from a demographic dividend.

First, persistently high fertility rates in many of the region's countries could both delay and diminish any potential dividend. In a worst-case scenario, a growing population and rising unemployment could exacerbate social risks and political tensions. This could also affect other economies, both in the region and elsewhere, as the number of people emigrating increases.

Furthermore, rising populations will strain public resources and countries' ability to cater to their people's needs. To provide these growing populations with even the current level of services, sub-Saharan African countries must expand their road networks; power, water, and sewer systems; and delivery of health and education services. Moreover, to fully exploit the potential demographic dividend, they will need not only to maintain their current level of services, but also to increase per capita investments in health, education, and infrastructure. In addition, timing is a problem: the education and health services need to be upgraded before these new citizens reach working age, but the money to fund those increases will not come until these citizens start working and paying taxes. Rethinking conventional agricultural practices and urban planning will be necessary as well. Improvements in agriculture will be essential to feed the population and free up the labor force to work in higher-productivity sectors, and urban design must factor in the influx of migrants from rural areas in search of jobs.

To fully exploit the dividend, countries will need to invest in education, health, and infrastructure.

Finally, the region must create jobs on an unprecedented scale—averaging 18 million a year between 2010 and 2035. The bulk of sub-Saharan Africans work in the informal sector, which will likely remain the main source of employment in the near term. Evidence suggests that most women in sub-Saharan Africa have no choice but to work in the informal sector, because they must both raise children and earn an income. The lower productivity associated with this sector could result in lower-than-average productivity in sub-Saharan Africa during some of its transition.

What needs to be done?

To improve the prospects of harnessing a dividend, macroeconomic policies need to focus on four main areas.

High-quality jobs to absorb new workforce entrants and increase overall productivity: Given that the lion's share of these jobs will have to be in the private sector, policies that promote flexible labor markets, facilitate the development of labor-intensive sectors that can compete globally, and liberalize trade are necessary to increase employment opportunities. Removing legal and institutional impediments to female labor force participation can aid this process.

Macroeconomic stability must be maintained while spurring economic transformation and facilitating private sector development, including by protecting investor rights, strengthening the rule of law, and reducing the cost of doing business by addressing the infrastructure gap. These policies will likely require increased spending, while maintaining debt sustainability, which requires more government revenue. Reducing distortionary taxes on capital and income can motivate the private sector to expand and will drive the demand for labor.

Human capital investment, including in health care and education, is critical in the early phases to speed the transition and improve the productivity of the workforce. Moreover, access to health care and education is critical to reduce disparity in opportunity and allow a more equitable distribution of the demographic dividend. Upgraded agricultural policies and urban planning are essential as well.

Financial sector development to effectively channel savings into investment can increase employment and growth. At the same time, planning for the nearly 500 million projected increase in pensioners calls for implementation of viable pension systems.

Many of these policies are interlinked, and exploiting their synergies will be critical to increasing the dividend.

Sub-Saharan Africa is at a crossroads. Successful reduction of mortality and fertility, combined with effective implementation of supporting policies, could earn the region a large demographic dividend and improve the quality of life for all its citizens. As a consequence, the region can emerge as a major player in the global economy and help mitigate some of the impact of aging in the rest of the world. At the same time, a failure to seize the opportunities offered by this new demographic situation would pose significant economic and social risks. ■

Vimal Thakoor is an Economist and John Wakeman-Linn is an Advisor, both in the IMF's African Department.

This article is based on Chapter 2 of the April 2015 IMF Regional Economic Outlook: Sub-Saharan Africa, *"How Can Sub-Saharan Africa Harness the Demographic Dividend?"*

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Bowie Bucks

David Bowie's image from his "Aladdin Sane" album cover adorns the Brixton £10 note.

World War II British secret agent Violette Szabo is featured on Brixton's £20 note.

Municipalities and neighborhood organizations establish local currencies to invigorate their communities

Marina Primorac

DAVID Bowie's death in January 2016 struck a chord with baby boomers who mourned the eclectic musician's tunes of their youth, while millennials recalled his cameo appearance in the movie *Zoolander* and his compositions in *The Life Aquatic*. But it's not only as an entertainer that Bowie was innovative.

In 1997 the pop star pioneered Bowie bonds, offering investors the opportunity to purchase a share in future royalties of 25 of his albums. And in 2011 he lent his support to the local currency of his birthplace, the south London neighborhood of Brixton, by agreeing to be featured on its £10 note.

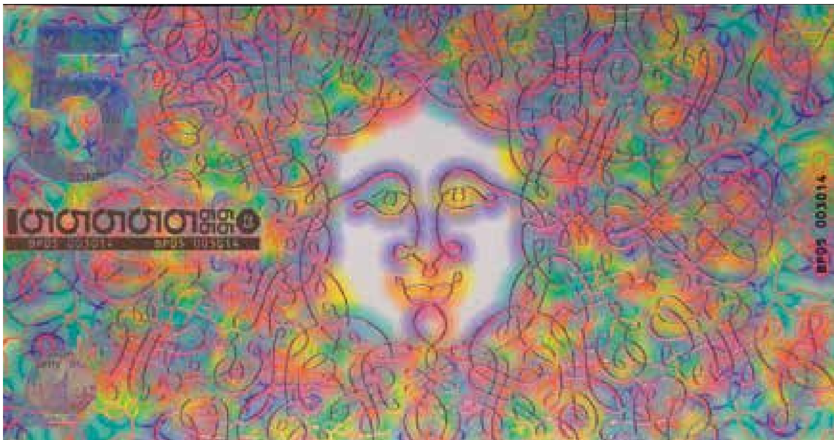
The Brixton pound is part of a resurgence since the turn of the century of local currencies, which hark back to an earlier era.

(Not so) golden years

During the Great Depression, uncertainty led to hoarding and thus shortages of currency. U.S. economist Irving Fisher advocated "stamp scrip"—time-stamped currencies that effectively carried a negative interest rate, called *demurrage*, if not spent quickly enough. This encouraged spending and turnover of the currency. Some municipalities resorted to scrip, which merchants were assured they could eventually hand in to city hall, school, or community organizations for U.S. dollars. Austria and Germany also issued scrip during the Depression.

Today, local currencies are being adopted, primarily in Europe and North America, to cultivate a sense of community, supporting locally owned businesses by attracting "main street" and

Bristol pounds being spent in a local coffee shop.



Oh! You pretty things: Five-year anniversary Brixton £5 note designed by artist Jeremy Deller.

"buy local" spending. In Brixton alone, £150,000 worth of the neighborhood currency is in circulation, boosting customer loyalty. Money spent with independent businesses circulates within the local economy up to three times longer than when it's spent with national chains, according to research by the New Economics Foundation.

The few circulating, paper-based—as opposed to virtual—local currencies also offer an outlet for local creativity and egalitarianism. "You look at regular currency, with all the dead presidents, monarchs, and establishment tropes and you see the cold dead hand of hierarchy and history. It can't be much fun designing money whose sole purpose seems to be reminding the great unwashed that the wealth isn't really theirs," says Charlie Waterhouse, Brixton pound designer.

The second issue of the Brixton series, with £1, £5, £10, and £20 notes, features well-known people with Brixton connections. "We wanted to ensure there was a good balance, says Waterhouse. "Len Garrison was a notable black archivist who founded Brixton's Black Cultural Archive; [Miami Heat basketball player] Luol Deng comes from a different era in Brixton's immigration history, and talks of the opportunity a place like Brixton provides regardless of race."

Heroes

British secret agent Violette Szabo is on Brixton's £20 note. The designer says, "London is full of statues to privileged warmongers we're supposed to remember as heroes—and here was a genuine hero, an ordinary shopgirl whose life became extraordinary thanks to World War II. She felt right for the notes—and was a nice nod to an earlier, more distant Brixton."

Brixton pounds are backed by pounds sterling, with 100 percent reserves in the local credit union. "While boosting demand in the local economy with vouchers that can only be spent in small businesses, the credit union is also bolstered with additional capital to make ethical loans to individuals and businesses in the area," explains Tom Shakhli, Brixton pound general manager.

Security features form a fundamental part of the notes' design. "The Brixton pound has more security features than notes from the Bank of England. Holographic film is die cut into editorial content; sequential numbering punches out of gold foil motifs; fluorescent inks are repeated throughout. And there are more features, which I'm not at liberty to mention!" adds Waterhouse.

The United Kingdom's first city-wide local currency, the Bristol pound, was established with advice from the Brixton team. Organizers say the currency fosters a sense of community and encourages creativity and grassroots activity. Like the London neighborhood currency, each Bristol pound is backed pound for pound by sterling deposits, so accepting the currency incurs no more financial risk than depositing money in a bank.

Today about a dozen local currencies operate in the United Kingdom alone. The Bank of England has studied local currencies and concludes that given their limited size and number, "they are unlikely to present a risk to the Bank's monetary or financial stability objectives."

Dollar days

In the United States, the city of Ithaca, New York, supports "Ithacash." Founder Scott Morris says Ithaca dollars (i$) "provide our region with a medium of exchange that works more equitably for our community and helps make our economy more efficient." Bucking the trend, Ithaca is about to launch physical currency notes to add to its now-virtual currency.

Forthcoming Ithaca dollar design features the town commons.

As circulation of legal tender national currency cedes to virtual transactions, the personal appeal of local currencies is their comparative advantage. "Since Bowie's death there has been a lot of interest in the B£10 note," says Waterhouse. "The Brixton pound note has taken on extra meaning since his death, serving as a reminder of Bowie and all the things people loved about him." ■

Marina Primorac is Managing Editor of Finance & Development.

Preparing the Ground

China's quest for sustainable growth calls for bold fiscal reforms

David A. Lipton is the IMF's First Deputy Managing Director.

THREE and a half decades into arguably the most successful development story of the modern era, China finds itself at a critical juncture. It must shift from a nearly exhausted investment-driven and export-reliant growth model—with rising macroeconomic and financial risks and unsustainable environmental costs—to a new path of more domestic consumption–based, more inclusive, and greener growth.

The dominant role of China's government in the economy means that the management of its finances—fiscal policy—is both a foundation of its past success and the root of future challenges. Fiscal policy reforms are needed to safeguard past achievements and prepare the ground for sustained improvements in the future.

Strategic reform goals

The goals of these strategic reforms are fourfold:

Balance the budget—Slow the accumulation of debt that would eventually burden government budgets and taxpayers, while being mindful of fiscal policy's role in preventing a sharp slowdown in growth;

Get prices right—Deal with the negative impact of resource use, especially energy, and eliminate subsidies that favor state-owned enterprises over the private sector;

Ensure the efficient use of state assets and their proceeds by hardening the budget constraints of local governments and state-owned enterprises; and

Help the economy rebalance from excessive saving and inefficient investment to higher household income and consumption and lower but more productive private investment, especially in the still-underdeveloped service sector.

Implementing this agenda would help safeguard macroeconomic stability, strengthen the government's role as a prudent and efficient steward of public resources, and foster much-needed structural change in the economy—in other words, help secure more balanced, more equal, and more environment-friendly growth—for the benefit of China, the region, and the global economy.

China's development record over the past 35 years has been nothing short of astonishing, with the economy growing at about 10 percent a year. Real per capita income has more than quadrupled since 1980, to about $7,600 in 2014, placing China in the ranks of lower-middle-income countries and lifting more than 600 million people out of poverty, according to the World Bank's World Development Indicators. And China is now the largest economy in the world on a purchasing-power-parity basis. China's economic status contributed to the recent decision to include its currency—the renminbi—in the IMF's special drawing right (SDR) basket.

China's fiscal policy and reforms have played a key role in its development strategy. As per capita income has grown, demand for public goods and services has also increased. Over the years, fiscal reforms—including to tax policy, revenue administration and expenditure policy, intergovernmental fiscal relations, budgeting processes and treasury management, and provision of public goods—have helped China's public sector cope with these rising demands while investing heavily in the country's economic development. Major reforms in intergovernmental relations have improved revenue and smoothed expenditure across provinces. And public financial management reforms have supported increased efficiency and control of public spending. Notably, the government has significantly reduced or brought on budget previously extrabudgetary funds and modernized its budgetary systems, including through better classification of expenditures.

Despite these reforms, vulnerabilities have recently emerged that could threaten the sustainability of long-term growth. Growing macroeconomic imbalances, fiscal and financial risks, rising inequality, and environmental degradation require increasing attention.

China's stimulus program, implemented in the aftermath of the global financial crisis, designated about 11 percent of GDP mainly for infrastructure investment and social housing projects. The stimulus supported China's rapid growth and provided a welcome lift to global demand. But it has proved difficult to unwind and has contributed to widening fiscal imbalances and a buildup of government debt. And most of the stimulus was implemented by local governments, mainly through off-budget financing, raising concern about the sustainability of local public finances.

China has also experienced rising inequality, partly because the tax system is not very progressive and large gaps remain in social protection spending. It has made notable efforts to expand the social security system and protect the most vulnerable, but large disparities remain. For example, the pension system offers nearly universal old-age coverage, but salaried retirees receive much higher benefits than nonsalaried retirees. Reducing this gap remains an important challenge.

China's rapid growth has had environmental consequences. It is the largest emitter of carbon dioxide (CO_2) in the world, accounting for 25 percent of the global total in 2012. Outdoor air pollution, partly from fuel combustion, caused 1.4 million premature deaths in 2010 according to the World Health Organization. Traffic congestion is growing relentlessly: traffic delays in Beijing, one of the world's most congested cities, are estimated to cost over 4 percent of the city's GDP. Fossil fuel subsidies in China, including implicit subsidies from undercharging for environmental costs, amounted to 17.3 percent of GDP in 2013.

A rocky path

In light of these challenges, a new generation of fiscal policies will play a central role in China's transition to more balanced, more inclusive, and greener growth.

Balancing the budget: To reduce fiscal deficits and contain public debt, China has begun implementing key reforms of taxes, expenditures, pricing, and social security. It is essential to move from the current five-year-plan system to medium-term budgeting—as China's new budget law, effective January 2015, proposes—that allows better fiscal policy management across the cycle, takes local government finances into consideration, and offers greater fiscal transparency. Future tax reforms should attempt to reduce income inequality while providing a broader tax base for local governments and enhancing efficiency in revenue collection. Reform of the personal income tax schedule could help redistribute income, while ongoing reform to replace the business tax with a value-added tax could improve overall tax progressivity. Expanding annual property taxes nationwide could help fund local government services and reduce inequality. On the spending side, there is room to strengthen the equity and sustainability of the social security system to address growing social inequality. In particular, it is critical to consolidate the pension system for salaried and nonsalaried workers and facilitate mobility across pension plans.

Getting prices right: Efficient energy taxation is essential to environment-friendly growth. The price of fossil fuels needs to reflect their contribution to pollution for growth to be environmentally sustainable. Energy taxes are a straightforward extension of gasoline taxes. Carbon charges can be applied in proportion to a fuel's CO_2 emission rate, local air pollution charges can be set on coal use, with credit for emission-control technologies linked directly to smokestack emissions. Gasoline taxes should reflect all adverse side effects from vehicle use—CO_2 emissions, local air pollution, traffic congestion, accidents, and road damage. A full energy tax reform could reduce CO_2 emissions by 26 percent and fossil fuel air pollution deaths by 60 percent, while raising revenue by about 9 percent of GDP.

Ensuring efficient use of state assets: Reform of state-owned enterprises is key to giving the market a more decisive role in the economy and unlocking new sources of growth. Leveling the playing field between state-owned enterprises and other firms can be accomplished by increasing the share of their profits that goes to the government budget, eliminating government subsidies, strengthening governance, and improving these enterprises' commercial orientation. Ultimately, such reform must also include greater tolerance of state-owned enterprise bankruptcy or exit and their full exposure to competition with private firms. These reforms can significantly boost productivity and create millions of jobs.

Rebalancing is a critical component of China's transition.

Rebalancing the economy: Rebalancing is a critical component of China's transition to a new growth model. The recent large increase in investment, driven largely by public sector spending, has led to less-efficient capital spending, thwarted growth, and increased debt. Encouraging a shift in demand toward consumption and away from saving, combined with more productive private investment, would make growth more sustainable.

Reforming the social safety net and increasing health and education spending are important priorities. At 10 percent of GDP, social spending in China is about half what it is in high-income members of the Organisation for Economic Co-operation and Development, so there is plenty of scope to spend more on health, education, and the social safety net. Social security contributions in China are regressive and high: mandatory contributions to pension, medical, unemployment, occupational injury, and maternity benefits add up to more than 40 percent of wages. Strengthening China's social security system will help reduce household precautionary saving, while lowering social contributions will help reduce inequality.

Over the past three and half decades, China has had remarkable success in achieving rapid economic growth and reducing poverty. Fiscal policy has played a major role in that accomplishment. Now a new generation of fiscal policy reforms is needed to safeguard past achievements and lay the groundwork for sustained improvement in the future. ■

This article is based on a chapter in the forthcoming book Sustaining China's Economic Growth with Fiscal System Reform, *ed. by Wing Thye Woo, Xin Zhang, Jeffrey D. Sachs, and Shuanglin Lin.*

El Niño
Good Boy or Bad?

El Niño has important effects on the world's economies—and not all of them are bad

Worker climbs down sacks of rice in National Food Authority warehouse, Taguig, Philippines.

Paul Cashin, Kamiar Mohaddes, and Mehdi Raissi

The current El Niño (Spanish for "The Boy")—a band of above-average ocean surface temperatures that develops every 3 to 7 years off the Pacific coast of South America and lasts about two years—is causing major climatological changes around the world. Climate experts are continuously monitoring the developments of the 2015–16 El Niño, which is one of the most severe events in the past 50 years and, notably, the largest since the 1997–98 episode that shocked global food, water, health, energy, and disaster-response systems.

But what are the macroeconomic effects of an average El Niño event? Economists are increasingly interested in the relationship between climate—temperature, precipitation, storms, and other aspects of the weather—and economic performance, including agricultural production, labor productivity, commodity prices, health, conflict, and economic growth. A thorough understanding of this relationship can help governments design appropriate institutions and macroeconomic policies.

Taking the temperature

In a recent IMF study, we examined variations in weather-related events—with a special focus on El Niño—over time and across different regions to identify their impact on growth, inflation, energy prices, and nonfuel commodity prices, motivated by growing concern about their effects on commodity prices and national macroeconomies. These extreme weather conditions can constrain the supply of rain-driven agricultural commodities, lead to higher food prices and inflation, and may trigger social unrest in commodity-dependent countries that rely primarily on imported food.

Our research—taking into account the economic interlinkages and spillovers between countries—analyzed the macroeconomic transmission of El Niño shocks between 1979 and 2013, both on national economies and internationally, focusing on its effects on real GDP, inflation, and commodity prices.

The results indicate that El Niño has a large but highly varied economic impact across different regions. Australia, Chile, India, Indonesia, Japan, New Zealand, and South Africa face a short-lived fall in economic activity in response to a typical El Niño shock. However, in other parts of the world, an El Niño event actually improves growth, in some countries directly—for instance, in the United States—and in other countries—such as in Europe—indirectly through positive spillovers from major trading partners. Many countries in our sample experienced short-term inflation pressures following an El Niño shock (its magnitude increasing with the share of food in the consumer price index, CPI, basket), while energy and nonfuel commodity prices also rose around the world.

Defining El Niño

In an El Niño year, air pressure drops along the coast of South America and over large areas of the central Pacific. The typical low pressure system in the western Pacific becomes a weak high pressure system, moderating the trade winds and allowing the equatorial countercurrent (which flows west to east) to accumulate warm ocean water along the coastline of Peru. This phenomenon causes the thermocline—a transition layer between warmer mixed water at the ocean's surface and cooler deep water below—to drop in the eastern part of Pacific Ocean, cutting off the upwelling of cold nutrient-rich ocean water along the coast of Peru.

An El Niño typically brings drought to the western Pacific (including Australia), rains to the equatorial coast of South America, and storms and hurricanes to the central Pacific (see Chart 1, which shows the climatological effects across two different seasons). These changes in weather patterns have significant effects on agriculture, fishing, and construction industries, as well as on national and global commodity prices.

One way to measure El Niño intensity is by using what weather experts call the Southern Oscillation index (SOI), which is based on air pressure differentials in the South Pacific between Tahiti and Darwin, Australia. Sustained SOI values below –8 indicate El Niño episodes (the warm phase of the Southern Oscillation). Likewise, sustained SOI values above 8 indicate the cold phase of the Southern Oscillation, dubbed La Niña. The 1982–83 and 1997–98 El Niño episodes were quite severe and had large adverse macroeconomic effects in many regions of the world, whereas other El Niño events in our sample period were relatively moderate: 1986–88, 1991–92, 1993, 1994–95, 2002–03, 2006–07, and 2009–10 (see Chart 2). The 2015–16 El Niño event has been one of the most severe of the past 50 years and the largest since that in 1997–98.

Climate and the global macroeconomy

We analyzed the international macroeconomic transmission of El Niño shocks, taking into account drivers of economic activity, interlinkages and spillovers between different regions, and the effects of unobserved or observed common factors such as energy and nonfuel commodity prices (see Chudik and Pesaran, 2016; and Cashin, Mohaddes, and Raissi, 2015, for details).

The results show that while Australia, India, Indonesia, New Zealand, Peru, and South Africa face a short-lived fall in economic activity in response to an El Niño shock, other countries, such as Argentina, Canada, Mexico, and the United States may actually benefit (either directly or indirectly through positive spillovers from major trading partners—see Chart 3).

Good boy or bad?

On the negative side, in *Australia* El Niño causes hot and dry summers in the southeast, increases the frequency and severity of bush fires, reduces wheat export volumes, and drives up global wheat prices, leading to a drop in the country's real GDP growth. *New Zealand* also experiences drought in places that are normally dry, and floods elsewhere, thereby lowering agricultural output and real GDP.

Generally—but not always—El Niño events tend to be inflationary.

El Niño conditions usually coincide with a weak monsoon and rising temperatures in *India*, which hurts its agricultural sector and increases domestic food prices and inflation. El Niño–induced drought in *Indonesia* is also harmful to that country's economy and agricultural sector, pushing up world prices for coffee, cocoa, and palm oil. Furthermore, mining equipment in Indonesia relies heavily on hydropower; with deficient rain and low river currents, the world's top exporter of nickel—used to strengthen steel—is able to produce less of the metal.

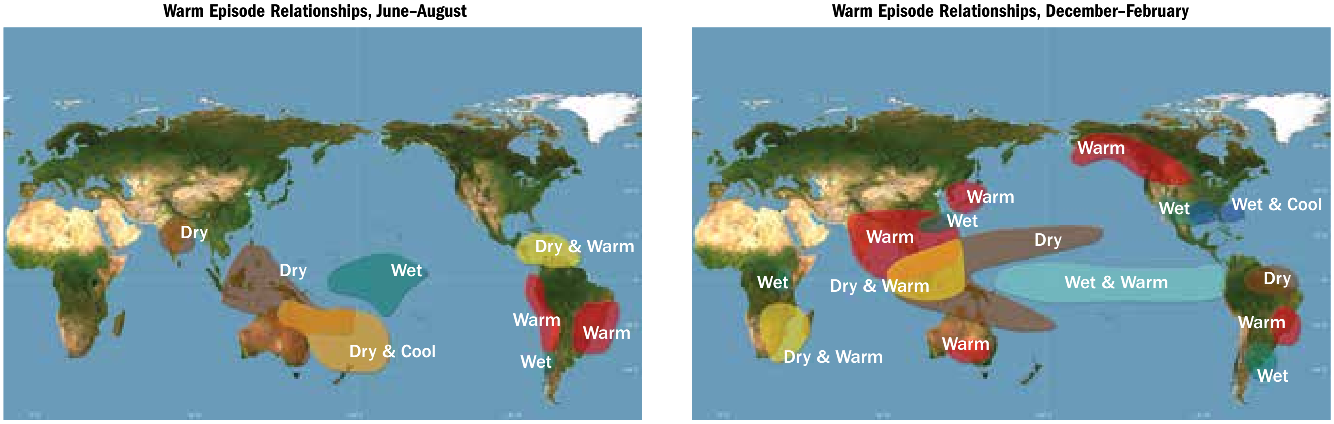
El Niño typically brings stormy winters to *Chile* and raises metal prices by disrupting the supply chain: heavy rain will reduce access to Chile's mountainous mining region, where large copper deposits lie. Therefore, we would expect an increase in metal prices and lower output growth, which

Chart 1

Shifting patterns

El Niño brings drought to Australia, India, and Indonesia in the Southern Hemisphere summer and to South America in the Southern Hemisphere winter.

Warm Episode Relationships, June–August | Warm Episode Relationships, December–February



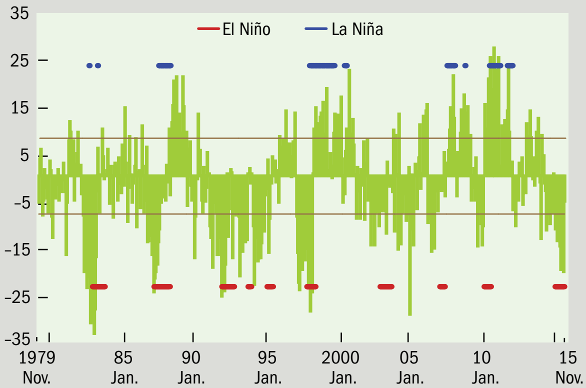
Source: U.S. National Oceanic and Atmospheric Administration (NOAA), Climate Prediction Center.

Chart 2

El Niño and La Niña

The current El Niño is one of the most severe in the past half-century and the largest since 1997–98.

(Southern Oscillation Index)



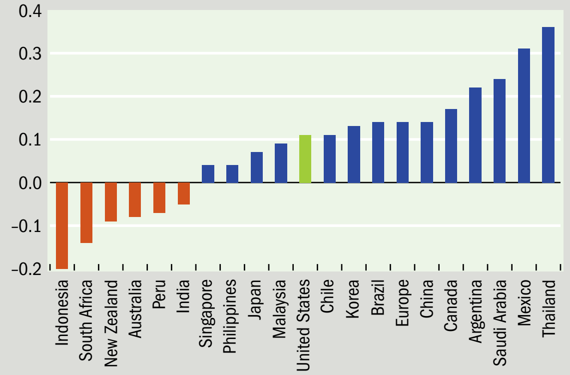
Source: Authors' construction based on data from Australia's Bureau of Meteorology.
Note: The Southern Oscillation index (SOI) is based on air pressure differentials in the South Pacific between Tahiti and Darwin, Australia. Sustained SOI values below –8 indicate El Niño episodes (the warm phase of the Southern Oscillation) and those above 8 indicate La Niña (the cold phase of the Southern Oscillation).

Chart 3

Varied impact

The effects of an El Niño shock on real GDP growth vary considerably across countries.

(real GDP growth response, percentage point)



Source: Authors' estimates.
Note: Figures are real GDP growth responses (averaged over the first year) to an El Niño shock.

we estimate to be about –0.2 percentage point on impact—with an average effect over the first year that is positive but not statistically significant. *South Africa* experiences hot and dry summers during an El Niño episode, with adverse effects on its agriculture and real GDP growth. More frequent typhoon strikes and cooler weather during summers are expected for *Japan*, which could depress consumer spending and growth. Our analysis suggests an initial drop of about 0.1 percentage point in Japanese output growth. However, the construction sector experiences a boost following typhoons, which can partly explain the increase in growth after an initial decline.

On the other hand, in the *United States,* El Niño typically brings wet weather to California (benefiting lime, almond, and avocado crops, among others), warmer winters in the Northeast, increased rainfall in the South, diminished tornado activity in the Midwest, and a decrease in the number of hurricanes that hit the east coast, all of which leads overall to higher real GDP growth. Plentiful rains can help boost soybean production in *Argentina*, which exports 95 percent of the soybeans it produces. *Canada* enjoys warmer weather in an El Niño year, and in turn a greater return from its fisheries. In addition, the increase in oil prices means larger oil revenues for Canada, which is the world's fifth-largest oil producer (averaging 3,856 million barrels a day in 2012). For *Mexico* we observe fewer hurricanes on the east coast and more hurricanes on the west coast, which generally brings stability to the oil sector and boosts exports. Although El Niño is associated with dry weather in northern *China* and wet weather in southern China, we do not observe any direct positive or negative effects on China's output growth. Moreover, a number of economies—in *Europe*, for example—that are not directly affected by El Niño do benefit from the shock, mainly due to positive indirect spillovers from commercial trade and financial market links.

Although there are both winning and losing countries from an El Niño event, in the aggregate the detrimental effects on losing countries more or less balance out the positive effects on winning countries.

Commodity prices and inflation

The El Niño weather phenomenon can also significantly affect global commodity prices. The higher temperatures and droughts following an El Niño event, particularly in Asia and the Pacific, not only increases the prices of nonfuel commodities (by about 5½ percent over a year), but also boosts demand for coal and crude oil as lower output is generated from hydroelectric power plants, thereby driving up their prices.

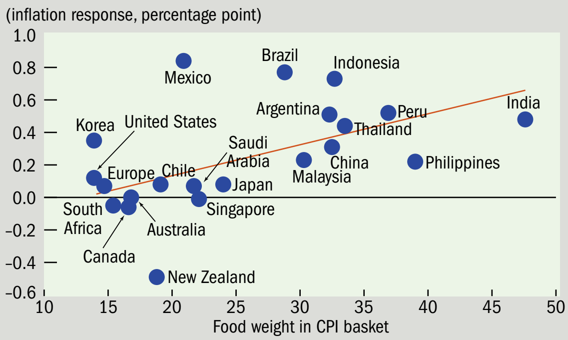
Generally—but not always—El Niño events tend to be inflationary, with the impact on our sample of countries ranging between 0.1 and 1 percentage point. This reflects mainly higher fuel and nonfuel commodity prices, but is also a result of government policies such as holding buffer stocks of grain, persistent inflation expectations, and strong domestic demand in countries whose growth picks up following an El Niño episode. The largest increases in inflation in Asia are observed in India, Indonesia, and Thailand, probably due to the high weight of food in the CPI basket of these countries—47.6 percent, 32.7 percent, and 33.5 percent, respectively. We investigated this hypothesis by looking at the weight of food in the CPI basket of the 21 countries and regions and their inflation responses and found a clear positive relationship between food share and increased inflation (see Chart 4).

Because growth, inflation, and commodity prices are sensitive to El Niño developments, governments should take

Chart 4

More food, more inflation

The larger the weight of food in a country's consumer price index (CPI) basket, the greater the increase in inflation in response to an El Niño shock.



Source: Authors' calculations based on data from Haver Analytics and inflation responses to an El Niño shock.

into consideration the likelihood and effects of El Niño episodes when formulating macroeconomic policy, and implement policies that could help ameliorate the adverse effects of such shocks. For example, in India changing cropping patterns and sowing quicker-maturing crop varieties, rainwater conservation, judicious release of food grain stocks, and changes in import policies and quantities would help bolster agricultural production in low-rainfall El Niño years. On the macroeconomic policy side, governments should continue to closely monitor any upticks in inflation arising from El Niño shocks—and alter their monetary policy stance appropriately—to avert second-round inflation effects. And in the longer term, investment in the agricultural sector, mainly in irrigation, as well as building more efficient food value chains, would serve as valuable insurance against future El Niño episodes. ■

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This article is based on 2015 IMF Working Paper 15/89, "Fair Weather or Foul? The Macroeconomic Effects of El Niño," by Paul Cashin, Kamiar Mohaddes, and Mehdi Raissi.

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$30 a Barrel

Masood Ahmed

Oil exporters in the Middle East and North Africa must adjust to low oil prices

Oil refinery, Kuwait.

IN early 1986, following a decision by some members of the Organization of the Petroleum Exporting Countries (OPEC) to substantially increase the supply of oil, the price nose-dived from about $30 a barrel to roughly $10 a barrel. Already feeling the adverse effects of earlier price declines and oil production cuts, the Middle East and North Africa (MENA) region—home to 6 of the world's 10 largest oil exporters—faced a pressing need to adjust their budget policies. A difficult decade followed: policymakers had to make tough choices, some of which, such as cuts in public investment, had a long-lasting impact on the region.

Almost 30 years later, oil-exporting countries in the MENA region and elsewhere face a similar plunge in oil prices—which declined from roughly $110 to about $30 a barrel owing to sluggish global growth, high OPEC production, and the surprising resilience of shale oil supplies. More important, no one expects a return to triple-digit oil prices for the foreseeable future, so oil exporters must adjust to a new reality rather than wait for these low prices to come to an end. At *F&D* press time, futures markets were pointing to an average oil price of about $35 a barrel this year and $40 a barrel in 2017. With many MENA countries also confronting violent conflict and a growing refugee crisis, getting policy responses right and avoiding a repeat of the poor performance of the 1980s is paramount.

Last year, the oil price decline cost MENA oil exporters $360 billion—one-sixth of their total output. The losses are projected to deepen this year, with oil prices falling again in late 2015 and early 2016. So far, the oil exporters have, as a first line of defense, sensibly used their sizable financial savings to limit the impact of declining oil prices on growth, buying themselves time to devise adjustment plans. The clock, however, is ticking because most countries cannot sustain large budget deficits indefinitely. Half of MENA oil exporters posted double-digit deficits as a share of GDP in 2015, notably Algeria, Bahrain, Iraq, Libya, Oman, and Saudi Arabia (see chart).

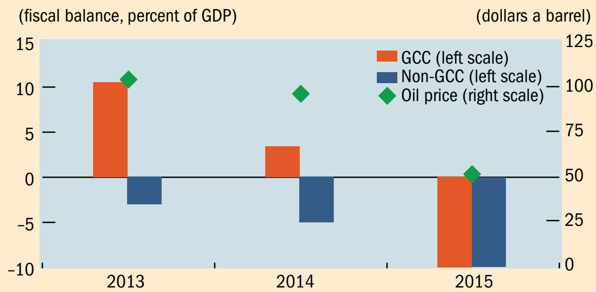
Difficult choices

To balance their books, MENA oil exporters must make difficult choices: cutting expenditures by roughly one-third, substantially increasing non-oil revenues (multiple times in some countries), or, ideally, some combination of the two.

Most countries are making progress in addressing the challenge posed by low oil prices, and the recently announced budgets for 2016 outline cuts to spending and the introduction of new revenue sources. Saudi Arabia plans to reduce expenditures by a sizable 14 percent this year and has increased energy prices. Qatar intends to make deep cuts in nonwage current expenditures but protect funding for health, education, and major capital projects. The United Arab Emirates has eliminated fuel subsidies and curbed transfer payments, including to government-related entities. Countries of the Gulf Cooperation Council (GCC)—Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates—plan to inroduce a value-added tax (VAT) and raise other non-oil revenues. Non-

Spilling red ink

Fiscal balances have deteriorated as oil prices have declined.



Source: IMF staff estimates.
Note: GCC = Gulf Cooperation Council.

GCC MENA oil exporters are adjusting policies as well: Algeria froze hiring and cut capital expenditures, and Iran increased the VAT and broadened its base and improved tax collection, among other measures.

These steps are an important down payment on the required fiscal adjustment. Given the large adjustment needs, the oil exporters will need to formulate medium-term plans that keep deficit reduction on track, spread measures over time to minimize the economic pain, and help prevent reform fatigue. The countries must also give careful consideration to the impact of deficit reduction on unemployment and inequality.

There is room for further reductions in operational expenditures, given the large run-up in wage, administrative, and security-related spending over the past decade. This trend has helped raise so-called budget break-even prices for oil well above current market prices—in some cases, these are near $100 a barrel. A number of governments are also trimming public investment, including by holding off on new projects. Given the previous sharp increase in government projects, there is undoubtedly room to cut waste. But, as countries learned in the 1980s, cutting investment indiscriminately could undermine future growth. In particular, some of the key outlays for health, education, and transportation infrastructure have high long-term value. Therefore, policymakers should also consider increasing the efficiency of public investment. IMF research suggests that, with the right modifications to public investment management, MENA governments could achieve the same results and spend 20 percent less.

Energy price reform can also produce significant savings, and several countries appear to be moving in this direction. The costs of keeping energy prices low across the region are significant—over $70 billion *annually* in the GCC countries in 2015 alone, most of which accrue to the well-off. Raising domestic energy prices, while protecting vulnerable people, would help reduce budget deficits and yield positive environmental benefits—an increasingly important consideration in light of the recent Paris accord on reducing greenhouse gas emissions. Fortunately, countries are moving to address this issue. The price of gasoline in the United Arab Emirates is now close to the U.S. pretax price. Qatar recently hiked electricity and water charges and gasoline prices, and Algeria, Bahrain, Kuwait, and Saudi Arabia have announced plans to further rein in their energy subsidies. Iran also significantly increased fuel prices last year.

In addition to spending cuts, governments must also find new sources of revenue. The current system in which more than three-quarters of all revenue typically comes from oil-related activities is untenable, and countries will have to tap more revenue from non-oil economic activity. Progress on introduction of a VAT in the GCC countries would be useful, since it is a relatively efficient, growth-friendly, and buoyant source of revenue. Meanwhile, Kuwait is preparing to introduce a business profit tax. Others should also consider broadening their corporate taxes, while revamping excise and property taxes.

New jobs

Finally, the challenge of maintaining fiscal resilience is exacerbated by the need to create jobs for a young national labor force that is expected to grow by some 10 million over the next five years. In the past, much of the non-oil growth in the region was fueled by redistribution of oil revenue through government coffers, in the form of public investment and other expenditures. Oil-rich states have become the employers of first resort, but in this environment of lower oil prices these governments cannot continue adding large numbers of new graduates to their payrolls.

Transformation of oil-exporting economies is no easy task.

Developing the private sector to create the jobs that governments can no longer provide will be challenging. It will require stronger incentives for nationals to enter the private sector, education and skills more aligned to market needs, and further improvements in the business environment. Meaningful opportunities and inclusive growth would help allay the fear of social pressure. For countries in conflict, stabilizing security conditions is an obvious prerequisite.

The transformation of oil-exporting economies is no easy task and will be a long-term project. It will require a sustained push for reforms and well-thought-out communications. Policymakers must also remain mindful of risks in other areas from lower oil prices—for example, the risk of lower asset quality and less liquidity in the financial system. The good news is that policymakers in most oil-exporting countries are increasingly determined to be proactive in addressing these challenges and to use them to transform and diversify their economies for a more sustainable economic future. ■

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A Move South

Rabah Arezki, Frederick van der Ploeg, and Frederik Toscani

A growing number of large resource finds are in the developing world, reflecting growing openness in their economies

HIGH-income countries have long been the main users and suppliers of natural resources.

It could be bauxite, copper, and iron ore across much of Europe—not to mention coal, lead, mercury, zinc, and oil and natural gas. English and Belgian coal deposits fueled the Industrial Revolution.

When the United States achieved independence in the late 18th century it was widely thought of as a country with "an abundance of land but virtually no mining potential." (O'Toole, 1997). But a century later, after the rebellious colonies had developed into a stable country, the United States not only became a high-income country in today's parlance but it overtook Europe to become the world's major resource producer.

Today, though, the high-income-country share of global resource deposits has fallen, driven by growth in discoveries in other, less-developed parts of the world.

We document a major shift in resource exploration and extraction from high-income regions, or the "North," to emerging market and developing economies, or the "South." This shift in resource discovery and extraction is associated with efforts in emerging market and developing economies to open up to foreign investment and/or improve their institutions—including through more stable government and stronger rule of law. That North-South shift mirrors on a global scale what happened in the United States after independence.

The new policies that have sparked a move south in global resource exploration and extraction operate over and above other forces that affect natural resource exploitation, such as rising global demand, especially from emerging markets, and depletion of deposits in the North. That shift has important implications both for the welfare of individual countries and for our global understanding of the balance of forces shaping commodity markets. Moreover, the increasing number of finds in developing economies puts to rest concerns that the world will soon run out of mineral and oil resources.

North to South shift

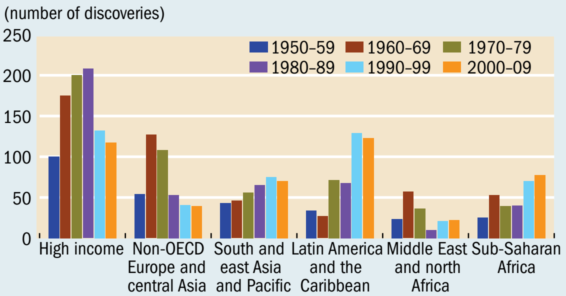
The data on known reserves of subsoil assets suggest that developing economies have much more oil, metals, and minerals to discover. There is an estimated $130,000 worth

Miner in the silver mines of Potosí, Bolivia.

Chart 1

Resource shift

Important natural resource discoveries are declining in high-income countries and growing in many emerging market and developing economies.



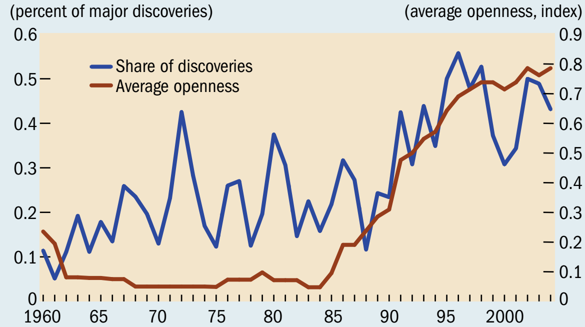
Sources: Oil and gas discoveries, Mike Horn, former president of the American Association of Petroleum Geologist; mineral discoveries from MinEx Consulting.

Note: The data cover discoveries classified as major, whose size varies by type of resource. Major discoveries rank behind giant and supergiant (once in a generation) discoveries in terms of importance. OECD = Organisation for Economic Co-operation and Development.

Chart 2

Open for discovery

There is a correlation between the increasing openness of emerging market and developing economies and their share of new discoveries.



Sources: Sachs and Warner (1995); and Wacziarg and Welch (2008).

Note: A country is considered open if it meets five criteria (see Box 1), If it satisfies the criteria, it receives a 1 on the Sachs and Warner Index. Otherwise it receives a zero. The rising red line reflects the steady increase in the number of countries receiving a 1. The chart covers 128 emerging market and developing economies.

of known subsoil assets beneath the average square kilometer of advanced and emerging market Organisation for Economic Co-operation and Development (OECD) member countries. That is much more than the roughly $25,000 in known assets in Africa (Collier, 2010; McKinsey Global Institute, 2013).

But it is unlikely that such differences in asset value can be explained by variations in geological formations between advanced and developing economies. It is much more likely that the difference is largely the result of more exploration in the OECD countries. The amount of resources a country knows it has and can get out of the ground changes as investment in exploration finds new deposits—and as technology increases the amount of deposits that can be extracted.

That there are many deposits yet to be found in emerging market and developing economies seems to be borne out by developments over the past few decades. We have developed a data set that covers major discoveries between 1950 and 2012 in 128 countries for 33 natural resources—including oil, metal ores, and minerals. While the total number of annual discoveries has remained broadly constant globally, where those discoveries occur has changed (see Chart 1). OECD countries accounted for 37 to 50 percent of all discoveries between 1950 and 1989, but for only 26 percent in the past decade, with sub-Saharan Africa and Latin America doubling their shares, to 17 percent and 27 percent, respectively. Latin America has had the most mineral and oil discoveries in the past two decades. Data on major oil and natural gas discoveries come from Mike Horn, a former president of the American Association of Petroleum Geologists. Data on major mineral discoveries were obtained from MinEx Consulting.

Resource discoveries and institutions

Differences in the quality of property rights and political stability (that is, the institutional environment) between advanced and developing economies can help explain why historically there have been relatively fewer exploration efforts in developing economies—and as a result fewer assets have been discovered. But this is changing. A widely used measure of market orientation (see Box 1) suggests that the rapid improvement in the institutional environment in many developing economies in the 1990s coincided with the increase in the share of oil and mineral discoveries in Latin America and Africa (see Chart 2). The evolution of principles such as the rule of law (see Box 2) over the past decades also shows a North-South convergence as various emerging market and developing economies adopted standards already prevalent in the North (see Chart 3).

There is solid anecdotal evidence of a link between better institutions and more discoveries across continents and types of natural resources (see table). The increase in discoveries after countries open up to the global economy tends to be quite stark. In Peru, for example, discoveries more than quadrupled, in Chile they tripled, and in Mexico they doubled. These discoveries not only occurred when commodity prices were high, but also when commodity prices were at historical lows.

Box 1

Market orientation

To measure market orientation, we use data on opening economies from 133 countries between 1950 and 2001. The measure was first designed by Sachs and Warner (1995) and extended by Wacziarg and Welch (2008). To be classified as open, a country must meet five criteria: the average tariff rate on imports is less than 40 percent; nontariff trade barriers affect less than 40 percent of imports; the economy is not socialist (where the state largely owns the means of production); the state does not have a monopoly on the major exports; and any black market premium for the currency is lower than 20 percent. If a country in any given year satisfies all five criteria it is classified as open and receives a score of 1. If it does not, it receives a zero.

Box 2

Rule of law

There are two aspects to the rule of law (ICRG, 2015). The first relates to the strength and impartiality of the legal system. The second encompasses the notion of "order," that is, how well the laws are followed. A country can have a highly rated judicial system but an overall low rating if it has a very high crime rate or if its citizens routinely ignore laws with impunity.

Market boom

Natural resource finds have increased in several countries that have opened their economies to be more market oriented.

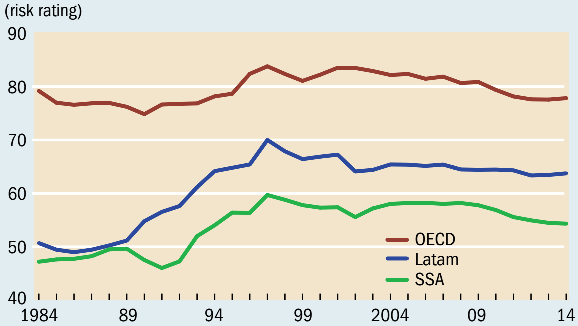
Country	Chile	Ghana	Indonesia	Mexico	Peru
Year the economy opened	1976	1985	1970	1986	1991
Number of discoveries during 10 years prior to opening	5	0	3	12	5
Number of discoveries during 10 years after opening	15	6	15	21	23
Main natural resources	Copper	Gold, oil	Various	Various	Gold, copper

Sources: Sachs and Warner (1995); and Wacziarg and Welch (2008).
Note: A country is considered open if it meets five criteria (see Box 1) that measure its market orientation.

Chart 3

Less risk

Between 1984 and 1998 political risk in emerging market and developing economies improved markedly relative to advanced economies and has held steady since then.



Source: International Country Risk Guide (2015).
Note: The risk rating assesses political stability based on a number of factors, including socioeconomic conditions, government stability, investment profile, internal conflict, external conflict, corruption, military involvement in government, religious tensions, ethnic tensions, law and order, democratic accountability, and bureaucratic quality. The risk rating ranges from 100 (least risk) to 0 (most risk). Latam = Latin America and the Caribbean; OECD = high-income and emerging market economies that are members of the Organisation for Economic Co-operation and Development; SSA = sub-Saharan Africa.

Researchers such as Cust and Harding (2014) have already shown that institutions have a substantial effect on oil and gas exploration. They did so by identifying how differences in institutions affect exploitation of oil deposits that sit on both sides of a border. They found that there is twice as much oil drilling on the side that has better institutions, as measured for example by the level of constraint on the executive (which has been shown to reduce expropriation). However, while Cust and Harding looked exclusively at oil, we include minerals in our analysis and believe that we are the first to document the North to South shift in global resource extraction, which is especially pronounced for minerals.

The theoretical literature on exhaustible resource exploitation and exploration dates back to a paper by Robert S. Pindyck, in which he demonstrated how a planner can maximize the value of social benefits from consumption of oil and how the reserve base can be replenished through exploration and discovery of new fields (1978). We expanded Pindyck's model to take into account that much of the exploration and development is carried out by multinational companies under a contract with an emerging market or developing economy. In addition to the physical cost of extraction multinational corporations incur, they can also face political risks and other institutional problems not present in the North. We included a "tax" in our model to capture costs not found in the North.

Of course, other factors affect exploration and extraction—such as the cost of discoveries and the demand for natural resources. To see how well our institution-focused model reflected reality, we developed predictions from the model and tested them against the data set of 128 countries. We included country, year, and geographic location and controlled for global common shocks and technological progress. To account for institution quality we included the generic measure of market orientation mentioned above.

The empirical analysis is consistent with our model's predictions and with anecdotal information about individual countries. That is, a country's market orientation is associated with a statistically and economically significant increase in the likelihood of resource discovery. In all situations we found that countries discover more natural resources after they adopt market-based institutions, especially when they improve the investment climate and government stability—for example, when contracts are strengthened or expropriation risk is reduced. A country's proven resource endowment is thus in part determined by its institutions.

Our analysis suggests that if all of Latin America and sub-Saharan Africa were to adopt the same quality of institutions as the United States, the number of discoveries worldwide would increase by 25 percent, all else equal.

Institutions can affect discoveries in many ways. A stronger rule of law may reduce the risk perceived by potential foreign investors, making them more willing to undertake the long-term investments usually required in resource exploration and extraction. This could make it easier for a country to adopt better technology, if, for example, stronger contracts make the prospect of costly investments in technology more attractive. The institutional changes could also improve the quality of the labor force and in turn affect the number of discoveries if they stimulate public investment in education. The quality and quantity of U.S. mining schools, for example, is seen as key to the many natural resource discoveries there in the late 19th century. We did not attempt to determine which of these elements was the most important way better institutions foster exploration and extraction; we merely document that better institutions are associated with more discovery and development of resources.

Many researchers, such as Acemoglu, Johnson, and Robinson (2001), have found a close relationship between the quality of institutions and overall economic development. Our research supports those findings, at least insofar as resource development can be considered part of overall economic development. We found systematic evidence that policies geared toward economic liberalization and/or improvement in institutions lead to major natural resource discoveries that increase the level of known resources and eventually push those countries toward extractive activities.

What consequences for the South?

From a policy standpoint, the North-South shift in the frontier of resource exploitation is likely to have important, mainly beneficial, consequences for individual economies with newly found natural resources. Indeed, these discoveries expand the list of resource-rich countries. They also portend positive economic developments. New mines mean more investment and jobs, especially in the resource sector, and increased government revenues, which if spent properly can increase the health and welfare of the people. The new production has fostered new trade routes from Latin America and Africa to emerging Asia—such as China-Ghana and China-Chile—multiplying commodity trade alone on those routes by more than 20 times since the 1990s.

New mines mean more investment and jobs, especially in the resource sector, and increased government revenues.

However, these newly found resources pose challenges for policymakers in developing economies, not the least of which is ensuring that countries do not squander their natural resources—the so-called natural resource curse. Income from the new resource discoveries must be spent on high-quality, growth-enhancing investment to ensure that the whole country benefits. Better knowledge of what lies beneath their soil is important, but it is equally important for authorities to negotiate with multinational corporations to find the just middle ground between giving incentives to exploration and ensuring that resource income will further development.

Doomsday unlikely

The gradual improvement in institutions and, during the last 13 years, high commodity prices have led to a scramble for natural resources. However, the recent dramatic plunge in oil and other commodity prices will reduce the incentive to open mines and drill fields, which will hamper the move from discoveries to natural resource production.

From a broader perspective, while demand for natural resources from emerging markets has been a key driver of recent global commodity market developments, progress in the quality of institutions has helped increase the supply of commodities and diversified the sources of those commodities. Our findings puncture doomsday scenarios such as the peak oil hypothesis, which predicted that global oil production would peak in the year 2000.

Of course, exploration and development have not increased only in countries with newly improved institutions. The North has also benefited from new technologies that enhance exploration and allow recovery of resource deposits that could not be extracted using older techniques. In effect, investment in technology can increase resource endowment. For example, new so-called unconventional technology in the United States permits extraction of oil from tight rock formations once thought unsuitable for drilling. As a result, oil production in the United States has grown significantly in the past five years. The reemergence of U.S. oil production suggests that technology, depending on how and where it is adopted, could to some degree attenuate the North-South shift in the frontier of resource extraction. That said, as the South continues to develop an environment that encourages investment, the move of resource exploration and extraction to emerging market and developing economies will continue. ■

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This article is based on the authors' forthcoming IMF Working Paper, "Shifting Frontiers in Global Resource Extraction: The Role of Institutions."

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Reflections on communication by a former Reserve Bank of India governor

Duvvuri Subbarao conducts Reserve Bank of India press conference, Mumbai, January 27, 2013.

The SIGNAL and the NOISE

Duvvuri Subbarao

ONE of the nice things about being a central bank governor is that the markets hang on every word you say, treating every syllable, nuance, and twitch of the face as a market cue. One of the stressful things about being a central bank governor is that the markets hang on every word you say, treating every syllable, nuance, and twitch of the face as a market cue. That about sums up both the opportunity and challenge of central bank communication.

Virtually all central bank governors have taken an ego trip on the magic of the words they spoke or rued the fallout from some miscommunication. Experience helps but doesn't guarantee that markets will not deem what you said something other than what you believe that you said. I learned along the way—and sometimes the hard way.

There are powerful examples from around the world of how central banks have exploited the power of communication to enhance their policy effectiveness. Hours after the 9/11 terrorist attacks on the United States in 2001, the U.S. central bank put out a simple statement: "The Federal Reserve System is open and operating. The discount window is open to meet liquidity needs."

These two seemingly banal sentences, coming so soon after the attacks, had a remarkably calming effect on U.S.—and global—financial markets. The "announcement effect" was striking.

Similarly, when the collapse of the euro seemed imminent, European Central Bank President Mario Draghi's famous words in April 2012 that the central bank would do "whatever it takes" did more to save the euro than all the euro area leaders' exhausting summits, emergency conclaves, and emphatic communiqués.

The positive impact of communication is not limited to times of crisis, however. Today's conventional wisdom is that greater transparency, active outreach, and more open communication are always good for central banks.

Modernizing monetary policy

As an institution, the Reserve Bank of India is deeply sensitive to its responsibility to communicate with the public—not just on monetary policy but on the entire range of its broad mandate, which includes financial market developments, external sector management, regulatory issues, printing and distribution of currency, and economic development.

Giving forward guidance on monetary policy was a big and challenging institutional innovation introduced during my time. At the heart of forward guidance is an indication by the central bank to shape market expectations of how it would react to evolving macroeconomic developments, allowing market participants to make necessary adjustments.

Forward guidance on monetary policy was and is a contentious issue. At the Reserve Bank, we deliberated internally over whether to adopt the practice. We recognized that it is not a totally benign option, but decided to go ahead because we felt that the benefits outweighed the costs—especially given continuing global uncertainty.

Forward guidance is typically one short paragraph in a six- to eight-page policy document, but crafting it can be a test of communication skills. Aware that there is a minor industry whose purpose is to parse these few sentences and probe for coded messages behind the plain English, we spent a disproportionate amount of time debating the choice of words, the turn of phrase, and the nuance.

Along the way, we discovered several inherent challenges in giving forward guidance. For one, a central bank's indication of how it is likely to act in the future depends on economic developments. But markets tend to ignore the caveats and interpret the guidance as an irrevocable commitment. As a result they find themselves on the wrong foot when things don't turn out as expected. For example, in our policy reviews both in October and December 2011, we said that "the cycle of rate increases has peaked and further actions are likely to reverse the cycle." This generated a widely shared expectation of a rate cut at the January 2012 policy meeting, an expectation that did not materialize because inflation had not trended down as anticipated. Even though our inaction was consistent with the guidance, the market was unforgiving and believed we had reneged on our commitment.

Moreover, when financial conditions are uncertain, markets more than ever want greater and more specific guidance, but that is precisely when central banks are least able to deliver. In our November 2010 policy statement, we said: "Based purely on current growth and inflation trends, the Reserve Bank believes that the likelihood of further rate action in the immediate future is relatively low. However in an uncertain world, we need to be prepared to respond appropriately to shocks that may emanate from either the global or the domestic environment."

Our guidance reflected domestic uncertainty about agricultural prospects and their impact on growth and inflation and external uncertainty arising from the euro area sovereign debt crisis. Many analysts thought the guidance—especially the signal to markets of possible rate action if actual outcomes deviated from expectations—was helpful; a few, however, considered it too vague to be of any use.

As we moved on, I realized that markets demand not only guidance but "guidance on guidance"—in other words, an explanation of what the guidance means. This can be tricky because a lot of thought goes into the wording, and attempts at further explanation risk distorting the message.

For instance, at the postpolicy media conference following the November 2010 guidance cited above, I was pushed to elaborate on the meaning of "immediate future." I replied that what we implied by "immediate" was around three months, thereby suggesting, although not saying so explicitly, that there would be no policy rate hike at the December 2010 midquarter review, which was six weeks away, and that a hike would be considered only at the following quarterly policy review, three months away. This elaboration triggered criticism that the three-month pause implied by the guidance was too dovish and did not sit tidily with our statement of risks to inflation. We could have avoided the criticism by refraining from guidance altogether, but we felt it was in keeping with best practice and was our obligation to the markets.

How you say it

Even as the Reserve Bank has moved to modernize monetary policymaking, the traditional challenges of communication continue. What you say (or do not say) is important, but how you say it matters even more.

What you say (or do not say) is important, but how you say it matters even more.

In the midst of the so-called taper tantrum, on July 15, 2013—when global markets reacted badly to hints from the U.S. Federal Reserve that it might raise interest rates—I took the extraordinary step of raising rates to manage the exchange rate ahead of the regularly scheduled quarterly policy review. Quite understandably, the decision attracted a lot of commentary and the usual share of compliments and criticism. At the scheduled review on July 30, I saw no case for further policy adjustment and simply reiterated the need to correct domestic structural imbalances to bring stability to the external sector.

The postpolicy media conference that afternoon was to be my last as governor. I had been looking forward to this conference and expecting it to be somewhat of a farewell engagement. Instead of a serious question-and-answer session on substantive issues, we would reminisce about my five years as governor. That wasn't to be.

The first question was whether and when the monetary tightening measures instituted to manage the exchange rate would be withdrawn. The intent behind this unusual action was to squeeze systemic liquidity to curb speculation on the rupee and thereby send a strong signal to the market about the Reserve Bank's resolve to defend the currency. I replied that these measures were temporary and would be rolled back once the exchange rate regained stability, that the bank was sensitive to the short-term economic costs of tight liquidity but I was in no position to be locked in to a rollback time frame. My intention was to allay market fears that the tight liquidity policy would choke incipient growth in the economy at a time of growing concern about rapidly declining economic activity.

The market reacted very badly to my response, and the rupee fell from 59.63 to the dollar to 60.48 by market close that day. I was criticized for sounding apologetic about my decision to use monetary policy to defend the exchange rate. Critics said that my concern for growth was misplaced when the market expected the Reserve Bank to focus on the exchange rate to the exclusion of all other concerns.

I realize now that I may have been guilty of miscommunication. I should have known that when the rupee was under such pressure, being firm and assertive on the exchange rate was far more important than giving reassurance on growth.

Being too direct or explicit is sometimes inadvisable.

At the same time, I was puzzled by the market reaction, because my reply was almost identical to our statement in the printed document. The consensus among my senior advisors was that the criticism of "apologetic tone" stemmed not so much from the exact content of the reply as from the nuance and perhaps the body language.

Even as I was close to finishing my job as governor, I had not yet learned a rookie lesson in communication: markets don't take what the governor says at face value. At least, I had learned to be opportunistic, slipping in guidance or correcting misinterpretation in speeches or in informal interviews! I used an analysts' teleconference the following day to correct this misinterpretation. While replying to a related question, I asserted the "Reserve Bank's single-minded commitment" to stabilizing the rupee and added that in the given context, the benefits of rupee stability outweighed any short-term sacrifice of growth. This was entirely consistent with what I had said at the media conference the previous day, but rephrasing it this way conveyed the message the way the market wanted to hear it. I corrected for the nuance too. The previous day, I had said that *these measures will be withdrawn when* the rupee became stable. Now I made a subtle change to affirm that *these measures will not be withdrawn until* there was firm evidence that the rupee had stabilized. Maybe that sounded alpha male enough. The market reacted positively, and the rupee swiftly reversed the losses of the previous day.

Learning is an unending task, and my education in communication continued right up to the close of my tenure. I learned, for example, that being too direct or explicit is sometimes inadvisable. At the postpolicy news conference on October 30, 2011, I was asked whether the Reserve Bank would intervene in the foreign exchange market to build up reserves, and I responded directly: "No, we would not." My answer should not have surprised anyone or caused anxiety. I was just stating the obvious, that under the Reserve Bank's declared policy the only condition that would trigger foreign exchange intervention was exchange rate volatility. However, the rupee came under heavy pressure the next day, and some analysts faulted me for being too explicit and suggested that whatever the intent, I should not have been so direct.

I also learned, several times over, that nothing the governor says is off the record. For example, in mid-January 2013, I was speaking at the Indian Institute of Management at Lucknow, explaining to the students how the tension between growth and inflation is overplayed and why low and steady inflation was necessary for sustained growth. My remarks were not aimed at the here and now, but were meant to convey how hard it is to make a judgment call on a complex policy issue. The media interpreted my comments as a signal of further policy tightening at the coming policy review at the end of January, and it was all over the news agency tickers before I had even finished speaking.

And finally, I learned of the need to better shape my messages to ensure fuller and accurate coverage. For example, at a bankers' conference, I focused my comments on the efficiency of the Indian banking system and covered a host of issues, including the relative efficiency of public and private banks; their asset liability management, credit standards, and customer service; and the use of technology. In passing, I commented on the salary structure of public sector bank chairs and said that it needs to be reviewed to attract talent. I was puzzled by the way the media made it look as if I had devoted the entire speech to bemoaning the salary structure of public sector bank chiefs and the need to fix it to improve the efficiency of the Indian banking system. Follow-up articles and opinion pieces included extensive comparative analysis of the salary structure of public, private, and foreign bank CEOs. Some media analysts even put the measly salary of the Reserve Bank governor in their comparative charts. Much of this reporting was constructive, but I feel that the larger issues of banking system efficiency should have made it to the commentary.

Mixed record

In my five years at the Reserve Bank, I was largely commended for bringing a culture of openness to a conservative and inward-looking institution and was complimented for making the bank more transparent, responsive, and consultative; for listening as well as speaking; for streamlining our written documents and simplifying our spoken language. On the flip side, I was criticized for showing self-doubt and reticence instead of conveying certainty and confidence, for straying from the message, and for too much straight talk and too little tact. I was both praised for speaking up and criticized for not speaking enough when the occasion demanded. Some analysts thought that I was not the überconfident, alpha male central bank governor markets respect; others thought that it was, in fact, my low-key demeanor and low-profile personality that commanded respect and aided effective communication. I will let it rest there.

There are many things I miss about being governor. One of them is that I can no longer move markets by my spoken word. Equally, there are many things I enjoy about not being governor. One of them is that I can speak freely without any fear of moving markets. ■

Duvvuri Subbarao was Governor of the Reserve Bank of India from 2008 to 2013. This article is based on a chapter in his forthcoming book, Who Moved My Interest Rate?

Opening Up to Inequity

Davide Furceri and Prakash Loungani

After countries remove restrictions on capital flows, inequality often gets worse

IN June 1979, shortly after winning a landmark election, Margaret Thatcher eliminated restrictions on "the ability to move money in and out" of the United Kingdom, which some of her supporters regard as "one of her best and most revolutionary acts" (Heath, 2015). *The Telegraph* wrote that "in the economic dark ages that were the 1970s" U.K. citizens could "forget about buying a property abroad, purchasing foreign equities or financing a holiday . . . The economic impact was devastating: companies were reluctant to invest in the U.K. as it was tough even for them to move money back to their home countries." Thatcher abolished "all of these nonsensical rules and liberalized the U.K.'s capital account."

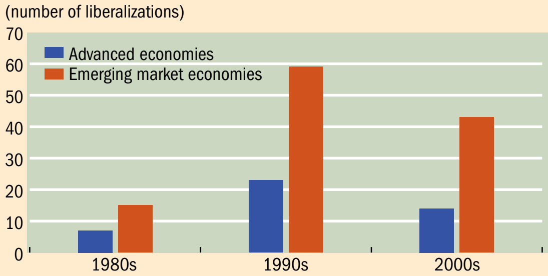
But Thatcher's critics had a different view. They regarded this same liberalization as starting a global trend whose "downside . . . proved to be painful" (Schiffrin, 2016). In their view, while the free mobility of capital across national borders confers many benefits in theory, in practice liberalization has often led to economic volatility and financial crisis. This in turn has adverse consequences for many in the economy, particularly for those who are not well off. Liberalization also affects the relative bargaining power of companies and workers (that is, of capital and labor, respectively, in the jargon of economists) because capital is generally able to move across national boundaries with greater ease than labor. The threat of being able to move production abroad reduces labor's bargaining power and the share of the income pie that goes to workers.

In studying such distributional effects of capital account liberalization we found that after countries take steps to open their capital account, an increase in inequality in incomes within countries follows (Furceri and Loungani, 2015). The impact is greater when liberalization is followed by a financial crisis and in countries where there is low financial development—that is, where financial institutions are small and access to these institutions is limited. We also find that the share of income going to labor declines in the aftermath of liberalization. Thus, like trade liberalization, capital account liberalization can lead to winners and losers. But while the distributional effects of trade have long been studied by economists, the distributional impacts of opening the capital account are just starting to be analyzed.

Chart 1

Popular move

In recent years, many countries have liberalized their capital account—that is, removed regulations on the flow of funds in and out of their economies.

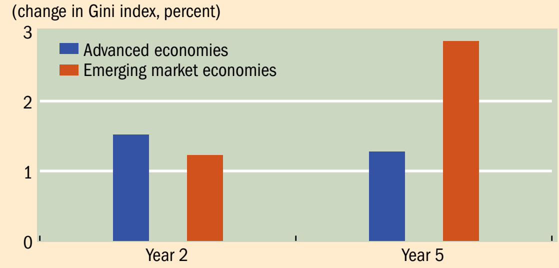


Source: Furceri and Loungani (2015).

Chart 2

Bad news ensues

Removal of regulations on capital flows in and out of a country is often followed by increases in income inequality.



Source: Furceri and Loungani (2015).
Note: The Gini coefficient is a measure of income inequality. If the index is at zero, income is equally shared in a country; at 100 one person has all the income. Data cover 1970–2010.

The push toward liberalization

At its annual meeting in October 1997 in Hong Kong SAR, the IMF put forward its arguments why countries should keep moving toward full capital account liberalization—that is, the elimination of restrictions on the movement of funds in and out of a country. The IMF's then-first deputy managing director, Stanley Fischer, called liberalization "an inevitable step on the path of development which cannot be avoided and should be embraced." Fischer, now vice chairman of the U.S. Federal Reserve Board, noted that liberalization ensures that "residents and governments can borrow and lend on favorable terms, and domestic financial markets become more efficient as a result of the introduction of advanced financial technologies, leading to better allocation of both saving and investment" (Fischer, 1998). While acknowledging that liberalization "increases the vulnerability of the economy to swings in [market] sentiment," Fischer argued that the potential benefits of opening up the capital account outweigh the costs.

Like trade liberalization, capital account liberalization can lead to winners and losers.

Persuaded by similar calculations, many governments have relaxed restrictions on foreign capital flows. Thatcher's move was followed by similar ones by Germany in 1984 and by other European countries over the subsequent decade. Among emerging market economies, Chile was an early mover toward liberalization, followed by several other Latin American countries in the 1990s and then by emerging market economies in Asia.

This push toward liberalization is widespread. An index of capital account openness constructed from annual IMF reports on cross-border financial transactions (IMF, various) shows a steady increase, signifying that restrictions on cross-border transactions have been progressively lifted.

We focused on episodes of large changes in this index, because such episodes are more likely to represent deliberate policy actions by governments to liberalize their capital accounts. According to this criterion, capital account liberalization picked up steam during the 1990s, with nearly 23 episodes of large changes in advanced economies and 58 in emerging market economies (see Chart 1). Of course, most emerging market economies started with a much more restricted capital account. As a result, even after steps toward liberalization, they remain, on average, less open than the advanced economies.

Liberalization and inequality

These episodes of capital account liberalization were followed by increases in income inequality. A commonly used measure of inequality is the Gini coefficient, which takes the value zero if all income is equally shared within a country and 100 if one person has all the income. In both advanced and emerging market economies, the Gini coefficient increases—in other words, inequality grows—following a liberalization. The short-term impact after two years is similar in both advanced and emerging market economies, but in the medium term, after five years, inequality widens much more in emerging markets (see Chart 2).

These effects are quantitatively significant. Gini coefficients change slowly over time: changes in the Gini have a standard deviation of 2 percent (that is, nearly 70 percent of the time, when the Gini index changes, it does so by less than 2 percent). The effects shown in Chart 2 are therefore quite large relative to the standard deviation; in simple terms, episodes of capital account liberalization can lead to big increases in inequality.

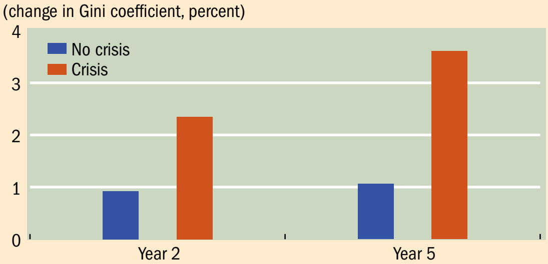
The impact of capital account liberalization on inequality holds even after several other determinants of inequality—such as openness to trade, changes in the size of government, and regulation of product, labor, and credit markets—are accounted for.

Why is liberalization followed by inequality? There are two possible reasons. First, as even Fischer acknowledged,

Chart 3

Compounded by crisis

If a financial crisis follows a capital account liberalization, inequality grows more than if there is no crisis.

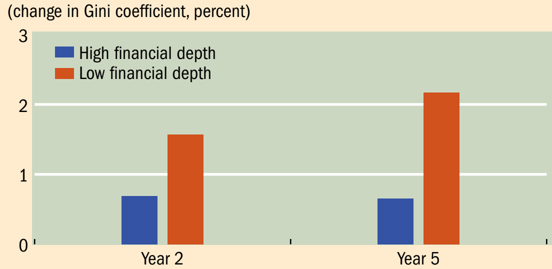


Source: Furceri and Loungani (2015).
Note: The Gini coefficient is a measure of income inequality. If the index is at zero, income is equally shared in a country; at 100 one person has all the income. "Financial crisis" is a broad term used to describe situations in which the value of financial assets, such as stocks and bonds, and/or the health of financial institutions declines precipitously and quickly. Data cover 1970–2010.

Chart 4

Deeper is better

Countries with deeper financial systems have less of an increase in inequality after capital account liberalization than those with less-well-developed financial systems.



Source: Furceri and Loungani (2015).
Note: The Gini coefficient is a measure of income inequality. If the index is at zero, income is equally shared in a country; at 100 one person has all the income. Data cover 1970–2010.

opening up to foreign capital flows can be a source of volatility—with large capital inflows followed by outflows and vice versa. Critics of liberalization insist that this volatility is a source of crisis. Dani Rodrik, for instance, noted that in 1996, five Asian economies received nearly $100 billion in inflows but experienced an outflow of over $10 billion the following year.

"Consequently," Rodrik wrote, three of those economies (Indonesia, Korea, Thailand) "were mired in a severe economic crisis" (1998). Rodrik argues that this is not an "isolated incident" and that "boom-and-bust cycles are hardly a sideshow or a minor blemish in international capital flows; they are the main story."

Second, liberalization should, in theory, expand the access of domestic borrowers to sources of capital. In practice, the strength of domestic financial institutions may play a crucial role in determining the extent to which this takes place. But in many countries, financial institutions do not offer a wide range of services, and large numbers of people do not have access to credit (Sahay and others, 2015). In these circumstances, liberalization may bias financial access in favor of those who are well off, which increases inequality.

We find evidence in favor of both channels: the impact of liberalization is greater when it is followed by a crisis and where financial depth and inclusion are low.

To study the first channel, we separated cases in which capital account liberalizations were followed by a financial crisis from cases in which no crisis ensued. The impact of openness on inequality differs markedly between the two cases, as shown in Chart 3. In particular, when there was a crisis, there was a medium-term increase in inequality of 3.5 percent, compared with a 1 percent increase in cases when no crisis ensued.

The evidence thus suggests that the combination of capital account liberalization and financial crisis leads to a significant impact on inequality. It is worth noting that not all financial crises lead to increases in inequality because there are offsetting effects (Otker-Robe and Podpiera, 2013). On one hand, financial crises may reduce inequality because bankruptcies and falling asset prices generally have a greater impact on those who are better off. On the other hand, financial crises associated with long-lasting recessions may disproportionately hurt the poor—and increase inequality.

The effect of liberalization on inequality also differs by financial depth and inclusiveness. We separate countries where financial markets are not very deep from others using a composite indicator from the Fraser Institute, a Canada-based think tank. In the medium term, inequality increases by over 2 percent in countries with low financial depth, four times the increase in countries with high financial depth (see Chart 4).

Labor's income share shrinks

In the textbook model of perfect competition, each factor of production—capital and labor—gets its just reward based on its contribution to a company's profits. But a more realistic description of the world is one of imperfect competition, where the division of the economic pie is based not just on the relative contributions of capital and labor to the bottom line but on their relative bargaining power. In his 1997 book, *Has Globalization Gone Too Far?*, Rodrik argued that capital account liberalization tilts the playing field in favor of capital, the more mobile of the factors of production. Because companies can move their operations abroad, workers' bargaining power can erode and they may lose some of their share of income.

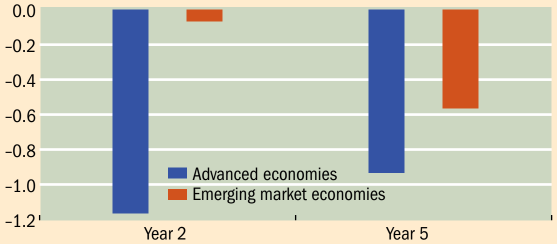
The evidence points to a clear decline in labor's share of income following capital account liberalization (see Chart 5). Focusing on the medium-term impact, which can be estimated more precisely than short-term effects, labor's share falls by about 1 percentage point in advanced economies and by about 0.6 percentage point in emerging market economies. As was the case with the Gini measure of inequality, these are big effects. The changes in the labor share have a standard deviation of 2.25 percentage points

Chart 5

Workers lose

In the aftermath of a financial liberalization, the labor share of income declines, more in advanced economies than in emerging market economies.

(change in labor share of national income, percent)



Source: Furceri and Loungani (2015).

(that is, nearly 70 percent of the time, when the labor share changes, it does so by less than 2.25 percentage points). Hence, capital account liberalization is associated with large declines in labor shares.

The impact of the loss of bargaining power may be more severe for workers in advanced economies than in emerging market economies for two reasons. First, companies in advanced economies may be in a better position to make a credible threat to relocate abroad—where wages are lower. Second, in many emerging market economies capital is scarce relative to labor. The arrival of foreign investment capital can raise the demand for labor, mitigating some of the effects of the relative change in bargaining power due to the opening of the capital account.

Capital account liberalization is associated with large declines in labor shares.

Proceed with caution

The benefits of capital account liberalization posited by Fischer nearly two decades ago still echo in the IMF's work, but there is a greater note of caution (Ostry and others, 2011). The IMF's "institutional view" (IMF, 2012) notes that liberalization allows domestic companies access to pools of foreign capital, and often—through foreign direct investment—to the technology that comes with it. It also allows domestic savers to invest in assets outside their home country. At the same time, the institutional view recognizes that capital flows can be volatile and—particularly given their large size relative to domestic markets—can pose a risk to financial stability. It concludes that "capital flow liberalization is generally more beneficial and less risky if countries have reached certain levels or thresholds of financial and institutional development." There is also greater acceptance of capital flow management measures (more commonly called "capital controls") to deal with the volatility of capital flows (Ostry and others, 2010).

We found an additional reason for a cautious approach to opening up the capital account. Countries that make reduction in inequality an important policy goal may need to design liberalization in a manner that balances this consideration against the benefits of higher productivity and growth. We also find that the impact of liberalization on inequality is muted when countries are at higher levels of financial development or when no financial crisis ensues after liberalization. This lends further support to the view that the benefit-to-cost ratio of liberalization is higher for countries above a certain level of financial development and where countries have adequately strengthened financial regulations before liberalization. In such cases, the benefits to growth are more likely to materialize, the risks of crisis are smaller, and the distributional costs—in terms of higher inequality and a lower labor share—are also smaller. ■

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Trade Turbulence

Megaship *Benjamin Franklin*, docked at Port of Los Angeles, San Pedro, California, United States.

Cristina Constantinescu, Aaditya Mattoo, and Michele Ruta

China's transition to a new growth path is contributing to trade volatility today and will shape trade opportunities tomorrow

GLOBAL trade has been a puzzle lately. In the 2000s, and especially after the Great Recession, trade growth has been persistently sluggish relative to GDP. And 2015 appears to have added a new dimension: volatility. Available data indicate that global trade contracted sharply in the first half of the year before beginning to grow again, albeit slowly.

In a previous article ("Slow Trade," in the December 2014 *F&D*), we examined the cyclical and structural factors behind the global trade slowdown: weak demand, maturing value chains, and slower trade liberalization than in the 1990s. These forces are all still at work and contributed to the weak growth of world trade in 2015.

The trade fluctuations in 2015 may reflect turbulence as China adjusts to a new, slower growth path that is less dependent on investment and industrial production. China's transition has strikingly different implications for countries depending on their main exports. Some of these effects are temporary; others are more structural. *Manufacturers* (especially in east Asia) suffered significant declines in export quantities but are now recovering; *commodity producers* were hurt primarily by lower export prices, which persist; and *services* exporters have benefited in a way that could presage future opportunities.

A most peculiar year

After a period of low but fairly consistent trade growth, preliminary data for 2015 show a sudden contraction in trade volume of about 3 percent quarter over quarter in the first half of the year (see Chart 1). In the third quarter of 2015, growth appears to be positive again but weaker than in the second half of 2014. The contraction and partial rebound were concentrated in emerging market economies.

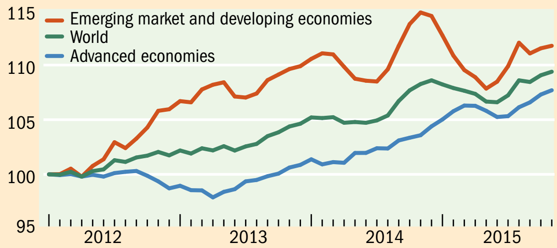
Emerging Asia, which accounts for more than a quarter of world trade, seems to have been the epicenter of the 2015 trade downturn and incipient rebound. According to preliminary figures, in the first half of 2015 emerging Asia's imports dropped by 10 percent, accounting for nearly 90 percent of the contraction in world import volumes. China alone saw a contraction in import volumes of 15 percent and was responsible for more than half of the contraction in world imports (see Chart 2). The reversal of these trends in the

Chart 1

Shopping rebound

World merchandise import volumes contracted in early 2015 and then recovered somewhat later in the year.

(three-month moving average, January 2012 = 100)



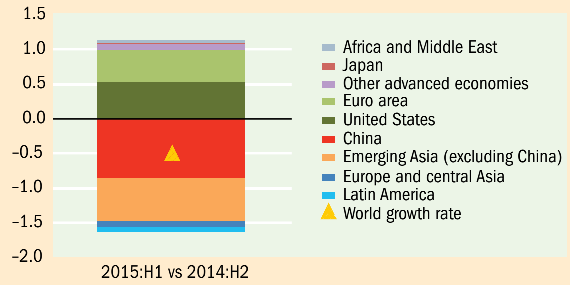
Source: CPB Netherlands Bureau of Economic Policy and Analysis; seasonally adjusted data.

Chart 2

Chinese influence

China has had the most influence on changes in world merchandise imports.

(contributions to world merchandise import volume growth, percent)



Sources: CPB Netherlands Bureau of Economic Policy Analysis; and World Bank *Global Economic Monitor.*

region in the third quarter is contributing to the rebound that we observe in world trade, although trade growth in 2015 was still weaker than in 2014. Developments in other regions also matter. In particular, lower imports from crisis-stricken commodity exporters such as Brazil and Russia—in part reflecting lower demand in China, as discussed below—have contributed to falling global imports.

Napoleon's prophecy

Napoleon is reputed to have said, "When China wakes, the world will shake." Indeed, short-term macroeconomic fluctuations as China's economy shifts from investment and manufacturing to consumption and services are affecting the pattern of production and trade in east Asia and beyond. These changes are manifested in manufacturing, commodities, and services trade.

On the production side, the slowdown in GDP has been concentrated in the industrial sector, which depends more

China's transition has strikingly different implications for countries depending on their main exports.

on imported inputs than do other sectors of the economy; imported inputs make up 11.5 percent of total inputs in the industrial sector and only about 6 percent in other sectors. On the demand side, the slowdown is more significant in investment, which has greater, though declining, import intensity than other components of total demand. The import intensity of China's investment is more than 50 percent higher than that of its consumption. Investment-related imports account for almost 60 percent of China's total imports, and for 11 percent of the world's investment-related imports (second only to the United States).

The contraction in China's imports was distributed across all the regions of the world. Countries more exposed to China, as measured by that country's share in their total exports, tended to see a greater contraction in the value of their exports in the first half of 2015 than in the corresponding period in 2014 (see Chart 3). Bilateral trade data for the third quarter are not yet available. A 1 percent higher exposure to China meant a 0.3 percent greater contraction in the growth of value of a country's exports. The reduction in value of exports was attributable to lower prices and lower quantities, varying across regions depending on the composition of their exports. The slower growth in imports from large commodity exporters, such as those in the Middle East and sub-Saharan Africa, reflects the recent drop in prices; the sizable contraction in imports from emerging Asia, especially in the first quarter of 2015, resulted largely from lower quantities.

Magnifying chains

The impact on *manufacturing* was most visible in east Asia, which experienced a regional trade collapse. China is an important ultimate destination for the value-added exports of other Asian countries. Data available for five countries in east and south Asia indicate that about 50 percent of gross exports of these countries to China constitute value added that is ultimately absorbed in China, and therefore fully dependent on Chinese demand. Another 20 percent of regional exports are reexported by China and consumed in third countries, and therefore not dependent on China's demand. The remainder constitutes foreign value added in a particular country's gross exports to China, which originates elsewhere in the region and beyond.

The impact of macroeconomic changes in China may have been magnified by changes in the composition of economic activity. Production shifted away from sectors that are associated with global value chains—that is, from industrial production to services and, within industrial production, from capital goods (equipment and machinery) to consumption goods. Given the extensive network of supply chains in east Asia, this magnification effect likely affected intraregional trade flows more than interregional trade.

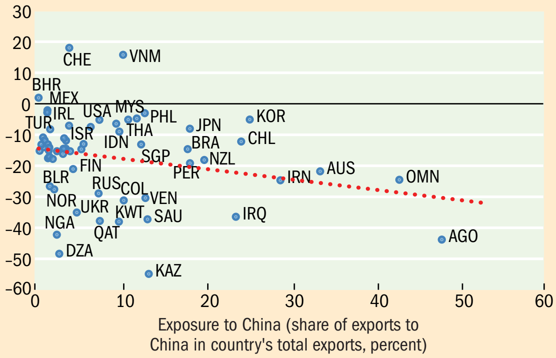
In the longer term, the recovery of global trade will, on one hand, be limited by diminished growth in demand in

Chart 3

Contractions exposed

Countries more exposed to China saw a greater contraction in the value of their exports in the first half of 2015 versus the first half of 2014.

(growth in total merchandise export values, first half of 2015 relative to first half of 2014)



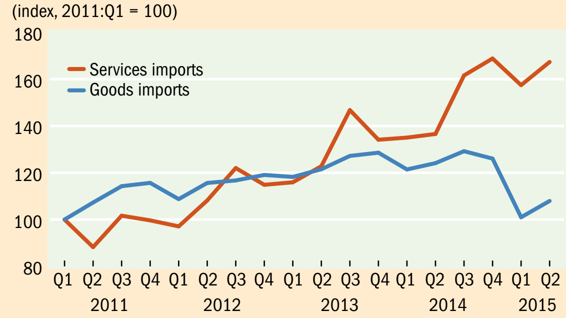
Source: IMF, *Direction of Trade Statistics*.
Note: Data labels in the chart use International Organization for Standardization (ISO) country codes.

Chart 4

Divergent paths

China's imports of services are rising while imports of goods decline.

(index, 2011:Q1 = 100)



Source: IMF, *Balance of Payments Statistics*.

China; on the other hand, it will be boosted by the relocation of production away from China toward other lower-cost economies. Rebalancing from investment to consumption is likely to create opportunities for exporters of final goods and may also eventually boost upstream intermediate and capital goods sectors that are now adversely affected.

Nominal troubles and real opportunities

Commodity exporters saw no decline in export *volumes*. Exporters in Africa, the Middle East, eastern Europe and central Asia, and Latin America did experience lower trade *values*, but that was largely because of falling commodity prices—that is, a nominal rather than a real contraction. This evidence suggests primarily a price response to expectations of diminished demand for commodities and enhanced supply in sectors like oil and gas. Nevertheless, deterioration in the terms of trade for commodity producers has hurt real incomes for that group and contributed to recessions in countries such as Brazil and Russia, leading to a further contraction in commodity exporters' import volumes.

Africa and the Middle East are emblematic of these nominal troubles. Having experienced the deepest plunge in export values since mid-2014, Africa and the Middle East contributed significantly to the recent decline in world trade values. Mostly a nominal phenomenon driven by changing prices, the downturn in oil and commodity exports also reflects sluggish volume growth in recent years. China and other emerging Asian economies together account for more than half of the decline in export values of Africa and the Middle East.

The rebalancing of the economy from investment to consumption is also shifting China's demand from goods to *services*. Some of this demand is being served by cross-border imports and consumption abroad—whose growth is already visible. Available data indeed show the different dynamics of goods and services imports in recent years, with slowing imports of goods and rising imports of services, especially travel (see Chart 4). The latter may reflect consumption abroad of services ranging from tourism to education and health. But it is also possible that these data capture other short-term factors such as disguised or illegal capital outflows.

Services imports are growing, but trade in goods still dominates. The net effect is influenced largely by the decline in imports of goods, because services were a relatively small share of total imports of China in 2014. But the share of services has grown—from about 15 percent at the beginning of 2011 to close to 22 percent in the first half of 2015.

Mind the transition

Looking ahead, the rebalancing of the Chinese economy will unquestionably influence trends in world trade. But how the transition is managed will affect how much global trade fluctuates in the coming years.

Diminished growth in China, as well as the national shift in emphasis from investment to consumption, is affecting manufacturing and commodity exporters. The changing composition of demand is likely to favor exporters of consumption goods and eventually of upstream intermediate and capital goods used in their production. In the longer term, rising wages in China may also encourage industrial production and exports in lower-cost economies, and in turn enhance demand for commodities. Finally, the rebalancing is also shifting China's demand from goods to services, and these imports may grow even faster if services markets continue to open up. ■

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This article is based on a World Bank report by the authors, "Global Trade Watch: Spillovers from China's Rebalancing."

The TRUTH about BANKS

Michael Kumhof and Zoltán Jakab

Banks create new money when they lend, which can trigger and amplify financial cycles

PROBLEMS in the banking sector played a critical role in triggering and prolonging the two greatest economic crises of the past 100 years: the Great Depression of 1929 and the Great Recession of 2008. In each case, insufficient regulation of the banking system was held to have contributed to the crisis. Economists therefore faced the challenge of providing policy prescriptions that could prevent a repeat of these traumatic experiences.

The response of macroeconomists—those who study the workings of national economies—in the 1930s was strikingly different from attitudes today. Then, there were two leading contenders for radical banking reform in the United States: the proposals that would eventually become the Glass-Steagall Act—which separated commercial and investment banks, created the deposit insurance program, and allowed greater branching by national banks—and proposals for 100 percent reserve banking, under which each dollar deposited by a bank customer must be backed by a dollar of cash in bank vaults or of bank reserves in the central bank.

Most leading U.S. macroeconomists at the time supported 100 percent reserve banking. This includes Irving Fisher of Yale and the founders of the so-called Chicago School of Economics. One of the main reasons they supported 100 percent reserve banking was that macroeconomists had, just before the Great Depression, come around to accept-

ing some fundamental truths about the nature of banking that had previously eluded the profession, specifically the fact that ***banks fund new loans by creating new deposit money*** (Schumpeter, 1954). In other words, whenever a new loan is made to a customer, the loan is disbursed by creating a new deposit of the same amount as the loan, and in the name of the same customer. This was a critical vulnerability of financial systems, it was thought, for two reasons.

First, if banks are free to create new money when they make loans, this can—if banks misjudge the ability of their borrowers to repay—magnify the ability of banks to create financial boom-bust cycles. And second, it permanently ties the creation of money to debt creation, which can become problematic because excessive debt levels can trigger financial crises, a fact that has since been corroborated using modern statistical techniques (Schularick and Taylor, 2012).

The proposals for 100 percent reserve banking were therefore aimed at taking away the ability of banks to fund loans through money creation, while allowing separate depository and credit institutions to continue to fulfill all other traditional roles of banks. Depository institutions would compete to give customers access to an electronic payment system restricted to transactions in central-bank-issued currency (some of which could bear interest); credit institutions would compete to attract such currency and lend it out once they had accumulated enough.

In Benes and Kumhof (2012) we found support for the claimed advantages of the 100 percent reserve proposal, using modern quantitative tools. To be clear, this article does not advocate 100 percent reserve banking; we mention its history here only as critical to the debate over the nature of banks.

In the 1930s the less radical Glass-Steagall reforms won the day, and eventually the U.S. financial system stabilized. But a by-product of this victory was that critical pre-war lessons about the nature of banking had, by the 1960s, been largely forgotten. In fact, around that time banks began to completely disappear from most macroeconomic models of how the economy works.

Unprepared for the Great Recession

This helps explain why, when faced with the Great Recession in 2008, macroeconomics was initially unprepared to contribute much to the analysis of the interaction of banks with the macro economy. Today there is a sizable body of research on this topic, but the literature still has many difficulties.

We find that many of these difficulties reflect the failure to remember the lessons of the 1930s (Jakab and Kumhof, 2015). Specifically, virtually all recent mainstream neoclassical economic research is based on the highly misleading “intermediation of loanable funds” description of banking, which dates to the 1950s and 1960s and back to the 19th century. We argue instead for the “financing through money creation” description, which is consistent with the 1930s view of economists associated with the Chicago School. These two views have radically different implications for a country’s macroeconomic response to financial and other shocks. This in turn has obvious relevance for key policy choices today.

In modern neoclassical intermediation of loanable funds theories, banks are seen as intermediating real savings. Lending, in this narrative, starts with banks collecting deposits of previously saved real resources (perishable consumer goods, consumer durables, machines and equipment, etc.) from savers and ends with the lending of those same real resources to borrowers. But such institutions simply do not exist in the real world. There are no loanable funds of real resources that bankers can collect and then lend out. Banks do of course collect checks or similar financial instruments,

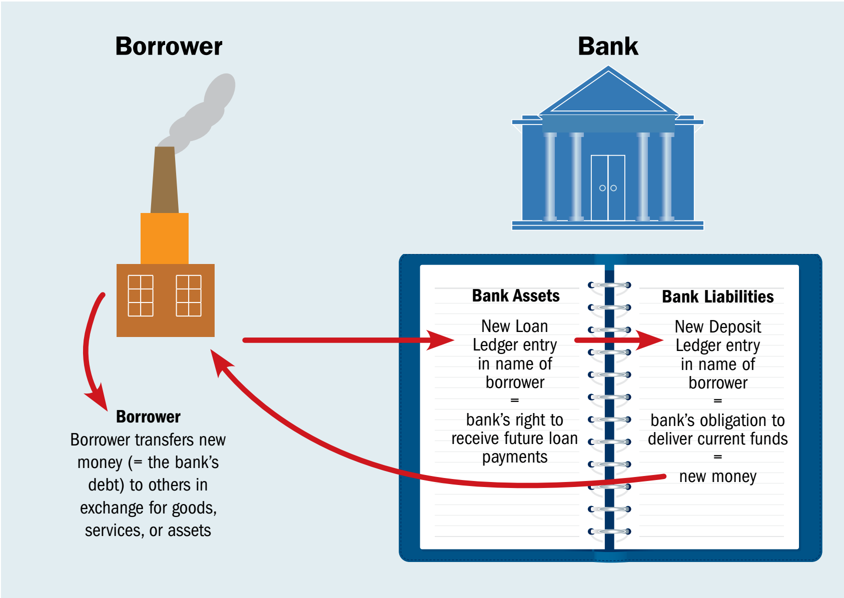
New funds are produced only with new bank loans.

but because such instruments—to have any value—must be drawn on funds from elsewhere in the financial system, they cannot be deposits of new funds from outside the financial system. New funds are produced only with new bank loans (or when banks purchase additional financial or real assets), through book entries made by keystrokes on the banker’s keyboard at the time of disbursement. This means that the funds do not exist before the loan and that they are in the form of electronic entries—or, historically, paper ledger entries—rather than real resources.

This process, financing, is of course the key activity of banks. The detailed steps are as follows. Assume that a banker has approved a loan to a borrower. Disbursement consists of a bank entry of a new loan, in the name of the borrower, as an asset on its books and a simultaneous new and equal deposit, also in the name of the borrower, as a liability. This is a pure bookkeeping transaction that acquires its economic significance through the fact that bank deposits are the generally accepted medium of exchange of any modern economy, its money. Clearly such transactions—which one of us has personally witnessed many times as a corporate banker—involve no intermediation whatsoever. Werner (2014), an economist with a banking background, provides a much more detailed description of the steps involved in a real-world loan disbursement.

We use the term “bank deposit” very broadly here to include all nonequity bank liabilities—that is, everything from checking accounts to long-term debt securities—because these liabilities can all be considered forms of money, albeit with highly varying degrees of liquidity. While the initial deposit is always created as a checking account, the ultimate holders of the new bank liability will as a rule demand a positive interest rate, with the level depending on how much they value liquidity over financial returns.

Two misconceptions could arise in this context. First, the newly created deposit does not “go away” as soon as the borrower uses it to purchase a good or an asset. It may leave the borrower’s bank if the seller of the good or asset banks elsewhere, but it never leaves the banking system as a whole unless the underlying loan is repaid. This highlights the great



importance of thinking about banks as part of an interconnected financial system, rather than thinking about one bank in isolation. Second, there is no reason to assume that such a loan will be repaid immediately. To the contrary, a loan is extended precisely because the funds are to be used to support additional economic activity, which in turn generates additional demand for liquidity and thus for bank deposits. If the funds are used to support relatively unproductive economic activity, it will give rise to relatively more goods or asset price inflation and less additional output. But this type of distinction is precisely what our new conceptual framework allows us to quantify.

Financing through money creation

This "financing through money creation" function of banks has been repeatedly described in publications of the world's leading central banks—see McLeay, Radia, and Thomas (2014a, 2014b) for excellent summaries. What has been much more challenging, however, is the incorporation of these insights into macroeconomic models. Our research therefore builds examples of economic models with "financing through money creation" banks and then contrasts the models' quantitative predictions with those of otherwise identical "intermediation of loanable funds" models.

We should add here that the financing through money creation view is well known in the post-Keynesian economic literature, which however differs from our approach in two ways. First, it does not feature the optimizing households and firms of modern neoclassical theory, which have become de rigueur in mainstream economics, including at most policy institutions. Second, it tends to model credit and money as fully demand determined, with banks playing a very passive role. The added value of our work is the assumption of a more realistic world in which credit risks limit banks' credit supply, and liquidity preferences limit nonbanks' demand for money.

In simulations that compare how these models behave, we assume that, in a single quarter, the likelihood of borrowers missing payments increases very significantly. Under the realistic assumption that banks had to set their lending interest rates before this shock, and are committed to these rates for some time under existing loan contracts, banks suffer significant loan losses. They respond by writing new loan contracts that take into account the increased risk and the erosion of their capital buffers. This forces them to make fewer new loans and charge higher interest on the ones they do make. However, hypothetical "intermediation of loanable funds" banks would choose very different combinations from real-world "financing through money creation" banks.

Intermediation of loanable funds banks would not, in aggregate, be able to reduce their balance sheets quickly during a crisis. Aggregate deposits of loanable funds could at best fall gradually over time, if depositors, in response to a recession, were to accumulate smaller savings than before. The only other theoretically feasible way for bank balance sheets to shrink would be for depositors to acquire private debt or equity securities from banks during the crisis. But empirical evidence shows that, during crises, holdings of nonbank debt or equity by the nonfinancial sector do not grow significantly. Moreover, this explanation says nothing about how banks' loan books (as opposed to their securities books) could shrink during a crisis.

Therefore, banks in the intermediation model, with the size of their balance sheets changing slowly, would keep lending to riskier borrowers. To compensate for this risk, they would dramatically increase their loan rates to ensure continued profitability.

On the other hand, financing through money creation banks can instantly and massively reduce the quantity of their lending if they think it will improve profitability. To reiterate, this flexibility is possible because deposits represent monetary purchasing power that can—through bookkeeping entries—be destroyed as fast as it was created, rather than representing real savings, which can decline only through reduced production or increased consumption of resources. Banks in the money creation model can immediately demand repayment (or refuse rollover) of a large share of existing loans out of existing deposits, causing an immediate, simultaneous, and large contraction of bank loans and bank deposits, while intermediation banks would experience almost no initial change.

Because this cutback in lending, relative to the intermediation model, reduces existing corporate bank borrowers' ratios of loans to collateral assets, and therefore the riskiness of their outstanding loans, banks initially increase interest rate spreads on these remaining loans far less than in the intermediation model. Much of their response is therefore in the form of quantity rationing rather than changes in interest rate spreads. This is also evident in the behavior of bank leverage, a key balance sheet ratio defined as the ratio of bank assets to net worth. In the intermediation model, bank leverage increases on impact, because losses and thus the decrease in net worth far exceed the gradual decrease in loans. In the money creation model, leverage either remains constant or drops, because the rapid decrease in loans is at least as large as the change in net worth. Finally, the contraction in GDP in the money creation model is typically far larger than in the intermediation model, mainly as a result of severe credit rationing and the ensuing shortages of liquidity throughout the economy.

It is straightforward to demonstrate that these characteristics of money creation models are much more in line with the actual data. Most important, bank lending—both for individual banks and for national banking systems—exhibits frequent, large, and fast jumps. Contrary to typical intermediation models, and again in line with the data, money creation models predict bank leverage ratios that increase during booms and fall during contractions, as well as severe credit rationing during downturns.

Saving does not finance investment, financing and money creation do.

The fundamental reason for these differences is that, according to the intermediation narrative, aggregate system-wide deposits must be accumulated through saving physical resources, which by its very nature is gradual and slow. On the other hand, the money creation narrative says that banks can create and destroy deposits instantaneously, because the process involves bookkeeping transactions rather than physical resources. Although deposits are essential to purchases and sales of real resources outside the banking system, they are not themselves physical resources and can be created at almost no cost.

Even though banks do not face technical limits to a quick rise in the quantity of their loans, they still face other restraints. But the most important limit, especially during the boom periods of financial cycles when all banks simultaneously decide to lend more, is their own assessment of their future profitability and solvency. The availability of savings of real resources does not constitute a limit to lending and deposit creation, nor does the availability of central bank reserves. Modern central banks pursue interest rate targets and must supply as many reserves as the banking system demands at those targets. This fact flies in the face of the still very popular deposit multiplier narrative of banking, which argues that banks make loans by repeatedly lending out an initial deposit of central bank reserves.

To summarize, our work builds on the fundamental fact that banks are not intermediaries of real loanable funds, as is generally assumed in the mainstream neoclassical macroeconomics literature. Rather, they are ***providers of financing***, through the creation of new monetary purchasing power for their borrowers. Understanding this distinction has important implications for a host of practical questions. We will conclude with one example, but there are many others.

Practical implication

Many policy prescriptions aim to encourage physical investment by promoting saving, which is believed to finance investment. The problem with this idea is that saving does not finance investment, financing and money creation do. Bank financing of investment projects does not require prior saving, but the creation of new purchasing power so that investors can buy new plants and equipment. Once purchases have been made and sellers (or those farther down the chain of transactions) deposit the money, they become savers in the national accounts statistics, but this saving is an accounting consequence—not an economic cause—of lending and investment. To argue otherwise is to confuse the respective macroeconomic roles of real resources (saving) and debt-based money (financing). Again, this point is not new; it goes back at least to Keynes (Keynes, 2012). But it seems to have been forgotten by many economists, and as a result is overlooked in many policy debates.

The implication of these insights is that policy should place priority on an efficient financial system that identifies and finances worthwhile projects, rather than on measures that attempt to encourage saving, in the hope that it will finance desired investment. The "financing through money creation" approach makes it very clear that with financing of physical investment projects, saving will be the natural result. ■

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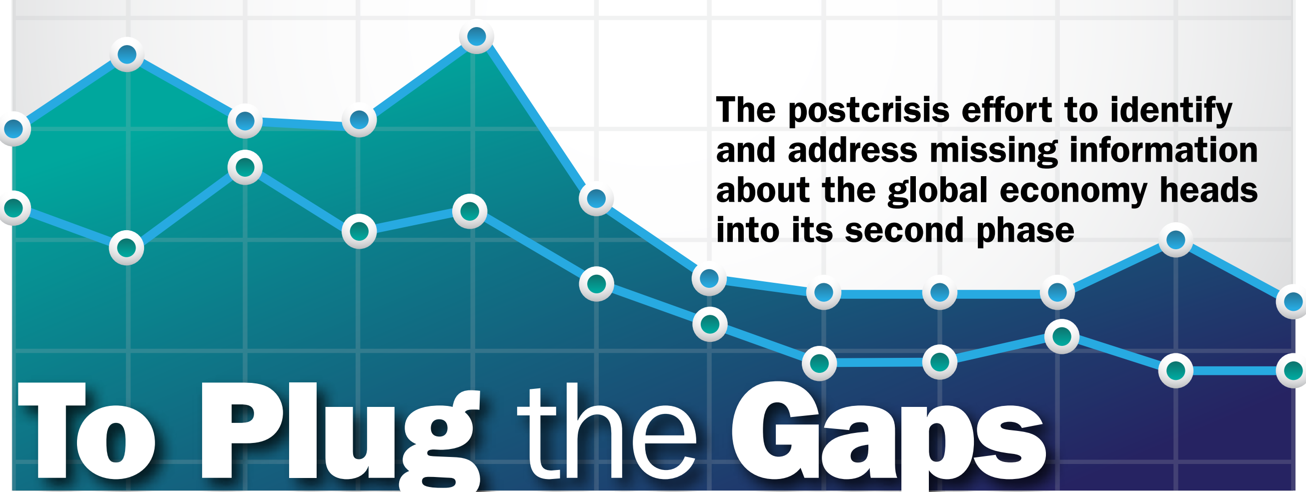


To Plug the Gaps

The postcrisis effort to identify and address missing information about the global economy heads into its second phase

Evrim Bese Goksu and Robert Heath

THE recent global financial crisis revealed gaps in economic and financial data that hindered detection of a buildup of economic risks. Eight years after the beginning of the crisis, policymakers and statisticians have made progress in identifying and addressing missing information. But more work is needed to complete the data enhancements envisioned in 2009 by the Group of 20 (G20) advanced and emerging market economies.

The so-called data gaps initiative, whose first phase ended in September 2015, dealt with missing information that is important to monitoring both financial institutions and global developments (a process called surveillance). It involved many organizations that gather economic and financial statistics. The G20 (which comprises Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, South Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, the United Kingdom, the United States, and the European Union) has authorized a second phase of the data gaps project.

Regulatory reform

The initiative deals with missing information that is essential to implementing global regulatory reforms to protect against problems in financial institutions that could spill across borders and affect the stability of the international financial system. Information was needed in the following areas.

Soundness of the financial system: The IMF has long produced a set of statistics, *Financial Soundness Indicators*, essential for monitoring and assessing the health and soundness of the financial sector overall. The data previously focused primarily on banks' health. Because of the rapidly changing financial environment and postcrisis global regulatory reforms, the list of indicators was updated in 2013, with an increased focus on nonbank financial institutions. The number of countries covered since 2008 has grown from 45 to more than 100.

Shadow banking: Financial institutions, such as investment firms, that are not banks but assume bank-like risks in providing funding to borrowers have been growing in importance in global financial markets. Typically, these institutions borrow heavily short term while investing in long-term assets that are hard to sell quickly. This exposes them to cash flow and maturity risks. But because they are not banks, many of their activities have not been captured by traditional banking regulation and statistics gathering. In 2011, the Financial Stability Board (FSB), an international body that monitors the global financial system, began an annual global shadow banking monitoring exercise that, as of 2014, included jurisdictions that account for 80 percent of global GDP and 90 percent of global financial system assets. The FSB plans to begin collecting and aggregating data on securities financing markets in 2017.

Global systemically important banks: Because major banks that are globally interrelated can spread shocks across borders and because the failure of one (or more) of them could severely upset the global financial system, several measures have been adopted to improve these institutions' resilience. Better data on the linkages among these institutions and their relationship to national financial systems can clarify the risks they pose. To this end, unique reporting forms were developed by a group headed by the FSB to produce consistent, detailed information on these global institutions that can be used by domestic regulators and to some extent by international financial institutions to monitor international financial stability. Data are being collected on bilateral linkages. This collection will continue and will include information on their exposure to and lending from 35 key economies.

Securities and derivatives markets: Because securities markets are an important channel for financing the real economy, better information about these markets is essential to understanding what is in the portfolios of both borrowers and creditors. The new *Handbook on Securities Statistics,* produced by the European Central Bank, the Bank for International Settlements (BIS), the IMF, and the World Bank, is fostering improvement in G20 countries' reporting to the BIS database on securities statistics. Moreover, the need to increase the transparency of trading in the over-the-counter *derivatives* markets has led to expanded coverage of data on credit default swaps, which are derivatives to insure against loan defaults. The second phase of the data gaps initiative will expand coverage of other derivatives traded over the counter—that is, not on an organized exchange.

Surveillance

Because institutions are increasingly interconnected, financial market shocks can spill over significantly across borders and across markets and institutions. This prospect calls for stronger balance sheet information and enriched flow-of-funds data to help analyze the impact of shocks and their transmission across sectors. New global flow-of-funds analysis has the potential to better reflect global interconnection (see box).

Sectoral accounts: Better data are needed on the balance sheets of various sectors of an economy—such as households and businesses—and on how funds flow within and among these sectors to assess links between the real economy and the financial sector and among economic sectors. But many countries lack such comprehensive data and are placing a high priority on improving and expanding that information. Progress has been slow because of the difficulties of collecting consistent data from all sectors of an economy.

Information is also missing for the government sector. The support many national authorities provided to the financial sector following the global financial crisis plus the costs of recession led to larger fiscal deficits and government debt. But there is little consistent and comparable fiscal data across the G20 economies, largely because state and local governments are not well covered and because such data are not institutionally well established in many countries. Although there has been an improvement in the availability of government debt statistics, more work is needed from national authorities in cooperation with international organizations.

Information is also missing for the government sector.

In a world in which capital flows freely from country to country and where there are few credit constraints, financial vulnerability can arise from growing inequality in the distribution of income, consumption, saving, and wealth. The Organisation for Economic Co-operation and Development is studying the link between distribution of income and national income accounts, such as GDP, and working on improving understanding of income, consumption, and wealth.

Cross-border financial interconnection: The crisis showed the impossibility of isolating problems in a single financial system because shocks propagate rapidly across financial systems. The central framework for understanding the linkages between a domestic economy and the rest of the world is the international investment position, which covers a country's exposure abroad—both its assets and liabilities.

Three other data sets essential to understanding cross-border interconnection are *international banking statistics* collected by the BIS, which provide quarterly information on overall assets and liabilities of internationally active banking systems; the IMF's semiannual *Coordinated Portfolio Investment Survey,* which contains information on bilateral portfolio asset holdings; and the IMF's *Coordinated Direct Investment Survey*, which contains information on bilateral direct investment positions. Significant progress has been made in improving these data sets. Frequency of international investment position reporting was increased from annually to quarterly. The BIS data have been enhanced with expanded coverage of banks' balance sheets and more information about banks' counterparties, especially nonbank financial institutions. The IMF portfolio survey is now more frequent and has increased coverage.

Property prices: The importance of good real estate price statistics has become clear—not only because property prices affect household consumption but because of the need to monitor these prices when monetary policy seeks to encourage spending and investment. Before the crisis, the availability and international comparability of real estate price statistics were limited. In 2010 the BIS began to disseminate residential real estate price statistics—including from most G20 countries—although more work is needed to ensure their consistency. Indices for commercial property prices are also being developed.

Although G20 economies have been the focus of the data gaps initiative, all 188 IMF member economies are indirectly affected, given the broad benefits of the initiative.

The data gaps initiative also helped improve data reporting. At the IMF, it facilitated the introduction of a new tier of enhanced data dissemination standards for economies that are key players in international capital markets and whose institutions are interrelated through such channels as interbank and securities lending, repurchase agreements, and derivatives contracts. In addition, a website, *Principal Global Indicators*, was launched, which includes data for the G20 economies and 14 non-G20 members whose financial sectors are systemically important.

Next phase

It is not easy to deliver comprehensive information in a standardized, frequent, and timely manner; that is reliable and of high quality; and that reflects the changing economic circumstances of economies and financial systems. But as recent efforts demonstrate, over time and with global cooperation it is possible. To reap the benefits of the investments of the G20's initial data gaps initiative, all players in the global economy must keep up the pace of work and coordination as the second phase of the initiative begins. ■

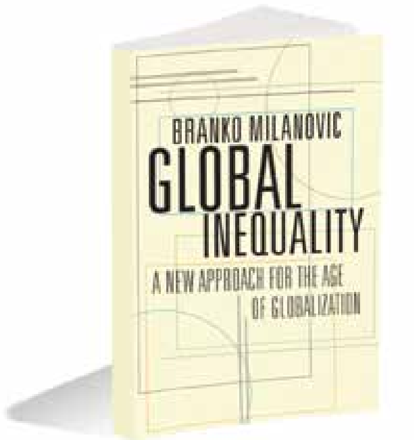
Evrim Bese Goksu is an Economist and Robert Heath is a former Deputy Director, both in the IMF's Statistics Department.

Global flow of funds

Data on cross-border financial exposure can be linked with domestic sectoral accounts data to build a comprehensive picture of financial interconnection domestically and internationally with a link back to the real economy through sectoral accounts. The result is known as the global flow of funds.

The construction of a global flow-of-funds framework was first outlined in 2011, and work began in 2013 as part of a broader IMF effort to strengthen the analysis of cross-border connections, global liquidity flows, and global financial interdependence. The project aims to construct a matrix that maps domestic and external financial stocks and that can be broken down bilaterally by countries and by regions. The matrix is intended to support regular monitoring of bilateral cross-border financial flows through a framework that highlights risks to national and international financial stability. The IMF is working toward developing a global flow of funds matrix of the largest global economies first.

Winners and Losers



Branko Milanovic

Global Inequality

A New Approach for the Age of Globalization

Harvard University Press, Cambridge, Massachusetts, 2016, 320 pp., $29.95 (cloth).

From assessing inequality in the Byzantine Empire to musing over where people fall on the global distribution of income, Branko Milanovic has made a name for himself as an innovative thinker in this field. Even before Thomas Piketty made it cool, he was using Jane Austen vignettes to explore historical patterns of inequality.

Milanovic's new book does not disappoint. He starts by identifying the winners from "high globalization"—the middle classes in emerging Asia and the global super-rich. The big loser is the middle class in the developed world. He notes that as inequality rises within countries, it is falling between countries—showing no real evidence of rising *global* inequality.

Some have used this point to dismiss inequality concerns. Milanovic does not. He acknowledges that future trends are unclear. If convergence does continue, within-country inequality may well dominate once again, much as it did in the 19th century, making class more important than location. Milanovic is also well aware that the nation state remains the locus of political deliberation.

The book's longest chapter is, therefore, devoted to within-country inequality. He seeks to partially rehabilitate Simon Kuznets from Piketty's critique by proposing a "grand theory" of inequality—what he calls "Kuznets waves" of alternating increases and decreases in inequality. He traces the first Kuznets wave over the century and a half ending in the 1980s, when the second wave began, jump-started by many of the same factors as the first—technology, globalization, and pro-rich economic policies.

But this explanation might be a little too tidy. For a start, it is not clear that reducing technical change to two technological revolutions is accurate. Others, for example, have emphasized four to six technological waves since the late 18th century.

And although he gives an extensive account of the benign and malign forces that reduce inequality, Milanovic is a bit murky on the wave's turning point. He argues that inequality becomes unsustainable, but doesn't fall on its own—it leads first to wars, social strife, and revolutions. This is the story he tells about World War I—he actually endorses Lenin's theory that it was driven endogenously by imperialist expansion. But what does this portend for our own times? Milanovic takes us to the precipice, but then pulls back. And strangely enough, he barely even mentions one of the greatest malign economic forces of the 21st century, climate change, which could spell catastrophe for income distribution both within and between countries.

Milanovic is on stronger ground when he reflects on the current zeitgeist. Especially in the United States, he sees little scope for reversing the "perfect storm of inequality" in an era when capital is highly mobile and the rich dominate the political system. His policy prescription for our predicament—focused on equalizing endowments, especially in terms of ownership of capital and education—warrants serious consideration.

But what else? Milanovic is a bit too sanguine about the financial sector, which contributes massively to inequality while adding little social value. Curbing the power and scale of this sector would help with both inequality and financial stability. And perhaps the time has come for a Piketty-style tax on global capital, which would of course require significant global coordination.

The big loser is the middle class in the developed world.

Milanovic also includes a timely discussion of migration, even if his suggested proposal in this area leaves questions unanswered. He advocates expanded migration, but with "legally defined relatively mild differences" between domestic workers and migrants. It doesn't require high deontology to see the red flags raised by this. The problem is that Milanovic's ethical frame of reference, like that of too many economists, is crimped. For example, he dismisses the mistreatment of guest workers on the grounds that they are still better off than if they had stayed home.

More generally, the ethical issues raised by inequality are still missing from the debate. This needs to change largely because economists tend to subordinate distributive justice to efficiency. Our conversation about inequality would benefit greatly from reflection on such questions as what constitutes fair allocation of resources, what we owe each other in a globalized world, and what characterizes a good society.

On the whole, Milanovic's book is highly recommended. It's an easy and enjoyable read. And its manageable length proves that serious analyses of inequality need not run to 700 pages!

Anthony Annett
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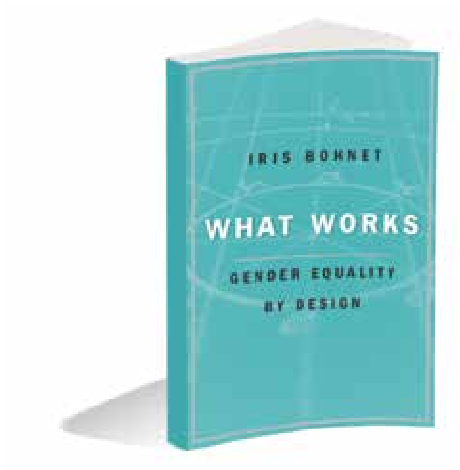
This Works



Iris Bohnet

What Works

Gender Equality by Design

Harvard University Press, Cambridge, Massachusetts, 2016, 400 pp., $26.95 (cloth).

I was struck by my reaction to Iris Bohnet's promise in the closing chapter of *What Works* that "we can reduce gender inequality." It evoked the image of Rosie the Riveter, iconic symbol of female empowerment, saying, "We Can Do It!" The immediacy of my response was a potent reminder of how ingrained our subconscious biases can be.

Bohnet elegantly and expansively demonstrates how such biases can be obstacles to gender equality. What sets her approach apart in an increasingly crowded field of gender-equality literature is her use of behavioral design to offer practical—and often intuitive—solutions.

What Works takes full advantage of the expanse of recent gender analysis and literature. Bohnet begins by reminding us of the biases that surround us and recapping the business case for gender equality. She recounts the value of increased female labor force participation for productivity, income, and economic growth, among others.

That is not to say *What Works* is just a compendium. Far from it. The majority of the book focuses on weaving together the many strands of the gender debate, producing a rich and interconnected narrative of the barriers to progress that biases present. And of these biases she even laments that "depressingly, unlearning is basically impossible." That is where behavioral design comes in, as "the most useful and underutilized tool we have."

Many of the individual strategies and policy actions called for in traditional debate seek to induce a conscious response that will help promote inclusion. We're asked to "lean in," adopt a "*consider-the-opposite* approach," or be "more deliberative" in considering diversity issues. Bohnet recognizes the benefits but also the pitfalls of these approaches. Not because she considers diversity training bad or gender targets wrong. But because the environment does not always lend itself to these interventions and actions being effective. We succumb to our biases.

Bohnet illustrates this point well. Inaction or inertia can undermine the need for a conscious response. One such example, albeit not gender focused, is the greater success of opt-out than opt-in retirement saving plans. (Most of us are too lazy to opt in!) And measures intended to promote inclusion can even have the opposite effect. For example, studies show "diversity training" programs may lead to *moral licensing*, where people feel more aware and are thus less likely to consciously apply the knowledge acquired.

Bohnet posits that smart behavioral design can foster an environment that helps minimize the reflection of those biases in our actions. This, she says, is preferable to relying on explicit action to counter those biases.

An example of such design was the Boston Symphony Orchestra's decision to audition musicians behind a screen. Similar "blind" auditions were soon adopted by other orchestras. The share of female musicians in top U.S. orchestras grew from 5 percent in 1970 to more than 35 percent today.

By design, this takes gender out of the equation, allowing men and women to play and be heard equally, without the albatross of gender. Bohnet offers numerous examples in which "electronic" screens or anonymization can be used in a similar way in recruitment and people management.

Bohnet's focus is the interactions between different aspects of behavioral design—using data analytics to target behavioral change, establishing norms to reorient behavior rather than enable moral licensing, structuring groups to avoid "tokenism" and enable diversity to add value. Yet, in aggregate, the goal is to create a large-scale change "to close gender gaps in economic opportunity, political participation, health and education."

Biases can be obstacles to gender equality.

What Works is not an easy read, particularly if you want to appreciate all it has to offer. At times, it can be heavy going—dense with data, facts, illustration, and imagery, a book that shouldn't be devoured all at once. It is best absorbed and mulled over in several sittings.

The true value of Bohnet's contribution is not in the minutiae, no matter how instructive and insightful. More inspiring is how she integrates so many different theories and data points. Then, rather than getting lost in the complexity, she uses her refrain—the promise of behavioral design—to deliver practical and actionable design suggestions.

In closing, Bohnet suggests that a "good leader is a behavioral designer." And that is perhaps the aspect of *What Works* that works best. Bohnet is no cheerleader. She leads through demonstration and design, leaving readers better equipped to find solutions that work, so we can each contribute to making a difference.

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